YAMAHA

SERVICE MANUAL

G9-AJ/EJ
G9-AG/AH
G9-EG/EH1
G9-EH2
G2-A/E

LIT-19616-G9-93

NOTICE

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

Yamaha Motor Company Ltd. is continually striving to further 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.

SERVICE DEPT
LEISURE VEHICLES & POWER
PRODUCTS OPERATIONS
YAMAHA MOTOR CO., LTD

HOW TO USE THIS MANUAL

Particularly important information is distinguished in this manual by the following notations:

⚠ WARNING

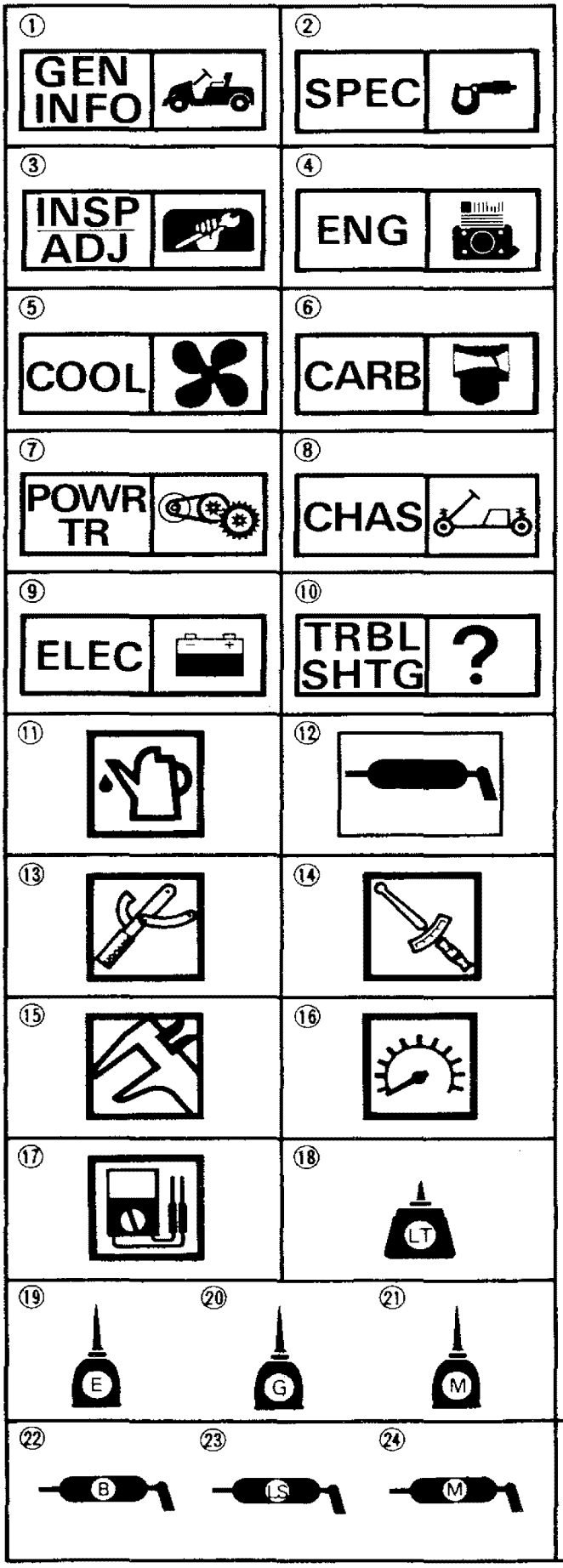
Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:

AN IMPORTANT indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

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



ILLUSTRATED SYMBOLS
(Refer to the illustration)

Illustrated symbols ① to ⑩ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Power train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Illustrated symbols ⑪ to ⑰ are used to identify the specifications appearing in the text.

⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Tightening
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Ω, V, A

Illustrated symbols ⑱ to ㉕ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑱ Apply locking agent (LOCTITE®)
⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply wheel bearing grease
㉓ Apply lightweight lithium-soap base grease
㉔ Apply molybdenum disulfide grease
㉕ Apply Yamaha bond 5®

INDEX

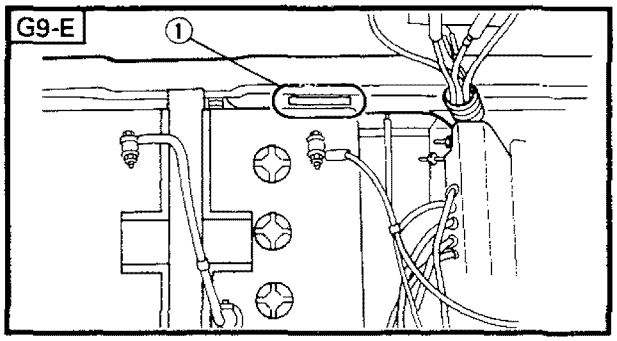
CONTENTS

CHAPTER 1
GENERAL INFORMATION

CHAPTER 2
SPECIFICATIONS

CHAPTER 3
PERIODIC INSPECTION AND AJUSTMENT

CHAPTER 6
POWER TRAIN



GENERAL INFORMATION

CAR IDENTIFICATION

FRAME SERIAL NUMBER (Primary I.D)

The frame serial number ① is located on the rectangular pipe under the operator's seat.

Starting Serial Number:
G9-E JH7-100311-100410
JH7-101111 ~ and later

SPECIFICATIONS

TRANSMISSION

Model	G9-E
Differential/Reduction Gear:	G.E. TRACTION MOTOR
Reduction Gear Ratio/Gear Type	(1:11.965)/Helical
Differential Type	Bevel gear
Oil Type/Capacity	SAE 90 Gear oil/300 cc (0.26 Imp qt, 0.32 US qt)

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. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE TABLE

Use this table to determine maintenance by the number of rounds (hours) or the period whichever comes first.

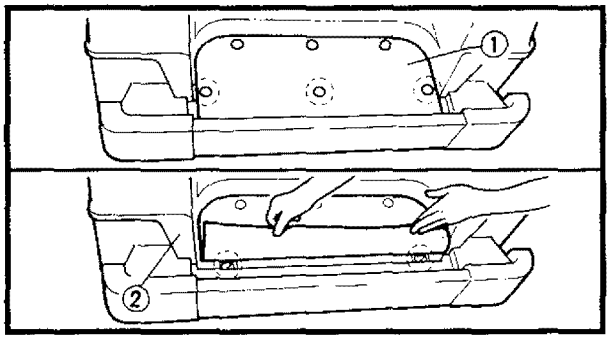
TRANSMISSION

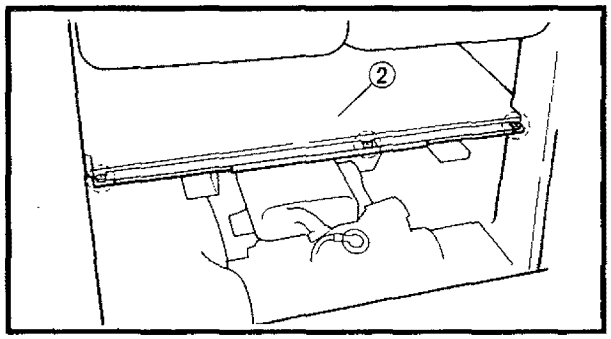
For G9-E

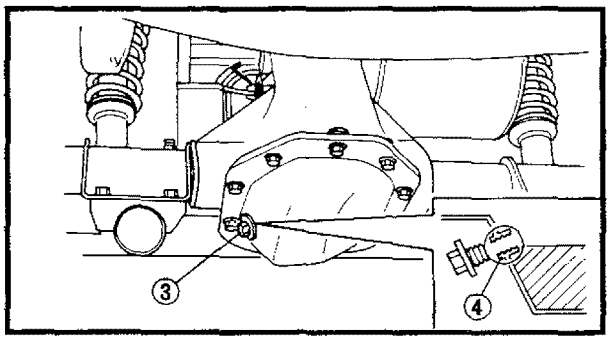
○ Checking or Adjusting ● Lubricating or Replacing

Item	Remarks	EVERY					
		Pre-Operation	20Rounds 10hours (1month)	125rds 60hrs (6mns)	250rds 130hrs (1year)	500rds 250hrs (2yrs)	1000rds 500hrs (4yrs)
Transmission case	Check for operation and installation of speed limiter.				○		
	Check for operation of forward-reverse shifting.				○		
	Check for damage of shifting cable, replace.				○		●
	Check gearbox oil level and leakage.				○		
	Replace gearbox oil. Oil quantity: 300 cc (0.26 Imp qt, 0.32 US qt) Oil type: SAE 90 gear oil						●

3







TRANSMISSION OIL LEVEL MEASUREMENT

1. Remove the rear cover ① and rear cowl ②.
2. Check:
   - Oil level
     Oil level low → Add sufficient oil

Transmission oil level inspection steps:
- Place the vehicle on a level surface.
- Remove the oil level plug ③.

NOTE:
Place an oil pan under the transmission case cover.

- Add sufficient oil until it begins to flow out from the level plug hole ④.

Recommended Oil:
SAE 90 gear oil

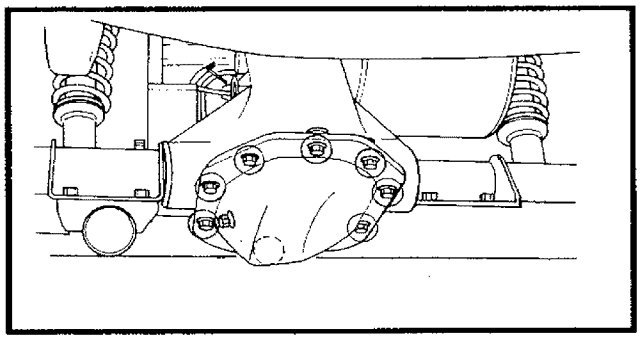
CAUTION:
Do not allow foreign material to enter the transmission case cover.

- Allow excess oil to flow out until it stops.
- Install the oil level plug.

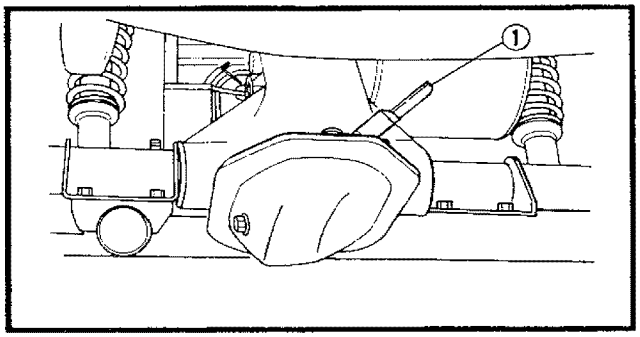
Oil Level Plug:
For G9-E
44 Nm (4.4 m • kg, 32 ft • lb)

TRANSMISSION OIL REPLACEMENT

1. Place the vehicle on a level area.
2. Place an oil pan under the transmission case.



3. Loosen:
   - Transmission case bolt



4. Remove:
   - Transmission case cover

   Drain the transmission oil.

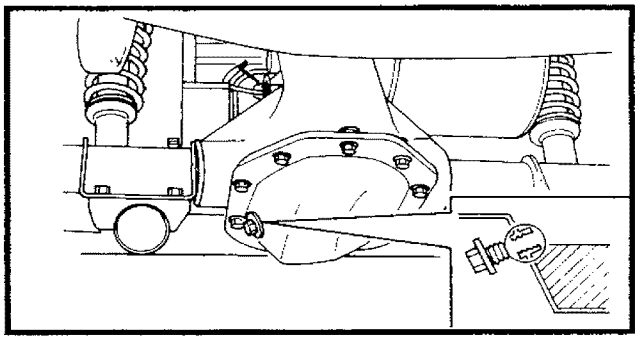
NOTE:

Separate the transmission case cover from the case assy using a gasket scraper ①.

5. Install:
   - Transmission case cover

   (See page 6-5)

6. Loosen:
   - Oil level plug



7. Fill:
   - Transmission case from oil level plug

   Refer to "TRANSMISSION OIL LEVEL MEASUREMENT" section.

Recommended Oil:
SAE 90 gear oil
Oil Quantity:
300 cc (0.26 Imp qt, 0.32 US qt)

CAUTION:

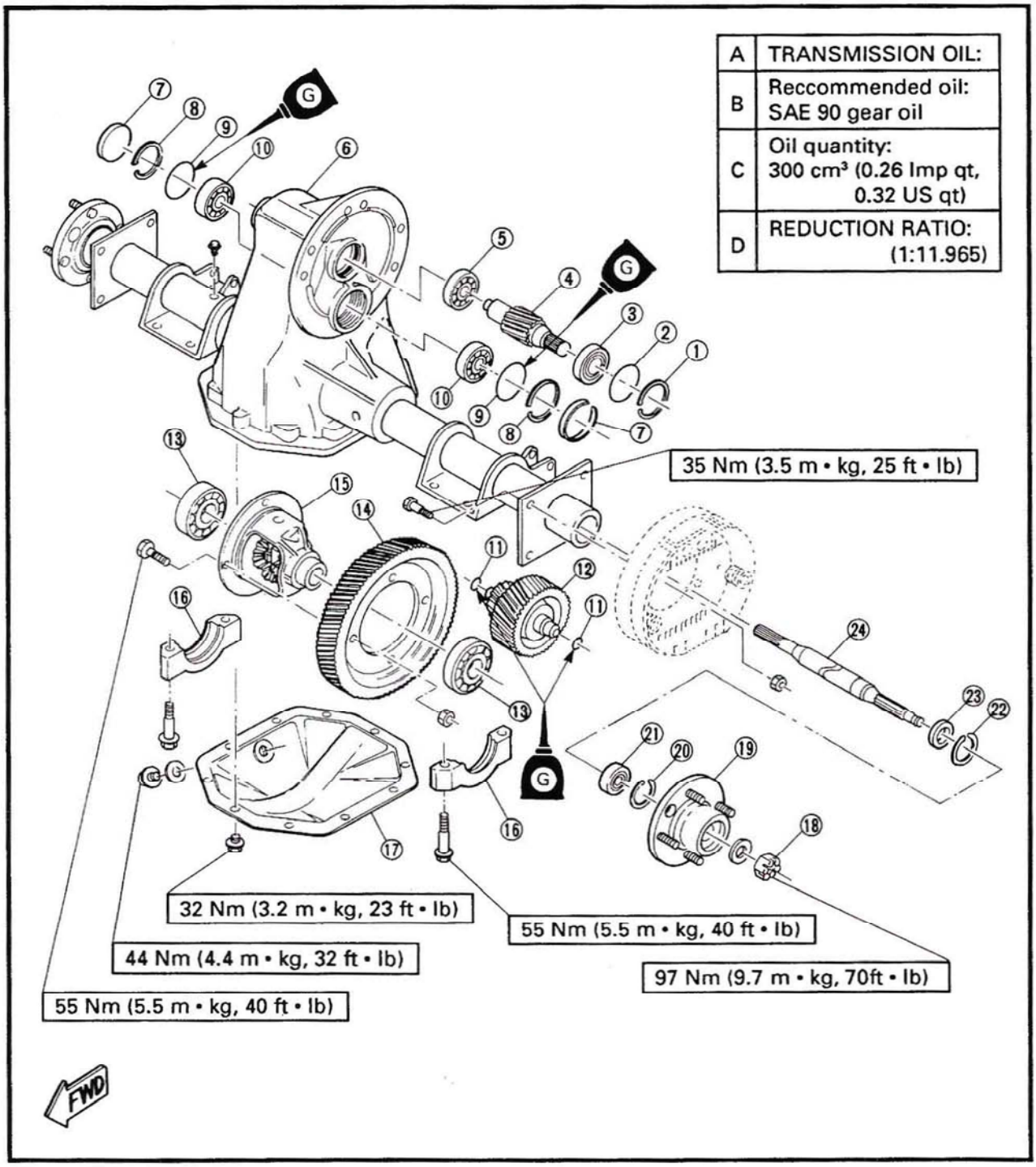
Do not allow foreign material to enter the transmission case.

8. Tighten:
   - Oil level plug

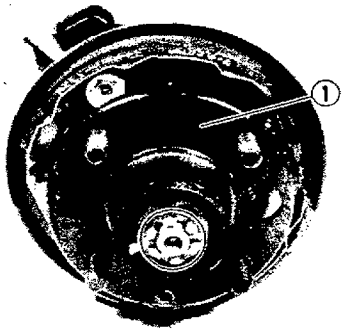
POWER TRAIN

TRANSMISSION

① Circlip
② O-ring
③ Bearing
④ Input shaft
⑤ Bearing
⑥ Case ass'y
⑦ Blind plug
⑧ Circlip
⑨ O-ring
⑩ Bearing
⑪ O-ring
⑫ Counter gear ass'y
⑬ Bearing
⑭ Ring gear
⑮ Differential ass'y
⑯ Bearing holder
⑰ Transmission case cover
⑱ Hexagon nut
⑲ Rear axle hub
⑳ Circlip
㉑ Bearing
㉒ Circlip
㉓ Oil seal
㉔ Rear axle shaft

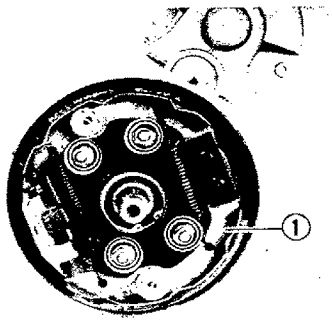


6

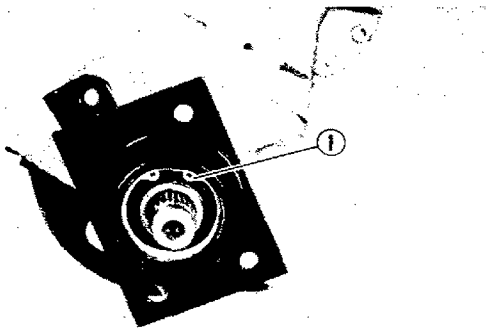


REMOVAL

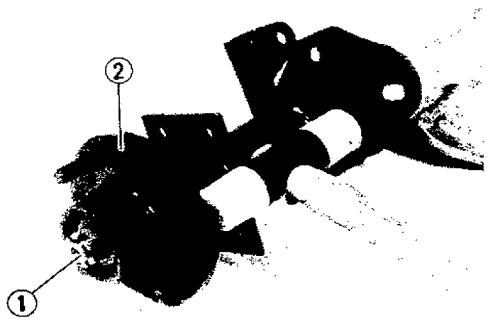
1. Remove:
   - Rear axle hub ①



2. Remove:
   - Brake shoe ass'y ①



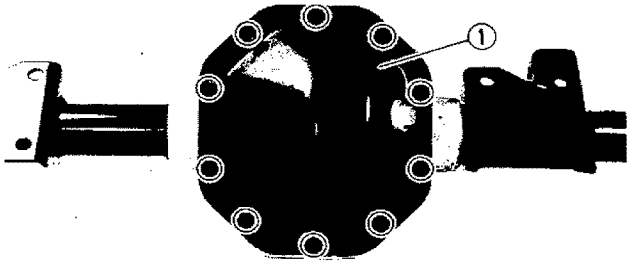
3. Remove:
   - Circlip ①
     From axle housing



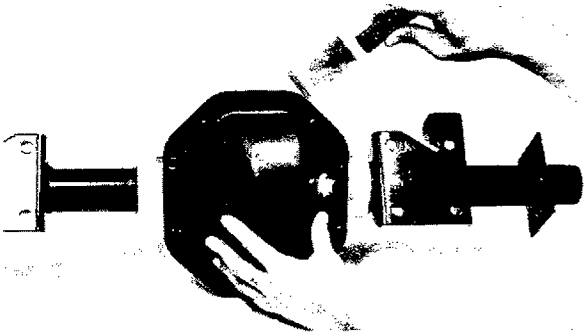
4. Remove:
   - Rear axle shaft with bearing ①

NOTE:

When removing the rear axle shaft, first install the axle housing ② to rear axle and then remove the axle shaft with axle housing by tapping with soft hammer.

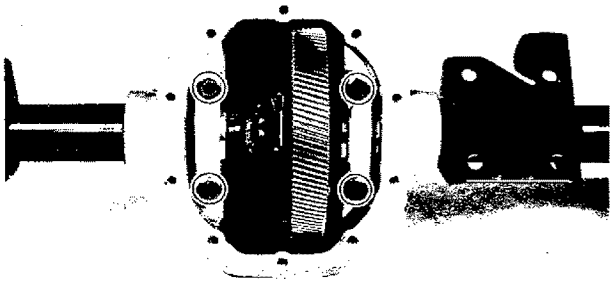


5. Remove:
   - Transmission case cover ①

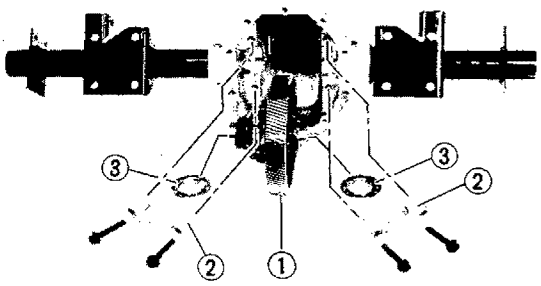


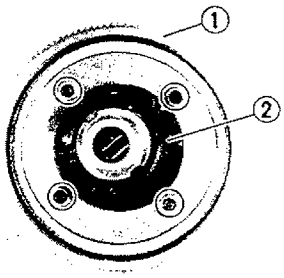
NOTE:
Separate the transmission case cover from the case ass'y using a gasket scraper.

CAUTION:
Be sure not to damage the case sealing surface or deform the transmission case cover.

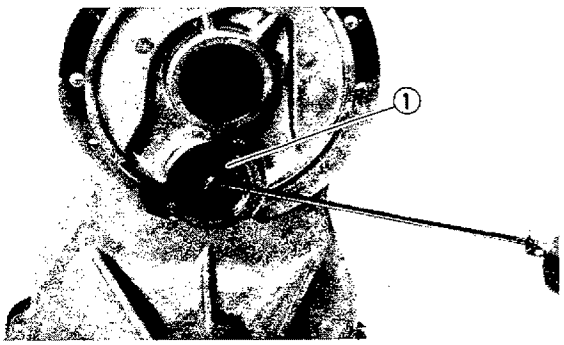


6. Remove:
   - Differential ass'y with ring gear ①
   - Bearing holder ②
   - Bearing ③



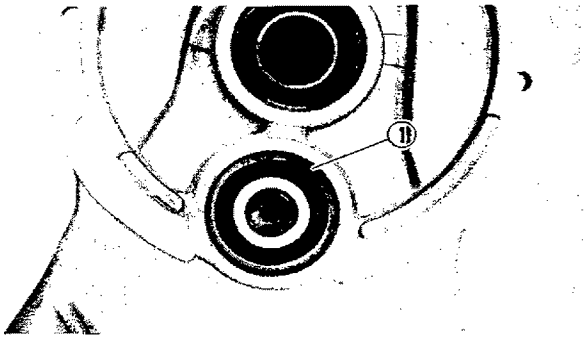


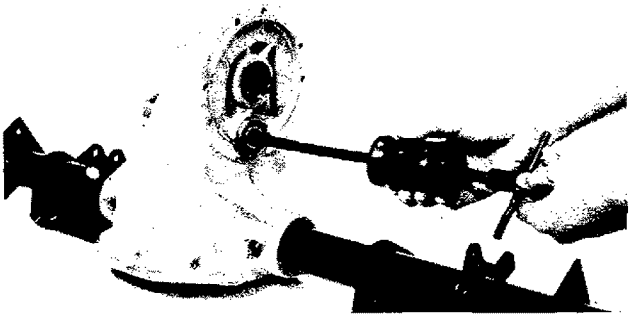
7. Separate:
   - Ring gear ①
   - Differential ass'y ②

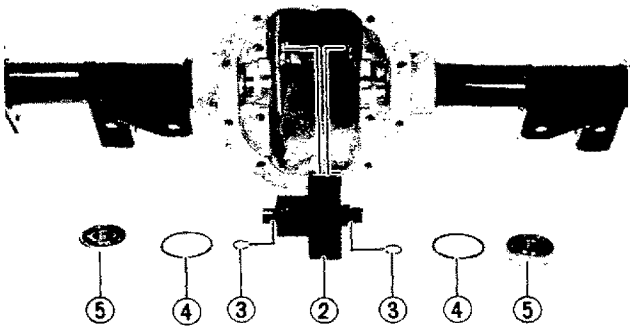


8. Remove:
   - Blind plug ① (both sides)

NOTE:
Punch or drill near the center of blind plug. Insert a suitable sized sheet metal screw until the plug is forced out of the bearing bore.

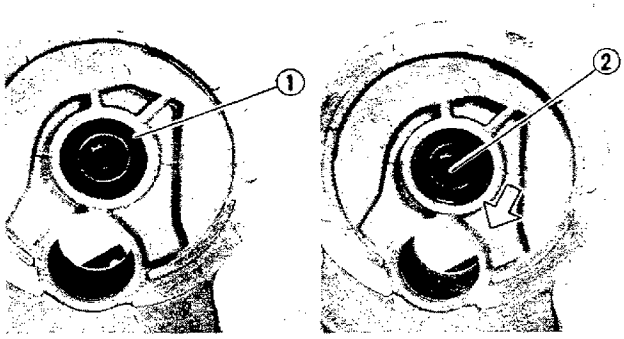




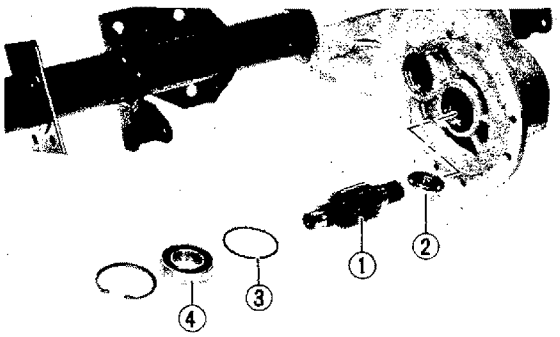


9. Remove:
   - Circlip ①
     (from counter gear bore)
   - Counter gear ②
   - O-ring of counter gear ③
   - O-ring of bearing ④
   - Bearing ⑤

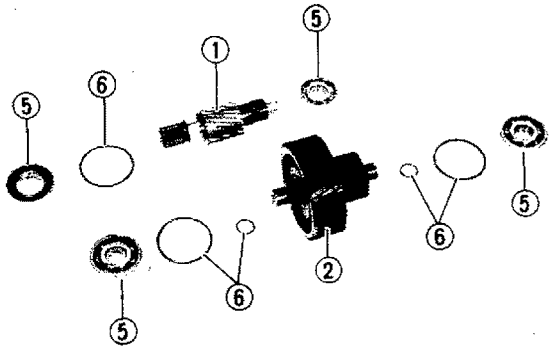
Counter gear removal steps:
1. Push out the counter gear shaft of input side from bearing inner race.
2. Remove the bearing of input side using the bearing puller.
3. Repeat the step 1 for counter gear bearing on opposite side.



10. Remove:
    - Circlip ①
    - Input shaft ass'y ②

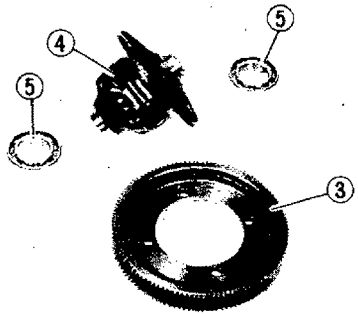


11. Remove:
- Input shaft ①
- Bearing ②
- O-ring ③
- Bearing ④



INSPECTION

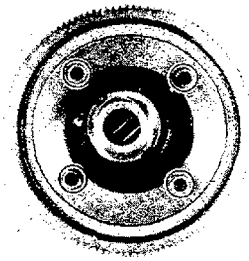
1. Inspect:
- Input shaft gear ①
- Counter gear ②
- Ring gear ③
- Differential gear ④
  Damage/wear → Replace
- Bearing ⑤
  Pitting/Damage → Replace
- O-ring ⑥
  Wear/Damage → Replace



ASSEMBLY

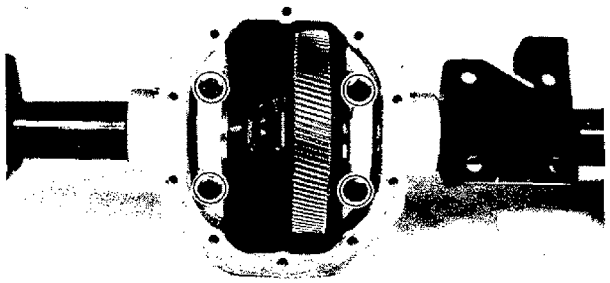
Reverse the "DISASSEMBLY" procedure. Note the following points.

1. Tighten:
- Differential case bolts

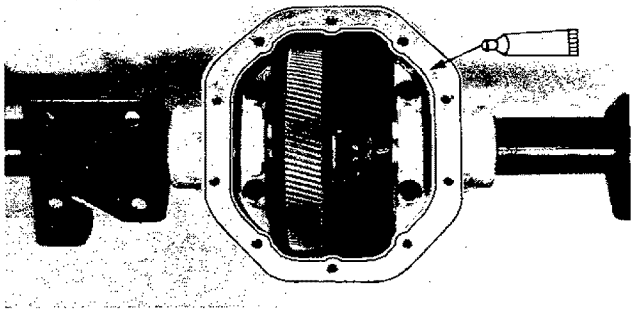


	Differential case bolts: 55 Nm (5.5 m • kg, 40 ft lb)

2. Tighten:
- Differential bearing holder bolts

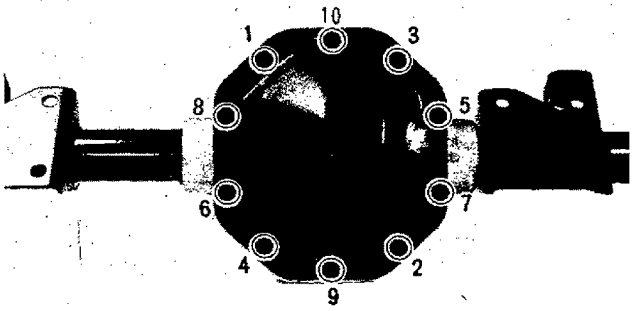


	Differential bearing holder bolts: 55 Nm (5.5 m • kg, 40 ft • lb)



NOTE:
Clean the transmission case surface.

3. Apply:
   - RTV Quick Gasket sealant (ACC-11001-05-01) or Three bond 1215 (to the case surface and into the 10 bolt holes)



4. Tightn:
   - Transmission case bolts

NOTE:
Tighten the bolt in order starting with the smallest number and torque the bolts in two stage.

	Transmission case bolts: 32 Nm (3.2 m • kg, 23 ft • lb)

NOTICE

This manual has been written by Yamaha Motor Company for use by Authorized Yamaha Dealers and their qualified mechanics. In light of this purpose it has been assumed that certain basic mechanical precepts and procedures inherent to our products are already known and understood by the mechanic. Without such basic knowledge, repairs or service to this model may render the machine unsafe, and for this reason we must advise that all repairs and/or service be performed by an Authorized Yamaha Dealer who is in possession of the requisite basic product knowledge.
Yamaha Motor Company, Ltd. is continually striving to further improve all models manufactured by the company. Modifications are therefore inevitable and changes in specifications or procedures will be forwarded to all Authorized Yamaha Dealers and will, where applicable, appear in future editions of this manual.

SERVICE DEPT.
LEISURE VEHICLE AND POWER
PRODUCTS OPERATIONS
YAMAHA MOTOR CO., LTD.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notations.

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

⚠ CAUTION: A CAUTION indicates special procedures that must be followed to avoid damage to the vehicle.

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

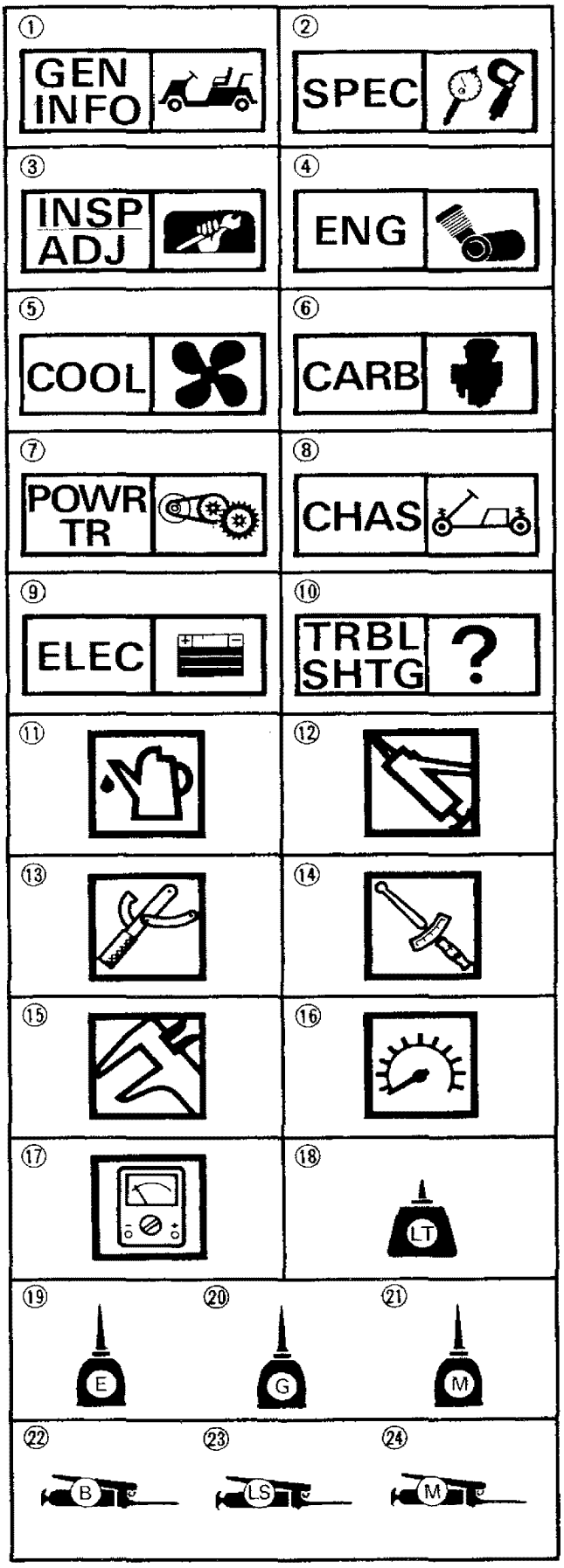
MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings:
  Pitting/Damage → Replace.

EXPLODED DIAGRAM

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



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑩ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Power train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Illustrated symbols ⑪ to ⑰ are used to identify the specifications appearing in the text.

⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Tightening
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Ω, V, A

Illustrated symbols ⑱ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

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

INDEX

CONTENTS

CHAPTER 1.
GENERAL INFORMATION

CHAPTER 2.
SPECIFICATIONS

CHAPTER 3.
PERIODIC INSPECTION AND ADJUSTMENT

CHAPTER 4.
ENGINE OVERHAUL

CHAPTER 5.
CARBURETION

CHAPTER 6.
POWER TRAIN (FOR G2-A)

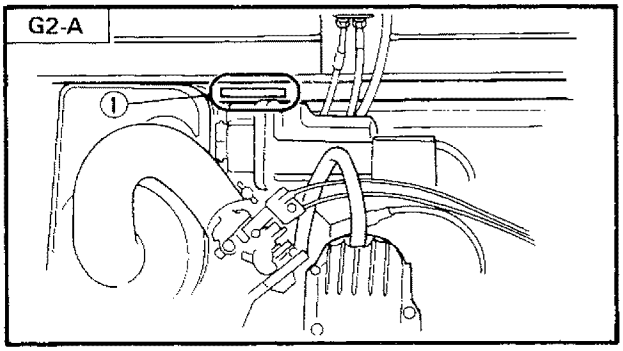
POWER TRAIN (FOR G2-E)

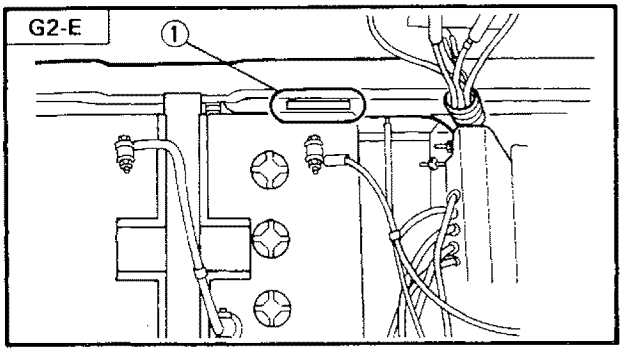
CHAPTER 7.
CHASSIS

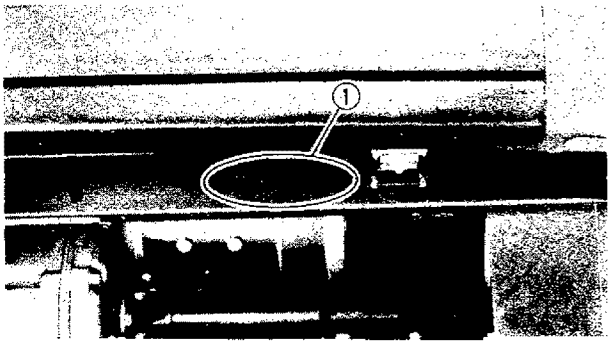
CHAPTER 8.
ELECTRICAL (FOR G2-A)

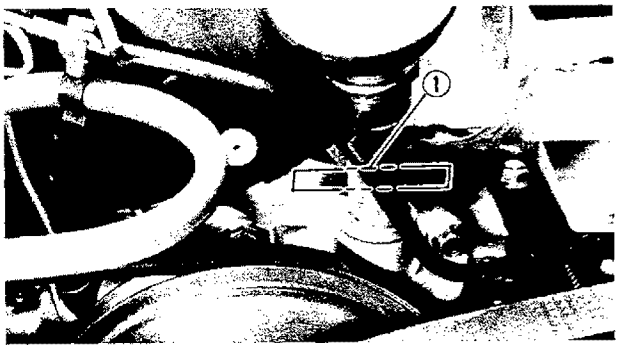
ELECTRICAL (FOR G2-E)

CHAPTER 9.
TROUBLESHOOTING









GENERAL INFORMATION

CAR IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number ① is located on the rectangular pipe under the operator's seat, or on the right hand side of the rectangular pipe by the rear bumper.

Starting Serial Number:	
G2-A	J38-000101
	JA2-000101
	J55-000101
G2-E	J41-000101
	JE2-000101
	J56-000101

NOTE:

The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.

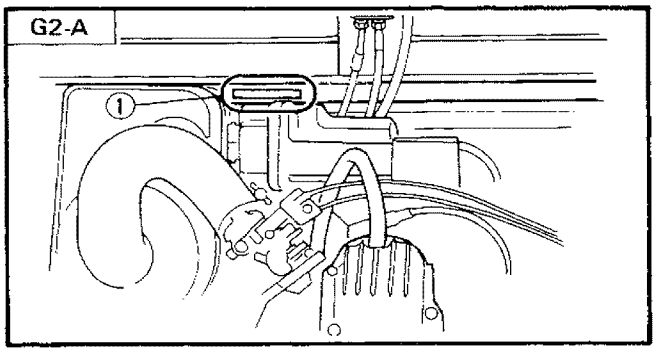
ENGINE SERIAL NUMBER

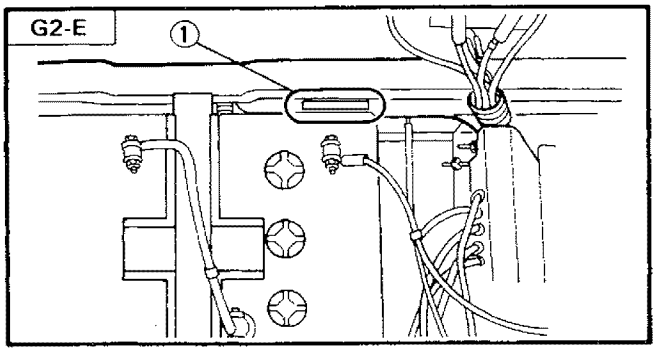
The engine serial number ① is located on the left-hand side of crank case.

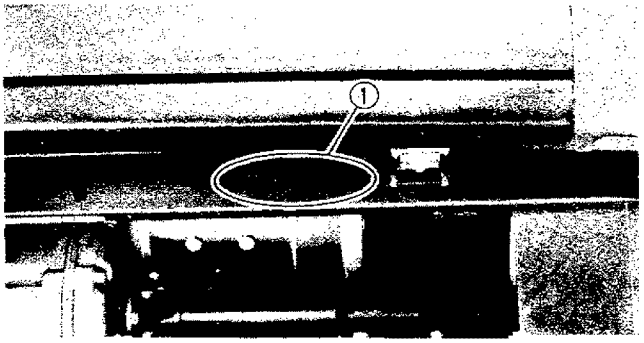
Starting Serial Number:	
G2-A	J38-000101
	JA2-000101
	J55-000101

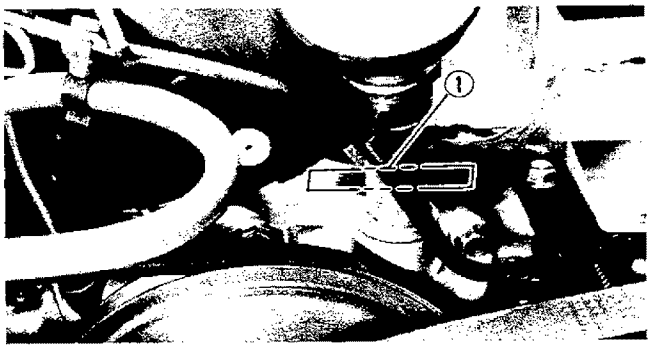
NOTE:

Designs and specifications are subject to change without notice.









GENERAL INFORMATION

CAR IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number ① is located on the rectangular pipe under the operator's seat, or on the right hand side of the rectangular pipe by the rear bumper.

Starting Serial Number:	
G2-A	J38-000101
	JA2-000101
	J55-000101
G2-E	J41-000101
	JE2-000101
	J56-000101

NOTE:

The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.

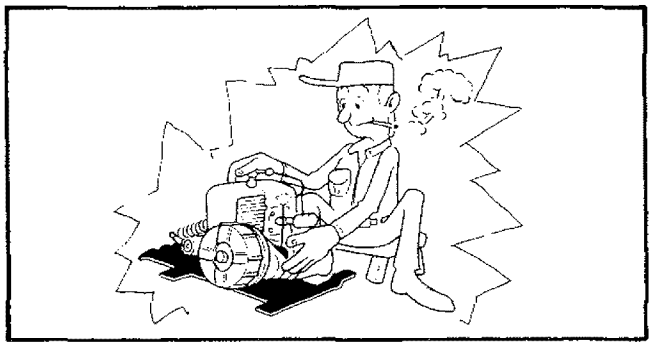
ENGINE SERIAL NUMBER

The engine serial number ① is located on the left-hand side of crank case.

Starting Serial Number:	
G2-A	J38-000101
	JA2-000101
	J55-000101

NOTE:

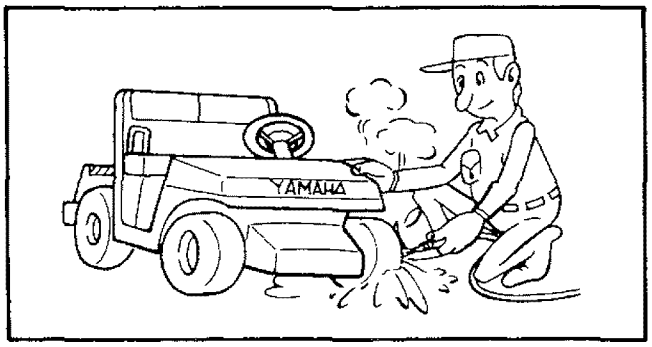
Designs and specifications are subject to change without notice.



IMPORTANT INFORMATION

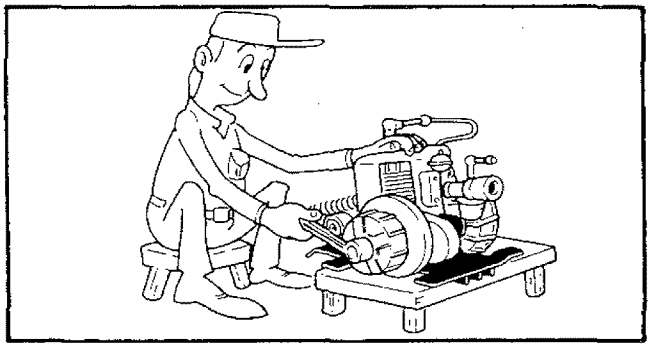
NO FLAME SOURCES

1. Avoid any flame sources in the service shop.



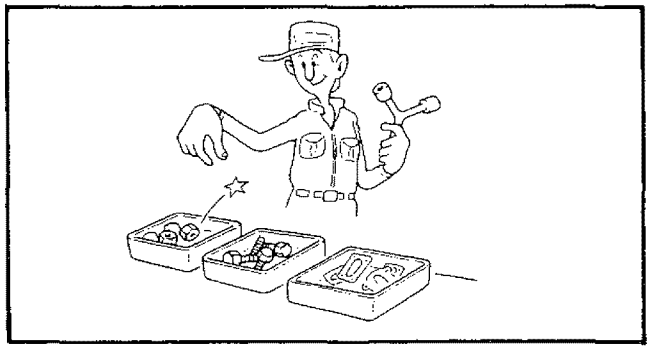
WASHING AND CLEANING

1. Thoroughly clean the exterior of the car body and engine. While cleaning, take care to protect the electrical parts, such as relay switches, motor, resistors, controllers, etc., from high pressure water splashes.



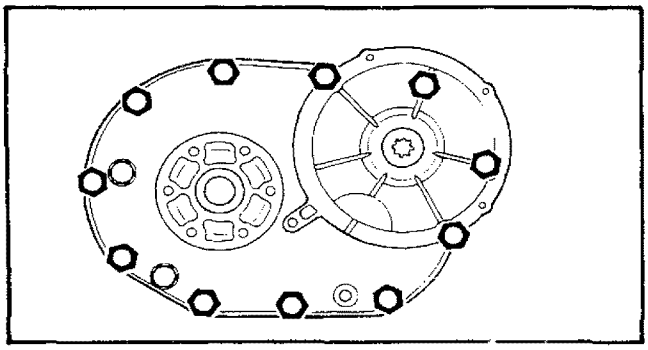
RIGHT TOOLS

1. Be sure to use the right special tool for the right part in order to protect the part from damage. Always use the right tool and the right instrument.



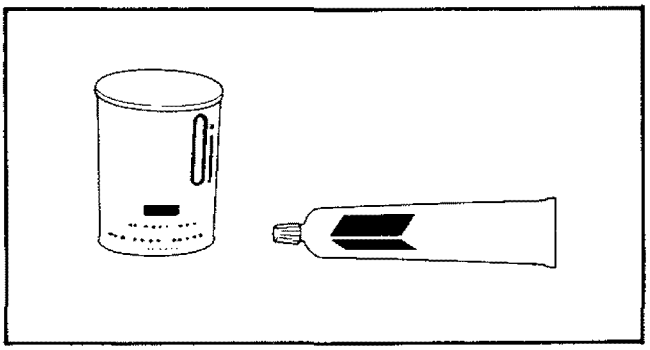
MAKING IT NEAT

1. Keep the removed parts separately in groups so that they will not be misplaced or confused.



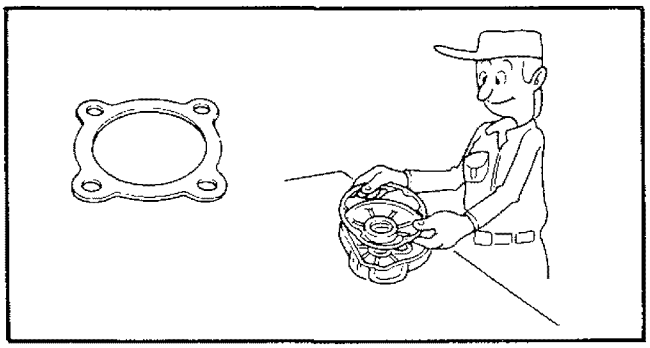
TIGHTENING TORQUE

1. Be sure to keep to tightening torque specifications. When tightening bolts, nuts, and screws, start with a larger-diameter one and from an inner-positioned one to an outer-positioned one in a criss-cross pattern. Refer to CHAPTER 2. "TIGHTENING TORQUE".



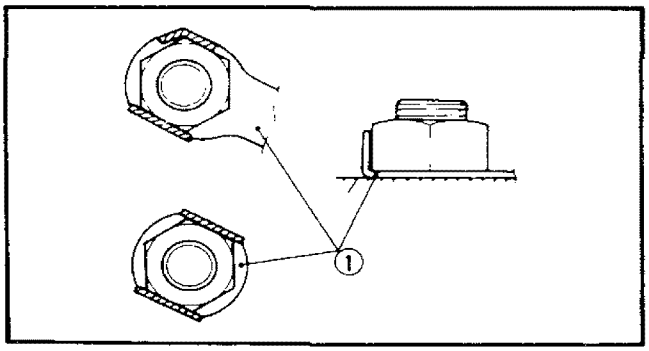
ALL REPLACEMENT PARTS

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



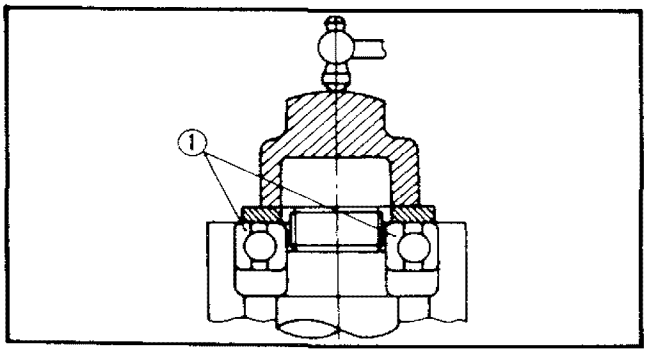
GASKETS, OIL SEALS, AND O-RINGS

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.



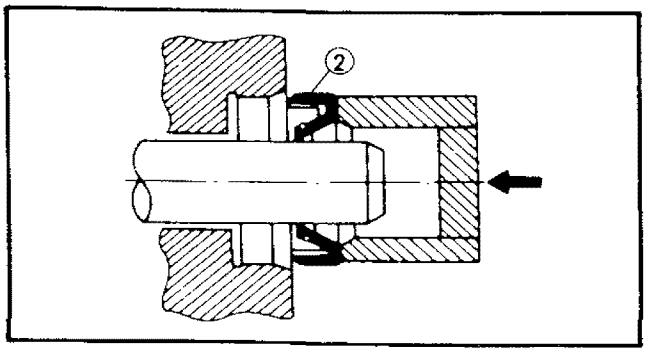
LOCK WASHERS/PLATES AND COTTER PINS

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.



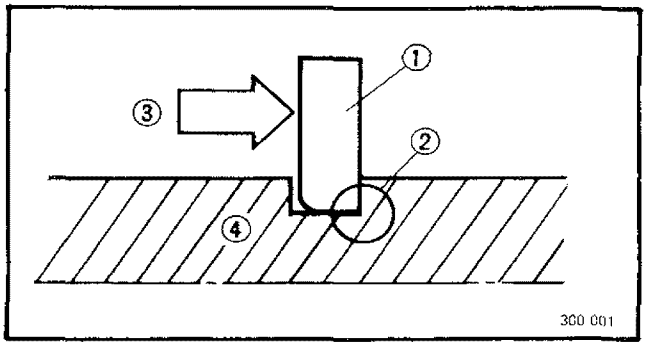
BEARINGS AND OIL SEALS

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:

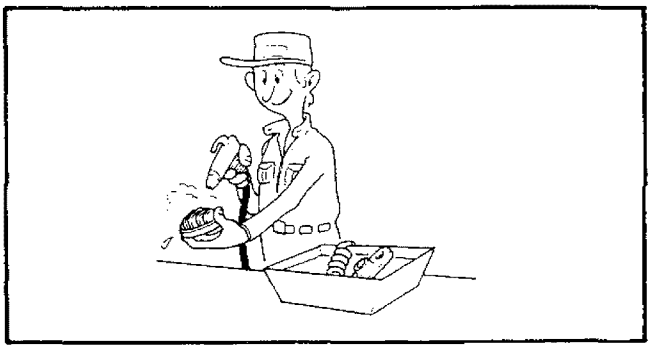
Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.



CIRCLIPS

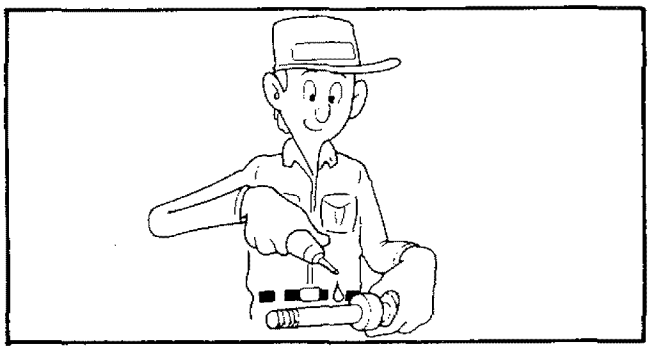
1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ① , make sure that the sharp-edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.

④ Shaft

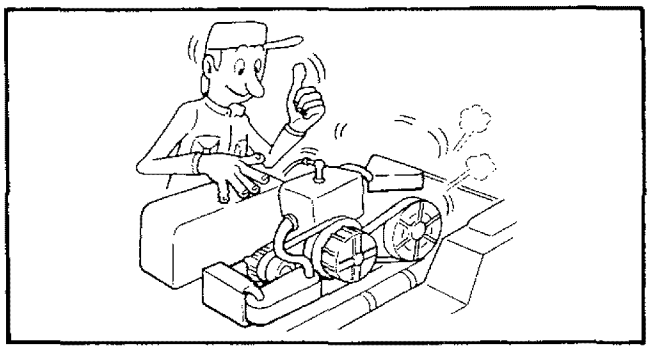


NOTES ON DISASSEMBLY AND ASSEMBLY

1. Parts should be cleaned and blown off with compressed air whenever they are disassembled.



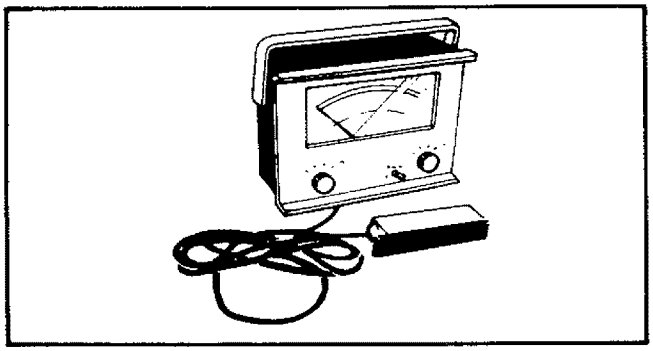
2. Contact surfaces of moving parts should be oiled when they are assembled. Apply grease to the oil seal lips.



3. After assembling, make sure each of the moving parts operates normally.

SPECIAL TOOLS

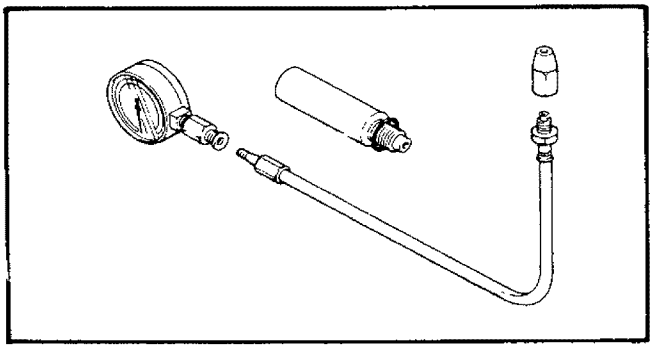
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



FOR TUNE UP

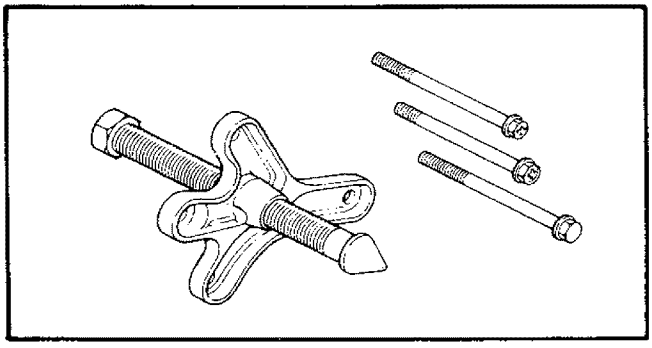
1. Inductive Tachometer
   P/N YU-08036, 90890-03113

This tool is needed for detecting engine rpm.



2. Compression Gauge
   P/N YU-33223, 90890-03081

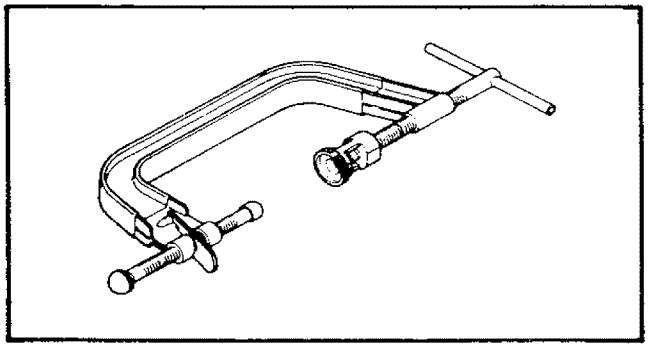
This gauge is used to measure the engine compression.



FOR ENGINE SERVICE

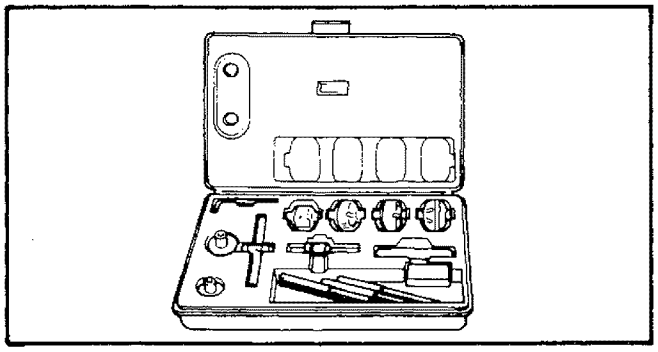
1. Heavy-Duty Universal Puller
   P/N YU-33270, 90890-01362

This tool is used to remove the flywheel.

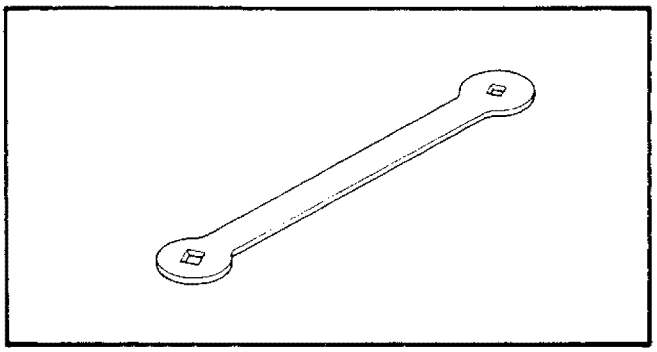


2. Valve Spring Compressor
   P/N YM-04019, 90890-01253

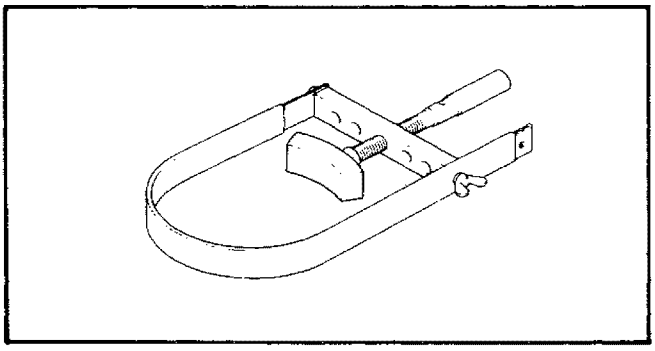
This tool is needed to remove and install the valve assemblies.



3. Valve Seat Cutter Set
P/N YM-91043
This tool is used to resurface the valve seat.

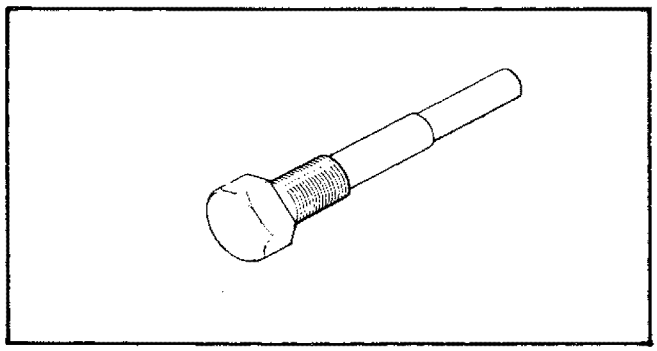


4. Valve Adjuster
P/N YM-08035, 90890-01311
This tool is used to adjust the valve clearance.

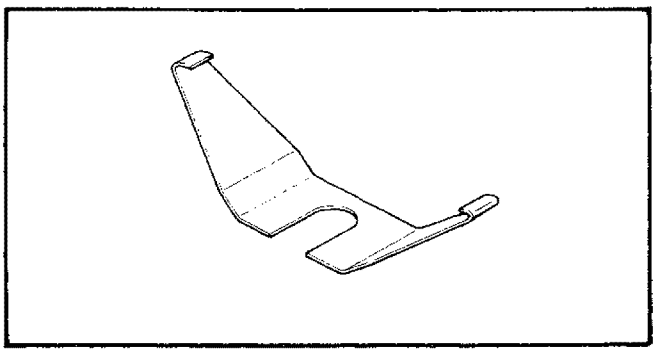


FOR POWER TRAIN

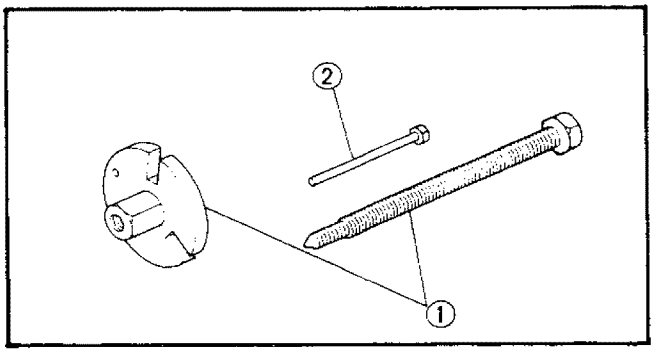
1. Primary Sheave Holder
P/N YS-01880, 90890-01701
This tool is used to hold the primary sheave when removing or installing the primary sheave securing bolt.



2. Primary Sheave Puller
P/N YG-01876, 90890-01876
This tool is used for removing the primary sheave.

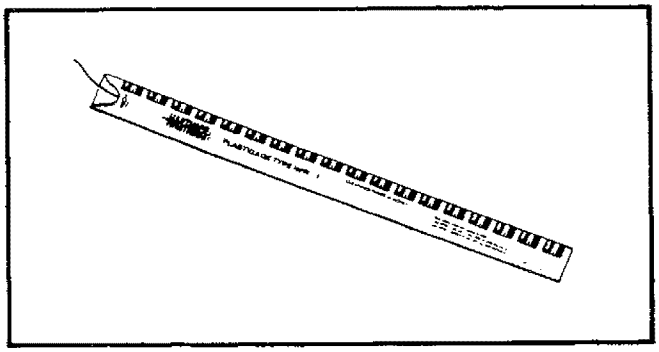


3. Secondary Sheave Holder
P/N YG-40103, 90890-01705
This tool is used to compress the sheave spring when removing or installing the secondary sheave securing nut.



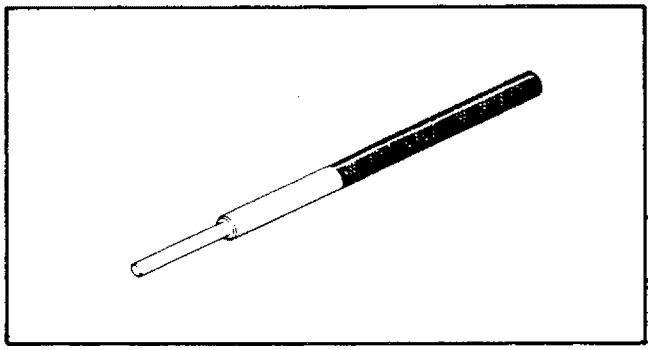
4. 3-Way Universal Puller – ①
   P/N YU-90105 or YU-33270, 90890-01362
   6 x 40 mm Bolt – ②
   P/N YU-90105-2

This tool is used to remove the secondary sheave.



5. Plastigage® Set "Green"
   P/N YU-33210

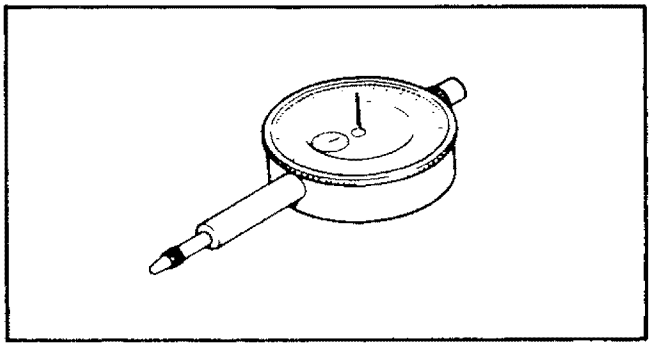
This gauge is needed to measure the clearance for the connecting rod bearing and the crank shaft bearing.



FOR CHASSIS SERVICE

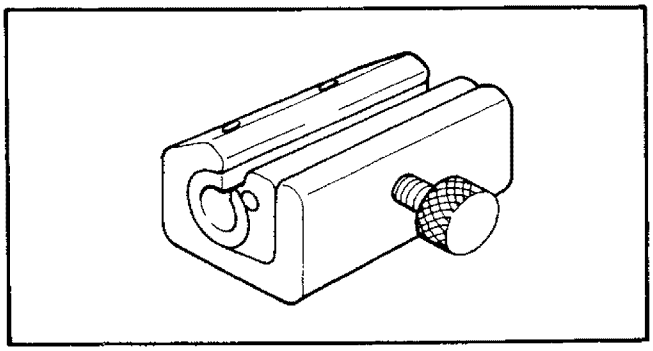
1. Drift punch (6 mm) or Valve Guide Remover
   P/N YM-04064, 90890-04064

This tool is used to remove the spring pins for steering knuckle.



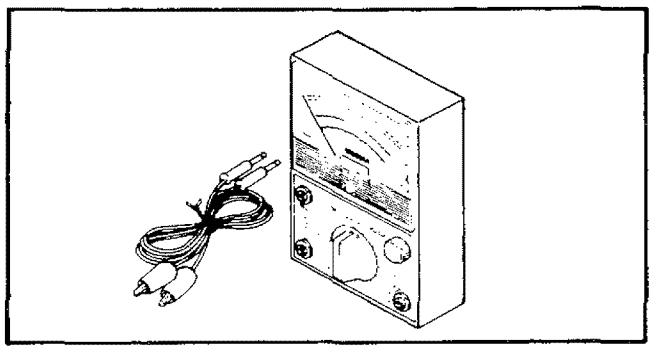
2. Dial Gauge
   P/N YU-03097, 90890-03097

This tool is used to measure small movement or runout such as the rear axle deflection.



3. Cable Injector
   P/N ACC-11110-43-15, 90890-70054

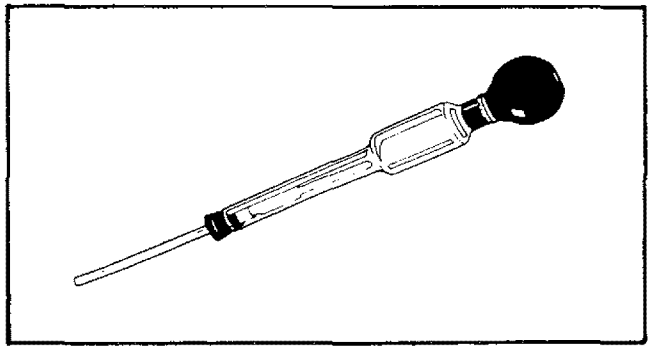
This tool is used to lubricate the throttle, shifter and brake cables.



FOR ELECTRICAL COMPONENTS

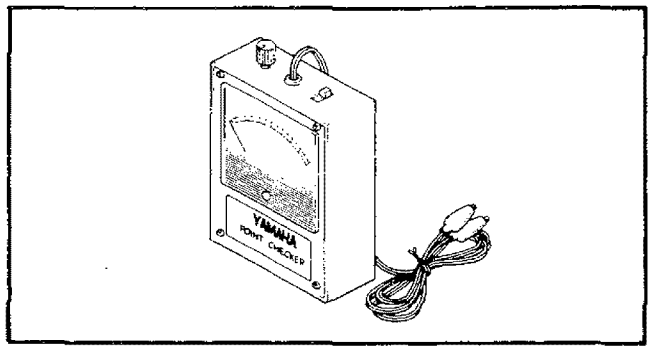
1. Pocket Tester
   P/N YS-03112, 90890-03112

This instrument is invaluable for checking the electrical system.



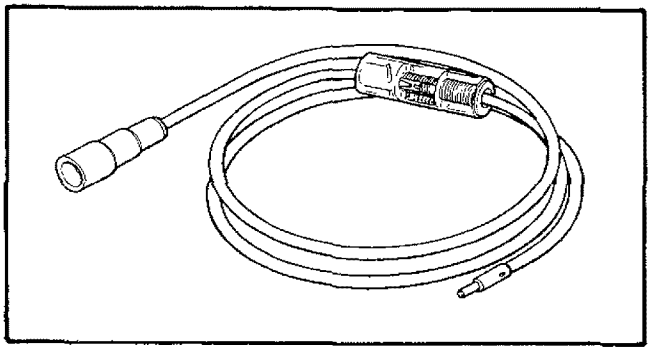
2. Hydrometer
   P/N YU-03036, 90890-03036

This gauge is used to measure the specific gravity of battery electrolyte.



3. Low Reading Ohmmeter
   P/N YU-91026, 90890-03064

This instrument is use to measure the low range resistance (0 ~ 1Ω) of the electrical components.



4. Dynamic Spark Tester
   P/N. YM-34487, 90890-03144

This tester is necessary for checking the ignition system components.

SPECIFICATIONS

GENERAL SPECIFICATIONS

FOR G2-A

Model	G2-A
Model Code Number	J38, JA2, J55 (For U.S.A. and Canada)
Frame Serial Number	J38-000101, JA2-000101, J55-000101
Engine Serial Number	J38-000101, JA2-000101, J55-000101
Dimensions:	
Overall Length	2,332 mm (91.8 in)
Overall Width	1,116 mm (43.9 in)
Overall Height (Steering height)	1,175 mm (46.3 in)
Height of Floor	285 mm (10.2 in)
Height of Seat from Floor	420 mm (16.5 in)
Wheelbase	1,550 mm (61.0 in)
Tread:	
Front	900 mm (35.4 in)
Rear	900 mm (35.4 in)
Min. Ground Clearance	104 mm (4.1 in)
Weight:	
Dry Weight (Without battery)	275 kg (606 lb)
Performance:	
Maximum Loading Limit	250 kg (550 lb)
Maximum Speed	19 km/h (12 mph)
Starter Generator Red Zone	4,000 r/min
Cranking Speed	Appx. 800 r/min
Minimum Turning Radius	2,900 mm (114 in)
Braking Distance	4,500 mm (177 in) at 19 km/h (12 mph)
Seating Capacity	2 persons
Hill Climbing Ability	26° (50% grade) on pavement

FOR G2-E

Model	G2-E
Model Code Number	J41, JE2, J56
Frame Serial Number	J41-000101, JE2-000101, J56-000101
Dimensions:	
Overall Length	2,332 mm (91.8 in)
Overall Width	1,116 mm (43.9 in)
Overall Height (Steering height)	1,175 mm (46.3 in)
Height of Floor	285 mm (10.2 in)
Height of Seat from Floor	420 mm (16.5 in)
Wheelbase	1,550 mm (61.0 in)
Tread:	
Front	900 mm (35.4 in)
Rear	900 mm (35.4 in)
Min. Ground Clearance	104 mm (4.1 in)

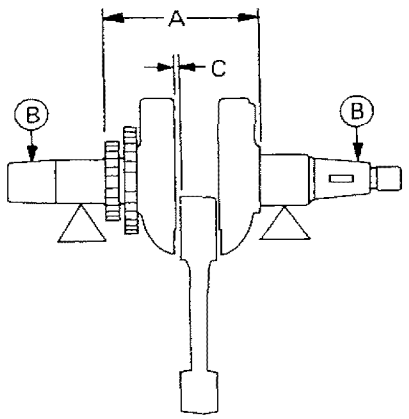
Model	G2-E
Weight:	
Dry Weight (Without battery)	223 kg (492 lb)
Performance:	
Maximum Loading Limit	210 kg (463 lb)
Maximum Speed	19 km/h (12 mph)
Speed	6 speeds
Motor Red Zone	5,500 r/min
Minimum Turning Radius	2,900 mm (114 in)
Braking Distance	4,500 mm (177 in) at 19 km/h (12 mph)
Seating Capacity	2 persons
Hill Climbing Ability	25° (46% grade) on pavement

MAINTENANCE SPECIFICATIONS

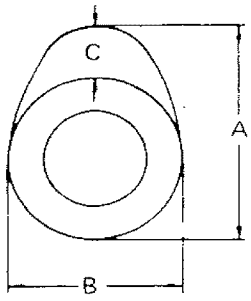
ENGINE

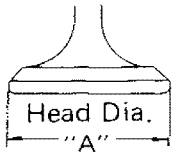
Model	G2-A
Description:	
Engine Type	4-stroke, Gasoline, OHV
Number of Cylinder	Single
Displacement	285 cm^3
Bore x Stroke	73 x 68 mm (2.84 x 2.68 in)
Compression Ratio	8.1 : 1
Cooling System	Forced air cooled
Starting System	Starter
Ignition System	TCI
Lubrication System	Wet sump
Cylinder Head:	
Combustion Chamber Volume (With spark plug)	38.8 ~ 39.6
Head Gasket Thickness 	*0.2 mm (0.008 in)
Cylinder:	
Material	Cast iron sleeved aluminum (crankcase)
Bore Size	73 mm (2.87 in)
Taper/Limit	0.02 mm (0.00008 in)/0.15 mm (0.006 in)
Out of Round/Limit	0.02 mm (0.00008 in)/0.15 mm (0.006 in)
Piston:	
Piston-to-Cylinder Clearance	0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
< Limit >	< 0.1 mm (0.004 in) >
Oversize: 1	0.25 mm (0.01 in)
2	0.50 mm (0.02 in)
Piston Pin Outside Diameter	17.995 ~ 18.000 mm (0.7085 ~ 0.7087 in)
Piston Pin-to-Piston Clearance	0.004 ~ 0.020 mm (0.0002 ~ 0.0008 in)
< Limit >	< 0.07 mm (0.003 in) >

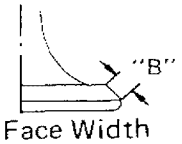
Model	G2-A
Piston Ring:	
Top Ring:	
Type	Keystone
Dimensions (B x T)	2.0 x 3.2 mm (0.079 x 0.126 in)
End Gap (Installed)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
< Limit >	< 1.0 mm (0.04 in) >
Size Clearance (Installed)	0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
< Limit >	< 0.07 mm (0.0028 in) >
2nd Ring:	
Type	Plain (Taper face)
Dimensions (B x T)	2.0 x 3.2 mm (0.079 x 0.126 in)
End Gap (Installed)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
< Limit >	< 1.0 mm (0.04 in) >
Side Clearance	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
< Limit > (Installed)	< 0.09 mm (0.0035 in) >
Oil Ring:	
Dimensions (B x T)	2.80 x 2.95 mm (0.110 x 0.116 in)
End Gap (Installed)	0.2 ~ 0.7 mm (0.008 ~ 0.028 in)
Small End Bearing:	
Type	None
Big End Bearing:	
Type	Plain bearing
Crankshaft:	
Crankshaft Assembly Width "A"	109.65 ~ 110.05 mm (4.317 ~ 4.333 in)
Crankshaft Deflection "B"	0.05 mm (0.0020 in)
Connecting Rod Big End Side Clearance "C"	0.2 ~ 0.5 mm (0.008 ~ 0.020 in)
Crank Pin Outside Diameter	31.95 ~ 31.97 mm (1.258 ~ 1.259 in)
Crank Pin Type	Solid crankshaft
Crank Bearing Type (Left) x Q'ty	# 6307 c3 x 1 pc
Crank Bearing Type (Right) x Q'ty	# 6306 c3 x 1 pc
Crank Oil Seal Type (Left) x Q'ty	SD 35 50 8 x 1 pc
Crank Oil Seal Type (Right) x Q'ty	SD 30 45 8 x 1 pc

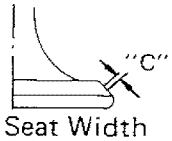


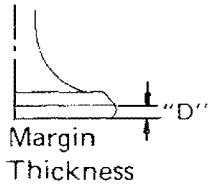
Model		G2-A
Camshaft:		
Drive Method		Gear drive
Cam Cap Inside Diameter		16.00 ~ 16.05 mm (0.630 ~ 0.632 in)
Camshaft Outside Diameter		15.90 ~ 15.99 mm (0.626 ~ 0.630 in)
Shaft-to-cap Clearance/Limit		0.01 ~ 0.05 mm (0.0004 ~ 0.0020 in)/ 0.15 mm (0.0059 in)
Cam Dimensions:		
Intake "A"		29.16 ~ 29.28 mm (1.148 ~ 1.153 in)
"B"		24.11 ~ 24.22 mm (0.949 ~ 0.954 in)
"C"		5.16 ~ 5.28 mm (0.203 ~ 0.208 in)
Exhaust "A"		29.20 ~ 29.32 mm (1.150 ~ 1.154 in)
"B"		24.15 ~ 24.25 mm (0.951 ~ 0.955 in)
"C"		5.20 ~ 5.32 mm (0.205 ~ 0.209 in)
Rocker Arm/Rocker Arm Shaft:		
Arm Inside Diameter		12.00 ~ 12.04 mm (0.472 ~ 0.474 in)
Shaft Outside Diameter		11.90 ~ 11.99 mm (0.469 ~ 0.472 in)
Arm-to-shaft Clearance		0.01 ~ 0.07 mm (0.0004 ~ 0.0028 in)
Valve, Valve Seat, Valve Guide:		
Valve Clearance (Cold)	IN.	0.1 mm (0.004 in)
	EX.	0.1 mm (0.004 in)
Valve Dimensions:		
"A" Head Dia.	IN.	30 mm (1.18 in)
	EX.	26 mm (1.02 in)
"B" Face Width	IN.	2.26 mm (0.089 in)
	EX.	2.26 mm (0.089 in)
"C" Seat Limit Width	IN.	1.4 mm (0.055 in)
	EX.	1.4 mm (0.055 in)
"D" Margin Thickness Limit	IN.	0.8 mm (0.032 in)
	EX.	0.6 mm (0.024 in)
Air Cleaner:		
Element Type		Wet paper with element cover
Element Assembly		J38-14450-00
Element Cover		J10-14417-00
Choke Cable:		
Free Play		1 mm (0.04 in)











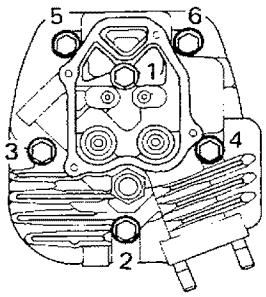
Model		G2-A
Carburetor:		
Model/Maker		BV26-18/MIKUNI
P/No.		J38-14101-00
I.D. Mark		J3800
Venturi Diameter	(Ven. T.)	ϕ18
Main Jet	(M.J.)	#106.3
Main Air Jet	(M.A.J.)	ϕ2.5
Pilot Jet	(P.J.)	#72.5
Pilot Air Jet	(P.A.J.)	ϕ1.4
Throttle Valve	(Th.V.)	#120
Valve Seat	(V.S.)	ϕ1.2
By-pass (1)	(B.P. 1)	ϕ0.7
By-pass (2)	(B.P. 2)	ϕ0.9
By-pass (3)	(B.P. 3)	ϕ0.6
Pilot Outlet	(P.O.)	ϕ1.0
Pilot Screw	(P.S.)	1-1/2 turn out
Float Height	(F.H.)	14.5 mm (0.57 in)
Engine Idling Speed*		900 r/min
Fuel Pump:		
Part No.		J38-24410-02
Manufacturer/Type		MIKUNI/DF-52 (Diaphragm)
Fuel Tank:		
Fuel Grade		Unleaded regular gasoline only
Fuel Tank Capacity		24.0 L (5.3 Imp gal, 6.3 US gal)
Fuel Tank Position		Right side in front of rear wheel
Material/Color		Polyethylene/Black
Gauge Position		Side of Filler Cap
Exhaust System:		
Parts No.		J38-14710-01

* Firing begining point

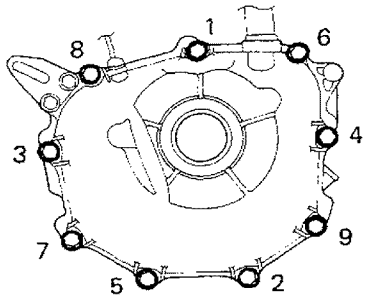
Tightening Torque:

Part to be tightened	Part name	Thread size	Tightening torque			Remarks
			Nm	m·kg	ft·lb	
Spark plug		M14 x P1.25	20	2.0	14	
Airshroud x Cylinder Head or Crankcase	Bolt	M6 x P1.0	8	0.8	5.8	
Airshroud Cylinder 1 x 2	Pan head	M6 x P1.0	4	0.4	2.9	
Cylinder Head:	Bolt	M8 x P1.25	28	2.8	20	
Cylinder Head x Rocker-Arm Cover	Bolt	M6 x P1.0	10	1.0	7.2	
Cylinder Head x Rocker-Arm Support	Bolt	M6 x P1.0	10	1.0	7.2	
Valve Adjuster Locknut	Nut	M6 x P0.75	14	1.4	10	
Connecting Rod Cap	Nut	M8 x P0.75	38	3.8	27	With Oil splusher
Cylinder x Exhaust Pipe	Nut	M8 x P1.25	12	1.2	8.7	
Exhaust Pipe Cover	Pan head	M6 x P1.0	7	0.7	5.1	
Carburetor x Joint	Clamp & Pan head	M4 x P0.7				Tightening steady
Flywheel	Nut	M16 x P1.0	75	7.5	54	
Crankcase x Engine Bracket	Bolt	M10 x P1.25	35	3.5		
Crankcase Cover	Bolt	M8 x P1.25	24	2.4	17	

[Cylinder Head Tightening Sequence]



[Crankcase Cover Tightening Sequence]



TRANSMISSION

For G2-A

Model	G2-A
Transmission:	
Type	V-belt automatic centrifugal engagement
Primary Reduction Ratio	3.2 : 1 ~ 0.8 : 1
Shift r/min	3,400 r/min
Primary Spring:	None
Secondary Spring:	
Part No.	90508-45679
Outside Diameter x Wire Diameter	54.5 x 4.5 mm (2.15 x 0.177 in)
No. of Turns/Free Length	7.25/100 mm (3.94 in)
Color Code	Black
Twist Angle (Preload setting)	60° (B-4)
Torque Cam Angle	50 deg
Sheave Center to Center Distance	270.5 mm
Sheave Off-Set	24.8 mm
V-belt Part No.	J38-46241-00
V-belt Width and Outer Line Length	31 x 1,010 mm (1.22 x 39.76 in)
V-belt Wear Limit	27 mm (1.06 in)
Differential/Reduction Gear:	
Secondary Reduction System	Helical gear
Secondary Reduction Ratio:	
Forward	13.65 : 1
Reverse	15.25 : 1
Differential Type	Bevel gear
Lubricant/Capacity	SAE 90 gear oil/800 cc (0.70 Imp qt, 0.85 US qt)
Governor:	
Type	Oil bath flyweight
Adjustment	Screw with lock nut
Factory Speed Setting	19 km/h (12 mph)

For G2-E

Model	G2-E
Differential/Reduction Gear:	G.E. TRACTION MOTOR
Reduction Gear Ratio/Gear Type	11.969 (60/23 x 78/17)/Helical
Differential Type	Bevel gear
Oil Type/Capacity	SAE 90 Gear oil/800 cc (0.70 Imp qt, 0.85 US qt)
Differential/Reduction Gear:	HITACHI TRACTION MOTOR
Reduction Gear Ratio/Gear Type	13.546 (62/21 x 78/17)/Helical
Defferential Type	Bevel gear
Oil Type/Capacity	SAE 90 Gear oil/800 cc (0.70 Imp qt, 0.85 US qt)

Tightening Torque:

Part to be tightened	Part name	Thread size	Tightening torque			Remarks
			Nm	m·kg	ft·lb	
For G2-A						
Primary Sheave x Engine	Bolt	1/2-UNF	75	7.5	54	
Secondary Sheave x Input Shaft	Castle nut	M12 x P1.25	60	6.0	43	
Transmission Case x Rear Arm	Bolt	M10 x P1.25	40	4.0	29	
Transmission Case x Frame	Bolt	M10 x P1.25	40	4.0	29	
Transmission Case 1 x Transmission Case 2	Bolt	M8 x P1.25	20 25	2.0 2.5	14 18	First Final
Differential Case x Ring Gear	Bolt	M8 x P1.25	38	3.8	27	◁T
For G2-E						
Transmission Case x Frame	Bolt	M10 x P1.25	40	4.0	29	
Transmission Case x Rear Axle Housing	Bolt	M8 x P1.25	25	2.5	18	
Transmission Case 1 x Transmission Case 2	Bolt	M8 x P1.25	20 25	2.0 2.5	14 18	First Final
Differential Case x Ring Gear	Bolt	M8 x P1.25	34	3.4	24	

CHASSIS

Model	G2-A/G2-E
Frame:	
Type	Ladder type pipe structure
Material/Color	Tubular steel (STKM)/Yamaha Black
Front Cowl: (UPR. & LWR.)	
Type	Injection molding
Material	Polypropylene
Color	Ivory white
Rear Cowl: (FR./RR.)	
Type	Injection molding
Material	Polypropylene
Color	Ivory white
Seat:	
Seat Cover:	
Material	Vinyl chloride leather + Nylon lining
Color	Ivory white
Seat Cushion:	
Material	Urethane foam
Bumper:	
Front	Steel + EVA cover
Rear	Steel + EVA end
Steering System:	
Type	Worm and pin
Steering Angle (L.H.)	1.5 turn
(R.H.)	1.5 turn
Turning Radius	2.9 m (114 in)
Lubricant/Capacity	Grease/90 cc (3.17 Imp oz, 3.04 US oz)
Front Axle:	
Type	Eliot kingpin type
Toe-in/Fully Loaded	10 ~ 20 mm (0.4 ~ 0.8 in)/Zero mm (Zero in)
Camber (Loaded)	Zero deg
Caster	7 deg
Kingpin Inclination	3 deg
Rear Axle:	
Rear Wheel Axle Type	Semi-floating type
Toe-in	Zero mm (Zero in)
Camber	Zero deg
Front Suspension:	
Type	Single swingarm (independent suspension) Coil springs with hydraulic shock absorbers (single action type)
Spring Rate	2.6 ~ 5.0 kg/mm (For G2-A) 3.6 kg/mm (For G2-E)
Coil Spring Free Length	170.8 mm (6.72 in) (For G2-A) 164 mm (6.46 in) (For G2-E)
Damper Type	Oil damper (Single action/tension only)

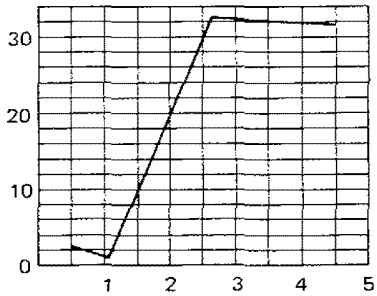
Model	G2-A/G2-E
Rear Suspension:	
Type	Axle type trailing arm (unit swing) Coil springs with hydraulic shock absorbers (double action type)
Spring Rate	2.30 ~ 3.07 kg/mm (For G2-A) 3.63 kg/mm (For G2-E)
Coil Spring Free Length	208 mm (8.19 in) (For G2-A) 199 mm (7.83 in) (For G2-E)
Damper Type	Oil damper (Double action/Both Comp. & Tens.)
Brakes:	
Brakes System	Mechanical brake linkage to individual drum brakes on each rear wheel with self-adjusting brake shoe. Dual internal expanding shoe.
Type of Brake	Leading/Trailing shoes (self-adjusting)
Lining Thickness Std/Min.	4 mm (0.16 in)/1.5 mm (0.06 in)
Brake Drum Inside Dia.	160 mm (6.30 in)
Linkage Adjustment (Brake cable end play)	0.1 ~ 0.5 mm (0.004 ~ 0.02 in)
Parking Brake:	
Type	Foot type; Parking brake with automatic release
Release Timing (Bolt head round parallel to arm)	1 mm (0.04 in)
Wheel:	
Tire Type (Pattern):	
Front	Tubeless (Rib)
Rear	Tubeless (Block) (For G2-A) Tubeless (Rib) (For G2-E)
Tire Size:	
Front	18 x 8.50 – 8.00/4 PR
Rear	18 x 8.50 – 8.00/4 PR
Rim Size:	7.00 – 1 – 8.00
Tire Pressure:	
Front/Rear	80 kPa (0.8 kg/cm^2, 12 psi) (For G2-A) 90 kPa (0.9 kg/cm^2, 13 psi) (For G2-E)

Tightening torque

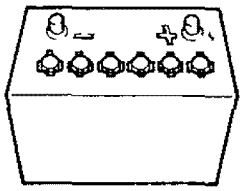
Part to be tightened	Part name	Thread size	Tightening torque			Remarks
			Nm	m·kg	ft·lb	
Front Lower Arm x Frame	Bolt	M10 x P1.25	48	4.8	35	
Rear Arm Comp. x Frame	Bolt	M10 x P1.25	90	9.0	65	
Tie Rod x Universal Joint	Nut	M12 x P1.25	48	4.8	35	
Tie Rod x Idler Arm or Knuckle Arm	Nut	M12 x P1.25	29	2.9	21	
Steering Wheel x Steering Shaft Nut	Nut	M12 x P1.25	39	3.9	28	
Pitman Arm x Idler Arm	Nylon nut	M16 x P1.5	85	8.5	61	Use lock washer
Steering Gearbox x Frame	Bolt	M10 x P1.25	29	2.9	21	
Steering Gearbox x Gearbox Cover						
(For G2-A)	Bolt	M5 x P1.0	7	0.7	5.1	
(For G2-E)	Bolt	M6 x P1.0	7	0.7	5.1	
Steering Shaft Adjusting Bolt x Locknut	Nut	M48 x P2.0	25	2.5	18	55 mm width
Pitman Shaft Adjusting Bolt x Locknut	Nut	M8 x P1.25	15	1.5	11	
Front Hub x Knuckle	Nylon nut	M14 x P1.5	92	9.2	65	
Front Wheel x Hub	Nut	M12 x P1.25	88	8.8	64	
Rear Wheel x Hub	Nut	M12 x P1.25	80	8.0	58	
Brake Shoe Plate Ass'y x Rear Axle Housing	Bolt	M8 x P1.25	30	3.0	22	
Shock Absorber Pivot Bolt	Nylon nut	M12 x P1.25	29	2.9	21	

ELECTRICAL

For G2-A

Model	G2-A
Voltage:	12V Negative ground
Ignition System: Type Model/Manufacturer Pickup Coil Resistance (Color code) Output (Min.) Ignition Timing Static	 TCI F057T513/MITSUBISHI 495 ~ 605Ω at 20°C (68°F) (White/Red – White/Black) PEAK 15V AC at Cranking speed* B.T.D.C. mm by dial indicator to crankcase marks at 3,000 r/min by timing light.
Ignition Advance Curve:	
Ignition: Model/Manufacturer Spark Gap Primary Winding Resistance Secondary Winding Resistance Diode (Yes or No)	 F6T507/MITSUBISHI 11 mm (0.43 in)/3,000 r/min 3.57 ~ 4.83Ω at 20°C (68°F) (Orange – Red/White) 11.2 ~ 15.2 kΩ at 20°C (68°F) (High tension code – Red/White) No
Spark Plug: Type & Quantity Spark Plug Gap Thread Size	 NGK BR5ES or CHAMPION RN8 x 1 pc. 0.7 ~ 0.8 mm (0.028 ~ 0.031 in) M14 x P1.25
Spark Plug Gap: Type Resistance	 Resistor type 3.75 ~ 6.25 kΩ at 20°C (68°F)
TCI Unit: Model/Manufacturer	 J4T01571/MITSUBISHI
Charging · Starting/System: Type Model/Manufacturer Starting Output Charging Output Armature Coil Resistance Field Coil Resistance Shunt Coil (Battery Charging) Series Coil (Starting) Brush Part Number Brush Length Std/Min. Spring Pressure/Q'ty Commutator Outside Dia. Mica Undercut/No. of Slot	 Starter generator HITACHI 0.6 kw 14V-15A/5,000 r/min 0.010 ~ 0.016Ω at 20°C (68°F) (A1 – A2) 4.5 ~ 5.5Ω at 20°C (68°F) (Red – Green) 0.005 ~ 0.007Ω at 20°C (68°F) (F1 – F2) J38-81111-10 23 mm (0.9 in)/16 mm (0.63 in) 300 ~ 500 g (10.6 ~ 17.6 oz)/4 pcs. 40.9 ~ 41.1 mm (1.61 ~ 1.62 in) 0.7 mm (0.028 in)/41 pcs

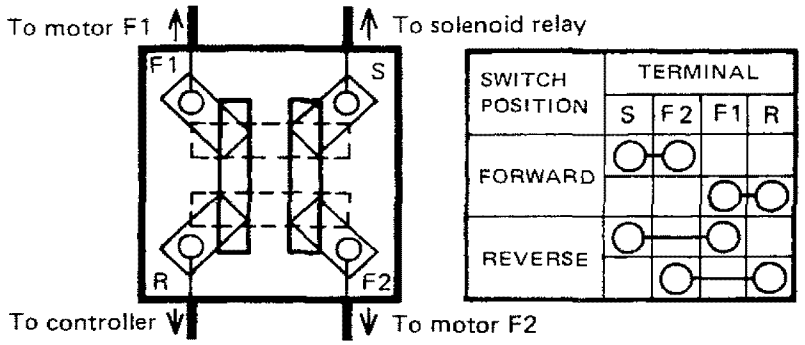
* Cranking speed approximately 800 r/min.

Model	G2-A	
Voltage Regulator:		
Type	Tillil-type	
Model/Manufacturer	T107-23/HITACHI	
Regulated Voltage (No lead)	14.3 ~ 15.3V	
Voltage Regulator		
Core Gap	0.6 ~ 1.0 mm (0.0024 ~ 0.04 in)	
Yoke Gap	0.9 mm (0.035 in)	
Point Gap	0.35 ~ 0.45 mm (0.014 ~ 0.018 in)	
Voltage Coil Resistance	8.24 ~ 12.36Ω at 20°C (68°F)	
Solenoid Relay:		
Model (P/No.)/Manufacturer	YZ29 (J38-81950-00)/ASAHI DENSO	
Amperage Rating	60A	
Cut in Voltage	Less than 8V	
Winding Resistance	6.7 ~ 7.4Ω at 20°C (68°F)	
Battery:	For U.S.A. and Canada	For Australia and Others
Model/Manufacturer	Group 24	N-50/FURUKAWA
Capacity (Rating minimum)	12V-48 AH	12V-50 AH
Specific Gravity	1.26	1.26
Gross Weight	—	15 kg
Electrolyte Quantity	—	4,500 cc
Dimension (W x H x T)	6.3/4 x 10-1/4 x 9 in	252 x 225 x 165 mm
Terminal Description		
Battery Charger:		
A.C. Input (Hose hold use)	At your requirement 50/60 Hz, 410 VA	
D.C. Out Put	6 ~ 12V 20A, 18 ~ 24V 10A	
Battery Charge Rating	5% of AH rating	
Back Buzzer:		
Type	Continuous beep	
Model/Manufacturer	S-12/NIKKO	
Frequency	500 ~ 700 Hz	
Current	Less than 0.08A	
Fuse:		
Amperage x Q'ty		
Plus Fuse	10A x 1	
Minus Fuse	10A x 1	
Spare Fuse	10A x 2	

For G2-E

Model	G2-E
Voltage:	36V DC, 6V Battery x 6 pcs series
G.E. Traction Motor:	
Model/Manufacturer	5BC48JB845/G.E.
Rated Voltage	36V DC
Power/Horsepower	2.2 kw/2.97 ph at 2,450 r/min
Current	77A
Voltage	36V
Torque	6.8 ~ 8.3 Nm (0.68 ~ 0.83 kg·m, 4.9 ~ 6.0 ft·lb)
Revolution	2,300 ~ 2,900 r/min
Allowable Maximum Revolution	5,500 r/min
Direction of Rotation	Clockwise and counterclockwise
Brush Length-Std/Min.	34.3 mm (1.35 in)/14.5 mm (0.57 in)
Brush Spring Pressure-Max./Min.	720 ~ 1,080 g (24.3 ~ 36.5 oz)/450 g (15.2 oz)
Mica Undercut-Std/Min.	0.79 mm (0.031 in)/0.25 mm (0.010 in)
Armature Coil Resistance	0.018 ~ 0.022Ω at 20°C (68°F)
Field Coil Resistance	0.012 ~ 0.014Ω at 20°C (68°F)
Insulation Resistance (All measurements)	1MΩ
HITACHI Traction Motor:	
Model/Manufacturer	MT320-06/HITACHI
Rated Voltage	36V DC
Power/Horsepower	2.0 kw/2.7 ph at 2,600 r/min
Current	70A
Voltage	36V
Torque	7.5 Nm (0.75 kg·m, 5.4 ft·lb) ± 10%
Revolution	2,600 r/min ± 10%
Allowable Maximum Revolution	5,500 r/min
Direction of Rotation	Clockwise or counterclockwise
Shaft Dia.	20 mm (0.787 in)
Shaft Bearing	6204
Brush Part Number	J14-81811-10
Brush Length-Std/Min.	29 mm (1.14 in)/15 mm (0.59 in)
Brush Spring Pressure-Max./Min.	1,000 ± 160 g (33.8 ± 5.4 oz)/400 g (13.5 oz.)
Mica Undercut-Std/Min.	1.0 mm (0.039 in)/0.3 mm (0.012 in)
Armature Coil Resistance	0.02Ω ± 10% at 20°C (68°F)
Field Coil Resistance	0.016Ω ± 10% at 20°C (68°F)
Insulation Resistance (All measurements)	1,000,000Ω
Controller:	
Voltage/Maximum Current Capacity	36V DC/400A
Contact Pressure-Nominal/Min.	1.0 ~ 1.4 kg (2.2 ~ 3.1 lb)/1.0 kg (2.2 lb) at Max. adjustment
Movable Contact	
Material	Copper alloy (Copper – Graphite impregnated)
Thickness-Std/Min.	7 mm (0.28 in)/4 mm (0.16 in)
Stationary Contact	
Material	Copper
Thickness-Std/Min.	6 mm (0.24 in)/4 mm (0.16 in)
Resistor:	
Coil Diameter	100 mm (3.94 in)
Wire Diameter	4.5 mm (0.177 in)
Winding	21 turns
Resistance	0.485 ~ 0.535Ω at 20°C (68°F)

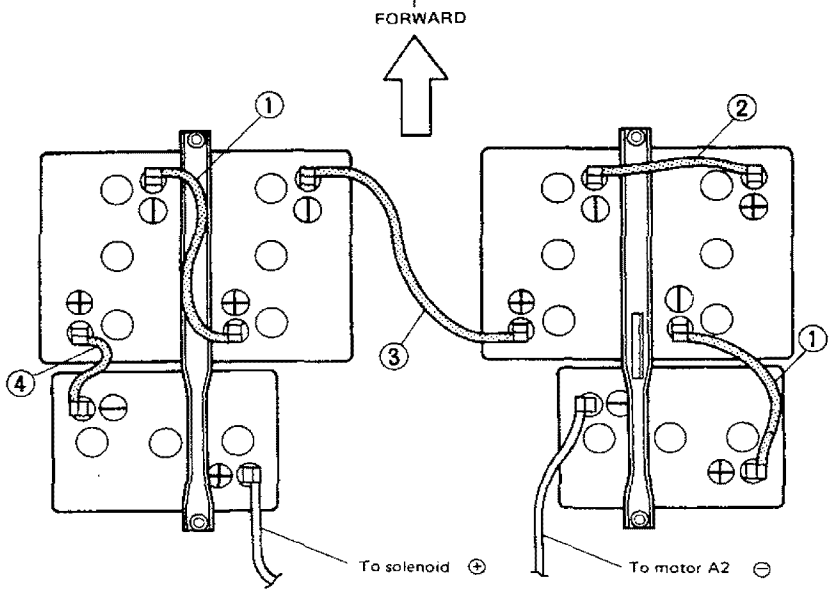
Model	G2-E
Shift Switch:	
Voltage/Maximum Current Capacity	36V DC/300A
Movable Contact	
Material	Copper
Thickness-Std/Min.	3 mm (0.12 in)/2.5 mm (0.10 in)
Stationary Contact	
Material	Copper
Thickness-Std/Min.	6 mm (0.24 in)/5.5 mm (0.22 in)

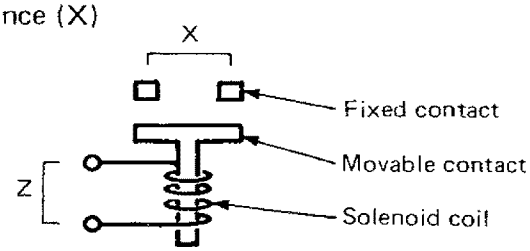


SWITCH POSITION	TERMINAL			
	S	F2	F1	R
FORWARD	○	○		
			○	○
REVERSE	○		○	
		○		○

Battery:	
Type	6V Electric vehicle deep cycle
Quantity/Connection	6 pcs/Series
Minimum Recommended Output	90 minutes at 75A or 185 AH
Specific Gravity	As specified by manufacturer at 80°F
Maximum Difference (at 1.200 corrected min.)	0.050

[Battery Arrangement and Terminal Connections]



Model	G2-E
Solenoid Relay:	
Model/Manufacturer	YZ-29A/ASAHI DENSO
Amperage Rating	0.58A
Solenoid Coil Resistance (Z)	56.2 ~ 68.6Ω at 20°C (68°F)
Resistance (X)	Less than 0.1Ω
	
Battery Charger:	
Input	Amp. will vary according to battery charge/ Condition
Minimum	105V/10.5A
Nominal	115V AC/12A (per unit)/60 Hz/Single phase
Maximum	128V/14A
Output Voltage (V) at Nominal Input	Varies by battery charge/Condition
Minimum	37V
Maximum	45V
Output Amperage (A) at Nominal Input	Varies by battery charge/Condition
Minimum	3A
Maximum	30A
Back Buzzer:	
Type	Continuous beep
Model/Manufacturer	S-36/NIKKO
Frequency	500 ~ 700 Hz
Current	Less than 0.05A
Fuse:	
Amperage x Q'ty	
Plus Fuse	10A x 1
Minus Fuse	10A x 1
Spare Fuse	10A x 2

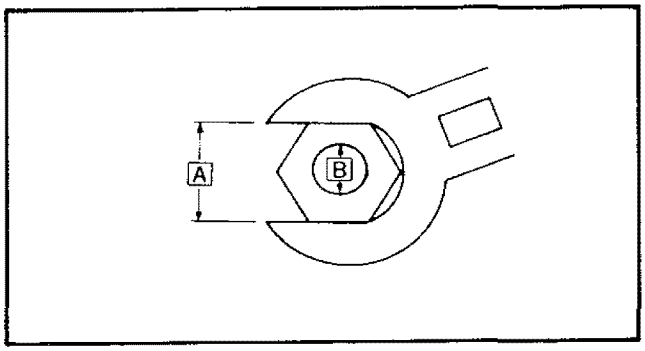
Tighteing torque

Part to be tightened	Part name	Thread size	Tightening torque			Remarks
			Nm	m·kg	ft·lb	
For G2-A						
Battery Hold Down x Battery	Nylon nut	M6 x P1.0	2	0.2	1.4	
Starter Motor Terminal x Wire	Nut	M6 x P1.0	6	0.6	4.3	
Relay Terminal x Wire	Nut	M8 x P1.25	6	0.6	4.3	
Battery Terminal x Wire	Nut	M8 x P1.25	6	0.6	4.3	
For G2-E						
Battery Hold Down x Battery	Nylon nut	M6 x P1.0	2	0.2	1.4	
Traction Motor Terminal x Wire	Nut	M8 x P1.25	7	0.7	5.1	
Relay Terminal x Wire	Nut	M8 x P1.25	6	0.6	4.3	
Battery Terminal x Wire	Nut	M8 x P1.25	6	0.6	4.3	
Traction Motor x Transmission Case	Bolt	M6 x P1.0	6	0.6	4.3	
Motor Stay x Transmission Case	Bolt	M8 x P1.25	6	0.6	4.3	

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are not covered by this chart, please look in the applicable sections of this manual. To avoid warpage, tighten multifastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

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



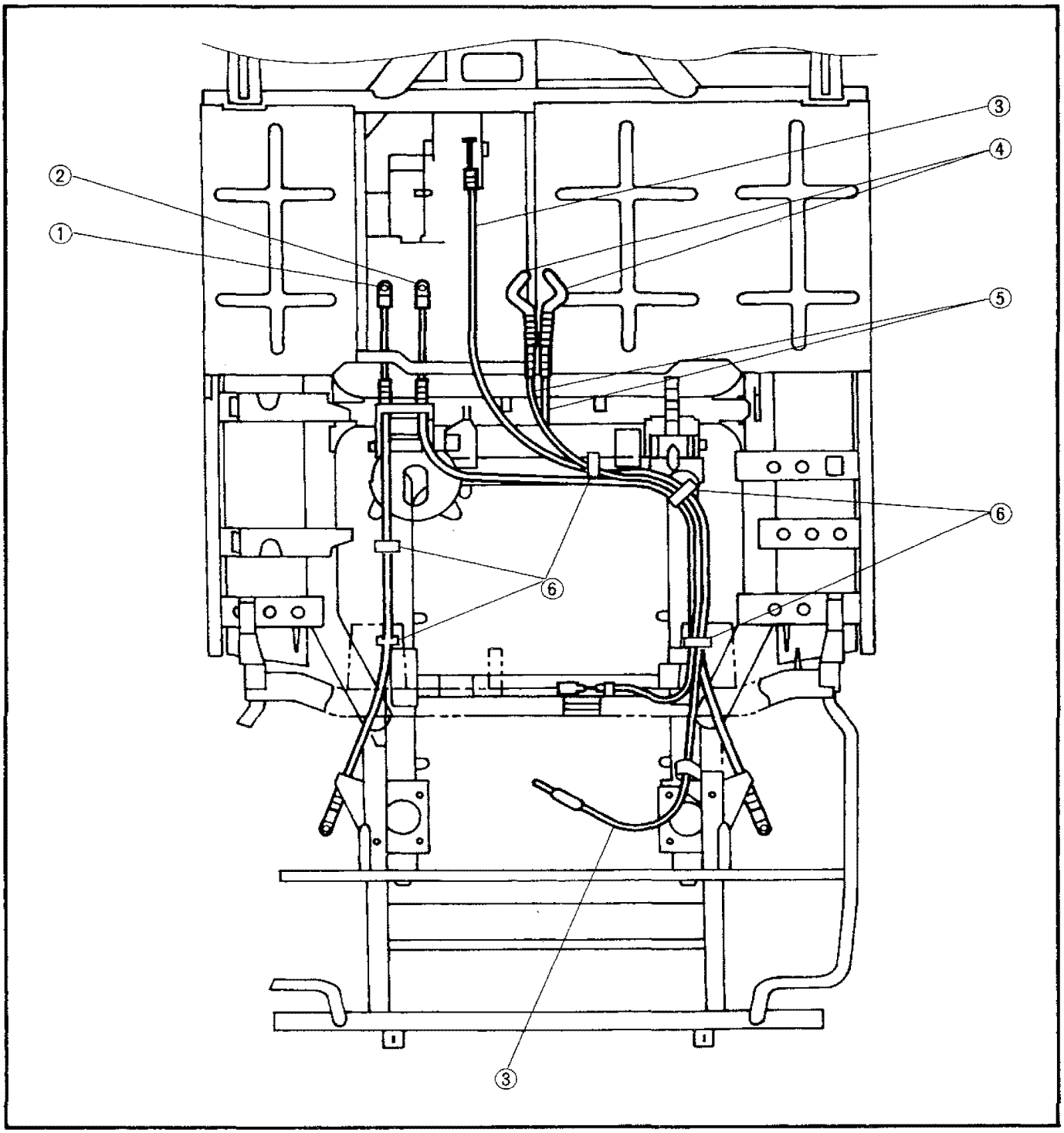
A Distance across flats
B Outside thread diameter

DEFINITION OF UNITS

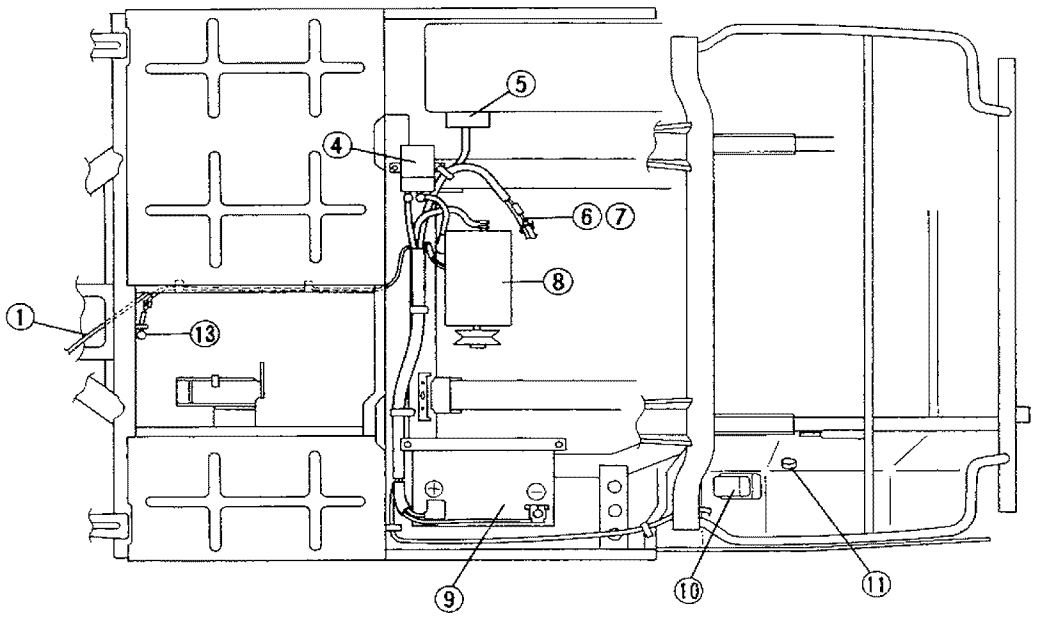
Unit	Read	Definition	Measure
mm cm	Millimeter Centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	Kilogram	10^{3} gram	Weight
N	Newton	1 kg x m/sec	Force
Nm m·kg	Newton Meter Meter Kilogram	N x m m x kg	Torque Torque
Pa N/mm	Pascal Newtons per Millimeter	N/m^2 N/mm	Pressure Spring Rate
L cm^3	Liter Cubic Centimeter	—	Volume or Capacity
r/min	Revolution per Minute	—	Engine Speed

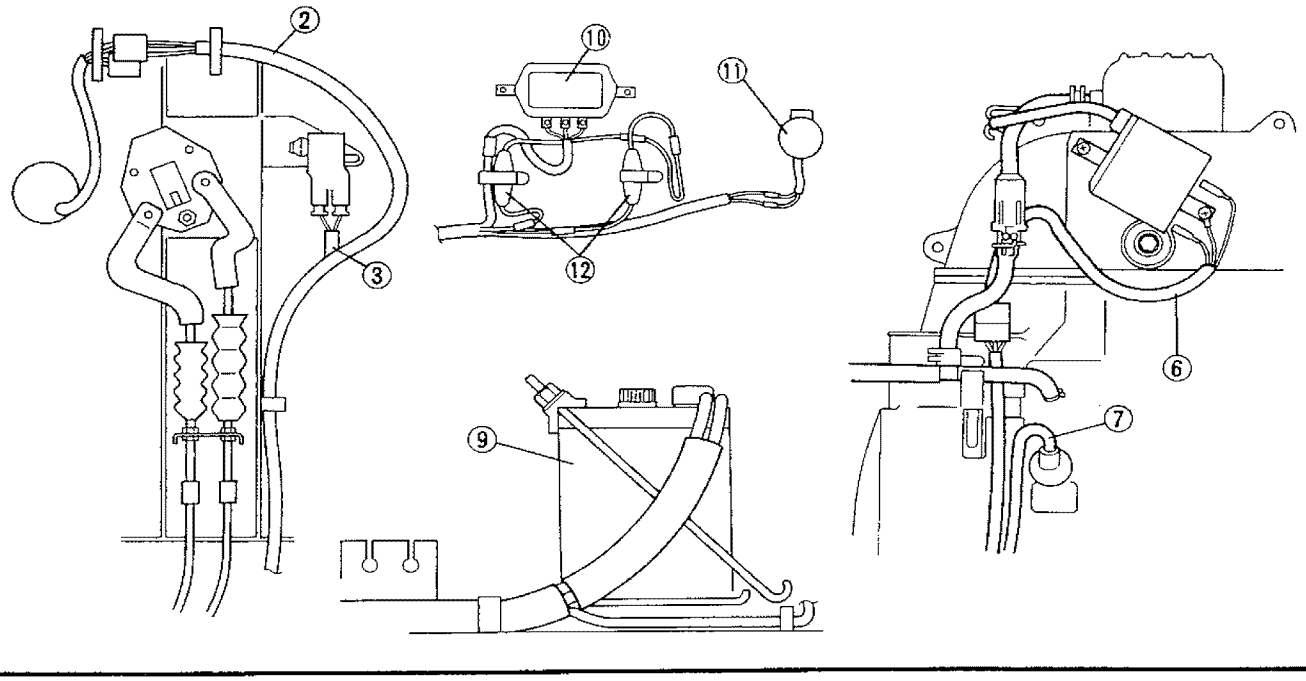
CABLE ROUTING (FOR G2-A)

① Brake cable (Left)
② Brake cable (Right)
③ Throttle cable
④ Shifting link
⑤ Shifting cable
⑥ Clamp



① "OIL WARNING" indicator light lead
② Main switch lead
③ Back-up buzzer switch lead
④ Solenoid relay
⑤ Ignitor unit
⑥ Ignition coil lead
⑦ Pickup coil lead
⑧ Starter-generator
⑨ Battery
⑩ Voltage regulator
⑪ Back-up buzzer
⑫ Fuse
⑬ Accelerator stop switch

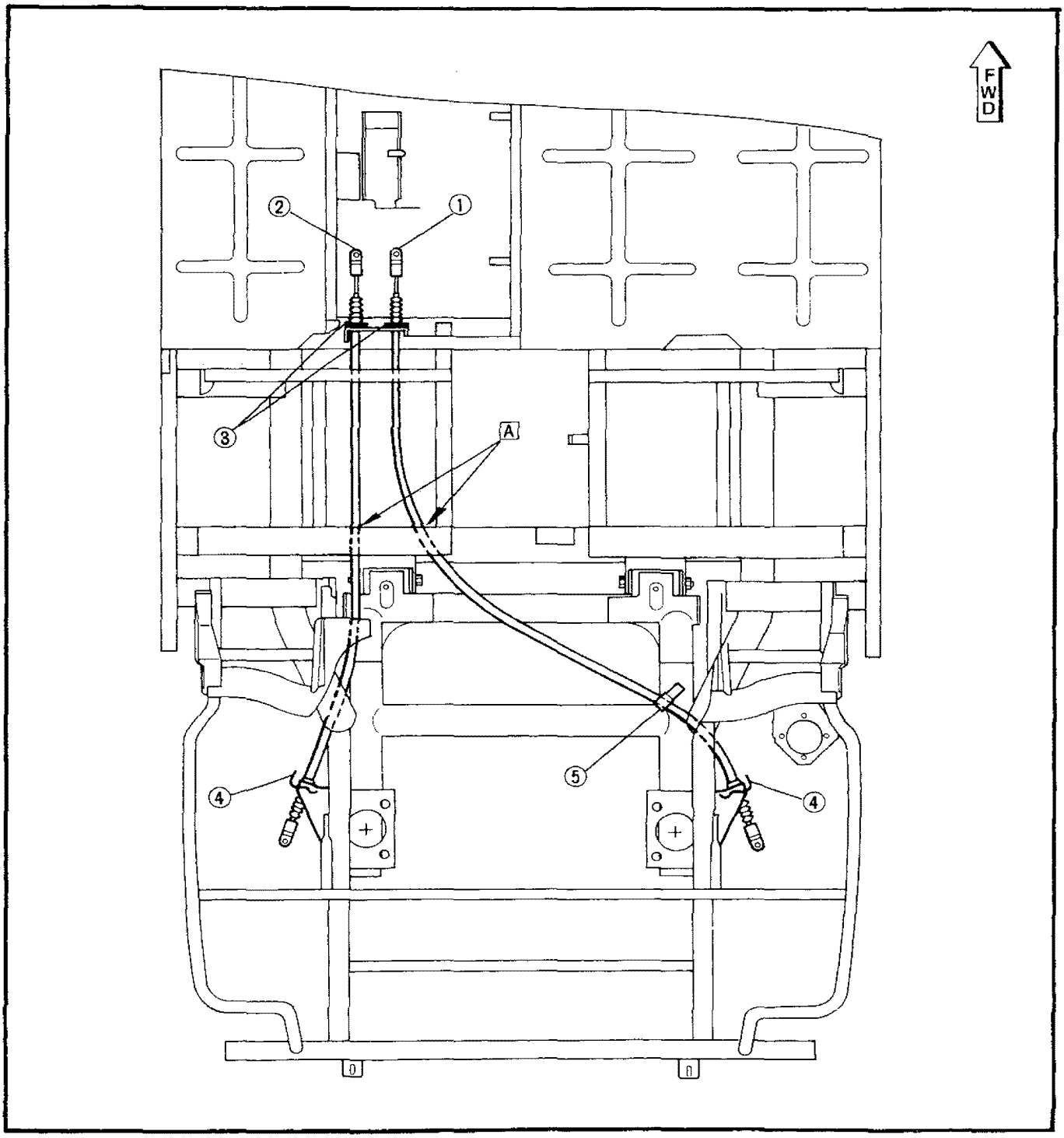




CABLE ROUTING (FOR G2-E)

① Brake cable (Right)
② Brake cable (Left)
③ Circlip
④ Retaining clip
⑤ Clamp

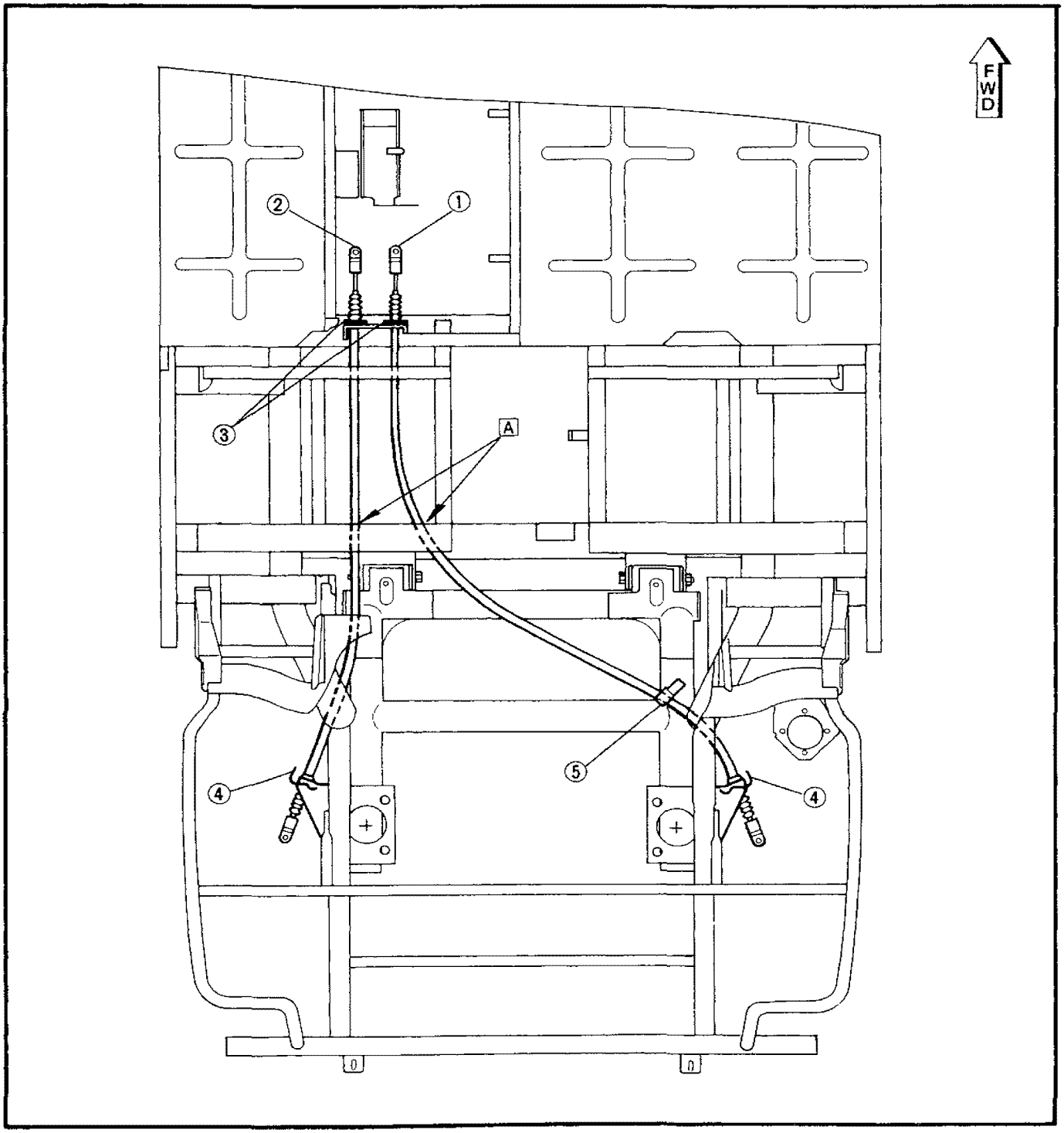
[A] ROUTE THE CABLES BETWEEN THE BATTERY STAY AND PIPE FRAME.



CABLE ROUTING (FOR G2-E)

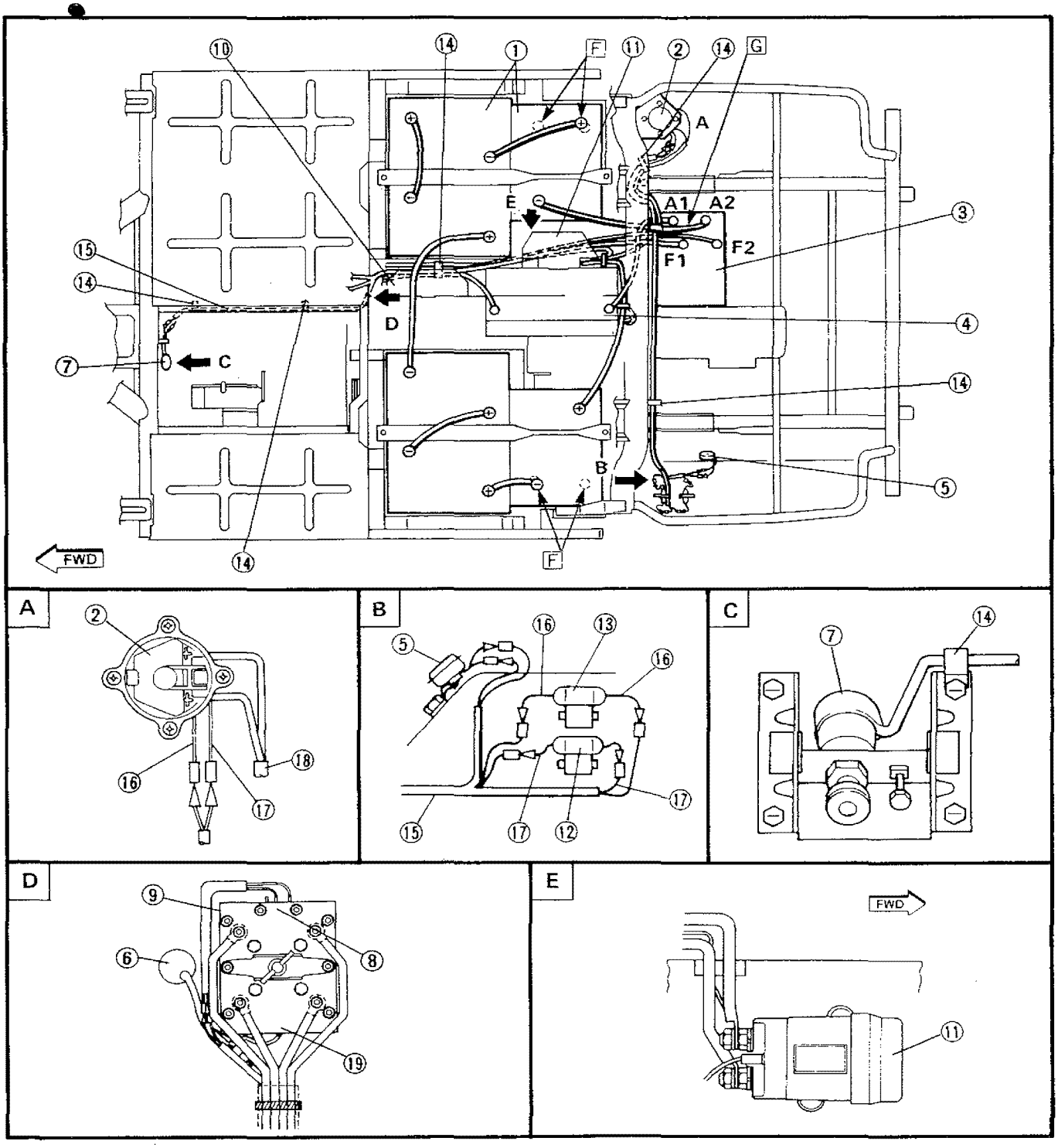
① Brake cable (Right)
② Brake cable (Left)
③ Circlip
④ Retaining clip
⑤ Clamp

[A] ROUTE THE CABLES BETWEEN THE BATTERY STAY AND PIPE FRAME.



① Batteries
② Charging receptacle
③ Traction motor
④ Resistor
⑤ Back-up buzzer
⑥ Main switch
⑦ Accelerator stop switch
⑧ Buzzer switch
⑨ Forward-reverse switch
⑩ Speed controller
⑪ Solenoid relay
⑫ Fuse (–)
⑬ Fuse (+)
⑭ Clamp
⑮ Wireharness
⑯ Red lead
⑰ Black lead
⑱ Lead wire
⑲ Cut-off switch

[A] A VIEW
[B] B VIEW
[C] C VIEW
[D] D VIEW
[E] E VIEW
[F] THE DRAIN HOLE OF BATTERY TRAY MUST FACE TO OUTSIDE OF VEHICLE.
[G] COVER THE LEADS SO THAT THEY DO NOT CONTACT WITH THE TERMINALS A1 AND F1.



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. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE TABLE

Use this table to determine maintenance by the number of rounds (hours) or the period whichever comes first.

FOR G2-A

○ Checking or Adjusting ● Lubricating or Replacing

Item	Remarks	EVERY					
		Pre-Operation	20Rounds 10hours (1month)	125rds 60hrs (6mns)	250rds 130hrs (1year)	500rds 250hrs (2yrs)	1000rds 500hrs (4yrs)
Engine	Adjustment: Valve clearance (cold) [Intake: 0.1 mm (0.004 in), Exhaust: 0.1 mm (0.004 in)]						○
	Check tightness of cylinder head.						○
	Check condition of air filter foam cover. Wash it with solvent and allow it to dry.			○	○		
	Check condition of air filter element assy. Replace element.			○	●		
	Check spark plug for condition of electrodes Plug gap: 0.7~0.8 mm (0.028~0.031 in)			○	●		
	Adjustment: Engine bracket tensioner. [Free play: 2 mm (0.08 in)]				○		
	Check engine oil level.	○	○				
	Replace oil: Oil quantity: 1.1 L (1.16 US qt., 0.97 Imp qt) Oil type: SAE 10W30 type SE or SF motor oil (If temperature does not go below 2°C (35°F): SAE 20W40)			● (optional)	●		
	Check oil delivery hose and check-valve, replace hose.					○	●
	Check compression pressure.						○
Fuel system	Adjustment: Throttle cable [Free play: 0.5 mm (0.02 in)]				○		
	Adjustment: Choke cable [Free play: 1 mm (0.04 in)]				○		
	Check operation of cables.	○			○		
	Check carburetor for dirt, or wear.					○	
	Check fuel lines for fuel leakage. Replace fuel hose.	○			○		●
	Check fuel filter for clogging. Replace filter.				○		●
	Check fuel level, and fuel gauge of tank.	○					

Item	Remarks	EVERY					
		Pre-Operation	20Rounds 10hours (1month)	125rds 60hrs (6mns)	250rds 130hrs (1year)	500rds 250hrs (2yrs)	1000rds 500hrs (4yrs)
Primary and secondary sheaves	Check drive belt for slipage, wear, or scratches				○		
	Grease primary sheave. Grease amount: 2~3 shots (manual grease gun), 2~3 seconds (automatic grease gun) Grease type: Molybdenum disulfide grease				●		
	Lubricate secondary sheave bearing area				●		
	Check for operation and wear of sliding sheave				○		
	Check for wear of ramp shoes on secondary spring seat. Wear limit: 1.0 mm (0.04 in)				○	●	
Transmission case	Check for operation and installation of speed limiter.				○		
	Check for operation of forward-reverse shifting.				○		
	Check for damage of shifting cable, replace.				○		●
	Check gearbox oil level and leakage.				○		
	Replace gearbox oil. Oil quantity: 800 cc (0.70 Imp qt, 0.85 US qt) Oil type: SAE 90 gear oil						●
Brakes	Check operation and adjust if necessary. Adjustment: Brake wire end play [0.1 ~ 0.5 mm (0.004 ~ 0.02 in)]	○ ○	○				
	Check for wear or damage parking brake ratchet and stopper.					○	
	Check shoe lining thickness: Wear limit: 1.5 mm (0.06 in)				○		
	Check drum inside diameter. Wear limit: 166 mm (6.34 in)				○		
Steering	Check operation and adjust if necessary.	○	○				
	Check gearbox for grease leakage. Grease amount: 90 cc (3.17 Imp oz, 3.04 US oz) Grease type: Multi type grease.						○
	Adjustment: Wheel alignment [Toe-in: Unloaded 10 ~ 20 mm (0.4 ~ 0.8 in), Fully loaded Zero mm (Zero in)]				○		
	Check kingpin play.				○		
	Check seal, cap of kingpin for damage.				○		
	Lubricate kingpin.				●		

Item	Remarks	EVERY					
		Pre-Operation	20Rounds 10hours (1month)	125rds 60hrs (6mns)	250rds 130hrs (1year)	500rds 250hrs (2yrs)	1000rds 500hrs (4yrs)
Wheel	Check tire pressure and correct if necessary. Front and rear: 80 kPa (0.8 kg/cm^2, 11 psi)	○	○				
	Check tire groove depth or far damage. Wear limit: 1.0 mm (0.04 in)				○		
	Check tire surface for damage, cracks, or hard objects embeded.	○			○		
	Check tightness of wheel nut.				○		
	Check wheel rims for damage.				○		
	Check for play front wheel bearing.				○		
	Check for play rear axle bearing.				○		
	Check rear axle for cracks, or distortion.				○		
Body & Chassis	Check body and chassis for damage.				○		
	Check tightness of all bolts, nuts and screws.				○		
	Check shock absorber for oil leakage.				○		
	Check coil spring for cracks, or damage.				○		
Starter	Check starter V-belt for damage, tension, and tightness.				○		
	Check brushes for wear. Wear limit: 16 mm (0.63 in)					○	
	Check commutator for dirt.					○	
Battery	Check electrolyte level.	○	○				
	Check specific gravity of electrolyte.				○		
Accelerator stop switch	Check operation, and adjust if necessary.				○		
Back-up buzzer	Check operation.	○					
NOTE: Keep high pressure water away from all electric parts; solenoid and connector.							

NOTE:

Be sure to perform periodic inspection for safe operation.

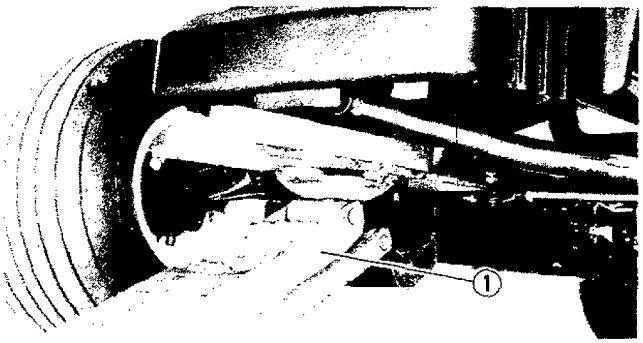
FOR G2-E

Item	Remarks	Daily	Every		
			5 Rounds 3 hours (Week)	20 Rounds 10 hours (Month)	Others
Batteries	Charge	○			
	Check electrolyte level.		○		
	Clean tops and terminals, check for corrosion.		○		
	Check for loose or broken connections.			○	
	Check the specific gravity of electrolyte.		○ (3 ~ 4 cells)		40 Rounds 20 hours (2 months) (all cells)
Accelerator (including speed controller)	Check for free movement and return	○			
	Check for loose or broken wires and connections.			○	
	Check controller contacts.				125 Rounds 60 hours (6 months)
	Adjustment: Contact allowance [1.0 ~ 2.0 mm (0.04 ~ 0.08 in)]				250 Rounds 130 hours (year)
Resistor	Check for loose or broken wires and connections.			○	
Solenoid relay	Check "click" (Solenoid contact sound).	○			
	Check wires and connections.			○	
Solenoid relay	Check solenoid contacts.				125 Rounds 60 hours (6 months)
Traction motor	Check for loose or broken connections.			○	
	Check brash and commutator				1000 Rounds 500 hours (4 years)
Wiring	Check all wire insulation for cracks and/or worn spots.				125 Rounds 60 hours (6 months)
Differential	Check gearbox oil level and leakage.				125 Rounds 60 hours (6 months)
	Replace gearbox oil. Oil quantity: 800 cm^3 (0.70 Imp qt, 0.85 US qt) Oil type: SAE 90 gear oil				500 Rounds 250 hours (2 years)
Brakes	Check operation and adjust if necessary.	○			
	Adjustment: Brake wire end play [0.1 ~ 0.5 mm (0.004 ~ 0.02 in)]				250 Rounds 130 hours (year)
	Check for wear or damage parking brake ratchet and stopper.				125 Rounds 60 hours (6 months)
	Check shoe lining thickness. Wear limit: 1.0 mm (0.04 in)				125 Rounds 60 hours (6 months)

Item	Remarks	Daily	Every		
			5 Rounds 3 hours (Week)	20 Rounds 10 hours (Month)	Others
Steering	Check operation and adjust if necessary.	○			
	Check gearbox for grease leakage, Grease amount: 90 cc (3.17 Imp oz, 3.04 US oz) Grease type: Multi type grease				1000Rounds 500 hours (4 years)
	Adjustment: Wheel alignment [Toe-in: Unloaded 10 ~ 20 mm (0.4 ~ 0.8 in), Fully loaded Zero mm (Zero in)]				250 Rounds 130 hours
	Check kingpin play.				250 Rounds 130 hours (year)
Wheel	Check tire pressure and correct if necessary. Front and rear: 90 kPa (0.9 kg/cm^2, 13 psi)	○			
	Check tire groove depth or for damage. Wear limit: 1.0 mm (0.04 in)				250 Rounds 130 hours (year)
	Check for play front wheel bearing.				250 Rounds 130 hours (year)
	Check for play rear axle bearing.				250 Rounds 130 hours (year)
Body & Chassis	Check body and chassis for damage.				250 Rounds 130 hours (year)
	Check tightness of all bolts, nuts and screws.				250 Rounds 130 hours (year)
	Check shock absorber for oil leakage.				250 Rounds 130 hours (year)

NOTE:

Keep from high pressure water all the electric parts; solenoids, motor, resistor, and controller.

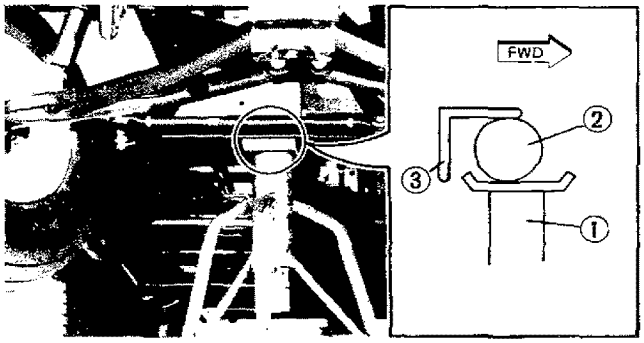


JACK-UP

Be sure to place jacks and stands on level ground. When working with vehicle raised, be sure to set a stand under the vehicle.

FRONT SIDE

1. Set the parking brake.
2. Place a jack ① under the frame base to which the lower arms are connected, and jack up the vehicle.
3. Support the vehicle with a stand ① at center of the front cross member pipe ②



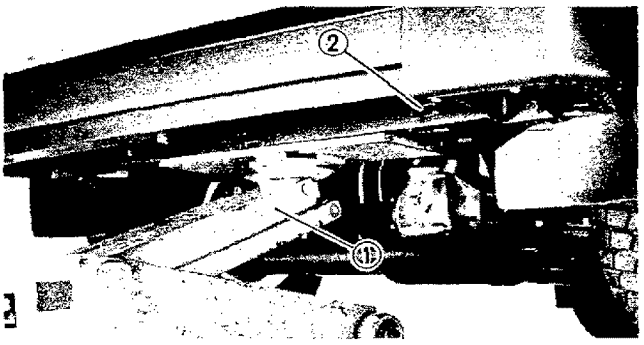
⚠ CAUTION:

Do not support at the bracket plate ③.

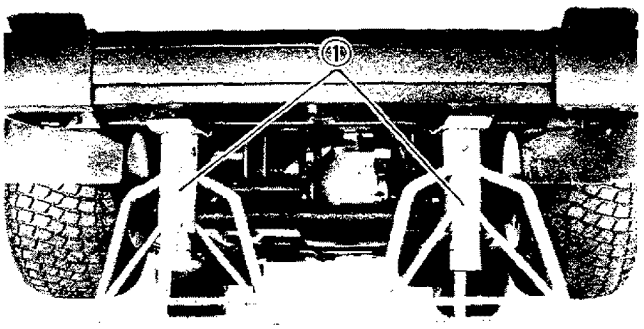
4. Block the rear wheels with wheel stoppers①

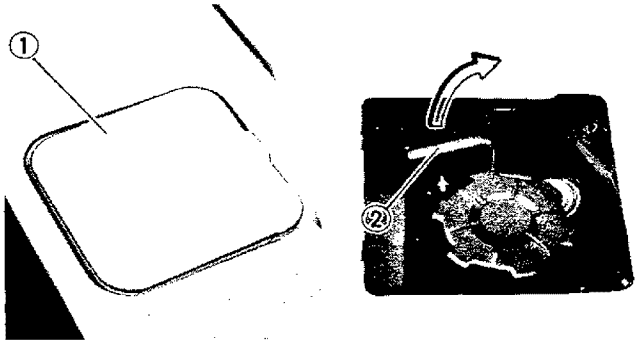
REAR SIDE

1. Block the front wheels with wheel stoppers.
2. Place a jack ① under the center of the rectangular pipe frame ② , and jack up the vehicle.



3. Support the vehicle with stands ① at both ends of the rectangular pipe frame.

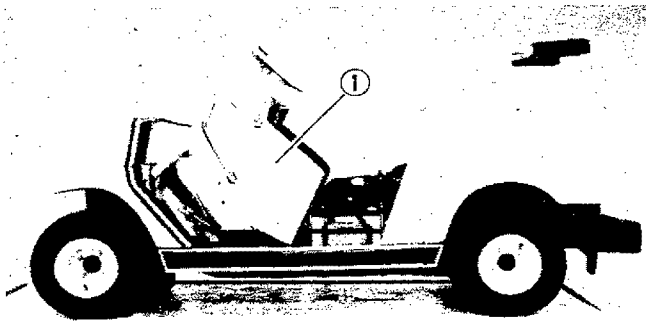




COWLING BODY

SEAT COWLING OPENING

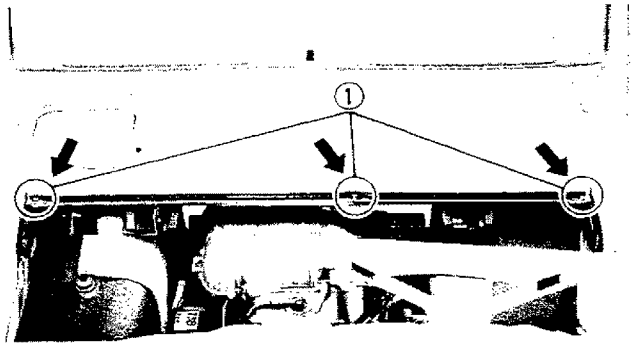
1. Open the lid ① , then pull up the lever ② to unhook the seat lock.

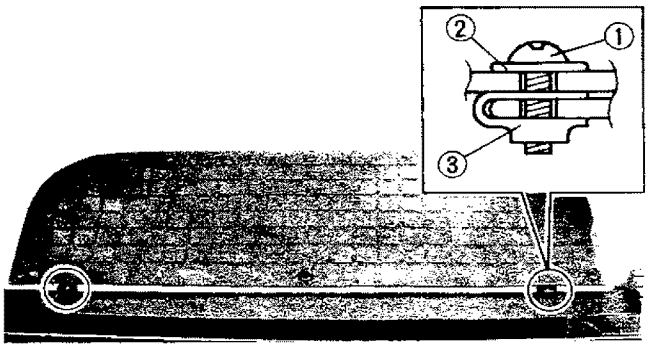


2. Open the seat cowling ① .

REAR COWLING REMOVAL

1. Open the seat cowling.
2. Remove:
   - Screws ① (With washers)
     From the front end of the rear cowling.





3. Remove:
   - Screws ① (With washers ②)
     From the rear end of the rear cowling.

NOTE:

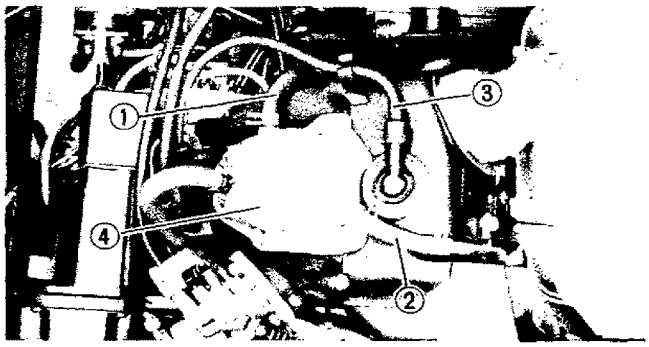
Do not lose the spring nuts ③

4. Remove the rear cowling ①

ENGINE (FOR G2-A)

VALVE CLEARANCE ADJUSTMENT

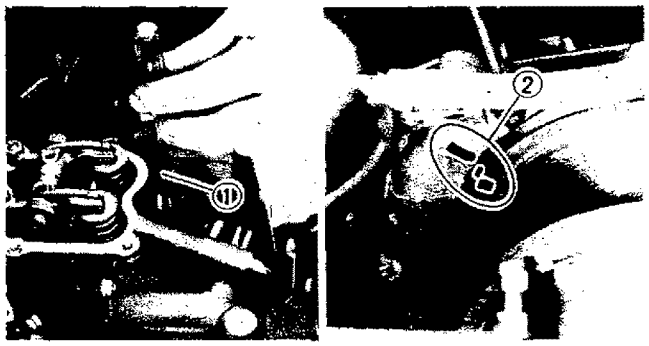
NOTE:
Valve clearance must be measured when the engine is cool to the touch.

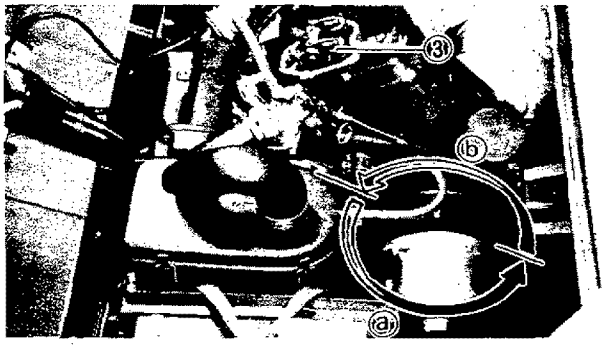


1. Open the seat.
   Refer to "COWLING BODY" section.
2. Position:
   - Shift lever
     To neutral position.
3. Disconnect:
   - Oil breather hose ①
   - Oil delivery hose ②
   - Spark plug lead ③
4. Remove:
   - Spark plug
   - Cylinder head cover ④

5. Set the piston at the top dead center (TDC) on compression stroke by rotating the primary sheave with hands.

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



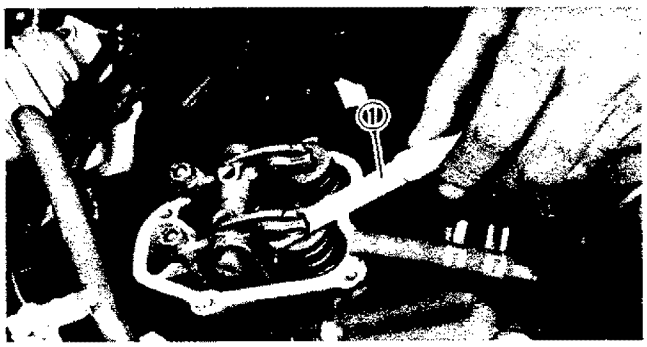


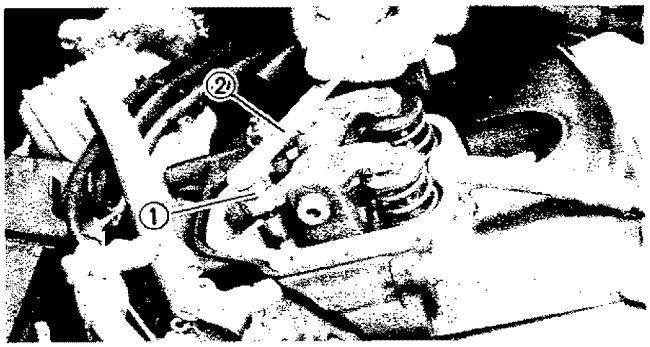
How to set the TDC on compression stroke:
- Set the piston at TDC.

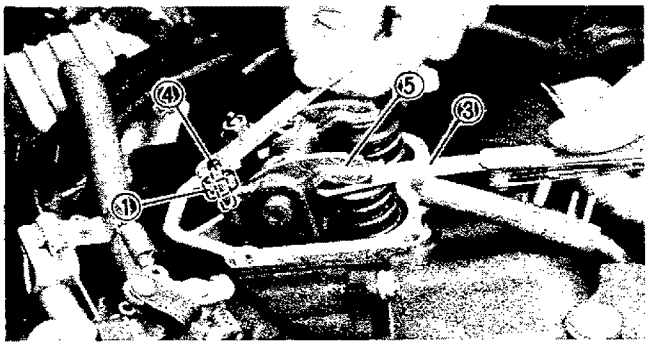
NOTE:
You can find the TDC by inserting a screw driver ① in to the spark plug hole.

- Paint the matching marks ② onto the sheave and crankcase.
- Rotate the sheave counter-clockwise in half a turn ⓐ from the TDC position, at this time.

Intake rocker arm ③ is moved.
→ Rotate sheave another half a turn ⓑ.
Both rocker arms are not moved.
→ Return sheave to initial position.







6. Measure:
   - Valve clearance
     Use feeler gauge ①.
     Out of specification → Adjust.

Intake Valve (Cold):
0.1 mm (0.004 in)
Exhaust Valve (Cold):
0.1 mm (0.004 in)

Valve clearance adjustment steps:
- Loosen the locknut ① while holding the adjusting screw with Valve Adjuster ②.

Valve Adjuster:
YM-08035, 90890-01311

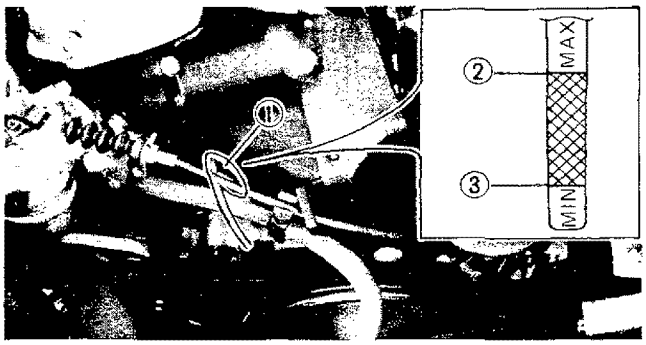
- Insert the feeler gauge (specified thickness) ③.
- Screw in the adjusting screw ④ until the rocker arm ⑤ contacts feeler gauge lightly.
- Tighten the locknut ① while holding the adjusting screw with Valve Adjuster ②.

NOTE:
Check feeler gauge fit. It should have a noticeable drag but not require excessive force.

Locknut:
14 Nm (1.4 m·kg, 10 ft·lb)

7. Install:
   - Cylinder head cover
   - Spark plug
   - Oil delivery hose
   - Oil breather hose
   - Spark plug lead

Bolts (Cylinder Head Cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Spark Plug:
20 Nm (2.0 m·kg, 14 ft·lb)



ENGINE OIL LEVEL MEASUREMENT

1. Place the vehicle on a level area.
2. Inspect:
   - Engine oil level
     Oil level low → Add sufficient oil.

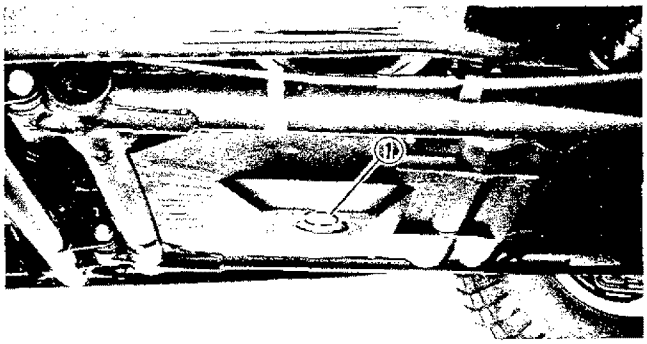
Engine oil level measurement step:
- Open the seat.
  Refer to "COWLING BODY" section.
- Remove the dip stick ①, and wipe it with clean rag.
- Insert the stick into the hole, and then just rest it in the crankcase.
- Pull up the dip stick, and inspect the oil level whether or not it is between maximum ② and minimum level ③

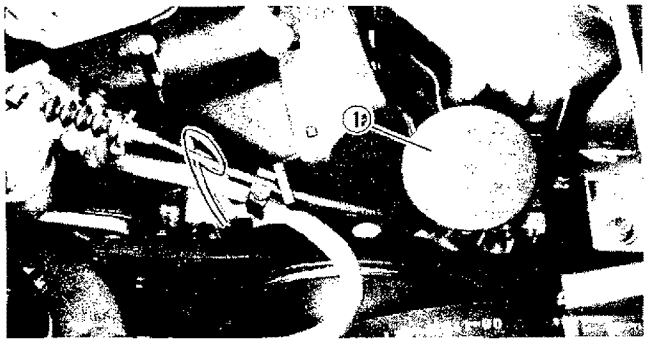
Recommended Oil:
SAE 10W30 type SE or SF motor oil

Oil Quantity:
1.1 L (0.97 Imp qt, 1.16 US qt)

NOTE:
Recommended engine oil classification; API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

⚠ CAUTION:
Do not allow foreign material to enter the engine.





ENGINE OIL REPLACEMENT

1. Place the vehicle on a level area.
2. Warm up the engine for several minutes, then place an oil pan under the engine.
3. Remove:
   - Drain plug ①
     Drain the engine oil.
4. Tighten:
   - Drain plug

Drain Plug:
30 Nm (3.0 m·kg, 22 ft·lb)

5. Remove:
   - Filler cap ①

6. Fill:
   - Crankcase

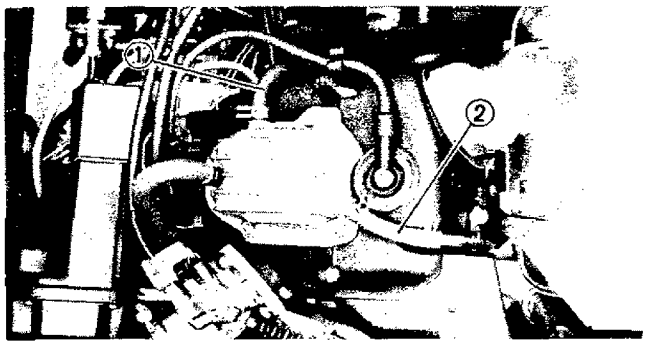
Recommended Oil:
SAE 10W30 type SE or SF motor oil
Oil Quantity:
1.1 L (0.97 Imp qt, 1.16 US qt)

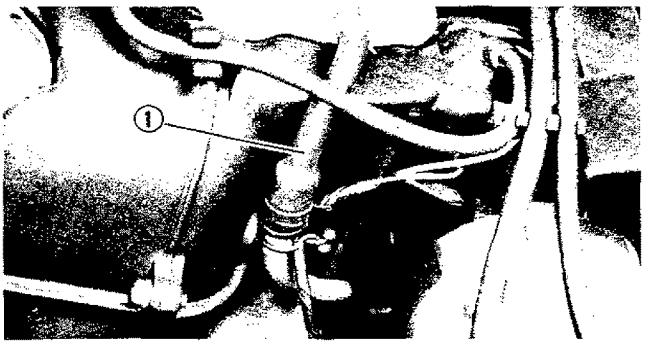
NOTE:
Recommended engine oil classification; API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

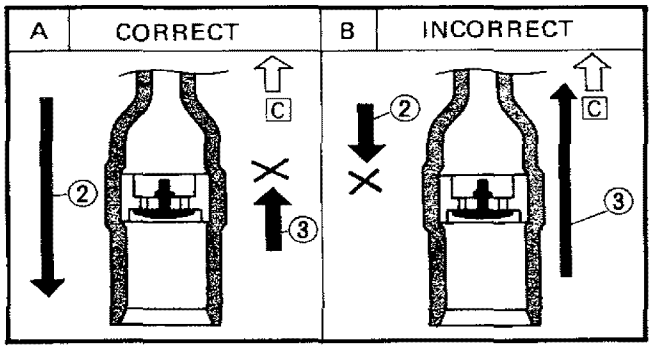
⚠ CAUTION:
Do not allow foreign material to enter the engine.

7. Install:
   - Filler cap

NOTE:
It is acceptable to change the oil more frequently if desired.







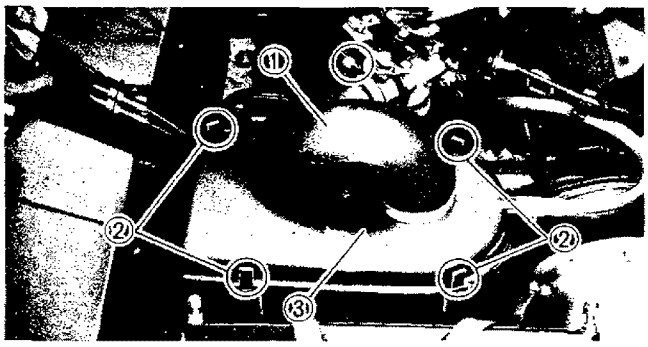
OIL DELIVERY HOSE INSPECTION

1. Inspect:
   - Oil breather hose ①
   - Oil delivery hoses ②
   Poor connection → Reconnect.
   Cracks/Damage → Replace.

2. Check:
   - Check-valve ①
   Check it by blowing and sucking on the hose on the head cover side.
   Out of specification → Replace.

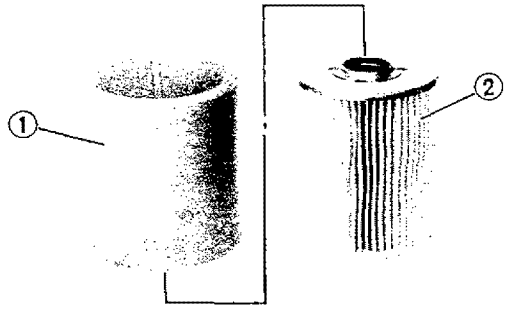
Blowing ② → Air can pass through.
Sucking ③ → Air cannot pass through.

C TO CYLINDER HEAD COVER

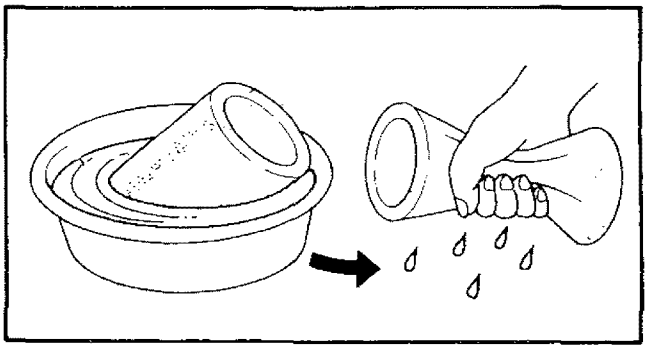


AIR FILTER CLEANING

1. Disconnect:
   - Rubber joint ①
     From carburetor.
2. Unhook:
   - Rubber hooks ②
3. Remove:
   - Case cap ③

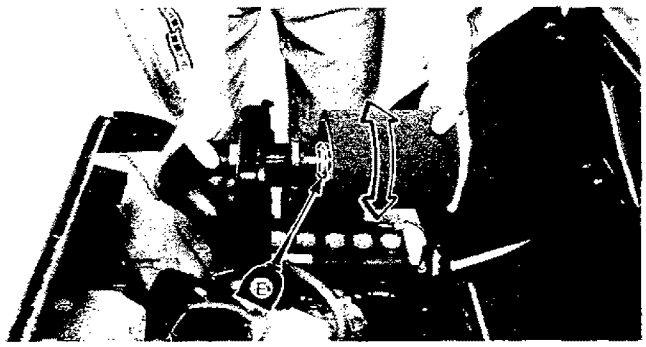


4. Remove:
   - Element cover ①
   - Air filter element ②
     From the case cap.
5. Clean:
   - Element cover ①
     Wash it with solvent, or soap and water. And allow it to dry.
   - Air filter element
     Tap it by hand to remove the dust.



⚠ CAUTION:

- **Do not apply oil to the element cover; resistance to air flow will be increased and adversley affect the performance.**
- **Do not use filters made from any other material. Engine life will be reduced.**



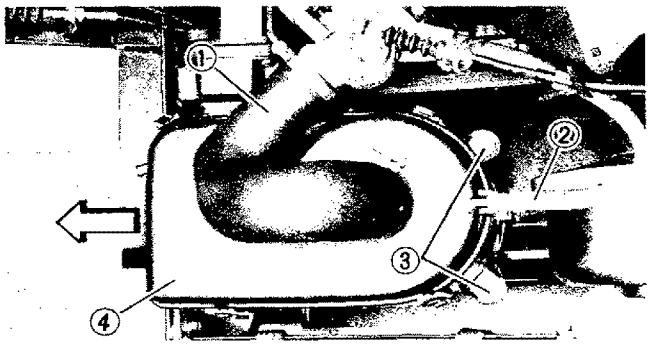
6. Install:
   - All components

NOTE:

When assembling the air filter, reverse the removal procedure. Note the following point.

⚠ CAUTION:

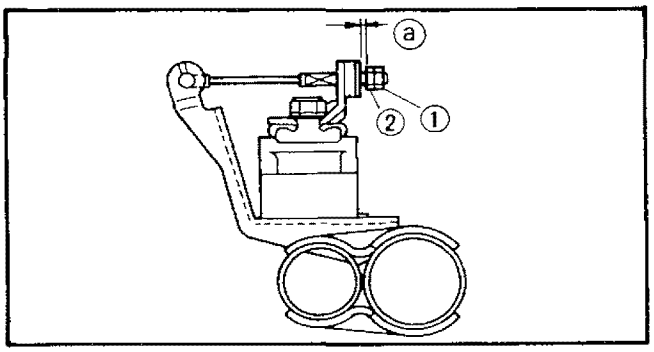
Be careful not to dislodge the O-ring sealing the element onto the case cap. Lightly oil the O-ring and install element with a twisting motion.

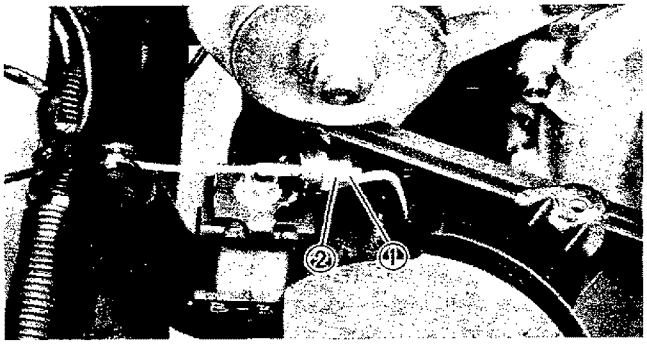


ENGINE BRACKET ADJUSTMENT

1. Disconnect:
   - Rubber joint ①
     From the carburetor.
   - Blow-by hose ②
2. Remove:
   - Holding bolts ③
   - Air cleaner case ④

NOTE:
When removing the case, push it toward the front.





3. Measure:
   - Free play ⓐ (Engine bracket tensioner)
     Out of specification → Adjust.

Engine Bracket Tensioner:
Free play ⓐ : 2 mm (0.08 in)

Free play adjustment steps:
- Loosen the locknut ① .
- Adjust free play by turning the locknuts.

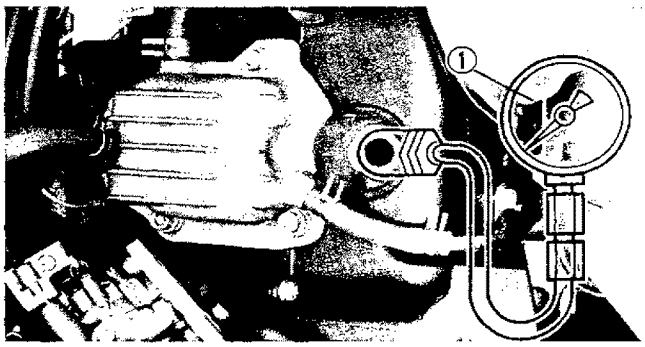
To Reduce → Turn locknut ② clockwise.
To Increase → Turn locknut ② counter-clockwise.

- Tighten the locknuts.

COMPRESSION PRESSURE MEASUREMENT

NOTE:
Insufficient compression pressure will result in performance loss.

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



2. Warm up the engine.
3. Remove:
   - Spark plug
4. Measure:
   - Compression pressure

Compression pressure measurement steps:
- Install the Compression Gauge ① using an adapter.

Compression Gauge:
YU-33223, 90890-03081

- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open and choke "OFF" until the compression reading on the gauge stabilizes.
- Check readings with specified levels (See chart).

Compression Pressure (at sea level):
Standard:
1,250 kPa (12.5 kg/cm², 178 psi)
Minimum:
1,000 kPa (10.0 kg/cm², 142 psi)
Maximum:
1,400 kPa (14.0 kg/cm², 199 psi)

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

- If pressure falls below the minimum level:
  1. Squirt a few drops of oil into the affected cylinder.
  2. Measure the compression again.

Compression Pressure (with oil introduced into cylinder)

Reading	Diagnosis
Higher than without oil	Worn or damaged piston or rings.
Same as without oil	Bad valves, cylinder head gasket or worn guides.
Above maximum level	Inspect cylinder head, valve surfaces, or piston crown for carbon deposits.

CARBURETOR ADJUSTMENT

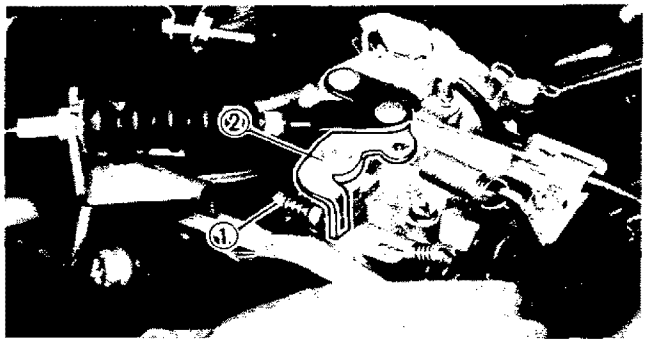
1. Adjust:
   - Pilot screw ①

Pilot screw adjustment steps:
- Lightly screw in the pilot screw ①.
- Back it out from its seated position.

STANDARD TURNED OUT:
1 and 1/2

- Adjust mixture by turning the pilot screw 1/8 ~ 1/4 turn each time.

To Lean → Turn pilot screw clockwise.
To Rich → Turn pilot screw counter clockwise.



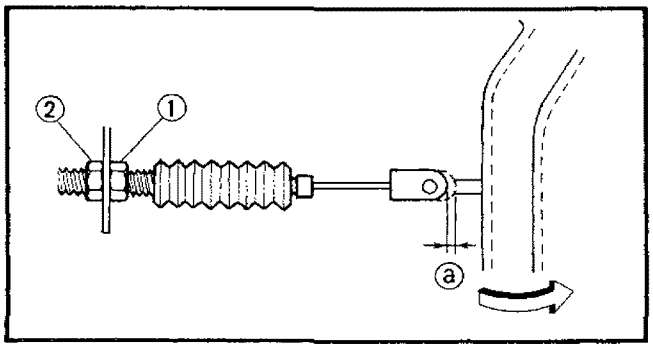
2. Adjust:
   - Throttle stop screw ①

Throttle stop screw adjustment steps:
- Screw out the throttle stop screw ① to clear the throttle arm ②.
- Slowly screw in the throttle stop screw ① until it is lightly touching the throttle arm ② , and give it another 1/4 turn.

Standard Turned In:
1/4

⚠ CAUTION:

Do not use any other setting, adverse performance will result.

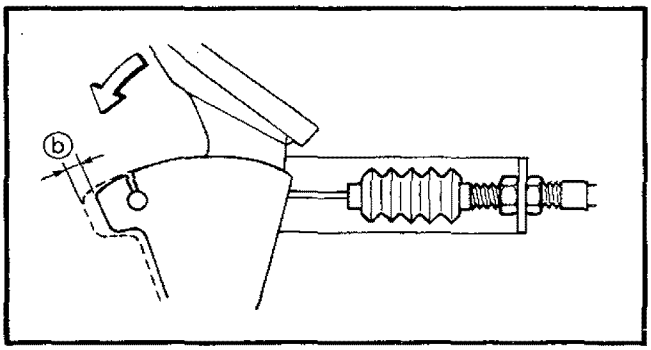


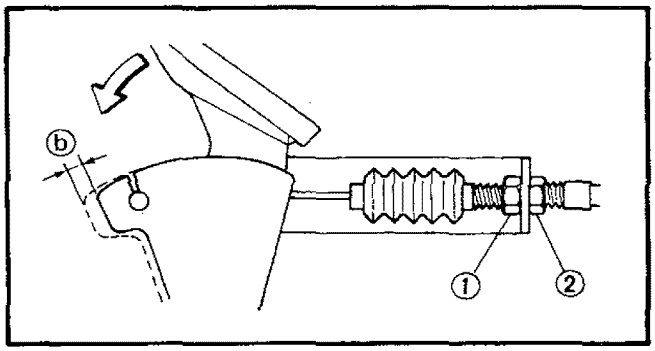
THROTTLE CABLE ADJUSTMENT

Free play adjustment

1. Measure:
   - Free play (Throttle cable 2) ⓐ
     Out of specification → Adjust.

Free Play (Throttle Cable 2):
0.5 mm (0.02 in)





2. Adjust:
   - Free play (Throttle cable 2)

Throttle cable 2 free play adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the correct free play is obtained.

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

- Tighten the locknut.

3. Measure:
   - Free play (Throttle cable 1) ⓑ
     Out of specification → Adjust.

Free Play (Throttle Cable 1):
0.2 ~ 0.5 mm (0.008 ~ 0.020 in)

4. Adjust:
   - Free play (Throttle cable 1) ⓑ

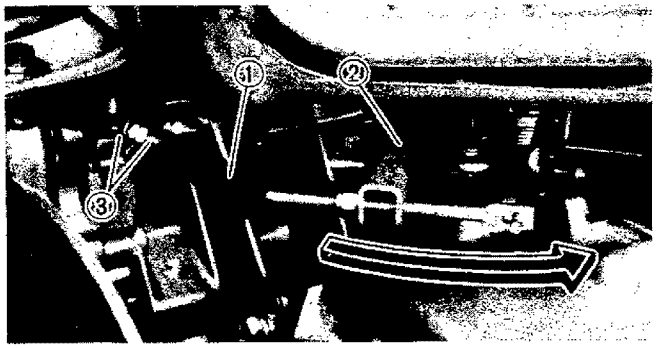
Throttle cable 1 free play adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the correct free play is obtained.

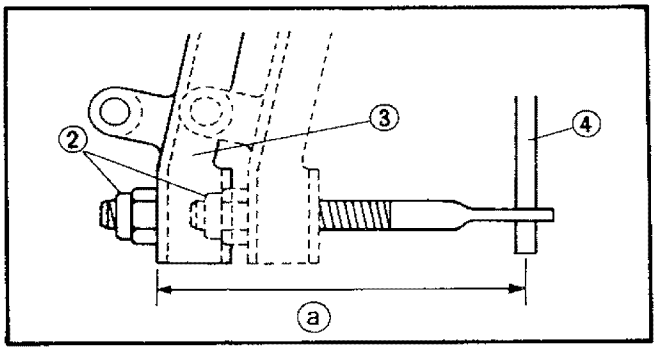
Turn in	**Free play is decreased.**
Turn out	**Free play is increased.**

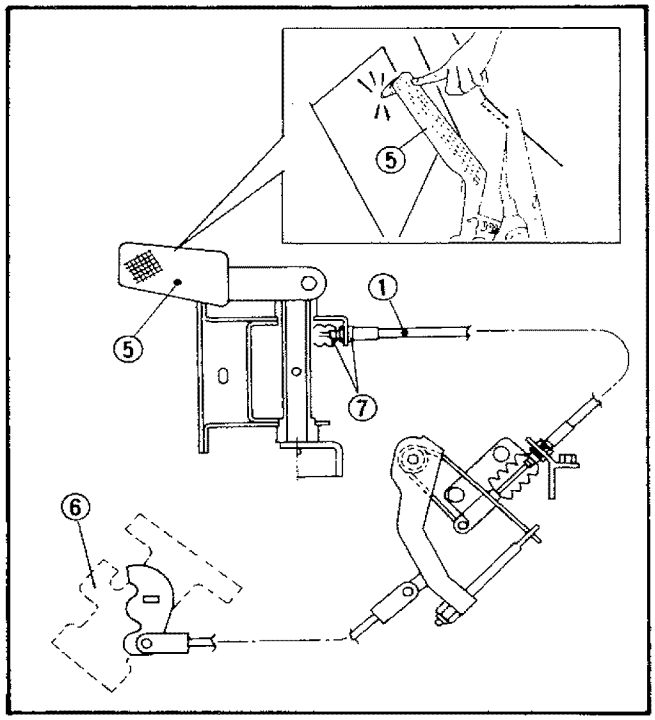
- Tighten the locknut.

Full Throttle Adjustment

1. Turn the main switch to "OFF."
2. Block the wheel with wheel stoppers.
3. Remove:
   - Rear cowling
     Refer to "COWLING BODY" section.







4. Adjust:
   - Throttle cable 2 (Governer-Carburetor) ①

Throttle cable 2 adjustment steps:
- Swing the governer lever ② counter-clockwise until it stops completely.
- While keeping the lever at this position, check that the throttle valve in the carburetor is fully open.
- If not, adjust the throttle cable 2 ① by turning the adjusting nuts ③ in or out.

5. Adjust:
   - Throttle cable 1 (Accelerator pedal-Governer) ①

Throttle cable 1 adjustment steps:
- Screw out the locknut ② in the governer lever ③ to make longest distance ⓐ.

④ Torsion spring

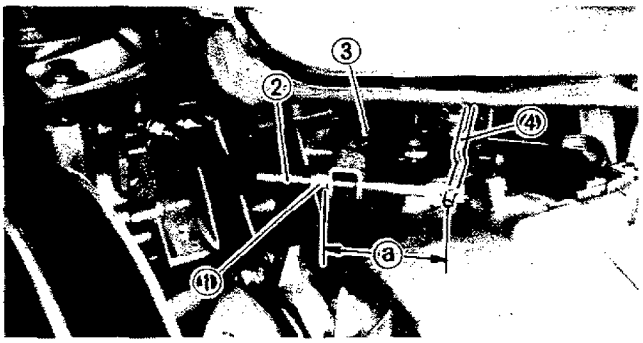
- Depress the accelerator pedal ⑤ to limit.
- While keeping the pedal at this position, check that the throttle valve in the carburetor ⑥ is fully open.
- If not, adjust the throttle cable 1 ① by turning the adjusting nuts ⑦ in or out.
- Adjust the speed limiter to initial setting.

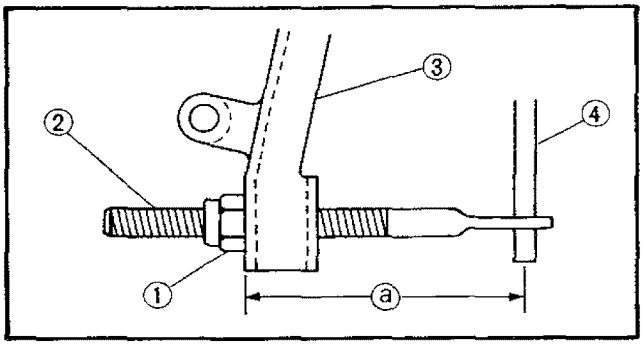
SPEED LIMITER ADJUSTMENT

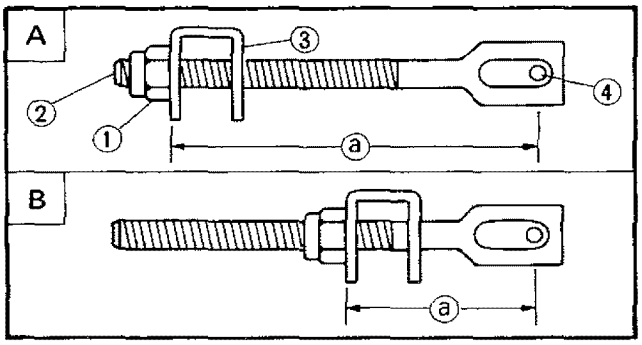
Adjustment

The speed limiter is properly adjusted at the factory, so no adjustment is normally required.

Standard Limiter Setting:
APPROX. 3,050 r/min at 19 km/h (12 mph)







Recommended Distance ⓐ :
54 mm (2.13 in)

NOTE:
- The limiter setting should be readjusted when the location of the governor or throttle cable are changed.
- The governor can be adjusted so that the maximum speed is 16 ~ 22 km/h (10 mph ~ 14 mph). The following procedure gives an alternative way to adjust maximum speed.

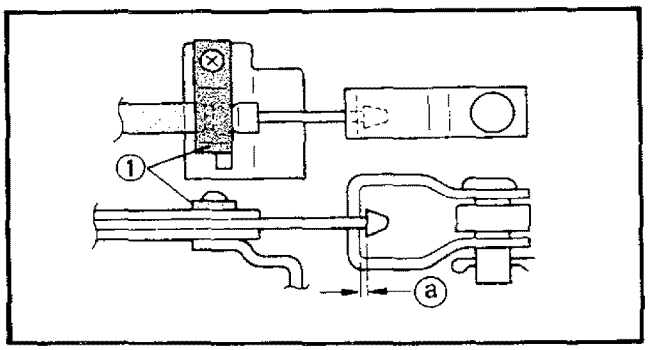
1. Remove the rear cowling.
   Refer to "REAR COWLING REMOVAL" section.
2. Adjust the limiter setting.

Limiter setting adjustment steps:
- Before getting started, mark the present setting position with a paint mark.
- Adjust the distance ⓐ by turning locknut ①.

To Reduce Max. Speed → Turn locknut ① counterclockwise A .
To Increase Max. Speed → Turn locknut ① clockwise B .

3. Check:
   - Setting speed
     Compare the maximum speed with another golf car driving parallel.
     Improper setting → Readjust.

② Adjusting bolt
③ Governor lever
④ Torsion spring

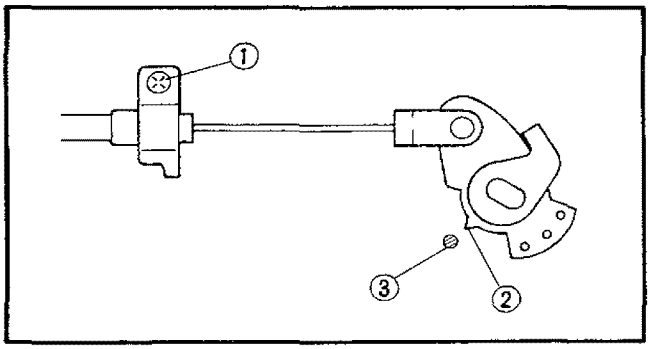


CHOKE CABLE ADJUSTMENT

1. Measure:
   - Free play (Choke cable) ⓐ
     Out of specification → Adjust.

Free Play (Choke Cable) ⓐ :
1.0 mm (0.04 in)

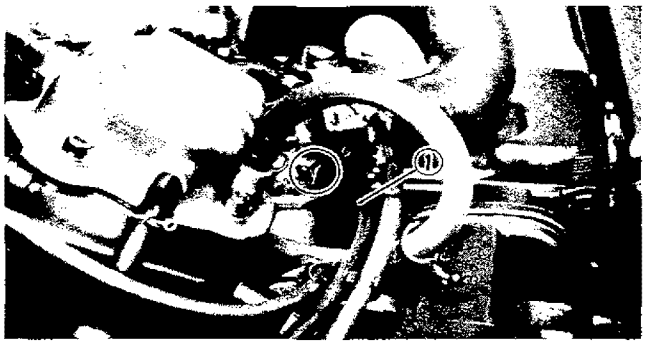
① Cable clamp



2. Adjust:
   - Free play (Choke cable)

Choke cable free play adjustment steps:
- Pull the choke knob until it stops, so when you let go of it, it stays pulled out.
- Loosen the cable clamp screw ①.
- Align the match mark ② with the stopper ③ on the carburetor body.
- Tighten the cable clamp screw.

NOTE:
After adjusting the choke cable, make sure that the choke moves smoothly.

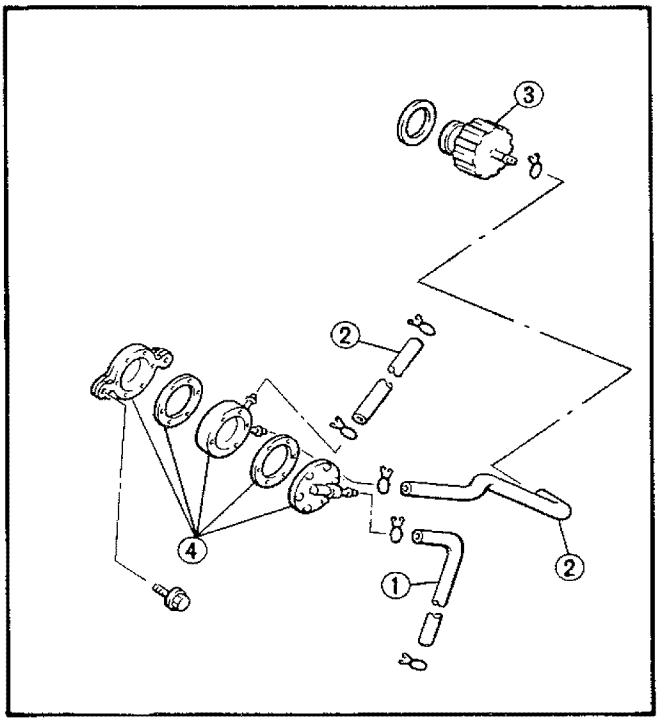


FUEL PUMP INSPECTION

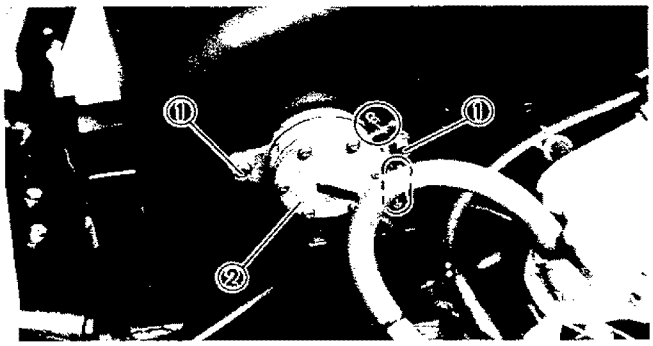
Pump Operation Checking

1. Remove:
   - Drive belt
     Refer to "DRIVE BELT INSPECTION" section.
2. Disconnect:
   - Fuel feed hose ①
     From carburetor.
   - Spark plug lead
3. Place an oil pan under the hose end.
4. Crank over the engine with starter motor.

⚠ WARNING:
Aim the fuel hose into a receptacle, and keep away from any spark or flame.

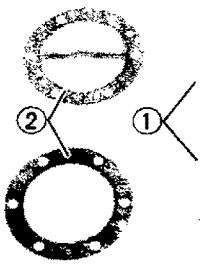


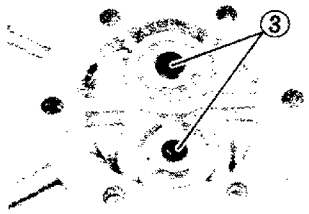
5. Check that the fuel flows out from the hose end.
   If fuel does not flow out, inspect the following points.
   - Disconnection or damage of the pulser hose ①.
   - Bending, clogging, or damage of the fuel hose ②.
   - Clogging of the fuel filter ③.
   - Damage of internal parts of the fuel pump assembly ④.



Component Parts Inspection

1. Disconnect:
   - Hoses
     From fuel pump.
2. Remove:
   - Bolts ①
   - Fuel pump assembly ②
3. Disassemble the fuel pump.
   Refer to CHAPTER 5 "FUEL PUMP — OVERHAULING" section.
4. Inspect:
   - Diaphragm ①
     Torn/Damage → Replace.
   - Gasket ②
     Torn/Damage → Replace.
   - Valve petals ③
     Fatique cracks → Replace.
5. Assemble and install the fuel pump.
   Refer to CHAPTER 5 "FUEL PUMP — OVERHAULING" section.

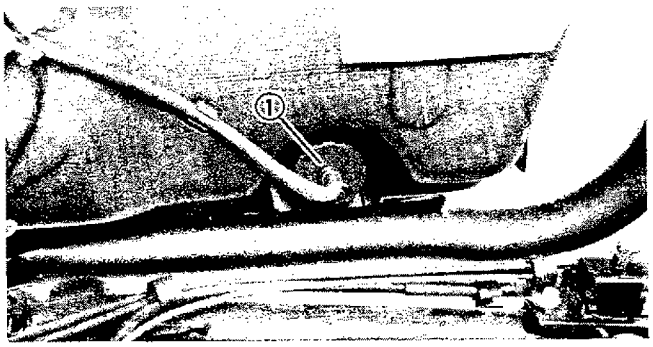




	Fuel Pump Holding Bolt: 7 Nm (0.7 m·kg, 5.1 ft·lb)

6. Connect the hoses.

NOTE:
Be sure to connect the hoses correctly, when re-piping.



FUEL FILTER INSPECTION

1. Disconnect:
   - Pulser hose
     From fuel pump.
   - Fuel hose
     From carburetor.
2. Remove:
   - Ignitor unit
   - Fuel tank
   - Fuel filter ①
3. Inspect:
   - Fuel filter
     Contamination → Replace.

	Fuel Filter: **6 Nm (0.6 m·kg, 4.3 ft·lb)**

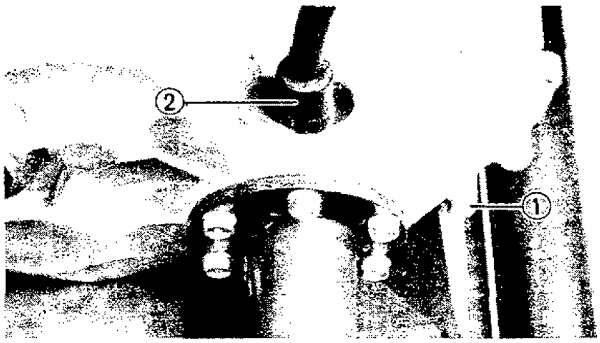
FUEL HOSE INSPECTION

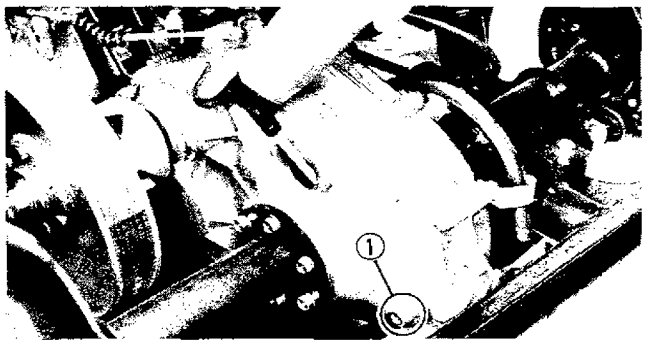
1. Inspect:
   - Fuel hoses
     Damage/Cracks → Replace.
     Poor connection → Reconnect.

POWER TRAIN

TRANSMISSION OIL LEVEL MEASUREMENT

1. Remove the rear cowling.
   Refer to "COWLING BODY" section.
2. Check:
   - Oil level
     Oil level low → Add sufficient oil.





Transmission oil level inspection steps:
- Place the vehicle on a level area.
- Remove the oil level plug ① and vent cap ② .

NOTE:
Place an oil pan under the transmission case.

- Add sufficient oil little by little into the vent hole until oil flows out from the level plug hole ① .

Recommended Oil:
SAE 90 gear oil

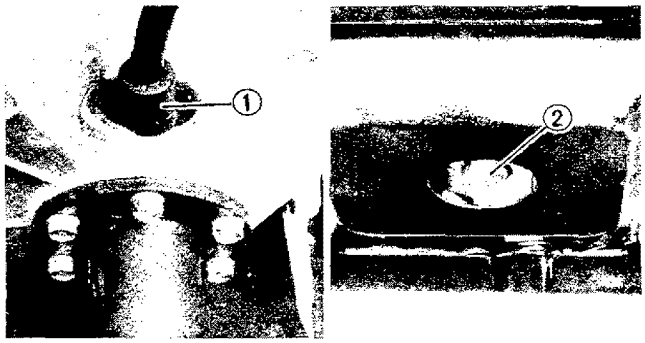
⚠ CAUTION:
Do not allow foreign material to enter the transmission case.

- Allow excess oil to flow out until it stops.
- Install the oil level plug and vent cap.

Oil Level Plug:
For G2-A:
14 Nm (1.4 m·kg, 10 ft·lb)
For G2-E:
29 Nm (2.9 m·kg, 21 ft·lb)

TRANSMISSION OIL REPLACEMENT

1. Place the vehicle on a level area.
2. Place an oil pan under the transmission case.
3. Remove:
   - Vent cap ①
   - Drain plug ②
     Drain the transmission oil.



4. Tighten:
   • Drain plug

Drain Plug: 29 Nm (2.9 m·kg, 21 ft·lb)

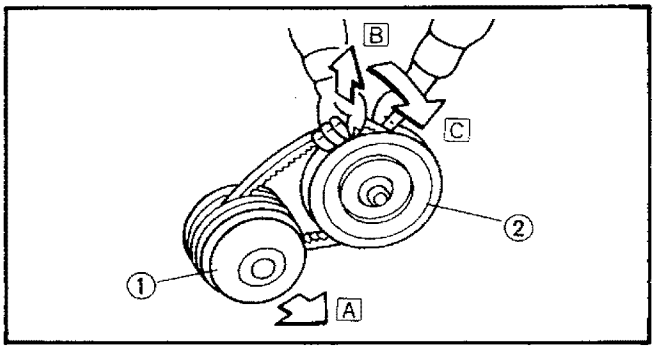
5. Fill:
   • Transmission case
   Refer to "TRANSMISSION OIL LEVEL MEASUREMENT" section.

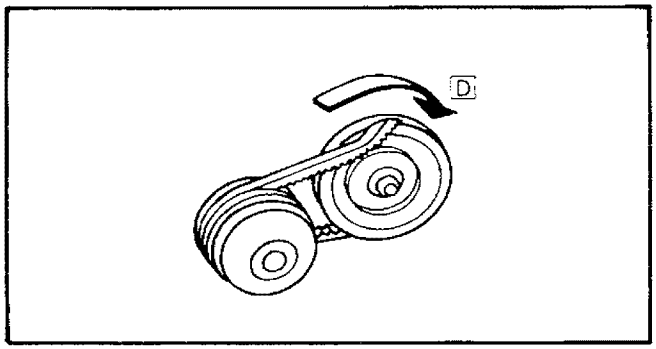
Recommended Oil: SAE 90 gear oil Oil Quantity: 800 cc (0.70 Imp qt, 0.85 US qt)

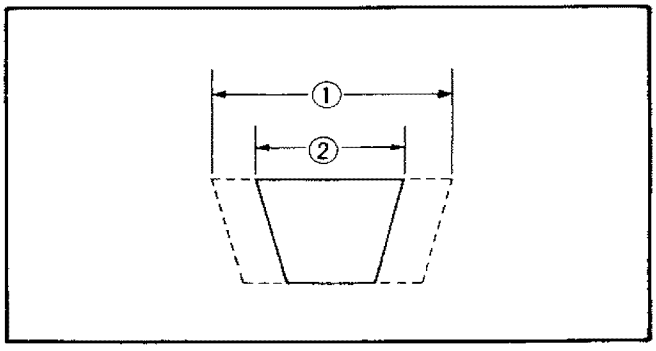
⚠ CAUTION:

Do not allow foreign material to enter the transmission case.

6. Install:
   • Vent cap







DRIVE BELT INSPECTION (FOR G2-A)

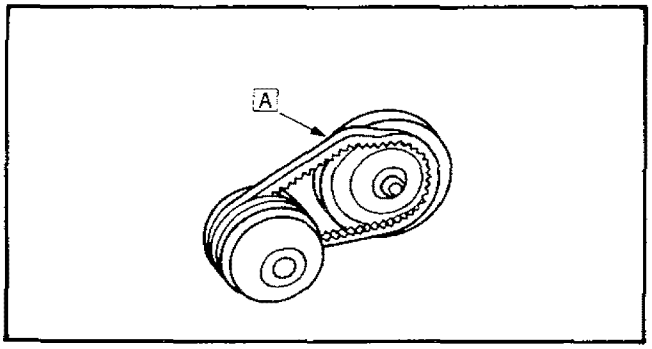
1. Open the seat.
   Refer to "COWLING BODY" section.
2. Remove the drive belt.

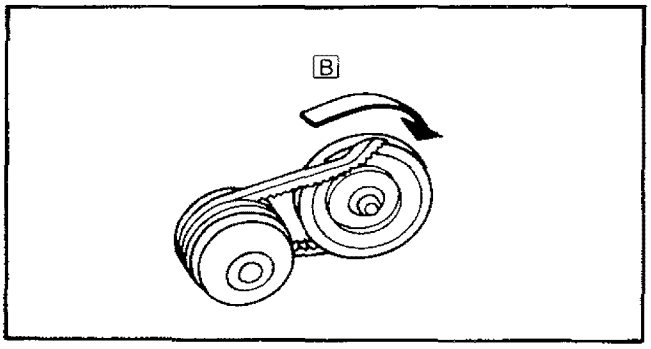
Drive belt removal steps:
- Set the shift lever to neutral position.
- Pull out the primary sliding sheave ① : A .
- Jerk up the belt B , push the belt outward over the edge of the secondary fixed sheave ② : C .
- Rotate the secondary sheave clockwise: D and the belt will roll off of the secondary sheave.
- Slip the belt over the primary sheave to completely remove.

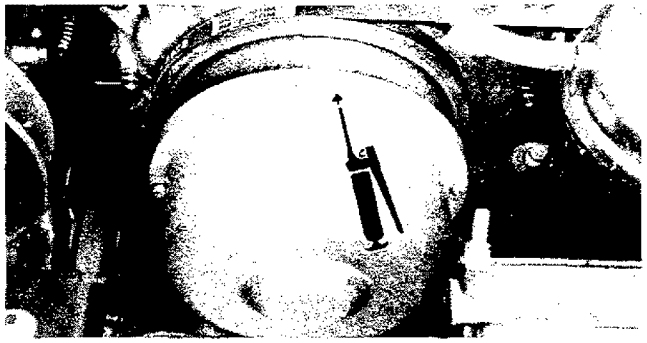
3. Inspect:
   • Drive belt
   Scratches/Slipage/Damage → Replace.
4. Measure:
   • Belt width
   Out of specification → Replace.

Wear Limit ② : 27.0 mm (1.06 in)

① New belt width: 31.0 mm (1.22 in)







5. Install the drive belt.

Drive belt installation steps:
- Set the shift lever to neutral position.
- Slip the belt over the primary sheave.
- Push the belt firmly into the secondary sheave at about the 10:00 o-clock position: A .
- Rotate the secondary sheave clockwise until the belt has rolled into complete position on the secondary sheave: B .

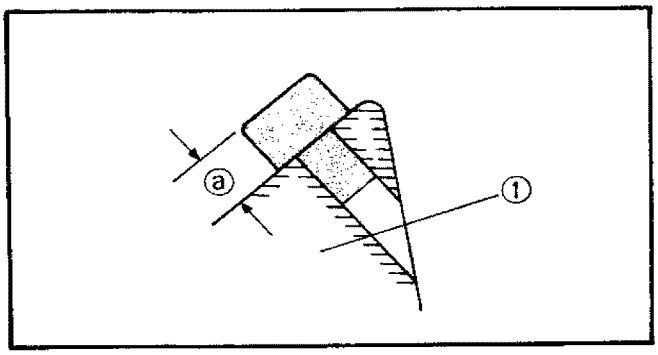
PRIMARY SHEAVE LUBRICATION (FOR G2-A)

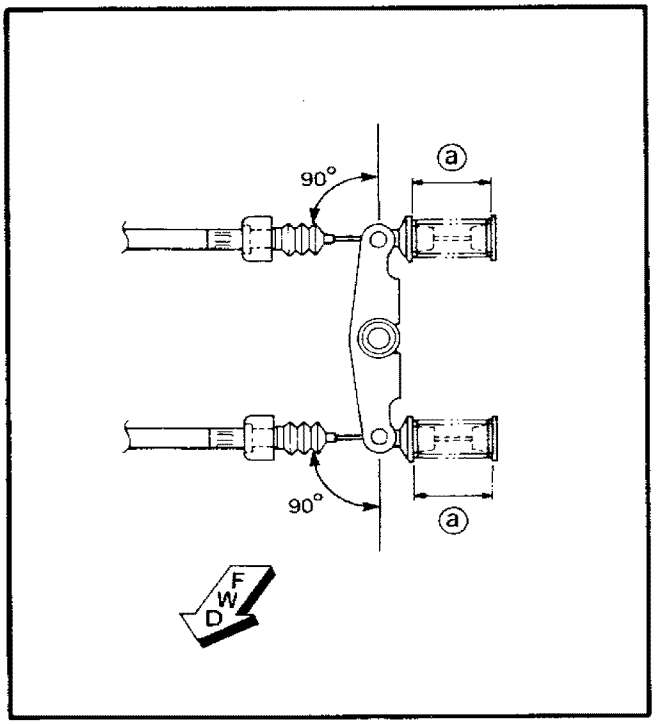
1. Inspect:
   Remove sheave cap and inspect link weights and pivot pins.
   Worn → Replace.
2. Lubricate:
   - Primary sheave

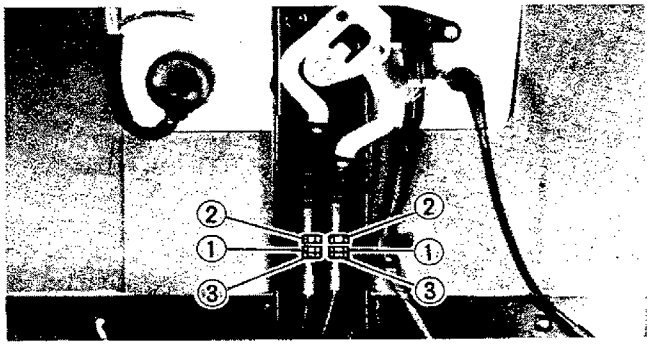
Recommended Grease:
Molybdenum disulfide grease
Grease Amount:
Three shots (Manual grease gun)
Three seconds (Automatic grease gun)

NOTE:
Clean any excess grease from link weights. Reinstall sheave cap. Link weight pivots must be clean and dry. Oil or grease will attract dirt and cause premature wear.

⚠ CAUTION:
Be sure that no grease gets on the sheave surface and drive belt.







SHEAVE INSPECTION

1. Inspect:
   - Sliding sheave movement (Primary and secondary)
     Check for condition by moving with hand.
     Obstruction → Disassemble sheave, and inspect component parts.
     Refer to CHAPTER 6. "PRIMARY SHEAVE" and "SECONDARY SHEAVE" section.
2. Measure:
   - Ramp shoe thickness (Secondary spring seat)
     Out of specification → Replace.

Wear Limit ⓐ :
1.0 mm (0.04 in)

① Spring seat cam

SHIFTING CABLE ADJUSTMENT (FOR G2-A)

1. Remove:
   - Muffler assembly
2. Measure:
   - Shift stroke
     Out of specification → Adjust.

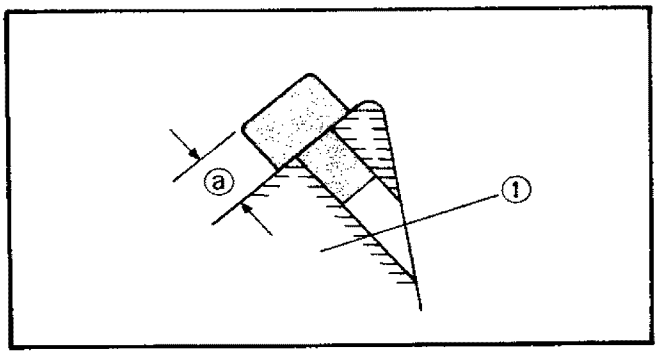
Shift Stroke ⓐ :
15 ~ 17 mm (0.59 ~ 0.67 in)

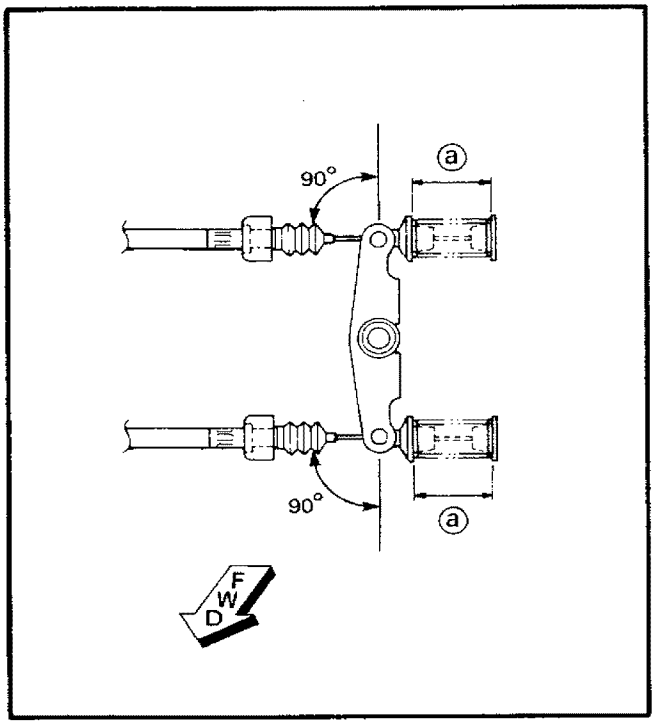
Shift stroke adjustment:
- Shift the transmission completely to the reverse position.
- Loosen the locknuts ② .
- Adjust the shift stroke by turning the adjuster ① .

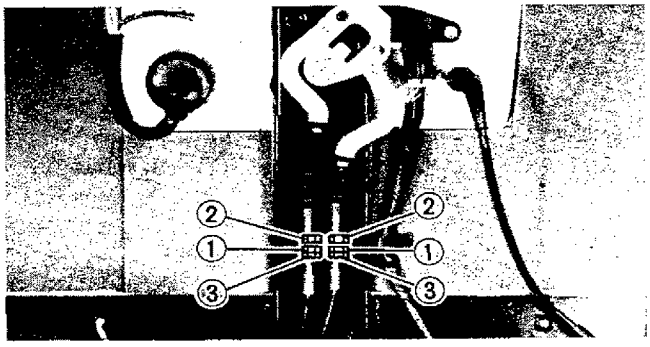
To Reduce → Turn adjuster ① clockwise.
To Increase → Turn adjuster ① counterclockwise.

- Tighten the locknuts ② , ③ .

NOTE:
Check shifting operation when adjusting shift stroke.







SHEAVE INSPECTION

1. Inspect:
   - Sliding sheave movement (Primary and secondary)
     Check for condition by moving with hand.
     Obstruction → Disassemble sheave, and inspect component parts.
     Refer to CHAPTER 6. "PRIMARY SHEAVE" and "SECONDARY SHEAVE" section.
2. Measure:
   - Ramp shoe thickness (Secondary spring seat)
     Out of specification → Replace.

Wear Limit ⓐ :
1.0 mm (0.04 in)

① Spring seat cam

SHIFTING CABLE ADJUSTMENT (FOR G2-A)

1. Remove:
   - Muffler assembly
2. Measure:
   - Shift stroke
     Out of specification → Adjust.

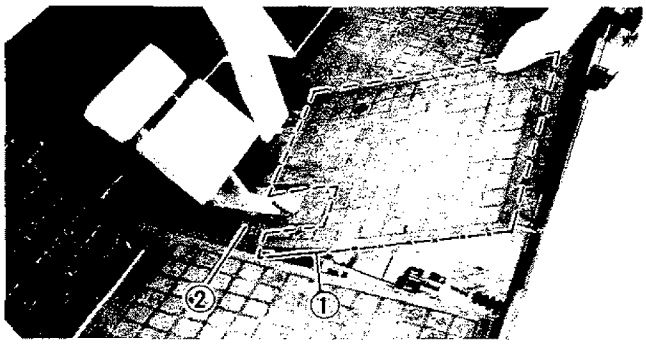
Shift Stroke ⓐ :
15 ~ 17 mm (0.59 ~ 0.67 in)

Shift stroke adjustment:
- Shift the transmission completely to the reverse position.
- Loosen the locknuts ② .
- Adjust the shift stroke by turning the adjuster ① .

To Reduce → Turn adjuster ① clockwise.
To Increase → Turn adjuster ① counterclockwise.

- Tighten the locknuts ② , ③ .

NOTE:
Check shifting operation when adjusting shift stroke.

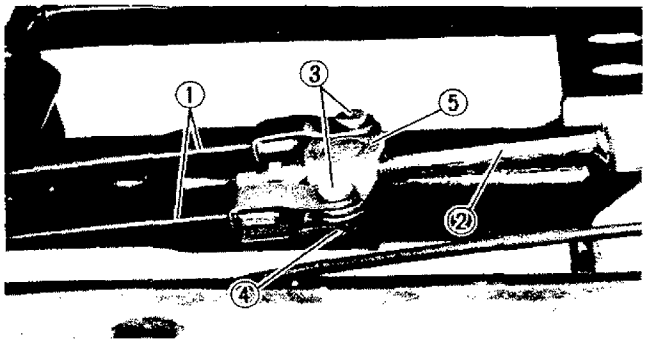


CHASSIS

BRAKE CABLE INSPECTION

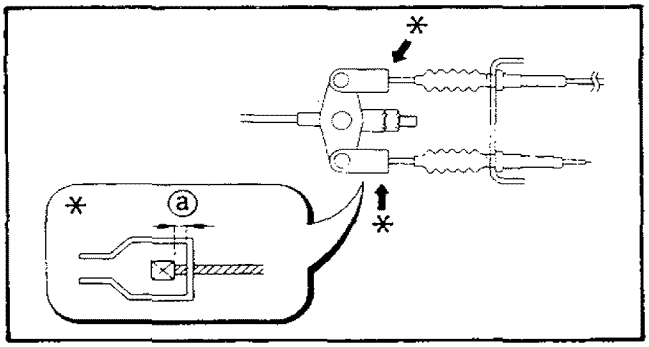
1. Remove:
   - Service lid ①

② Floor mat



2. Inspect:
   - Brake cables ①
   - Brake rod ②
   - Clevis pins ③
   - Cotter pins ④

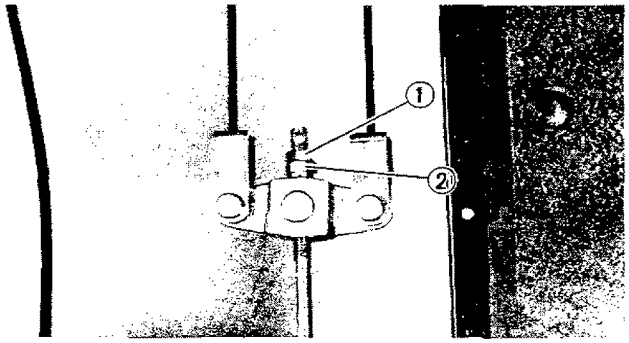
   On the brake equalizer ⑤.
   Wear/Damage → Replace.



3. Measure:
   - End play (Brake cable) ⓐ

   Out of specification → Adjust.

End Play (Brake Cable):
0.1 ~ 0.5 mm (0.004 ~ 0.020 in)



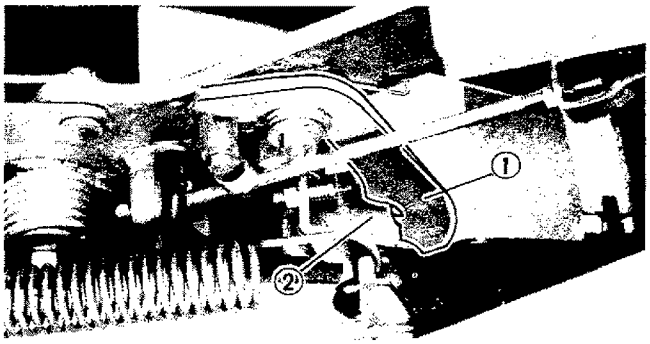
End play adjustment steps:
- Loosen the locknut ①.
- Adjust the end play by turning the adjusting nut ②.

To Reduce →	**Turn adjusting nut ② clockwise.**
To Increase →	**Turn adjusting nut ② counterclockwise.**

- Tighten the locknut ①.

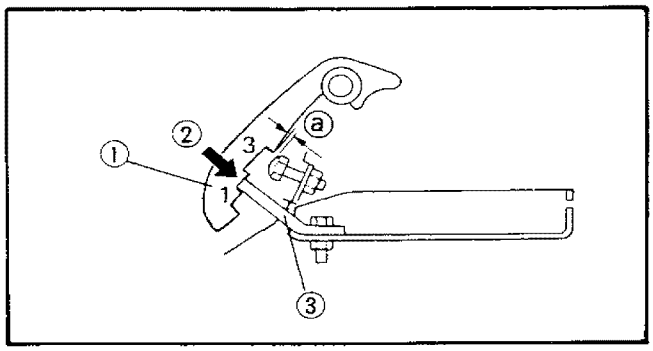
⚠ CAUTION:

Overly tight cables will prevent proper brake self-adjuster action.



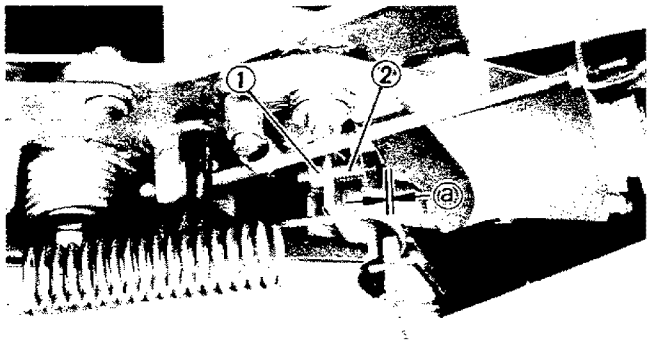
PARKING BRAKE ADJUSTMENT

1. Turn the main switch to "OFF", and remove the key.
2. Remove the service lid.
3. Inspect:
   - Parking brake ratchet ①
   - Ratchet stopper ②
   Wear/Damage → Replace.



4. Apply the brake, hook the ratchet ① at the second position ② on the stopper ③ .
5. Measure:
   - Free play (Release timing) ⓐ
   Out of specification → Adjust.

Free Play (Release Timing):
1.0 mm (0.04 in)

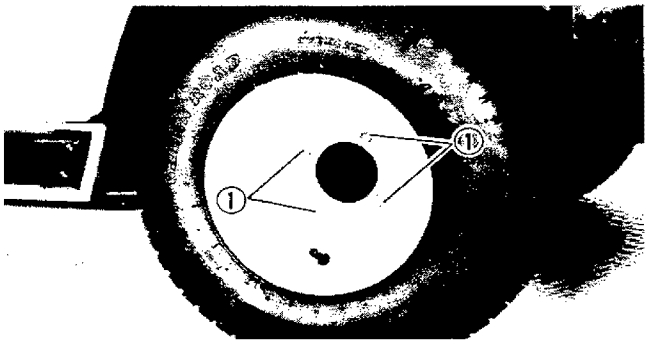


Release timing adjustment steps:
- Loosen the locknut ① .
- Adjust the release timing by turning the adjusting bolt ② .

To Advance	→	**Turn adjusting bolt ② counterclockwise.**
To Retard	→	**Turn adjusting bolt ② clockwise.**

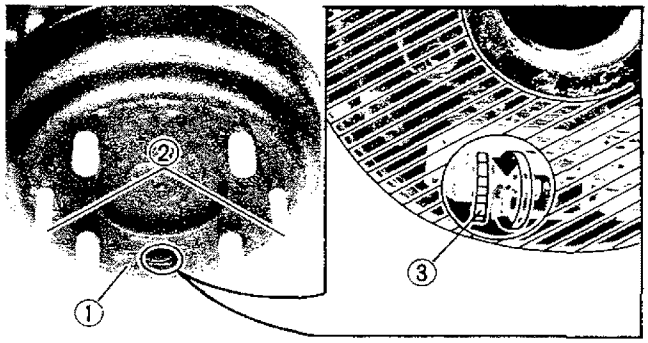
- Tighten the locknut ① .
- Recheck the release timing.

ⓐ Release timing free play



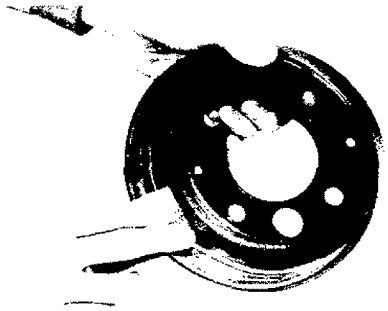
SHOE LINING INSPECTION

1. Turn the main switch to "OFF", and remove the key.
2. Apply parking brake, loosen the wheel nuts.
3. Jack up the rear of the vehicle. Block the front wheels.
   Refer to "JACK-UP", section.
4. Release parking brake by depressing the accelerator pedal.
5. Remove the wheel nuts ① and rear wheel.

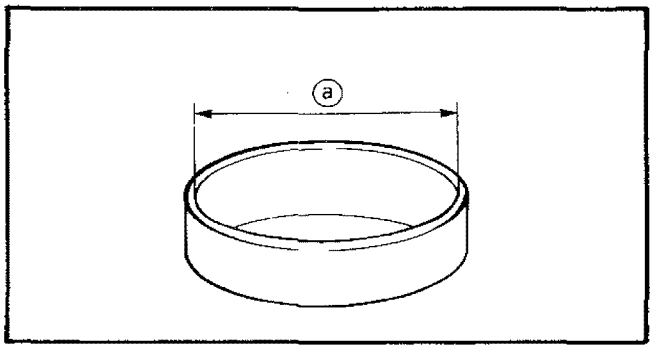


6. Remove:
   • Brake drum ①
   To loosen the drum, install the 10 mm bolts ② onto the drum and screw in them.

NOTE:
If it is very hard to remove the drum, screw in the adjusting nut ③ in the shoe plate.

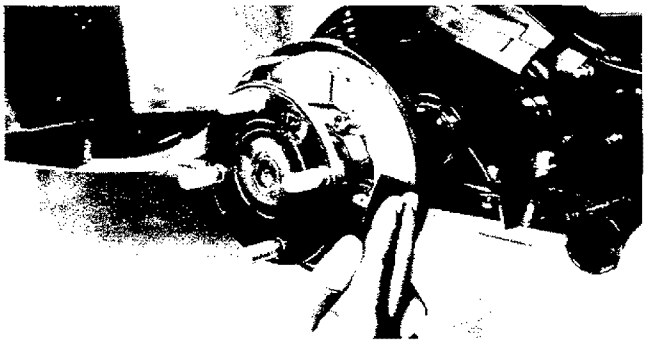


7. Inspect:
   • Drum inner surface
   Oil → Clean completely with non-oily solvent.
   Scratches → Lightly polish evenly with emery cloth.

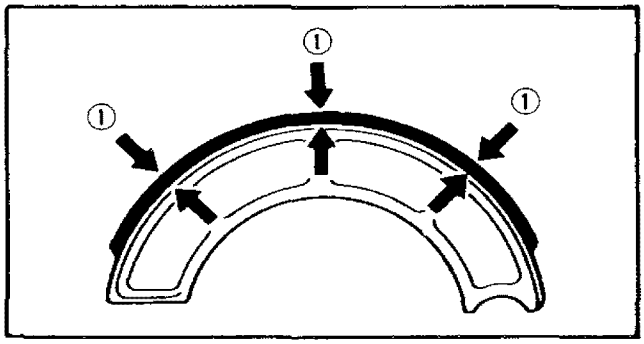


8. Measure:
   • Drum inside diameter ⓐ
   Out of spedification → Replace drum.

Maximum Inside Diameter:
161 mm (6.34 in)



9. Inspect:
   • Shoe lining surface
   Oil → Replace/Clean completely with non-oily solvent, and emery cloth.
   Scratches → Lightly polish with emery cloth.



10. Measure:
   • Shoe lining thickness
   Out of specification → Replace.
   Refer to CHAPTER 7. "BRAKE" section.

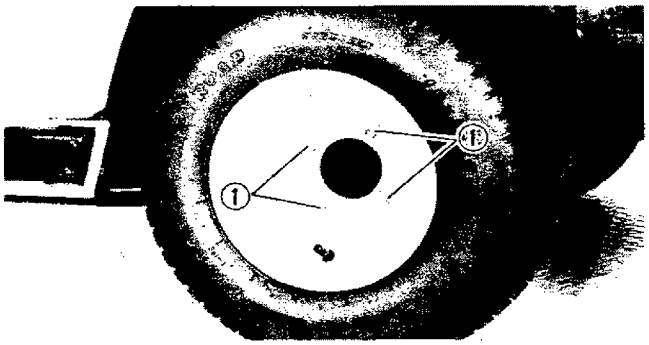
Wear Limit:
1.5 mm (0.06 in)

① Measuring points

NOTE:
Replace the brake shoes as a set if either is found to be worn to the wear limit.

11. Install:
    - Brake drum
    - Rear wheel

⚠ CAUTION:
Make sure that no grease or water comes in contact with the brake drum and/or shoe surfaces.

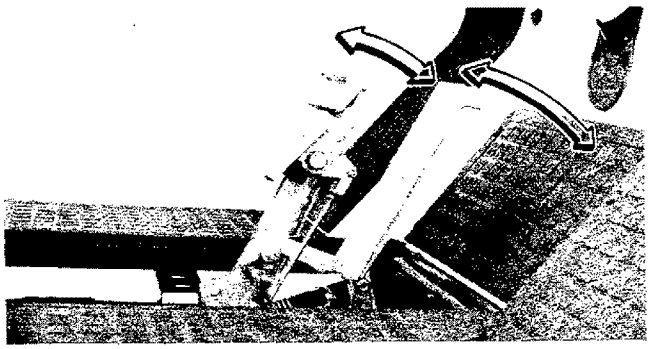


12. Install:
    - Wheel nuts

NOTE:
Finger-tighten first a top nut, then the rest ones diagonally. Let the vehicle down till the weight is on the wheel. Finish tightening the nuts.

Wheel Nut ①:
80 Nm (8.0 m·kg, 58 ft·lb)

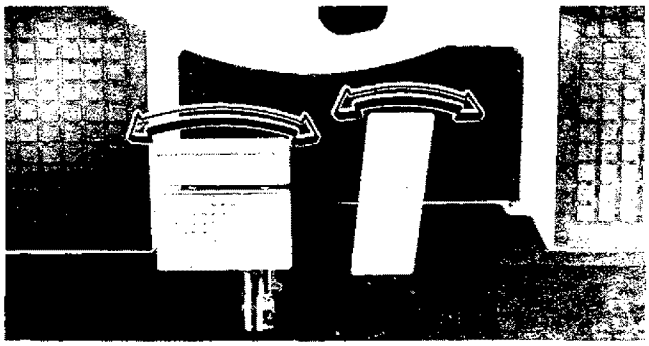
13. After assembling, depress the brake pedal about 10 times to adjust the shoe-drum clearance.



BRAKE AND ACCELERATOR PEDALS

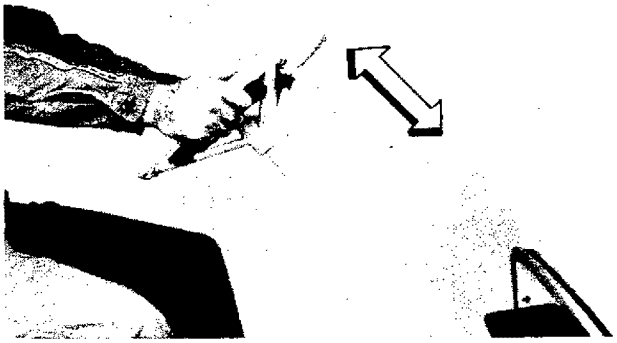
1. Check:
    - Pedal movement
      Disconnect the brake rod and throttle cable.
      Roughness → Lubricate pivoting parts.

Recommended Lubricant:
SAE 10W30 Motor Oil



2. Check:
- Pedal side free play
  Try to move the pedals from side to side.
  Noticeable free play → Replace pivoting parts.

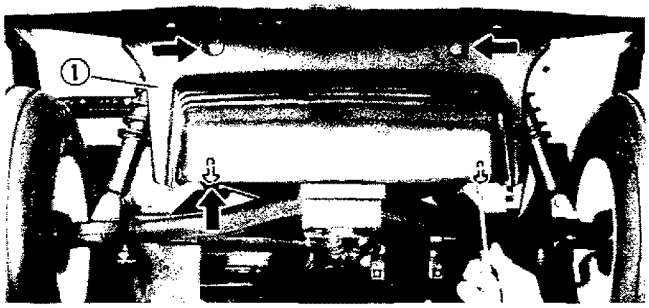
Pedal Side Play Limit:
5 mm (0.20 in)



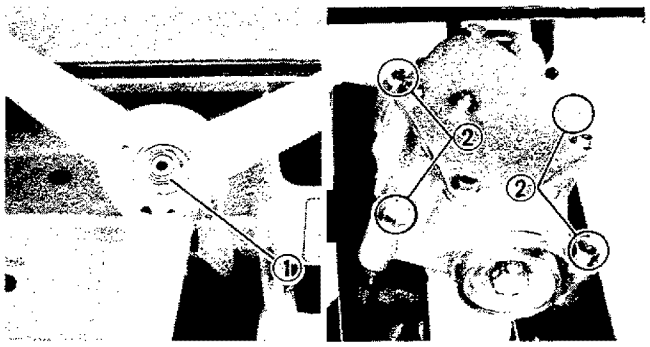
STEERING INSPECTION

Steering Shaft Axial Play Inspection

1. Check:
- Axial play
  Pull and push the steering wheel.
  Looseness → Retighten steering wheel and/or steering gearbox.

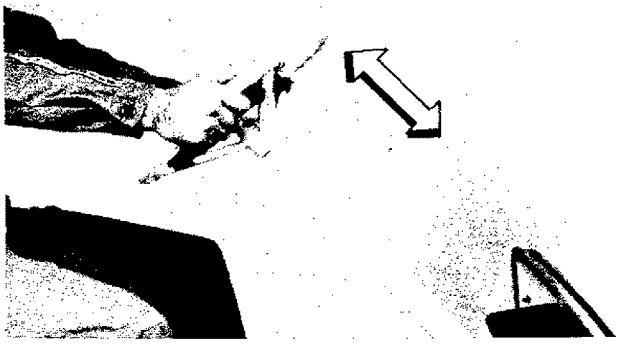


2. Remove:
- Front under cover ①
- Score card holder
  From the steering wheel.

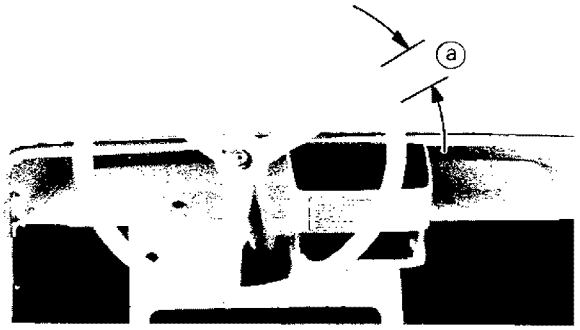


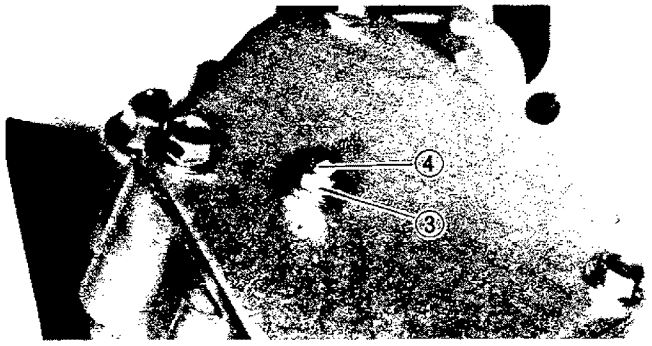
3. Tighten:
- Nut (Steering wheel) ①
- Bolts (Gear box) ②

Nut (Steering Wheel) ① :
39 Nm (3.9 m·kg, 28 ft·lb)
Bolt (Gear Box Securing) ② :
29 Nm (2.9 m·kg, 21 ft·lb)



4. Recheck:
- Axial play
  Still excess play → Adjust the steering wheel free play (gearbox backlash).
  Follow the "Steering Wheel Free Play Adjustment" steps.





Steering wheel free play adjustment steps:

- Loosen the locknut ①.
- Tighten the steering shaft adjusting bolt ② until the steering shaft does not move.
- Loosen the adjusting bolt ② completely.
- Retighten the adjusting bolt ② until the steering shaft has no axial looseness, but it rotates smoothly to both left and right full rotation.
- Tighten the locknut ①.

Locknut ①:
25 Nm (2.5 m·kg, 18 ft·lb)

Steering Wheel Free Play (Gearbox backlash) Adjustment

1. Check:
   - Steering wheel free play ⓐ
     Turn the steering wheel lightly.
     Out of specification → Adjust.

Steering Wheel Free Play ⓐ:
Limit: 30 mm (1.2 in)

Steering wheel free play adjustment steps:

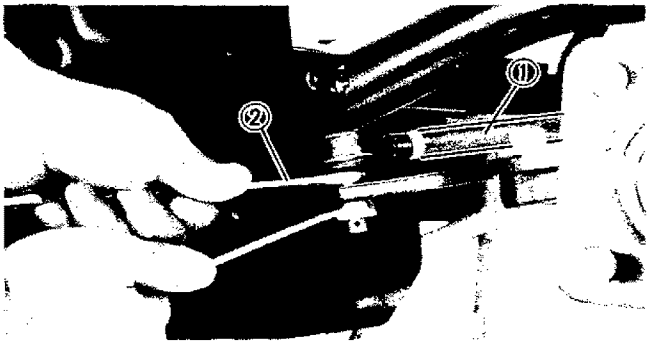
- Loosen the locknut ①.
- Tighten the pitman arm adjusting screw ② until it stops.
- Turn the adjusting screw ② out 1/4 turn.
- Jack up the front of the vehicle.
- Check for binding, while turning the steering wheel from lock to lock.
- If binding is felt, loosen the adjusting screw ② another 1/4 turn. Repeat procedure until binding is removed.

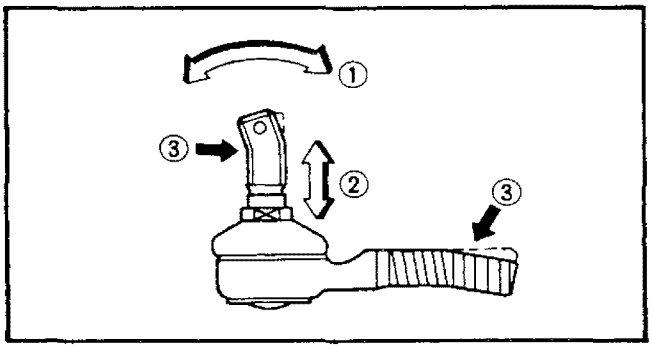
NOTE:
If binding cannot be removed within 1-1/2 turns of the adjusting screw, the steering gearbox must be disassembled and inspected.

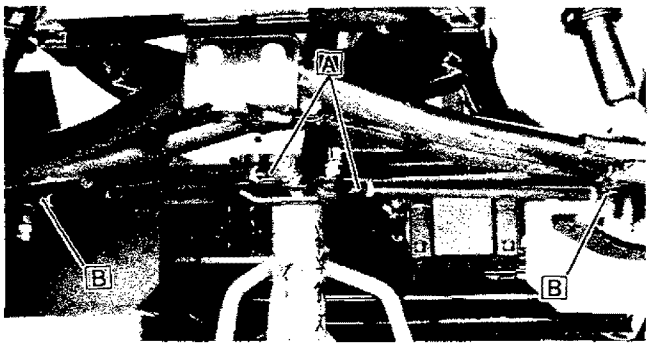
- Place the vehicle on the ground.
  Tighten the locknut ①.

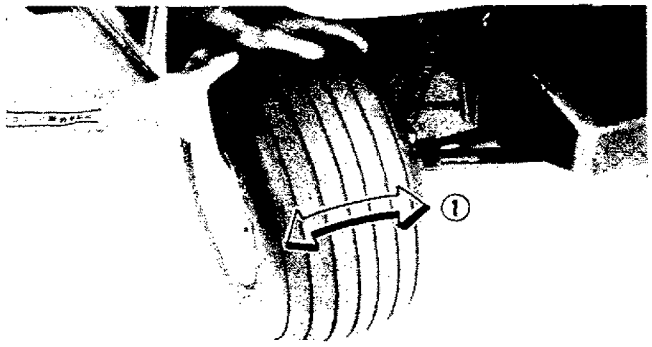
Locknut ③:
15 Nm (1.5 m·kg, 11 ft·lb)

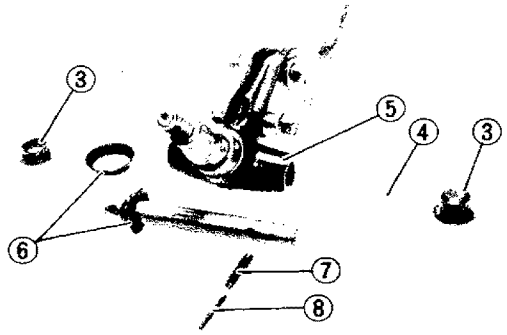
2. Recheck:
   - Steering wheel free play
     Still play → Disassemble the steering gearbox and check the components.











STEERING LINKAGE INSPECTION

Tie-Rod End (Universal joint)

1. Remove:
   - Cotter pin
   - Locknut
   - Tie rod ①

NOTE:

When removing the locknut, hold the rod end using a 14 mm wrench ②.

2. Check:
   - Rod end

   Unsmooth movement ① → Replace.
   Noticeable free play ② → Replace.
   Bolt bends ③ → Replace.
   Refer to CHAPTER 7. "STEERING SYSTEM" section.

3. Install:
   - Tie rod

Tie-Rod-Idler Arm [A] :
Knuckle Arm-Tie Rod [B] :
29 Nm (2.9 m·kg, 21 ft·lb)

Knuckle

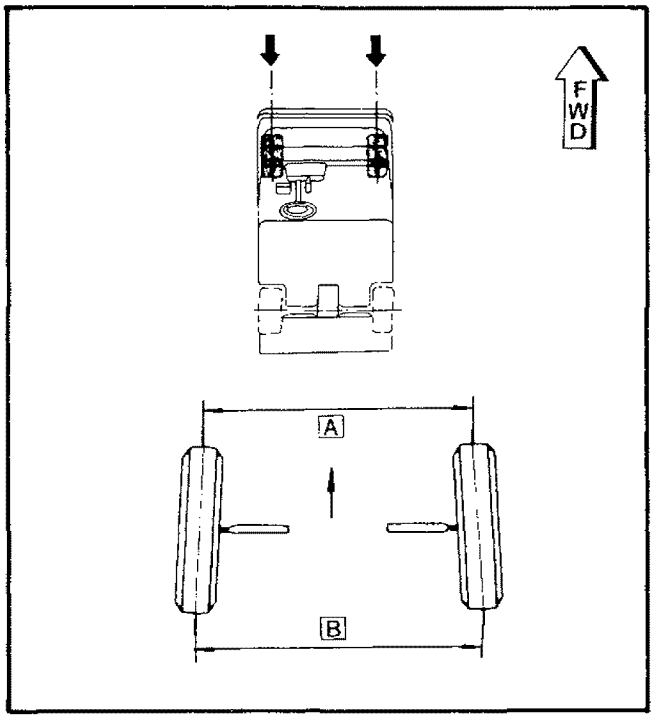
1. Check:
   - Kingpin free play

   Gently rock ① the front wheel back and forth.
   Noticeable free play → Replace kingpin ② and bushings ③.

Free Play Limit ① :
5 mm (0.20 in)

Refer to CHAPTER 7 "FRONT SUSPENSION AND KNUCKLE", section.

④ Thrust washer
⑤ Steering knuckle
⑥ Dust cover
⑦ Spring pin
⑧ Lock pin



WHEEL ALIGNMENT

Toe-In

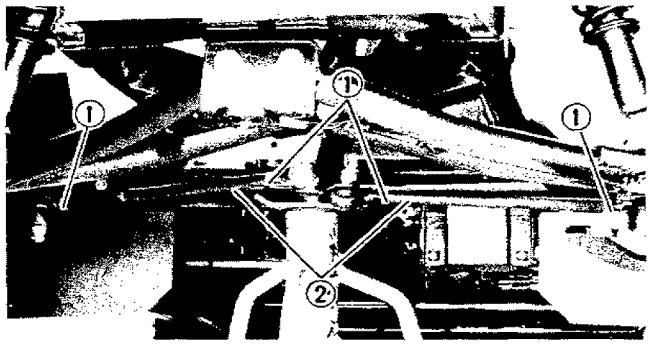
1. Place the vehicle on a level area.
2. Measure:
   - Toe-in

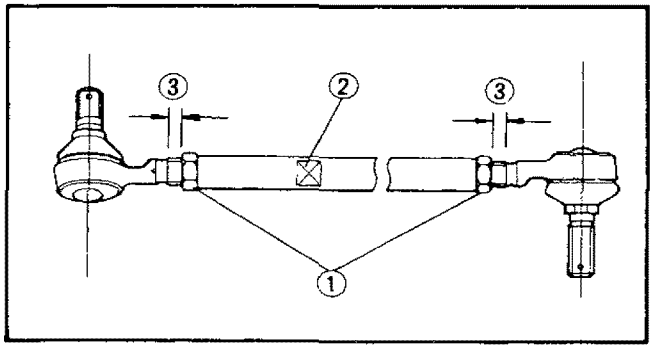
     Position the front wheels straight ahead.

     Out of specification → Adjust

Toe-In (B − A):
Unloaded:
10 ~ 20 mm (0.4 ~ 0.8 in)
Fully loaded: Zero mm (Zero in)

A CENTER-TO-CENTER AT FRONT SIDE TIRE TREAD.
B CENTER-TO-CENTER AT REAR SIDE TIRE TREAD.





Toe-in adjustment steps:
- Jack-up the front of the vehicle. Apply parking brake. Refer to "JACK-UP", section.
- Loosen the locknuts ①.
- Adjust the toe-in by turning the tie rods ②.

To Reduce →	**Turn the tie rods ② to make its length longer.**
To Increase →	**Turn the tie rods ② to make its length shorter.**

NOTE:
- When loosening or tightening the locknuts ① , hold the tie-rod at a flat section ② with a 19 mm wrench.
- The length of the threads ③ of both rod ends must be same.

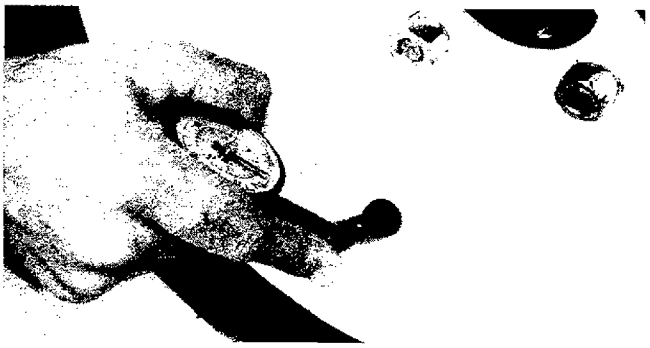
- Tighten the locknuts.

Rod End Locknut:
48 Nm (4.8 m·kg, 35 ft·lb)

- Place the vehicle back on the ground.
- Compress the suspension by standing on the front bumper.

3. Recheck:
   - Toe-in

     Out of specification → Repeat adjustment steps.



TIRE AND WHEEL INSPECTION

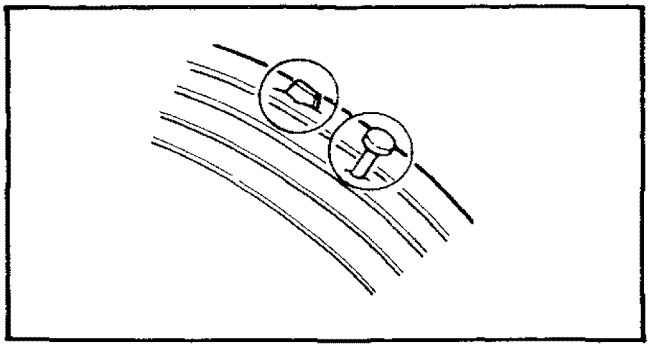
1. Measure:
   - Air pressure

   Out of specification → Adjust.

Tire Pressure: (Front and Rear)
FOR G2-A:
80 kPa (0.8 kg/cm², 11 psi)
FOR G2-E:
90 kPa (0.9 kg/cm², 13 psi)

⚠ WARNING:

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



2. Inspect:
   - Tire surfaces

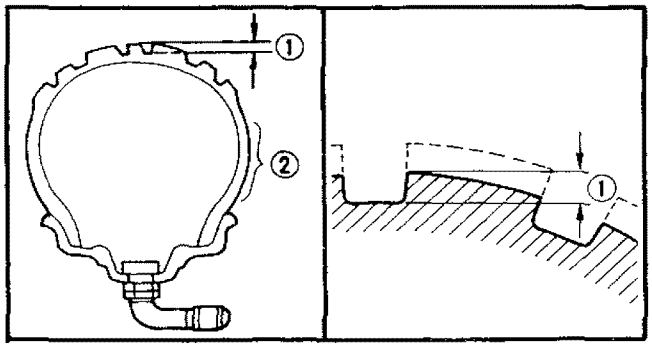
   Wear/Damage/Cracks/Road hazards → Replace.
   - Wheels

   Damage/Bends → Replace.

   Never attempt even small repairs to the wheel.

⚠ WARNING:

Ride conservatively after installing a tire to allow it to seat itself properly on the rim.

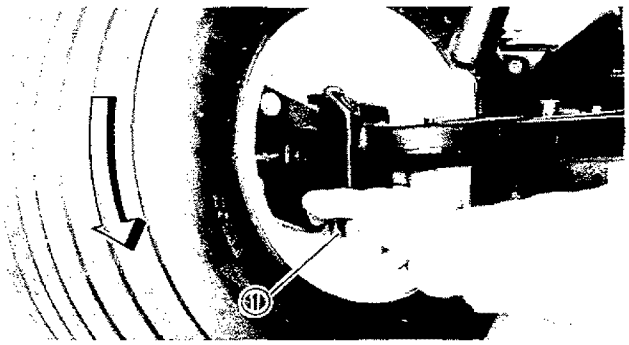


3. Measure:
   - Tire tread depth

   Out of specification → Replace.

Minimum Tire Tread Depth: (Front and rear) 1.0 mm (0.04 in)

① Tread depth
② Side wall

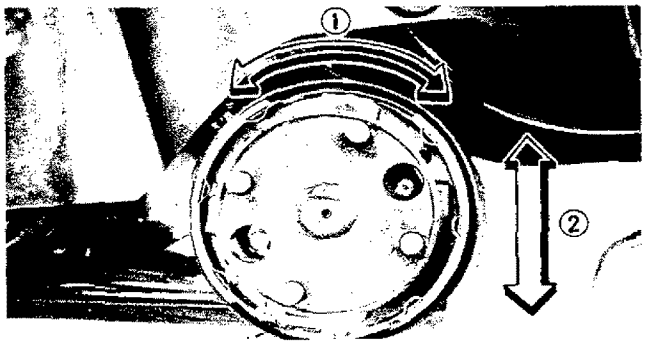


FRONT WHEEL BEARING INSPECTION

1. Jack-up the front of the vehicle. Apply parking brake. Refer to "JACK-UP", section.
2. Spin the wheel by hand. Touch the knuckle or kingpin ① while spinning the wheel.
   Excessive vibration → Replace bearings.
   Refer to CHAPTER 7 "FRONT WHEEL — WHEEL BEARING REPLACEMENT" section.

REAR AXLE BEARING INSPECTION

1. Apply the parking brake, loosen the rear wheel nut.
2. Jack-up the rear of the vehicle. Block the front wheels. Refer to "JACK-UP", section.
3. Remove:
   - Rear wheel
   - Brake drum



4. Turn ① the rear axle slowly by hand.
   Roughness → Replace bearing.
5. Gently rock ② the rear axle up and down.
   Noticeable free play → Replace bearing.
   Refer to CHAPTER 7 "REAR AXLE — INSPECTION" section.

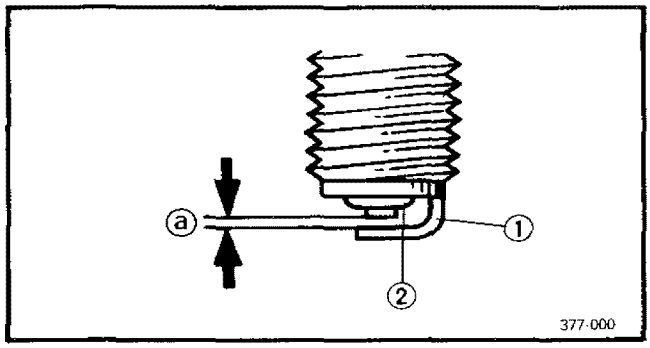
SHOCK ABSORBER INSPECTION

1. Inspect:
   - Oil leakage
     Oil leaks → Replace shock absorber assembly.
   - Coil spring
     Fatigue/Cracks/Damage → Replace shock absorber assembly.
     Refer to CHAPTER 7, "FRONT SUSPENSION" and "REAR SUSPENSION" section.

	Pivot Bolt-Nut: **(Upper and Lower)** **29 Nm (2.9 m·kg, 21 ft·lb)**

ELECTRICAL (FOR G2-A)

SPARK PLUG INSPECTION



1. Remove:
   - Spark plug
2. Inspect:
   - Spark plug type
     Incorrect → Replace.

Standard Spark Plug:
BR5ES (NGK) or RN8 (CHAMPION)

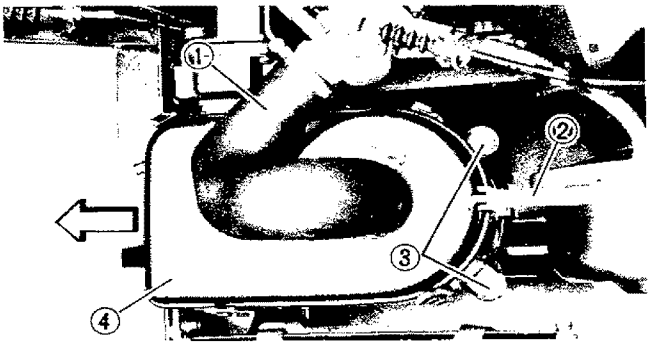
3. Inspect:
   - Electrode ①
     Wear/Damage → Replace.
   - Insulator ②
     Abnormal color → Replace.
     Normal color is a medium-to-light tan color.
4. Clean:
   - Spark plug
     Use a spark plug cleaner or wire brush.
5. Measure:
   - Plug gap ⓐ
     Use a Wire Gauge or Feeler Gauge.
     Out of specification → Regap.

Spark Plug Gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

6. Tighten:
   - Spark Plug

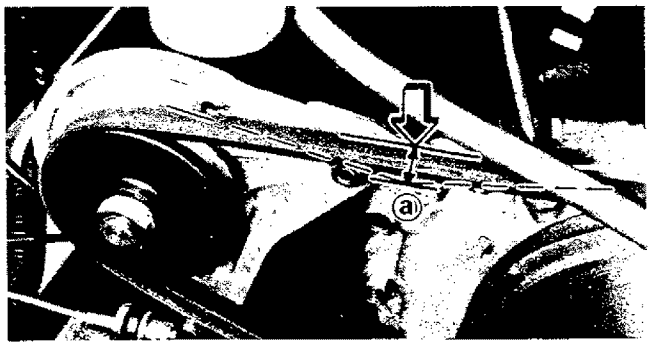
Spark Plug:
20 Nm (2.0 m · kg, 14 ft · lb)

NOTE:
- Before installing a spark plug, clean the gasket and plug surfaces.
- Finger-tighten the spark plug before torquing to specification.



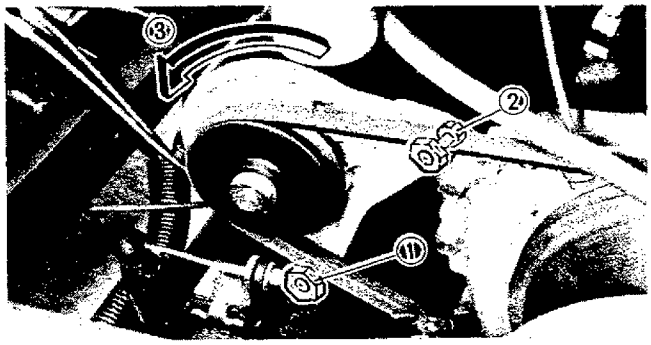
STARTER BELT INSPECTION

1. Disconnect:
   - Rubber joint ①
     (from the carburetor)
   - Blow-by hose ②
2. Remove:
   - Holding bolts ③
   - Air cleaner case ④
     When removing the case, push it toward the front.
3. Inspect:
   - Starter belt
     Wear/Cracks/Damage → Replace.



4. Check:
   - Belt tension
     Out of specification → Adjust.

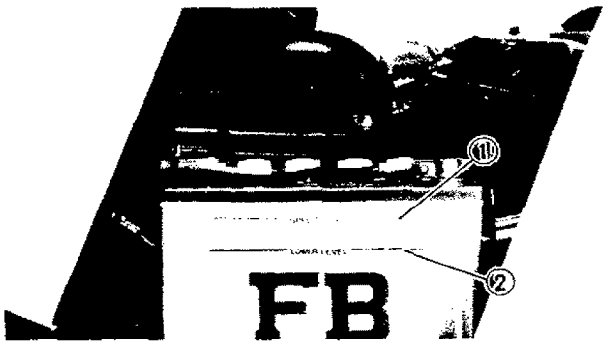
Starter Belt Tension ⓐ :
8 ~ 12 mm/10 kg
(0.31 ~ 0.47 in/22 lb)



Belt tension adjustment steps:
- Loosen the nut ① .
- Loosen the belt tension bolt ② .
- Ajust the tension by swinging the starter ③ .
- Tight the tension bolt ② first, then tighten the nut ① .

Belt Tension Bolt-Nut ② :
14 Nm (1.4 m· Kg, 10 ft· lb)
Holding Bolt-Nut ① :
53 Nm (5.3 m· kg, 38 ft· lb)

NOTE:
If the specified value can not be obtained with the tension adjusting position is at the maximum, replace the belt.



BATTERY INSPECTION

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

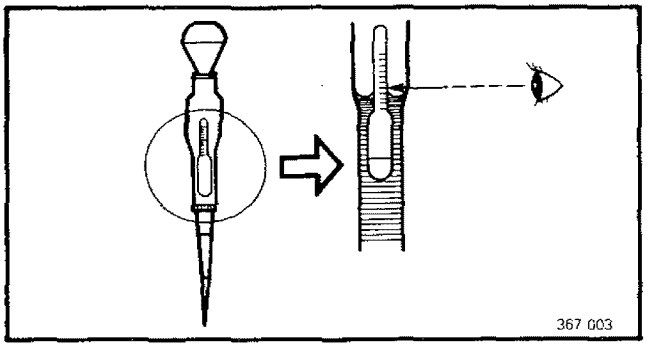
⚠ CAUTION:

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

2. Inspect:
   - Battery terminal
     Dirty terminal → Clean with wire brush.
     Poor connection → Correct.

NOTE:

After cleaning the terminals, apply grease lightly to the terminals.



3. Check:
   - Specific gravity
     Less then 1.26 → Recharge battery.

Charging Current:
4.8 Amps/10 Hrs.
Specific Gravity:
1.26 at 20°C (68°F)

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

⚠ CAUTION:

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

⚠ WARNING:

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

Always follow these precautionary measures:

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

Antidote (EXTERNAL):

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

Antidote (INTERNAL):

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

Batteries also generate explosive hydrogen gas. Therefore you should always follow these precautionary measures:

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

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

BATTERY CHARGING

The battery must be charge properly before using for the first time. This initial charge will prolong the life of the battery.

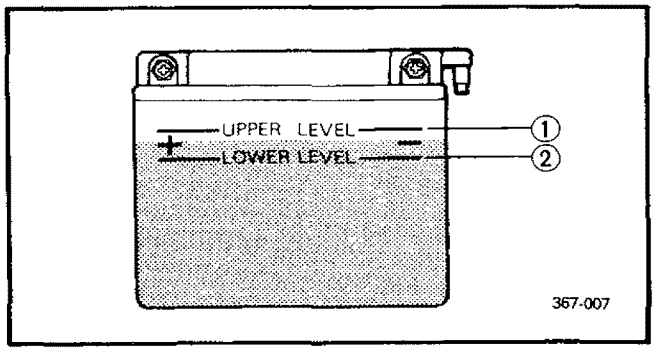
Battery charging step:

- Remove all filler caps from the battery.

NOTE:

Place the battery on a level place.

- Cool the electrolyte down to below 30°C (86°F).
- Pour electrolyte into each cell little by little up to the upper level line, and leave it for a while. When the battery fluid permeates the plates and separators, the fluid level begins to lower. Add electrolyte and bring back to upper level line.



① Upper level
② Lower level

NOTE:
Fill the battery with diluted sulfuric acid (electrolyte).

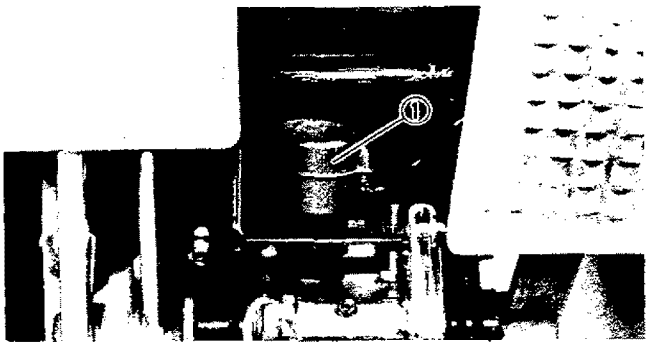
- Connect the battery to a battery charger.
- Set the battery charger rate at 1/10 the battery capacity and charge the battery for 10 hours.

Charging Rate:
4.8 AH x 10 hours
Battery Capacity:
12V 48AH

- Turn the battery charger off then disconnect it from the battery.
- Check the specific gravity of each cell with a hydrometer. If the hydrometer readings is below the specification, additional charging is necessary.

Specific Gravity:
1.260 at 20°C (68°F)

- Install the filler caps, and thoroughly wipe off the fluid around the filler caps.



ACCELERATOR STOP SWITCH ADJUSTMENT

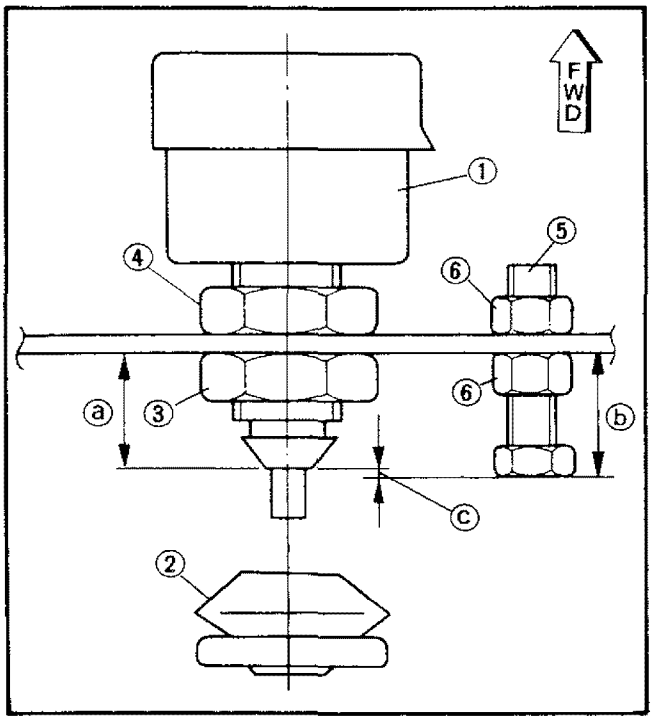
1. Remove the service lid.
2. Check:
   - Operation timing (Accelerator stop switch ①)

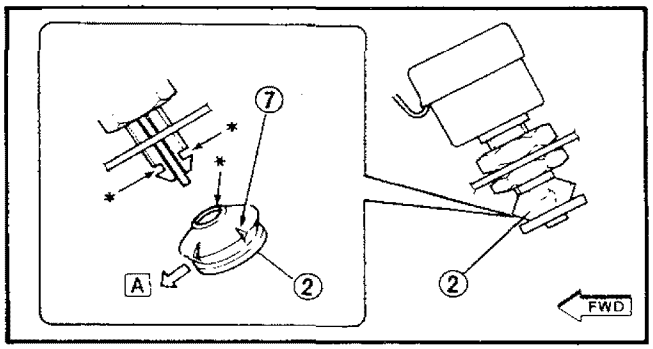
   Depress the accerator pedal slowly.
   If throttle valve opening occurs before accelerator stop switch click → Adjust the accelerator stop switch installing height.

Switch installing height adjustment steps:
- Remove the rubber protector ②.
- Loosen the locknut ③.
- Adjust the installation height ⓐ by turning the locknut ④.

To Increase → Turn locknut ④ counter-clockwise.

- Tighten the locknut ③.





Locknut ③ :
5 Nm (0.5 m·kg, 3.6 ft·lb)

- Adjust the stopper bolt height ⓑ for the difference ⓒ .

Standard Switch Height ⓐ :
13.6 ~ 14.0 mm (0.54 ~ 0.55 in)
Standard Stopper Bolt Height ⓑ :
16.0 ~ 16.4 mm (0.63 ~ 0.65 in)
Difference ⓒ :
2.0 ~ 2.8 mm (0.08 ~ 0.09 in)

⑤ Stopper bolt
⑥ Lock nut

- Install the rubber protector ② .

⚠ CAUTION:
Besure to face one of the slots ⑦ downward A .

- Recheck the stop switch click should occur before throttle valve opens.

ELECTRICAL (FOR G2-E)

BATTERY CHARGING

The batteries must be charge properly before using for the first time. This initial charge will prolong the life of the batteries.

⚠ CAUTION:

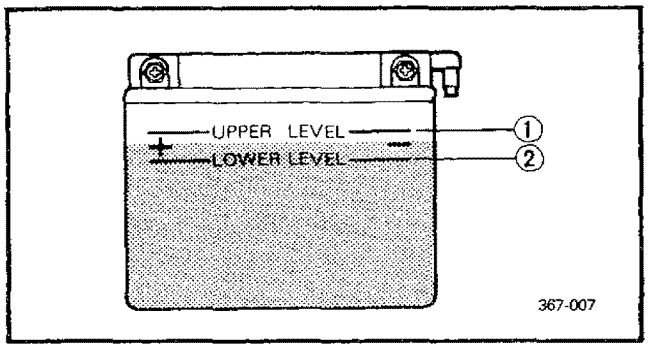
To insure maximum battery performance be sure to:

- **Charge a new battery before use.**
  Proper current; 4 amps/12 hrs.
- **Maintain proper electrolyte level.**
  Be especially careful not to overfill the batteries, or allow the electrolyte level to drop below the top of the plate.
- **Do not over charge the batteries.**

Failure to observe these points will result in a shortened battery life.

NOTE:

Periodic charge is necessary during extended storage.



Battery charging step:

- Remove all filler caps from the batteries.
- Cool the electrolyte down to below 30°C (86°F).
- Pour electrolyte into each cell little by little up to the upper level line, and leave it for a while. When the batteries fluid permeates the plates and separators, the fluid level begins to lower. Add electrolyte and bring back to upper level line.

①Upper level
②Lower level

NOTE:

Fill the batteries with diluted sulfuric acid (electrolyte).

⚠ WARNING:

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

Always follow these precautionary measures:

- **Avoid bodily contact with electrolyte as it can cause servere burns or permanent eye injury.**

- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

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

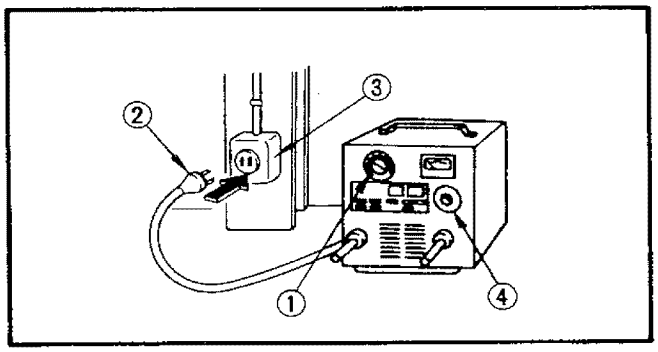
Antidote (INTERNAL):

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

Batteries also generate explosive hydrogen gas. Therefore you should always follow these precautionary measures:

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

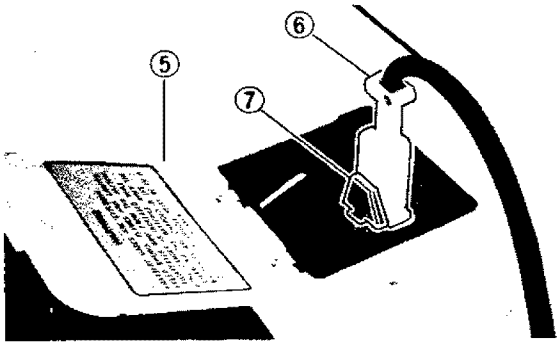
KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.



- Turn the main switch to the OFF position.
- Turn a battery charger timer ① off and connect a AC plug ② of the battery charger to a wall socket ③ .

④ Pilot lamp

- Open the cowl body for ventilation during battery charging.
- Open the lid ⑤ and insert the charger plug ⑥ into the golf car's charging receptacle ⑦.



⚠ CAUTION:

Take care so that the charger cord is not damaged by being caught in the car body.

⚠ WARNING:

Do not unplug the charger from the receptacle in the car until the charger is turned off. Unplugging an operating charger will cause sparks.

- Set the battery charger timer at 12 hours and charge the battery.
- Turn the battery charger off, then dis connect it from the battery.

- Check the specific gravity of each cell with a hydrometer. If the hydrometer readings is below the specification, additional charging is necessary.

Specific Gravity:
1.260 at 20°C (68°F)

- Install the filler caps, and thoroughly wipe off the fluid around the filler caps.

Preferable charging:

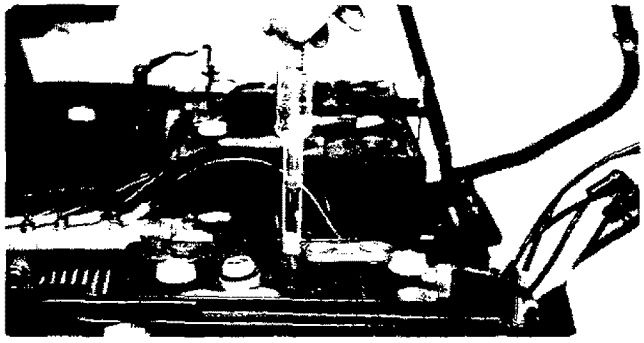
- For the first five rounds, new batteries should go only 18 holes between charges.
- A20-minute charge between rounds helps extend battery life.
- As batteries get older, their lives can be extended by decreasing the charging time from the normal 12 hours to as little as 6 hours to prevent overcharging.

NOTE:
Use the following for setting the charger time:

Finish rate on Charger Ammeter	Timer setting
1 — 4 Amps	12 Hrs
6 — 8 Amps	10 Hrs
10 — 12 Amps	8 Hrs
15 Amps +	6 Hrs

⚠ CAUTION:

- **Take care that the batteries are not overcharged. This will shorten their life.**
- **Choose a well-ventilated area during charging.**



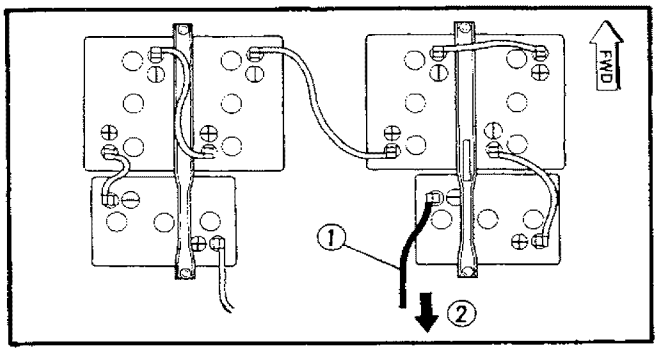
- Organize and store the vehicles so that get equal use.
- The batteries should be charged every day. But if they are not used and checking shows that a catch-up charging is not required, they should not be charged.

CATCH-UP CHARGING

State of charge (Specific gravity)	Charge
1.260 to 1.280	None needed
1.240 to 1.260	4 Hrs
1.220 to 1.240	8 Hrs
Below 1.220	12 Hrs

BATTERY INSPECTION

Refer to "FOR G2-A — BATTERY INSPECTION" section. Note the following points.

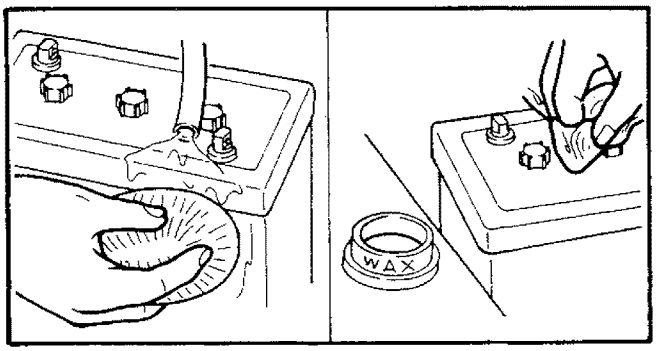


1. Remove:
   - Battery leads
   - Batteries

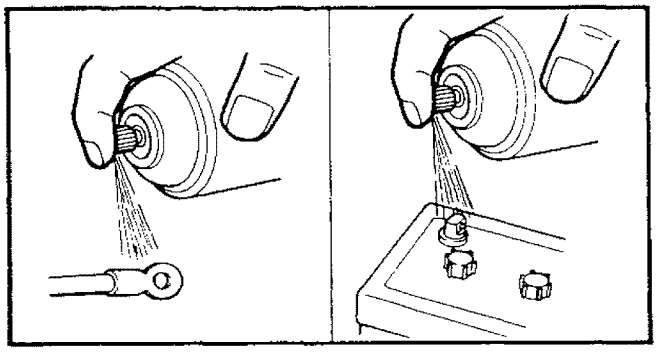
⚠ WARNING:

- **Always disconnect the negative lead ① first.**
- **Insulate wrenches with tape to avoid short circuiting of the batteries.**

② To motor terminal A2.



2. Wash the battery tops, sides, and surrounding area with baking soad dissolved in water. Be careful not to get this solution into the batteries. After drying, coat it with a car wax.



3. Inspect:
   - Lead terminals
   - Battery terminals

   Corrosion → Clean.

Terminal cleaning steps:

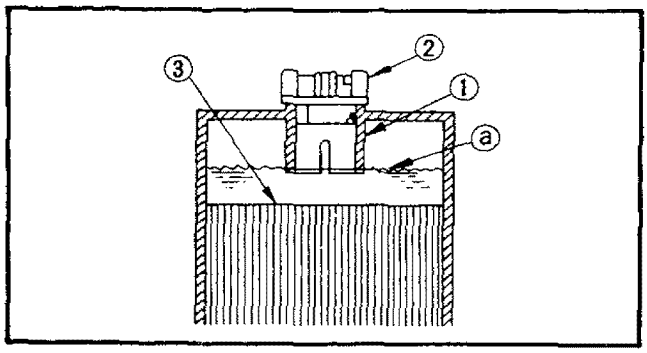
- Spray the terminals with the WD-40, then allow few minutes.
- Wipe off with a clean rag.

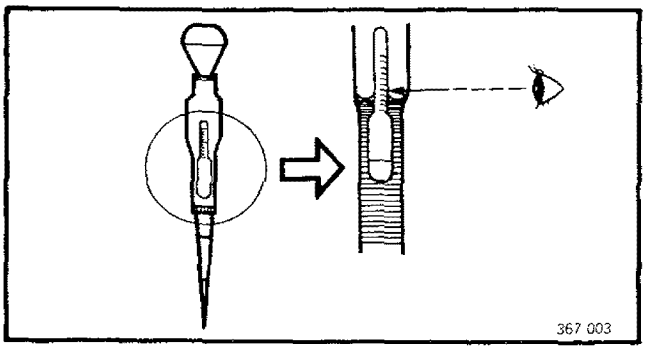
4. Inspect:
   - Holddowns

   Use a wire brush.

   Corrosion → Clean/Replace.

   After cleaning, rinse with water. Then repaint with a corrosion resistance paint.





5. Check:
   - Electrolyte level ⓐ
     Below level → Add distilled water.

ⓐ Proper fill level – DO NOT OVER FILL!
① Level indicator
② Cap
③ Plate

6. Inspect:
   - Cap vent
     Contamination → Clean.

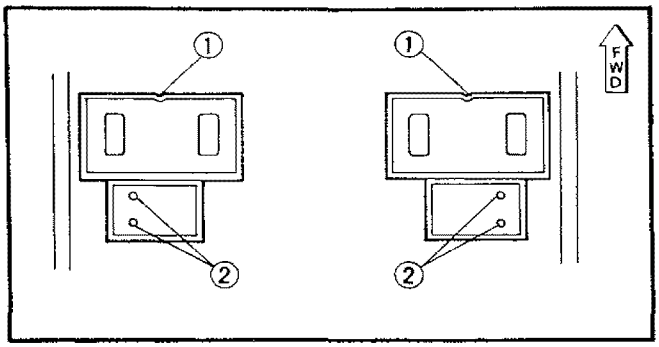
7. Measure:
   - Specific gravity
     Use the Hydrometer.
     Less than 1.260 → Charge battery.
     Refer to "BATTERY CHARGING" section.

Hydrometer:
YU-03036, 90890-03036

State of charging/Specific gravity (at 26.7°C (80°F)	
Charged	Initial full charge of 1.260
100%	1.260
75%	1.225
50%	1.190
25%	1.155
Discharge	1.120

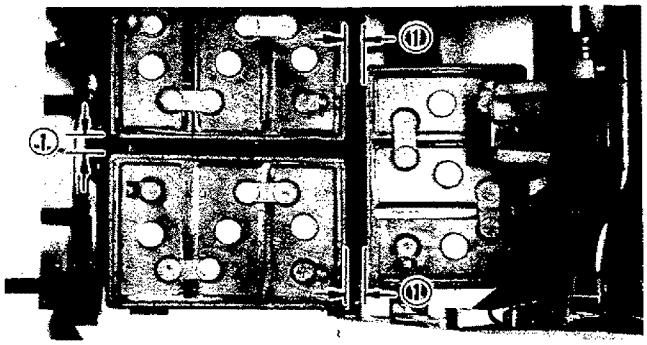
NOTE:
The specific gravity of battery electrolyte varies greatly according to temperatures, use the chart as reference.

Temperature		Satisfactory uncorrected hydrometer reading
°F	°C	
120	48.9	1.244
110	43.3	1.248
100	37.8	1.252
90	32.2	1.256
80	26.7	1.260
70	21.1	1.264
60	15.6	1.268
50	10.0	1.272
40	4.4	1.276
30	−1.1	1.280



8. Install the battery traies in place shown on the illustration.

① Escape cutting-off for holding bolt.
② Drain hole

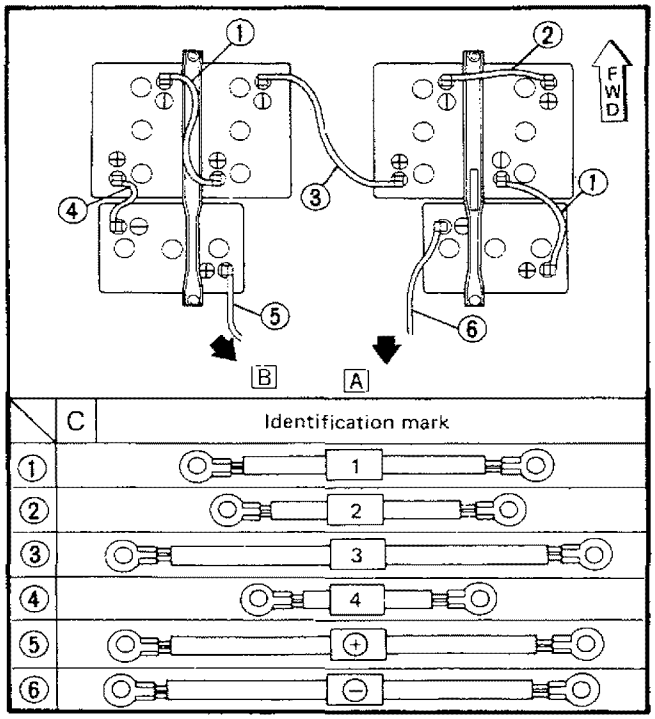


9. Install:
   • Batteries

	Battery Holder: 2 Nm (0.2 m·kg, 1.4 ft·lb)

⚠ CAUTION:

Keep the clearance ① between the batteries as much as possible for cooling.



	C	Identification mark
①		1
②		2
③		3
④		4
⑤		⊕
⑥		⊖

10. Connect:
    • Battery leads
      See illustration.

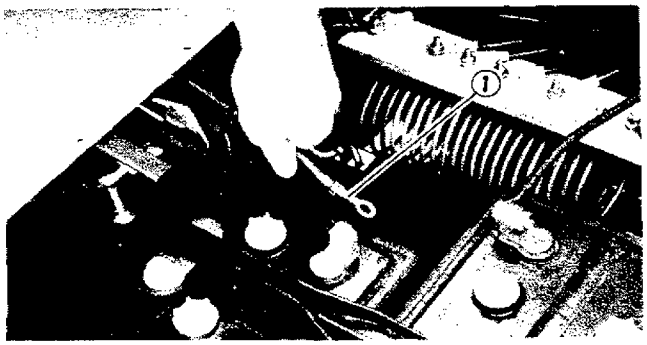
	Terminal Nut: 6 Nm (0.6 m·kg, 4.3 ft·lb)

⚠ WARNING:

Connect the negative lead ⑥ last.

⚠ CAUTION:

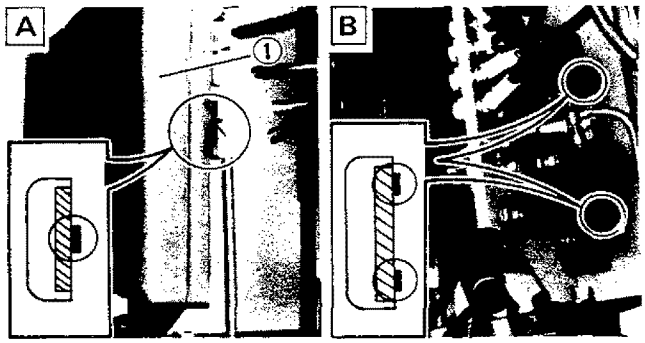
Using a wire brush, clean both the contact surface of the battery terminal and lead clamp until both have a bright metalic shine for good electrical contact.
Apply specially treated felt washers, an anti-corrosion spray, or grease, to prevent corrosion.



A To solenoid relay
B To motor terminal A2

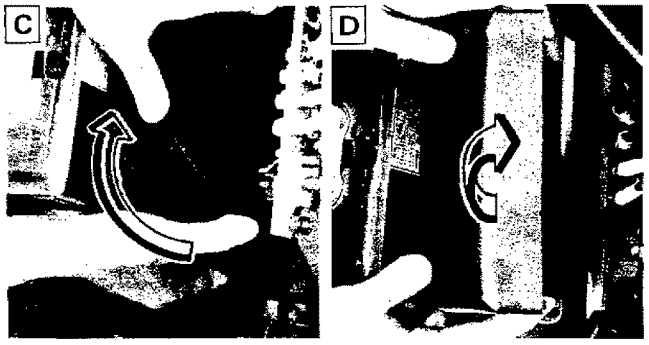
SPEED CONTROLLER INSPECTION

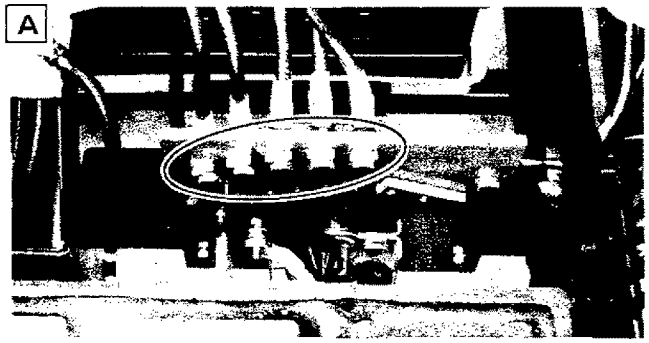
1. Open the seat.
   Refer to "SEAT COLWING OPENING" section.
2. Disconnect the battery negative lead ① .



3. Remove the controller cover ①.

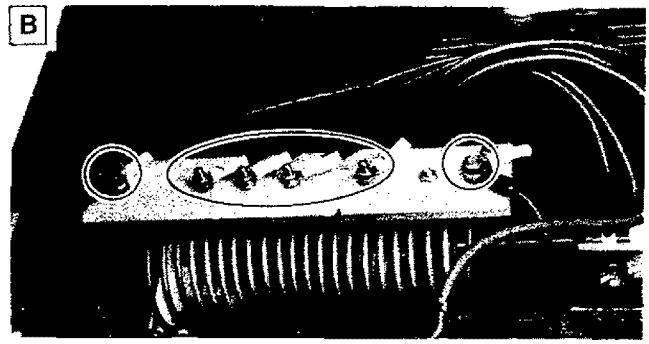
Controller cover removal steps.
- Unhook the upper side of the cover ① from the base plate: [A].
- Unhook the lower side of the cover: [B]
- Raise the front side of the cover up: [C]
- While turning, pull the cover out: [D]

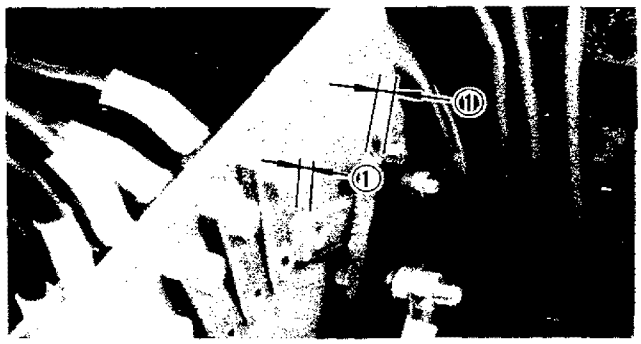




4. Check:
- Leads connection (Controller [A] and resistor [B])
  Looseness → Retighten.

Terminal Nut:
3 Nm (0.3 m·kg, 2.2 ft·lb)

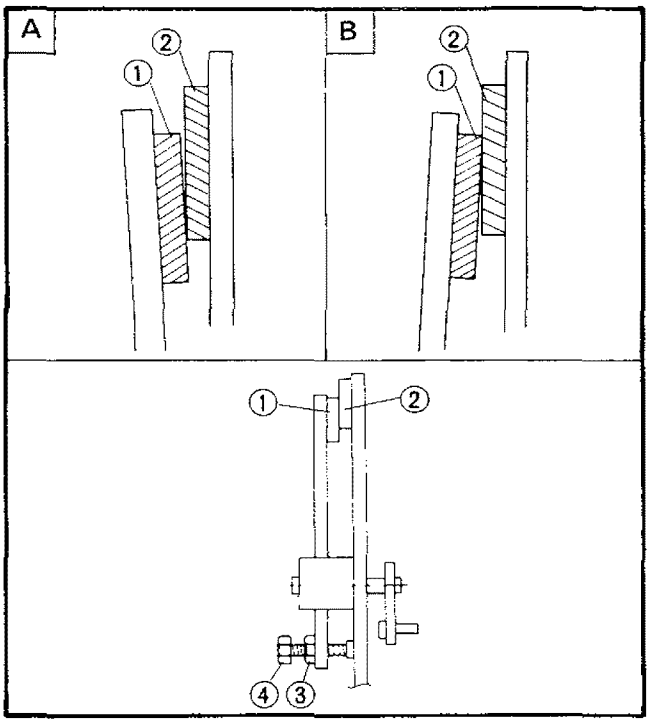




5. Inspect:
- Surface of contacts
  Burn/Wear → Replace contact.

6. Measure:
- Contact thickness ①
  Out of specification → Replace.

Wear Limit ①:
4.0 mm (0.16 in)

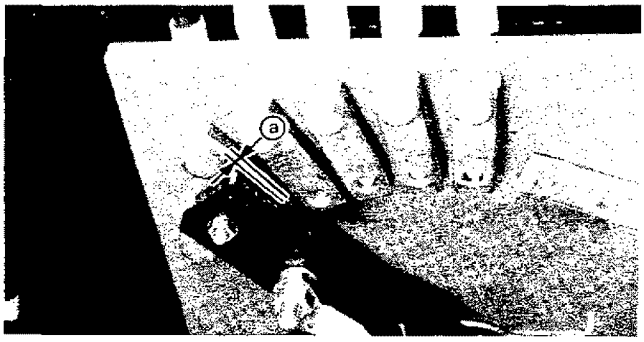


7. Inspect:
   - Movable contact ① /fixed contact ② matching
     Inspect matching of each contact.
     Incorrect matching (A or B) → Adjust.

Contact matching adjustment steps:
- Loosen the locknut ③ .
- Adjust matching by turning the adjusting bolt ④.

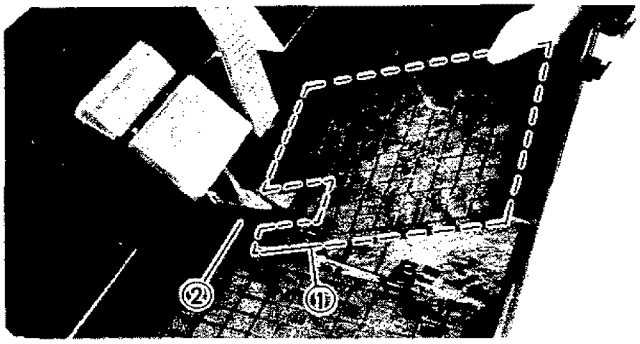
Matching A →	Turn adjusting bolt ④ counter-clockwise.
Matching B →	Turn adjusting bolt ④ clockwise.

- Tighten the locknut ③ .



8. Measure:
   - Contact overlap allowance ⓐ
     Measure the overlap while depressing the accelerator pedal to the full extent.
     Out of specification → Adjust.

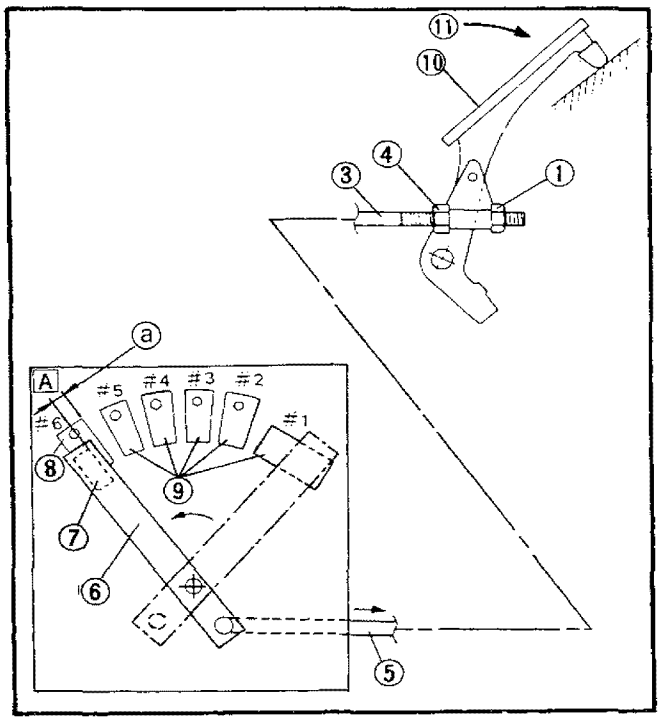
Contact Overlap Allowance ⓐ :
1.0 ~ 2.0 mm (0.04 ~ 0.08 in)



Contact overlap allowance adjustment steps:
- Remove the service lid ① with the floor mat ② .
- Loosen the locknuts ③, ④ on the accelerator rod ⑤ .
- Adjust overlap 1 by turning the locknut.

To Reduce →	Turn locknut ③ clockwise.
To Increase →	Turn locknut ④ counterclockwise

- Tighten the locknut ④ or ③ .

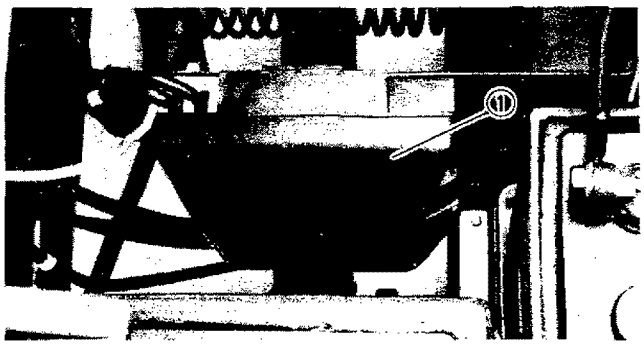


A CONTACT OVERLAP ALLOWANCE
⑥ Slider arm
⑦ Movable contact
⑧ Fixed contact #6
⑨ Fixed contacts #1 ~ #5
⑩ Accelerator pedal
⑪ Depress to the full extent

SOLENOID RELAY INSPECTION

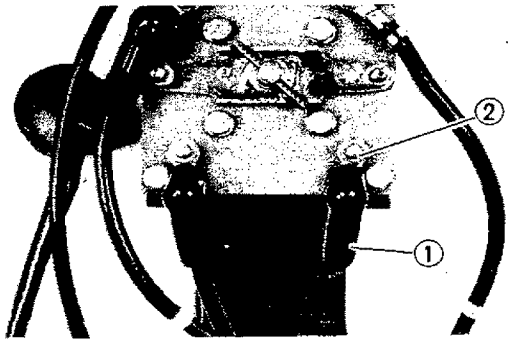
Function

The solenoid coil, when activated by closing the accelerator stop switch, close the solenoid contacts thus providing the starter with current. Also act as a safety device, preventing the vehicle from abruptly starting when the main switch is operated.

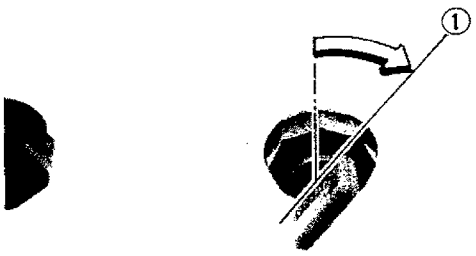


Inspection

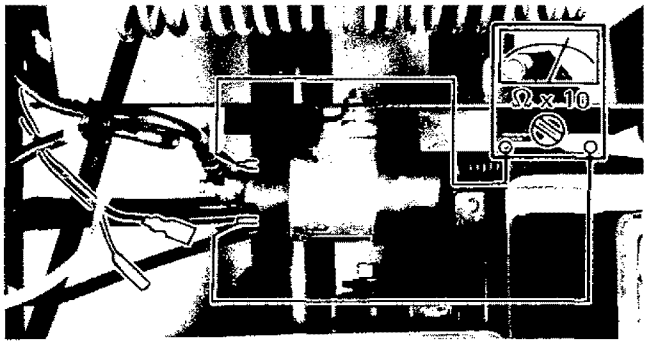
1. Open the seat, and remove the solenoid cover ①.



2. Disconnect:
   - Forward-reserse switch lead ①
     From the switch terminal F2 ②.
3. Insulate the lead end with tape.



4. Turn the main switch to "ON" ① .
5. Check:
   • Solenoid relay (Clicking)
   Depress the accelerator pedal to close the accelerator stop switch.
   Not clicking → Measure coil resistance.



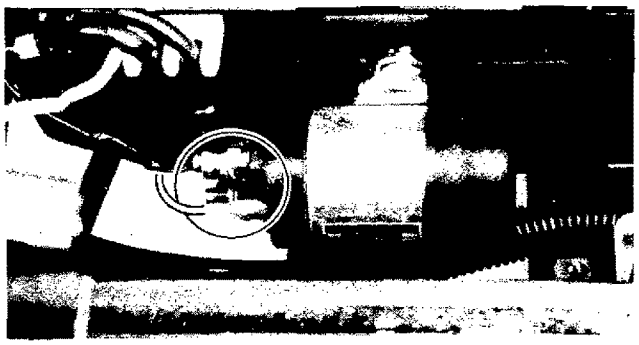
6. Disconnect the solenoid coil leads ② .
7. Measure:
   • Coil resistance
   Use the Pocket Tester ③ .
   Out of specification → Replace.
   Within specification → Inspect control circuit.
   Refer to CHAPTER 8 "SOLENOID RELAY – TROUBLESHOOTING" section.

Solenoid Coil Resistance:
56.2 ~ 68.6Ω at 20°C (68°F)

Pocket Tester:
YS-03112, 90890-03112

8. Check for continuity between the two contact posts with Pocket Tester while the solenoid is activated. If there is no continuity, replace the relay.

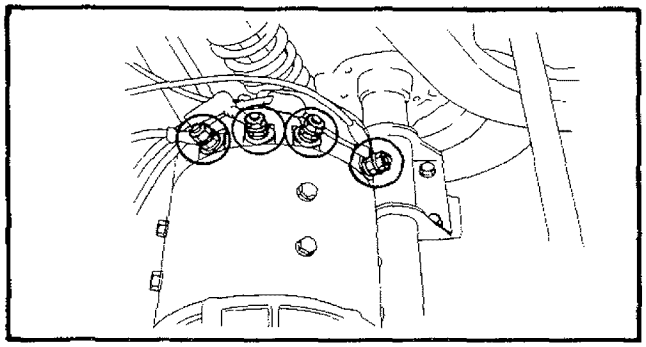
Pocket Tester:
YS-03112, 90890-03112



9. Check:
   • Leads connection
   Looseness → Retighten/Reconnect.

Terminal Nut:
6 Nm (0.6 m·kg, 4.3 ft·lb)

10. Connect the forward-reverse switch lead.
11. Check:
   • Solenoid contacts
   Check temperature of the solenoid relay, after maximum speed driving.
   Excessive heating → Replace relay.



TRACTION MOTOR INSPECTION

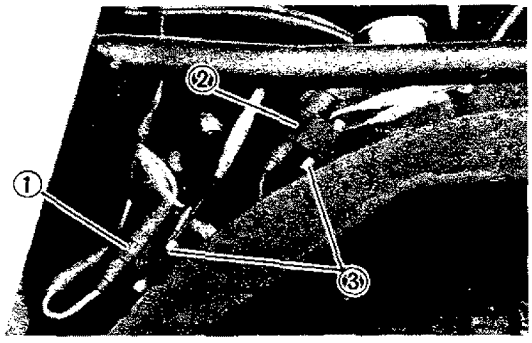
1. Open the seat, and remove the rear cowling.
   Refer to "COWLING BODY", section.
2. Check:
   - Lead connections
     Loose → Retighten.
     Faulty → Replace.

Terminal Nut:
7 Nm (0.7 m·kg, 5.1 ft·lb)

CABLE ROUTING INSPECTION

1. Inspect:
   - Lead connections (Terminals and connectors)
     Loose → Retighten/Reconnect.
     Refer to CHAPTER 2 "TIGHTENING TORQUE" section.
2. Inspect:
   - All leads (Routing)
     Be sure the all leads are properly routed.
     Refer to routing diagram.
3. Inspect:
   - All leads (Insulation)
     Cracks/Damage → Replace.

NOTE:
For details, refer to CHAPTER 2. "CABLE ROUTING", section.



FUSE

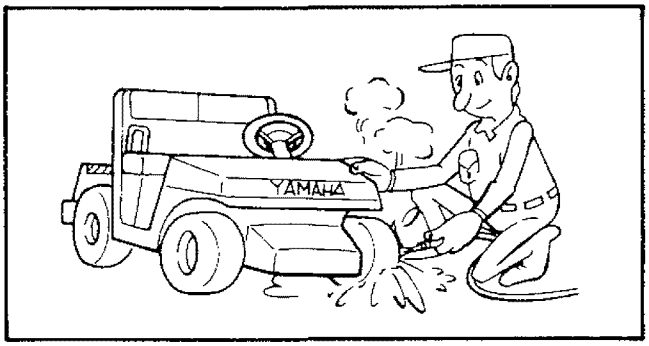
There are two fuse holders on this golf car. The positive fuse ① (red lead) and negative fuse ② (black lead) are located on the front side of the left-rear tire housing.

③ Spare fuses

ENGINE OVERHAUL

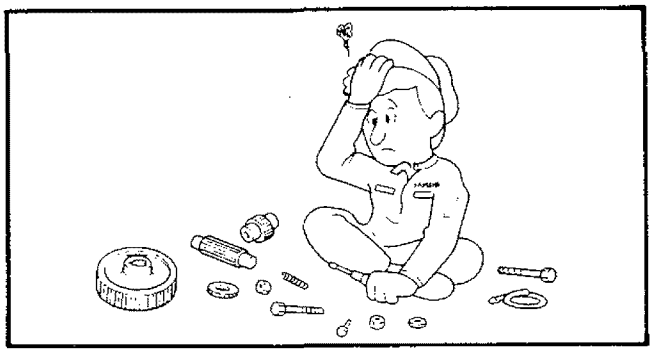
ENGINE REMOVAL

NOTE:
It is not necessary to remove the engine in order to remove the following components:
- Cylinder head assembly
- Carburetor
- Startor-generator
- Primary sheave

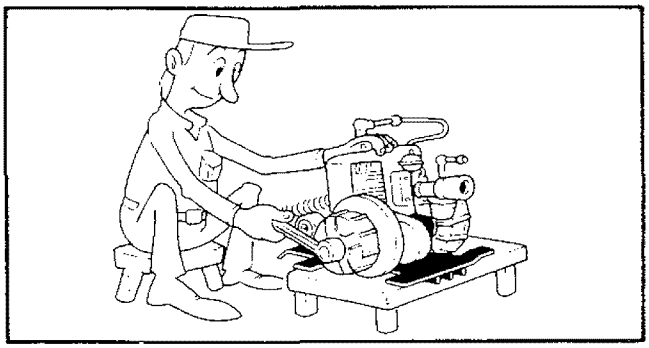


PREPARATION FOR REMOVAL

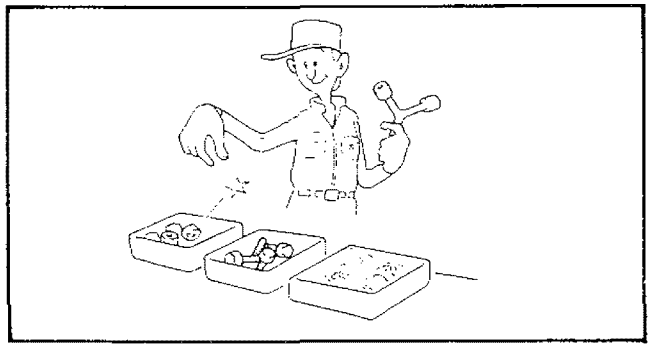
1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.



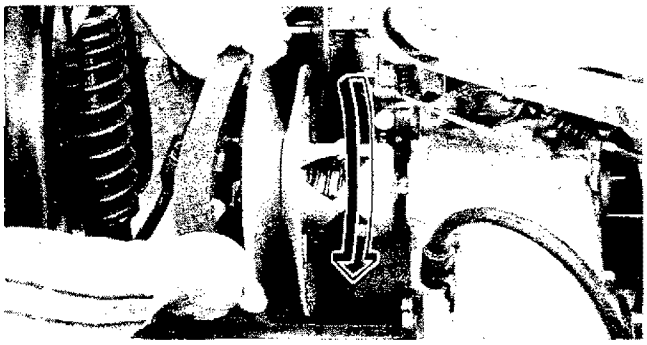
2. Use proper tools and cleaning equipment. Refer to CHAPTER 1 "SPECIAL TOOLS".



NOTE:
When disassembling the engine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.



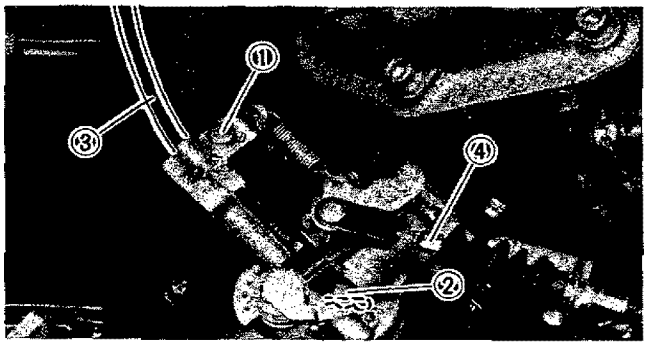
3. During the engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Disconnect the battery negative lead.
5. Drain the engine oil completely. Refer to CHAPTER 3 "ENGINE OIL REPLACEMENT" section.



DRIVE BELT

1. Remove:
   - Drive belt

   Refer to CHAPTER 3 "DRIVE BELT INSPECTION" section.

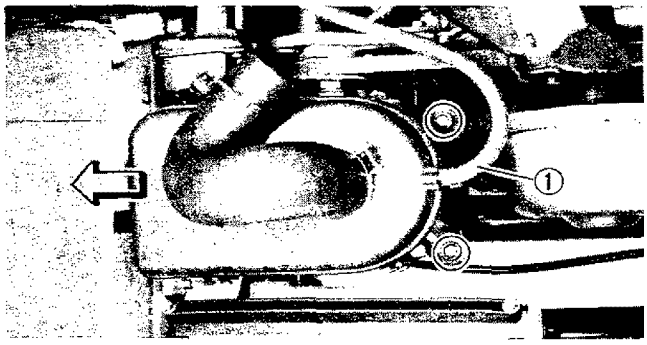


CARBURETOR

1. Disconnect:
   - Fuel hose
2. Loosen:
   - Choke cable clamp screw ⓘ
3. Remove:
   - Cotter pin

     From clevis pin ② .
   - Clevis pin
   - Choke cable ③
4. Remove:
   - Circlip
   - Cotter pin

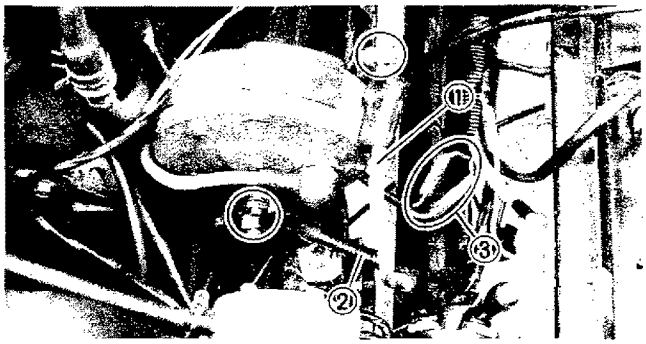
     From clevis pin.
   - Clevis pin
   - Throttle cable ④
5. Loosen:
   - Carburetor joint clamp screws
6. Remove:
   - Carburetor body holding nuts
   - Carburetor assembly
   - Gasket
   - Intake manifold holding screws
   - Intake manifold and gasket



AIR CLEANER CASE

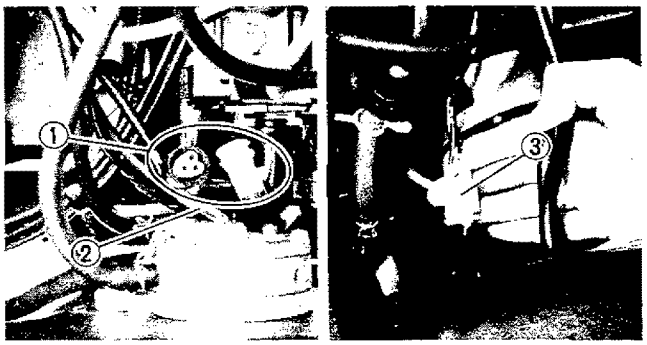
1. Disconnect:
   - Blow-by hose ①
2. Remove:
   - Air cleaner case holding bolts
   - Air cleaner case

     When removing the case, push it toward the front.

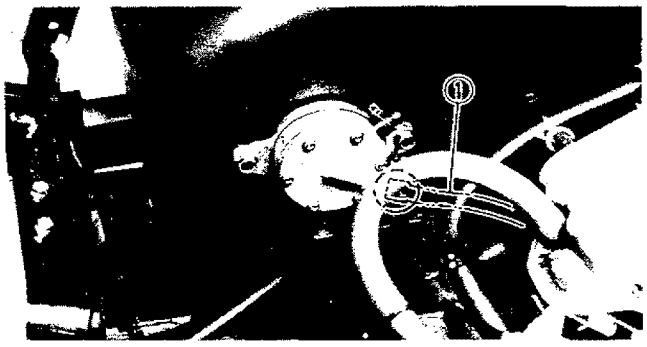


LEAD AND HOSE

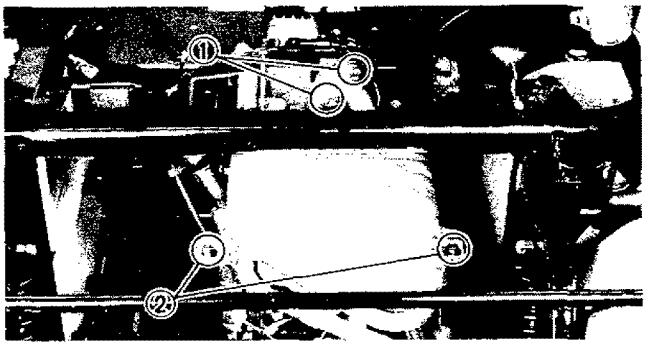
1. Disconnect:
   - Starter-generator lead (Red) ①
   - Starter-generator lead (Black) ②
     (from starter-generator)
   - Starter-generator thin leads ③



2. Disconnect:
   - Pickup coil lead ①
   - Oil level switch lead ②
   - Ignition coil lead ③

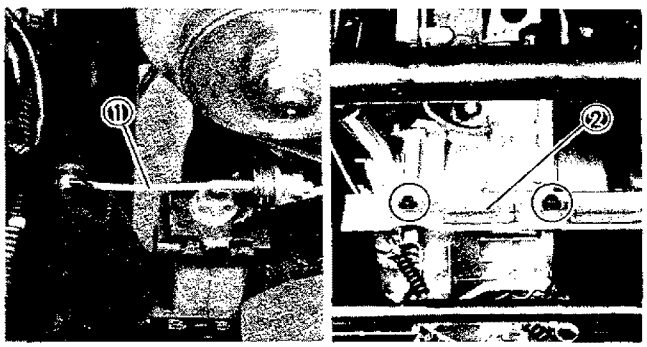


3. Disconnect:
   - Pulser hose ①
     From fuel pump.



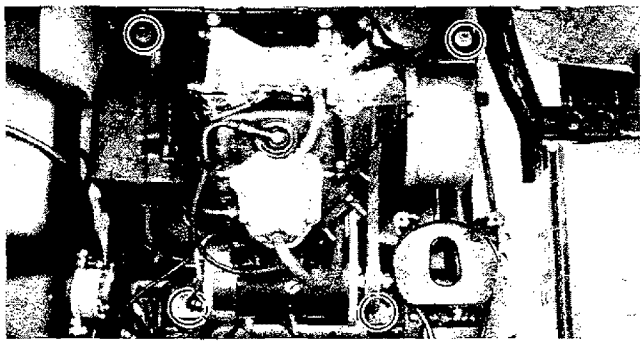
MUFFLER

1. Remove:
   - Exhaust pipe holding nuts ①
   - Muffler mount bolts ②
   - Gasket



ENGINE REMOVAL

1. Disconnect:
   - Engine bracket tensioner cable ①
2. Remove:
   - Muffler stay ②

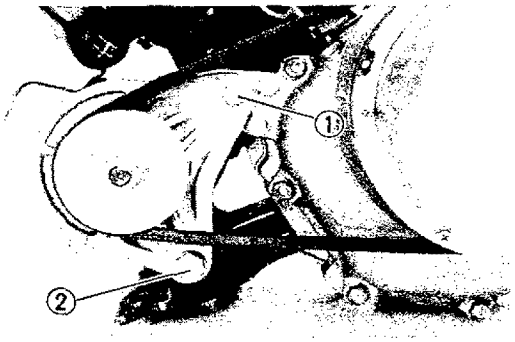


3. Remove:
   - Engine mount nuts
   - Engine (With starter-generator)

ENGINE DISASSEMBLY

STARTER-GENERATOR

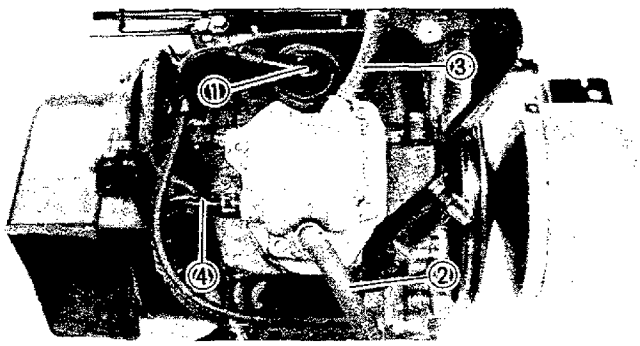
NOTE:
With the engine mounted, the starter-generator can be maintained by removing the following parts.
- Air cleaner case



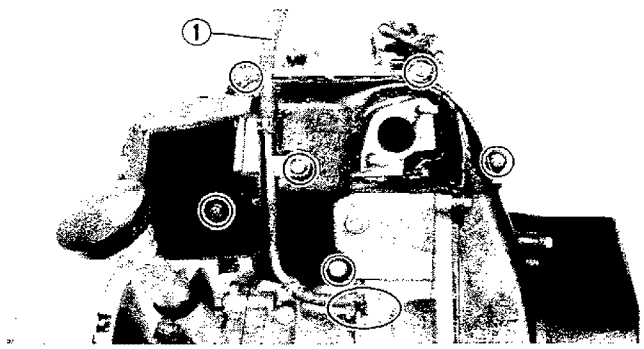
1. Remove:
   - Bolts and nuts ① ②
   - V-belt
   - Starter-generator

AIR SHOURD

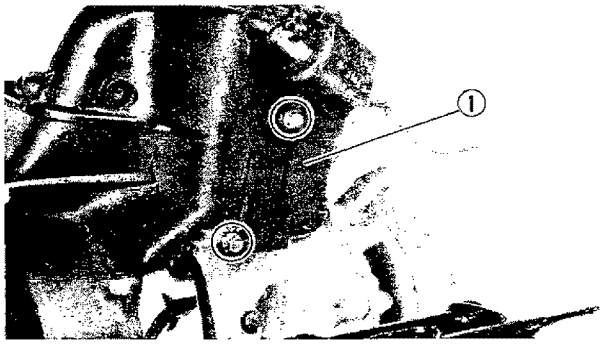
NOTE:
With the engine mounted, the air shroud can be maintained by removing the following parts.
- Muffler
- Fuel tank



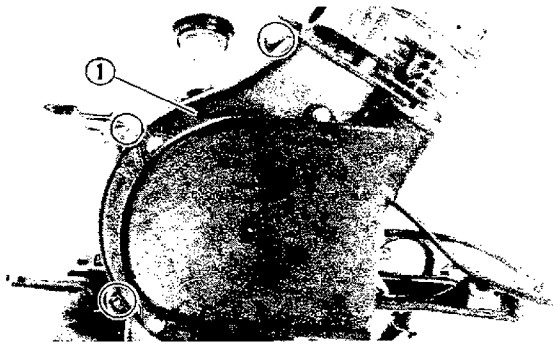
1. Disconnect:
   - Plug cap ①
   - Blow-by hose ②
   - Oil delivery hose ③
   - Oil breather hose ④



2. Remove:
   - Oil delivery hose ①
   - Air shroud (Rear)
     From exhaust side.



3. Remove:
   - Air shroud (Front) ①
     From engine intake side.
     Remove shroud with ignition coil.



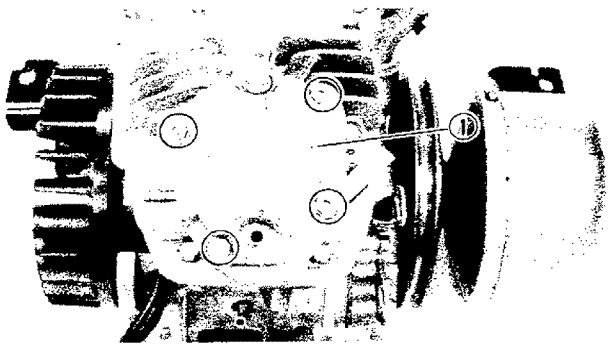
4. Remove:
   - Air shroud (Side) ①
     From engine right side.

CYLINDER HEAD

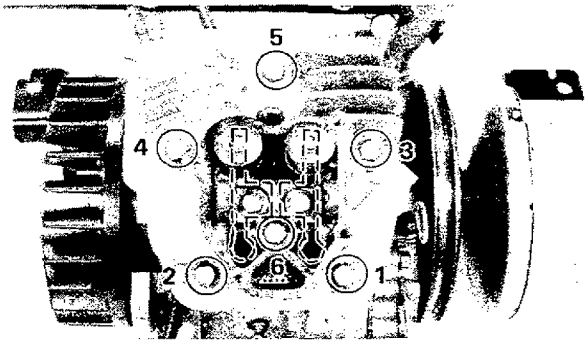
NOTE:

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

- Muffler
- Carburetor
- Fuel tank
- Air shroud

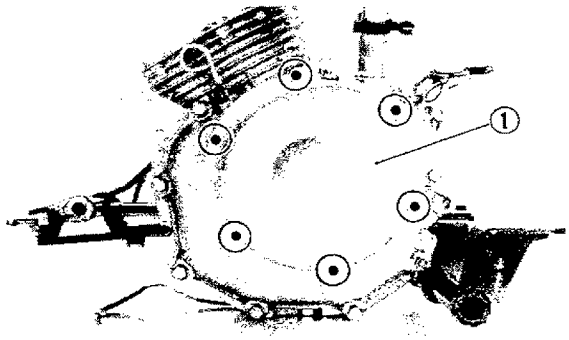


1. Remove:
   - Cylinder head cover ①
   - Spark plug
2. Place the piston at TDC on the compression stroke so that both valves are closed.
   Refer to CHAPTER 3 "VALVE CLEARANCE ADJUSTMENT" section.



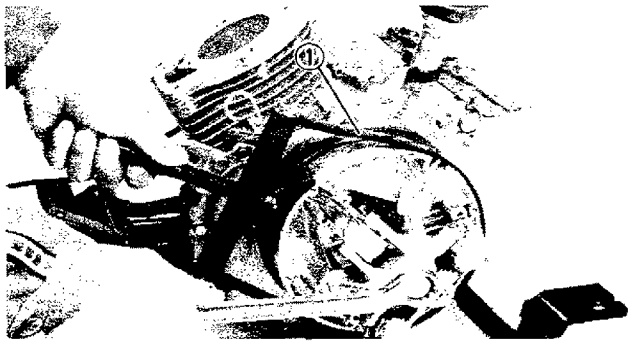
3. Remove:
   - Cylinder head bolts
   - Cylinder head
   - Push rods (Exhaust/Intake)

NOTE:
- Follow numerical number shown in photo. Start by loosening each nut 1/2 turn until all are loosen.
- Mark both push rods so they can be reinstalled in their original positions.



PRIMARY SHEAVE

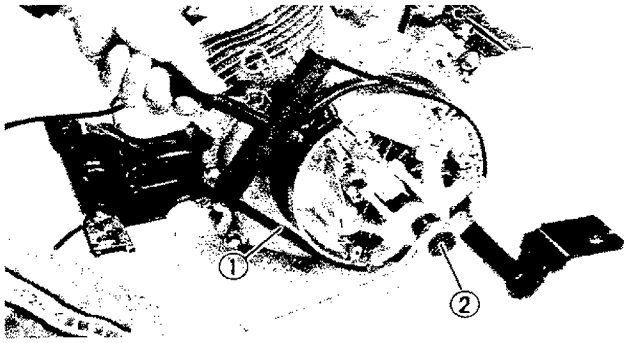
1. Remove:
   - Sheave cap ①



2. Remove:
   - Sheave securing bolt

   Use a Primary Sheave Holder ① .

	**Primary Sheave Holder: YS-01880, 90890-01701**



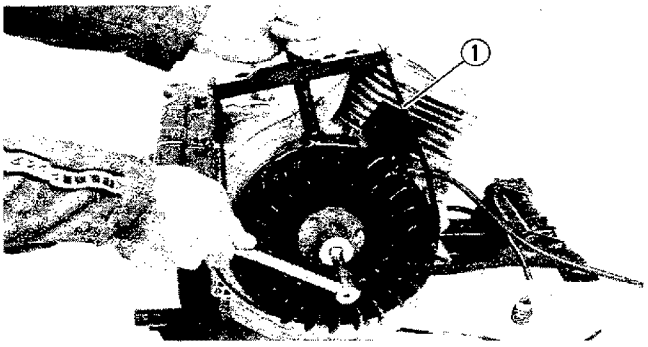
3. Remove:
   - Primary sheave assembly

   Use a Sheave Holder ① and Primary Sheave Puller ② .

	**Primary Sheave Holder: YS-01880, 90890-01701** **Primary Sheave Puller: YG-01876, 90890-01876**

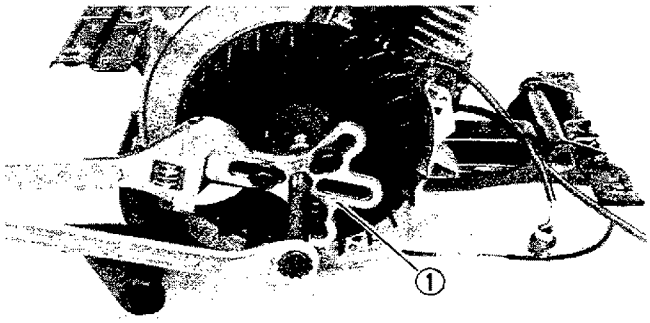
FLYWHEEL (Cooling Fan)

NOTE:
With the engine mounted, the flywheel can be maintained by removing the following parts.
- Muffler
- Fuel tank
- Air shroud



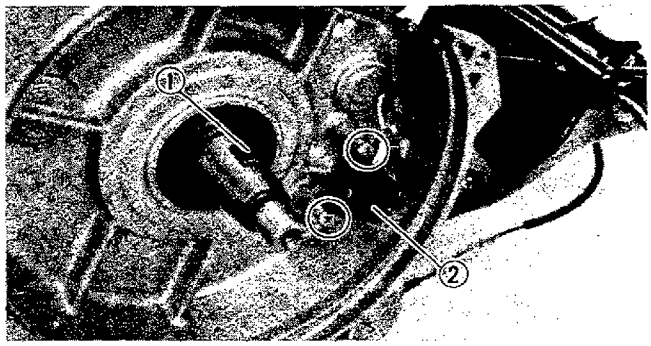
1. Remove:
   - Flywheel securing bolt
     Use a Sheave Holder ① .

	Primary Sheave Holder: YS-01880, 90890-01701

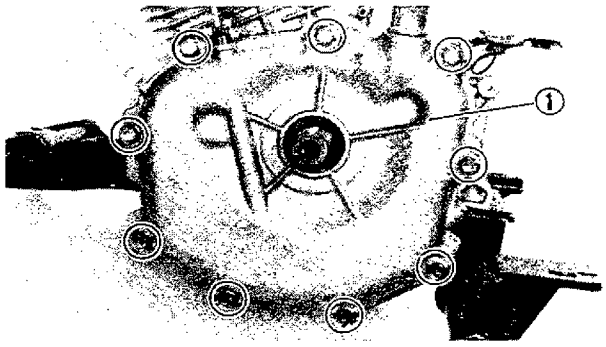


2. Remove:
   - Flywheel
     Use a Universal Puller ① .

	Universal Puller: YU-90105 or YU-33270, 90890-01362

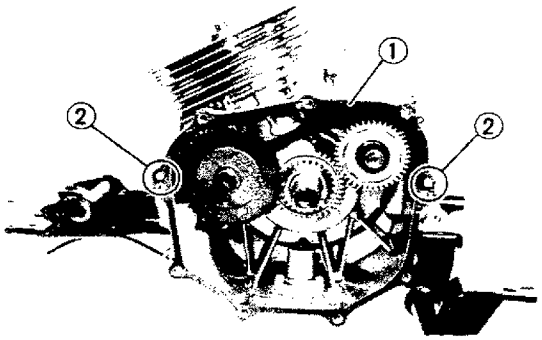


3. Remove:
   - Woodruff key ①
   - Pickup coil ②

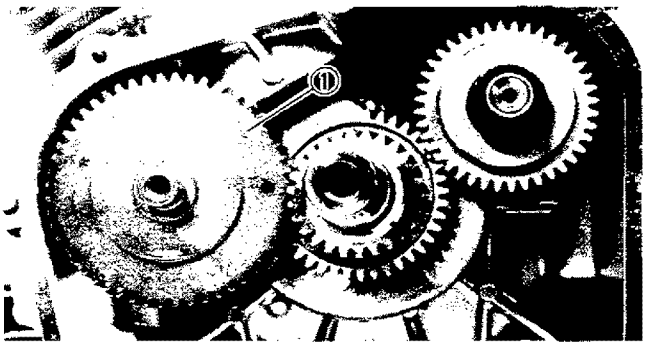


CRANKCASE COVER

1. Remove:
   - Left carnkcase cover ①



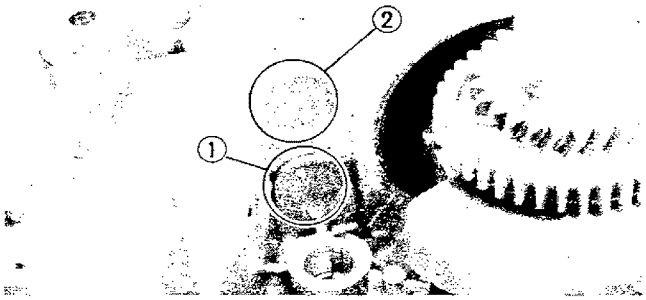
2. Remove:
   - Gasket ①
   - Dowel pins ②



CAMSHAFT

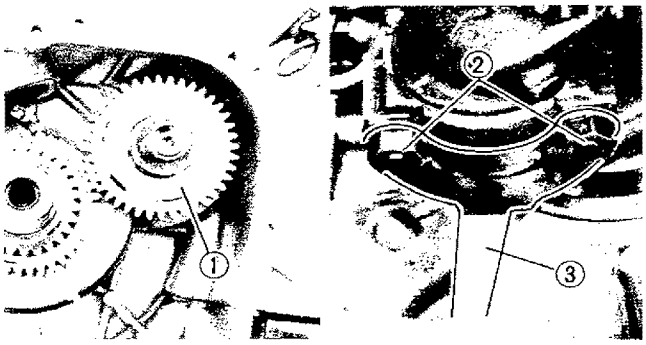
1. Remove:
   - Camshaft ①

NOTE:
Before removing the camshaft, place the engine with its left-side up to prevent the tappets from falling out.



2. Remove:
   - Tappets (Exhaust ① /Intake ②)

NOTE:
Mark both tappets so they can be reinstalled in their original guide hole.



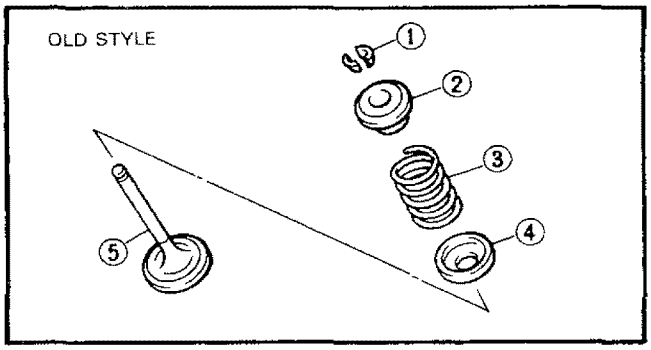
BALANCER SHAFT AND CRANKSHAFT

1. Remove:
   - Balancer shaft ①

2. Remove:
   - Connecting rod securing nuts ② (With splash plate ③)
   - Connecting rod cap
   - Bolts
   - Crankshaft

PISTON AND CONNECTING ROD

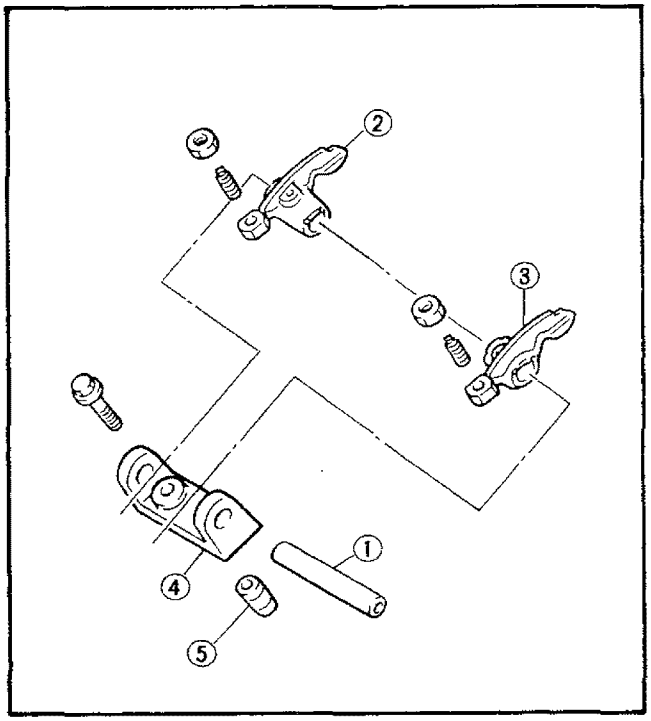
1. Remove:
   - Connecting rod (With piston)
   - Piston pin clips
   - Piston pin
   - Piston



ENGINE BRACKET

1. Remove:
   - Engine bracket
   - Oil level switch

   From crankcase.



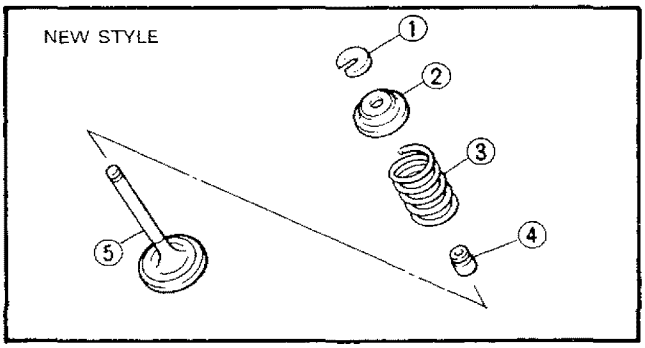
INSPECTION AND REPAIR

CYLINDER HEAD

1. Remove:
   - Rocker arm shaft ①
   - Rocker arm (Exhaust) ②
   - Rocker arm (Intake) ③
2. Remove:
   - Rocker arm shaft support ④
   - Dowel pins ⑤

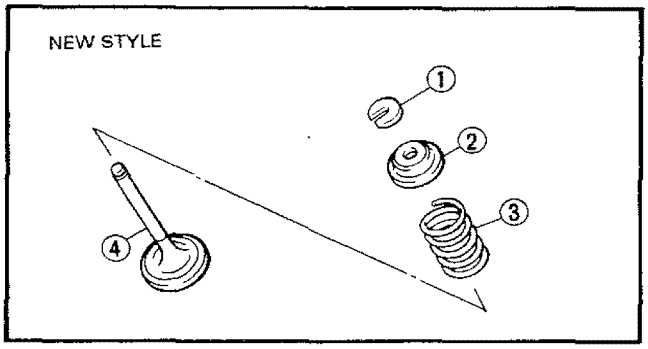
3. Attach:
   - Adapter ①
   - Valve Spring Compressor ②

	Valve Spring Compressor: YM-04019, 90890-01253



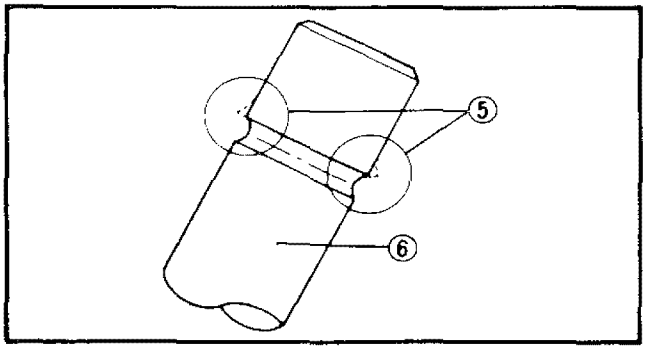
4. Remove:
   - Valve retainer ①

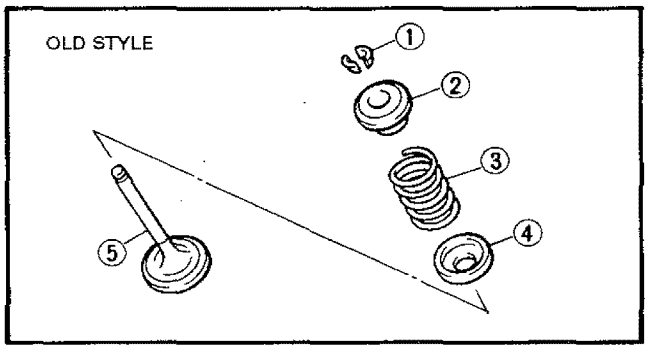
     Use magneto or tweezers.
   - Valve spring seat (Upper) ②
   - Valve spring ③
   - Oil seal ④
   - Valve (Intake) ⑤



5. Remove:
   - Valve retainer ①
     Use magneto or tweezers.
   - Valve spring seat (Upper) ②
   - Valve spring ③
   - Valve (Exhaust) ④

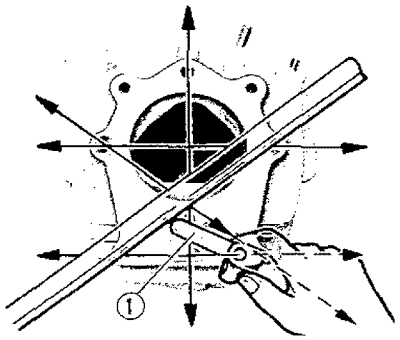
NOTE:
Deburr ⑤ any deformed valve stem ⑥ end. Use an oil stone to smooth the stem end.





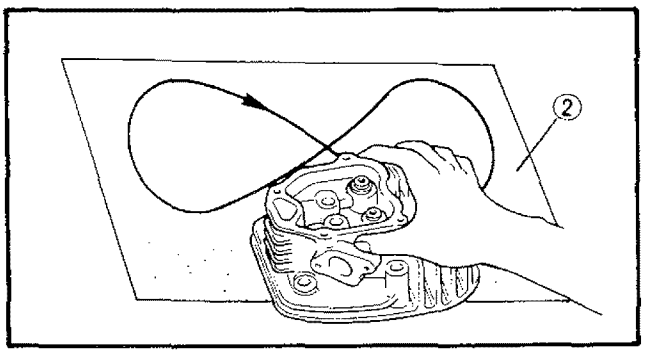
6. Elimiate
   - Carbon deposit.
     Use rounded scraper.

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

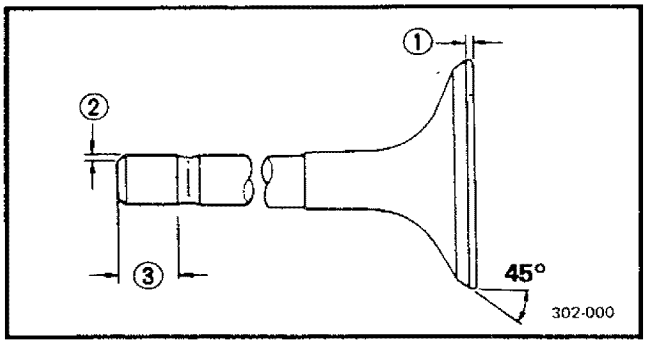


7. Measure:
   - Cylinder head warpage
     Out of specification → Resurface/Replace.

Cylinder Head Warp Limit:
Less than 0.05 mm (0.002 in)



① Feeler gauge
② Emery paper (400 ~ 600 grit wet)

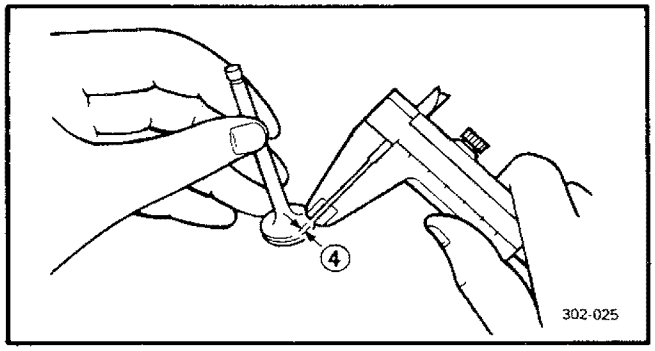


VALVE

1. Inspect:
   - Valve face
   - Stem end

   Wear/Pitting → Reface.
   Out of specification → Replace.

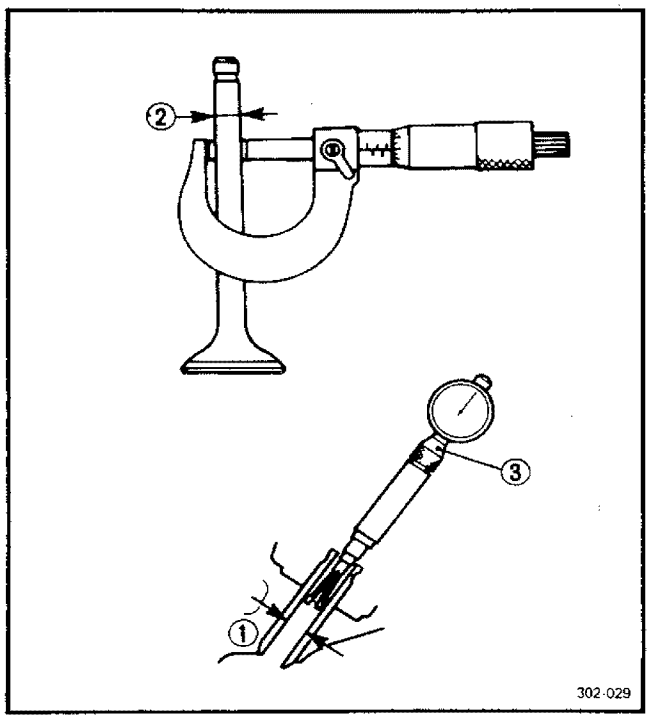
Margin Thickness (Service limit) ① :
Intake 0.8 mm (0.031 in)
Exhaust 0.6 mm (0.024 in)
Beveled ② :
0.5 mm (0.020 in)
Minimum Length (Service limit) ③ :
4.8 mm (0.189 in)
Seat Width (Valve face) ④ :
0.7 ~ 0.9 mm (0.028 ~ 0.035 in)



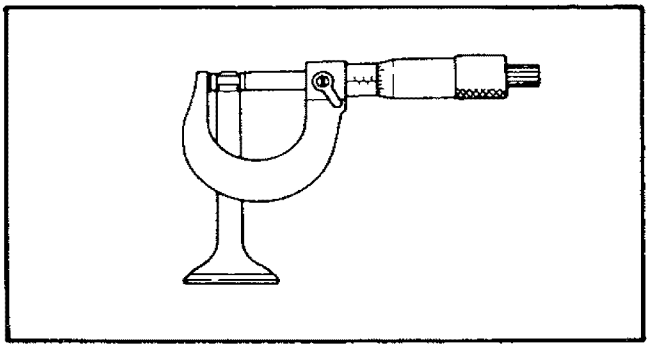
2. Measure:
   - Valve stem clearance

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

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

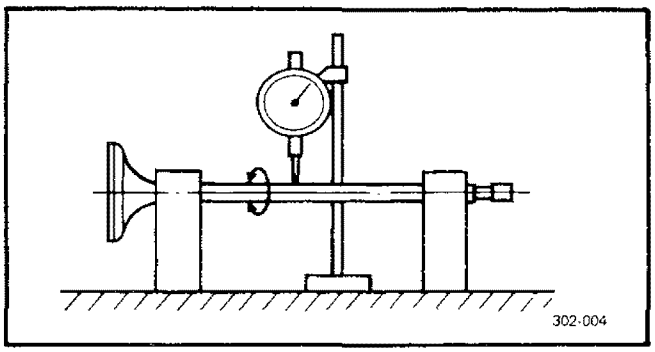


	Valve Stem. Clearance	Maximum
Intake	0.037 ~ 0.067 mm (0.0015 ~ 0.0026 in)	0.11 mm (0.0043 in)
Exhaust	0.030 ~ 0.060 mm (0.0012 ~ 0.0024 in)	0.11 mm (0.0043 in)



3. Inspect:
   - Valve stem end

   Mushroom shape/Larger diameter than rest of stem → Replace valve, valve guide, and oil seal.

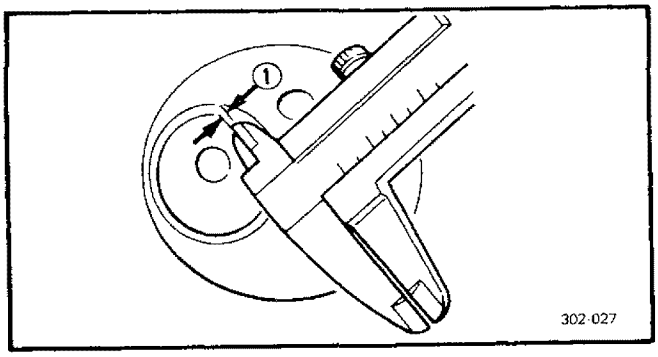


4. Measure:
   - Valve stem runout
     Out of specification → Repiace.

Maximum Runout:
0.02 mm (0.0008 in)

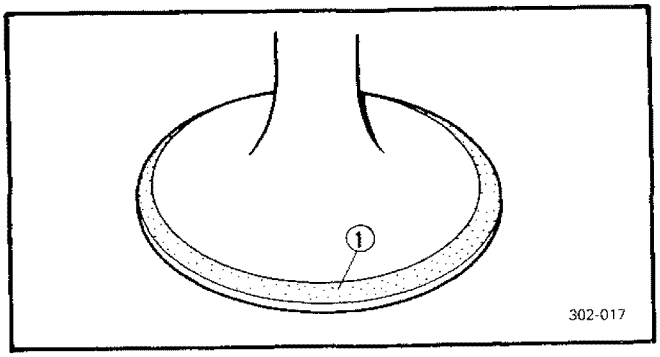
VALVE SEAT

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

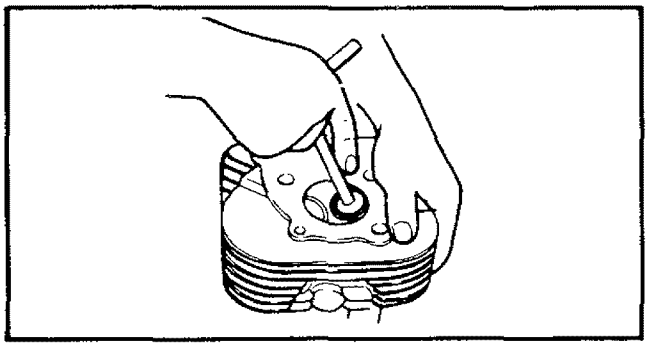


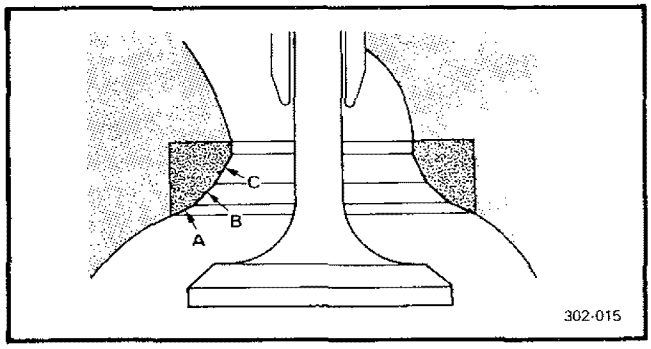
3. Measure:
   - Valve seat width ①
     Out of specification → Reface valve seat.

Valve Seat Width:
Std: 0.7 ~ 0.9 mm
(0.028 ~ 0.035 in)
Wear Limit:
1.4 mm (0.055 in)

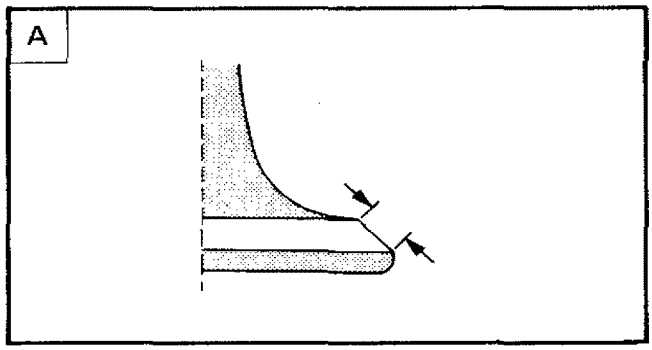


Valve seat width measurement steps:
- Apply the Mechanic's bluing dye (Dykem) ① to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clean pattern.
- Measure the valve seat width. Whether the valve seat and valve face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

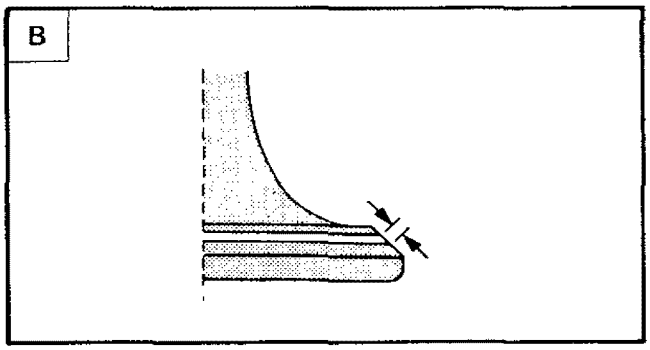




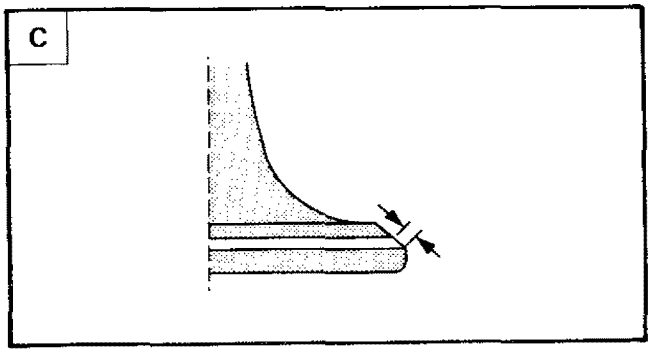
A



B



C



4. Reface:
   - Valve seat

   Use 10°, 45° and 60° Valve Seat Cutter.

⚠ CAUTION:

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

Cut sections as follows	
Section	Cutter
A	10°
B	45°
C	60°

Valve seat refacing steps:

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

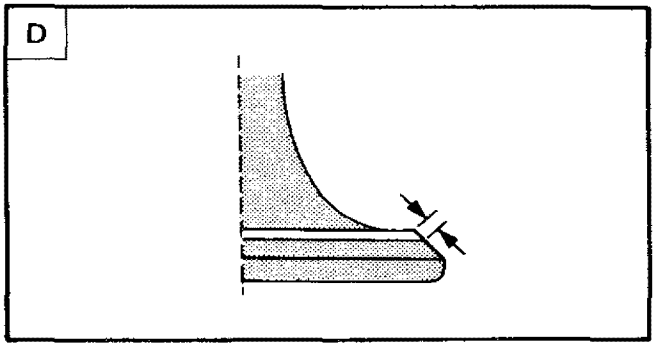
Valve Seat Cutter Set		Desired Result
Use lightly	10° cutter	To reduce valve seat width to 1.0 mm (0.04 in)
	60° cutter	

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

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

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

Valve Seat Cutter Set		Desired Result
Use	10° cutter	To center the seat and to achieve its width of 1.0 mm (0.04 in)
	45° cutter	

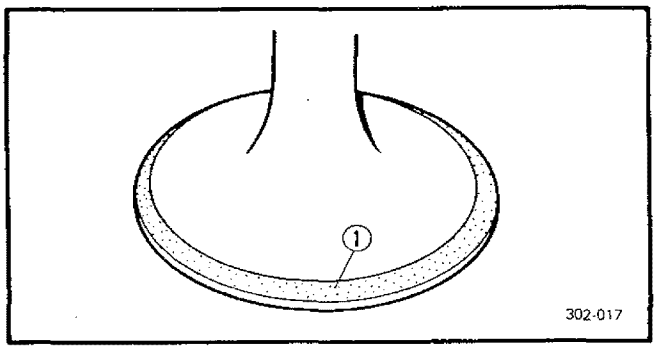


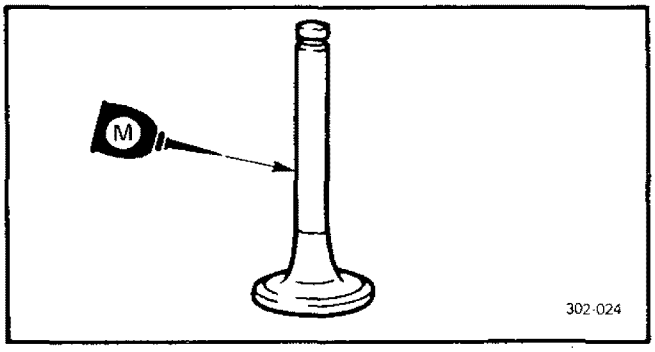
D Valve seat is too narrow and is located down near the bottom edge of the valve face.

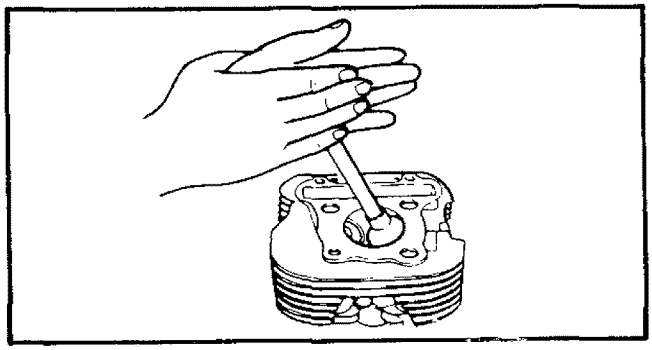
Valve Seat Cutter Set		Desired Result
Use	60° cutter, first	To center the seat and increase its width.
	45° cutter	

5. Lap:
   - Valve face
   - Valve seat

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





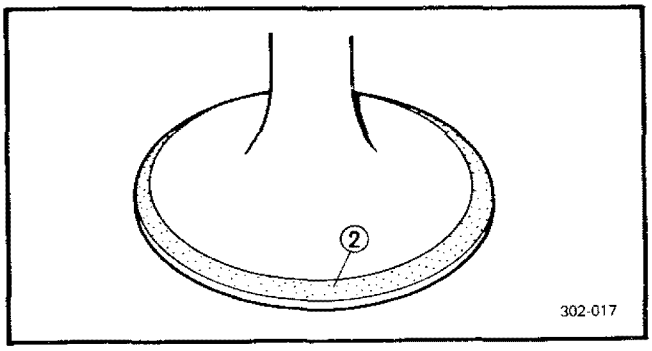


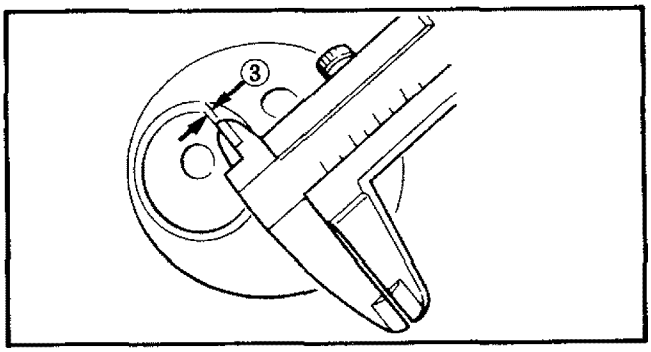
Valve lapping steps:
- Apply a coarse lapping compound ① to the valve face.

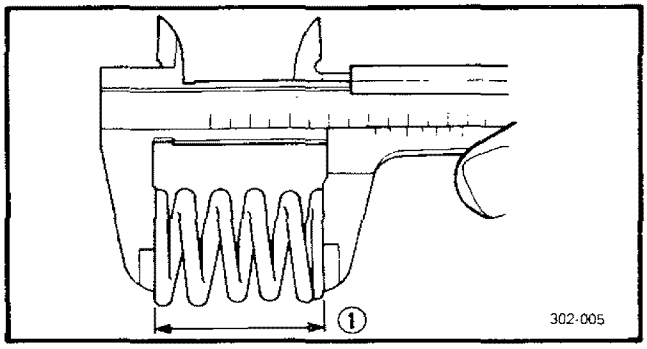
⚠ CAUTION:
Be sure no compound enteres the gap between the valve stem and guide.

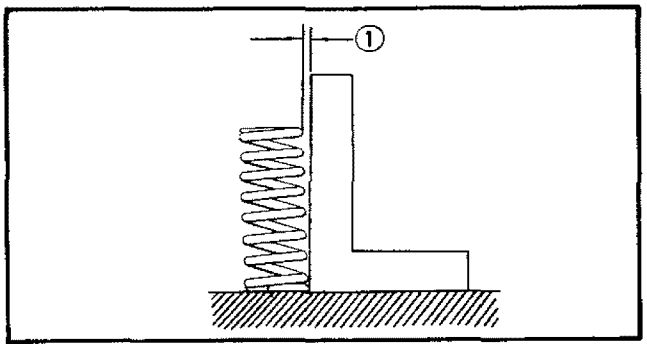
- Apply a molybdnum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.

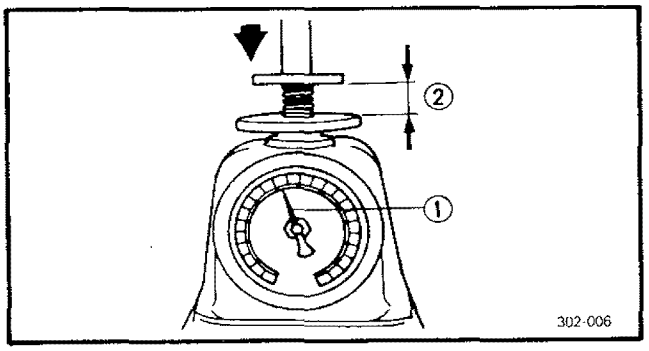
NOTE:
To obtain the best lapping result, lightly tap the valve seat while rotating the valve back and forth between your hand.











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

NOTE:

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

- Apply the Mechanic's bluing dye (Dykem) ② to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width ③ again. If the valve seat width is out of specification, reface and lap the valve seat.

Valve Spring

1. Measure:
   - Spring free length ①
     Out of specification → Replace

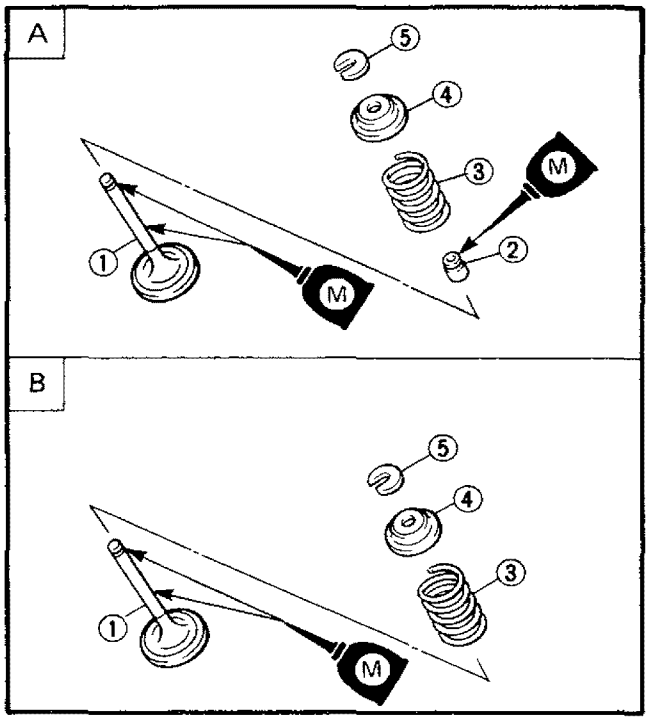
Valve Spring Free Length Limit (IN/EX):
35.0 mm (1.38 in)

2. Measure:
   - Spring tilt ①
     Out of specification → Replace.

Tilt Limit:
2.5° or 1.6 mm (0.063 in)

3. Measure:
   - Spring force (Installed length)
     Out of specification → Replace.

Valve Compressed Force Limit:
8.0 kg (17.6 lb) ① /
29 mm (1.14 in) ②



VALVE INSTALLATION

1. Lubricate
   - Valve stem
   - Oil seal
   - Valve stem end

High-Quality Molybdenum Disulfide Motor Oil or Molybdenum Disulfide Grease.

2. Install:
   - Valve ①
   - Oil seal ②
   - Valve spring ③
   - Valve spring seat ④ (Upper)
   - Valve retainer ⑤

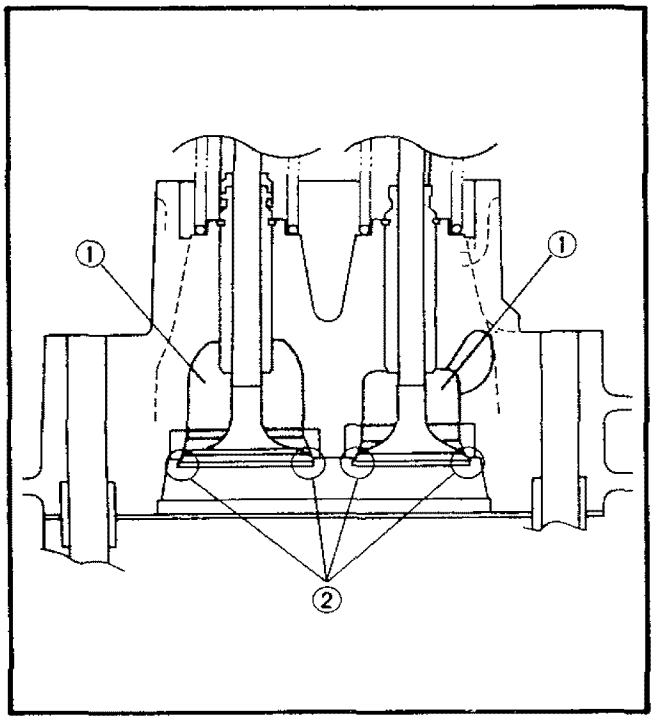
   Use the Valve Spring Compressor.

[A] INTAKE
[B] EXHAUST

Valve Spring Compressor: YM-04019, 90890-01253

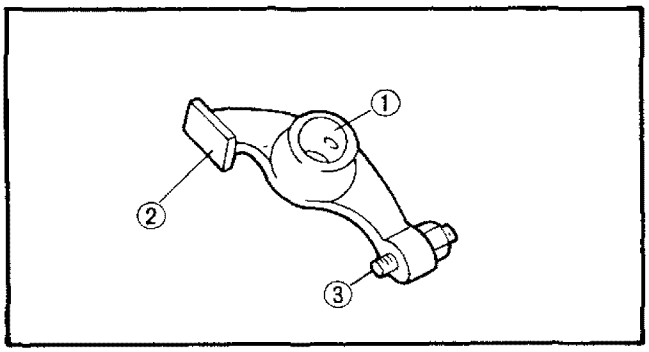
3. Check:
   - Valve sealing

   Leakage at valve seat → Reface, relap or replace valve, relap.
   Refer to "VALVE SEAT".



Valve seat checking steps:
- Pour a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing, there should be no leakage at the valve seat ② .

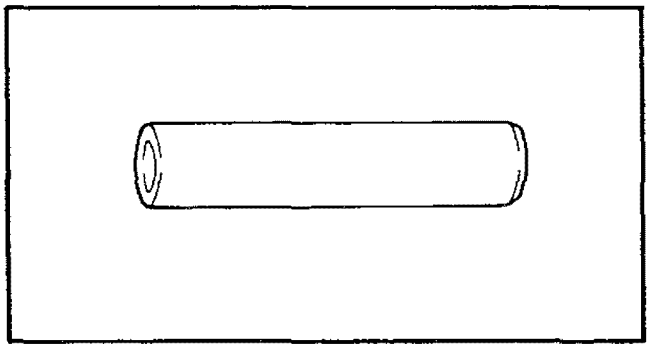
Relapping steps:
- Reassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.



ROCKER ARM, ROCKER ARM SHAFT AND ROCKER ARM SHAFT SUPPORT

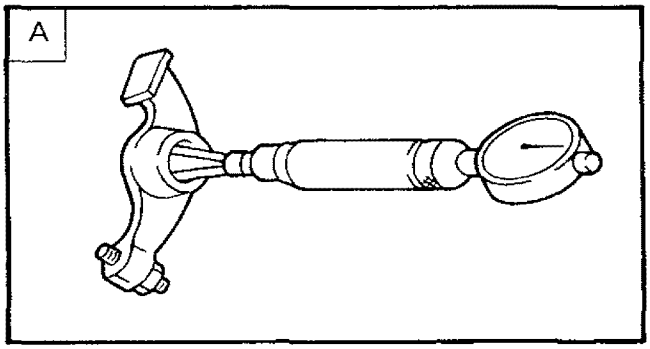
1. Inspect:
   - Rocker arm shaft hole ①
   - Valve contact surface ②
   - Adjuster surface ③

   Wear/Pitting/Scratches/Blue discoloration → Replace.



2. Inspect:
   - Rocker arm shaft

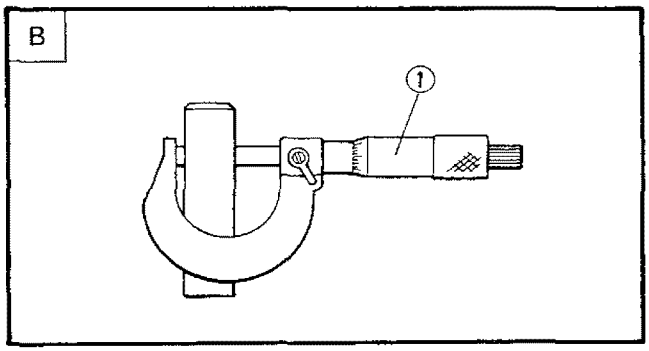
   Groove can be felt (bearing surface), Blue discoloration (rocker arm shaft) → Replace then inspect lubrication system.



3. Measure:
   - Rocker arm inside diameter [A]

   Use a Bore gauge ①.
   Out of specification → Replace.

Rocker Arm Inside Diameter:
12.00 ~ 12.04 mm
(0.472 ~ 0.474 in)



4. Measure:
   - Rocker arm shaft outside diameter [B]

   Use a Micrometer ① .
   Out of specification → Replace.

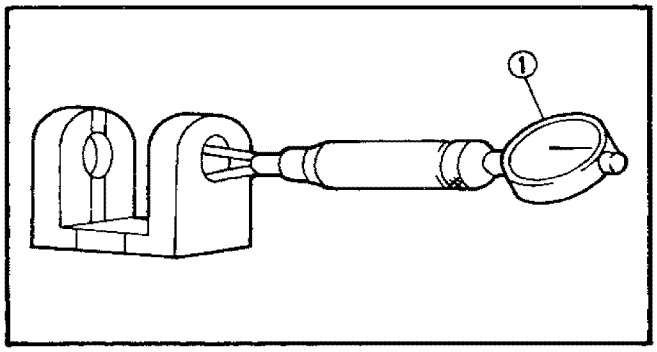
Rocker Arm Shaft Outside Diameter:
11.90 ~ 11.99 mm
(0.469 ~ 0.472 in)

5. Measure:
   - Rocker arm/Rocker arm shaft clearance

   Calculate clearance by substracting Outside diameter [A] of rocker arm shaft from inside dismeter [B] of rocker.

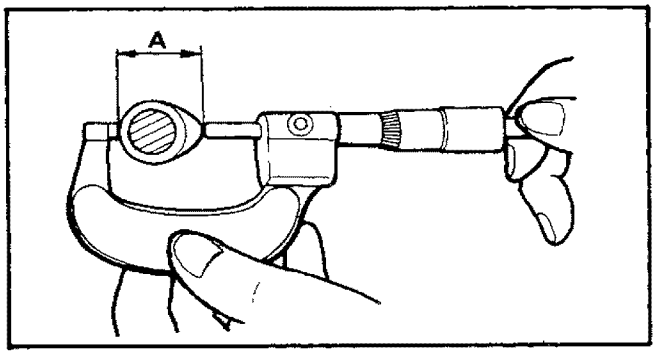
Rocker Arm-Rocker Arm Shaft Clearance = [A] - [B]:
0.01 ~ 0.07 mm
(0.0004 ~ 0.0028 in)
Limit: 0.14mm (0.0055 in)

6. Inspect:
   • Rocker arm shaft support hole
   Wear/Pitting/Scratches/Blue discoloration → Replace.



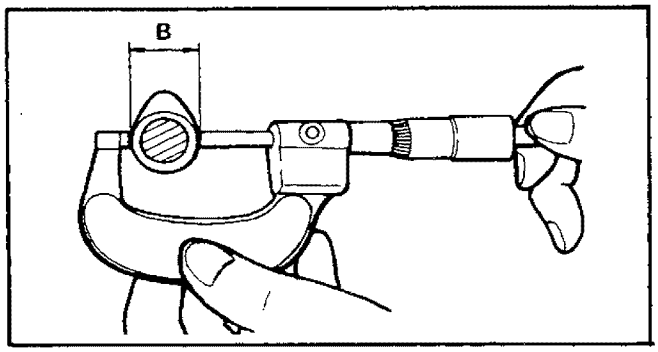
7. Measure:
   • Rocker arm shaft support inside diameter
   Use a Bore Gage ①.
   Out of specification → Replace.

Rocker Arm Shaft Support Inside Diameter:
12.00 ~ 12.14 mm
(0.472 ~ 0.478 in)
Rocker Arm Shaft-Rocker Arm Shaft Support Clearance:
Limit: 0.24 mm (0.0094 in)

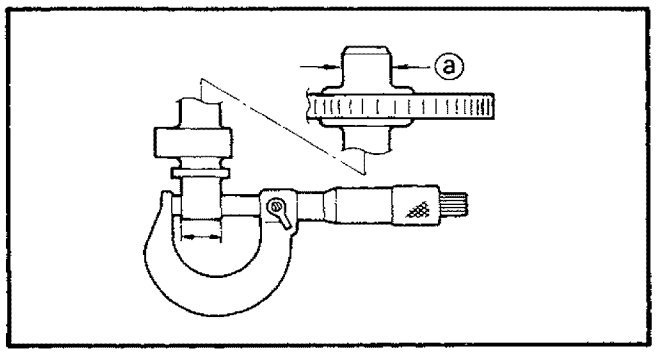


CAMSHAFT

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

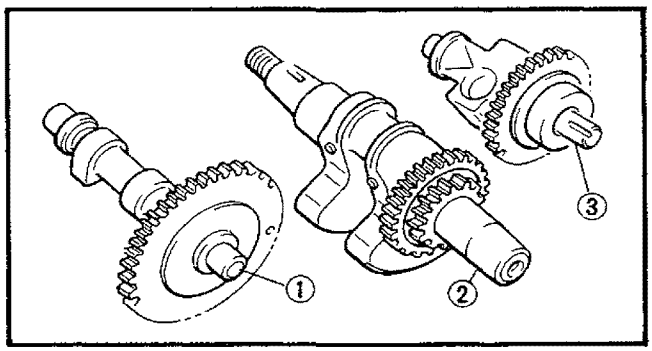


	Cam Lobe "A"	Cam Lobe "B"
Intake	29.16 ~ 29.28 mm (1.148 ~ 1.153 in)	24.11 ~ 24.22 mm (0.949 ~ 0.954 in)
Exhaust	29.29 ~ 29.32 mm (1.150 ~ 1.154 in)	24.15 ~ 24.25 mm (0.951 ~ 0.955 in)



3. Measure:
   • Camshaft bearing surface diameter ⓐ
   Use a micrometer.
   Out of specification → Replace camshaft.
   • Camshaft pivot inside diameter:
   Out of specification → Replace crankcase cover.

Camshaft Bearing Surface Diameter:
15.90 ~ 15.99 mm
(0.625 ~ 0.630 in)
Camshaft Pivot Inside Diameter:
16.00 ~ 16.05 mm
(0.630 ~ 0.632 in)



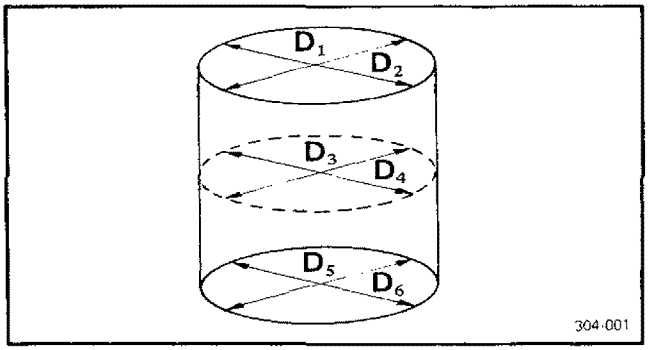
① Camshaft
② Crankshaft
③ Balancer shaft

GEARS

1. Inspect:
   - Gear teeth
     Blue Discoloration/Pitting/Wear → Replace.

CYLINDER AND PISTON

1. Inspect:
   - Cylinder and piston walls
     Vertical scratches → Rebore or replace cylinder and piston.
2. Measure:
   - Piston-to-cylinder clearance

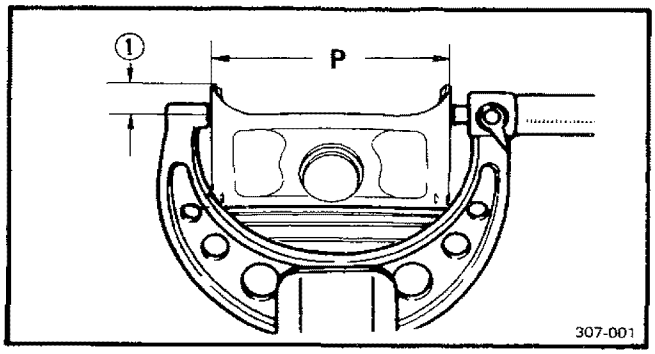


Piston-to-cylinder clearance measurement steps:
First step:
- Measure the cylinder bore "C" with the Cylinder Bore Gauge.

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

Cylinder Bore "C":
73.00 ~ 73.02 mm
(2.874 ~ 2.875 in)
< Limit: 73.5 mm (2.876 in) >
Taper Limit "T":
0.15 mm (0.006 in)
Out of Round "R":
0.05 mm (0.002 in)

C = Maximum D
T = (Maximum D_1 or D_2) − (Minimum D_5 or D_6)



R = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)

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

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

① 5 mm (0.20 in) from the piston bottom edge

Piston Outside Diameter "P"

Standard	73.00 mm (2.874 in)
Oversize 1	73.25 mm (2.884 in)
Oversize 2	73.50 mm (2.894 in)

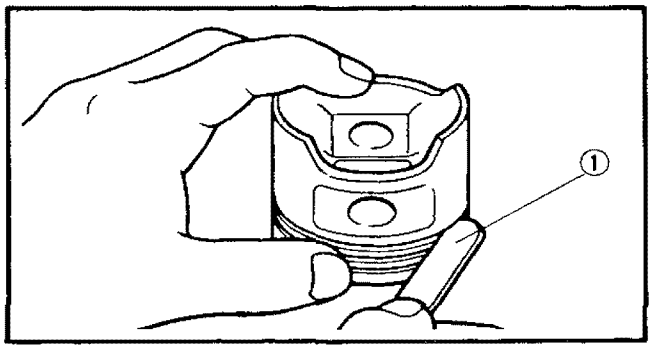
- If out of specification, replace the piston and piston rings as a set.

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

Piston-to-cylinder Clearance = Cylinder Bore "C" – Piston Skirt Diameter "P"

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

Piston-to-cylinder Clearance:
0.03 ~ 0.05 mm
(0.0012 ~ 0.0020 in)
< Limit: 0.10 mm (0.0039 in) >



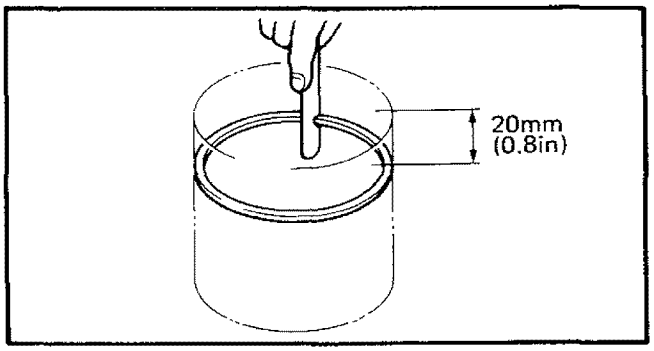
PISTON RING AND PISTON PIN

Piston Ring

1. Measure:
   - Side clearance
     Use the Feeler Gauge ①.
     Out of specification → Replace piston and/or rings.

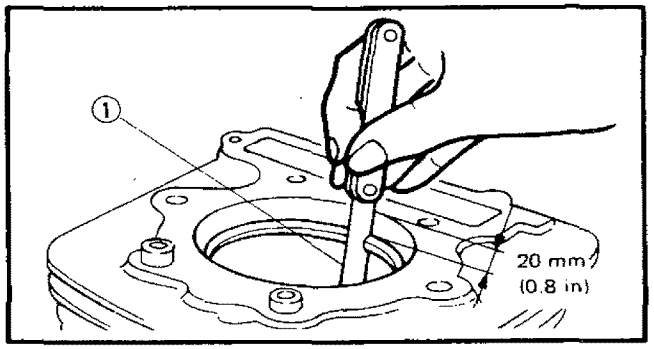
NOTE:
Decarbon the piston ring grooves and rings before measuring the side clearance.

	Side Clearance	
	Standard	Limit
Top Ring	0.03 ~ 0.05 mm (0.001 ~ 0.002 in)	0.07 mm (0.003 in)
2nd Ring	0.03 ~ 0.07 mm (0.001 ~ 0.003 in)	0.09 mm (0.004 in)



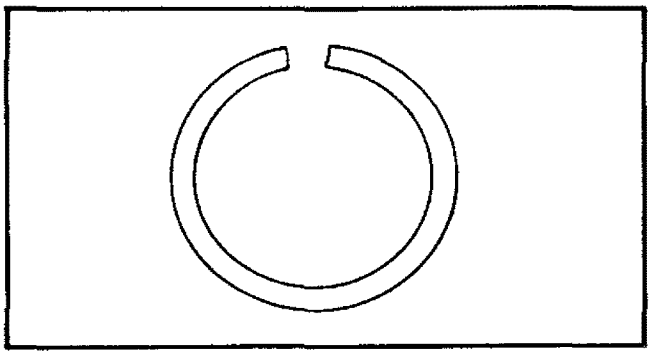
2. Position:
   - Piston ring
     Into cylinder.

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



3. Measure:
   - End gap
     Use a Feeler Gauge ①
     Out of specification → Replace rings as set.

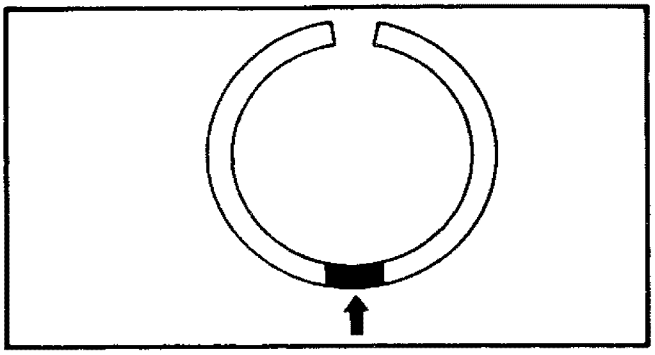
	End Gap	
	Standard	Limit
Top Ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	1.0 mm (0.04 in)
2nd Ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	1.0 mm (0.04 in)
Oil Ring	0.2 ~ 0.7 mm (0.008 ~ 0.028 in)	1.3 mm (0.05 in)



Piston Ring Oversize

- Top and 2nd piston ring
  Oversize top and middle ring sizes are stamped on top of ring.

Oversize 1	0.25 mm (0.0098 in)
Oversize 2	0.50 mm (0.0197 in)

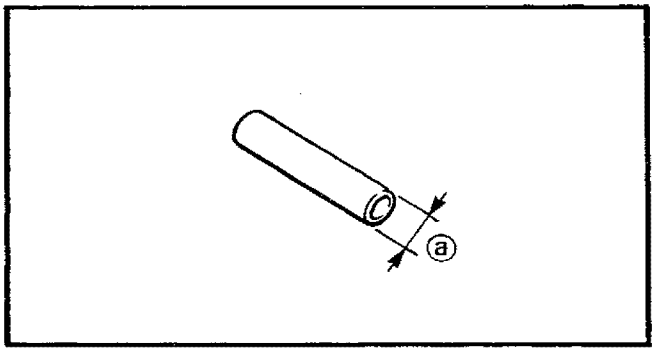


- Oil control ring
  Expander spacer of bottom ring (oil control ring) is color-coded to identify sizes.

Size	Color
Oversize 1	White
Oversize 2	Blue

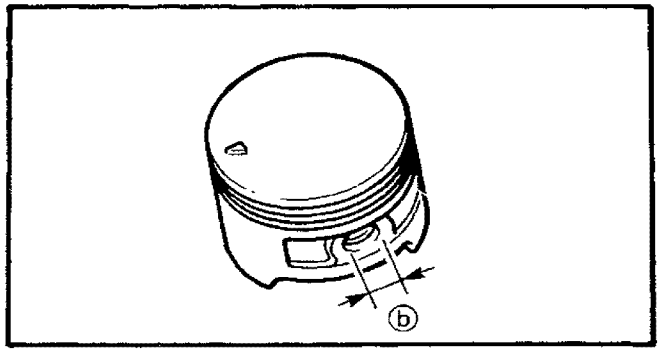
Piston Pin

1. Inspect:
   - Piston pin
     Blue discoloration/Grooves → Replace then inspect lubrication system.



2. Measure:
   - Out side diameter ⓐ (Piston pin)
     Out of specification → Replace.

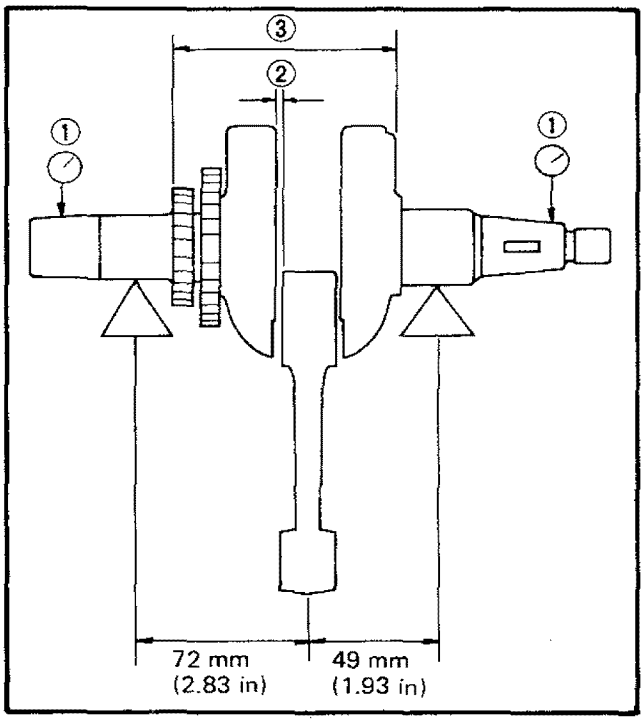
Outside Diameter (Piston Pin):
17.995 ~ 18.000 mm
(0.7085 ~ 0.7087 in)



3. Measure:
   - Piston pin-to-piston clearance
     Out of specification → Replace piston.

Piston Pin-to-Piston Clearance =
Bore Size (Piston Pin) ⓑ —
Outside Diameter (Piston Pin) ⓐ

Piston Pin-to-Piston Clearance:
0.004 ~ 0.020 mm
(0.0002 ~ 0.0008 in)
< Limit: 0.07 mm (0.003 in) >



CRANKSHAFT AND CONNECTING ROD

Crankshaft Runout

1. Measure:
   - Crankshaft deflection ①
     Use V-blocks and Dial Gauge.
     Out of specification → Replace.

Dial Gauge:
YU-03097, 90890-03097

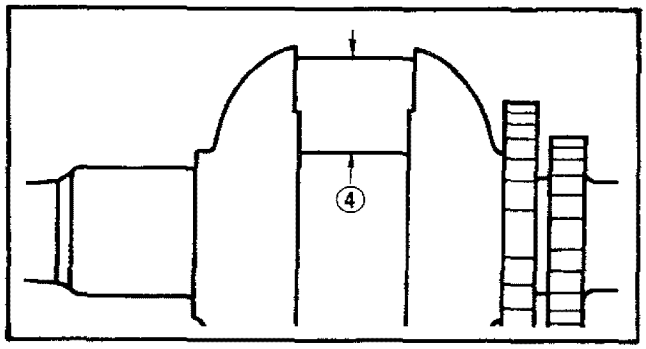
Crankshaft Deflection ①:
0.05 mm (0.002 in)

- Connecting rod big end side clearance ②.
  Out of specification → Replace connecting rod.

Big End Side Clearance ②:
0.2 ~ 0.5 mm (0.008 ~ 0.020 in)

- Crankshaft assembly width ③.
  Out of specification → Replace crankshaft.

Crankshaft Assembly Width ③:
109.65 ~ 110.05 mm
(4.317 ~ 4.333 in)



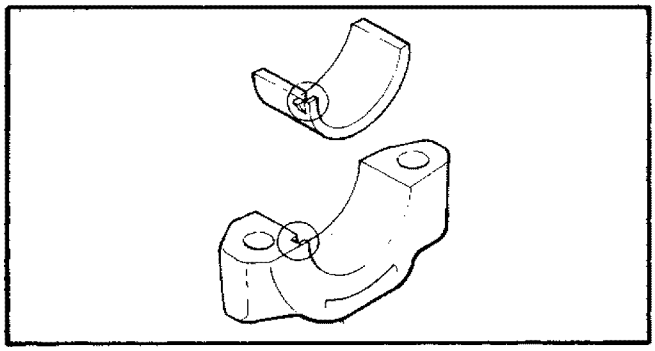
Crank Pin Outside Diameter

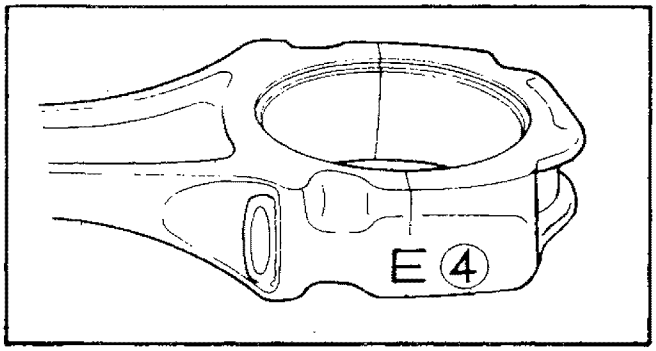
1. Measure:
   - Crank pin outside diameter ④
     Use a micrometer.
     Out of specification → Replace.

Crank Pin Outside Diameter:
31.95 ~ 31.97 mm
(1.258 ~ 1.259 in)
Crank Pin Round or Taper Limit:
0.03 mm (0.0012 in)

Connecting Rod Bearing Clearance

1. Clean:
   - Crankshaft
   - Connecting rod and cap
   - Connecting rod bearings





2. Install:
   • Connecting rod bearings.
     Into connecting rod and cap.

NOTE:
Be sure to align the bearing end projection with the notches of the connecting rod and cap.

3. Attach:
   • Plastigage®
     Onto the crank pin.

	Plastigage® **YU-33210**

4. Install:
   • Connecting rod
     Connecting rod cap.

NOTE:
Be sure the letter on both components align to form perfect character.

5. Lubricate:
   • Connecting rod bolt threads

	Molybdenum Disulfide Grease or Oil

6. Tighten:
   • Connecting rod cap nu

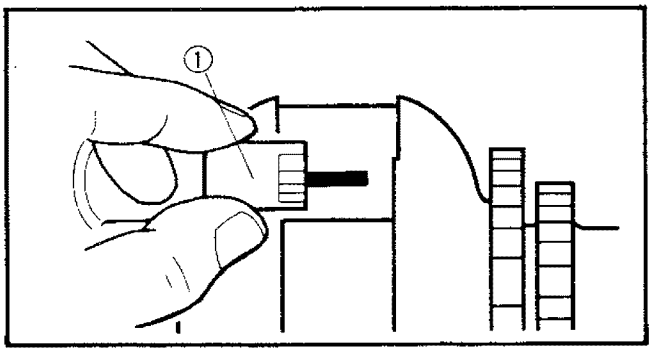
NOTE:
Do not turn connecting rod until clearance measurement has been completed.

⚠CAUTION:

Tighten to full torque specification without pausing. Apply continuous torque between 3.0 and 3.8 m·kg. Once you reach 3.0 m·kg, DO NOT STOP TIGHTENING until final torque is reached. If tightening is interrupted between 3.0 and 3.8 m·kg, loosen nut to less than 3.0 m·kg and start again.

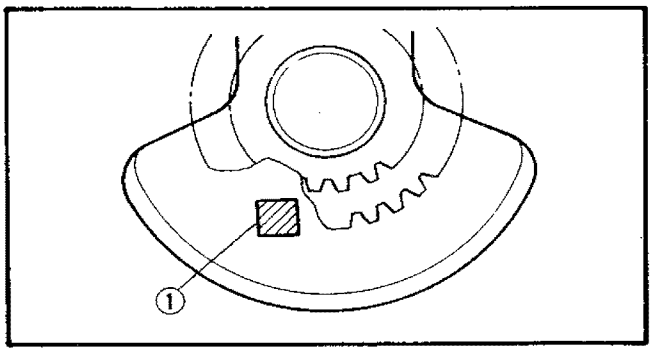
	Connecting Rod Cap: **38 Nm (3.8 m·kg, 27 ft·lb)**

7. Remove:
   - Connecting rod cap
     Use care in removing.



8. Measure:
   - Width of plastigage® ①
     Out of specification → Replace bearings and/or replace crankshaft if necessary.

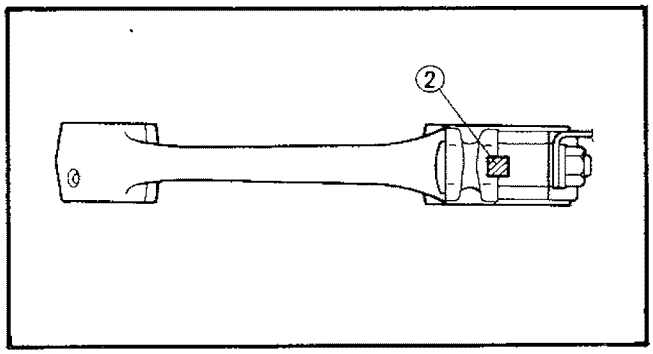
	Connecting Rod Bearing Clearance: **0.020 ~ 0.050 mm** **(0.0008 ~ 0.0020 in)** **Limit: 0.1 mm (0.004 in)**



Connecting Rod Bearing Selection

- Numbers used to indicate crankpin size are stamped on crank web ① .

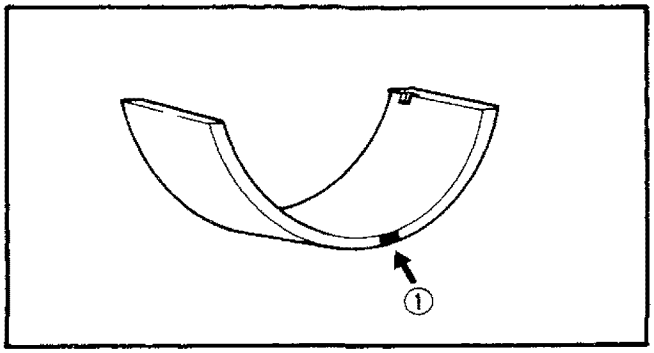
No.	Size
1	**31.961 ~ 31.970 mm** **(1.2583 ~ 1.2587 in)**
2	**31.952 ~ 31.961 mm** **(1.2580 ~ 1.2583 in)**



- Connecting rod is numbered "0" or "1"; numbers are stamped in ink, on the rod ② .

No.	Size
0	**35.012 ~ 35.024 mm** **(1.3784 ~ 1.3789 in)**
1	**35.000 ~ 35.012 mm** **(1.3780 ~ 1.3784 in)**

NOTE:
This number serves together for joint mark.



1. Subtract rod size number from crank pin number to select.

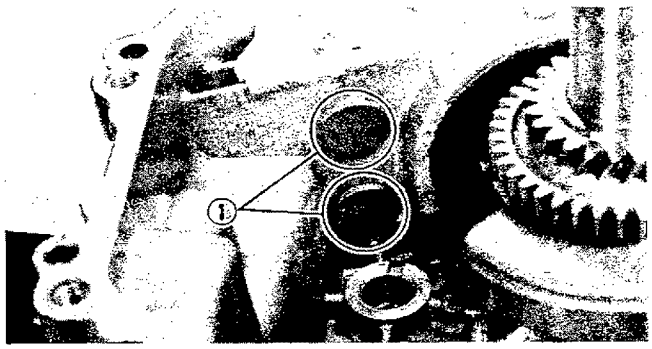
No.	Color ①	Part No.
0	Brown	J38-11656-00
1	Black	J38-11656-10
2	Blue	J38-11656-20

ENGINE ASSEMBLY AND ADJUSTMENT

ENGINE BRACKET

1. Install:
   - Oil level switch
   - Engine bracket

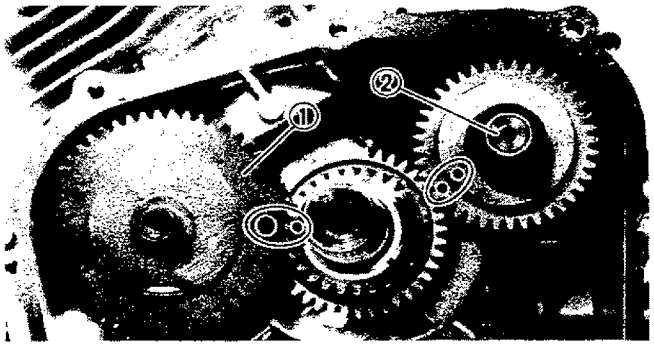
Oil Level Switch Holding Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)
Bracket Holding Bolt:
39 Nm (3.9 m·kg, 28 ft·lb)



CRANKSHAFT, CAMSHAFT AND BALANCER SHAFT

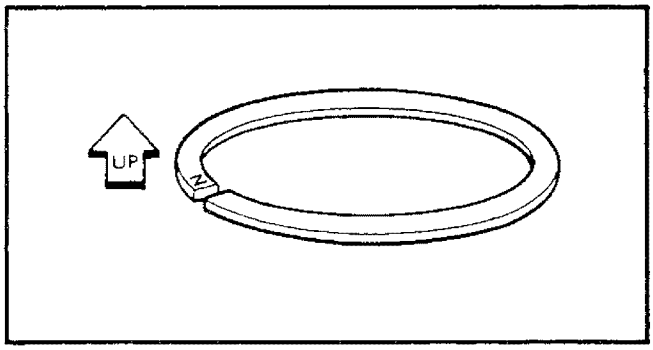
1. Install:
   - Crankshaft
   - Tappets ①

NOTE:
Be sure the tappets are positioned correctly.



2. Install:
   - Camshaft ①
   - Balancer shaft ②

⚠ CAUTION:
Align the hole in the camshaft gear with the punch mark in the crankshaft cam gear. Align the punch mark in the balancer shaft gear with the inkstamp mark in the crankshaft balancer gear.



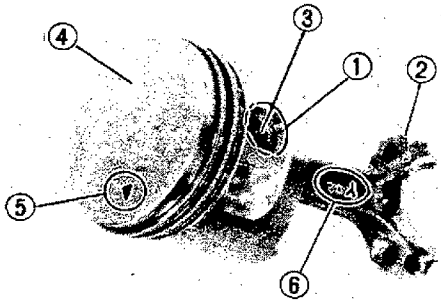
PISTON AND CONNECTING ROD

1. Install:
   - Piston rings

   Onto the piston.

NOTE:

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

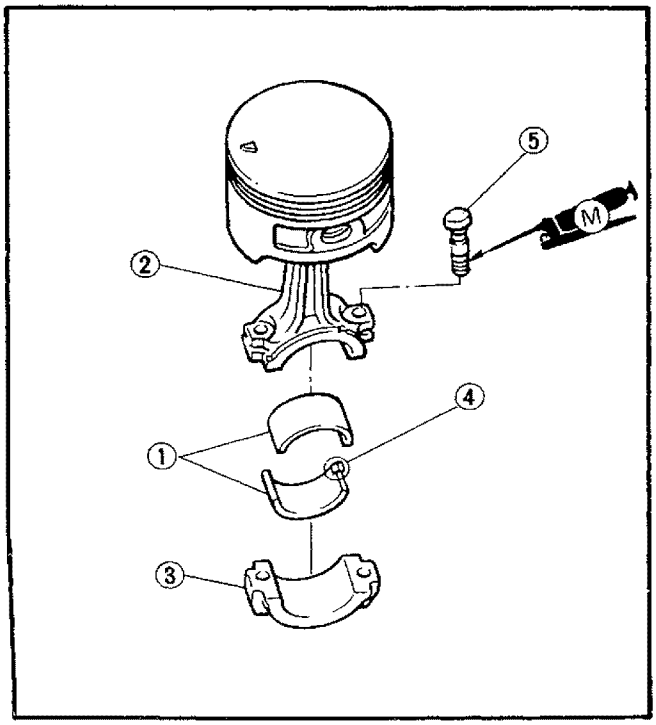


2. Install:
   - Piston pin clip
   - Connecting rod ②
   - Piston pin ③
   - Piston pin clip ①

   Onto piston ④

NOTE:

- Install the piston with the arrow mark ⑤ on the piston head pointing toward left of the "Y" mark ⑥ .
- Always install new piston pin clips ① .



3. Install:
   - Connecting rod bearings ①

   Into connecting rod ② and cap ③ .

NOTE:

Be sure to align the bearing end projection ④ with the notches of the connecting rod and cap.

   - Connecting rod bolts ⑤

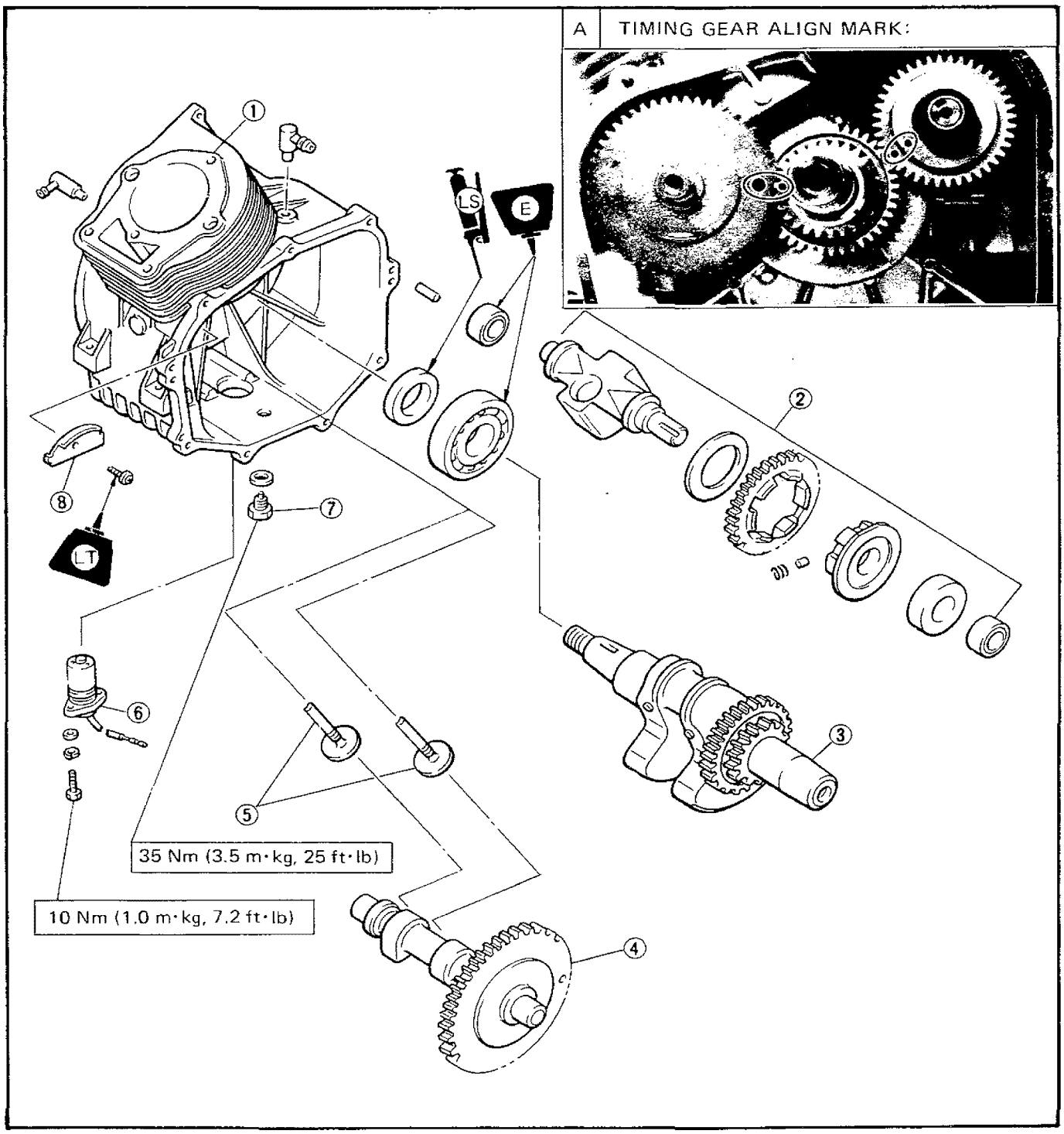
   Into connecting rod ② .

4. Lubricate:
   - Connecting rod bolt threads

	Molybdenum Disulfide Grease

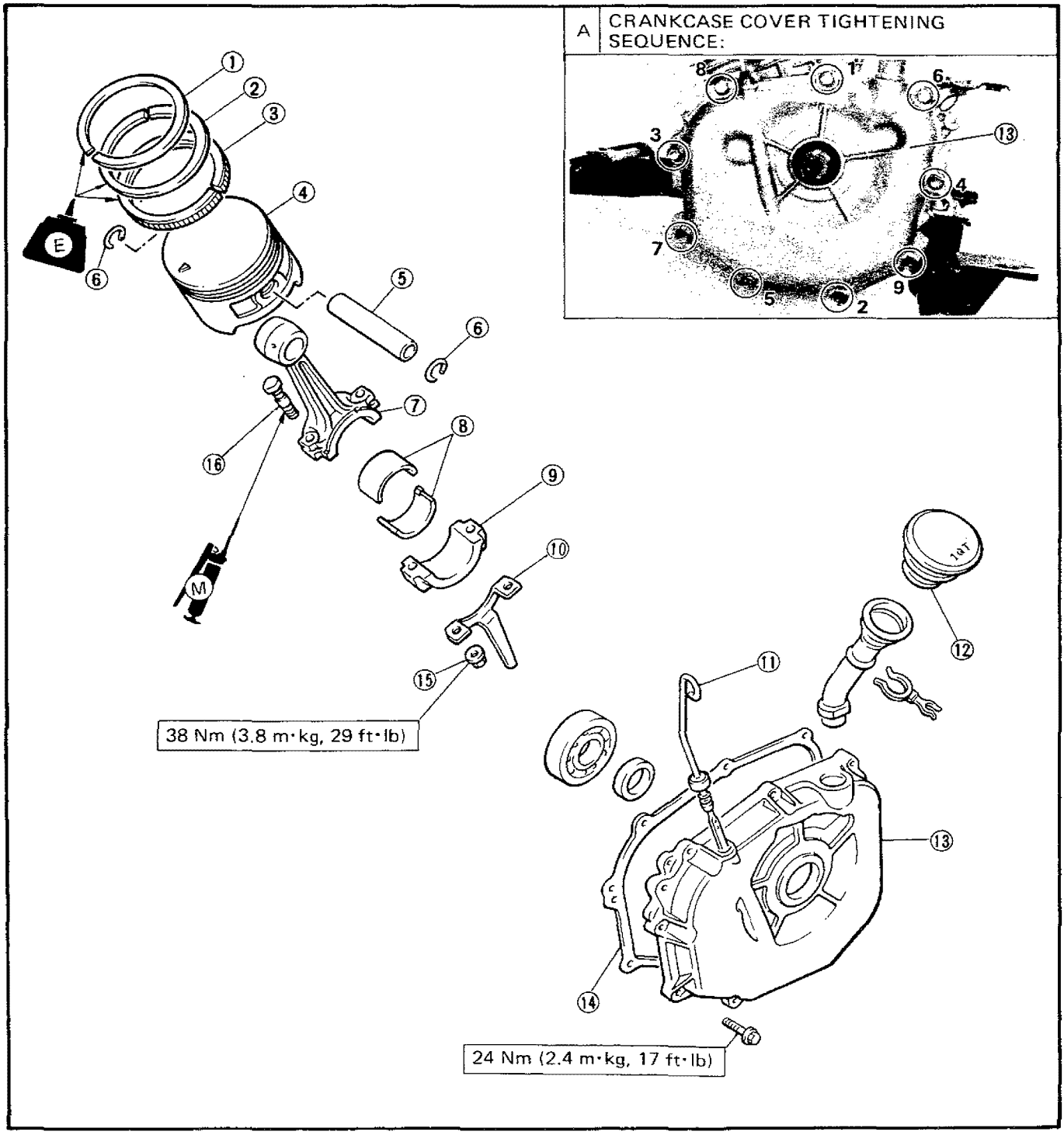
CRANKSHAFT, BALANCER SHAFT, AND CAMSHAFT

① Crankcase
② Balancer shaft
③ Crankshaft
④ Tappet
⑤ Camshaft
⑥ Oil level switch

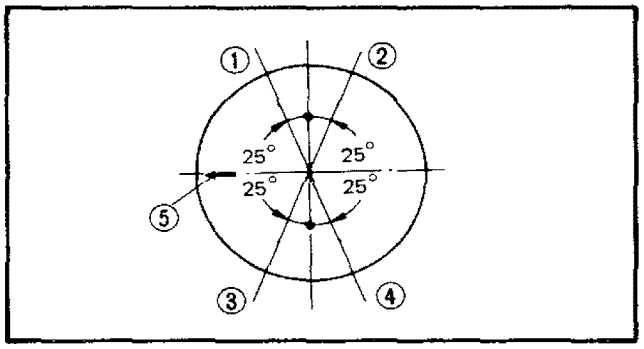


PISTON, CONNECTING ROD, AND CRANKCASE COVER

① Top ring
② 2nd ring
③ Oil ring
④ Piston
⑤ Piston pin
⑥ Piston pin clip
⑦ Connecting rod
⑧ Connecting rod bearing
⑨ Rod cap
⑩ Splashed plate
⑪ Dip stick
⑫ Filler cap
⑬ Crankcase cover
⑭ Gasket
⑮ Nut
⑯ Rod cap bolt



5. Oil liberally:
   - Piston
   - Rings
   - Cylinder
   - Piston pin



6. Set:
   - Piston ring ends

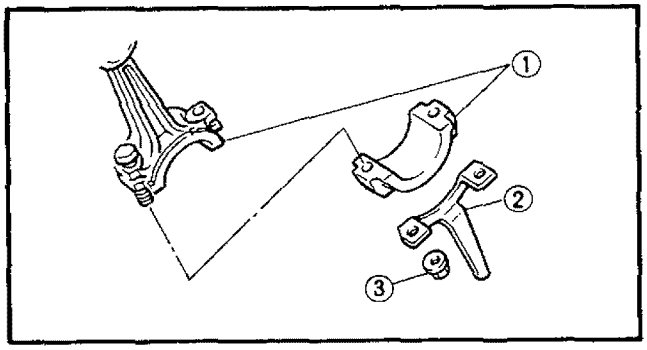
⚠ CAUTION:

Make sure the ends of the oil ring expanders do not overlap.

① TOP RING
② OIL RING (LOWER RAIL)
③ OIL RING (UPPER RAIL)
④ 2ND RING
⑤ ARROW MARK

7. Install:
   - Piston/Connecting rod
     Into cylinder.

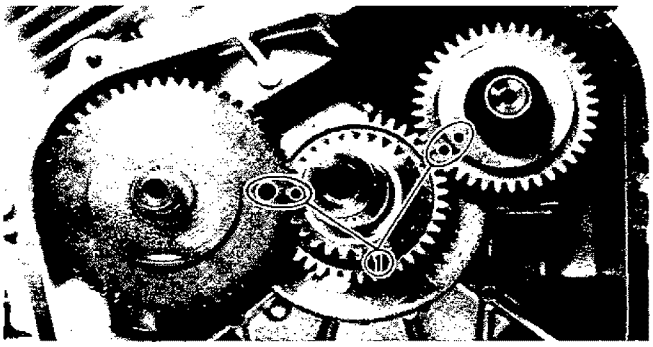
NOTE:
The arrow mark ⑤ on the piston should face toward the front (Push rod side).



8. Install:
   - Connecting rod cap ① (with bearing)
   - Splash plate ②
   - Connecting rod cap nuts ③

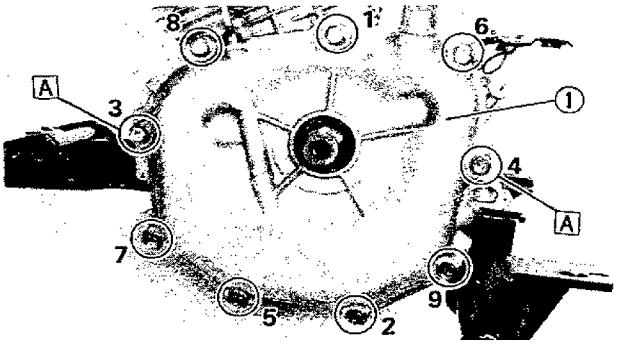
NOTE:
Align the joint marks on the connecting rod and cap.

	Connecting Rod Cap Nut: **38 Nm (3.8 m·mg, 29 ft·lb)**



9. Align the timing marks ① on the crankshaft, camshaft, and balancer shaft.

NOTE:
Do not turn the crankshaft in this position until the rocker arms are installed.



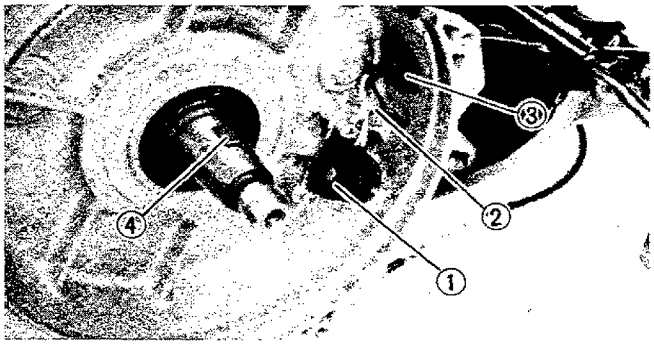
CRANKCASE COVER

1. Install:
   - Dowel pins
   - Gasket (New)
   - Crankcase cover ①

NOTE:
Follow numerical number shown in photo.

	Crankcase Cover Bolt: 24 Nm (2.4 m·kg, 17 ft·lb)

A WITH DOWEL PINS



FLYWHEEL

1. Install:
   - Pickup coil ①
     Connect the black lead ② with the pickup coil.

NOTE:
Insert the grommet ③ completely into the crankcase.

2. Remove any oil and/or grease from the tapered portion of crankshaft and flywheel with a non-oily solvent.
3. Install:
   - Woodruff key ④
   - Flywheel
   - Washer
   - Spring washer
   - Nut

4. Tighten:
   - Flywheel securing nut
   Use the Primary Sheave Holder.

	Flywheel Securing Nut: 75 Nm (7.5 m·kg, 54 ft·lb)
	Primary Sheave Holder: YS-01880, 90890-01701

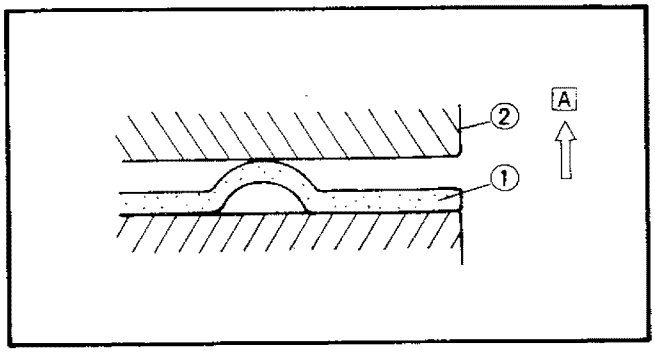
PRIMARY SHEAVE

1. Install:
   - Primary sheave assembly
   Use the Primary Sheave Holder.
   Refer to CHAPTER 6 "PRIMARY SHEAVE – INSTALLATION" section.

	Bolt (Primary Sheave): 75 Nm (7.5 m·kg, 54 ft·lb)
	Primary Sheave Holder: YS-01880, 90890-01701

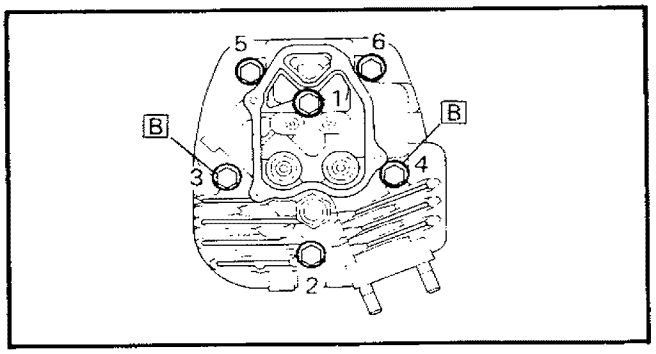
CYLINDER HEAD

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



NOTE:
The swelling side of the gasket ① should face upward.

Ⓐ UPWARD

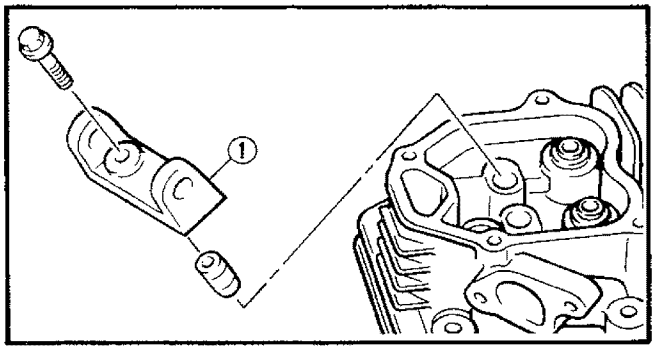


NOTE:
Tighten the bolts in sequence as shown and torque the bolts in two stages.

	Bolt (Cylinder Head): 28 Nm (2.8 m·kg, 20 ft·lb)

Ⓑ LONGER BOLT

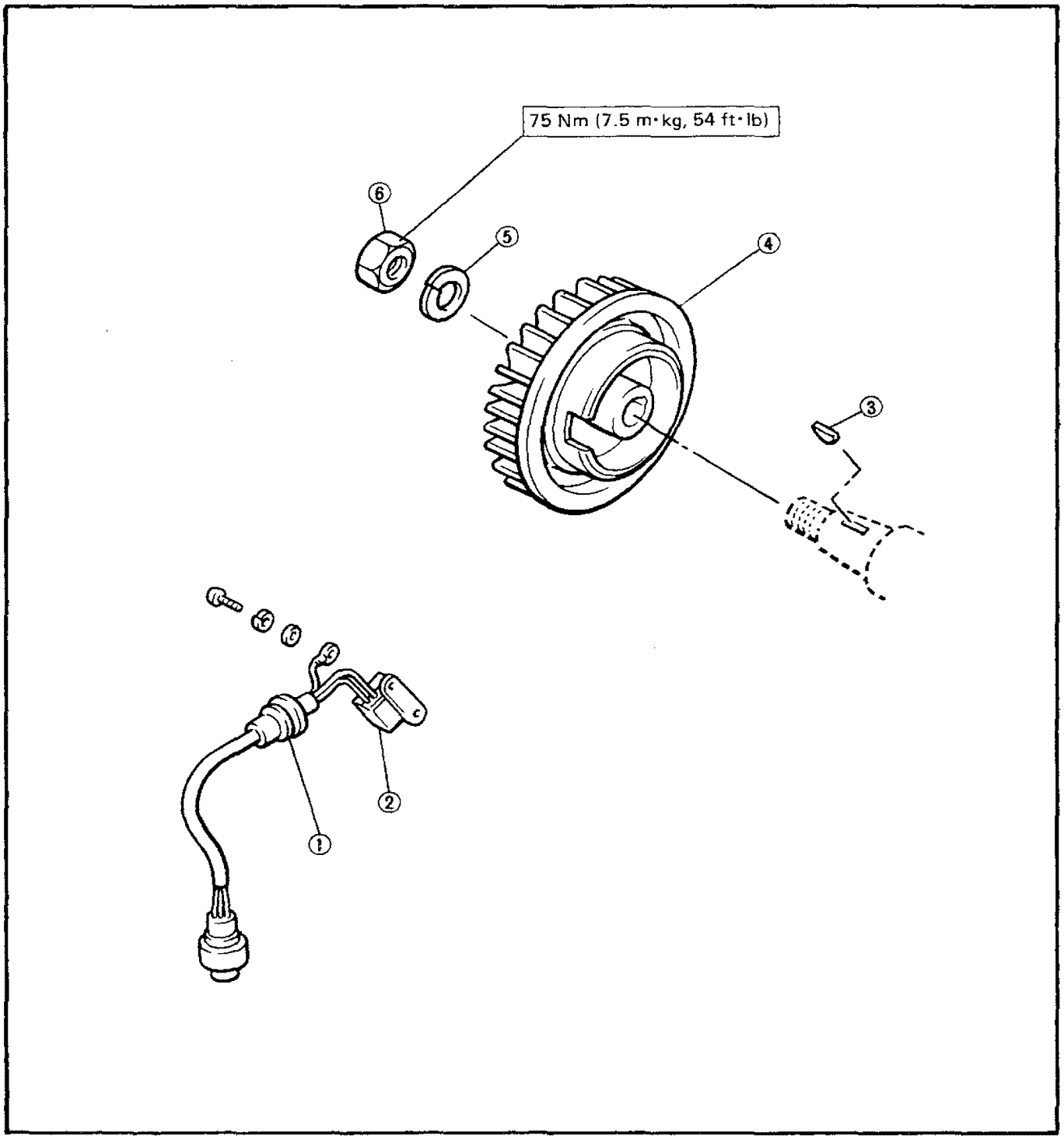
2. Install:
   - Rocker-arm-shaft supporter ①

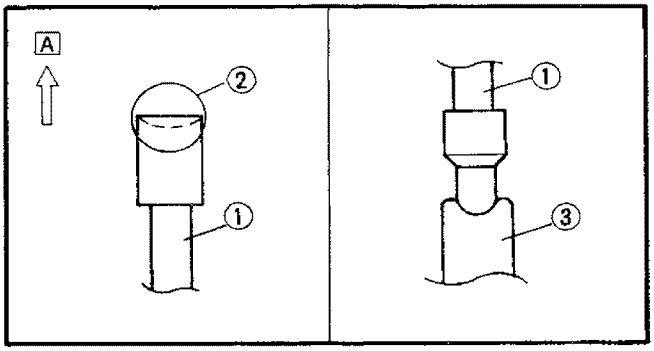


	Supporter Holding Bolt: 10 Nm (1.0 m·kg, 7.2 ft·lb)

FLYWHEEL

① Grommet
② Pick up coil
③ Woodruff key
④ Flywheel
⑤ Spring washer
⑥ Nut

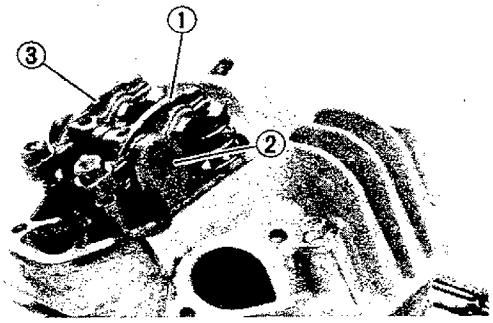




3. Install:
   - Push rods ①

NOTE:
- Be sure the push rod is positioned correctly.
- The hollow end ② of the push rod should face to upward.
- Be sure the push rod is placed correctly onto the tappet ③ .

A UPWARD



4. Install:
   - Rocker arm (Intake) ①
   - Rocker arm shaft ②
   - Rocker arm (Exhaust) ③

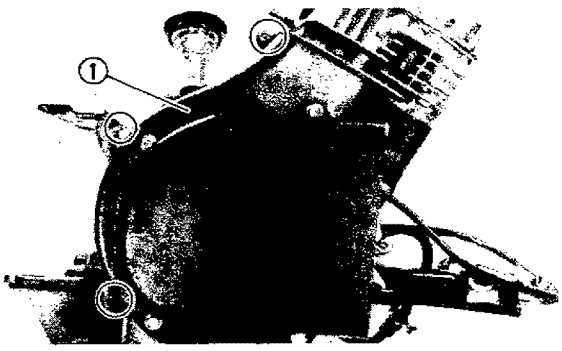
5. Adjust:
   - Valve clearance

   Refer to CHAPTER 3 "VALVE CLEARANCE ADJUSTMENT" section.

Valve Clearance (Cold):
Intake and exhaust:
0.1 mm (0.004 in)

6. Install:
   - Gasket (New)
   - Cylinder head cover
   - Spark plug

Bolt (Cylinder Head Cover):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Spark Plug:
20 Nm (2.0 m·kg, 14 ft·lb)



AIR SHROUD

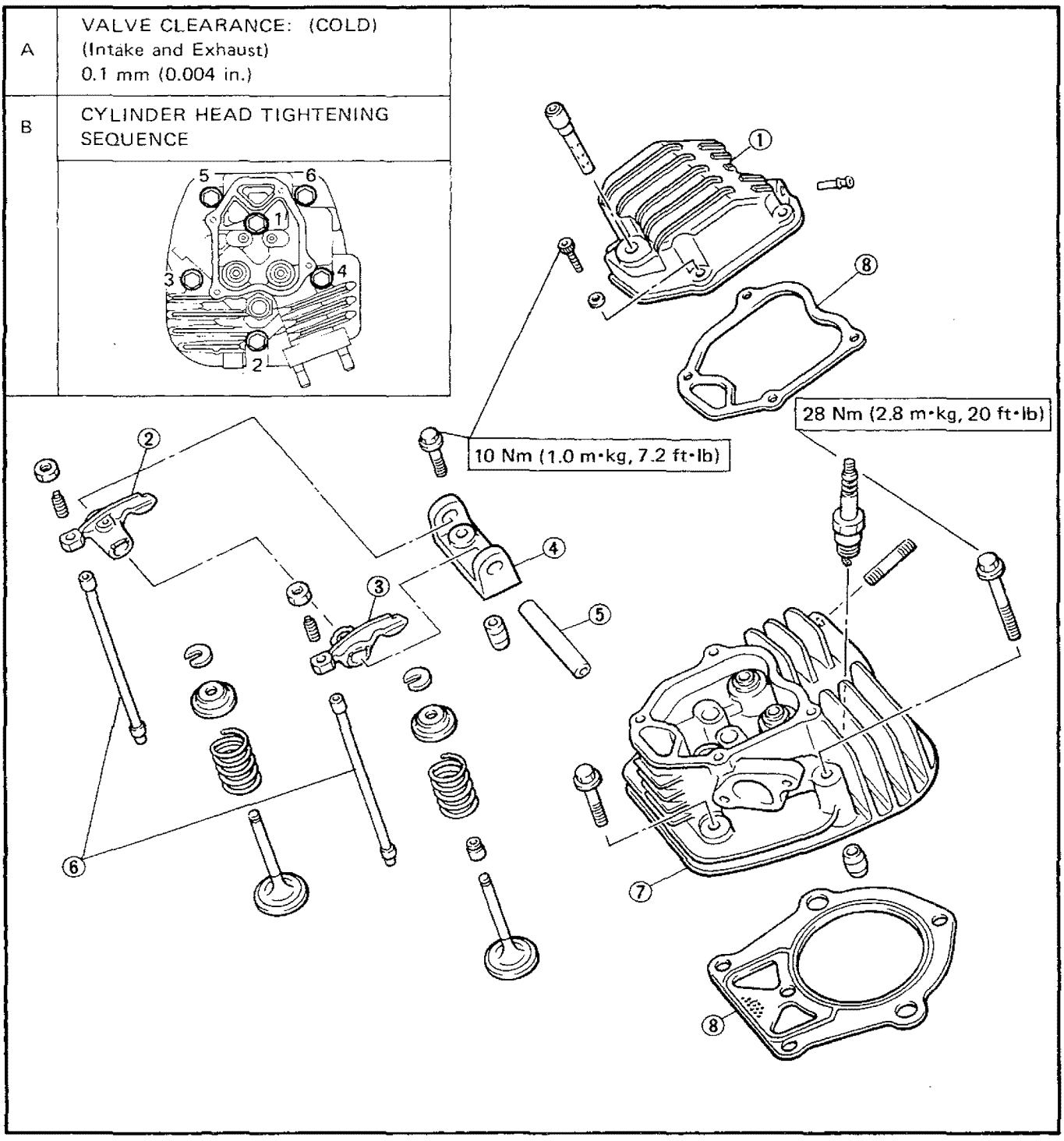
1. Install:
   - Air shroud (Side) ①

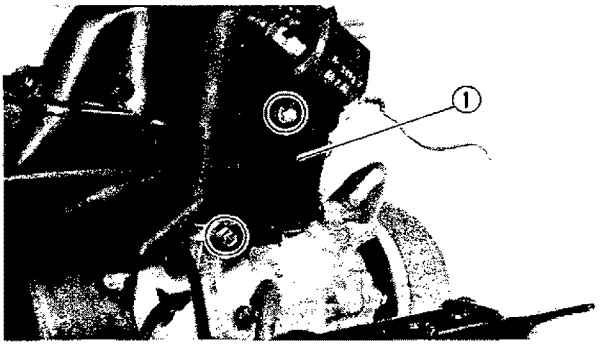
Bolt (Air Shroud – Side):
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

CYLINDER HEAD AND ROCKER ARM

① Cylinder head cover
② Rocker arm (Exhaust)
③ Rocker arm (Intake)
④ Rocker-arm-shaft support
⑤ Rocker arm shaft
⑥ Push rod
⑦ Cylinder head
⑧ Gasket

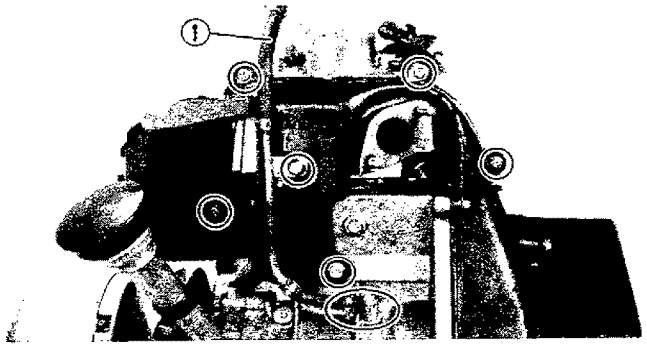
A	VALVE CLEARANCE: (COLD) (Intake and Exhaust) 0.1 mm (0.004 in.)
B	CYLINDER HEAD TIGHTENING SEQUENCE





2. Install:
   - Air shroud (Front) ① (With ignition coil)

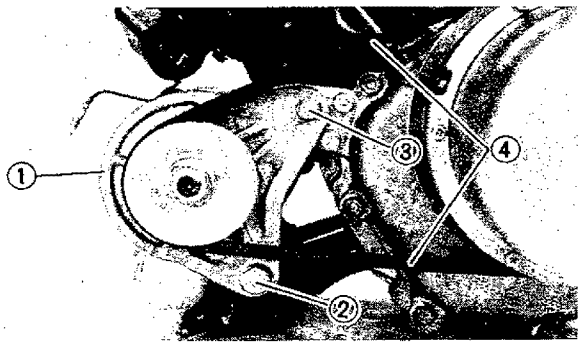
Bolt (Air Shroud – Front):
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®



3. Install:
   - Air shroud (Rear)
   - Oil delivery hose ①

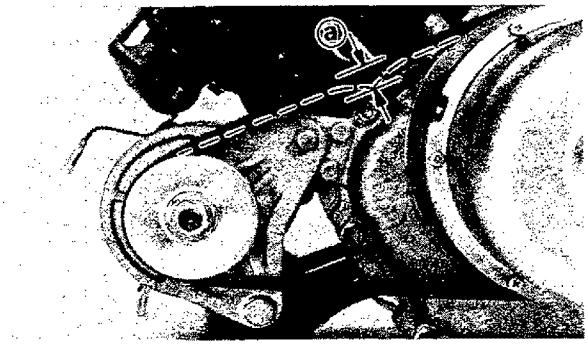
Screw (Air Shroud – Rear):
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

4. Connect:
   - Oil breather hose
   - Oil delivery hose
   - Blow-by hose
   - Plug cap



STARTER-GENERATOR

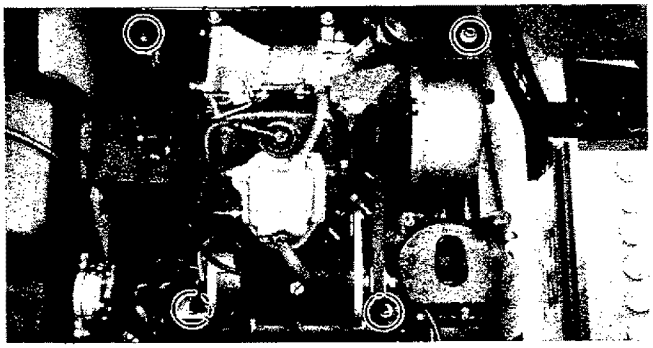
1. Install:
   - Starter-generator ①
   - Mounting bolt ② /Nut
   - Belt tension bolt ③ /Nut
     Belt ④



2. Adjust:
   - Belt tension ⓐ
     Refer to CHAPTER 3 "STARTER BELT INSPECTION" section.

Starter Belt Tension ⓐ :
8 ~ 12 mm /10 kg
(0.31 ~ 0.47 in/22 lb)

Belt Tension Bolt-Nut:
14 Nm (1.4 m·kg, 10 ft·lb)
Holding Bolt-Nut:
53 Nm (5.3 m·kg, 38 ft·lb)



REMOUNTING ENGINE

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

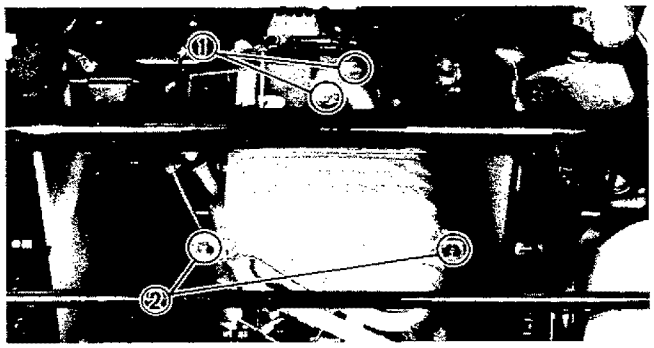
1. Install:
   - Engine (With bracket)
   - Mounting nuts

Engine Bracket Mounting Nut:
35 Nm (3.5 m·kg, 25 ft·lb)

2. Install:
   - Maffler stay (With throttle cable)
3. Adjust:
   - Engine-bracket-tensioner
     Refer to CHAPTER 3 "ENGINE BRACKET ADJUSTMENT" section.

Engine-Bracket-Tension Free Play:
2 mm (0.08 in)

4. Install:
   - Muffler assembly (With new gasket)
   - Exhaust pipe cover
   - Air cleaner case
   - Carburetor



5. Tighten:
   - Bolts/Nuts/Screws

Exhaust Flange Nut ① :
20 Nm (2.0 m·kg, 14 ft·lb)
Muffler Holding Bolt ② :
14 Nm (1.4 m·kg, 10 ft·lb)
Carburetor Holding Nut:
6 Nm (0.6 m·kg, 4.3 ft·lb)
Spark Plug:
20 Nm (2.0 m·kg, 14 ft·lb)

6. Connect:
   - Throttle cable
   - Choke cable
   - Fuel hose
7. Adjust:
   - Free play (Throttle cable 2)
   - Free play (Choke cable)

   Refer to CHAPTER 3 "THROTTLE CABLE ADJUSTMENT" and "CHOKE CABLE ADJUSTMENT" section.

Free Play (Throttle Cable 2):
0.5 mm (0.02 in)
Free Play (Choke Cable):
1.0 mm (0.04 in)

8. Fill:
   - Crankcase

   Refer to CHAPTER 3 "ENGINE OIL REPLACEMENT" section.

Recommended Oil:
SAE 10W30 type SE or SF motor oil
Oil Quantity:
1.1 L (0.97 Imp qt, 1.16 US qt)

NOTE:
Recommended engine oil classification; API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

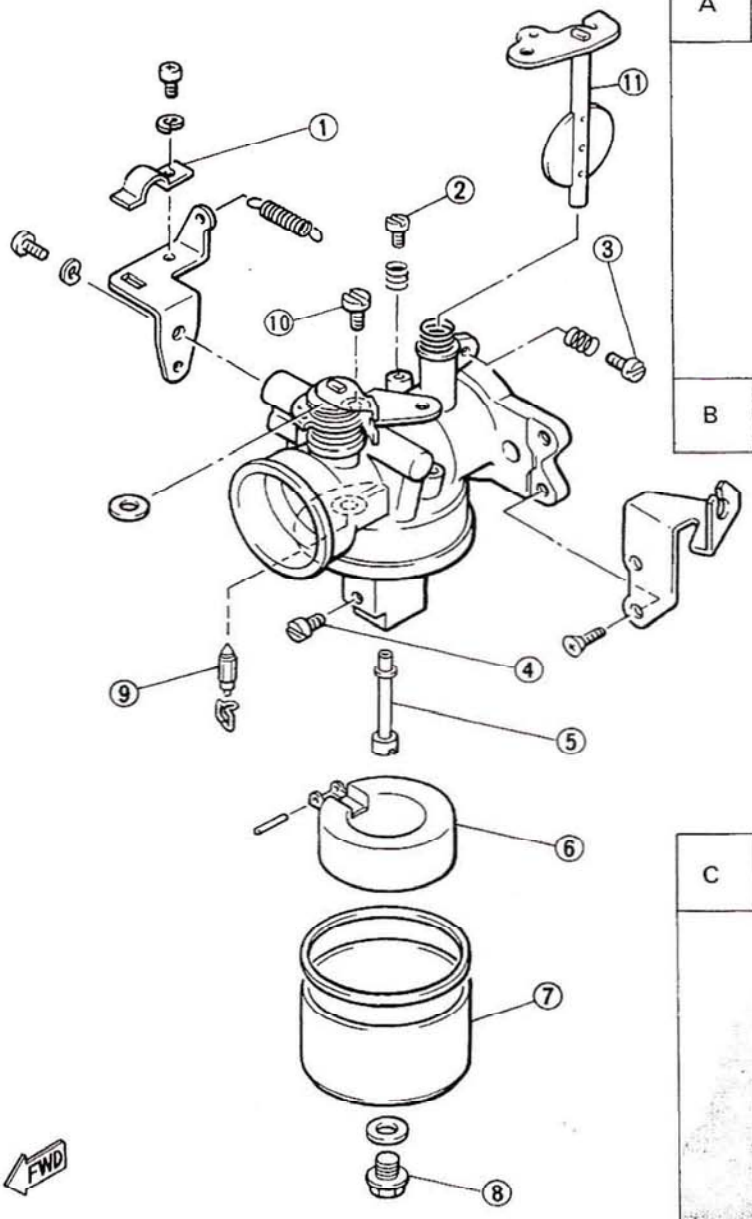
⚠ CAUTION:
Do not allow foreign material to enter the engine.

CARBURETION

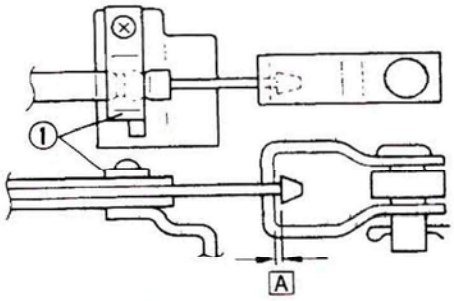
CARBURETOR

① Cable housing clamp
② Pilot screw (P.S.)
③ Throttle stop screw
④ Main jet (M.J.)
⑤ Main nozzle
⑥ Float
⑦ Float chamber cover
⑧ Cover holding bolt
⑨ Float needle valve
⑩ Pilot jet (P.J.)
⑪ Throttle valve

SPECIFICATIONS		
Main jet	(M.J.)	#106.3
Main air jet	(M.A.J.)	ϕ2.5
Pilot jet	(P.J.)	#72.5
Pilot air jet	(P.A.J.)	ϕ1.4
Throttle valve	(Th.V.)	#120
Valve seat	(V.S.)	ϕ1.2
By-pass (1)	(B.P.-1)	ϕ0.7
By-pass (2)	(B.P.-2)	ϕ0.9
By-pass (3)	(B.P.-3)	ϕ0.6
Pilot outlet	(P.O.)	ϕ1.0
Pilot screw	(P.S.)	1½ turn out
Float height	(F.H.)	14.5 mm (0.57 in)

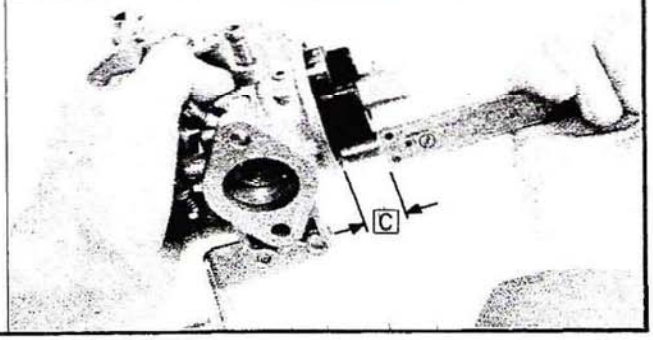


A | CHOKE CABLE FREE PLAY: 1.0 mm (0.04 in)



B | THROTTLE CABLE FREE PLAY: 0.5 mm (0.02 in)

C | FLOAT HEIGHT (F.H.): 14.5 mm (0.57 in)

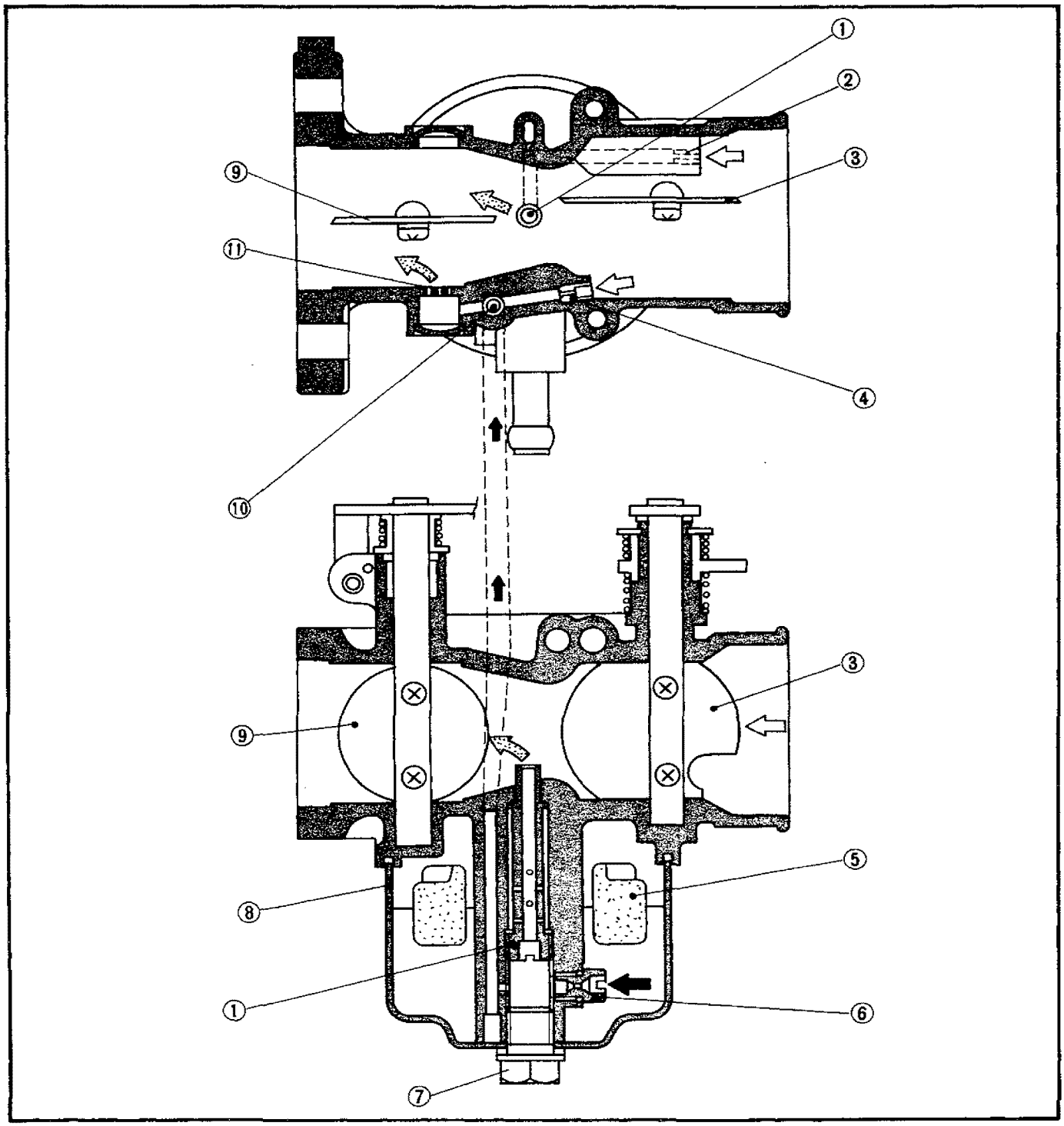


SECTION VIEW

Main Metering System

① Main nozzle
② Main air jet
③ Choke valve
④ Pilot air jet
⑤ Float
⑥ Main jet
⑦ Cover holding bolt
⑧ Float chamber cover
⑨ Throttle valve
⑩ Pilot jet
⑪ Bypass hole

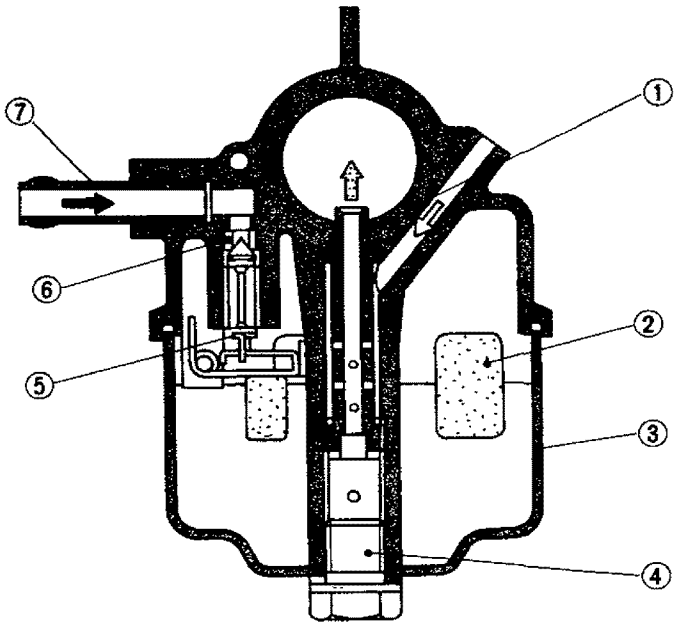
A	⇦	AIR
B	⇦	MIXTURE
C	⬅	FUEL



Float System

① Main nozzle
② Float
③ Float chamber cover
④ Cover holding bolt
⑤ Needle valve
⑥ Valve seat
⑦ Fuel inlet

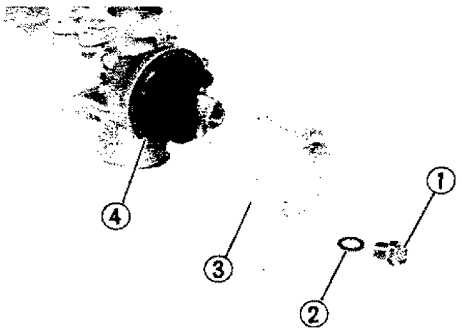
A	⇦	AIR
B	⇦	MIXTURE
C	⬅	FUEL



REMOVAL

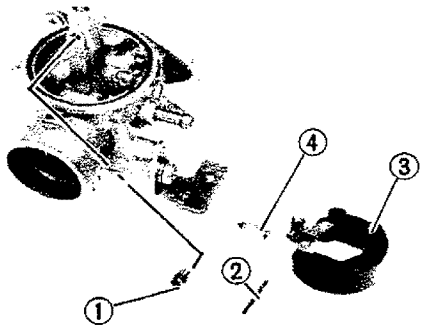
1. Remove:
   - Carburetor assembly

   Refer to CHAPTER 4 "ENGINE REMOVAL – CARBURETOR" section.

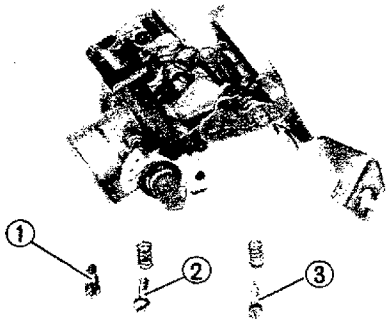


DISASSEMBLY

1 Remove:
- Cover holding bolt ①
- Gasket ②
- Float chamber cover ③
- Rubber gasket ④



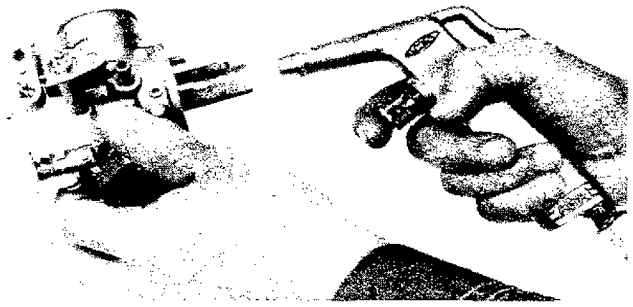
2. Remove:
   - Main Jet ①
   - Float pin ②
   - Float ③
   - Float needle valve ④
   - Main nozzle



3. Remove:
   - Pilot Jet ①
   - Throttle stop screw ② (With spring)
   - Pilot screw ③ (With spring)

⚠ CAUTION:

If the throttle valve has been disassembled, a repair kit must be installed as screws are clinched and will damage shaft if removed.



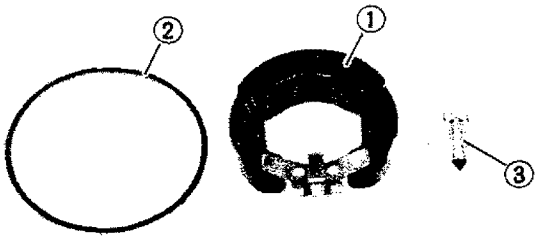
INSPECTION

1. Inspect:
   - Carburetor body
   - Fuel passage

   Contamination → Clean.

NOTE:

- Use a petroleum based solvent for cleaning.
- Blow out all passages and jets with compressed air.



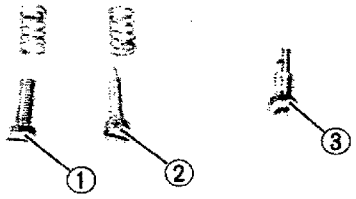
2. Inspect:
   - Float ①

   Damage/Torn → Replace.
   - Rubber gasket ②

   Damage → Replace.
   - Needle valve ③

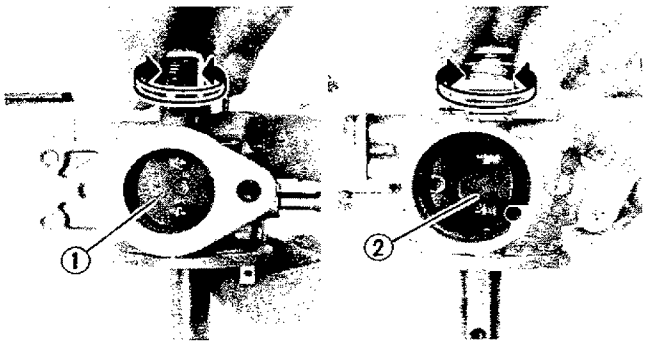
   Wear → Replace.
   - Valve seat

   Wear/Damage → Replace the carburetor body.



3. Inspect:
   - Throttle stop screw ①
   - Pilot screw ②
   - Pilot jet ③

   Wear/Damage → Replace.

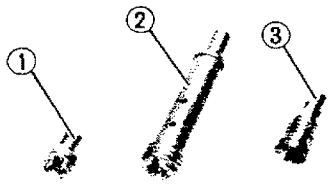


4. Inspect:
   - Throttle valve ①

   Wear/Damage → Replace bushing.
   - Choke valve ②

   Wear/Damage → Replace carburetor body.
5. Check:
   - Choke valve free movement

   Stick → Replace carburetor body.



6. Inspect:
   - Main jet ①
   - Main nozzle ②
   - Pilot jet ③

   Contamination → Clean/Replace.

NOTE:

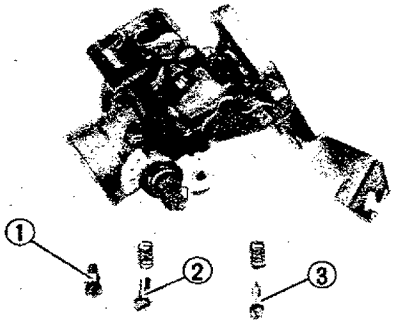
Blow out the jets with compressed air.

ASSEMBLY

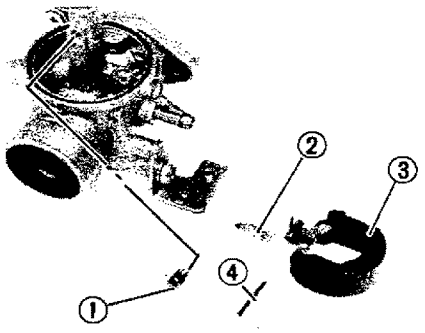
Reverse the "DISASSEMBLY" procedures.
Note the following points.

⚠ CAUTION:

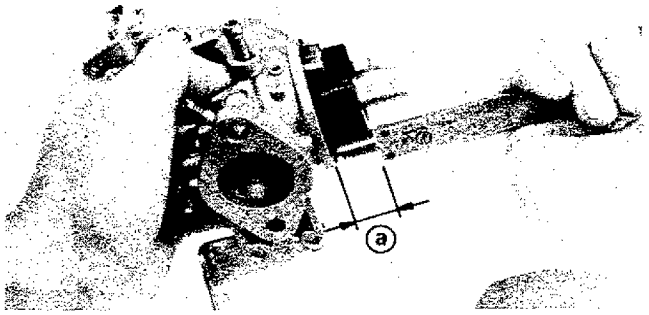
Before reassembling, wash the all parts with a clean gasoline.



1. Install:
   - Pilot jet ①
   - Throttle stop screw ② (With spring)
   - Pilot screw ③ (With spring)



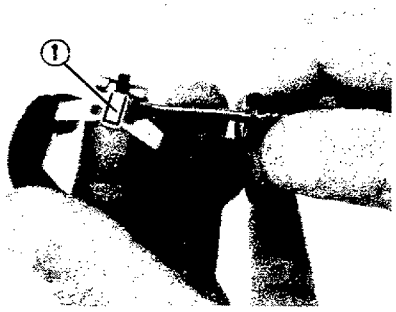
2. Install:
   - Main nozzle
   - Main jet ①
   - Float needle valve ②
   - Float ③
   - Float pin ④



3. Measure:
   - Float height ⓐ
     Out of specification → Adjust.

Float Height (F.H.):
14.5 mm (0.57 in)

Measurement and adjustment steps:
- Hold the carburetor in an upside down position.
- Incline the carburetor at 60 ~ 70° (so that the end of the float valve does not hang down as a result of float weight).
- Measure the distance from the mating surface of the float chamber (gasket removed) to the top of the float.



NOTE:
The float should be just resting on, but not depressing, the spring loaded inlet needle.

- If the float height is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the float height.

4. Install:
   - Rubber gasket (New)
   - Float chamber cover
   - Cover holding bolt

INSTALLATION

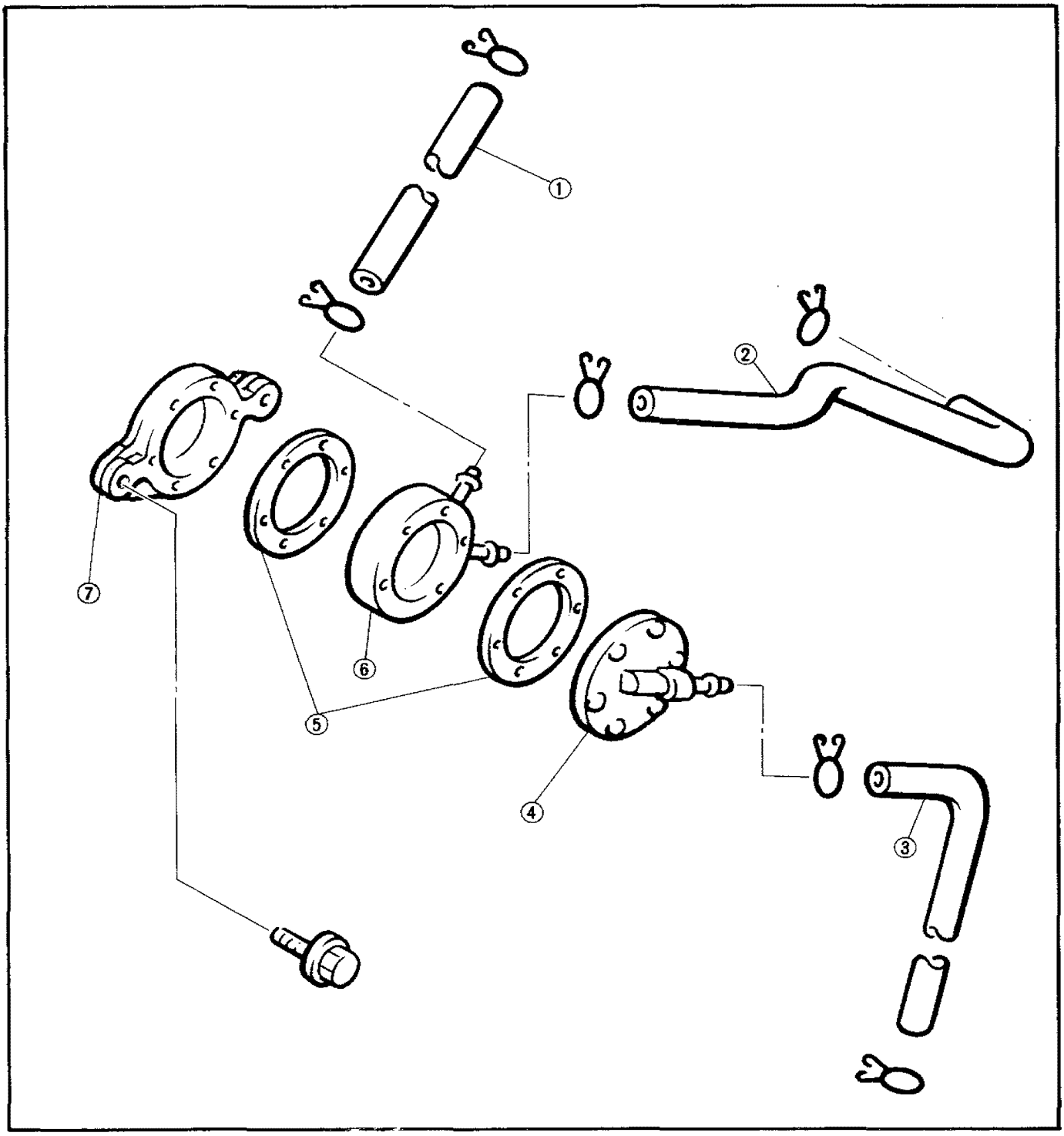
Reverse the "REMOVAL" procedures.
Note the following points.

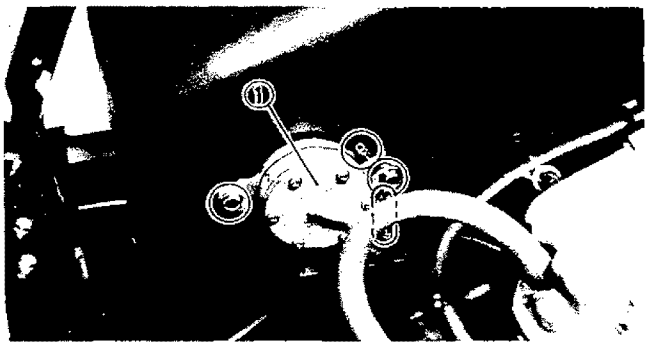
1. Install:
   - Carburetor

	Carburetor Holding Nut: 6 Nm (0.6 m·kg, 5.3 ft·lb)

FUEL PUMP

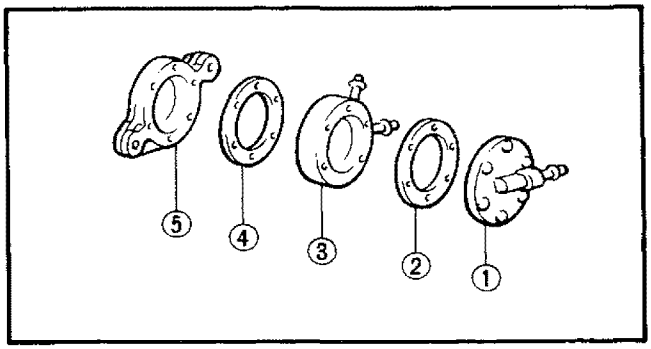
① Pulser hose
② Fuel hose
③ Fuel hose
④ Outer cover
⑤ Diaphragm with gasket
⑥ Pulse chamber cover
⑦ Inner cover



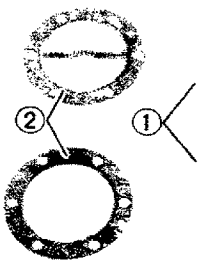


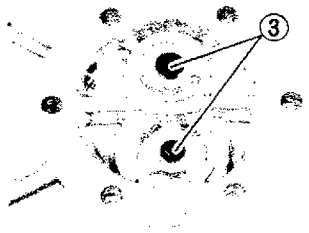
OVERHAULING

1. Remove:
   - Hoses
     From fuel pump.
   - Fuel pump ①



2. Remove:
   - Screws
   - Outer cover ①
   - Diaphragm with gasket ②
   - Pulse chamber cover ③
   - Diaphragm with gasket ④
   - Inner cover ⑤





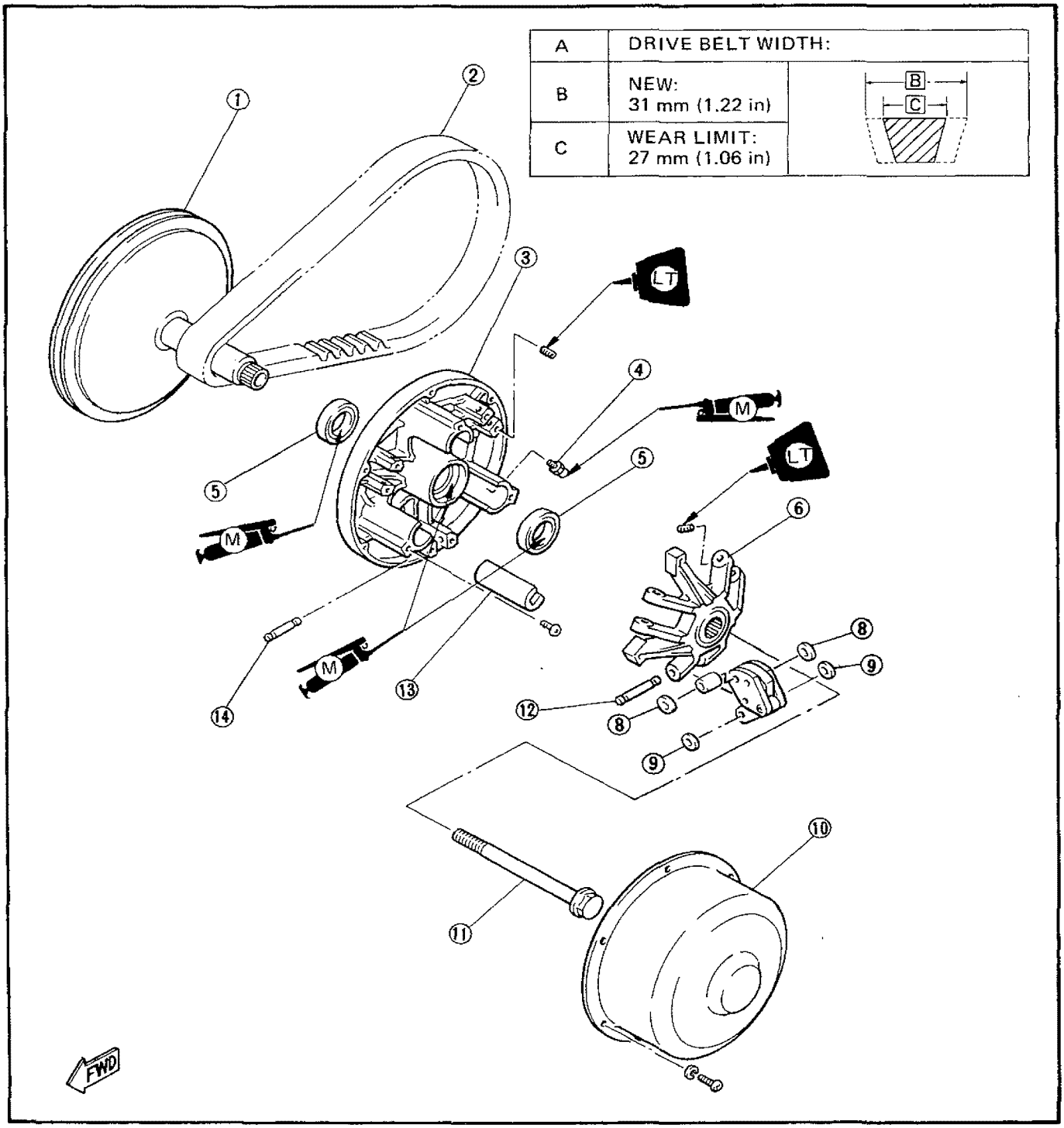
3. Inspect:
   - Diaphragm ①
     Torn/Damage → Replace.
   - Gasket ②
     Torn/Damage → Replace.
   - Valve petals ③
     Fatique cracks → Replace.

4. Assembly:
   - Fuel pump
5. Install:
   - Fuel pump
6. Connect:
   - Hoses

POWER TRAIN (FOR G2-A)

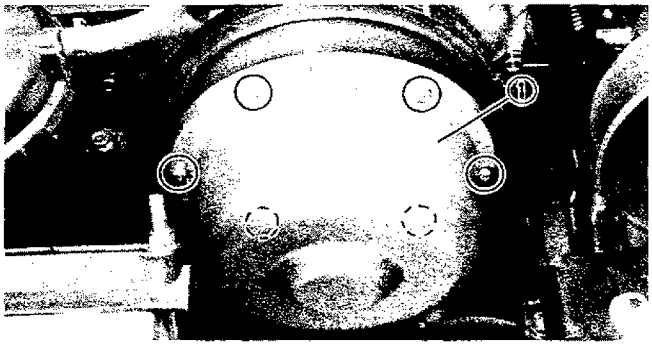
PRIMARY SHEAVE

① Fixed sheave
② Drive belt
③ Sliding sheave
④ Grease nipple
⑤ Oil seal
⑥ Spider
⑦ Weight assembly
⑧ Plastic washer (thin washer)
⑨ Plastic washer (thick washer)
⑩ Sheave cap
⑪ Securing bolt
⑫ Pivot pin (Spider)
⑬ Slider
⑭ Pivot pin (Sliding sheave)

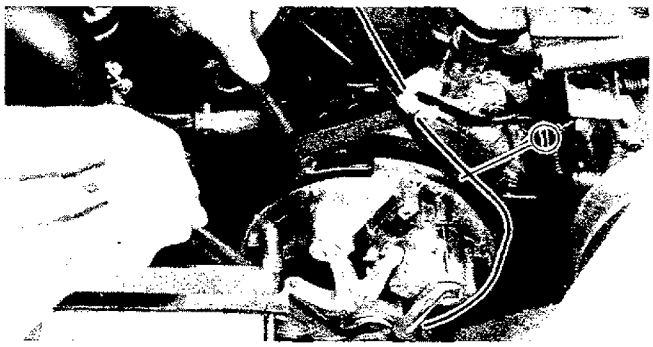


REMOVAL

1. Open the seat cowling.
   Refer to CHAPTER 3 "COWLING BODY" section.
2. Remove:
   - Drive belt
     Refer to CHAPTER 3 "DRIVE BELT INSPECTION" section.



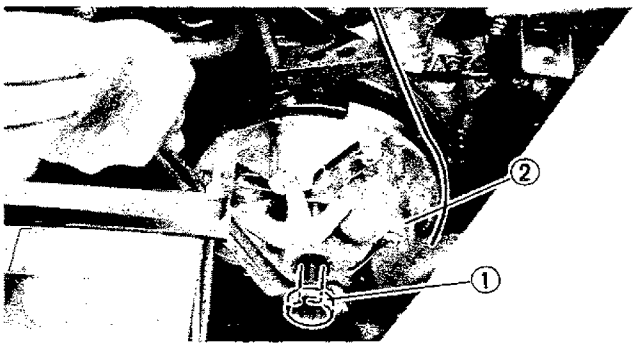
3. Remove:
   - Screws
   - Primary sheave cap ①



4. Attach:
   - Primary Sheave Holder ①

	Primary Sheave Holder: YS-01880, 90890-01701

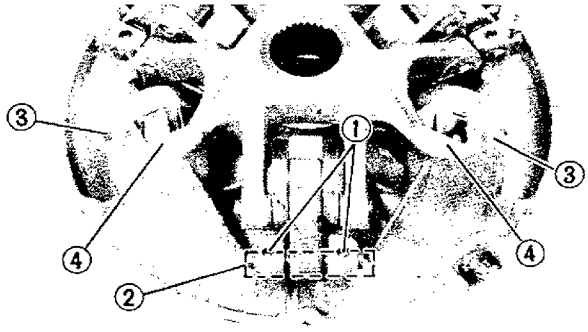
5. Remove:
   - Bolt (Primary Sheave)



6. Attach:
   - Primary Sheave Puller ①

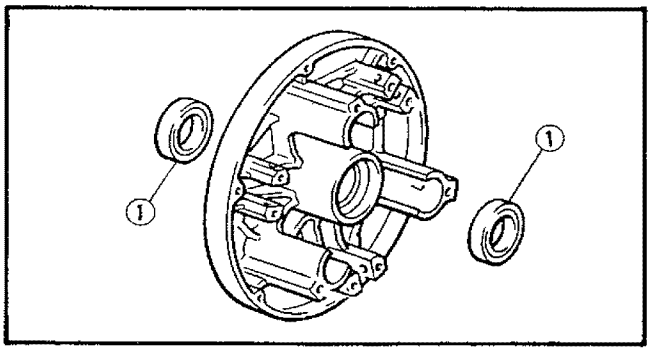
	Primary Sheave Puller: YG-01876, 90890-01876

7. Remove:
   - Primary sheave assembly ②
     When removing the sheave ② , tighten the sheave puller ① .



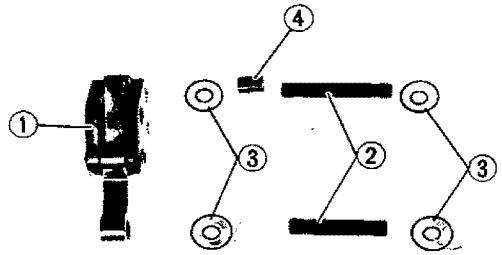
DISASSEMBLY

1. Separate the sliding sheave and fixed sheave.
2. Remove:
   - Screws ①
   - Pivot pins ②
3. Separate the sliding sheave and spider.
4. Remove:
   - Screws ③
   - Slider

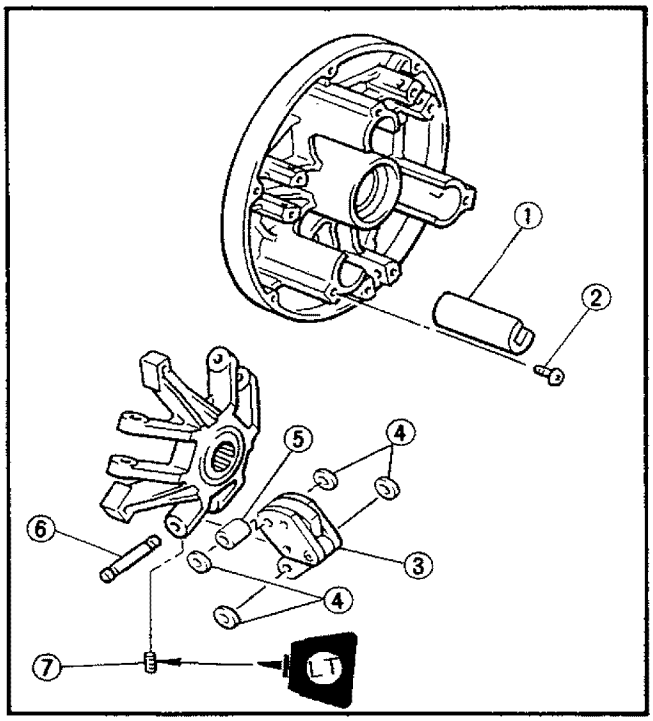


INSPECTION

1. Inspection:
   - Oil seal (Sliding sheave) ①
     Wear/Damage → Replace.



2. Inspect:
   - Weight ①
     Unsmooth operation/Damage → Replace.
   - Pivolt pin ②
   - Plastic washer ③
   - Collar ④
   - Slider
     Wear/Scratches/Damage → Replace.

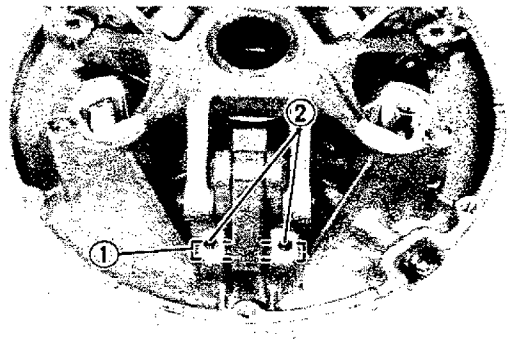


ASSEMBLY

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

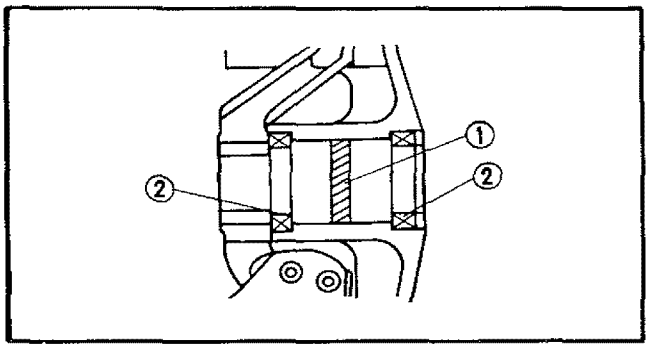
1. Install:
   - Sliders ①
   - Screws ②
     On to sliding sheave.
2. Install:
   - Weights ③
   - Plastic washers ④
   - Collars ⑤
   - Pivot pins ⑥
     On to sliding sheave.
   - Screws ⑦

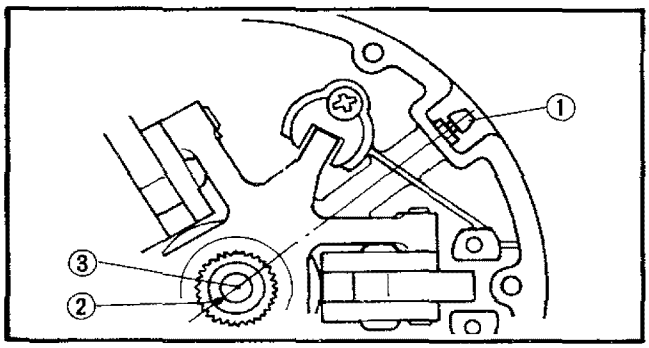
NOTE:
Apply LOCTITE® to the pivot pin screws ⑦ .



3. Position:
   - Spider
     Into sliding sheave.
4. Connect the link arm of the weight onto the sliding sheave using the pivot pins ① and washers.
5. Tighten the screws ② .

NOTE:
Apply LOCTITE® to the pivot pin screws ② .





6. Grease the bushing ① and oil seal lips ② in side of the sliding sheave.
7. Install:
   - Sliding sheave
     Onto fixed sheave.

⚠CAUTION:

Do not damage or deform the oil seal lips during installation.

8. Engage the serration in the spider with the fixed sheave.

NOTE:

The grease nipple ① must be positioned aligning on the line connecting the punch mark ② and the center ③ of the crankshaft. Refer to the illustration describing this position.

INSTALLATION

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

1. Remove any oil and/or grease from the tapered portion of crankshaft and primary sheave with a non-oily solvent.
2. Install:
   - Primary sheave assembly
   - Sheave securing bolt
     Lightly tighten the bolt in this step.
3. Check:
   - Sliding sheave operation
     Push and pull the sliding sheave by hand.
     Unsmooth operation → Reassemble primary sheave.

4. Attach:
   - Primary Sheave Holder ①

	Primary Sheave Holder: YS-01880, 90890-01701

5. Tighten:
   - Bolt (Primary Sheave)

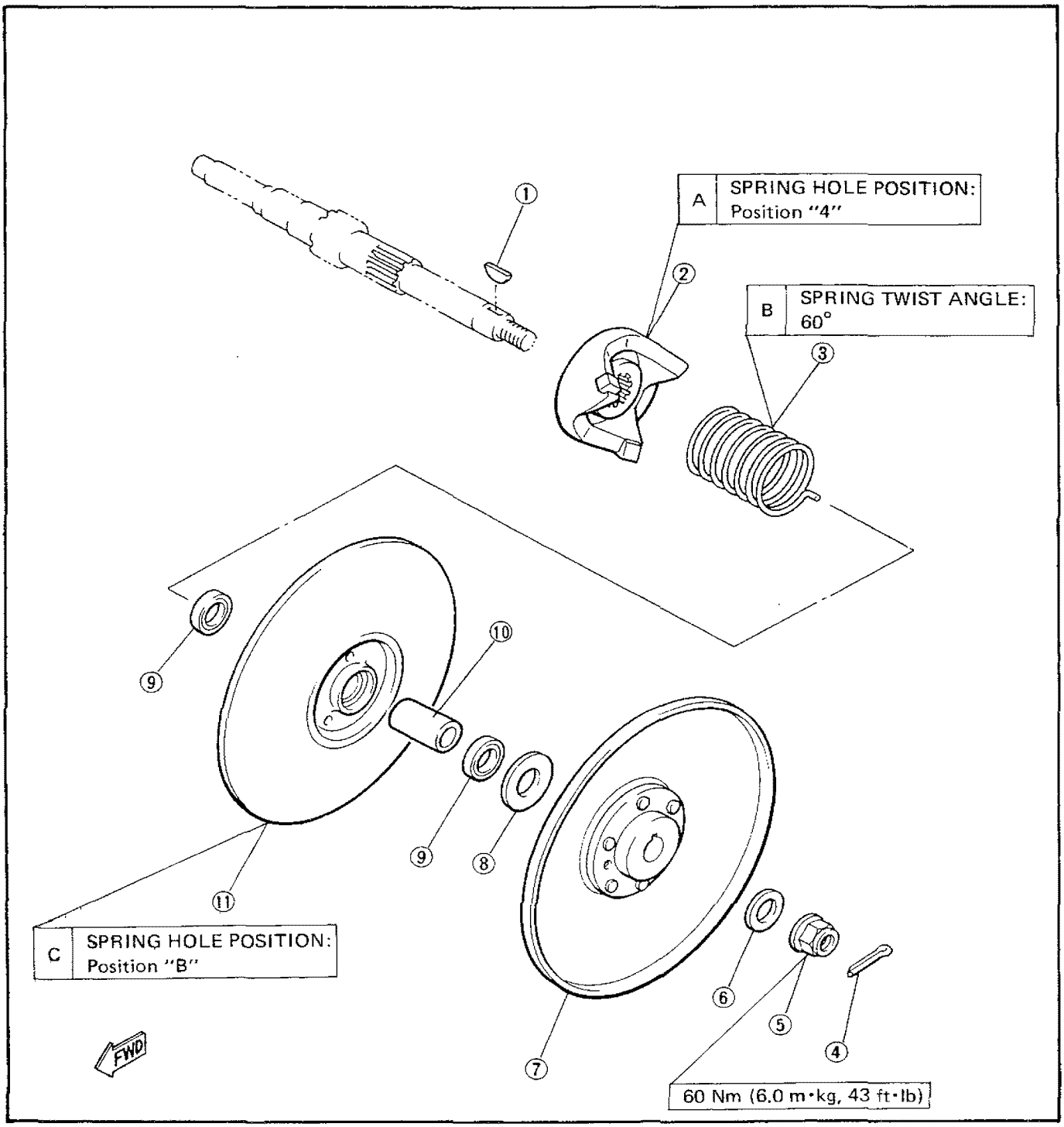
	Bolt (Primary Sheave): 75 Nm (7.5 m·kg, 54 ft·lb)

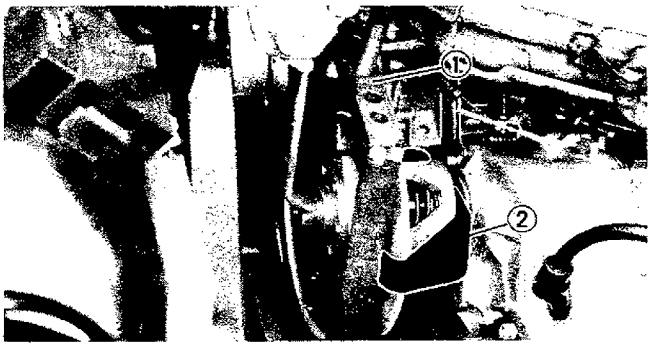
6. Install:
   - Primary sheave cap
   - Drive belt

   Refer to CHAPTER 3 "DRIVE BELT INSPECTION" section.

SECONDARY SHEAVE

① Woodruff key
② Spring seat
③ Compression spring
④ Cotter pin
⑤ Securing nut
⑥ Washer
⑦ Fixed sheave
⑧ Plastic washer
⑨ Oil seal
⑩ Bushing
⑪ Sliding sheave



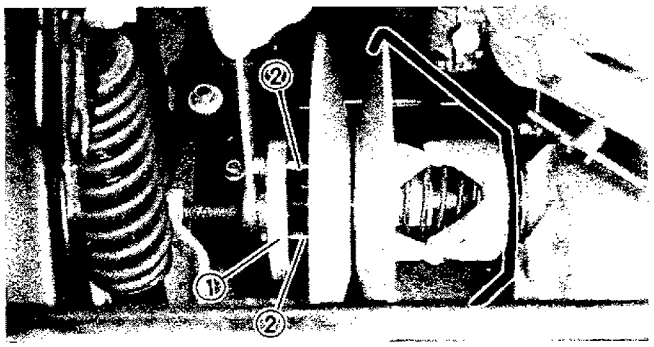


DISASSEMBLY

1. Remove the rear cowling.
   Refer to CHAPTER 3 "COWLING BODY", section.
2. Remove the drive belt.
3. Attach:
   - Primary Sheave Holder ①
   - Secondary Sheave Holder ②

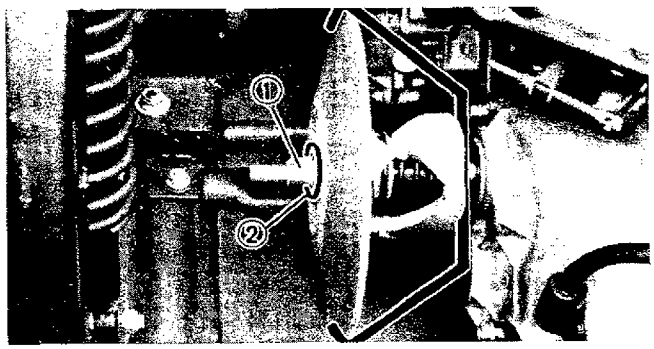
Primary Sheave Holder:
YS-01880, 90890-01701
Secondary Sheave Holder:
YG-40103, 90890-01705

4. Remove:
   - Cotter pin
   - Sheave securing nut
   - Washer



5. Attach:
   - 3-Way Universal Puller ①
   - 6 mm Bolt ②

3-Way Universal Puller:
YU-90105, 90890-01362
6 mm Bolt:
YU-90105-2

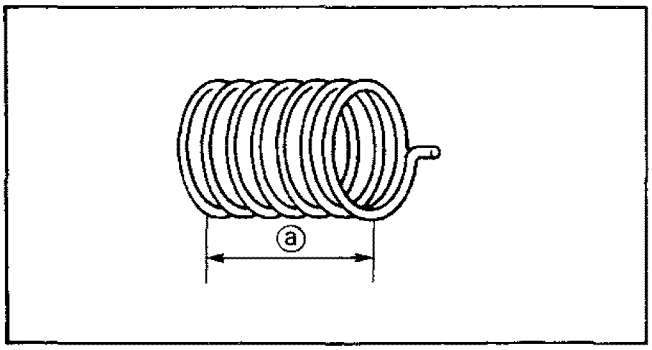


6. Remove:
   - Fixed sheave
   - Woodruff key ①
   - Plastic washer ②
     (from the input shaft)
7. Remove:
   - Secondary Sheave Holder
     When removing the sheave holder, push in the sliding sheave by hand.
8. Release spring force slowly, then remove the sliding sheave.
9. Remove:
   - Compression spring
   - Spring seat

INSPECTION

1. Inspect:
   - Sliding sheave
   - Fixed sheave

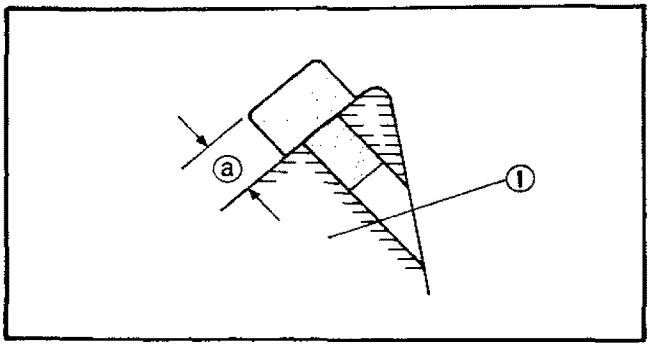
   Warpage/Scratches/Damage → Replace.



2. Measure:
   - Free length (Secondary spring) ⓐ

   Less than specification → Replace.

Free Length (Secondary Spring):
Limit: 100 mm (3.94 in)



3. Measure:
   - Ramp shoe thickness ⓐ

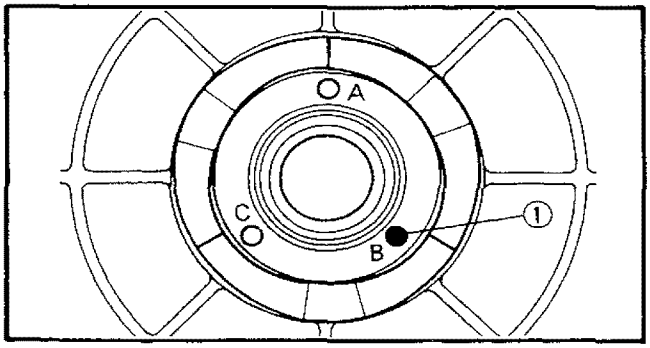
   Out of specification → Replace.

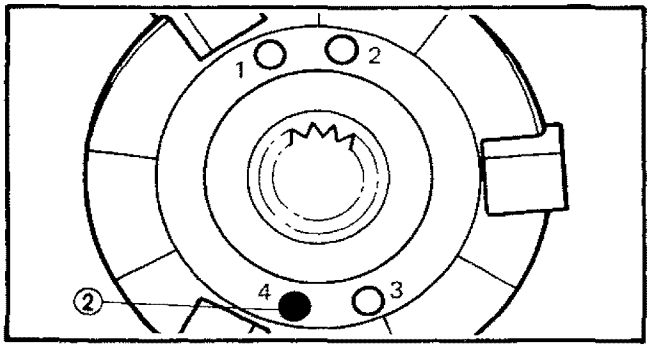
Wear Limit:
1.0 mm (0.04 in)

① Spring seat cam

4. Inspect:
   - Oil seal

   Wear/Damage → Replace.





ASSEMBLY

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

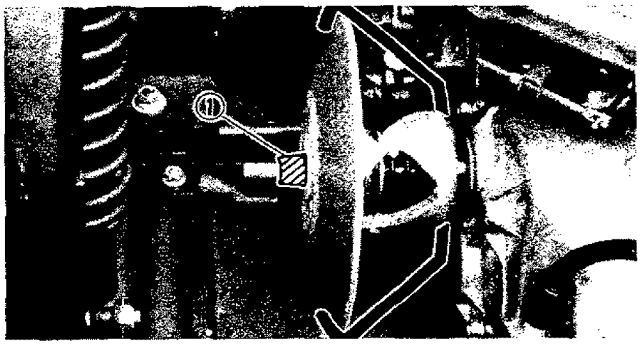
1. Install:
   - Spring seat

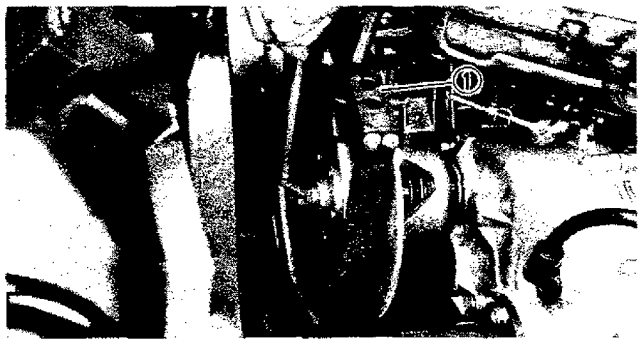
   Onto the input shaft.
2. Grease the bushing and oil seal lips inside of the sliding sheave.
3. Hook the spring end into the spring hole "B" ① in the sheave.
4. Install the spring and sliding sheave onto the input shaft.
5. Hook the other end of spring into the hole "4" ② in the spring seat.

6. Install:
   - Secondary Shave Holder
     Onto the sliding sheave.

Secondary sheave holder installation steps:
- Push the sliding sheave in, while turning it approx 60° clockwise to preload the spring. Then hold the sheave in this position.
- Hook the Secondary Sheave Holder onto the sliding sheave.

Secondary Sheave Holder:
YG-40103, 90890-01705





7. Remove any oil and/or grease from the tapered portion of input shaft ① and fixed sheave with a thinner.
8. Install:
   - Plastic washer
   - Woodruff key
   - Fixed sheave
   - Washer
   - Securing nut

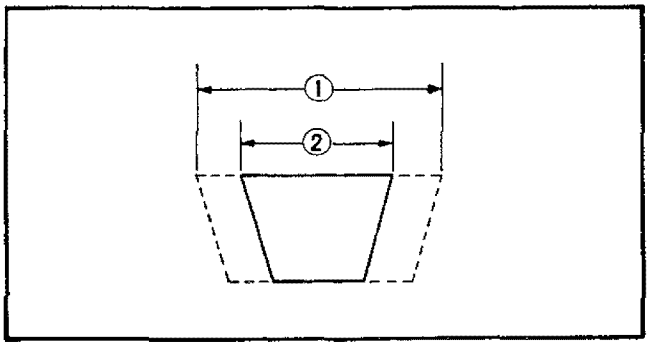
9. Attach:
   - Primary Sheave Holder ①
     Onto fixed sheave.

Primary Sheave Holder:
YS-01880, 90890-01701

10. Tighten:
    - Nut (Secondary sheave)

Nut (Secondary Sheave):
60 Nm (6.0 m·kg, 43 ft·lb)

11. Install:
    - Cotter pin (New)
12. Remove the excess grease from the sheaves and input shaft.
13. Install the drive belt.



DRIVE V-BELT

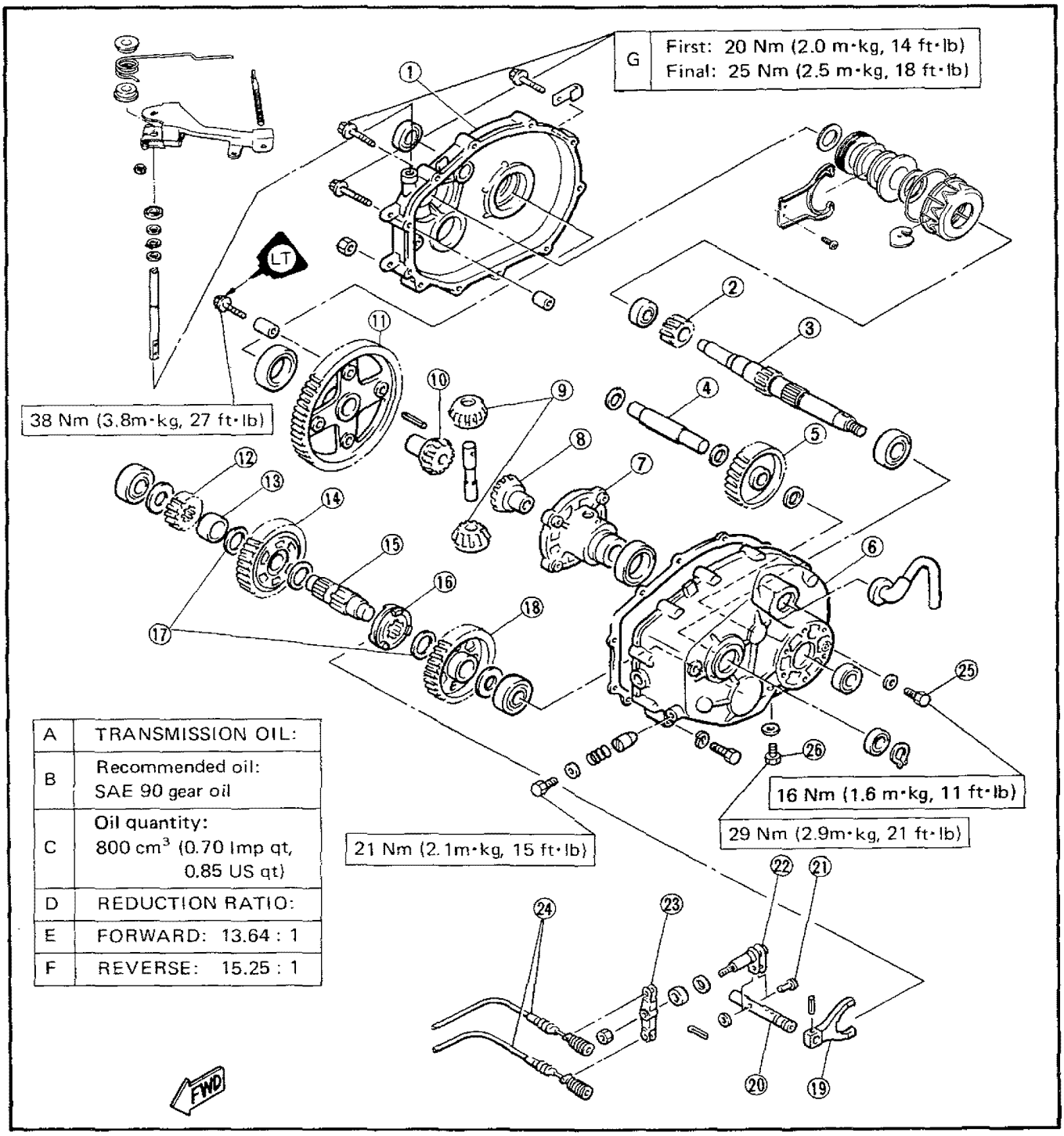
INSPECTION AND REPLACEMENT

Refer to CHAPTER 3 "DRIVE BELT INSPECTION" section.

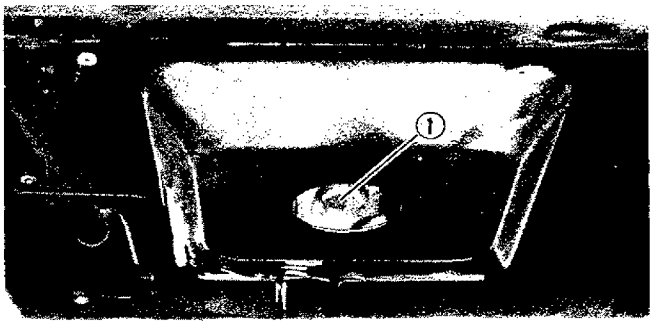
Drive Belt Width:
New ① : 31 mm (1.22 in)
Wear limit ② : 27 mm (1.06 in)

TRANSMISSION

① Transmission case (Right)
② Primary gear (Forward)
③ Input shaft
④ Idler shaft
⑤ Idler gear (Reverse)
⑥ Transmission case (Left)
⑦ Differential case
⑧ Differential side gear
⑨ Differential pinion
⑩ Differential side gear
⑪ Ring gear
⑫ Counter gear 2
⑬ Spacer
⑭ Counter gear (Forward)
⑮ Counter shaft
⑯ Dog clutch
⑰ Thrust washer
⑱ Counter gear (Reverse)
⑲ Shift fork
⑳ Shift fork bar
㉑ Pin
㉒ Shift lever shaft
㉓ Shift lever
㉔ Shifting cable
㉕ Oil level plug
㉖ Drain plug

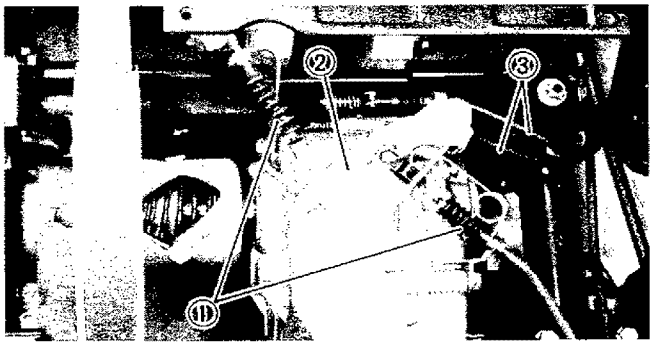


A	TRANSMISSION OIL:
B	Recommended oil: SAE 90 gear oil
C	Oil quantity: 800 cm³ (0.70 Imp qt, 0.85 US qt)
D	REDUCTION RATIO:
E	FORWARD: 13.64 : 1
F	REVERSE: 15.25 : 1

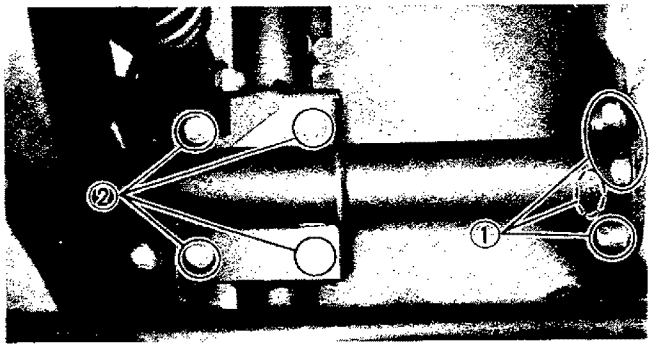


REMOVAL

1. Place an oil pan under the transmission case.
2. Remove:
   - Drain plug ①
     Drain the transmission oil.



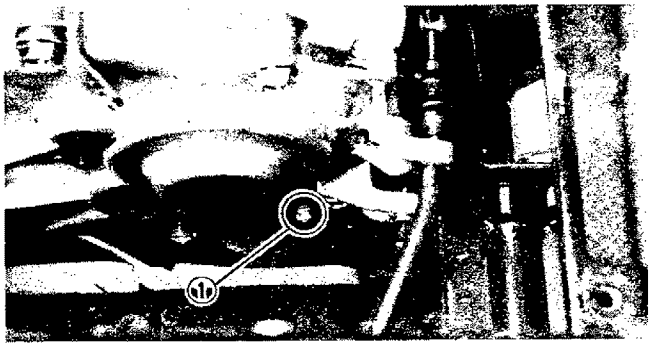
3. Remove:
   - Muffler
     Refer to CHAPTER 3 "ENGINE REMOVAL – MUFFLER" section.
4. Disconnect:
   - Throttle cables ①
     From the speed limit lever ② .
   - Shifting cables (With shift lever) ③
     From the shift lever shaft.
5. Remove:
   - Secondary sheave
     Refer to "SECONDARY SHEAVE – REMOVAL" section.



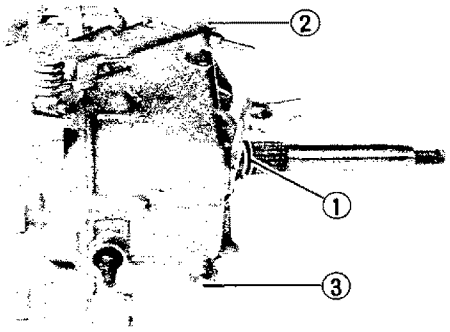
6. Remove:
   - Bolts
     From the axle housing – case ① and rear arm ② .

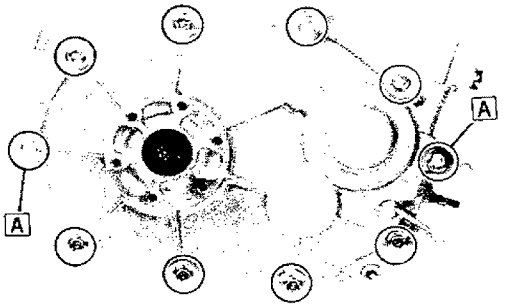
NOTE:
When removing the bolts, support the rear arm with a jack.

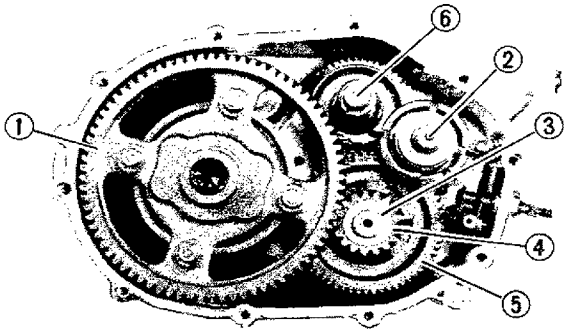
7. Disconnect the axle shafts from the differential gear.

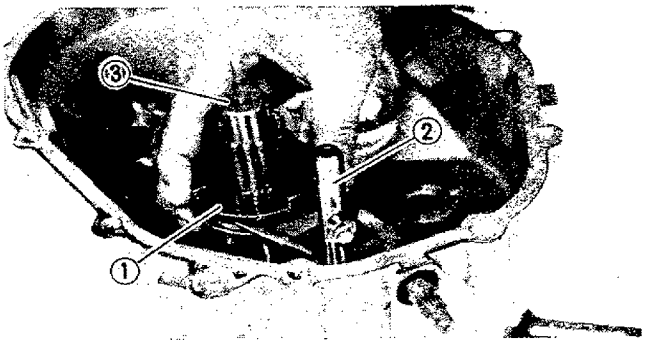


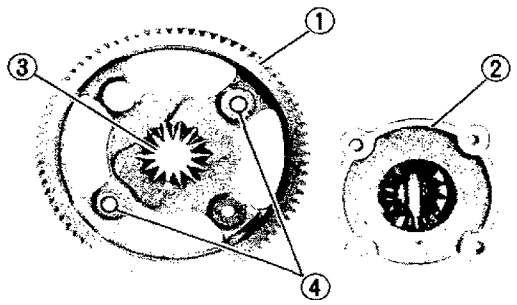
8. Remove:
   - Case mounting bolt ①
9. Remove:
   - Transmission case assembly











DISASSEMBLY

1. Remove:
   - Circlip ①

   From the input shaft.
2. Remove:
   - Speed limiter lever ②

   From the governer shaft.
3. Loosen:
   - Knock pin plug ③

   Loosen the plug completely but do not remove it in this step.
4. Remove:
   - Bolts
   - Transmission case (Right)

   Pull the case straight out from the transmission assembly.

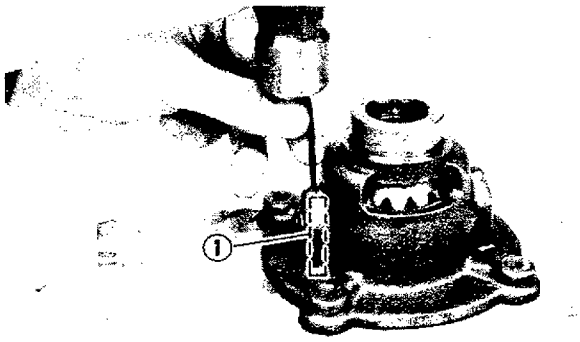
⚠ CAUTION:

Do not drive chisels, screwdrivers, etc. between the case halves. Tap with soft mallet if necessary to loosen case.

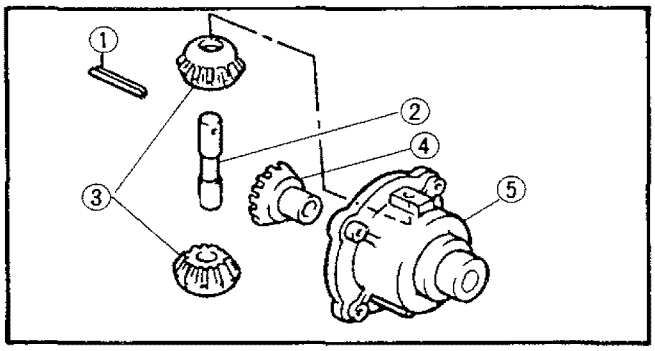
A LONGER BOLTS WITH DOWEL PINS

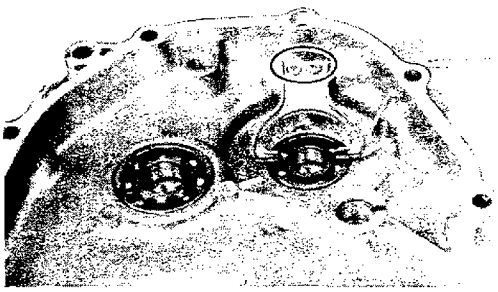
5. Remove:
   - Ring gear assembly ①
   - Input shaft (With governor) ②
   - Thrust washer ③
   - Counter gear 2 ④
   - Counter gear (Forward) ⑤
   - Idle gear (With shaft) ⑥
6. Remove:
   - Dog clutch ① (With shift fork/bar assembly) ②
   - Counter shaft (With gear) ③
   - Plug
   - Spring
   - Knock pin
   - Shift lever shaft
7. Remove:
   - Bolts

   Loosen it in a criss-cross pattern.
8. Remove:
   - Ring gear ①
   - Differential case assembly ②
   - Side gear (Right) ③
   - Dowel pins ④



9. Remove:
   - Spring pin ①
   - Pinion shaft ②
   - Pinion gears ③
   - Side gear (Left) ④
   - Differential case ⑤





10. Remove:
    - Screws
    - Governor fork

    From the governer shaft.
11. Pull the governor shaft from the transmission case (Left).

INSPECTION

1. Inspect:
   - Gears

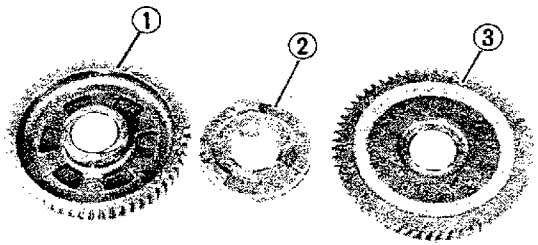
     Damage/Wear → Replace.
   - Bearings

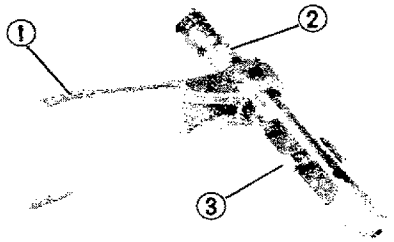
     Pitting/Damage → Replace.
   - Oil seals

     Wear/Damage → Replace.
   - Transmission cases

     Cracks/Damage → Replace.
2. Inspect:
   - Counter gear (Reverse) ①
   - Dog clutch ②
   - Counter gear (Forward) ③

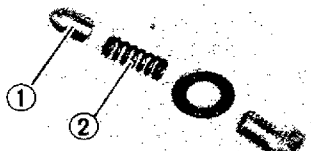
     Wear/Cracks/Damage → Replace.





3. Inspect:
   - Shift fork ①
   - Guide bar ②
   - Pin ③

   Wear/Damage → Replace.



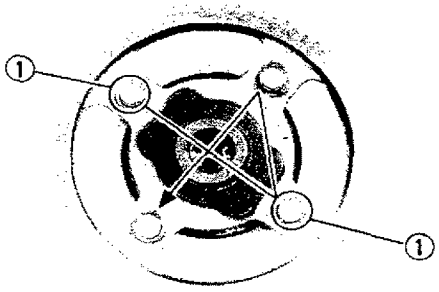
4. Inspect:
   - Knock pin ①
   - Spring ②

   Wear/Damage → Replace.

ASSEMBLY

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

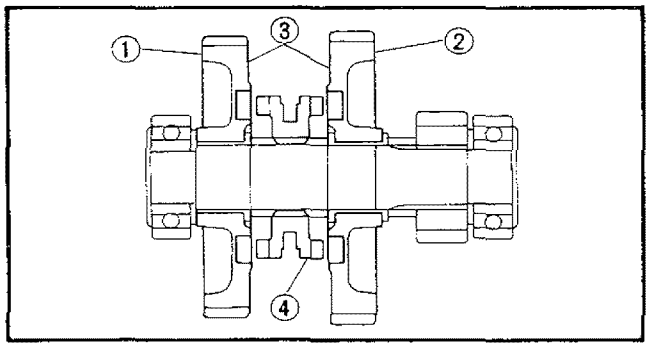
1. When install the governer fork onto the governer shaft, apply LOCTITE® to the holding screws.
2. Install the governer fork onto the governer shaft.



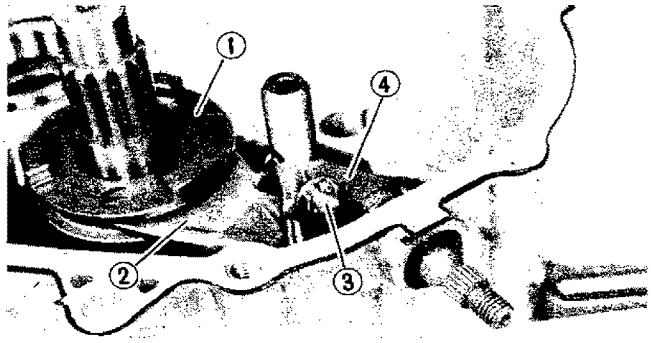
3. Install:
   Differential case

	Bolt (Differential Case): **34 Nm (3.4 m·kg, 24 ft·lb)** **LOCTITE®**

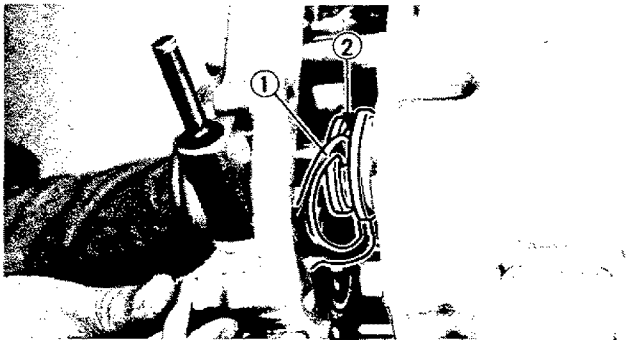
① With dowel pins



4. Make sure that the counter gears (Reverse ① and Forward ②) are installed on the counter shaft with the flush side ③ facing the dog clutch ④ .

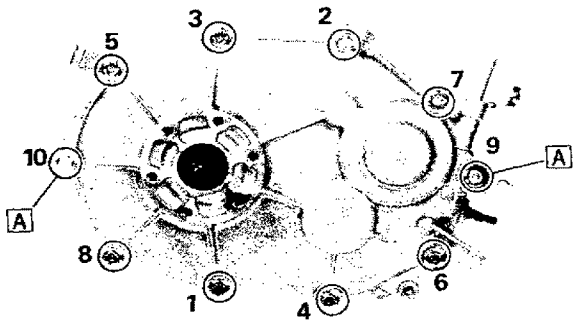


5. Install:
   - Dog clutch ①
     Before installing the clutch, engage the shift fork ② with groove of the clutch. Then align the slot of the shift shaft lever ④ with pin ③.



6. Install:
   - Dowell pins
   - Gasket (New)
   - Transmission case (Right)
     Onto the left transmission case.

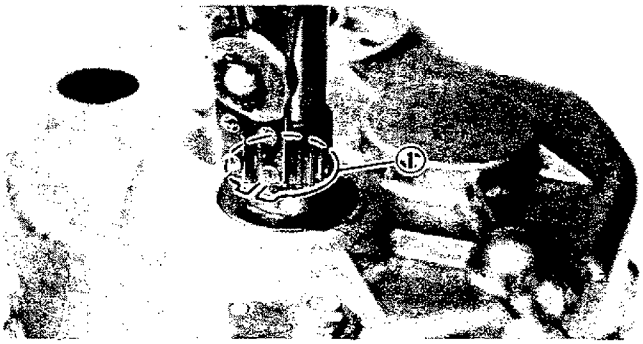
NOTE:
When installing the transmission case (Right), make sure that the governer fork ① is fit in the groove ② of the lifter in the speed limiter.



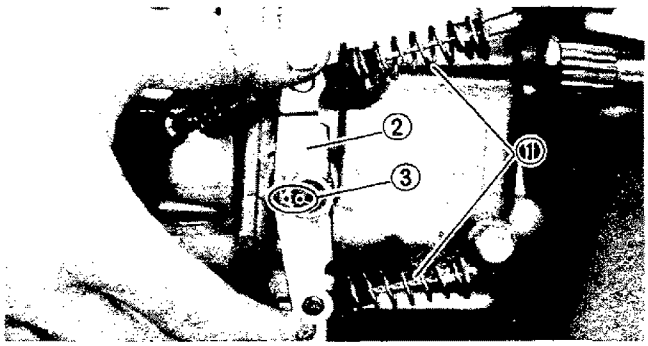
7. Tighten:
   - Bolts (Transmission case)
     Tighten them in the tightening sequence shown in the photo.

Transmission Case:
First: 20 Nm (2.0 m·kg, 14 ft·lb)
Final: 25 Nm (2.5 m·kg, 18 ft·lb)

A LONGER BOLTS WITH DOWEL PINS



8. Install:
   - Speed limiter lever
     Onto the governer shaft.
   - Circlip ①
     Onto the input shaft.

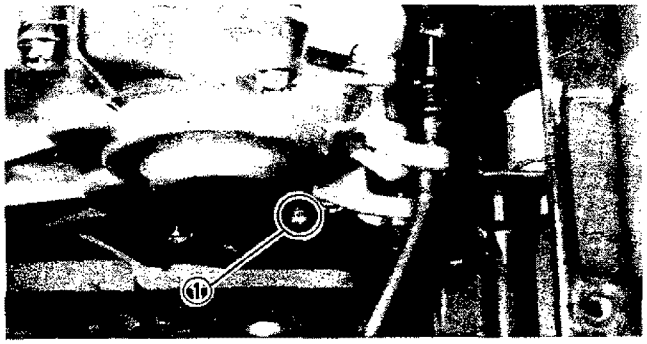


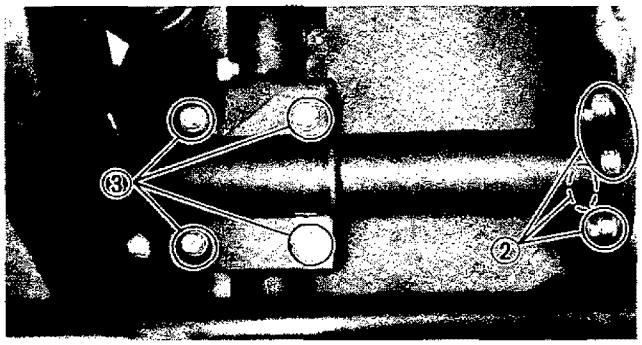
INSTALLATION

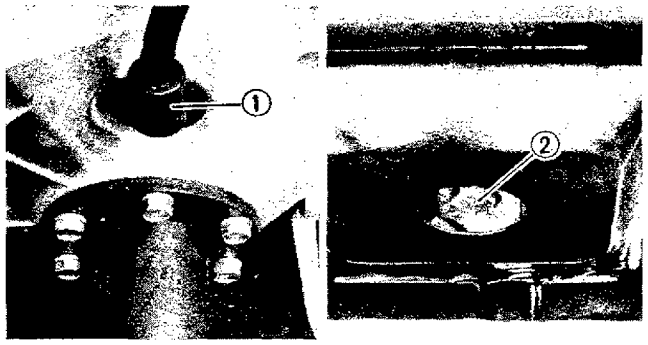
Reverse the "REMOVAL" procedure.
Note the following points.

1. Connect:
   - Shifting cables ① (With lever ②)
     Onto shift shaft.

NOTE:
Align the match marks ③ on the lever and shaft.







2. Install:
   - Transmission case assembly
   - Case mounting bolts ①

NOTE:
Do not tighten the mounting bolts ① in this step.

3. Install:
   - Axle housing assemblies.

Case Mounting Bolt ① :
40 Nm (4.0 m·kg, 29 ft·lb)
Transmission Case — Axle Housing ② :
25 Nm (2.5 m·kg, 18 ft·lb)
Axle Housing — Rear Arm ③ :
43 Nm (4.3 m·kg, 31 ft·lb)

4. Remove:
   - Vent cap ①
5. Tighten:
   - Drain plug ②

Drain Plug ② :
29 Nm (2.9 m·kg, 21 ft·lb)

6. Fill:
   - Transmission case

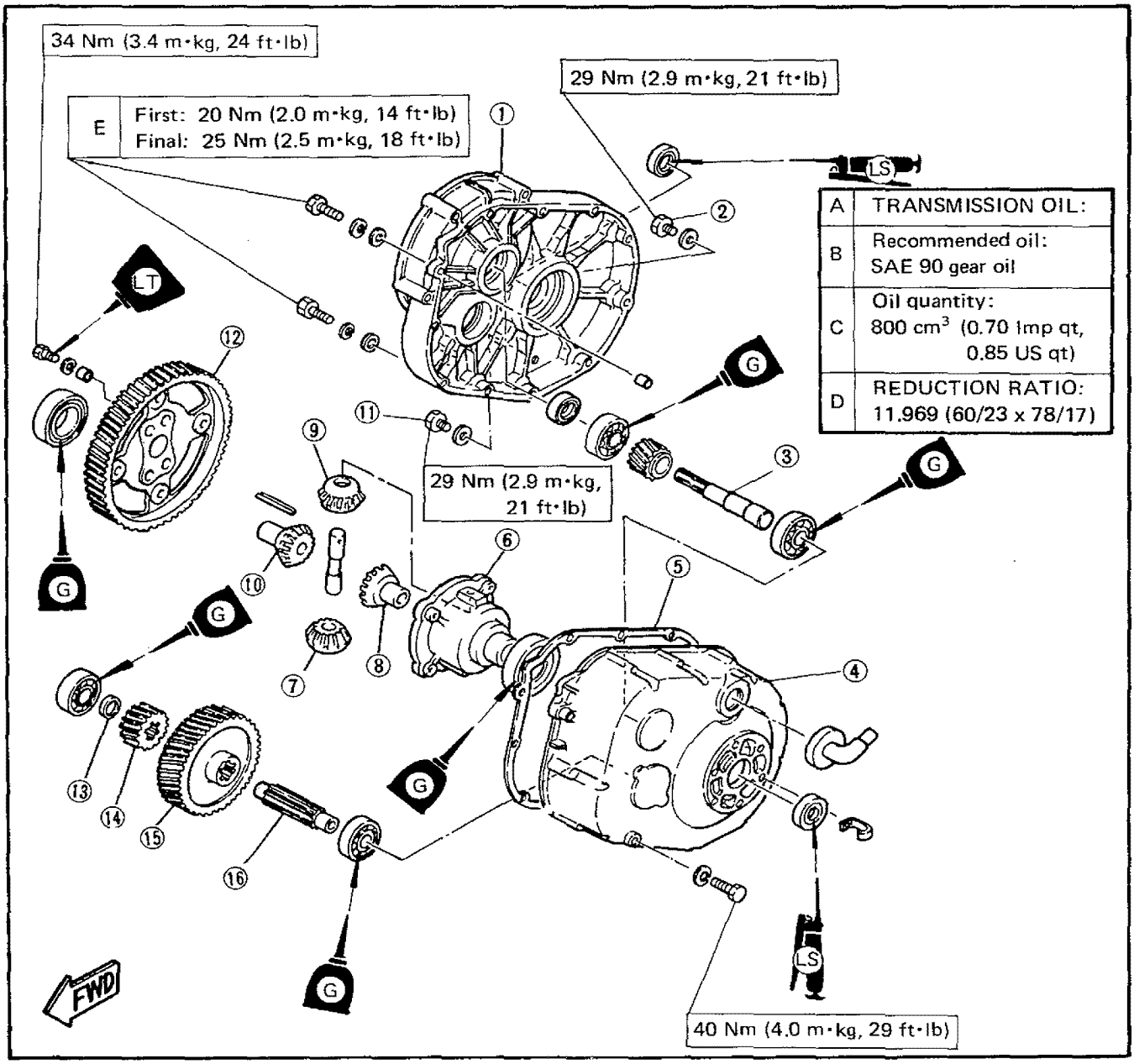
Recommended Oil:
SAE 90 gear oil
Oil Quantity:
800 cc (0.70 Imp qt, 0.85 US qt)

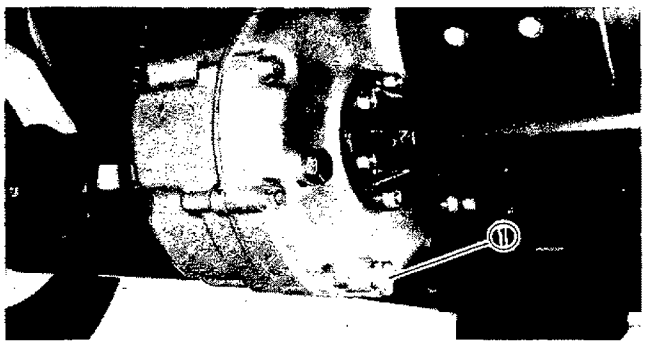
7. Install:
   - Vent cap
8. Connect:
   - Throttle cables
     Onto speed limiter.
9. Adjust:
   - Throttle cable free play
     Refer to CHAPTER 3 "THROTTLE CABLE ADJUSTMENT" section.

POWER TRAIN (FOR G2-E)

TRANSMISSION

① Transmission case (Right)
② Oil level plug
③ Input shaft
④ Transmission case (Left)
⑤ Gascket
⑥ Differential case
⑦ Differential pinion
⑧ Differential side gear (Left)
⑨ Differential pinion
⑩ Differential side gear (Right)
⑪ Drain plug
⑫ Ring gear
⑬ Washer
⑭ Counter gear 2
⑮ Counter gear 1
⑯ Counter shaft

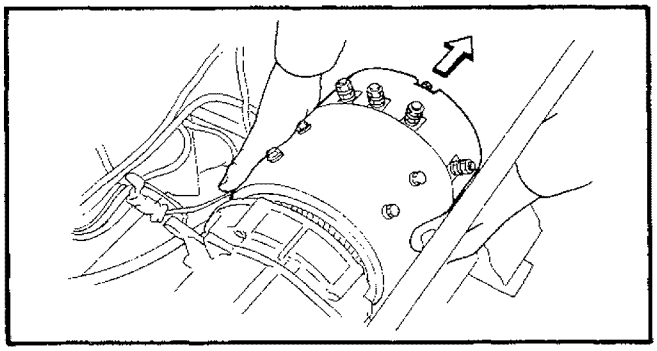




REMOVAL

1. Place an oil pan under the transmission case.
2. Remove:
   - Drain plug ①

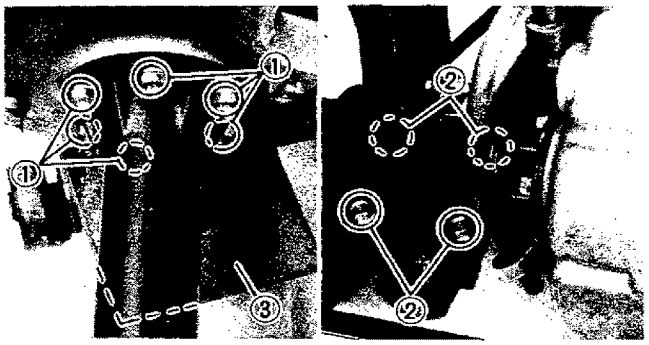
   Drain the transmission oil.



3. Jack up the rear of the vehicle, place a stands under the frame. Block the front wheel. Refer to CHAPTER 3 "JACK-UP" section.
4. Remove:
   - Rear wheels
5. Remove:
   - Rear shock absorber (Right)
   - Traction motor

   Refer to CHAPTER 8 "TRACTION MOTOR" section.
6. Remove:
   - Bolts

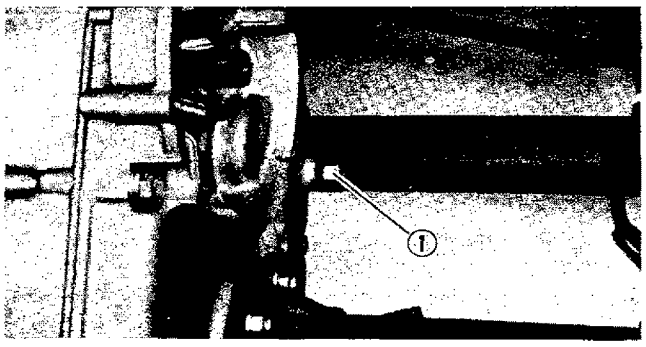
   From the axle housing — case ① and rear arm ② .



NOTE:

When removing the bolts, support the transmission case with a jack ③ .

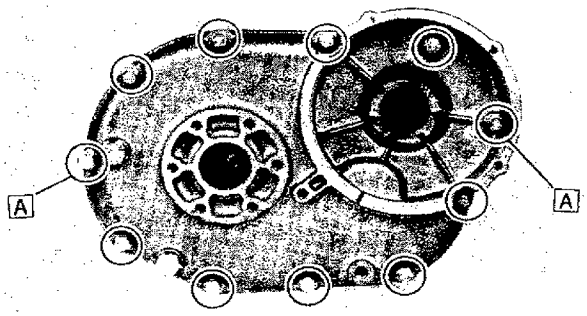
7. Disconnect the axle shafts from the differential gear.
8. Remove:
   - Case mounting bolts ①
9. Remove:
   - Transmission case assembly



DISASSEMBLY

1. Remove:
   - Bolts
   - Transmission case (Right)

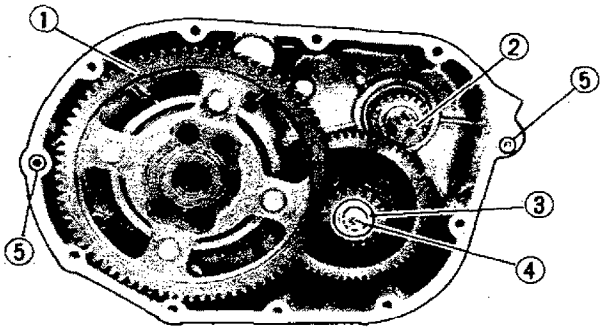
   Pull the case straight out from the transmission assembly.



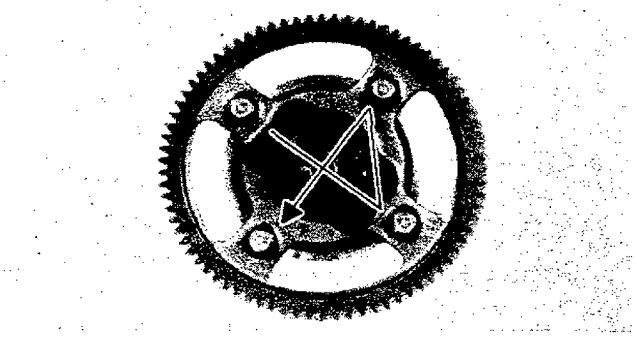
⚠ CAUTION:

Do not drive chisels, screwdrivers, etc, between the case halves.

A LONGER BOLTS WITH DOWEL PINS

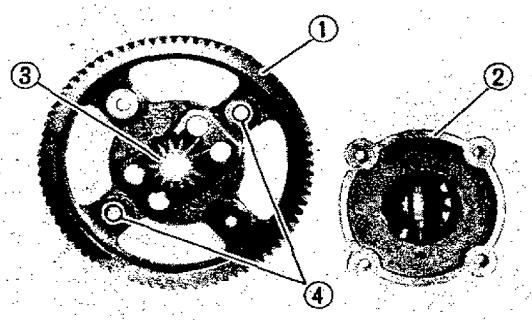


2. Remove:
   - Ring gear assembly ①
   - Input shaft (With input gear) ②
   - Thrust washer ③
   - Counter shaft ④
   - Counter gears
   - Dowel pins ⑤

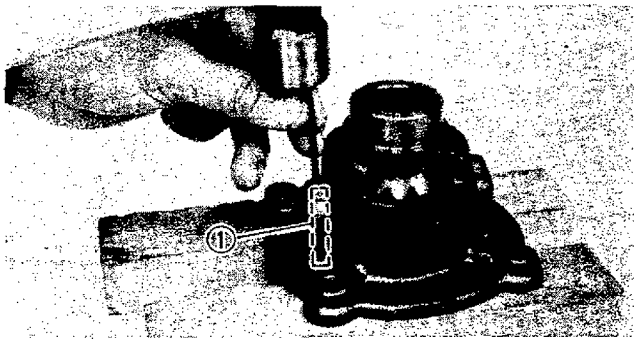


3. Remove:
   - Bolts

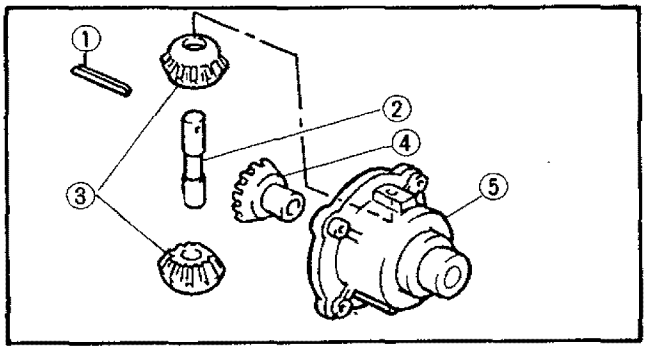
   Loosen them in a criss-cross pattern.

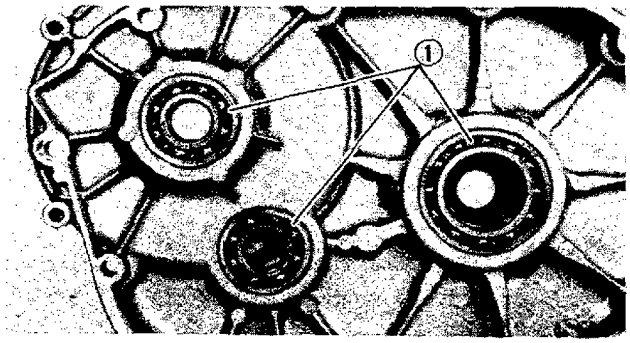


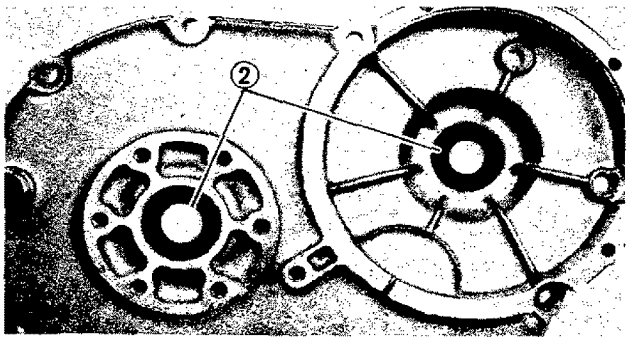
4. Remove:
   - Ring gear ①
   - Differential case assembly ②
   - Side gear (Right) ③
   - Dowel pins ④



5. Remove:
   - Spring pin ①
   - Pinion shaft ②
   - Pinion gears ③
   - Side gear (Left) ④
   - Differential case ⑤

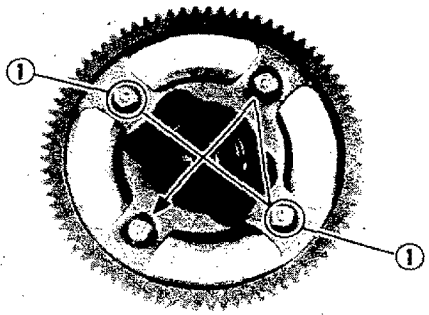






INSPECTION

1. Inspect:
   - Gears
     Damage/Wear → Replace.
   - Bearings ①
     Pitting/Damage → Replace.
   - Oil seals ②
     Wear/Damage → Replace.
   - Transmission cases
     Cracks/Damage → Replace.



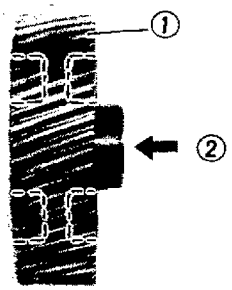
ASSEMBLY

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

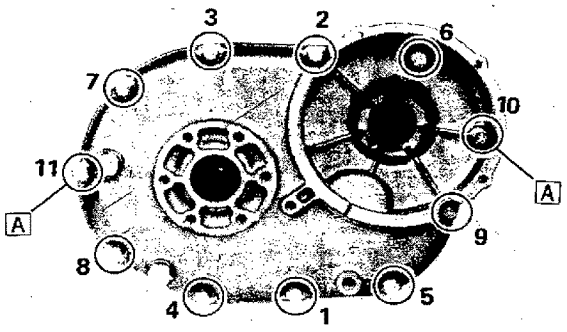
1. Tighten:
   - Differential case securing bolts

	Differential Case: **34 Nm (3.4 m·kg, 24 ft·lb)**

① With dowel pins



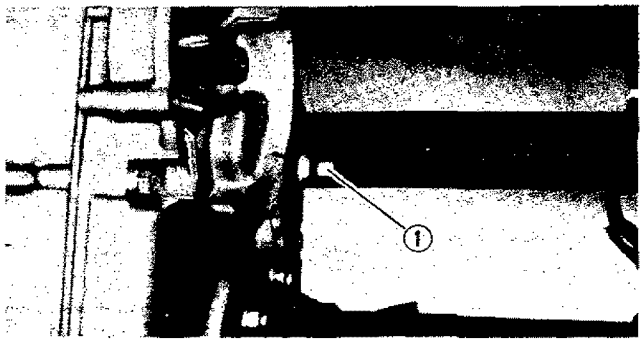
2. Make sure that the counter gear (Larger) ① install onto the counter shaft with the larger boss side ② facing the smaller gear.

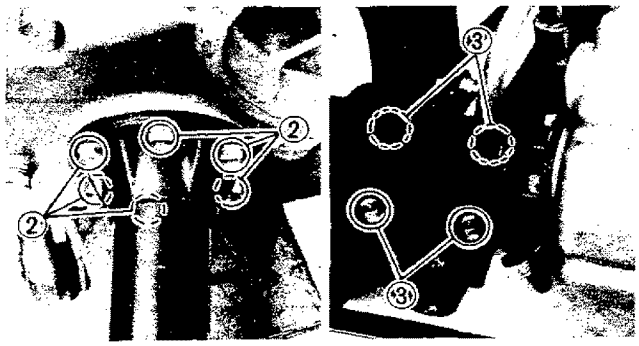


3. Install:
   - Dowell pins
   - Gasket (New)
   - Transmission case (Right)
     Onto the left transmission case.
   - Bolts
     Tighten them in the tightening sequence shown in the photo.

	Transmission Case: **First: 20 Nm (2.0 m·kg, 14 ft·lb)** **Final: 25 Nm (2.5 m·kg, 18 ft·lb)**

A LONGER BOLTS WITH DOWEL PINS





INSTALLATION

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

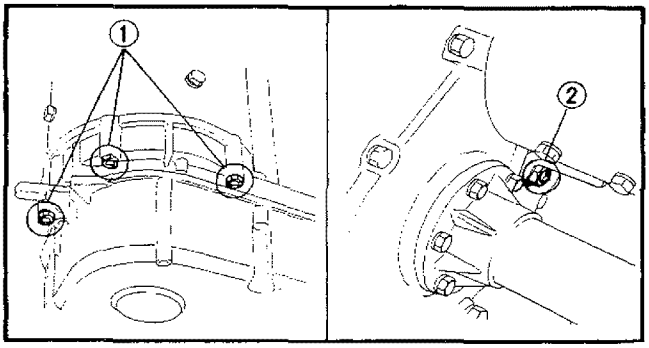
1. Install:
   - Transmission case assembly
   - Case mounting bolts ①

NOTE:

Do not tighten the mounting bolts ① in this step.

2. Place a jack under the transmission case, raise the case to align the bolt holes with holes of axle housing.
3. Install:
   - Axle housing assemblies

Case Mounting Bolt ① :
40 Nm (4.0 m·kg, 29 ft·lb)
Transmission Case – Axle Housing ② :
25 Nm (2.5 m·kg, 18 ft·lb)
Axle Housing – Rear Arm ③ :
43 Nm (4.3 m·kg, 31 ft·lb)

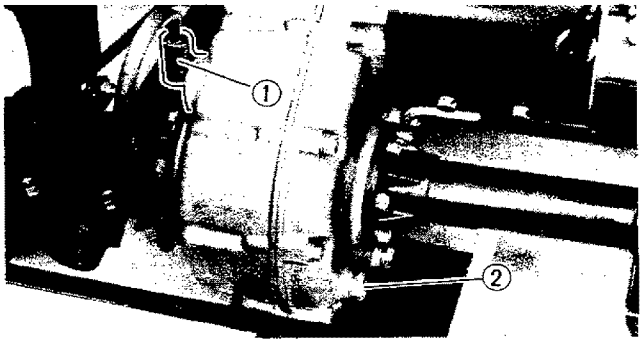


4. Install:
   - Rear shock absorber
   - Traction motor

Shock Absorber Pivot Bolt:
(Upper and Lower)
45 Nm (4.5 m·kg, 35 ft·lb)
Motor Securing Bolt ①: (Upper)
6 Nm (0.6 m·kg, 4.3 ft·lb)
Motor Securing Bolt ②: (Lower)
6 Nm (0.6 m·kg, 4.3 ft·lb)

5. Install:
   - Rear wheels

Rear Wheel:
80 Nm (8.0 m·kg, 58 ft·lb)



6. Remove:
   • Vent cap ①
7. Tighten:
   • Drain plug ②

Drain Plug ② :
29 Nm (2.9 m·kg, 21 ft·lb)

8. Fill:
   • Transmission case

Recommended Oil:
SEA 90 gear oil
Oil Quantity:
800 cc (0.70 Imp qt, 0.85 US qt)

9. Install:
   • Vent cap

CHASSIS

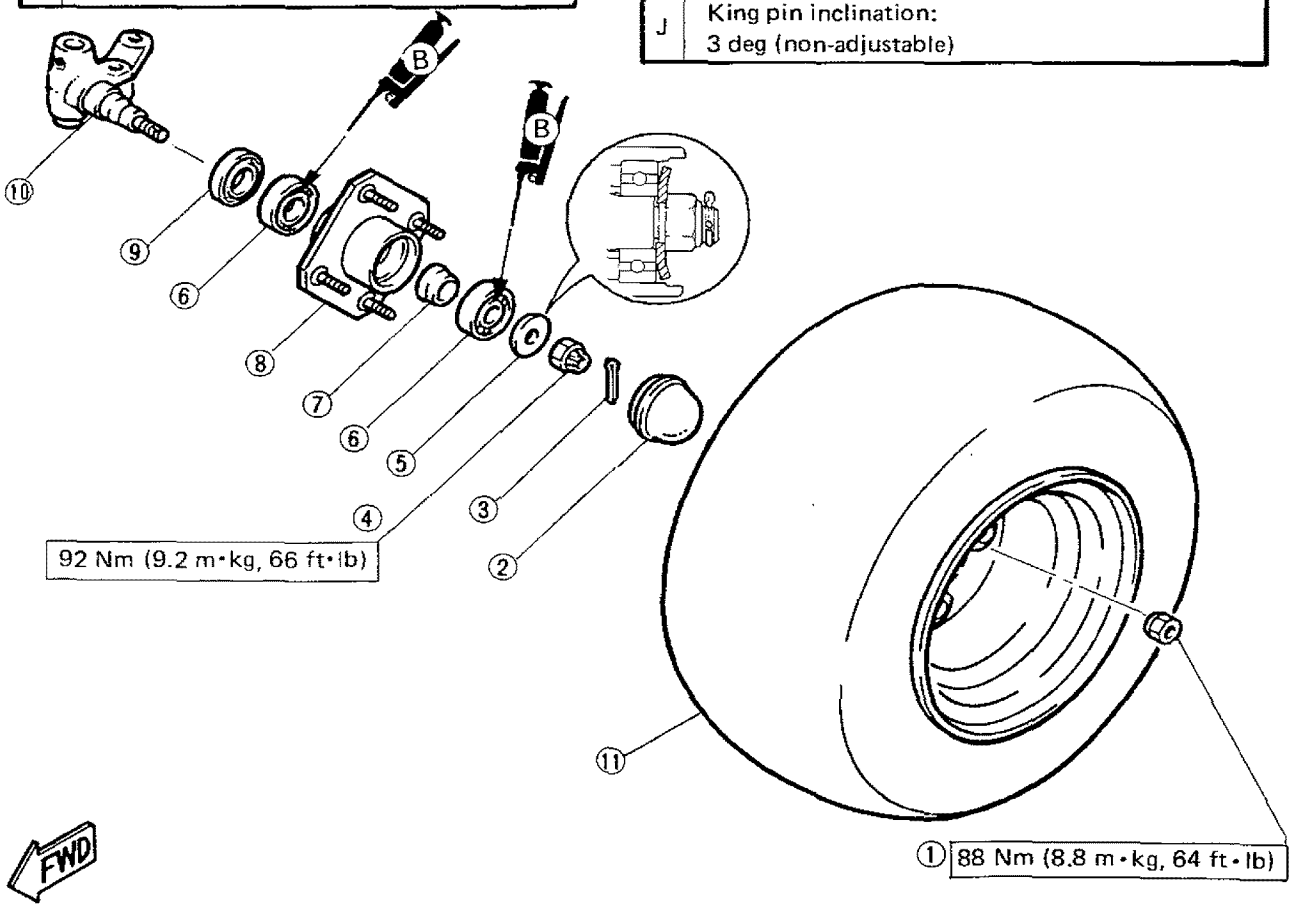
FRONT WHEEL

① Wheel nut
② Dust cover
③ Cotter pin
④ Hub nut
⑤ Conical washer
⑥ Hub bearing
⑦ Spacer
⑧ Hub
⑨ Oil seal
⑩ Knuckle
⑪ Front wheel

NOTE:
Camber is not adjustable, but is affected by toe-in settings.

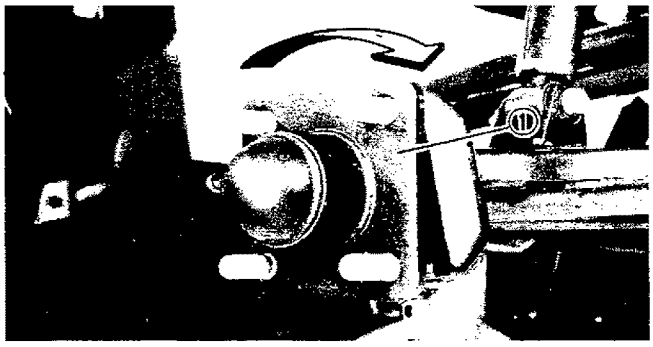
A	TIRE SIZE: 18 x 8.50-8.00/4PR
B	TIRE TYPE (Pattern): TUBELESS (Rib)
C	TIRE PRESSURE: For G2-A 80 kPa (0.8 kg/cm², 12 psi) For G2-E 90 kPa (0.9 kg/cm², 13 psi)
D	WEAR LIMIT: 1.0 mm (0.04 in)

E	RIM SIZE: 7.00-I-8.00
F	WHEEL ALIGNMENT:
G	Toe-in Unloaded/Fully loaded: 10 ~ 20 mm (0.39 ~ 0.79 in)/Zero mm (Zero in)
H	Camber: Fully loaded: Zero deg (non-adjustable)
I	Caster: 7 deg (non-adjustable)
J	King pin inclination: 3 deg (non-adjustable)

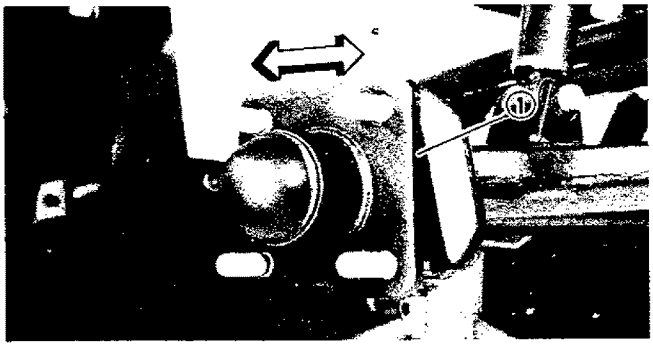


REMOVAL

1. Place the vehicle on a level place.
2. Apply parking brake.
3. Loosen:
   - Nuts (Front wheel)
4. Jack up the front wheels by placing the suitable stand under the frame.
   Refer to CHAPTER 3 "JACK-UP" section.
5. Remove:
   - Nuts (Front wheel)
   - Front wheel

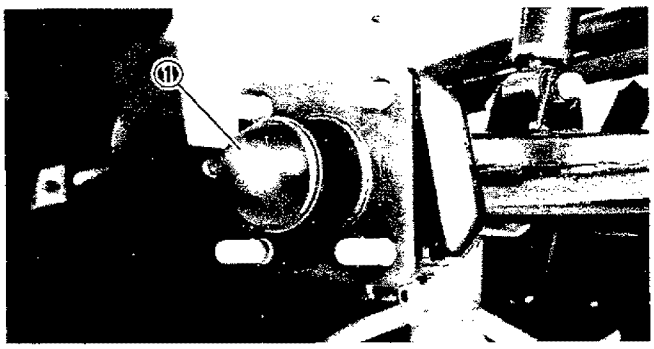


6. Check:
   - Movement (Wheel bearing)
     Rotate the hub ① by hand.
     Roughness → Replace bearing.
     Refer to "INSPECTION" section.

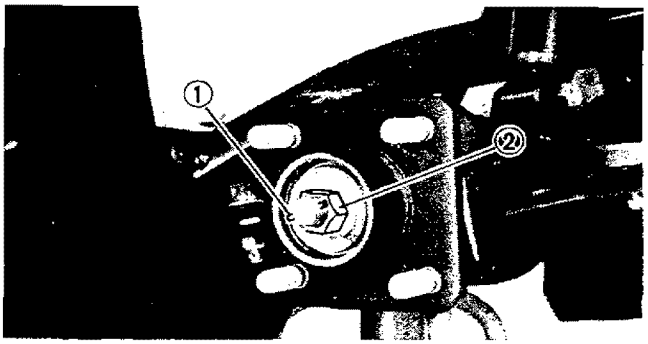


7. Check:
   - Free play (Wheel bearing)
     Gently rock the hub ① back and forth.
     Looseness/Noticeable free play → Retighten the hub nut.
     Still play → Replace bearing.
     Refer to "INSPECTION" section.

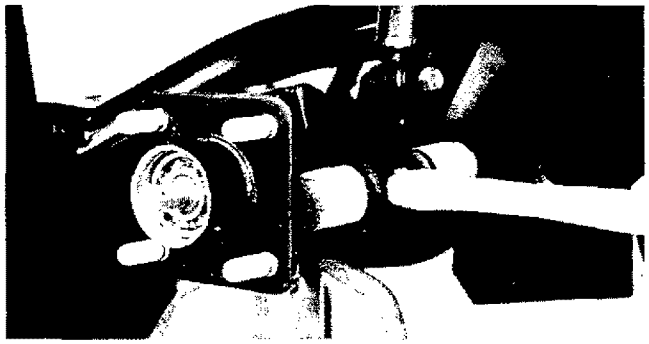
	**Hub Nut:** **92 Nm (9.2 m·kg, 66 ft·lb)**



8. Remove:
   - Dust cover ①



9. Remove:
   - Cotter pin ①
   - Hub nut ②
   - Conical washer



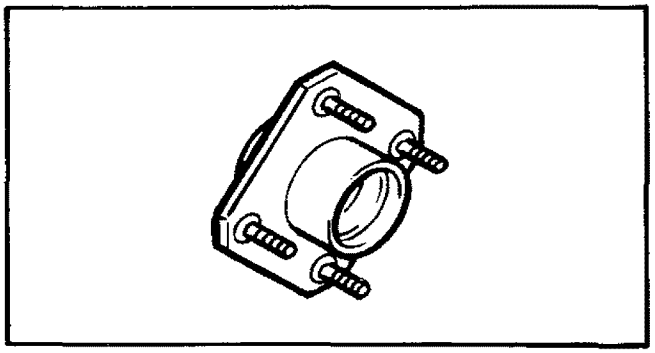
10. Remove:
    - Hub (Front wheel)

    Tap the hub out using a soft hammer.

INSPECTION

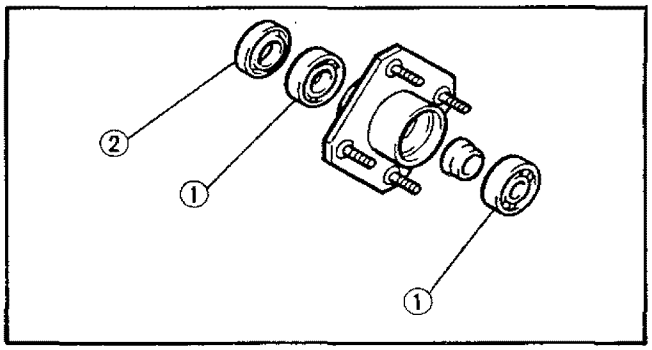
1. Inspect:
   - Wheel

   Cracks/Bends/Warpage → Replace.



2. Inspect:
   - Wheel hub

   Cracks/Damage → Replace.



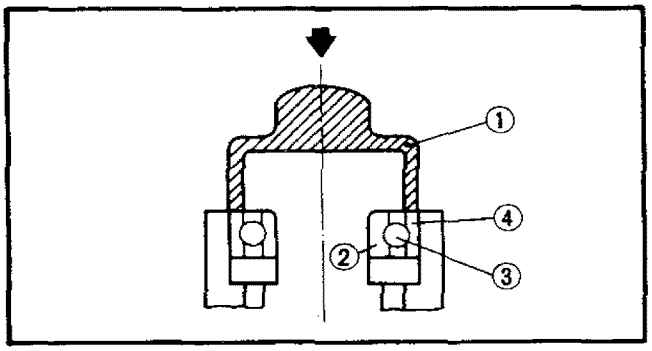
3. Inspect:
   - Bearings (Wheel hub) ①

   Bearings allow play in the wheel hub or the wheel turns roughly → Replace.
   - Oil seal ②

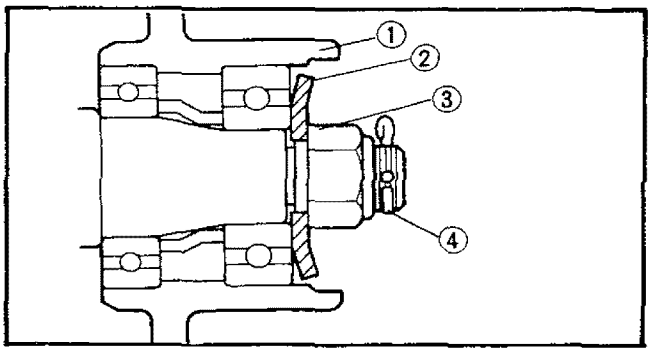
   Wear/Damage → Replace.

Wheel bearing and oil seal replacement steps:
- Clean the inside of the wheel hub.
- Remove the oil seal and the bearing using a general bearing puller.
- Install the new bearing and oil seal by reversing the previous steps.

NOTE:
Use a socket ① that matches the outside diameter of the race of the bearing and oil seal.



⚠ CAUTION:
Do not strike the center race ② or balls ③ of the bearing. Contact should be made only with the outer race ④.



INSTALLATION

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

1. Install:
   - Hub ①
   - Conical washer ②
   - Hub nut ③

NOTE:
Install the conical washer ② with the tapered side facing inward.

Hub Nut ③ :
92 Nm (9.2 m·kg, 66 ft·lb)

2. Install:
   - Cotter pin ④ (New)
   - Dust cover

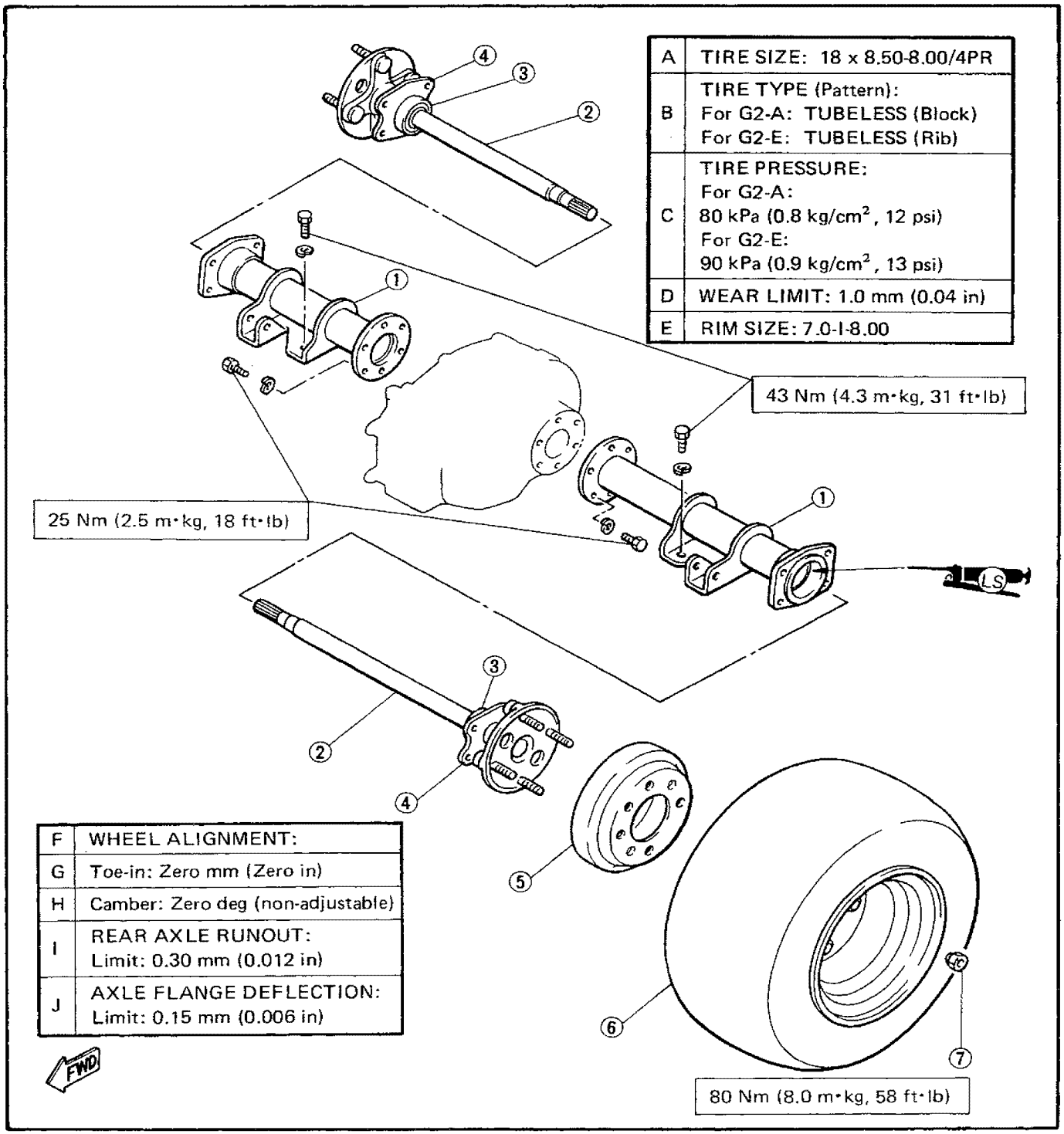
⚠ WARNING:
Always use a new cotter pin.

3. Install:
   - Front wheel

Nut (Front Wheel):
88 Nm (8.8 m·kg, 64 ft·lb)

REAR WHEEL AND REAR AXLE

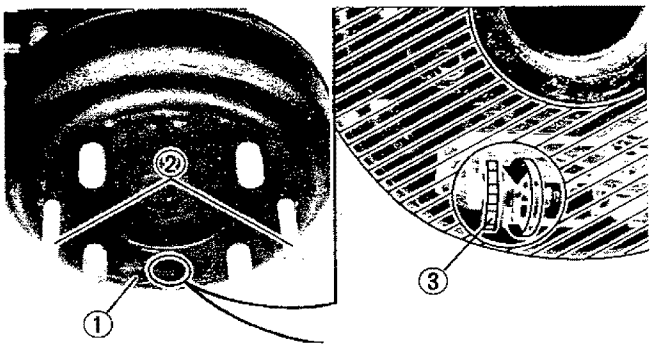
① Axle housing
② Rear axle
③ Axle bearing
④ Bearing cover
⑤ Brake drum
⑥ Rear wheel
⑦ Wheel nut



REMOVAL

1. Place the vehicle on a level place.
2. Apply parking brake.
3. Loosen:
   - Nuts (Rear wheel)
4. Jack up the rear wheels by placing the suitable stand under the frame.
   Block the front wheels.
   Refer to CHAPTER 3 "JACK-UP" section.
5. Remove:
   - Nuts (Rear wheel)
   - Rear wheel
6. Release parking brake by depressing the accelerator pedal.
7. Remove:
   - Brake drum ①

   To loosen the drum, install the 10 mm bolts ② onto the drum and screw in them.

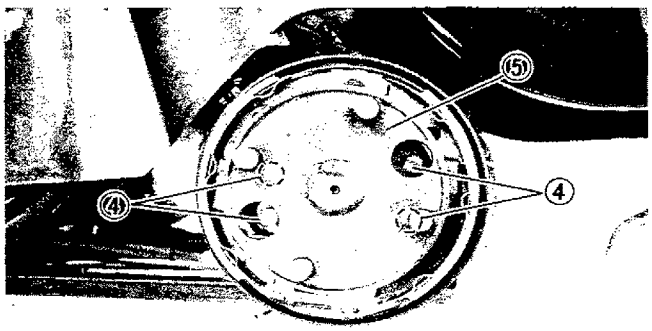


NOTE:

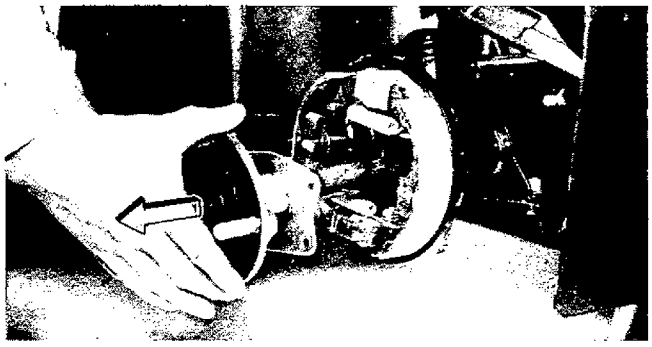
If it is very hard to remove the drum, screw in the adjusting nut ③ in the shoe plate.

8. Remove:
   - Bolts (Shoe plate) ④

   Rotate the axle flange ⑤ , align the holes of the flange with the bolts to loosen.



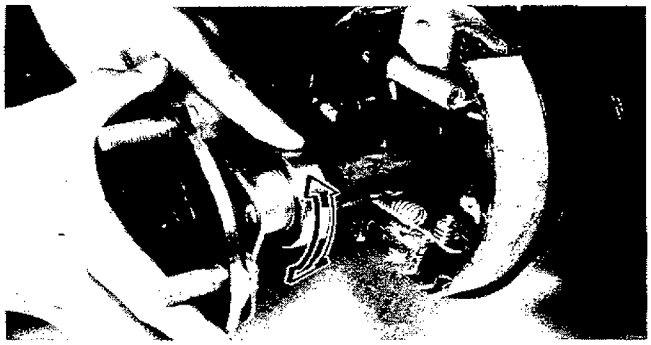
9. Remove:
   - Rear axle



INSPECTION

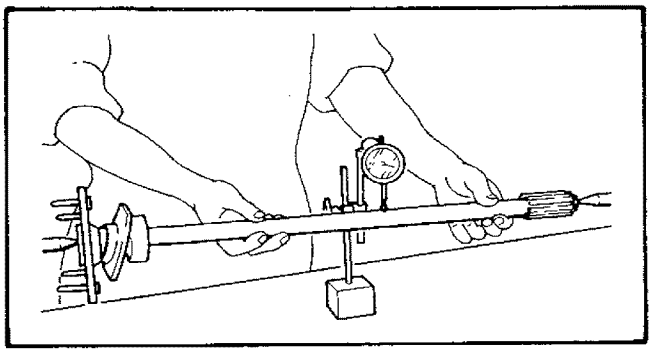
1. Inspect:
   - Wheel

   Cracks/Bends/Warpage → Replace.



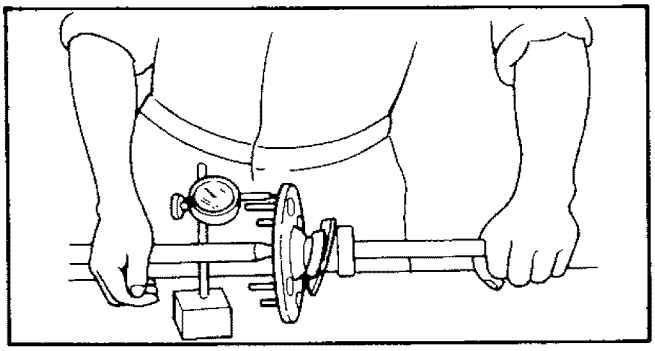
2. Inspect:
   - Axle bearing
     Refer to CHAPTER 3 "REAR AXLE BEARING INSPECTION" section.
   - Axle bearing movement
     Rotate by finger.
     Roughness/Wear → Replace rear axle.

NOTE:
The axle bearing can not be removed from the rear axle.



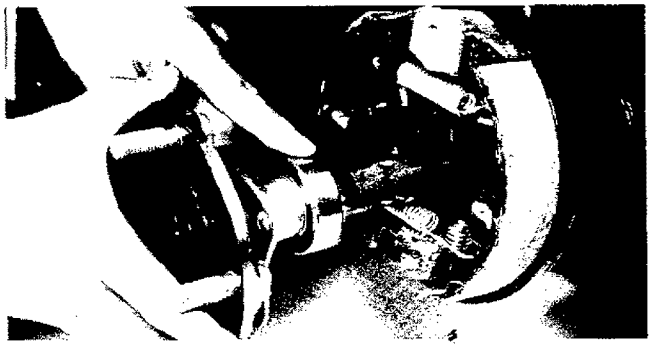
3. Measure:
   - Axle shaft runout
     Use a centering device and the Dial Gauge.
     Out of specification → Replace.

	Dial Gauge: YU-03097, 90890-03097
	Runout Limit: 0.30 mm (0.012 in)



4. Measure:
   - Axle flange deflection
     Use a centering device and the Dial Gauge.
     Out of specification → Replace.

	Dial Gauge: YU-03097, 90890-03097
	Deflection Limit: 0.15 mm (0.006 in)



INSTALLATION

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

1. Lubricate:
   - Bearing outer surface

	Lightweight Lithium Soap Base Grease

2. Install:
   - Rear axle

Bolts (Shoe Plate):
30 Nm (3.0 m·kg, 22 ft·lb)

3. Install:
   - Brake dram
   - Rear wheel

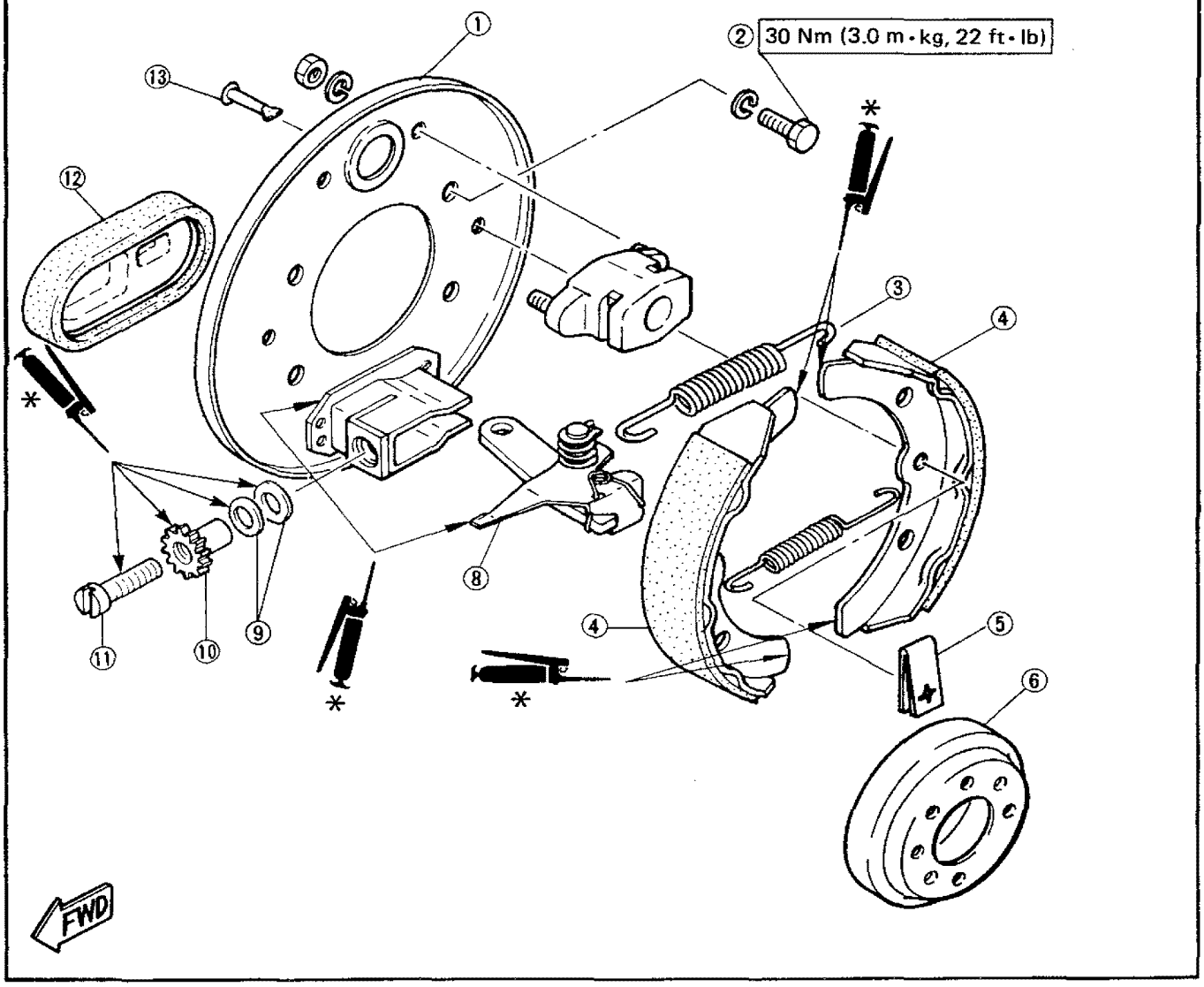
Nut (Rear Wheel):
80 Nm (8.0 m·kg, 58 ft·lb)

BRAKE

BRAKE SHOE

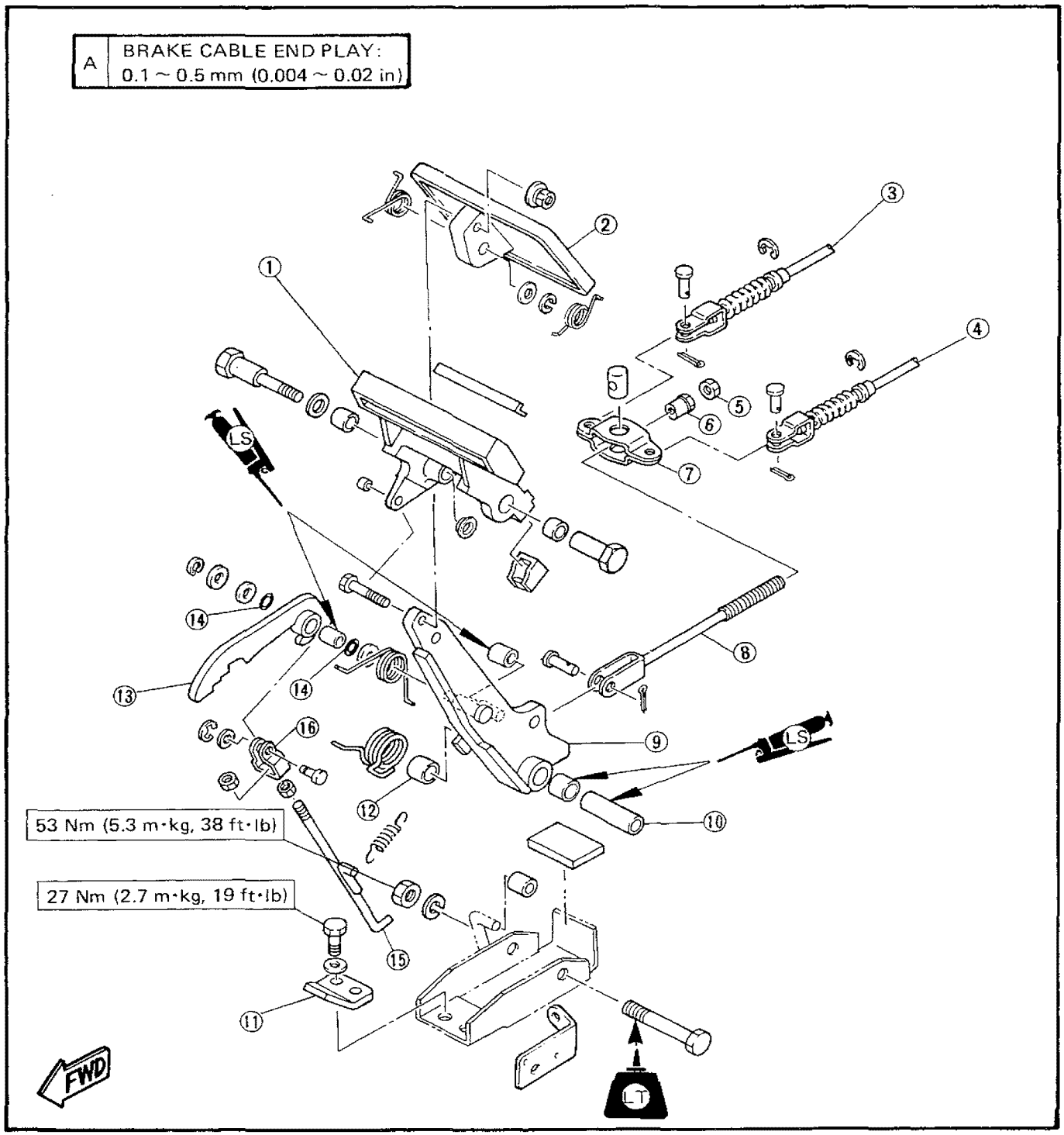
① Brake shoe plate
② Shoe plate securing bolts
③ Tension spring (Upper)
④ Brake shoes
⑤ Shoe clamp springs
⑥ Brake drum
⑦ Tension spring (Lower)
⑧ Brake lever assembly
⑨ Washer
⑩ Adjusting nut
⑪ Adjusting bolt
⑫ Dust cover
⑬ Clamp spring holding pins
* High temperature grease

A	BRAKE SHOE LINING THICKNESS: Standard: 4.0 mm (0.16 in) Limit: 1.5 mm (0.06 in)
B	BRAKE DRUM INSIDE DIAMETER: Standard: 160 mm (6.30 in) Limit: 161 mm (6.34 in)



BRAKE PEDAL

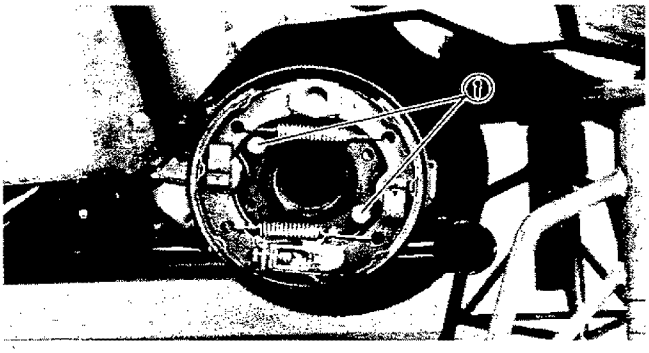
① Brake pedal (Parking)
② Brake pedal (Main)
③ Brake cable (Right)
④ Brake cable (Left)
⑤ Locknut
⑥ Adjusting nut
⑦ Brake equalizer
⑧ Brake rod
⑨ Brake arm
⑩ Collar
⑪ Ratchet stopper
⑫ Bushing
⑬ Parking brake ratchet
⑭ Oil seal
⑮ Parking brake rod
⑯ Clevis



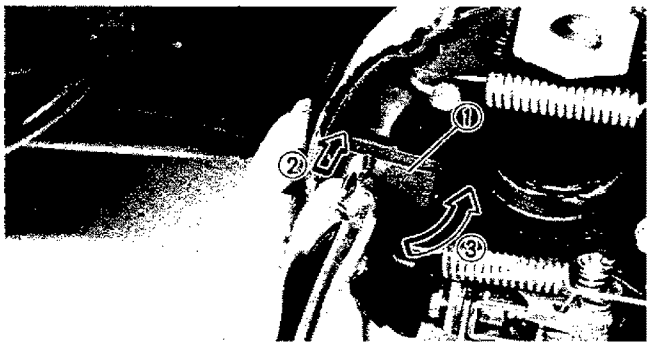
DISASSEMBLY

1. Remove:
   - Rear wheel
   - Brake drum
   - Rear axle

   Refer to "REAR WHEEL AND REAR AXLE – REMOVAL" section.



2. Hold the brake shoe plate using two securing bolts ① .

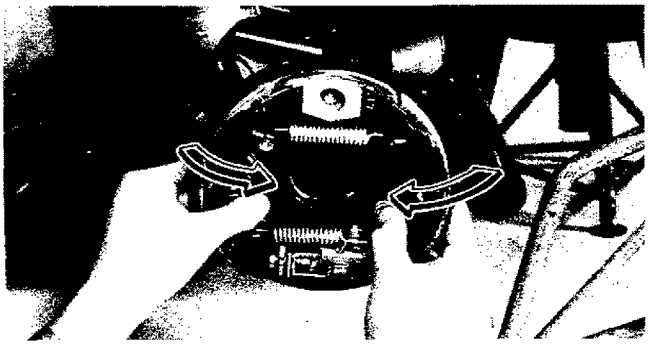


3. Remove:
   - Shoe clamp springs ①

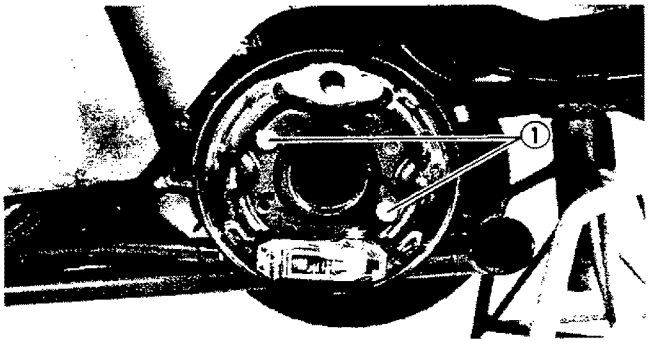
   While depressing ② the spring ① , turn ③ it to align the spring slot with the pin head.

⚠ CAUTION:

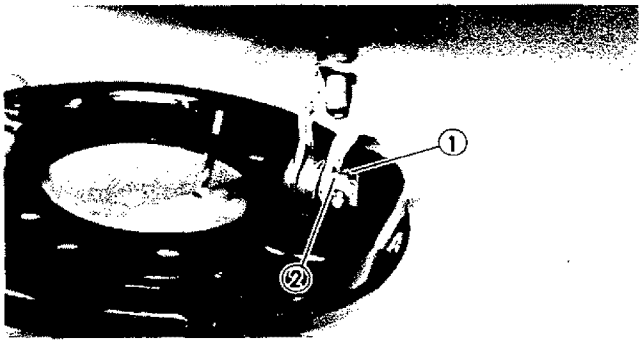
Do not turn the pins as their rear seal may be broken.



4. Remove:
   - Brake shoes (With tension springs)



5. Remove:
   - Bolts ①

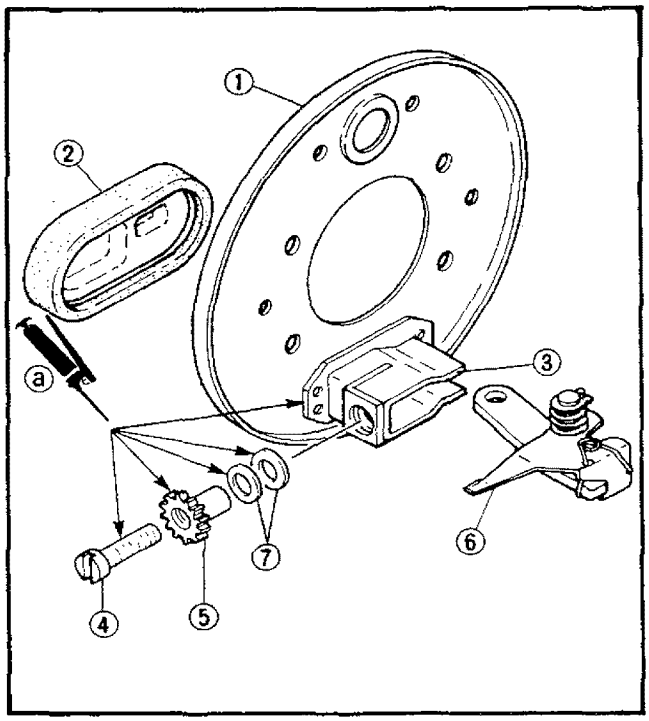


6. Remove:
   - Cotter pin ①
   - Clevis pin ②

INSPECTION

Brake Shoe and Brake Drum

Refer to CHAPTER 3 "SHOE LINING INSPECTION" section.



Brake Shoe Plate

1. Inspect:
   - Brake shoe plate ①
     Bends/Cracks/Damage → Replace.
2. Inspect:
   - Dust cover ②
     Cracks/Wear → Replace.
3. Check:
   - Lever holder ③
     Unsmooth movement → Lubricate with high temperature grease.
4. Turn the adjusting bolt ④ in completely by hand. Do not tighten it so that movement is not free. This bolt must rotate freely.

NOTE:

Lubricate the adjusting bolt with high temperature grease ⓐ .

⑤ Adjusting nut
⑥ Brake lever assembly
⑦ Washers

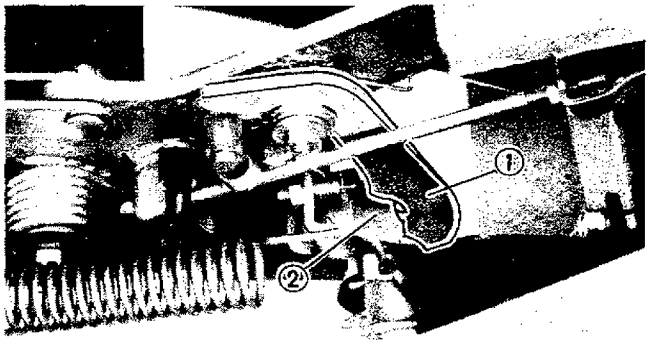
NOTE:

Always replace the shoes as a set.

Brake Pedal

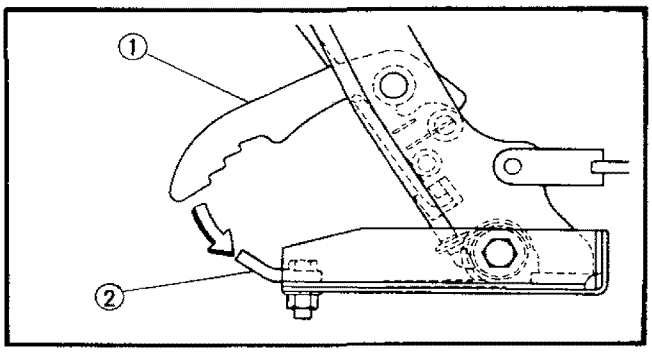
1. Check:
   - Pedal movement
   - Side free play

   Refer to CHAPTER 3 "BRAKE AND ACCELERATOR PEDALS INSPECTION" section.



2. Inspect:
   - Parking brake ratchet ①
   - Ratchet stopper ②

   Wear/Damage → Replace.

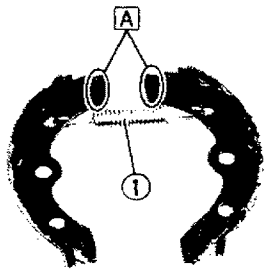


ASSEMBLY

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

Brake Shoe

1. Connect:
   - Brake cable
2. Install:
   - Shoe plate
   - Brake shoes

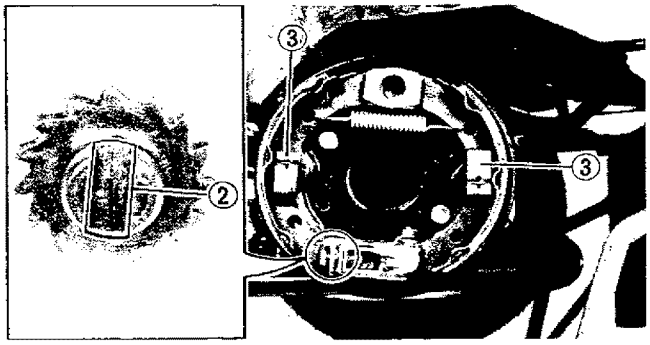


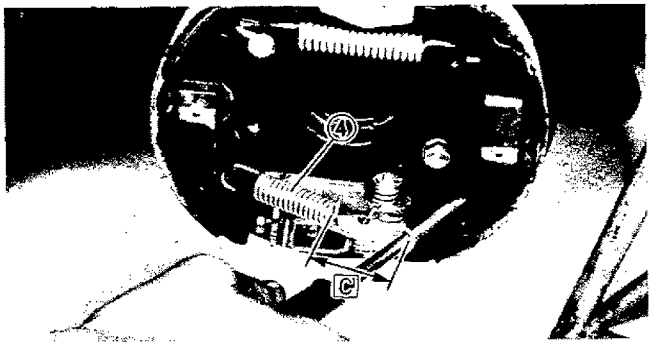
Brake shoe assembly steps:

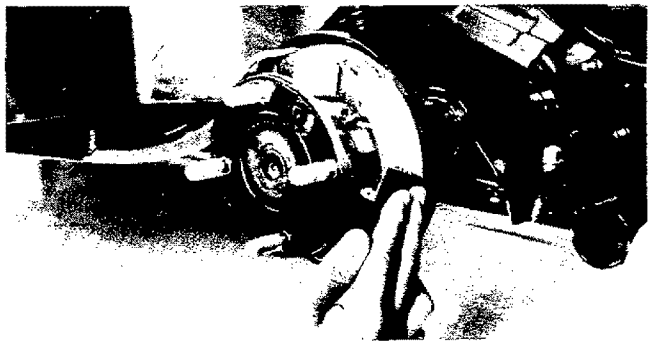
- Apply a light coat of high temperature grease to each end of both brake shoes.

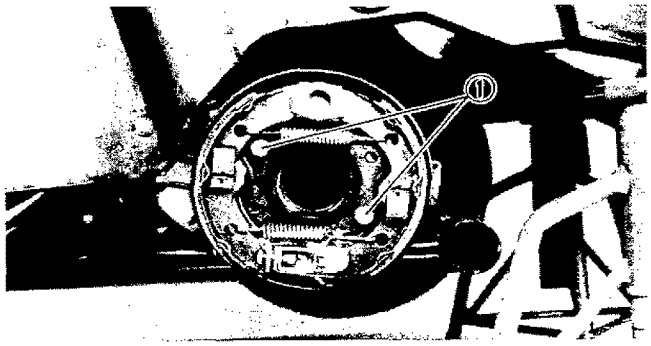
⚠CAUTION:

Be sure that no grease gets on the lining surface.









- Hook the upper spring (larger) ① on to the shoes.

NOTE:
The upper side of shoe is stamped number [A] .

- Install the shoes onto the shoe plate.

NOTE:
Align the shoe end with the slot ② of the adjusting bolt head [B] .

- Install the clamp springs ③ .
- Install the lower spring (smaller) ④ onto the shoes.

NOTE:
The long end of the spring must be pointing toward the rear of the vehicle.

[C] LONG END

- Lightly polish the new lining surfaces with emery cloth.

3. Remove:
   - Bolts ①

4. Lubricate:
   - Bearing outer surface

Lightweight Lithium Soap Base Grease

5. Install:
   - Rear axle
   - Brake drum
   - Rear wheel

   Refer to "REAR WHEEL AND REAR AXLE – INSTALLATION" section.

Bolt (Shoe Plate):
30 Nm (3.0 m·kg, 22 ft·lb)
Nut (Rear Wheel):
80 Nm (8.0 m·kg, 58 ft·lb)

6. Adjust:
   - End play (Brake cable)

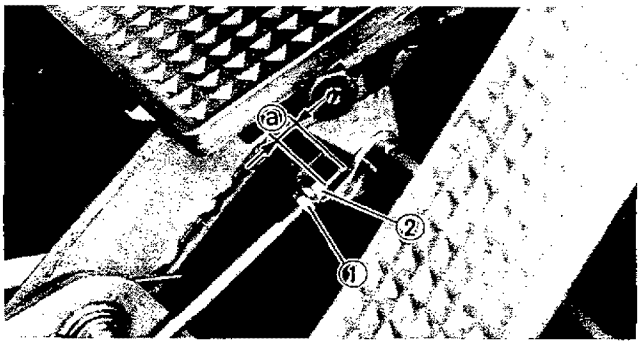
   Refer to CHAPTER 3 "BRAKE CABLE INSPECTION" section.

End Play (Brake Cable):
0.1 ~ 0.5 mm (0.004 ~ 0.020 in)

7. Adjust:
   - Free play (Release timing)

   Refer to CHAPTER 3 "PARKING BRAKE ADJUSTMENT" section.

Free Play (Release Timing):
1.0 mm (0.04 in)



8. Adjust:
   - Rod end length (Parking brake pedal) ⓐ

Rod End Length (Parking Brake Pedal):
10 mm (0.4 in)

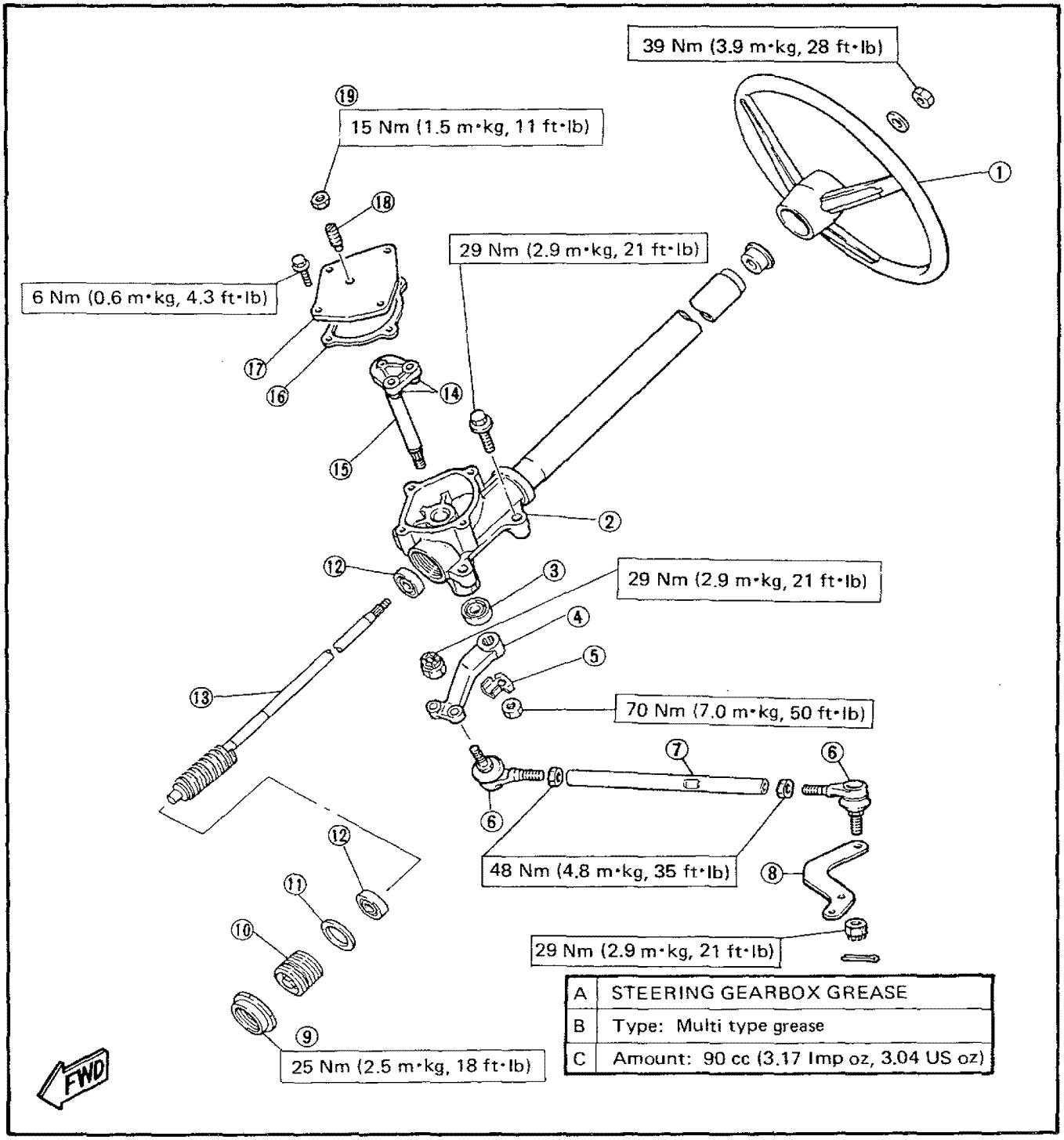
Rod end length adjustment step:
- Loosen the lock nut ①.
- Turn the adjuster nut ② in or out until proper rod end length is attained.

Turn in	**Rod end length is increased.**
Turn out	**Rod end length is decreased.**

- Tighten the locknut.

STEERING SYSTEM

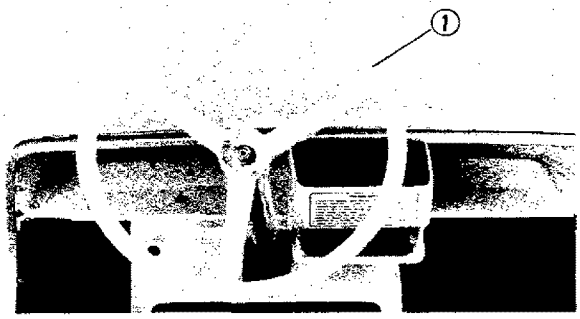
① Steering wheel
② Steering gearbox
③ Oil seal
④ Idler arm
⑤ Lock washer
⑥ Tie rod end
⑦ Tie rod
⑧ Knuckle arm
⑨ Locknut
⑩ Steering shaft adjusting bolt
⑪ O-ring
⑫ Bearing
⑬ Steering shaft
⑭ Pitman pin
⑮ Pitman arm
⑯ Gasket
⑰ Gearbox cover
⑱ Pitman shaft adjusting bolt
⑲ Locknut



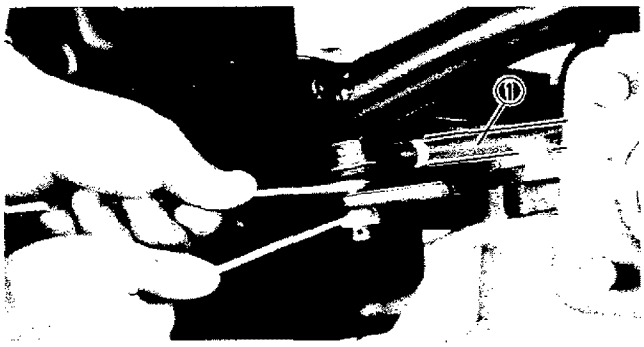
A	STEERING GEARBOX GREASE
B	Type: Multi type grease
C	Amount: 90 cc (3.17 Imp oz, 3.04 US oz)

REMOVAL

1. Place the vehicle on a level place.
2. Apply parking brake.
3. Jack up the front wheels by placing the suitable stand under the frame.
   Refer to CHAPTER 3 "JACK-UP" section.

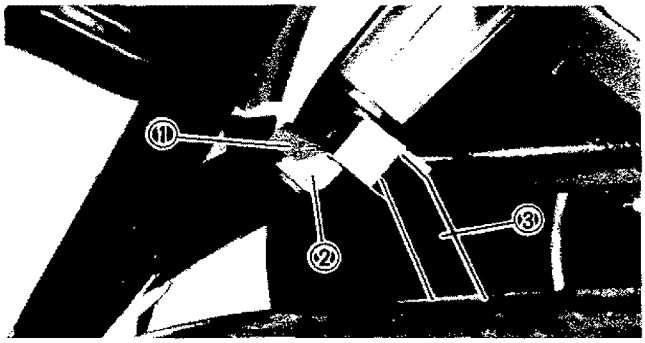


4. Remove:
   - Score card holder
   - Steering wheel nut
   - Washer
   - Steering wheel ①
   - Front under cover

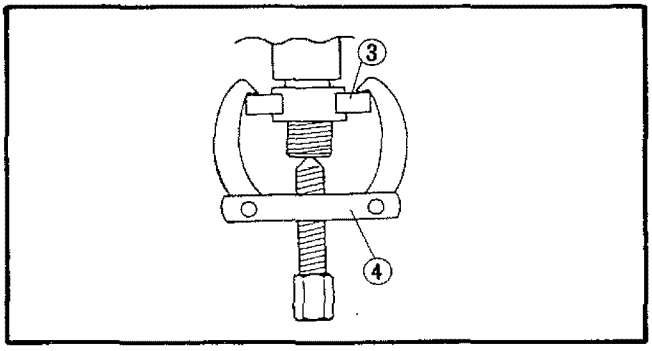


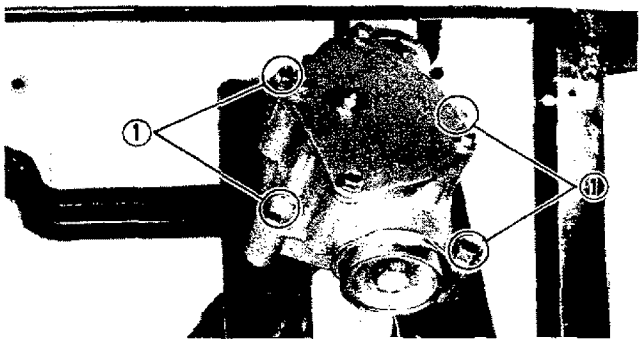
5. Remove:
   - Cotter pin
   - Locknut
   - Tie rod ①

NOTE:
When removing the locknut, hold the rod end using a 14 mm (0.6 in) wrench.

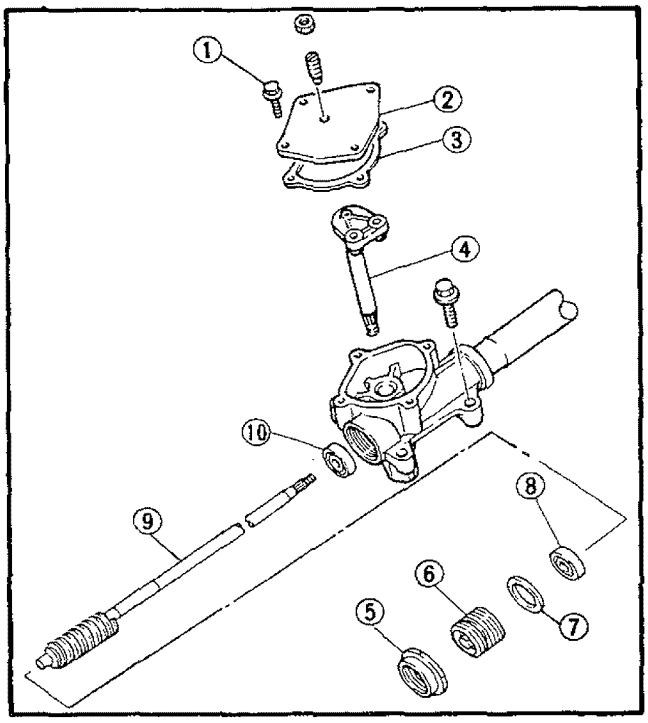


6. Bend:
   - Lock washer tub ①
7. Remove:
   - Locknut ②
   - Lock washer
8. Disconnect:
   - Idler arm ③
     From the pitman shaft.
     Use a two jaw universal puller ④.



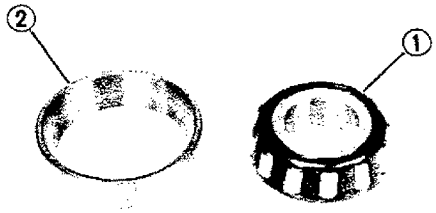


9. Remove:
   - Bolts ①
   - Steering gear box



DISASSEMBLY

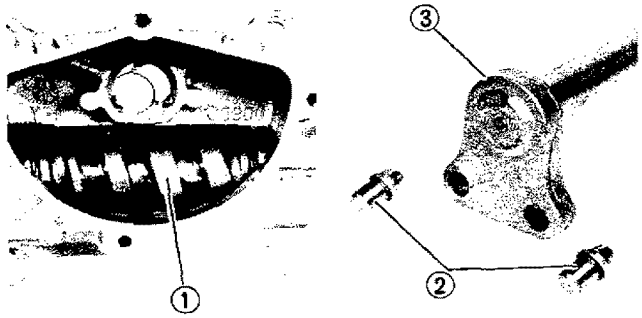
1. Remove:
   - Bolts ①
   - Gearbox cover ②
   - Gasket ③
   - Pitman arm ④
   - Locknut ⑤
   - Steering shaft adjusting bolt ⑥ (With O-ring ⑦)
   - Bearing (Lower) ⑧
   - Steering shaft ⑨
   - Bearing (Upper) ⑩



INSPECTION

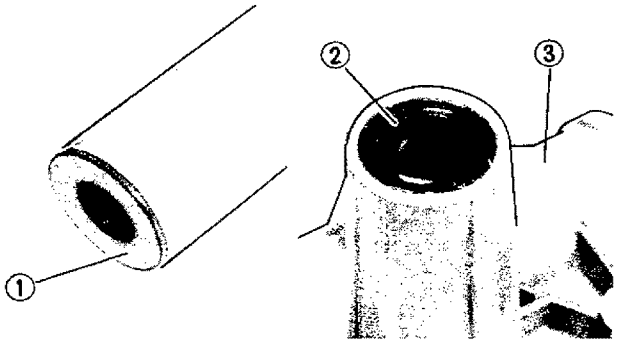
1. Inspect:
   - Steering shaft bearings ①
   - Bearing outer races ②
     Pitting/Damage → Replace.

NOTE:
Always replace the bearing and race as a set.



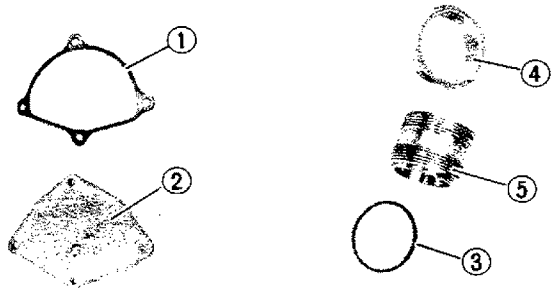
2. Inspect:
   - Steering worm gear ①
     Wear/Scratches/Damage → Replace steering shaft.
3. Inspect:
   - Pitman pins ②
     Wear/Damage → Replace.

③ Pitman arm



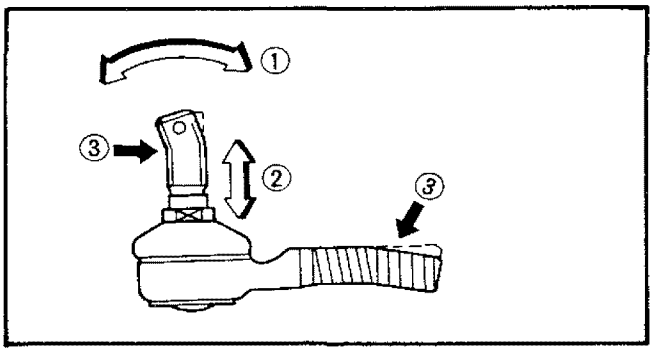
4. Inspect:
   - Bushing ① (Steering shaft)
     Wear/Damage → Replace.
5. Inspect:
   - Oil seal ② (Pitman arm shaft)
     Wear/Damage → Replace.

③ Steering gearbox

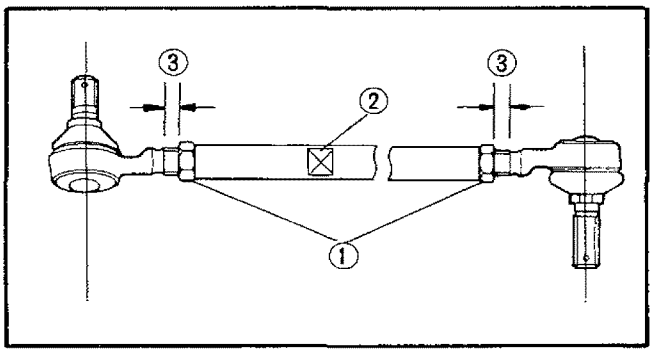


6. Inspect:
   - Gasket ① (Gearbox cover ②)
     Brakes/Damage → Replace.
7. Inspect:
   - O-ring ③ (Locknut ④)
     Wear/Damage → Replace.

⑤ Steering shaft adjusting bolt



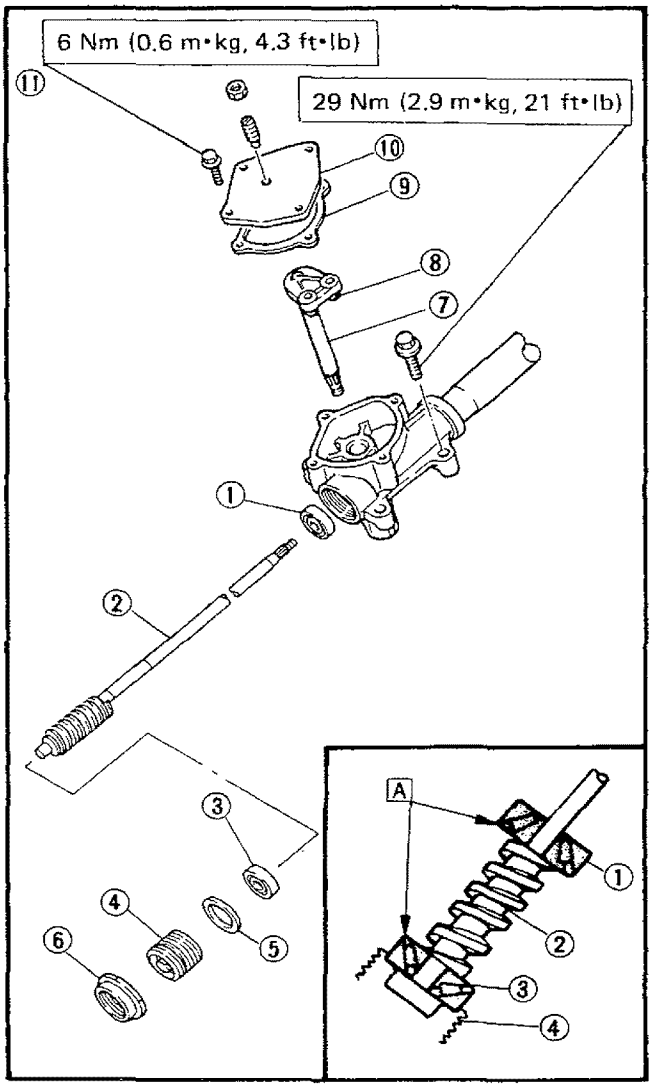
8. Inspect:
   - Rod end
     Unsmooth movement ① → Replace.
     Noticeable free play ② → Replace.
     Bolt bent ③ → Replace.



9. Replace the rod end with a new one.

NOTE:
- When loosening or tightening the locknuts ①, hold the tie-rod at a flat section ② with a 19 mm wrench.
- The length of the threads ③ of both rod ends must be same.

	Locknut (Rod End): 48 Nm (4.8 m·kg, 35 ft·lb)



ASSEMBLY

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

1. Lubricate:
   - Bearings
   - Worm gear
   - Pitman arm shaft
   - Oil seal lip

Multi Type Grease
Lightly Coat

2. Install:
   - Bearing (Upper) ①
   - Steering shaft ②
   - Bearing (Lower) ③
   - Adjusting bolt ④ (With O-ring ⑤)
   - Locknut ⑥

NOTE:

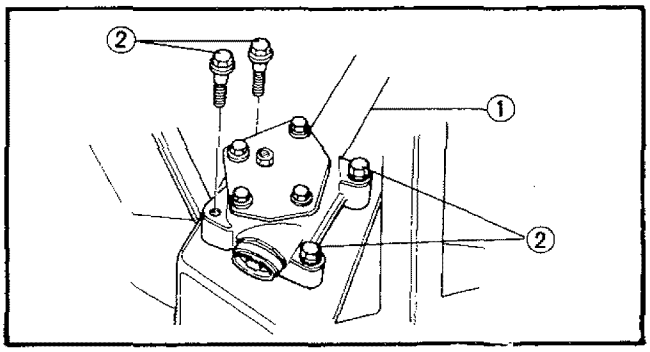
Be sure that the bearings are installed in the correct direction [A] .

3. Add grease to the gearbox

Gearbox Grease:
Multi type grease
90 cc (3.17 Im oz, 3.04 US oz)

4. Install:
   - Pitman arm ⑦ (With pins ⑧)
   - Gasket ⑨
   - Gearbox cover ⑩
   - Bolts (Gearbox cover) ⑪

Bolt (Gearbox Cover):
6 Nm (0.6 m·kg, 4.3 ft·lb)



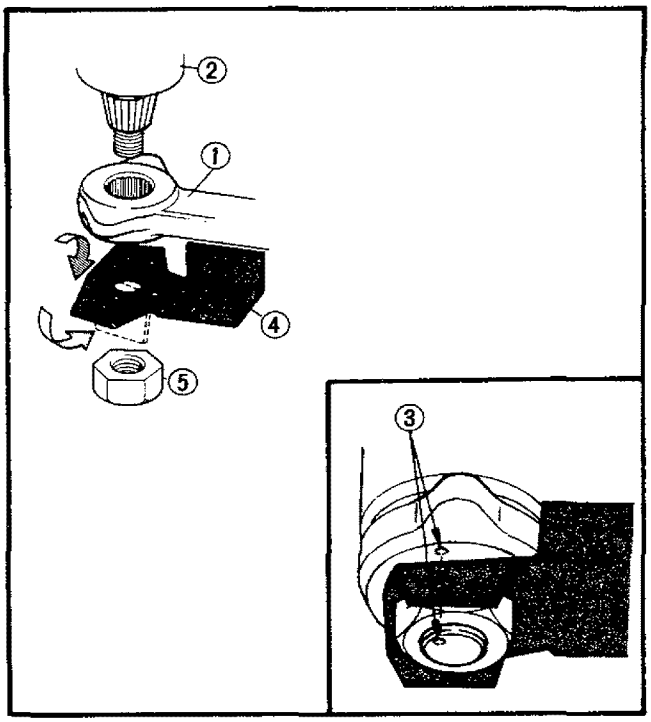
INSTALLATION

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

1. Install:
   - Steering gearbox assembly ①
   - Bolts (Gearbox) ②

   Onto the frame.

Bolt (Gearbox):
29 Nm (2.9 m·kg, 21 ft·lb)



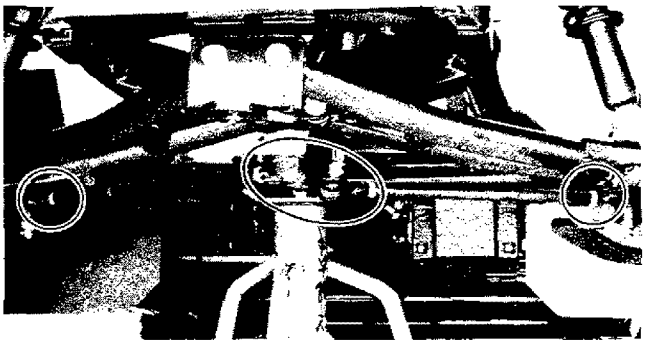
2. Install:
   - Idler arm ①
     Onto the pitman arm shaft ② .

NOTE:
Align the I.D. marks ③ with the end of pitman arm shaft, and idler arm.

3. Install:
   - Lock washer ④
   - Locknut (Idler arm) ⑤

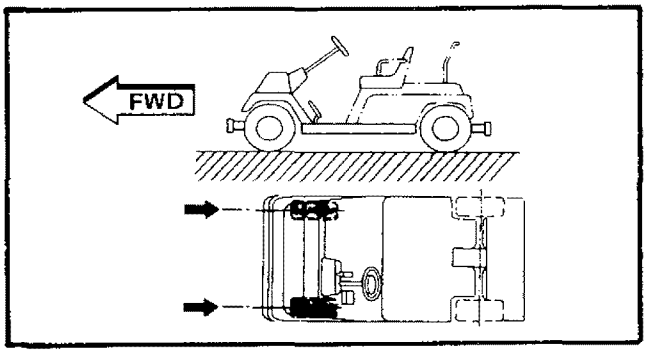
	Locknut (Idler Arm): **70 Nm (7.0 m·kg, 50 ft·lb)**

4. Bend the lock washer tab tightly against the nut flats.



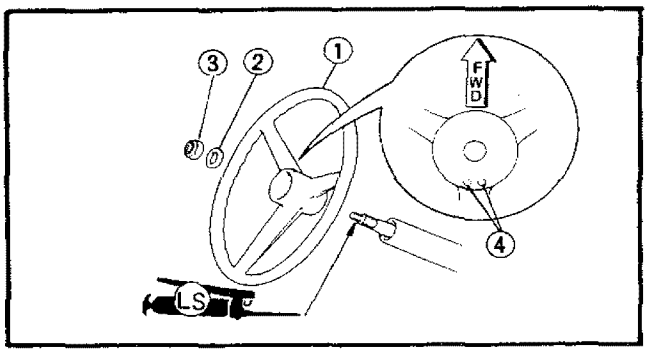
5. Install:
   - Tie rod

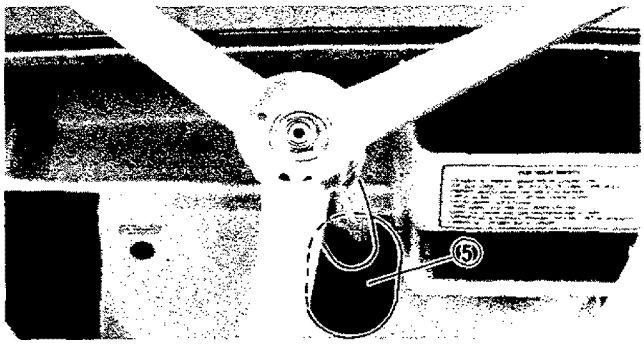
	Nut (Tie Rod End): **29 Nm (2.9 m·kg, 21 ft·lb)**



6. Adjust:
   - Backlash (Worm gear-pitman pins)
     Refer to CHAPTER 3 "STEERING INSPECTION — Steering Wheel Free Play Adjustment" section.
7. Position the front wheels straight ahead.
8. Lightly grease the tapered portion and spline of the steering shaft.

	Lightweight Lithium Soap Base Grease



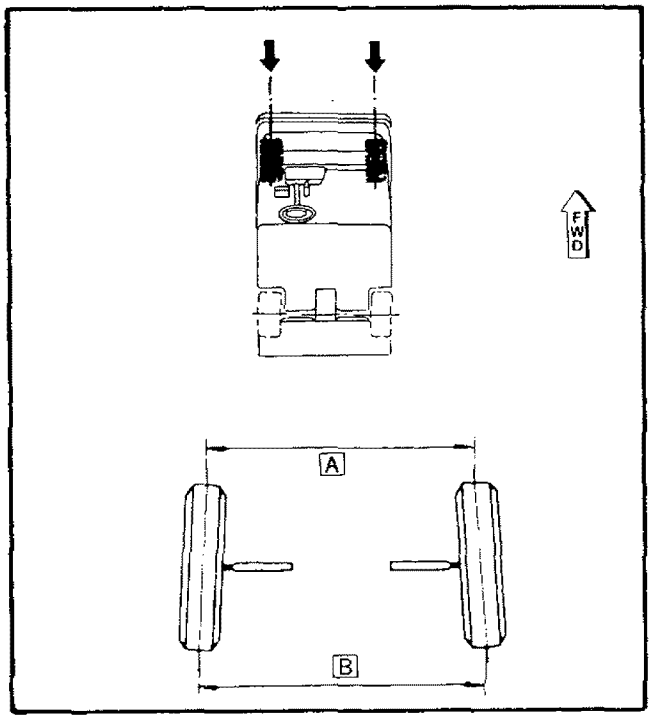


9. Install:
   - Steering wheel ①
   - Washer ②
   - Nut (Steering wheel) ③

Nut (Steering Wheel):
39 Nm (3.9 m·kg, 28 ft·lb)

NOTE:
- Position the drain holes ④ in the steering wheel at the bottom.
- Fit the rubber seal ⑤ properly around the steering column and into the hole in the bulk head.

10. Install:
    - Score card holder
    - Front under cover



11. Adjust:
    - Toe-in

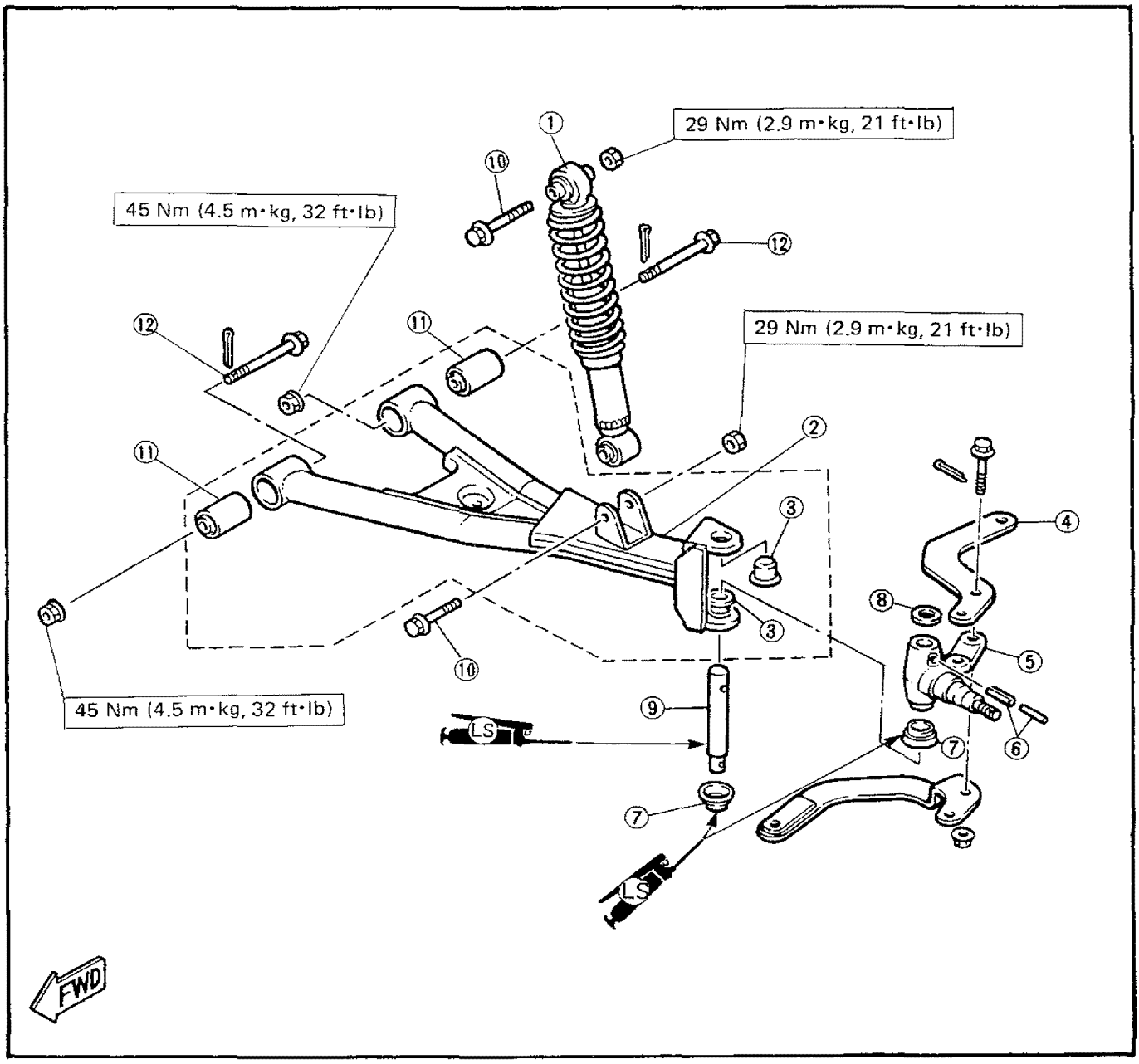
    Refer to CHAPTER 3 "WHEEL ALIGNMENT" section.

Toe-in (B − A):
Unloaded:
10 ~ 20 mm (0.4 ~ 0.8 in)
Fully loaded: Zero mm (Zero in)

A Center-to-center at front side tire tread.
B Center-to-center at rear side tire tread.

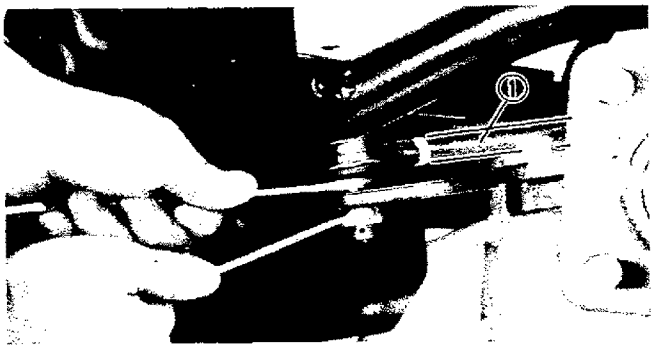
FRONT SUSPENSION AND KNUCKLE

① Shock absorber assembly
② Front lower arm
③ Bushing
④ Knuckle arm
⑤ Knuckle
⑥ Spring pin
⑦ Dust cover
⑧ Thrust washer
⑨ Kingpin
⑩ Pivot bolt
⑪ Bushing
⑫ Pivot bolt

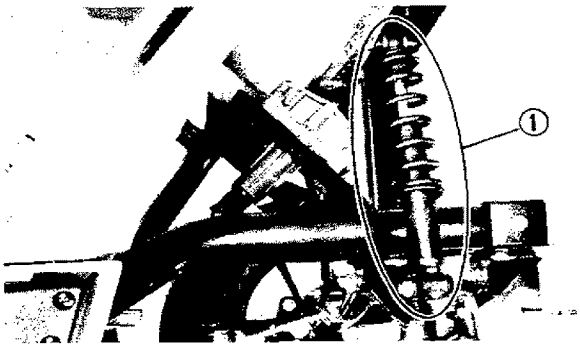


REMOVAL

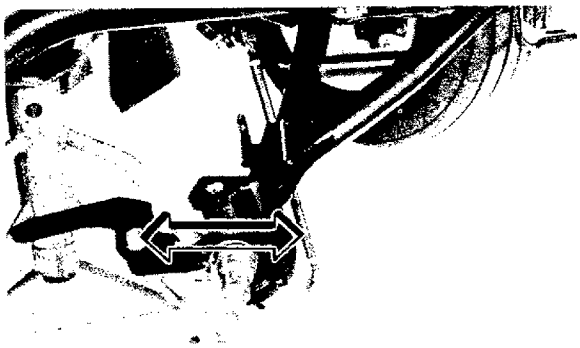
1. Place the vehicle on a level place.
2. Apply parking brake.
3. Loosen:
   - Nuts (Front wheel)
4. Jack up the front wheels by placing the suitable stand under the frame.
   Refer to CHAPTER 3 "JACK-UP" section.
5. Remove:
   - Front wheel
   - Hub (Front wheel)
   Refer to "FRONT WHEEL – REMOVAL" section.



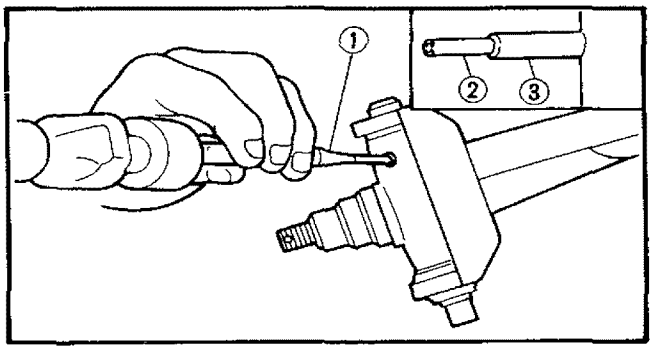
6. Remove:
   - Tie rod ①
   From the knuckle arm.



7. Remove:
   - Shock absorber assembly ①



8. Check:
   - Pivot bushings
   Try to move the arm forward and backward.
   Noticeable free play → Replace pivot bushings.



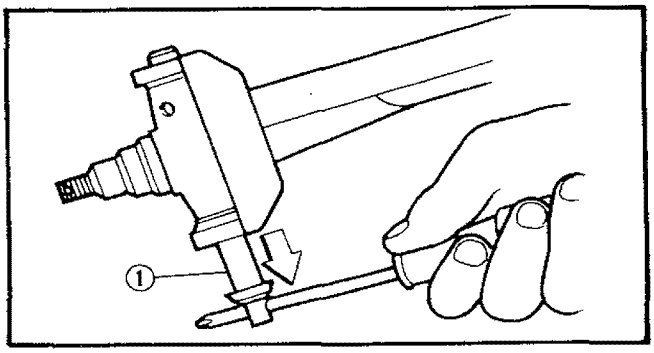
9. Remove:
   - Spring pins

   Use the Valve Guide Remover ① or drift punch.

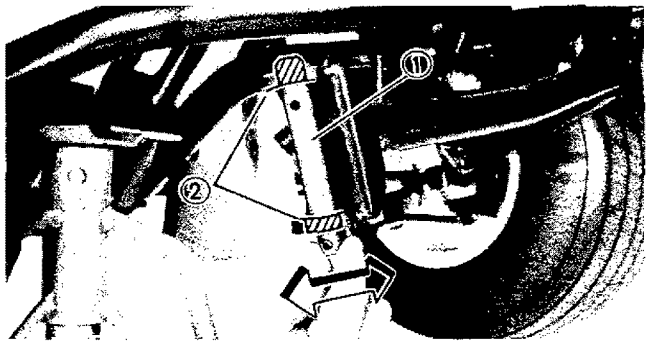
NOTE:
- Before removing the spring pins, remove a knuckle arm bolt (Knuckle side).
- There are two spring pins. The inner pin locks the outer and must be removed first.

	Valve Guide Remover: YM-04064, 90890-04064

② Inner pin
③ Outer pin



10. Remove:
    - Kingpin ①
    - Knuckle



11. Check:
    - Kingpin free play

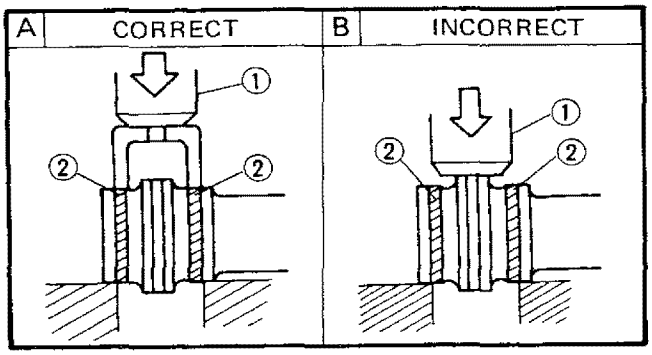
    Insert the kingpin ① into the bushings ② on the lower arm, move the kingpin side to side.

    Excessive free play → Replace bushings ② and/or kingpin ① .

12. Remove:
    - Lower arm

INSPECTION

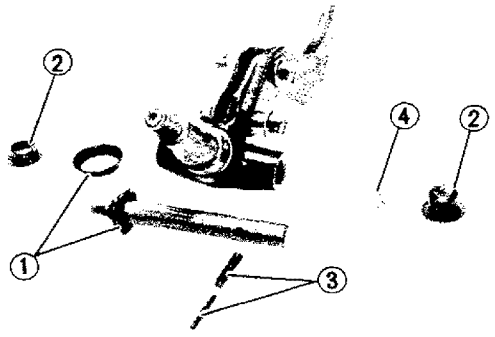
1. Inspect:
   - Shock absorber
     Refer to CHAPTER 3 "SHOCK ABSORBER INSPECTION" section.
2. Inspect:
   - Lower arm
     Bends/Damage → Replace.



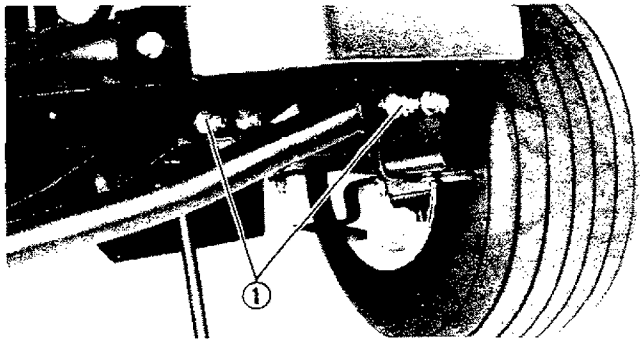
3. Inspect:
   - Bushing (Lower arm pivot)
     Wear/Damage → Replace.

Pivot bushing replacement steps:
- Remove the bushing using a hydraulic press ① .
- Install the nwe bushing.

NOTE:
Do not press the center collar and rubber of the bushing. Contact should be made only with the outer collar ② .



4. Inspect:
   - Dust covers ①
   - Bushings ②
   - Spring pins ③
   - Thrust washer ④
     Wear/Damage → Replace.



INSTALLATION

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

1. Install:
   - Lower arm

	Nut (Pivot Bolt) ① : 45 Nm (4.5 m·kg, 32 ft·lb)

2. Lubricate:
   - Kingpin

Lightweight Lithium Soap Base Grease

3. Install:
   - Knuckle
   - Bolt (Knuckle arm)
   - Shock absorber assembly

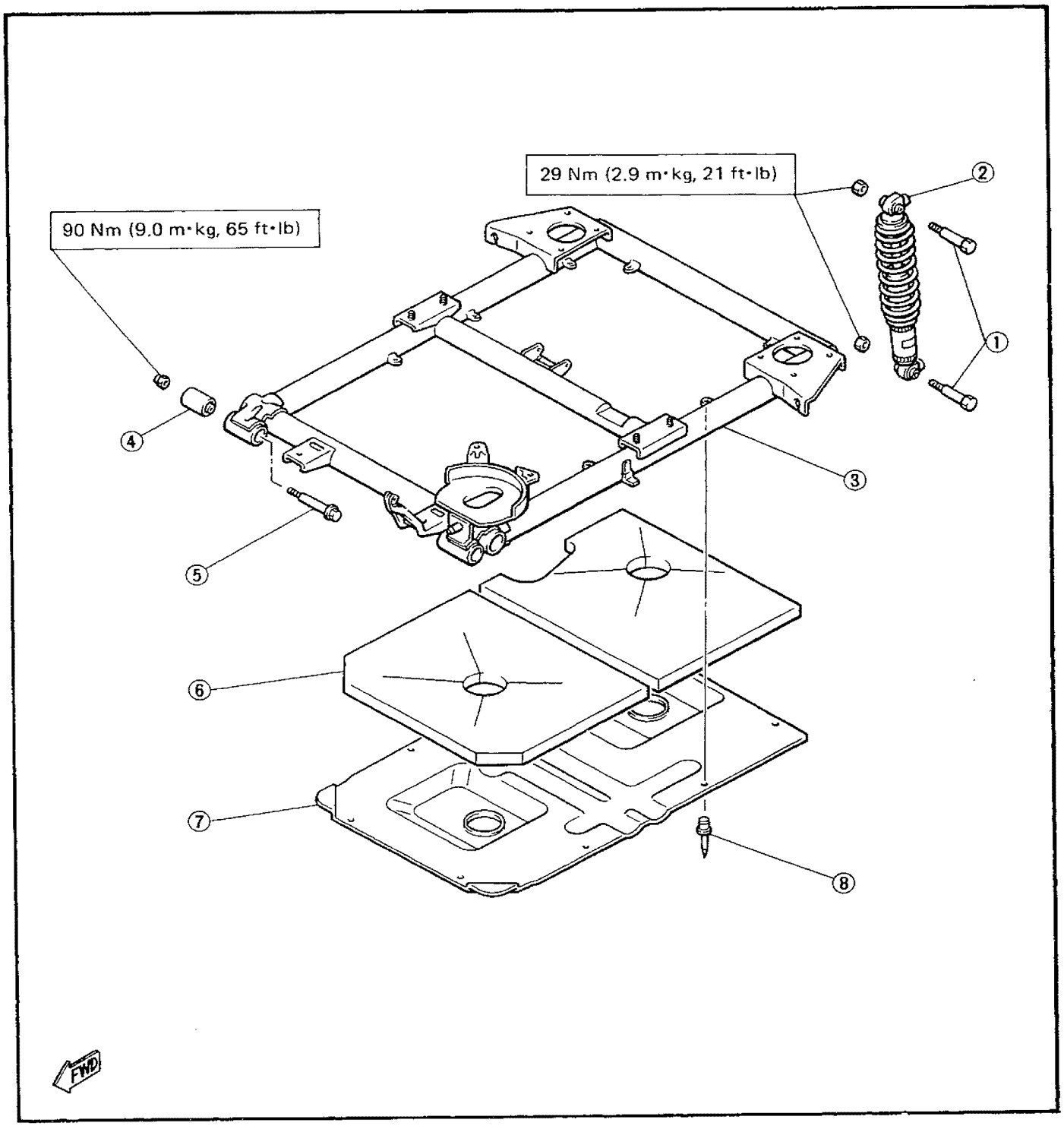
Nut (Shock Absorber Pivot):
29 Nm (2.9 m·kg, 21 ft·lb)

4. Install:
   - Tie rod
   - Hub (Front wheel)
   - Front wheel

Nut (Tie Rod End):
29 Nm (2.9 m·kg, 21 ft·lb)
Nut (Hub):
92 Nm (9.2 m·kg, 66 ft·lb)
Nut (Front Wheel):
88 Nm (8.8 m·kg, 64 ft·lb)

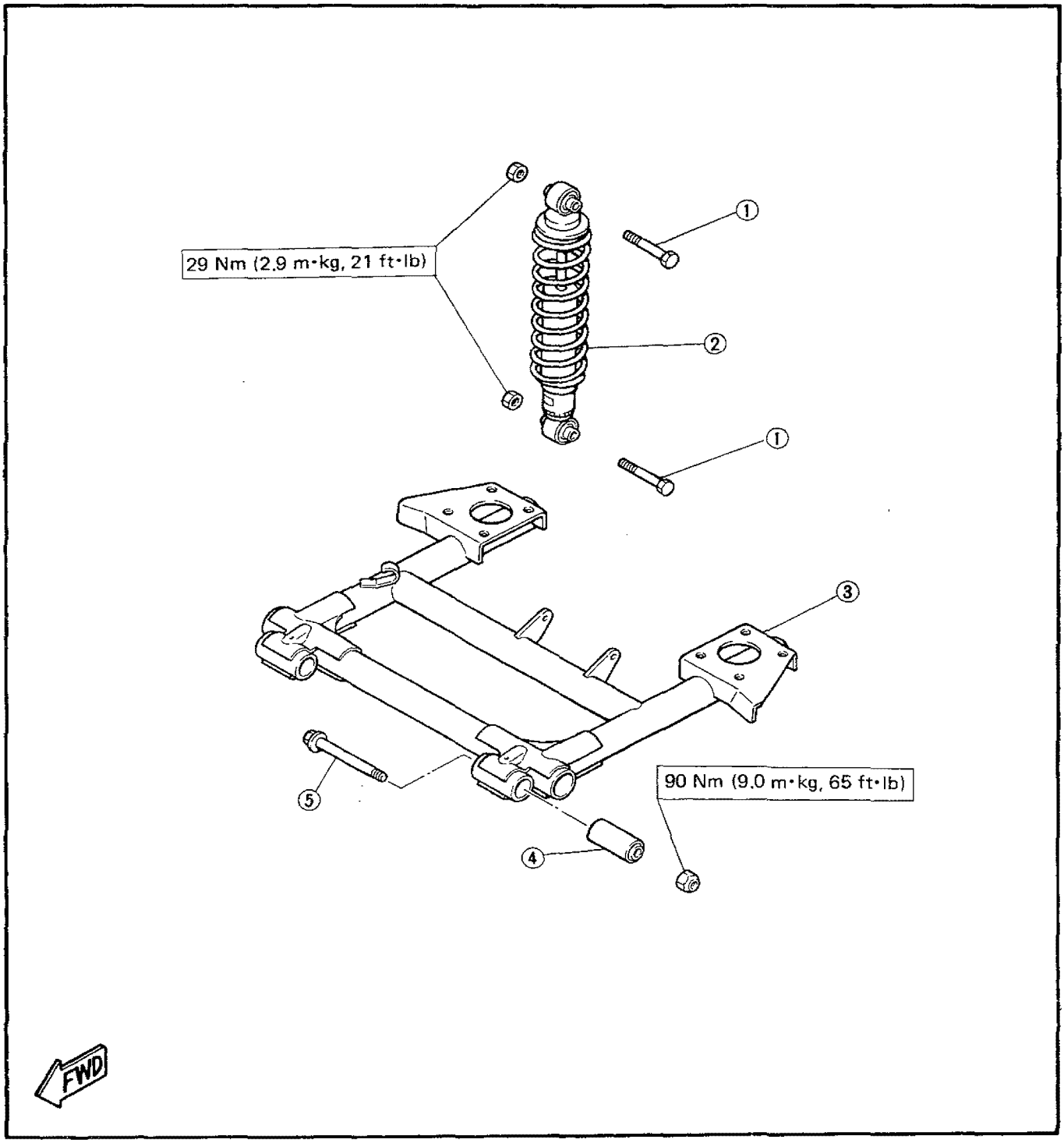
REAR SUSPENSION (FOR G2-A)

① Pivot bolt
② Shock absorber assembly
③ Rear arm
④ Pivot bushing
⑤ Pivot bolt
⑥ Insulator
⑦ Protector panel
⑧ Blind rivet



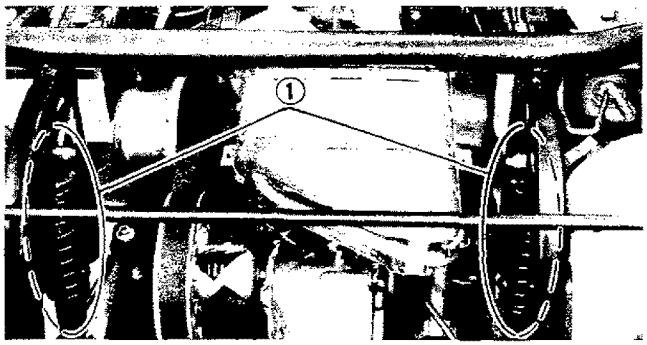
REAR SUSPENSION (FOR G2-E)

① Pivot bolt
② Shock absorbre assembly
③ Rear arm
④ Pivot bushing
⑤ Pivot bolt



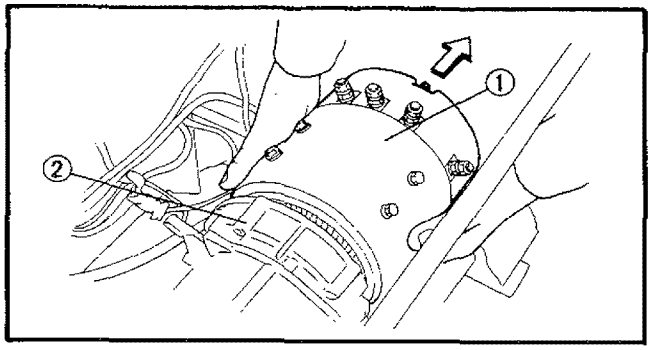
REMOVAL

1. Place the vehicle on a level place.
2. Jack up the rear wheels by placing the suitable stand under the frame.
   Block the front wheels.
   Refer to CHAPTER 3 "JACK-UP" section.



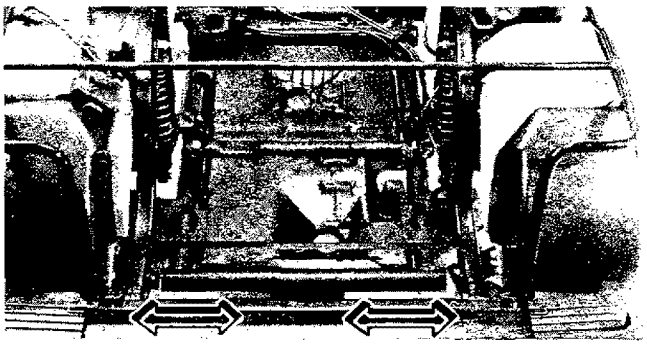
3. Remove:
   - Rear shock absorber assembly ①

NOTE:
When removing the shock absorber, support the rear arm with a jack.



4. Remove:
   - Engine (For G2-A)
   - Traction motor (For G2-E) ①
   - Transmission case ②

   Refer to CHAPTER 4 "ENGINE REMOVAL", CHAPTER 8 "FOR G2-E TRACTION MOTOR" and CHAPTER 6 "TRANSMISSION" section.



5. Check:
   - Rear arm free play

   Try to move the rear arm side to side.
   Noticeable free play → Replace pivot bushings.

6. Remove:
   - Rear arm

INSPECTION

1. Inspect:
   - Shock absorber
     Refer to CHAPTER 3 "SHOCK ABSORBER INSPECTION" section.
2. Inspect:
   - Rear arm
     Bends/Damage → Replace.
3. Inspect:
   - Bushing (Rear arm pivot)
     Wear/Damage → Replace.
     Refer to "FRONT SUSPENSION AND KNUCKLE — INSPECTION" section.

INSTALLATION

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

1. Install:
   - Rear arm
   - Transmission case
   - Engine (For G2-A)
   - Traction motor (For G2-E)
   - Rear shock absorber assembly

Nut (Rear Arm Pivot):
90 Nm (9.0 m·kg, 65 ft·lb)
Bolt (Transmission Case — Axle Housing):
25 Nm (2.5 m·kg, 18 ft·lb)
Mount Bolt (Transmission Case):
40 Nm (4.0 m·kg, 29 ft·lb)
Nut (Engine Bracket):
35 Nm (3.5 m·kg, 25 ft·lb)
Bolt (Motor):
6 Nm (0.6 m·kg, 4.3 ft·lb)
Nut (Shock Absorber Pivot):
29 Nm (2.9 m·kg, 21 ft·lb)

CABLES

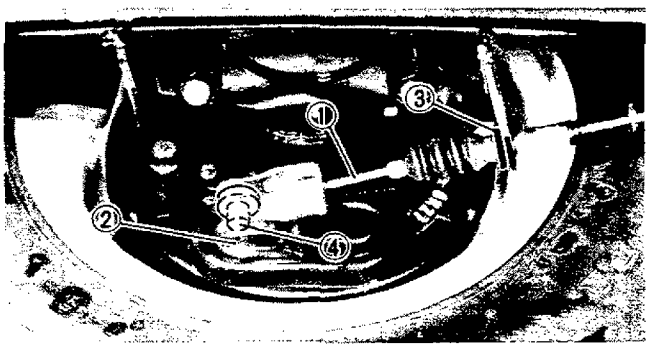
CABLE MAINTENANCE

NOTE:

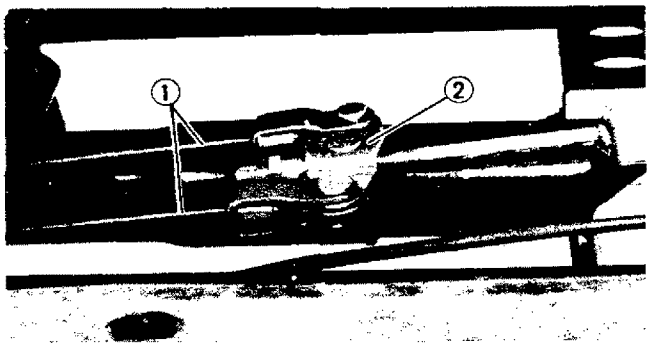
Cable maintenance is primarily concerned with preventing deterioration and providing proper lubrication to allow the cable to move freely within its housing. Cable removal is straightforward and uncomplicated. Removal is not discussed within this section.

⚠ WARNING:

Cable routing is very important. For details of cable routing, see the "CABLE ROUTING" in the CHAPTER 3. Improperly routed or adjusted cables may make the golf car unsafe for operation.

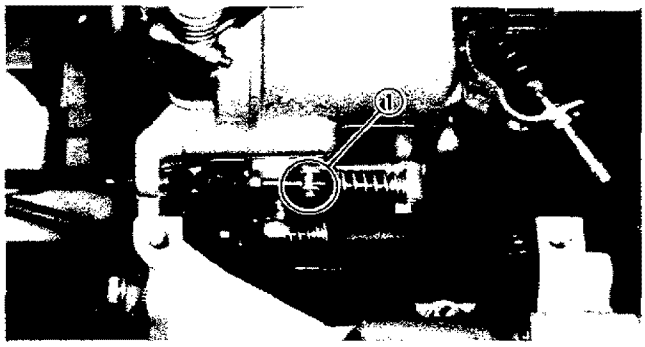


1. Disconnect the brake cable ① from the brake lever ② by removing clevis pin ④ .
2. Remove:
   - Retaining clip ③



3. Disconnect:
   - Brake cables ①
     From the brake equalizer ② .
4. Remove:
   - Circlips
   - Brake cables

5. Disconnect:
   - Choke cable (For G2-A)
     From the carburetor and choke knob.
   - Throttle cable (For G2-A)
     From the carburetor, limiter lever, and accelerator pedal.



6. Disconnect:
   - Shift cables (For G2-A)

   From the shift lever and transmission lever.

NOTE:
When removing the shift cables from the transmission lever, open the transmission lever end ①.

7. Remove:
   - Cables

   From the clamps and band.
8. Check:
   - Cable free movement

   Obstruction → Inspect for wear/Damage.
   Kinking/Frayed strands/Damage → Replace.
9. Lubricate:
   - Cables

   Use the Cable Injector.

Cable Injector:
ACC-11110-43-15, 90890-70054

NOTE:
Choice of lubricant depends upon conditions and preferences. The use of a semi-drying chain and cable lubricant will perform adequately under most conditions.

10. Install:
    - Cables

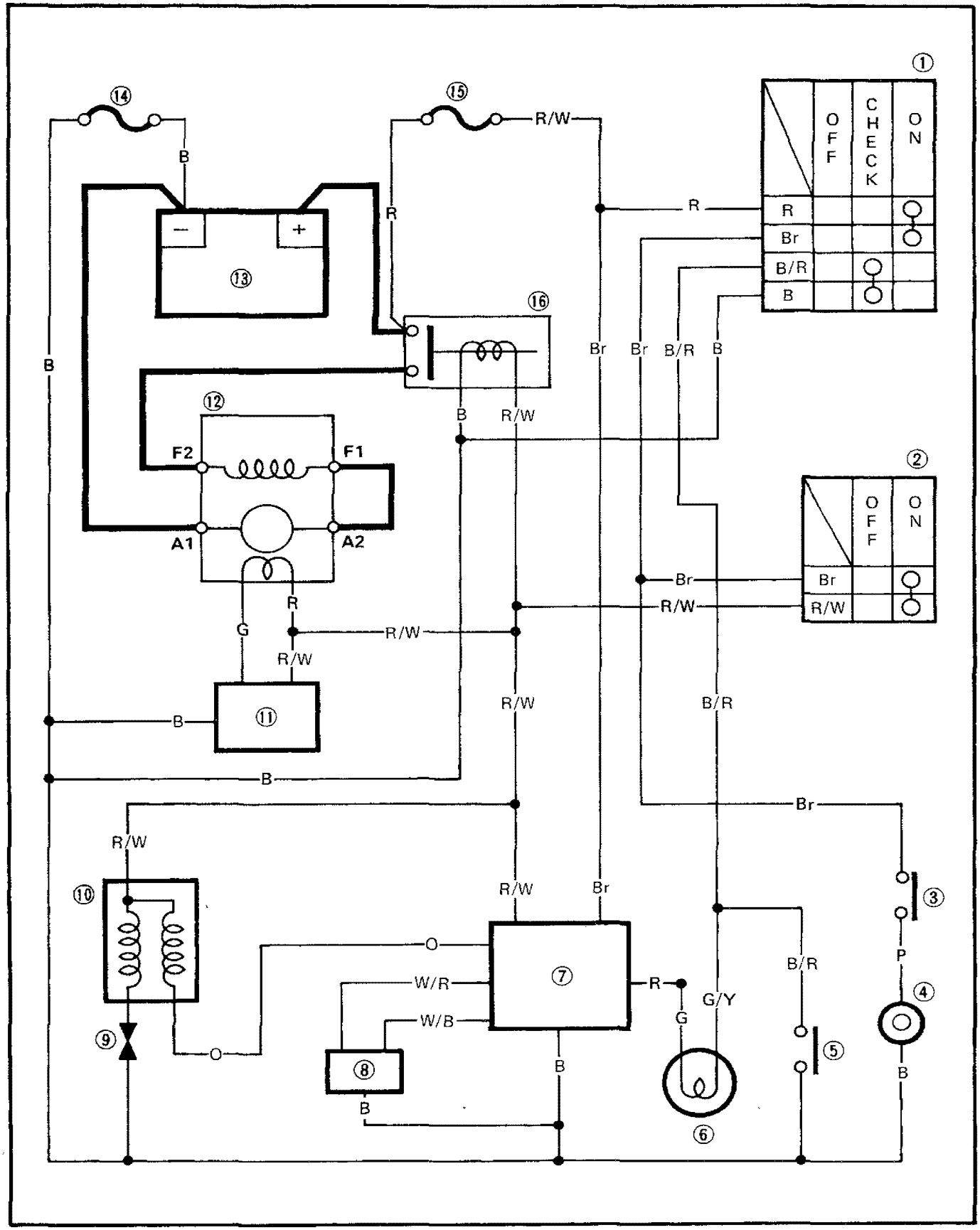
    Reverse the removal procedure.
11. Adjust:
    - End play (Brake cable)
    - Free play (Throttle cable 1, 2) (For G2-A)
    - Free play (Choke cable) (For G2-A)

    Refer to CHAPTER 3 "BRAKE CABLE INSPECTION", "THROTTLE CABLE ADJUSTMENT" and "CHOKE CABLE ADJUSTMENT" section.

End Play (Brake Cable):
0.1 ~ 0.5 mm (0.004 ~ 0.020 in)
Free Play (Throttle Cable 1):
0.2 ~ 0.5 mm (0.008 ~ 0.020 in)
Free Play (Throttle Cable 2):
0.5 mm (0.02 in)
Free Play (Choke Cable):
1.0 mm (0.04 in)

ELECTRICAL (FOR G2-A)

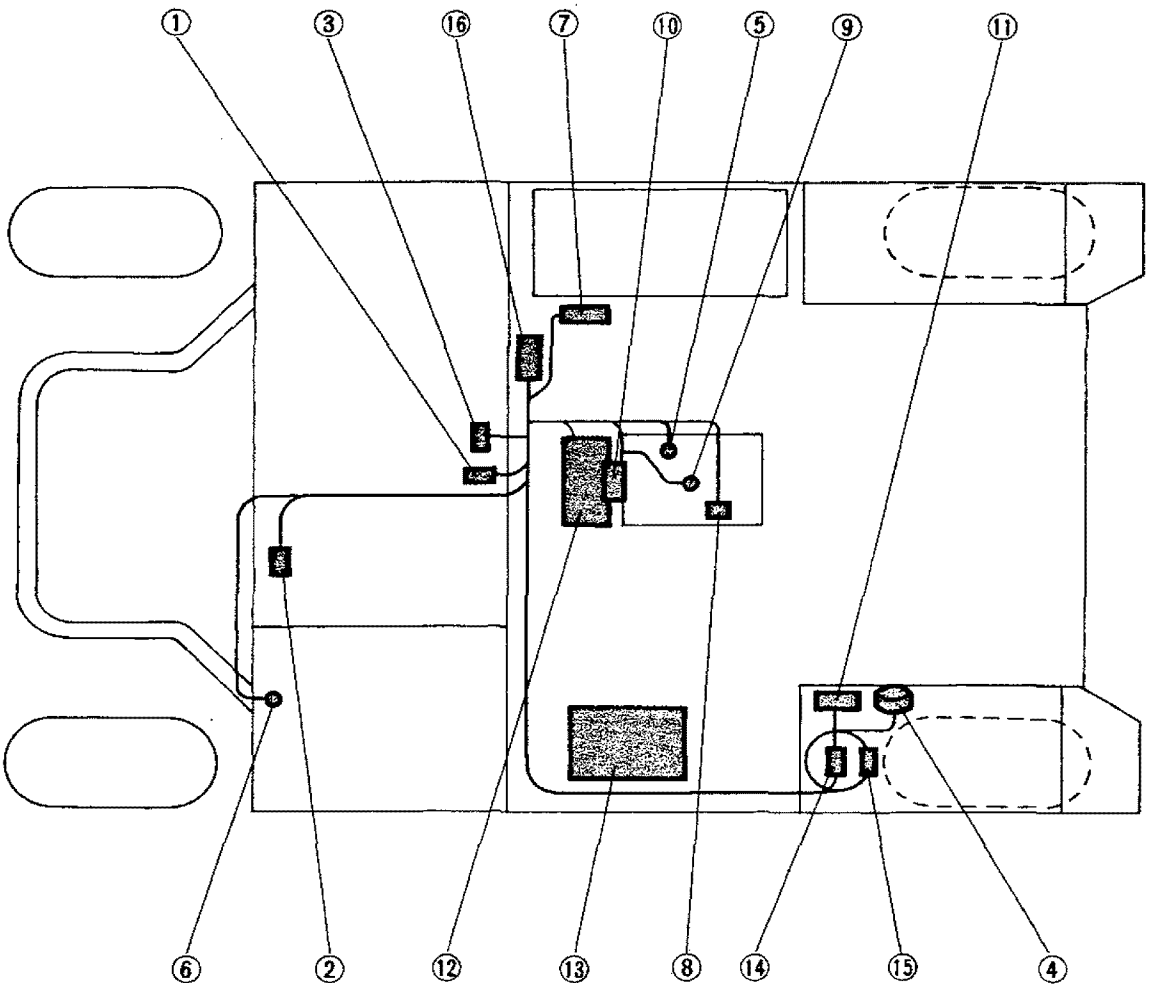
G2-A CIRCUIT DIAGRAM



① Main switch
② Accelerator stop switch
③ Buzzer switch
④ Back-up buzzer
⑤ Oil level switch
⑥ Oil level indicator light
⑦ Ignitor unit
⑧ Pickup coil
⑨ Spark plug
⑩ Ignition coil
⑪ Voltage regulator
⑫ Starter-generator
⑬ Battery (12V)
⑭ Fuse "Negative" (10A)
⑮ Fuse "Positive" (10A)
⑯ Solenoid relay

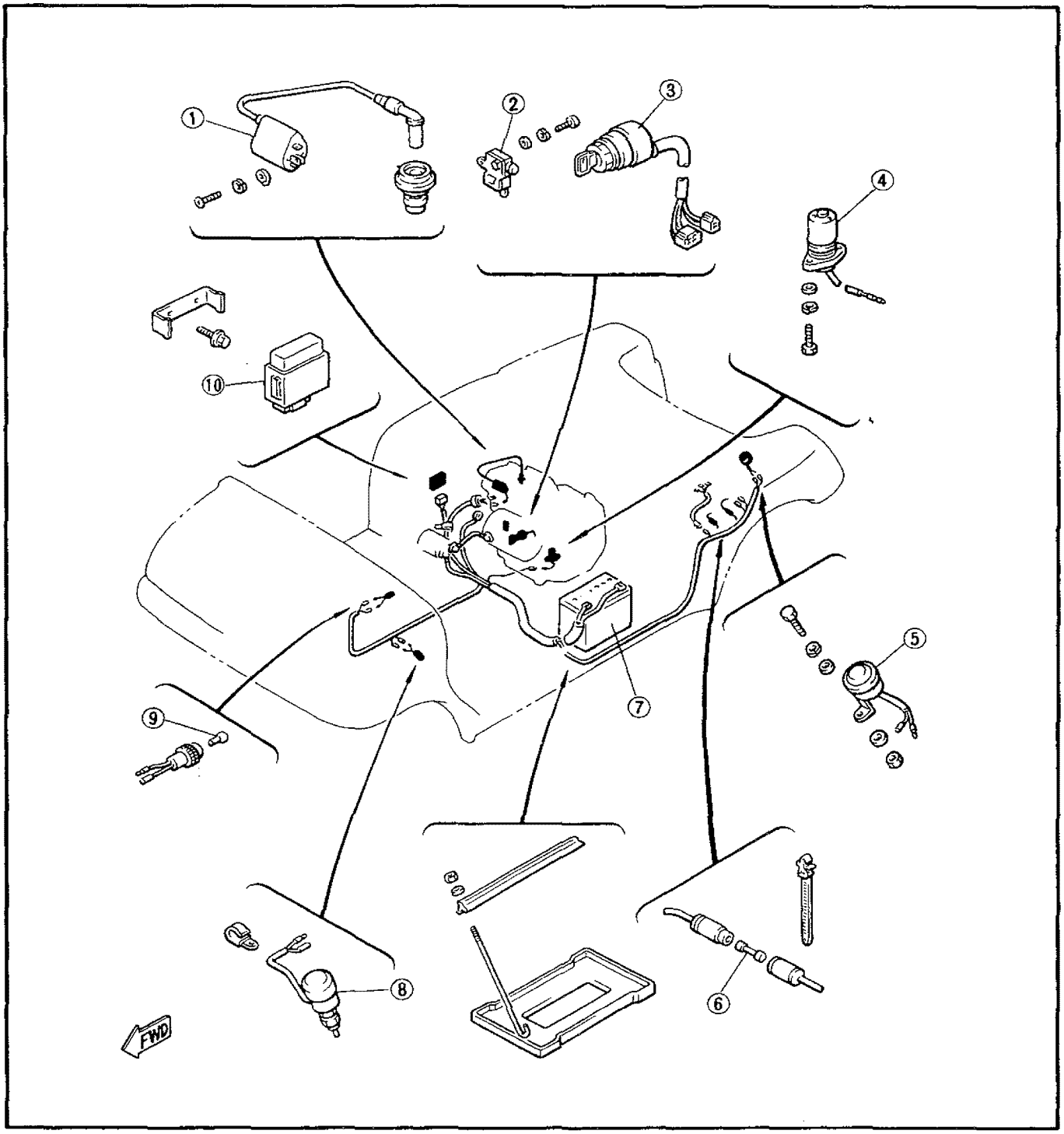
COLOR CODE

R . . . . . .Red
B . . . . . .Black
O . . . . . .Orange
Br. . . . . .Brown
G . . . . . .Green
P . . . . . .Pink
R/W . . . . .Red/White
W/R . . . . .White/Red
W/B . . . . .White/Black
B/R . . . . .Black/Red
G/Y . . . . .Green/Yellow



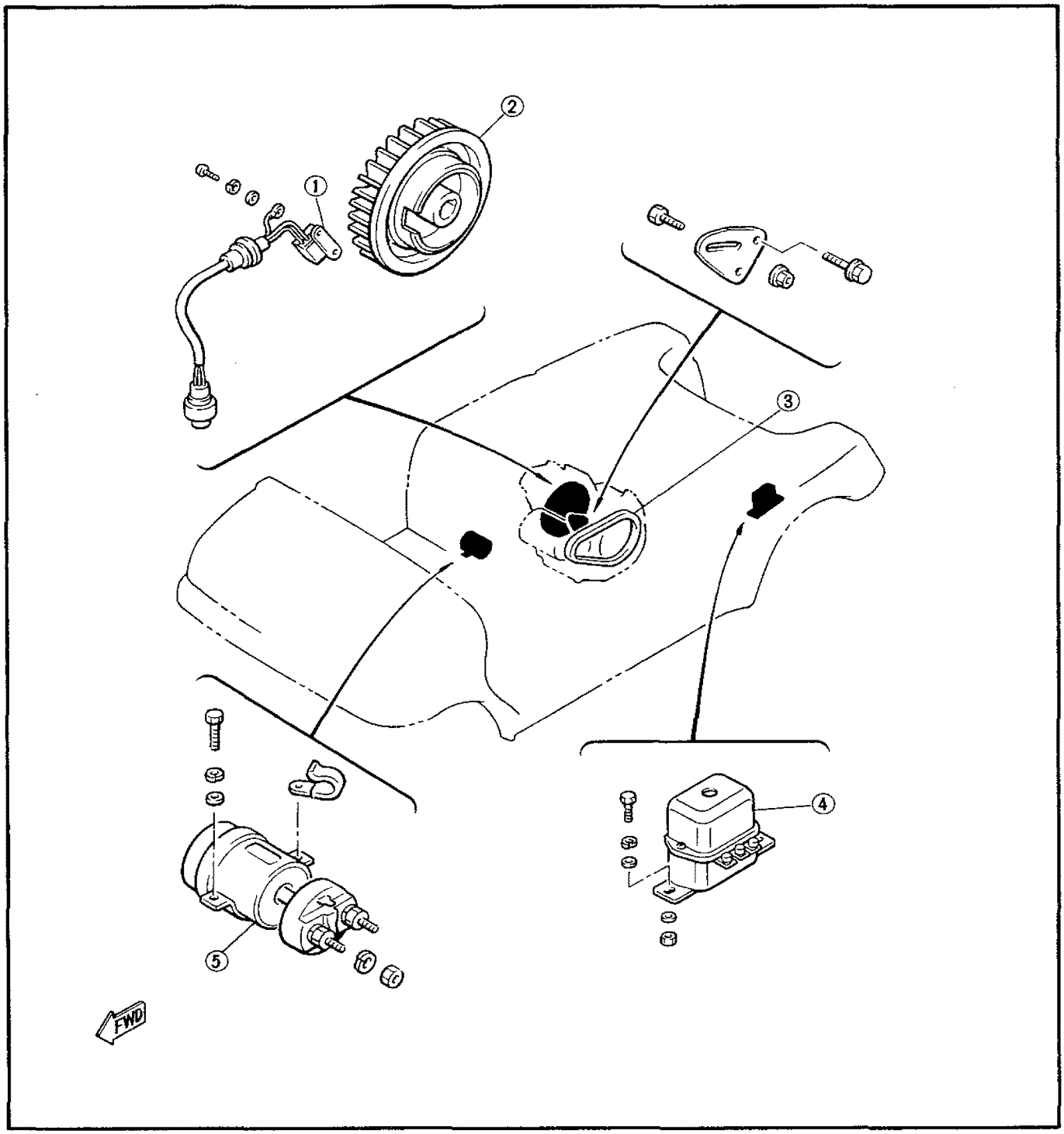
ELECTRICAL COMPONENTS 1

① Ignition coil
② Buzzer switch
③ Main switch
④ Oil level switch
⑤ Back-up buzzer
⑥ Fues
⑦ Battery
⑧ Accelerator switch
⑨ Oil indicator light
⑩ Ignitor unit

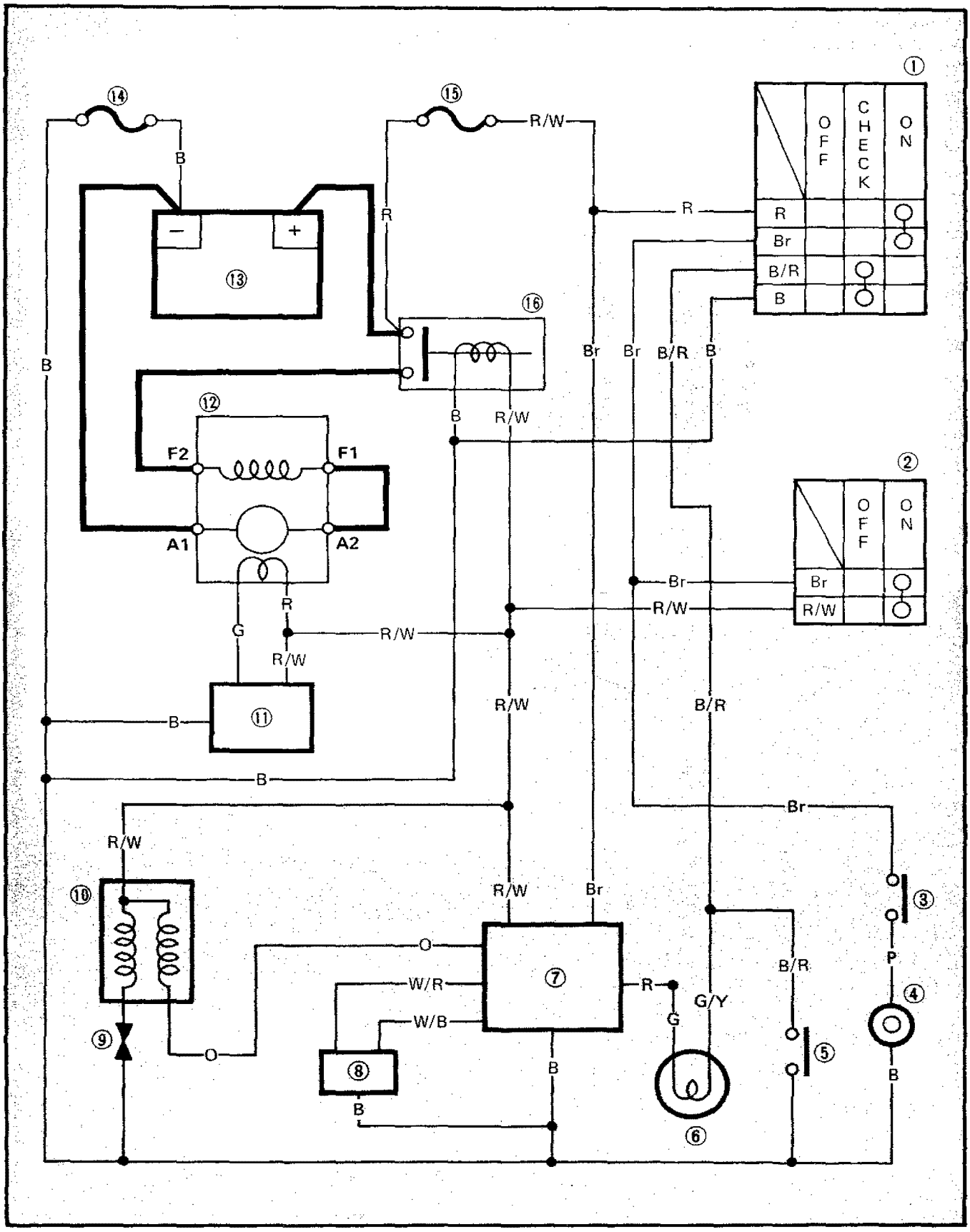


ELECTRICAL COMPONENTS 2

① Pickup coil
② Flywheel
③ Starter-generator belt
④ Voltage-regurator
⑤ Solenoid relay



STARTING AND CHARGING SYSTEM

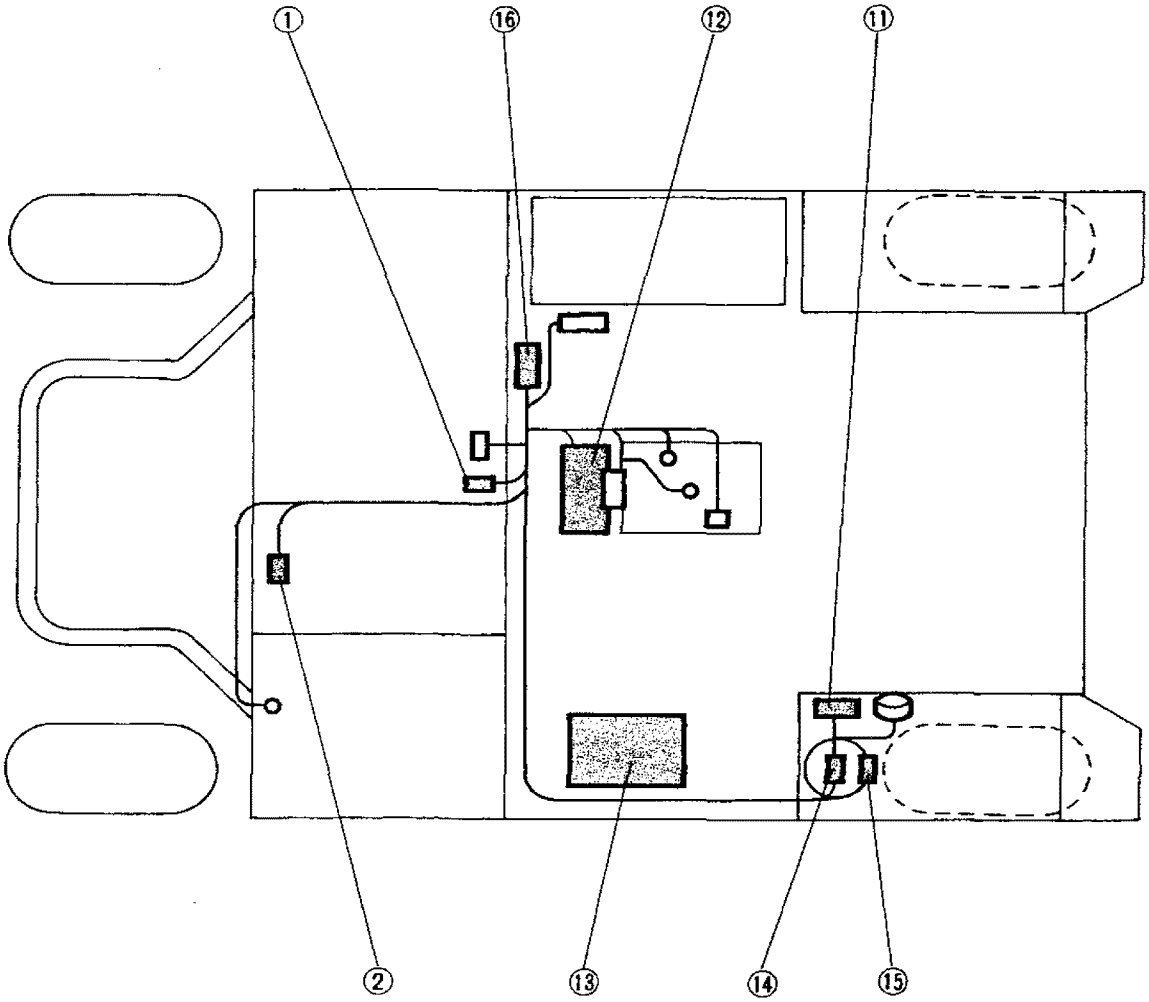


Aforementioned circuit diagram shows starting and charging circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

①Main switch
②Accelerator stop switch
⑪Voltage regulator
⑫Starter-generator
⑬Battery (12V)
⑭Fuse "Negative" (10A)
⑮Fuse "Positive" (10A)
⑯Solenoid relay



TROUBLESHOOTING

THE STARTER DOES NOT TURN

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Accelerator stop switch
5. Starter-generator
6. Solenoid relay
7. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Hydrometer:
YU-03036, 90890-03036

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
12V

INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NOCONTINUITY →
Replace fuse.

CONTINUITY ↓

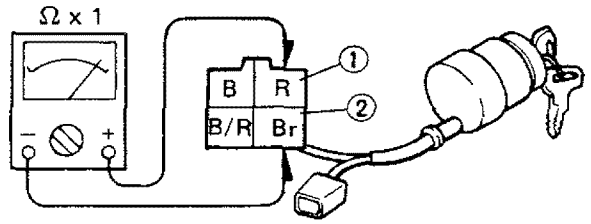
*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch.

Tester (+) Lead → Red Lead ①
Tester (—) Lead → Brown Lead ②



- Turn the main switch to "ON", "CHECK" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
OFF	X	○	X	○
CHECK	X	○	X	○
ON	○	X	X	○

○: Continuity X: Nocontinuity

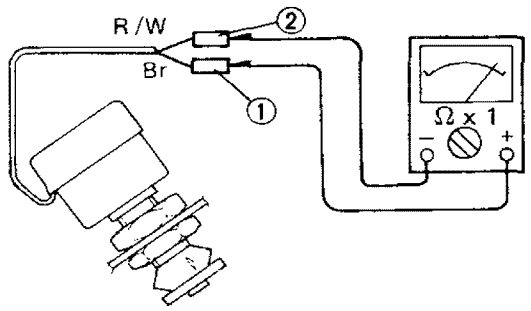
BAD CONDITION → Replace main switch.

GOOD CONDITION

4. Accelerator stop switch

- Disconnect the accelerator stop switch leads from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the accelerator stop switch.

Tester (+) Lead → Brown Lead ①
Tester (—) Lead → Red/White Lead ②



- Push the accelerator pedal.
- Check the accelerator stop switch for continuity.

Accelerator Pedal Position	Good Condition	Bad Condition		
Push	○	○	X	X
Free	X	○	○	X

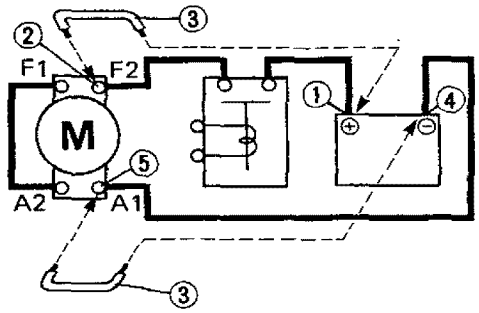
○: Continuity X: Nocontinuity

BAD CONDITION → Replace accelerator stop switch.

GOOD CONDITION ↓

5. Starter-generator

- Connect the battery positive terminal ① and starter-generator terminal F2 ② using the jumper lead ③ *.
- Connect the battery negative terminal ④ and starter-generator terminal A1 ⑤ using the jumper lead ③ *.
- Check the starter-generator operation.



* **⚠ WARNING:**

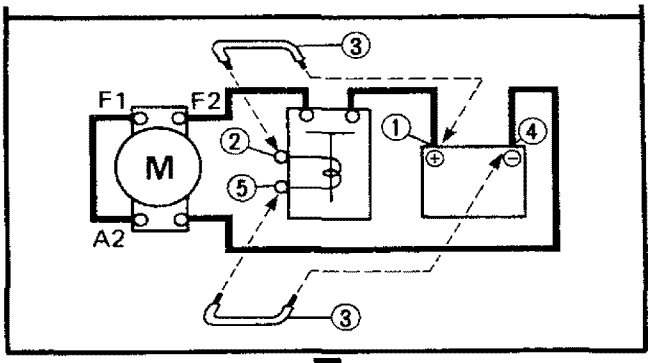
- **A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.**
- **This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.**

FAULTY → Repair and/or replace starter-generator.

OK ↓

6. Solenoid relay

- Disconnect the solenoid relay leads (Red/White, Black).
- Connect the battery positive terminal ① and solenoid relay lead (Red/White) ② using the jumper lead ③.
- Connect the battery negative terminal ④ and solenoid relay lead (Black) ⑤ using the jumper lead ③.
- Check the starter-generator operation.



FAULTY

Replace solenoid relay.

OK

7. Wiring connection

- Check the entire starting system for connections.
  Refer to "WIRING DIAGRAM" section.

THE BATTERY IS NOT CHARGED

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Accerator stop switch
5. Charging voltage
6. Charging coil resistance
7. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Hydrometer:
YU-03036, 90890-03036

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
12V

INCORRECT →

- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NOCONTINUITY →

Replace fuse.

CONTINUITY ↓

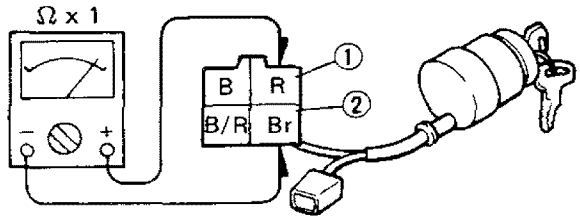
*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch.

Tester (+) Lead → Red Lead ①
Tester (–) Lead → Brown Lead ②



- Turn the main switch to "ON", "CHECK" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
OFF	X	○	X	○
CHECK	X	○	X	○
ON	○	X	X	○

○: Continuity X: Nocontinuity

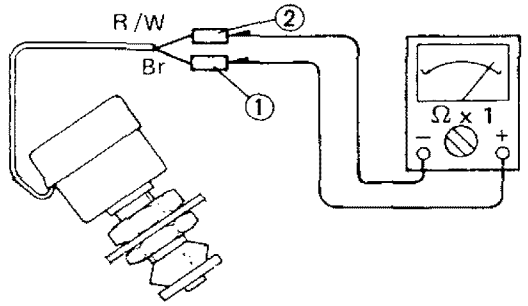
BAD CONDITION → Replace main switch.

GOOD CONDITION

4. Accelerator stop switch

- Disconnect the accelerator stop switch leads from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the accelerator stop switch.

Tester (+) Lead → Brown Lead ①
Tester (–) Lead → Red/White Lead ②



- Push the accelerator pedal.
- Check the accelerator stop switch for continuity.

Accelerator Pedal Position	Good Condition	Bad Condition		
Push	○	○	X	X
Free	X	○	○	X

○: Continuity X: Nocontinuity

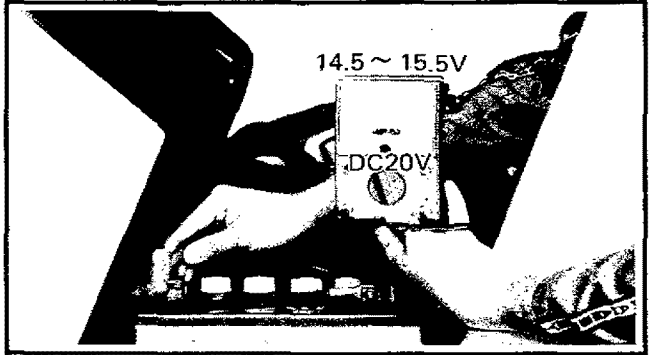
BAD CONDITION → Replace accelerator stop switch.

GOOD CONDITION ↓

5. Charging voltage

- Connect the Pocket Tester (DC20V) to the battery.

Tester (+) Lead → Battery Positive Terminal
Tester (—) Lead → Battery Negative Terminal



- Remove the drive belt.
- Start the engine and accelerate to about 2,500 r/min.
- Measure the charging voltage.

Charging Voltage:
14.5 ~ 15.5V at 2,500 r/min

MEETS SPECIFICATION → Replace battery.

OUT OF SPECIFICATION ↓

*

*

6. Charging coil resistance

- Disconnect the starter-generator thin leads (Red, Green).
- Connect the Pocket Tester (Ω x 1) to the starter-generator thin leads.

Tester (+) Lead → Red Lead
Tester (—) Lead → Green Lead

- Measure the charging coil resistance.

Charging Coil Resistance:
4.5 ~ 5.5Ω at 20°C (68°F)

OUT OF SPECIFICATION → Repair and/or replace starter-generator.

MEETS SPECIFICATION ↓

7. Wiring connection

- Check the entire charging system for connections.
  Refer to "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

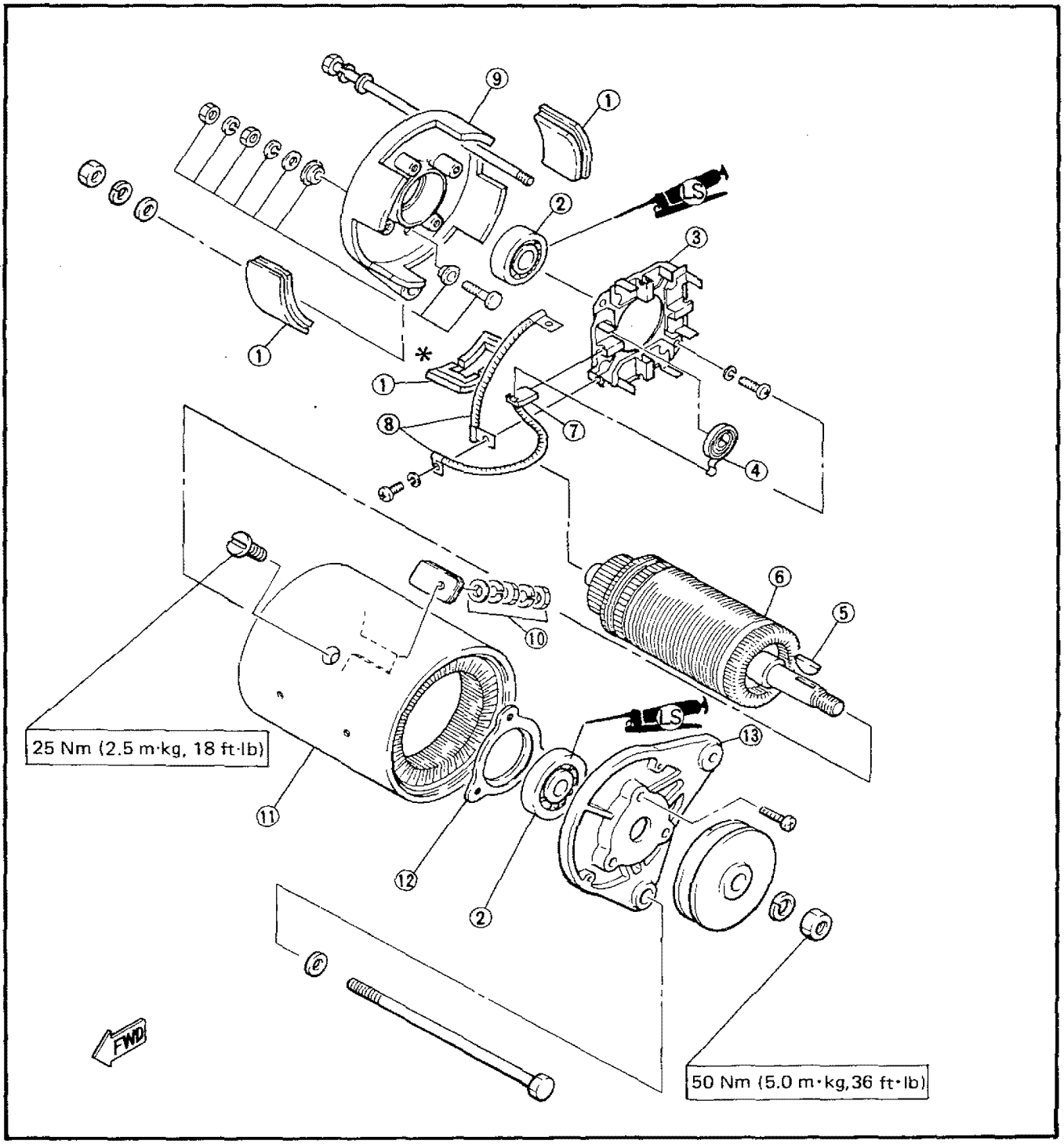
CORRECT ↓

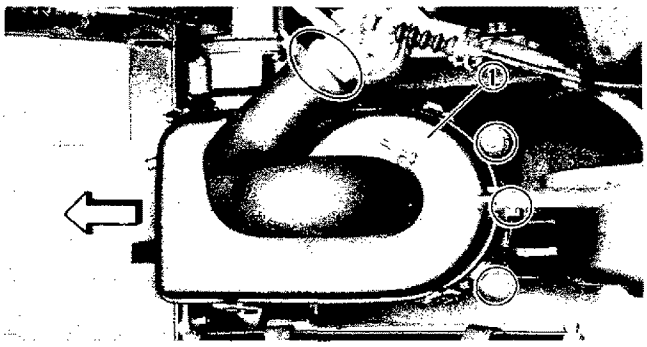
Repair and/or replace voltage regulator.

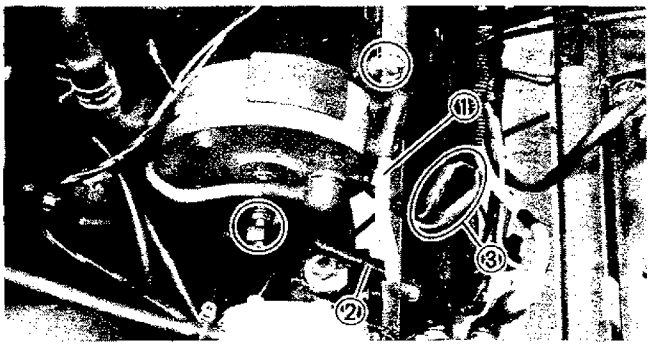
STARTER-GENERATOR

① Brush cover
② Bearing
③ Brush holder
④ Brush-spring
⑤ Woodruff key
⑥ Armature assembly
⑦ Brush
⑧ Lead wire
⑨ Bracket (Brush side)
⑩ Terminal
⑪ Yoke
⑫ Bearing holder
⑬ Bracket (Puller side)

NOTE:
* The drain slot in the brush cover having a drain slit must face toward downward.





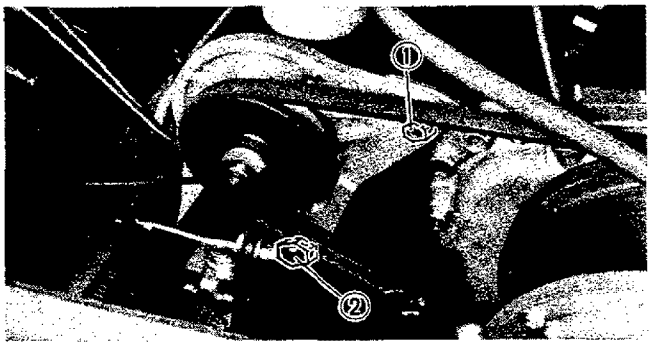


Removal

1. Open the seat cowling.
   Refer to CHAPTER 3 "COWLING BODY" section.
2. Disconnect the battery negative lead.
3. Remove:
   - Air cleaner case ①
     Refer to CHAPTER 3 "ENGINE BRACKET ADJUSTMENT" section.
4. Disconnect:
   - Starter-generator lead (Red) ①
   - Starter-generator lead (Black) ②
   - Starter-generator thin leads (Red, Green) ③
     From starter-generator.
5. Attach:
   - Primary Sheave Holder
     Onto the primary sheave.

	Primary Sheave Holder: YS-01880, 90890-01701

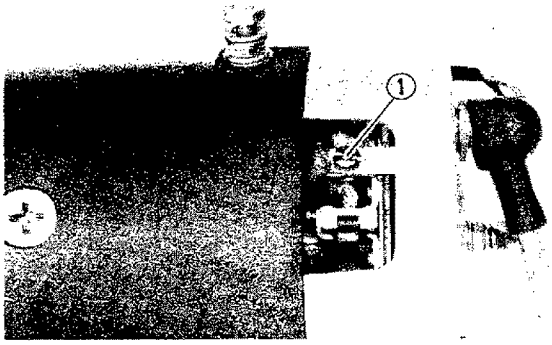
6. Loosen:
   - Pulley nut (starter-generator)



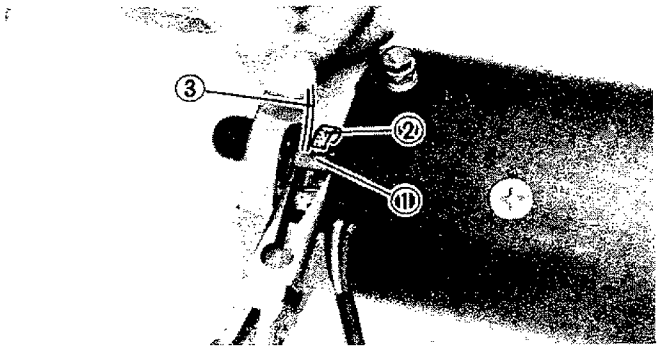
7. Remove:
   - Bolts and nuts ①, ②
   - V-belt
   - Starter-generator

Disassembly

1. Remove:
   - Pulley nut
   - Washer
   - Belt pulley
   - Woodruff key

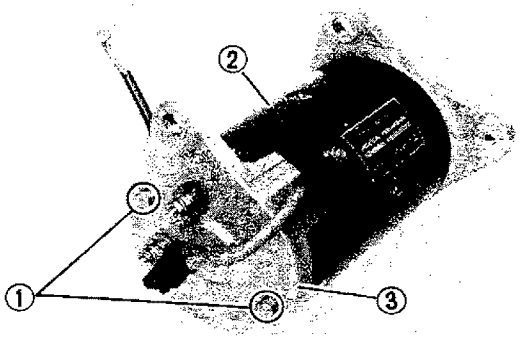


2. Remove:
   - Brush covers
   - Lead connecting screws ①

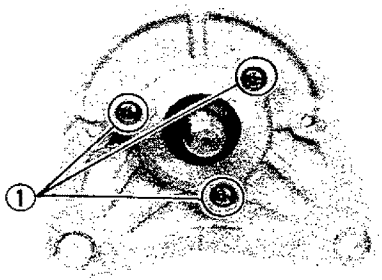


3. Remove:
   - Brush ①

   Remove it while pulling up the brush spring ② with a spring puller (made from steel-wire) ③.



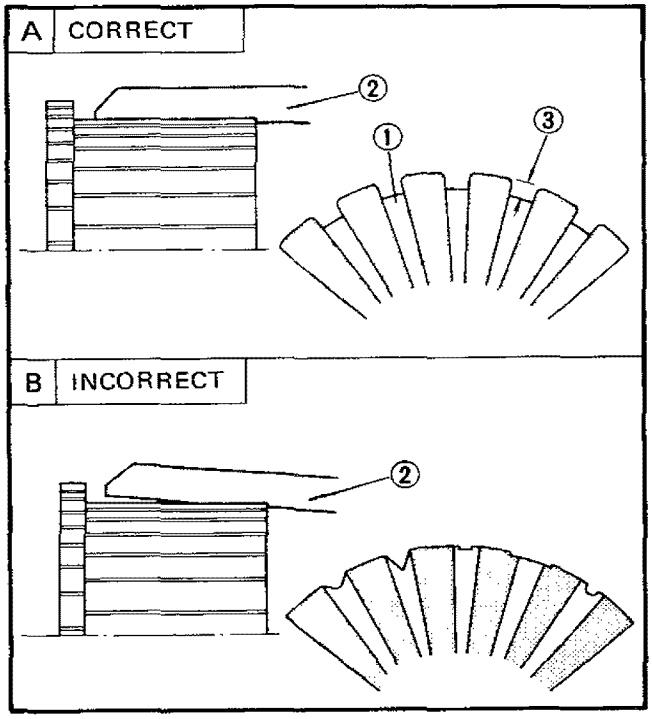
4. Remove:
   - Bolts ①
5. Separate the yoke ②, armature and bracket (brush side) ③.



6. Remove:
   - Screws ①
7. Separate the bracket (pulley side) and armature assembly.

Inspection

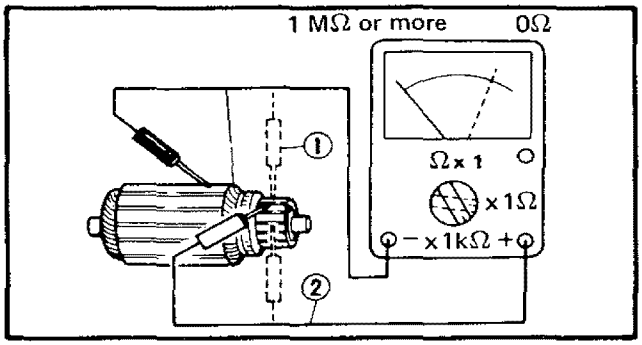
1. Clean the interior of the yoke and brackets with compressed air.
2. Inspect:
   - Outer surface (Yoke and brackets) Cracks/Damage → Replace.



6. Measure:
   - Mica ① (Insulation depth) (between commutator segments)
     Out of specification → Scrape mica to proper limits.
     Use a hacksaw blade ② that is ground to fit.

Depth of Insulation ③ :
Limit: 0.3 mm (0.012 in)

NOTE:
- The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.
- Carefully clean between the segments after the above steps.



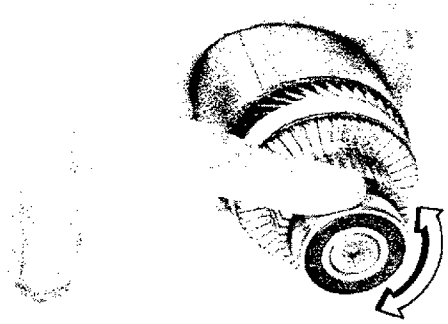
7. Inspect:
   - Armature coil (insulation/continuity)
     Defects → Replace starter motor.

Armature coil inspecting steps:
- Connect the Pocket Tester for continuity check ① and insulation check ② .
- Measure the armature coil resistances.

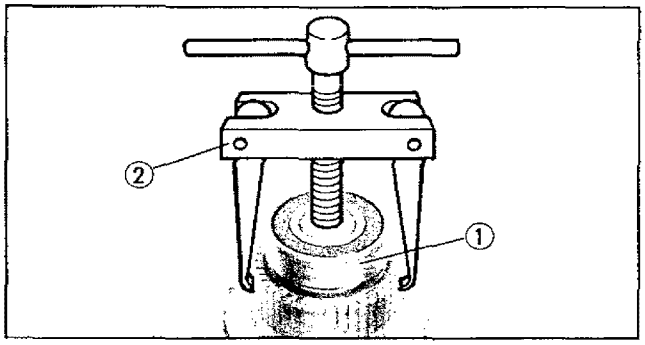
Pocket Tester:
YS-03112, 90890-03112

Armature Coil Resistance:
Continuity Check ① :
0Ω at 20°C (68°F)
Insulation Check ② :
More than 1MΩ at 20°C (68°F)

- If the resistance is incorrect, replace the starter-generator.



8. Check:
   - Bearing movement
     Rotate with fingers.
     Roughness/Wear → Replace.

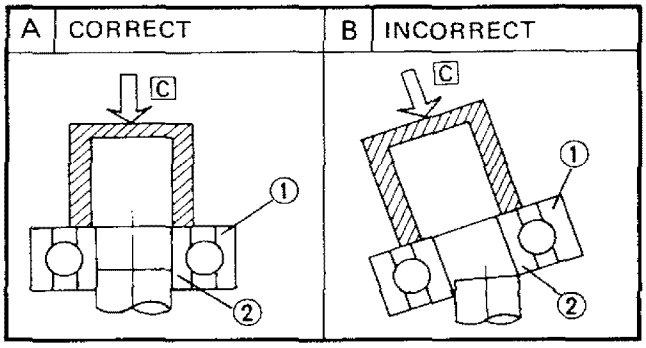


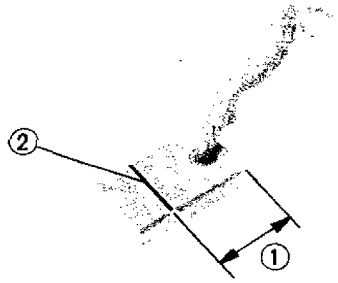
Bearing replacement steps:
- Remove the bearing ① with a bearing puller ② .
- Install the new bearing.

⚠ CAUTION:

Do not strike the outer race ① or balls of the bearing. Contact should be made only with the center race ② .

C PRESS

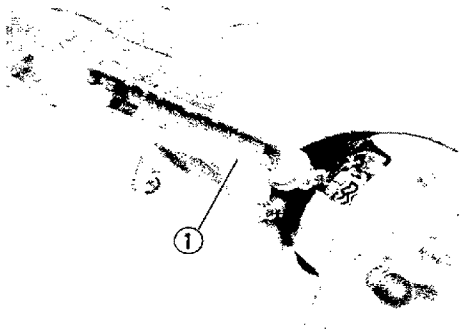




9. Measure:
   - Brush length
     Out of specification → Replace.

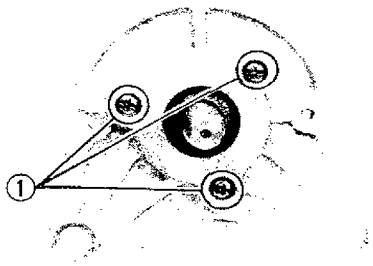
Wear Limit ① :
15 mm (0.59 in)

② Wear indicator



10. Assemble:
    - Motor
      Refer to "Assembly".
11. Measure:
    - Brush spring force
      Use a spring scale ① .
      Pull the scale until the brush spring just comes off the brush, check reading.
      Out of specification → Replace.

Brush Spring Force:
300 ~ 500 g (10.6 ~ 17.6 oz)



Assembly

Reverse the "Disassembly" procedure.

Note the following points.

1. When tightening the flush screws ① , hold the bearing retainer with a screw driver to align the screw holes.

Installation

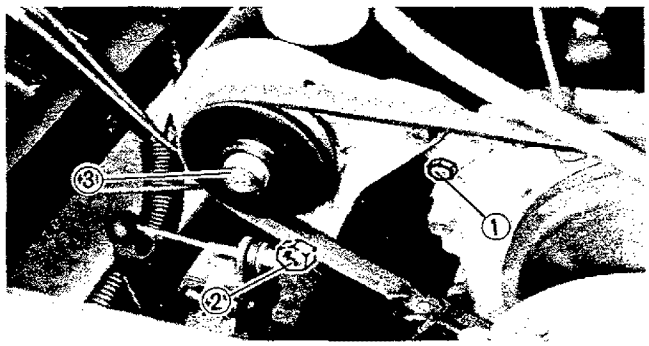
Reverse the "Removal" procedure.

Note the following points.

1. Adjust:
   - Starter belt tension

   Refer to CHAPTER 3 "STARTER BELT INSPECTION" section.

Starter Belt Tension:
8 ~ 12 mm/10 kg
(0.31 ~ 0.47 in/22 lb)



2. Tighten:
   - Bolts/Nuts

Belt Tension Bolt-Nut ① :
14 Nm (1.4 m·kg, 10 ft·lb)
Starter Holding Bolt-Nut ② :
53 Nm (5.3 m·kg, 38 ft·lb)

3. Tighten:
   - Pulley nut ③

   Tighten it while holding the primary sheave with Primary Sheave Holder.

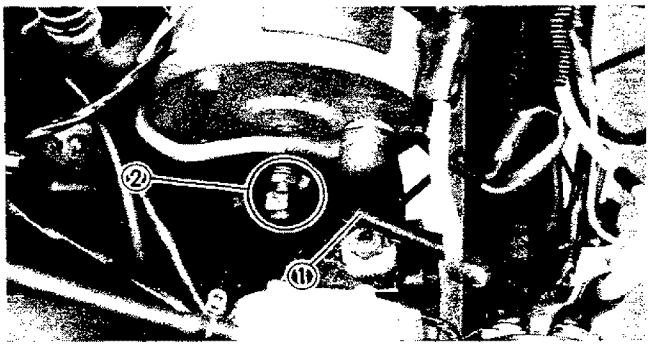
Pulley Securing Nut:
50 Nm (5.0 m·kg, 35 ft·lb)

Primary Sheave Holder:
YS-01880, 90890-01701

SOLENOID RELAY

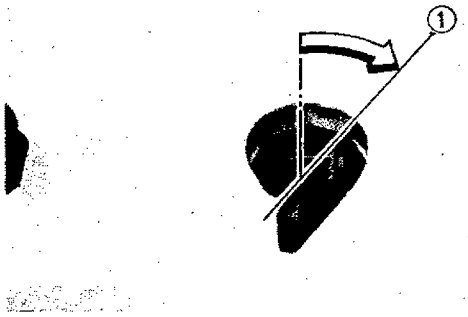
Function

The solenoid coil, when activated by closing the accelerator stop switch, closes the solenoid contacts, thus providing the starter with current. It also acts as a safety device, preventing the vehicle from abruptly starting when the main switch is operated.

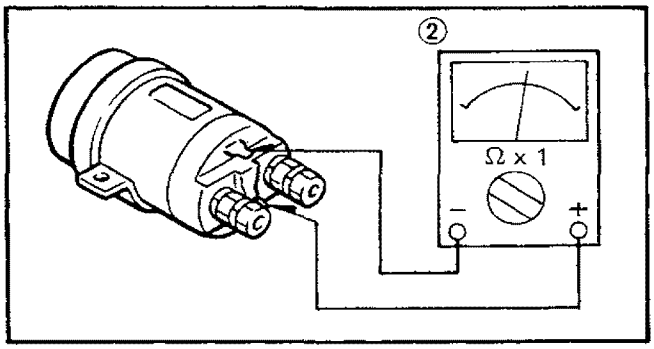


Inspection

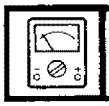
1. Open the seat cowling.
2. Disconnect:
   - Starter-generator lead (Black) ①
     From terminal A1 ② .
3. Insulate the lead end with tape.



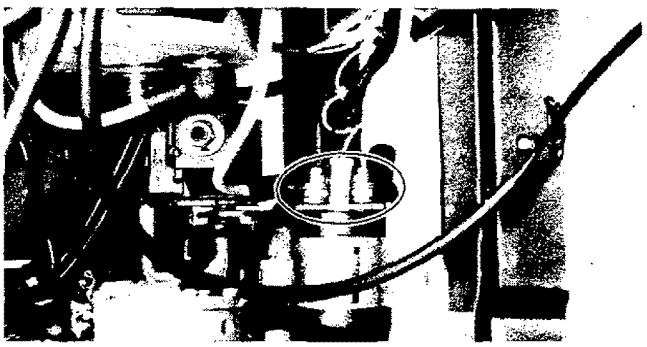
4. Turn the main switch to "ON" ① .
5. Check:
   - Solenoid relay (Clicking)
     Press the accelerator pedal to close the accelerator stop switch.
     Not clicking → Measure coil resistance.
6. Disconnect the solenoid coil leads.
7. Measure:
   - Coil resistance
     Use the Pocket Tester ② .
     Out of specification → Replace.
     Within specification → Inspect starting circuit.
     Refer to "TROUBLESHOOTING" section.



	**Pocket Tester:** YS-03112, 90890-03112

	**Solenoid Coil Resistance:** 6.3 ~ 7.7Ω at 20°C (68°F)

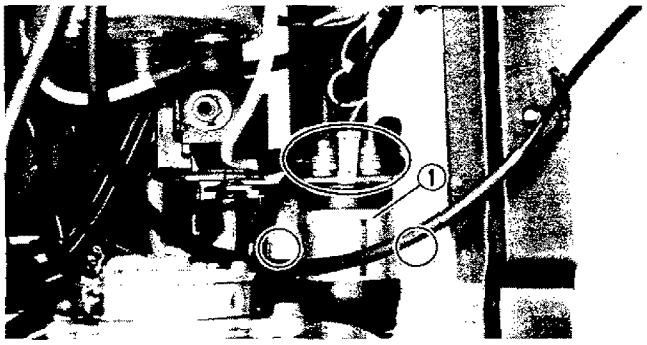
8. Check for continuity between the two contact posts with Pocket Tester, while the solenoid is activated. If there is no continuity, replace the relay.



9. Check:
   - Leads connection
     Looseness → Retighten/Reconnect.

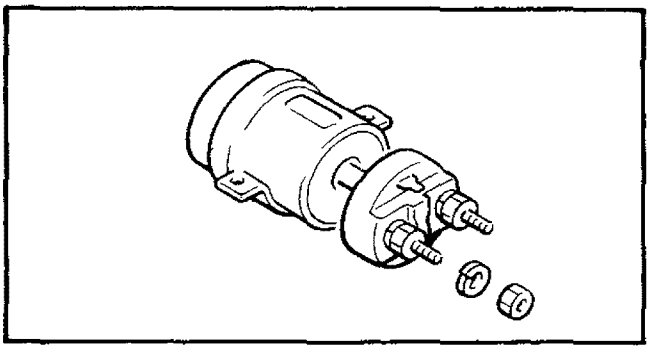
	Terminal Nut: **6 Nm (0.6 m·kg, 4.3 ft·lb)**

10. Connect the starter-generator lead.
11. Check:
    - Solenoid contacts
      Check temperature of the solenoid relay after maximum speed driving.
      Excessive heating → Replace relay.



Removal

1. Disconnect:
   - Battery negative lead
   - Solenoid leads
     From solenoid relay terminal.
2. Remove:
   - Solenoid relay ①



Disassembly

1. Remove:
   - Relay end cover

NOTE:

When removing end cover, heat the terminals until the solder has melted.

2. Remove:
   - Rubber cover
   - Plate
   - Collars

Inspection

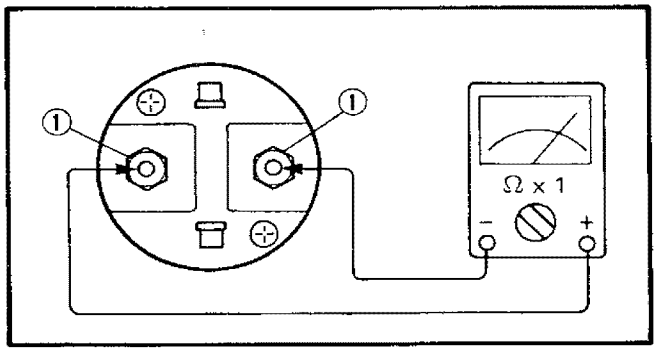
1. Inspect:
   - Contact plate (With shaft)
     Wear/Bends → Replace.
   - Plunger
     Wear/Damage → Replace.
   - Seal
     Wear/Damage → Replace.

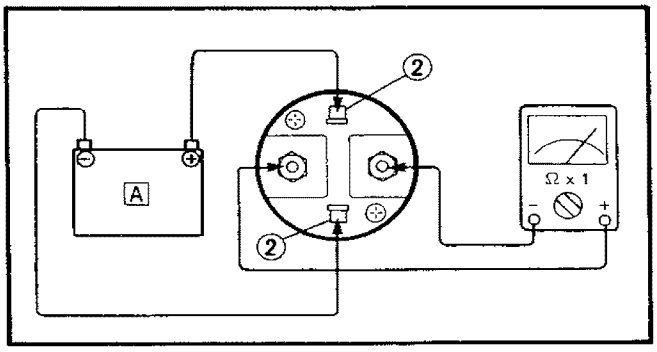
Assembly

Reverse the "Disassembly" section.
Note the following points.

1. Apply:
   - High-temperature grease
     Lightly grease to the solenoid relay body inside.
2. Install:
   - Contact plate (With shaft)
   - Spring
     From thread side of the shaft.
   - Plunger
3. Install:
   - Relay end cover

NOTE:
When installing the end cover, use the guide tubes over the wires.





4. Adjust:
   - Air gap (Plunger)

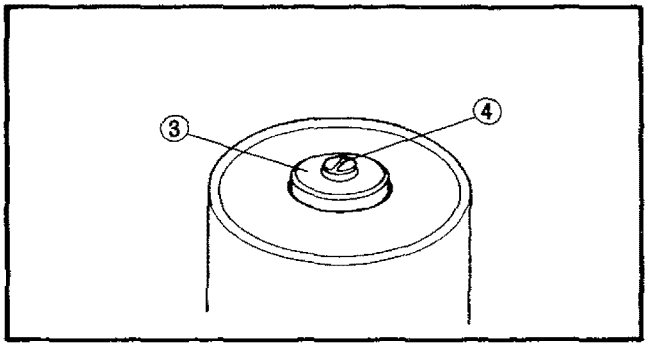
Air gap adjusting step:

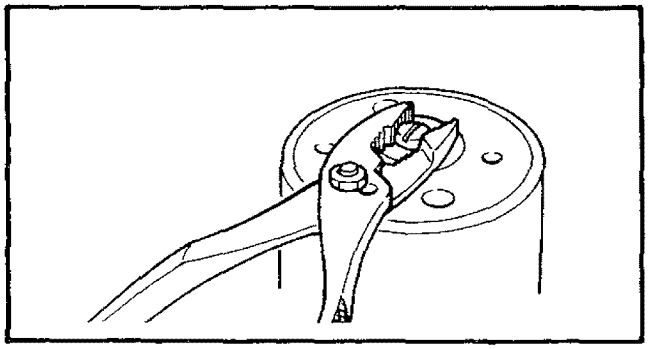
- Connect a Pocket Tester (Ω x 1) to main solenoid terminals ① .

NOTE:
Then confirm the tester shows ∞ Ω.

- Connect the battery to small solenoid terminals ② .

[A] For G2-A: 12V
For G2-E: 36V





- Hold the plunger ③.
- Turn the shaft ④ clockwise until the needle on the tester just starts to move. Then, turn the shaft another 1 ± 1/8 turn clockwise.

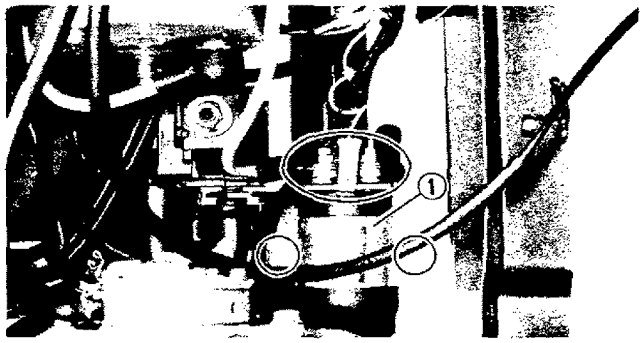
NOTE:
Then confirm the tester shows zero Ω.

- Disconnect the battery and Pocket Tester.

5. Stake the shaft screw slot by squeezing the collar around it.

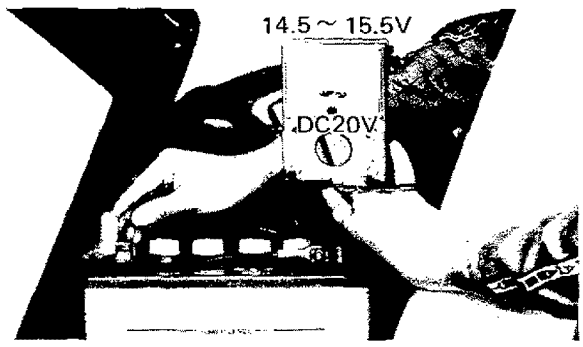
NOTE:
Be careful not to squeeze too tight.

6. Install:
   - Collars
   - Plate
   - Rubber cover



Installation
Reverse the "Removal" procedure.
Note the following points.

1. Install:
   - Solenoid relay ①
2. Connect:
   - Solenoid leads
   - Battery negative lead



VOLTAGE REGULATOR

Generator Voltage Inspection

1. Connect the Pocket Tester (DC20V) to the battery.

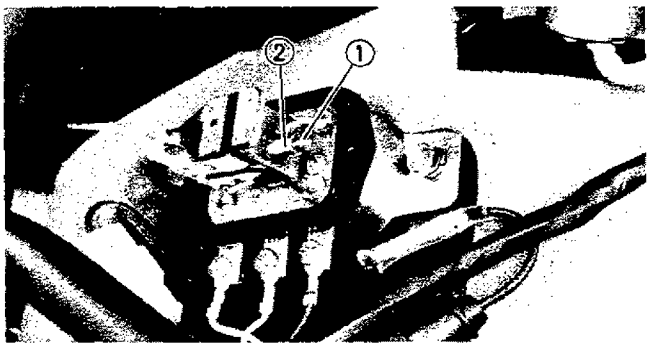
Pocket Tester:
YS-03112, 90890-03112

2. Remove:
   - Drive belt

   Refer to CHAPTER 3 "DRIVE BELT INSPECTION" section.
3. Start the engine and accelerate to about 2,500 r/min.
4. Measure:
   - Generator voltage

   Out of specification → Adjust.

	Generator Voltage: **14.5 ~ 15.5V**

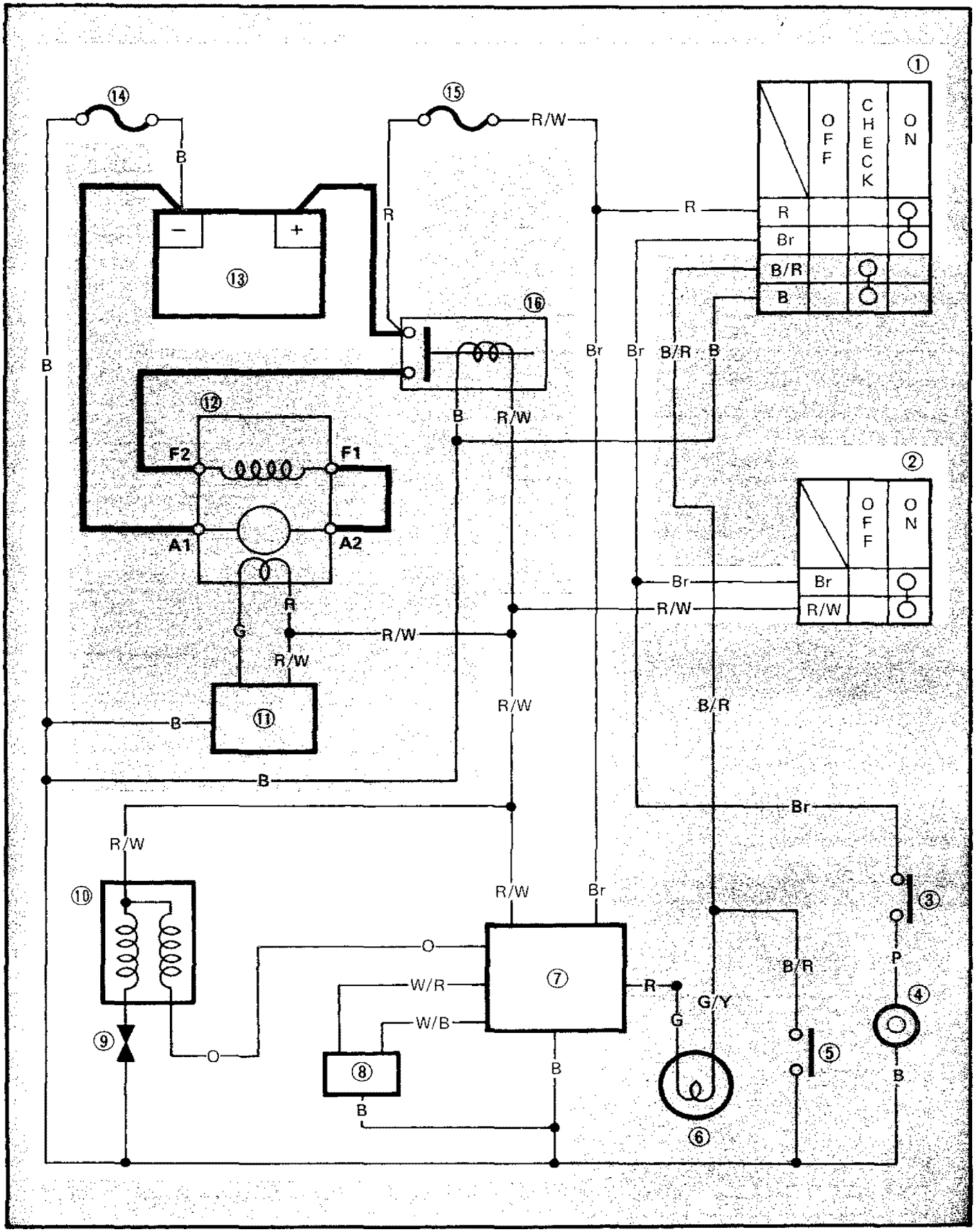


Voltage adjustment steps:
- Remove the regulator cover.
- Adjust a voltage by turning the adjusting screw ①.

To Raise	→	**Turn the adjusting screw ① clockwise.**
To Lower	→	**Turn the adjusting screw ① counterclockwise.**

- Tighten the Locknut ②.

IGNITION SYSTEM

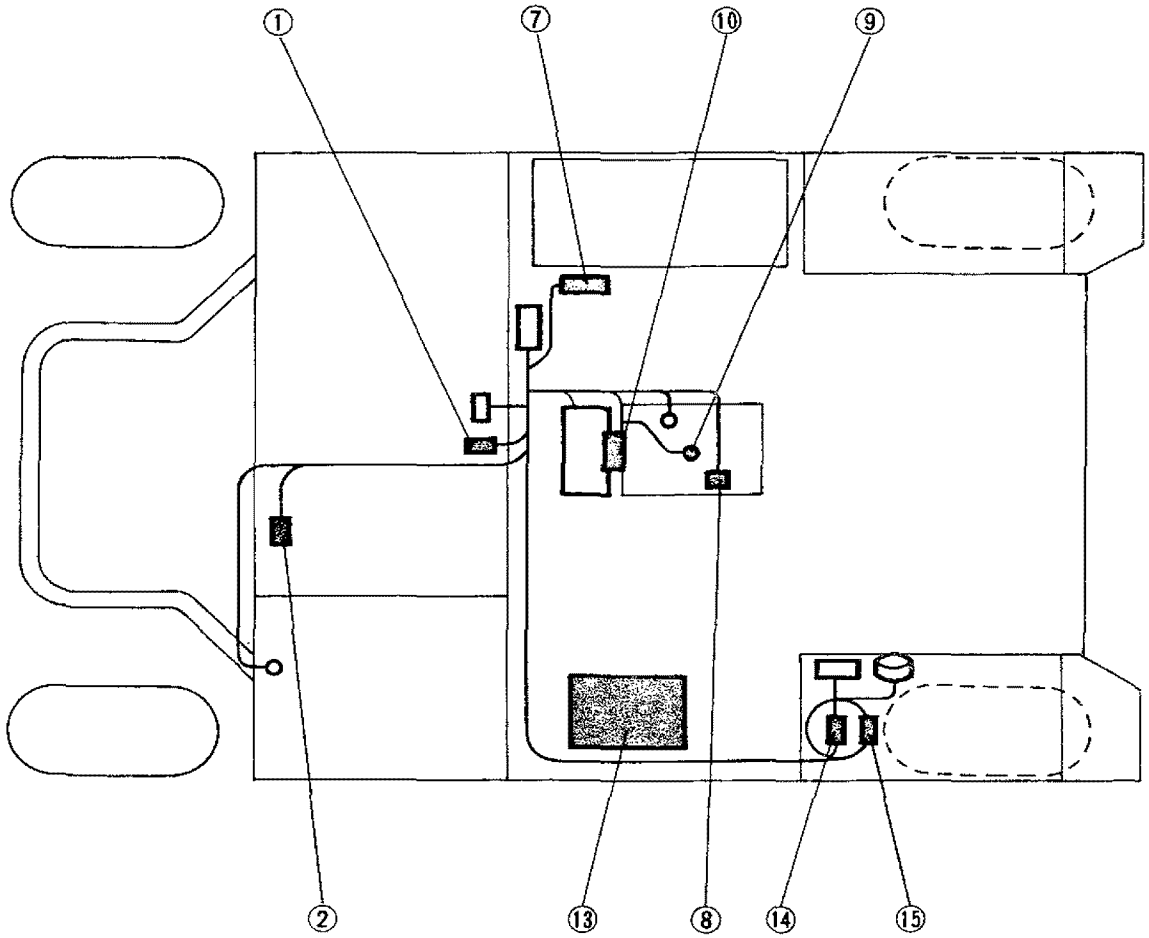


Aforementioned circuit diagram shows ignition circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

①Main switch
②Accelerator stop switch
⑦Ignitor unit
⑧Pickup coil
⑨Spark plug
⑩Ignition coil
⑬Battery (12V)
⑭Fuse "Negative" (10A)
⑮Fuse "Positive" (10A)



TROUBLESHOOTING

NO SPARK OR WEAR SPARK.

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Accelerator stop switch
5. Spark plug
6. Ignition spark gap
7. Spark plug cap resistance
8. Ignition coil resistance
9. Pickup coil resistance
10. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Dynamic Spark Tester:
YM-34487, 90890-03144

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
12V

INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remoye the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NOCONTINUITY →
Replace fuse.

CONTINUITY ↓

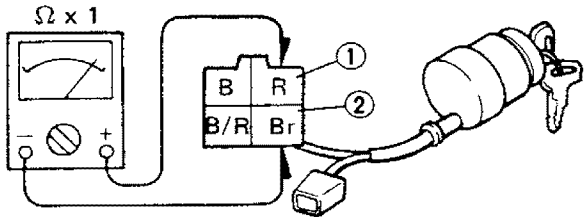
*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch.

Tester (+) Lead → Red Lead ①
Tester (—) Lead → Brown Lead ②



- Turn the main switch to "ON", "CHECK" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
OFF	X	○	X	○
CHECK	X	○	X	○
ON	○	X	X	○

○: Continuity X: Nocontinuity

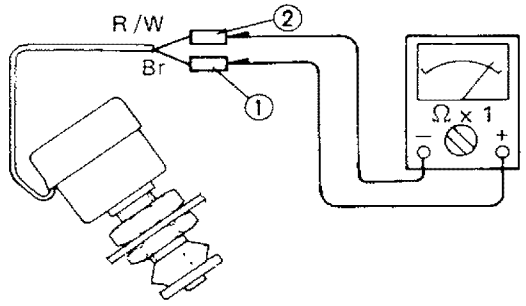
BAD CONDITION → Replace main switch.

GOOD CONDITION

4. Accelerator stop switch

- Disconnect the accelerator stop switch leads from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the accelerator stop switch.

Tester (+) Lead → Brown Lead ①
Tester (—) Lead → Red/White Lead ②



- Push the accelerator pedal.
- Check the accelerator stop switch for continuity.

Accelerator Pedal Position	Good Condition	Bad Condition		
Push	○	○	X	X
Free	X	○	○	X

○: Continuity X: Nocontinuity

BAD CONDITION → Replace accelerator stop switch.

GOOD CONDITION

5. Spark plug

- Check the spark plug condition.
- Check the spark type.
- Check the spark plug gap.
  Refer to CHAPTER 3 "SPARK PLUG INSPECTION" section.

Standard Spark Plug:
B5ES (NGK), N8 (CHAMPION)

Spark Plug Gap:
0.7 ~ 0.8 mm (0.028 ~ 0.032 in)

INCORRECT → Repair or replace spark plug.

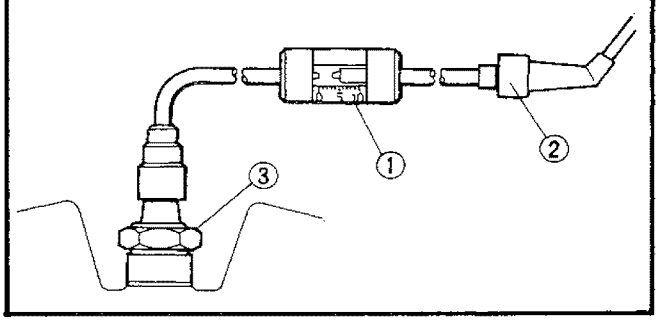
CORRECT

6. Ignition spark gap

- Disconnect the spark plug cap from spark plug.
- Connect the Dynamic Spark Tester ① as shown.

② Spark plug cap
③ Spark plug

- Turn the main switch to "ON".



- Check the ignition spark gap.
- Start engine, and increase spark gap until misfire occurs.

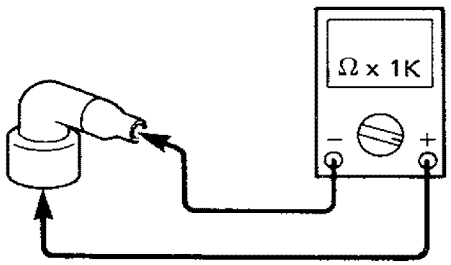
Minimum Spark Gap:
6.0 mm (0.24 in)

MEETS SPECIFICATION → Ignition system is good.

OUT OF SPECIFICATION OR NO SPARK

7. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the Pocket Tester (Ω x 1k) to the spark plug cap.



- Check the spark plug cap for specificated resistance.

Spark Plug Cap Resistance:
3.75 ~ 6.25 kΩ at 20°C (68°F)

OUT OF SPECIFICATION → Replace spark plug cap.

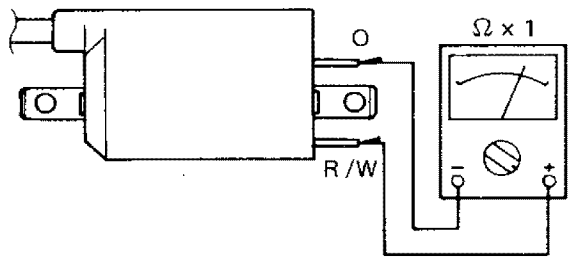
MEETS SPECIFICATION

8. Ignition coil resistance

- Disconnect the ignition coil coupler from the wireharness.
- Connect the Pocket Tester to the ignition coil.

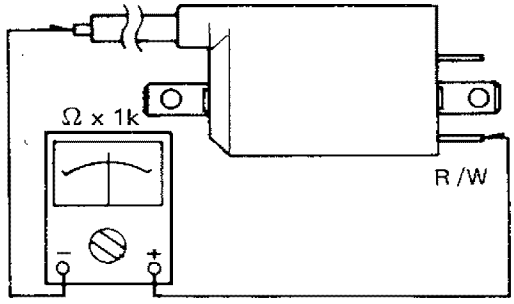
Primary Coil [A] :
Tester (+) Lead → Red/White Lead
Tester (–) Lead → Orange Lead

A



Secondary Coil [B] :
Tester (+) Lead → Red/White Lead
Tester (–) Lead → Spark Plug Lead

B



- Measure the primary and secondary coil resistances.

Primary Coil Resistance:
3.57 ~ 4.83Ω at 20°C (68°F)
Secondary Coil Resistance:
11.2 ~ 15.2 kΩ at 20°C (68°F)

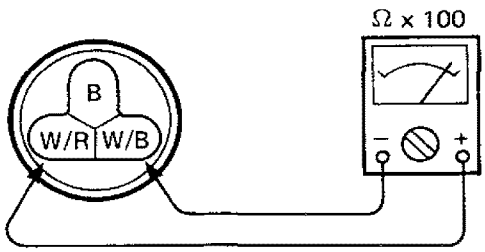
OUT OF SPECIFICATION → Replace ignition coil.

BOTH MEETS SPECIFICATIONS

9. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the Pocket Tester (Ω x 100) to the pickup coil terminal.

Tester (+) Lead → White/Red Lead
Tester (—) Lead → White/Black Lead



- Measure the pickup coil resistance.

Pickup Coil Resistance:
495 ~ 605Ω at 20°C (68°F)
(White/Red — White/Black)

OUT OF SPECIFICATION → Replace pickup coil.

MEET SPECIFICATION

10. Wiring connection

Check the entire ignition system for connections.
Refer to "WIRING DIAGRAM" section.

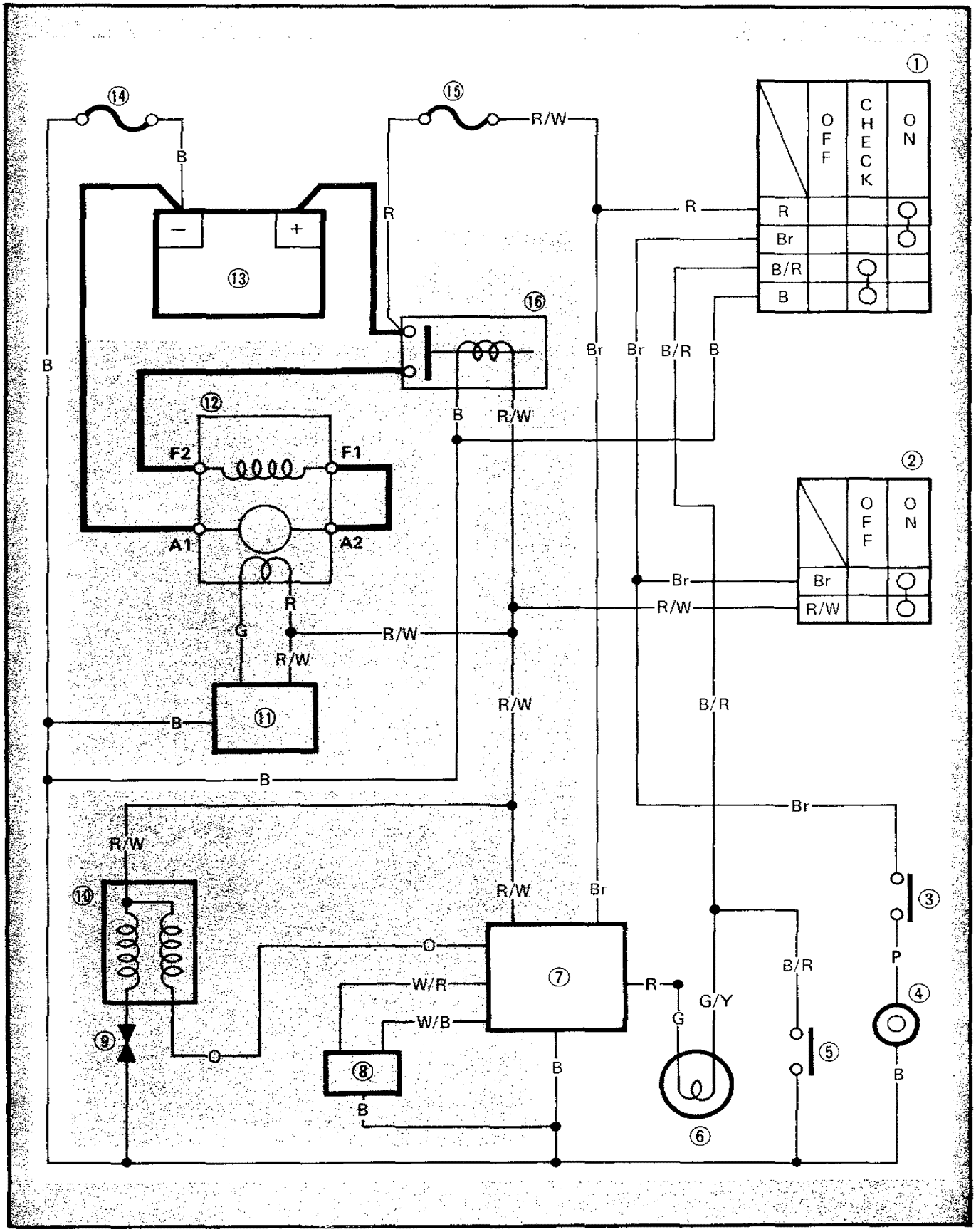
POOR CONNECTION → Correct.

CORRECT

Replace ignitor unit.

— MEMO —

SIGNAL SYSTEM

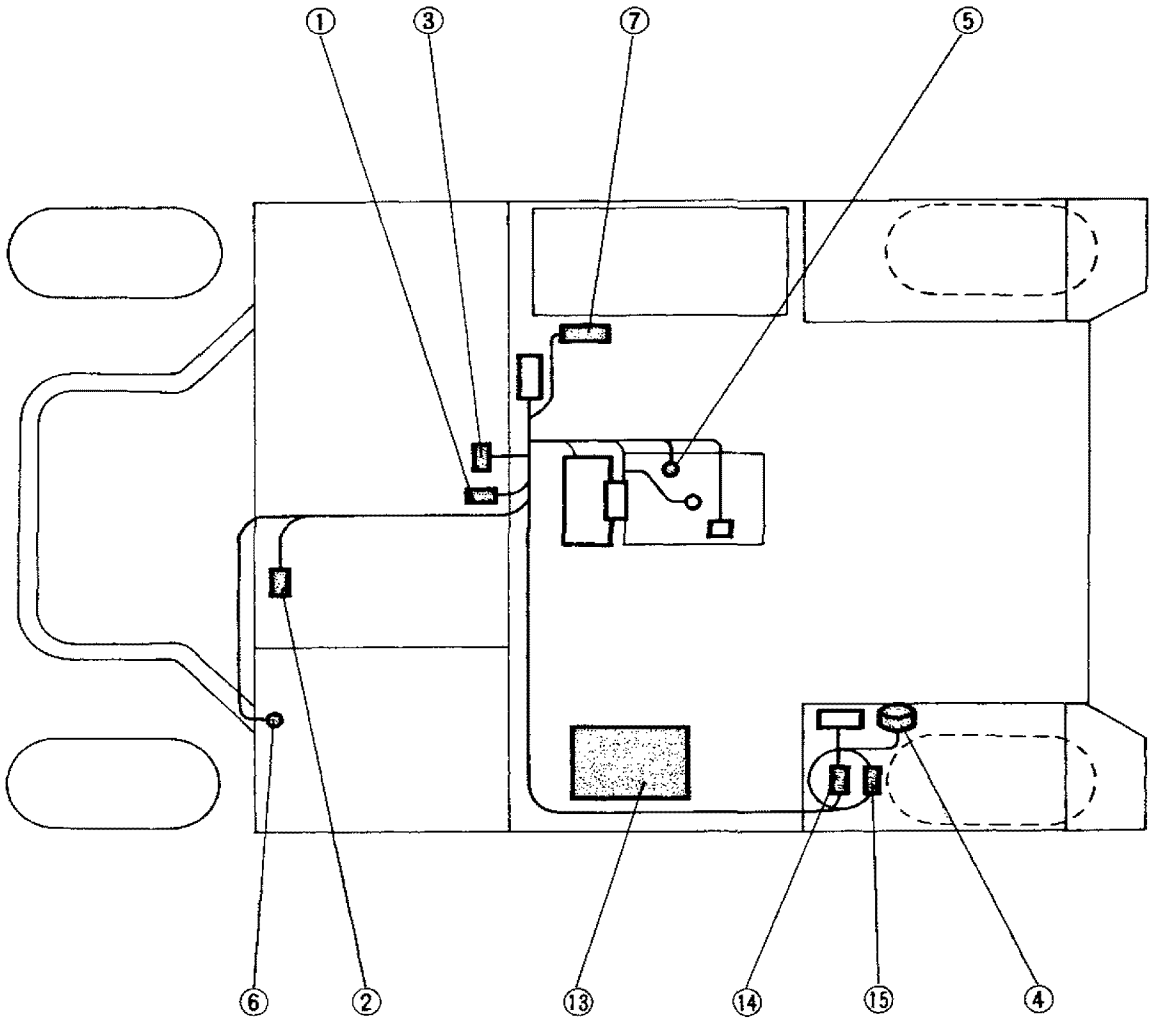


Aforementioned circuit diagram shows signal circuit in circuit diagram.

NOTE:

For the color codes, see page 8-2.

①Main switch
②Accelerator stop switch
③Buzzer switch
④Back-up buzzer
⑤Oil level switch
⑥Oil level indicator light
⑦Ignitor unit
⑬Battery (12V)
⑭Fuse "Negative" (10A)
⑮Fuse "Positive" (10A)



TROUBLESHOOTING

THE OIL LEVEL INDICATOR LIGHT DOES NOT COME ON

Procedure

Check;

1. Bulb
2. Bulb socket
3. Battery
4. Fuse
5. Main switch
6. Oil level switch
7. Wiring connection

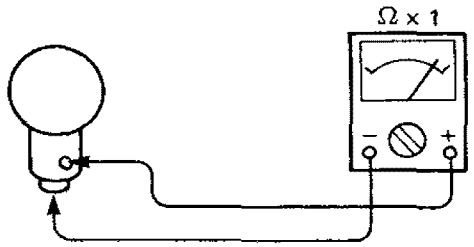
NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester: YS-03112, 90890-03112	**Hydrometer: YU-03036, 90890-03036**

1. Bulb

- Remove the bulb.
- Connect the Pocket Tester (Ω x 1) to the bulb.



- Check the bulb for continuity.

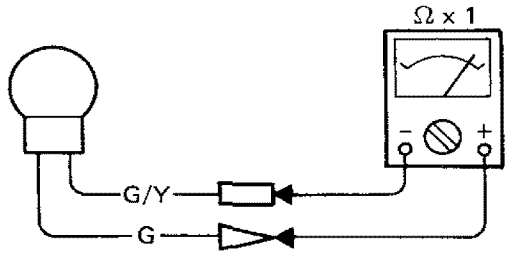
NOCONTINUITY → Replace bulb.

CONTINUITY ↓

2. Bulb socket

- Disconnect the indicator light leads (Green, Green/Yellow).
- Connect the Pocket Tester (Ω x 1) to the leads.

Tester (+) Lead → Green Lead
Tester (—) Lead → Green/Yellow Lead



- Check the bulb socket for continuity.

NOCONTINUITY → Replace bulb socket.

CONTINUITY ↓

3. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
12V

INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

4. Fuse:

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

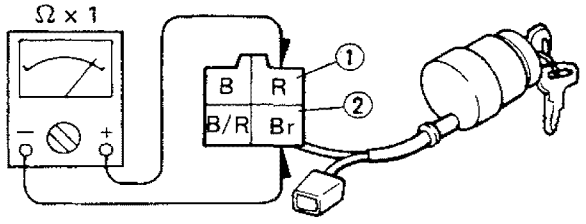
NOCONTINUITY → Replace fuse.

CONTINUITY ↓

5. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch.

Tester (+) Lead → Red Lead ①
Tester (—) Lead → Brown Lead ②



- Turn the main switch to "ON", "CHECK" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
OFF	X	○	X	○
CHECK	X	○	X	○
ON	○	X	X	○

○: Continuity X: Nocontinuity

BAD CONDITION → Replace main switch.

GOOD CONDITION

6. Oil level switch

- Disconnect the oil level switch lead.
- Connect the Pocket Tester (Ω x 1) to the oil level switch lead (Black/Red).

Tester (+) Lead → Black/Red Lead
Tester (—) Lead → Ground (Engine body)

- Turn the main switch to "CHECK".
- Check the oil level switch for continuity.
- Drain the engine oil.
  Refer to CHAPTER 3 "ENGINE OIL REPLACEMENT" section.
- Check the oil level switch for continuity.

Oil level	Good condition	Bad condition		
Full	X	X	○	○
Empty	○	X	X	○

○: Continuity X: Nocontinuity

BAD CONDITION → Replace oil level switch.

GOOD CONDITION

7. Wiring connection

- Check the entire signal system for connection.
  Refer to "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT

Replace ignitor unit.

THE BACK-UP BUZZER DOES NOT OPERATE

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Buzzer switch
5. Back-up buzzer
6. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Hydrometer:
YU-03036, 90890-03036

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
12V

INCORRECT →

- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NOCONTINUITY →

Replace fuse.

CONTINUITY ↓

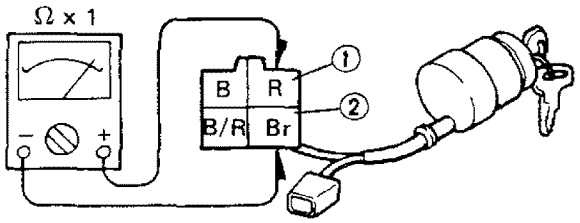
*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch.

Tester (+) Lead → Red Lead ①
Tester (—) Lead → Brown Lead ②



- Turn the main switch to "ON", "CHECK" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
OFF	X	○	X	○
CHECK	X	○	X	○
ON	○	X	X	○

○: Continuity X: Nocontinuity

BAD CONDITION

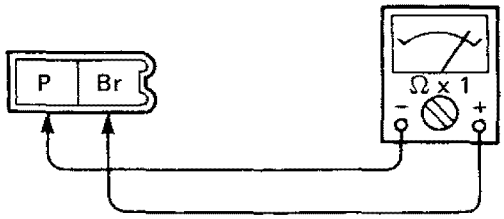
Replace main switch.

GOOD CONDITION

4. Buzzer switch

- Disconnect the buzzer switch coupler.
- Connect the Pocket Tester (Ω x 1) to the buzzer switch coupler.

Tester (+) Lead → Brown Lead
Tester (—) Lead → Pink Lead



- Turn the shift lever "FORWARD" and "REVERSE" position.
- Check the buzzer switch for continuity.

Lever Position	Good condition	Bad condition		
FORWARD	X	X	○	○
REVERSE	○	X	X	○

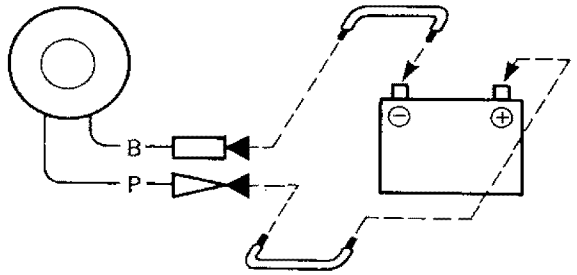
○: Continuity X: Nocontinuity

BAD CONDITION → Replace buzzer switch.

GOOD CONDITION

5. Back-up buzzer

- Disconnect the back-up buzzer leads.
- Connect a jumper leads to the back-up buzzer leads (Black, Pink) and battery.



- Confirm the back-up buzzer sounds.

FAULTY → Replace back-up buzzer.

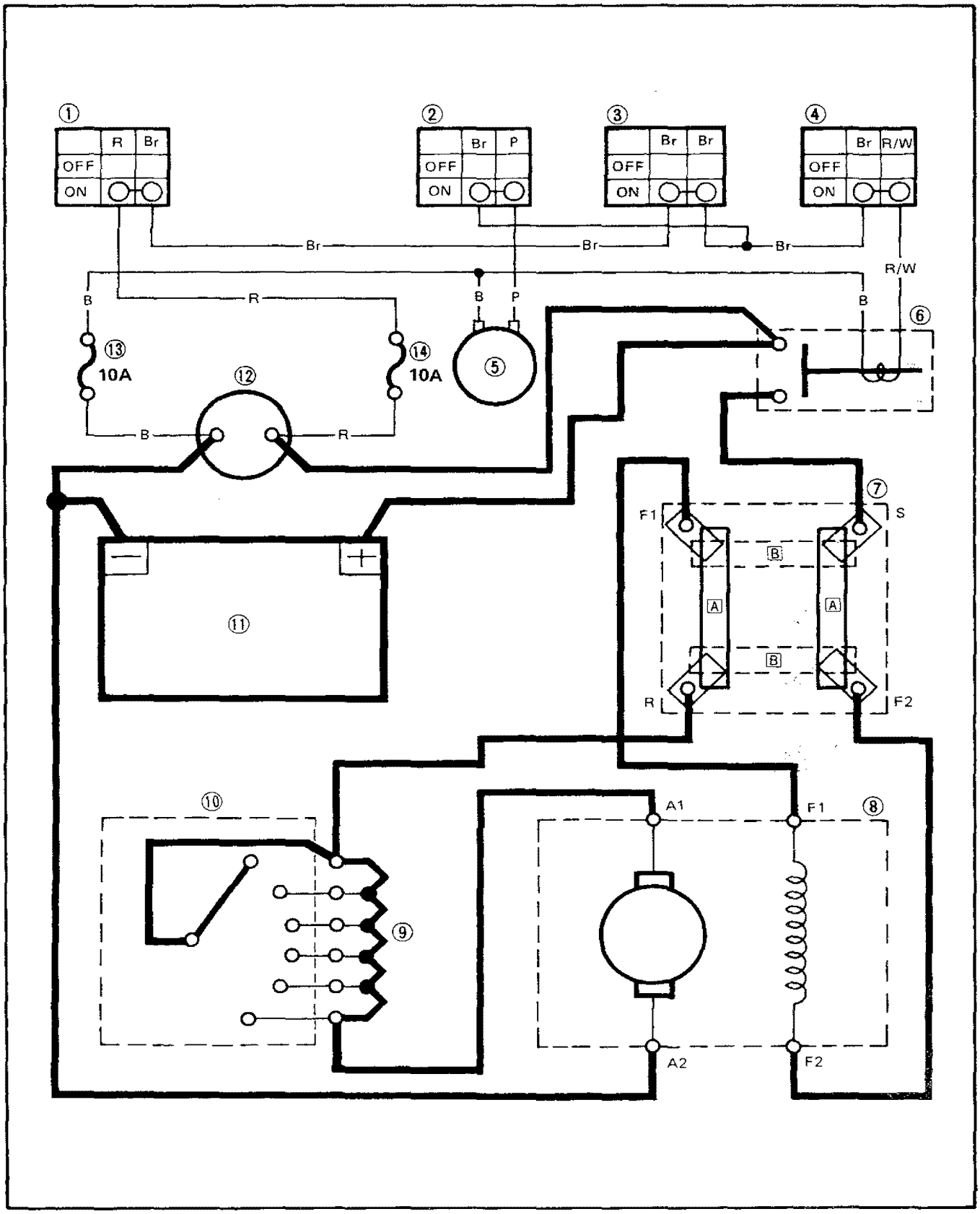
OK

6. Wiring connection

- Check the entire signal system for connection.
  Refer to "WIRING DIAGRAM" section.

ELECTRICAL (FOR G2-E)

G2-E CIRCUIT DIAGRAM

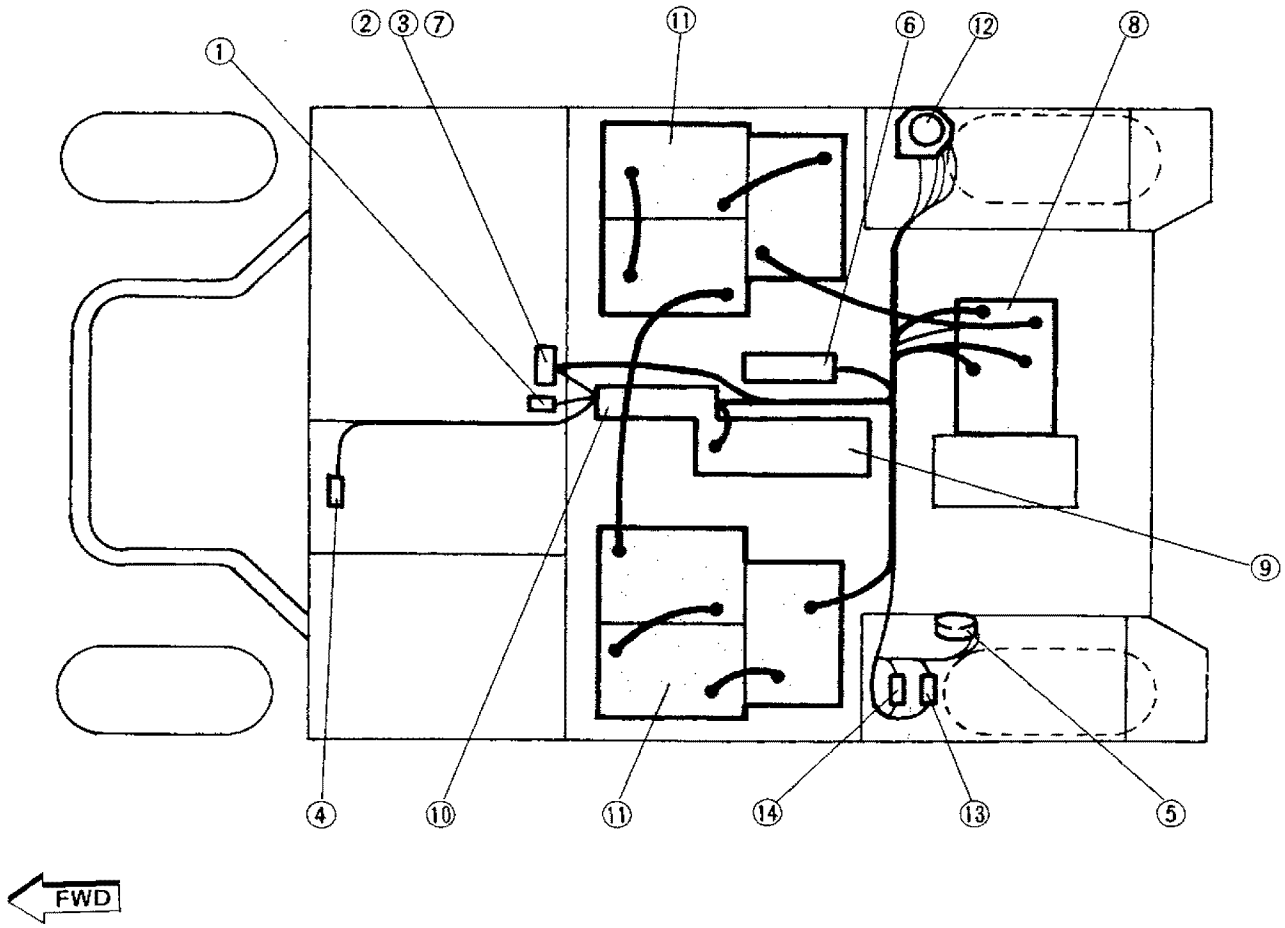


① Main switch
② Buzzer switch
③ Cut-off switch
④ Accelerator stop switch
⑤ Back-up buzzer
⑥ Solenoid relay
⑦ Forward-reverse switch
⑧ Traction motor
⑨ Resistor
⑩ Speed controller
⑪ Batteries (6V x 6)
⑫ Charging receptacle
⑬ Fuse "Negative" (10A)
⑭ Fuse "Positive" (10A)

A FORWARD (Contact position)
B REVERSE (Contact position)

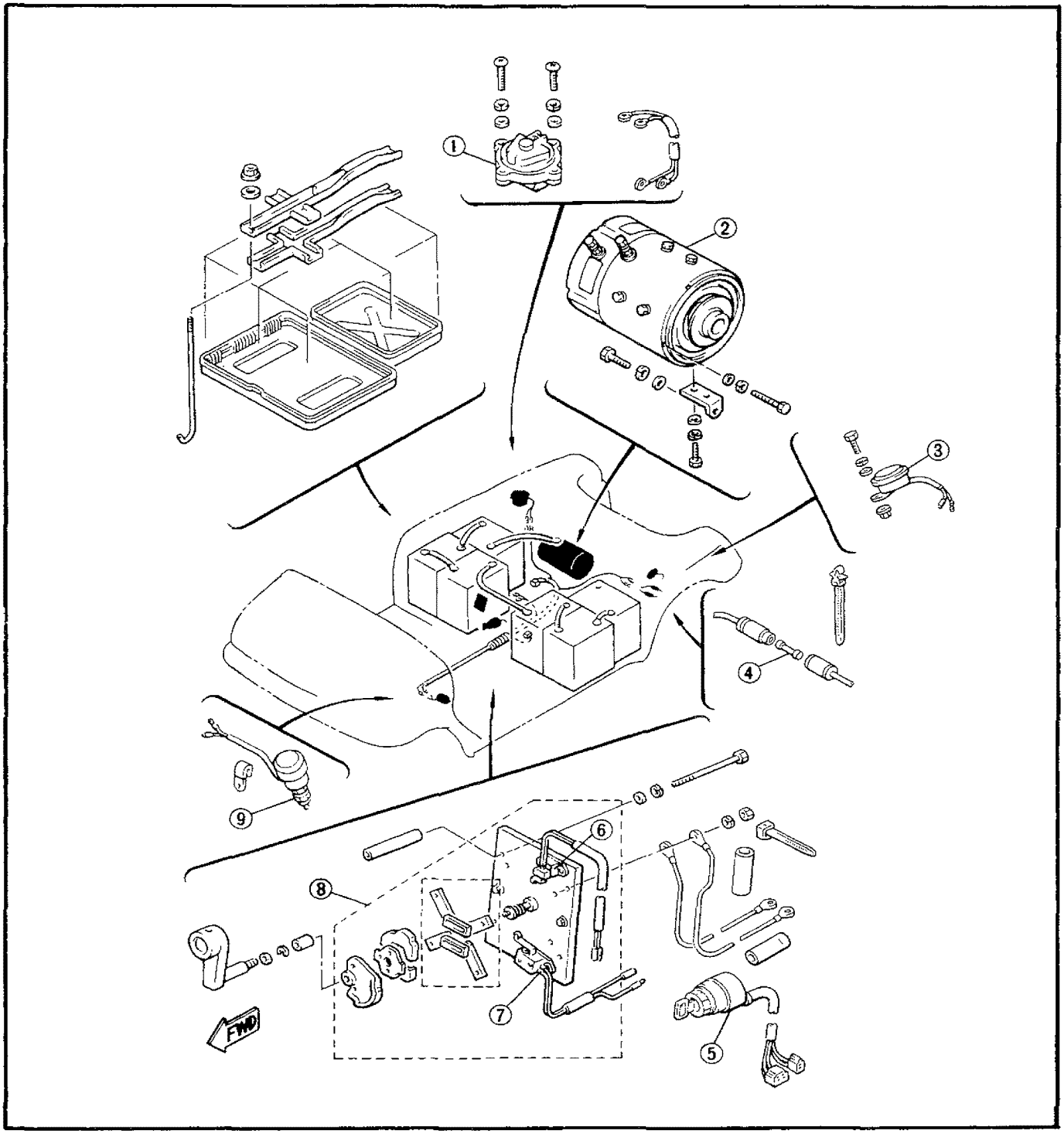
COLOR CODE

R	Red
R/W	Red/White
Br	Brown
P	Pink
B	Black



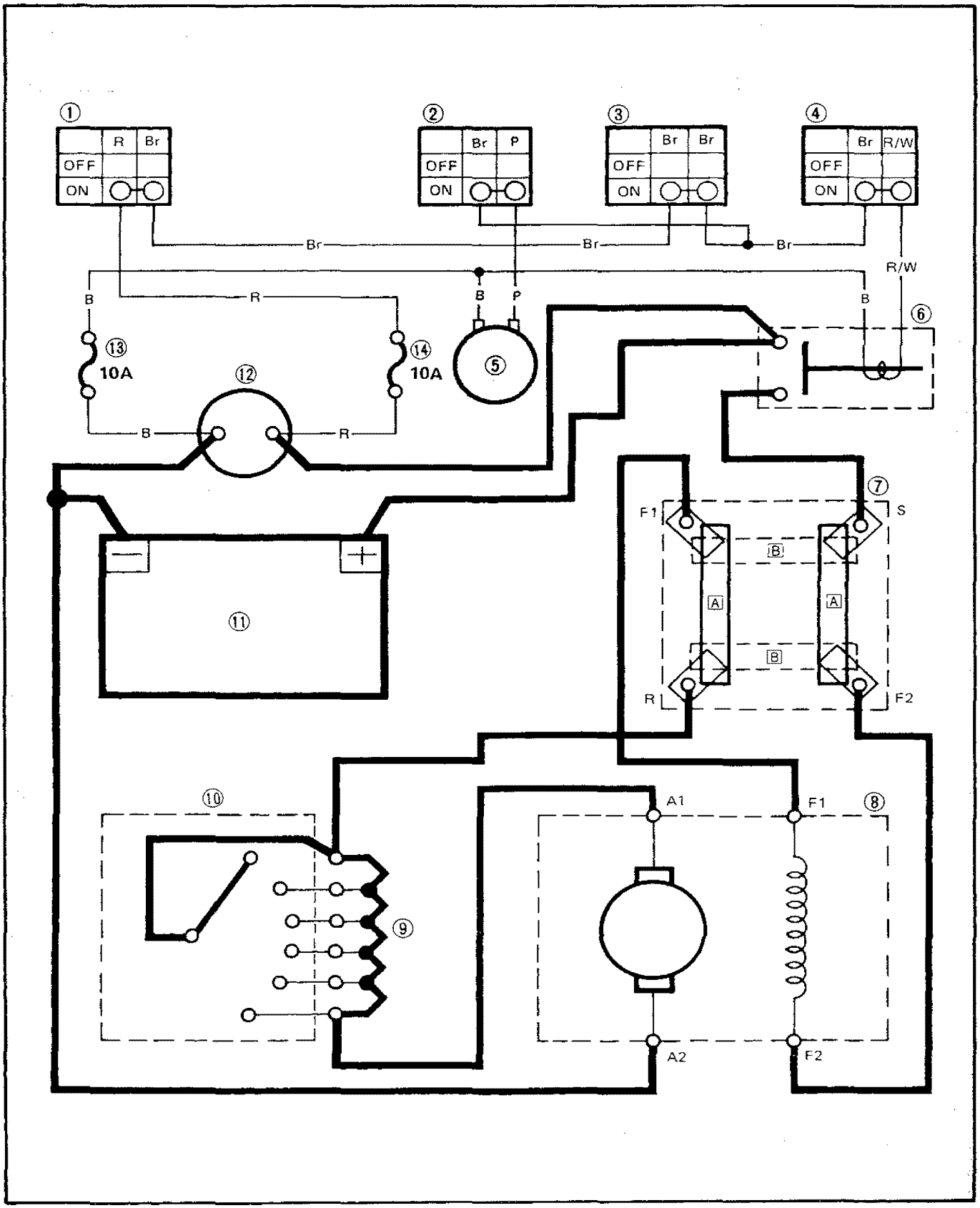
ELECTRICAL COMPONENTS

① Charge receptacle
② Traction motor
③ Back-up buzzer
④ Fuse
⑤ Main switch
⑥ Buzzer switch
⑦ Cut-off switch
⑧ Speed controller assembly
⑨ Accelerator stop switch



— MEMO —

STARTING AND RECHARGING SYSTEM

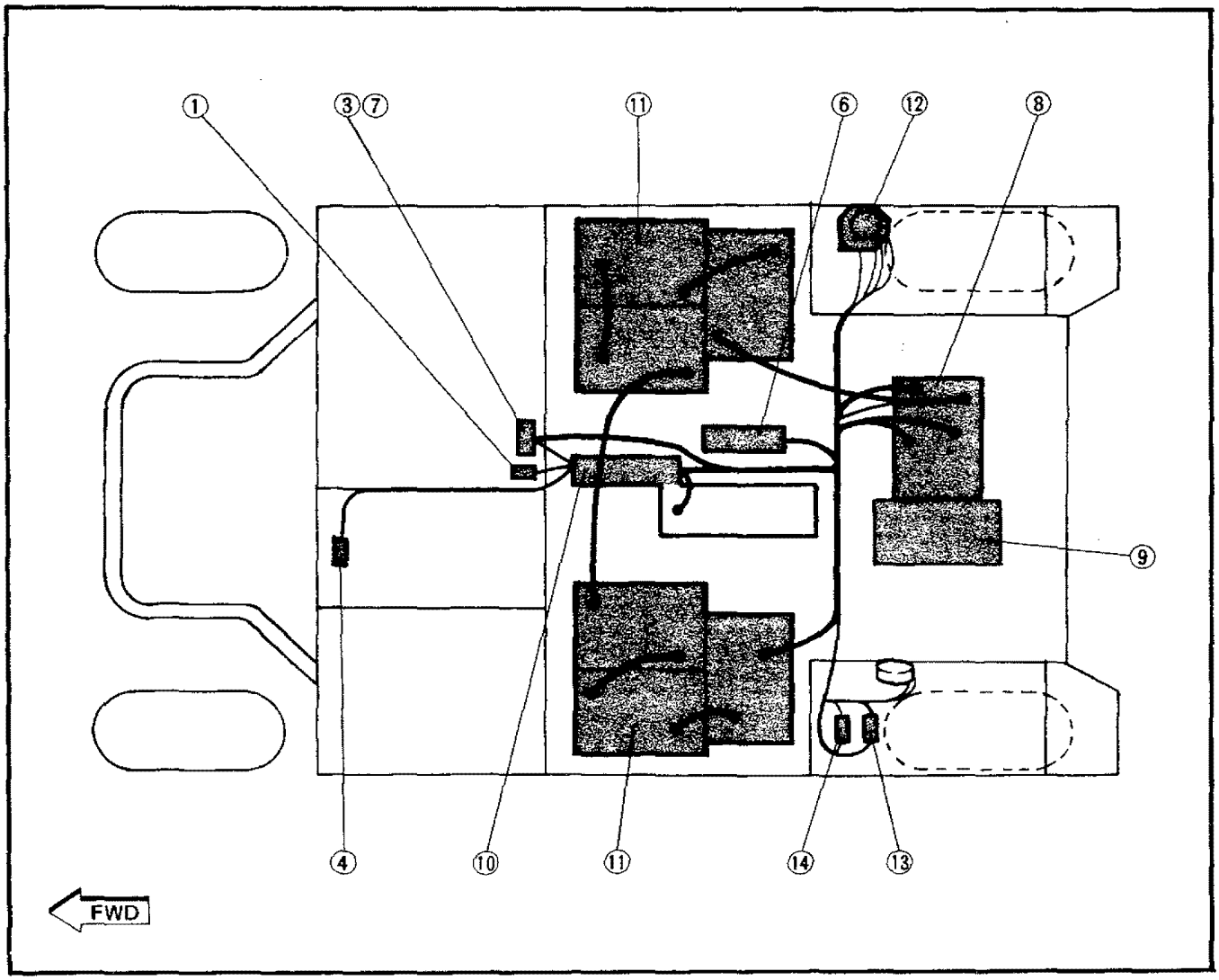


Aforementioned circuit diagram shows starting and recharging circuit in circuit diagram.

NOTE:

For the color codes, see page 8-44.

①Main switch
③Cut-off switch
④Accelerator stop switch
⑥Solenoid relay
⑦Forward-reverse switch
⑧Traction motor
⑨Resistor
⑩Speed controller
⑪Batteries (6V x 6)
⑫Charging receptacle
⑬Fuse "Negative" (10A)
⑭Fuse "Positive" (10A)



TROUBLESHOOTING

THE MOTOR DOES NOT TURN

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Cut-off switch
5. Accelerator stop switch
6. Forward-reverse switch
7. Resistor resistance
8. Traction motor
9. Solenoid relay
10. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Hydrometer:
YU-03036, 90890-03036

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
6V (x 6)

INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuses for continuity.

NOCONTINUITY →
Replace fuse.

CONTINUITY ↓

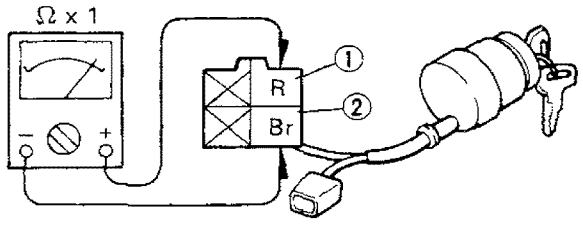
*

✳

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch coupler (Red, Brown).

Tester (+) Lead → Red terminal ①
Tester (—) Lead → Brown terminal ②



- Turn the main switch to "ON" and "OFF".
- Check the main switch for continuity.

BAD CONDITION → Replace main switch.

Switch position	Good condition	Bad condition		
ON	○	X	X	○
OFF	X	X	○	○

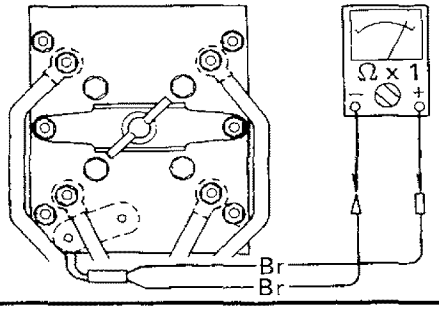
○: Continuity X: Nocontinuity

GOOD CONDITION

4. Cut-off switch

- Disconnect the cut-off switch lead.
- Connect the Pocket Tester (Ω x 1) to the cut-off switch leads (Brown, Brown).

Tester (+) Lead → Brown Lead
Tester (—) Lead → Brown Lead



- Turn the shift lever "FORWARD", neutral and "REVERSE" position.
- Check the cut-off switch for continuity.

Lever position	Good condition	Bad condition		
FORWARD OR REVERSE	○	X	X	○
Neutral	X	X	○	○

○: Continuity X: Nocontinuity

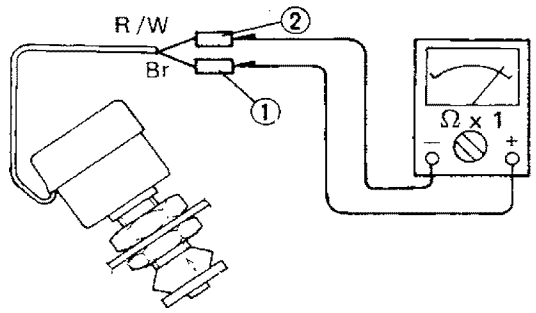
BAD CONDITION → Replace cut-off switch.

GOOD CONDITION

5. Accelerator stop switch

- Disconnect the accelerator stop switch leads.
- Connect the Pocket Tester (Ω x 1) to the accelerator stop switch leads (Brown, Red/White).

Tester (+) Lead → Brown Lead
Tester (–) Lead → Red/White Lead



- Push the accelerator pedal.
- Check the accelerator stop switch for continuity.

Accelerator pedal position	Good condition	Bad condition		
Push	○	X	X	○
Free	X	X	○	○

○: Continuity X: Nocontinuity

BAD CONDITION → Replace accelerator stop switch.

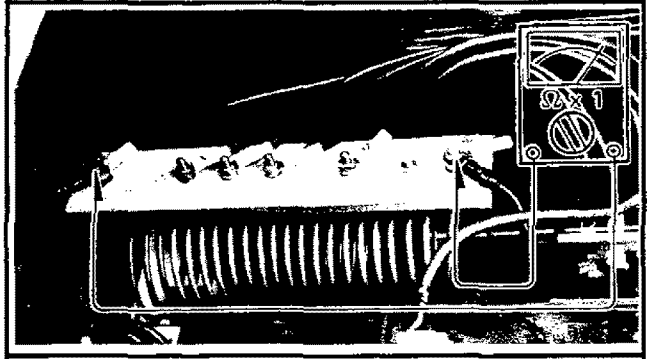
GOOD CONDITION

*

*

7. Resistor resistance

- Connect the Pocket Tester (Ω x 1) to the resister terminals.



- Measure the resistor resistance.

Resistor Resistance:
0.485 ~ 0.535Ω at 20°C (68°F)

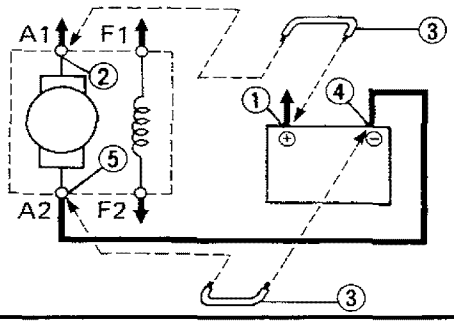
OUT OF SPECIFICATION

Replace resistor.

MEETS SPECIFICATION

8. Traction motor

- Connect the battery positive terminal ① and traction motor terminal A1 ② using the jumper lead ③*.
- Connect the battery negative terminal ④ and traction motor terminal A2 ⑤ using the jumper lead ③*.
- Check the traction motor operation.



*

⚠ WARNING:

- **A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.**
- **This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.**

FAULTY

Repair and/or replace traction motor.

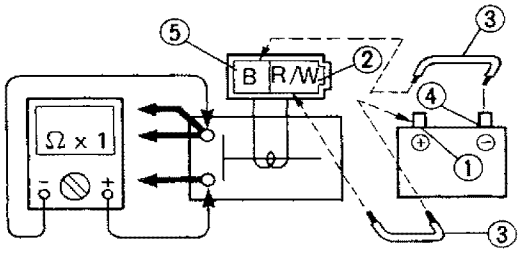
OK

*

*

9. Solenoid relay

- Connect the Pocket Tester (Ω x 1) to the solenoid relay terminals.
- Disconnect the solenoid relay coupler.
- Connect the battery positive terminal ① and solenoid relay lead (Red/White) ② using the jumper lead ③ *.
- Connect the battery negative terminal ④ and solenoid relay lead (Black) ⑤ using the jumper lead ③ *.



- Check the solenoid relay for continuity.

	Good condition	Bad condition		
Connect the battery	○	X	X	○
Disconnect the battery	X	X	○	○

○: Continuity X: Nocontinuity

BAD CONDITION

Replace solenoid relay.

GOOD CONDITION

10. Wiring connection

- Check the entire starting system for connections.
  Refer to "WIRING DIAGRAM" section.

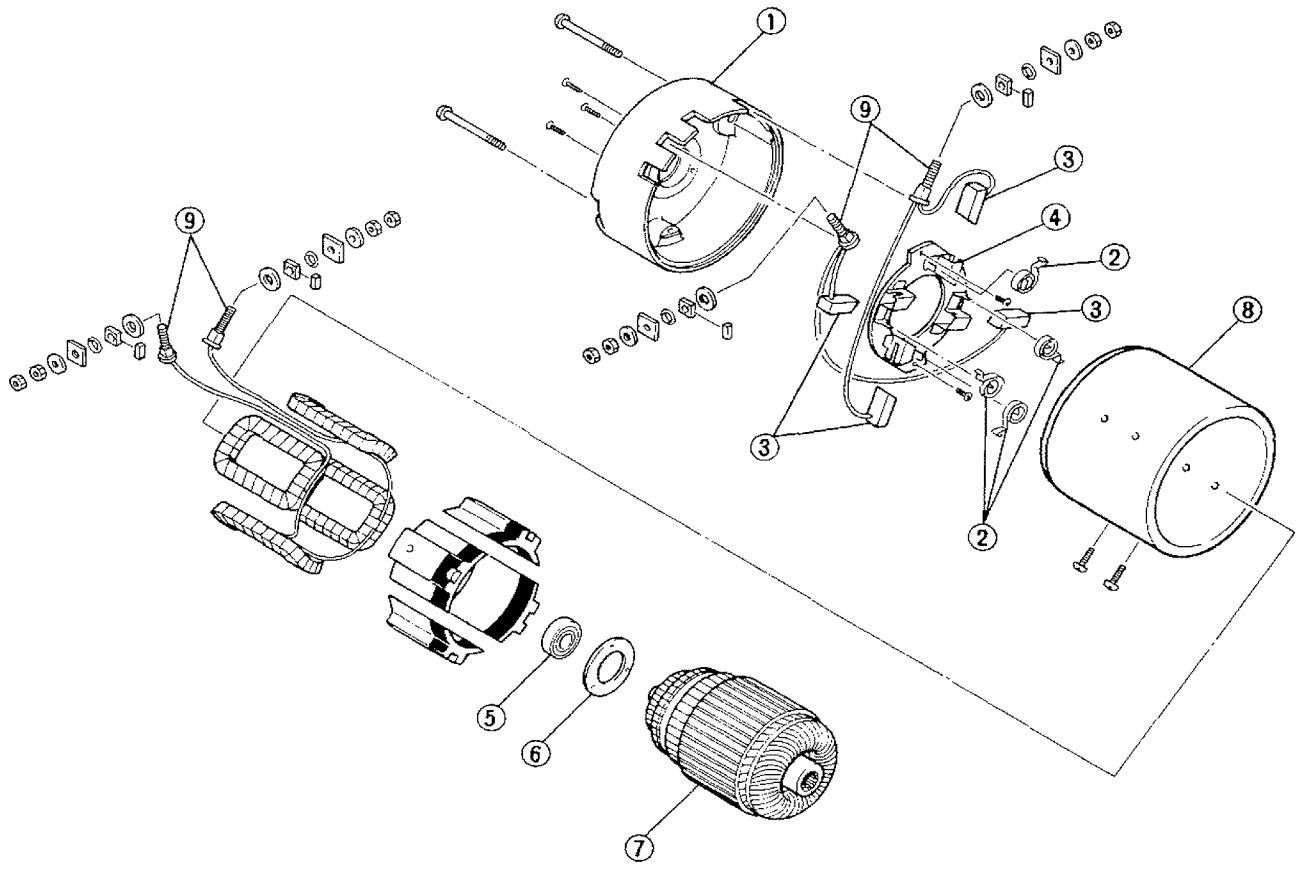
G.E. TRACTION MOTOR

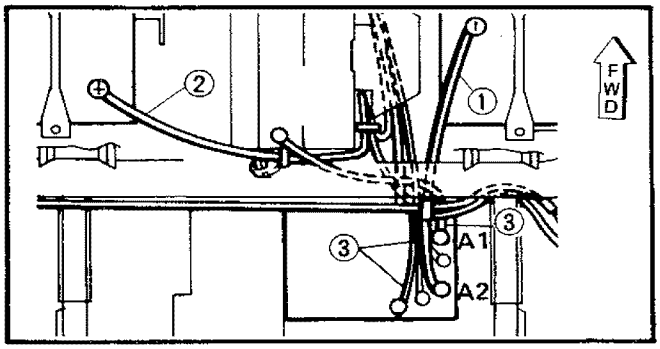
① Bracket
② Brush spring
③ Brush
④ Brush holder
⑤ Bearing
⑥ Bearing retainer
⑦ Armature assembly
⑧ Yoke
⑨ Terminal bolt

SPECIFICATIONS	
Model	5BC48JB845 und
Voltage	36V
Rated output KW/HP	2.2 KW/2.97 HP (30 min.)
Performance	
Current	77A
Voltage	36V
Torque	6.8 ~ 8.3 Nm (0.68 ~ 0.83 m•kg, 4.9 ~ 6.0 ft•lb)
Revolution	2,300 ~ 2,900 r/min
Weight	16.5 kg (36.4 lb)

A	BRUSH LENGTH: Limit: 14.5 mm (0.57 in) Standard: 34.3 mm (1.35 in)
B	BRUSH SPRING FORCE: New brush: 720 ~ 1,080 g (24.3 ~ 39.2 oz) Worn brush: 450 g (15.2 oz)

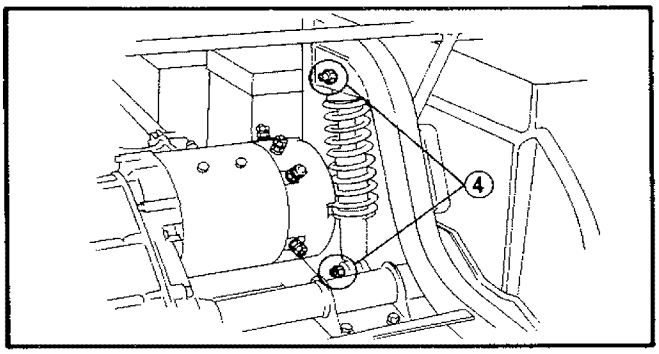
C	COMMUTATOR DIAMETER: Wear limit: 66.55 mm (2.62 in)

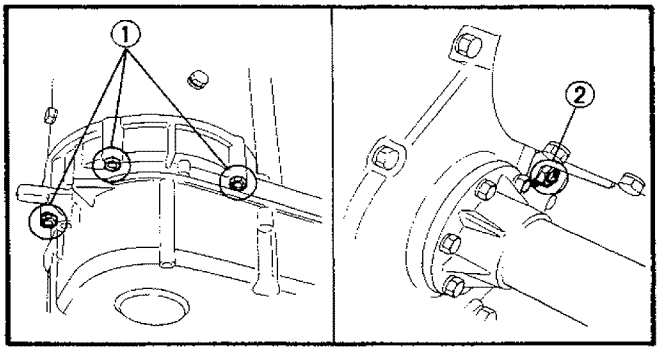




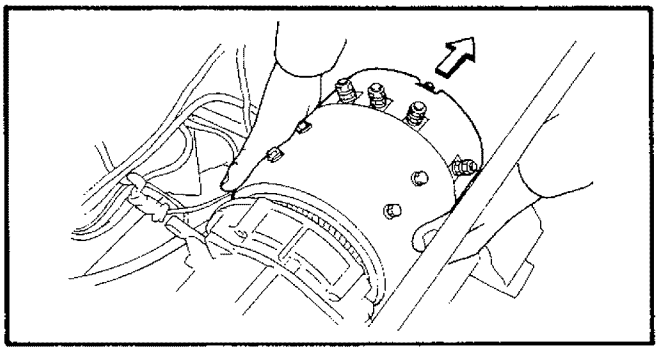
Removal

1. Remove:
   - Battery negative lead ①
     From the battery terminal (−) and motor terminal A2.
2. Disconnect:
   - Battery positive lead ②
     From the battery terminal (+).
   - All leads ③
     From the motor terminals A1, S1, and S2.
3. Remove:
   - Rear shock absorber assembly (Right)
     When removing the pivot bolts ④, support the rear end of the frame with a garage jack.

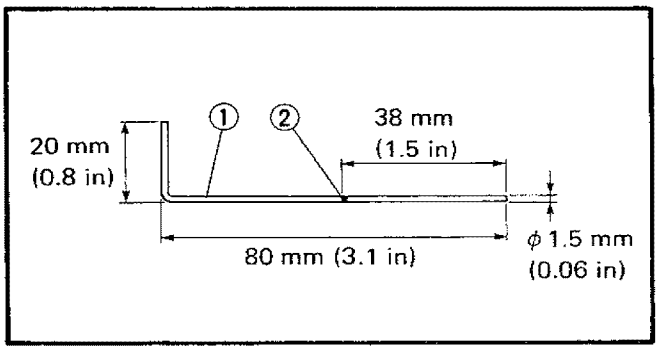




4. Remove:
   - Motor securing bolts (Upper) ①
   - Motor securing bolt (Lower) ②



5. Remove:
   - Traction motor



6. Check:
   - Brush length

Brush length checking steps:

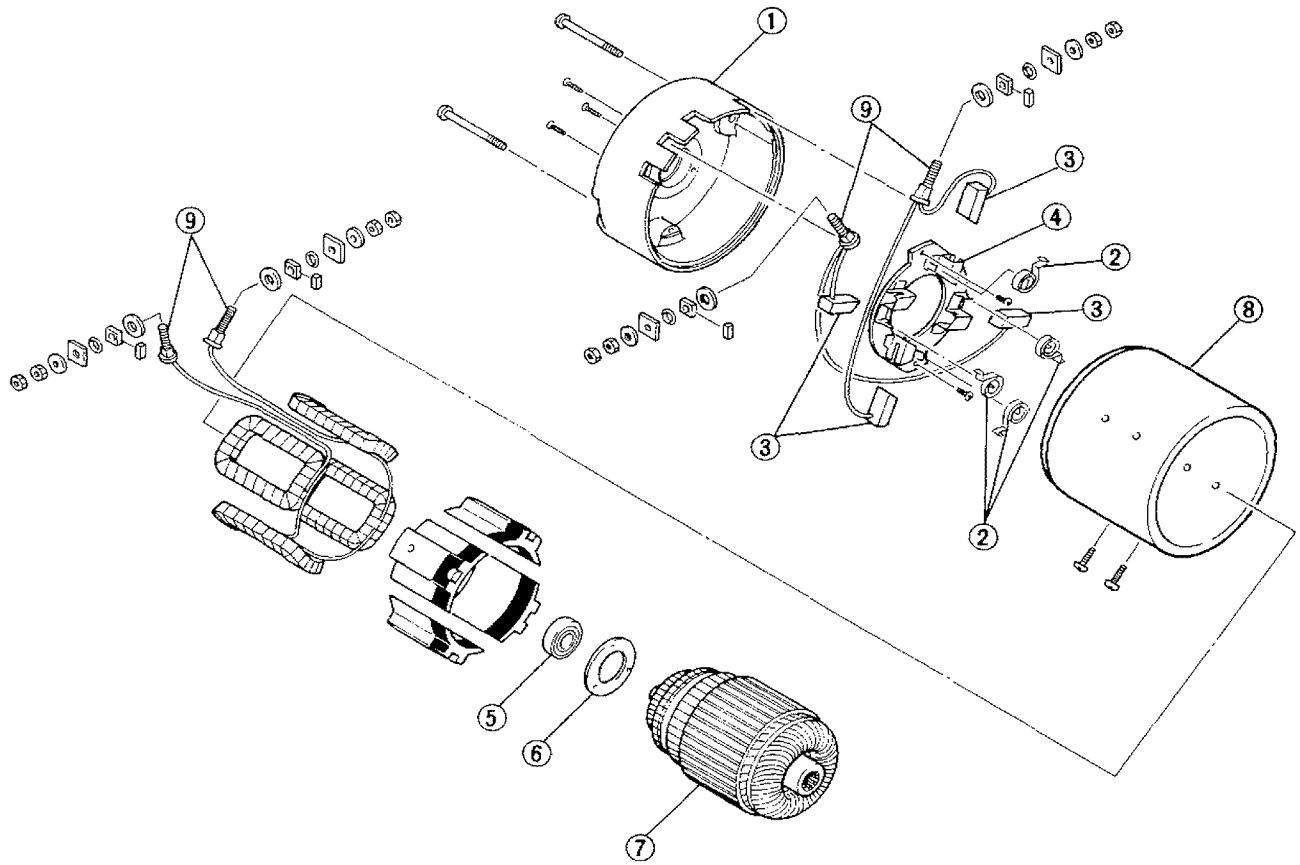
- Make the tool ① to check the brush length as the left illustration shows. The steel-wire should be ϕ 1.5 mm (0.06 in).

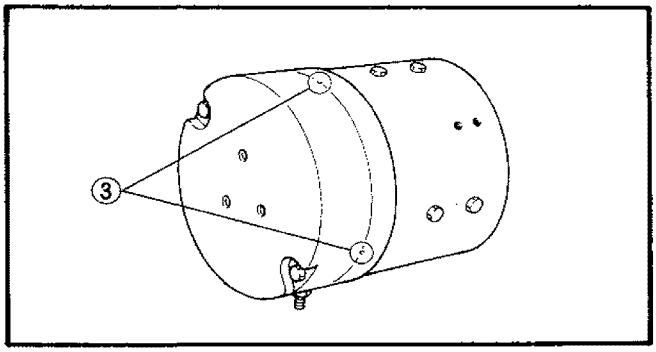
G.E. TRACTION MOTOR

① Bracket
② Brush spring
③ Brush
④ Brush holder
⑤ Bearing
⑥ Bearing retainer
⑦ Armature assembly
⑧ Yoke
⑨ Terminal bolt

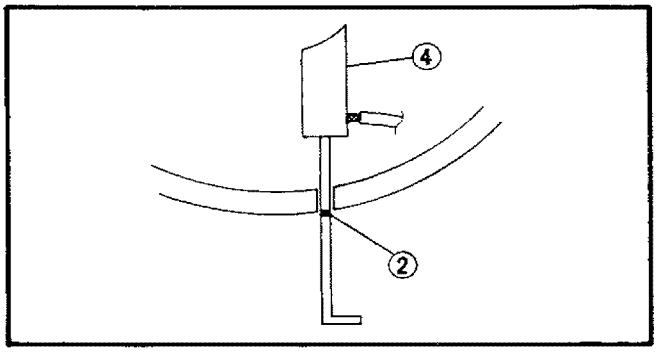
SPECIFICATIONS	
Model	5BC48JB845 und
Voltage	36V
Rated output KW/HP	2.2 KW/2.97 HP (30 min.)
Performance	
Current	77A
Voltage	36V
Torque	6.8 ~ 8.3 Nm (0.68 ~ 0.83 m·kg, 4.9 ~ 6.0 ft·lb)
Revolution	2,300 ~ 2,900 r/min
Weight	16.5 kg (36.4 lb)

A	BRUSH LENGTH: Limit: 14.5 mm (0.57 in) Standard: 34.3 mm (1.35 in)
B	BRUSH SPRING FORCE: New brush: 720 ~ 1,080 g (24.3 ~ 39.2 oz) Worn brush: 450 g (15.2 oz)
C	COMMUTATOR DIAMETER: Wear limit: 66.55 mm (2.62 in)





- Mark by painting the point ② , 38 mm (1.5 in) from the right end of the wire.
- Insert the above tool into the holes ③ to check whether the tool reaches the inside brush. In the case you can not see the painted mark ② outside, it means the brush ④ should be replaced.

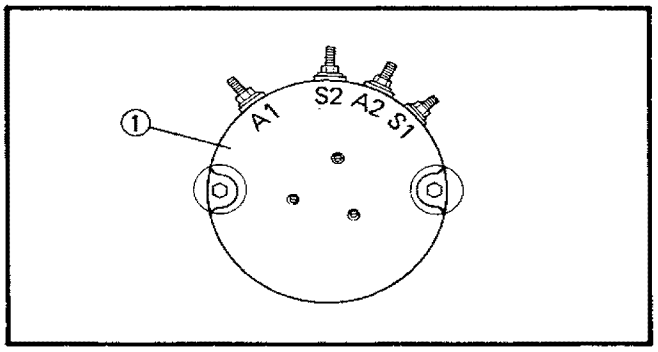


Disassembly

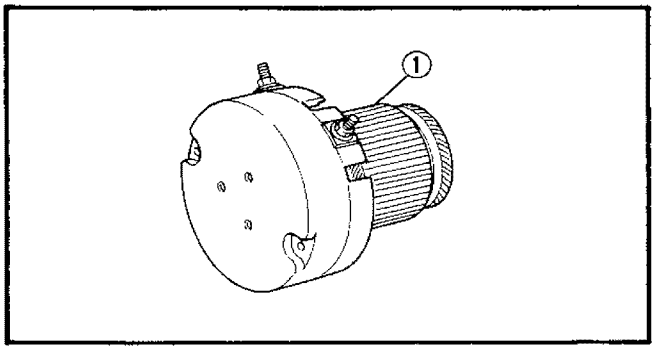
1. Remove:
   - Bracket ①

NOTE:

Before removing the bracket loosen the S1 and S2 terminal nuts.



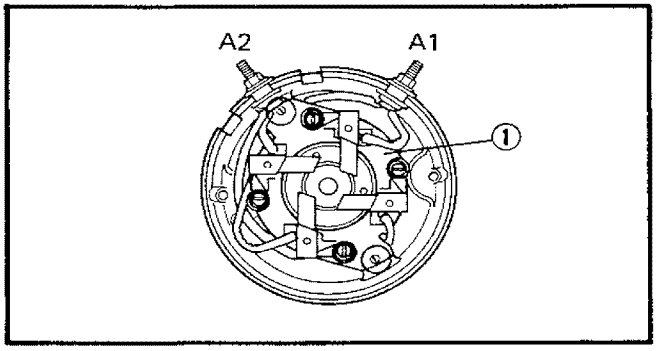
2. Remove:
   - Armature ①

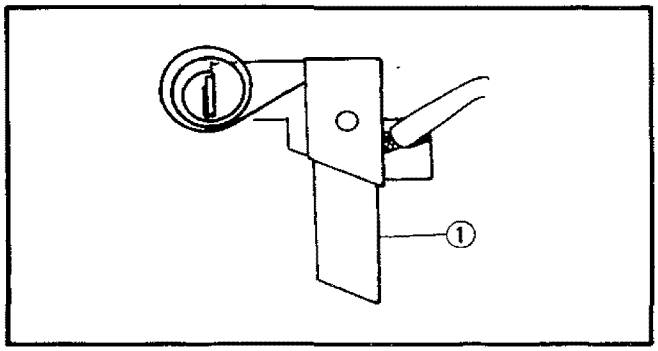


3. Remove:
   - Brush holder ①

NOTE:

Before removing the brush holder loosen the A1 and A2 terminal nuts.

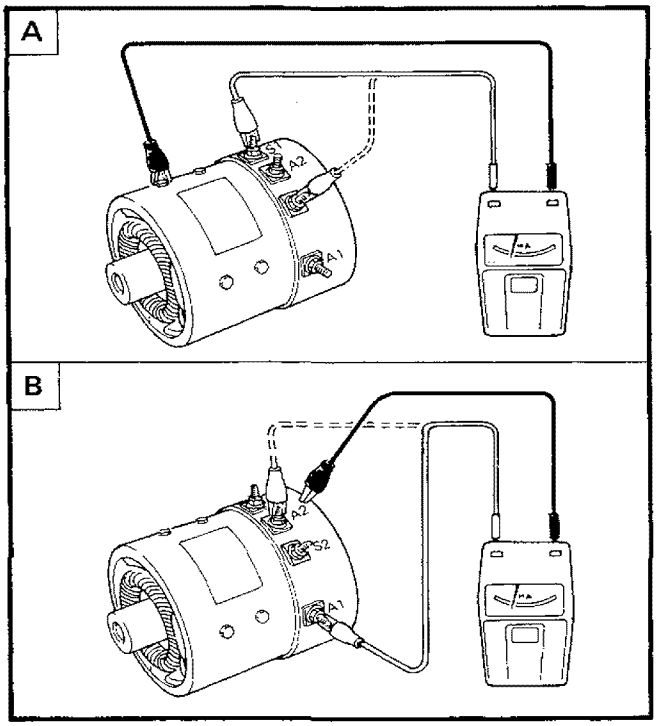




4. Remove:
   - Brushes ①

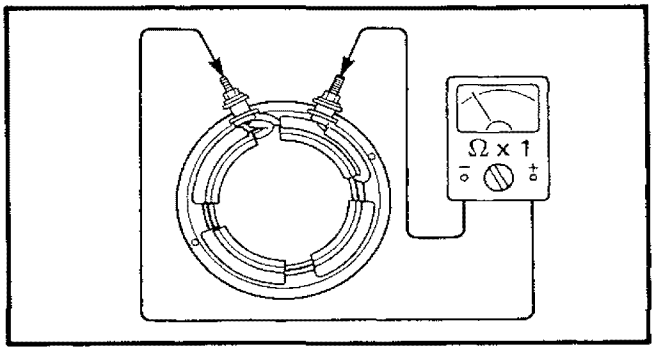
Inspection

1. Clean the interior of the yoke and bracket with compressed air.
2. Inspect:
   - Outer surface
     Cracks/Damage → Replace.



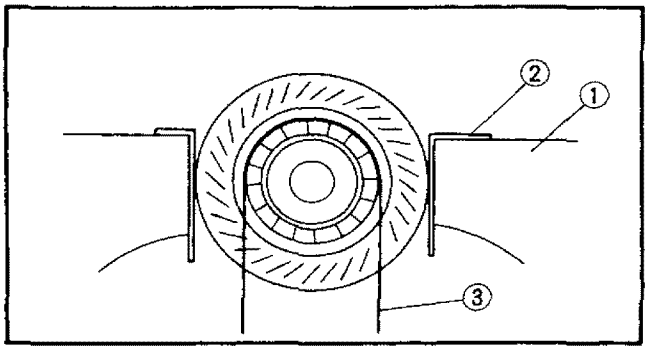
3. Measure:
   - Insulation resistance (Yoke [A] and bracket [B])
     Use a 500 volt insulating resistance tester.
     Defective → Replace.

	Insulation Resistance: **More than 1 MΩ at 20°C (68°F)**



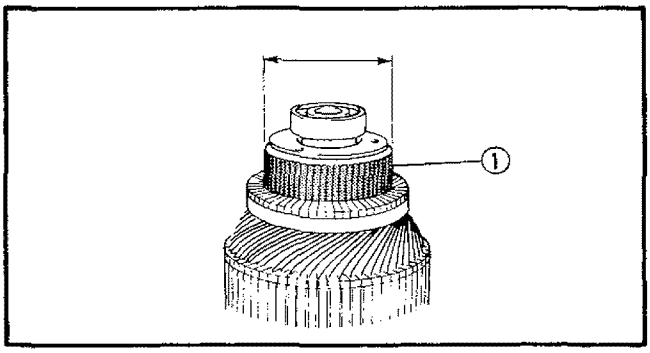
4. Measure:
   - Field coil resistance
     Use the Low Reading Ohmmeter.
     Out of specification → Replace.

	Field Coil Resistance: **0.012 ~ 0.014Ω at 20°C (68°F)**
	Low Reading Ohmmeter: **YU-91026, 90890-03064**



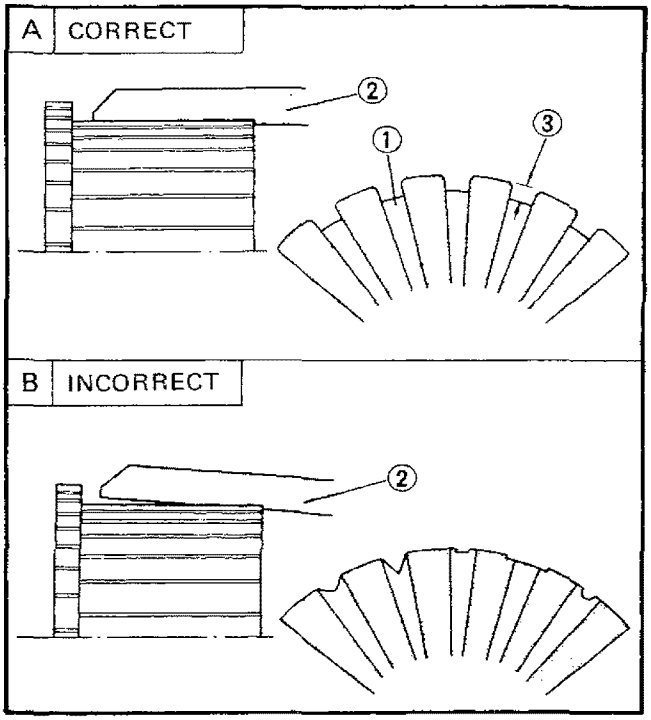
5. Inspect:
- Commutator (Outer surface)
  Hold the armature in a vise ① and copper or aluminium plate ②.
  Dirty → Clean with #600 grit emery cloth ③.

NOTE:
Lightly grip the armature with a vise.



6. Measure:
- Commutator (Diameter)
  Out of specification → Replace.
  Measure the diameter of the comutator at which the brush contacts. ①
  Out of specification → Replace.

Wear Limit (Mimimum Diameter):
66.55 mm (2.62 in)



7. Measure:
- Mica ① (Insulation depth)
  (between commutator segments)
  Out of specification → Scrape mica to proper limits.
  Use a hacksaw blade ② that is ground to fit.

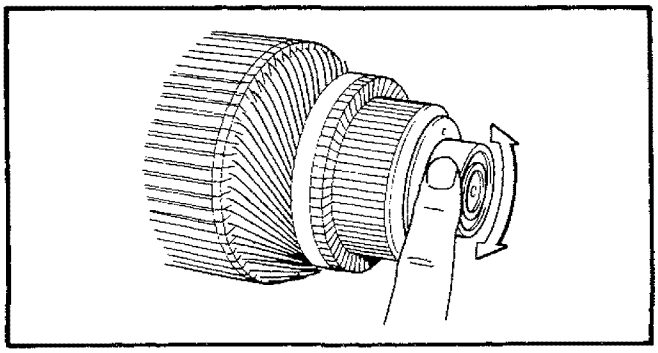
Mica Undercut ③ :
Limit: 0.25 mm (0.0098 in)

NOTE:
- The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.
- Carefully clean between the segments after the above steps.

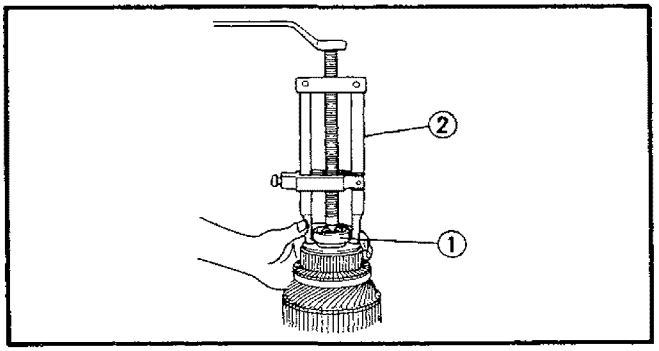
8. Measure:
- Armature coil resistance
  Use the Low Reading.
  Out of specification → Replace.

Armature Coil Resistance:
0.018 ~ 0.022Ω at 20°C (68°F)

Low Reading Ohmmeter:
YU-91026, 90890-03064



9. Check:
   - Bearing movement
     Rotate with fingers.
     Roughness/Wear → Replace.

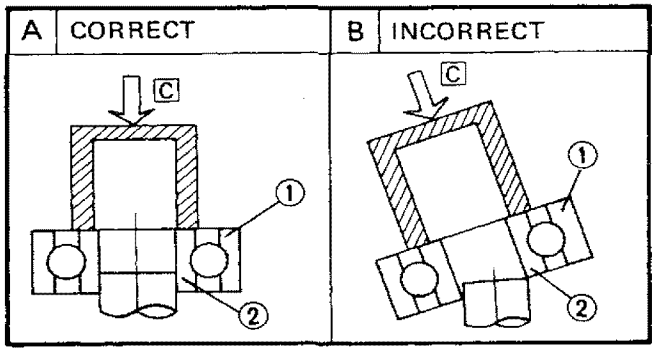


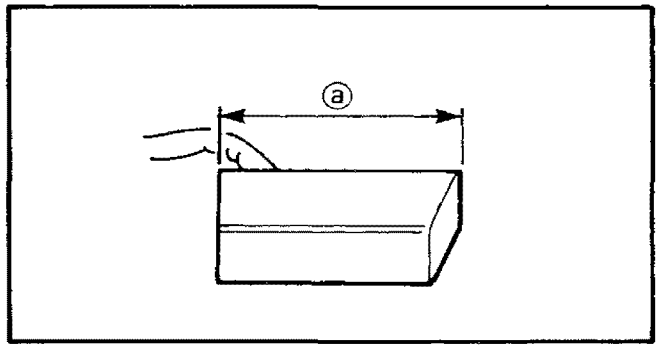
Bearing replacement steps:
- Remove the bearing ① with a bearing puller ②.
- Install the new bearing.

⚠ CAUTION:

Do not strike the outer race ① or balls of the bearing. Contact should be made only with the center race ②.

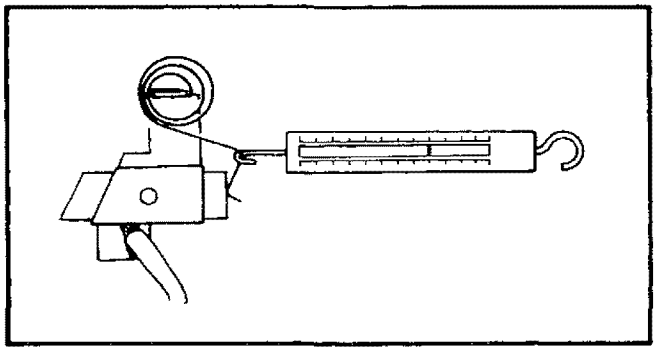
Ⓒ PRESS





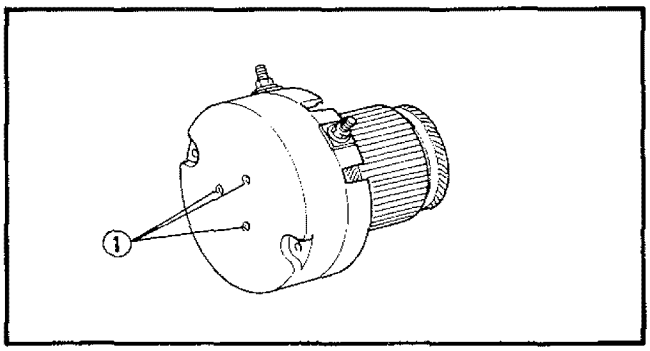
10. Measure:
    - Brush length ⓐ
      Out of specification → Replace.

Wear Limit:
14.5 mm (0.57 in)



11. Install:
    - Armature coil
      Into the brush holder.
12. Measure:
    - Brush spring force
      Use a spring scale ①.
      Pull the scale untill the brush spring just come off the brush, check reading.
      Out of specification → Replace.

Brush Spring Force:	
New brush:	720 ~ 1,080 g (24.3 ~ 36.5 oz)
Limit:	450 g (15.2 oz)

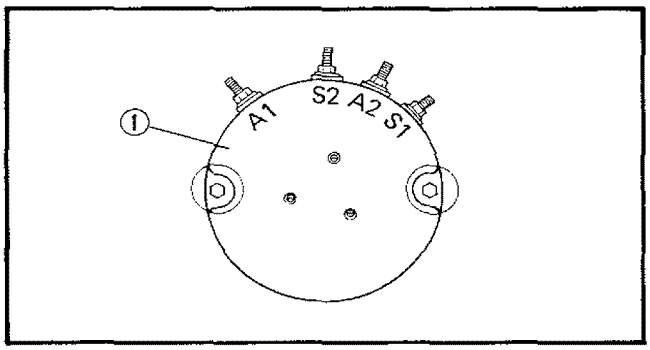


Assembly

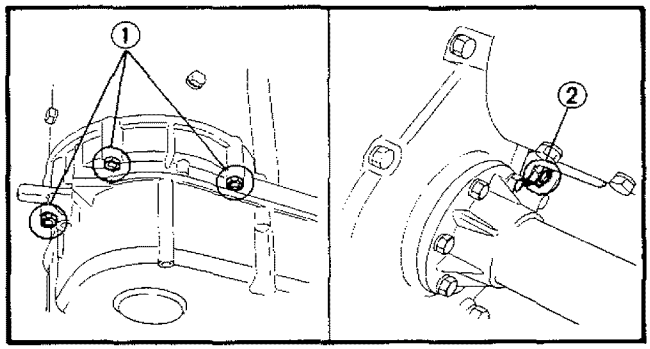
Reverse the "Disassembly" procedure.

Note the following points.

1. When tightening the screws ① , hold the bearing retainer with a screw driver to align the screw holes.



2. Install:
   - Bracket ①

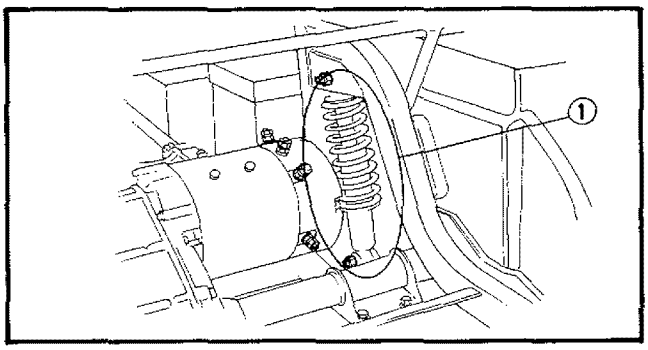


Installation

Reverse the "Removal" procedure.

Note the following points.

Motor Securing Bolt ① : (Upper) 6 Nm (0.6 m·kg, 4.3 ft·lb)
Motor Securing Bolt ② : (Lower) 14 Nm (1.4 m·kg, 10 ft·lb)



2. Place a jack under the transmission case.
3. Install:
   - Rear shock absorber (Right) ①

   When installing the pivot bolt, support the transmission case with a jack to align the bolt holes.

Shock Absorber Pivot: (Upper and Lower) 29 Nm (2.9 m·kg, 21 ft·lb)

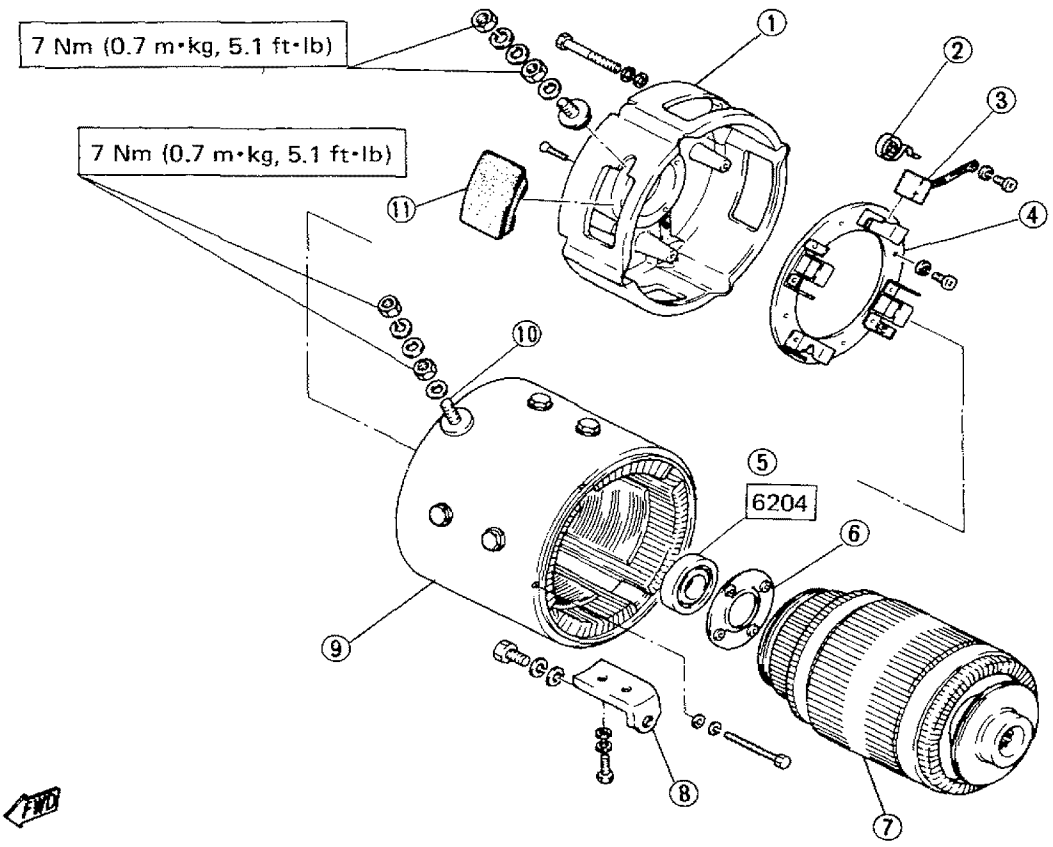
HITACHI TRACTION MOTOR

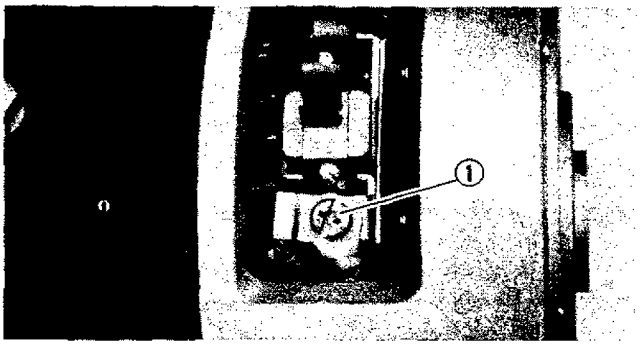
① Bracket
② Brush spring
③ Brush
④ Brush holder
⑤ Bearing
⑥ Bearing retainer
⑦ Armature assembly
⑧ Stay
⑨ Yoke
⑩ Terminal bolt
⑪ Cover

SPECIFICATIONS	
Model	D.C. series wound
Voltage	36V
Rated output KW/HP	2.0 KW/2.7 HP (30 min.)
Performance	
Current	70A
Voltage	36V
Torque	7.5 Nm (0.75 m•kg, 5.4 ft•lb) ± 10!
Revolution	2,600 r/min ± 10%
Weight	19.3 kg (42.6 lb)

A	BRUSH LENGTH:
B	Limit: 15 mm (0.59 in)
C	Standard: 29 mm (1.14 in)
D	BRUSH SPRING FORCE:
E	New brush: 0.9 ~ 1.1 kg (2.0 ~ 2.4 lb)

F	Worn brush: 0.4 kg (0.9 lb) or more
G	COMMUTATOR DIAMETER:
H	Wear limit: 270 mm (1.06 in)



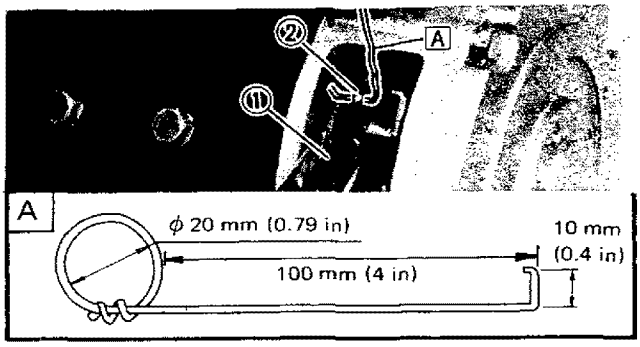


REMOVAL

Refer to CHAPTER 2 "Traction motor, Removal", page 2-16.

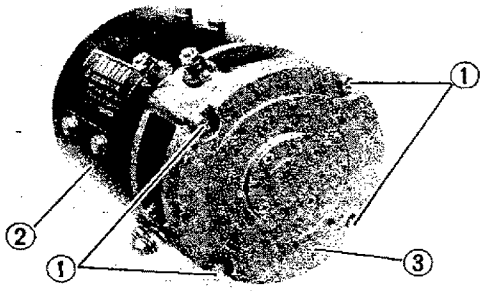
DISASSEMBLY

1. Remove:
   - Brush covers
   - Lead connecting screws ①

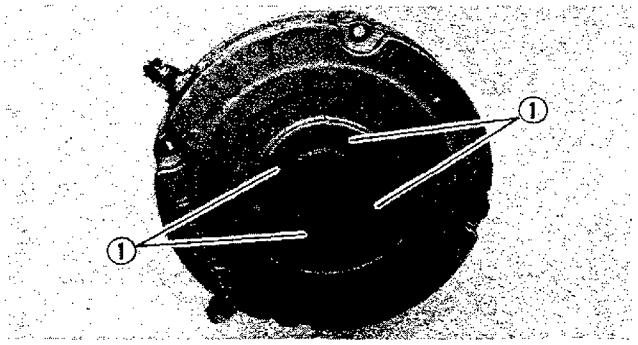


2. Remove:
   - Brushes ①

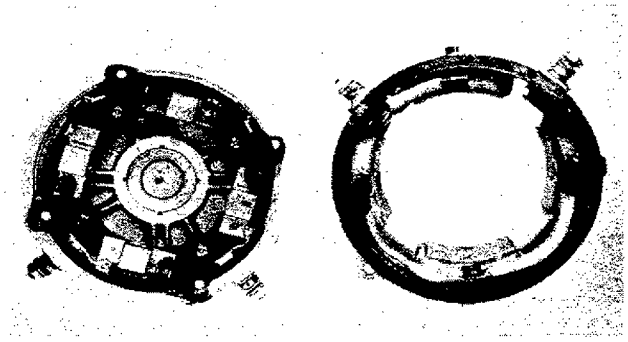
   Remove them pulling up the brush spring ② with a spring puller (made from steel-wire) A .



3. Remove:
   - Bolts ①
4. Separate the yoke ② and bracket ③.



5. Remove:
   - Flasher screws ①
6. Separate the bracket and armature assembly.

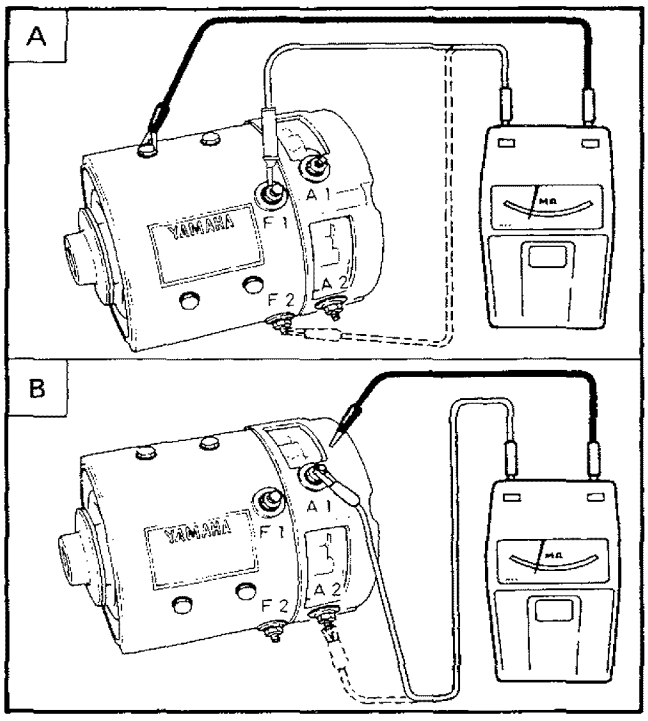


INSPECTION

Yoke and Bracket

1. Clean the interior of the yoke and bracket with compressed air.
2. Inspect:
   - Outer surface

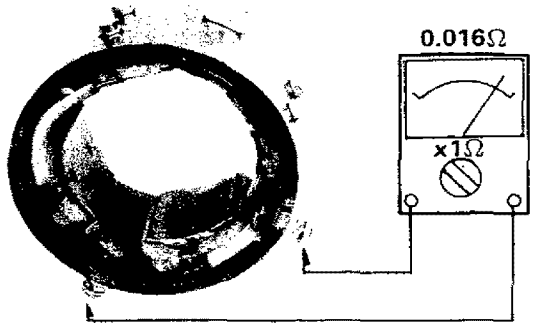
   Cracks/Damage → Replace.



3. Measure:
- Insulation resistance (Yoke [A] and bracket [B])

Use a 500 volt insulating resistance tester.
Defective → Replace.

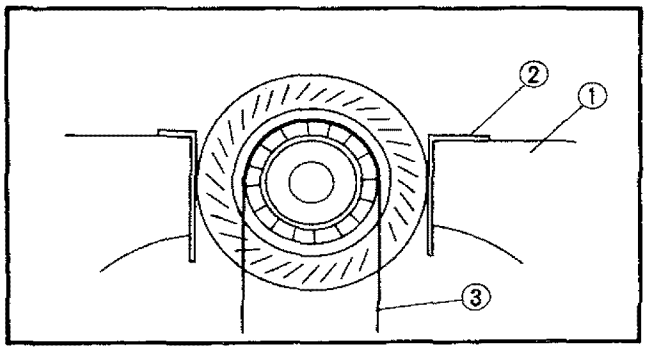
Insulation Resistance:
More than 1 MΩ at 20°C (68°F)



4. Measure:
- Field coil resistance

Use the Low Reading Ohmmeter (YU-91026).
Out of specification → Replace.

Field Coil Resistance:
0.016Ω ± 10% at 20°C (68°F)

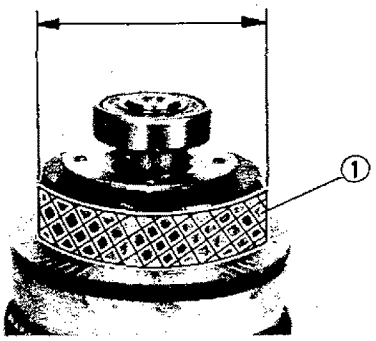


Armature

1. Inspect:
- Commutator (Outer surface)

Hold the armature in a vise ① and copper or aluminium plate ②.
Dirty → Clean with #600 grit emery cloth ③.

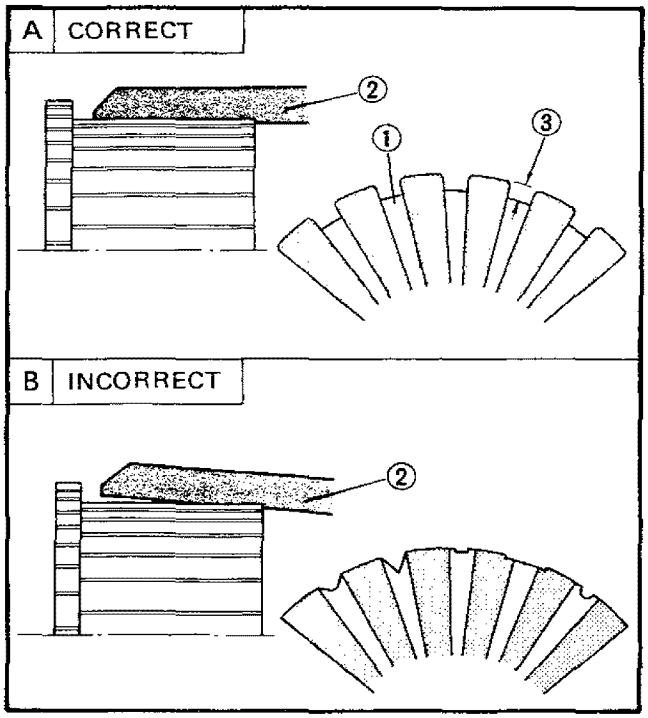
NOTE:
Lightly grip the armature with a vise.



2. Measure:
- Commutator (Diameter)

Out of specification → Replace.
Measure the diameter of the comutator at which the brush contacts. ①
Out of specification → Replace.

Wear Limit (Mimimum Diameter):
88 mm (3.46 in)



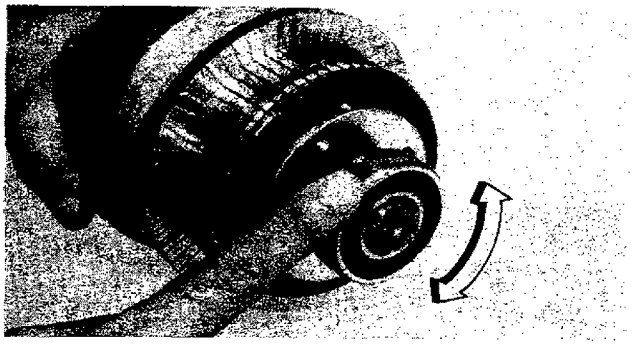
3. Measure:
   - Mica ① (Insulation depth) (between commutator segments)
     Out of specification → Scrape mica to proper limits.
     Use a hacksaw blade ② that is ground to fit.

Depth of Insulation ③ :
Limit: 0.3 mm (0.012 in)

NOTE:
- The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.
- Carefully clean between the segments after the above steps.

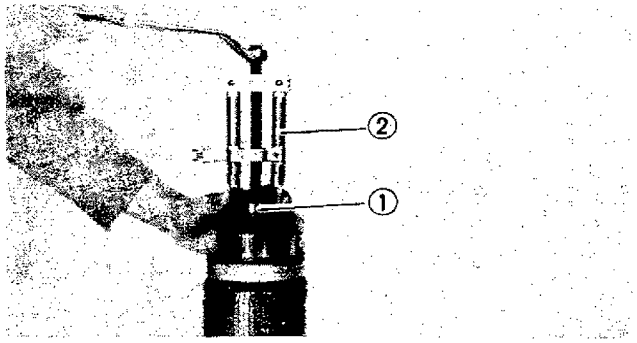
4. Measure:
   - Armature coil resistance
     Use the Low Reading Ohmmeter (YU-91026).
     Out of specification → Replace.

Armature Coil Resistance:
0.02Ω ± 10% at 20°C (68°F)

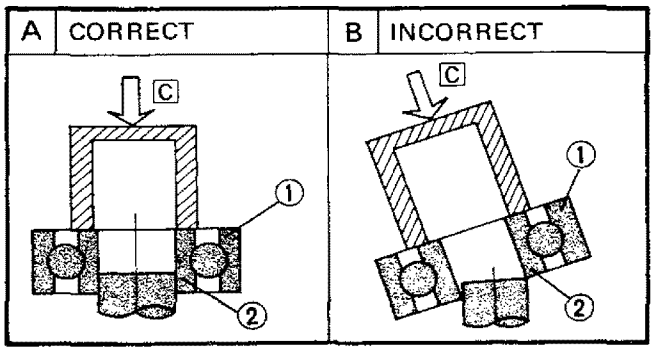


Bearing

1. Check:
   - Bearing movement
     Rotate with fingers.
     Roughness/Wear → Replace.



Bearing replacement steps:
- Remove the bearing ① with a bearing puller ②.

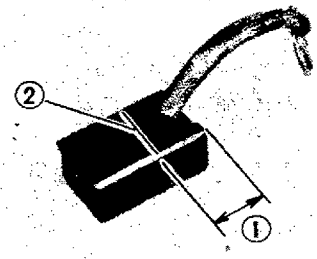


- Install the new bearing.

CAUTION:

Do not strike the outer race ① or balls of the bearing. Contact should be made only with the center race ②.

C PRESS



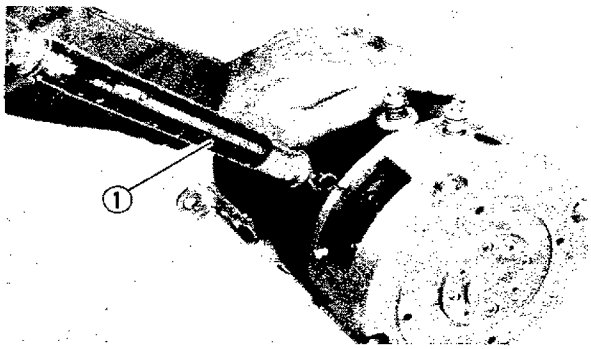
Brush Holder

1. Measure:
   - Brush length

   Out of specification → Replace.

Wear Limit ① :
15 mm (0.59 in)

② Wear indicator



2. Assemble:
   - Motor

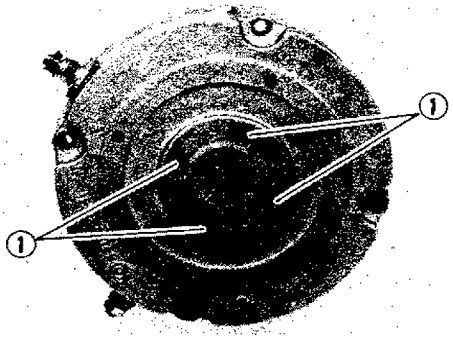
   Refer to "Assembly".
3. Measure:
   - Brush spring force

   Use a spring scale ① .

   Pull the scale untill the brush spring just come off the brush, check reading.

   Out of specification → Replace.

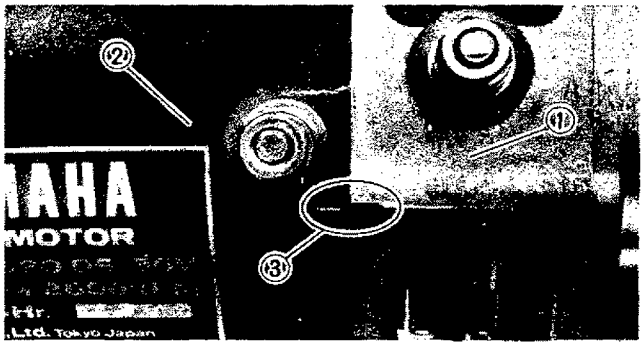
Brush Spring Force:
New brush : 0.9 ~ 1.1 kg (2.0 ~ 2.4 lb)
Limit : 0.4 kg (0.9 lb)



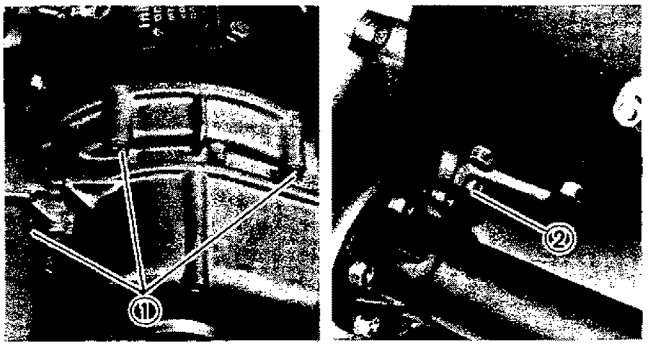
ASSEMBLY

Reverse the disassembly steps by noting following points.

1. When tightening the flash screws ① , hold the bearing retainer with a screw driver to align the screw holes.



2. When istalling the bracket ①, make sure that the terminals A1, A2 on the bracket face to the terminal F1, F2 on the yoke ②.

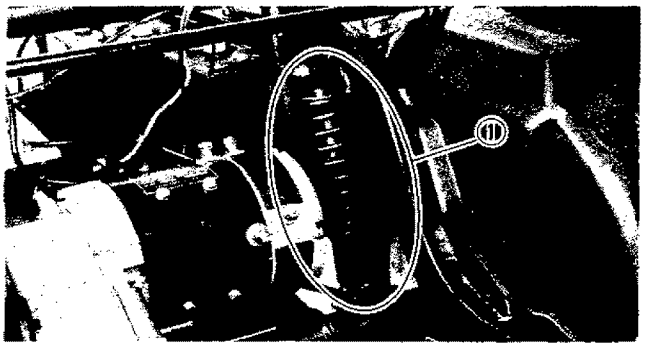


③ Matching mark

INSTALLATION

1. Install:
   - Traction motor

	Motor Securing Bolt ① : (Upper) **6 Nm (0.6 m·kg, 4.3 ft·lb)** **Motor Securing Bolt ② : (Lower)** **14 Nm (1.4 m·kg, 10 ft·lb)**



2. Place a jack under the transmission case.
3. Install:
   - Rear shock absorber (Right) ①

   When installing the pivot bolt, support the transmission case with a jack to align the bolt holes.

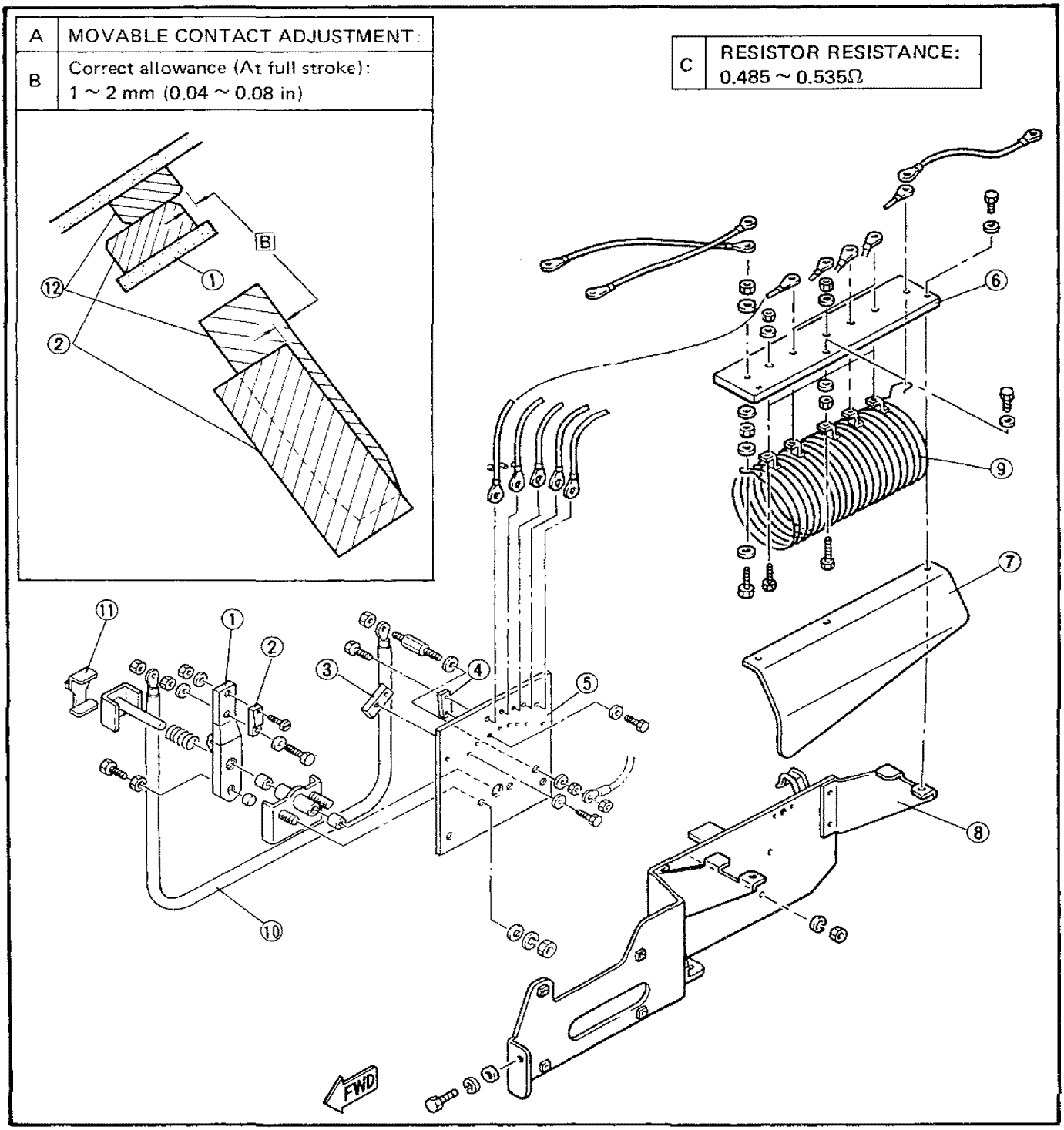
	Shock Absorber Pivot: **(Upper and Lower)** **29 Nm (2.9 m·kg, 21 ft·lb)**

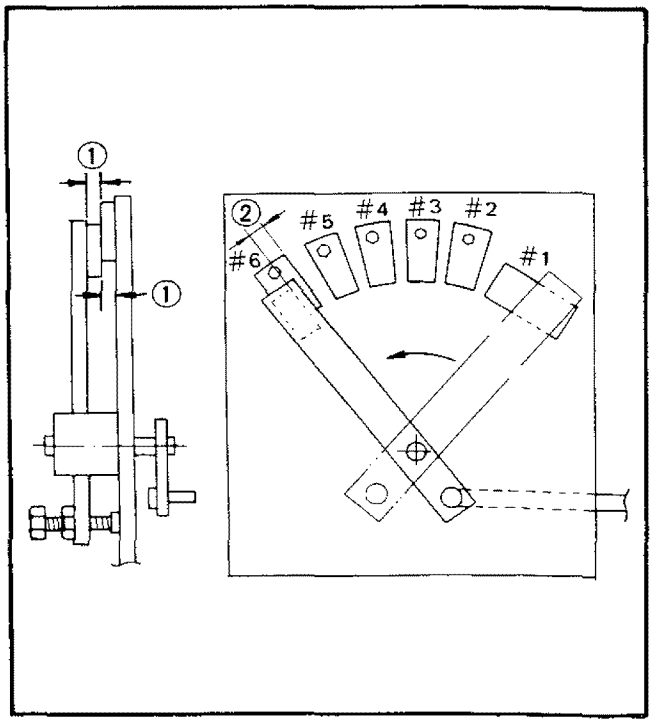
SPEED CONTROLLER

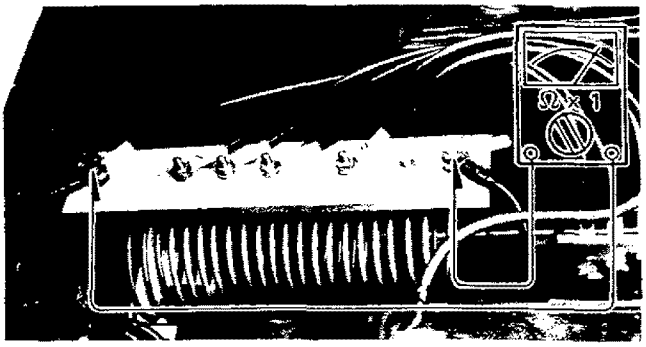
① Slider arm
② Movable contact
③ Fixed contact #1
④ Fixed contact #2
⑤ Base plate
⑥ Resistor plate
⑦ Resistor cover
⑧ Controller plate
⑨ Resistor assembly
⑩ Lead wire
⑪ Wire guide
⑫ Fixed contact #6

A	MOVABLE CONTACT ADJUSTMENT:
B	Correct allowance (At full stroke): 1 ~ 2 mm (0.04 ~ 0.08 in)

C	RESISTOR RESISTANCE: 0.485 ~ 0.535Ω







Inspection

1. Check:
   - Lead connection
   - Contact thickness ①
   - Contact overlap allowance ②
   - Surface of contacts
   - Contacts matching

   Refer to CHAPTER 3 "SPEED CONTROLLER INSPECTION" section.

Terminal Nut:
3 Nm (0.3 m·kg, 2.2 ft·lb)

Contact Wear Limit:
4.0 mm (0.16 in)
Contact Overlap Allowance ② :
1.0 ~ 2.0 mm (0.04 ~ 0.08 in)

2. Measure:
   - Resistor resistance

   Use the Low Reading Ohmmeter.
   Out of specification → Replace.

Resistor Resistance:
0.485 ~ 0.535Ω at 20°C (68°F)

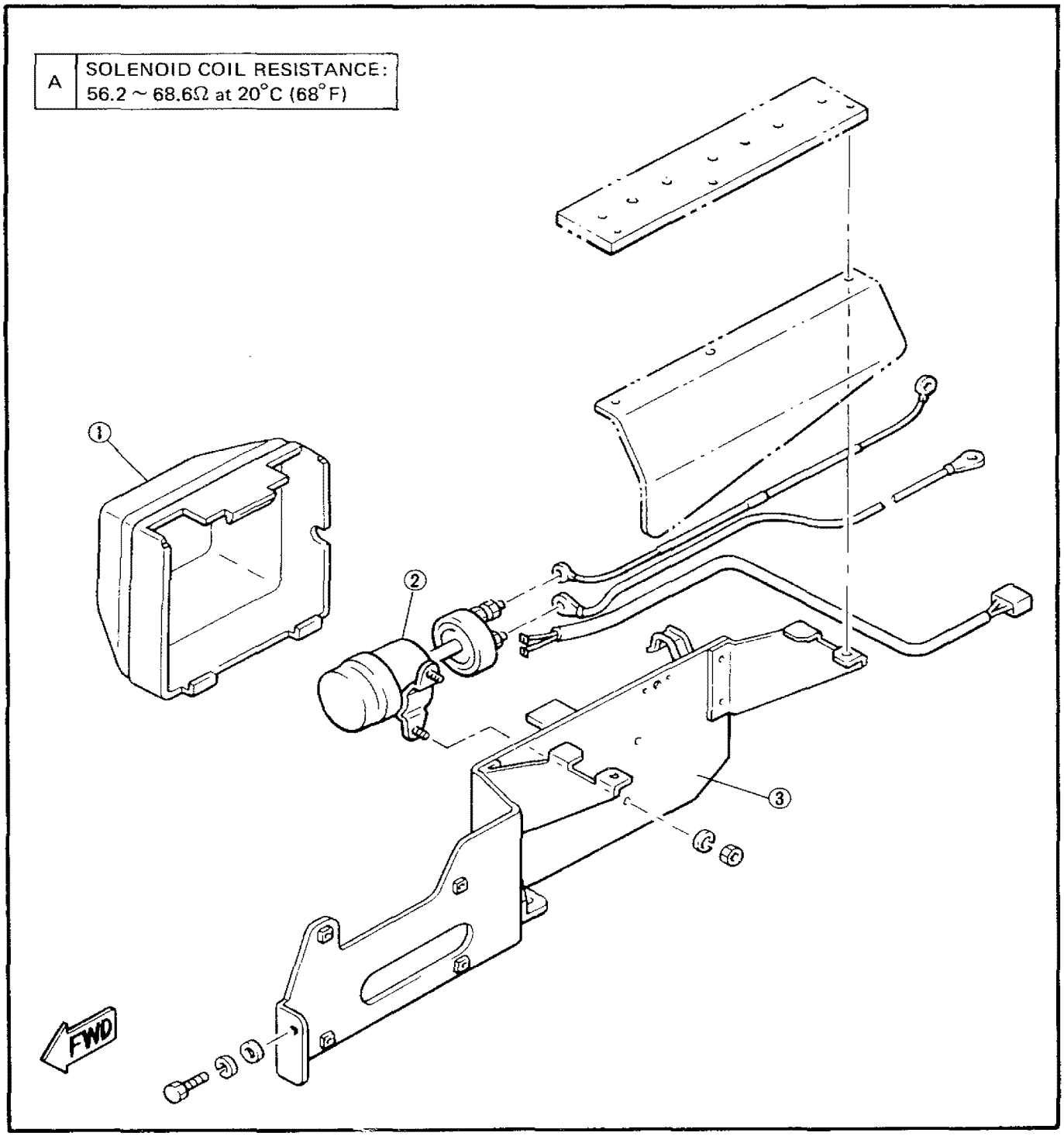
Low Reading Ohmmeter:
YU-91026, 90890-03064

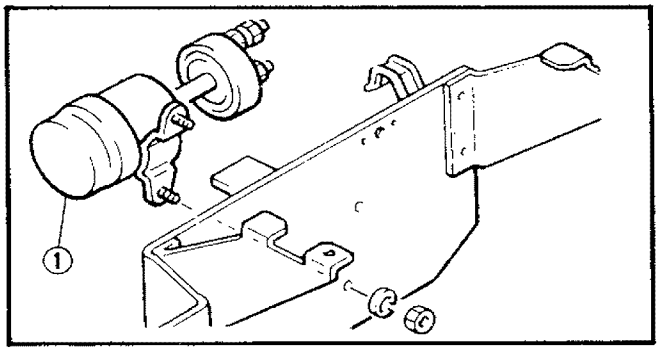
3. Inspect:
   - Base plate (Fixed contacts)

   Burn/Cracks/Damage → Replace.

SOLENOID RELAY

① Solenoid cover
② Solenoid relay assembly
③ Controller plate

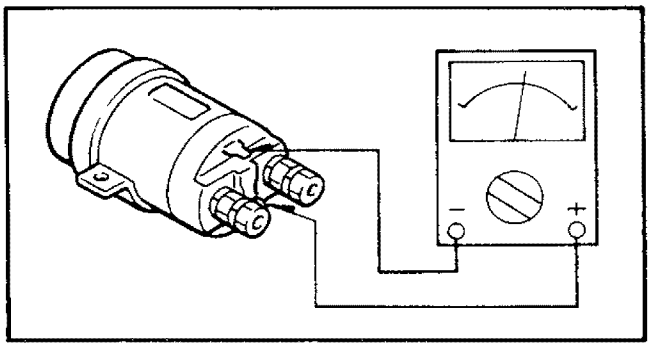




Removal

1. Remove:
   - Solenoid relay ①

   Refer to CHAPTER 3 "SOLENOID RELAY INSPECTION" section.



Disassembly, Inspection and Assembly

Refer to "ELECTRICAL (FOR G2-A) – SOLENOID RELAY" section.
Note the following points.

1. Measure:
   - Coil resistance

   Use the Pocket Tester.
   Out of specification → Replace.

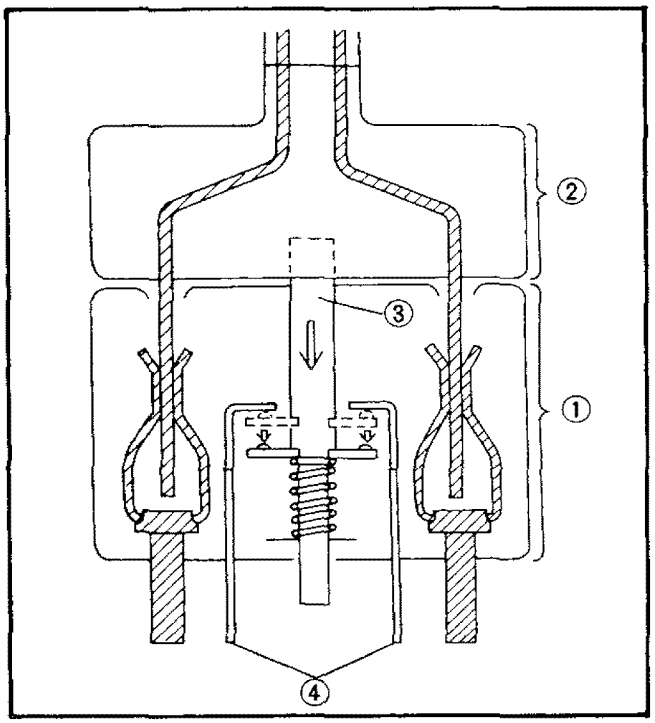
	Pocket Tester: **YS-03112, 90890-03112**

	Solenoid Coil Resistance: **56.2 ~ 68.6Ω at 20°C (68°F)**

Installation

1. Install:
   - Solenoid relay
2. Connect:
   - Leads

	Nut (Terminal): **6 Nm (0.6 m·kg, 4.3 ft·lb)**

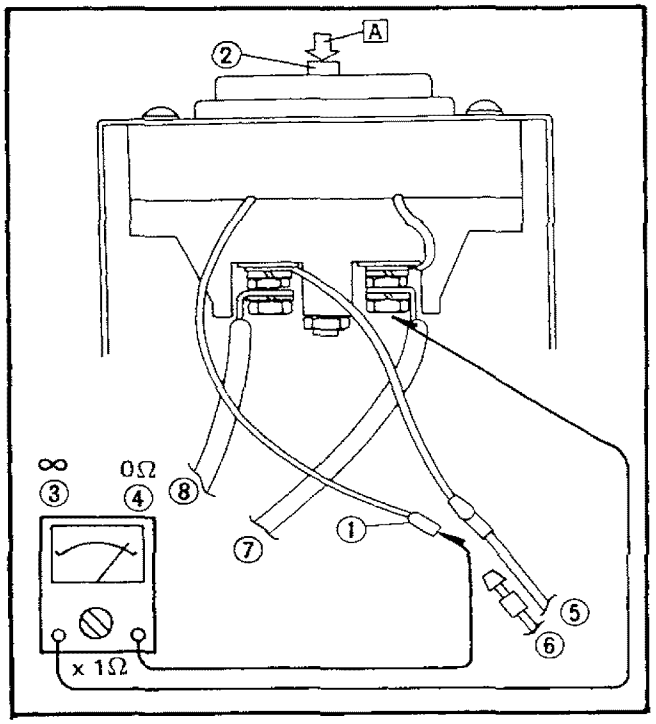


CHARGING RECEPTACLE

Operation

The charging receptacle ① for Yamaha Electric Golf Car G2-E has two functions. One is the normal function as a charging receptacle. The other is when the plug ② from the charger is pushed into the receptacle it depresses a button ③. This button operates a safety control circuit which prevents the golf car from being driven at any time the charger is plugged in.

④ Solenoid control circuit is open.



Inspection

1. Turn the main switch to "OFF".
2. Remove:
   - Rear cowling
     Refer to CHAPTER 3 "COWLING BODY" section.
3. Disconnect:
   - Thin red lead connector ①
4. Check:
   - Receptacle operation (Cut-off switch)
     Use the Pocket Tester.
     Out of specification → Replace.

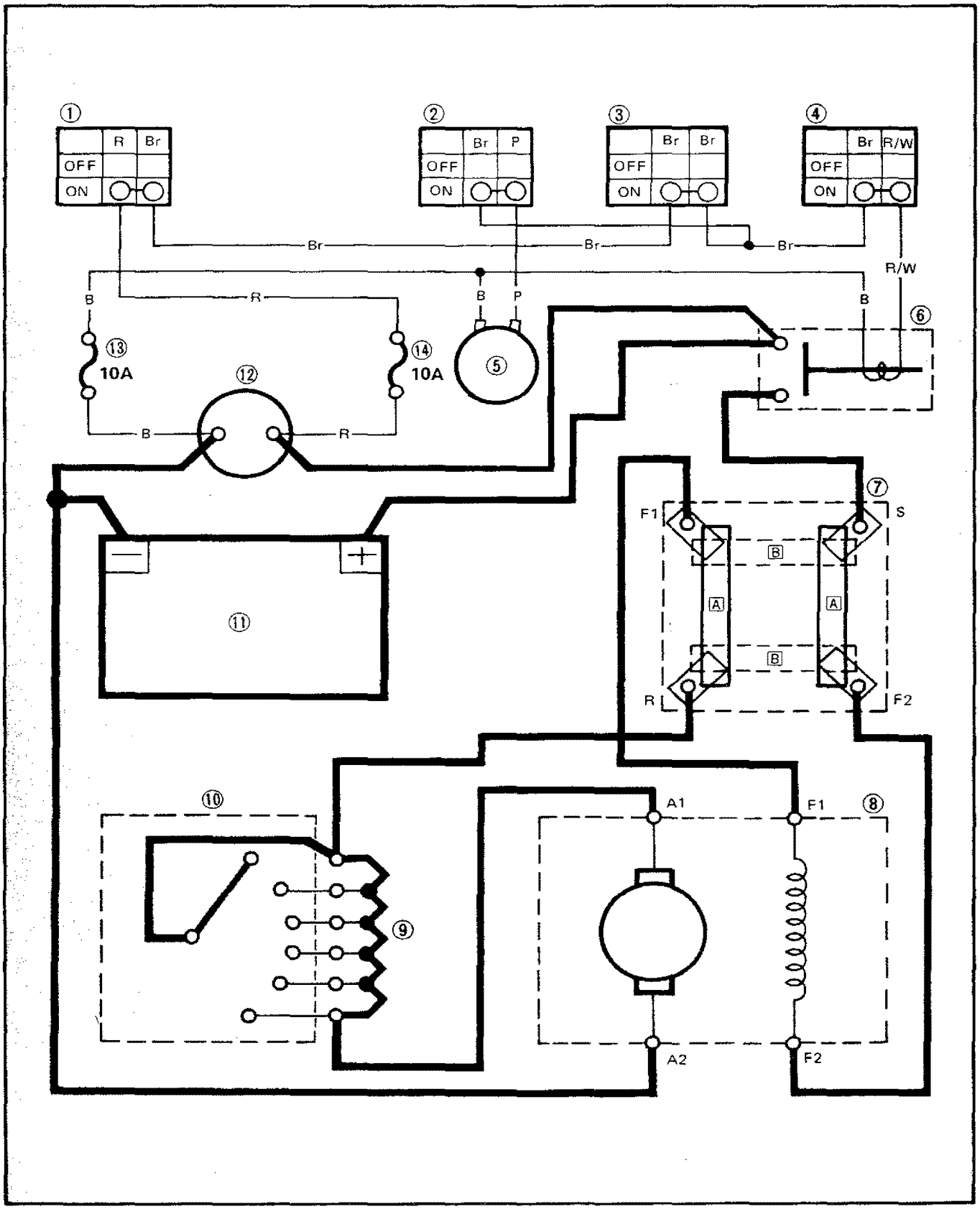
Pocket Tester:
YS-03112, 90890-03112

Charging Receptacle Check:
Button ② is free → ∞ ③
Button ② is pushed → Zero Ω ④
A PUSH HERE

⑤ To fuse "Negative" (Thin black lead)
⑥ To fuse "Positive" (Thin red lead)
⑦ To solenoid contact terminal (Thick red lead)
⑧ To motor A2 terminal (Thick black lead)

— MEMO —

SIGNAL SYSTEM

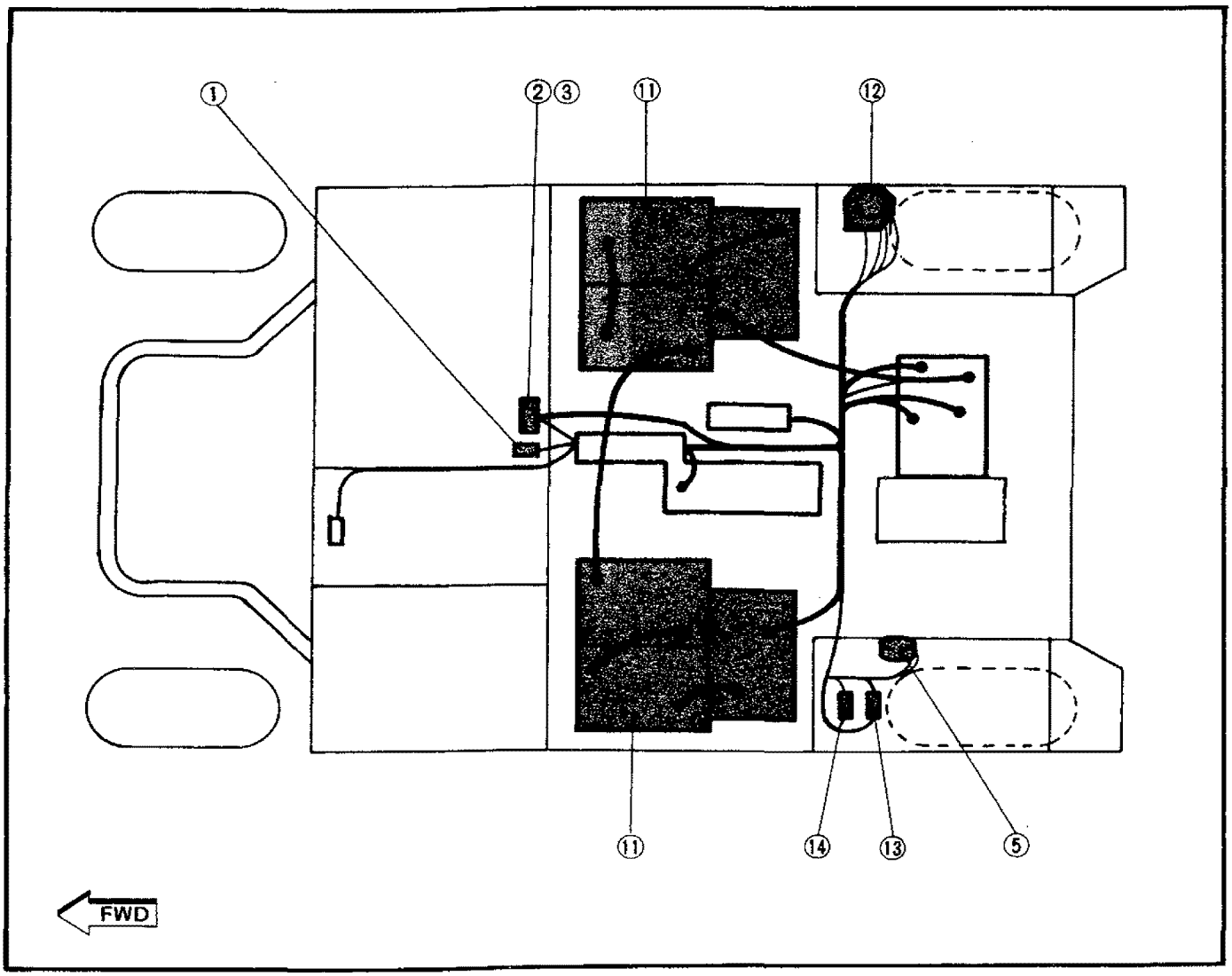


Aforementioned circuit diagram shows signal circuit in circuit diagram.

NOTE:

For the color codes, see page 8-44.

①Main switch
②Buzzer switch
③Cut-off switch
⑤Back-up buzzer
⑪Batteries (6V x 5)
⑫Charging receptacle
⑬Fuse "Negative" (10A)
⑭Fuse "Positive" (10A)



TROUBLESHOOTING

THE BACK-UP BUZZER DOES NOT OPERATE

Procedure

Check;

1. Battery
2. Fuse
3. Main switch
4. Cut-off switch
5. Buzzer switch
6. Back-up buzzer
7. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat cowling
  2) Service lid
  3) Rear cowling
- Use the following special tool in this troubleshooting.

Pocket Tester:
YS-03112, 90890-03112

Hydrometer:
YU-03036, 90890-03036

1. Battery

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

Specific Gravity:
1.260 at 20°C (68°F)
Voltage:
6V (x 6)

INCORRECT →

- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

2. Fuse

- Remove the fuses (positive and negative).
- Connect the Pocket Tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NOCONTINUITY →

Replace fuse.

CONTINUITY ↓

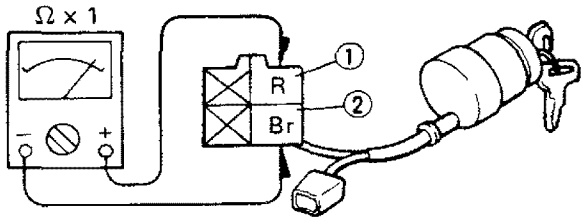
*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Connect the Pocket Tester (Ω x 1) to the main switch coupler (Red, Brown).

Tester (+) Lead → Red terminal ①
Tester (—) Lead → Brown terminal ②



- Turn the main switch to "ON" and "OFF".
- Check the main switch for continuity.

Switch position	Good condition	Bad condition		
ON	○	X	X	○
OFF	X	X	○	○

○: Continuity X: Nocontinuity

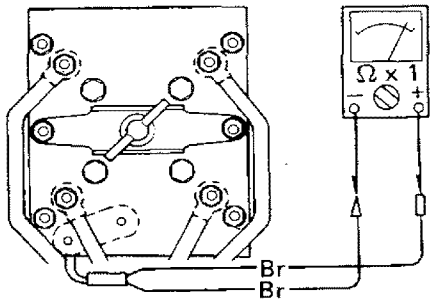
BAD CONDITION → Replace main switch.

GOOD CONDITION

4. Cut-off switch

- Disconnect the cut-off switch lead.
- Connect the Pocket Tester (Ω x 1) to the cut-off switch leads (Brown, Brown).

Tester (+) Lead → Brown Lead
Tester (—) Lead → Brown Lead



- Turn the shift lever "FORWARD", neutral and "REVERSE" position.
- Check the cut-off switch for continuity.

Lever position	Good condition	Bad condition		
FORWARD OR REVERSE	○	X	X	○
Neutral	X	X	○	○

○: Continuity X: Nocontinuity

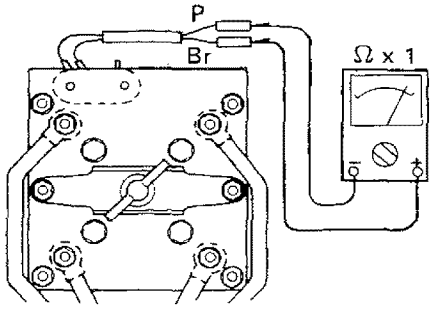
BAD CONDITION → Replace cut-off switch.

GOOD CONDITION

5. Buzzer switch

- Disconnect the buzzer switch leads.
- Connect the Pocket Tester (Ω x 1) to the buzzer switch leads (Brown, Pink).

Tester (+) Lead → Brown Lead
Tester (—) Lead → Pink Lead



- Turn the shift lever "FORWARD" and "REVERSE" position.
- Check the buzzer switch for continuity.

Lever position	Good condition	Bad condition		
FORWARD	X	X	○	○
REVERSE	○	X	X	○

○: Continuity X: Nocontinuity

BAD CONDITION → Replace buzzer switch.

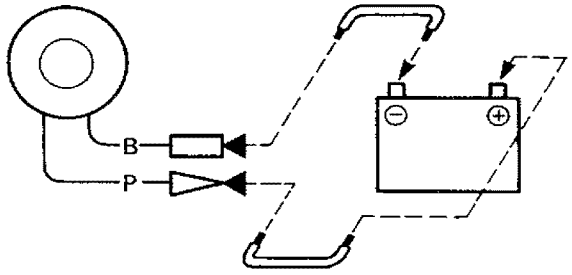
GOOD CONDITION

*

*

6. Back-up buzzer

- Disconnect the back-up buzzer leads.
- Connect a jumper leads to the back-up buzzer leads (Black, Pink) and battery (36V).



- Confirm the back-up buzzer sounds.

FAULTY → Replace back-up buzzer.

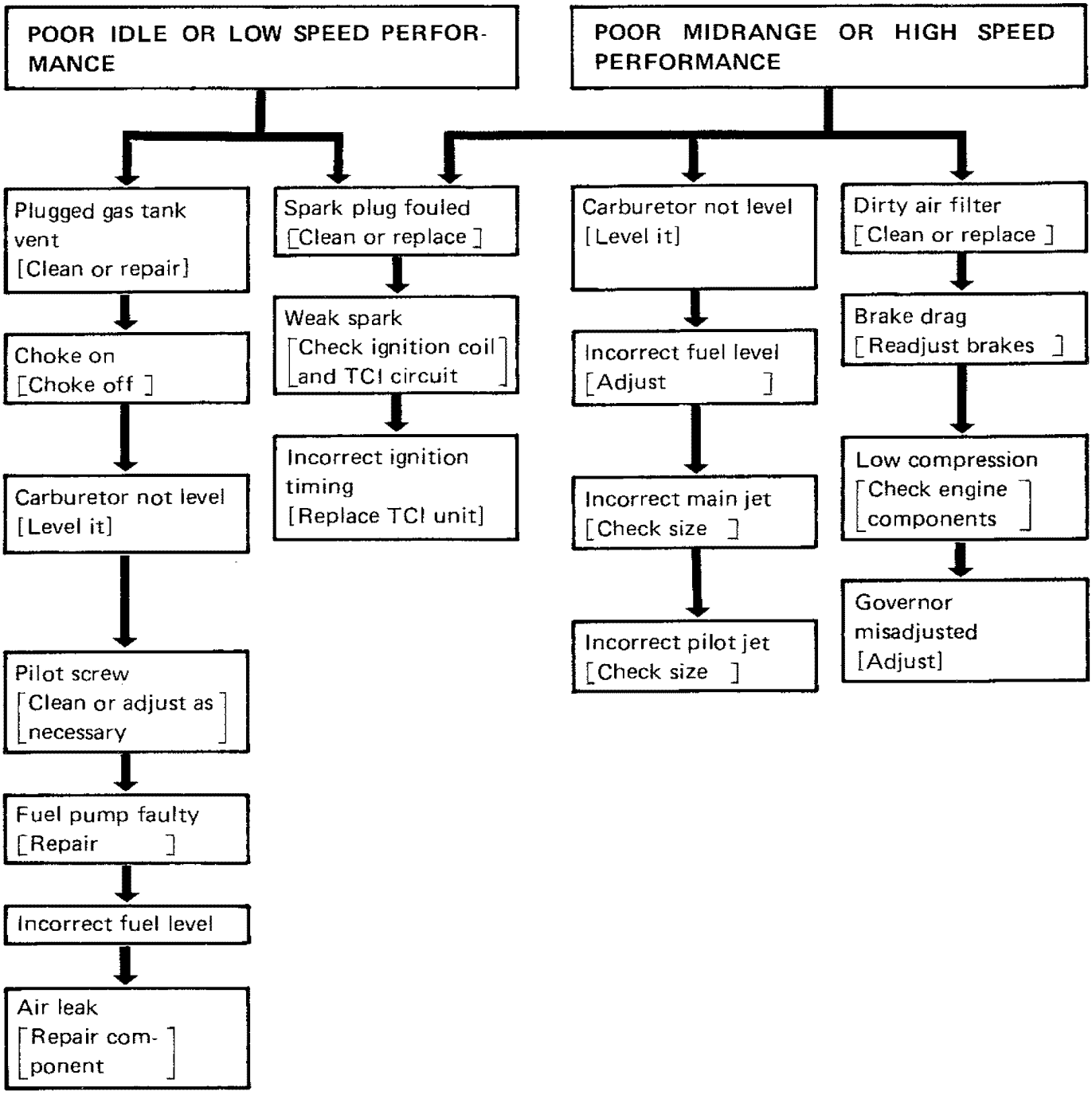
OK

7. Wiring connection

- Check the entire signal system for connection.
  Refer to "WIRING DIAGRAM" section.

TROUBLESHOOTING

TROUBLESHOOTING CHART (FOR G2-A)



ENGINE (FOR G2-A)

Condition	Possible Cause	Correction
ENGINE WILL NOT START.	1. Weak battery.	Test battery specific gravity. Recharge or replace as necessary.
	2. Corroded or loose battery connections.	Clean and tighten battery connection. Apply a coat of grease to terminals.
	3. Faulty starter.	Repair starter-generator.
	4. Moisture on ignition leads and spark plug cap.	Wipe leads and cap clean and dry.
	5. Faulty ignition circuit leads.	Replace any cracked or shorted leads.
	6. Open or shorted primary ignition circuit.	Trace primary ignition circuit and repair as necessary.
	7. Faulty coil.	Test and replace if necesary.
	8. Incorrect spark plug gap.	Set gap correctly.
	9. Incorrect ignition timing.	Replace TCI unit.
	10. Dirt or water in fuel line or carburetor.	Clean lines and carburetor. Replace filter.
	11. Carburetor flooded.	Adjust float level – check seats.
	12. Incorrect carburetor float setting.	Adjust float level – check seats.
	13. Faulty fuel pump.	Install new fuel pump.
	14. Carburetor percolating. No fuel in the carburetor.	Measure float level. Check bowl vent.
ENGINE STALLS	1. Idle speed set too low.	Adjust carburetor.
	2. Incorrect choke adjustment	Adjust choke.
	3. Idle mixture too lean or too rich.	Adjust carburetor.
	4. Incorrect carburetor float setting.	Adjust float setting.
	5. Leak in intake manifold.	Inspect intake manifold gasket and replace if necessary.
	6. Incorrect ignition wiring.	Install correct wiring.
	7. Faulty coil.	Test and replace if necessary.
ENGINE LOSS OF POWER	1. Incorrect ignition timing.	Replace TCI unit.
	2. Dirty or incorrectly gapped spark plug.	Clean plug and set gap.
	3. Dirt or water in fuel line, carburetor or filter.	Clean lines, carburetor and replace filter.

SUSPENSION AND STEERING

Condition	Possible Cause	Correction
HARD OR ERRATIC STEERING	1. Incorrect tire pressure.	Inflate tires to recommended pressures.
	2. Insufficient or incorrect lubrication.	Lubricate as required.
	3. Suspension, steering or linkage parts damaged or misaligned.	Repair or replace parts as necessary.
	4. Incorrect front wheel alignment.	Adjust wheel alignment angles.
	5. Incorrect steering gear adjustment.	Adjust steering gear.
	6. Sagging springs.	Replace springs.
PLAY OR LOOSENESS IN STEERING	1. Steering wheel loose.	Inspect splines and repair as necessary. Tighten steering wheel nut.
	2. Steering linkage or attaching parts loose or worn.	Tighten, adjust, or replace faulty components.
	3. Pitman arm loose.	Inspect shaft splines and repair as necessary. Torque attaching nut and lock in place with lock washer plate.
	4. Steering gear attaching bolts loose.	Tighten bolts.
	5. Loose or worn wheel bearings.	Adjust or replace bearings.
	6. Steering gear adjustment incorrect or parts badly worn.	Adjust gear or replace defective parts.
WHEEL SHIMMY OR VIBRATION	1. Incorrect tire pressure.	Inflate tires to recommended pressures.
	2. Wheels, tires, or brake drums out-of-round.	Inspect parts and replace unacceptable out-of-round parts.
	3. Inoperative, worn, or loose shock absorbers or mounting parts.	Repair or replace shocks or mountings.
	4. Loose or worn steering or suspension parts.	Tighten or replace as necessary.
	5. Loose or worn wheel bearings.	Adjust or replace bearings.
	6. Incorrect steering gear adjustments.	Adjust steering gear.
	7. Incorrect front wheel alignment.	Correct front wheel alignment.
TIRE WEAR	1. Incorrect tire pressure.	Inflate tires to recommended pressures.
	2. Failure to rotate tires.	Rotate tires.
	3. Brakes grabbing.	Adjust or repair brakes.
	4. Incorrect front wheel alignment.	Align front wheels.
	5. Broken or damaged steering and suspension parts.	Repair or replace defective parts.
	6. Wheel runout.	Replace faulty wheel.
	7. Excessive speed on turns.	Make driver aware of condition.
CAR PULLS TO ONE SIDE	1. Incorrect tire pressure.	Inflate tires to recommended pressures.
	2. Front tires with uneven tread depth, wear pattern, or different design.	Install tires of same construction and reasonably even tread depth and wear pattern.
	3. Incorrect front wheel alignment.	Align front wheels.
	4. Brakes dragging.	Adjust or repair brakes.
	5. Pulling due to uneven tire construction.	Replace faulty tire.

ELECTRICAL (FOR G2-A)

Condition	Possible Cause	Correction
STARTER DOES NOT TURN.	1. Weak battery.	Test battery specific gravity. Recharge or replace as necessary.
	2. Corroded or loose battery connection.	Clean and tighten battery connections. Apply a coat of grease to terminals.
	3. Open or shorted solenoid coil circuit.	Trace solenoid coil circuit and repair as necessary.
	4. Faulty solenoid relay.	Test and replace if necessary.
	5. Faulty main, or accelerator stop switches.	Replace switches if necessary.
GENERATOR DOES NOT CHARGE	1. Corroded or loose battery connections.	Clean and tighten battery connections. Apply a coat of grease to terminals.
	2. Faulty starter-generator.	Repair starter-generator.

STARTER-GENERATOR (FOR G2-A)

Condition	Possible Cause	Correction
STARTER DOES NOT TURN.	1. Brushes are off commutator.	Adjust properly or replace.
	2. Starter-generator terminals are loose or corroded.	Tighten or clean.
	3. Leads are broken.	Check for breaks at bend or joint. Repace or repair leads.
	4. Field coil is open.	Repair or replace at a service shop.
	5. Armature coil is open.	Repair or replace at a service shop.
STARTER TURNS SLOWLY.	1. Terminals are loose or corroded.	Retighten or clean.
	2. Leads are nearly broken or connections are faulty.	Check for any defect of leads at bend or joint. Replace leads or repair connections.
	3. Mechanical problem inside motor.	Check
STARTER IS NOISY.	1. Bolts are loose.	Retighten.
	2. Starter-generator has foreign matter inside.	Clean motor interior.
	3. Bearings are faulty.	Replace
	4. Bearings contain foreign matter.	Replace
	5. Bearings need grease.	Replace
BEARING HEAT EXCESSIVE.	1. Bearings are faulty or lack grease.	Replace
	2. Improperly installed.	Adjust, replace if necessary.
RECTIFICATION IS IMPERFECT.	1. Load exceeds specification.	Adjust load to spec.
	2. Armature is out of round.	Repair or replace at service shop.
	3. Brushes are worn beyond limits.	Replace
	4. Commutator is excessively rough.	Smooth with sandpaper (#500 ~ 600).
	5. High mica segment.	Recondition at service shop.
	6. Commutator is dirty with oil or dust.	Clean with a cleaner, and dry cloth.
	7. Armature coil is shorted or broken.	Repair or replace at service shop.
VIBRATION	1. Starter-generator installed loosely.	Retighten.
	2. Starter-generator turns irregularly.	Repair or replace at service shop.

ELECTRICAL (FOR G2-E)

Should any one of the troubles (1 to 9) below occur, it is advisable to check for the possible cause in the order specified.

1. If batteries tend to discharge much faster than specified after being charged properly.
2. When the car does not move.
3. When the car moves forward but not backward, or it moves backward but not forward.
4. When the acceleration becomes rough, uneven or jerky.
5. The car abruptly starts off the moment the main switch is set to "ON" position.
6. The car abruptly stops.
7. The car speed becomes slow.
8. The speed controller contact points are burned unduly.
9. The motor does not stop even when the accelerator pedal is released.

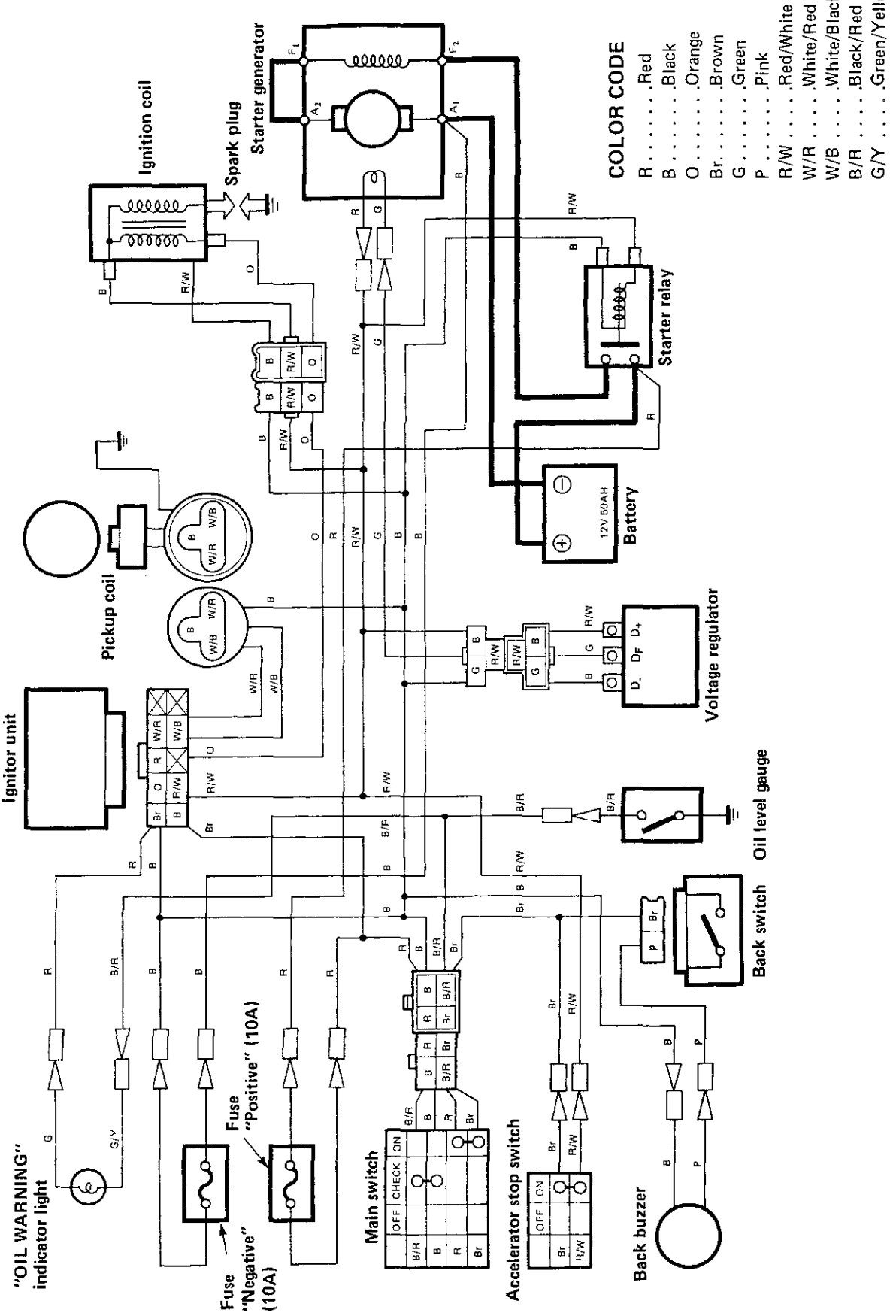
CHECK ITEMS
1. If batteries tend to discharge much faster then normal after being charged properly.
A. Batteries, charger and charging circuit 1) Check battery terminals for tightness or corrosion. 2) Check the battery electrolyte level. 3) Check the specific gravity of battery electrolyte. 4) Check battery cells for damage. 5) Check the charging circuit for loose connections, broken wires, or separated connections. 6) Check whether the battery charger output is adjusted correctly, and that proper A.C. voltage (115 Volts, 15 Amp) exists at the battery charger A.C. connection. 7) Check that the charging receptacle is tightly connected to the charger plug. 8) Check charge cord for damage. B. Solenoid control circuit and traction motor circuit 9) Check the solenoid control circuit and traction motor circuit for loose connectors. (Check for loose connectors on the speed controller, solenoid relay and traction motor.) 10) Check the speed controller and solenoid relay for dirty, burned or worn-contact points, and for full sweep arm travel. 11) Check the traction motor for worn brushes, misaligned brushes, or dirty commutator. C. Parts other than circuits 12) Check the brake for proper play. (Check if the brakes are dragging.) 13) Check whether the speed controller is properly adjusted. 14) Check whether the tire pressures are low. [Tire pressure: 98 kPa (1 kg/cm^2, 14 psi)] 15) Check for excessive wheel bearing friction. 16) Check the differential for oil leakage or malfunction. 17) Check whether the operation of controls is correct. Except when low speed operation is necessary, the car should be run with the accelerator pedal fully depressed as much as possible to minimize power consumption.
2. When the car does not move.
1) Check whether the batteries are discharged. 2) Check the battery posts and battery terminals for loose or separated connections, or corrosion. 3) Place the main switch in the "ON" position and step on the accelerator pedal to check whether a click is heard. If no click, check the solenoid relay, main switch, accelerator stop switch, cut-off switch and charging receptacle. 4) Check traction motor, speed controller and resistor for loose or separated connections. 5) Check the speed controller for worn contact points and for operation. 6) Check the traction motor for worn or separated brushes, or dirty commutator. Also check the armature circuits for broken wires or shortcircuit.

CHECK ITEMS
3. When the car moves forward but not backward, or it moves backward but not forward.
• Check the forward-reverse switch 1) Check the operation of the forward-reverse switch. Check the motor circuit for loose or separated connections. 2) Check the contact of the forward-reverse switch.
4. When the acceleration becomes rough, uneven or jerky.
1) Check for loose or separated connections between the speed controller, resistor, and solenoid relay. 2) Check the speed controller for dirty, burned, corroded, shorted, or worn contact points. 3) Check the resistor for damage. 4) Check for loose terminal.
5. The car abruptly starts off the moment the main switch is set to the "ON" position.
1) Check the accelerator stop switch and solenoid relay for stuck contact points. 2) Check the speed controller for stuck contact points. 3) Check for stuck accelerator pedal.
6. The car abruptly stops. Refer to Item 2 or 3 above.
7. The car speed becomes slow.
1) Check the batteries for sulfation. Check the battery electrolyte level and charged condition. 2) Check the batteries, speed controller, resistor, and traction motor for loose connections. 3) Check the speed controller for dirty or worn contact plates on the high speed side. Also check for wires shorted or separated at connections, and for full sweep arm movement. 4) Check the traction motor for worn or separated brushes, or dirty commutator.
8. The speed controller contact plates are burned unduly.
1) Check that the movalbe contact plate is parallel to the fixed one.
9. The motor does not stop even when the accelerator pedal is release.
• The motor stops if the main switch is placed in the OFF position: 1) Check the accelerator stop switch. • The motor does not stop even if the main switch is placed in the OFF position: 2) Check the solenoid relay for stuck contact points. 3) Check the accelerator stop switch and speed controller for stuck contacts. 4) Check the main switch.

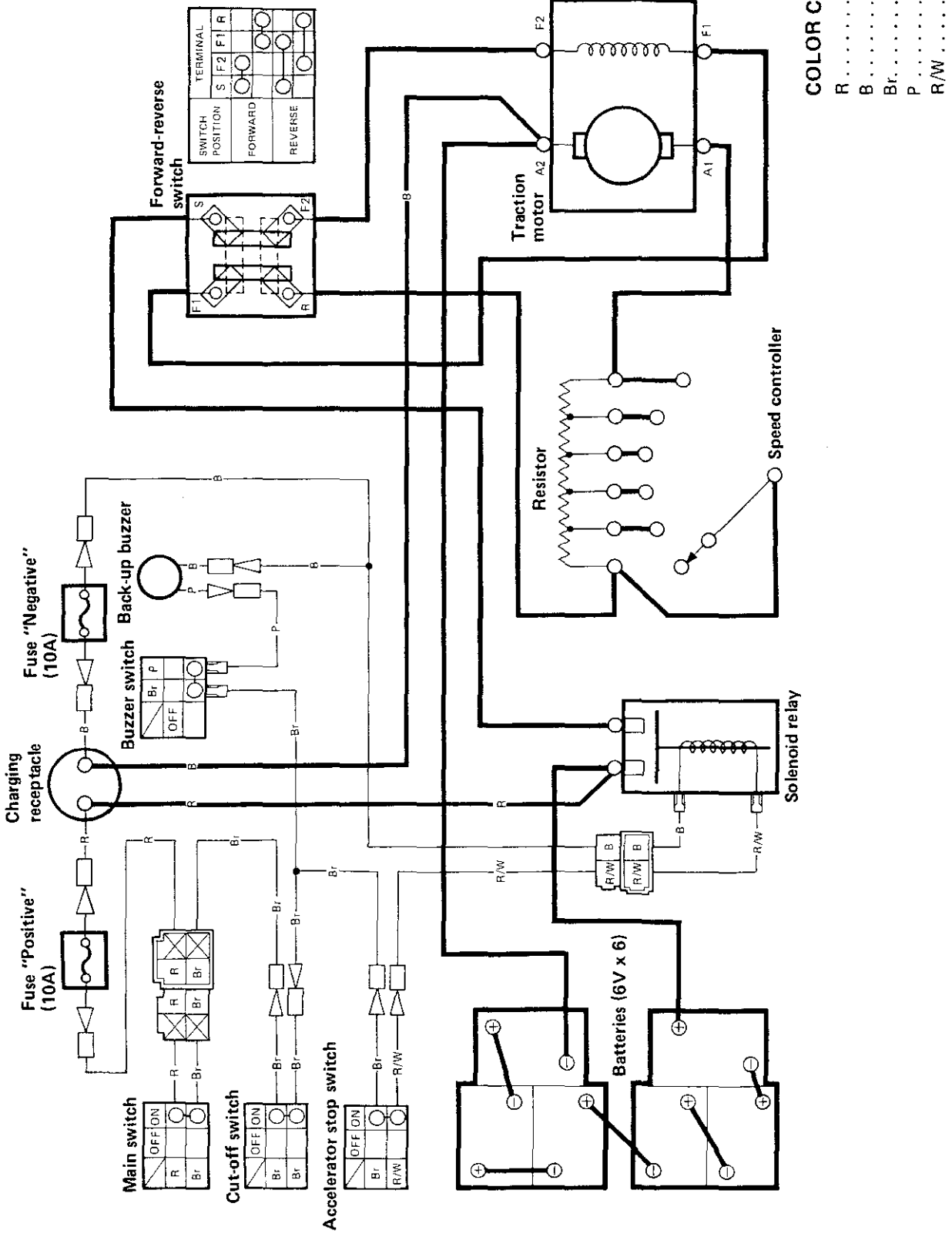
MOTOR (FOR G2-E)

Condition	Possible Cause	Correction
MOTOR DOES NOT TURN.	1. Brushes are off commutator.	Adjust properly or replace.
	2. Motor terminals are loose or corroded.	Tighten or clean.
	3. Leads are broken.	Check for breaks at bend or joint. Replace or repair leads.
	4. Field coil is open.	Repair or replace at a service shop.
	5. Armature coil is open.	Repair or replace at a service shop.
MOTOR TURNS SLOWLY.	1. Terminals are loose or corroded.	Retighten or clean.
	2. Leads are nearly broken or connections are faulty.	Check for any defect of leads at bend or joint. Replace leads or repair connections.
	3. Sweep arm movement is too short.	Adjust
	4. Mechanical problem inside motor.	Check
MOTOR IS NOISY.	1. Bolts are loose.	Retighten.
	2. Motor has foreign matter inside.	Clean motor interior.
	3. Bearings are faulty.	Replace
	4. Bearings contain foreign matter.	Replace
	5. Bearings need grease.	Replace
BEARING HEAT EXCESSIVE.	1. Bearings are faulty or lack grease.	Replace
	2. Improperly installed.	Adjust, replace if necessary.
RECTIFICATION IS IMPERFECT.	1. Load exceeds specification.	Adjust load to spec.
	2. Armature is out of round.	Repair or replace at service shop.
	3. Brushes are worn beyond limits.	Replace
	4. Commutator is excessively rough.	Smooth with sandpaper (#500 ~ 600).
	5. High mica segment.	Recondition at service shop.
	6. Commutator is dirty with oil or dust.	Clean with a cleaner, and dry cloth.
	7. Armature coil is shorted or broken.	Repair or replace at service shop.
VIBRATION	1. Motor installed loosely.	Retighten.
	2. Motor turns irregularly.	Repair or replace at service shop.

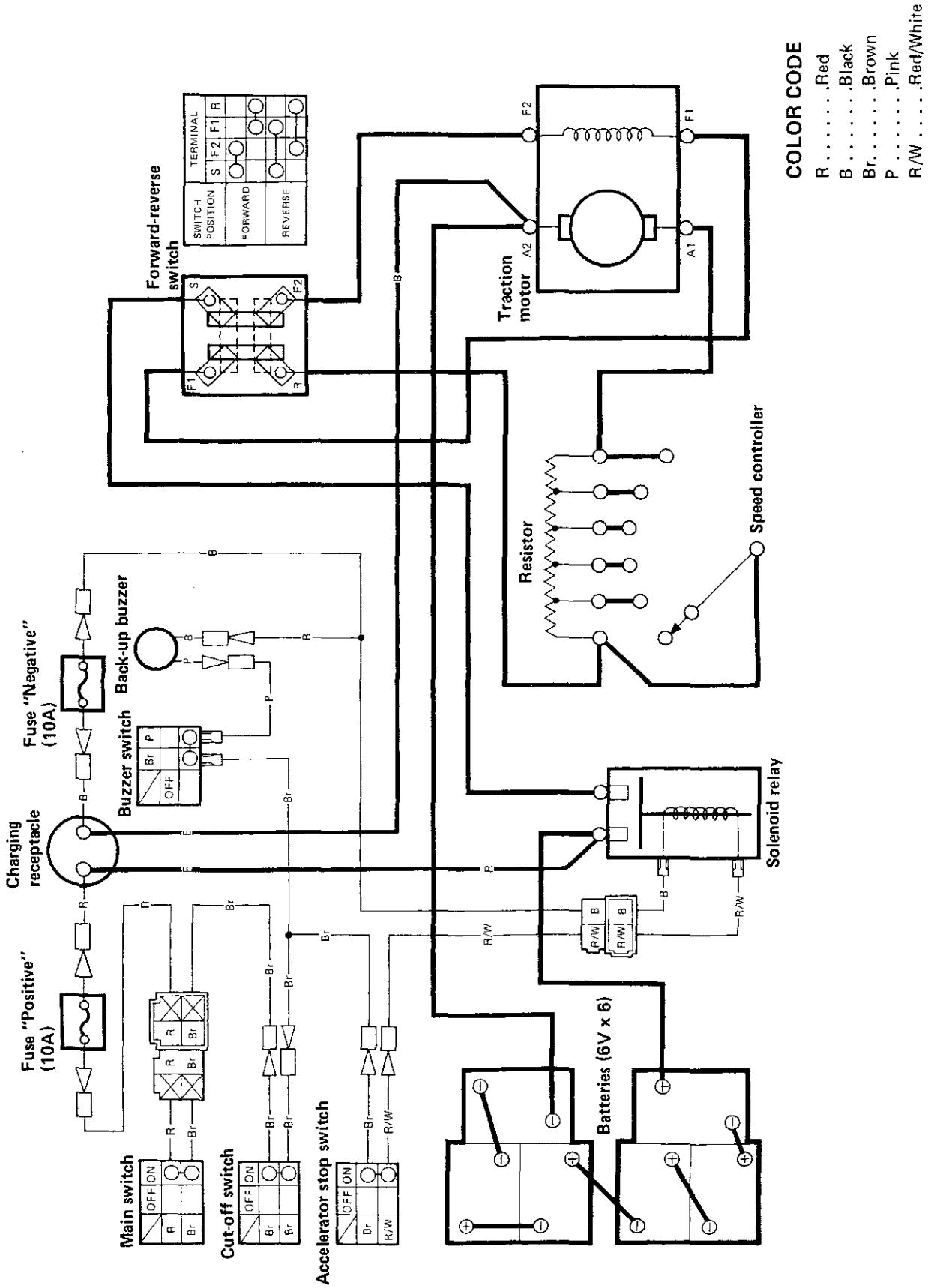
G2-A WIRING DIAGRAM



G2-E WIRING DIAGRAM



G2-E WIRING DIAGRAM



HOW TO USE THIS MANUAL

Particularly important information is distinguished in this manual by the following notations:

⚠ WARNING

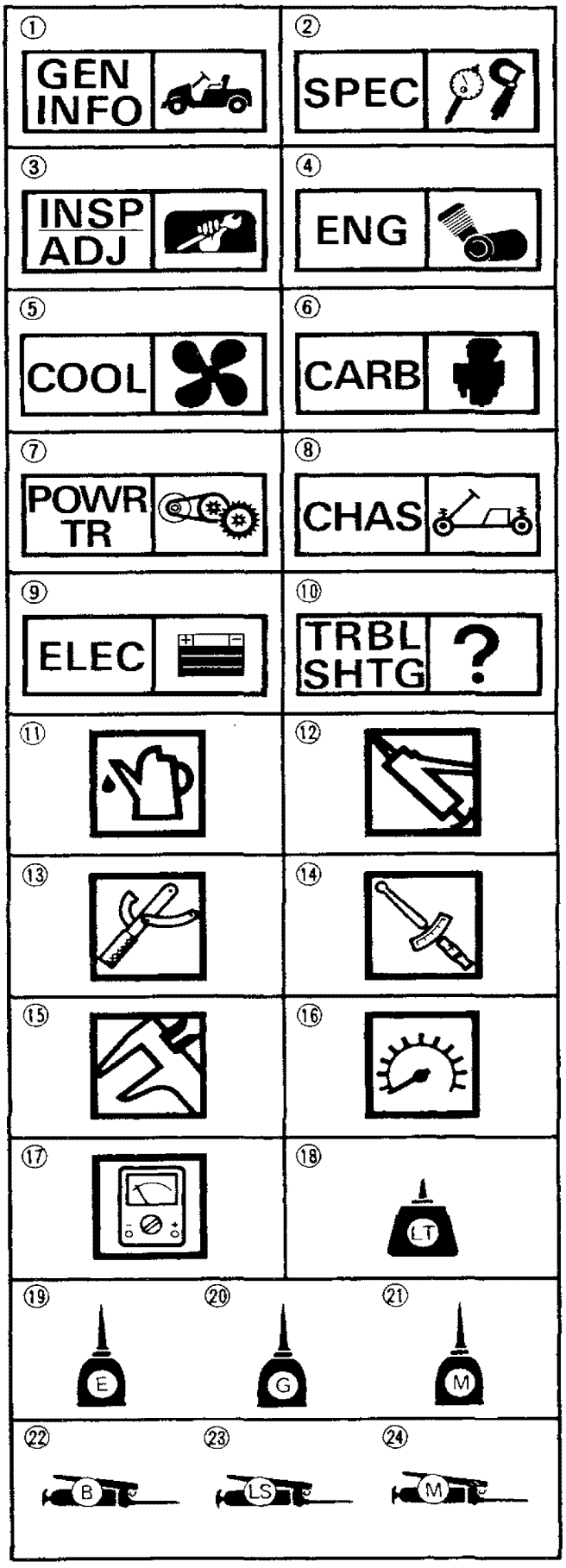
Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

IMPORTANT:

An IMPORTANT indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

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



ILLUSTRATED SYMBOLS

(Refer to the illustration)

Illustrated symbols ① to ⑩ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Power train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Illustrated symbols ⑪ to ⑰ are used to identify the specifications appearing in the text.

⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Tightening
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Ω, V, A

Illustrated symbols ⑱ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

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

INDEX

CONTENTS

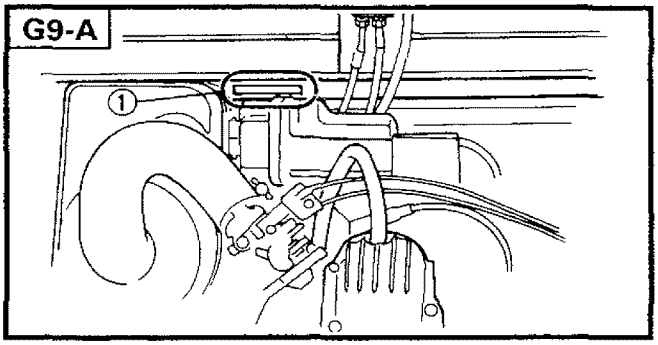
CHAPTER 1
GENERAL INFORMATION

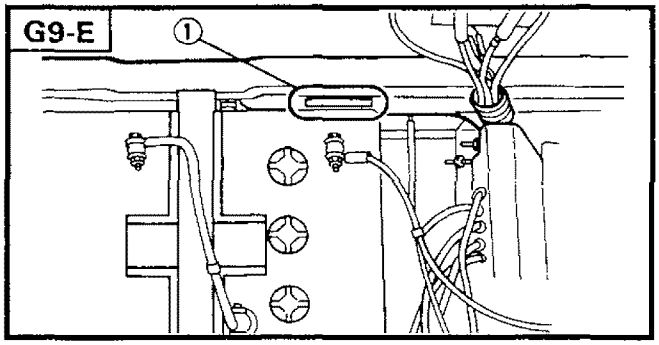
CHAPTER 2
SPECIFICATIONS

CHAPTER 3
PERIODIC INSPECTION AND ADJUSTMENT

CHAPTER 7
CHASSIS

CHAPTER 8
ELECTRICAL





GENERAL INFORMATION

CAR IDENTIFICATION

FRAME SERIAL NUMBER (Primary I.D)

The frame serial number ① is located on the rectangular pipe under the operator' s seat.

Starting Serial Number:	
G9-A	JG5-000101
G9-E	JG6-000101

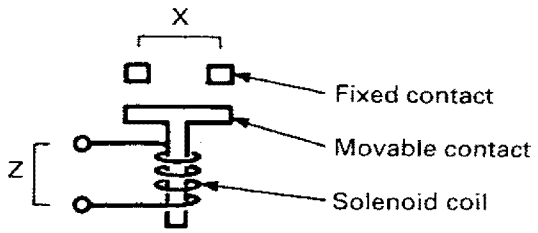
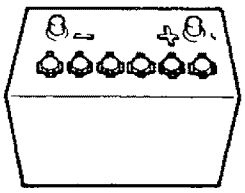
SPECIFICATIONS

GENERAL SPECIFICATIONS

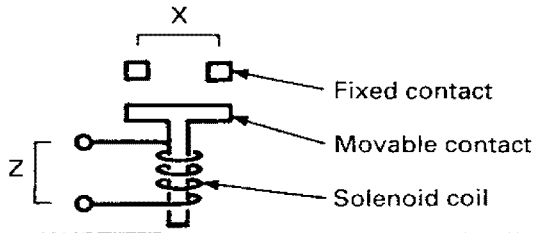
Model	G9-A	G9-E
Model Code Number: Frame Serial Number:	JG5 JG5-000101	JG6 JG6-000101
Dimensions:		
Overall Length	2,322 mm (91.4 in)	←
Overall Width	1,116 mm (43.9 in)	←
Overall Height (Steering height)	1,175 mm (46.3 in)	←
Height of Floor	285 mm (10.2 in)	←
Height of Seat from Floor	420 mm (16.5 in)	←
Wheelbase	1,550 mm (61.0 in)	←
Tread:		
Front	900 mm (35.4 in)	←
Rear	900 mm (35.4 in)	←
Min. Ground Clearance	104 mm (4.1 in)	←
Weight:		
Dry Weight (Without battery)	275 kg (606 lb)	232 kg (512 lb)
Fuel tank capacity: Oil tank capacity:	24.0 L (6.3 gal) 1.1 L (1.16 qt)	
Color:	Ivory white	

MAINTENANCE SPECIFICATIONS

ELECTRICAL (FOR G9-A)

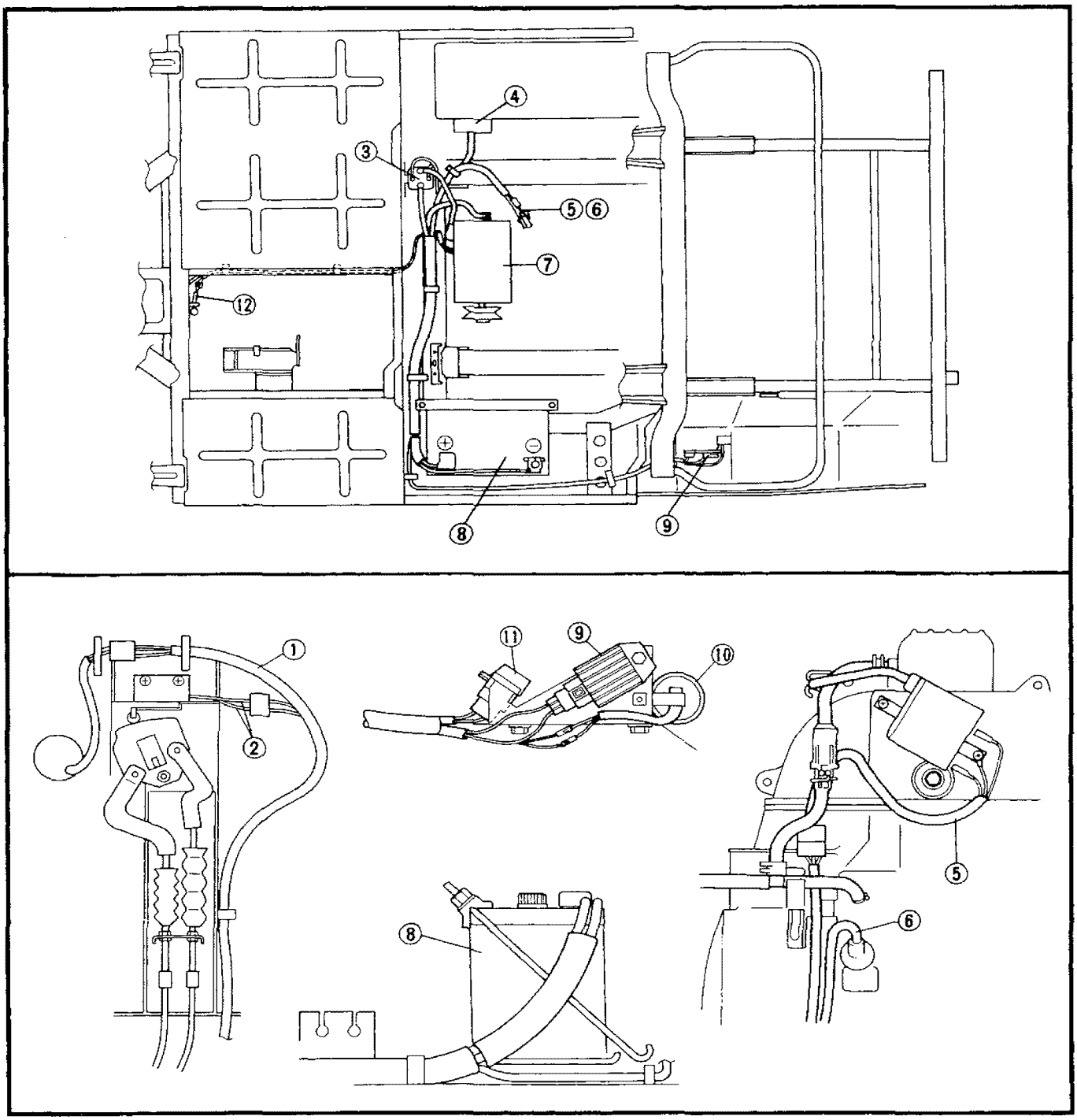
Model	G9-A
TCI Unit: Model/Manufacturer Brush Length Std./Min. Spring Pressure/Q'ty Commutator Outside Dia. Mica Undercut/No. of Slots	 JG5-00/MITUSBISHI 26.5 mm (0.9 in)/16 mm (0.63 in) 300 ~ 500 g (10.6 ~ 17.6 oz)/4 pcs. 40.9 ~ 41.1 mm (1.61 ~ 1.62 in) 0.7 mm (0.028 in)/41 pcs.
Voltage Regulator: Type Model/Manufacturer Regulated Voltage (No lead)	 Transistor JF2-00/SHINDENGEN 14.0 ~ 15.0V
Solenoid Relay: Model/Manufacturer Amperage Rating Solenoid Coil Resistance (Z) Resistance (X) 	 586-117111/ESSEX CONTROLS 100A Z: 189Ω ± 10% X: OFF ∞ ON 0Ω
Battery: Model Capacity Specific Gravity Dimension (W x H x T) Terminal Description	 BCI Group 24 (12V-48AH) RC : minimum 70 min CCA : minimum 300A 1.280 6-3/4 x 10-1/4 x 9 in
Back Buzzer: Type Model/Manufacturer Frequency Current	 Continuous beep WBS-36/NIKKO 500 ~ 700 Hz Less than 0.05A
Fuse: Amperage x Q'ty Plus Fuse	 10A x 1

ELECTRICAL (FOR G9-E)

Model	G9-E
Motor Controller:	FET (Field Effect Transistor) chopper
Solenoid Relay: Model/Manufacturer Amperage Rating Solenoid Coil Resistance (Z) Resistance (X)  	586-117111/ESSEX CONTROLS 100A Z: 189Ω ± 10% X: OFF ∞ ON 0Ω
Back Buzzer: Type Model/Manufacturer Frequency Current	 Continuous beep WBS-36/NIKKO 500 ~ 700 Hz Less than 0.05A
Fuse: Amperage x Q'ty Plus Fuse	 10A x 1

CABLE ROUTING (FOR G9-A)

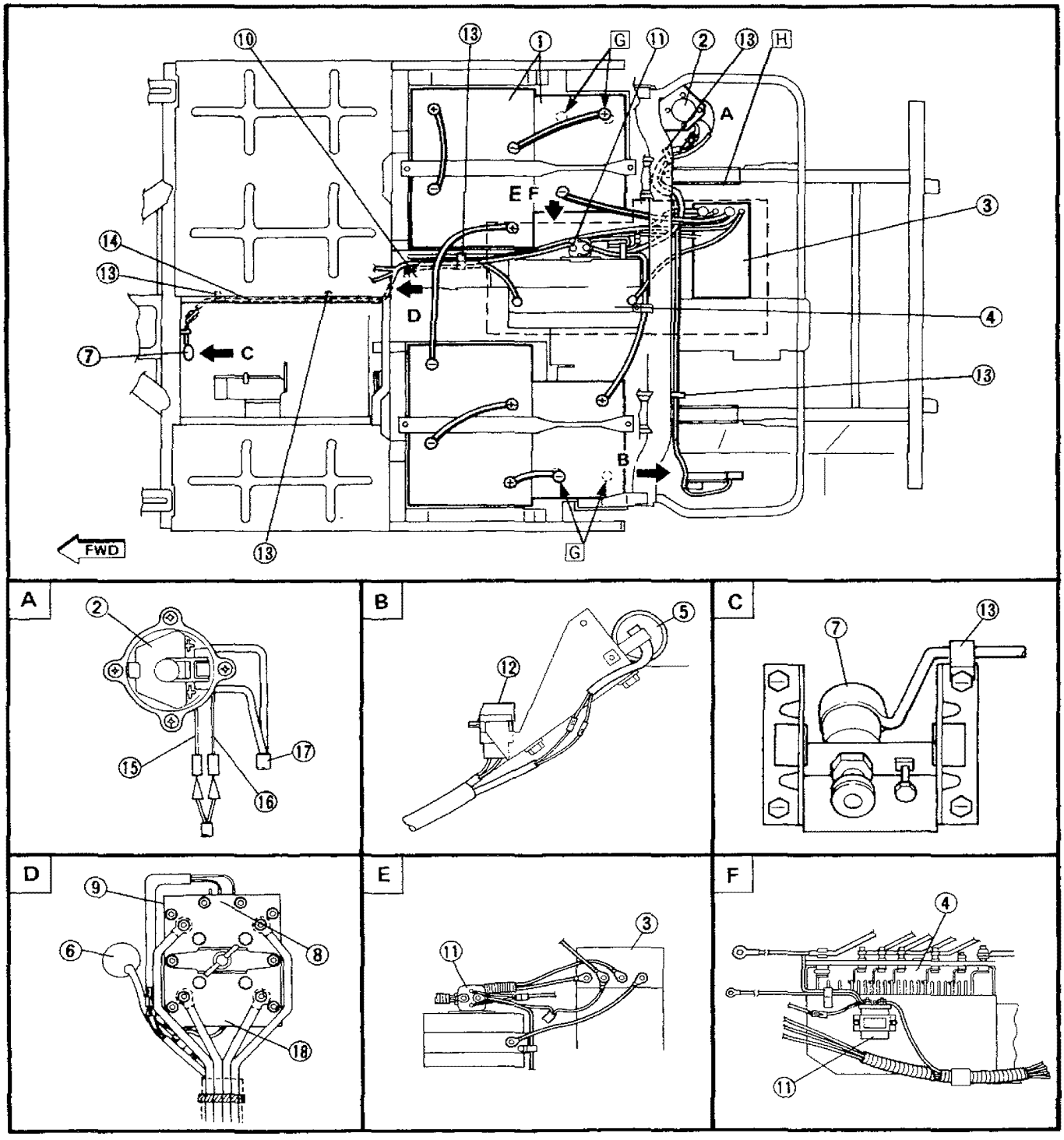
① Main switch lead
② Back-up buzzer switch lead
③ Solenoid relay
④ Ignitor unit
⑤ Ignition coil lead
⑥ Pickup coil lead
⑦ Starter-generator
⑧ Battery
⑨ Voltage regulator
⑩ Back-up buzzer
⑪ Fuse
⑫ Accelerator stop switch

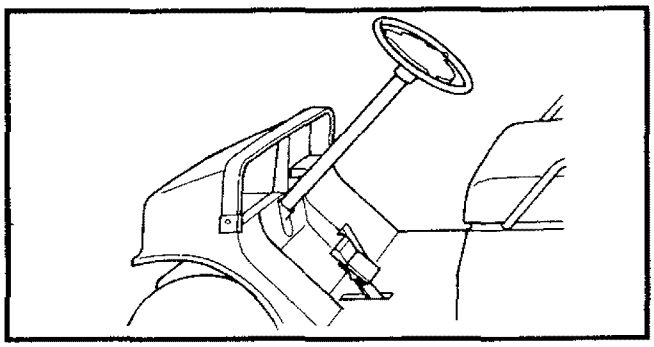


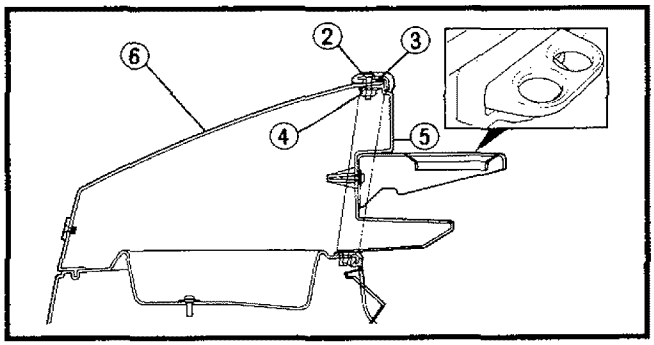
CABLE ROUTING (FOR G9-E)

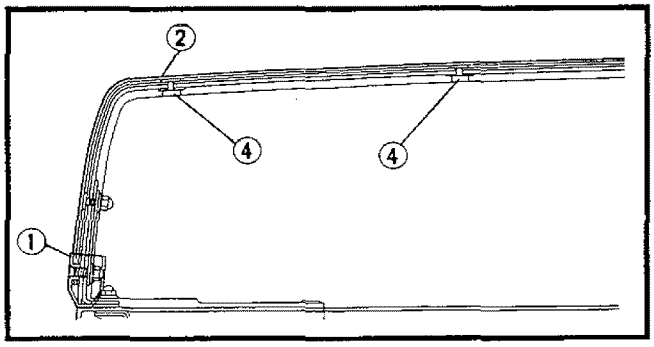
① Batteries
② Charging receptacle
③ Traction motor
④ Resistor
⑤ Back-up buzzer
⑥ Main switch
⑦ Accelerator stop switch
⑧ Buzzer switch
⑨ Forward-reverse switch
⑩ Speed controller
⑪ Solenoid relay
⑫ Fuse (+)
⑬ Clamp
⑭ Wire harness
⑮ Red lead
⑯ Black lead
⑰ Lead wire
⑱ Cut-off switch

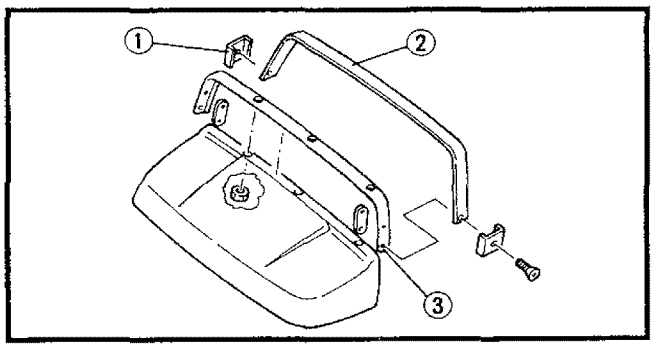
[A] A VIEW
[B] B VIEW
[C] C VIEW
[D] D VIEW
[E] E VIEW
[F] F VIEW
[G] THE DRAIN HOLE OF BATTERY TRAY MUST FACE THE OUTSIDE OF THE VEHICLE.
[H] COVER THE LEADS SO THAT THEY DO NOT MAKE CONTACT WITH THE TERMINALS A1 AND F1.











PERIODIC INSPECTION AND ADJUSTMENT

FRONT UPPER COWL REMOVAL

1. Remove:
   - Protector end cap ① (Right and Left)
   - Trim nuts ④
   - Protector-1 ② with trim ③

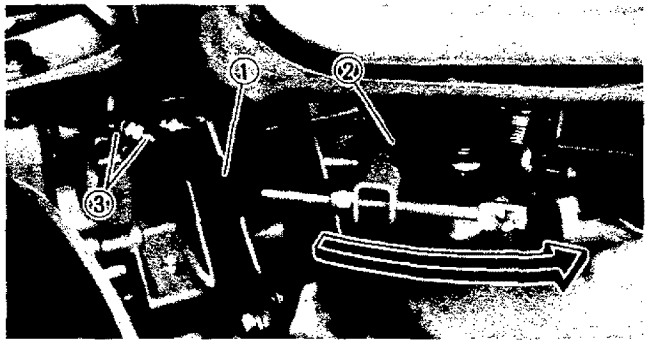
2. Remove:
   - Housing holder ⑤ with beverage holder
   - Front upper cowl ⑥

ENGINE

THROTTLE CABLE ADJUSTMENT

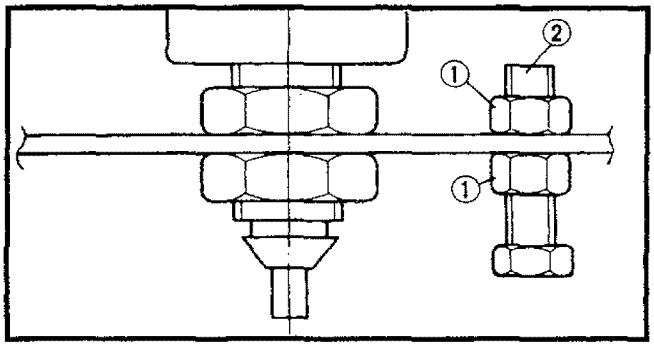
Full Throttle Adjustment

1. Turn the main switch to "OFF".
2. Block the wheel with wheel stoppers.
3. Remove:
   - Rear cowling
     Refer to "COWLING BODY" section.



4. Adjust:
   - Throttle cable 2 (Governor-Carburetor) ①

Throttle cable 2 adjustment steps:
- Swing the governor lever ② counter-clockwise until it stops completely.
- While keeping the lever in this position. Adjust the carburetor to the fully open position by turning the adjusting nut ③ in or out.



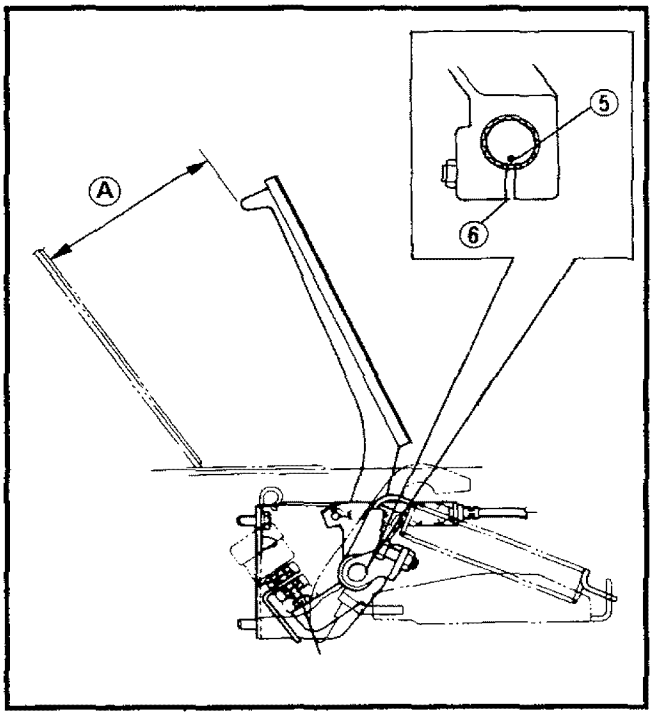
5. Adjust:
   - Accelerator pedal height

Accelerator pedal height adjustment steps:
- Loosen the locknuts ① .
- Adjust the pedal height Ⓑ by turning the stopper bolt ② .

Stopper bolt	Accelerator pedal height
Trun in	Lower
Trun out	Higher

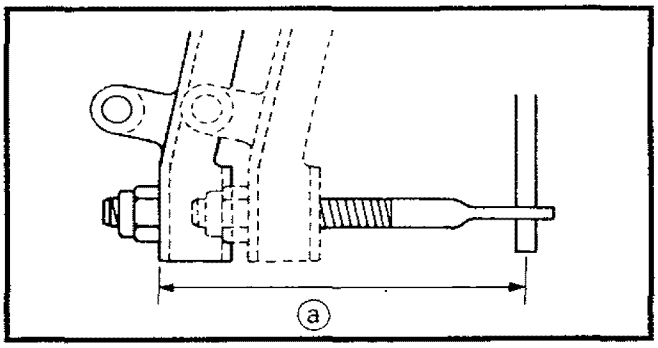
- Tighten the locknuts ① .

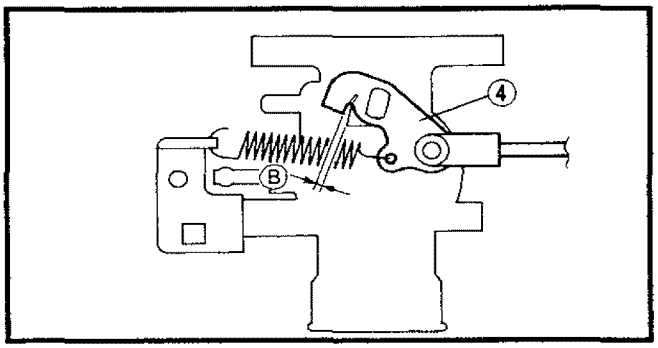
Pedal Height Ⓐ :
118 ~ 122 mm (4.64 ~ 4.80 in)

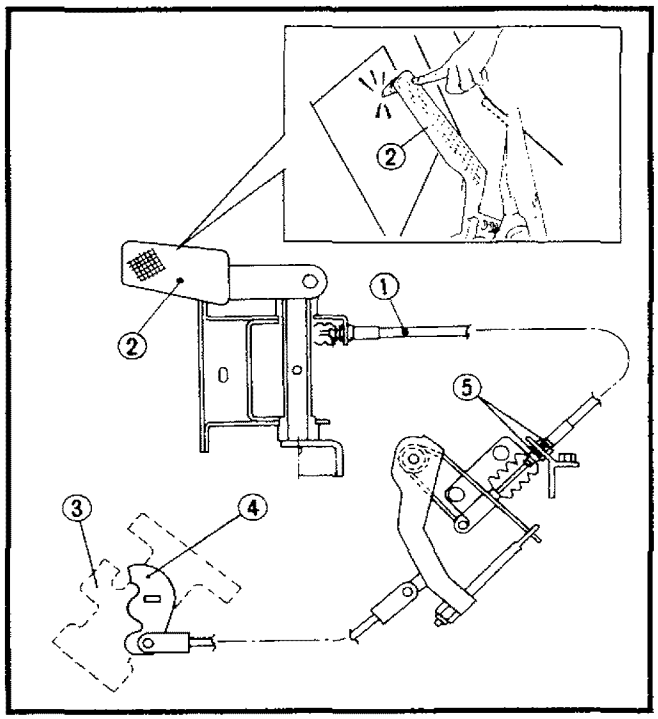


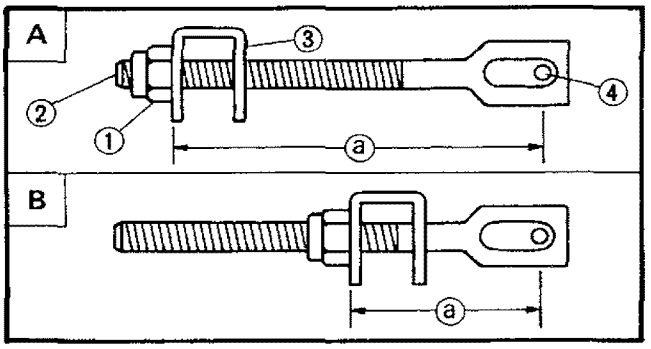
NOTE:

Be sure the punch mark ⑤ the on shaft aligns with the slit ⑥ in accelerator pedal.









6. Adjust:
   - Throttle cable ①
     (Accelerator Pedal-Governor)

Throttle cable 1 adjustment steps:
- Check the governor lever distance.

Recommended Distance ⓐ :
54 mm (2.13 in)

- **Depress the accelerator pedal ② fully.**
- **While keeping the pedal in this position, check that the throttle valve free play Ⓑ .**

Throttle Lever ④ Free Play Ⓑ :
0.2 ~ 0.5 mm (0.008 ~ 0.02 in)

- **If not, adjust the throttle cable 1 ① by turning the adjusting nuts ⑤ in or out.**
- **Adjust the speed limiter to initer to initial setting ⓐ .**

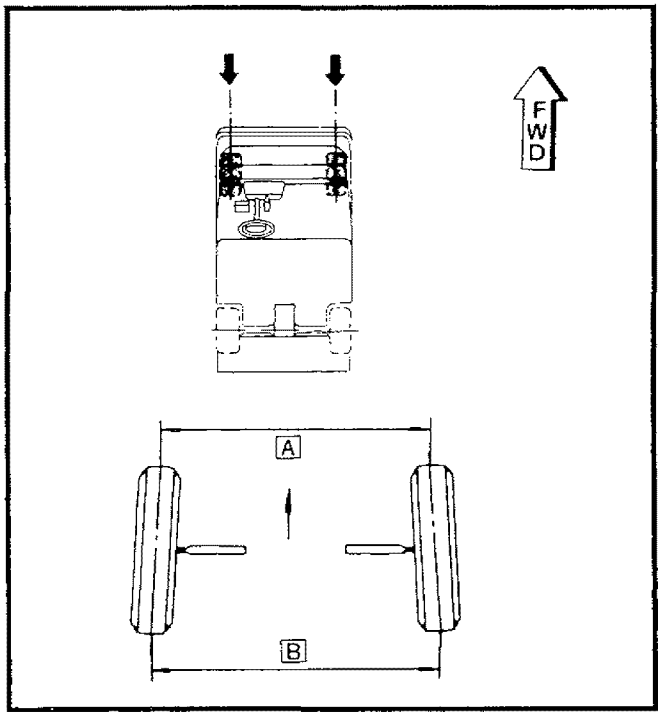
7. Adjust the limiter setting.

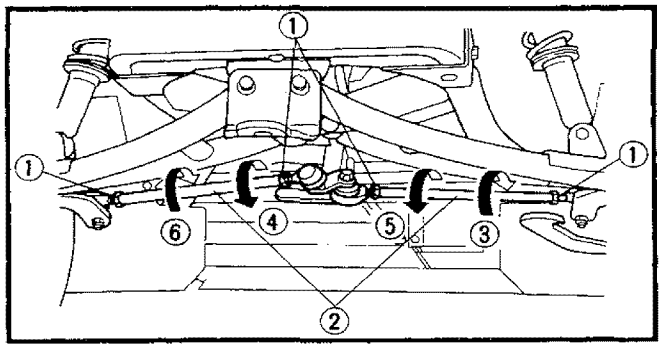
Limiter setting adjustment steps:
- Before getting started, mark the present setting position with a paint mark.
- Adjust the distance ⓐ by turning locknut ① .

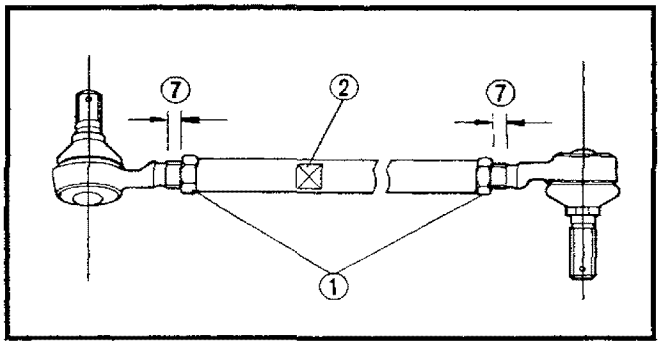
To Reduce Max. Speed → Turn locknut ① counterclockwise Ⓐ .
To Increase Max. Speed → Turn locknut ① clockwise Ⓑ .

8. Check:
   - Setting speed
     Compare the maximum speed with another golf car driving parallel.
     Improper setting → Readjust.

② Adjusting bolt
③ Governor lever
④ Torsion spring







CHASSIS

WHEEL ALIGNMENT

Toe-In

1. Place the vehicle on a level area.
2. Measure:
   - Toe-in
     Position the front wheels straight shead.
     Out of specification → Adjust

Toe-In (B − A):
Unloaded:
15 ± 5 mm (0.59 ± 0.2 in) G9-A
9 ± 5 mm (0.35 ± 0.2 in) G9-E

A Center to center at Front side tire tread.
B Center to center at Rear side tire tread.

Toe-in adjustment step:
- Appy the parking brake.
- Loosen the locknuts ① .
- Adjust the toe-in by turning the tie rods ② .

Toe-In	Left side	Right side	Tie-rod length
To Increase	③	④	Longer
To Reduce	⑤	⑥	Shorter

NOTE:
- When loosening or tightening the locknuts ① , hold the tie-rod at a flat section ② .
- The length of the threads ⑦ of both rod ends must be the same.

- Tighten the locknuts.

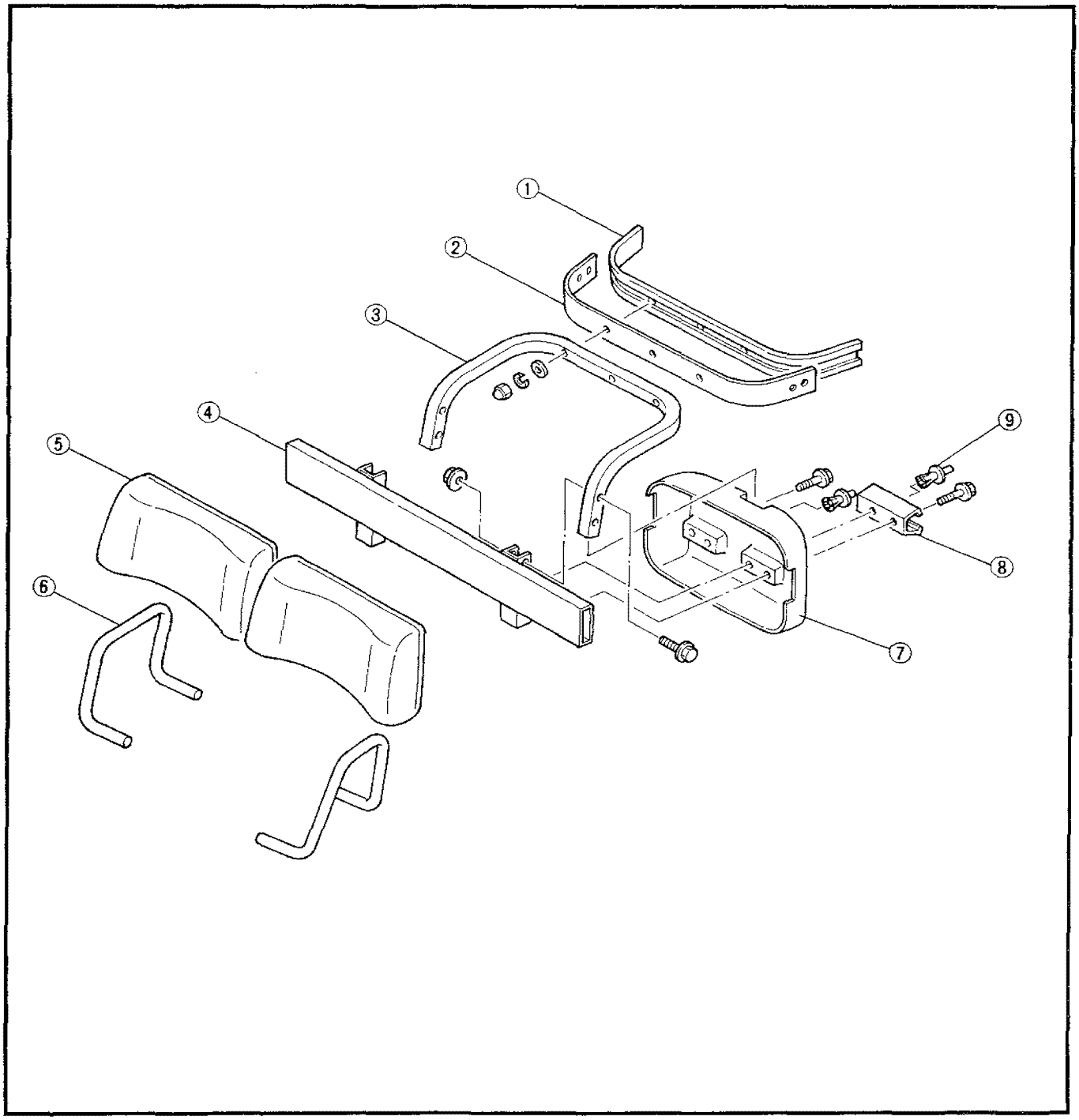
Rod End Locknut:
48 Nm (4.8 m • kg, 35 ft • lb)

- Turning the steering handle the right and left.
- Recheck the toe-in.
  Out of specification → Repeat adjustment steps.

CHASSIS

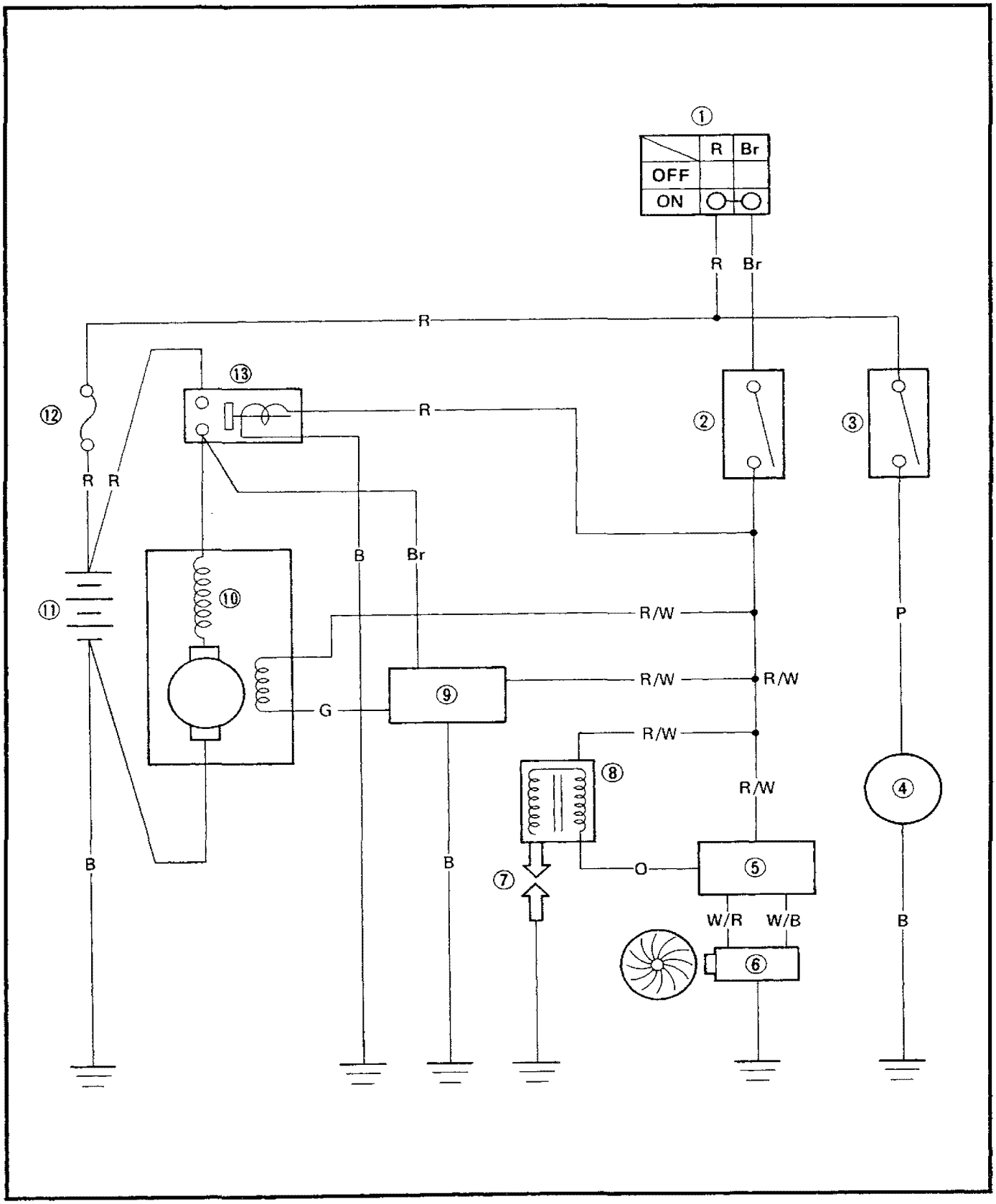
SEAT AND BAG SUPPORT

① Bag pad support
② Bag support
③ Bag upper support
④ Back seat support
⑤ Seat back
⑥ Arm-rest
⑦ Seat back cover
⑧ Boll holder
⑨ Blind rivet



ELECTRICAL

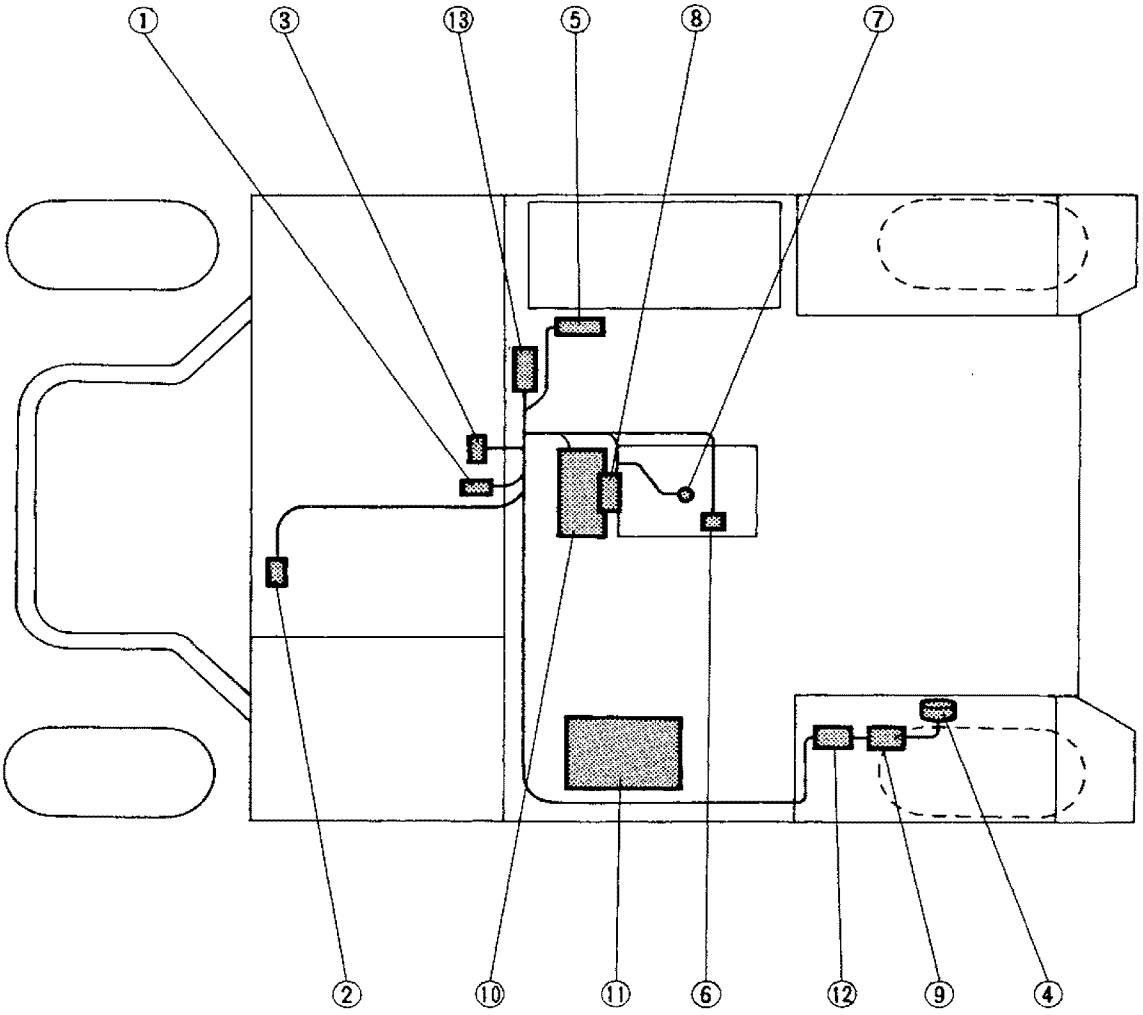
CIRCUIT DIAGRAM (FOR G9-A)



① Main switch
② Accelerator stop switch
③ Buzzer switch
④ Back-up buzzer
⑤ Ignitor unit
⑥ Pickup coil
⑦ Spark plug
⑧ Ignition coil
⑨ Voltage regulator
⑩ Starter-generator
⑪ Battery (12V)
⑫ Fuse (10A)
⑬ Solenoid relay

COLOR CODE

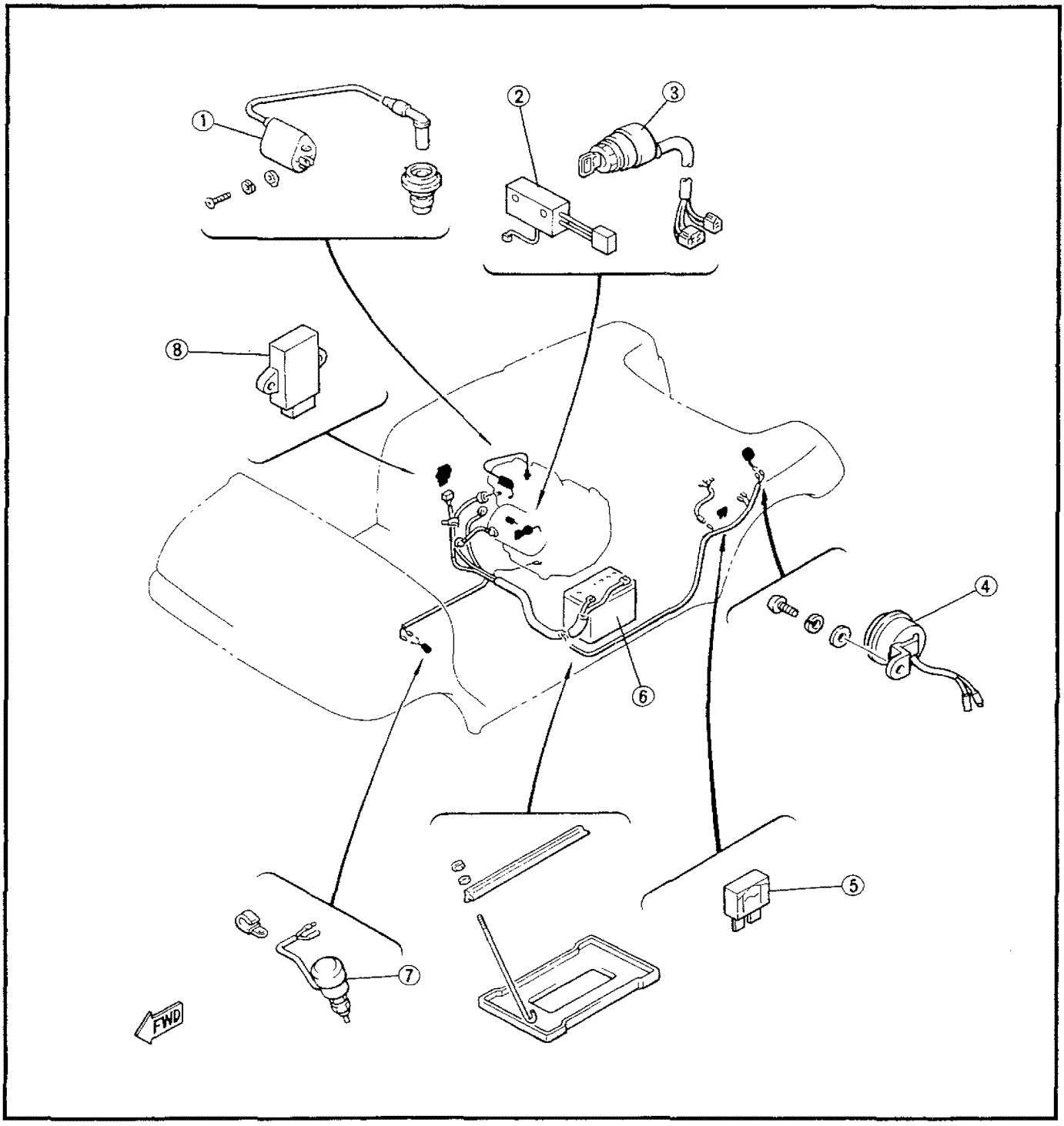
R .....Red
B .....Black
O .....Orange
Br .....Brown
G .....Green
P .....Pink
R/W .....Red/White
W/B .....White/Black



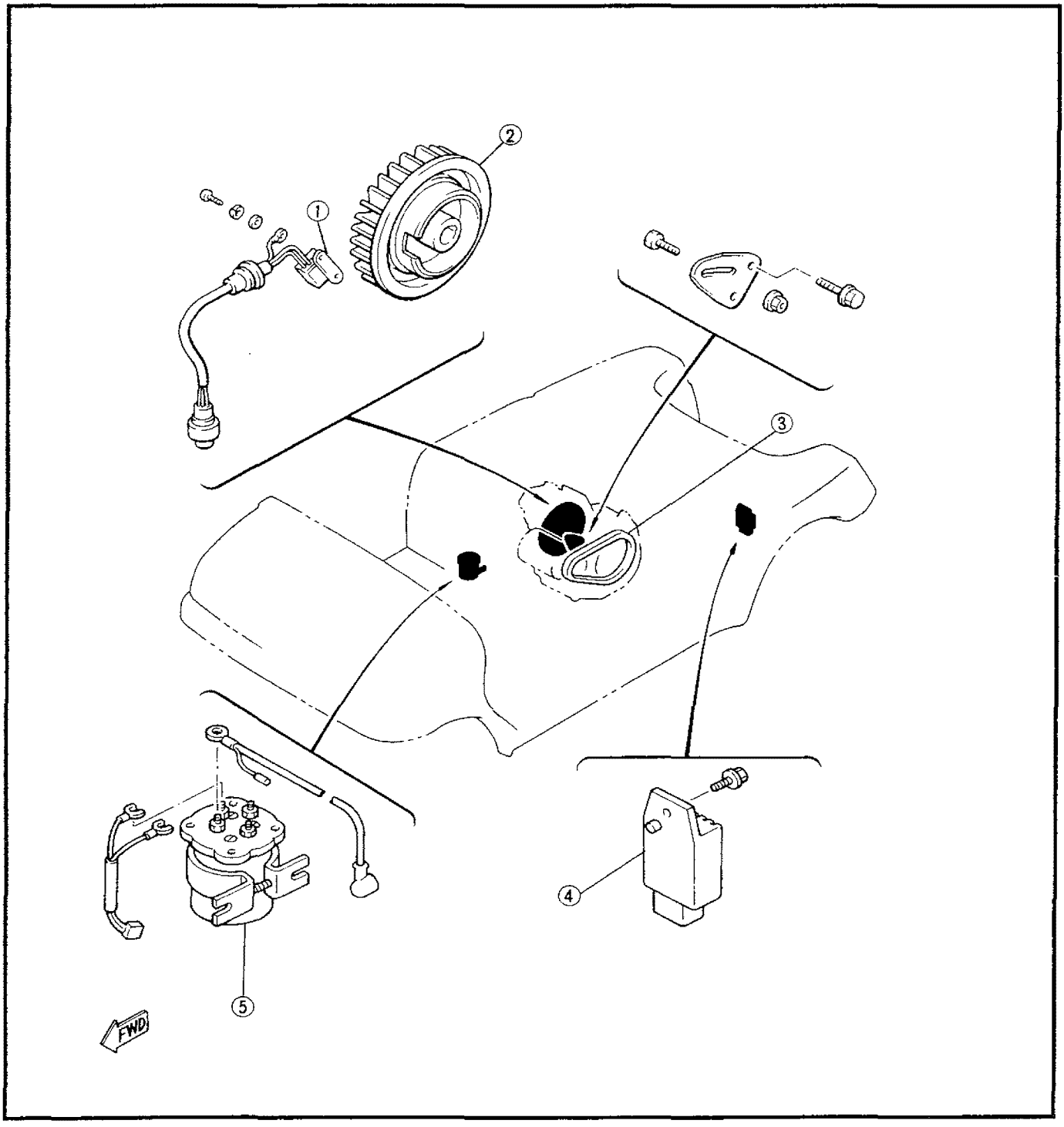
ELECTRICAL COMPONENTS

FOR G9-A

① Ignition coil
② Buzzer switch
③ Main swith
④ Back-up buzzer
⑤ Fuse
⑥ Battery
⑦ Accelerator switch
⑧ Ignitor unit

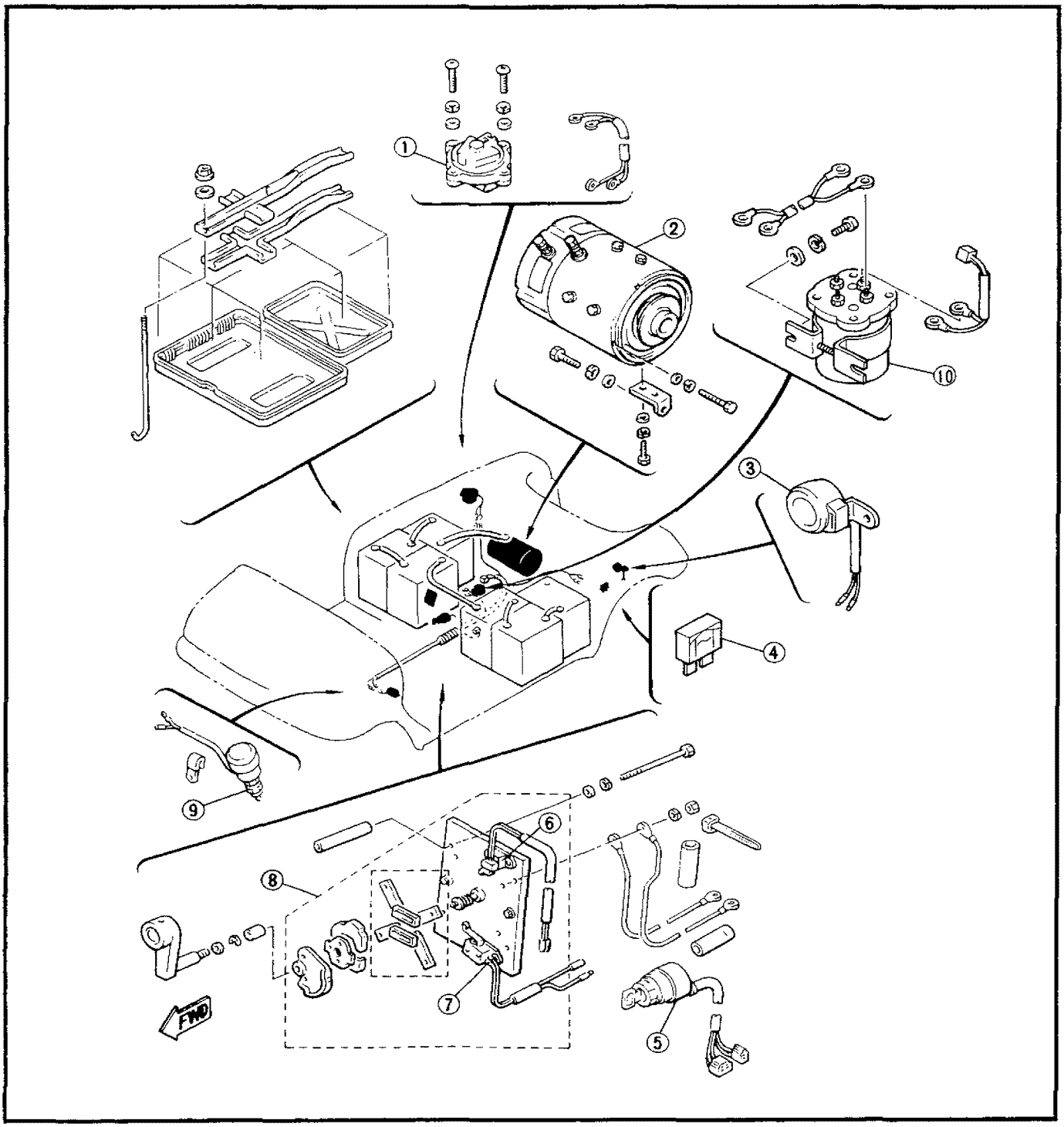


① Pickup coil
② Flywheel
③ Starter-generator belt
④ Voltage-regulator
⑤ Solenoid relay



FOR G9-E

① Charge receptacle
② Traction motor
③ Back-up buzzer
④ Fuse
⑤ Main switch
⑥ Buzzer switch
⑦ Cut-off switch
⑧ Speed controller assembly
⑨ Accelerator stop switch
⑩ Relay assembly

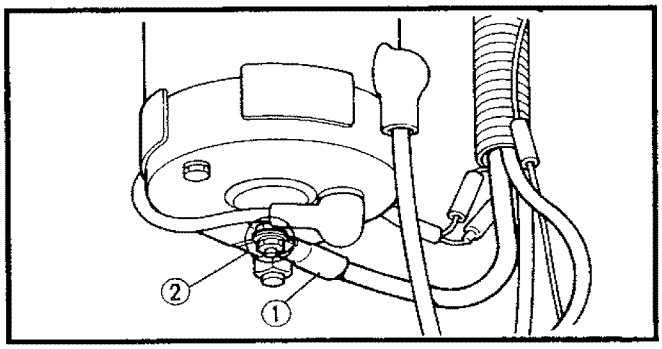


STARTING AND CHARGING SYSTEM

SOLENOID RELAY

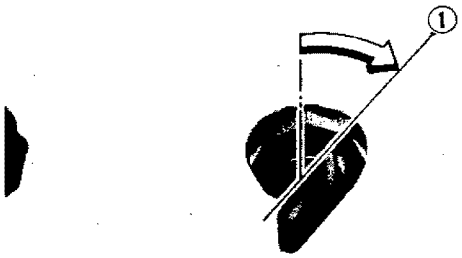
Function

The solenoid coil, when activated by closing the engine stop switch, closes the solenoid contacts, thus providing the starter with current.

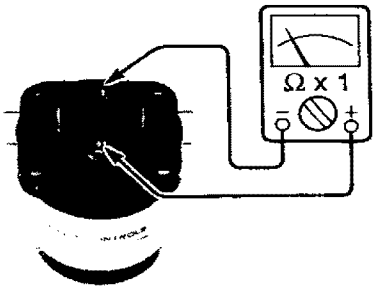


Inspection

1. Remove the seat.
2. Disconnect:
   - Starter-generator lead (Black) ①
     From terminal A1 ② .
3. Insulate the lead end with tape.



4. Turn the main switch to "ON"①.
5. Check:
   - Solenoid relay (Clicking)
     Press the accelerator pedal to close the engine stop switch.
     Not clicking → Measure coil resistance.
6. Disconnect the solenoid coil leads.
7. Measure:
   - Coil resistance
     Use the Pocket Tester ② .
     Out of specification → Replace.
     Within specification → Inspect starting circuit.
     Refer to "TROUBLESHOOTING" section.



	**Pocket Tester:** **YS-03112, 90890-03112**

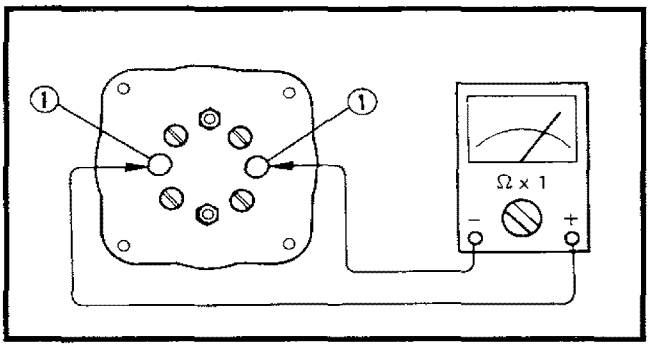
For G9-A

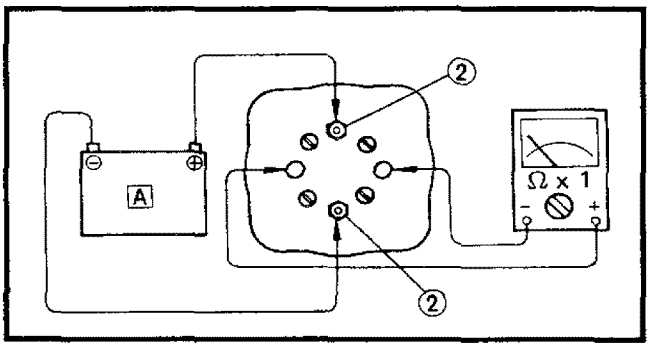
	**Solenoid Coil Resistance:** **18.9 ~ 23.1Ω at 20° C (68° F)**

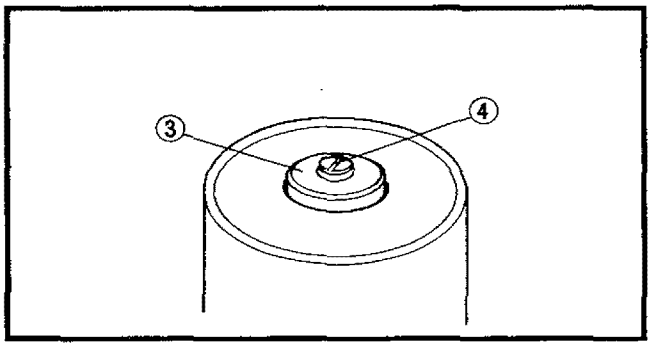
For G9-E

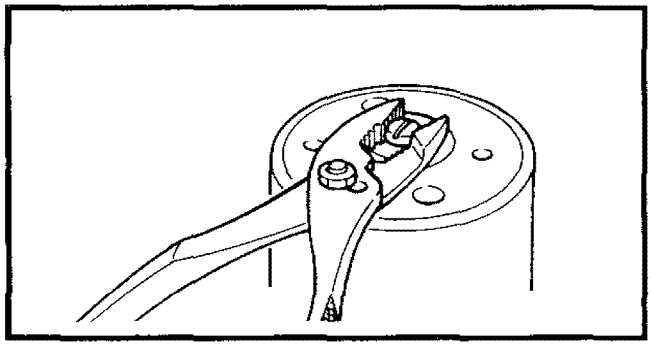
	**Solenoid Coil Resistance:** **56.2 ~ 68.6Ω at 20°C (68°F)**

8. Check for continuity between the two contact posts with Pocket Tester, while the solenoid is activated. If there is no continuity, replace the relay.









9. Adjust:
   - Air gap (Plunger)

Air gap adjusting steps:

- Connect a Pocket Tester (Ω x 1) to main solenoid terminals ① .

NOTE:

Then confirm the tester shows ∞ Ω.

- Connect the battery to the small solenoid terminals ② .

A For G9-A: 12V
For G9-E: 36V

- Hold the plunger ③ .
- Turn the shaft ④ clockwise until the needle on the tester just starts to move. Then, turn the shaft another 1 ± 1/8 turn clockwise.

NOTE:

Then confirm the tester shows zero Ω.

- Disconnect the battery and the Pocket Tester.

10. Stake the shaft screw slot by squeezing the collar around it.

NOTE:

Be careful not to squeeze too tight.

11. Install:
    - Collars
    - Plate
    - Rubber cover

Installation

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

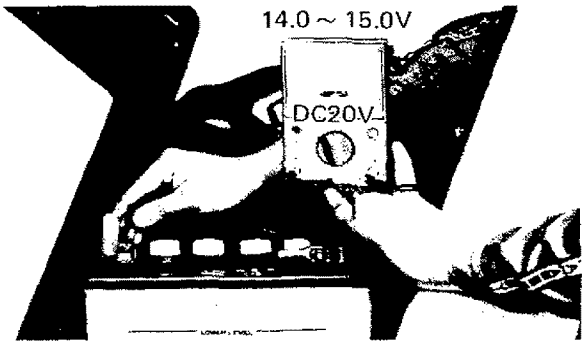
1. Install:
   - Solenoid relay
2. Connect:
   - Solenoid leads
   - Battery negative lead

VOLTAGE REGULATOR (FOR G9-A)

Generator Voltage Inspection

1. Connect the Pocket Tester (DC20V) to the battery.

	Pocket Tester: **YS-03112, 90890-03112**



2. Lift the rear of the vehicle.
3. Start the engine and accelerate to about 2,500 rpm.
4. Measure:
   - Generator voltage
     Out of specification → Replace.

	Charging Voltage: **14 ~ 15V / 2,500 rpm.**

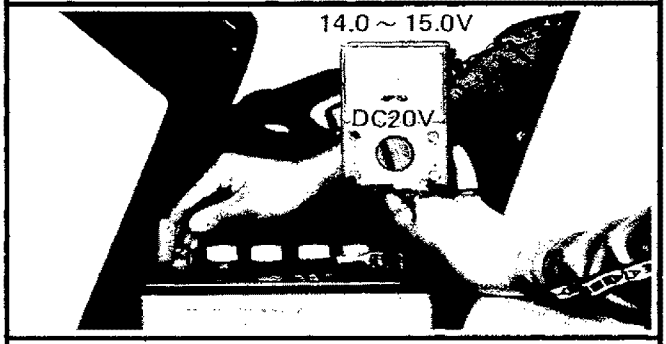
TROUBLESHOOTING

BATTERY IS NOT CHARGED

1. Charging voltage

- Connect the Pocket Tester (DC20V) to the battery.

Tester (+) Lead → Battery Positive Terminal
Tester (–) Lead → Battery Negative Terminal



- Lift the rear of the vehicle.
- Start the engine and accelerate to about 2,500 r/min.
- Measure the charging voltage.

Charging Voltage:
14.0 ~ 15.0V at 2,500 r/min

MEETS SPECIFICATION → Replace battery.

OUT OF SPECIFICATION

2. Charging coil resistance

- Disconnect the starter-generator thin leads (Red, Green).
- Connect the Pocket Tester(Ω x 1) to the starter-generator thin leads.

Tester (+) Lead → Red Lead
Tester (–) Lead → Green Lead

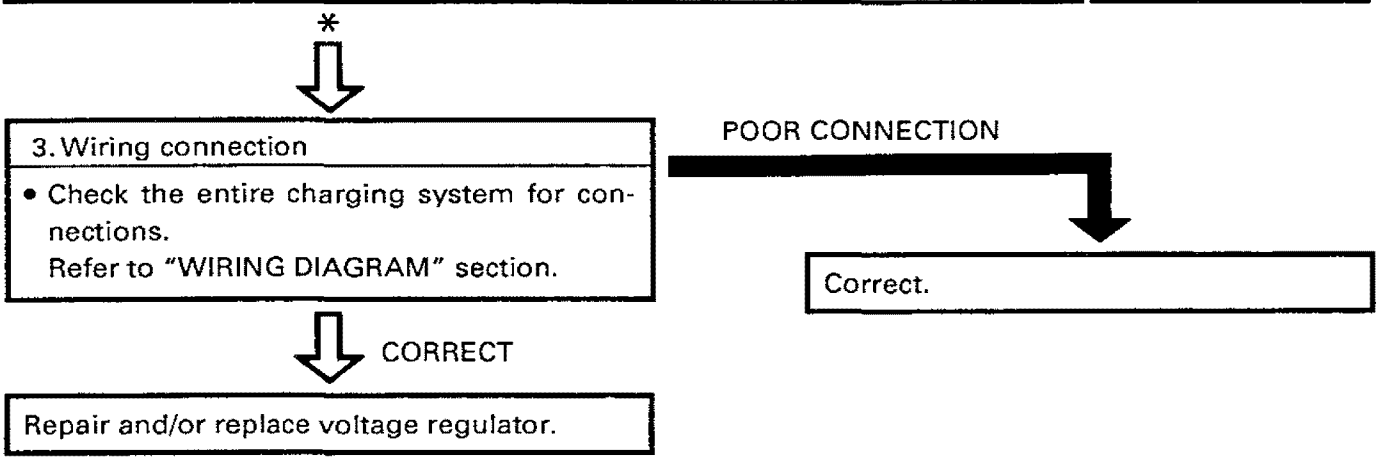
- Measure the charging coil resistance.

Charging Coil Resistance:
4.5 ~ 5.5Ω at 20° C (68°F)

OUT OF SPECIFICATION → Repair and/or replace starter-generator.

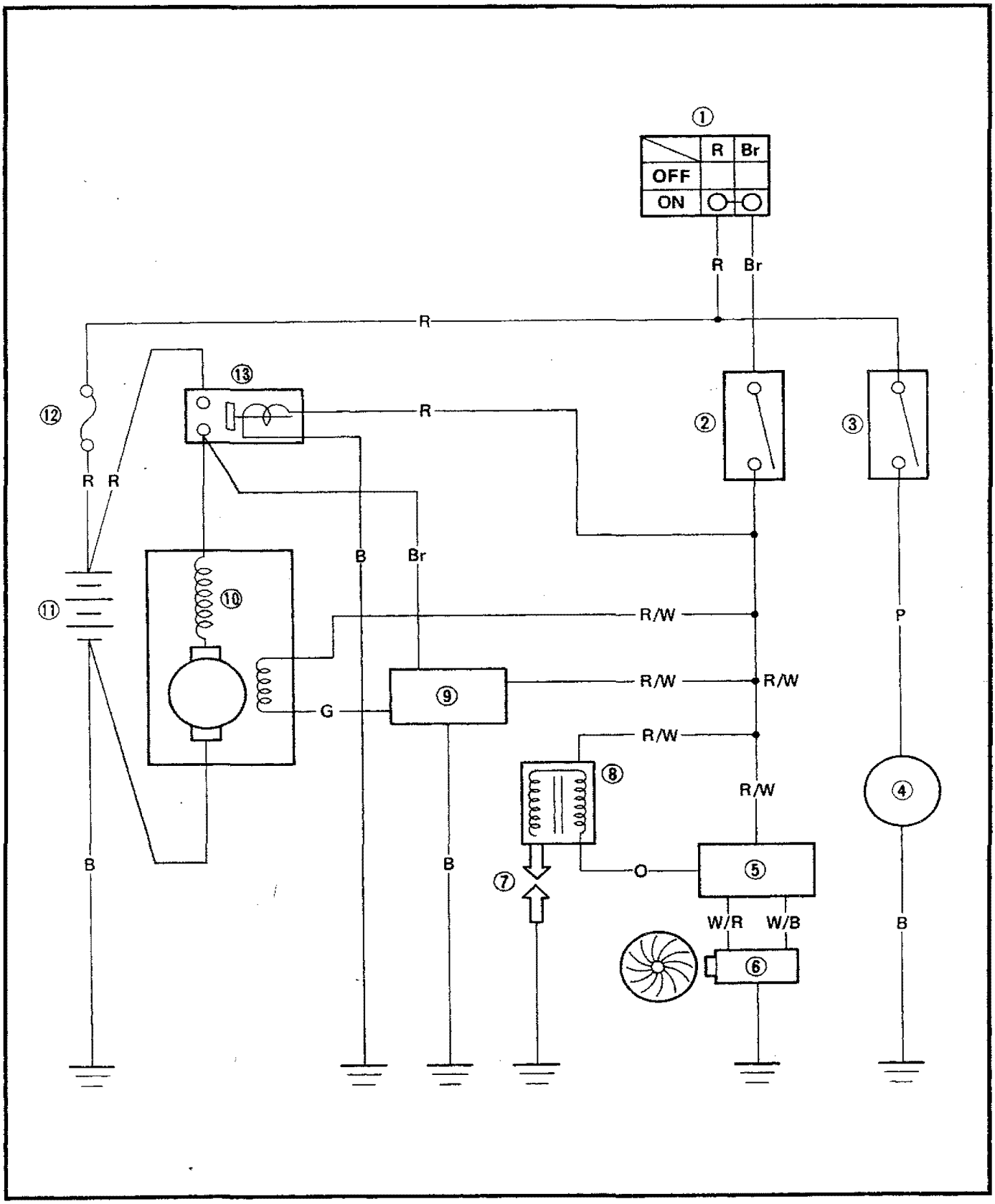
MEETS SPECIFICATION

*

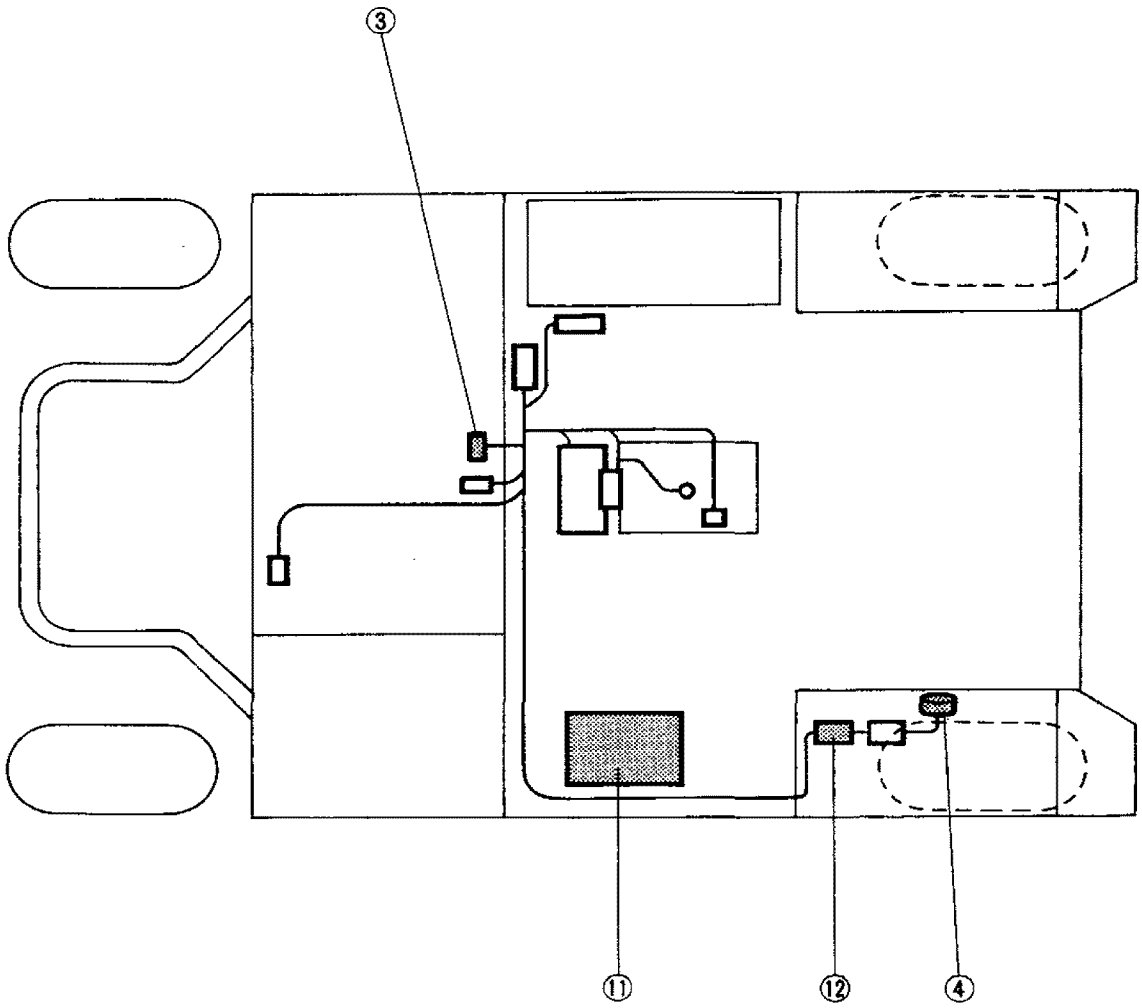

*
3. Wiring connection
• Check the entire charging system for connections.
Refer to "WIRING DIAGRAM" section.
POOR CONNECTION
Correct.
CORRECT
Repair and/or replace voltage regulator.

SIGNAL SYSTEM

CIRCUIT DIAGRAM (FOR G9-A)



③ Buzzer switch
④ Back-up buzzer
⑪ Battery (12V)
⑫ Fuse (10A)



TROUBLESHOOTING

THE BACK-UP BUZZER DOES NOT OPERATE

NOTE:

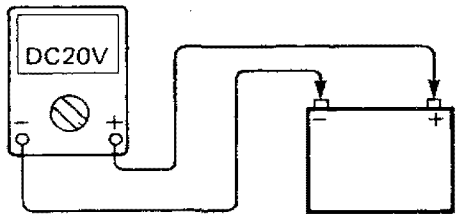
- Remove the following parts before troubleshooting.
  (1) Rear cowling
- Use the following special tool in this troubleshooting.

	Pocket Tester: **YS-03112, 90890-03112**

1. Battery

- Connect the pocket tester to battery terminals.
- Measure the battery voltage and fluid gravity.

Battery Voltage:
more than 10 V at 20°C (68°F)



OUT OF SPECIFICATION →
- Check the battery.
- Replace and/or charge battery.

OK ↓

2. Fuse

- Fuse
- Remove the cartridge fuse.
- Connect the Pocket Tester (Ω x 1) to the fuse.

NO →
Replace cartridge fuse.

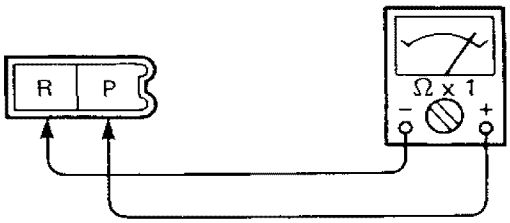
OK ↓

*

*

3. Buzzer switch

- Disconnect the buzzer switch coupler.
- Connect the Pocket Tester (Ω x 1) to the buzzer switch coupler.
- Turn the shift lever to the "FORWARD"and "REVERSE " positions.



- Check the buzzer switch for continuity.

	Good Condition
REVERSE	0 Ω
FORWARD	∞ Ω

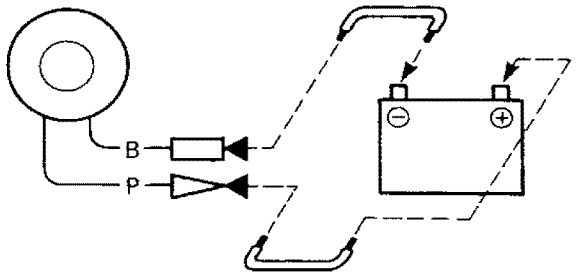
INCORRECT

Replace buzzer switch.

OK

4. Back-up buzzer

- Disconnect the back-up buzzer leads.
- Connect jumper leads to the back-up buzzer leads (Black, Pink) and battery.



- Confirm the back-up buzzer sounds.

NO

Replace back-up buzzer.

OK

5. Wiring connection

- Check the entire signal system for connection.
  Refer to "WIRING DIAGRAM" section.

YAMAHA

SERVICE MANUAL

G9-EC

LIT-19616-00-49

JH7-28197-10

NOTICE

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

Yamaha Motor Company Ltd. is continually striving to further 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.

SERVICE DEPT
LEISURE VEHICLES & POWER
PRODUCTS OPERATIONS
YAMAHA MOTOR CO., LTD

HOW TO USE THIS MANUAL

Particularly important information is distinguished in this manual by the following notations:

⚠ WARNING

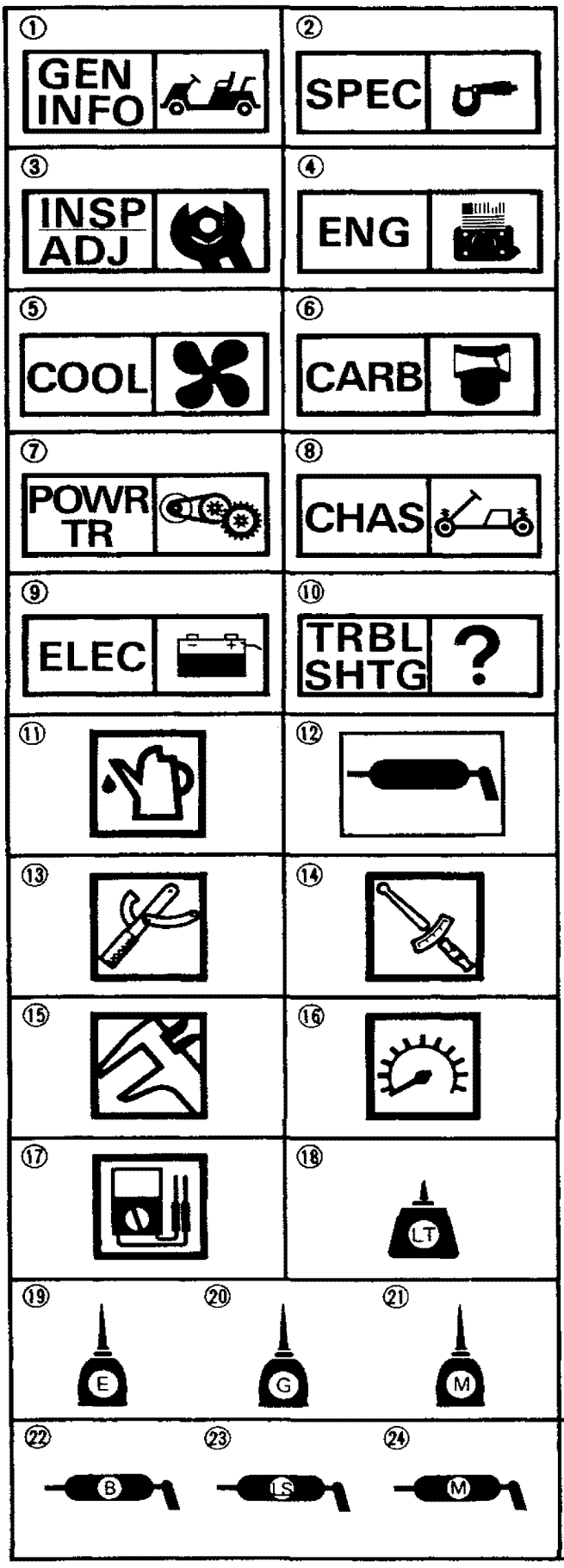
Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

IMPORTANT:

AN IMPORTANT indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

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



ILLUSTRATED SYMBOLS

(Refer to the illustration)

Illustrated symbols ① to ⑩ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Power train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Illustrated symbols ⑪ to ⑰ are used to identify the specifications appearing in the text.

⑪ Filling fluid
⑫ Lubricant
⑬ Special tool
⑭ Tightening
⑮ Wear limit, clearance
⑯ Engine speed
⑰ Ω, V, A

Illustrated symbols ⑱ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑱ Apply locking agent (LOCTITE®)
⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply wheel bearing grease
㉓ Apply lightweight lithium-soap base grease
㉔ Apply molybdenum disulfide grease
㉕ Apply Yamaha bond 5®

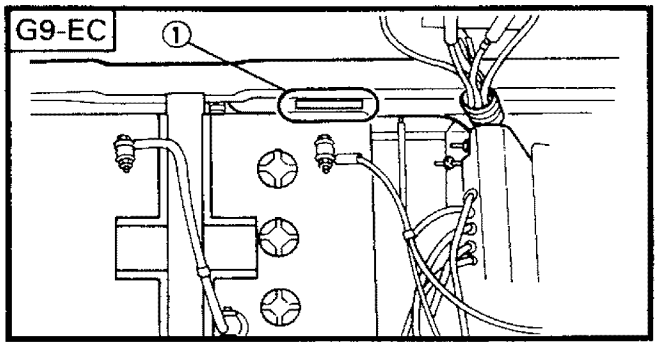
INDEX

CONTENTS

CHAPTER 1
GENERAL INFORMATION

CHAPTER 2
SPECIFICATIONS

CHAPTER 8
ELECTRICAL



GENERAL INFORMATION

CAR IDENTIFICATION

FRAME SERIAL NUMBER (Primary I.D)

The frame serial number ① is located on the rectangular pipe under the operator's seat.

Starting Serial Number:	
G9-E	.....JH7-000101

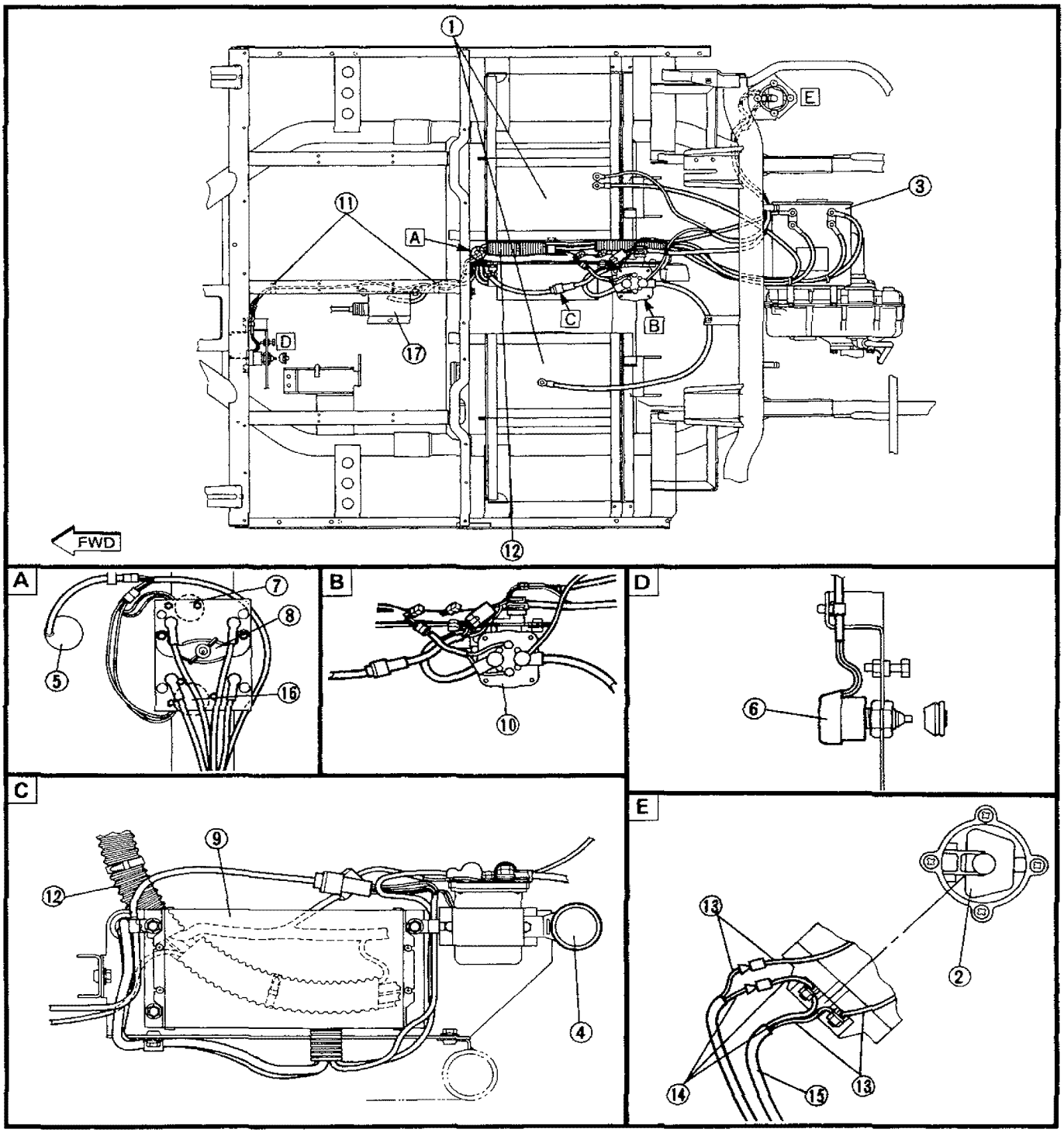
SPECIFICATIONS

GENERAL SPECIFICATIONS

Model		G9-EC
Model Code Number: Frame Serial Number:		JH7 JH7-000101
Dimensions: Overall Length Overall Width Overall Height (Steering height) Height of Floor Height of Seat from Floor Wheelbase Tread: Front Rear Min. Ground Clearance		 2,322 mm (91.4 in) 1,116 mm (43.9 in) 1,175 mm (46.3 in) 285 mm (10.2 in) 420 mm (16.5 in) 1,550 mm (61.0 in) 900 mm (35.4 in) 900 mm (35.4 in) 104 mm (4.1 in)
Weight: Dry Weight (without battery)		 232 kg (512 lb)
Color:		Ivory white
Vehicle Speed:	Forward Maximum Reverse Maximum	 19 Km/h (12 mph) 12 Km/h (7.5 mph)

① Batteries
② Charging receptacle
③ Traction motor
④ Back-up buzzer
⑤ Main switch
⑥ Accelerator swich
⑦ Buzzer switch
⑧ Forward-reverse switch
⑨ Motor control unit ass'y
⑩ Solenoid relay
⑪ Clamp
⑫ Wireharness
⑬ Red lead
⑭ Black lead
⑮ Lead wire
⑯ Cut-off switch
⑰ Throttle sensor

[A] A VIEW
[B] B VIEW
[C] C VIEW
[D] D VIEW
[E] E VIEW



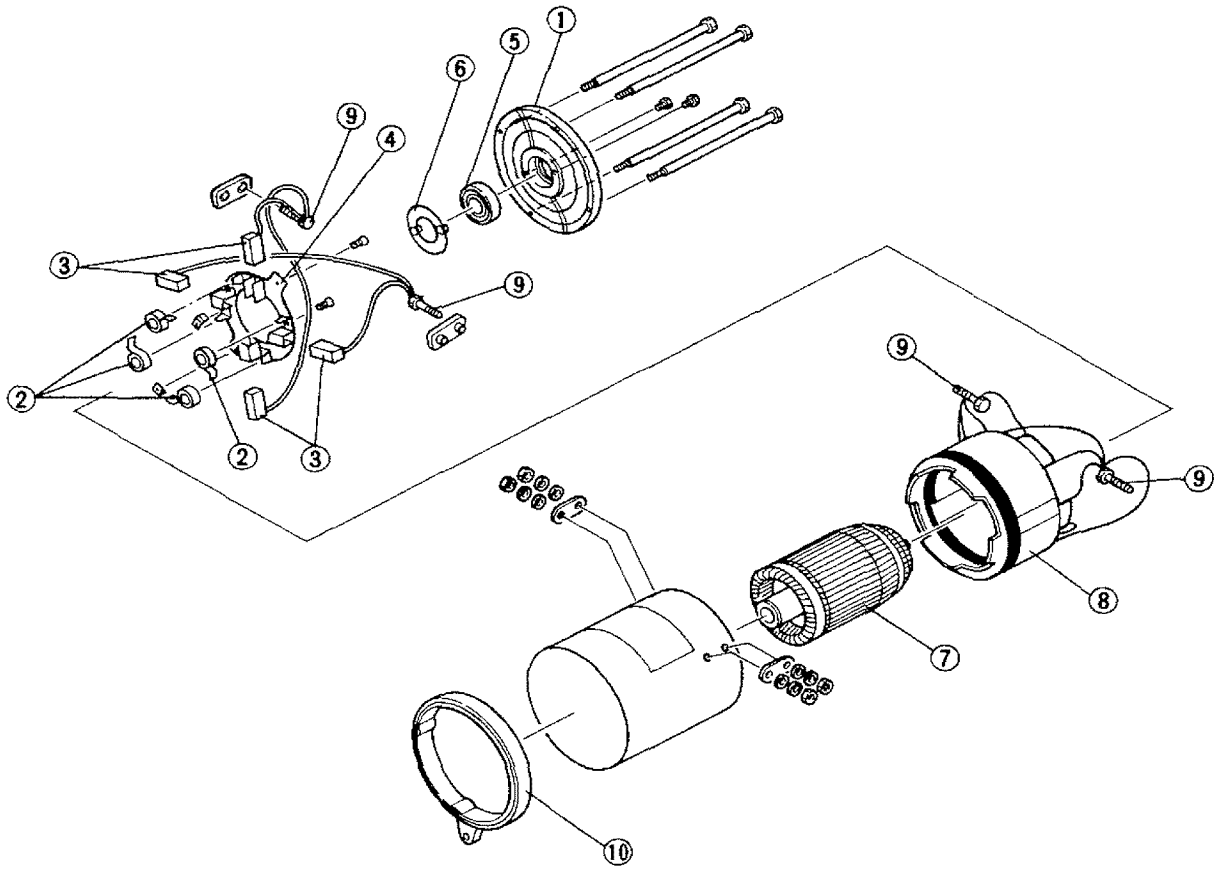
STARTING AND RECHARGING SYSTEM

G.E. TRACTION MOTOR

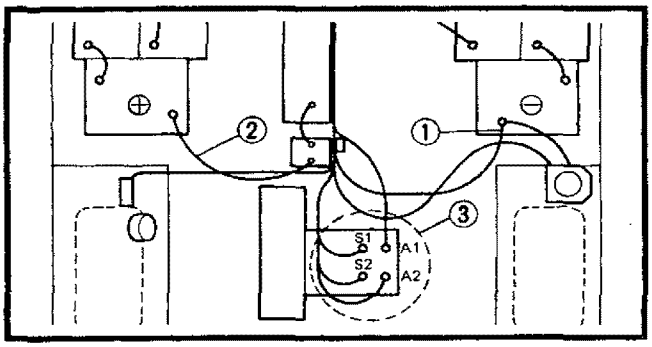
① Bracket
② Brush spring
③ Brush
④ Brush holder
⑤ Bearing
⑥ Bearing retainer
⑦ Armature assembly
⑧ Yoke
⑨ Terminal bolt
⑩ End bracket

SPECIFICATIONS	
Model	5BC58JBS6103
Voltage	36V
Rated output KW/HP	2.2 KW/2.97 HP (30 min.)
Performance	
Current	77A
Voltage	36V
Torque	6.8 ~ 8.3 Nm (0.68 ~ 0.83 m • kg, 4.9 ~ 6.0 ft • lb)
Revolution	2,300 ~ 2,900 r/min
Weight	16.5 kg (36.4 lb)

A	BRUSH LENGTH: Limit: 14.5mm (0.57 in) Standard: 34.3 mm (1.35 in)
B	BRUSH SPRING FORCE: New brush: 720 ~ 1,080 g (24.3 ~ 39.2 oz) Worn brush: 450 g (15.2 oz)
C	COMMUTATOR DIAMETER: Wear limit: 66.55 mm (2.62 in)

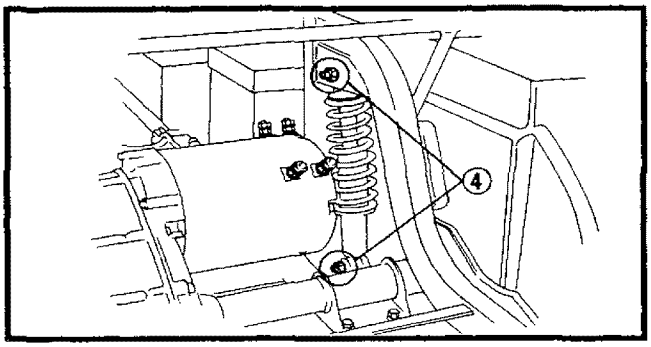


8

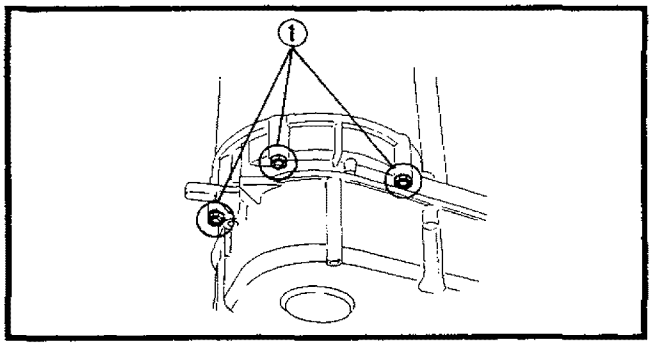


Removal

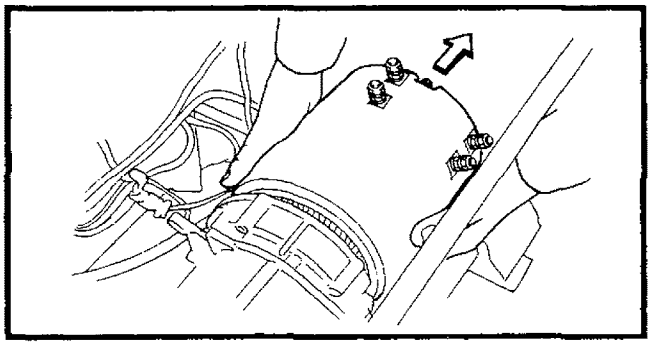
1. Remove:
   - Battery negative lead ①
     From the battery terminal (–) and motor terminal A2.
2. Disconnect:
   - Battery positive lead ②
     From the battery terminal (+).
   - All leads ③
     From the motor terminals A1, S1, and S2.



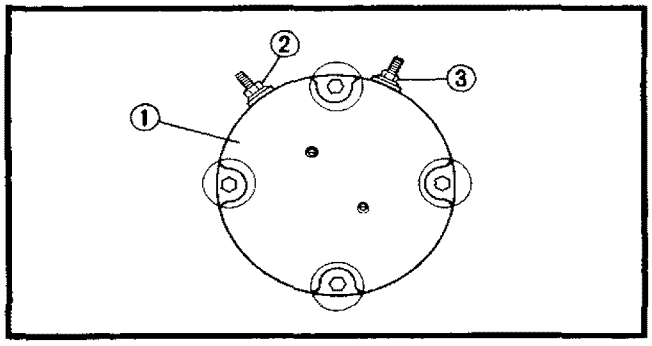
3. Remove:
   - Rear shock absorber assembly (Right)
     When removing the pivot blots ④, support the rear end of the frame with a garage jack.



4. Remove:
   - Motor securing bolts ①



5. Remove:
   - Traction motor

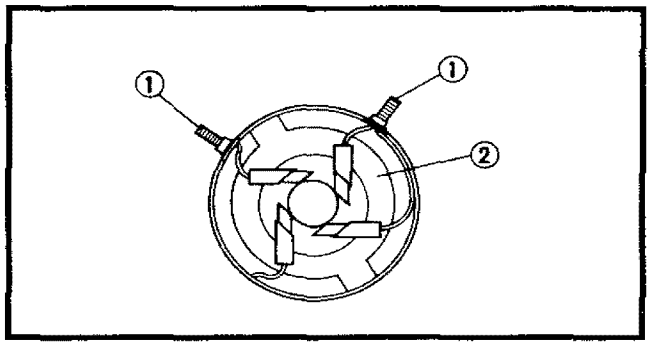


Disassembly

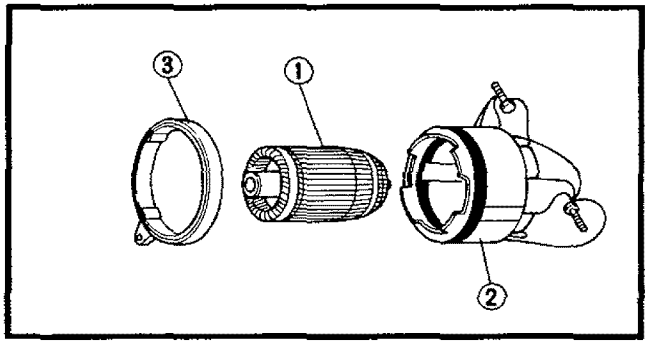
1. Remove:
   - Bracket ①

NOTE:

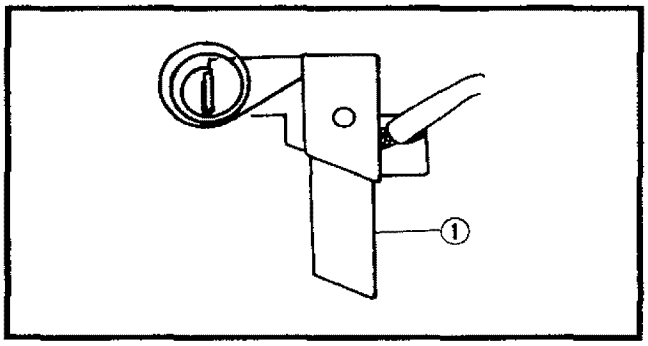
Before removing the bracket ① loosen the S1, A1, ② and S2, A2 ③ terminal nuts.



2. Remove:
   - Terminal bolts ①
   - Brush holder ②



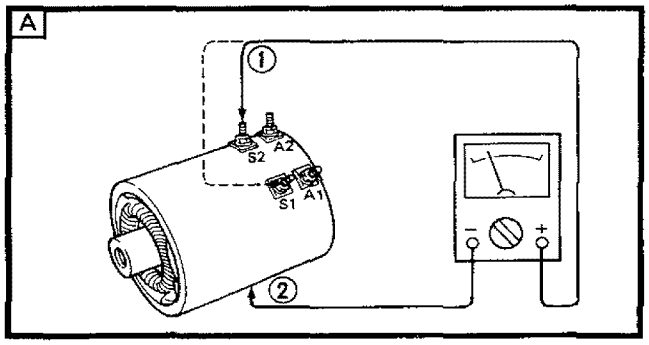
3. Remove:
   - Armature ①
   - Yoke ②
   - End bracket ③



4. Remove:
   - Brushes ①

Inspection

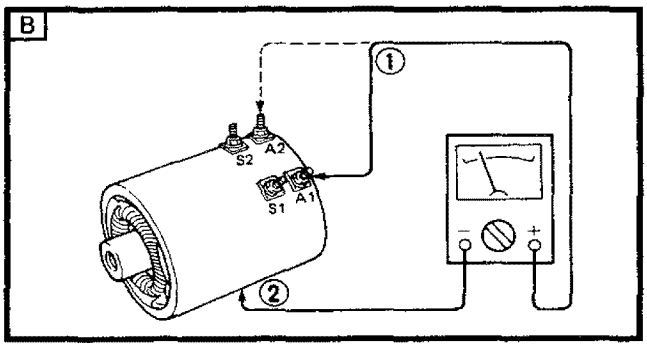
1. Clean the interior of the yoke and bracket with compressed air.
2. Inspect:
   - Outer surface
     Cracks/Damage → Replace.



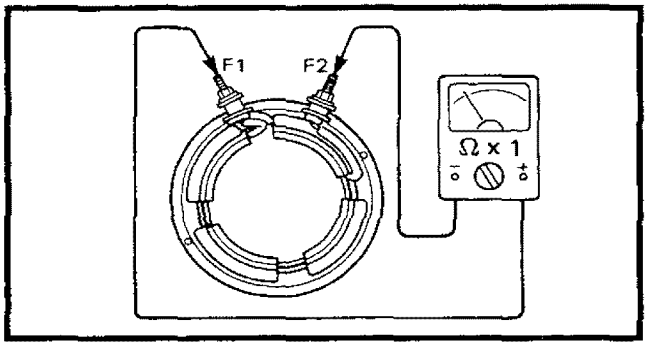
3. Measure:
   - Insulation resistance (Yoke ① and bracket ②)
     Use a 500 volt insulating resistance tester.
     Defective → Replace.

A S1. S2.

Insulation Resistance:
More than 1MΩ at 20° C (68° F)



B A2. A1.

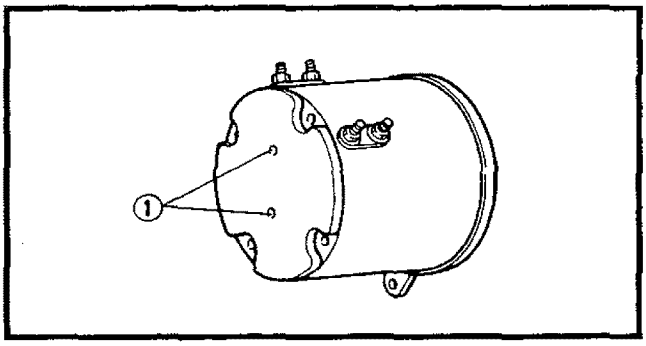


4. Measure:
   - Field coil resistance
     Use the Low Reading Ohmmeter.
     Out of specification → Replace.

Field Coil Resistance:
0.012 ~ 0.014 Ω at 20° C (68° F)

Low Reading Ohmmeter:
YU-91026, 90890-03064

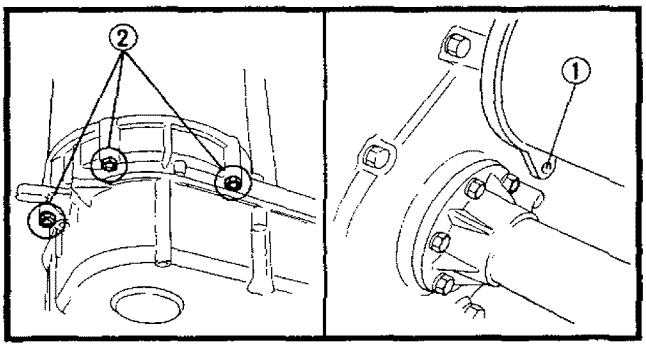
5. Inspect:
   Refer to page 8-58 (JG5-28197-10)
   (LIT-19616-00-43)



Assembly

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

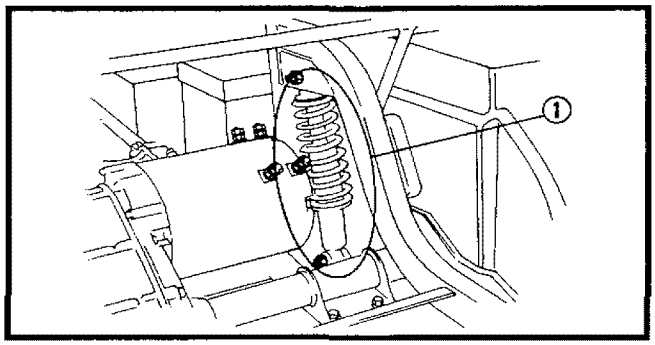
1. When tightening the screws ① , hold the bearing retainer with a screw driver to bring the screw holes.



Installation

1. Install:
   - Pin ①
   - Motor securing bolts ②

Motor Securing Bolt ② : (Upper)
6 Nm (0.6 m • kg, 4.3 ft • lb)



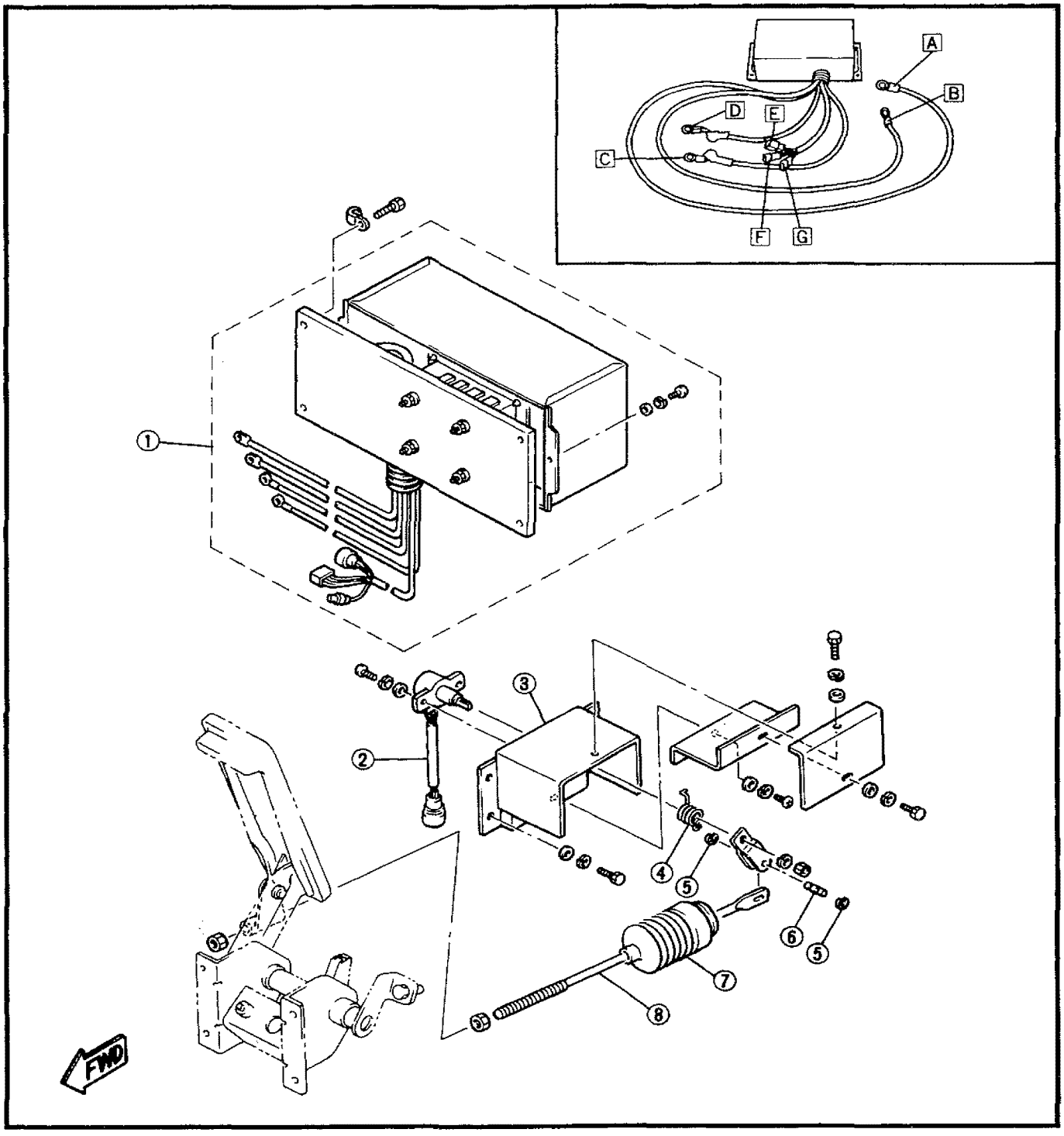
2. Place a jack under the transmission case.
3. Install:
   - Rear shock absorber (Right) ①
     When installing the pivot bolt, support the transmission case with a jack to bring the bolt holes.

Shock Absorber Pivot:
(Upper and Lower)
29 Nm (2.9 m • kg, 21 ft • lb)

MOTOR CONTROLLER

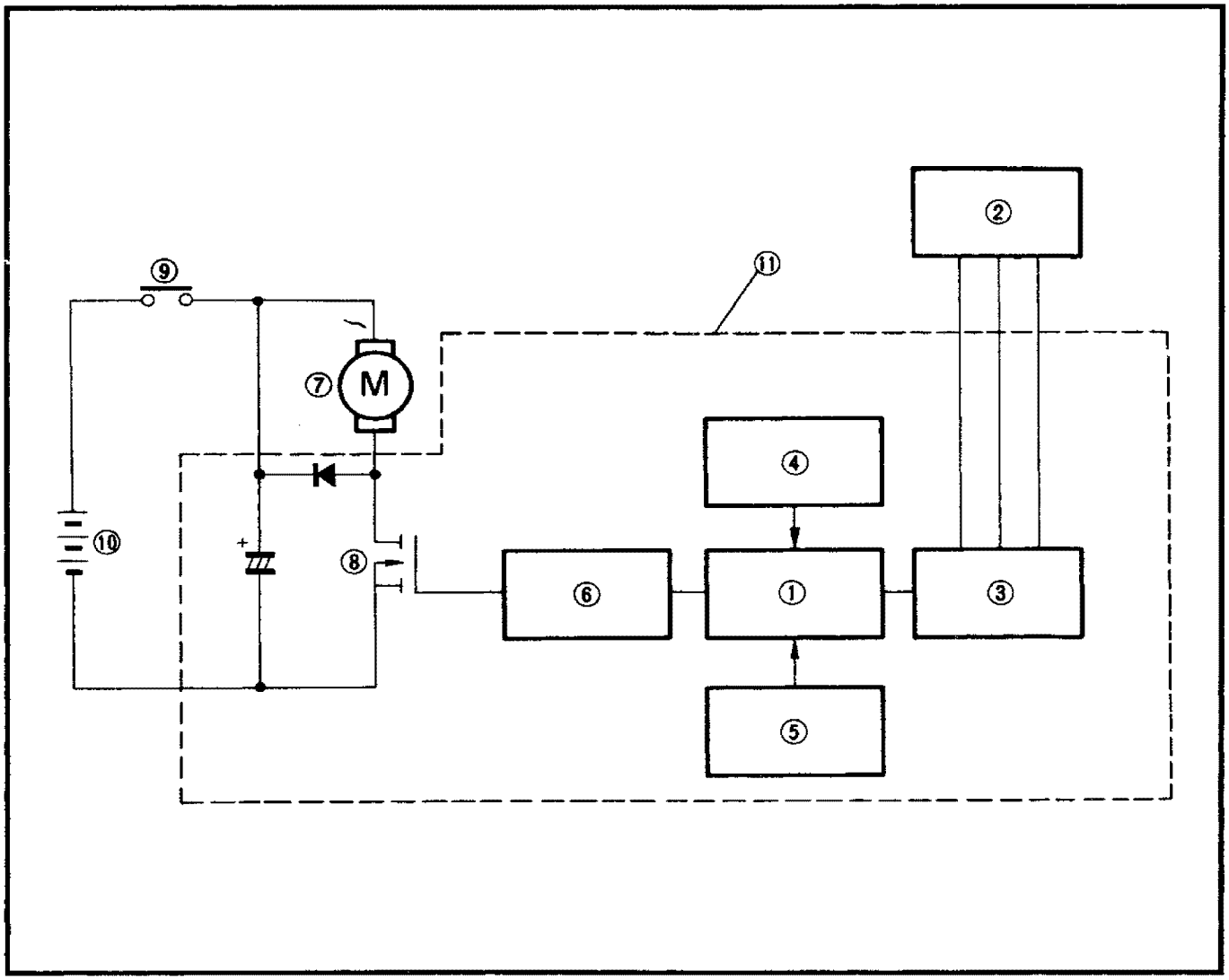
① Motor control unit Ass'y
② Throttle sensor
③ Throttle bracket
④ Return spring
⑤ Circlip
⑥ Pedal crank pin
⑦ Cover
⑧ Joint rod

[A] To Battery (Negative)
[B] To Traction motor A2
[C] To Shift switch
[D] To Solenoid relay
[E] To Wireharness
[F] To Throttle sensor
[G] To Buzzer



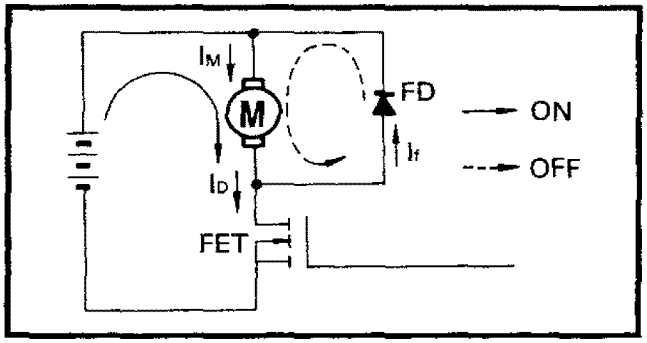
CONTROLLER SYSTEM

① PWM (Pulse Width Modulation) control circuit
② Throttle sensor
③ Slow-start circuit
④ Electric current control circuit (Current limiter)
⑤ Safeguard circuit
⑥ FET driving circuit
⑦ Traction motor
⑧ FET (Field Effect Transistor)
⑨ Solenoid relay
⑩ Battery
⑪ Controller unit



FEATURES

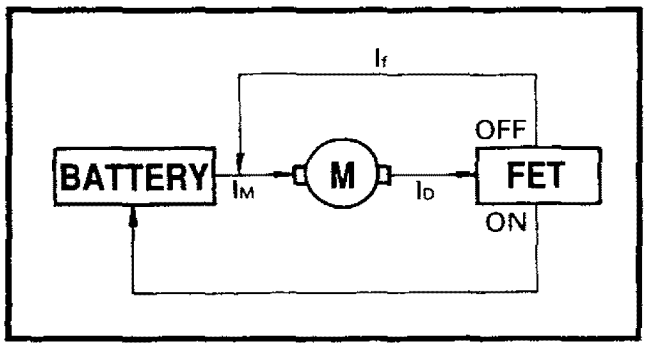
- Maintenance free due to contact point-less controller
- Soft starting and smooth operating (Stage-less speed control)
- Current limiter to prevent motor burning
- Solenoid relay protection circuit to prevent relay chattering damage when climbing by an excessive discharge of the battery.

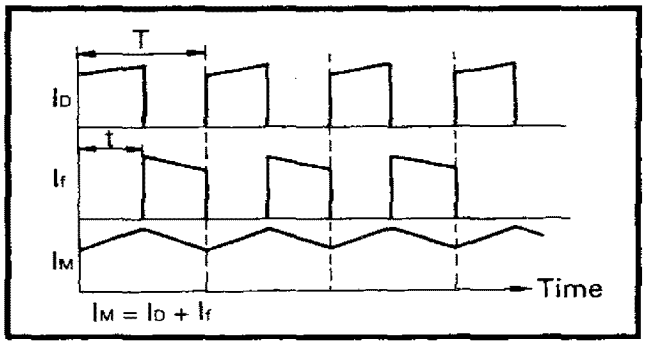


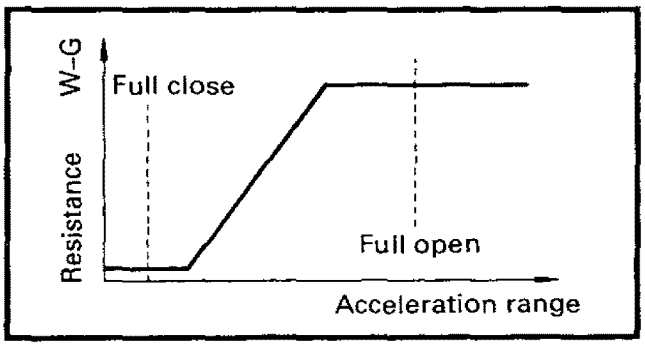
FUNCTION

1. PWM control circuit

In the partiall open range, the FET controls the motor speed repeating "ON" and "OFF".
In this case, while the FET is "ON" (time t), the current ID is on to traction motor; while FET is in "OFF" (time T-t), the current IF is on to traction motor through FD (Field Diode).
Consequently, in the partial open range, the battery current ID will be reduced, because the motor current IM is compounded with ID and If.

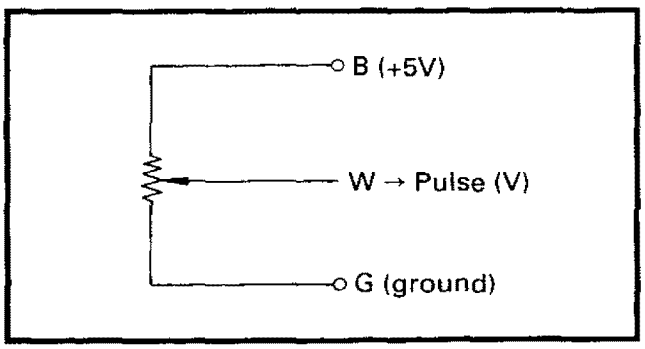






2. Throttle sensor

The throttle sensor transfers a pulse (determined by the movement of the accelerator pedal) to the controller.

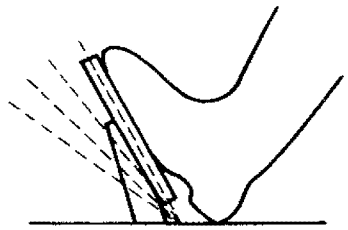


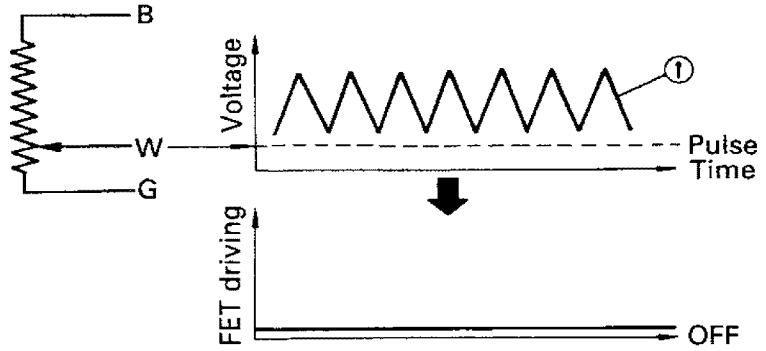
G ..... Green
W..... White
B ..... Blue

3. Principle of PWM driving circuit

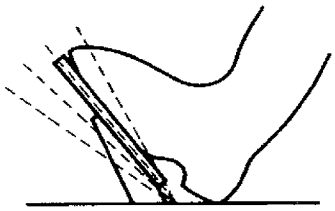
ⓐ Forward side

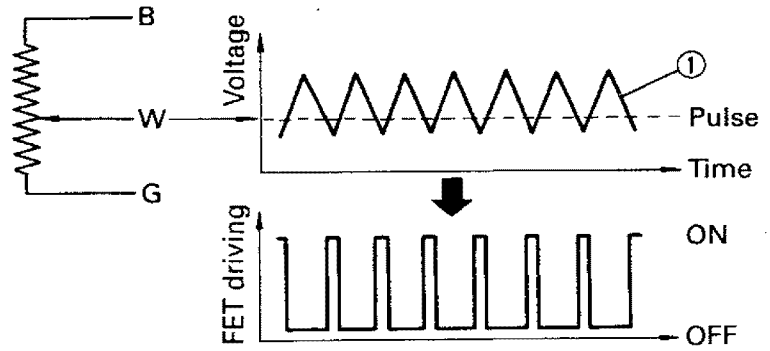
Full close



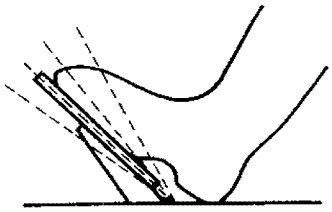


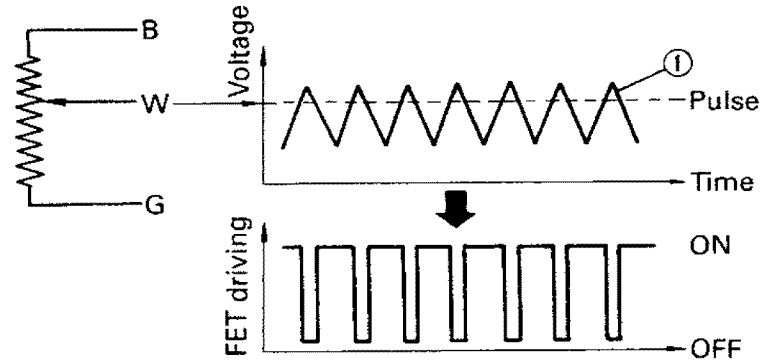
Partial range (low)



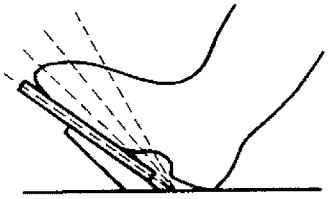


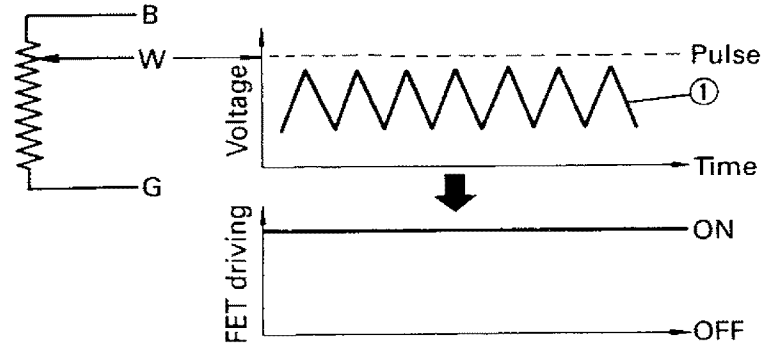
Partial range (high)





Full open

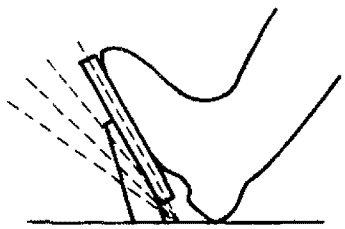


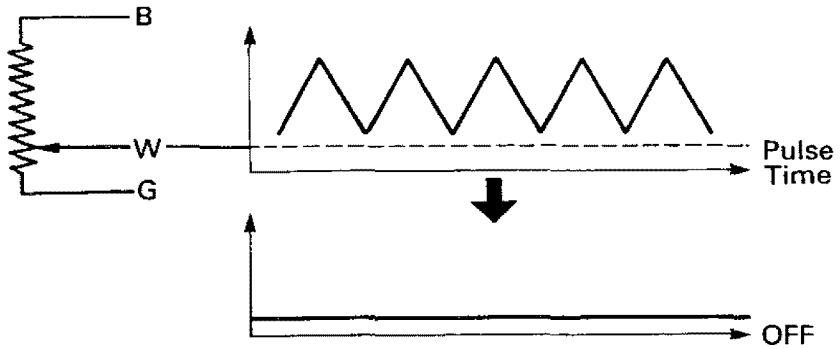


① PWM IC Chopping Wave

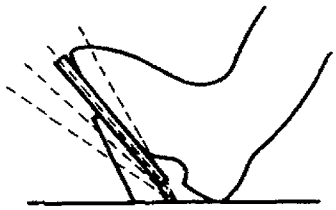
ⓑ **Reverse side**

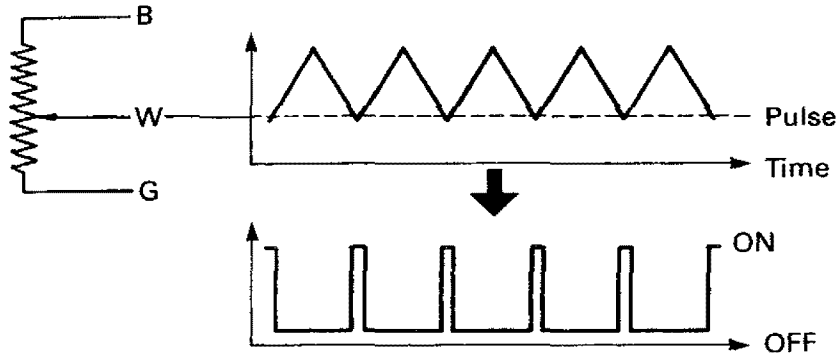
Full close



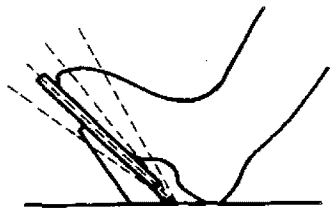


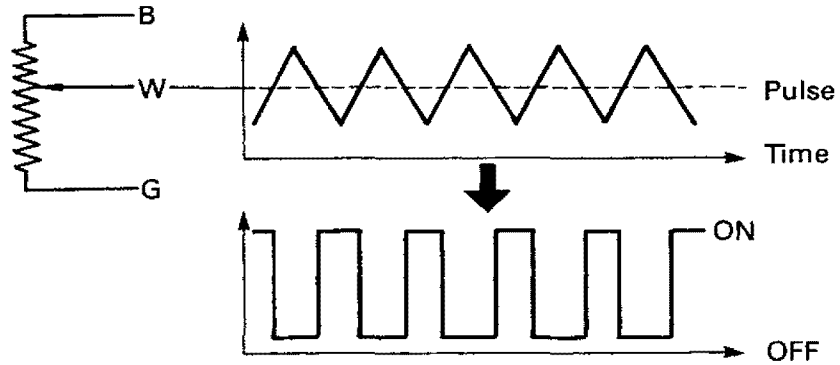
Partial range (low)



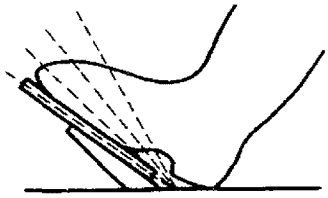


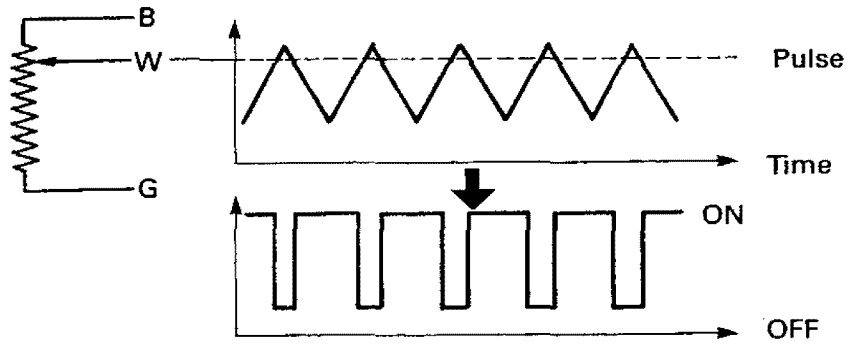
Partial range (high)

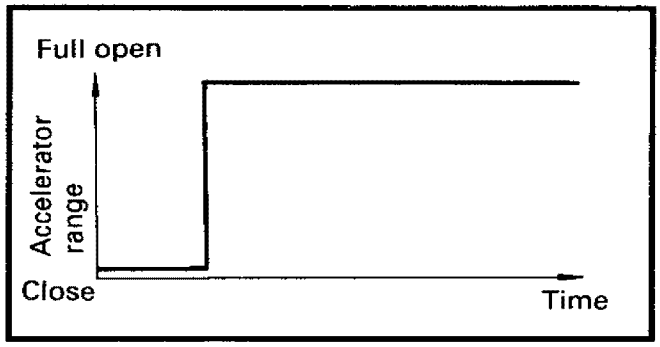




Full open

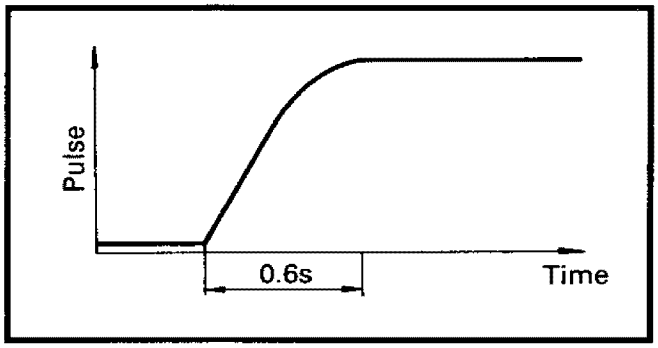




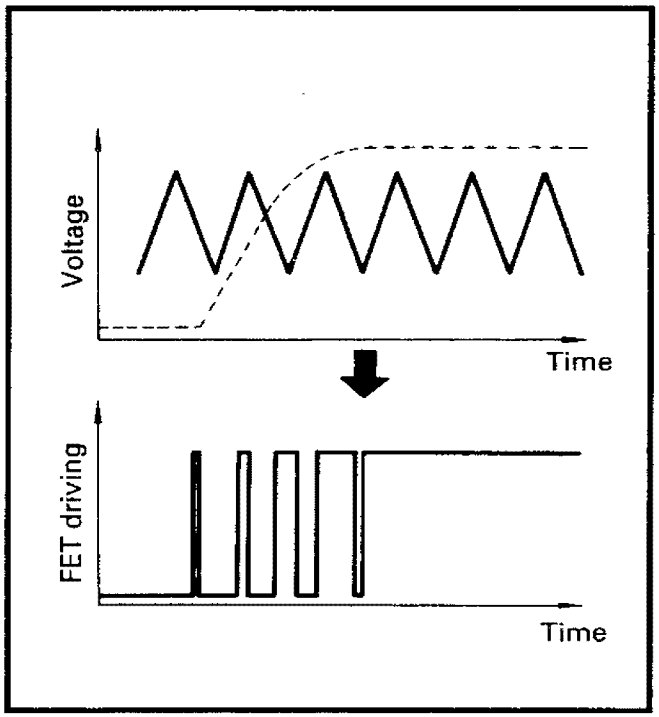


4. Slow-start circuit

When the accelerator pedal is depressed briskly, the slow-start circuit prevents the Golfcar from starting too quickly.



In this case, the slow-start circuit delays the accelerator pulse by 0.6s.



5. Electric current control circuit (Current limiter)

The current limiter keeps the traction motor and controler from burning out due to a too large current when the traction motor locks.

6. Safegaurd circuit

1) Spark Contact Protection

- The current is 'ON' after the solenoid relay is 'ON'.
- FET is forced off while the shift lever is in operation.

2) Low-Voltage protection

- FET is turned off by force if the battery voltage becomes 10V to prevent relay chattering damaged by an excessive discharge of the battery.

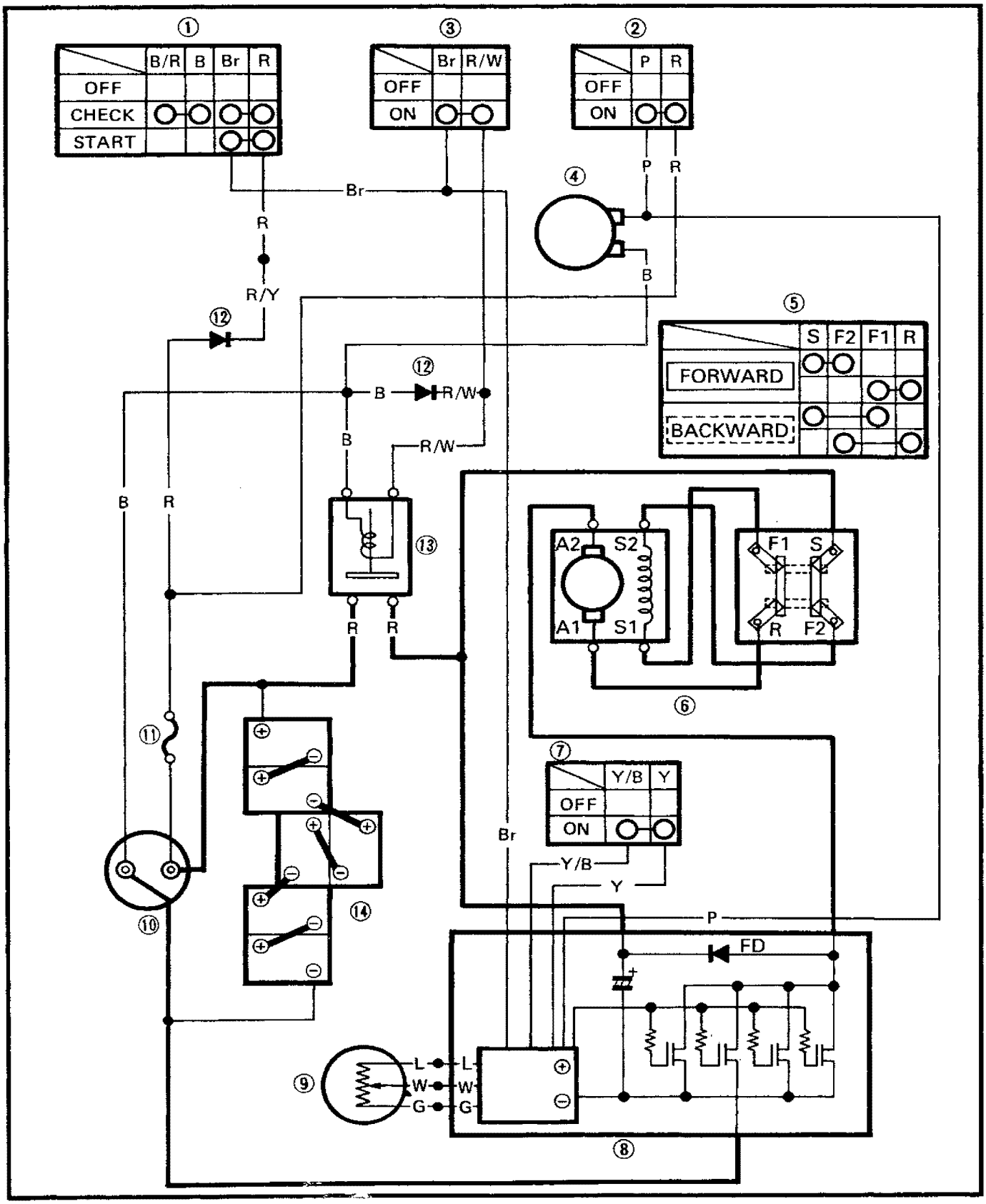
3) Thermal protector

- The FET is forced OFF, when the FET temperature reaches 100°C.
- When the thermal protector cuts in, stop and let it cool for a while, then start again.

— MEMO —

ELECTRICAL (FOR G9-EC)

CIRCUIT DIAGRAM

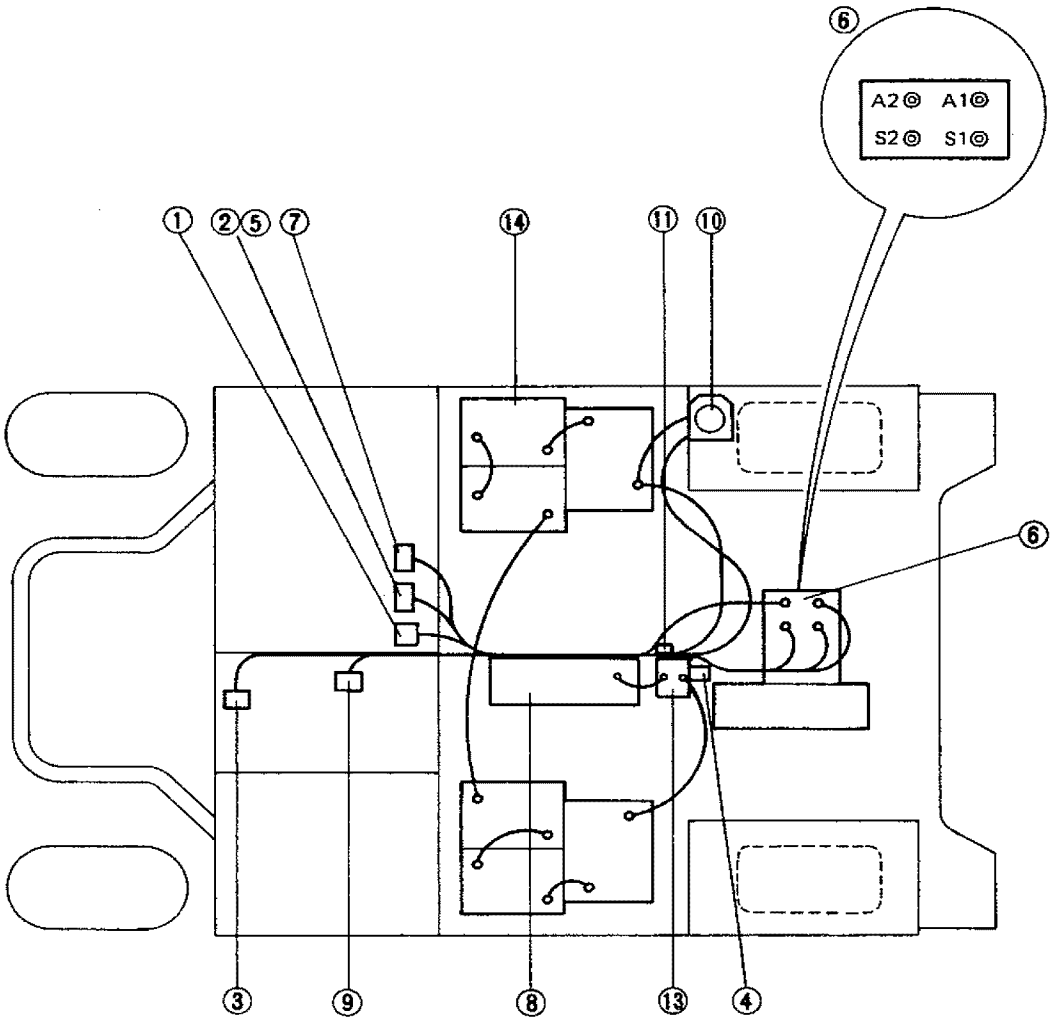


① Main switch
② Buzzer switch
③ Accelerator stop switch
④ Back-up buzzer
⑤ Forward-reverse switch
⑥ Traction motor
⑦ Cut-off switch
⑧ Motor control unit Ass'y
⑨ Throttle sensor
⑩ Charging receptacle
⑪ Fuse
⑫ Diode
⑬ Solenoid relay
⑭ Batteries (6V x 6)

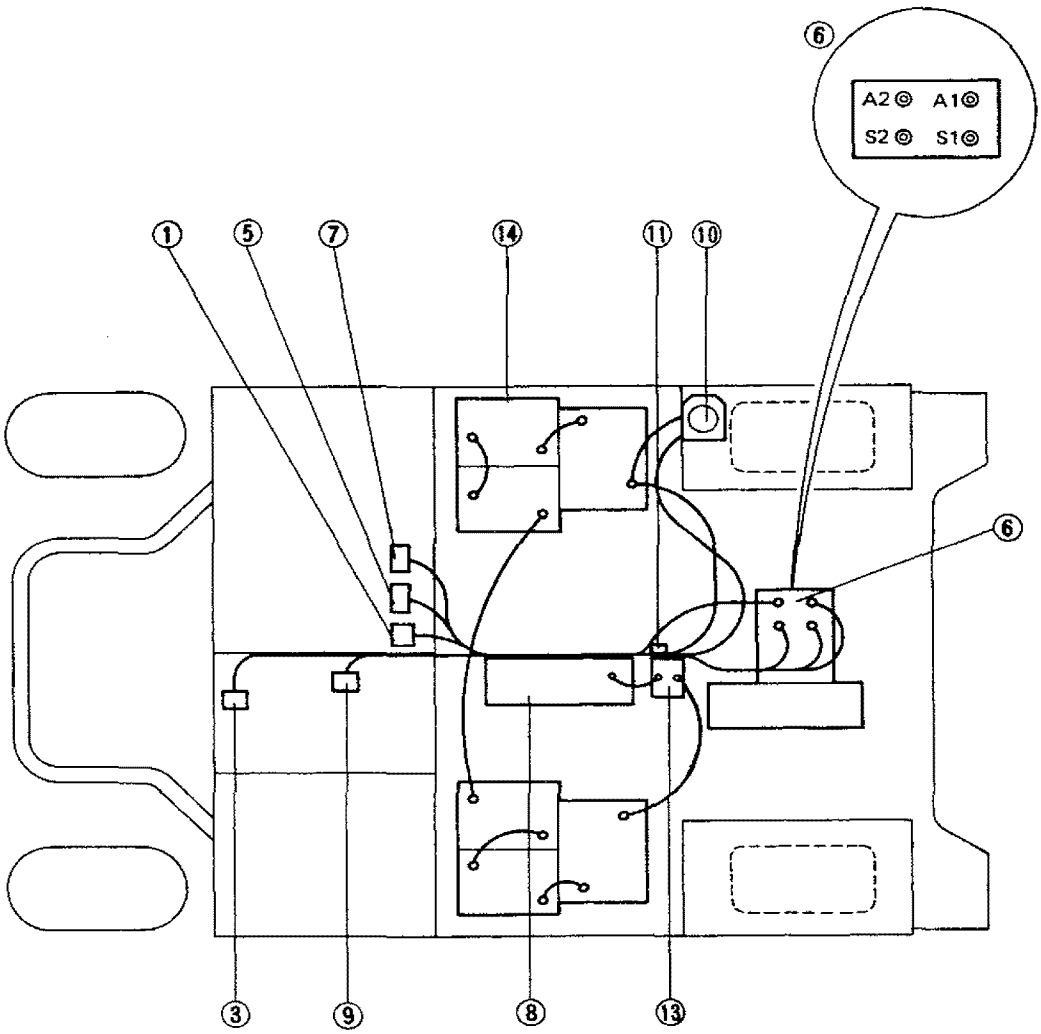
[A] FORWARD (Contact position)
[B] REVERSE (Contact position)

COLOR CODE

R	Red
R/W	Red/White
Br	Brown
P	Pink
B	Black



① Main switch
③ Accelerator switch
⑤ Forward-reverse switch
⑥ Traction motor
⑦ Cut-off switch
⑧ Motor control unit Ass'y
⑨ Throttle sensor
⑩ Charging receptacle
⑪ Fuse
⑫ Diode
⑬ Solenoid relay
⑭ Batteries (6V x 6)



TROUBLESHOOTING

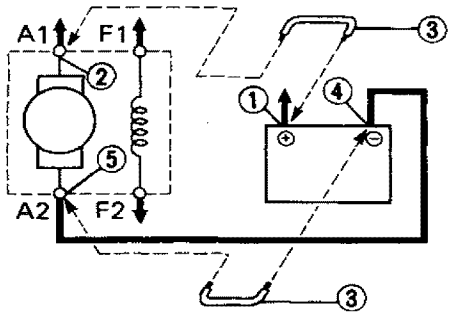
THE MOTOR DOES NOT TURN

Check;
1. Main switch
2. Accelerator switch
3. Solenoid relay

- Refer to STARTING SYSTEM
  LIT-19616-00-43 (JG5-28197-10)
  Page 8-50, 8-51, 8-53, Sections.

1. Traction motor

- Connect the battery positive terminal ① and traction motor terminal A1 ② using the jumper lead ③ *.
- Connect the battery negative terminal ④ and traction motor terminal A2 ⑤ using the jumper lead ③ *.
- Check the traction motor operation.



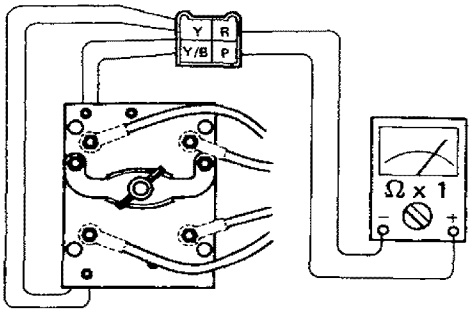
FAULTY

Repair and/or replace traction motor.

OK

2. Cut-off switch

- Disconnect the cut-off switch coupler (to the switch side coupler)



- Turn the shift lever "FORWARD" and "REVERSE" position.

INCORRECT

Replace cut-off switch.

OK

*

*

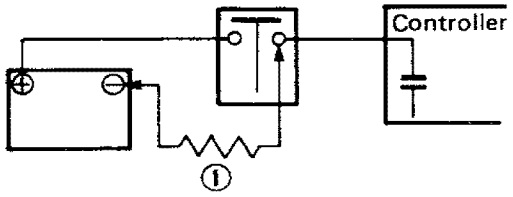
⚠ WARNING

- **A wire to the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.**
- **This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.**

*

3. Controller

- Before checking the controller, turn the main switch "OFF".
- Discharge the condensor of controller for 30 seconds.

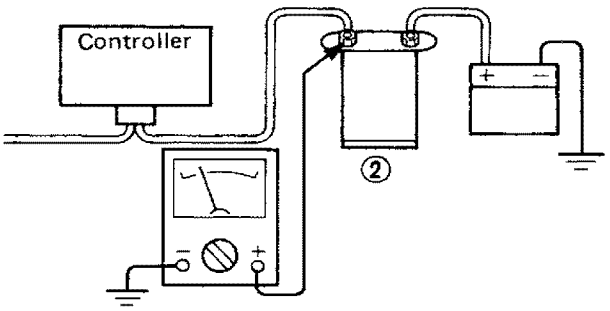


- Turn the main switch "ON".
- Turn the shift lever to "F"
- Check the solenoid relay for output voltage.

NOTE:
Use the jumper lead with 1 kΩ resistance ①.

Tester (+) Lead → Solenoid relay ② output terminal
Tester (–) Lead → Ground.

- Slightly push the accelerator pedal.



Solenoid relay output: ②
36V

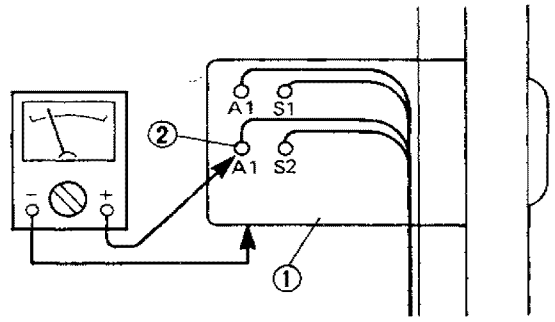
INCORRECT

Check solenoid relay again and wiring harness.

- Check the traction motor ① for output voltage.

Tester (+) Lead → A2 terminal ②
Tester (–) Lead → Ground

- Slightly push the accelerator pedal.



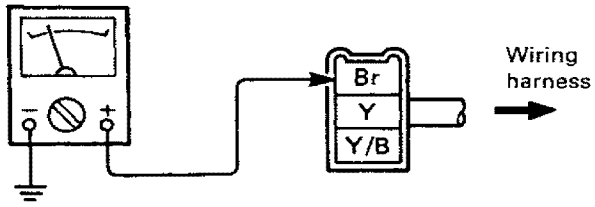
Traction motor output voltage:
36V

OUT OF SPECIFICATION

Check shift switch, traction motor again and wiring harness.

- Remove the controller coupler.
- Check the controller power source voltage.

Tester (+) Lead → Brown terminal
Tester (–) Lead → Ground



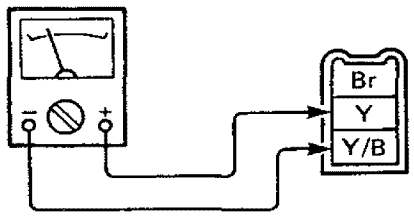
Controller input voltage:
36V

OUT OF SPECIFICATION

Check wiring harness.

- Check the cut-off switch for resistance.

- Check the continuity of wire harness. (to the wire harness side of controller coupler)



Cut-off switch resistance:
Shift lever F•R position: 0Ω
Shift lever neutral position: ∞ Ω

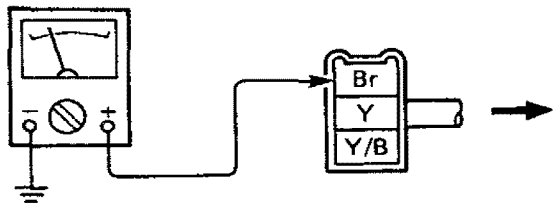
OUT OF SPECIFICATION

Check
- Cut-off switch coupler
- Wiring harness for damage.

OK

4. Controller

- Disconnect the controller coupler.
- Measure the Controller power source voltage (to the wire harness side coupler)
- Turn the maine siwtch "ON".

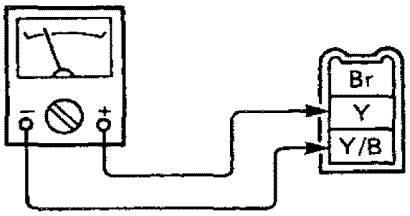


Controller input voltage:
36V

OUT OF SPECIFICATION

Check wiring harness.

Tester (+) Lead → Yellow terminal
Tester (–) Lead → Yellow/Black terminal



OUT OF SPECIFICATION

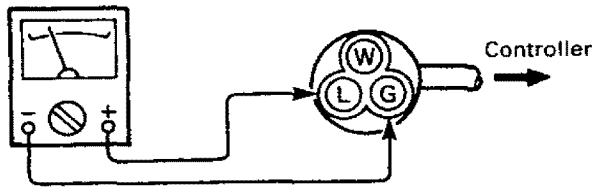
Check
- Cut-off switch coupler
- Wireharness

Cut-off switch resistance:
Shift lever F·R position: 0Ω
Shift lever neutral position: ∞ Ω

NOTE:
Before checking the controller output voltage, connect the controller coupler.

- Check the controller for output voltage.
- Remove the throttle sensor coupler from controller.

Tester (+) Lead → Blue terminal
Tester (–) Lead → Green terminal

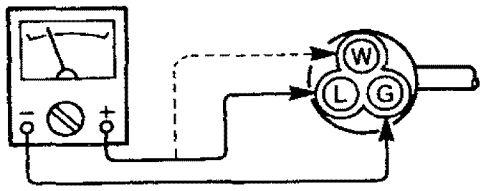


Output voltage:
Blue-Green : 5V

OUT OF SPECIFICATION

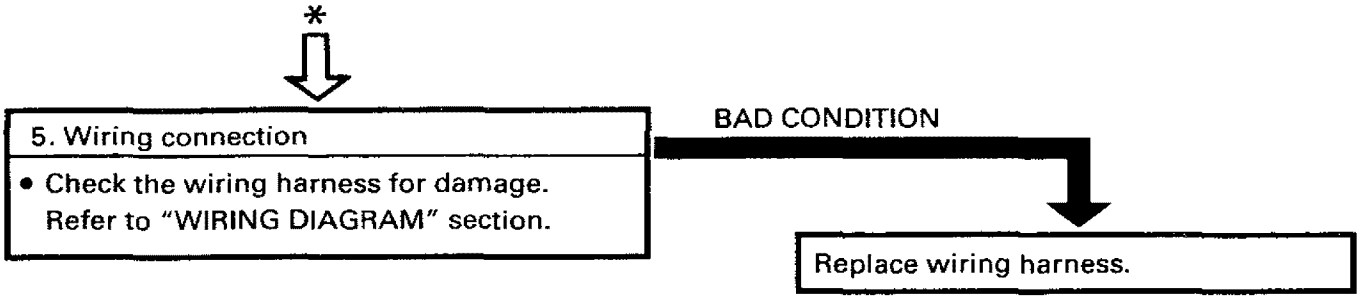
- Connect the throttle sensor coupler side.
- Depress the accelerator pedal.

Replace controller.



OK

*


*
5. Wiring connection
• Check the wiring harness for damage.
Refer to "WIRING DIAGRAM" section.
BAD CONDITION
Replace wiring harness.

YAMAHA

YAMAHA MOTOR
MANUFACTURING CORP.
OF AMERICA

Printed in U.S.A.
KCC