YAMAHA

YFM45FAT
YFM450FAT

5ND2-AE3

SUPPLEMENTARY SERVICE MANUAL

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and data for the YFM45FAT/YFM450FAT. For complete service information procedures it is necessary to use this Supplementary Service Manual together with the following manual.

YFM45FAR/YFM450FAR SERVICE MANUAL: 5ND2-AE1
YFM45FAS/YFM450FAS SUPPLEMENTARY SERVICE MANUAL: 5ND2-AE2

YFM45FAT/YFM450FAT
SUPPLEMENTARY
SERVICE MANUAL

First edition, June 2004

EB001000

NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha machine has a basic understanding of the mechanical ideas and the procedures of machine repair. Repairs attempted by anyone without this knowledge are likely to render the machine unsafe and unfit for use.

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

NOTE:
Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

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

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

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

CAUTION: A CAUTION 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.

EB002000

HOW TO USE THIS MANUAL

MANUAL ORGANIZATION

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

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

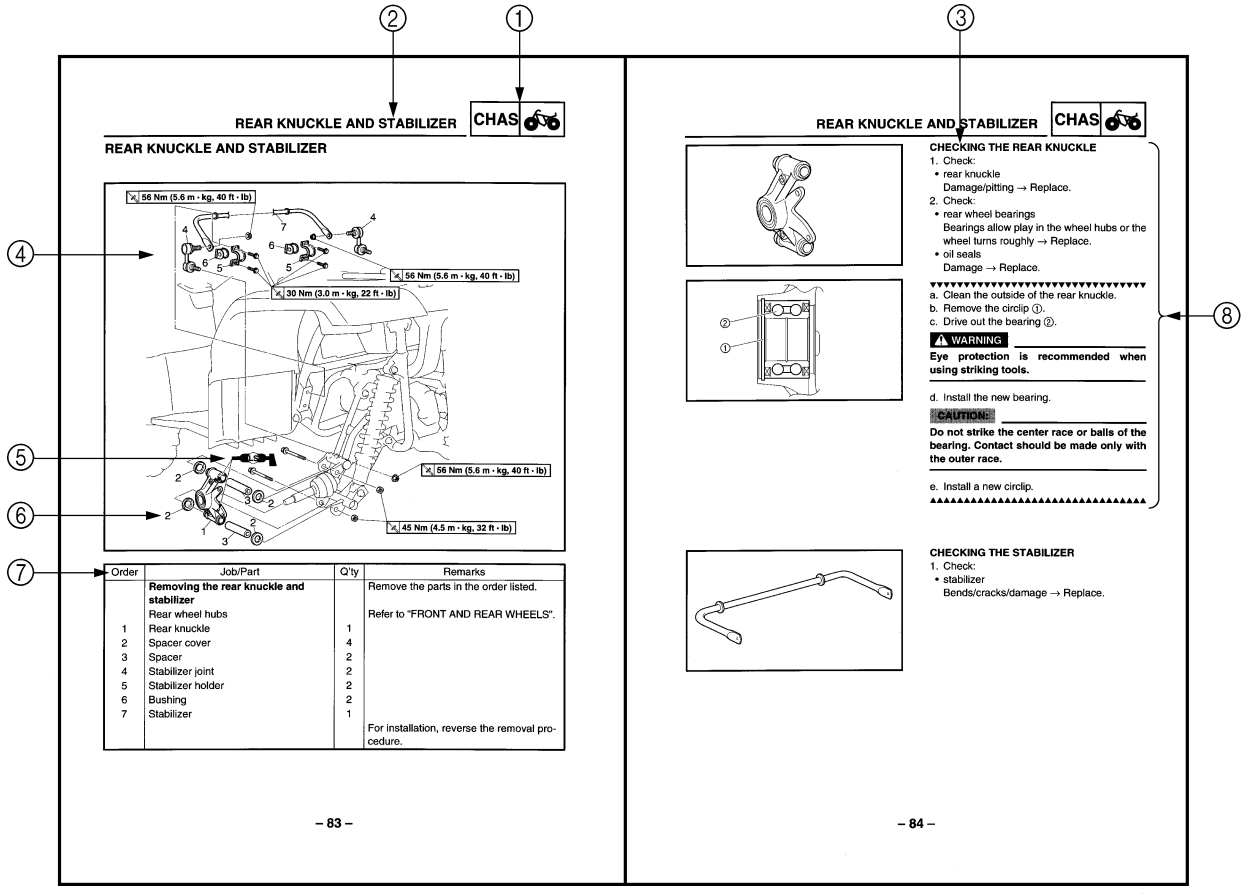
2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper left corner of the page.

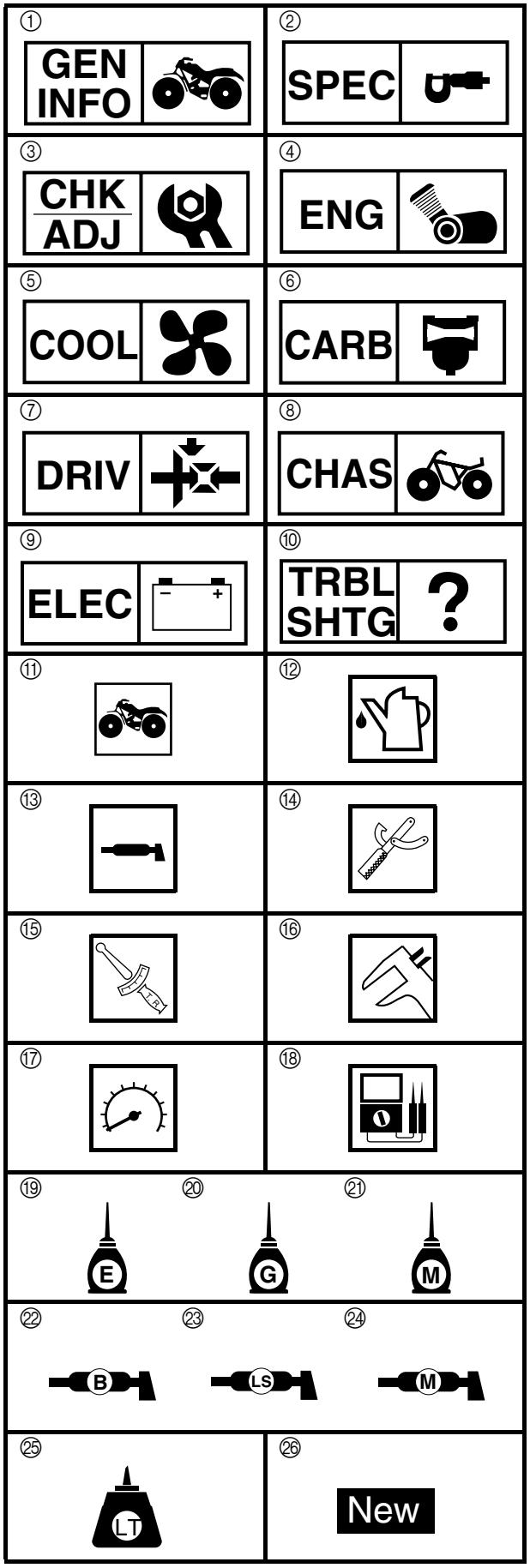
3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks ⑥. The meanings of the symbol marks are given on the next page.
4. A job instruction chart ⑦ accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements ⑧ are given in addition to the exploded diagram and the job instruction chart.





EB003000

ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑩ are printed on the top right of each page and indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Drive train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Illustrated symbols ⑪ to ⑱ are used to identify the specifications appearing in the text.

⑪ Can be serviced with engine mounted
⑫ Filling fluid
⑬ Lubricant
⑭ Special tool
⑮ Torque
⑯ Wear limit, clearance
⑰ Engine speed
⑱ Ω, V, A

Illustrated symbols ⑲ to ㉔ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply wheel bearing grease
㉓ Apply lithium-soap-based grease
㉔ Apply molybdenum disulfide grease

Illustrated symbols ㉕ to ㉖ in the exploded diagrams indicate where to apply a locking agent ㉕ and when to install a new part ㉖.

㉕ Apply the locking agent (LOCTITE®)
㉖ Replace

CONTENTS

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard
Model code:	1D91, 1D95 (for USA) 1D92, 1D96 (for CDN) 1D93, 1D97 (for Europe) 1D94 (for Oceania)
Dimensions:	
Overall length	1,993 mm (78.5 in)
Overall width	1,093 mm (43.0 in)
Overall height	1,120 mm (44.1 in)
Seat height	830 mm (32.7 in)
Wheelbase	1,233 mm (48.5 in)
Minimum ground clearance	245 mm (9.7 in)
Minimum turning radius	3,000 mm (118.1 in)
Basic weight:	
With oil and full fuel tank	285 kg (628 lb) (for USA, CDN, and Oceania) 289 kg (637 lb) (for Europe)
Oil capacity:	
Engine oil	
Periodic oil change	2.30 L (2.02 Imp qt, 2.43 US qt)
With oil filter replacement	2.40 L (2.11 Imp qt, 2.54 US qt)
Total amount	2.60 L (2.29 Imp qt, 2.75 US qt)
Final gear case oil	
Periodic oil change	0.16 L (0.14 Imp qt, 0.17 US qt)
Total amount	0.18 L (0.16 Imp qt, 0.19 US qt)
Differential gear case oil	
Periodic oil change	0.23 L (0.20 Imp qt, 0.24 US qt)
Total amount	0.28 L (0.25 Imp qt, 0.30 US qt)
Radiator capacity (including all routes)	1.32 L (1.16 Imp qt, 1.40 US qt)
Chassis:	
Frame type	Steel tube frame
Caster angle	2.5°
Camber angle	1°
Kingpin angle	11°
Kingpin offset	0 mm (0 in)
Trail	8.5 mm (0.33 in)
Tread (STD) front	850 mm (33.46 in)
rear	839 mm (33.03 in)
Toe-in	0 ~ 10 mm (0 ~ 0.39 in)

Item		Standard
Tires:		
Type		Tubeless
Size	front	AT25 × 8–12
	rear	AT25 × 10–12
Manufacturer	front	MAXXIS (for USA, CDN, and Europe) CHENG SHIN (for Oceania)
	rear	MAXXIS (for USA, CDN, and Europe) CHENG SHIN (for Oceania)
Model	front	M911Y (for USA, CDN, and Europe) C828 (for Oceania)
	rear	M912Y (for USA, CDN, and Europe) C828 (for Oceania)
Suspension:		
Front suspension		Double wishbone
Rear suspension		Double wishbone

MAINTENANCE SPECIFICATIONS

ENGINE

Item		Standard	Limit
Carburetor:			
I. D. mark		5NDC 00	----
Main jet	(M.J)	#131.3	----
Main air jet	(M.A.J)	#50	----
Jet needle	(J.N)	5EP13-55-3	----
Needle jet	(N.J)	P-0M	----
Pilot air jet	(P.A.J.1)	#80	----
Pilot air jet	(P.A.J.2)	1.3	----
Pilot outlet	(P.O)	0.95	----
Pilot jet	(P.J)	#17.5	----
Bypass 1	(B.P.1)	0.8	----
Bypass 2	(B.P.2)	0.8	----
Bypass 3	(B.P.3)	0.8	----
Pilot screw	(P.S.)	2-1/2 turns out	----
Valve seat size	(V.S)	2.0	----
Starter jet	(G.S.1)	#70	----
Starter jet	(G.S.2)	0.9	----
Throttle valve size	(Th.V)	#90	----
Float height	(F.H)	13 mm (0.51 in)	----
Fuel level	(F.L)	4.0 ~ 5.0 mm (0.16 ~ 0.20 in)	----
Engine idle speed		1,450 ~ 1,550 r/min	----
Intake vacuum		33.3 kPa (250 mmHg, 9.84 inHg)	----

Tightening torques

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Shift cam stopper	—	M14	1	18	1.8	13	
Stopper lever shaft	Bolt	M6	1	10	1.0	7.2	

CHASSIS

Item		Standard	Limit
Front suspension:			
Shock absorber travel		99 mm (3.90 in)	----
Fork spring free length		285 mm (11.22 in)	----
Spring fitting length		231.9 mm (9.13 in)	----
Spring rate	(K1)	15 N/mm (1.53 kg/mm, 85.68 lb/in)	----
Stroke	(K1)	0 ~ 99 mm (0 ~ 3.90 in)	----
Optional spring		No	----
Rear suspension:			
Shock absorber travel		95 mm (3.74 in)	----
Spring free length		277.9 mm (10.94 in)	----
Spring fitting length		247.9 mm (9.76 in)	----
Spring rate	(K1)	27 N/mm (2.75 kg/mm, 153.99 lb/in)	----
Stroke	(K1)	0 ~ 95 mm (0 ~ 3.74 in)	----
Optional spring		No	----
Rear disc brake:			
Type		Single	----
Disc outside diameter × thickness		220.0 × 3.5 mm (8.66 ~ 0.14 in)	----
Pad thickness	inner	5.0 mm (0.20 in)	1 mm (0.04 in)
Pad thickness	outer	5.0 mm (0.20 in)	1 mm (0.04 in)
Master cylinder inside diameter		14 mm (0.55 in)	----
Caliper cylinder inside diameter		32.03 mm (1.26 in)	----
Brake fluid type		DOT 4	----
Brake lever and brake pedal:			
Brake lever free play (pivot)	front	0 mm (0 in)	----
	rear	0.5 ~ 2.0 mm (0.02 ~ 0.08 in)	----
Brake pedal height		67 ~ 77 mm (2.64 ~ 3.03 in)	----
Throttle lever free play		3 ~ 5 mm (0.12 ~ 0.20 in)	----

Tightening torques

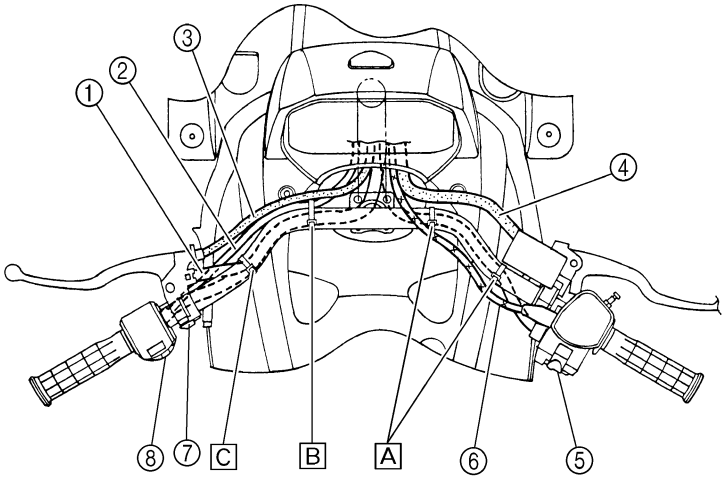
Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Rear shock absorber and sub-frame	M10	45	4.5	32	
Rear shock absorber and rear lower arm	M10	45	4.5	32	
Rear upper arm and sub-frame	M10	45	4.5	32	LS
Rear lower arm and sub-frame	M10	45	4.5	32	LS
Rear upper arm and rear knuckle	M10	45	4.5	32	
Rear lower arm and rear knuckle	M10	45	4.5	32	
Stabilizer and sub-frame	M8	30	3.0	22	
Stabilizer joint and stabilizer	M10	56	5.6	40	
Stabilizer joint and rear lower arm	M10	56	5.6	40	
Frame and sub-frame (front lower)	M12	82	8.2	59	
Frame and sub-frame (rear upper)	M10	48	4.8	35	
Final drive gear case and sub-frame	M10	45	4.5	32	
Trailer hitch and sub-frame	M10	40	4.0	29	
Brake disc guard and steering knuckle	M6	7	0.7	5.1	
Front lower arm and protector	M6	7	0.7	5.1	
Fuel tank and frame	M6	10	1.0	7.2	
Front wheel and wheel hub	M10	55	5.5	40	
Rear axle and wheel hub	M20	260	26.0	190	Stake
Rear knuckle and brake caliper	M8	30	3.0	22	
Brake disc guard and rear knuckle	M6	7	0.7	5.1	
Rear brake disc and wheel hub	M8	30	3.0	22	G
Front brake pipe joint and frame	M6	7	0.7	5.1	
Rear brake master cylinder	M8	23	2.3	17	
Rear brake master cylinder bracket	M8	30	3.0	22	
Rear brake pipe nut	M10	19	1.9	13	
Rear brake pipe joint and frame	M6	7	0.7	5.1	
Final drive gear case filler bolt	M14	23	2.3	17	
Final drive gear case drain bolt	M14	23	2.3	17	
Final drive gear case and bearing housing	M10	40	4.0	29	
Final drive gear case and bearing housing	M8	23	2.3	17	
Bearing retainer (final drive pinion gear)	M75	115	11.5	85	Left-hand threads
Universal joint yoke (final drive pinion gear)	M14	97	9.7	70	
Ring gear stopper	M8	16	1.6	11	
Air duct assembly 1 and frame	M6	7	0.7	5.1	
Engine skid plate and frame	M6	7	0.7	5.1	
Final gear case skid plate and sub-frame	M6	7	0.7	5.1	

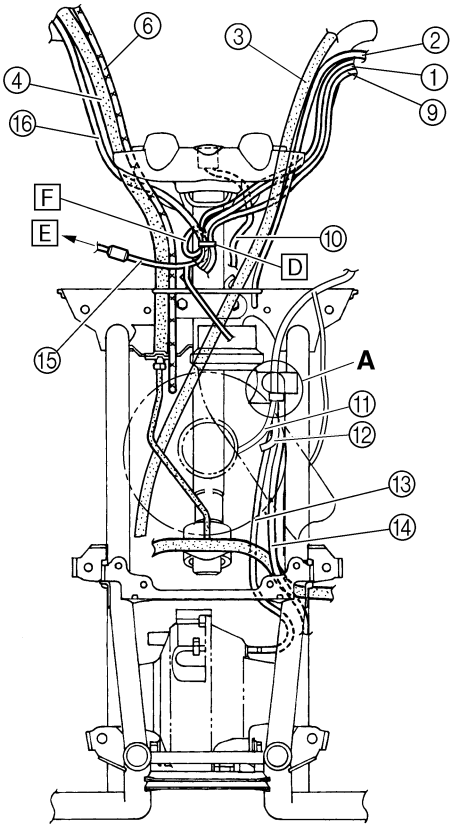
ELECTRICAL

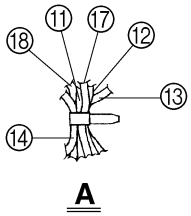
Item	Standard	Limit
C.D.I.:		
Magneto model/manufacturer	F4T464/MITSUBISHI	----
Pickup coil resistance/color	459 ~ 561 Ω at 20 °C (68 °F)/ White/Red – White/Green	----
Rotor rotation direction sensing coil resistance/color	0.086 ~ 0.105 Ω at 20 °C (68 °F)/ Red – White/Blue	----
C.D.I. unit model/manufacturer	F8T40373/MITSUBISHI	----

CABLE ROUTING

① Rear brake switch lead
② Starter cable
③ Rear brake cable
④ Front brake hose
⑤ On-command four-wheel drive switch and differential gear lock switch
⑥ Throttle cable
⑦ Horn switch (for Europe and Oceania)
⑧ Handlebar switch
⑨ Handlebar switch lead
⑩ Main switch lead
⑪ Fan motor lead
⑫ Fan motor breather hose
⑬ Differential gear case breather hose
⑭ Sub-wire harness
⑮ Horn switch lead (for Europe and Oceania)
⑯ On-command four-wheel drive switch and differential gear lock switch lead

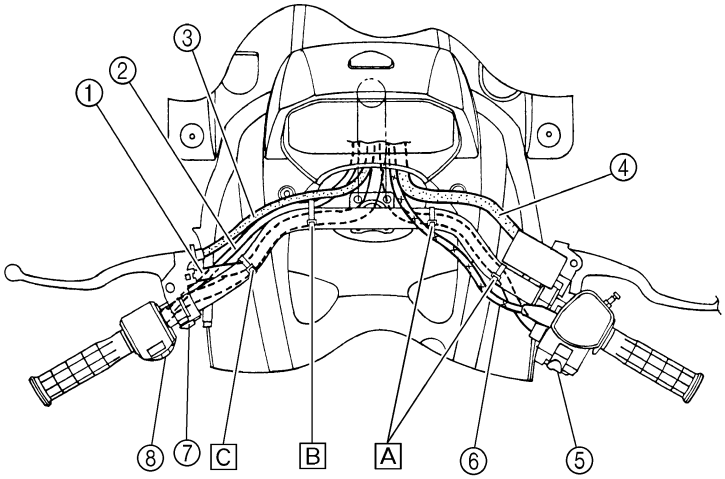


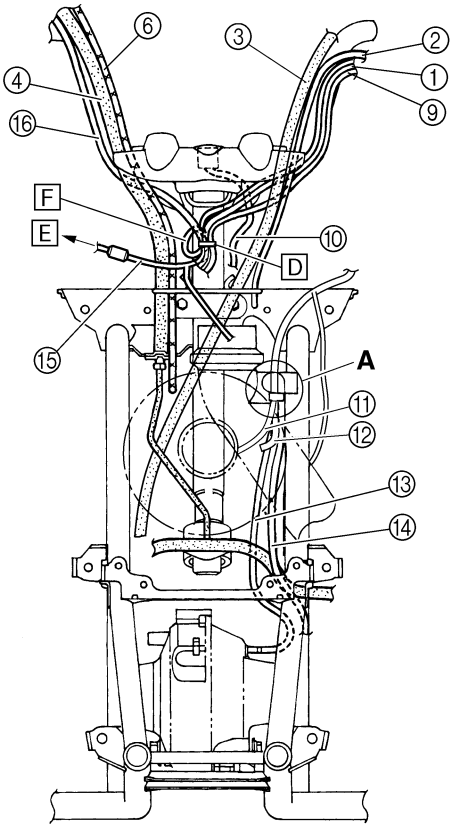


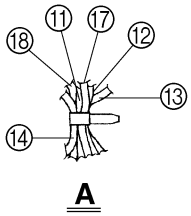


⑰ Coolant reservoir hose
⑱ Coolant reservoir breather hose

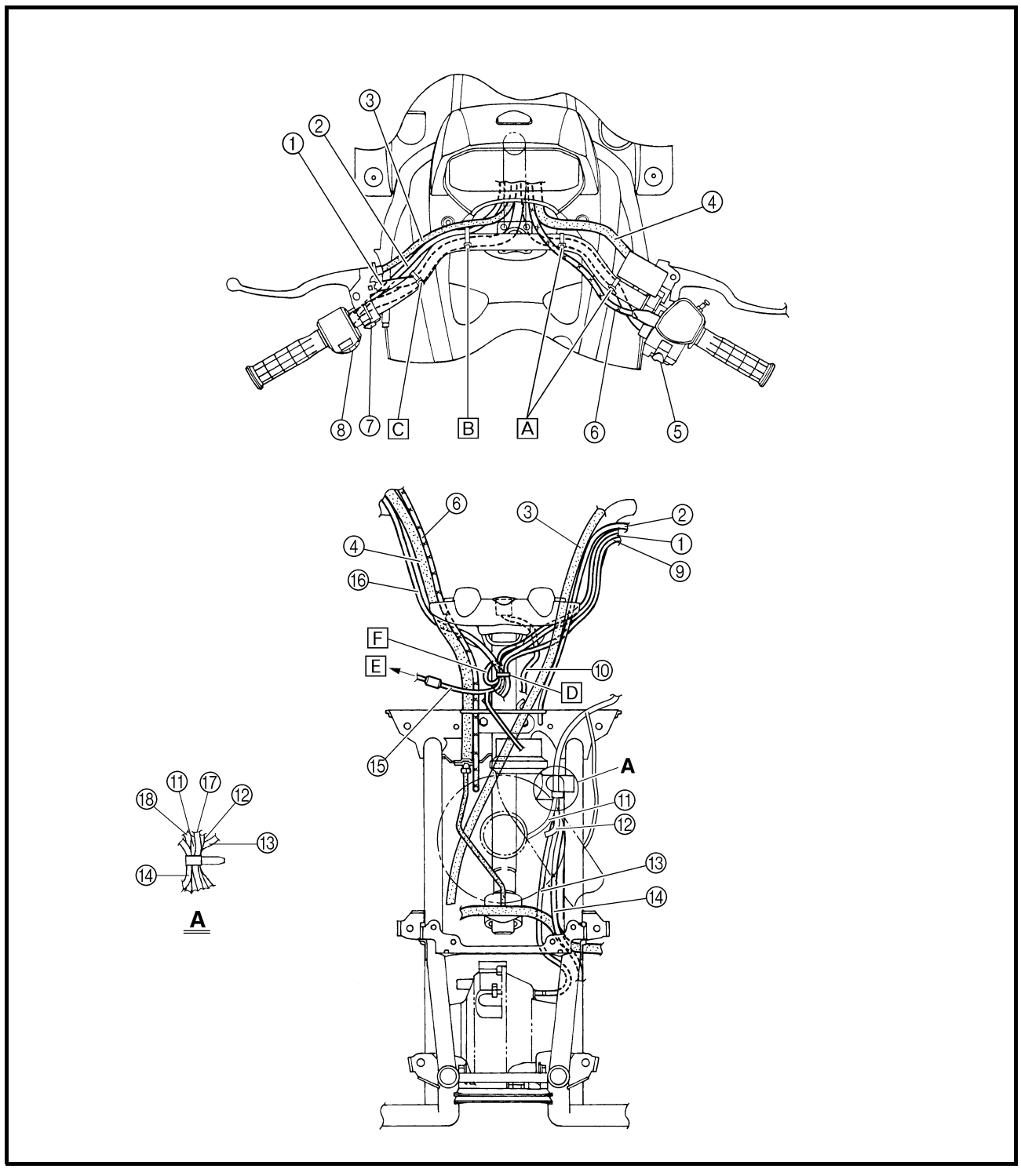
[A] Fasten the on-command four-wheel drive switch and differential gear lock switch lead behind the handlebar with a plastic band.
[B] Fasten the starter cable, handlebar switch lead, rear brake switch lead, and horn switch lead (for Europe and Oceania) behind the handlebar with a plastic band.
[C] Fasten the handlebar switch lead, rear brake switch lead, and horn switch lead (for Europe and Oceania) behind the handlebar with a plastic band.
[D] Fasten the handlebar switch lead, rear brake switch lead, and on-command four-wheel drive switch and differential gear lock switch lead, and horn switch lead (for Europe and Oceania) with a plastic band.





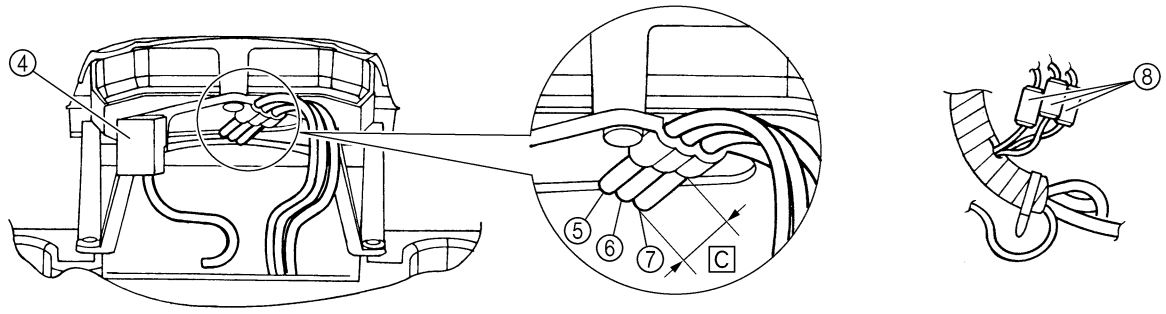


E To wire harness
F Loop the horn switch lead (for Europe and Oceania) around the plastic band as shown.



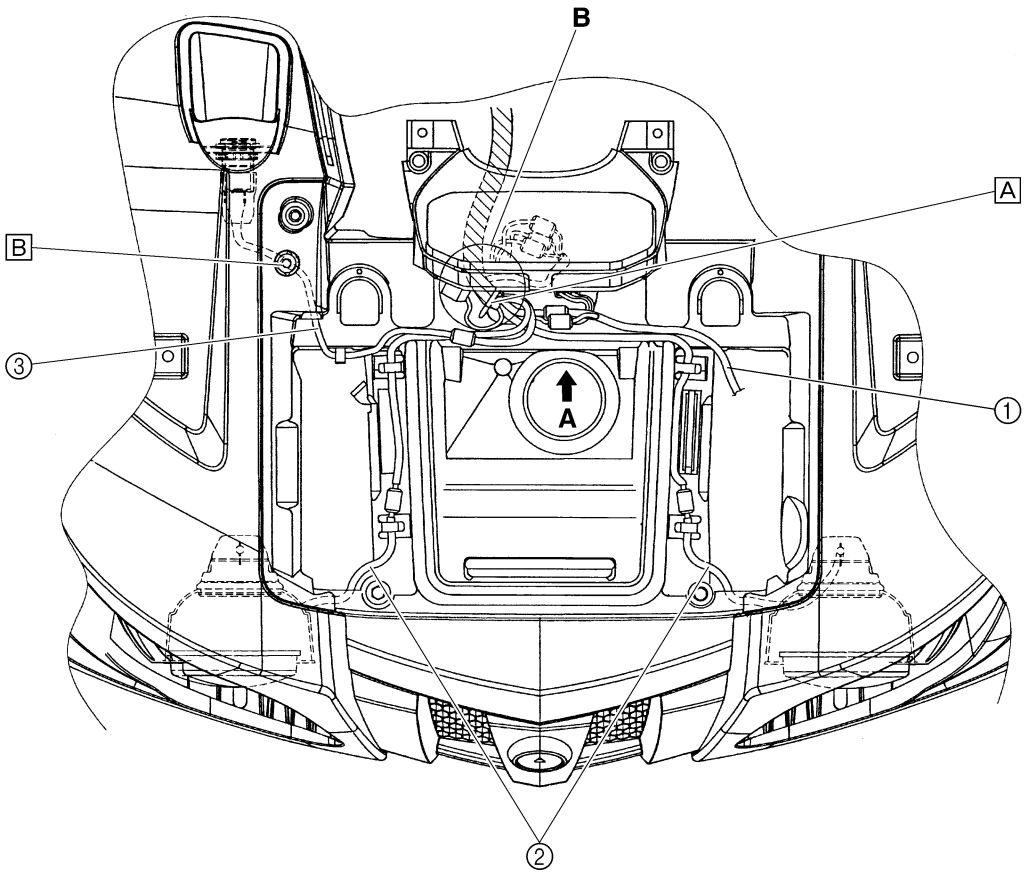
① Sub-wire harness
② Headlight leads
③ Auxiliary DC jack lead
④ Four-wheel drive relay 3
⑤ Fan motor breather hose
⑥ Differential gear case breather hose
⑦ Coolant reservoir breather hose
⑧ Meter assembly couplers

A Fasten the wire harness with a plastic band.
B Fasten the auxiliary DC jack lead with a plastic holder.
C 50 ~ 60 mm (1.97 ~ 2.36 in)

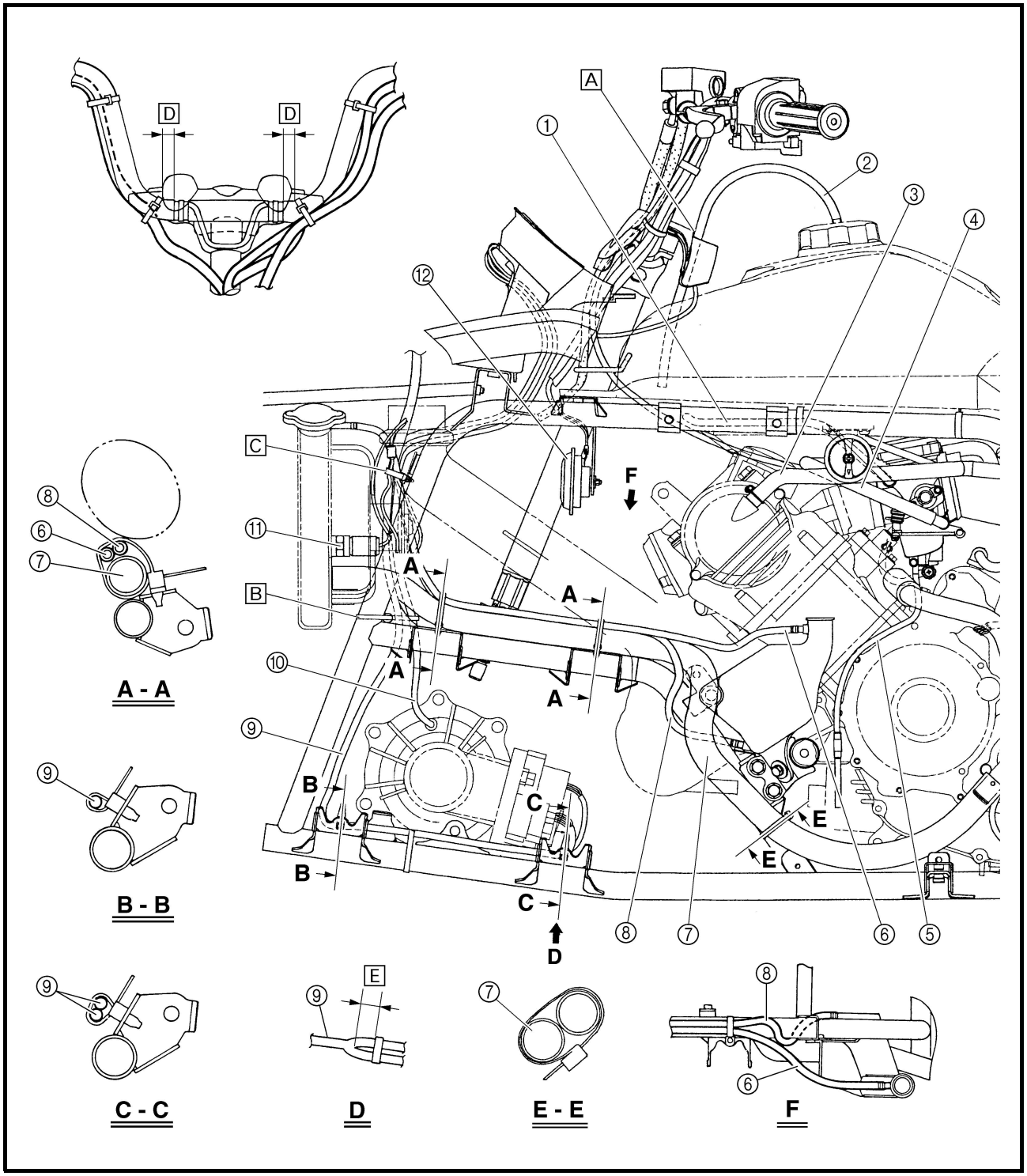


A

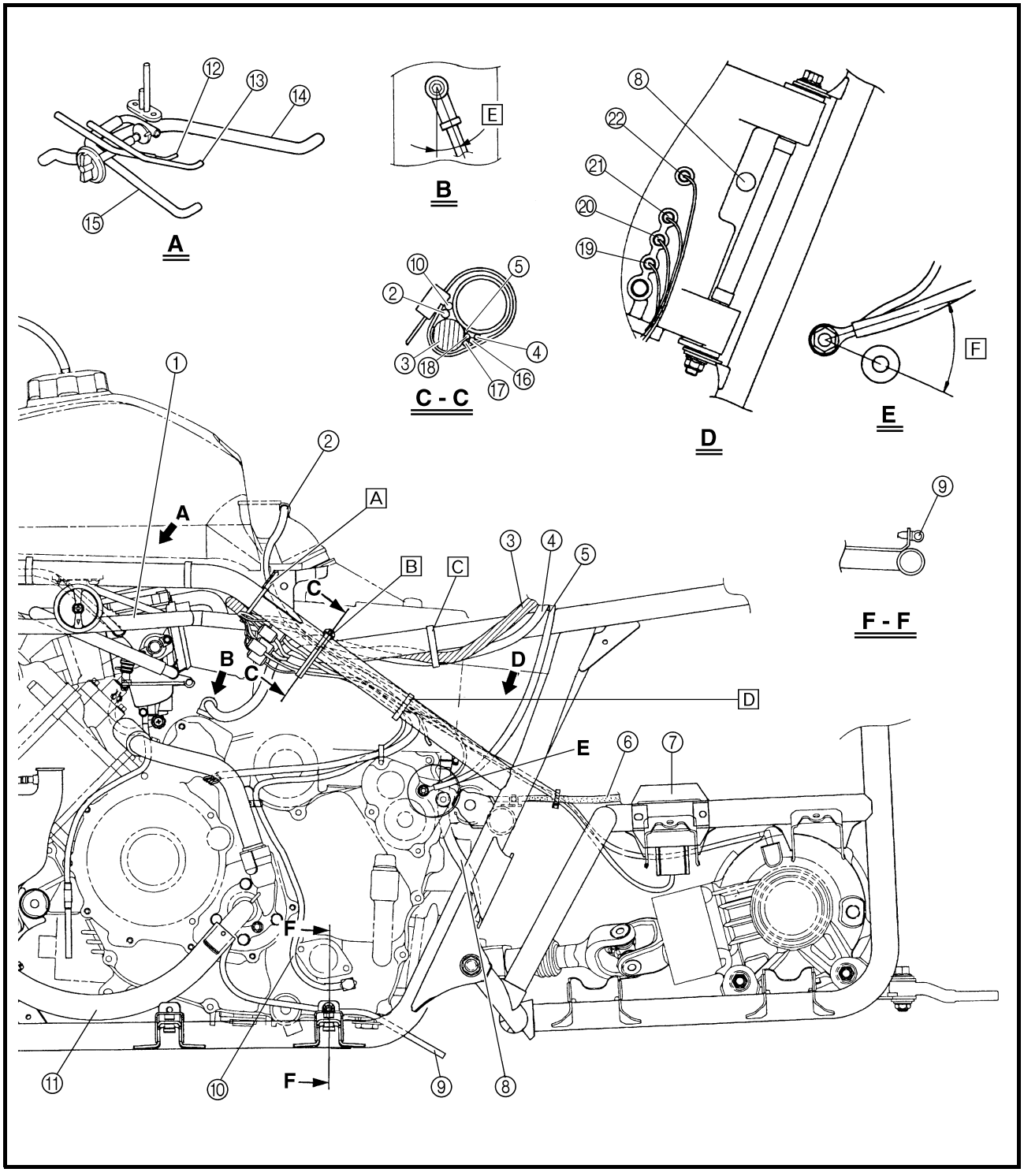
B



① Starter cable
② Fuel tank breather hose
③ Cylinder head breather hose
④ Fuel hose
⑤ Carburetor drain hose
⑥ Coolant reservoir breather hose
⑦ Radiator outlet hose
⑧ Coolant reservoir hose
⑨ Sub-wire harness
⑩ Differential gear case breather hose
⑪ Thermo switch 2
⑫ Horn (for Europe and Oceania)
[A] Insert the fuel tank breather hose into the hole of the handlebar cover.
[B] Fasten the sub-wire harness and differential gear case breather hose with a plastic band.
[C] Fasten the sub-wire harness, differential gear case breather hose, coolant reservoir hose, coolant reservoir breather hose, fan motor lead, and fan motor breather hose with a plastic band.
[D] 11.5 ~ 12.5 mm (0.45 ~ 0.49 in)
[E] 10.0 ~ 15.0 mm (0.39 ~ 0.59 in)

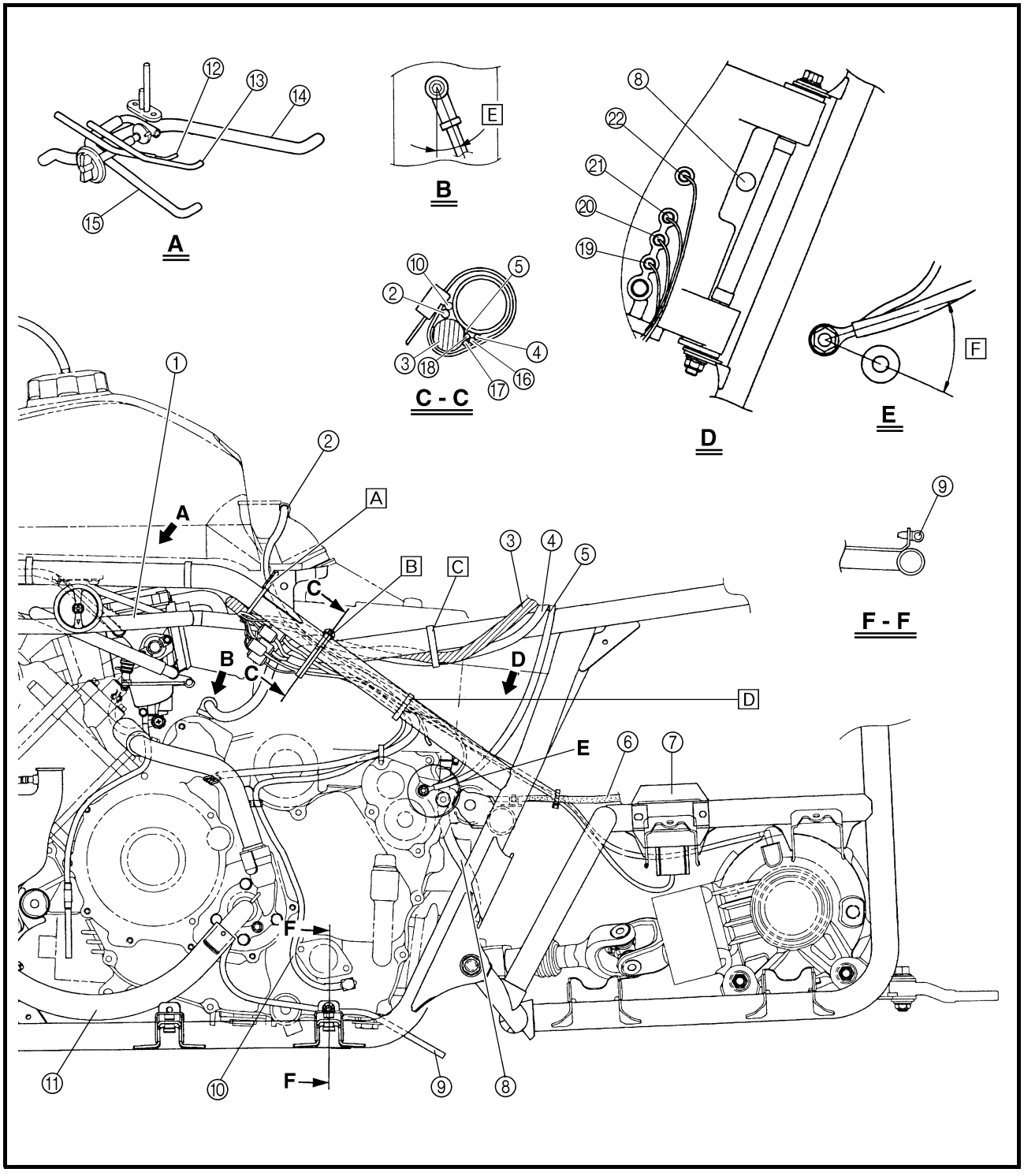


① Cylinder head breather hose
② Final drive gear case breather hose
③ Wire harness
④ Starter motor lead
⑤ Negative battery lead
⑥ Rear brake hose
⑦ Rectifier/regulator
⑧ Air filter case check hose
⑨ Water pump breather hose
⑩ Speed sensor lead
⑪ Radiator outlet hose
⑫ Starter cable
⑬ Float chamber air vent hose
⑭ Cylinder head breather hose
⑮ Fuel hose
⑯ A.C. magneto lead
⑰ Low-range switch/high-range switch/neutral switch/reverse switch leads
⑱ Rectifier/regulator lead
⑲ Low-range switch
⑳ High-range switch



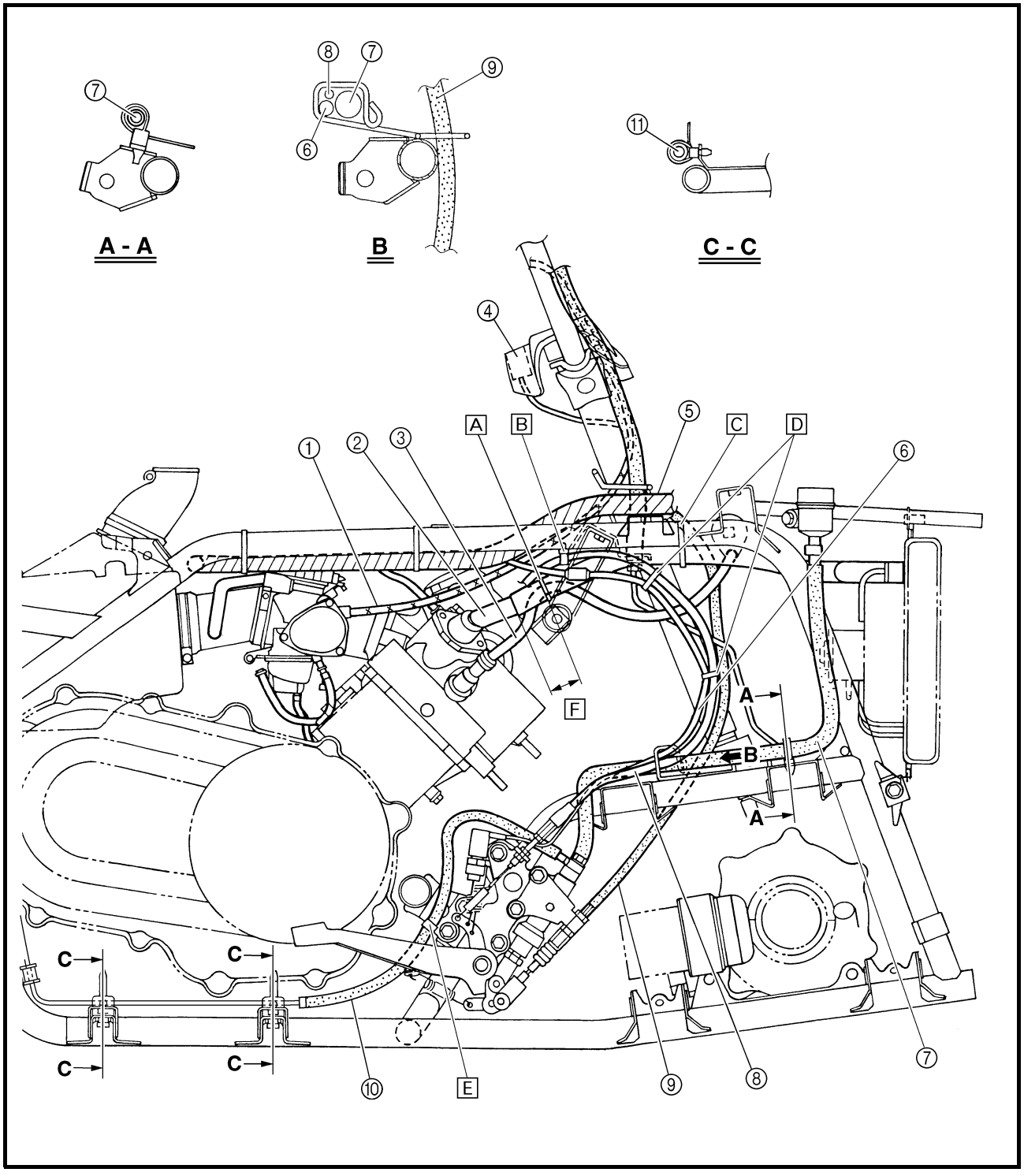
㉑ Neutral switch
㉒ Reverse switch

[A] Fasten the wire harness with a plastic band.
[B] Fasten the starter motor lead, wire harness, negative battery lead, final gear case breather hose, rectifier/regulator lead, low-range switch/high-range switch/neutral switch/reverse switch leads, speed sensor lead, and A.C. magneto lead with a plastic band.
[C] Fasten the wire harness and starter motor lead with a plastic band.
[D] Fasten the low-range switch/high-range switch/neutral switch/reverse switch leads, speed sensor lead, A.C. magneto lead, rectifier/regulator lead, negative battery lead, and final drive gear case breather hose with a plastic band.
[E] 10 ~ 30°
[F] 35 ~ 45°



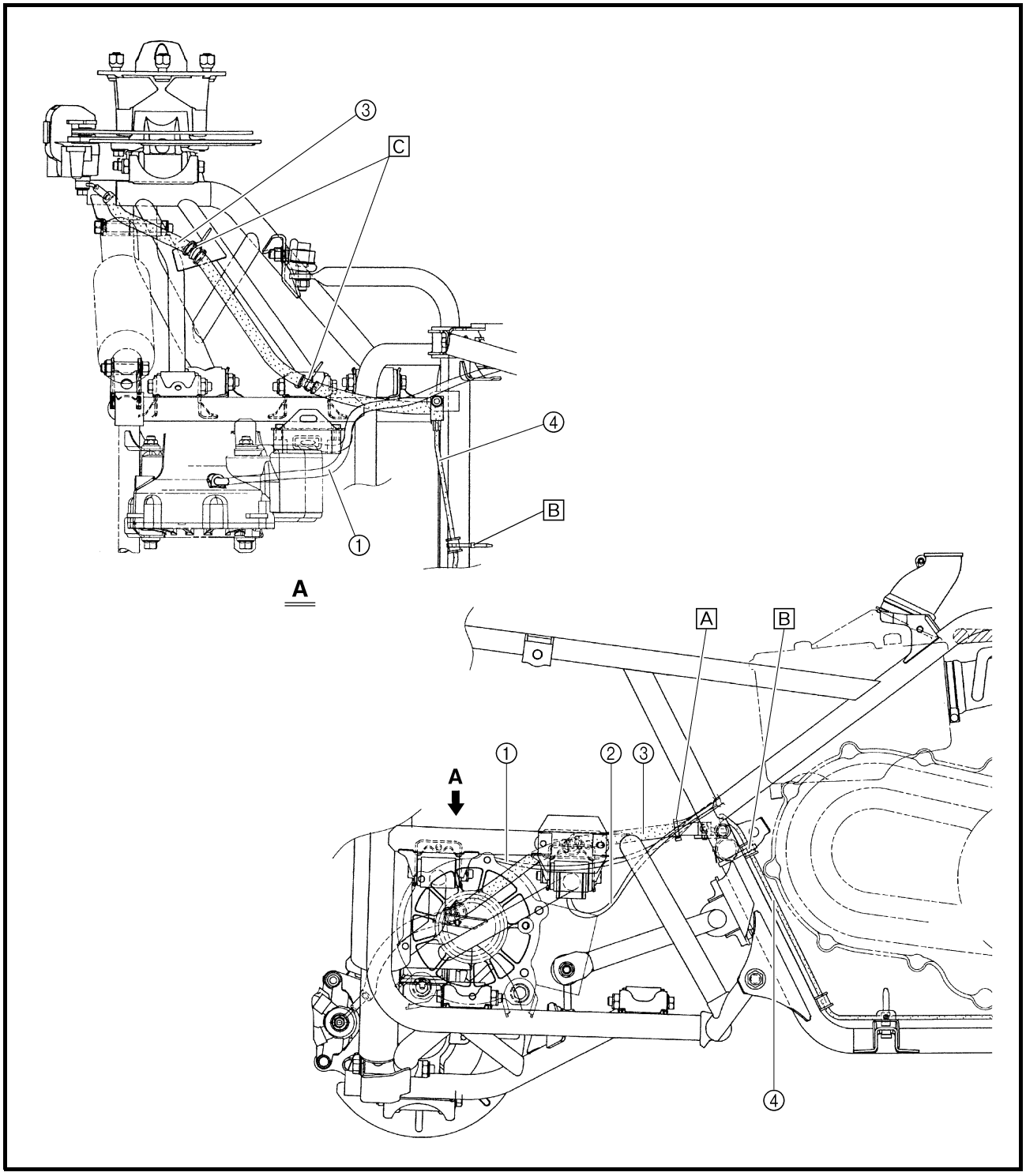
① Throttle cable
② Radiator inlet hose
③ Spark plug lead
④ Main switch
⑤ Wire harness
⑥ Rear brake light switch lead
⑦ Rear brake fluid reservoir hose
⑧ Select lever control cable
⑨ Rear brake cable
⑩ Rear brake hose
⑪ Rear brake pipe

A Fasten the radiator inlet hose and spark plug lead with a plastic band.
B Fasten the select lever control cable with a plastic holder.
C Fasten the radiator inlet hose with a plastic holder.
D Fasten the select lever control cable and rear brake light switch lead with the plastic bands.
E Fasten the rear brake hose with a plastic holder.
F 15 ~ 45 mm (0.59 ~ 1.77 in)

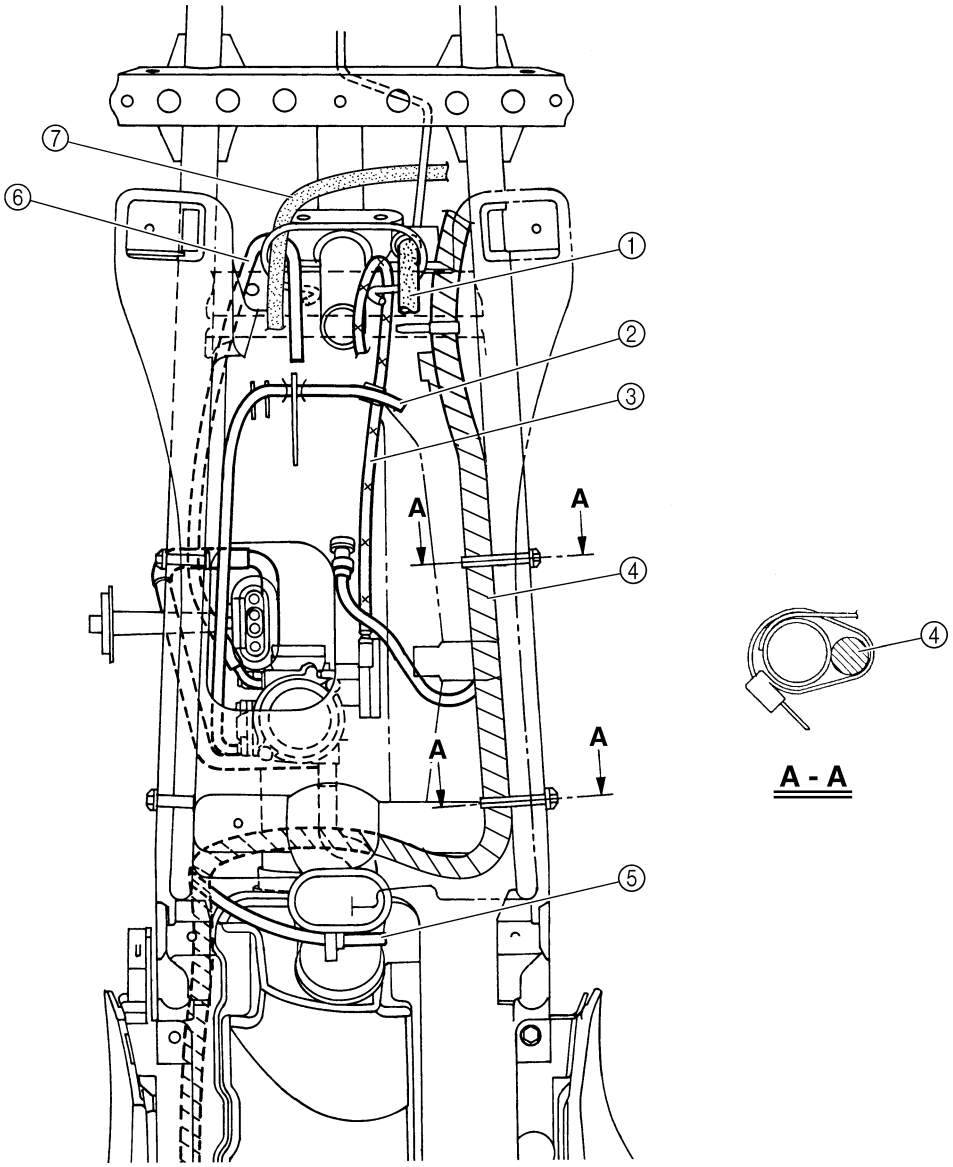


① Final drive gear case breather hose
② Rectifier/regulator lead
③ Rear brake hose
④ Rear brake pipe

A Fasten the final drive gear case breather hose, rectifier/regulator lead, and rear brake hose with a plastic band.
B Fasten the brake pipe with the plastic bands.
C Fasten the brake hose with the plastic bands.

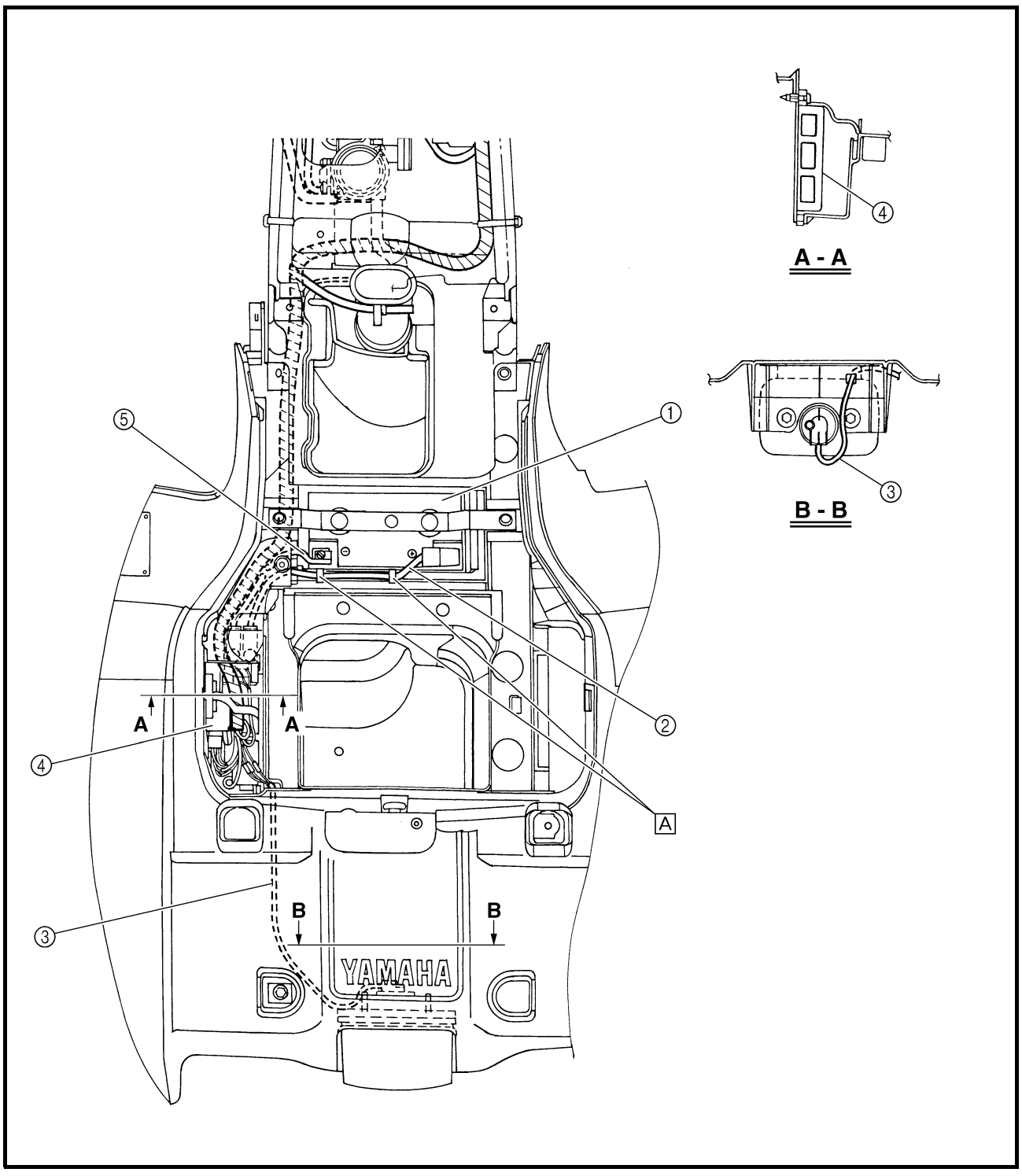


① Front brake hose
② Float chamber air vent hose
③ Throttle cable
④ Wire harness
⑤ Final drive gear case breather hose
⑥ Starter cable
⑦ Rear brake cable



① Battery
② Positive battery lead
③ Tail/brake light lead
④ CDI unit
⑤ Negative battery lead

[A] Fasten the positive battery lead with the plastic holders.



EB300000

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE/LUBRICATION

NOTE:

- For ATVs not equipped with an odometer or an hour meter, follow the month maintenance intervals.
- For ATVs equipped with an odometer or an hour meter, follow the km (mi) or hours maintenance intervals. However, keep in mind that if the ATV isn't used for a long period of time, the month maintenance intervals should be followed.

ITEM	ROUTINE	Whichever comes first ⇨		INITIAL			EVERY	
			month	1	3	6	6	12
			km (mi)	320 (200)	1,200 (750)	2,400 (1,500)	2,400 (1,500)	4,800 (3,000)
			hours	20	75	150	150	300
Valves*	• Check valve clearance. • Adjust if necessary.			○		○	○	○
Cooling system	• Check coolant leakage. • Repair if necessary. • Replace coolant every 24 months.			○	○	○	○	○
Spark plug	• Check condition. • Adjust gap and clean. • Replace if necessary.			○	○	○	○	○
Air filter element	• Clean. • Replace if necessary.			Every 20–40 hours (More often in wet or dusty areas.)				
Carburetor*	• Check starter (choke). • Adjust engine idling speed.				○	○	○	○
Crankcase breather system*	• Check breather hose for cracks or damage. • Replace if necessary.					○	○	○
Exhaust system*	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.					○	○	○
Fuel line*	• Check fuel hose for cracks or damage. • Replace if necessary.					○	○	○
Engine oil	• Replace. (Warm engine before draining.)			○		○	○	○
Engine oil filter cartridge	• Replace.			○		○		○
Engine oil strainer*	• Clean.			○		○		○
Final gear oil **Differential gear oil**	• Check oil level/oil leakage. • Replace every 12 months.			○				○
Front brake*	• Check operation/fluid leakage. (See NOTE page 19.) • Correct if necessary.			○	○	○	○	○
Rear brake*	• Check operation/fluid leakage. (See NOTE page 19.) • Correct if necessary.			○	○	○	○	○
Select lever safety system cable*	• Check operation. • Adjust if necessary.					○	○	○

CHK ADJ

ITEM	ROUTINE	Whichever comes first ⇨		INITIAL			EVERY	
			month	1	3	6	6	12
			km (mi)	320 (200)	1,200 (750)	2,400 (1,500)	2,400 (1,500)	4,800 (3,000)
			hours	20	75	150	150	300
V-belt*	• Check operation. • Check for cracks or damage.			○		○	○	○
Wheels*	• Check balance/damage/runout. • Repair if necessary.			○		○	○	○
Wheel bearing*	• Check bearing assemblies for looseness/damage. • Replace if damaged.			○		○	○	○
Front and rear suspension*	• Check operation. • Correct if necessary.					○		○
Steering system*	• Check operation./Replace if damaged. • Check toe-in./Adjust if necessary.			○	○	○	○	○
Rear upper and lower knuckle pivots*	• Lubricate with lithium-soap-based grease.					○	○	○
Drive shaft universal joint*	• Lubricate with lithium-soap-based grease.					○	○	○
Engine mount*	• Check for cracks or damage.					○	○	○
Front and rear axle boots*	• Check operation. • Replace if damaged.			○	○	○	○	○
Stabilizer bushes*	• Check for cracks or damage.					○	○	○
Fittings and fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.			○	○	○	○	○
Lights and switches*	• Check operation. • Adjust headlight beams.			○	○	○	○	○

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE:

- Recommended brake fluid: DOT 4
- Brake fluid replacement:

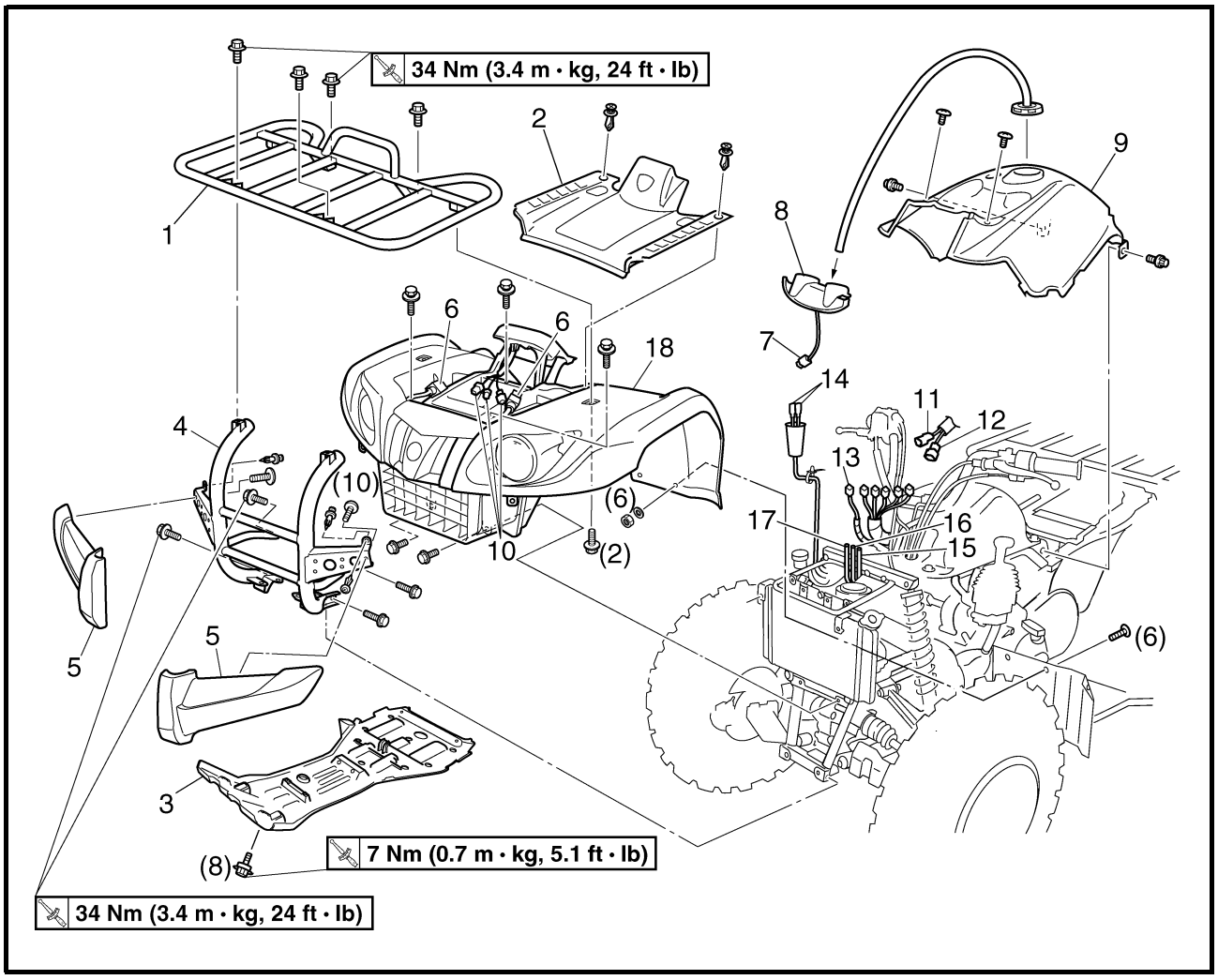
1. When disassembling the master cylinders or calipers, replace the brake fluid. Normally check the brake fluid level and add fluid as required.
2. On the inner parts of the master cylinders and calipers, replace the oil seals every two years.
3. Replace the brake hoses every four years, or if cracked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

⚠ WARNING

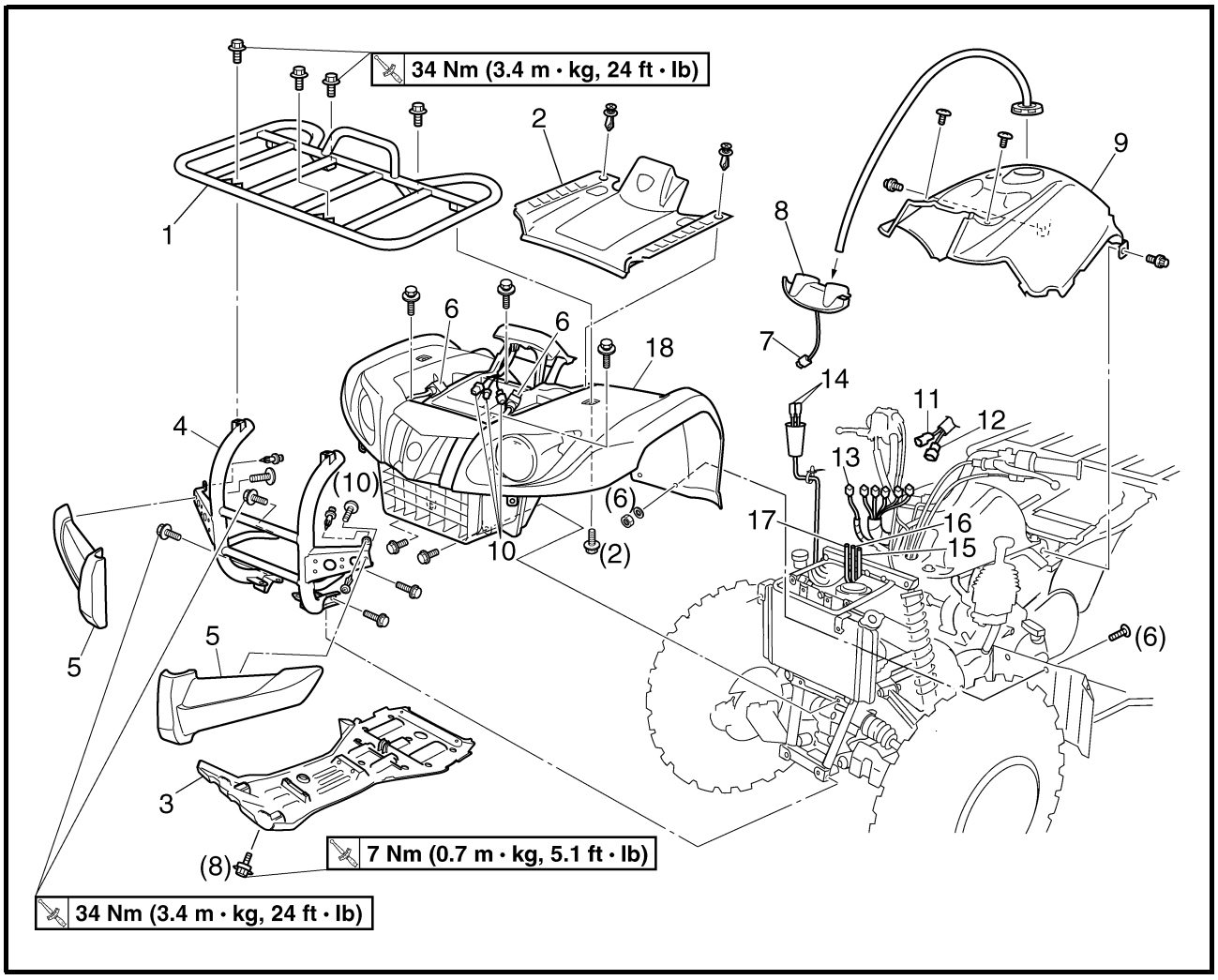
Indicates a potential hazard that could result in serious injury or death.

SEAT, CARRIERS, FENDERS AND FUEL TANK

FRONT CARRIER, FRONT BUMPER AND FRONT FENDER



Order	Job/Part	Q'ty	Remarks
	Removing the front carrier, front bumper and front fender		Remove the parts in the order below.
	Seat and fuel tank side panels		Refer to "SEAT AND SIDE PANELS" in chapter 3. (Manual No.: 5ND2-AE1)
1	Front carrier	1	
2	Front fender panel	1	
3	Engine skid plate	1	
4	Front bumper	1	
5	Front bumper cover	2	
6	Headlight coupler	2	Disconnect.
7	Main switch coupler	1	Disconnect.
8	Handlebar cover	1	
9	Fuel tank cover	1	



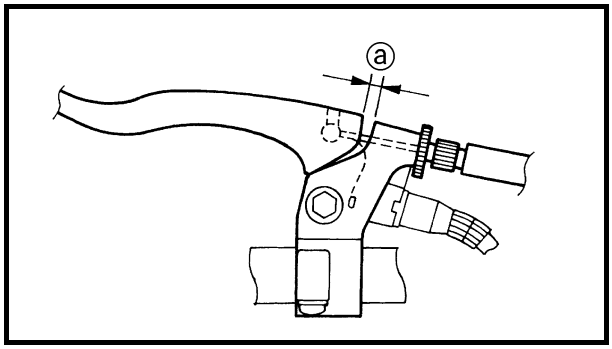
Order	Job/Part	Q'ty	Remarks
10	Meter assembly coupler	3	Disconnect.
11	Sub-wire harness 1 coupler	1	Disconnect.
12	Sub-wire harness 2 coupler	1	Disconnect.
13	Four-wheel drive relay 3 coupler	1	Disconnect.
14	Auxiliary DC jack connector	2	Disconnect.
15	Coolant reservoir breather hose	1	
16	Differential gear case breather hose	1	
17	Fan motor breather hose	1	
18	Front fender	1	
			For installation, reverse the removal procedure.

CHASSIS

ADJUSTING THE REAR BRAKE

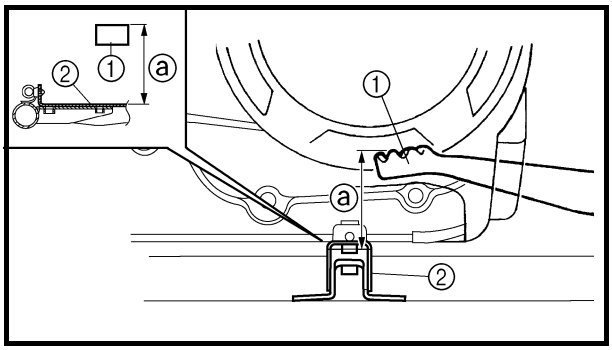
⚠ WARNING

Always adjust both the brake pedal and the rear brake lever whenever adjusting the rear brake.



1. Check:
   - rear brake lever free play ⓐ
     Out of specification → Adjust.

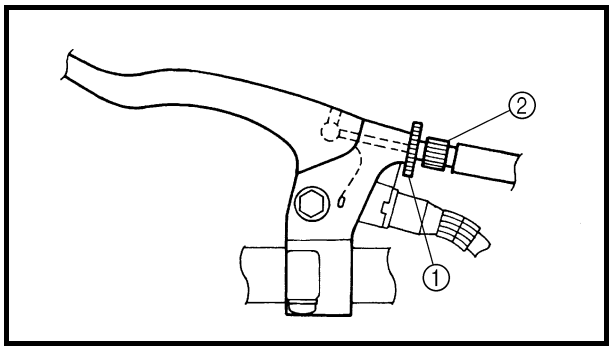
Rear brake lever free play
0.5 ~ 2.0 mm (0.02 ~ 0.08 in)



2. Check:
   - rear brake pedal height ⓐ
     Out of specification → Adjust.

Rear brake pedal height
67 ~ 77 mm (2.64 ~ 3.03 in)

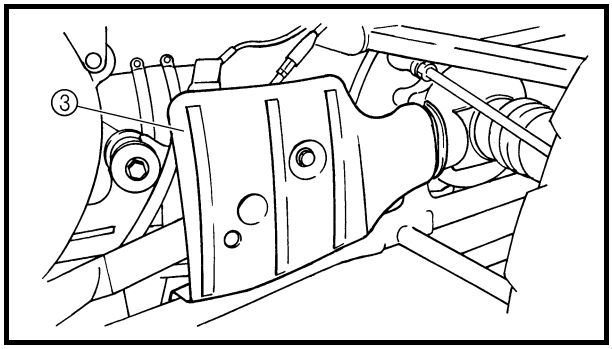
① Brake pedal
② Footrest bracket

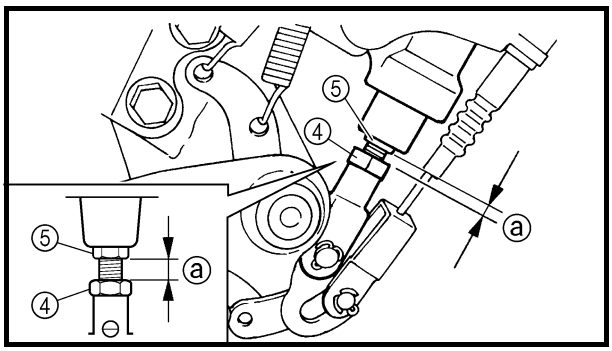


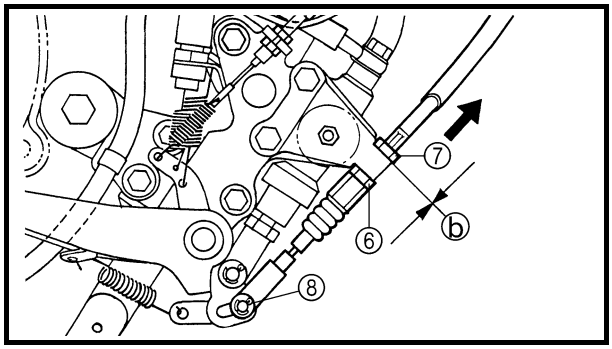
3. Adjust:
   - rear brake lever free play
   - rear brake pedal height

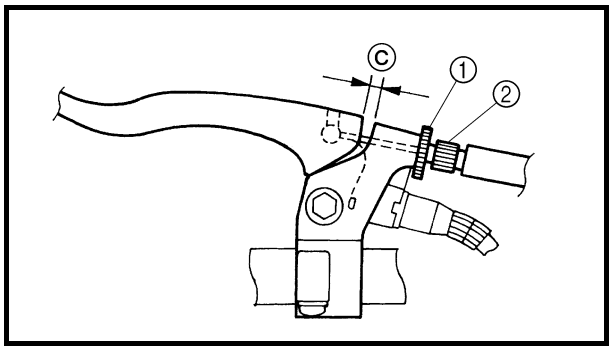
▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Loosen the locknut (handlebar) ① and fully screw in the brake lever cable adjuster (handlebar) ②.
b. Remove the rear brake master cylinder cover ③.









c. Loosen the locknut ④.
d. Turn the adjusting bolt ⑤ until the brake pedal height is within the specified limits.

Brake pedal height
67 ~ 77 mm (2.64 ~ 3.03 in)

e. Tighten the locknut ④.

NOTE:
When adjusting the brake pedal height make sure the locknut-to-adjusting bolt clearance ⓐ does not exceed 6 mm (0.24 in).

f. Loosen the locknut ⑥.
g. Pull up the brake outer cable and turn the brake cable adjusting (nut) ⑦ until the clearance ⓑ is within the specified limits.

Clearance ⓑ
Less than 1 mm (0.04 in)

NOTE:
Make sure the pin ⑧ is all the way to the right of the link plate hole.

h. Hold the adjusting nut ⑦ and tighten the locknut ⑥.
i. Turn the brake lever cable adjuster (handlebar) ② until the rear brake lever free play ⓒ is within the specified limits.

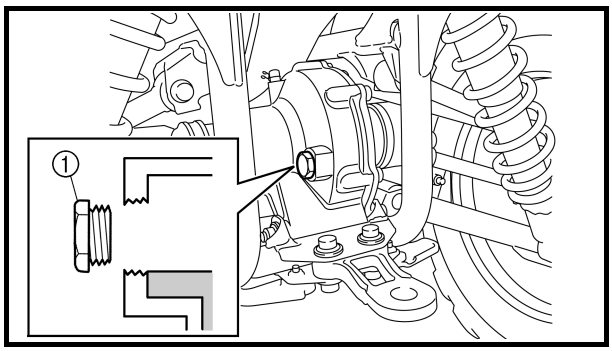
Rear brake lever free play
0.5 ~ 2.0 mm (0.02 ~ 0.08 in)

Tighten the locknut (handlebar) ①.
j. Adjust the select lever control cable.
Refer to "ADJUSTING THE SELECT LEVER CONTROL CABLE AND SHIFT ROD" in chapter 3. (Manual No.: 5ND2-AE1)
k. Install the rear brake master cylinder cover.

⚠ WARNING

After this adjustment is performed, lift the front and rear wheels off the ground by placing a block under the engine, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed perform the above steps again.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



CHECKING THE FINAL GEAR OIL LEVEL

1. Place the vehicle on a level surface.
2. Remove:
   - oil filler plug ①
3. Check:
   - oil level

     Oil level should be up to the brim of the hole.

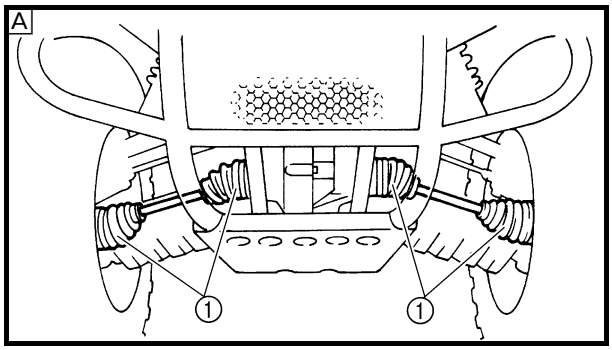
     Oil level low → Add oil to the proper level.

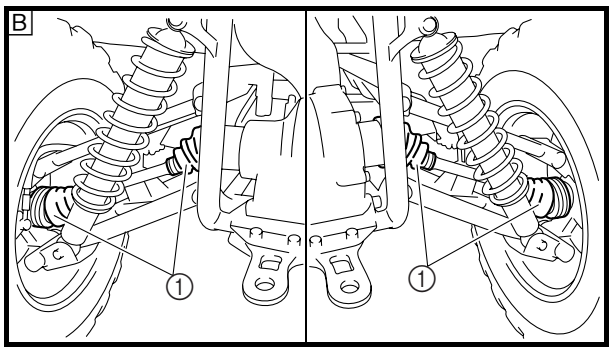
Recommended oil
SAE 80 API "GL-4" Hypoid gear oil

CAUTION:

Take care not allow foreign material to enter the final gear case.

4. Install:
   - oil filler plug — **23 Nm (2.3 m · kg, 17 ft · lb)**





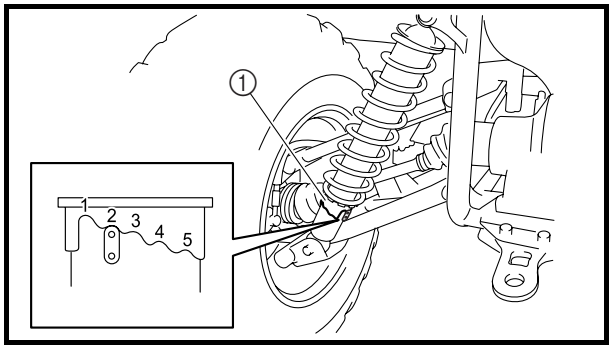
CHECKING THE CONSTANT VELOCITY JOINT DUST BOOTS

1. Check:
   - dust boots ①

     Damage → Replace.

     Refer to "FRONT CONSTANT VELOCITY JOINTS AND DIFFERENTIAL GEAR" in chapter 7 (Manual No.: 5ND2-AE1) for the front constant velocity joint dust boots or "REAR CONSTANT VELOCITY JOINTS, FINAL DRIVE GEAR AND DRIVE SHAFT" for the rear constant velocity joint dust boots.

A Front
B Rear



ADJUSTING THE REAR SHOCK ABSORBERS

⚠ WARNING

Always adjust both shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.

NOTE:

The spring preload of the shock absorbers can be adjusted to suit the operator's preference, weight, and the operating conditions.

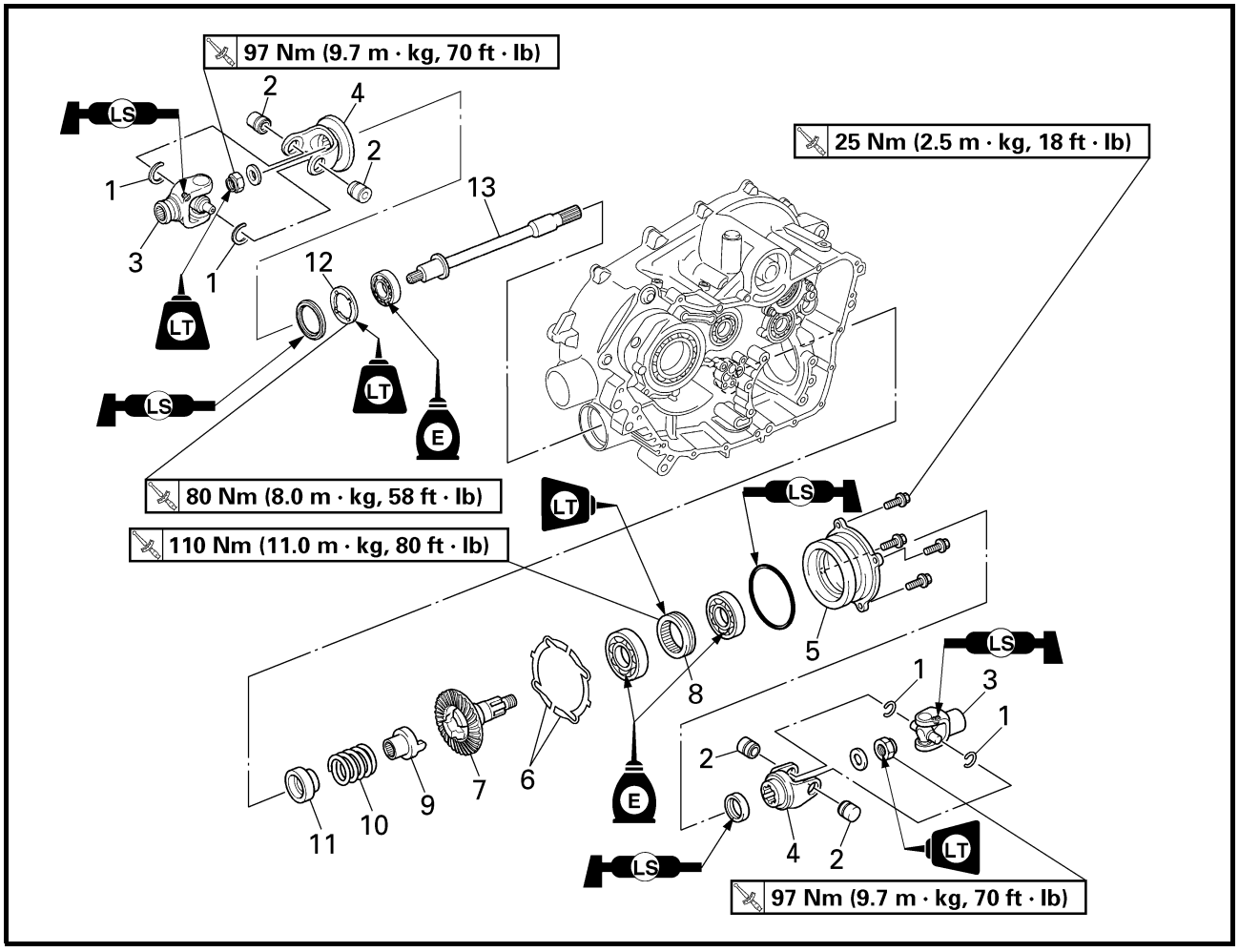
1. Adjust:
   - spring preload
     Turn the adjuster ① to increase or decrease the spring preload.

Standard position: 2
Minimum (Soft) position: 1
Maximum (Hard) position: 5

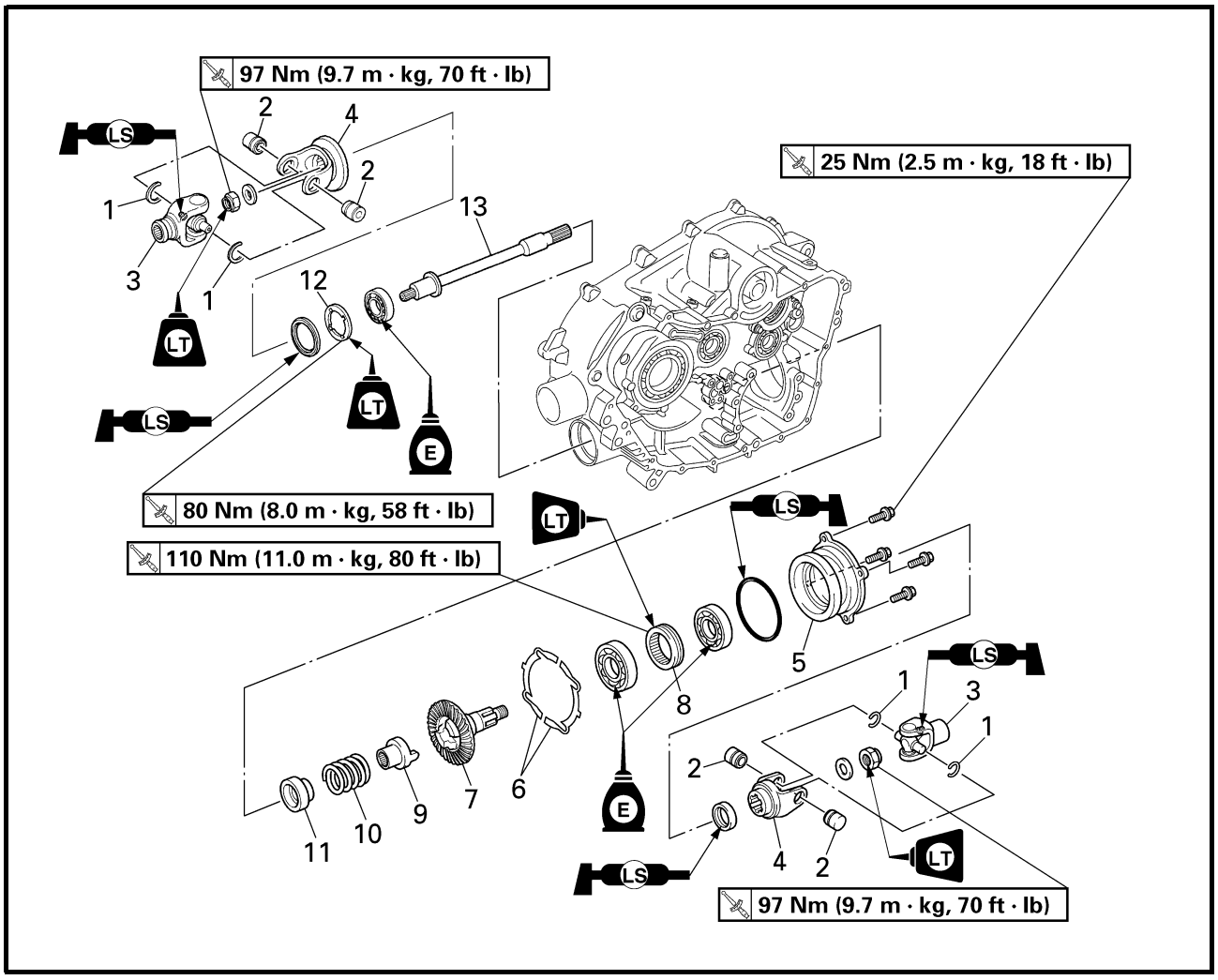
ENGINE

MIDDLE GEAR

MIDDLE DRIVEN SHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the middle driven shaft		Remove the parts in the order below.
	Crankcase separation		Refer to "CRANKCASE" in chapter 4. (Manual No.: 5ND2-AE1)
1	Circlip	4	Refer to "REMOVING THE MIDDLE DRIVEN SHAFT" and "INSTALLING THE MIDDLE DRIVEN SHAFT" in chapter 4. (Manual No.: 5ND2-AE1)
2	Bearing	4	
3	Universal joint	2	
4	Universal joint yoke	2	
5	Bearing housing	1	
6	Shim		Refer to "SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIM" in chapter 4. (Manual No.: 5ND2-AE1)
7	Middle drive pinion gear	1	Refer to "REMOVING THE MIDDLE DRIVEN SHAFT" and "INSTALLING THE MIDDLE DRIVEN SHAFT" in chapter 4. (Manual No.: 5ND2-AE1)
8	Bearing retainer	1	



Order	Job/Part	Q'ty	Remarks
9	Damper cam	1	
10	Spring	1	
11	Gear coupling	1	
12	Bearing retainer	1	
13	Middle driven shaft	1	
			For installation, reverse the removal procedure.

DRIVE TRAIN

TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2. A "rolling rumble" noticeable at low speed; a high-pitched whine; a "clunk" from a shaft drive component or area. 3. A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the front and/or rear wheel.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign objects lodged between the moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and check them.

1. Check:
   • unusual noises

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

The following "noises" may indicate a mechanical defect:

a. A "rolling rumble" noise during coasting, acceleration, or deceleration. The noise increases with front and/or rear wheel speed, but it does not increase with higher engine or transmission speeds.
   Diagnosis: Possible wheel bearing damage.
b. A "whining" noise that varies with acceleration and deceleration.
   Diagnosis: Possible incorrect reassembly, too-little gear lash.

CAUTION:

Too little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

c. A slight "thunk" evident at low speed operation. This noise must be distinguished from normal machine operation.
   Diagnosis: Possible broken gear teeth.

⚠ WARNING

Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing loss of control of the machine and possible injury to the rider.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Check:
   • drained oil
   Drained oil shows large amounts of metal particles → Check the bearings for seizure.

NOTE:

A small amount of metal particles in the oil is normal.

3. Check:
   • oil leakage

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Clean the entire machine thoroughly, then dry it.
b. Apply a leak-localizing compound or dry powder spray to the shaft drive.
c. Road test the machine for the distance necessary to locate the leak.
   Leakage → Check the component housing, gasket, and/or seal for damage.
   Damage → Replace the component.

NOTE:

- An apparent oil leak on a new or nearly new machine may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

Troubleshooting chart

When basic condition “a” and “b” exist, check the following points:

Elevate and spin both wheels. Feel for wheel bearing damage.
YES → Replace the wheel bearings. (Refer to “STEERING SYSTEM” (Manual No.: 5ND2-AE2) for the front wheel bearings or “REAR KNUCKLES AND STABILIZER” for the rear wheel bearings.)
NO ↓

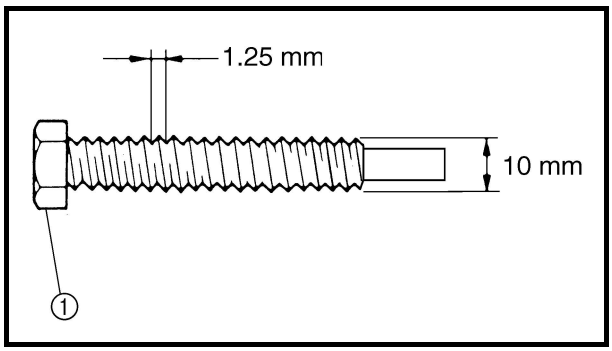
Check the wheel nuts and hub nuts for tightness.
NO → Torque to specification. (Refer to “FRONT AND REAR WHEELS” in chapter 8 (Manual No.: 5ND2-AE1) for the front wheel nuts and hub nuts or “FRONT AND REAR WHEELS” for the rear wheel nuts and hub nuts.)
YES ↓

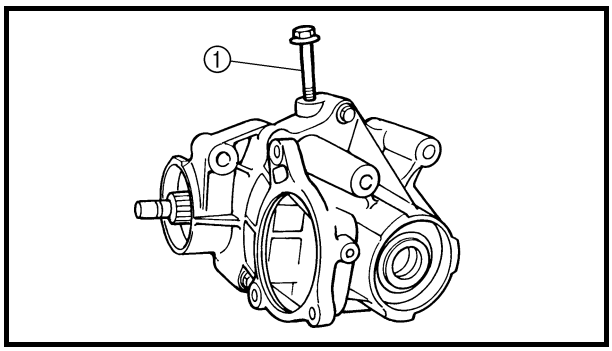
Check the front constant velocity joints. Feel for bearing damage.
NO → Constant velocity joint bearings and differential gear bearings are probably not damaged. Repeat the test or remove the individual components.
YES ↓

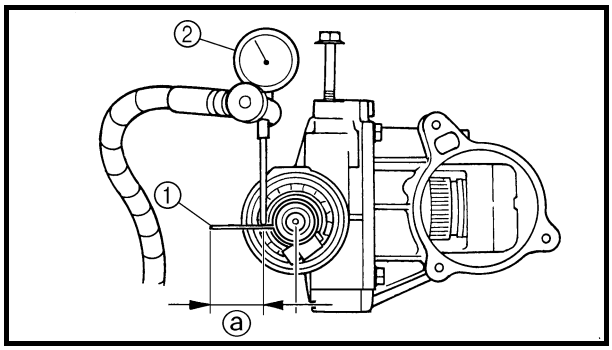
Check the rear brake adjustment.
NO → Adjust per instructions. (Refer to “ADJUSTING THE REAR BRAKE”.)
YES ↓

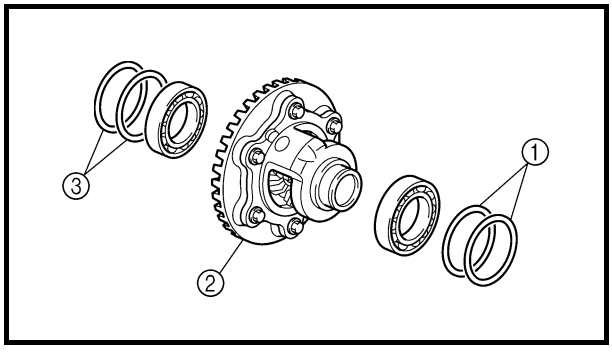
Check the rear constant velocity joints. Feel for bearing damage.
NO → Constant velocity joint bearings and final drive gear bearings are probably not damaged. Repeat the test or remove the individual components.
YES ↓

Remove the drive shaft components.









FRONT CONSTANT VELOCITY JOINTS AND DIFFERENTIAL GEAR

MEASURING AND ADJUSTING THE DIFFERENTIAL GEAR LASH

Measuring the differential gear lash

1. Secure the gear case in a vise or another supporting device.
2. Remove:
   - drain plug
   - gasket
3. Install:
   - a bolt of the specified size ①
     (into the drain plug hole)

CAUTION:

Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.

4. Attach:
   - gear lash measurement tool ①
   - dial gauge ②

	Gear lash measurement tool **P/N. YM-01467, 90890-01467**

ⓐ Measuring point is 32 mm (1.26 in)

5. Measure:
   - gear lash
     Gently rotate the gear coupling from engagement to engagement.

	Differential gear lash **0.05 ~ 0.25 mm** **(0.002 ~ 0.010 in)**

NOTE:

Measure the gear lash at four positions. Rotate the shaft 90° each time.

Adjusting differential gear lash

1. Remove:
   - shim(s) (left) ①
   - differential gear assembly ②
   - shim(s) (right) ③

2. Adjust:
   • gear lash

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Select the suitable shims using the following chart.

Too little gear lash	**Reduce shim thickness.**
Too large gear lash	**Increase shim thickness.**

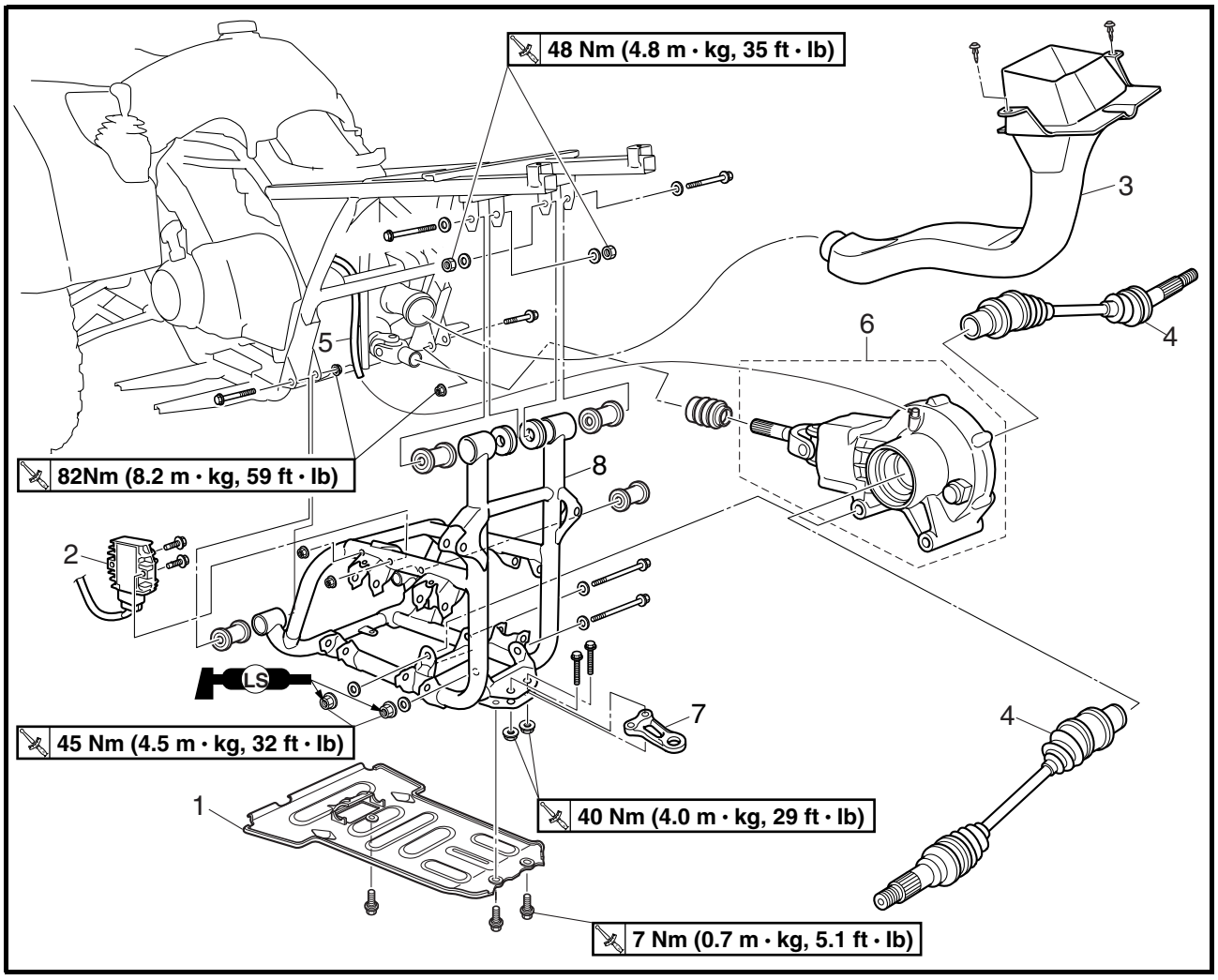
b. If it is necessary to increase by more than 0.05 mm (0.002 in):
   Reduce right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm (0.004 in) of left shim increase.
c. If it is necessary to reduce by more than 0.1 mm (0.004 in):
   Increase right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm of left shim decreased.

	**Ring gear shim (left and right)**		
Thickness (mm)	**0.1** **0.4** **1.5***	**0.2** **0.5**	**0.3** **1.0**

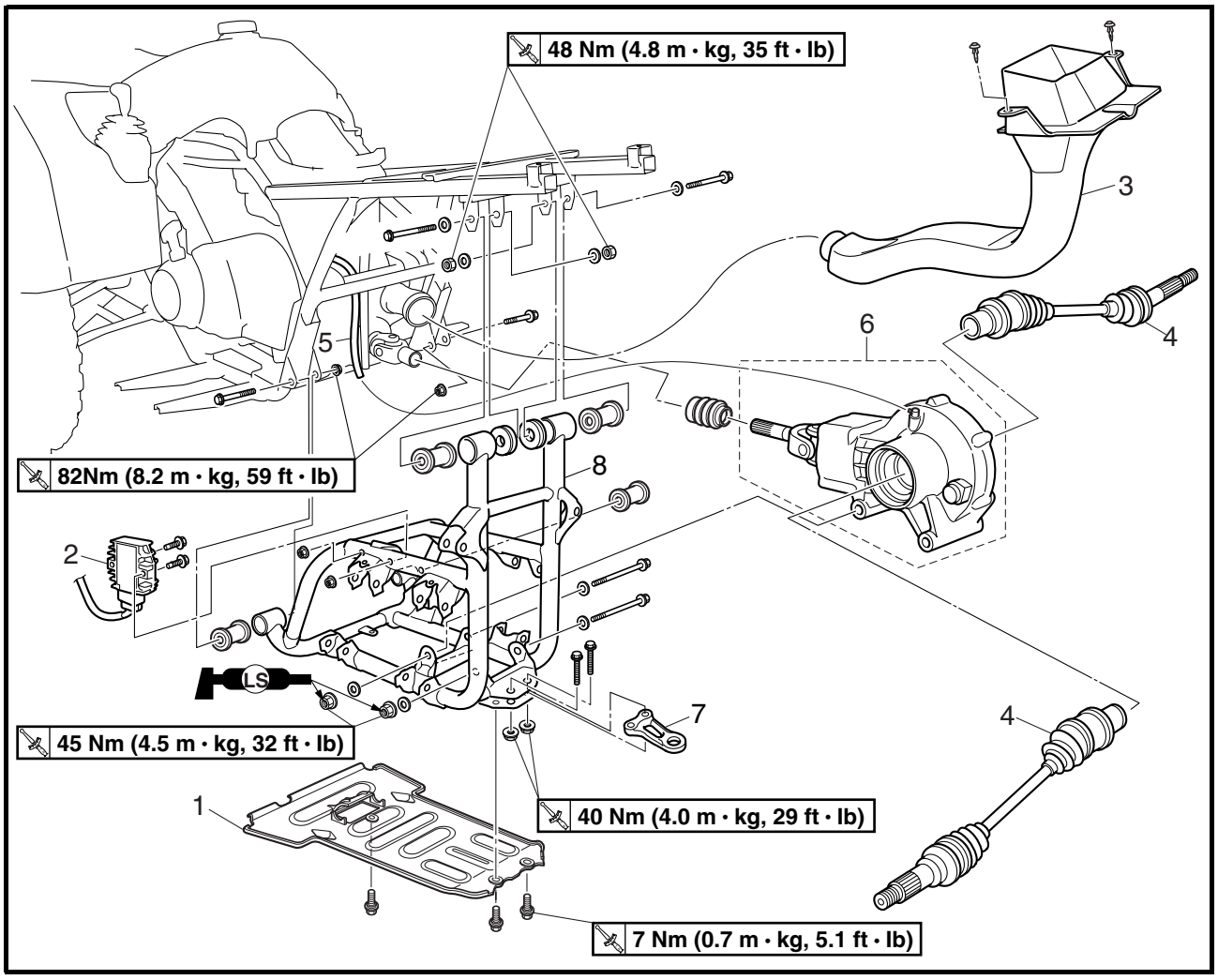
* Left only

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

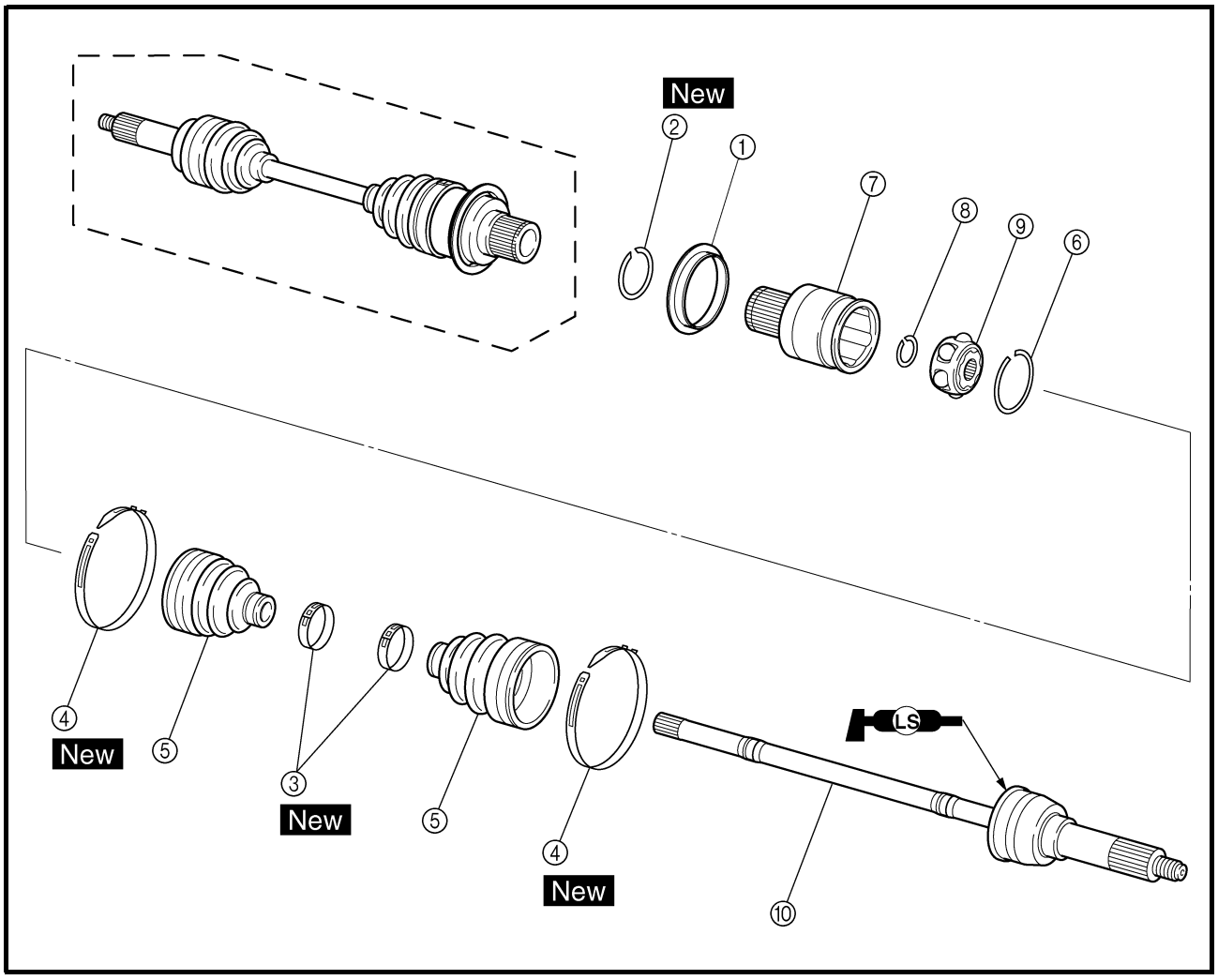
REAR CONSTANT VELOCITY JOINTS, FINAL DRIVE GEAR AND DRIVE SHAFT



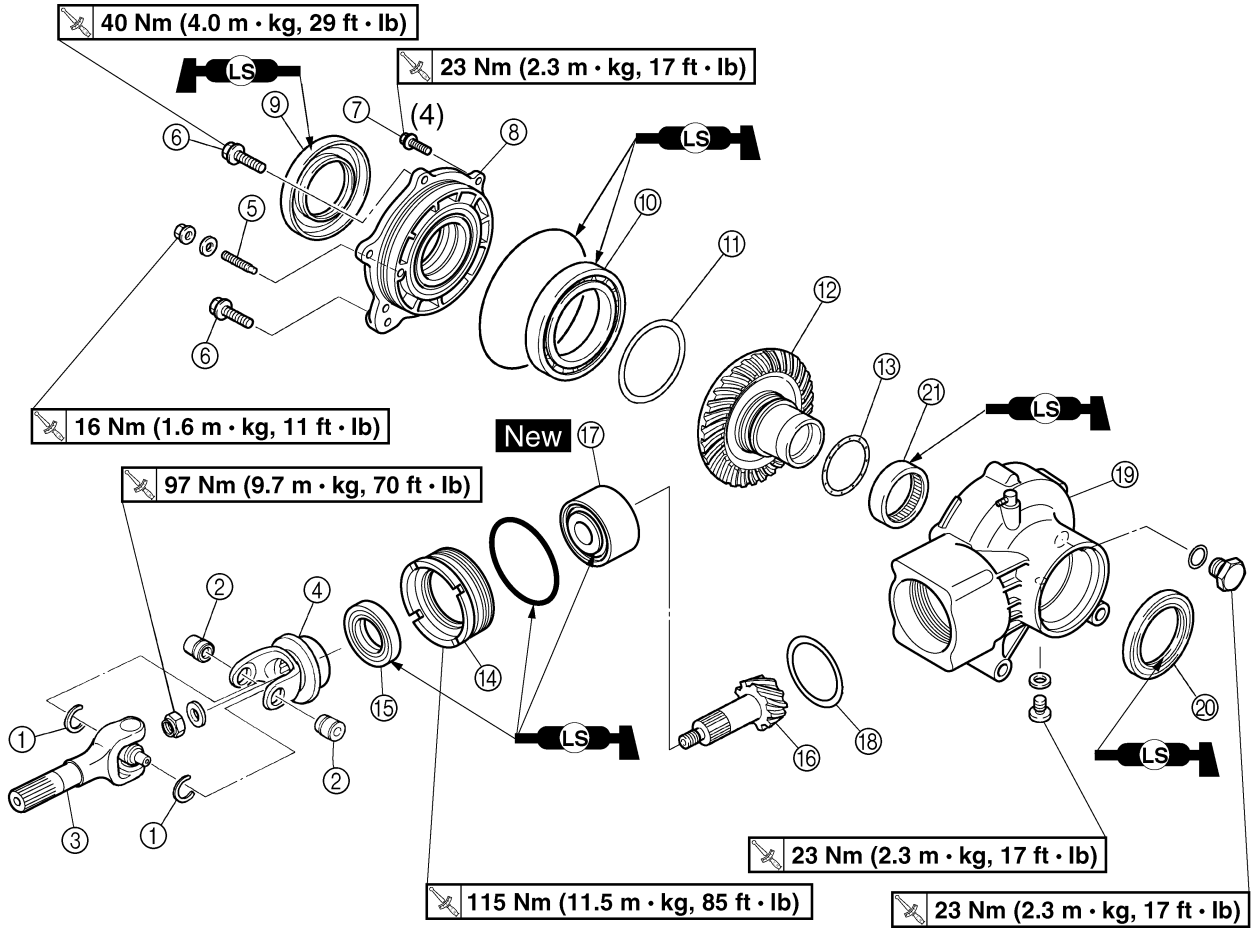
Order	Job/Part	Q'ty	Remarks
	Removing the rear constant velocity joints, final drive gear assembly and drive shaft		Remove the parts in the order below.
	Engine skid plate		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".
	Rear fender		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in chapter 3. (Manual No.: 5ND2-AE1)
	Footrest boards		Refer to "FOOTREST BOARDS" in chapter 3. (Manual No.: 5ND2-AE1)
	Final gear oil		Drain.
	Rear arms and rear shock absorber		Refer to "REAR ARMS AND REAR SHOCK ABSORBERS".



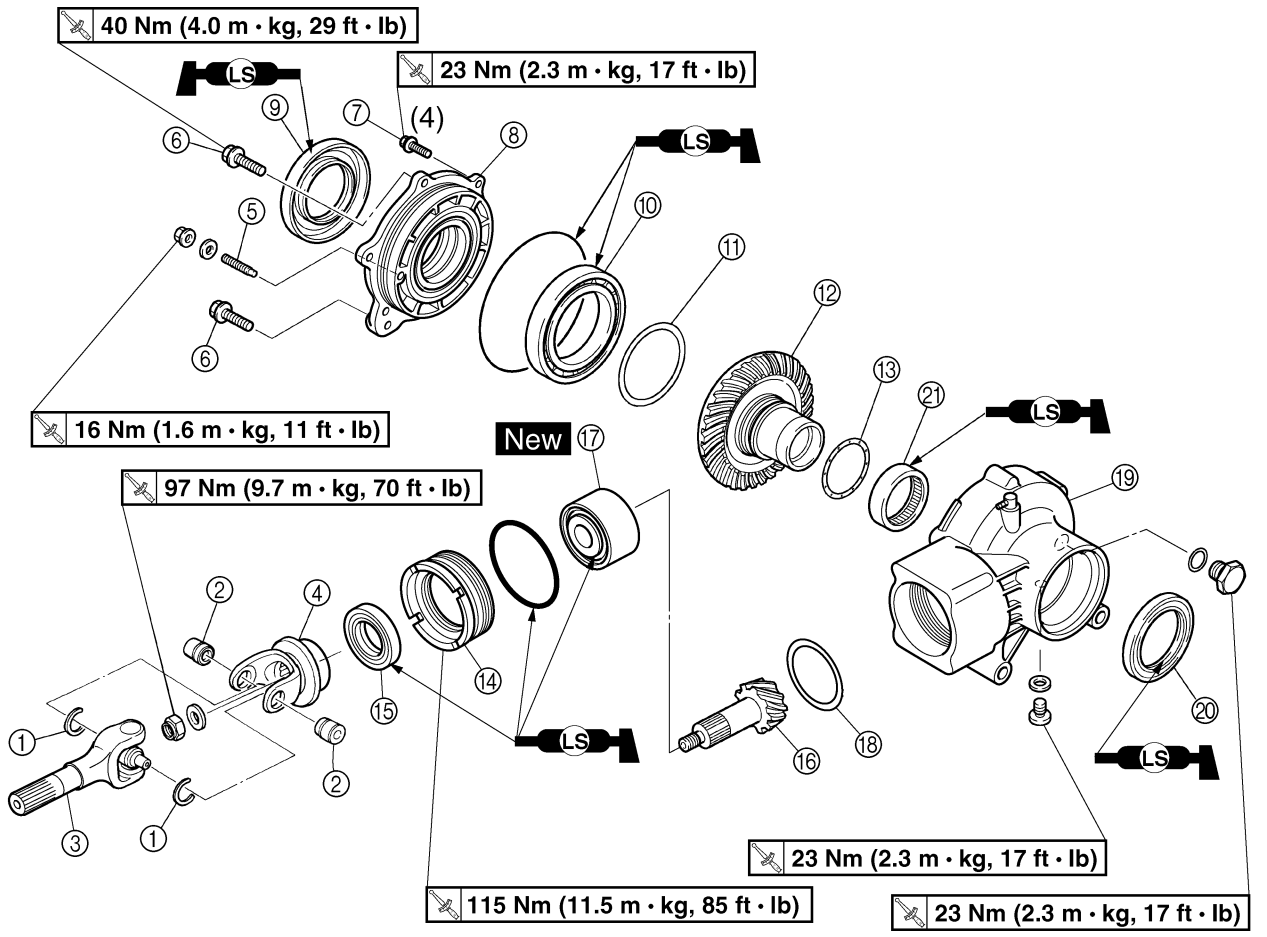
Order	Job/Part	Q'ty	Remarks
1	Final gear case skid plate	1	
2	Rectifier/regulator	1	
3	Air duct assembly 2	1	
4	Rear constant velocity joint	2	
5	Final drive gear case breather hose	1	Disconnect.
6	Final drive gear assembly	1	
7	Trailer hitch	1	
8	Sub-frame	1	
			For installation, reverse the removal procedure.



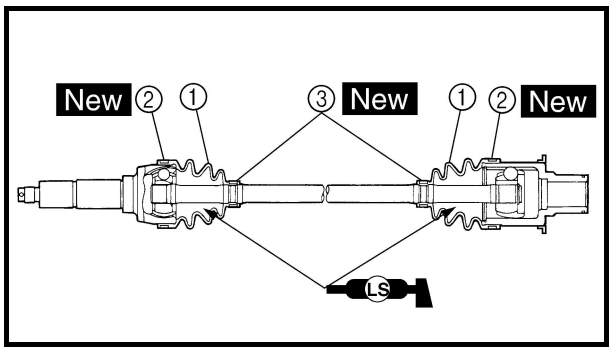
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear constant velocity joint		Remove the parts in the order below.
①	Dust cover	1	
②	Circlip	1	
③	Boot band	2	
④	Boot band	2	
⑤	Dust boot	2	
⑥	Circlip	1	Refer to "ASSEMBLING THE REAR CONSTANT VELOCITY JOINTS".
⑦	Double off-set joint	1	
⑧	Snap ring	1	
⑨	Ball bearing	1	
⑩	Joint shaft assembly	1	
			For assembly, reverse the disassembly procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the final drive gear		Remove the parts in the order below.
①	Circlip	2	
②	Bearing	2	Refer to "DISASSEMBLING THE FINAL DRIVE GEAR" and "ASSEMBLING THE FINAL DRIVE GEAR".
③	Drive shaft/universal joint yoke	1	
④	Universal joint yoke	1	
⑤	Ring gear stopper	1	
⑥	Bolt	2	
⑦	Bolt	4	**NOTE:** Working in a crisscross pattern, loosen each bolt 1/4 of a turn. After all the bolts are loosened, remove them.
⑧	Ring gear bearing housing	1	
⑨	Oil seal	1	
⑩	Bearing	1	



Order	Job/Part	Q'ty	Remarks
⑪	Ring gear shim	1	
⑫	Ring gear	1	
⑬	Thrust washer	1	
⑭	Bearing retainer	1	
⑮	Oil seal	1	
⑯	Final drive pinion gear	1	Refer to "REPLACING THE FINAL DRIVE PINION GEAR AND BEARING".
⑰	Bearing	1	
⑱	Final drive pinion gear shim	1	
⑲	Final drive gear case	1	
⑳	Oil seal	1	
㉑	Bearing	1	Refer to "REPLACING THE FINAL DRIVE ROLLER BEARING".
			For assembly, reverse the disassembly procedure.



ASSEMBLING THE REAR CONSTANT VELOCITY JOINTS

1. Apply:
   - lithium-soap base grease (into the ball joint assembly)
2. Install:
   - dust boots ①
   - boot bands ②, ③ New

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Apply lithium-soap base grease into the dust boots.

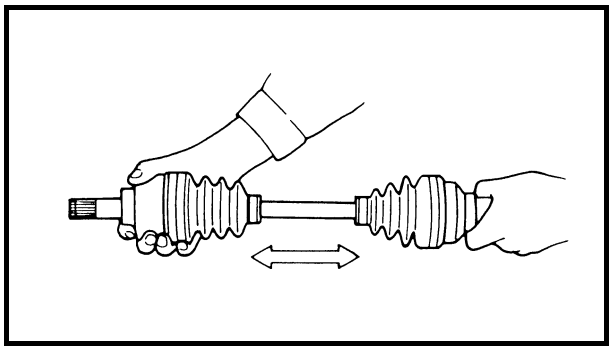
Lithium-soap base grease
40 g (1.4 oz) per dust boot (rear wheel side)
60 g (2.1 oz) per dust boot (final gear case side)

b. Install the dust boots.
c. Install the dust boot bands.

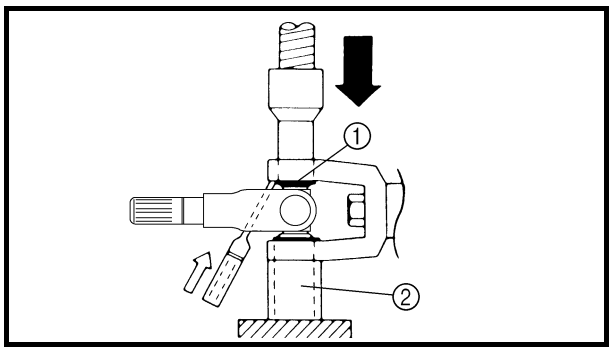
NOTE:

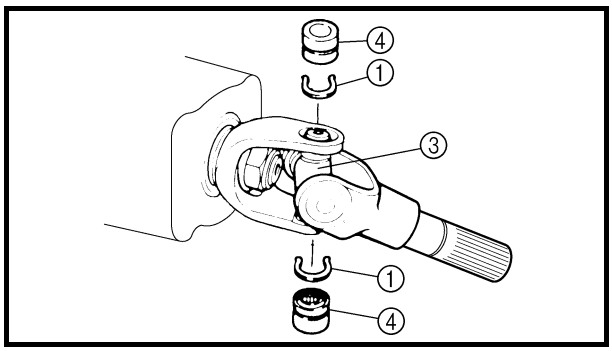
- The new boot bands may differ from the original ones.
- The dust boots should be fastened with the boot bands ③ at the grooves in the joint shaft.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



3. Check:
   - free play (thrust movement)
     Excessive play → Replace the joint assembly.





DISASSEMBLING THE FINAL DRIVE GEAR

1. Remove:
   - drive shaft assembly

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Remove the circlips ①.
b. Place the U-joint in a press.
c. With a suitable diameter pipe ② beneath the yoke ③, press the bearing ④ into the pipe as shown.

NOTE:

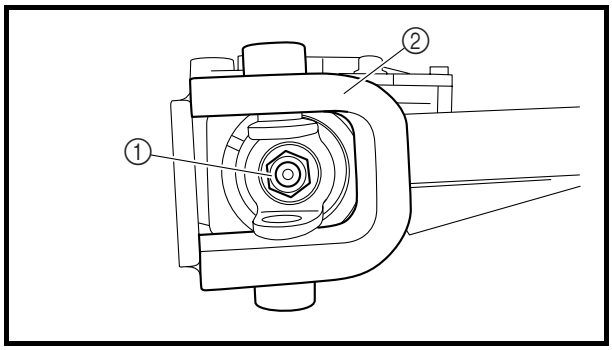
It may be necessary to lightly tap the yoke with a punch.

d. Repeat the steps for the opposite bearing.
e. Remove the yoke.

NOTE:

It may be necessary to lightly tap the yoke with a punch.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

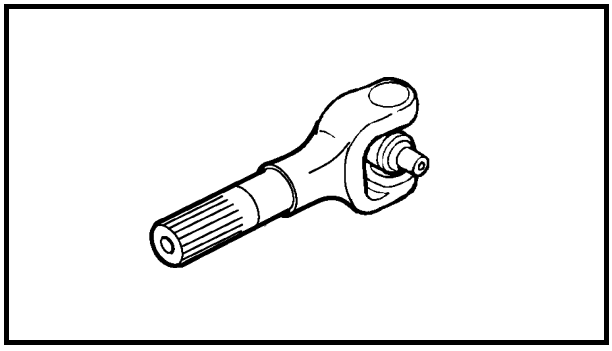


2. Remove:
   - nut ①
   - washer
   - universal joint yoke

NOTE:

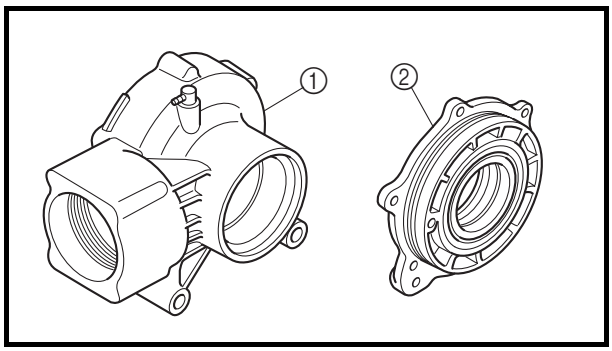
Use the universal joint holder ② to hold the universal joint yoke.

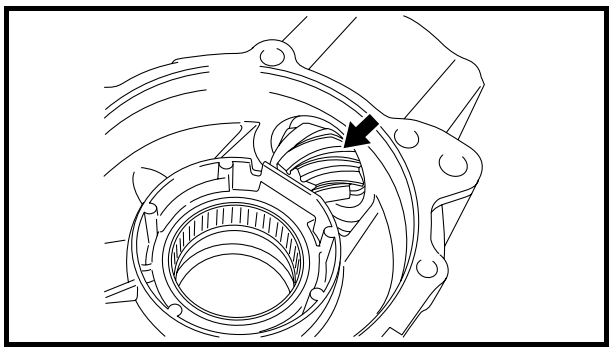
Universal joint holder
P/N. YM-04062, 90890-04062



CHECKING THE DRIVE SHAFT/UNIVERSAL JOINT YOKE

1. Check:
   - drive shaft/universal joint yoke (splines)
     Wear/damage → Replace.





CHECKING THE FINAL DRIVE GEAR

1. Check:
   - final gear case ①
   - bearing housing (ring gear) ②
     Cracks/damage → Replace.

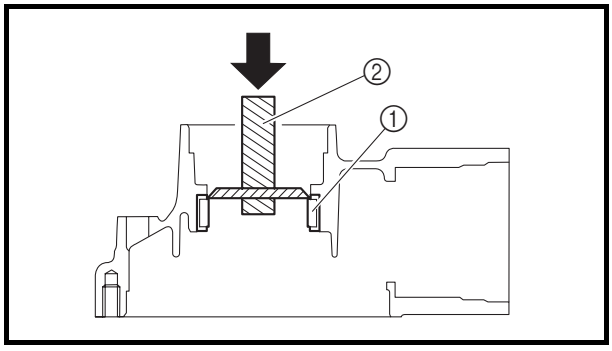
NOTE:

When the final gear case and/or the ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.

2. Check:
   - gear teeth
     Pitting/galling/wear → Replace the drive pinion gear and ring gear as a set.
     Refer to "REPLACING THE FINAL DRIVE PINION GEAR AND BEARING".
   - oil seals
   - O-rings
     Damage → Replace.
3. Check:
   - bearings
     Damage → Replace.

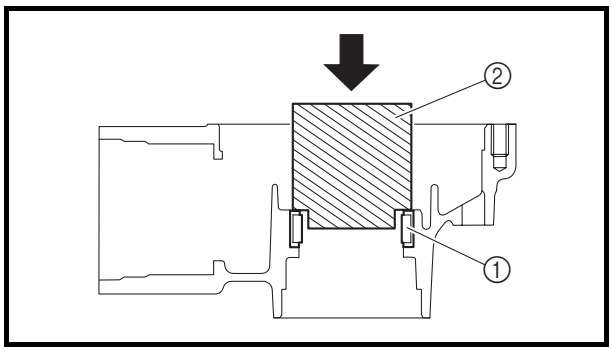
NOTE:

- Reusing roller bearing is acceptable, but Yamaha recommends installing new ones. Do not reuse oil seals.
- When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.

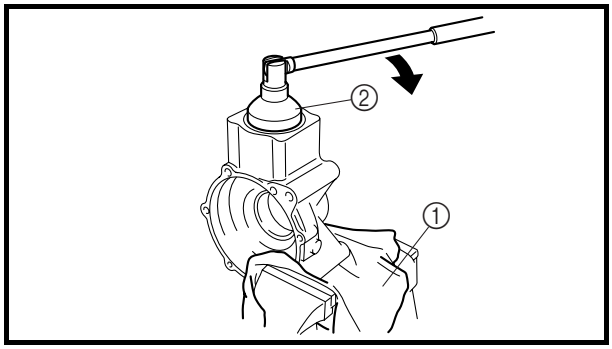


REPLACING THE FINAL DRIVE ROLLER BEARING

1. Remove:
   - roller bearing ①
     Use a suitable press tool ② and an appropriate support for the main housing.



2. Install:
   • roller bearing ①
   Use a suitable press tool ② and a press to install the above component into the main housing.



REPLACING THE FINAL DRIVE PINION GEAR AND BEARING

1. Remove:
   • bearing retainer

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Place a folded rag ①.
b. Secure the final drive gear case edge in the vise.
c. Attach the bearing retainer wrench ②.

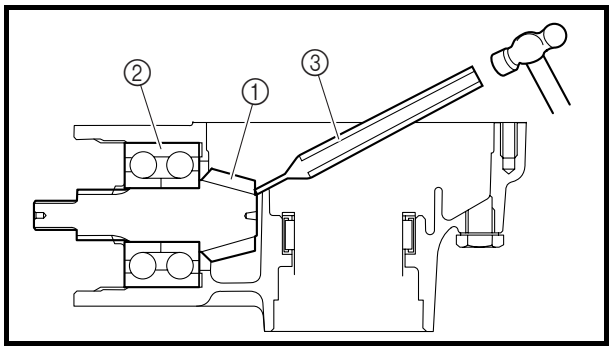
	**Bearing retainer wrench P/N. YM-04050, 90890-04050**

d. Remove the bearing retainer.

CAUTION:

The bearing retainer has left-handed threads. To loosen the retainer, turn it clockwise.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



2. Remove:
   • final drive pinion gear ①
   • final drive pinion gear bearing ②

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

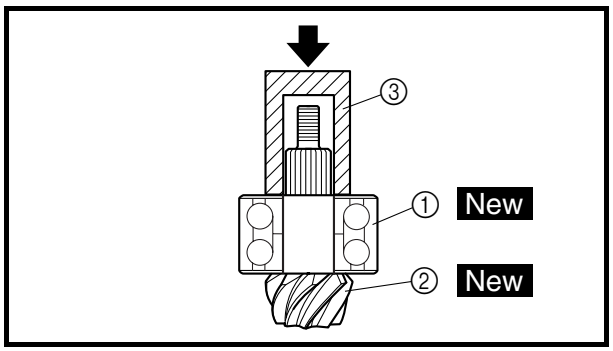
a. Heat the main housing only to 150°C (302 °F).
b. Remove the final drive pinion gear assembly with an appropriately shaped punch ③.
c. Remove the final drive pinion gear bearing ② from the final drive pinion gear ①.

NOTE:

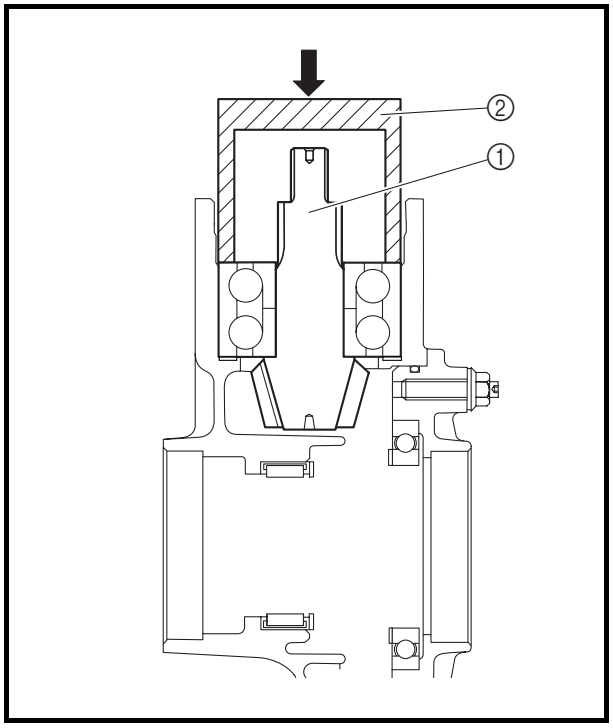
The removal of the final drive pinion gear is difficult and seldom necessary.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

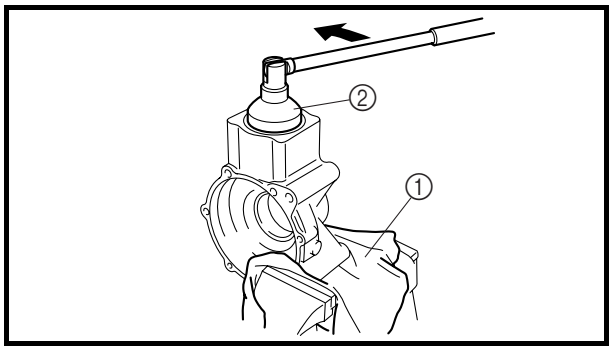
3. Select:
   • final drive pinion gear shim
   Refer to “POSITIONING THE FINAL DRIVE PINION GEAR”.



4. Install:
   - final drive pinion gear bearing ① New
   - final drive pinion gear ② New
   Use a suitable press tool ③ and a press to install the final drive pinion gear bearing into the final drive pinion gear.



5. Install:
   - final drive pinion gear shim
   - final drive pinion gear assembly ①
   Use a suitable press tool ② and a press to install the above components into the final drive gear case.



6. Install:
   - bearing retainer

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Place a folded rag ①.
b. Secure the final drive gear case edge in the vise.
c. Attach the bearing retainer wrench ②.

	**Bearing retainer wrench** **P/N. YM-04050, 90890-04050**

d. Tighten the bearing retainer.

	**Bearing retainer** **115 Nm (11.5 m · kg, 85 ft · lb)**

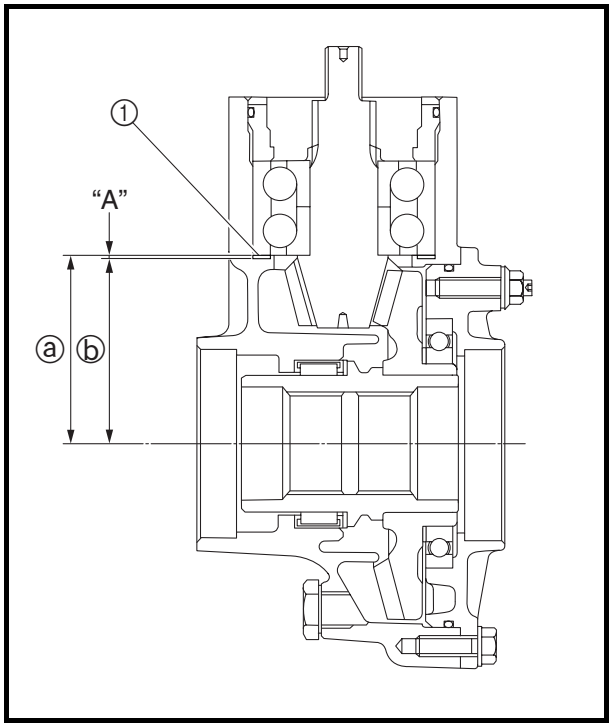
CAUTION:

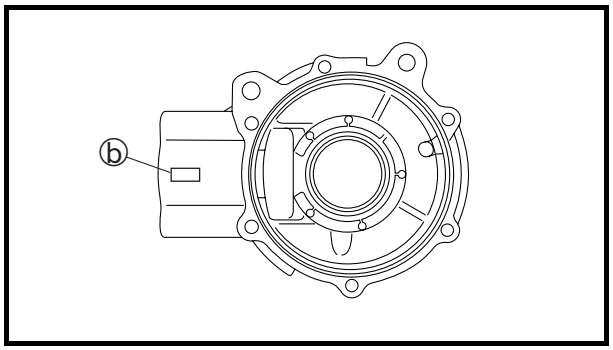
The bearing retainer has left-hand threads. Turn the retainer counterclockwise to tighten it.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

POSITIONING THE FINAL DRIVE PINION GEAR

When the final drive pinion gear, ring gear, final drive gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions of the final drive pinion gear using shim.





Final drive pinion gear shim selection

1. Select:
   - final drive pinion gear shim ①

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. To find the final drive pinion gear shim thickness "A", use the following formula.

Final drive pinion gear shim thickness "A" = ⓐ – ⓑ

ⓐ = 76.0 mm

ⓑ = a numeral (usually a decimal number) on the final drive gear case either added to or subtracted from "75"

Example:

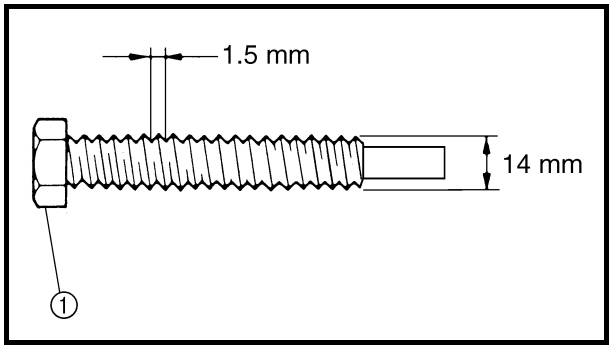
1) ⓐ = 76
2) If "51" is stamped on the final drive gear case,
   ⓑ = 75 + 0.51 = 75.51
3) Therefore, "A" is 0.49.
   "A" = 76 – 75.51
   = 0.49
4) Round off the hundredth digit and select the appropriate shim.
   In the example above, the calculated number is 0.49. The chart instructs you to round off 9 to 10 at the hundredth place. Thus, the shim thickness is 0.50 mm.

Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shims are supplied in the following thicknesses.

Final drive pinion gear shim			
Thickness (mm)	0.15	0.30	0.40
	0.45	0.50	

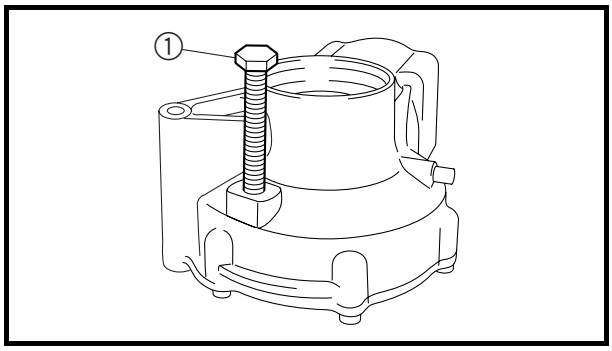
▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



MEASUREMENT AND ADJUSTING THE FINAL GEAR LASH

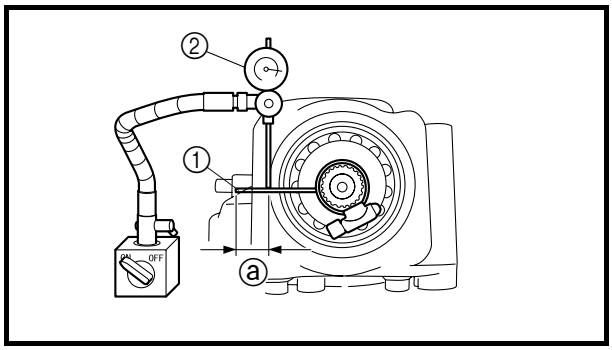
Final gear lash measurement

1. Remove:
   - drain plug
   - gasket
2. Install:
   - a bolt of the specified size ①
     (into the drain plug hole)



CAUTION:

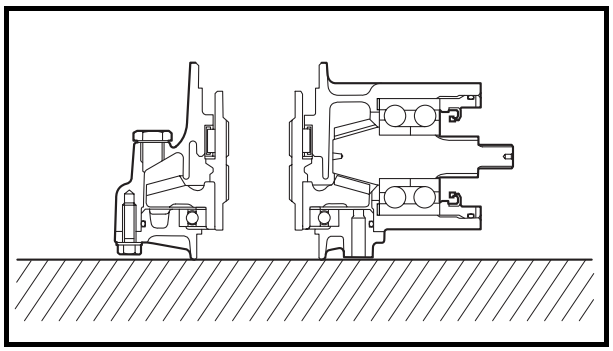
Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.



3. Attach:
   - gear lash measurement tool ①
   - dial gauge ②

Gear lash measurement tool P/N. YM-01467, 90890-01467

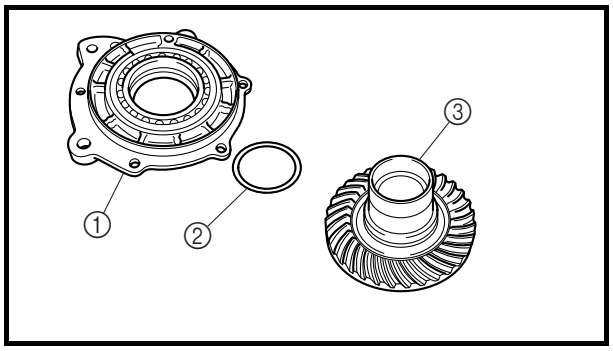
ⓐ Measuring point is 34.15 mm (1.34 in)



4. Measure:
   • gear lash
   Gently rotate the gear coupling from engagement to engagement.

	Final gear lash **0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

NOTE:
- Secure the gear case with the ring gear bearing housing side facing down.
- Measure the gear lash at four positions. Rotate the shaft 90° each time.



Final gear lash adjustment
1. Remove:
   • bearing housing ①
   • ring gear shim ②
   • ring gear ③

2. Adjust:
   • gear lash

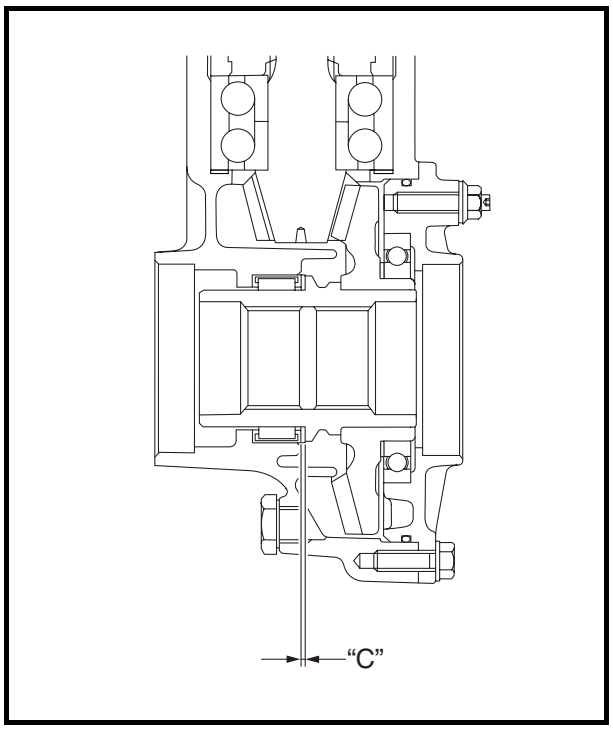
▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

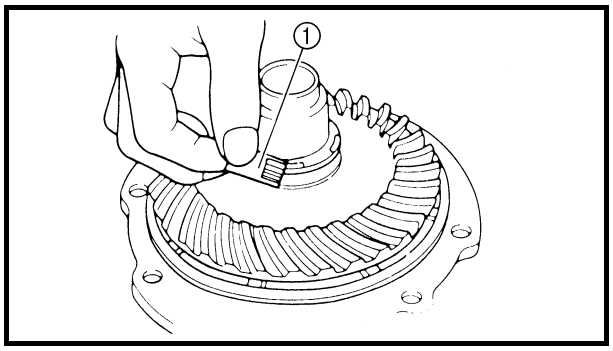
a. Select suitable shim and thrust washer using the following chart.

Too little gear lash	**Reduce shim thickness.**
Too large gear lash	**Increase shim thickness.**

	Ring gear shim			
Thickness (mm)	**0.25** **0.40**	**0.30** **0.45**	**0.35** **0.50**	

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲





Ring gear thrust clearance adjustment

1. Measure/adjust:
   - ring gear thrust clearance "C"

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Place four pieces of Plastigauge® between the thrust washer and the ring gear.

NOTE:

Install the thinnest thrust washer from the following chart.

	Thrust washer		
Thickness (mm)	1.0	1.1	1.2
	1.3	1.35	1.4
	1.45	1.5	1.55
	1.6	1.7	1.8
	1.9	2.0	2.1

b. Install the ring gear assembly and tighten the bolts to specification.

M8 bolts (bearing housing)
23 Nm (2.3 m · kg, 17 ft · lb)
M10 bolts (bearing housing)
40 Nm (4.0 m · kg, 29 ft · lb)

NOTE:

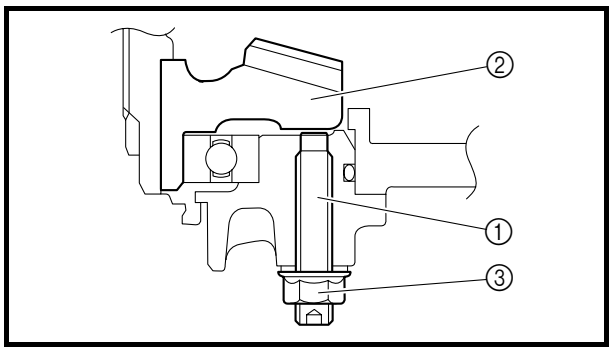
Do not turn the final drive pinion gear and ring gear when measuring the clearance with Plastigauge®.

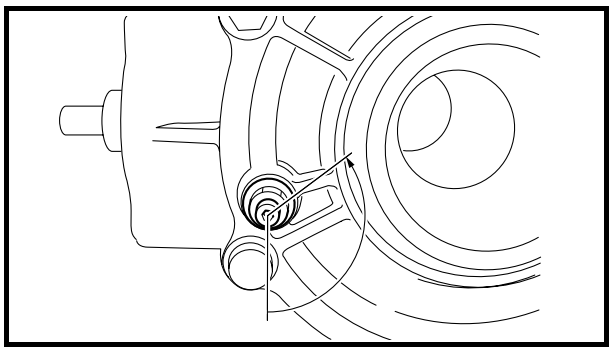
c. Remove the ring gear assembly.
d. Measure the thrust clearance. Calculate the width of the flattened Plastigauge® ①.

Ring gear thrust clearance
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

e. If out of specification, repeat the measurement steps with a slightly thicker thrust washer until the ring gear thrust clearance is within the specified limits.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



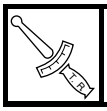


Ring gear stopper adjustment

1. Install:
   - ring gear stopper
   - nut
2. Adjust:
   - ring gear stopper clearance

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Finger tighten the ring gear stopper ① until it contacts the ring gear ②.
b. Turn the ring gear stopper 120° counterclockwise.
c. Tighten the ring gear stopper nut ③.

	**Ring gear stopper nut** **16 Nm (1.6 m · kg, 11 ft · lb)**

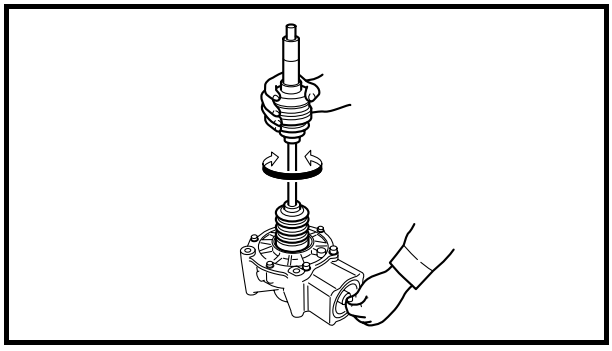
NOTE:

Apply Quick Gasket® to the ring gear stopper threads.

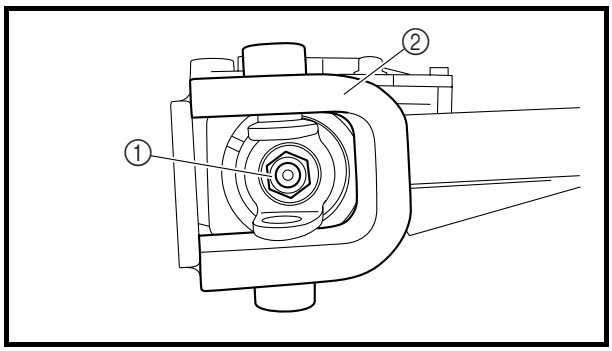
▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

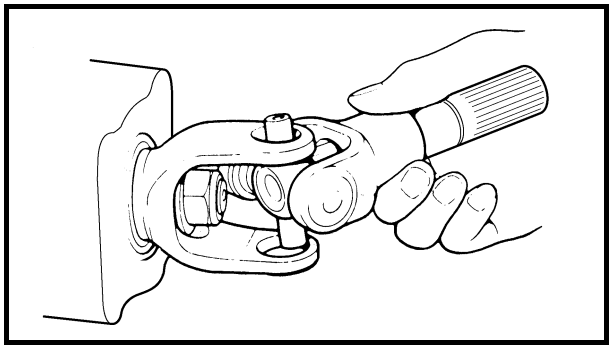
ASSEMBLING THE FINAL DRIVE GEAR

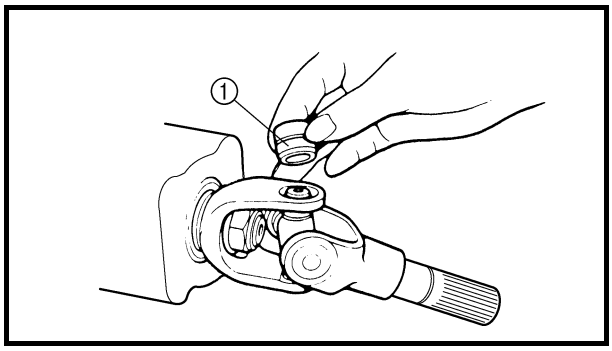
1. Adjust:
   - final gear lash
     Refer to "MEASUREMENT AND ADJUSTING THE FINAL GEAR LASH".

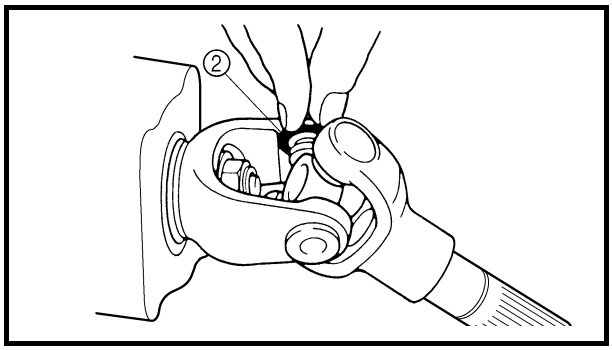


2. Check:
   - final drive gear operation
     Unsmooth operation → Replace the final drive gear assembly.
     Insert the double off-set joint into the final drive gear, and turn the gear back and forth.









3. Install:
   - universal joint yoke
   - washer
   - nut ①

97 Nm (9.7 m · kg, 70 ft · lb)

NOTE:
Use the universal joint holder ② to hold the yoke.

Universal joint holder
P/N. YM-04062, 90890-04062

4. Install:
   - drive shaft assembly

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Install the opposite yoke into the U-joint.
b. Apply wheel bearing grease to the bearings.
c. Install the bearings ① onto the yoke.

CAUTION:

Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

d. Press the bearings into the U-joint using a suitable socket.

NOTE:
The bearing must be inserted far enough into the U-joint so that the circlip can be installed.

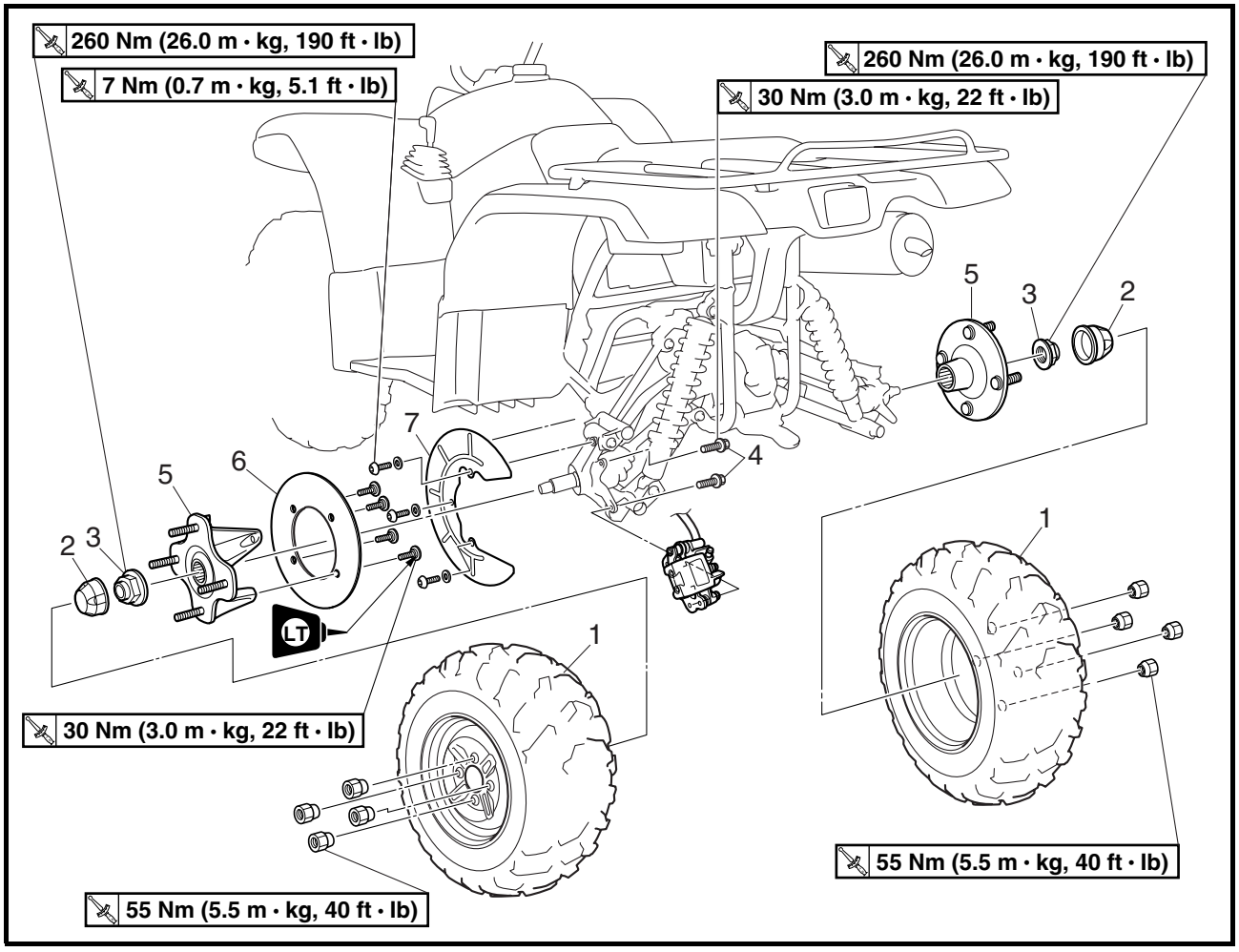
e. Install the circlips ② into the groove of each bearing.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

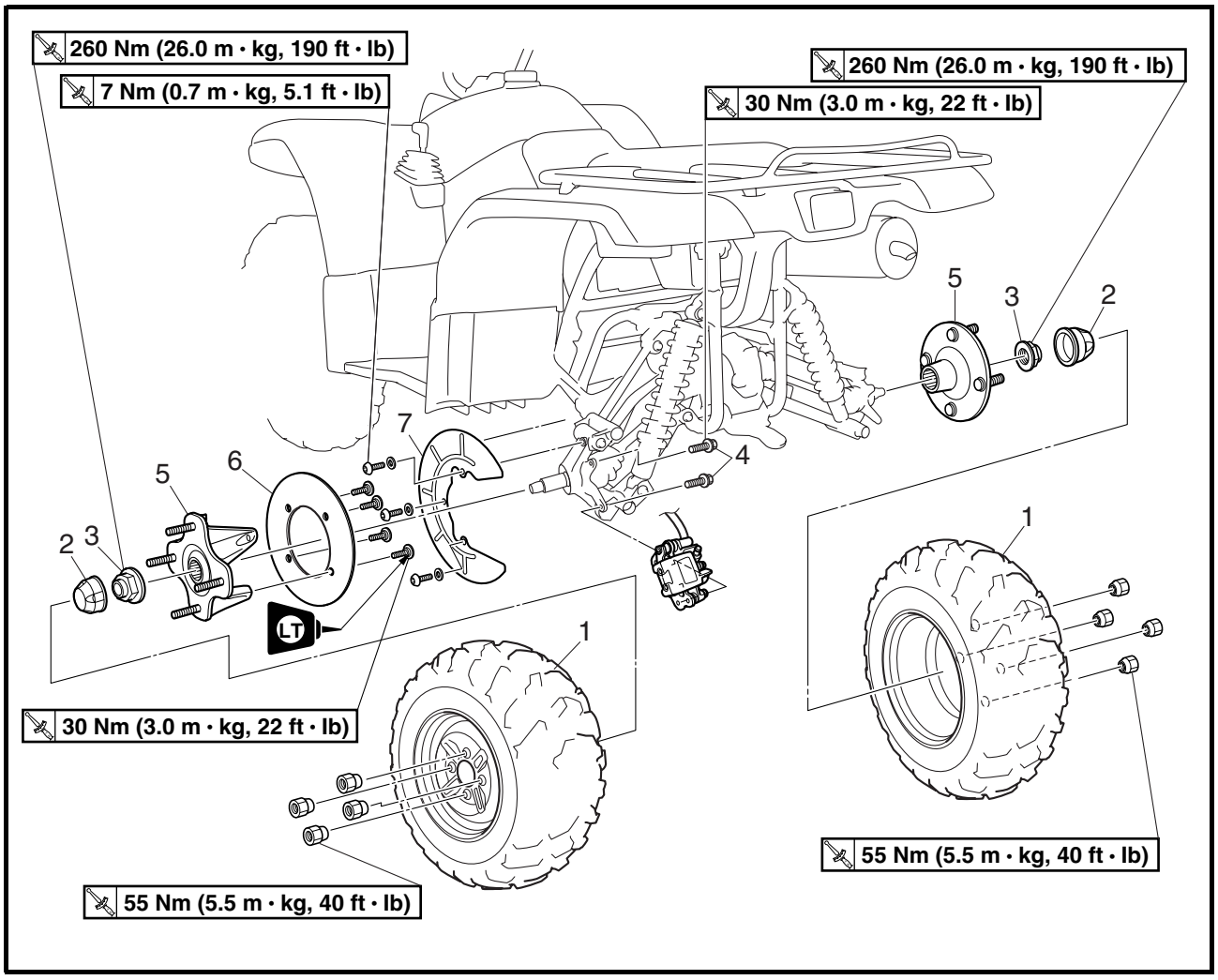
CHASSIS

FRONT AND REAR WHEELS

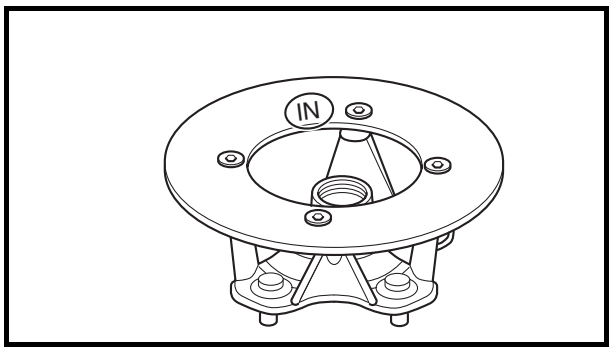
REAR WHEELS



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order below. Place the machine on a level surface. **⚠ WARNING** **Securely support the machine so there is no danger of it falling over.**
1	Rear wheel	2	Refer to "INSTALLING THE WHEELS" in chapter 8. (Manual No.: 5ND2-AE1)
2	Wheel cap	2	
3	Axle nut	2	Refer to "INSTALLING THE REAR WHEEL HUBS".
4	Brake caliper mounting bolt	2	
5	Wheel hub	2	
6	Brake disc	1	



Order	Job/Part	Q'ty	Remarks
7	Brake disc guard	1	For installation, reverse the removal procedure.

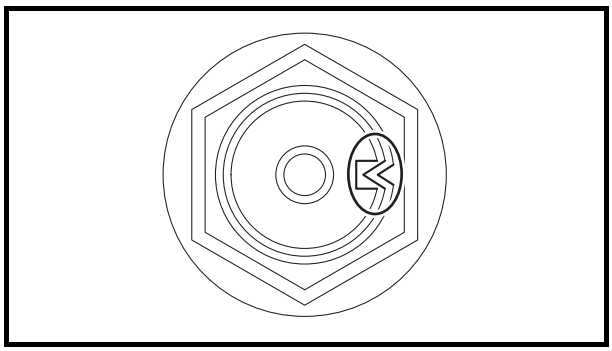


INSTALLING THE REAR BRAKE DISC

1. Install:
   - brake disc — 30 Nm (3.0 m · kg, 22 ft · lb)

NOTE:

Install the brake disc to the rear wheel hub with the “IN” mark facing away from the wheel hub.



INSTALLING THE REAR WHEEL HUBS

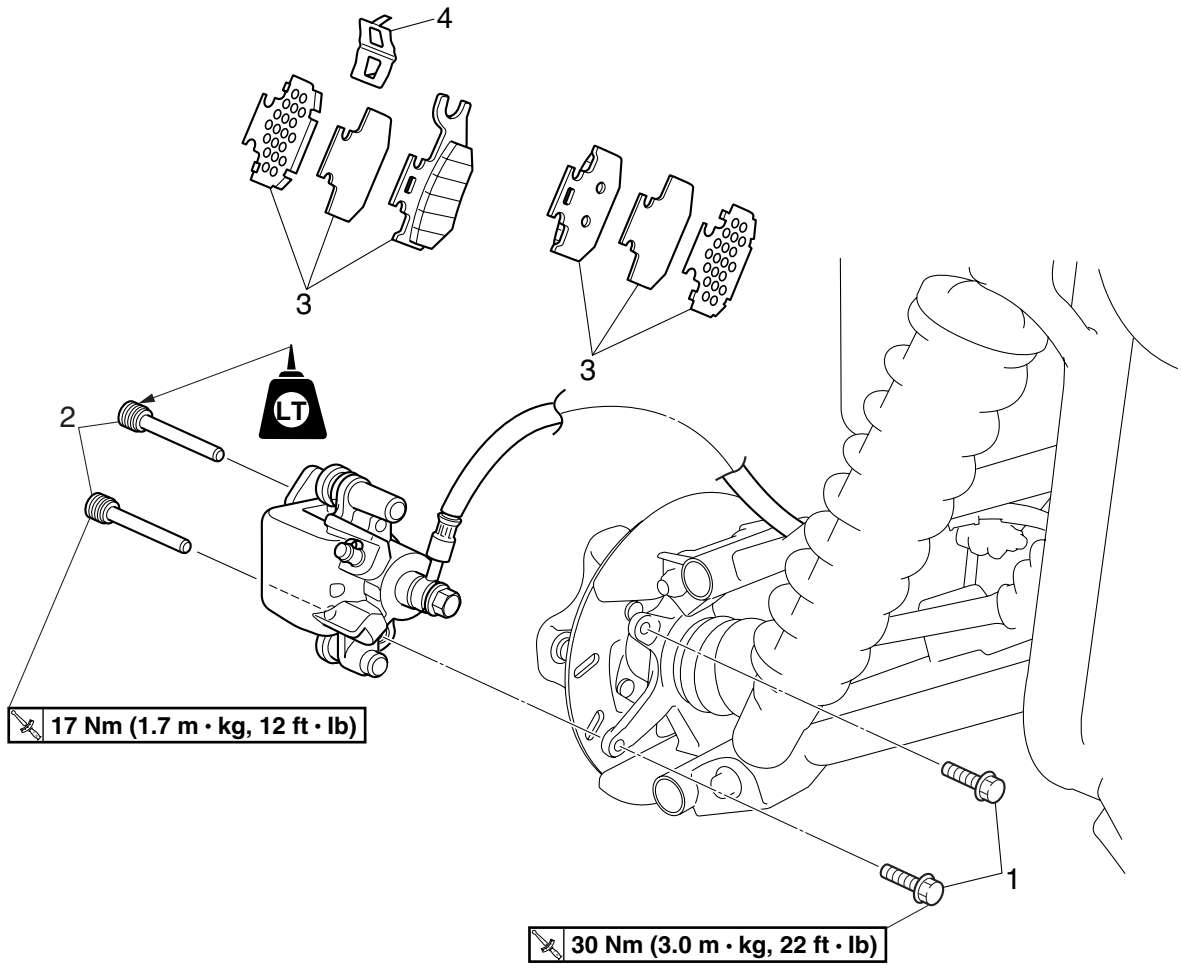
1. Install:
   - axle nut New — 260 Nm (26.0 m · kg, 190 ft · lb)

NOTE:

- Do not apply oil to the seat of the nut.
- After tightening the nut, stake the collar of the nut into the notch of the shaft.

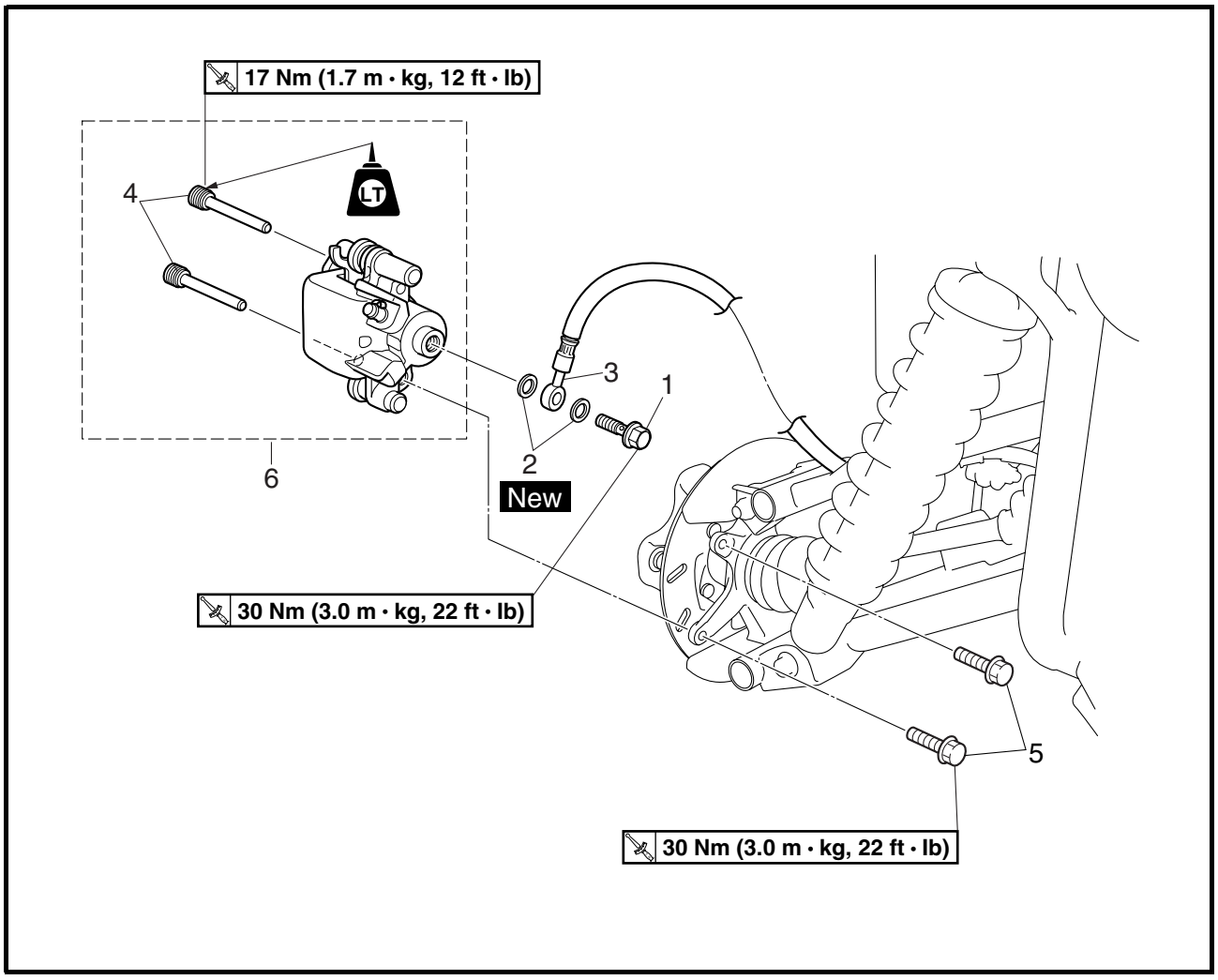
FRONT AND REAR BRAKES

REAR BRAKE PADS

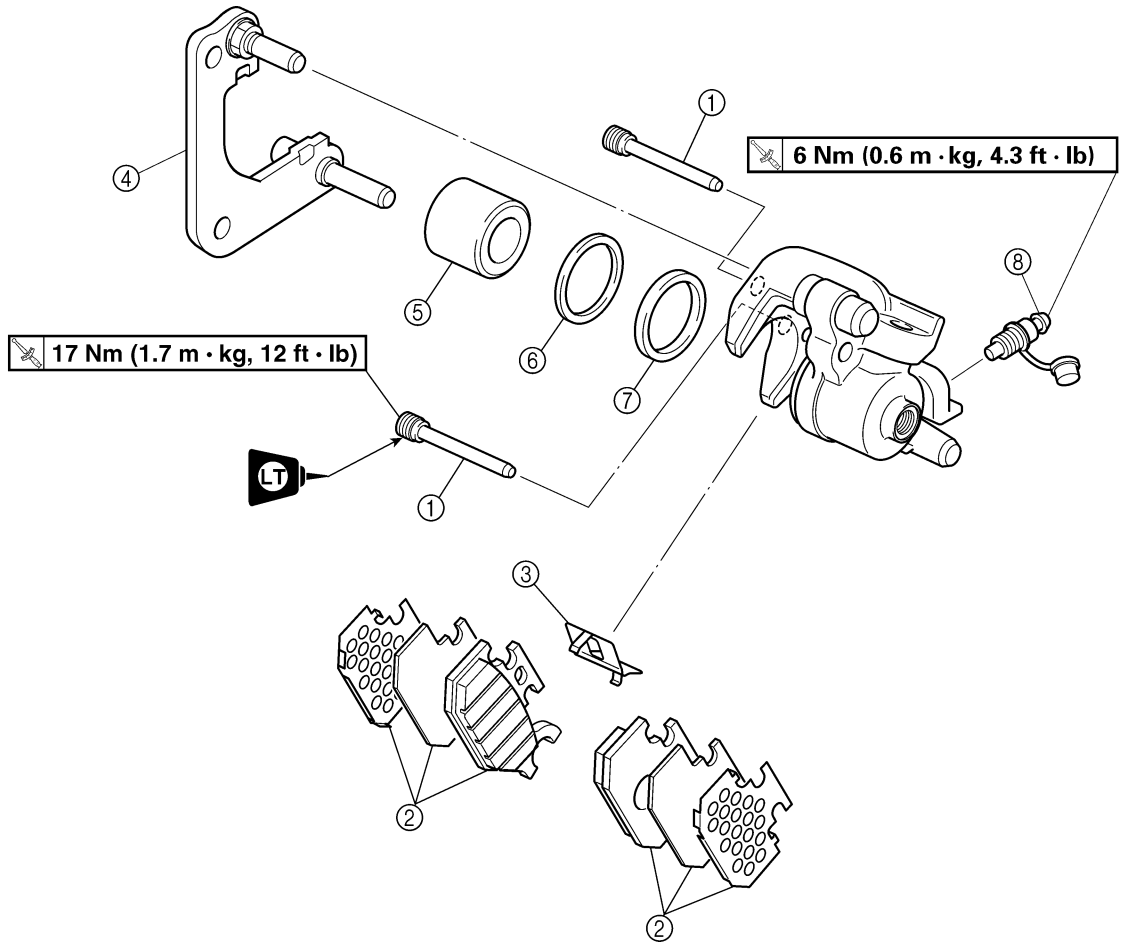


Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order below.
	Rear wheel (left)		Refer to "FRONT AND REAR WHEELS".
1	Brake caliper mounting bolt	2	Refer to "REPLACING THE REAR BRAKE PAD" in chapter 8. (Manual No.: 5ND2-AE1)
2	Brake pad holding bolt	2	
3	Brake pad/insulator/pad shim	2/2/2	
4	Pad spring	1	
			For installation, reverse the removal procedure.

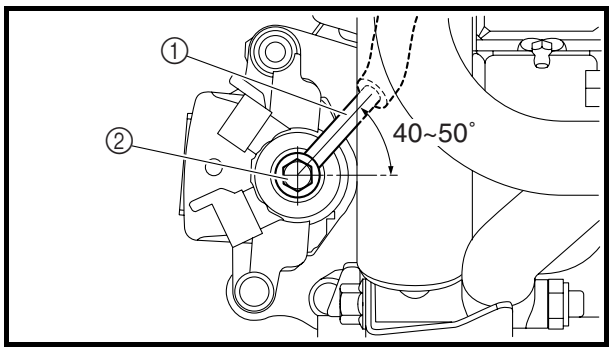
REAR BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order below.
	Brake fluid		Drain.
	Rear wheel		Refer to "FRONT AND REAR WHEELS".
1	Union bolt	1	Refer to "INSTALLING THE REAR BRAKE CALIPER".
2	Copper washer	2	
3	Brake hose	1	Disconnect.
4	Brake pad holding bolt	2	Loosen.
5	Brake caliper mounting bolt	2	
6	Brake caliper assembly	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Remove the parts in the order below.
①	Brake pad holding bolt	2	
②	Brake pad/insulator/pad shim	2/2/2	
③	Pad spring	1	
④	Caliper bracket	1	
⑤	Brake caliper piston	1	Refer to "DISASSEMBLING THE FRONT AND REAR BRAKE CALIPER" and "ASSEMBLING THE FRONT AND REAR BRAKE CALIPER" in chapter 8. (Manual No.: 5ND2-AE1)
⑥	Dust seal	1	
⑦	Caliper piston seal	1	
⑧	Bleed screw	1	
			For assembly, reverse the disassembly procedure.



EBS00436

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - brake caliper assembly
   - brake caliper mounting bolts
     30 Nm (3.0 m · kg, 22 ft · lb)
   - brake hose ①
   - copper washers **New**
   - union bolt ② **30 Nm (3.0 m · kg, 22 ft · lb)**

NOTE:

Tighten the union bolt while holding the brake hose as shown.

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING".

2. Fill:
   - brake reservoir

Recommended brake fluid
DOT 4

CAUTION:

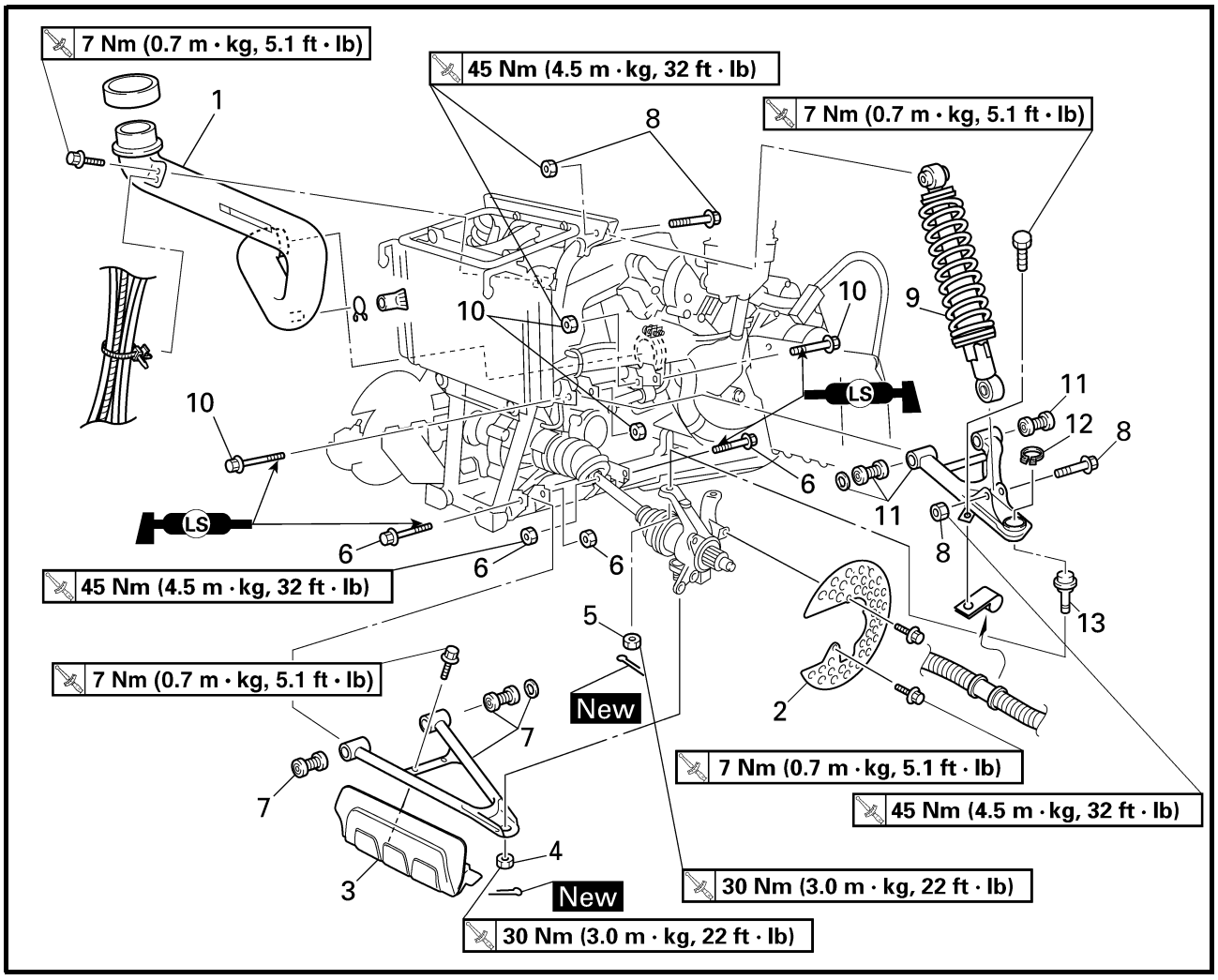
Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

⚠ WARNING

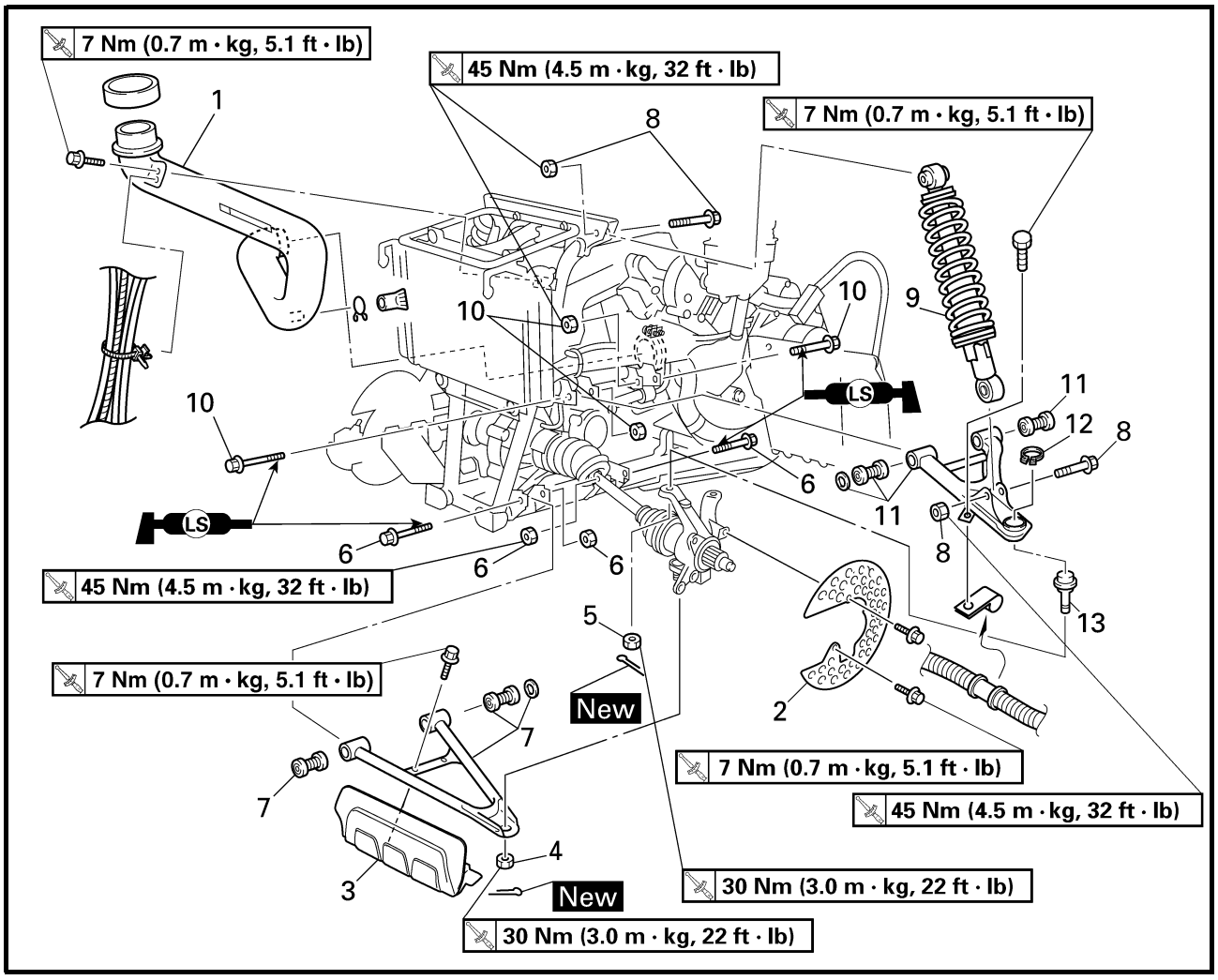
- **Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.**
- **Be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

3. Air bleed:
   • brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3. (Manual No.: 5ND2-AE1)
4. Check:
   • brake fluid level
   Brake fluid level is below the “MIN” level line
   → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3. (Manual No.: 5ND2-AE1)

FRONT ARMS AND FRONT SHOCK ABSORBERS

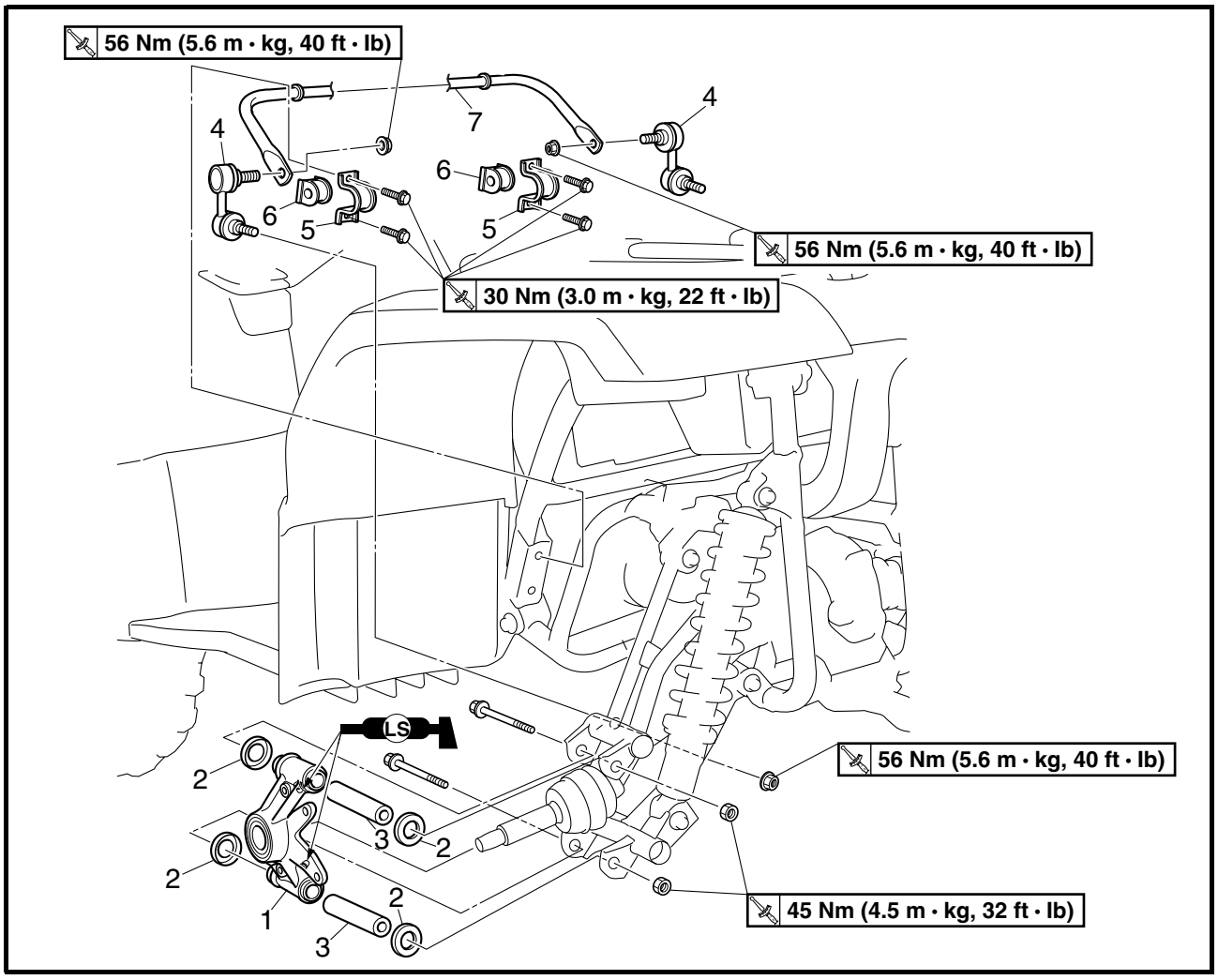


Order	Job/Part	Q'ty	Remarks
	Removing the front arms and front shock absorbers		Remove the parts in the order below.
	Engine skid plate		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".
	Front fender		
	Front wheel/brake disc		Refer to "FRONT AND REAR WHEELS" in chapter 8. (Manual No.: 5ND2-AE1)
1	Air duct assembly 1	1	
2	Brake disc guard	1	
3	Protector	1	

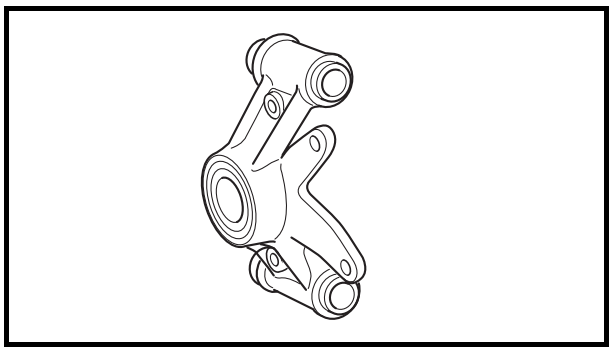


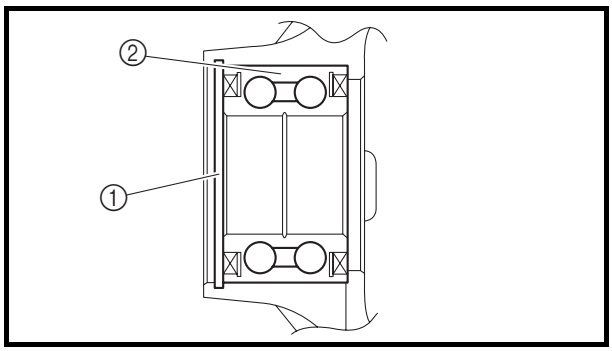
Order	Job/Part	Q'ty	Remarks
4	Nut	1	Refer to "REMOVING THE FRONT ARMS" and "INSTALLING THE FRONT ARMS AND FRONT SHOCK ABSORBER" in chapter 8. (Manual No.: 5ND2-AE1)
5	Nut	1	
6	Bolt/nut	2/2	
7	Front lower arm/washer/bushing	1/1/2	
8	Nut/bolt	2/2	
9	Front shock absorber	1	
10	Bolt/nut	2/2	
11	Front upper arm/washer/bushing	1/1/2	
12	Circlip	1	
13	Ball joint	1	
			For installation, reverse the removal procedure.

REAR KNUCKLES AND STABILIZER



Order	Job/Part	Q'ty	Remarks
	Removing the rear knuckles and stabilizer		Remove the parts in the order listed.
	Rear wheel hubs		Refer to "FRONT AND REAR WHEELS".
1	Rear knuckle	1	
2	Spacer cover	4	
3	Spacer	2	
4	Stabilizer joint	2	
5	Stabilizer holder	2	
6	Bushing	2	
7	Stabilizer	1	
			For installation, reverse the removal procedure.





CHECKING THE REAR KNUCKLES

1. Check:
   - rear knuckles
     Damage/pitting → Replace.
2. Check:
   - rear wheel bearings
     Bearings allow play in the wheel hubs or the wheel turns roughly → Replace.
   - oil seals
     Damage → Replace.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Clean the outside of the rear knuckle.
b. Remove the circlip ①.
c. Drive out the bearing ②.

⚠ WARNING

Eye protection is recommended when using striking tools.

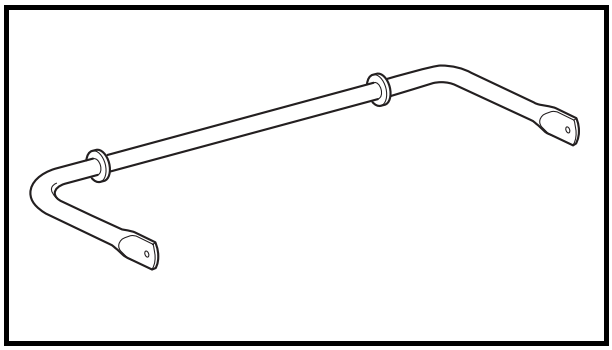
d. Install a new bearing.

CAUTION:

Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

e. Install a new circlip.

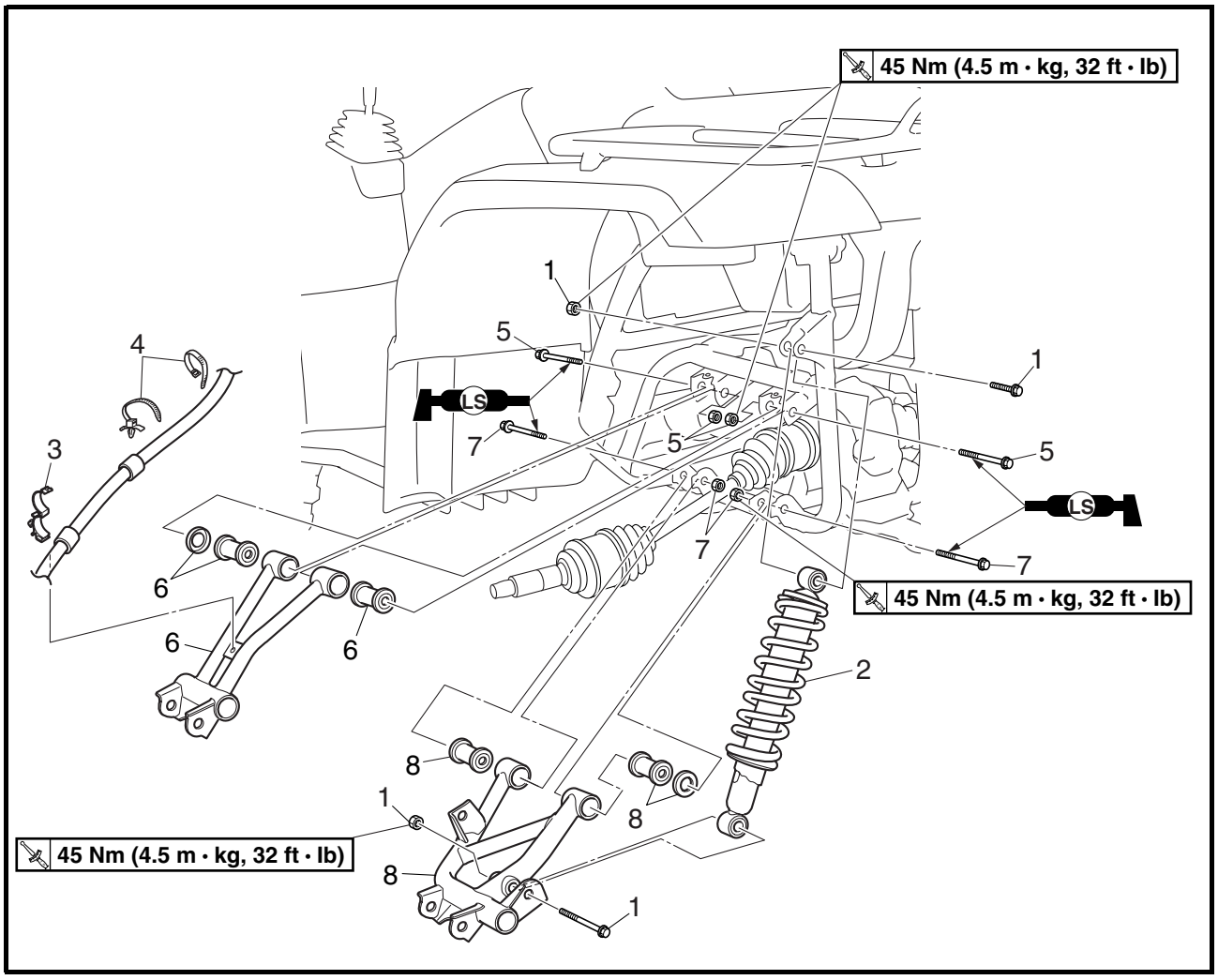
▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲



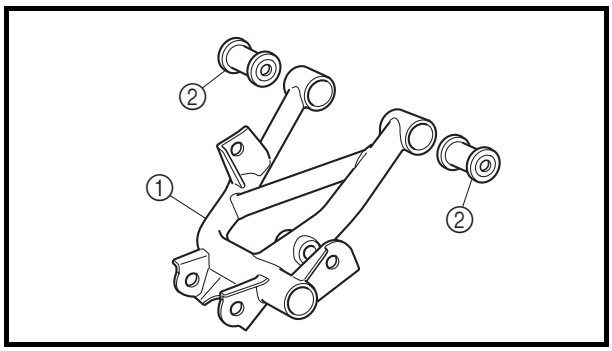
CHECKING THE STABILIZER

1. Check:
   - stabilizer
     Bends/cracks/damage → Replace.

REAR ARMS AND REAR SHOCK ABSORBERS

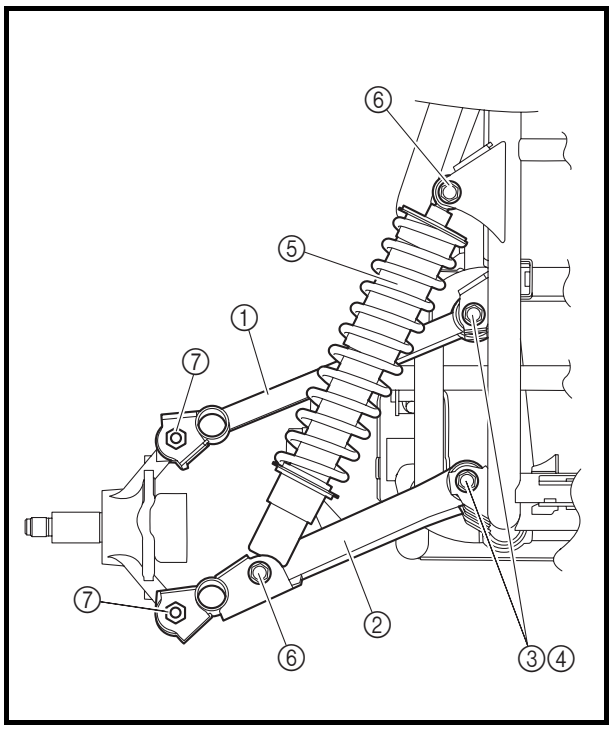


Order	Job/Part	Q'ty	Remarks
	Removing the rear arms and rear shock absorbers		Remove the parts in the order listed.
	Rear knuckle/stabilizer		Refer to "REAR KNUCKLES AND STABILIZER".
	Rear brake caliper		Refer to "FRONT AND REAR BRAKES".
1	Nut/bolt	2/2	
2	Rear shock absorber	1	
3	Plastic holder	1	
4	Plastic band	3	Refer to "INSTALLING THE REAR ARMS AND REAR SHOCK ABSORBERS".
5	Nut/bolt	2/2	
6	Rear upper arm/washer/bushing	1/1/2	
7	Nut/bolt	2/2	
8	Rear lower arm/washer/bushing	1/1/2	
			For installation, reverse the removal procedure.



CHECKING THE REAR ARMS

1. Check:
   - rear arms ①
     Bends/damage → Replace.
2. Check:
   - bushings ②
     Wear/damage → Replace.



INSTALLING THE REAR ARMS AND REAR SHOCK ABSORBERS

1. Install:
   - rear arms
   - rear shock absorbers

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Install the rear upper arm ① and rear lower arm ②.

NOTE:

- Lubricate the bolts ③ with lithium-soap-based grease.
- Be sure to position the bolts ③ so that the bolt head faces outward.
- Temporarily tighten the nuts ④.

b. Install the rear shock absorber ⑤.

	**Nut ⑥** **45 Nm (4.5 m · kg, 32 ft · lb)**

c. Install the rear knuckle.

	**Nut ⑦** **45 Nm (4.5 m · kg, 32 ft · lb)**

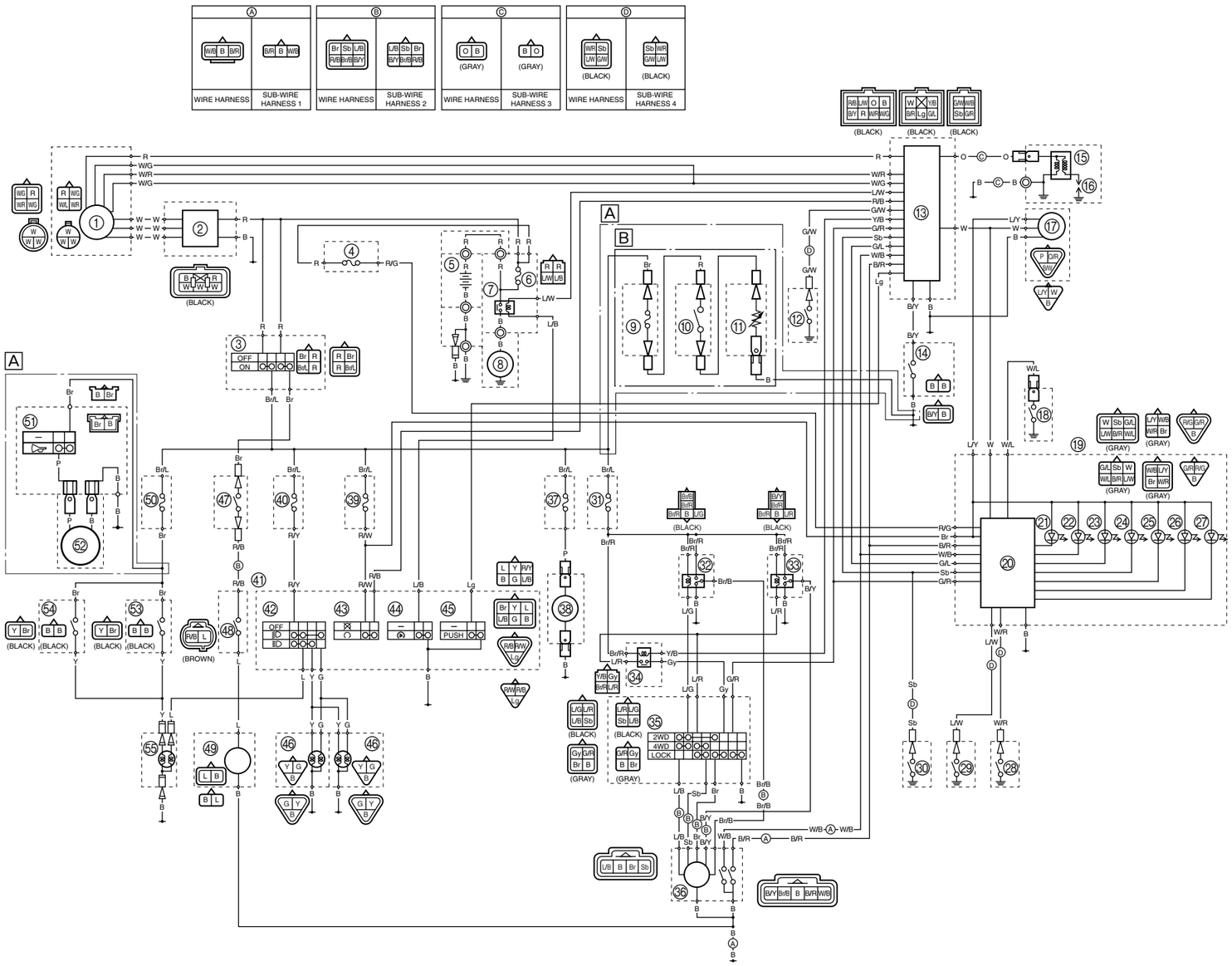
d. Tighten the nuts ④.

	**Nut ④** **45 Nm (4.5 m · kg, 32 ft · lb)**

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

YFM45FAT/YFM450FAT WIRING DIAGRAM



COLOR CODE

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

① A.C. magneto
② Rectifier/regulator
③ Main switch
④ Backup fuse
⑤ Battery
⑥ Main fuse
⑦ Starter relay
⑧ Starter motor
⑨ Carburetor heater fuse
⑩ Thermo switch (carburetor heater)
⑪ Carburetor heater
⑫ Reverse switch
⑬ CDI unit
⑭ Rear brake switch
⑮ Ignition coil
⑯ Spark plug
⑰ Speed sensor
⑱ Thermo switch (cylinder head)
⑲ Meter assembly
⑳ Multi-function meter
㉑ Differential gear lock indicator light
㉒ Coolant temperature warning light
㉓ Reverse indicator light
㉔ Neutral indicator light
㉕ Park indicator light
㉖ High-range indicator light
㉗ Low-range indicator light
㉘ Low-range switch
㉙ High-range switch
㉚ Neutral switch
㉛ Four-wheel drive fuse
㉜ Four-wheel drive relay 1
㉝ Four-wheel drive relay 2
㉞ Four-wheel drive relay 3
㉟ On-command four-wheel drive switch and differential gear lock switch
㊱ Gear motor
㊲ Auxiliary DC jack fuse
㊳ Auxiliary DC jack
㊴ Ignition fuse
㊵ Headlight fuse
㊶ Handlebar switch (left)
㊷ Light switch
㊸ Engine stop switch
㊹ Start switch
㊺ Override switch
㊻ Headlight
㊼ Circuit breaker (fan motor)
㊽ Thermo switch (radiator)
㊾ Fan motor
㊿ Signaling system fuse
(51) Horn switch
(52) Horn
(53) Front brake light switch
(54) Rear brake light switch
(55) Tail/brake light
[A] For Europe and Oceania
[B] Option (for Europe and Oceania)