

YAMAHA

FZR400SP '91

3TJ-ME1

SERVICE MANUAL

NOTICE

This manual was by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha machines have a basic understanding of the mechanical concepts and procedures inherent in machine repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit for use and/or unsafe.

Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

TECHNICAL PUBLICATIONS
SERVICE DIVISION
MOTORCYCLE GROUP
YAMAHA MOTOR CO., LTD.

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notations:



The Safety Alert Symbol means ATTENTION: BECOME ALERT: YOUR SAFETY IS INVOLVED.



Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander, or a person inspecting or repairing the motorcycle.

CAUTION:

A CAUTION indicates special precautions that must be taken by you, the operator, to the motorcycle.

NOTE

A NOTE provides key information to make procedures easier or clearer.

FZR400SP

SERVICE MANUAL

1990 by Yamaha Motor Co., Ltd.

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HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See illustrated symbols)

- 1st title : This is a chapter with its symbol on the upper right of each page
- 2nd title : This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment," the 3rd title appears.)
- 3rd title : This is a final title.

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy-to-read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections. A set of particularly important procedure is placed between a line of asterisks "*" with each procedure preceded by "•".
























IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol.
- An encircled numeral indicates a part name, and an encircled alphabetical letter, data or an alignment mark, the others being indicated by an alphabetical letter in a box.
- A condition of a faulty component will precede an arrow symbol and the course of action required the symbol.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



1 GEN INFO 	2 SPEC 	
3 INSP ADJ 	4 ENG 	
5 COOL 	6 CARB 	
7 CHAS 	8 ELEC 	
9 TRBL SHTG ? 	10 	
11 	12 	
13 	14 	
15 	16 	
17 	18 	19 
20 	21 	22 
23 	24 New	

ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols 1 to 9 are designed as thumb tabs to indicate the chapter's number and content.

- 1 General information
- 2 Specifications
- 3 Periodic inspection and adjustment
- 4 Engine
- 5 Cooling system
- 6 Carburetor
- 7 Chassis
- 8 Electrical
- 9 Troubleshooting









Illustrated symbols 10 to 16 are used to identify the specifications appearing in the text.

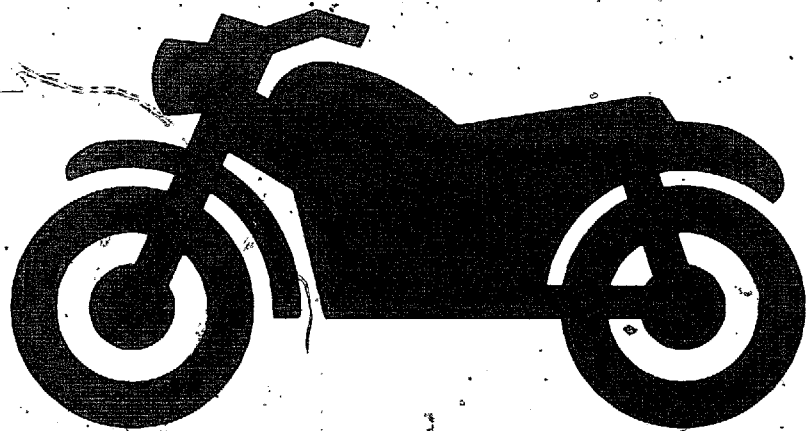
- 10 Filling fluid
- 11 Lubricant
- 12 Special tool
- 13 Tightening
- 14 Wear limit clearance
- 15 Engine speed
- 16 Δ V A

Illustrated symbols 17 to 23 in the exploded diagram indicate grade of lubricant and location of lubrication point.

- 17 Apply engine oil
 - 18 Apply gear oil
 - 19 Apply molybdenum disulfide oil
 - 20 Apply wheel bearing grease
 - 21 Apply lightweight lithium soap base grease
 - 22 Apply molybdenum disulfide grease
 - 23 Apply locking agent (LOCTITE)
- 24 Use new one

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	COOL 5
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	CARB 6
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	CHAS 7
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	ELEC 8
TROUBLESHOOTING	?
	TRBL SHTG 9



**GEN
INFO**

1



CHAPTER 1. GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

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IMPORTANT INFORMATION

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FOR TUNE UP

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FOR ENGINE SERVICE

A-10

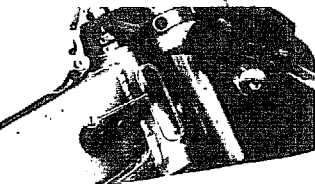
FOR CHASSIS SERVICE

A-11

FOR ELECTRICAL COMPONENTS

A-11

GENERAL INFORMATION



MOTORCYCLE IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number 1 is stamped into the right side of the steering head.

Starting serial number
3TJ-141101

ENGINE SERIAL NUMBER

The engine serial number 1 is stamped into the right side of the engine.

Starting serial number
3TJ 141101

NOTE

- The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.



IMPORTANT INFORMATION

PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to SPECIAL TOOL.
3. When disassembling the machine, keep mated parts together. This includes gears, cylinders, pistons, and other mated parts that have been mated through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.
5. Keep away from fire.



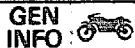
ALL REPLACEMENT PARTS

1. Use only genuine Yamaha parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

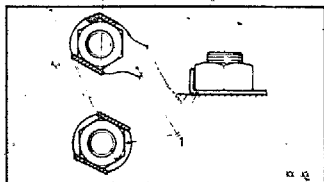
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.

IMPORTANT INFORMATION

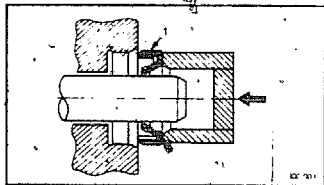


A-9



LOCK WASHERS PLATES AND COTTER PINS

- 1 All lock washers plates 1 and cotter pins must be replaced when they are removed. Lock tabs 2 should be bent along the bolt or nut flats 3 after the bolt or nut has been properly tightened.



BEARINGS AND OIL SEALS

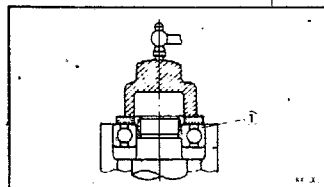
- 1 Install the bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. In other words, the stamped letters must be on the side exposed to view. When installing oil seal(s) apply a light coating of light weight lithium base grease to the seal lip(s). Oil the bearing(s) liberally when installing.

- 1 Oil seal

CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

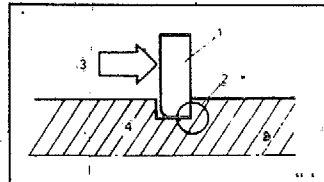
- 1 Bearing



CIRCLIPS

- 1 All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip 1 make sure that the sharp edged corner 2 is positioned opposite to the thrust 3 it receives. See the sectional view.

- 1 Shaft



SPECIAL TOOLS



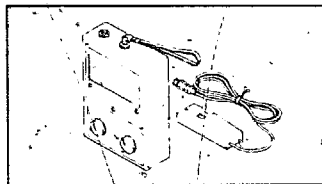
SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune up and assembly. Using the correct special tools will help prevent damage caused by the use of improper tools or improvised techniques.

FOR TUNE UP

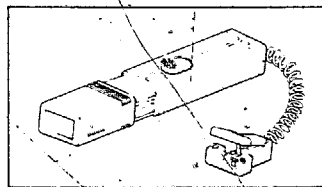
- 1 Inductive tachometer
P/N 90890 03113

This tool is needed for detecting engine rpm.



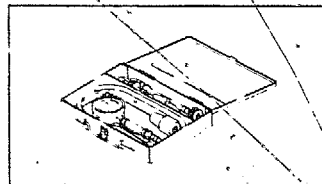
- 2 Inductive timing light
P/N 90890 03141

This tool is necessary for checking ignition timing.



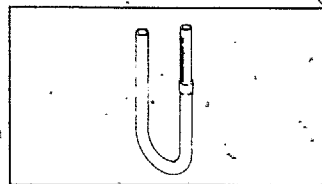
- 3 Compression gauge
P/N 90890 03081

This gauge is used to measure the engine compression.



- 4 Fuel level gauge
P/N 90890 01312

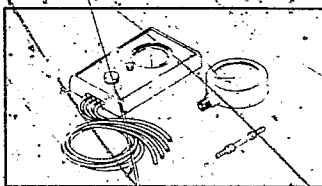
This gauge is used to measure the fuel level in the float chamber.



SPECIAL TOOLS

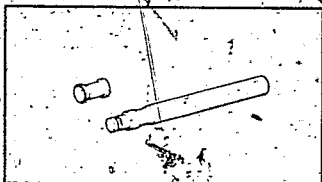


A-10



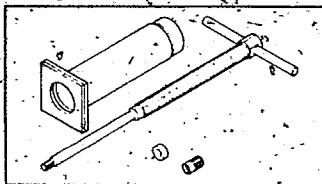
5 Vacuum gauge
P/N 90890-03094

This gauge is needed for carburetor synchronization.



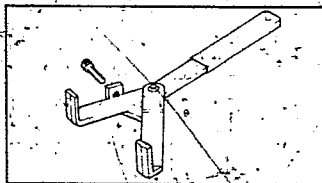
FOR ENGINE SERVICE
1 Valve lapper
P/N 90890-04101

This tool is used to lap the valves



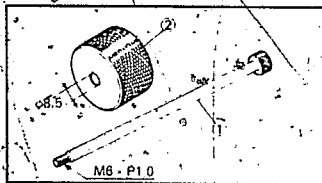
2 Piston pin puller
P/N 90890-01304

This tool is used to remove the piston pin.



3 Universal clutch holder
P/N 90890-04086

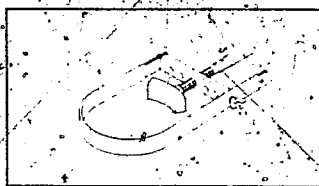
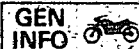
This tool is used to hold the clutch when removing or installing the clutch bowl locknut.



4 Slide hammer bolt (M6)
P/N 90890-01083 - 1
Weight
P/N 90890-01084 - 2

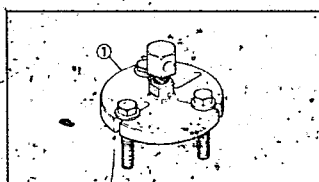
These tools are used to remove the clutch spacer

SPECIAL TOOLS



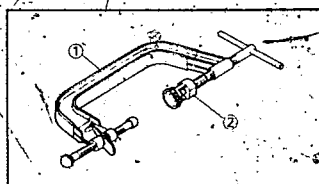
5 Rotor holder
P/N 90890-01701

This tool is used to hold the rotor



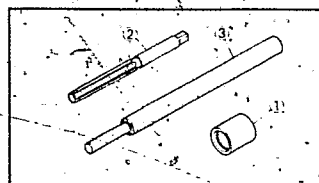
6 Rotor puller
P/N 90890-01362

This tool is used to remove the rotor



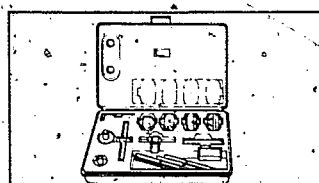
7 Valve spring compressor
P/N 90890-04019
Attachment
P/N 90890-04114

These tools are used to remove and install the valve assemblies.



8 Valve guide installer (4 mm)
P/N 90890-04112
Valve guide reamer (4 mm)
P/N 90890-04113
Valve guide remover (4 mm)
P/N 90890-04111

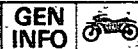
These tools are used to remove, install and re-bore the valve guide.



9 Valve seat cutter
P/N YM-91043

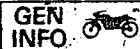
This tool is used to adjust the valve clearance.

SPECIAL TOOLS



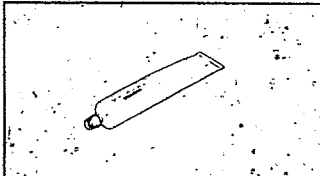
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SPECIAL TOOLS



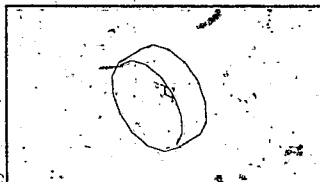
10. Plastigage set "Green"
P/N YU 33210

This gauge is needed to measure the clearance for the connecting rod bearing and the crankshaft bearing.



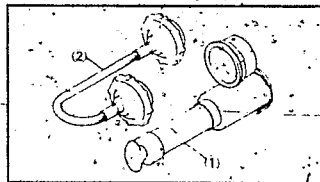
11. YAMAHA bond No. 1215
P/N 90890 85505

This sealant (bond) is used for crankcase mating surfaces, etc.



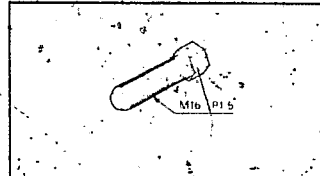
12. Oil filter wrench
P/N 90890 01426

This tool is used to remove and install the oil filter.



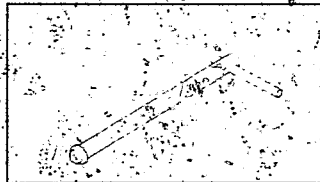
13. Radiator cap tester
P/N 90890-01325 1
Adapter
P/N 90890-01352 2

This tester is used for checking the cooling system.



14. Rotor puller
P/N 90890-01080

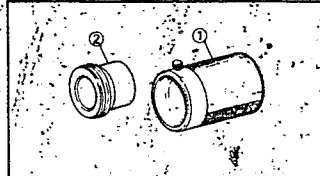
This tool is used to remove the rotor.



FOR CHASSIS SERVICE

1. Damper rod holder
P/N 90890 01425

This tool is used to loosen and tighten the front fork damper rod holding bolt.



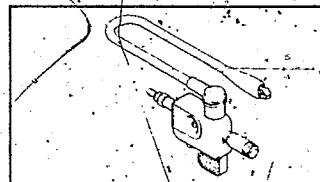
2. Front fork seal driver (weight)
P/N 90890 01367 1
Adapter (43 mm)
P/N 90890 01374 2

These tools are used when installing the fork oil seal.



3. Ring nut wrench
P/N 90890 01403

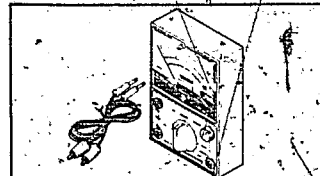
This tool is used to loosen and tighten the steering ring nut.



FOR ELECTRICAL COMPONENTS

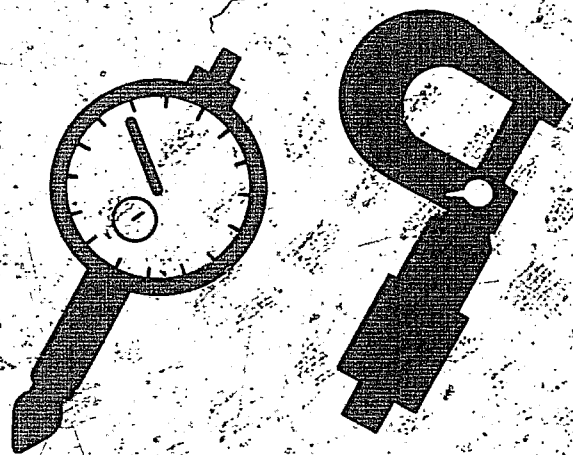
1. Ignition checker
P/N 90890-06754

This instrument is necessary for checking the ignition system components.



2. Pocket tester
P/N 90890 03112

This instrument is invaluable for checking the electrical system.



SPEC

2

CHAPTER 2 SPECIFICATIONS

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LUBRICATION POINT AND GRADE OF LUBRICANT	B-8
CABLE BOLTING	B-9

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	FZR400SP
Model Code Number	3TJ2
Frame Starting Number	3TJ-141101
Engine Starting Number	3TJ-141101
Dimensions:	
Overall Length	1,975 mm (77.8 in)
Overall Width	705 mm (27.8 in)
Overall Height	1,090 mm (42.9 in)
Seat Height	760 mm (29.9 in)
Wheelbase	1,365 mm (53.7 in)
Minimum Ground Clearance	125 mm (4.9 in)
Basic Weight	
With Oil and Full Fuel Tank	185 kg (408 lb)
Engine:	
Engine Type	Liquid cooled 4-stroke, DOHC
Cylinder Arrangement	Forward inclined parallel 4-cylinder
Displacement	399 cm ³
Bore x Stroke	56.0 x 40.5 mm (2.20 x 1.59 in)
Compression Ratio	12.2 : 1
Compression Pressure	1,100 kPa (11.0 kg/cm ² , 156 psi)
Starting System	Electric starter
Lubrication System	Wet sump
Engine Oil Type or Grade	

SAE 20W40 type SE motor oil

SAE 10W30 type SE motor oil

Model	FZR400SP	
Engine Oil Capacity		
Periodic Oil Change	2.6 L (2.3 Imp qt, 2.7 US qt)	
With Oil Filter Replacement	2.9 L (2.6 Imp qt, 3.1 US qt)	
Total Amount	3.5 L (3.1 Imp qt, 3.7 US qt)	
Coolant Total Amount (Including All Routes)	2.18 L (1.9 Imp qt, 2.3 US qt)	
Air Filter	Dry type element	
Fuel:		
Type	Regular unleaded gasoline	
Tank Capacity	15 L (3.9 Imp gal, 4.0 US gal)	
Reserve Amount	3 L (0.7 Imp gal, 0.8 US gal)	
Carburetor:		
Type x Quantity	BDST 32 x 4	
Manufacturer	MIKUNI	
Spark Plug:		
Type	CR8E, CR9E/U24ESR-N, U27ESR-N	
Manufacturer	NGK/NIPPONDENSO	
Gap	0.7 - 0.8 mm (0.028 - 0.031 in)	
Clutch Type:	Wet, multiple-disc	
Transmission:		
Primary Reduction System	Spur gear	
Primary Reduction Ratio	89/41 (2.170)	
Secondary Reduction System	Chain Drive	
Secondary Reduction Ratio	52/19 (2.736)	
Transmission Type	Constant mesh 6 speed	
Operation	Left foot operation	
Gear Ratio		
1st	32/13 (2.461)	
2nd	33/17 (1.941)	
3rd	31/19 (1.631)	
4th	27/18 (1.500)	
5th	26/19 (1.368)	
6th	25/20 (1.250)	
Chassis:		
Frame Type	Backbone	
Caster Angle	24°	
Trail	92 mm (3.62 in)	
Type:	Front	Rear
Type	Tubeless	Tubeless
Size	120/60R17 55H	160/60R17 69H
Manufacturer (Type)	MICHELIN (TX11)	MICHELIN (TX23)

GENERAL SPECIFICATIONS

SPEC



A-16

MAINTENANCE SPECIFICATIONS

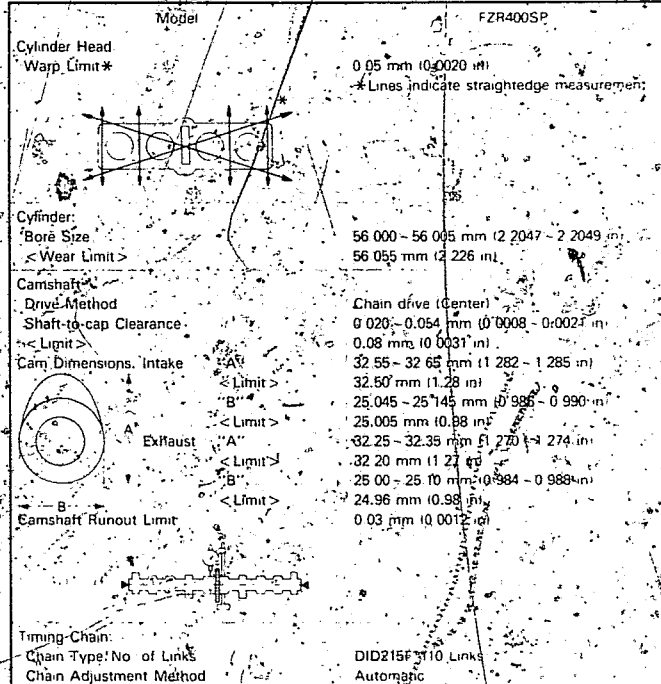
SPEC



MAINTENANCE SPECIFICATIONS

ENGINE

Model	FZR400SP
Cylinder Head Warp Limit*	0.05 mm (0.0020 in) *Lines indicate straightedge measurement.
Cylinder: Bore Size <Wear Limit>	56.000 - 56.095 mm (2.2047 - 2.2049 in) 56.055 mm (2.226 in)
Camshaft Drive Method	Chain drive (Center)
Shaft-to-cap Clearance <Limit>	0.020 - 0.054 mm (0.0008 - 0.0021 in) 0.08 mm (0.0031 in)
Cam Dimensions: Intake <Limit>	32.55 - 32.65 mm (1.282 - 1.285 in) 32.50 mm (1.28 in)
Exhaust <Limit>	25.045 - 25.145 mm (0.986 - 0.990 in) 25.005 mm (0.98 in)
Camshaft Runout Limit	32.25 - 32.35 mm (1.270 - 1.274 in) 32.20 mm (1.27 in) 25.00 - 25.10 mm (0.984 - 0.988 in) 24.96 mm (0.98 in) 0.03 mm (0.0012 in)
Timing Chain: Chain Type: No. of Links Chain Adjustment Method	DID215F 310 Links Automatic



Model	FZR400SP
Tire Pressure (Cold Tire) *Maximum Load*	100 kg (220 lb)
Cold Tire Pressure	Front Rear
Up to Maximum Load*	200 kPa (2.00 kg/cm ² , 28 psi) 250 kPa (2.50 kg/cm ² , 36 psi)
*Load is total weight of cargo, rider and accessories.	
Brake: Front Brake Type Operation Rear Brake Type Operation	Dual disc brake Right hand operation Single disc brake Right foot operation
Suspension: Front Suspension Rear Suspension	Telescopic fork Swingarm (Link suspension)
Shock Absorber: Front Shock Absorber Rear Shock Absorber	Coil spring/Oil damper Coil Gas spring/Oil damper
Wheel Travel: Front Wheel Travel Rear Wheel Travel	120 mm (4.72 in) 130 mm (5.12 in)
Electrical: Ignition System Generator System Battery Type or Model Battery Capacity	T.C.I. (Digital) A.C. magneto generator YTX9-BS 12V 8AH
Headlight Type:	Quartz bulb (Halogen)
Bulb Wattage x Quantity: Headlight Tail/Brake Light Flasher Light Indicator Light: Wattage x Quantity	12V 55/40W x 2 12V 5W/21W x 2 12V 15W x 4 12V 1.7W x 4 12V 3.4W 12V 3.4W 12V 3.4W 12V 3.4W 12V 3.4W



Model		FZR400SP	
Valve: Valve Seat, Valve Guide:			
Valve Clearance (Cold):			
	IN.	0.11 - 0.20 mm (0.004 - 0.008 in)	
	EX.	0.21 - 0.30 mm (0.008 - 0.012 in)	
Valve Dimensions:			
A Head Dia	IN.	21.9 - 22.1 mm (0.86 - 0.87 in)	
	EX.	18.9 - 19.1 mm (0.74 - 0.75 in)	
B Face Width	IN.	1.6 - 2.4 mm (0.063 - 0.094 in)	
	EX.	1.6 - 2.4 mm (0.063 - 0.094 in)	
C Seat Limit Width	IN.	0.9 - 1.1 mm (0.035 - 0.043 in)	
	EX.	0.9 - 1.1 mm (0.035 - 0.043 in)	
D Margin Thickness Limit	IN.	0.6 - 0.8 mm (0.024 - 0.032 in)	
	EX.	0.6 - 0.8 mm (0.024 - 0.032 in)	
Stem Outside Diameter	IN.	3.975 - 3.990 mm (0.1565 - 0.157 in)	
	EX.	3.960 - 3.975 mm (0.1559 - 0.1565 in)	
< Limit >	IN.	3.950 mm (0.156 in)	
	EX.	3.850 mm (0.152 in)	
Guide Inside Diameter	IN.	4.000 - 4.012 mm (0.1575 - 0.1580 in)	
	EX.	4.000 - 4.012 mm (0.1575 - 0.1580 in)	
< Limit >	IN.	4.042 mm (0.159 in)	
	EX.	4.042 mm (0.159 in)	
Stem Runout Limit		0.02 mm (0.008 in)	
Valve Seat Width	IN.	0.9 - 1.1 mm (0.035 - 0.043 in)	
	EX.	0.9 - 1.1 mm (0.035 - 0.043 in)	

Model		FZR400SP	
Valve Spring			
Free Length			
	IN.	40.05 mm (1.59 in)	
	EX.	40.05 mm (1.59 in)	
< Limit >			
	IN.	38.00 mm (1.50 in)	
	EX.	38.00 mm (1.50 in)	
Tilt Limit			
	IN.	2.5° ± 1.8 mm (2.5° ± 0.07 in)	
	EX.	2.5° ± 1.8 mm (2.5° ± 0.07 in)	
Direction of Winding (Top View)		IN	Counter clockwise
		EX	Counter clockwise
Piston:			
Piston Size "D"			
Measuring Point "H"			
	IN.	55.940 - 55.955 mm (2.202 - 2.203 in)	
	EX.	3 mm (0.12 in)	
Piston Off-set			
Piston Off-set Direction			
Piston-to-Cylinder Clearance			
< Limit >			
Piston Ring			
Top Ring			
Type			
Dimensions (B x T)			
End Gap (Installed)			Barrel
	IN.	0.8 - 2.1 mm (0.031 - 0.083 in)	
	EX.	0.15 - 0.30 mm (0.006 - 0.012 in)	
Side Clearance (Installed)			
	IN.	0.03 - 0.07 mm (0.0012 - 0.0028 in)	
2nd Ring			
Type			
Dimensions (B x T)			
End Gap (Installed)			Taper
	IN.	0.8 - 2.1 mm (0.031 - 0.083 in)	
	EX.	0.15 - 0.30 mm (0.006 - 0.012 in)	
Side Clearance			
	IN.	0.02 - 0.06 mm (0.0008 - 0.0024 in)	
Oil Ring			
Dimensions (B x T)			
End Gap (Installed)			
	IN.	1.5 - 2.2 mm (0.059 - 0.087 in)	
	EX.	0.2 - 0.7 mm (0.008 - 0.028 in)	

MAINTENANCE SPECIFICATIONS

SPEC

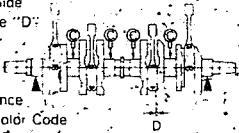


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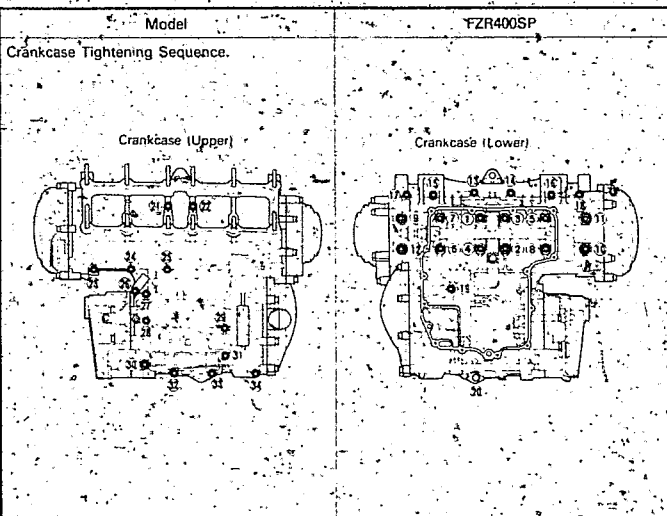
MAINTENANCE SPECIFICATIONS

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Model	FZR400SP
Connecting Rod:	
Oil Clearance	0.043-0.066 mm (0.0017-0.0026 in)
Bearing Color Code	1 Blue 2 Black 3 Brown 4 Green
Crankshaft:	
Runout Limit "C"	0.03 mm (0.0012 in)
Big End Side Clearance "D":	0.16-0.26 mm (0.006-0.010 in)
	
Oil Clearance	0.025-0.043 mm (0.0010-0.0017 in)
Bearing Color Code	1 Blue 2 Black 3 Brown 4 Green 5 Yellow
Clutch:	
Friction plate:	
Thickness	2.9-3.1 mm (0.114-0.122 in)
Quantity	9 pcs
Wear Limit	2.8 mm (0.11 in)
Clutch Plate:	
Thickness	1.8-2.2 mm (0.071-0.087 in)
Quantity	8 pcs
Warp Limit	0.1 mm (0.004 in)
Clutch Spring	
Free Length	33.5 mm (1.32 in)
Quantity	5 pcs
Minimum Free Length	32.5 mm (1.28 in)
Clutch Release Method	Inner push, Screw push
Transmission:	
Main Axle Runout Limit	0.02 mm (0.0008 in)
Drive Axle Runout Limit	0.02 mm (0.0008 in)
Shifter	
Type	Guide bar

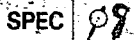
Model	FZR400SP
Carburetor:	
I.D. Mark	BTJ 10
Main Jet	(M.J.) #14 #100 #23 #97 5
Main Air Jet	(M.A.J.) #70
Jet Needle	(J.N.) #1.4 5CEW16 3 #2.3 5CKA33
Needle Jet	(N.J.) X-6
Throttle Valve Size	(Th.V.) #130
Pilot Jet	(P.J.) #92 5
Pilot Air Jet	(P.A.J.) #110
Bypass J	(B.P.1) #0 8 (B.P.2) #0 8 (B.P.3) #0 8
Pilot Screw	(P.S.) 2.1 2 turns out
Valve Seat	(V.S.) #1.2
Starter Jet	(S.J.) #50
	(G.S.) #0.6
Fuel Level	20.9-21.9 mm (0.82-0.86 in) Above from the float chamber line
Engine Idling Speed	1,250-1,350 r/min
Vacuum Pressure at Idling Speed	19.1 kPa or more (145 mmHg, 5.7 inHg)
Lubrication System:	
Oil Filter Type	Paper type
Oil Pump Type	Trochoid pump type
Tip Clearance	0.03-0.08 mm (0.0012-0.0031 in)
Side Clearance	0.09-0.15 mm (0.0035-0.0059 in)
Cooling System:	
Radiator Core Size	Width 320 mm (12.6 in) Height 238 mm (9.37 in) Thickness 24 mm (0.94 in)
Radiator Cap Opening Pressure	105-125 kPa (1.05-1.25 kg/cm ² , 14.93-17.77 psi)
Reservoir Tank Capacity	0.3 L (0.26 imp qt, 0.32 US qt)
Water Pump	< 0.28 L (0.25 imp qt, 0.30 US qt)
Type	Single suction centrifugal pump
Reduction Ratio	81:41-48:49 (2:126)
Thermostat	
Opening Temperature	80-84°C (176-183°F)



TIGHTENING TORQUE

Part to be tightened	Part name	Thread size	Qty	Tightening torque			Remarks
				Nm	mKg	ft-lb	
Camshaft cap	Flange bolt	M 6	24	10	1.0	7.2	
Cylinder head	Nut	M 9	12	37	3.7	27	
Spark plug		M10	4	12.5	1.25	9.0	
Cylinder head cover	Bolt	M 6	8	10	1.0	7.2	
Cylinder drain	Bolt	M 6	2	7	0.7	5.1	
Connecting rod	Nut	M 7	8	23	2.3	17	
Camshaft sprocket	Bolt	M 7	4	24	2.4	17	
Timing chain tensioner	Bolt	M 6	2	10	1.0	7.2	
	Bolt	M11	1	20	2.0	14	
Chain tensioner guide link	Bolt	M 6	1	10	1.0	7.2	
Pipe 2	Bolt	M 6	2	10	1.0	7.2	
Thermo unit cover	Bolt	M 8	2	10	1.0	7.2	
	Flange bolt	M 6	2	7	0.7	5.1	
Radiator	Flange bolt	M 6	4	7	0.7	5.1	
Joint	Bolt	M 6	4	10	1.0	7.2	
Water pump cover	Bolt	M 6	4	10	1.0	7.2	
Pipe 1	Bolt	M 6	2	10	1.0	7.2	
Oil pump cover	Screw	M 6	1	7	0.7	5.1	
Oil pump assembly	Bolt	M 6	3	10	1.0	7.2	
Oil strainer housing	Bolt	M 6	2	10	1.0	7.2	
Oil pan	Bolt	M 8	14	10	1.0	7.2	
Drain bolt		M14	1	43	4.3	31	
Oil delivery pipe	Union bolt	M10	1	20	2.0	14	
	Bolt	M 6	4	10	1.0	7.2	
Oil filter		M20	1	17	1.7	12	
Oil filter housing	Union bolt	M20	1	63	6.3	45	
Carburetor joint	Bolt	M 6	8	10	1.0	7.2	
	Screw	M 5	4	5	0.5	3.6	
Air filter case	Flange bolt	M 6	1	7	0.7	5.1	
Exhaust pipe	Nut	M 6	8	10	1.0	7.2	
	Bolt	M 6	4	10	1.0	7.2	
Muffler	Bolt	M 8	1	20	2.0	14	
EX-UP	Bolt	M 6	3	10	1.0	7.2	
Pulley	Bolt	M 5	1	5	0.5	3.6	
Exhaust joint	Bolt	M 8	3	20	2.0	14	
Exhaust pipe and muffler	Bolt	M 8	1	20	2.0	14	
EX-UP cover	Bolt	M 6	3	10	1.0	7.2	
Crank case upper and lower	Bolt	M 8	13	24	2.4	17	
	Bolt	M 6	21	12	1.2	8.7	
Breather plate	Screw	M 6	2	7	0.7	5.1	
	Screw	M 6	4	7	0.7	5.1	
AC magneto cover	Bolt	M 6	5	10	1.0	7.2	
Crankcase cover 1	Bolt	M 6	5	10	1.0	7.2	
	Screw	M 5	1	4	0.4	2.9	

MAINTENANCE SPECIFICATIONS



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MAINTENANCE SPECIFICATIONS



Part to be tightened	Part name	Thread size	Qty.	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Bearing plate	Bolt	M 6	4	10	1.0	7.2	⊙
Crankcase cover 2	Bolt	M 6	7	10	1.0	7.2	
Plug (to crankcase 2)		M16	1	8	0.8	5.8	
Crankcase cover 3	Bolt	M 6	10	10	1.0	7.2	⊙
	Screw	M 5	4	4	0.4	2.9	
Cover 1	Screw	M 6	1	7	0.7	5.1	
Plug (to crankcase 2)		M16	1	25	2.5	18	
Starter clutch assembly	Flange bolt	M10	1	80	8.0	58	⊙
Starter clutch outer	Bolt	M 8	3	30	3.0	22	
Pressure plate	Bolt	M 5	5	6	0.6	4.3	
Clutch boss	Nut	M18	1	70	7.0	50	⊙
Push lever assembly	Screw	M 5	2	4.5	0.45	3.3	⊙
Push rod	Nut	M 8	1	16	1.6	11	
Drive sprocket	Nut	M18	1	70	7.0	50	⊙
Stopper plate	Flange bolt	M 6	1	10	1.0	7.2	⊙
Shift arm	Flange bolt	M 6	1	10	1.0	7.2	
Shift rod	Nut	M 6	2	10	1.0	7.2	
Stopper lever	Bolt	M 6	1	10	1.0	7.2	
Side plate	Screw	M 5	1	4	0.4	2.9	
AC magneto rotor	Bolt	M10	1	80	8.0	58	⊙
Stator	Bolt	M 6	3	10	1.0	7.2	
Pick-up	Screw	M 5	2	5	0.5	3.6	
Starter motor	Flange bolt	M 6	2	10	1.0	7.2	
Neutral switch	Screw	M 6	2	4	0.4	2.9	
Oil pressure switch			1	12	1.2	8.7	
Thermo switch assembly		M16	1	22.5	2.25	16.3	
Thermo unit			1	15	1.5	11	
Oil pressure lead	Bolt	M 4	1	1	0.1	0.7	

CHASSIS

Model		FZR400SP
Steering System:		
Steering Bearing Type	Taper Roller Bearing	
Front Suspension:		
Front Fork Travel	120 mm (4.72 in)	
Front Spring Free Length	359 mm (14.1 in)	
< Limit >	< 354 mm (13.9 in) >	
Spring Rate:	K1	6.5 N/mm (0.65 kg/mm, 36.4 lb/in)
Stroke:	KT	0.0 - 120 mm (0.0 - 4.72 in)
Optional Spring	No	
Oil Capacity:	433 cm ³ (15.2 Imp oz, 14.6 US oz)	
Oil Level:	106 mm (4.17 in)	
	From top of inner tube fully compressed without spring.	
Oil Grade	Fork oil 10W or equivalent	
Rear Suspension:		
Shock Absorber Travel	70 mm (2.8 in)	
Spring Free Length	205 mm (8.07 in)	
Fitting Length	190 mm (7.5 in)	
Spring Rate:	K1	60 N/mm (6 kg/mm, 336 lb/in)
Stroke:	K1	0.0 - 70 mm (0.0 - 2.8 in)
Optional Spring:	No	
Enclosed Gas Pressure Standard	2,000 kPa (20 kg/cm ² , 284 psi)	
Swingarm:		
Free Play/Limit	1.0 mm (0.039 in) at swingarm end Move swingarm end side to side	
Front Wheel:		
Type	Cast wheel	
Rim Size	J17 - MJ3.50	
Rim Material	Aluminum	
Rim Runout Limit:	Radial	1.0 mm (0.039 in)
	Lateral	0.5 mm (0.020 in)
Rear Wheel:		
Type	Cast wheel	
Rim Size	J17 - MJ4.50	
Rim Material	Aluminum	
Rim Runout Limit:	Radial	1.0 mm (0.039 in)
	Lateral	0.5 mm (0.020 in)
Drive Chain:		
Type/Manufacturer	RK428SMO TAKASAGO	
No. of Links	128	
Chain Free Play	15 - 20 mm (0.59 - 0.79 in)	


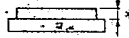
MAINTENANCE SPECIFICATIONS

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MAINTENANCE SPECIFICATIONS

SPEC. 99

Model		FZR400SP
Front Disc Brake		
Type	Dual	
Disc Outside Diameter x Thickness	298 x 4 mm (11.7 x 0.16 in.)	
Pad Thickness	5.5 mm (0.22 in.)	
< Limit > *	< 0.5 mm (0.02 in.) >	
Pad Thickness	5.5 mm (0.22 in.)	
< Limit > *	< 0.5 mm (0.02 in.) >	
		
Master Cylinder Inside Diameter	14 mm (0.55 in.)	
Caliper Cylinder Inside Diameter	34.0 x 27.0 mm (1.34 - 1.05 in.)	
Brake Fluid Type	DOT #4	
	If DOT #4 is not available, DOT #3 can be used.	
Rear Disc Brake		
Type	Single	
Disc Outside Diameter x Thickness	210 x 5 mm (8.27 x 0.20 in.)	
Pad Thickness	8.5 mm (0.22 in.)	
< Limit > *	< 0.5 mm (0.02 in.) >	
Pad Thickness	5.5 mm (0.22 in.)	
< Limit > *	< 0.5 mm (0.02 in.) >	
		
Master Cylinder Inside Diameter	14 mm (0.55 in.)	
Caliper Cylinder Inside Diameter	38.18 mm (1.50 in.)	
Brake Fluid Type	DOT #4	
	If DOT #4 is not available, DOT #3 can be used.	
Brake Lever and Brake Pedal	50 mm (1.97 in.)	
Brake Pedal Position	Below top of footrest.	

TIGHTENING TORQUE

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m*kg	ft*lb	
Handle crown and inner tube	M 8	22	2.2	17	
Handle crown and steering shaft	M22	110	11.0	80	
Handlebar and inner tube	M 8	22	2.2	17	
Handlebar and handle crown	M 6	13	1.3	9.4	
Steering shaft and ring nut	M 6	6	0.6	4.3	See note
Under bracket and inner tube	M10	38	3.8	27	
Brake hose joint and under bracket	M 6	10	1.0	7.2	
Handle crown and main switch	M 6	10	1.0	7.2	
Front master cylinder	M 6	4	0.4	2.9	
Brake hose and union bolt	M10	26	2.6	19	
Upper cowl and stay	M 6	4	0.4	2.9	
Upper cowl and lower cowl	M 5	3	0.3	2.2	
Front flasher light and stay	M 8	16	1.6	11	
Engine mounting bolt (front)	M10	40	4.0	2.9	
(rear upper)	M10	55	5.5	40	
(rear lower)	M10	55	5.5	40	
(front pinion bolt)	M 8	23	2.3	17	
Frame and rear frame	M 8	33	3.3	24	
Frame and engine bracket (rear)	M 8	33	3.3	24	
Pivot shaft nut	M18	90	9.0	6.5	
Relay arm and frame	M10	40	4.0	29	
Relay arm and arm	M10	40	4.0	29	
Rear arm and arm	M10	40	4.0	29	
Rear shock and relay arm	M10	40	4.0	29	
Rear shock and bracket	M10	40	4.0	29	
Frame and rear shock bracket	M16	52	5.2	37	
Chain case	M 6	7	0.7	5.1	
Seal garter	M 6	7	0.7	5.1	
Rear brake hose holder	M 6	7	0.7	5.1	
Fuel tank	M 6	7	0.7	5.1	
Fuel cock	M 6	7	0.7	5.1	
Fuel sender	M 6	7	0.7	5.1	
Reservoir tank	M 6	7	0.7	5.1	
Rear fender	M 6	7	0.7	5.1	
Rear flasher	M 8	16	1.6	11	
Front fork cap bolt		23	2.3	17	
Front fork locknut	M 8	15	1.5	11	
Front fork damper bolt		40	4.0	29	
Front wheel axle holder	M 8	20	2.0	14	
Front wheel shaft	M16	75	7.5	54	
Rear wheel shaft and nut	M18	105	10.5	75	
Rear wheel shaft and locknut	M18	45	4.5	32	
Front caliper and front fork	M10	35	3.5	25	
Rear caliper and bracket	M10	35	3.5	25	
Rear caliper bracket		55	5.5	40	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Brake caliper retaining pin	M 8	10	1.0	7.2	
Brake disc and hub	M 8	20	2.0	14	
Rear Wheel sprocket and hub	M 8	43	4.3	31	
Bleed screw and caliper	M 8	6	0.6	4.3	
Sidestand bolt	M10	46	4.6	33	
Sidestand locknut	M10	39	3.9	28	
Bracket footrest and frame	M 8	22	2.2	16	
Rear master cylinder and frame	M 8	22	2.2	16	
Rear brake reservoir tank and frame	M 6	4	0.4	2.9	

NOTE:

1. First, tighten the ring nut approximately 38 Nm (3.8 m·kg, 27 ft·lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut to specification.

ELECTRICAL

Model	FZR400SP
Voltage	12V
Ignition System:	
Ignition Timing (B.T.D.C.)	10° at 1,200 r/min
Advanced Timing (B.T.D.C.)	37° at 3,500 r/min
Advancer Type	Electrical type
T.C.I.:	
Pickup Coil Resistance (Color)	80.8 - 121.2Ω at 20°C (68°F) (White: Red - White: Black)
T.C.I. Unit/Manufacturer	BB7208/HITACHI
Ignition Coil:	
Model/Manufacturer	CM12-50/HITACHI
Minimum Spark Gap	6 mm (0.24 in)
Primary Winding Resistance	1.8 - 2.2Ω at 20°C (68°F)
Secondary Winding Resistance	9.6 - 14.4 Ω at 20°C (68°F)
Spark Plug Cap:	
Type	Resin type
Resistance	10 kΩ at 20°C (68°F)
Charging System:	
Type	A.C. magneto generator

MAINTENANCE SPECIFICATIONS

SPEC



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MAINTENANCE SPECIFICATIONS

SPEC



Model	FZR400SP
A.C. Generator:	
Model/Manufacturer	FL-118-17/HITACHI
Nominal Output	14V 20.5A at 5,000 r/min
Stator Coil Resistance	0.31 - 0.41Ω at 20°C (68°F) (White - White)
Rectifier/Regulator:	
Model/Manufacturer	NIPPON DENSO
Type	Semi conductor - Short circuit type
Voltage Regulator:	
No load Regulated Voltage	14.3 - 15.3V
Rectifier:	
Capacity	25A
Withstand Voltage	240V
Battery:	
Specific Gravity	1.320
Electrical Starter System:	
Type	Constant mesh type
Starter Motor:	
Model/Manufacturer	3HE/YAMAHA
Output	0.7 kW
Brush - Overall Length	12.5 mm (0.49 in)
<Limit>	< 4 mm (0.16 in) >
Commutator Dia.	28.0 mm (1.10 in)
Wear Limit	27.0 mm (1.06 in)
Mica Undercut	0.7 mm (0.028 in)
Starter Relay:	
Model/Manufacturer	A104-128/HITACHI
Amperage Rating	100A
Horn:	
Type/Quantity	Plane type/1 pc.
Model/Manufacturer	MF12/NIKKO
Maximum Amperage	1.5A

Model	FZR400SP
Flasher Relay (Relay Assembly):	
Type	Condenser type
Model/Manufacturer	FZ230SD/NIPPON DENSO
Self-Cancelling Device	No
Flasher Frequency	60 - 120 cpl/min
Wattage	15W x 4 = 3.4W
Starting Circuit Cut-Off Relay:	
Model/Manufacturer	3EN/OMRON
Coil/Winding Resistance	202 - 247Ω
Diode	Yes
Electric Fan:	
Model/Manufacturer	NA AL81/NIPPON DENSO
Thermostat Switch:	
Model/Manufacturer	2ELYN THERMOSTAT
Function Temperature	95°C (203°F) ON 80.5 - 83.5°C (177 - 182°F) OFF
Thermo Unit:	
Model/Manufacturer	11H/NIPPON SEIKI
Coil Winding Resistance	153.9Ω at 50°C (122°F) 47.5 - 52.8Ω at 80°C (176°F) 26.2 - 29.3Ω at 100°C (212°F) 16.1Ω at 120°C (248°F)
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit: Quantity	
MAIN	30A 1 pc.
HEAD	20A 1 pc.
IGNITION	10A 1 pc.
SIGNAL	10A 1 pc.
FAN	10A 1 pc.
RESERVE	30A 1 pc., 20A 1 pc., 10A 1 pc.

GENERAL TORQUE SPECIFICATIONS/ DEFINITION OF UNITS

SPEC 09

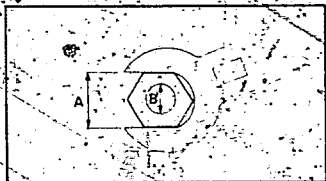
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SPEC 09

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

A (Nut)	B (Bolt)	General torque specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



A Distance across flats
B Outside thread diameter

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm	millimeter	10 ⁻³ meter	Length
cm	centimeter	10 ⁻² meter	Length
kg	kilogram	10 ³ gram	Weight
N	Newton	1 kg · m/sec ²	Force
Nm	Newton meter	N · m	Torque
m·kg	Meter kilogram	m · kg	Torque
Pa	Pascal	N/m ²	Pressure
N/mm	Newton per millimeter	N/mm	Spring rate
L	Liter		Volume or capacity
cm ³	Cubic centimeter		Volume or capacity
r/min	Revolutions per minute		Engine speed

LUBRICATION POINT AND GRADE OF LUBRICANT

SPEC 09

LUBRICATION POINT AND GRADE OF LUBRICANT ENGINE

Lubrication Point	Lubricant Type
Oil seal lips	12-5
O-ring	12-5
Bearing	12-5
Piston surface	12-5
Piston pin	12-5
Connecting rod (Big and small end)	12-5
Connecting rod bolt	12-5
Crankshaft journal	12-5
Camshaft cam lobe/journal	12-5
Valve stem (IN, EX.)	12-5
Valve stem end (IN, EX.)	12-5
Water pump impeller shaft	12-5
Oil pump rotor (Inner/outer) shaft	12-5
Cylinder head (Bolt thread)	12-5
Valve lifter outside	12-5
Camshaft cap (Bolt thread)	12-5
Cylinder sleeve (O-ring)	Silicon grease
Starter idler gear shaft	12-5
Push lever assembly	12-5
Transmission gear (Wheel/pinion)	12-5
Axle (Main/drive)	12-5
Shift cam	12-5
Shift fork/guide bar	12-5
Shift shaft assembly	12-5
Shift boss (inner)	12-5
Matching surface	Yamaha Bond No. 1215
(Cylinder head and cylinder head cover)	
Crankcase matching surface	Yamaha Bond No. 1215

LUBRICATION POINT AND GRADE OF LUBRICANT.

SPEC



B-9

CABLE ROUTING

SPEC



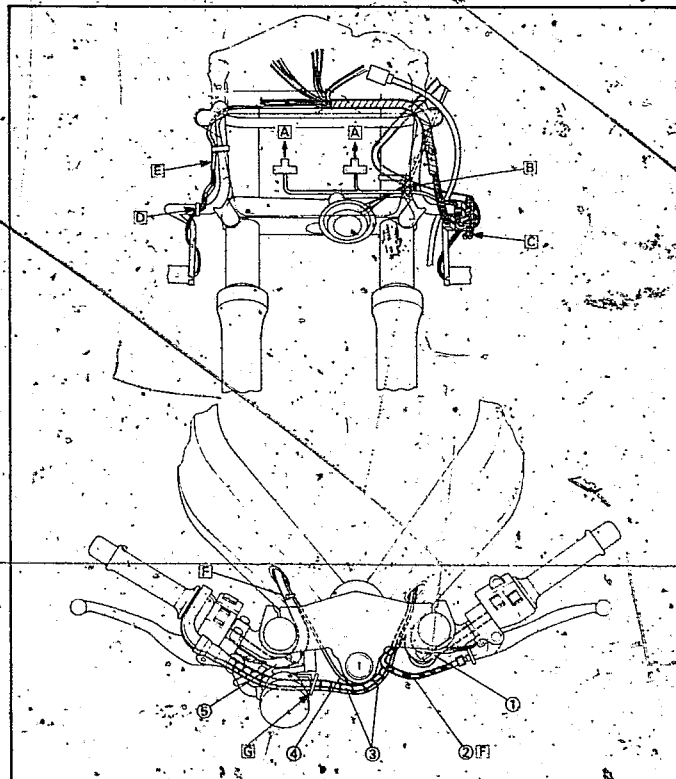
CHASSIS

Lubrication Point	Lubricant Type
Gear unit (Speedometer)	SAE 90
Front wheel oil seal lips	SAE 90
Rear wheel oil seal lips	SAE 90
Bush (Swingarm) and thrust cover	SAE 90
Oil seal lips (Swingarm) and bearing	SAE 90
Pivot shaft (Swingarm)	SAE 90
Bearing (Relay arm and rear shock absorber)	SAE 90
Bearing (Relay arm and frame)	SAE 90
Bearing (Relay arm and connecting rod)	SAE 90
Bearing (Connecting rod and swingarm)	SAE 90
Shift pedal shaft	SAE 90
Bearing (Steering head)	SAE 90
Tube guide (Throttle grip) inner surface	SAE 90
Brake lever, sliding surface	SAE 90
Clutch lever, sliding surface	SAE 90
Clutch cable end	SAE 90
Side stand bolt, sliding surface	SAE 90
Swingarm	SAE 90
Relay arm	SAE 90
Brake pedal and rear master cylinder	SAE 90

CABLE ROUTING

- ① Handlebar switch lead (left)
- ② Clutch cable
- ③ Throttle cable
- ④ Main switch lead
- ⑤ Handlebar switch lead (right)

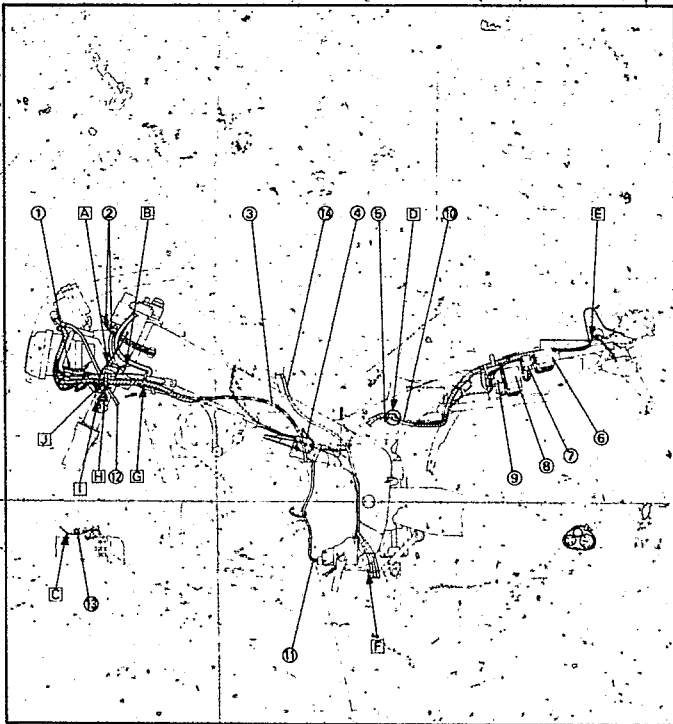
- A To headlight.
- B To horn.
- C To front flasher light (left).
- D Clamp the flasher light lead.
- E To front flasher light (right).
- F Through inside of throttle cable to under the frame.
- G Through the throttle cables.





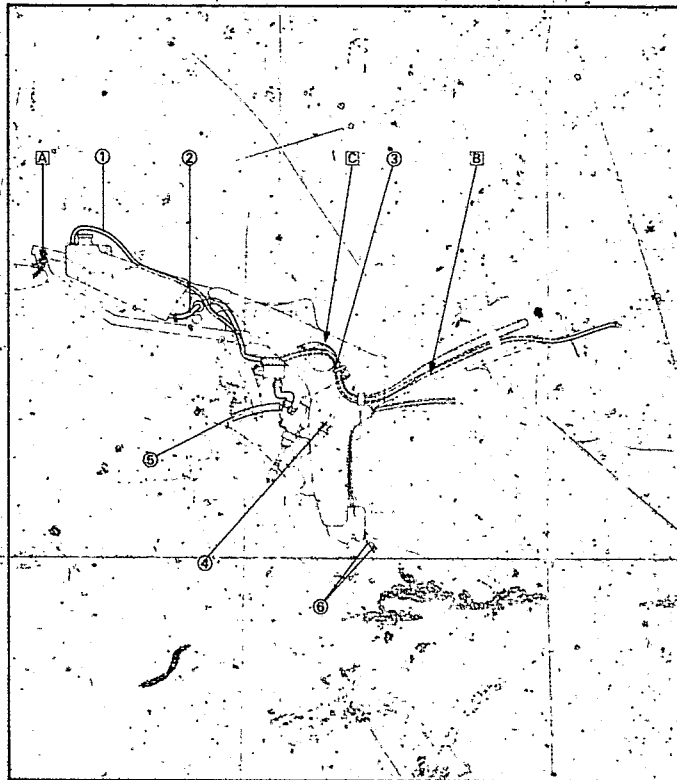
- ① Headlight lead
- ② Throttle cable
- ③ Clutch cable
- ④ Starter
- ⑤ Cross tube
- ⑥ Fuel box
- ⑦ Main fuse
- ⑧ Relay
- ⑨ Flasher relay
- ⑩ EX-UP lead
- ⑪ Sidestand switch lead
- ⑫ Speedometer cable
- ⑬ Air cleaner drain hose

- A Clamp the horn lead.
- B Connect the fuel tank reserve switch.
- C Through to clutch cable over the cable guide.
- D Through to the main harness, radiator reservoir hose, over flow hose, ground lead, EX-UP lead and starter motor (+) lead over 4kg cross tube.
- E Clamp the flasher lead and tail light lead.
- F Clamp the air filter breather hose, fuel tank breather hose, and over flow hose.
- G Clamp the main harness and handlebar switch lead (left).
- H Through the guide.
- I Through the flasher leads (left and right) under the bracket hole.
- J Clamp the flasher lead, main harness and handlebar switch lead.



- ① Reservoir tank over flow hose
- ② Reservoir hose
- ③ Brake switch lead
- ④ Rear brake switch
- ⑤ Brake hose
- ⑥ EX-UP cable

- A Clamp the flasher lead (right).
- B Through the reservoir hose inside of tank rail.
- C Clamp the brake switch leads and main harness.



CABLE ROUTING

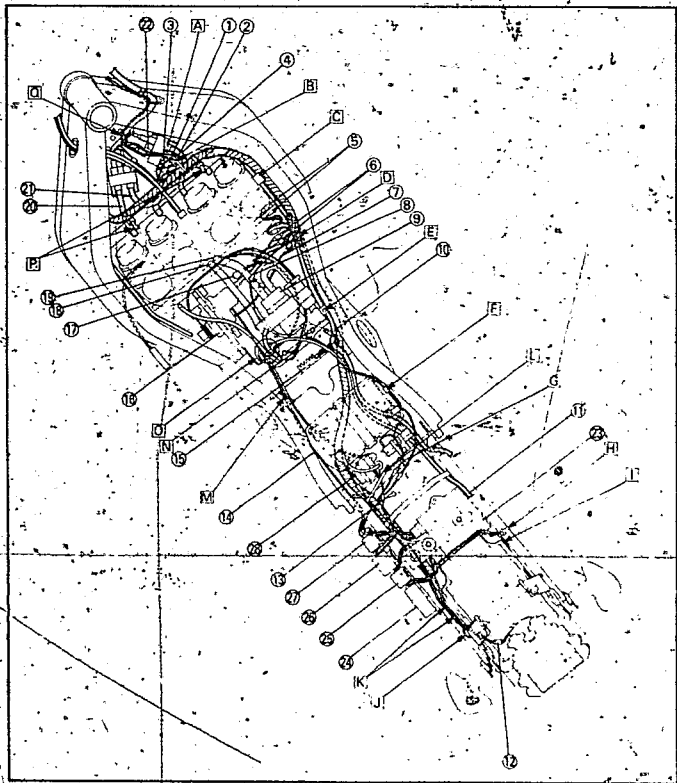
SPEC



B-11

- ① Main switch coupler (rod)
- ② Handlebar switch coupler (white)
- ③ High tension cord #2
- ④ High tension cord #3
- ⑤ Thermo switch/Thermo unit.
- ⑥ AC magneto coupler
- ⑦ Sidestand lead
- ⑧ Fuel pump lead
- ⑨ Fuel pump
- ⑩ Rear brake switch coupler
- ⑪ Over flow hose
- ⑫ Tail light coupler
- ⑬ EX-UP test terminal
- ⑭ EX-UP lead
- ⑮ Regulator
- ⑯ EX-UP motor
- ⑰ Starter motor (+) lead
- ⑱ Air filter breather hose
- ⑲ Fuel hose (to carburetor)
- ⑳ High tension cord #1

- ㉑ High tension cord #4
- ㉒ Ignition coil
- ㉓ Ignitor unit
- ㉔ Fuse box
- ㉕ Main fuse
- ㉖ Relay
- ㉗ Flasher relay
- ㉘ Starter relay



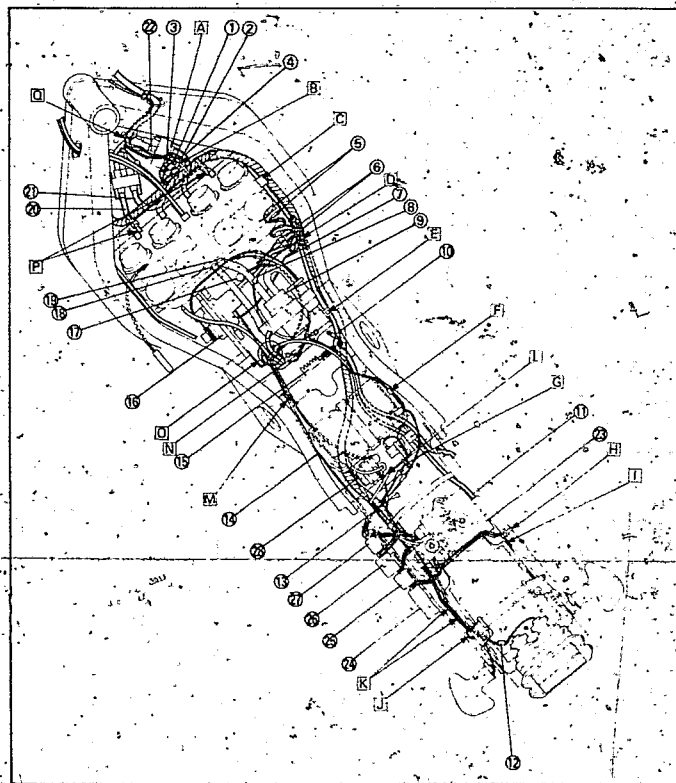
CABLE ROUTING

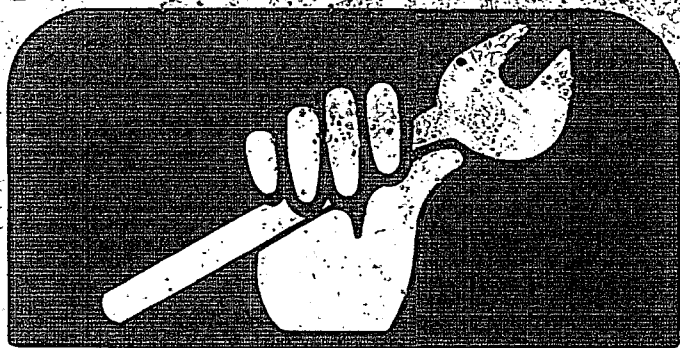
SPEC



- A To fan.
- B Clamp the handlebar lead (right), main switch lead, fan lead and main harness.
- C Clamp the main harness and radiator reservoir hose.
- D Clamp the main harness, sidestand lead, AC magneto lead; thermo switch lead and fuel pump lead.
- E Clamp the main harness and radiator reservoir hose.
- F Clamp the ground lead.
- G Clamp the ground lead and resistor lead.

- H Clamp the flasher lead
- I To the rear flasher light (right).
- J Clamp the flasher lead and tail light lead.
- K To the rear flasher light (left).
- L Clamp the main harness and starter lead.
- M Clamp the EX-UP lead and starter motor lead.
- N Pass through the EX-UP cables
- O Clamp the air filter hose breather hose over flow hose, EX-UP lead and starter motor lead
- P Clamp the main harness to the frame.
- Q Clamp the main switch lead and handlebar switch lead (right).





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CHAPTER 3.
PERIODIC INSPECTION AND ADJUSTMENT.

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PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

Unit: km (miles)

ITEM	REMARKS	BREAK-IN 1,000 (600)	EVERY	
			6,000 (4,000) or 6 months	12,000 (8,000) or 12 months
Valves*	Check valve clearance. Adjust if necessary		EVERY 24,000 (16,000)	
Spark plug(s)	Check condition. Clean or replace if necessary.			
Air filter	Clean. Replace if necessary.			
Carburetor	Check idle speed/synchronization/starter operation. Adjust if necessary.			
Fuel line*	Check fuel hose and vacuum tube for cracks or damage. Replace if necessary.			
Fuel filter*	Check condition. Replace if necessary.			
Engine oil	Replace. (Warm engine before draining.)			
Engine oil filter*	Replace.			
Brake*	Check operation/fluid leakage/See NOTE. Correct if necessary.			
Clutch	Check operation. Adjust if necessary.			
Swingarm pivot*	Check swingarm assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.**			
Rear suspension link pivots*	Check operation. Apply grease lightly every 24,000 (16,000) or 24 months.**			
Wheels*	Check balance/damage/runout. Repair if necessary.			
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.			
Steering bearings*	Check bearings assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.**			
Front forks*	Check operation/oil leakage. Repair if necessary.			
Rear shock absorber*	Check operation/oil leakage. Repair if necessary.			
Cooling system	Check coolant leakage. Repair if necessary. Replace coolant every 24,000 (16,000) or 24 months.			
Drive chain	Check chain slack/alignment. Adjust if necessary. Clean and lube.		EVERY 500 (300)	
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.			
Sidestand*	Check operation. Repair if necessary.			
Sidestand switch*	Check operation. Clean or replace if necessary.			

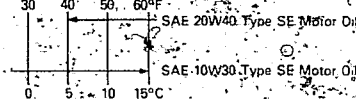
It is recommended that these items be serviced by a Yamaha dealer.
Lightweight lithium-soap base grease. 3-1
Molybdenum disulfide grease

NOTE:

Brake system:

1. When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluid level and add the fluid as required.
2. We recommend that, on the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
3. We recommend that replace the brake hoses every four years, or if cracked or damaged.

Engine oil:





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**COWLING
REMOVAL**

Lower cowl:

1. Remove:
 - Covers (left and right) 1

NOTE:

When remove the left cover, disconnect the fuel reserve switch 2, coupler.

2. Remove:
 - Front flasher light (left) 1

3. Remove:
 - Speedometer cable 1
 - Lower cowl (left) 2

4. Remove:
 - Front flasher light (right) 1
 - Lower cowl (right) 1
 - Inner panel 1

Upper cowl:

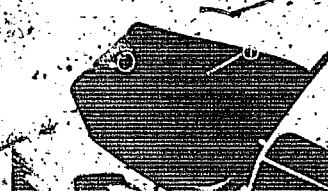
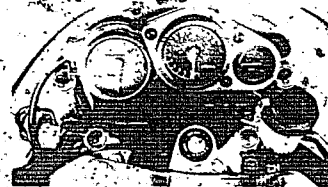
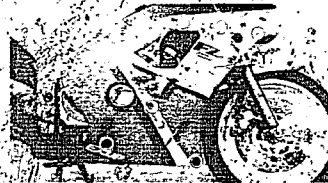
1. Remove:
 - Rear view mirrors (left and right) 1

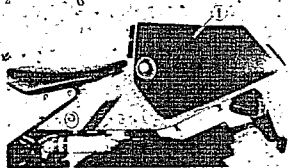
2. Remove:
 - Upper cowl 1

3. Disconnect:
 - Headlight coupler 1
 - Headlight unit 2

Tail cover:

1. Remove:
 - Seat 1



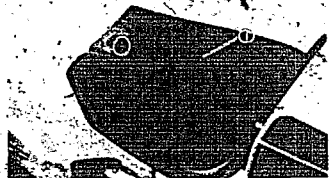


2. Remove:

- Tail cover - 1

NOTE:

Before remove the tail cover, disconnect the tail/brake coupler



Fuel tank

2. Remove:

- Seat - 1



2. Remove:

- Fuel tank installing bolts - 1



3. Turn the fuel cock "OFF"



4. Disconnect:

- Breather hose - 1
- Fuel hose - 2
- Fuel sender coupler - 3

5. Remove:

- Fuel tank



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INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points

1. Install:

- Seat

NOTE:

When installing the seat, insert the lobe on the rear into the stay on the frame

2. Install:

- Flasher lights

NOTE:

Install the flasher light having a chocolate color lead on the left side and install the flasher light having a dark green color lead on the right side

*8533001

**ENGINE
VALVE CLEARANCE ADJUSTMENT****NOTE:**

- The valve clearance should be adjusted when the engine is cool, to the touch.
- The piston must be at Top Dead Center (TDC) on compression stroke to check or adjust the valve clearance.

1. Remove:

- Lower cowl
- Fuel tank

Refer to the "COWLING" section.

2. Drain the coolant

Refer to the "COOLANT REPLACEMENT" section.

3. Remove:

- Air filter case 1

4. Remove:

- Radiator hose 1
(Radiator-Thermostat housing)
- Hose 2
(Radiator-Joint)
- Radiator hose 3
(Radiator-Water pump cover)
- Reserve tank hose -1
- Hose 5
(Radiator-Oil filter)

5. Remove:

- Fan/motor coupler 1

6. Remove:

- Radiator 1

7. Remove:

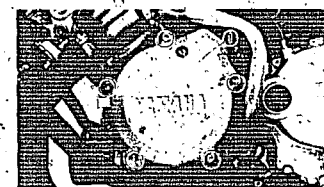
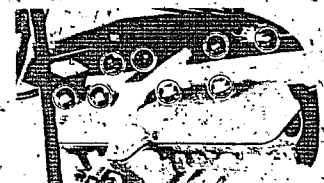
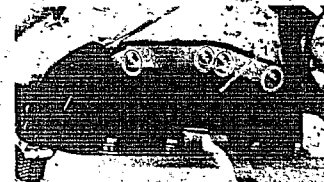
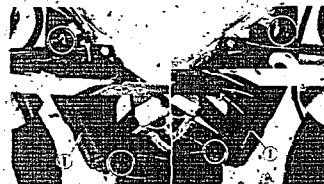
- Cover 1
- Plug cap

8. Remove:

- Cylinder head cover 1

9. Remove:

- Flywheel magneto cover 1



VALVE CLEARANCE ADJUSTMENT



C-3

10. Check:
- Valve clearance
 - Out of Specification → Adjust

	Valve clearance (cold):
	Intake valve
	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in.)
	Exhaust valve
	0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in.)

Checking steps:

- Turn the crankshaft counterclockwise with a wrench
- Align the "T" mark with the crankcase matching surface - 1 when #1 piston is at TDC on compression stroke.

- Turn the crankshaft 180 degrees counterclockwise from #3 cylinder TDC on compression stroke.

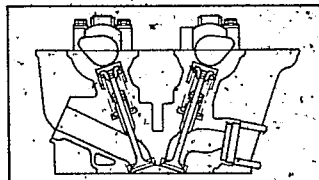
NOTE:

TDC on compression stroke can be found when the cam lobes are opposite each other as shown.

- Measure the valve clearance by using a feeler gauge 1.

NOTE:

- Record the measured reading if the clearance is incorrect.
- Measure valve clearance in the following sequence

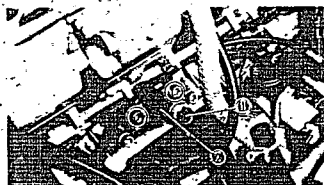


VALVE CLEARANCE ADJUSTMENT



Measuring sequence:

#1 → #2 → #4 → #3



11. Remove:

- Cam chain tensioner bolt 1
- Cam chain tensioner 2

12. Remove:

- Chain guide (exhaust) 1
- Chain guide (upper) 2
- Camshaft caps 3
- Camshafts.

NOTE:

- Refer to "ENGINE DISASSEMBLY-CYLINDER HEAD, CYLINDER AND PISTON" section.
- Fasten the wire to the cam chain to prevent it from falling into the crankcase

13. Adjust:

- Valve clearance

Adjustment steps:

- Remove the valve lifter 1 and pad 2 by using the valve lifter 3

	Valve lifter: P/N 90890-04 101
--	-----------------------------------

NOTE:

- Place a piece of rag in the cam chain room to prevent the pad from falling into the crankcase.
- Remove the rag after adjustment
- Select the proper valve adjusting pad from the following chart.

VALVE CLEARANCE ADJUSTMENT



C-4

VALVE CLEARANCE ADJUSTMENT



INTAKE

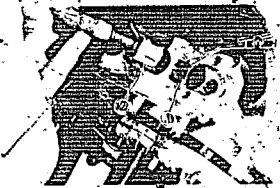
MEASURED CLEARANCE	[A] INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02																									
0.03 ~ 0.07																									
0.08 ~ 0.10																									
0.11 ~ 0.20																									
0.21 ~ 0.22																									
0.23 ~ 0.27																									
0.28 ~ 0.32																									
0.33 ~ 0.37																									
0.38 ~ 0.42																									
0.43 ~ 0.47																									
0.48 ~ 0.52																									
0.53 ~ 0.57																									
0.58 ~ 0.62																									
0.63 ~ 0.67																									
0.68 ~ 0.72																									
0.73 ~ 0.77																									
0.78 ~ 0.82																									
0.83 ~ 0.87																									
0.88 ~ 0.92																									
0.93 ~ 0.97																									
1.00 ~ 1.02																									
1.03 ~ 1.07																									
1.08 ~ 1.12																									
1.13 ~ 1.17																									
1.18 ~ 1.22																									
1.23 ~ 1.27																									
1.28 ~ 1.32																									
1.33 ~ 1.37																									

EXAMPLE:
VALVE CLEARANCE (cold):
 0.11 ~ 0.20 mm (0.004 ~ 0.008 in)
 Installed is: 148 (Rounded off number is 150)
 Measured clearance is 0.24 mm (0.009 in)
 Replace 148 pad with 160 pad

EXHAUST

MEASURED CLEARANCE	[A] INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02																									
0.03 ~ 0.07																									
0.08 ~ 0.12																									
0.13 ~ 0.17																									
0.18 ~ 0.20																									
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0.28 ~ 0.32																									
0.33 ~ 0.37																									
0.38 ~ 0.42																									
0.43 ~ 0.47																									
0.48 ~ 0.52																									
0.53 ~ 0.57																									
0.58 ~ 0.62																									
0.63 ~ 0.67																									
0.68 ~ 0.72																									
0.73 ~ 0.77																									
0.78 ~ 0.82																									
0.83 ~ 0.87																									
0.88 ~ 0.92																									
0.93 ~ 0.97																									
1.00 ~ 1.02																									
1.03 ~ 1.07																									
1.08 ~ 1.12																									
1.13 ~ 1.17																									
1.18 ~ 1.22																									
1.23 ~ 1.27																									
1.28 ~ 1.32																									
1.33 ~ 1.37																									
1.38 ~ 1.42																									
1.43 ~ 1.47																									

EXAMPLE:
VALVE CLEARANCE (cold):
 0.21 ~ 0.30 mm (0.008 ~ 0.012 in)
 Installed is 175
 Measured clearance is 0.35 mm (0.014 in)
 Replace 175 pad with 185 pad



Pad range	Pad availability:
	25 increments
No. 120	1.20 mm (0.047 in)
No. 240	2.00 mm (0.094 in)
	Pads are stamped in 0.05 mm (0.002 in) increments

NOTE:
 Thickness of each pad is marked on the pad (face that contacts the valve lifter (right the cam).

- Round off the hundredths digit of the original pad number to the nearest 0.05 mm increment.

Hundredths digit → Rounded valve
0 or 2 → 0
5 → (NOT ROUNDED OFF)
8 → 10

EXAMPLE:
 Original pad number 173 (1.73 mm)
 Rounded off digit 175
NOTE:
 Pads can only be selected in 0.05 mm (0.002 in) increments:

- Locate the previously installed pad number on the chart. Locate the measured valve clearance on the chart. The point where these coordinates intersect is the new pad number.

NOTE:
 Use the new pad number as a guide only. The number must be verified.

- Install the new pad #1 and valve lifter #2.
- NOTE:**
 Apply molybdenum disulfide grease to the pad.


VALVE CLEARANCE ADJUSTMENT



C-5

- Valve lifter must be rotated smoothly by a finger.

- 14. Install:
 - Camshafts
 - Timing chain
 - Camshaft caps
 - Chain guide (exhaust side)
 - Camchain chain tensioner
 - Chain guide (upper)

	Bolt (camshaft caps, camchain tensioner, chain guide): 10 Nm (1.0 m · kg, 7.2 ft · lb) Cap bolt (camchain tensioner): 15 Nm (1.5 m · kg, 11 ft · lb)
-----------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------

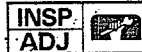
NOTE:

- Install the exhaust camshaft first
- Align the matching marks.
- Refer to "ENGINE ASSEMBLY AND ADJUSTMENT: CYLINDER HEAD, CYLINDER AND PISTONS" section:
- Apply molybdenum disulfide grease to the camshaft caps
- Tighten the bolts (camshaft cap) in a crisscross pattern from inside.
- Turn the crankshaft counterclockwise several turns for the installed parts to settle into the correct position:

CAUTION:

The bolts (camshaft cap) must be tightened evenly; or damage to the cylinder head, camshaft caps and cam will be result.

VALVE CLEARANCE ADJUSTMENT/ CARBURETOR SYNCHRONIZATION




- 15. Measure:
 - Valve clearance

Verification steps:

- Follow the valve clearance measurement steps.
- If the clearance is incorrect, repeat all adjustment steps until the proper clearance is obtained.

16. Install:

- Reverse removal steps.
- Cylinder head cover
- Radiator assembly

	Bolt (cylinder head cover): 10 Nm (1.0 m · kg, 7.2 ft · lb)
-------------------------------------------------------------------------------------	----------------------------------------------------------------

17. Install:

- Air cleaner case
- Fuel tank
- Seat
- Lower cowl

Refer to the "COWLING" section.

CARBURETOR SYNCHRONIZATION

NOTE:

Valve clearance should be adjusted properly before synchronizing the carburetors.

CARBURETOR SYNCHRONIZATION



C-6

- Place the motorcycle on a level surface.

NOTE

Place the motorcycle on its centerstand if a centerstand is equipped.

If not, place a suitable stand under the motorcycle.

- Start the engine and let it warm up for several minutes.

- Remove:

- Fuel tank
- Refer to the "COWLING" section.
- Screws

- Install:

- Attachment 1



Attachment:
P/N 90890-03060

- Attach:

- Inductive tachometer 1 (to #1 spark plug lead)
- Vacuum gauge 2



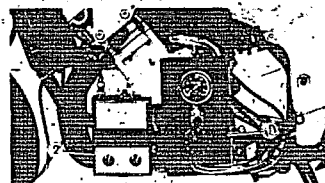
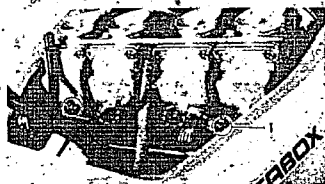
Inductive tachometer:
P/No. 90890-03113
Vacuum gauge:
P/No. 90890-03094

- Check:

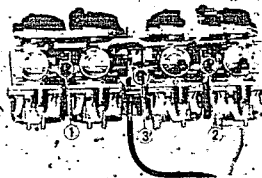
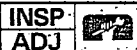
- Engine idling speed
- Out of specification → Adjust.
Refer to "ENGINE IDLING SPEED ADJUSTMENT" section.



Engine idling speed:
1,250 ~ 1,350 r/min



CARBURETOR SYNCHRONIZATION



- Adjust:

- Carburetor synchronization

Adjustment steps:

- Synchronize carburetor No.1 to carburetor No.2 by turning synchronizing screw 1 until both gauges read the same.
- Race the engine for less than a second, two or three times and check the synchronization again.
- Repeat the above steps to synchronize carburetor No.4 to carburetor No.3 by turning synchronizing screw 2 until both gauges read the same.
- Repeat the same steps to synchronize carburetor No.2 to carburetor No.3 by turning synchronizing screw 3 until both gauges read the same.

Vacuum pressure at idle speed:

30.59 ~ 35.91 kPa

(230 ~ 270 mm Hg, 9.04 ~ 10.64 in Hg)

NOTE

The difference between both carburetors should be 1.33 kPa (10 mm Hg, 0.4 in Hg) or less.

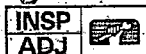
- Check:

- Engine idling speed
- Out of specification → Adjust


- Stop the engine and detach the measuring equipment and install the screws.



**CARBURETOR SYNCHRONIZATION/
TIMING CHAIN ADJUSTMENT/
IDLING SPEED ADJUSTMENT**



10. Adjust:
- Throttle cable free play
- Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

 Free play
3 ~ 7 mm (0.12 ~ 0.28 in)

11. Install:
- Fuel tank
- Refer to the "COWLING" section.

YB532003
TIMING CHAIN ADJUSTMENT
Adjustment free.

YB532004
IDLING SPEED ADJUSTMENT
NOTE:


The carburetor synchronization should be adjusted properly before adjusting the idling speed.

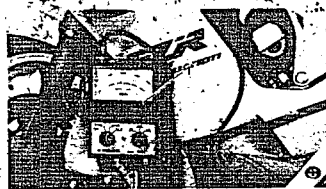
1. Start the engine and let it warm up for several minutes.
2. Remove:
 - Fuel tankRefer to the "COWLING" section.

IDLING SPEED ADJUSTMENT




3. Attach:
- Inductive tachometer (to the spark plug lead).

 Inductive tachometer:
P/No. 90890/03113



4. Check:
- Engine idling speed
- Out of specification → Adjust.

 Engine idling speed:
1,250 ~ 1,350 r/min

5. Adjust:
- Engine idling speed

Adjustment steps:

- Turn the Pilot air screw in until it is lightly seated.
- Turn out the pilot air screw for the specified number of turns.


Pilot air screw: 2-1/2 turns out

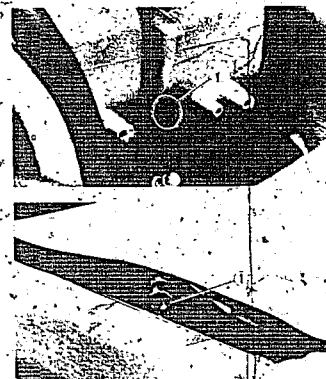
- Turn the throttle stop screw in or out until specified idling speed is obtained.

Turning in → Idling speed increased.

Turning out → Idling speed decreased.

6. Adjust:
- Throttle cable free play
- Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

 Free play:
3 ~ 7 mm (0.12 ~ 0.28 in)



IDLING SPEED ADJUSTMENT/ THROTTLE CABLE ADJUSTMENT



C-8

7. Install:
- Fuel tank

VB532005

THROTTLE CABLE ADJUSTMENT

NOTE:

Engine idling speed and carburetor synchronization should be adjusted properly before adjusting the throttle cable free play.

1. Check:

- Throttle cable free play (A)
- Out of specification → Adjust.



Free play:
3 ~ 7 mm (0.12 ~ 0.28 in.)
At throttle grip end

2. Adjust:

- Throttle cable free-play

Adjustment steps:

NOTE:

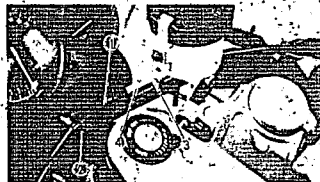
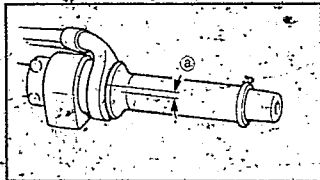
When accelerating, throttle cable #1 (1) is pulled and throttle cable #2 (2) is pushed.

- Loosen the locknut (3) on throttle cable #1.
- Turn the adjuster (4) in or out until the specified free play is obtained.

Turning in → Free play is increased.

Turning out → Free play is decreased.

- Tighten the locknuts.



THROTTLE CABLE ADJUSTMENT/ SPARK PLUG INSPECTION



WARNING

After adjusting, turn the handlebar to the right and left, making sure that the engine idling speed does not change.

VB532006

SPARK PLUG INSPECTION

1. Remove:

- Spark plug cap
- Spark plug

2. Inspect:

- Spark plug type
- Incorrect → Replace:

Standard spark plug:
CR8EA (N.G.K.) or CR9EA (N.G.K.)
U24ESR-N (N.I.D.) or U27ESR-N (N.I.D.)

3. Inspect:

- Electrode (1)
- Wear/Damage → Replace.
- Insulator (2)
- Abnormal color → Replace
- Normal color is a medium-to-light tan color.

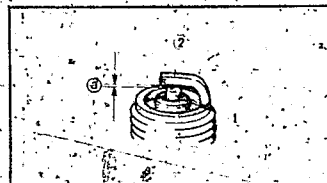
- 4. Clean the spark plug with a spark plug cleaner or wire brush.

5. Measure:

- Plug gap (A)
- Use a Wire Gauge or Feeler Gauge
- Out of specification → Re-gap.



Spark plug gap:
0.7 ~ 0.8 mm
(0.028 ~ 0.031 in.)



SPARK PLUG INSPECTION/ IGNITION TIMING CHECK



C-9

6. Tighten:

- Spark plug



Spark plug:

12.5 Nm (1.25 m • kg•9.0 ft.lb)

NOTE:

- Before installing a spark plug, clean the gasket surface and plug surface.

7. Install:

- Spark plug cap

*B532007

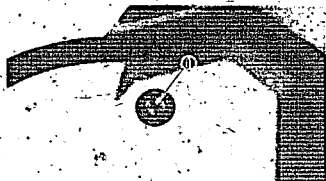
IGNITION TIMING CHECK

NOTE:

- Carburetor synchronization, engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

1. Remove:

- Timing plug (1)



2. Attach:

- Timing light and inductive tachometer (2) to the spark plug lead for #1 cylinder



Timing light:

P/N 90890-0314.1

Inductive tachometer:

P/N 90890-03113.

IGNITION TIMING CHECK/ COMPRESSION PRESSURE MEASUREMENT



3. Check:

- Ignition timing

Checking steps:

- Warm up the engine and keep it at the specified speed.



Engine speed:

1,250-1,350 r/min.

- Visually check the stationary pointer (1) to verify it is within the required firing range (2) indicated on the flywheel. Incorrect firing range → Check flywheel and/or pickup assembly.

4. Install:

- Timing plug

*B532008

COMPRESSION PRESSURE MEASUREMENT

NOTE:

- Insufficient compression pressure will result in performance loss.

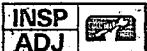
1. Remove:

- Lower cowl
Refer to the "COWLING" section.

2. Check:


- Valve clearance
Out of specification → Adjust.
Refer to the "VALVE CLEARANCE ADJUSTMENT" section.

COMPRESSION PRESSURE MEASUREMENT



C-10

3. Start the engine and let it warm up for several minutes.
4. Stop the engine.
5. Remove:
 - Spark plug
6. Attach:
 - Compression gauge ①

 Compression gauge:
P/N. 90890-03081



7. Measure
 - Compression pressure

Above the maximum pressure:
Inspect cylinder head, valve surfaces, and piston crown for carbon deposits.

Below the minimum pressure:
Squirt a few drops of oil into affected cylinder and measure again.

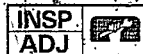
 - Follow the table below.

Compression pressure (With oil applied into cylinder)	
Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Defective ring(s), valves, cylinder head gasket or piston is possible.

Compression pressure (at sea level):
Standard:
- 1,100 kPa (11.0 kg/cm², 156 psi)
Minimum:
- 900 kPa (9.0 Kg/cm², 128 psi)

.....
Measurement steps:

COMPRESSION PRESSURE MEASUREMENT



- Crank over the engine with the throttle wide-open until the compression reading on the gauge stabilizes.

WARNING

When cranking the engine, ground all spark plug leads to prevent sparking.

.....

8. Repeat the previous steps for the other cylinders.

NOTE

The difference of compression pressure between the highest and lowest cylinder compression readings should be 100 kPa (1 kg/cm², 14 psi) or less:

.....

9. Install:
 - Lower cowl

YBS32009

ENGINE OIL LEVEL INSPECTION

NOTE:

Position the motorcycle straight up when inspecting the oil level.

- 1 Place the motorcycle on a level surface.

NOTE:

Place the motorcycle on its centerstand if a centerstand is equipped. If not, place a suitable stand under the motorcycle.

- 2 Inspect

• Oil level

Oil level should be between maximum (1) and minimum (2) marks.

Oil level low → Add oil to proper level.



Recommended oil:

At 5°C (40°F) or higher:
SAE 20W40 type SE
motor oil

At 15°C (60°F) or lower:
SAE 10W30 type SE
motor oil

CAUTION:

- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

- 3 Start the engine and let it warm up for several minutes.

- 4 Stop the engine and inspect the oil level once again.

NOTE:

Wait a few minutes until the oil settles before inspecting the oil level.

YBS32010

ENGINE OIL REPLACEMENT

- 1 Start the engine and let it warm up for several minutes.

- 2 Stop the engine and place an oil pan under the engine.

- 3 Remove:

• Lower cowl

Refer to the "COWLING" section.

- 4 Remove:

• Oil filler plug

• Drain plug

Drain the crankcase of its oil.

- 5 If the oil filter is replaced with oil change, remove the following parts and reinstall them.

Replacement steps:

- Remove the oil filter element (1) using the oil filter wrench (2).



Oil filter wrench;
P/N 90890-01426

- Apply the engine oil lightly to O-ring of new oil filter.

NOTE:

Make sure the O-ring is positioned properly.

- Install the new oil filter (1) using the oil filter wrench (2).



Oil filter wrench;
P/N 90890-04126



Oil filter:
17 Nm (1.7 m · kg, 12 ft · lb)

ENGINE OIL REPLACEMENT/ CLUTCH ADJUSTMENT

INSP
ADJ



C-12

6. Install:

- Drain plug



Drain plug:

43 Nm (4.3 m² kg, 31 ft · lb)

NOTE:

Check the gasket (drain plug). If damaged, replace it with a new one.

7. Fill:

- Engine oil



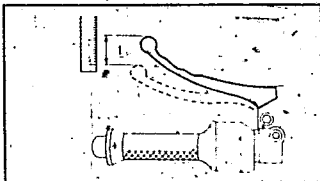
Oil quantity:

without oil filter change
2.6 L (2.3 Imp. qt, 2.7 US qt)
with oil filter change
2.9 L (2.6 Imp. qt, 3.1 US qt)

Refer to the "ENGINE OIL LEVEL INSPECTION" section.

8. Install:

- Lower cowl



WASJ2071

CLUTCH ADJUSTMENT

Cable Free Play Adjustment

1. Check:

- Clutch cable free play (A).
Out of specification → Adjust.



Free play:

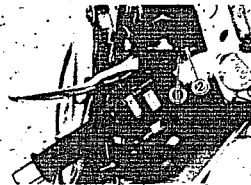
10 ~ 15 mm (0.4 ~ 0.6 in)
At clutch lever end

2. Adjust:

- Clutch cable free play

CLUTCH ADJUSTMENT

INSP
ADJ



Adjustment steps:

- Loosen the locknut (1)
- Turn the adjuster(s) (2) in or out until the specified free play is obtained.

Turning in → Free play is increased.

Turning out → Free play is decreased.

- Tighten the locknut(s).

NOTE:

If specified cable free play cannot be obtained by above steps, follow mechanism adjustment to achieve specified free play

Mechanism Adjustment

1. Remove.

- Lower cowl

Refer to the "COWLING" section.

2. Adjust

- Mechanism free play

Adjustment steps:

- Loosen the locknut (1)
- Turn in the adjuster (2) until lightly touched.
- Turn out the adjuster (1, 4).
- Tighten the locknut.

3. Install:

- Lower cowl

4. Adjust:

- Clutch cable free play



*B532012

AIR FILTER CLEANING

1. Remove:

- Fuel tank

Refer to the "COWLING" section.

2. Remove:

- Air filter cover (1)
- Air filter element

CAUTION:

Never operate the engine with the air filter element removed. Unfiltered air will cause rapid wear of engine parts and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.

3. Inspect:

- Air filter element
- Damaged → Replace.

4. Clean:

- Air filter element

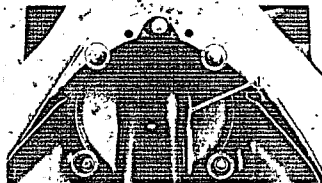
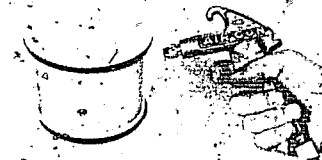
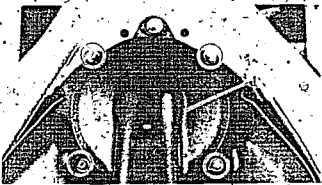
Blow out the dust in the element from the outer surface using compressed air.

5. Install:

- Air filter element
- Air filter case cover (1)

NOTE:

When installing the element in its case, be sure its sealing surface matches the sealing surface of the case so there is no air leak.



6. Install:

- Fuel tank

*B532013

CARBURETOR JOINT INSPECTION

1. Remove:

- Fuel tank

Refer to the "COWLING" section.

2. Inspect:

- Carburetor joints (1)
- Cracks/Damage → Replace.
- Refer to the "CHAPTER 6-CARBURETION" section.

3. Install:

- Fuel tank



*B532014

FUEL LINE INSPECTION

1. Remove:

- Fuel tank

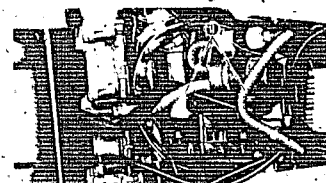
Refer to the "COWLING" section.

2. Inspect:

- Fuel hose (1)
- Crack/Damage → Replace.

3. Install:

- Fuel tank

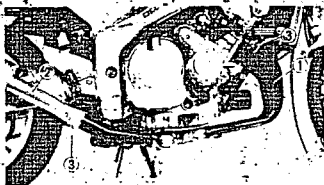





YB532015

EXHAUST SYSTEM INSPECTION

1. Remove:
 - Lower cowl
 Refer to the "COWLING" section.



2. Inspect:
 - Exhaust pipe(s) (1)
 - Muffler(s) (2)
 - Cracks/Damage → Replace
 - Gasket(s) (3)
 - Exhaust gas leaks → Replace

	Bolt (exhaust pipe): 10 Nm (1.0 m · kg, 7.2 ft · lb)
	Bolt (muffler): 20 Nm (2.0 m · kg, 14 ft · lb)

3. Install:
 - Lower cowl

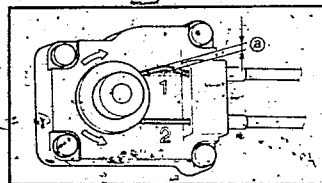


YB532020

EX-UP CABLE

1. Remove:
 - Lower cowl
 Refer to the "COWLING" section.
 - Ex-up valve cover (1)

2. Check:
 - Ex-up operation
Turn the main switch ON. →
Ex-up valve operated one cycle.



3. Check:
 - Ex-up cable free play (a)
 Out of specification → Adjust



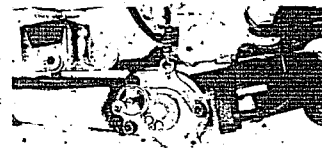
Ex-up cable free play:
1.5 mm (0.06 in) or less



4. Adjust:
 - Ex-up cable free play

Adjusting steps:

- Remove the seat and fuel tank.
- Insert the pin (φ4) in the pin and housing hole.
- Loosen the locknut (1).
- Turn the adjuster (2) clockwise.
- Turn the adjuster counterclockwise until become it harder.
- Turn the adjuster 1/4 clockwise.
- Tighten the locknut.
- Remove the pin (φ4).
- Install the fuel tank and seat.



5. Install:
 - Ex-up valve cover
 - Lower cowl



Bolt (ex-up valve cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)

YB532016

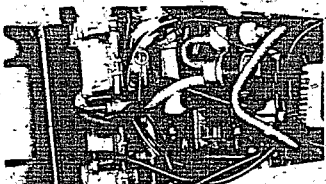
CRANKCASE-BREATHER HOSE INSPECTION

1. Remove:
 - Fuel tank
 Refer to the "COWLING" section.

CRANKCASE BREATHER HOSE INSPECTION/ COOLANT LEVEL INSPECTION



C-15



2. Inspect:
 - Crankcase breather hose (1)
 - Crank/Damage → Replace.
3. Install:
 - Fuel tank

9512018

COOLANT LEVEL INSPECTION

NOTE:

Position the motorcycle straight up when inspecting the coolant level.

1. Place the motorcycle on a level surface.
NOTE:

Place the motorcycle on its centerstand if a centerstand is equipped. If not, place a suitable stand under the motorcycle.

2. Remove:
 - Tail coverRefer to the "COWLING" section.
3. Inspect:
 - Coolant level
 - Coolant level should be between maximum (1) and minimum (2) marks.
 - Coolant level low → Add soft water (tap water) to proper level.

CAUTION:

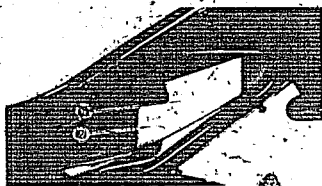
Hard water or salt water is harmful to the engine parts. You may use boiled water or distilled water, if you can't get soft water.

4. Start the engine and let it warm up for several minutes.

5. Stop the engine and inspect the coolant level once again.

NOTE:

Wait a few minutes until the coolant settles



COOLANT LEVEL INSPECTION/ COOLANT REPLACEMENT



before inspecting the coolant level.

6. Install:
 - Tail cover

9512018

COOLANT REPLACEMENT

1. Remove:
 - Lower cowlRefer to the "COWLING" section.

2. Remove:
 - Radiator cap

WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by following this procedure: Place a thick rag or towel over the radiator cap. Slowly rotate the cap counterclockwise to the detente. This allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.



3. Remove:
 - Drain bolt (1) (water pump cover).
 - Drain bolts (2) (cylinder)
 - Gaskets (drain bolt)
 - Drain the radiator and engine of its coolant.

4. Inspect:
 - Gasket (drain bolt)
 - Damage → Replace.

COOLANT REPLACEMENT



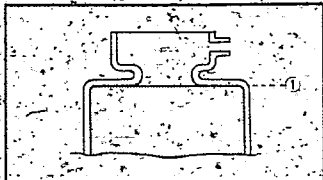
C-16



5. Install:
- Gaskets ① (drain bolt)
 - Drain bolts (water pump cover and cylinder).

Drain bolt:
8 Nm (0.8 m · kg, 5.8 ft · lb)

6. Fill:
- Radiator.
 - Engine (to specified level ①).



Recommended coolant:
High quality ethylene glycol anti-freeze containing corrosion inhibitors for aluminum engine inhibitors.

Coolant and water (soft water)
Mixed ratio: 50%/50%
Total amount:
2.18 L (1.9 imp qt, 2.3 US qt)
Reservoir tank capacity:
0.3 L (0.26 imp qt, 0.32 US qt)

Handling notes of coolant:
The coolant is harmful so it should be handled with special care.

⚠ WARNING

- When coolant splashes in your eye. Thoroughly wash your eye with water and see your doctor.
- When coolant splashes on your clothes. Quickly wash it away with water and then

COOLANT REPLACEMENT



- with soap.
- When coolant is swallowed. Quickly make him vomit and take him to a doctor.

CAUTION:

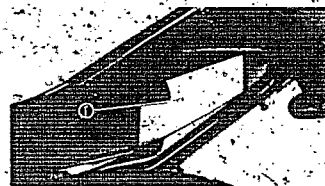
- Hard water or salt water is harmful to the engine parts. Use boiled or distilled water if you can't get soft water.
- Do not use water containing impurities or oil.
- Take care so that coolant does not splash on painted surfaces. If it splashes, wash it away with water.
- Do not mix more than one type of ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines.

7. Install:
- Radiator cap.
8. Connect:
- Hose (reservoir tank).
9. Fill:
- Reservoir tank (to maximum level ①).
10. Start the engine and let it warm up for several minutes.
11. Stop the engine and inspect the level. Refer to the "COOLANT LEVEL INSPECTION" section.

NOTE:

Wait a few minutes until the coolant settles before inspecting the coolant level.

12. Install:
- Lower cowl.



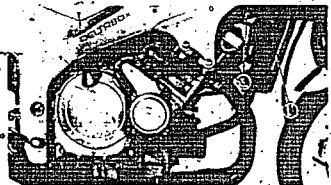
YB532019

COOLING SYSTEM INSPECTION

1. Remove:
 - Lower cowl
 Refer to the "COWLING" section.

2. Inspect:
 - Radiator ①
 - Inlet hose ②
 - Outlet hose ③
 Cracks/Damage → Replace.
 Refer to the "COOLING SYSTEM" section in the CHAPTER 5.

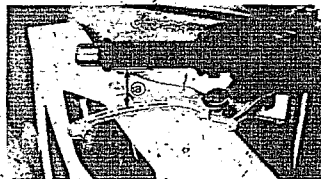
3. Install.
 - Lower cowl



YB533001

**CHASSIS
FRONT BRAKE LEVER POSITION ADJUSTMENT**

1. Adjust:
 - Brake lever position (distance ① from handle grip to front brake lever)



Adjusting steps:

- Turn the adjuster ① while pushing the front brake lever toward until the desired lever position is obtained.

Adjuster position #1	Distance ① is the largest
Adjuster position #4	Distance ① is the smallest

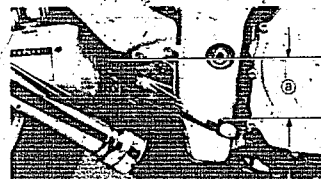
WARNING

After adjusting the front brake lever position (distance), make sure the pin on the brake lever holder is firmly inserted in the hole in the adjuster.

YB533002

REAR BRAKE ADJUSTMENT

1. Check:
 - Brake pedal height ①
 Out of specification → Adjust.

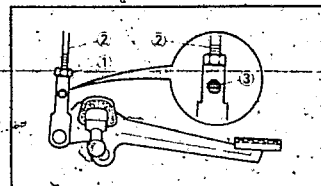


	Brake pedal height:
	50 mm (2.0 in) Below top of footrest

2. Adjust:
 - Brake pedal height

Adjustment steps:

- Loosen the locknut(s) ①
- Turn the adjuster(s) ② in or out until the specified pedal height is obtained.



REAR BRAKE ADJUSTMENT/ BRAKE FLUID LEVEL INSPECTION



D-2

Turning In → Pedal height is lower.

Turning out → Pedal height is upper.

CAUTION:

After adjusting the brake pedal height, visually check the adjuster end through the hole ③ of the joint holder. The adjuster end must appear within this hole.

- Tighten the locknut(s).

CAUTION:

Make sure that the brake does not drag after adjusting it.

WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the motorcycle is operated. Air in the system will cause greatly diminished braking capability and can result in loss of control and an accident. Inspect and bleed the system if necessary.

3. Adjust:

- Brake light switch
Refer to the "BRAKE LIGHT SWITCH ADJUSTMENT" section.

*9533003

BRAKE FLUID LEVEL INSPECTION

NOTE:

Position the motorcycle straight up when inspecting the fluid level.

BRAKE FLUID LEVEL INSPECTION



1. Place the motorcycle on a level surface.

NOTE:

Place the motorcycle on its center stand if a center stand is equipped; if not, place a suitable stand under the motorcycle.

2. Inspect:

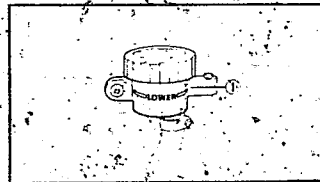
- Fluid level
Fluid level is under "LOWER" level line →
Fill to proper level.



Recommended fluid:

DOT #4

If DOT #4 is not available,
DOT #3 can be used.



NOTE:

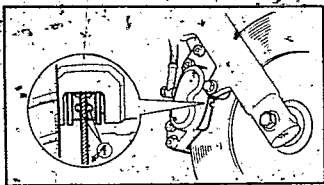
When inspecting the fluid level of the reservoir at the handlebars, make sure the master cylinder top is horizontally level.

CAUTION:

The fluid may corrode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

WARNING

- Use only the designated quality fluid. Otherwise, the rubber seals may deteriorate causing leakage and poor brake performance.
- Refill with the same type of fluid. Mixing fluids may result in a harmful chemical reaction leading to poor brake performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.



VB533054

BRAKE PAD INSPECTION

1. Activate the brake lever or brake pedal.
 2. Inspect:
 - Brake pad
- Wear indicator ① nearly contacting brake disc → Replace brake pads as a set.
- Refer to the "BRAKE PAD REPLACEMENT" section in the CHAPTER 7.

VB533005

BRAKE LIGHT SWITCH ADJUSTMENT

NOTE:

The brake light switch is operated by movement of the brake pedal. Proper adjustment is achieved when the brake light comes on just before the brake begins to take effect.

1. Check:
 - Brake light operating timing
- Incorrect → Adjust.

2. Adjust:
 - Brake light operating timing

Adjustment steps:

- Hold the main body ① of the switch with your hand so that it does not rotate, and turn the adjuster in or out ② until the operating timing is correct.



VB533006

AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

WARNING:

- Bleed the brake system if:
- The system has been disassembled.
 - A brake hose has been loosened or removed.
 - The brake fluid is very low.


- The brake operation is faulty.
- A loss of braking performance may occur if the brake system is not properly bled.

1. Bleed:
- Brake fluid

Air bleeding steps:

- a. Add proper brake fluid to the reservoir.
- b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- c. Connect the clear plastic tube ① tightly to the caliper bleed screw.
- d. Place the other end of the tube into a container.
- e. Slowly apply the brake lever or pedal several times.
- f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
- g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
- h. Tighten the bleed screw when the lever or pedal limit has been reached, then release the lever or pedal.



 **Bleed screw:**
6 Nm (0.6 m • kg, 4.3 ft • lb)

- i. Repeat steps (e) to (h) until the air bubbles have been removed from the system.

NOTE:

If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

AIR-BLEEDING (HYDRAULIC BRAKE SYSTEM)/ DRIVE CHAIN SLACK ADJUSTMENT



D-4

- j. Add brake fluid to proper level.

WARNING

Check the operation of the brake after bleeding the brake system.

YB533007

DRIVE CHAIN SLACK ADJUSTMENT

NOTE:

Before checking and/or adjusting, rotate the rear wheel several revolutions and check slack at several points to find the tightest point. Check and/or adjust the chain slack with the rear wheel in this "tightest" position.

CAUTION:

Too little of chain slack will overload the engine and other vital parts. Keep the slack within the specified limits.

WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Place the motorcycle on a level place and hold it in an upright position.

NOTE:

Both wheels should be on the ground without the rider on it.

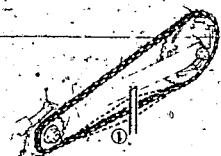
2. Check:

- Drive chain slack ③

Out of specification → Adjust.



Drive chain slack:
15~20 mm (0.59~0.79 in)
with both wheels on ground
without rider.

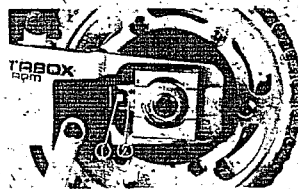


DRIVE CHAIN SLACK ADJUSTMENT



3. Loosen:

- Locknut (1) (rear wheel axle)
- Axle nut (2)
- Bolt (3) (brake caliper bracket)



4. Adjust:

- Drive chain slack

Adjustment steps:

- Loosen the locknut(s) (1)
- Turn the adjuster(s) (2) in or out until the specified slack is obtained.

Turning in → Slack is increased.

Turning out → Slack is decreased.

NOTE:

Turn each adjuster exactly the same amount to maintain correct axle alignment. (There are marks on each side of swingarm and on each chain puller. Use them to check for proper alignment.)

- Tighten the axle nut to specification while pushing up or down on the chain to zero slack.



Axle nut:
105 Nm (10.5 m · kg, 75 ft · lb)

- Tighten the locknut(s).

5. Tighten:

- Bolt (brake caliper bracket)
- Locknut (rear wheel axle)



Bolt (brake caliper bracket):
35 Nm (3.5 m · kg, 25 ft · lb)
Locknut (rear wheel axle):
45 Nm (4.5 m · kg, 32 ft · lb)

DRIVE CHAIN LUBRICATION/ STEERING HEAD ADJUSTMENT



D-5

Y6633008

DRIVE CHAIN LUBRICATION

The chain consists of many parts that work with each other. If the chain is not maintained properly, it will wear out rapidly. Therefore, form the habit of periodically servicing the chain. This service is especially necessary when riding in dusty conditions.

This motorcycle has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvents can damage these O-rings. Use only kerosene to clean the drive chain. Wipe it dry and thoroughly lubricate it with SAE 30 ~ 50W motor oil. Do not use any other lubricants on the drive chain. They may contain solvents that could damage the O-rings.



Recommended lubricant:
SAE 30 ~ 50 W Motor Oil or
chain lubricants suitable
for "O-ring" chains.

Y6633009

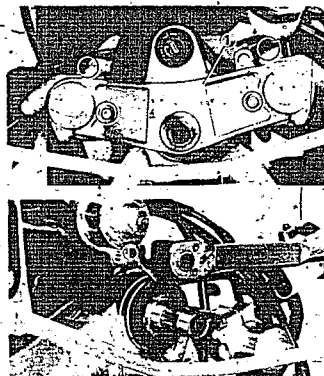
STEERING HEAD ADJUSTMENT

WARNING:

Securely support the motorcycle so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Check:
 - Steering assembly bearings
 - Grasp the bottom of the forks and gently rock the fork assembly back and forth.
 - Looseness → Adjust steering head.
3. Remove:
 - Front wheel
 - Refer to the "FRONT WHEEL" section in CHAPTER 7.

STEERING HEAD ADJUSTMENT



4. Adjust:
 - Steering head

Adjustment steps:

- Remove the handle crown (1) and special washer.
- Remove the ring nut (upper) and rubber washer.
- Tighten the ring nut (lower) using the ring nut wrench (2).

NOTE:

Set the torque wrench to the Ring nut wrench so that they form a right angle.



Ring nut wrench:
P/N 90890-01403



Ring nut (initial tightening):
38 Nm (3.8 m · kg, 27 ft · lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the Ring nut wrench.

WARNING:

Avoid over-tightening.



Ring nut (final tightening):
6 Nm (0.6 m · kg, 4.3 ft · lb)

NOTE:

Recheck the steering head by turning the steering from left to right.

If steering is bound, remove the steering stem assembly and inspect the steering bearing. Refer to the "STEERING HEAD" section in the CHAPTER 7.

- Install the rubber washer and ring nut (upper).

STEERING HEAD ADJUSTMENT



D-6



- Finger tighten the ring nut (upper), then align the slot of both ring nuts. If not aligned, hold the ring nut (lower) and tighten the other until they are aligned.

NOTE:

Make sure the special washer tab is placed in the slots.

- Install the handle crown.

	• Bolt (steering shaft):
	• 110 Nm (11 m · kg, 80 ft · lb)
	Pinch bolt (handle crown):
• 22 Nm (2.2 m · kg, 17 ft · lb)	

5. Install:

- Front wheel
- Refer to the "FRONT WHEEL" section in CHAPTER 7.

FRONT FORK INSPECTION/ FRONT FORK ADJUSTMENT



Y8533010

FRONT FORK INSPECTION

WARNING:

Securely support the motorcycle so there is no danger of it falling over.

1. Place the motorcycle on a level place.
2. Check:
 - Inner tube
 - Scratch/Damage → Replace.
 - Oil seal
 - Excessive oil leakage → Replace.
3. Hold the motorcycle in upright position and apply the front-brake.
4. Check:
 - Operation
 - Pump the front fork up and down several times.
 - Unsmooth operation → RepairRefer to the "FRONT FORK" section in CHAPTER 7.



Y8533011

FRONT FORK ADJUSTMENT

WARNING:

- Always adjust each fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.
- Securely support the motorcycle so there is no danger of it falling over.

Spring preload

1. Adjust:
 - Spring preload
 - Turn the adjuster (1) in or out.

Turning in → Spring preload is harder.

Turning out → Spring preload is softer.



FRONT FORK ADJUSTMENT



D-7

Adjuster position:
 Standard: 6
 Minimum: 8
 Maximum: 1

CAUTION:

- Grooves are provided to show the adjusting level.
- Always keep the adjustment level equal on both forks.
- Never turn the adjuster beyond the maximum or minimum setting.

Rebound damping

1. Adjust:
- Rebound damping
 Turn the adjuster ① in or out.

Turning in → Rebound damping is harder.

Turning out → Rebound damping is softer.

Adjuster position:

Standard: 8 clicks out
 Minimum: 10 clicks out
 Maximum: 1 click out from full turn in

CAUTION:

- Always keep the adjustment level equal on both forks.
- Never attempt to turn the adjuster beyond the maximum or minimum setting.

FRONT FORK ADJUSTMENT/ REAR SHOCK ABSORBER ADJUSTMENT



Compression damping

1. Adjust:
- Compression damping
 Turn the adjuster ① in or out.

Turning in →
 Compression damping is harder.

Turning out →
 Compression damping is softer.

Adjuster position:

Standard: 8 clicks out
 Minimum: 10 clicks out
 Maximum: 1 click out from full turn in

CAUTION:

- Always keep the adjustment level equal on both forks.
- Never attempt to turn the adjuster beyond the maximum or minimum setting.

VB33012

REAR SHOCK ABSORBER ADJUSTMENT

WARNING

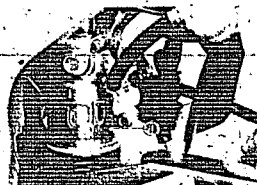
Securely support the motorcycle so there is no danger of it falling over.

Spring preload

1. Adjust:
- Spring preload
 Turn the adjuster. ① in or out.

Turning in → Spring preload is harder.

Turning out → Spring preload is softer.



REAR SHOCK ABSORBER ADJUSTMENT



D-8

Adjuster position:
Standard: 3
Minimum: 1
Maximum: 7

CAUTION:

Never turn the adjuster beyond the maximum or minimum setting.

Rebound damping

- Adjust:
- Rebound damping
- Turn the adjuster ① in or out.

Turning in → Rebound damping is harder.

Turning out → Rebound damping is softer.

Adjuster position:
Standard: 10 clicks out
Minimum: 24 clicks out
Maximum: 1 click out from full turn in

CAUTION:

Never turn the adjuster beyond the maximum or minimum setting.

Compression damping

- Adjust:
- Compression damping
- Turn the adjuster ① to in or out.

Turning in →
Compression damping is harder.

Turning out →
Compression damping is softer.

Adjuster position:
Standard: 5 clicks in
Minimum: 1 click in from full turn out
Maximum: 20 clicks in

CAUTION:

Never turn the adjuster beyond the maximum or minimum setting.

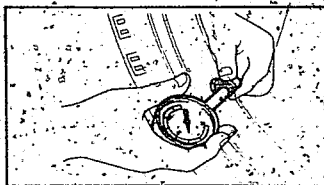
TIRE INSPECTION



YB5301A

TIRE INSPECTION

- Measure:
 - Tire pressure
- Out of specification → Adjust.



WARNING:

Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature. Tire inflation pressure must be adjusted according to total weight of cargo, rider, and accessories (fairing, saddlebags, etc. if approved for this model), and vehicle speed.

Proper loading of your motorcycle is important for the handling, braking, and other performance and safety characteristics of your motorcycle. Do not carry loosely packed items that can shift. Securely pack your heaviest items close to the center of the motorcycle, and distribute the weight evenly from side to side. Properly adjust the suspension for your load, and check the condition and pressure of your tires. **NEVER OVERLOAD YOUR MOTORCYCLE.** Make sure the total weight of the cargo, rider, and accessories (fairing, saddlebags, etc. if approved for this model) does not exceed the maximum load of the motorcycle. Operation of an overloaded motorcycle could cause tire damage, an accident, or even injury.

Basic weight:	
With oil and full fuel tank:	185 kg (408 lb)
Maximum load:	100 kg (220 lb)

TIRE INSPECTION



D-9

Cold tire pressure	Front	Rear
Up to Maximum load*	200kPa (2.0kg/ cm ²) 28 psil	250kPa (2.5kg/ cm ²) 36 psil

*Load is the total weight of cargo, rider, and accessories.

2. Inspect:

- Tire surfaces.
- Wear/Damage → Replace.

	Minimum tire tread depth: (front and rear): 1.0 mm (0.04 in)
--	--------------------------------------------------------------------

- (1) Tread depth
(2) Side wall
(3) Wear indicator

WARNING

- It is dangerous to ride with a worn-out tire. When a tire tread begins to show lines, replace the tire immediately.
- Do not use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.

Tube type wheel → Tube type tire only

Tubeless type wheel → Tube type or tubeless tire

- Be sure to install the correct tube when using tube type tires.

TIRE INSPECTION/ WHEEL INSPECTION



WARNING

After extensive tests, the tires mentioned below have been approved by Yamaha Motor Co., Ltd. for this model. No guarantee for handling characteristics can be given if tire combinations other than what is approved are used on this motorcycle. The front and rear tires should be of the same manufacture and design.

FRONT:

Manufacture	Size	Type
MICHELIN	120/60R17 55H	TX11

REAR:

Manufacture	Size	Type
MICHELIN	160/60R17 69H	TX23

WARNING

After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.

V8633015

WHEEL INSPECTION

1. Inspect:
- Wheels
 - Damage/Bends → Replace.

NOTE:

Always balance the wheel when a tire or wheel has been changed or replaced.

**WHEEL INSPECTION/
CABLE INSPECTION AND LUBRICATION**



D-10

WARNING

Never attempt to make any repairs to the wheel.

Y8533016

CABLE INSPECTION AND LUBRICATION

WARNING

Damaged cable sheath may cause corrosion and interfere with the cable movement. Replace damaged cables as soon as possible.

1. Inspect:

- Cable sheath
- Damage → Replace.

2. Check:

- Cable operation
- Unsmooth operation → Lubricate.



Recommended lubricant:
SAE 10W30 motor oil

NOTE:

Hold cable and upward and apply several drops of lubricant into the cable.

**LEVER AND PEDAL LUBRICATION/SIDESTAND
LUBRICATION/REAR SUSPENSION LUBRICATION**



Y8533017

LEVER AND PEDAL LUBRICATION

Lubricate the lever and pedal at their pivoting points.



Recommended lubricant:
Lithium soap base grease

Y8533018

SIDESTAND LUBRICATION

Lubricate the sidestand at pivoting points.



Recommended lubricant:
Lithium soap base grease

Y8533018

REAR SUSPENSION LUBRICATION

Lubricate the swingarm and relay arms at their pivoting points.



Recommended lubricant:
Molybdenum disulfide grease

VB554001

**ELECTRICAL
BATTERY INSPECTION
NOTE:**

Since the MF battery is of a sealed-type construction, it is impossible to measure the specific gravity of the electrolyte in order to check the state of charge in the battery. Therefore, to check the state of charge in the battery, voltage must be measured at the battery terminals.

CAUTION:**CHARGING METHOD**

- This battery is sealed type. Never remove sealing caps even when charging. With the sealing cap removed, this balancing will not be maintained, and battery performance will lower gradually.

- Never add water. If distilled water is added, chemical reaction in the battery will not proceed in the normal way, thus making it impossible for the battery to operate regularly.

- The charging time, charging current and charging voltage for the MF battery is different than general type batteries.

The MF battery should be charged as instructed in the "Charging method". Should the battery be overcharged, the electrolyte level will over extremely. Therefore, use special care when charging the battery.

- Avoid using any electrolyte other than specified. The specific gravity of the MF battery electrolyte is 1.32 at 20 C (68 F). (The specific gravity of the general type battery electrolyte is 1.28.) If the electrolyte whose specific gravity is less than 1.32, the sulfuric acid will decrease and thus low battery performance will result. Should any electrolyte, whose specific gravity is 1.32 or more, be used, the battery plates will corrode and battery life will shorten.

**WARNING:**

Battery electrolyte is dangerous: it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- Avoid bodily contact with electrolyte as it can cause severe burns and permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN - Flush with water.
- EYES - Flush with water for 15 minutes and get immediate medical attention.

Antidote (INTERNAL):

- Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.

Batteries generate explosive hydrogen gas.

Always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)
- DO NOT SMOKE When charging or handling batteries.

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

1. Remove:

- Seat

2. Disconnect:

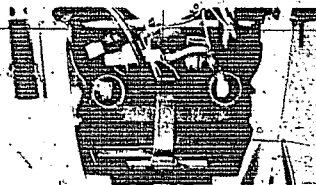
- Battery leads

CAUTION:

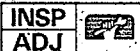
Disconnect the negative lead first and then disconnect the positive lead.

3. Remove:

- Battery

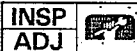


BATTERY INSPECTION

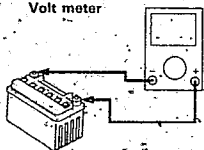


D-12

BATTERY INSPECTION



Volt meter



4. Check:

- Battery condition

Battery condition checking steps:

- Connect the pocket tester to the battery terminals.

- Tester (+) lead → Battery (+) terminal.
- Tester (-) lead → Battery (-) terminal.

NOTE:

The state of a discharged MF battery can be checked by measuring open circuit voltage (the voltage measured with the positive terminals being disconnected).

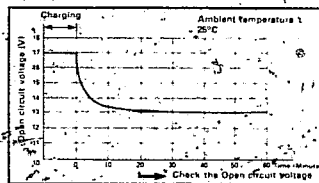
Open-circuit voltage	Charging time
12.8 v or higher	No charging is necessary.
12.7 v - 11.5 v	5 - 10 hours
Less than 11.5 v	15 - 20 hours

- Battery condition chart as shown.

5. Charging method of MF battery

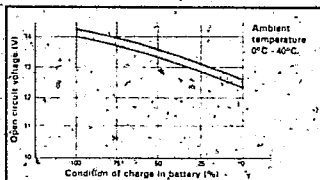
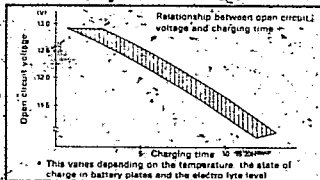
CAUTION:

- If it is impossible to set the standard charging current, be careful not to overcharge.
- When charging the battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle for some reason, be sure to disconnect the wire at the negative terminal.)

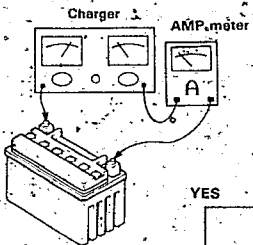


ve terminal.)

- Never remove the sealing plug from the MF battery.
- Use special care so that charging clips are in a full contact with the terminal and that they are not shorted. (A corroded clip of the charger may cause the battery to generate heat at the contact area. A weak clip spring may cause sparks.)
- Before removing the clips from the battery terminals, be sure to turn off the power switch of the charger.
- Change in the open-circuit voltage of the MF battery after being charged is shown below. As shown in the figure, the open-circuit voltage is stabilized 30 minutes after charging has been completed. Therefore, to check the condition of the battery, measure the open-circuit voltage 30 minutes after has been completed.



Charging method using a variable-current (voltage) type charger



Measure the open-circuit voltage prior to charging.

NOTE: Voltage should be measured 30 minutes after the machine is stopped.

Connect a charger and AMP meter to the battery and start charging.

NOTE: Set the charging voltage at 16-17v. If the setting is lower, charging will be insufficient. If too high, the battery will be over charged.

Make sure the current is higher than the standard charging current written on the battery.

YES

NO

Adjust the voltage so that current is at standard charging level.

By turning the charging voltage adjust dial, set the charging voltage at 20-25 v.

Monitor the amperage for 3-5 minutes to check if the standard charging current is reached.

1A or more
If the current is more than 1 amp, adjust the voltage to 16-17 v and continue charging.

NO

After 5 minutes, adjust the voltage to 16-17 v, and continue charging.

If current does not exceed standard charging current after 5 minutes, replace the battery.

Set the timer according to the charging time suitable for the open-circuit voltage.

In case that charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

Measure the battery open-circuit voltage after having left the battery unused for more than 30 minutes.
12.8 v or more --- Charging is complete
12.7 v or less --- Recharging is required
Under 12.0 v --- Replace the battery

Charging method using a constant-voltage type charger

Measure the open-circuit voltage prior to charging.

NOTE: Voltage should be measured 30 minutes after the machine is stopped.

Connect a charger and AMP meter to the battery, and start charging.

Make sure the current is higher than the standard charging current written on the battery.

YES

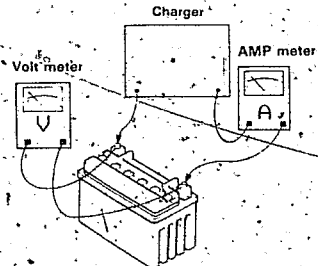
NO

Charge the battery until the battery's charging voltage is 16 volts or more.

NOTE: Set the charging time at 20 hours (maximum).

This type of battery charger cannot charge the MF battery. A variable voltage charger or a constant current charger is recommended.

Check the open-circuit voltage after having left the battery for 30 minutes after charging.
12.8 v or more --- Charging is complete.
12.7 v or less --- Recharging is necessary.
Under 12 v --- Replace the battery.



Charging method using a constant current type charger (Exclusive for MF Battery):

Measure the open-circuit voltage prior to charging

NOTE:
Voltage should be measured 30 minutes after the machine is stopped

Connect a charger and AMP meter to the battery, and start charging

After one hour of charging, make sure the rated charging current of the charger is flowing by checking AMP meter.

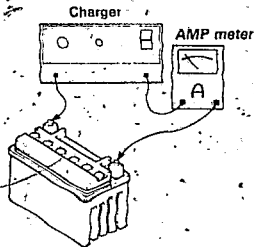
YES

NO

Since the charging current is constant, the charging time varies depending on the battery capacity.
Set the charging time according to the instructions specified for the charger.

If rated current is not flowing, replace the battery.

Measure the battery open-circuit voltage after having left the battery unused for more than 30 minutes
12.8 v or more --- Charging is complete.
12.7 v or less --- Recharging is required.
Under 12.0 v --- Replace the battery



FUSE INSPECTION

CAUTION:

Always turn off the main switch when checking or replacing a fuse. Otherwise, short-circuiting may occur.

1. Remove:

- Tail cover
- Refer to the "COWLING" section.

2. Inspect:

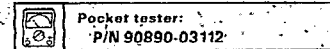
- Fuse

Inspection steps:

- Connect the Pocket tester to the fuse and check it for continuity.

NOTE:

Set the tester selector to "Ωx1" position.



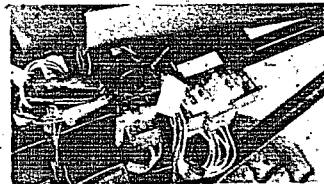
- If the tester indicates at . . . Replace the fuse.

3. Replace:

- Blown fuse

Replacement steps:

- Turn off the ignition.
- Install a new fuse of proper amperage.
- Turn on the switches to verify operation of the effected electrical device.
- If the fuse immediately blows again, check



FUSE INSPECTION/ HEADLIGHT BEAM ADJUSTMENT



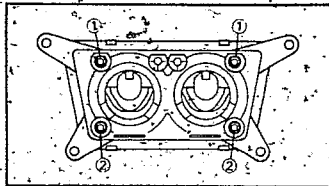
D-15

the electrical circuit.

WARNING:

Never use a fuse with a rating other than specified. Never use other material in place of a fuse. An improper fuse may cause damage to the electrical system, to possibly cause a fire, the lighting and/or ignition.

4. Install:
- Tag cover



8534002

HEADLIGHT BEAM ADJUSTMENT

1. Adjust:

- Headlight beam (horizontally)
- Turn the adjuster (1) in or out.

Right side:

Turning in → Headlight beam moves right.

Turning out → Headlight beam moves left.

Left side:

Turning in → Headlight beam moves left.

Turning out → Headlight beam moves right.

2. Adjust

- Headlight beam (vertically)
- Turn the adjuster (2) in or out.

Turning in → Headlight beam moves higher.

Turning out → Headlight beam moves lower.

HEADLIGHT BULB REPLACEMENT



8534004

HEADLIGHT BULB REPLACEMENT

1. Remove:

- Cover



2. Remove:

- Bulb holder
- Bulb

NOTE:

Unhook the bulb holder and remove the defective bulb.



WARNING:

Keep flammable products and your hands away from the bulb while it is on. It will be hot. Do not touch the bulb until it cools down.

3. Install:

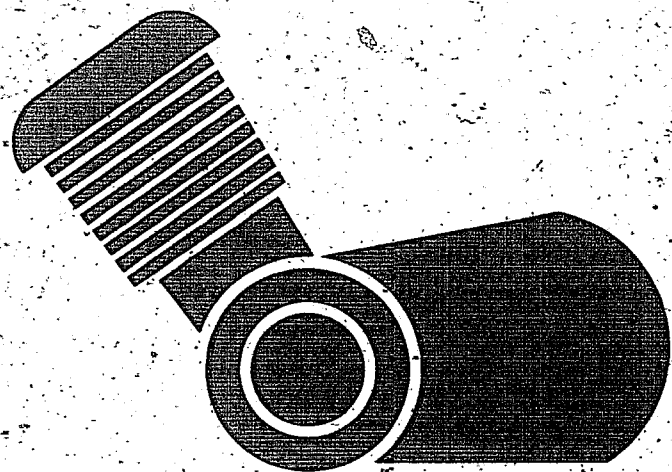
- Bulb (new)
- Secure the new bulb with the bulb holder.

CAUTION:

Avoid touching glass part of bulb and keep it free from oil. Otherwise, transparency of glass, bulb life and illuminance flux will be adversely affected. If oil gets on the bulb, clean it with a cloth moistened with alcohol or lacquer thinner.

4. Install:

- Cover



ENG

4



CHAPTER 4. ENGINE OVERHAUL

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YB541001

ENGINE OVERHAUL ENGINE REMOVAL

NOTE:

It is not necessary to remove the engine in order to remove the following components:

- Cylinder head
- Cylinder
- Piston
- Clutch
- Oil pump
- Water pump
- AC magneto

YB541002

COWLING

1. Remove:

- Lower cowl
- Upper cowl
- Fuel tank

Refer to the "COWLING" section in the CHAPTER 3.

2. Drain:

- Engine oil
- Coolant

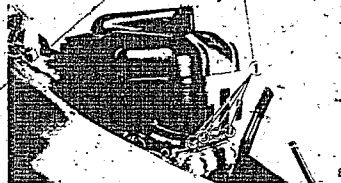
Refer to the "ENGINE OIL REPLACEMENT/COOLANT REPLACEMENT" section in the CHAPTER 3.

YB541003

AIR FILTER

1. Disconnect:

- Crankcase breather hose (1)
- Drain hose (2)



2. Loosen:

- Clamp (1) (air filter joint)

3. Remove:

- Air filter case

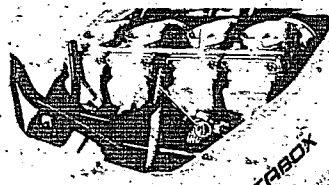


YB541004

CARBURETOR

1. Disconnect:

- Starter cable (1)



2. Remove:

- Fuel hose (1)

3. Loosen:

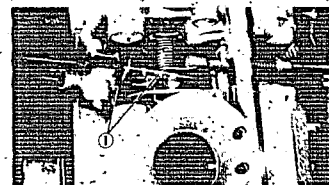
- Clamp (carburetor joint)

4. Remove:

- Carburetor
(from intake manifold)

NOTE:

Cover the carburetor with a clean rag to prevent dirt or foreign material from entering the carburetor.



5. Remove:

- Throttle cables (1)



YB541005

BATTERY LEADS

1. Disconnect:

- Battery leads

CAUTION:

Disconnect the negative lead ① first and then disconnect the positive lead ②.

YB541006

RADIATOR

1. Remove:

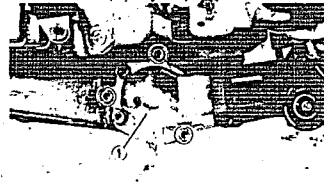
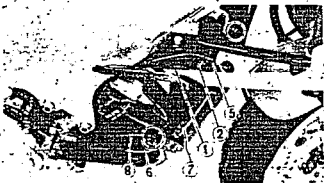
- Radiator hose ① (radiator-thermostat housing)
- Radiator hose ② (radiator-joint)
- Radiator hose ③ (radiator-waterpump cover)
- Fan motor coupler ④
- Reservoir hose ⑤
- Radiator hose ⑥ (radiator-oil filter)
- Radiator ⑦
- Radiator stay ⑧

YB541007

MUFFLER

1. Remove:

- Ex-up cover ①



2. Insert the pin (Ø4) ① into the pulley hole.

3. Remove:

- Bolt ② (pulley)

4. Remove:

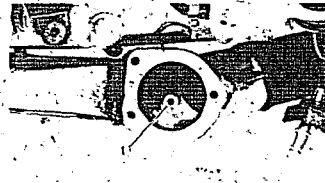
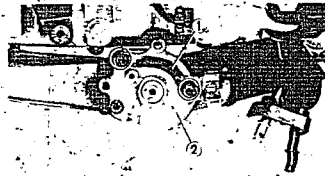
- Pulley ③

5. Disconnect:

- Pulley cables ④

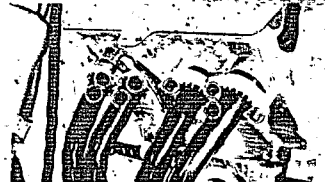
6. Remove:

- Bracket ①
- Housing ②
- Gasket



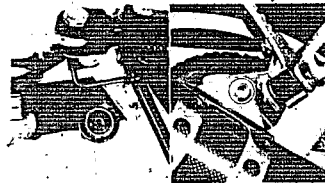
7. Remove:

- Ex-up valve ①
- Bush



8. Remove:

- Muffler assembly





YB541008

OIL FILTER**1. Remove:**

- Oil filter ①
- Use the oil filter wrench.



Oil filter wrench:
P/N 90890-01426

YB541009

CLUTCH CABLE**1. Remove:**

- Shift arm ①
- Crankcase cover ② (left)
- Spacer

2. Disconnect:

- Clutch cable ①

YB541010

DRIVE SPROCKET**1. Straighten:**

- Lock washer tab.

2. Remove:

- Nut ①
- Lock washer ②
- Drive sprocket ③

NOTE:

Loosen the nut while applying the rear brake.

YB541011

LEADS**1. Disconnect:**

- Ground lead ①
- Starter motor lead ②
- Oil pressure switch/Neutral switch coupler ③
- AC magneto coupler ④
- Sidestand switch coupler ⑤
- Thermo switch/Thermo unit coupler ⑥

2. Remove:

- Cover ①
- Spark plug cap

YB541012

ENGINE REMOVAL**1. Loosen:**

- Pinch bolts ① (engine mount bolt)

2. Remove:

- Mounting bolts ② (front—upper)

3. Remove:

- Mounting bolt ① (rear—upper)
- Collar ②

4. Remove:

- Mounting bolt ① (rear—lower)



Y8542001

ENGINE DISASSEMBLY CYLINDER HEAD COVER, CAMSHAFT AND CYLINDER HEAD.

NOTE:

With the engine mounted, the cylinder head cover, camshaft and cylinder head can be maintained by removing the following parts.

- Lower cowl
- Fuel tank
- Radiator

1. Remove:

- Cylinder head cover ①

NOTE:

Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.

2. Remove:

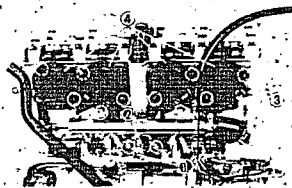
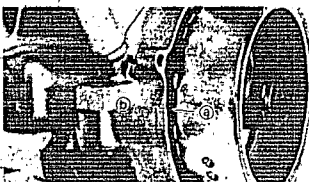
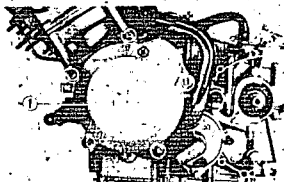
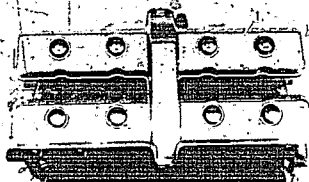
- Magneto cover ①

3. Align:

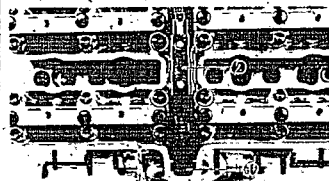
- T mark
(with crankcase surface)

NOTE:

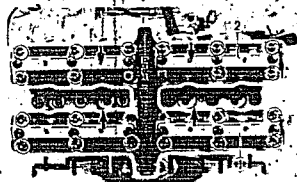
Turn the crankshaft counterclockwise and align the T mark ② on the AC magneto rotor with the crankcase matching surface ① when #1 piston is at TDC on compression stroke.

**4. Remove:**

- Camchain tensioner cap bolt ①
- Camchain tensioner ②
- Thermostat housing ③
- Carburetor joint ④

**5. Remove:**

- Chain guide ① (upper)
- Chain guide ② (exhaust)

**6. Remove:**

- Camshaft caps ① (intake)
- Camshaft caps ② (exhaust)

NOTE:

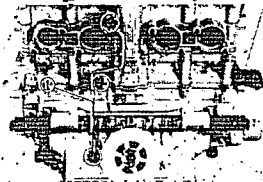
Remove the camshaft cap bolts from both side to in side.

**7. Remove:**

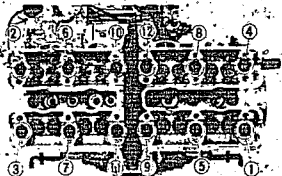
- Camshafts ①

NOTE:

Fasten a safety wire ② to the timing chain to prevent it from falling into the crankcase

**8. Remove:**

- Oil delivery pipe ①



9. Remove:

- Nuts (cylinder head)

NOTE:

- Loosen the bolts in their proper loosening sequence.
- Follow numerical order shown in photo. Start by loosening each nut 1/2 turn until all are loose.

YB542002

CYLINDER AND PISTON**NOTE:**

With the engine mounted, the cylinder and piston can be maintained by removing the following parts.

- Lower cowl
- Fuel tank
- Radiator
- Cylinder head

1. Remove:

- Joint ①
- Pipe ②

2. Remove:

- Dowel pins ①
- Cylinder head gasket ②
- Cylinder ③
- Dowel pins
- Cylinder gasket

3. Remove:

- Piston pin clips ①
- Piston pins ②
- Pistons ③

NOTE:

- Before removing piston pin clips, cover crankcase with a clean rag to prevent clips from falling into crankcase cavity.
- Before removing the piston pin, deburr the clip grooved and pin hole area. If the piston

pin groove is deburred and piston pin is still difficult to remove, use piston pin puller.

- Put identification mark on the each piston head for reference during reinstallation.



Piston pin puller:

P/N 90890-01304

CAUTION:

Do not use a hammer to drive the piston pin out.

YB542003

CLUTCH**NOTE:**

With the engine mounted, the clutch assembly can be maintained by the following parts.

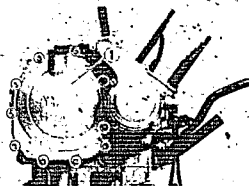
- Lower cowl

1. Remove:

- Crankcase cover ① (right)

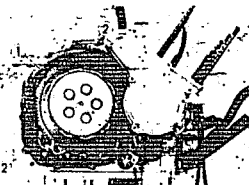
NOTE:

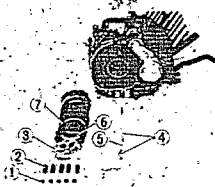
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



2. Remove:

- Gasket ① (crankcase cover)
- Dowel pins ②





3. Remove:

- Bolts (1)
- Clutch springs (2)
- Pressure plate (3)
- Push rod (4)
- Ball (5)
- Friction plates (6)
- Clutch plates (7)

NOTE:

Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.

4. Straighten:

- Lock washer tab

5. Loosen:

- Nut (1) (clutch boss)

NOTE:

Loosen the nut (clutch boss) while holding the clutch boss with universal clutch holder (2).



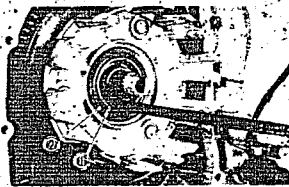
Universal clutch holder:
P/N 90890-04086

6. Remove:

- Nut (clutch boss) (1)
- Lock washer (2)
- Clutch boss (3)

7. Remove:

- Thrust plate (1)



8. Remove:

- Spacer (1)
- Bearing (2)

NOTE:

Remove the spacer using the slide hammer bolt (IM6) (3) and weight.



Slide hammer bolt (IM6):

P/N 90890-01083

Weight:

P/N 90890-01084

9. Remove:

- Clutch housing (1)
- Thrust plate (2)
- Collar (3)

18542004

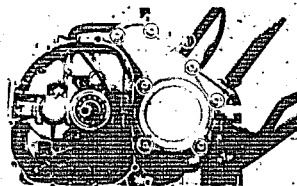
STARTER CLUTCH**NOTE:**

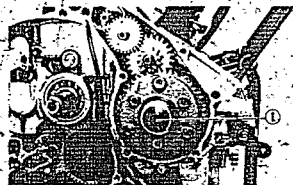
With the engine mounted, starter clutch can be maintained by removing the following parts.

- Lower cawl
- Magneto cover

1. Remove:

- Starter clutch cover (1)
- Dowel pins
- Gasket





2. Remove:

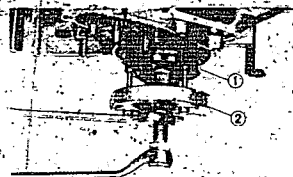
- Bolt (1) (starter clutch)

NOTE:

Loosen the bolt (starter clutch) while hold the rotor with the sheave holder.



Sheave holder:
P/N 90890-01701

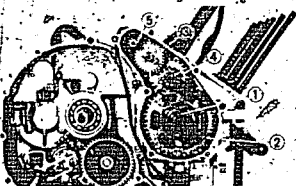


3. Remove:

- Starter clutch (1)
- Use the flywheel puller (2).



Flywheel puller:
P/N 90890-01362



4. Remove:

- Woodruff key (1)
- Starter clutch gear (2)
- Idle gear (3)
- Idle gear (4)
- Starter motor gear (5)

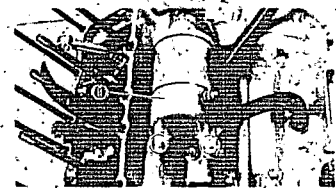
YB542005

A.C. MAGNETO

NOTE:

With the engine mounted, A.C. magneto and starter motor can be maintained by removing the following parts.

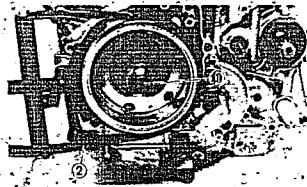
- Lower cowl
- Fuel tank



1. Remove:

- Starter motor (1)

4-13



2. Remove:

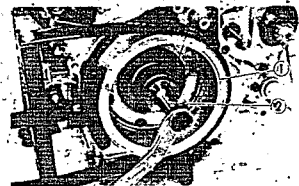
- Bolt (rotor) (1)
- Washer (2)

NOTE:

Loosen the bolt (rotor) (1) while holding the rotor by the sheave holder (2).



Sheave holder:
P/N 90890-01701



3. Remove:

- Rotor (1)
- Woodruff key

NOTE:

Remove the rotor (1) using the sheave holder and rotor puller (2).



Rotor puller:
P/N 90890-01080

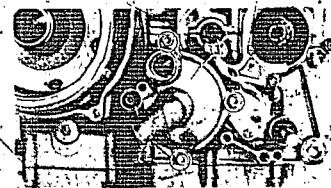
YB542006

WATER PUMP

NOTE:

With the engine mounted, the water pump can be maintained by the following parts.

- Lower cowl
- Shift arm
- Crankcase cover (left)
- AC magneto



1. Remove:

- Water pump housing cover (1)
- O-ring (2)

4-14



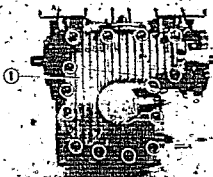
2. Remove:
 • Water pump housing (1)

YB542007

OIL PAN AND OIL STRAINER**NOTE:**

With the engine mounted, the oil pan, oil filter and oil strainer can be maintained by removing the following parts.

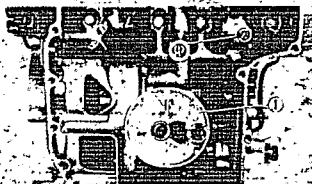
- Lower cowl
- Muffler



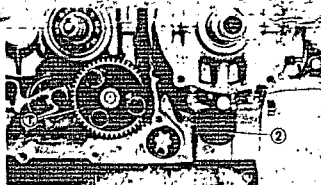
1. Remove:
 • Oil pan (1)
 • Dowel pins
 • Gasket

NOTE:

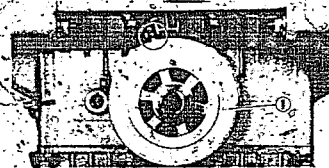
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



2. Remove:
 • Oil strainer
 • Oil strainer housing (1)
 • Relief valve (2)



3. Remove:
 • Oil pump (1)
 • Dowel pin
 • Gasket
 • Oil pressure switch (2)



4. Remove:
 • Lower cowl
 • Oil filter housing (1)

YB542008

SHIFT SHAFT**NOTE:**

With the engine mounted, the shift shaft can be maintained by the following parts.

- Lower cowl
- Shift arm
- Crankcase cover (right)
- Clutch assembly



1. Remove:
 • Neutral switch (1)



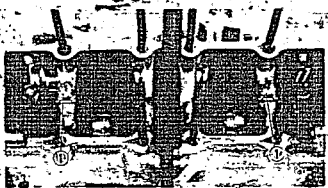
2. Remove:
 • Shift shaft (1)
 • Stopper lever (2)
 • Spring



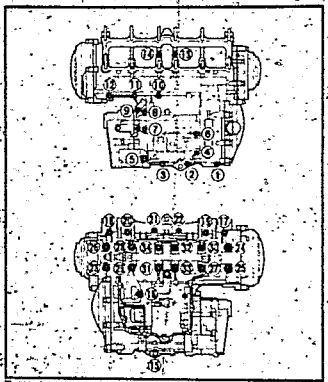
YB542009

CRANKCASE**1. Remove:**

- Oil seal guide (1)



2. Remove:
• Nozzle (1)



3. Remove:
• Bolts (crankcase)

NOTE:

- Loosen the bolts 1/4 turn each and remove them after all are loosened.
- Loosen the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase (lower) designate the tightening sequence.

4. Remove:
• Lower crankcase (1)

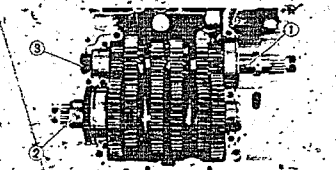
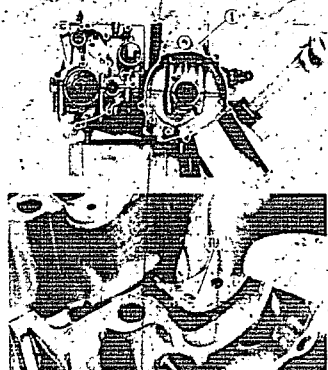
CAUTION:

Use a soft hammer to tap on the case half. Tap only on reinforced portions of the case. Do not tap on the gasket mating surface. Work slowly and carefully. Make sure that the case halves separate evenly.

5. Remove:
• Main journal bearing (1)
(from lower crankcase)

NOTE:

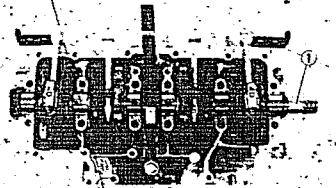
Identify each plane bearing position very carefully so that it can be reinstalled in its original place.



Y8542010

TRANSMISSION

1. Remove:
• Main axle (1)
• Drive axle (2)
• Oil seal (3)



Y8542011

CRANKSHAFT

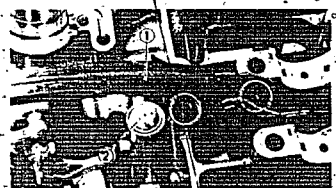
1. Remove:
• Crankshaft (1)



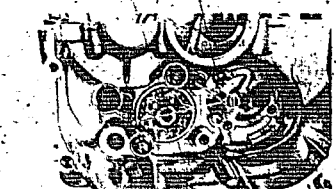
2. Remove:
• Main journal bearing (1)
(from upper crankcase)

NOTE:

Identify each plane bearing position very carefully so that it can be reinstalled in its original place.



3. Remove:
• Chain guide (1)
• Orifice (2)



Y8542012

SHIFT FORK AND SHIFT CAM

1. Remove:
• Stapper plate (1)

ENGINE DISASSEMBLY

ENG



E-12



2. Remove:
- Shift guide bar ①
 - Shift fork 1 ②
 - Shift fork 2 ③
 - Shift fork 3 ④



3. Remove:
- Shift cam ①

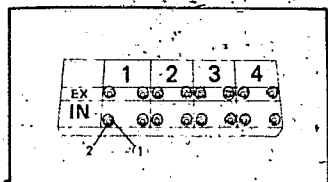
YB542013

VALVE

NOTE:

Before removing the interjial parts (valve, valve spring, valve seat etc.) of the cylinder head.

The valve sealing should be checked.



1. Remove:

- Lifters ①
- Pads ②

NOTE:

Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.

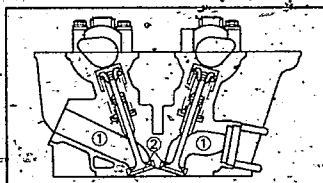
2. Check:

- Valve sealing

Leakage at valve seat → Inspect the valve face, valve seat and valve seat width
Refer to the "INSPECTION AND REPAIR - VALVE SEAT".

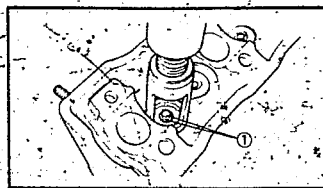
ENGINE DISASSEMBLY

ENG



Checking steps:

- Pour a clean solvent ① into the intake and exhaust ports
- Check the valve sealing.
There should be no leakage at the valve seat ②




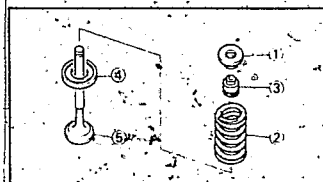
3. Remove:

- Valve cotters ①

NOTE:

Remove the valve cotters while compressing the valve spring with the valve spring compressor.

 Valve spring compressor:
P/N 90890-04109
Attachment:
P/N 90890-04114



4. Remove:

- Valve retainers ①
- Valve spring ②
- Oil seal ③
- Spring seat ④
- Valve ⑤

NOTE:

Identify each part position very carefully so that it can be reinstalled in its original place.



YB542014

OIL PUMP

1. Remove:

- Rotor housing ①
- Dowel pins ②



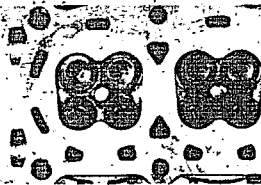
2. Remove:

- Outer rotor ①
- Inner rotor ②
- Pin ③
- Washer ④
- Oil pump cover ⑤
- Driven gear shaft ⑥

YB543001

INSPECTION AND REPAIR
CYLINDER HEAD

- Eliminate:
- Carbon deposits
(from combustion chamber)
- Use a rounded scraper



NOTE:

Do not use a sharp instrument and avoid damaging or scratching:

- Spark plug threads
- Valve seat

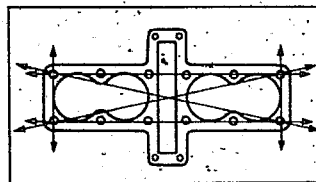
2. Inspect:

- Cylinder head
Scratches/Damage → Replace.
- Water jacket
Crust of minerals/Rust → Eliminate

3. Measure:

- Cylinder head warpage
Out of specification → Resurface.

	Warpage limit:
	0.05 mm (0.002 in)



Warpage measurement and resurfacing step:

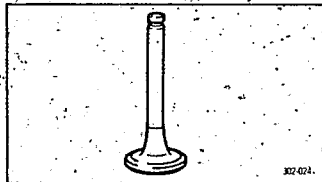
- Attach a straight edge and a thickness gauge on the cylinder head.
- Measure the warpage.
- If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head



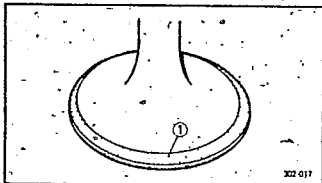
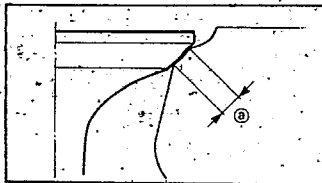
using a figure-eight sanding pattern.

NOTE:

Rotate the head several times to avoid removing too much material from one side.



302-074



302-077

V8543002

VALVE SEAT**1. Eliminate:**

- Carbon deposit (from valve face and valve seat)

2. Inspect:

- Valve seat
- Pitting/Wear → Refuse the valve seat.

3. Measure:

- Valve seat width **a**
- Out of specification → Reface valve seat.

**Valve seat width:**

Intake →

0.9 ~ 1.1 mm (0.035 ~ 0.043 in)

Exhaust

0.9 ~ 1.1 mm (0.035 ~ 0.043 in)

Measurement steps:

- Apply the Mechanic's bluing dye (Dykem) **1** to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Wherever the valve seat and valve face made contact, bluing will have been removed.
- If the valve seat width is too wide, too narrow, or seat has not centered, the valve seat must be refaced.

**4. Reface:**

- Valve seat
- Use a 30°, 45° and 60° valve seat cutter.

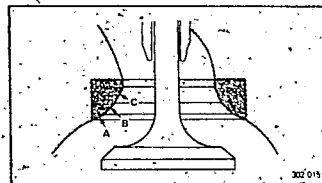


Valve seat cutter:

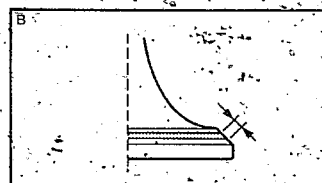
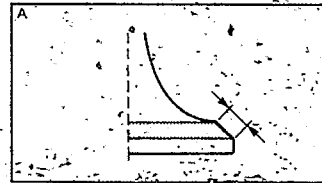
YM-91043

CAUTION:

When twisting cutter, keep an even downward pressure (4 ~ 5 kg) to prevent chatter marks.



302-015

**Cut section as follows**

Section	Cutter
A	30°
B	45°
C	60°

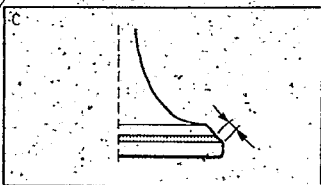
Refacing steps:

- A** Valve seat is centered on valve face but it is too wide.

Valve seat cutter set		Desired result
Use	30° cutter	To reduce valve seat width to 1.0 mm (0.039 in).
lightly	45° cutter	

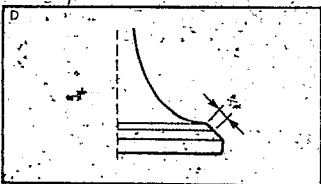
- B** Valve seat is in the middle of the face but it is too narrow.

Valve seat cutter set		Desired result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.039 in).



- C Valve seat is too narrow and it is near valve margin.

Valve seat cutter set		Desired result
Use	First: 30° cutter	To center the seat and to achieve its width of 1.0 mm (0.039 in).
	Second: 45° cutter	



- D Valve seat is too narrow and it is located near the bottom edge of the valve face.

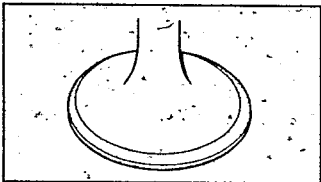
Valve seat cutter set		Desired result
Use	First: 60° cutter	To center the seat and increase its width.
	Second: 45° cutter	

5. Lap:

- Valve face
- Valve seat

NOTE:

After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.

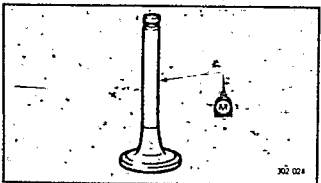


Lapping steps:

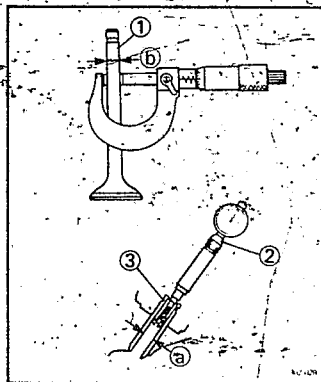
- Apply a coarse lapping compound to the valve face.

CAUTION:

Be sure no compound enters the gap between the valve stem and guide.



- Apply a molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.



VB543003

VALVE AND VALVE GUIDE

1 Measure:

- Stem-to-guide clearance

Stem-to-guide clearance =
Valve guide inside diameter (A) -
Valve stem diameter (B)

Out of Specification → Replace valve guide

Stem-to-guide clearance:

Intake:

0.010 ~ 0.037 mm
(0.0004 ~ 0.0015 in)
(Limit): 0.08 mm (0.0031 in)

Exhaust:

0.025 ~ 0.052 mm
(0.0010 ~ 0.0020 in)
(Limit): 0.10 mm (0.0039 in)

NOTE:

To obtain the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

- Apply fine lapping compound to the valve face and repeat the above steps.

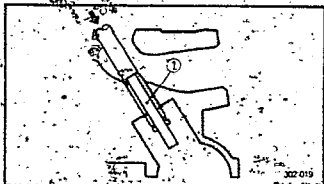
NOTE:

Be sure to clean off all compound from the valve face and valve seat after every lapping operation.

- Apply a Mechanic's bluing dye (Dykem) to the valve face.
- Install the valve into the cylinder head.

- Press the valve through the valve guide and onto the valve seat to make a clear pattern.

- Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the valve seat.

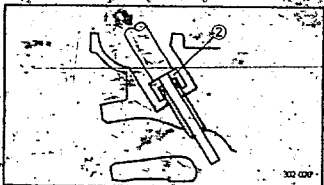


2. Replace:
• Valve guide

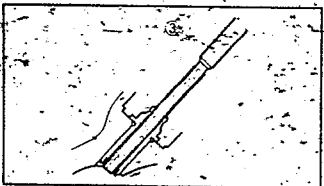
Replacement steps:

NOTE:

Heat the cylinder head in an oven to 100°C (212°F) to ease guide removal and installation and to maintain correct interference fit.



- Remove the valve guide using the valve guide remover ①
• Install the valve guide (new) using the valve guide installer ② and valve guide remover ①
• After installing the valve guide, bore the valve guide using the valve guide reamer ③ to obtain proper stem-to-guide clearance.



- Valve guide remover (4 mm):
P/N 90890-04111
Valve guide installer (4 mm):
P/N 90890-04112
Valve guide reamer (4 mm):
P/N 90890-04113

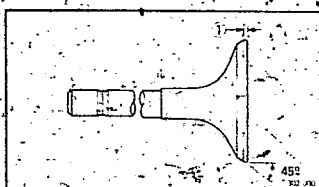
NOTE:

Reface the valve seat after replacing the valve guide.

3. Eliminate:
• Carbon deposit
(from valve face)

4. Inspect:

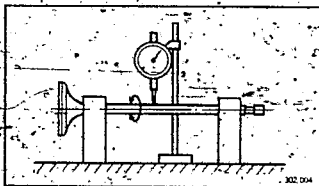
- Valve face
Pitting/Wear → Grind the face.
- Valve stem end
Mushroom sharp or diameter larger than rest of stem → Replace.



5. Measure:

- Margin thickness ③
- Out of specification → Replace

Margin thickness:
Limit: 0.6 mm (0.024 in)



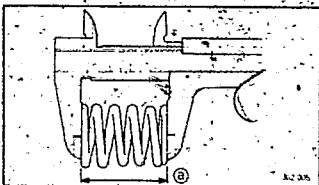
6. Measure:

- Runout (valve stem)
- Out of specification → Replace

Runout:
Less than 0.01 mm (0.0004 in)

NOTE:

- Always replace the guide if the valve is replaced.
- Always replace the oil seal if the valve is removed.



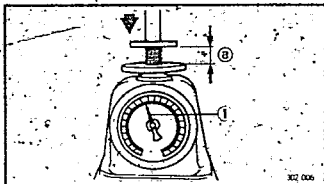
302 004

VALVE SPRING

1. Measure:

- Free length ③ (valve spring)
- Out of specification → Replace

Free length (valve spring):
Intake:
38.00 mm (1.496 in)
Exhaust:
38.00 mm (1.496 in)



2. Measure:

- Compressed force (valve spring) ①
- Out of specification → Replace.

② Installed length:



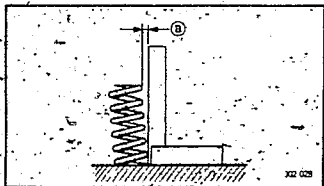
Compressed force:

Intake:

14.3 kg (31.5 lb)
at 35.5 mm (1.4 in)

Exhaust:

14.3 kg (31.5 lb)
at 35.5 mm (1.4 in)



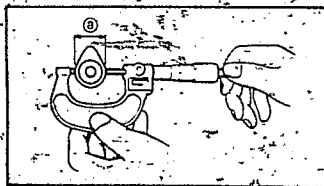
3. Measure:

- Spring tilt ②
- Out of specification → Replace.



Spring tilt:

Less than 1.8 mm (0.071 in)



VB543005

CAMSHAFT

1-Inspect:

- Cam lobes
- Pitting/Scratches/Blue discoloration → Replace.

2. Measure:

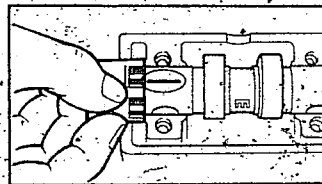
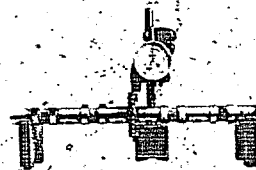
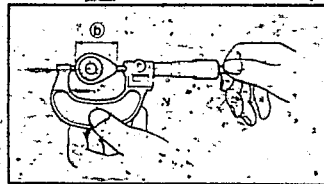
- Cam lobes length ③ and ④
- Out of specification → Replace



Cam lobes length:

Intake:

③ 25.005 mm (0.984 in)
④ 32.50 mm (1.280 in)



Cam lobes length:

Exhaust

③ 24.96 mm (0.983 in)
④ 32.20 mm (1.268 in)

3. Measure:

- Runout (camshaft)
- Out of specification → Replace.



Runout (camshaft):

Less than 0.03 mm (0.0012 in)

4. Measure:

- Camshaft-to-cap clearance
- Out of specification → Measure bearing diameter (camshaft).



Camshaft-to-cap clearance:

0.08 mm (0.0031 in)

Measurement steps:

- Install the camshaft onto the cylinder head.
- Position a strip of Plastigauge[®] onto the camshaft.
- Install the dowel pins and camshaft caps.



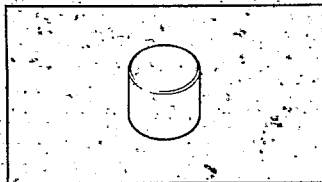
Bolt (camshaft cap):

10 Nm (1.0 m² · kg, 7.2 ft · lb)

NOTE:

- Tighten the camshaft caps in a crisscross pattern from innermost to outer.
- Do not turn the camshaft when measuring clearance with the Plastigauge[®].

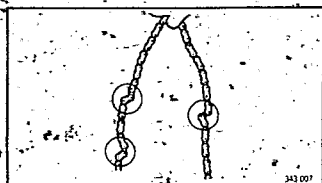
- Remove the camshaft caps and measure width of the Plastigauge[®].



Y8543006

VALVE LIFTER**1. Inspect:**

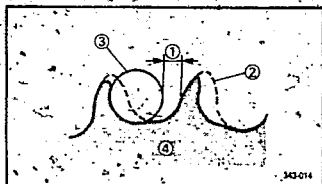
- Valve lifters
- Scratches/Damage → Replace both lifters and cylinder head.



Y8543007

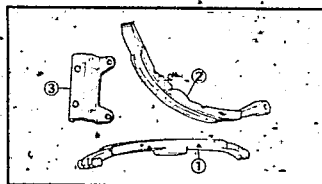
TIMING CHAIN, SPROCKET AND CHAIN GUIDE**1. Inspect:**

- Timing chain
- Stiff/Cracks → Replace timing chain and sprocket as a set.

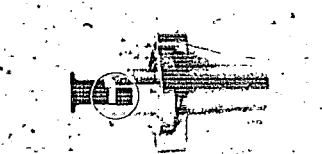
**2. Inspect:**

- Cam sprocket
- Wear/Damage → Replace cam sprocket and timing chain as a set.

- ① 1/4 tooth
- ② Correct
- ③ Roller
- ④ Sprocket

**3. Inspect:**

- Chain guide ① (exhaust side)
- Chain guide ② (intake side)
- Chain guide ③ (upper)



Y8543022

TIMING CHAIN TENSIONER**1. Check:**

- One-way cam operation
- Unsmooth operation → Replace.

2. Inspect:

- All parts
- Damage/Wear → Replace.

Y8543008

CYLINDER AND PISTON**1. Inspect:**

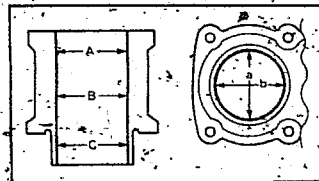
- Cylinder and piston walls
- Vertical scratches → Bore or replace cylinder and piston.

2. Measure:

- Piston-to-cylinder clearance

Measurement steps:**First step:**

- Measure the cylinder bore "C" with a cylinder bore gauge.

**NOTE:**

Measure the cylinder bore "C" in parallel to and at right angle to the crankshaft. Then, find the average of the measurements.

Cylinder bore "C"	56.000 - 56.005 mm (2.2047 - 2.2049 in)
(Wear limit)	(56.55 mm (2.226 in))
Taper limit "T"	0,05 mm(0,0020 in)



"C"=Maximum D

"T"=(Maximum D₂ or D₃)-(Maximum D₁ or D₄)

- If out of specification, rebore or replace cylinder, and replace piston and piston rings as a set.

Second step:

- Measure the piston skirt diameter "P" with a micrometer.

- ① 3 mm (0.12 in) from the piston bottom edge.

	Piston size P
Standard	55.940~55.955 mm (2.202~2.203 in)
Oversize	56.440~56.455 mm (2.222~2.223 in)

- If out of specification, replace piston and piston rings as a set.

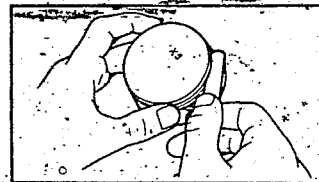
Third step:

- Calculate the piston-to-cylinder clearance with following formula:

$$\text{Piston-to-cylinder clearance} = \text{Cylinder bore "C"} - \text{Piston skirt diameter "P"}$$

- If out of specification, rebore or replace cylinder, and replace piston and piston rings as a set.

Piston-to-cylinder clearance:
0.045~0.065 mm
0.0018~0.0026 in
Limit: 0.15 mm (0.0059 in)



V8543009

PISTON RING

1. Measure:

- Side clearance
- Out of specification → Replace piston and piston ring as a set.

NOTE:

Clean carbon from piston ring grooves and rings before measuring side clearance.



Side clearance:

Top ring
0.03~0.07 mm
(0.0012~0.0028 in)

2nd ring
0.02~0.06 mm
(0.0008~0.0024 in)

2. Position:

- Piston ring (into the cylinder)

NOTE:

Push the ring with the piston crown so that the ring will be at a right angle to cylinder bore.

- ① 5 mm (0.2 in)

3. Measure:

- End gap
- Out of specification → Replace.

NOTE:

You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all three rings.



End gap:

Top ring
0.15~0.30 mm
(0.006~0.012 in)

2nd ring
0.15~0.30 mm
(0.006~0.012 in)

Oil ring
0.2~0.7 mm (0.008~0.028 in)



YB543010

PISTON PIN**1. Inspect:**

* Piston pin

Blue discoloration/groove → Replace, then inspect lubrication system.

2. Measure:

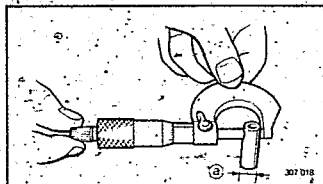
- piston pin-to-piston clearance

Measurement steps:

- Measure the piston pin outside diameter

①

If out of specification, replace the piston pin.



307 018



Outside diameter (piston pin):
14.991~15.000 mm
(0.5902~0.5906 in)

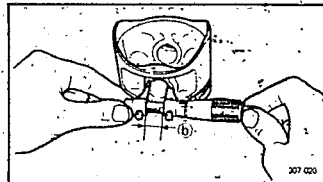
- Measure the piston inside diameter ②
- Calculate the piston pin-to-piston clearance with following formula:

Piston pin-to-piston clearance =
Bore size (piston) ② -
Outside diameter (piston pin) ①

- If out of specification, replace the piston.



Piston pin-to-piston clearance:
0.045~0.065 mm
(0.0018~0.0026 in)
Limit: 0.15 mm (0.0059 in)



307 020



YB543011

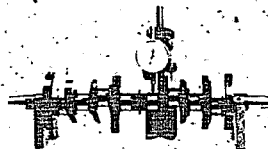
CRANKSHAFT AND CONNECTING ROD.**1. Measure:**

- Runout (crankshaft)

Out of specification → Replace.

**Runout:**

Less than 0.03 mm (0.0012 in)

**2. Inspect:**

- Main journal surfaces
 - Crank pin surfaces
 - Bearing surfaces
- Wear/Scratches → Replace:

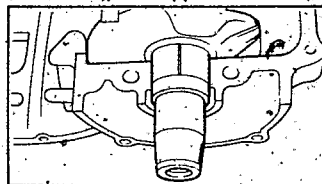
3. Measure:

- Oil clearance (main journal)

Out of specification → Replace bearing.



Oil clearance:
0.025~0.043 mm
(0.0010~0.0017 in)

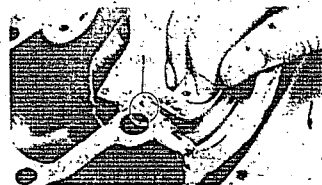
**Measurement steps:****CAUTION:**

Do not interchange the bearings. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.

- Clean the bearings, main journals and bearing portions of the crankcase.
- Place the crankcase (upper) on a bench in an upside down position.
- Install the upper half of the bearings and crankshaft into the crankcase (upper).

NOTE:

Align the projection (1) of the bearing with the notch in the crankcase.





- Put a piece of Plastigauge® on the each main journal.

NOTE:

Do not put the Plastigauge® over the oil hole in the main journal of the crankshaft.

- Install lower half of the bearings into the crankcase (lower) and assembly the crankcase halves.

NOTE:

● Align the projection of the bearing with the notch in the crankcase.

● Do not move the crankshaft until the oil clearance measurement has been completed.

- Tighten the bolt to specification in tightening sequence cast on the crankcase.

	M8 (① ~ ④ and ⑥):
	24 Nm (2.4 m · kg, 17 ft · lb)
	M6 (⑤ ~ ⑧ and ⑩ ~ ⑬):
	12 Nm (1.2 m · kg, 8.7 ft · lb)

NOTE:

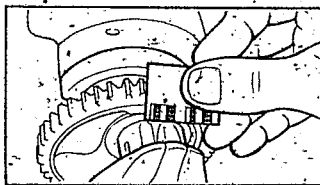
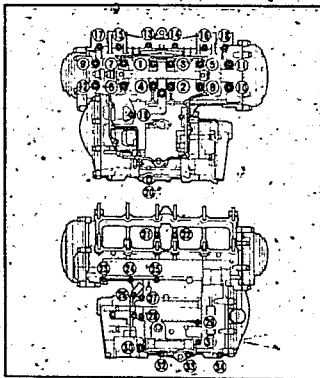
Lubricate the threads of bolts (M8 and M6) with engine oil.

- Remove the crankcase (lower) and lower half of the bearings.
- Measure the compressed Plastigauge® width on each main journal.
If oil clearance is out of specification, select a replacement bearing.

4. Measure:

- Oil clearance (crank pin)
Out of specification → Replace bearing.

	Oil clearance:
	0.043 ~ 0.066 mm (0.0017 ~ 0.0026 in)

**Measurement steps:****CAUTION:**

Do not interchange the bearings and connecting rod. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.

- Clean the bearings, crank pins and bearing portions of the connecting rods.
- Install the upper half of the bearing into the connecting rod and lower half of the bearing into the connecting rod cap.

NOTE:

Align the projection of the bearing with the groove of the cap and connecting rod.

- Put a piece of Plastigauge® on the crank pin.
- Assemble the connecting rod halves.

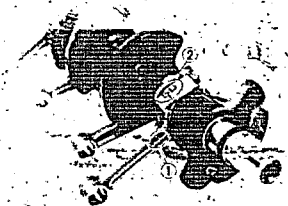
NOTE:

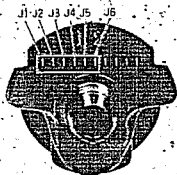
- Do not move the connecting rod or crankshaft until the oil clearance measurement has been completed.
- Lubricate molybdenum disulfide grease to the bolt threads and nut seats.
- Make sure the "Y" marks ① on the connecting rods face toward left side crankshaft.
- Make sure that the letters ② on both components align to from a perfect character.

- Tighten the nuts in 2~3 steps.

	Nut:
	23 Nm (2.3 m · kg, 17 ft · lb)

- Remove the connecting rods and bearings.
- Measure the compressed plastigauge width on each crank pin.
If oil clearance is out of specification, select a replacement bearing.





5. Select:

- Main journal bearing (J₁ - J₆)
- Crank pin bearing (P₁ and P₂)

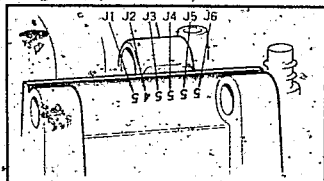
Selection of bearings:

Example 1: Main journal bearing

- If the numerals "4" and "1" are respectively shown on the crankcase J₁ and crankwed J₁, the bearing size of J₁ is:

Bearing size of J₁:

Crankcase J₁ - Crankwed J₁ =
5 - 1 = 4 (Green)



BEARING COLOR CODE

1	Blue
2	Black
3	Brown
4	Green
5	Yellow

Example 2: Crank pin bearing

- If the numerals "5" and "1" are respectively shown on the connecting rod P₁ and crankwed P₁, the bearing size of P₁ is:

Bearing size of P₁:

Connecting rod P₁ - Crankwed P₁ =
4 - 1 = 3 (Brown)

BEARING COLOR CODE

1	Blue
2	Black
3	Brown
4	Green



YB55430121

STARTER CLUTCH AND GEARS

1. Inspect:

- Starter clutch
- Push the dowel pin to arrow direction. Unsmooth operation → Replace starter clutch assembly.

2. Inspect:

- Starter clutch gear teeth
- Idle gear teeth ①
- Starter motor gear teeth ②
- Burrs/Chips/Roughness/Wear → Replace.

3. Inspect:

- Mounting boss (starter clutch gear) ③
- Pittings/Damage → Replace.

4. Inspect:

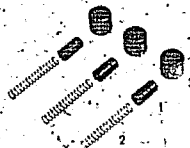
- Spring cap ①
- Spring ②
- Roller ③
- Wear/Damage → Replace.

YB5543013

PRIMARY DRIVE

1. Inspect:

- Primary drive gear teeth ①
- Primary driven gear teeth ②
- Wear/Damage → Replace both gears. Excessive noise during operation → Replace both gears.





YB542014

CLUTCH**1. Inspect:**

- Friction plate
- Damage/Wear → Replace friction plate as a set.

2. Measure:

- Friction plate thickness
- Out of specification → Replace friction plate as a set.
- Measure at all four points.



Thickness:
2.9~3.1 mm (0.114~0.122 in)
(Limit: 2.8 mm (0.11 in))

3. Inspect:

- Clutch plate
- Damage → Replace clutch plate as a set.

4. Measure:

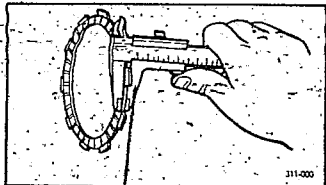
- Clutch plate warpage
- Out of specification → Replace clutch plate as a set.
- Use a surface plate and feeler gauge ①.



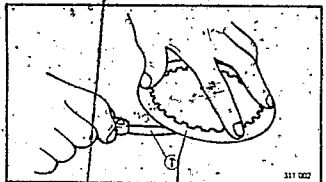
Warp limit:
Less than 0.1 mm (0.004 in)

5. Inspect:

- Clutch spring
- Damage → Replace as a set.



311-000



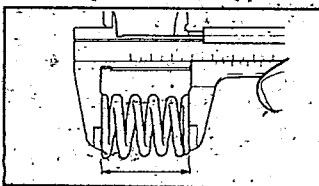
311-002

**6. Measure:**

- Clutch spring free length
- Out of specification → Replace spring as a set.



Free length (clutch spring):
40.05 mm (1.59 in)
(Limit: 38.0 mm (1.50 in))

**7. Inspect:**

- Dogs on the clutch housing
- Pitting/Wear/Damage → Deburr or replace.
- Clutch housing bearing
- Wear/Damage → Replace clutch housing.

NOTE:

Pitting on the clutch housing dogs will cause erratic operation.

8. Inspect:

- Clutch boss splines
- Pitting/Wear/Damage → Replace clutch boss.

NOTE:

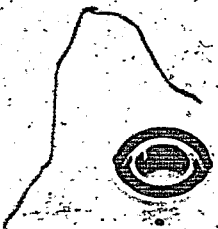
Pitting on the clutch boss splines will cause erratic operation.

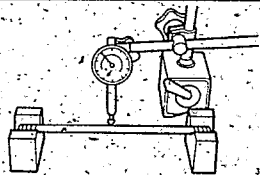
9. Inspect:

- Spacer
- Wear/Damage → Replace.

10. Inspect:

- O-ring ①
- Push rod #1 ②
- Push rod #2 ③
- Ball ④
- Wear/Crack/Damage → Replace.






311 000

11. Measure:

- Push rod #2
- Out of specification → Replace.

 Bending limit:
0.3 mm (0.012 in)

12. Inspect:

- Shift cam ①
- Return spring ②
- Wear/Damage → Replace.

Y8543015

TRANSMISSION AND SHIFTER

1. Inspect:

- Shift fork cam follower ①
- Shift fork pawl ②
- Scoring/Bends/Wear/Damage → Replace.

2. Inspect:

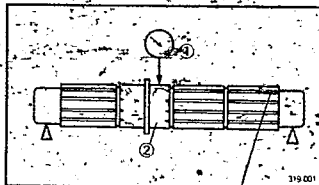
- Guide bar
- Roll the guide bar on a flat surface.
- Bends → Replace.

WARNING

Do not attempt to straighten a bent guide bar.

3. Check:

- Shift fork movement (on its guide bar)
- Unsmooth operation → Replace the fork and guide bar.




319 001

4. Inspect:

- Shift cam grooves
- Wear/Damage/Scratches → Replace.
- Shift cam segment ①
- Wear/Damage → Replace.
- Shift cam bearing ②
- Pitting/Damage → Replace.

5. Measure:

- Axle runout ①
- Use centering device and dial gauge ②
- Out of specification → Replace bent axle.

 Runout limit:
0.02 mm (0.0008 in)

6. Inspect:

- Gear teeth
- Blue discoloration/Pitting/Wear → replace.
- Mated dogs
- Rounded edges/Cracks/Missing portions → Replace.

7. Check:

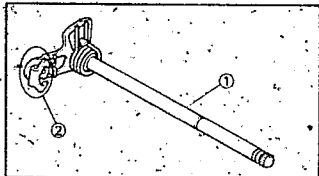
- Proper gear engagement (each gear) (to its counterpart)
- Incorrect → Reassemble.
- Gear movement
- Roughness → Replace.

Y8543023

SHIFT SHAFT AND STOPPER LEVER

1. Inspect:

- Shift shaft ①
- Shift pawls ②
- Bends/Wear/Damage → Replace.





2. Inspect:

- Stopper lever ①
- Roller turns roughly → Replace.
- Bends/Damage → Replace.



3. Inspect:

- Return spring (shift shaft) ①
- Return spring (shift pawls)
- Return spring (stopper lever)
- Wear/Damage → Replace.



YB543016

OIL PUMP

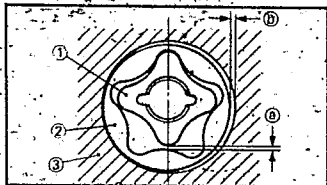
1. Inspect:

- Oil pump drive gear
- Oil pump driven gear ①
- Wear/Crack/Damage → Replace.



2. Measure:

- Tip clearance ③
- (between inner rotor ① and outer rotor ②)
- Side clearance ④
- (between outer rotor ② and pump housing ③)
- Out of specifications → Replace oil pump.



Tip clearance:
0.03~0.08 mm
(0.0012~0.0031 in.)

Side clearance:
0.09~0.15 mm
(0.0035~0.0059 in.)



3. Install:

- Oil pump assembly
- Reverse the "ENGINE DISASSEMBLY—OIL PUMP" section.

NOTE:

Align the pins in the pump shaft with the groove on the inner rotors during assembly.

4. Check:

- Oil pump operation
- Unsmooth operation → Replace.

EX-UP

1. Inspect:

- Valve (EXUP) ①
- Housing (valve) ②
- Gasket (steel) ③
- Wear/Cracks/Damage → Replace.
- Bush ④
- Wear → Replace.



YB543016

OIL PIPE AND STRAINER

1. Inspect:

- Oil delivery pipe ①
- Cracks/Damage → Replace.
- Clog → Blow out with compressed air.



2. Inspect:

- Oil strainer ①
- Damage → Replace.





YB543019

CRANKCASE

1. Thoroughly wash the case halves in mild solvent.
2. Clean all the gasket mating surface and crankcase mating surface thoroughly.

3. Inspect:

- Crankcase
- Cracks/Damage → Replace.
- Oil delivery passages
- Clog → Blow out with compressed air.

YB543020

BEARING AND OIL SEAL

1. Inspect:

- Bearings
- Clean and lubricate, then rotate inner race with finger.
- Roughness → Replace.

2. Inspect:

- Oil seals.
- Damage/Wear → Replace.

YB543021

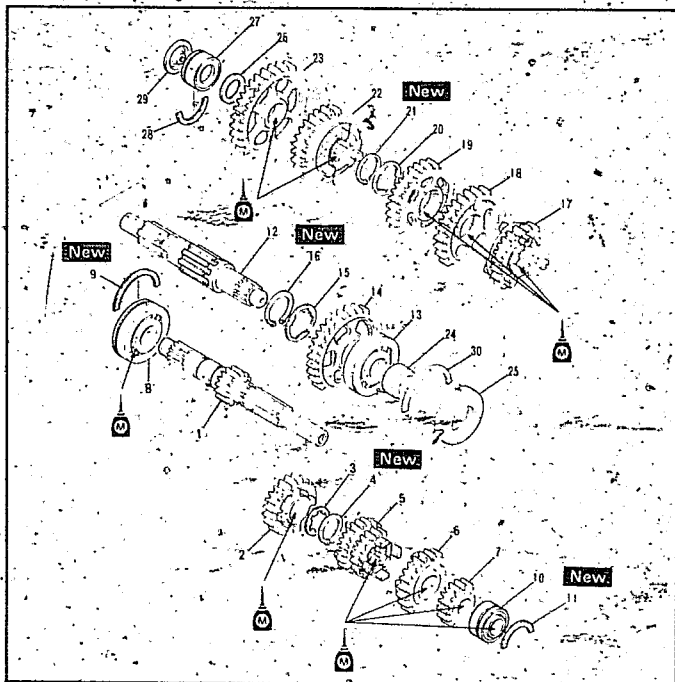
CIRCLIP AND WASHER

1. Inspect:

- Circlips
- Washers
- Damage/Looseness/Bends → Replace.

TRANSMISSION

- | | | |
|-------------------|------------------|------------------|
| ① Main axle. | ⑪ Circlip | ⑳ Circlip |
| ② 5th pinion gear | ⑫ Drive axle. | ㉑ 5th wheel gear |
| ③ Washer | ⑬ Bearing | ㉒ 7st wheel gear |
| ④ Circlip | ⑭ 2nd wheel gear | ㉓ Collar |
| ⑤ 3rd pinion gear | ⑮ Washer | ㉔ Oil seal |
| ⑥ 6th pinion gear | ⑯ Circlip | ㉕ Plate washer |
| ⑦ 2nd pinion gear | ⑰ 6th wheel gear | ㉖ Bearing |
| ⑧ Bearing | ⑱ 3rd wheel gear | ㉗ Circlip |
| ⑨ Circlip | ㉘ 4th wheel gear | ㉙ Nozzle |
| ⑩ Bearing | ㉚ Washer | ㉛ Circlip |





Y0544001

ENGINE ASSEMBLY AND ADJUSTMENT

WARNING:

For engine reassembly, replace the following parts with new ones.

- O-ring
- Gasket
- Oil seal
- Copper washer
- Lock washer
- Circlip

Y0544002

CONNECTING ROD

1. Apply:

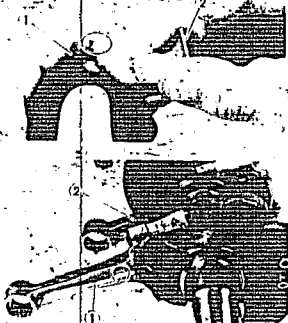
- Molybdenum disulfide grease (onto threads of bolts and bottom surfaces of nuts)
- Engine oil (onto crank pins, crank pin bearings and inner surfaces of connecting rods)

2. Install:

- Crank pin bearings (1)
- Connecting rods (2)
- Connecting rod caps (onto crank pins)

NOTE:

- Align the projection of bearing with the groove of the caps and connecting rod.
- Identify each bearing position very carefully so that it can be reinstalled in its original place.
- The stamped "Y" mark on the connecting rods (1) should face towards the left side of the crankcase.
- Be sure that the letter (2) on both components align to form a perfect character.



3. Align:

- Bolt head (1)
- (with connecting rod cap)

4. Tighten:

- Nuts (connecting rods)



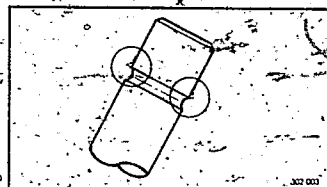
Nut (connecting rod):
23 Nm (2.3 m · kg, 17 ft · lb)

Y0544003

VALVE

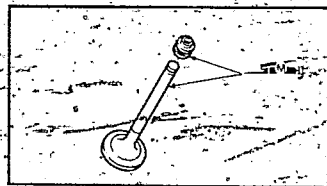
1. Deburr:

- Valve stem end
- Use an oil stone to smooth the stem end.



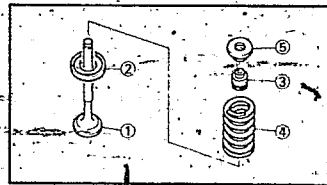
2. Apply:

- Molybdenum disulfide oil (onto valve stem and oil seal)



3. Install:

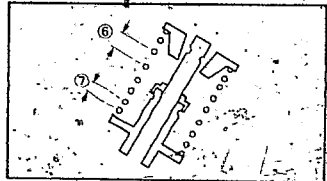
- Valve seat (1)
- Spring seat (2)
- Oil seal (3)
- Valve spring (4)
- Valve retainer (5) (into cylinder head)



NOTE:

- Make sure that each valve is installed in its original place.
- Install the valve spring with larger pitch (6) facing upward.

Smaller pitch

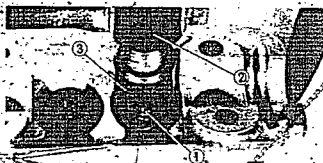


ENGINE ASSEMBLY AND ADJUSTMENT

ENG



F-12



4. Install:

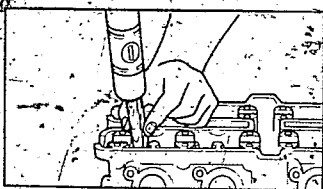
- Valve cotters (1)

NOTE:

Install the valve cotters while compressing the valve spring with the valve spring compressor (2) and attachment (3).



Valve spring compressor:
P/N 90890-04 109
Attachment:
P/N 90890-04 114



5. Secure the valve cotter on to the valve stem by tapping it lightly with a piece of wood.

NOTE:

Do not hit so much as to damage the valve.

6. Apply:

- Molybdenum disulfide oil (onto outer surface of valve lifters and pads.)

7. Install:

- Valve lifters (1)
- Pads (2)

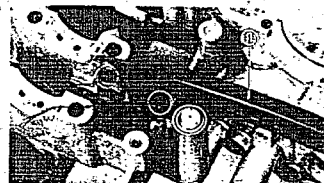
NOTE:

• Valve lifter must be rotated smoothly by a finger.
• Each valve lifter and pad position very carefully so that its original place.



ENGINE ASSEMBLY AND ADJUSTMENT

ENG

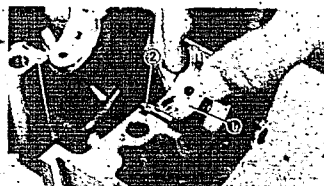


YB544004

CRANKSHAFT

1. Install:

- Chain guide (4)



2. Apply:

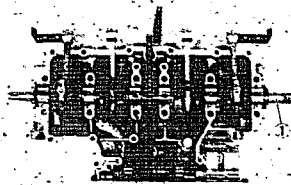
- Engine oil (onto main journal bearings)

3. Install:

- Main journal bearings (onto lower crankcase)

NOTE:

• Align the projection (2) of the bearing with the notch in the case.
• Identify each bearing position so that the bearing should be installed in position.



4. Apply:

- Engine oil (onto main journal of crankcase)

5. Install:

- Crankshaft assembly (1)



YB54A005

SHIFT FORK AND SHIFT CAM

1. Install:

- Shift cam (1)

2. Install:

- Shift fork 1 (1)
- Shift fork 2 (2)
- Shift fork 3 (3)
- Guide bars (4)

NOTE:

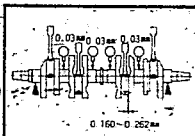
Install the shift forks with the embossed mark on each shift fork facing right side of the engine.



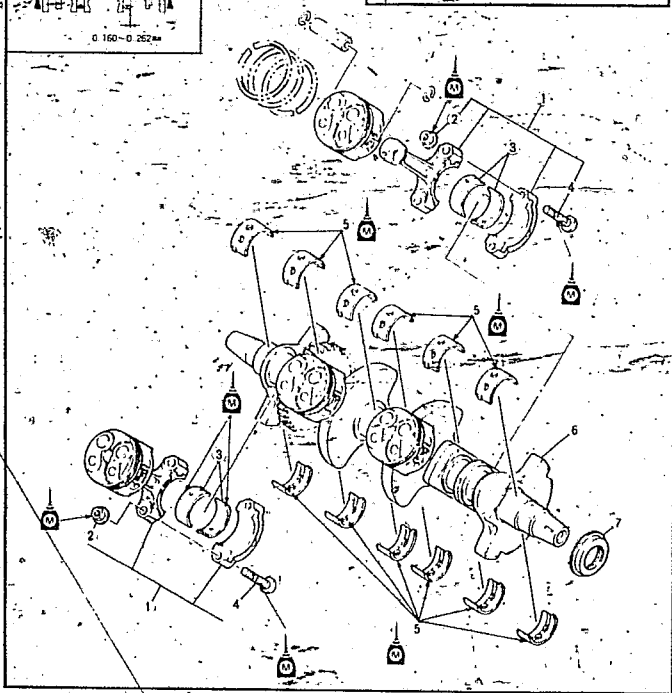


CONNECTING ROD AND CRANKSHAFT

- ① Connecting rod assembly
- ② Nut
- ③ Connecting rod bearing
- ④ Connecting rod bolt
- ⑤ Main journal bearing
- ⑥ Crankshaft
- ⑦ Oil seal



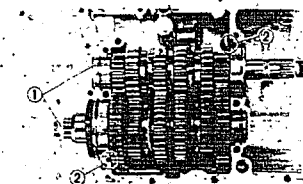
- | | |
|---|----------------------------------------------------------------------|
| A | MAIN JOURNAL OIL CLEARANCE:
0.025 - 0.043 mm (0.0010 - 0.0017 in) |
| B | CRANK PIN OIL CLEARANCE:
0.043 - 0.066 mm (0.0017 - 0.0026 in) |



3. Install:
 - Stopper plate ① (shift cam)



Bolt (stopper plate):
10 Nm (1.0 m · kg, 7.2ft · lb)



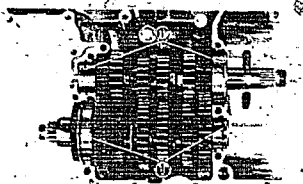
YB544006

TRANSMISSION

1. Install:
 - Transmission assembly ①

NOTE:

Align the bearing knock pin ② with the pin slot in the crankcase lower half.



2. Install:
 - Stopper ring ①

NOTE:

- Be sure the stopper ring is fitted to the bearing and the stopper ring have been positioned in the ring groove.
- Stopper ring is setted between the upper and lower crank case.



3. Check:

- Transmission operation
Unsmooth operation → Repair.

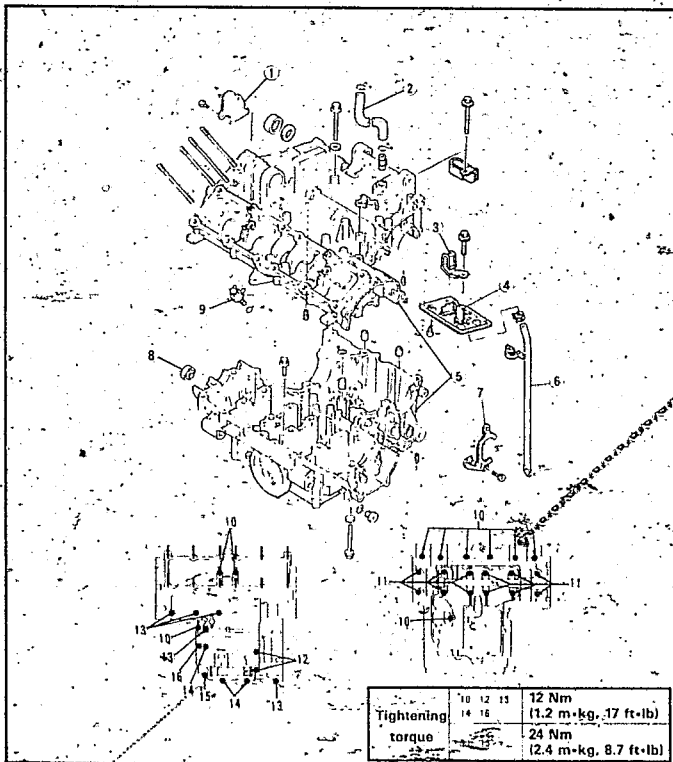


4. Install:
 - Oil seal ①



CRANKCASE

- ① Breather plate
- ② Breather pipe
- ③ Clamp
- ④ Breather plate
- ⑤ Crankcase assembly
- ⑥ Hose
- ⑦ Bearing plate
- ⑧ Level gauge
- ⑨ Jet nozzle
- ⑩ Bolt (6m/mt = 40 mm)
- ⑪ Bolt (6m/mt = 85 mm)
- ⑫ Bolt (6m/mt = 90 mm)
- ⑬ Bolt (6m/mt = 50 mm)
- ⑭ Bolt (6m/mt = 70 mm)
- ⑮ Bolt (6m/mt = 70 mm)
- ⑯ Bolt (6m/mt = 80 mm)



Tightening torque	10 12 15	12 Nm (1.2 m·kg, .17 ft·lb)
	11 16	24 Nm (2.4 m·kg, 8.7 ft·lb)

YB54A007

CRANK CASE

- 1. Apply
Engine oil
(onto main journal bearings)



2. Install:

- Main journal bearings (1)
(onto upper crank case)

NOTE:

- Align the projection of the bearing with the notch in the case.
- Identify each bearing position so that the bearing should be installed in position.

3. Apply:

- Sealant
(onto crankcase matching surfaces)



Yamaha bond No. 1215:
P/N 90890-85505

NOTE:

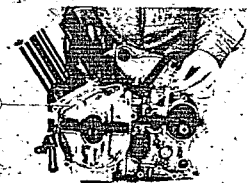
DO NOT ALLOW any sealant to come in contact with the oil gallery or crankshaft bearing. Do not apply sealant to within 2-3 mm (0.08-0.12 in) of the bearings.

4. Install:

- Dowel pin (1)

- 5. Set shift cam and transmission gears in 'NEUTRAL' position.





6. Install:

- Upper crankcase ①

CAUTION:

Before tightening the crankcase bolts, check the following points:

- Be sure the gear shifts correctly while hand turning the shift cam.

7. Install:

- Bolts (crankcase)

- Ⓐ Lower crankcase
- Ⓑ Upper crankcase

Bolt (crankcase):

M8 (① ~ ⑫ and ⑭):
24 Nm (2.4 m · kg, 17 ft · lb)

M6 (⑬ ~ ⑲ and ⑳ ~ ㉑):
12 Nm (1.2 m · kg, 8.7 ft · lb)

NOTE:

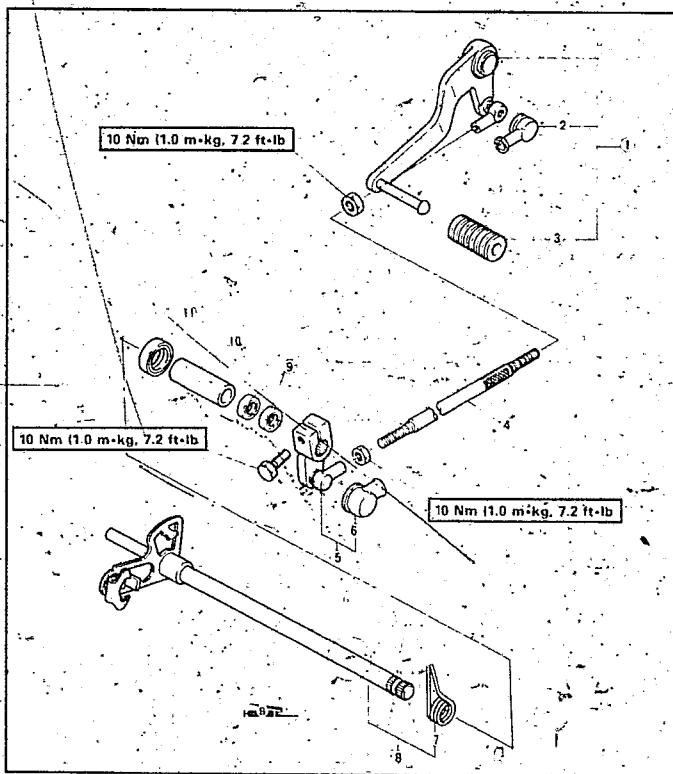
- Lubricate the threads of bolts (M8 and M6) with engine oil.
- Tighten the bolts starting with the lowest numbered one.
- Install the copper washer on the bolts No. 29.
- Install the cable holder on the bolt No. 26 and No. 32.
- Install the ground lead on the bolt No. 33.

8. Install:

- Oil seal/stopper plate ①

**SHIFT SHAFT**

- ① Shift pedal assembly
- ② Dust cover
- ③ Shift pedal cover
- ④ Shift rod
- ⑤ Shift arm
- ⑥ Dust cover
- ⑦ Spring
- ⑧ Shift shaft assembly
- ⑨ Oil seal
- ⑩ Spacer
- ⑪ Oil seal





9844011

SHIFT SHAFT

1. Install:

- Neutral switch 1

2. Install:

- Spring 1
- Stopper lever 2
- Shift shaft 3



Bolt (stopper lever):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Lactate*

NOTE:

- Mesh the stopper lever with the shift cam stopper.
- Hook the spring ends on the stopper lever and crankcase boss.

9844012

OIL PUMP

1. Install:

- Dowel pin 1
- Pump cover gasket 2
- Oil pump assembly



Bolt (oil pump):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Use Loctite*

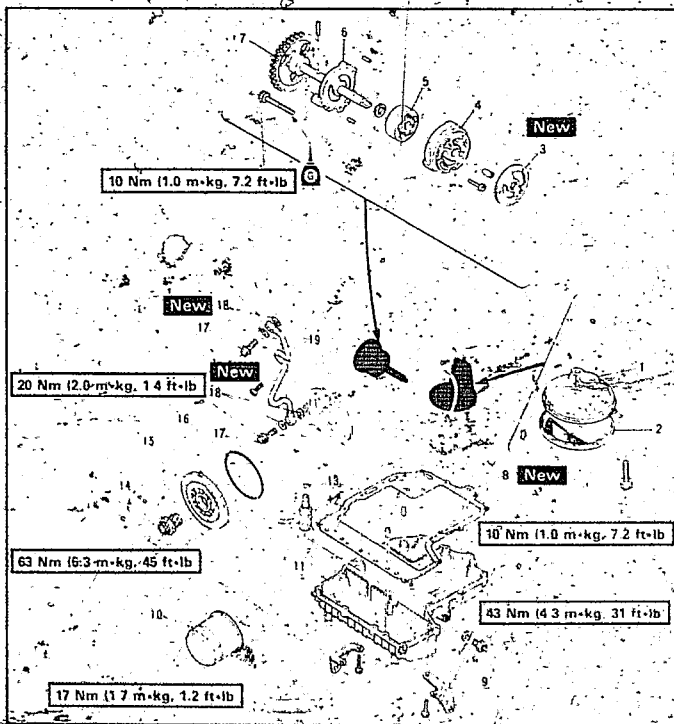
NOTE:

- Align the oil pump arrow mark 1 with crankcase arrow mark 2.

OIL PUMP, OIL STRAINER, OIL PAN

- Oil strainer housing
- Oil strainer
- Gasket
- Rotor housing
- Rotor assembly
- Pump cover
- Pump shaft assembly
- Gasket
- Drain plug
- Oil filter

- Oil pan
- Relief valve
- O-ring
- Bypass valve
- Oil filter housing
- O-ring
- Union bolt
- Copper washer
- Oil delivery pipe



**CAUTION:**

- Be sure that the oil pump turns smoothly in itself after tightening the bolts.
- Be sure that the oil pump shaft projection mesh with the water pump impeller shaft slot.

YB544013

OIL STRAINER AND OIL PAN**1. Install:**

- Relief valve
- Oil strainer housing

NOTE:

The arrow on the oil strainer housing point to the front of the engine.



Bolt (oil strainer housing):
10 Nm (1.0 m • kg, 7.2 ft • lb)

2. Install:

- Oil strainer

NOTE:

The arrow on the oil strainer point to the front of the engine.

3. Install:

- Dowel pins
- Gasket
- Oil pan

NOTE:

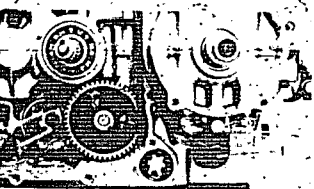
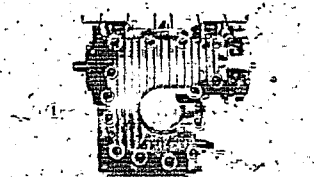
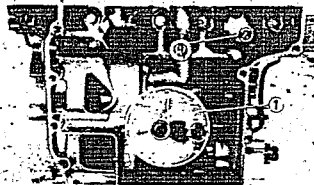
Tighten the bolts (oil pan) in a crisscross pattern.



Bolt (oil pan):
10 Nm (1.0 m • kg, 7.2 ft • lb)

4. Install:

- Oil pressure switch
- Apply the Yamaha bond No.1215 to the thread.



Oil pressure switch:
12 Nm (1.2 m • kg, 8.7 ft • lb)



Yamaha bond No.1215:
P/N 90890-85505

5. Install:

- Oil filter housing

NOTE:

Mesh the housing cover projection with the crankcase slot.



Bypass valve:
63 Nm (6.3 m • kg, 45 ft • lb)

YB544008

STARTER MOTOR**1. Install:**

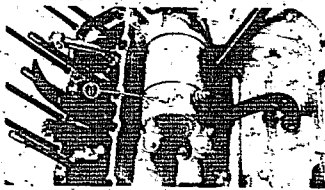
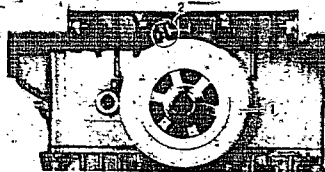
- Starter motor



Bolt (starter motor):
10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:

Apply the engine oil to the O-ring of the starter motor.



YB544009

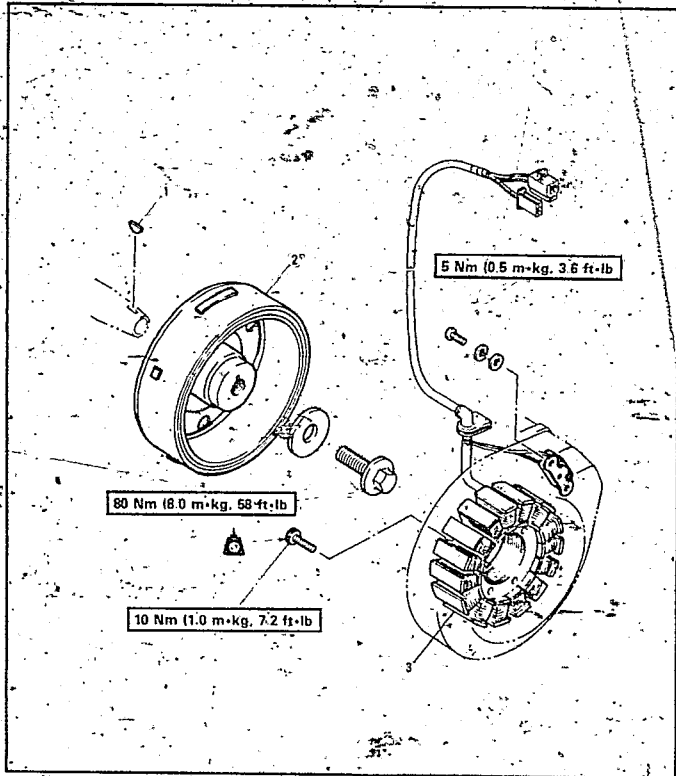
AC MAGNETO**1. Install:**

- Woodruff key
- Magneto rotor
- Washer
- Bolt (magneto rotor)



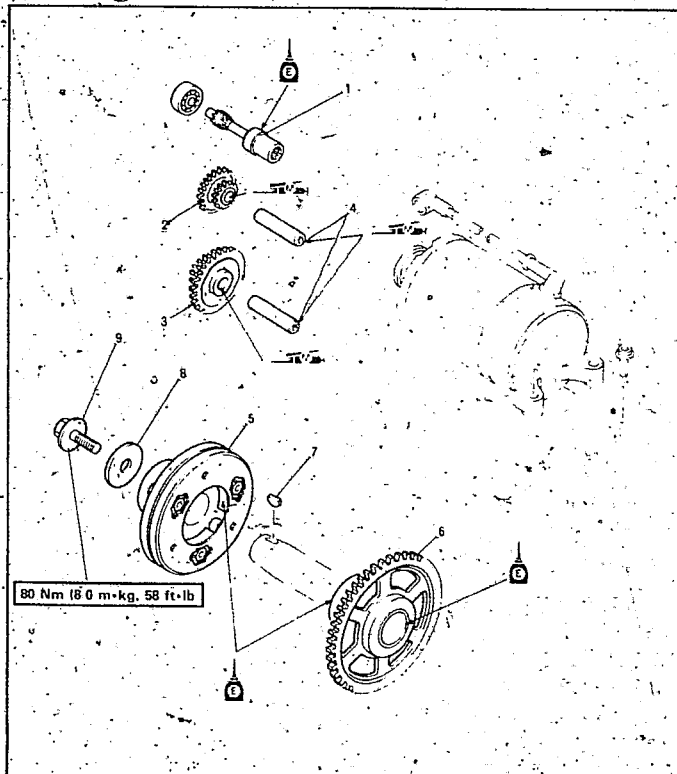
AC MAGNETO

- ① Woodruff key
- ② Rotor assembly
- ③ Stator assembly



STARTER CLUTCH

- ① Starter motor gear
- ② Idle gear 1
- ③ Idle gear 2
- ④ Shaft
- ⑤ Starter clutch assembly
- ⑥ Starter clutch gear
- ⑦ Woodruff key
- ⑧ Plate washer
- ⑨ Bolt



**NOTE:**

- Clean the tapered portion of the crankshaft and magneto rotor.
- When installing the magneto rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.

3. Tighten:

- Bolt (magneto rotor)

NOTE:

Tighten the bolt (magneto rotor) ② while holding the magneto rotor ① with the sheave holder ③.



Sheave holder
P/N 90890-01701



Bolt (magneto rotor)
80 Nm (8.0 m • kg, 58 ft • lb)

YBS44010

STARTER CLUTCH**1. Install:**

- Starter clutch spring cap ①
- Spring ②
- Roller ③

2. Install:

- Starter motor gear ①



3

**3. Install:**

- Starter clutch gear ①
- Woodruff key ②

**4. Install:**

- Starter clutch ①

NOTE:

When installing the starter clutch, make sure that the woodruff key is properly seated in the keyway of the crankshaft.

**5. Apply:**

- Molybdenum disulfide oil (onto the idle gear)

6. Install:

- Idle gear ①
- Idle gear ②

**7. Install:**

- Plate washer ①
- Bolt ② (starter clutch)

NOTE:

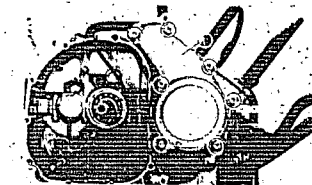
Tighten the bolt while holding the rotor with the sheave holder.



Bolt (starter clutch)
80 Nm (8.0 m • kg, 58 ft • lb)

8. Install:

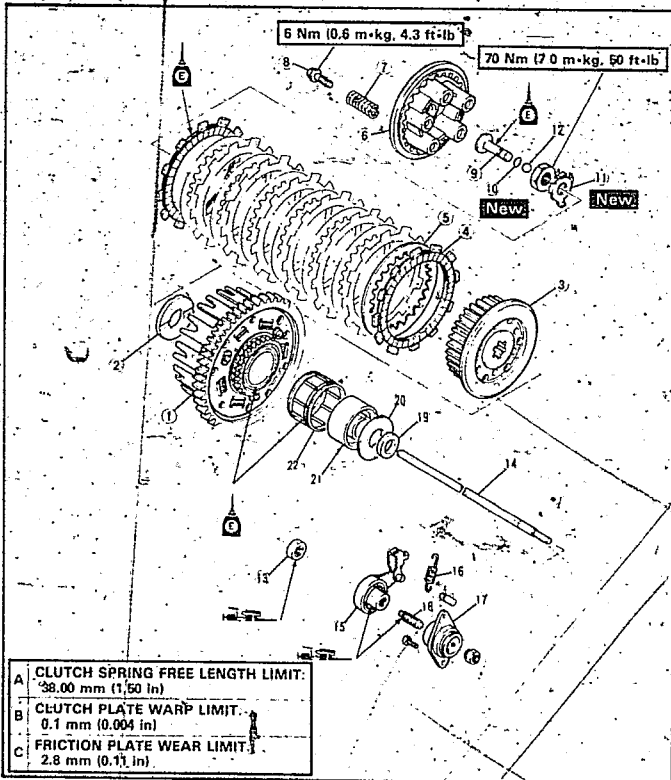
- Dowel pins
- Gasket
- Starter clutch cover ①





CLUTCH

- | | |
|------------------|-----------------------|
| ① Clutch housing | ⑫ Bolt |
| ② Thrust plate | ⑬ Push rod seal |
| ③ Clutch boss | ⑭ Push rod |
| ④ Friction plate | ⑮ Push lever assembly |
| ⑤ Clutch plate | ⑯ Spring |
| ⑥ Pressure plate | ⑰ Ball screw housing |
| ⑦ Clutch spring | ⑱ Set screw |
| ⑧ Bolt | ⑲ Collar |
| ⑨ Push rod | ⑳ Thrust plate |
| ⑩ O-ring | ㉑ Spacer |
| ⑪ Lock washer | ㉒ Bearing |



Bolt (starter clutch cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)*

CLUTCH

1. Install:

- Collar ①
- Thrust plate ②
- Clutch housing ①

2. Install:

- Spacer ①
- Bearing ②

3. Install:

- Thrust plate
- Clutch boss ①
- Lock washer ② (new)
- Nut (clutch boss) ③

NOTE:

Make sure that the tab of the lock washer engages the slot in the clutch boss.

4. Tighten:

- Nut (clutch boss) ③



Nut (clutch boss):
70 Nm (7.0 m·kg, 50 ft·lb)

NOTE:

- Tighten the nut (clutch boss) ③ while holding the clutch housing by the clutch holder ②.



- Bend the lock washer tab along the nut flat.



Universal clutch holder;
P/N 90890-04086

5. Install:

- Push rod #2 ①
- Ball ②
- Push rod #1 ③

NOTE:

Apply the lithium soap base grease to the push rod #2 and ball.

6. Install:

- Friction plate ①
- Clutch plates ②

7. Install:

- Pressure plate

NOTE:

Align the punched mark ① on the clutch boss with the arrow mark ② on the pressure plate.

8. Install:

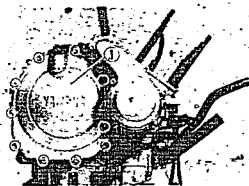
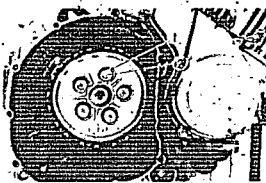
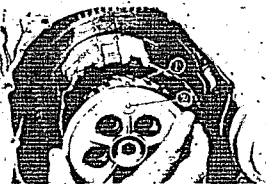
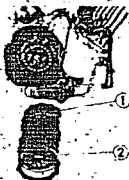
- Clutch spring ①
- Bolts (clutch spring) ②



Bolt (clutch spring):
6 Nm (0.6 m · kg, 4.3 ft · lb)

NOTE:

Tighten the bolts (clutch spring) in stage, using a crisscross pattern.

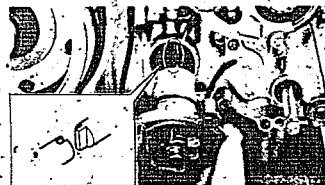


9. Install:

- Dowel pins
- Gasket
- Crankcase cover ① (right)



Bolt (crankcase cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)



Y8544D15

WATER PUMP

1. Install:

- Water pump housing

NOTE:

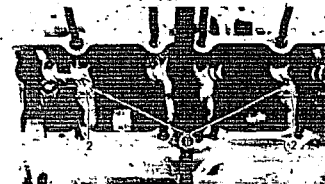
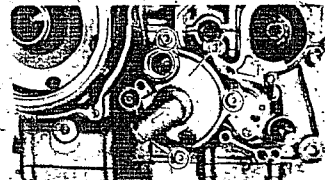
Align the impeller shaft slit with pump shaft projection.

2. Install:

- O-ring
- Water pump cover ①



Bolt (water pump cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)



Y8544D16

CYLINDER AND PISTON

1. Install:

- Oil-iat nozzles ①
- (with O-ring ②)

NOTE:

Apply the engine oil to the O-rings.

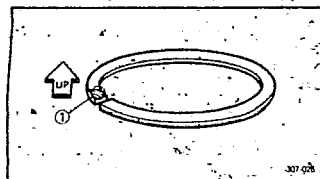
2. Install:

- Piston rings

NOTE:

• Be sure to install rings to that manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.

• Piston ring with 1 mark should be installed into second ring position.

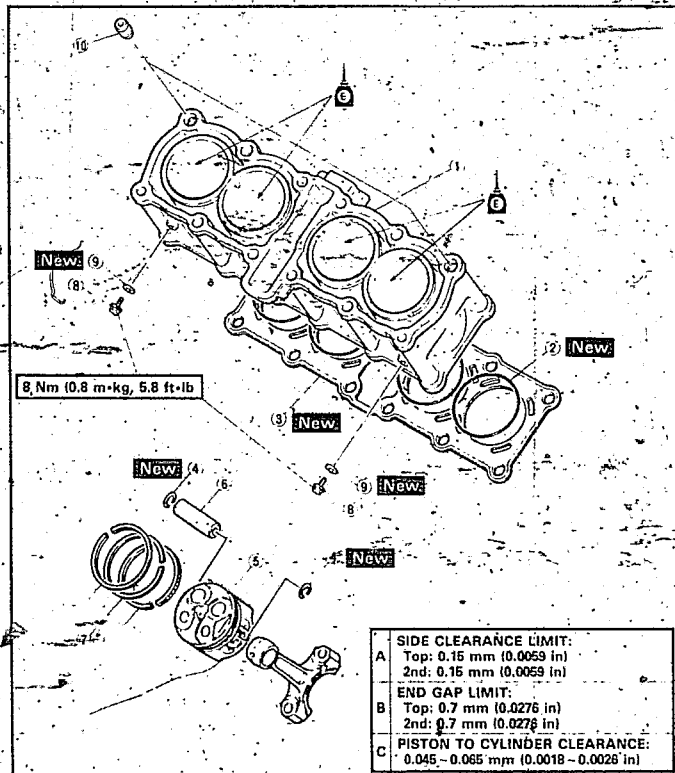


307-026



CYLINDER, PISTON, PISTON RING

- ① Cylinder
- ② O-ring
- ③ Gasket
- ④ Circlip
- ⑤ Piston
- ⑥ Piston pin
- ⑦ Piston ring set
- ⑧ Drain bolt
- ⑨ Gasket
- ⑩ Dowel pin



3. Install:
- Piston pins ⑥
 - Pistons ⑤
 - Circlips (piston pin) ④

NOTE:

- Apply the engine oil to the piston pin.
- Be sure that the piston allow mark ④ face to exhaust side of the engine.
- Before installing the piston pin circlips, cover the crankcase with a clean rag to prevent the circlip from falling into the crankcase cavity.
- Be sure that the marked piston numbers should be in sequence (1,2,3,4) beginning from the left.



WARNING

Always use new circlips (piston pin).

4. Install:

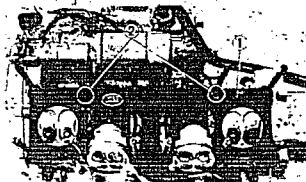
- Gasket (cylinder) ③
- Dowel pins ②

NOTE:

The gasket "3TJ" mark should face upward.

WARNING

Always use a new gasket (cylinder).

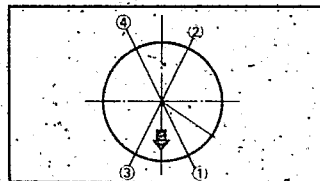


5. Apply:

- Pistons
- Piston rings
- Cylinder

NOTE:

Apply a liberal coating of engine oil.



6. Piston:

- Top ring
- 2nd ring
- Oil ring

Offset the piston ring end gaps as shown.

- ① Top ring end
- ② Oil ring end (lower)
- ③ Oil ring end (upper)
- ④ 2nd ring end



7. Install:
 • O-ring (new)



8. Install:

- Cylinder


NOTE:

- Install the #2 and #3 pistons first.
- Pass the cam chain and cam chain guide (exhaust side) through the cam chain cavity.



9. Install:

- Joint ①
- O-ring
- Pipe ②

 Bolt (joint and pipe):
 10 Nm (1.0 m • kg, 7.2 ft • lb).

CYLINDER HEAD AND CAMSHAFT

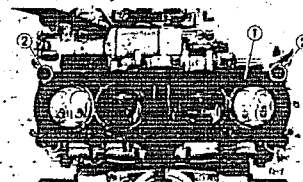
1. Install:
 • Gasket ① (cylinder head)
 • Dowel pins ②

NOTE:

The gasket "UP" mark should face upward as photo.

▲WARNING
 Always use a new gasket (cylinder head).

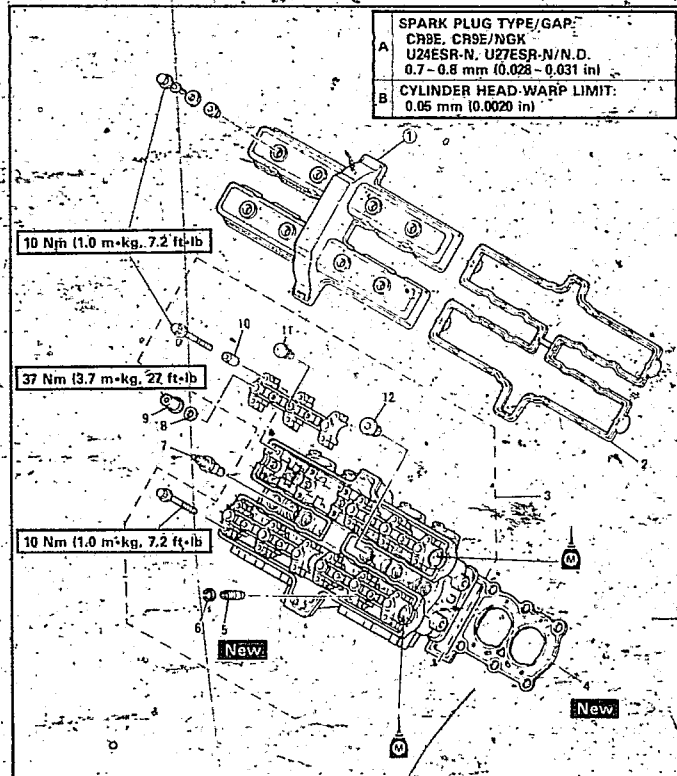
2. Install:
 • Cylinder head



CYLINDER HEAD

- ① Cylinder head cover
- ② Cylinder head cover gasket
- ③ Cylinder head
- ④ Cylinder head gasket
- ⑤ Valve guide
- ⑥ Circlip

- ⑦ Spark plug
- ⑧ Plate washer
- ⑨ Nut
- ⑩ Dowel pin
- ⑪ Plug
- ⑫ Straight screw plug



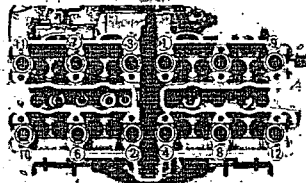
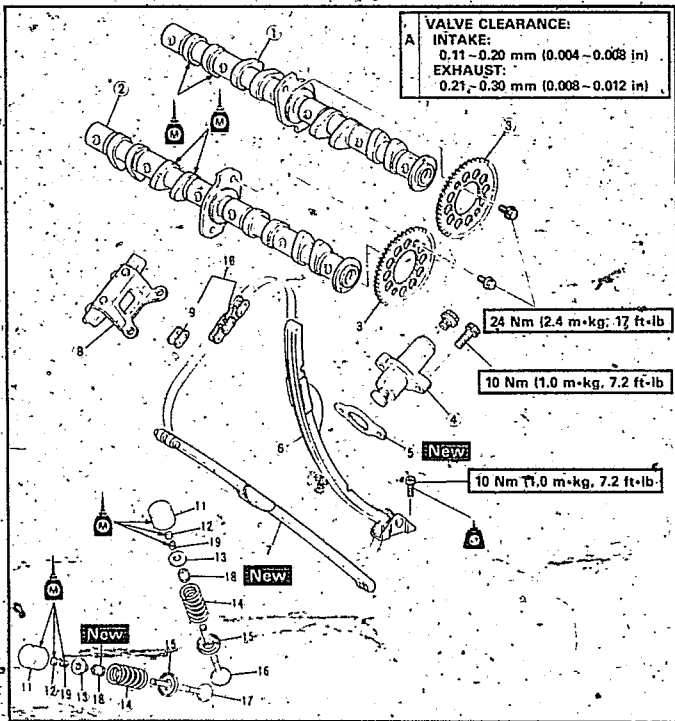


CAMSHAFT, CAM CHAIN

- ① Camshaft (Intake)
- ② Camshaft (Exhaust)
- ③ Cam chain sprocket
- ④ Cam chain tensioner-assembly
- ⑤ Gasket
- ⑥ Chain guide
- ⑦ Chain guide
- ⑧ Chain guide
- ⑨ Cam chain joint
- ⑩ Cam chain

- ⑪ Valve lifter
- ⑫ Adjusting pad
- ⑬ Valve spring retainer
- ⑭ Valve-spring
- ⑮ Valve spring seat
- ⑯ Intake valve
- ⑰ Exhaust valve
- ⑱ Valve stem seal
- ⑲ Valve cotter

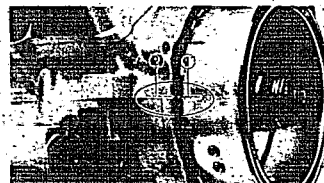
VALVE CLEARANCE:
INTAKE:
 0.11 - 0.20 mm (0.004 - 0.008 in)
EXHAUST:
 0.21 - 0.30 mm (0.008 - 0.012 in)



3. Install:
• Nuts ①

Nut (cylinder head):
 37 Nm (3.7 m·kg, 27 ft·lb)

- NOTE:**
- Apply the engine oil onto the nut threads.
 - Tighten the nuts in a crisscross pattern.



4. Turn the crankshaft counterclockwise until the "T" mark ① is aligned with the stationary pointer. ②



5. Install:
• Exhaust camshaft ①
• Intake camshaft
• Dowel pins

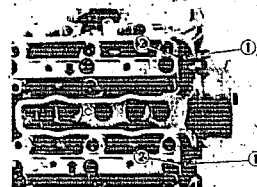
NOTE:
 Install the camshaft with the punch mark facing upward.

6. Install:
• Camshaft caps
Apply the engine oil onto the camshaft cap journal.
- NOTE:**
 Install the camshaft caps with the arrow marks embossed facing opposite of the engine as photo.

7. Tighten:
• Bolt (camshaft cap)

Bolt (camshaft cap):
 10 Nm (1.0 m·kg, 7.2 ft·lb)

- NOTE:**
- Align the punch marks on the camshaft ① and the camshaft cap ②.
 - Tighten the bolts (camshaft cap) in a criss-





ross pattern from inside.

CAUTION:

The bolts (camshaft cap) must be tightened evenly, or damage to the cylinder head, camshaft caps and cam will be result.

8. Install:

- Chain guide ① (upper)
- Chain guide ② (exhaust side)



Bolt (upper chain guide):
10 Nm (1.0 m · kg, 7.2 ft · lb)

YB544019

TIMING CHAIN TENSIONER

1. Install:

- Gasket ①
- Timing chain tensioner

Installation steps:

- Remove the tensioner cap bolt ② and springs ③.
- Release the timing chain tensioner one-way cam ④ and push the tension rod ⑤.
- Install the tensioner with a new gasket ① into the cylinder.

NOTE:

Install the tensioner body so that the "UP" mark face upward.



Bolt (timing chain tensioner):
10 Nm (1.0 m · kg, 7.2 ft · lb)

- Install the springs ③ and cap bolt ②.



Cap bolt (timing chain tensioner):
15 Nm (1.5 m · kg, 11 ft · lb)

2. Check:

- Valve timing
Out of alignment → Adjust.
Refer to "CYLINDER AND CAMSHAFT" section.

3. Check:

- Valve clearance
Out of specification → Adjust.
Refer to "VALVE CLEARANCE ADJUSTMENT" section in the CHAPTER 3.



Intake valve (cold):
0.11 ~ 0.20 mm
(0.0043 ~ 0.0079 in)
Exhaust valve (cold):
0.21 ~ 0.30 mm
(0.0083 ~ 0.012 in)

YB543919

CYLINDER HEAD COVER

1. Install:

- Gasket (cylinder head cover)
- Cylinder head cover ①



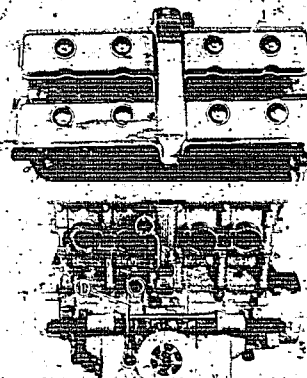
Bolt (cylinder head cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)

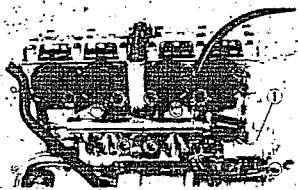
2. Install:

- Oil delivery pipe ①
- Copper washers (new)




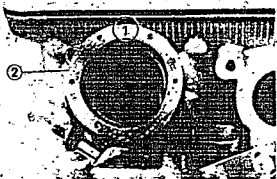
Union bolt:
20 Nm (2.0 m · kg, 14 ft · lb)
Bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)





3. Install:
- Thermostat housing (1)
 - O-ring

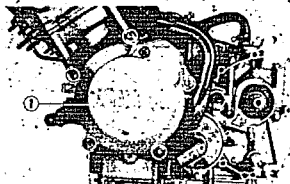
 Bolt (thermostat housing):
10 Nm (1.0 m · kg, 7.2 ft · lb)




4. Install:
- Carburetor joint (2)

NOTE:

The number should be in sequence (1,2,3,4) beginning from the left.



5. Install:
- Dowel pins
 - Gasket (new)
 - AC magneto cover (1)

 Bolt (AC magneto cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)

V9544020

REMounting ENGINE

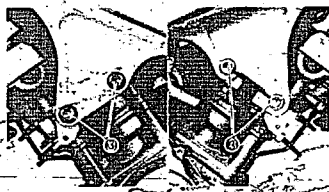
When remounting the engine, reverse the removal procedure. Note the following points.



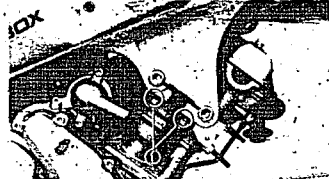
1. Install:
- Mounting bolt (rear-lower) (1)
 - Mounting bolt (rear-upper) (2)
 - Mounting bolt (cylinder) (3)

NOTE:


Install the all bolts and nuts first, and then tighten the bolts and nuts to specification.

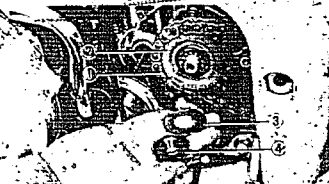
**Engine mounting:**

- Bolt (rear-lower)
48 Nm (4.8 m · kg, 35 ft · lb)
- Bolt (rear-upper)
56 Nm (5.5 m · kg, 40 ft · lb)
- Bolt (cylinder)
55 Nm (5.5 m · kg, 40 ft · lb)


**2. Tighten:**

- Pinch bolt (engine mounting bolt) (1)

 Pinch bolt:
23 Nm (2.3 m · kg, 17 ft · lb)

**3. Install:**

- Drive chain (1)
- Drive sprocket (2)
- Lock washer (3)
- Nut (drive sprocket) (4)

 Nut (drive sprocket):
70 Nm (7.0 m · kg, 50 ft · lb)

NOTE:


- Tighten the nut (drive sprocket) while applying the rear brake.
- Bend the lock washer tab along the nut flat.

WARNING

Always use a new washer.



4. Install:
- Spacer
 - Crankcase cover (1) (left)
 - Shift arm

 Bolt (crankcase cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)

Bolt (shift arm):
10 Nm (1.0 m · kg, 7.2 ft · lb)



5. Install:

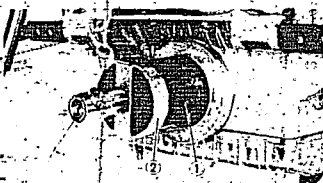
- Shift pedal assembly



Bolt (shift pedal):
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Align the punch mark (1) on the shift shaft and shift arm.



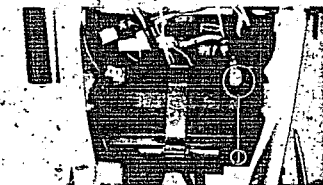
6. Install:

- O-ring
- Oil filter (1)

Use the oil filter wrench (2).



Oil filter:
17 Nm (1.7 m · kg, 12 ft · lb)



7. Connect:

- Battery leads

NOTE:

Connect the battery positive lead (1) first.



8. Install:

- Muffler assembly (1)

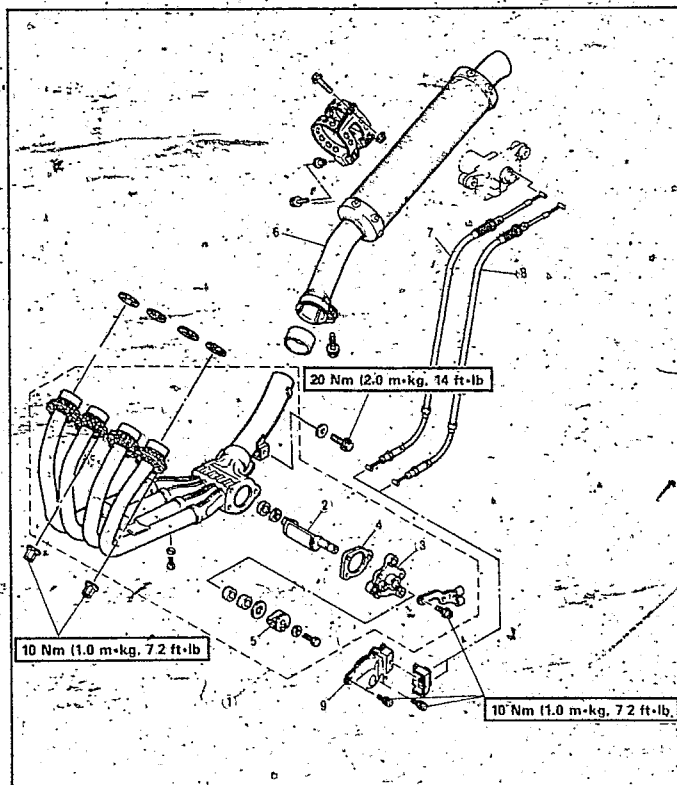


Nut (exhaust):
10 Nm (1.0 m · kg, 7.2 ft · lb)
Bolt (muffler):
20 Nm (2.0 m · kg, 14 ft · lb)



MUFFLER

- Exhaust pipe assembly
- EX UP valve
- Housing
- Gasket
- Pin
- Muffler assembly
- Pulley cable 1
- Pulley cable 2
- EX-UP valve cover

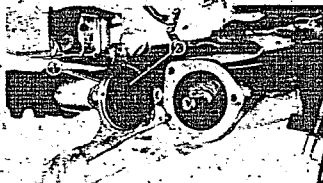


ENGINE ASSEMBLY AND ADJUSTMENT

ENG



G-12



9. Install:

- Gasket ①
- Housing ②

NOTE:

Do not contact projection on the housing with ex-up valve.



10. Install:

- Pulley

Installing steps:

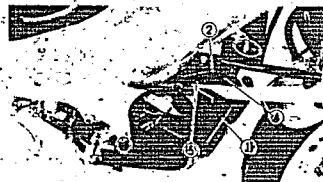
- Install the pulley cable ①, ② to the pulley ③.
- Install the pulley.
- Insert the pin (φ4) to the pulley hole.
- Tighten the pulley bolt.



Bolt (pulley):

5 Nm (0.5 m · kg, 3.6 ft · lb)

- Remove the pin (φ4).
 - Adjust the pulley cable free play.
- Refer to "EX-UP CABLE" in the CHAPTER 3.



11. Install:

- Radiator ①
- Reservoir hose ②
- Radiator hose ③ (radiator-water pump cover)
- Radiator hose ④ (radiator-joint)
- Radiator hose ⑤ (radiator-thermostat housing)



Bolt (radiator):

10 Nm (1.0 m · kg, 7.2 ft · lb)



12. Install:

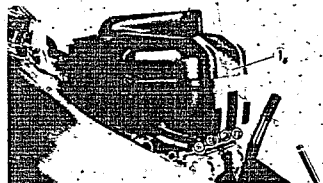
- Carburetor assembly

NOTE:

Make the the carburetors is properly in place.

ENGINE ASSEMBLY AND ADJUSTMENT

ENG



13. Install:

- Air cleaner case ①



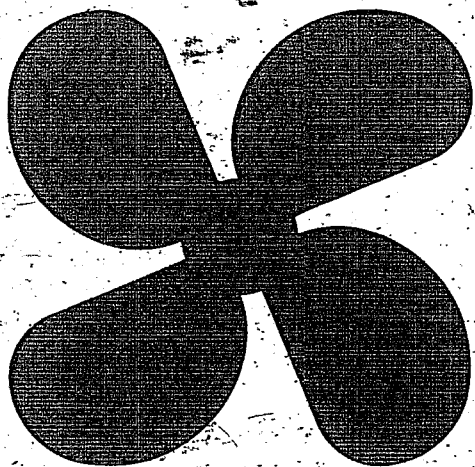
Screw (air filter case):

10 Nm (1.0 m · kg, 7.2 ft · lb)

14. Install:

- Fuel tank
- Upper cowl
- Lower cowl

Refer to the "COWLING" section in the CHAPTER 3.



COOL

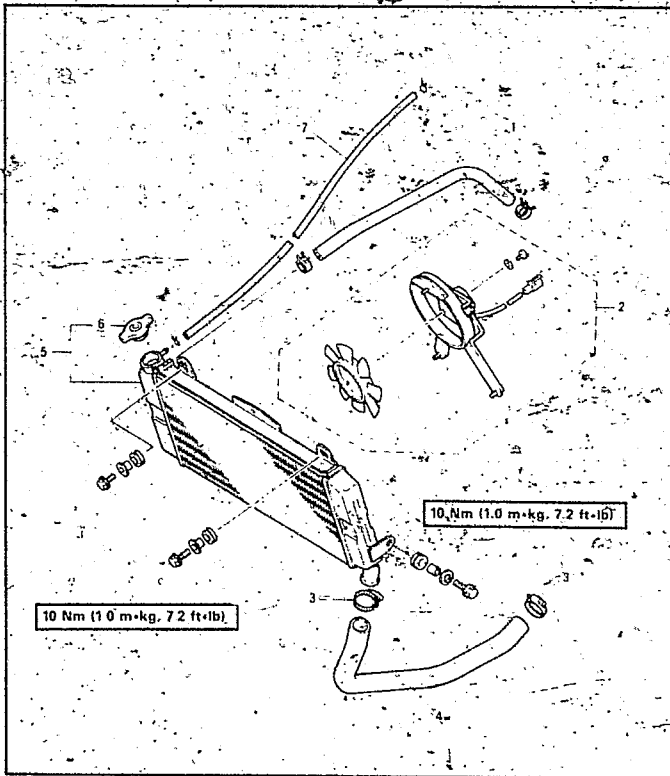
5

**CHAPTER 5.
COOLING SYSTEM**

RADIATOR	G-16
REMOVAL	G-16
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ASSEMBLY	H-1
WATER PUMP	H-3
DISASSEMBLY	H-3
INSPECTION	H-3
ASSEMBLY	H-4
THERMOSTAT	H-5
REMOVAL	H-5
INSPECTION	H-5
ASSEMBLY	H-5

RADIATOR

- ① Radiator hose (radiator joint)
- ② Fan assembly
- ③ Hose clamp
- ④ Radiator hose (radiator water pump cover)
- ⑤ Radiator assembly
- ⑥ Radiator cap
- ⑦ Reservoir hose



YBS51000

COOLING SYSTEM
RADIATOR**WARNING**

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure. Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detents. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

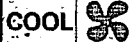
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REMOVAL

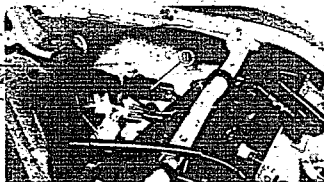
1. Drain:
 - Coolant
 Refer to CHAPTER 3 COOLANT REPLACEMENT.
2. Remove:
 - Lower cowl
 - Fuel tank
 Refer to the COWLING section in the CHAPTER 3.
3. Remove:
 - Radiator hose 1 (radiator water pump cover)
4. Remove:
 - Radiator hose 1 (radiator thermostat housing)
 - Radiator hose 2 (radiator joint)
 - Reservoir hose 3



RADIATOR



H-1



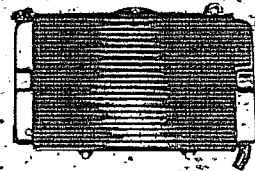
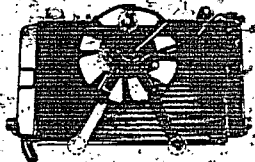
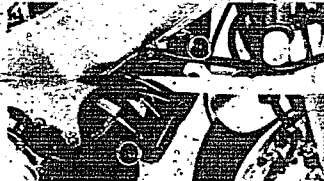
5. Disconnect:
- Fan motor coupler



6. Remove:
- Radiator assembly



7. Remove:
- Fan motor assembly

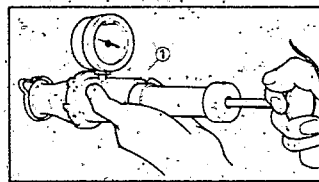
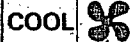


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INSPECTION

1. Inspect:
- Radiator
 - Obstruction → Blow out with compressed air through rear of radiator.
 - Flattened fins → Repair.
 - Coolant hoses
 - Cracks/Damage → Replace

RADIATOR:



2. Inspect:
- Radiator cap
 - Vacuum valve

Inspection steps:

- Measure radiator cap pressure using the radiator cap tester.
- Check vacuum valve for spring tension and seating condition.



Radiator cap tester:
P/N 90890-01325

- Valve opens at pressure below specified value or defective → Replace

Valve opening pressure:

105 ~ 125 kPa
(1.05 ~ 1.25 kg/cm², 14.9 ~ 17.8 psi)

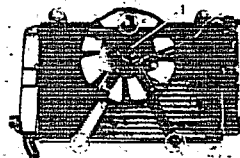
7855003

ASSEMBLY

1. Install:
- Fan motor



Bolt (fan motor):
8 Nm (0.8 m · kg, 5.8 ft · lb)



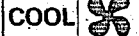
2. Install:
- Radiator assembly



Bolt (radiator):
10 Nm (1.0 m · kg, 7.2 ft · lb)



RADIATOR



H-2

RADIATOR



3. Connect:

- Fan/pump coupler
- Radiator hose ① (radiator-water pump cover)
- Radiator hose ② (radiator-thermostat housing)
- Radiator hose ③ (radiator-joint)
- Reservoir hose ④

4. Tighten:

- Drain bolts



Drain bolt (cylinder, water pump cover):

10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Replace with new copper gaskets.

5. Fill:

- Coolant

Coolant filling steps:

- Fill the coolant into the radiator until the radiator is full.
- Start the engine (coolant level decreases)

CAUTION:

Always check coolant level, and check for coolant leakage before starting engine.

- Add the coolant while engine is running.
- Stop the engine when coolant level stabilizes.
- Add the coolant again to specified level
- Install the radiator cap

Recommended coolant:

High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine inhibitors



Coolant and water mixed ratio:
50%:50%

Total amount:

2.18 L (1.9 Imp qt, 2.3 US qt)

Reservoir tank capacity:

0.3 L (0.26 Imp qt, 0.32 US qt)

From "LOW" to "FULL" level:

0.28 L (0.25 Imp qt, 0.30 US qt)

CAUTION:

- Hard water or salt water is harmful to the engine. You may use distilled water if you can not get soft water.
- Do not mix more than one type of ethylene glycol anti-freeze containing corrosion for aluminum engine inhibitors.

6. Inspect:

- Cooling system

Inspection steps:

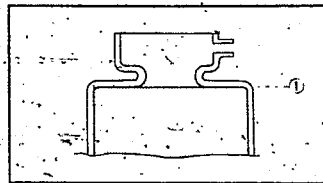
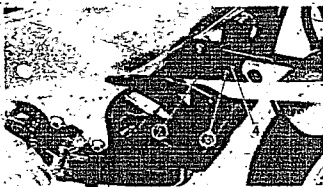
- Connect radiator cap tester.
- Apply 1.0 kg/cm² (14 lb/in²) pressure
- Measure pressure with gauge.
- Decrease of pressure (leak) → Repair as required.



Radiator cap tester:
P/N 90890-01325

7. Install:

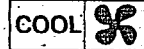
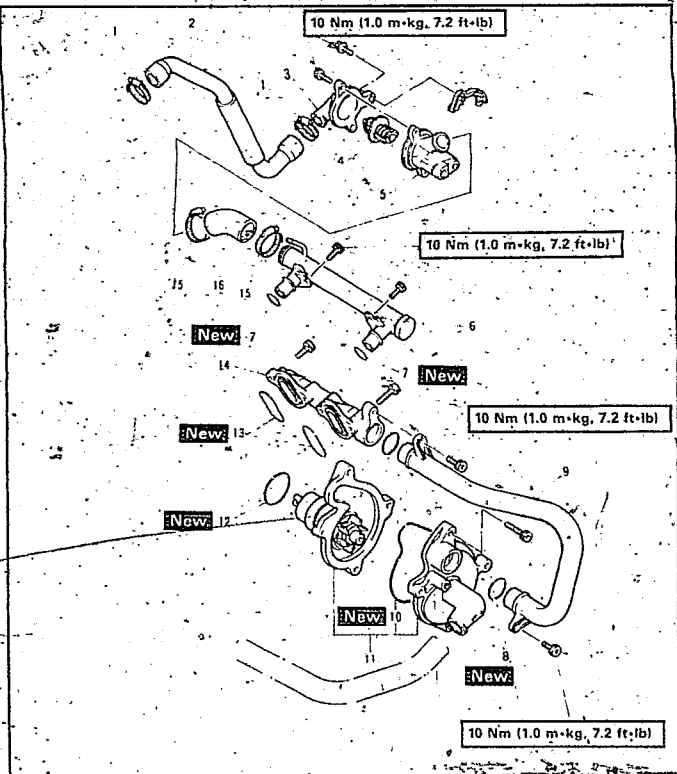
- Fuel tank
- Lower cowl





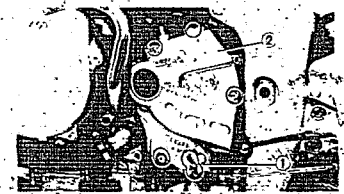
WATER PUMP, THERMOSTAT

- ① Hose clamp
- ② Radiator hose (radiator-thermostat)
- ③ Thermostat cover
- ④ Thermostat
- ⑤ Thermostat housing
- ⑥ Pipe
- ⑦ O ring
- ⑧ O-ring
- ⑨ Pipe
- ⑩ O-ring
- ⑪ Water pump
- ⑫ O-ring
- ⑬ O-ring
- ⑭ Joint
- ⑮ Hose clamp

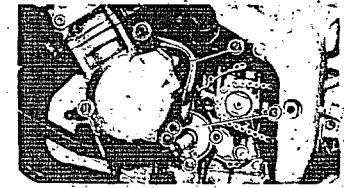


**WATER PUMP
DISASSEMBLY**

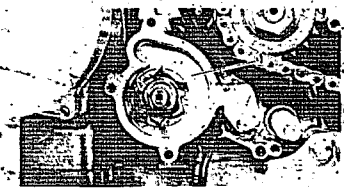
NOTE:
Be sure to drain the coolant and engine oil before disassembly of the cooling system components.



1. Remove:
- Lower cowli
- Refer to the "COWLING" section in the CHAPTER 3.



2. Remove:
- Shift arm
 - Crankcase cover - 2 (left)



3. Remove:
- Radiator hose 1 (radiator-water pump cover)
 - Pipe 2
 - Water pump cover - 3

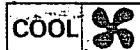
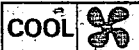


4. Remove:
- Water pump housing - 1
 - O-ring
5. Eliminate:
- Deposits
- From the impeller and water pump housing.

INSPECTION

1. Inspect:

- Impeller shaft
- Cracks/Wear/Damage → Replace



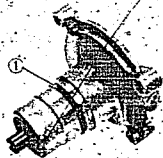
V0552003

ASSEMBLY

Reverse the "DISASSEMBLY" procedure.

1. Install:

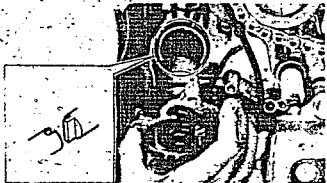
- O-ring 1 (new)

**2. Install:**

- Water pump housing

CAUTION:

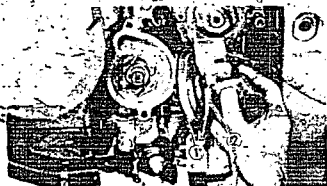
- Be sure that the oil pump shaft projection mesh with the water pump impeller shaft slot.
- Do not pinch the neutral and sidestand levers.

**3. Install:**

- O-ring 1 (new)
- Water pump cover 2



Bolt (water pump cover):
10 Nm (1.0 m • kg, 7.2 ft • lb)

**4. Install:**

- O-ring 1
- Pipe 2



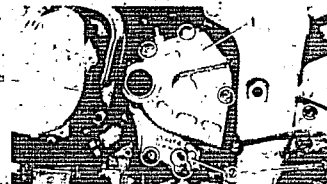
Bolt (pipe):
10 Nm (1.0 m • kg, 7.2 ft • lb)

**5. Install:**

- Crankcase cover (left) 1
- Shift arm 2



Bolt (crankcase cover, shift arm):
10 Nm (1.0 m • kg, 7.2 ft • lb)

**6. Fill:**

- Coolant
Refer to the "COOLANT REPLACEMENT" section in the CHAPTER 3.
- Engine oil
Refer to the "ENGINE OIL REPLACEMENT" section in the CHAPTER 3.

THERMOSTAT

COOL



H-5

YB853001

THERMOSTAT REMOVAL

1. Remove:

- Lower cowll
- Fuel tank

Refer to the "COWLING" section in the CHAPTER 3.

2. Drain:

- Coolant

Refer to the "COOLANT REPLACEMENT" section in the CHAPTER 3.

3. Remove:

- Radiator hose (1) (radiator-thermostat housing)
- Radiator hose (thermostat housing-joint)
- Ground lead (2)

4. Remove:

- Thermostat housing (1)
- Thermo unit lead (2)
- Thermo switch lead (3)

5. Remove:

- Thermostat housing cover (1)
- Thermostat (2)
- Thermo unit (3)
- Thermo switch (4)



THERMOSTAT

COOL



YB853002

INSPECTION

1. Inspect:

- Thermostat (5)
- Valve dose not open at 80~84°C (176~183°F) → Replace.

Inspection steps:

- Suspend thermostat in a vessel.
- Place reliable thermometer in a water.
- Heat water slowly.
- Observe thermometer, while stirring water continually.

① Thermometer

- ② Full open
- ③ Opening sequence begins
- ④ Water
- ⑤ Thermostat

⑥ Vessel

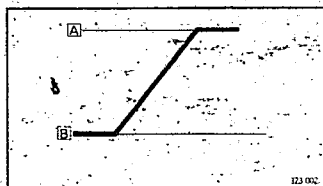
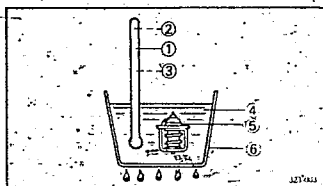
- Ⓐ OPEN
- Ⓑ CLOSE

NOTE:

Thermostat is sealed and its setting is specialized work. If its accuracy is in doubt, replace it. A faulty unit could cause serious overheating or overcooling.

2. Inspect:

- O-ring
- Wear/Damage → Replace.



YB853003

ASSEMBLY

Reverse the "REMOVAL" procedure.

1. Install:

- Thermostat

NOTE:

Install the bypass hole as shown in the photo



THERMOSTAT



H-6

2. Install:

- Thermostat cover



Bolt (thermostat cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)

3. Install:

- Thermo switch (1)
- Thermo unit (2)

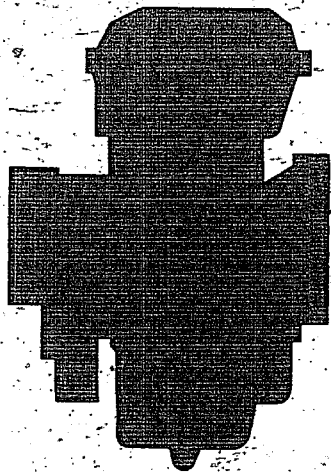


Thermo switch, Thermo unit:
14 Nm (1.4 m · kg, 10 ft · lb)

4. Fill:

- Coolant
- Refer to the "COOLANT REPLACEMENT" section in the CHAPTER 3.





CARB

6



CHAPTER 6. CARBURETION

CARBURETOR	H-10
REMOVAL	H-10
DISASSEMBLY	H-11
INSPECTION	H-12
ASSEMBLY	H-12
INSTALLATION	H-14
FUEL LEVEL ADJUSTMENT	H-14

CARBURETOR

CARB



H-10

CARBURETOR

CARB

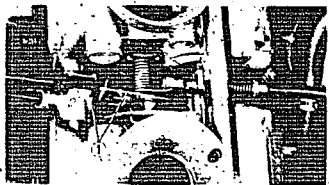
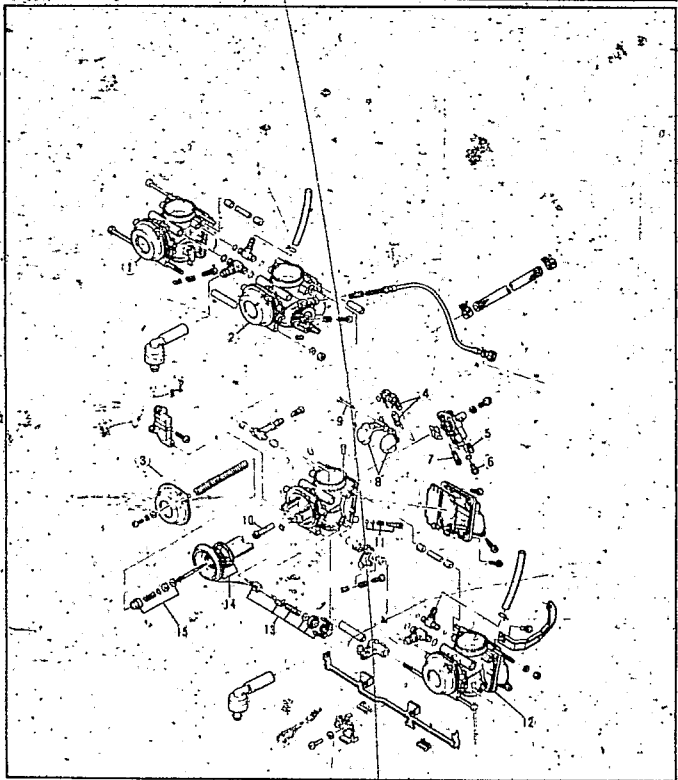


CARBURETION

CARBURETOR

- ① Carburetor assembly
- ② Carburetor assembly
- ③ Carburetor assembly
- ④ Needle valve set
- ⑤ Starter jet
- ⑥ Main jet
- ⑦ Pilot jet
- ⑧ Float
- ⑨ Float pin
- ⑩ Needle jet
- ⑪ Pilot screw set
- ⑫ Carburetor assembly
- ⑬ Starter set
- ⑭ Diaphragm set
- ⑮ Jet needle set

SPECIFICATIONS	
ID MARK	3TJ00
MAIN JET	# 1,4: # 100 # 2,3: # 97.5
MAIN AIR JET	# 70
PILOT AIR JET	# 32.5
PILOT AIR JET	# 110
JET NEEDLE	# 1,4: 5CEW18-3 # 2,3: 5CKP3-3 2 1/2 Turns out
PILOT AIR SCREW	# 130
THROTTLE VALVE	
ENGINE IDLE SPEED	1,250 - 1,350 r/min



VB581001

REMOVAL

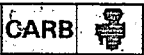
1. Remove:
 - Lower cowl
 - Fuel tank
 Refer to the "COWLING" section in the CHAPTER 3.
 - Air filter case

2. Disconnect:
 - Starter cable

3. Remove:
 - Fuel hose
 - Carburetor

4. Disconnect:
 - Throttle cables

5. Remove:
 - Starter cable (from carburetor)



9541002

DISASSEMBLY
NOTE:

The following parts can be cleaned and inspected without carburetor separation.

- Throttle valve
- Piston valve
- Starter plunger
- Float chamber components

1. Remove:
- Starter lever (1)
 - Throttle stop screw stay (2)

2. Remove:
- Connecting shafts (1) (upper)
 - Connecting shaft (2) (lower)
 - Collar (3)

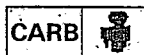
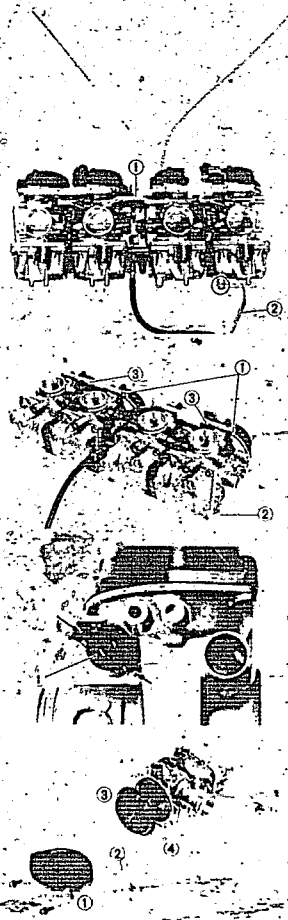
3. Disconnect:
- Carburetor assembly

4. Remove:
- Starter plunger (1)

NOTE:

Unhook the hooks from the carburetor body and then pull out the starter plunger.

5. Remove:
- Vacuum chamber cover (1)
 - Spring (2)
 - Diaphragm assembly (3)
 - O-ring (4)



6. Remove:
- Plug (1)
 - Jet needle (2)

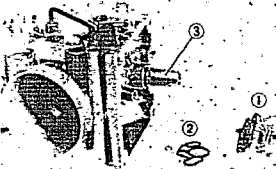
7. Remove:
- Float chamber
 - Gasket
 - Pilot screw (1)

8. Remove:
- Float pin (1)
 - Float (2)
 - Needle valve (3)

9. Remove:
- Valve seat (1)
 - O-ring

10. Remove:
- Main jet (1)
 - Pilot jet (2)
 - Bolt (3)
 - Starter jet (4)





11. Remove:
- Jet housing (1)
 - O-ring (2)
 - Needle jet (3)
 - Throttle valve support

*B561003

INSPECTION**1. Inspect:**

- Carburetor body
- Float chamber
- Jet housing
- Cracks/Damage → Replace.
- Fuel passage
- Contamination → Clean as indicated.

Cleaning steps:

- Wash carburetor in petroleum based solvent.
(Do not use any caustic carburetor cleaning solution.)
- Blow out all passage and jets with compressed air.

2. Inspect:

- Floats
- Damage → Replace.

3. Inspect:

- Needle valve (1)
- Valve seat (2)
- O-ring (3)
- Damage/Wear/Contamination → Replace as a set.

**4. Inspect:**

- Diaphragm assembly (1)
- Throttle valve support
- Scratches/Wear/Damage → Replace.
- O-ring
- Wear/Damage → Replace.

5. Inspect:

- Main jet (1)
- Starter jet (2)
- Pilot jet (3)
- Pilot screw set (4)
- Needle jet (5)
- Bends/Wear/Damage - Replace.
- Contamination → Blow out jets with compressed air.

6. Inspect:

- Jet needle
- Bends/Wear → Replace.

7. Check:

- Free movement
- Insert the throttle valve into the carburetor body, and check for free movement.
- Stick → Replace.

*B561004

ASSEMBLY

Reverse the "DISASSEMBLY" procedures. Note the following points.

CAUTION:

- Before reassembling, wash all parts in clean petroleum based solvent.
- Always use a new gasket.

CARBURETOR

CARB



H-13

1. Install:

- Throttle valve support
- Needle jet

2. Install:

- O-ring
- Jet housing ①

NOTE:

Align the groove ③ on the needle jet with the projection ④ on the jet housing.

3. Install:

- Bolt ①
- Pilot jet ②
- Main jet ③
- Starter jet ④

NOTE:

- The jet with a bigger eye is main jet ③. It should be installed on position ④.
- The jet with a smaller eye is starter jet ④. It should be installed on position ③.

4. Install:

- O-ring
- Valve seat ①

CARBURETOR

CARB



5. Install:

- Needle valve ①
- Float ②
- Float pin ③

6. Install:

- O-ring
- Float chamber

7. Install:

- Pilot screw ①

Installation points:

- Screw in the pilot air screw ① until it is tightly seated.
- Back out by the specified number of turns.

Pilot air screw (turn out): 2-1/2

8. Install:

- Jet needle set (to the diaphragm assembly)

9. Install:

- O-ring
- Diaphragm assembly

10. Install:

- Spring ①
- Vacuum chamber cover ②

CARBURETOR



H-14

11. Install:

- Starter plunger ①

NOTE:

Be sure that the carburetor body projection mesh with the starter plunger slot.

12. Connect:

- Carburetor assemblies

13. Install:

- Connecting shafts ① (upper/lower)
- Collar ②

14. Install:

- Starter lever ①
- Throttle stop screw stay
- Starter cable

v8161005

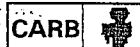
INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points.

1. Adjust.
 - Carburetor synchronization

Refer to the "CARBURETOR SYNCHRONIZATION" section in the CHAPTER 3

CARBURETOR



	Engine idle speed: 1,250 ~ 1,350 r/min
--	-------------------------------------------

Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

3. Adjust:

- Throttle cable free play

	Throttle cable free play: 3 ~ 7 mm (0.12 ~ 0.28 in)
--	--------------------------------------------------------

Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.

v8161006

FUEL LEVEL ADJUSTMENT

1. Measure:

- Fuel level ①
- Out of specification → Adjust.

	Fuel level ①: 20.9 ~ 21.9 mm (0.82 ~ 0.86 in) below the float chamber line
--	----------------------------------------------------------------------------------

Measurement and adjustment steps:

- Place the motorcycle on a level surface
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.

- Connect the fuel level gauge ① to the drain pipe ②.

	Fuel level gauge: P/N 90890-01312
--	--------------------------------------

- Loosen the drain screw ③, and warm up the engine for several minutes

CARBURETOR

CARB



H-15

- Hold the gauge vertically next to the float chamber line ④.
- Measure the fuel level ③ with the gauge.

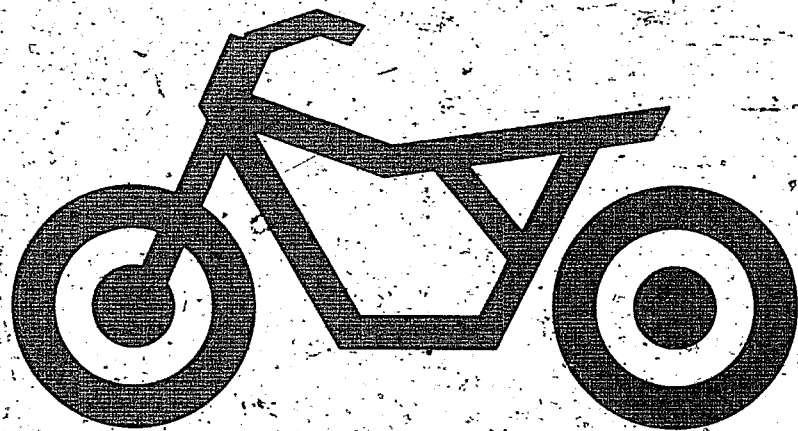
NOTE:

Fuel level readings of both side of carburetor line should be equal.

- If the fuel level is incorrect, adjust the fuel level:

- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust float level by bending the float tang ① slightly.
- Install the carburetor.
- Recheck the fuel level.





CHAS

7

**CHAPTER 7.
CHASSIS**

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FRONT WHEEL

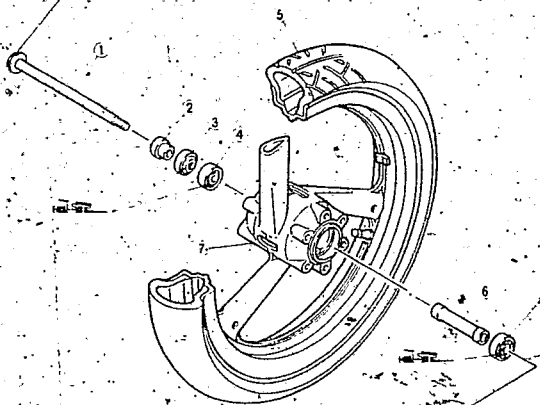
- ① Wheel axle
- ② Collar
- ③ Oil seal
- ④ Bearing
- ⑤ Tire
- ⑥ Spacer
- ⑦ Wheel
- ⑧ Gear unit
- ⑨ Oil seal
- ⑩ Meter clutch retainer
- ⑪ Meter clutch

TIRE AIR PRESSURE (COLD)

Cold tire pressure	Front	Rear
Up to maximum load*	200 kPa 2.0 kg/cm ² 28 psi	250 kPa 2.5 kg/cm ² 36 psi

*Load is the total weight of cargo, rider, and accessories.

75 Nm (7.5 m·kg, 54 ft·lb)



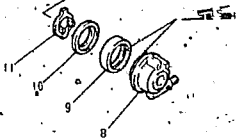
A TIRE SIZE:
120/60 R17 55H

B RIM SIZE:
J17 - MT3.50

RIM RUNOUT LIMIT:
VERTICAL

C -1.0 mm (0.039 in)

LATERAL
0.5 mm (0.020 in)



V6571001

REMOVAL

WARNING

Support the motorcycle securely so there is no danger of it falling over.

1. Remove:
 - Lower cowl
 Refer to the "COWLING" section in the CHAPTER 3.

2. Remove:
 - Muffler assembly
 Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

3. Elevate the front wheel by placing a suitable stand under the engine.

4. Disconnect:
 - Speedometer cable

5. Remove:
 - Calipers ② (left and right)



6. Loosen:
 - Pinch bolt ①



7. Remove:
 - Axle shaft ②

8. Remove:
 - Front wheel
 - Gear unit (speedometer)
 - Collar

NOTE:

Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.

0571002

INSPECTION

1. Inspect:

• Tire

Wear/Damage → Replace.

Refer to the "TIRE INSPECTION" section in the CHAPTER 3.

2. Eliminate any corrosion from parts.

3. Inspect:

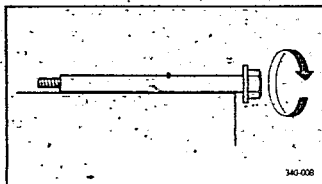
• Wheel axle

Roll the axle on a flat surface.

Bends → Replace.

WARNING:

Do not attempt to straighten a bent axle.



4. Inspect:

• Wheel

Cracks/Bends/Warpage → Replace.

5. Measure:

• Wheel runout

Out of specification → Check the wheel and bearing play.

**Rim runout limits:**

Vertical 1 : 1.0 mm (0.04 in)

Lateral 2 : 0.5 mm (0.02 in)

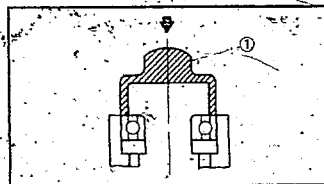
WARNING:

After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.

6. Check:

• Wheel bearings

Bearings allow play in the wheel hub or wheel turns roughly → Replace.

**Replacement steps:**

• Clean the outside of the wheel hub.

• Remove the bearing a, using a general bearing puller.

• Install the new bearing.

NOTE:

Use a socket 1 that matches the outside diameter of the race of the bearing.

CAUTION:

Do not strike the inner of race balls of the bearing. Contact should be made only with the outer race.

VES7003

INSTALLATION

Reverse the "Removal" procedure.

Note the following points.

1. Lubricate:

- Oil seal
- Gear unit

Recommended lubricant:
Lithium soap base grease

FRONT WHEEL

CHAS 

1-5

2. Install:

- Gear unit assembly

NOTE:

Make sure the projection inside the gear unit are meshed with the flats in the wheel hub.

3. Install:

- Front wheel assembly

NOTE:

Be sure the boss ① on the outer fork tube correctly engages with the locating slot ② on the gear unit assembly.

4. Tighten:

- Axle shaft ①
- Pinch bolt ②



Axle shaft:

75 Nm (7.5 m · kg, 54 ft · lb)

Pinch bolt:

20 Nm (2.0 m · kg, 14 ft · lb)

5. Install:

- Brake caliper



Bolt (brake caliper):

35 Nm (3.5 m · kg, 25 ft · lb)

16571004

STATIC WHEEL BALANCER ADJUSTMENT

NOTE:

- After replacing the tire and/or rim, wheel balance should be adjusted.
- Adjust the wheel balance with brake disc installed.

FRONT WHEEL

CHAS 

1. Remove:

- Balancing weight

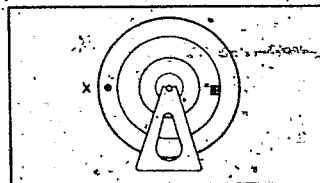
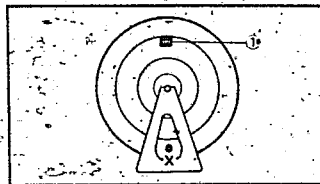
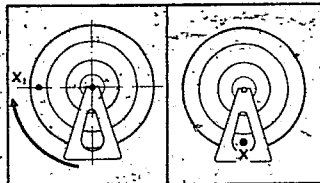
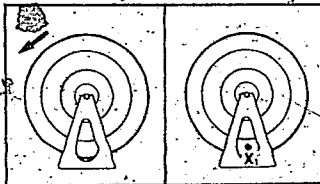
2. Set the wheel on a suitable stand.

3. Find:

- Heavy spot

Procedure:

- Spin the wheel and wait for it to rest.
- Put an "X" mark on the wheel-bottom spot.
- Turn the wheel so that the "X" mark is 90° up.
- Let the wheel fall and wait for it to rest. Put an "X" mark on the wheel-bottom spot.
- Repeat the above steps several times until these marks come to the same spot.
- This spot is the heavy spot "X".



4. Adjust:

- Wheel balance

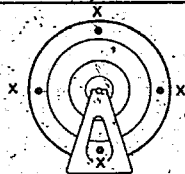
Adjustment steps:

- Install a balance weight "W" on the rim exactly opposite to the heavy spot "X".

NOTE:

Start with the smallest weight.

- Turn the wheel so that the heavy spot is 90° up.
- Check that the heavy spot is at rest there. If not try another weight until the wheel is balanced.



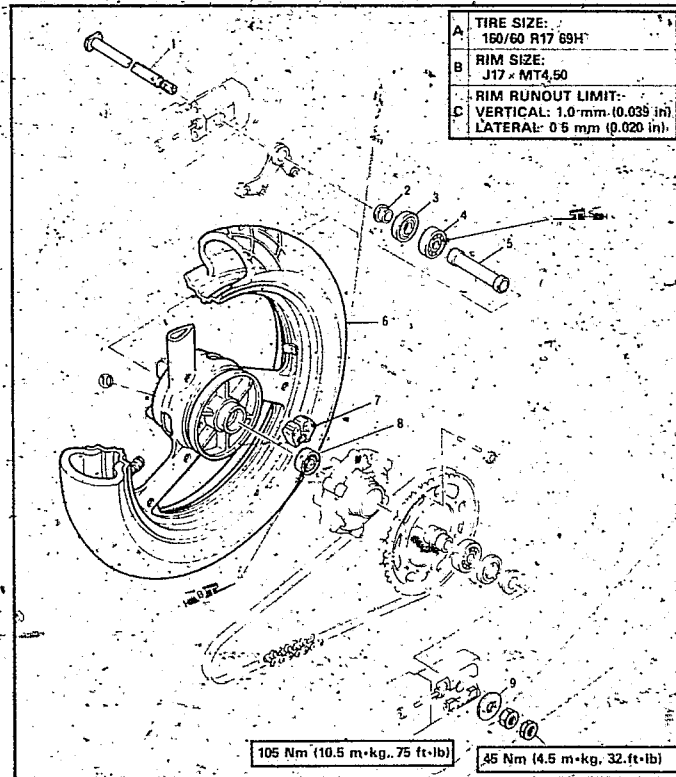
5. Check:
- Wheel balance

Checking steps:

- Turn the wheel so that it comes to each point as shown.
- Check that the wheel is at rest at each point. If not readjust the wheel balance.

REAR WHEEL

- 1 Wheel axle
- 2 Collar
- 3 Oil seal
- 4 Bearing
- 5 Spacer
- 6 Rear tire
- 7 Damper
- 8 Bearing
- 9 Plate washer
- 10 Wheel





YBS72001

REMOVAL

WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Place the motorcycle on the level place.
2. Elevate the rear wheel by placing a suitable stand under the swingarm.

3. Remove:

- Locknut (1) (wheel axle)
- Axle nut (2)

4. Loosen:

- Caliper bracket installing bolt (1)

5. Remove:

- Wheel axle (1)
- Chain puller (2)

6. Remove:

- Rear wheel (1)

NOTE:

- Before removing the rear wheel, push the wheel forward and remove the drive chain.
- Do not depress the brake pedal when the wheel is off the motorcycle as the brake pads will be forced shut.



YBS72002

INSPECTION

1. Inspect:

- Tire
- Rear wheel axle
- Wheel
- Wheel bearings
- Oil seals

Refer to the "FRONT WHEEL-INSPECTION".

2. Measure:

- Wheel runout

Refer to the "FRONT WHEEL-INSPECTION".

3. Check:

- Wheel balance

Refer to the "FRONT WHEEL-INSPECTION".

4. Inspect:

- Clutch damper
- Wear/Damage → Replace.



YBS72003

INSTALLATION

Reverse the "Removal" procedure. Note the following points.

1. Lubricate:

- Rear wheel axle
- Bearings
- Oil seals

Recommended lubricant:
Lithium soap base grease

2. Adjust:
- Drive chain slack



Drive chain slack:
16 ~ 20 mm (0.59 ~ 0.79 in)

Refer to the "CHAPTER 3--DRIVE CHAIN ADJUSTMENT"

3. Tighten:
- Axle nut (rear wheel axle)
 - Locknut (rear wheel axle)
 - Bolts (caliper bracket)



Axle nut (rear wheel axle):
105 Nm (10.5 m · kg, 75 ft · lb)
Locknut (rear wheel axle):
45 Nm (4.5 m · kg, 32 ft · lb)
Bolt (caliper bracket):
55 Nm (5.5 m · kg, 40 ft · lb)

STATIC WHEEL BALANCE ADJUSTMENT

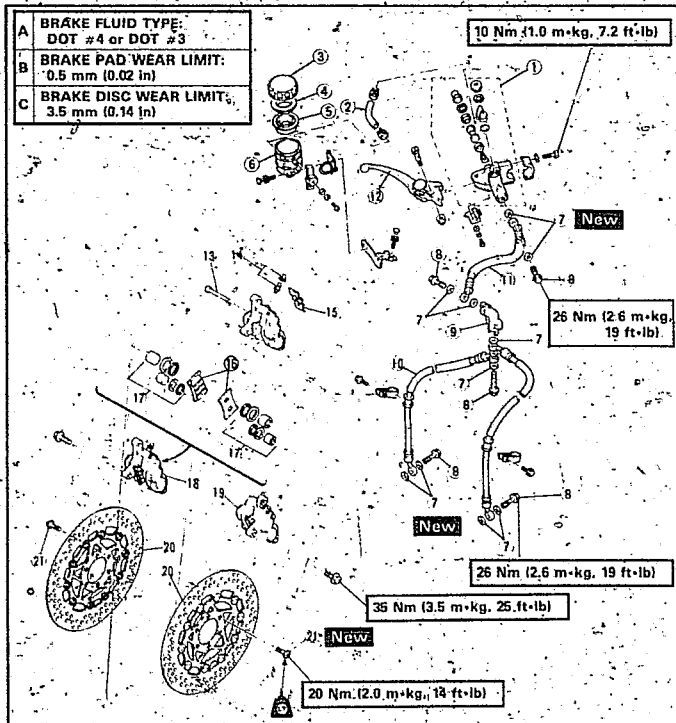
NOTE:

- After replacing the tire and/or rim, wheel balance should be adjusted.
- Adjust the wheel balance with brake disc, and wheel hub installed.

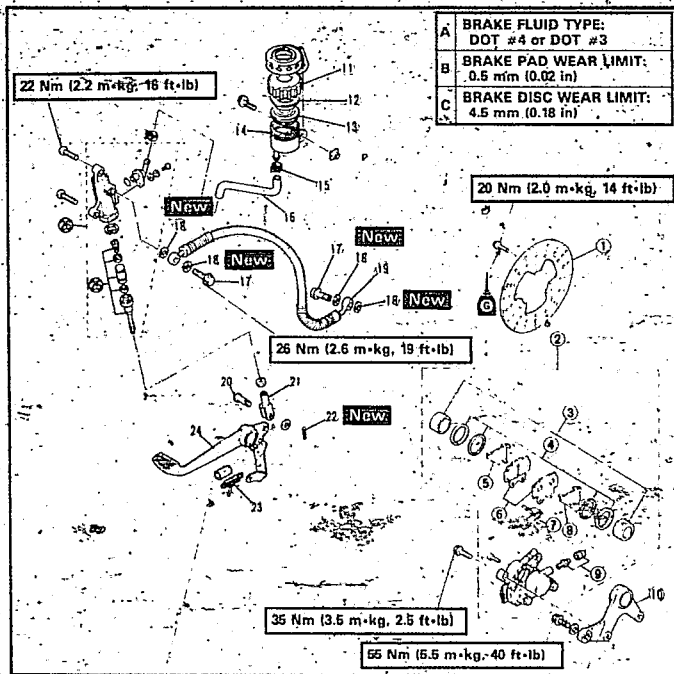
1. Adjust:
- Wheel balance
- Refer to the "FRONT WHEEL--STATIC WHEEL BALANCE ADJUSTMENT" section.

FRONT AND REAR BRAKE

- | | |
|----------------------------|----------------------------|
| ① Master cylinder assembly | ⑭ Brake lever |
| ② Reservoir hose | ⑮ Retaining pin |
| ③ Reservoir cap | ⑯ Bleed screw set |
| ④ Diaphragm bush | ⑰ Pad spring |
| ⑤ Diaphragm | ⑱ Brake pad |
| ⑥ Reservoir tank | ⑲ Piston seal kit |
| ⑦ Copper washer | ⑳ Caliper assembly (right) |
| ⑧ Union bolt | ㉑ Caliper assembly (left) |
| ⑨ Hose joint | ㉒ Brake disc |
| ⑩ Brake hose | ㉓ Bolt |



- | | |
|--------------------|----------------------------|
| ① Brake disc | ⑭ Brake hose |
| ② Caliper assembly | ⑮ Pin |
| ③ Caliper piston | ⑯ Joint |
| ④ Caliper seal kit | ⑰ Cotter pin |
| ⑤ Shim | ⑱ Spring |
| ⑥ Brake pad | ⑳ Brake pedal |
| ⑦ Pad spring | ㉑ Master cylinder kit |
| ⑧ Shim | ㉒ Master cylinder assembly |
| ⑨ Bleed screw kit | |
| ⑩ Caliper bracket | |
| ⑪ Reservoir cap | |
| ⑫ Diaphragm bush | |
| ⑬ Diaphragm | |
| ⑭ Reservoir tank | |
| ⑮ Clip | |
| ⑯ Reservoir hose | |
| ⑰ Union bolt | |
| ⑱ Copper washer | |



YB573001

CAUTION:

Disc brake components rarely require disassembly. **DO NOT:**

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake component
- Use contaminated brake fluid for cleaning. Use only clean brake fluid.
- Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

YB573001

BRAKE PAD REPLACEMENT**NOTE:**

It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

Front brake**1. Remove:**

- Clip ①
- Retaining pin ②
- Pad spring ③

**3. Remove:**

- Brake pad ④



NOTE:

- Replace the pad spring if the pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.



Wear limit (A) :
0.5 mm (0.02 in)

Installation steps:

1. Connect a suitable hose (A) tightly to the caliper bleed screw, then, place the other end of this hose into an open container.
2. Loosen the caliper bleed screw and push the piston into the caliper by your finger.
3. Tighten the caliper bleed screw.



Caliper bleed screw:
6.8 Nm (0.6 m · kg, 4.3 ft · lb)

- Install the brake pad (new) of the pad spring (new).

3. Install:

- Brake pad (new) (A)
- Pad spring (new) (B)
- Retaining pin (C)

4. Tighten:

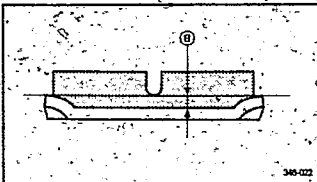
- Retaining pin



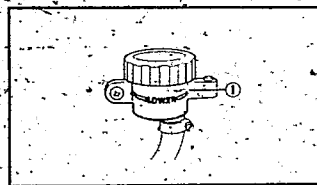
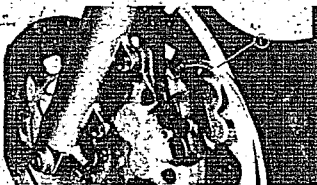
Retaining pin:
10 Nm (1.0 m · kg, 7.2 ft · lb)

5. Install:

- Clip



348-022

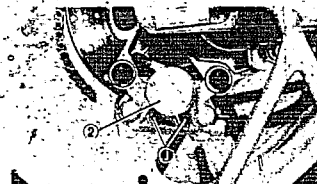


6. Inspect:

- Brake fluid level
- Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.
- (A) "LOWER" level line

7. Check:

- Brake lever operation
- A softy or spongy filling → Bleed brake system.
- Refer to the "AIR BLEEDING" section in the CHAPTER 7.



Rear brake:

1. Loosen:
- Retaining pin (A)

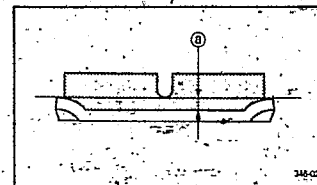
2. Remove:

- Caliper body (B)



3. Remove:

- Retaining pin (A)
- Brake pad (B)
- Shim
- Pad spring



348-022

NOTE:

- Replace the spring if the pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.



Wear limit (A) :
0.5 mm (0.02 in)

- Replace the pad shim if the pad replacement is required.

4. Install:

- Pad spring (new) ①
- Shim (new) ②
- Brake pad (new) ③
- Retaining pin

Installation steps:

- Connect a suitable hose ① tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper by your finger.
- Tighten the caliper bleed screw.



Caliper bleed screw:
6 Nm (0.6 m · kg, 4.3 ft · lb)

- Install the pad shim (new) to the brake pad (new).
- Install the brake pad (new) and pad spring (new).

5. Install:

- Caliper body



Bolts (caliper body):
35 Nm (3.5 m · kg, 25 ft · lb)

- 6. Tighten:
- Retaining pin

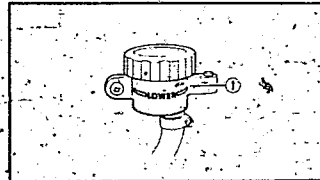


Retaining pin:
10 Nm (1.0 m · kg, 7.2 ft · lb)

7. Inspect:

- Brake fluid level
- Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" level line.



8. Check:

- Brake pedal operation
- A soft or spongy feeling → Bleed brake system.
- Refer to "AIR BLEEDING" section in CHAPTER 7.

16573002

CALIPER DISASSEMBLY

NOTE:

Before disassembling the front brake caliper or rear brake caliper, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

Front brake

1. Remove:
 - Caliper body
 - Brake pad
 - Pad spring
- Refer to the "BRAKE PAD REPLACEMENT" section.



2. Remove:

- Piston ①
- Piston seal ②

Removal steps:

- Blow compressed air into the tube joint opening to force out the piston from the caliper body.

WARNING

- Never try to pry out the piston.
- Cover the piston with a rag. Use care so that piston does not cause injury as it is expelled from the cylinder.

Rear brake

1. Remove:

- Caliper body
- Brake pads
- Pad spring

Refer to the "BRAKE PAD REPLACEMENT" section.

2. Remove:

- Piston ①
- Piston seal ②

Removal steps:

- Blow compressed air into the tube joint opening to force out the piston from the caliper body.

WARNING

- Never try to pry out the piston.
- Cover the piston with a rag. Use care so that piston does not cause injury as it is expelled from the cylinder.



*B573003

MASTER CYLINDER DISASSEMBLY

NOTE:

Before disassembling the front or rear brake master cylinders, drain the hose, master cylinder, brake caliper and reservoir tank of their brake fluid.



Front brake

1. Remove:
 - Brake lever ①
 - Brake switch ②



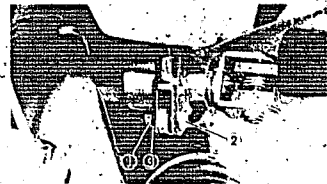
2. Remove:

- Union bolt ①
- Copper washer ②
- Brake hose ③
- Reservoir hose ④



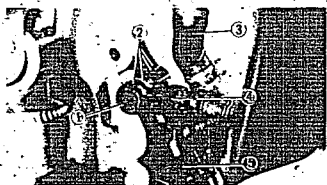
3. Remove:

- Master cylinder bracket ①
- Master cylinder ②



Rear brake

1. Remove:
 - Cotter pin ①
 - Pin ②
 - Washer ③



2. Remove:

- Union bolt ①
- Copper washer ②
- Reservoir hose ③
- Brake hose ④
- Master cylinder ⑤

*8573004

INSPECTION AND REPAIR

Recommended brake component replacement schedule:

Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every five years
Brake fluid	Replace only when brakes are disassembled

WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents which cause seals to swell and distort.

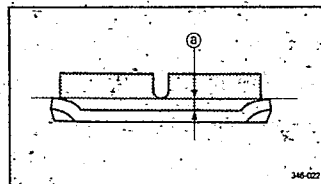
1. Inspect:

- Caliper piston ①
Scratches/Rust/Wear → Replace caliper assembly.
- Caliper cylinder ②
Wear/Scratches → Replace caliper assembly.

- △ Front
- Rear

7.21

B



346-022

**WARNING**

Replace the piston seal and dust seal whenever a caliper is disassembled.

2. Measure:

- Brake pad thickness ①
Out of specification → Replace



Pad wear limit:
0.5 mm (0.02 in)

NOTE:

Replace the pads as a set if either is found to be worn the wear limit.

3. Inspect:

- Brake hose
Cracks/Damage → Replace.

4. Inspect:

- Master cylinder body
Scratches/Wear → Replace.

NOTE:

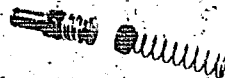
Clean all passage with new brake fluid.



5. Inspect:

- Master cylinder kit
Scratches/Wear → Replace.

- △ Front brake
- Rear brake



7.22



78573005

ASSEMBLY

WARNING

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



Brake fluid:
DOT #4
If DOT #4 is not available,
DOT #3 can be used.

- Replace the piston seals whenever a caliper is disassembled.

Front brake

1. Install:
 - Piston seal
 - Piston

2. Install:

- Brake pad
- Pad Spring
- Retaining pin

Refer to the "BRAKE PAD REPLACEMENT" section.



3. Install:
 - Brake caliper



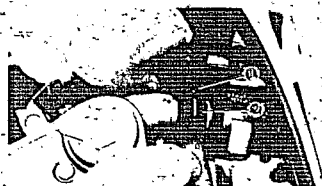
Bolt (brake caliper):
35 Nm (3.5 m • kg, 25 ft • lb)



4. Install:
 - Master cylinder kit



5. Install:
 - Circlip
 - Master cylinder boot



6. Install:
 - Master cylinder

NOTE:

- Install the master cylinder bracket with the "UP" mark facing upward.
- Align the punch mark on the handlebar with the matching surface of the master cylinder.
- Tighten first the upper bolt, then the lower bolt.



Bolt (master cylinder bracket):
10 Nm (1.0 m • kg, 7.2 ft • lb)

7. Install:

- Brake hose ①
- Copper washers ②
- Union bolts ③



Union bolt:
26 Nm (2.6 m · kg, 19 ft · lb)

- Ⓐ Master cylinder
- Ⓑ Brake caliper

CAUTION:

When installing the brake hose to the caliper, lightly touch the pipe with the projection on the caliper and master cylinder.

WARNING:

Always use new copper washers.

8. Install:

- Brake switch ①
- Brake lever ②

NOTE:

Apply lithium soap base grease to pivot shaft of brake lever.

9. Fill:

- Brake fluid



Recommended brake fluid:
DOT #4
If DOT #4 is not available,
DOT #3 can be used.

CAUTION:

Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

WARNING:

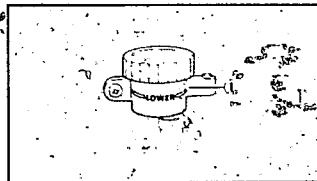
- Use only the designated quality brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.

10. Air bleed:

- Brake system
- Refer to the "AIR-BLEEDING" section.

11. Inspect:

- Brake fluid level
- Fluid level is under "LOWER" level line → Replenish.
Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.



Rear brake

1. Install:

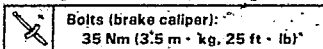
- Piston seal 1
- Piston 2



2. Install:
- Pad spring
 - Brake pad
 - Retaining pin

Refer to the "BRAKE PAD REPLACEMENT" section.

3. Install:
- Brake caliper



4. Install:

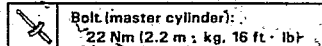
- Master cylinder kit 1

5. Install:

- Circlip 1
- Nut 2
- Joint 3

6. Install:

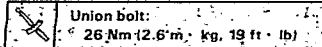
- Master cylinder 1
- Shaft 2
- Plain washer 3
- Cotter pin


**WARNING**


Always use new cotter pin.

7. Install:

- Brake hose 1
- Copper washers 2
- Union bolt 3



-  Master cylinder

-  Brake caliper

CAUTION:

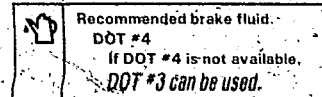
When installing the brake hose, lightly touch the brake pipe with the projections on the caliper and master cylinder.

WARNING

Always use new copper washers.

8. Fill:

- Brake fluid

**CAUTION:**

Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

WARNING

- Use only the designated quality brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid mixing fluid may result in a harmful chemi-

- cal reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.

9. Air bleed:

- Brake system

Refer to the "AIR BLEEDING" section in the CHAPTER 7.

10. Inspect:

- Brake fluid level

Fluid level is under "LOWER" level line → Replenish.

Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.



YB673006

AIR BLEEDING**WARNING:**

Bleed the brake system if:

- The system has been disassembled.
- A brake hose has been loosened or removed.
- The brake fluid is very low.
- The brake operation is faulty.

A dangerous loss of braking performance may occur if the system is not properly bled.

1. Bleed:

- Brake fluid

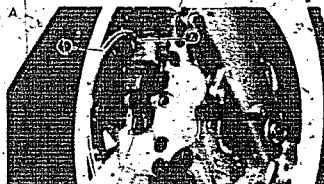
Air bleeding steps:

- Add proper brake fluid to the reservoir.
- Install the diaphragm. Be sure, careful not to spill any fluid or allow the reservoir to overflow.

- Connect the clear plastic tube tightly to the caliper bleed screw.

A Front

B Rear



- Place the other end of the tube into a container.

- Slowly apply the brake lever or pedal several times.

- Pull the lever in or push down on the pedal. Hold the lever or pedal in position.

- Loosen the bleed screw and allow the lever or pedal to travel toward its limit.

- Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.



Bleed screw:

6 Nm (0.6 m · kg, 4.3 ft · lb)

- Repeat above steps until of the air bubbles have been removed from the system.

NOTE:

If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

- Add brake fluid to the level line on the reservoir

FRONT FORK

- | | |
|----------------|-------------------------------|
| ① Cap bolt | ⑤ Plate washer |
| ② O-ring | ⑥ Slide metal |
| ③ Spring seat | ⑦ Outer tube |
| ④ Lock nut | ⑧ Oil lock piece |
| ⑤ Fork spring | ⑨ Inner tube |
| ⑥ Dust-seal | ⑩ Damper rod assembly |
| ⑦ Stopper ring | ⑪ Front fork assembly (right) |
| ⑧ Oil seal | ⑫ Washer |

FORK OIL CAPACITY:
433 cm³ (15.2 imp oz, 14.6 US oz)
GRADE:
Fork oil 10W or equivalent

23 Nm (2.3 m·kg, 17 ft·lb)

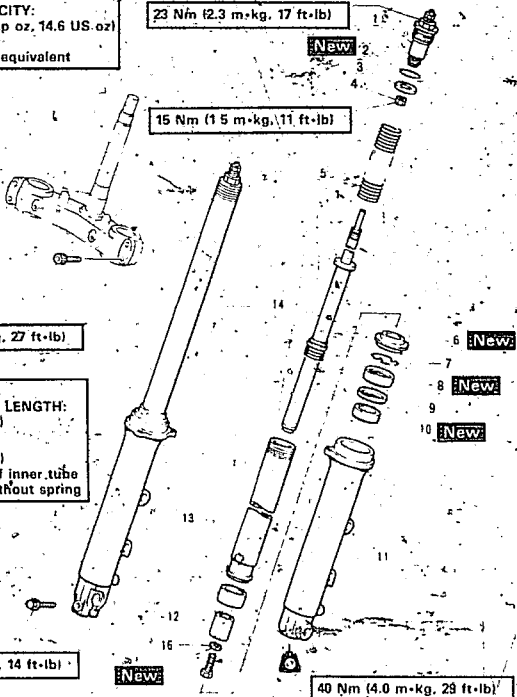
15 Nm (1.5 m·kg, 11 ft·lb)

38 Nm (3.8 m·kg, 27 ft·lb)

FORK SPRING:
MINIMUM FREE LENGTH:
354 mm (13.9 in)
OIL LEVEL:
106 mm (4.17 in)
From the top of inner tube
compressed without spring

20 Nm (2.0 m·kg, 14 ft·lb)

40 Nm (4.0 m·kg, 29 ft·lb)



V0574001

REMOVAL

WARNING:

Support the motorcycle securely so there is no danger of it falling over.

1. Remove:

- Lower cowl
- Upper cowl

Refer to the "COWLING" section in the CHAPTER 3.

- Muffler assembly

Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

2. Elevate the front wheel by placing a suitable stand under the engine.

3. Remove:

- Front wheel

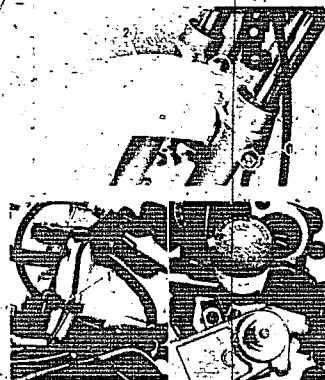
Refer to the "FRONT WHEEL—REMOVAL" section

4. Remove:

- Holders 1 (brake hose)
- Front fender 2

5. Remove:

- Horn lead holder 1
- Reservoir tank stay 2





6. Loosen:
- Pinch bolts (1) (handle crown)
 - Pinch bolts (2) (handlebar)
 - Cap bolts (3)



7. Loosen:
- Pinch bolts (1) (lower bracket)

WARNING:

Support the fork before loosening the pinch bolt.

8. Remove:

- Front fork

10574002

DISASSEMBLY

1. Turn in the rebound damping-adjuster fully.

2. Remove:

- Inner tube
- from cap bolt.

3. Loosen:

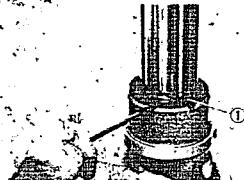
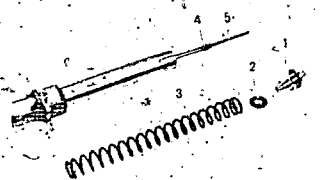
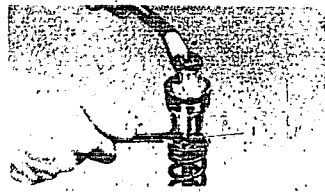
- Locknut (1)

NOTE:

When loosening the locknut, hold the spring pre-load adjuster.

4. Remove:

- Cap bolt (1)
- Spring seat (2)
- Fork spring (3)
- Lock nut (4)
- Push rod (5)



5. Drain:

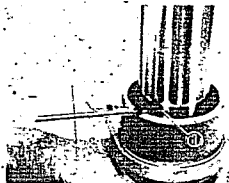
- Fork oil

6. Remove:

- Dust seal (1)

NOTE:

Use a thin screwdriver, and be careful not to scratch the inner fork tube.

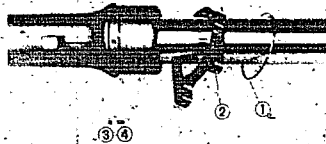


7. Remove:

- Stopper ring (1)

NOTE:

Use a thin screw driver, and be careful not to scratch the inner fork tube.

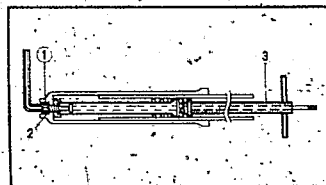


8. Remove:

- Circlip (1)
- Front fender bracket (2)
- Ball (3)
- Spring (4)

NOTE:

Do not lose the ball and spring.



9. Remove:

- Bolt (damper rod) (1)
- Washer (2)

NOTE:

Hold the damper rod to loosen the bolt (damper rod) by the damper rod holder (3).



Damper rod holder:
P/N 90890-01425

10. Remove:

- Damper rod assembly

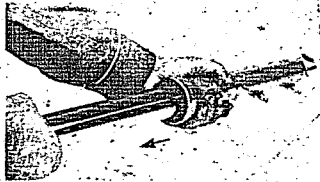
11. Remove:

- Inner fork tube

FRONT FORK

CHAS 

J-4



Removal steps:

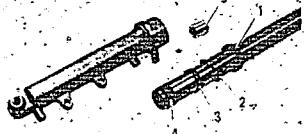
- Hold the fork leg horizontally.
- Clamp the caliper mounting boss of the outer tube securely in a vise with soft jaws.
- Pull out the inner fork tube from the outer tube by forcefully, but carefully, with drawing the inner tube.

CAUTION:

- Excessive force will damage the oil seal and/or the bushes. Damaged oil seal and bushing must be replaced.
- Avoid bottoming the inner tube in the outer tube during the above procedure, as the oil lock piece will be damaged.

12. Remove:

- Oil seal (1)
- Washer (2)
- Slide metal (3)
- Piston metal (4)
- Oil lock piece (5)



YB574003

INSPECTION

1. Inspect:

- Inner fork tube (1)
 - Damper rod holder (2)
- Scratches/Bends/Damages → Replace.

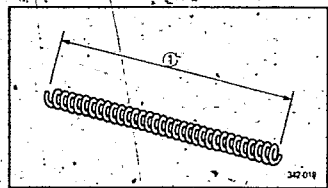


WARNING

Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.

FRONT FORK

CHAS 



2. Measure:

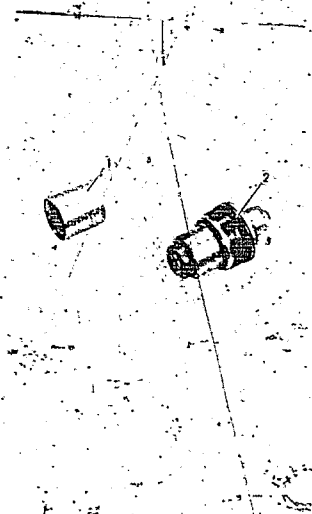
- Fork spring (large) free length. (1)
- Out of specification → Replace.



Fork spring (large) free length:
359 mm (14.1 in)
Minimum free length:
354 mm (13.9 in)

3. Inspect:

- Push rod (1)
- Wear/Damage → Replace
Contamination → Blow out oil passages with compressed air.



4. Inspect:

- Oil lock piece (1)
 - O-ring 2 (cap bolt)
- Damage → Replace.

YB574004

ASSEMBLY

Reverse the "DISASSEMBLY" procedure. Note the following points.

NOTE:

- In front fork reassembly, be sure to use following new parts.
- Guide bush
- Slide bush
- Oil seal
- Dust seal
- Make sure all components are clean before reassembly.

1. Install:

- Piston metal (1) to the inner tube.



2. Install:

- Inner tube (1)
 - Damper rod (2)
 - Oil lock piece (3)
- to the outer tube.

CAUTION:

Allow the damper rod to slide slowly down the inner fork tube until it protrudes from the bottom, being careful not to damage the inner fork tube.

3. Install:

- Copper washer (new)
- Bolt (damper rod)

4. Tighten:

- Bolt (1) (damper rod)
- Use the damper rod holder (2) to lock the damper rod.



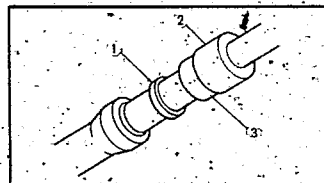
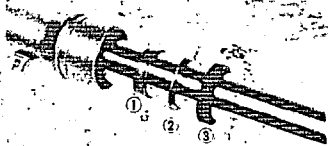
Damper rod holder:
P/N 90890-01425



Bolt (damper rod):
40 Nm (4.0 m · kg, 29 ft · lb)
Loctite®

5. Install:

- Slide metal (1)
 - Washer (2)
 - Oil seal (3)
- Use the fork seal driver weight (4) and adapter (5).



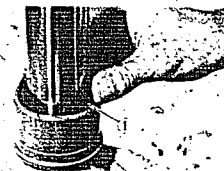
Fork seal driver weight:
P/N 90890-01367
Adapter:
P/N 90890-01374

CAUTION:

Be sure that the oil seal numbered side face upward.

NOTE:

Before installing the oil seal, apply the lithium soap base grease onto the oil seal lips.



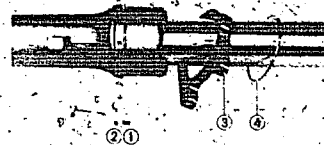
6. Install:

- Stopper ring (1)

NOTE:

Fit the stopper ring correctly in the groove in the outer tube.

- Dust seal



7. Install:

- Spring (1)
- Ball (2)
- Front fender bracket (3)
- Circlip (4)

8. Fill:

- Front fork oil
- until top of inner tube end.



Fork oil grade:
Fork oil 10WT or equivalent

FRONT FORK

CHAS 

J-6

9. Install:

- Rod puller attachment ①
- rod puller ②



• Rod puller attachment:
P/N 90890-01436
Rod puller:
P/N 90890-01437

10. Stroke the damper rod assembly about 10 times or more.

11. Fill:

- Fork oil
- until top of inner tube.

12. Stroke the inner tube about 150 mm (5.9 in) slowly.

13. Measure:

- Fork oil level



• Oil level ①
106 mm (4.17 in)
From the top of inner tube
compressed without spring

14. Install:

- Fork spring ①
- Push rod ②
- Locknut
- Spring seat

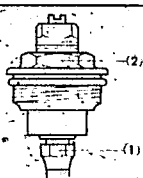


15. Install:

- O-ring ①
- Cap bolt ②

NOTE:

- Before installing the cap bolt, apply the grease to the O-ring.
- Temporarily tighten the cap bolt with your finger.



FRONT FÖRK

CHAS 

16. Tighten:

- Locknut ①
- Hold the spring preload adjuster and then tighten the locknut.



Locknut:

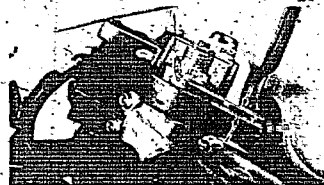
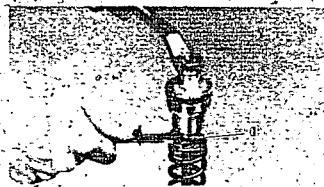
15 Nm (1.5 m · kg, 11 ft · lb)

17. Install:

- Inner tube

NOTE:

Temporarily tighten the inner tube.



VB574005

INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points.

1. Install:
 - Front fork
 Temporarily tighten the pinch bolts.

NOTE:

Position the inner fork tube end in such a way that it is 5-mm (0.2 in) with the top of the handle crown.

2. Tighten:

- Pinch bolts ① (under bracket)



Pinch bolt (under bracket):

38 Nm (3.8 m · kg, 27 ft · lb)



3. Tighten:

- Cap bolt ①
- Pinch bolts ② (handle crown)
- Pinch bolt ③ (handlebar)



Cap bolt:
23 Nm (2.3 m · kg, 17 ft · lb)
Pinch bolt (handle crown):
22 Nm (2.2 m · kg, 17 ft · lb)
Pinch bolt (handlebar):
22 Nm (2.2 m · kg, 17 ft · lb)

4. Install:

- Brake caliper



Bolt (brake caliper):
35 Nm (3.5 m · kg, 25 ft · lb)

5. Install:

- Front wheel



Wheel shaft:
75 Nm (7.5 m · kg, 54 ft · lb)
Pinch bolt (wheel shaft):
20 Nm (2.0 m · kg, 14 ft · lb)

Refer to the "FRONT WHEEL - INSTALLATION" section.

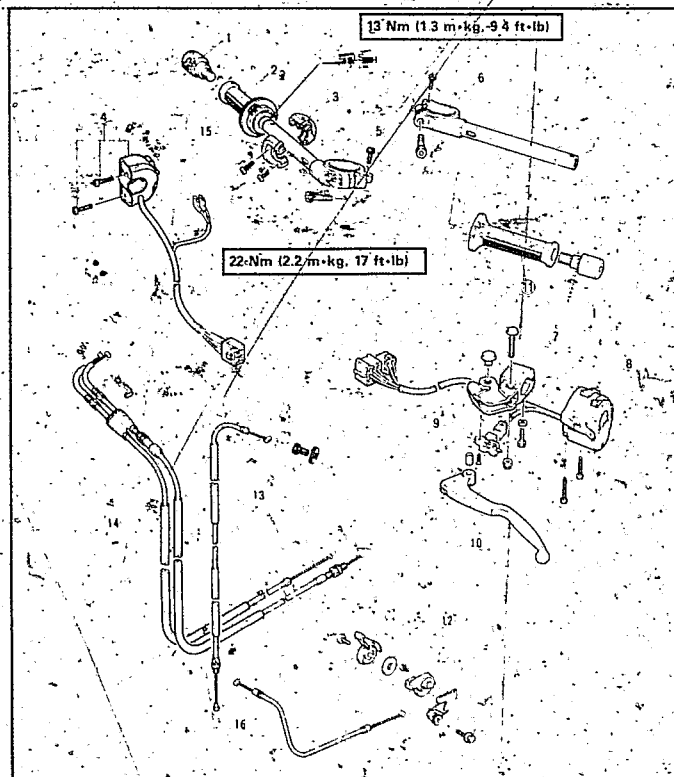
6. Adjust:

- Front fork setting

Refer to the "FRONT FORK ADJUSTMENT" section in the CHAPTER 3.

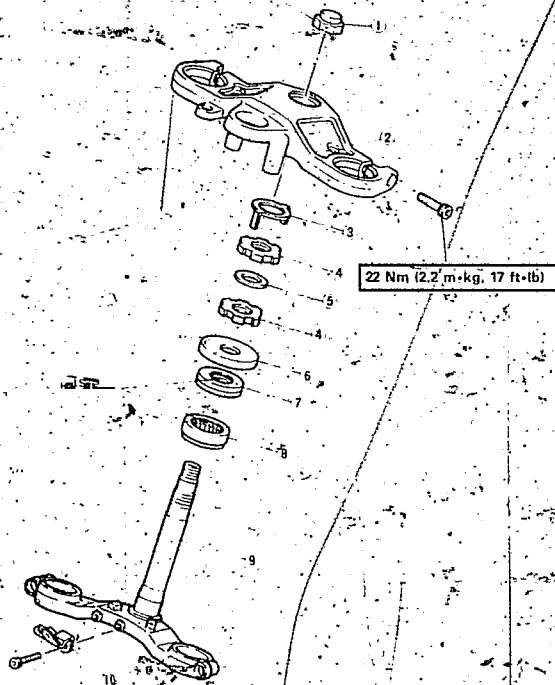
STEERING HEAD AND HANDLEBAR

- | | |
|----------------------------|--------------------|
| ① Grip end | ⑨ Clutch switch |
| ② Throttle grip assembly | ⑩ Clutch lever |
| ③ Upper holder | ⑪ Grip |
| ④ Handlebar switch (right) | ⑫ Starter assembly |
| ⑤ Handlebar (right) | ⑬ Clutch cable |
| ⑥ Handlebar (left) | ⑭ Throttle cable |
| ⑦ Clutch lever holder | ⑮ Lower holder |
| ⑧ Handlebar switch (left) | ⑯ Starter cable |



- ① Nut
- ② Handle crown
- ③ Special washer
- ④ Ring nut
- ⑤ Rubber washer
- ⑥ Ball race cover
- ⑦ Bearing
- ⑧ Bearing
- ⑨ Under bracket
- ⑩ Stay

110 Nm (11.0 m·kg, 80 ft·lb)



22 Nm (2.2 m·kg, 17 ft·lb)

REMOVAL

WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Remove:

- Lower cowl
- Upper cowl

Refer to the "COWLING" section in the CHAPTER 3.

- Muffler assembly

Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

2. Elevate the front wheel by placing a suitable stand under the engine.

3. Remove:

- Front wheel
- Refer to the "FRONT WHEEL—REMOVAL" section.

- Front fork

Refer to the "FRONT FORK—REMOVAL" section.

4. Remove:

- Master cylinder

5. Remove:

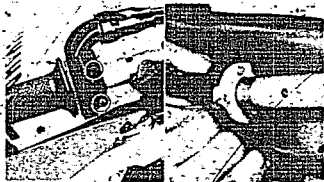
- Handlebar switch (right)



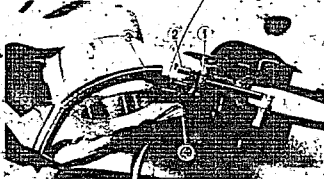
STEERING HEAD AND HANDLEBAR



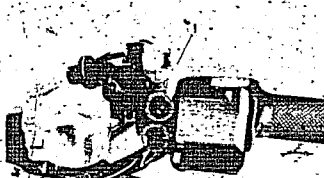
J-9



6. Remove:
- Throttle grip



7. Loosen:
- Locknut (1) (clutch cable)
 - Adjuster (2) (clutch cable)



8. Remove:
- Clutch cable (1)
 - Clutch switch (2)

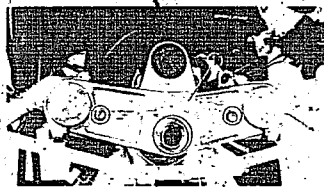
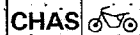


9. Remove:
- Clutch lever assembly (1)
10. Remove:
- Handlebar switch (1) (left)

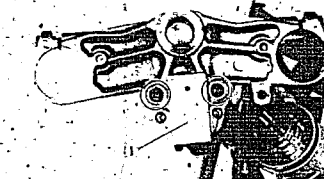


11. Remove:
- Horn (1)
 - Brake hose joint (2)

STEERING HEAD AND HANDLEBAR



12. Remove:
- Handle crown (1)



13. Remove:
- Main switch (1)



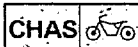
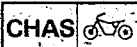
14. Remove:
- Special washer (1)
 - Ring nut (2)
 - Rubber washer
 - Ring nut (3)
 - Bearing cover
 - Bearing (upper)



NOTE:
Remove the ring nut by the ring nut wrench.

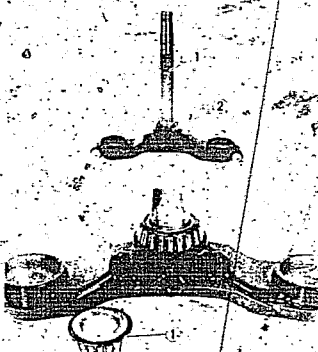
	Ring nut wrench: P/N 90890-01403
--	-------------------------------------

WARNING:
Support the lower bracket so that it may not fall down.



15. Remove:

- Lower bracket (1)
- Bearing (2) (lower)



1897602

INSPECTION

1. Wash the bearings with a solvent.

2. Inspect:

- Bearing (1)
- Pitting/Damage → Replace.

Replacement steps:

- Remove the bearing races using a long rod (1) and hammer as shown.
- Remove the bearing race on the steering stem using the floor chisel (2) and the hammer as shown.
- Install the new dust seal and races.

NOTE:

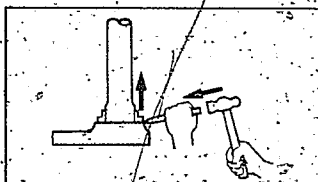
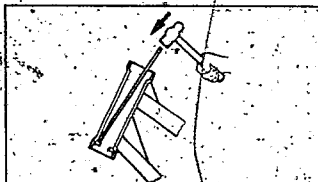
Always replace bearings, races and dust seal as a set.

3. Inspect:

- Handlebars
- Bends/Cracks/Damage → Replace.

WARNING:

Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.



Replacement steps:

- Remove the handlebar grip and lever holder.
- Install the lever holder to a new handlebar.
- Apply a light coat of an adhesive for rubber, on the left handlebar end.
- Install the handlebar grip.

NOTE:

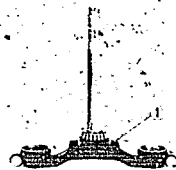
Wipe off excess adhesive with a clean rag.

WARNING:

Leave the handlebar intact until the adhesive becomes dry enough to make the grip and handlebar stuck securely.

4. Inspect:

- Lower bracket (1)
- Damage/Crack → Replace.



1897603

INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points

1. Lubricate:

- Bearing (upper and lower)
- Bearing races



Recommended lubricant:
Wheel bearing grease

2. Install:

- Bearing (lower)
- (onto steering stem)
- Steering stem

STEERING HEAD AND HANDLEBAR



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CAUTION:

Hold the steering stem until it is secured.

- Bearing (upper)
- Bearing cover
- Ring nut

3. Tighten:

- Ring nut (1)

Tightening steps:

- Tighten the ring nut using the ring nut wrench (2)



Ring nut wrench:
P/N 90890-01403

NOTE:

Set the torque wrench to the ring nut wrench so that they form a right angle.



Ring nut wrench
(initial tightening):
38 Nm (3.8 m • kg, 27 ft • lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the ring nut wrench.

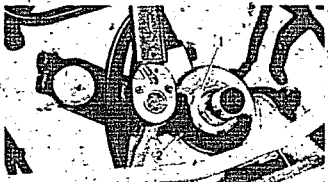
WARNING:

Avoid over-tightening.



Ring nut (final tightening):
6 Nm (0.6 m • kg, 4.3 ft • lb)

- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the



STEERING HEAD AND HANDLEBAR



steering bearings.

- Install the rubber washer (1)
- Install the ring nut (upper) (2)

NOTE:

The tapered side of the ring nut must face downward.

- Finger tighten the ring nut, then align the slots of both ring nuts. If not aligned, hold the lower ring nut and tighten the other until they are aligned.
- Install the special washer (3)

NOTE:

Make sure that the special washer tab is placed in the slots.

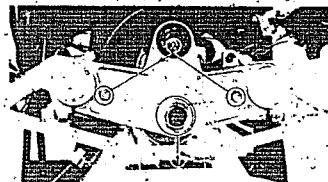


4. Install:

- Handle crown
- Handlebars

NOTE:

Temporarily tighten the steering fitting bolt (1) and handlebar fitting bolt (2)



5. Install:

- Front fork

Refer to the "FRONT FORK - INSTALLATION" section.



Pinch bolt (lower bracket):
38 Nm (3.8 m • kg, 27 ft • lb)
Pinch bolt (handle crown):
22 Nm (2.2 m • kg, 17 ft • lb)

6. Tighten:

- Steering fitting bolt
- Handlebar fitting bolt



Steering fitting bolt:
110 Nm (11.0 m • kg, 80 ft • lb)
Handlebar fitting bolt:
13 Nm (1.3 m • kg, 9.4 ft • lb)



7. Install:
- Throttle grip (1)
 - Handlebar switch (right)

8. Install:
- Brake master cylinder
- Refer to the "FRONT BRAKE—ASSEMBLY" section.

9. Install:
- Clutch cable

NOTE:

Apply a light coat of lithium soap base grease onto the clutch cable end.

10. Install:
- Front wheel
- Refer to the "FRONT WHEEL—INSTALLATION" section.



Wheel shaft:
75 Nm (7.5 m·kg, 54 ft·lb)
Pinch bolt (wheel shaft):
20 Nm (2.0 m·kg, 14 ft·lb)

11. Adjust:
- Clutch cable free play

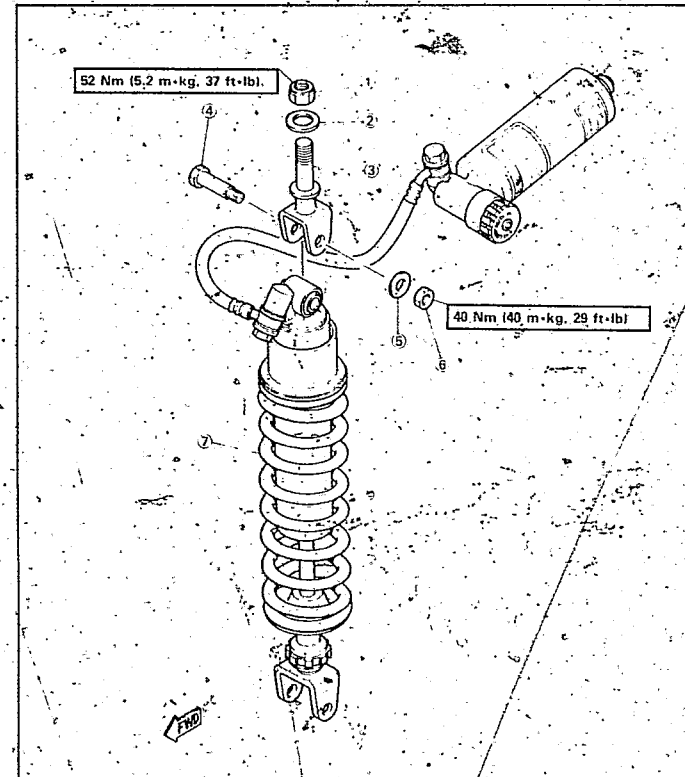


Free play:
10–15 mm (0.4–0.6 in)
at lever end

Refer to "CLUTCH ADJUSTMENT" section in CHAPTER 3.

REAR SHOCK ABSORBER AND SWINGARM

- 1 Nut
2 Spacer
3 Bracket
4 Bolt
5 Plate washer
6 Nut
7 Rear shock absorber ass'y

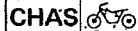


REAR SHOCK ABSORBER AND SWINGARM

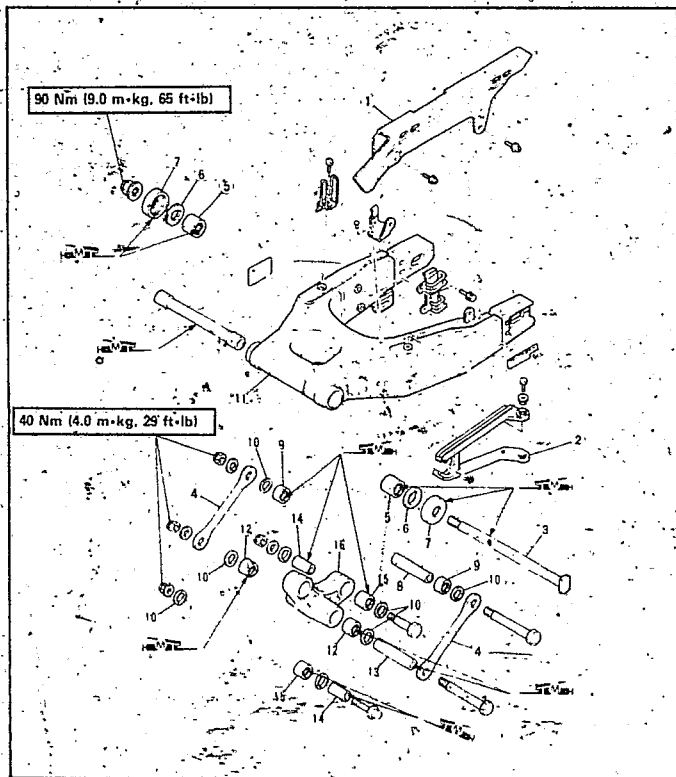


J-13

REAR SHOCK ABSORBER AND SWINGARM



- | | |
|-------------------|-------------|
| ① Chain case | ⑨ Bearing |
| ② Chain protector | ⑩ Oil seal |
| ③ Pivot shaft | ⑪ Rear arm |
| ④ Connecting arm | ⑫ Bearing |
| ⑤ Bearing | ⑬ Collar |
| ⑥ Plate washer | ⑭ Collar |
| ⑦ Cover | ⑮ Bearing |
| ⑧ Collar | ⑯ Relay arm |



70576001

HANDLING NOTE

WARNING

This shock absorber contains highly pressurized nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer can not be held responsible for property damage or personal injury that may result from improper handling.

- Do not tamper with or attempt to open the cylinder assembly.
- Do not subject shock absorber to an open flame or other high heat source. This may cause the unit to explode due to excessive gas pressure.
- Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.
- Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.
- When scrapping the shock absorber, refer to the "NOTES ON DISPOSAL" section.

70576001

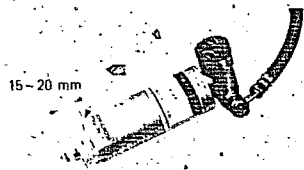
NOTES ON DISPOSAL

Disposal steps:

- Gas pressure must be released before disposing of shock absorber. To do so, drill a 2-3 mm (0.08-0.12 in) hole through the cylinder wall at a point 15-20 mm (0.6-0.8 in) from the end of the gas chamber.

WARNING

Wear eye protection to prevent eye damage from escaping gas and/or metal chips.





*9576003

REMOVAL

Rear shock absorber

WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Remove:

- Lower cowl
Refer to the "COWLING" section in the CHAPTER 3.
- Muffler assembly
Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

2. Elevate the rear wheel by placing a suitable stand under the engine.

3. Remove:

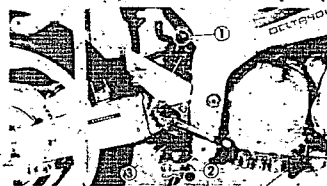
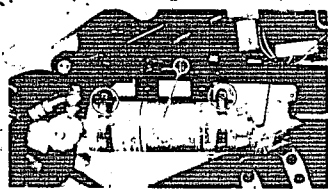
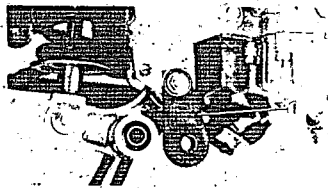
- Rear wheel
Refer to the "REAR WHEEL" section.

4. Remove:

- Connecting arm (1)

5. Remove:

- Subtank assembly (1)



6. Remove:

- Bolt (1) (shock absorber—top)
- Bolt (2) (shock absorber—lower)
- Rear shock absorber (3)

Swingarm

WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Remove:

- Lower cowl
Refer to the "COWLING" section in the CHAPTER 3.
- Muffler assembly
Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

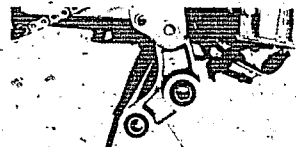
2. Elevate the rear wheel by placing a suitable stand under the engine.

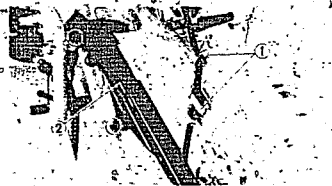
3. Remove:

- Rear shock absorber
Refer to the "REAR SHOCK ABSORBER" section.

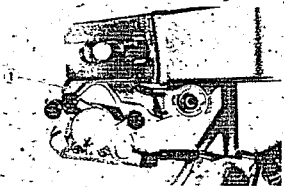
4. Remove:

- Relay arm (1)





5. Remove:
- Brake hose holder 1
 - Chain case 2




6. Remove:
- Caliper bracket 1


7. Check:
- Swingarm free play

Inspection steps:

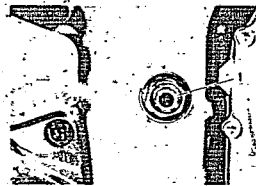
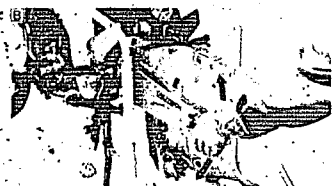
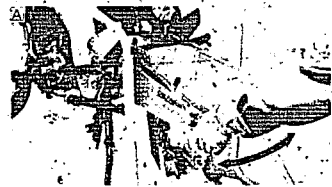
- Check the tightening torque of the pivot shaft (swingarm) securing nut.

 **Nut (swingarm—pivot shaft):**
90 Nm (9.0 m · kg, 65 ft · lb)

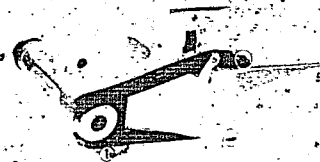
- Check the swingarm side play **(A)** by moving it from side to side.
If side play is noticeable, check the inner collar, bearing, washer and thrust cover.

 **Side play (at end of swingarm):**
1.0 mm (0.04 in)

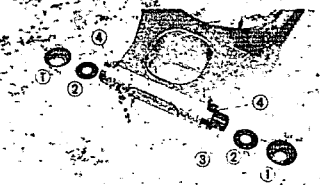
- Check the swingarm vertical movement **(B)** by moving it up and down.
If vertical movement is tight, binding or rough, check the inner collar, bearing, washer and thrust cover.



8. Remove:
- Pivot shaft 1
 - Rear arm



9. Remove:
- Chain protector 1



10. Remove:
- Cover 1
 - Plate washer 2
 - Bush 3
 - Bearing 4



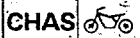
YBS76004

INSPECTION

1. Inspect
- Shock absorber
 - Oil leaks/Damage → Replace.

2. Inspect:
- Swingarm
 - Bends/Cracks/Damage → Replace

REAR SHOCK ABSORBER AND SWINGARM



J-16



3. Inspect:
- Relay arm ①
 - Connecting arm 1 ②
 - Connecting arm 2 ③
 - Bends/Cracks/Damage → Replace.

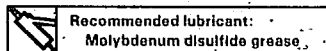
4. Inspect:
- Bush ①
 - Scratches/Damage → Replace.
 - Bearing ②
 - Pitting/Damage → Replace.

78575006

INSTALLATION Swingarm

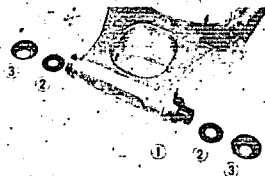
Reverse the "REMOVAL" procedure.
Note the following points.

1. Lubricate:
- Bearings
 - Inner collars
 - Thrust washers
 - Pivot shaft



Recommended lubricant:
Molybdenum disulfide grease.

2. Install:
- Bush ①
 - Thrust washer ②
 - Cover ③

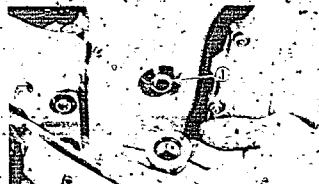


REAR SHOCK ABSORBER AND SWINGARM



3. Tighten:
- Bolt ① (chain protector)

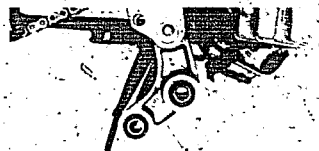
Bolt ① (chain protector):
7 Nm (0.7 m · kg, 5.1 ft · lb)



4. Install:
- Rear arm
 - Pivot shaft
 - Apply lithium soap base grease.

5. Tighten:
- Nut ① (pivot shaft)

Nut (pivot shaft):
90 Nm (9.0 m · kg, 65 ft · lb)



6. Tighten:
- Nut ① (relay arm)

Nut (relay arm):
40 Nm (4.0 m · kg, 29 ft · lb)

7. Install:
- Rear shock absorber
 - Connecting arm

Nut (rear shock absorber, connecting arm):
40 Nm (4.0 m · kg, 29 ft · lb)

Refer to the "REAR SHOCK ABSORBER
INSTALLATION" section.

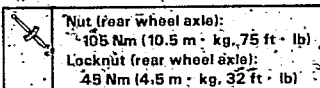
- B. Adjust:
- Drive chain slack

Drive chain slack:
15 - 20 mm (0.59 - 0.79 in)

Refer to the "DRIVE CHAIN SLACK ADJUST-
MENT" section in the CHAPTER 3.



9. Install:
- Rear wheel



Refer to the "REAR WHEEL-INSTALLATION" section.

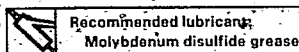
Rear shock absorber

Reverse the "REMOVAL" procedure.

Note the following points.

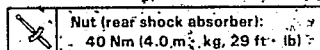
1. Lubricate:

- Bearings
- Oil seal
- Collars
- Bushings



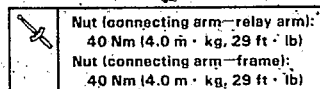
2. Install:

- Rear shock absorber



3. Install:

- Connecting arm



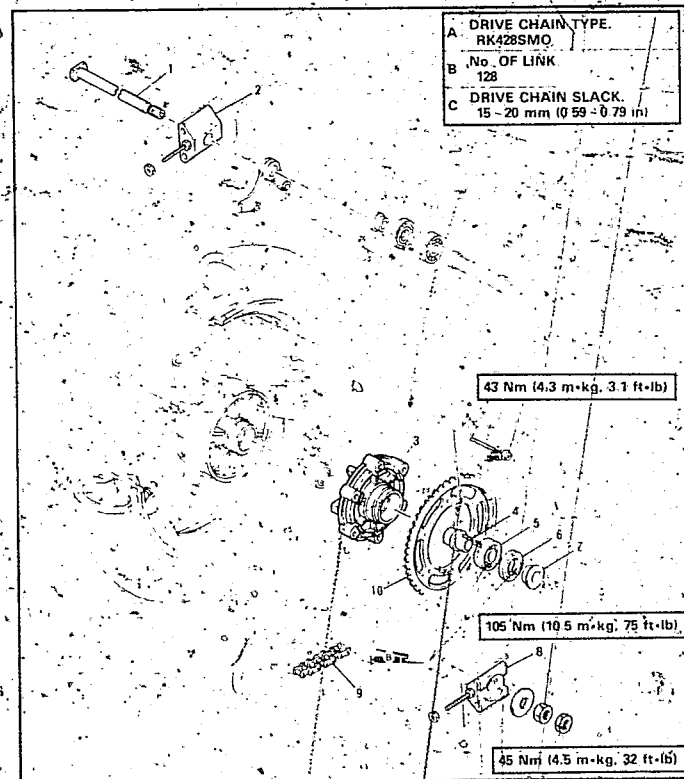
4. Adjust.

- Rear shock absorber setting

Refer to the "REAR SHOCK ABSORBER ADJUSTMENT" section in the CHAPTER 3.

DRIVE CHAIN AND SPROCKET

- 1 Wheel axle
- 2 Chain puller
- 3 Clutch hub
- 4 Collar
- 5 Bearing
- 6 Oil seal
- 7 Collar
- 8 Chain puller
- 9 Drive chain
- 10 Rear wheel sprocket



Y8577000

NOTE:

Before removing the drive chain and sprockets, drive chain slack and 10-link length of drive chain should be measured.

Y857700P

REMOVAL**WARNING:**

Securely support the motorcycle so there is no danger of it falling over.

1. Remove:

- Lower cowl
Refer to the "COWLING" section in the CHAPTER 3.
- Muffler
Refer to the "ENGINE REMOVAL—MUFFLER" section in the CHAPTER 4.

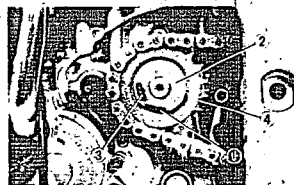
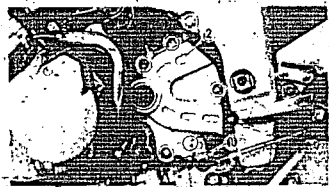
2. Elevate the rear wheel by placing a suitable stand under the engine.

3. Remove:

- Shift pedal (1)
- Crankcase cover (2) (left)

4. Loosen:

- Drive chain
Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3:



5. Straighten:

- Lock washer (Tab)

6. Remove:

- Nut (drive sprocket) (2)
- Lock washer (3)
- Drive sprocket (4)

NOTE:

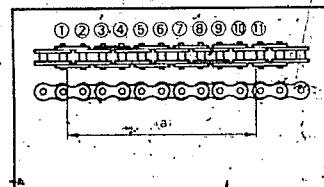
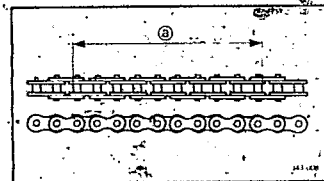
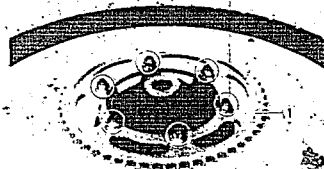
Loosen the nut (drive sprocket) while applying the rear brake.

7. Remove:

- Rear wheel
Refer to the "REAR WHEEL" section.
- Swingarm
Refer to the "REAR SHOCK ABSORBER AND SWINGARM" section.

8. Remove:

- Drive sprocket (1)




Y857700J

INSPECTION

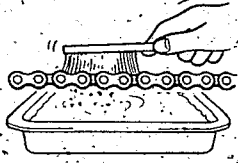
1. Measure:

- 10-link length (a) (drive chain)
Out of specification → Replace drive chain

	10-link length limit:
	150.0 mm (5.91 in)

NOTE:

- For measurement make the chain tense by finger
- 10-link length is a measurement between the insides of the 1 and 11 rollers as shown.
- Two or three different 10-link length should be measured.

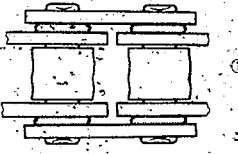


2. Clean:

- Drive chain
Place it in kerosene, and brush off as much dirt as possible. Then remove the chain from the kerosene and dry the chain.

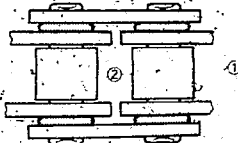
CAUTION:

This motorcycle has a drive chain with small rubber O-rings ① between the chain plates. Steam cleaning, high-pressure washers, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain.



3. Inspect:

- O-ring ① (drive chain)
Damage → Replace drive chain.
- Rollers ②
- Side plates ③
Damage/Wear → Replace drive chain.



4. Lubricate:

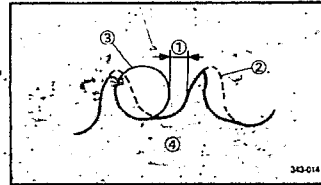
- Drive chain



Drive chain lubricant:
*SAE 30-50 W motor oil or
chain lubricants suitable
for "O-ring" chains.

5. Inspect:

- Drive chain stiffness
Stiff → Clean and lubricate or replace.



6. Inspect:

- Drive sprocket
- Driven sprocket
More than 1/4 teeth wear → Replace sprocket.
Bent teeth → Replace sprocket.
- Correct
- Roller
- Sprocket

Replacement steps:

- Straighten the lock washer tabs and remove the driven sprocket.
- Install a new driven sprocket and lock washers.

WARNING:

Always use new lock washers.



Nut (driven sprocket):
43 Nm (4.3 m · kg, 31 ft · lb)

- Bend the washer tabs along the nut flats.

YB57003

INSTALLATION

Reverse the "REMOVAL" procedure
Note the following points.

1. Install:
 - Drive chain
 - Swingarm
Refer to the "REAR SHOCK ABSORBER AND SWINGARM" section.
 - Rear wheel
Refer to the "REAR WHEEL" section.

2. Install:

- Drive chain ①
- Drive sprocket ②
- Lock washer ③
- Nut (drive sprocket) ④



Nut (drive sprocket):
70 Nm (7.0 m · kg, 50 ft · lb)

NOTE:

Tighten the nut (drive sprocket) while applying the rear brake.

WARNING:

Always use a new lock washer.

3. Install:

- Rear wheel

Refer to the "REAR WHEEL - INSTALLATION" section in the CHAPTER 6.



Nut (wheel shaft):
105 Nm (10.5 m · kg, 75 ft · lb)
Locknut (wheel shaft):
45 Nm (4.5 m · kg, 32 ft · lb)

4. Adjust:

- Drive chain slack

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.



Drive chain slack:
15 ~ 20 mm (0.59 ~ 0.79 in)

CAUTION:

Too small chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

WARNING:

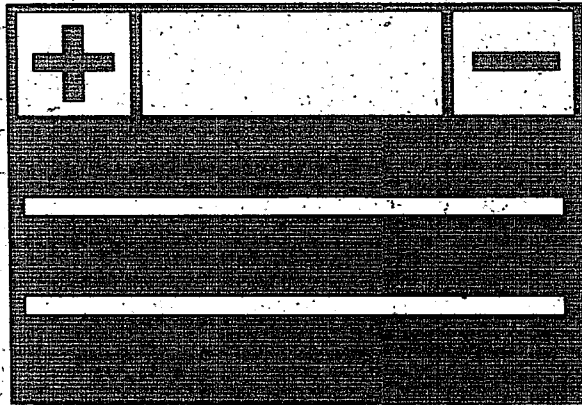
Always use a new cotter pin on the axle nut.

5. Install:

- Crankcase cover (left)
- Shift pedal



Bolt (crankcase cover):
10 Nm (1.0 m · kg, 7.2 ft · lb)
Bolt (shift pedal):
10 Nm (1.0 m · kg, 7.2 ft · lb)



ELEC

8



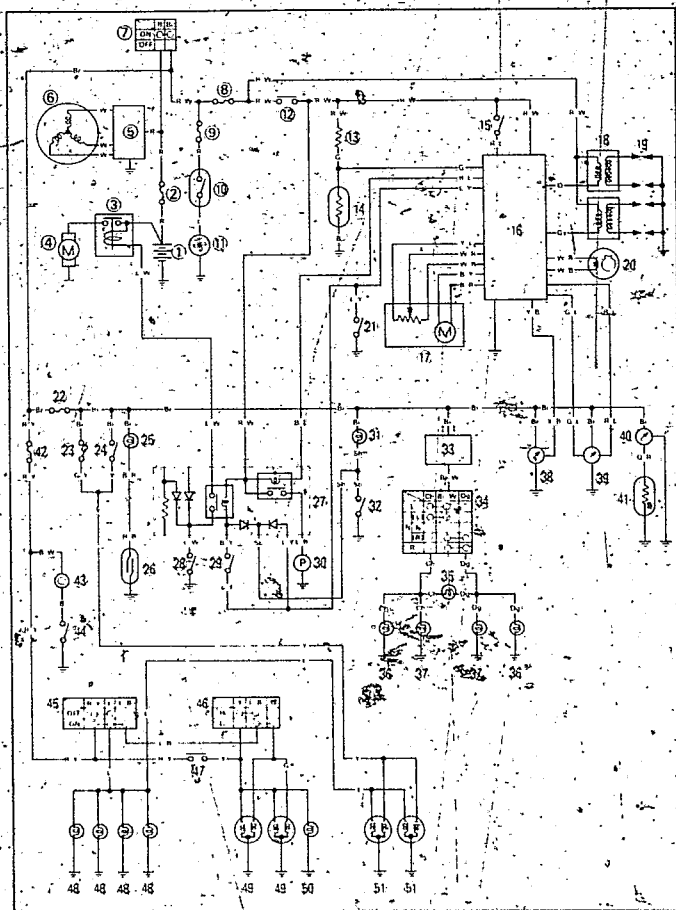
CHAPTER 8. ELECTRICAL

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ELECTRICAL

FZR400SP CIRCUIT DIAGRAM



- 1 Battery
- 2 Fuse (main)
- 3 Starter relay
- 4 Starter motor
- 5 Rectifier/regulator
- 6 AC magnet
- 7 Main switch
- 8 Fuse (ignition)
- 9 Fuse (fan)
- 10 Thermo switch
- 11 Fan motor
- 12 "ENGINE STOP" switch
- 13 Resistor
- 14 Fuel sender
- 15 Reserve switch
- 16 Ignitor
- 17 EXUP
- 18 Ignition coil
- 19 Spark plug
- 20 Pick up
- 21 Sidestand switch
- 22 Fuse (signal)
- 23 Front brake switch
- 24 Rear brake switch
- 25 "OIL" warning indicator light

- 26 Oil pressure switch
- 27 Relay
- 28 "START" switch
- 29 Clutch switch
- 30 Fuel pump
- 31 "NEUTRAL" indicator light
- 32 Neutral switch
- 33 Flasher relay
- 34 "TURN" signal switch
- 35 "TURN" indicator light
- 36 Front flasher light
- 37 Rear flasher light
- 38 Tachometer
- 39 Speedometer
- 40 Engine temperature gauge
- 41 Thermo unit
- 42 Fuse (headlight)
- 43 Horn
- 44 "HORN" switch
- 45 "LIGHTS" switch
- 46 "LIGHTS" (Dimmer) switch
- 47 "PASS" switch
- 48 Meter light
- 49 Headlight
- 50 "HIGH BEAM" indicator light
- 51 Tail/Brake light

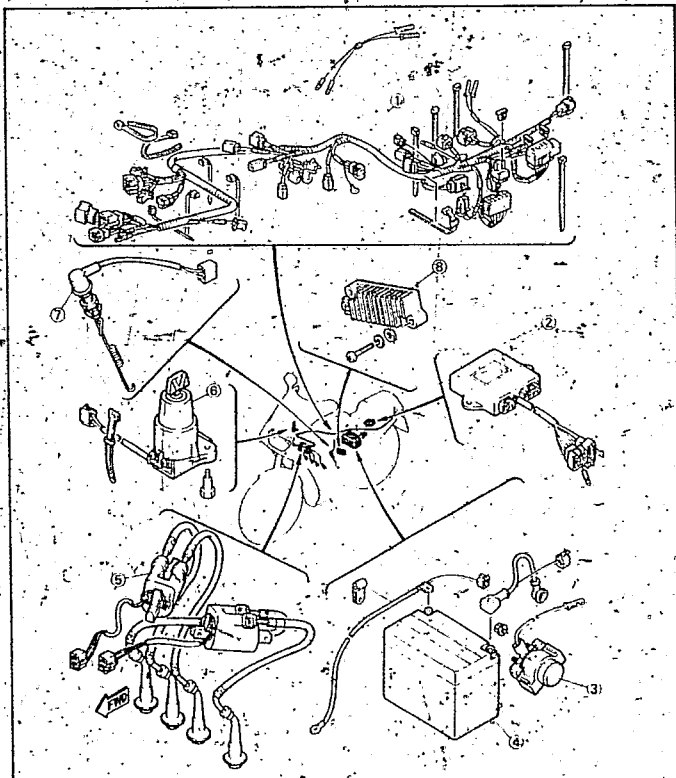
COLOR CODE

B	Black	W	White	L/W	Blue/White
Br	Brown	Y	Yellow	L/Y	Blue/Yellow
Ch	Chocolate	B/L	Black/Blue	R/B	Red/Black
Dg	Dark green	B/R	Black/Red	R/G	Red/Green
G	Green	B/W	Black/White	R/L	Red/Blue
Gy	Gray	B/Y	Black/Yellow	R/Y	Red/Yellow
L	Blue	Br/W	Brown/White	R/W	Red/White
O	Orange	G/L	Green/Blue	W/B	White/Black
P	Pink	G/R	Green/Red	W/R	White/Red
R	Red	G/Y	Green/Yellow	Y/B	Yellow/Black
Sb	Sky blue	L/B	Blue/Black	Y/L	Yellow/Blue

ELECTRICAL COMPONENTS

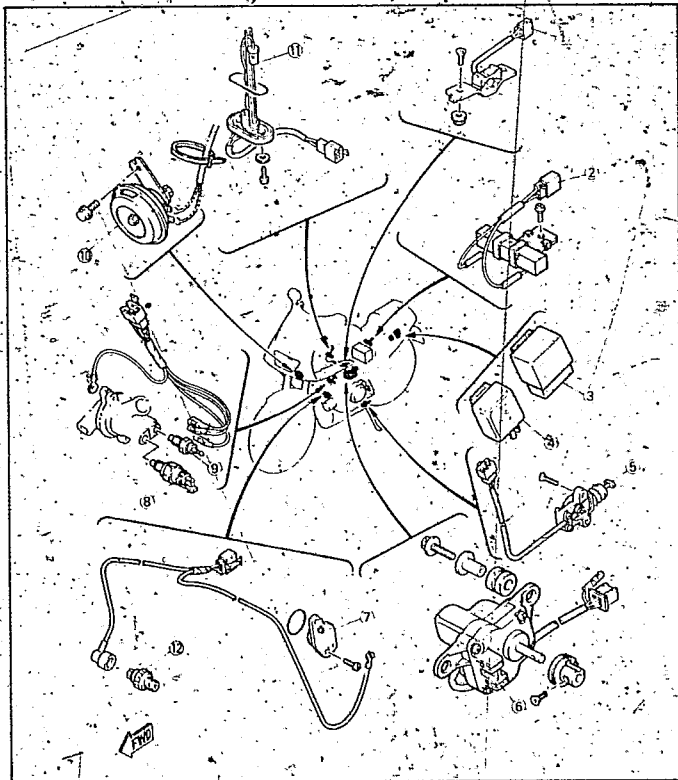
- 1 Wireharness
- 2 Digital ignitor unit
- 3 Starter relay
- 4 Battery
- 5 Ignition coil
- 6 Main switch*
- 7 Rear brake switch
- 8 Rectifier/regulator

BATTERY:
CAPACITY: 12V 8AH



- 1 Reserve switch
- 2 Resistor
- 3 Relay
- 4 Flasher relay
- 5 Sidestand switch
- 6 Ex-up servomotor
- 7 Neutral switch
- 8 Thermo switch
- 9 Thermo unit
- 10 Horn
- 11 Fuel sender
- 12 Oil pressure switch

SPECIFICATIONS	RESISTANCE
IGNITION COIL	
PRIMARY	1.8-2.2Ω at 20°C (65°F)
SECONDARY	9.5-14.4 kΩ at 20°C (68°F)
PICKUP COIL	80.8-121.2Ω at 20°C (68°F)



78581000

CHECKING OF SWITCHES

Check the switches for the continuity between the terminal to determine correct connection.

Read the following for switch inspection.

78581001

SWITCH CONNECTION AS SHOWN IN MANUAL

The manual contains a connection chart as shown left showing the terminal connections of the switches (e.g. main switch, handlebar switch, bracket switch, lighting switch etc.)

The extreme left column indicates the switch positions and the top line indicates the colors of leads connected with the terminals in the switch component.

○—○ indicates the terminals between which there is a continuity of electricity; i.e., a closed circuit at the respective switch positions.

In this chart:

"R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

"B and B/W" is continuous with the "OFF" switch position.

"B" and "B/W" is continuous with the "LOCK" switch position.

"B and B/W" and "R and L/R" are continuous with the "P" switch position.

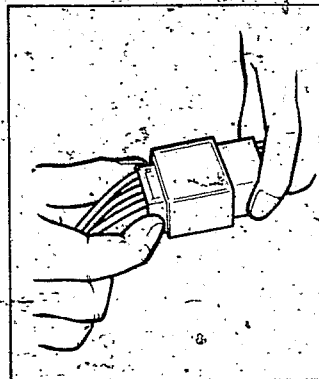
	B	B/W	R	Br	L/W	L/R
ON			○	○	○	○
OFF	○	○				
LOCK	○	○				
P	○	○	○			○

78581002

CHECKING SWITCH FOR TERMINAL CONNECTION

Before checking the switch, refer to the connection chart as shown above and check for the correct terminal connection (closed circuit) by the color combination.

To explain how to check the switch, the main switch taken for example in the following.



1. Disconnect the main switch coupler from the wire harness.

CAUTION:

Never disconnect the main switch coupler by pulling the leads. Otherwise, leads may be pulled off the terminals inside the coupler.

2. Inspect whether any lead is off the terminal inside the coupler. If it is, repair it.

NOTE:

If the coupler is clogged with mud or dust, blow it off by compressed air.



3. Use the connection chart to check the color combination for continuity (a closed circuit). In this example, the continuity is as follows:

"R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

"B and B/W" is continuous with the "OFF" switch position.

"B and B/W" is continuous with the "LOCK" switch position.

"B and B/W" and "R and L/R" are continuous with the "P" switch position.

Please note that there is no continuity (an open circuit) at all for the color combinations other than the above.

4. Check the switch component for the continuity between "R and Br".

Checking steps:

- Turn the switch key to the "ON", "OFF", "LOCK" and "P" several times.
- Set the pocket tester selector to the "1x1".
- Connect the fester (+) lead to the "R" lead terminal in the coupler and the (-) lead to the "Br" lead terminal.

NOTE:

Use thin probes for checking the continuity. Otherwise, the probes may contact other terminals inside the coupler.

- Check the continuity between "R" and "Br" at the respective switch position of "ON", "OFF", "LOCK", and "P". There must be continuity (the fester indicating "0") at the "ON" switch position, and there must be no continuity (the fester indicating "∞") at "OFF", "LOCK" or "P". There is something wrong between "R" and "Br" if there is no continuity at the "ON" position or if there is some continuity

either at the "OFF" or "LOCK" or "P".

NOTE:

Check the switch for continuity several times.

5. Next go on to checking of the continuity between "B" and "B/W", "L/W and L/R", and "R and L/R" at the respective switch positions, as in the same manner mentioned above.

6. If there is something wrong with any one of the combinations, replace the switch component.



16582000

CHECKING OF BULBS (FOR HEADLIGHT, TAIL/BRAKE LIGHT, FLASHER LIGHT, METER LIGHT, ETC.)

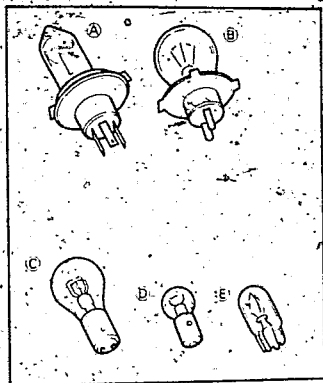
Check the bulb terminal continuity for the condition of the bulb.

16582001

KINDS OF BULBS

The bulbs used in the motorcycle are classified as shown left by the shape of the bulb socket.

- Ⓐ and Ⓑ are many used for the headlight.
- Ⓒ is mainly used for the flasher light and tail/brake light.
- Ⓓ and Ⓔ are mainly used for the meter light and other indicator lights.



16582002

CHECKING BULB CONDITION

1. Remove the bulb

NOTE:

- Bulbs of the Ⓐ and Ⓑ type uses a bulb holder. Remove the bulb holder before removing the bulb itself. Most of the bulb holder for this type can be removed by turning them counterclockwise.
- Most of the bulbs of Ⓒ and Ⓓ type can be removed from the bulb sockets by pushing and turning them counterclockwise.
- Bulbs of the Ⓔ type can be removed from the bulb sockets by simply pulling them out

CAUTION:

Be sure to hold the socket firmly when removing the bulb. Never pull the lead. Otherwise, the lead may be pulled off the terminal in the coupler.

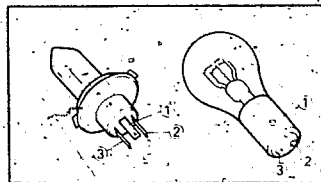
WARNING:

Keep flammable products or your hands away from the headlight bulb while it is on. It will be hot. Do not touch the bulb until it cools down.

2. Check the bulb terminals for continuity.

Checking steps:

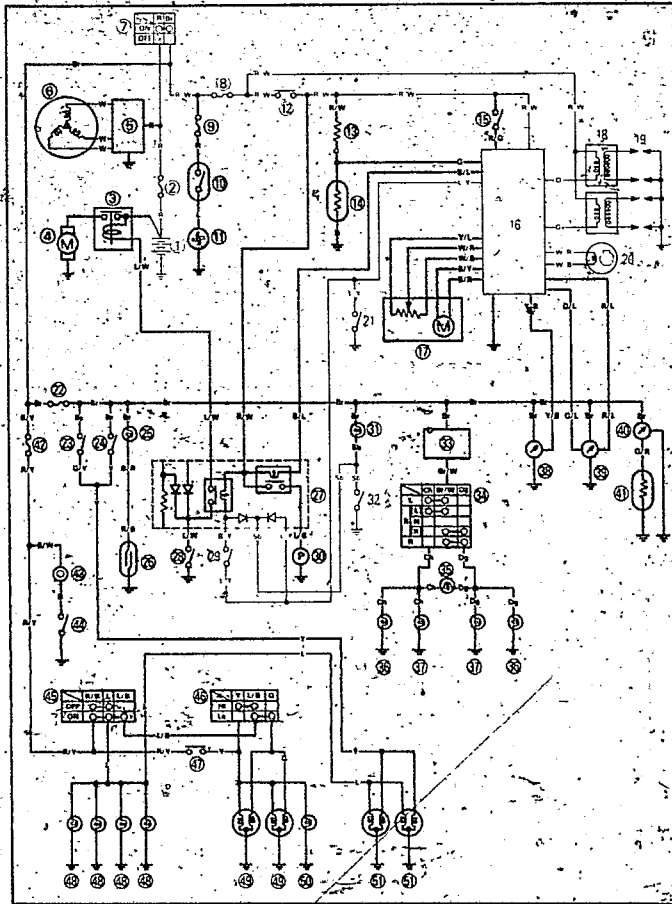
- Set the pocket tester selector to the bulb.
- Connect the tester lead to the respective bulb terminals. Take for example a 3-terminal bulb as shown left. First check the continuity between the 1 and 2 terminal by connecting the tester (+) lead to the 1 terminal and the tester (-) lead to the 2 terminal. Then check the continuity between the 1 and 3 terminals by connecting the tester (+) lead still to the 1 terminal and the tester (-) lead to the 3 terminal. If the tester shows "∞" in either case, replace the bulb.



3. Check the bulb socket by installing a proven bulb to it. As in the checking of bulbs, connect the pocket tester leads to the respective leads of the socket and check for continuity in the same manner as mentioned above.



IGNITION SYSTEM
CIRCUIT DIAGRAM

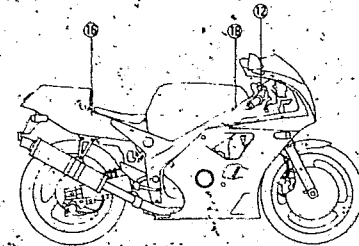
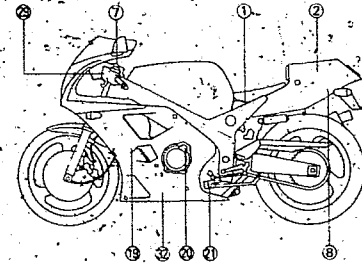


Aformentioned circuit diagram shows ignition circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

- ① Battery
- ② Fuse (main)
- ⑦ Main switch
- ⑧ Fuse (ignition)
- ⑫ "ENGINE STOP" switch
- ⑮ Ignitor
- ⑱ Ignition coil
- ⑲ Spark plug
- ⑳ Pick up
- ㉑ Sidestand switch
- ㉓ Clutch switch
- ㉔ Neutral switch



TROUBLESHOOTING

IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE
(NO SPARK OR INTERMITTENT SPARK)

Procedure

Check


- | | |
|------------------------------|----------------------------|
| 1. Fuse (main and ignition) | 8. "ENGINE STOP" switch |
| 2. Battery | 9. Neutral switch |
| 3. Spark plug | 10. Sidestand switch |
| 4. Ignition spark gap | 11. Diode (relay unit) |
| 5. Spark plug cap resistance | 12. Pickup coil resistance |
| 6. Ignition coil resistance | 13. Wiring connection |
| 7. Main switch | (Entire ignition system) |


NOTE:

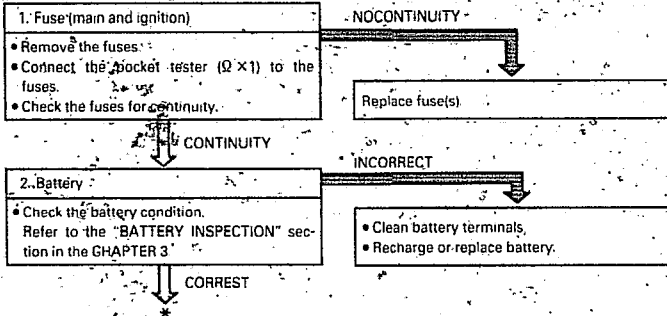
Remove the following parts before troubleshooting.

- | | |
|---------------|--------------------|
| 1) Seat | 3) Fuel tank |
| 2) Tail cover | 4) Air filter case |

Use the following special tools in this troubleshooting

 Ignition checker:
90890-06754


 Pocket tester:
90890-03112



3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap. Refer to the "SPARK PLUG INSPECTION" section in the CHAPTER 3.

Standard spark plug:
CR8E (NGK), CR9E (NGK), U24ESR-N (N.D.), U27ESR-N (N.D.)

 Spark plug gap:
0.7 - 0.8 mm (0.028 - 0.031 in)

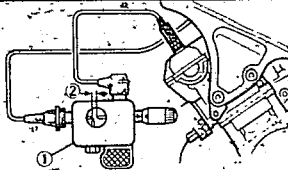
INCORRECT

Repair or replace spark plug


CORRECT

4. Ignition spark gap

- Disconnect the spark plug cap from spark plug.
- Connect the ignition checker as shown.
- Spark gap
- Turn the main switch to "ON"



- Check the ignition spark gap.
- Start engine, and increase spark gap until misfire occurs.

 Minimum spark gap:
6.0 mm (0.24 in)

MEETS SPECIFICATION

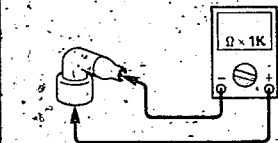
Ignition system is good

OUT OF SPECIFICATION
OR NO SPARK




5 Spark plug cap resistance

- Remove the spark plug cap
- Connect the pocket tester ($\Omega \times 1k$) to the spark plug cap.



- Check the spark plug cap for specified resistance.

 Spark plug cap resistance:
9-11 k Ω at 20°C (68°F)

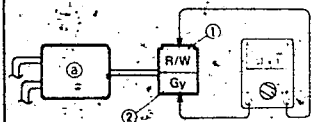
MEETS SPECIFICATION


6. Ignition coil resistance

- Disconnect the ignition coil coupler from the wireharness.
- Connect the pocket tester ($\Omega \times 1$) to the ignition coil

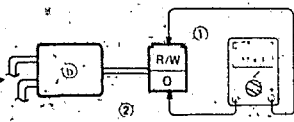
Ignition coil (for #2 and #3) 

Tester (+) lead - Red/White terminal;
Tester (-) lead - Gray 2 terminal




Ignition coil (for #1 and #4) 

Tester (+) lead - Red/White terminal;
Tester (-) lead - Orange 2 terminal

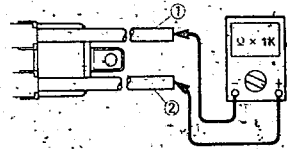


- Check the primary coil for specified resistance.


 Primary coil resistance:
1.8-2.2 Ω at 20°C (68°F)

- Connect the pocket tester ($\Omega \times 1k$) to the ignition coil

Tester (+) lead - Spark plug lead 1
Tester (-) lead - Spark plug lead 2



- Check the secondary coil for specified resistance

 Secondary coil resistance:
9.6-14.4 k Ω at 20°C (68°F)
(Spark plug lead - Spark plug lead)

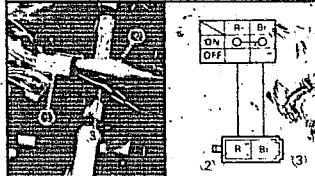
BOTH MEET SPECIFICATIONS

OUT OF SPECIFICATION

Replace ignition coil

7. Main switch

- Disconnect the main switch coupler from the wireharness
- Check the switch component for the continuity between "Red 2" and Brown 3." Refer to the "CHECKING OF SWITCHES" section



CORRECT

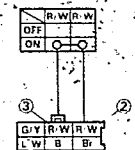
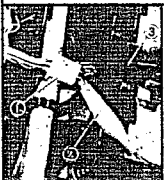
INCORRECT

Replace main switch.



8 "ENGINE STOP" switch

- Disconnect the handlebar switch (right) coupler from ① the wireharness
- Check the switch component for the continuity between "Red/White ②" and Red/White ③". Refer to the "CHECKING OF SWITCHES" section.



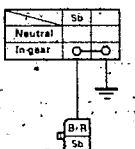
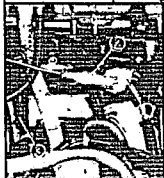
INCORRECT

Replace handlebar switch (right)

CORRECT

9 Neutral switch

- Disconnect the neutral switch coupler ① from the wireharness
- Check the switch component for the continuity between "Sky blue ② and ground". Refer to the "CHECKING OF SWITCHES" section.



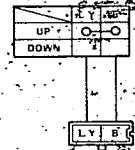
INCORRECT

Replace neutral switch

CORRECT

10. Sidestand switch

- Disconnect the sidestand switch coupler ① from the wireharness
- Check the switch component for the continuity between "Blue/Yellow ② and Black ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace sidestand switch

CORRECT

11. Diode (relay unit)

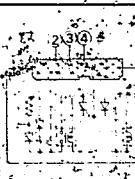
- Disconnect the relay unit ① from the wireharness
- Connect the pocket tester ($\Omega \times 1$) to the relay unit terminal

Tester (+) lead - Blue/Yellow terminal ②

Tester (-) lead - Skyblue terminal ③

Tester (+) lead - Black/Yellow terminal ②

Tester (-) lead - Skyblue terminal ③



- Check the relay unit for continuity.

NOCONTINUITY

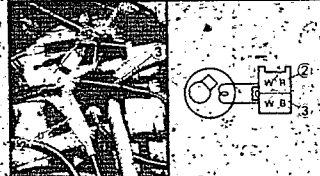
Replace relay unit

CONTINUITY

12. Pickup coil resistance

- Disconnect the pickup coil (1) coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 100$) to the pickup coil terminal.

Tester (+) lead - White/Red (2) terminal
 Tester (-) lead - White/Black (3) terminal.



- Check the pickup coil for specified resistance.

Pickup coil resistance:
 80-121.2 Ω at 20°C (68°F)
 White/Red - White/Black

OUT OF SPECIFICATION

Replace pickup coil.

MEET SPECIFICATION

POOR CONNECTION

Correct.

13. Wiring connection

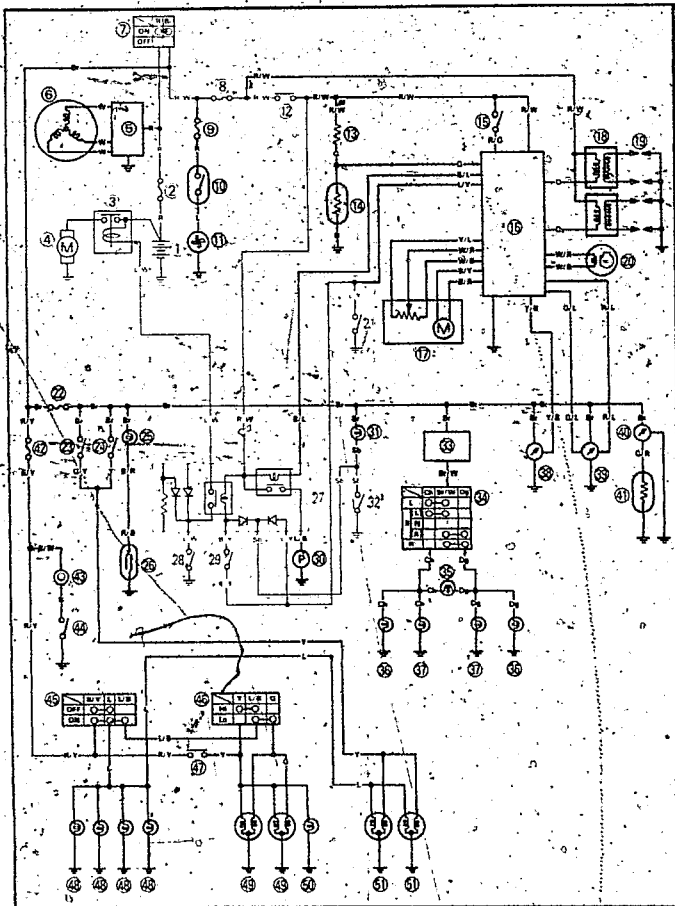
Check the entire ignition system for connections.
 Refer to the "WIRING DIAGRAM" section.

CORRECT

Replace digital ignitor unit.



ELECTRICAL STARTING SYSTEM CIRCUIT DIAGRAM

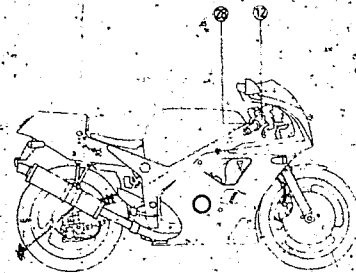
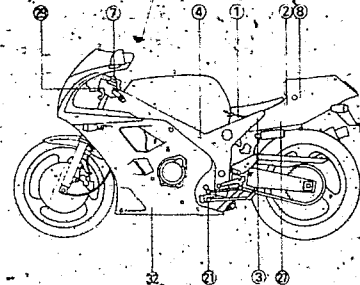


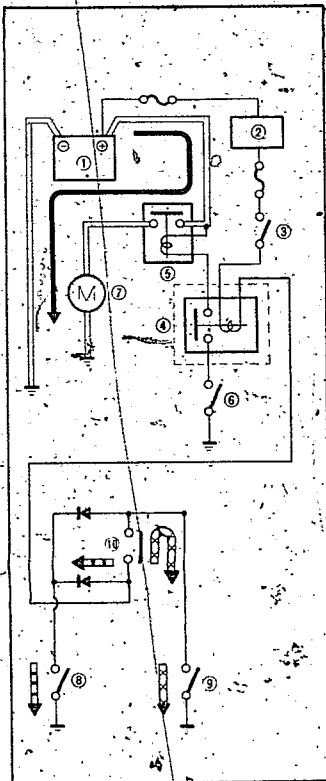
Aformentioned circuit diagram shows electrical starting circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

- 1 Battery
- 2 Fuse (main)
- 3 Starter relay
- 4 Starter motor
- 7 Main switch
- 8 Fuse (ignition)
- 12 "ENGINE STOP" switch
- 27 Sideständ switch
- 27 Relay
- 27 "START" switch
- 28 Clutch switch
- 32 Neutral switch





Y9284001

STARTING CIRCUIT OPERATION

The starting circuit on this model consist of the starter motor, starter relay, and the relay unit (starting circuit cut-off relay). If the "ENGINE STOP" switch and the main switch are both closed, the starter motor can operate only if:

The transmission is in neutral (the neutral switch is closed).

or if

The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor.

When one of both of the above conditions have been met, however, the starting circuit cut-off relay is closed, and the engine can be started by pressing the starter switch.

← WHEN THE TRANSMISSION IS IN NEUTRAL
← WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED IN

1. Battery
2. Main switch
3. "ENGINE STOP" switch
4. Starting circuit cut-off relay
5. Starter relay
6. "START" switch
7. Starter motor
8. Neutral switch
9. Sidestand switch
10. Clutch switch

TROUBLESHOOTING**STARTER MOTOR DOES NOT OPERATE.****Procedure****Check:**

- | | |
|-----------------------------------|-----------------------------------|
| 1. Fuse (main and ignition) | 8. Neutral switch |
| 2. Battery | 9. Sidestand switch |
| 3. Starter motor | 10. Clutch switch |
| 4. Starter relay | 11. "START" switch |
| 5. Starting circuit cut-off relay | 12. Wiring connection |
| 6. Main switch | (Entire electric starting system) |
| 7. "ENGINE STOP" switch | |

NOTE:

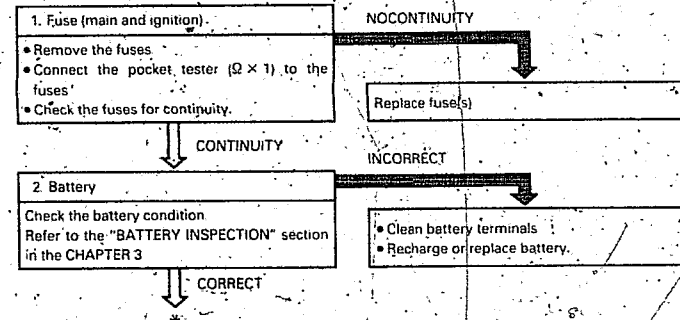
Remove the following parts before troubleshooting

- | | |
|---------------|--------------------|
| 1) Seat | 3) Fuel tank |
| 2) Tail cover | 4) Air filter case |

• Use the following special tool in this troubleshooting

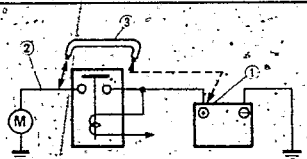
**Pocket tester:**

90890-03112



3. Starter motor

- Connect the battery positive terminal (1) and starter motor cable (2) using a jumper lead (3) *

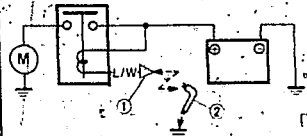


- Check the starter motor for operation

MOVES

4. Starter relay

- Disconnect the starter relay lead from the wireharness.
- Ground the starter relay lead (Blue/White) (1) to the frame using the jumper lead (2).



- Check the starter motor for operation

MOVES

5. Starting circuit cut-off relay (relay unit)

- Disconnect the relay unit "coupler" from the wireharness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12V) to the relay unit coupler terminals.

WARNING

- A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT MOVE

Repair or replace starter motor,

DOES NOT MOVE

Replace starter relay.

Step 1.

Battery (+) terminal—Red/White (1) terminal.

Battery (-) terminal—Black/Yellow (2) terminal.

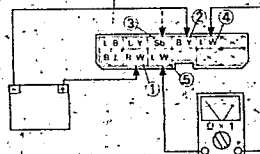
Step 2.

Battery (+) terminal—Red/White (1) terminal.

Battery (-) terminal—Skyblue (3) terminal.

Tester (+) lead—Blue/White (4) terminal.

Tester (-) lead—Blue/White (5) terminal.

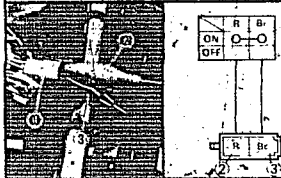


- Check the starting circuit cut-off relay for continuity.

CONTINUITY*

6. Main switch

- Disconnect the main switch coupler (1) from the wireharness.
- Check the switch component for the continuity between "Red (2) and Brown (3)". Refer to the "CHECKING OF SWITCHES" section.



CORRECT

NOCONTINUITY

Replace relay assembly

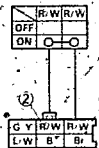
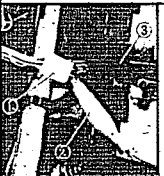
INCORRECT

Replace main switch



7. "ENGINE STOP" switch

- Disconnect the handlebar switch (right) coupler (1) from the wireharness.
- Check the switch component for the continuity between "Red/White (2) and Red/White (3)". Refer to the "CHECKING OF SWITCHES" section.



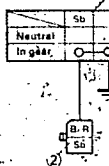
INCORRECT

Replace handlebar switch (right)

CORRECT

8. Neutral switch

- Disconnect the neutral switch lead (1) from the wireharness.
- Check the switch component for the continuity between "Sky blue (2) and Ground". Refer to the "CHECKING OF SWITCHES" section.



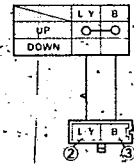
INCORRECT

Replace neutral switch

CORRECT

9. Sidestand switch

- Disconnect the sidestand switch coupler (1) from the wireharness.
- Check the switch component for the continuity between "Blue/Yellow (2) and Black (3)". Refer to the "CHECKING OF SWITCHES" section.



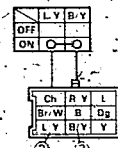
INCORRECT

Replace sidestand switch

CORRECT

10. Clutch switch

- Disconnect the handlebar switch (left) coupler (1) from the wireharness.
- Check the clutch switch component for the continuity between "Blue/Yellow (2) and Black/Yellow (3)". Refer to the "CHECKING OF SWITCHES" section.



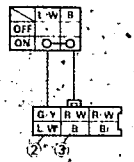
INCORRECT

Replace clutch switch

CORRECT

11. "START" switch

- Disconnect handlebar switch (right) coupler (1) from wireharness.
- Check the "START" switch component for the continuity between "Blue/White (2) and Black (3)". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace handlebar switch (right)

CORRECT

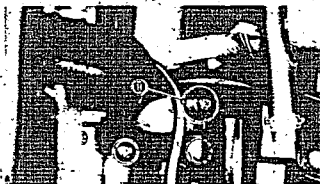
↓

12. Wiring connection

Check the entire ignition system for connections.
Refer to the "WIRING DIAGRAM" section

POOR CONNECTION

Correct



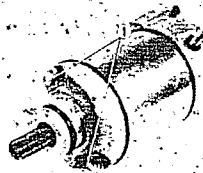
78564007

Removal

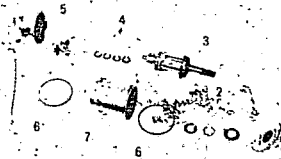
1. Remove:
 - Starter motor.
 Refer to the "ENGINE OVERHAUL - ENGINE DISASSEMBLY" section in the CHAPTER 4.

Disassembly

1. Remove:
 - Bolts 1



2. Remove:
 - Bracket 4
 - Washers 2
 - Armature 3
 - Shims 1
 - Bracket 5
 - O-rings 6
 - Yoke 7



3. Remove:
 - Brush 1



Inspection and repair

1. Inspect:
 - Commutator
 Dirty → Clean it with 600 grit sandpaper.
2. Measure:
 - Commutator diameter (A)
 Out of specification → Replace starter motor





Commutator wear limit:
27 mm (1.06 in)

3. Measure:

- Mica undercut $\text{\textcircled{a}}$
Out of specification \rightarrow Scrape the mica to proper value use a hacksaw blade can be grind to fit.



Mica undercut:
0.7 mm (0.028 in)

NOTE:

The mica insulation of the commutator must be undercut to ensure proper operation of commutator.

4. Inspect:

- Armature coil (insulation/continuity)
Defects \rightarrow Replace starter motor.

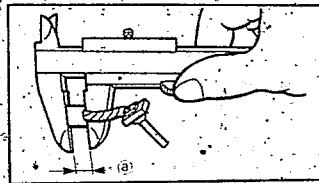
Inspecting steps:

- Connect the pocket tester for continuity check $\text{\textcircled{1}}$ and insulation check $\text{\textcircled{2}}$.
- Measure the armature resistances.



Armature coil resistance:
Continuity check $\text{\textcircled{1}}$:
0 Ω at 20°C (68°F)
Insulation check $\text{\textcircled{2}}$:
More than 1M Ω at 20°C
(68°F)

- If the resistance is incorrect, replace the starter motor



5. Measure:

- Brush length $\text{\textcircled{a}}$
Out of specification \rightarrow Replace.



Brush length limit:
4.0 mm (0.16 in)

6. Measure:

- Brush spring force
Fatigue/Out of specification \rightarrow Replace as a set.



Brush spring force:
570 g (20.1 oz)

7. Inspect:

- Bearing 1
- Oil seal 2



Assembly

Reverse the Removal procedure.
Note the following points.

1. Install:
• Brush set

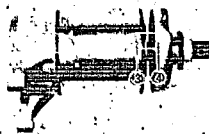
NOTE:

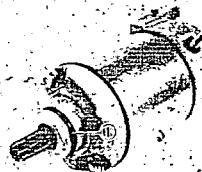
Align the projection $\text{\textcircled{1}}$ on the brush seat with the slot $\text{\textcircled{2}}$ on the housing.

2. Install:
• Yoke 1
• Brackets 2

NOTE:

Align the match marks $\text{\textcircled{1}}$ on the yoke with the match marks on the brackets.





Installation

1. Install:

- Starter motor

NOTE:

Apply a light grease to the O-ring.



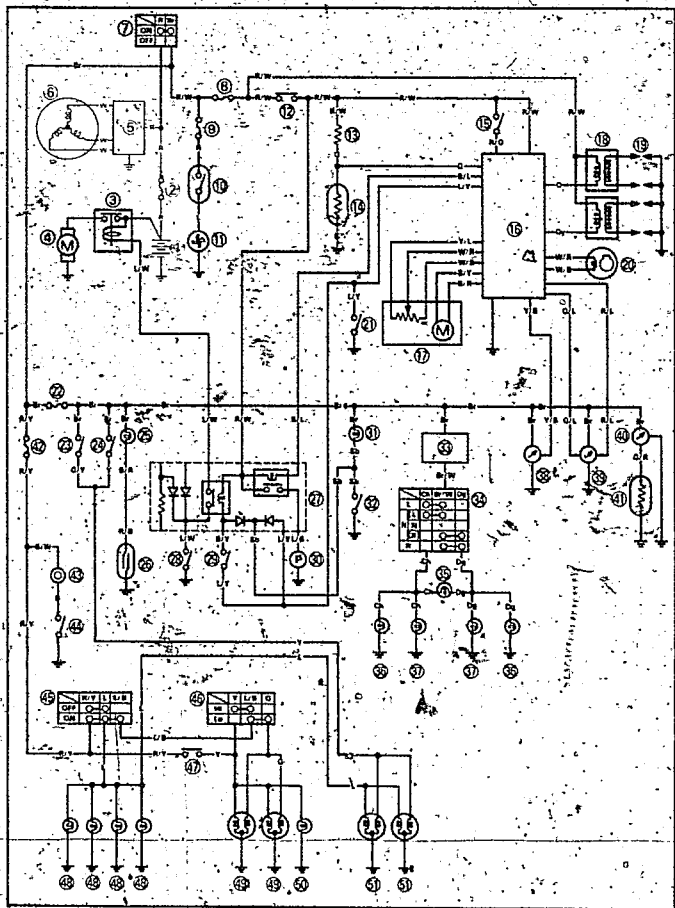
Bolt (starter motor):

10 Nm (1.0 m · kg · 7.2 ft · lb)

Refer to the "ENGINE OVERHAUL - ENGINE ASSEMBLY" section in the CHAPTER 4.



CHARGING SYSTEM CIRCUIT DIAGRAM

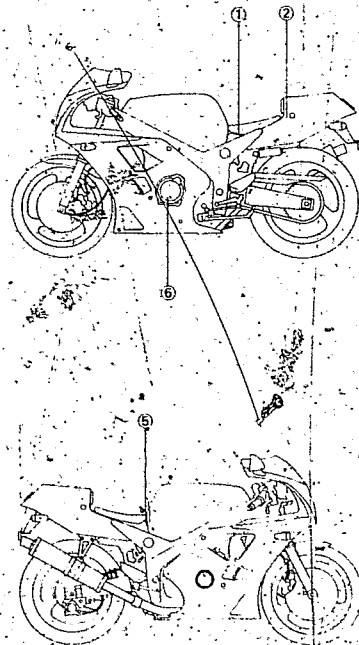


Aforementioned circuit diagram show the charging circuit in the circuit diagram

NOTE:

For the color codes, see page 8-2.

- ① Battery
- ② Fuse (main)
- ⑤ Rectifier/Regulator
- ⑥ AC magneto



TROUBLESHOOTING

THE BATTERY IS NOT CHARGED.

Procedure

Check:

1. Fuse (main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connection (Entire charging system)

NOTE:

- Remove the following parts before troubleshooting:
 - 1) Seat
 - 2) Tail cover
- Use the following special tool(s) in this troubleshooting.



Inductive tachometer:
90890-03113



Pocket tester:
90890-03112

1. Fuse (main)

- Remove the fuse.
- Connect the pocket tester ($\Omega \times 1$) to the fuse.
- Check the fuse for continuity

NO CONTINUITY

Replace fuse (main)

CONTINUITY

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3

INCORRECT

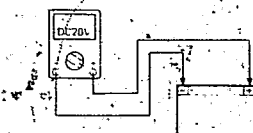
- Clean battery terminals
- Recharge or replace battery.

CORRECT

3 Charging voltage

- Connect the inductive tachometer to spark plug lead.
- Connect the pocket tester: (DC20V) to the battery

Tester (+) lead—Battery (+) terminal
Tester (-) lead—Battery (-) terminal



- Start the engine and accelerate to about, 3,000 r/min.
- Check charging voltage



Charging voltage:
14.3–15.3V at 3,000 r/min

NOTE:

Use a full charged battery.

MEETS SPECIFICATION

Charging circuit is good

OUT OF SPECIFICATION

4 Stator coil resistance

- Remove the generator cover.
- Connect the pocket tester " $\Omega \times 1$ " to the stator coils
- Measure the stator coil resistances

Tester (+) lead—White lead 1
Tester (-) lead—White lead 2

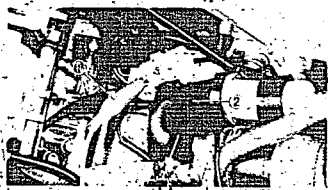
Tester (+) lead—White lead 1
Tester (-) lead—White lead 3



Stator coil resistance:
0.31–0.41 at 20°C (68°F)

OUT OF SPECIFICATION

Replace stator assembly.



5. Wiring connection

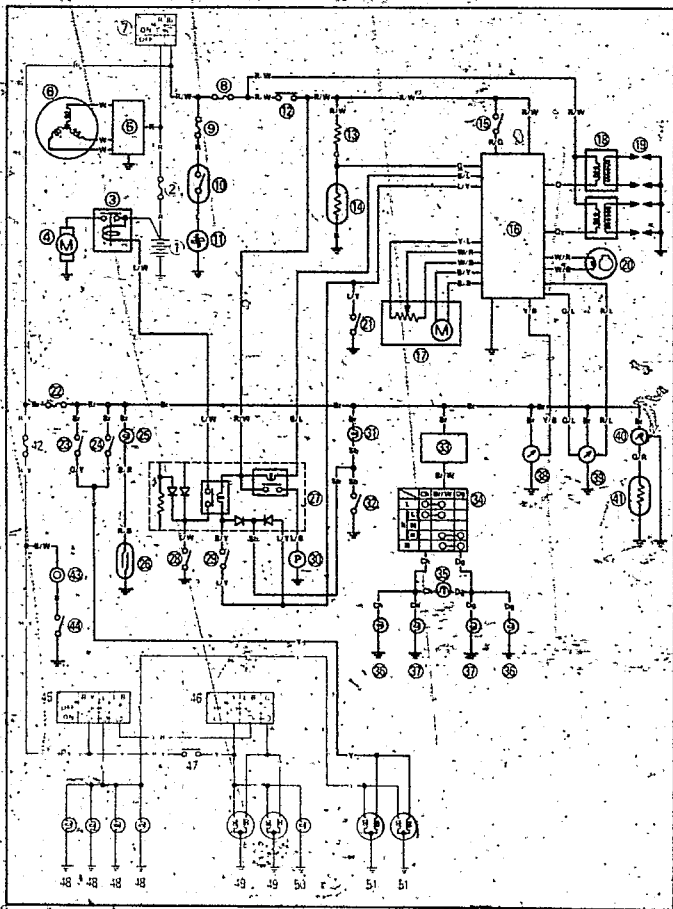
- Check the entire ignition system for connection.
- Refer to the "WIRING DIAGRAM" section.

OK

Replace rectifier/regulator.

POOR CONNECTION

Correct

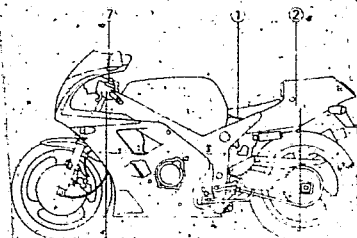
**LIGHTING SYSTEM
CIRCUIT DIAGRAM**


Aforementioned circuit is lighting circuit in circuit diagram.

NOTE:

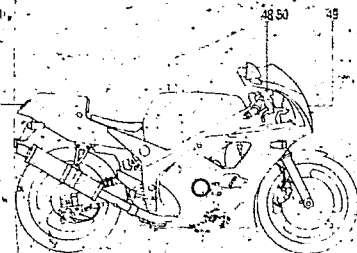
For color codes, see page 8-2

1. Battery
2. Fuse (main)
7. Main switch
3. Fuse (headlight)
45. "LIGHTS" switch
43. "LIGHTS" (Dimmer) switch
47. "PASS" switch
48. Meter light
43. Headlight
30. "HIGH BEAM" indicator light
51. Tail/brake light



45-46-47

42



51

48, 50

43

TROUBLESHOOTING

MEADLIGHT "HIGH BEAM" INDICATOR LIGHT, TAILLIGHT, AUXILIARY LIGHT AND/OR METER LIGHT DO NOT COME ON.


Procedure

Check:

1. Fuse (main and head)
2. Battery
3. Main switch
4. "LIGHTS" switch
5. "LIGHTS" (Dimmer) switch
6. "PASS" switch
7. Wiring connection (Entire lighting system)

NOTE:

- Remove the following parts before troubleshooting
 - 1) Seat
 - 2) Tail cover
 - 3) Fuel tank
 - 4) Air filter case
- Use the following special tool(s) in this troubleshooting

 **Pocket tester:**
90890-03112

1 Fuse (main and head)

- Remove the fuses
 - Connect the pocket tester ($\Omega \times 1$) to the fuses
 - Check the fuses for continuity.
- Refer to the "FUSE INSPECTION" in the CHAPTER 3

NO CONTINUITY

Replace fuse(s)

CONTINUITY

INCORRECT

2 Battery

- Check the battery condition
- Refer to the "BATTERY INSPECTION" section in the CHAPTER 3

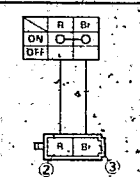
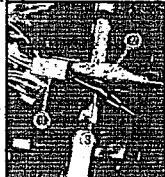
CORRECT

INCORRECT

- Clean battery terminals.
- Recharge or replace battery

3. Main switch

- Disconnect the main switch coupler (1) from the wireharness
- Check the switch component for the continuity between "Red-2" and Brown 3". Refer to the "CHECKING OF SWITCHES" section.



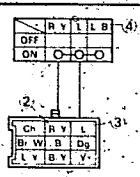
INCORRECT

Replace main switch

CORRECT

4 "LIGHTS" switch

- Disconnect the handlebar switch (left) coupler (1) from the wireharness
- Check the switch component for the continuity between "Red/Yellow 2" and Blue 3" and "Red/Yellow 2 and Blue/Black 4". Refer to the "CHECKING OF SWITCHES" section.



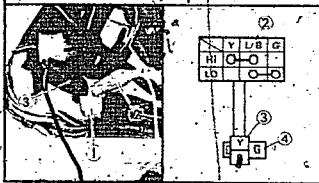
INCORRECT

Replace handlebar switch (left).

CORRECT

5 "LIGHTS" (dimmer) switch

- Disconnect the handlebar switch (left) coupler ① from the wire harness.
- Check the switch component for the continuity between "Blue/Black ② and Yellow ③" and "Blue/Black ② and Green ④." Refer to the "CHECKING OF SWITCHES" section.

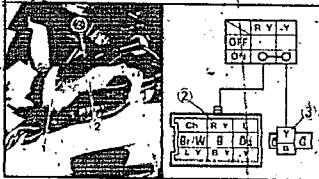


INCORRECT.

Replace handlebar switch (left).

6 "PASS" switch

- Disconnect the handlebar switch (left) couplers ① from the wire harness.
- Check the switch component for the continuity between "Red/Yellow ② and Yellow ③." Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace handlebar switch (left)

CORRECT

7. Wiring connection

- Check the entire lighting system for connections. Refer to the "WIRING DIAGRAM" section.

CORRECT

Check condition of each circuit for lighting system. Refer to "LIGHTING SYSTEM CHECK" section.

POOR CONNECTION

Correct

LIGHTING SYSTEM CHECK

1. Headlight and "HIGH BEAM" indicator light do not come on

NOCONTINUITY

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

CONTINUITY

Replace bulb and/or bulb socket

2. Voltage

- Connect the pocket tester (DC 20V) to the headlight and "HIGH BEAM" indicator light couplers.

Head light:

Tester (+) lead—Yellow ① or Green ② lead.

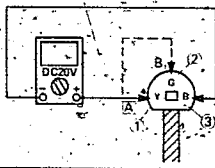
Tester (-) lead—Black ③ lead.

"HIGH BEAM" indicator light:

Tester (+) lead—Yellow ④ lead.

Tester (-) lead—Black ⑤ lead.

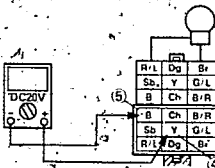
A



OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair

B



[A] When "LIGHT" (dimmer) switch is "LO" position.

[B] When "LIGHTS" (dimmer) switch is "HI" position.

- Turn the main switch to "ON".
- Turn the "LIGHTS" switch to "ON".
- Turn the "LIGHTS" (dimmer) switch to "LO" or "HI" position. (Push in the "PASS" switch)
- Check for voltage (12V) on the "Green" and "Yellow" lead at bulb socket connectors.

MEETS SPECIFICATION (12V)

This circuit is good

2. Meter light does not come on

NOCONTINUITY

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

Replace bulb and/or bulb socket

CONTINUITY

2. Voltage

- Connect the pocket tester (DC 20V) to the bulb socket coupler.

Tester (+) lead—Blue ② terminal

Tester (-) lead—Black ③ terminal



OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

- Turn the main switch to "ON".
- Turn the "LIGHTS" switch to "PD" or "ON".
- Check for voltage (12V) on the "Blue" lead at the bulb socket connector.

MEETS SPECIFICATION (12V)

This circuit is good



3. Tailight does not come on

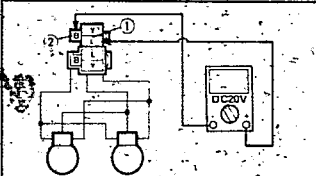
1. Bulb and bulb socket
 • Check the bulb and bulb socket for continuity
 Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

Replace bulb and/or bulb socket

CONTINUITY

2. Voltage
 • Connect the pocket tester (DC20V) to the bulb socket connector
Tester (+) lead - Blue ① terminal
Tester (-) lead - Black ② terminal

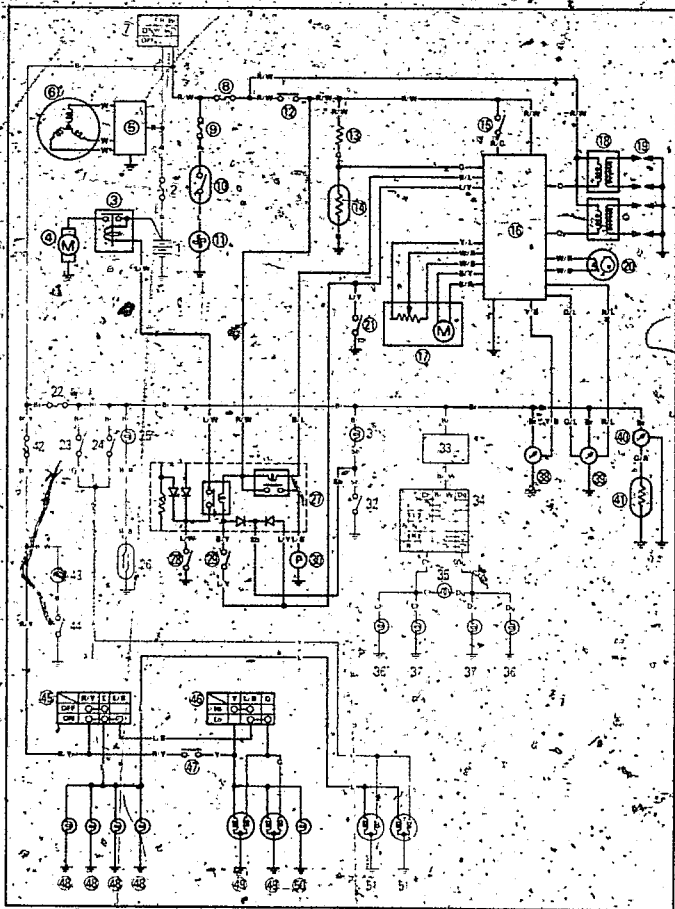


OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair

MEETS SPECIFICATION (12V)

This circuit is good

SIGNAL SYSTEM
CIRCUIT DIAGRAM

Aforementioned circuit diagram shows the signal circuit in the circuit diagram.

NOTE

For the color codes, see page 8-2

- 1 Battery
- 2 Fuse (main)
- 7 Main switch
- 22 Fuse (signal)
- 23 Front brake switch
- 24 Rear brake switch
- 25 "OIL" warning indicator light
- 26 Oil pressure switch
- 31 "NEUTRAL" indicator light
- 32 Neutral switch
- 33 Flasher relay
- 34 "TURN" signal switch
- 35 "TURN" indicator light
- 38 Front flasher light
- 37 Rear flasher light
- 43 Horn
- 44 "HORN" switch
- 39 Tail/Brake light





TROUBLESHOOTING

- FLASHER LIGHT, BRAKE LIGHT AND/OR INDICATOR LIGHT DO NOT COME ON
- HORN DOES NOT SOUND
- TACHOMETER DOES NOT OPERATE

Procedure

Check:


1. Fuse (main and signal)
2. Battery
3. Main switch
4. Wiring connection
(Entire signal system)

NOTE:

- Remove the following parts, before troubleshooting

- 1) Seat
- 2) Tail cover
- 3) Fuel tank
- 4) Air filter case

- Use the following special tool in this troubleshooting

 Pocket tester:
90890-03112

1. Fuse (main head and signal)

- Remove the fuses
 - Connect the pocket tester ($\Omega \times 1$) to the fuses
 - Check the fuses for continuity
- Refer to the "FUSE INSPECTION" in the CHAPTER 3

NOCONTINUITY

Replace fuse(s)

CONTINUITY

2. Battery

- Check the battery condition
- Refer to the "BATTERY INSPECTION" section in the CHAPTER 3

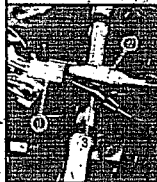
INCORRECT

- Clean battery terminals
- Recharge or replace battery

CORRECT

3. Main switch

- Disconnect the main switch coupler 1, from the wireharness
- Check the switch component for the continuity between "Red 2" and Brown 3". Refer to the "CHECKING OF SWITCHES" section.



CORRECT

INCORRECT

Replace main switch

4. Wiring connection

Check the entire signal system for connections. Refer to the "WIRING DIAGRAM" section

POOR CONNECTION

Correct

CORRECT

Check condition of each circuit for signal system. Refer to "SIGNAL SYSTEM CHECK" section



SIGNAL SYSTEM CHECK

1. Horn does not sound

1. "HORN" switch

- Disconnect the handlebar switch (left) coupler (1) from the wire harness
 - Check the switch component for the continuity between "Red/Yellow" (2) and Black (3).
- Refer to the "CHECKING OF SWITCHES" section.



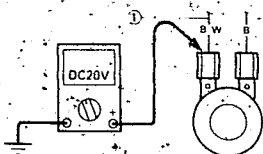
CORRECT

INCORRECT

Replace handlebar switch (left)

2. Voltage

- Connect the pocket tester (DC20V) to the horn lead
- Tester (+) lead - Black/White (1) lead
Tester (-) lead - Frame ground



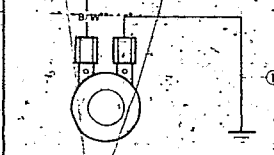
OUT OF SPECIFICATION

- Turn the main switch to "ON".
- Check for voltage (12V) on the "Black/White" lead at the horn terminal

MEETS SPECIFICATION (12V)

3. Horn

- Disconnect the "Black" lead at the horn terminal.
- Connect a jumper lead (1) to the horn terminal and ground the jumper lead.
- Turn the main switch to "ON".



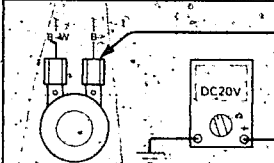
HORN IS SOUNDED

Horn is good

HORN IS NOT SOUNDED

4. Voltage

- Connect the pocket tester (DC20V) to the horn at the "Black" terminal
- Tester (+) lead - Black (1) lead
Tester (-) lead - Frame ground



OUT OF SPECIFICATION

- Turn the main switch to "ON".
- Check for voltage (12V) on the "Black" lead at the horn terminal

MEETS SPECIFICATION (12V)

Adjust or replace horn

2. Brake light does not come on.

1. Bulb and bulb socket

Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section

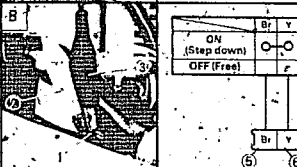
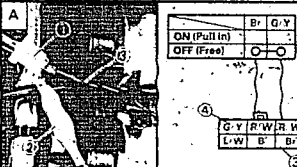
CONTINUITY

NOCONTINUITY

Replace bulb and/or bulb socket.

2. Brake switch

- Disconnect the handlebar switch (left) coupler 1 and brake switch coupler 2 from the wireharness.
- Check the switch component for the continuity between "Brown 3 and Green/Yellow 4", or "Brown 5 and Yellow 6". Refer to the "CHECKING OF SWITCHES" section.



A Front brake switch
B Rear brake switch

CORRECT

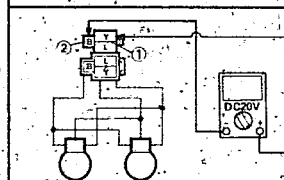
INCORRECT

Replace brake switch

3. Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead—Yellow (1) lead
Tester (−) lead—Black (1) lead



- Turn the main switch to "ON".
- The brake level is pulled in or brake pedal is stepped down.
- Check for voltage (12V) on the "Yellow" lead at the bulb socket connector.

MEETS SPECIFICATION (12V)

This circuit is good

3. Flasher light and/or "TURN" indicator light do not blink.

NOCONTINUITY

1. Bulb and bulb socket

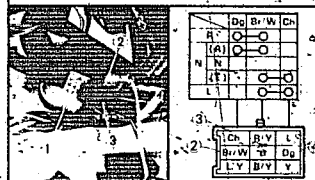
- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

CONTINUITY

Replace bulb and/or bulb socket

2 "TURN" switch

- Disconnect the handlebar switch (left) coupler 1 from the wireharness.
- Check the switch component for the continuity between "Brown/White 1 and Chocolate 3" and "Brown/White 2 and Dark green 4". Refer to the "CHECKING OF SWITCHES" section.



CORRECT

INCORRECT

Replace handlebar switch (left)

OUT OF SPECIFICATION

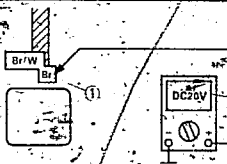
Wiring circuit from main switch to bulb socket connector is faulty, repair



3. Voltage

- Connect the pocket tester (DC20V) to the flasher relay.

Tester (+) lead - Brown (1) terminal
Tester (-) lead - Ground



OUT OF SPECIFICATION

- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown" lead at the flasher relay terminal.

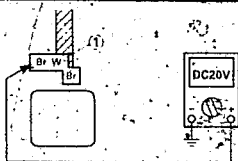
MEETS SPECIFICATION (12V)

Wiring circuit from main switch to flasher relay connector is faulty, repair.

4. Voltage

- Connect the pocket tester (DC20V) to the flasher relay.

Tester (+) lead - Brown/White (1) terminal,
Tester (-) lead - Ground



OUT OF SPECIFICATION

- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown/White" lead at the flasher relay terminal.

MEETS SPECIFICATION (12V)

Replace flasher relay

5. Voltage

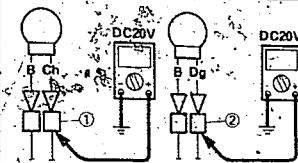
- Connect the pocket tester (DC20V) to the bulb socket connector.

At flasher light (left).

Tester (+) lead - Chocolate (1) lead
Tester (-) lead - Frame ground

At flasher light (right).

Tester (+) lead - Dark green (2) lead
Tester (-) lead - Frame ground



OUT OF SPECIFICATION

- Turn the main switch to "ON".
- Turn the "TURN" switch to "L" or "R".
- Check for voltage (12V) on the "Chocolate" lead or "Dark green" lead at the bulb socket connector.

MEETS SPECIFICATION (12V)

Wiring circuit from "TURN" switch to bulb socket connector is faulty, repair.

This circuit is good



4 "NEUTRAL" indicator light does not come on.

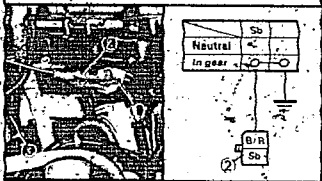
NOCONTINUITY

1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section

Replace bulb and/or bulb socket.

CONTINUITY

2. Neutral switch
- Disconnect the neutral switch coupler from the wire harness.
 - Check the switch component for the continuity between "Sky blue (2) and Ground". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

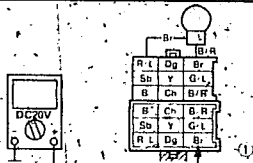
Replace neutral switch.

CORRECT

3 Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead - Brown (1) terminal
Tester (-) lead - Frame ground



- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown" lead at bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION (12V)

This circuit is good.

5. "OIL PRESSURE" indicator light does not come on, when engine oil level is low

NOCONTINUITY

1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section

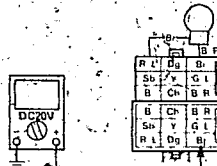
Replace bulb and/or bulb socket

CONTINUITY

2. Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead - Brown (1) lead
Tester (-) lead - Frame ground



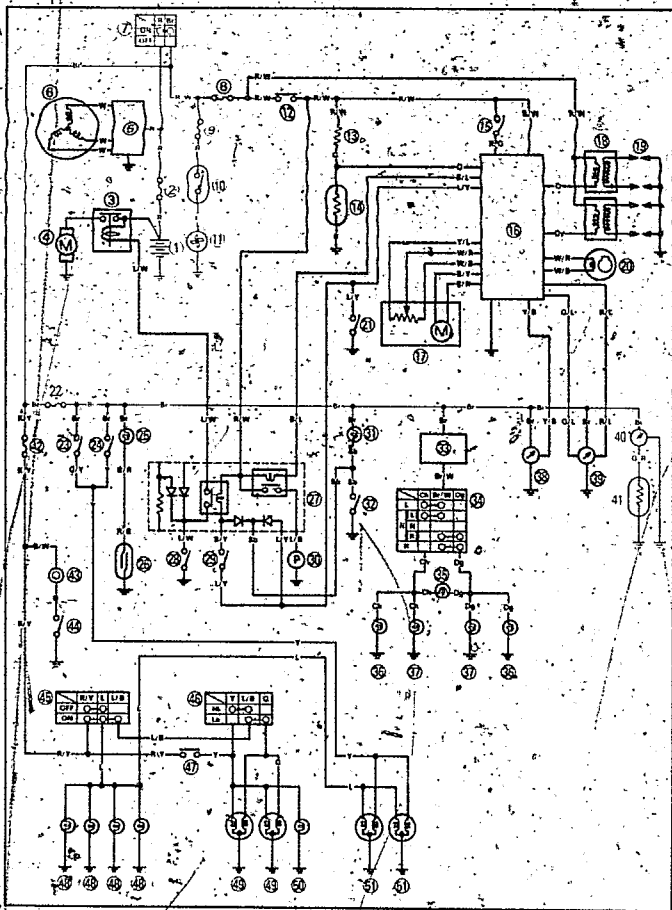
OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown" lead at bulb socket connector.

MEETS SPECIFICATION (12V)

Replace oil pressure switch

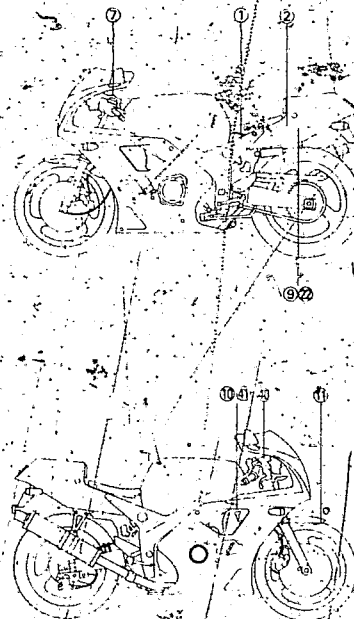
COOLING SYSTEM
CIRCUIT DIAGRAM

Aforementioned circuit diagram shows the cooling circuit in the circuit diagram

NOTE:

For the color codes see page 8-2.

- 1 Battery
- 2 Fuse (main)
- 7 Main switch
- 9 Fuse (fan)
- 10 Ther (no switch)
- 11 Fan motor
- 12 Fuse (signal)
- 13 Engine temperature gauge
- 14 Ther unit





TROUBLESHOOTING

FAN MOTOR DOES NOT TURN.

Procedure

Check:

1. Fuse (main, signal and fan)
2. Battery
3. Main switch
4. Fan motor (Test 1)
5. Fan motor (Test 2)
6. Thermo switch
7. Wiring connection (Entire cooling system)

NOTE:

- Remove the following parts before troubleshooting:
 - 1) Seat
 - 2) Tail cover
 - 3) Fuel tank
 - 4) Air filter case
- Use the following special tool in this troubleshooting



Pocket tester:
90890-03112

1. Fuse (main and fan)

- Remove the fuses.
- Connect the pocket tester ($\Omega \times 1$) to the fuses.
- Check the fuses for continuity. Refer to the "FUSE INSPECTION" in the CHAPTER 3.

NO CONTINUITY

Replace fuse(s)

CONTINUITY

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

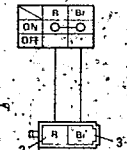
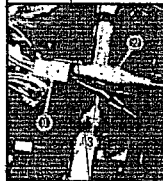
INCORRECT

- Clean battery terminals
- Recharge or replace battery

CORRECT

3. Main switch

- Disconnect the main switch coupler (1) from the wireharness.
- Check the switch component for the continuity between "Red (2)" and Brown (3)". Refer to the "CHECKING OF SWITCHES" section.

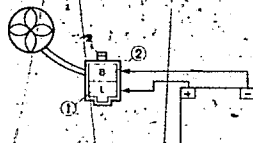


CORRECT

4. Fan motor (test 1)

- Disconnect the fan motor coupler.
- Connect the battery (12V) as shown.

Battery (+) lead - Blue (1) terminal
Battery (-) lead - Black (2) terminal



- Check the fan motor for operation.

MOVES

INCORRECT

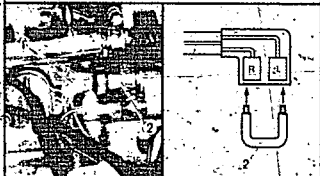
Replace main switch

DOES NOT MOVE

Replace fan motor

5. Fan motor (test 2)

- Disconnect the thermo switch leads ("Red" and "Blue") (1).
- Turn the main switch to "ON".
- Connect the leads with the jumper lead (2) as shown.



DOES NOT MOVE

Wiring circuit from main switch to fan motor leads is faulty, repair.

MOVES

6. Thermo switch

- Remove the thermo switch from the thermostat housing.
- Connect the pocket tester ($\Omega \times 1$) to the thermo switch (1).
- Immerse the thermo switch in the water (2).
- Check the thermo switch for continuity. Note temperatures while heating the water with the temperature gauge (3).

Test step	Water temperature	Good condition
1	0 - 98°C (32 - 208.4°F)	X
2	More than 105 ± 3°C (221.0 ± 5.4°F)	O
3	105 to 98°C (221.0 to 208.4°F)	O
4	Less than 98°C (208.4°F)	X

Test 1 & 2: Heat-up tests

Test 3* & 4*: Cool-down tests

O: Continuity X: No continuity

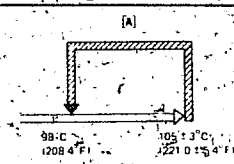
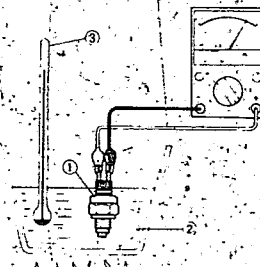
WARNING

Handle the thermo switch with special care. Never subject it to strong shock or allow it to be dropped. Should it be dropped, it must be replaced.



Thermo switch:

• 8 Nm (0.9 m · kg, 5.8 ft · lb)
• Three band sealock #10



A: THERMO SWITCH - ON; FAN - ON
B: COOLANT TEMPERATURE

BAD CONDITION

Replace thermo switch

COOLING SYSTEM

ELEC



M-10

COOLING SYSTEM

ELEC



WHEN ENGINE IS HOT, TEMPERATURE GAUGE DOES NOT MOVE

Procedure

Check:

1. Fuse (main and signal)
2. Battery
3. Main switch
4. Thermo unit
5. Voltage
6. Wiring connection (Entire cooling system)

NOTE:

- Remove the following parts before troubleshooting
 - 1) Seat
 - 2) Tail cover
 - 3) Fuel tank
 - 4) Air-filter case
- Use the following special tool(s) in this troubleshooting

Pocket tester:
90890-03112

1 Fuse (main and signal)

- Remove the fuses.
- Connect the "pocket tester ($\Omega \times 1$)" to the fuses.
- Check the fuses for continuity. Refer to "FUSE INSPECTION" in the CHAPTER 3

NO CONTINUITY

Replace fuse(s)

CONTINUITY

INCORRECT

2 Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3

CORRECT

3 Main switch

- Disconnect the main switch coupler 1 from the wireharness
- Check the switch component for the continuity between "Red 2 and Brown 3". Refer to the "CHECKING OF SWITCHES" section.



CORRECT

INCORRECT

Replace main switch

4. Thermo unit

- Drain the coolant and remove the thermo unit.

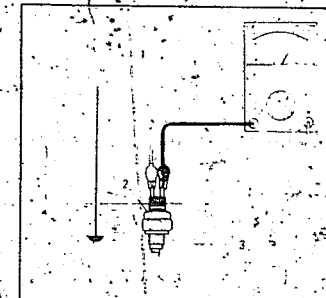
WARNING

Handle the thermo unit with special care. Never subject it to strong or allow it to be dropped. Should it be dropped, it must be replaced.

- Immerse the thermo unit 2 in coolant 3
- Measure the resistance at each temperature as tabulated

Coolant temperature	Resistance
50 C (122 F)	15k Ω
80 C (176 F)	47 - 57 Ω
100 C (212 F)	26 - 29 Ω
120 C (248 F)	16 Ω

- After measuring the thermo unit, install the unit.



Thermo unit.
14 Nm (1.4 m·kg, 10 ft·lb)

OUT OF SPECIFICATION

CAUTION:
Avoid overtightening.

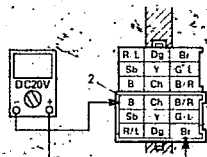
Replace thermo unit.

MEET
SPECIFICATIONS

5. Voltage

• Connect the pocket tester (DC20V) to the temperature gauge leads

Tester (+) lead--Brown (1) terminal
Tester (-) lead--Black (2) terminal



OUT OF SPECIFICATION

Wiring circuit from main switch to temperature gauge connector; repair

• Turn the main switch to "ON"
• Check for voltage (12V) on the "Brown" lead at the temperature gauge connector

MEETS
SPECIFICATION (12V)

POOR CONNECTION

6. Wiring connection

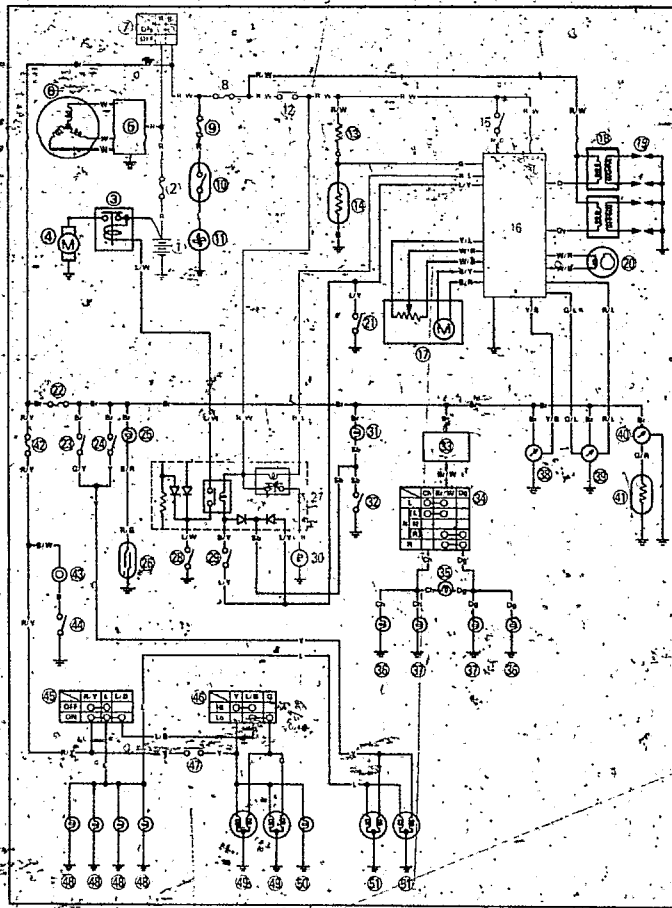
Check the entire cooling system for connections. Refer to the "WIRING DIAGRAM" section

Correct.

CORRECT

Replace tempmeter gauge

FUEL PUMP SYSTEM
CIRCUIT DIAGRAM

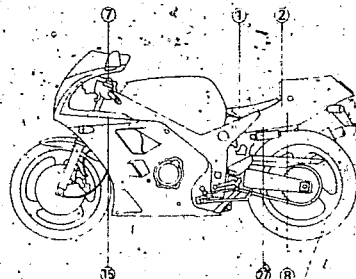


Aforementioned circuit shows fuel pump system circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

- 1 Battery
- 2 Fuse (main)
- 7: Main switch
- 8: Fuse (ignition)
- 12 "ENGINE STOP" switch
- 15 Reserve switch
- 16 Ignitor
- 17: Relay
- 18 Fuel pump





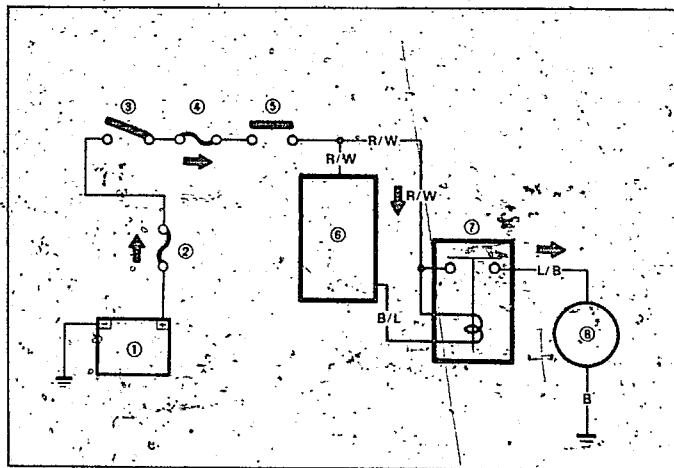
FUEL PUMP CIRCUIT OPERATION

The fuel pump circuit consists of the fuel pump relay, fuel pump, "ENGINE STOP" switch and digital ignition unit.

The digital ignition unit includes the control unit for the fuel pump.

The fuel pump starts and stops as indicated in the chart below.

- 1 Battery
- 2 Fuse (main)
- 3 Main switch
- 4 Fuse (ignition)
- 5 "ENGINE STOP" switch
- 6 Digital ignitor unit
- 7 Fuel pump relay
- 8 Fuel pump



FUEL PUMP		
START		STOP
<ul style="list-style-type: none"> Main/"ENGINE STOP" switch turned to "ON" <p>For about 5 seconds when carburetor fuel level is low</p>	<ul style="list-style-type: none"> Engine turned on. <p>After about 0.1 second</p>	<ul style="list-style-type: none"> Engine turned off <p>After about 5 seconds</p>



TROUBLESHOOTING

FUEL PUMP FAILS TO OPERATE

Procedure:

1. Fuse (main and ignition)
2. Battery
3. Main switch
4. "ENGINE STOP" switch
5. Fuel pump relay (relay unit)
6. Fuel pump
7. Wiring connection (Entire fuel system)

NOTE:

• Remove the following before troubleshooting:

- 1) Seat
- 2) Tail cover
- 3) Fuel tank
- 4) Air filter case

• Use the following special tool in this troubleshooting:

Pocket tester:
90890-03112

1 Fuse (main and ignition)

- Remove the fuses
- Connect the pocket tester ($\Omega \times 1$) to the fuses.
- Check the fuses for continuity. Refer to the "FUSE INSPECTION" section in the CHAPTER 3

NOCONTINUITY

Replace the fuse(s)

CONTINUITY

INCORRECT

2 Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3

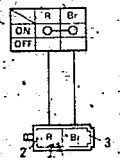

- Clean battery terminals
- Recharge or replace battery.

CORRECT



3. Main switch

- Disconnect the main switch coupler 1 and lead from the wireharness.
- Check the switch component for the continuity between "Red 2" and Brown 3". Refer to the "CHECKING OF SWITCHES" section.

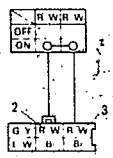

INCORRECT

Replace main switch.



4. "ENGINE STOP" switch

- Disconnect the handlebar switch (right) coupler 1 from the wireharness.
- Check the switch component for the continuity between "Red/White 2" and Red/White 3". Refer to the "CHECKING OF SWITCHES" section.

INCORRECT

Replace handlebar switch (right)


CORRECT



5. Fuel pump relay (relay unit)

- Disconnect the fuel pump relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12V) voltage to the fuel pump relay unit coupler terminals.

Tester (+) lead - Blue/Black 1 terminal
 Tester (-) lead - Red/White 2 terminal
 Battery (+) lead - Red/White 2 terminal
 Battery (-) lead - Black/Blue 3 terminal



• Check the relay for continuity

NOCONTINUITY

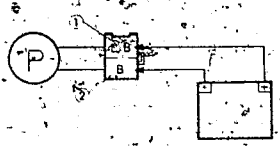
Replace relay unit

CONTINUITY

6. Fuel pump

- Disconnect the fuel pump coupler from the wire harness.
- Connect the battery voltage (12V) as shown.

Battery (+) lead - Blue/Black 1 terminal
 Battery (-) lead - Black 2 terminal



• Check the fuel pump operation.

DOES NOT MOVE

Replace fuel pump

MOVES



7. Wiring connection

- Check the entire fuel pump system for connections
- Refer to the "WIRING DIAGRAM" section

CORRECT

Replace digital ignitor unit

POOR CONNECTION

Correct



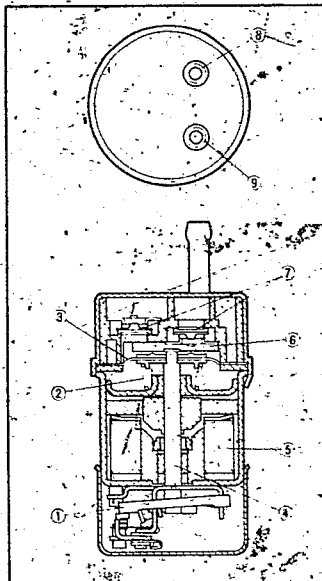
FUEL PUMP TEST

Operation

The diaphragm is pulled in by the plunger allowing fuel to be sucked into the fuel chamber. Fuel is pushed out from the pump until the float chamber is filled with fuel, and then the cut off switch cuts off the circuit. When the spring pushes the diaphragm further to the end, the cut-off switch turns on and the solenoid coil pulls the plunger with the diaphragm forcing fuel into the fuel chamber.

NOTE

When the main and "ENGINE STOP" switches are ON, the fuel pump relay is activated for five (5) seconds at which time the fuel pump operates.



- 1 Cut off switch
- 2 Spring
- 3 Diaphragm
- 4 Plunger
- 5 Solenoid coil
- 6 Fuel chamber
- 7 Valve
- 8 Outlet
- 9 Inlet

Inspection

- 1 Inspect
 - Fuel pump
 - Cracks-Damage - Replace
- 2 Check
 - Fuel pump operation

Checking steps.

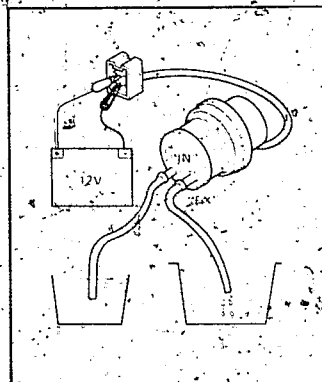
- Connect suitable hoses to the fuel pump
- Put the "IN" side hose into the clean solvent
- Place an open container under the "EX" side hose end
- Connect the battery to fuel pump terminal

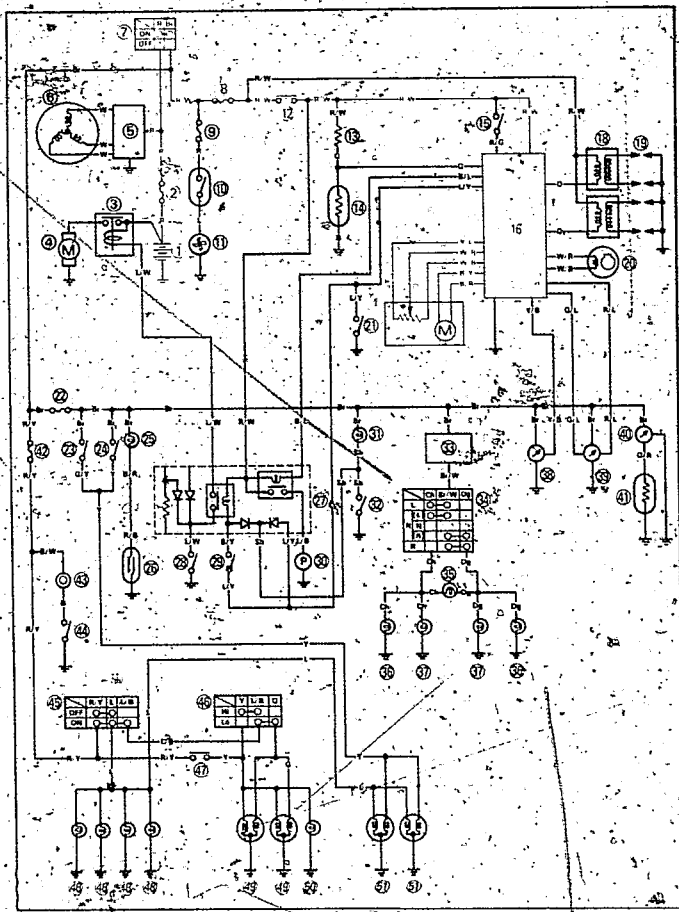
Battery (+) terminal - "Blue/Black" terminal
 Battery (-) terminal - "Black" terminal

- If solvent flow out from "EX" side hose fuel pump is good. If not replace the fuel hose

NOTE

After checking, pump out the solvent from inside of fuel pump.



EX-UP SYSTEM
CIRCUIT DIAGRAM

A forementioned circuit diagram shows the EX-UP circuit in the circuit diagram.

NOTE:

For the color codes, see page 8-2.

- 1 Battery
- 2 Fuse (main)
- 7 Main switch
- 8 Fuse (ignition)
- 12 "ENGINE STOP" switch
- 16 Ignitor
- 17 EX-UP

