YAMAHA

FZR1000 '87

2GH-ME1



SERVICE MANUAL

FZR1000
SERVICE MANUAL
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NOTICE

This manual was written 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 motorcycles have a basic understanding of the mechanical concepts and procedures inherent in motorcycle repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to 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 OPERATIONS
YAMAHA MOTOR CO., LTD.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

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

CAUTION: A **CAUTION** indicates special procedures that must be followed to avoid damage to the motorcycle.

WARNING: A **WARNING** indicates special procedures that must be followed to avoid injury to a motorcycle operator or person inspecting or repairing the motorcycle.

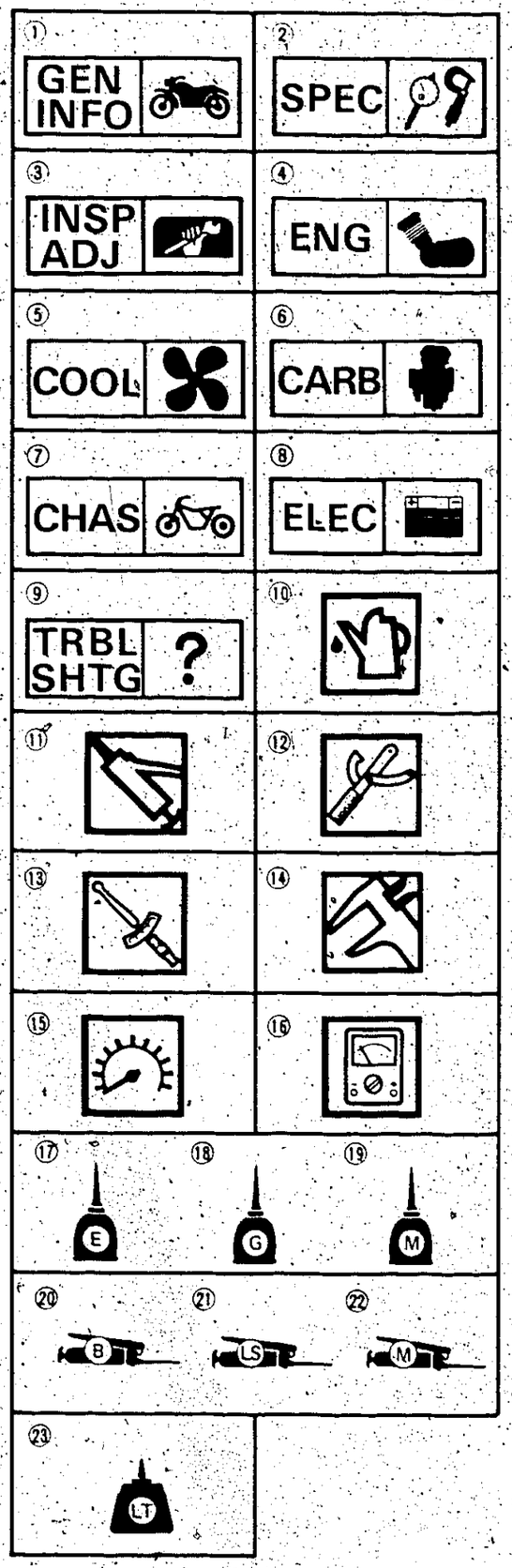
MANUAL FORMAT

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 inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/Damage → Replace.

EXPLODED DIAGRAM

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



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 Carburetion
⑦ Chassis
⑧ Electrical
⑨ Troubleshooting

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

⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Tightening
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, 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®)

INDEX

GENERAL INFORMATION	GEN INFO 1
SPECIFICATIONS	SPEC 2
PERIODIC INSPECTION AND ADJUSTMENT	INSP ADJ 3
ENGINE OVERHAUL	ENG 4
COOLING SYSTEM	COOL 5
CARBURETION	CARB 6
CHASSIS	CHAS 7
ELECTRICAL	ELEC 8
TROUBLESHOOTING	TRBL SHTG 9

CONTENTS

CHAPTER 1.
GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION B-2
- VEHICLE IDENTIFICATION NUMBER B-2
- ENGINE SERIAL NUMBER B-2

IMPORTANT INFORMATION B-2
- PREPARATION FOR REMOVAL B-2
- ALL REPLACEMENT PARTS B-2
- GASKET, OIL SEALS, AND O-RINGS B-2
- LOCK WASHER/PLATES AND COTTER PINS B-3
- BEARINGS AND OIL SEALS B-3
- CIRCLIPS B-3

SPECIAL TOOLS B-3
- FOR TUNE UP B-3
- FOR ENGINE SERVICE B-4
- FOR CHASSIS SERVICE B-5
- FOR ELECTRICAL COMPONENTS B-6

CHAPTER 2.
SPECIFICATIONS

SPECIFICATIONS C-2
- GENERAL SPECIFICATIONS C-2
- MAINTENANCE SPECIFICATIONS C-3
- ENGINE C-3
- CHASSIS C-7
- ELECTRICAL C-8
- GENERAL TORQUE SPECIFICATIONS C-9
- LUBRICATION POINT AND GRADE OF LUBRICANT C-10
- DEFINITION OF UNITS C-11

LUBRICATION DIAGRAM C-11

COOLANT DIAGRAM C-13

CABLE ROUTING C-14

CHAPTER 3.
PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION E-2

PERIODIC MAINTENANCE/LUBRICATION E-2

COWLINGS REMOVAL AND INSTALLATION E-3

ENGINE E-4
- VALVE CLEARANCE ADJUSTMENT E-4
- CARBURETOR SYNCHRONIZATION E-8
- IDLE SPEED ADJUSTMENT E-8
- THROTTLE CABLE FREE PLAY ADJUSTMENT E-9
- SPARK PLUG INSPECTION E-9
- IGNITION TIMING CHECK E-10
- COMPRESSION PRESSURE MEASUREMENT E-10
- ENGINE OIL LEVEL INSPECTION E-11
- ENGINE OIL REPLACEMENT E-11
- ENGINE OIL FILTER REPLACEMENT E-12
- AIR FILTER CLEANING E-13
- CARBURETOR JOINT INSPECTION E-13
- FUEL LINE INSPECTION E-13
- CRANKCASE VENTILATION HOSE INSPECTION E-13
- EXHAUST SYSTEM INSPECTION E-13
- COOLANT LEVEL INSPECTION E-14
- COOLANT REPLACEMENT E-14

CHASSIS E-15
- FRONT BRAKE ADJUSTMENT E-15
- REAR BRAKE ADJUSTMENT E-15
- BRAKE FLUID INSPECTION E-15
- BRAKE PAD INSPECTION E-15
- REAR BRAKE LIGHT SWITCH ADJUSTMENT E-15
- BRAKE HOSE INSPECTION E-16
- DRIVE CHAIN SLACK CHECK E-16
- DRIVE CHAIN SLACK ADJUSTMENT E-16
- DRIVE CHAIN LUBRICATION E-16
- STEERING HEAD INSPECTION F-1
- FRONT FORK OIL REPLACEMENT F-2
- FRONT FORK ADJUSTMENT F-3
- REAR SHOCK ABSORBER ADJUSTMENT F-3
- RECOMMENDED COMBINATION OF FRONT FORK AND REAR SHOCK ABSORBER SETTINGS F-3
- TIRE INSPECTION F-4
- WHEEL INSPECTION F-4
- CABLE INSPECTION F-5
- LUBRICATION F-5

ELECTRICAL F-5
BATTERY INSPECTION F-5
FUSE INSPECTION F-6
HEADLIGHT BEAM ADJUSTMENT F-6
HEADLIGHT BULB REPLACEMENT F-7
TAIL/BRAKE BULB REPLACEMENT F-7

CHAPTER 4.

ENGINE OVERHAUL

ENGINE REMOVAL G-2
SIDE COWLING, SEAT, SIDE COVERS, FUEL TANK G-2
AIR CLEANER G-2
CARBURATOR G-2
RADIATOR G-2
MUFFLER ASSEMBLY G-3
OIL COOLER G-3
CLUTCH RELEASE CYLINDER AND DRIVE SPROCKET G-3
LEADS G-3
ENGINE REMOVAL G-4

ENGINE DISASSEMBLY G-4
CAMSHAFT AND CYLINDER HEAD G-4
CYLINDER AND PISTON G-6
CLUTCH G-6
OIL PAN AND OIL STRAINER G-7
OIL PUMP AND SHIFT SHAFT G-7
WATER PUMP G-8
STARTER MOTOR AND AC GENERATOR G-8
CRANKCASE DISASSEMBLY G-8
TRANSMISSION G-9
STARTER CLUTCH AND CRANK SHAFT G-9
SHIFT FORK AND SHIFT CAM G-9
CYLINDER HEAD AND CAMSHAFT CASE G-10
VALVE G-10

INSPECTION AND REPAIR G-11
CYLINDER HEAD G-11
VALVE G-11
VALVE GUIDE G-12
VALVE SEAT G-12
VALVE SPRING G-14
VALVE INSTALLATION G-14
VALVE LIFTER AND CAMSHAFT CASE G-15
CAMSHAFT, CAM CHAIN AND CAM SPROCKET G-16

CYLINDER AND PISTON H-1
PISTON RING AND PISTON PIN H-1
CRANKSHAFT AND CONNECTING ROD H-2
OIL PUMP H-5
PRIMARY DRIVES H-5
STARTER DRIVES H-5
CLUTCH H-6
TRANSMISSION H-7
OIL JET NOZZLE H-7
RELIEF VALVE AND PIPE H-7
CRANKCASE H-8
BEARING AND OIL SEAL H-8
CIRCLIP AND WASHER H-8

ENGINE ASSEMBLY AND ADJUSTMENT H-8
CRANKSHAFT H-8
LOWER CRANKCASE H-9
UPPER CRANKCASE H-10
TRANSMISSION H-11
CRANKCASE ASSEMBLY H-12
SHIFT SHAFT AND OIL PUMP H-13
OIL STRAINER AND OIL PAN H-13
WATER PUMP H-14
AC GENERATOR AND STARTER MOTOR H-14
CLUTCH H-15
PISTON AND CYLINDER H-16
CYLINDER HEAD I-2
CAMSHAFT I-2
CAM CHAIN TENSIONER I-4
CYLINDER HEAD COVER AND OIL DELIVERY PIPE I-5
REMOUNTING ENGINE I-5
OIL COOLER I-6
MUFFLER ASSEMBLY I-6
CARBURATOR AND THROTTLE CABLE I-6

CHAPTER 5.
COOLING SYSTEM

RADIATOR J-2
REMOVAL J-2
INSPECTION J-2
ASSEMBLY J-2

WATER PUMP J-3
DISASSEMBLY J-3
INSPECTION J-3
BEARING AND SEAL REPLACEMENT J-3
ASSEMBLY J-4

THERMOSTATIC VALVE J-4
REMOVAL J-4
INSPECTION J-4
ASSEMBLY J-4

CHAPTER 6.
CARBURETOR

CARBURETOR K-2
SECTION VIEW K-2
REMOVAL K-3
DISASSEMBLY K-3
INSPECTION K-4
ASSEMBLY K-5
INSTALLATION K-5
ADJUSTMENT K-5

CHAPTER 7.
CHASSIS

FRONT WHEEL L-2
REMOVAL L-2
INSPECTION L-2
INSTALLATION L-4

REAR WHEEL L-4
REMOVAL L-5
INSPECTION L-5
INSTALLATION L-5

FRONT AND REAR BRAKE L-6
BRAKE PAD REPLACEMENT L-7
CALIPER DISASSEMBLY L-8
MASTER CYLINDER DISASSEMBLY L-8
INSPECTION AND REPAIR L-10
ASSEMBLY L-11
AIR BLEEDING L-11

HYDRAULIC CLUTCH L-12
DISASSEMBLY L-13
INSPECTION AND REPAIR L-14
ASSEMBLY L-14
AIR BLEEDING L-15

FRONT FORK L-15
REMOVAL L-16
DISASSEMBLY L-16
INSPECTION M-1
ASSEMBLY M-1
INSTALLATION M-2

STEERING M-3
REMOVAL M-4
INSPECTION M-5
INSTALLATION M-5

REAR SHOCK ABSORBER AND SWINGARM M-7
HANDLING NOTES M-8
DISPOSAL NOTES M-8
REMOVAL M-8
INSPECTION M-9
INSTALLATION M-10

DRIVE CHAIN AND SPROCKET M-10
REMOVAL M-10
INSPECTION AND CLEANING M-10
INSTALLATION M-11

METER ASSEMBLY M-12
REMOVAL M-12
INSTALLATION M-12

CHAPTER 8. ELECTRICAL

FZR1000(T) CIRCUIT DIAGRAM A-2

ELECTRICAL COMPONENTS A-3

IGNITION SYSTEM A-4
- CIRCUIT DIAGRAM A-4
- DIGITAL IGNITION CONTROL SYSTEM DESCRIPTION A-5
- OPERATION A-5
- TROUBLESHOOTING A-5

ELECTRIC STARTING SYSTEM A-9
- CIRCUIT DIAGRAM A-9
- STARTING CIRCUIT OPERATION A-10
- TROUBLESHOOTING A-10
- STARTER MOTOR TEST A-13

CHARGING SYSTEM A-15
- CIRCUIT DIAGRAM A-15
- TROUBLESHOOTING A-16

LIGHTING SYSTEM B-2
- CIRCUIT DIAGRAM B-2
- TROUBLESHOOTING B-3

SIGNAL SYSTEM B-7
- CIRCUIT DIAGRAM B-7
- TROUBLESHOOTING B-8
- SWITCHES TEST B-12

DISPLAY SYSTEM B-13
- CIRCUIT DIAGRAM B-13
- TROUBLESHOOTING B-14

COOLING SYSTEM C-1
- CIRCUIT DIAGRAM C-1
- TROUBLESHOOTING C-2

FUEL SYSTEM C-4
- CIRCUIT DIAGRAM C-4
- FUEL PUMP CIRCUIT OPERATION C-5
- TROUBLESHOOTING C-5
- FUEL PUMP TEST C-11

CHAPTER 9. TROUBLESHOOTING

STARTING FAILURE/HEAD STARTING D-2

POOR IDEL SPEED PERFORMANCE D-3

POOR MEDIUM AND HIGH SPEED PERFORMANCE D-3

FAULTY GEAR SHIFTING D-3

CLUTCH SLIPPING/DRAGGING D-4

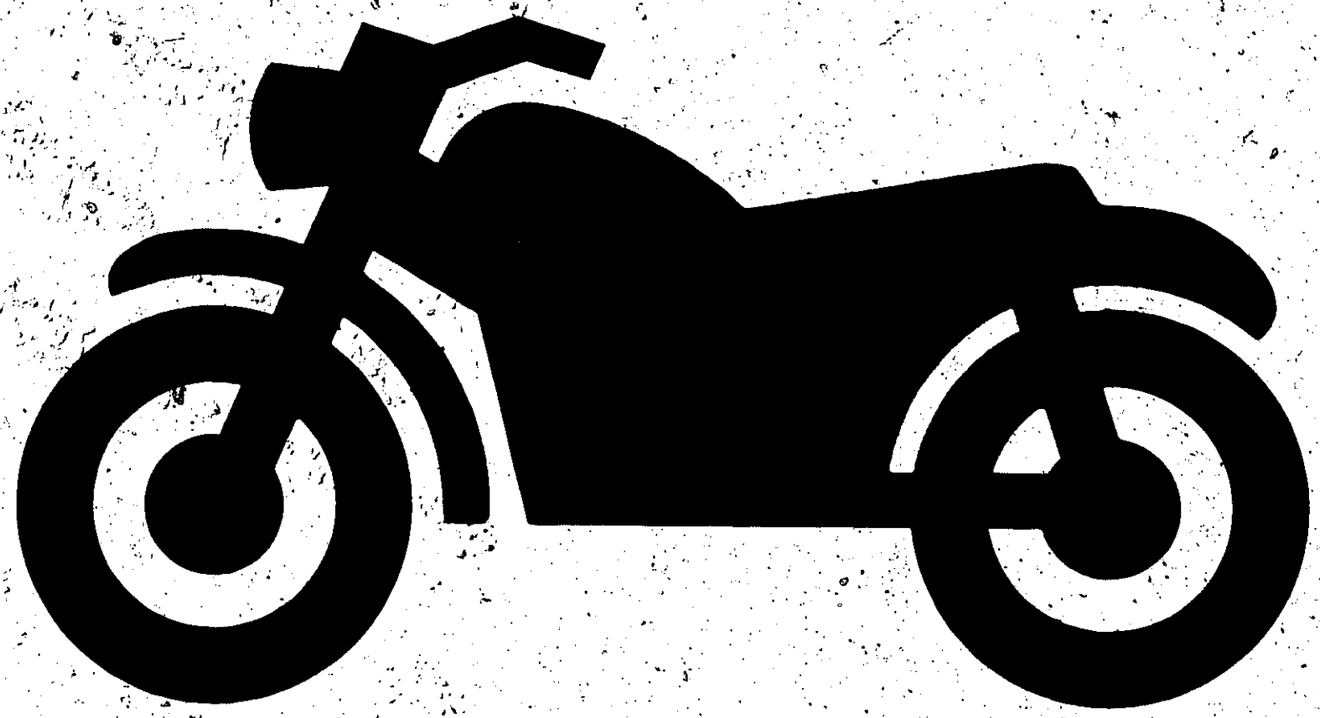
OVERHEATING OR OVER-COOLING D-4

FAULTY BRAKE D-5

FRONT FORK OIL LEAKAGE/MALFUNCTION D-5

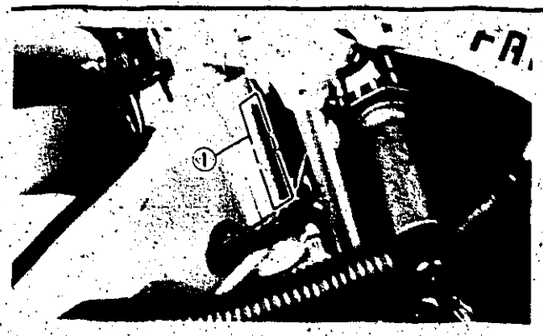
INSTABLE HANDLING D-5

FAULTY SIGNALS AND LIGHTS D-6



GEN INFO

1



GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

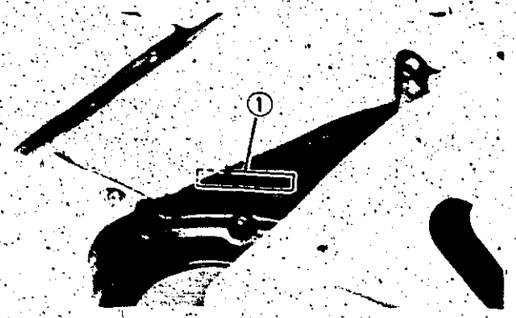
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stemped into the right side of the steering head.

Starting Serial Number:	
FZR1000 . . .	2GH-000101
FZR1000 . . .	2LA-000101 (D, S)
FZR1000 . . .	2LE-000101 (F)
FZR1000 . . .	2LF-000101 (A, CH)
FZR1000 . . .	2RG-000101 (GB)
FZR1000T . . .	2LL-000101 (AUS, NZ, ZA)

NOTE:

The vehicle identification number is used to identify your motorcycle and may be used to register your motorcycle with the licensing authority in your state.



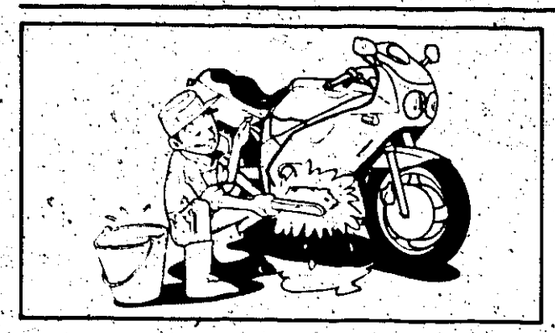
ENGINE SERIAL NUMBER

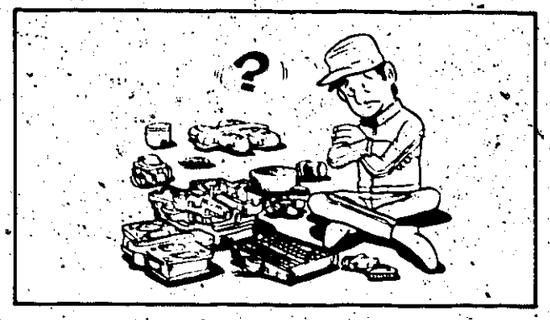
The engine serial number ① is stamped into the right side of the engine.

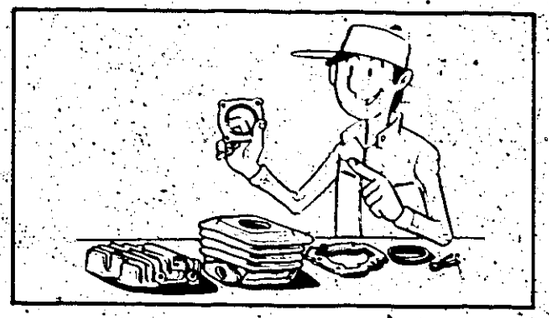
Starting Serial Number:	
FZR1000 . . .	2GH-000101
FZR1000 . . .	2LA-000101 (D, S)
FZR1000 . . .	2LE-000101 (F)
FZR1000 . . .	2LF-000101 (A, CH)
FZR1000 . . .	2RG-000101 (GB)
FZR1000T . . .	2LL-000101 (AUS, NZ, ZA)

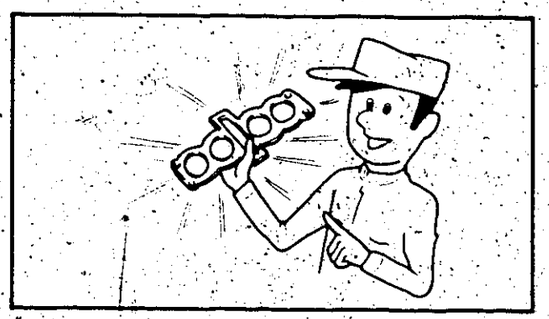
NOTE:

- 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

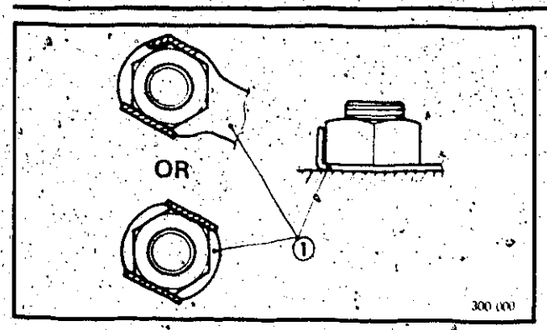
1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOL".
3. When disassembling the machine, keep mated parts together. This includes gears, cylinders, pistons, and other mated parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machines 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.

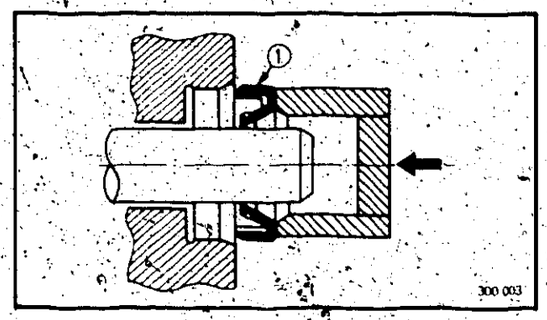
GASKETS, OIL SEALS, AND O-RINGS

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.



LOCK WASHERS/PLATES AND COTTER PINS

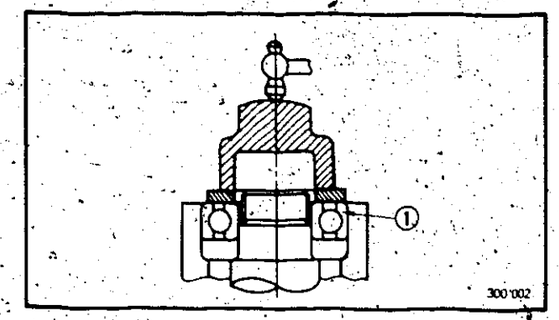
1. All lock washers/plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



BEARINGS AND OIL SEALS

1. Install the bearing(s) ① and oil seal(s) ② 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 bearings liberally when installing.

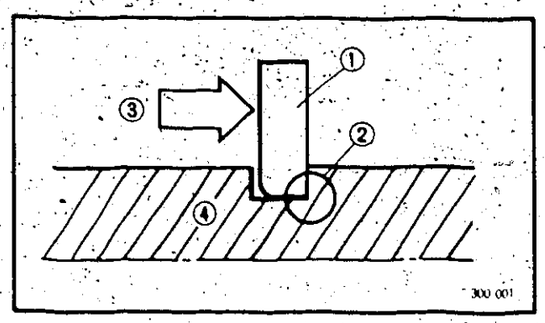
① Oil seal



CAUTION

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

① Bearing



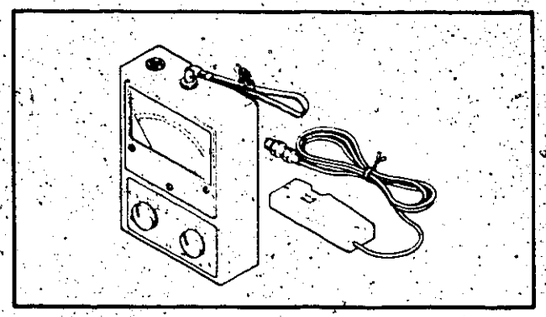
CIRCLIPS

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.

④ Shaft

SPECIAL TOOLS

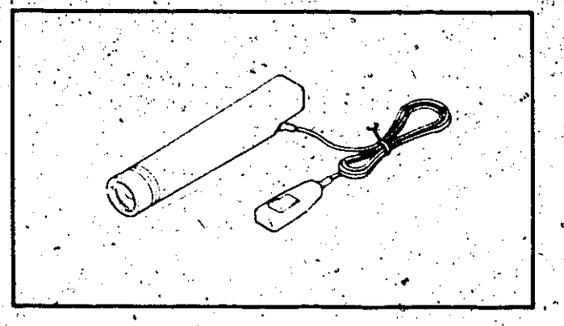
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



FOR TUNE UP

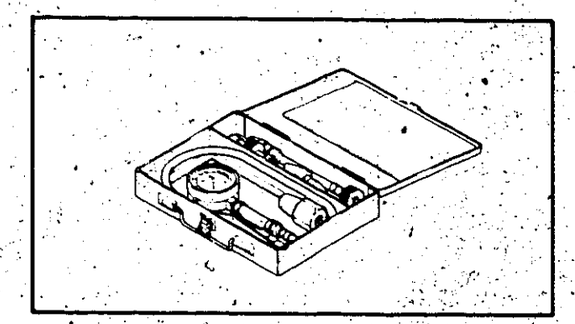
1. Inductive Tachometer
   P/N 90890-03113

This tool is needed for detecting engine rpm.



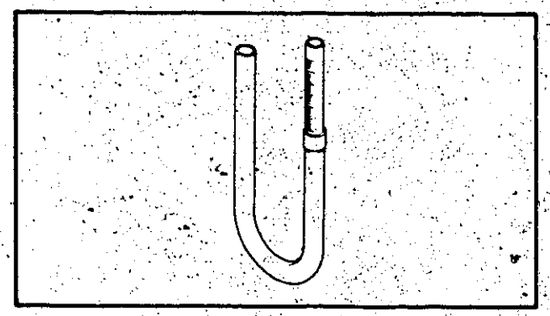
2. Inductive Timing Light
   P/N 90890-03109

This tool is necessary for checking ignition timing.



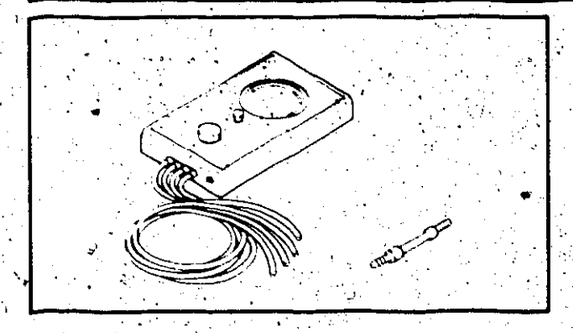
3. Compression Gauge
   P/N 90890-03081

This gauge is used to measure the engine compression.



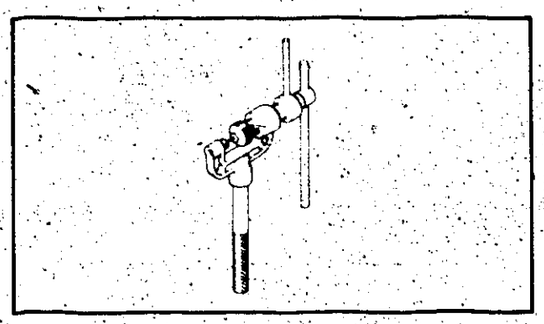
4. Fuel Level Gauge
   P/N 90890-01312

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



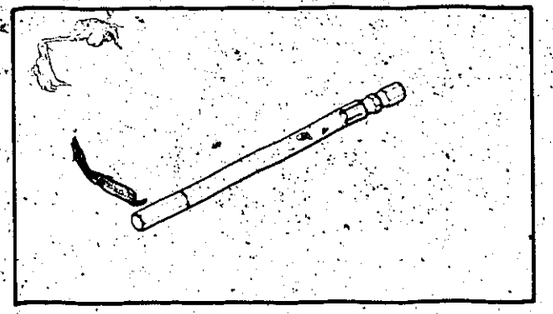
5. Vacuum Gauge
P/N 90890-03094
Adapter
P/N 90890-03060

This gauge is needed for carburetor synchronization.



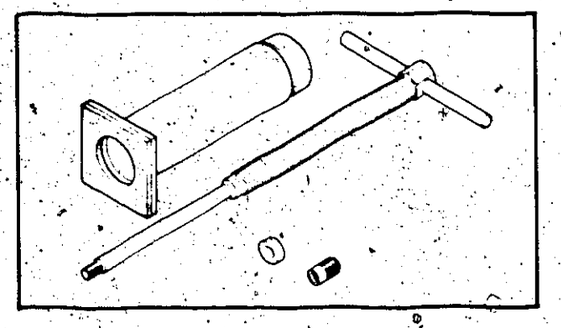
FOR ENGINE SERVICE
1. Cam Chain Cutter
P/N 90890-01112

This tool is used when cutting the cam chain.



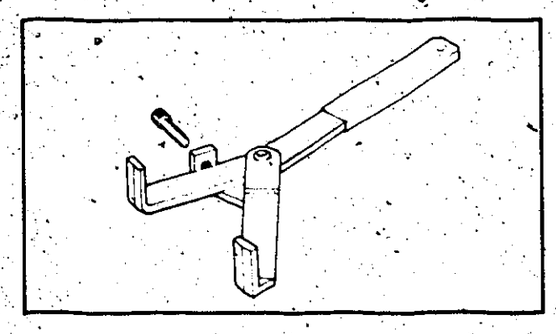
2. Hexagon Wrench (6 mm)
P/N 90890-01395

This tool is used to loosen or tighten the cylinder head securing nut.



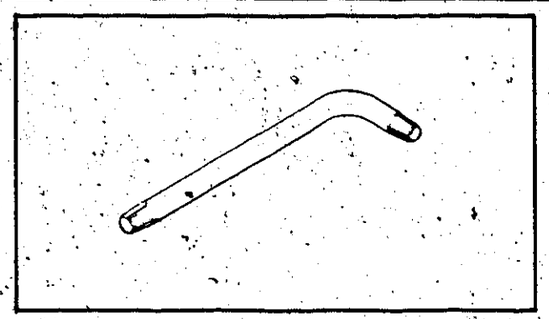
3. Piston Pin Puller
P/N 90890-01304

This tool is used to remove the piston pin.



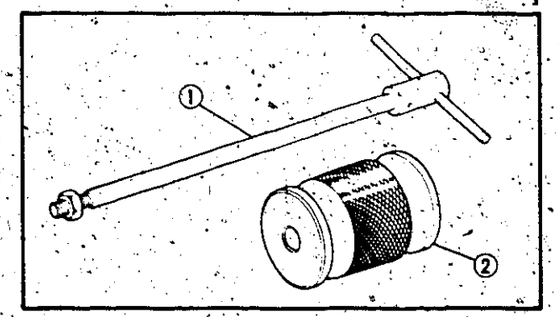
4. Universal Clutch Holder
P/N 90890-04086

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



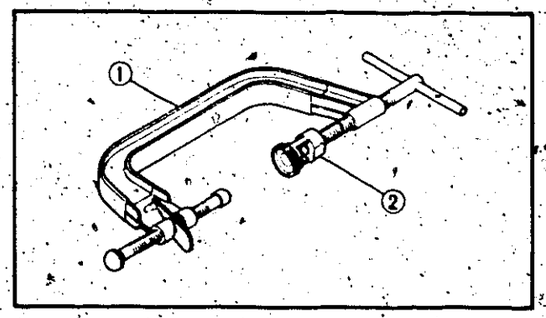
5. Torx wrench (T30)
P/N 90890-05245

This tool is used to loosen or tighten the main axle bearing retainer bolt.



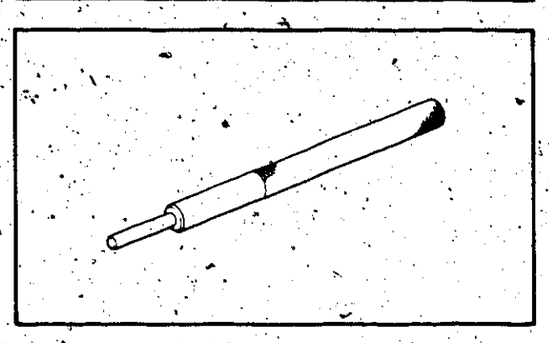
6. Armature Shock Puller
P/N 90890-01290 – ①
Weight
P/N 90890-01291 – ②

These tools are used to remove the generator armature.



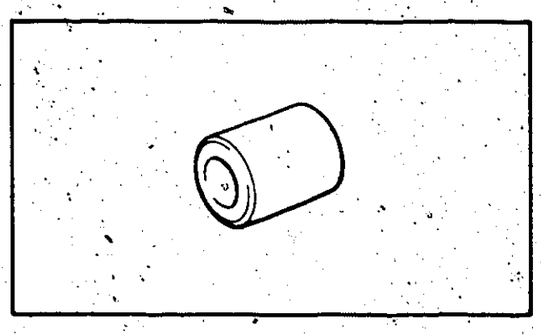
7. Valve Spring Compressor ①
P/N 90890-04019
Attachment ②
P/N 90890-04108

This tool is needed to remove and install the valve assemblies.



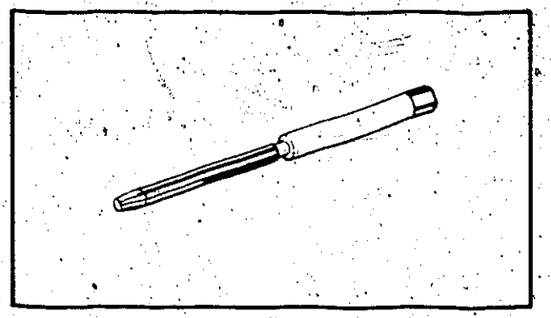
8. Valve Guide Remover (5.0 mm)
P/N 90890-04097

This tool is used to remove the valve guides.



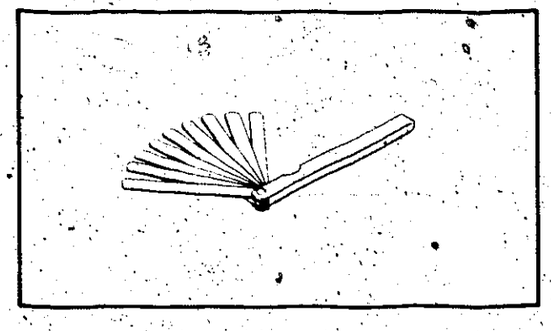
9. Valve Guide Installer
P/N 90890-04098

This tool is needed to install the valve guides properly.



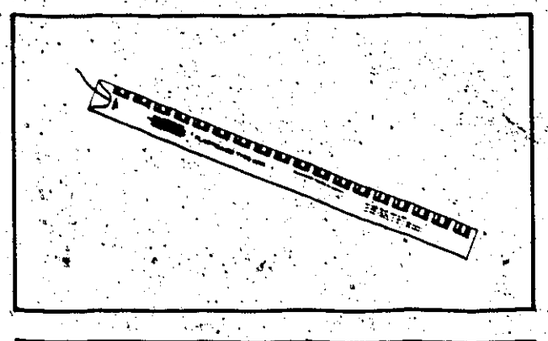
10. Valve Guide Reamer (5.0 mm)
P/N 90890-04099

This tool is used to rebore the new valve guide.



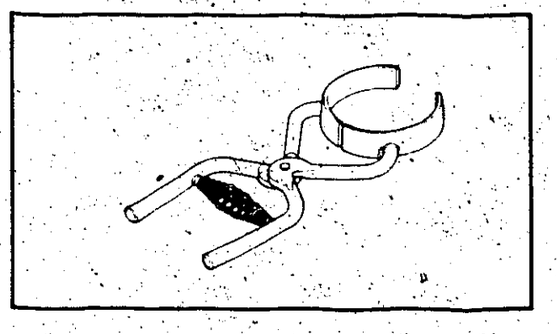
11. Special Thickness Gauge
P/N 90890-01399

This tool is used to adjust the valve clearance.



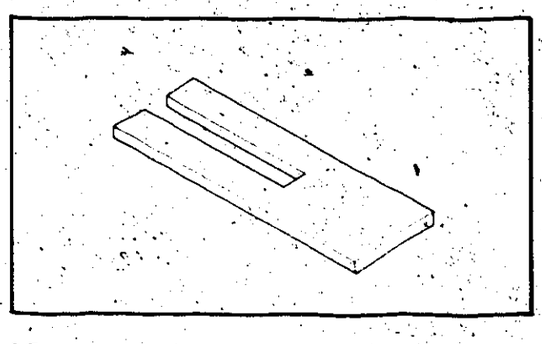
12. Plastigage® Set "Green"

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



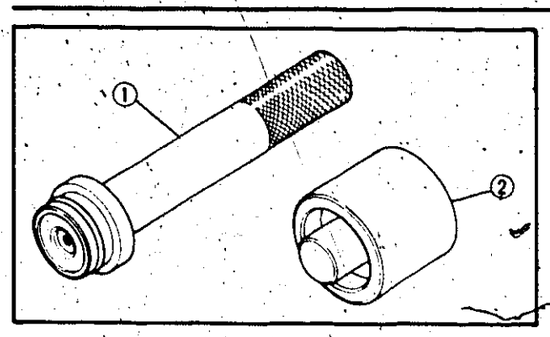
13. Piston Ring Compressor
P/N 90890-04008

This tool is used to compress piston rings when installing the cylinder.

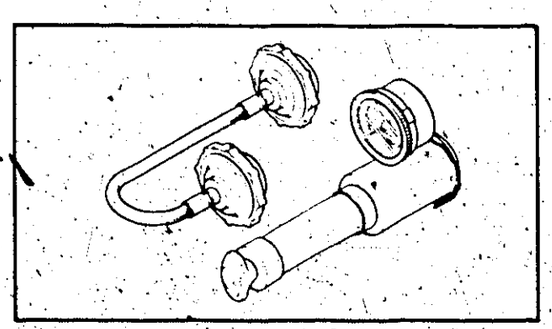


14. Piston Base
P/N 90890-01067

Use 4 of these to hold the piston during cylinder installation.

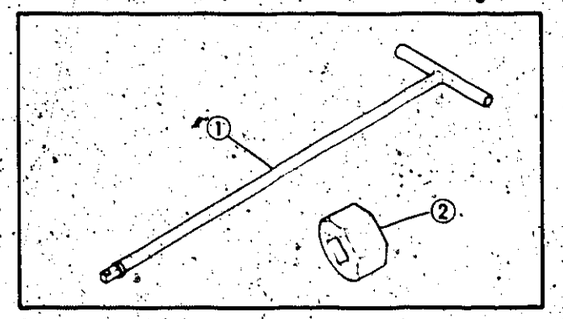


15. Water pump seal installer
P/N 90890-04058 – ①
Adapter
P/N 90890-04078 – ②



16. Radiator Cap Tester
P/N 90890-01325
Adaptor
P/N 90890-01352

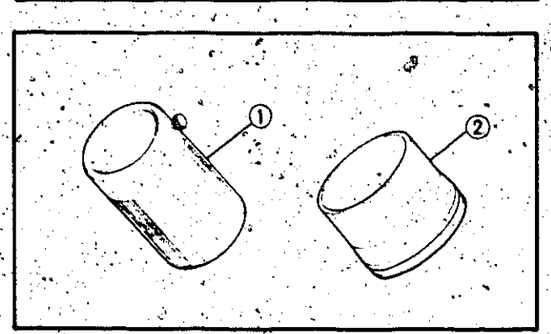
This tester is needed for checking the cooling system.



FOR CHASSIS SERVICE

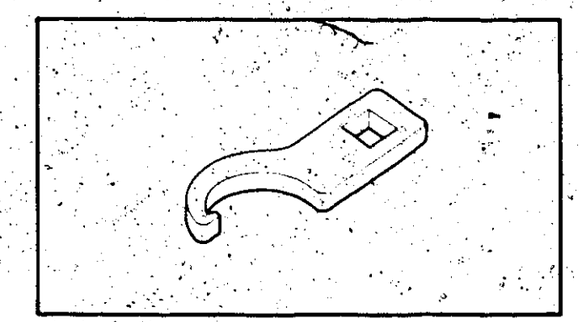
1. T-Handle
P/N 90890-01326 – ①
Fork Damper Rod Holder 27 mm
P/N 90890-01388 – ②

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



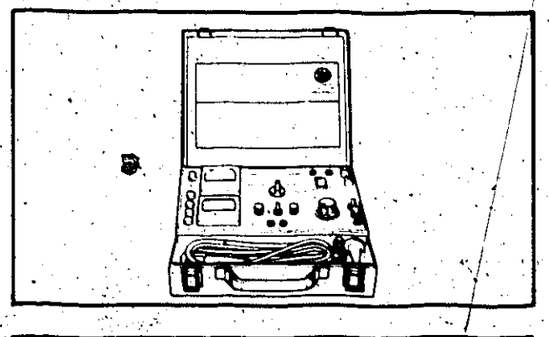
2. Front Fork Seal Driver (weight)
P/N 90890-01367 – ①
Adapter (41 mm)
P/N 90890-01381 – ②

These tools are used when installing the fork seat.



3. Ring Nut Wrench
P/N 90890-01403

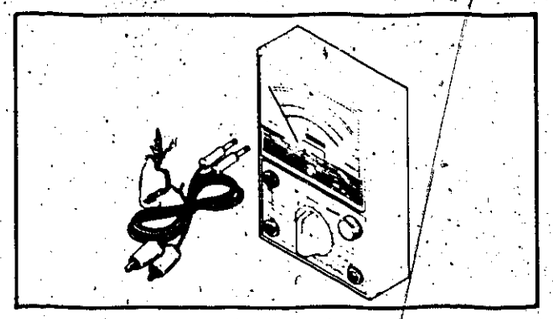
This tool is used to loosen and tighten the steering ring nut.



FOR ELECTRICAL COMPONENTS

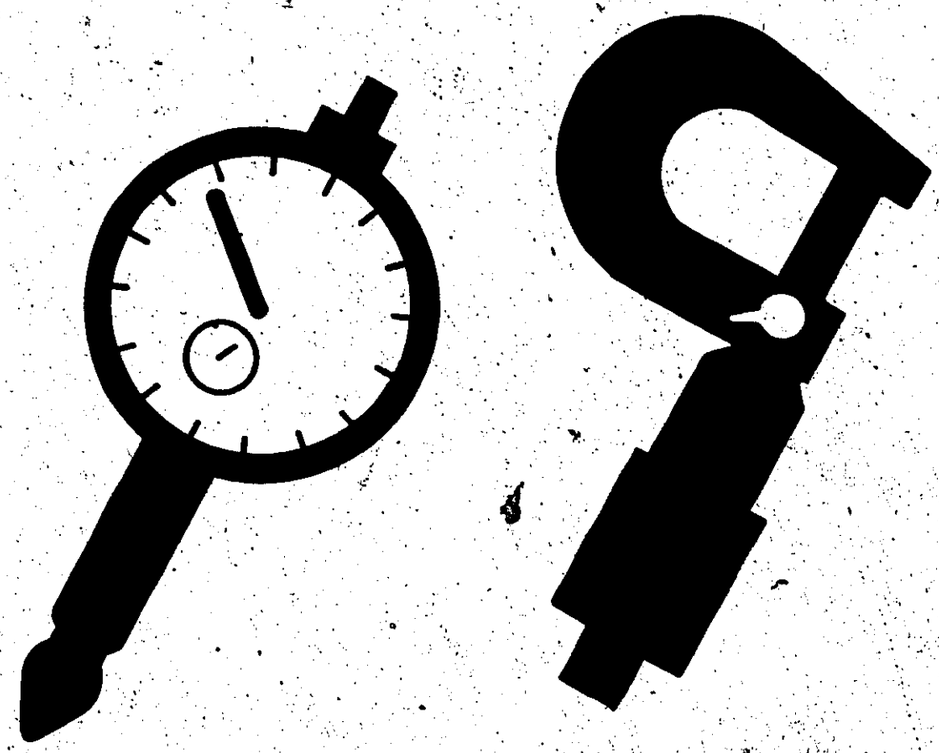
1. Electro Tester
   P/N 90890-03021

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.

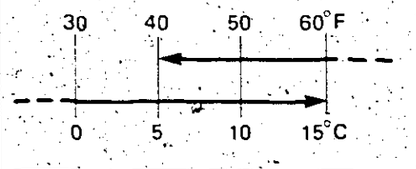


SPEC 2

C-2

SPECIFICATIONS

GENERAL SPECIFICATIONS

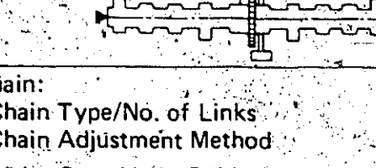
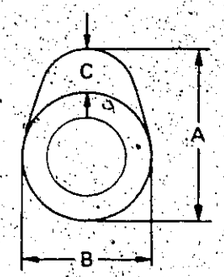
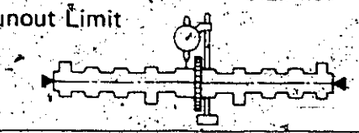
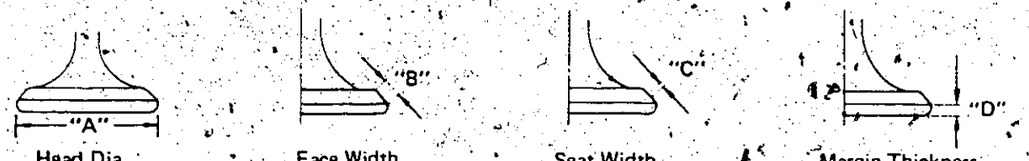
Model	FZR1000
Model Code Number:	2GH 2LA (D, S) 2LE (F) 2LF (A, CH) 2RG (GB, IR) 2LL (AUS, NZ, ZA)
Frame Starting Number:	2GH-000101 2LA-000101 (D, S) 2LE-000101 (F) 2LF-000101 (A, CH) 2RG-000101 (GB) 2LL-000101 (AUS, NZ, ZA)
Engine Starting Number:	2GH-000101 2LA-000101 (D, S) 2LE-000101 (F) 2LF-000101 (A, CH) 2RG-000101 (GB, IR) 2LL-000101 (AUS, NZ, ZA)
Dimensions:	
Overall Length	2,205 mm (86.8 in)
Overall Width	730 mm (28.7 in)
Overall Height	1,215 mm (47.8 in)
Seat Height	775 mm (30.5 in)
Wheelbase	1,470 mm (57.9 in)
Minimum Ground Clearance	140 mm (5.5 in)
Basic Weight:	
With Oil and Full Fuel Tank	229 kg (505 lb)
Minimum Turning Radius:	3,400 mm (134 in)
Engine:	
Engine Type	Liquid cooled 4-stroke, gasoline, DOHC
Cylinder Arrangement	4-cylinder parallel
Displacement	989 cm³ (60.3 cu.in)
Bore x Stroke	75.0 x 56.0 mm (2.9528 x 2.2047 in)
Compression Ratio	11.2 : 1
Compression Pressure	1,078.8 kPa (11 kg/cm², 156 psi)
Starting System	Electric starter
Lubrication System:	Wet sump
Engine Oil Type or Grade:	 Yamalube 4-cycle oil or SAE 20W40 type SE motor oil SAE 10W30 type SE motor oil

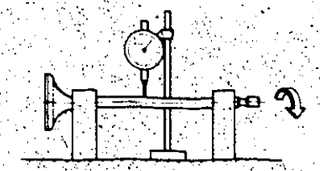
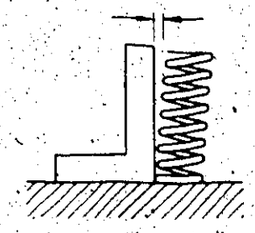
Model		FZR1000	
Engine Oil Capacity:			
Engine Oil:			
Periodic Oil Change:		2.7 L (2.4 Imp qt, 2.9 US qt)	
With Oil Filter Replacement		3.0 L (2.6 Imp qt, 3.1 US qt)	
Total Amount		3.6 L (3.2 Imp qt, 3.8 US qt)	
Coolant Total Amount: (Including All Routes)		2.3 L (2.0 Imp qt, 2.4 US qt)	
Air Filter:		Dry type element	
Fuel:			
Type		Regular gasoline Unleaded Fuel only (AUS)	
Tank capacity		20.0 L (4.4 Imp gal, 5.3 US gal)	
Reserve Amount		4.5 L (0.99 Imp gal, 1.19 US gal)	
Carburetor:			
Type x Quantity		BDS37 x 4	
Manufacturer		MIKUNI	
Spark Plug:			
Type (Manufacture)		DR8ES-L (NGK), X24ESR-U (N.D.)	
Gap		0.6 ~ 0.7 mm (0.024 ~ 0.028 in)	
Clutch Type:		Wet, multiple-disc	
Transmission:			
Primary Reduction System		Spur gear	
Primary Reduction Ratio		68/41 (1.659)	
Secondary Reduction System		Chain drive	
Secondary Reduction Ratio		46/16 (2.875)	
Transmission Type		Constant-mesh, 5-speed	
Operation		Left foot operation	
Gear Ratio	1st	36/14 (2.571)	
	2nd	32/18 (1.778)	
	3rd	29/21 (1.381)	
	4th	27/23 (1.174)	
	5th	28/27 (1.037)	
Chassis:			
Frame Type		Double cradle, alminum deltabox	
Caster Angle		25.33°	
Trail		100 mm (3.941 in)	
Tire:		Front	Rear
Type		Tubeless	Tubeless
Size		120/70VR17-V270 120/70 ZR17	160/60VR18-V270 160/60 ZR18
Manufacture (Type)		DUNLOP (K445F) PIRELLI (MP7S)	DUNLOP (K445) PIRELLI (MP7S)

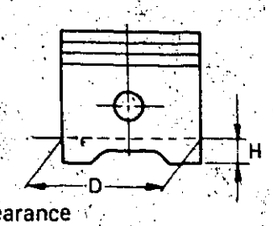
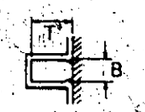
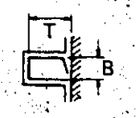
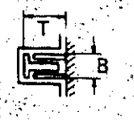
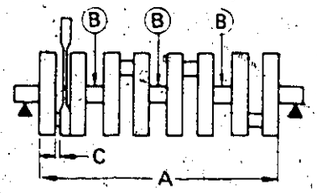
Model	FZR1000	
Tire Pressure (Cold tire):	Front	Rear
Up to 90 kg (198 lb) load*	250 kPa (2.5 kg/cm², 36 psi)	250 kPa (2.5 kg/cm², 36 psi)
90 kg (198 lb) ~ Maximum load*	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
High speed riding	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
*Load is total weight of cargo, rider, passenger, and accessories.		
Brake:		
Front Brake Type	Dual disc brake	
Operation	Right hand operation	
Rear Brake Type	Single disc brake	
Operation	Right foot operation	
Suspension:		
Front Suspension	Telescopic fork	
Rear Suspension	Swingarm (Link suspension)	
Shock Absorber:		
Front Shock Absorber	Coil spring, oil damper	
Rear Shock Absorber	Coil spring, gas-oil damper	
Wheel Travel:		
Front Wheel Travel	130 mm (5.12 in)	
Rear Wheel Travel	130 mm (5.12 in)	
Electrical:		
Ignition System	T.C.I. (Digital ignition)	
Generator System	A.C. generator	
Battery Type or Model	YB14L	
Battery Capacity	12V 14AH	
Headlight type:	Quartz bulb Bulb (A, DK, GR, I, NL, SF)	
Bulb Wattage x Quantity:		
Headlight	35W/35W x 2 55W x 1, 60W/55W x 1 (B, D, F, S) 45W/40W x 2 (A, DK, E, GR, N, NL, SF) 60W/55W x 1 (CH)	
Marker Light	3.4W x 2 4W x 1 (A, B, CH, D, DK, E, F, GR, NL, S, SF) 4W x 2 (I)	
Tail/Brake Light	5W/21W x 2	
Flasher Light	21W x 4	
License Light	5W x 2	
Meter Light	3.4W x 4	
Indicator Light:		
Wattage x Quantity "NEUTRAL"	3.4W x 1	
"HIGH BEAM"	3.4W x 1	
"TURN"	3.4W x 1	
"OIL LEVEL"	3.4W x 1	

MAINTENANCE SPECIFICATIONS

Engine

Model	FZR1000
Cylinder Head:	
Warp Limit*	0.03 mm (0.0012 in) *Lines indicate straightedge measurement
	
Cylinder:	
Bore Size/Measureing Point* 	75.000 ~ 75.005 mm (2.9528 ~ 2.9529 in)/ 40 mm (1.57 in)
Taper Limit	0.05 mm (0.002 in)
Out of Round Limit	0.05 mm (0.002 in)
Camshaft:	
Drive Method	Chain drive (Center)
Cam Cap Inside Dia. (I1, I4, E1, E4)	24.470 ~ 24.491 mm (0.9634 ~ 0.9642 in)
(I2, I3, E2, E3)	24.500 ~ 24.521 mm (0.9646 ~ 0.9654 in)
Camshaft Outside Dia.	24.437 ~ 24.450 mm (0.9621 ~ 0.9626 in)
Shaft-to-Cap Clearance (I1, I4, E1, E4)	0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)
(I2, I3, E2, E3)	0.050 ~ 0.084 mm (0.0020 ~ 0.0033 in)
Cam Dimensions: Intake "A"	32.55 ~ 32.65 mm (1.2815 ~ 1.2854 in)
< Limit >	32.45 mm (1.278 in)
"B"	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)
< Limit >	24.85 mm (0.9783 in)
"C"	7.70 mm (0.3031 in)
< Limit >	7.50 mm (0.2953 in)
Exhaust "A"	32.4 ~ 32.5 mm (1.2756 ~ 1.2795 in)
< Limit >	32.3 mm (1.2717 in)
"B"	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)
< Limit >	24.85 mm (0.978 in)
"C"	7.55 mm (0.2972 in)
< Limit >	7.35 mm (0.2894 in)
	
Camshaft Runout Limit	0.03 mm (0.0012 in)
	
Cam Chain:	
Cam Chain Type/No. of Links	DID219 (BUSH CHAIN)/110 Links
Cam Chain Adjustment Method	Automatic
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:	
	
Head Dia.	Face Width	Seat Width	Margin Thickness

Model		FZR1000
"A" Head Dia.	IN.	23.4 ~ 23.6 mm (0.9213 ~ 0.9291 in)
	EX.	24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in)
"B" Face Width	IN.	1.63 ~ 2.90 mm (0.0642 ~ 0.1142 in)
	EX.	1.63 ~ 2.90 mm (0.0642 ~ 0.1142 in)
"C" Seat Limit Width	IN.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)
	EX.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)
"D" Margin Thickness Limit	IN.	0.45 ~ 0.95 mm (0.0177 ~ 0.0374 in)
	EX.	0.75 ~ 1.25 mm (0.0295 ~ 0.0492 in)
Stem Outside Diameter	IN.	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)
	EX.	4.960 ~ 4.975 mm (0.1953 ~ 0.1959 in)
< Limit >	IN.	4.945 mm (0.1947 in)
	EX.	4.930 mm (0.1941 in)
Guide Inside Diameter	IN.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
	EX.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
< Limit >	IN.	5.05 mm (0.1988 in)
	EX.	5.05 mm (0.1988 in)
Stem-to-Guide Clearance	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX.	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
< Limit >	IN.	0.08 mm (0.0031 in)
	EX.	0.1 mm (0.0039 in)
Stem Runout Limit		0.01 mm (0.0004 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)
< Limit >	IN.	1.8 mm (0.071 in)
	EX.	1.8 mm (0.071 in)
Valve Spring:		
Free Length	IN.	39.76 mm (1.565 in)
	EX.	39.96 mm (1.573 in)
Installed Length (Valve Closed)	IN.	35.0 mm (1.378 in)
	EX.	35.0 mm (1.378 in)
Compressed Pressure	IN.	7.3 ~ 8.7 kg (16.1 ~ 19.2 lb)
(Valve closed)	EX.	11.0 ~ 13.0 kg (24.3 ~ 28.7 lb)
Tilt Limit	IN.	2.5°/1.7 mm (0.067 in)
	EX.	2.5°/1.7 mm (0.067 in)
		
Direction of Winding (Top view)	IN.	
	EX.	

Model	FZR1000
Piston:	
Piston Size "D"	74.93 ~ 74.94 mm (2.949 ~ 2.950 in)
Measuring Point "H"	3 mm (0.12 in) (From bottom line of piston skirt)
	
Piston-to-Cylinder Clearance	0.06 ~ 0.08 mm (0.0024 ~ 0.0031 in)
Oversize: 2nd	75.50 mm (2.97 in)
Piston Ring:	
Sectional Sketch — Top Ring	Barrel B = 0.8 mm (0.0315 in) T = 3.1 mm (0.1220 in)
	
2nd Ring	Taper B = 1.0 mm (0.0394 in) T = 3.1 mm (0.1220 in)
	
Oil Ring	Expander B = 2.0 mm (0.0787 in) T = 2.5 mm (0.0984 in)
	
End Gap (Installed): Top Ring	0.3 ~ 0.5 mm (0.0118 ~ 0.0197 in)
< Limit >	0.7 mm (0.0276 in)
2nd Ring	0.3 ~ 0.5 mm (0.0118 ~ 0.0197 in)
< Limit >	0.7 mm (0.0276 in)
Oil Ring	0.2 ~ 0.8 mm (0.0078 ~ 0.0315 in)
Side Clearance: Top Ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
< Limit >	0.15 mm (0.0059 in)
2nd Ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)
< Limit >	0.15 mm (0.0059 in)
Oil Ring	—
Connecting Rod:	
Crank Pin Oil Clearance	0.032 ~ 0.056 mm (0.0013 ~ 0.0022 in)
Bearing Size No. Color Code	1. Blue 2. Black 3. Brown 4. Green
Crankshaft:	
	
Assembly Width "A"	339.8 ~ 340.2 mm (13.38 ~ 13.39 in)
Runout Limit "B"	0.03 mm (0.0012 in)
Big End Side Clearance "C"	0.16 ~ 0.262 mm (0.006 ~ 0.010 in)

MAINTENANCE SPECIFICATIONS SPEC 99

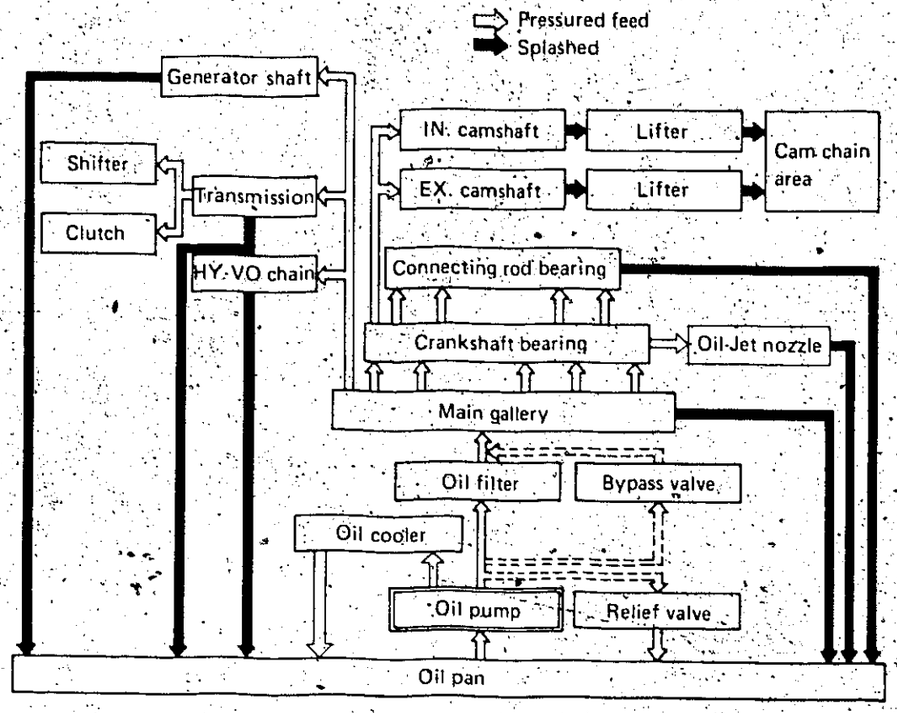
Model	FZR1000		
Main Journal Oil Clearance	0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in)		
Bearing Size No. Color Code	1. Blue 2. Black 3. Brown 4. Green 5. Yellow		
Clutch:			
Friction Plate Thickness x Quantity	2.9 ~ 3.1 mm (0.114 ~ 0.122 in) x 9		
Location x Quantity/Identification	Outer x 1/Single semi-circular slot Center x 1/Blue painted mark Others x 7/Red painted mark		
Wear Limit	2.8 mm (0.110 in)		
Clutch Plate Thickness x Quantity	1.9 ~ 2.1 mm (0.075 ~ 0.083 in) x 7		
Warp Limit	0.1 mm (0.0039 in)		
Clutch Spring Free Length x Quantity	55.5 mm (2.185 in) x 6		
Clutch Spring Minimum Length	54.0 mm (2.126 in)		
Clutch Release Method	Hydrauric inner push		
Transmission:			
Main Axle Deflection Limit	0.08 mm (0.0031 in)		
Drive Axle Deflection Limit	0.08 mm (0.0031 in)		
Shifter:			
Shifter Type	Guide bar		
Carburetor:			
Type/Manufacture x Quantity	BDS37/MIKUNI x 4		
	2GH, 2RG, 2LL	2LA, 2LE	2LF
I.D. Mark	2GH00	2LE00	2LF00
Main Jet (M.J.)			
(=1, 4 Cylinder)	#110	#112.5	#92.5
(=2, 3 Cylinder)	#107.5	#110	#90
Main Air Jet (M.A.J.)	#65	#65	#65
Jet Needle-Clip Position (J.N.)	5CZ2-4	5CZ2-3	5CZ2-3
Needle Jet (N.J.)	Y-0	Y-0	Y-0
Pilot Jet (P.J.)	#20	#20	#20
Pilot Outlet Size (P.O.)	0.8	0.8	0.8
Pilot Air Jet (P.A.J.)	#115	#115	#117.5
Pilot Screw (P.S.)	2-1/2	2-1/2	2-1/2
Valve Seat Size (V.S.)	1.5	1.5	1.5
Starter Jet ($G.S_1$)	#30	#30	#30
($G.S_2$)	0.5	0.5	0.5
Bypath Size ($B.P_1$)	0.8	0.8	0.8
Throttle Valve Size (Th.V)	#130	#130	#130
Fuel Level (F.L.)	7.3 ~ 9.3 mm (0.287 ~ 0.366 in) Below from the float chamber line		

MAINTENANCE SPECIFICATIONS SPEC 99

Model	FZR1000
Lubrication System:	
Oil Filter Type	Paper
Oil Pump Type	Trochoid pump
Tip Clearance	0.09 ~ 0.15 mm (0.0035 ~ 0.0060 in)
< Limit >	< 0.2 mm (0.008 in) >
Side Clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
< Limit >	< 0.15 mm (0.006 in) >
Bypass Valve Setting Pressure	176.5 ~ 215.8 kPa (1.8 ~ 2.2 kg/cm², 25.6 ~ 31.3 psi)
Relief Valve Operating Pressure	382.5 ~ 460.9 kPa (3.9 ~ 4.7 kg/cm², 55.5 ~ 66.8 psi)
Cooling System:	
Radiator Core Size Width	375 mm (14.76 in)
Height	185 mm (7.28 in)
Thickness	32 mm (1.26 in)
Radiator Cap Opening Pressure	74 ~ 103 kPa (0.75 ~ 1.05 kg/cm², 10.7 ~ 14.9 psi)
Reservoir Tank Capacity	0.4 L (0.35 Imp qt, 0.42 US qt)
< From Low to Full Level >	0.15 L (0.13 Imp qt, 0.16 US qt)
Water Pump	
Type	Single-suction centrifugal pump
Reduction Ratio	68/41 x 41/43 (1.581)

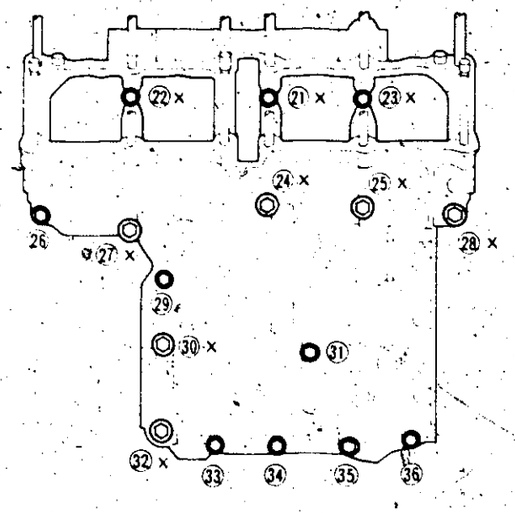
Model	FZR1000

Lubrication Chart:

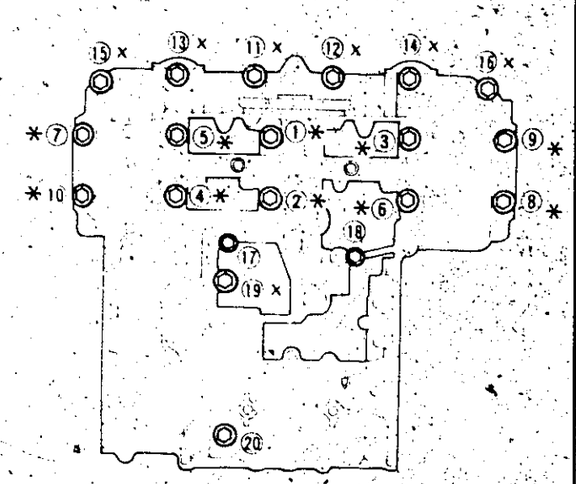


Crankcase Tightening Sequence:

Crankcase (Upper)



Crankcase (Lower)

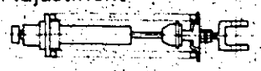


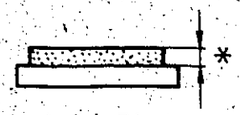
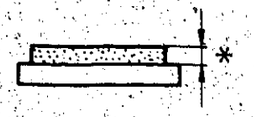
* : 9 mm Bolt: 32 Nm (3.2 m·kg, 23 ft·lb)
x : 8 mm Bolt: 24 Nm (2.4 m·kg, 17 ft·lb)
: 6 mm Bolt: 12 Nm (1.2 m·kg, 8.7 ft·lb)

TIGHTENING TORQUE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque Nm	m·kg	ft·lb	Remarks
Camshaft Cap	Bolt	M6	40	10	1.0	7.2	
Cylinder Head (Exhaust pipe)	Stud bolt	M8	8	15	1.5	11	
Cylinder Head	Nut	M9	12	37	3.7	27	
Spark Plug	–	M12	4	17.5	1.75	12.5	
Cylinder Head Cover	Bolt	M6	8	10	1.0	7.2	
Connecting Rod	Nut	M8	8	36	3.6	25	
Cam Chain Sprocket	Flange bolt	M7	4	24	2.4	17	
Cam Chain Tensioner	Bolt	M6	2	10	1.0	7.2	
Cam Chain Tensioner End	Cap bolt	M11	1	20	2.0	14	
Chain Guide (Intake side)	Bolt	M6	2	10	1.0	7.2	
Oil Pump Housing	Screw	M6	1	10	1.0	7.2	
Oil Pump Mount	Bolt	M6	3	10	1.0	7.2	
Oil Filter Case	–	M20	1	15	1.5	11	
Oil Pan	Bolt	M6	12	10	1.0	7.2	
Drain Plug	–	M14	1	43	4.3	31	
Oil Pipe 1	Bolt	M6	3	7	0.7	5.1	
Oil Buffle Plate (Lower)	Frange bolt	M6	14	10	1.0	7.2	
Oil Level Switch	Bolt	M6	2	10	1.0	7.2	
Exhaust Pipe	Nut	M6	8	10	1.0	7.2	
Muffler Stay	Bolt	M10	1	25	2.5	18	
Muffler Bracket	Bolt	M8	1	20	2.0	14	
Exhaust Pipe Blind Plug (CO test)	Bolt	M6	4	10	1.0	7.2	
Crankcase (Cylinder head)	Stud bolt	M9	12	10	1.0	7.2	
Main Axle Bearing Stopper	Torx	M6	3	10	1.0	7.2	
Crankshaft End Cover	Screw	M6	6	7	0.7	5.1	
Crankcase Cover (Right)	Bolt	M6	11	10	1.0	7.2	
Crankcase	Bolt	M6	10	12	1.2	8.7	
Crankcase	Bolt	M8	16	24	2.4	17	
Crankcase	Bolt	M9	10	32	3.2	23	
Starter Clutch	Bolt	M8	3	25	2.5	18	Stake
Starter Chain Guide	Bolt	M6	2	10	1.0	7.2	
Clutch Boss	Nut	M20	1	70	7.0	50	Use lock washer
Clutch Spring	Bolt	M6	6	8	0.8	5.8	
Drive Sprocket	Nut	M18	1	70	7.0	50	Use lock washer
Shift Cam Stopper Lever	Bolt	M6	2	10	1.0	7.2	
Shift Cam (Neutral)	Screw	M5	1	4	0.4	2.9	
Other Engine Part	Bolt	M8	–	20	2.0	14	
	Bolt	M6	–	10	1.0	7.2	
	Screw	M6	–	7	0.7	5	

Chassis

Model		FZR1000
Steering System:		
Steering Bearing Type		Taper Roller Bearing
Front Suspension:		
Front Fork Travel		130 mm (5.12 in)
Front Spring Free Length		533 mm (20.98 in)
< Limit >		528 mm (20.79 in)
Spring Rate:	K1	5.88 N/mm (0.6 kg/mm, 33.59 lb/in)
	K2	8.34 N/mm (0.85 kg/mm, 47.58 lb/in)
Stroke	K1	0.0 ~ 95 mm (0.0 ~ 3.74 in)
	K2	95 ~ 130 mm (3.74 ~ 5.12 in)
Optional Spring		No
Oil Capacity		425 cm³ (15.0 Imp.oz, 14.4 US oz)
Oil Level (Fully Compression)		143 mm (5.63 in)
		Bellow the top of inner fork tube without fork spring
Oil Grade		Yamaha Fork Oil 10WT or equivalent
Adjustment		← Stiffer | Std. | Softer →
		Adjusting groove: 1 2 3 4 5 6 7
Rear Suspension:		
Shock Absorber Travel		50 mm (1.97 in)
Spring Free Length		202 mm (7.95 in)
Fitting Length		190 mm (7.48 in)
Spring Rate	K1	152 N/mm (15.5 kg/mm, 868 lb/in)
Stroke	K1	0 ~ 50 mm (0.0 ~ 1.97 in)
Optional Spring		No
Adjustment	Minimum	12.5 mm (0.49 in)
	Standard	14.5 mm (0.57 in)
	Maximum	20.5 mm (0.81 in)
Swingarm:		
Free Play Limit	End	1.0 mm (0.04 in)
	Side	1.0 mm (0.04 in)
Front Wheel:		
Type		Cast Wheel
Rim Size		MT3.50 x 17
Rim Material		Aluminum
Rim Runout Limit	Radial	1 mm (0.04 in)
	Lateral	0.5 mm (0.02 in)
Rear Wheel:		
Type		Cast wheel
Rim Size		MT4.50 x 18
Rim Material		Aluminum
Rim Runout Limit	Radial	1 mm (0.04 in)
	Lateral	0.5 mm (0.02 in)
Drive Chain:		
Type/Manufacturer		532ZL/D.I.D, RK532GSV/RK
No. of Links		110
Chain Free Play		15 ~ 20 mm (0.6 ~ 0.8 in)

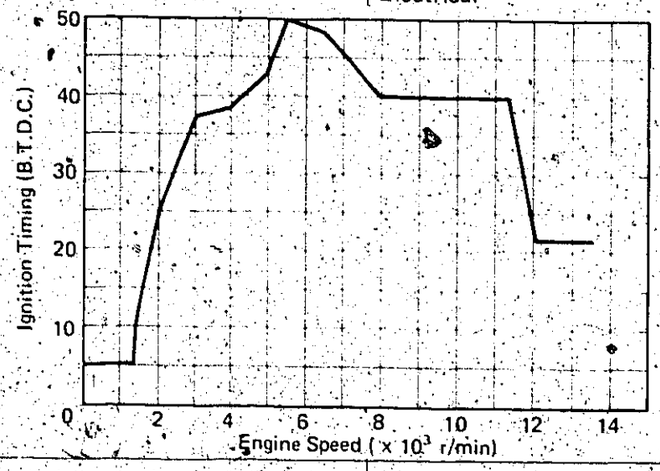
Model		FZR1000
Front Disc Brake:		
Type		Dual (4-pot caliper)
Disc Outside Diameter x Thickness		320 x 4 mm (12.60 x 0.16 in)
Pad Thickness	Inner	5.5 mm (0.22 in)
	< Limit >*	0.5 mm (0.02 in)
Pad Thickness	Outer	5.5 mm (0.22 in)
	< Limit >*	0.5 mm (0.02 in)
		
Master Cylinder Inside Diameter		15.87 mm (0.62 in)
Caliper Cylinder Inside Diameter:	Left	32.10 mm (1.26 in)
	Right	33.96 mm (1.34 in)
Brake Fluid Type		DOT #3
Rear Disc Brake:		
Type		Single (4-pot caliper)
Disc Outside Diameter x Thickness		267 x 5 mm (10.51 x 0.20 in)
Pad Thickness	Inner	5.5 mm (0.22 in)
	< Limit >*	0.5 mm (0.02 in)
Pad Thickness	Outer	5.5 mm (0.22 in)
	< Limit >*	0.5 mm (0.02 in)
		
Master Cylinder Inside Diameter		14.0 mm (0.55 in)
Caliper Cylinder Inside Diameter		42.85 mm (1.69 in)
Brake Fluid Type		DOT #3
Clutch:		
Master Cylinder Inside Diameter		15.87 mm (0.63 in)
Release Cylinder Inside Diameter		38.1 mm (1.50 in)
Brake Fluid Type		DOT #3
Brake Lever and Brake Pedal:		
Brake Lever Free Play		2 ~ 5 mm (0.08 ~ 0.20 in)
Brake Pedal Position		50 mm (2.0 in)
		Bellow the top of the footrest.

Part to be tightened	Thread size	Tightening torque Nm	m·kg	ft·lb
Front Axle	M14	58	5.8	42
Front Axle Pinch	M8	20	2.0	14
Front Fender	M6	107	10.7	77.4
Handle Crown and Inner Tube	M6	20	2.0	14
Handle Crown and Steering Stem Assy'	M22	110	11.0	80
Steering Stem Assy' and Lower Ring Nut: 1st	M22	52	5.2	37
(Refer to NOTE) 2nd			Loosen	
3rd		3	0.3	2.2
Brake Caliper (Front/Rear)	M10	35	3.5	25
Brake Disc and Wheel	M10	20	2.0	14
Master Cylinder and Master Cylinder Holder	M6	9	0.9	6.5
Master Cylinder and Master Cylinder Cap	M5	2	0.2	1.4
Bleed Screw and Brake Caliper	M8	6	0.6	4.3
Brake Hose	M10	25	2.5	18
Handlebar and Inner Tube	M8	20	2.0	14
Handlebar and Handle Crown	M6	9	0.9	6.5
Grip End (Handlebar)	M16	26	2.6	19
Engine Mounting: Front upper	M10	55	5.5	40
Rear upper slit	M8	15	1.5	11
Rear upper	M10	55	5.5	40
Rear lower	M10	42	4.2	30
Down Tube and Frame: Front	M10	63	6.3	46
Rear	M8	28	2.8	20
Footrest Bracket and Frame (Front)	M8	28	2.8	20
Footrest and Footrest Bracket (Front)	M10	55	5.5	40
Pivot Axle and Locknut	M14	90	9.0	65
Relay Arm and Frame	M10	48	4.8	35
Arm and Swingarm	M12	74	7.4	54
Arm and Relay Arm	M12	74	7.4	54
Rear Shock Absorber and Frame	M10	42	4.2	30
Rear Shock Absorber and Relay Arm	M10	40	4.0	28
Footrest and Footrest Bracket (Rear)	M10	55	5.5	40
Master Cylinder and Frame (Rear)	M8	20	2.0	14
Rear Frame and Frame	M10	55	5.5	40
Tension Bar and Swingarm	M8	28	2.8	20
Brake Caliper and Tension Bar (Rear)	M8	28	2.8	20
Brake Disc and Clutch Hub	M8	20	2.0	14
Sprocket and Clutch Hub	M10	55	5.5	40
Rear Axle and Nut	M15	110	11.0	80

NOTE:
After torquing the steering shaft and ring nut, adjust them for smooth movement of the handlebar.

Electrical

Model	FZR1000
Voltage	12V
Ignition System:	
Ignition Timing (B.T.D.C.)	5° ± 1° at 1,000 r/min
Advanced Timing (B.T.D.C.)	50° at 6,000 r/min
Advancer Type	Electrical
T.C.I.:	
Pickup Coil Resistance	135 ~ 165Ω at 20°C (68°F)
(Color)	(Gray – Orange)
T.C.I. Unit/Manufacturer	TID14-57/HITACHI
Ignition Coil:	
Model/Manufacturer	CM12-32/HITACHI
Minimum Spark Gap	6 mm (0.24 in) or more at 500 r/min
Primary Winding Resistance	1.8 ~ 2.2Ω at 20°C (68°F)
Secondary Winding Resistance	10.8 ~ 13.2 kΩ at 20°C (68°F)
Spark Plug Cap Resistance	10 kΩ
Charging System:	
Type	A.C. Generator
A.C. Generator:	
Model/Manufacturer	B3G/NIPPONDENSO
Nominal Output	12V, 28A at 5,000 r/min
Field Coil Resistance	3.8 ~ 4.2Ω at 20°C (68°F) (Brown – Green)
Starter Coil Resistance	0.15 ~ 0.18Ω at 20°C (68°F) (White – White)
Brush – Overall Length	13.7 mm (0.54 in)
< Limit >	4.7 mm (0.19 in)
– Spring Force	230 ~ 330 gr (8.1 ~ 11.6 oz)
Voltage Regulator:	
Type	Field control
No load Regulated Voltage	14.2 ~ 14.8V
Battery:	
Capacity	12V, 14AH
Specific Gravity	1.280

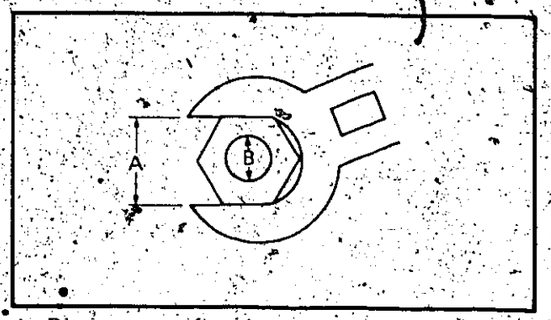


Model	FZR1000
Electrical Starter System:	
Type	Constant mesh type
Starter Motor:	
Model/Manufacturer	SM-8/MITSUBA
Output	0.6 kw
Armature Coil Resistance	0.012Ω ± 10% at 20°C (68°F)
Brush — Overall Length	12 mm (0.47 in)
< Limit >	5 mm (0.20 in)
— Spring Force	680 ~ 920 g (24.0 ~ 32.4 oz)
Commutator Dia.	28 mm (1.10 in)
Wear Limit	27 mm (1.06 in)
Mica Undercut	0.8 mm (0.03 in)
Starter Switch:	
Model/Manufacturer	A104-128/HITACHI
Amperage Rating	100A
Coil Resistance	4.0 ~ 4.7Ω at 20°C (68°F)
Horn:	
Type/Quantity	Plane Type/1 pcs.
Model/Manufacturer	CF-12/NIKKO
Maximum Amperage	2.5A
Flasher Relay (Relay Assembly):	
Type	Semi transistor type
Model/Manufacturer	FX257N/NIPPON DENSO
Self Cancelling Device	Yes (Except D)
Flasher Frequency	75 ~ 95 cycle/min
Wattage	21W x 2 pcs + 3.4W
Sidestand Relay:	Except AUS, NZ, ZA
Model/Manufacturer	G4MW-112IT-010-Y17/OMRON
Coil Winding Resistance	75Ω ± 10% at 20°C (68°F)
Diode	No
Oil Level Switch:	
Model/Manufacturer	4H7/NIPPON DENSO
Fuel Pump Relay:	
Model/Manufacturer	25G-00/OMRON
Thermostat Switch:	
Model/Manufacturer	47X/NIPPON THERMOSTAT
Thermo Unit:	
Model/Manufacturer	11H/NIPPON SEIKI
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit x Quantity:	
MAIN	30A x 1
HEADLIGHT	15A x 1
SIGNAL	10A x 1
IGNITION	10A x 1
RESERVE	10A x 1, 15A x 1, 30A x 1

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

LUBRICATION POINT AND GRADE OF LUBRICANT

ENGINE

Lubrication Point	Symbol	Grade of Lubricant
Oil seal lip	B	Wheel bearing grease
O-Ring	B	Wheel bearing grease
Bearing	E	Engine oil
Piston surface	E	Engine oil
Piston pin	E	Engine oil
Crankshaft pin	E	Engine oil
Crankshaft journal	E	Engine oil
Connecting rod bolt/Nut	M	Molybdeum disulfide oil
Camshaft cam lobe/Journal	M	Molybdeum disulfide oil
Valve stem (IN, EX)	M	Molybdeum disulfide oil
Valve stem end (IN, EX)	M	Molybdeum disulfide oil
Water pump impeller shaft	E	Engine oil
Oil pump rotor (Inner/Outer), housing	E	Engine oil
Oil strainer assembly	E	Engine oil
Outer starter clutch surface	E	Engine oil
Idle gear surface/Bearing	E	Engine oil
Starter clutch ball	E	Engine oil
Primary driven gear	E	Engine oil
Transmission gear (Wheel/Pinion)	M	Molybdeum disulfide oil
Axle (Main/Drive)	M	Molybdeum disulfide oil
Shift cam	M	Molybdeum disulfide oil
Shift fork/Guide bar	E	Engine oil
Shift shaft assembly	E	Engine oil

CHASSIS

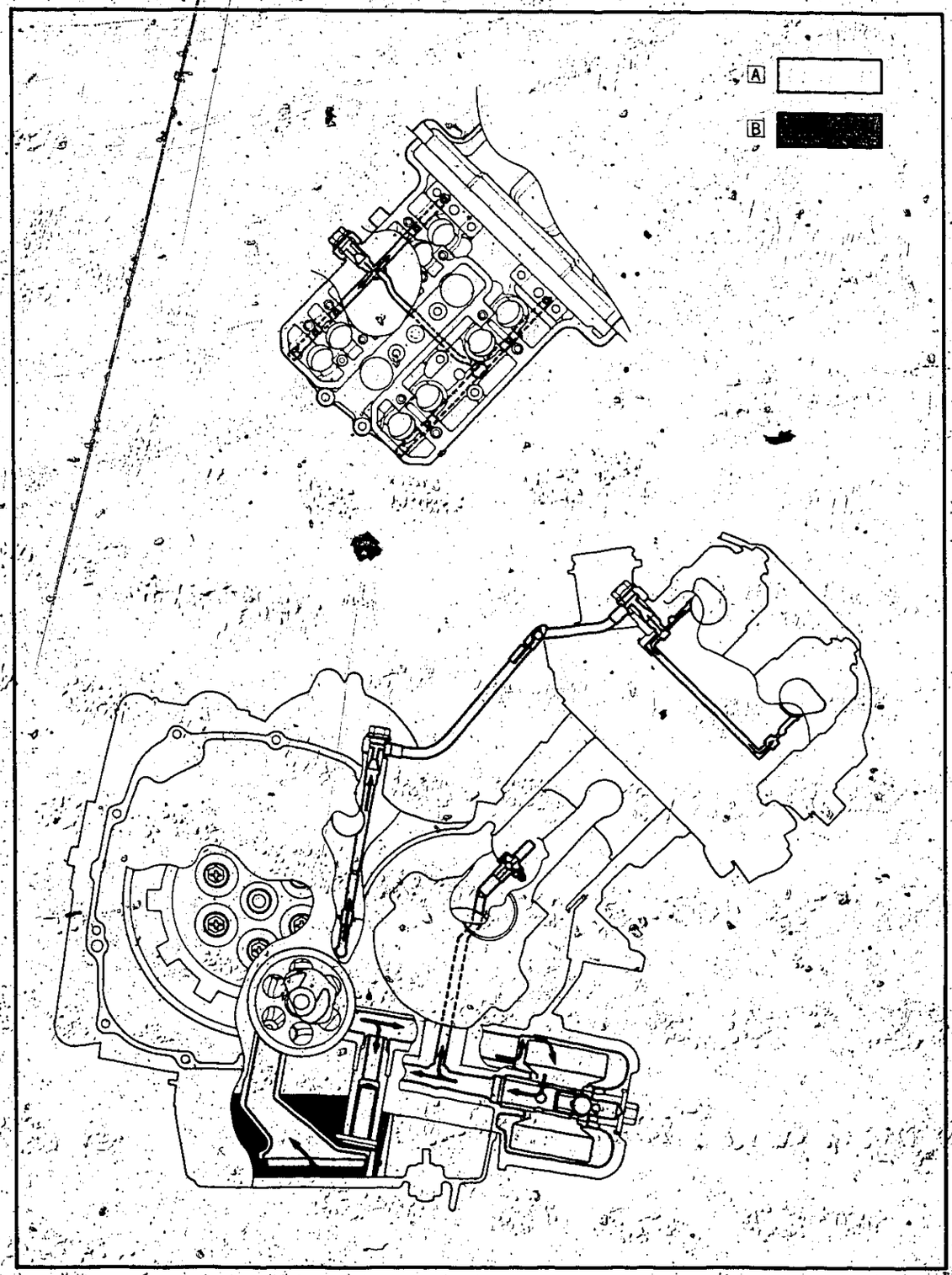
Lubrication Point	Symbol	Grade of Lubricant
Steering bearing (Upper/Lower)	B	Molybdenum disulfide grease
Wheel bearing/Axle	B	Wheel bearing grease
Front wheel oil seal (Right/Left)	B	Wheel bearing grease
Rear wheel oil seal	B	Wheel bearing grease
Clutch hub oil seal	B	Wheel bearing grease
Clutch hub fitting area	B	Wheel bearing grease
Rear brake pedal shaft	B	Wheel bearing grease
Change pedal	B	Wheel bearing grease
Side stand sliding surface	B	Wheel bearing grease
Tube guide (Throttle grip) inner surface	B	Wheel bearing grease
Brake lever bolt, sliding surface	B	Wheel bearing grease
Clutch lever bolt, sliding surface	B	Wheel bearing grease
Rear shock absorber (Upper/Lower)	M	Molybdenum disulfide grease
Swingarm pivot bearing	LS	Lithium-soap base grease
Pivot shaft	LS	Lithium-soap base grease
Arm 1, 2 bearing	LS	Lithium-soap base grease
Thrust cover (Inner)	LS	Lithium-soap base grease
Rellay arm bearing (Inner)	LS	Lithium-soap base grease
Rear footrest ball	B	Wheel bearing grease
Rear footrest pin	B	Wheel bearing grease

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	millimeter centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	kilogram	10^{3} gram	Weight
N	Newton	1 kg x m/sec^2	Force
Nm m·kg	Newton meter Meter kilogram	N x m m x kg	Torque Torque
Pa N/mm	Pascal Newton per millimeter	N/m^2 N/mm	Pressure Spring rate
L cm^3	Liter Cubic centimeter		Volume or Capacity
r/min	Rotation per minute		Engine Speed

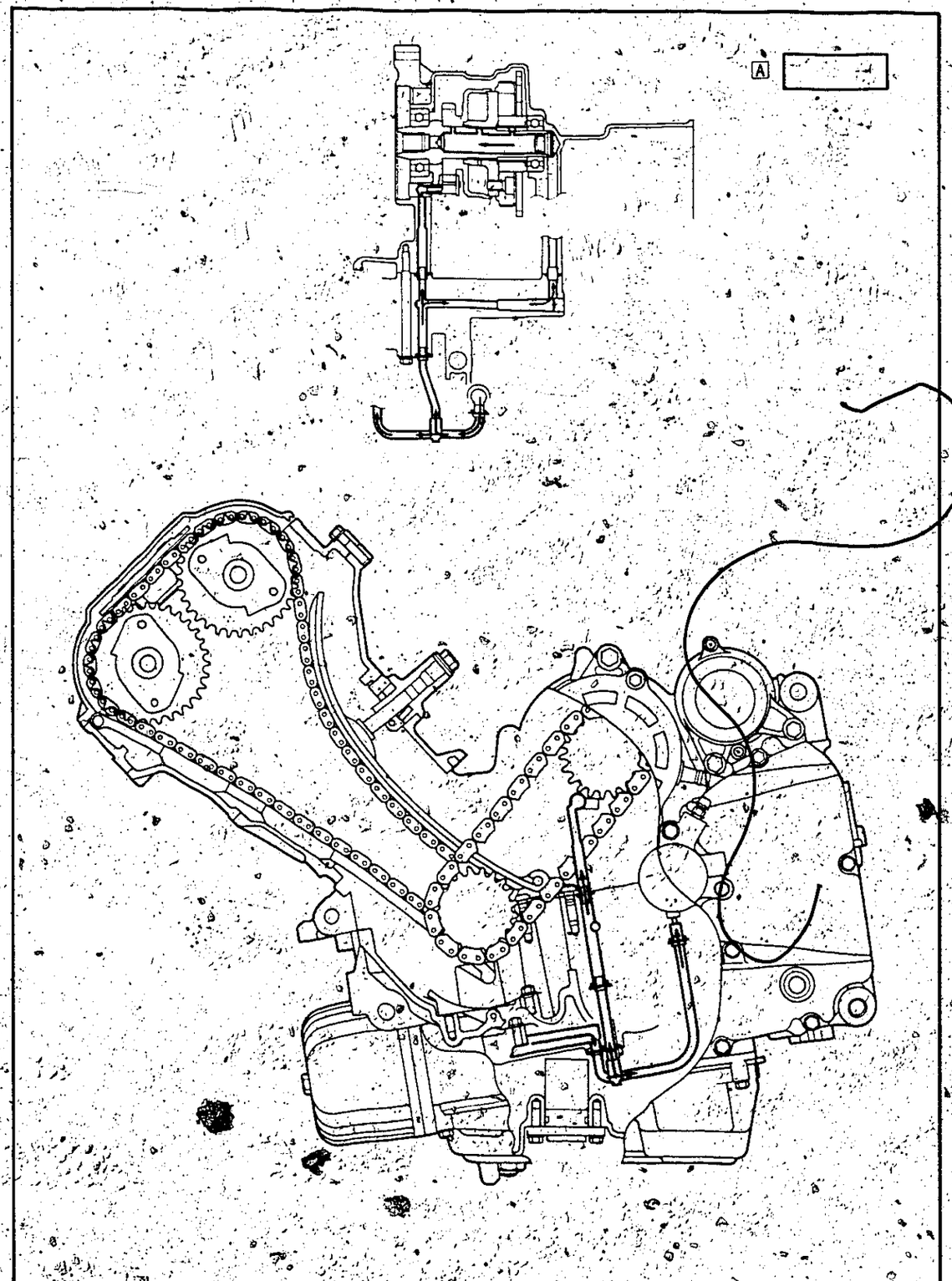
LUBRICATION DIAGRAM (1)

A Feed
B Scavenge



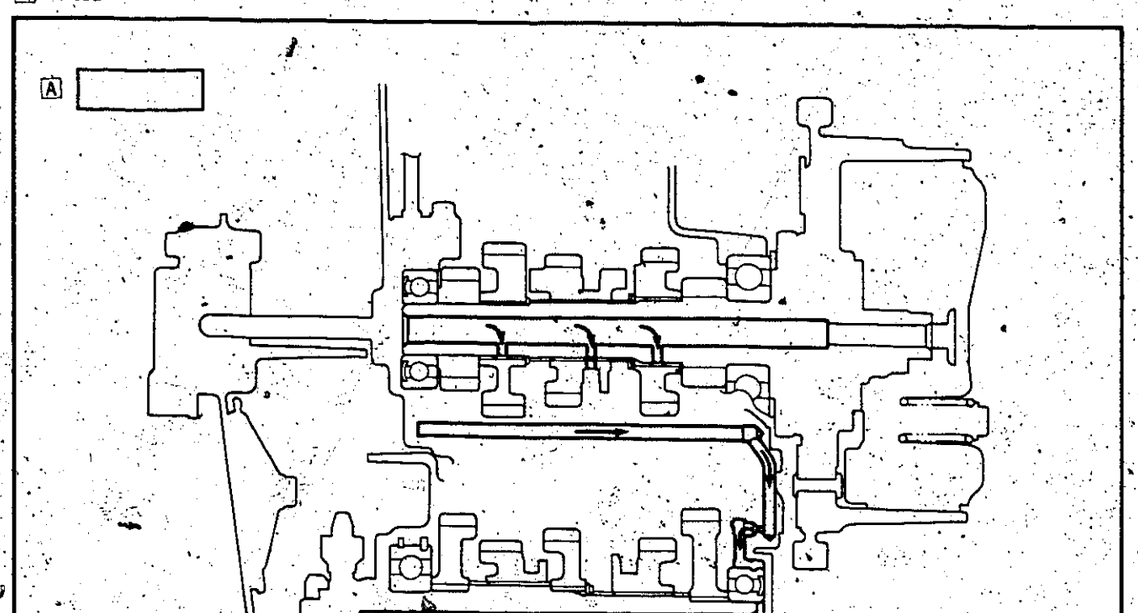
LUBRICATION DIAGRAM (2)

A Feed



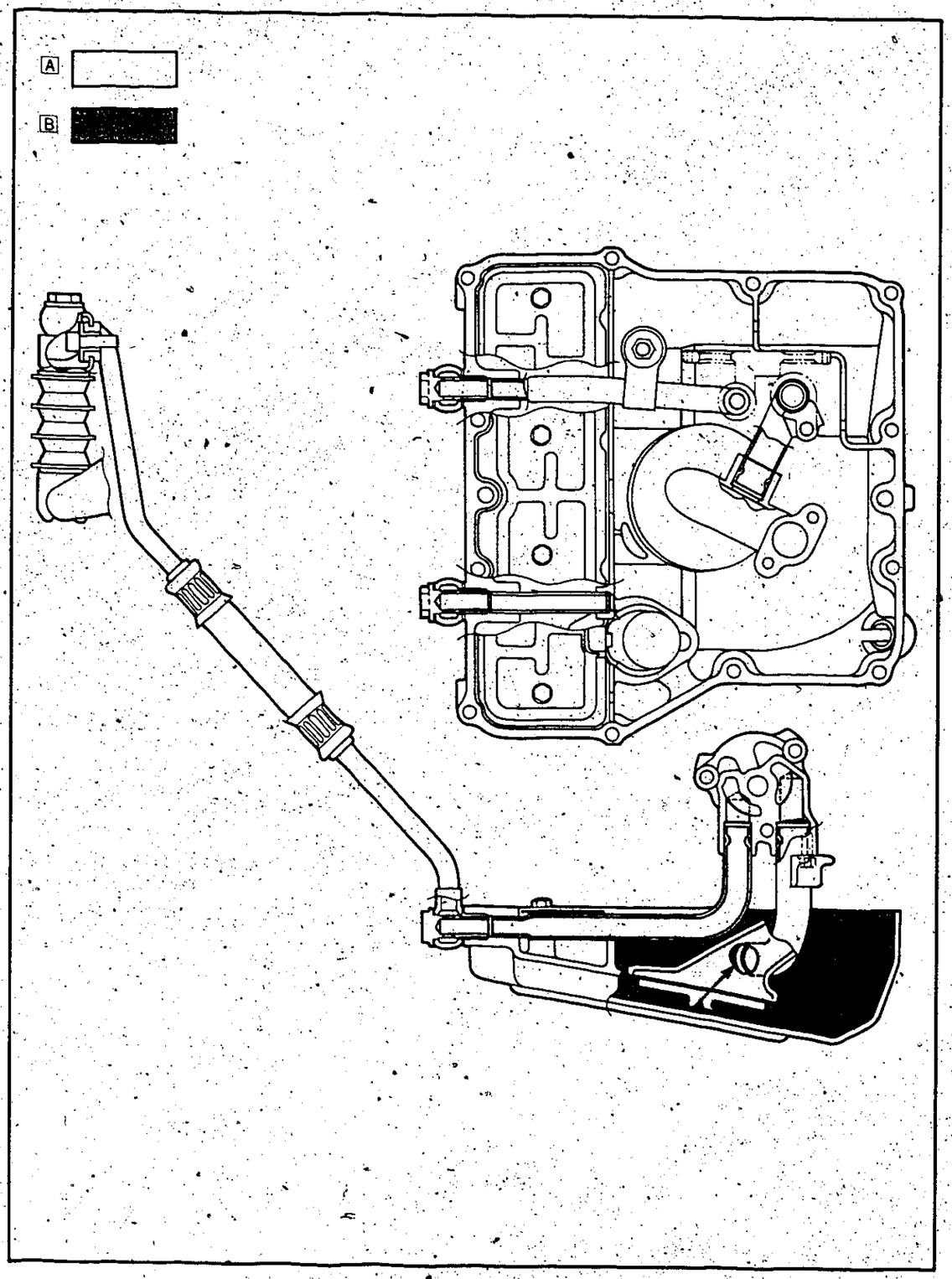
LUBRICATION DIAGRAM (3)

A Feed



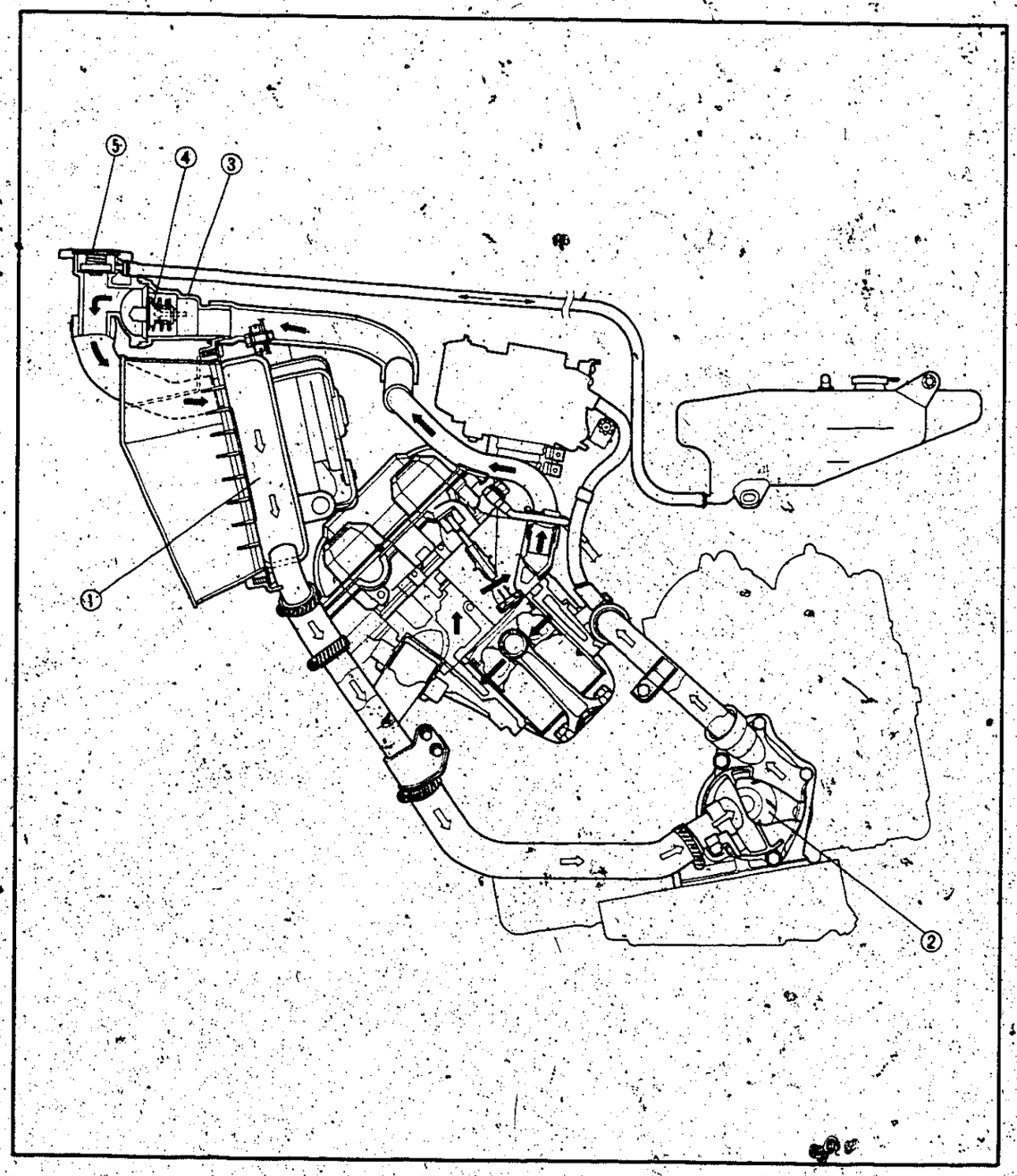
LUBRICATION DIAGRAM (4)

A Feed
B Scavenge

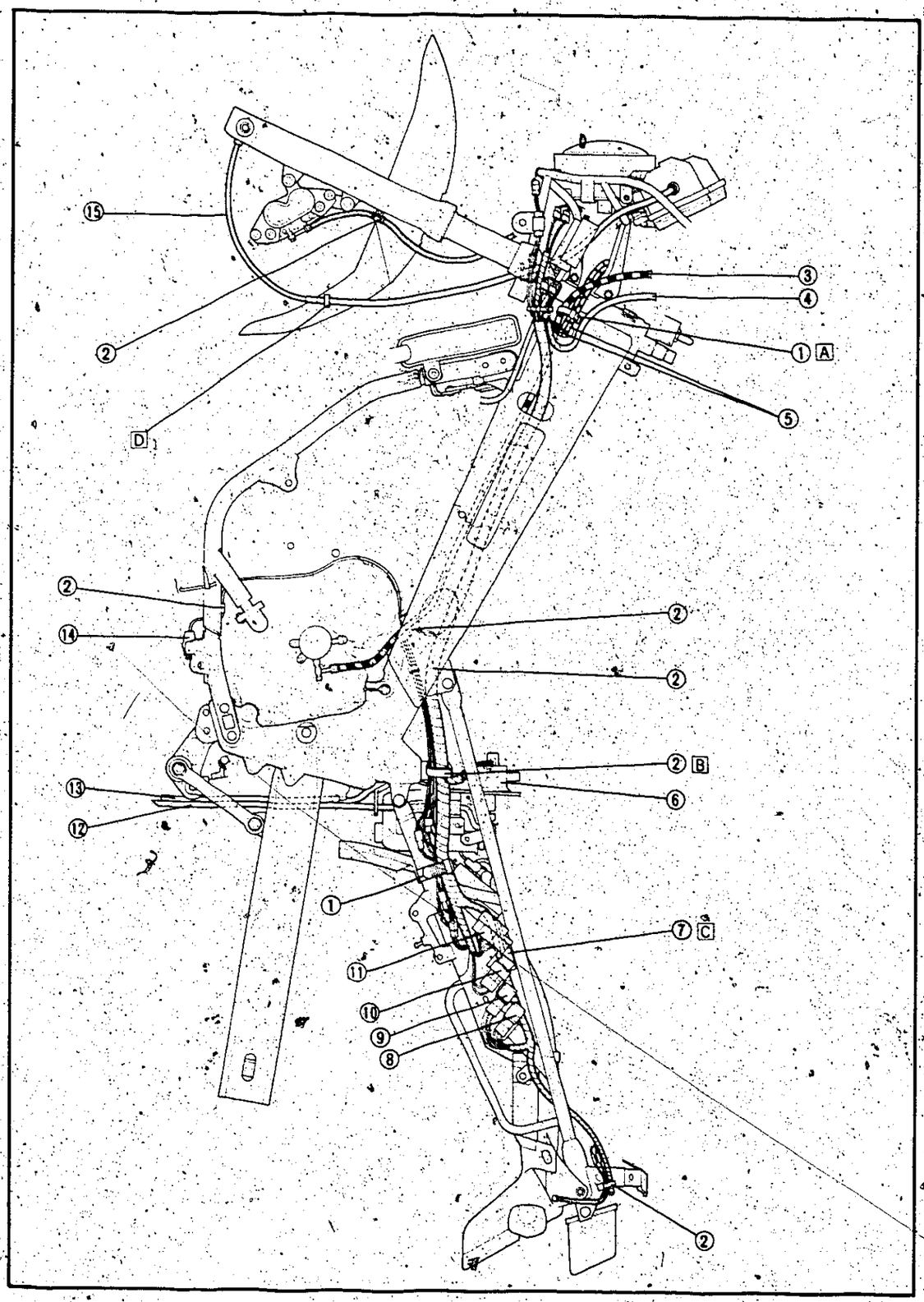


COOLANT DIAGRAM

① Radiator
② Water pump
③ Thermostat housing
④ Thermostatic valve
⑤ Radiator cap

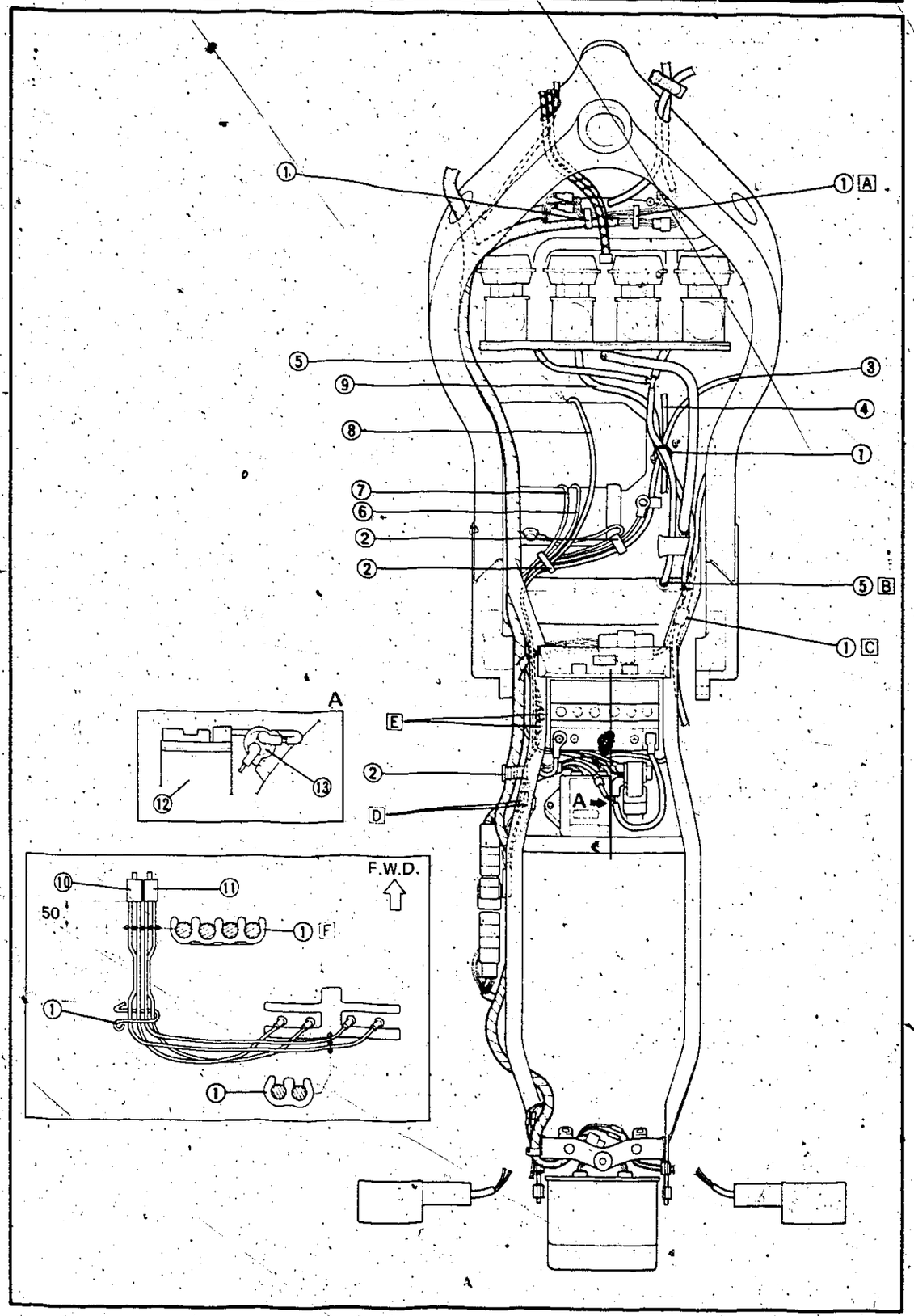


CABLE ROUTING



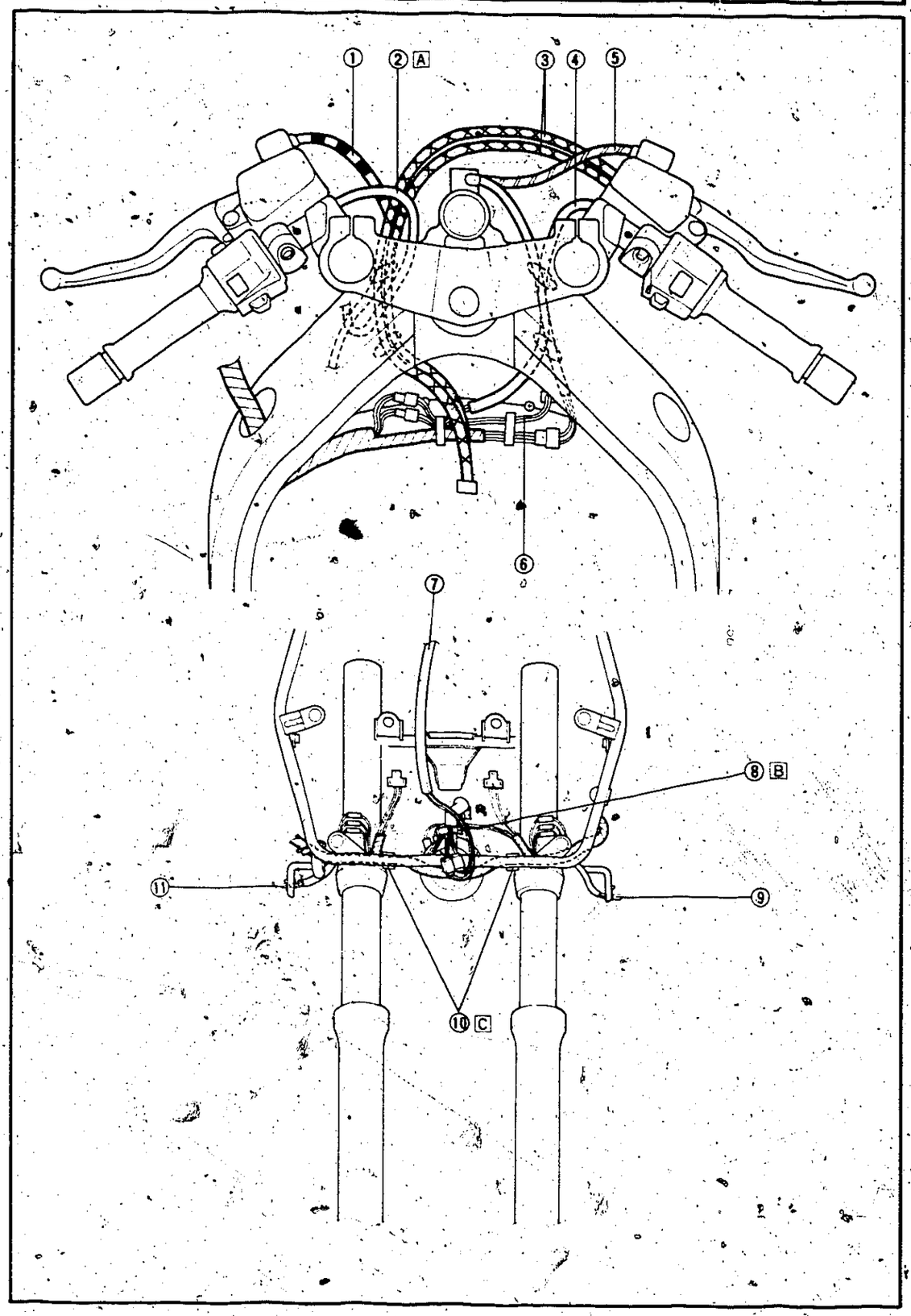
① Band
② Clamp
③ Clutch hose
④ Handle switch lead (Right)
⑤ Throttle cables
⑥ Flasher relay
⑦ Diode block
⑧ Sidestand relay
⑨ Fuel pump control relay
⑩ Fuse (MAIN)
⑪ Fuse box
⑫ Breather hose (Battery)
⑬ Breather hose (Coolant reservoir tank)
⑭ Sidestand switch
⑮ Speedometer cable

Ⓐ Clamp the throttle cables and clutch hose.
Ⓑ Clamp the leads from the engine and wire harness at the white tape would around it.
Ⓒ Route the diode block lead inside of the rear frame.
Ⓓ Pass the speedometer cable through the guide.



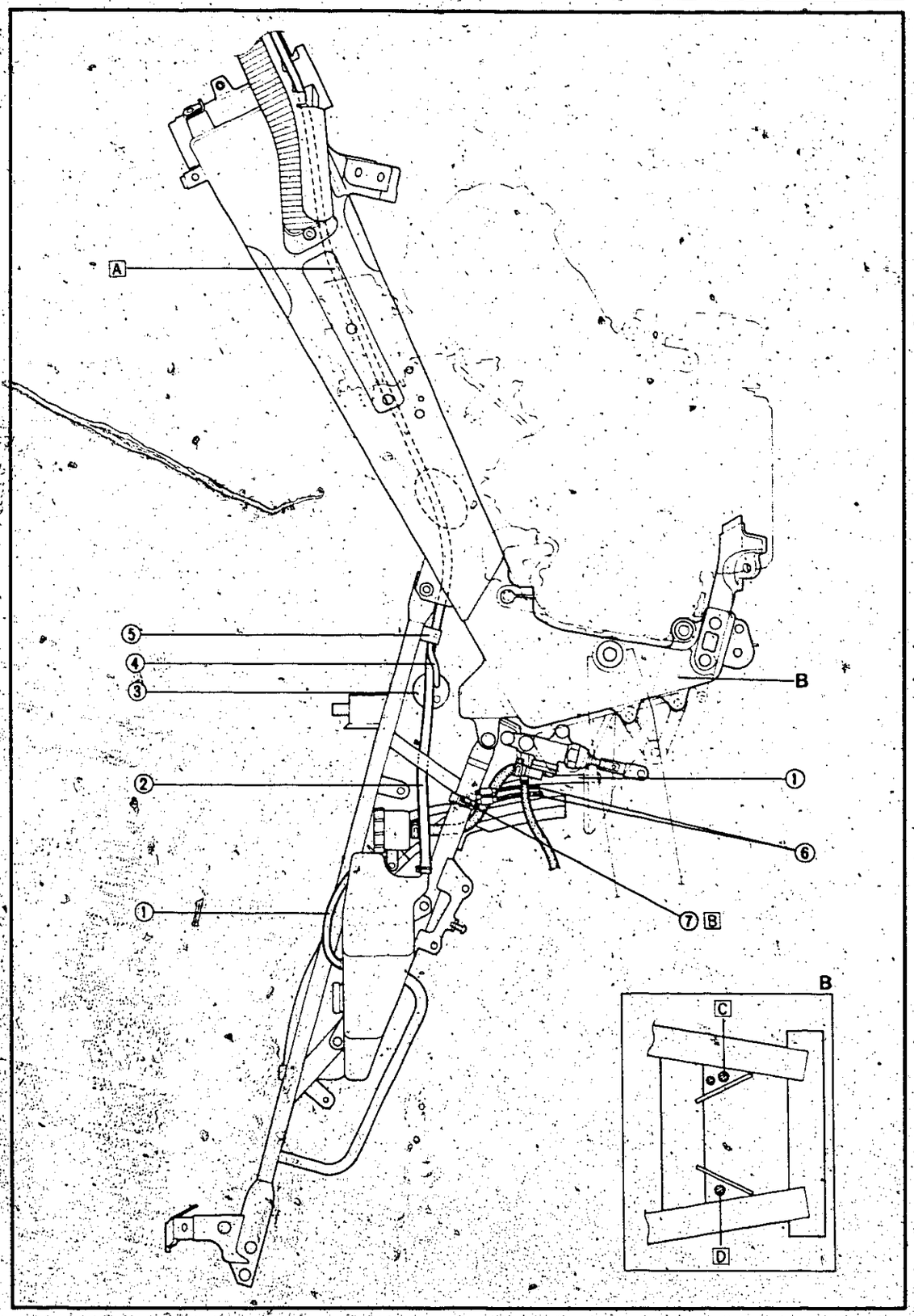
① Clamp
② Band
③ Pick-up coil leads
④ Reservoir tank hose
⑤ Air vent hose
⑥ A.C. generator lead
⑦ Neutral switch lead
⑧ Sidestand switch lead
⑨ Fuel hose
⑩ Ignition coil (#1, #4 cylinder)
⑪ Ignition coil (#2, #3 cylinder)
⑫ Battery
⑬ Starter relay

A Clamp the main switch lead and fan motor lead.
B Push in the air vent hose end into the hole on the crankcase rear end.
C Clamp the fuel hose and the coolant reservoir tank hose.
D Pass the neutral switch coupler (Green) and sidestand switch connectors between the wire harness and frame.
E Pass the A.C. generator coupler and the fuel pump coupler between the wire harness and battery box.
F Clamp the spark plug leads at 50 mm (1.97 in) from the ignition coils.



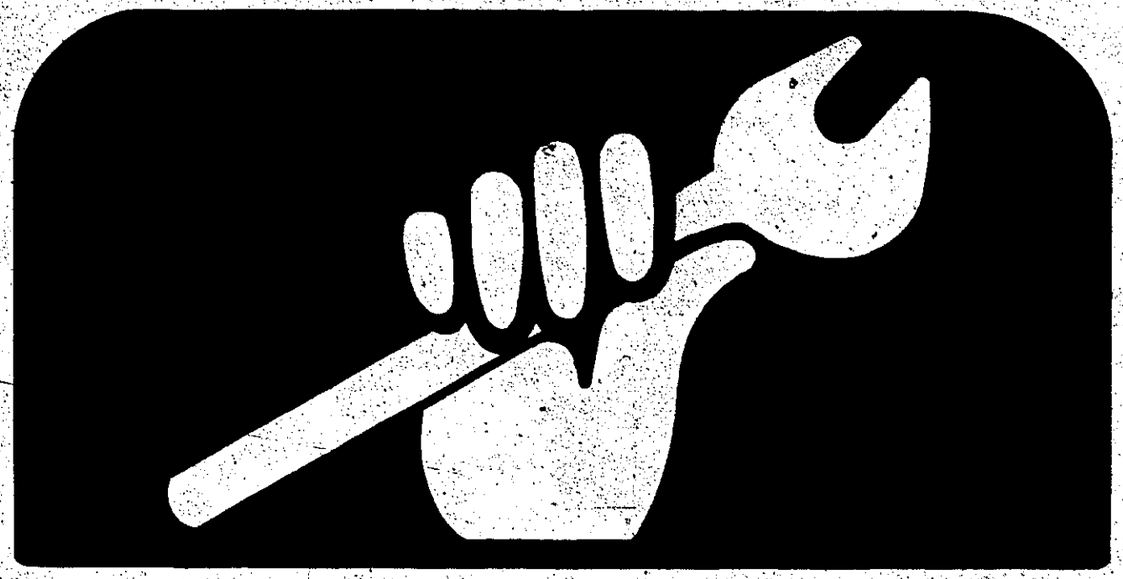
① Clutch hose
② Handle switch leads (Left)
③ Throttle cables
④ Handle switch leads (Right)
⑤ Brake hose
⑥ Fan motor lead
⑦ Meter ass'y lead
⑧ Band
⑨ Front flasher lead (Left)
⑩ Cramp
⑪ Front flasher light (Right)

A Route the handle switch lead (Right) above the clutch hose and throttle cables.
B Clamp only the meter ass'y leads after connection of couplers.
C Route the headlight leads outside of the cramps at both sides.



① Breather hose (Coolant reservoir tank)
② Hose (Coolant reservoir tank)
③ Fuel pump
④ Fuel hose
⑤ Clamp
⑥ Stop switch leads
⑦ Band

Ⓐ Route the coolant reservoir tank hose inside of the frame (Right).
Ⓑ Clamp the stop switch leads inside of the frame.
Ⓒ Pass the fuel tank breather hose and battery breather hose.
Ⓓ Pass the coolant reservoir tank breather hose.



INSP
ADJ

3

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

Unit: km (miles)

Item	Remarks	Break-in 1,000 (600)	EVERY 6,000 (4,000) or 6 months	EVERY 12,000 (8,000) or 12 months
Valve(s)*	Check valve clearance. Adjust if necessary.	EVERY 42,000 (28,000)		
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 pipe for cracks or damage. Replace if necessary.		○	○
Fuel filter*	Check condition. Replace every 30,000 (20,000).			○
Engine oil	Replace (Warm engine before draining).	○	○	○
Engine oil filter*	Replace.	○		○
Brake*	Check operation/fluid leakage/See NOTE. Correct if necessary.		○	○
Clutch*	Check operation/fluid leakage/See NOTE. Correct if necessary.		○	○
Rear arm pivot*	Check rear arm 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 bearing*	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)		

Unit: km (miles)

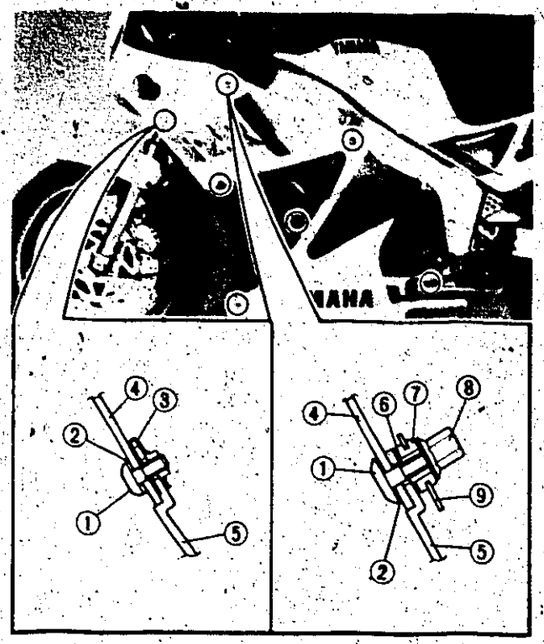
Item	Remarks	Break-in 1,000 (600)	EVERY 6,000 (4,000) or 6 months	EVERY 12,000 (8,000) or 12 months
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○
Center and sidestand*	Check operation. Repair if necessary.	○	○	○
Battery*	Check specific gravity. Check breather pipe for proper operation. Correct if necessary.		○	○
A.C. Generator*	Replace generator brushes every 100,000 (62,000).			

* It is recommended that these items be serviced by a Yamaha dealer.
** Medium-weight wheel bearing grease.
*** Molybdenum disulfide grease.

NOTE:

Brake fluid replacement:

1. When disassembling the master cylinder or caliper cylinder (clutch release cylinder), replace the brake fluid. Normally check the brake fluid level and add the fluid as required.
2. On the inner parts of the master cylinder and caliper cylinder (clutch release cylinder), replace the oil seals every two years.
3. Replace the brake (clutch) hoses every four years, or if cracked or damaged.



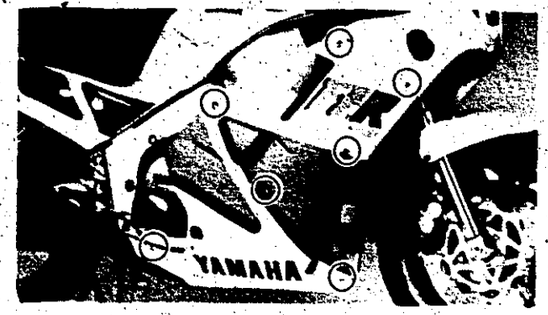
COWLINGS REMOVAL AND INSTALLATION

SIDE COWLING

Removal

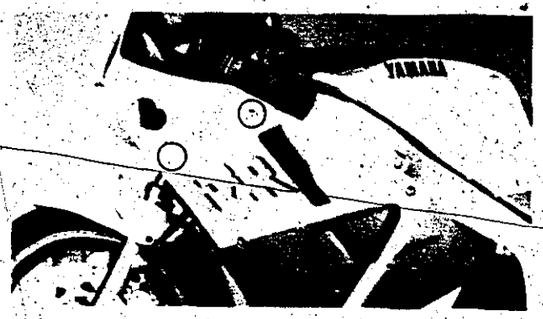
1. Remove:
   - Bolts
   - Engine grille
   - Side cowlings

① Hexagon socket head bolt
② Plain washer
③ Spring nut
④ Upper cowling
⑤ Side cowling
⑥ Collar
⑦ Gromet
⑧ Nut
⑨ Stay



Installation

1. Install:
   Reverse removal procedure.
   - Side cowlings
   - Engine grille
   - Bolts



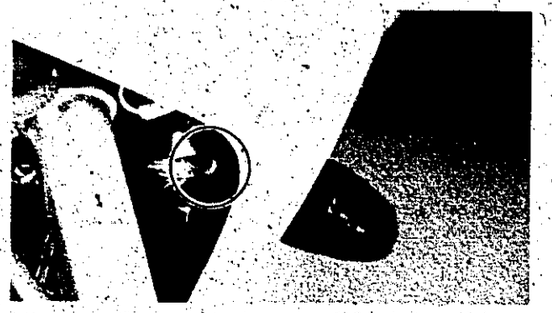
UPPER COWLING

Removal

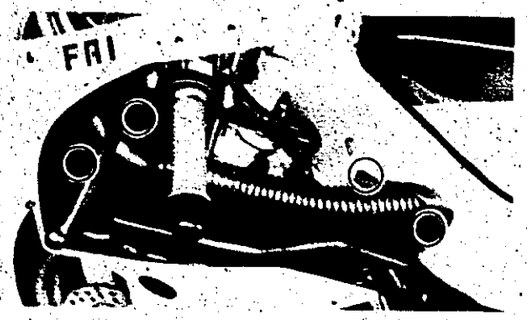
1. Remove:
   - Bolts



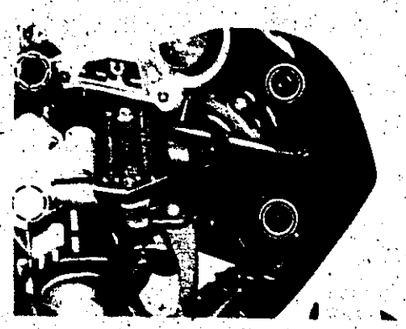
2. Remove:
   - Nuts
   - Rear view mirrors



3. Disconnect:
   - Flasher light leads
4. Remove:
   - Flasher lights



5. Remove:
   - Bolts
   - Fresh Air Intake ducts
6. Disconnect:
   - Headlight couplers
   - Front position light coupler



7. Remove:
   - Nuts (4 pcs.)
   - Upper cowling

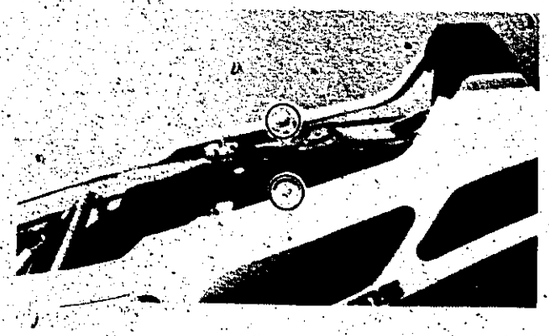
CAUTION:

Remove the headlight together with the upper cowling to prevent falling the headlight off.

SIDE COVER AND TAIL COWLING

Removal

1. Remove:
   - Seat
   - Screws
   - Side covers
   Remove the side covers downward.

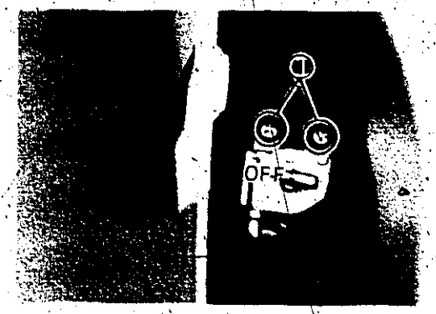


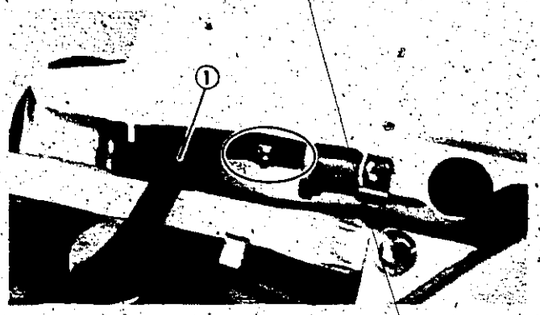
2. Remove:
   - Tail cowling

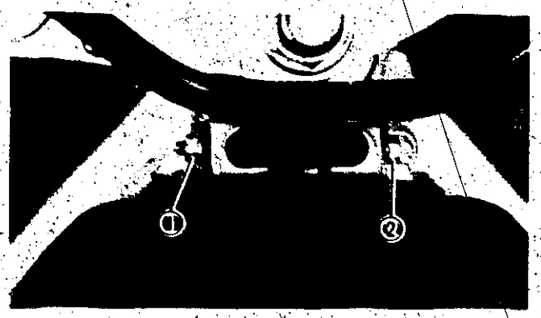


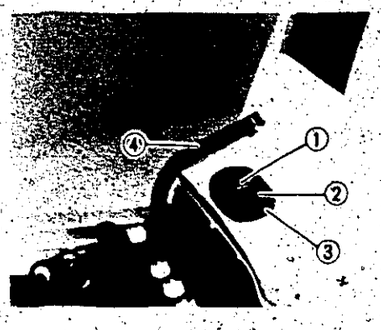
Installation

1. Install:
   Reverse removal procedure.









FUEL TANK

Removal

1. Place the motorcycle on a level place.
2. Turn the fuel cock to "OFF" position.
3. Remove:
   - Seat
   - Side covers
   - Screws (Fuel cock) ①
4. Disconnect:
   - Fuel hose ①

WARNING:

Gasoline is highly flammable.
Avoid spilling fuel on the hot engine.

NOTE:

Place the rug on the engine to absorb a spilt fuel.

5. Remove:
   - Nut ①
   - Bolt ②
6. Remove:
   - Bolt ①
   - Plate ②
   - Rubber washer ③
7. Disconnect:
   - Breather pipe (Fuel tank) ④
8. Remove:
   - Fuel tank

Installation

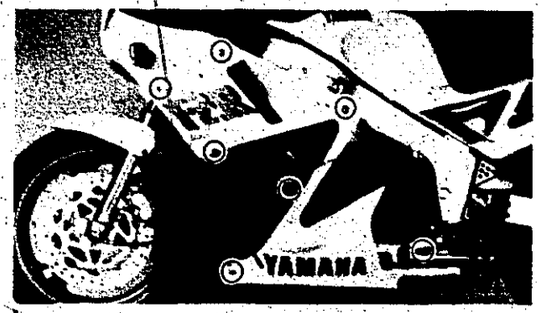
1. Install:

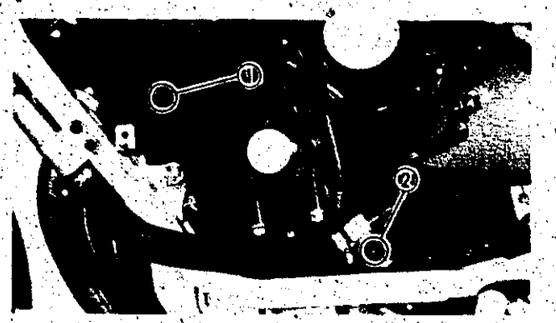
   Reverse removal procedure.
   - Seat

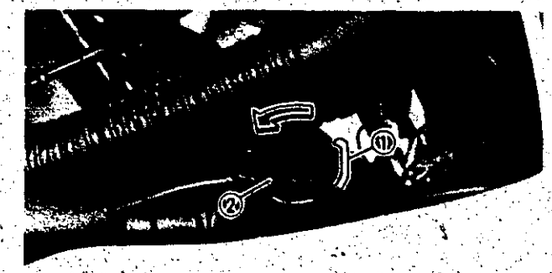
NOTE:

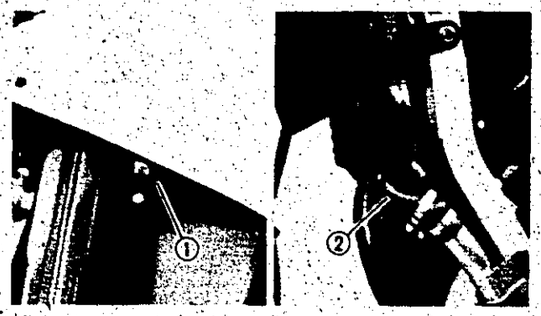
Insert the seat lobe into the receptacle on the frame. Make sure that the seat is securely locked.

2. Turn the fuel cock to "ON" position.









ENGINE

VALVE CLEARANCE ADJUSTMENT

WARNING:

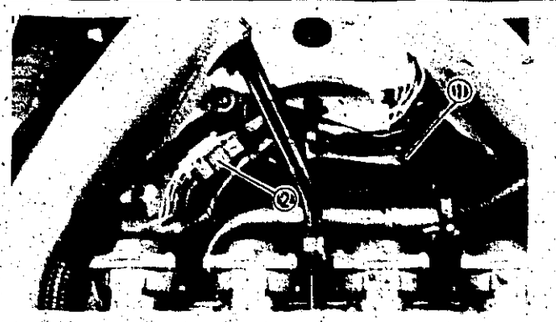
The engine must be cool before servicing the valve clearance.

NOTE:

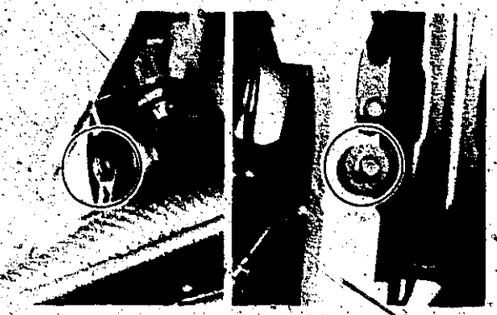
Measure and adjust valve clearance when piston is at TDC on compression stroke.

Removal

1. Remove:
   - Side cowlings
   - Engine grille
   - Side covers
   - Fuel tank
   - Air cleaner
2. Place a drain pan under the drain bolts.
3. Remove:
   - Drain bolt (Water pump) ①
   - Drain bolts (Cylinder) ②
4. Remove:
   - Stopper (Radiator cap) ①
   - Radiator cap ②
5. Drain:
   - Coolant
6. Disconnect:
   - Hose (Radiator – Inlet) ①
   - Hose (Radiator – Outlet) ②



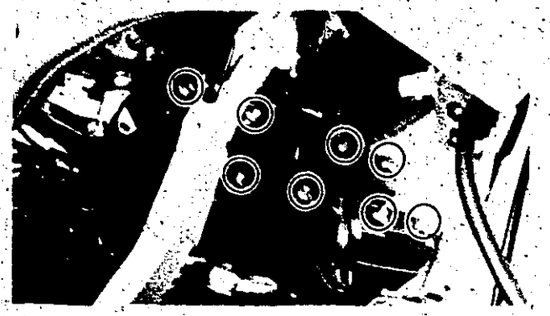
7. Remove:
   - Air baffle plate ①
8. Disconnect:
   - Fan motor coupler ②



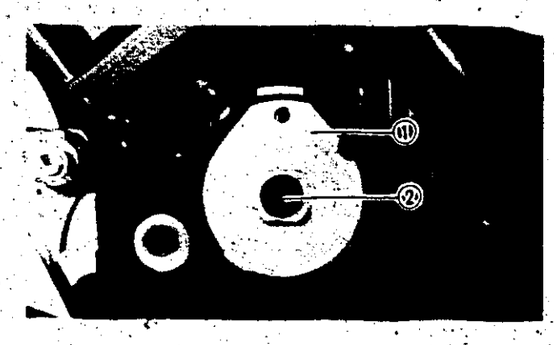
9. Remove:
   - Nut (Radiator – Right upper)
   - Bolts (Radiator – Upper)
   - Bolts (Radiator – Lower)



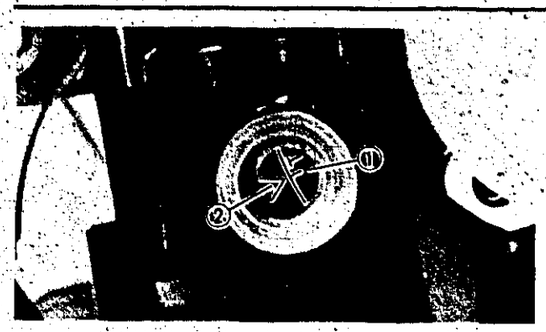
10. Remove:
    - Radiator assembly

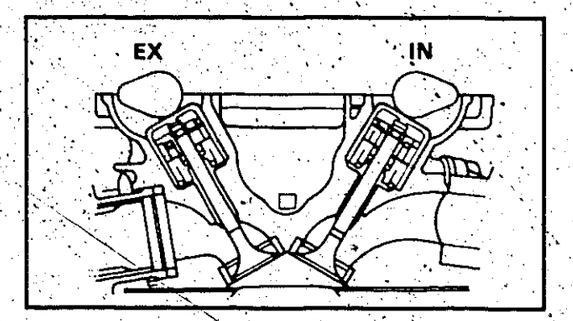


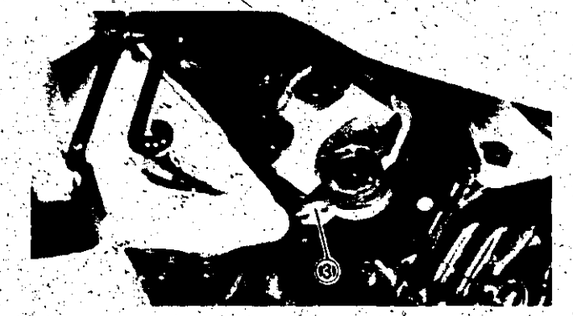
11. Remove:
    - Spark plug leads
    - Cylinder head cover

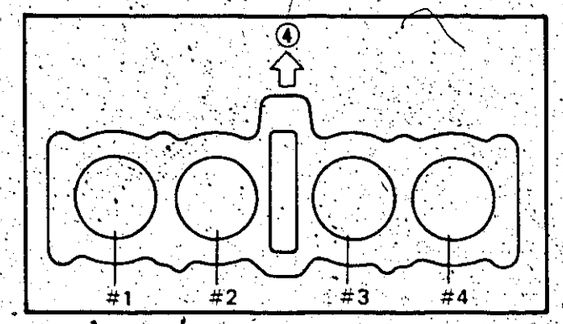


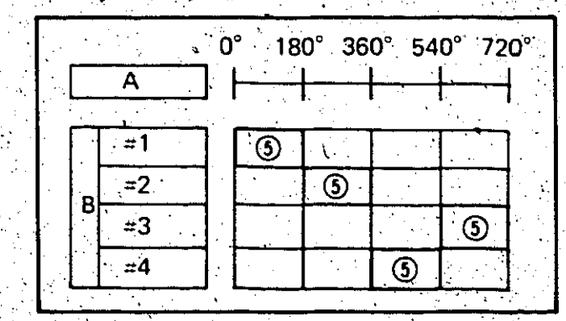
12. Remove:
    - Crankshaft end cover (Left)
    - Plug screw
13. Install:
    - Timing rotor ①
      P/N. 33M-81673-10
    - Dowel pin
      P/N. 93604-08071
    - Bolt (8 mm) ②
      P/N. 91316-08030
14. Tighten:
    - Bolt











Valve Clearance Measurement

1. Measure:
   - Valve clearance

Valve clearance measurement steps:
- Turn the crankshaft counterclockwise.
- Align the "T" mark ① on the crankshaft web with the stationary pointer ② when #1 piston is at TDC on compression stroke.

NOTE:
Compression T.D.C. can be found when the cam lobes are apart from each other, as shown.

- Measure the valve clearance using Special Thickness Gauge ③ (90890-01399).
  Out of specification → Adjust valve clearance.

Intake Valve (Cold):
0.11 ~ 0.20 mm (0.004 ~ 0.008 in)
Exhaust Valve (Cold):
0.21 ~ 0.30 mm (0.008 ~ 0.012 in)

- Record the measured amount if the clearance is incorrect.
- Measure the valve clearance in sequence, for #2, 4 and #3 cylinders.
  Out of specification → Adjust valve clearance.

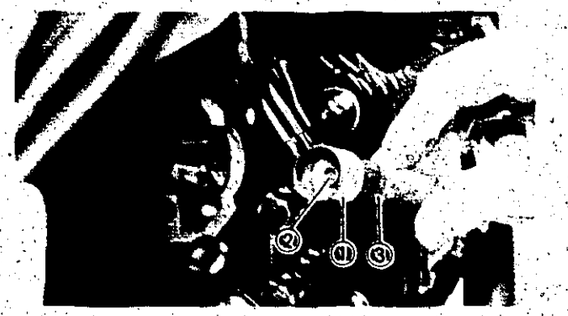
Firing Sequence:
#1 → #2 → #4 → #3

④ Front

NOTE:
Turn crankshaft each degrees counterclockwise from #1 Cylinder TDC.

#2 Cylinder	180 degrees
#4 Cylinder	360 degrees
#3 Cylinder	540 degrees

A Crankshaft counterclockwise turning angle
B Cylinder
⑤ Combustion



Adjusting Pad Replacement

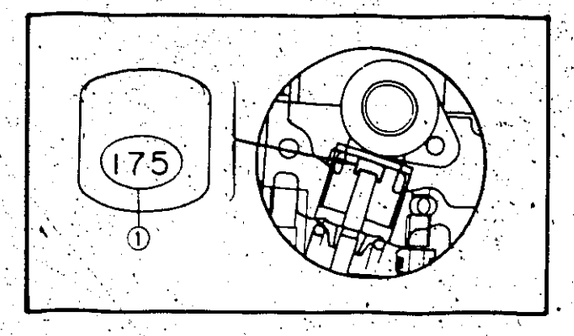
1. Remove:
   - Cam chain tensioner
   - Chain guide (Upper)
   - Chain guide (Exhaust side)
   - Cam caps
   - Cam chain
   - Cam shafts

NOTE:
Refer to "CHAPTER 4. ENGINE DISASSEMBLY CAMSHAFT AND CYLINDER HEAD – Procedure 2".
Fasten the wire to the cam chain to prevent it from falling into the crankcase.

2. Remove:
   - Valve lifter ①
   - Pad ②

   Use valve lapper ③.
   Record the installed pad number.

NOTE:
- Place a piece of rug in the cam chain room to prevent the pad from falling into the crankcase.
- Remove the rug after adjustment.



3. Select:
   - Proper pad

Proper pad selection steps:
- Select the proper pad from the table.

Pad range		Pad Availability: 25 increments
No. 120	1.20 mm (0.047 in)	Pads stepped in 0.05 mm (0.002 in) increments
No. 240	2.40 mm (0.094 in)	

NOTE:
Thickness ① of each pad is marked on the pad side wall.

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

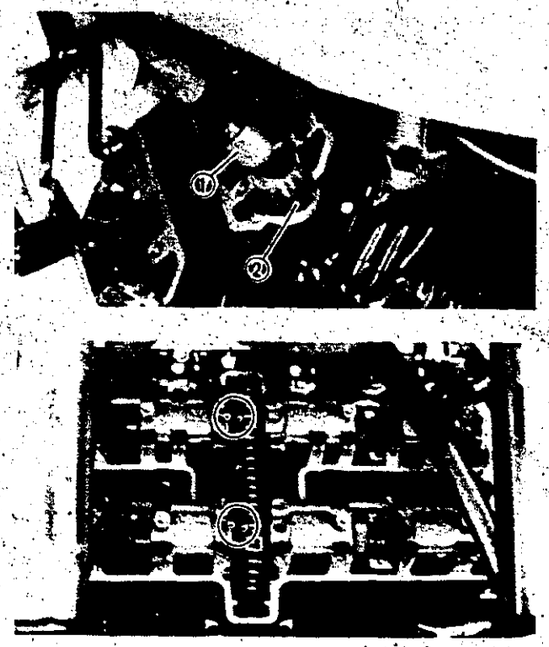
Hundredths digit	Rounded valve
0 or 2	0
5	(NOT ROUNDED OFF)
8	10

EXAMPLE:
Installed pad number = 148 (1.48 mm)
Rounded off digit = 150

NOTE:
Pads can only be selected in 0.05 mm (0.002 in) increments.

- Locate the "Rounded off Pad Number" on the chart, and then find the measured valve clearance. The point where these coordinates intersect is the new pad number.

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



4. Install:
   - Valve lifter ①
   - Pad ② (New)

NOTE:
- Apply molybdenum disulfide grease to the pad.
- Valve lifter must be rotated smoothly by a finger.

5. Install:
   - Camshafts
   - Cam chain
   - Camshaft caps

Bolts (Camshaft Cap): 10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
- Install the exhaust camshaft first.
- Align the matching marks.

INTAKE

B 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				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20	RECOMMENDED CLEARANCE																								
0.21 ~ 0.22	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.23 ~ 0.27	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.28 ~ 0.32	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.33 ~ 0.37	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.38 ~ 0.42	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.43 ~ 0.47	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.48 ~ 0.52	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.53 ~ 0.57	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.58 ~ 0.62	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.63 ~ 0.67	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.68 ~ 0.72	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.73 ~ 0.77	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.78 ~ 0.82	185	190	195	200	205	210	215	220	225	230	235	240													
0.83 ~ 0.87	190	195	200	205	210	215	220	225	230	235	240														
0.88 ~ 0.92	195	200	205	210	215	220	225	230	235	240															
0.93 ~ 0.97	200	205	210	215	220	225	230	235	240																
0.98 ~ 1.02	205	210	215	220	225	230	235	240																	
1.03 ~ 1.07	210	215	220	225	230	235	240																		
1.08 ~ 1.12	215	220	225	230	235	240																			
1.13 ~ 1.17	220	225	230	235	240																				
1.18 ~ 1.22	225	230	235	240																					
1.23 ~ 1.27	230	235	240																						
1.28 ~ 1.32	235	240																							
1.33 ~ 1.37	240																								

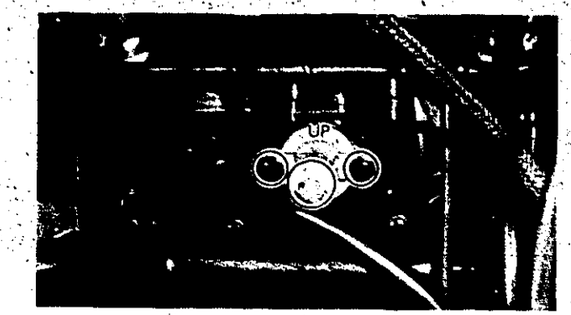
VALVE CLEARANCE (cold):
0.11 ~ 0.20 mm (0.004 ~ 0.008 in)
Example: Installed is 170
Measured clearance is 0.24 mm (0.009 in)
Replace 170 pad with 180 pad

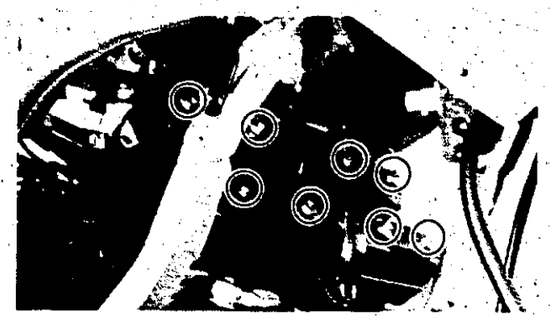
EXHAUST

B 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						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.30	RECOMMENDED CLEARANCE																								
0.31 ~ 0.32	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.33 ~ 0.37	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.38 ~ 0.42	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.43 ~ 0.47	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.48 ~ 0.52	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.53 ~ 0.57	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.58 ~ 0.62	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.63 ~ 0.67	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.68 ~ 0.72	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.73 ~ 0.77	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.78 ~ 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.83 ~ 0.87	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.88 ~ 0.92	185	190	195	200	205	210	215	220	225	230	235	240													
0.93 ~ 0.97	190	195	200	205	210	215	220	225	230	235	240														
0.98 ~ 1.02	195	200	205	210	215	220	225	230	235	240															
1.03 ~ 1.07	200	205	210	215	220	225	230	235	240																
1.08 ~ 1.12	205	210	215	220	225	230	235	240																	
1.13 ~ 1.17	210	215	220	225	230	235	240																		
1.18 ~ 1.22	215	220	225	230	235	240																			
1.23 ~ 1.27	220	225	230	235	240																				
1.28 ~ 1.32	225	230	235	240																					
1.33 ~ 1.37	230	235	240																						
1.38 ~ 1.42	235	240																							
1.43 ~ 1.47	240																								

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







NOTE:
- Refer to "CHAPTER 4. ENGINE ASSEMBLY AND ADJUSTMENT – CYLINDER HEAD AND CAMSHAFT" section.
- Apply molybdenum disulfide grease to the cam caps.
- Turn the crankshaft counterclockwise several turns for the installed parts to settle into the correct position.

6. Measure:
- Valve clearance

Valve clearance verification steps:
- Follow the valve clearance measurement steps.
- If the clearance is incorrect, repeat all Adjusting Pad Replacement steps until the proper clearance is obtained.

7. Install:
Reverse removal steps
- Crankshaft end cover (Left)
- Plug screw
- Chain guide (Exhaust side)
- Chain guide (Upper)
- Cam chain tensioner
- Cylinder head cover
- Spark plug leads
- Radiator assembly
- Cowlings

Bolts (Cam Chain Tensioner):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolts (Cylinder Head Cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)

8. Fill:
- Coolant

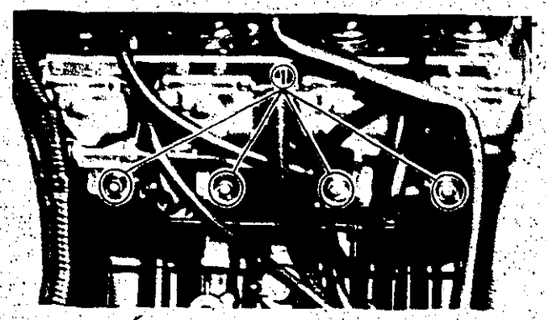
Coolant Amount:
2.3 L (2.0 Imp qt, 2.4 US qt)

CARBURETOR SYNCHRONIZATION

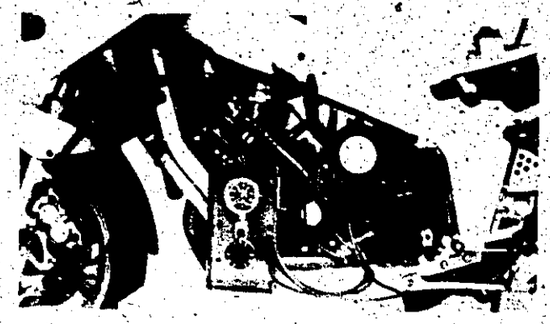
Carburetors must be adjusted to open and close simultaneously.

NOTE:
Valve clearance must be set properly before synchronizing the carburetors.

1. Remove:
   - Side cowlings
   - Seat
   - Side covers
   - Nut (Fuel tank)
   - Bolts (Fuel tank)
   - Fuel tank

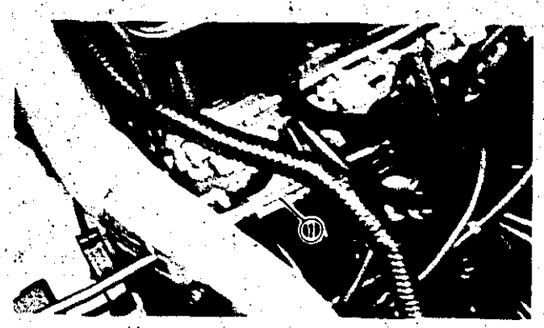


2. Remove:
   - Screws (Vacuum plugs) ①



3. Install:
   - Adapters
   - Vacuum gauge
   - Sub tank

	Adapter: P/N 90890-03060 **Vacuum Gauge: P/N 90890-03094**

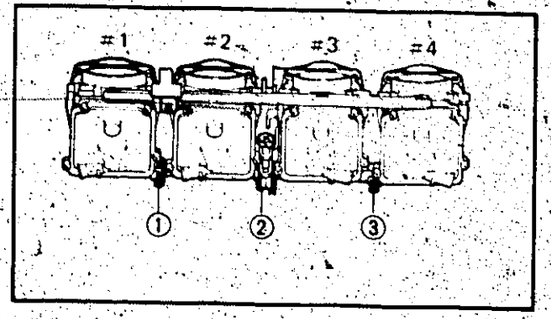


4. Start the engine and let it warm up.
5. Adjust:
   - Idle speed

   Turn the throttle stop screw ①.

Turn in	Engine speed is increased.
Turn out	Engine speed is decreased.

	Idle Speed: 950 ~ 1,050 r/min





6. Adjust:
   - Carburetors synchronization

Carburetor synchronization adjustment steps:
- Lift up the front of fuel tank
- Synchronize carburetor No. 1 to carburetor No. 2 by turning synchronizing screw ① until both gauges read the same.
- Racing the engine for less than a second, two or three times, and check the synchronization again.

Vacuum Pressure at Idle Speed:
26.66 ± 0.6 kPa
(200 ± 5 mm Hg, 7.87 ± 0.2 in Hg)
Vacuum Synchronous Difference:
1.33 kPa (10 mm Hg, 0.4 in Hg)

- Repeat the above steps to synchronize carburetor No. 4 to carburetor No. 3 by turning synchronizing screw ③ until both gauges read the same.
- Repeat the same steps to synchronize No. 2 carburetor to No. 3 carburetor by turning synchronizing screw ② until both gauges read the same.

7. Adjust:
   - Idle speed
8. Install:
   - Screws (Vacuum plug)
   - Nut (Fuel tank)
   - Bolts (Fuel tank)
   - Side covers
   - Seat
   - Side cowlings

IDLE SPEED ADJUSTMENT

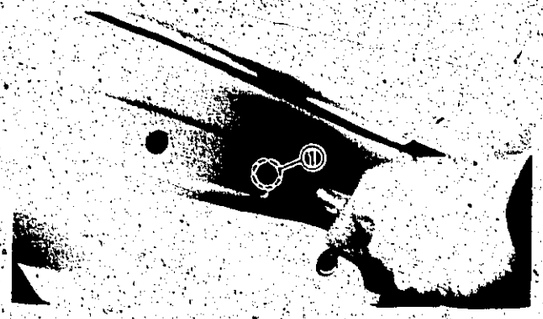
1. Start the engine and let it warm up.
2. Inspect:
   - Idle speed

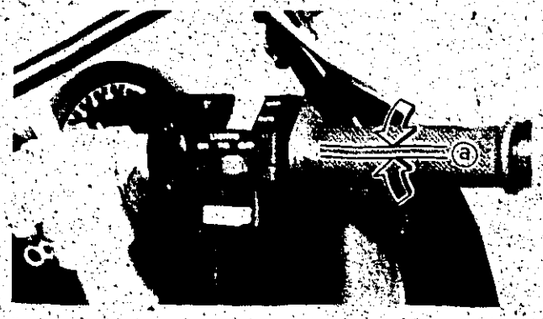
   Out of specification → Adjust.

	Idle Speed: 950 ~ 1,050 r/min

THROTTLE CABLE FREE PLAY ADJUSTMENT

INSP ADJ





2. Adjust:
   - Idle speed

   Turn the throttle stop screw ①

Turn in	Engine speed is increased.
Turn out	Engine speed is decreased.

THROTTLE CABLE FREE PLAY ADJUSTMENT

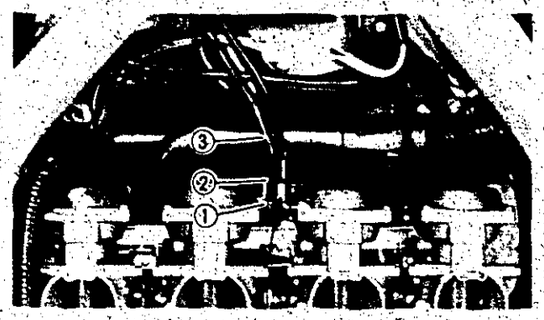
NOTE:
Before adjusting the throttle cable free play, the engine idle speed should be adjusted.

1. Check:
   - Throttle cable free play ⓐ

   Out of specification → Adjust.

Throttle Cable Free Play ⓐ:
2 ~ 5 mm (0.08 ~ 0.20 in)

2. Remove:
   - Fuel tank
   - Air cleaner



3. Adjust:
   - Throttle cable free play

Throttle cable adjustment steps:

First step:
- Loosen the locknuts (Throttle cable 2) ①.
- Turn the adjuster (Throttle cable 2) ② clockwise or counterclockwise until the specified free play ⓐ.

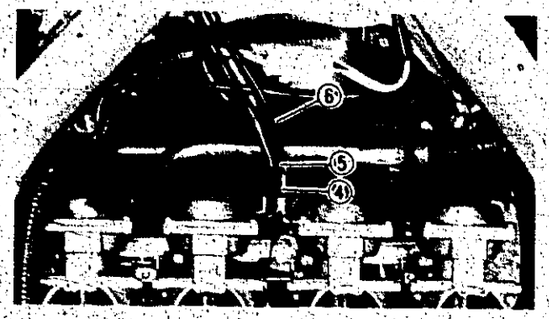
Throttle Cable 2 Free Play ⓐ:
Zero mm (Zero in)

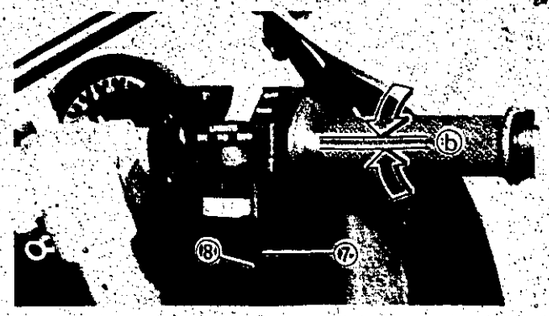
③ Throttle cable 2

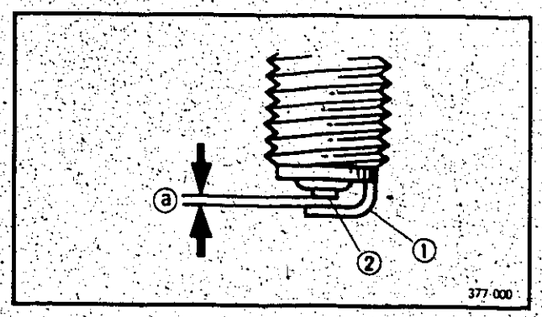
- Tighten the locknuts ①.

SPARK PLUG INSPECTION

INSP ADJ







Second step:
- Loosen the locknuts (Throttle cable 1) ④.
- Turn the adjuster (Throttle cable 1) ⑤ clockwise or counterclockwise until proper free play (Throttle grip) is attained.

Throttle Cable Free Play (Throttle Grip):
2 ~ 5 mm (0.08 ~ 0.20 in)

⑥ Throttle cable 1

- Tighten the locknuts ④.

Final step:
- If the free play is incorrect, adjust the throttle cable free play with the adjuster (Throttle grip side).
- Loosen the locknut (Throttle cable 1 — Throttle grip side) ⑦.
- Turn the adjuster (Throttle cable 1 — Throttle grip side) ⑧ clockwise or counterclockwise until proper free play (Throttle grip) ⓑ is attained.

Throttle Cable Free Play (Throttle Grip) ⓑ:
2 ~ 5 mm (0.08 ~ 0.20 in)

- Tighten the locknut ⑦.

SPARK PLUG INSPECTION

1. Inspect:
   - Electrode ①

     Wear/Damage → Replace.
   - Insulator color ②

     Normal condition is a medium to light tan color.

     Distinctly different color → Check the engine condition.

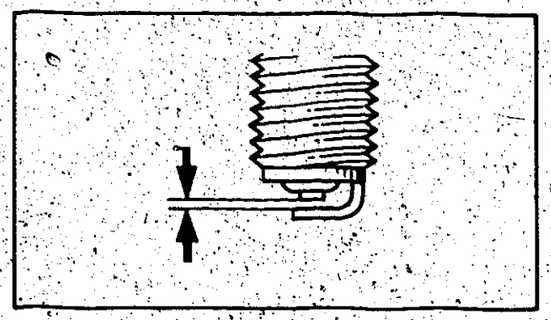
ⓐ Spark plug gap

2. Clean:
   - Spark plug

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

SPARK PLUG INSPECTION

INSP ADJ



3. Inspect:
   • Spark plug type
   Incorrect → Replace.

Standard Spark Plug:
DR8ES-L (NGK),
X24ESR-U (NIPPON DENSO)

4. Measure:
   • Spark plug gap
   Out of specification → Regap.
   Use a wire gauge.

Spark Plug Gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

5. Tighten:
   • Spark plug

NOTE:

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

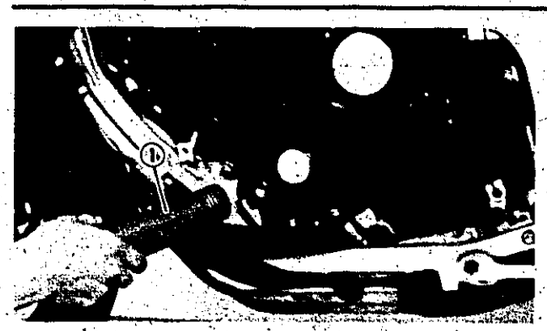
Spark Plug:
17.5 Nm (1.75 m·kg, 13 ft·lb)

NOTE:

If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/4 to 1/2 turns part finger tight. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.

IGNITION TIMING CHECKS/ COMPRESSION PRESSURE MEASUREMENT

INSP ADJ



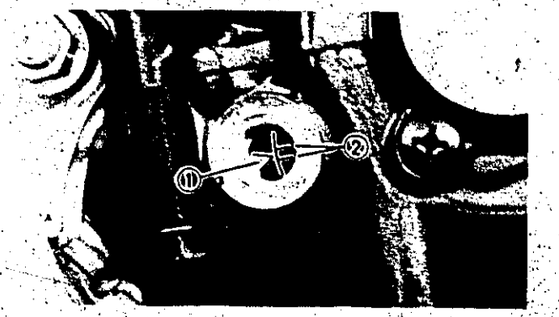
IGNITION TIMING CHECKS

1. Remove:
   • Plug screw
2. Connect:
   • Timing light ①
   To the #1 spark plug lead.
   • Inductive tachometer

Timing Light:
P/N 90890-03109
Inductive Tachometer:
P/N 90890-03113

3. Warm up the engine and allow it to idle at the specified speed.

Engine Idle Speed:
950 ~ 1,050 r/min



4. Check:
   • Ignition timing
   Visually check the stationary pointer ① is within the firing range ② on the crankshaft web.
   Out of firing range → Check pickup assembly.

NOTE:

Ignition timing is not adjustable.

5. Install:
   • Plug screw

COMPRESSION PRESSURE MEASUREMENT

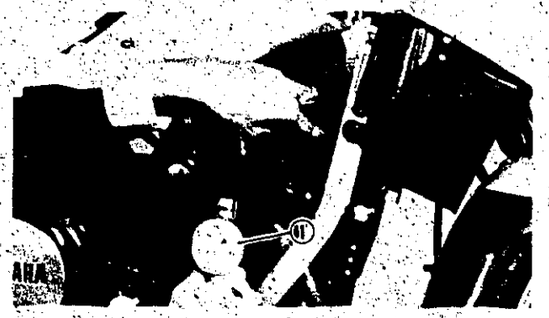
NOTE:

Insufficient compression pressure will result in performance loss.

1. Measure:
   • Valve clearance
   Out of specification → Adjust.
   Refer to "VALVE CLEARANCE ADJUSTMENT".
2. Warm up the engine.
3. Remove:
   • Spark plugs

COMPRESSION PRESSURE MEASUREMENT

INSP ADJ



4. Measure:
   - Compression pressure

Compression pressure measurement steps:
- Install the Compression Gauge ① using an adapter.
- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide open until the compression reading on the gauge stabilizes.
- Check readings with specified levels (See chart).

Compression Gauge:
P/N 90890-03081

Compression Pressure
(At sea level):
Standard:
1,100 kPa (11 kg/cm², 160 psi)
Minimum:
1,000 kPa (10 kg/cm², 145 psi)
Maximum:
1,150 kPa (11.5 kg/cm², 164 psi)

WARNING:

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

- Repeat the previous steps for the other cylinders.
- If pressure falls bellow the minimum level:

1) Squirt a few drops of oil into the affected cylinder.
2) Measure the compression again.

Compression Pressure (with oil introduced 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.
Above maximum level	Inspect cylinder head, valve surfaces, or piston crown for carbon deposits.

ENGINE OIL LEVEL INSPECTION/ ENGINE OIL REPLACEMENT

INSP ADJ

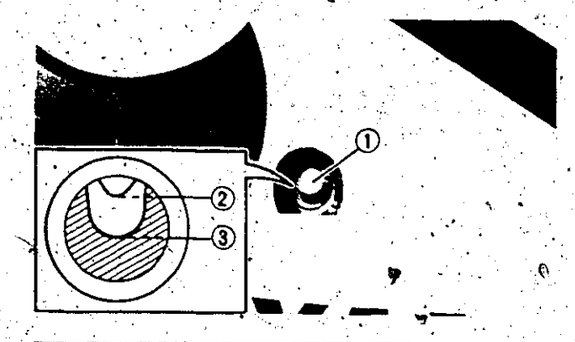
NOTE:
The difference between the highest and lowest cylinder compression readings must not vary more than the specified value.

Difference Between Each Cylinder:
Less than 98 kPa (1 kg/cm², 14 psi)

ENGINE OIL LEVEL INSPECTION

1. Place the motorcycle on its centerstand and warm up the engine for several minutes.

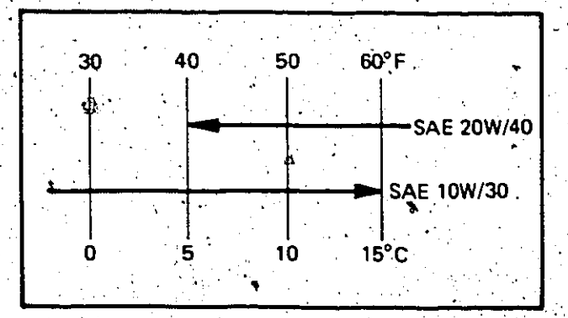
NOTE:
Position motorcycle straight up when checking oil level, a slight tilt to the side can produce false readings.



2. Stop the engine and visually check the oil level throught the level window ①.
3. Inspect:
   - Oil level

   Oil level should be between maximum ② and minimum ③ marks.
   Low oil level → Add oil to proper level.

NOTE:
Wait a few minutes until level settles before inspecting.



Recommended Engine 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

ENGINE OIL REPLACEMENT

1. Warm up the engine for serveral minutes.
2. Place a drain pan under the engine.
3. Remove:
   - Oil filler cap



4. Remove:
   - Drain plug ①

   Drain the engine oil.
5. Tighten:
   - Drain plug ①

Oil Drain Plug:
43 Nm (4.3 m·kg, 31 ft·lb)

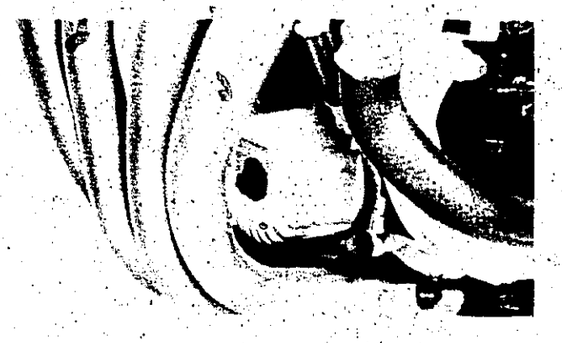
6. Fill:
   - Crankcase

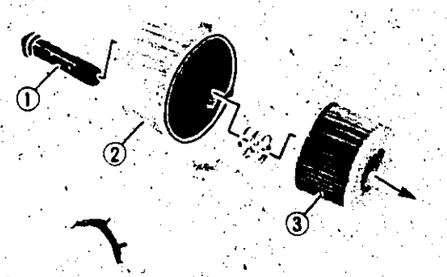
CAUTION:

Do not allow foreign material to enter the crankcase.

Periodic Oil Change:
2.7 L (2.4 Imp qt, 2.9 US qt)
Recommended Engine Oil:
At 5°C (40°F) or Higher:
Yamalube 4-cycle oil or
SAE 20W40 Type SE Motor Oil
At 15°C (60°F) or Lower:
SAE 10W30 Type SE Motor Oil

7. Install:
   - Oil filler cap





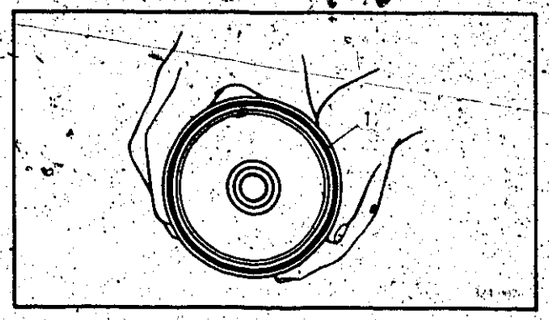
ENGINE OIL FILTER REPLACEMENT

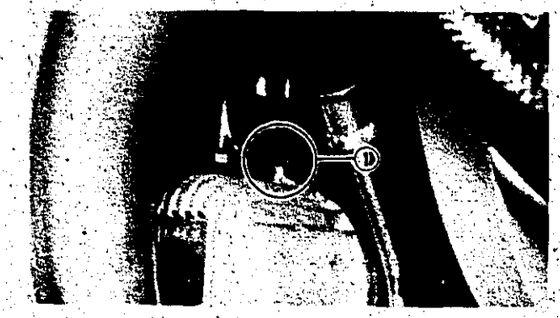
1. Warm up the engine for several minutes.
2. Place a drain pan under the engine.
3. Remove:
   - Oil filler cap
   - Drain plug

   Drain the engine oil.

4. Remove:
   - Bolt (Oil filter) ①
   - Filter cover ②
   - Oil filter ③
5. Check:
   - O-rings

   Cracks/Damage → Replace.





6. Install:
   - Drain plug
   - Oil filter (New)
   - Plain washer
   - Spring
   - Oil filter bolt

NOTE:

Be sure the O-ring ① is positioned properly.

Drain Plug:
43 Nm (4.3 m·kg, 31 ft·lb)
Bolt (Oil Filter):
15 Nm (1.5 m·kg, 11 ft·lb)

NOTE:

Mesh the oil filter cover projection ① with the crankcase slot.

7. Fill:
   - Crankcase

With Oil Filter Replacement:
3.0 L (2.6 Imp qt, 3.1 US qt)

8. Warm up the engine for a few minutes, then stop the engine.
9. Observe:
   - Oil level



CAUTION:

Check oil pressure after replacing engine oil as follows:

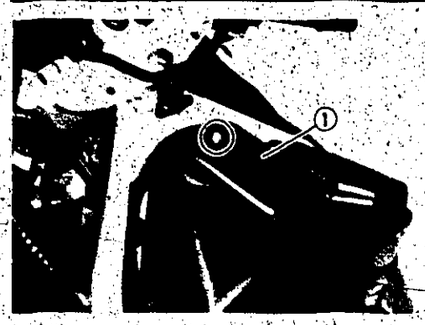
- **Slightly loosen the oil gallery bolt ① in the cylinder head.**
- **Start the engine. Keep it idling until oil begins to seep from the loosened oil gallery bolt.**
- **Turn the engine off, and tighten the oil gallery bolt to specification.**

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

- **Turn off engine immediately if no oil seeps from oil gallery bolt after one minute to prevent engine seizure.**
- **Locate and resolve problem, then recheck oil pressure.**

AIR FILTER CLEANING/CARBURATOR JOINT INSPECTION/FUEL LINE INSPECTION

INSP ADJ





AIR FILTER CLEANING

1. Remove:
   - Seat
   - Side covers
   - Fuel tank
   - Air filter case cover ①
   - Air filter element

CAUTION:

The engine should never be run without the air/filter element installed; excessive piston and/or cylinder wear may result.

2. Clean:
   - Air filter element

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

3. Inspect:
   - Air filter element

   Damage → Replace.
4. Install:
   - Air filter element
   - Air filter case cover
   - Fuel tank
   - Side covers
   - Seat



CARBURETOR JOINT INSPECTION

1. Inspect:
   - Carburetor joint

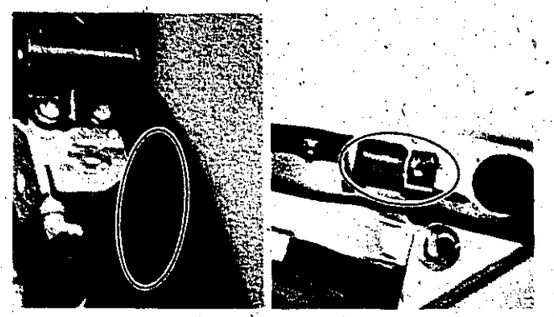
   Cracks/Damage → Replace.

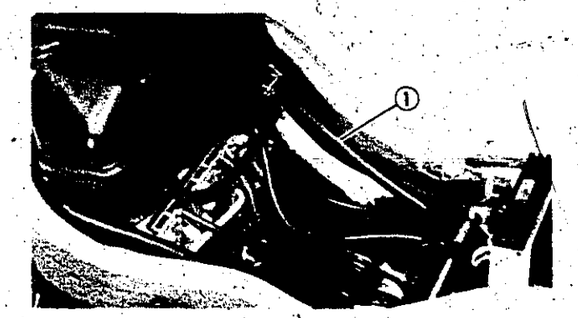
FUEL LINE INSPECTION

1. Remove:
   - Seat
   - Side cover (Right)

CRANKCASE VENTILATION HOSE INSPECTION/ EXHAUST SYSTEM INSPECTION

INSP ADJ





2. Inspect:
   - Fuel pipes

   Cracks/Damage → Replace.
   - Fuel filter

   Contamination/Damage → Replace.

NOTE:

Drain and flush the fuel tank if abrasive damage to any components is evident.

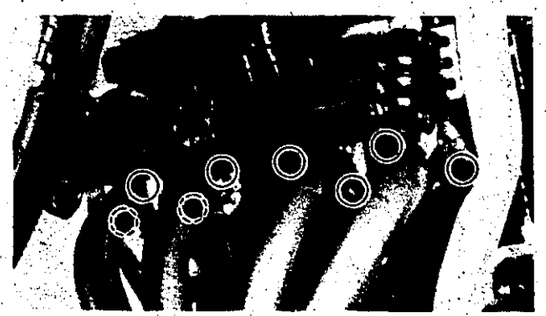
CRANKCASE VENTILATION HOSE INSPECTION

1. Remove:
   - Seat
   - Side covers
   - Fuel tank
2. Inspect:
   - Crankcase ventilation hose ①

   Cracks/Damage → Replace.

EXHAUST SYSTEM INSPECTION

1. Remove:
   - Side cowlings
   - Engine grill

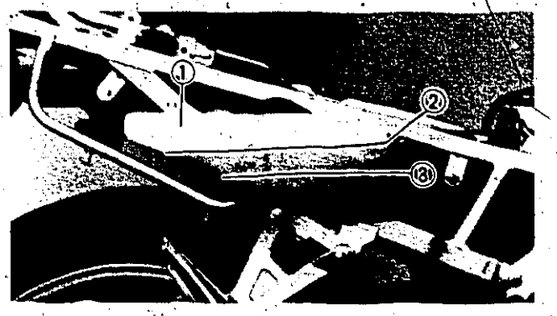


2. Inspect:
   - Exhaust pipe
   - Gaskets (Exhaust pipe)
   - Muffler

   Cracks/Damage → Replace.
   - Bolt
   - Nut

   Loose → Tighten.
3. Tighten:

Nuts (Exhaust Pipe):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolt (Muffler Stay):
25 Nm (2.5 m·kg, 18 ft·lb)
Bolt (Muffler/Rear Footrest):
42 Nm (4.2 m·kg, 30 ft·lb)



① Coolant reservoir tank
② "FULL" level
③ "LOW" level

COOLANT LEVEL INSPECTION

1. Remove:
   - Seat
   - Side cover (Left)
2. Inspect:
   - Coolant level
     (Reservoir tank ①)
     Low level → Add tap water (Soft water).

WARNING:

Do not remove the radiator cap when the engine is hot.

CAUTION:

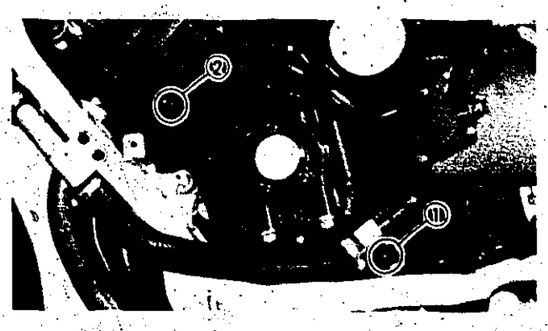
Hard water or salt water is harmful to the engine parts; use boiled or distilled water if you can't get soft water.

COOLANT REPLACEMENT

WARNING:

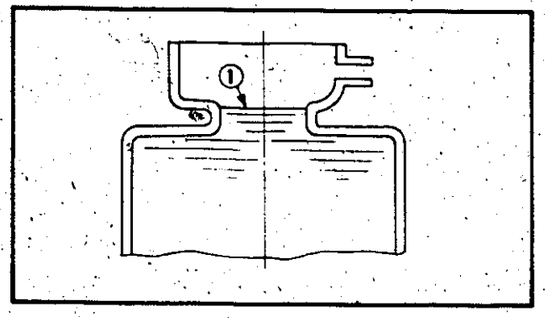
Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. 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.

1. Place a drain pan under the drain bolts.



2. Remove:
   - Drain bolt (Water pump) ①
   - Drain bolt (Cylinder) ②
   - Radiator cap
     Drain the coolant.

NOTE:
Remove the drain bolts first, then remove the radiator cap to prevent the coolant spilling.



3. Tighten:
   - Drain bolt (Cylinder)
   - Drain bolt (Water pump)

Drain Bolt (Cylinder):
8 Nm (0.8 m·kg, 5.8 ft·lb)
Drain Bolt (Water Pump):
8 Nm (0.8 m·kg, 5.8 ft·lb)

NOTE:
Replace with new copper gasket.

4. Fill:
   - Cooling system

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 ①.
- Install the radiator cap.

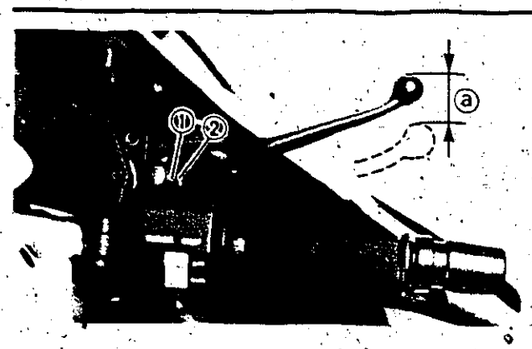
Recommended Coolant:
High Quality Ethylene Glycol Anti-Freeze Containing Anti-Corrosion for Aluminum Engine Inhibitors
Coolant and Water Mixed Ratio:
50%/50%
Total Amount:
2.3 L (2.0 Imp qt, 2.4 US qt)
Reservoir Tank Capacity:
0.4 L (0.35 Imp qt, 0.42 US qt)
From "LOW" to "FULL" Level:
0.15 L (0.13 Imp qt, 0.16 US qt)

CAUTION:

- **Hard water or salt water is harmful to the engine. You may use distilled water if you can't get soft water.**
- **Do not mix more than one type of ethlen glycol antifreeze containing corrosion for aluminum engine inhabitors.**

FRONT BRAKE ADJUSTMENT/REAR BRAKE ADJUSTMENT

INSP ADJ



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FRONT BRAKE ADJUSTMENT

1. Loosen:
   - Adjuster locknut ①
2. Adjust:
   - Free play.
     Turn the adjuster ② until the free play ⓐ is within the specified limits.

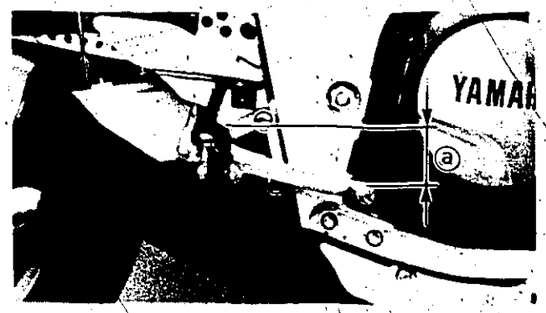
Turn in	Free play is decreased.
Turn out	Free play is increased.

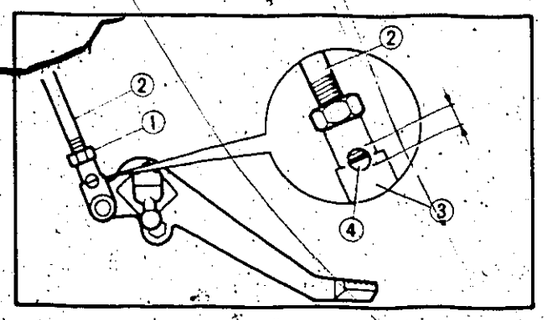
Front Brake Lever Free Play:
2 ~ 5 mm (0.08 ~ 0.2 in)

CAUTION:

Proper lever free play is essential to avoid excessive brake drag.

3. Tighten:
   - Adjuster locknut





REAR BRAKE ADJUSTMENT

1. Loosen:
   - Adjuster locknut ①
2. Adjust:
   - Brake pedal height ⓐ
     Turn the adjuster ② until the brake pedal position is at the specified height.
   - Rear brake light switch

Brake Pedal Height:
50 mm (2.0 in)
Below the Top of the Footrest

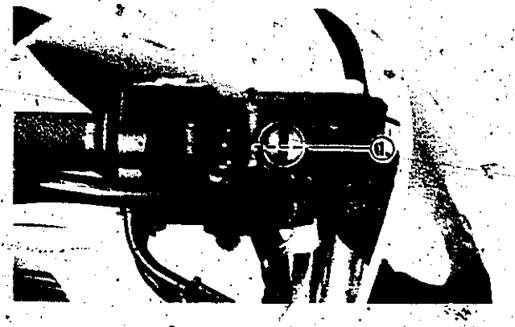
WARNING:

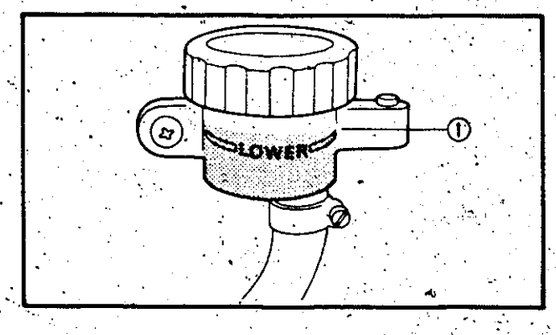
After adjusting the brake pedal height, visually check the adjuster end ② through the hole of the joint holder ③. The adjuster end must appear within this hole ④.

3. Lock:
   - Lock nut ①

BRAKE FLUID INSPECTION/BRAKE PAD INSPECTION
REAR BRAKE LIGHT SWITCH ADJUSTMENT

INSP ADJ





BRAKE FLUID INSPECTION

1. Inspect:
   - Brake fluid level
     Fluid at lower level → Replenish.

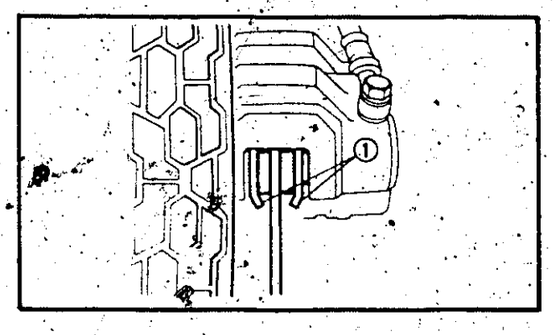
① Front brake fluid lower level

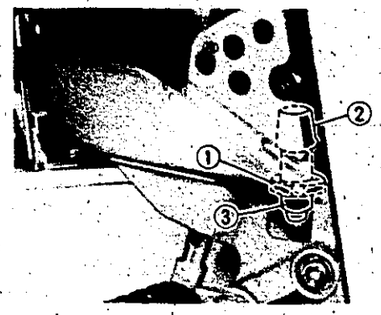
Brake Fluid: DOT #3

WARNING:

- **Use only designated quality brake fluid to avoid poor brake performance.**
- **Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.**
- **Be sure that water or other contaminants do not enter master cylinder when refilling.**
- **Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.**

① Rear brake fluid lower level



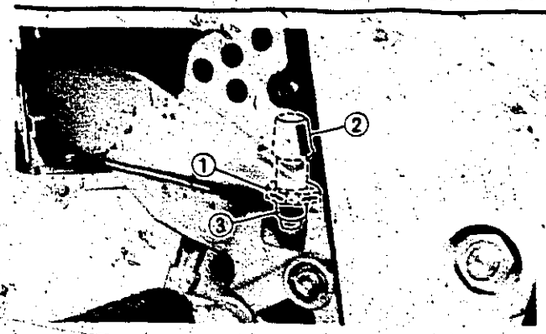


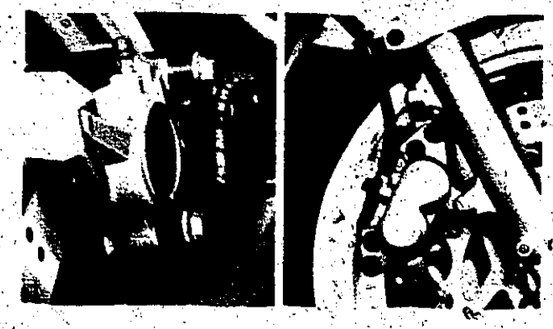
BRAKE PAD INSPECTION

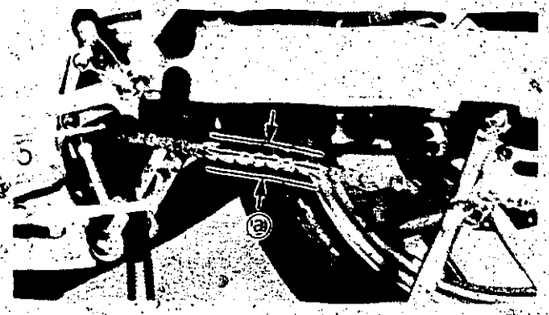
1. Activate the brake lever or brake pedal.
2. Inspect:
   - Wear indicator ①
     Indicator almost contacts disc → Replace pads.

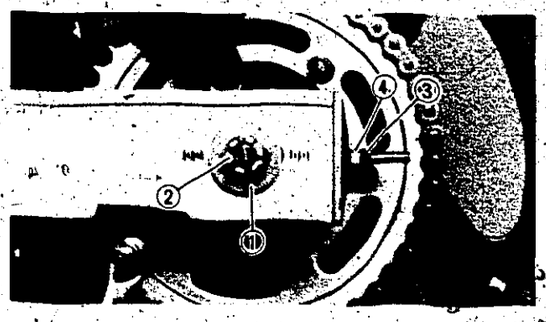
REAR BRAKE LIGHT SWITCH ADJUSTMENT

1. Loosen:
   - Locknut ①









2. Adjust:
   - Rear brake light switch
     Hold the switch body ② with your hand so it does not rotate and turn the adjuster ③.

NOTE:

Proper adjustment is achieved when the brake light comes on just before the brake begins to take effect.

BRAKE HOSE INSPECTION

1. Inspect:
   - Brake hoses
     Cracks/Damage → Replace.

DRIVE CHAIN SLACK CHECK

NOTE:

Before checking and/or adjusting the chain slack, rotate the rear wheel through several revolutions. Check the chain slack several times to find the point where the chain is the tightest. Check and/or adjust the chain slack where the rear wheel is in this "tight chain" position.

1. Place the motorcycle vertically on a leve place.
2. Measure:
   - Drive chain slack ⓐ
     Out of specification → Adjust.

Drive Chain Slack:	15 ~ 20 mm (0.6 ~ 0.8 in)

DRIVE CHAIN SLACK ADJUSTMENT

1. Remove:
   - Cotter pin ①
2. Loosen:
   - Nut (Rear axle) ②
   - Locknut ③
3. Adjust:
   - Chain slack
     Turn the adjuster ④ in or out.

Turn in	Chain slack is decreased.
Turn out	Chain slack is increased.

NOTE:

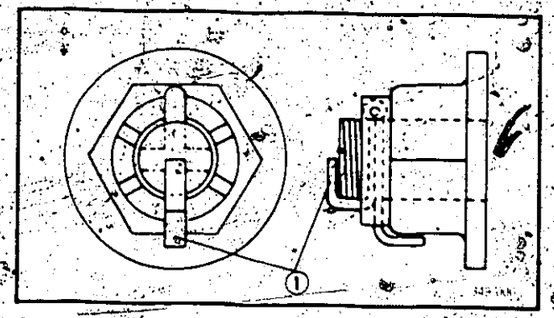
There are marks on each side of rear arm and on each chain puller; use them to check for proper alignment.

CAUTION:

Too small chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

4. Tighten:
   - Locknut
   - Nut (Rear axle)

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



5. Install:
   - Cotter pin ① (New)

WARNING:

Always use a new cotter pin on the axle nut.

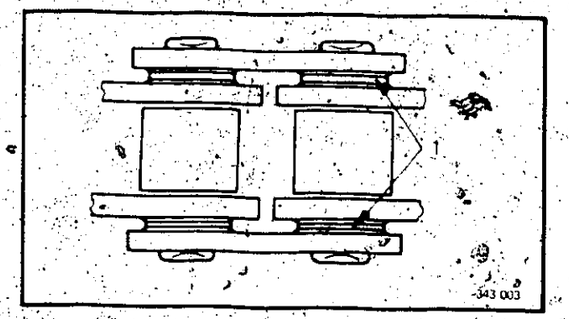
NOTE:

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.

DRIVE CHAIN LUBRICATION

1. Clean:
   - Drain chain

Drain Chain Cleaner:	Kerosene



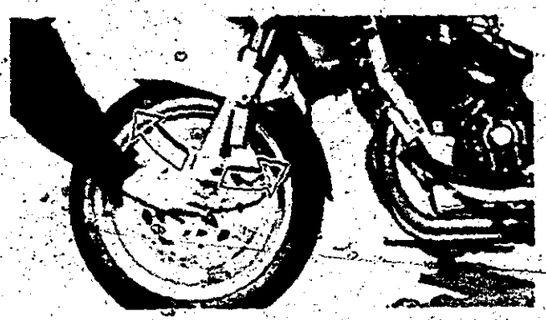
CAUTION:

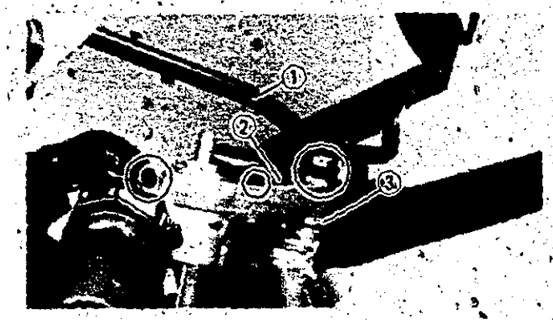
Do not use steam cleaning, high-pressure washes, and certain solvent or O-ring ① damage may occur.

2. Lubricate:
   - Drive chain.

Drive Chain Lubricant:
SAE 30 ~ 50 motor oil or chain lubricants for "O-ring" chains

CAUTION:
Do not use any other lubricants or O-rings damage may occur.

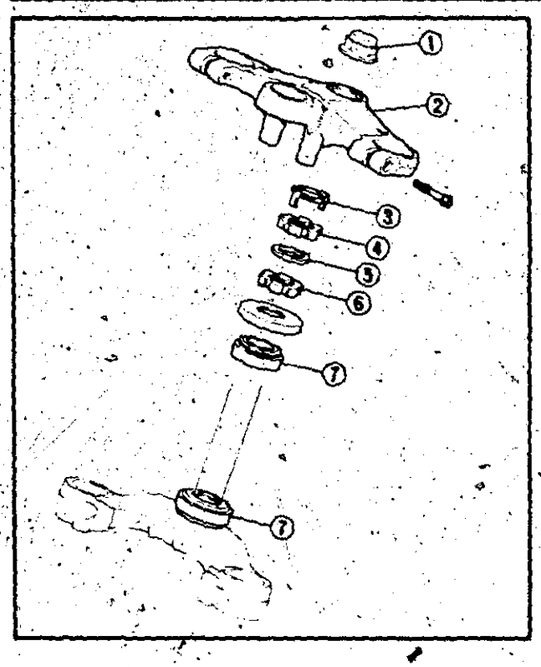




STEERING HEAD INSPECTION

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

1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing a suitable stand under the engine.
3. Check:
   - Steering assembly bearings
     Grasp the bottom of the front forks and gently rock the fork assembly back and forth.
     Looseness → Adjust the steering head.
4. Remove:
   - Stay (Upper cowling) ①
   - Nut (Steering stem)
   - Blind plugs
   - Bolts (Handlebars)
5. Loosen:
   - Pinch bolts (Handle crown)
6. Remove:
   - Handle crown ②
   - Lock washer
   - Ring nut (Upper) ③
   - Washer



7. Tighten:
   - Ring nuts (Lower and upper)

Ring nuts tightening steps:

NOTE:
Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

- Install the ring nut (Lower) ⑥.

NOTE:
The tapered side of ring nut must faced downward.

- Tighten the ring nut ⑥ using the Ring Nut Wrench.

Ring Nut Wrench:
P/N 90890-01403

Ring Nut ⑥ (Initial Tightening):
52 Nm (5.2 m·kg, 37 ft·lb)

- Loosen the ring nut ⑥ completely and retighten it to specification.

WARNING:
Do not over-tighten.

Ring Nut ⑥ (Final Tightening):
3 Nm (0.3 m·kg, 2.2 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 bearing ⑦.
  Refer to "CHAPTER 7. STEERING HEAD" for more details.
- Install the washer ⑤.
- Install the ring nut (Upper) ④.

NOTE:
The tapered side of ring nut must face downward.

- Finger tighten the ring nut ④, then align the slots of both ring nuts. If not aligned, hold the lower ring nut ⑥ and tighten the other until they are aligned.
- Install the lock washer ③.

NOTE:
Make sure the lock washer tab is placed in the slots.

- Install the handle crown ② and tighten the steering stem nut ① to specification.

Nut (Steering Stem):
110 Nm (11.0 m·kg, 80 ft·lb)

- Tighten the pinch bolts to specification.

Pinch Bolt (Handle Crown):
20 Nm (2.0 m·kg, 14 ft·lb)

8. Install:
   - Bolts (Handlebars)
   - Blind plugs
   - Stay (Upper cowling)

FRONT FORK OIL REPLACEMENT

WARNING:

- **Fork oil leakage can cause loss of stability and safe handling. Have any problem corrected before operating the machine.**
- **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. Loosen:
   - Pinch bolt ① (Handle crown)
3. Remove:
   - Cap bolt ②

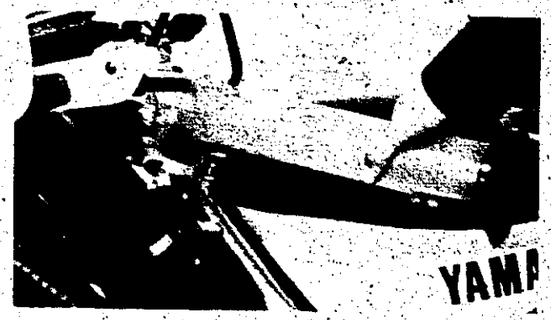


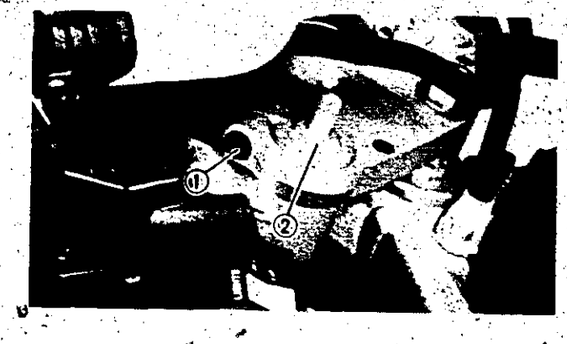
4. Place an open container under the drain hole.
5. Remove:
   - Drain screw ①

WARNING:

Do not allow any oil to contact the disc brake components. If oil is discovered, be sure to remove it, otherwise diminished braking capacity and damage to the rubber components of the brake assembly will occur.

6. After most of the oil has drained, slowly raise and lower outer tubes to pump out remaining oil.
7. Inspect:
   - Gasket (Drain screw)
   - O-ring (Cap bolt)
   Damage → Replace.
8. Install:
   - Gasket (Drain screw)
   - Drain screw





9. Fill:
   - Fork oil

Front Fork Oil Capacity (Each Fork):
425 cm³ (15.0 Imp oz, 14.4 US oz)
Recommended Oil:
Yamaha fork oil 10WT or equivalent

After filling pump the forks slowly up and down to distribute the oil.

11. Install:
   - Cap bolt ②

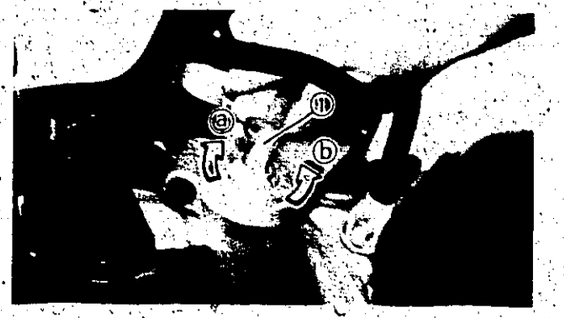
Cap Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)

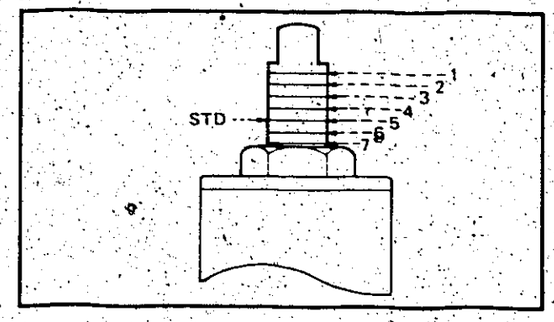
12. Tighten:
   - Pinch bolt ①

Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

FRONT FORK ADJUSTMENT/ REAR SHOCK ABSORBER ADJUSTMENT

INSP ADJ





FRONT FORK ADJUSTMENT

1. Adjust:
   - Spring preload

Stiffer ⓐ	→ Increase the spring preload. (Turn the adjuster ① in.)
Softer ⓑ	→ Decrease the spring preload. (Turn the adjuster ① out.)

Adjusting groove	← Stiffer				Std	Softer →
	1	2	3	4	5	6	7

CAUTION:

The grooves are there just to show the adjusting level.

WARNING:

Always adjust each fork preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.

REAR SHOCK ABSORBER ADJUSTMENT

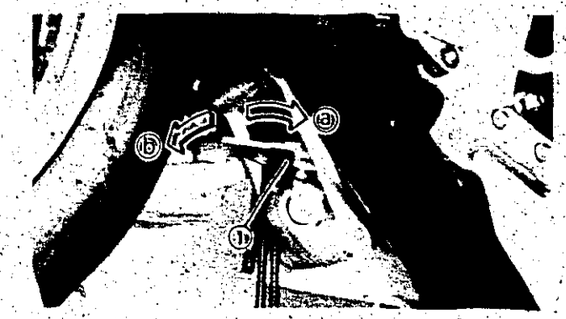
1. Adjust:
   - Spring preload

Spring preload adjustment steps:
- Loosen the locknut.
- Adjust the spring preload.
  Use the wrench (Owner's tool kit).

NOTE:

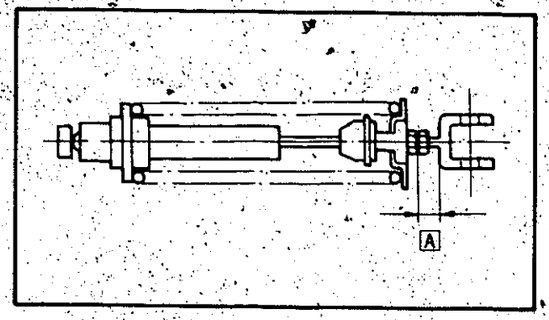
The length of the spring changes 1.0 mm (0.04 in) per turn of the adjuster.

Stiffer ⓐ	→ Increase the spring preload. (Turn the adjuster ① in.)
Softer ⓑ	→ Decrease the spring preload. (Turn the adjuster ① out.)



RECOMMENDED COMBINATION OF FRONT FORK AND REAR SHOCK ABSORBER SETTINGS

INSP ADJ



A Measurement length

Standard Length:
14.5 mm (0.57 in)
Minimum Length:
12.5 mm (0.49 in)
Maximum Length:
20.5 mm (0.81 in)

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

- Tighten the locknut.

Locknut:
42 Nm (4.2 m·kg, 30 ft·lb)

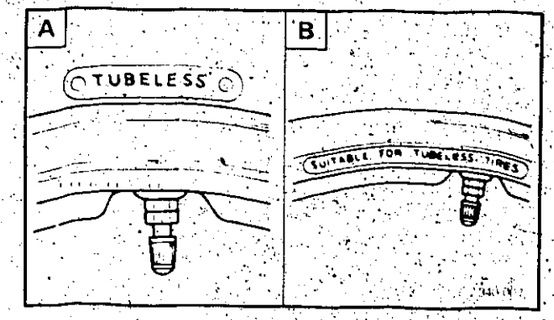
RECOMMENDED COMBINATIONS OF FRONT FORK AND REAR SHOCK ABSORBER SETTINGS.

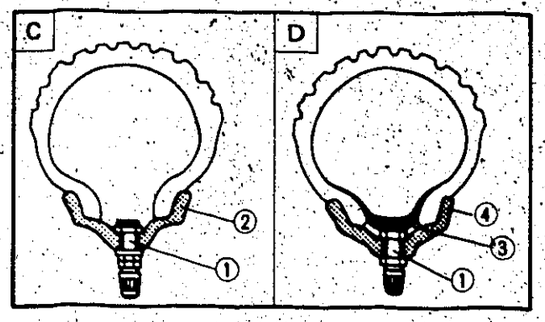
Use this table as a guide for specific riding and motorcycle load conditions.

	Front fork	Rear shock absorber	Loading condition			
	Spring preload adjuster	Measurement "A"	Solo rider	With passenger	With accessories and equipment	With accessories equipment and passenger
1	4 ~ 7	12.5 ~ 16.5 mm (0.49 ~ 0.65 in)	○			
2	2 ~ 5	14.5 ~ 18.5 mm (0.57 ~ 0.73 in)		○	○	
3	1 ~ 4	16.5 ~ 20.5 mm (0.65 ~ 0.81 in)				○

TIRE INSPECTION

INSP ADJ



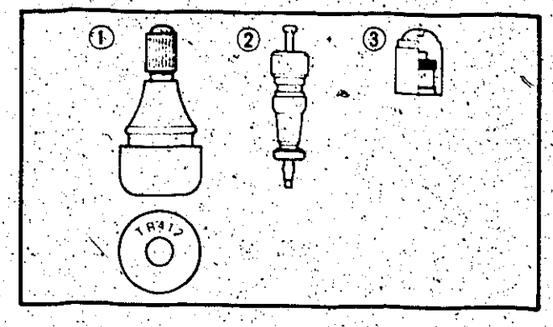


FRONT:

Manufacture	Size	Type
Bridgestone	120/70 VR17–V270	CYROX-03
Dunlop	120/70 VR17–V270	K455F
Pirelli	120/70 ZR17	MP7S

REAR:

Manufacture	Size	Type
Bridgestone	160/60 VR18–V270	CYROX-04
Dunlop	160/60 VR18–V270	K455
Pirelli	160/60 ZR18	MP7S



	Type
Tire valve	TR412
Valve core	#9000A (genuine)

TIRE INSPECTION

WARNING:

- **Do not attempt to use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.**

Wheel	Tire
Tube type	Tube type only
Tubeless type	Tube type or tubeless type

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

A Tire
B Wheel
C Tubeless tire
D Tube type tire
① Air valve
② Aluminum wheel (tubeless type)
③ Tube
④ Aluminum wheel (tube type)

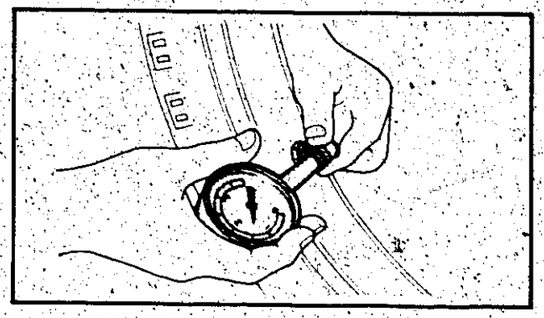
WARNING:

- **After extensive tests, the tires mentioned 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.
- **The use of tire valves and valve cores other than listed could cause tire deflation during extreme high speed riding. Always use genuine parts or their equivalent for replacement.**
- **Be sure to install the valve caps securely, as these are important to prevent air pressure leakage during extreme high speed riding.**

① Tire valve
② Valve core
③ Valve cap with seal

WHEEL INSPECTION

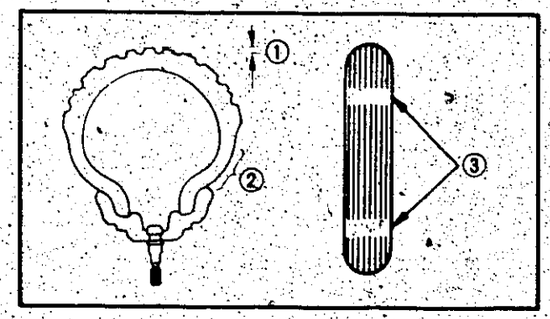
INSP ADJ



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

Basic weight: With oil and full fuel tank	229 kg (505 lb)	
Maximum load*	390 kg (860 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	250 kPa (2.5 kg/cm², 36 psi)	250 kPa (2.5 kg/cm², 36 psi)
90 kg (198 lb) ~ Maximum load*	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
High speed riding	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)

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



2. Inspect:
   - Tire surfaces
   Wear/Damage → Replace.

Minimum Tire Tread Depth (Front and Rear): 1 mm (0.04 in)

① Tread depth
② Side wall
③ Wear indicator

WHEEL INSPECTION

1. Inspect:
   - Aluminum wheels
   Damage/Bends → Replace.
   Never attempt even small repairs to the wheel.

NOTE:

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

CABLE INSPECTION/LUBRICATION

INSP ADJ

CABLE INSPECTION

1. Inspect:
   - Throttle cables
   - Throttle sheaths
   - Choke cable

   Check for damage to the cable insulation.
   Corrosion/Damage → Replace.
   Obstruction → Reroute.
   Unsmoothness → Lubricate.

LUBRICATION

Throttle cables/Choke cable

Cable lubrication steps:
- Remove the two grip end that secure throttle to handlebar.
- Hold cable end high and apply several drops of lubricant to cable.
- Coat metal surface of disassembled throttle twist grip with suitable all-purpose grease to minimize friction.

SAE 10W30 Motor Oil

Lever/Pedal

Lubricate pivoting part of each lever and pedal.

SAE 10W30 Motor Oil

Sidestand

Lubricate the pivoting part.

SAE 10W30 Motor Oil

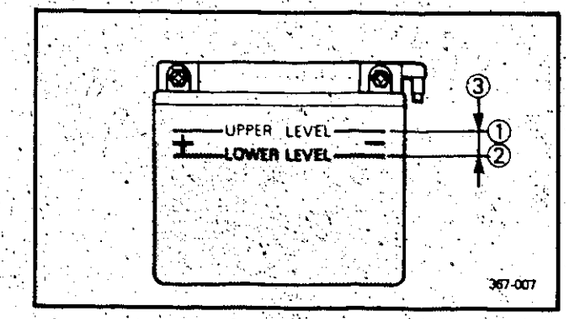
BATTERY INSPECTION

INSP ADJ

ELECTRICAL

BATTERY INSPECTION

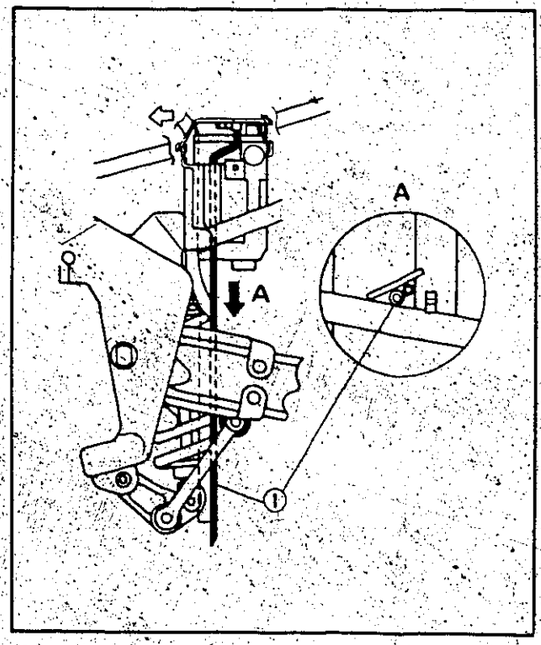
1. Remove:
   - Seat



2. Inspect:
   Fluid level ③ should be between upper ① and lower ② marks.
   Incorrect → Refill.

CAUTION:

Refill with distilles water only; tap water contains minerals harmful to a battery.



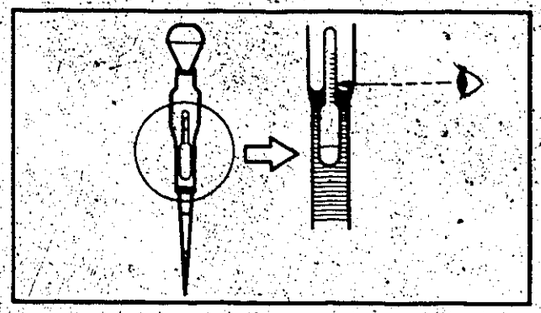
3. Connect:
   - Breather pipe (Battery) ①

   Be sure the hose is properly attached and routed.
4. Inspect:
   - Breather pipe (Battery) ①

   Obstruction → Reroute.
   Damage → Replace.

CAUTION:

When inspecting the battery, be sure the breather pipe is routed correctly. If the breather pipe touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the motorcycle can occur.



5. Check:
   - Specific gravity:

   Less than 1.280 → Recharge battery.

Charging Current:
1.4 amps/10 hrs
Specific Gravity:
1.280 at 20°C (68°F)

BATTERY INSPECTION

INSP ADJ

Replace the battery if:
- Battery voltage will not rise to a specific value or bubbles fail to rise even after many hours of charging.
- Sulfation of one or more cells occurs, as indicated by the plates turning white, or an accumulation of material exists in the bottom of the cell.
- Specific gravity readings after a long, slow charge indicate one cell to be lower than the rest.
- Warpage or buckling of plates or insulators is evident.

CAUTION:

Always charge a new battery before using it to ensure maximum performance.



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 servere burns or 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.**

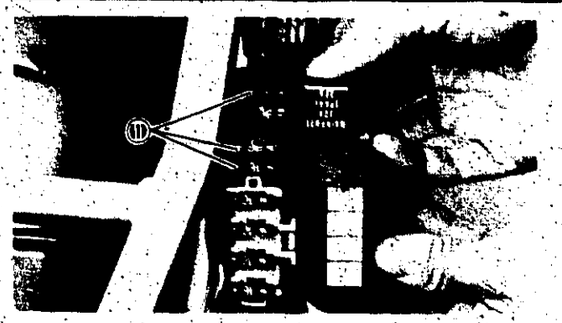
Antidote (INTERNAL):
- **Drink large quantities of water or milk follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.**

Batteries also generate explosive hydrogen gas, therefore you should 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.

FUSE INSPECTION/HEADLIGHT BEAM ADJUSTMENT

INSP ADJ



FUSE INSPECTION

The fuse panel is located under the seat.

1. Inspect:
   - Fuses
     Defective → Replace.
     Blown fuse (New) → Inspect circuit.

NOTE:

Install new fuses of proper amperage.

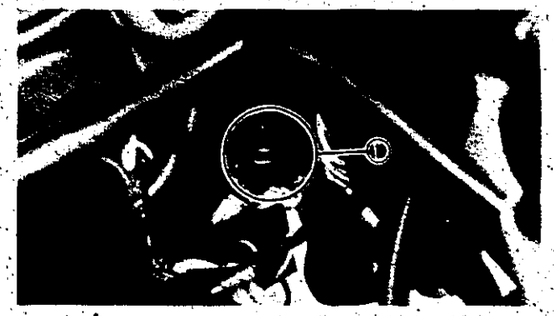
① Spare fuses

Description	Amperage	Quantity
Main	30A	1
Headlight	15A	1
Signal	10A	1
Ignition	10A	1
Reserve	10A	1
	15A	1
	30A	1

Blown fuse replacement steps:
- Turn off ignition and the circuit.
- Install a new fuse of proper amperage.
- Turn on switches to verify operation of electrical device.
- If fuse blows immediately again, check circuit in question.

WARNING:

Do not use fuses of higher amperage rating than recommended. Extensive electrical system damage and fire could result from substitution of a fuse of improper amperage.

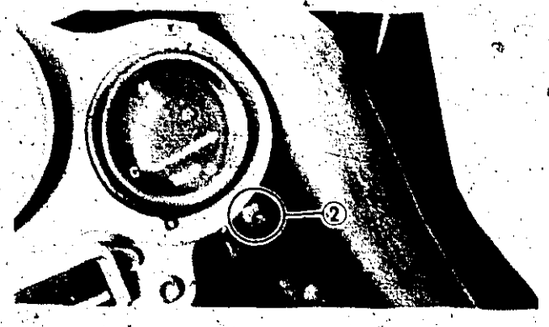


HEADLIGHT BEAM ADJUSTMENT

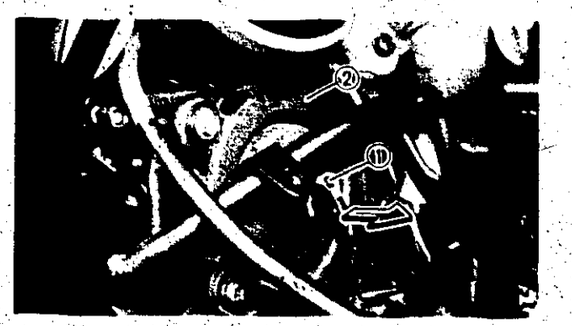
1. Adjust:
   - Horizontal adjustment:
     To adjust the beam to the right, turn the adjusting screw ① clockwise.
     To adjust the beam to the left, turn the screw ① counterclockwise.

HEADLIGHT BULB REPLACEMENT

INSP ADJ



2. Adjust:
   - Vertical adjustment:
     To raise the beam, turn the adjusting screw ② clockwise.
     To lower the beam, turn the screw ② counterclockwise.



HEADLIGHT BULB REPLACEMENT

1. Remove:
   - Air intake duct
2. Disconnect:
   - Headlight lead ①
3. Remove:
   - Cover (Headlight) ②
   - Cover (Bulb)



4. Remove:
   - Bulb
     Turn the bulb holder counterclockwise to release bulb.

WARNING

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

5. Install:
   - Bulb (New)
     Secure the new bulb with the bulb holder.

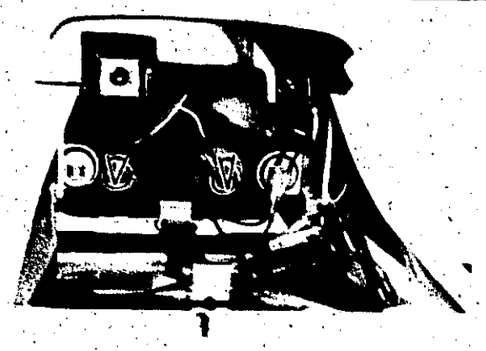
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Avoid touching glass part of bulb. Also keep it free from oil otherwise, transparency of glass, bulb life and illuminous flux will be adversely affected. If oil gets on bulb, clean it with a cloth moistened thoroughly with alcohol or lacquer thinner.

6. Install:
   - Cover (Bulb)
   - Cover (Headlight)
   - Headlight lead
   - Air intake duct

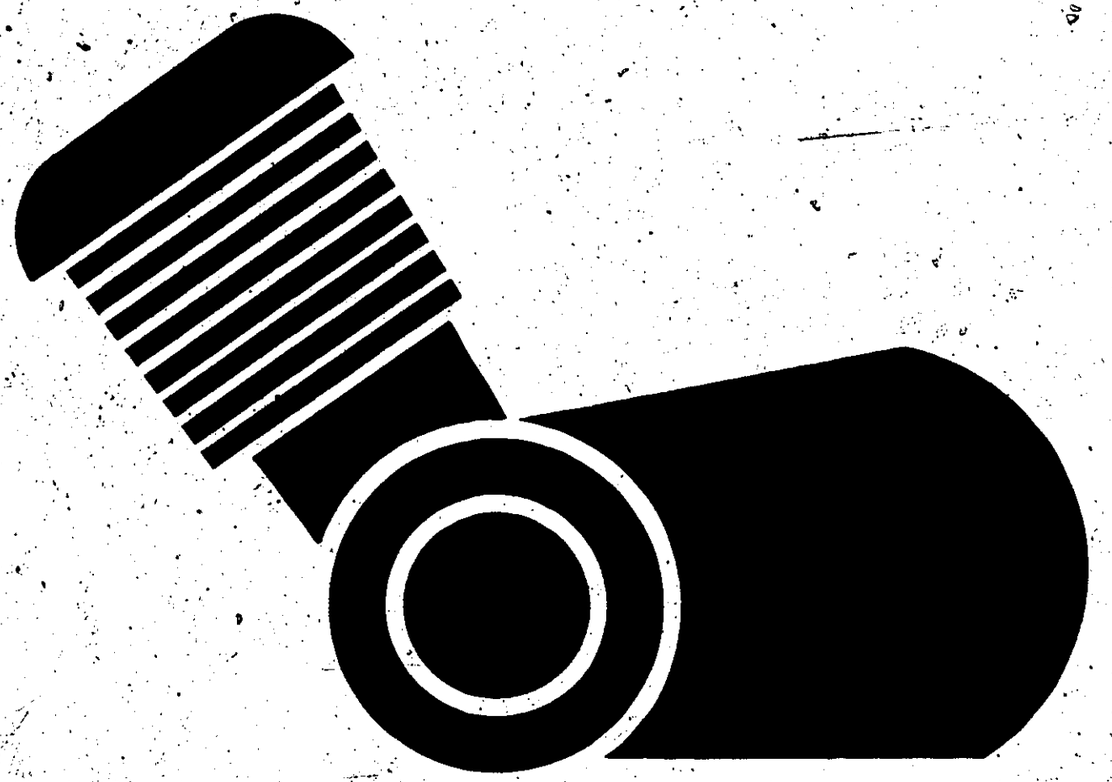
TAILL/BRAKE BULB REPLACEMENT

INSP ADJ



TAIL/BRAKE BULB REPLACEMENT

1. Remove:
   - Seat
   - Side covers
   - Tail cowling
2. Remove:
   - Bulb socket
     Turn the bulb socket approximately 30° counterclockwise.
3. Replace:
   - Defective bulb
4. Install:
   - Bulb socket
   - Tail cowling
   - Side covers
   - Seat



ENG 4

ENGINE OVERHAUL

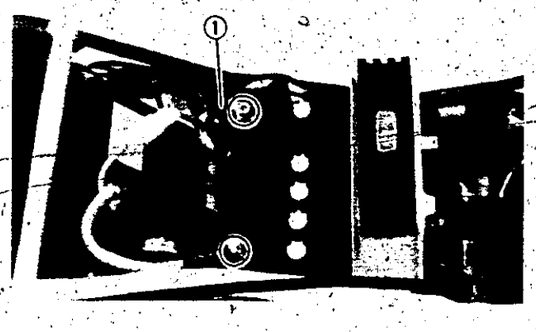
ENGINE REMOVAL

NOTE:
It is not necessary to remove the engine in order to remove the following componeats:
- Cylinder head
- Cylinder
- Piston
- Clutch
- Water pump
- A.C. generator

SIDE COWLING, SEAT, SIDE COVERS, FUEL TANK

1. Remove:
   - Side cowling
   - Seat
   - Side covers
   - Fuel tank

   Refer to "CHAPTER-3 COWLINGS REMOVAL AND INSTALLATION".
2. Disconnect:
   - Battery leads

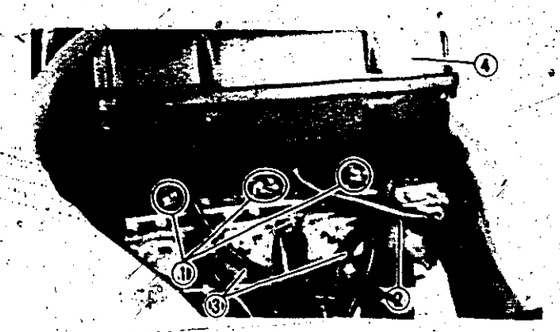


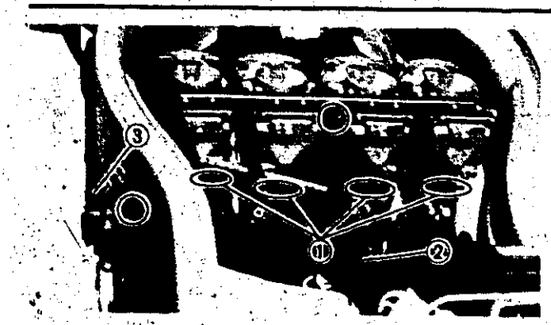
NOTE:
Disconnect the negative lead ① first.

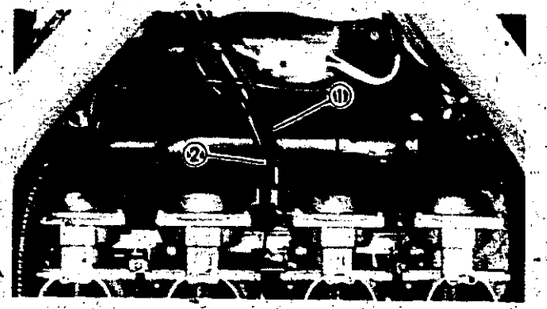
3. Drain:
   - Engine oil
   - Coolant
   - Refer to "CHAPTER-3 ENGINE OIL REPLACEMENT AND COOLANT REPLACEMENT".

AIR CLEANER

1. Loosen:
   - Screws (Air cleaner joint) ①
2. Disconnect:
   - Hose ② (Crankcase ventilation)
   - Air vent hose ③
3. Remove:
   - Air cleaner assembly ④





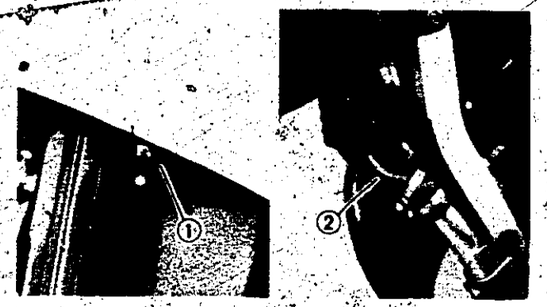


CARBURATOR

1. Loosen:
   - Screws (Carburator joint clamp – Lower) ①
2. Disconnect:
   - Fuel hose ②
3. Remove:
   - Choke lever assembly ③
   - Carburator and joints assembly

4. Disconnect:
   - Throttle cable 1 ①
   - Throttle cable 2 ②

NOTE:
Cover the carburator with a clean rag to prevent dirt or foreign material into the carburator.



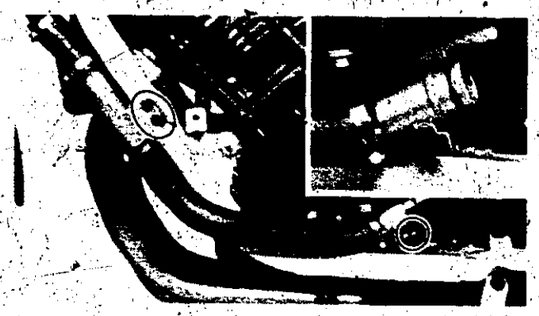
RADIATOR

1. Disconnect:
   - Hose (Radiator – Inlet) ①
   - Hose (Radiator – Outlet) ②

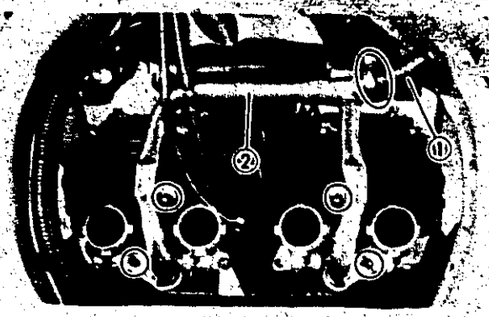


2. Disconnect:
   - Fan motor coupler
3. Remove:
   - Radiator assembly

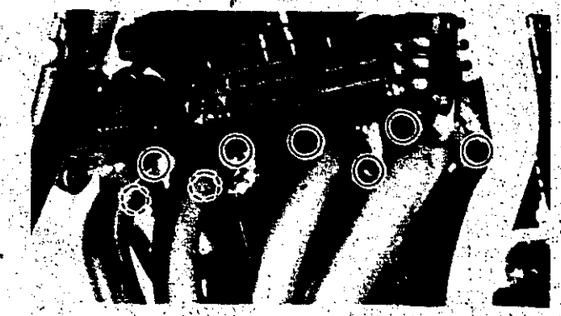
CAUTION:
Cover the cylinder head cover and the fender with rugs to prevent a scratching.



4. Remove:
   - Pipes (Radiator – Outlet)
   - O-ring

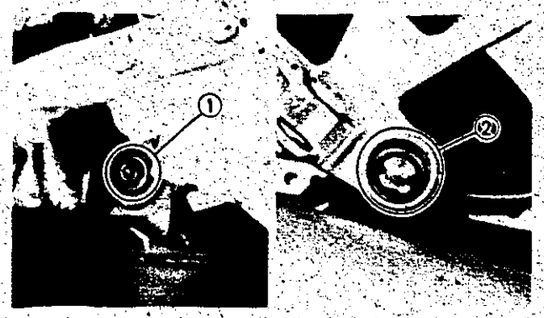


5. Disconnect:
   - Hose (Radiator – Inlet) ①
6. Remove:
   - Pipe (Radiator – Inlet) ②
   - O-rings

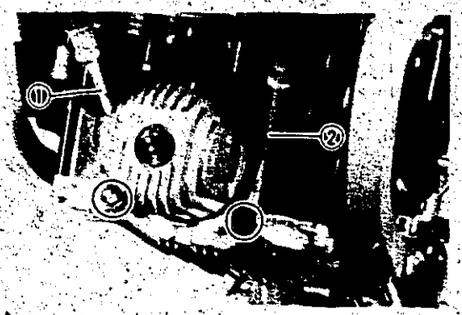


MUFFLER ASSEMBLY

1. Remove:
   - Nuts (Exhaust pipe)

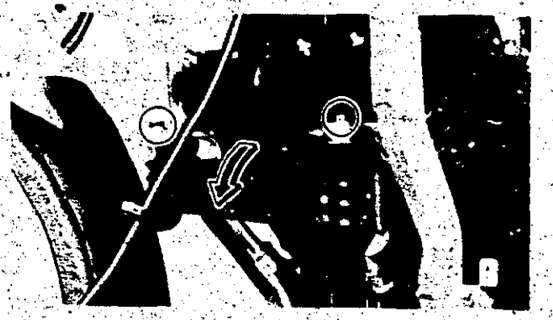


2. Remove:
   - Bolt (Muffler bracket) ①
   - Bolt (Muffler stay) ②
   - Muffler assembly

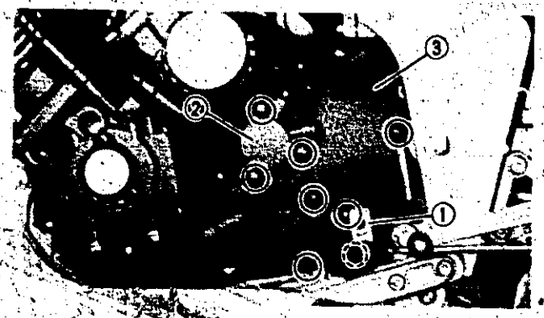


OIL COOLER

1. Remove:
   - Union bolts
   - Hose (Oil cooler – Inlet) ①
   - Hose (Oil cooler – Outlet) ②
   - Washers

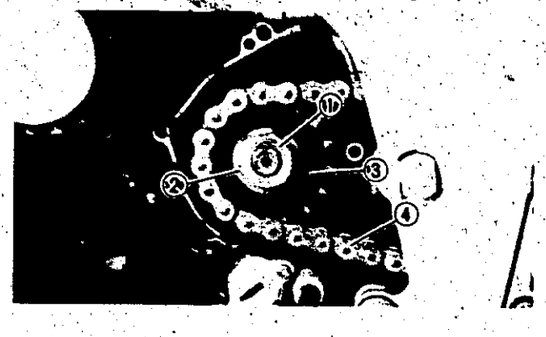


2. Remove:
   - Oil cooler

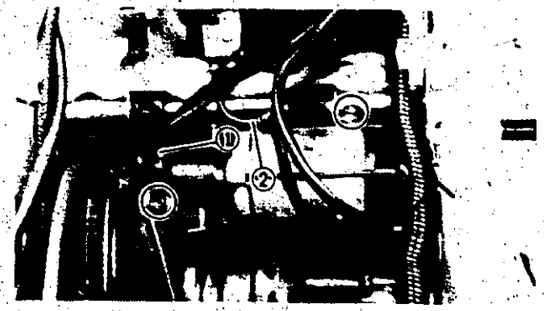


CLUTCH RELEASE CYLINDER AND DRIVE SPROCKET

1. Remove:
   - Change pedal link ①
   - Clutch release cylinder ②
   - Cover (Crankcase – Left) ③

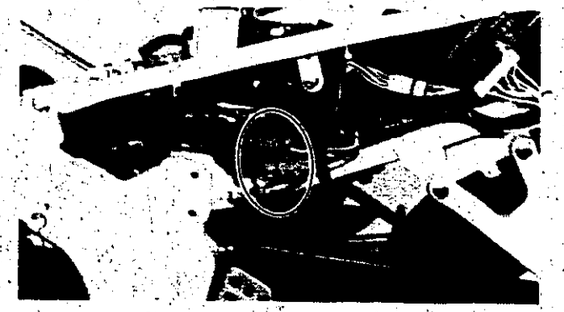


2. Loosen:
   - Drive chain slack
     Use the adjuster.
3. Remove:
   - Nut (Drive sprocket) ①
   - Lock washer ②
   - Drive sprocket ③
   - Drive chain ④

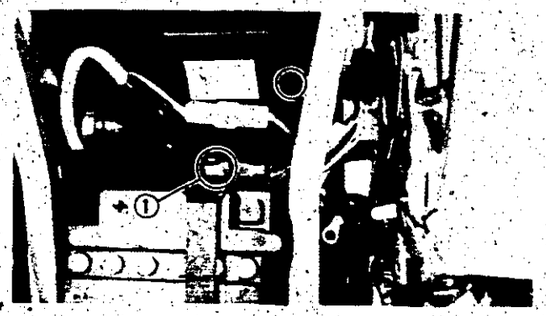


LEADS

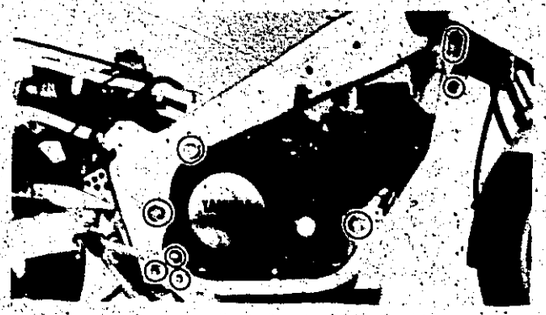
1. Remove:
   - Lead (Ground) ①
   - Lead (Starter motor) ②

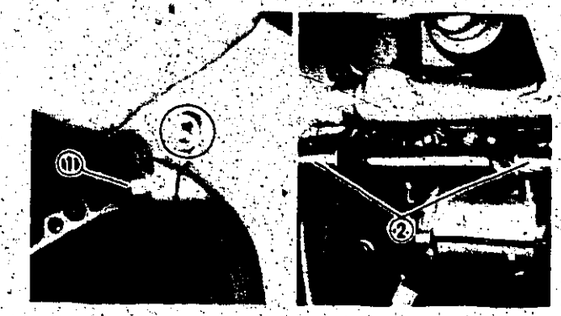


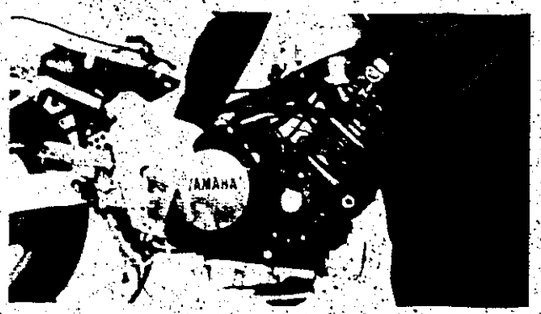
2. Disconnect:
   - Coupler (Oil level/Neutral switch)
   - Coupler (A.C. generator)
   - Leads (Side stand switch)



3. Disconnect:
   - Coupler (Pickup coil) ①
     Remove the digital ignitor unit.
4. Remove:
   - Leads (Spark plug)





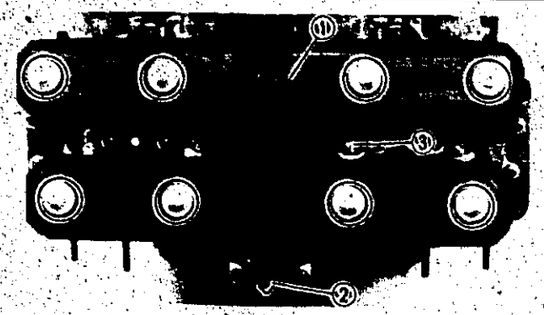


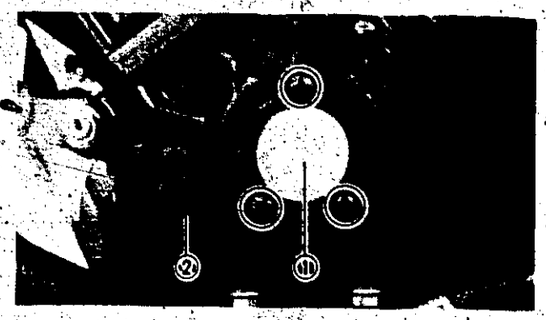
ENGINE REMOVAL

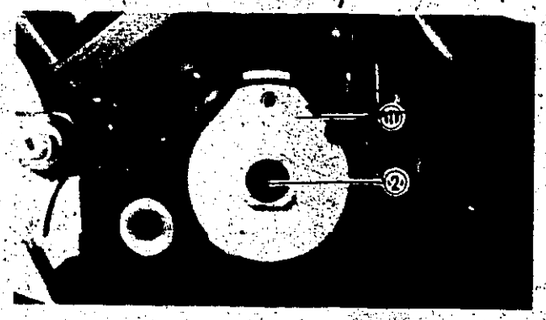
1. Place a suitable stand under the engine.
2. Remove:
   - Nuts
   - Bolts
   - Bolts (Cowling stay)
   - Down tube frame (Right)
   - Down tube frame (Left)

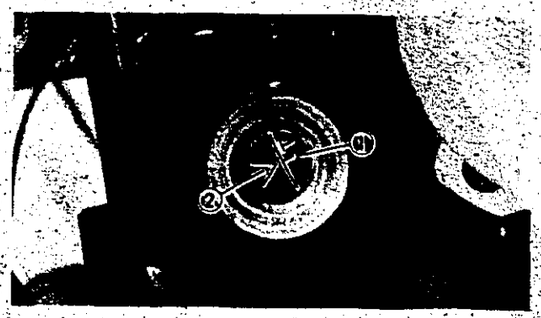
3. Loosen:
   - Bolt ①
4. Remove:
   - Bolts (Engine – Mounting)
     From left side.
   - Collars ②

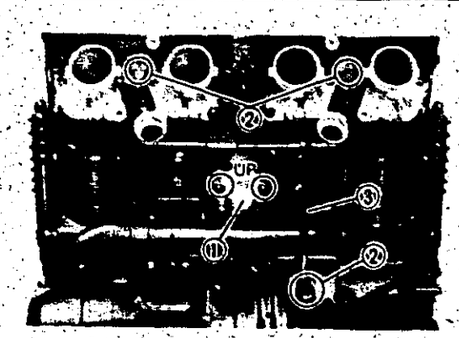
5. Remove:
   - Engine assembly
     From right side.











ENGINE DISASSEMBLY

CAMSHAFT AND CYLINDER HEAD

1. Remove:
   - Cylinder head cover ①
   - Gasket (Cylinder head cover) ②
   - Spark plugs ③

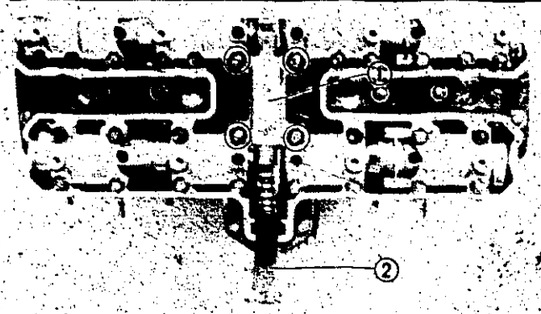
2. Remove:
   - Crankshaft end cover (Left) ①
   - Plug screw ②

3. Install:
   - Timing rotor ①
     P/N 33M-81673-10
   - Dowel pin ②
     P/N 93604-08071
   - Bolt (8 mm) ③
     P/N 91316-08030
4. Tighten:
   - Bolt

5. Turn:
   - Crankshaft
     Counterclockwise
6. Align:
   - "T" mark ①
   - Stationary pointer ②

NOTE:
When #1 piston is at TDC on compression stroke.

7. Remove:
   - Cam chain tensioner ①
   - Union bolts ②
   - Oil delivery pipe ③
   - Washers

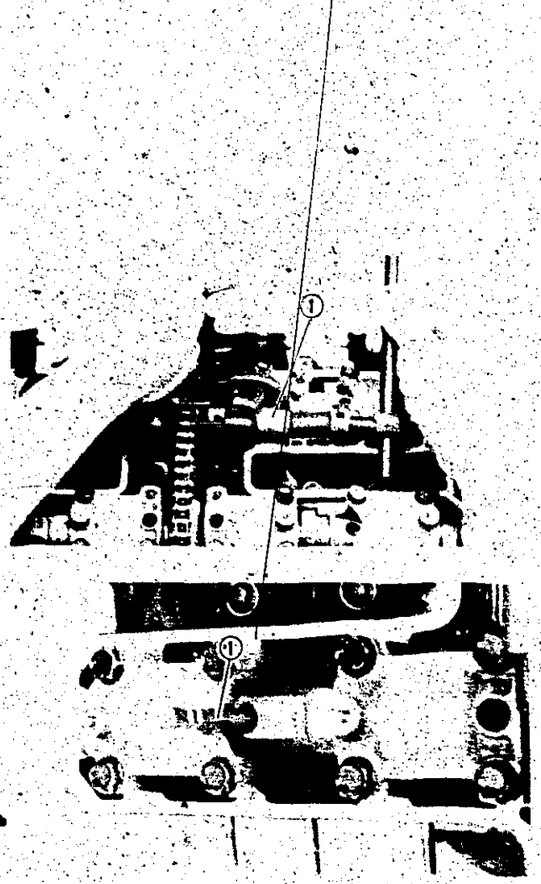


8. Remove:
   - Cam chain guide (Upper) ①
   - Cam chain guide (Exhaust side) ②

NOTE:
- Select either of the two procedures explained in this manual, as follows:

- **Procedure 1.**
  For engine service except cylinder head disassembly.
  → Disconnect the cam chain.
  The pistons and cylinder can be removed without removing the camshafts.

- **Procedure 2.**
  For engine service including cylinder head disassembly.
  → Remove the cam caps and camshafts.
  The camshafts can be removed without disconnecting the cam chain.



Procedure 1.

1. Disconnect:
   - Cam chain
     Use the Cam Chain Cutter ①.

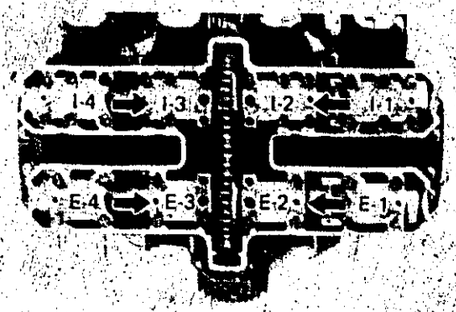
	Cam Chain Cutter: P/N 90890-01112

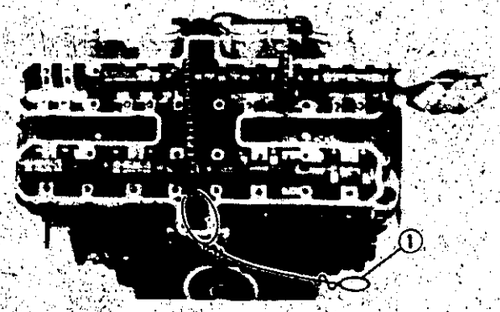
2. Remove:
   - Nuts (Cylinder head)
     Use the Hexagon Wrench ①.

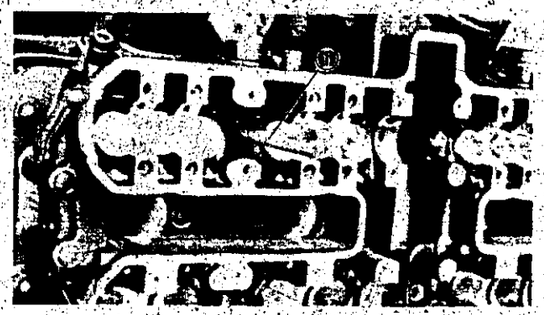
	Hexagon Wrench: P/N 90890-01395

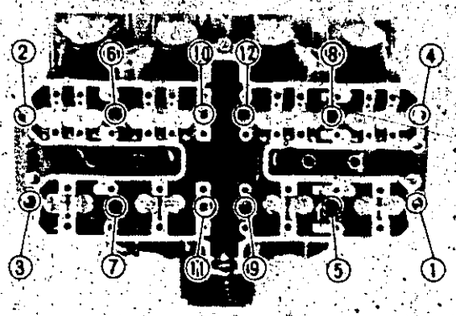
NOTE:
Remove the cylinder head, camshaft case and camshafts as an assembly.

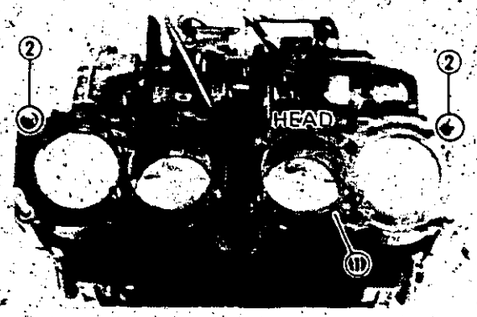
3. Go to "CYLINDER AND PISTON".











Procedure 2.

1. Remove:
   - Camshaft caps
   - Dowel pins

NOTE:
Remove the camshaft caps in a crisscross pattern from outermost to inner caps.

CAUTION:
Do not rotate the camshaft or valve damage may occur.

2. Remove:
   - Camshafts

NOTE:
Fasten safety wire ① to the cam chain to prevent it from falling into the crankcase.

3. Remove:
   - Nuts (Cylinder head)
     Use the Hexagon Wrench ①.

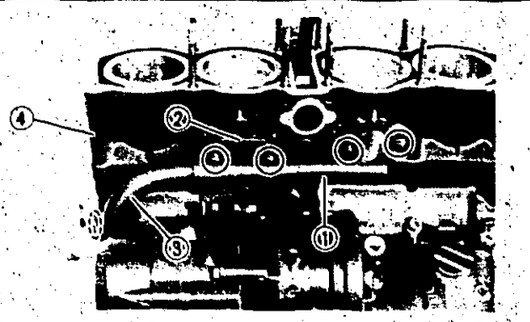
	Hexagon Wrench: P/N 90890-01395

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

4. Remove:
   - Cylinder head
   - Camshaft case

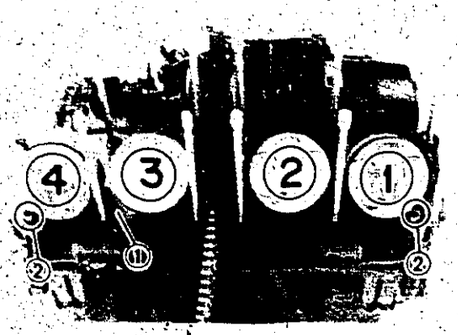
NOTE:
Remove the cylinder head and camshaft case as a whole to prevent the valve lifters and adjusting pads from falling into the crankcase.

5. Remove:
   - Gasket (Cylinder head) ①
   - Dowel pins ②



CYLINDER AND PISTON

1. Remove:
   - Water jacket joint ①
   - Holder (Air vent hose) ②
   - Coolant feed pipe ③
   - Cylinder ④



2. Remove:
   - Gasket (Cylinder) ①
   - Dowel pins ②
3. Mark:
   - Pistons

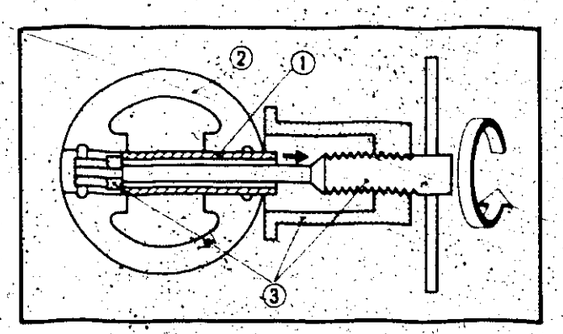
   With the piston number designations as shown.



4. Remove:
   - Circlips (Piston pin) ①

NOTE:

Before removing the piston pin circlip, cover the crankcase with a clean rag to prevent the circlip from falling into the crankcase cavity.

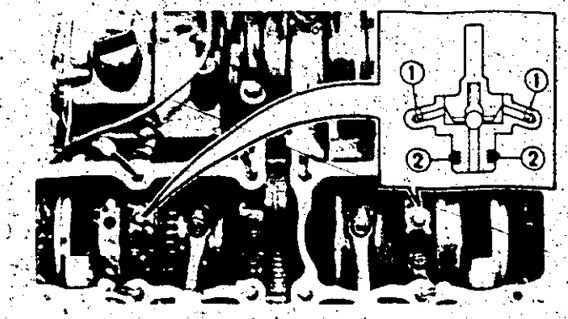


5. Remove:
   - Piston pins ①
   - Pistons ②

NOTE:

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 the Piston Pin Puller.

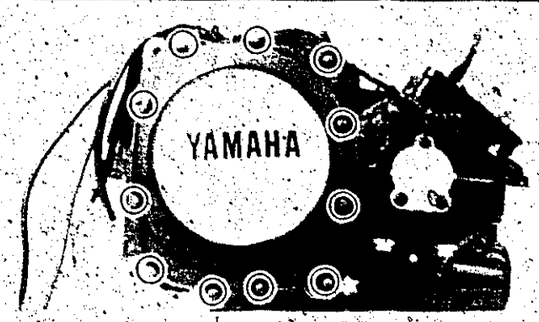
Piston Pin Puller:
P/N 90890-01304



CAUTION:

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

6. Remove:
   - Oil-Jet nozzles ①
   - O-rings ②

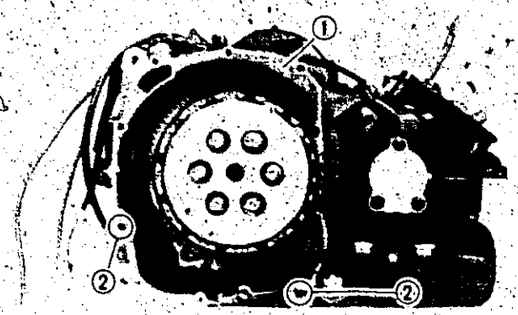


CLUTCH

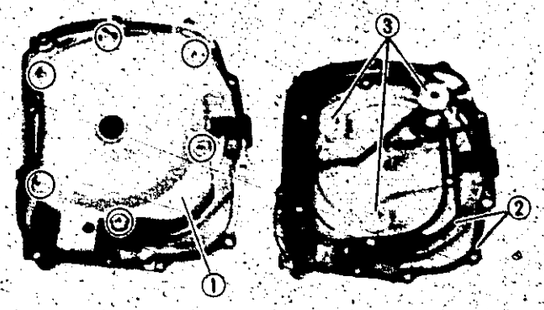
1. Remove:
   - Crankcase cover (Right)

NOTE:

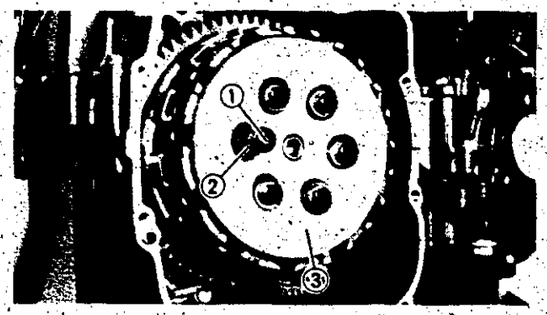
Working in a crisscross pattern, loosen bolts 1/4 turn each. Remove them after all are loosened.



2. Remove:
   - Gasket ①
   - Dowel pins ②



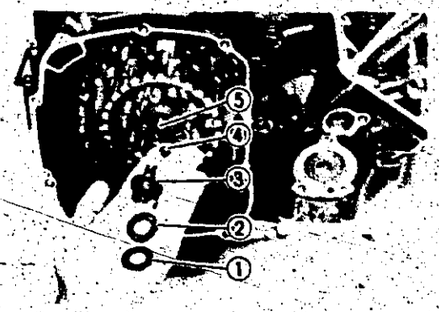
3. Remove:
   - Breather ①
   - Gasket ②
   - Washer ③
   - Rubber ring
   - Cover



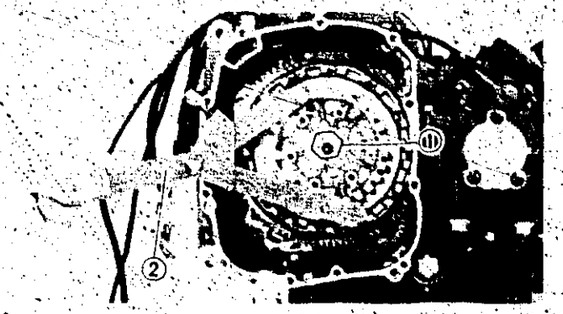
4. Remove:
   - Bolts (Clutch spring) ①
   - Clutch springs ②
   - Pressure plate ③
   - Friction plates
   - Clutch plates
   - Cushion spring

NOTE:

Loosen the bolts in a crisscross pattern.

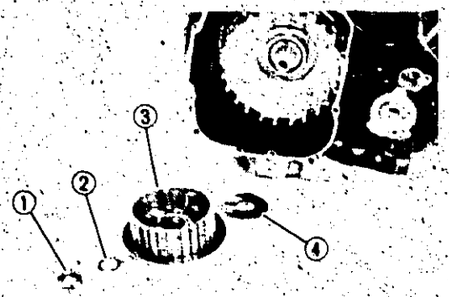


5. Remove:
   - Washer ①
   - Bearing ②
   - Push rod #1 ③
   - Ball ④
   - Push rod #2 ⑤

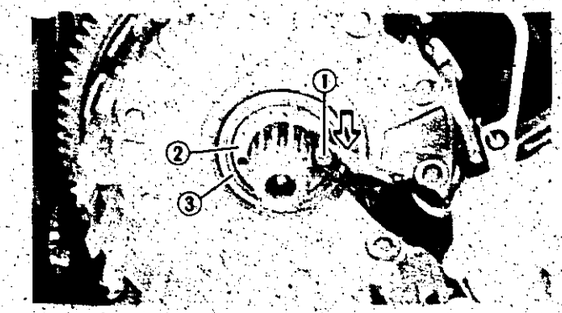


6. Straighten the lock washer tabs.
7. Loosen:
   - Nut (Clutch boss) ①
     Use the Universal Clutch Holder ②

	Universal Clutch Holder: P/N 90890-04086

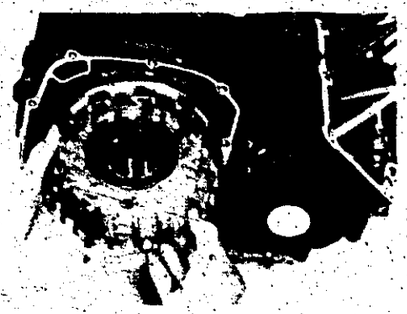


8. Remove:
   - Nut (Clutch boss) ①
   - Lock washer ②
   - Clutch boss ③
   - Thrust washer ④

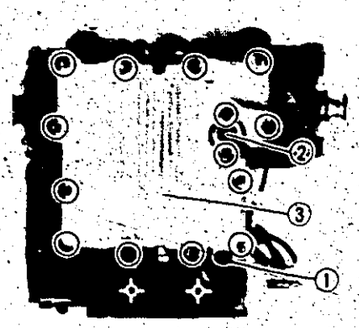


9. Remove:
   - Spacer ②
   - Bearing ③

NOTE:
Install the 5 mm (0.2 in) screw ① on the spacer ② then remove the spacer with pulling out screw.

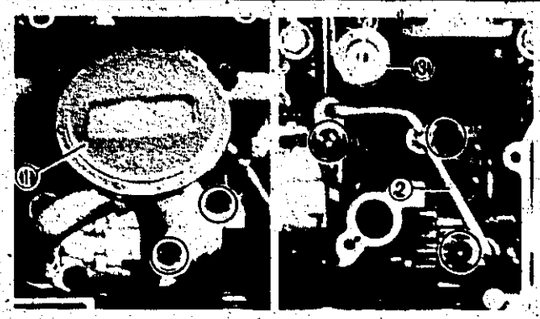


10. Remove:
    - Clutch housing

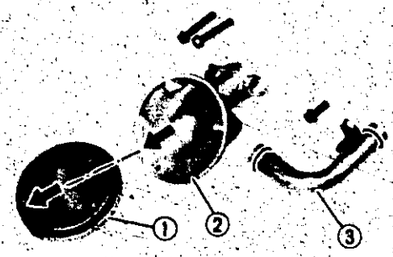


OIL PAN AND OIL STRAINER

1. Remove:
   - Drain plug ①
   - Oil level switch ②
   - Oil pan ③



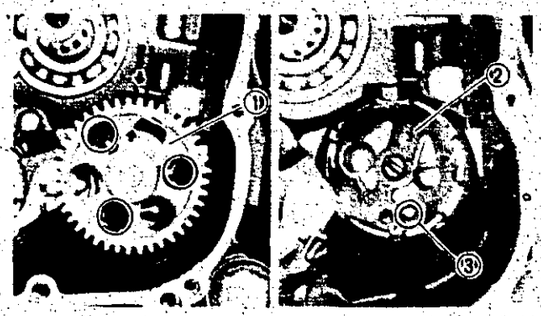
2. Remove:
   - Oil strainer assembly ①
   - Oil pipe 5 ②
   - Relief valve ③

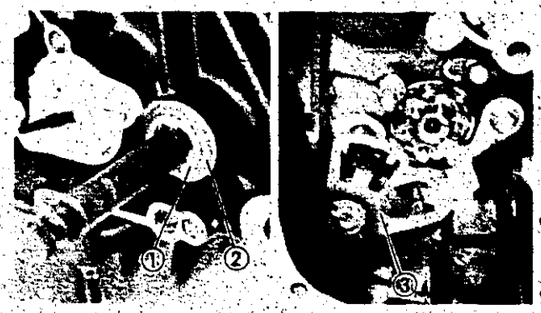


3. Remove:
   - Oil strainer element ①
   - Housing (Oil strainer) ②
   - Pipe ③

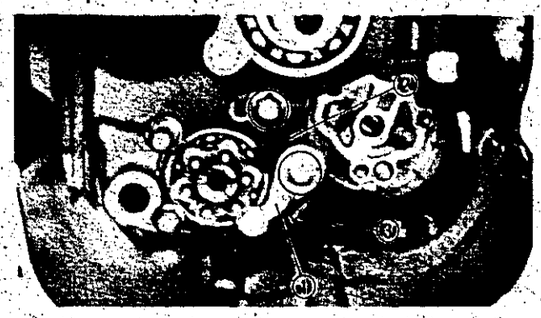
OIL PUMP AND SHIFT SHAFT

1. Remove:
   - Oil pump assembly ①
   - Gasket ②
   - Dowel pin ③

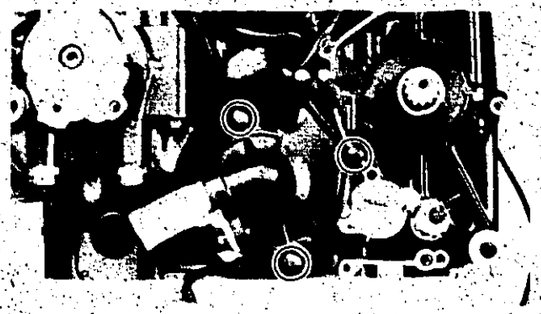




2. Remove:
   - Circlip ①
   - Washer ②
   - Shift shaft assembly ③

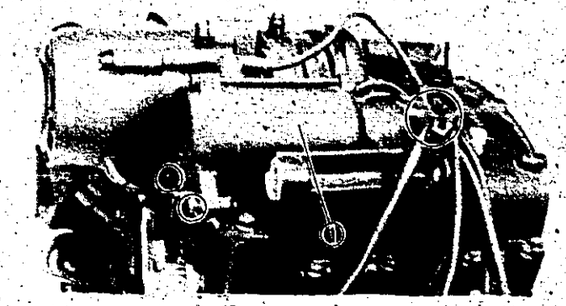


3. Remove:
   - Stopper lever ①
   - Shift fork guide bar stopper ②
   - Spring ③



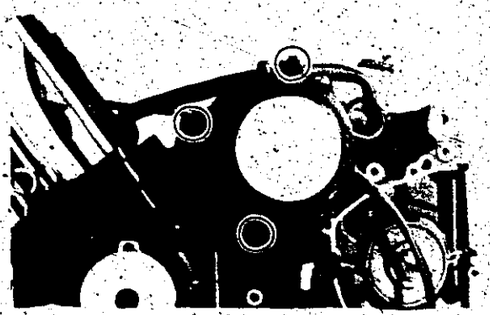
WATER PUMP

1. Remove:
   - Water pump assembly

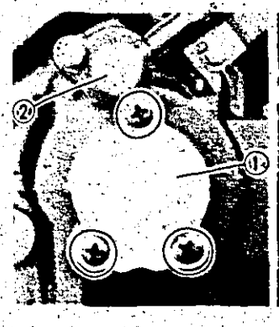


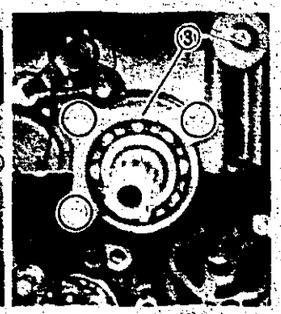
STARTER MOTOR AND A.C. GENERATOR

1. Remove:
   - Starter motor ①



2. Remove:
   - A.C. generator



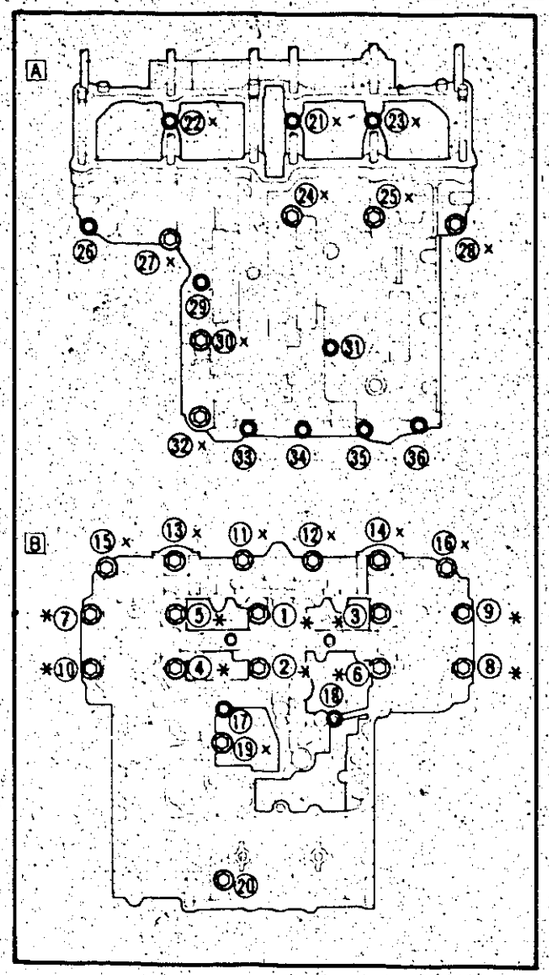


CRANKCASE DISASSEMBLY

1. Remove:
   - Crankshaft end cover (Right) ①
   - Pickup coil ②
   - Main axle bearing stopper ③

   Use the Torx Wrench (T30).

	Torx Wrench (T30): **P/N 90890-05245**



2. Remove:
   - Bolts (Crankcase)

NOTE:
- Remove the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase designate the crankcase tightening sequence.

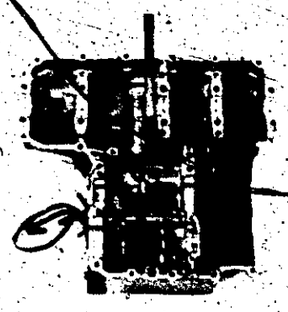
3. Plate the engine upside down.
4. Remove:
   - Crankcase (Lower)

   Use a soft hammer.

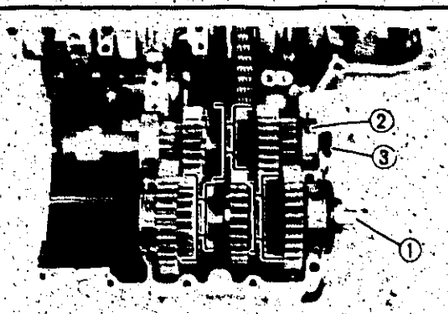
A: Upper case
B: Lower case
△: 6 mm bolts
x: 8 mm bolts
✱: 9 mm bolts



Crankcase (Upper)

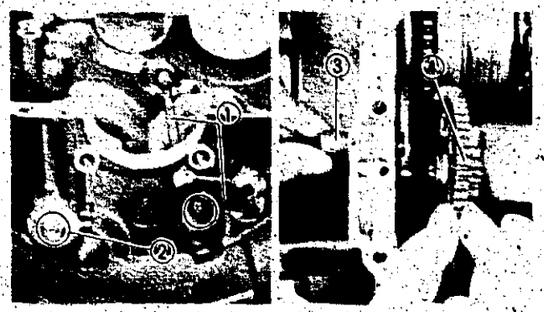


Crankcase (Lower)



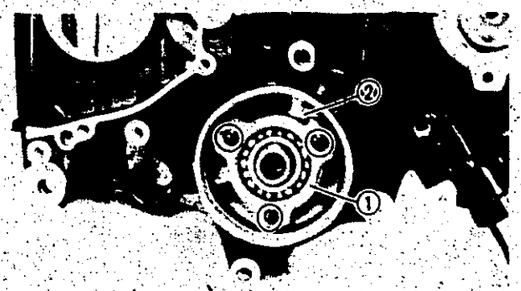
TRANSMISSION

1. Remove:
   - Drive axle assembly ①
   - Main axle assembly ②
   - Oil seal ③

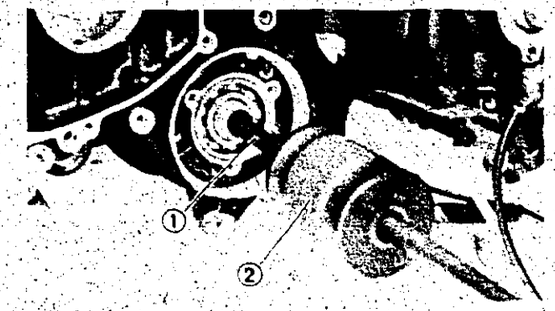


STARTER CLUTCH AND CRANKSHAFT

1. Remove:
   - Oil pipe 2 ①
   - Oil plug plate ②
   - Gasket
   - Shaft ③
   - Starter idle gear ④



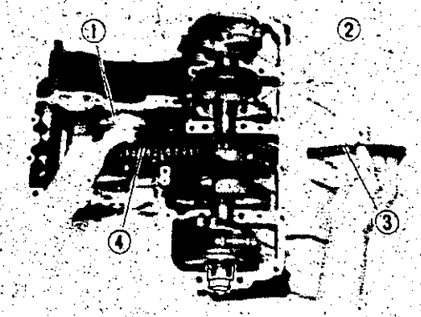
2. Remove:
   - Cover plate ①
   - Oil splay nozzle ②



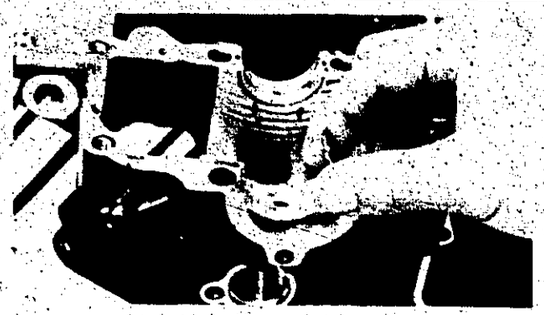
3. Remove:
   - Shaft (A.C. generator)
   - Bearing

   Use the Armature Shock Puller ① and Weight ②.

	Armature Shock Puller: **P/N 90890-01290** **Weight:** **P/N 90890-01291**

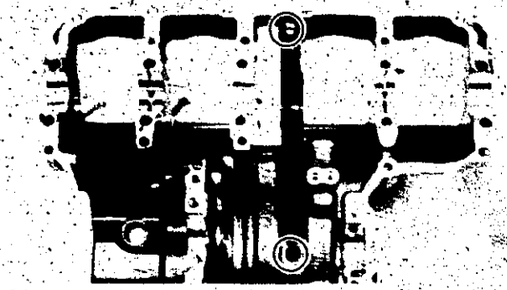


4. Remove:
   - Starter clutch assembly ①
   - Crankshaft assembly ②
   - Cam chain ③
   - HY-VO chain ④

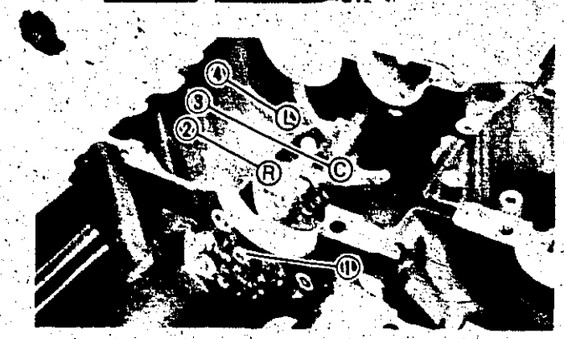


5. Remove:
   - Plane bearings (Crankshaft)

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

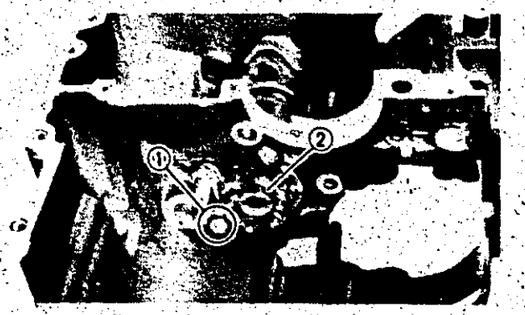


6. Remove:
   - HY-VO chain guide

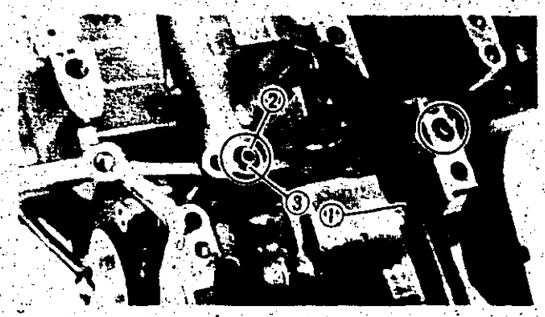


SHIFT FORK AND SHIFT CAM

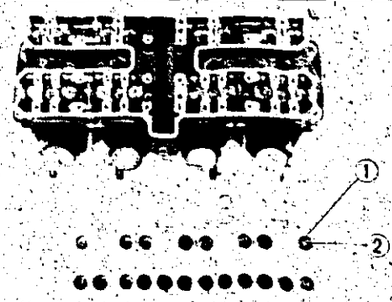
1. Remove:
   - Guide bar ①
   - Shift fork "R" ②
   - Shift fork "C" ③
   - Shift fork "L" ④



2. Remove:
   - Bolt ①
   - Shift cam assembly ②



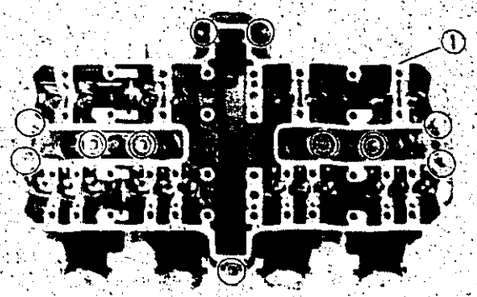
3. Remove:
   - Cam chain guide (Intake side) ①
   - Dowel pins ②
   - O-rings ③



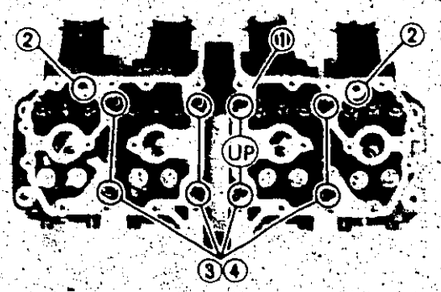
CYLINDER HEAD AND CAMSHAFT CASE

1. Remove:
   - Lifers ①
   - Valve pads ②
   - Spark plugs

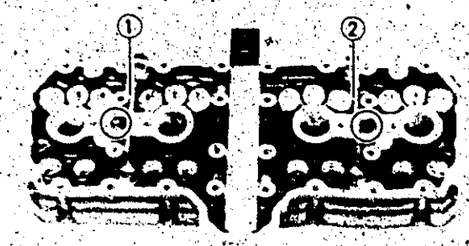
NOTE:
Identify each lifter and pad position very carefuly so that it can be reinstalled in its original place.



2. Remove:
   - Camshaft case ①



3. Remove:
   - Gasket (Camshaft case) ①
   - Dowel pins ②
   - Nuts (Cylinder head) ③
   - Washers ④

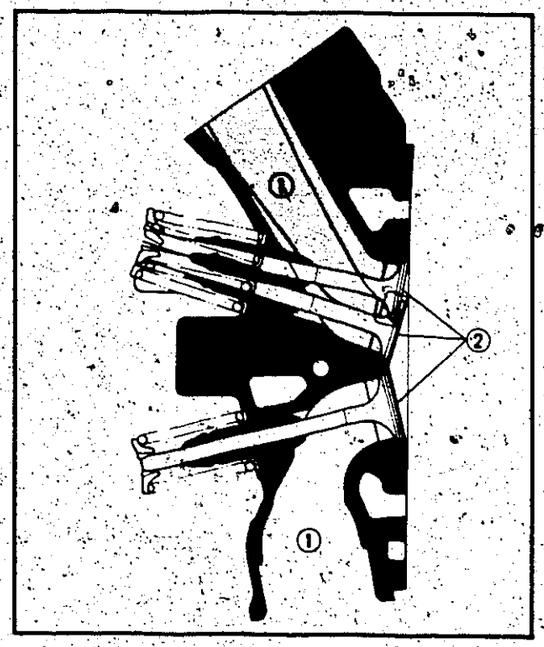


4. Remove:
   - Oil pipe 3 ①
   - Oil pipe 4 ②
   - O-rings

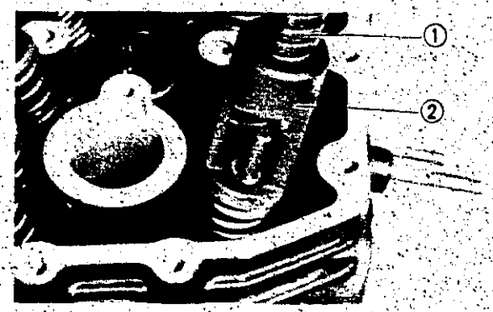
VALVE

NOTE:
Before removing the internal parts (Valve, valve spring, valve seat etc.) of the cylinder, the valve sealing should be checked.

1. Check:
   - Valve sealing
   Leakage at valve seat → Inspect the valve face, valve seat and valve seat width.
   Refer to "INSPECTION AND REPAIR – VALVE SEAT".

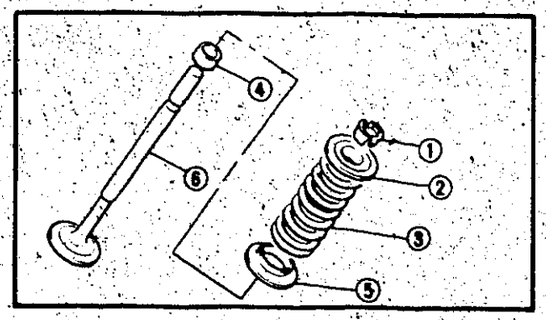


Valve Seat Checking Steps:
- Pour a clean solvent ① into the intake and exhaust ports.
- Check the valve seating.
There should be no leakage at the valve seat ②.



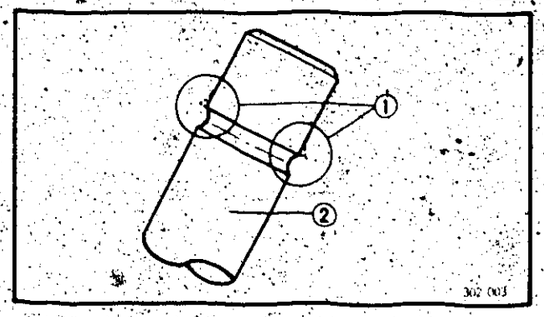
2. Attach:
   - Valve spring compressor ①
   - Attachment ②

Valve Spring Compressor:
P/N 90890-04019
Attachment:
P/N 90890-04018



3. Remove:
   - Valve retainers ①
   - Valve spring seat ②
   - Valve spring ③
   - Oil seal ④
   - Valve spring seat ⑤
   - Valve ⑥

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

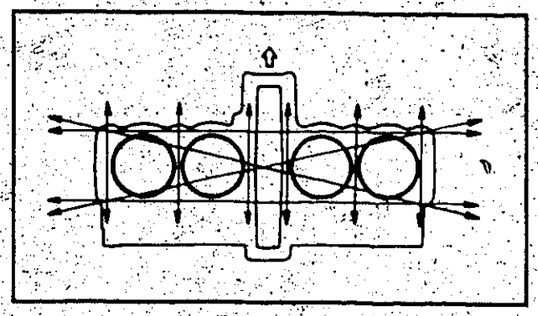


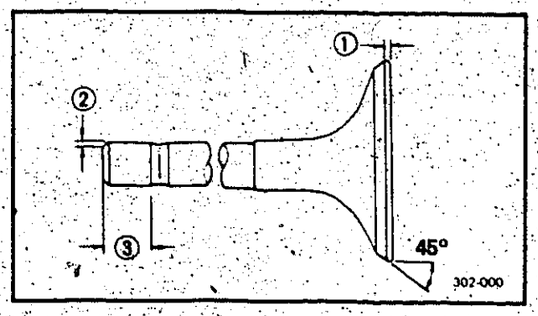
NOTE:
Deburr any deformed valve stem end. Use an oil stone to smooth the stem end.

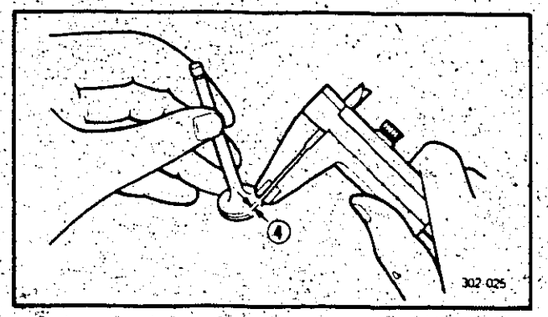
① Deburr
② Valve stem

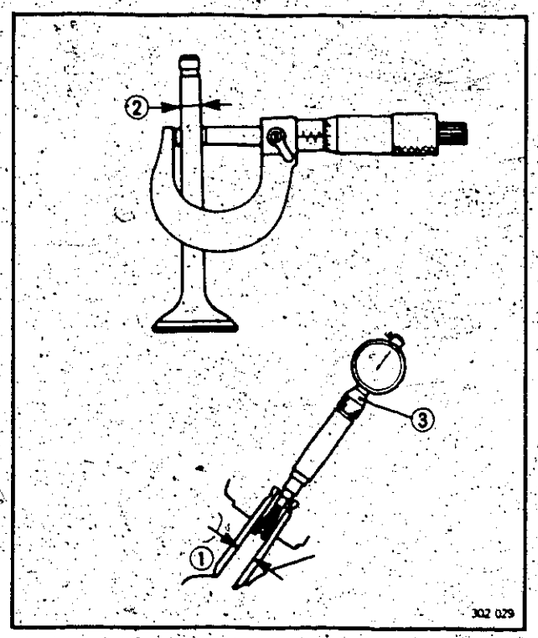
4. Eliminate:
- Carbon deposit.
  From the combustion chamber.
  Use a rounded scraper.

NOTE:
Do not use a sharp instrument and avoid damaging or scratching:
- Spark plug threads
- Valve seat
- Cylinder head









INSPECTION AND REPAIR

CYLINDER HEAD

1. Measure:
- Warpage
  Under specification → Reface.
  Over specification → Replace.

Cylinder Head Warpage:
Less than 0.03 mm (0.0012 in)

VALVE

1. Inspect:
- Valve face
- Stem end
  Wear/Pitting → Reface.
  Out of specification → Replace.

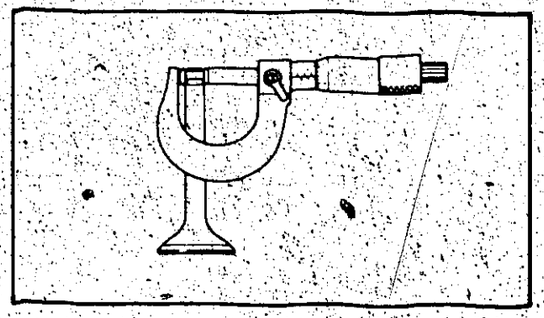
Minimum Thickness (Service limit) ① :
0.7 mm (0.0276 in)
Beveled ② :
0.35 mm (0.0138 in)
Minimum Length (Service limit) ③ :
14.5 mm (0.571 in)
Seat Width (Valve face) ④ :
0.9 ~ 1.1 mm (0.035 ~ 0.43 in)

2. Measure:
- Valve stem clearance

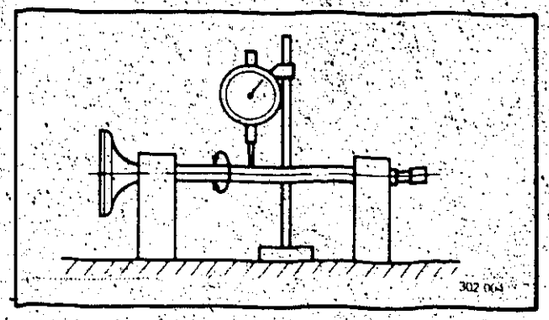
Valve stem clearance =
Valve guide inside diameter ① − Valve stem diameter ②

Out of specification → Replace either valve and/or guide.
Use a Micrometer and Bore Gauge ③.

	Valve Stem Clearance	Maximum
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.10 mm (0.0039 in)



3. Inspect:
- Valve stem end
  Mushroom shape/Larger diameter than rest of stem → Replace valve, valve guide, and oil seal.



4. Measure:
- Valve stem runout
  Out of specification → Replace.

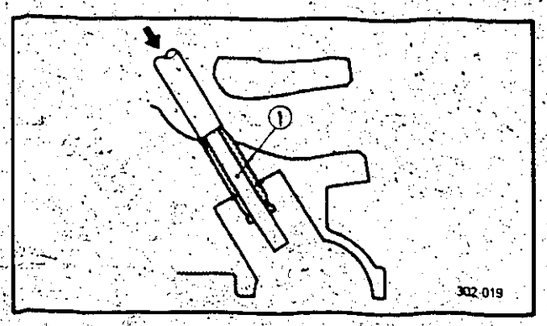
	Maximum Runout: 0.01 mm (0.0004 in)

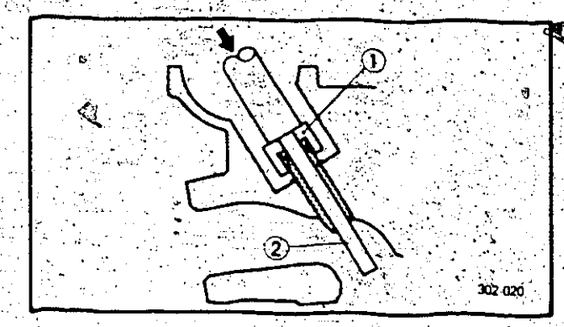
VALVE GUIDE

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

1. Inspect:
- Valve guide
  Wear/Oil leakage into cylinder → Replace.
2. Remove:
- Valve guide
  Use the Valve Guide Remover ①.

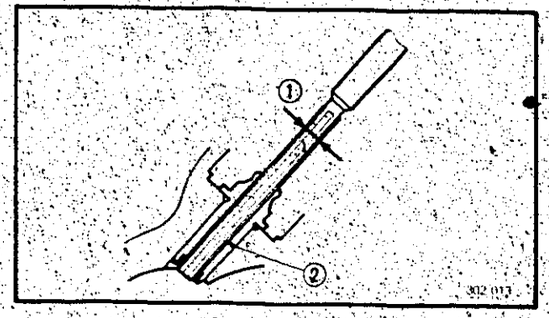
	Valve Guide Remover (5.0 mm): P/N 90890-04097





3. Install:
- Valve guide (New)
  Use the Valve Guide Installer ① with the valve Guide Remover ②.

	Valve Guide Installer: P/N 90890-04098 **Valve Guide Remover (5.0 mm): P/N 90890-04097**



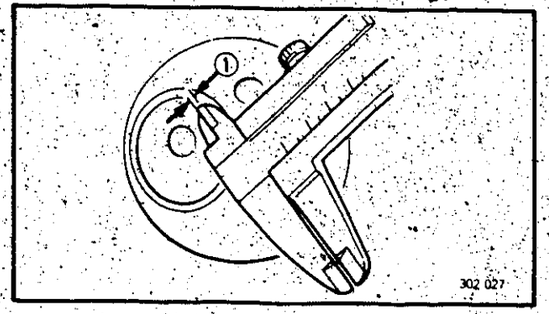
4. Bore valve guide ② to obtain proper valve stem clearance.
Use the Valve Guide Reamer (5.0 mm) ①.

	Valve Guide Reamer (5.0 mm): P/N 90890-04099

NOTE:
Reface the valve seat after installing the valve guide.

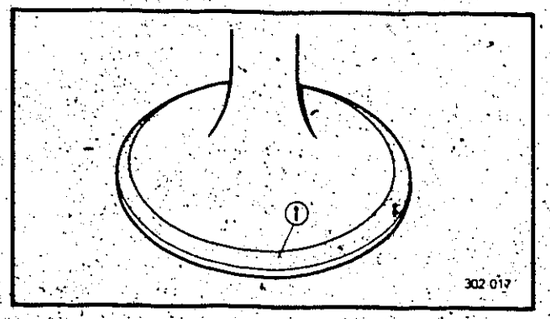
VALVE SEAT

1. Clean:
- Valve face
- Valve seat
  Remove carbon deposit.
2. Inspect:
- Valve seat
  Pitting/Wear → Reface valve seat.

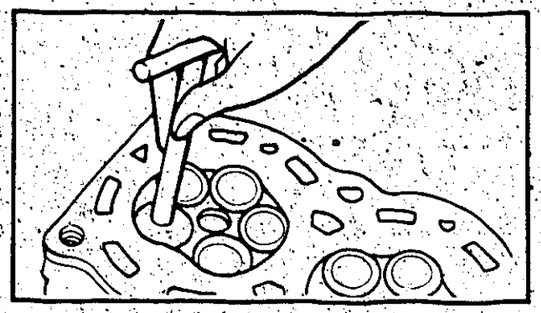


3. Measure:
- Valve seat width ①
  Out of specification → Reface valve seat.

	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)



Valve seat width 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 clean pattern.
- Measure the valve seat width. Whether 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.

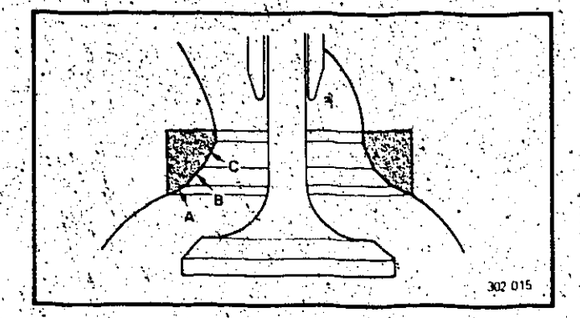


4. Reface:
- Valve seat

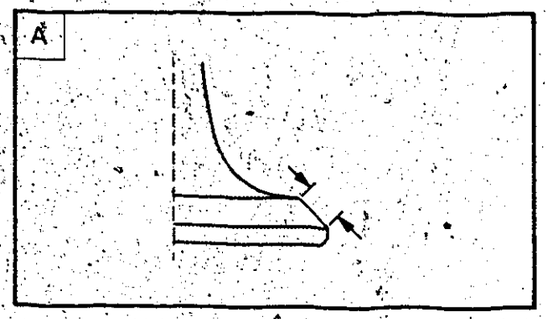
Use 20°, 45° and 60° Valve Seat Cutter.

CAUTION:

Remove just enough material to achieve satisfactory seat.
When twisting cutter, keep and even downward pressure to prevent chatter marks.



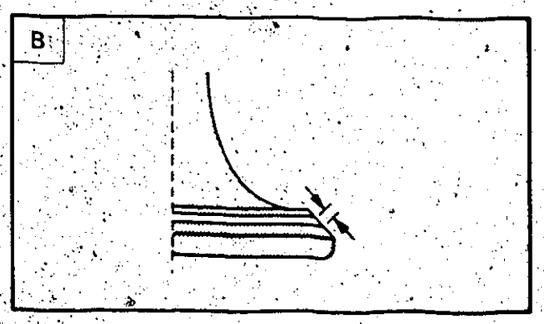
Cut sections as follows	
Section	Cutter
A	20°
B	45°
C	60°



Valve seat refacing steps:

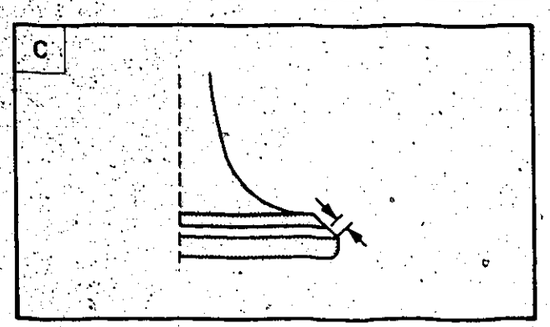
A Valve face indicates that valve seat is centered on valve face but is too wide.

Valve Seat Cutter Set		Desired Result
Use lightly	20° cutter	To reduce valve seat width to 1.0 mm (0.04 in)
	60° cutter	



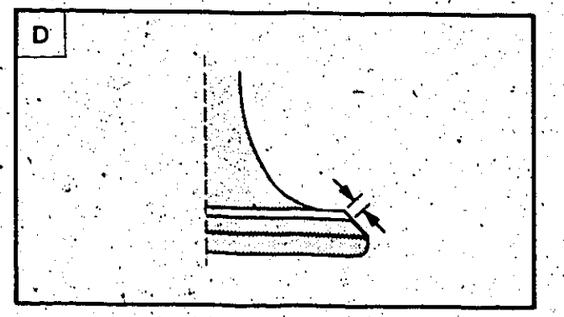
B Valve seat is in the middle of the valve face but too narrow.

Valve Seat Cutter Set		Desired Result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.04 in)



C Valve seat is too narrow and right up near valve margin.

Valve Seat Cutter Set		Desired Result
Use	20° cutter	To center the seat and to achieve its width of 1.0 mm (0.04 in)
	45° cutter	



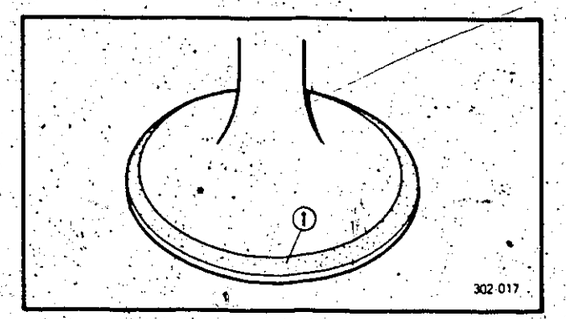
D Valve seat is too narrow and is located down near the bottom edge of the valve face.

Valve Seat Cutter Set		Desired Result
Use	60° cutter, first	To center the seat and increase its width.
	45° cutter	

5. Lap:
- Valve face
- Valve seat

NOTE:

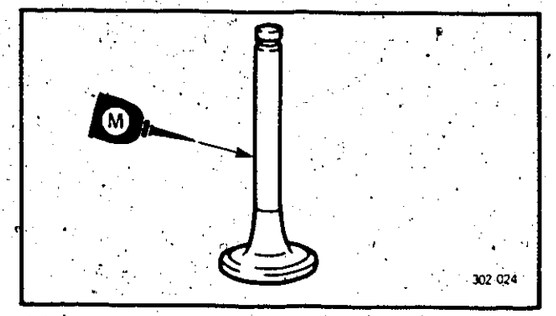
After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.



Valve lapping steps:
- Apply a coarse lapping compound ① to the valve face.

CAUTION:

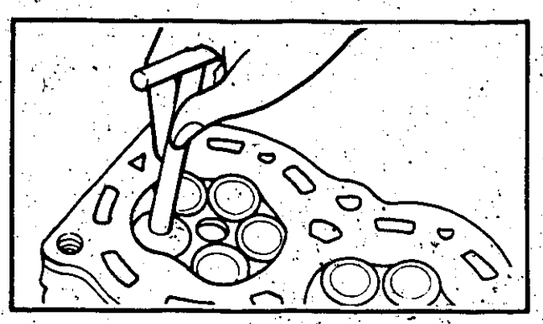
Be sure no compound enteres the gap between the valve stem and guide.



- Apply a molybdnum 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.

NOTE:

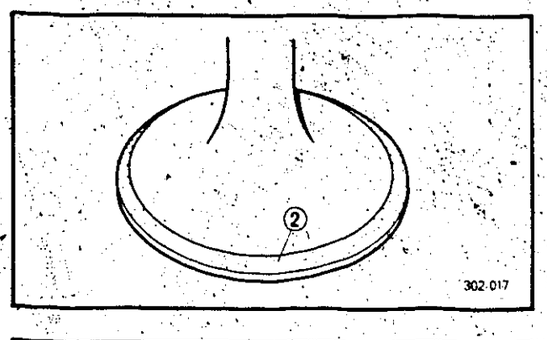
To obtain the best lapping result, lightly tap the valve seat while rotating the valve back and forth between your hand.

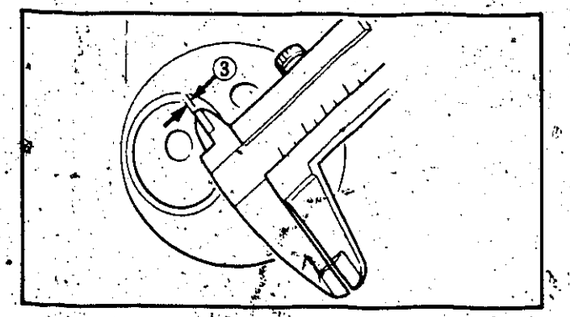


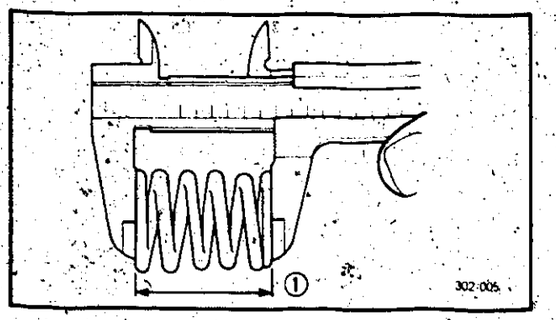
- Apply a fine lapping compound to the valve face and repeat the above steps.

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

- Apply the Mechanic's bluing dye (Dykem) ② 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 ③ again. If the valve seat width is out of specification, reface and lap the valve seat.





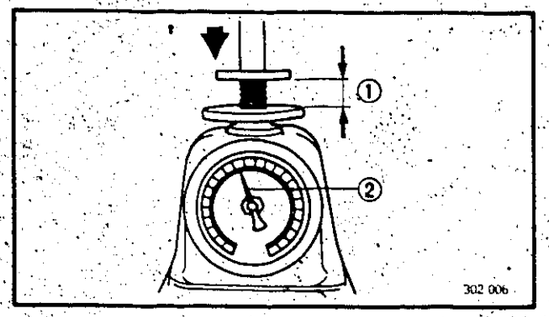


VALVE SPRING

1. Measure:
   - Valve spring free length ①

   Out of specification → Replace.

Valve Spring Free Length	
Intake spring	Exhaust spring
39.76 mm (1.565 in)	39.96 mm (1.573 in)

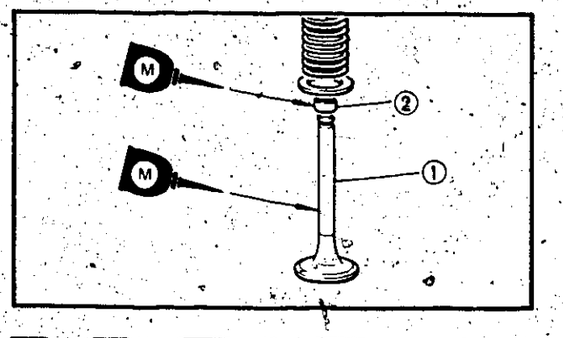


2. Measure:
   - Valve spring installed force ②

   Out of specification → Replace.

① Installed length

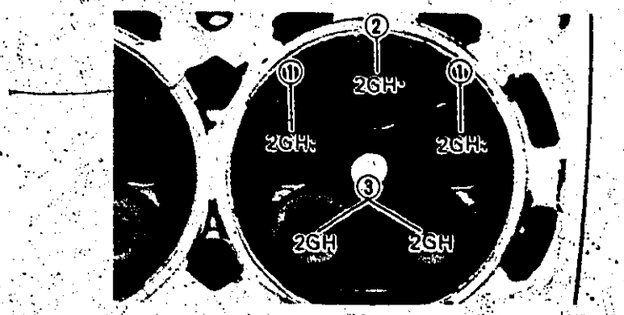
Valve Spring Installed Force			
Intake spring		Exhaust spring	
①	②	①	②
35.0 mm (1.378 in)	7.3 ~ 8.7 kg (16.1 ~ 19.2 lb)	35.0 mm (1.378 in)	11.0 ~ 13.0 kg (24.3 ~ 28.7 lb)



VALVE INSTALLATION

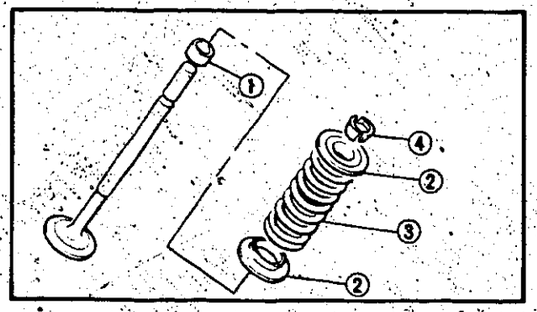
1. Lubricate:
   - Valve stem ①
   - Oil seal ②

High-Quality Molybdenum Disulfide Motor Oil or Molybdenum Disulfide Grease



2. Install:
   - Valves
   - Intake (Right/Left) : "2GH:" ①
     (Center) : "2GH" ②
     Exhaust : "2GH" ③

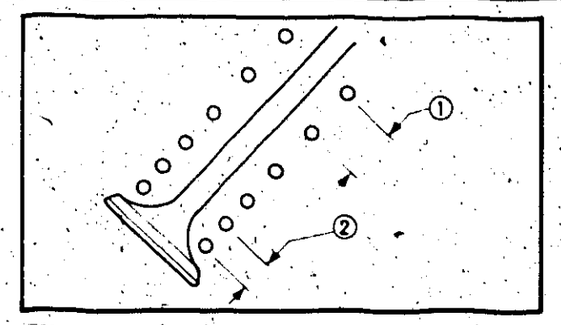
NOTE:
Be sure to reinstall in its original place.



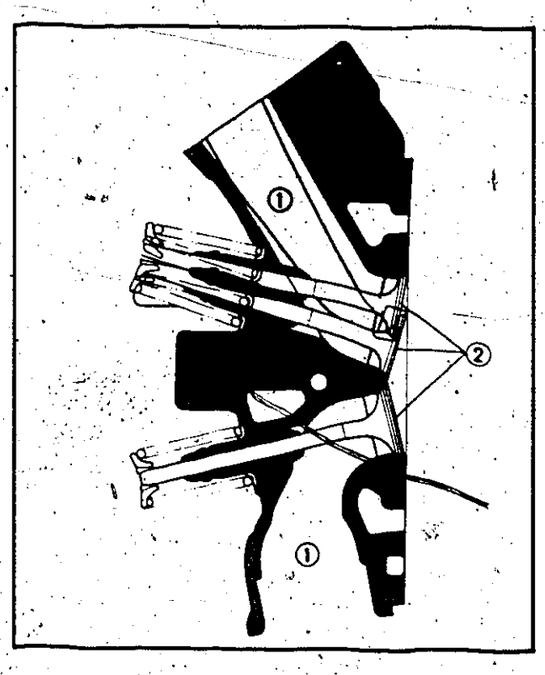
3. Install:
   - Oil seal ①
   - Valve spring seat ②
   - Valve spring ③
   - Valve retainers ④

   Use the Valve Spring Compressor and Attachment.

Valve Spring Compressor:
P/N 90890-04019
Attachment:
P/N 90890-04018



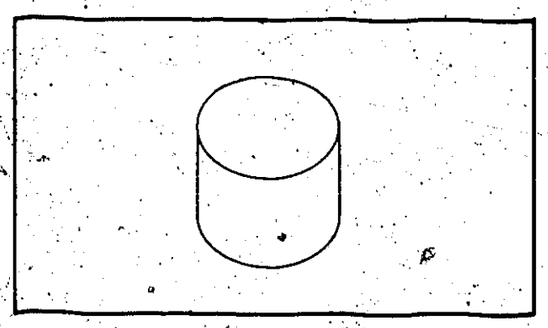
NOTE:
- All valve springs must be installed with the larger pitch ① upward as shown.
- Be sure the "Blue" spring is for intake and "Red" for exhaust.



4. Check:
- Valve sealing
  Leakage at valve seat → Reface, relap or replace valve, relap.
  Refer to "VALVE SEAT".

Valve seat 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.

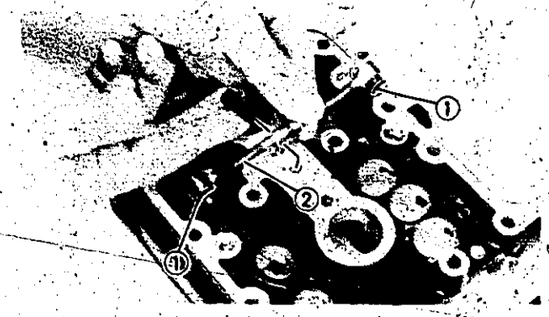
Relapping steps:
- Reassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.



VALVE LIFTER AND CAMSHAFT CASE

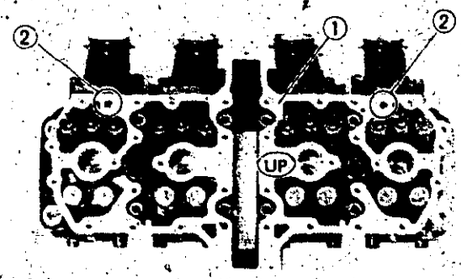
1. Inspect:
- Valve lifters
  Scratches/Damage → Replace both lifters and camshaft case.

2. Inspect:
- O-ring
- Oil pipe 3
- Oil pipe 4
  Damage → Replace.
  Contamination → Wash and blow-out the passage.



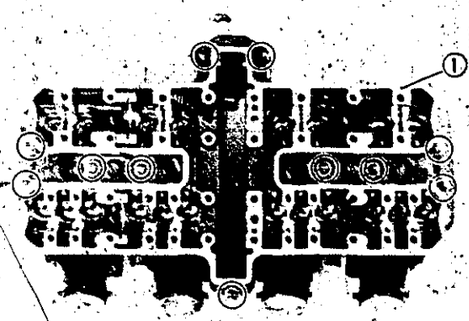
3. Install:
- O-rings ①
- Oil pipe 3 and 4 ②
- Bolts
  (on the camshaft case)

Oil pipe 3 and 4 bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)



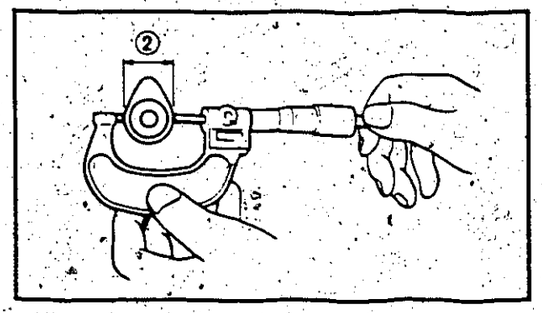
4. Install:
- Gasket (Camshaft case) ①
- Dowel pins ②

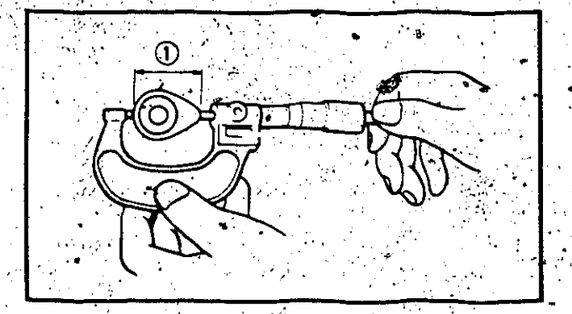
NOTE:
Be sure the "UP" mark face to upward.

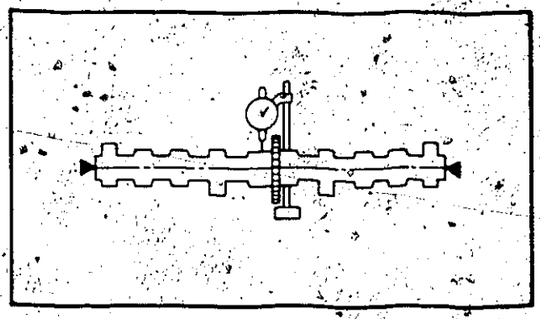


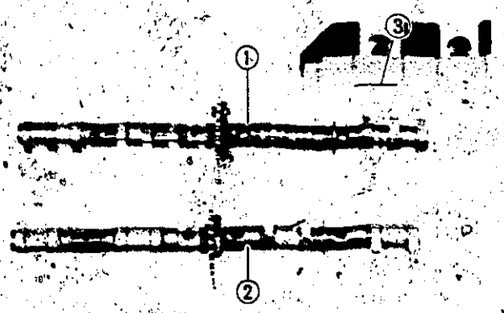
5. Install:
- Camshaft case ①

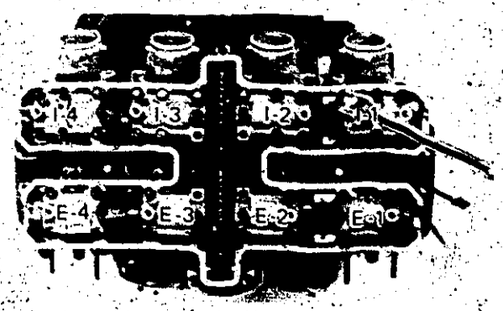
Camshaft Case Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)











CAMSHAFT, CAM CHAIN, AND CAM SPROCKET

Camshaft

1. Inspect:
   - Cam lobes
     Pitting/Scratches/Blue discoloration → Replace.
2. Measure:
   - Cam lobes
     Use the Micrometer.
     Out of specification → Replace.

	Cam Lobe ① (Limit)	Cam Lobe ② (Limit)
Intake	32.45 mm (1.278 in)	24.85 mm (0.978 in)
Exhaust	32.30 mm (1.272 in)	24.85 mm (0.978 in)

3. Measure:
   - Camshaft runout
     Use the Micrometer.
     Out of specification → Replace.

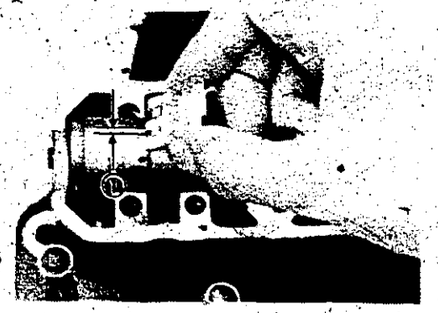
Camshaft Runout Limit:
0.03 mm (0.0012 in)

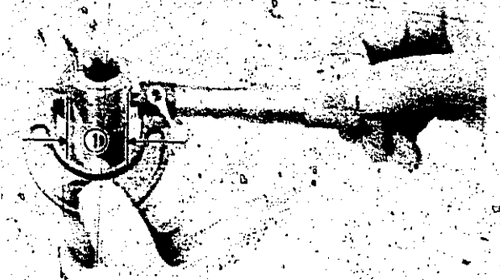
Camshaft/Cap Clearance Measurement

1. Install:
   - Intake camshaft ①
   - Exhaust camshaft ②
2. Position:
   - Strip of Plastigage® ③
     Onto the camshaft.

3. Install:
   - Dowel pins
   - Camshaft caps
4. Tighten:
   - Camshaft cap bolts

Bolts (Camshaft Cap):
10 Nm (1.0 m·kg, 7.2 ft·lb)





NOTE:
- Tighten the camshaft caps in a crisscross pattern from innermost to outer caps.
- Do not turn the camshaft when measuring clearance with the Plastigage®.

5. Remove:
   - Camshaft caps

6. Measure:
   - Width of Plastigage® ①
     Out of specification → Follow step 7.

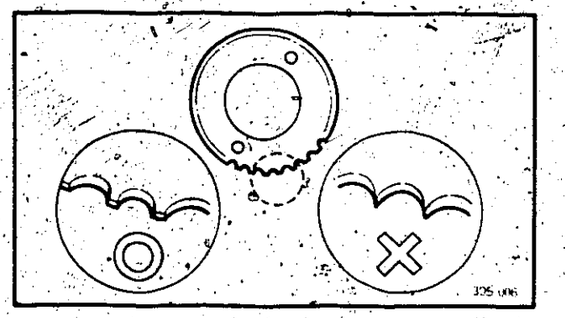
Camshaft-to-cap Clearance:
I-1, I-4, E-1, E-4:
0.020 ~ 0.054 mm
(0.0008 ~ 0.0021 in)
I-2, I-3, E-2, E-3:
0.050 ~ 0.084 mm
(0.0020 ~ 0.0033 in)

7. Measure:
   - Camshaft bearing diameter ①
     Use a micrometer.
     Out of specification → Replace the camshaft.
     Within specification → Replace the camshaft case.

Camshaft Outside Diameter:
Standard: 24.437 ~ 24.450 mm
(0.9621 ~ 0.9626 in)
Cam Cap Inside Diameter:
Standard: 24.500 ~ 24.521 mm
(0.9646 ~ 0.9654 in)

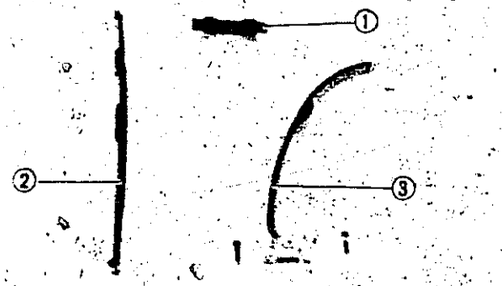
Cam Chain

1. Inspect:
   - Cam chain
     Chain stretch/Cracks → Replace.



Cam Sprockets

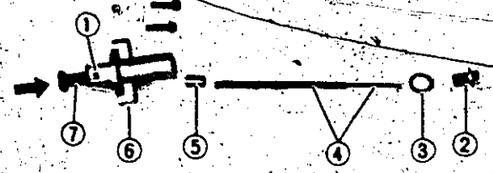
1. Inspect:
   - Cam sprockets
     Wear/Damage → Replace.



Cam Chain Guide

1. Inspect:
   - Cam chain guide (Upper) ①
   - Cam chain guide (Exhaust side) ②
   - Cam chain guide (Intake side) ③

   Wear → Replace.



Cam Chain Tensioner

1. Check:
   - One-way cam ① operation

   Unsmooth operation → Replace.
2. Inspect:
   - All parts

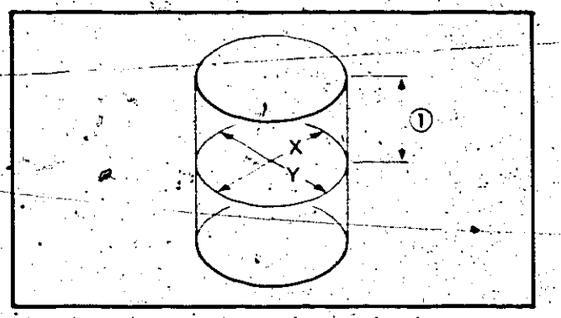
   Damage/Wear → Replace.

② End plug
③ Washer
④ Springs
⑤ Collar
⑥ Tensioner body
⑦ Tensioner rod

CYLINDER AND PISTON

1. Inspect:
   - Cylinder and Piston walls

   Vertical scratches → Rebore or Replace cylinder and piston.
2. Measure:
   - Piston-to-cylinder clearance



Piston-to-cylinder clearance measurement steps:

First step:

- Measure the cylinder bore "C" with a Cylinder Bore Gauge.

① 40 mm (1.57 in) from the cylinder top.

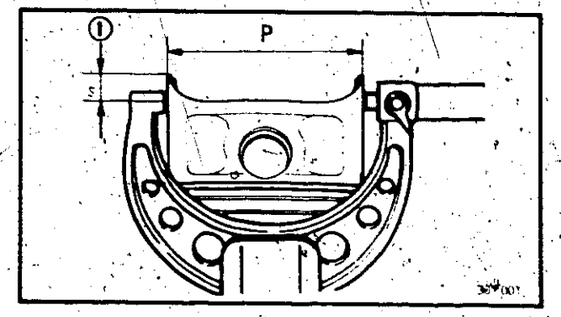
NOTE:

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

	Standard	Wear Limit
Cylinder Bore "C":	75.000 ~ 75.005 mm (2.9528 ~ 2.9529 in)	75.1 mm (2.9567 in)

$$C = \frac{X + Y}{2}$$

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



2nd 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	74.93 ~ 94.94 mm (2.949 ~ 2.950 in)
Oversize 2	75.5 mm (2.97 in)

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

3rd step:

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

Piston-to-cylinder clearance = Cylinder bore "C" − 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:
0.06 ~ 0.08 mm (0.0024 ~ 0.0031 in)
Limit: 0.1 mm (0.004 in)



PISTON RING AND PISTON PIN

Piston Ring

1. Measure:
   - Side clearance

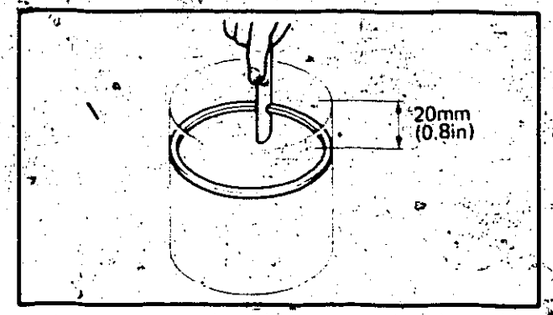
   Use the Feeler Gauge.

   Out of specification → Replace the piston and/or rings.

NOTE:

Decarbon the piston ring grooves and rings before measuring the side clearance.

	Side Clearance:	
	Standard	Limit
Top ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)	0.15 mm (0.0059 in)
2nd ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)	0.15 mm (0.0059 in)



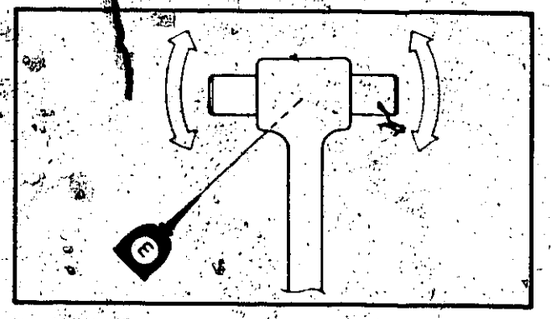
2. Position:
   - Piston ring
     Into cylinder.

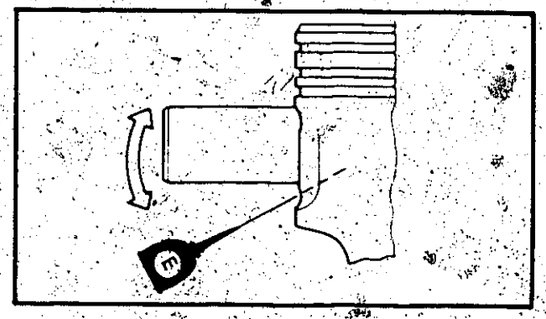
NOTE:
Insert the ring into the cylinder, and push it approximately 20 mm (0.8 in) into the cylinder. Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.



3. Measure:
   - End gap
     Out of specification → Replace.

	End Gap (Installed):	
	Standard	Limit
Top ring	0.3 ~ 0.5 mm (0.0118 ~ 0.0197 in)	0.7 mm (0.0276 in)
2nd ring	0.3 ~ 0.5 mm (0.0118 ~ 0.0197 in)	0.7 mm (0.0276 in)
Oil control (Rails)	0.2 ~ 0.8 mm (0.0078 ~ 0.0315 in)	–



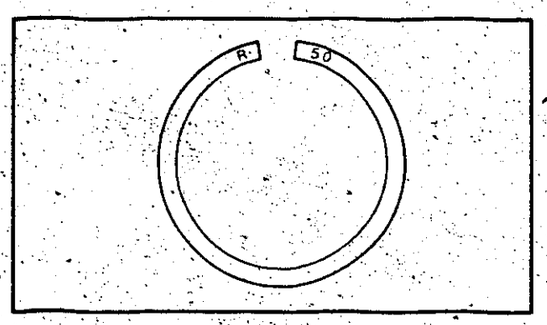


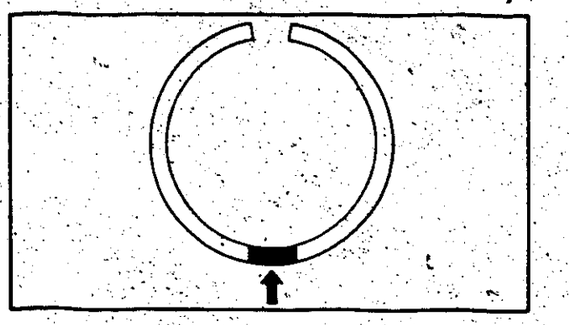
Piston Pin

1. Lubricate:
   - Piston pin (Lightly)

SAE 10W30 Motor Oil

2. Install:
   - Piston pin
     Into the small end of connecting rod.
3. Check:
   - Free play
     Free play → Inspect the connecting rod for wear.
     Wear → Inspect the connecting rod and piston pin.
4. Position:
   - Piston pin
     Into the piston.
5. Check:
   - Free play
     When the pin is in place in the piston.
     Free play → Replace the piston pin and/or piston.





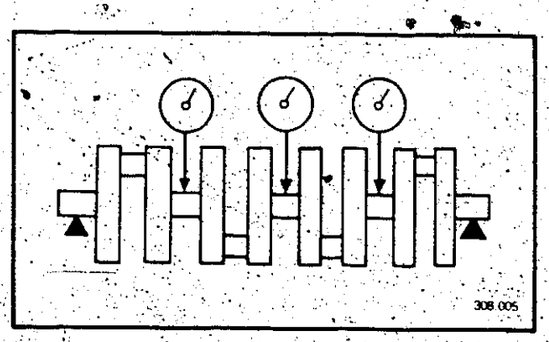
Piston Ring Oversize

- Top and 2nd piston ring
  Oversize top and middle ring size is stamped on the top of ring.

Oversize 2	0.50 mm (0.0197 in)

- Oil control ring
  Expander spacer of bottom ring (oil control ring) is color-coded to identify sizes.

Size	Color
Oversize 2	Red



CRANKSHAFT AND CONNECTING ROD

Crankshaft

1. Measure:
   - Runout
     Use the V-Blocks and Dial Gauge.
     Out of specification → Replace.

Runout Limit:
0.03 mm (0.0012 in)

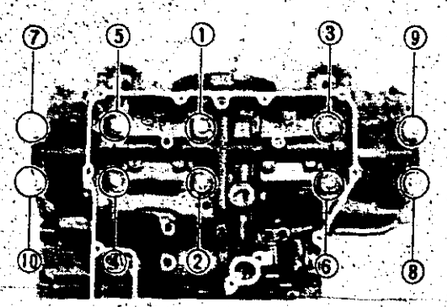
2. Inspect:
   - Crankshaft bearing surfaces
     Wear/Scratches → Replace.

Main Journal Oil Clearance

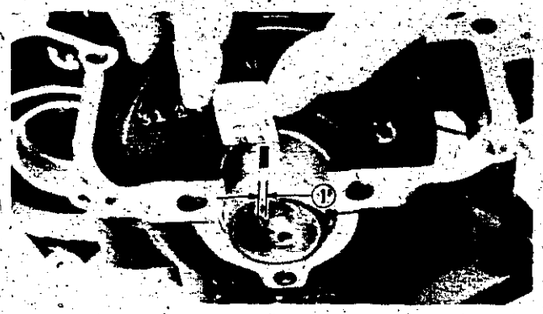
1. Clean all parts.
2. Position:
   - Crankcase half (Upper)
     Place on a bench in an upside down position.
3. Install:
   - Bearings
     Into the upper crankcase.
   - Crankshaft
4. Attach:
   - Plastigage®
     Onto the crankshaft journal surface.

NOTE:
Do not turn the crankshaft until clearance measurement has been completed.

5. Install:
   - Bearings
     Into the lower crankcase.
   - Crankcase (Lower)
6. Tighten:
   - Bolts



CAUTION:
Tighten to full torque in torque sequence cast on the crankcase.



	9 mm (0.35 in) Bolt: 32 Nm (3.2 m·kg, 23 ft·lb)

7. Remove:
   - Bolts
     Reverse assembly procedure.
   - Crankcase (Lower)
     Use care in removing.
8. Measure:
   - Plastigage width ①
     Out of specification → Replace the bearings; replace the crankshaft if necessary.

	Main Journal Oil Clearance: 0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in)

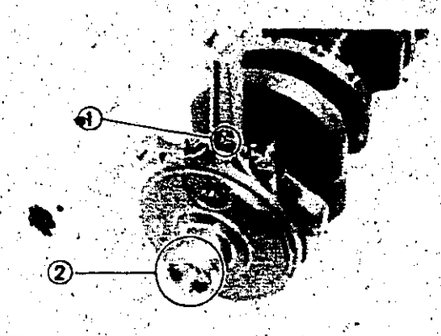
Connecting Rod Bearings

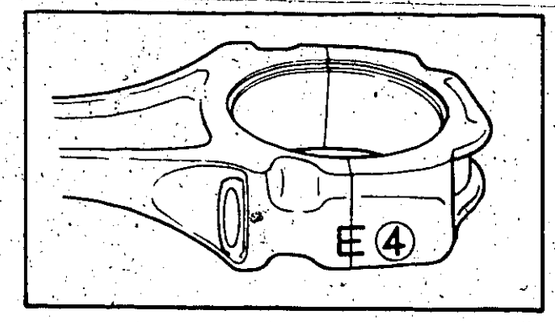
1. Inspect:
   - Bearings
     Burns/Flaking/Roughness/Scratches → Replace.

Crank Pin Oil Clearance

1. Clean all parts thoroughly.
2. Install:
   - Connecting rod bearings
     Into the connecting rod and cap.
3. Attach:
   - Plastigage®
     Onto the crank pin.
4. Install:
   - Connecting rod
   - Connecting rod cap.

NOTE:
- Be sure the "Y" marks ① on the connecting rods face toward left crankshaft end ②.
- Be sure the letters on both components align to form a perfect character.





5. Lubricate:
   - Bolt threads (Connecting rod)
   - Nut seats (Connecting rod)

	Molybdenum Disulfide Grease

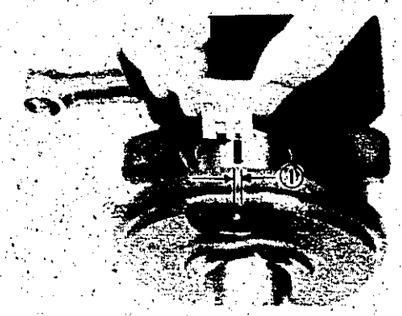
6. Tighten:
   - Nuts (Connecting rod cap)

NOTE:
Do not turn the connecting rod until the clearance measurement has been completed.

CAUTION:

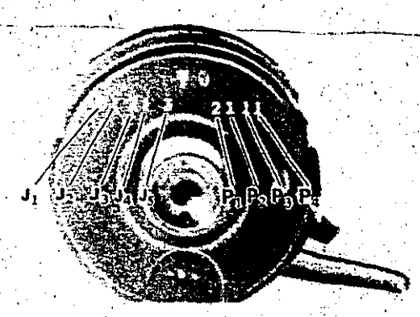
Tighten to full torque specification without pausing. Apply continuous torque between 2.0 and 3.6 m·kg. Once you reach 2.0 m·kg DO NOT STOP TIGHTENING until final torque is reached. If tightening is interrupted between 3.0 and 3.6 m·kg, loosen nut to less than 2.0 m·kg, and start again.

Nuts (Connecting Rod):
36 Nm (3.6 m·kg, 25 ft·lb)



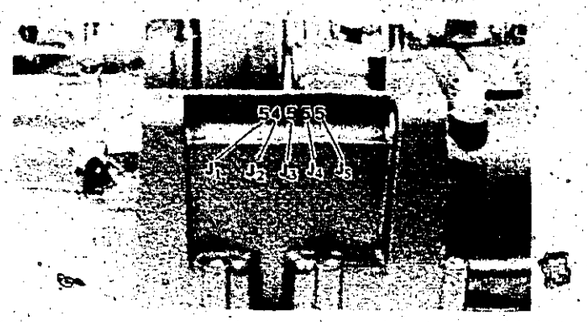
7. Remove:
   - Connecting rod cap
     Use care in removing.
8. Measure:
   - Width of Plastigage® ①
     Out of specification → Replace the bearings and/or replace the crankshaft if necessary.

Crank Pin Oil Clearance:
0.032 ~ 0.056 mm
(0.0013 ~ 0.0022 in)

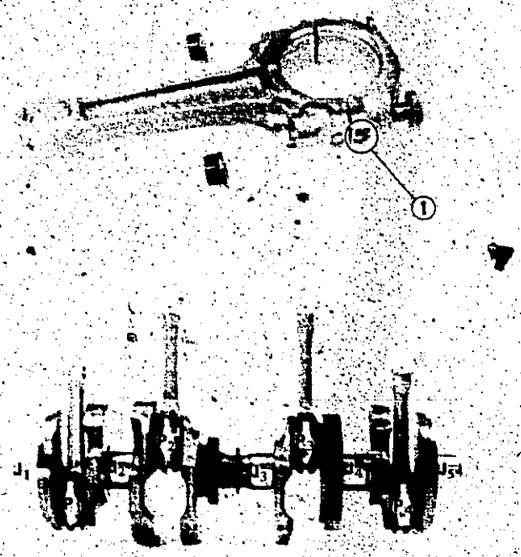


Crankshaft Main Journal and Crank Pin Bearing Selection

- Numbers used to indicate crankshaft journal sizes are stamped on the LH crankweb. The first five (5) are main journal bearing numbers, starting with the left journal. The four (4) crank pin bearing numbers follow in the same sequence.



- The upper crankcase half is numbered J1, J2, J3, J4 and J5 on the rear right bosse as shown.



- The numbers are stamped in ink on the rod cap ①.

BEARING COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
* No. 5	Yellow

* No. 5 applies only to the main journal bearing selection.

Example 1: Selection of the main journal bearings:

- If the crankcase J1 and crankshaft J1 sizes are No. 4 and No. 1, respectively, the bearing size No. is:

Bearing Size No. =
Crankcase No. – Crankshaft No. =
4 – 1 = 3 (Brown)

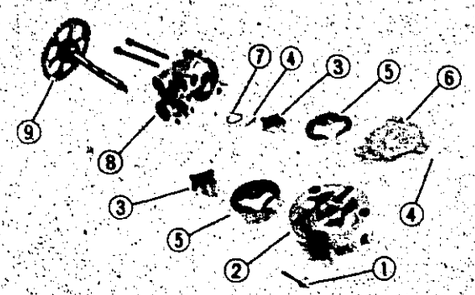
BEARING COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
No. 5	Yellow

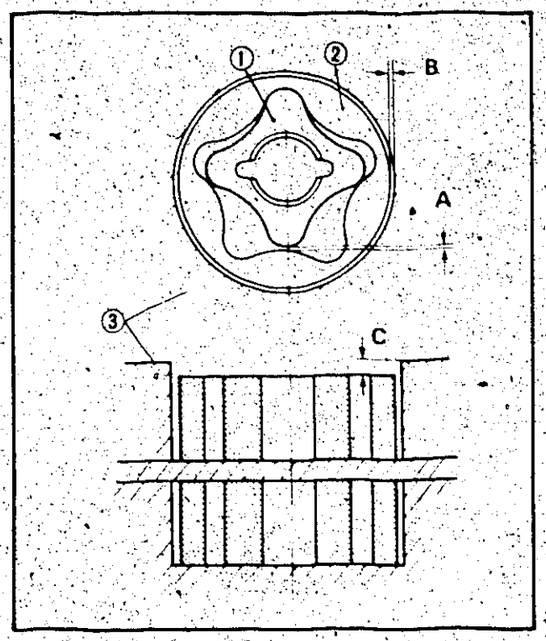
Example 2: Selection of the crank pin bearing:

- If the connecting rod P1 and crankshaft P1 sizes are No. 5 and No. 1, respectively, the bearing size No. is:

Bearing Size No. =
Connecting rod No. – Crankshaft No. =
5 – 1 = 4 (Green)

BEARING COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green





OIL PUMP

1. Remove:
   - Screw ①
   - Pump housing ②
   - Inner rotors ③
   - Pin ④
   - Outer rotors ⑤
   - Intermidiate plate ⑥
   - Washer ⑦
   - Pump cover ⑧
   - Pump shaft ⑨
2. Measure:
   - Tip clearance "A"
     Between the inner rotor ① and the outer rotor ②.
   - Side clearance "B"
     Between the outer rotor ② and the pump housing ③.
   - Housing clearance "C"
     Between the pump housing ③ and the rotors ①, ②.
     Use the Filler Gauge and Straight Edge.
     Out of specification → Replace the oil pump assembly.

Tip Clearance "A" Limit:
0.2 mm (0.008 in)
Side Clearance "B" Limit:
0.15 mm (0.006 in)
Housing Clearance "C":
0.03 ~ 0.08 mm
(0.0012 ~ 0.0031 in)

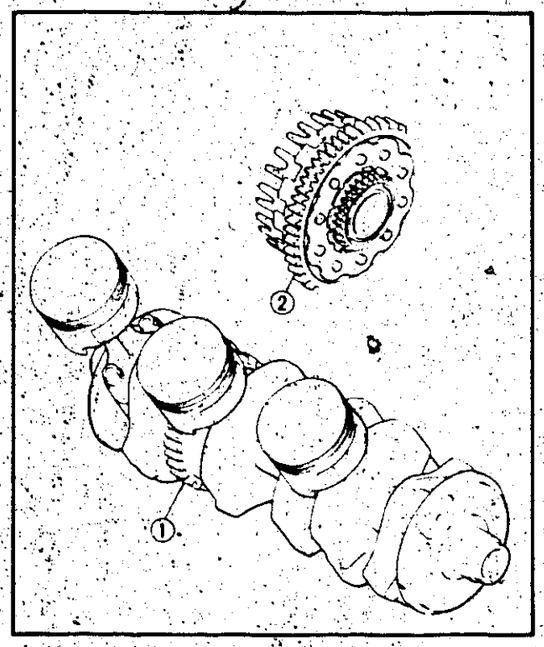
3. Lubricate:
   - Inner rotors
   - Outer rotors
   - Oil seal
   - Pump shaft

SAE 10W30 Motor Oil

4. Install:
   Reverse removal procedure.

NOTE:
Alighn the pins in the pump shaft and the groove on the inner rotors dualing assembly.

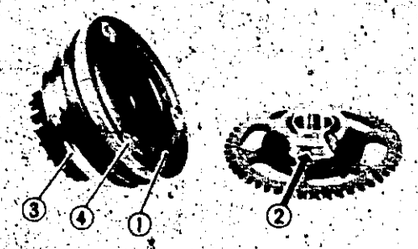
5. Check:
   - Oil pump operation
     With a finger.
     Unsmooth operation → Repeat step 2. or replace.



PRIMARY DRIVE

1. Inspect:
   - Primary drive gear (Crank shaft) ①
   - Primary driven gear ②
     Wear/Damage → Replace both gears.
     Excessive noises during operation → Replace both gears.

Primary reduction ratio:		
No. of teeth		Ratio
Drive	Driven	
41	68	1.659



STARTER DRIVES

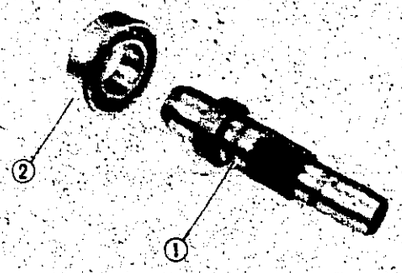
Starter Clutch

1. Check:
   - Starter clutch ① operation
     Unsmooth operation → Replace one-way clutch.
2. Inspect:
   - Surface of the idle gear ②
     Pitting/Wear/Damage → Replace.
3. Lubricate:
   - Starter clutch ①
   - Outer starter clutch ③

SAE 10W30 Motor Oil

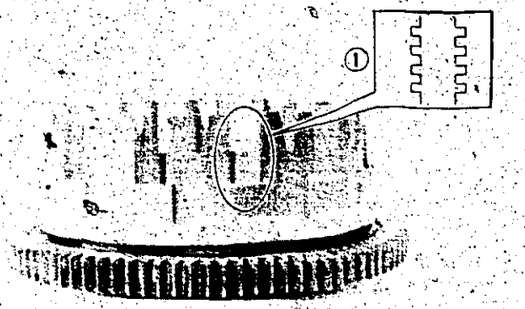
4. Install:
   - Starter clutch ①
     To the outer starter clutch ③.
5. Tighten:
   - Screws ④

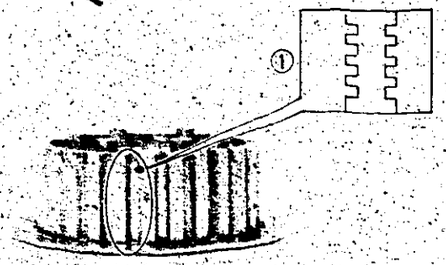
Screws (Starter Clutch):
25 Nm (2.5 m·kg, 18 ft·lb)
LOCTITE®
Stake over the end of the screw



AC Generator Shaft

1. Check:
   - •Shaft ①
     Wear/Damage → Replace.
   - •Bearing ②
     Unsmooth operation → Replace.





CLUTCH

Clutch Housing

1. Inspect:
   - •Dogs on the housing
     Cracks/Wear/Damage → Deburr or replace.
   - •Clutch housing bearing
     Chafing/Wear/Damage → Replace.

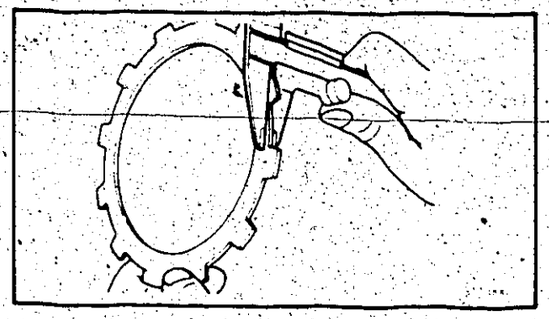
NOTE:

Wear on the friction plate dogs of the clutch housing will cause an erratic operation.

   - •Clutch boss splines
     Scoring/Wear/Damage → Replace clutch boss assembly.

NOTE:

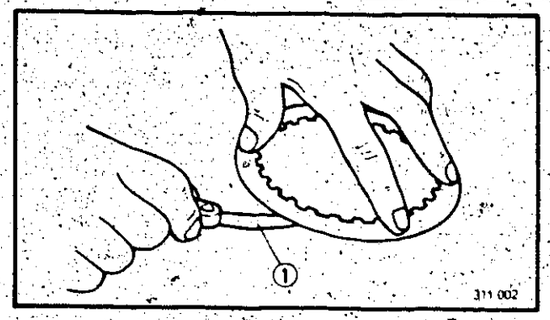
Scoring on the clutch plate splines will cause erratic operation.



Friction Plates

1. Inspect:
   - •Friction plate
     Damage/Wear → Replace the friction plates as a set.
2. Measure:
   - •Friction plate thickness
     Measure at all four points.
     Out of specification → Replace the friction plates as a set.

Wear Limit: 2.8 mm (0.110 in)

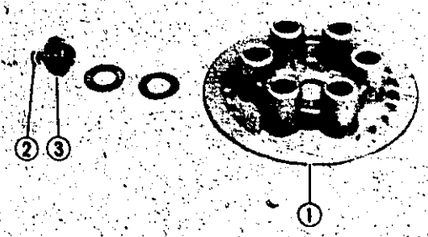


Clutch Plates

1. Measure:
   - •Clutch plate warpage
     Use the surface plate and Feeler Gauge ①.
     Out of specification → Replace.

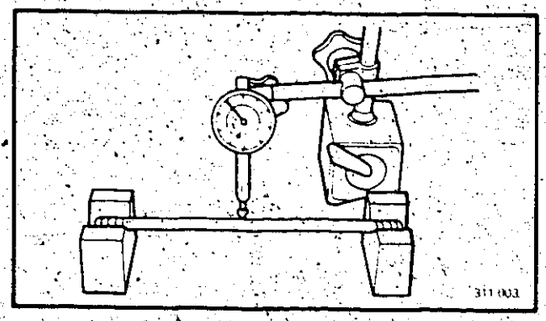
Warp Limit: 0.1 mm (0.004 in)

2. Inspect:
   - •Pressure plate ①
     Damage → Replace.



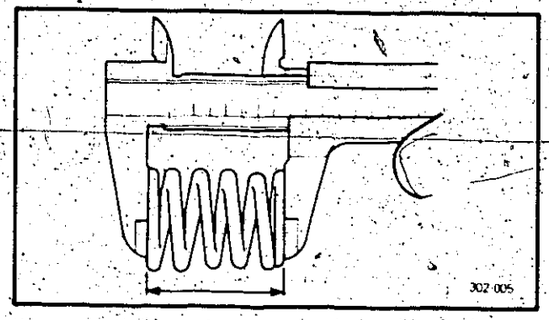
Push Rod

1. Inspect:
   - •Oil seal ②
   - •Push rod ③
     Wear/Cracks/Damage → Replace.



2. Measure:
   - •Push rod runout
     Use the V-Blocks and Dial Gauge.
     Out of specification → Replace.

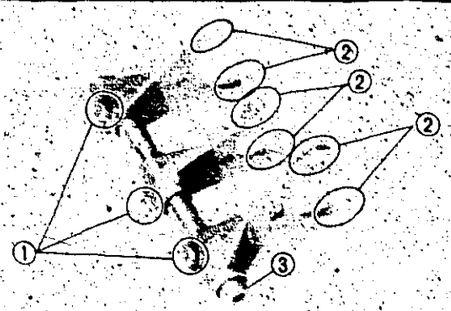
Bending Limit: 0.3 mm (0.012 in)



Clutch Spring

1. Measure:
   - •Clutch spring free length
     Out of specification → Replace the springs as a set.

Clutch Spring Minimum Free Length: 55.5 mm (2.185 in)



TRANSMISSION

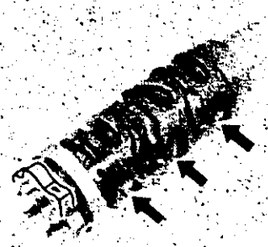
Shift Fork

1. Inspect:
   - Shift fork cam follower ①
   - Shift fork pawl ②

   Wear/Chafing/Bends/Damage → Replace.
2. Check:
   - Shift fork movement

   On its guide bar ③.

   Unsmooth operation → Replace the fork and/guide bar.



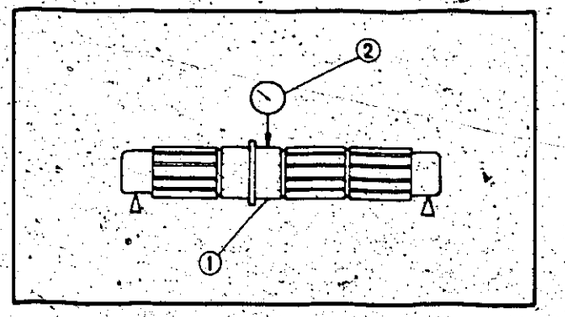
Shift Cam

1. Inspect:
   - Shift cam grooves

     Wear/Damage/Scratches → Replace.
   - Shift cam segment

     Damage/Wear → Replace.
   - Shift cam bearing

     Pitting/Damage → Replace.



Main and Drive Axles

1. Measure:
   - Axle runout ①

   Use the centering device and Dial Gauge ②.

   Out of specification → Replace.

   Out of specification → Replace.

Runout Limit: 0.08 mm (0.0031 in)



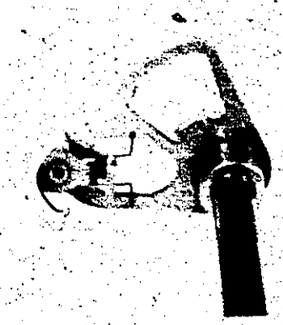
Gears

1. Inspect:
   - Gears

     Damage/Wear → Replace.
2. Check:
   - Gear movement

     Unsmooth operation → Replace.
3. Inspect:
   - Mating dogs

     Cracks/Wear/Damage → Replace.

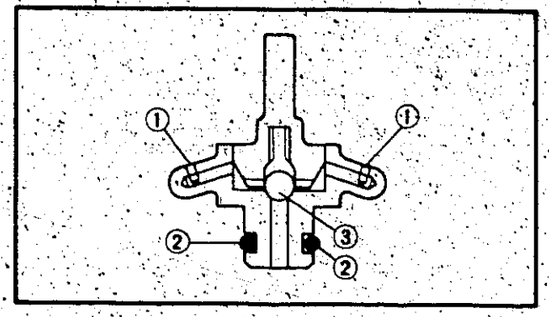


Shift Shaft Assembly

1. Inspect:
   - Shift shaft

     Bends/Wear/Damage → Replace.
   - Spring

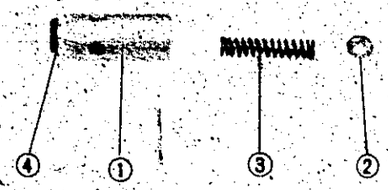
     Damage → Replace.



OIL JET NOZZLE

1. Check:
   - Oil Jet nozzles ①
   - O-rings ②
   - Check ball ③

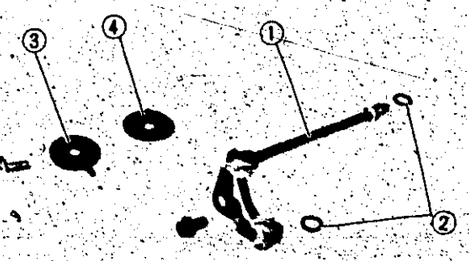
   Damage/Wear → Replace.



RELIEF VALVE AND PIPE

1. Check:
   - Relief valve body ①
   - Cover ②
   - Spring ③
   - O-ring ④

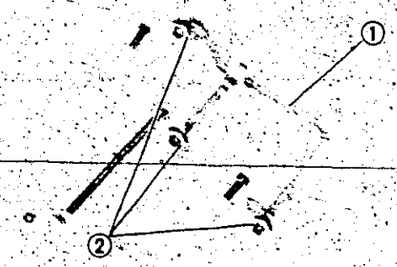
   Damage/Wear → Replace.



2. Check:
   - Oil pipe 2 ①
   - O-ring ②
   - Oil plug plate ③
   - Gasket ④

   Damage → Replace.

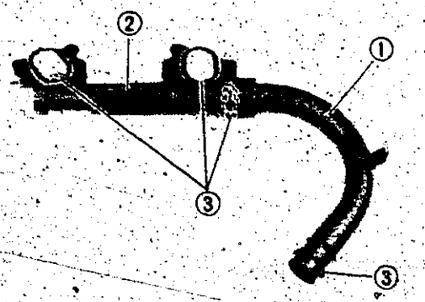
   Comtamination → Wash and blow out the passage.



3. Check:
   - Oil pipe 5 ①
   - O-ring ②

   Damage → Replace.

   Comtamination → Wash and blow out the passage.



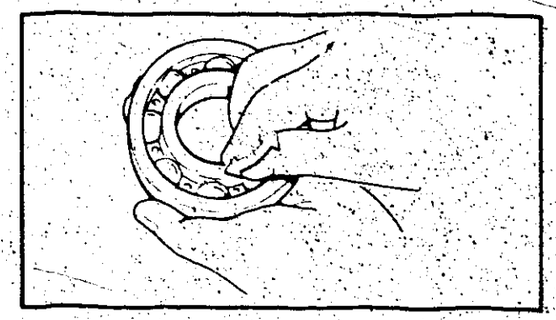
4. Check:
   - Coolant pipe ①
   - Water jacket joint ②
   - O-rings ③

   Damage → Replace.

CRANKCASE

1. Inspect:
   - •Case halves
   - •Bearing seat
   - •Fitting

   Damage → Replace



BEARING AND OIL SEAL

1. Inspect:
   - •Bearings

   Clean and lubricate, then rotate inner race with finger.

   Roughness → Replace the bearing (see Removal).
2. Inspect:
   - •Oil seals

   Damage/Wear → Replace the (see Removal).

CIRCLIP AND WASHER

1. Inspect:
   - •Circlips
   - •Washers

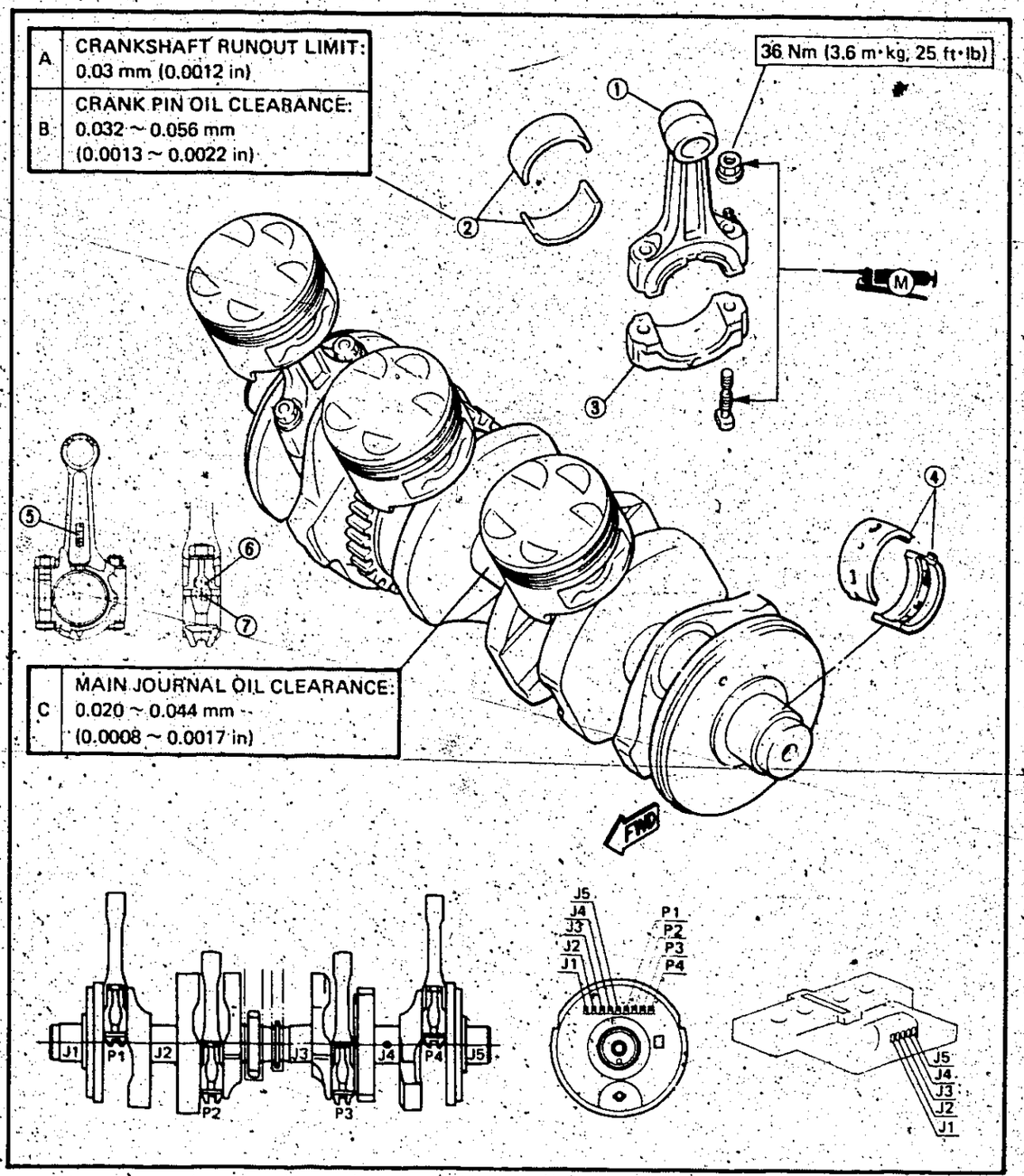
   Damage/Looseness/Bends → Replace.

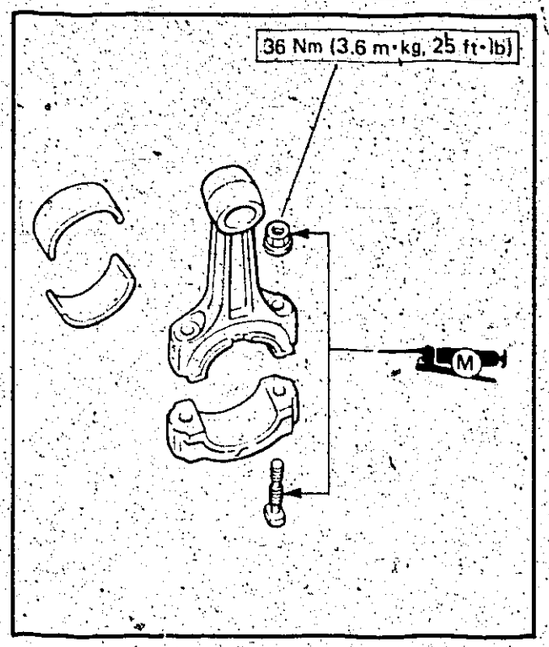
ENGINE ASSEMBLY AND ADJUSTMENT

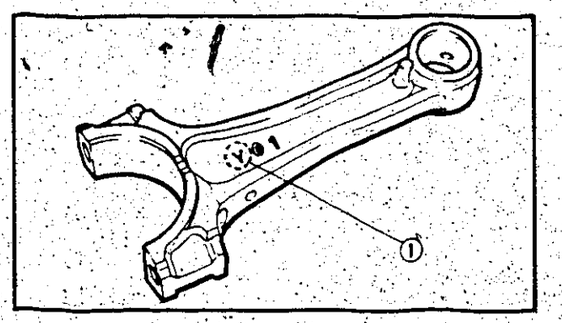
CRANKSHAFT

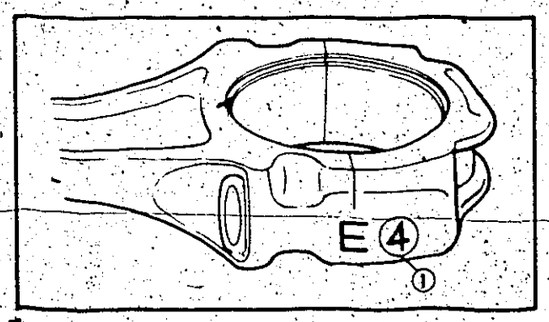
① Connecting rod
② Connecting rod bearing
③ Connecting rod cap
④ Main journal bearing
⑤ "Y" mark
⑥ Matching mark
⑦ Crank pin bearing size

A	CRANKSHAFT RUNOUT LIMIT: 0.03 mm (0.0012 in)
B	CRANK PIN OIL CLEARANCE: 0.032 ~ 0.056 mm (0.0013 ~ 0.0022 in)
C	MAIN JOURNAL OIL CLEARANCE: 0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in)









CRANKSHAFT

1. Clean:
   - Crankshaft
   - Connecting rods
2. Install:
   - Connecting rod bearings
     Into the connecting rod and cap.
3. Lubricate:
   - Connecting rod bolt threads
   - Connecting rod nuts

	Molybdenum Disulfide Grease

4. Apply engine oil to the crankshaft pins.
5. Install:
   - Connecting rods
   - Connecting rod caps

NOTE:

- The stamped "Y" mark on the connecting rods ① should face towards the left side of the crankcase.
- Be sure the letter on both components align to form a perfect character.

6. Install:
   - Connecting rod bolts
     Align the bolt head and connecting rod cap.
7. Tighten:
   - Connecting rod nuts

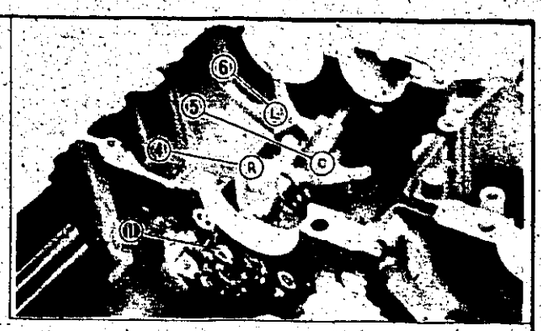
CAUTION:

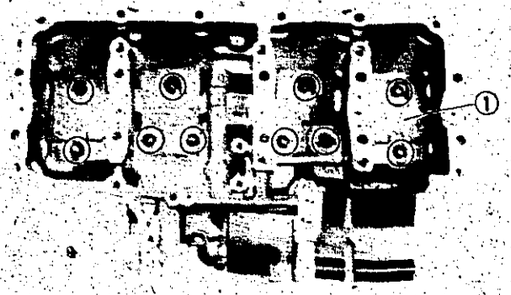
Tighten to full torque specification without pausing. Apply continuous torque between 2.0 and 3.6 m·kg. Once you reach 2.0 m·kg DO NOT STOP TIGHTENING unitl final torque is reached. If the tightening is interrupted between 2.0 and 3.6 m·kg, loosen the nut to less than 2.0 m·kg and start again.

	36 Nm (3.6 m·kg, 25 ft·lb)

LOWER CRANKCASE

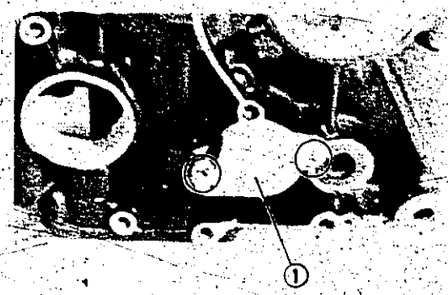
① Guide bar
② Stopper lever
③ Shift fork guide bar stopper
④ Shift fork (R)
⑤ Shift fork (C)
⑥ Shift fork (L)
⑦ Shift cam
⑧ Main axle bearing stopper
⑨ Crankshaft main bearing
⑩ O-ring



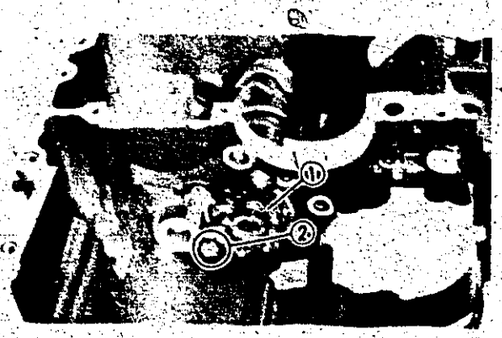


1. Install:
   - Oil baffle plates ①

	Oil Baffle Plate Bolts: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

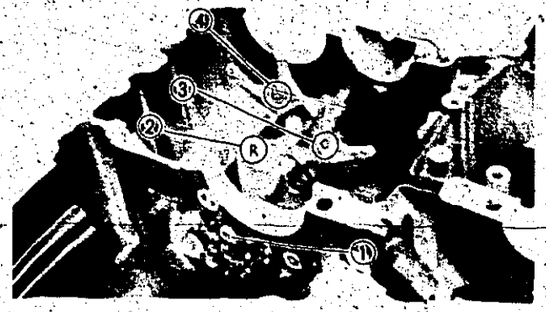


2. Install:
   - Neutral switch assembly ①



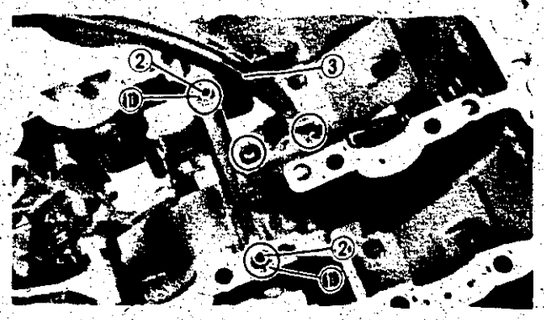
3. Install:
   - Shift cam assembly ①
   - Bolt ②

	Bolt (Shift Cam): **10 Nm (1.0 m·kg, 7.2 ft·lb)** **Apply LOCTITE®**



4. Install:
   - Guide bar ①
   - Shift fork "R" ②
   - Shift fork "C" ③
   - Shift fork "L" ④

NOTE:
All shift fork letters should face to the right side and be in sequence (R, C, L) begining from the right.

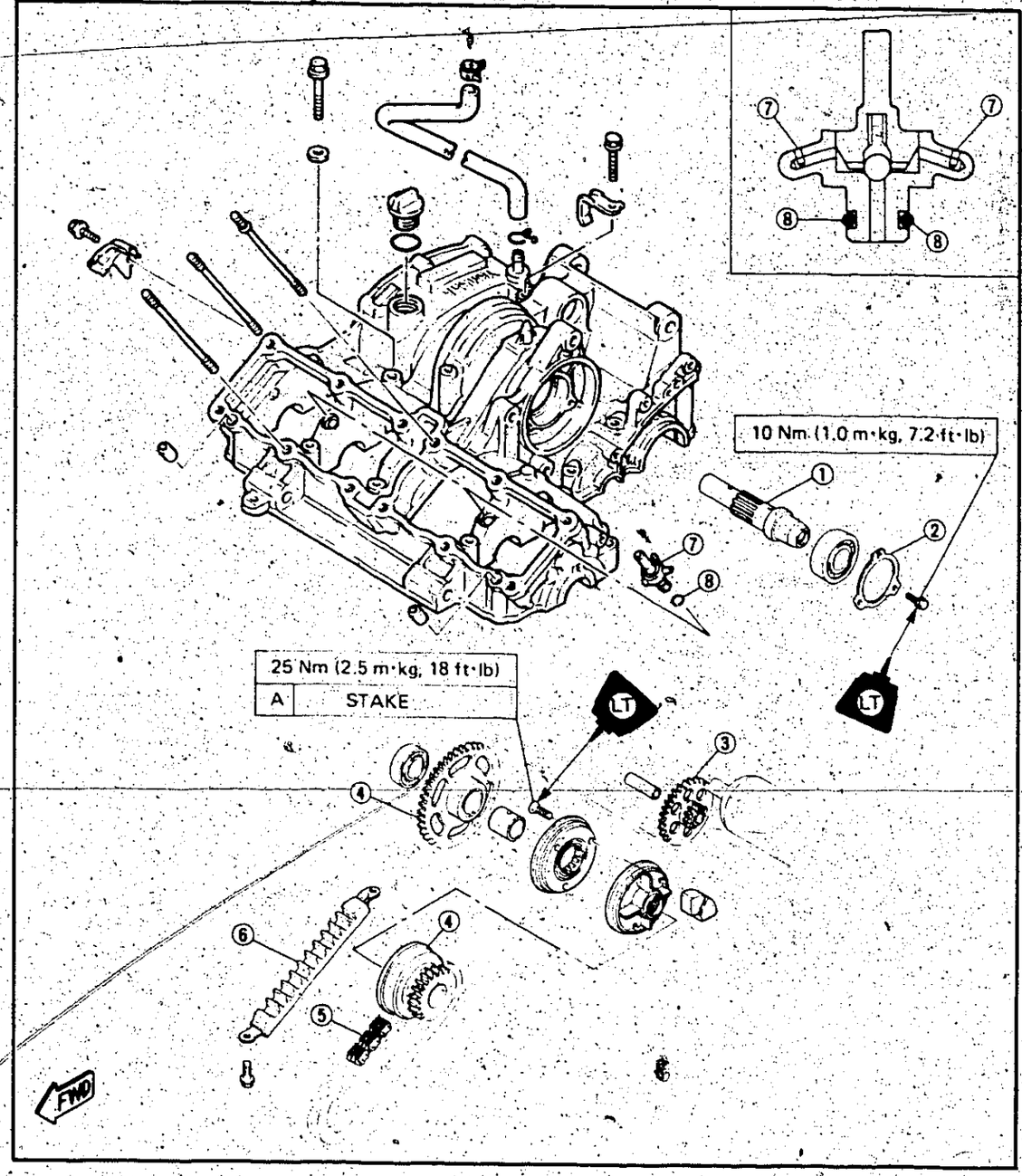


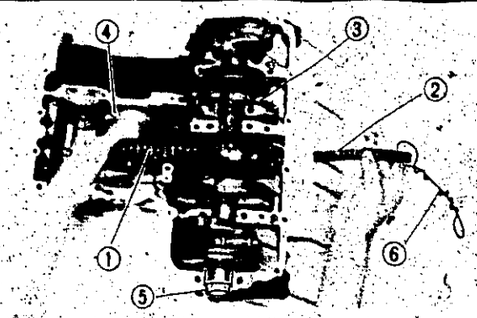
5. Install:
   - O-rings ①
   - Dowel pins ②
   - Cam chain guide (Intake side) ③

	Bolts (Chain Guide): **10 Nm (1.0 m·kg, 7.2 ft·lb)**

UPPER CRANKCASE

① AC generator shaft
② Cover plate
③ Starter idle gear
④ Starter clutch damper assembly
⑤ HY-VO chain
⑥ HY-VO chain guide
⑦ Oil Jet nozzle
⑧ O-ring

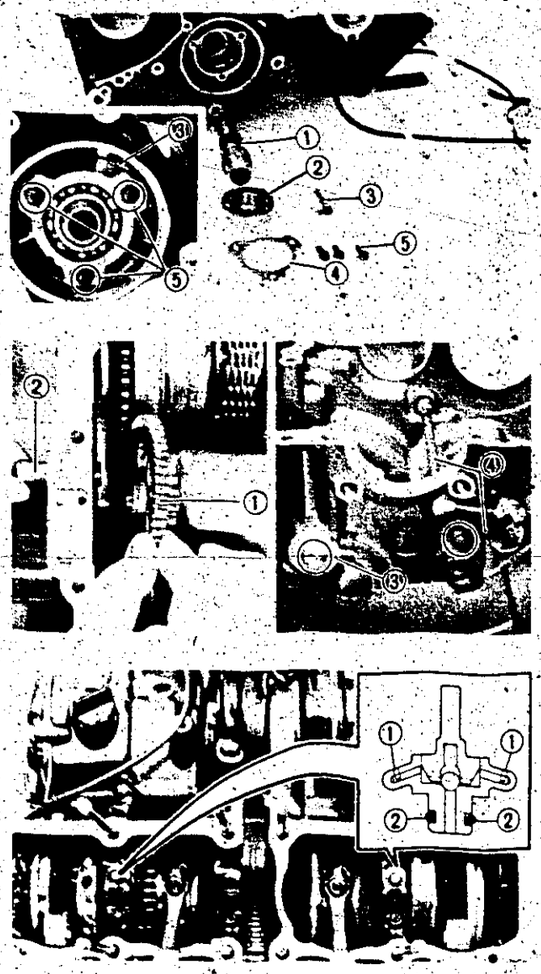




1. Install:
   - HY-VO chain guide
   - HY-VO chain ①
   - Cam chain ②
     Onto the crankshaft
   - Crankshaft assembly ③
   - Starter clutch damper assembly ④

Bolts (HY-VO Chain Guide): 10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
- The stepped crankshaft end ⑤ should face to the left.
- Pass the cam chain through the cam chain cavity. Be sure to attach a retaining wire ⑥ to the cam chain.



2. Install:
   - A.C. generator shaft ①
   - Bearing ②
   - Oil sprag nozzle ③
   - Cover plate ④
   - Bolts ⑤

Bolts (Cover Plate): 10 Nm (1.0 m·kg, 7.2 ft·lb) Apply LOCTITE®

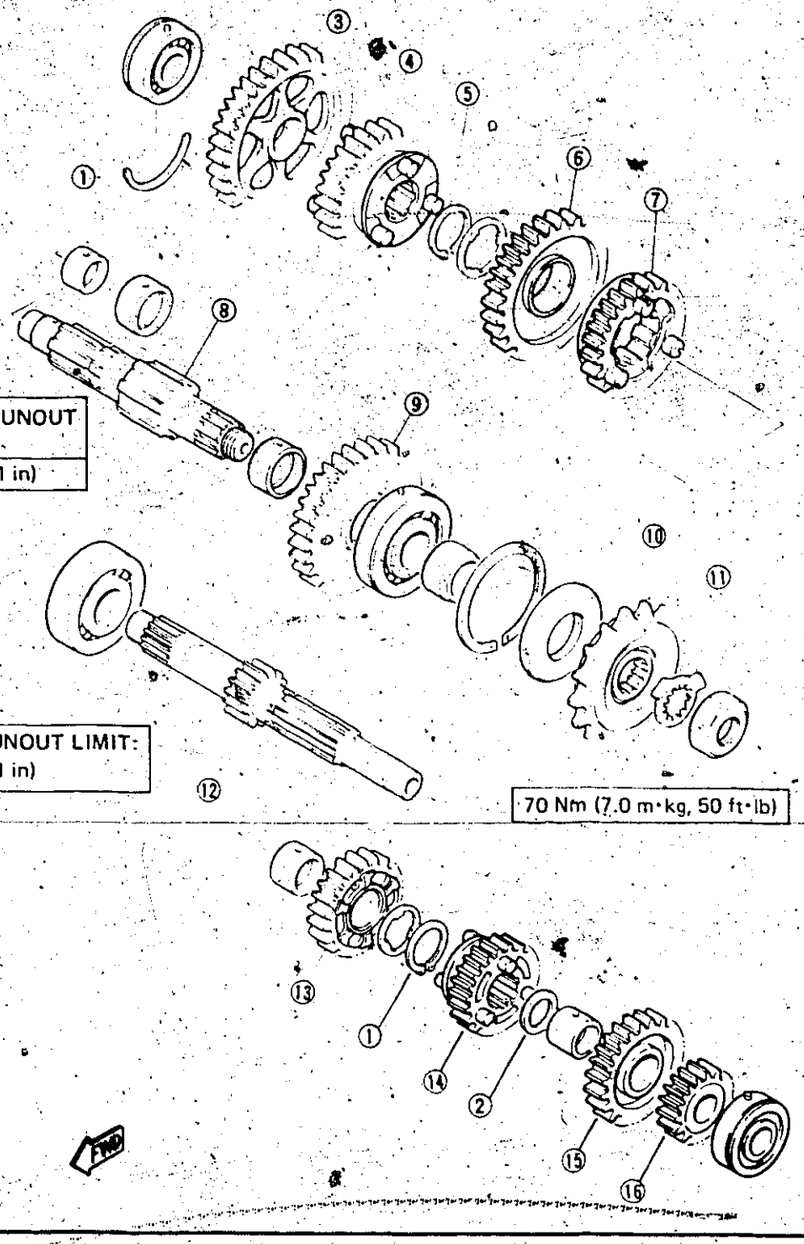
3. Install:
   - Starter idle gear ①
   - Shaft ②
   - Gasket
   - Oil plug plate ③
   - Oil pipe 2 ④

Bolts (Oil Plug Plate): 10 Nm (1.0 m·kg, 7.2 ft·lb)

4. Install:
   - Oil-Jet nozzles ①
   - O-rings ②

Transmission

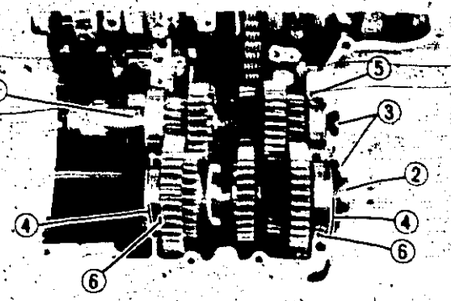
① Circlip
② Plain washer
③ 1st wheel gear (36T)
④ 4th wheel gear (27T)
⑤ Circlip
⑥ 3rd wheel gear (29T)
⑦ 5th wheel gear (28T)
⑧ Drive axle
⑨ 2nd wheel gear (32T)
⑩ Drive sprocket
⑪ Lock washer
⑫ Main axle
⑬ 4th pinion gear (27T)
⑭ 3rd pinion gear (21T)
⑮ 5th pinion gear (27T)
⑯ 2nd pinion gear (18T)



A	DRIVE AXLE RUNOUT LIMIT: 0.08 mm (0.0031 in)

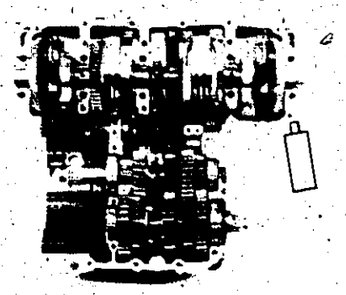
B	MAIN AXLE RUNOUT LIMIT: 0.08 mm (0.0031 in)

70 Nm (7.0 m·kg, 50 ft·lb)



5. Install:
   - Main axle assembly ①
   - Drive axle assembly ②
   - Oil seal ③
   - Circlip ④

NOTE:
- Be sure the drive axle bearing circlips ④ are inserted into the upper crankcase positioning grooves.
- Be sure the main axle bearing pin ⑤ should face to front and the drive axle bearing pins ⑥ should face to rear.



CRANKCASE ASSEMBLY

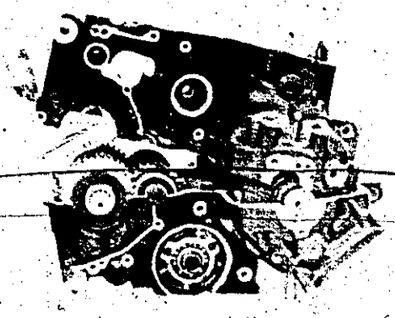
1. Apply:
   - Yamaha Bond No. 1215

   To crankcase matching surfaces.

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

NOTE:

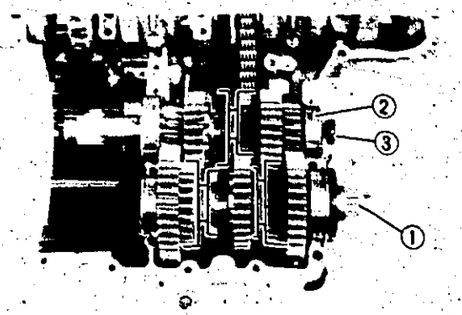
DO NOT ALLOW any sealant to come in contact with the oil gallery O-ring, or crankshaft bearings. Do not apply sealant to within 2 ~ 3 mm (0.08 ~ 0.12 in) of the bearings.



2. Set shift cam and transmission gears in NEUTRAL position.
3. Place the lower crankcase assembly on the upper crankcase assembly.
4. Install:
   - Lower crankcase

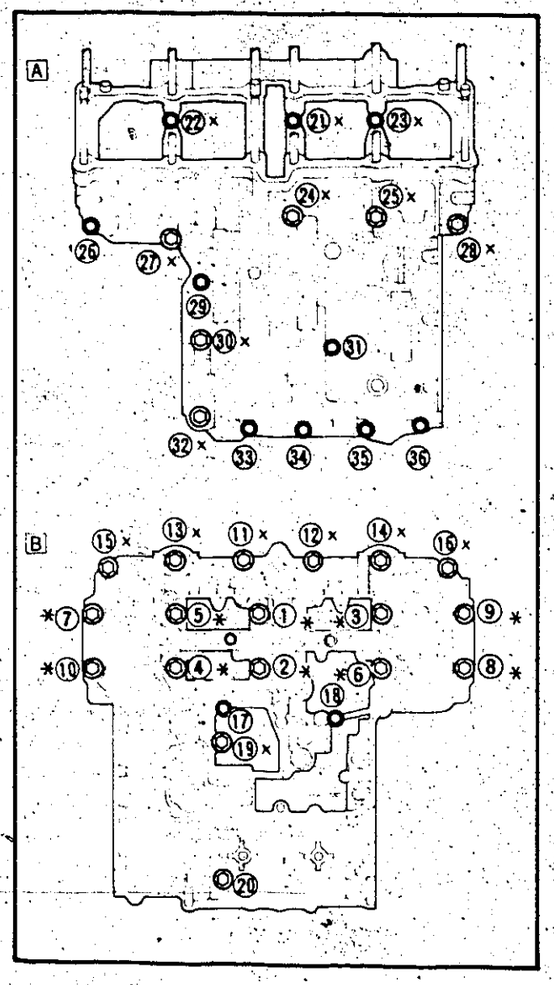
   Carefully guide the shift forks so that they mesh smoothly with transmission gears.

NOTE:
- Mesh the shift fork "L" with the 4th wheel gear ① and "R" with the 5th wheel gear ② on the drive axle.
- Mesh the shift fork "C" with the 3rd pinion gear ③ on the main axle.



CAUTION:

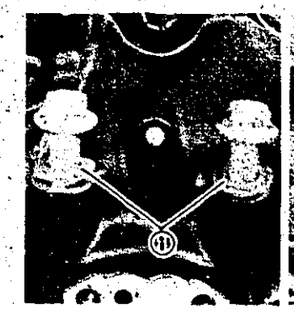
Before tightening the crankcase bolts, check the following points:
- **Be sure the gear shifts correctly while hand-turning the shift cam.**

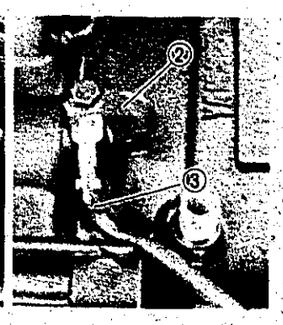


5. Tighten:
   - Lower crankcase bolt [B]
   - Upper crankcase bolt [A]

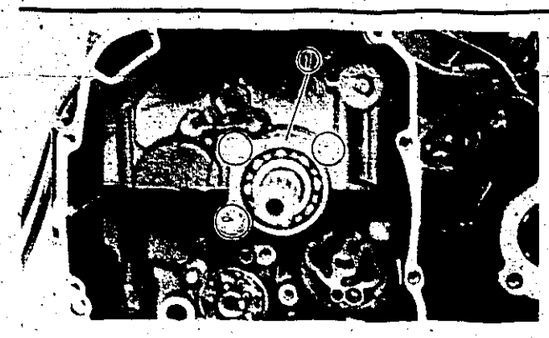
   (Follow the proper tightening sequence.)

	×6 mm Bolts: 12 Nm (1.2 m·kg, 8.7 ft·lb) ×8 mm Bolts: 24 Nm (2.4 m·kg, 17 ft·lb) *9 mm Bolts: 32 Nm (3.2 m·kg, 23 ft·lb)



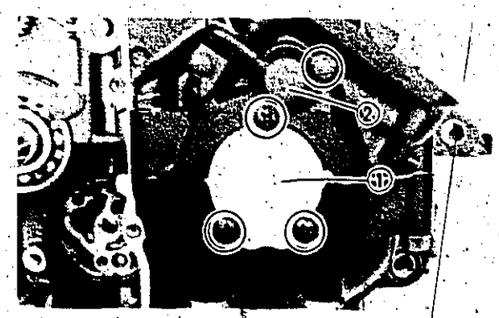


NOTE:
- Install the washer ① on Bolt No. 7, 8, 9, and 10.
- Install the clamp ② and ground lead ③ on Bolt No. 31.



6. Install:
   - Main axle bearing stopper ①
   Use the Torx Wrench (T30).

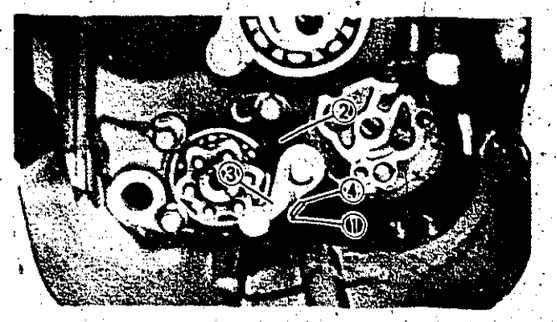
	Torx Wrench (T30): P/N 90890-05245
	Screws (Bearing Stopper): 10 Nm (1.0 m·kg, 7.2 ft·lb) LOCTITE®



7. Install:
   - O-ring
   - Crankshaft end cover ① (Right)
   - Pickup coil ②

	Screws (Crankshaft End Cover): 7 Nm (0.7 m·kg, 5.1 ft·lb)
	Bolt (Pickup coil): 10 Nm (1.0 m·kg, 7.2 ft·lb)

SHIFT SHAFT AND OIL PUMP



1. Install:
   - Spring ①
   - Shift fork shaft stopper ②
   - Stopper lever ③

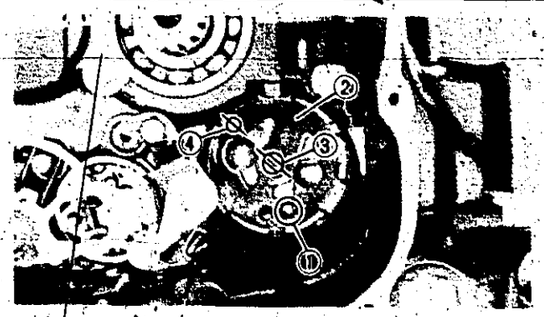
	Bolts (Shift Fork Shaft Stopper/ Stopper Lever): 10 Nm (1.0 m·kg, 7.2 ft·lb) Apply LOCTITE®

NOTE:
- Mesh the stopper lever ③ with the shift cam stopper.
- Hook the spring ends on the stopper lever and crankcase boss ④.



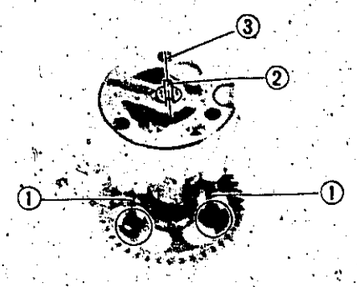
2. Install:
   - Change lever assembly ①
   - Wahser ②
   - Circlip ③

NOTE:
Insert the stopper between spring ends.



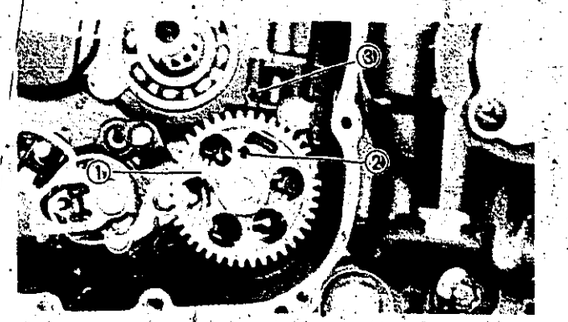
3. Install:
   - Dowel pin ①
   - Gasket ②

NOTE:
Align the water pump impeller shaft slot ③ with the oil pump thread hole ④.



4. Install:
   - Oil pump mounting bolts ①

NOTE:
Align the oil pump shaft projection ② with the oil pump hole ③.



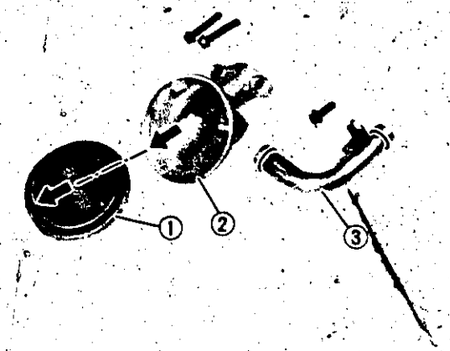
5. Install
   - Oil pump assembly ①

	Oil Pump Mounting Bolts: 10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Align the oil pump arrow mark ② with crankcase arrow mark ③.

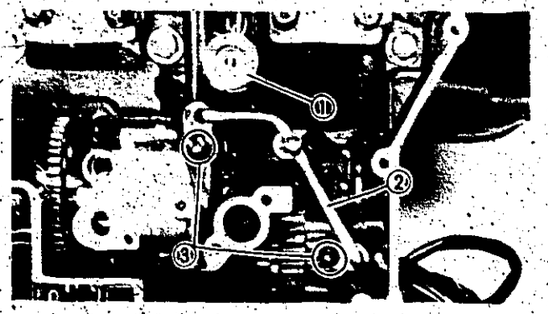
CAUTION:
- **Be sure the oil pump turns smoothly in itself after tightening the bolts.**
- **Be sure the oil pump shaft projection mesh with the water pump impeller shaft slot.**

OIL STRAINER AND OIL PAN



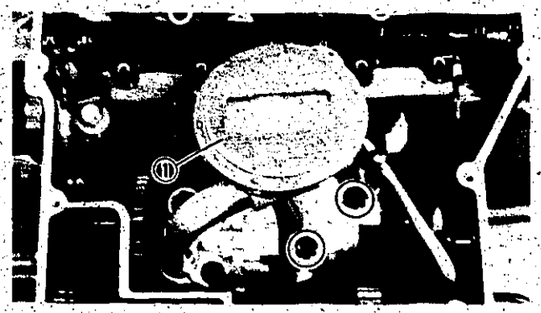
1. Assemble:
   - Oil strainer element ①
   - Housing (Oil strainer) ②
   - Pipe ③

NOTE:
The element (window) must be installed vertically against housing arrow mark.



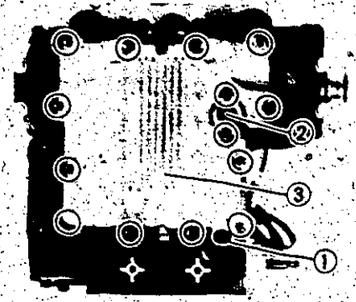
2. Install:
- Relief valve ①
- Oil pipe 5 ②

Bolts (Oil Pipe 5):
6 mm ③:
10 Nm (1.0 m·kg, 7.2 ft·lb)



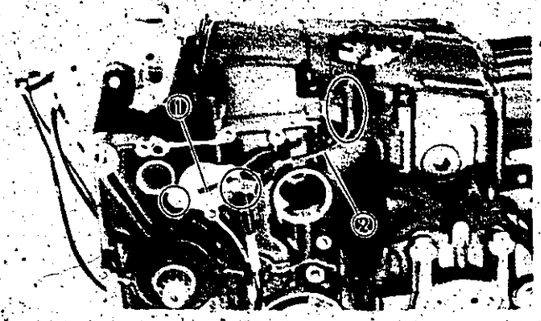
3. Install:
- Oil strainer assembly ①
- Gasket (New)

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

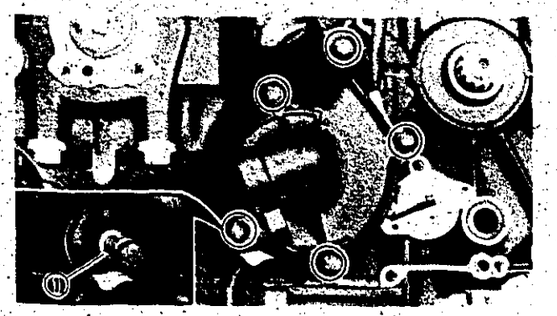


4. Install:
- Drain plug ①
- Oil level switch ②
- Oil pan ③

Drain Plug:
43 Nm (4.3 m·kg, 31 ft·lb)
Bolts (Oil Level Switch):
Oil Pan Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)



5. Connect:
- Neutral switch lead ①
- Oil level switch lead ②

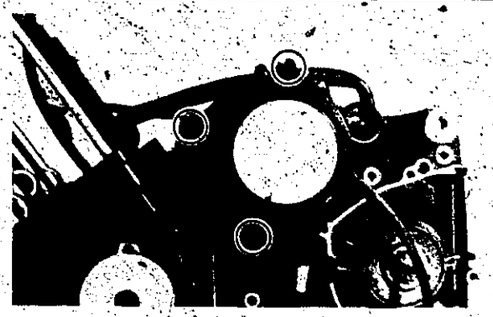


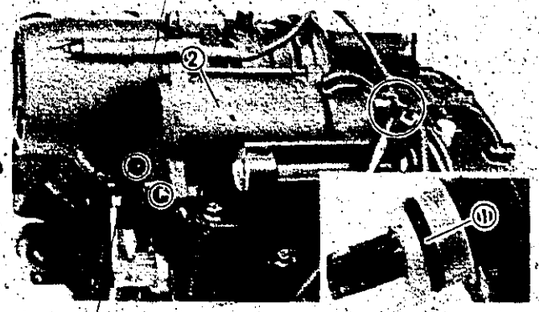
WATER PUMP

1. Install:
- Water pump assembly

Bolts (Water Pump):
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Use the cupper washer ① on the coolant drain bolt.





AC GENERATOR AND STARTER MOTOR

1. Install:
- Generator

Bolts (Generator):
20 Nm (2.0 m·kg, 14 ft·lb)

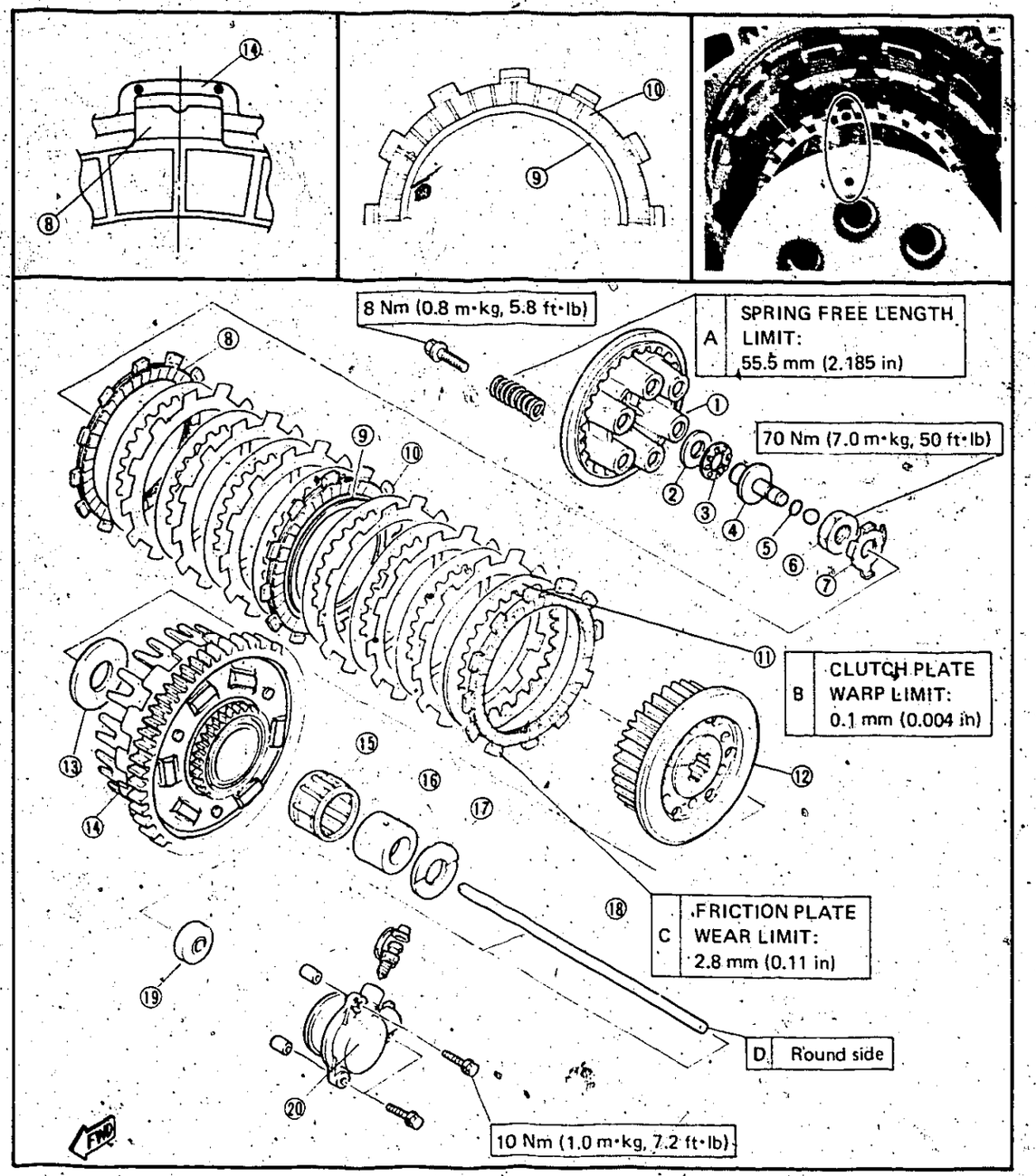
2. Check:
- O-ring (Starter motor) ①
Damage → Replace.

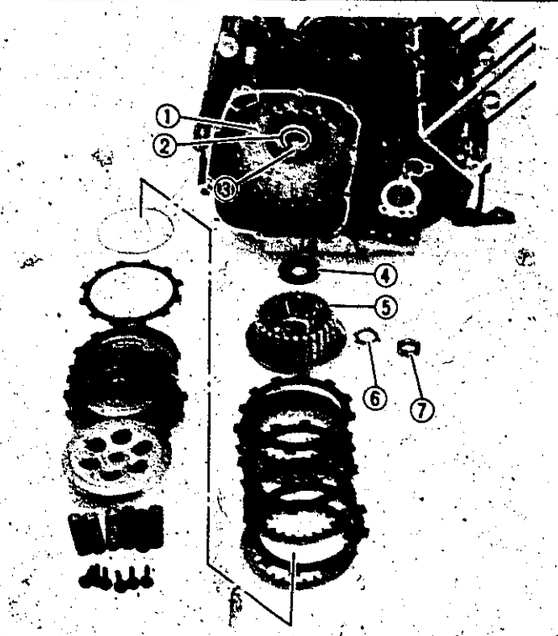
3. Install:
- Starter motor ②

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

CLUTCH

① Pressure plate
② Plate washer
③ Bearing
④ Push rod # 1
⑤ O-ring
⑥ Ball
⑦ Lock washer
⑧ Friction plate (Outer)
⑨ Cushion spring
⑩ Friction plate (Center)
⑪ Clutch plate
⑫ Clutch boss
⑬ Washer
⑭ Primary driven gear
⑮ Bearing
⑯ Spacer
⑰ Thrust washer
⑱ Push rod # 2
⑲ Oil seal
⑳ Clutch release cylinder

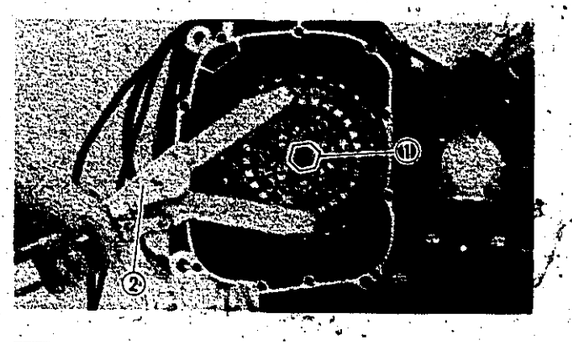




CLUTCH

1. Install:
   - Thrust washer
   - Clutch housing ①
   - Bearing ②
   - Spacer ③
   - Washer ④
   - Clutch boss ⑤
   - Lock washer (New) ⑥
   - Nut (Clutch boss) ⑦

NOTE:
Install the bearing ② and spacer ③ after installation of the clutch housing ①.

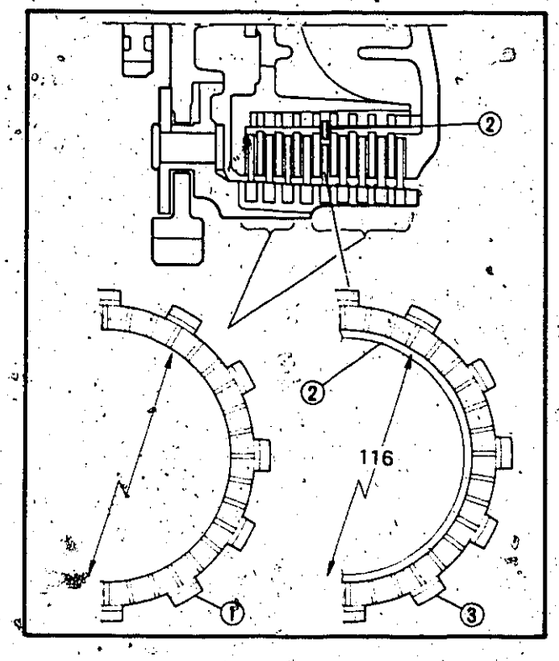


2. Tighten:
   - Nut (Clutch boss) ①

   Use the Universal Clutch Holder ②.

	Universal Clutch Holder: P/N 90890-04086
	Nut (Clutch Boss): 70 Nm (7.0 m·kg, 50 ft·lb)

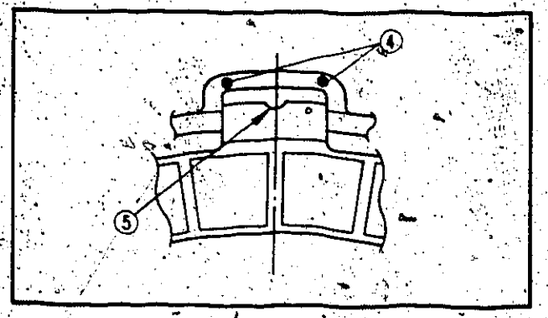
NOTE:
Bend the lock washer tab along the nut flat.



3. Install:
   - Friction plates
   - Clutch plates
   - Cushion spring

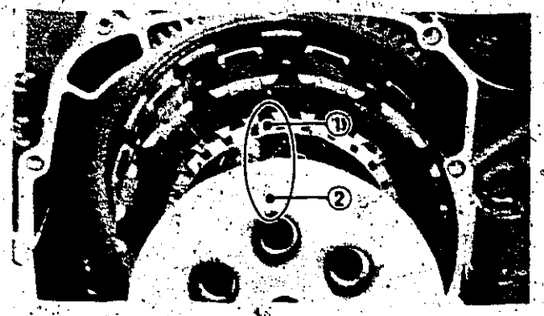
Friction plates and clutch plate installation steps:
- Install the four friction plates (with the red painted mark) ① and the four clutch plates mutually.
- Install the cushion spring ② and the one center friction plate (With the blue painted mark) ③ at the center position.

NOTE:
Be sure the cushion spring ② and the center friction plate ③ must be positioned at the center amoung nine friction plates.



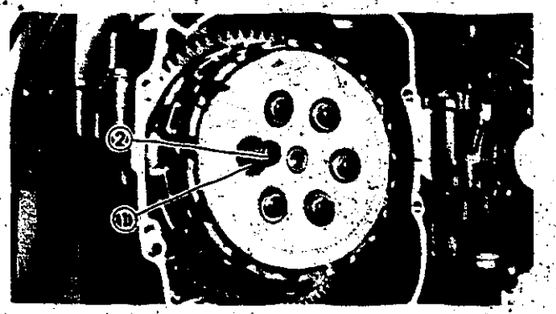
- Install the three friction plates ① (With the red painted mark) and the three clutch plates mutually.
- Install the one outer friction plate (With the signal semi-circular slot) ④.

NOTE:
- Be sure the single semi-circular slot ④ on the friction plate is aligned with the clutch housing embossed match marks ⑤.



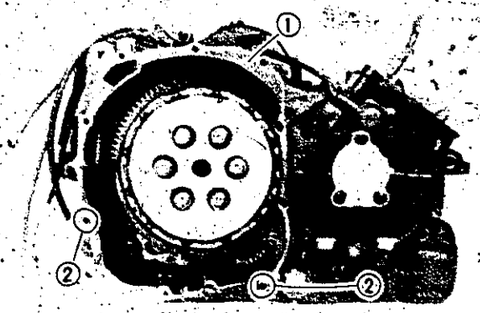
4. Install:
   - Pressure plate

NOTE:
Be sure the match mark ① on the clutch boss is aligned with the match mark ② on the pressure plate.

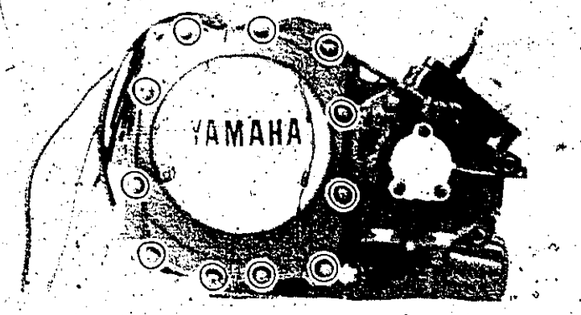


5. Install:
   - Clutch springs ①
   - Bolts (Clutch spring) ②

	Bolts (Clutch Spring): 8 Nm (0.8 m·kg, 5.8 ft·lb)



6. Install:
   - Gasket ①
   - Dowel pins ②

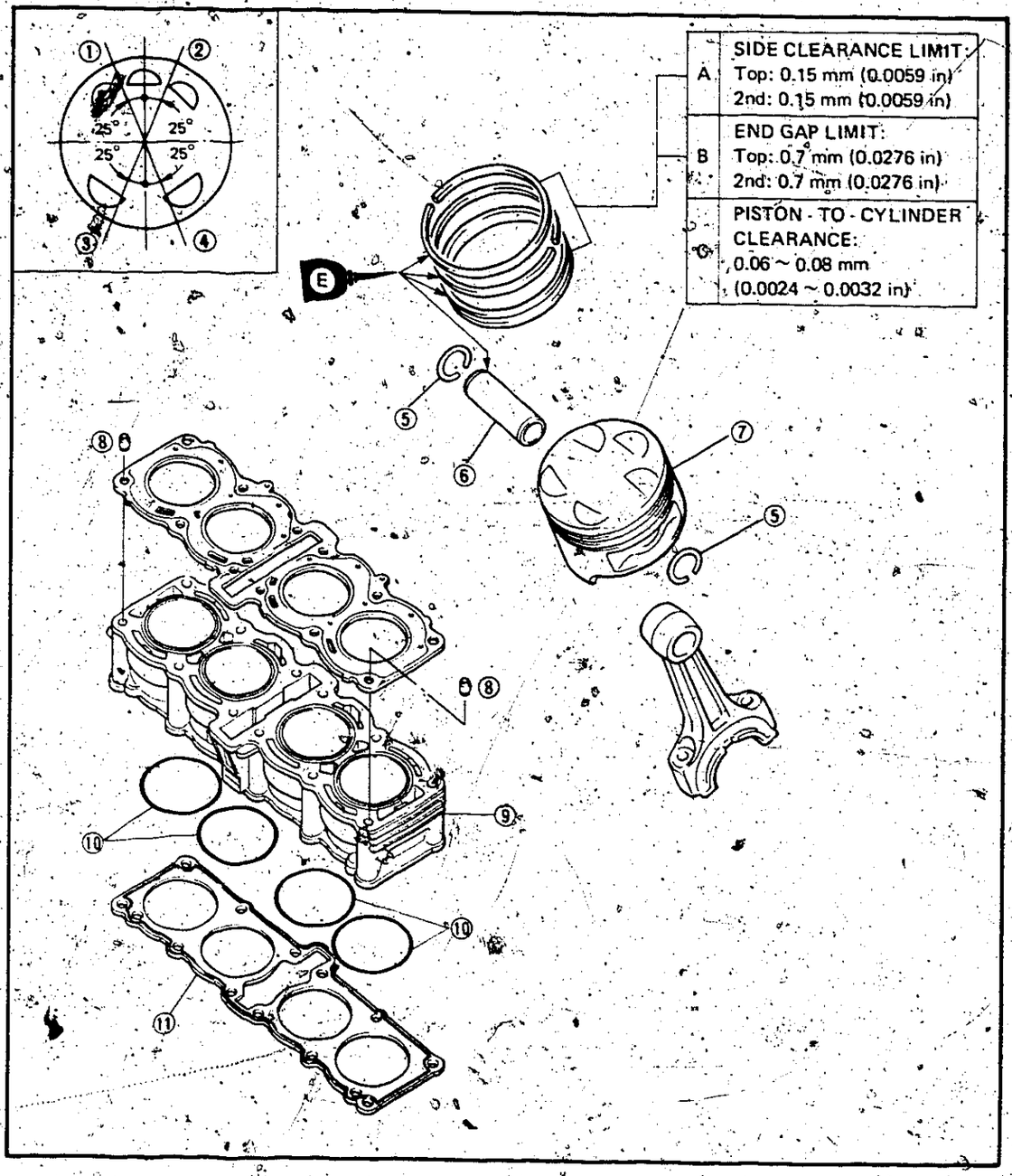


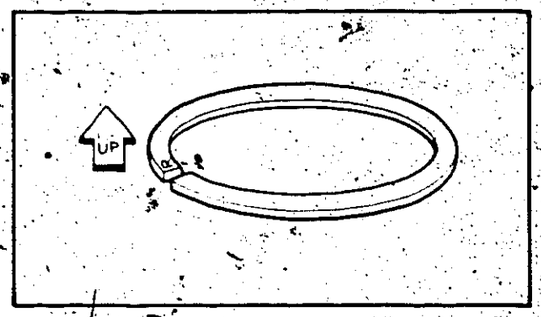
7. Install:
   - Crankcase cover (Right)

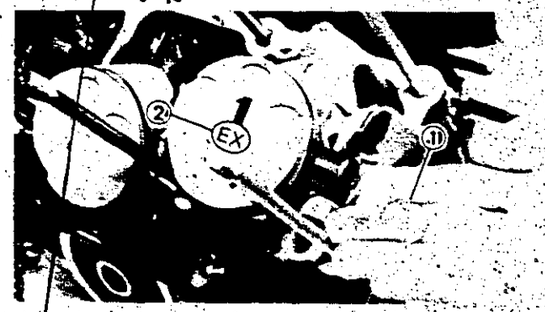
	Bolts (Crankcase Cover): 10 Nm (1.0 m·kg, 7.2 ft·lb)

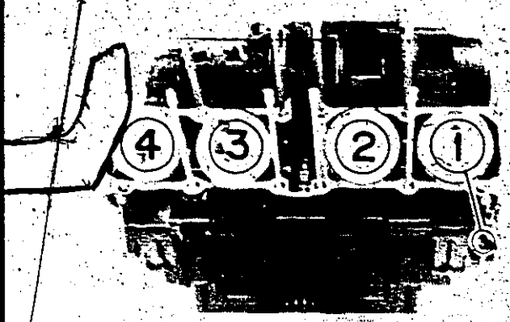
PISTON AND CYLINDER

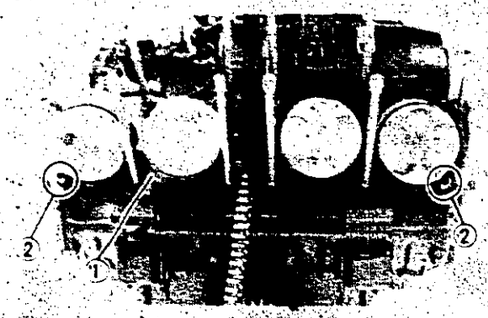
① Top ring
② Oil ring (Lower)
③ Oil ring (Upper)
④ Second ring
⑤ Circlip
⑥ Piston pin
⑦ Piston
⑧ Dowel pin
⑨ Cylinder
⑩ O-ring
⑪ Gasket

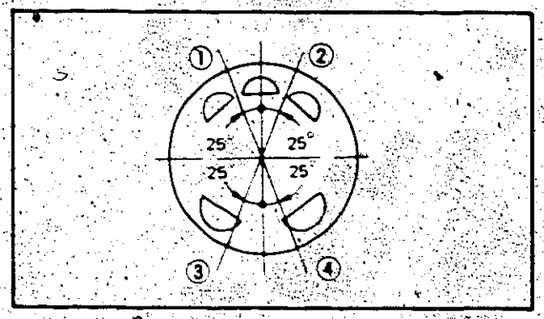












PISTON AND CYLINDER

1. Install:
   - Piston rings

NOTE:
Be sure to install rings so that Manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.

2. Install:
   - Piston pins
   - Pistons
   - Circlips (Piston pin) ①

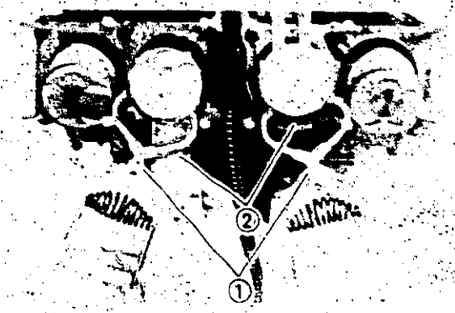
NOTE:
- Be sure the piston "EX" mark ② face to exhaust side of the engine.
- Before installing the piston pin circlip, cover the crankcase with a clean rag to prevent the circlip from falling into the crankcase cavity.
- Be sure the marked piston numbers ③ should be in sequence (1, 2, 3, 4) begining from the left.

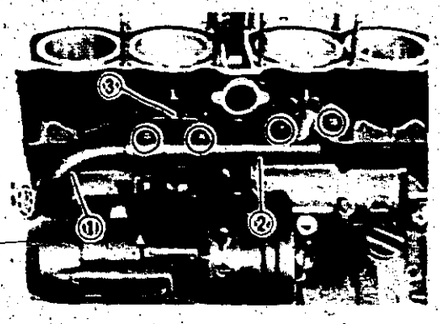
WARNING:
Always use new circlips (Piston pin).

3. Install:
   - Gasket (Cylinder) ①
   - Dowel pins ②
4. Lubricate:
   - Pistons
   - Piston rings
   - Cylinder

NOTE:
Apply a liberal coating of 4-stroke engine oil.

5. Position:
   Offset the piston ring end gaps.
   - Top ring end ①
   - Oil ring end (Lower) ②
   - Oil ring end (Upper) ③
   - 2nd ring end ④





6. Install:
   - Cylinder
   Use the Position Ring Compressor ① and Piston Base ②.

Piston Ring Compressor:
P/N 90890-04008
Piston Base:
P/N 90890-01067

NOTE:
Pass the cam chain and cam chain guide (Exhaust side) through the cam chain cavity.

7. Install:
   - Coolant feed pipe ①
   - Water jacket joint ②
   - Holder (Air vent hose) ③

Bolt (Coolant Feed Pipe):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolts (Water Jacket Joint):
10 Nm (1.0 m·kg, 7.2 ft·lb)

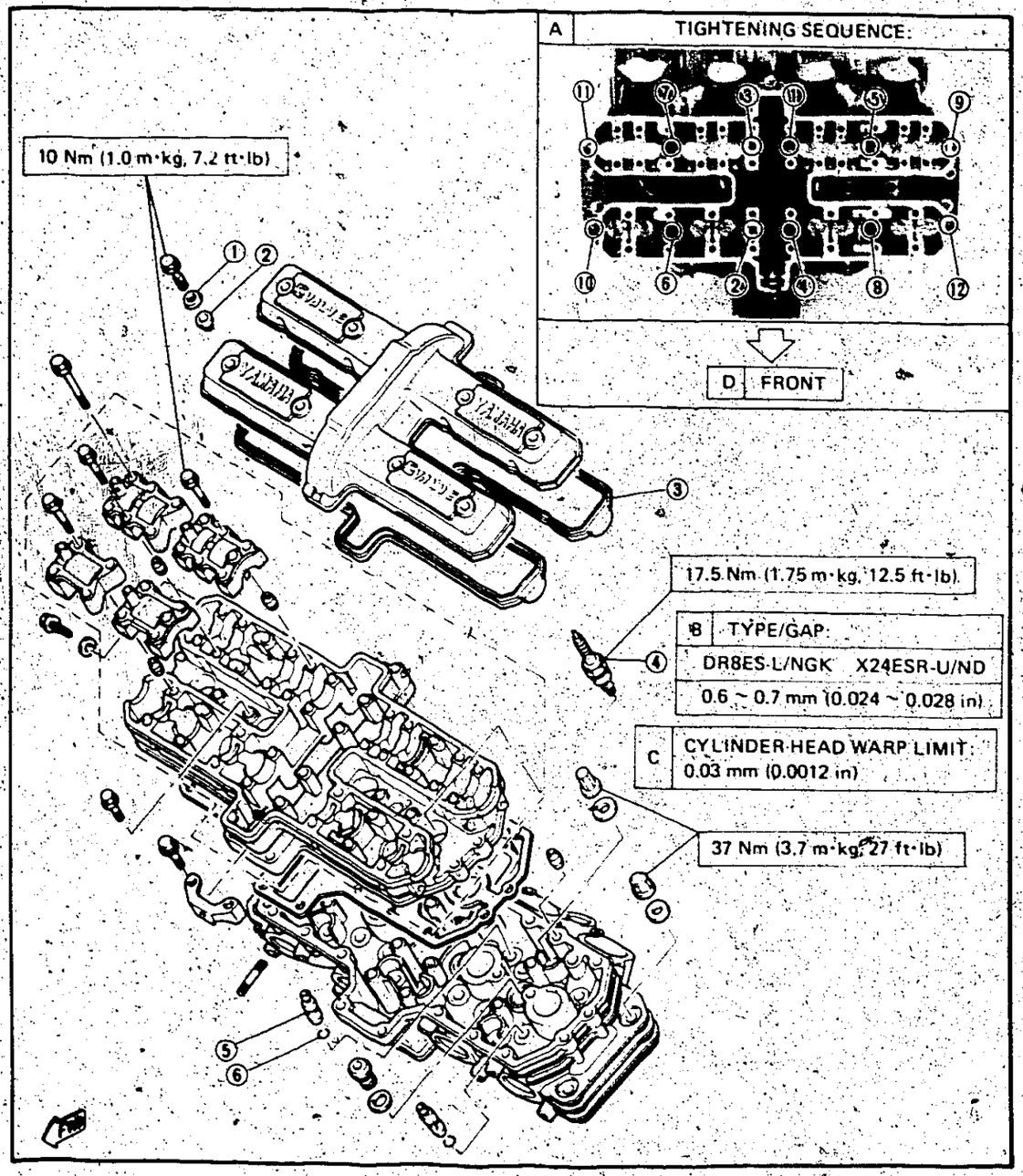
8. Turn:
   - Crankshaft
   Counterclockwise.
9. Align:
   - "T" mark
   - Stationary pointer
   Refer to "ENGINE DISASSEMBLY – CYLINDER HEAD AND CAMSHAFT".

NOTE:
When = 1 piston is at TDC.

CYLINDER HEAD AND CAMSHAFT

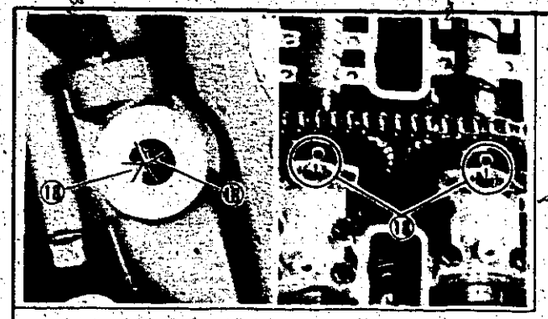
Cylinder Head

① Washer
② Rubber washer
③ Gasket
④ Spark plug
⑤ Valve guide
⑥ Circlip

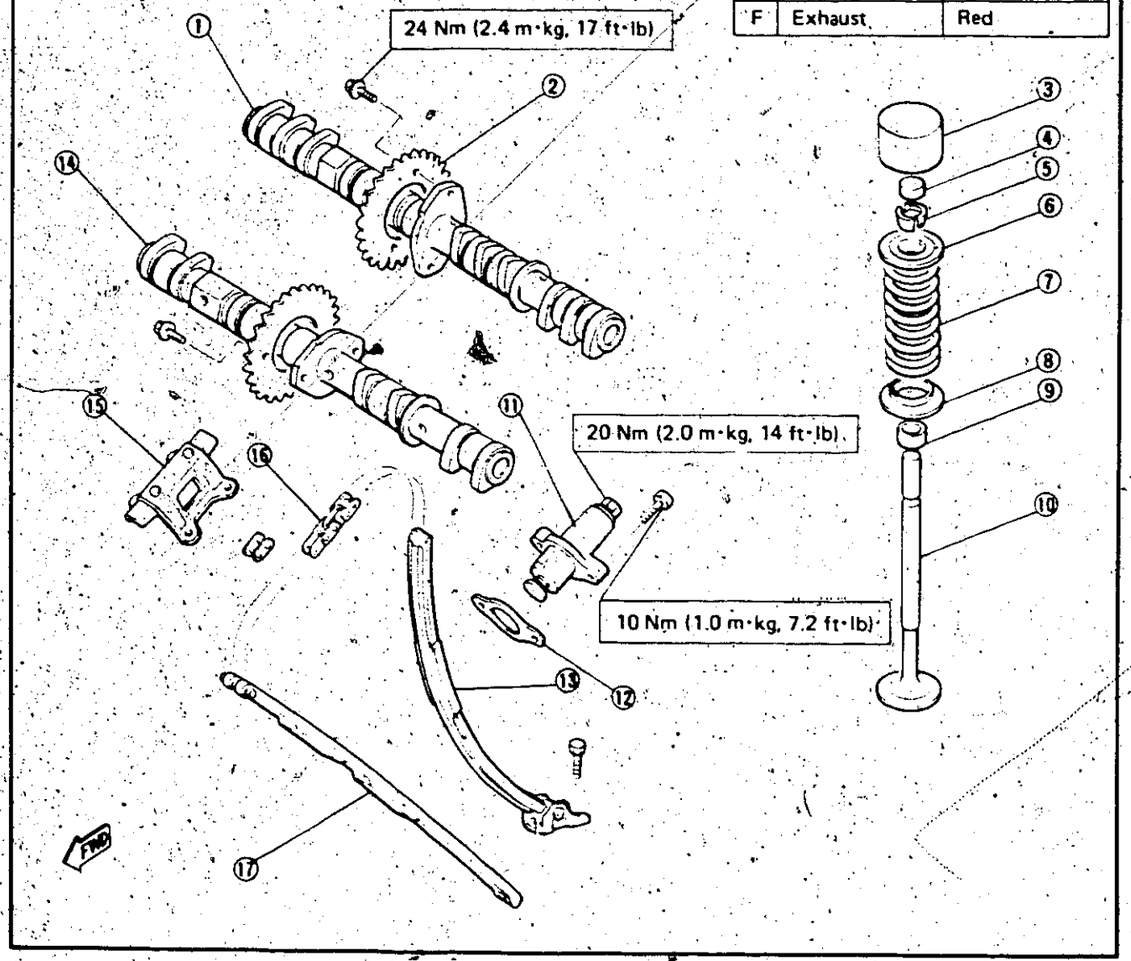


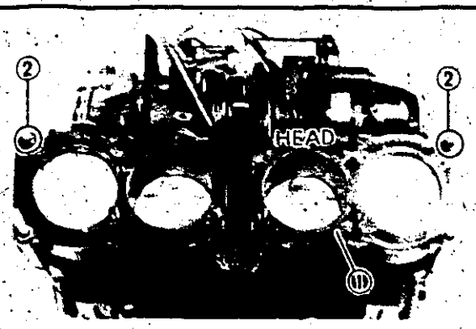
Camshaft

① Camshaft (Intake)
② Cam chain sprocket
③ Valve lifter
④ Valve pad
⑤ Valve retainer
⑥ Spring seat
⑦ Valve spring
⑧ Spring seat
⑨ Oil seal
⑩ Valve
⑪ Cam chain tensioner
⑫ Gasket
⑬ Cam chain guide (Intake side)
⑭ Camshaft (Exhaust)
⑮ Chain guide (Upper)
⑯ Cam chain
⑰ Cam chain guide (Exhaust side)
⑱ Match mark



A	VALVE CLEARANCE (COLD):	
B	INTAKE: 0.11 ~ 0.20 mm (0.004 ~ 0.008 in)	
C	EXHAUST: 0.21 ~ 0.30 mm (0.008 ~ 0.012 in)	
D	VALVE SPRING COLOR:	
E	Intake	Blue
F	Exhaust	Red



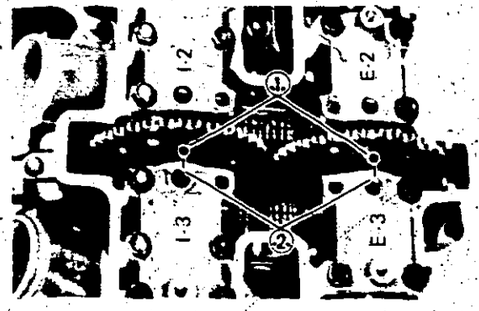


CYLINDER HEAD AND CAMSHAFT

1. Install:
   - Gasket (Cylinder head) ① (New)
   - Dowel pins ②

NOTE:
The gasket "HEAD" mark should face upward.

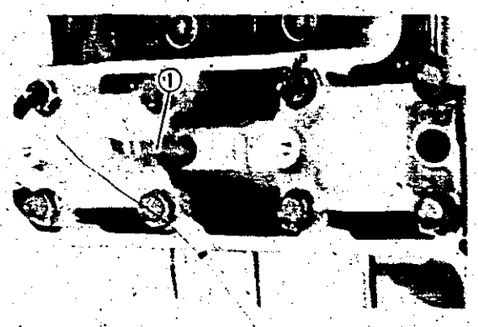
NOTE:
- Select either of the two procedures explained in this manual, as follows:
- Procedure 1.
  The cam chain is disconnected → Connect.
- Procedure 2.
  The camshafts are removed → Install.



Procedure 1

1. Install:
   - Camshafts, camshaft case and cylinder head assembly

NOTE:
- Be sure the camshaft timing marks ① align with the camshaft cap marks ②.
- Be sure the "T" mark on the crankshaft web align the stationary pointer when = 1 piston is at TDC.

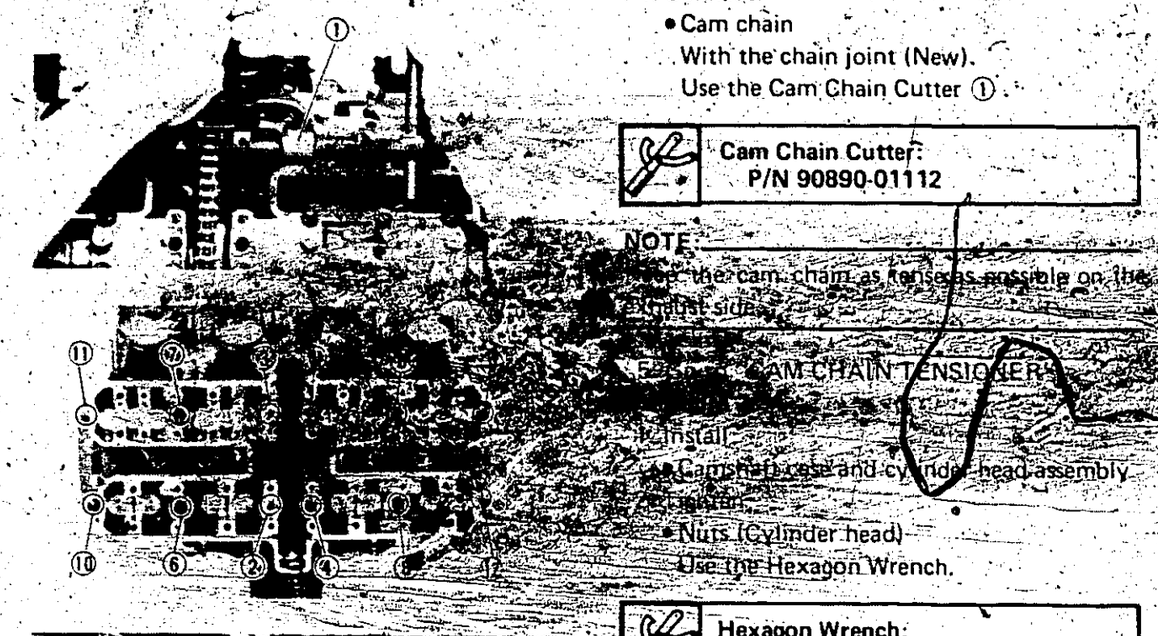


2. Tighten:
   - Nuts (Cylinder head)
     Use the Hexagon Wrench ①.

Hexagon Wrench: P/N 90890-01395

NOTE:
Tighten the nuts in their proper tightening sequence and torque nuts in two stages.

Nuts (Cylinder Head): 37 Nm (3.7 m·kg, 27 ft·lb)



4. Connect:
   - Cam chain
     With the chain joint (New).
     Use the Cam Chain Cutter ①.

Cam Chain Cutter: P/N 90890-01112

NOTE:
Set the cam chain as tensions possible on the exhaust side.

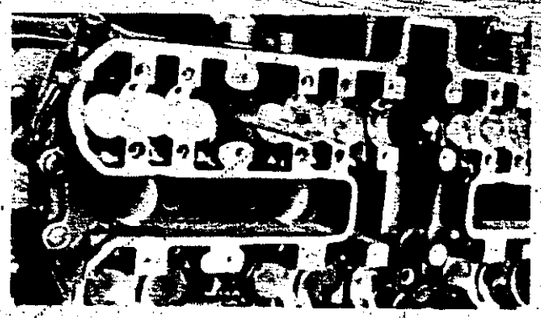
CAM CHAIN TENSIONER

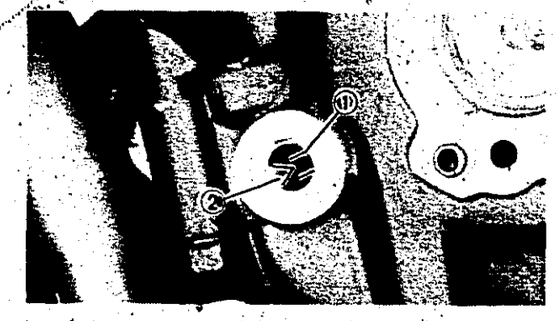
5. Install:
   - Camshaft case and cylinder head assembly
   - Nuts (Cylinder head)
     Use the Hexagon Wrench.

Hexagon Wrench: P/N 90890-01395

NOTE:
Tighten the nuts in their proper tightening sequence and torque nuts in two stages.

Nuts (Cylinder Head): 37 Nm (3.7 m·kg, 27 ft·lb)

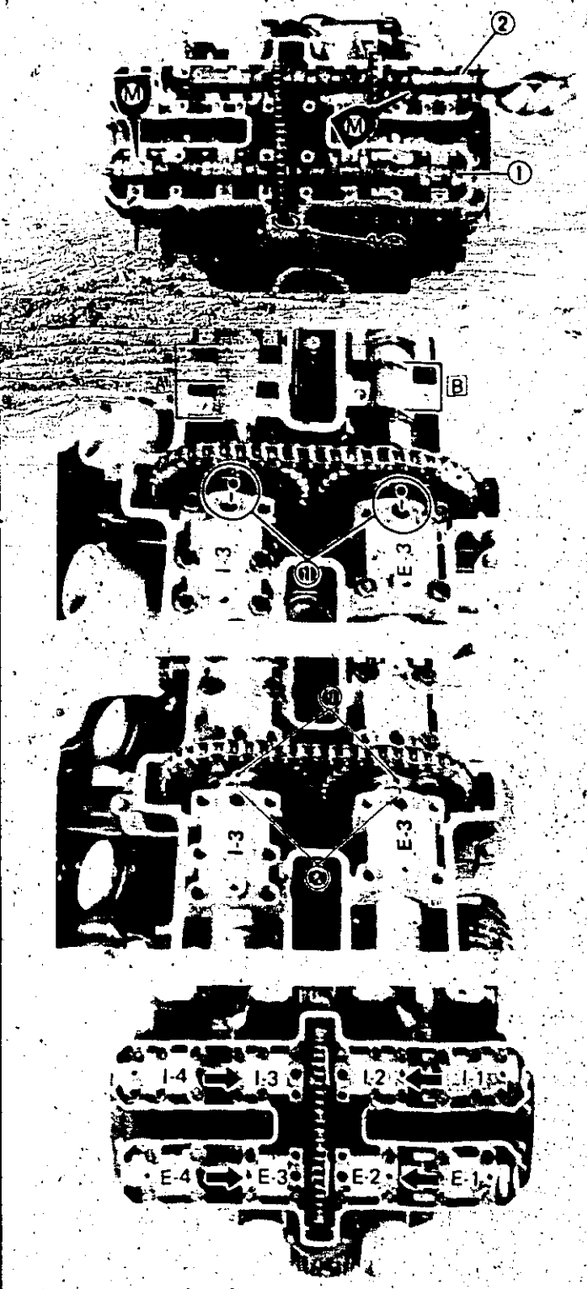




3. Install:
   - Camshafts

Camshaft installation steps:
- Turn the crankshaft counterclockwise.
- Align the "T" mark ① on the crankshaft web with the stationary pointer ② when = 1 piston is at TDC.

CAUTION:
Do not turn the crankshaft during the camshafts installation. Damage or improper valve timing will result.



- Lubricate the camshaft bearing surfaces, cam lobes and cam journals.

Molybdeum Disulfide Oil

- Install the exhaust camshaft ① first, then install the intake camshaft ②.

NOTE:
- "3 – Lobe" [A] is for the intake camshaft.
- "2 – Lobe" [B] is for the exhaust camshaft.
- Be sure the timing marks ① on the camshaft face upward.
- Keep the cam chain as tense as possible on the exhaust side.
- Remove the retaining wire ②.

CAUTION:

Do not turn the camshaft separately or damage to the piston and valve will result.

- Install the dowel pins.
- Install the camshaft caps.
- Align the camshaft timing marks ① with the camshaft cap marks ②.

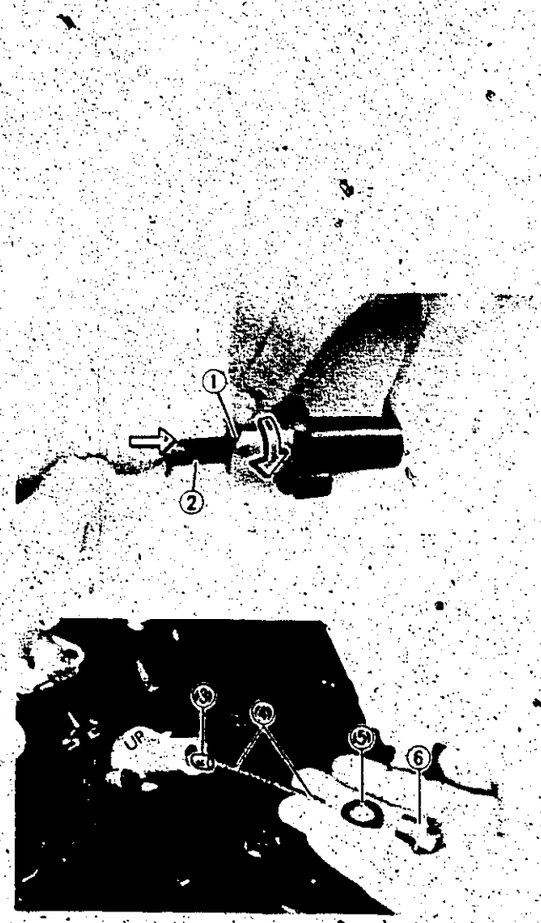
NOTE:
- The numbers are punched on the camshaft caps in increments from right to left.
- Do not install the bolts at * marked place in this stage.
- Tighten the bolts (Camshaft caps).

NOTE:
Tighten the camshaft caps in a crisscross pattern from innermost to outer caps.

CAUTION:

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

Bolts (Camshaft Cap):
10 Nm (1.0 m·kg, 7.2 ft·lb)



CAM CHAIN TENSIONER

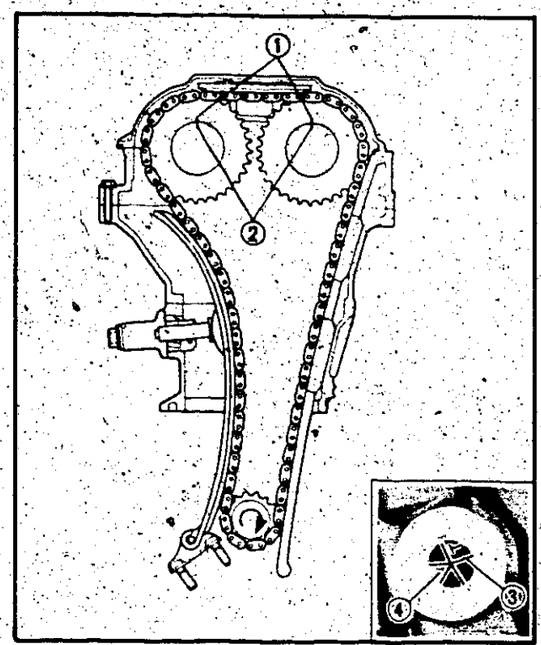
1. Position:
   - Cam chain
     Exhaust side → Tense.
     Intake side → Slack.
2. Install:
   - Cam chain tensioner

Cam chain tensioner installation steps:
- Remove the tensioner end cap bolt and spring.
- Release the cam chain tensioner one-way cam ① and push the tension rod ②.
- Install the tensioner with a new gasket into the cylinder.

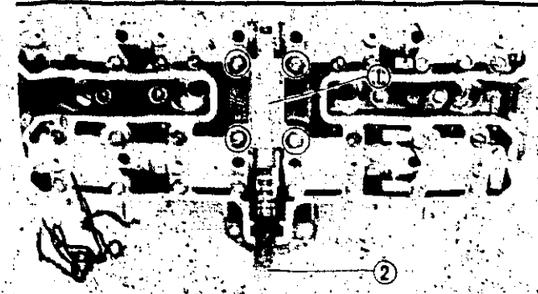
Bolts (Cam Chain Tensioner):
10 Nm (1.0 m·kg, 7.2 ft·lb)

- Install the collar ③, springs ④, washer ⑤ and end cap bolt ⑥.

End Cap Bolt (Cam Chain Tensioner):
20 Nm (2.0 m·kg, 14 ft·lb)



3. Turn:
   - Crankshaft
     Counterclockwise for a several turns.
4. Inspect:
   - Camshaft timing marks ①
     Align with the camshaft cap marks ②.
   - Crankshaft "T" mark ③
     Align with the stationary pointer ④.
     Out of alignment → Adjust.
     Refer to "CAMSHAFT INSTALLATION STEPS".



6. Install:
   - Cam chain guide (Upper) ①
   - Cam chain guide (Exhaust side) ②

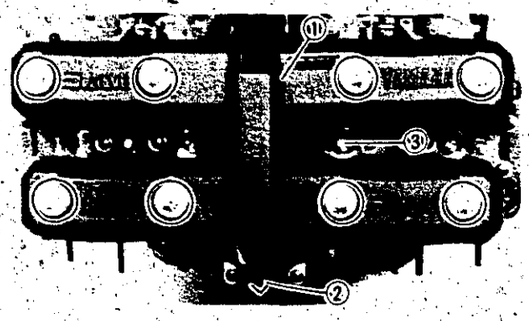
Bolts (Upper Chain Guide):
10 Nm (1.0 m·kg, 7.2 ft·lb)



7. Measure:
   - Valve clearance

   Out of specification → Adjust.
   Refer to "CHAPTER 3 – VALVE CLEARANCE ADJUSTMENT".

Intake Valve (Cold):
0.11 ~ 0.20 mm
(0.004 ~ 0.008 in)
Exhaust Valve (Cold):
0.21 ~ 0.30 mm
(0.008 ~ 0.012 in)



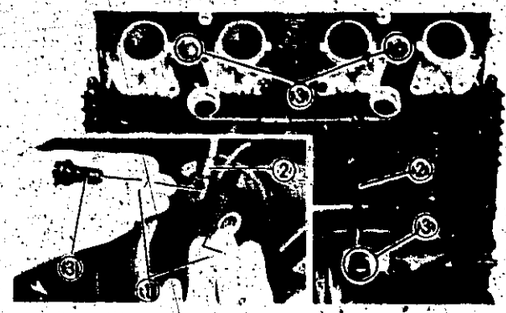
CYLINDER HEAD COVER AND OIL DELIVERY PIPE

1. Install:
   - Cylinder head cover ①
   - Gasket (Cylinder head cover)

NOTE:
Be sure the cylinder head gasket mark ② face front.

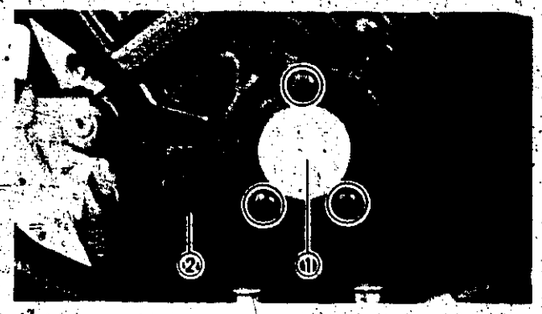
2. Tighten:
   - Bolts (Cylinder head cover)
   - Washers
   - Rubber washers
   - Spark plugs ③

Bolts (Cylinder Head Cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Spark Plugs:
17.5 Nm (1.75 m·kg, 12.5 ft·lb)



3. Install:
   - Washers (New) ①
   - Oil delivery pipe ②
   - Union bolts ③

Union Bolts (Oil Delivery Pipe):
21 Nm (2.1 m·kg, 15 ft·lb)



4. Remove:
   - Timing rotor
   - Dowel pin
   - Bolt (8 mm)
5. Install:
   - O-ring
   - Crankshaft end cover (Left) ①
   - Plug screw ②

Screws (Crankshaft end cover):
7 Nm (0.7 m·kg, 5.1 ft·lb)

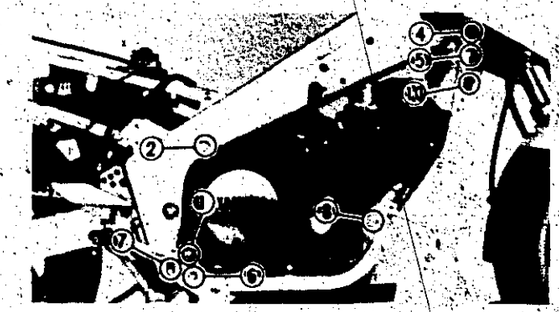
REMOUNTING ENGINE

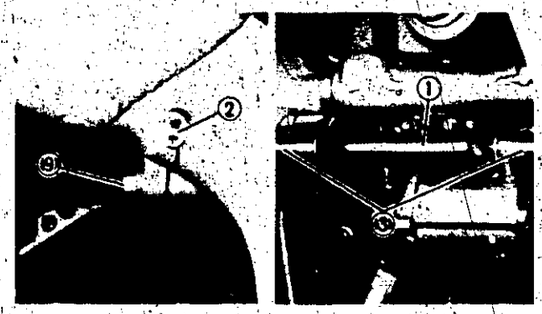
When remounting the engine, reverse the removal procedure. Note the following points.

1. Install:
   - Engine assembly

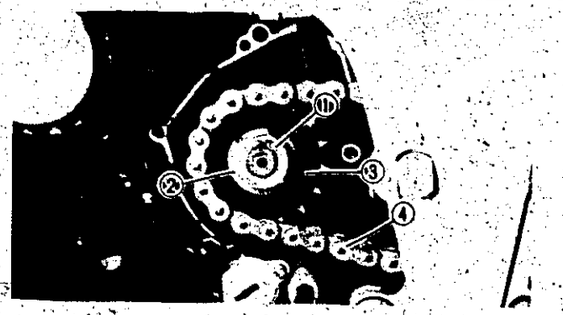
2. Install:
   - Bolts (Engine) ①, ②
   - Collars ③
   - Bolts (Down tube) ④, ⑤, ⑥, ⑦
   - Bolt (Engine) ⑧
   - Bolt (Frame slit) ⑨
   - Bolt (Cowling stay) ⑩

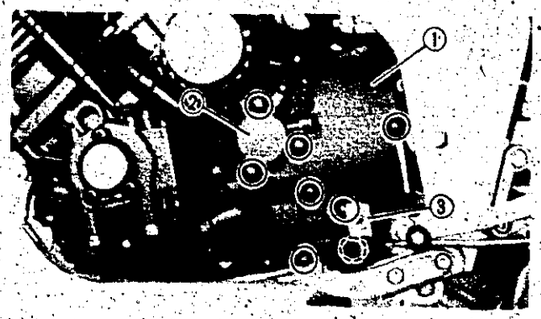
NOTE:
Tighten the bolts (= ① ~ = ⑩) in that order.

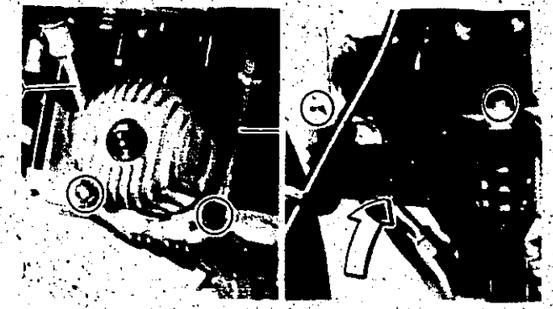


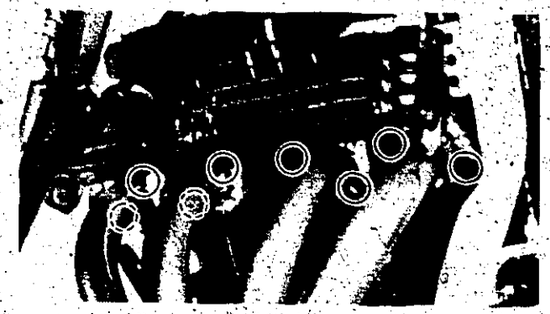


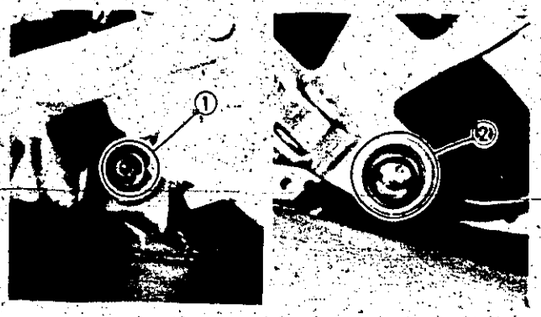
Engine Mounting:
Bolt (Engine) ①:
42 Nm (4.2 m·kg, 30 ft·lb)
Bolt (Engine) ②, ⑧:
55 Nm (5.5 m·kg, 40 ft·lb)
Bolts (Down tube) ④, ⑤:
63 Nm (6.3 m·kg, 46 ft·lb)
Bolts (Down tube) ⑥, ⑦:
28 Nm (2.8 m·kg, 20 ft·lb)
Bolt (Frame slit) ⑨:
15 Nm (1.5 m·kg, 11 ft·lb)
Bolts (Cowling stay) ⑩:
15 Nm (1.5 m·kg, 11 ft·lb)











3. Install:
   - Drive chain ①
   - Drive sprocket ②
   - Lock washer (New) ③
   - Nut (Drive sprocket) ④

Nut (Drive Sprocket): 70 Nm (7.0 m·kg, 50 ft·lb)

NOTE:
Adjust the drive chain slack if necessary.

4. Install:
   - Cover (Crankcase Left) ①
   - Clutch release cylinder ②
   - Change pedal link ③

Bolts (Crankcase cover – Left): 10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolt (Change pedal link): 10 Nm (1.0 m·kg, 7.2 ft·lb)

OIL COOLER
1. Install:
   - Oil cooler
   - Bolts (Oil cooler)
   - Hoses (Oil cooler)
   - Washers (New)
   - Union bolts

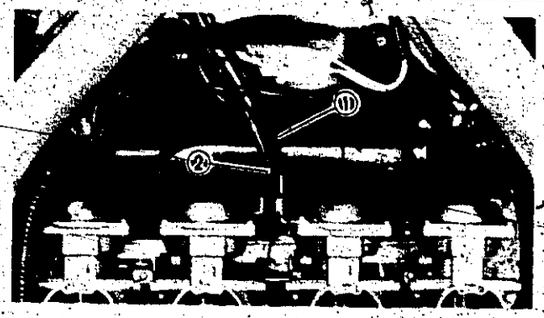
Union Bolts (Oil Cooler Hose): 25 Nm (2.5 m·kg, 18 ft·lb)

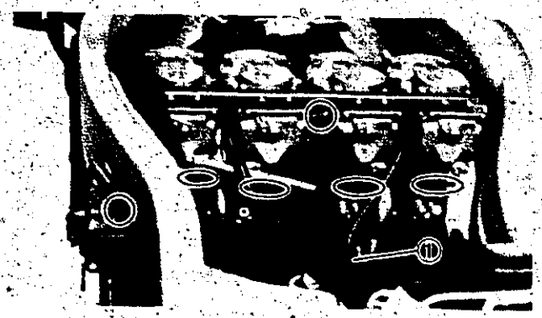
MUFFLER ASSEMBLY
1. Install:
   - Muffler assembly
2. Tighten:
   - Frange nuts (Exhaust pipe)

Frange Nuts (Exhaust Pipe): 10 Nm (1.0 m·kg, 7.2 ft·lb)

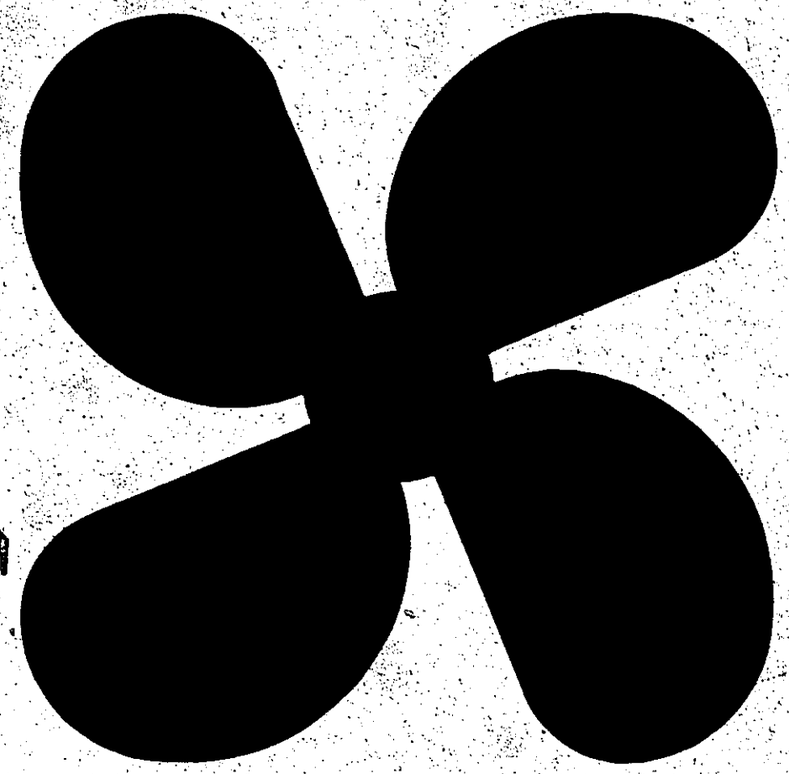
2. Tighten:
   - Bolt (Muffler bracket) ①
   - Bolt (Muffler stay) ②

Bolt (Muffler bracket): 20 Nm (2.0 m·kg, 14 ft·lb)
Bolt (Muffler stay): 25 Nm (2.5 m·kg, 18 ft·lb)





CARBURATOR AND THROTTLE CABLE
1. Install:
   - Joints (Carburator)
     To the carburator assembly.
2. Connect:
   - Throttle cable 1 ①
   - Throttle cable 2 ②
3. Install:
   - Carburator and joints assembly
     To the cylinder head.
   - Choke lever assembly
4. Connect:
   - Fuel hose ①
5. Adjust:
   - Throttle cable free play
     Refer to "CHAPTER – 3, THROTTLE CABLE FREE PLAY ADJUSTMENT".



COOL 5

COOLING SYSTEM

RADIATOR

WARNING:

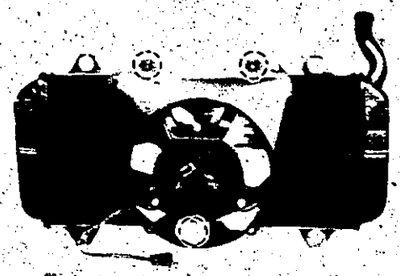
Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. 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.

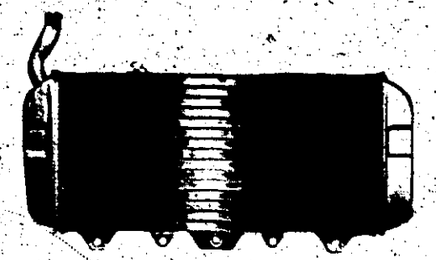
REMOVAL

1. Drain:
   - Coolant

   Refer to "CHAPTER 3. COOLANT REPLACEMENT".
2. Disconnect:
   - Fan motor coupler
3. Remove:
   - Radiator assembly

   Refer to "CHAPTER 3. VALVE CLEARANCE ADJUSTMENT".
4. Remove:
   - Fan motor assembly
   - Radiator grille





INSPECTION

1. Inspect:
   - Radiator

   Obstruction → Blow out with compressed air through rear of radiator.
   Flattened fins → Repair.
   - Coolant hoses

   Cracks/Damage → Replace.



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 valve or defective → Replace.

Valve Opening Pressure:
74 ~ 103 KPa
(0.75 ~ 1.05 kg/cm², 10.7 ~ 14.9 psi)

ASSEMBLY

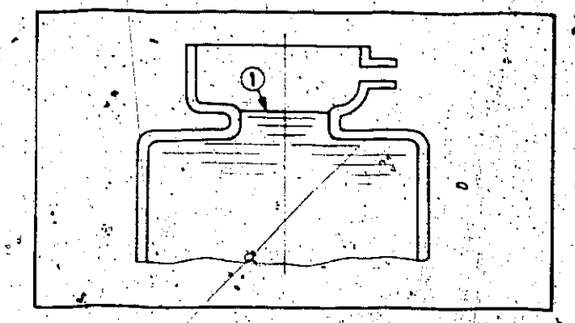
1. Install:
   - Radiator assembly

Bolts (Radiator):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Nut (Radiator):
10 Nm (1.0 m·kg, 7.2 ft·lb)

2. Connect:
   - Fan motor coupler
   - Hose (Radiator – Inlet)
   - Hose (Radiator – Outlet)
3. Tighten:
   - Drain bolts

Drain bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Replace with new copper gaskets.



4. Fill:
   - Cooling system

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 ①.
- 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:
2.3 L (2.0 Imp qt, 2.4 US qt)
Reservoir Tank Capacity:
0.4 L (0.35 Imp qt, 0.42 US qt)
From "LOW" to "FULL" Level:
0.15 L (0.13 Imp qt, 0.16 US qt)

CAUTION:

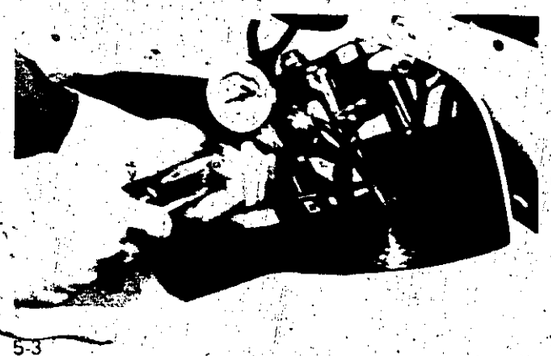
- **Hard water or salt water is harmful to the engine. You may use distilled water if you can't get soft water.**
- **Do not mix more than one type of ethlen glycol antifreeze containing corrosion for aluminum engine inhabitors.**

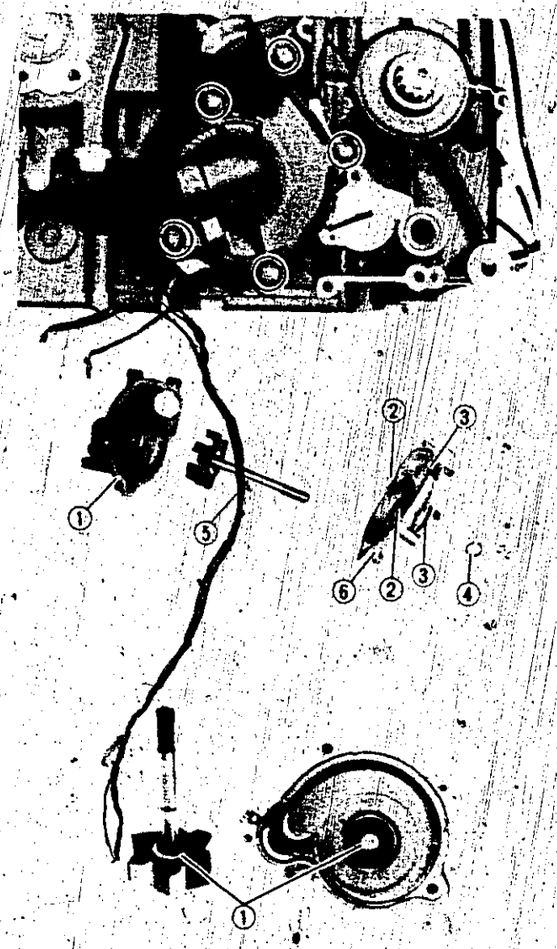
5. Inspect:
   - Cooling system

Inspection Steps:
- Connect Radiator Cap Tester.
- Apply 1.0 kg/cm² (14 lb/in²) pressure.
- Measure pressure with gauge.

Decrease of pressure (leaks) → Repair as required.

Radiator Cap Tester:
P/N 90890-01325





WATER PUMP

DISASSEMBLY

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

1. Remove:
   - Cover (Water pump) ①
   - Dowel pins ②
   - O-rings ③
   - Circlip ④
   - Impeller shaft ⑤
2. Eliminate:
   - Deposits

   From the impeller and water pump housing ⑥

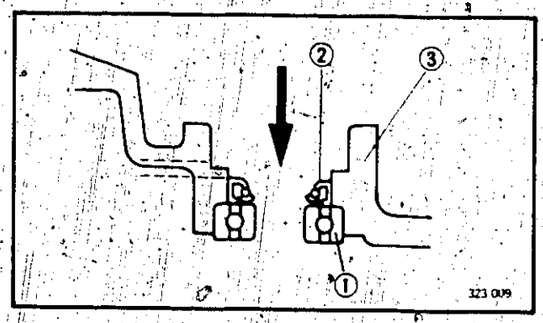
INSPECTION

1. Inspect:
   - Water pump seals ①
     Wear/Damage → Replace.
   - Bearing
     Wear/Damage → Replace.
   - Oil seal
     Wear/Damage → Replace.
   - Impeller
     Cracks/Wear/Damage → Replace.

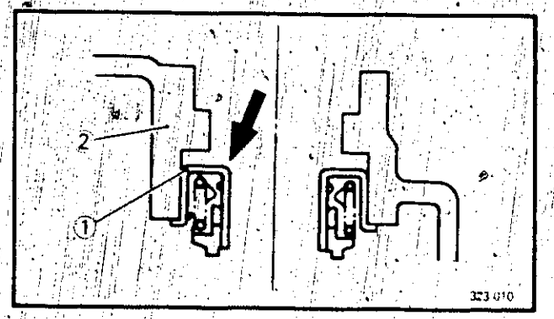
BEARING AND SEAL REPLACEMENT

1. Remove:
   - Bearing ①
   - Oil seal ②

   Tap off both components from water pump seal side.

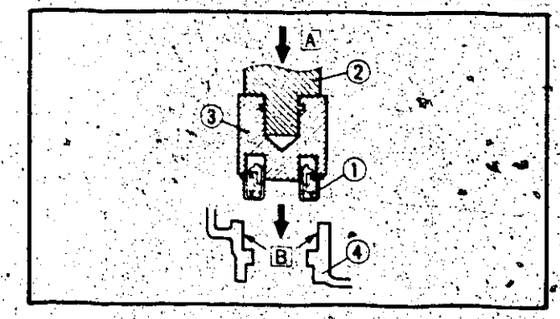


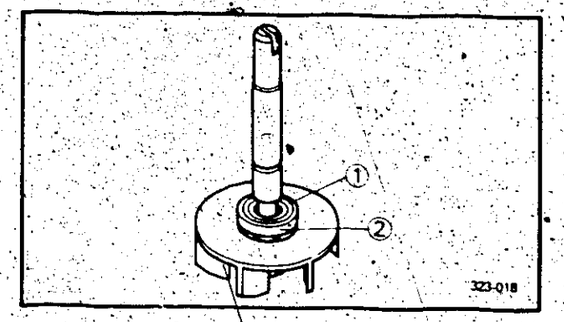
③ Crankcase cover

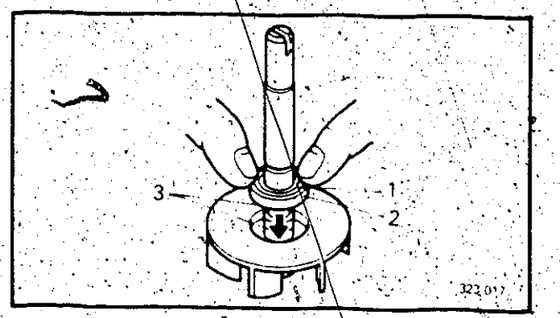


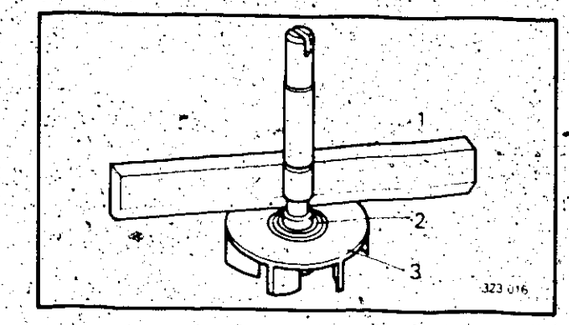
2. Remove:
   - Water pump seal (Crankcase side) ①

   Tap it off from the water pump housing ②









3. Install:
   - Water pump seal ①
   Use Water Pump Seal Installer.
   Apply Yamaha Bond No. 1215 to water pump housing ④ before installing seal.

Water Pump Seal Installer:
P/N 90890-04058 ②
P/N 90890-04078 ③
Yamaha Bond No. 1215
P/N 90890-85505

A PRESS
B APPLY YAMAHABOND No. 1215

4. Remove:
   - Seal No. 2 ①
   - Damper rubber ②
   From the impeller.
   Pry out with a small screwdriver.

NOTE:
Be careful not to scratch or bend the impeller shaft.

5. Apply:
   - Water or coolant
   To outer surface of dampper rubber ③ and impeller hab.

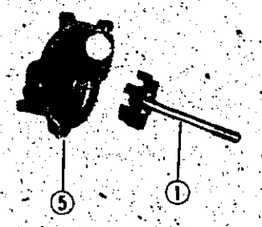
CAUTION:
Never apply oil or grease to water pump seal surfaces.

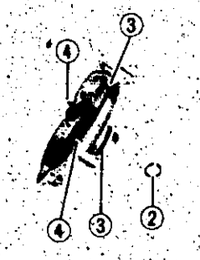
6. Assemble:
   - Seal No. 2 ① /Damper rubber ②
   To impeller hab.
7. Measure:
   - Tilt
   Out of specification → Repeat the above procedure "4 ~ 6".

NOTE:
Be srue seal No. 2 ② fits squarely.

Tilt Limit:
0.15 mm (0.006 in)

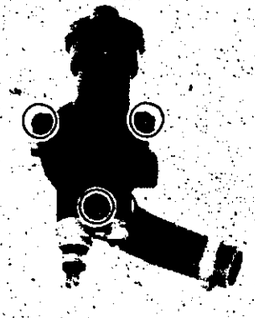
① Straight edge
③ Impeller





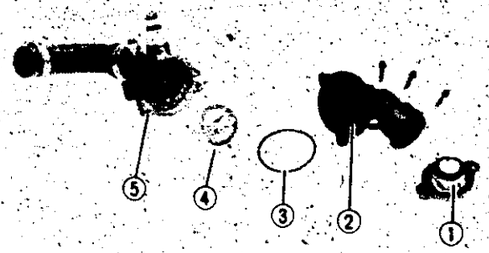
ASSEMBLY
1. Install:
   - Impeller shaft ①
   - Circlip ②
   - O-rings ③
   - Dowel pins ④
   - Cover (Water pump) ⑤

CAUTION:
- **Be sure not to scratch the water pump seal while installing.**
- **Replace any scratched seal.**



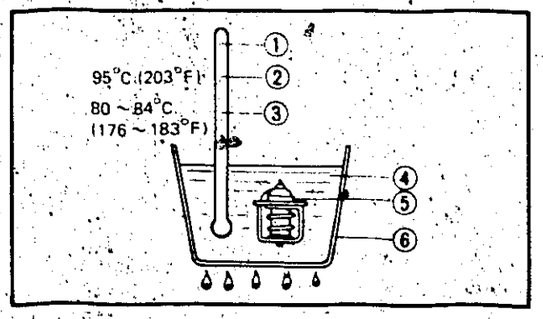
THERMOSTATIC VALVE

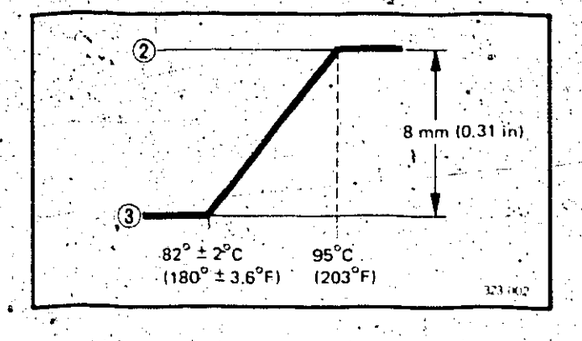
REMOVAL
1. Remove:
   - Bolts (Thermostat cover)



2. Remove:
   - Radiator cap ①
   - Thermostat cover ②
   - O-ring ③
   - Thermostatic valve ④
   - Thermostat housing ⑤

INSPECTION
1. Inspect:
   - Thermostatic valve ⑤
   Valve does not open at 80 ~ 84°C (176 ~ 183°F) → Replace.



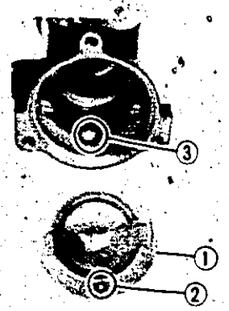


Inspection Steps:
- Suspend thermostatic valve in a vessel.
- Place reliable thermometer in a water.
- Heat water slowly.
- Observe thermometer, while stirring water continually.

① Thermometer
② Full open
③ Opening sequence begins
④ Water
⑤ Thermostatic valve
⑥ Vessel
A OPEN
B CLOSE

NOTE:
Thermostatic valve is sealed and its setting is specialized work. If its accuracy is in doubt, replace it. A fualty unit could cause serious overheating or overcooling.

2. Inspect:
- O-ring
  Wear/Damage → Replace.



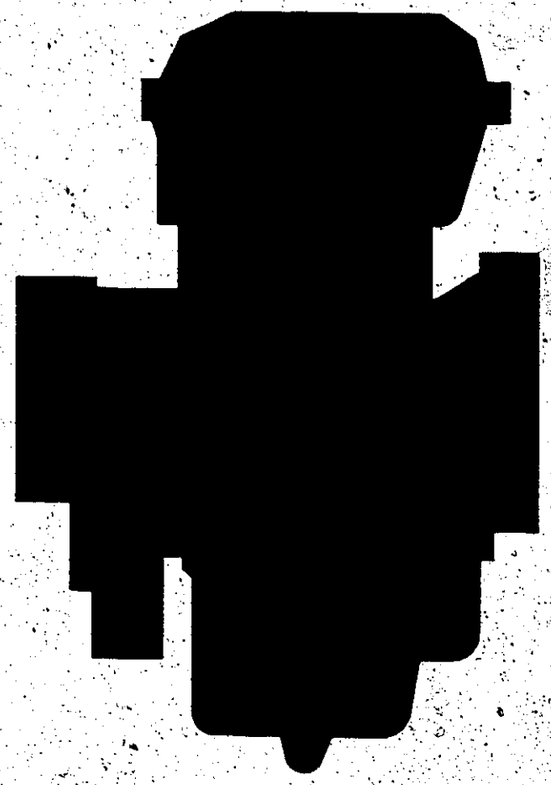
ASSEMBLY

1. Install:
- Thermostatic valve ①

NOTE:
The thermostatic valve breather hole ② must be aligned with housing slot ③.

2. Install:
- Thermostat cover

Bolts (Thermostat Cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)



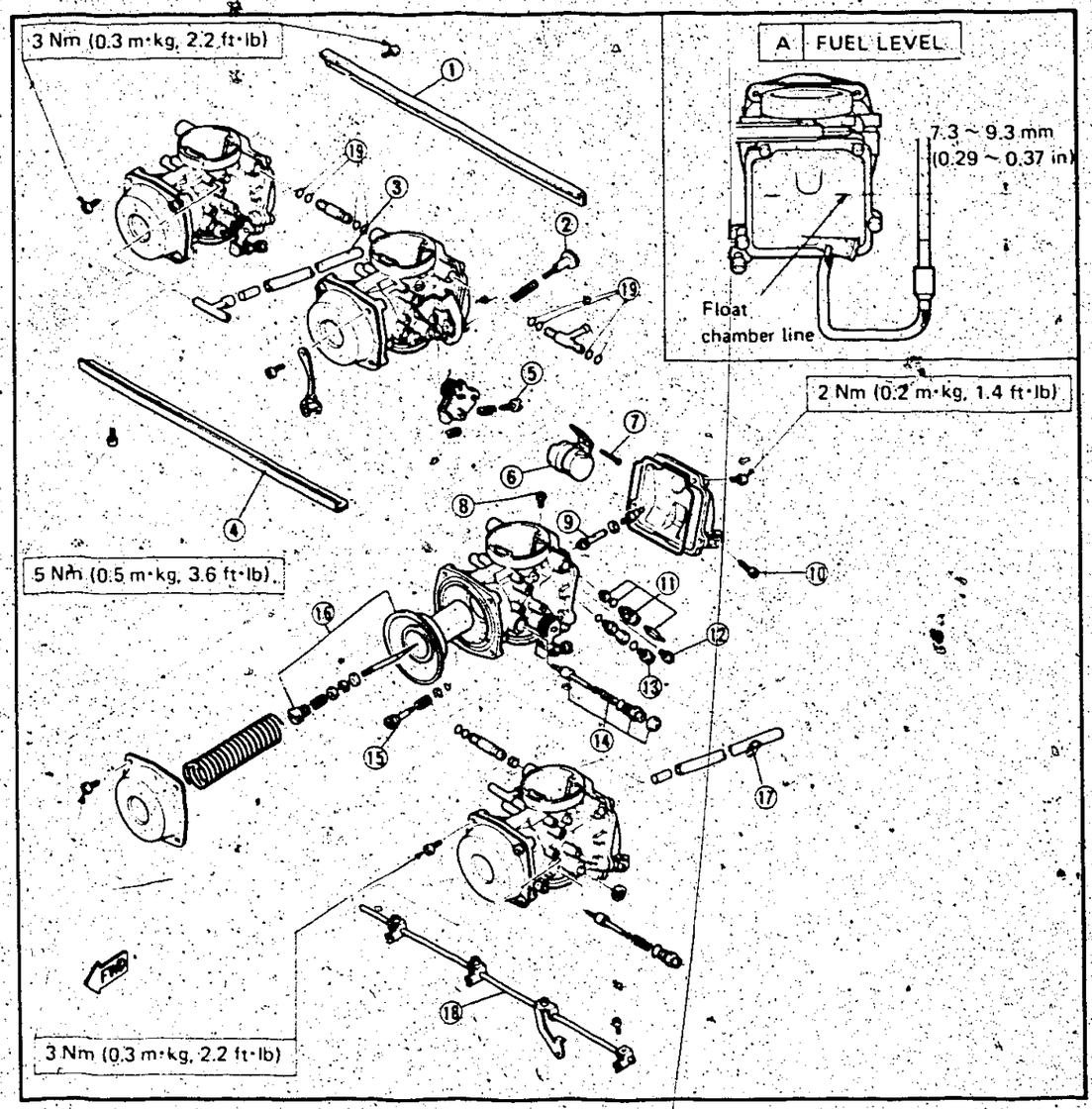
CARB 6

CARBURETOR

CARBURETOR

① Upper bracket
② Throttle stop screw
③ Fuel overflow hose
④ Lower bracket
⑤ Syncronizing screw
⑥ Float
⑦ Float pin
⑧ Pilot air screw
⑨ Needle jet
⑩ Fuel drain screw
⑪ Valve seat assembly
⑫ Pilot jet
⑬ Main jet
⑭ Starter plunger assembly
⑮ Pilot screw
⑯ Piston valve assembly
⑰ Fuel feed hose
⑱ Starter lever shaft
⑲ O-ring

SPECIFICATIONS			
ID Mark	2GH00	2LE00	2LF00
MAIN JET			
(#1, 4 cylinder)	#110	#112.5	#92.5
(#2, 3 cylinder)	#107.5	#110	#90
MAIN AIR JET	#65	#65	#65
PILOT JET	#20	#20	#20
PILOT AIR JET	#115	#115	#117.5
JET NEEDLE	5CZ2-4	5CZ2-3	5CZ2-3
PILOT SCREW	2-1/2	2-1/2	2-1/2
THROTTLE VALVE	#130	#130	#130
ENGINE IDLE SPEED	950 ~ 1,050 r/min		
FUEL LEVEL	7.3 ~ 9.3 mm (0.29 ~ 0.37 in)		





CAUTION:

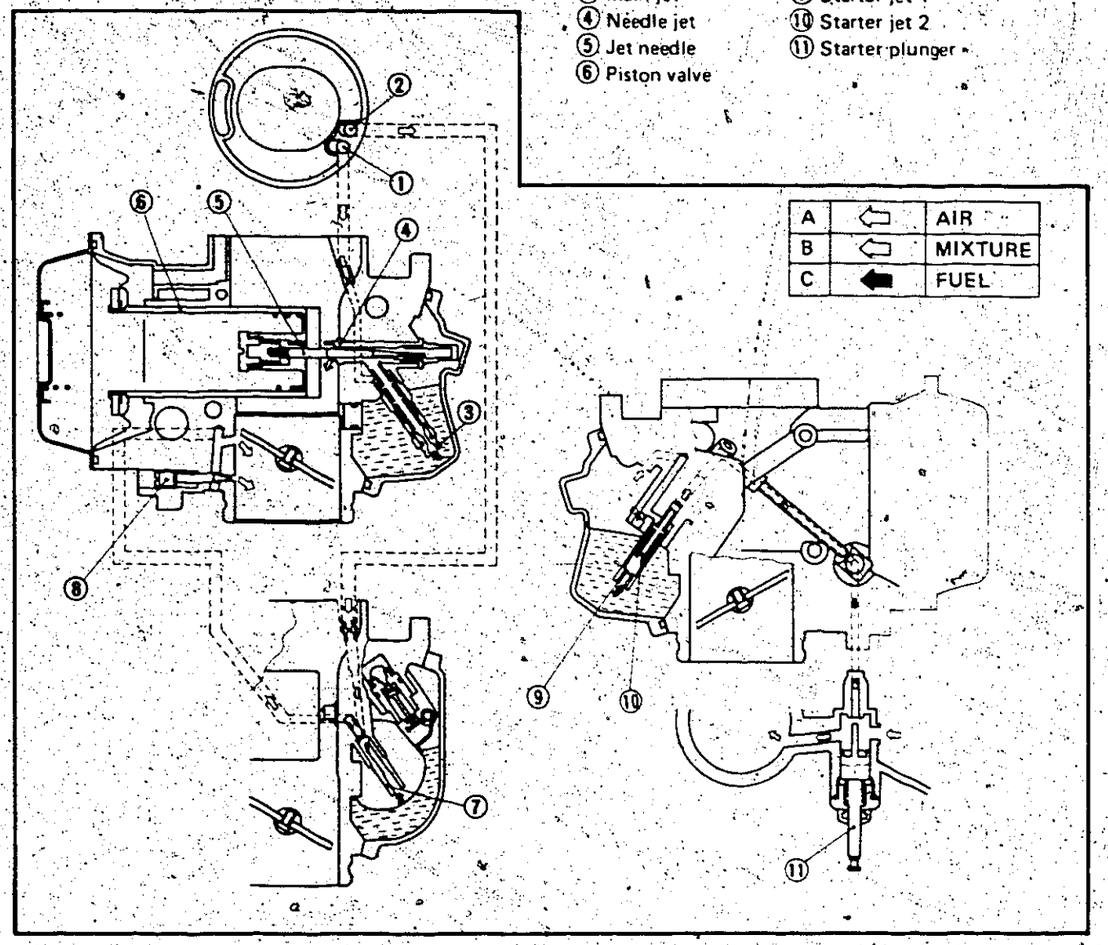
The pilot screw settings are adjusted for maximum performance at the factory. Any attempt to change these settings will decrease engine performance.

WARNING:

When the pilot screw adjustment is necessary, disconnect the thermostatic switch ① coupler to prevent cooling fan turning.

SECTION VIEW

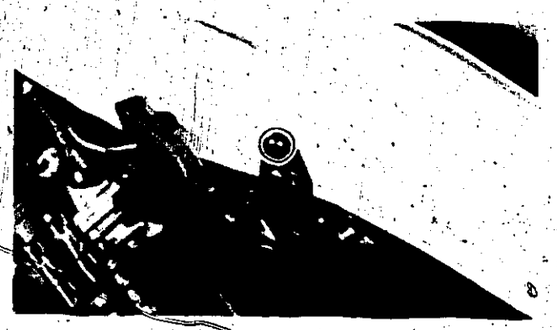
① Main air jet
② Pilot air jet
③ Main jet
④ Needle jet
⑤ Jet needle
⑥ Piston valve
⑦ Pilot jet
⑧ Pilot screw
⑨ Starter jet 1
⑩ Starter jet 2
⑪ Starter plunger



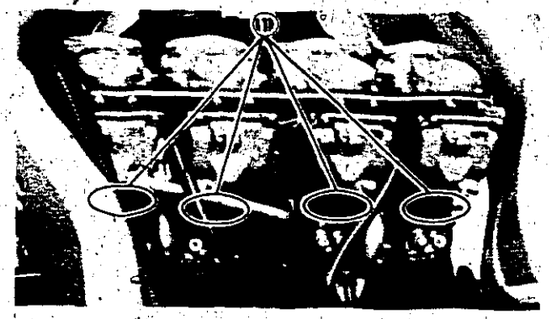
REMOVAL

1. Remove:
   - Seat
   - Side covers
   - Fuel tank
   - Air cleaner

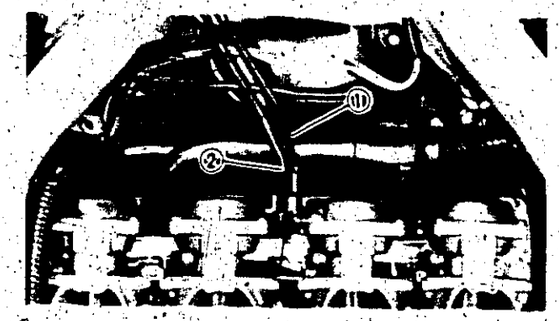
   Refer to "CHAPTER 3 – SEAT, SIDE COVER AND FUEL TANK REMOVAL".



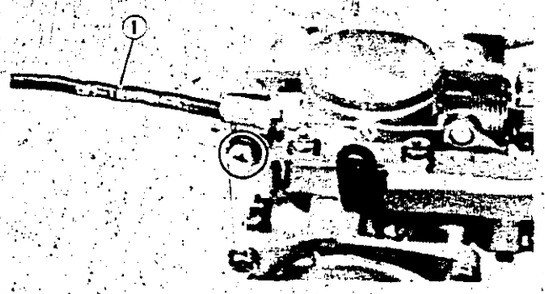
2. Remove:
   - Choke lever assembly



3. Loosen:
   - Screws (Carburetor joint clamp – Lower) ①



4. Remove:
   - Carburetor assembly and joints
5. Disconnect:
   - Throttle cable 1 ①
   - Throttle cable 2 ②

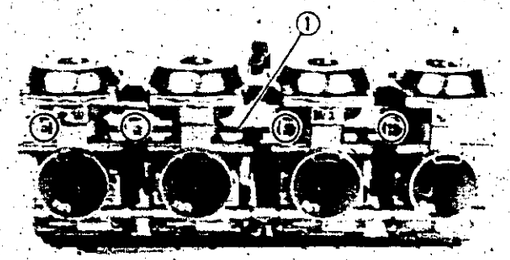


6. Loosen:
   - Screw (Choke cable clamp)
7. Disconnect:
   - Choke cable ①

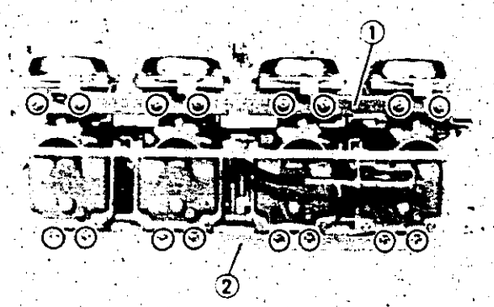
DISASSEMBLY

NOTE:

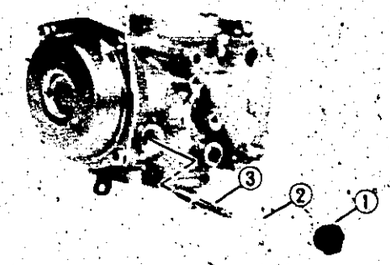
The following parts can be cleaned and inspected without carburetor separation.
- Throttle valve
- Piston valve
- Starter plunger
- Float chamber components



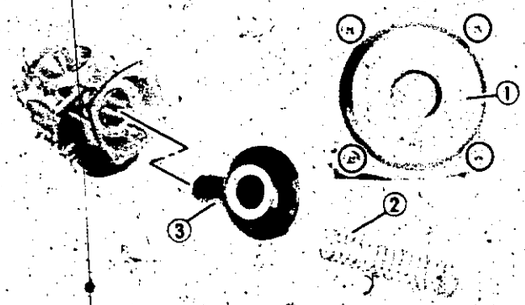
1. Remove:
   - Starter lever shaft ①



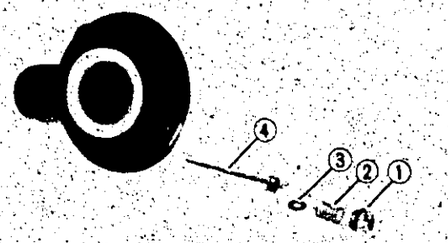
2. Remove:
   - Bracket (Upper) ①
   - Bracket (Lower) ②



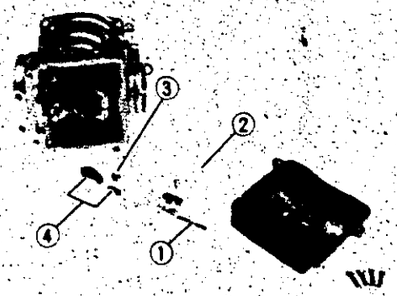
3. Remove:
   - Nut ①
   - Spring ②
   - Starter plunger ③



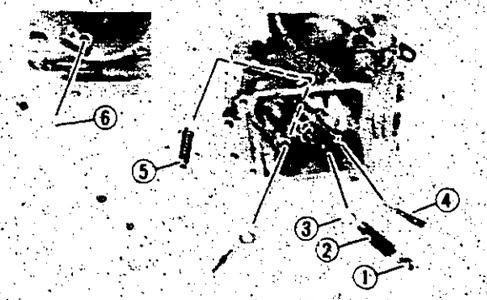
4. Remove:
   - Vacuum chamber cover ①
   - Spring ②
   - Piston valve assembly ③



5. Remove:
   - Plug (Jet needle) ①
   - Spring ②
   - Washer ③
   - Jet needle ④



6. Remove:
   - Float chamber cover
   - Gasket
   - Float pin ①
   - Float ②
   - Valve seat screw ③
   - Valve seat assembly ④

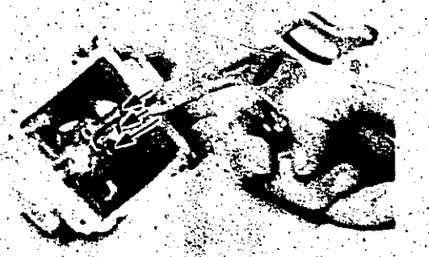


7. Remove:
   - Main jet ①
   - Holder (Main jet) ②
   - Washer ③
   - Pilot jet ④
   - Needle jet ⑤
   - Pilot air jet ⑥

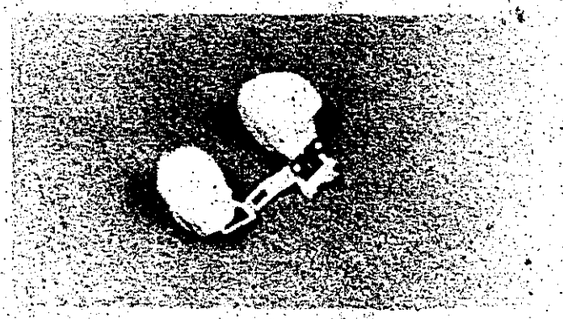
INSPECTION

1. Inspect:
   - Carburetor body
   - Fuel passage

   Contamination → Clean as indicated.

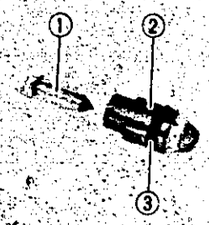


Carburetor cleaning steps:
- Wash carburetor in petroleum based solvent. (Do not use any caustic carburetor cleaning solution.)
- Blow out all passages and jets with a compressed air.



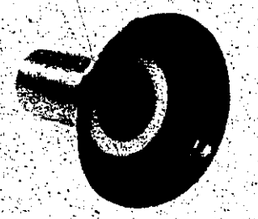
2. Inspect:
   - Floats

   Damage → Replace.



3. Inspect:
   - Float needle valve ①
   - Seat ②
   - O-ring ③

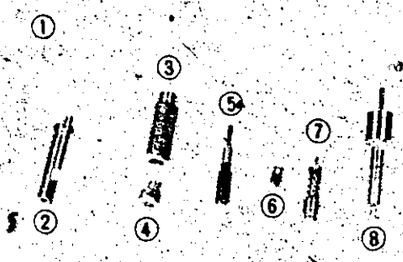
   Damage/Wear/Contamination → Replace as a set.



4. Inspect:
   - Throttle valve

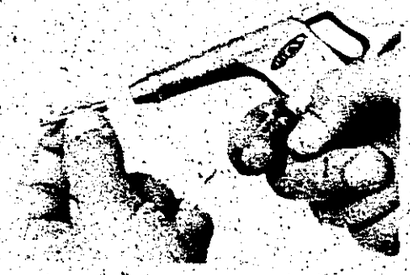
   Scratches → Replace.
   - Rubber diaphragm

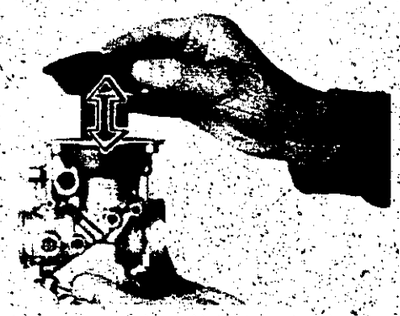
   Tears → Replace.



5. Inspect:
   - Jet needle ①
   - Needle jet ②
   - Holder ③
   - Main jet ④
   - Pilot jet ⑤
   - Pilot air jet ⑥
   - Pilot adjust screw ⑦
   - Starter plunger ⑧

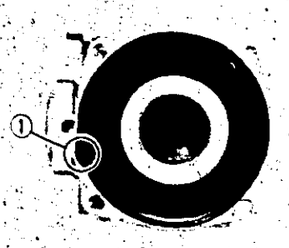
   Bends/Wear/Damage → Replace.
   Contamination → Blow out jets with a compressed air.





6. Check:
   - Free movement

   Insert the throttle valve into the carburetor body, and check for free movement.
   Stick → Replace.



ASSEMBLY

To assemble the carburetor, reverse the disassembly procedures. Note the following points.

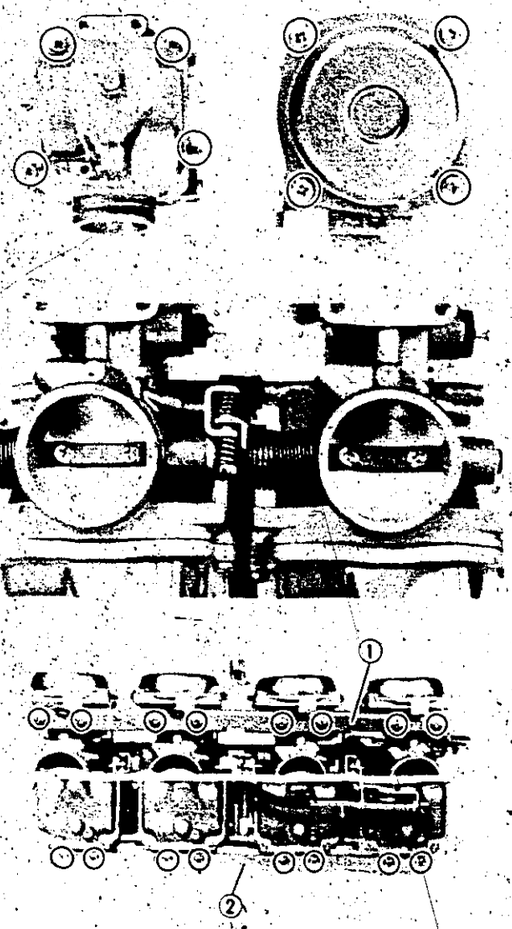
CAUTION:

- **Before reassembling, wash all parts in clean gasoline.**
- **Always use a new gasket.**

1. Install:
   - Piton valve assembly

NOTE:

Note position of tab ① on diaphragm. This tab must be placed in the cavity of the carburetor body during reassembly.



2. Install:
   - Float chamber cover
   - Vacuum chamber cover

Screw (Float Chamber Cover)	2 Nm (0.2 m•kg, 1.4 ft•lb)
Screw (Vacuum Chamber Cover)	3 Nm (0.3 m•kg, 2.2 ft•lb)

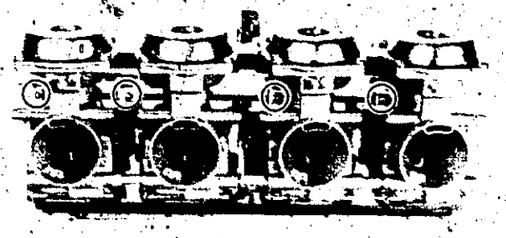
3. Connect:
   - Throttle shaft

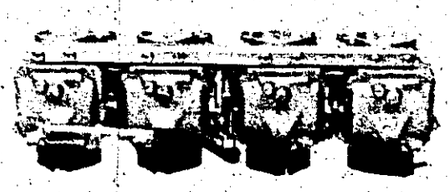
CAUTION:

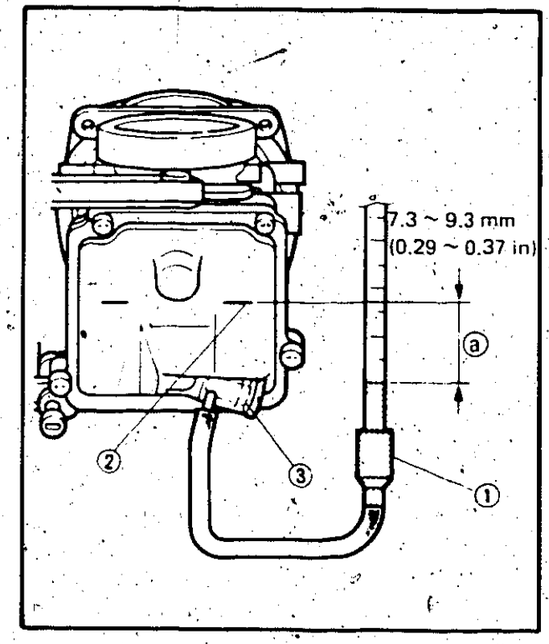
Throttle valves must be fully closed.

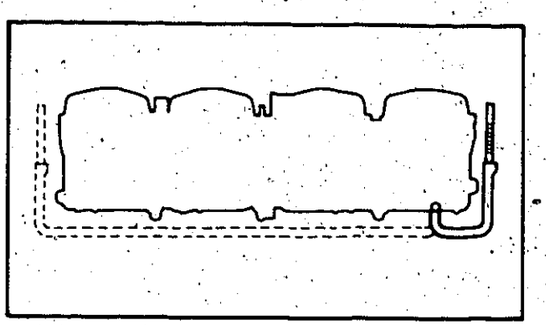
4. Installer:
   - Upper bracket ①
   - Lower bracket ②

Screw (Upper Bracket)	3 Nm (0.3 m•kg, 2.2 ft•lb)
Screw (Lower Bracket)	5 Nm (0.5 m•kg, 3.6 ft•lb)









5. Install:
   - Starter lever shaft

Screw (Starter Lever Shaft)	3 Nm (0.3 m•kg, 2.2 ft•lb)
	Apply LOCTITE®.

INSTALLATION

1. Install:
   - Carburetor assembly

   Reserve the removal procedure.

ADJUSTMENT

NOTE:

Before adjusting the fuel level, the float height should be adjusted.

CAUTION:

The pilot screw settings are adjusted for maximum performance at the factory. Any attempt to change these settings will decrease engine performance.

Fuel Level Adjustment

1. Measure:
   - Fuel level ⓐ

   Out of specification → Adjust it by the following adjustment steps.

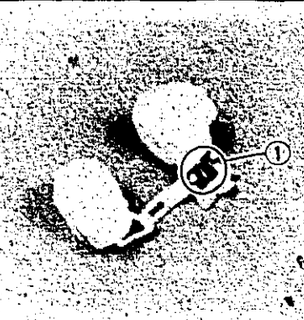
Fuel Level ⓐ	7.3 ~ 9.3 mm (0.29 ~ 0.37 in)
	Below the float chamber line.

Fuel level measurement steps:

- Place the motorcycle on the level place.
- Install the Fuel Level Gauge Adapter (90890-01329) to the drain hole of the carburetor.
- Connect the Fuel Level Gauge (90890-01312) to the Adapter ①.
- Place the Gauge vertically next to the float chamber line ②.
- Loosen the drain screw ③.
- Warm up the engine, then shut it off after a few minutes.
- Measure the fuel level. It should be within the specified range.

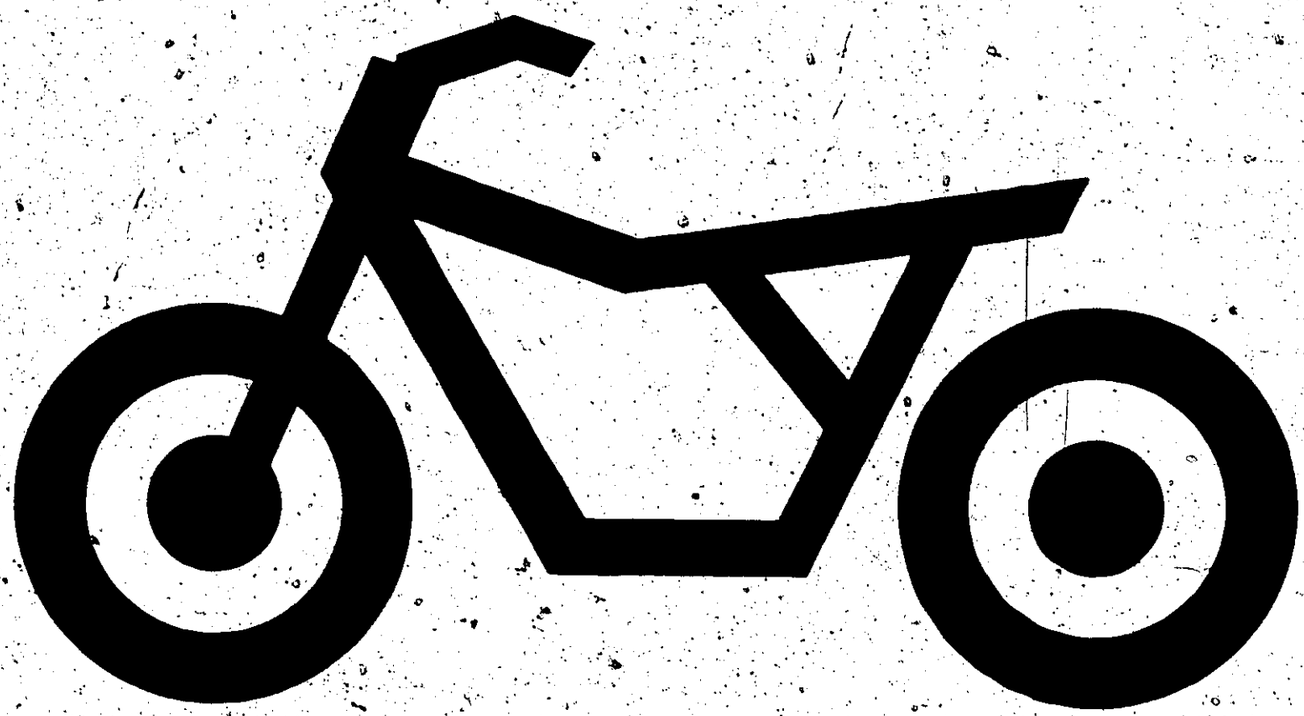
NOTE:

Fuel level readings of both side of carburetor line should be equal.



2. Adjust:
   •Fuel level

Fuel level adjustment steps:
- Remove the carburetor assembly.
  Refer to "REMOVAL" section.
- Remove the float, valve seat and the needle valve.
- Inspect the valve seat and the needle valve.
  If either is worn, replace as a set.
- If both are fine, adjust the float height by bending the float tang ①.
- Recheck the fuel level.



CHAS 7

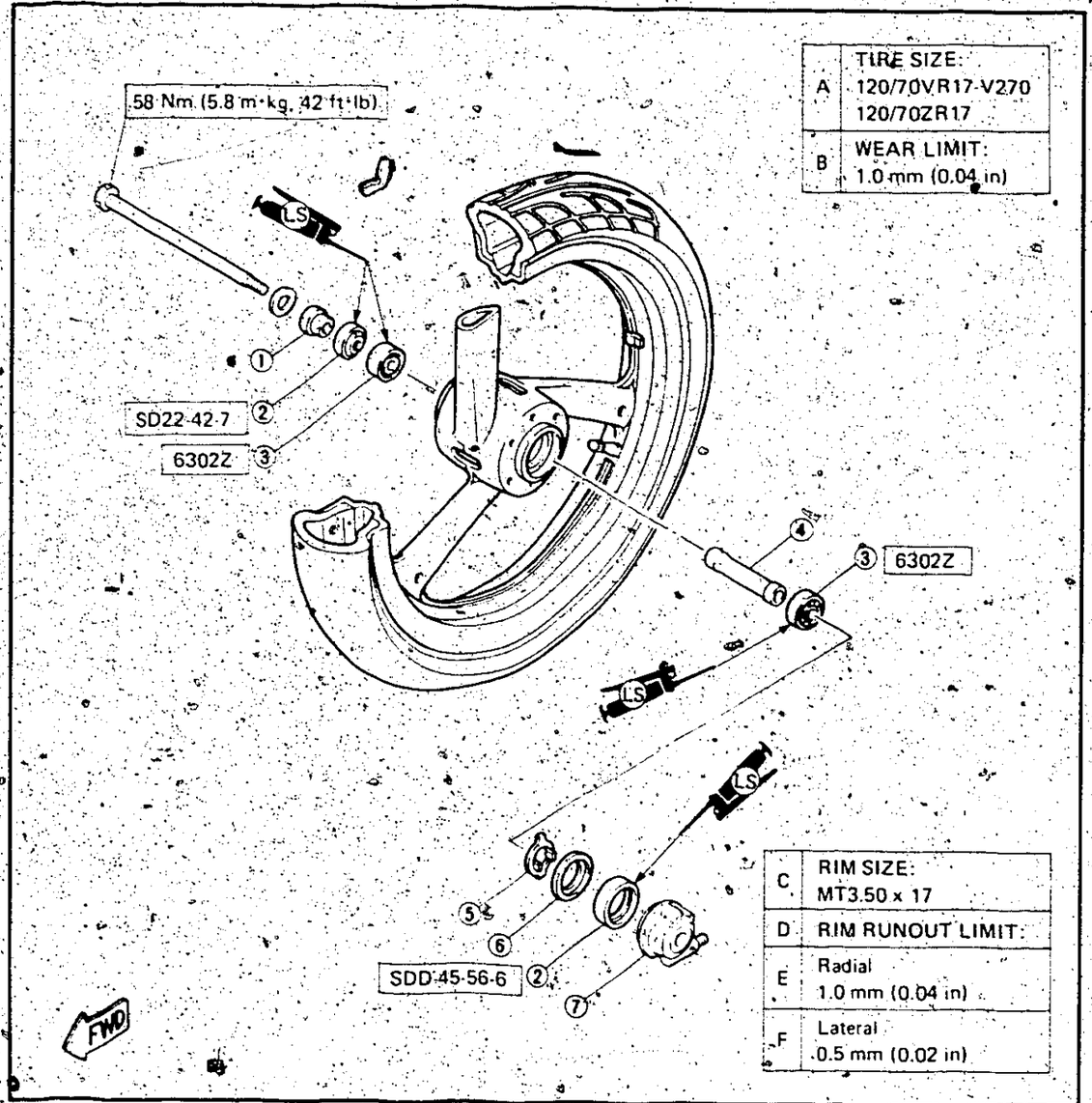
CHASSIS

FRONT WHEEL

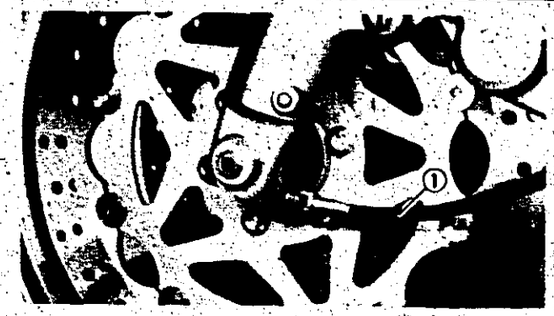
① Collar
② Oil seal
③ Bearing
④ Spacer
⑤ Meter clutch
⑥ Clutch retainer
⑦ Speedometer gear unit

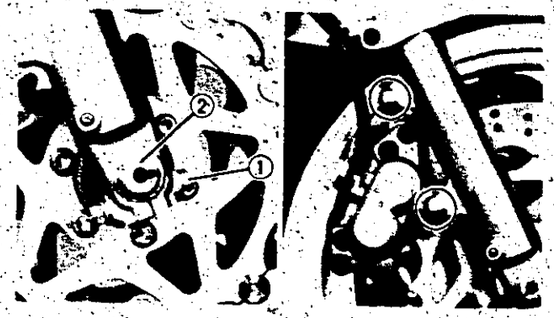
TIRE AIR PRESSURE (COLD):		
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	250 kPa (2.5 kg/cm², 36 psi)	250 kPa (2.5 kg/cm², 36 psi)
90 kg (198 lb) ~ Maximum load*	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
High speed riding	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)

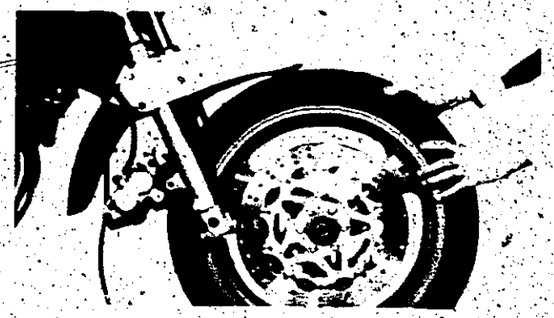
*Load is the total weight of cargo, rider, passenger, and accessoires.



A	TIRE SIZE: 120/70VR17-V270 120/70ZR17
B	WEAR LIMIT: 1.0 mm (0.04 in)
C	RIM SIZE: MT3.50 x 17
D	RIM RUNOUT LIMIT:
E	Radial 1.0 mm (0.04 in)
F	Lateral 0.5 mm (0.02 in)







REMOVAL

1. Place the motorcycle on a level place.

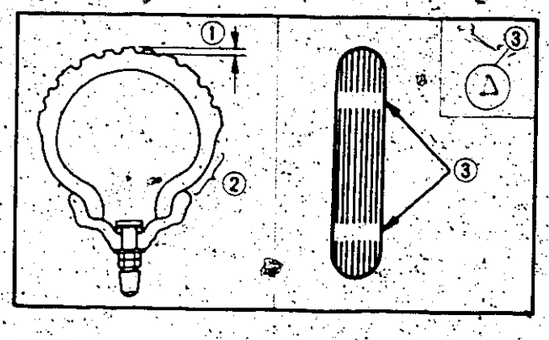
WARNING:

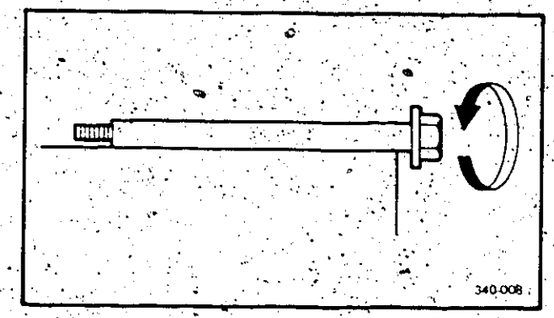
Securely support the motorcycle so there is no danger of it falling over.

2. Remove:
   - Speedometer cable ①
3. Remove:
   - Brake calipers (Right/Left)
4. Loosen:
   - Pinch bolt (Front axle) ①
   - Axle (Front) ②
5. Elevate the front wheel by placing a suitable stand under the engine.
6. Remove:
   - Axle
   - Wheel (Front)
   - Speedometer gear unit

NOTE:

Do not squeeze the brake lever while the wheel is off the motorcycle.





INSPECTION

1. Inspect:
   - Tire

   Tire tread shows crosswise lines (minimum tread depth)/Cracks → Repalce.

Minimum Tire Tread Depth: 1.0 mm (0.04 in)

① Tread depth ② Side wall ③ Wear indicator

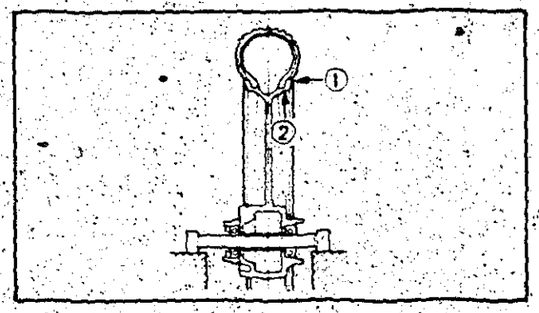
2. Inspect:
   - Front axle

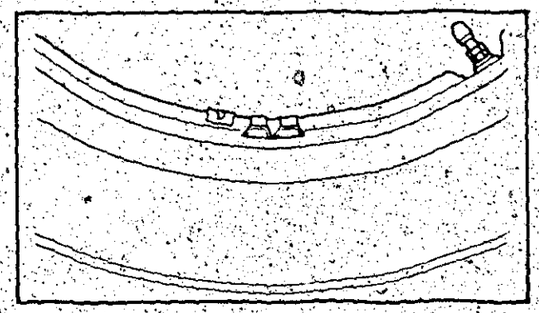
   Bends → Replace.

   Roll the axle on a flat surface.

WARNING:

Do not attempt to straighten a dent axle.





3. Inspect:
- Wheel
  Cracks/Bends/Warpage → Replace.

4. Measure:
- Wheel runout
  Over specified limit → Replace.

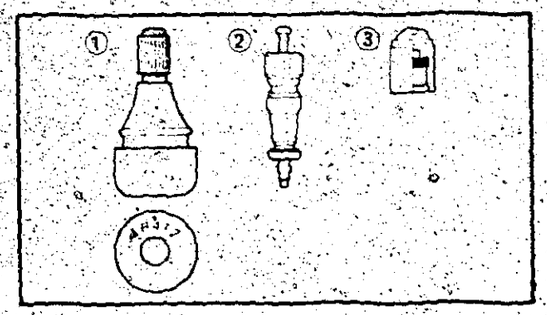
Rim Runout Limits:
Radial ① : 1.0 mm (0.04 in)
Lateral ② : 0.5 mm (0.02 in)

5. Check:
- Wheel balance
  Out of balance → Install appropriate balance weight at lightest point (on top).

NOTE:
Balance wheels with the brake discs installed.

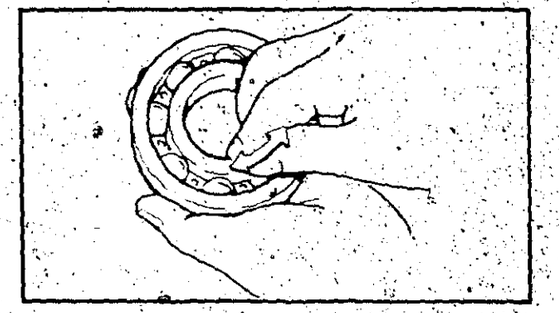
CAUTION:
Be sure the valve stem locknut is tightened securely after repairing or replacing a tire and/or wheel.

WARNING:
- **Ride conservatively after installing a tire to allow the tire to seat itself correctly on the rim.**
- **The use of tire valves and valve cores other than listed could cause tire deflation during extreme high speed riding. Always use genuine parts on their equivalent for replacement.**
- **Be sure to install the valve caps securely, as there are important to prevent air pressure leakage during extreme high speed riding.**

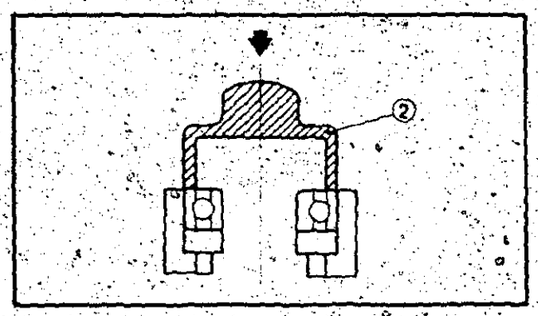


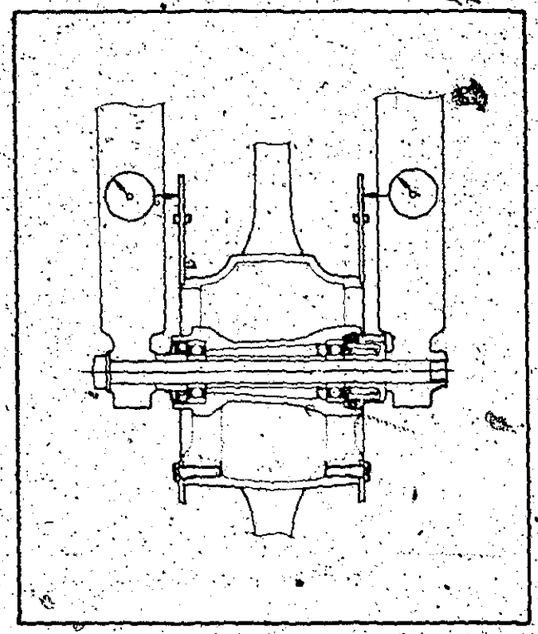
	Type
Tire valve	TR412
Valve core	= 9000A (genuine)

① Tire valve
② Valve core
③ Valve cap with seal









6. Inspect:
- Wheel bearings
  Bearings allow play in the wheel hub or wheel turns roughly → Repalce.

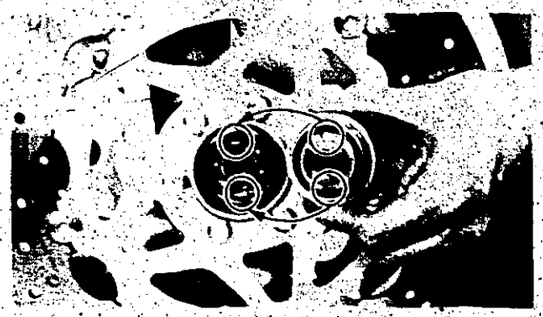
Wheel bearing replacement steps:
- Clean the outside of the wheel hub.
- Remove the bearing using a general bearing puller ①.
- Install the new bearing by reversing the previous steps.

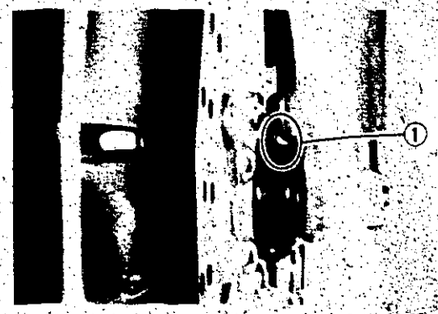
NOTE:
Use a socket ② that matches the outside diameter of the race of the bearing.

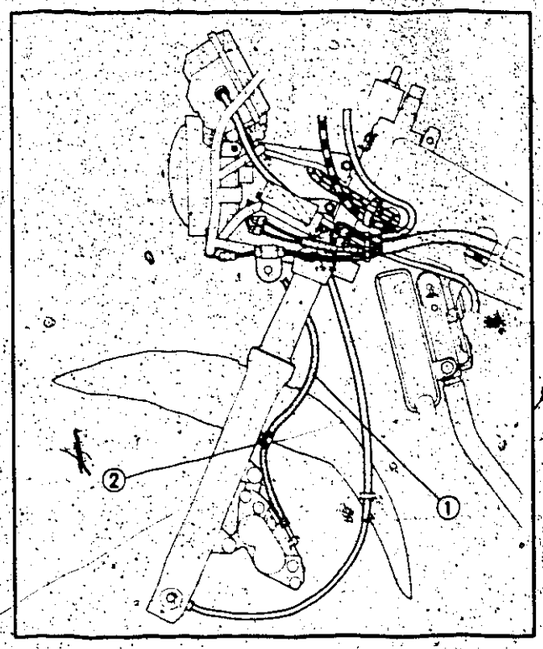
CAUTION:
Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

7. Inspect:
- Brake disc
  Wear/Over specified limit → Replace.

Maximum Deflection (Front and Rear):
0.15 mm (0.006 in)
Minimum Disc Thickness
Front:
4.5 mm (0.18 in)
Rear:
5.5 mm (0.22 in)







INSTALLATION

When installing the front wheel, reverse the removal procedure. Note the following points.

1. Lublicate:
   - Bearings
   - Oil seals

Lithium – Soap Base Grease

2. Install:
   - Speedometer gear unit

NOTE:
Be sure that the two projections inside the wheel hub mesh with the two slots in the gear unit assembly.

3. Install:
   - Front wheel

NOTE:
Be sure that the projecting portion (torque stopper) ① of the gear unit housing is positioned correctly.

4. Tighten:
   - Front axle
   - Brake calipers (Right/Left)
   - Pinch bolt (Front axle)
   - Speedometer cable

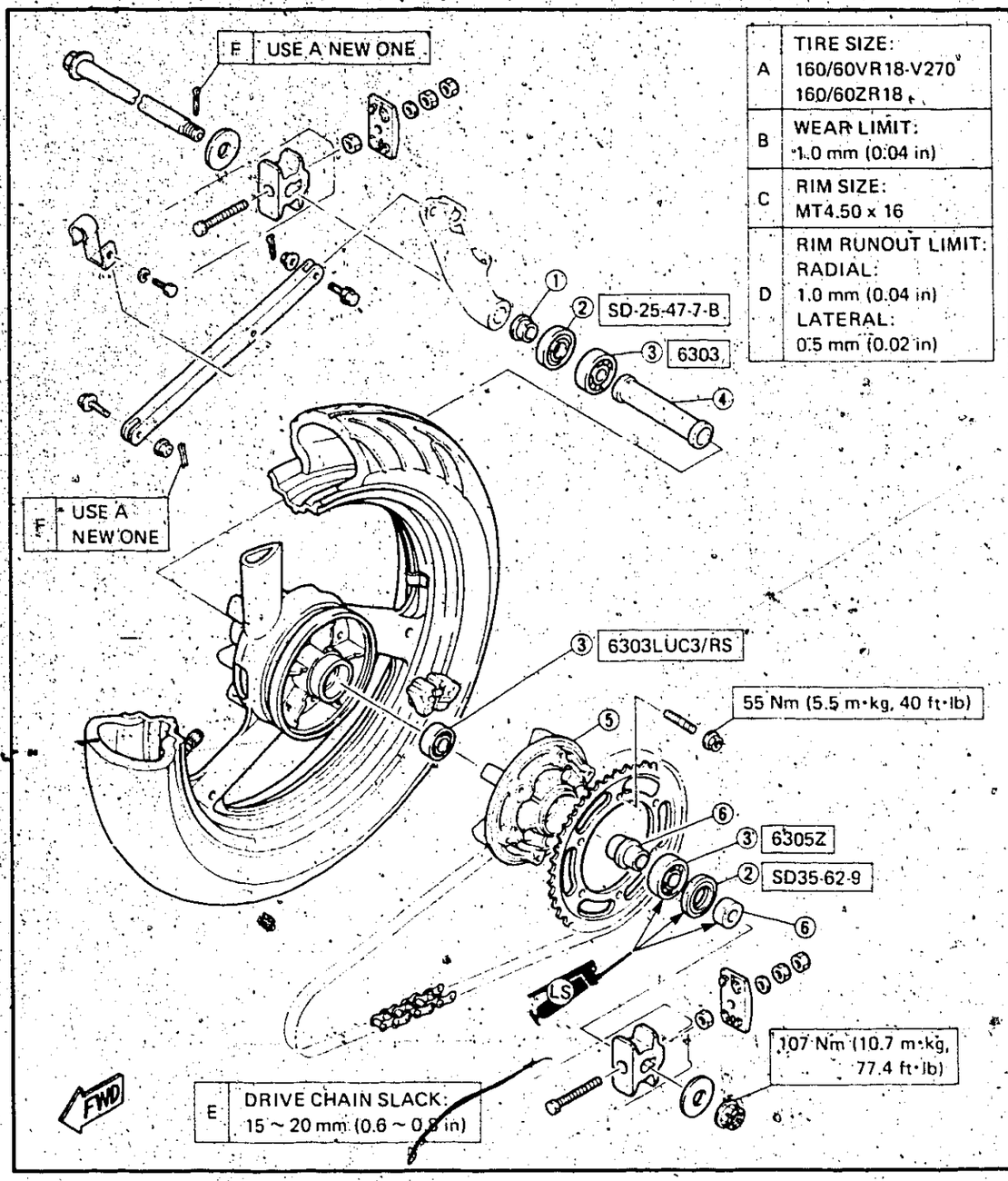
Front Axle:
58 Nm (5.8 m·kg, 42 ft·lb)
Bolts (Brake Caliper):
35 Nm (3.5 m·kg, 25 ft·lb)
Pinch Bolt (Front Axle):
20 Nm (2.0 m·kg, 14 ft·lb)

WARNING:
Make sure that the brake hoses are routed properly.

① Brake hose
② Brake hose holder

REAR WHEEL

① Dust cover
② Oil seal
③ Bearing
④ Spacer
⑤ Clutch hub
⑥ Collar



REMOVAL

1. Place the motorcycle on a level place.

WARNING:

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

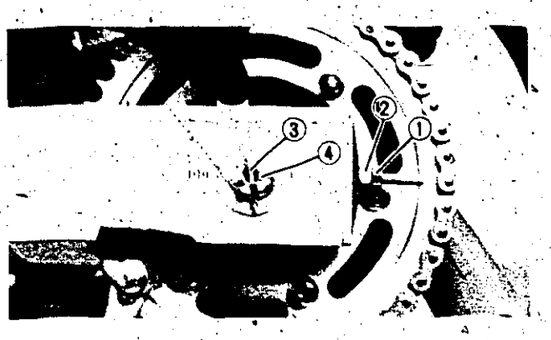
2. Elevate the rear wheel by placing a suitable stand under the swing arm.



3. Remove:
   - Brake caliper

NOTE:

Do not depress the brake pedal while the caliper is off the disc.



4. Loosen:
   - Lock nut ①
   - Adjuster ②
5. Remove:
   - Cotter pin ③
   - Axle nut ④
   - Axle
   - Rear wheel

INSPECTION

1. Inspect:
   - Tire
   - Rear axle
   - Wheel
   - Wheel bearings
   - Brake disc

   Refer to "FRONT WHEEL – INSPECTION".
2. Measure:
   - Wheel runout

   Refer to "FRONT WHEEL – INSPECTION".
3. Check:
   - Wheel balance

   Refer to "FRONT WHEEL – INSPECTION".

INSTALLATION

When installing the rear wheel, reverse the removal procedure. Note the following points.

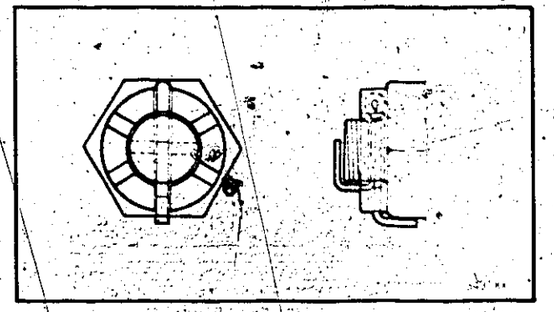
1. Lubricate:
   - Bearings
   - Oil seals
   - Spacer
   - Collar

Lithium – Soap Base Grease

2. Adjust:
   - Drive chain slack

Drive Chain Slack:
15 ~ 20 mm (0.6 ~ 0.8 in)

Refer to "CHAPTER 3. – DRIVE CHAIN ADJUSTMENT".



3. Tighten:
   - Nut (Rear axle)
   - Brake caliper

Nut (Rear axle):
110 Nm (11.0 m·kg, 80 ft·lb)
Brake Caliper:
35 Nm (3.5 m·kg, 25 ft·lb)

NOTE:

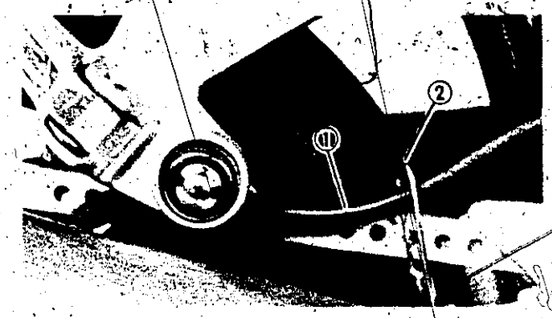
Do not loosen the axle nut after torque tightening.

If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.

- Install the cotter pin.

WARNING:

- **Always use a new cotter pin on the axle nut.**
- **Make sure that the brake hose is routed properly.**

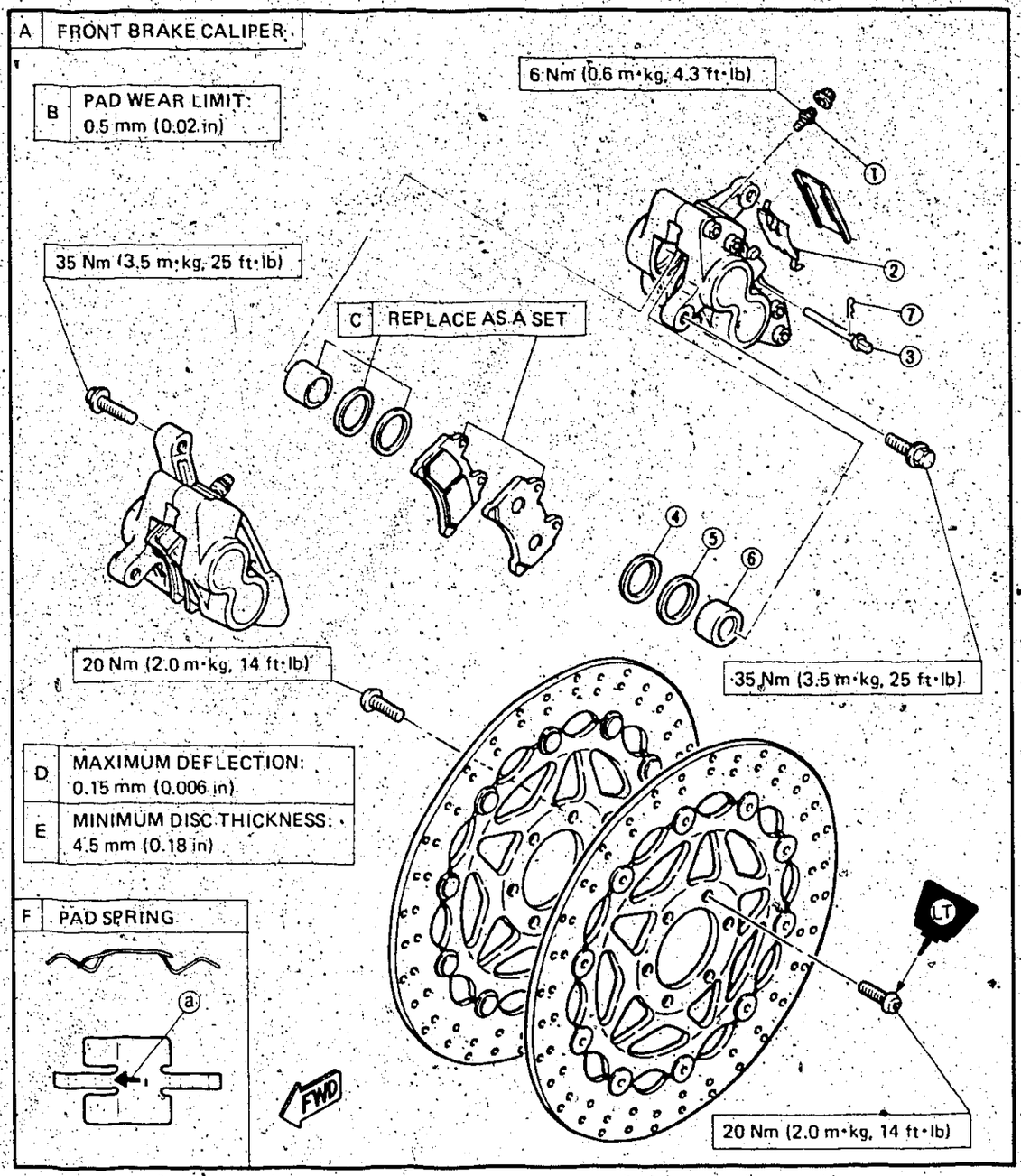


① Brake hose
② Brake hose holder

FRONT AND REAR BRAKE

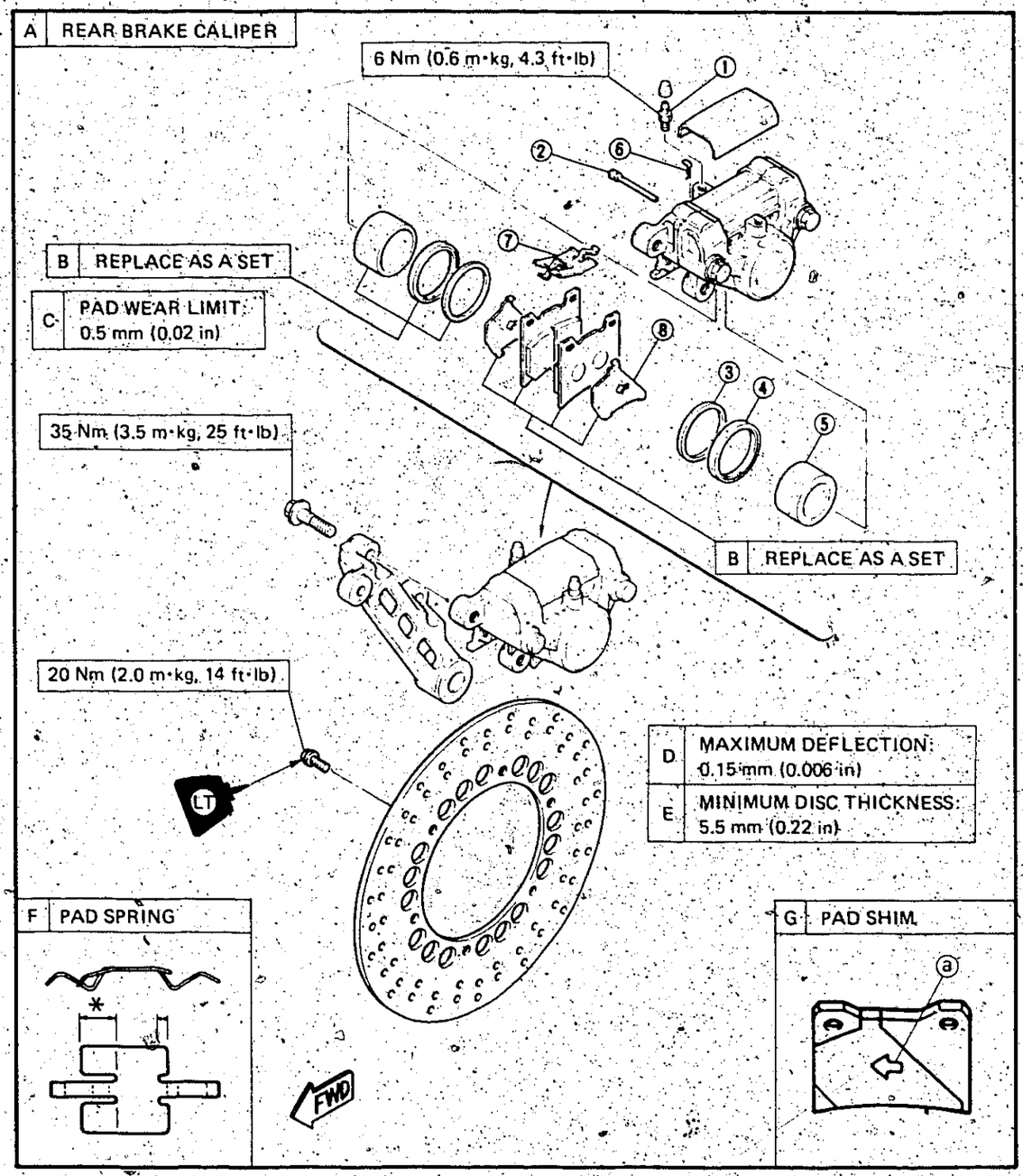
① Air bleed screw
② Pad spring
③ Retaining pin
④ Dust seal
⑤ Piston seal
⑥ Piston
⑦ Circlip

F. The arrow mark ⓐ on the pad spring must pointing the disc rotating direction.



① Air bleed screw
② Retaining pin
③ Dust seal
④ Piston seal
⑤ Piston
⑥ Circlip
⑦ Pad spring
⑧ Pad shim

F. The longer tangs (*) of the pad spring must point in the disc rotating direction.
G. The allow mark ⓐ on the pad shim must point in the disc rotating direction.

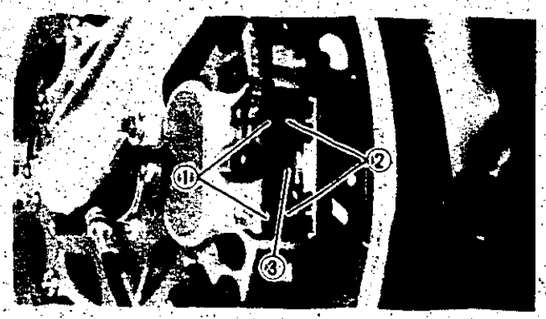


CAUTION:

Disc brake components rarely require disassembly. DO NOT:

- Disassembly 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.



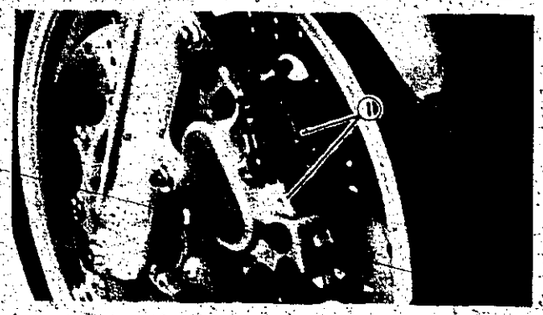


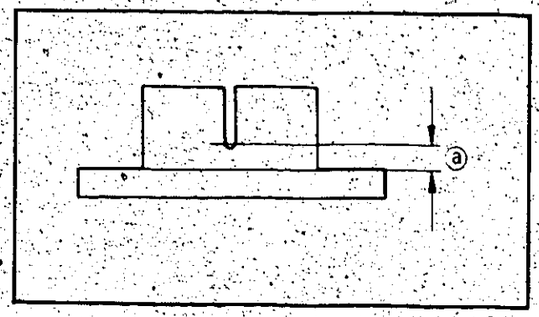
BRAKE PAD REPLACEMENT

It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

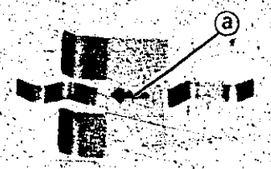
1. Remove:
   - Cover ①

2. Remove:
   - Retaining clips ①
   - Retaining pins ②
   - Pad spring ③

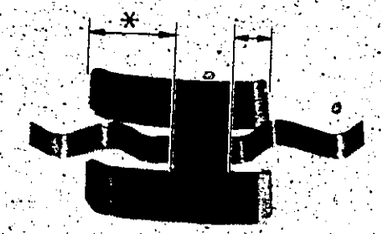




A



B



3. Remove:
   - Brake pads ①

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.
- Replace the pad shim if the pad replacement is required for the rear brake.

Wear Limit ⓐ:
0.5 mm (0.02 in)

4. Install:
   Reverse removal procedure.

A Pad spring (Front)

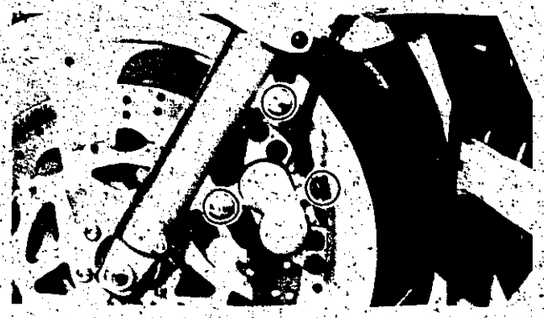
NOTE:

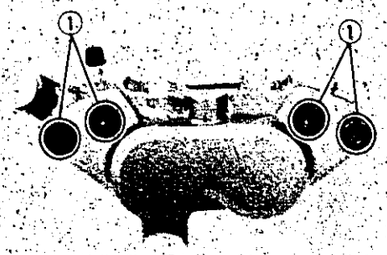
The arrow mark ⓐ on the pad spring must point in the disc rotating direction.

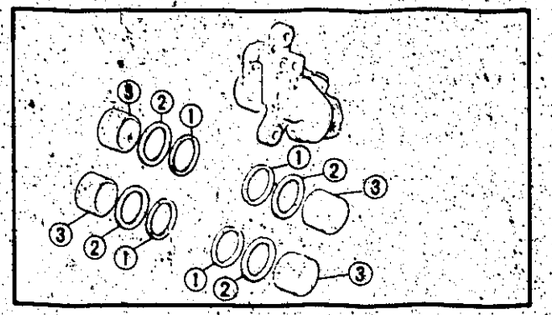
B Pad spring (Rear)

NOTE:

The longer tangs (*) of the pad spring must point in the disc rotating direction.









CALIPER DISASSEMBLY

1. Remove:
   - Pads

   Refer to "BRAKE PAD REPLACEMENT".
2. Remove:
   - Brake hose

   Place the open hose end into a container and pump the old fluid out carefully.
3. Remove:
   - Caliper

CAUTION:

Never loosen the bridge bolts ① on either side of the caliper.

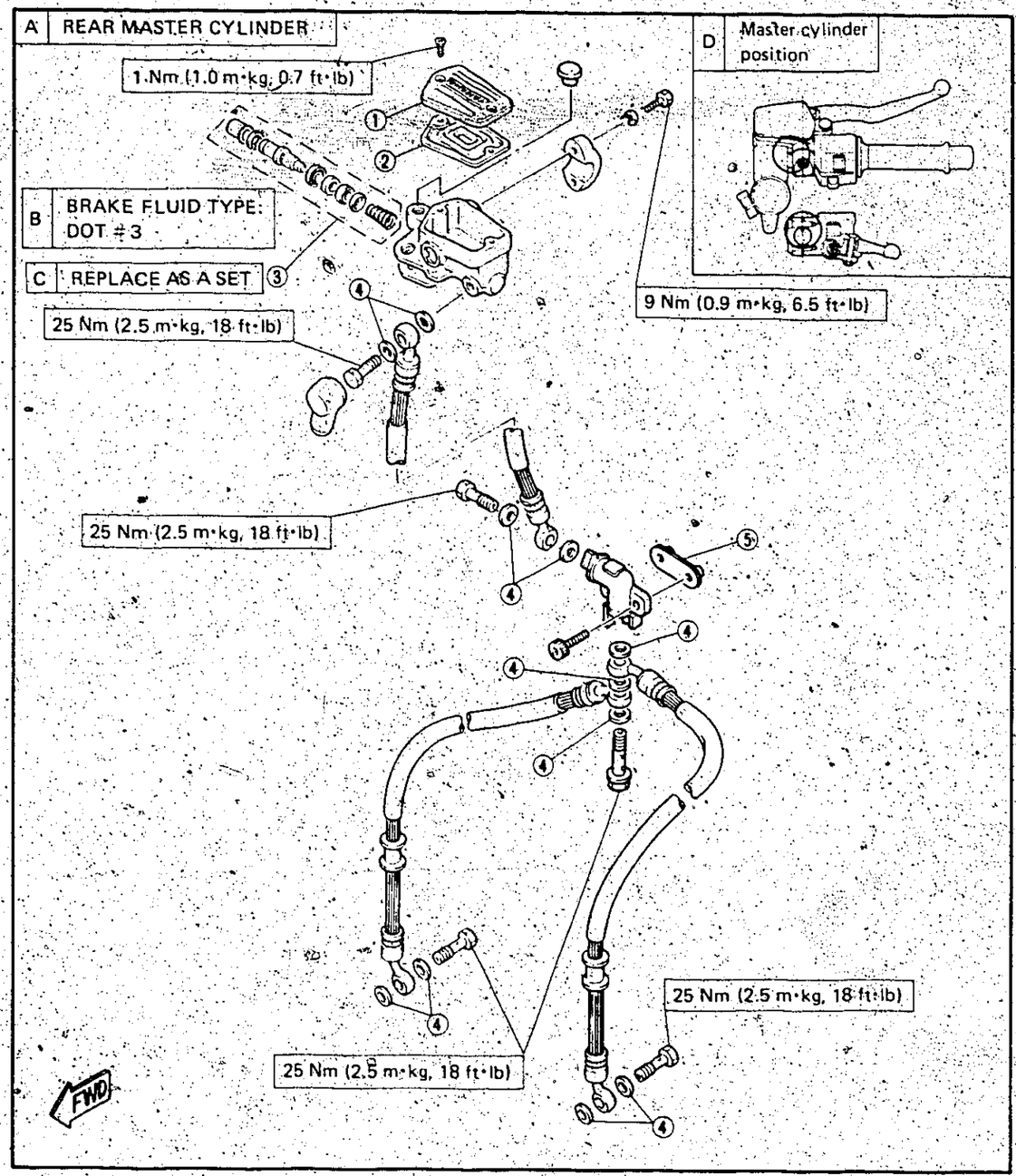
4. Remove:
   - Dust seals ①
   - Piston seals ②
   - Pistons ③

Caliper piston removal steps:

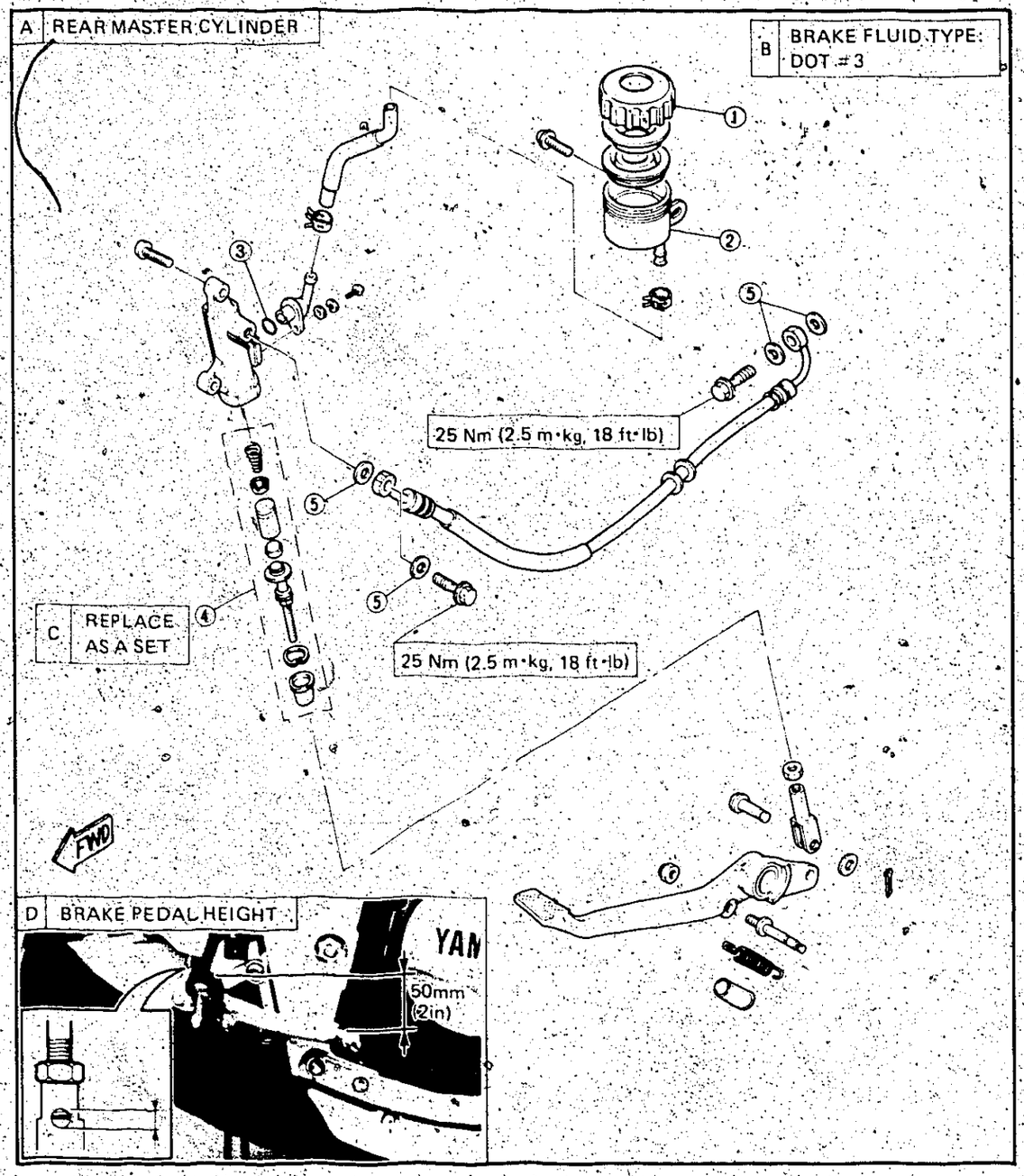
- Insert a place of wooden board ④ into the caliper to lock the right side piston.
- Blow compressed air into the tube joint opening to force out the left side pistons from the caliper body.
- Repeat previous step to force out the right side pistons from the caliper body.

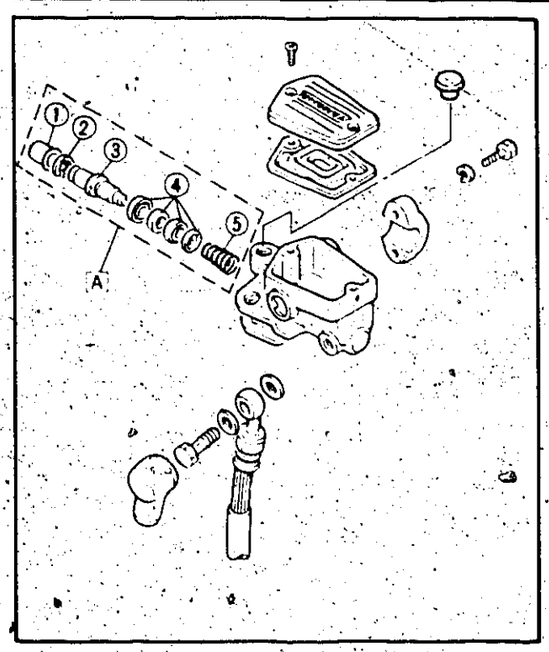
MASTER CYLINDER DISASSEMBLY

① Master cylinder cap
② Rubber seal
③ Master cylinder kit
④ Copper washer
⑤ Metering valve



① Reservoir tank cap
② Reservoir tank
③ O-ring
④ Master cylinder kit
⑤ Copper washer

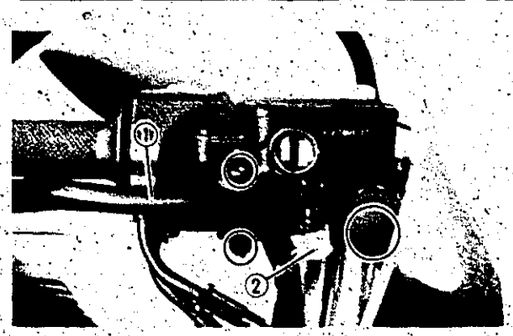




Front Brake Master Cylinder Disassembly

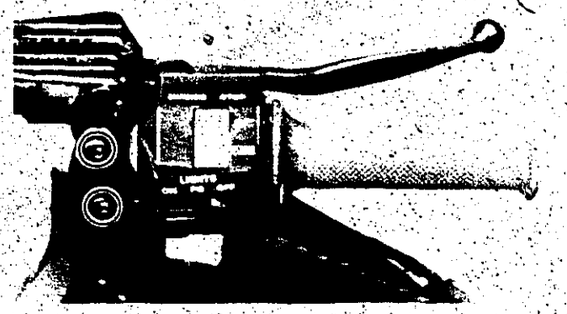
NOTE:
Drain the brake fluid before removing master cylinder.

① Dust boot
② Circlip
③ Piston
④ Piston cups
⑤ Spring
A MASTER CYLINDER KIT (Replace as a set)

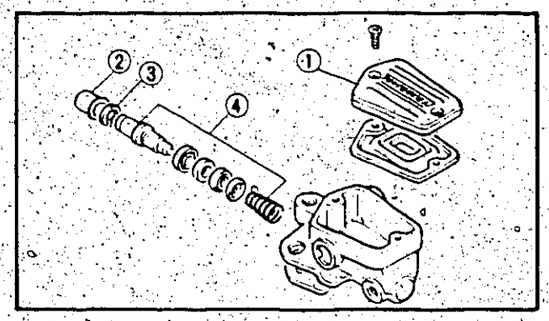


1. Remove:
   - Brake lever ①
   - Lever spring
2. Disconnect:
   - Brake light switch leads ②
   - Brake hose

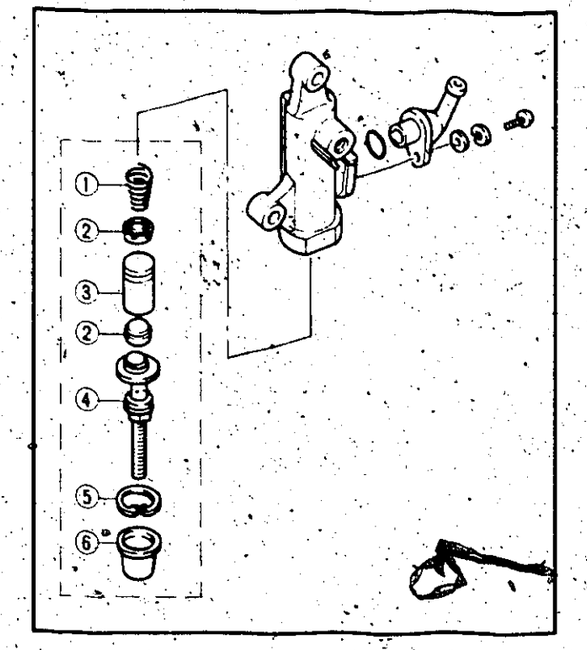
   Drain the brake fluid.

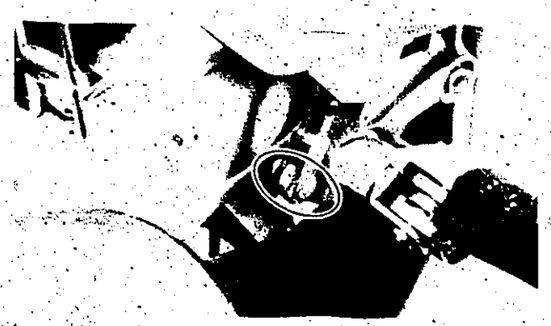


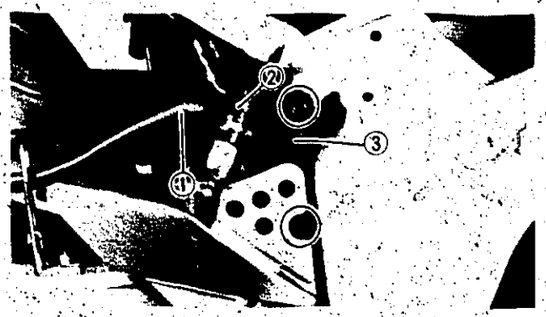
3. Remove:
   - Master cylinder

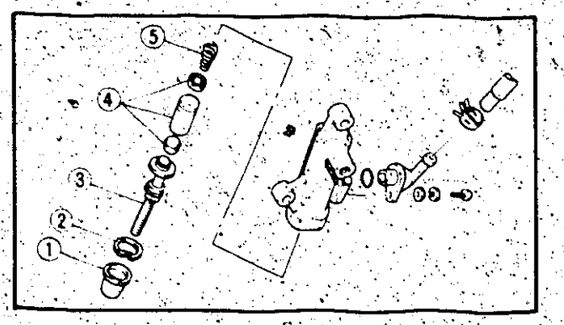


4. Remove:
   - Master cylinder cap ①
   - Dust boot ②
   - Circlip ③
   - Master cylinder kit ④









Rear Brake Master Cylinder Disassembly

NOTE:
Drain the brake fluid before removing master cylinder.

1. Remove:
   - Side cover (Right)

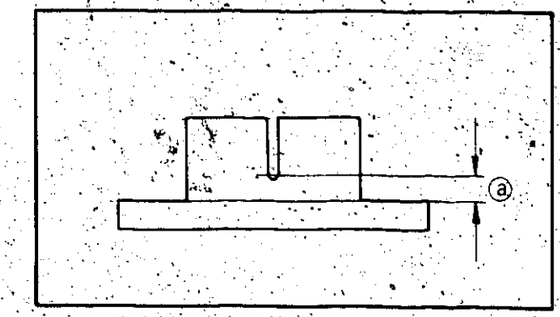
① Spring
② Piston cup
③ Piston
④ Push rod
⑤ Circlip
⑥ Dust boot
[A] MASTER CYLINDER KIT (Repalce as a set)

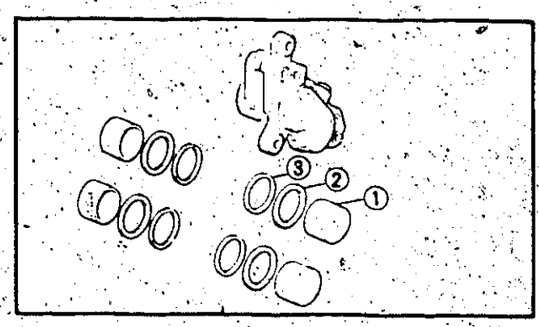
2. Remove:
   - Cotter pin
   - Clevis pin

3. Disconnect:
   - Brake hose ①
   - Reservoir tank hose ②
4. Remove:
   - Master cylinder ③

5. Remove:
   - Dust boot ①
   - Circlip ②
   - Push rod ③
   - Master cylinder kit ④
   - Spring ⑤

   Drain the excess fluid.





INSPECTION AND REPAIR

Recommended Brake Component Replacement Schedule:	
Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four 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 will cause seals to swell and distort.

1. Inspect:
   - Brake pads

   Over specified limit → Replace as a set.

Wear Limit ⓐ :
0.5 mm (0.02 in)

2. Inspect:
   - Caliper piston ①

   Rust/Wear/Damage → Replace.
   - Piston seals ②

   Damage → Replace.
   - Dust seals ③

   Damage → Replace.

WARNING:
Replace the piston and dust seals whenever a caliper is disassembled.

   - Master cylinder kit
   - Master cylinder body

   Scratches/Wear → Replace.

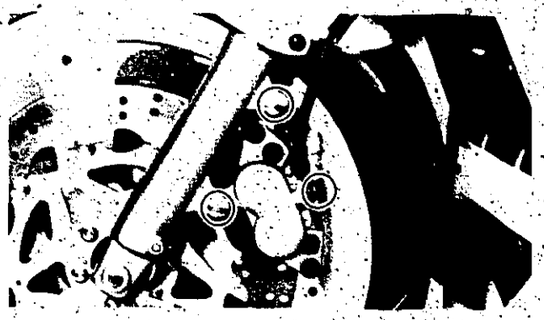
NOTE:
Clean all passages with new brake fluid.

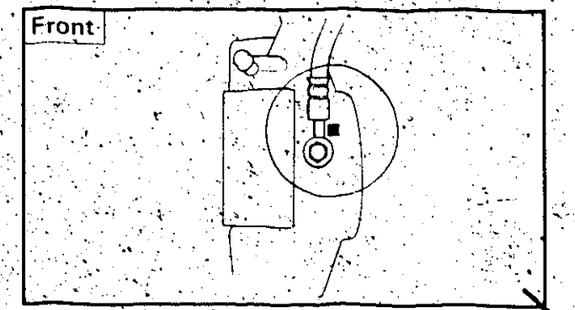
   - Brake hose

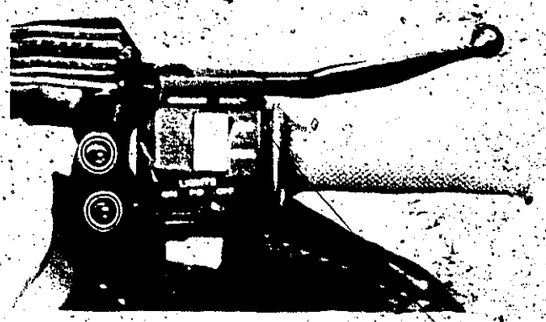
   Cracks/Wear/Damage → Replace.
   - Brake disc

   Wear/Over specified limit → Replace.

Maximum Deflection (Front/Rear):
0.15 mm (0.006 in)
Minimum Disc Thickness:
4.5 mm (0.18 in) (Front)
5.5 mm (0.22 in) (Rear)







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 #3

Brake Caliper

When assembling the caliper, reverse the disassembly procedure. Note the following points:

1. Install:
   - Brake calipers
   - Brake hoses
   - Copper washers (New)

CAUTION:

Install the brake hoses lightly touch with the projection on the brake calipers.

Bolts (Brake Caliper):
35 Nm (3.5 m·kg, 25 ft·lb)
Bolts (Brake Hose):
25 Nm (2.5 m·kg, 18 ft·lb)

2. Bleed the air completely from the brake system.

Master Cylinder

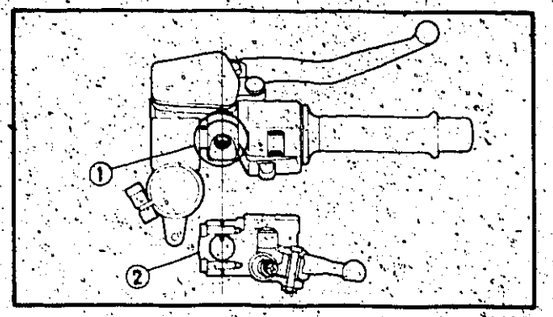
When assembling the master cylinder, reverse the disassembly procedure. Note the following points.

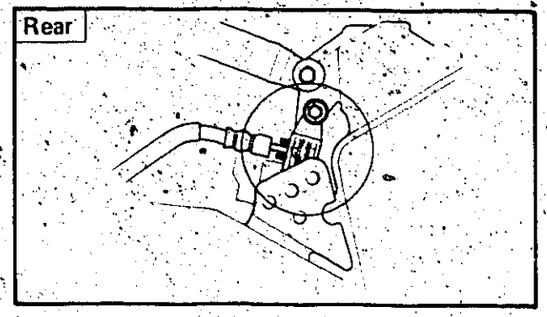
1. Install:
   - Master cylinder kit

WARNING:

Internal parts should be lubricated with brake fluid when installed.

2. Install:
   - Master cylinder (Front brake)
   - Master cylinder (Rear brake)
   - Copper washers (New)





CAUTION:

- Align the end of the holder with the punch mark ① on the handlebar.
- Tighten the upper bolt first, then tighten the lower bolt.
- Install the rear brake hose between the projections on the rear master cylinder.

② Holder

Bolts (Master Cylinder/Front):
9 Nm (0.9 m·kg, 6.5 ft·lb)
Bolts (Master Cylinder/Rear):
20 Nm (2.0 m·kg, 14 ft·lb)
Union Bolt (Brake Hose):
25 Nm (2.5 m·kg, 18 ft·lb)

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 brake system is not properly bled.



1. Bleed:
   - Brake fluid

Air bleeding steps:

a. Add proper brake fluid to the reservoir.
b. Install diaphragm.
   Be careful not to spill any fluid or allow the reservoir to over flow.
c. Connect the clear plastic tube (4.5 mm, 3/16 in inside dia.) tightly to the caliper bleed screw.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever several times.
f. Pull the lever in. Hold the lever in position.
g. Loosen the bleed screw and allow the lever to travel towards its limit.

h. Tighten the bleed screw when the lever limit has been reached; then release the lever.
i. Repeat steps (e) to (h) until of the air bubbles have been removed from the system.

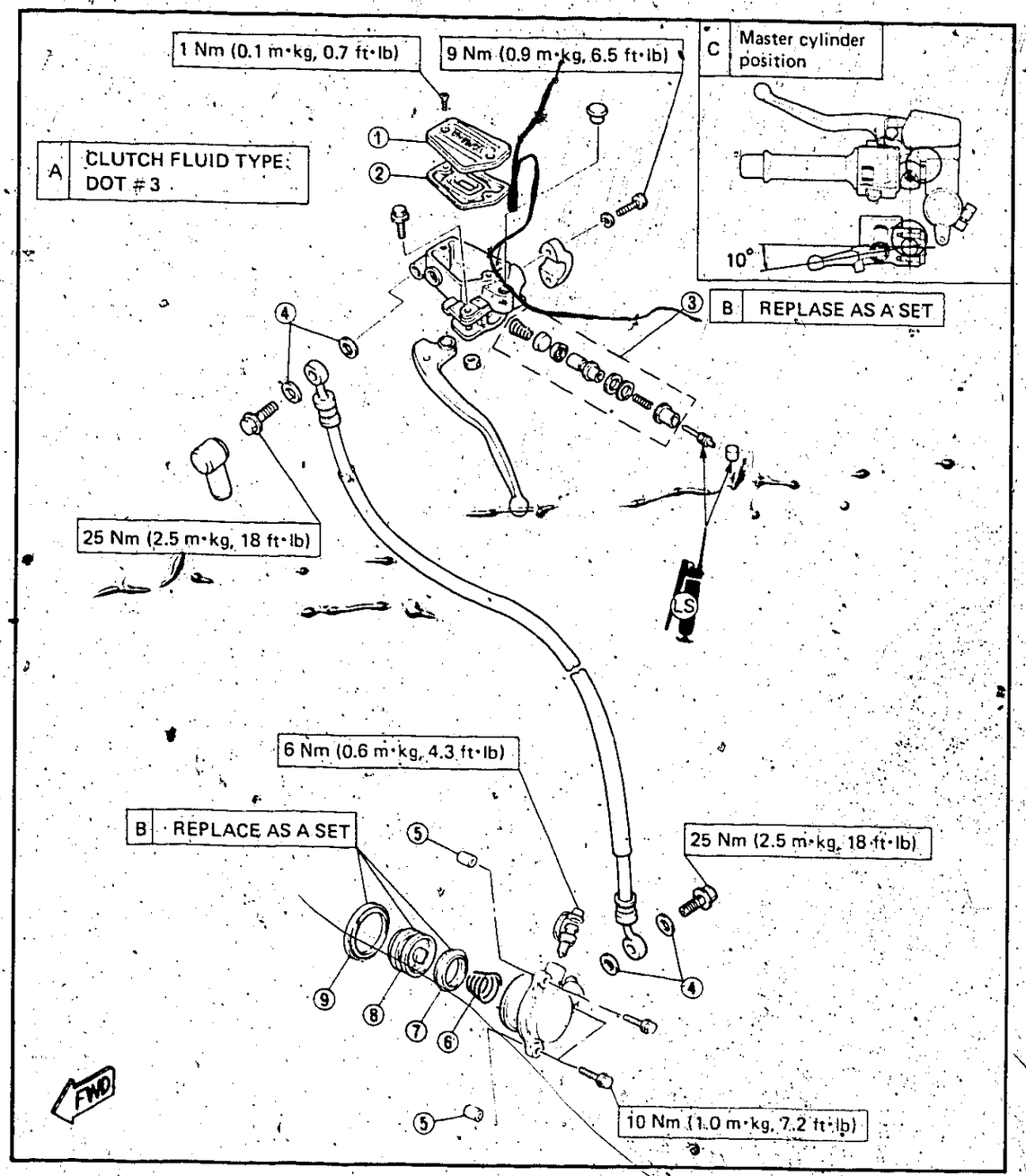
NOTE:
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in system have disappeared.

2. Tighten:
- Bleed screw
- Screws (Master cylinder cap)

Bleed Screw:
6 Nm (0.6 m·kg, 4.3 ft·lb)
Screws (Master cylinder cap):
1 Nm (0.1 m·kg, 0.7 ft·lb)

HYDRAULIC CLUTCH

① Master cylinder cap
② Rubber seal
③ Master cylinder kit
④ Copper washer
⑤ Dowel pin
⑥ Spring
⑦ Piston
⑧ Piston seal
⑨ Dust seal



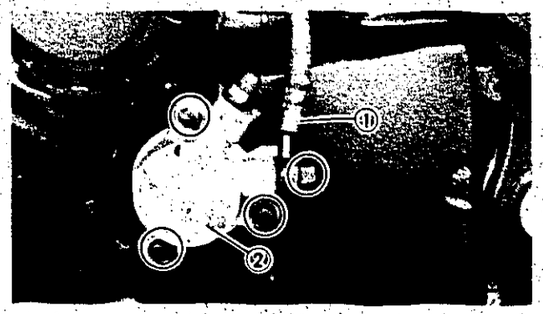
CAUTION:

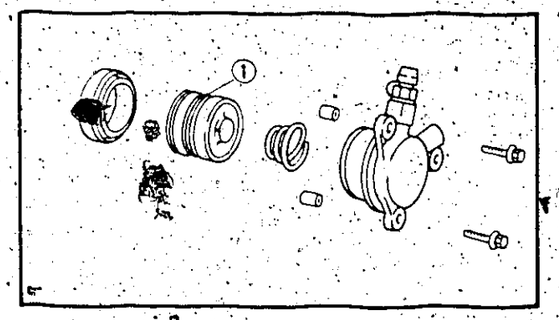
Hydraulic clutch components rarely require disassembly. DO NOT:

- Disassembly components unless absolutely necessary.
- Use solvents on internal hydraulic clutch component.
- Use contaminated clutch fluid or cleaning. Use only clean clutch 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.

NOTE:

Drain the brake fluid before removing clutch hose.





DISASSEMBLY

Clutch Release Cylinder

1. Remove:
   - Clutch hose ①
   - Clutch release assembly ②
   - Dowel pins
2. Remove:
   - Dust seal
   - Piston assembly
   - Spring

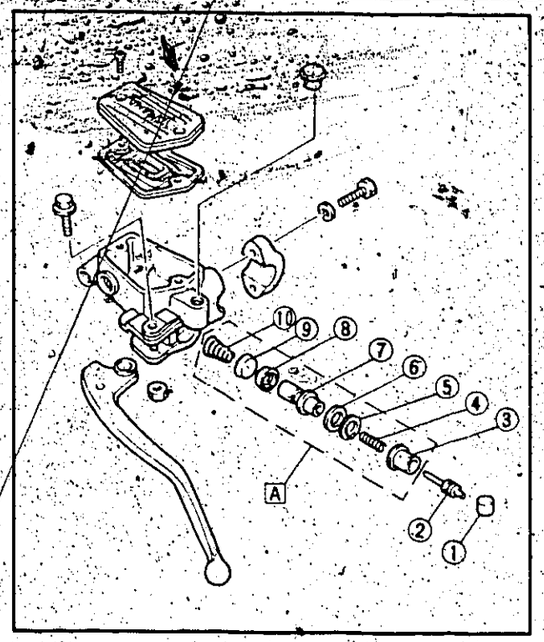
NOTE:

Blow compressed air into the hose joint opening to force out the piston from the release cylinder body.

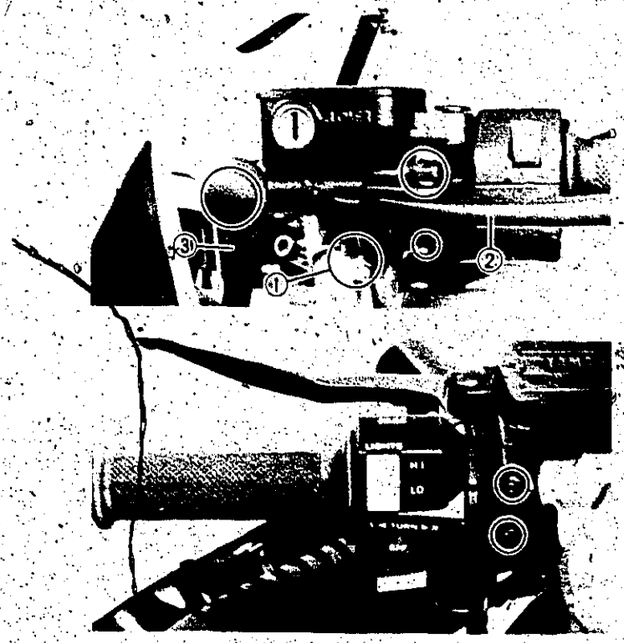
① Piston seal

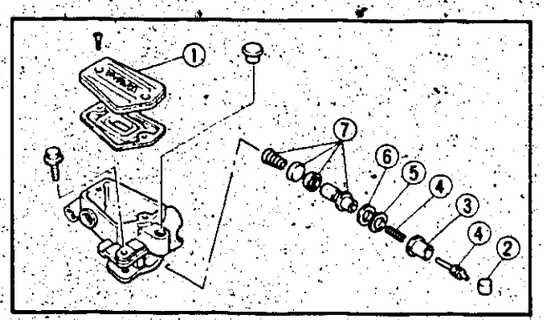
WARNING:

- Cover piston with rag and use extreme caution when expelling piston from cylinder.
- Never attempt to pry out piston.



① Bush
② Push rod
③ Dust boot
④ Spring
⑤ Circlip
⑥ Washer
⑦ Piston cup
⑧ Piston
⑨ Seat
⑩ Return spring
A Master cylinder kit (Replace as a set)





Master Cylinder

NOTE:

Drain the clutch fluid before removing master cylinder.

1. Remove:
   - Clutch switch leads ①
   - Clutch lever ②
   - Clutch hose ③

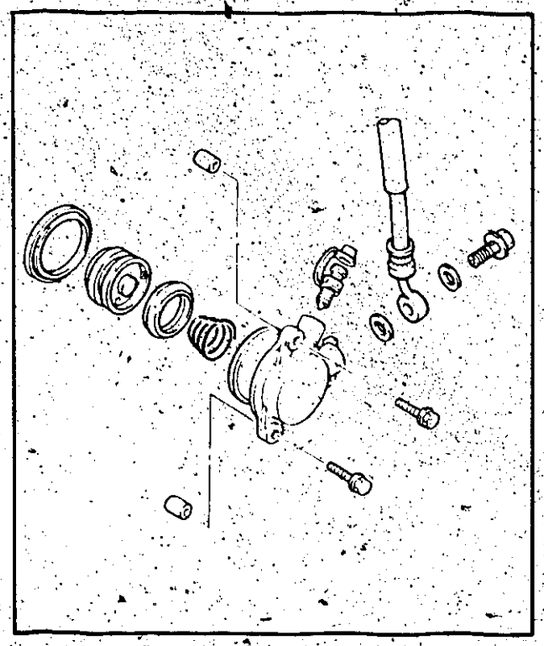
   Drain the excess fluid.

2. Remove:
   - Master cylinder

3. Remove:
   - Master cylinder cap ①
   - Push rod ②
   - Dust boot ③
   - Spring ④
   - Circlip ⑤
   - Washer ⑥
   - Master cylinder cap kit ⑦

INSPECTION AND REPAIR

Recommended Clutch Component Replacement Schedule	
Piston seal, dust seal	Every two years
Clutch hoses	Every four years
Clutch fluid (Brake fluid)	Replace only when Clutch is disassembled



1. Inspect:
   - Master cylinder body
   - Release cylinder body

   Scratches/Wear → Replace.

NOTE:
Clean all passages with new brake fluid.

- Master cylinder kit

  Scratches/Wear → Replace as a set.
- Piston
- Piston seal
- Dust seal

  Scratches/Wear → Replace as a set.
- Clutch hose

  Cracks/Wear/Damage → Replace.

ASSEMBLY

WARNING:

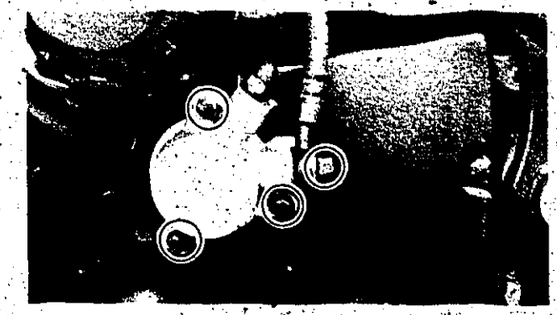
- **All internal parts should be cleaned in new brake fluid only.**
- **Internal parts should be lubricated with brake fluid when installed.**

	Brake Fluid: DOT # 3

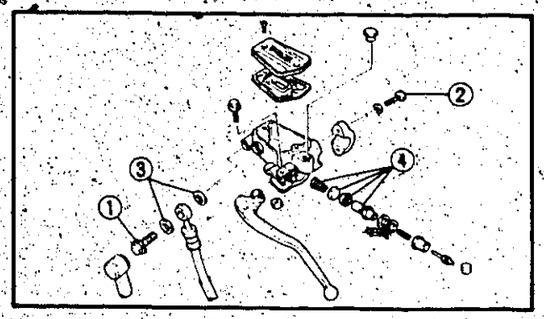
Release Cylinder

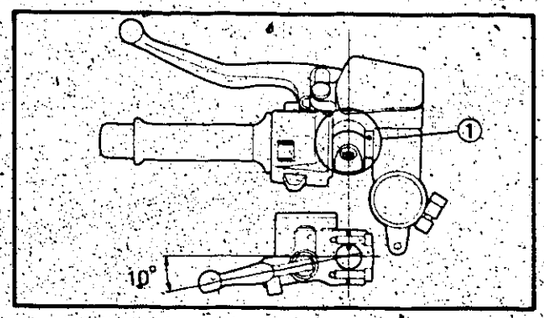
When assembling the clutch release cylinder, reverse the disassembly procedure. Note the following points.

1. Install:
   - Dowel pins
   - Release cylinder
   - Clutch hose



	Bolts (Release Cylinder): 10 Nm (1.0 m·kg, 7.2 ft·lb) Union Bolt (Clutch Hose): 25 Nm (2.5 m·kg, 18 ft·lb)





Master Cylinder

When assembling the master cylinder, reverse the disassembly procedure. Note the following points.

1. Install:
   - Master cylinder
   - Clutch hose

CAUTION:

- **Align the end of the holder with the punch mark ① on the handlebar.**
- **Tighten the upper bolt first, then tighten the lower bolt.**

	Bolts (Master Cylinder): 9 Nm (0.9 m·kg, 6.5 ft·lb) Union Bolt (Clutch Hose): 25 Nm (2.5 m·kg, 18 ft·lb)

2. Install:
   - Clutch lever

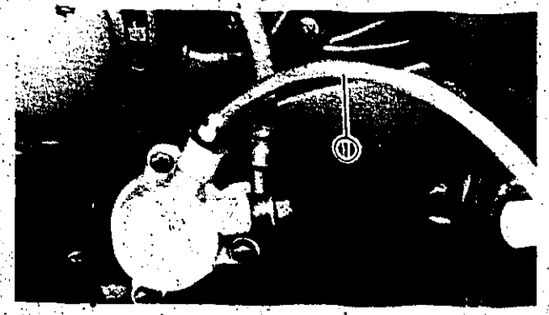
NOTE:
Lubricate the contact point of the clutch lever and the bush.

	Lithium – Soap Base Grease

3. Fill:
   - Master cylinder

	Brake Fluid: DOT # 3

4. Bleed the air completely from the clutch system.



AIR BLEEDING

WARNING:

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

1. Bleed:
   - Clutch fluid (Brake fluid)

   By the following steps.

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 over flow.
c. Connect the clear plastic hose ① to the bleed screw.
d. Place the other end of the tube into a container.
e. Slowly apply the clutch lever several times.
f. Pull in the lever and hold it in position.
g. Loosen the bleed screw and allow the lever to travel slowly toward its limit.
h. Tighten the bleed screw when the lever has reached its limit, then release the lever.

Bleed Screw:
6 Nm (0.6 m·kg, 4.3 ft·lb)

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

NOTE:

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

j. Add brake fluid to the level line on the reservoir.

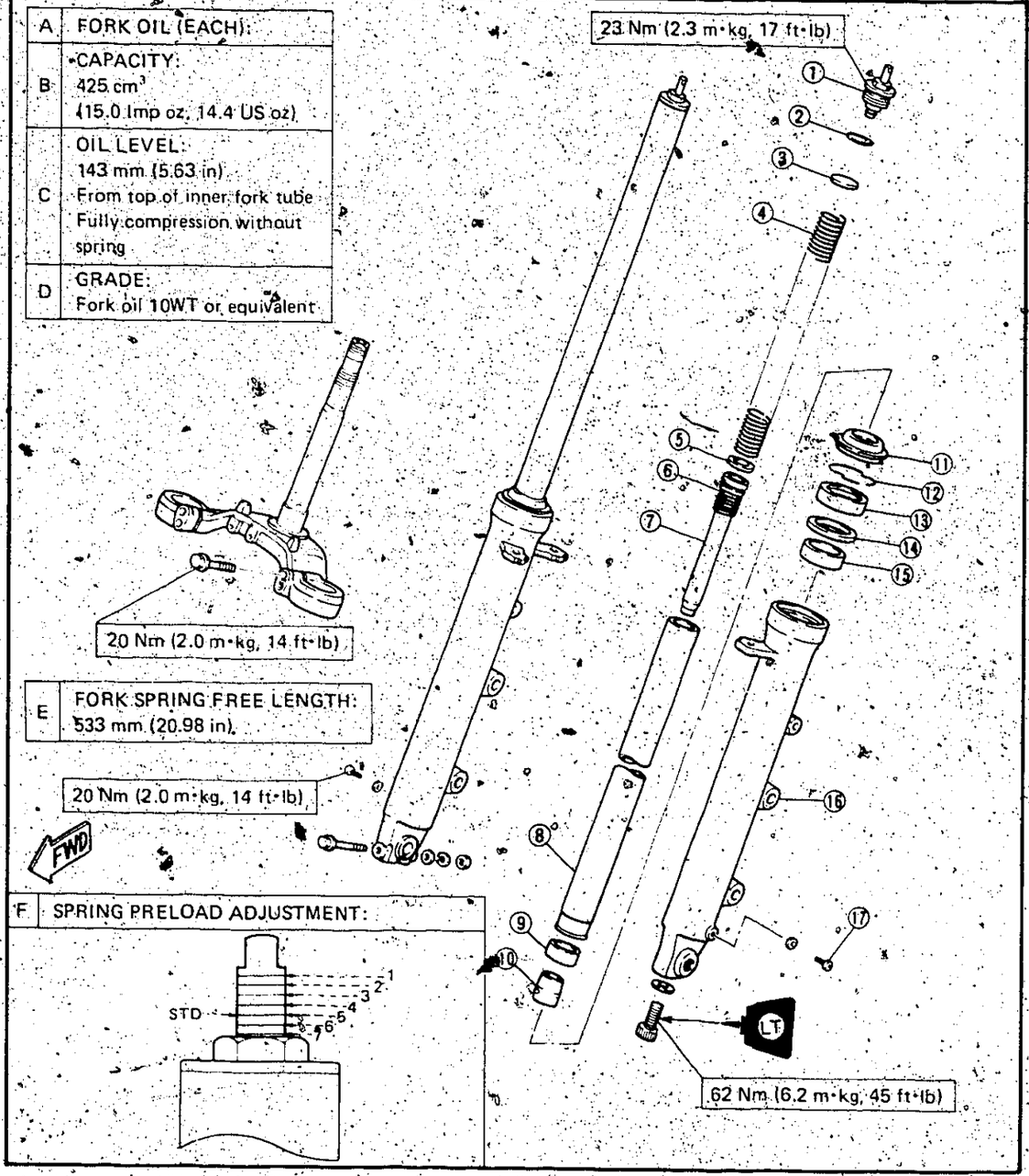
WARNING:

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

FRONT FORK

① Cap bolt
② O-ring
③ Spring seat
④ Fork spring
⑤ Ring
⑥ Rebound spring
⑦ Damper rod
⑧ Inner fork tube
⑨ Slide bushing
⑩ Oil lock piece
⑪ Dust seal
⑫ Retaining clip
⑬ Oil seal
⑭ Seal spacer
⑮ Guide bushing
⑯ Outer fork tube
⑰ Drain screw

A	FORK OIL (EACH):
B	•CAPACITY: 425 cm³ (15.0 Imp oz, 14.4 US oz)
C	OIL LEVEL: 143 mm (5.63 in) From top of inner fork tube Fully compression without spring
D	GRADE: Fork oil 10WT or equivalent



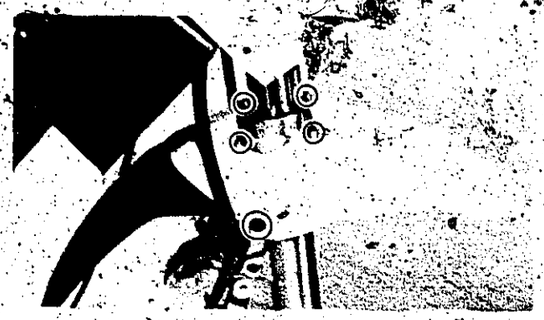
E	FORK SPRING FREE LENGTH: 533 mm (20.98 in)

F	SPRING PRELOAD ADJUSTMENT:

REMOVAL

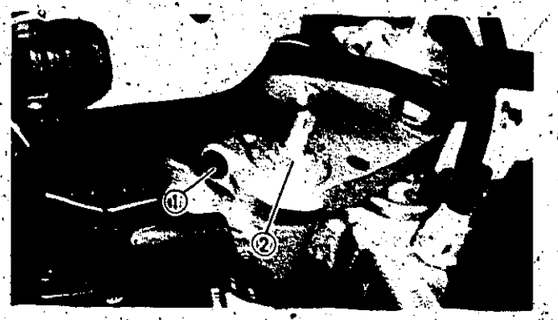
WARNING:

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

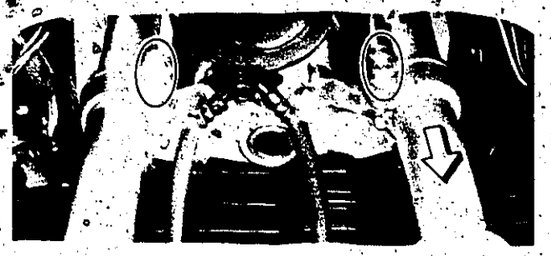


1. Remove:
   - Side coverings (Right/Left)
   - Front wheel

   Refer to "FRONT WHEEL – REMOVAL"
2. Remove:
   - Front fork brace
   - Front fender
   - Brake hose clamps



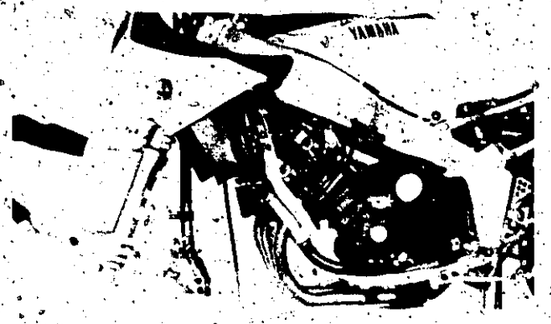
3. Loosen:
   - Pinch bolt (Handle crown) ①
   - Cap bolt ②
   - Pinch bolts (Handlebar)



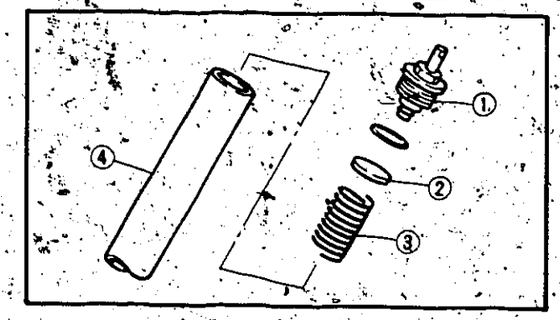
4. Loosen:
   - Pinch bolts (Steering system)

CAUTION:

Support the fork before loosening the pinch bolts.



5. Remove:
   - Front fork(s)

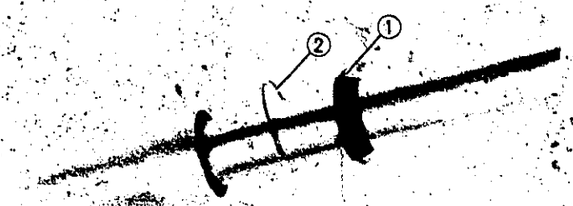


DISASSEMBLY

1. Remove:
   - Cap bolt ①
   - Spring seat ②
   - Fork spring ③

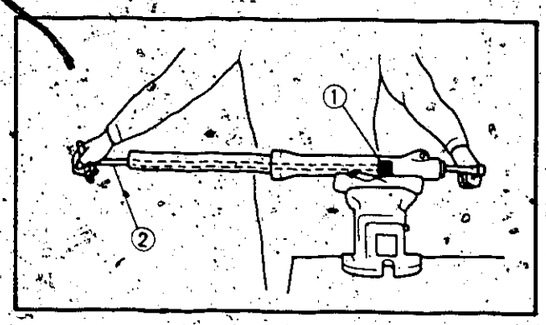
   Drain the fork oil.

④ Inner fork tube



2. Remove:
   - Dust seal ①
   - Retaining clip ②

   Use a thin flat screwdriver, and be careful not to scratch the inner fork tube.

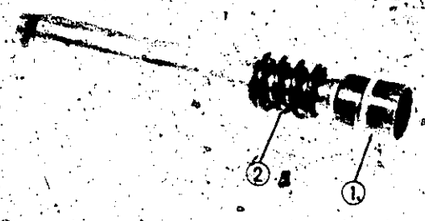


3. Remove:
   - Bolt (Damper rod)

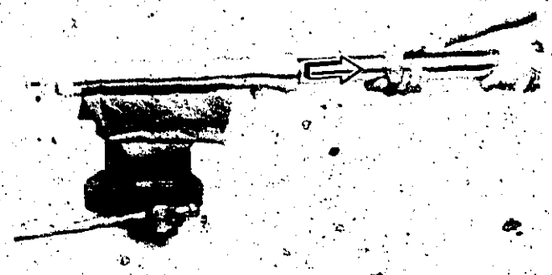
   Use the Damper Rod Holder ① and T-Handle ② to lock the damper rod.



Damper Rod Holder (27 mm):
P/N 90890-01388
T-Handle:
P/N 90890-01326



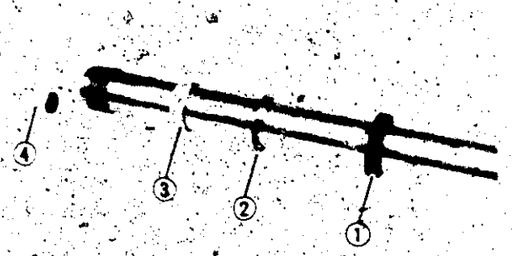
4. Remove:
   - Damper rod ①
   - Rebound spring ②



5. Remove:
   - Inner fork tube

Inner fork tube removal steps:
- Hold 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.

NOTE:
- 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.



6. Remove:
   - Oil seal ①
   - Seal spacer ②
   - Guide bushing ③
   - Oil lock piece ④

INSPECTION

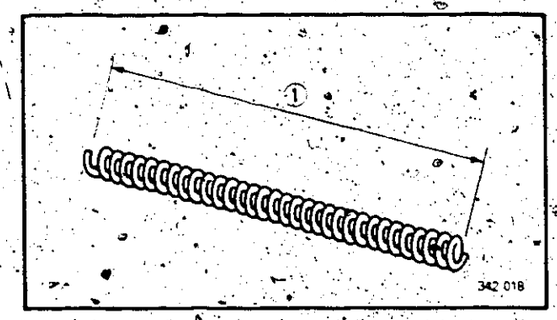
1. Inspect:
   - Inner fork tube
     Scratches/Bends → Replace.

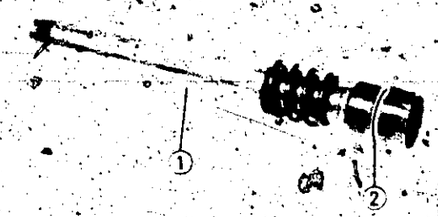
WARNING:

Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.

   - Outer fork tube
     Scratches/Bends/Damage → Replace.
2. Measure:
   - Fork spring
     Over specified limit → Replace.

Fork Spring Free Length (Limit): 528 mm (20.79 in)





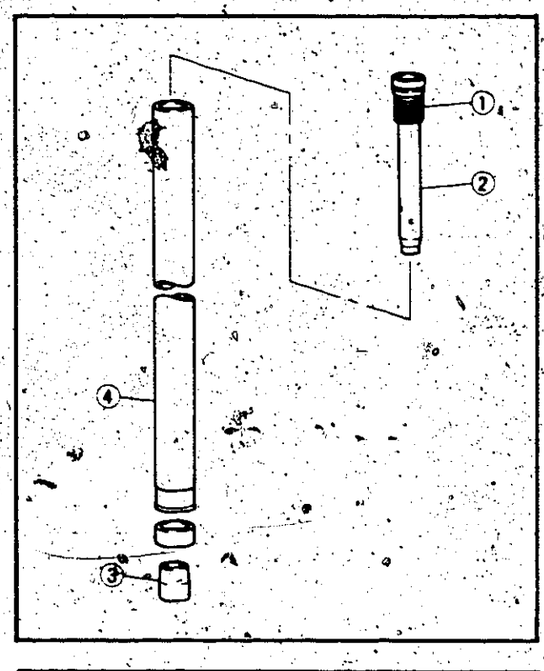
3. Inspect:
   - Damper rod ①
   - Ring ②
     Wear/Damage → Replace.
     Contamination → Blow out all oil passages with compressed air.
   - Oil lock piece
   - O-ring (Cap bolt)
     Damage → Replace.

ASSEMBLY

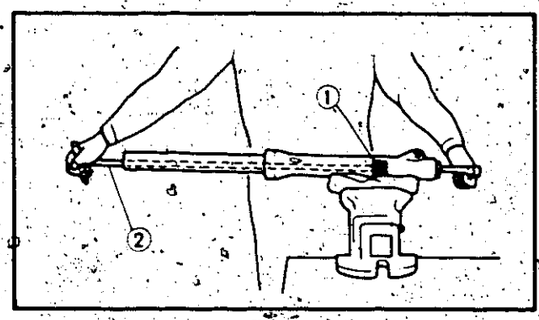
Before assembling, clean and inspect all parts and replace when necessary.

NOTE:

In front fork assembly, be sure to use following new parts. Do not reuse them.
- Slide bushing
- Guide bushing
- Oil seal
- Dust seal



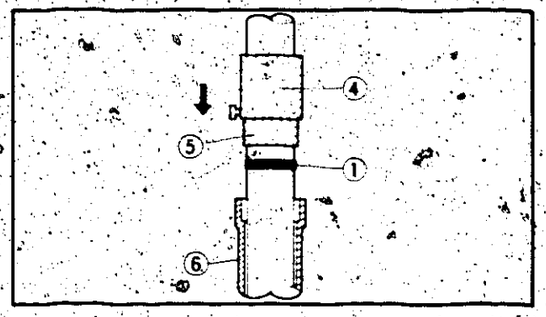
1. Install:
   - Rebound spring ①
   - Damper rod ②
     Allow the rod to slide slowly down the tube until the it protrudes from the bottom.
   - Oil lock piece ③
     Fit oil lock piece over damper rod sticking out of the inner fork tube.
   - Inner fork tube ④
     Into the outer fork tube.



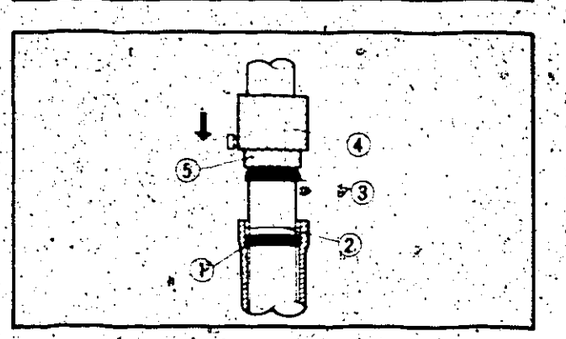
2. Tighten:
   - Bolt (Damper rod)
     Use the Damper Rod Holder ① and T-Handle ② to lock the damper rod.

Damper Rod Holder (27 mm): P/N 90890-01388
T-Handle: P/N 90890-01326

Bolt (Damper Rod): 62 Nm (6.2 m·kg, 45 ft·lb)
Apply LOCTITE®

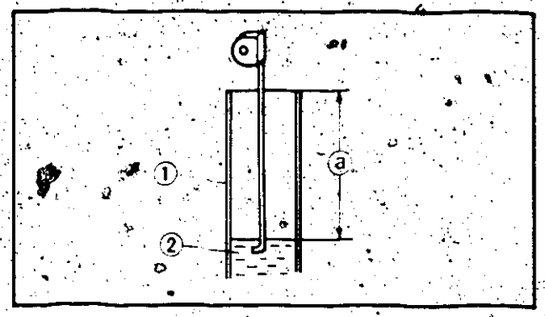


3. Install:
- Guide bushing ① (New)
  Into the Outer fork tube ⑥.
- Seal spacer ②
  On the top of guide bushing ①.
- Oil seal ③
  Use the Fork Seal Driver Weight ④ and Adopter ⑤.



Fork Seal Driver Weight:
P/N 90890-01367
Fork Seal Driver Adopter:
P/N 90890-01381

- Retaining clip
- Dust seal

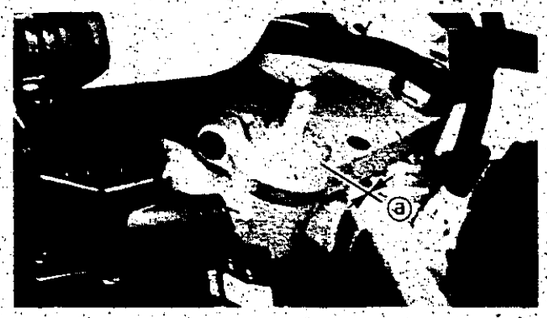


4. Fill:
- Front fork

Each Fork:
425 cm³
(15.0 Imp oz, 14.4 US oz)
Fork Oil 10WT or equivalent
After filling, slowly pump the fork up and down to distribute oil.
Oil Level ⓐ:
143 mm (5.63 in)
From the top of inner fork tube fully compressed without spring.

① Inner fork tube
② Fork oil

5. Install:
- Fork spring
  With the smaller pitch side up.
- Spring seat
- Cap bolt
  Temporarily tighten the cap bolt.





INSTALLATION
When installing the front fork, reverse the removal procedure.
Note the following points.
1. Install:
   - Front fork(s)
     Into the steering stem.
2. Tighten:
   - Pinch bolts (Steering stem)
   - Pinch bolt(s) (Handle crown)
     Temporarily tighten the pinch bolts.

NOTE:
Position the inner tube end so that it is flush ⓐ with the top of the steering crown.

3. Tighten:
   - Pinch bolts (Steering stem)

Pinch Bolts (Steering Stem):
20 Nm (2.0 m·kg, 14 ft·lb)

NOTE:
Do not tighten the pinch bolt (Handle crown) in this stage.

4. Tighten:
   - Cap bolt
   - Pinch bolt (Handle crown)
   - Pinch bolts (Handlebar)

Cap Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)
Pinch Bolt (Handle Crown):
20 Nm (2.0 m·kg, 14 ft·lb)
Pinch Bolts (Handlebar):
20 Nm (2.0 m·kg, 14 ft·lb)

5. Adjust:
   - Spring preload
     Refer to "CHAPTER 3. – FRONT FORK ADJUSTMENT".

6. Install:
   - Front fender
   - Front fork brace
   - Brake hose clamp

	Bolts (Front Fender): **8 Nm (0.8 m·kg, 5.8 ft·lb)**

7. Install:
   - Front wheel
   - Brake caliper (Right/Left)
   - Speedometer cable

   Refer to "FRONT WHEEL – INSTALLATION".

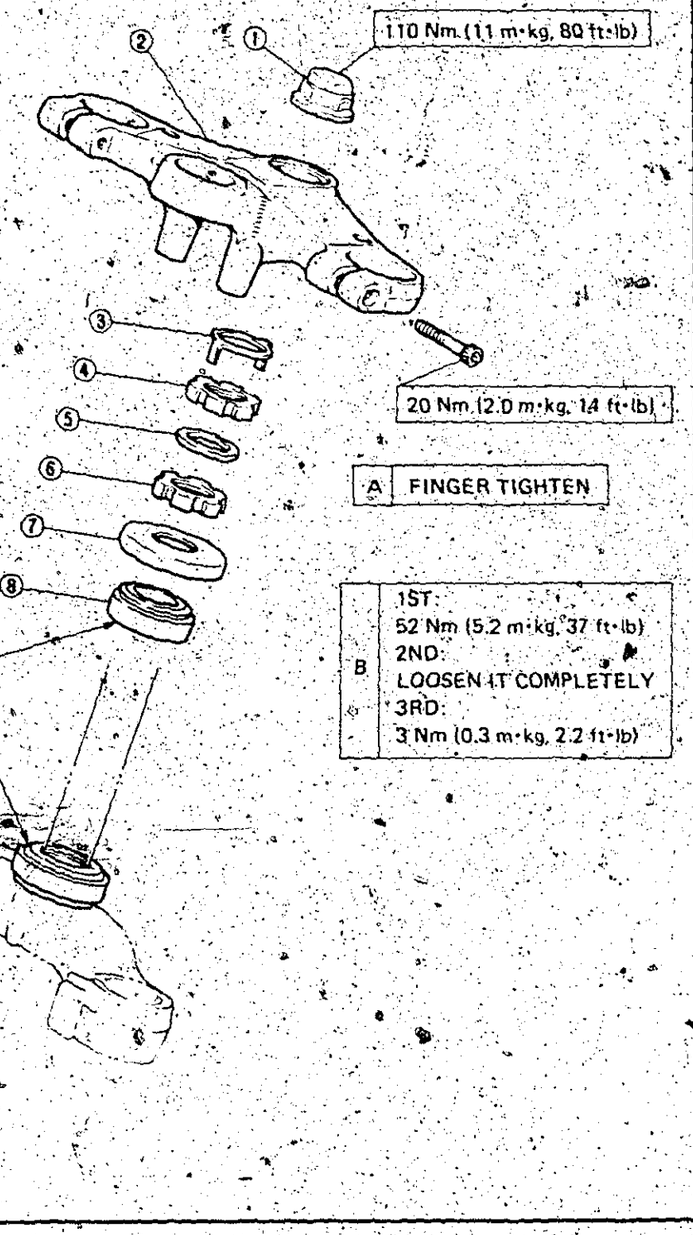
	Front Axle: **58 Nm (5.8 m·kg, 42 ft·lb)** **Bolts (Brake Caliper):** **35 Nm (3.5 m·kg, 25 ft·lb)** **Pinch Bolt (Front Axle):** **20 Nm (2.0 m·kg, 14 ft·lb)**

WARNING:

Make sure that the brake hoses are routed properly.

STEERING

① Steering stem nut
② Handle crown
③ Lock washer
④ Ring nut (Upper)
⑤ Washer
⑥ Ring nut (Lower)
⑦ Bearing cover
⑧ Bearing (Upper)
⑨ Bearing (Lower)
⑩ Steering stem



REMOVAL

WARNING:

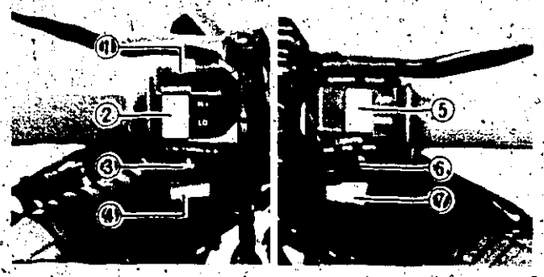
Securely support the motorcycle so there is no danger of it falling over.

1. Remove:
   - Side cowlings (Right/Left)
   - Front wheel
   - Front forks

   Refer to "FRONT WHEEL – REMOVAL" and "FRONT FORK – REMOVAL".

Handlebar

1. Remove:
   - Master cylinders (Brake/Clutch)
   - Handlebar switches (Right/Left)



2. Remove:
   - Grip ends (Right/Left)
   - Grip (Left)



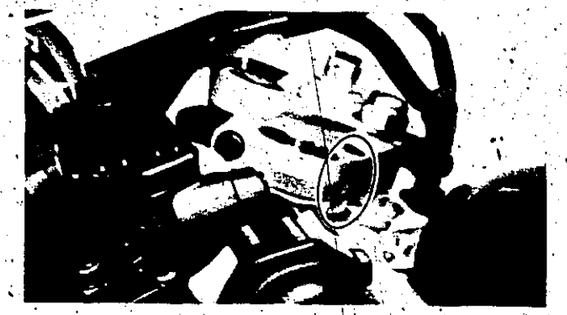
3. Disconnect:
   - Throttle cables.
4. Remove:
   - Throttle grip





5. Remove:
   - Bolt caps
   - Bolts (Handlebar)
   - Handlebars (Right/Left)

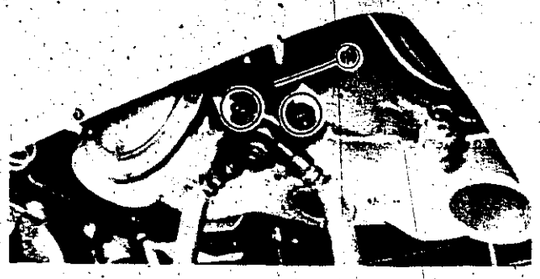


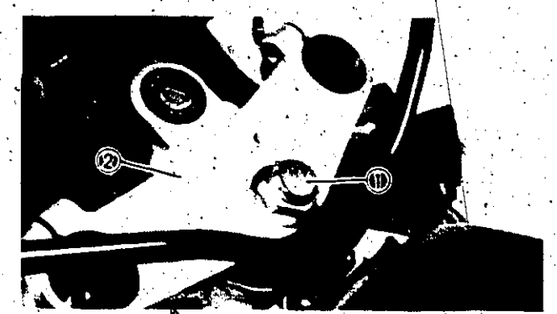


Steering Head

1. Remove:
   - Bolt caps
   - Bolts (Handlebar)
   - Handlebar assemblys (Right/Left)

2. Remove:
   - Brake hose joint ①





3. Remove:
   - Nut (Handle crown) ①
   - Handle crown ②



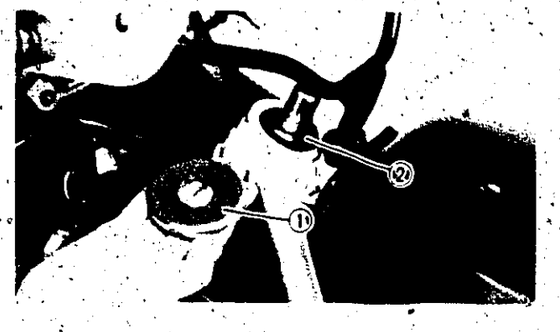
4. Remove:
   - Lock washer (Right nut) ①
   - Ring nut (Upper) ②
   - Washer ③



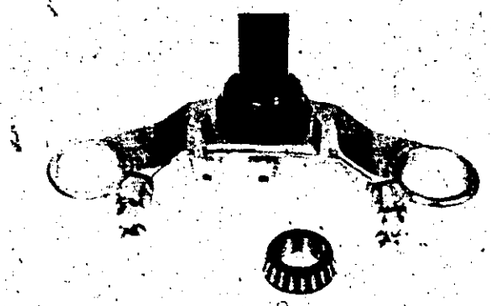
5. Remove:
   - Ring nut (Lower)

   Use the Ring Nut Wrench.

	Ring Nut Wrench: P/N 90890-01268



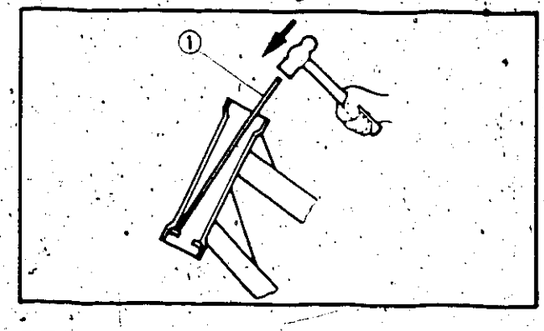
6. Remove:
   - Steering stem
   - Bearing cover ①
   - Bearing (Upper) ②
   - Bearing (Lower)



INSPECTION

1. Wash the bearing in a solvent.
2. Inspect:
   - Bearings
   - Bearing race

   Pitting/Damage → Replace.

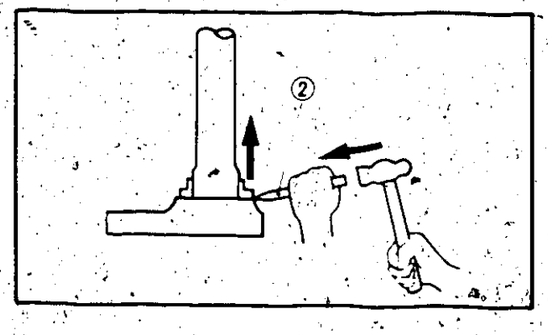


Bearing race remplacement steps:

- Remove the bearing races using long rod ① and the 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 and races as a set.



3. Inspect:
   - Handlebars

   Bents/Damage → Replace.

INSTALLATION

Reverse the removal procedure.
Note the following points.

1. Lubricate:
   - Bearings (Upper/Lower)
   - Bearing races

	Wheel Bearing Grease

2. Install:
   - Bearing (Lower) ①

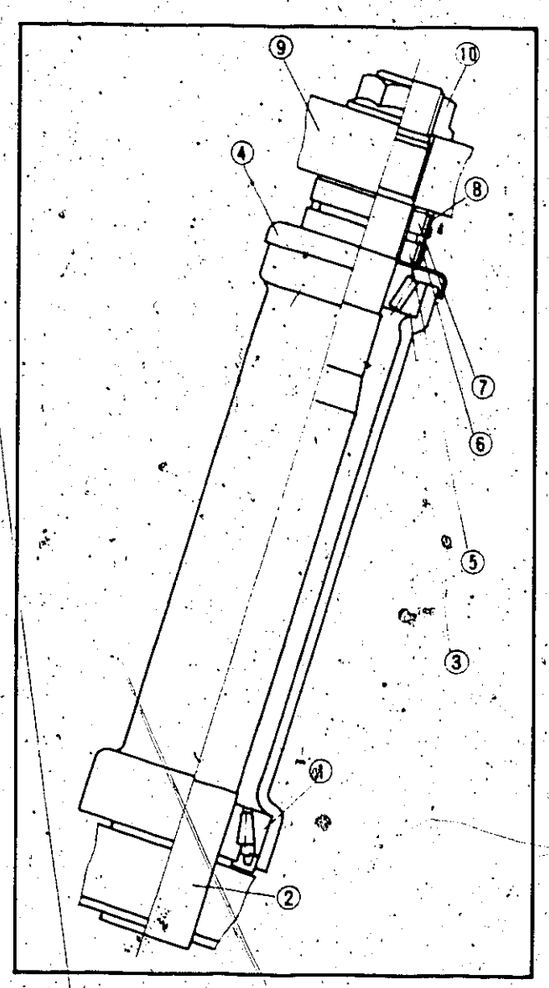
   Onto the steering stem.
   - Steering stem ②

CAUTION:

Hold the steering stem until it is secured.

   - Bearing (Upper) ③
   - Bearing cover ④
   - Ring nut (Lower) ⑤

3. Tighten:
   - Ring nuts (Lower/Upper)





Ring nuts tightening steps:

NOTE:

Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

- Install the ring nut (Lower) ⑤.

NOTE:

The tapered side of ring nut must face downward.

- Tighten the ring nut ⑤ using the Ring Nut Wrench.

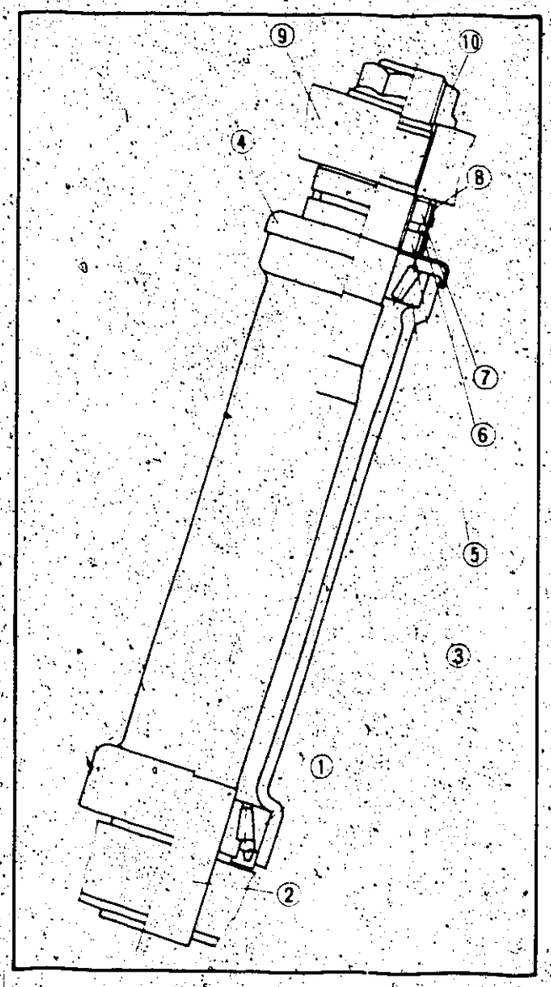
	Ring Nut Wrench: P/N 90890-01268
	Ring Nut ⑤ (Initial Tightening): 52 Nm (5.2 m·kg, 37 ft·lb)

- LOOSEN THE RING NUT ⑤ COMPLETELY and retighten it to specification:

WARNING:

Do not over-tightening.

	Ring Nut ⑤ (Final Tightening): 3 Nm (0.3 m·kg, 2.2 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 bearings ① , ③ .
- Install the washer ⑥ .
- Install the ring nut (Upper) ⑦ .

NOTE:
The tapered side of ring nut must face downward.

- FINGER TIGHTEN THE RING NUT ⑦ , then align the slots of both ring nuts. If not aligned, hold the lower ring nut ⑤ and tighten the other until they are aligned.
- Install the lock washer ⑧ .

NOTE:
Make sure the lock washer tab is placed in the slots.

- Install the handle crown ⑨ and tighten the steering stem nut ⑩ to specification.

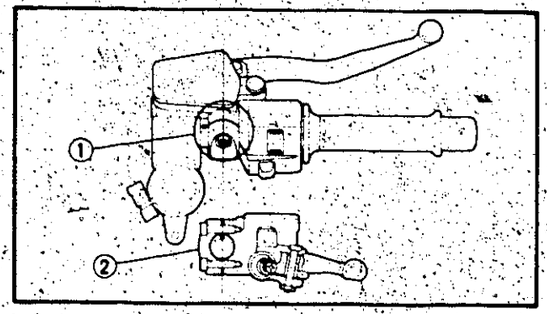
Nut (Steering Stem):
110 Nm (11.0 m·kg, 80 ft·lb)

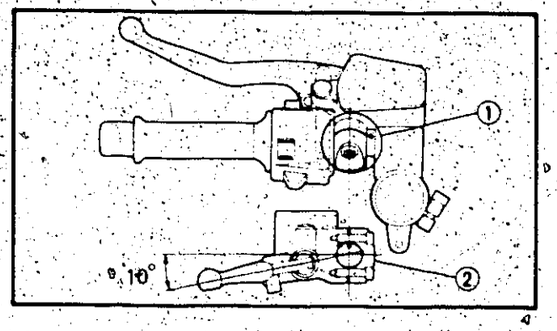
4. Install:
   - Brake hose joint
   - Handlebars (Right/Left)

Bolts (Brake Hose Joint):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolts (Handlebar):
9 Nm (0.9 m·kg, 6.5 ft·lb)

5. Install:
   - Front forks
   - Front wheel

   Refer to "FRONT FORK – INSTALLATION" and "FRONT WHEEL – INSTALLATION".





6. Install:
   - Master cylinders (Brake/Clutch)

   Refer to "FRONT AND REAR BRAKE – ASSEMBLY" and "HYDRAULIC CLUTCH – ASSEMBLY".

CAUTION:
- Align the end of the holder with the punch mark ① on the handlebar.
- Tighten the upper bolt first, then tighten the lower bolt.

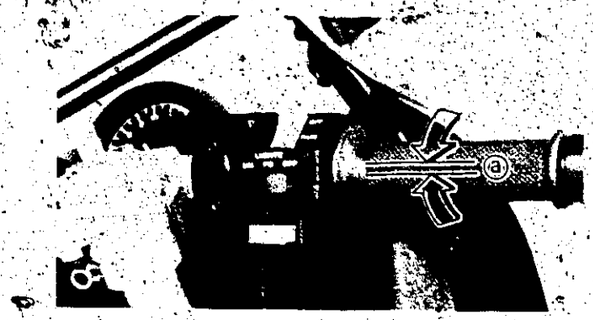
② Holder

Bolts (Front Brake Master Cylinder):
9 Nm (0.9 m·kg, 6.5 ft·lb)
Bolts (Clutch Master Cylinder):
9 Nm (0.9 m·kg, 6.5 ft·lb)

   - Throttle grip

   Connect with the throttle cables.
   - Handle switches (Right/Left)
   - Grip ends (Right/Left)

Bolts (Grip End):
26 Nm (2.6 m·kg, 19 ft·lb)



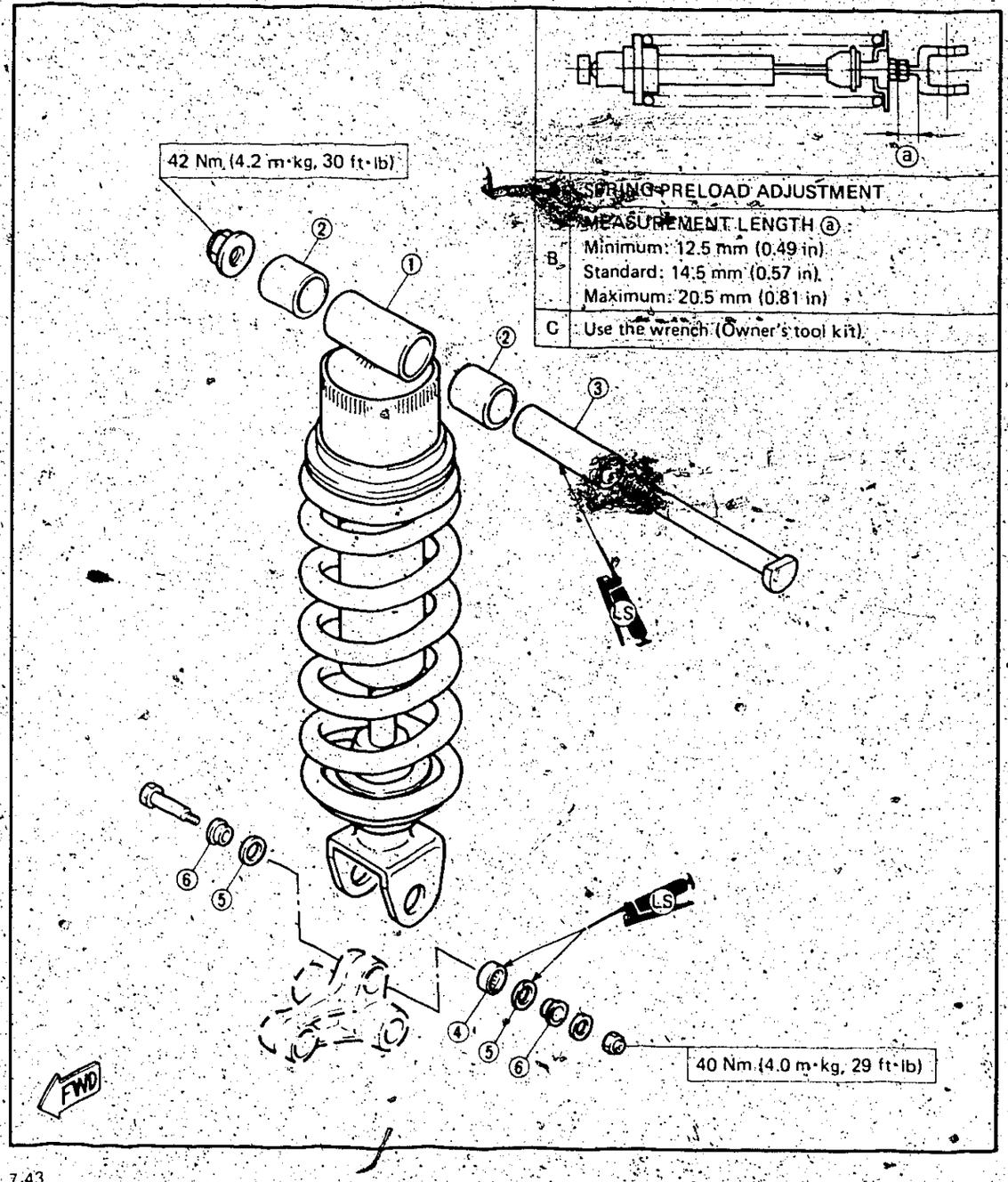
7. Adjust:
   - Throttle cable free play

   Refer to "CHAPTER 3. THROTTLE CABLE FREE PLAY ADJUSTMENT".

Throttle Cable Free Play ⓐ :
2 ~ 5 mm (0.08 ~ 0.20 in)

REAR SHOCK ABSORBER

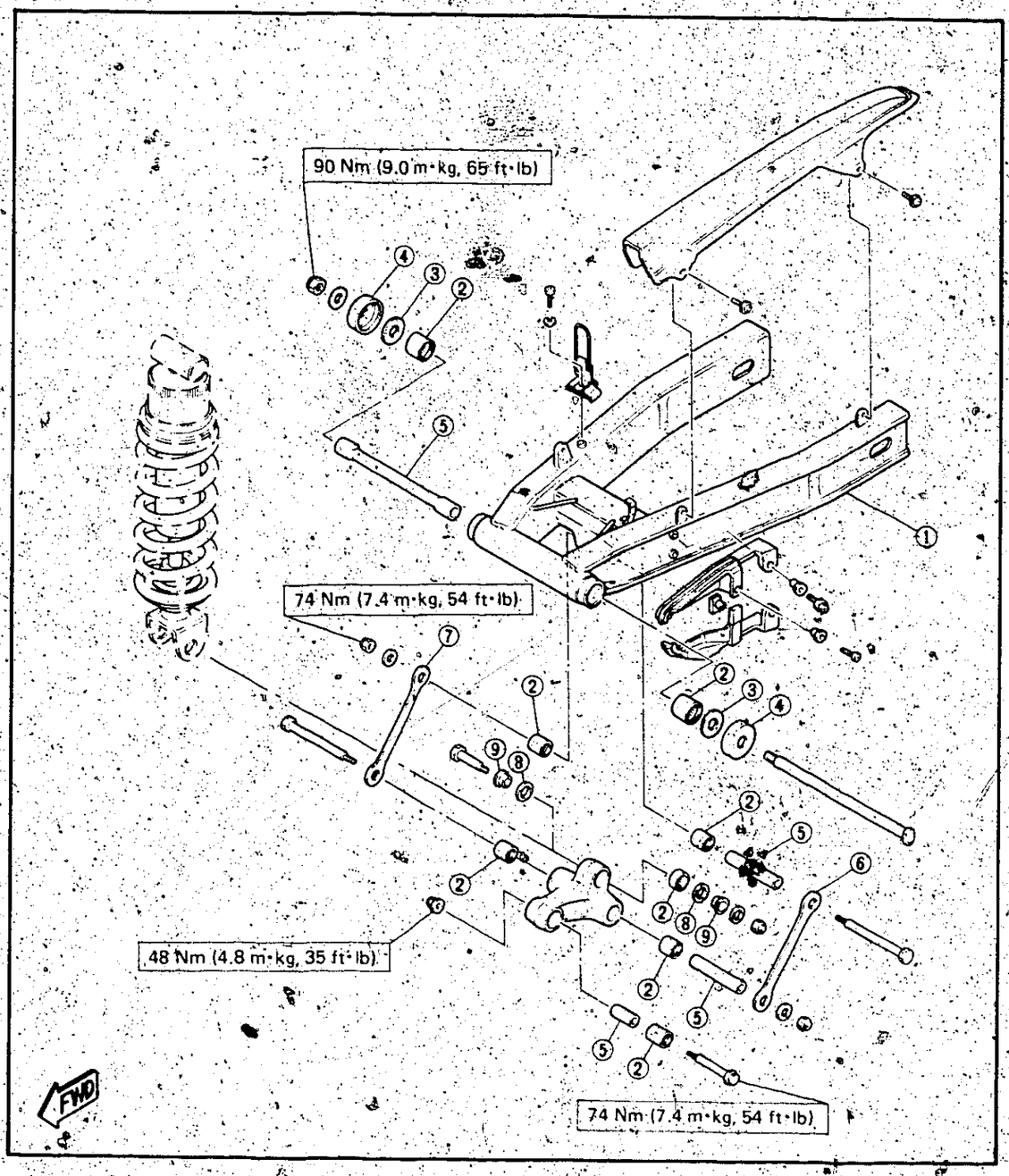
① Shock absorber
② Bushing
③ Collar
④ Bearing
⑤ Oil seal
⑥ Dust seal



SWINGARM

① Swingarm
② Bearing
③ Thrust washer
④ Thrust cover
⑤ Collar
⑥ Arm 1
⑦ Arm 2
⑧ Oil seal
⑨ Dust cover

NOTE:
Coat the bearings, bushings, thrust covers, oil seals, and collars with a liberal amount of light weight lithium-soap base grease before installing. After installing, thoroughly wipe off excess grease.

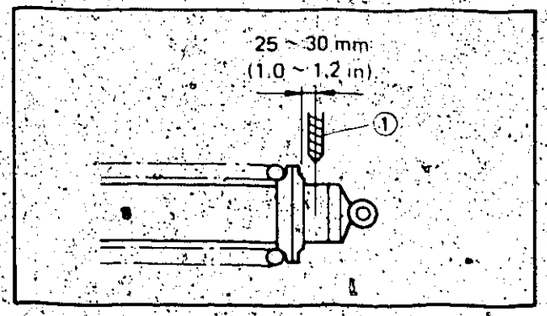


HANDLING NOTES

WARNING:

This shock absorber contains highly compressed nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

1. **Do not tamper or attempt to open the cylinder assembly.**
2. **Do not subject shock absorber to an open flame or other high heat. This may cause the unit to explode due to excessive gas pressure.**
3. **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**



DISPOSAL NOTES

Shock absorber disposal steps:

Gas pressure must be released before disposing the shock absorber. To do so, drill ① a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the cylinder wall at a point 25 ~ 30 mm (1.0 ~ 1.2 in) under the spring seat.

CAUTION:

Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

REMOVAL

Rear Shock Absorber

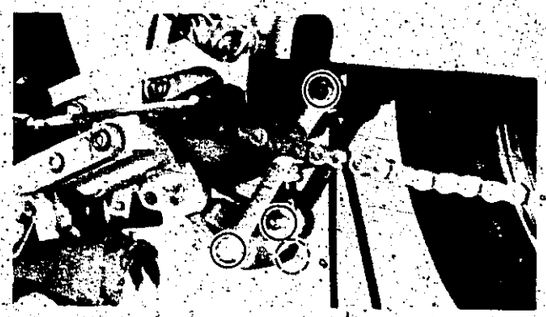
1. Place the motorcycle on a level place.

WARNING:

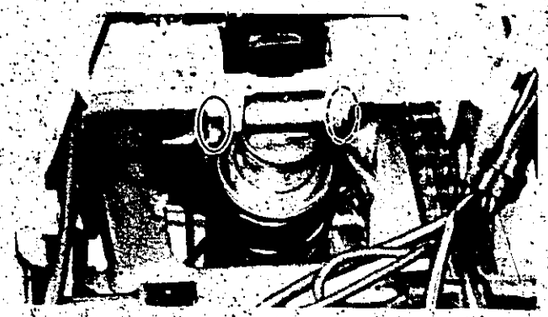
Securely support the motorcycle so there is no danger of it falling over.

2. Remove:
   - Side cowlings (Right/Left)
   - Seat
   - Side covers (Right/Left)

   Refer to "CHAPTER 3. COWLINGS REMOVAL AND INSTALLATION".



3. Remove:
   - Bolt (Rear shock absorber – Bottom)
   - Arms (Right/Left)



4. Remove:
   - Bolt (Rear shock absorber – Top)
   - Rear shock absorber

Swingarm

WARNING:

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

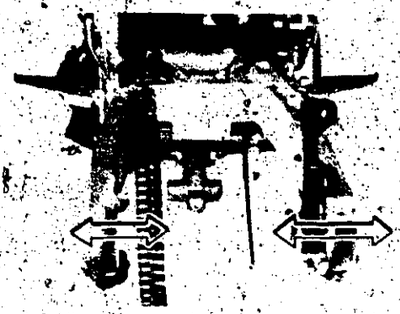
1. Remove:
   - Rear wheel

     Refer to "REAR WHEEL – REMOVAL".
   - Rear shock absorber
   - Chain case
2. Check:
   - Swingarm (Side play)

     Side play → Replace the bearings and collar.

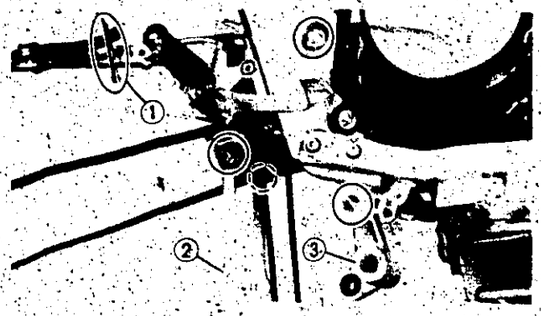
     Move the swingarm from side to side.

     There should be no noticeable side play.

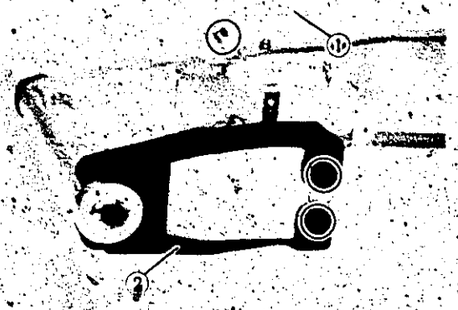




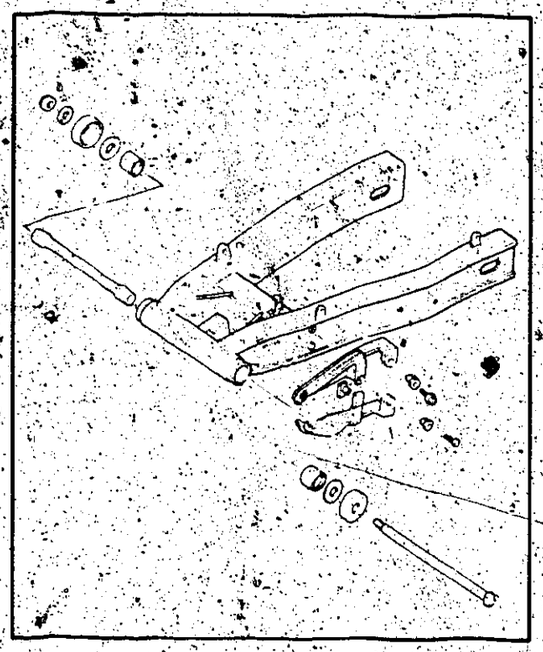
3. Check:
   - Swingarm (Vertical movement)
     Tightness/Binding/Rough spots → Replace the bearings.
     Move the swingarm up and down.



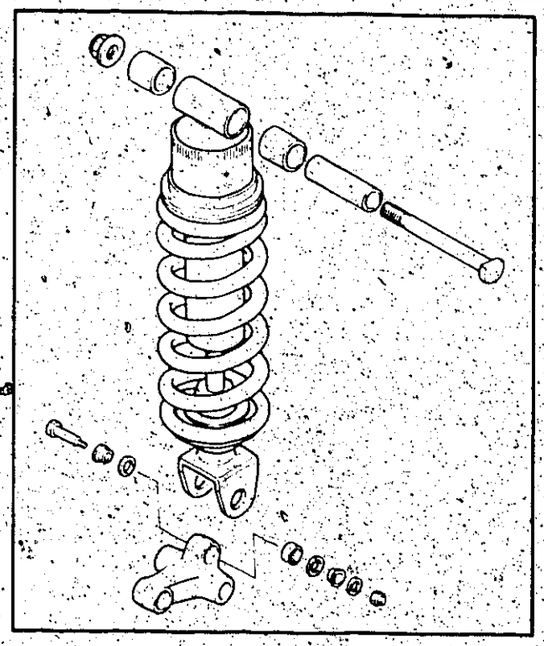
4. Remove:
   - Brake hose holder ①
   - Nut (Pivot shaft)
   - Pivot shaft
   - Swing arm
   - Arms ②
   - Relay arm ③

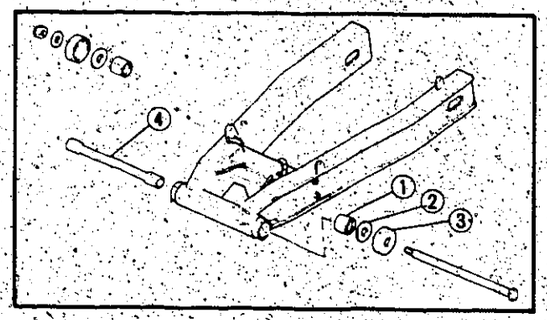


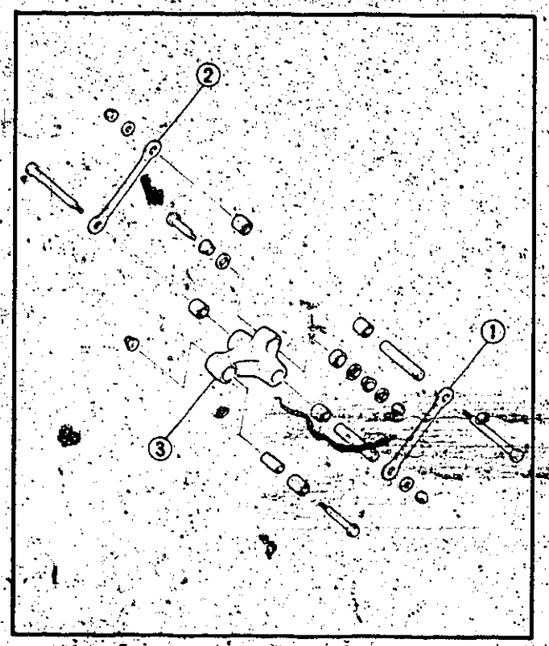
5. Remove:
   - Tension bar ①
   - Chain guide ②



6. Remove:
   - Thrust covers
   - Thrust washers
   - Bearings
   - Collar.







INSPECTION

Rear Shock Absorber

1. Inspect:
   - Rear shock absorber
     Oil leaks/Damage → Replace.
2. Inspect:
   - Bushings
   - Bearing
   - Dust seals
     Wear/Damage → Replace.

Swingarm

1. Wash the bearings in a solvent.
2. Inspect:
   - Bearings (Race/Rollers) ①
     Pitting/Damage → Replace.
   - Trust washers ②
   - Trust covers ③
     Damage → Replace.
   - Collar ④
   - Pivot shaft
     Damage → Replace.
3. Inspect:
   - Arm 1 ①
   - Arm 2 ②
   - Relay arm ③
     Damage → Replace.
   - Bearings
     Pitting/Damge → Replace.
   - Oil seals
   - Dust covers
   - Collars
     Damage → Replace.

INSTALLATION

Reverse the removal procedure.
Note the following points.

1. Lubricate:
   - Bearings
   - Oil seals
   - Collars

	Lithium Base Waterproof Wheel Bearing Grease

Rear Shock Absorber

1. Install:
   - Rear shock absorber

	Rear Shock Absorber: Upper: 42 Nm (4.2 m·kg, 30 ft·lb) Lower: 40 Nm (4.0 m·kg, 29 ft·lb)

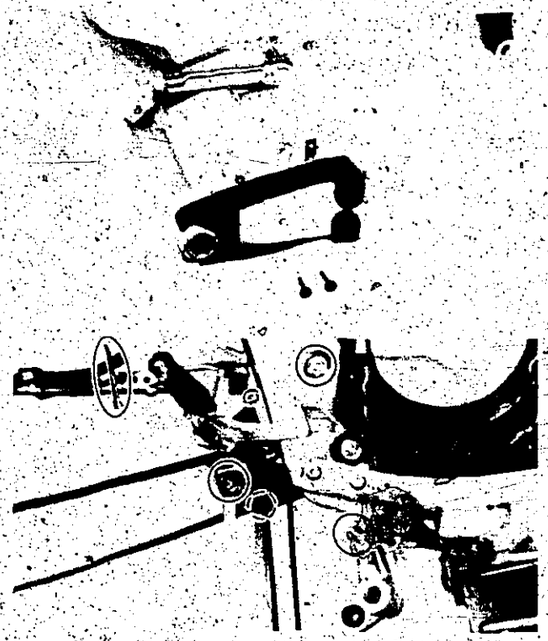
2. Adjust:
   Refer to "CHAPTER 3. REAR SHOCK ABSORBER ADJUSTMENT".

Swingarm

1. Install:
   - Tension rod
   - Cotter pins (New)
   - Chain guide

	Bolt (Tension rod): 28 Nm (2.8 m·kg, 20 ft·lb)

2. Install:
   - Arms
   - Relay arm
   - Drive chain
   - Swing arm



	Bolts (Arms): 74 Nm (7.4 m·kg, 54 ft·lb) Bolt (Relay Arm – Frame): 48 Nm (4.8 m·kg, 35 ft·lb) Pivot Shaft (Swingarm): 90 Nm (9.0 m·kg, 65 ft·lb)

   - Rear shock absorber

3. Install:
   - Rear wheel
     Refer to "REAR WHEEL – INSTALLATION".

WARNING:

- **Always use a new cotter pin on the axle nut.**
- **Make sure that the brake hose is routed properly.**

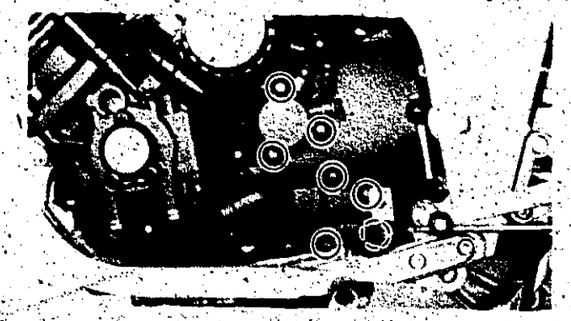
DRIVE CHAIN AND SPROCKET

REMOVAL

1. Place the motorcycle vertically on a level place.

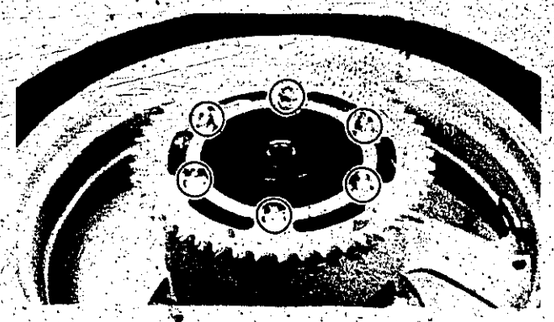
WARNING:

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

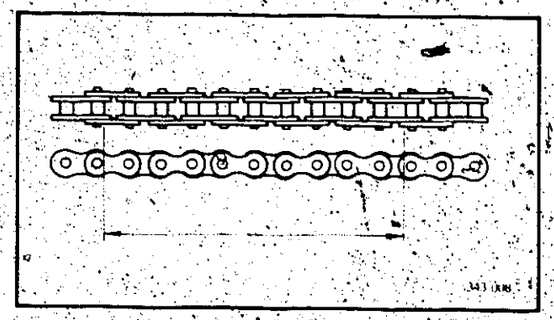


2. Remove:
   - Change pedal link
   - Cover (Crankcase – Left)
   - Nut (Drive sprocket)
   - Lock washer
   - Drive sprocket
     Refer to "CHAPTER 4. ENGINE – REMOVAL".

3. Remove:
   - Rear wheel
   - Swingarm
   - Drive chain
     Refer to "REAR WHEEL – REMOVAL" and "REAR SHOCK ABSORBER AND SWINGARM – REMOVAL".



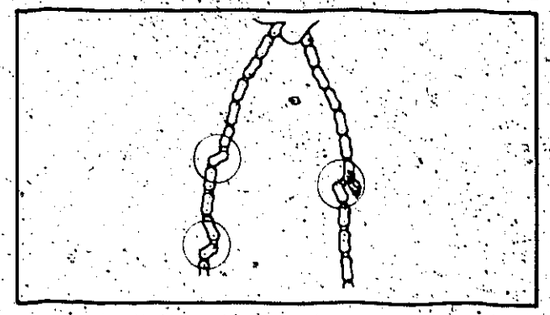
4. Remove:
   - Driven sprocket

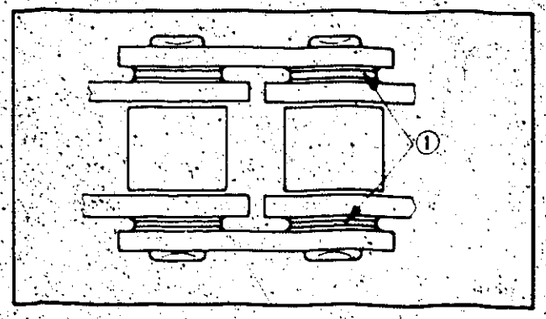


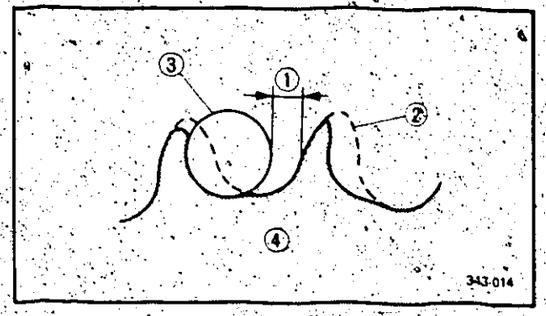
INSPECTION AND CLEANING

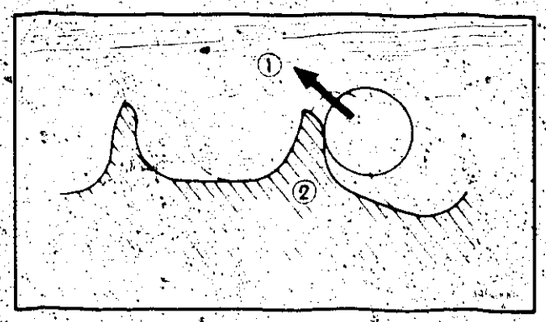
1. Measure:
   - Drive chain wear
     Length of 10 links.
     Over specified limit → Replace the drive chain, drive sprocket and driven sprocket as a set.

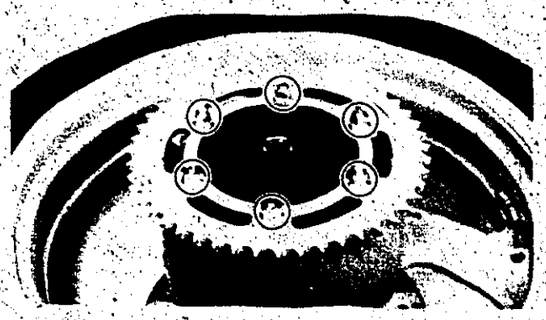
	Drive Chain Wear Limit (10 Links): 155 mm (6.10 in)











2. Check:
- Drive chain stiffness
  Clean and oil the chain and hold as illustrated.
  Stiff → Replace drive chain.

3. Clean:
- Drive chain

Drive Chain Cleaner:
Kerosene

CAUTION:

Do not use steam cleaning, high-pressure washes, and certain solvent of O-ring ① damage may occur.

4. Inspect:
- Drive sprocket
  More than 1/4 teeth ① wear → Replace sprocket.

② Correct
③ Roller
④ Sprocket

5. Inspect:
- Drive sprocket
  Bent teeth ② → Replace sprocket.

① Slip off

INSTALLATION

Reverse the removal procedure.
Note the following points.

1. Install:
- Driven sprocket

Nuts (Driven Sprocket):
55 Nm (5.5 m·kg, 40 ft·lb)

2. Lubricate:
- Bearings
- Oil seals
- Collars

Lithium Base Waterproof Wheel Bearing Grease

3. Install:
- Drive chain
- Swingarm
- Rear wheel
  Refer to "REAR SHOCK ABSORBER AND SWINGARM – INSTALLATION" and "REAR – WHEEL – INSTALLATION".

4. Install:
- Drive sprocket
- Lock washer (New)
- Nut (Drive sprocket)

Nut (Drive Sprocket):
70 Nm (7.0 m·kg, 50 ft·lb)

5. Install:
- Cover (Crankcase – Left)
- Change pedal link

Bolts (Crankcase – Left):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bolt (Change pedal link):
10 Nm (1.0 m·kg, 7.2 ft·lb)

6. Adjust:
- Drive chain slack
  Refer to "CHAPTER 3. DRIVE CHAIN SLACK ADJUSTMENT".

Drive Chain Slack:
15 ~ 20 mm (0.6 ~ 0.8 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.

METER ASSEMBLY

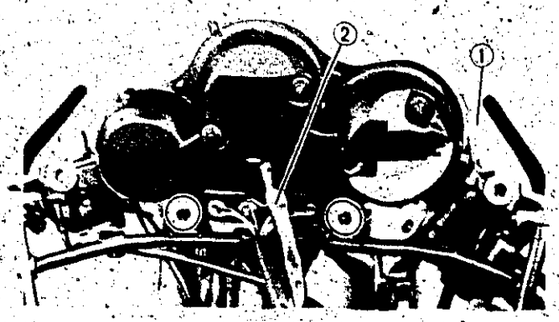
REMOVAL

1. Remove:
   - Side cowlings
   - Upper cowling

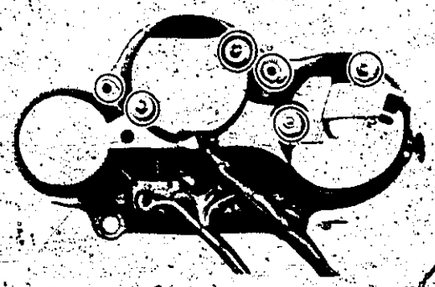
   Refer to "CHAPTER 3. – SIDE COWLING/UPPER COWLING – REMOVAL".

CAUTION:

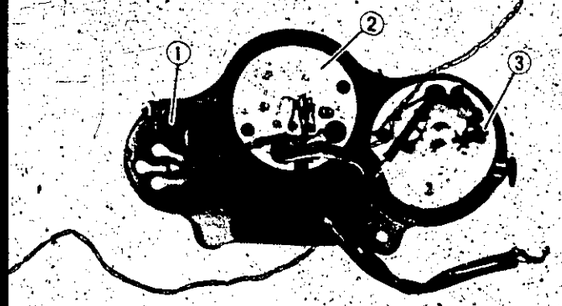
Remove the headlight together with the upper cowling to prevent falling the headlight off.



2. Disconnect:
   - Speedometer cable ①
   - Meter leads ②
3. Remove:
   - Speedometer assembly



4. Remove:
   - Gover (Meter assembly)



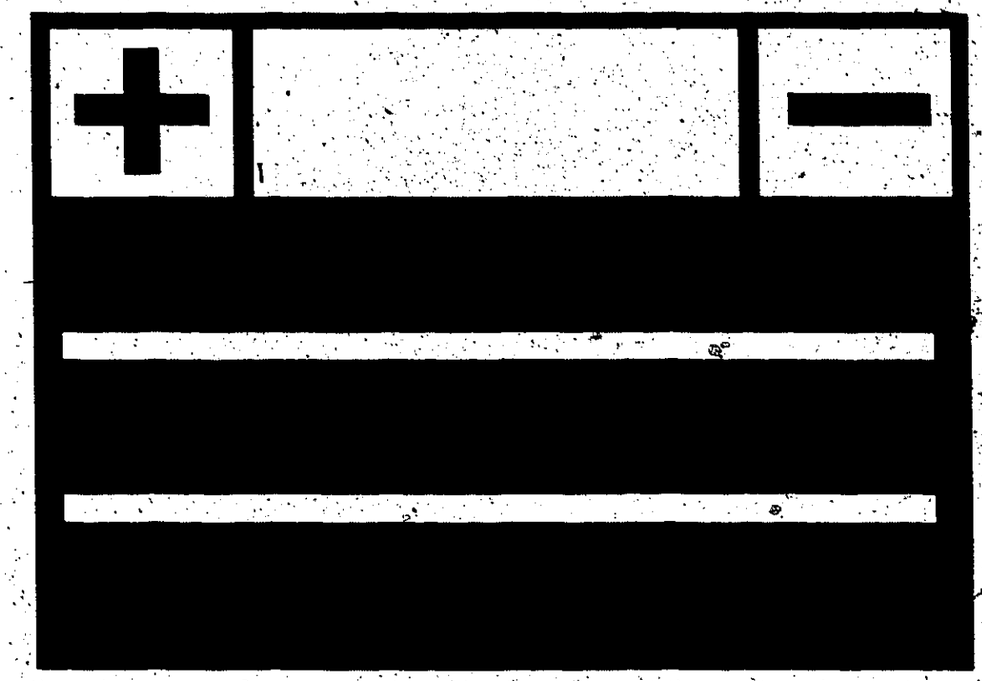
5. Disconnect:
   - Leads (Meters)
6. Remove:
   - Water temperature meter ①
   - Tacho meter ②
   - Speedometer ③

INSTALLATION

Reverse the removal procedure.

1. Connect:
   - Leads (Meters)
2. Install:
   - Upper cowlings
   - Side cowlings

   Refer to "CHAPTER 3. SIDE COWLING/UPPER COWLING – INSTALLATION".

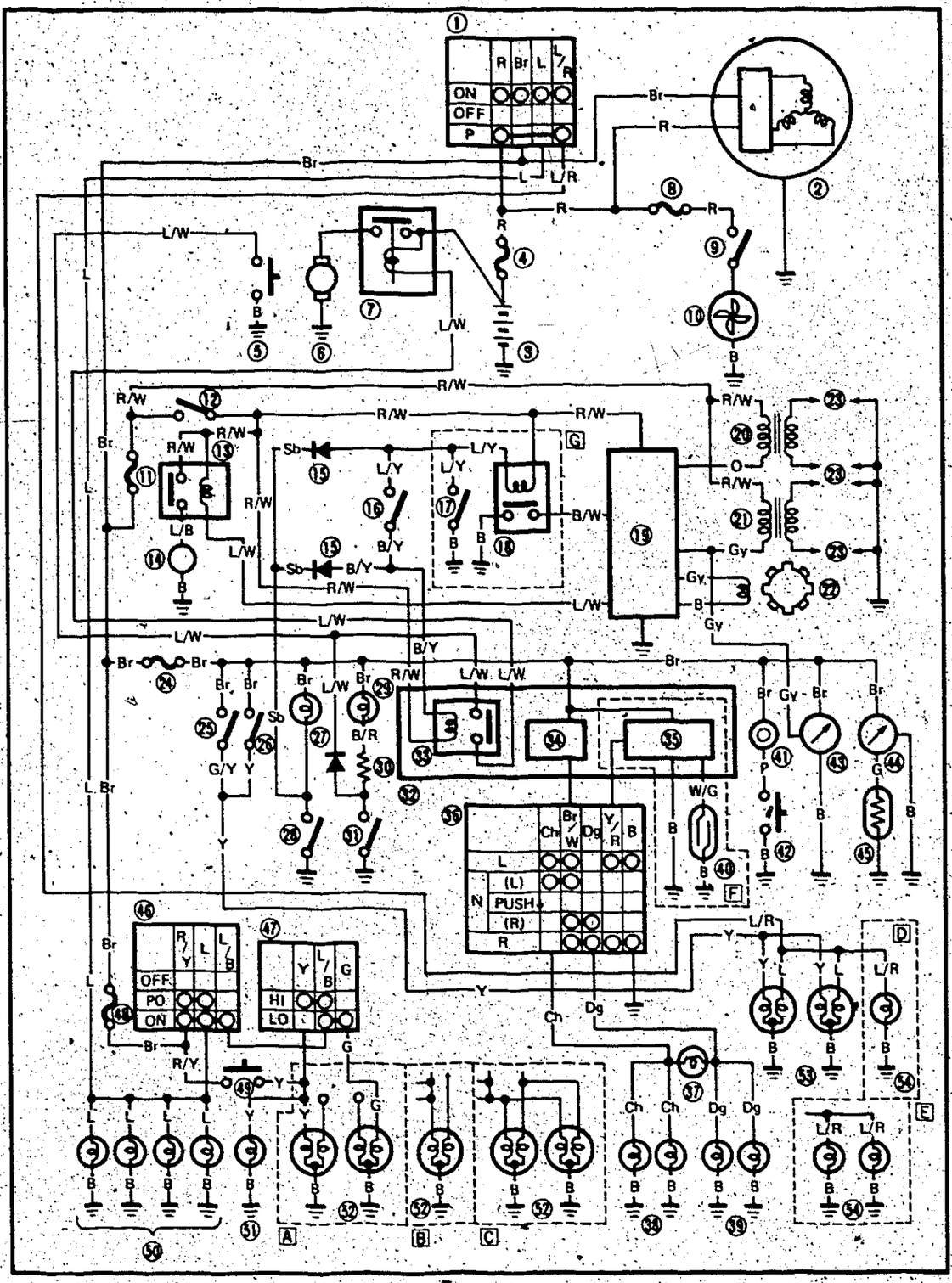


ELEC8

A-2

ELECTRICAL

FZR1000(T) CIRCUIT DIAGRAM



① Main switch
② A.C. generator
③ Battery
④ Fuse "MAIN"
⑤ "START" switch
⑥ Starter motor
⑦ Starter relay
⑧ Fuse "FAN"
⑨ Thermo switch
⑩ Fan motor
⑪ Fuse "IGNITION"
⑫ "ENGINE STOP" switch
⑬ Fuel pump relay
⑭ Fuel pump
⑮ Diode block
⑯ Clutch switch
⑰ Sidestand switch
⑱ Sidestand relay
⑲ Digital ignitor unit
⑳ Ignition coil (#1 and #4 cylinder)
㉑ Ignition coil (#2 and #3 cylinder)
㉒ Pickup coil
㉓ Spark plug
㉔ Fuse "SIGNAL"
㉕ Front brake switch
㉖ Rear brake switch
㉗ "NEUTRAL" indicator light
㉘ Neutral switch
㉙ "OIL" indicator light
㉚ Resister
㉛ Oil level switch
㉜ Relay assembly
㉝ Starting circuit cut-off relay
㉞ Flasher relay
㉟ Cancelling unit
㊱ "TURN" switch
㊲ "TURN" indicator light
㊳ Flasher light (Left)
㊴ Flasher light (Right)
㊵ Reed switch
㊶ Horn
㊷ "HORN" switch
㊸ Tachometer
㊹ Temp meter
㊺ Thermo unit
㊻ "LIGHTS" switch
㊼ "LIGHTS" (Dimmer) switch
㊽ Fuse "HEAD"
㊾ "PASS" switch
㊿ Meter light
(51) "HIGH BEAM" indicator light
(52) Headlight
(53) Tail/Brake light
(54) Auxiliary light

[A] B, D, F, S
[B] CH
[C] OTHERS
[D] A, B, D, F, NL, S, SF
[E] OTHERS
[F] Except D
[G] Except AUS, NZ, ZA

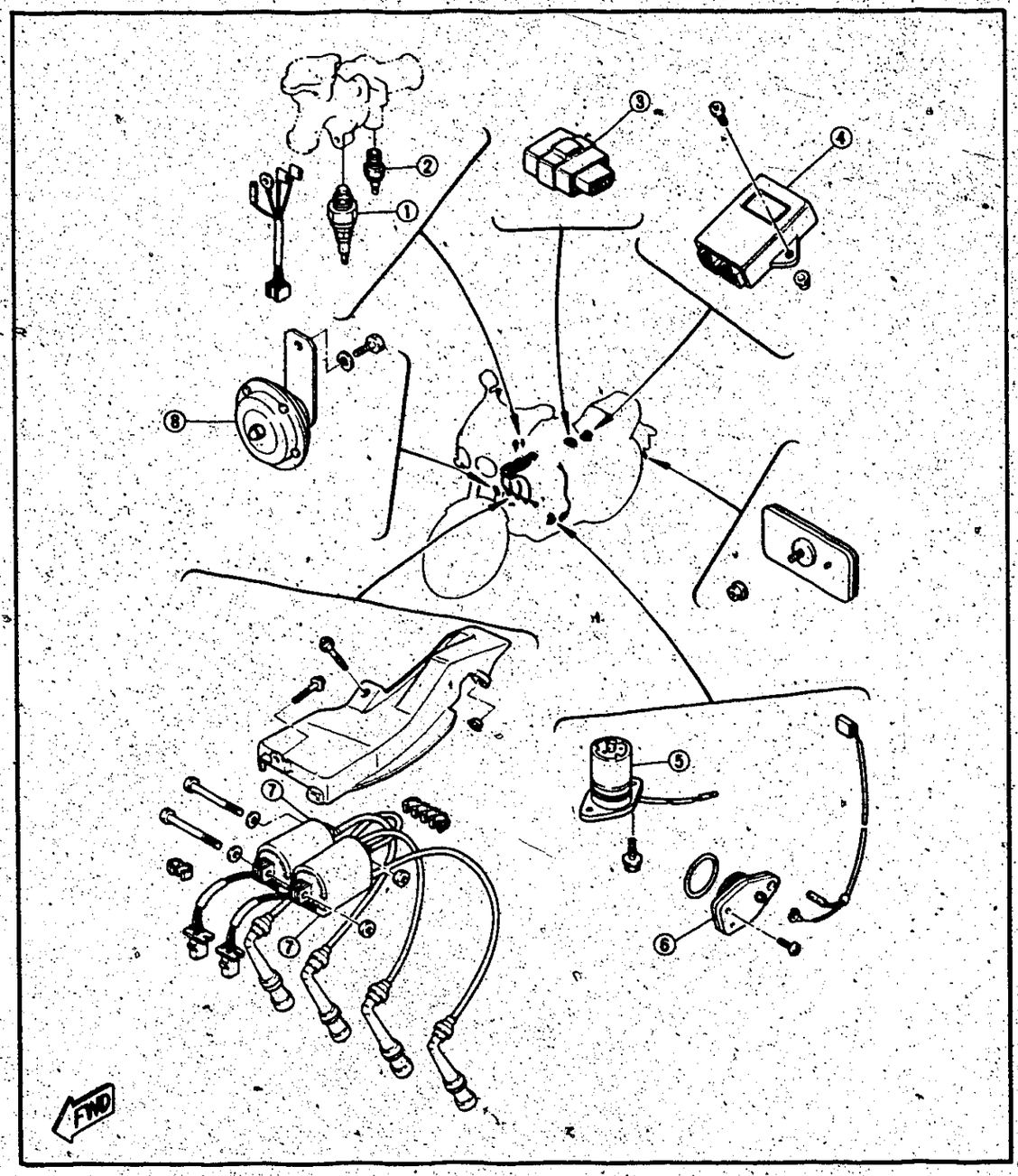
COLOR CODE

O	Orange	Y/R	Yellow/Red
R	Red	Br/W	Brown/White
L	Blue	R/W	Red/White
Br	Brown	R/Y	Red/Yellow
B	Black	B/R	Black/Red
Y	Yellow	B/W	Black/White
W	White	B/Y	Black/Yellow
G	Green	L/W	Blue/White
P	Pink	L/B	Blue/Black
Dg	Dark green	L/Y	Blue/Yellow
Ch	Chocolate	G/Y	Green/Yellow
Gy	Gray	W/R	White/Red
Sb	Sky blue	W/G	White/Green

ELECTRICAL COMPONENTS (1)

① Thermo switch
② Thermo unit
③ Relay assembly
④ Digital ignitor unit
⑤ Oil level switch
⑥ Neutral switch
⑦ Ignition coil
⑧ Horn

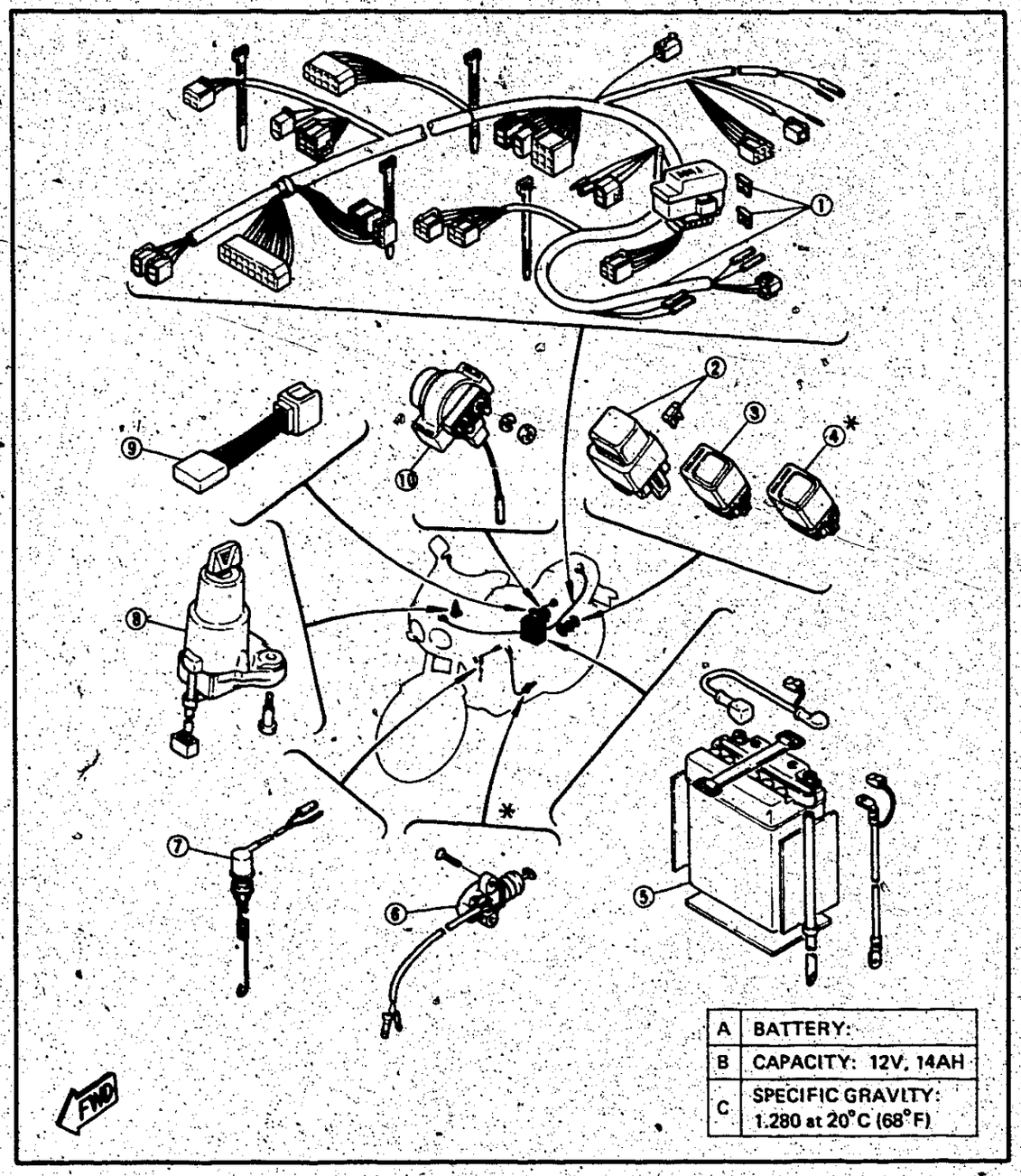
SPECIFICATIONS	RESISTANCE
IGNITION COIL:	
PRIMARY	1.8 ~ 2.2Ω
SECONDARY	9.6 ~ 14.4 kΩ
PICKUP COIL:	135 ~ 165Ω



ELECTRICAL COMPONENTS (2)

① Wire harness
② Fuse "MAIN"
③ Fuel pump relay
④ Sidestand relay*
⑤ Battery
⑥ Sidestand switch*
⑦ Rear brake switch
⑧ Main switch
⑨ Diode block
⑩ Starter relay

* Except AUS, NZ, ZA

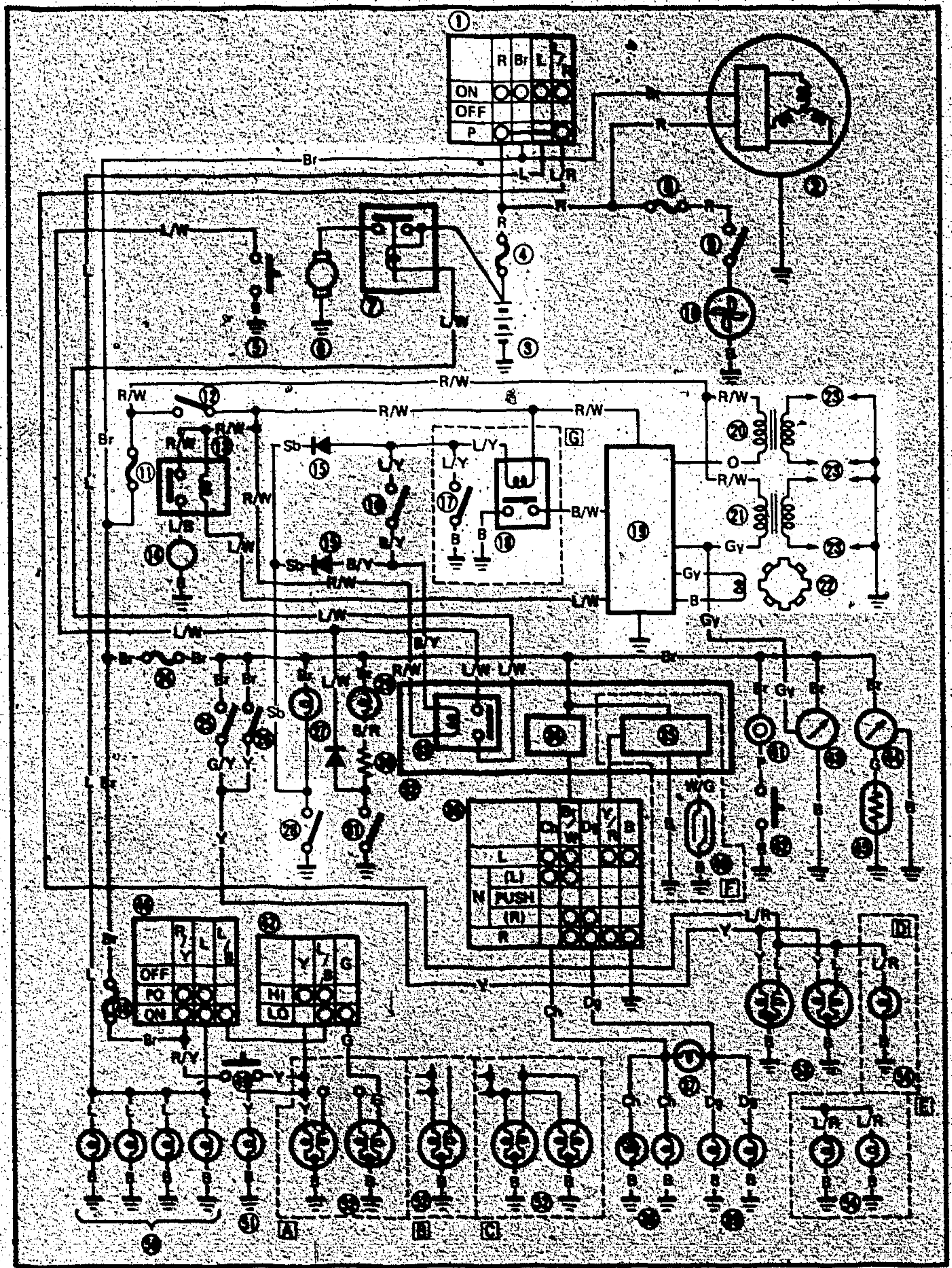


A	BATTERY:
B	CAPACITY: 12V, 14AH
C	SPECIFIC GRAVITY: 1.280 at 20°C (68°F)

A-4

IGNITION SYSTEM

CIRCUIT DIAGRAM

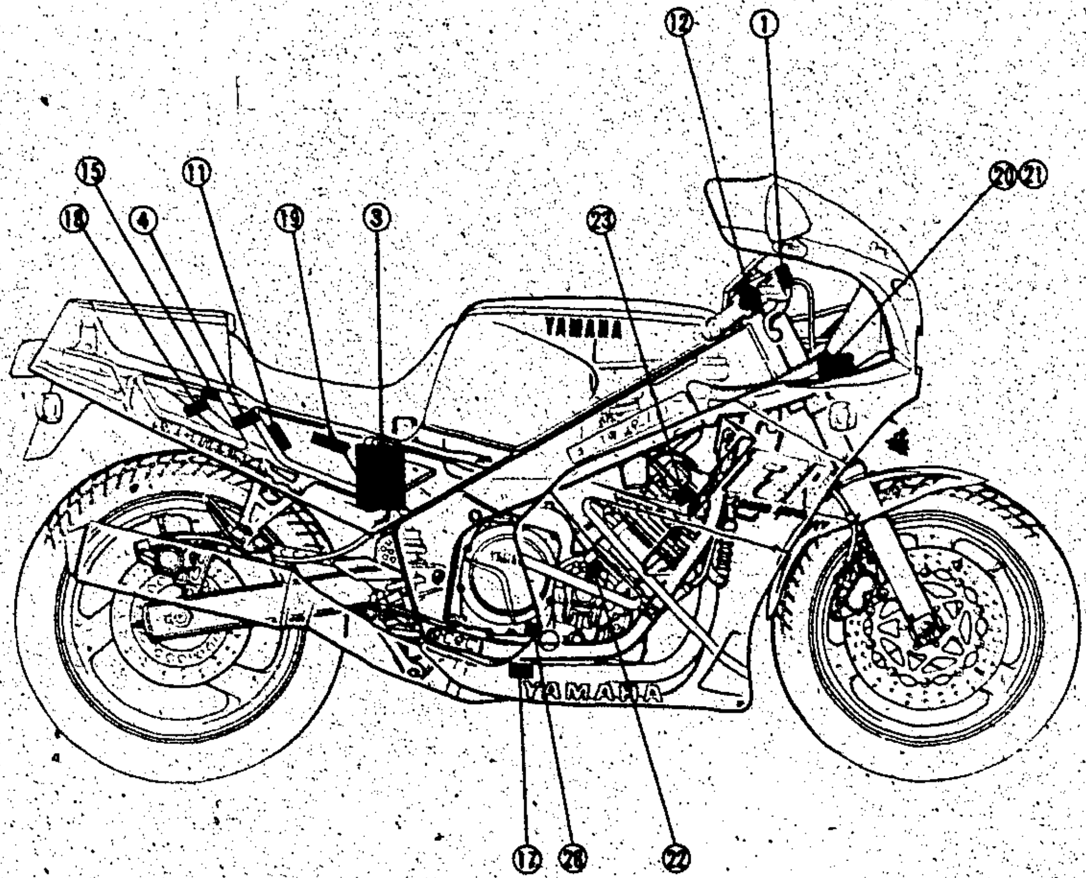


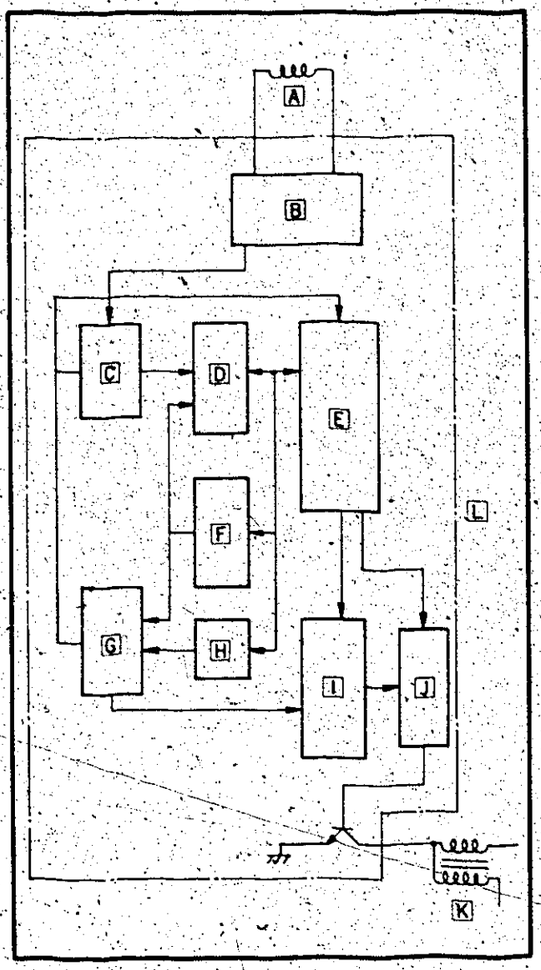
Aforementioned circuit diagram shows the ignition circuit in the wiring diagram.

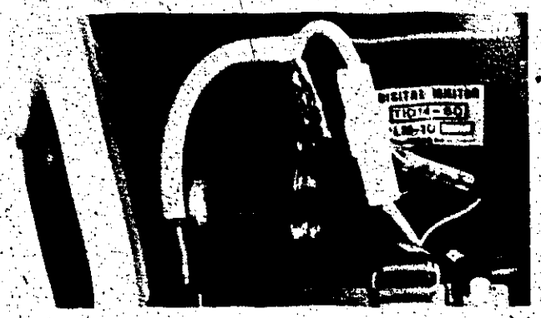
NOTE:

For the color codes, see page 8-2.

① Main switch
③ Battery
④ Fuse "MAIN"
⑪ Fuse "IGNITION"
⑫ "ENGINE STOP" switch
⑮ Diode block
⑰ Sidestand switch ✱
⑱ Sidestand switch ✱
⑲ Digital ignitor unit
⑳ Ignition coil (#1 and #4 cylinder)
㉑ Ignition coil (#2 and #3 cylinder)
㉒ Pickup coil
㉓ Spark plug
㉘ Neutral switch
✱ Except AUS, NZ, ZA









DIGITAL IGNITION CONTROL SYSTEM

DESCRIPTION

The electronic ignition that sparks the engine is computer controlled and operated by the digital microprocessor. It has a pre-programed ignition advance curve.

This programed advance curve closely matches the spark timing to the engine's ignition requirements. Only one pickup coil is needed to meet the requirements of the digital ignitor unit.

The digital ignitor also includes the control unit for the electric fuel pump.

- A Pickup coil
- B Wave-shape shaping circuit
- C Edge detection circuit
- D Latch circuit
- E Microprocessor
- F Free-running counter
- G Comparison circuit
- H Register
- I Flip-flop circuit
- J Driving circuit
- K Ignition coil
- L Digital ignitor unit

OPERATION

The following operations are digitally-performed by signal from the pickup coil signal:

1. Determing proper ignition timing.
2. Sensing the engine revolution speed.
3. Determing timing for switching on ignition coil (duty control).
4. Increasing ignition coil primary current for starting the engine.
5. Sensing engine stall.
6. Preventing over-revolution of the engine.

TROUBLESHOOTING

IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE (NO SPARK OR INTERMITTENT SPARK)

Procedure

1. Battery inspection
2. Fuse "MAIN/IGNITION" inspection
3. Spark plug inspection
4. Ignition spark test
5. Spark plug cap resistance test
6. Ignition coil resistance test
7. Main switch conduct check
8. "ENGINE STOP" switch conduct check
9. Neutral switch conduct check
10. Sidestand switch conduct check
11. Sidestand relay test
12. Pickup coil resistance test
13. Wiring connection check (Entire ignition system)

NOTE:

Remove the following before troubleshooting.

- Side cowlings (Right/Left)
- Seat
- Side cover (Left)
- Air duct (Left)
- Ignition coil cover
- Spark plugs
- Fuel tank
- Air cleaner

1. Battery inspection

- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

2. Fuse "MAIN/IGNITION" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

*

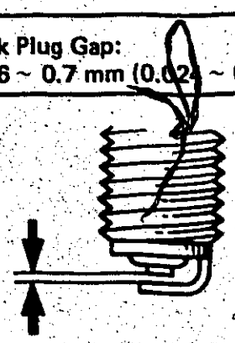
*

3. Spark plug inspection

- Check the spark plug type.
- Check the spark plug gap.
  Refer to "CHAPTER 3. SPARK PLUG INSPECTION".

Standard Spark Plug:
DR8ES-L (NGK), X24ESR-U (N.D.)

Spark Plug Gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

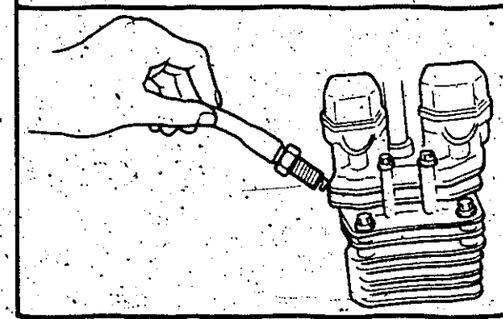


OUT OF SPECIFICATION → Regap or replace spark plugs.

OK ↓

4. Ignition spark test (With spark plug)

- Install the spark plug to the plug cap.
- Ground the spark plug to the cylinder head.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Check the ignition spark condition.



SPARK → Ignition circuit is good.

NO SPARK ↓

*

*

5. Spark plug cap resistance test

- Disconnect the spark plug caps.
- Connect the Pocket Tester "Ω x 1".

Spark Plug Cap Resistance:
7.5 ~ 12.5 kΩ at 20°C (68°F)

OUT OF SPECIFICATION → Replace spark plug caps.

OK ↓

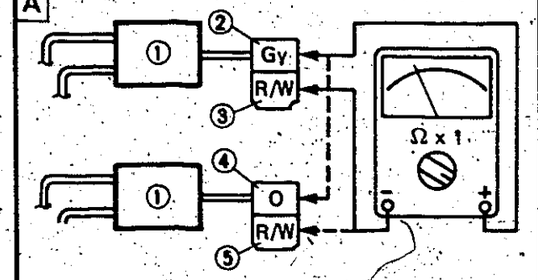
6. Ignition coil resistance test

- Disconnect the ignition coil coupler and spark plug leads.
- Connect the Pocket Tester to the ignition coils ① (Gray ②, Red/White ③, Orange ④, Red/White ⑤ and Spark plug leads ⑥).
- Measure the primary coil and secondary coil resistances.

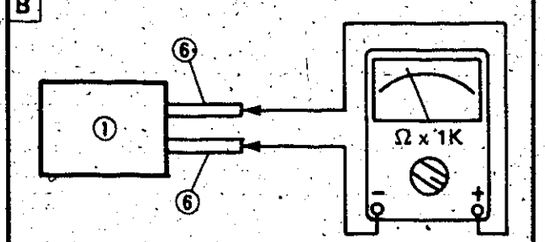
Primary Coil Resistance [A]:
1.8 ~ 2.2Ω at 20°C (68°F)
Secondary Coil Resistance [B]:
9.6 ~ 14.4 kΩ at 20°C (68°F)

OUT OF SPECIFICATION → Replace ignition coil(s).

A



B



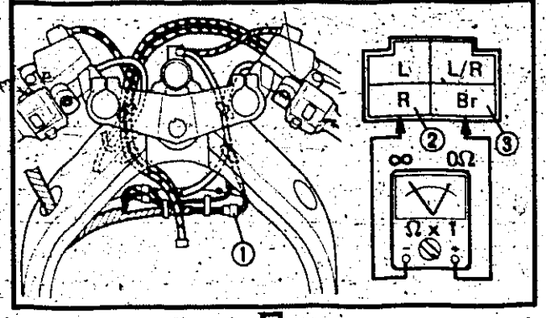
BOTH RESISTANCES MEET SPECIFICATIONS ↓

*

*

7. Main switch conduct check

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ② and Brown ③).
- Turn the main switch to "ON".
- Check the switch for continuity.

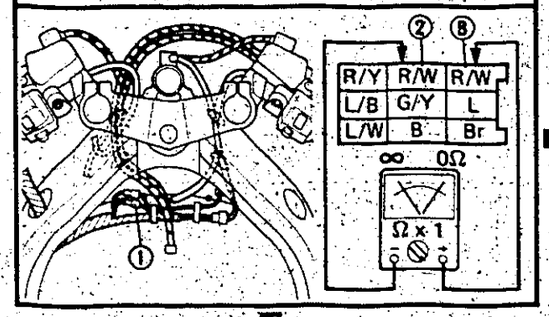


NO CONTINUITY → Replace main switch.

CONTINUITY ↓

8. "ENGINE STOP" switch conduct check

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the handlebar switch (Right) coupler terminals (Red/White ② and Red/White ③).
- Turn the "ENGINE STOP" switch to "RUN".
- Check the switch for continuity.



NO CONTINUITY → "ENGINE STOP" switch is faulty. Replace handlebar switch (Right).

CONTINUITY ↓

*

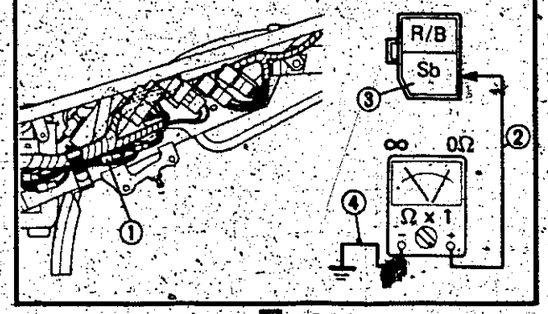
*

9. Neutral switch conduct check

- Disconnect the neutral/oil level switch coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "Ω x 1" to the coupler terminal (Sky blue ③).
- Ground the negative lead ④ of the Pocket Tester to the engine.
- Shift the gear, and check the switch for continuity.

Transmission Position	Good Condition	Bad Condition		
In neutral	O	O	X	X
In gear	X	O	X	O

O: Continuity X: No continuity



BAD CONDITION → Replace neutral switch.

GOOD CONDITION ↓

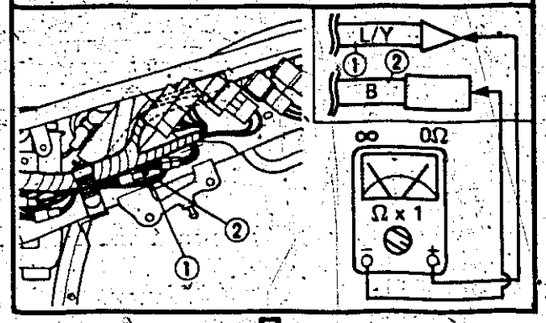
10. Sidestand switch conduct check

- Disconnect the sidestand switch leads from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the sidestand switch leas (Blue/Yellow ① and Black ②).
- Move the sidestand upon down.
- Check the sidestand switch for continuity.

NOTE:
Except AUS, NZ, ZA. Go to 12.

Sidestand Position	Good Condition	Bad Condition		
Up	O	O	X	X
Down	X	O	X	O

O: Continuity X: Nocontinuity

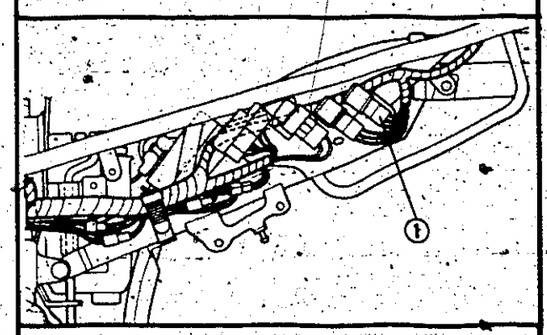


BAD CONDITION → Replace sidestand switch.

GOOD CONDITION ↓

11. Sidestand relay test

- Disconnect the sidestand relay coupler ① from the wire harness.



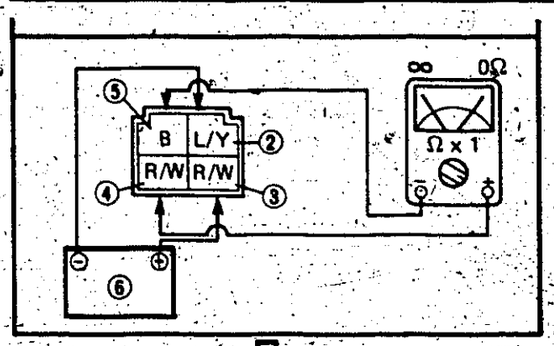
- Connect the Pocket Tester "Ω x 1" and battery (12V) ⑥ to the sidestand relay coupler terminals (Blue/Yellow ②, Red/White ③, Black/White ④ and Black ⑤).
- Check the relay for continuity.

	Good Condition	Bad Condition		
Battery Connected	X	O	X	O
Battery Disconnected	O	O	X	X

O: Continuity X: Nocontinuity

NO CONTINUITY → Replace sidestand relay.

NOTE:
Except AUS, NZ, ZA. Go to 12.

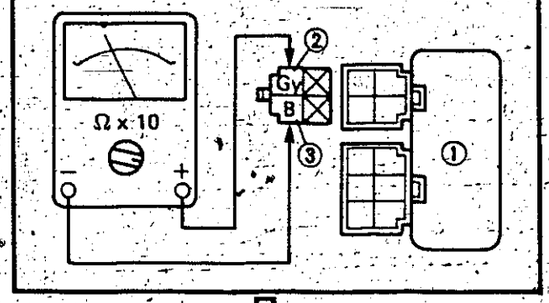


CONTINUITY ↓

12. Pickup coil resistance test

- Disconnect the pickup coil coupler (Gray, Black) from the ignitor unit ①.
- Connect the Pocket Tester "Ω x 10" to the pickup coil coupler terminals (Gray ② and Black ③).

Pickup Coil Resistance:
135 ~ 165Ω at 20°C (68°F)



OUT OF SPECIFICATION → Replace pickup coil.

RESISTANCE MEET SPECIFICATION ↓

13. Wiring connection check

- Entire ignition system
  Refer to "WIRING DIAGRAM".

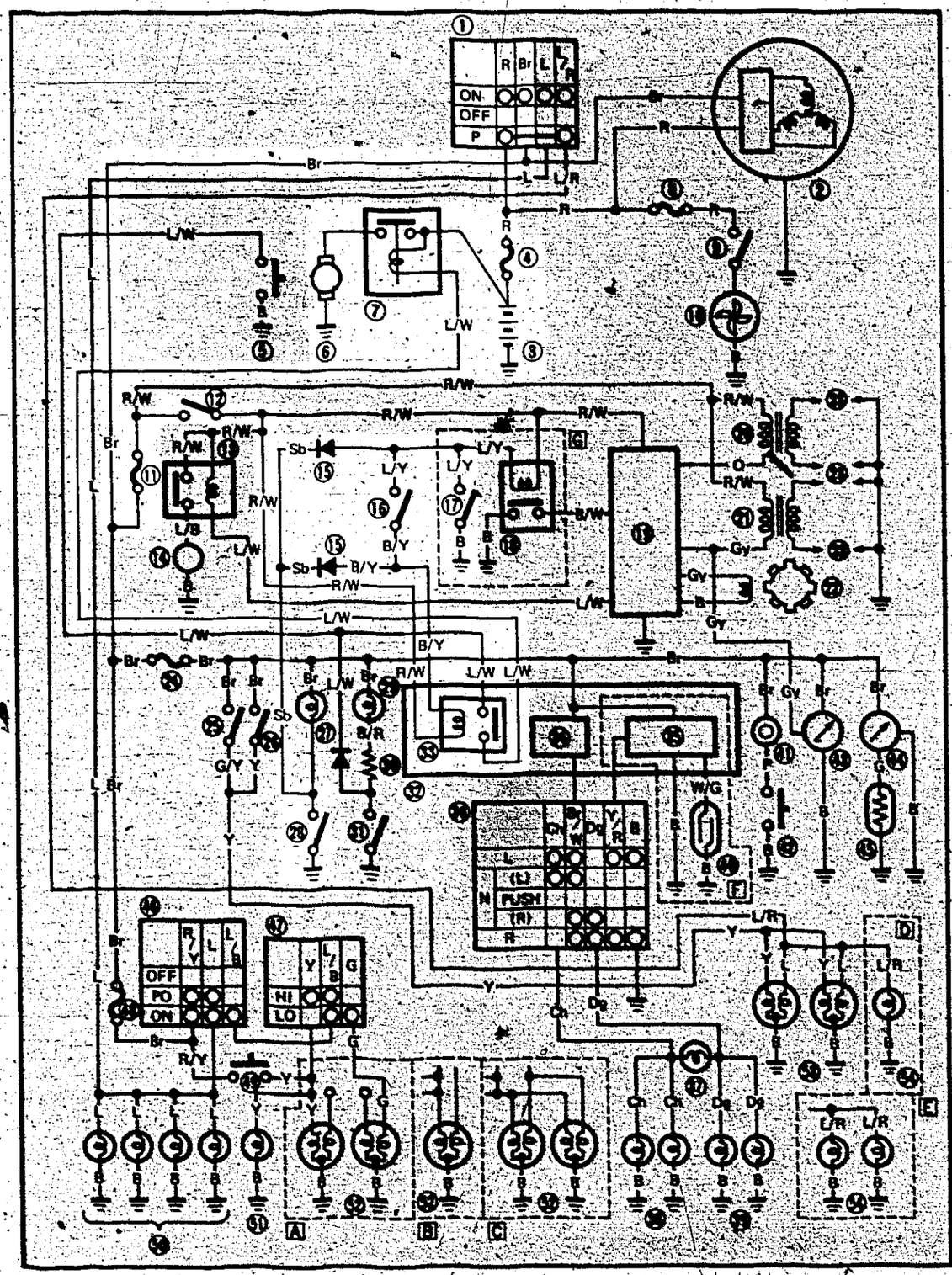
POOR CONNECTION → Correct connection(s).

OK ↓

Digital ignitor unit is faulty.
Replace the digital ignitor unit.

ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM



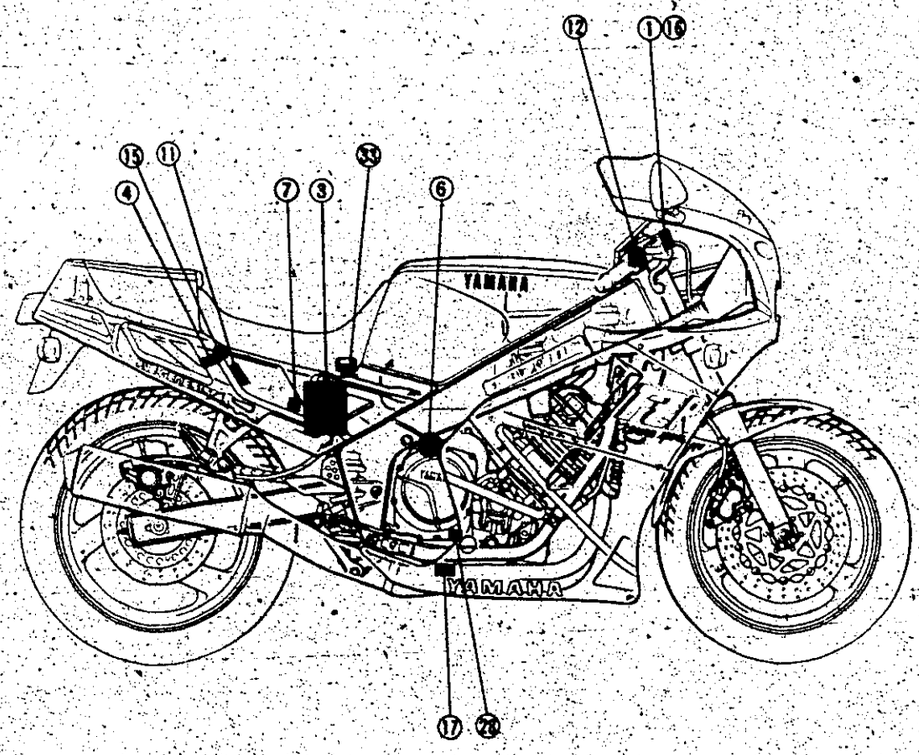
Aforementioned circuit diagram shows the electric starting circuit in the wiring diagram.

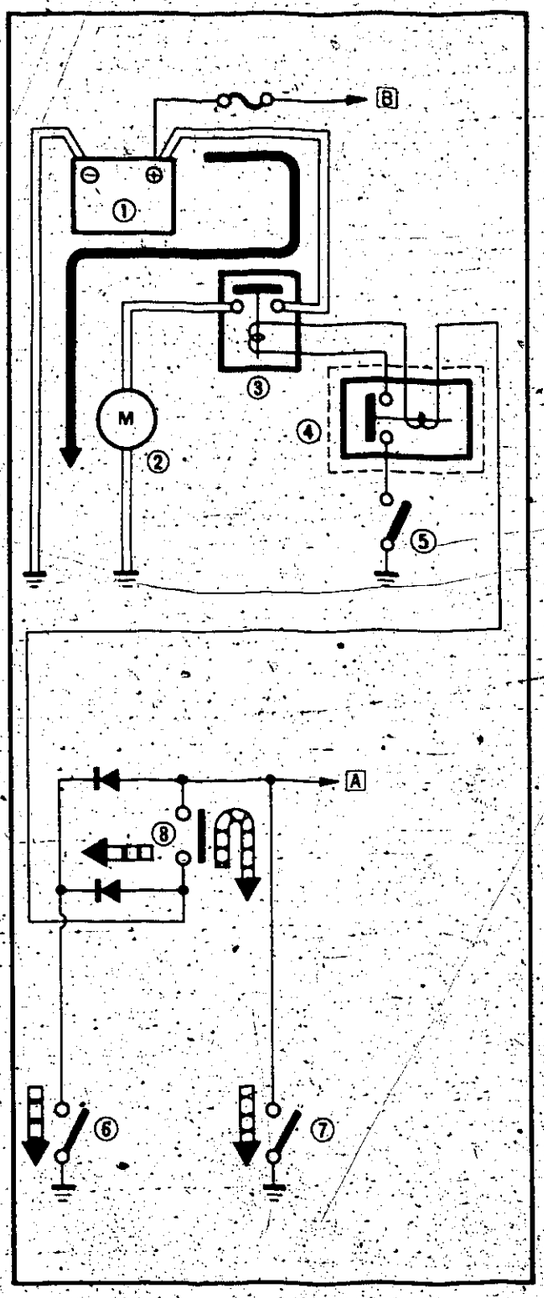
NOTE:

For the color codes, see page 8-2.

① Main switch
③ Battery
④ Fuse "MAIN"
⑥ Starter motor
⑦ Starter relay
⑪ Fuse "IGNITION"
⑫ "ENGINE STOP" switch
⑮ Diode block
⑯ Clutch switch
⑰ Sidestand switch*
㉘ Neutral switch
㊳ Starting circuit cut-off relay (Relay assembly ㉜)

*Except AUS, NZ, ZA





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 Starter motor
③ Starter relay
④ Starting circuit cut-off relay
⑤ Engine stop switch
⑥ Neutral switch
⑦ Sidestand switch
⑧ Clutch switch

A To sidestand relay
B To main switch

TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.

Procedure

1. Battery inspection
2. Fuse "MAIN/IGNITION" inspection
3. Starter motor test
4. Starting circuit cut-off relay (Relay assembly) test
5. Main switch conduct check
6. "ENGINE STOP" switch conduct check
7. Neutral switch conduct check
8. Sidestand switch conduct check
9. Clutch switch conduct check
10. Wiring connection check (Entire electric starting system)

NOTE:

Remove the following before troubleshooting.

- Side cowling (Left)
- Seat
- Side cover (Left)
- Fuel tank
- Air cleaner

1. Battery inspection

- Check the battery condition Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity: 1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

2. Fuse "MAIN/IGNITION" inspection

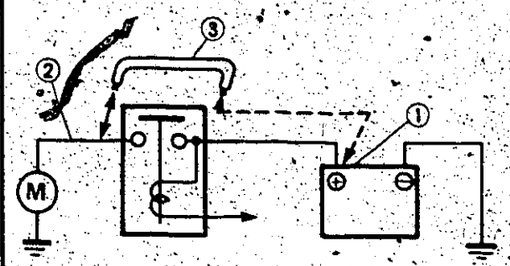
- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

3. Starter motor test

- Connect the battery positive terminal ① and starter motor cable ② using the jumper lead ③.
- Check the starter motor operation.



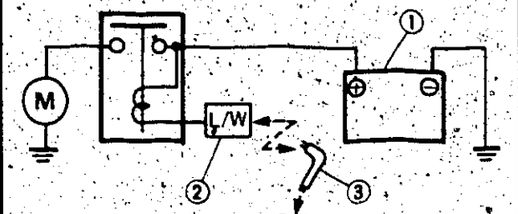
- If the starter motor is operated, go to the next steps. If not, repair and/or replace the starter motor.
- Disconnect the starter relay lead (Blue/White).

*

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.**

- Ground the starter relay coupler (Blue/White) ② to the frame using the jumper lead ③.
- Check the starter motor operation.

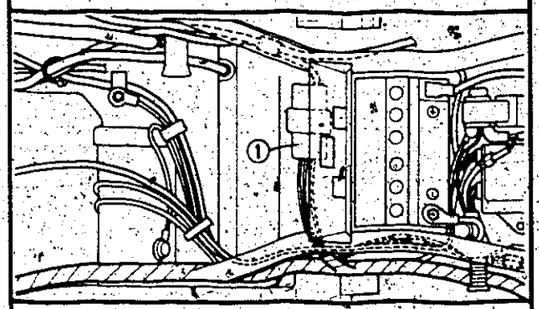


FAULTY → Repair or replace starter motor.

OK ↓

4. Starting circuit cut-off relay test

- Disconnect the relay assembly coupler ① from the wire harness.

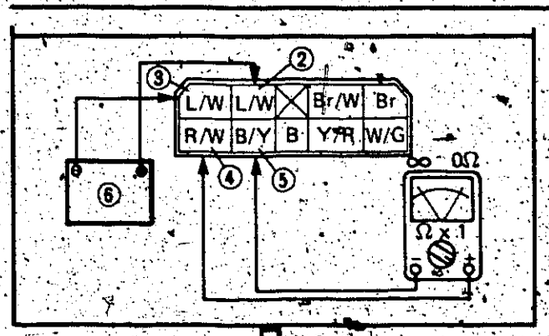


- Connect the Pocket Tester and battery (12V) ⑥ to the relay coupler terminals (Blue/White ②, Blue/White ③, Red/White ④ and Blue/Yellow ⑤).
- Check the relay for continuity.

	Bood Condition	Bad Condition		
Battery Connected	O	O	X	X
Battery Disconnected	X	O	X	O

O: Continuity X: No continuity

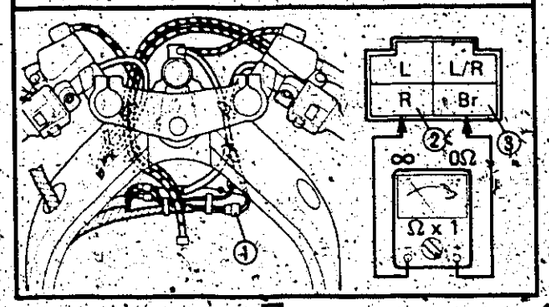
FAULTY → Replace relay assembly.



OK ↓

5. Main switch conduct check

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch leads (Red ② and Brown ③).
- Turn the main switch to "ON" position.
- Check the switch for continuity.

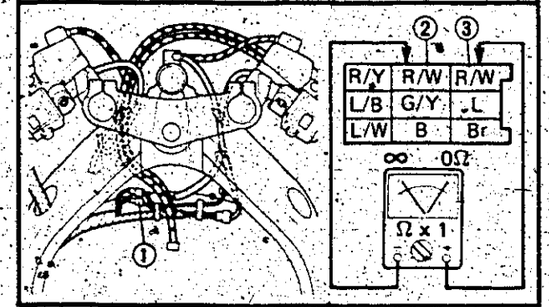


NO CONTINUITY → Replace main switch.

CONTINUITY ↓

6. "ENGINE STOP" switch conduct check

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the handlebar switch leads (Red/White ② Red/White ③).
- Turn the "ENGINE STOP" switch to "RUN" position.
- Check the switch for continuity.



NO CONTINUITY → Replace handlebar switch (Right).

CONTINUITY ↓

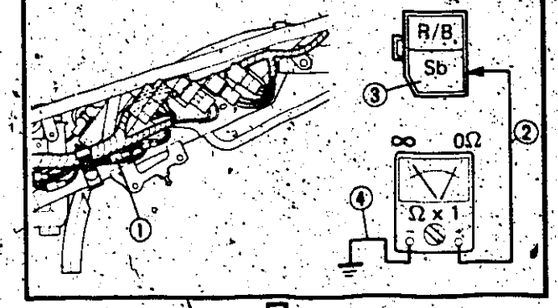
*

*

7. Neutral switch conduct check
- Disconnect the neutral/oil level switch coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester to the neutral switch coupler terminal (Sky blue ③).
- Ground the negative lead ④ of the Pocket Tester to the engine.
- Shift the gear, and check the switch for continuity.

Transmission Position	Good Condition	Bad Condition		
In neutral	O	O	X	X
In gear	X	O	X	O

O: Continuity X: No continuity



BAD CONDITION → Replace neutral switch.

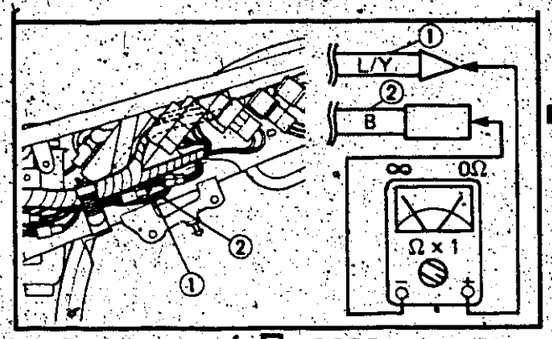
GOOD CONDITION

8. Sidestand switch conduct check
- Disconnect the sidestand switch leads from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the sidestand switch leads (Blue/Yellow ① and Blue ②).
- Move the sidestand up or down.
- Check the sidestand switch for continuity.

Sidestand Position	Good Condition	Bad Condition		
Up	O	O	X	X
Down	X	O	X	O

O: Continuity X: No continuity

NOTE:
Except AUS, NZ, ZA. Go to 9.



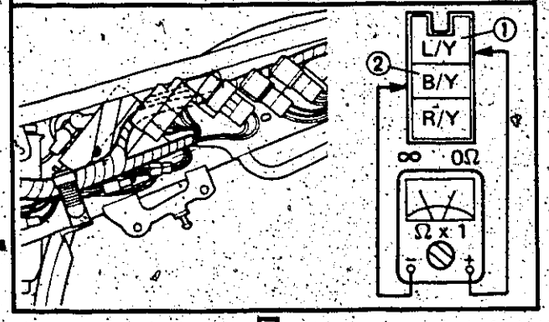
BAD CONDITION → Replace sidestand switch.

GOOD CONDITION

9. Clutch switch conduct check
- Disconnect the clutch switch coupler from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the clutch switch coupler terminals (Blue/Yellow ① and Black/Yellow ②).
- Grab or release the clutch lever.
- Check the clutch switch for continuity.

Clutch Lever Position	Good Condition	Bad Condition		
Grab	O	O	X	X
Release	X	O	X	O

O: Continuity X: No continuity



BAD CONDITION → Replace clutch switch.

GOOD CONDITION

10. Wiring connection check
- Entire electric starting system
  Refer to "WIRING DIAGRAM".

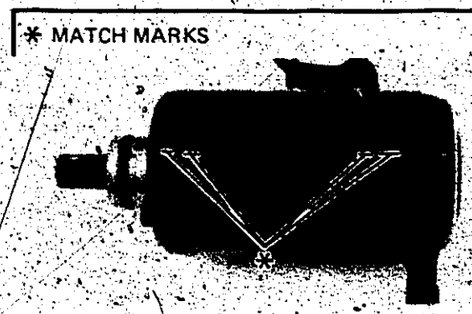
POOR CONNECTION → Correct connection(s).

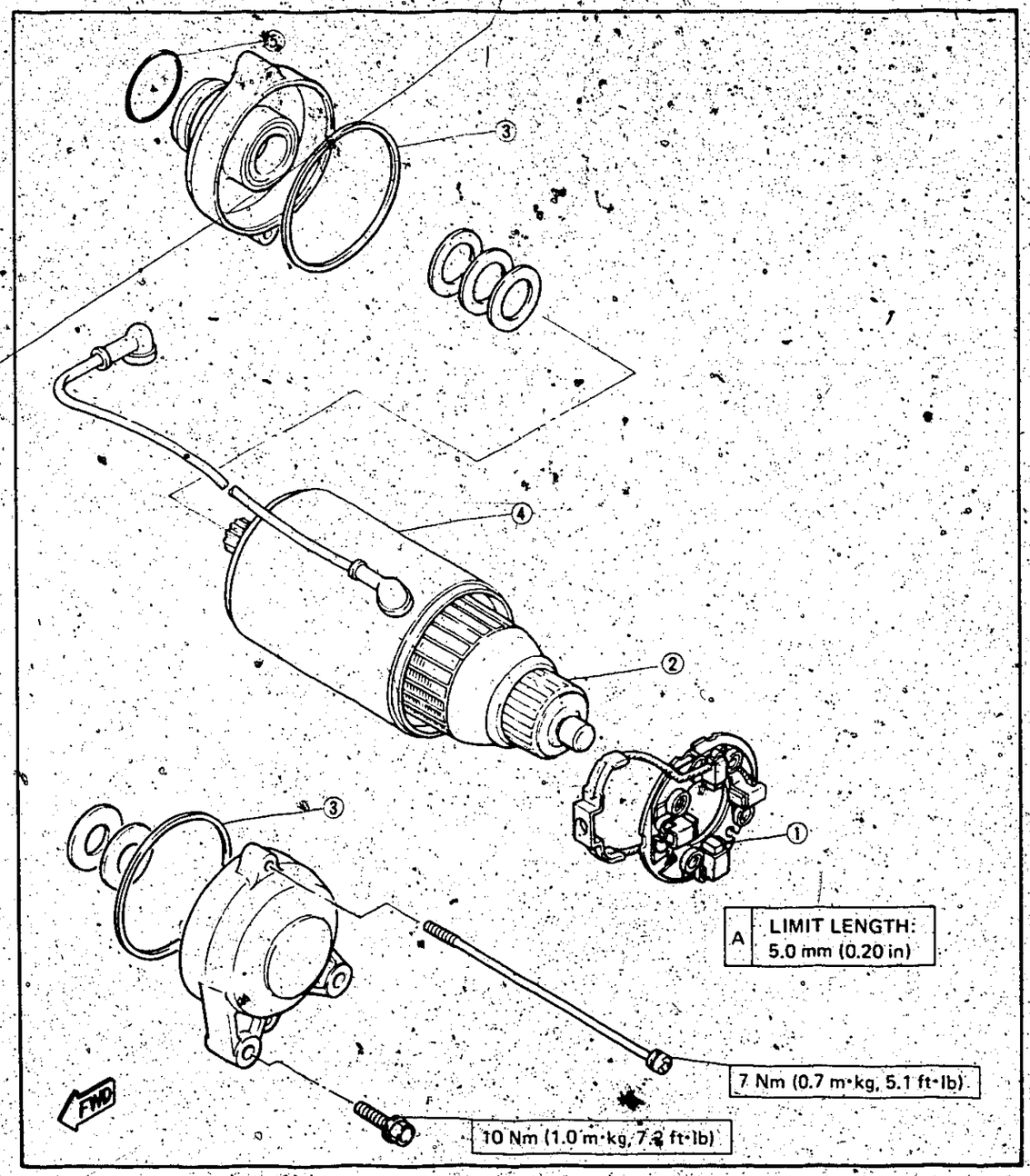
OK

Diode block is faulty.
Replace the diode block.

STARTER MOTOR

① Brush
② Armature
③ Gasket
④ Stator
⑤ O-ring

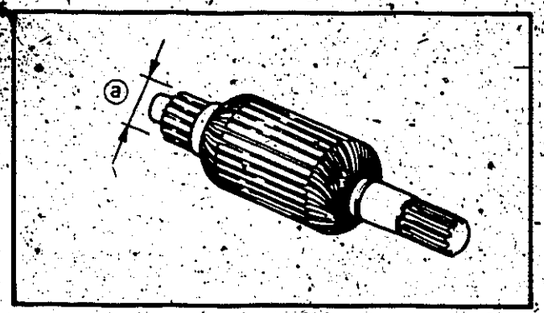


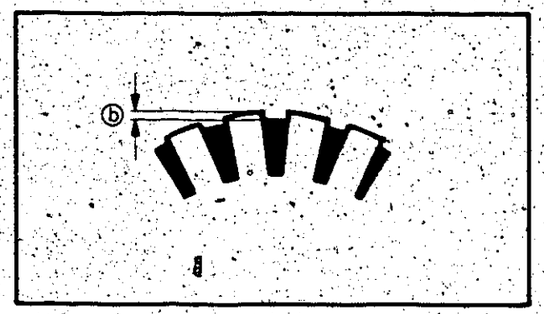


Removal

1. Remove:
   - Starter motor

   Refer to "CHAPTER 4. ENGINE OVERHAUL – ENGINE REMOVAL" section.





Inspection and Repair

1. Inspect:
   - Commutator

   Dirty → Clean it with #600 grit sandpaper.
2. Measure:
   - Commutator diameter ⓐ

   Out of specification → Replace starter motor.

Commutator Wear Limit ⓐ : 27 mm (1.06 in)

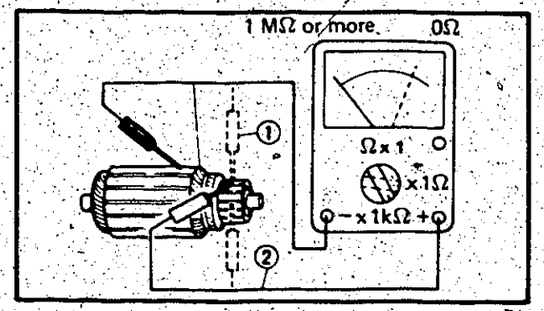
3. Measure:
   - Mica undercut ⓑ

   Out of specification → Scrape the mica to proper value use a hacksaw blade can be ground to fit.

Mica Undercut ⓑ : 0.8 mm (0.03 in)

NOTE:

The mica insulation of the commutator must be undercut to ensure proper operation of commutator.



4. Inspect:
   - Armature coil (insulation/continuity)

   Defects(s) → Replace starter motor.

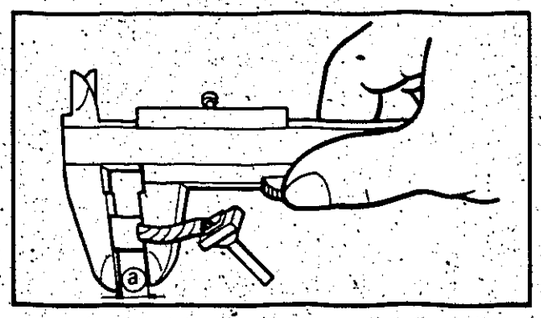
Armature coil inspecting steps:

- Connect the Pocket Tester for continuity check ① and insulation check ②.
- Measure the armautre resistances.

Armature Coil Resistance:
Continuity Check ① :
0Ω at 20°C (68°F)
Insulation Check ② :
More than 1MΩ at 20°C (68°F)

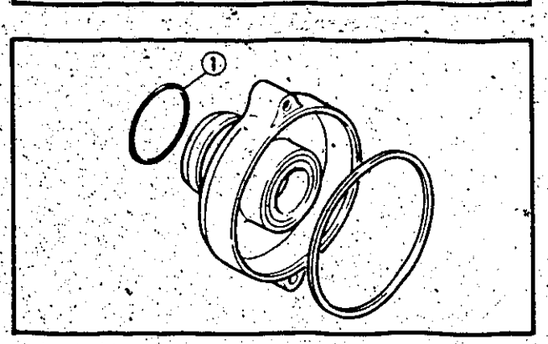
- If the resistance is incorrect, replace the starter motor.

5. Measure:
   - Brush length ⓐ
   Out of specification → Replace.



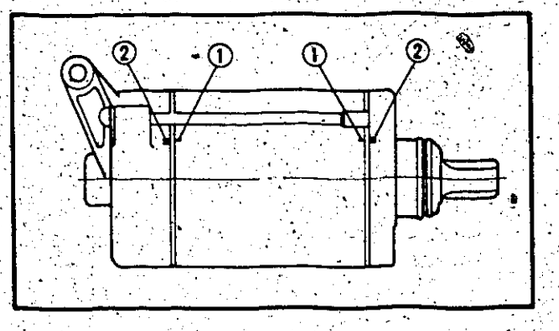
Brush Length Limit:
5.0 mm (0.20 in)

6. Measure:
   - Brush spring pressure
   Fatigue/Out of specification → Replace as a set.



Brush Spring Pressure:
680 ~ 920 g (24.0 ~ 32.4 oz)

7. Inspect:
   - Bearing
   - Oil seal
   - O-rings ①
   Wear/Damage → Replace.



Installation

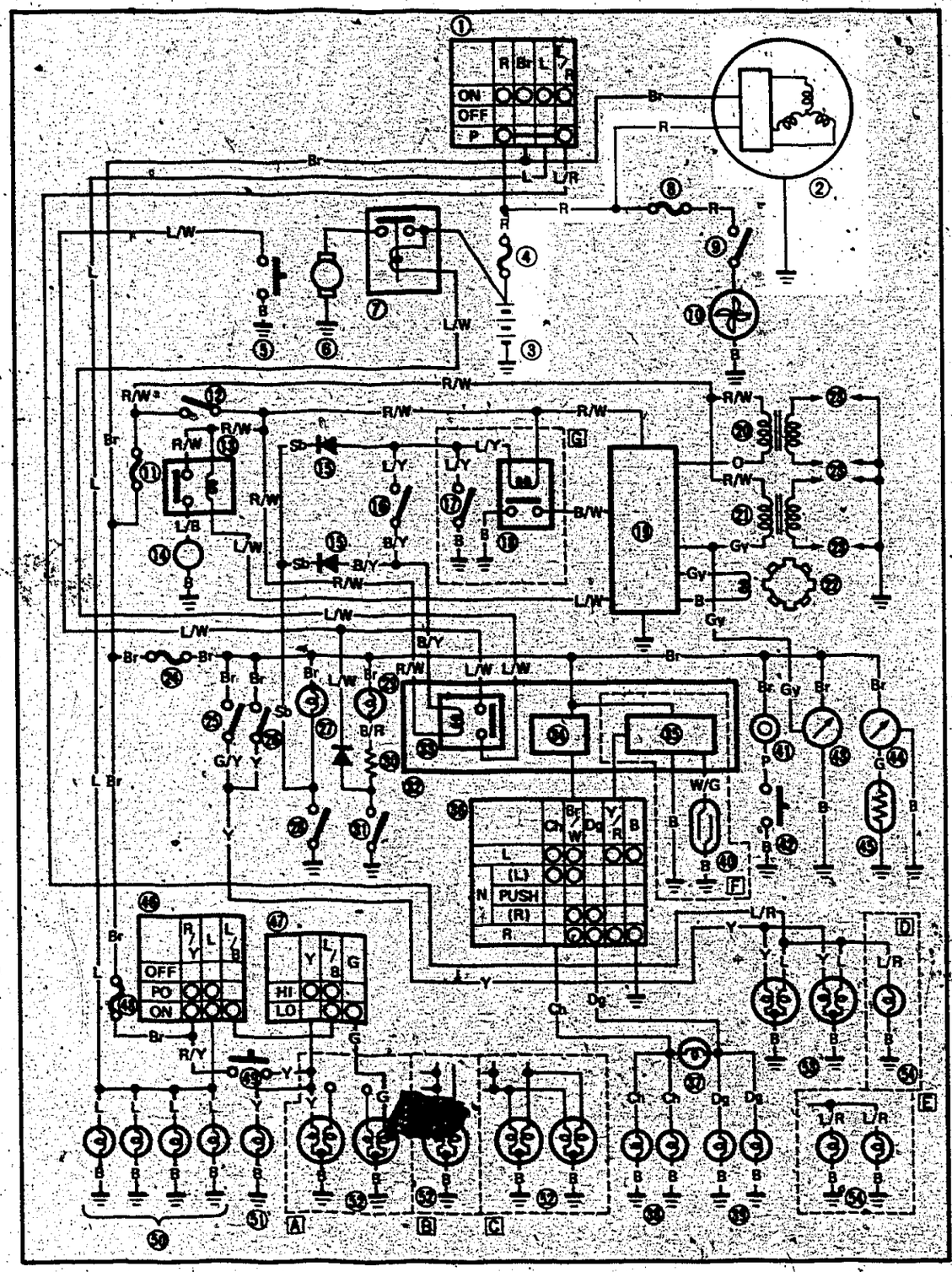
1. Install:
   - Starter motor

NOTE:
Align the match marks ① on the bracket with the match marks ② on the housing.



CHARGING SYSTEM

CIRCUIT DIAGRAM

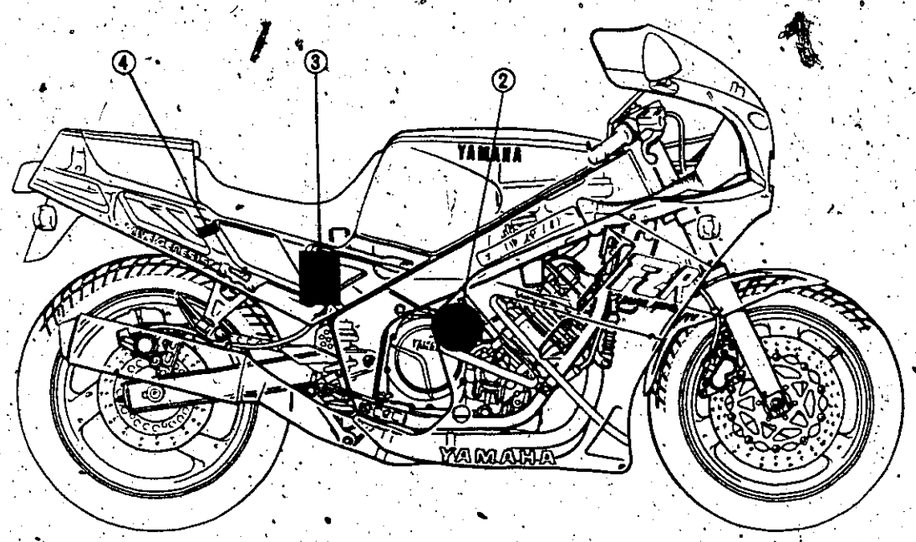


Aforementioned circuit diagram show the charging circuit in the wiring diagram.

NOTE:

For the color codes, see page 8-2.

② A.C. generator
③ Battery
④ Fuse "MAIN"



TROUBLESHOOTING

BATTERY IS NOT CHARGED.

Procedure

1. Fuse "MAIN" inspection
2. Battery inspection
3. Charging voltage test
4. Charging coil resistance test
5. Brush inspection
6. Field coil (Rotor) resistance test
7. Wiring connection check (Entire charging system)

NOTE:

Remove the following before troubleshooting.
- Side cowling (Left)
- Seat
- Side cover (Left)

1. Fuse "MAIN" inspection
- Connect the Pocket Tester "Ω × 1" to the fuse.
- Check the fuse for continuity.

NO CONTINUITY → Replace fuse.

CONTINUITY ↓

2. Battery inspection
- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity: 1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

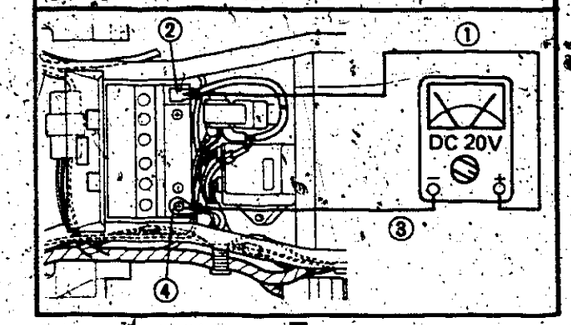
3. Charging voltage test
- Connect the Pocket Tester "DC20V" to the battery.
- Start the engine and accelerate to about 5,000 r/min.
- Measure the charging voltage.

Charging Voltage: 14 ~ 15V at 5,000 r/min

CAUTION:

Never disconnect the battery cables while the A.C. generator is operating or the rectifier/regulator will be damaged.

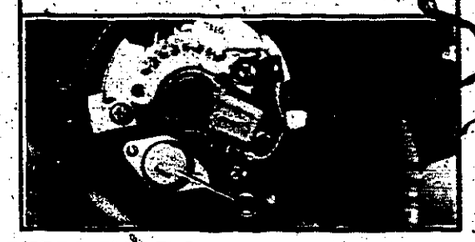
① Positive lead (Pocket Tester)
② Positive terminal (Battery)
③ Negative lead (Pocket Tester)
④ Negative terminal (Battery)



CHARGING VOLTAGE MEETS SPECIFICATION → Replace battery.

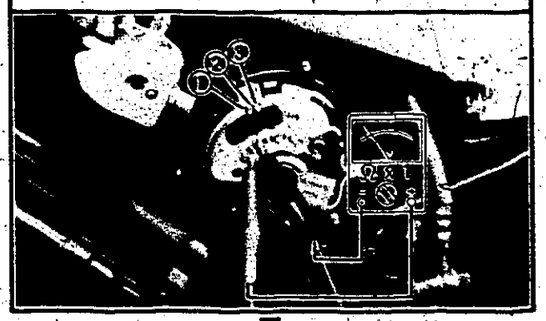
LESS THAN 13V ↓

MORE THAN 15V → Replace rectifier with regulator ①



4. Stator coil resistance test
- Remove the generator cover.
- Connect the Pocket Tester "Ω × 1" to the stator coils.
- Measure the stator coil resistances.

Stator Coil Resistance: (White ① — White ②, White ④ — White ③, White ② — White ③) 0.16 ~ 0.18Ω at 20°C (68°F)

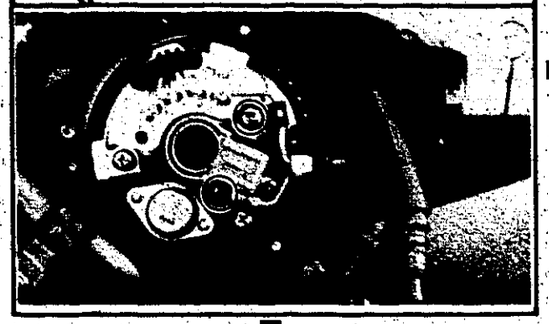


OUT OF SPECIFICATION → Replace stator assembly.

*

5. Brush inspection
- Remove the brush holder.
- Inspect the brush spring.
- Measure the brush length.

Minimum Brush Length:
5 mm (0.2 in)



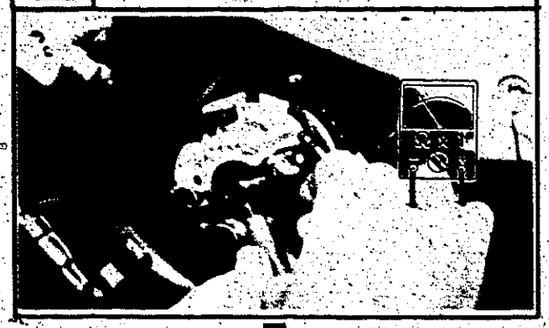
WEAR/DAMAGE
OUT OF SPECIFICATION

Replace brush and/or spring.

OK

6. Field coil (Rotor) resistance test
- Connect the Pocket Tester "Ω x 1" to the rotor.
- Measure the resistance.

Field Coil (Rotor) Resistance:
3.8 ~ 4.2Ω at 20°C (68°F)



OUT OF SPECIFICATION

Replace field coil (Rotor).

RESISTANCE
MEETS SPECIFICATION

*

*

7. Wiring connection check
- Entire the charging system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

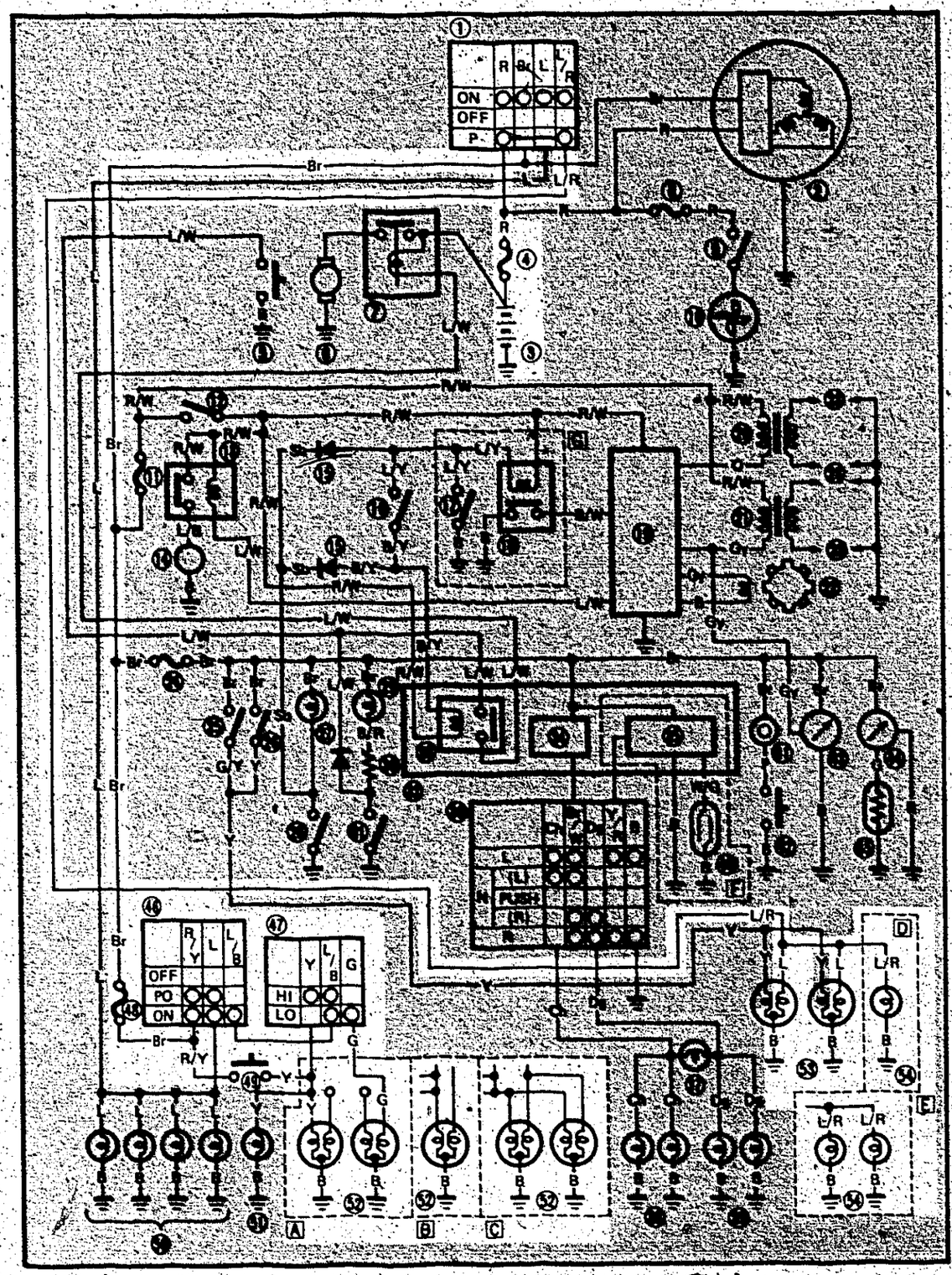
Correct connection(s).

OK

Rectifier/Regulator is faulty.
Replace the rectifier/regulator.

LIGHTING SYSTEM

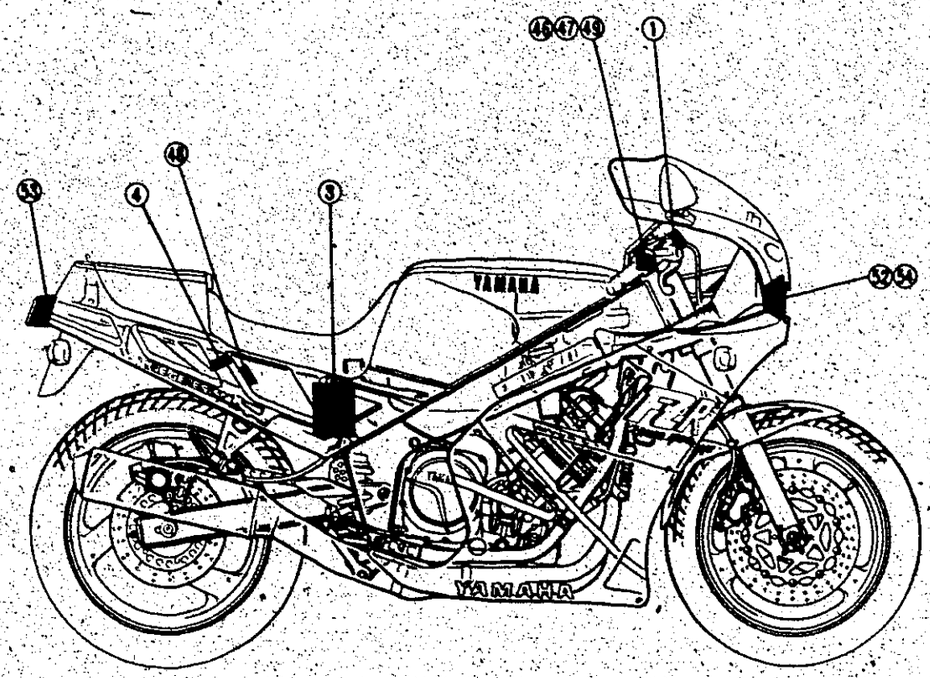
CIRCUIT DIAGRAM



Aforementioned circuit diagram shows the lighting circuit in the wiring diagram.

NOTE:
For the color codes, see page 8-2.

① Main switch
③ Battery
④ Fuse "MAIN"
㊻ "LIGHTS" switch
㊼ "LIGHTS" (Dimmer) switch
㊽ Fuse "HEAD"
㊾ "PASS" switch
㉜ Headlight
㉝ Tail light
㉞ Auxiliary light



TROUBLESHOOTING

HEADLIGHT DOES NOT COME ON.

Procedure

1. Headlight bulb conduct check
2. Headlight bulb socket conduct check
3. Battery inspection
4. Fuse "MAIN/HEAD" inspection
5. Lighting voltage test
6. "LIGHTS" (Dimmer) switch conduct check
7. "LIGHTS" switch conduct check
8. Main switch conduct check
9. Wiring connection check (Entire lighting system)

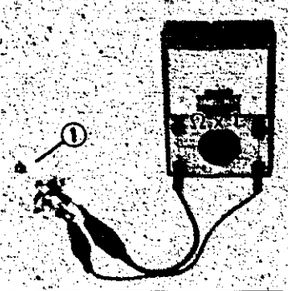
NOTE:

Remove the following before troubleshooting.

- Seat
- Air duct (Left)
- Fuel tank
- Air cleaner

1. Headlight bulb conduct check

- Remove the headlight bulb(s) ①. Refer to "CHAPTER 3. HEADLIGHT BULB REPLACEMENT".
- Connect the Pocket Tester "Ω x 1" to the bulb terminals.
- Check the bulb for continuity.



NO CONTINUITY

Replace headlight bulb(s).

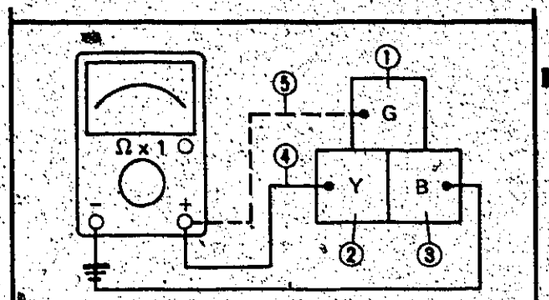
CONTINUITY

2. Headlight bulb socket conduct check

- Install the bulb to the bulb socket.
- Connect the Pocket Tester "Ω x 1" to the socket coupler terminals (Green ①, Yellow ② and Black ③).
- Check the bulb socket for continuity.

NOTE:

Five types of headlight bulb sockets are prepared to meet the regulations in the respective markets.
Refer to "WIRING DIAGRAM" ⑨ Headlight (Left) and ⑲ Headlight (Right).



③ "LO" Low beam
④ "HI" High beam

NO CONTINUITY

Repair or replace the headlight bulb socket(s).

CONTINUITY

3. Battery inspection

- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity: 1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK

4. Fuse "MAIN/HEAD" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY

Replace fuse(s).

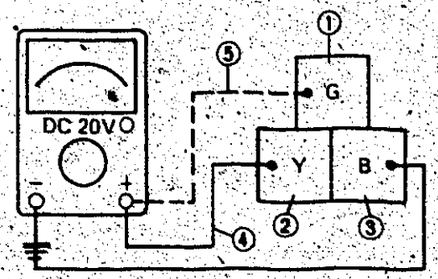
CONTINUITY

5. Lighting voltage test

- Connect the Pocket Tester "DC20V" to the headlight bulb socket terminals (Green ①, Yellow ② and Black ③).
- Turn the "LIGHTS" switch to "ON" position.
- Turn the "LIGHTS" (Dimmer) switch to "LO" and "HI" position.
- Start the engine and accelerate to about 5,000 r/min.
- Measure the lighting voltage.

Tester (+) lead →
Green ① "LO" or Yellow ② "HI"
Tester (–) lead → Black ③

Lighting voltage:
14 ~ 15V at 5,000 r/min



④ "HI" position (High beam)
⑤ "LO" position (Low beam)

LIGHTING VOLTAGE MEETS SPECIFICATION

Lighting system (Headlight) is good.

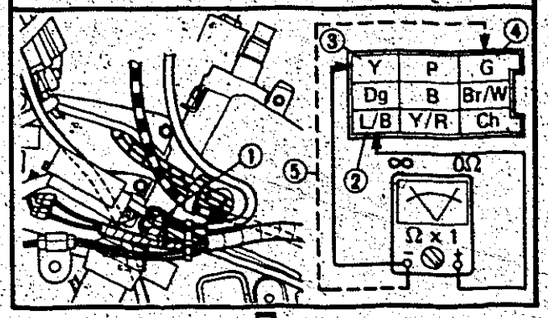
OUT OF SPECIFICATION

6. "LIGHTS" (Dimmer) switch conduct check

- Disconnect the handlebar switch (Left) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the coupler terminals (Blue/Black ②, Yellow ③ and Green ④).
- Turn the switch to "LO" and "HI" position.
- Check the switch for continuity.

Switch Position	Good Condition	Bad Condition		
"HI" ④	○	○	X	X
"LO" ⑤	○	X	X	○

○: Continuity X: No continuity



BAD CONDITION

"LIGHT" (Dimmer switch is faulty. Replace handle switch (Left).

GOOD CONDITION

*

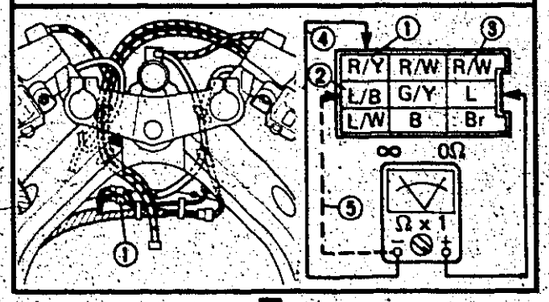
*

7. "LIGHTS" switch conduct check

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the coupler terminals (Red/Yellow ①, Blue/Black ② and Blue ③).
- Turn the "LIGHTS" (Dimmer) switch to "PO" and "ON" position.

Switch Position	Good Condition	Bad Condition		
PO ④	○	○	X	X
ON ⑤	○	X	X	○

○: Continuity X: No continuity



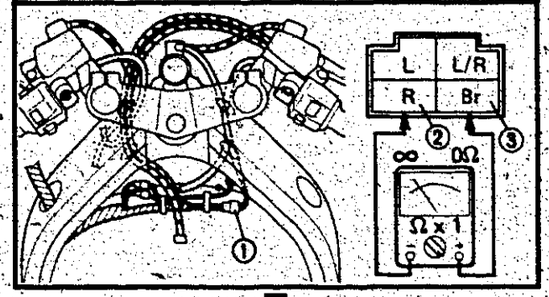
NO CONTINUITY

"LIGHTS" (Dimmer) switch is faulty. Replace handle switch (Right).

CONTINUITY

8. Main switch conduct test

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ②, Brown ③).
- Turn the main switch to "ON" position.
- Check the switch for continuity.



NO CONTINUITY

Replace main switch.

CONTINUITY

*

*

9. Wiring connection check
- Entire lighting system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION → Correct connection(s).

Check the charging system.

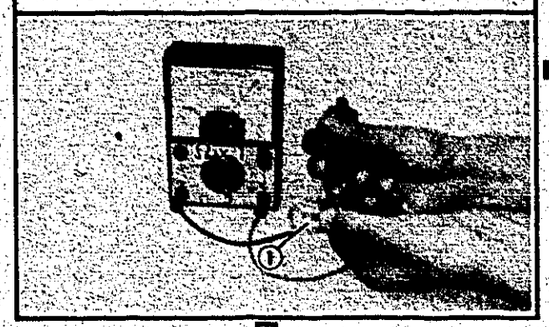


TAILLIGHT AND/OR AUXILIARY LIGHT DO NOT COME ON.

Procedure
1. Taillight bulb conduct check
2. Taillight bulb socket conduct check
3. Battery inspection
4. Fuse "MAIN" inspection
5. Lighting voltage test
6. Main switch conduct check
7. Wiring connection check
   (Entire lighting system)

NOTE:
Remove the following before troubleshooting.
1. Seat
2. Tool kit

1. Taillight bulb conduct check
- Remove the tail/brake light bulb(s) ①.
- Connect the Pocket Tester "Ω x 1" to to the bulb terminals.
- Check the bulb(s) for continuity.

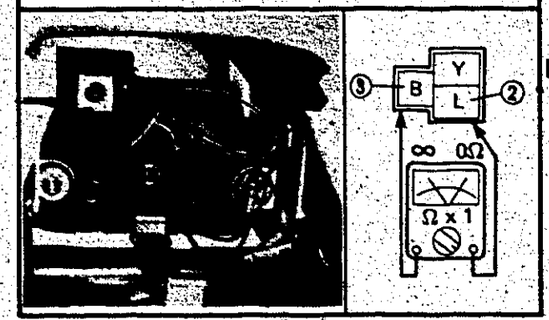


NO CONTINUITY → Replace bulb(s).

NOTE:
The following are the taillight troubleshooting steps, which can also be used for troubleshooting the auxiliary light(s).

CONTINUITY ↓

2. Taillight bulb socket conduct check
- Install the bulb to the bulb socket.
- Disconnect the tail/brake light coupler ①.
- Connect the Pocket Tester "Ω x 1" to the coupler terminals (Blue ② and Black ③).
- Check the bulb socket for continuity.



NO CONTINUITY → Replace bulb socket.

CONTINUITY ↓

*

*

3. Battery inspection

- Check the battery condition
  Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/
LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK

4. Fuse "MAIN" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse.
- Check the fuse for continuity.

NO CONTINUITY

Replace fuse.

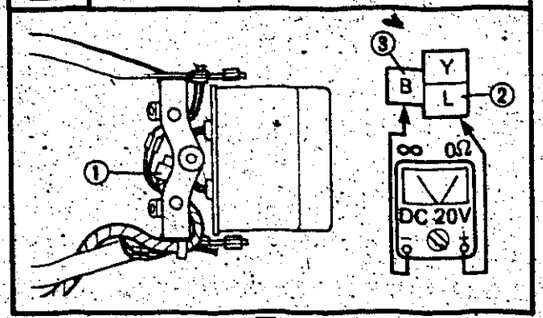
CONTINUITY

5. Lighting voltage test

- Connect the Pocket Tester "DC20V" to the tail/brake light coupler ① terminals (Blue ② and Black ③).
- Start the engine and accelerate to about 5,000 r/min.
- Measure the lighting voltage.

Tester (+) lead → Blue
Tester (–) lead → Black

Lighting Voltage:
14 ~ 15V at 5,000 r/min



OUT OF
SPECIFICATION

*

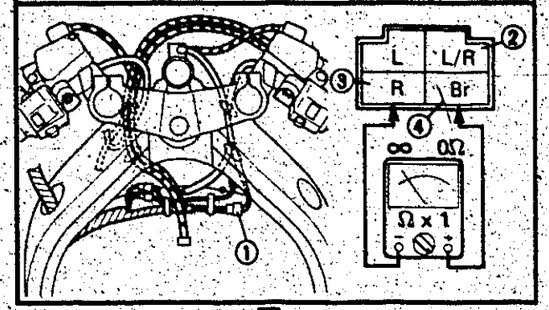
LIGHTING VOLTAGE
MEETS SPECIFICATION

Lighting system (Taillight) is good.

*

6. Main switch conduct check

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Blue/Red ②, Red ③ and Brown ④).
- Turn the main switch to "ON" and "P" position.
- Check the switch for continuity.



NO CONTINUITY

Replace main switch.

CONTINUITY

7. Wiring connection check

- Entire lighting system.
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

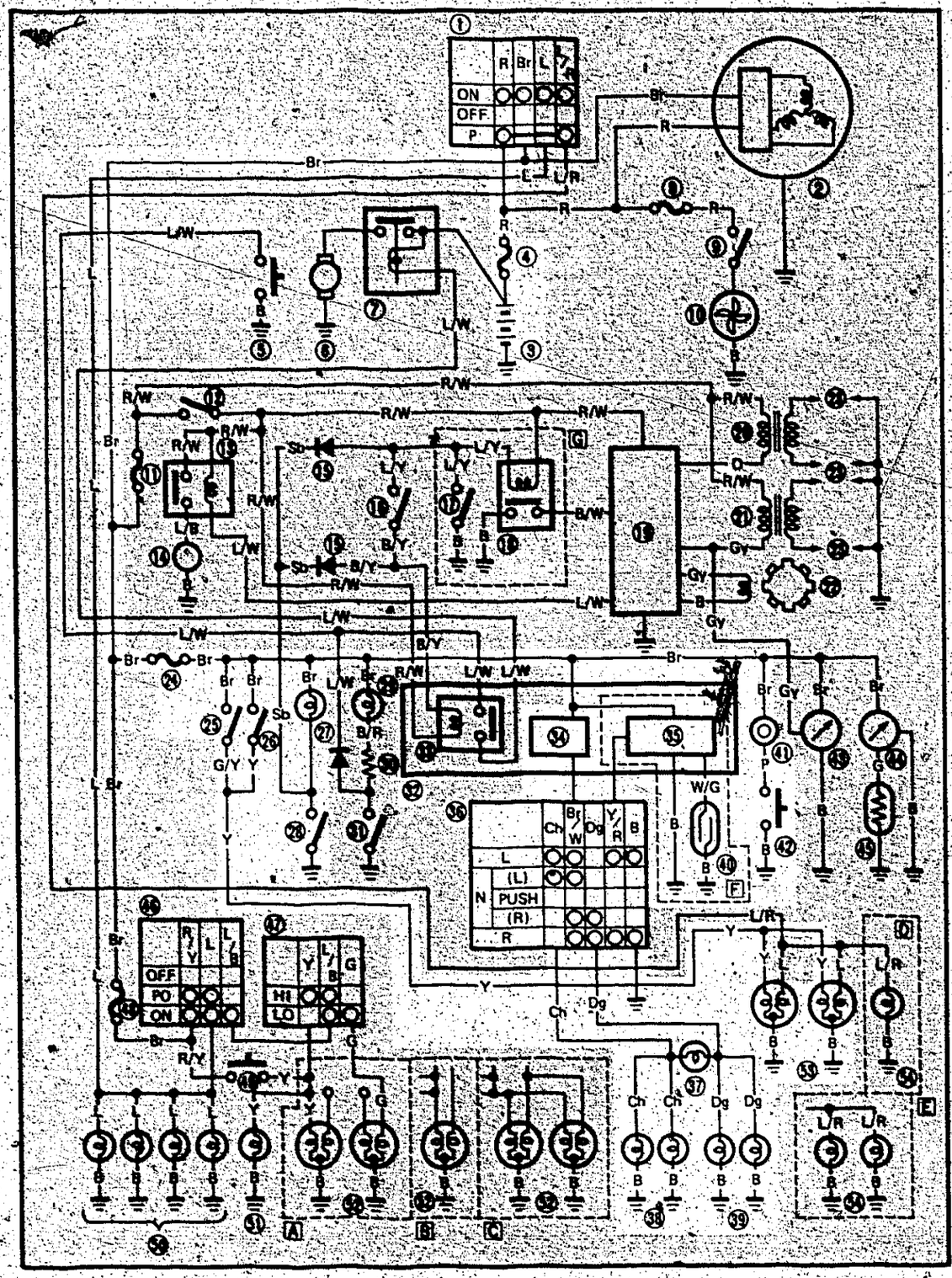
Correct connection(s).

OK

Check the charging system.

SIGNAL SYSTEM

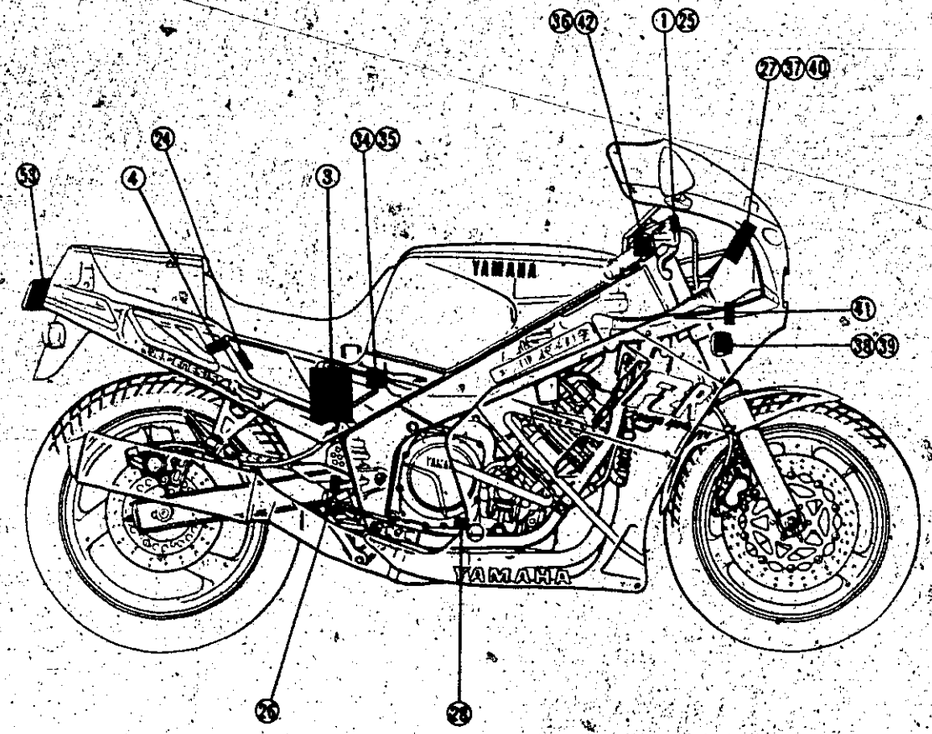
CIRCUIT DIAGRAM



Aforementioned circuit diagram shows the signal circuit in the wiring diagram.

NOTE:
For the color codes, see page 8-2.

① Main switch
③ Battery
④ Fuse "MAIN"
㉔ Fuse "SIGNAL"
㉕ Front brake switch
㉖ Rear brake switch
㉗ "NEUTRAL" indicator light
㉘ Neutral switch
㉞ Flasher relay (Relay assembly ㉜)
㉟ Cancelling unit (Relay assembly ㉜)
㊱ "TURN" switch
㊲ "TURN" indicator light
㊳ Flasher light (Left)
㊴ Flasher light (Right)
㊵ Reed switch
㊶ Horn
㊷ "HORN" switch
㊸ Brake light



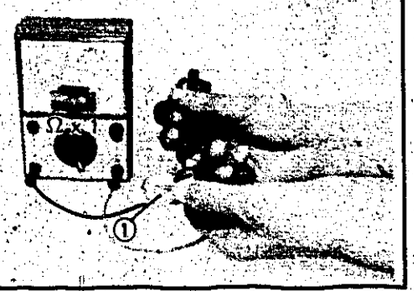
TROUBLESHOOTING

FLASHER LIGHT DOES NOT COME ON.

Procedure
1. Flasher light bulb conduct check
2. Flasher light bulb socket conduct check
3. Battery inspection
4. Fuse "MAIN/SIGNAL" inspection
5. Battery voltage test
6. Flasher relay (Relay assembly) test
7. Wiring connection check (Entire signal system)

NOTE:
Remove the following before troubleshooting.
- Seat
- Fuel tank

1. Flasher light bulb conduct check
- Remove the flasher light bulb(s) ①.
- Connect the Pocket Tester "Ω x 1" to the bulb terminals.
- Check the bulb(s) for continuity.

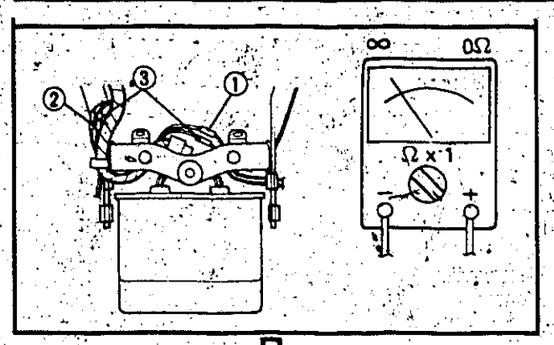


NO CONTINUITY → Replace bulb(s).

CONTINUITY ↓

2. Flasher light bulb socket conduct check
- Install the bulb(s) to the bulb socket(s).
- Disconnect the flasher light leads.
- Connect the Pocket Tester "Ω x 1" to the leads (Dark green ① or Chocolate ②, and Black ③).
- Check the bulb socket for continuity.

NO CONTINUITY → Flasher light bulb socket is faulty. Replace the flasher light.



CONTINUITY ↓

3. Battery inspection
- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity: 1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

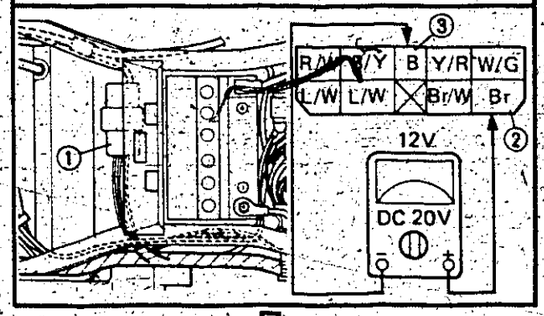
4. Fuse "MAIN/SIGNAL" inspection
- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

5. Battery voltage test
- Disconnect the relay assembly coupler ① from the wire harness.
- Connect the Pocket Tester "DC20V" to the coupler terminals (Brown ② and Black ③ – Wire harness side).
- Turn the main switch to "ON" position.
- Measure the battery voltage.

Tester (+) lead → Brown ②.
Tester (–) lead → Black ③.

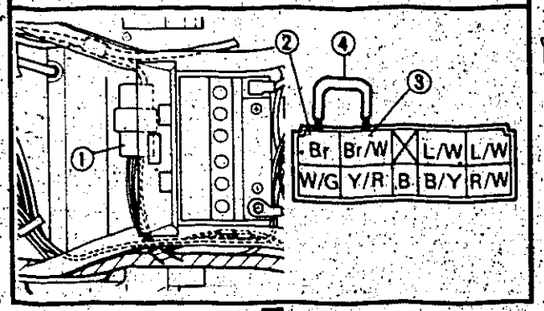


LESS THAN 12V → Check main switch.

MORE THAN 12V ↓
*

*

6. Flasher relay test
- Disconnect the relay assembly coupler ① from the wire harness.
- Connect the relay assembly coupler terminals (Brown ② and Brown/White ③) with the jumper lead ④.
- Turn the main switch to "ON".
- Turn the "TURN" switch to "L" or "R".
- Check the flasher light condition.



DOES NOT LIGHT

Check "TURN" switch.

OK

7. Wiring connections check
- Entire signal system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

Correct connections(s).

OK

Flasher relay is faulty.
Replace the relay assembly.

FLASHER LIGHT DOES NOT CANCEL.

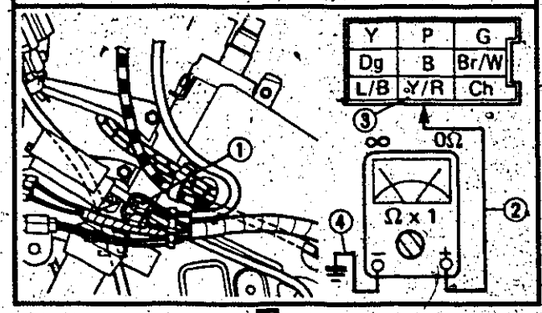
Procedure
1. "TURN" switch conduct check
2. Reed switch test
3. Wiring connection check

NOTE:
Remove the following before troubleshooting.
- Ignition coil cover

1. "TURN" switch conduct check
- Disconnect the handlebar switch (Left) coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "Ω x 1" to the handlebar switch coupler terminal (Yellow/Red ③).
- Ground the negative lead ④ of the Pocket Tester to the frame.
- Check the following for continuity.
- Push the "TURN" switch to left or right. Once the switch is released it will return to the center position.
  To cancel the signal, push the switch in after it has returned to the center position.

"TURN" Switch Position	Good Condition	Bad Condition		
"L" and "R"	O	O	X	X
"N" (Cancel)	X	O	X	O

O: Continuity X: No continuity



GOOD CONDITION

*

"TURN" switch is faulty.
Replace handlebar switch (Left).

*

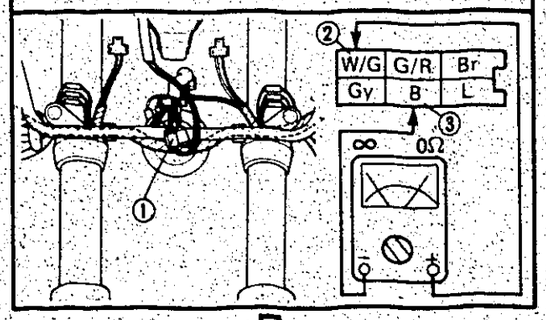
2. Reed switch test

- Disconnect the speedometer coupler ① from the wire harness (Headlight).
- Connect the Pocket Tester "Ω x 1" to the speedometer coupler terminals (White/Green ② and Black ③).
- Lift the front wheel and rotate the wheel by hand, and measure the reed switch resistance.

WARNING:

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

Reed Switch Resistance:
About 7Ω
Then return back 0Ω or ∞
when wheel is stopped.



OUT OF SPECIFICATION

Reed switch is faulty.
Replace speedometer.

BOTH RESISTANCES MEET SPECIFICATION

3. Wiring connection check

- Entire signal system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

Correct connection(s).

Replace the relay assembly.

BRAKE LIGHT DOES NOT COME ON.

Procedure

1. Brake light bulb conduct check
2. Brake light bulb socket conduct check
3. Battery inspection
4. Fuse "MAIN/SIGNAL" inspection
5. Front and rear brake switches test
6. Wiring connection check (Entire signal system)

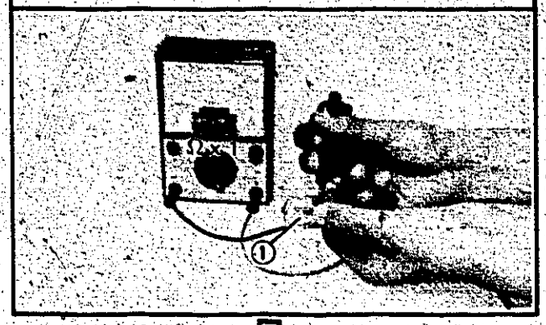
NOTE:

Remove the following before troubleshooting.

- Seat
- Side cover (Right)
- Taillight lens

1. Brake light bulb conduct check

- Remove the tail/brake light bulb(s).
- Connect the Pocket Tester "Ω x 1" to the bulb terminals.
- Check the bulb(s) for continuity.



NO CONTINUITY

Replace bulb(s).

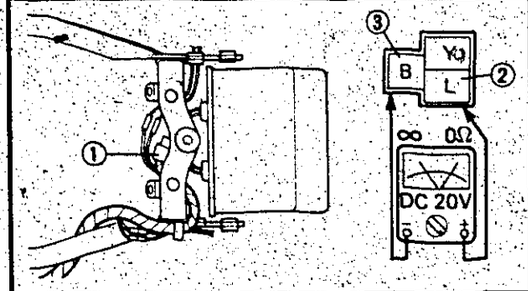
CONTINUITY

*

*

2. Brake light bulb socket conduct check

- Install the bulb to the bulb socket.
- Disconnect the tail/brake light coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the coupler terminals (Yellow ② and Black ③).
- Check the bulb socket for continuity.



NO CONTINUITY → Replace bulb socket.

CONTINUITY ↓

3. Battery inspection

- Check the battery condition
  Refer to "CHAPTER 3. BATTERY INSPECTION.

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

4. Fuse "MAIN/SIGNAL" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY → Replace fuse(s).

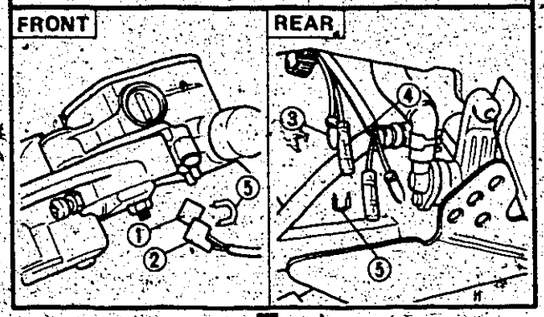
CONTINUITY ↓

*

*

5. Front and rear brake switches test

- Disconnect the front brake switch leads and rear brake switch leads from the wire harness.
- Connect the front brake switch leads (Brown ① and Green/Yellow ②) and the rear brake switch leads (Brown ③ and Yellow ④) with the jamper leads ⑤
- Turn the main switch to "ON" position.
- Check the brake light operation.



DOES NOT LIGHT → Check main switch.

LIGHTS ↓

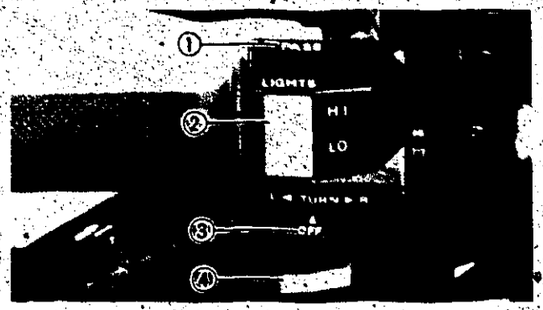
6. Wiring connection check

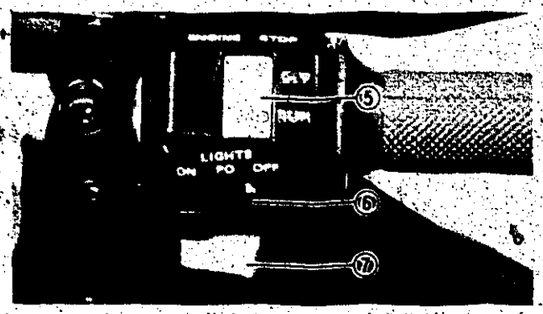
- Entire signal system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION → Correct connection(s).

OK ↓

Replace the front and/or rear brake switch(es).





SWITCHES TEST

Switches may be checked for continuity with the Pocket Tester on the "Ω x 1" position.

① "PASS" switch
② "LIGHTS" (Dimmer) switch
③ "TURN" switch
④ "HORN" switch
⑤ "ENGINE STOP" switch
⑥ "LIGHTS" switch
⑦ "START" switch

Main Switch

Switch Position	Lead Color			
	R	Br	L	L/R
ON	○——	——○	○——	——○
OFF				
P	○——			——○

"LIGHTS" (Dimmer) switch

Switch Position	Lead Color		
	Y	L/B	G
HI	○——	——○	
LO		○——	——○

"TURN" Switch

Switch Position		Lead Color				
		Ch	Br/W	Dg	Y/R	B
L		○——	——○		○——	——○
N	L	○——	——○			
	OFF					
	R		○——	——○		
R			○——	——○	○——	——○

"HORN" Switch

Switch Position	Lead Color	
	P	B
OFF		
ON	○——	——○

"ENGINE STOP" Switch

Switch Position	Lead Color	
	R/W	R/W
OFF		
RUN	○——	——○

"LIGHTS" Switch

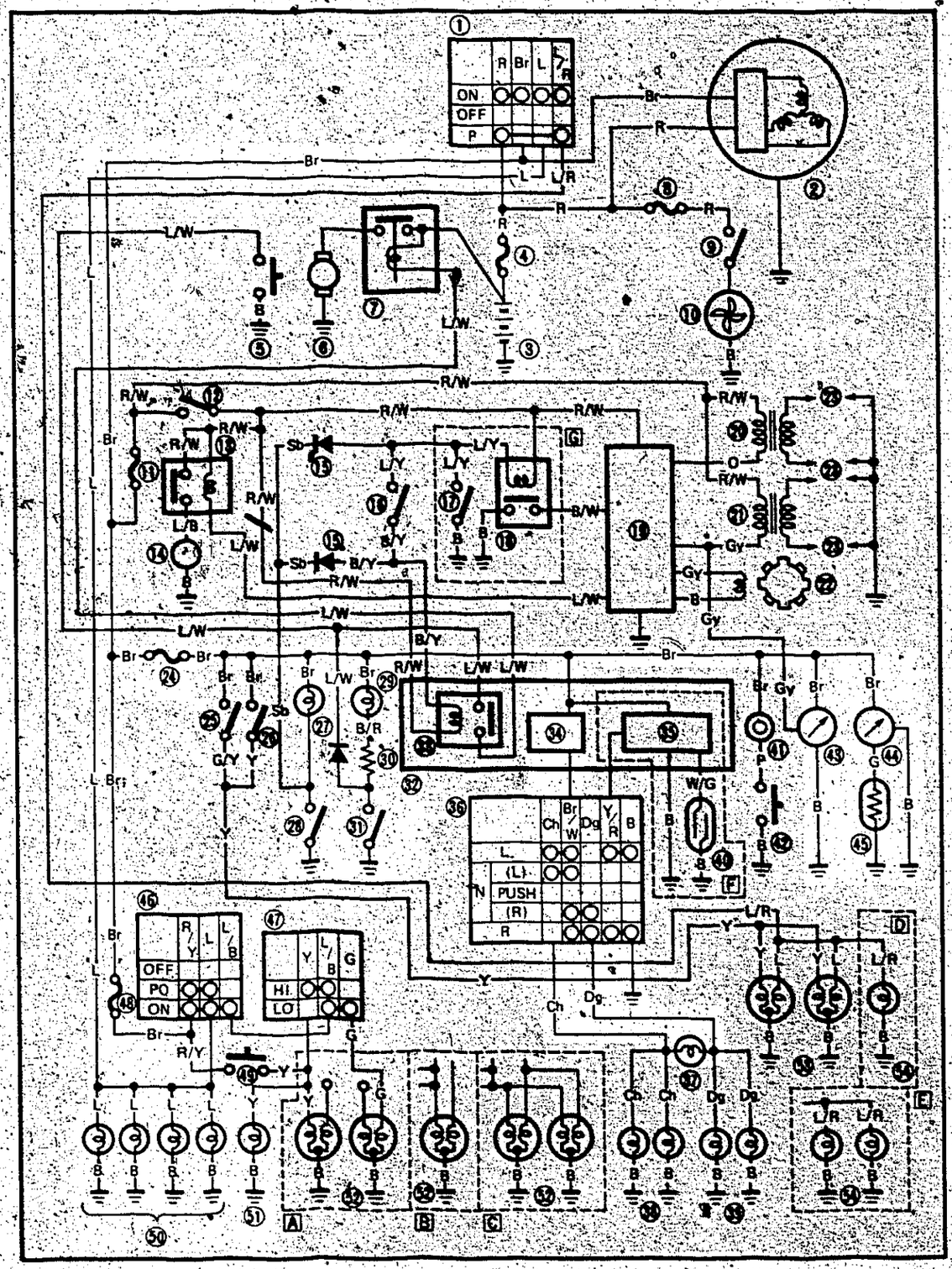
Switch Position	Lead Color		
	R/Y	L	L/B
OFF			
PO	○——	——○	
ON	○——	——○	——○

"START" Switch

Switch Position	Lead Color	
	L/W	B
OFF		
ON	○——	——○

DISPLAY SYSTEM

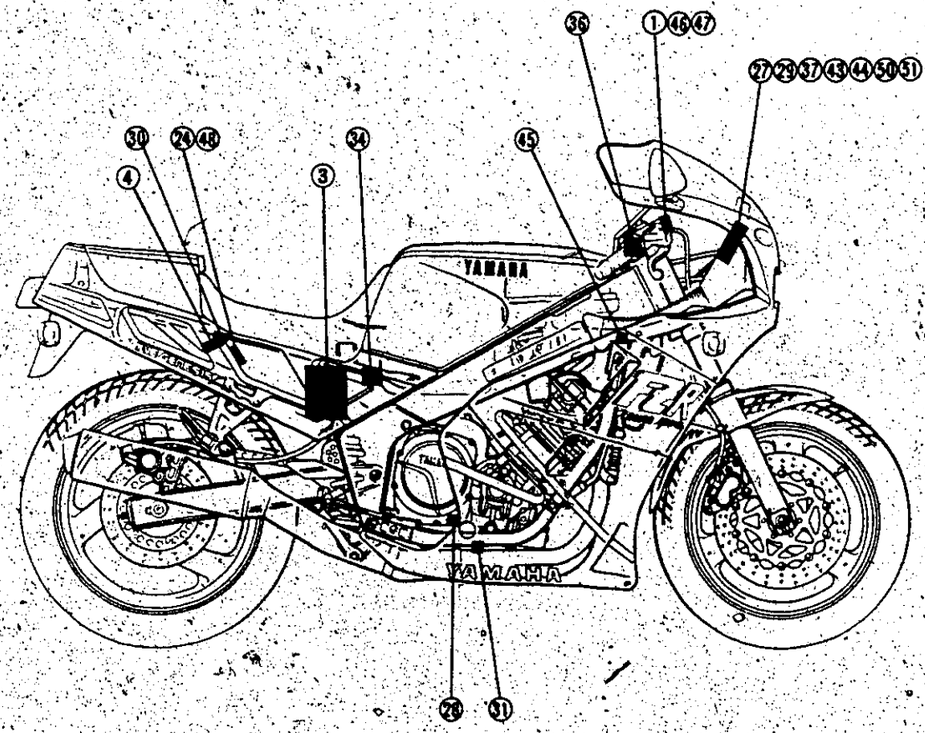
CIRCUIT DIAGRAM



A forementioned circuit diagram shows the display circuit in the wiring diagram.

NOTE:
For the color codes, see page 8-2.

① Main switch
③ Battery
④ Fuse "MAIN"
㉔ Fuse "SIGNAL"
㉗ "NEUTRAL" indicator light
㉘ Neutral switch
㉙ "OIL" indicator light
㉚ Resister (Diode block ⑮)
㉛ Oil level switch
㉞ Flasher relay (Relay assembly ㉜)
㊱ "TURN" switch
㊲ "TURN" indicator light
㊸ Tachometer
㊹ Temp meter
㊺ Thermo unit
㊻ "LIGHTS" switch
㊼ "LIGHTS" (Dimmer) switch
㊽ Fuse "HEAD"
㊿ Meter light
(51) "HIGH BEAM" indicator light



TROUBLESHOOTING

METER LIGHT OR INDICATOR LIGHT DOES NOT COME ON.

Procedure (Alternative)

1. Indicator bulb conduct check
2. Indicator bulb socket conduct check
3. Battery inspection
4. Fuse "MAIN/SIGNAL" inspection
5. Main switch conduct check
6. Switch test
7. Wiring connection check (Entire display system)

NOTE:

Remove the following before troubleshooting.

- Upper cowling
- Side cowling (Left)
- Seat
- Side cover (Left)
- Ignition coil cover
- Fuel tank
- Air cleaner

1. Indicator bulb conduct check

- Remove the bulb(s) from the meter assembly.
- Connect the Pocket Tester "Ω x 1" to the bulb terminals.
- Check the bulb(s) for continuity.

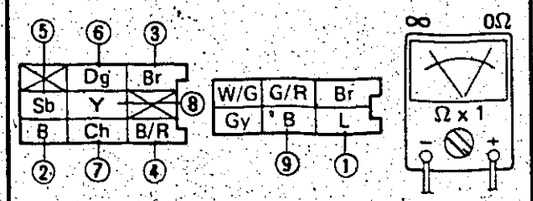
NO CONTINUITY → Replace bulb(s).

CONTINUITY ↓

2. Indicator bulb socket conduct check

- Install the bulb(s) to the bulb socket(s).
- Disconnect the meter couplers.
- Connect the Pocket Tester "Ω x 1" to the meter coupler terminals.
- Check the bulb socket(s) for continuity.

Meter Light	: Blue ① and Black ②
"OIL"	: Brown ③ and Black/Red ④
"NEUTRAL"	: Brown ③ and Sky blue ⑤
"TURN"	: Dark green ⑥ and Chocolate ⑦
"HIGH BEAM"	: Yellow ⑧ and Black ⑨



NO CONTINUITY → Bulb socket is faulty. Replace socket code assembly.

CONTINUITY ↓ *

*

3. Battery inspection

- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity: 1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY → Refill battery fluid. Clean battery terminals. Recharge or replace battery.

OK ↓

4. Fuse "MAIN/SIGNAL" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

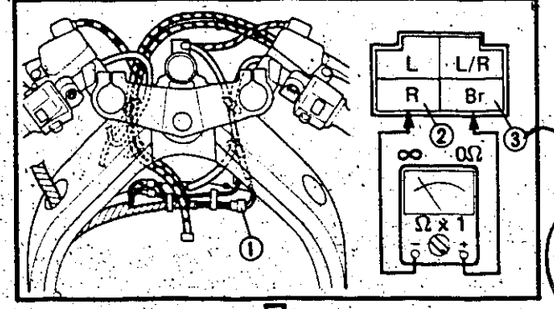
NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

5. Main switch conduct test

- Disconnect the main switch coupler from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ① and brown ②).
- Turn the main switch to "ON" position.
- Check the switch for continuity.

NO CONTINUITY → Replace main switch.



CONTINUITY ↓

6. Switch test

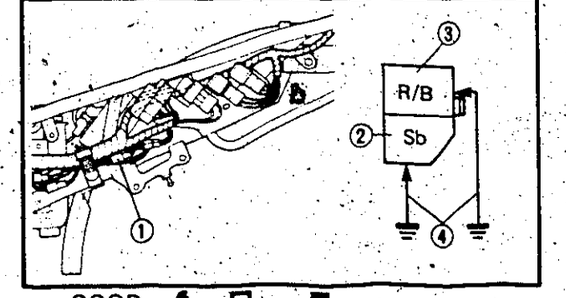
Meter light
- Check the "LIGHTS" switch. Refer to "LIGHTING SYSTEM".

"TURN" indicator light
- Check the "TURN" switch. Refer to "SIGNAL SYSTEM".

"HIGH BEAM" indicator light
- Check the "LIGHTS" (Dimmer) switch. Refer to "LIGHTING SYSTEM".

BAD CONDITION → Replace switch.

"NEUTRAL" indicator light
"OIL" indicator light
- Check the neutral switch and oil level switch.
- Disconnect the neutral/oil level switch coupler ① from the wire harness.
- Ground the coupler terminals – wire harness side (Sky blue ② and Red/-Black ③) to the engine with the jamper leads ④ .
- Shift the gear in neutral.
- Turn the main switch to "ON".
- Check the "NEUTRAL" and "OIL" indicator lights condition.



GOOD CONDITION ⇩ ➡ DOES NOT LIGHT

7. Wiring connection check
- Entire display system
Refer to "WIRING DIAGRAM".

NOTE:
The engine oil level should be between maximum and minimum marks.

LIGHTS ⇩

Replace neutral switch.
Replace oil level switch.

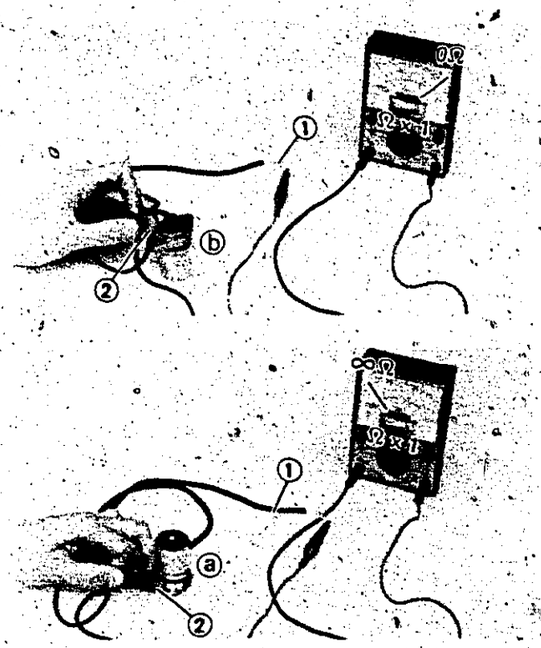
POOR CONNECTION ➡

Correct connection(s).
Replace diode block for oil level switch.

OIL LEVEL SWITCH TEST

1. Drain:
   - Engine oil
2. Remove:
   - Oil level switch
3. Remove:
   - Oil level switch resistance.
     Use the Pocket Tester "Ω x 1".
     Out of specification → Replace.

Oil Level Gauge Resistance:
Float is down ⓐ → ∞
Float is up ⓑ → Zero Ω



① Red/Black
② Ground

TEMPERATURE GAUGE DOES NOT MOVE.

Procedure
1. Battery inspection
2. Fuse "MAIN/SIGNAL" inspection
3. Main switch conduct check
4. Temperature gauge test
5. Termo unit test
6. Wiring connection check

NOTE:
Remove the following before troubleshooting.
- Side cowling (Right)
- Upper cowling
- Headlight
- Seat
- Side cover (Left)

1. Battery inspection
- Check the battery condition.
  Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20℃ (68°F)

INCORRECT/LOW SPECIFIC GRAVITY ➡

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK ⇩

2. Fuse "MAIN/SIGNAL" inspection
- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY ➡

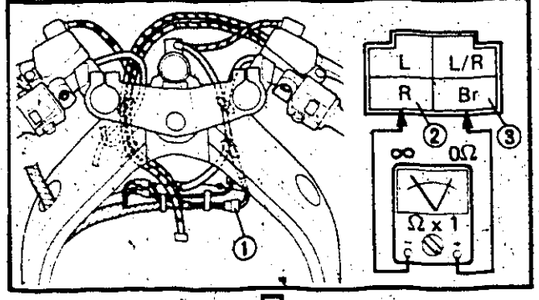
Replace fuse(s).

CONTINUITY ⇩

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*

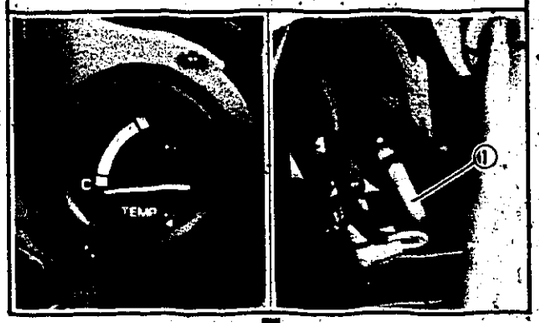
3. Main switch conduct test
- Disconnect the main switch coupler from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ① and Brown ②).
- Turn the main switch to "ON" position.
- Check the switch for continuity.



NO CONTINUITY → Replace main switch.

CONTINUITY ↓

4. Temperature gauge test
- Disconnect the thermo unit lead (Green/Red) ①.
- Check that the temperature gauge stays put at "C".
- Ground the lead to the frame with the jamper lead.
- Turn the main switch to "ON".
- Check that the temperature gauge hand moves up to "H".



CAUTION:

As soon as the gauge hand get in the "Red" zone, turn the main switch to "OFF" to avoid damage to the temperature gauge.

CORRECT → Check wiring connection(s).

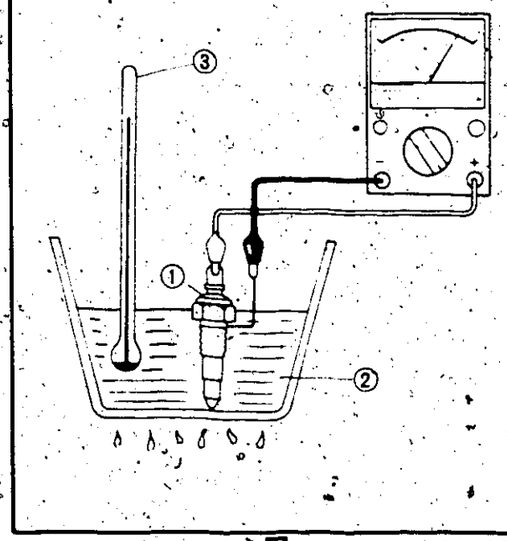
INCORRECT ↓

*

*

5. Thermo unit test
- Remove the thermo unit from the thermostat housing.
- Connect the Pocket Tester "Ω x 1" to the thermo unit ①.
- Immerse the thermo unit in the water ②.
- Measure the resistances.
  Note temperatures while heating the water with the temperature gauge ③.

Water Temperature	50°C (122°F)	80°C (176°F)	100°C (212°F)
Resistance	153.9Ω	47.5~56.8Ω	26.2~29.3Ω



RESISTANCES MEET SPECIFICATION ↓

6. Wiring connection check
  Temperature gauge circuit in the display system.

POOR CONNECTION → Correct connection(s).

WARNING:

Handle the thermo unit with special care. Never subject it to strong shock or allow it to be dropped. Should it be dropped, it must be replaced.

OUT OF SPECIFICATION → Replace thermo unit.

Thermo unit:
14 Nm (1.4 m·kg, 10 ft·lb)
Sealant (For water resistant)

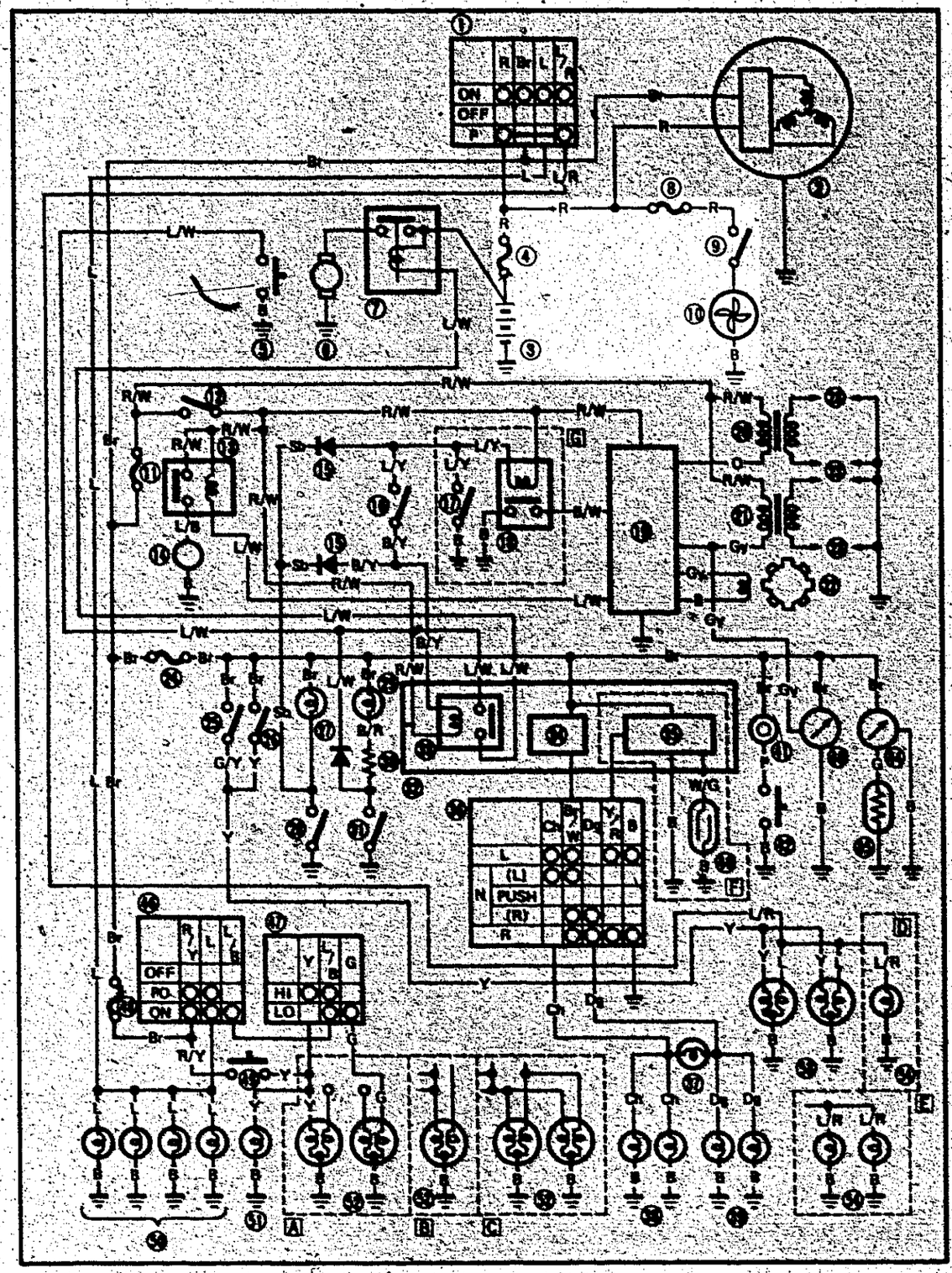
CAUTION:

After replacing the thermo unit, check the coolant level in the radiator and also check for any leakage.

C-1

COOLING SYSTEM

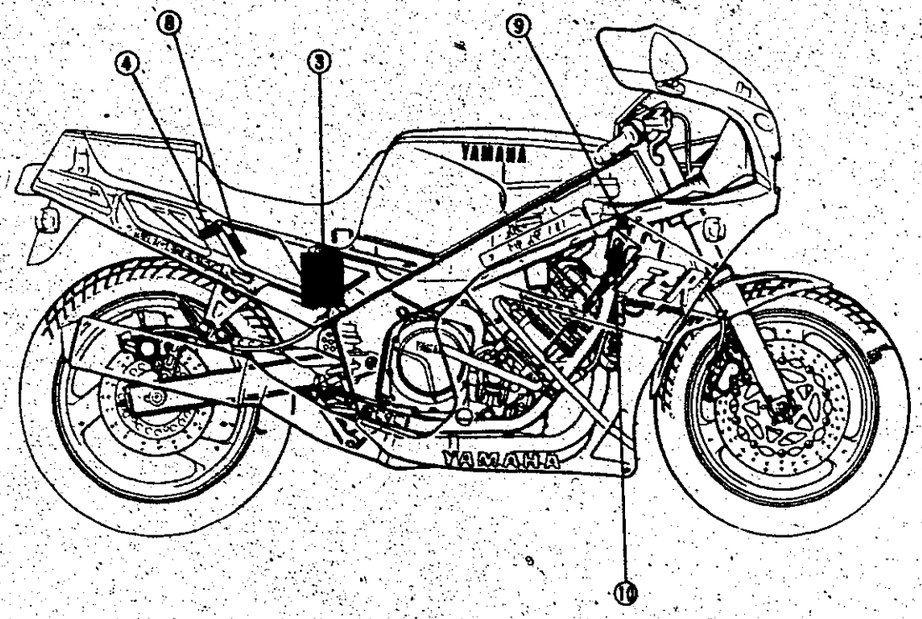
CIRCUIT DIAGRAM



A foremention circuit diagram shows the cooling circuit in the circuit diagram.

NOTE:
For the color codes, see page 8-2.

③ Battery
④ Fuse "MAIN"
⑧ Fuse "FAN"
⑨ Thermo switch
⑩ Fan motor



TROUBLESHOOTING

FAN MOTOR DOES NOT TURN.

Procedure
1. Battery inspection
2. Fuse "MAIN/FAN" inspection
3. Fan motor test
4. Fan motor test with thermo switch
5. Thermo switch test
6. Wiring connection check (Entire cooling system)

NOTE:
Remove the following before troubleshooting.

Side cowling (Right)	Fuel tank
Seat	Air cleaner
Side cover (Left)	Air duct (Right)

1. Battery inspection
- Check the battery condition. Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK

2. Fuse "MAIN/FAN" inspection
- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY

Replace fuse(s).

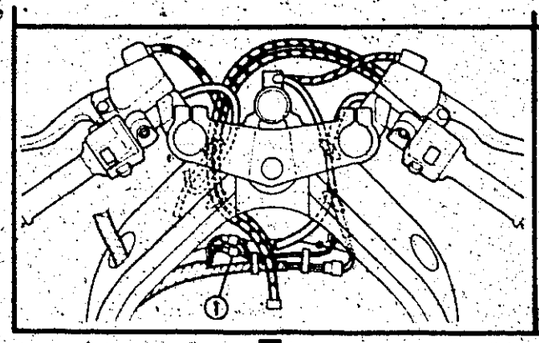
CONTINUITY

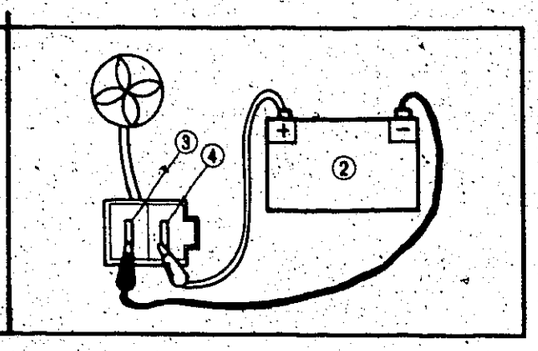
3. Fan motor test 1
- Disconnect the fan motor coupler ①.
- Connect the battery ② leads to the coupler terminals (Blue ③ and Black ④).
- Check the fan motor for operation.

Battery (+) lead → Blue ③
Battery (–) lead → Black ④

NO OPERATIVE

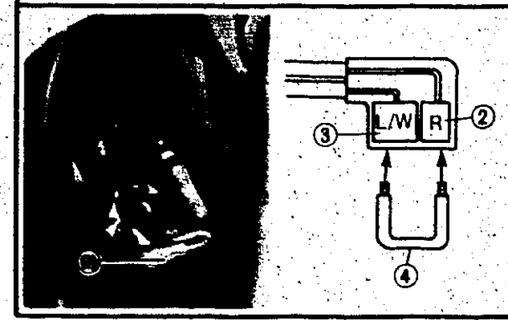
Replace fan motor.





OPERATIVE

4. Fan motor test 2
- Disconnect the thermo switch lead ①.
- Connect the leads (Red ② and Blue/White ③) with the jamper lead ④.
- Check the fan motor for operation.



NO OPERATIVE

Check wiring connection(s).

OPERATIVE

5. Thermo switch test
- Remove the thermo switch from the thermostat housing.
- Connect the Pocket Tester "Ω x 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.

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.

BAD CONDITION

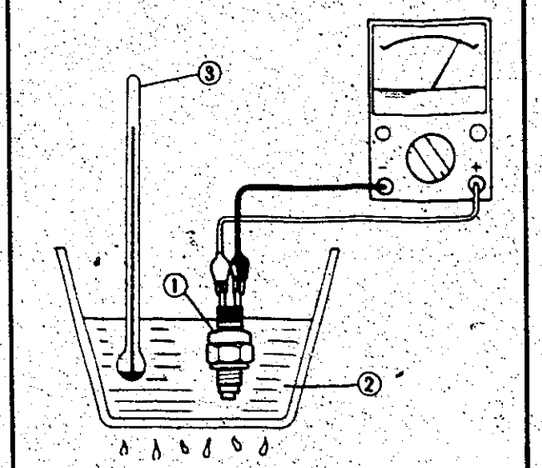
Replace thermo switch.

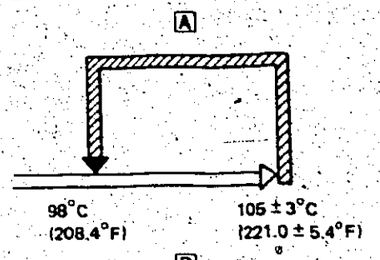
Thermo Switch:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Three Bond Sealock® #10

CAUTION:
After replacing the thermo switch, check the cooland level in the radiator and also check for any leakage.

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)	○
3*	105 to 98°C (221.0 to 208.4°F)	○
4*	Less than 98°C (208.4°F)	X

Test 1 & 2; Heat-up tests
Test 3* & 4*; Cool-down tests
○ : Continuity X : No continuity





GOOD CONDITION

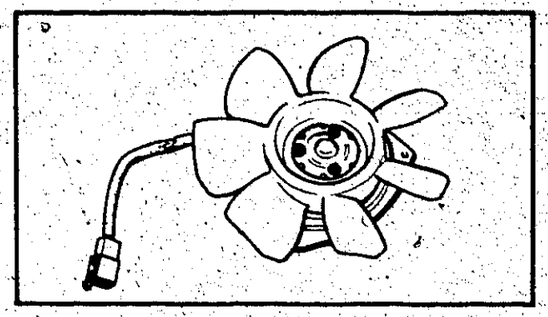
6. Wiring connection check
- Entire cooling system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

Correct connection(s).

NOTE:
The electric fan is controlled by the thermo switch whenever the main switch is "ON" or "OFF". Thus, under certain operating conditions, this fan may continue to run until the engine temperature has cooled down to about 98°C (208°F).

A THERMO SWITCH "ON", FAN "ON"
B COOLANT TEMPERATURE



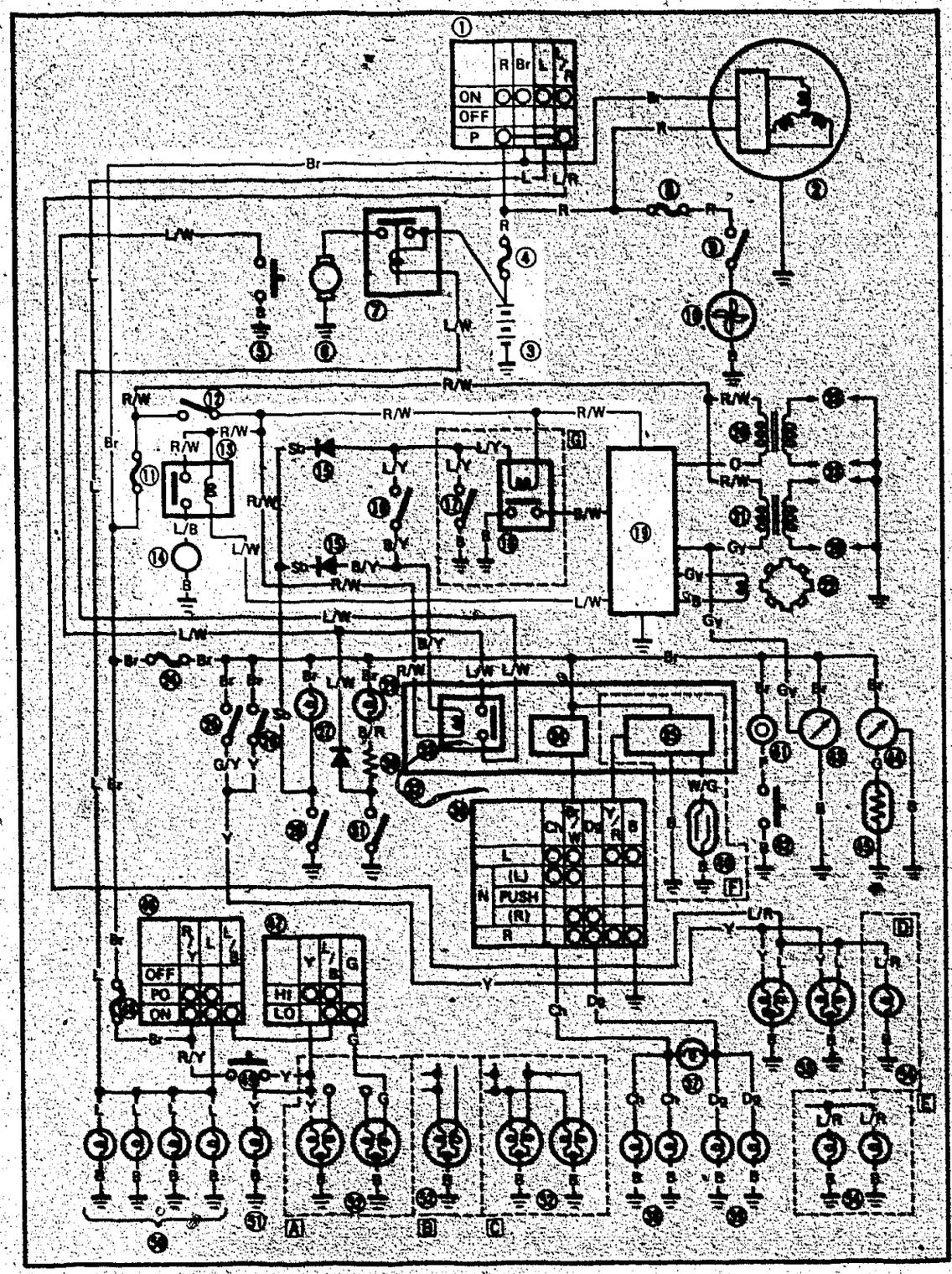
Fan Motor Inspection

The following problems may require repair or replacement of components

Component	Condition
Fan motor	Unsmooth operation
Fan motor	Excessive vibration
Fan motor bracket	Cracks
Fan blades	Cracks
Securing bolts	Looseness

FUEL SYSTEM

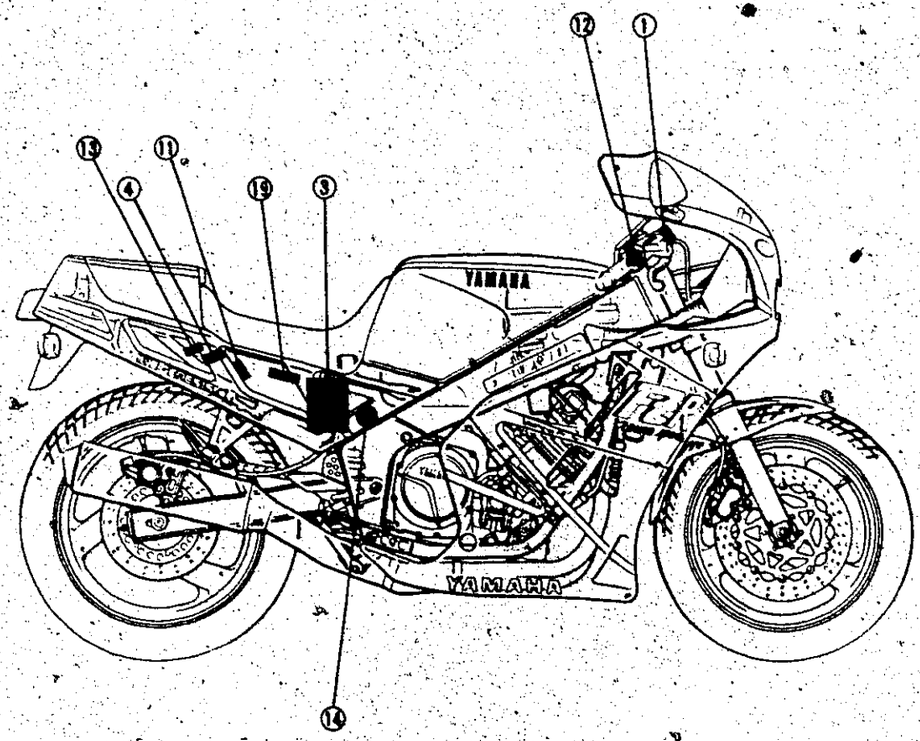
CIRCUIT DIAGRAM



A forementioned circuit diagram shows the fuel circuit in the circuit diagram.

NOTE:
For the color codes, see page 8-2.

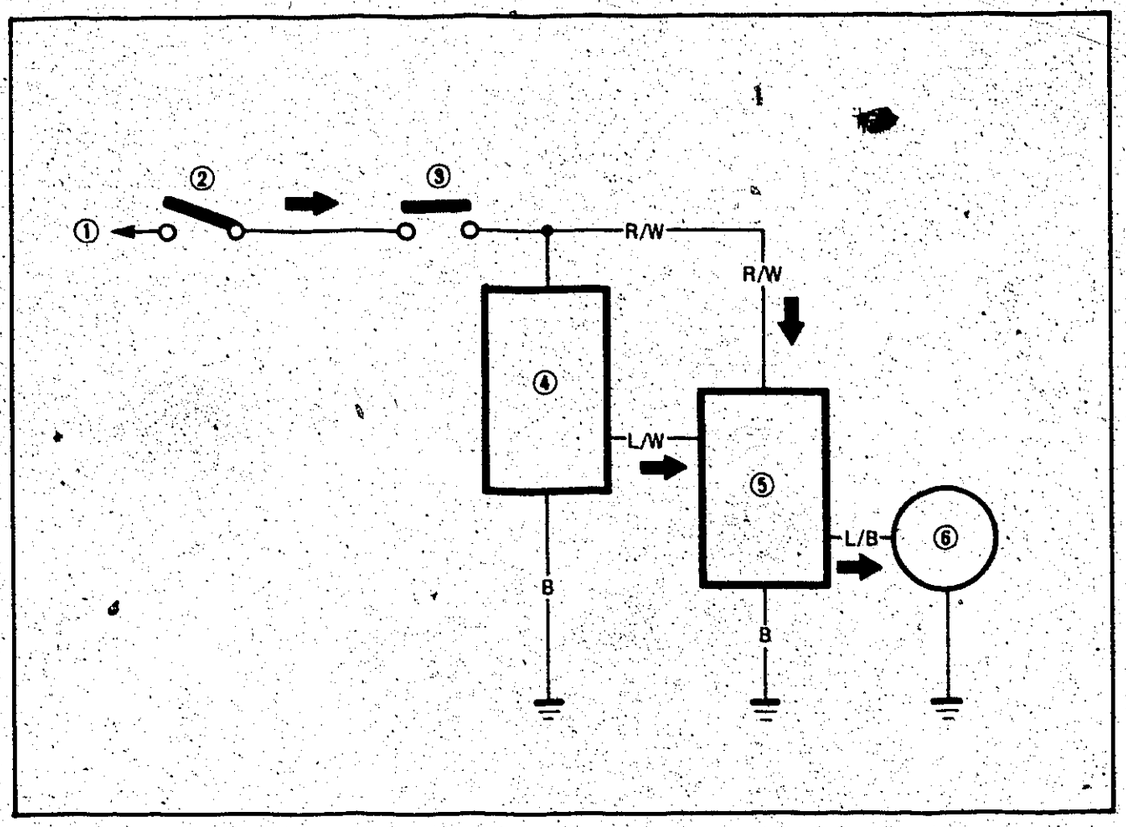
① Main switch
③ Battery
④ Fuse "MAIN"
⑪ Fuse "IGNITION"
⑫ "ENGINE STOP" switch
⑬ Fuel pump control relay
⑭ Fuel pump
⑲ Digital ignitor unit



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 To main fuse and battery
② Main switch
③ "ENGINE STOP" switch
④ Digital ignitor unit
⑤ Fuel pump relay
⑥ Fuel pump



FUEL PUMP		
START		STOP
• Main/Engine stop switch turned to "ON"	• Engine turned on	• Engine turned off
For about 5 seconds when carburetor fuel level is low	After about 0.1 second	After about 5 seconds

TROUBLESHOOTING

FUEL PUMP FAILS TO OPERATE AFTER ENGINE IS STARTED.

Procedure
1. Battery inspection
2. Fuse "MAIN/IGNITION" inspection
3. Main switch conduct check
4. "ENGINE STOP" switch conduct check
5. Battery voltage test
6. Fuel pump relay test
7. Wiring connection check (Entire fuel system)

NOTE:
Remove the fol owing before troubleshooting.
- Seat
- Side cover (Left)
- Fuel tank
- Air cleaner
- Use the fuel subtank when the fuel tank and air cleaner are removed. Refer to "CHAPTER 2. CARBURATOR SYNCHRONIZATION".

1. Battery inspection
- Check the battery condition
  Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK

2. Fuse "MAIN/IGNITION" inspection
- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY

Replace fuse(s).

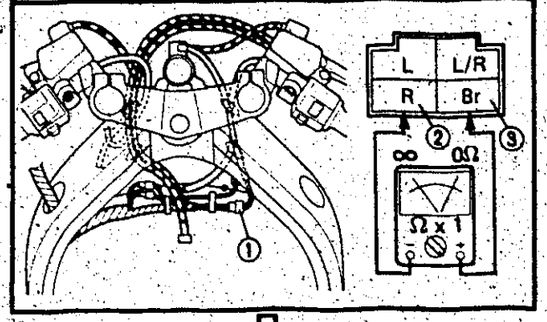
CONTINUITY

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3. Main switch conduct check

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ② and Brown ③).
- Turn the main switch to "ON" position.
- Check the switch for continuity.

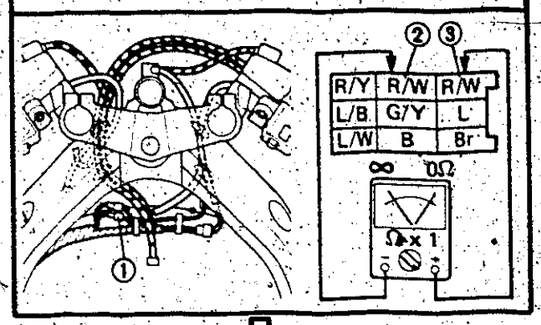


NO CONTINUITY → Replace main switch.

CONTINUITY ↓

4. "ENGINE STOP" switch conduct test

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the handlebar switch (Right) coupler terminals (Red/White ② and Red/White ③).
- Turn the "ENGINE STOP" switch to "RUN" position.
- Check the switch for continuity.



NO CONTINUITY → "ENGINE STOP" switch is faulty. Replace handlebar switch (Right).

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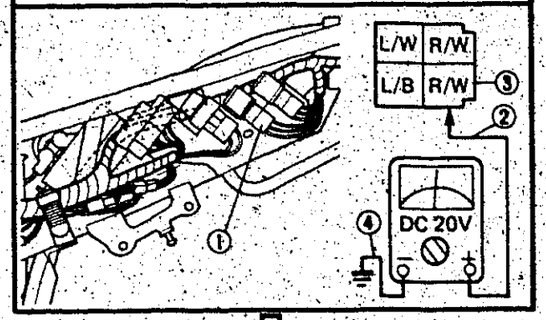
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CONTINUITY ↓

5. Battery voltage test

- Disconnect the fuel pump relay coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "DC20V" to the relay coupler terminal (Red/White ③ — wire harness side).
- Ground the negative lead ④ of the Pocket Tester to the frame.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Measure the battery voltage.

Tester (+) lead → Red/White
Tester (—) lead → Ground



LESS THAN 12V → Check wiring connection(s).

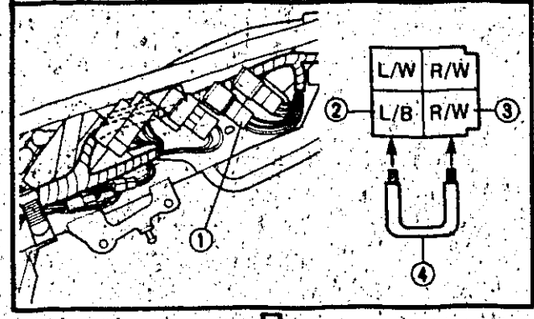
MORE THAN 12V ↓

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6. Fuel pump relay test

- Disconnect the fuel pump relay coupler ①.
- Connect the relay coupler terminals (Blue/Black ② and Red/White ③ — Wire harness side) with the jamper lead ④.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Check the fuel pump for operation.



NO OPERATIVE

Replace fuel pump.

OPERATIVE

7. Wiring connection check

- Entire fuel pump system.
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

Correct connection(s).

OK

Fuel pump relay is faulty.
Replace the fuel pump relay.

FUEL PUMP FAILS TO OPERATE FOR A 5 SECOND INTERVAL

Procedure

1. Battery inspection
2. Fuse "MAIN/IGNITION" inspection
3. Main switch conduct check
4. "ENGINE STOP" switch conduct check
5. Battery voltage test
6. Fuel pump input voltage test
7. Wiring connection check (Entire fuel system)

NOTE:

Remove the following before troubleshooting.

- Seat
- Side cover (Left)
- Fuel tank
- Air cleaner
- Use the fuel sub tank when the fuel tank and air cleaner are removed.
  Refer to "CHAPTER 2. CARBURATOR SYNCHRONIZATION".

1. Battery inspection

- Check the battery condition.
  Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68° F)

INCORRECT/LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminal.
Recharge or replace battery.

OK

2. Fuse "MAIN/IGNITION" inspection

- Connect the Pocket Tester "Ω × 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY

Replace fuse(s).

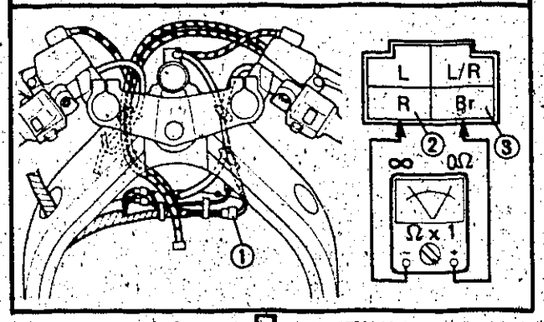
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CONTINUITY

3. Main switch conduct test

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ② and Brown ③).
- Turn the main switch to "ON" position.
- Check the switch for continuity.



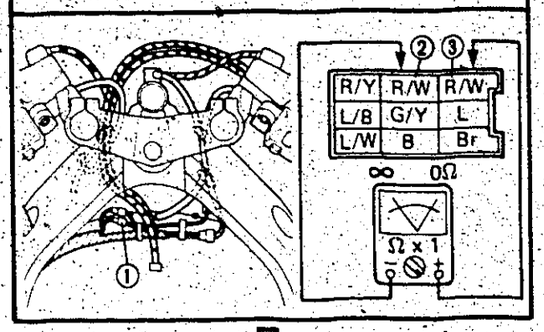
NO CONTINUITY

Replace main switch.

CONTINUITY

4. "ENGINE STOP" switch conduct test

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the handlebar switch (Right) coupler terminals (Red/White ② and Red/White ③).
- Turn the "ENGINE STOP" switch to "RUN" position.
- Check the switch for continuity.



NO CONTINUITY

"ENGINE STOP" switch is faulty.
Replace handlebar switch (Right).

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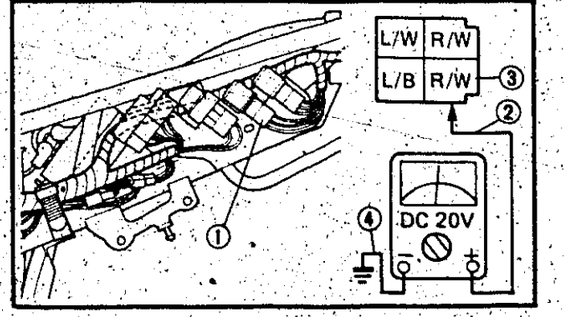
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CONTINUITY

5. Battery voltage test

- Disconnect the fuel pump relay coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "DC20V" to the relay coupler terminal (Red/White ③ — wire harness side).
- Ground the negative lead ④ of the Pocket Tester to the frame.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Measure the battery voltage.

Tester (+) lead → Red/White
Tester (–) lead → Ground



LESS THAN 12V

Check wiring connection(s).

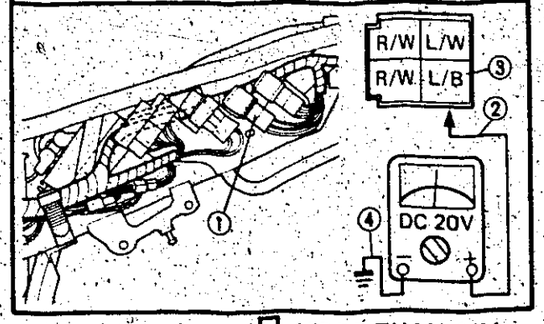
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* MORE THAN 12V

6. Fuel pump input voltage test

- Disconnect the fuel pump relay coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "DC20V" to the relay coupler terminal (Blue/Black ③).
- Ground the negative lead ④ of the pocket Tester to the frame.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Measure the fuel pump input voltage.

Tester (+) lead → Blue/Black
Tester (—) lead → Ground



LESS THAN 11V

Replace fuel pump relay.

MORE THAN 11V

7. Wiring connection check

- Entire fuel system
  Refer to "WIRING DIAGRAM".

POOR CONNECTION

Correct connection(s).

OK

Fuel pump is faulty.
Replace the fuel pump.

FUEL PUMP DOES NOT STOP AFTER 30 SECONDS.

Procedure

1. Battery inspection
2. Fuse "MAIN/IGNITION" inspection
3. Main switch conduct check
4. "ENGINE STOP" switch conduct check
5. Fuel pump input voltage test
6. Wiring connection check (Entire fuel system)

NOTE:

Remove the following before troubleshooting.

- Seat
- Side cover (Left)
- Fuel tank
- Air cleaner
- Use the fuel sub tank when the fuel tank and air cleaner are removed.
  Refer to "CHAPTER 2. CARBURATOR SYNCHRONIZATION".

1. Battery inspection

- Check the battery condition.
  Refer to "CHAPTER 3. BATTERY INSPECTION".

Specific Gravity:
1.280 at 20°C (68°F)

INCORRECT/LOW SPECIFIC GRAVITY

Refill battery fluid.
Clean battery terminals.
Recharge or replace battery.

OK

2. Fuse "MAIN/IGNITION" inspection

- Connect the Pocket Tester "Ω x 1" to the fuse(s).
- Check the fuse(s) for continuity.

NO CONTINUITY

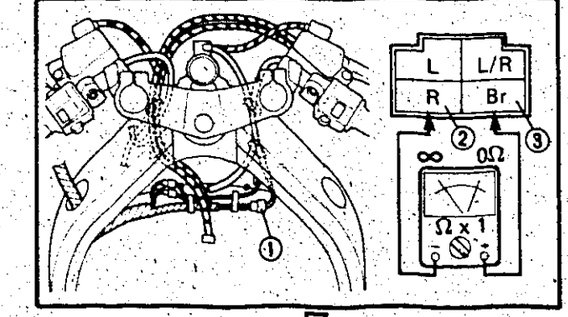
Replace fuse(s).

*

* ↓ CONTINUITY

3. Main switch conduct check

- Disconnect the main switch coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the main switch coupler terminals (Red ② and Brown ③).
- Turn the main switch to "ON" position.
- Check the switch for continuity.

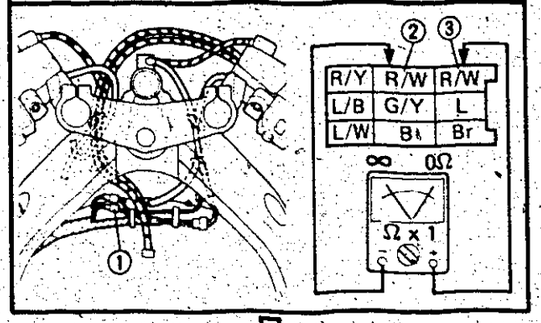


NO CONTINUITY → Replace main switch.

↓ CONTINUITY

4. "ENGINE STOP" switch conduct test

- Disconnect the handlebar switch (Right) coupler ① from the wire harness.
- Connect the Pocket Tester "Ω x 1" to the handlebar switch (Right) coupler terminals (Red/White ② and Red/White ③).
- Turn the "ENGINE STOP" switch to "RUN" position.
- Check the switch for continuity.



NO CONTINUITY → "ENGINE STOP" switch is faulty. Replace handlebar switch (Right)

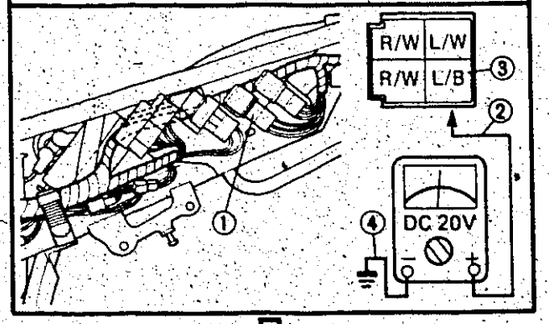
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* ↓ CONTINUITY

5. Fuel pump input voltage test

- Disconnect the fuel pump relay coupler ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester "DC20V" to the relay coupler terminal (Blue/Black ③).
- Ground the negative lead ④ of the Pocket Tester to the frame.
- Turn the main switch to "ON".
- Turn the "ENGINE STOP" switch to "RUN".
- Push the "START" switch.
- Measure the fuel pump input voltage.

Tester (+) lead → Blue/Black
Tester (–) lead → Ground



LESS THAN 11V → Replace digital ignitor unit.

MORE THAN 11V ↓

6. Wiring connection check

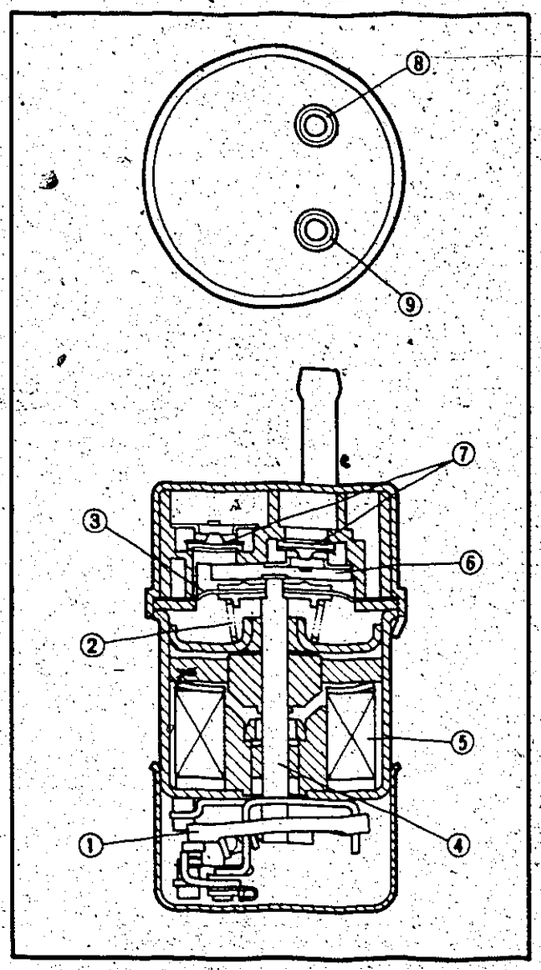
- Entire fuel system
  Refer to "WIRING DIAGRAM".

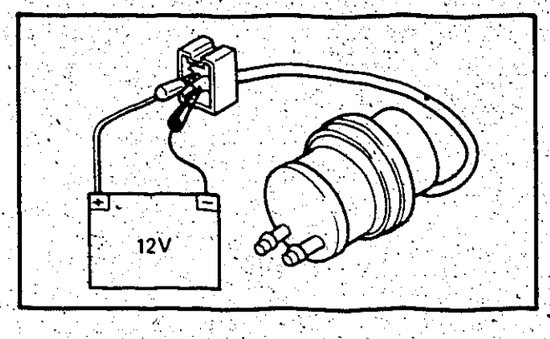
POOR CONNECTION → Correct connection(s).

OK ↓

Fuel pump relay is faulty.
Replace the fuel pump relay.

FUEL SYSTEM ELEC





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 carb 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. Connect:
   - Battery (12V)
2. Inspect:
   - Fuel pump
     Cracks/Damage → Replace.
3. Check:
   - Fuel pump operation
     Faulty operation → Replace.

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TRBL SHTG

9

TROUBLESHOOTING

NOTE:
The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM	PROBABLE CAUSE
Fuel tank	• Empty
	• Clogged fuel filter
	• Clogged fuel breather pipe
	• Deteriorated fuel or fuel containing water or foreign material
Fuel cock	• Clogged fuel hose
Carburetor	• Deteriorated fuel, fuel containing water or foreign material
	• Clogged pilot jet
	• Clogged pilot air passage
	• Sucked-in air
	• Deformed float
	• Groove-worn needle valve
	• Improperly sealed valve seat
	• Improperly adjusted fuel level
	• Improperly set pilot jet
	• Clogged starter jet
	• Starter plunger malfunction
	• Improperly adjusted starter cable
Air cleaner	• Clogged
Fuel pump	• Faulty fuel pump
	• Faulty fuel pump relay
	• Faulty fuel sender unit

ELECTRICAL SYSTEM	
Spark plug	• Improper plug cap
	• Worn electrodes
	• Wire between terminals broken
	• Improper heat range
	• Faulty spark plug cap
Ignition coil	• Broken or shorted primary/secondary
	• Faulty spark plug lead
	• Broken body
Full-transistor system	• Faulty igniter unit
	• Faulty pickup coil
Switches and wiring	• Faulty main switch
	• Faulty engine stop switch
	• Broken or shorted wiring
	• Faulty neutral switch
	• Faulty starter motor switch
	• Faulty clutch switch
Starter motor	• Faulty starter motor
	• Faulty starter relay
	• Faulty circuit cut-off relay
	• Faulty starter clutch

COMPRESSION SYSTEM	
Cylinder and cylinder head	• Loose spark plug
	• Loose cylinder head or cylinder
	• Broken cylinder head gasket
	• Worn, damaged or seized cylinder

- Piston and piston rings
  - Improperly installed piston ring
  - Worn, fatigued or broken piston ring
  - Seized piston ring
  - Seized or damaged piston
- Crankcase and crankshaft
  - Improperly seated crankcase
  - Improperly sealed valve
  - Improperly contacted valve and valve seat
  - Improper valve timing
  - Broken valve spring
  - Seized crankshaft

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE	PROBABLE CAUSE
Carburetor	• Improperly returned starter plunger
	• Loose pilot jet
	• Clogged pilot air jet
	• Improperly synchronized carburetors
	• Improperly adjusted idle speed (Throttle stop screw)
	• Improper throttle cable play
	• Flooded carburetor
Electrical system	• Faulty battery
	• Faulty spark plug
	• Faulty igniter unit
	• Faulty pickup coil
	• Faulty ignition coil
Valve train	• Improperly adjusted valve clearance

POOR MEDIUM AND HIGH SPEED PERFORMANCE

POOR MEDIUM AND HIGH SPEED PERFORMANCE

Refer to "Starting failure/Hard starting." (Fuel system, electrical system, compression system and valve train)

	PROBABLE CAUSE
Carburetor	• Improper jet needle clip position
	• Diaphragm malfunction
	• Improperly adjusted fuel level
	• Clogged or loose main jet
Air cleaner	• Clogged air filter
Fuel pump	• Faulty fuel pump

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to "Clutch dragging."

SHIFT PEDAL DOES NOT MOVE	PROBABLE CAUSE
Shift shaft	• Improperly adjusted shift rod
	• Bent shift shaft
Shift cam, shift fork	• Groove jammed with impurities
	• Seized shift fork
	• Bent shift fork guide bar
Transmission	• Seized transmission gear
	• Jammed impurities
	• Incorrectly assembled transmission

JUMP-OUT GEAR	
Shift shaft	• Improperly adjusted
	• Improperly returned stopper lever
Shift fork	• Worn shift fork
Shift cam	• Improper thrust play
	• Worn shift cam groove
Transmission	• Worn gear dog

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING	PROBABLE CAUSE
Clutch	• Loose clutch spring
	• Fatigued clutch spring
	• Worn friction plate/clutch plate
Engine oil	• Low oil level
	• Improper quality/viscosity

CLUTCH DRAGGING	
Clutch	• Warped pressure plate, air-contained clutch fluid
	• Unevenly tensioned clutch springs
	• Match marks not aligned
	• Bent push rod
	• Loose push rod/bent clutch boss nut
	• Burnt primary driven gear bushing
	• Bent clutch plate
	• Swollen friction plate
	• Clutch fluid leakage
	• Faulty cylinder kit cup
	• Broken clutch hose
	• Improper clutch fluid level
Engine oil	• Improper oil level
	• Improper quality/viscosity
	• Deterioration

OVERHEATING OR OVER-COOLING

OVERHEATING	
Ignition system	• Improper spark plug gap
	• Improper spark plug heat range
	• Faulty CDI unit
Fuel system	• Improper carburetor main jet (setting)
	• Improperly adjusted H dimension
	• Clogged air cleaner element
Compression system	• Heavy carbon build-up
Engine oil	• Incorrect oil level
	• Improper oil viscosity
	• Inferior oil quality
Brake	• Dragging brake
Cooling system	• Faulty water temperature meter
	• Faulty thermo-unit
	• Incorrect cooling water level
	• Faulty thermostat
	• Clogged or damaged radiator
	• Faulty radiator cap
	• Broken dowel pin/tipped gear
	• Faulty thermoswitch
	• Inoperative fan motor

OVER-COOLING	
Cooling system	• Faulty water temperature meter
	• Faulty thermo-unit
	• Faulty thermostat
	• Faulty thermoswitch
	• Inoperative fan motor

FAULTY BRAKE

POOR BRAKING EFFECT
- Worn brake pads
- Worn disc
- Air in brake fluid
- Leaking brake fluid
- Faulty cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose
- Oily or greasy disc/brake pads
- Improper brake fluid level

FRONT FORK OIL LEAKAGE/MALFUNCTION

OIL LEAKAGE
- Bent, damaged or rusty inner tube
- Damaged or cracked outer tube
- Damaged oil seal lip
- Improperly installed oil seal
- Improper oil level (too much)
- Loose hexagon bolt (front fork bottom)
- Broken cap bolt O-ring
- Loose drain bolt
- Damaged drain bolt gasket

MALFUNCTION
- Bent, deformed or damaged inner tube
- Bent or deformed outer tube
- Damaged fork spring
- Worn or damaged slide metal
- Bent or damaged piston
- Improper oil viscosity or level

INSTABLE HANDLING

HANDLEBARS
- Improperly installed or bent

STEERING
- Improperly installed handle crown
- Bent steering stem
- Damaged bearing

FRONT FORKS
- Uneven oil levels on both sides
- Uneven spring tension (Uneven damping adjuster position)
- Broken spring
- Twisted front forks
- Uneven tire pressures on both sides

WHEELS
- Incorrect wheel balance
- Deformed cast wheel
- Unevenly worn tires
- Incorrect tire pressure
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel run-out

FRAME
- Twisted
- Damaged head pipe bearing race
- Improperly installed bearing race

REAR ARM
- Worn bearing bushes
- Damaged

REAR CUSHION
- Fatigued spring
- Improper adjustment
- Oil leakage

DRIVE CHAIN
- Improperly adjusted chain

FAIRING
- Damaged or broken
- Incorrectly installed

FAULTY SIGNALS AND LIGHTS

HEADLIGHT DARK
- Improper bulb
- Too many electrical accessories
- Hard charging (broken stator coil wire, faulty rectifier with regulator)
- Incorrectly connected coupler/connector/ wire harness
- Improperly grounded
- Poor contacts (main or light switch)
- Bulb life expired

BULB BURNT OUT
- Improper bulb
- Faulty battery
- Faulty rectifier/regulator (AC generator)
- Improperly grounded
- Faulty switch (main and light switch)
- Bulb life expired

FLASHER DOES NOT LIGHT
- Improperly grounded
- Discharged battery
- Faulty flasher switch
- Faulty flasher relay
- Broken wire harness/loosely connected coupler
- Bulb burnt out

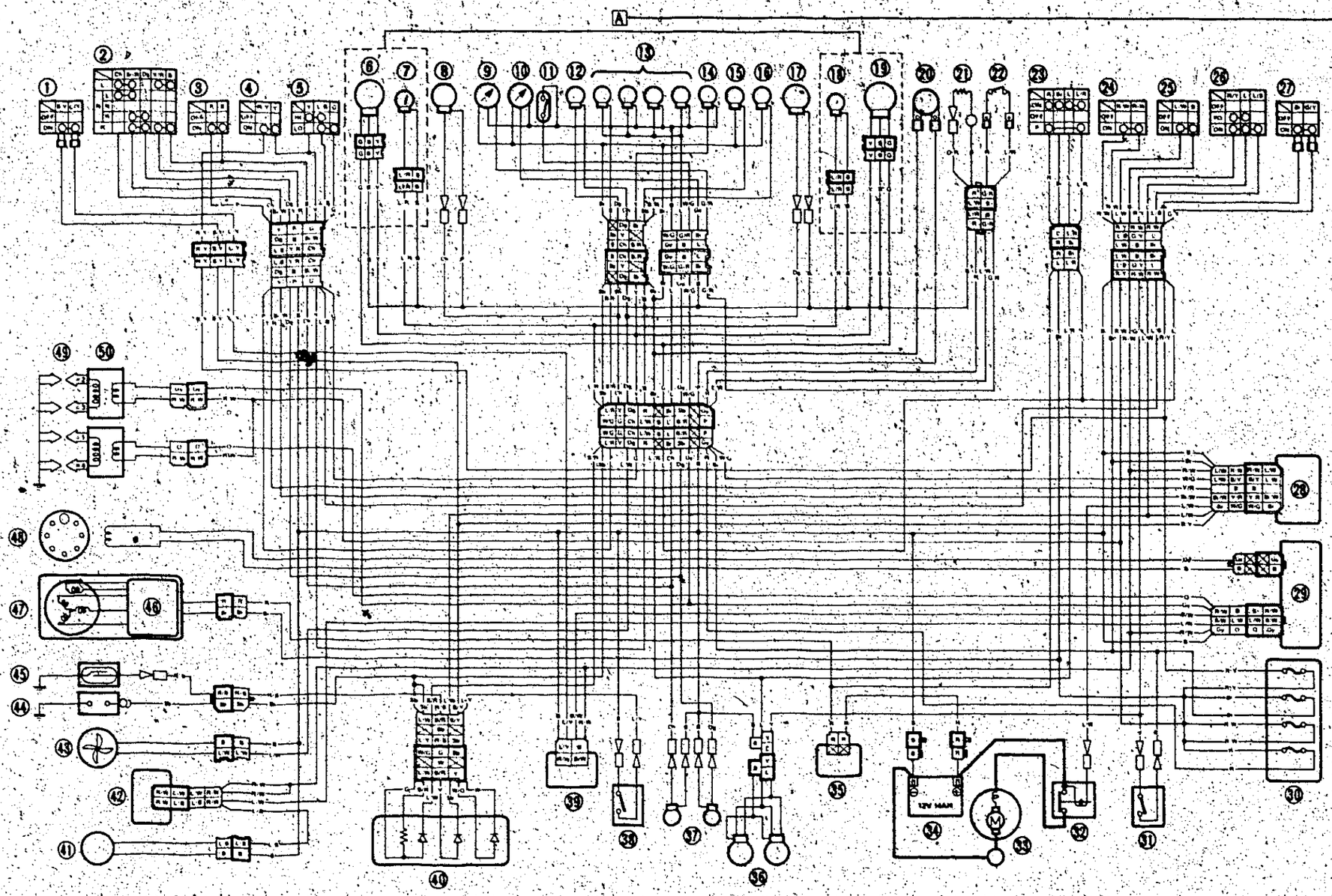
FLASHER KEEPS ON
- Faulty flasher relay
- Insufficient battery capacity (nearly discharged)
- Bulb burnt out (front or rear)

FLASHER WINKS SLOWER
- Faulty flasher relay
- Insufficient battery capacity (nearly discharged)
- Improper bulb
- Faulty switch (main or flasher switch)

FLASHER WINKS QUICKER
- Improper bulb
- Faulty flasher relay

HORN IS INOPERATIVE
- Faulty battery
- Faulty switch (main or horn switch)
- Improperly adjusted horn
- Faulty horn (coil wire broken or having poor contacts)
- Broken wire harness

FZR1000 WIRING DIAGRAM



HEADLIGHT

- A I
- B B, D, F, S
- C A, NL, SF
- D CH
- E OTHERS

COLOR CODE

B	Black
R	Red
L	Blue
G	Green
O	Orange
Y	Yellow
P	Pink
Br	Brown
Ch	Chocolate
Gy	Gray
Sb	Sky blue
Dg	Dark green
W	White
B/R	Black/Red
B/Y	Black/Yellow
B/W	Black/White
R/Y	Red/Yellow
R/B	Red/Black
R/W	Red/White
L/B	Blue/Black
L/R	Blue/Red
L/Y	Blue/Yellow
L/W	Blue/White
G/R	Green/Red
G/Y	Green/Yellow
Y/R	Yellow/Red
Br/W	Brown/White
W/G	White/Green

1. Clutch switch
2. "TURN" switch
3. "HORN" switch
4. "PASS" switch
5. "LIGHTS" (Dimmer) switch
6. Headlight (Left)
7. Auxiliary light (Left)
8. Front flasher light (Left)
9. Temperature gauge
10. Tachometer
11. Reed switch
12. "TURN" indicator light
13. Meter light
14. "HIGH BEAM" indicator light
15. "NEUTRAL" indicator light
16. "OIL LEVEL" indicator light
17. Front flasher light (Right)
18. Auxiliary light (Right)
19. Headlight (Right)
20. Horn
21. Thermo unit
22. Thermo switch
23. Main switch
24. "ENGINE STOP" switch
25. "START" switch
26. "LIGHTS" switch
27. Front brake switch
28. Relay assembly
29. Digital ignitor unit
30. Fuse
31. Rear brake switch
32. Starter relay
33. Starter motor
34. Battery
35. Main fuse
36. Tail/brake light
37. Rear flasher light
38. Sidestand switch
39. Sidestand relay
40. Diode block
41. Fuel pump
42. Fuel pump relay
43. Fan motor
44. Neutral switch
45. Oil level switch
46. Rectifier/regulator
47. A.C. generator
48. Pickup coil
49. Spark plug
50. Ignition coil