YAMAHA

FJ1200AD
FJ1200ADC

SUPPLEMENTARY SERVICE MANUAL

LIT-11616-07-98

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service information and new data for the FJ1200A D/DC. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manuals:

FJ1100L/LC Service Manual: LIT-11616-04-08
FJ1200S/SC Supplementary Service Manual: LIT-11616-05-00
FJ1200W/WC Supplementary Service Manual: LIT-11616-06-94
FJ1200B/BC Supplementary Service Manual: LIT-11616-07-80

FJ1200A D/DC
SUPPLEMENTARY
SERVICE MANUAL
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unauthorized use without the written
permission of Yamaha Motor Co., Ltd.
is expressly prohibited.

NOTICE

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

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the motorcycle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provicde the customer with the most satisfaction from his motorcycle and to conform with federal environmental quality objectives.

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.

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system for the FJ1200A D/DC. Please read this material carefully.

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

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

CAUTION: A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.

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

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

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

1st title ① : This is a chapter with its symbol on the upper right of each page.

2nd title ② : This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)

3rd title ③ : This is a final title.

MANUAL FORMAT

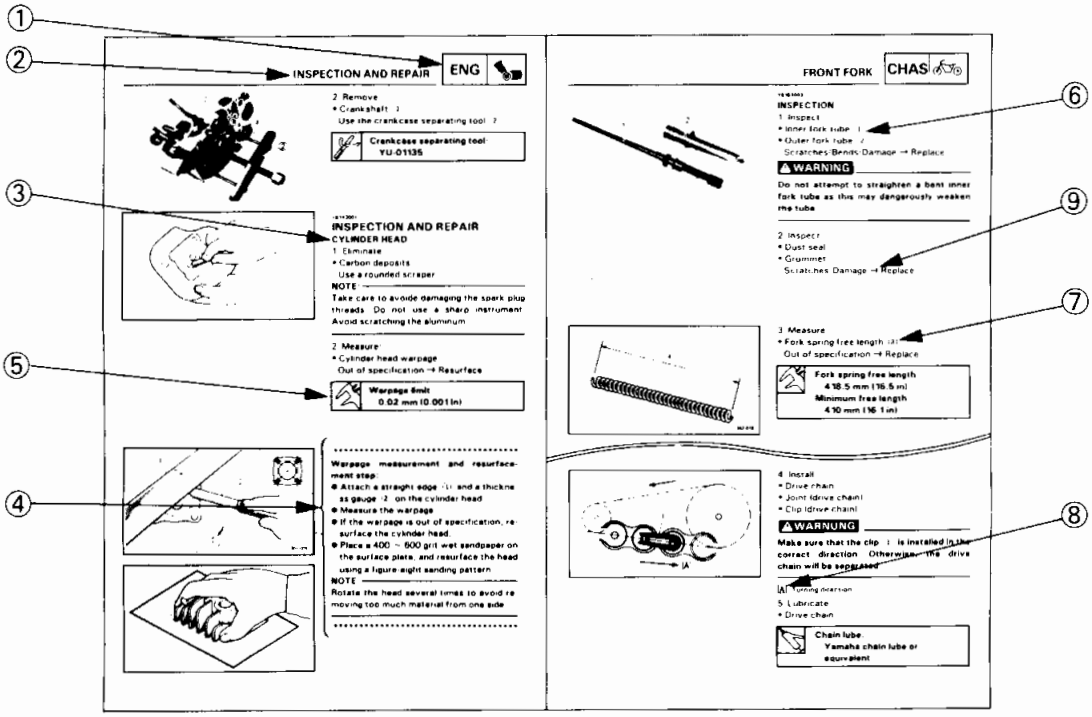
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.
A set of particularly important procedure ④ is placed between a line of asterisks "*" with each procedure preceded by " ● ".

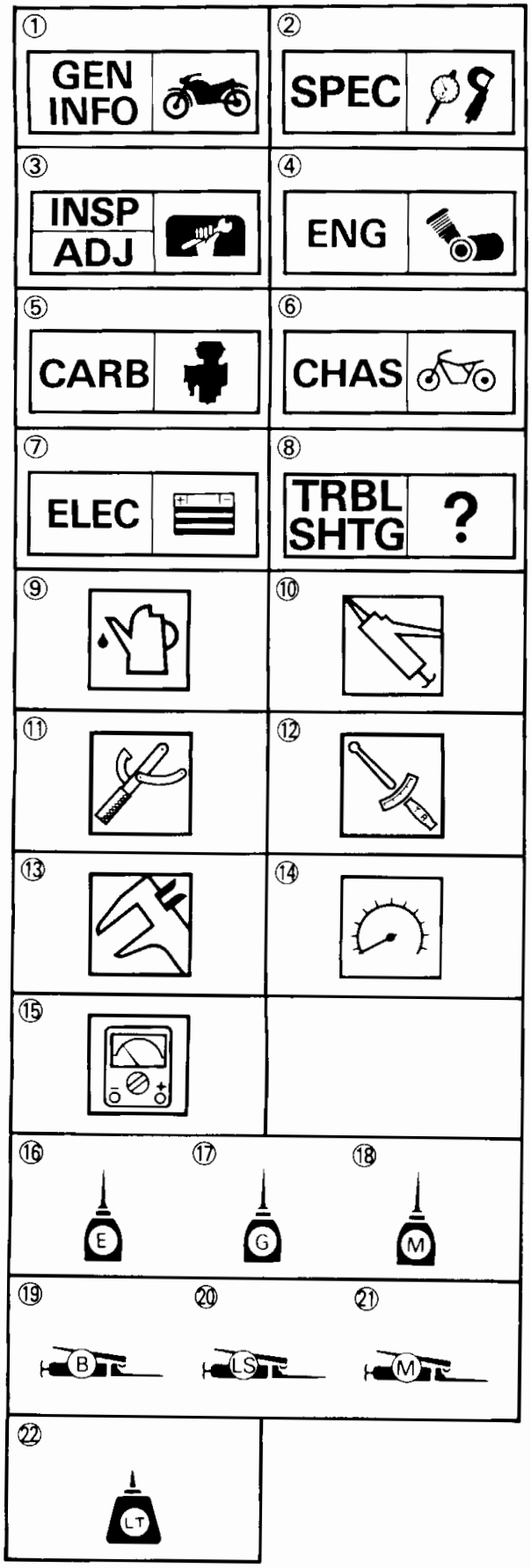
IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤ .
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦ , the others being indicated by an alphabetical letter in a box ⑧ .
- A condition of a faulty component will precede an arrow symbol and the course of action required the symbol ⑨ .

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 ⑧ 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 Carburetion
⑥ Chassis
⑦ Electrical
⑧ Troubleshooting

Illustrated symbols ⑨ to ⑮ are used to identify the specifications appearing in the text.

⑨ Filling fluid
⑩ Lubricant
⑪ Special tool
⑫ Tightening
⑬ Wear limit, clearance
⑭ Engine speed
⑮ Ω, V, A

Illustrated symbols ⑯ to ㉒ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑯ Apply engine oil
⑰ Apply gear oil
⑱ Apply molybdenum disulfide oil
⑲ Apply wheel bearing grease
⑳ Apply lightweight lithium-soap base grease
㉑ Apply molybdenum disulfide grease
㉒ Apply locking agent (LOCTITE®)

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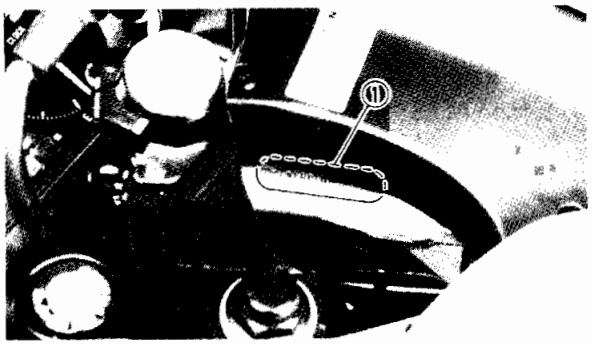
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FJ1200A D/DC WIRING DIAGRAM

GENERAL INFORMATION



MOTORCYCLE IDENTIFICATION

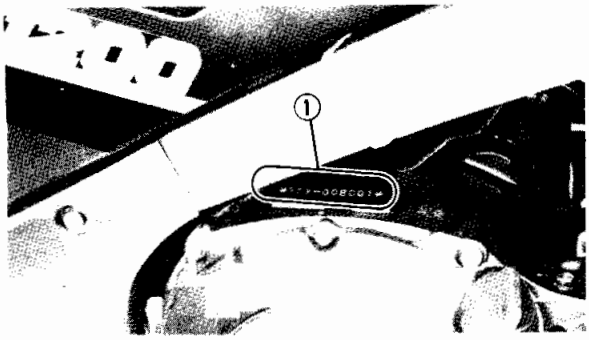
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the right side of the frame.

Starting serial number:
FJ1200A D (Except for California):
JYA4CRE0 ✳ NA000101
FJ1200A DC (For California):
JYA4CRC0 ✳ NA001101

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.

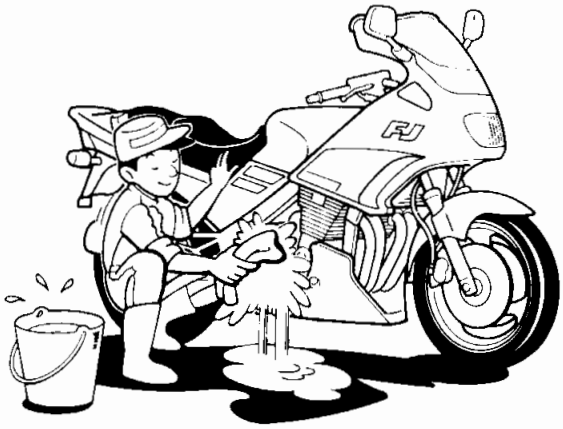
Starting serial number:
FJ1200A D (Except for California):
4CR-000101
FJ1200A DC (For California):
4CR-001101

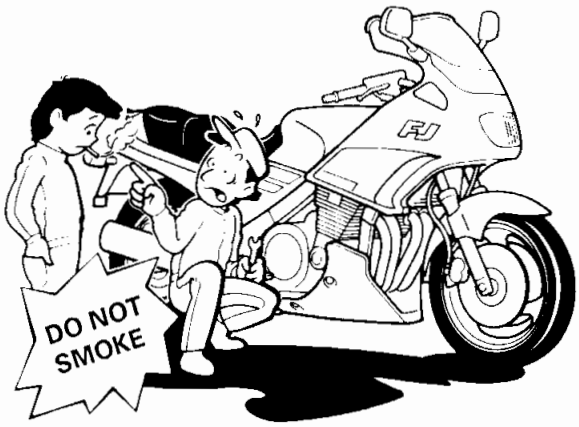
NOTE:

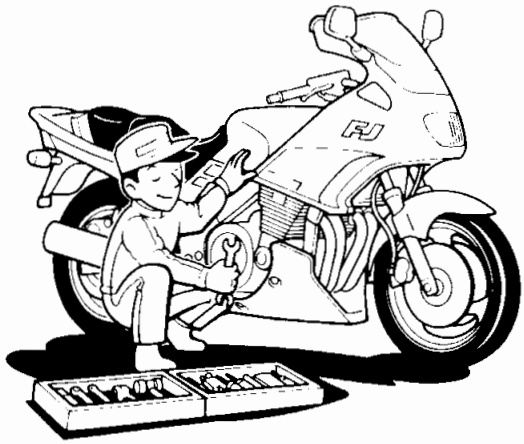
- The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.

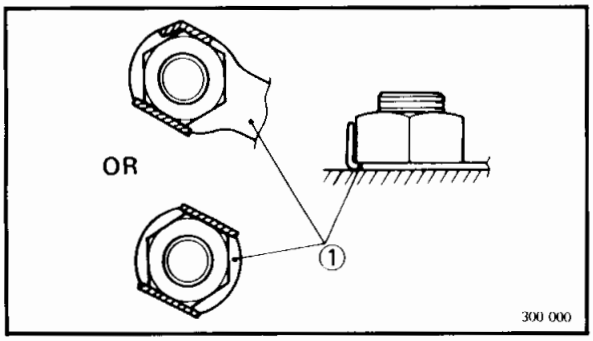












IMPORTANT INFORMATION

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 the "GENERAL INFORMATION-SPECIAL TOOLS" section in CHAPTER 1.
3. When disassembling the machine, keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.
5. Keep away from fire.

ALL REPLACEMENT PARTS

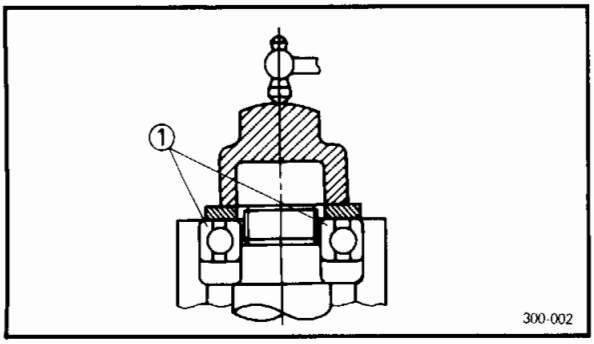
1. We recommend the use of Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

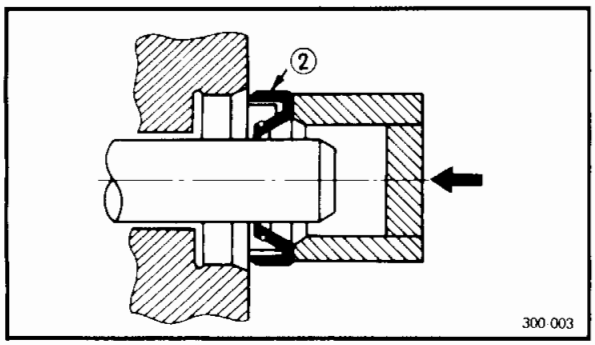
GASKETS, OIL SEALS, AND O-RINGS

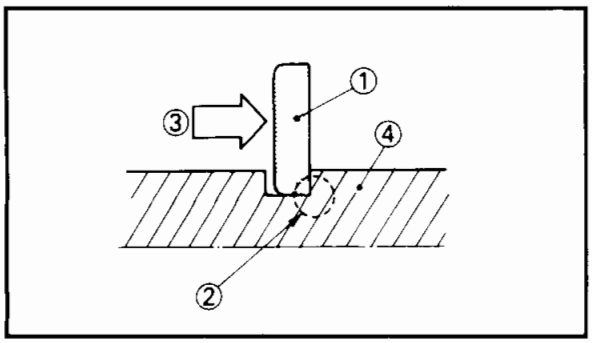
1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.

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.

CAUTION:

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

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.

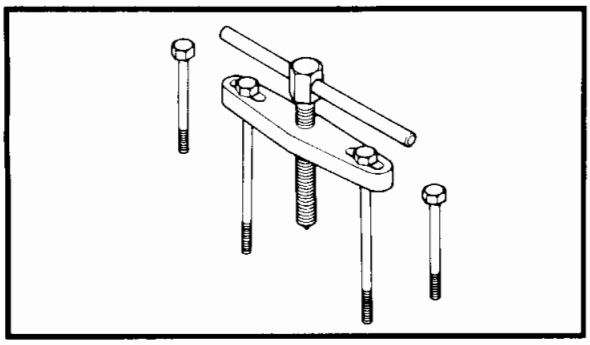
④ Shaft

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. The shape and part number used for the special tool differ by country, so two types are provided. Refer to the list provided to avoid errors when placing an order.

P/N. YM-□□□□□, YU-□□□□□
YS-□□□□□, YK-□□□□□ For US, CDN
ACC-□□□□□

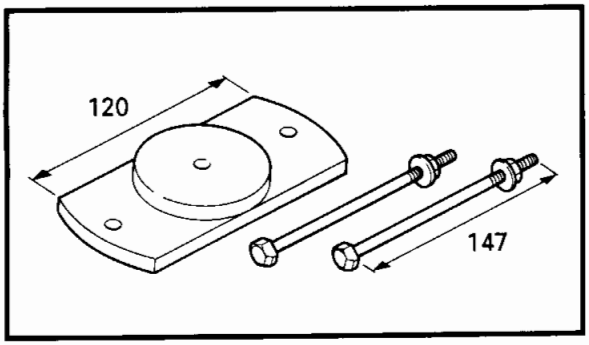
P/N. 90890-□□□□□ Except for US, CDN



FOR CHASSIS SERVICE

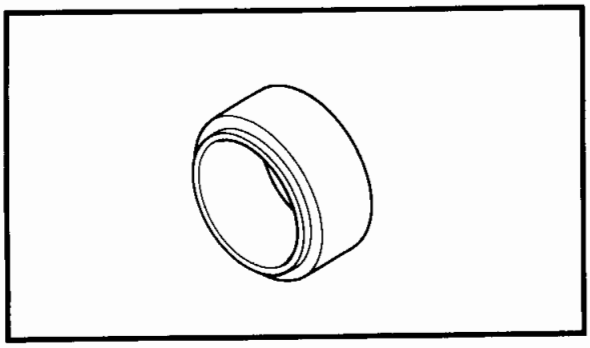
1. Crankcase separating tool
   P/N. YU-01135-A
   P/N. 90890-01135

This tool is necessary to remove the ABS sensor rotor.



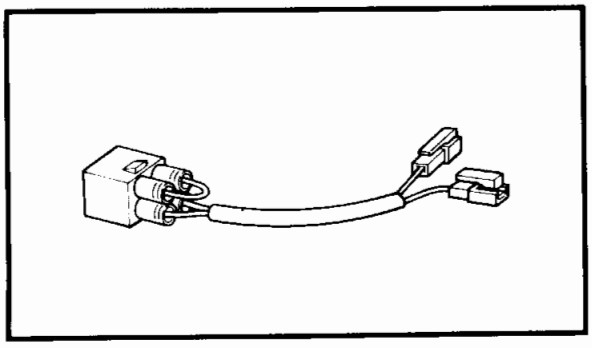
2. Sensor rotor puller guide
   P/N. YM-04126

This tool is necessary to remove the ABS sensor rotor.Use this tool with Crankcase separating tool for removal of sensor rotor.



3. Sensor rotor installation pot
   P/N. YM-04124
   P/N. 90890-04124

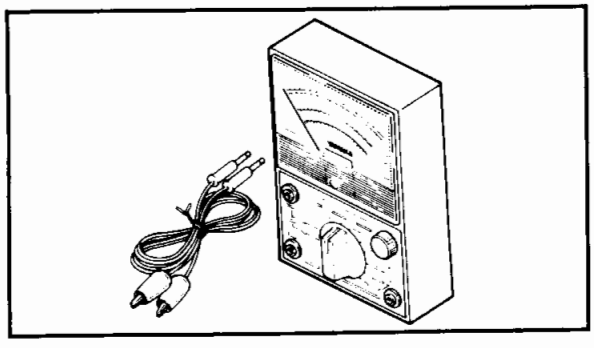
This tool is necessary to install the ABS sensor rotor.



FOR ELECTRICAL COMPONENTS

1. ABS test coupler adapter
   P/N. YM-03149
   P/N. 90890-03149

This instrument is necessary for self diagnosis of the ABS system.



2. Pocket tester
   P/N. YU-03112
   P/N. 90890-03112

This instrument is necessary for checking the electrical system.

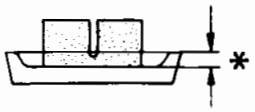
SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	FJ1200A D/DC	
Model Code Number:	4CR1 (Except for California)	4CR2 (For California)
Vehicle Identification Number:	JYA4CRE0*NA000101	JYA4CRC0*NA001101
Engine Starting Number:	4CR-000101	4CR-001101
Basic Weight: With Oil and Full Fuel Tank	274 kg (604 lb)	275 kg (606 lb)
Tire Pressure (Cold Tire): Maximum Load*	177 kg (390 lb): Except for California 176 kg (388 lb): For California	
Cold Tire Pressure:	Front	Rear
Up to 90 kg (198 lb) Load*	225 kpa (2.25 kg/cm², 32 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.		
Bulb wattage x quantity: Headlight Tail/Brake light Front position light/Front flasher light Rear flasher light Meter light Indicator light: "NEUTRAL" "TURN" "OIL LEVEL" "HIGH BEAM" "ABS" warning	 12V 60W/55W x 1 12V 8W/27W x 2 12V 8W/27W x 2 12V 27W x 2 12V 3.4W x 3 12V 3.4W x 1 12V 3.4W x 2 12V 3.4W x 1 12V 3.4W x 1 12V 3.4W x 1	

MAINTENANCE SPECIFICATIONS

CHASSIS

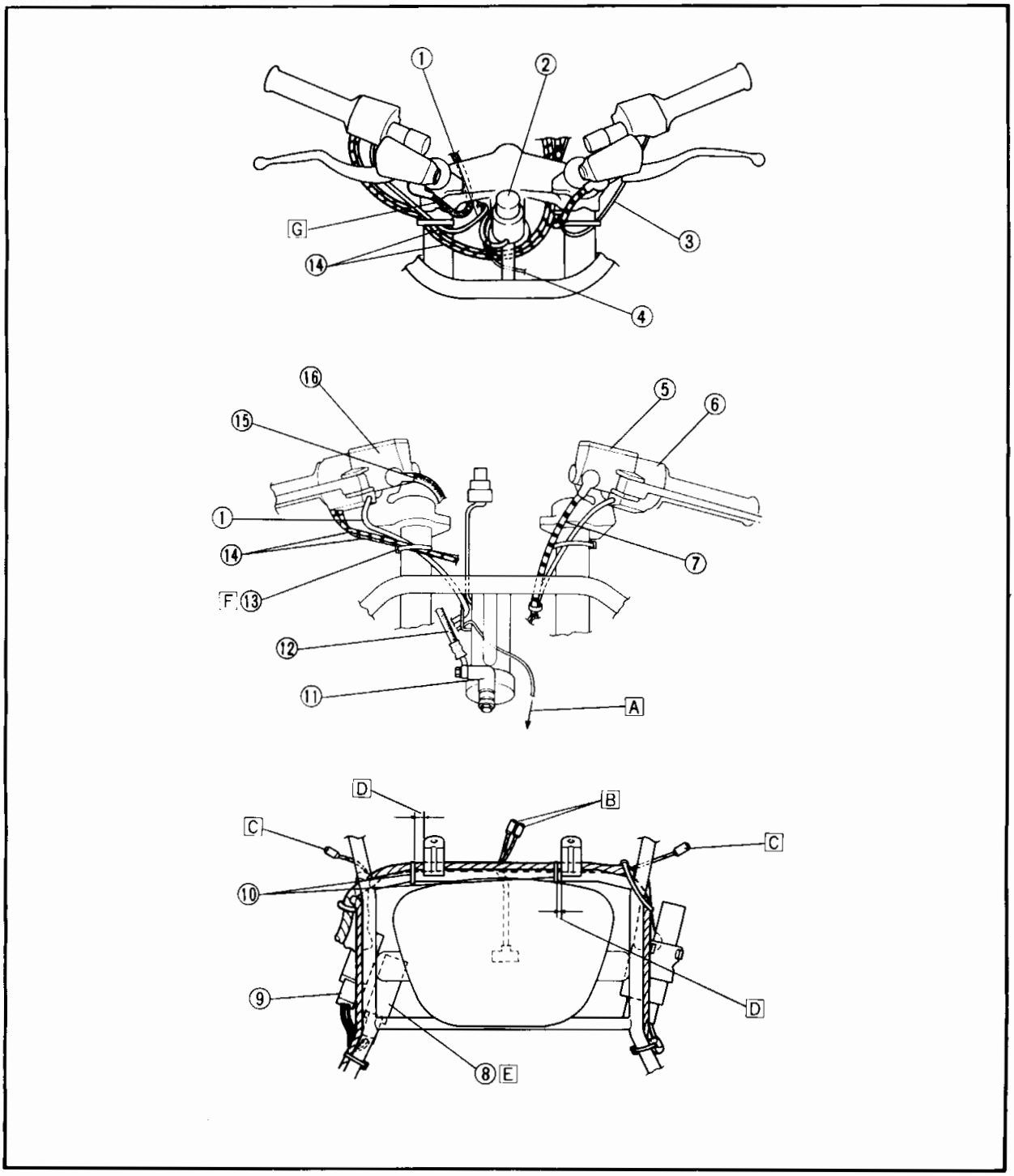
Model	FJ1200A D/DC
Front Disc Brake:	
Type	Dual
Disc Outside Diameter x Thickness	298 x 5.0 mm (11.73 x 0.20 in)
Pad Thickness Inner	5.5 mm (0.22 in)
<Limit>*	<0.5 mm (0.02 in)>
Pad Thickness Outer	5.5 mm (0.22 in)
<Limit>*	<0.5 mm (0.02 in)>
	
Master Cylinder Inside Diameter	15.87 mm (0.63 in)
Caliper Cylinder Inside Diameter	32.1 mm (1.26 in)
Brake Fluid Type	DOT #4or DOT #3
Brake lever and Brake Pedal:	
Brake Lever Free Play	2 ~ 5 mm (0.08 ~ 0.20 in) at brake lever end
Brake Pedal Position	30 mm (1.18 in) below top of footrest
Brake Pedal Free Play	5 ~ 9 mm (0.20 ~ 0.35 in)

ELECTRICAL

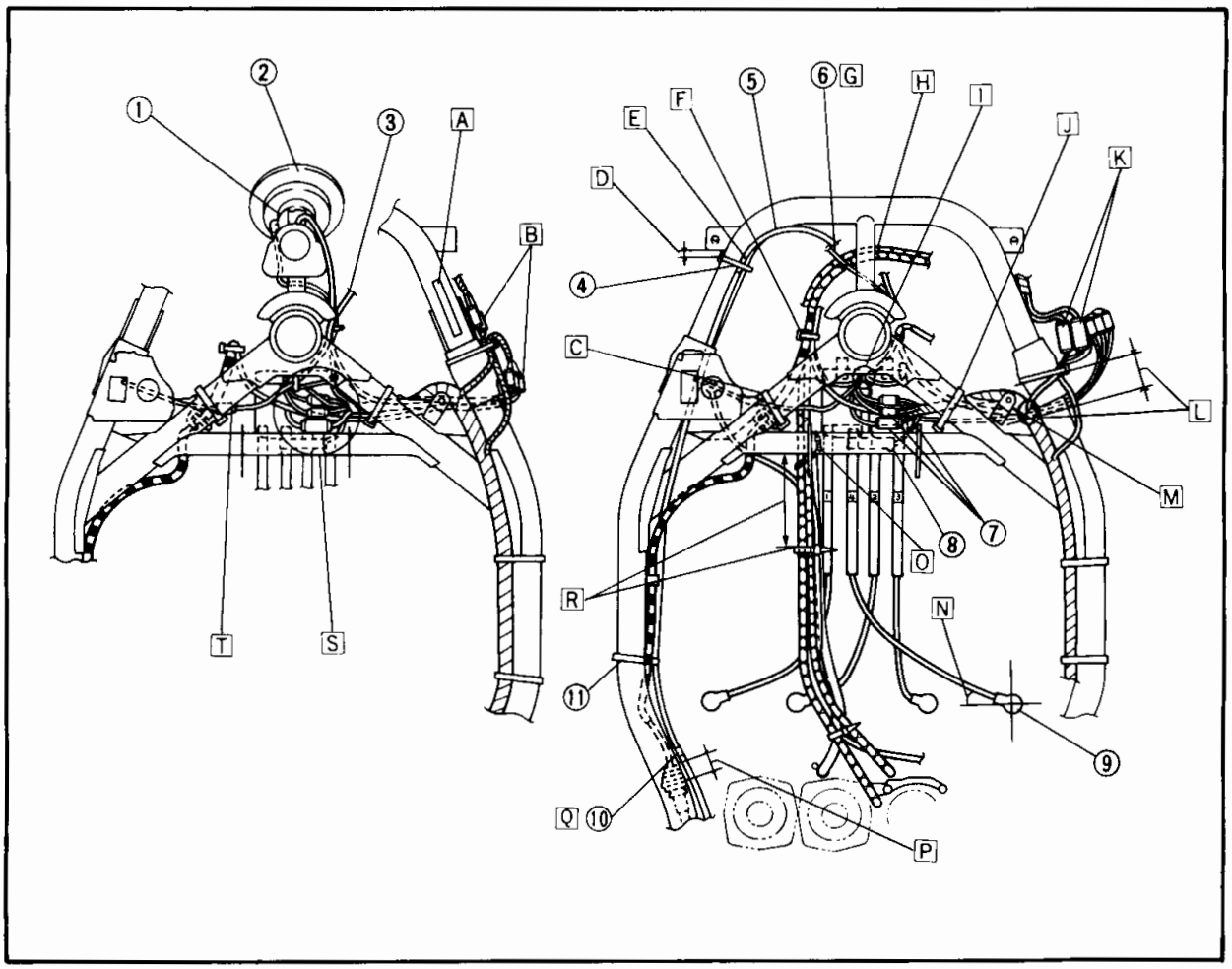
Model	FJ1200A D/DC
Voltage:	12V
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit x Quantity	
MAIN	30A x 1
ABS PUMP	30A x 1
ECU	3A x 1
WARNING	3A x 1
HEAD	15A x 1
SIGNAL	15A x 1
IGNITION	15A x 1
RESERVE	30A x 1
	15A x 1
	3A x 1

CABLE ROUTING

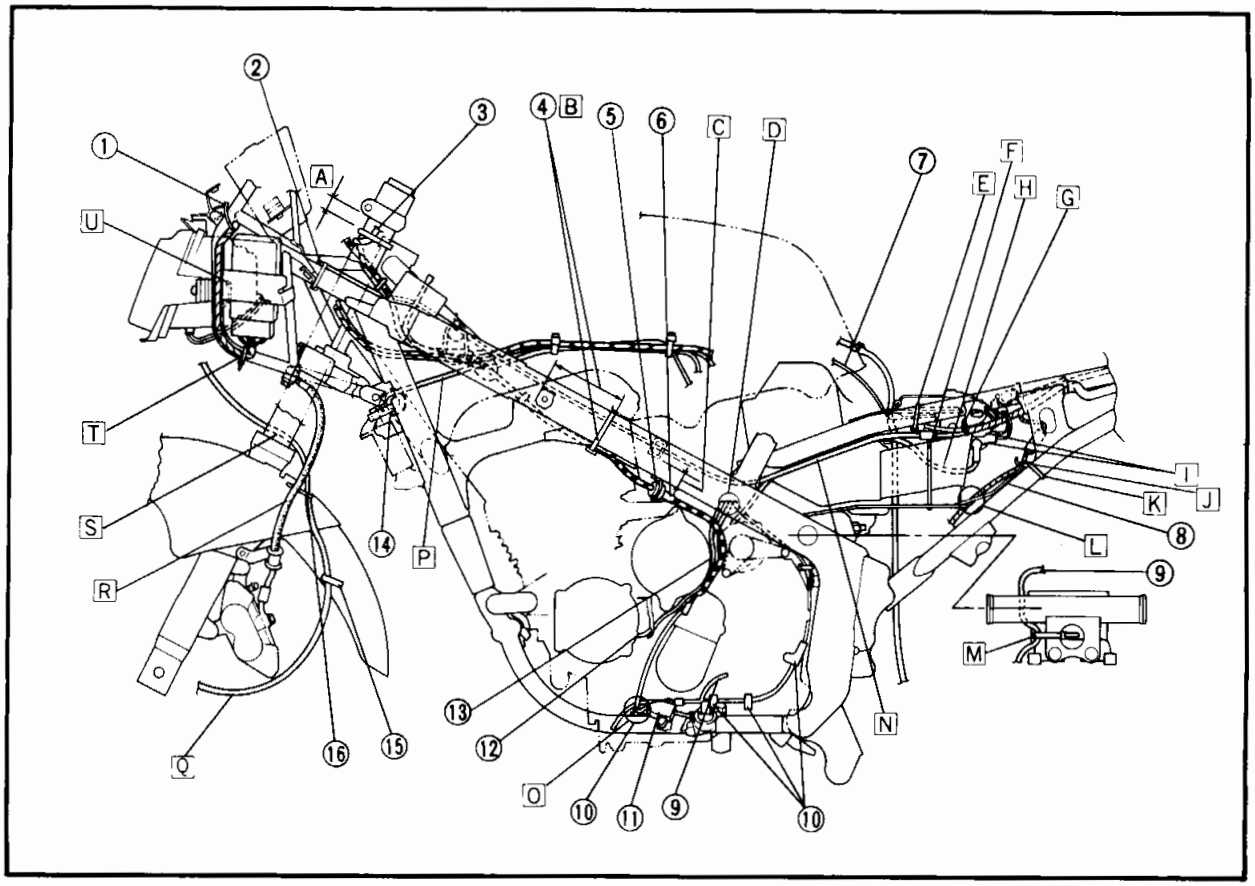
① Handle switch lead (right)
② Main switch
③ Handle switch lead (left)
④ Horn lead
⑤ Master cylinder (clutch)
⑥ Handle switch 4 (left)
⑦ Clutch hose
⑧ Flasher relay
⑨ Safety relay assembly
⑩ Band
⑪ Joint (brake hose)
⑫ Brake hose 5
⑬ Band
⑭ Throttle cable
⑮ Brake hose 1
⑯ Master cylinder (front brake)
[A] To the horn
[B] Connect the meter coupler
[C] Connect the flasher light coupler
[D] Less than 10 mm (0.39 in)
[E] Fit the flasher relay on the inside.
[F] Cut the end of the band which clamps the 2 throttle cables, handlebar switch lead (right), and the 4 front brake switch leads.
[G] The brake hose 1 should not cross the handlebar switch lead (right) and the throttle cable.



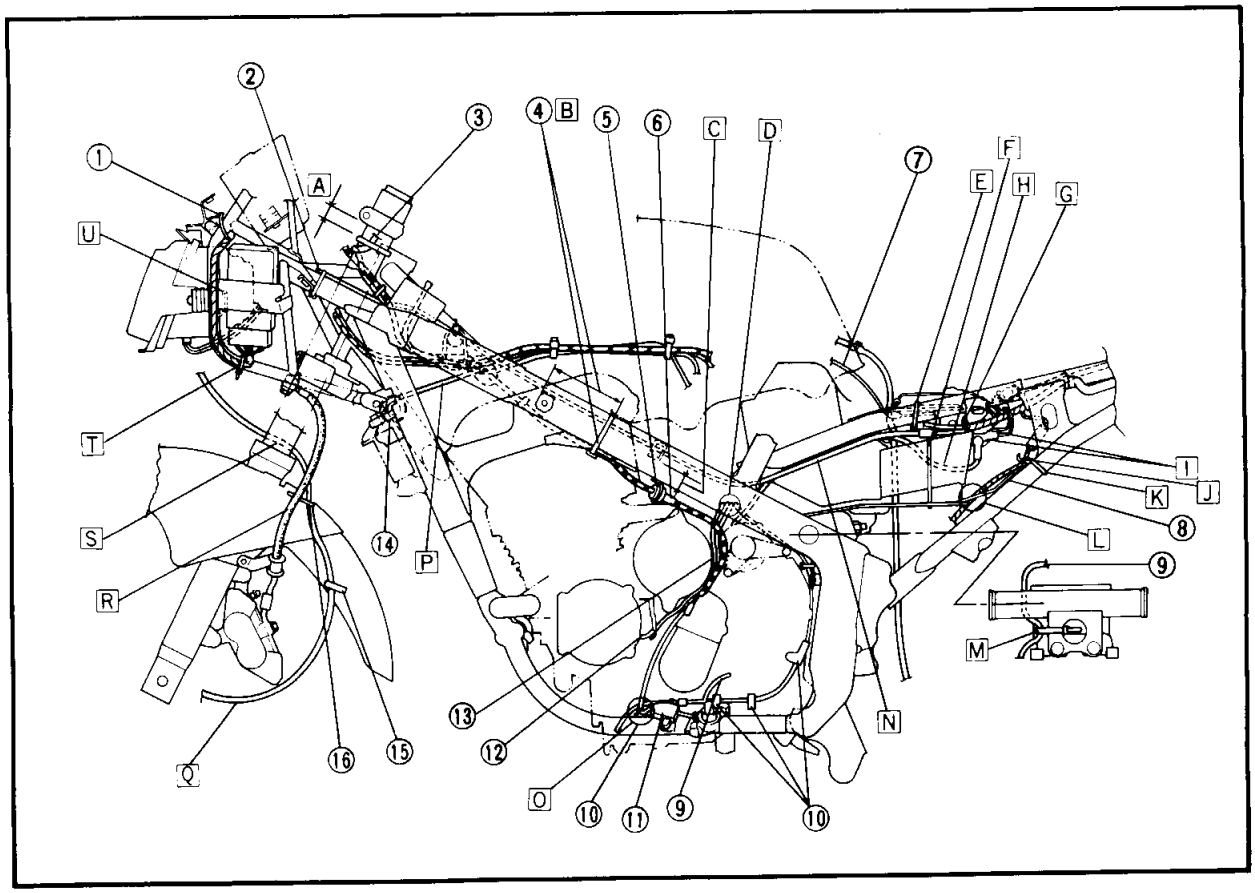
① Main switch
② Horn
③ Handle switch lead (right)
④ Band
⑤ Front wheel sensor lead
⑥ Horn lead
⑦ Ignition coil coupler (two pieces)/Main switch coupler
⑧ Frame earth
⑨ Plug cap
⑩ Clamp
⑪ Band
[A] Make sure the frame No. is not hidden by the harness.
[B] Coupler on the outside of the frame.
[C] Secure the clutch hose and reserve switch lead, so that the front ends face towards the inside of the frame.
[D] Less than 10 mm (0.39 in).
[E] Clamp the positioning white tape.
[F] Clamp the clutch hose and handle switch lead (left).
[G] Route the horn lead in front of the head pipe (within the triangular shape) and above the throttle cable.
[H] Route the throttle cable through the center of the head pipe (Within the triangular shape).
[I] Route the ignition coil leads (two pieces.), main switch lead, and reserve switch lead through the clamp of the frame unit.
[J] Secure the main harness and handle switch lead (right/ left) together, and make sure that the band front end is directed towards the inside of the frame.
[K] After connecting with the coupler of cowl stay, clamp it.
[L] Position the harness so that the branch is aligned with the bracket end (Less than 10 mm (0.39 in)).
[M] Insert the harness beneath the bracket.
[N] Position the spark plug lead about 15° from centerline to prevent contact with air duct.
[O] Clamp the two throttble cables to the cross pipe (for California only).
[P] 10 ~ 20 mm (0.39 ~ 0.79 in) from the clutch hose clamp.
[Q] When clamping on the inside of the tank rail, always be sure to remove oils from the tank rail. The open part of the clamp should be on top.
[R] Secure both throttle cables, the choke cable and the pressure senser hose less than 60 mm (2.36 in) from the cross member. (On Californian Models the cannistor hose has to be clamped with these five items.)
[S] At the time of installing the fuel tank, insert the lead and coupler within the frame so that they are not pinched.
[T] The coupler should be inserted beneath the frame.



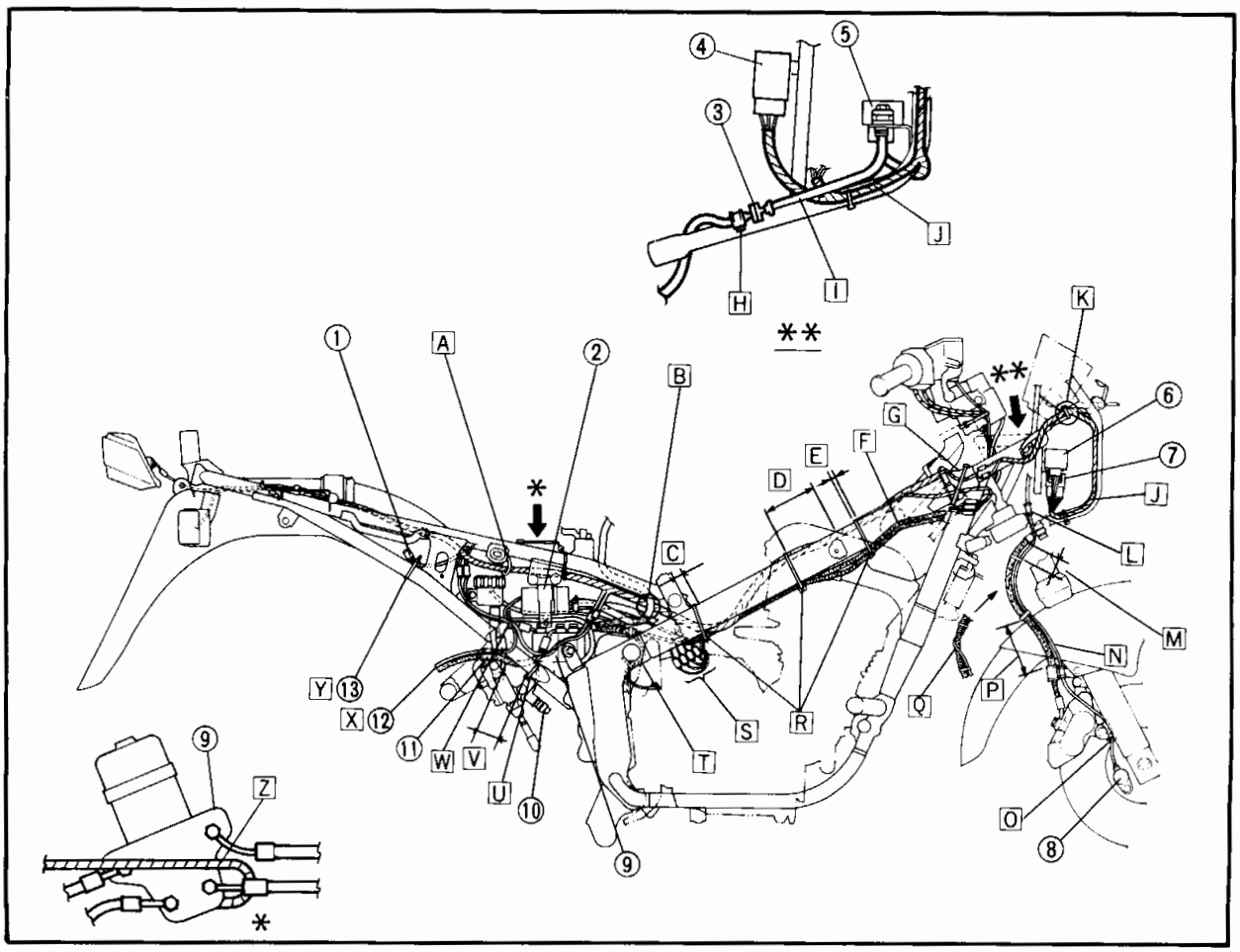
① Band
② Front wheel sensor lead
③ Handle switch lead (left)
④ Band
⑤ Clamp (clutch hose)
⑥ Clutch hose 2
⑦ Fuel sender unit lead
⑧ Rubber seat
⑨ Neutral switch lead
⑩ Clamp
⑪ Side stand switch
⑫ Pickup coil lead
⑬ A.C. generator lead
⑭ Cross pipe
⑮ Cable holder
⑯ Holder
[A] Clamp at a position 20 mm (0.79 in) beneath the handle crown (Common for left and right sides).
[B] Less than 100 mm (3.94 in) approximately. After fitting the band, cut the excess band and position the end on the underside of the frame.
[C] 15 ~ 20 mm (0.59 ~ 0.79 in).
[D] Route the neutral switch lead, side stand switch lead, pickup coil lead and A.C. generator lead between the insulating plate and carburetor to the right side of the vehicle body.
[E] Clamp in such a way that the wires do not get stuck in the damper at the seat bottom.
[F] Secure the starter motor lead, air cleaner duct and rubber seat. The band should be routed through the rubber seat hole, and the end should be inserted at the rear part of the frame.
[G] After mounting the damper on the bracket, clamp the wire harness to the damper.
[H] Insert the starter motor lead between the air cleaner duct and the battery box. Do not position it above the duct.
[I] The harness should be led out to the rear of the vehicle body. (Facing sideways)
[J] Clamp the hydraulic unit (H.U.) lead. The coupler should be fitted on the inside of the frame bracket.
[K] The clamp securing the rubber seat is to be fitted on the mudguard of the rear frame, routed from the top of the bracket and the end is to be inserted on the inside of the frame.
[L] The motor lead of the hydraulic unit (H.U.) should be routed though the rubber seat hole.
[M] The front end of the band should be inserted in the engine bracket.
[N] The starter motor lead and the front wheel sensor lead should be routed above the air cleaner duct, and should not protrude outside the frame.
[O] The side stand switch lead should not sag. (To prevent contact with the joint silencer)
[P] Route the pressure sensor hose to the left of the high-tension cord 1 (for California, through the center between the canister and the high-tension cord 1), and over the cross-pipe. Pass it behind the oil cooler attachment pin and to the right side of the vehicle.



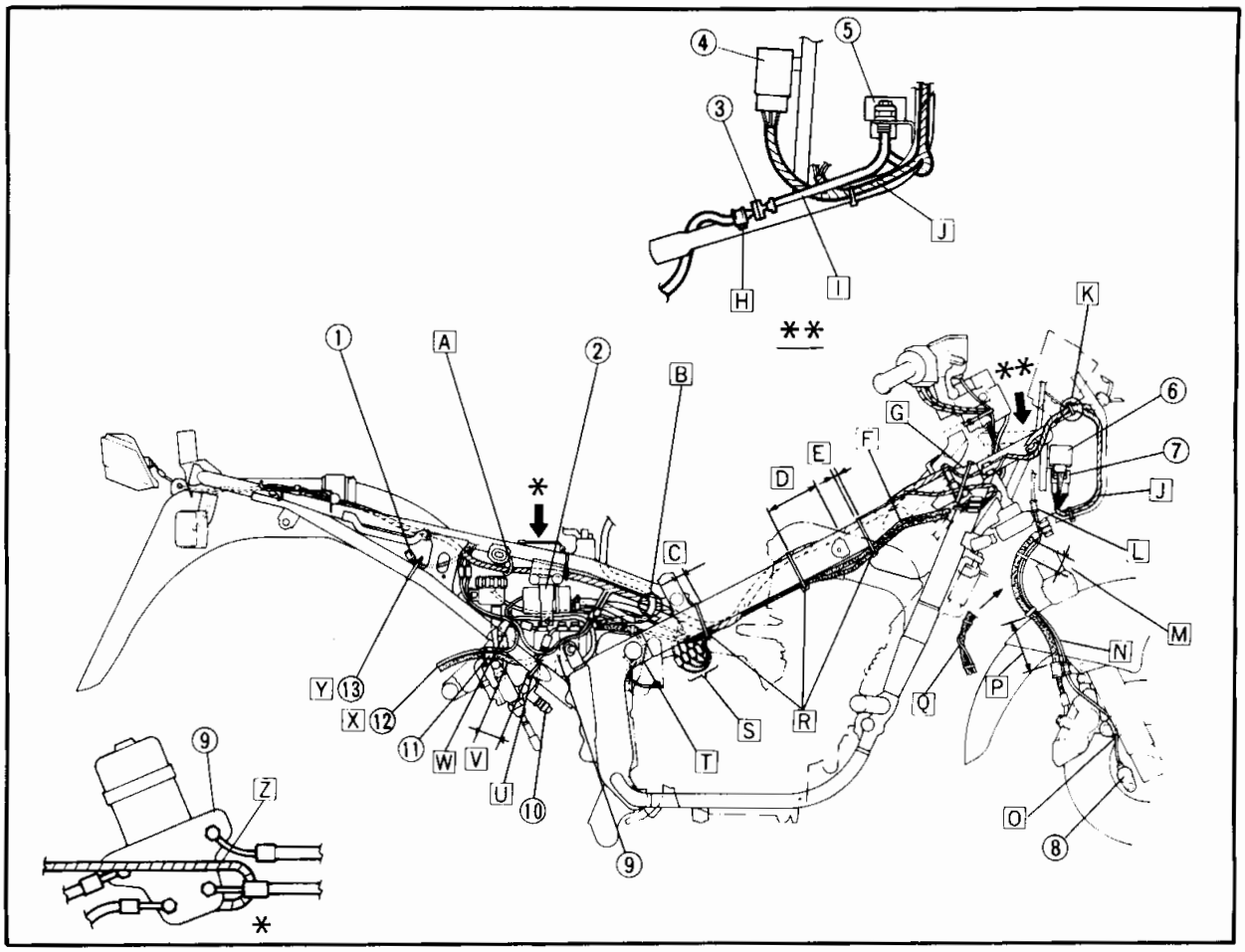
Q The speedometer cable should be routed through both holders.
R The brake hose should be routed on the outside of the meter cable.
S Should be routed through the inner side of the fork.
T Wireharness should be routed on the outside of the cowl stay and clamped.Whether the front end of the band is cut or not cut, it should be directed outside the cowl.
U The earth lead should be secured along with the igniter unit.
(The earth lead should be sandwiched between the ignitor unit and screw.)



① ABS test coupler
② Fuel pump
③ Nozzle
④ Fuel pump control relay
⑤ Pressure sensor
⑥ Safety relay
⑦ Flasher relay
⑧ Front wheel sensor
⑨ Hydraulic unit (H.U.)
⑩ Rear brake switch
⑪ Clamp
⑫ Rear wheel sensor lead
⑬ Band
[A] Mount the damper on the bracket, and clamp the main harness using a band.
[B] The fuel hose should be more on the outside than the main harness.
[C] Less than 20 mm (0.79 in).
[D] Less than 100 mm (3.94 in).
[E] Less than 15 mm (0.59 in).
[F] Brake pipes 1 and 2 should not be crossed. Make sure brake pipe 1 (joint nut white plating) is above brake pipe 2 (joint nut black plating).
[G] After connecting the band, the end should be directed towards the outside portion of the frame.
[H] Using the cowl stay clamp, secure it on top of the nozzle or the clamp.
[I] Route the band on the outside of the cowl stay and the harness. Do not clamp it together with the relay card.
[J] The harness should be routed on the outside of the cowl stay and should not enter the inside part of the cowl stay.
[K] Align the harness branch with the bracket for fitting meter.
[L] Clamp the horn stay.
[M] Approximately 50 mm (1.97 in).
[N] The wheel sensor lead should be parallel to the brake hose.
[O] The sensor lead should be routed correctly through the guide, and should not touch the disk.
[P] Approximately 100 mm (3.94 in).
[Q] The wheel sensor lead should not be coiled around the brake hose.
[R] After fitting the band, cut the end and position the end on the underside of the frame.
[S] After connecting the pickup coil lead, A.C. generator lead, neutral switch lead and side stand switch lead, these lead wires should be enclosed on the inside portion of the frame. Make sure you do not damage the carburetor breather pipe when positioning these wires.
[T] The negative lead should be routed in front of the engine suspension bracket, and above the rubber plate, to the battery. The securing on the crankcase side is by fastening the wire and the case by means of the securing bolt.
[U] Cut the end of the band.
[V] Less than 70 mm (2.76 in).
[W] Clamp the rear wheel sensor lead, the hydraulic unit (H.U.) lead, fuel pump lead and the

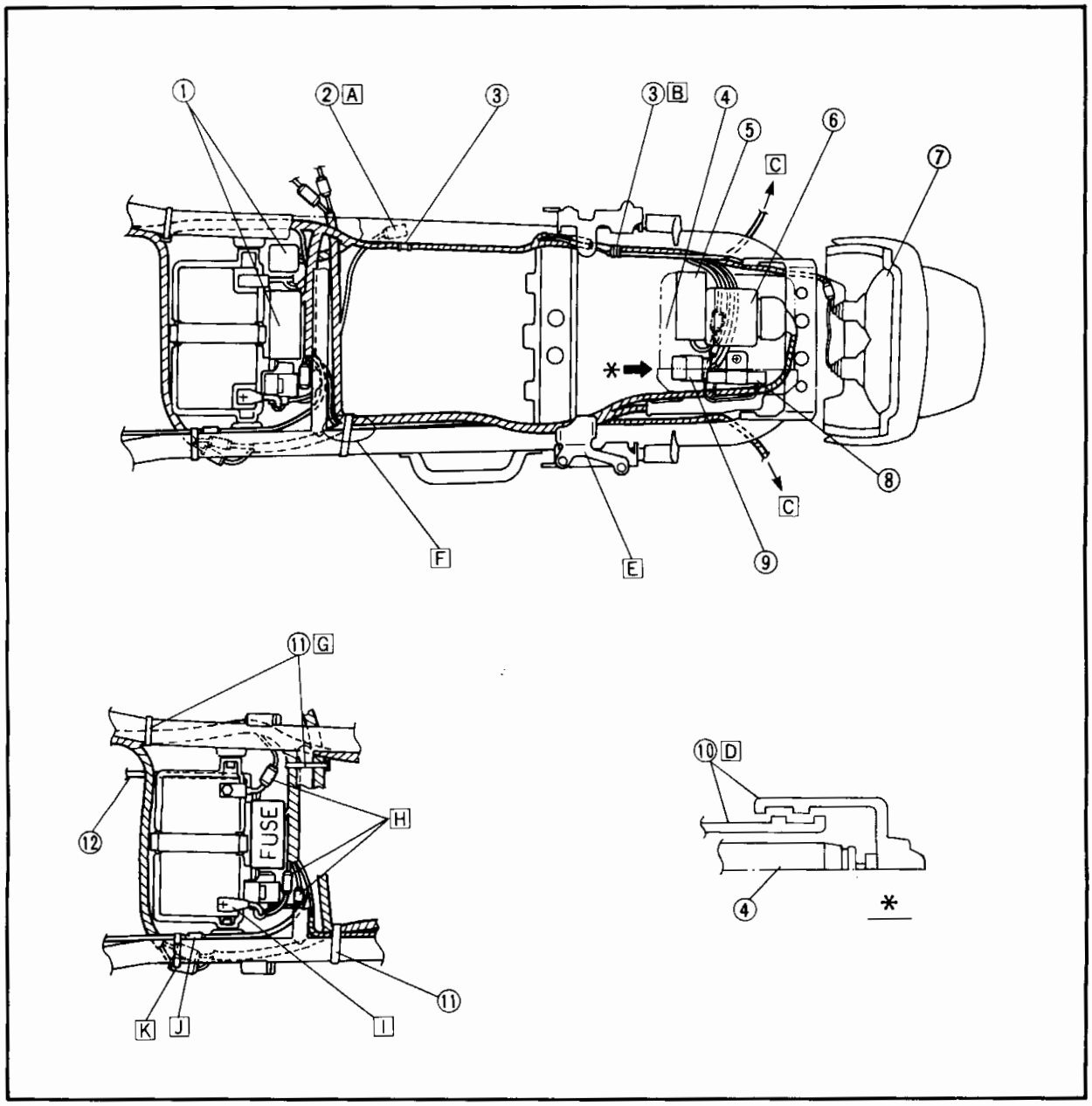


[X] The wheel sensor lead should be parallel to the brake hose.
[Y] The end of the band should be enclosed on the inside of the frame.
[Z] The hydraulic unit (H.U.) lead should be routed between the two brake hoses.



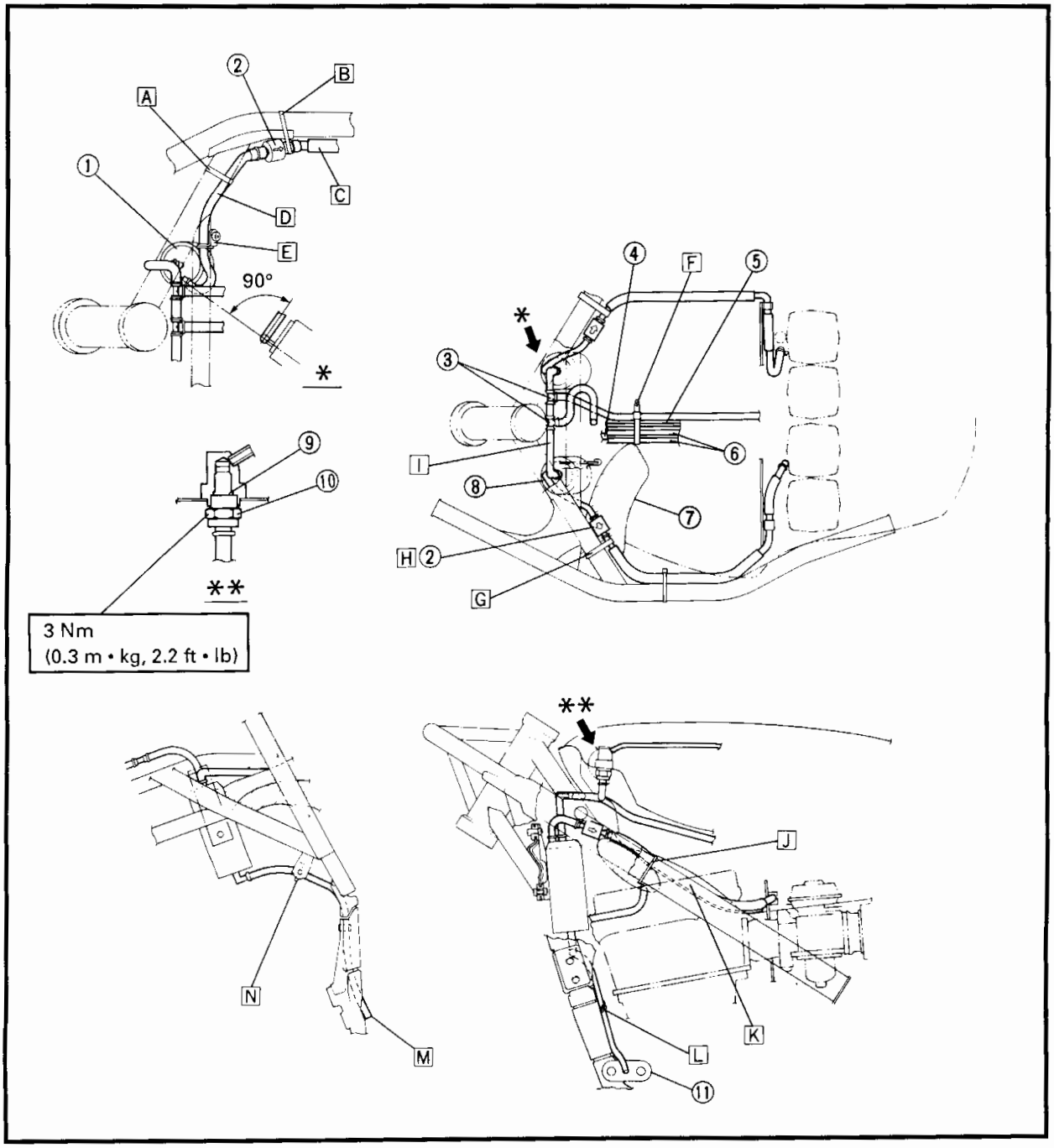
① Fuse
② ABS test coupler
③ Clamp
④ ABS Electronic control unit (ECU)
⑤ Condenser
⑥ Fail-safe relay
⑦ Tail light unit
⑧ Resister
⑨ Relay assembly (brake switch)
⑩ ECU cover
⑪ Band
⑫ Battery negative lead

[A] After checking its condition, fit the protection cap to the ABS test coupler and locate it on the inside porsion of the frame.
[B] Insert the rear flasher lead in the clamp, and make sure it is firmly secured.
[C] To the flasher light.
[D] Make sure the ECU cover seats properly into the grooves of case cover.
[E] The seat spring should hold down the wireharness.
[F] The harness should not protrude above the seat rail.
[G] After securing the band, cut the front end. If it is not cut, the front end should be inserted beneath the frame.
[H] The negative lead, positive lead and starter relay coupler should not protrude above the frame.
[I] Install so that the positive lead comes out in the rear.
[J] The fuel sender lead coupler should be inserted on the inside part of the seat rail and should not protrude above the frame.
[K] Clamp the fuel sender lead, taking care not to trap it by seat bottom damper.



EMISSION HOSE ROUTING (FOR CALIFORNIA-ONLY)

① Canister assembly (right)
② Outer vent valve
③ Joint pipe
④ Pressure sensor hose
⑤ Choke cable
⑥ Throttle cable
⑦ Air duct
⑧ Canister assembly (left)
⑨ O-ring
⑩ Roll over valve
⑪ Engine suspension bracket
[A] Make sure the hose is not collapsed at any point.
[B] Clamp the hose and main harness with the hand. Make sure the hose is not collapsed at any point.
[C] Pass the hose under the main harness.
[D] Pass the hose over the airduct.
[E] Route the hose through the brake hose holder.
[F] Clamp the canister hose, throttle cable, choke cable and pressure sensor hose with the band.
[G] Make sure the hose is not collapsed at any point.
[H] The arrow mark on the outer vent valve should face the carburetor side.
[I] Pass the hose over the ignition coil.
[J] Cut the end of the band.
[K] Pass the hose inside the tank rail.
[L] Secure it with the clamp of the down tube.
[M] Route the hose between the under cowling and the engine suspension bracket.
[N] Pass the hose through the holder of the oil cooler bracket.



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.

MAINTENANCE INTERVALS CHARTS

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emissions control are grouped separately.

PERIODIC MAINTENANCE EMISSION CONTOROL SYSTEM

No.	Item	Remarks	Initial	Odometer readings				
			1,000 km or 1 month (600 mi)	**1 7,000 km or 7 months (4,400 mi)	**2 13,000 km or 13 months (8,200 mi)	19,000 km or 19 months (12,000 mi)	**3 25,000 km or 25 months (15,800 mi)	31,000 km or 31 months (19,600 mi)
1*	Valve clearance	Check and adjust valve clearance when engine is cold.					○	
2	Spark plugs	Check condition. Adjust gap and clean. Replace at 13,000 km (or 13 months) and thereafter every 12,000 km (or 12 months).		○	Replace	○	Replace	○
3*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		○	○	○	○	○
4*	Fuel line	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○	○	○	○	○
5*	Fuel filter	Replace initial 31,000 km (19,600 mi) and thereafter every 30,000 km (19,000 mi).						Replace
6*	Exhaust system	Check for leakage. Retighten if necessary. Replace gasket (s) if necessary.		○	○	○	○	○
7*	Carburetor Synchronization	Adjust synchronization of carburetors.	○	○	○	○	○	○
8*	Idle speed	Check and adjust engine idle speed. Adjust cable free play.		○	○	○	○	○
9*	Evaporative emission control system**	Check control system for damage. Rplace if necessary.				○		○

* It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.

** For California type only

NOTE:

For farther odometer reading, repeat the above maintenance at the period established; **1: Every 6,000 km (3,800 mi), **2: Every 12,000 km (7600 mi), **3: Every 24,000 km (15,200 mi) intervals.

GENERAL MAINTENANCE/LUBRICATION

No.	Item	Remarks	Type	Initial	Odometer readings				
				1,000 km or 1 month (600 mi)	**1 7,000 km or 7 months (4,400 mi)	**2 13,000 km or 13 months (8,200 mi)	19,000 km or 19 months (12,000 mi)	**3 25,000 km or 25 months (15,800 mi)	31,000 km or 31 months (19,600 mi)
1	Engine oil	Warm-up engine before draining.	*1) Yamalube 4 (20W40) or SAE 20W40 type "SE" motore oil *2) Yamalube 4 (10W30) or SAE 10W30 type "SE" motor oil	○	○	○	○	○	○
2	Oil filter	Replace	–	○		○		○	
3*	Air filter	Clean with compressed air. Replace if necessary.	–		○	○	○	○	○
4*	Brake system	Adjust free play. Replace pads if necessary.	–	○	○	○	○	○	○
5	Drive chain	Check chain condition. Adjust and lubricate chain thoroughly.	SAE30W-50 motor oil	Every 500 km (300 mi)					
6*	Control and meter cable	Apply chain lube thoroughtly.	Yamaha chain and cable lube or SAE 10W30 motor oil.	○	○	○	○	○	○
7	Rear arm pivot shaft and suspension link pivots.	Apply grease lightly.	Lithium soap base grease.					○	
8	Brake/ Clutch lever pivot shaft	Aplly chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil.		○	○	○	○	○
9	Brake pedal and shift pedal shaft	Lubricate. Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil.		○	○	○	○	○
10*	Center/Side stand pivots	Check operation and lubricate. Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil.		○	○	○	○	○
11*	Front fork oil	Check operation and leakage.	–		○	○	○	○	○
12*	Steering bearings	Check bearings assembly for looseness. Moderately repack every 24,000 km (15,200 mi)	Medium weight wheel bearing grease.		○	○	○	Repack	○

No.	Item	Remarks	Type	Initial	Odometer readings				
				1,000 km or 1 month (600 mi)	**1 7,000 km or 7 months (4,400 mi)	**2 13,000 km or 13 months (8,200 mi)	19,000 km or 19 months (12,000 mi)	**3 25,000 km or 25 months (15,800 mi)	31,000 km or 31 months (19,600 mi)
13*	Wheel bearings	Check bearings for smooth rotation.	–		O	O	O	O	O
14*	A.C. Generator	Replace generator brushes every 100,000 km (62,000 mi)	–	Every 100,000 km (62,000 mi)					
15*	Sidestand switch	Check and clean or replace if necessary.	–	O	O	O	O	O	O

*1) If ambient temperature dose not go below 5°C.
*2) If ambient temperature dose not go above 15°C.
* It is recommended that these items be service by a Yamaha dealer or other qualified mechanic.

NOTE:

For farther odometer reading, repeat the above maintenance at the period established; **1: Every 6,000 km (3,800 mi), **2: Every 12,000 km (7600 mi), **3: Every 24,000 km (15,200 mi) intervals.

CHASSIS

ANTI-LOCK BRAKE SYSTEM (ABS)

The Yamaha ABS (Anti-lock Brake System) features an electronic control system employing a dual control device for the front and rear independently.
The ABS can be operated in the same manner as the ordinary brake, using the brake lever and brake pedal.

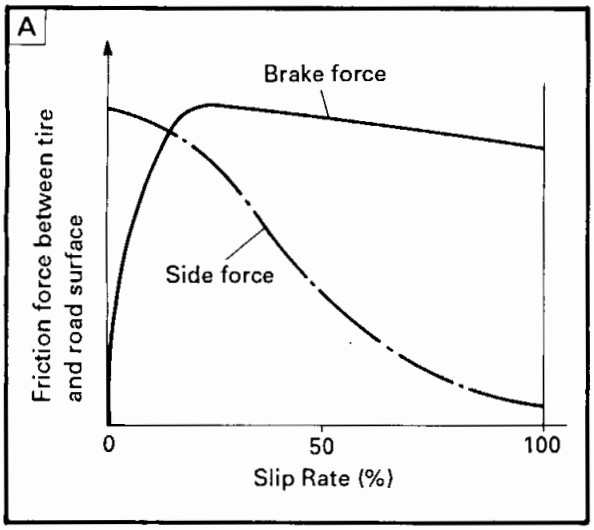
NOTE:
Prior to entering the explanations on ABS, please refer to the explanations on technical terms.

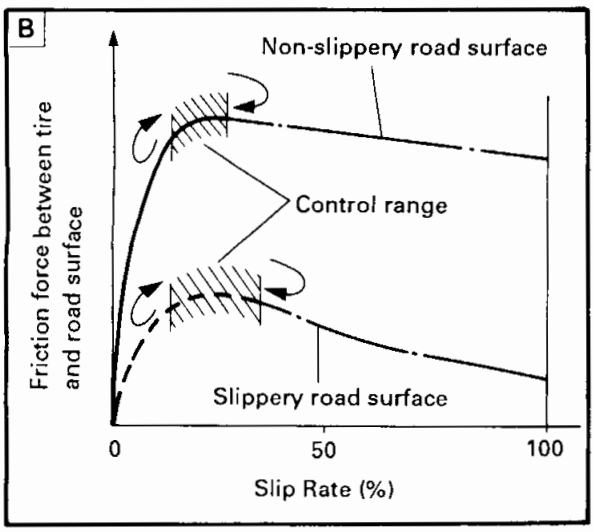
- Wheel Speed
  When the brake is applied, the wheel speed (rpm) reduces. This rotational speed of the wheel is called wheel speed.
- Motorcycle Speed
  The wheel speed is restricted when the brake is applied therefore the motorcycle speed reduces. But even though the wheel rotation is restricted, the motorcycle tries to advance due to the inertial force. This speed of advance is called the motorcycle speed.
- Braking Force
  Force which reduces the speed of the motorcycle
- Wheel Lock
  On slippery road surfaces, in spite of applying a strong braking force, even though the vehicle is running the wheel rotation may stop altogether. This condition is called wheel lock.
- Side Force
  Force which tires to turn the motorcycle towards the side.

- Slip Rate
  The lag which occurs between the wheel speed and motorcycle speed when the brake is applied is called the slip. The value indicating the percentage slip is called the slip rate and is expressed as given below.

$$\text{Slip Rate} = \frac{\text{Motorcycle speed - Wheel speed}}{\text{Motorcycle speed}} \times 100\ (\%)$$

- Slip Rate
  0 % .....No slipping between the wheel and road surface with perfect rotation of wheel
  100% .....Wheel rotating speed is 0. In other words, the wheel is locked.





BRAKING FORCE AND MOTORCYCLE STABILITY

When the braking pressure increases, a corresponding brake is applied on the wheel, slip between the tire and road surface occurs, and results in a braking force. The limit of this braking force is determined by the friction force between the tire and road surface and it has a strong interrelation with the slip condition.

The slip condition is indicated by the slip rate.

The directional stability of the motorcycle is determined by the side force; where as, the side force also has a strong interrelation with the slip condition.

Fig. A indicates these interrelations. If the motorcycle is braked while maintaining an appropriate slip rate, the maximum braking force can be obtained without losing the side force.

ABS is a system which utilizes these tire characteristics effectively, on slippery as well as non-slippery road surfaces. (Fig. B)

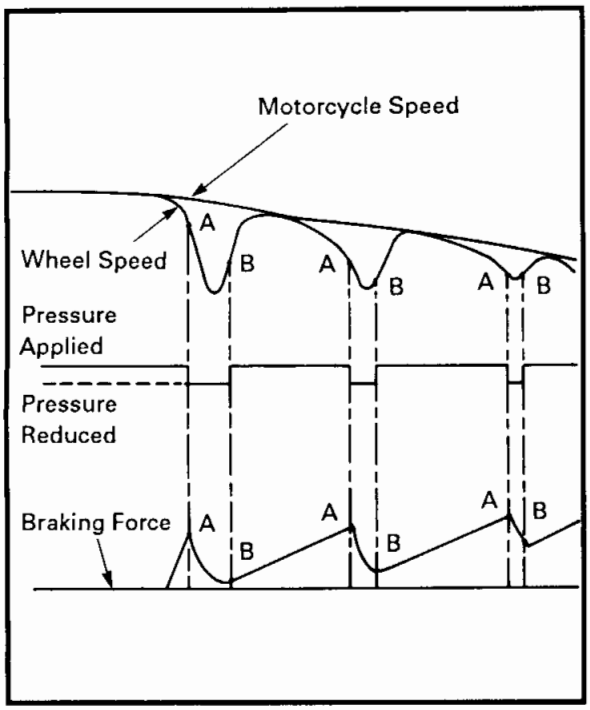
WHEEL SLIP AND HYDRAULIC PRESSURE CONTROL

The ABS computer calculates the different wheel speeds based on the rotation signals received from the front and rear wheel sensors. The computer calculates the motorcycle running speed, and reduction in speed of wheel based on the value of wheel speed. The difference between the calculated running speed and wheel speed of each wheel corresponds to the slip of the wheel.

When the wheel tends to lock, the wheel decelerates suddenly indicating sudden motion.

When the magnitude of slip and the wheel deceleration values exceed the decided quantity, the ABS computer judges that the wheel has a tendency to lock and controls the brake as indicated below.

If the slip is large, and the wheel tends to lock (Point A in figure), it reduces pressure. When the locking tendency (Point B in figure) is eliminated, it increases the pressure.

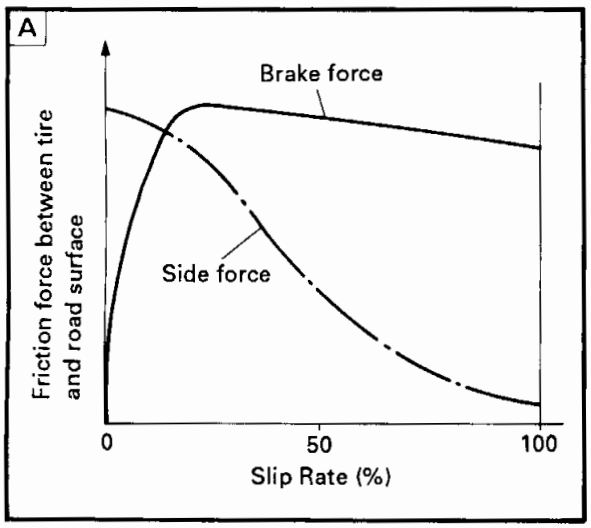


ABS OPERATION AND MOTORCYCLE CONTROL

If the ABS starts operating, it means that there is a tendency of the wheel to lock, and indicates that the motorcycle is approaching the limit of control. To make the rider aware of this condition, the ABS has been designed to generate a reaction force ("pulsing sensation") in the brake lever and brake pedal.

NOTE :

The reaction force ("pulsing sensation") generated in the brake lever and brake pedal when the ABS operates, is not an abnormal condition. It is merely a warning given to the rider.



In motorcycles equipped with ABS, as well as those equipped with conventional brake systems, side force is reduced when braking. Therefore, sudden braking while cornering is not recommended.
Furthermore, prevention of slip in the transverse direction is also not a function of ABS.

⚠WARNING

The braking of the motorcycle, even in the worst case, is principally executed when the motorcycle is advancing straight ahead. Sudden braking during cornering is liable to cause a loss of traction of the tires. Even in motorcycles fitted with ABS, over turning of the motorcycle cannot be prevented if it is braked suddenly while cornering.

ABS functions to prevent the tendency of locking of the wheels by controlling the brake hydraulic pressure.
But, if in case there is a tendency of the wheel to lock on a slippery road surface due to engine braking, even if the ABS operates, it may not be able to prevent the locking tendency.

⚠WARNING

ABS controls only wheel-locking tendency caused by using the brakes. The ABS cannot prevent wheel locking on sippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is working.

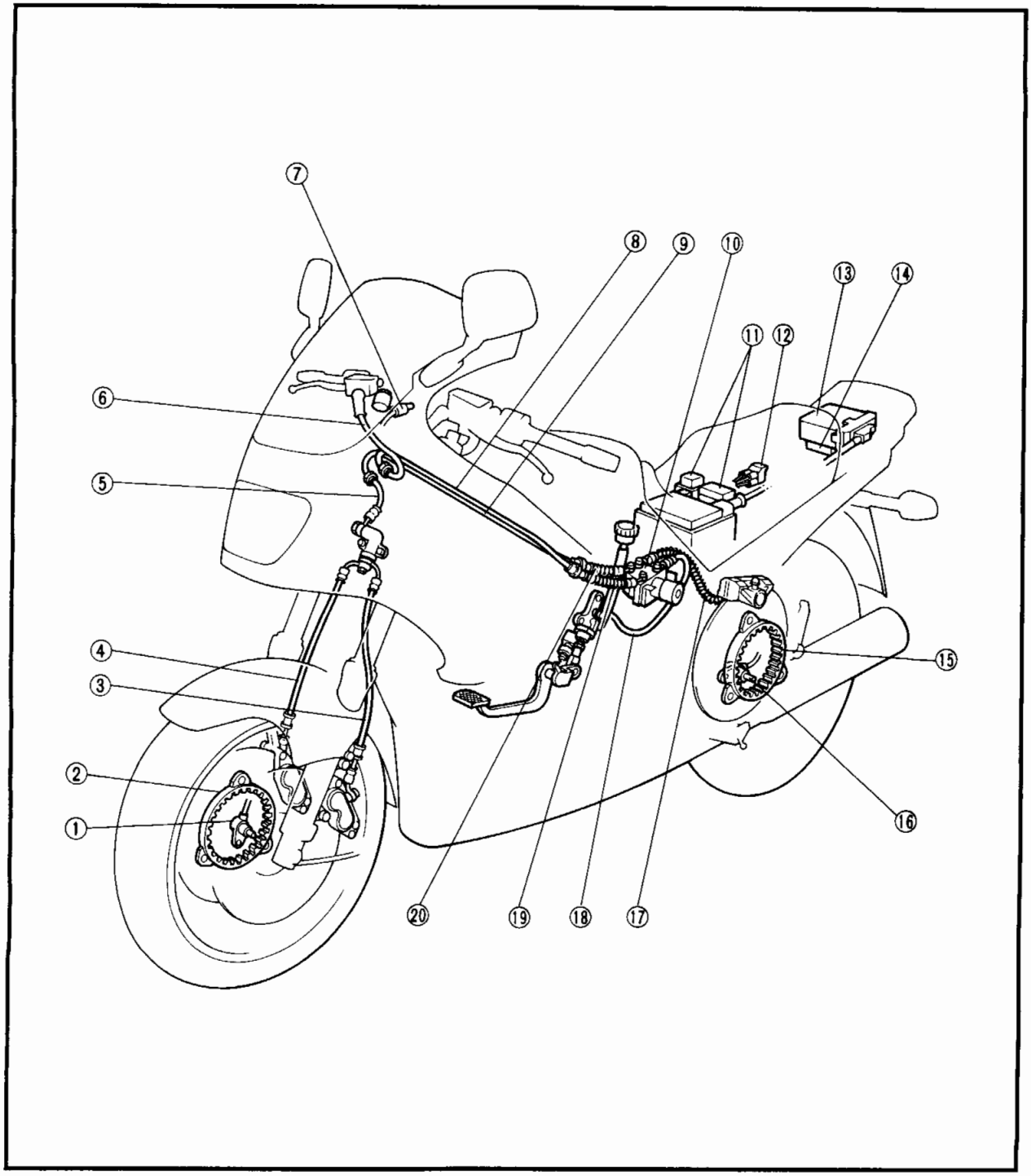
ELECTRONIC ABS

High level self diagnostic functions have been provided in this system. ABS has been designed so that if by chance there is a breakdown or fault, it detects the fault, and reverts to the normal braking system.

In such cases, the "ABS" warning light on the meter panel lights up and warns the rider. The Yamaha ABS has been designed so that the faults are saved in memory as a record so that the fault code numbers can be referred to at the service shop by using the "ABS" warning light or circuit tester during troubleshooting.

ABS COMPONENTS

① Front wheel sensor
② Sensor rotor
③ Brake hose 2 (front left)
④ Brake hose 3 (front right)
⑤ Brake hose 5
⑥ Brake hose 1
⑦ "ABS" warning light
⑧ Brake pipe 1
⑨ Brake pipe 2
⑩ Hydraulic unit (HU)
⑪ Fuse
⑫ ABS test coupler
⑬ Electronic control unit (ECU)
⑭ Fail-safe relay
⑮ Sensor rotor
⑯ Rear wheel sensor
⑰ Brake hose 7
⑱ Brake hose 6
⑲ Brake hose 3
⑳ Brake hose 4



ABS consists of a front and rear independent 2-sensor, 2 channel electronic control system, and the following four main components:

① Wheel sensor and sensor rotor
② Electronic Control Unit (ECU)
③ Hydraulic Unit (H.U.)
④ Fail-safe relay

Fig. [A] indicates the arrangement of the main components in the motorcycle. In addition to these, there are other related components such as ABS test coupler on the ABS harness in the right side cover and "ABS" warning light in the meter panel.

CAUTION:

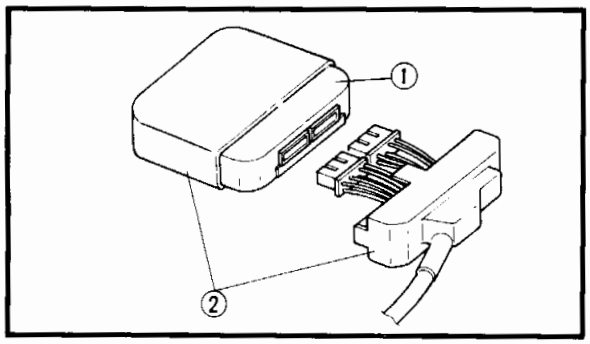
- **The ABS components have been precisely adjusted. Therefore take extreme care and precautions to avoid impact or dirt on these components.**
- **Within the ABS components, ECU, HU, wheel sensor and fail-safe relay cannot be disassembled. Even if you feel that a minor fault has occurred in one of these components, do not try to disassemble the component and repair it. Please replace it with a new part.**

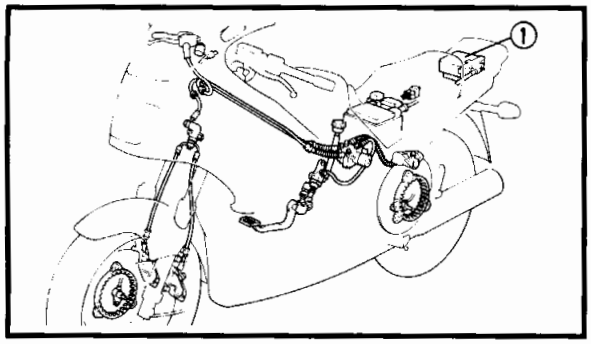
FUNCTIONS OF ABS COMPONENTS

WHEEL SENSOR AND SENSOR ROTOR

The wheel sensor ① transmits wheel rotation signals which the ECU detects speed of wheel rotation from. It consists of components such as permanent magnet and coils. At the front wheel as well as the rear wheel, the wheel sensor is mounted in the sensor housing.

Sensor rotor ② is press fitted inside the wheel hub in the front wheel as well as the rear wheel, and it rotates along with the wheel. 44 teeth have been cut on the inside face of the sensor rotor and these are located in the vicinity of the front end of the wheel sensor. Along with the rotation of the wheel, the distance between the sensor pole and the sensor rotor varies and induction current is generated in the wheel sensor. In this way, the speed of wheel rotation can be detected from the frequency of this alternating voltage.

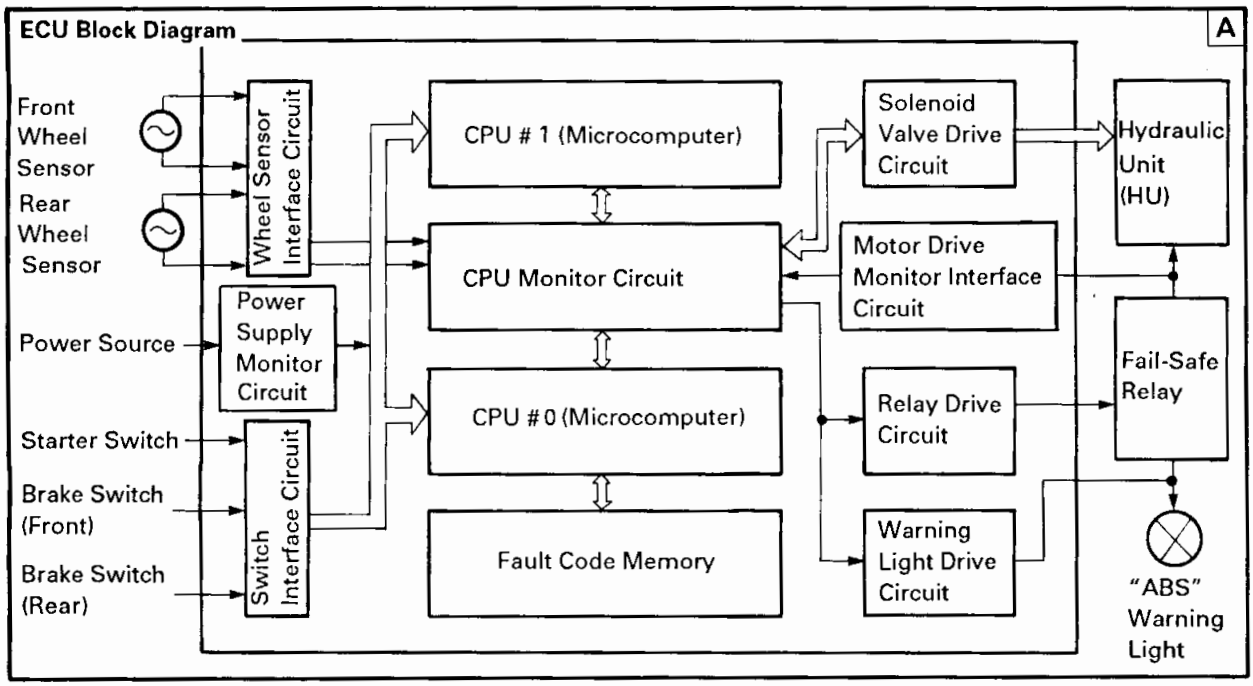




ELECTRONIC CONTROL UNIT (ECU)

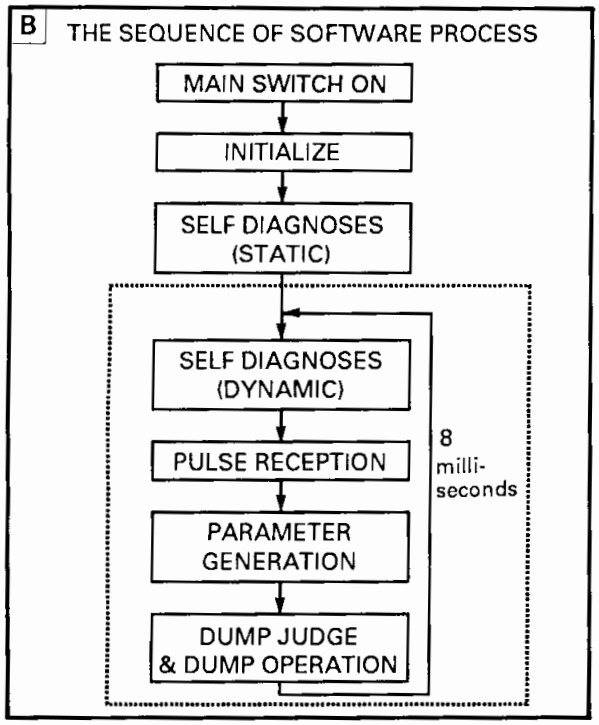
The Electronic Control Unit (ECU) ① controls the ABS and is mounted inside the tail cowl. The ECU ① is covered by a ECU cover ② , for protection against water.

Function of ECU



As indicated in the ECU Block Diagram of Fig. A , the ECU captures signals from the front and rear wheel sensors and also the monitor circuit signals. Two microcomputers are provided in the ECU and each of these operates independently to process the ABS control logic.

The independently processed results of each microcomputer are compared by the CPU monitor circuit. After verifying that the results are the same, the CPU monitor circuit sends control commands to the Hydraulic Unit (H.U.) and the Fail-Safe Relay.



ABS control

The ABS control performed by ECU is basically of the two portions mentioned below :

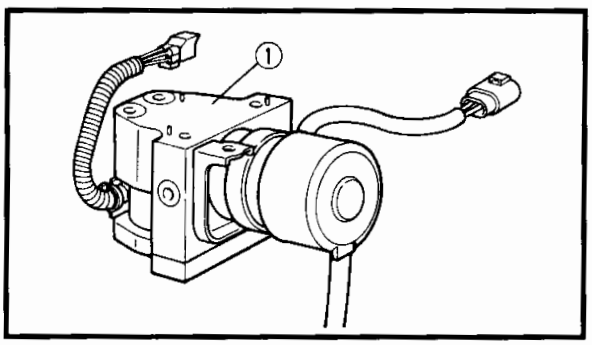
① Hydraulic control
② Self Diagnoses

The control processes, as explained in Fig. B , are made in 8 milliseconds each time, and repeated.

The description of faults are saved in the Fault Code Memory, for fault detection and inspection at a later stage.

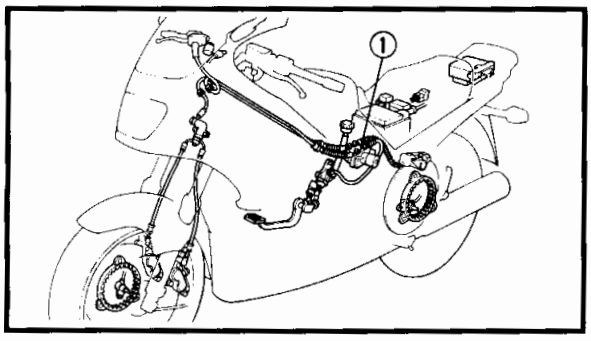
NOTE:

Some kinds of faults are not saved in memory (Example : Drop in power source voltage, etc.)

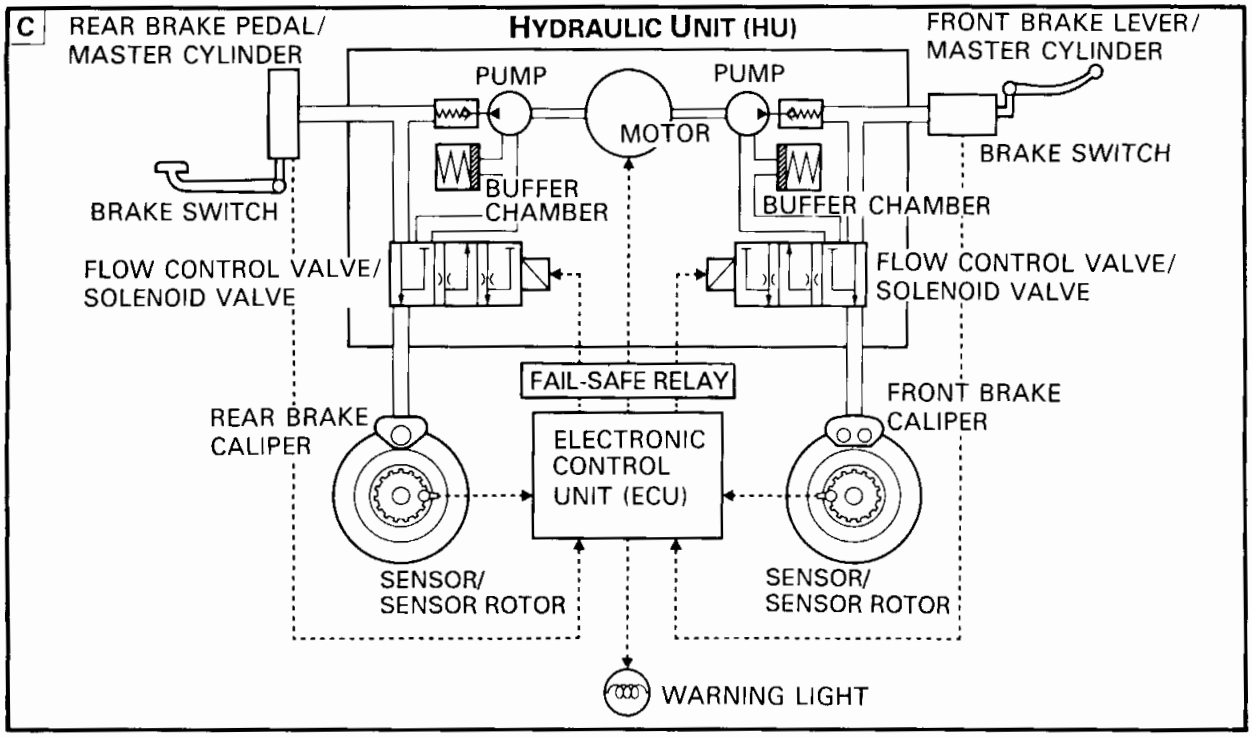


HYDRAULIC UNIT (HU)

The Hydraulic Unit ① is a component used to modulate the hydraulic pressure of the brake system, based on the instructions of the ECU. It is installed beneath the battery box at the central part of the vehicle.

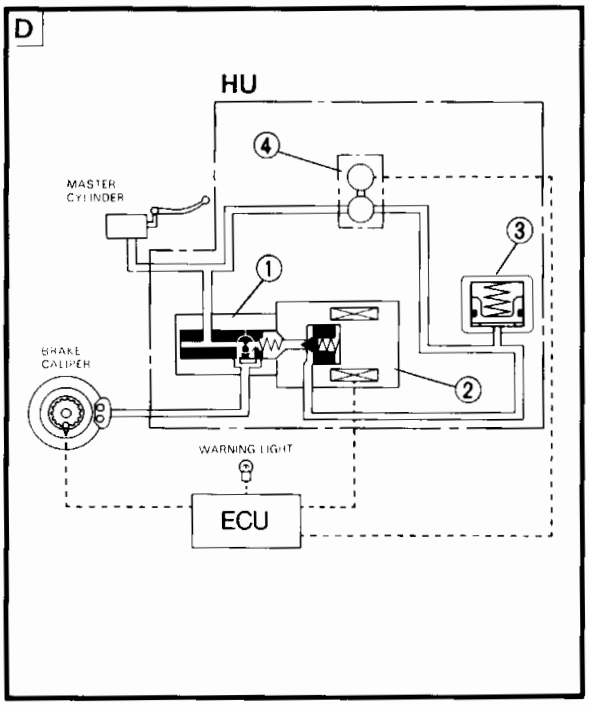


C



The Hydraulic Unit has the same configuration for the rear wheel as well as the front wheel, and an independent hydraulic circuit is provided for each wheel. The pump motor for both the front and rear systems is common. (Fig. C)

D



Components of HU

The components of the system are as follows :

① Flow control valve
② Solenoid valve
③ Buffer chamber
④ Hydraulic pump
(See Fig. D).

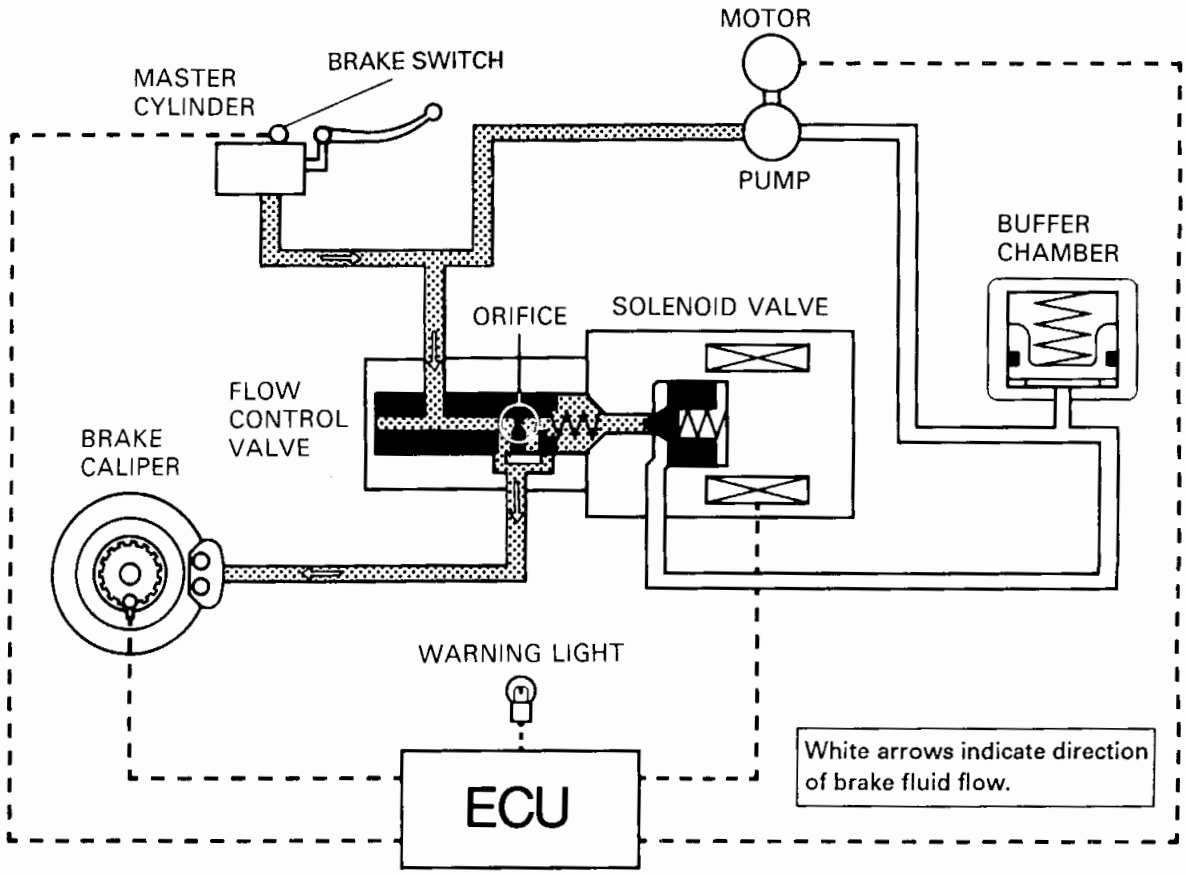
The flow control valve ① is a component which maintains a constant brake fluid flow rate during the ABS operation. It works in combination with the solenoid valve ② in increasing and reducing the brake fluid pressure.

The buffer chamber ③ has the function of temporarily collecting the brake fluid, whose pressure has been reduced during ABS operation.

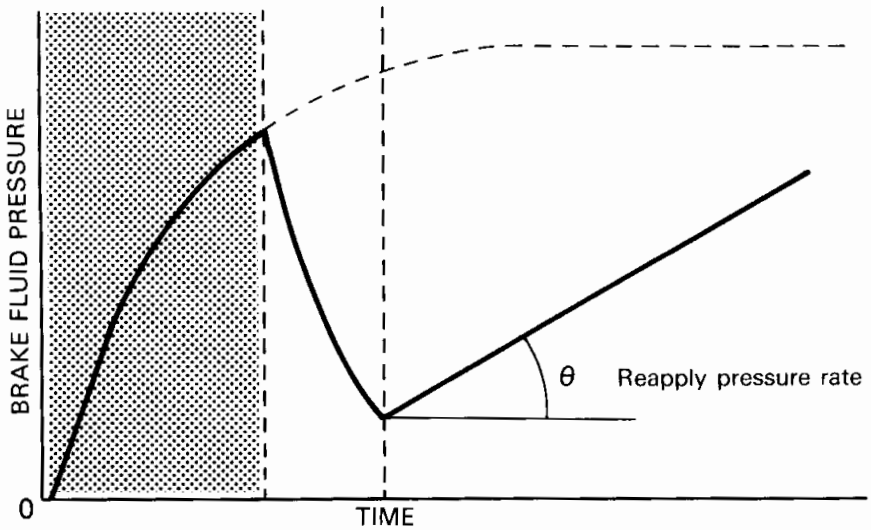
Hydraulic pump ④ is driven by the motor. Its function is to return the brake fluid collected in the buffer chamber ③, to the circuit on the side of the master cylinder.

HU OPERATION

NORMAL BRAKING OPERATION

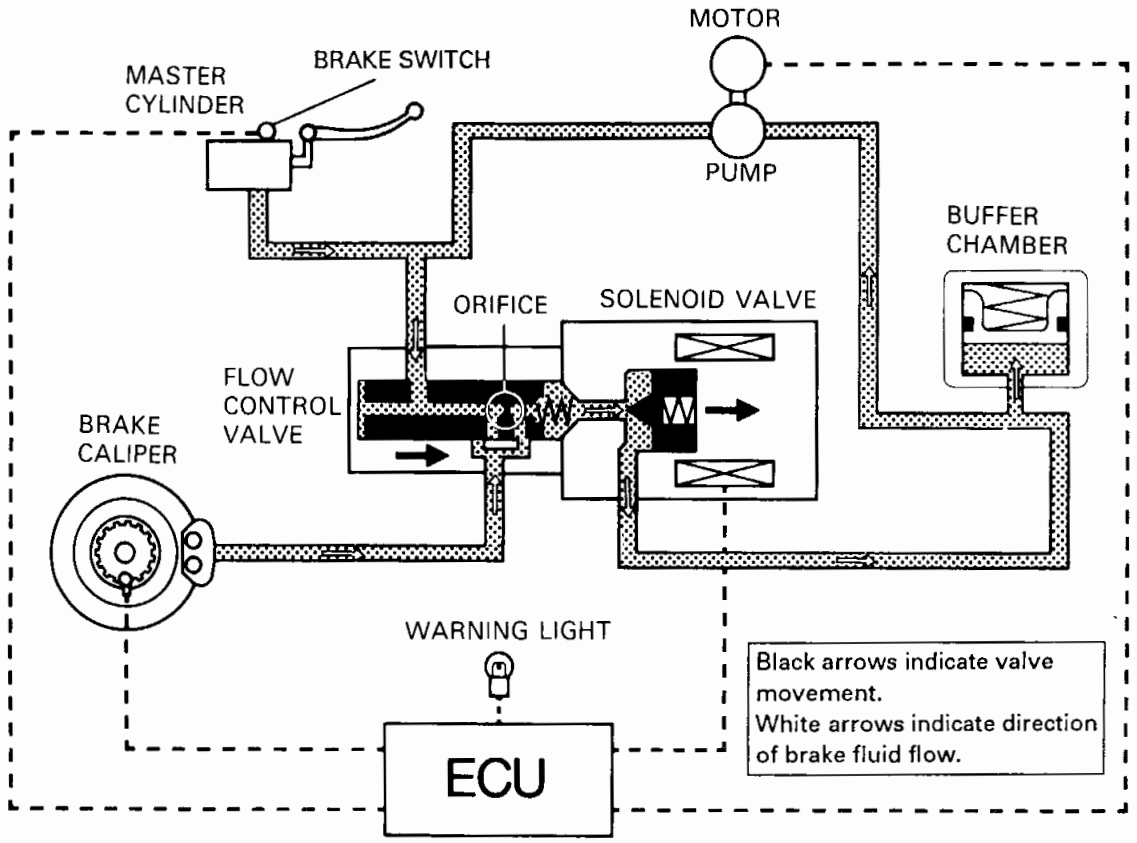


During normal braking operation, the master cylinder pressurizes the brake caliper directly.

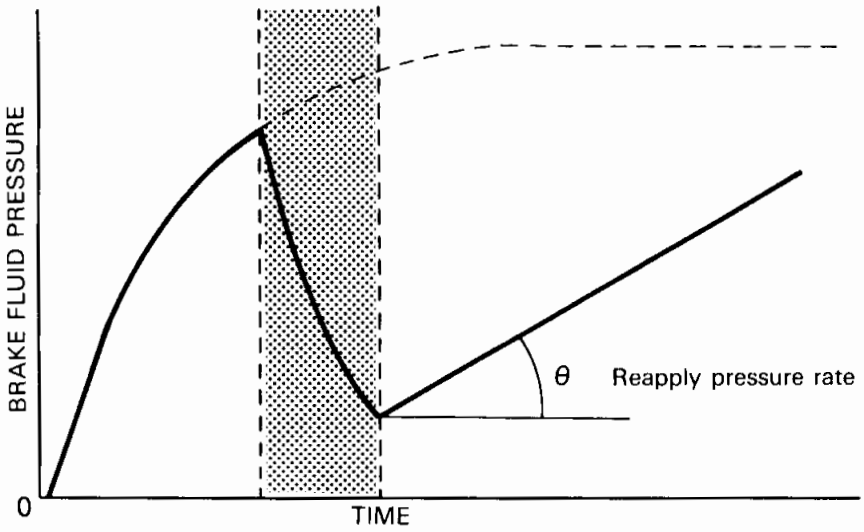


*Front and rear system operation is identical although only one system is shown.

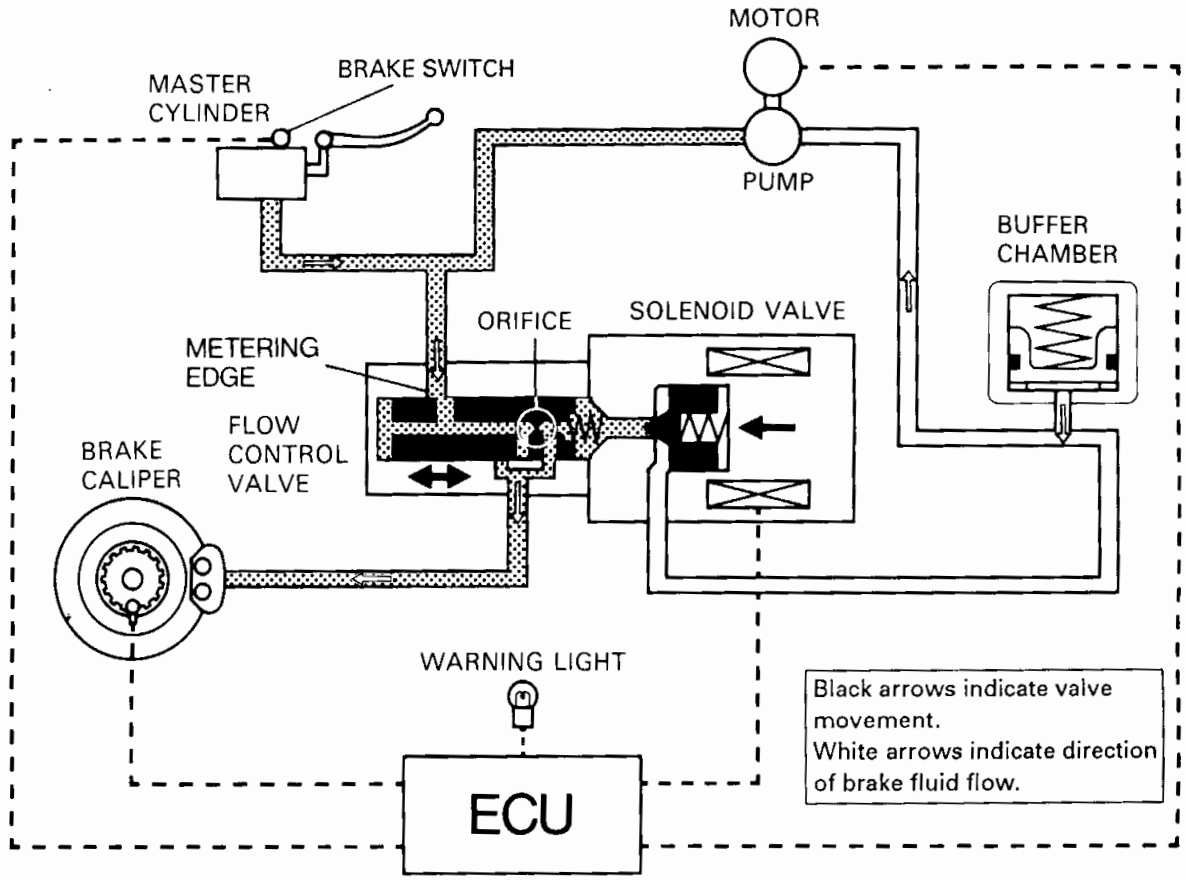
ABS IN OPERATION (PRESSURE IS REDUCED)



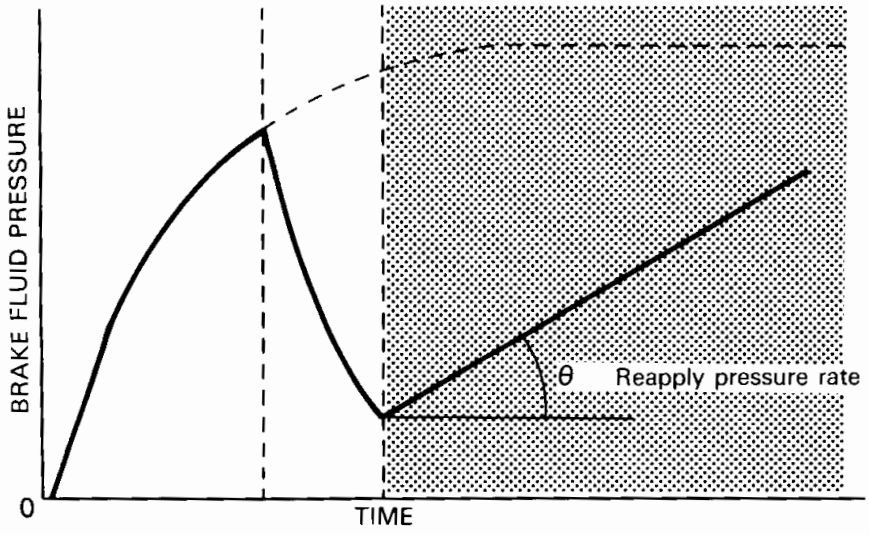
As the ABS is activated, the solenoid valve is opened releasing brake fluid pressure to the buffer chamber. The flow control valve moves due to the pressure difference before and after the orifice. Movement of the flow control valve cuts the passage to the caliper before the orifice. Farther movement opens the passage after the orifice allowing the caliper to depressurize.



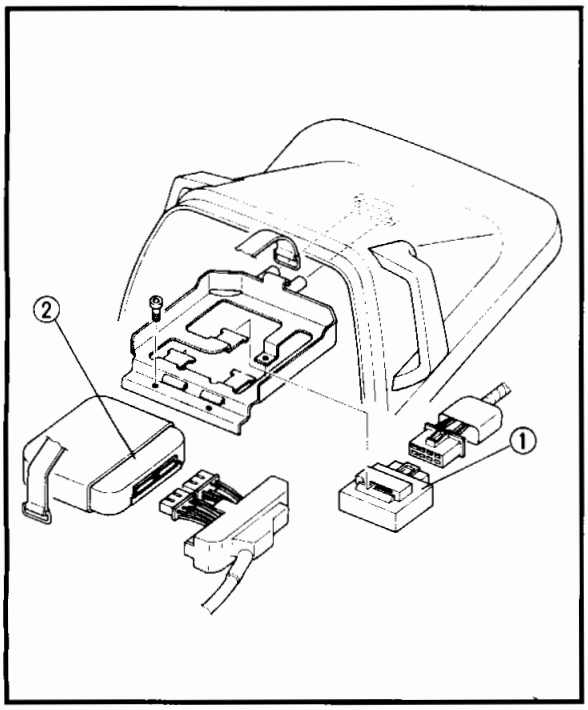
ABS IN OPERATION (PRESSURE IS REAPPLIED)



The solenoid valve closes and the caliper is repressurized. Brake fluid pressure is controlled to a specified amount by the metering edge.

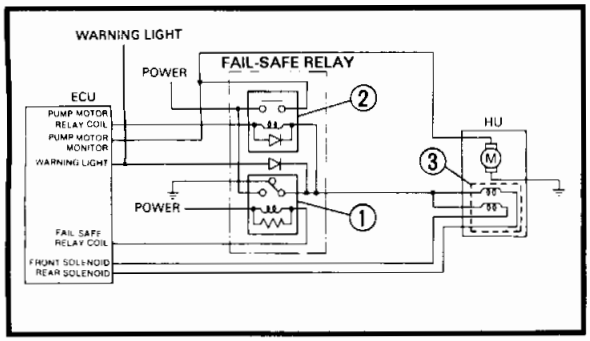


* The flow control valve is restored to the normal brake position due to spring action when brake fluid pressure is not applied.



FAIL-SAFE RELAY

Fail-safe relay ① controls the power supply to the HU and is installed beneath the ECU ② inside the tail cowl.



Components and functions of the fail-safe relay

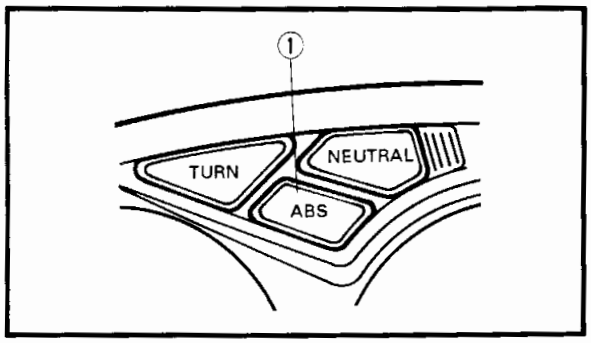
Fail-safe relay consists of a solenoid relay ① and a motor relay ② .

The solenoid relay ① is activated by the ECU command, when the ECU starts activating the ABS system. With this condition, the solenoid valve ③ can operate if the ECU's dump command is given.

At the same time when the ECU's dump command is given, the motor relay is also activated by the ECU. This makes the pump motor start simultaneouly when pressure reduction in ABS starts.

In case of a fault in the ABS system, the ECU cuts off the solenoid relay ① , therefore the solenoid valve ③ cannot operate.

At the same time, this disables the motor relay ② causing the "ABS" warning light to come on. This is called a "System Down". Since reduction of hydraulic pressure is not possible during a System Down, the braking reverts to the conventional system.

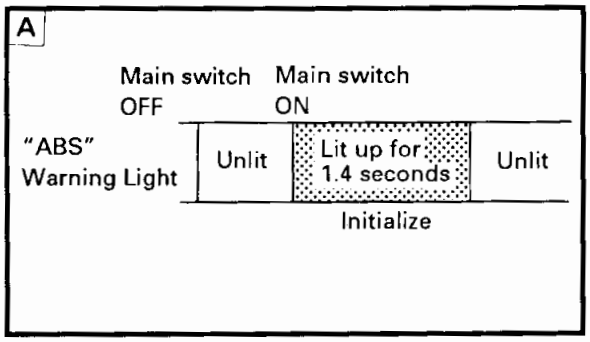


OTHER THAN ABS COMPONENTS

ABS WARNING LIGHT

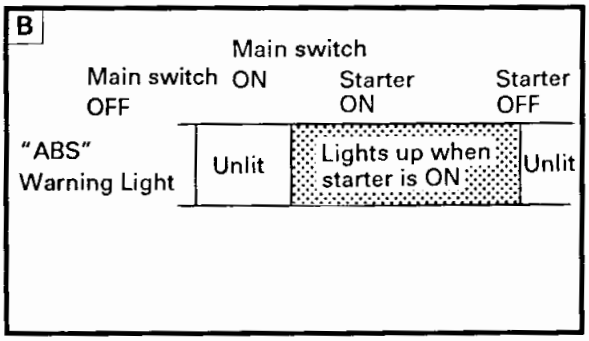
The warning light informs the rider of ABS self diagnosis results and is installed in the meter panel.

① "ABS" Warning Light



Lighting up of "ABS" Warning Light

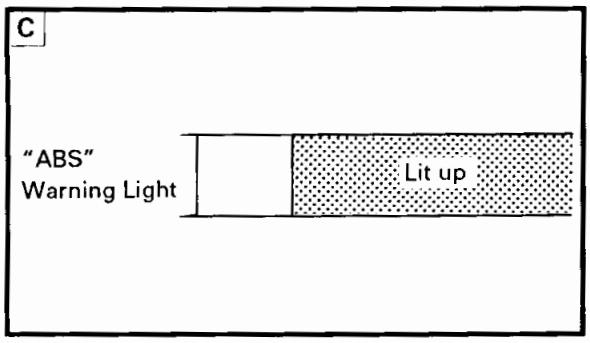
1. Main switch key is switched "ON" (Fig. [A]).
   When the main switch key is switched "ON", it lights up for about 1.4 seconds. In this interval, the ECU is executing a system check.



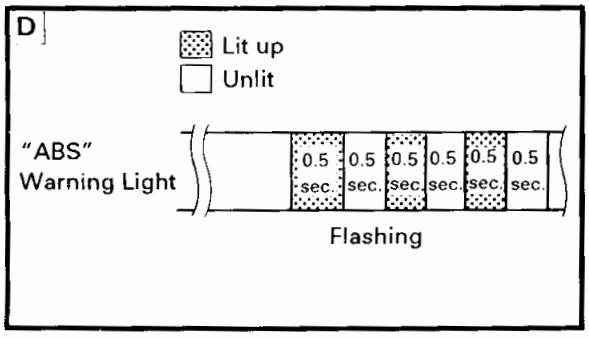
2. Main switch key is switched "ON" and the start button is pressed (Fig. [B]).
   When the main switch key is switched "ON" and the start button is pressed, the "ABS" warning light continues to be lit up when the start button is pressed. The rider can confirm the operation of the warning light by this.

NOTE :

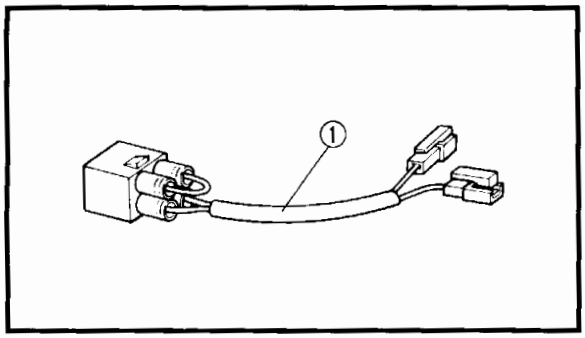
When the start button is pressed, the oil level indicator also lights up steadily.



3. Lights up during normal operation (Fig. [C]).
   When it lights up during normal operation, a fault is detected in the ABS. In this case, the ABS hydraulic pressure is not controlled, and the motorcycle is reverts to conventional braking.



4. Flashes during normal operation (Fig. [D]).
   When it flashes during normal operation, this is not a fault.
   Refer to section "ABS Troubleshooting".

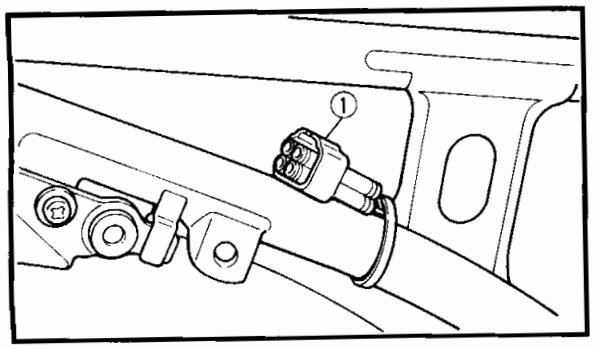


5. ABS test coupler
When the ABS test coupler adapter ① is inserted into the ABS test coupler, the history of faults recorded in the ECU are displayed by flashes.



ABS Test Coupler Adapter:
P/N. YM-03149
P/N. 90890-03149

NOTE :
The "ABS" warning light lights up when the motorcycle is run without removing the test coupler adapter.



ABS Test Coupler
If you remove the right side cover, you can see the 4-pole coupler ① by the side of the rear frame extending from the ABS harness. This is a test coupler for reading the ABS fault code.
For details of the method of usage of ABS test coupler, refer to section "ABS Troubleshooting".

ABS TROUBLESHOOTING OUTLINE

INTRODUCTION

The following gives a detailed explanation of the troubleshooting procedures of this system. Please read this service manual carefully for a good understanding of the system before correcting any fault.

The electronic control unit (ECU) of this system has a self-diagnosis function. If there is anything faulty found with the system, the warning light in the meter panel warns the operator of any such fault.

These troubleshooting instructions explain in detail how to look into the fault in connection with this warning light and then how to correct it. As for the other troubleshooting, perform it basically in conformity with the normal repairs on a motorcycle.

⚠ WARNING

At the time of maintenance or servicing of ABS related parts, always check the section "[D-6] FINAL INSPECTION BEFORE DELIVERY OF THE SERVICED MOTORCYCLE", before handing over the motorcycle to the customer.

1. Indication of Fault by Means of ABS

The following situations may occur:

- Warning light stays on. → A fault exists. Reverts automatically to ordinary braking.
- Warning light goes on and off when main switch is turned to "ON". → Not faulty
- Warning light comes on when pushing starter switch. → Not faulty
- Warning light flashes.

Faulty Brake switch	→ A fault exists
Rear wheel running idle while front wheel is stopped	→ Not faulty
The motorcycle is running on a bumpy road continuously.	→ Not faulty

2. Troubleshooting Points-Using the self-diagnosed results.

(1) Use the self-diagnosing function to datermine the type of fault.

(2) If a fault is currently being encountered, use a circuit tester (Yamaha pocket tester P/N 90890-03112 or Kent Moore pocket tester P/N YU-03112) to diagnose the cause.

NOTE :
Digital tester cannot be used to read fault codes.

(3) When the ECU is put into the diagnosis mode and is displaying the history of past faults which were recorded, use a circuit tester or the warning light in the meter assembly to diagnose the fault.

Self-Diagnosis by ECU

ECU performs the statistical checking of the entire system when the ignition switch is turned on. Also while the motorcycle is running, the ECU is capable of checking such faults that cannot be detected on the motorcycle unless it is operation. It is because of this that faults sometimes cannot be indicated at a workshop. However, those faults which have once been detected and indicated are all memorized. In this case, the memorized fault codes can be identified by putting the ECU into the diagnosis mode and using a circuit tester or the warning light in the meter.

(4) As there may be more than one kind of fault, take note of all indicated codes.

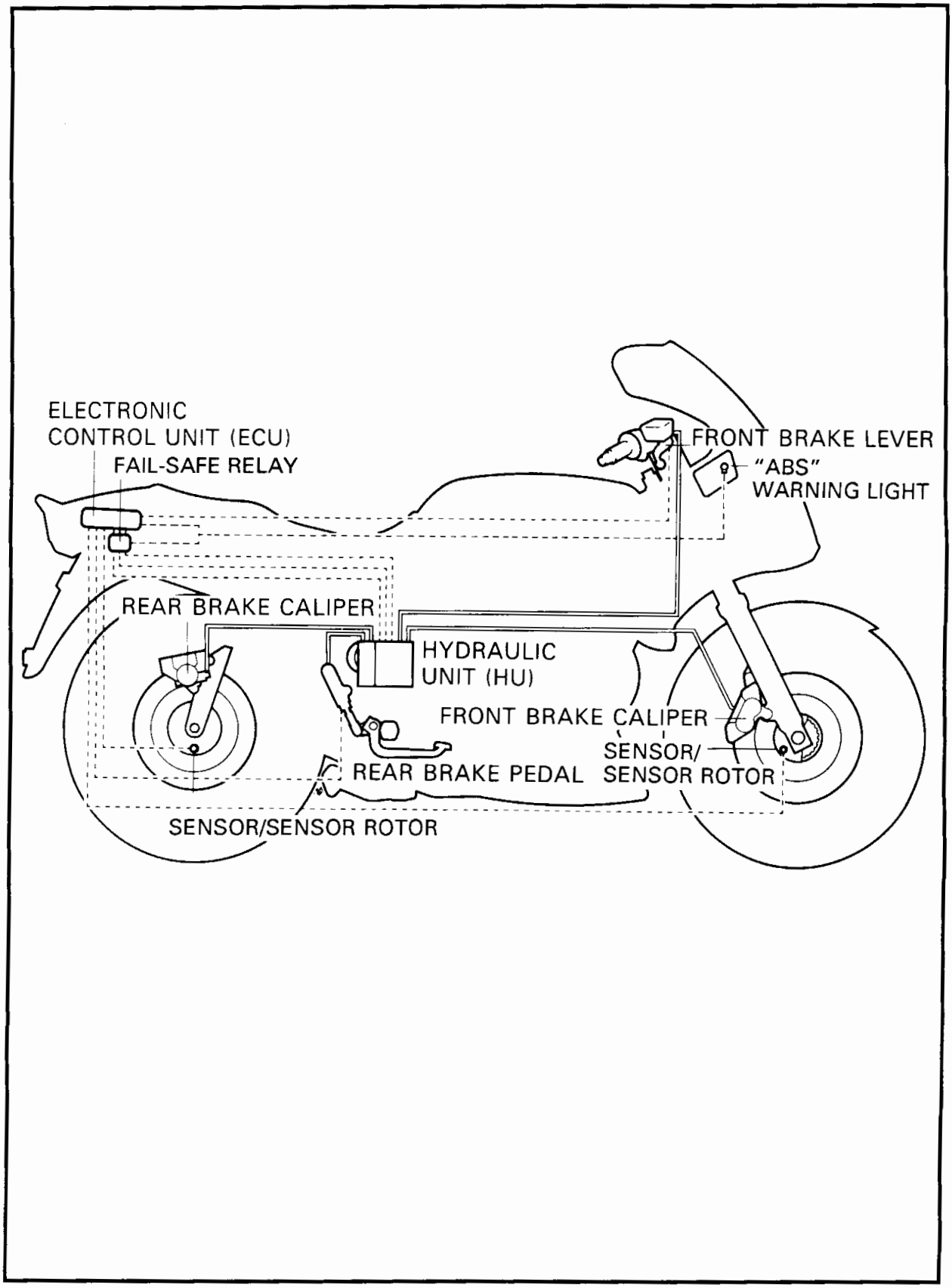
3. Notes for Service-Differences from Ordinary Motorcycle

(1) The component parts of the ABS are precision adjusted and are apt to be damaged by impacts or strains. Use care in handling the ABS.

(2) The ECU, HU, sensor, and relay box of the ABS cannot be disassembled. Even if one of them is found to be faulty, do not try to disassemble and repair it but replace it with a new one.

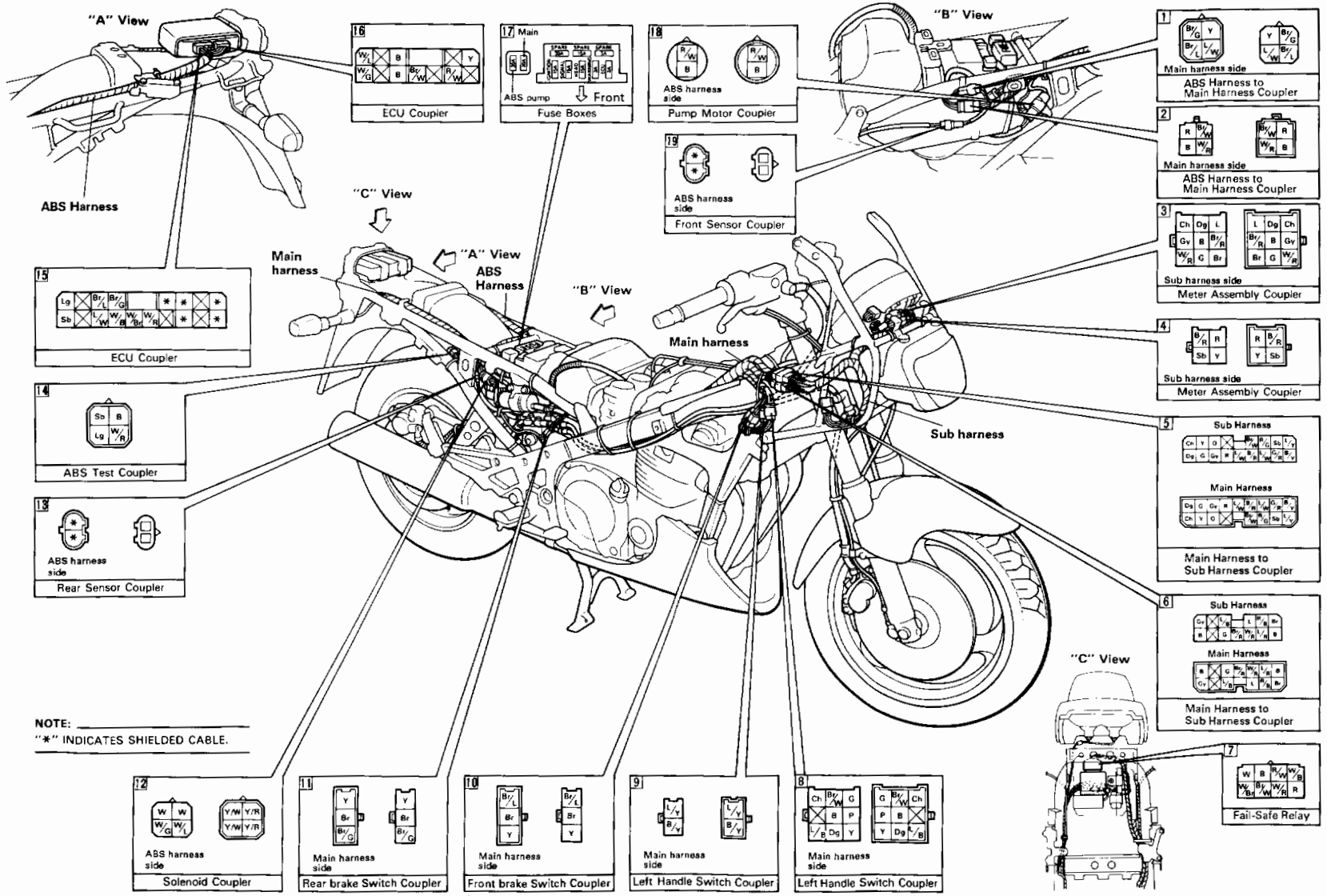
(3) Even after the fault has been corrected, the ABS keeps the history of all past faults.
Be sure to erase all past faults after correct operation has been verified. This will ensure that, should another fault occur sometime in the future, the old codes will not confuse the diagnosis of the problem.
(Refer to D-6-4)

ARRANGEMENT OF ABS PARTS DIAGRAM



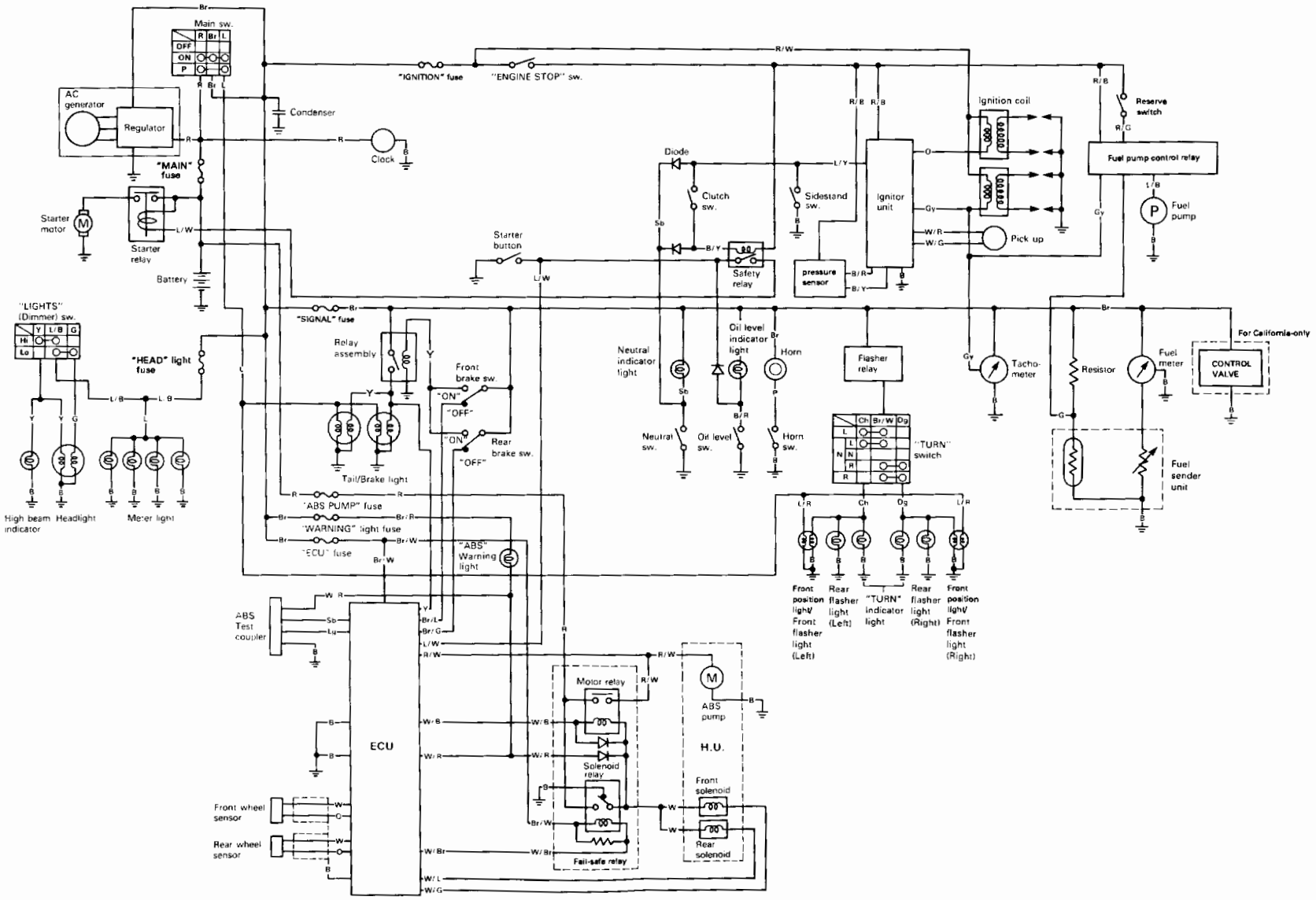
ABS TROUBLESHOOTING OUTLINE CHAS

ABS LAYOUT OF WIRE HARNESS COUPLERS



ABS TROUBLESHOOTING OUTLINE CHAS

CIRCUIT DIAGRAM



BASIC PROCEDURES FOR TROUBLESHOOTING

NOTE:
When troubleshooting, perform the checks [A] to [D] in order for each separate fault.

[A] SERIES: Checking of fault by use of "ABS" warning light

[B] SERIES: Further checking of fault
Self-diagnosed results are checked by the ECU using the warning light or a circuit tester.

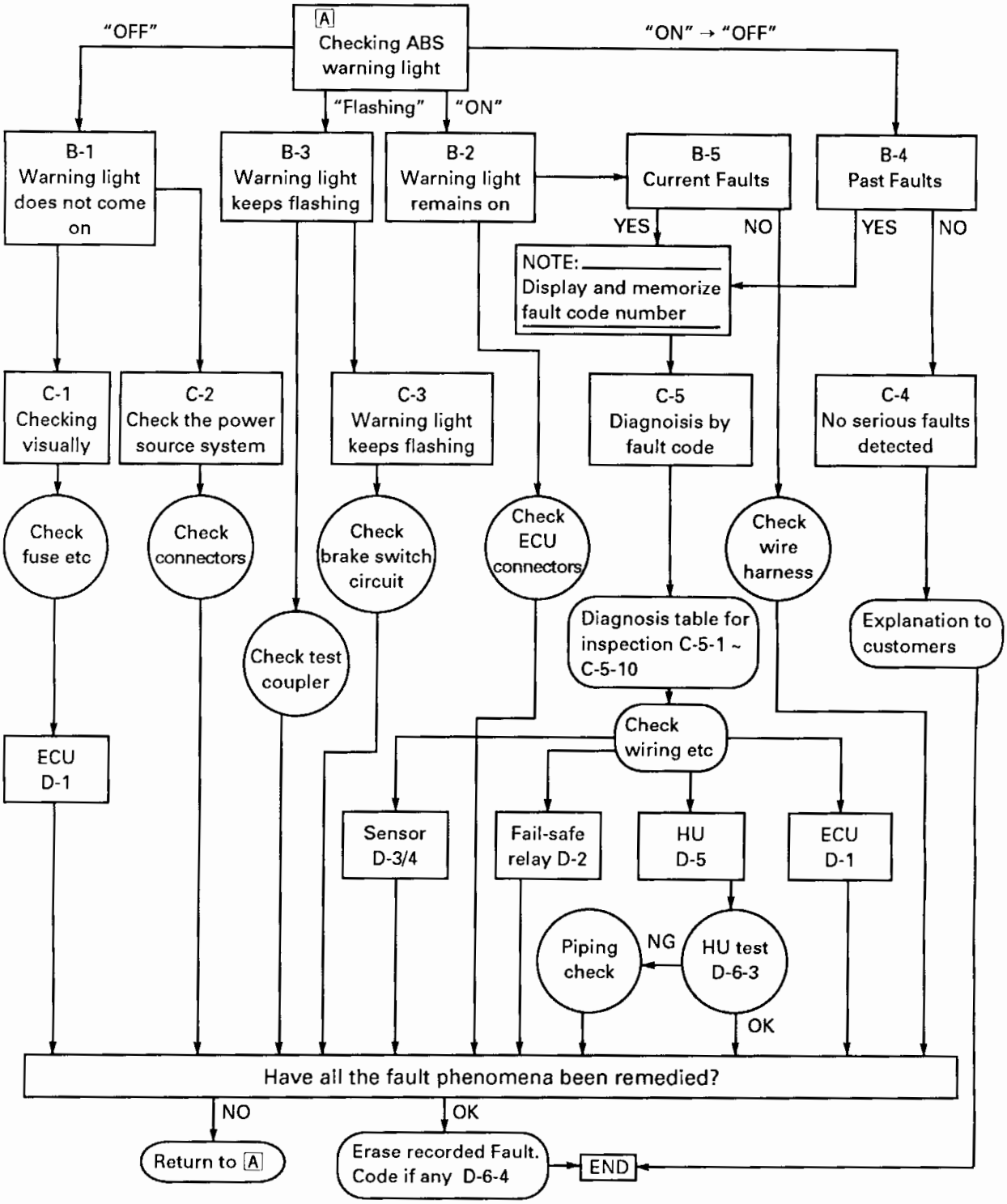
[C] SERIES: Assuming causes and locations
Causes for the fault are looked into with the assumption of the locations involved and the circumstances under which such fault occurred.

[D] SERIES: ABS service
Disassembly, Reassembly and Final Inspection procedure.

⚠ WARNING

Always start the troubleshooting procedure from the beginning or you may make the wrong diagnosis, which could mean continued failure of the ABS system.

BASIC PROCEDURES FOR TROUBLESHOOTING DIAGRAM



NOTE:

Do not erase fault codes until after the correct diagnosis has been made and the problem repaired. Be sure to erase all past faults after correct operation has been verified. This will ensure that, should another fault occur sometime in the future, the old codes will not confuse the diagnosis of the problem.

⚠ WARNING

At the time of maintenance or servicing of ABS related parts, always check the section "[D-6] FINAL INSPECTION BEFORE DELIVERY OF THE SERVICED MOTORCYCLE", before handing over the motorcycle to the customer.

ABS TROUBLESHOOTING

[A] SERIES: CHECKING OF FAULT BY ABS WARNING LIGHT

Turn on the main switch (Engine should not be running).

(1) Warning light does not come on. → B-1

(2) Warning light remains on. → B-2

(3) Warning light keeps flashing → B-3

(4) Warning light remains on for about 1.4 seconds and then goes out. → B-4

[B] SERIES: FURTHER CHECKING OF FAULT

B-1 Warning light does not come on

Are the other indicator lights working all right?

(1) Yes → C-1

(2) No → C-2

B-2 Warning light remains on

Check the ECU inside of the seat cowl. Is the coupler securely connected?

(1) Yes → B-5

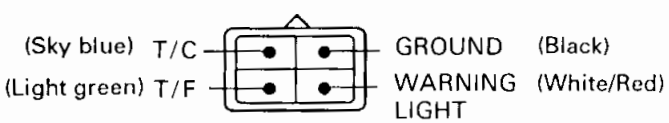
(2) No → Insert the coupler securely until a click is heard.

B-3 Warning light keeps flashing

NOTE:

Make sure the battery is properly charged before proceeding with these steps.
(Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.)

Check the test coupler behind the right-hand side cover. Is the T/C terminal grounded?



(1) Yes → Unground the terminal and replace the protection cap.

NOTE:

When the ABS Test Coupler Adapter is connected, the T/C terminal is grounded.

(2) No → C-3

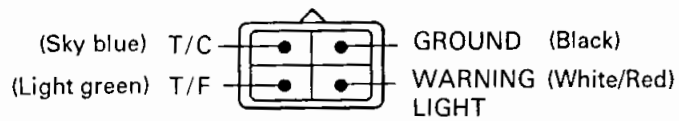
Arrangement and function of test coupler

T/C is a terminal which puts the ECU in a fault diagnosis mode by shorting it to ground.

T/F is a terminal which puts out a fault code (rise and fall of voltage) produced by the ECU which has been put in the fault diagnosis mode.

The Warning Light terminal is a terminal for checking the warning light circuit.

To short the T/C terminal, connect the ABS Test Coupler Adapter (P/N YM-03149, 90890-03149) with the test coupler. Make sure beforehand that the battery is sufficiently charged.

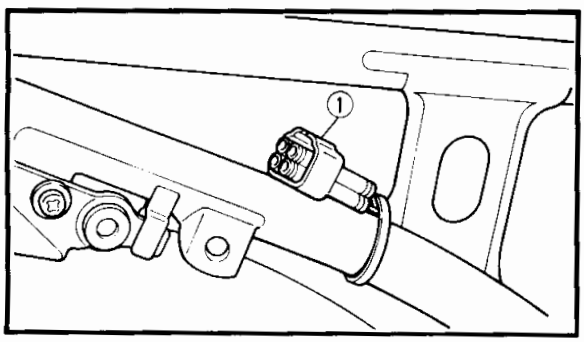


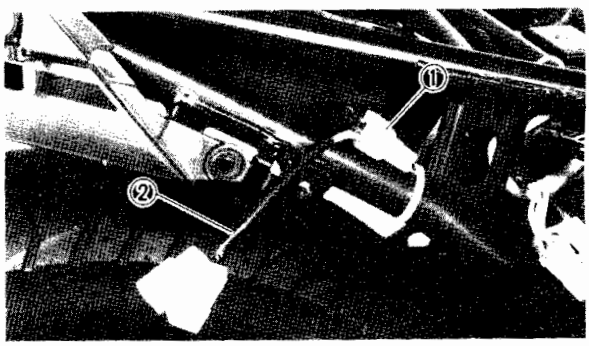


ABS Test Coupler Adapter
(P/N. YM-03149, 90890-03149)

B-4 Checking past faults by means of ABS self-diagnosis (Past faults)

Remove the right hand side cover and locate the test coupler ① . Short the T/C terminal (Sky bule) to ground by connecting the ABS Test Coupler Adapter ② with the test coupler.

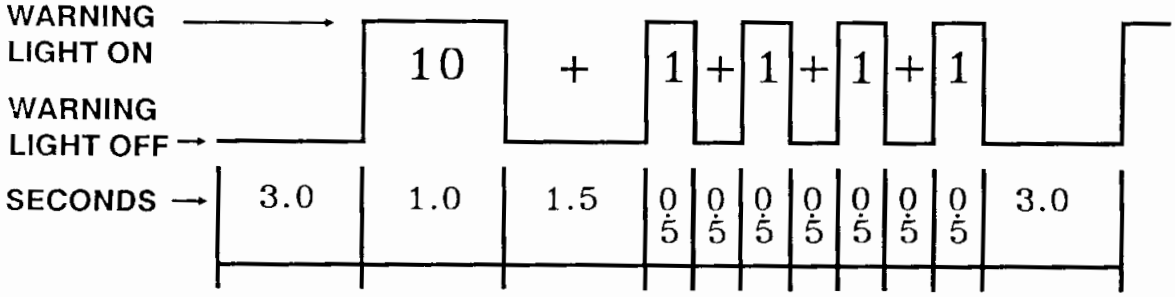




(1) Warning light keeps flashing at a regular interval of 0.5 seconds (for more than six seconds). → C-4

(2) Warning light keeps flashing in a pattern similar to the following. → C-5

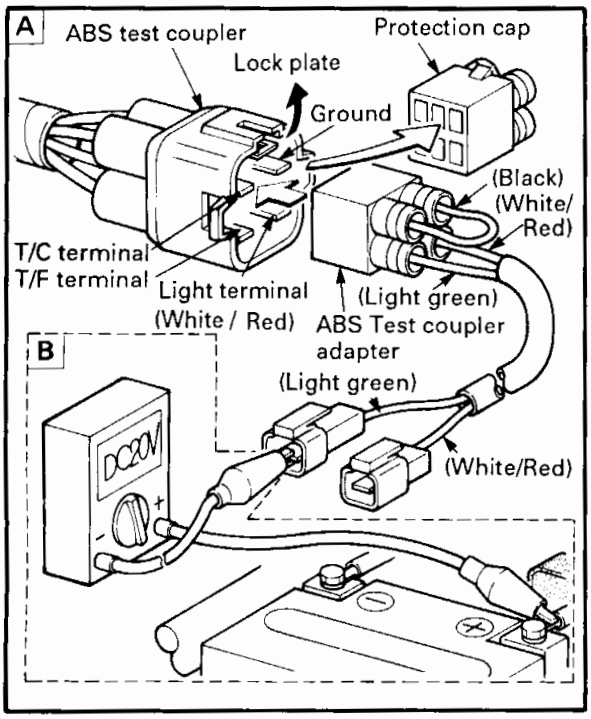
This pattern is showing FAULT CODE 14

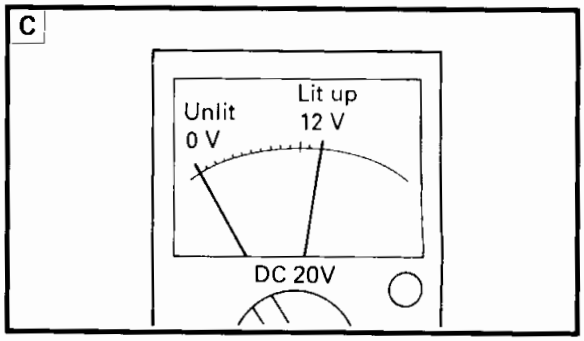


B-5 Checking faults by means of ABS self-diagnosis (Current faults)

NOTE:
Read Section **B-3 Arrangement and Function of Test Coupler** before proceeding with this section.

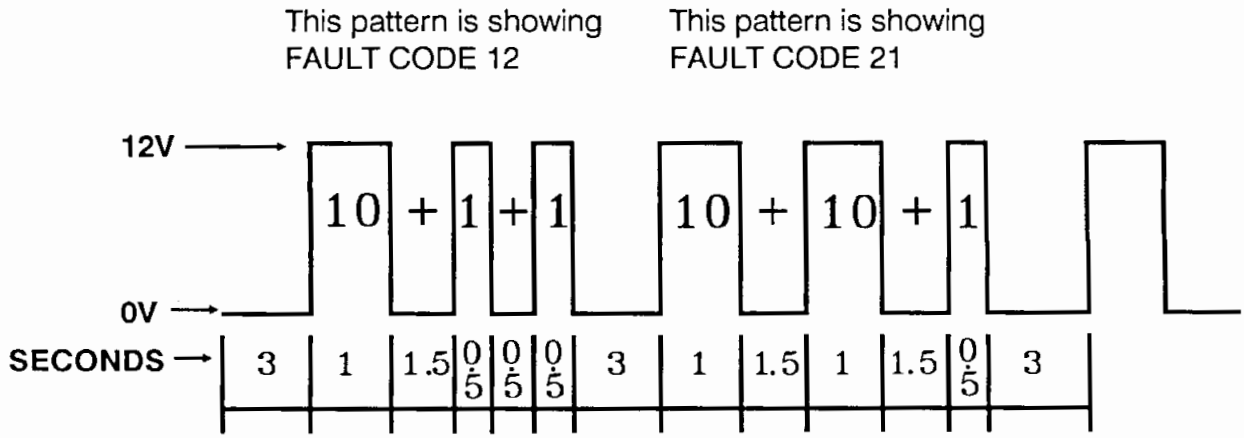
Remove the right hand side cover and locate the test coupler. Short the T/C terminal (Sky blue) to ground by connecting the ABS Test Coupler Adapter with the test coupler. (Fig. A)





Adjust the range selector to DC 20V on the circuit tester. Then connect the negative pole with the T/F terminal (Light green) and the positive pole with the battery's positive terminal. (Fig. B)
Read the swinging of the needle indication. (Fig. C)

This is an example of a "Pattern of 10's and 1's" as displayed by the circuit tester. → C-5

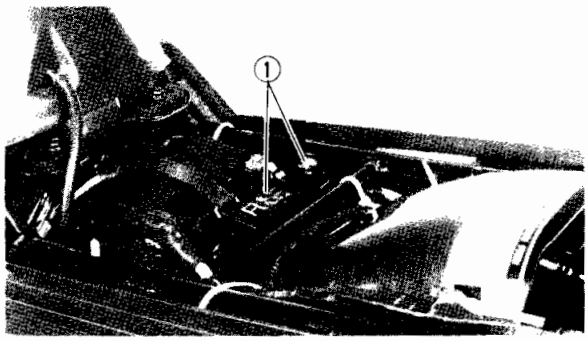


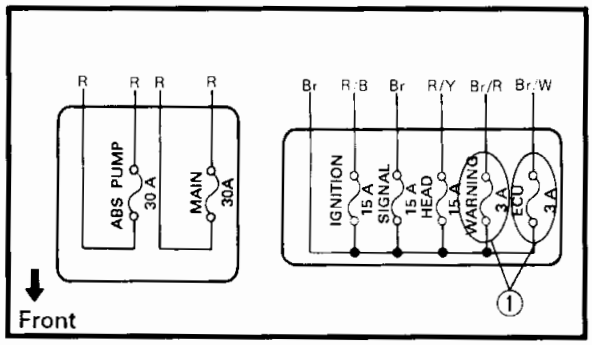
[C] SERIES: ASSUMING CAUSES AND LOCATIONS

C-1 Only the warning light does not come on with the main switch on.

[1] Checking Visually

(1) Check the fuses ① (ECU and Warning Light).





A fuse can be blown, for example, if the harness is pinched. Correct such trouble and replace the blown fuse with a new one.

(2) Check ABS harness and main harness couplers

Check that the couplers for the ABS and main harnesses are securely connected. The harnesses have two couplers each. Check both. (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS/-[1], [2]" section.)

(3) Check ECU and ABS harness connector.

Check that the ABS harness is securely connected with the ECU. (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS- [15], [16]" section.)

[2] Checking by Means of ABS Test Coupler Adapter

(1) Connect the test coupler with the ABS Test Coupler Adapter. (Refer to the "B-5" section.)

(2) Short the warning light terminal (White/Red) of the ABS Test Coupler Adapter to ground (or to the battery's negative terminal).

- If the warning light comes on, there may be internal wire breakage in the ABS harness.
- If the warning light does not come on, there may be wire breakage in or disconnection of the warning light.

(3) Remove the ECU coupler and check the continuity of the (White/Red) lead.
(White/Red lead ECU side and ABS Test Coupler Adapter side)

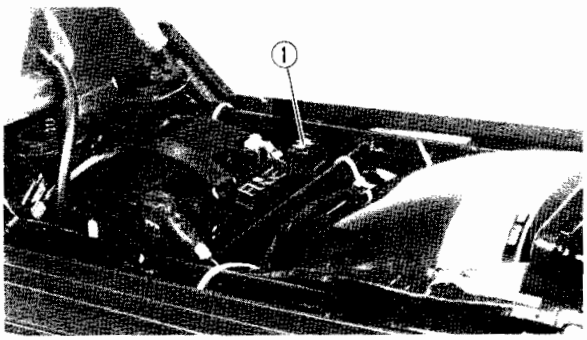
- If there is continuity, the ECU is faulty. → Replace ECU.
- If there is no continuity, there is something faulty with the warning light circuit in the ABS harness (wire breakage, etc.) → Repair. (Refer to the "WIRING DIAGRAM" section).

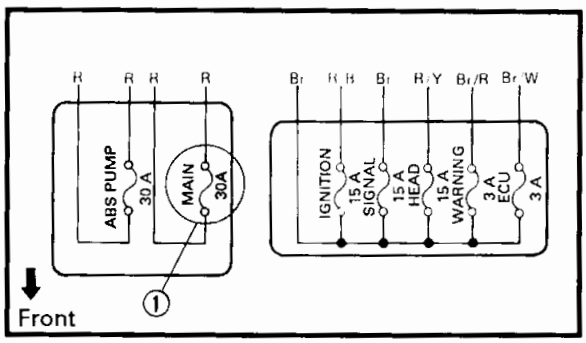
C-2 Neither the warning light nor the other indicators come on

The suspected cause lies in the motorcycle's power source system or in the connections.

[1] Check the power source system

(1) Is the battery connected correctly?
(2) Is the battery voltage correct?
(3) Is the "MAIN" fuse ① blown? If it is, something faulty is suspected in the circuit. Correct the fault and replace the fuse.





[2] Check connectors

(1) Is the "MAIN" fuse coupler connections inserted properly?
(2) Are the main harness and front sub-harness connected properly? (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS-[5],[6]" section.)
(3) Is the main switch coupler connected properly?
(4) Is the meter coupler connected properly?
Refer to the "WIRING DIAGRAM" section.

After completing the above checks, go back to **[A] SERIES** and check the ABS system again.

C-3 Warning light keeps flashing

Check the brake switches (front and rear) while the engine is not running.

Does the brake light come on when the front brake and rear brake are applied?

(1) The brake light only responds either to the front or to the rear brake.

→ A brake switch coupler is probably disconnected. (Refer to the "WIRING DIAGRAM" section.)

→ The brake switch for the non-responding brake is broken. (Refer to the "ELECTRICAL-SIGNAL SYSTEM" section.)

(2) The brake light responds neither to the front nor to the rear brake.

→ Check the brake switch circuit (Brown) on the power source side as it is likely that the wire is broken or the "SIGNAL" fuse is blown. (Refer to the "WIRING DIAGRAM" section.)

(3) The brake light stays on.

→ The couplers for the ABS harness and main harness may be disconnected. (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS-[1],[2]" section).

C-4 The light flashes at a regular interval of 0.5 seconds

If the system works normally, or no fault has been recorded by the ECU, the following causes can be considered.

Please explain to your customer what the causes for the apparent malfunction might have been.

[1] Reasons unrelated to ECU

The following may be cause for "flashing of warning light while running but later appearing normal", or " flashing of the warning light but stopping when the ignition switch is turned off and then on again".

(1) The rear wheel is running idle when the front wheel is stopped. → The system is OK.
(i.e. while on a centerstand)

(2) The rear wheel is spinning. → The system is OK.

(3) The motorcycle is wheelying. → The system is OK.

(4) The motorcycle is running on a bumpy road continuously. → The system is OK.

(5) A brake switch is faulty or is improperly adjusted. → Check and correct it. (Refer to the "ELECTRICAL-SIGNAL SYSTEM" section.)

[2] Drop in voltage

In order for the ABS to work properly, the voltage must be maintained above a certain level. Thus, if the power source voltage drops below 10V, the warning light comes on and the ABS stops functioning. When the voltage comes back to 10V or more, the system starts functioning again. However, the fact that the power source voltage went down to 10V or less is an indication that there may be something faulty with the generator or battery. Correct any such fault according to the normal procedure for correcting the power source system. (Refer to the "ELECTRICAL - CHARGING SYSTEM" section in the CHAPTER 7.)

[3] ECU stops functioning due to external interference

If other causes have been ruled out and the ABS is functioning correctly, the ECU may have judged it should stop functioning due to an unusual external interference of some type. This could include interference such as strong electric waves, static electricity, or radiation.

Explain to the customer that there is no system malfunction, since there are no fault codes. Explain that the system reacted to an unusual external interference as it should, and that the motorcycle can continue to be used.

C-5 Diagnosis Through Fault Codes

The Fault Codes output by the ECU in Section B-4 or B-5 are used to determine what trouble exists. Use the following chart for this determination.

NOTE:

Before you start, record all the displayed fault codes and work out a remedy for each fault.

F. Code	Phenomenon	Check	Reference
11	Front sensor signals are not received properly.	• Front sensor mount • Front sensor lead wire, coupler • ABS harness circuit • Front sensor housing/See the "NOTE:" below this table.	C-5-1 Electrical
12	Rear sensor signals are not received properly.	• Rear sensor mount • Rear sensor lead wire, coupler • Rear sensor housing • ABS harness circuit	C-5-2 Electrical
13/14	Abnormal signals have been detected from front (13) or rear (14) sensor.	• Sensor mounts • Sensor housings • Sensor rotors	C-5-3
15	A discontinuity of the sensor circuits has been detected.	• Sensor (front/rear) • ABS harness circuits • Couplers of sensors • Sensor lead wires See the "NOTE:" following this table.	C-5-4 Electrical
21	A discontinuity or a short-circuit of the solenoid circuits has been detected.	• ABS harness circuits • Coupler of solenoid wire • Solenoid	C-5-5 Electrical
31	The monitor circuit for the solenoid has detected a wire discontinuity among the fail safe relay and the solenoids.	• ABS harness circuits • Fail-safe relay circuit • Coupler of solenoid wire	C-5-6
32	The monitor for the solenoid has detected an abnormal response of the relay.	• Fail-safe relay • ABS harness circuit	C-5-7 Electrical
33	The monitor for the HU motor has detected an abnormal response of the motor (the motor remains not moving.)	• ABS harness circuit • Coupler of motor • Fail-safe relay • HU motor circuit	C-5-8 Electrical
34	The monitor for the HU motor detects an abnormal response of the motor (the motor continues rotation.)	• Fail-safe relay • ABS harness circuit • HU motor circuit	C-5-9 Electrical

F. Code	Phenomenon	Check	Reference
41	One of the wheels does not recover from an imminent tendency of wheel locking inspite of a continuous command by the ECU to release the hydraulic pressure.	• Customes' usage of the motorcycle i.e. *extra ordinary engine braking • Forced dragging of a wheel • HU operation test (Refer to the "D-6-3" section) • Brake hydraulic piping	C-5-10
Current Fault (B-5) with continuous indication of 12V by the tester	There may be a fault within the ECU.	• ABS harness circuit (Test coupler circuit) • ECU (Replacement)	D-1 Electrical

NOTE:

Fault Code 15 is very similar to Fault Codes 11 and 12 in that there is a disconnection of a sensor. Fault Code 15 is displayed when the ECU cannot determine which sensor is disconnected in the case of which the machine is not moving.

Fault Code 11 can be displayed if the rear wheel rotates for more than 20 seconds while the front wheel is stopped.
(i.e. while on centerstand)

(C-5-1) Fault Code 11

Try turning "OFF" the main switch and then turning it back "ON" again.

(1) The warning light remains lighted.
→ There is a disconnection in the front sensor circuit.
- Sensor connector is disconnected → (D-3)
- Sensor lead or coil has been cut → (D-3)
- Sensor circuit of ABS wire harness has been cut → (Refer to the "WIRING DIAGRAM" section.)
- ECU connector terminal has been unplugged → (D-1)

(2) Warning light comes on (for 1.4 seconds) and then goes out.
① With the front wheel stopped, the rear wheel has been left to spin for a short period of time (approximately 20 seconds); this is not a breakdown.
② The front sensor is not issuing signals.
- Sensor is disconnected → (D-3)
- Sensor rotor has broken down → (D-3)

③ Short in front sensor circuit
- Short in sensor wire or coil → (D-3)
- Short in sensor circuit of ABS wire harness → (Refer to the "WIRING DIAGRAM" section.)

④ Lowered output of front sensor
- A problem in the bearings for the front wheel, the wheel shaft, the wheel itself, the sensor housing, or another component can cause a drop in the output of the sensor signal. Check for looseness and distortion.

(C-5-2) Fault Code 12
Try turning "OFF" the main switch and then turning it back "ON" again.

(1) The warning light remains lighted.
→ There is a disconnection in the rear sensor circuit.
- Sensor connector is disconnected → (D-4)
- Sensor lead or coil has been cut → (D-4)
- Sensor circuit of ABS wire harness has been cut → (Refer to the "WIRING DIAGRAM" section.)
- ECU connector terminal has been unplugged → (D-1)

(2) Warning light comes on (for 1.4 seconds) and then goes out.
① With the rear wheel stopped, the front wheel has been left to spin for a short period of time; this is not a breakdown.
② The rear sensor is not issuing signals.
- Sensor is disconnected → (D-4)
- Sensor rotor has broken down → (D-4)

③ Short in rear sensor circuit
- Short in sensor wire or coil → (D-4)
- Short in sensor circuit of ABS wire harness → (Refer to the "WIRING DIAGRAM" section.)

④ Lowered output of rear sensor
- A problem in the bearings around the rear wheel, the wheel shaft, the wheel itself, the sensor housing, or another component can cause a drop in the output of the sensor signal. Check for looseness and distortion.

NOTE:
If the motorcycle is being driven continuously on bumpy roads, the warning lamp may begin to blink. If the rider continues to ride on this type of surface, Fault Code 11 or Fault Code 12 may be recorded, depending on the conditions in effect at the time.

(C-5-3) Fault Code 13 (Front) and 14 (Rear)
(1) There may be some problem with the attachment of the sensor or sensor rotor.

① Sensor attachment
- See if the sensor is attached normally to the housing. → (D-3, 4)
- Check for rattling between the housing and the wheel. → (D-3, 4)

② Sensor rotor attachment
- Check to see if the rotor has been correctly press-fitted to the wheel. → (D-3, 4)
- Check for foreign matter in the area where the rotor is attached. → (D-3, 4)

(2) There may be some problem with the sensor rotor teeth.
- Check for scratches on the teeth of the rotor.
  Also check for the presence of foreign matter. → (D-3, 4)

(3) The sensor output may have dropped.
- A problem in the bearings for the front or rear wheel, the wheel shaft, the wheel itself, the sensor housing, or another component can cause a drop in the output of the sensor signal. Check for looseness and distortion.

(C-5-4) Fault Code 15

A cut or disconnection may have been detected in the front or rear sensor circuit.

→
- Disconnected front or rear sensor connector → (D-3, 4)
- Cut in the front or rear sensor lead or coil → (D-3, 4)
- Disconnection or cut in sensor circuit of ABS wire harness → (Refer to the "WIRING DIAGRAM" section).
- Terminals of ABS wire harness ECU connector may be unplugged. → (D-1)

NOTE:
- It is possible that both connectors are unplugged, so be sure and check both of them.
- If Fault Code 15 is displayed and the motorcycle continues to run, the display will specify either the front or rear, and will change to read "11" or "12".

(C-5-5) Fault Code 21

Using the procedure outlined below, check each of the points in sequence.

(1) Solenoid coupler
- See if the solenoid coupler terminal is unplugged. → (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS- 12 " section.)

(2) HU solenoids
- See if the solenoids are conductive (front and rear). → (D-5)
- Check the insulation of all of the solenoid terminals and the negative (–) battery terminal.

(3) ABS wire harness
- Check the conductivity of the solenoid circuits (White/Blue-White and White/Green-White), as well as the insulation of the negative (–) battery terminal and the various solenoid circuits. → (Refer to the "WIRING DIAGRAM" section.)

(C-5-6) Fault Code 31

Using the procedure outlined below, check each of the points in sequence.

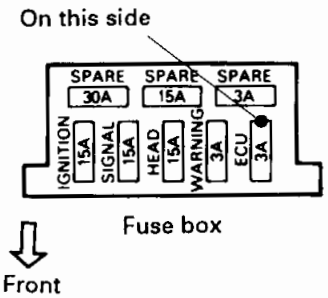
(1) ABS pump fuse
- Check to see if the ABS pump fuse at the side of the battery has blown.

(2) Solenoid coupler
- Check the solenoid coupler inside the right side cover, to see if it is disconnected or not coupled tightly. → (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS- 12 " section.)

(3) ABS wire harness
- Among the circuits between the ECU and the fail-safe relay, check the conductivity of the (White/Brown) wires. → (Refer to the "WIRING DIAGRAM" section.)
- Disconnected ECU coupler terminals (White/Brown) → (D-1)

(4) Fail-safe relay
- Check the function of the fail safe relay. → (D-2)

(5) Main harness
- Among the fail-safe relay couplers, check the conductivity between the (Red) terminal and the positive (+) battery terminal.
- Disconnect the ECU fuse, and then, among the fail safe relay couplers, check the conductivity between the (Brown/White) wires and the ECU fuse, as shown in the diagram below.



(C-5-7) Fault Code 32

(1) Fail-safe relay
- Check the function of the fail-safe relay. → (D-2)

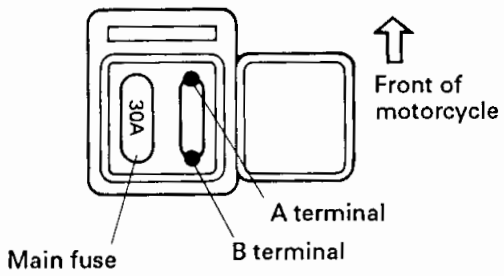
(2) ABS wire harness
- With the fail-safe relay and the ECU disconnected from the ABS wire harness, check the insulation between the (White) terminal and the (Red) terminal of the fail-safe relay couplers. → (Refer to the "WIRING DIAGRAM" section.)

(C-5-8) Fault Code 33

(1) ABS pump fuse
- Check to see if the ABS pump fuse at the side of the battery has blown.

(2) Fail safe relay
- Check the function of the fail safe relay. → (D-2)

(3) Main harness and ABS wire harness
- Disconnect the fail safe relay, and check the conductivity between the (Red) terminal of the ABS harness and the ABS wire harness (the A terminal in the diagram) of the ABS pump fuse terminal in the fuse box (the fuse should be disconnected). → (Refer to the "WIRING DIAGRAM" section.)



- Check the conductivity between the positive (+) terminal of the battery and the battery side of the ABS pump fuse terminal (the B terminal in the diagram).
- Disconnect the ECU and the fail-safe relay from the ABS wire harness, and check the conductivity between the (White/Black) wires and each of the couplers. Also check the conductivity between the terminals of the (Red/White) wires.

(C-5-9) Fault Code 34

(1) HU pump motor
- Check to make sure the pump motor coupler inside the left side cover is not disconnected, and is securely coupled. → (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS- 18 " section.)
- Check the conductivity of the motor → (D-5).

(2) ABS wire harness
- With the coupler of the HU pump motor disconnected, check the conductivity between the (Black) terminal in the pump motor coupler of the ABS wire harness and the negative (–) terminal of the battery.
- With the ECU coupler disconnected, check the conductivity between the (Red/White) terminals of the ECU coupler, and the (Red/White) terminals of the pump motor coupler. → (D-1)
- With the fail-safe relay disconnected, check the insulation between the (Red/White) terminals of the pump motor coupler and the positive (+) terminal of the battery.

(3) Fail-safe relay
- Check the function of the fail-safe relay. → (D-2)

(C-5-10) Fault Code 41

(1) Wheel rotation
- Make sure the front and rear wheels rotate smoothly.
- Check the wheel bearings for looseness and rattling, the wheel shaft for bending or curving, and the brake disks for bending or curving.

(2) Master cylinder and calipers
- Check to make sure input to the lever and pedal is conveyed properly, and when the input is released, make sure the braking force is released.

(3) Brake fluid
- Check the brake piping to make sure there is no noticeable deterioration of the brake fluid (water absorption, solidification, contamination, foreign matter, etc.).
- Make sure no air is getting into the brake piping.

(4) Brake piping
- In the brake piping, check for any additions which might obstruct the passage of brake fluid, and make sure there is no foreign matter in the piping.

⚠ WARNING

Use of any brake pipes, hoses, or union bolts other than genuine YAMAHA parts, or parts equivalent in quality and specifications, may cauce blockage of the pipe channels. This could lead to failure of the brake system and an accident.

- Check the various systems for the brake hoses and pipes on the master cylinder side and the caliper side, to make sure connections to the HU have not been accidentally reversed. → (D-5)

NOTE:

If connections are reversed or made incorrectly, the lever or pedal will not return in the proper pulsing motion when the HU test described in D-6 is performed. Instead, the lever or pedal will drop and return slowly to the original position, which is incorrect operation.

(5) Solenoid coupler terminals
- Make sure the front and rear solenoid coupler terminals (on the HU side and the wire harness side) have not been accidentally reversed. → (Refer to the "ABS LAYOUT OF WIRE HARNESS COUPLERS- 12 " section.)

	Terminal Color	
	Solenoid Side	Wire Harness Side
Front system	Yellow-white/ Yellow-white	White/White-green
Rear system	Yellow-red/ Yellow-red	White/White-blue

NOTE:

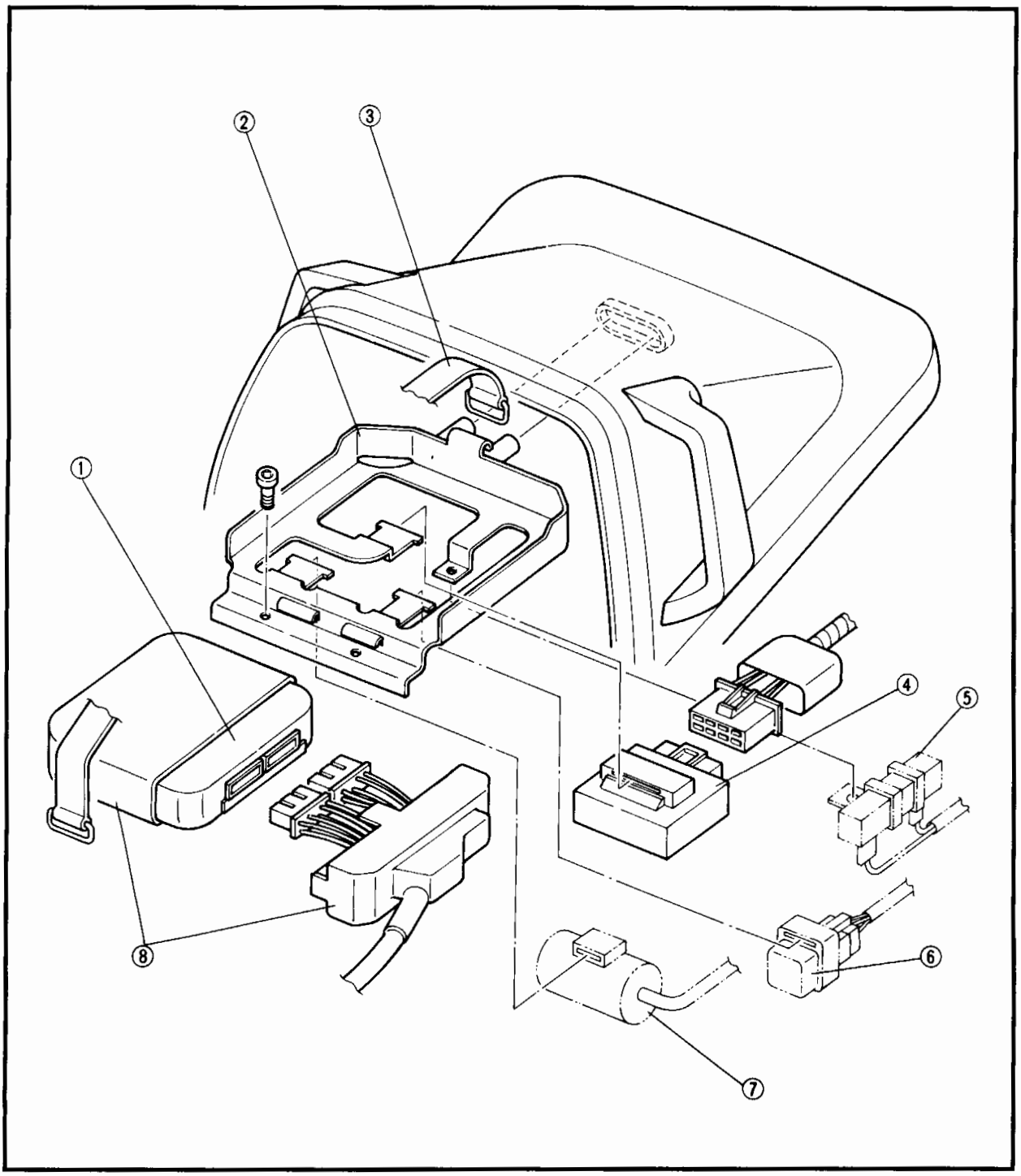
If connections are reversed or made incorrectly, the front brake lever will not pulse first as it should when the HU test described in D-6 is performed. Instead , the rear brake pedal will pulse first, which is incorrect operation.

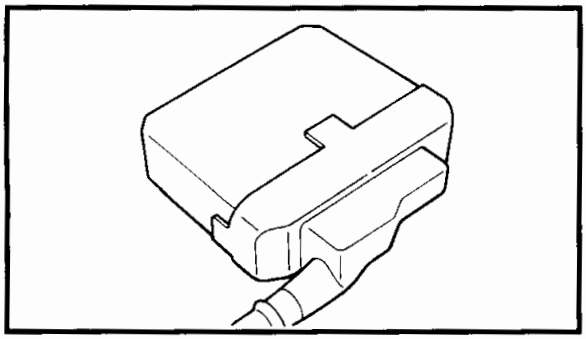
(6) HU

If none of the operations above are applicable in solving the problem, there may be something wrong with the function of the hydraulic unit. Substitute a different hydraulic unit and connect the pipes and wiring correctly. Then run the HU operation test described in D-6 and check the function.

[D-1] SERVICE OF ECU/[D-2] FAIL-SAFE RELAY

① Electronic control unit (ECU)
② ECU bracket
③ Band
④ Fail-safe relay
⑤ Resister
⑥ Relay assembly (brake switch)
⑦ Condenser
⑧ ECU cover





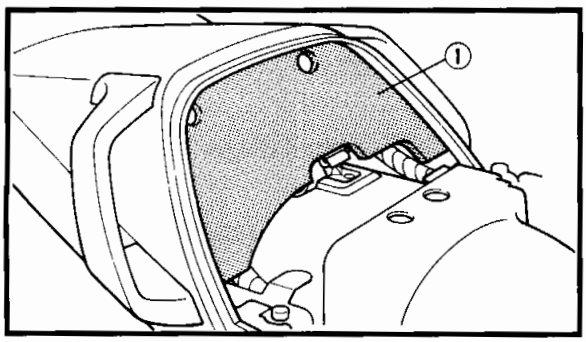
[D-1] SERVICE OF ECU

Removal

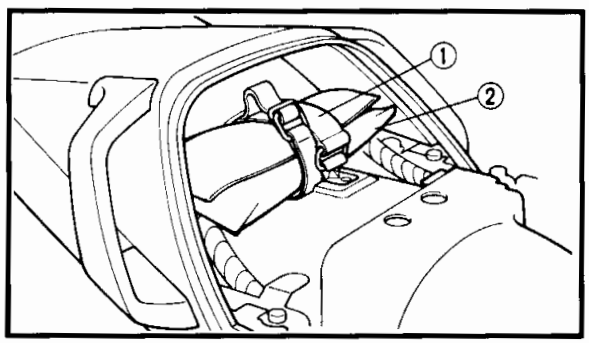
1. Place the motorcycle on a level place and the motorcycle on its centerstand.

2. Remove:
   - Seat

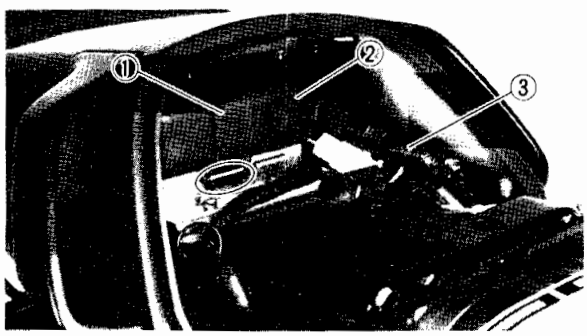
   Refer to the "SEAT, SIDE COVERS AND FUEL TANK" section in the CHAPTER 3.



3. Remove:
   - Cover ①



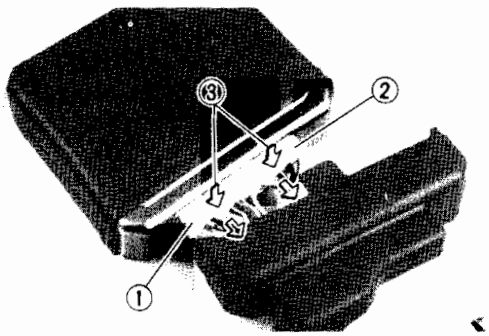
4. Remove:
   - Band ①
   - Owner's tool kit ②



5. Remove:
   - Band ①
   - Electronic control unit (ECU) ②

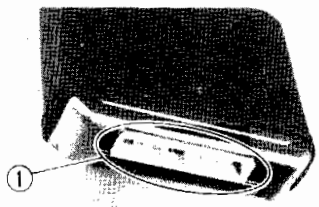
NOTE:

When removing the ECU, carefully pull the ECU herness ③ so as not to cause damage to the ECU coupler.



6. Disconnect:
   - ECU coupler ①
   - ECU coupler ②

NOTE :
Do not pull the ECU leads to remove the ECU coupler. Remove each coupler carefully while pressing the lock tabs ③ .

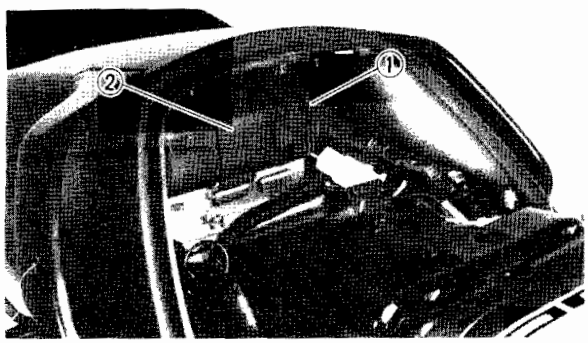




Inspection

1. Inspect:
   - ECU terminals ①
     Cracks/Damage → Replace.
   - ECU coupler ② terminals
     Disconnected / Dirty → Repair.

NOTE:
If the coupler is clogged with mud or dust, blow it off by compressed air.

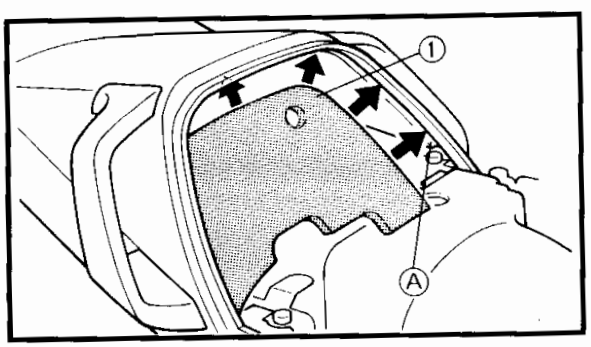


Installation

Reverse the "REMOVAL" procedure. Note the following points.

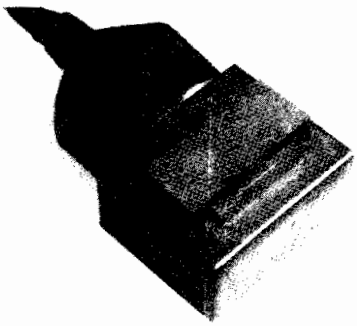
1. Install:
   - Electronic control unit (ECU) ①
   - Band ②

NOTE:
Connect the ECU coupler unit properly, ensuring that you connect it without damaging any terminal, until a "click" sound is heard.



2. Install:
   - Owner's tool kit
   - Band
   - Cover ①

NOTE :
When assembling cover ① , fit it securely in the groove Ⓐ in the tail cover unit.

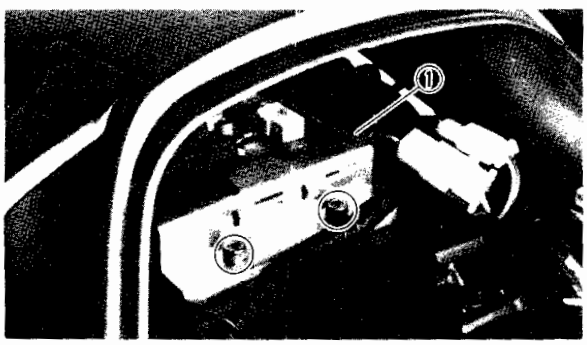


[D-2] SERVICE OF FAIL-SAFE RELAY

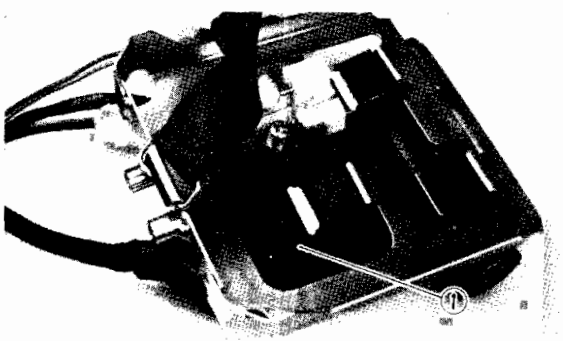
Removal

1. Place the motorcycle on a level place and the motorcycle on its centerstand.

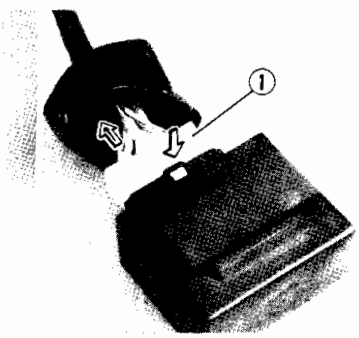
2. Remove:
   - Seat
   - Cover
   - Owner's tool kit
   - Electronic control unit (ECU)
     Refer to the "[D-1] SERVICE OF ECU-Removal" section.



3. Remove:
   - ECU bracket ①



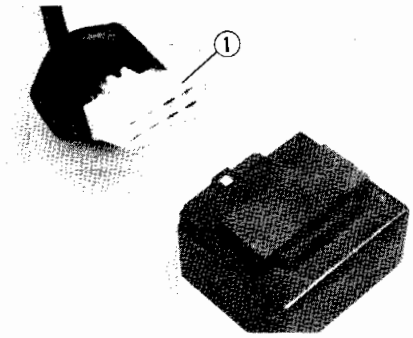
4. Disconnect:
   - ABS Fail-safe relay ①

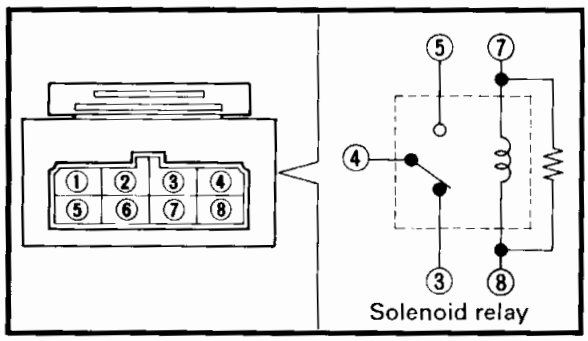


5. Disconnect:
   - ABS Fail-safe relay coupler ①

NOTE :

Do not pull the ABS Fail-safe relay leads to remove the ABS Fail-safe relay coupler.
Remove each terminal carefully while pressing the lock.





Solenoid relay standard value

Terminal name	③	④	⑤	⑦	⑧
Normal Condition	○	○		○	○
When battery power supply is connected between ⑦ and ⑧.		○	○		

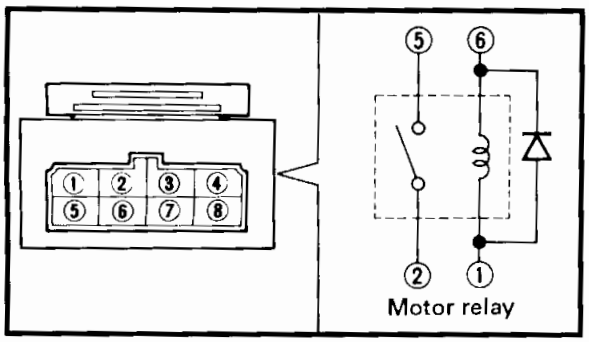
Inspection

Fail-safe relay

1. Check:
   - Continuity of solenoid relay.
   - Connect the pocket tester (Ω x 1) to the following terminals.
   - First, check the solenoid relay for continuity between terminals ③ and ④.
     Tester (+) lead → ③ terminal
     Tester (–) lead → ④ terminal
     If the tester shows "∞" → Replace fail-safe relay.
   - Second, check the solenoid relay for the continuity between terminals ⑦ and ⑧.
     Tester (+) lead → ⑦ terminal
     Tester (–) lead → ⑧ terminal
     If the tester shows "∞" → Replace fail-safe relay.
   - Third, connect the battery positive terminal to terminal ⑦, and the battery negative terminal to terminal ⑧.
     Check the solenoid relay for the continuity between terminals ④ and ⑤.
     Tester (+) lead → ④ terminal
     Tester (–) lead → ⑤ terminal
     If the tester shows "∞" → Replace fail-safe relay.

CAUTION:

Take care to avoid shorting between the positive and negative terminals of the battery when connecting the relay terminal and battery.



Motor relay standard value

Terminal name	①	②	⑤	⑥	
Normal condition	○			○	
When battery power supply connected between ⑥ and ①.		○	○		

2. Check:
   - Continuity of motor relay.
   - Connect the pocket tester (Ω x 1) to the motor relay terminal.
   - First check the motor relay for continuity between terminals ① and ⑥.
     Tester (+) lead → ① terminal
     Tester (–) lead → ⑥ terminal
     If tester shows "∞" → Replace fail-safe relay.

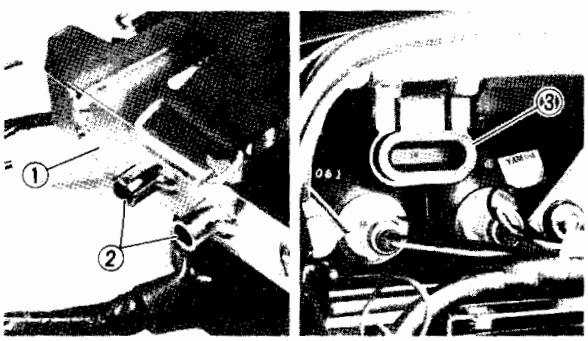
NOTE :

Make sure you do not reverse the connections of test lead because you will not be able to detect the fault.

   - Second, connect the battery positive terminal to terminal ⑥, and connect the battery negative terminal to terminal ①.
     Check the motor relay component for the continuity between terminals ② and ⑤.
     Tester (+) lead → ② terminal
     Tester (–) lead → ⑤ terminal
     If the tester shows "∞" → Replace fail-safe relay.

CAUTION:

- **Take care not to reverse the battery connections because the diode will be damaged.**
- **Take care to avoid shorting the positive and negative terminals at the time of connecting the battery and relay.**



Installation

Reverse the "REMOVAL" procedure.
Note the following points.

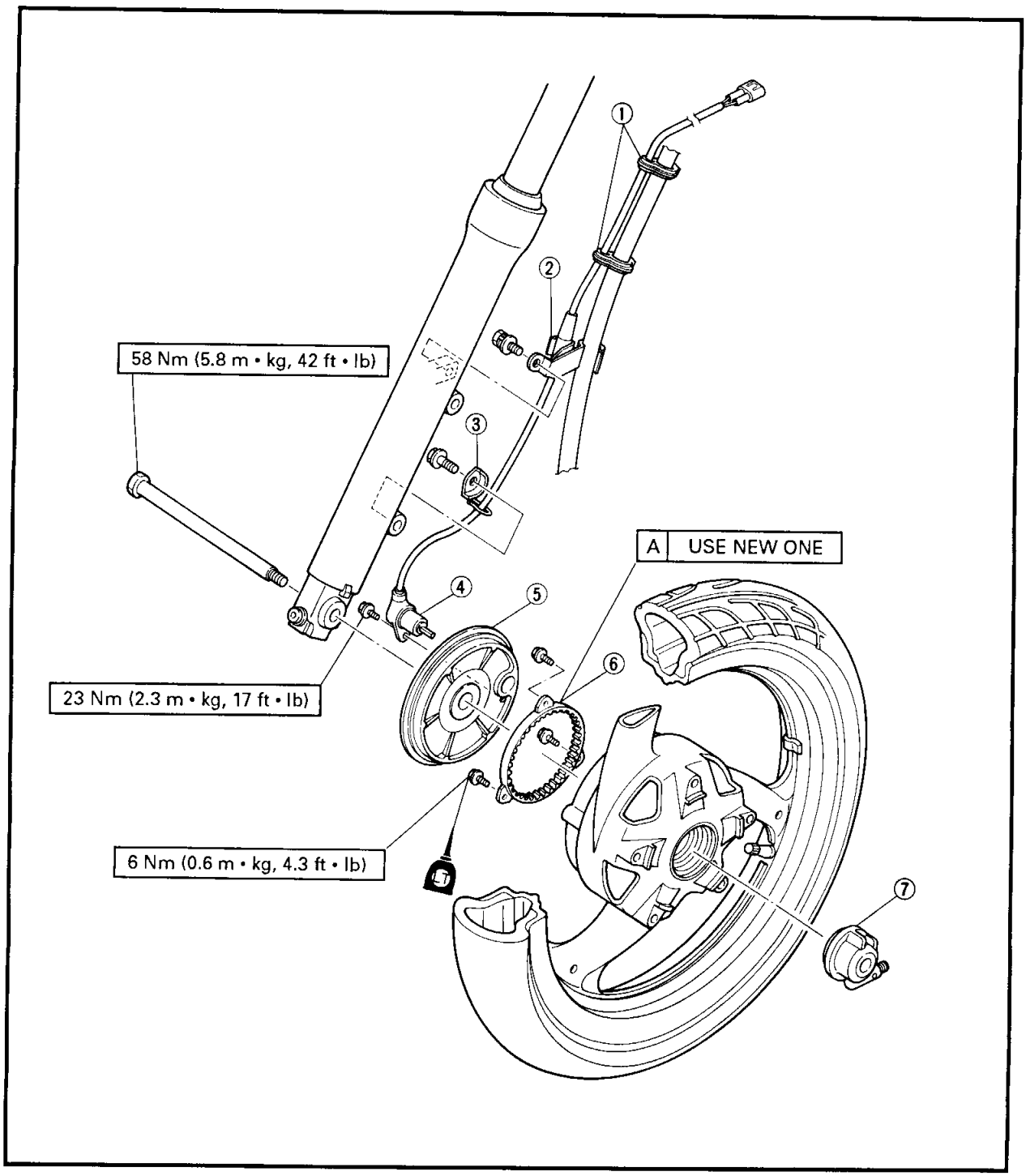
1. Install:
   - ECU bracket ①

NOTE :

Assemble so that the protruding parts ② of ECU bracket sits firmly in the hole of damper ③ inside the tail cowl.

[D-3] SERVICE OF FRONT WHEEL SENSOR AND SENSOR ROTOR

① Clamp
② Holder (brake hose and sensor lead)
③ Holder (sensor lead)
④ Front wheel sensor
⑤ Sensor housing
⑥ Sensor rotor
⑦ Speedometer gear unit



ABS WHEEL SENSOR AND SENSOR ROTOR

CAUTION:

- **Handle ABS components carefully. ABS components are precisely adjusted. Avoid impact or dirt on these components.**
- **The ABS wheel sensor cannot be disassembled. Even if you feel that the fault is minor, do not try to disassemble and repair the component. Replace the part.**

[D-3] SERVICE OF FRONT WHEEL SENSOR AND SENSOR ROTOR

Removal

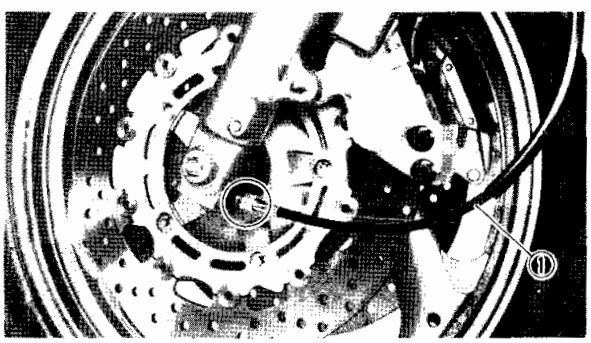
⚠WARNING

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

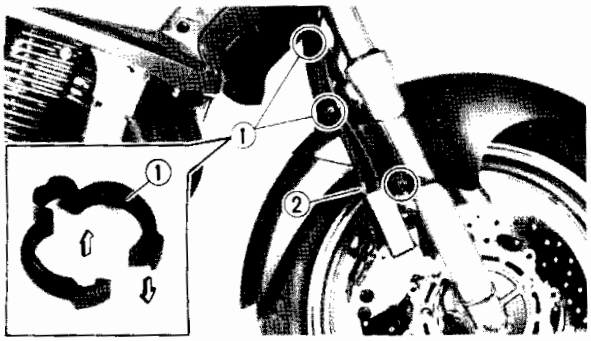
1. Place the motorcycle on a level place and on its centerstand.

2. Remove:
   - Seat
   - Side cover (left)
   - Side cover (right)
   - Fuel tank
   - Upper cowling

   Refer to the "SEAT, SIDE COVERS AND FUEL TANK and UPPER COWLING" section in the CHAPTER 3.



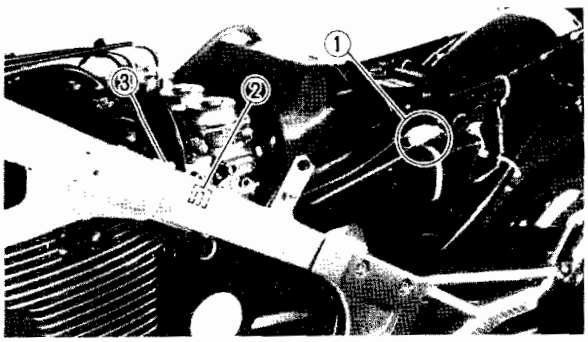
3. Remove:
   - Speedometer cable ①



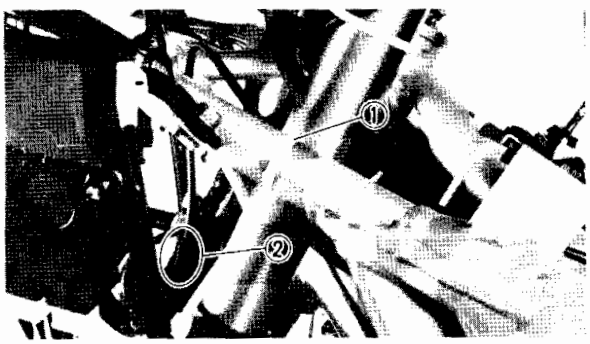
4. Remove:
   - Clamp ①
   - Holder ② (brake hose and wheel sensor lead)

NOTE :

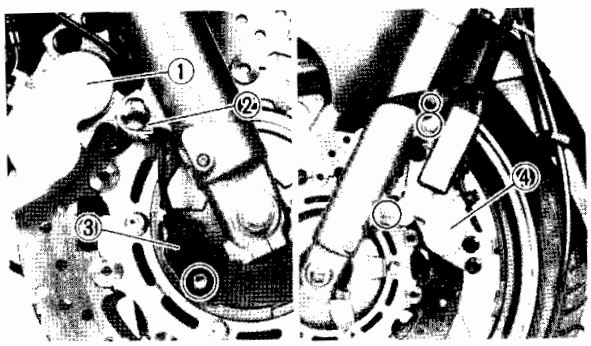
If you move the joining clamp ends of brake hose and wheel sensor lead wire up and down, it becomes easy to remove.



5. Disconnect:
   - Wheel sensor coupler ①
   - Clamp ②
   - Band ③



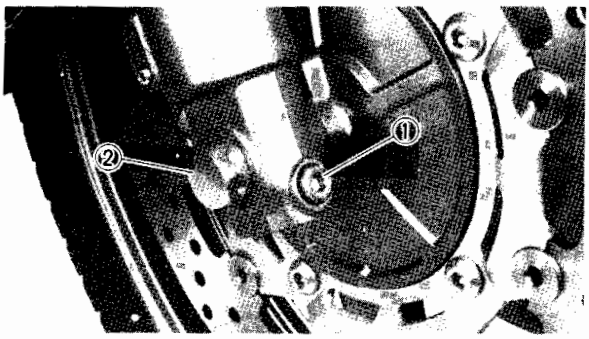
6. Disconnect:
   - Band ①
   - Wheel sensor lead ② (from horn stay)



7. Remove:
   - Brake caliper (right) ①
   - Holder ② (wheel sensor lead)
   - Wheel sensor ③
   - Brake caliper (left) ④

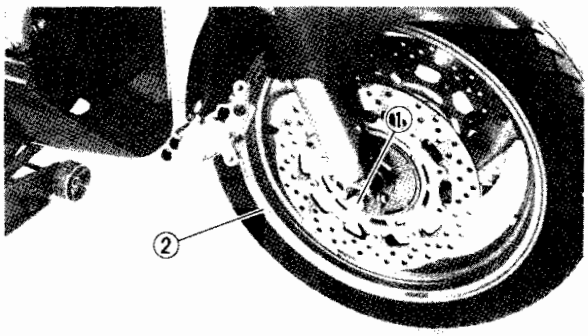
CAUTION:

- **Take care to avoid metal contact with the pole of the wheel sensor when removing from wheel hub.**
- **Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.**

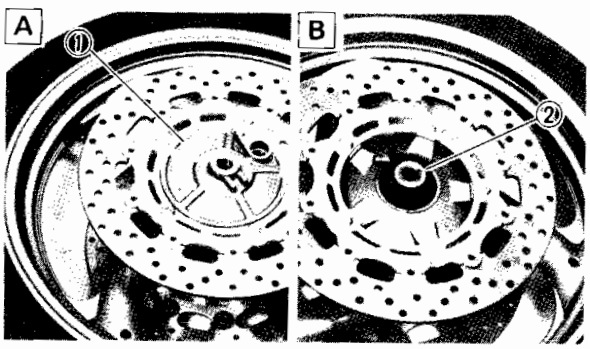


8. Loosen:
   - Bolt ①
   - Wheel shaft (front) ②

9. Elevate the front wheel by placing a suitable stand under the engine.

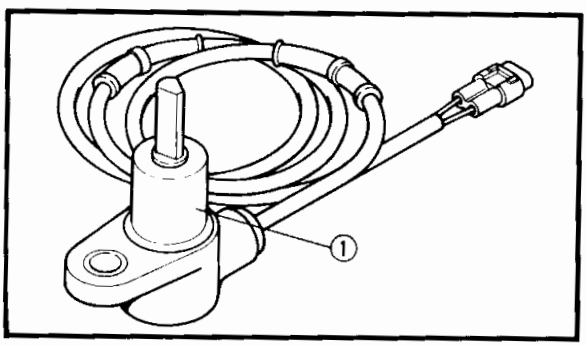


10. Remove:
    - Wheel shaft (front) ①
    - Front wheel assembly ②



11. Remove:
    - Sensor housing ①
    - Speedometer gear unit ②

[A] Right side
[B] Left side



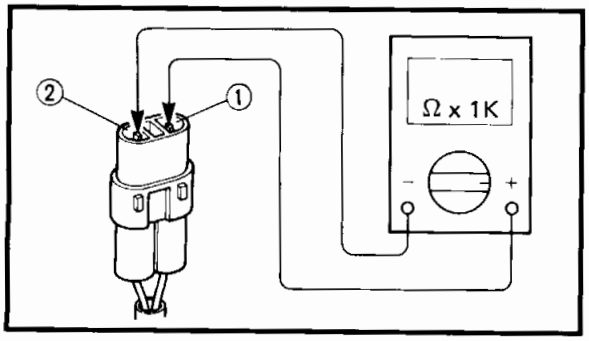
Inspection

1. Inspect:
   - Front wheel sensor ①
     Cracks/Bends/Warpage → Replace.

2. Check:
   - Front wheel sensor specified resistance.
     Connect the pocket tester (Ω x 1k) to the front wheel sensor coupler terminal.

CAUTION:

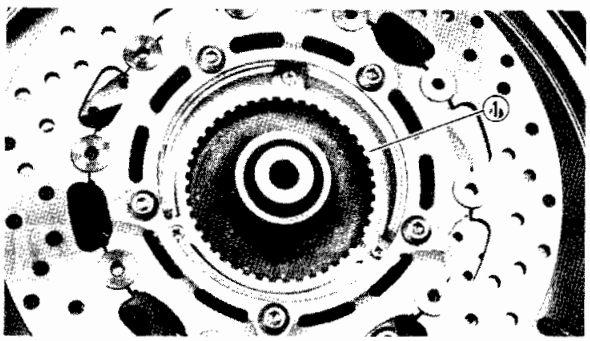
While checking, do not force the pocket tester probes into the coupler terminals. The terminal gap may widen resulting in poor connection.



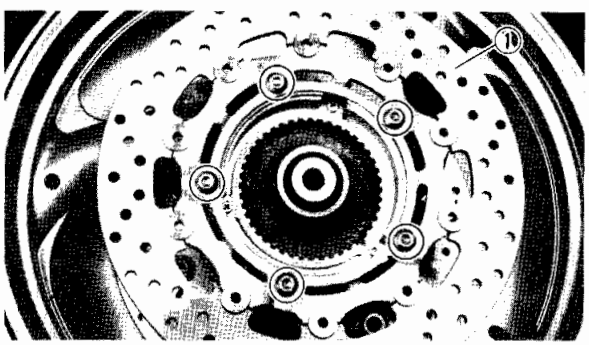
Tester (+) lead → ① terminal
Tester (–) lead → ② terminal

Front wheel sensor resistance:
1.19 ~ 2.21 kΩ at 20°C (68°F)
(① terminal – ② terminal)

Out of specification → Replace.



3. Inspect:
   - Sensor rotor ①
     Cracks/Damage → Replace.



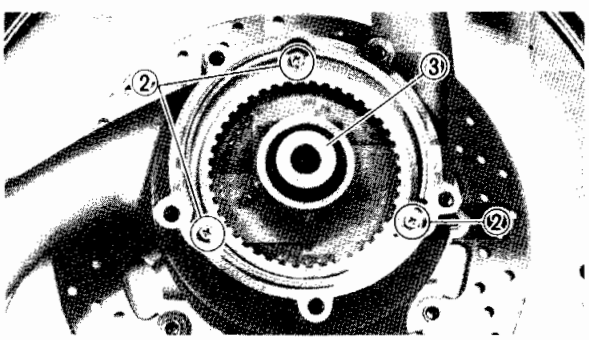
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Front wheel sensor rotor replacement steps:

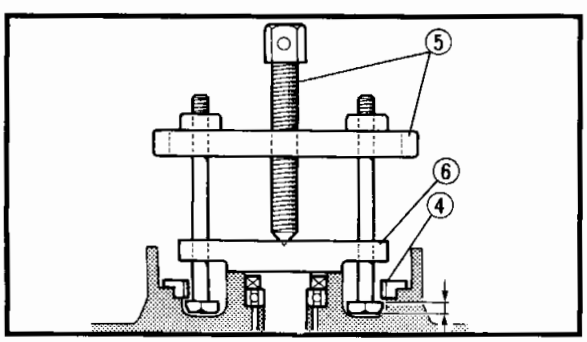
- Remove the brake disc ① (right).
- Remove the bolts ② (front sensor rotor).
- Remove the spacer collar ③ .
- Remove the front wheel sensor rotor ④ by using the crankcase separating tool ⑤ and the Sencer rotor puller guide ⑥ .

NOTE:

Be careful not to apply pressure to the inner race of the bearing.

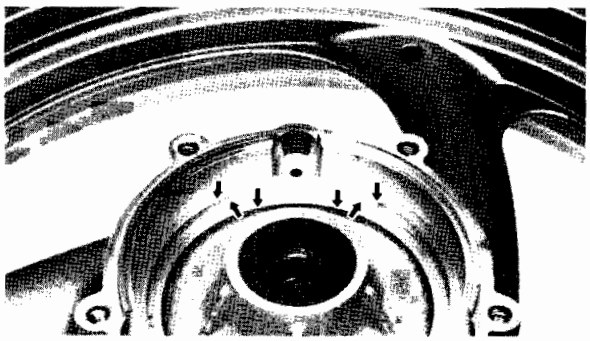


Crankcase separating tool:
P/N. YU-01135-A, 90890-01135
Sensor rotor puller guide:
P/N. YM-04126



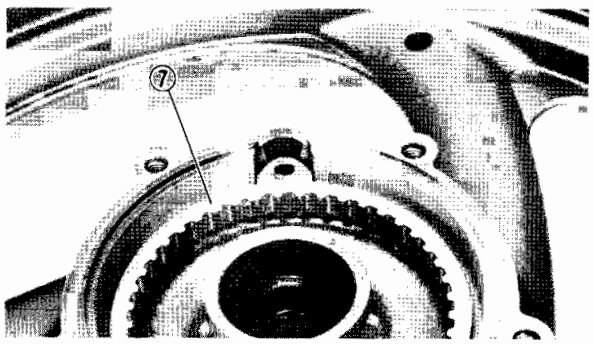
NOTE :

- Install the bolts into the special tool with the heads facing downward.
- Secure the bolt heads between the teeth of the rotor and pull upward by turning the handle of the special tool.



- Remove the brake disc (left).
- Check the surface of the hub where the sensor rotor is fitted.
  If the surface is found to be rough from damage, etc., replace the wheel assembly.

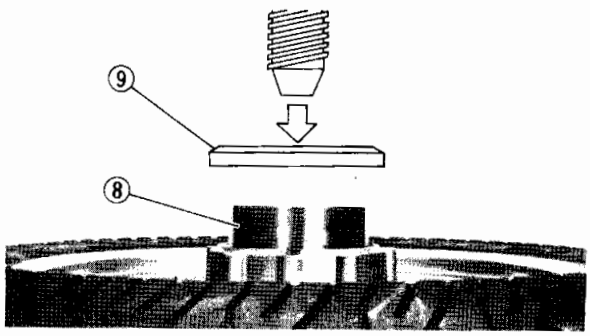
NOTE:
A rough surface will not allow the new sensor rotor to be seated properly.



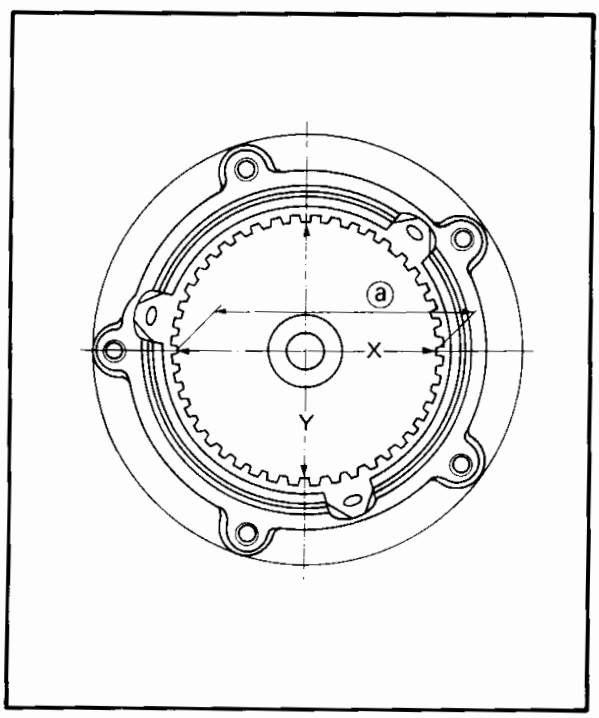
- Put the hub on the hydraulic press so that it is level. Place a new sensor rotor ⑦ in the wheel hub parallel with its mating surface. It must not be cocked at an angle. Be sure the bolt holes are aligned with the holes in the hub.

⚠ WARNING

Never reuse the sensor rotor if it has been removed. Always use a new one. Other wise the ABS may not work correctly, which could cause an accident.



- Place the sensor rotor installation pot ⑧ on the new sensor rotor ⑦ .Carefully place an appropriate support plate ⑨ centered on the pot. Then fully seat the sensor rotor in the hub by applying force on the center of the support plate with the hydraulic press.



Sensor rotor installation pot:
P/N. YM-04124, 90890-04124

CAUTION:

Do not strike the sensor rotor.

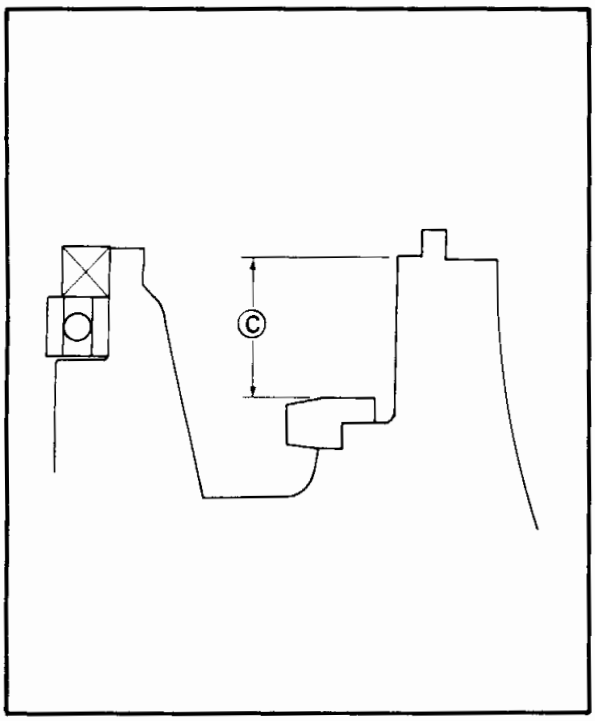
- Measure the inside diameters of the installed sensor rotor with vernier calipers.

NOTE:
Measure the inside diameters of the installed sensor rotor at four equally divided points of its circumference, at right angles to the wheel axle. Then, find the average of the measurements.

Sensor rotor inside diameter ⓐ :
99.90 ~ 100.15 mm (3.933 ~ 3.943 in)
Allowance ⓑ :
Less than 0.1 mm (0.004 in)

$$ⓐ = \frac{X+Y}{2} \qquad ⓑ = X-Y$$

If the measurement is not within the above ⓐ and ⓑ, replace the wheel assembly.



- Measure the distance between the surface of the wheel hub and the outer circumference of the sensor rotor with a vernier calipers.

NOTE:
Measure the distance at six equally divided points of the sensor rotor in parallel to the wheel axle. Then, find the average of the measurements.

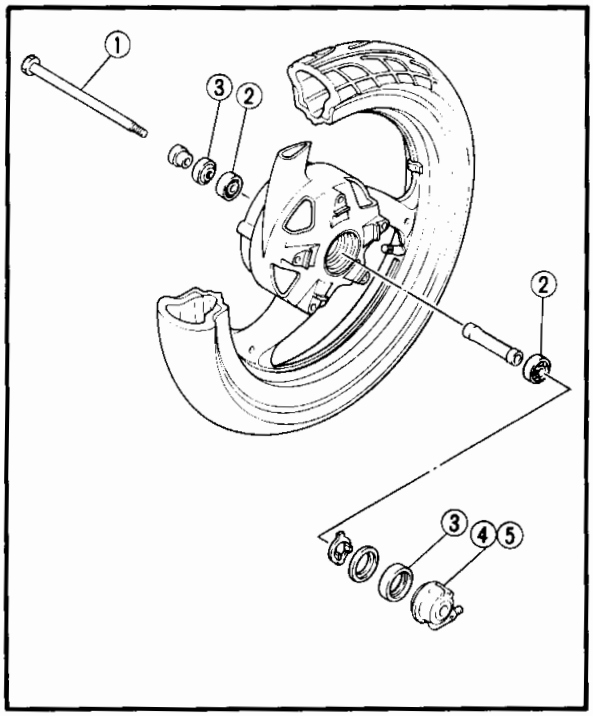
Distance ⓒ:
13.65 ~ 14.35 mm (0.537 ~ 0.565 in)

If out of specification, replace the wheel assembly.

- Install the bolts ② (front sensor rotor), the brake disk ①, ⑧ and the spacer collar ③.

Bolts (sensor rotor):
6 Nm (0.6 m • kg, 4.3 ft • lb)
LOCTITE®
Bolts (brake disc):
20 Nm (2.0 m • kg, 14 ft • lb)
LOCTITE®

****



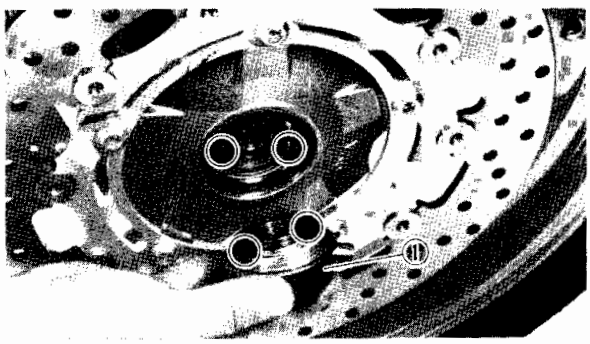
Installation

Reverse the "REMOVAL" procedure.

Note the following points.

1. Lubricate:
   - Wheel axle ①
   - Bearings ②
   - Oil seal (lip) ③
   - Drive ④ /Driven gear ⑤ (speedometer)

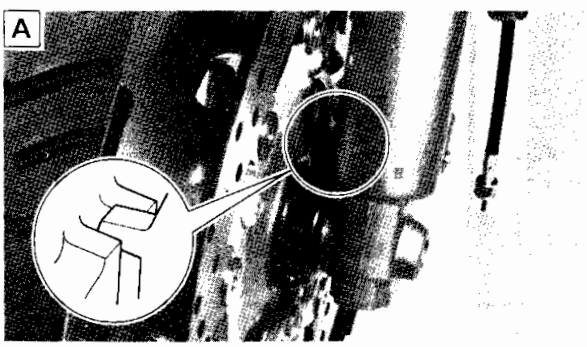
Lithium soap base grease



2. Install:
   - Speedometer gear unit ①

NOTE:

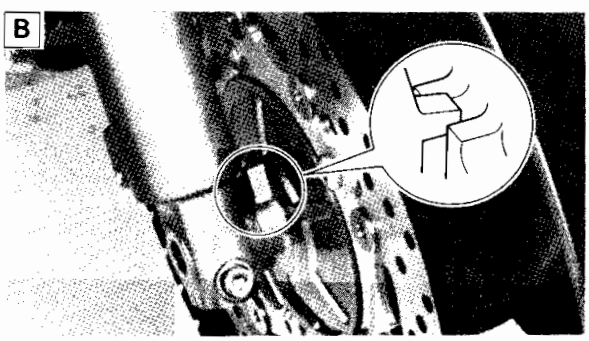
Make sure the projections on the meter clutch are meshed with the flats in the wheel hub.



3. Install:
   - Front wheel assembly

NOTE:

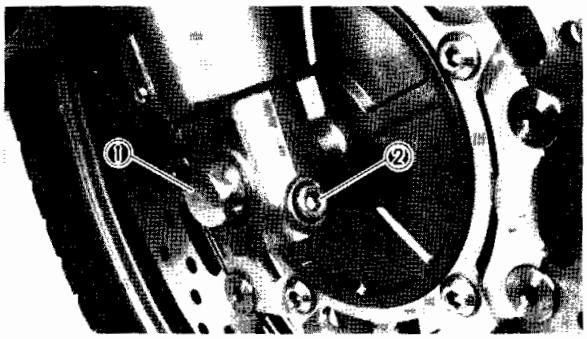
Be sure the boss on the outer fork tube correctly engages with the locating slot on the speedometer gear unit and sensor housing.



CAUTION:

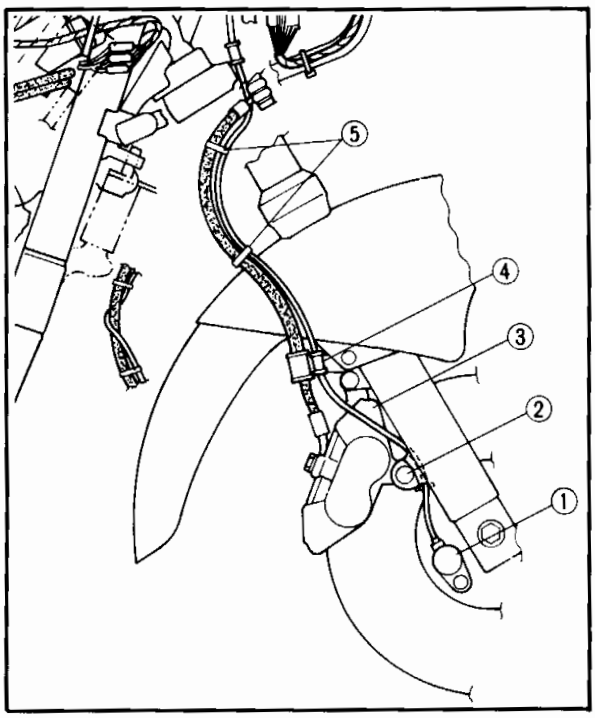
Install after you make sure that no foreign matter has entered the front wheel hub. This may result in damage to the internal sensor rotor and wheel sensor.

A Speedometer gear unit
B Sensor housing



4. Tighten:
- Wheel axle ①
- Bolt (axle holder) ②

Wheel axle:
59 Nm (5.9 m • kg, 43 ft • lb)
Bolt (axle holder):
20 Nm (2.0 m • kg, 14 ft • lb)

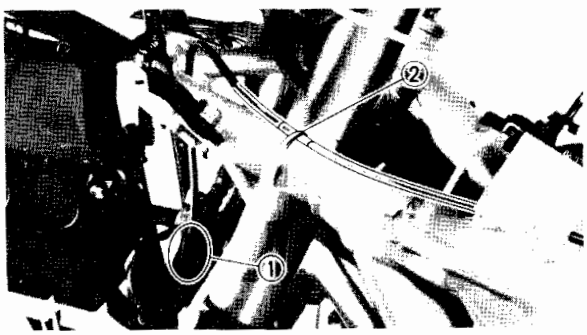


5. Install:
- Front wheel sensor ①
- Holder ② (wheel sensor)
- Brake caliper (right) ③
- Holder ④
- Clamp ⑤
- Brake caliper (left)

NOTE :
When mounting the wheel sensor, make sure that there is no twist in the wheel sensor lead wire or no foreign matter is sticking to the pole.

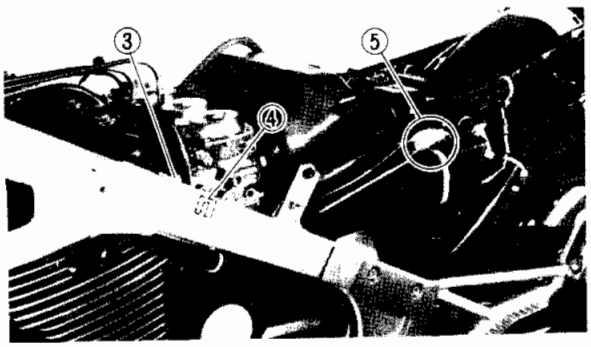
CAUTION:
Make sure that the front wheel sensor lead is routed properly.
Refer to the "CABLE ROUTING" section in the CHAPTER 2.

Bolt (front wheel sensor):
23 Nm (2.3 m • kg, 17 ft • lb)
Bolt (brake caliper):
35 Nm (3.5 m • kg, 25 ft • lb)



6. Connect:
- Wheel sensor lead ① (to horn stay)
- Band ②
- Band ③
- Clamp ④
- Wheel sensor lead coupler ⑤

NOTE :
When strapping the sensor lead to the frame, place the band over the white-taped portion.



CAUTION:

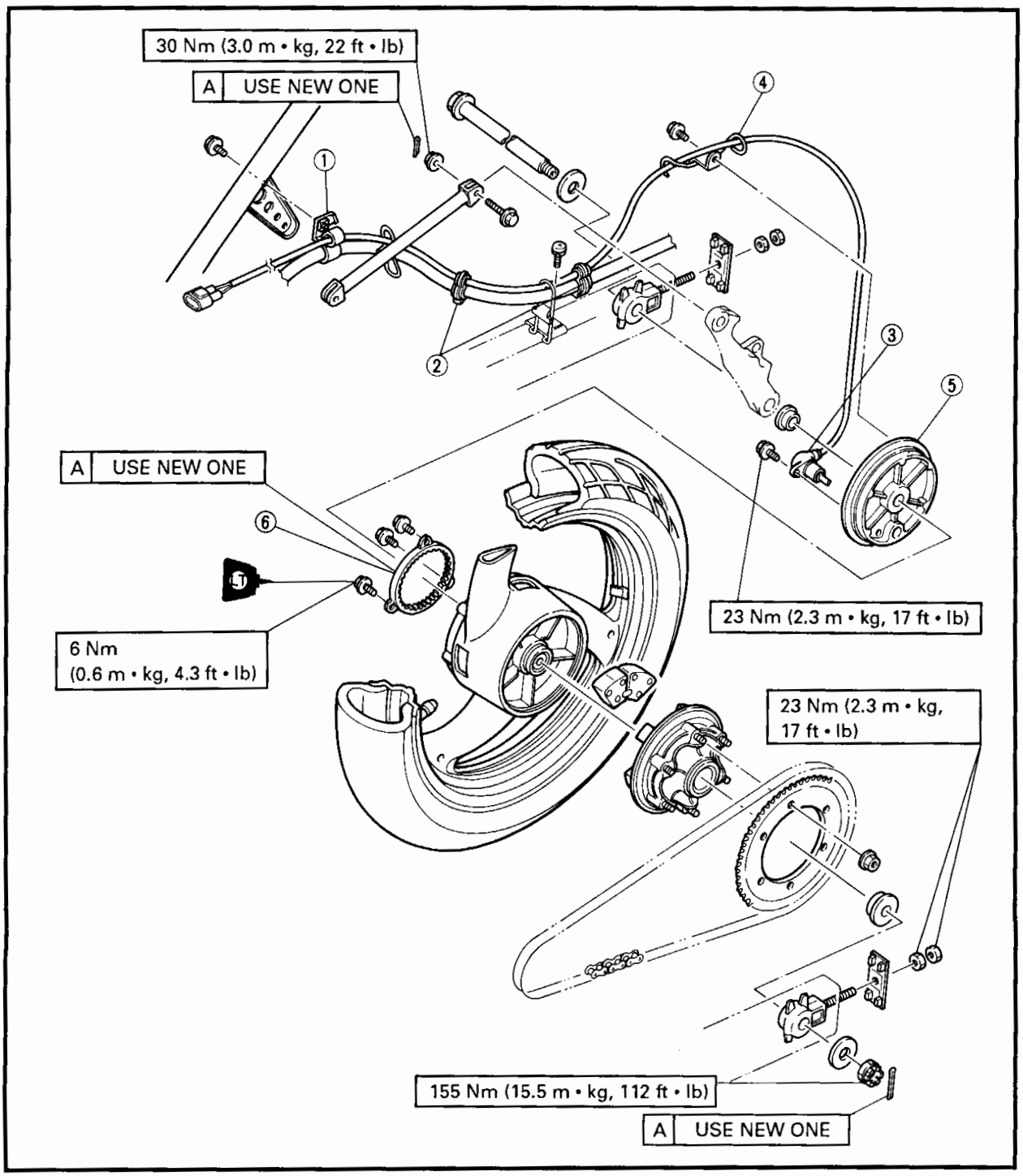
Make sure that the front wheel sensor lead are routed properly.
Refer to the "CABLE ROUTING" section in the CHAPTER 2.

⚠WARNING

Always use a new band.

[D-4] SERVICE OF REAR WHEEL SENSOR AND SENSOR ROTOR

① Holder (brake hose and sensor lead)
② Clamp
③ Rear wheel sensor
④ Holder (sensor lead)
⑤ Sensor housing
⑥ Sensor rotor



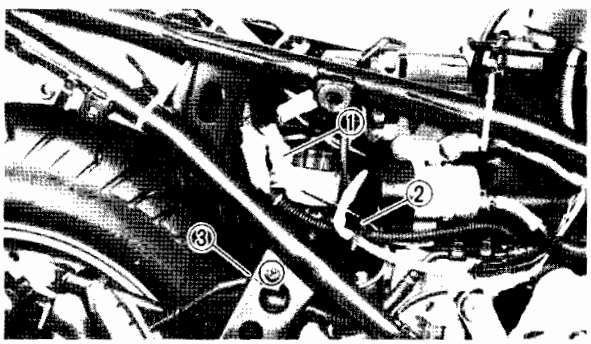
[D-4] SERVICE OF REAR WHEEL SENSOR AND SENSOR ROTOR

Removal

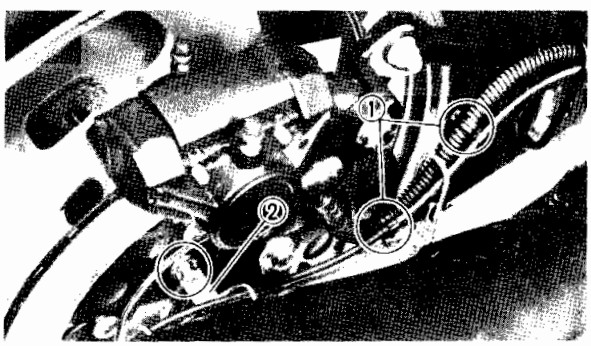
⚠ WARNING

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

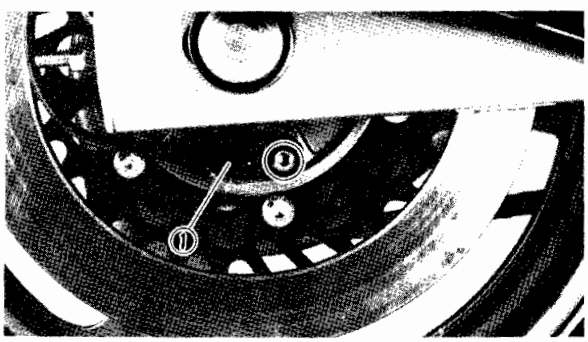
1. Place the motorcycle on a level place and on its centerstand.
2. Remove:
   - Seat
   - Side cover (right)
     Refer to the "SEAT, SIDE COVERS AND FUEL TANK" section in the CHAPTER 3.



3. Disconnect:
   - Wheel sensor lead coupler ①
   - Band ②
4. Remove:
   - Holder ③ (brake hose and sensor lead)



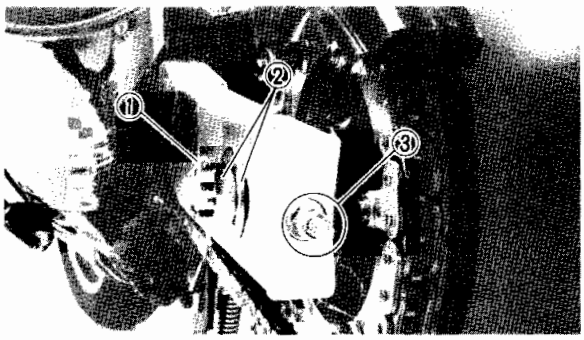
5. Remove:
   - Clamp ①
   - Holder ② (sensor lead)



6. Remove:
   - Wheel sensor ①

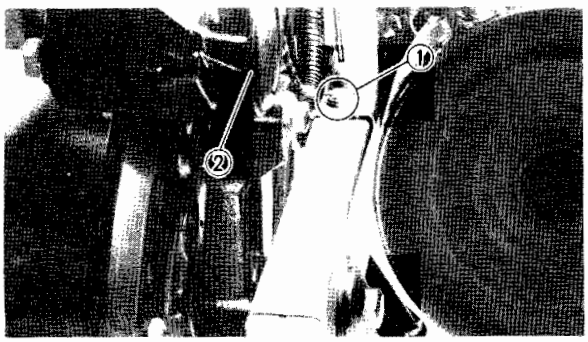
CAUTION:

Take care to avoid metal contact with the pole of the wheel sensor when removing from sensor housing.



7. Remove:
   - Cotter pin ①
   - Wheel shaft nut and washer ②

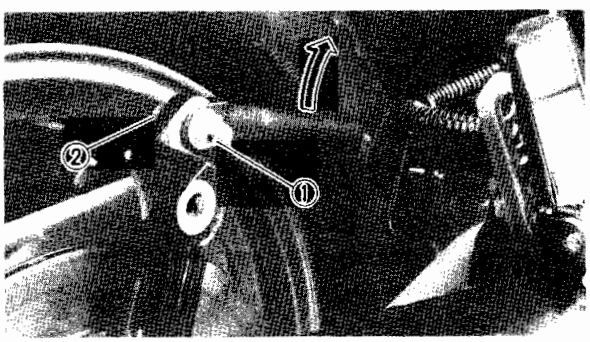
8. Loosen:
   - Chain puller adjusting nuts (left and right) ③



9. Remove:
   - Bolt ① (brake hose holder)
   - Brake caliper ②

NOTE:

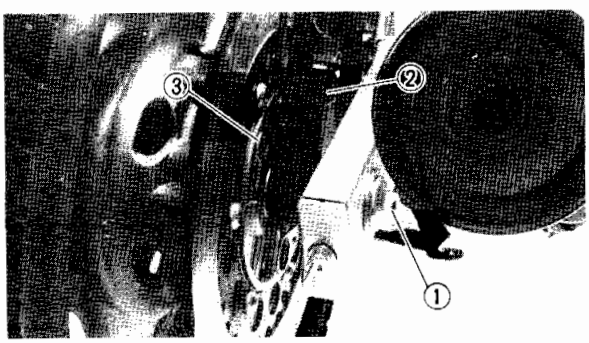
Do not depress the brake pedal when the wheel is off the motorcycle as the brake will be forced shut.



10. Remove:
    - Cotter pin ①
    - Bolt ②

NOTE :

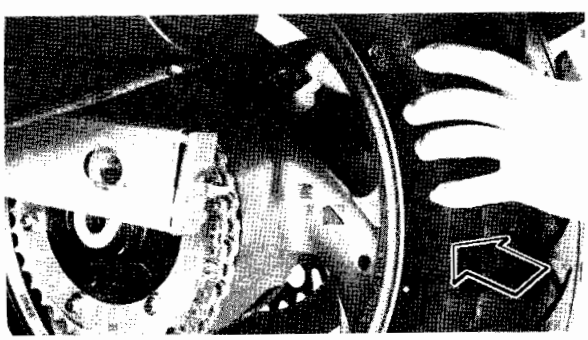
After removing bolt ②, move the compression bar upward and position it so that it does not become a hindrance at the time of removing or mounting the wheel.



11. Remove:
    - Wheel shaft ①
    - Caliper bracket ②

CAUTION:

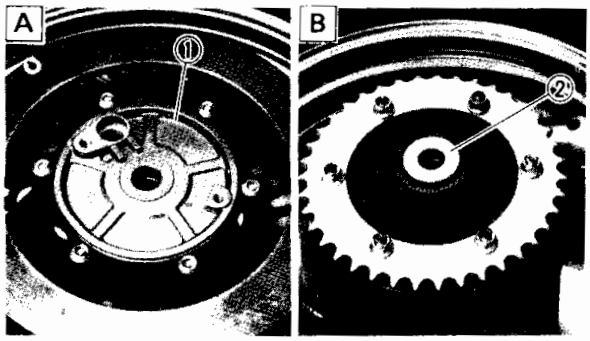
To prevent damage to sensor rotor, the sensor housing ③ should not be removed *before* rear wheel is removed.



12. Remove:
    - Rear wheel

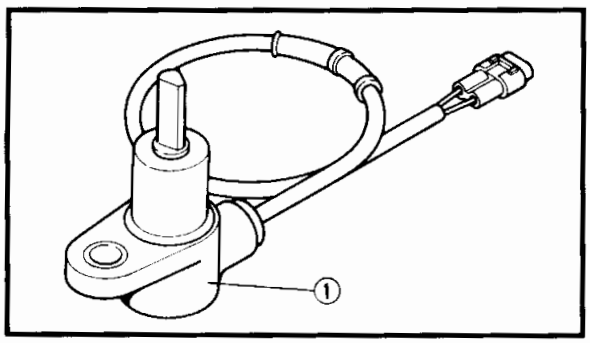
NOTE:

Before removing the rear wheel, push the wheel forward and remove the drive chain.



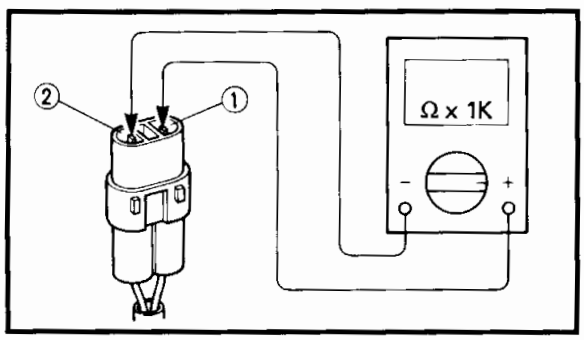
13. Remove:
- Sensor housing ①
- Collar ②

A Right side
B Left side



Inspection

1. Inspect:
- Rear wheel sensor ①
  Cracks/Bends/Warpage → Replace.



2. Check:
- Rear wheel sensor specified resistance.
  Connect the pocket tester (Ω x 1K) to the rear wheel sensor.

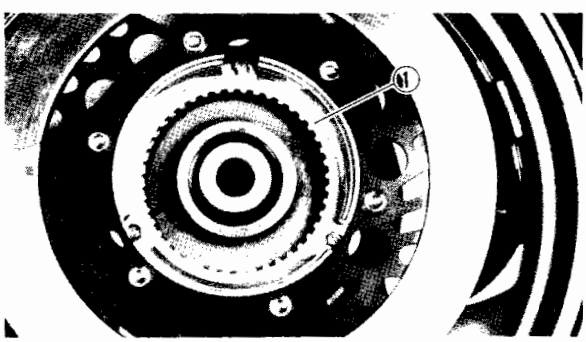
CAUTION:

While checking, do not force the pocket tester probes into the coupler terminals. The terminal clearance may widen resulting in poor connection.

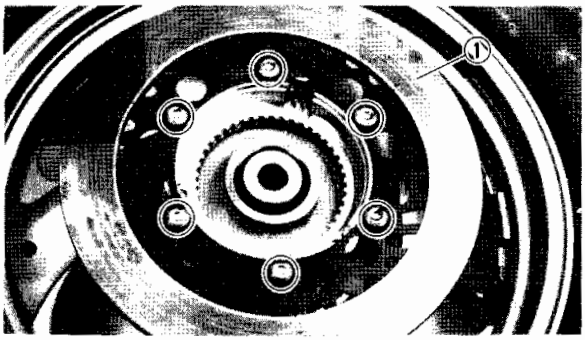
Tester (+) lead → ① terminal
Tester (–) lead → ② terminal

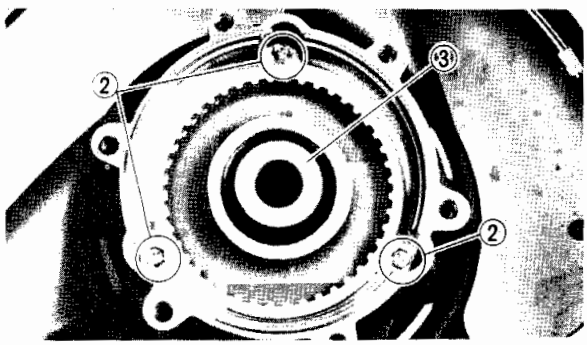
Rear wheel sensor resistance:
1.19 ~ 2.21 kΩ at 20°C (68°F)
(① terminal – ② terminal)

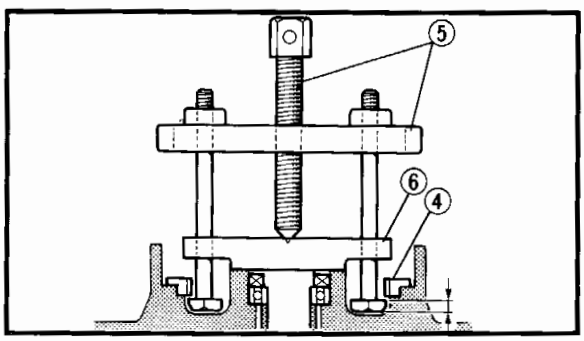
Out of specification → Replace.

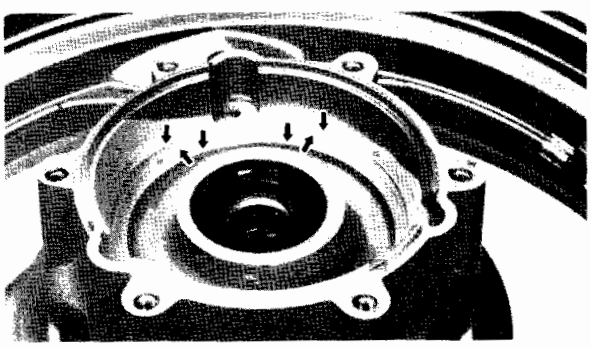


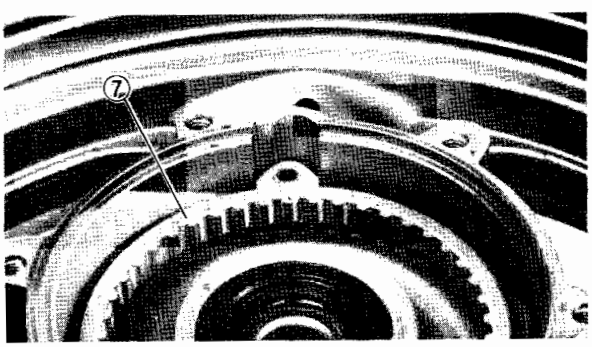
3. Inspect:
- Sensor rotor ①
  Cracks/Damage → Replace.











****

Rear wheel sensor rotor replacement steps:

- Remove the brake disc ① .
- Remove the bolts ② (rear sensor rotor):
- Remove the spacer collar ③ and the spacer collar (left).
- Remove the rear wheel sensor rotor④by using the crankcase separating tool⑤and the Sencer rotor puller guide⑥.

NOTE:

Be careful not to apply pressure to the inner race of the bearing.

Crankcase separating tool:
P/N. YU-01135-A, 90890-01135
Sensor rotor puller guide:
P/N. YM-04126

NOTE :

- Install the bolts into the special tool with the heads facing downward.
- Secure the bolt heads between the teeth of the rotor and pull upward by turning the handle of the special tool.

- Check the surface of the hub where the sensor rotor is fitted.
  If the surface is found to be rough from damage, etc., replace the wheel assembly.

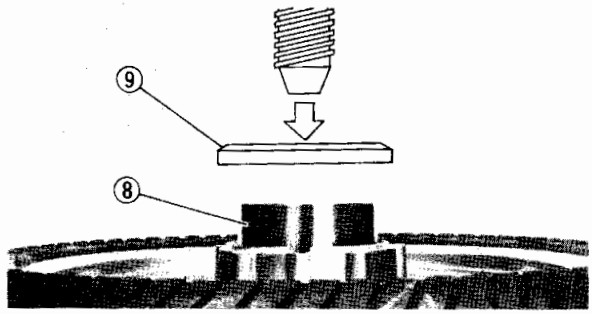
NOTE:

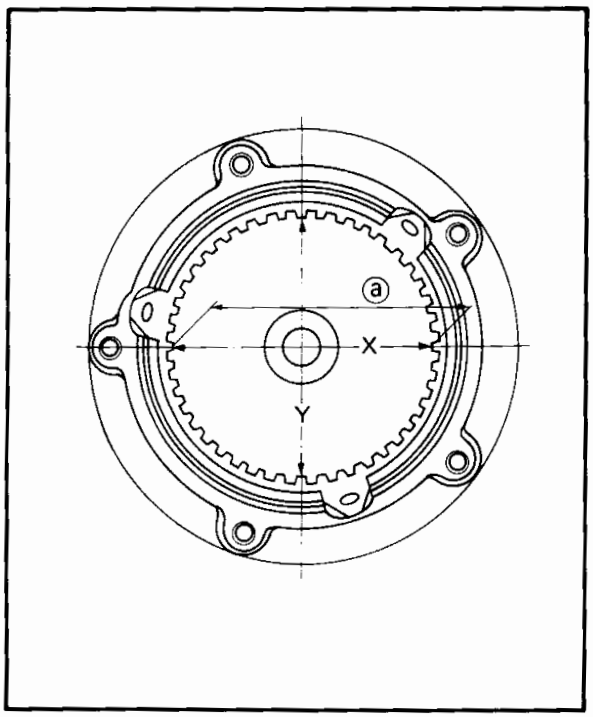
A rough surface will not allow the new sensor rotor to be seated properly.

- Put the hub on the hydraulic press so that it is level. Place a new sensor rotor ⑦ in the wheel hub parallel with its mating surface. It must not be cocked at an angle. Be sure the bolt holes are aligned with the holes in the hub.

⚠WARNING

Never reuse the sensor rotor if it has been removed. Always use a new one. Otherwise the ABS may not work correctly, which could cause an accident.





- Place the sensor rotor installation pot ⑧on the new sensor rotor ⑦ .Carefully place an appropriate support plate ⑨ centered on the pot. Then fully seat the sensor rotor in the hub by applying force on the center of the support plate with the hydraulic press.

Sensor rotor installation pot:
P/N. YM-04124, 90890-04124

CAUTION:

Do not strike the sensor rotor.

- Measure the inside diameters of the installed sensor rotor with vernier calipers.

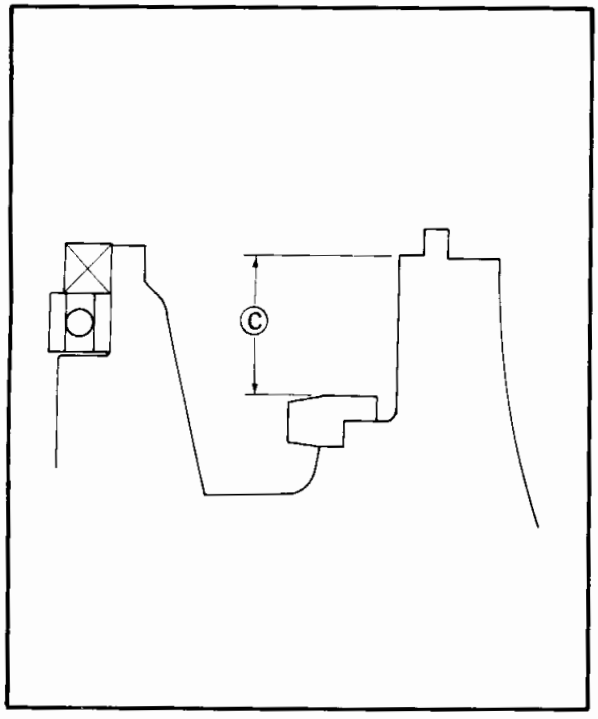
NOTE:

Measure the inside diameters of the installed sensor rotor at four equally divided points of its circumference, at right angles to the wheel axle. Then, find the average of the measurements.

Sensor rotor inside diameter ⓐ :
99.90 ~ 100.15 mm (3.933 ~ 3.943 in)
Allowance ⓑ :
Less than 0.1 mm (0.004 in)

$$ⓐ = \frac{X+Y}{2} \qquad ⓑ = X-Y$$

If the measurement is not within the above ⓐ and ⓑ , replace the wheel assembly.



● Measure the distance between the surface of the wheel hub and the outer circumference of the sensor rotor with a vernier calipers.

NOTE:

Measure the distance at six equally divided points of the sensor rotor in parallel to the wheel axle. Then, find the average of the measurements.

Distance Ⓒ:
18.15 ~ 18.85 mm (0.715 ~ 0.742 in)

If out of specification, replace the wheel assembly.

● Install the bolts ② (rear sensor rotor), the brake disk ① and the spacer collar ③.

Bolts (sensor rotor):
6 Nm (0.6 m • kg, 4.3 ft • lb)
LOCTITE®

Bolts (brake disc):
20 Nm (2.0 m • kg, 14 ft • lb)
LOCTITE®

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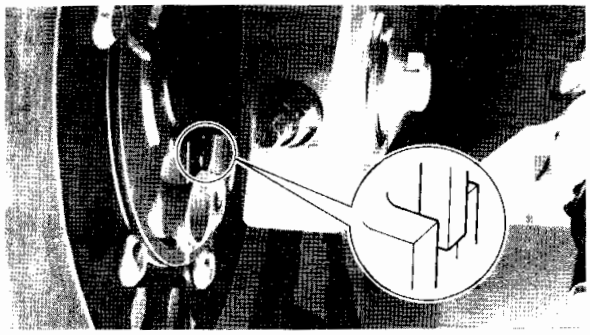
Installation

Reverse the "REMOVAL" procedure.
Note the following points.

1. Lubricate:
   - Wheel axle
   - Bearings
   - Oil seals (lip)

Litium soap base grease

2. Install:
   - Rear wheel assembly



NOTE:

Measure the distance at six equally divided points of the sensor rotor in parallel to the wheel axle. Then, find the average of the measurements.

CAUTION:

Install after you make sure that no foreign matter has entered the rear wheel hub. This may lead to damage of the internal sensor rotor and wheel sensor.

3. Adjust:
   - Drive chain slack



Drive chain slack:
15 ~ 20 mm (0.6 ~ 0.8 in)

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

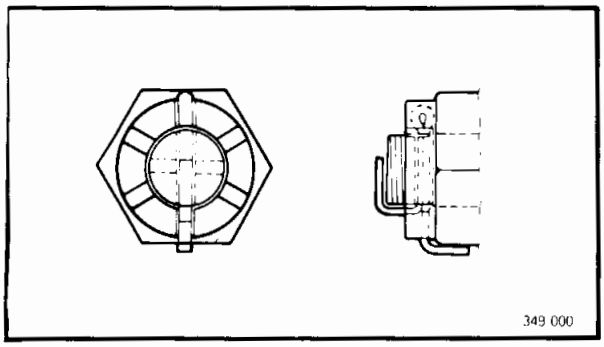
4. Tighten:
   - Axle nut
   - Bolt (chain puller)
   - Nut (compression bar)
   - Bolt (brake caliper)



Axle nut:
155 Nm (15.5 m • kg, 112 ft • lb)
Bolt (chain puller):
23 Nm (2.3 m • kg, 17 ft • lb)
Nut (compression bar):
30 Nm (3.0 m • kg, 22 ft • lb)
Bolt (brake caliper):
35 Nm (3.5 m • kg, 25 ft • lb)

NOTE:

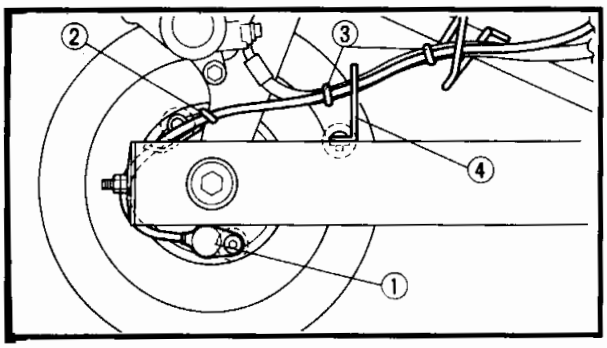
Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.



5. Install:
   - Cotter pin

NOTE:
Bend the ends of the cotter pin as shown.

⚠ WARNING
Always use a new cotter pin.

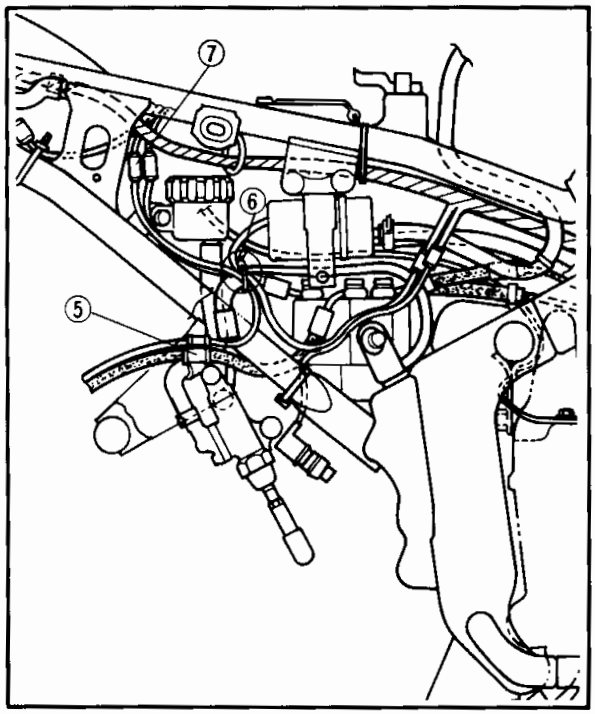


6. Install:
   - Rear wheel sensor ①
   - Holder ② (sensor lead)
   - Clamp ③
   - Holder ④ (brake hose and sensor lead)

NOTE :
- When mounting the wheel sensor, make sure that there is no twist in the wheel sensor lead wire or no foreign matter is sticking to the pole.
- The small head flange bolt of the sensor lead holder ② and the screw with washer of the brake hose holder ④ are 12 mm (0.47 in) long. Take care not to mistake the bolts.

CAUTION:
Make sure that the rear wheel sensor lead is routed properly. Refer to the "CABLE ROUTING" section in the CHAPTER 2.

	Bolt (rear wheel sensor): **23 Nm (2.3 m • kg, 17 ft • lb)**



7. Install:
   - Holder ⑤ (brake hose and sensor lead)
8. Connect:
   - Band ⑥
   - Wheel sensor lead coupler ⑦

CAUTION:

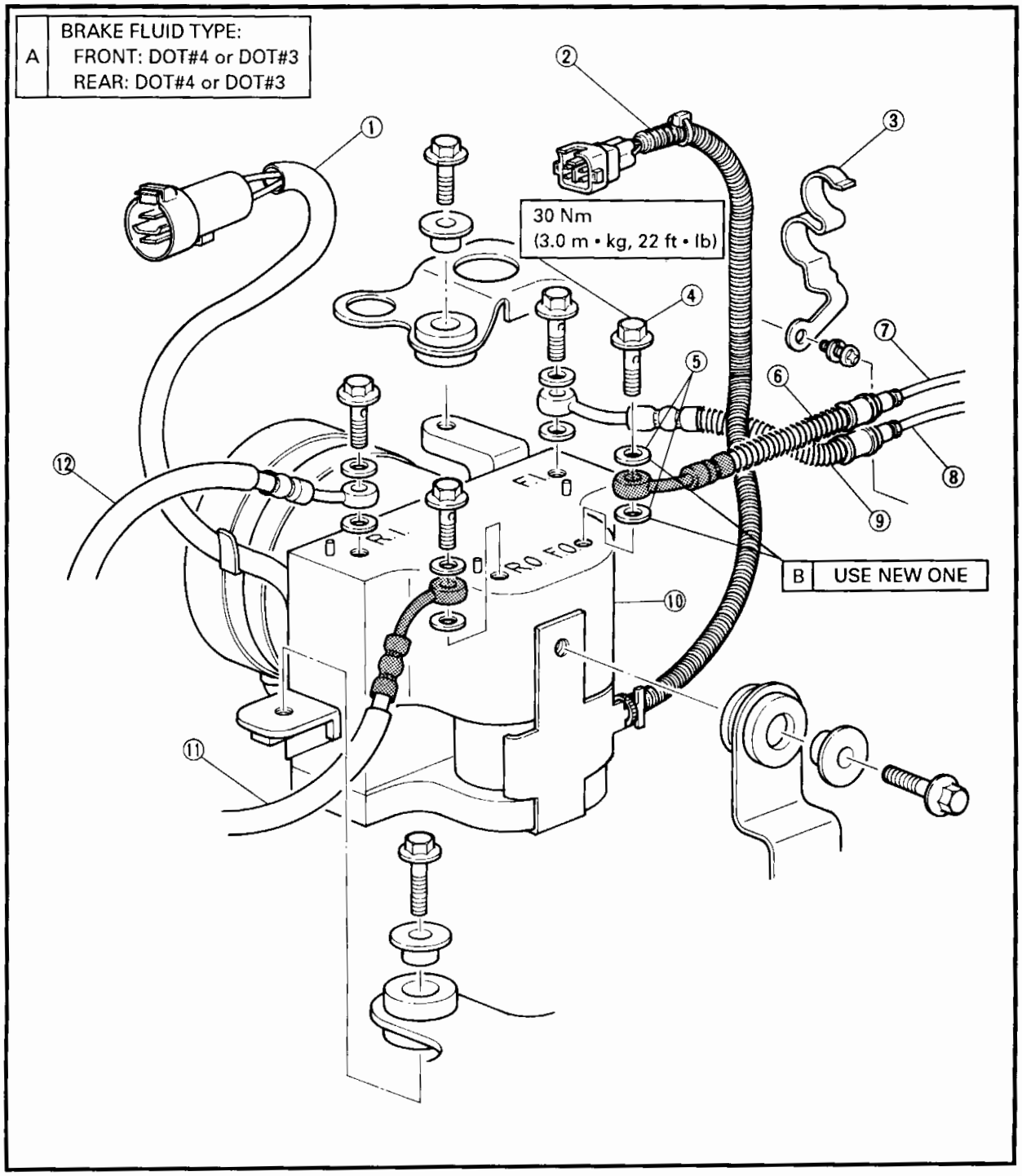
Make sure that the rear wheel sensor lead is routed properly. Refer to the "CABLE ROUTING" section in the CHAPTER 2.

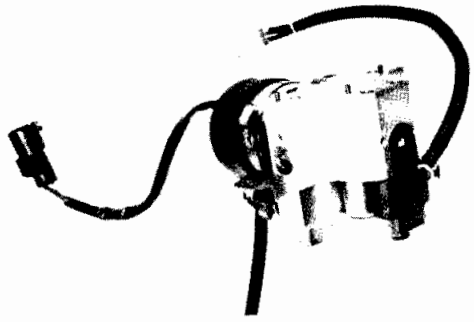
⚠ WARNING

Always use a new band.

[D-5] SERVICE OF HYDRAULIC UNIT (HU)

① Motor lead (HU)
② Solenoid valve lead (HU)
③ Brake hose holder
④ Union bolt
⑤ Copper washer
⑥ Brake hose 4 (to front brake caliper)
⑦ Brake pipe 2
⑧ Brake pipe 1
⑨ Brake hose 3 (from front master cylinder)
⑩ Hydraulic unit (HU)
⑪ Brake hose 7 (to rear brake caliper)
⑫ Brake hose 6 (from rear master cylinder)





[D-5] SERVICE OF HYDRAULIC UNIT (HU)

NOTE:

When checking this unit for the solenoid and motor resistance, do not remove it but refer to the "Inspection" section of this chapter.

CAUTION:

- **Handle ABS components carefully. ABS components are precisely adjusted. Avoid impact or dirt on these components.**
- **The ABS Hydraulic Unit cannot be disassembled. Even if you feel that the fault is minor, do not try to disassemble and repair it. Replace the part.**

  Disk brake components rarely require disassembly. DO NOT:
- **Disassemble components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning.**
- **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 connections, otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

Removal

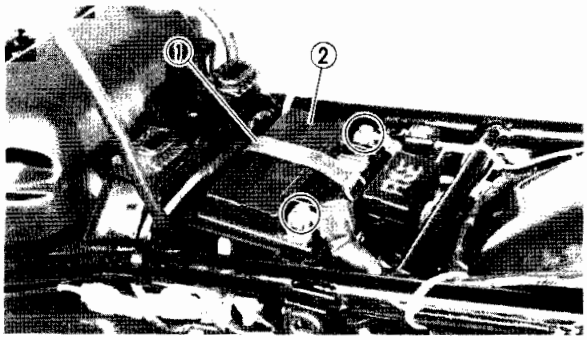
⚠WARNING

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

1. Place the motorcycle on a level place and on its centerstand.

2. Remove:
   - Seat
   - Side cover (left)
   - Side cover (right)
   - Fuel tank
   - Upper cowling

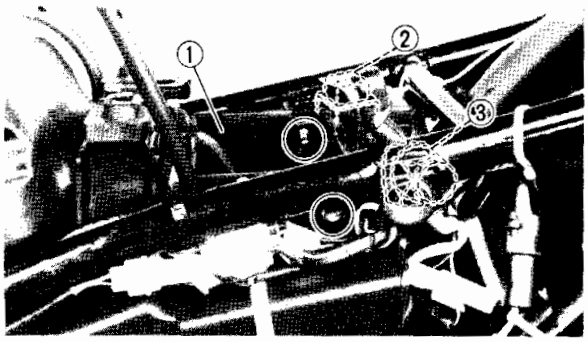
   Refer to the "SEAT, SIDE COVERS AND FUEL TANK and UPPER COWLING" section in the CHAPTER 3.



3. Remove:
   - Battery band ①
   - Battery ②

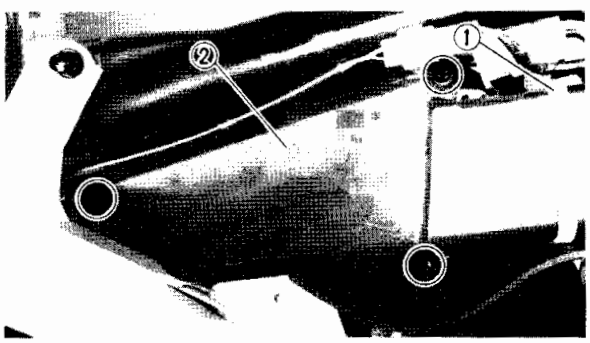
CAUTION:

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



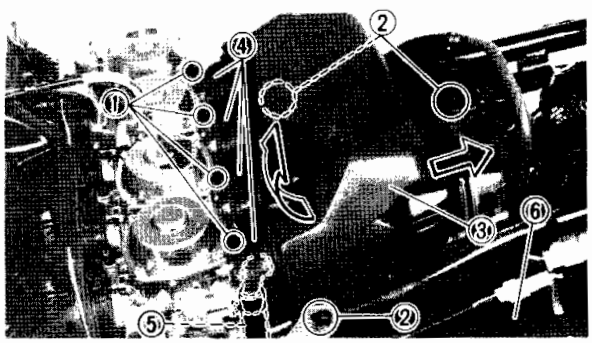
4. Remove:
   - Battery case ①

5. Disconnect:
   - "MAIN" and "ABS PUMP" fuse box ②
   - Starter relay ③



6. Disconnect:
   - Band ①

7. Remove:
   - Air cleaner case cover ②

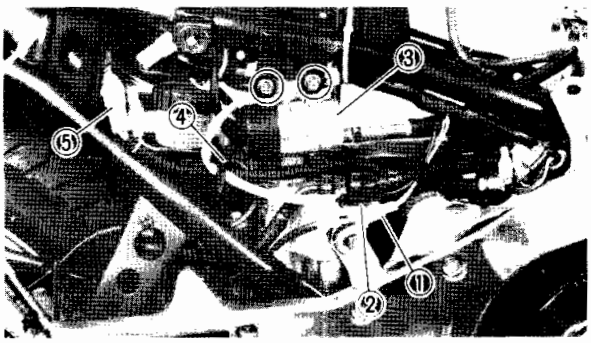


8. Loosen:
   - Air cleaner joint band screw ①
9. Remove:
   - Bolts (air cleaner case) ②
10. Move the air filter case ③ to the rear.

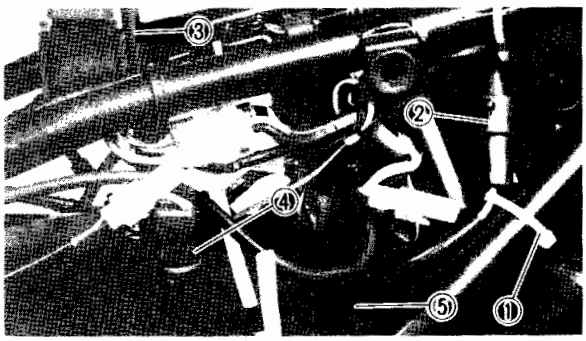
11. Remove:
    - Air cleaner joint bands
    - Air cleaner joint ④
12. Remove:
    - Air air cleaner case ③
    - Breather hose (crankcase) ⑤

NOTE :

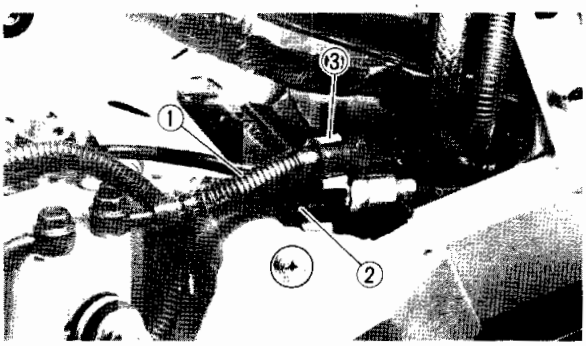
At the time of removal of the air cleaner case, shift the rubber sheet ⑥ from beneath the air cleaner case towards the rear, and remove it. Then remove the breather hose ⑤ (crankcase), hold the air cleaner case on the front side, as indicated by the arrows in the figure, lift it up and remove it.



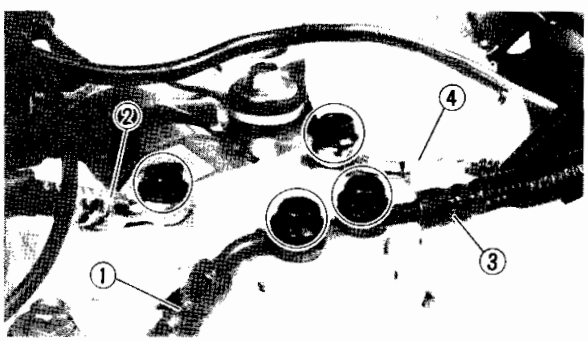
13. Disconnect:
    - Rear brake switch lead coupler ①
    - Fuel pump lead coupler ②
14. Remove:
    - Fuel pump ③
15. Disconnect:
    - Band ④
    - Solenoid valve lead (HU) coupler ⑤



16. Disconnect:
    - Band ①
    - Motor lead (HU) coupler ②
    - Breather hose (fuel tank) ③
    - Battery case damper rubber ④
    - Rubber seat ⑤



17. Disconnect:
    - Brake hose 4 ①
      (from brake hose holder ③)
    - Brake hose 3 ②
      (from brake hose holder ③)
18. Remove:
    - Brake hose holder ③



19. Remove:
    - Brake hose 7 ①
    - Brake hose 6 ②
    - Brake hose 4 ③
    - Brake hose 3 ④

NOTE :

Do not operate the front brake lever and the rear brake pedal. The brake fluid may leak out and air may enter the hose.

CAUTION:

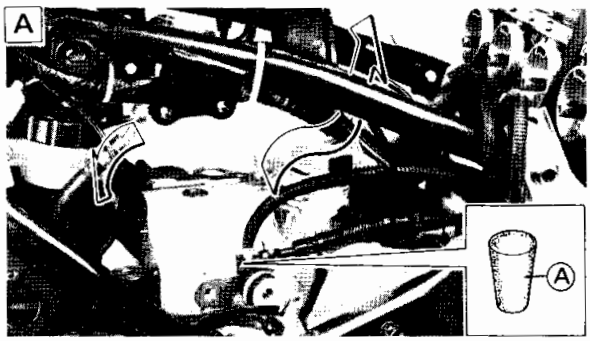
Spread out a rag around the hydraulic unit before removing the brake hose so that the brake fluid does leak on other parts.



20. Remove:
- Hydraulic unit ①

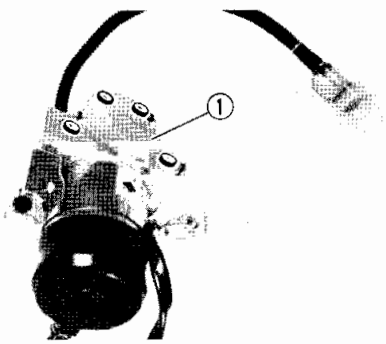
NOTE :

When removing the hydraulic unit, tilt the unit on its side as indicated in fig. [A] , and remove in the direction of the carburetors. Then install an appropriate rubber plug as indicated in Fig. Ⓐ so as to prevent brake fluid leakage and entering of foreign matter.



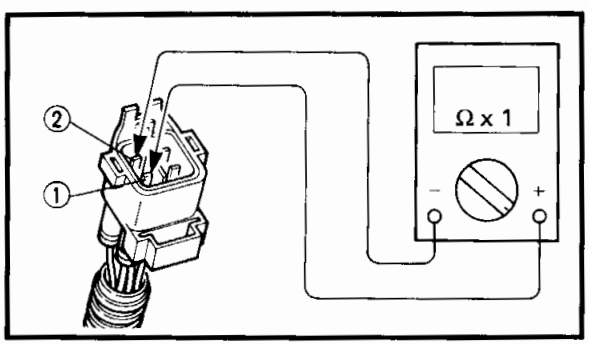
CAUTION:

Spread out a waste cloth around the hydraulic unit before removing the brake hose so that the brake fluid does leak on other parts.



Inspection

1. Inspect:
- Hydraulic unit ①
  Cracks/Damage → Replace.

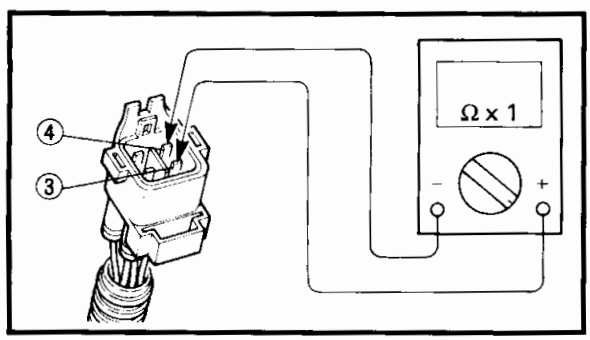


2. Check:
- Solenoid valve (front) specified resistance.
  Connect the pocket tester (Ω x 1) to the solenoid valve (front) terminals.

Tester (+) lead → Yellow/White terminal ①
Tester (–) lead → Yellow/White terminal ②

	Solenoid valve (front) resistance: Less than 10Ω at 20°C (68°F)

Out of specification → Replace Hydraulic unit.

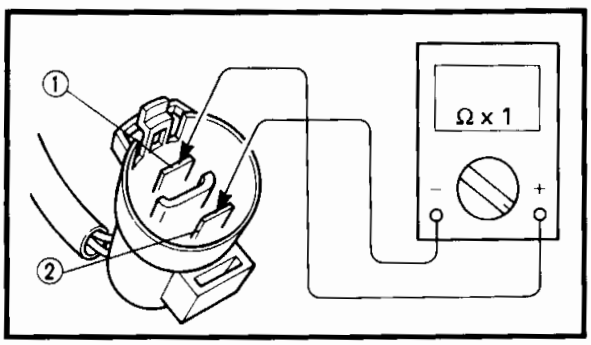


3. Check:
- Solenoid valve (rear) specified resistance.
  Connect the pocket tester (Ω x 1) to the solenoid valve (rear) terminals.

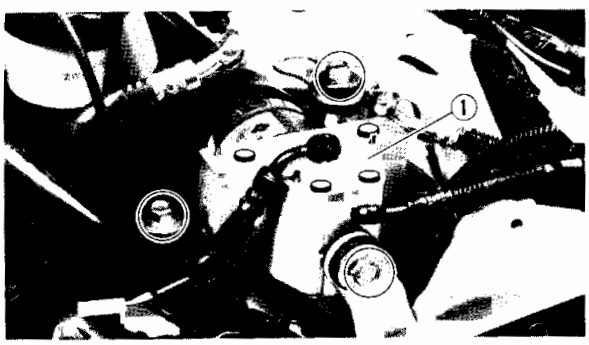
Tester (+) lead → Yellow/Red terminal ③
Tester (–) lead → Yellow/Red terminal ④

Solenoid valve (rear) resistance:
Less than 10Ω at 20°C (68°F)

Out of specification → Replace Hydraulic unit.



4. Check:
   - Continuity of Motor (HU)
     Connect the pocket tester (Ω x 1) to the motor coupler terminals.
     Check the motor for continuity between terminals ① and ② .
     If the tester shows "∞" → Replace Hydraulic unit.



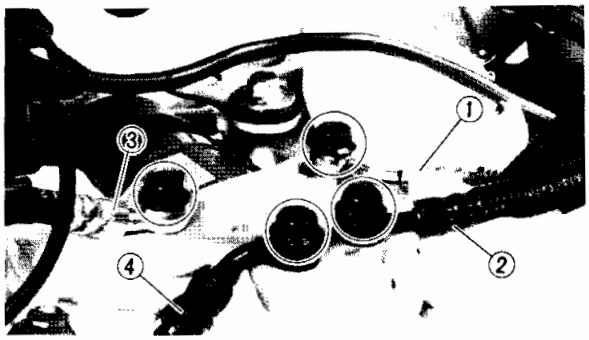
Installation

Reverse the "REMOVAL" procedure.
Note the following points.

1. Install:
   - Hydraulic unit ①

CAUTION:

- **There are chances of dirt around the hydraulic unit entering the brake fluid in the hose at the time of installing it. Therefore clean off the dirt thoroughly before installing the brake hose.**
- **Do not remove the rubber plug inserted in the brake hose hole at the time of installing it, because it prevents leakage of brake fluid and entering of air.**

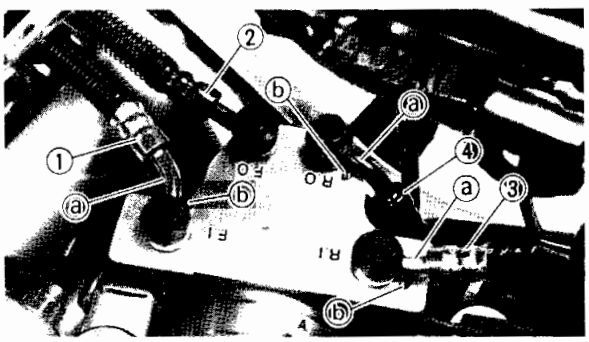


2. Install:
   - Brake hose 3 ① (from front master cylinder)
   - Brake hose 4 ② (to front brake caliper)
   - Brake hose 6 ③ (from rear master cylinder)
   - Brake hose 7 ④ (to rear brake caliper)

	Union bolt: **30 Nm (3.0 m • kg, 22 ft • lb)**

NOTE:

The inlet pipe ends of the front and rear brake hoses are white plated, and the outlet ends of the black plated.



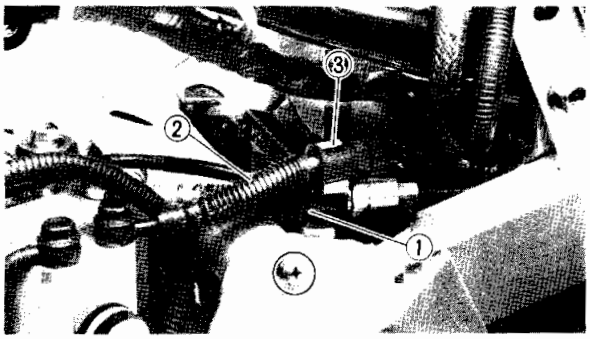
CAUTION:

- **When installing the brake hose, position it so that portion of pipe ⓐ is touching projection ⓑ on the hydraulic unit.**
- **Make sure that the brake hoses are routed properly. Refer to the "CABLE ROUTING" section in the CHAPTER 2.**

⚠ WARNING

- **Always use new copper washers.**
- **On the upper surface of the hydraulic unit, marks (F.I), (F.O), (R.I), (R.O) are provided to indicate the position of installation of each hose. Install the hoses after carefully confirming the correct position of each hose. Incorrect installation of brake hose will result in locking of wheel.**

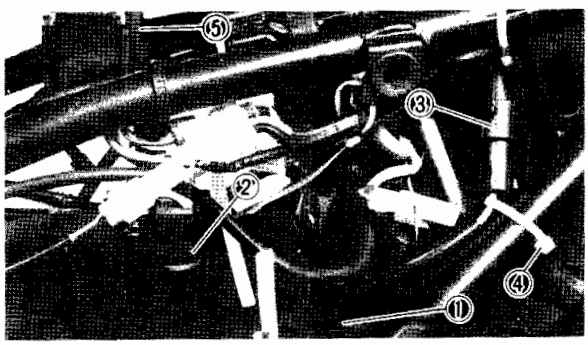
F.I (Front Inlet)– Brake hose 3 ① of from front master cylinder
F.O (Front Outlet)– Brake hose 4 ② of to front brake caliper
R.I (Rear Inlet)– Brake hose 6 ③ of from rear master cylinder
R.O (Rear Out let)– Brake hose 7 ④ of to rear brake caliper



3. Connect:
   - Brake hose 3 ① (to brake hose holder ③)
   - Brake hose 4 ② (to brake hose holder ③)
4. Install:
   - Brake hose holder ③

CAUTION:

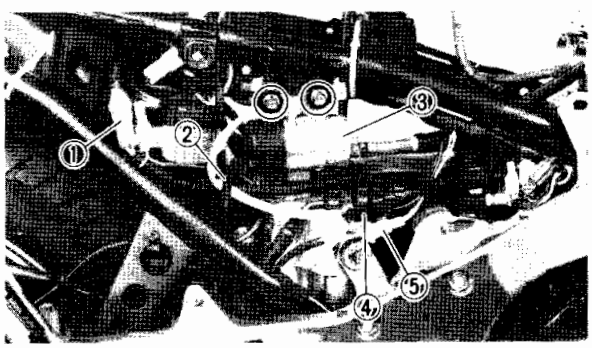
Make sure that the brake hoses are routed properly.Refer to the "CABLE ROUTING" section in the CHAPTER 2.



5. Connect:
   - Rubber seat ①
   - Battery case damper rubber ②
   - Motor lead (HU) coupler ③
   - Band ④
   - Breather hose (fuel tank) ⑤

⚠WARNING

Always use a new band.



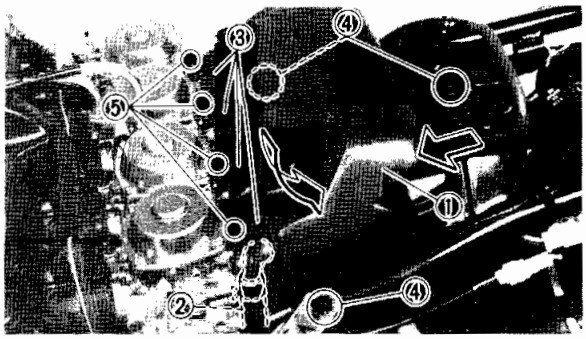
6. Connect:
   - Solenoid valve lead (HU) coupler ①
   - Band ②
7. Install:
   - Fuel pump ③
8. Connect:
   - Fuel pump coupler ④
   - Rear brake switch lead coupler ⑤

CAUTION:

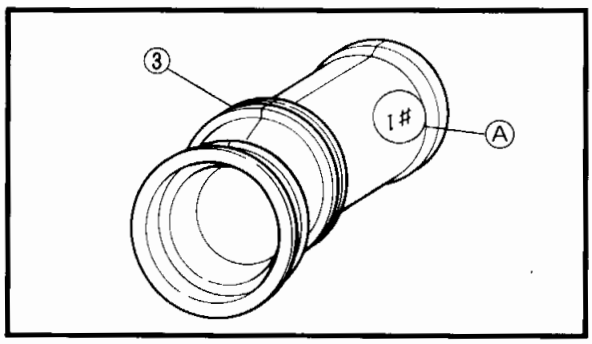
Make sure that the solenoid valve lead and fuel pump lead are routed properly. Refer to the "CABLE ROUTING" section in the CHAPTER 2.

⚠WARNING

Always use a new band.



9. Install:
   - Air cleaner case ①
   - Breather hose (crankcase) ②
   - Air cleaner joint ③
   - Air cleaner joint bands
10. Move air cleaner case to the front.
11. Tighten:
   - Bolts (air cleaner case) ④
   - Air cleaner joint band screw ⑤

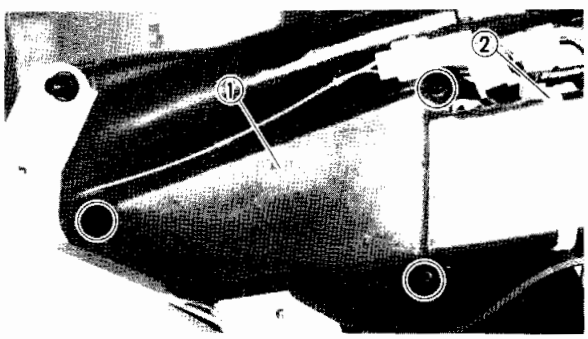


NOTE :

Each air cleaner joint is numbered. Match number Ⓐ of air cleaner joint with number of carburetor when installing.

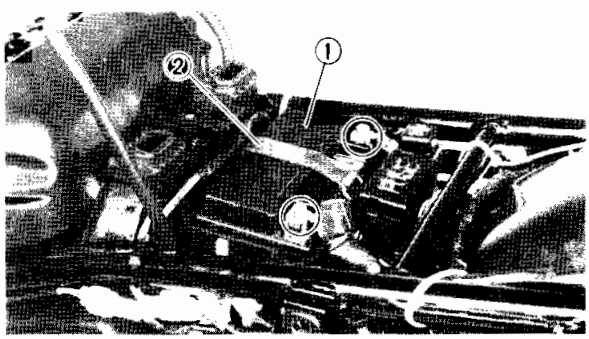
CAUTION:

Tightly secure the breather hose ② (crankcase).



12. Install:
   - Air cleaner case cover ①
13. Connect:
   - Band ②

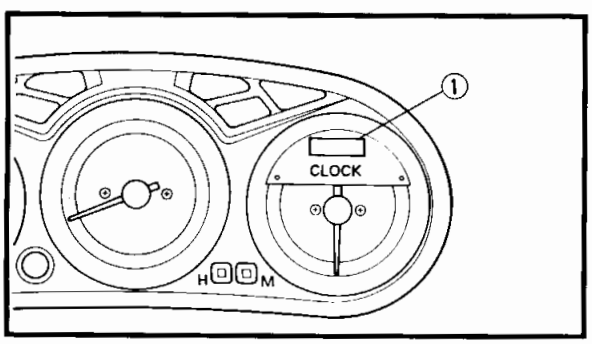
   Refer to the "CABLE ROUTING" section in the CHAPTER 2.



14. Install:
   - Battery ①
   - Battery band ②

CAUTION:

Connect the positive lead first, and then connect the negative lead.



15. Adjust:
   - Clock ①

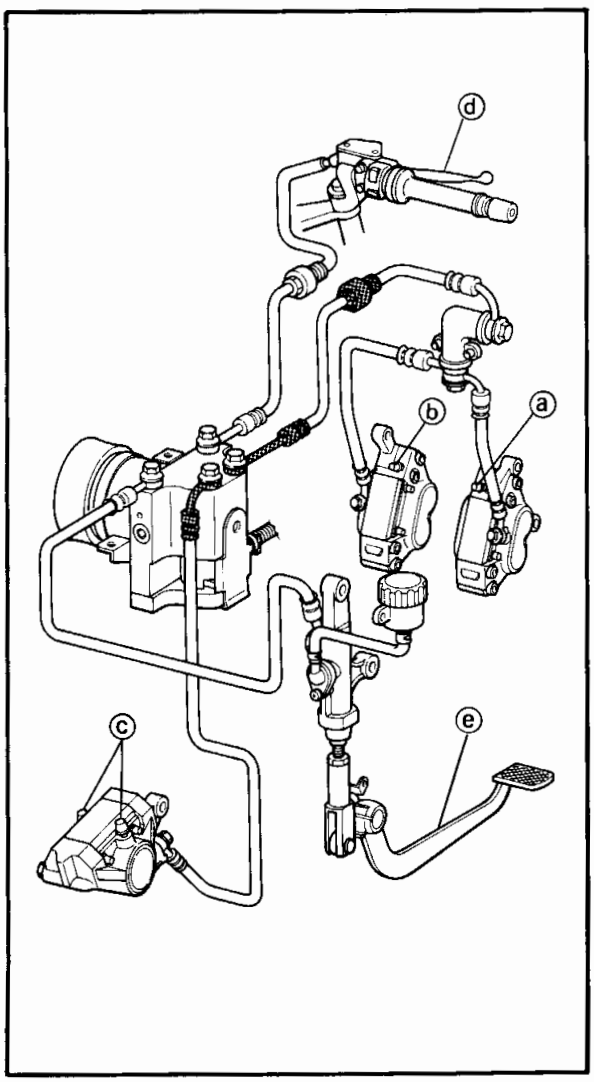
   Refer to the "DIGITAL CLOCK SYSTEM-ADJUSTMENT" section in the CHAPTER 7.

16. Fill:
    - Brake fluid

	Recommended brake fluid: **Front:** **DOT#4 or DOT #3** **Rear:** **DOT#4 or DOT#3**

17. Air bleed:
    - Brake system

    Refer to the "AIR BLEEDING" section.



Air bleeding (ABS BRAKE SYSTEM)

⚠ WARNING

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

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

1. Bleed:
    - Brake fluid

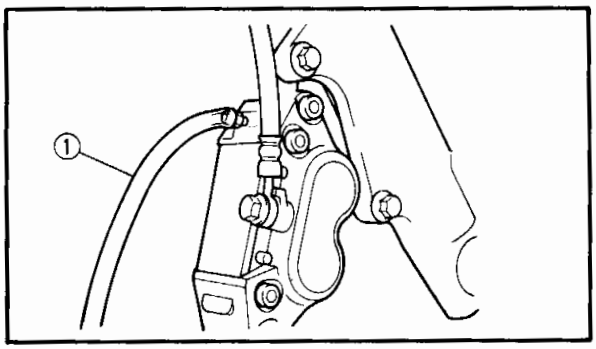
****

Air bleeding steps:

NOTE:

Bleed the brake system in the following order.
ⓐ First step-Front brake caliper (right)
ⓑ Second step-Front brake caliper (left)
ⓒ Third step-Rear brake caliper

ⓓ Brake lever
ⓔ Brake pedal



First step-Front brake caliper (right):

a. Add proper brake fluid to the reservoir.
b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
c. Connect the clear plastic tube ① tightly to the caliper bleed screw.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever 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.

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

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

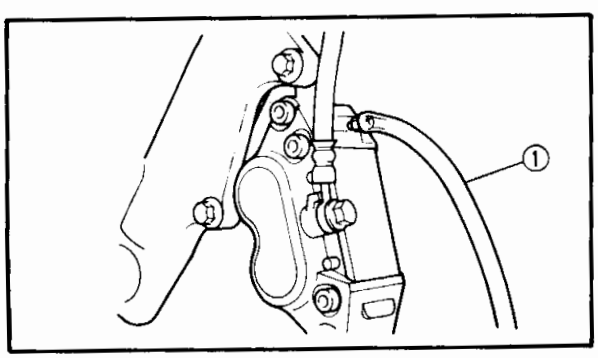
NOTE:

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

j. Add brake fluid to proper level.

⚠ WARNING

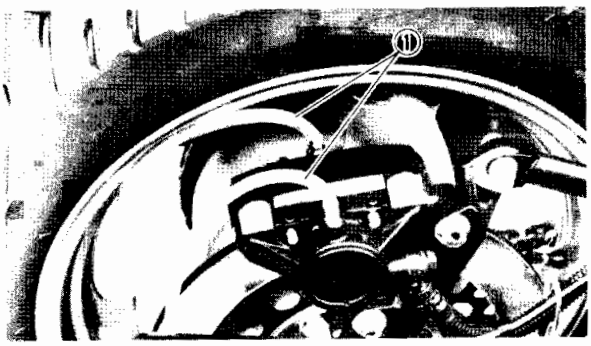
The brake system is not completely bled until all three steps are performed. Do not operate the machine until the other brakes have been bled also.



Second step-Front brake caliper (left):

a. Repeat steps (a) through (j) of right brake caliper.

① Plastic tube



Third step-Rear brake caliper:

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

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

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

NOTE:

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

j. Add brake fluid to proper level.

⚠ WARNING

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

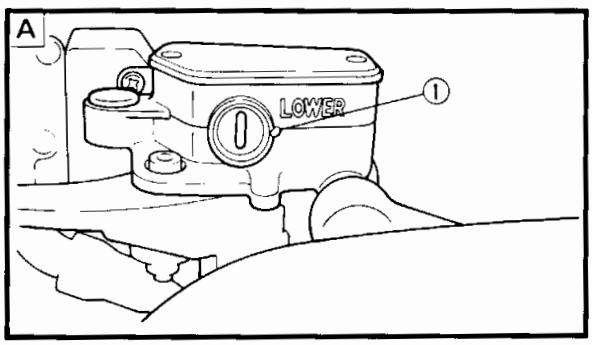
Hydraulic Unit pressure drop Operation check

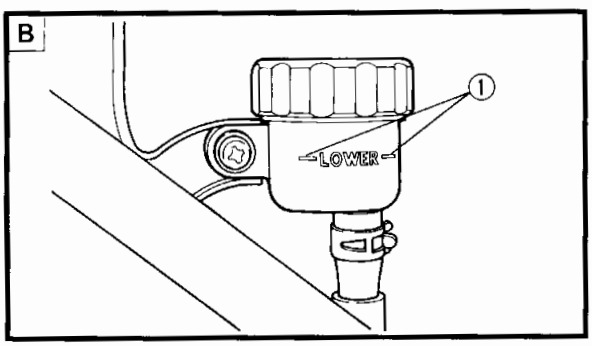
1. Pressure Drop Operation Check
   Refer to the [D-6-3] HU operation check section.

[D-6] FINAL INSPECTION BEFORE DELIVERY OF THE SERVICED MOTORCYCLE

Troubleshooting procedure

1. Brake fluid inspection
2. Re-confirmation of wheel sensor installation
3. HU operation test
4. Erasing the fault-code(s)
5. Test run





[D-6-1] Brake Fluid Inspection

1. Place the motorcycle on a level place.

NOTE:

- Position the motorcycle straight up when inspecting the brake fluid level.
- When inspecting the front brake fluid level, make sure the master cylinder top is horizontal by turning the handlebars.

2. Inspect:
   - Brake fluid level
     Fluid level is under "LOWER" level line ①
     → Fill up.

Recommended brake fluid
Front:
DOT No.4 or DOT No.3
Rear:
DOT No.4 or DOT No.3

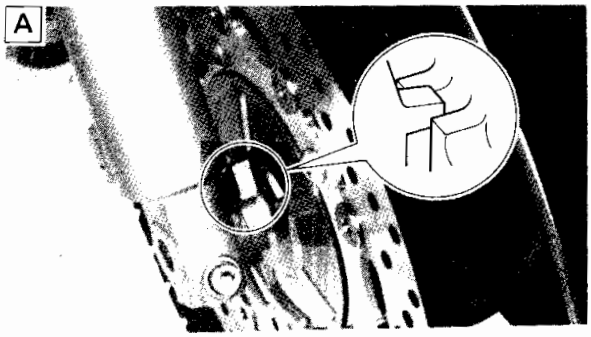
A Front
B Rear

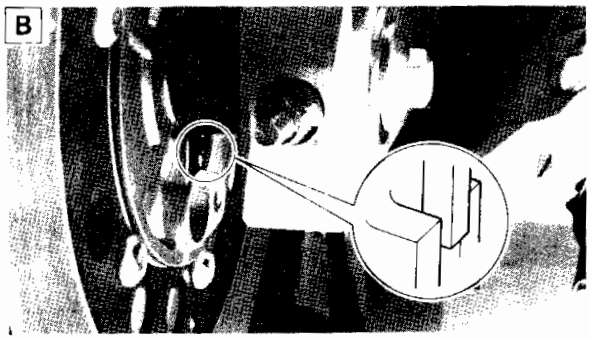
CAUTION:

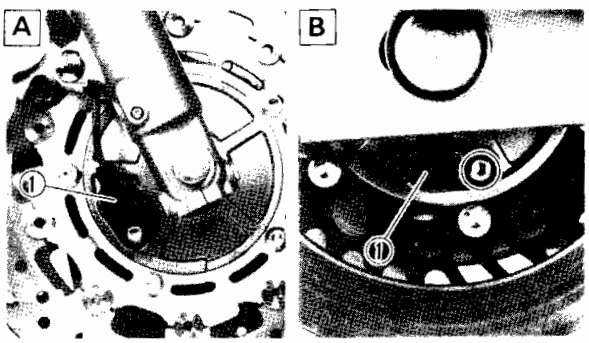
Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

⚠ WARNING

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







[D-6-2] Re-confirmation of wheel sensor installation

1. Check that the wheel sensor housings are installed at the correct positions. Refer to the "[D-3] / [D-4] SERVICE OF WHEEL SENSOR AND SENSOR ROTOR" section.

[A] Front
[B] Rear

2. Inspect:
   - The installation of the wheel sensors ① on to the sensor housing.

	Bolt (wheel sensor): 23 Nm (2.3 m • kg, 17 ft • lb)

   - The wire routing of the wheel sensors Refer to the "CABLE ROUTING" section in the CHAPTER 2.

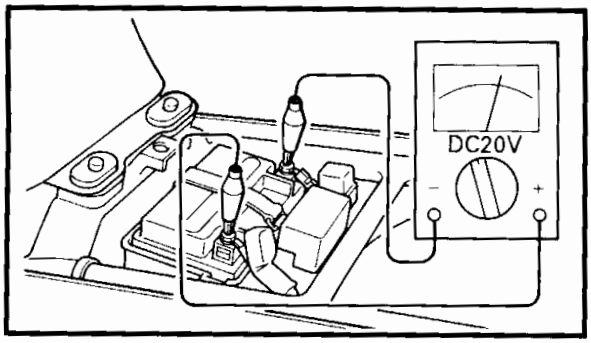
[A] Front
[B] Rear

[D-6-3] HU operation test

⚠ WARNING

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

1. Place the motorcycle on a level place and on its centerstand.



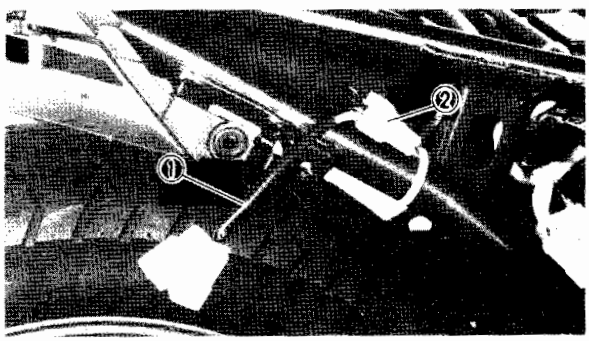
2. Remove:
   - Seat
3. Check:
   - Battery voltage

Battery voltage:
12.8 V or higher at 20°C (68°F)

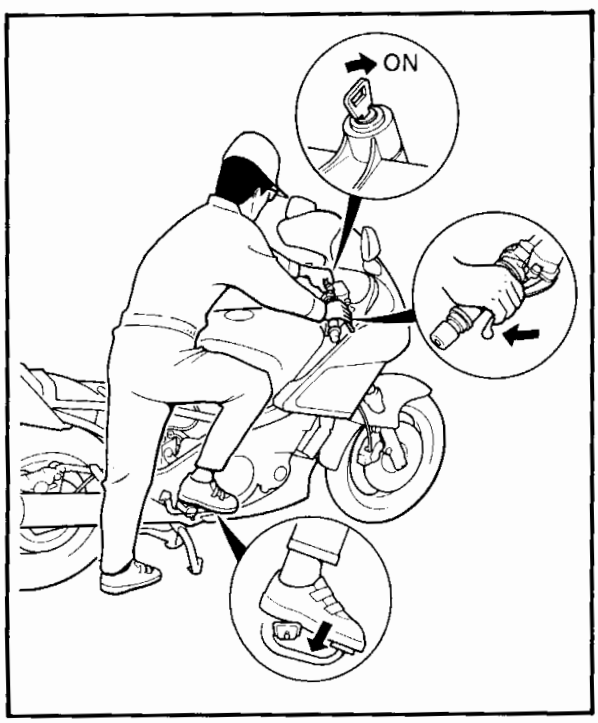
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

NOTE:

- If the source voltage is lower than 12.8 V, it is recommended to carry out the test after fully charging the battery.
- If the source voltage is lower than 10V, the "ABS" warning light will come on and the ECU will stop ABS operation.



4. Insert the ABS test coupler adapter ① into the ABS test coupler ② .
   Refer to the "[B-5]" section.

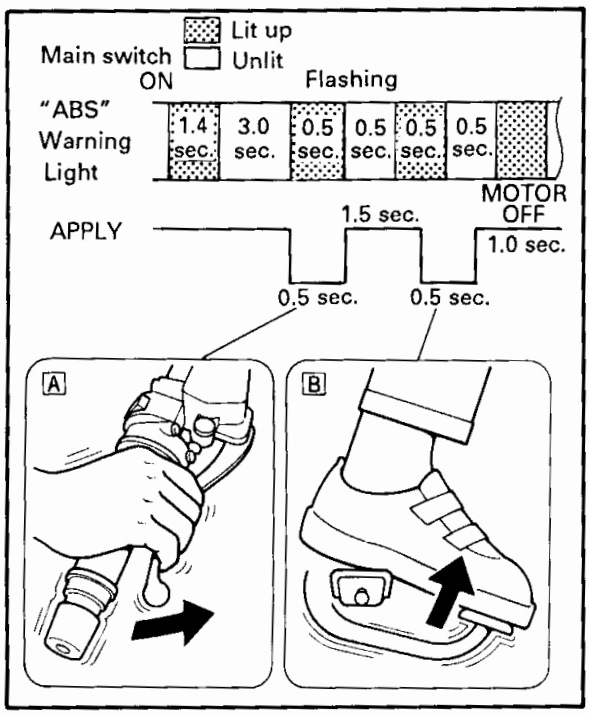


5. Apply both the front brake lever and the rear brake pedal at the same time.
6. Turn the main switch to "ON".

NOTE:

This test will not start unless BOTH brake lever and pedal are applied at the moment when the main switch is turned to "ON"

7. Confirm that HU operates in the way indicated as follows.



HU operation:

- "ABS" warning light comes on for 1.4 seconds after the main switch is turned "ON".
- The HU dumps the front brake pressure for 0.5 seconds. At the same time, the hydraulic pump starts reapplying the front brake pressure. The series of hydraulic operations feels like a "Drop-in" and then a pulsing "Return" of the lever.
- After the movement of the front brake, the HU dumps the rear brake pressure for 0.5 seconds.
  The same hydraulic operation as that of the front brake lever is felt at the rear brake pedal.

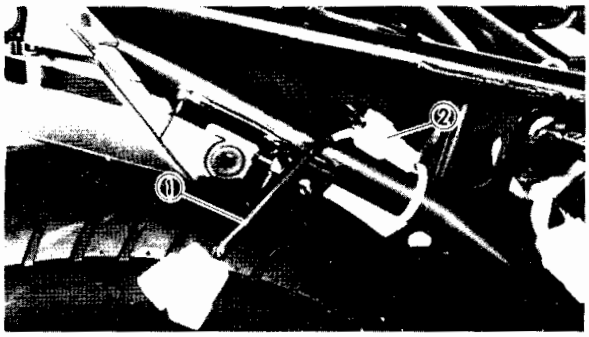
[A] Front brake lever
[B] Rear brake pedal

NOTE:

- The order of the pressure dumping (first at front and then at rear) is very essential. If this order is different, the hydraulic circuit should be checked again.
- If you do not feel a pulsing "return", but rather a smooth return, the HU's inlet and outlet hoses are most likely reversed. Recheck the connections.
- If all HU operations are correct, erase the fault cordes.

⚠WARNING

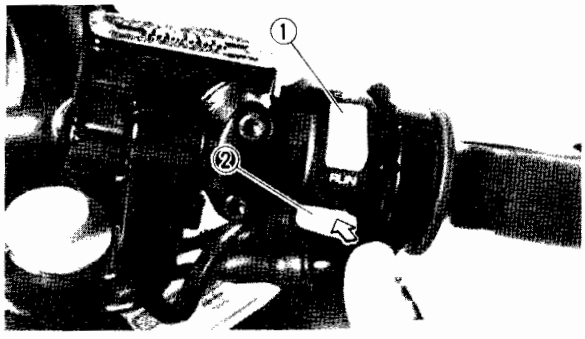
Reversed connections of the brake hoses at the HU will cause the instantaneous lock up of the caliper to the brake disk. This could cause loss of control and an accident.



[D-6-4] Erasing the fault-code(s)

1. Insert the ABS test coupler adapter ① into the ABS test coupler ②.
   Refer to the "[B-5]" section.

2. Turn the main switch to "ON".
   The fault codes previously recorded should be displayed by the "ABS" warning light.

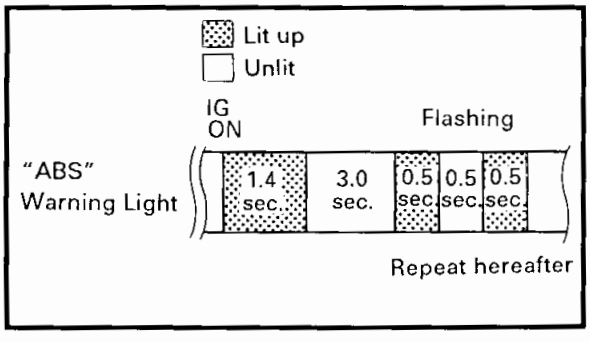


3. Turn the "ENGINE STOP" switch ① to "OFF".
4. Press the starter switch ② at least 10 times within 4 seconds.

NOTE:

The "OIL LEVEL" indicator will light at the same time as you press the starter switch: This is normal.

5. Confirm that the "ABS" warning light stays on. (Make sure that the light is on for more than 2 seconds.)
6. Turn the main switch to "OFF".



7. Turn the main switch to "ON" again. Confirm that the "ABS" warning light starts flashing after it lights up 1.4 seconds and goes off for 3 seconds.

8. Turn the main switch to "OFF".

9. Remove the ABS test coupler adapter from the ABS test coupler, and insert the protection cap into the ABS test coupler. This completes the erasing procedure.

NOTE:

- The ECU stores the fault codes in its memory until they are erased.
- Be sure to erase all past faults after correct operation has been verified.
- This will ensure that, should another fault occur sometime in the future, the old codes will not confuse the diagnosis of the problem.

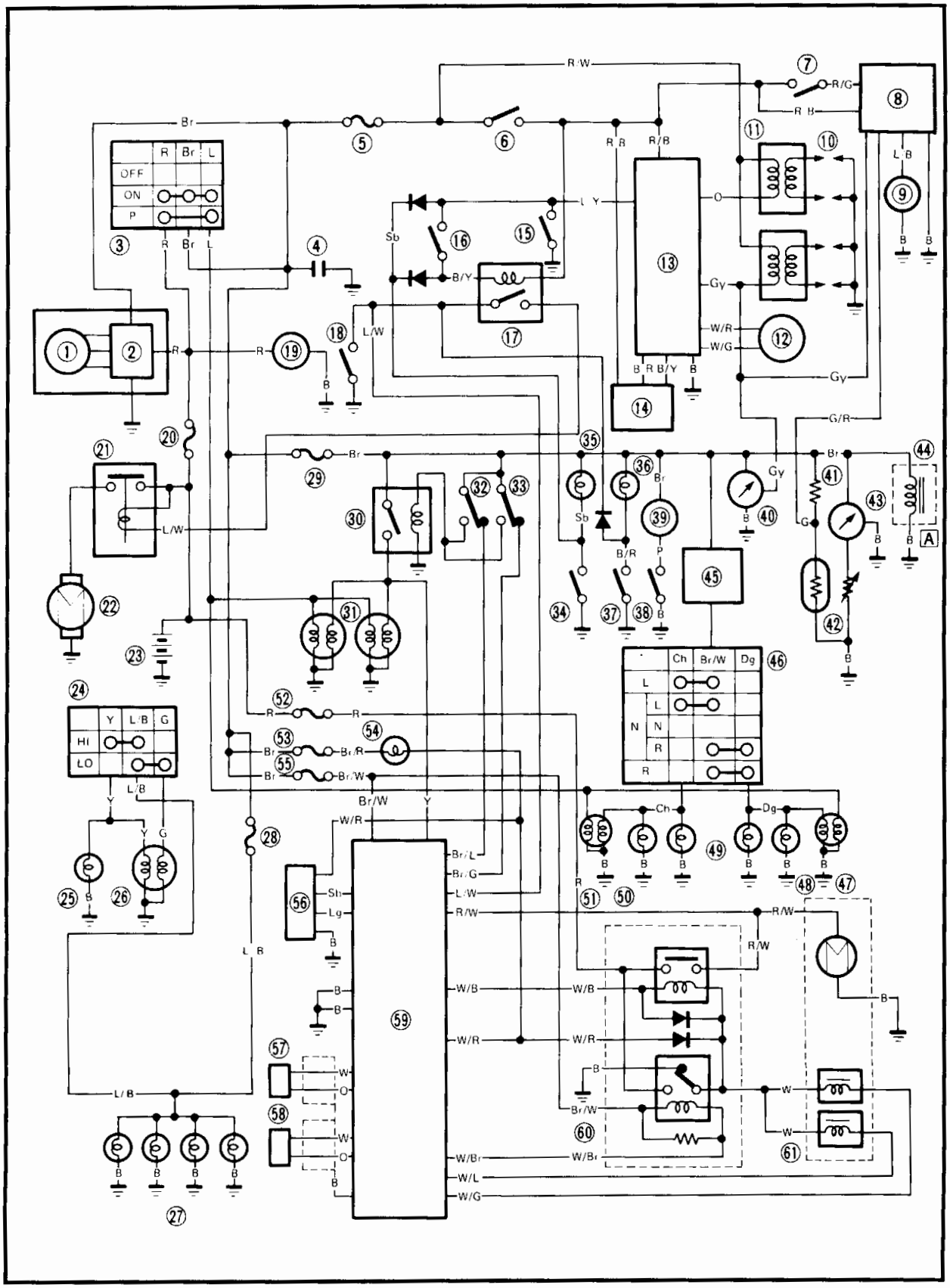
[D-6-5] Test run

If everything is correct after all the checking, test run the motorcycle at a low and safe speed of more than 10 km/h (6.2 m.p.h.).

This completes the "FINAL INSPECTION BEFORE DELIVERY OF THE SERVICE MOTORCYCLE".
The motorcycle may now be returned to its owner.

ELECTRICAL

FJ1200A D/DC CIRCUIT DIAGRAM



① A.C. Generator
② Rectifier/Regulator
③ Main switch
④ Condenser
⑤ Fuse "IGNITION"
⑥ "ENGINE STOP" switch
⑦ "RESERVE" switch
⑧ Fuel pump control relay
⑨ Fuel pump
⑩ Spark plug
⑪ Ignition coil
⑫ Pickup coil
⑬ Digital ignitor unit
⑭ Pressuer sensor
⑮ Sidestand switch
⑯ Clutch switch
⑰ Safety relay
⑱ "START" switch
⑲ Clock
⑳ Fuse "MAIN"
㉑ Starter relay
㉒ Starter motor
㉓ Battery
㉔ "LIGHTS" (Dimmer) switch
㉕ "HIGH BEAM" indicator light
㉖ Headlight
㉗ Meter light
㉘ Fuse "HEAD LIGHT"
㉙ Fuse "SIGNAL"
㉚ Relay assembly (brake switch)
㉛ Tail/brake light
㉜ Front brake switch
㉝ Rear brake switch
㉞ Neutral switch
㉟ "NEUTRAL" indicator light
㊱ "OIL LEVEL" indicator light
㊲ Oil level switch
㊳ "HORN" switch
㊴ Horn
㊵ Tachometer
㊶ Resistor
㊷ Fuel sender unit
㊸ Fuel meter
㊹ Control valve (for California-only)
㊺ Flasher relay
㊻ "TURN" switch
㊼ Front position light (right)
㊽ Flasher light (Right)
㊾ "TURN" indicator light
㊿ Flasher light (Left)
(51) Front position light (left)
(52) Fuse "ABS PUMP"
(53) Fuse "WARNING"
(54) Fuse "ECU"
(55) "ABS" warning light
(56) ABS test coupler
(57) Front wheel sensor
(58) Rear wheel sensor
(59) ABS Electronic control unit (ECU)
(60) Fail-safe relay
(61) Hydraulic unit (HU)
[A] For California-only

COLOR CODE

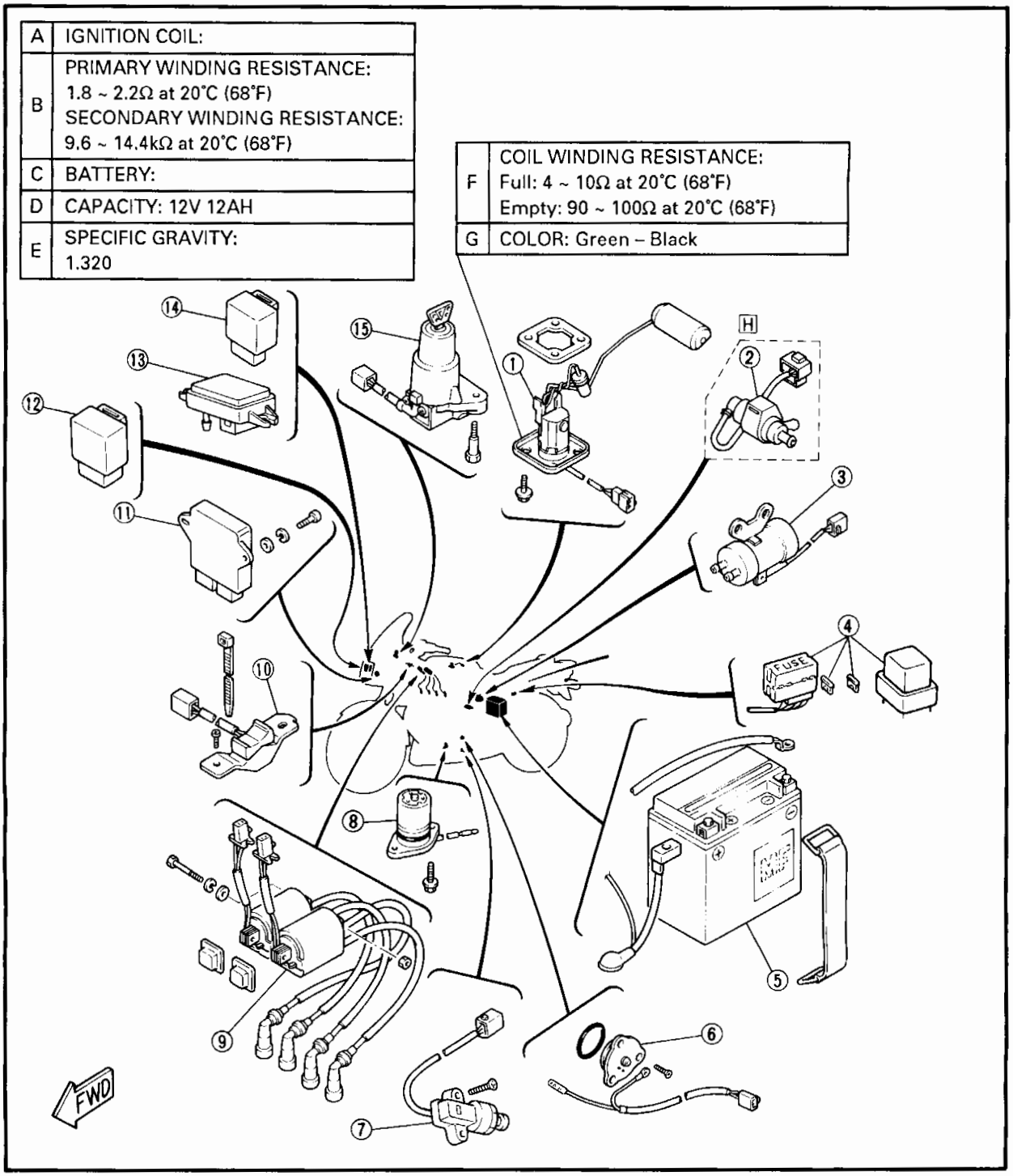
B	Black	Br/R	Brown/Red
Br	Brown	Br/W	Brown/White
Ch	Chocolate	G/R	Green/Red
Dg	Dark green	L/B	Blue/Black
G	Green	L/R	Blue/Red
Gy	Gray	L/W	Blue/White
L	Blue	L/Y	Blue/Yellow
Lg	Light green	R/B	Red/Black
O	Orange	R/G	Red/Green
P	Pink	R/W	Red/White
R	Red	W/B	White/Black
Sb	Sky blue	W/Br	White/Brown
W	White	W/G	White/Green
Y	Yellow	W/L	White/Blue
B/R	Black/Red	W/R	White/Red
B/Y	Black/Yellow		
Br/G	Brown/Green		
Br/L	Brown/Blue		

ELECTRICAL COMPONENTS (1)

① Fuel sender unit
② Control valve (For California-only)
③ Fuel pump
④ Fuse
⑤ Battery
⑥ *Neutral* switch
⑦ Sidestand switch
⑧ Oil level switch
⑨ Ignition coil
⑩ "FUEL" (Reserve) switch
⑪ Digital ignitor unit
⑫ Safety relay
⑬ Pressure sensor
⑭ Fuel pump control relay
⑮ Main switch
H For California-only

A	IGNITION COIL:
B	PRIMARY WINDING RESISTANCE: 1.8 ~ 2.2Ω at 20°C (68°F) SECONDARY WINDING RESISTANCE: 9.6 ~ 14.4kΩ at 20°C (68°F)
C	BATTERY:
D	CAPACITY: 12V 12AH
E	SPECIFIC GRAVITY: 1.320

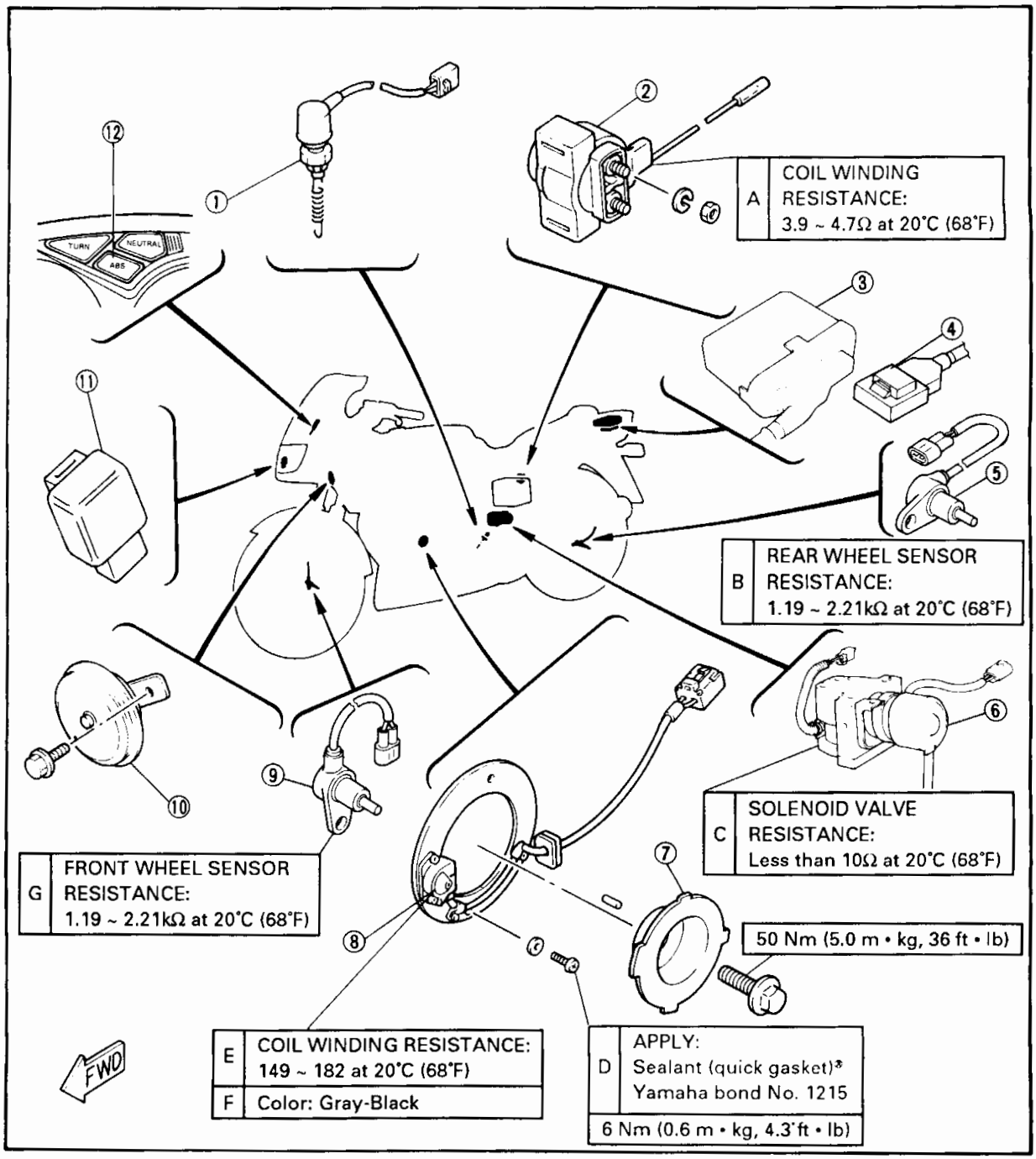
F	COIL WINDING RESISTANCE: Full: 4 ~ 10Ω at 20°C (68°F) Empty: 90 ~ 100Ω at 20°C (68°F)
G	COLOR: Green – Black



ELECTRICAL COMPONENTS (2)

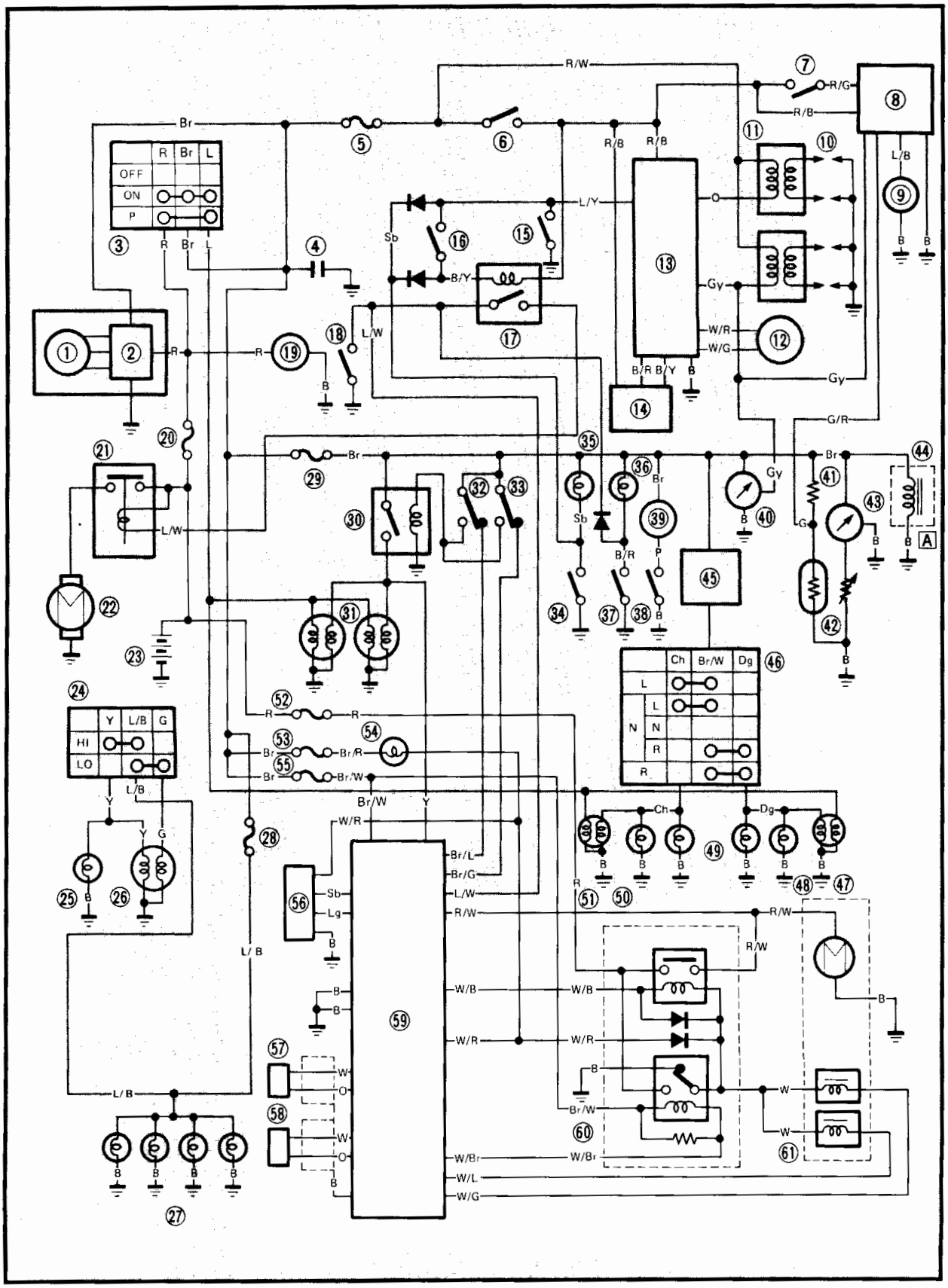
① Rear brake switch
② Starter relay
③ ABS Electronic control unit (ECU)
④ ABS Fail-safe relay
⑤ ABS Rear wheel sensor
⑥ ABS Hydraulic unit (HU)
⑦ Pickup rotor
⑧ Pick up coil
⑨ ABS Front wheel sensor
⑩ Horn
⑪ Flasher relay
⑫ "ABS" warning light

GENERATOR:	STARTER MOTOR:
STATOR COIL RESISTANCE: 0.19 ~ 0.20Ω at 20°C (68°F) (White – White)	BRUSH LENGTH LIMIT: 5.0 mm (0.20 in)
FIELD COIL RESISTANCE: 3.8 ~ 4.2Ω at 20°C (68°F)	COMMUTATOR DIA. LIMIT 27 mm (1.06 in)
BRUSH LENGTH LIMIT: 4.5 mm (0.18 in)	



ANTI-LOCK BRAKE SYSTEM (ABS)

CIRCUIT DIAGRAM

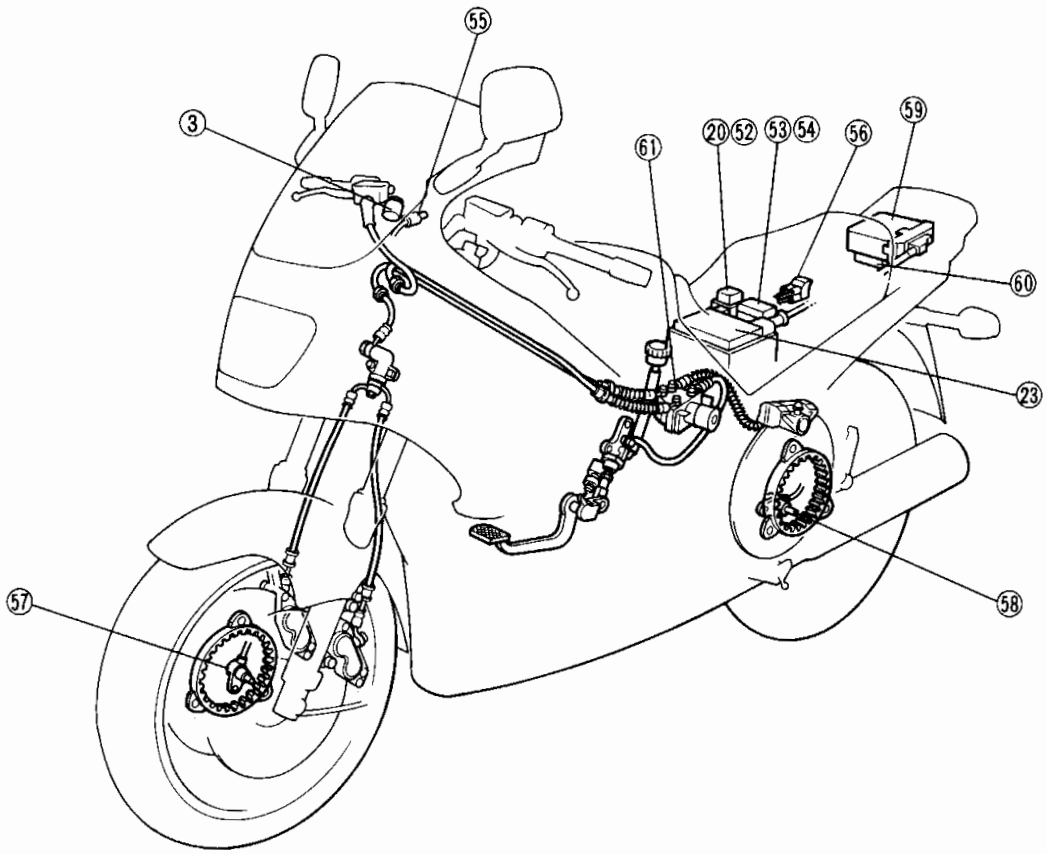


Aforementioned circuit diagram shows anti-lock brake circuit.

NOTE:

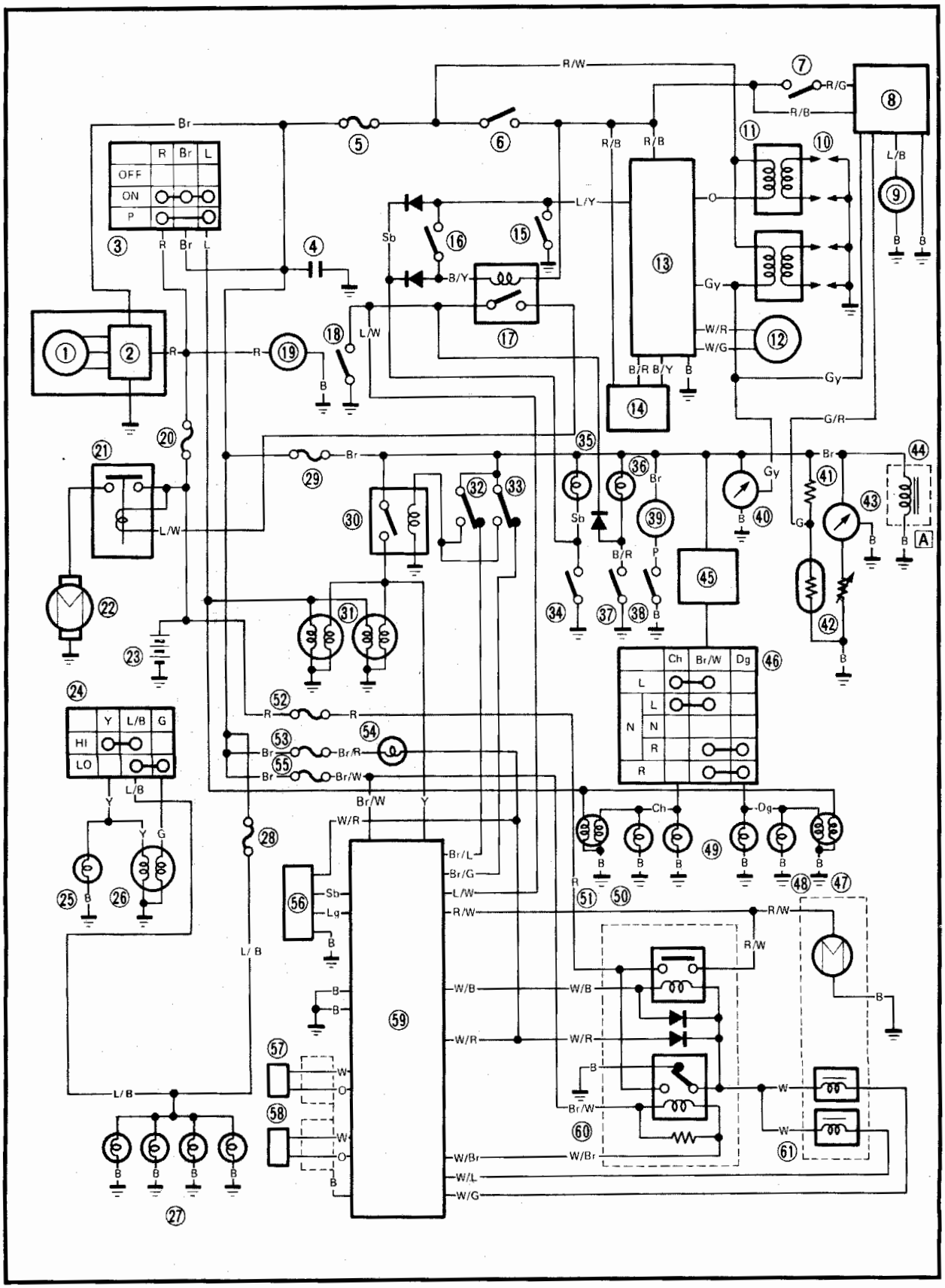
For color codes, see page 99.

③ Main switch
⑳ Fuse "MAIN"
㉓ Battery
㉜ Fuse "ABS PUMP"
㉝ Fuse "WARNING"
㉞ Fuse "ECU"
㉟ "ABS" warning light
㊱ ABS test coupler
㊲ Front wheel sensor
㊳ Rear wheel sensor
㊴ ABS Electronic control unit (ECU)
㊵ Fail-safe relay
㊶ Hydraulic unit (HU)



SIGNAL SYSTEM

CIRCUIT DIAGRAM

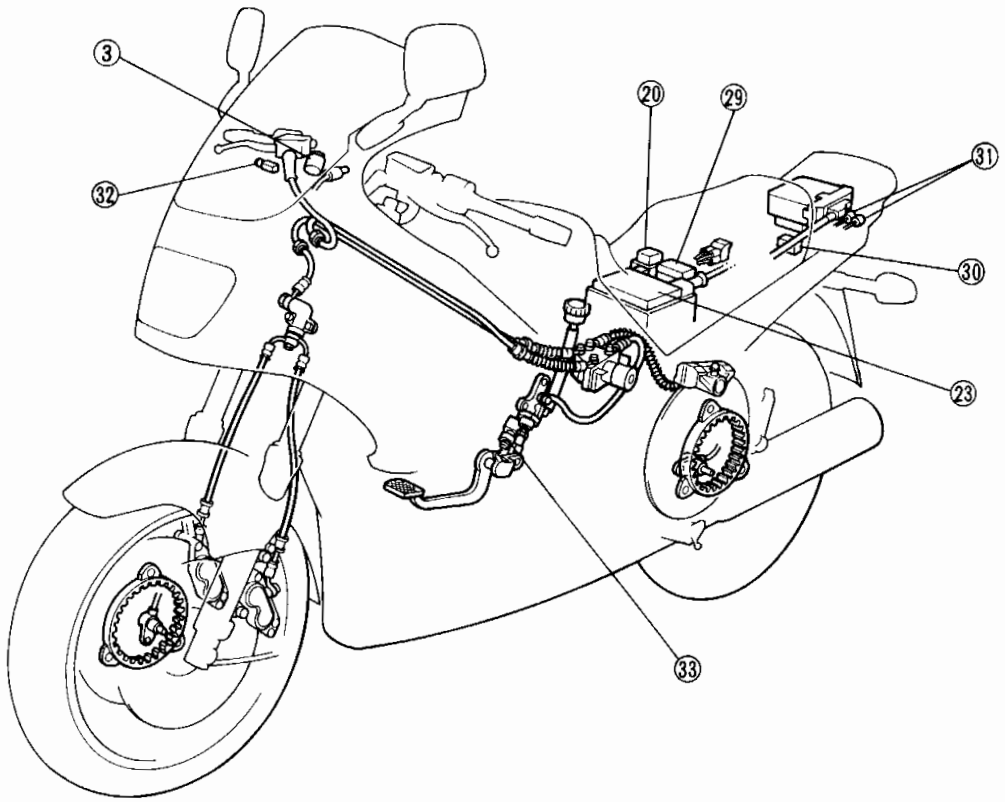


Aforementioned circuit diagram shows signal circuit.

NOTE:

For color codes, see page 99.

③ Main switch
⑳ Fuse "MAIN"
㉓ Battery
㉙ Fuse "SIGNAL"
㉚ Relay assembly (brake switch)
㉛ Tail/brake lights
㉜ Front brake switch
㉝ Rear brake switch



TROUBLESHOOTING

• BRAKE LIGHT DOES NOT COME ON.

Procedure

Check;

1. Fuse
2. Battery
3. Main switch
4. Bulb and bulb socket
5. Brake switch
6. Relay assembly
7. Voltage

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Side cover (left and right)
  3) Fuel tank
  4) Upper cowling
  5) ECU bracket

  Refer to the "ABS TROUBLESHOOTING – [D-2]" section.
- Use the following special tool in this troubleshooting.



Pocket tester:
P/N. YU-03112
P/N. 90890-03112

1. Fuse

- Remove the fuse.
- Connect the pocket tester (Ω × 1) to the fuse.
- Check the fuse for continuity.
  Refer to the "FUSE INSPECTION" in the CHAPTER 3.

NO CONTINUITY → Replace fuse.

CONTINUITY ↓

2. Battery

- Check the battery condition.
  Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Voltage
12.8 V or higher at 20°C (68°F)

INCORRECT →
- Clean battery terminals.
- Recharge or replace battery.
  Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

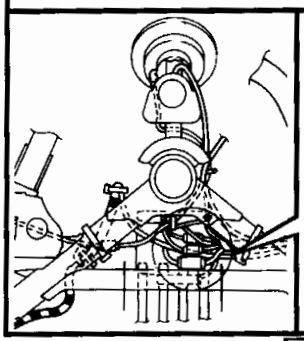
CORRECT ↓

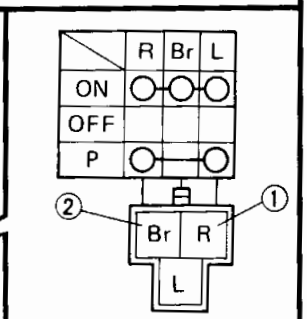
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3. Main switch

- Disconnect the main switch coupler from the wire harness.
- Connect the pocket tester (Ω x 1) to the main switch terminal.
- Check the switch for the continuity between "Red ① and Brown ② ".
  Refer to the "CHECKING OF SWITCHES" section in the CHAPTER 7.





INCORRECT

Main switch is faulty, replace it.

CORRECT

4. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.
  Refer to the "CHECKING OF BULBS" section in the CHAPTER 7.

NO CONTINUITY

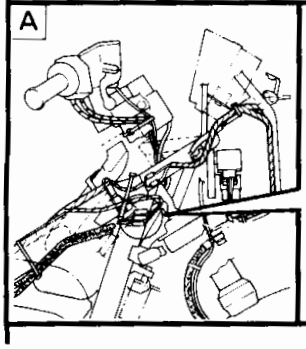
Replace bulb and/or bulb socket.

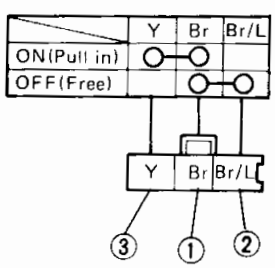
CONTINUITY

5. Brake switch

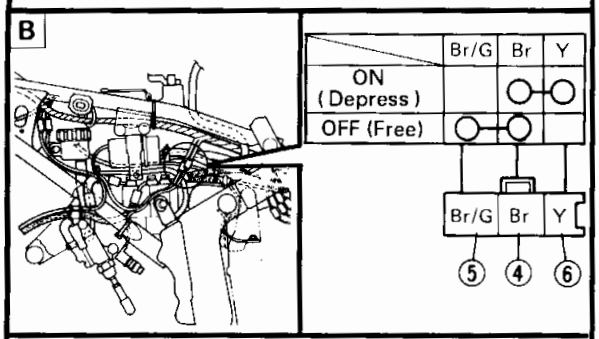
- Disconnect the brake switch and coupler from the wire harness.
- Connect the pocket tester (Ω x 1) to the brake switch terminal.
- Check the switch component for continuity between "Brown ① and Brown/ Blue ② " or Brown ① and Yellow ③ .
  Refer to the "CHECKING OF SWITCHES" section in the CHAPTER 7.

A





- Check the switch component for continuity between "Brown ④ and Brown/Green ⑤ or Brown ④ and Yellow ⑥ .
  Refer to the "CHECKING OF SWITCHES" section in the CHAPTER 7.



A Front brake switch
B Rear brake switch

INCORRECT

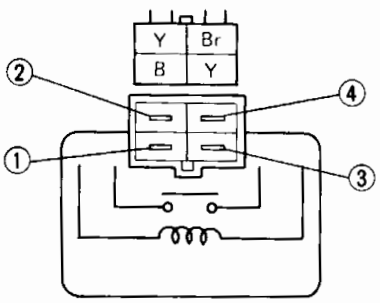
Brake switch is faulty, replace it.

CORRECT

6. Relay assembly

- Connect the pocket tester (Ω x 1) to the relay assembly coupler terminals.

Battery (+) terminal → Yellow teminal ①
Battery (–) terminal → Black terminal ②
Tester (+) lead → Brown terminal ③
Tester (–) lead → Yellow terminal ④



- Check the relay assembly component for the continuity between the "Brown" and "Yellow" leads at the relay assembly coupler terminals.

NO CONTINUITY

Relay assembly.

CORRECT

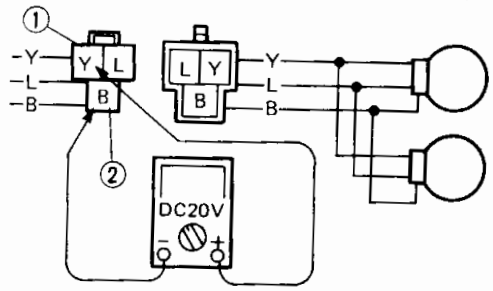
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7. Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead → Yellow lead ①
Tester (–) lead → Black lead ②



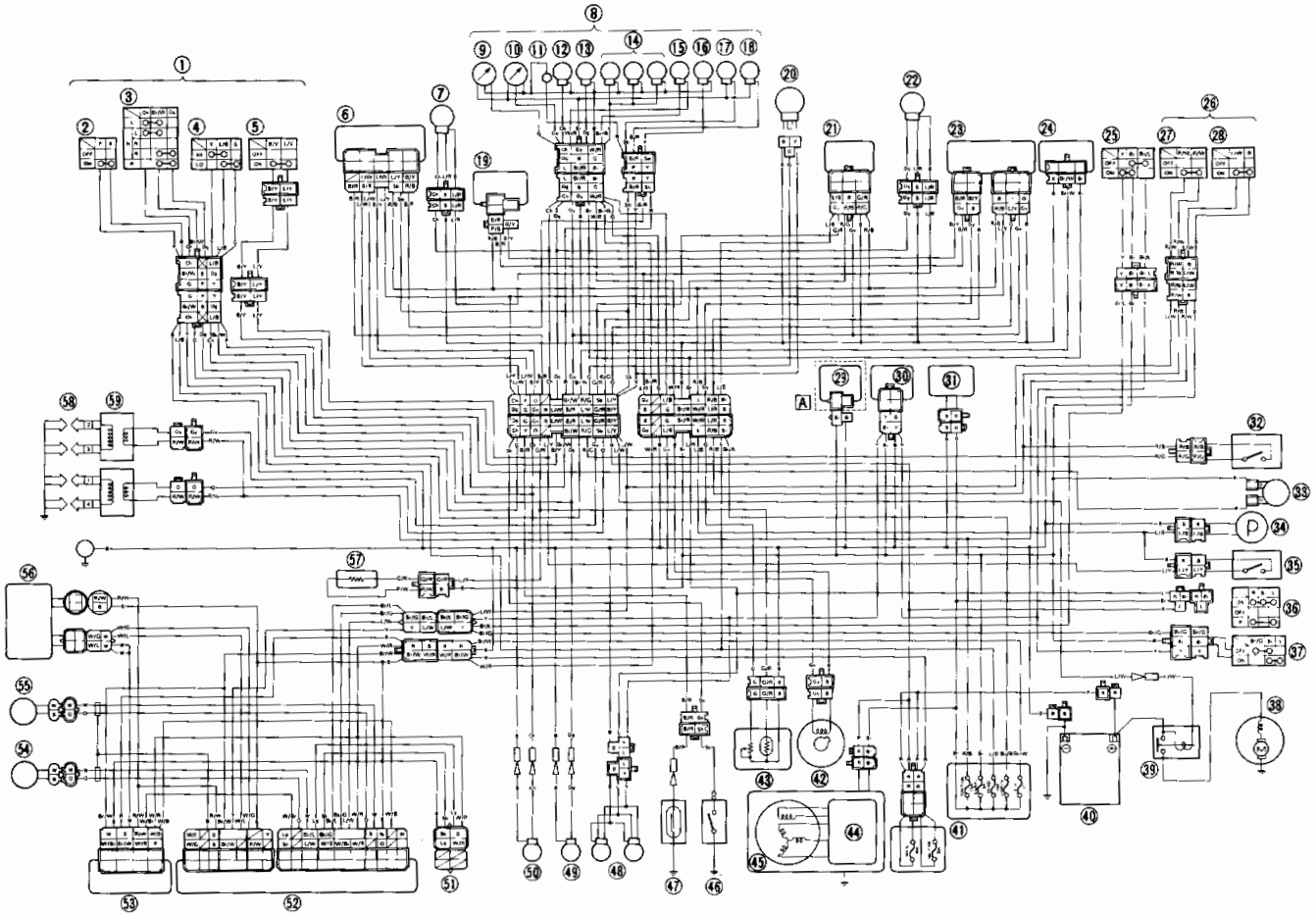
- Turn the main switch to "ON".
- The brake lever is pulled in or brake pedal is stepped on.
- Check for voltage (12V) on the "Yellow" lead at the bulb socket connector.

OUT OF SPECIFICATION → Wiring circuit from main switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION (12V)

This circuit is good.

FJ1200A D/DC WIRING DIAGRAM



COLOR CODE

B ..... Black	Lg ..... Light green	B/R ..... Black/Red	L/B ..... Blue/Black	W/B .... White/Black
Br ..... Brown	O ..... Orange	B/Y ..... Black/Yellow	L/R ..... Blue/Red	W/Br ... White/Brown
Ch ..... Chocolate	P ..... Pink	Br/G .... Brown/Green	L/W ..... Blue/White	W/G .... White/Green
Dg ..... Dark green	R ..... Red	Br/L ..... Brown/Blue	L/Y ..... Blue/Yellow	W/L ..... White/Blue
G ..... Green	Sb ..... Sky blue	Br/R .... Brown/Red	R/B ..... Red/Black	W/R .... White/Red
Gy ..... Gray	W ..... White	Br/W ... Brown/White	R/G ..... Red/Green	
L ..... Blue	Y ..... Yellow	G/R ..... Green/Red	R/W .... Red/White	

① Handlebar switch (L)
② "HORN" switch
③ "TURN" switch
④ "LIGHTS" (Dimmer) switch
⑤ Clutch switch
⑥ Safety relay assembly
⑦ Front position light/Front flasher light (L)
⑧ Meter
⑨ Fuel meter
⑩ Tachometer
⑪ Clock
⑫ "TURN" indicator light (L)
⑬ "TURN" indicator light (R)
⑭ Meter light
⑮ "ABS" warning light
⑯ "HIGH BEAM" indicator light
⑰ "NEUTRAL" indicator light
⑱ "OIL LEVEL" indicator light
⑲ Pressure sensor
⑳ Headlight
㉑ Fuel pump control relay
㉒ Front position light/Front flasher light (R)
㉓ Digital ignitor unit
㉔ Flasher relay
㉕ Front brake switch
㉖ Handlebar switch (R)
㉗ "ENGINE STOP" switch
㉘ "START" switch
㉙ Control valve
㉚ Relay (brake switch)
㉛ Condenser
㉜ "RESERVE" switch
㉝ Horn
㉞ Fuel pump
㉟ Sidestand switch
㊱ Main switch
㊲ Rear brake switch
㊳ Starter motor
㊴ Starter relay
㊵ Battery
㊶ Fuse
㊷ Pickup coil
㊸ Fuel sender unit
㊹ Rectifier/regulator
㊺ A.C. generator
㊻ Neutral switch
㊼ Oil level switch
㊽ Tail/brake light
㊾ Rear flasher light (R)
㊿ Rear flasher light (L)
(51) ABS test coupler
(52) ABS Electronic control unit (ECU)
(53) Fail-safe relay
(54) Rear wheel sensor
(55) Front wheel sensor
(56) Hydraulic unit (HU)
(57) Resistor
(58) Spark plug
(59) Ignition coil
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