YAMAHA

SERVICE MANUAL

2008

FX Nytro

FX10X
FX10RTX
FX10RTRX
FX10RTRAX
FX10MTX
FX10MTRX
FX10MTRAX

LIT-12618-02-69

8GL-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 snowmobiles have a basic understanding of the mechanical concepts and procedures inherent in snowmobile repair. Without such knowledge, attempted repairs or service to this model may render it unfit and/or unsafe to use. Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

FX10X, FX10RTX, FX10RTRX, FX10RTRAX, FX10MTX, FX10MTRX, FX10MTRAX
SERVICE MANUAL

1st Edition, July 2007

Printed in U.S.A.
P/N.LIT-12618-02-69

HOW TO USE THIS MANUAL

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

⚠

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

⚠ WARNING

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

CAUTION:

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

NOTE:

A NOTE provides key information that can make procedures easier or clearer.

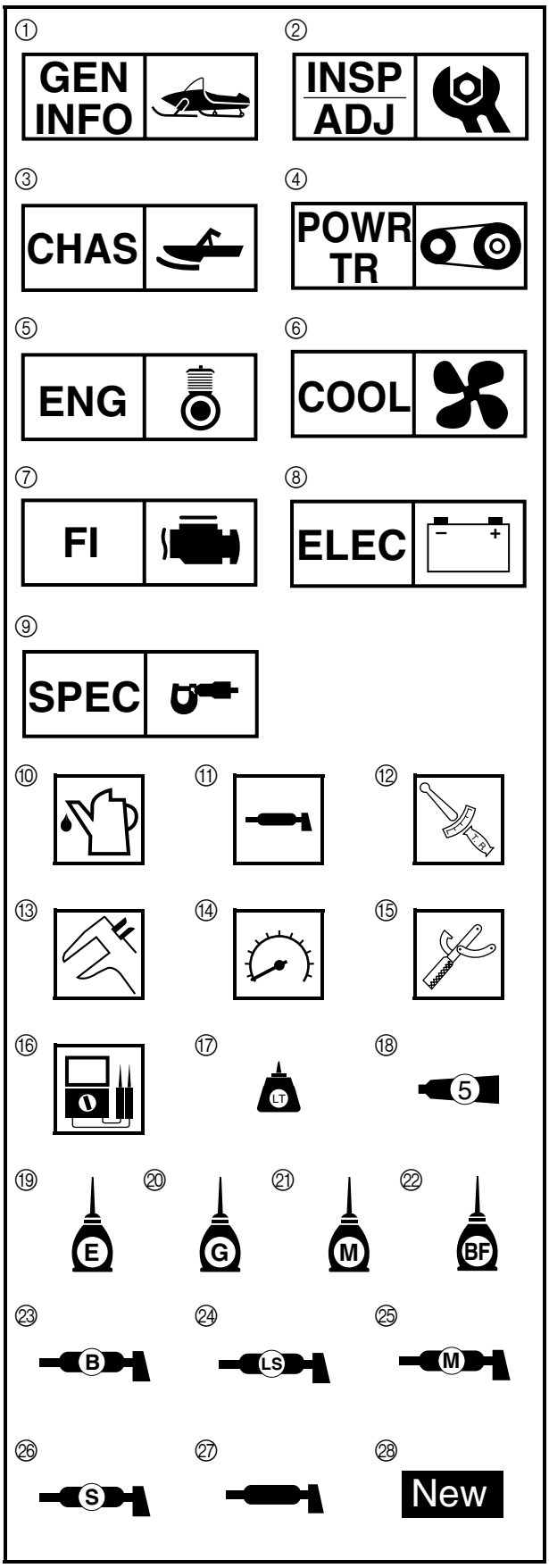
MANUAL FORMAT

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

- Bearings
  Pitting/damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section to facilitate correct disassembly and assembly procedures.



ILLUSTRATED SYMBOLS (Refer to the illustration)

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

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

Illustrated symbols ⑩ to ⑯ are used to identify the specifications which appear.

⑩ Filling fluid
⑪ Lubricant
⑫ Tightening torque
⑬ Wear limit, clearance
⑭ Engine speed
⑮ Special tool
⑯ Electrical data (Ω, V, A)

Illustrated symbols ⑰ to ㉘ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑰ Apply locking agent (LOCTITE®)
⑱ Apply Yamabond No.5®
⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply brake fluid
㉓ Apply wheel bearing grease
㉔ Apply low-temperature lithium-soap-based grease
㉕ Apply molybdenum disulfide grease
㉖ Apply silicone grease
㉗ ESSO beacon 325 grease or Aeroshell grease #7A
㉘ Use new one

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GENERAL INFORMATION

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PERIODIC INSPECTION AND ADJUSTMENT

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CHASSIS

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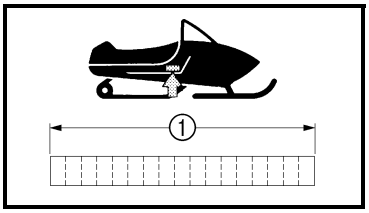
CHAPTER 5. ENGINE

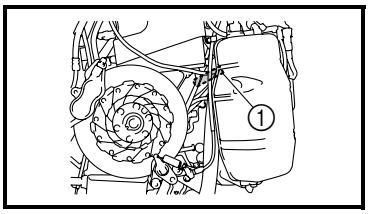
CHAPTER 6. COOLING SYSTEM

CHAPTER 7. FUEL INJECTION SYSTEM

CHAPTER 8. ELECTRICAL

CHAPTER 9.
SPECIFICATIONS





GENERAL INFORMATION

SNOWMOBILE IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number ① is located on the right-hand side of the frame (just below the front of the seat).

ENGINE SERIAL NUMBER

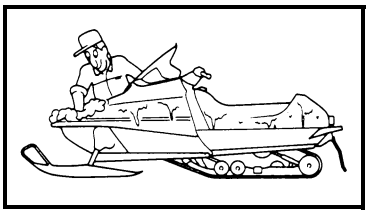
The engine serial number ① is located on the right-hand side of the crankcase.

NOTE:

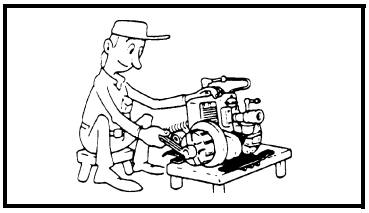
Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

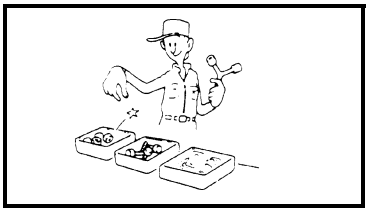


1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
   While cleaning, take care to protect the electrical parts, such as relays, switches, motor, resistors, controllers, etc., from high pressure water splashes.



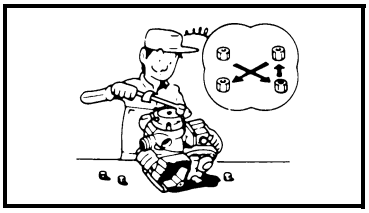
2. Use proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS”.

3. When disassembling the snowmobile, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been “mated” through normal wear. Mated parts must be reused or replaced as an assembly.

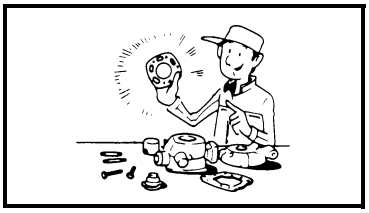


4. During disassembly of the snowmobile, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help ensure that all parts are reinstalled correctly.

5. Keep all parts away from any source of fire.



6. Be sure to keep to the tightening torque specifications. When tightening bolts, nuts, and screws, start with those that have larger diameters, and proceed from the inside to the outside in a crisscross pattern.

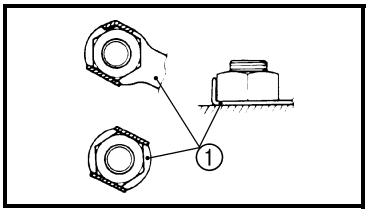


ALL REPLACEMENT PARTS

We recommend using genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for assembly and adjustments.

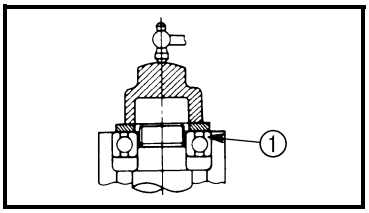
GASKETS, OIL SEALS, AND O-RINGS

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



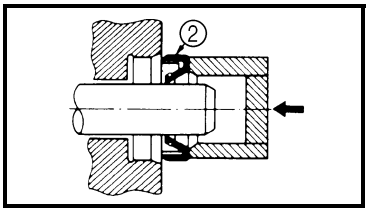
LOCK WASHERS/PLATES AND COTTER PINS

All lock washers/plates ① and cotter pins must be replaced if 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.



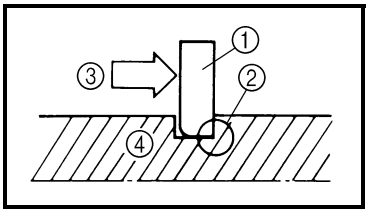
BEARINGS AND OIL SEALS

Install the bearings ① and oil seals ② with their manufacturer marks or numbers facing outwards. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seals, apply a light coating of low temperature lithium-soap-based grease to the seal lips. Oil the bearings liberally when installing.



CAUTION:

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



CIRCLIPS

All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace misshapen 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

LOCTITE®

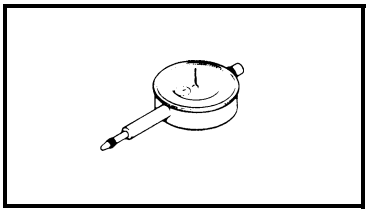
After installing fasteners that have LOCTITE® applied, wait 24 hours before using the snowmobile. This will give the LOCTITE® time to dry properly.

SPECIAL TOOLS

Some special tools are necessary for a completely accurate tune-up and assembly. Using the correct special tool will help prevent damage that can be caused by the use of improper tools or improvised techniques.

NOTE:

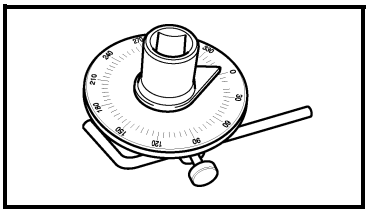
- Be sure to use the correct part number when ordering the tool, since the part number may differ according to country.
- For USA and Canada, use part number starting with “YB-”, “YM-”, “YU-” or “YS-”.
- For others, use part number starting with “90890-”.



FOR TUNE UP

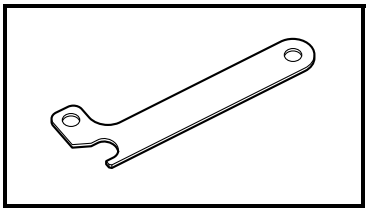
- Dial indicator gauge
  P/N: YU-A8428
- Dial gauge
  P/N: 90890-03097

This gauge is used for runout measurements.



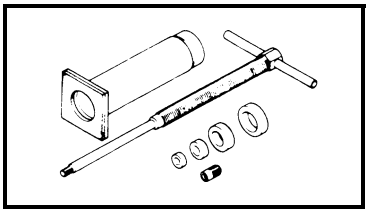
- Angle gauge
  Use goods on the market.

This tool is used to tighten to specified angles.



- Steering linkage alignment plate
  P/N: YS-01531
  90890-01531

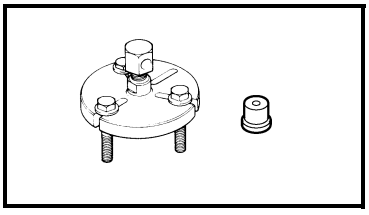
Locks steering column and pivot arm in place while adjusting the steering linkage for front-end alignment.



FOR ENGINE SERVICE

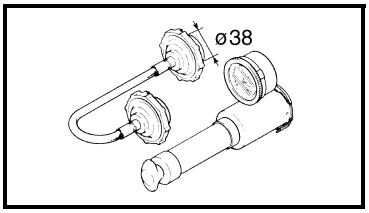
- Piston pin puller
  P/N: YU-01304
- Piston pin puller set
  P/N: 90890-01304

This tool is used to remove the piston pin.



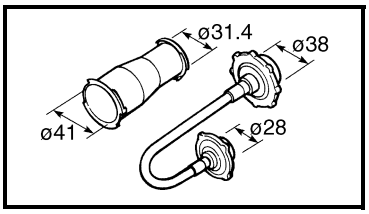
- Heavy duty puller
  P/N: YU-33270-B
- Flywheel puller
  P/N: 90890-01362
- Crankshaft protector
  P/N: YM-33282
- Flywheel puller attachment
  P/N: 90890-04089

These tools are used to remove the magneto rotor.



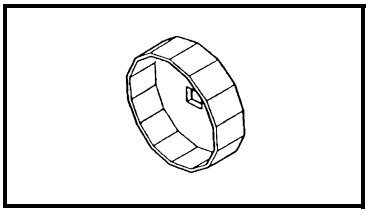
- Radiator pressure tester
  P/N: YU-24460-01
- Radiator cap tester
  P/N: 90890-01325

This tester is used to check the cooling system.



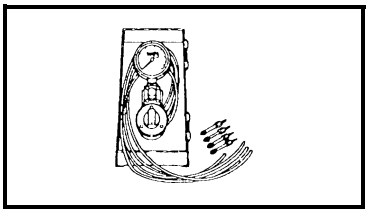
- Radiator pressure tester adapter
  P/N: YU-33984
- Radiator cap tester adapter
  P/N: 90890-01352

This adapter is used to check the cooling system.



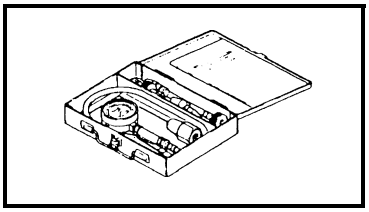
- Oil filter wrench
  P/N: YM-01469
  90890-01469

This tool is needed to loosen or tighten the oil filter cartridge.



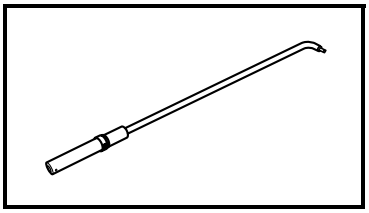
- Carburetor synchronizer
  P/N: YU-44456
- Vacuum gauge
  P/N: 90890-03094

This tool is used to synchronize the throttle bodies.



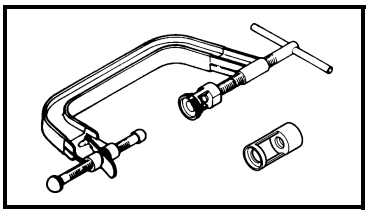
- Engine compression tester
  P/N: YU-33223
- Compression gauge
  P/N: 90890-03081

This tool is used to measure engine compression.



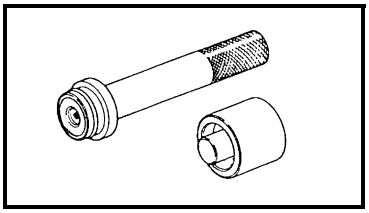
- Carburetor angle driver 2
  P/N:90890-03173

This tool is used to synchronize the throttle bodies.



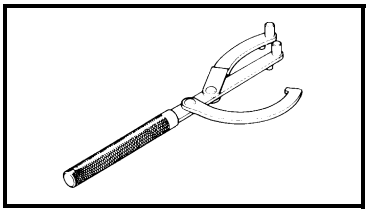
- Valve spring compressor
  P/N: YM-04019
  90890-04019
- Valve spring compressor adapter 19.5 mm
  P/N: YM-04114
- Valve spring compressor attachment
  P/N: 90890-04114

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



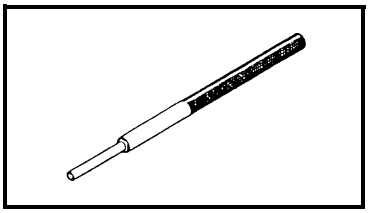
- Bearing driver 40 mm
  P/N: YM-04058
- Middle driven shaft bearing driver
  P/N: 90890-04058
- Mechanical seal installer
  P/N: 90890-04145

These tools are used to install the water pump seal.



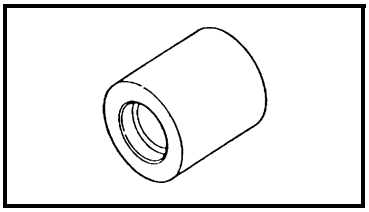
- Universal magneto & rotor holder
  P/N: YU-01235
- Rotor holding tool
  P/N: 90890-01235

This tool is used to hold the camshaft sprockets and oil pump driven gear.



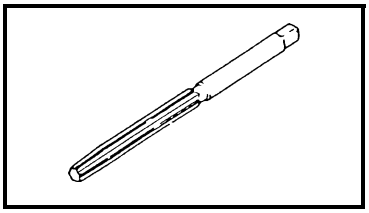
- Valve guide remover (4.5 mm)
  P/N: YM-04116
- Valve guide remover (ø4.5)
  P/N: 90890-04116

This tool is used to remove or install the valve guides.



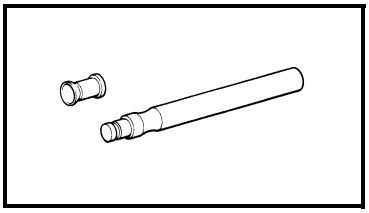
- Valve guide installer (4.5 mm)
  P/N: YM-04117
- Valve guide installer (ø4.5)
  P/N: 90890-04117

This tool is used to install the valve guides.



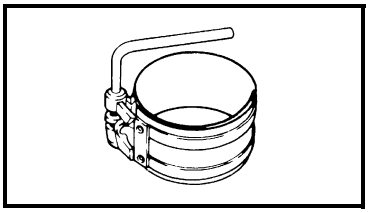
- Valve guide reamer (4.5 mm)
  P/N: YM-04118
- Valve guide reamer (ø4.5)
  P/N: 90890-04118

This tool is used to rebore the new valve guides.



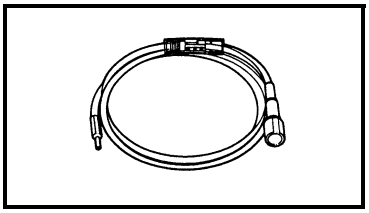
- Valve lapping tool
  P/N: YM-A8998
- Valve lapper
  P/N: 90890-04101

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



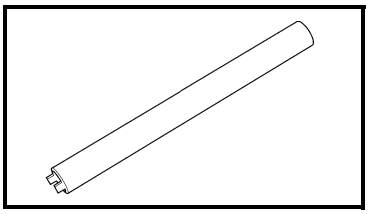
- Piston ring compressor
  P/N: YM-08037
  90890-05158

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



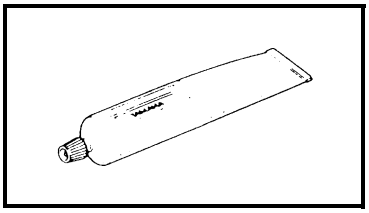
- Opama pet-4000 spark checker
  P/N: YM-34487
- Ignition checker
  P/N: 90890-06754

This tool is used to check the ignition system component.



- Engine mount spacer wrench
  P/N: YS-01516
  90890-01516

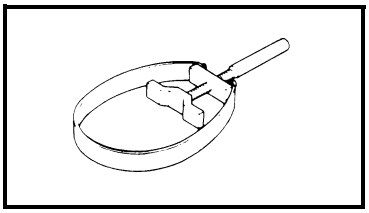
Used to turn the engine mounting bolt spacer when removing/installing engine.



- Yamaha bond No. 1215
  P/N: 90890-85505
  (Three Bond No.1215®)

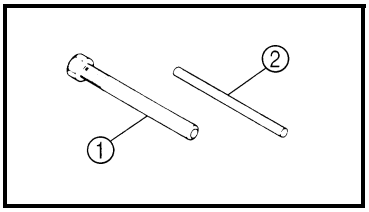
This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces.)

FOR POWER TRAIN SERVICE



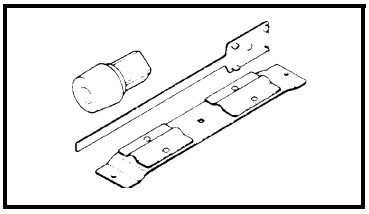
- Primary clutch holder
  P/N: YS-01880-A
- Sheave holder
  P/N: 90890-01701

This tool is used to hold the primary sheave and AC magneto rotor.



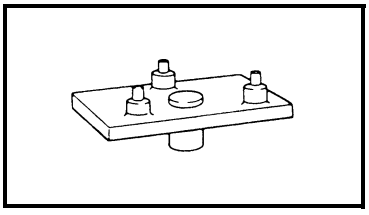
- Primary sheave puller (18 mm)
  P/N: YS-01881-A ①, YS-01881-1 ②
  90890-01898

This tool is used for removing the primary sheave.



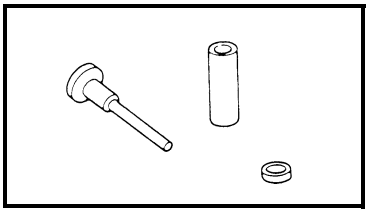
- Clutch spider separator
  P/N: YS-28890-C
  90890-01711

This tool is used when disassembling and assembling the primary sheave.



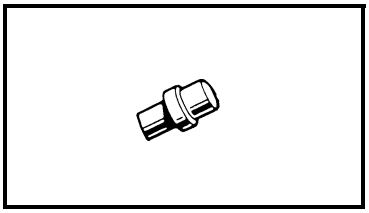
- Clutch separator adapter
  P/N: YS-34480
  90890-01740

This tool is used when disassembling and assembling the primary sheave.



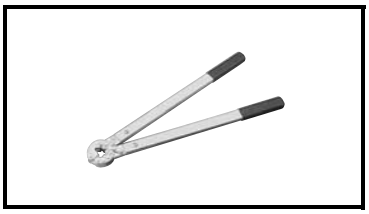
- YXR clutch bushing jig kit
  P/N: YS-39752
  90890-01528

This tool is used for removal and installation of primary clutch weight and roller bushings.



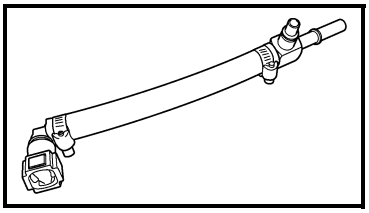
- Clutch bushing press
  P/N: YS-42424
  90890-01529

This tool is used for removing and installing the post bushings (primary sheave cap bush, sliding sheave bush and torque cam bush).



- Track clip installer
  P/N: YS-91045-C
  90890-01721

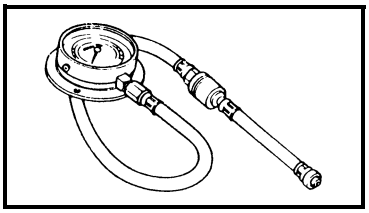
This tool is used for installing the track clip.



FOR FUEL INJECTION SERVICE

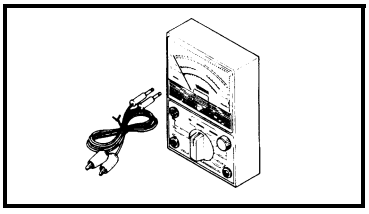
- Fuel pressure adapter
  P/N: YM-03176
  90890-03176

This tool is needed to measure fuel pressure.



- Pressure gauge
  P/N: YU-03153
  90890-03153

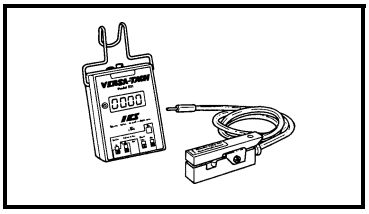
This tool is used to measure fuel pressure.



FOR ELECTRICAL SERVICE

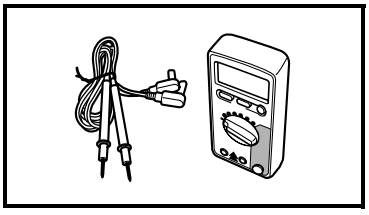
- Analog pocket tester
  P/N: YU-03112-C
- Pocket tester
  P/N: 90890-03112

This instrument is necessary for checking the electrical components.



- Engine tachometer
  P/N: YU-08036-C
  90793-80009

This tool is used to check engine speed.



- Model 88 Multimeter with tachometer
  P/N: YU-A1927
- Digital circuit tester
  P/N: 90890-03174

This instrument is necessary for checking the electrical components.

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 snowmobile operation and a longer service life. In addition, the need for costly overhaul work will be greatly reduced. This information applies to snowmobiles already in service as well as new snowmobiles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

	ITEM	REMARKS	INITIAL	EVERY
			1 month or 800 km (500 mi) (40 hr)	Seasonally or 4000 km (2500 mi) (200 hr)
	Spark plugs	• Check condition. • Adjust gap and clean. • Replace if necessary.		●
*	Valve clearance	• Check and adjust valve clearance when engine is cold.	Every 40000 km (25000 mi)	
*	Crankcase breather system	• Check breather hose for cracks or damage. • Replace if necessary.		●
*	Fuel filter	• Check condition. • Replace fuel pump assembly if necessary.		●
*	Fuel line	• Check fuel hose for cracks or damage. • Replace if necessary.		●
*	Fuel injection	• Check synchronization. • Adjust if necessary.	●	●
*	Exhaust system	• Check for leakage. • Tighten or replace gasket if necessary.		●

* It is recommended that these items be serviced by a Yamaha dealer.

GENERAL MAINTENANCE AND LUBRICATION CHART

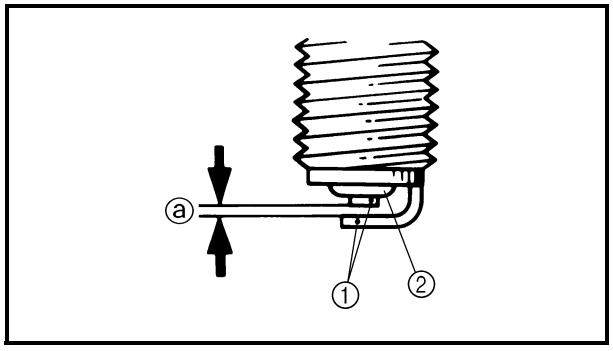
	ITEM	REMARKS	INITIAL	EVERY
			1 month or 800 km (500 mi) (40 hr)	Seasonally or 4000 km (2500 mi) (200 hr)
	Engine oil	• Change (warm engine before draining)	●	●
*	Engine oil filter cartridge	• Replace.	●	Every 20000 km (12000 mi)
*	Cooling system	• Check coolant level. • Air bleed the cooling system if necessary.		●
*	Primary and secondary clutches	• Check engagement and shift speed. • Adjust if necessary.		●
			Whenever operating elevation is changed.	
		• Inspect sheaves for wear and damage. • Inspect weights/rollers and bushings for wear for primary. • Inspect ramp shoes/bushings for wear for secondary. • Replace if necessary.		●
		• Lubricate with specified grease.		●
*	Drive chain	• Check chain slack. • Adjust if necessary.	Initial at 500 km (300 mi) and every 800 km (500 mi) thereafter.	
*	Drive chain oil	• Check oil level.	●	●
		• Change.		●
*	Brake and parking brake	• Adjust free play and/or replace pads if necessary.		●
		• Change brake fluid.	See NOTE following this chart.	
	Control cables	• Make sure that operation is smooth. • Lubricate if necessary.		●
*	Disc brake installation	• Check for slight free play. • Lubricate shaft with specified grease as required.	Every 1600 km (1000 mi)	
*	Slide runners	• Check for wear and damage. • Replace if necessary.		●
*	Skis and ski runners	• Check for wear and damage. • Replace if necessary.		●
*	Steering system	• Check toe-out. • Adjust if necessary.		●
*	Steering bearings	• Check bearing assemblies for looseness. • Lubricate with specified grease.		●
*	Ski and front suspension	• Lubricate with specified grease.		●
*	Suspension component	• Lubricate with specified grease.		●
	Fittings and fasteners	• Make sure that all nuts, bolts and screws are properly tightened. • Tighten if necessary.	●	●
*	Battery	• Check condition. • Charge if necessary.		●

* It is recommended that these items be serviced by a Yamaha dealer.

NOTE:

Brake system:

- After disassembling the master cylinder or caliper cylinder, always change the brake fluid. Regularly check the brake fluid level and add fluid if necessary.
- Replace the oil seals of the master cylinder and caliper cylinder every two years.
- Replace the brake hose every four years, or if cracked or damaged.

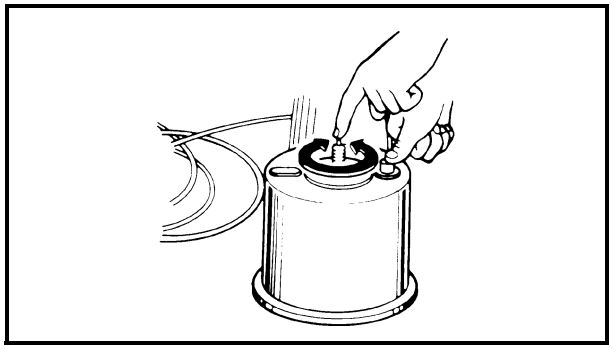


ENGINE

SPARK PLUGS

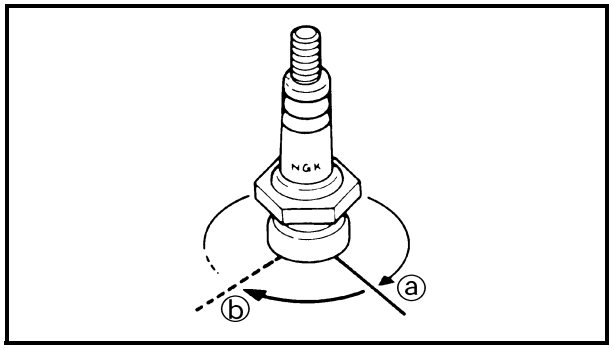
1. Remove:
   - Left side cover
     Refer to “COVERS” in CHAPTER 3.
2. Remove:
   - Ignition coils
   - Spark plugs
3. Inspect:
   - Electrodes ①
     Damage/wear → Replace the spark plug.
   - Insulator color ②
     Abnormal color → Replace the spark plug
     Normal color is medium-to-light tan.
4. Measure:
   - Spark plug gap ⓐ
     Out of specification → Regap.
     Use a wire thickness gauge.

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



If necessary, clean the spark plugs with a spark plug cleaner.

Standard spark plug:
NGK CR9E (NGK)

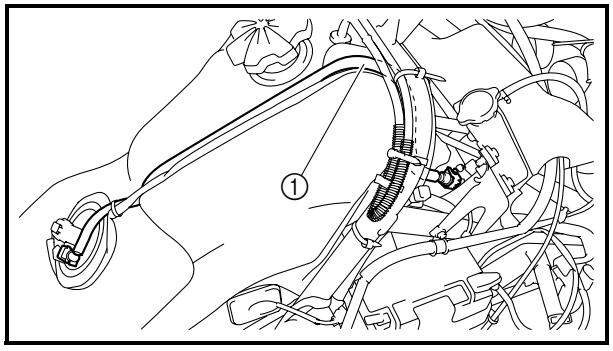


Before installing a spark plug, clean the gasket surface and spark plug surface.

5. Install:
   - Spark plugs

Spark plug:
13 Nm (1.3 m · kg, 9.4 ft · lb)

NOTE:
Finger-tighten ⓐ the spark plug before torquing ⓑ it to specification.



FUEL LINE INSPECTION

1. Remove:
   - Fuel tank cover
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5.
2. Inspect:
   - Fuel hose ①
     Cracks/damage → Replace.

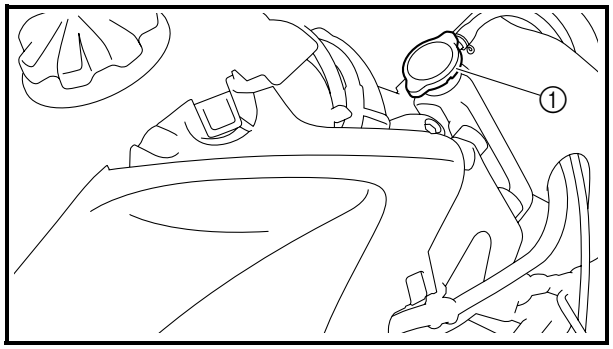
COOLING SYSTEM

Coolant replacement

NOTE:

The coolant should be changed at least every season.

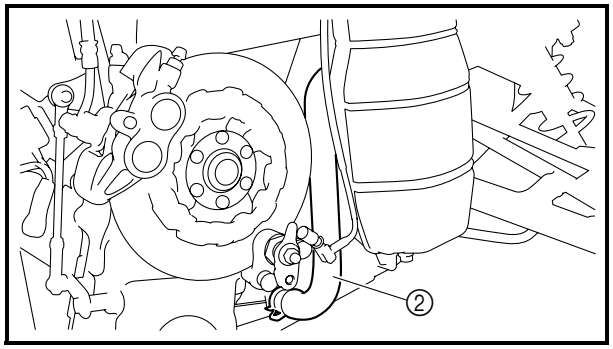
1. Place the snowmobile on a level surface.
2. Remove:
   - Right lower cover
     Refer to "COVERS" in CHAPTER 3.
3. Remove:
   - Radiator cap ①

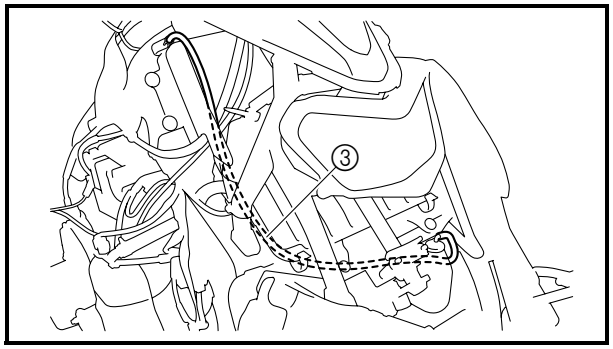


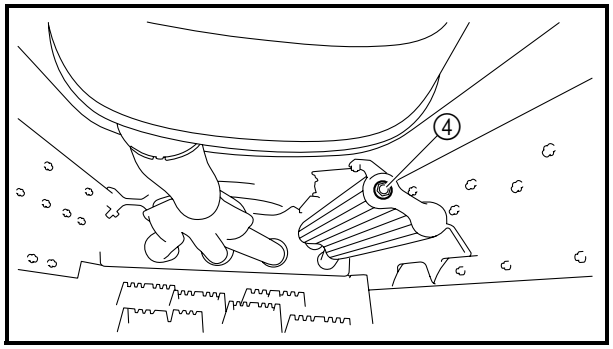
⚠ WARNING

Do not remove the radiator cap when the engine is hot. Pressurized scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, place a thick rag or a towel over the radiator cap. Slowly turn the cap counterclockwise until it stop. This allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning it counterclockwise to remove it.

4. Place an open container under the thermostat outlet hose, coolant reservoir hose and, for FX10MT/FX10MTR/FX10MTRA only, heat exchanger.
5. Disconnect:
   - Thermostat outlet hose ②
   - Coolant reservoir hose ③
6. Remove:
   - Heat exchanger drain bolt ④
     (FX10MT/FX10MTR/FX10MTRA)
7. Drain the coolant.







NOTE:

Lift up the tail of the snowmobile to drain the coolant.

⚠ WARNING

Coolant is poisonous. It is harmful or fatal if swallowed.

- **If coolant is swallowed, induce vomiting immediately and get immediate medical attention.**
- **If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.**
- **If coolant splashes on your skin or clothes, quickly wash it away with soap and water.**

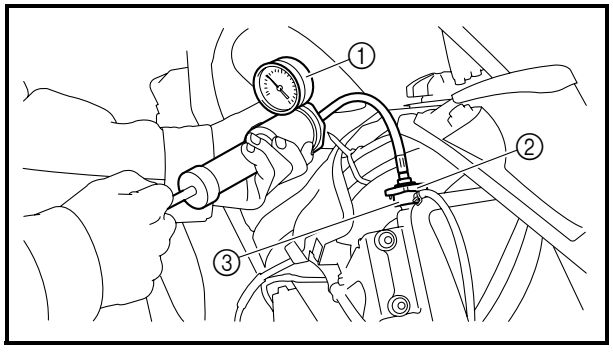
8. Connect:
   - Coolant reservoir hose
   - Thermostat outlet hose
9. Fill:
   - Cooling system

Recommended coolant:
High quality ethylene glycol anti-freeze containing corrosion inhibitors
Coolant mixing ratio (coolant:water):
3:2 (60%:40%)
Total amount:
FX10/FX10RT/FX10RTR/FX10RTRA
3.40 L (2.99 Imp qt, 3.59 US qt)
FX10MT/FX10MTR/FX10MTRA
4.70 L (4.14 Imp qt, 4.97 US qt)

CAUTION:

- **Hard water or salt water is harmful to engine parts. If soft water is not available, use boiled or distilled water.**
- **Do not use water containing impurities or oil.**

10. Bleed the air from the cooling system.



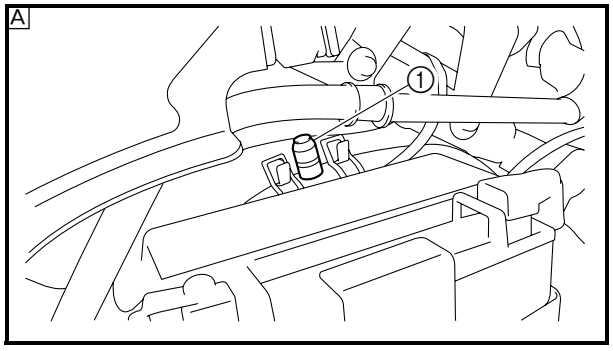
11. Inspect:
    - Cooling system
      Decrease of pressure (leaks) → Repair as required.

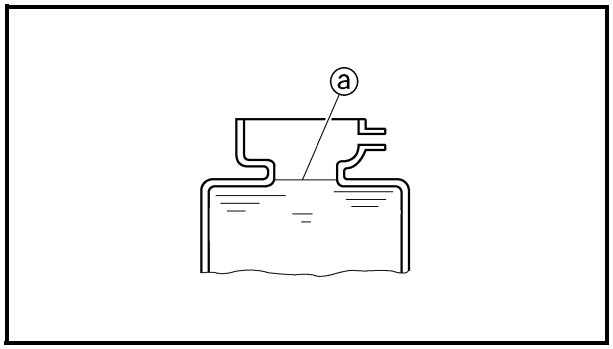
Inspection steps:

- Attach the cooling system tester ① and adapter ② to the radiator filler ③.

Radiator cap tester:
90890-01325
Radiator pressure tester:
YU-24460-01
Radiator cap tester adapter:
90890-01352
Radiator pressure tester adapter:
YU-33984

- Apply 100 kPa (1.0 kg/cm^2, 14 psi).
- Measure the pressure with the gauge.





Air bleeding steps:

NOTE:

For models other than FX10MT/FX10MTR/FX10MTRA, skip steps 1–3.

- Remove the cap ① on the heat exchanger pipe.
- While slowly adding coolant to the radiator filler, drain the coolant until no more air bubbles appear.
- Install the cap ①.
- Add coolant to the full level ⓐ.
- Install the radiator cap.

  Apply and lock the parking brake. Start the engine and run it at less than the clutch engagement speed until the coolant circulates (approximately 3 ~ 5 minutes). The heat exchanger will be warm to the touch (FX10MT/FX10MTR/FX10MTRA).

A FX10MT/FX10MTR/FX10MTRA

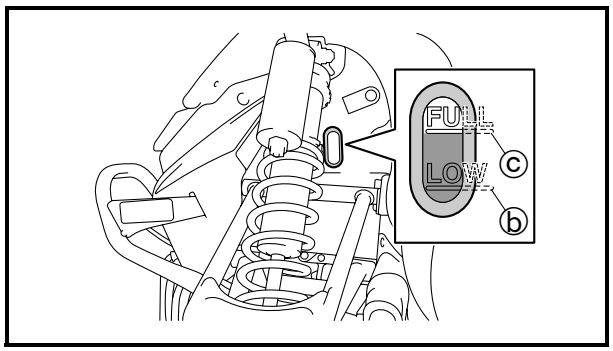
⚠ WARNING

To avoid severe injury or death:

- **Make sure the snowmobile is securely supported with a suitable stand.**
- **Do not exceed the clutch engagement speed. Drive line damage and excessive V-belt wear could occur, or the snowmobile could unexpectedly move forward if the clutch engages.**
- **Operate the engine only in a well-ventilated area.**

- Remove the radiator cap and bleed the cooling system again, as described above.

  No air bubbles → OK.
- Check the coolant level in the coolant reservoir when the engine is cold. If the coolant level is below the “LOW” mark ⓑ, add coolant until it reaches the “FULL” mark ⓒ.

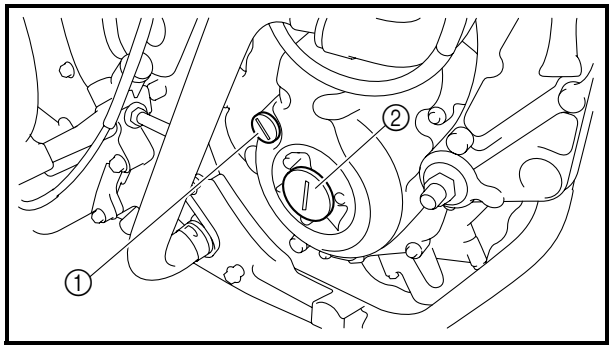


VALVE CLEARANCE ADJUSTMENT

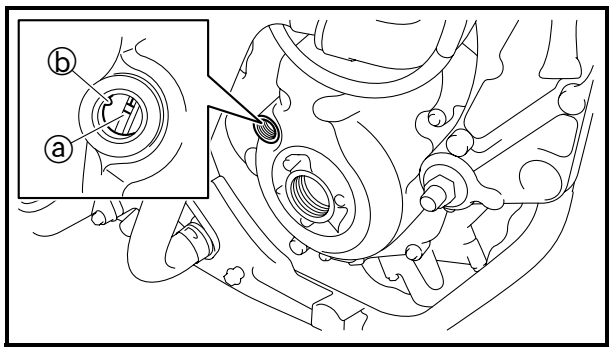
NOTE:

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at the top dead center (TDC) on the compression stroke.

1. Drain:
   - Engine oil
     Refer to “ENGINE OIL REPLACEMENT”.
2. Remove:
   - Fuel tank
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5.
   - Oil tank
     Refer to “OIL TANK” in CHAPTER 5.

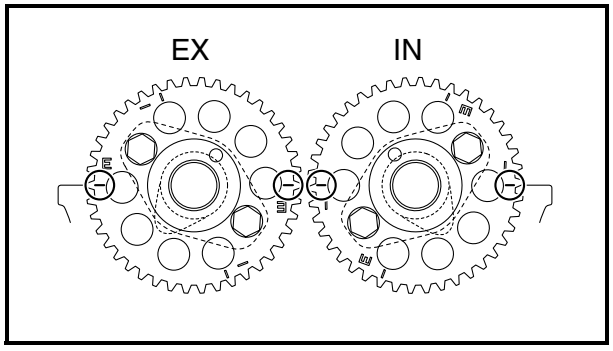


3. Remove:
   - Cylinder head cover
     Refer to “CAMSHAFTS” in CHAPTER 5.
   - Timing mark accessing screw ①
   - Crankshaft end accessing screw ②



4. Measure:
   - Valve clearance
     Out of specification → Adjust.

Valve clearance (cold):
Intake valve:
0.15 ~ 0.22 mm
(0.0059 ~ 0.0087 in)
Exhaust valve:
0.21 ~ 0.25 mm
(0.0083 ~ 0.0098 in)

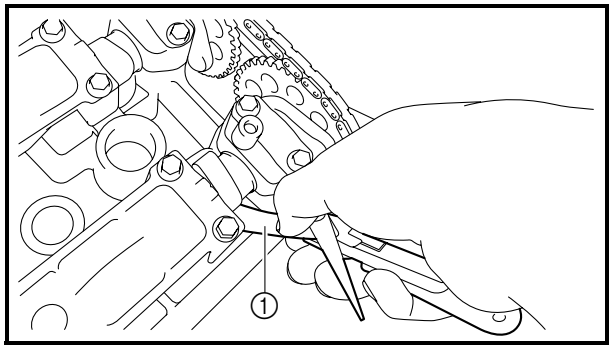


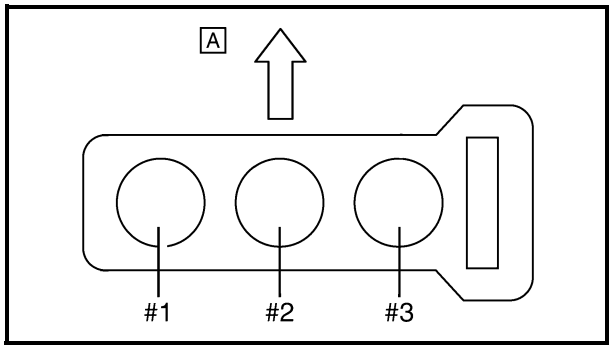
Checking steps:

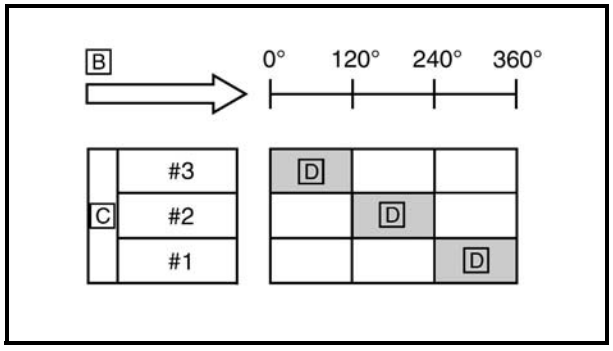
- Turn the crankshaft clockwise.
- When piston #3 is at TDC on the compression stroke, align the TDC mark ⓐ on the AC magneto rotor with the mark ⓑ on the AC magneto cover.

NOTE:

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.







- Measure the valve clearance with a thickness gauge ①.

NOTE:

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence
Cylinder #3 → #2 → #1

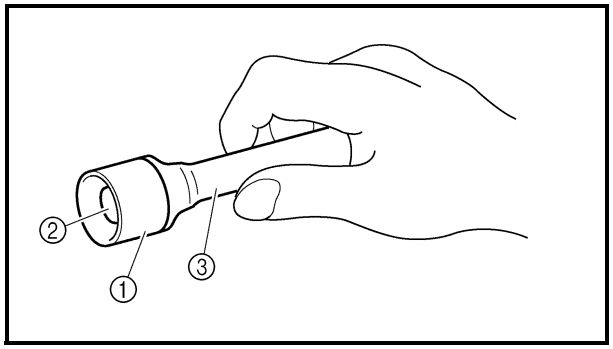
A Front
For each cylinder, starting with cylinder #3 at TDC, turn the crankshaft clockwise as specified in the following table.
B Degrees that the crankshaft is turned clockwise
C Cylinder
D Combustion cycle

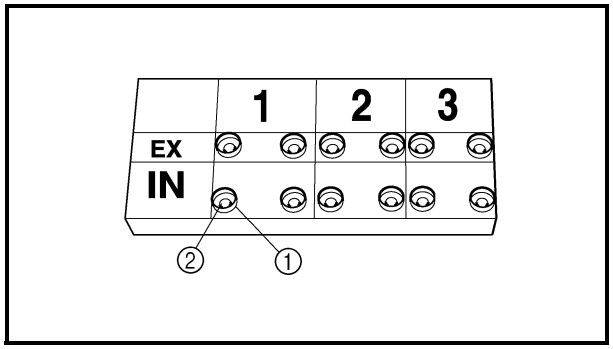
Cylinder #2	120°
Cylinder #1	240°

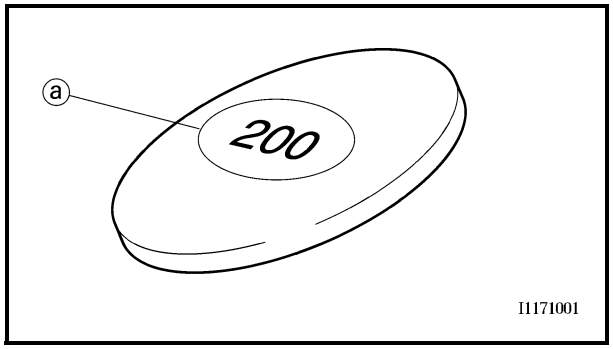
5. Remove:
   - Intake camshaft
   - Exhaust camshaft

NOTE:

- Refer to “CAMSHAFTS” in CHAPTER 5.
- When removing the timing chain and camshafts, fasten a wire to the timing chain to retrieve it if it falls into the crankcase.







6. Adjust:
   - Valve clearance

Adjustment steps:

- Remove the valve lifter ① and the valve pad ② with a valve lapper ③.

Valve lapper
90890-04101
Valve lapping tool
YM-A8998

NOTE:

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter ① and valve pad ② so that they can be installed in the correct place.

- Select the proper valve pad from the following table.

Valve pad thickness range		Available valve pads
Nos. 120 ~ 240	1.20 ~ 2.40 mm (0.047 ~ 0.094 in)	25 thicknesses in 0.05 mm (0.0020 in) increments

NOTE:

- The thickness ⓐ of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.

- Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	**0**
5	**5**
8	**10**

EXAMPLE:

Original valve pad number = 148 (thickness = 1.48 mm (0.058 in))

Rounded value = 150

- Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

NOTE:

The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

VALVE PAD SELECTION TABLE

INTAKE

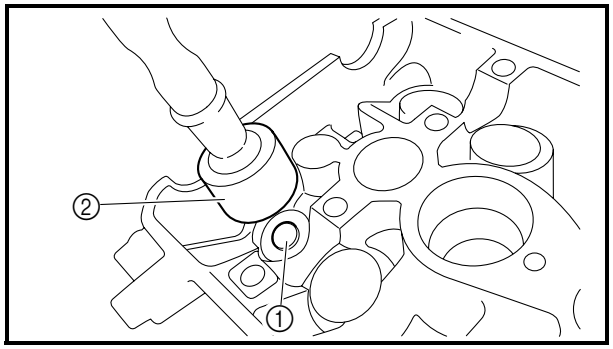
Measured clearance ↓	INSTALLED PAD NUMBER																										
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.04				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.05 ~ 0.09			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.10 ~ 0.14		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.15 ~ 0.22	Specification																								
exa 0.23 ~ 0.27	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
→ 0.28 ~ 0.32	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.33 ~ 0.37	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.38 ~ 0.42	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.43 ~ 0.47	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.48 ~ 0.52	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.53 ~ 0.57	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.58 ~ 0.62	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.63 ~ 0.67	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.68 ~ 0.72	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.73 ~ 0.77	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.78 ~ 0.82	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.83 ~ 0.87	185	190	195	200	205	210	215	220	225	230	235	240													
0.88 ~ 0.92	190	195	200	205	210	215	220	225	230	235	240														
0.93 ~ 0.97	195	200	205	210	215	220	225	230	235	240															
0.98 ~ 1.02	200	205	210	215	220	225	230	235	240																
1.03 ~ 1.07	205	210	215	220	225	230	235	240																	
1.08 ~ 1.12	210	215	220	225	230	235	240																		
1.13 ~ 1.17	215	220	225	230	235	240																			
1.18 ~ 1.22	220	225	230	235	240																				
1.23 ~ 1.27	225	230	235	240																					
1.28 ~ 1.32	230	235	240																						
1.33 ~ 1.37	235	240																							
1.38 ~ 1.42	240																								

EXAMPLE:
VALVE CLEARANCE:
0.15 ~ 0.22 mm (0.0059 ~ 0.0087 in)
Installed is 150
Measured clearance is 0.30 mm (0.0118 in)
Replace 150 pad with 160 pad

EXHAUST

Measured clearance ↓	INSTALLED PAD NUMBER																										
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.25	Specification																								
exa 0.26 ~ 0.30	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
→ 0.31 ~ 0.35	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.36 ~ 0.40	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.41 ~ 0.45	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.46 ~ 0.50	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.51 ~ 0.55	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.56 ~ 0.60	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.61 ~ 0.65	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.66 ~ 0.70	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.71 ~ 0.75	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.76 ~ 0.80	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.81 ~ 0.85	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.86 ~ 0.90	185	190	195	200	205	210	215	220	225	230	235	240													
0.91 ~ 0.95	190	195	200	205	210	215	220	225	230	235	240														
0.96 ~ 1.00	195	200	205	210	215	220	225	230	235	240															
1.01 ~ 1.05	200	205	210	215	220	225	230	235	240																
1.06 ~ 1.10	205	210	215	220	225	230	235	240																	
1.11 ~ 1.15	210	215	220	225	230	235	240																		
1.16 ~ 1.20	215	220	225	230	235	240																			
1.21 ~ 1.25	220	225	230	235	240																				
1.26 ~ 1.30	225	230	235	240																					
1.31 ~ 1.35	230	235	240																						
1.36 ~ 1.40	235	240																							
1.41 ~ 1.45	240																								

EXAMPLE:
VALVE CLEARANCE:
0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)
Installed is 175
Measured clearance is 0.35 mm (0.0138 in)
Replace 175 pad with 185 pad



- Install the new valve pad ① and the valve lifter ②.

NOTE:
- Apply molybdenum disulfide oil to the valve pad and the valve lifter.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.

- Install the exhaust and intake camshafts, timing chain and camshaft caps.

Camshaft cap bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:
- Refer to “CAMSHAFTS” in CHAPTER 5.
- Lubricate the camshaft caps, camshaft lobes, camshaft journals and camshaft cap bolts.
- Align the camshaft marks with the camshaft cap marks.
- Rotate the crankshaft clockwise several turns to seat the parts.

- Measure the valve clearance again.
- If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

7. Install:
   - All removed parts

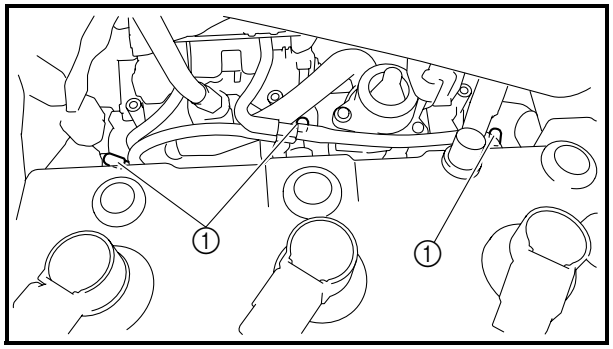
NOTE:
For installation, reverse the removal procedure.

8. Add:
   - Engine oil
     Refer to “ENGINE OIL REPLACEMENT”.

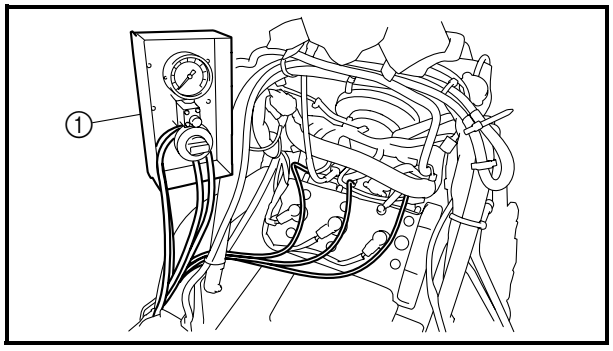
THROTTLE BODY SYNCHRONIZATION

NOTE:
Prior to synchronizing the throttle bodies, the valve clearance should be properly adjusted.

1. Remove:
   - Fuel tank
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5.



2. Remove:
   - Vacuum caps ①



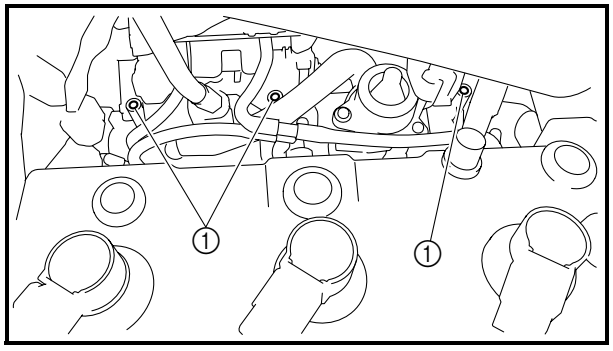
3. Install:
   - Vacuum gauge ①

Vacuum gauge:
90890-03094
Carburetor synchronizer:
YU-44456

4. Install:
   - Fuel tank
     Refer to “SEAT AND FUEL TANK” in CHAPTER 5.
5. Start the engine and let it warm up for several minutes, and then let it run at specified engine idling speed.

Engine idle speed:
1,450 ~ 1,550 r/min

6. Adjust:
   - Throttle body synchronization



Adjustment steps:

- With throttle body #1 as standard, adjust throttle body #1 and #2 using the synchronizing screws ①.

Carburetor angle driver 2:
90890-03173

NOTE:

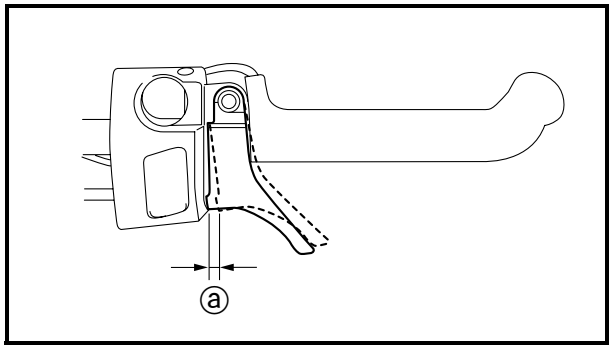
After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.

Vacuum pressure at engine idling speed:
25.37 ~ 28.03 kPa
(0.25 ~ 0.28 kg/cm^2, 3.61~ 3.99 psi)

NOTE:

The difference in vacuum pressure between two throttle bodies should not exceed 1.3 kPa (0.01 kg/cm^2, 0.18 psi).

7. Stop the engine and remove the measuring equipment.
8. Adjust:
   - Throttle cable free play
     Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT".



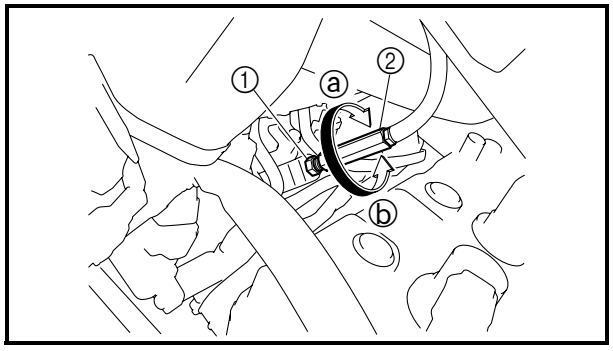
THROTTLE CABLE FREE PLAY ADJUSTMENT

NOTE:

Adjust the throttle cable free play while the cable is in the cable guide.

1. Measure:
   - Throttle cable free play ⓐ
     Out of specification → Adjust.

Throttle cable free play:
3.0 ~ 4.0 mm (0.12 ~ 0.16 in)



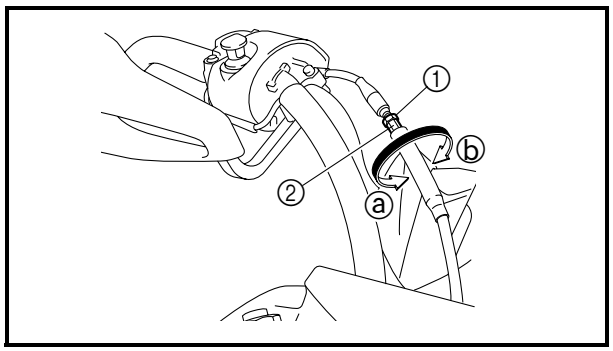
2. Adjust:
   • Throttle cable free play

Throttle body side adjustment steps:
- Remove the left side cover.
  Refer to "COVERS" in CHAPTER 3.
- Loosen the locknut ①.
- Turn the adjusting nut ② in direction ⓐ or ⓑ until the specified free play is obtained.

Direction ⓐ	**Free play is increased.**
Direction ⓑ	**Free play is decreased.**

- Tighten the locknut.

NOTE:
If the specified throttle cable free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

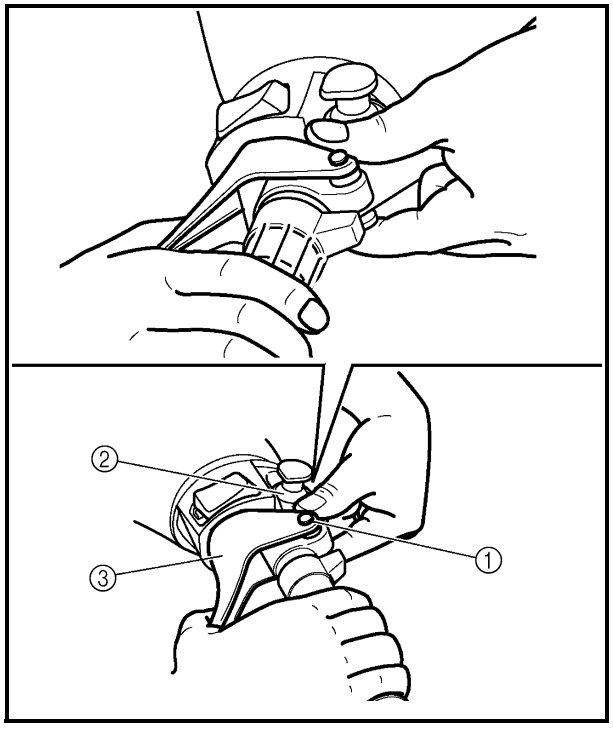


Handlebar side adjustment steps:
- Slide back the rubber cover.
- Loosen the locknut ①.
- Turn the adjusting nut ② in direction ⓐ or ⓑ until the specified free play is obtained.

Direction ⓐ	**Free play is increased.**
Direction ⓑ	**Free play is decreased.**

- Tighten the locknut.
- Slide the rubber cover to its original position.

NOTE:
After adjusting the free play, turn the handlebar to right and left, and make sure that the engine idling does not run faster.



THROTTLE OVERRIDE SYSTEM (T.O.R.S.) CHECK

⚠ WARNING

When checking the T.O.R.S.:
- **Be sure the parking brake is applied.**
- **Be sure the throttle lever moves smoothly.**
- **Do not rev the engine to the point that the clutch engages, otherwise, the snowmobile could start moving forward unexpectedly, which could cause an accident.**

1. Start the engine.
2. Hold the pivot point of the throttle lever away from the throttle switch by putting your thumb (above) and forefinger (below) between the throttle lever pivot ① and engine stop switch housing ②.
   While holding as described above, press the throttle lever ③ gradually.
   The T.O.R.S. will be activated and the engine speed will be limited to less than the clutch engagement speed.

Engagement speed:
FX10/FX10RT/FX10RTR/FX10RTRA
3,550 ~ 3,950 r/min
FX10MT/FX10MTR "USA/Canada"/ FX10MTRA "USA/Canada"
3,300 ~ 3,700 r/min
FX10MTR "Europe"/FX10MTRA "Europe"
3,100 ~ 3,500 r/min

⚠ WARNING

If the engine speed does not decrease to less than the clutch engagement speed, stop the engine by turning the main switch to the off position and check the electrical system.

COMPRESSION PRESSURE MEASUREMENT

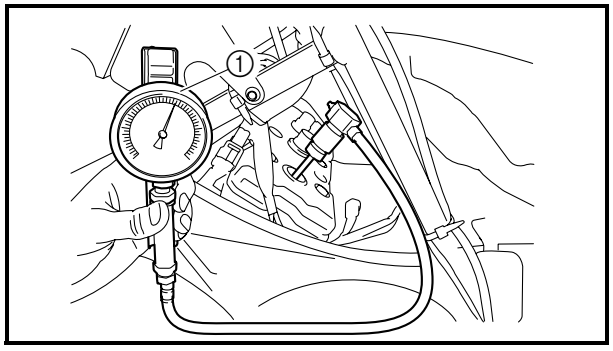
NOTE:

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "VALVE CLEARANCE ADJUSTMENT".
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Fuel tank
     Refer to "SEAT AND FUEL TANK" in CHAPTER 5.
4. Remove:
   - Spark plug

CAUTION:

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.



5. Install:
   - Compression gauge ①

Compression gauge:
90890-03081
Engine compression tester:
YU-33223

6. Measure:
   - Compression pressure
     Above the maximum pressure → Inspect the cylinder head, valve surfaces, and piston crown for carbon deposits.
     Below the minimum pressure → Squirt a few drops of oil into the affected cylinder and measure again.
     Refer to the following table.

Compression pressure (with oil applied into cylinder)	
Reading	**Diagnosis**
Higher than without oil	**Piston ring(-s) wear or damage → Repair.**
Same as without oil	**Piston, valves, cylinder head gasket or piston possibly defective → Repair.**

Compression pressure (at sea level):
Standard:
1,500 kPa (15.0 kg/cm^2, 213.3 psi) at 400 r/min
Minimum:
1,400 kPa (14.0 kg/cm^2, 199.1 psi) at 400 r/min
Maximum:
1,600 kPa (16.0 kg/cm^2, 227.5 psi) at 400 r/min

Measurement steps:
- Set the engine stop switch to “RUN” and turn the main switch to “START”.
- With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

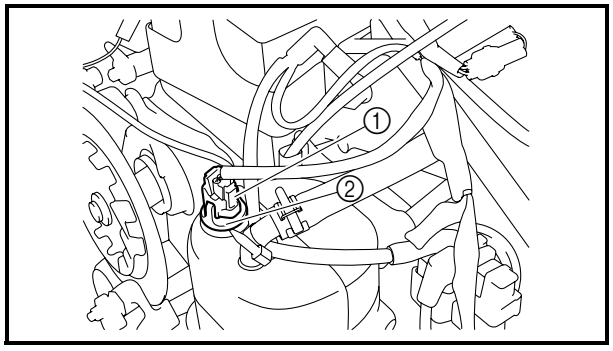
⚠ WARNING

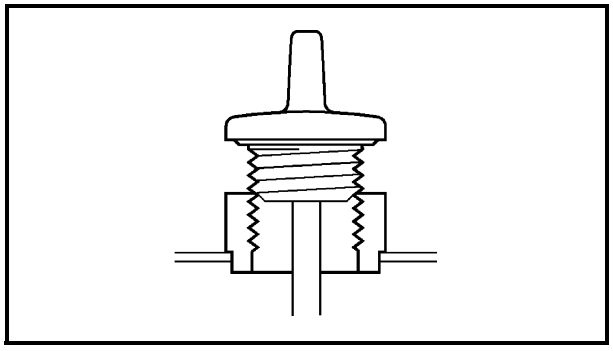
To prevent sparking, disconnect all ignition coil couplers before cranking the engine.

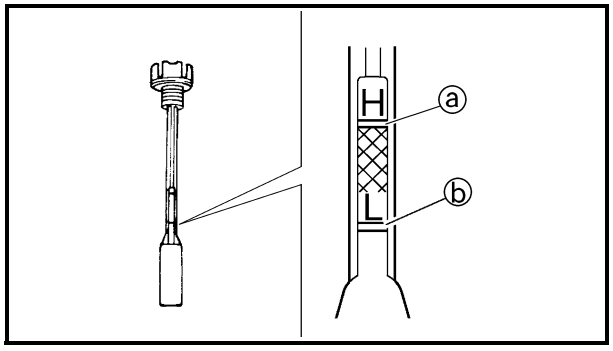
NOTE:
The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm^2, 14.2 psi).

7. Install:
   - Spark plug

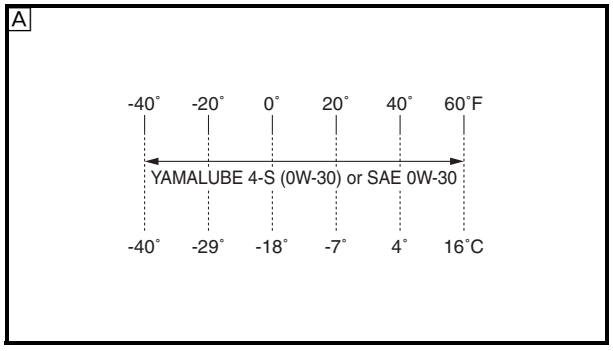
Spark plug:
13 Nm (1.3 m · kg, 9.4 ft · lb)



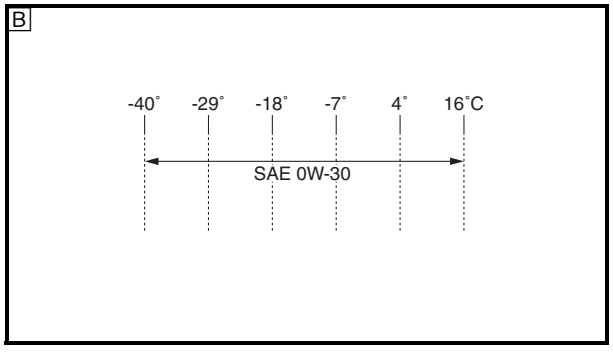




A



B



ENGINE OIL LEVEL INSPECTION

1. Inspect:
   - Engine oil level

CAUTION:

Do not run the engine with too much or not enough oil in the oil tank. Oil could flow into the air filter and the engine could be damaged.

Inspection steps:

- Place the snowmobile on a level surface and apply the parking brake.
- Start the engine, warm it up for 10 ~ 15 minutes, and then turn off.
- Remove the right side cover.
  Refer to "COVERS" in CHAPTER 3.
- Disconnect the oil level switch coupler ①.

CAUTION:

Disconnect the oil level switch coupler before removing the oil level gauge. Otherwise the lead can twist and become severed.

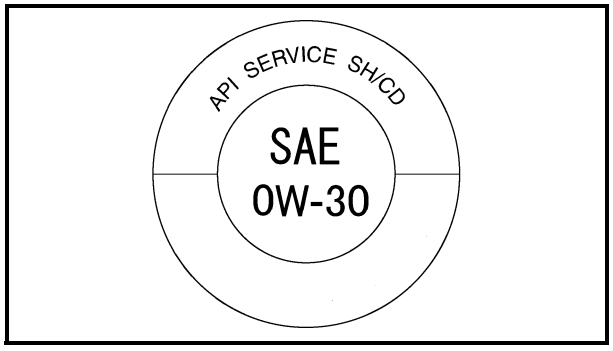
- Remove the oil level gauge ②, wipe it clean, insert it back into the filler hole (without screwing it in), and then remove it again to check the oil level.
- The engine oil level should be between the maximum level mark "H" ⓐ and minimum level mark "L" ⓑ.
  Below the minimum level mark → Add the recommended engine oil to the proper level.

CAUTION:

- **When adding the engine oil, be careful not to fill above the maximum level mark "H" and minimum level mark "L" on the oil level gauge.**
- **Do not allow foreign materials to enter the oil tank.**

Recommended engine oil type:
For USA/Canada
YAMALUBE 4-S (0W-30) or SAE 0W-30
For Europe
SAE 0W-30
Recommended engine oil grade:
API service SG type or higher, JASO standard MA

A USA/Canada
B Europe



NOTE:

Before checking the engine oil level, wait a few minutes until the oil has settled.

- Start the engine, warm it up for several minutes, and then turn it off.
- Check the engine oil level again.

NOTE:

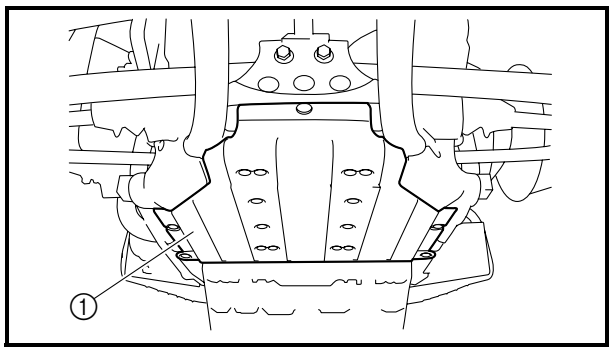
Before checking the engine oil level, wait a few minutes until the oil has settled.

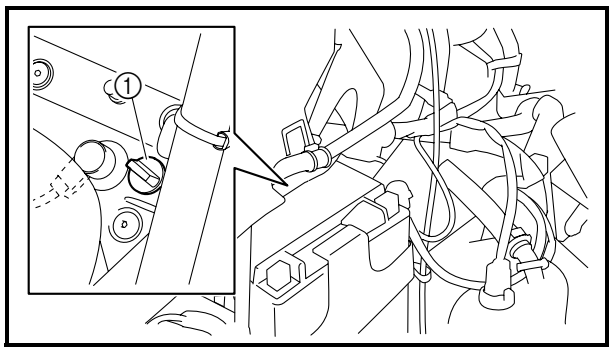
CAUTION:

- **Use only 4-stroke engine oil.**
- **Engine oil also lubricates the starter clutch. In order to prevent clutch slippage, do not mix any chemical additives with the oil or use oils of a higher grade than "CD". In addition, do not use oils labeled "ENERGY CONSERVING II" or higher.**

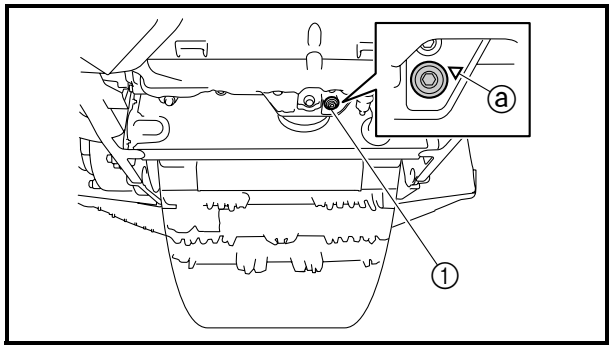
ENGINE OIL REPLACEMENT

1. Place the snowmobile on a level surface and apply the parking brake.
2. Start the engine, warm up for several minutes, and then turn it off.
3. Remove:
   - Lower cover (left and right)
     Refer to "COVERS" in CHAPTER 3.
4. Place containers under the engine oil pan and oil tank.
5. Remove:
   - Bottom panel ①
6. Disconnect:
   - Oil level switch coupler
     Refer to "ENGINE OIL LEVEL INSPECTION".
7. Remove:
   - Oil level gauge
     Refer to "ENGINE OIL LEVEL INSPECTION".



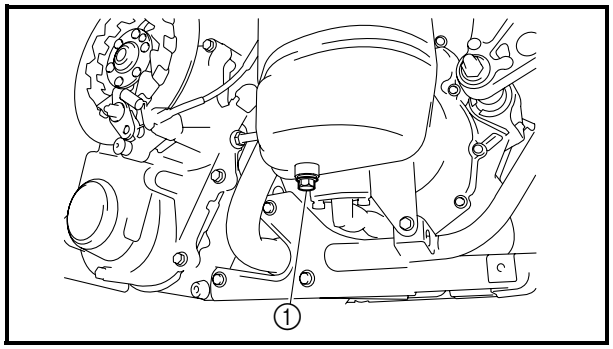


8. Remove:
   - Cylinder head oil filler cap ①

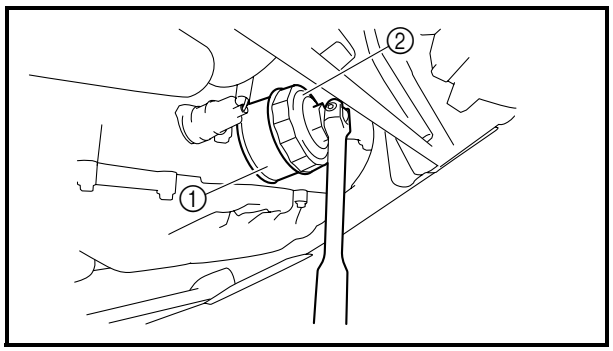


9. Remove:
   • Oil pan engine oil drain bolt ①

NOTE:
A "▽" mark ⓐ is stamped in the oil pan near the oil pan drain bolt.

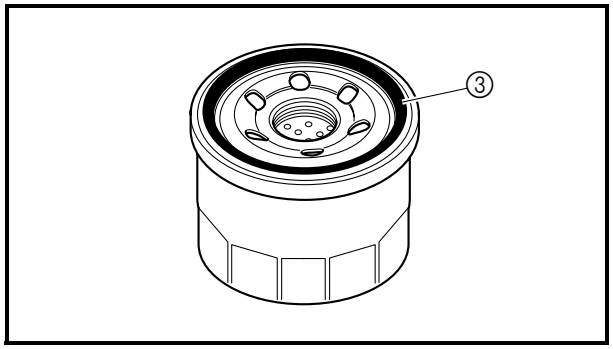


10. Remove:
    • Oil tank engine oil drain bolt ①
11. Drain:
    • Engine oil
      (completely from the oil pan and oil tank)
12. If the oil filter cartridge is also to be replaced, perform the following procedure.



Replacement steps:
• Remove the oil filter cartridge ① with an oil filter wrench ②.

NOTE:
Make sure that the O-ring is removed together with the oil filter cartridge. If the O-ring remains attached to the crankcase, oil leakage may occur.

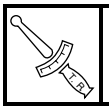


Oil filter wrench:
90890-01469
YM-01469

• Apply a thin coat of engine oil onto the O-ring ③ of the new oil filter cartridge.

CAUTION:
Make sure that the O-ring ③ is positioned correctly in the groove of the oil filter cartridge.

• Tighten the new oil filter cartridge to specification with an oil filter wrench.



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

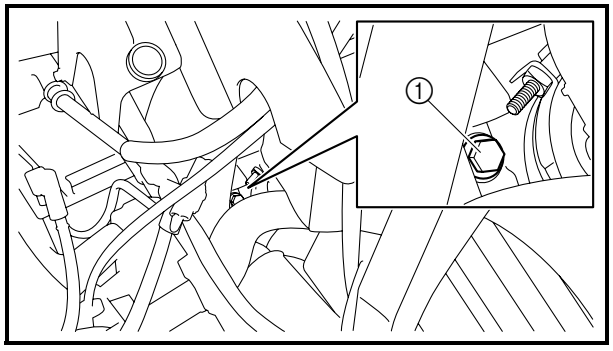
13. Install:
    - Drain bolts
      (along with the new gaskets)

Oil tank engine oil drain bolt:
16 Nm (1.6 m · kg, 11 ft · lb)
Oil pan engine oil drain bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)

14. Fill:
    - Engine oil
      (with the specified amount of the recommended engine oil)
      Add 2.0 L (1.76 Imp qt, 2.11 US qt) of the recommended engine oil to the oil tank, and then install and tighten the oil level gauge and the cylinder head oil filler cap.

Quantity:
Total amount:
3.90 L (3.43 Imp qt, 4.12 US qt)
Periodic oil change:
3.00 L (2.64 Imp qt, 3.17 US qt)
With oil filter cartridge replacement:
3.20 L (2.82 Imp qt, 3.38 US qt)

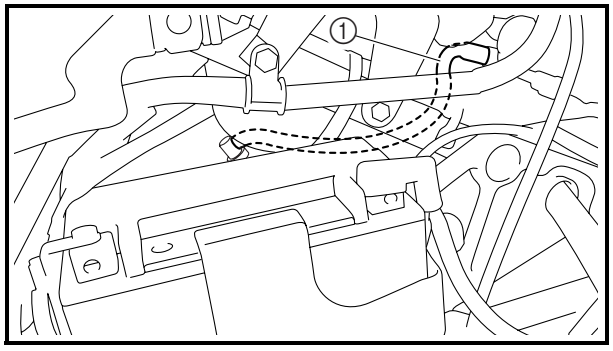
15. Inspect:
    - Engine and oil tank
      (for oil leaks)
16. Inspect:
    - Engine oil level
      Refer to “ENGINE OIL LEVEL INSPECTION”.



17. Inspect:
    - Engine oil pressure

Inspection steps:
- Slightly loosen the oil check bolt ①.
- Start the engine and keep it idling until engine oil starts to seep from the oil check bolt.
  If no engine oil comes out after one minute, turn the engine off so that it will not seize.
- Check the engine oil passages, the oil filter and the oil pump for damage or leakage.
- Start the engine after solving the problem(-s) and check the engine oil pressure again. Tighten the oil check bolt to specification.

Oil check bolt:
20 Nm (2.0 m · kg, 14 ft · lb)

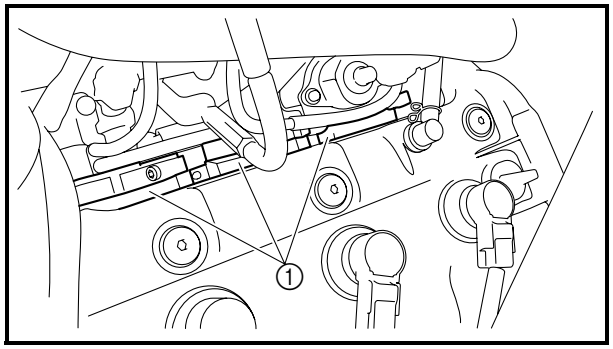


CYLINDER HEAD BREATHER HOSE INSPECTION

1. Inspect:
   - Cylinder head breather hose ①
     Cracks/damage → Replace.
     Loosen connection → Connect properly.

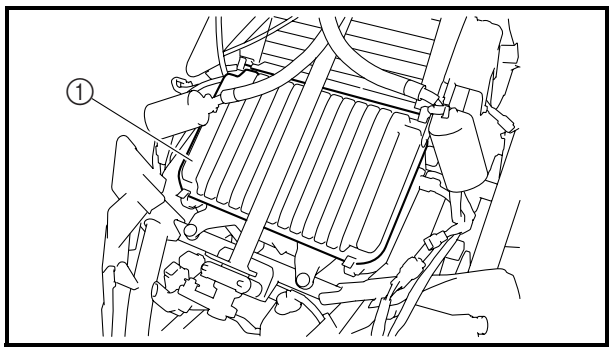
CAUTION:

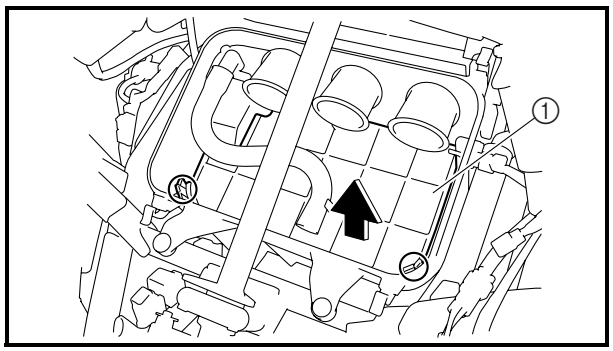
Make sure that the cylinder head breather hose is routed correctly.



THROTTLE BODY JOINTS INSPECTION

1. Inspect:
   - Throttle body joints ①
     Cracks/damage → Replace the defective parts.
     Refer to "THROTTLE BODY" in CHAPTER 7.





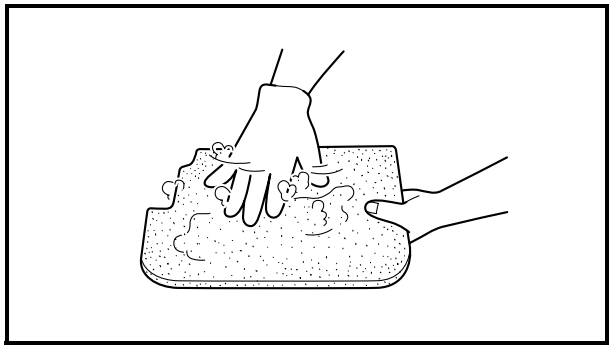
CHECKING THE AIR FILTER ELEMENT

1. Remove:
   - Headlight stay
     Refer to "COVERS" in CHAPTER 3.
2. Remove:
   - Air filter case cover ①

NOTE:

Slide the air filter case cover toward the right side of the snowmobile and remove it.

3. Lift up the air filter element frame ① and remove the air filter element.

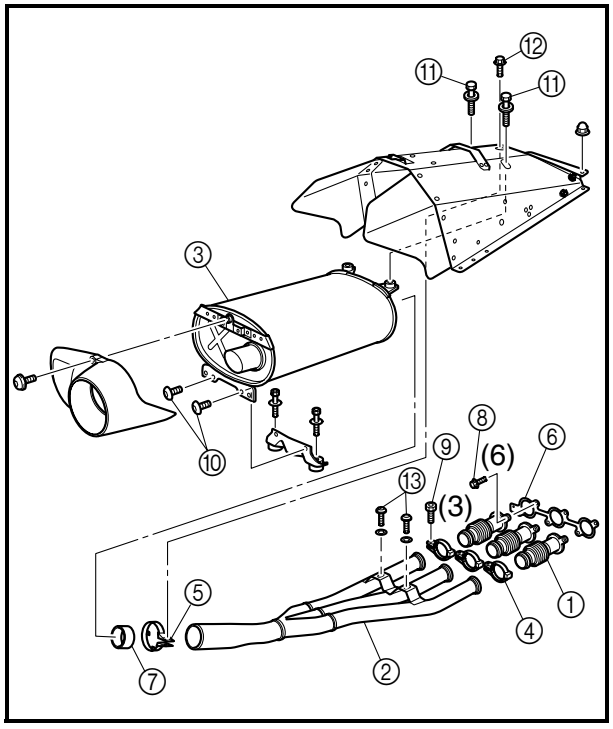


4. Clean:
   - Air filter element

NOTE:
Remove the snow.

5. Inspect:
   - Air filter element
     Damage/clogs → Replace.
6. Install:
   - Air filter element
   - Air filter element frame
   - Air filter case cover

NOTE:
Push down on the air filter element frame until a click is heard.



EXHAUST SYSTEM INSPECTION

1. Remove:
   - Fuel tank
     Refer to "SEAT AND FUEL TANK" in CHAPTER 5.
2. Inspect:
   - Exhaust pipe joints ①
   - Exhaust pipe ②
   - Muffler ③
   - Exhaust pipe bands ④
   - Muffler band ⑤
     Cracks/damage → Replace.
   - Exhaust pipe joint gasket ⑥
   - Muffler gasket ⑦
     Exhaust gas leaks → Replace.
3. Inspect:
   - Tightening torque

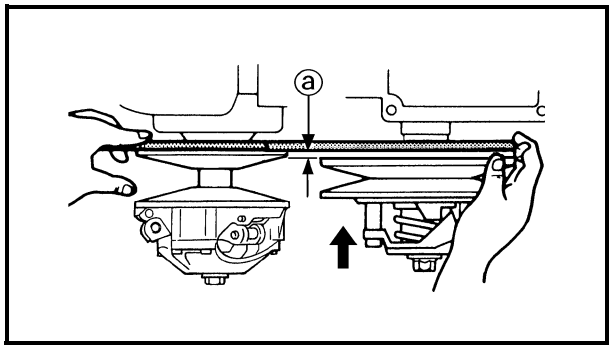
Exhaust pipe joint bolt ⑧:
25 Nm (2.5 m · kg, 18 ft · lb)
Exhaust pipe band bolt ⑨:
9 Nm (0.9 m · kg, 6.5 ft · lb)
Muffler bolt (rear side) ⑩:
23 Nm (2.3 m · kg, 17 ft · lb)
Muffler bolt (front side) ⑪:
23 Nm (2.3 m · kg, 17 ft · lb)
Muffler band bolt ⑫:
20 Nm (2.0 m · kg, 14 ft · lb)
Exhaust pipe bolt ⑬:
23 Nm (2.3 m · kg, 17 ft · lb)

4. Install:
   - Fuel tank
     Refer to "SEAT AND FUEL TANK" in CHAPTER 5.

POWER TRAIN

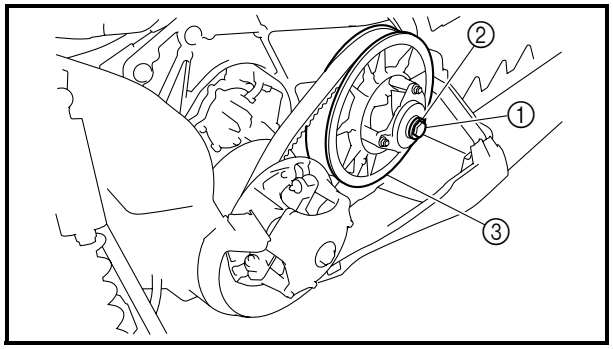
SHEAVE OFFSET ADJUSTMENT

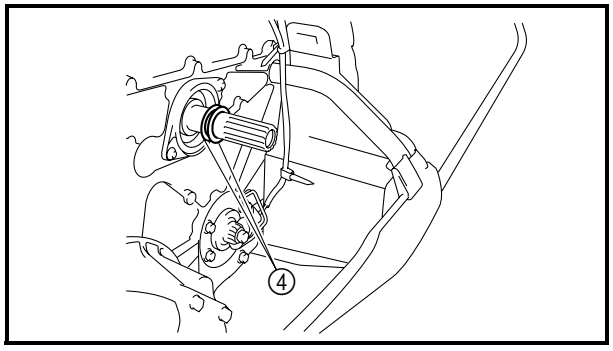
1. Remove:
   - Left side cover
   - Drive guard
   Refer to “COVERS” in CHAPTER 3.
2. Remove:
   - Drive V-belt
3. Measure:
   - Sheave offset ⓐ
   Use a straightedge that is approximately 470 mm (18.5 in) long, 20 mm (0.79 in) wide, and 4 mm (0.16 in) thick.
   Out of specification → Adjust.



Sheave offset:
13.5 ~ 16.5 mm (0.53 ~ 0.65 in)

NOTE:
Push the secondary sheave inward towards the frame, and then measure the sheave offset.





4. Adjust:
   - Sheave offset

Adjustment steps:
- Apply the brake to lock the secondary sheave.
- Remove the secondary sheave bolt ①, washer ②, shim(s) (left), and secondary sheave ③.
- Install the appropriate shim(s) (right) ④ from the following table so that the sheave offset is within specification.

Shim size	
Part number	**Thickness**
90201-286K9	**1.0 mm (0.04 in)**

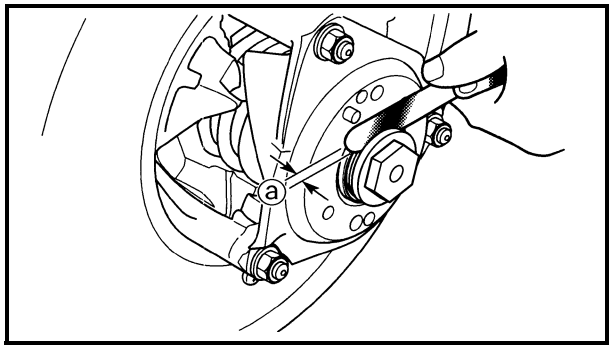
- Install the secondary sheave, secondary sheave bolt and washer.

	Secondary sheave bolt: **64 Nm (6.4 m · kg, 46 ft · lb)**

- Recheck the sheave offset. If out of specification, repeat the above steps.

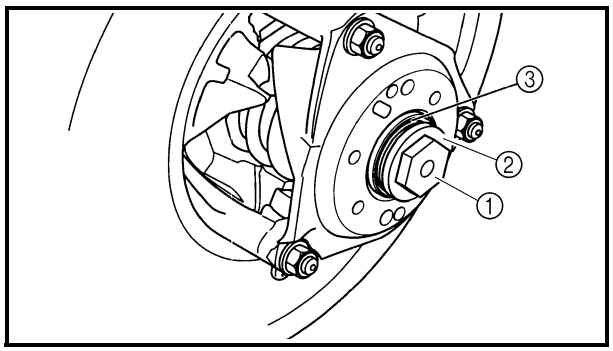
NOTE:

When adjusting the sheave offset, the secondary sheave free play (clearance) should be adjusted.



5. Measure:
   - Secondary sheave free play (clearance) ⓐ
     Use a feeler gauge.
     Out of specification → Adjust.

	Secondary sheave free play (clearance): **1.0 ~ 2.0 mm (0.04 ~ 0.08 in)**

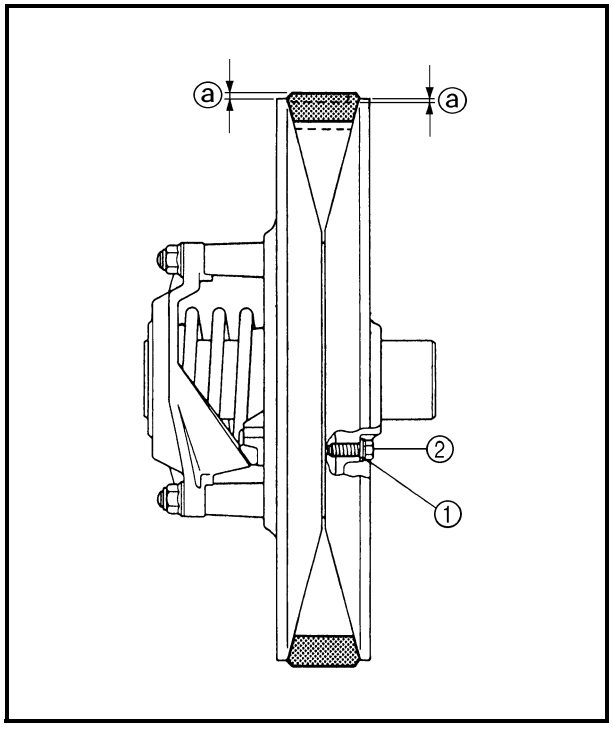


6. Adjust:
   - Secondary sheave free play (clearance)

Adjustment steps:

- Apply the parking brake to lock the secondary sheave.
- Remove the secondary sheave bolt ① and washer ②.
- Install the appropriate shim(s) (left) ③ from the following table so that the secondary sheave free play is within specification.

Shim size	
Part number	**Thickness**
90201-252F1	**0.5 mm (0.02 in)**
90201-25527	**1.0 mm (0.04 in)**



DRIVE V-BELT

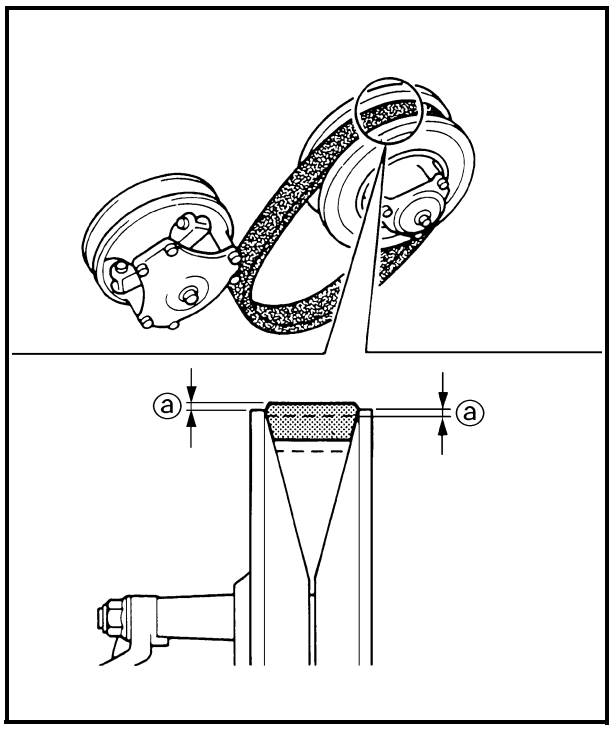
⚠ WARNING

When installing the new V-belt, make sure that it is positioned from 1.5 mm (0.06 in) above the edge of the secondary sheave to –0.5 mm (–0.02 in) below the edge ⓐ.
If the V-belt is not positioned correctly, the clutch engagement speed will be changed. The snowmobile may move unexpectedly when the engine is started.
Adjust the V-belt position by removing or adding a spacer ① on each adjusting bolt ②.

CAUTION:

As the V-belt wears, adjustment may be necessary. To ensure proper clutch performance, the V-belt position should be adjusted by adding a spacer on each adjusting bolt when the V-belt position reaches 1.5 mm (0.06 in) below the edge.

New belt width:
34.1 mm (1.34 in)
Belt wear limit width:
32.5 mm (1.28 in)

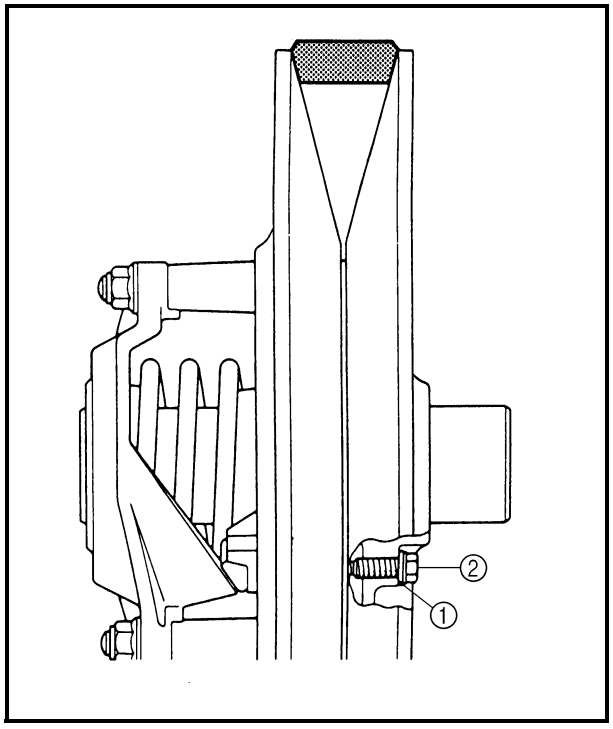


1. Measure:
   • V-belt position ⓐ

NOTE:

Install the new V-belt onto the secondary sheave only. Do not force the V-belt between the sheaves; the sliding and fixed sheaves must touch each other.

Standard V-belt height:
–0.5 ~ 1.5 mm (–0.02 ~ 0.06 in)



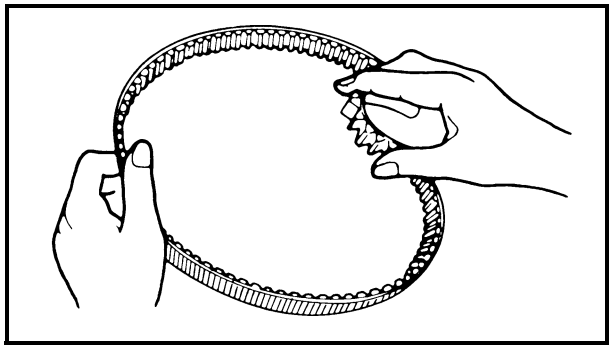
2. Adjust the position of the V-belt by removing or adding a spacer ① on each adjusting bolt ②.

V-belt position	Adjustment
More than 1.5 mm (0.06 in) above the edge	Remove a spacer
From 1.5 mm (0.06 in) above the edge to –0.5 mm (–0.02 in) below the edge	Not necessary (It is correct.)
More than –0.5 mm (–0.02 in) below the edge	Add spacer

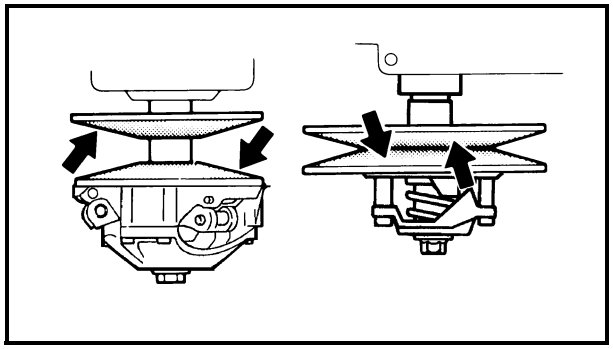
Part number	Thickness
90201-061H1	0.5 mm (0.02 in)
90201-06037	1.0 mm (0.04 in)

3. Tighten:
   - Secondary sheave adjusting bolt ②

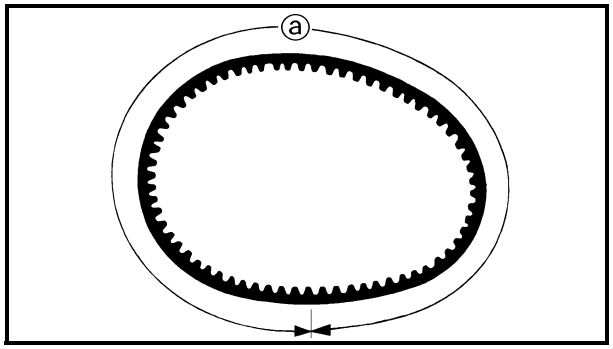
	Secondary sheave adjusting bolt: 10 Nm (1.0 m · kg, 7.2 ft · lb)



4. Inspect:
   - Drive V-belt
     Cracks/damage/wear → Replace.
     Oil or grease on the V-belt → Check the primary and secondary sheaves.



5. Inspect:
   - Primary sheave
   - Secondary sheave
     Oil or grease on the primary and secondary sheaves → Use a rag soaked in lacquer thinner or solvent to remove the oil or grease, and then check the primary and secondary sheaves.



6. Measure:
   • Drive V-belt circumference ⓐ
   Out of specification → Replace.

V-belt circumference:
1,129 ~ 1,137 mm (44.4 ~ 44.8 in)

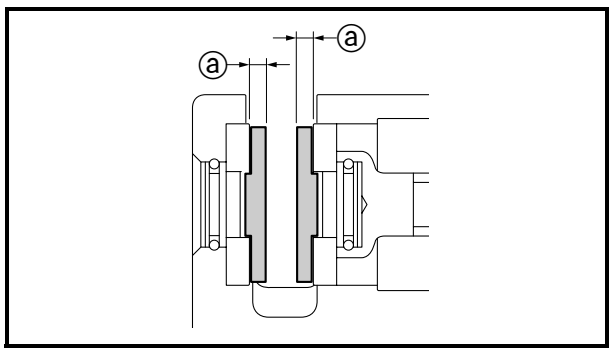
ENGAGEMENT SPEED CHECK

1. Place the snowmobile on a level surface.
2. Inspect:
   • Clutch engagement speed

Inspection steps:

- Start the engine, and open the throttle lever gradually.
- Check the engine speed when the snowmobile starts moving forward.
  Out of specification → Adjust the primary sheave.

Engagement speed:
FX10/FX10RT/FX10RTR/FX10RTRA
3,550 ~ 3,950 r/min
FX10MT/FX10MTR "USA/Canada"/
FX10MTRA "USA/Canada"
3,300 ~ 3,700 r/min
FX10MTR "Europe"/FX10MTRA
"Europe"
3,100 ~ 3,500 r/min



PARKING BRAKE PAD INSPECTION

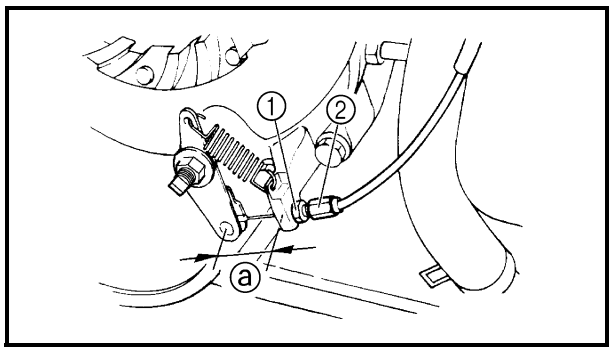
1. Remove:
   - Right side cover
     Refer to "COVERS" in CHAPTER 3.
2. Inspect:
   - Parking brake pad
     Wear limit ⓐ reached → Replace the parking brake assembly.

Parking brake pad wear limit:
1.2 mm (0.05 in)

PARKING BRAKE ADJUSTMENT

1. Remove:
   - Right side cover
     Refer to "COVERS" in CHAPTER 3.
2. Measure:
   - Parking brake cable distance
     Out of specification → Adjust.

Parking brake cable distance:
43.5 ~ 46.5 mm (1.713 ~ 1.831 in)



3. Adjust:
   - Parking brake cable

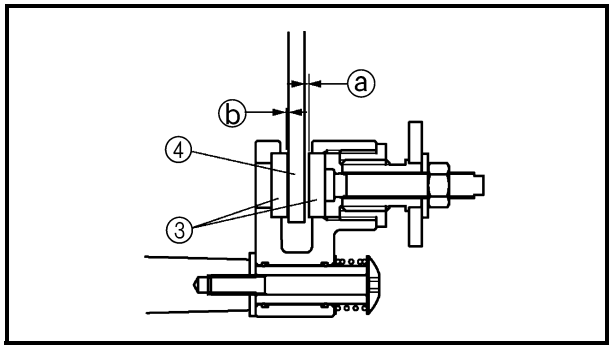
Adjustment steps:

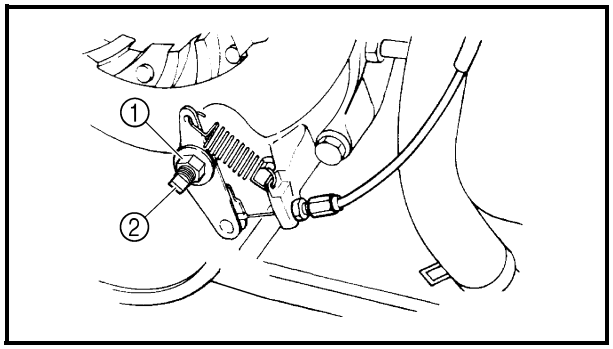
- Loosen the locknut ①.
- Turn the adjusting nut ② in or out until the specified distance ⓐ is obtained.

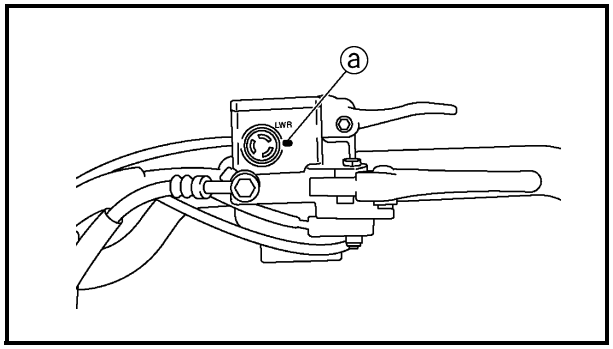
Turning in	**Distance is increased.**
Turning out	**Distance is decreased.**

- Tighten the locknut.

Parking brake cable locknut:
6 Nm (0.6 m · kg, 4.3 ft · lb)







4. Measure:
   • Brake pad clearance (ⓐ + ⓑ)
   Out of specification → Adjust.

Brake pad clearance (ⓐ + ⓑ):
1.5 ~ 2.0 mm (0.059 ~ 0.079 in)

5. Adjust:
   • Brake pad clearance

Adjustment steps:
- Loosen the locknut ①.
- Turn the adjusting bolt ② in or out until the specified clearance between the parking brake pad ③ and brake disc ④ is obtained.
- Tighten the locknut.

Parking brake adjusting locknut:
15 Nm (1.5 m · kg, 1.1 ft · lb)

BRAKE FLUID LEVEL INSPECTION

1. Place the snowmobile on a level surface.
2. Check:
   • Fluid level
   Fluid level is under the lower level line ⓐ → Fill to the proper level.

Recommended brake fluid:
DOT 4

NOTE:

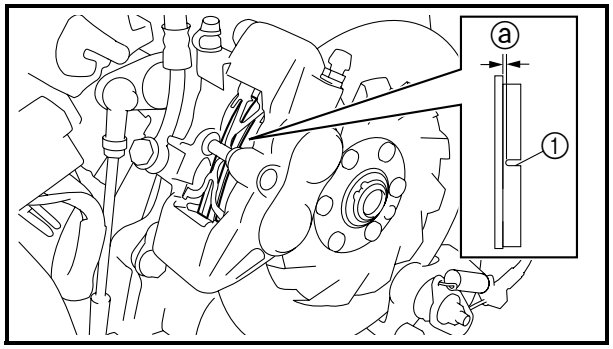
For a correct reading of the brake fluid level, make sure that the top of the handlebar brake master cylinder reservoir is horizontal.

CAUTION:

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

⚠ WARNING

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



BRAKE PAD INSPECTION

1. Remove:
   - Right side cover
     Refer to "COVERS" in CHAPTER 3.
2. Apply the brake lever.
3. Inspect:
   - Brake pad wear limit ⓐ
     Wear indicator groove ① almost disappeared
     → Replace as a set.

Wear limit:
1.5 mm (0.06 in)

BRAKE HOSE INSPECTION

1. Inspect:
   - Brake hose
     Cracks/damage/wear → Replace.
2. Check:
   - Fluid leakage
     Apply the brake lever several times.
     Fluid leakage → Replace the defective parts.

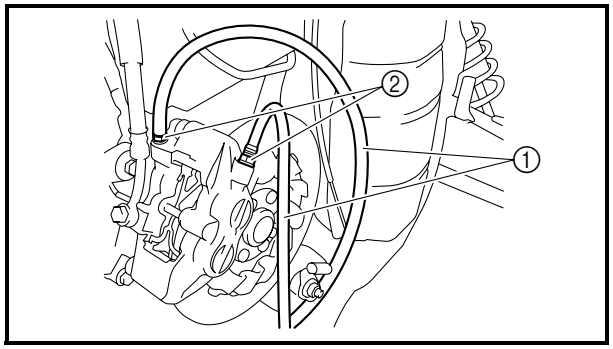
AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

⚠ WARNING

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

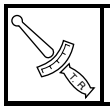
If the brake system is not properly bled a loss of braking performance may occur.

1. Remove:
   - Right side cover
     Refer to “COVERS” in CHAPTER 3.
2. Bleed:
   - Brake system



Air bleeding steps:

a. Fill the brake master cylinder reservoir with the proper brake fluid.
b. Install the diaphragm. Be careful not to spill any fluid or allow the brake master cylinder reservoir to overflow.
c. Connect clear plastic hoses ① tightly to the brake caliper bleed screws ②.
d. Place the other end of the hoses in a container.
e. Slowly apply the brake lever several times.
f. Pull the lever in, then hold the lever in position.
g. Loosen the bleed screws and allow the brake lever to travel towards its limit.
h. Tighten the bleed screws when the brake lever limit has been reached, then release the lever.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the fluid.
j. Tighten the bleed screws.



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

NOTE:

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

k. Add brake fluid to the proper level.
   Refer to “BRAKE FLUID LEVEL INSPECTION”.

⚠ WARNING

After bleeding the brake system, check the brake operation.

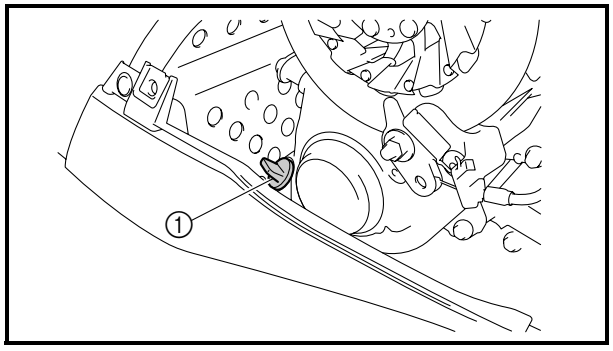
DRIVE CHAIN

Oil level inspection

⚠ WARNING

The engine and muffler will be very hot after the engine has run. Avoid touching a hot engine and muffler while they are still hot with any part of your body or clothing during inspection or repair.

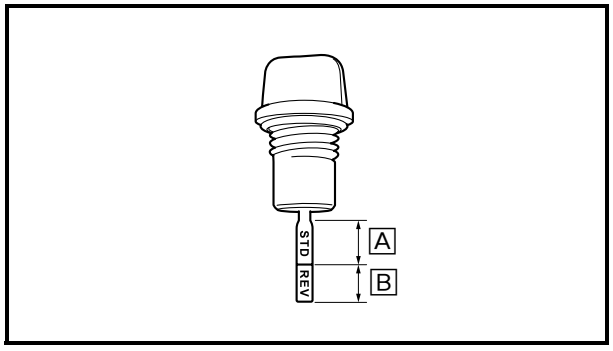
1. Remove:
   - Right side cover
     Refer to “COVERS” in CHAPTER 3.
2. Place the snowmobile on a level surface.
3. Check:
   - Oil level



Checking steps:

- Remove the dipstick ① and wipe it off with a clean rag, and then screw it back into the filler hole.
- Remove the dipstick and check that the oil level is within the range show at the bottom of the dipstick. If the oil does not reach the bottom of the dipstick, add sufficient oil of the recommended type to raise it to the correct level.

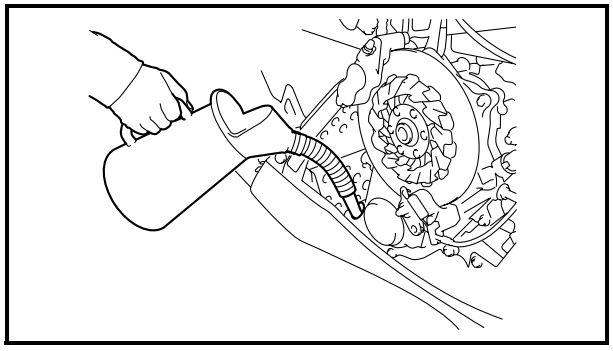
Ⓐ FX10RT/FX10MT
Ⓑ FX10/FX10RTR/FX10RTRA/FX10MTR/FX10MTRA

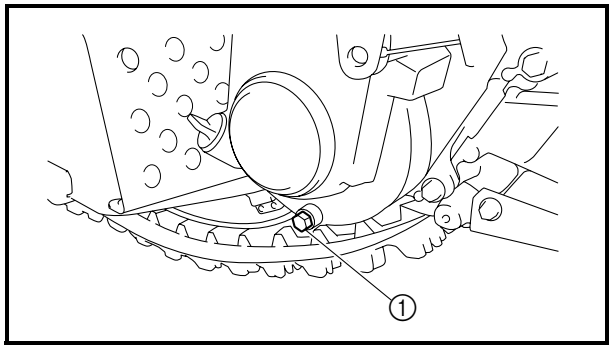


Recommended oil:
Gear oil “GL-3” 75W or 80W

CAUTION:

Make sure that no foreign material enters the drive chain.





Oil replacement

Oil replacement steps:

- Remove the right lower cover.
  Refer to "COVERS" in CHAPTER 3.
- Place the drive chain cover under the drain hole.
- Remove the oil drain bolt (along with the gasket) ① and drain the oil.

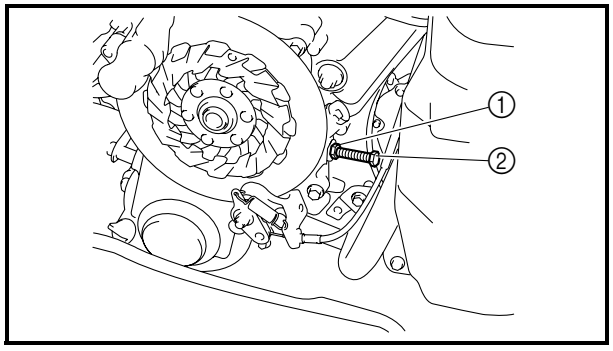
CAUTION:

Be sure to remove any oil from the heat protector.

- Install the new gasket and oil drain bolt ①.

Oil drain bolt:
16 Nm (1.6 m · kg, 11 ft · lb)

Recommended oil:
Gear oil "GL-3" 75W or 80W
Oil capacity:
0.20 L (0.18 Imp qt, 0.21 US qt)



Chain slack adjustment

1. Adjust:
   - Drive chain slack

Adjustment steps:

- Loosen the locknut ①.
- Turn the adjusting bolt ② clockwise until it is finger tight, and then loosen it 1/4 turn.
- Hold the adjusting bolt ② in place while tightening the chain adjusting locknut ①.

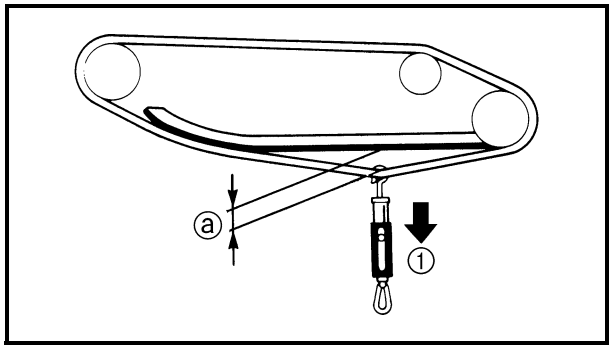
Drive chain adjusting locknut:
25 Nm (2.5 m · kg, 18 ft · lb)

TRACK TENSION ADJUSTMENT

⚠ WARNING

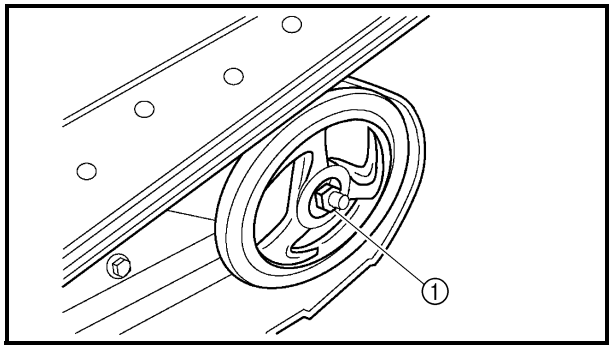
A broken track or track fittings, and debris thrown by the track could be dangerous to an operator or bystanders. Observe the following precautions.

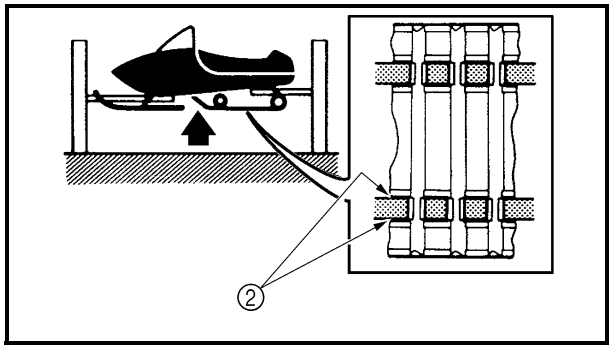
- **Do not allow anyone to stand behind the snowmobile when the engine is running.**
- **When the rear of the snowmobile is raised to allow the track to spin, a suitable stand must be used to support the rear of the snowmobile. Never allow anyone to hold the rear of the snowmobile off the ground to allow the track to spin. Never allow anyone near a rotating track.**
- **Inspect the condition of the track frequently. Replace the track if it is damaged to a level where the fabric reinforcement material is visible.**

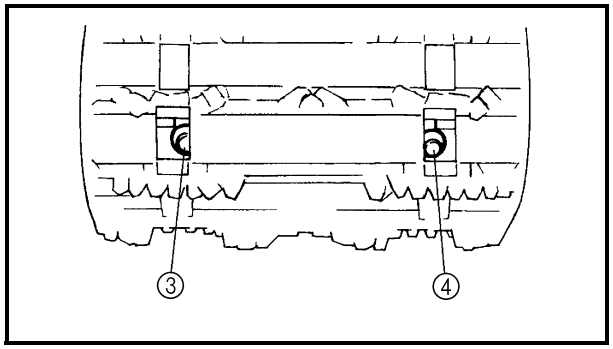


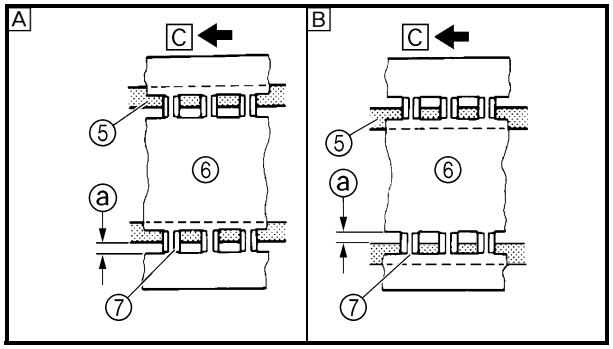
1. Lift the rear of the snowmobile onto a suitable stand to raise the track off the ground.
2. Measure:
   - Track deflection ⓐ
     Using a spring scale ①, pull down on the center of the track with 100 N (10 kg, 22 lb) of force.
     Out of specification → Adjust.

Track deflection:
FX10/FX10RT/FX10RTR/FX10RTRA
25.0 ~ 30.0 mm (0.98 ~ 1.18 in)
FX10MT/FX10MTR/FX10MTRA
30.0 ~ 35.0 mm (1.18 ~ 1.38 in)









3. Adjust:
   • Track deflection

Adjustment steps:

a. Place the snowmobile onto a suitable stand to raise the track off of the ground.
b. Loosen the rear axle nut ①.
c. Start the engine and rotate the track once or twice. Stop the engine.
d. Check the track alignment with the slide runner ②. If the alignment is incorrect, turn the left and right adjusters to adjust.

Track alignment	[A] Shifted to right	[B] Shifted to left
③ Left adjuster	Turn out	Turn in
④ Right adjuster	Turn in	Turn out

⑤ Slide runner
⑥ Track
⑦ Track metal
ⓐ Gap
[C] Forward

e. Adjust the track deflection until the specified amount is obtained.

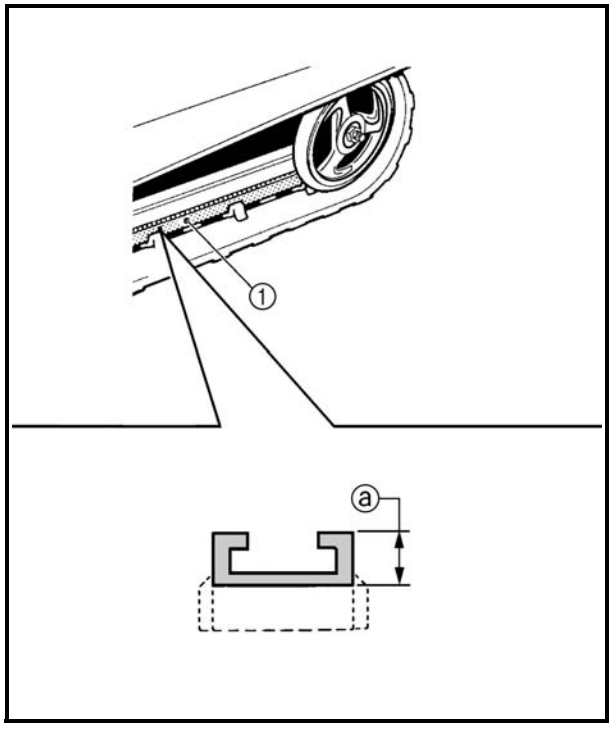
Track deflection	More than specified	Less than specified
③ Left adjuster	Turn in	Turn out
④ Right adjuster	Turn in	Turn out

CAUTION:

The adjusters should be turned an equal amount.

f. Recheck the alignment and deflection. If necessary, repeat steps (c) to (e) until the specified amount is obtained.
g. Tighten the rear axle nut.

Rear axle nut:
75 Nm (7.5 m · kg, 54 ft · lb)



SLIDE RUNNER INSPECTION

1. Inspect:
   - Slide runner ①
     Cracks/damage/wear → Replace.
2. Measure:
   - Slide runner wear limit ⓐ
     Out of specification → Replace.

Slide runner wear limit:
10.5 mm (0.41 in)

MAXIMIZING DRIVE TRACK LIFE

Recommendations

Track tension

During initial break-in, the new drive track will tend to stretch quickly as the track settles. Be sure to correct the track tension and alignment frequently. (See pages 2-37 ~ 2-38 for adjustment procedures.) A loose track can slip (ratchet), derail or catch on suspension parts causing severe damage. Do not overtighten the drive track, otherwise it may increase the friction between the track and the slide runners, resulting in the rapid wear of both components. Also, this may put an excessive load on the suspension components, resulting in component failure.

Marginal snow

The drive track and the slide runners are lubricated and cooled by snow and water. To prevent the drive track and slide runners from overheating, avoid sustained high-speed usage in areas such as icy trails, frozen lakes and rivers that have minimal snow coverage. An overheated track will be weakened internally, which may cause failure or damage.

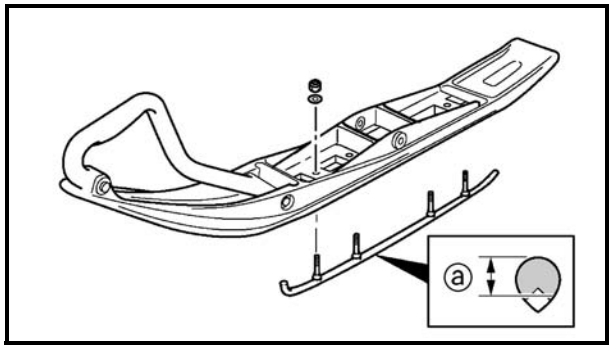
Off-trail riding

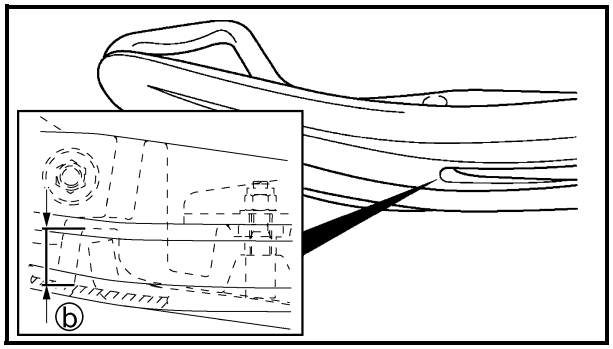
Avoid off-trail riding until there is sufficient snow coverage. It generally takes several feet of snow to provide a good overall base to properly cover debris, such as rocks, logs, etc. If snow coverage is not sufficient, stay on trails to avoid impact damage to the drive track.

Studded track

In general, track life will be shortened when studs are installed. Drilling stud holes into the drive track will cut the internal fibers, which weakens the track. Avoid spinning the drive track. Studs may catch on an object and pull out of the track, leaving tears and damage around the already weakened area. To minimize possible damage, consult your stud manufacturer for installation and stud pattern recommendations.

Yamaha does not recommend track studding.





CHASSIS

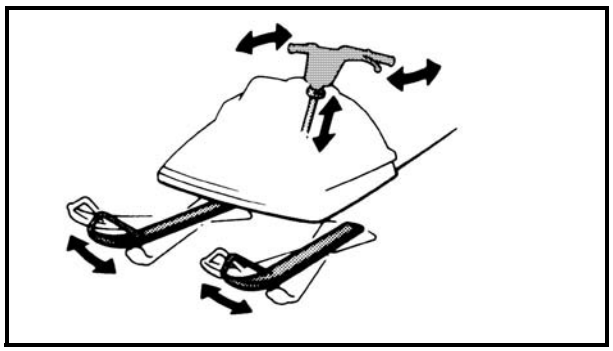
SKI/SKI RUNNER

1. Inspect:
   - Ski
   - Ski runner
     Damage/wear → Replace.
   - Ski runner thickness ⓐ
   - Plastic ski thickness ⓑ
     Out of specification → Replace.

Ski runner wear limit:
FX10/FX10RT/FX10RTR/FX10RTRA
8 mm (0.31 in)
FX10MT/FX10MTR/FX10MTRA
6 mm (0.24 in)
Plastic ski wear limit:
FX10RT/FX10RTR/FX10RTRA
12 mm (0.47 in)
FX10
13 mm (0.51 in)
FX10MT/FX10MTR/FX10MTRA
24 mm (0.95 in)

CAUTION:

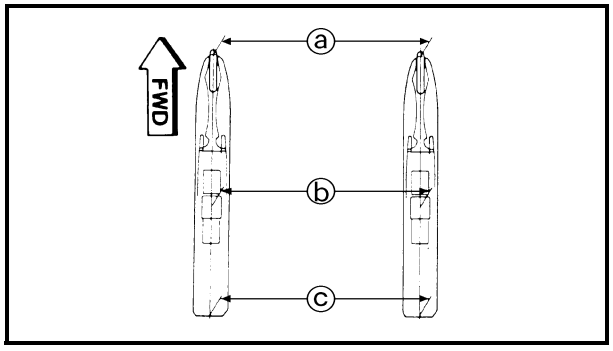
To avoid scratching, wearing and damaging the plastic skis, be careful when loading and unloading the snowmobile and avoid riding in areas with little or no snow and on surfaces with sharp edges such as concrete, curbs, etc.



STEERING SYSTEM

Free play check

1. Check:
   - Steering system free play
     Move the handlebar up and down and back and forth.
     Turn the handlebar slightly to the right and left.
     Excessive free play → Check that the handlebar, tie rod ends and relay rod ends are installed securely in position. If free play still exists, check the steering bearing, front suspension links and ski mounting area for wear. Replace if necessary.

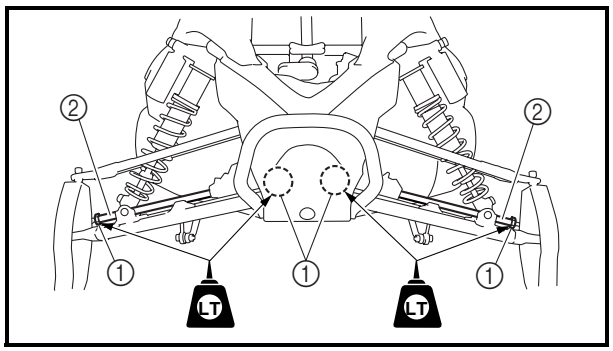


Toe-out adjustment

1. Place the snowmobile on a level surface.
2. Measure:
   - Ski toe-out (ⓐ – ⓒ)
   - Ski stance ⓑ

   Point the skis forward.
   Out of specification → Adjust.

Ski toe-out:
0 ~ 15 mm (0 ~ 0.59 in)
Ski stance (center to center):
FX10/FX10RT/FX10RTR/FX10RTRA
1,050 mm (41.3 in)
FX10MT/FX10MTR/FX10MTRA
980 mm (38.6 in)



3. Adjust:
   - Ski toe-out

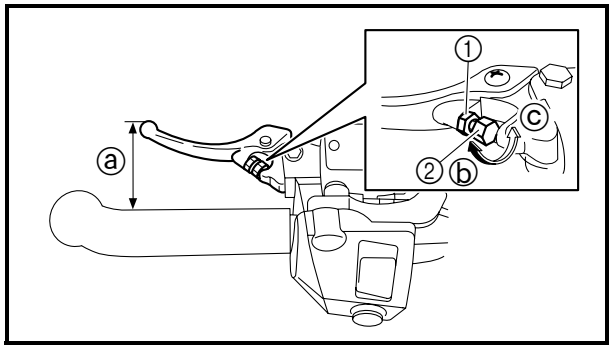
Adjustment steps:

- Remove the shroud.
  Refer to "COVERS" in CHAPTER 3.
- Loosen the locknuts (tie-rods) ①.
- Turn the tie rods ② in or out until the specified toe-out is obtained.
- Tighten the locknuts (tie-rods) ①.

Tie-rod end locknut:
25 Nm (2.5 m · kg, 18 ft · lb)
LOCTITE®

CAUTION:

After tightening the inside and outside ball joint locknuts ①, make sure the tie rods ② can be rotated freely through the ball joint travel. If not, loosen the locknuts ① and reposition the ball joint so that the tie rods ② can be rotated freely. Tighten the locknuts to specification.



BRAKE LEVER ADJUSTMENT

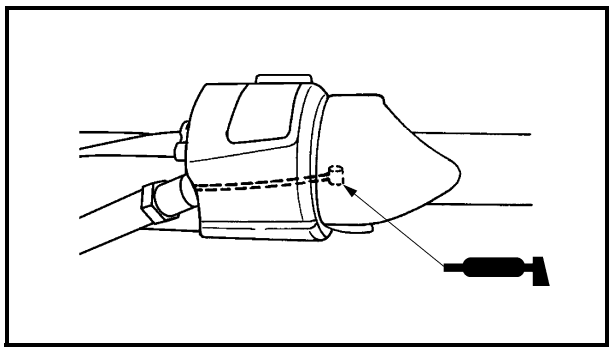
1. Adjust:
   - Brake lever position ⓐ

Adjustment steps:

- While pushing the brake lever forward, loosen the locknut ①.
- While pushing the brake lever forward, turn the adjusting bolt ② in direction ⓑ or ⓒ until the brake lever is in the desired position.
- Tighten the locknut.

CAUTION:

Be sure to tighten the locknut, as failing to do so will cause poor brake performance.



LUBRICATION

Brake lever, throttle lever and throttle cable end

1. Lubricate the brake lever pivot, throttle lever and the ends of the throttle cables.

Recommended lubricant:
Throttle lever and throttle cable end:
ESSO Beacon 325 Grease or Aeroshell Grease #7A
Brake lever pivot:
Silicon grease

⚠ WARNING

Apply a dab of grease onto only the end of the cables.
Do not grease the throttle cables.
They could freeze and cause a loss of control.

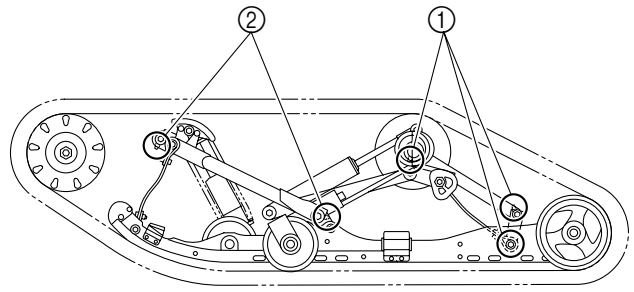
Rear suspension

1. Use a grease gun to inject grease into the nipples.
2. Apply grease to the pivoting parts.

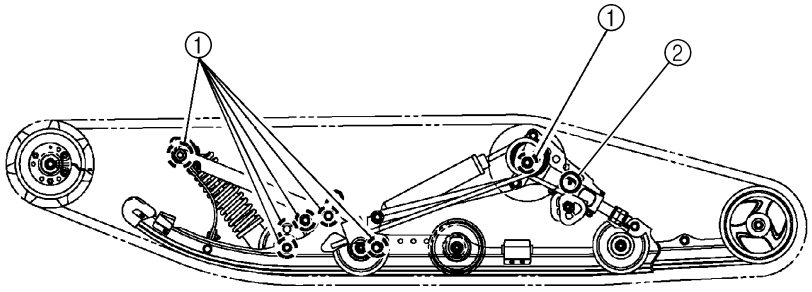
Recommended lubricant:
ESSO Beacon 325 Grease or
Aeroshell Grease #7A

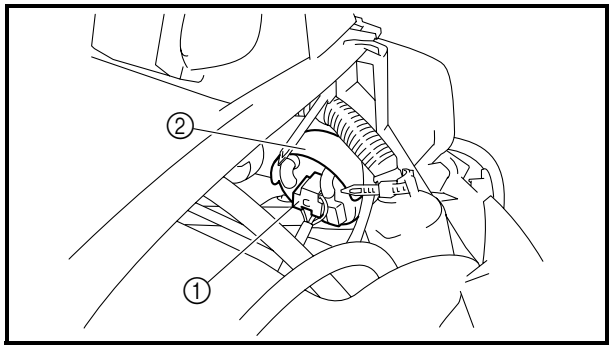
A FX10/FX10RT/FX10RTR/FX10RTRA
B FX10MT/FX10MTR/FX10MTRA
① Nipple
② Nipple (both sides)

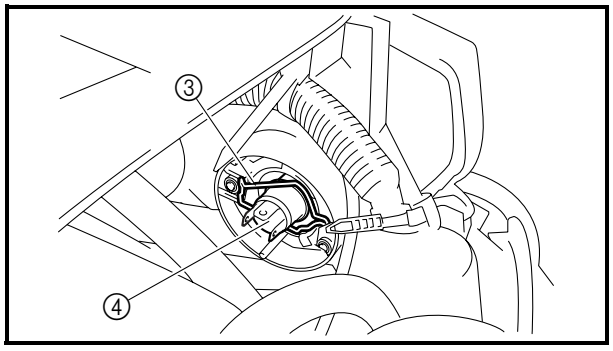
A



B







ELECTRICAL

HEADLIGHT BULB REPLACEMENT

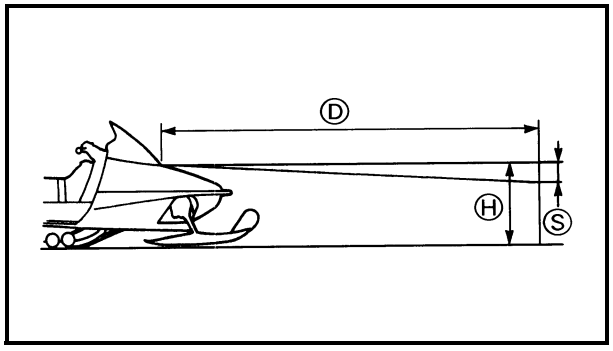
The following procedure applies to both of the headlight bulbs.

1. Remove:
   - Shroud
     Refer to “COVERS” in CHAPTER 3.
2. Disconnect:
   - Headlight coupler ①
3. Remove:
   - Headlight bulb cover ②
4. Detach:
   - Headlight bulb holder ③
5. Remove:
   - Headlight bulb ④
6. Install:
   - Headlight bulb New
     Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

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

7. Attach:
   - Headlight bulb holder
8. Install:
   - Headlight bulb cover
9. Connect:
   - Headlight coupler
10. Install:
    - Shroud
      Refer to “COVERS” in CHAPTER 3.

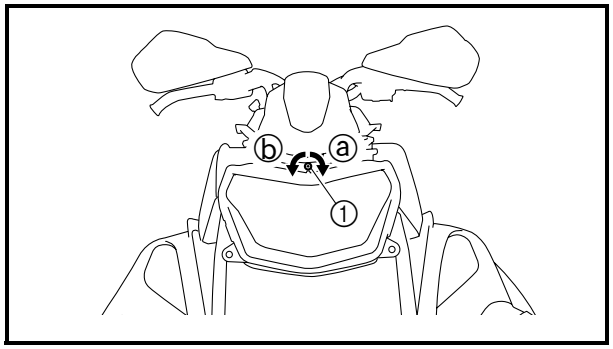


HEADLIGHT BEAM ADJUSTMENT

1. Place the snowmobile on a level surface.
2. Place the snowmobile in front of a wall at the recommended distance Ⓓ. Refer to the table below.
3. Measure the distance Ⓗ from the floor to the center of the headlight and place a mark on the wall at that height.
4. With a person sitting on the snowmobile, apply the parking brake, start the engine and let it idle.
5. Switch on the headlight high beam and check the height of the projected beam on the wall. The projection should be at the position marked in step 3 or 1/2° lower (set range Ⓢ).

Ⓓ	**3.0 m (10 ft)**	**7.6 m (25 ft)**
Ⓢ	**26 mm (1.0 in)**	**66 mm (2.6 in)**

Ⓓ: Distance Ⓗ: Height Ⓢ: Set range

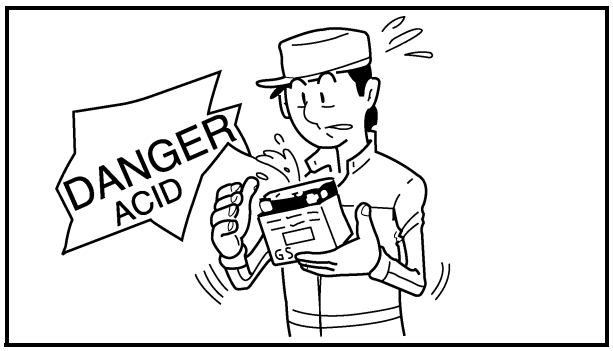


6. Adjust:
   - Headlight beam (vertically)

Adjustment steps:

- Remove the shroud.
  Refer to "COVERS" in CHAPTER 3.
- Turn the adjusting screw ① in direction ⓐ or ⓑ to adjust the headlight beams.

Direction ⓐ	**Headlight beam is raised.**
Direction ⓑ	**Headlight beam is lowered.**



BATTERY INSPECTION

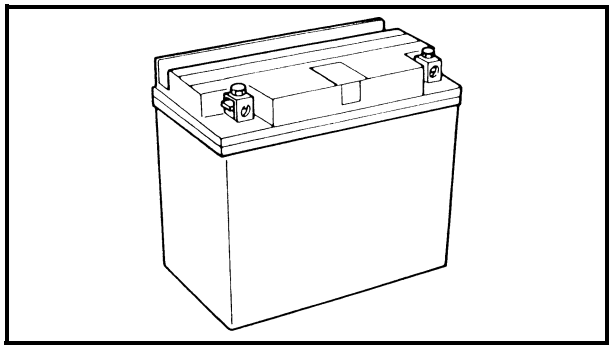
⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

First aid in case of bodily contact:
External
- **SKIN – Wash with water.**
- **EYES – Flush with water for 15 minutes and get immediate medical attention.**

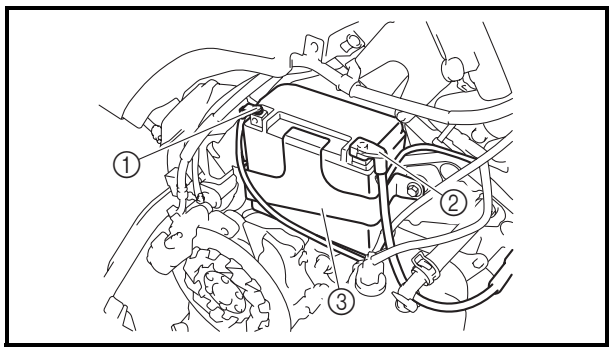
Internal
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**



CAUTION:
- **This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for a MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

NOTE:
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

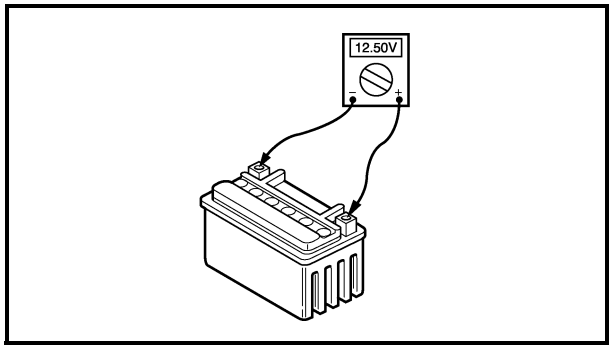
1. Remove:
   - Right side cover
     Refer to "COVERS" in CHAPTER 3.

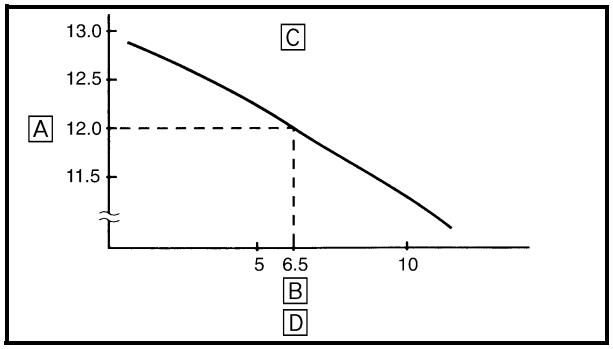


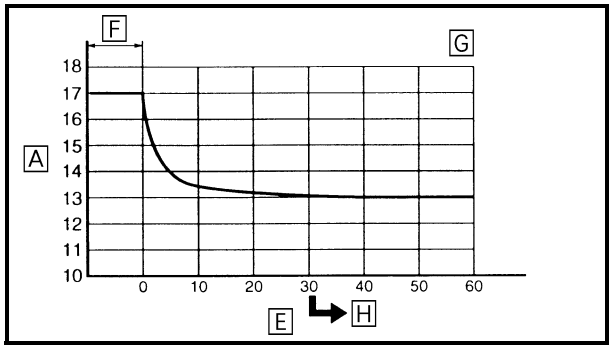
2. Disconnect:
   - Battery leads
     (from the battery terminals)

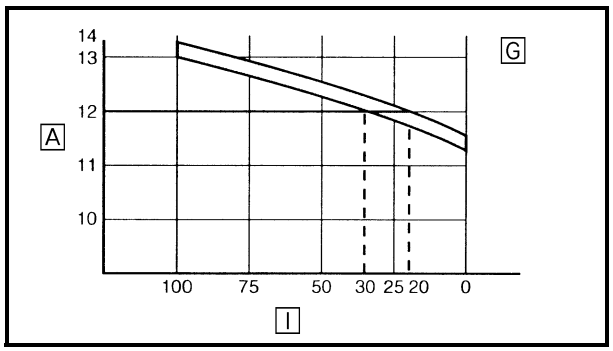
CAUTION:
First, disconnect the negative battery lead ①, then the positive battery lead ②.

3. Remove:
   - Battery bracket ③









4. Remove:
   - Battery
5. Inspect:
   - Battery charge

Inspection steps:

- Connect a pocket tester to the battery terminals.

Positive tester probe →
positive battery terminal
Negative tester probe →
negative battery terminal

NOTE:

- The charge state of a MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

- Check the charge of the battery, as shown in the charts and the following example.

Example

- Open-circuit voltage = 12.0 V
- Charging time = 6.5 hours
- Charge of the battery = 20 ~ 30%

A Open-circuit voltage (V)
B Charging time (hours)
C Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
D These values vary with the temperature, the condition of the battery plates, and the electrolyte level.
E Time (minutes)
F Charging
G Ambient temperature 20 °C (68 °F)
H Check the open-circuit voltage.
I Charging condition of the battery (%)

6. Charge:
   • Battery
   (refer to the appropriate charging method illustration)

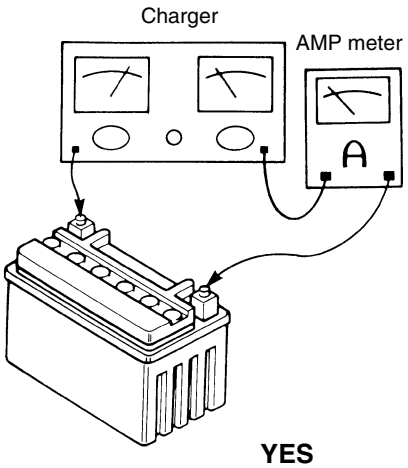
⚠ WARNING

Do not quick charge a battery.

CAUTION:

- **Make sure that the battery vent is free of obstructions.**
- **Never remove the MF battery sealing caps.**
- **Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the snowmobile. (If charging has to be done with the battery mounted on the snowmobile, disconnect the negative lead from the battery terminal.)**
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**
- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**
- **As shown in the following illustration, the open-circuit voltage of a MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**

Charging method using a variable voltage charger



Measure the open-circuit voltage prior to charging.

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

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

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

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

YES

NO

By turning the charging voltage adjust dial, set the charging voltage at 20 ~ 24 V.

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

YES

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

NO

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

Set the time according to the charging time suitable for the open-circuit voltage.
Refer to “BATTERY INSPECTION”.

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

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

Charging method using a constant voltage charger

Measure the open-circuit voltage prior to charging.

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

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

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

YES

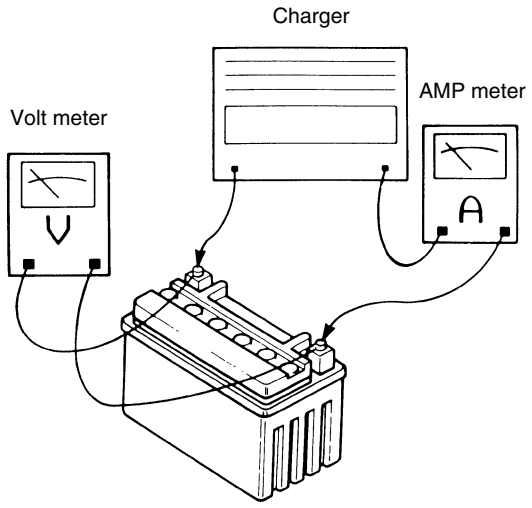
Charge the battery until the battery's charging voltage is 15 V.

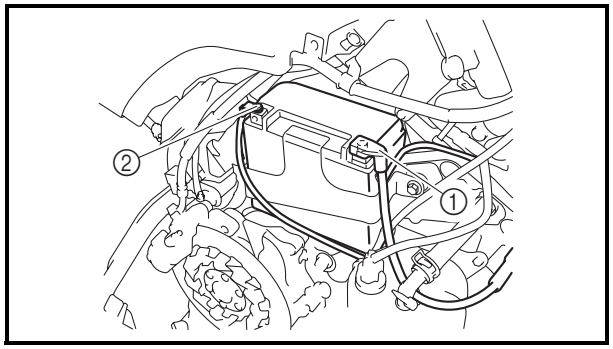
NOTE:
Set the charging time at 20 hours (maximum).

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

NO

This type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.





7. Install:
   • Battery
8. Install:
   • Battery bracket
9. Connect:
   • Battery leads
     (to the battery terminals)

CAUTION:

First, connect the positive battery lead ①, then the negative battery lead ②.

10. Check:
    • Battery terminals
      Dirt → Clean with a wire brush.
      Loose connection → Connect properly.
11. Lubricate:
    • Battery terminals

Recommended lubricant:
Dielectric grease

FUSE INSPECTION

The following procedure applies to all of the fuses.

CAUTION:

To avoid a short circuit, always turn the main switch off when checking or replacing a fuse.

1. Remove:
   • Right side cover
     Refer to "COVERS" in CHAPTER 3.
2. Inspect:
   • Continuity

Inspection steps:

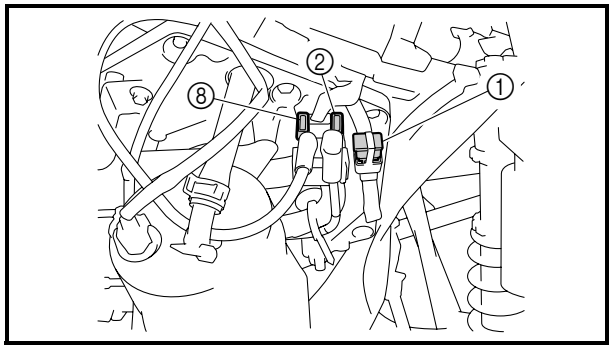
• Connect the pocket tester to the fuse and check the continuity.

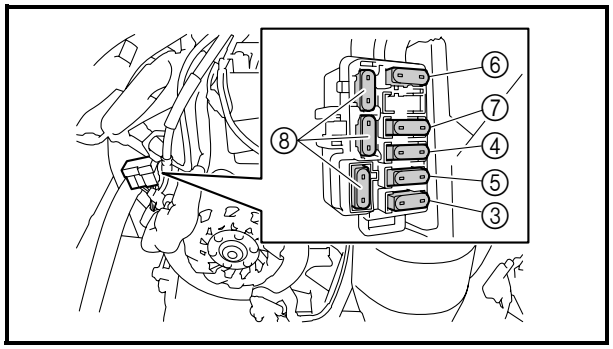
NOTE:

Set the pocket tester selector to "Ω × 1".

Pocket tester:
90890-03112
Analog pocket tester:
YU-03112-C

• If the pocket tester indicates "∞", replace the fuse.





3. Replace:
   • Blown fuse

Replacing steps:
- Turn the main switch off.
- Install a new fuse of the correct amperage.
- Turn the main switch on and verify if the electrical circuit is operational.
- If the fuse immediately blows again, check the electrical circuit.

Item	Amperage	Q'ty
① Main fuse	40 A	1
② Fuel injection system fuse	10 A	1
③ Headlight fuse	20 A	1
④ Signal fuse	3 A	1
⑤ Auxiliary DC jack fuse*1	3 A	1
⑥ Ignition fuse	20 A	1
⑦ Radiator fan motor fuse	10 A	1
⑧ Reserve fuse	20 A 10 A 3 A	1 2 1

*1: FX10MT/FX10MTR/FX10MTRA

⚠ WARNING

Never use a fuse with an amperage other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting, ignition, grip warmer, signal and meter systems to malfunction and could possibly cause a fire.

TUNING

CLUTCH

High altitude

P	Pink	S	Silver
Y	Yellow		

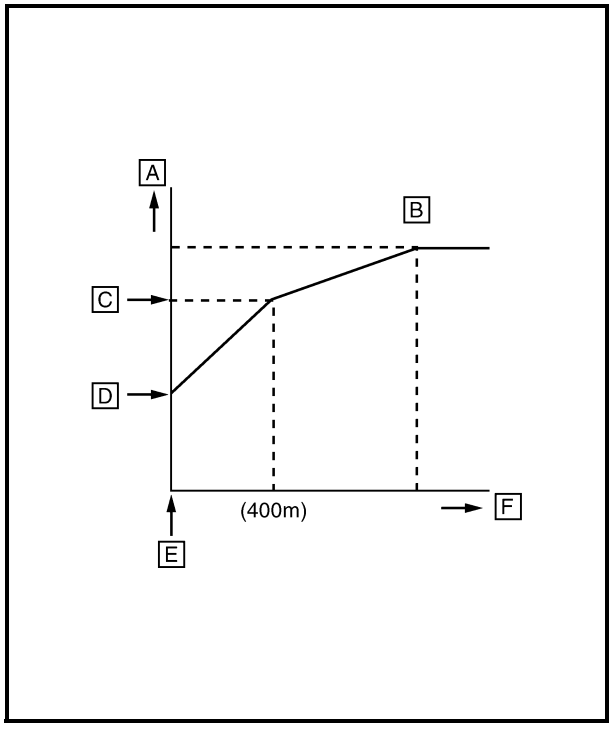
Specifications Model: FX10/FX10RT/FX10RTR/FX10RTRA

A Elevation	~ 800 m (~ 2,500 ft)	600 ~ 1,400 m (2,000 ~ 4,500 ft)	1,200 ~ 2,000 m (4,000 ~ 6,500 ft)	1,800 ~ 2,600 m (6,000 ~ 8,500 ft)	2,400 ~ 3,000 m (8,000 ~ 10,000 ft)
B Engine idle speed	1,500 ± 50 r/min	←	←	←	←
C Engagement r/min	Approx. 3,750 r/min	←	Approx. 3,850 r/min	←	Approx. 3,950 r/min
D Shift r/min	Approx. 8,750 r/min	←	←	←	←
E Secondary reduction ratio (number of links)	21/39 (68 L)	←	20/39 (68 L)	←	19/39 (68 L)
F Primary sheave spring	90501-582L1	←	←	←	←
G Color	Y-S-Y	←	←	←	←
H Free length	87.4 mm (3.44 in)	←	←	←	←
I Preload	343 N (35 kg, 77 lb)	←	←	←	←
J Spring rate	24.5 N/mm (2.5 kg/mm, 140 lb/in)	←	←	←	←
K Wire diameter	5.8 mm (0.228 in)	←	←	←	←
L Outside diameter	59.5 mm (2.34 in)	←	←	←	←
M Weight (ID)	8GL-17605-00 (8GL00)	←	←	←	←
N Weight rivet	Steel 10.3 (OUT)	←	Steel 13.3 (OUT)	←	Steel 13.9 (OUT)
	Steel 17.2 (CENTER)	Steel 13.9 (CENTER)	Steel 10.3 (CENTER)	←	None (CENTER)
	Steel 17.2 (IN)	Steel 13.9 (IN)	Steel 10.3 (IN)	None (IN)	←
O Weight bushing	VESPEL TP-8549	←	←	←	←
P Roller outer dia.	15.6 mm (0.614 in)	←	←	←	←
Q Roller bushing	VESPEL TP-8549	←	←	←	←
R Pri. clutch shim	None	←	←	←	←
S Secondary sheave spring	90508-60012	←	←	←	←
T Color	P	←	←	←	←
U Free length	75 mm (2.95 in)	←	←	←	←
V Preload rate	80° (2-6) 1,211 kg·mm/rad	←	←	←	←
W Wire diameter	6.0 mm (0.236 in)	←	←	←	←
X Outside diameter	69.5 mm (2.74 in)	←	←	←	←
Y Sec. torque cam angle	43°	←	←	←	←
Z Sec. clutch shim	1.0 mm (0.039 in)	←	←	←	←

Br	Brown	G	Green
L	Blue	P	Pink
W	White		

Specifications Model: FX10MT/FX10MTR/FX10MTRA

A Elevation	~ 800 m (~ 2,500 ft)	600 ~ 1,400 m (2,000 ~ 4,500 ft)	1,200 ~ 2,000 m (4,000 ~ 6,500 ft)	1,800 ~ 2,600 m (6,000 ~ 8,500 ft)	2,400 ~ 3,000 m (8,000 ~ 10,000 ft)
B Engine idle speed	1,500 ± 50 r/min	←	←	←	←
C Engagement r/min	Approx. 3,300 r/min	←	Approx. 3,400 r/min	←	Approx. 3,500 r/min
D Shift r/min	Approx. 8,750 r/min	←	←	←	←
E Secondary reduction ratio (number of links)	22/40 (70 L)	←	21/40 (70 L)	20/40 (68 L)	←
F Primary sheave spring	90501-580A2	←	←	90501-603L3	←
G Color	L-Br-L	←	←	G-W-G	←
H Free length	98.4 mm (3.87 in)	←	←	89.8 mm (3.54 in)	←
I Preload	490 N (50 kg, 110 lb)	←	←	441 N (45 kg, 99 lb)	←
J Spring rate	19.6 N/mm (2.0 kg/mm, 112 lb)	←	←	27.0 N/mm (2.75 kg/mm, 154 lb/mm)	←
K Wire diameter	5.8 mm (0.228 in)	←	←	6.0 mm (0.236 in)	←
L Outside diameter	59.5 mm (2.34 in)	←	←	←	←
M Weight (ID)	8FS-17605-00 (8FS00)	←	←	←	←
N Weight rivet	Steel 17.2 (OUT)	Steel 13.3 (OUT)	Aluminum with-hole 13.3 (OUT)	Steel with-hole 13.3 (OUT)	None (OUT)
	Steel 17.2 (CENTER)	Steel 13.3 (CENTER)	←	None (CENTER)	←
	Steel with-hole 13.3 (IN)	Steel 13.3 (IN)	←	None (IN)	←
O Weight bushing	VESPEL TP-8549	←	←	←	←
P Roller outer dia.	16.5 mm (0.650 in)	←	←	←	←
Q Roller bushing	VESPEL TP-8549	←	←	←	←
R Pri. clutch shim	None	←	←	←	←
S Secondary sheave spring	90508-60012	←	←	←	←
T Color	P	←	←	←	←
U Free length	75 mm (2.95 in)	←	←	←	←
V Preload rate	70° (1-6) 1,211 kg·mm/rad	←	←	←	←
W Wire diameter	6.0 mm (0.236 in)	←	←	←	←
X Outside diameter	69.5 mm (2.74 in)	←	←	←	←
Y Sec. torque cam angle	39°	←	←	←	←
Z Sec. clutch shim	1.0 mm (0.039 in)	←	←	←	←



The clutch may require tuning depending upon where the snowmobile will be operated and the desired handling characteristics. The clutch can be tuned by changing the engagement and shifting speeds.

Clutch engagement speed is defined as the engine speed at which the snowmobile first begins to move from a complete stop.

Clutch shifting speed is defined as the engine speed reached when the snowmobile has travelled 800 m (2,500 ft) after being started at full-throttle from a dead stop.

Normally, when a snowmobile reaches shifting speed, the vehicle speed increases but the engine speed remains nearly constant. Under unfavorable conditions (wet snow, icy snow, hills, or rough terrain), however, engine speed may decrease after the shifting speed has been reached.

A Engine speed
B Good condition
C Clutch shifting speed
D Clutch engagement speed
E Starting position
F Distance travelled 800 m (2,500 ft)

GEAR SELECTION

The reduction ratio of the driven gear to the drive gear must be set according to the snow conditions. If there are many rough surfaces or unfavorable snow conditions, the drive/driven gear ratio should be increased. If the surfaces are fairly smooth or better snow conditions exist, decrease the ratio.

Gear ratio chart

The drive and driven gears and the chains shown in the gear ratio chart are available as options. The figures containing a decimal point represent the drive/driven gear ratios, while the bottom numbers designate the number of links in the chain.

① Chain and sprocket part number

Ⓐ Parts name	Ⓑ Teeth & links	Ⓒ Parts no.	Ⓓ Standard
Ⓔ Drive sprocket	18 teeth	8FA-17682-80	
	19 teeth	8FA-17682-90	
	20 teeth	8FA-17682-00	FX10MT/ FX10MTR “USA/Canada”/ FX10MTRA “USA/Canada”
	21 teeth	8FA-17682-10	FX10/FX10RT/FX10RTR/ FX10RTRA
	22 teeth	8FA-17682-20	FX10MTR “Europe”/ FX10MTRA “Europe”
	23 teeth	8FA-17682-30	
	24 teeth	8FA-17682-40	
Ⓕ Driven sprocket	37 teeth	8DW-47587-71	
	38 teeth	8DW-47587-81	
	38 teeth	8FB-47587-80	
	39 teeth	8DW-47587-91	FX10RT
	39 teeth	8FB-47587-90	FX10/FX10RTR/FX10RTRA
	40 teeth	8DW-47587-01	FX10MT
	40 teeth	8FB-47587-00	FX10MTR/FX10MTRA
Ⓖ Chain	68 links	94890-09068	FX10/FX10RT/FX10RTR/ FX10RTRA/FX10MT/ FX10MTR “USA/Canada”/ FX10MTRA “USA/Canada”
	70 links	94890-09070	FX10MTR “Europe”/ FX10MTRA “Europe”

② Gear ratio

Ⓑ Driven gear \ Ⓐ Drive gear	18 teeth	19 teeth	20 teeth	21 teeth	22 teeth	23 teeth	24 teeth
37 teeth	—	—	—	1.76 68 links	1.68 68 links	1.61 68 links	1.54 70 links
38 teeth	—	—	1.90 68 links	1.81 68 links	1.73 68 links	1.65 70 links	1.58 70 links
39 teeth	2.17 68 links	2.05 68 links	1.95 68 links	1.86 68 links	1.77 70 links	1.70 70 links	1.63 70 links
40 teeth	2.22 68 links	2.11 68 links	2.00 68 links	1.91 70 links	1.82 70 links	1.74 70 links	1.67 70 links

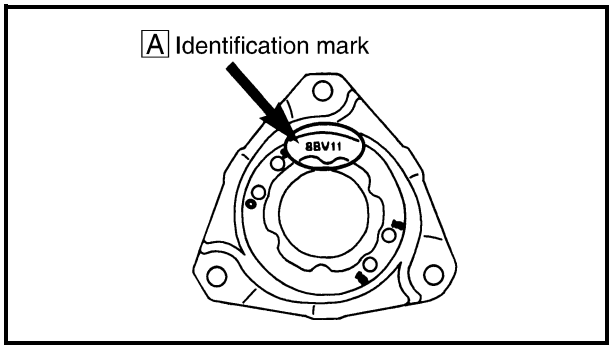
③ Secondary sheave spring

A Part No.	B Spring rate N · mm/rad (kg · mm/rad)	C Preload N/mm (kg/mm) (lb/in)	D Color	E Wire gauge mm (in)	F No. of coils	G Free length mm (in)	H Outside diameter mm (in)	I Standard
90508-500B1	6003 (613)	6.2 (0.63), 35.40	Brown	5.0 (0.197)	5.19	75 (2.95)	69.5 (2.736)	
90508-536A9	7147 (729)	7.3 (0.74), 41.68	Red	5.3 (0.209)	5.53	75 (2.95)	69.5 (2.736)	
90508-556A2	8314 (848)	8.5 (0.87), 48.53	Green	5.5 (0.217)	5.53	75 (2.95)	69.5 (2.736)	
90508-556A7	9460 (965)	10.2 (1.04), 58.24	Silver	5.5 (0.217)	4.86	75 (2.95)	69.5 (2.736)	
90508-60012	11876 (1211)	12.3 (1.26), 70.23	Pink	6.0 (0.236)	5.53	75 (2.95)	69.5 (2.736)	FX10/FX10RT/ FX10RTR/ FX10RTRA/ FX10MT/FX10MTR/ FX10MTRA
90508-60007	12654 (1290)	13.5 (1.38) 77.08	White	6.0 (0.236)	5.19	75 (2.95)	69.5 (2.736)	

④ Secondary spring twist angle

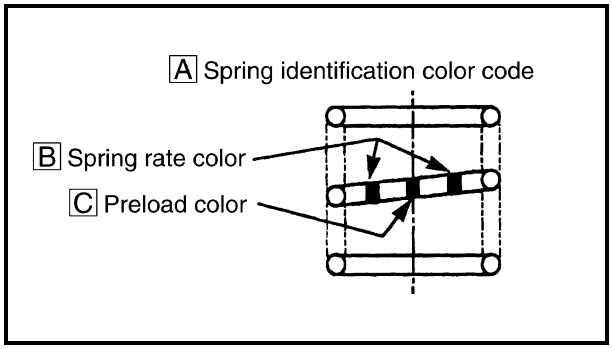
A Seat / B Sheave	0	3	6	9
1	10°	40°	70°	100°
2	20°	50°	80°	110°
3	30°	60°	90°	120°

⑤ Torque cam (secondary spring seat)



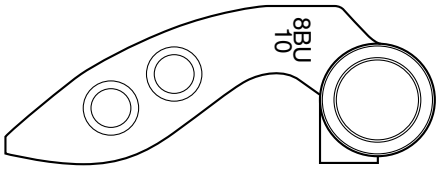
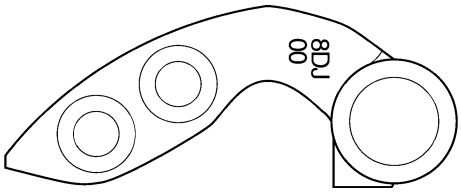
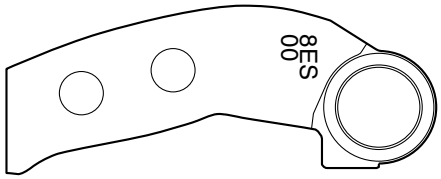
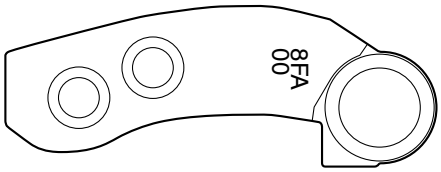
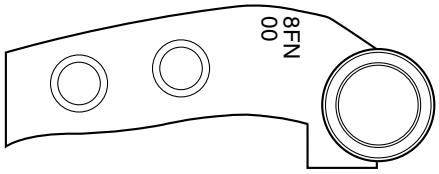
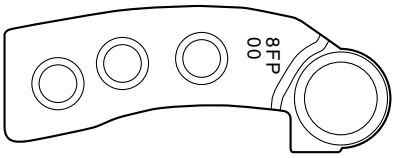
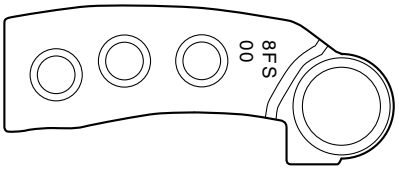
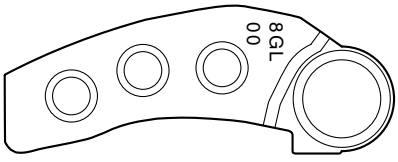
B Effects	C Part no.	D Cam angle	E Identification mark	F Standard
G Quicker upshifting during acceleration	8FA-17604-00	51-43°	8BVFA	
	8BV-17604-71	47°	8BV71	
	8BV-17604-51	45°	8BV51	
	8BV-17604-31	43°	8BV31	FX10/FX10RT/ FX10RTR/ FX10RTRA
	8BV-17604-11	41°	8BV11	
H Quicker backshifting under load	8BV-17604-91	39°	8BV91	FX10MT/FX10MTR/ FX10MTRA

⑥ Primary spring



D Parts No.	E Spring rate N/mm (kg/mm)	F Preload N (kg)	G Color	H Wire gauge mm (in)	I Outside diameter mm (in)	J No. of coils	K Free length mm (in)	L Standard
90501-550A2	19.6 (2.00)	196 (20)	Blue-Blue-Blue	5.5 (0.217)	59.5 (2.34)	4.89	83.4 (3.28)	
90501-551L3	19.6 (2.00)	294 (30)	Blue-Pink-Blue	5.5 (0.217)	59.5 (2.34)	4.91	88.4 (3.48)	
90501-551L9	19.6 (2.00)	343 (35)	Blue-Silver-Blue	5.5 (0.217)	59.5 (2.34)	4.91	90.9 (3.58)	
90501-552L5	19.6 (2.00)	392 (40)	Blue-Green-Blue	5.5 (0.217)	59.5 (2.34)	4.91	93.4 (3.68)	
90501-580A1	24.5 (2.50)	196 (20)	Yellow-Blue-Yellow	5.8 (0.228)	59.5 (2.34)	4.91	81.4 (3.20)	
90501-580A2	19.6 (2.00)	490 (50)	Blue-Brown-Blue	5.8 (0.228)	59.5 (2.34)	5.64	98.4 (3.87)	FX10MTR “Europe”/ FX10MTRA “Europe”
90501-581L5	24.5 (2.50)	294 (30)	Yellow-Pink-Yellow	5.8 (0.228)	59.5 (2.34)	4.92	85.4 (3.36)	
90501-581L6	27.0 (2.75)	294 (30)	Green-Pink-Green	5.8 (0.228)	59.5 (2.34)	4.66	84.3 (3.32)	
90501-582L1	24.5 (2.50)	343 (35)	Yellow-Silver-Yellow	5.8 (0.228)	59.5 (2.34)	4.92	87.4 (3.44)	FX10/FX10RT/ FX10RTR/ FX10RTRA
90501-582L2	27.0 (2.75)	343 (35)	Green-Silver-Green	5.8 (0.228)	59.5 (2.34)	4.66	86.1 (3.39)	
90501-582L6	22.1 (2.25)	392 (40)	White-Green-White	5.8 (0.228)	59.5 (2.34)	5.25	91.2 (3.59)	
90501-582L7	24.5 (2.50)	392 (40)	Yellow-Green-Yellow	5.8 (0.228)	59.5 (2.34)	4.92	89.4 (3.52)	
90501-583L0	19.6 (2.00)	441 (45)	Blue-White-Blue	5.8 (0.228)	59.5 (2.34)	5.65	95.9 (3.78)	
90501-583L1	22.1 (2.25)	441 (45)	White-White-White	5.8 (0.228)	59.5 (2.34)	5.25	93.4 (3.68)	
90501-583L4	22.1 (2.25)	343 (35)	White-Silver-White	5.8 (0.228)	59.5 (2.34)	5.25	89.0 (3.50)	
90501-583L5	22.1 (2.25)	294 (30)	White-Pink-White	5.8 (0.228)	59.5 (2.34)	5.25	86.7 (3.41)	
90501-600A1	29.4 (3.00)	196 (20)	Pink-Blue-Pink	6.0 (0.236)	59.5 (2.34)	4.81	80.1 (3.15)	
90501-601L7	29.4 (3.00)	294 (30)	Pink-Pink-Pink	6.0 (0.236)	59.5 (2.34)	4.82	83.4 (3.28)	
90501-601L8	31.9 (3.25)	294 (30)	Orange-Pink-Orange	6.0 (0.236)	59.5 (2.34)	4.60	82.6 (3.25)	
90501-602L3	29.4 (3.00)	343 (35)	Pink-Silver-Pink	6.0 (0.236)	59.5 (2.34)	4.82	85.1 (3.35)	
90501-602L8	27.0 (2.75)	392 (40)	Green-Green-Green	6.0 (0.236)	59.5 (2.34)	5.08	87.9 (3.46)	
90501-602L9	29.4 (3.00)	392 (40)	Pink-Green-Pink	6.0 (0.236)	59.5 (2.34)	4.82	86.7 (3.41)	
90501-603L2	24.5 (2.50)	441 (45)	Yellow-White-Yellow	6.0 (0.236)	59.5 (2.34)	5.39	91.4 (3.60)	
90501-603L3	27.0 (2.75)	441 (45)	Green-White-Green	6.0 (0.236)	59.5 (2.34)	5.08	89.8 (3.54)	FX10MT/FX10MTR “USA/Canada”/ FX10MTRA “USA/Canada”
90501-624L8	31.9 (3.25)	343 (35)	Orange-Silver-Orange	6.2 (0.244)	59.5 (2.34)	5.00	84.2 (3.31)	

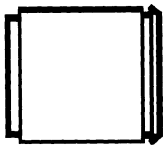
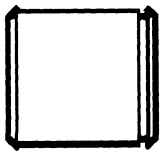
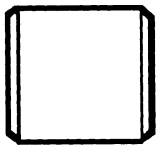
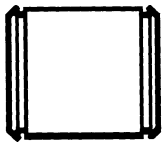
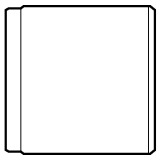
⑦ Clutch weight

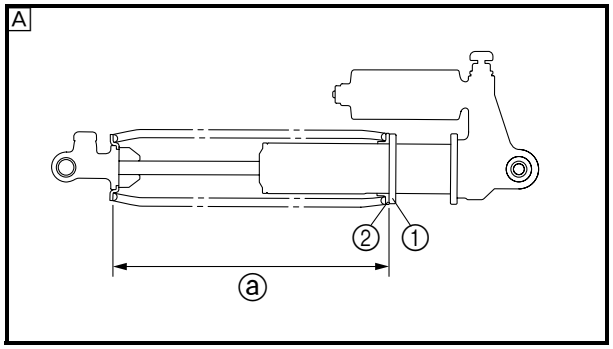
Ⓐ Parts No.	Ⓑ Weight g (oz) without bush and rivets	Ⓒ Shape & ID mark	Ⓓ Standard
8BU-17605-20	45.41 (1.603)		
8DJ-17605-00	37.77 (1.333)		
8ES-17605-00	54.63 (1.928)		
8FA-17605-10	63.81 (2.252)		
8FN-17605-00	75.28 (2.657)		
8FP-17605-00	67.81 (2.394)		
8FS-17605-00	65.52 (2.313)		FX10MT/FX10MTR/ FX10MTRA
8GL-17605-00	49.43 (1.745)		FX10/FX10RT/ FX10RTR/ FX10RTRA

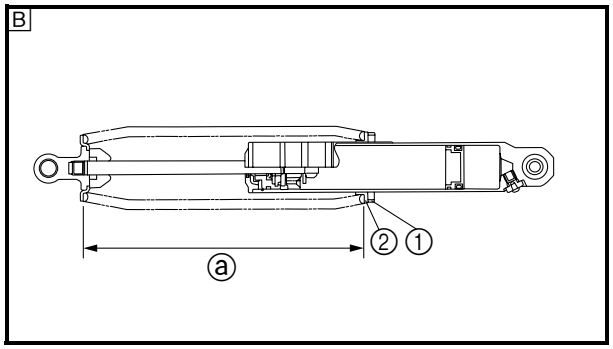
⑧ Weight rivets

A Parts No.	B Material	C Length mm (in)	D Weight g (oz)	E Standard	F Effects
90261-06033	Steel	17.2 (0.677)	4.5 (0.159)	IN: FX10/FX10RT/FX10RTR/ FX10RTRA CENTER: FX10/FX10RT/ FX10RTR/FX10RTRA/ FX10MTR “Europe”/ FX10MTRA “Europe” OUT: FX10MTR “Europe”/ FX10MTRA “Europe”	G Increased force
90269-06006	Steel	17.2 (0.677)	3.6 (0.127) with hole		
90261-06034	Steel	13.9 (0.547)	3.6 (0.127)		
90261-06019	Steel	13.3 (0.524)	3.1 (0.109)		
90266-06002	Steel	13.3 (0.524)	2.44 (0.086) with hole	IN: FX10MTR “Europe”/ FX10MTRA “Europe”	
90261-06015	Steel	10.3 (0.406)	2.44 (0.086)	OUT: FX10/FX10RT/FX10RTR/ FX10RTRA	
90261-06028	Aluminum	10.3 (0.406)	0.85 (0.030)		
90266-06001	Aluminum	13.3 (0.524)	0.85 (0.030) with hole		
None				FX10MT/ FX10MTR “USA/Canada”/ FX10MTRA “USA/Canada”	H Decreased force

⑨ Rollers

I.D. 9 mm (0.354 in)					
A Roller with bushing part number	B Outside diameter mm (in)	C Bushing type (P/N)	D Identification mark (Width)	E Standard	F Effects
8FG-17624-00	14.5 (0.57)	VESPEL TP-8549 90386-09001	G Grooved & Machined  (14.6 mm [0.57 in])		L Increased force  M Decreased force
8FG-17624-10	15.0 (0.59)	VESPEL TP-8549 90386-09001	H Grooved  (14.6 mm [0.57 in])		
8FG-17624-20	15.6 (0.61)	VESPEL TP-8549 90386-09001	I No Mark  (14.6 mm [0.57 in])	FX10/FX10RT/ FX10RTR/ FX10RTRA	
8FG-17624-30	16.0 (0.63)	VESPEL TP-8549 90386-09001	J Grooved & Grooved  (14.6 mm [0.57 in])		
8FG-17624-40	16.5 (0.65)	VESPEL TP-8549 90386-09001	K Machined  (14.6 mm [0.57 in])	FX10MT/FX10MTR/ FX10MTRA	





FRONT SUSPENSION

Spring preload

1. Adjust:
   - Spring preload

Adjustment steps:

- Loosen the locknut ①.
- Turn the spring seat ② in or out.

FX10

Spring seat distance	Standard		
	Short ←		→ Long
Preload	Hard ←		→ Soft
Length ⓐ	Min.		Max.
	250 mm (9.84 in)	260 mm (10.24 in)	260 mm (10.24 in)

FX10MT/FX10MTR/FX10MTRA

Spring seat distance	Standard		
	Short ←		→ Long
Preload	Hard ←		→ Soft
Length ⓐ	Min.		Max.
	246 mm (9.69 in)	256 mm (10.08 in)	256 mm (10.08 in)

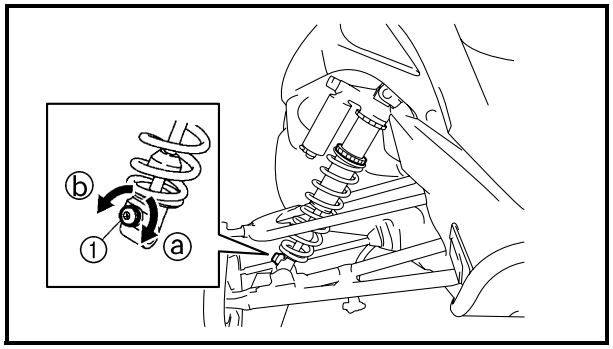
A FX10
B FX10MT/FX10MTR/FX10MTRA

CAUTION:

Be sure that the left and right spring preload are the same.

⚠ WARNING

These shock absorbers contain highly pressurized nitrogen gas.
Do not tamper with or attempt to open the shock absorber assemblies.
Do not subject the shock absorber assemblies to flames or high heat, which could cause it to explode.



Rebound damping force adjustment (FX10)

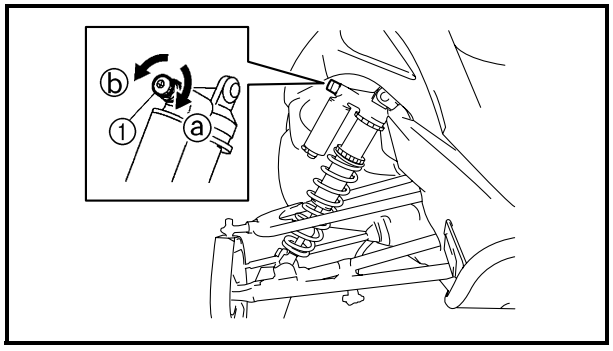
The rebound damping force can be adjusted by turning the adjusting knob ①.

Adjusting knob position	**20 clicks out 11 clicks out 3 clicks out** **Minimum Standard Maximum** **Direction ⓑ* ← → Direction ⓐ**
Rebound damping force	**Soft ← → Hard**

* With the adjusting knob fully turned lightly in direction ⓐ

CAUTION:

- **Do not continue to turn the adjusting knob in direction ⓐ after it stops. The shock absorber can be damaged and rebound damping force adjustments cannot be made.**
- **Do not turn the adjusting knob in direction ⓑ more than 20 clicks. Even if the adjusting knob is continually turned after 20 clicks, there will be no change in the rebound damping force.**
- **Be sure to stop the adjusting knob at a position where there is a click.**
- **The damping forces for the left and right ski shock absorbers must be adjusted to the same settings. Uneven settings can cause poor handling and loss of stability.**



Compression damping force adjustment (FX10)

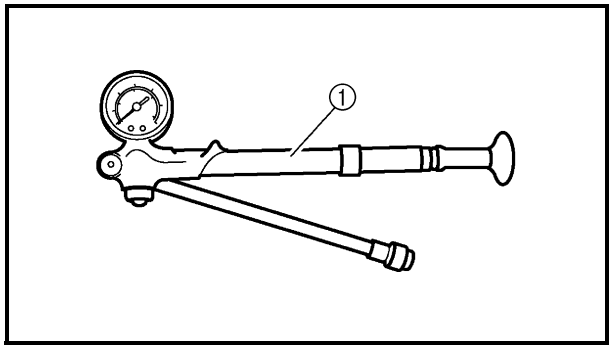
The compression damping force can be adjusted by turning the adjusting knob ①.

Adjusting knob position	**12 clicks out**	**6 clicks out**	**2 clicks out**
	Minimum	**Standard**	**Maximum**
	Direction ⓑ* ←		**→ Direction ⓐ**
Compression damping force	**Soft ←**		**→ Hard**

* With the adjusting knob fully turned lightly in direction ⓐ

CAUTION:

- **Do not continue to turn the adjusting knob in direction ⓐ after it stops. The shock absorber can be damaged and compression damping force adjustments cannot be made.**
- **Do not turn the adjusting knob in direction ⓑ more than 12 clicks. Even if the adjusting knob is continually turned after 12 clicks, there will be no change in the compression damping force.**
- **Be sure to stop the adjusting knob at a position where there is a click.**
- **The damping forces for the left and right ski shock absorbers must be adjusted to the same settings. Uneven settings can cause poor handling and loss of stability.**



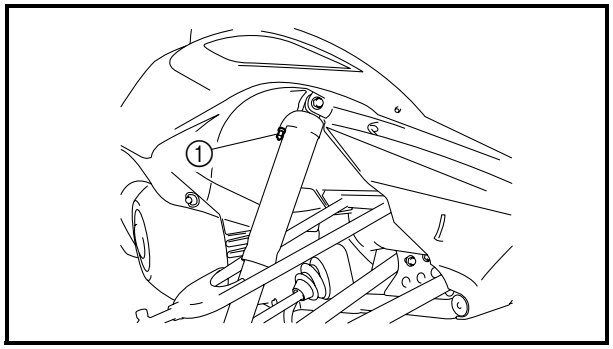
Air pressure adjustment (FX10RT/FX10RTR/FX10RTRA)

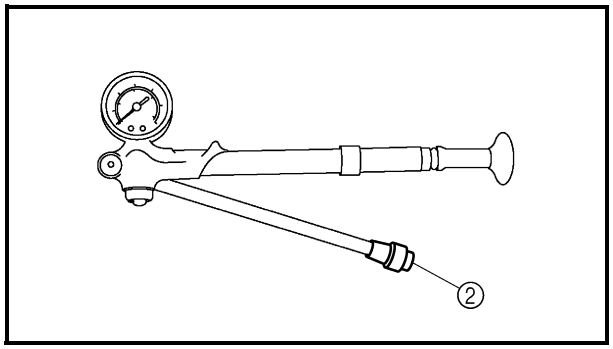
CAUTION:

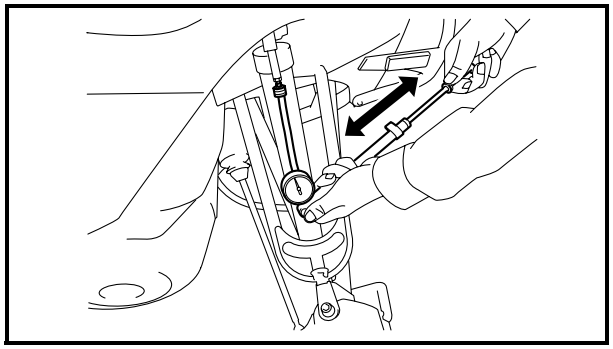
The left and right shock absorber air pressure must be set to the same setting. Uneven settings can cause poor handling and loss of stability.

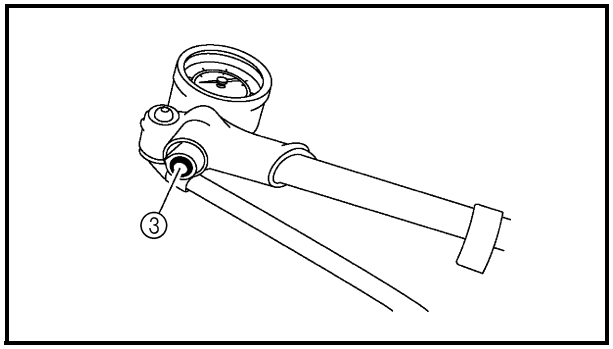
This snowmobile is equipped with FOX shock absorbers as standard equipment.

The air pressure of the shock absorbers can be adjusted using the shock absorber pump ① included with your snowmobile.









Adjustment steps:

⚠ WARNING

Support the snowmobile securely on a suitable stand before adjusting the shock absorbers.

CAUTION:

Make sure that there is no load on the shock absorbers and that they are fully extended before making any air pressure adjustments.

- Place the snowmobile on a level surface and apply the parking brake.
- Lift the front of the snowmobile onto a suitable stand to raise the skis off the ground.
- Remove the air valve cap ① from the shock absorber.
- Install the hose connector ② of the shock absorber pump onto the air valve of the shock absorber and tighten it approximately six turns until the pressure registers on the pump gauge.

CAUTION:

Do not overtighten the connector onto the air valve as this will damage the connector seal.

NOTE:

If the shock absorber has no air pressure, the gauge reading will be zero.

- To increase the air pressure, operate the pump a few times. The pressure should increase slowly. If the pressure increases rapidly, check to make sure that the pump is properly connected and tightened onto the air valve. To decrease the air pressure, push the bleed valve button ③.

NOTE:

To allow pressure to escape from the pump and the shock absorber, push the button halfway down and hold it. To allow only a small amount of pressure to escape, push the button all the way down and quickly release it.

- Remove the hose connector from the air valve.

NOTE:

When removing the connector, the sound of air escaping may be heard, but this is from the pump hose, not the shock absorber.

Air pressure range:
345 kPa (3.4 kg/cm², 50 psi) to 1,034 kPa (10.3 kg/cm², 150 psi)
Recommended air pressure:
517 kPa (5.3 kg/cm², 75 psi)

CAUTION:

Do not exceed 1,034 kPa (10.3 kg/cm², 150 psi).

- Install the air valve cap.

NOTE:

If the front suspension bottoms too easily or rolls too much during cornering, increase the air pressure by 34 kPa (0.3 kg/cm², 5 psi). If the suspension is too firm and you want a more compliant ride, decrease the air pressure by 34 kPa (0.3 kg/cm², 5 psi).

REAR SUSPENSION

Stopper band

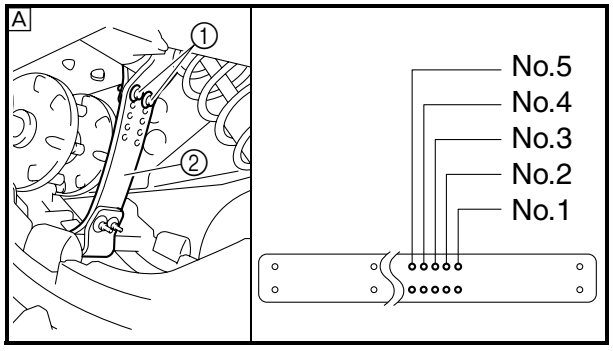
1. Adjust:
   - Stopper band length

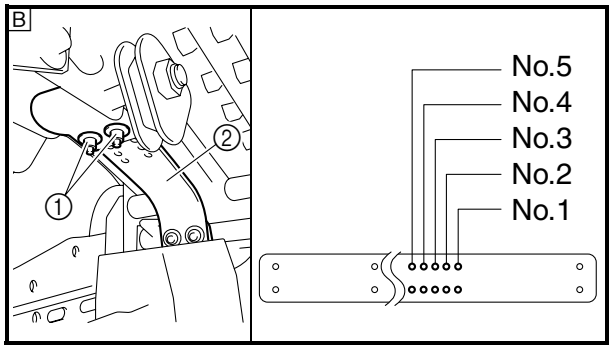
CAUTION:

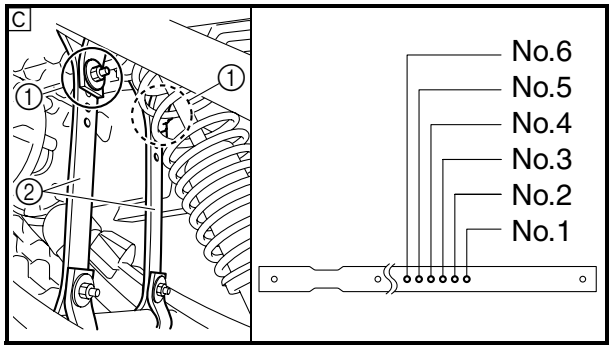
Make sure the left and right rear suspension stopper bands are adjusted evenly. (FX10MT/FX10MTR/FX10MTRA)

NOTE:

This adjustment affects the handling characteristics of the snowmobile.







Adjustment steps:

- Remove the stopper band bolts ①, nuts and washers.
- Adjust the length of the stopper bands ② by inserting the bolts in different holes.

Standard setting:
No. 1 hole

- Tighten the stopper band nuts.

Stopper band nut:
4 Nm (0.4 m · kg, 2.9 ft · lb)

A FX10/FX10RT/FX10RTR/FX10RTRA (front side)
B FX10/FX10RT/FX10RTR/FX10RTRA (rear side)
C FX10MT/FX10MTR/FX10MTRA

Choosing other settings:

CAUTION:

The standard settings work well under most general riding conditions. The suspension can be adjusted to work better in one condition, but only at the expense of another. Keep this in mind when you adjust the suspension.

Ⓐ: No. 5 hole Ⓑ: No. 6 hole (shortest)	No. 1 hole (longest)
More weight on skis: • Heavy steering/ oversteer • More maneuverability Favors: hardpack snow, ice, smooth trails, tight turns	Less weight on skis: • Light steering/ understeer • Better acceleration and speed Favors: deep snow, straight line acceleration, top speed

Ⓐ FX10/FX10RT/FX10RTR/FX10RTRA
Ⓑ FX10MT/FX10MTR/FX10MTRA

Spring preload

1. Adjust:
   • Spring preload

Adjustment step:

Front side

• Loosen the locknut ①.
• Turn the spring seat ② in or out.

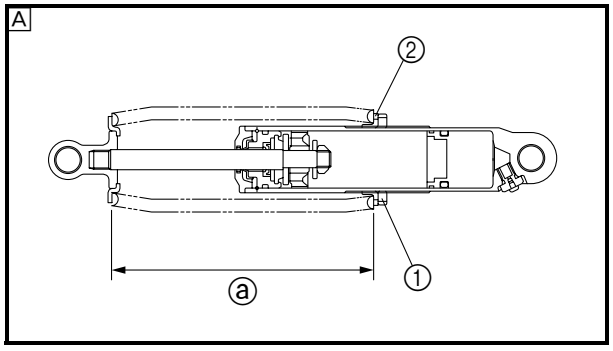
FX10

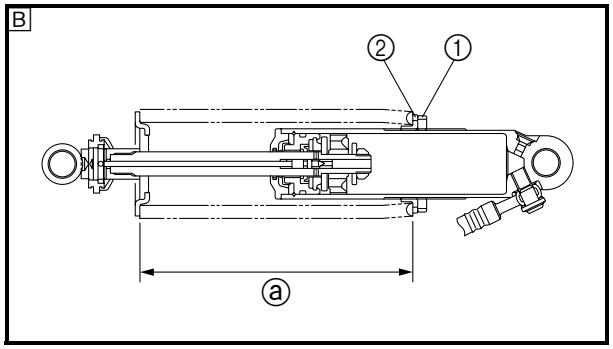
Spring seat distance	Standard		
	Short ←		→ Long
Preload	Hard ←		→ Soft
Length ⓐ	Min. 186 mm (7.32 in)	196 mm (7.72 in)	Max. 196 mm (7.72 in)

FX10RT/FX10RTR/FX10RTRA

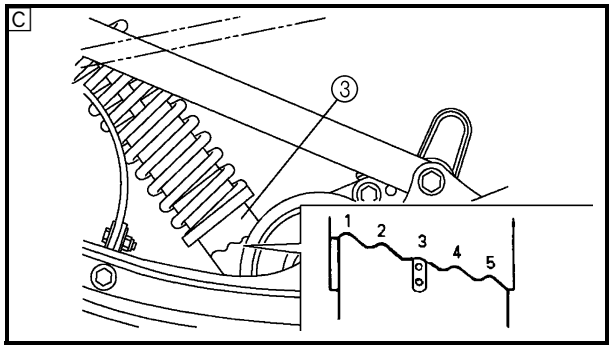
Spring seat distance	Standard		
	Short ←		→ Long
Preload	Hard ←		→ Soft
Length ⓐ	Min. 182 mm (7.17 in)	192 mm (7.56 in)	Max. 192 mm (7.56 in)

Ⓐ FX10
Ⓑ FX10RT/FX10RTR/FX10RTRA





C



- Turn the adjusting ring ③ to the proper position.

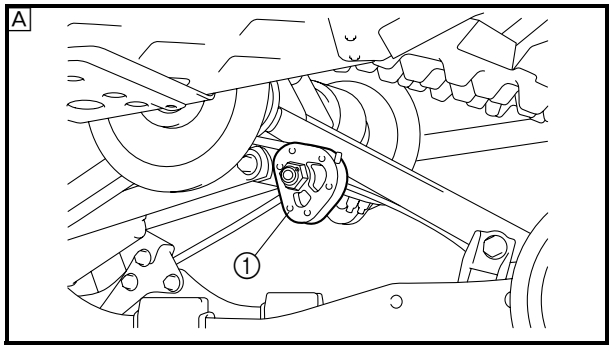
Spring adjuster position	1	2	3	4	5
Preload	Soft ←				→ Hard
Standard	3				

⚠ WARNING

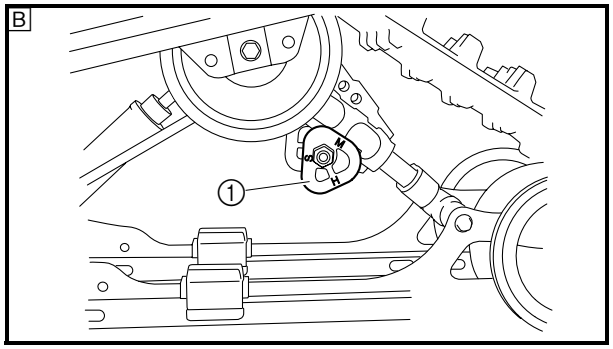
This shock absorber contains highly pressurized nitrogen gas.
Do not tamper with or attempt to open the shock absorber assembly.
Do not subject the shock absorber assembly to flames or high heat, which could cause it to explode.

C FX10MT/FX10MTR/FX10MTRA

A



B



Rear side

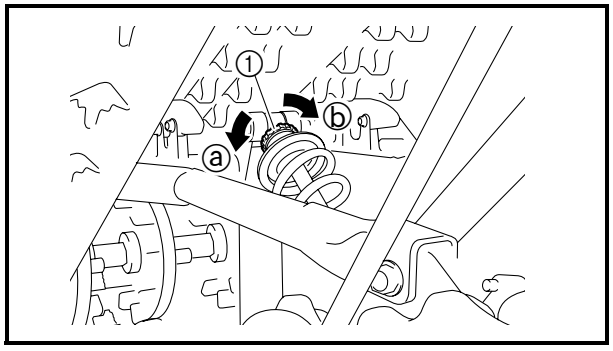
- Turn the spring preload adjuster ① to proper position.

Spring preload adjuster position	S	M	H
Spring preload	Soft	Medium	Hard
Standard	M		

⚠ WARNING

Always adjust both spring preload (left and right) to the same setting. Uneven adjustment can cause poor handling and loss of stability.

A FX10/FX10RT/FX10RTR/FX10RTRA
B FX10MT/FX10MTR/FX10MTRA



Damping force adjustment
Rebound damping force (Front side)
(FX10RT/FX10RTR/FX10RTRA)

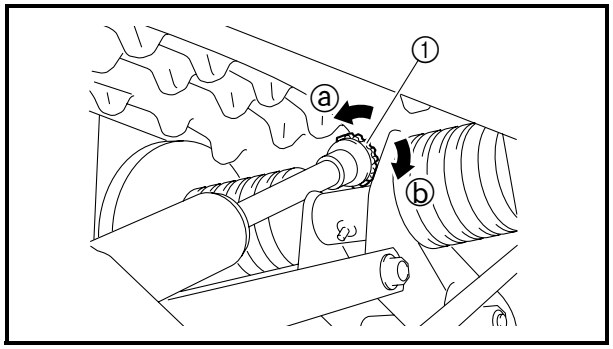
The damping force can be adjusted by turning the adjusting dial ①.

Adjusting dial position	**20 clicks out 11 clicks out 3 clicks out** **Minimum Standard Maximum** **Direction ⓑ* ← → Direction ⓐ**
Rebound damping force	**Soft ← → Hard**

* With the adjusting dial fully turned lightly in direction ⓐ

CAUTION:

- **Do not continue to turn the adjusting dial in direction ⓐ after it stops. The shock absorber can be damaged and damping force adjustments cannot be made.**
- **Do not turn the adjusting dial in direction ⓑ more than 20 clicks. Even if the adjusting dial is continually turned after 20 clicks, there will be no change in the damping force.**
- **Be sure to stop the adjusting dial at a position where there is a click.**



Rebound damping force (Rear side) (FX10RT/FX10RTR/FX10RTRA)

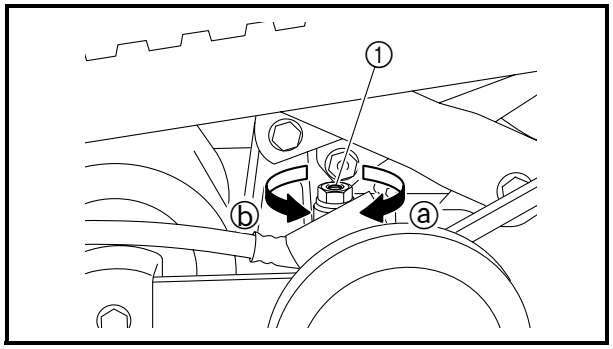
The damping force can be adjusted by turning the adjusting dial ①.

Adjusting dial position	**20 clicks out 11 clicks out 3 clicks out** **Minimum Standard Maximum** **Direction ⓑ* ← → Direction ⓐ**
Rebound damping force	**Soft ← → Hard**

* With the adjusting dial fully turned lightly in direction ⓐ

CAUTION:

- **Do not continue to turn the adjusting dial in direction ⓐ after it stops. The shock absorber can be damaged and damping force adjustments cannot be made.**
- **Do not turn the adjusting dial in direction ⓑ more than 20 clicks. Even if the adjusting dial is continually turned after 20 clicks, there will be no change in the damping force.**
- **Be sure to stop the adjusting dial at a position where there is a click.**



Compression damping force (Front side) (FX10RT/FX10RTR/FX10RTRA)

The compression damping force can be adjusted by turning the adjusting screw ①.

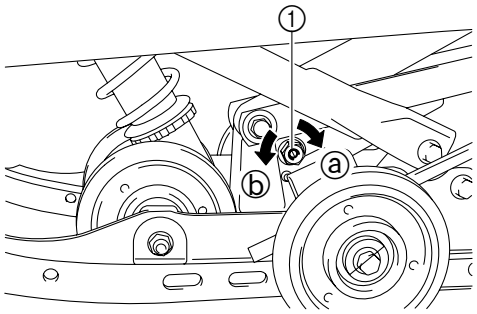
Adjusting screw position	**12 clicks out 6 clicks out 2 clicks out** **Minimum Standard Maximum** **Direction ⓑ* ← → Direction ⓐ**
Compression damping force	**Soft ← → Hard**

* With the adjusting screw fully turned lightly in direction ⓐ

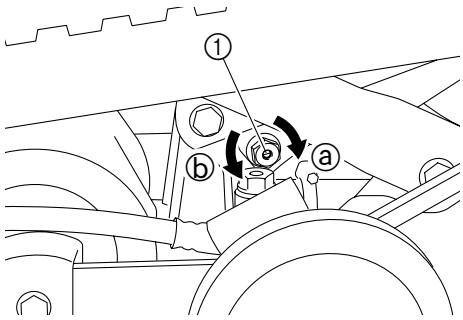
CAUTION:

- **Do not continue to turn the adjusting screw in direction ⓐ after it stops. The shock absorber can be damaged and compression damping force adjustments cannot be made.**
- **Do not turn the adjusting screw in direction ⓑ more than 12 clicks. Even if the adjusting screw is continually turned after 12 clicks, there will be no change in the compression damping force.**
- **Be sure to stop the adjusting screw at a position where there is a click.**

A



B



Compression damping force (Rear side) (FX10/FX10RT/FX10RTR/FX10RTRA)

The compression damping force can be adjusted by turning the adjusting screw ①.

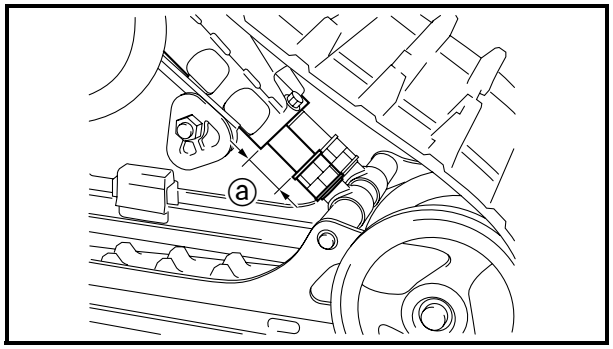
Adjusting screw position	**12 clicks out 6 clicks out 2 clicks out** **Minimum Standard Maximum** **Direction ⓑ* ← → Direction ⓐ**
Compression damping force	**Soft ← → Hard**

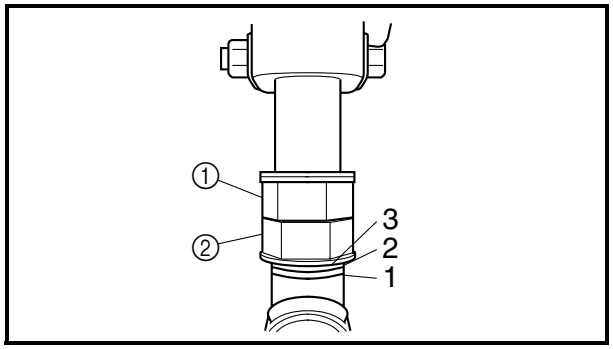
* With the adjusting screw fully turned lightly in direction ⓐ

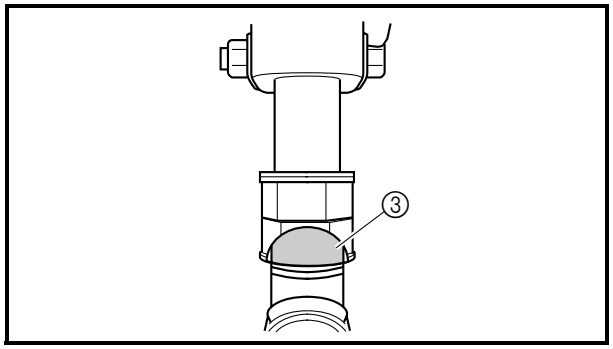
CAUTION:

- **Do not continue to turn the adjusting screw in direction ⓐ after it stops. The shock absorber can be damaged and compression damping force adjustments cannot be made.**
- **Do not turn the adjusting screw in direction ⓑ more than 12 clicks. Even if the adjusting screw is continually turned after 12 clicks, there will be no change in the compression damping force.**
- **Be sure to stop the adjusting screw at a position where there is a click.**

A FX10
B FX10RT/FX10RTR/FX10RTRA







Control rod (FX10MT/FX10MTR/FX10MTRA)

1. Adjust:
   - Control rod stroke ⓐ

CAUTION:

Make sure the adjusting nut ends are set at the same position on each side.

Adjustment steps:

- Loosen the locknut ①.
- Turn the adjusting nut ② in or out to adjust the control rod stroke.

Adjusting nut position	1	2	3
Effect	Increase weight transfer ←		→ Decrease weight transfer
Standard		2	

⚠ WARNING

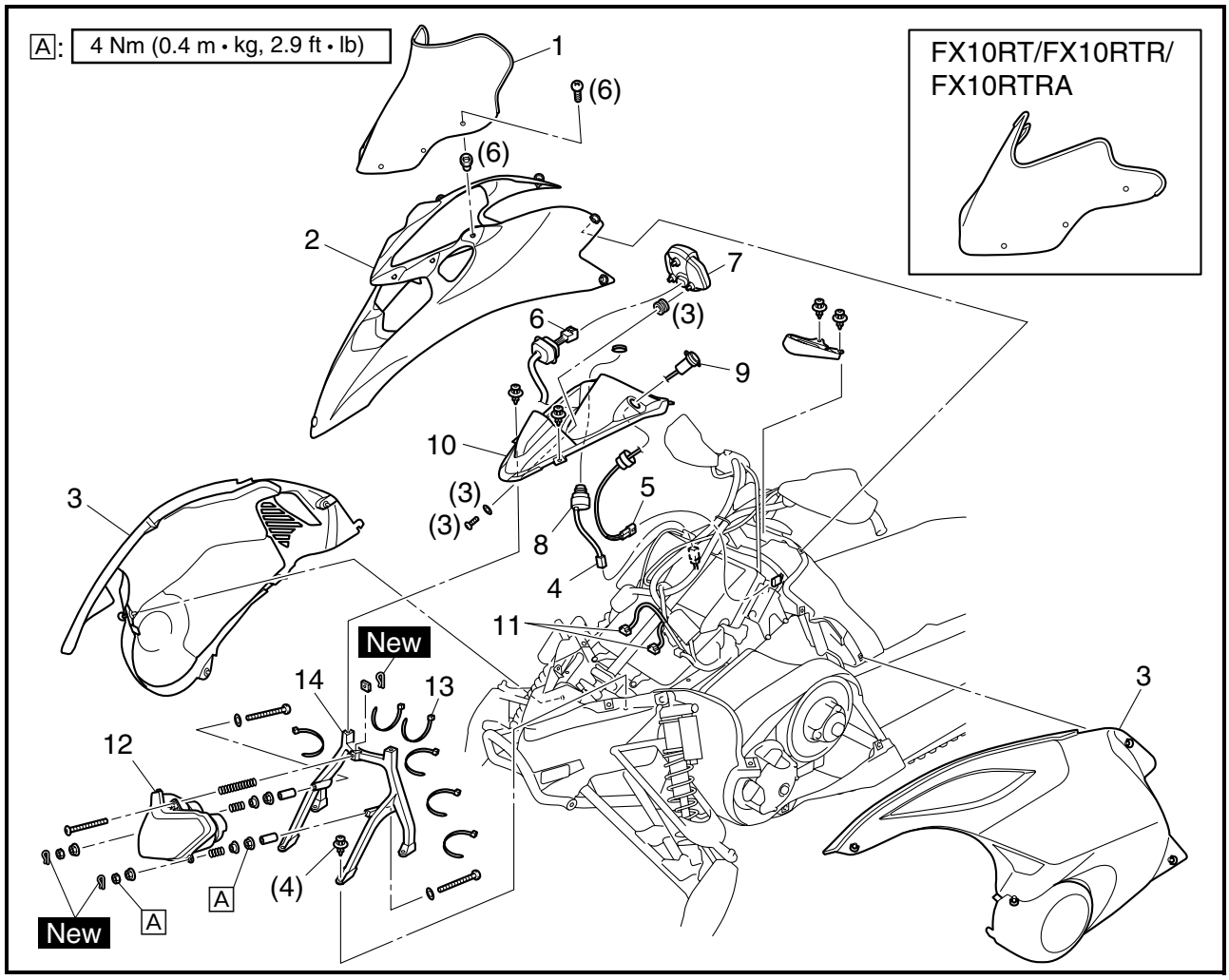
Never adjust the control rods beyond the maximum range indicated on the rods with red paint ③.

- While holding the adjusting nut securely, tighten the locknut ①.

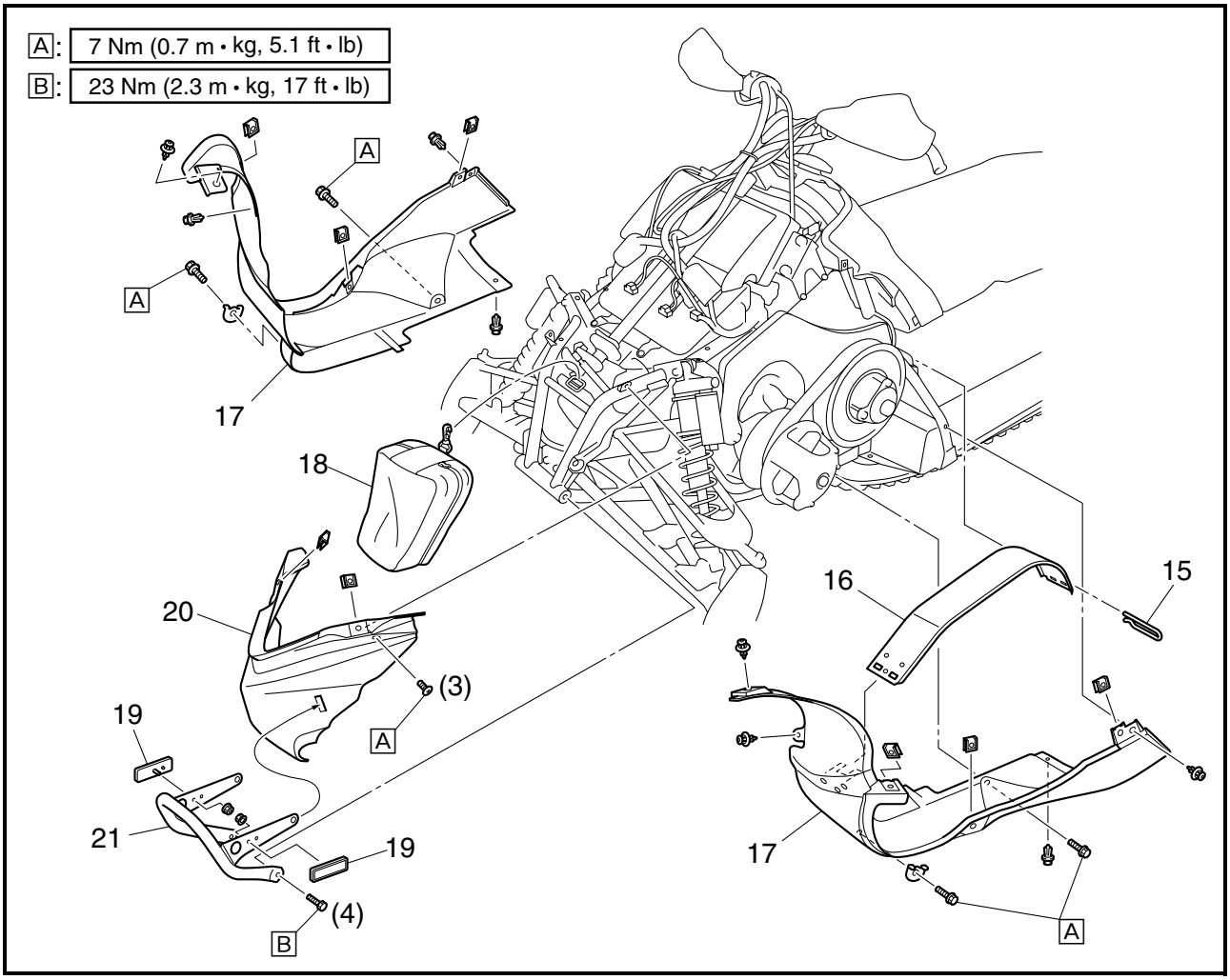
	**Locknut:** **25 Nm (2.5 m · kg, 18 ft · lb)**

CHASSIS

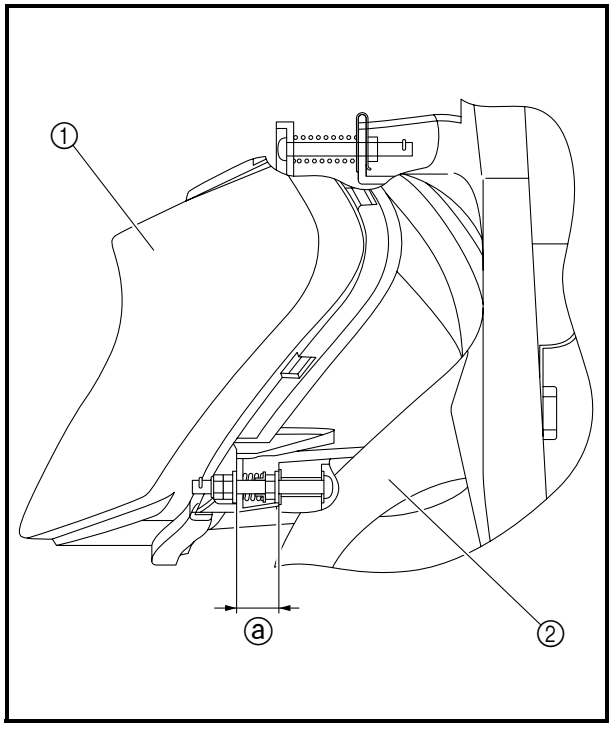
COVERS



Order	Job name/Part name	Q'ty	Remarks
	Covers removal		Remove the parts in the order listed below.
1	Windshield	1	
2	Shroud	1	
3	Side cover (left and right)	2	
4	Main switch coupler	1	Disconnect.
5	Auxiliary DC jack coupler	1	Disconnect. FX10MT/FX10MTR/FX10MTRA
6	Speedometer coupler	1	Disconnect.
7	Speedometer	1	
8	Main switch	1	
9	Auxiliary DC jack	1	FX10MT/FX10MTR/FX10MTRA
10	Speedometer cover	1	
11	Headlight coupler	2	Disconnect.
12	Headlight assembly	1	
13	Plastic band	6	
14	Headlight stay	1	



Order	Job name/Part name	Q'ty	Remarks
15	Drive guard pin	1	
16	Drive guard	1	
17	Lower cover (left and right)	2	
18	Storage pouch	1	
19	Reflector	2	
20	Front cover	1	
21	Front bumper	1	
			For installation, reverse the removal procedure.



INSTALLATION

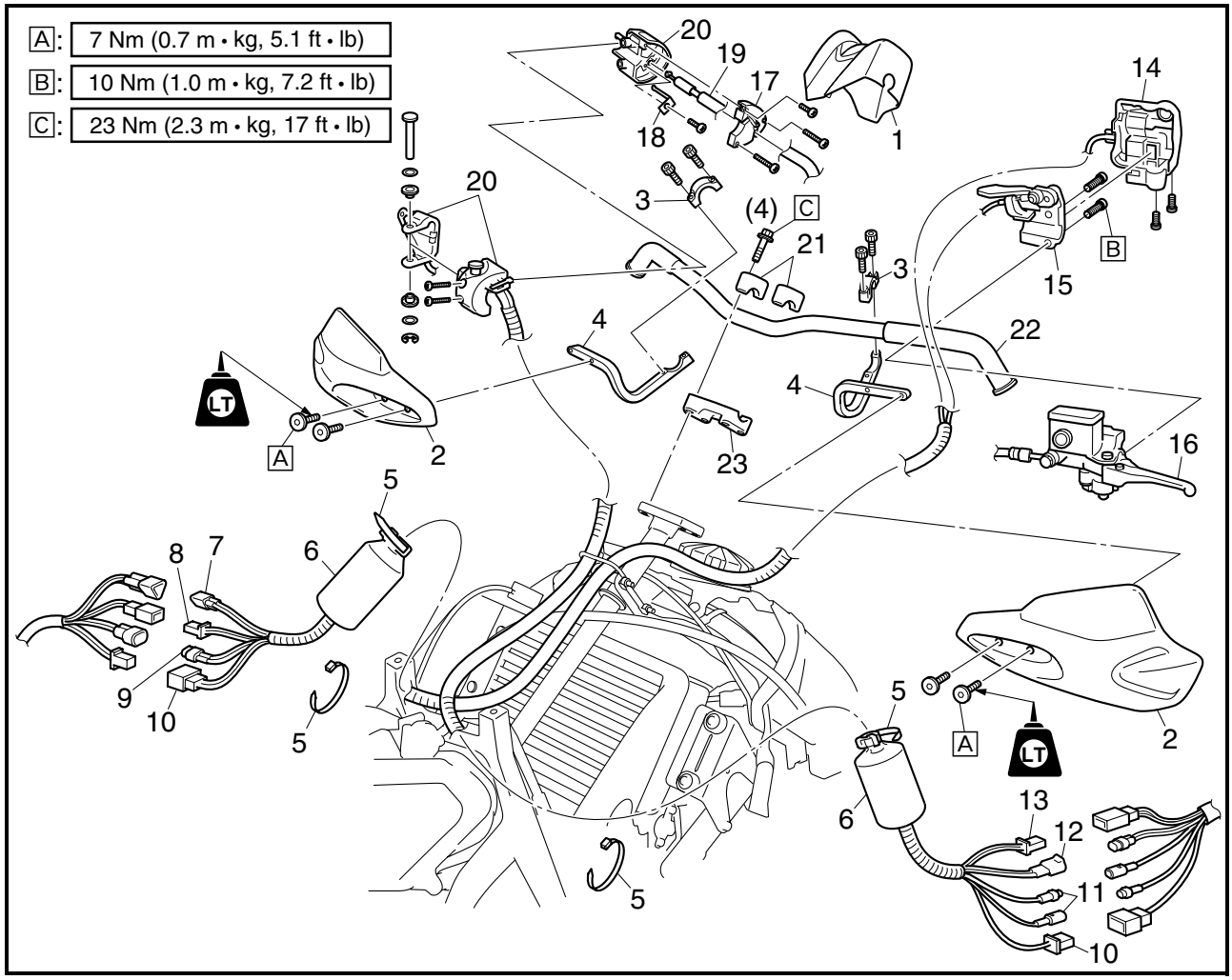
1. Install:
   - Headlight assembly ①

Installed position ⓐ:
16.0 mm (0.63 in)

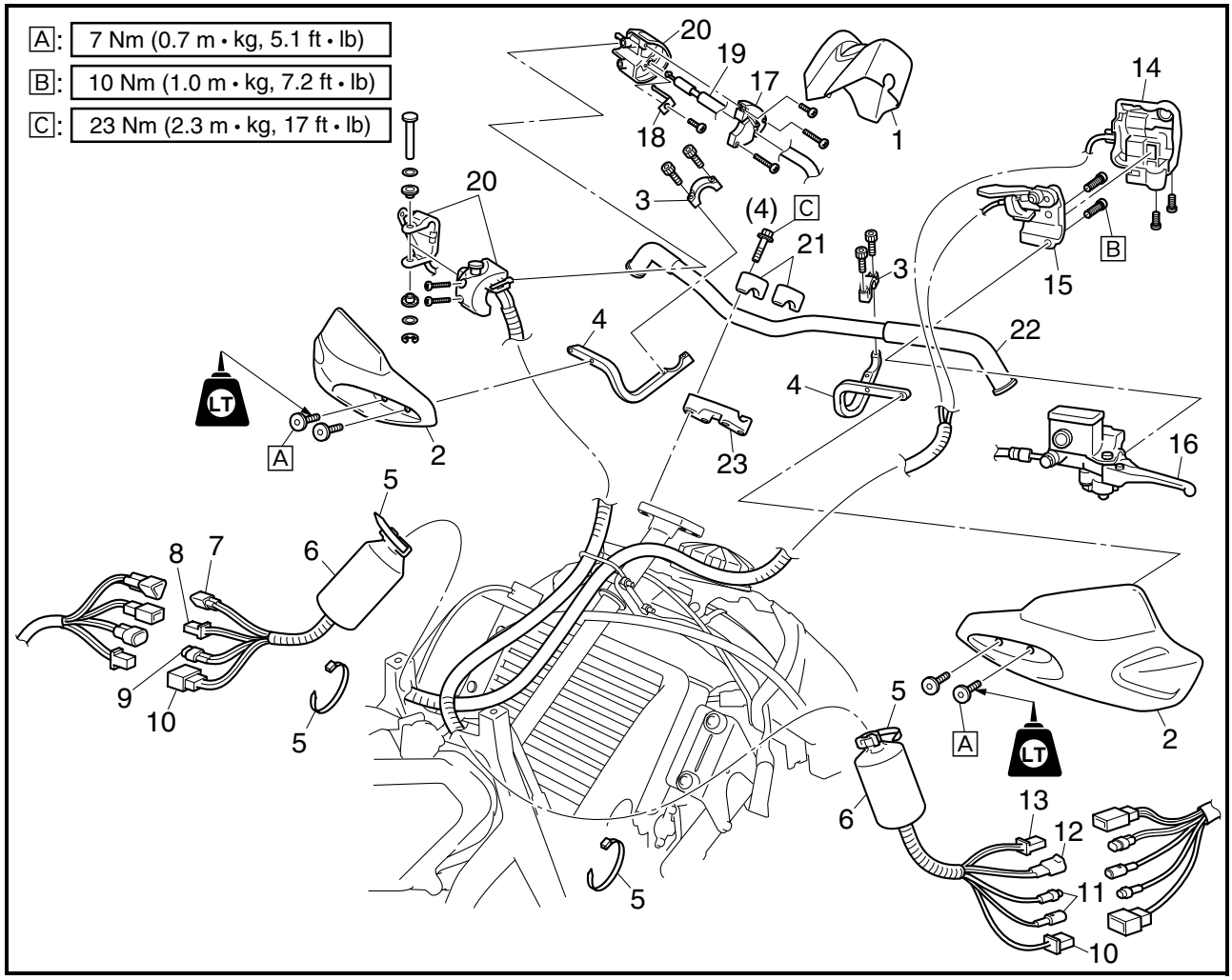
② Headlight stay

STEERING

FX10

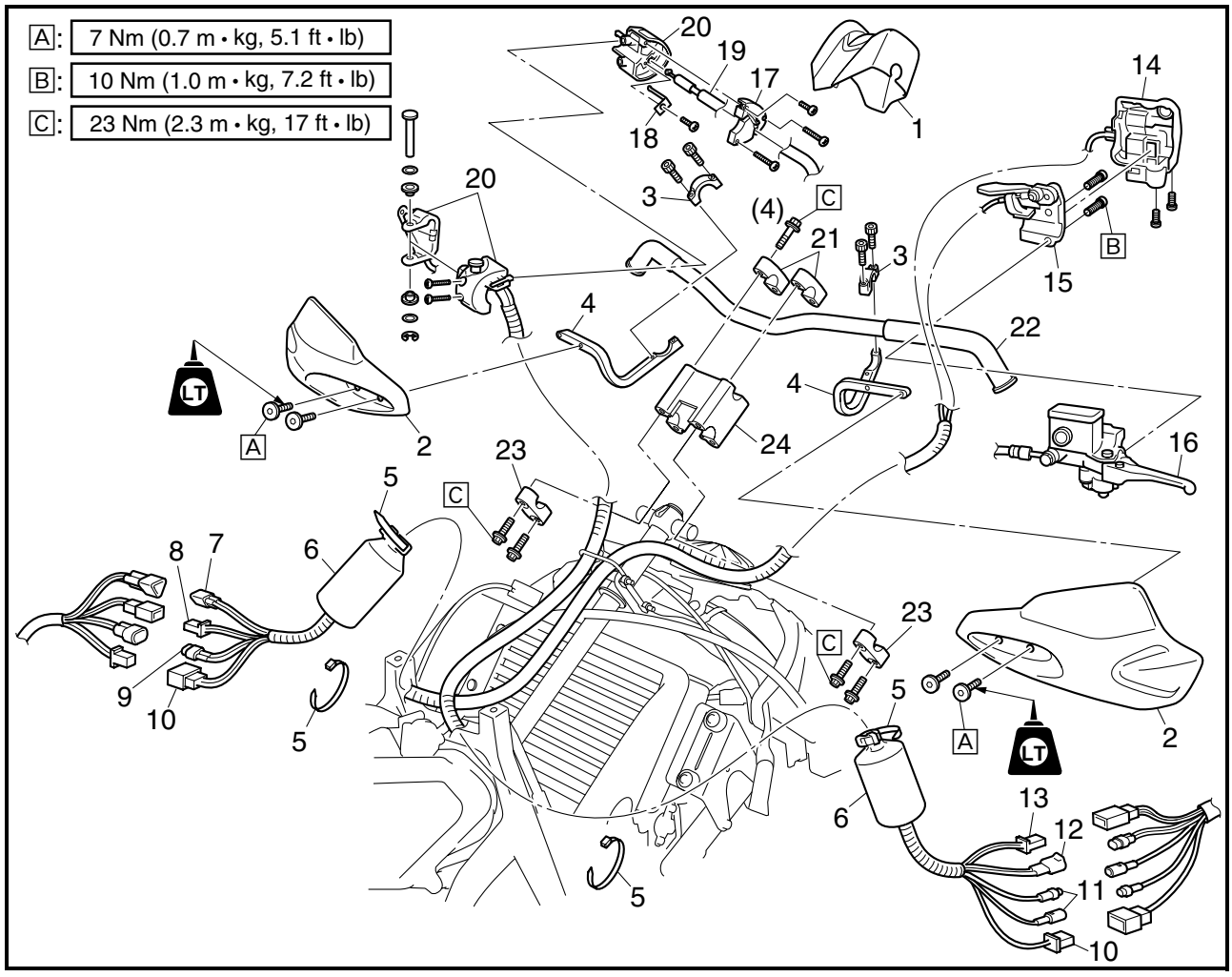


Order	Job name/Part name	Q'ty	Remarks
	Handlebar removal		Remove the parts in the order listed below.
	Shroud/Side covers/Speedometer cover		Refer to "COVERS".
1	Handlebar cover	1	
2	Wind deflector (left and right)	2	
3	Wind deflector bracket holder	2	
4	Wind deflector bracket (left and right)	2	
5	Plastic band	4	
6	Rubber cover	2	
7	Grip/thumb warmer adjustment switch coupler	1	Disconnect.
8	Brake light switch coupler	1	Disconnect.
9	Headlight beam switch coupler	1	Disconnect.
10	Grip warmer coupler	2	Disconnect.
11	Throttle switch coupler	2	Disconnect.
12	Engine stop switch coupler	1	Disconnect.
13	Thumb warmer coupler	1	Disconnect.

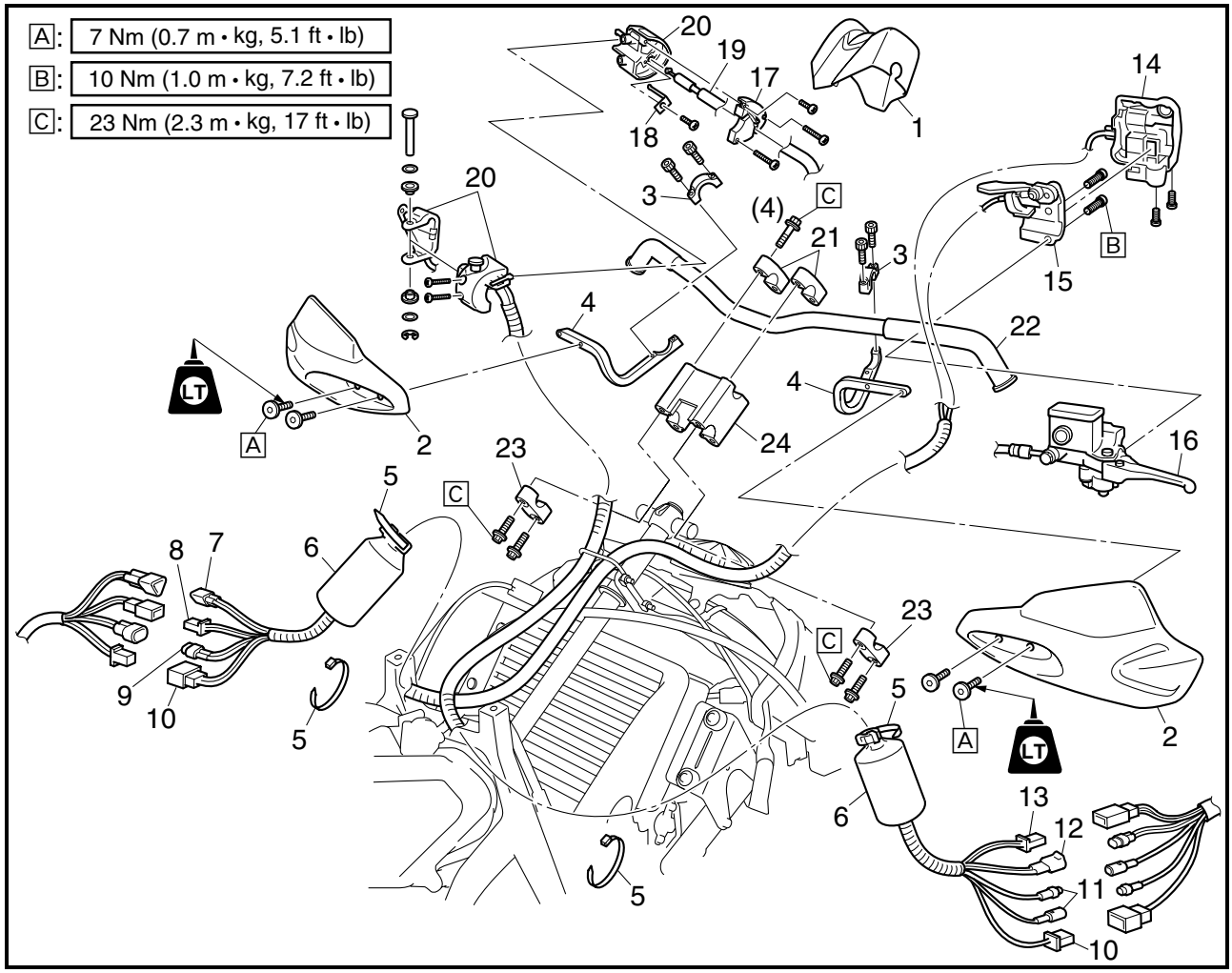


Order	Job name/Part name	Q'ty	Remarks
14	Left handlebar switch	1	
15	Brake master cylinder holder	1	
16	Master cylinder assembly	1	
17	Right handlebar switch cover	1	
18	Throttle cable holder	1	
19	Throttle cable	1	Disconnect.
20	Right handlebar switch/throttle lever assembly	1	
21	Upper handlebar holder	2	
22	Handlebar	1	
23	Lower handlebar holder	1	
			NOTE: After installing all parts, refer to "CABLE ROUTING" in CHAPTER 9, to check the cable and lead routing.
			For installation, reverse the removal procedure.

FX10RT/FX10RTR/FX10RTRA

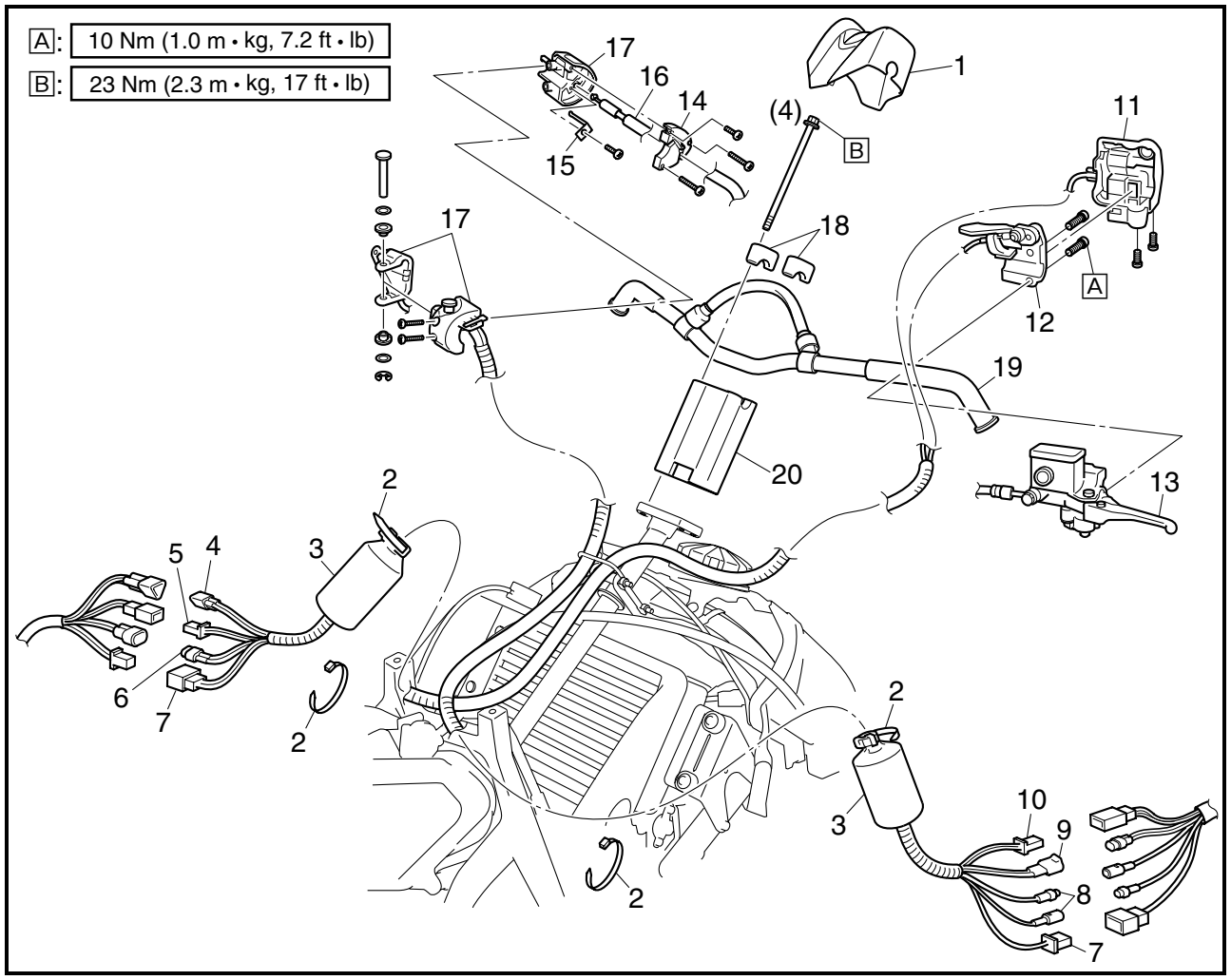


Order	Job name/Part name	Q'ty	Remarks
	Handlebar removal		Remove the parts in the order listed below.
	Shroud/Side covers/Speedometer cover		Refer to "COVERS".
1	Handlebar cover	1	
2	Wind deflector (left and right)	2	
3	Wind deflector bracket holder	2	
4	Wind deflector bracket (left and right)	2	
5	Plastic band	4	
6	Rubber cover	2	
7	Grip/thumb warmer adjustment switch coupler	1	Disconnect.
8	Brake light switch coupler	1	Disconnect.
9	Headlight beam switch coupler	1	Disconnect.
10	Grip warmer coupler	2	Disconnect.
11	Throttle switch coupler	2	Disconnect.
12	Engine stop switch coupler	1	Disconnect.
13	Thumb warmer coupler	1	Disconnect.

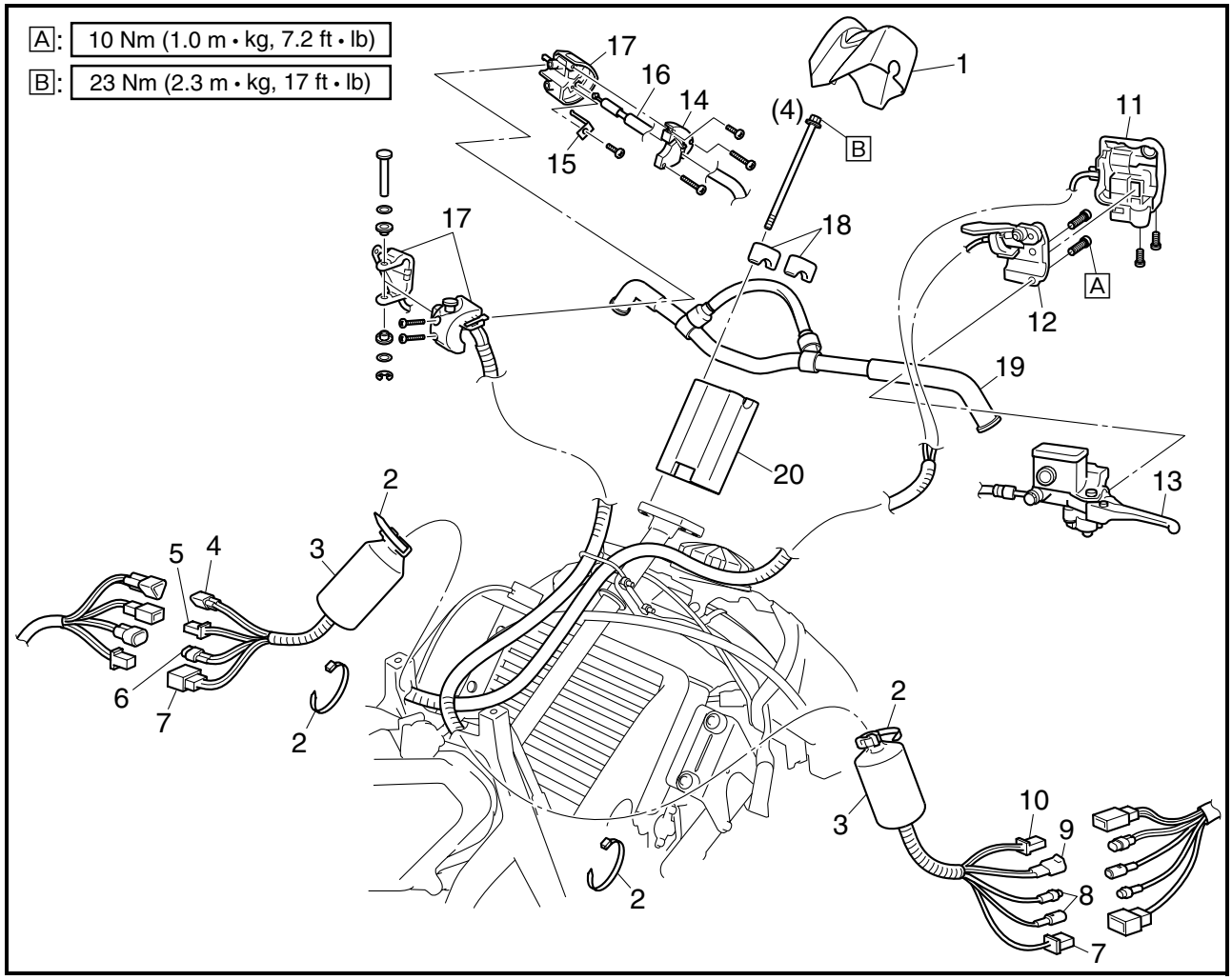


Order	Job name/Part name	Q'ty	Remarks
14	Left handlebar switch	1	
15	Brake master cylinder holder	1	
16	Master cylinder assembly	1	
17	Right handlebar switch cover	1	
18	Throttle cable holder	1	
19	Throttle cable	1	Disconnect.
20	Right handlebar switch/throttle lever assembly	1	
21	Handlebar holder	2	
22	Handlebar	1	
23	Steering joint holder	2	
24	Steering joint	1	
			NOTE: After installing all parts, refer to "CABLE ROUTING" in CHAPTER 9, to check the cable and lead routing.
			For installation, reverse the removal procedure.

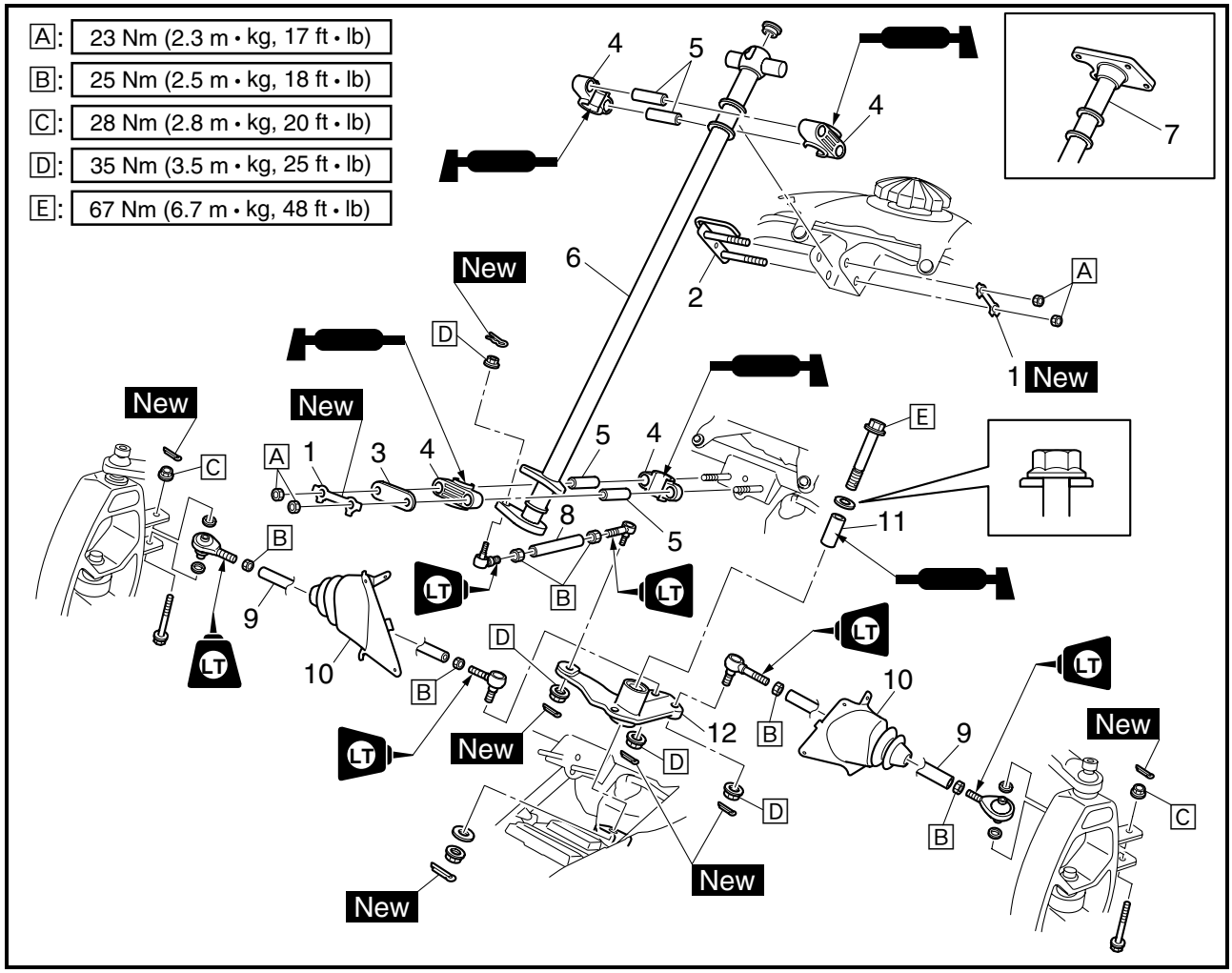
FX10MT/FX10MTR/FX10MTRA



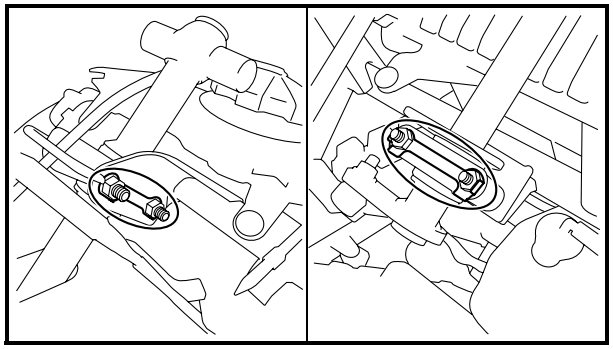
Order	Job name/Part name	Q'ty	Remarks
	Handlebar removal		Remove the parts in the order listed below.
	Shroud/Side covers/Speedometer cover		Refer to "COVERS".
1	Handlebar cover	1	FX10MTRA
2	Plastic band	4	
3	Rubber cover	2	
4	Grip/thumb warmer adjustment switch coupler	1	Disconnect.
5	Brake light switch coupler	1	Disconnect.
6	Headlight beam switch coupler	1	Disconnect.
7	Grip warmer coupler	2	Disconnect.
8	Throttle switch coupler	2	Disconnect.
9	Engine stop switch coupler	1	Disconnect.
10	Thumb warmer coupler	1	Disconnect.
11	Left handlebar switch	1	
12	Brake master cylinder holder	1	
13	Master cylinder assembly	1	
14	Right handlebar switch cover	1	



Order	Job name/Part name	Q'ty	Remarks
15	Throttle cable holder	1	
16	Throttle cable	1	Disconnect.
17	Right handlebar switch/throttle lever assembly	1	
18	Upper handlebar holder	2	
19	Handlebar	1	
20	Steering joint	1	
			NOTE: After installing all parts, refer to "CABLE ROUTING" in CHAPTER 9, to check the cable and lead routing.
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Steering column and tie rod removal		Remove the parts in the order listed below.
	Headlight stay/Side covers		Refer to "COVERS".
	Bottom panel		Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 2.
1	Lock washer	2	
2	Bearing holder	1	
3	Plate	1	
4	Bearing	4	
5	Collar	4	
6	Steering column	1	FX10RT/FX10RTR/FX10RTRA
7	Steering column	1	FX10/FX10MT/FX10MTR/FX10MTRA
8	Steering shaft	1	
9	Tie rod	2	
10	Dust boots	2	
11	Collar	1	
12	Pivot arm	1	
			For installation, reverse the removal procedure.



REMOVAL

1. Straighten the lock washer tabs.

INSPECTION

1. Inspect:
   - Handlebar
   - Steering column
     Bends/cracks/damage → Replace.

⚠ WARNING

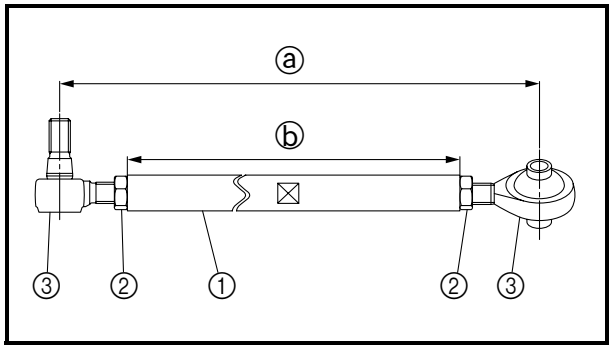
Do not attempt to straighten a bent column. This may dangerously weaken the column.

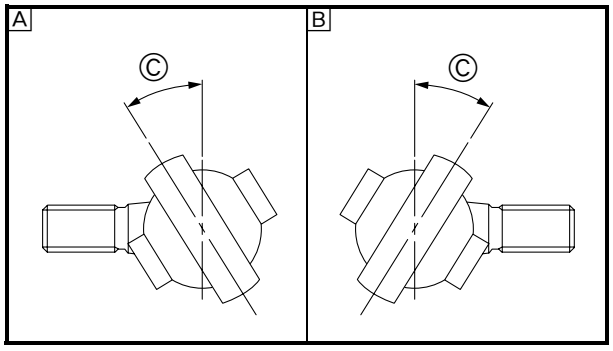
2. Inspect:
   - Bearings (steering column)
   - Collars
   - Bearings (pivot arm)
     Wear/damage → Replace.
   - Steering column
     (bearing contact surfaces)
     Scratches/wear/damage → Replace.
3. Inspect:
   - Tie rods
   - Steering shaft
     Bends/cracks/damage → Replace.

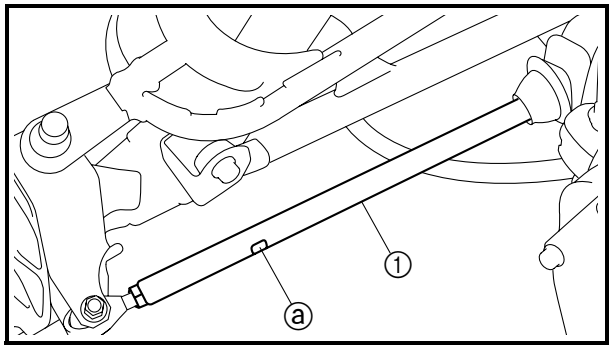
⚠ WARNING

Do not attempt to straighten bent rods. This may dangerously weaken the rods.

4. Check:
   - Rod end movement
     Rod end free play exists → Replace the rod end.
     Rod end turns roughly → Replace the rod end.







INSTALLATION

1. Install:
   - Tie rod ①
   - Locknuts ②
   - Joints ③

A Tie rod part number	B Set length ⓐ	C Tie rod length ⓑ
8GL-23830-00 (FX10/FX10RT/ FX10RTR/ FX10RTRA)	544.0 mm (21.42 in)	475.5 mm (18.72 in)
8HA-23830-00 (FX10MT/ FX10MTR/ FX10MTRA)	518.0 mm (20.39 in)	449.5 mm (17.70 in)

2. Check:
   - Tie rod angle ⓒ

Tie rod angle:
32°

CAUTION:

After tightening the inside and outside ball joint locknut ②, make sure the tie rod ① can be rotated freely through the ball joint travel. If not, loosen the locknut ② and re-position the ball joint so that the tie rod ① can be rotated freely. Tighten the locknut to specification.

A Left side
B Right side

3. Install:
   - Tie rods ①

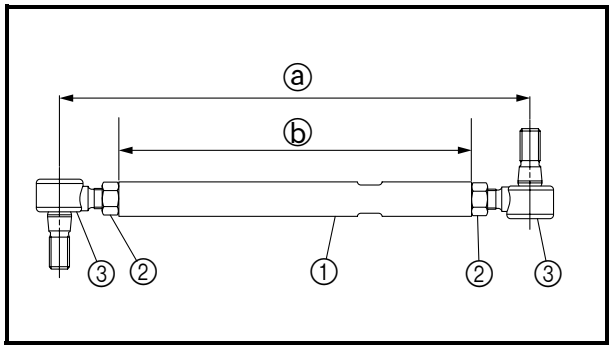
NOTE:

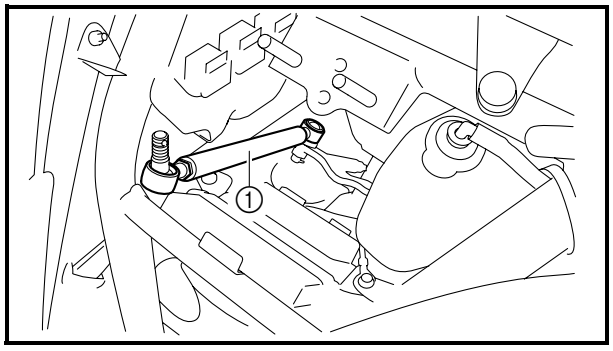
Make sure that the indentation ⓐ on the tie rod faces out.

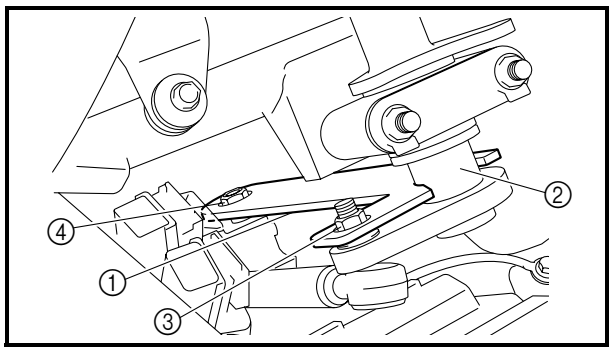
CAUTION:

Always use new cotter pins.

Tie rod end locknut:
25 Nm (2.5 m · kg, 18 ft · lb)
LOCTITE®
Tie rod and pivot arm nut:
35 Nm (3.5 m · kg, 25 ft · lb)
Tie rod and steering knuckle nut:
28 Nm (2.8 m · kg, 20 ft · lb)







4. Install:
   - Steering shaft ①
   - Locknuts ②
   - Joints ③

Ⓐ Steering shaft part number	Ⓑ Set length ⓐ	Ⓒ Shaft length ⓑ
8GL-23820-00	232.2 mm (9.14 in)	174.2 mm (6.86 in)

CAUTION:

Always use new cotter pin.

Steering shaft and pivot arm nut:
35 Nm (3.5 m · kg, 25 ft · lb)
Steering shaft and steering column nut:
35 Nm (3.5 m · kg, 25 ft · lb)

5. Bend the lock washer tab along a flat side of the bolt.

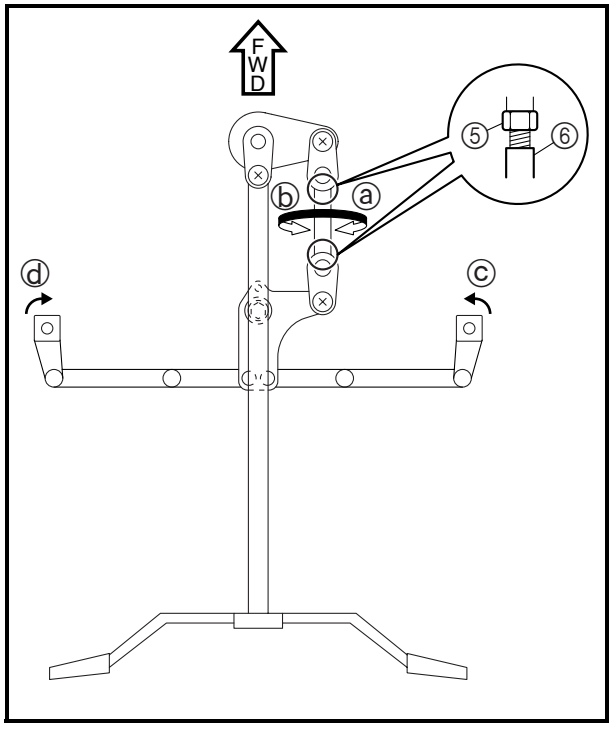
6. Adjust:
   - Skis

Adjustment steps:
- Temporarily install the handlebar.
- Hold the handlebar straight and check that the skis are at right angles to the handlebar.
- Install the steering linkage alignment plate ①.

NOTE:

To install the steering linkage alignment plate, turn the handlebar completely to the right, position the plate behind the steering column ②, and then fit the steering column into the cutout in the plate and fit the nut ③ into the hole in the plate. Then, while turning the handlebar to face it straight ahead, fit the bolt ④ into the hole in the plate.

Steering linkage alignment plate:
90890-01531, YS-01531



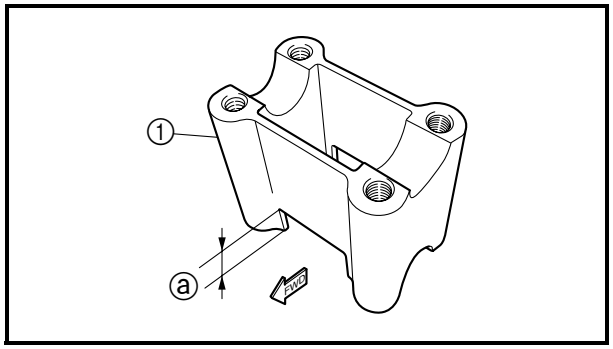
- Loosen the steering shaft locknuts ⑤.
- Adjust the steering shaft ⑥ by turning so that the pivot arm point right under.

Turning the steering shaft in direction ⓐ	**Turning the ski in direction ⓒ**
Turning the steering shaft in direction ⓑ	**Turning the ski in direction ⓓ**

- Tighten the steering shaft locknuts ⑤.

Steering shaft locknut:
25 Nm (2.5 m · kg, 18 ft · lb)
LOCTITE®

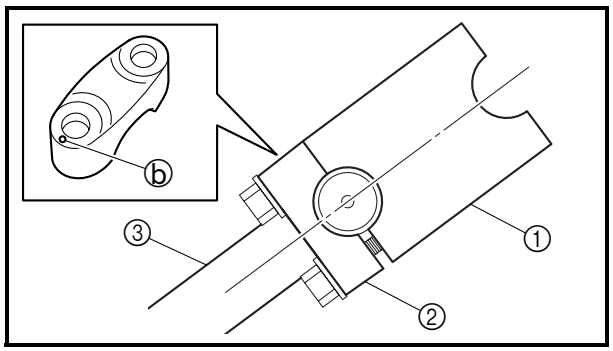
- Adjust each angle of right and left skis by turning the tie rod respectively.
- Measure the ski toe-out.
  Refer to "STEERING SYSTEM" in CHAPTER 2.



7. Install:
   For FX10RT/FX10RTR/FX10RTRA
   - Steering joint ①
   - Steering joint holders ②

NOTE:

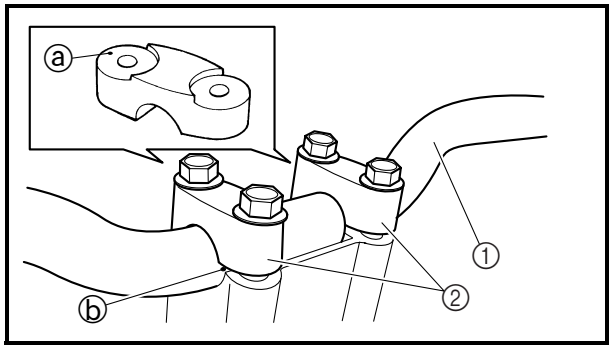
- Install the steering joint with the shallow cutout ⓐ facing forward.
- Align the centerline of the steering joint with the centerline of the steering column ③ as shown in the illustration.



- The steering joint holders should be installed with punch marks ⓑ facing forward.

CAUTION:

First, tighten the bolts on the front side of the steering joint holder, and then on the rear side.



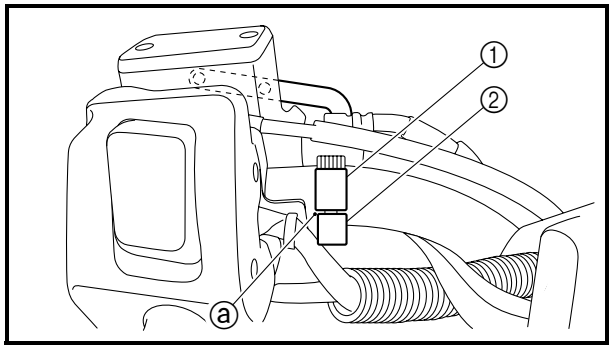
8. Install:
   - Handlebar ①
   - Handlebar holders ②

NOTE:
- The handlebar holders should be installed with the punch marks ⓐ facing forward.
- Align the punch mark ⓑ on the handlebar with the upper surface of the lower handlebar holder. (FX10)
- Align the punch mark ⓑ on the handlebar with the upper surface of the steering joint. (FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA)

CAUTION:

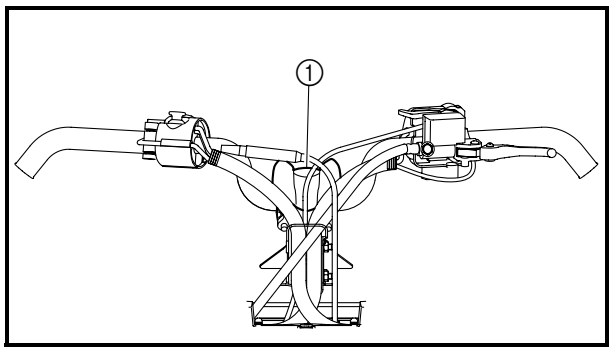
First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.

	Handlebar holder bolt: **23 Nm (2.3 m · kg, 17 ft · lb)**



9. Install:
   For FX10/FX10RT/FX10RTR/FX10RTRA
   - Wind deflector bracket holder ①
   - Wind deflector bracket ②

NOTE:
Align the end of the wind deflector bracket with the punch mark ⓐ on the handlebar.



10. Install:
    - Handlebar protector ① (FX10/FX10RT/FX10RTR/FX10RTRA/FX10MTRA)

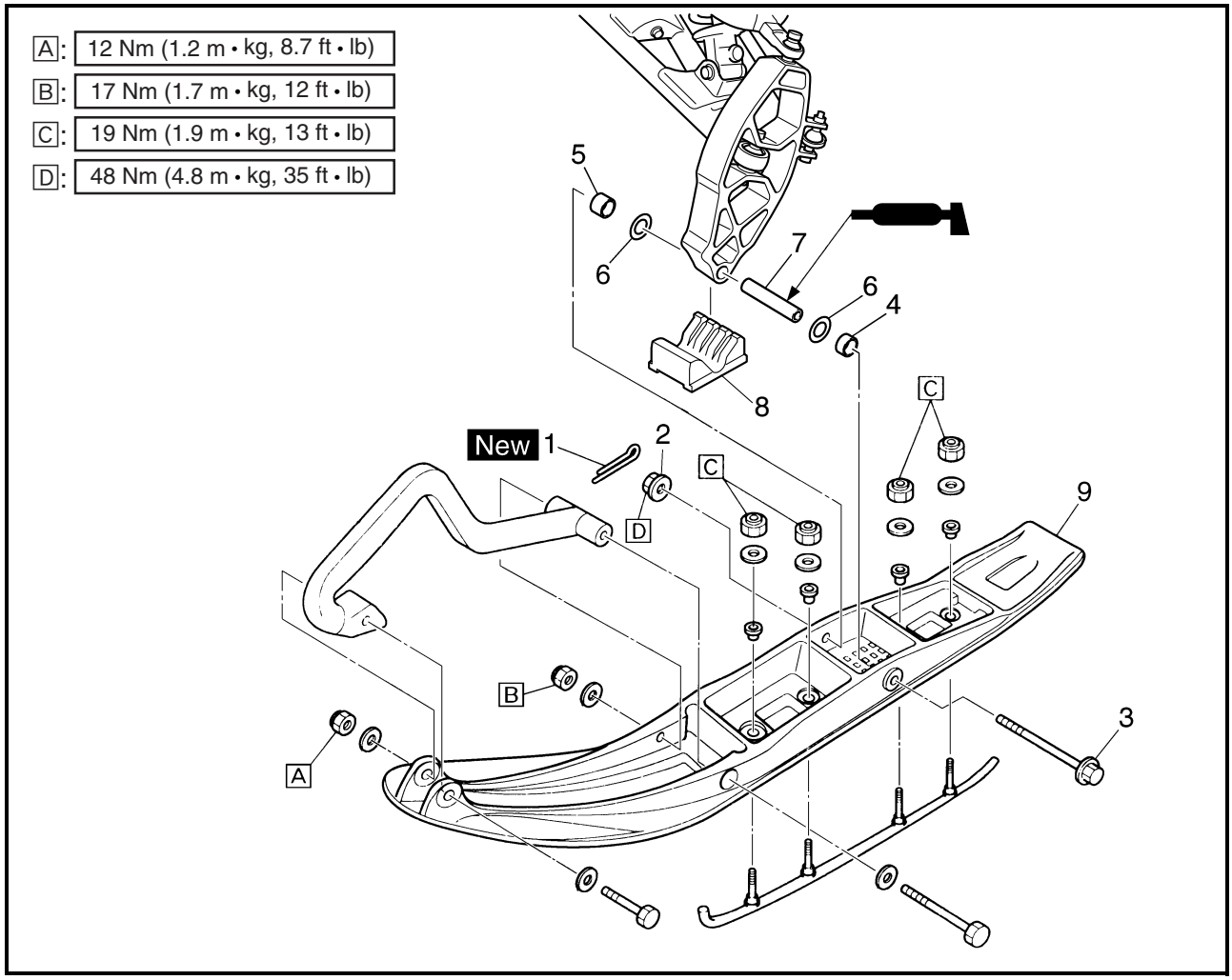
NOTE:
Install the handlebar cover ①, making sure not to pinch the cables, leads, etc.

11. Adjust:
    - Throttle cable free play

    Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" in CHAPTER 2.

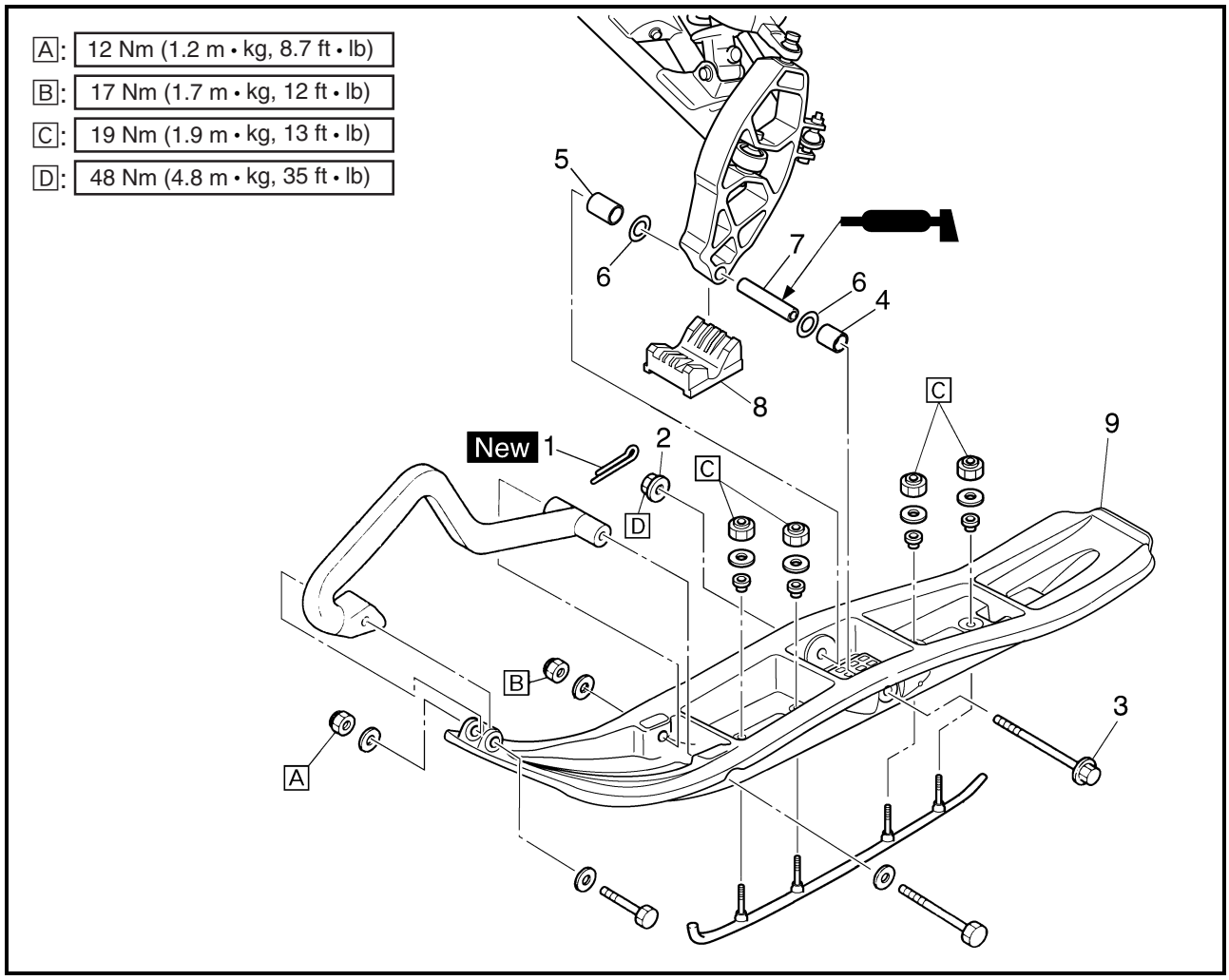
SKI

FX10/FX10RT/FX10RTR/FX10RTRA



Order	Job name/Part name	Q'ty	Remarks
	Ski removal		Remove the parts in the order listed below. The following procedure applies to both of the ski.
1	Cotter pin	1	
2	Nut	1	
3	Bolt	1	
4	Collar	1	
5	Collar	1	
6	Washer	2	
7	Collar	1	
8	Ski stopper	1	
9	Ski	1	
			For installation, reverse the removal procedure.

FX10MT/FX10MTR/FX10MTRA



Order	Job name/Part name	Q'ty	Remarks
	Ski removal		Remove the parts in the order listed below. The following procedure applies to both of the ski.
1	Cotter pin	1	
2	Nut	1	
3	Bolt	1	
4	Collar	1	
5	Collar	1	
6	Washer	2	
7	Collar	1	
8	Ski stopper	1	
9	Ski	1	
			For installation, reverse the removal procedure.

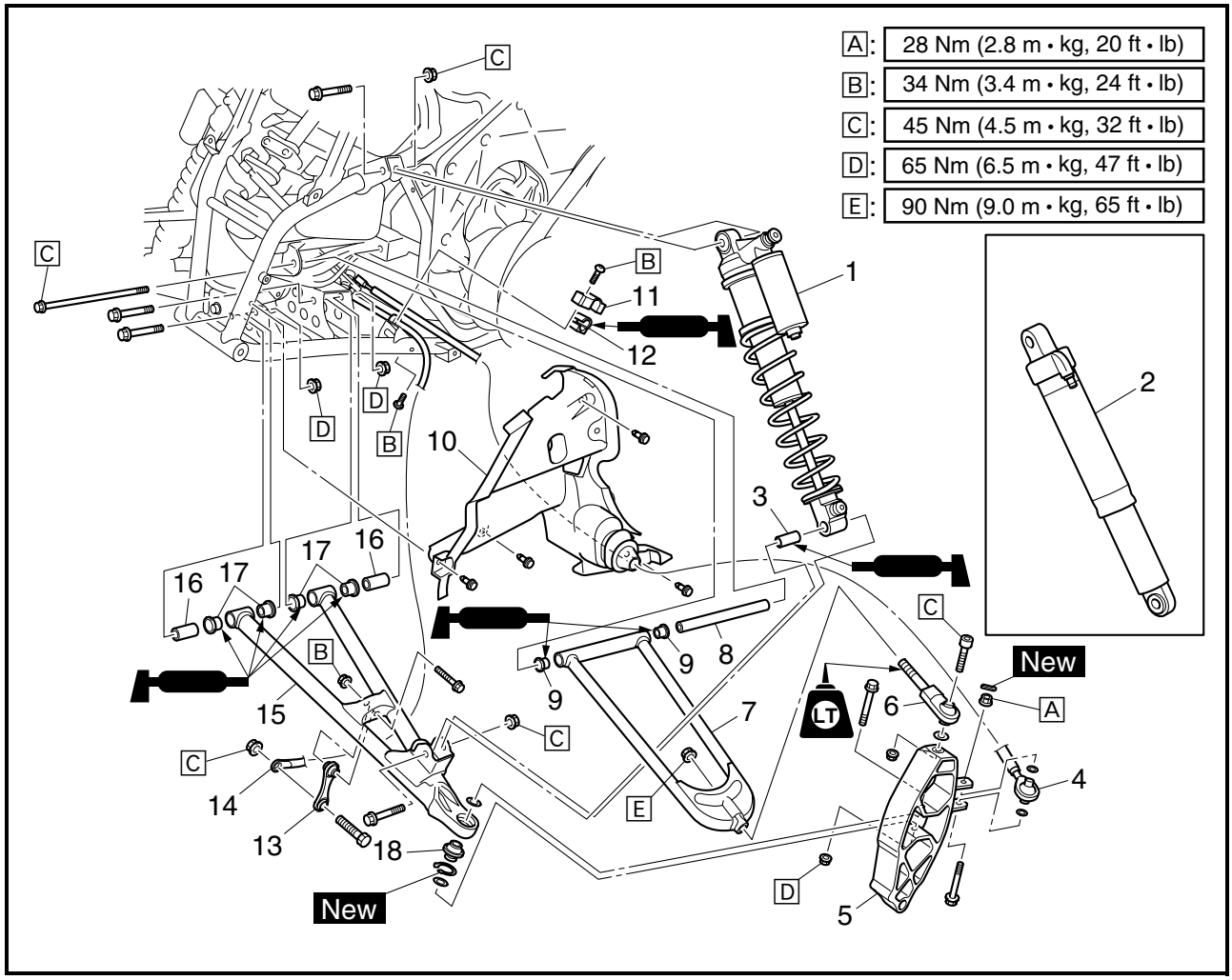
INSPECTION

The following procedure applies of all of the skis and related components.

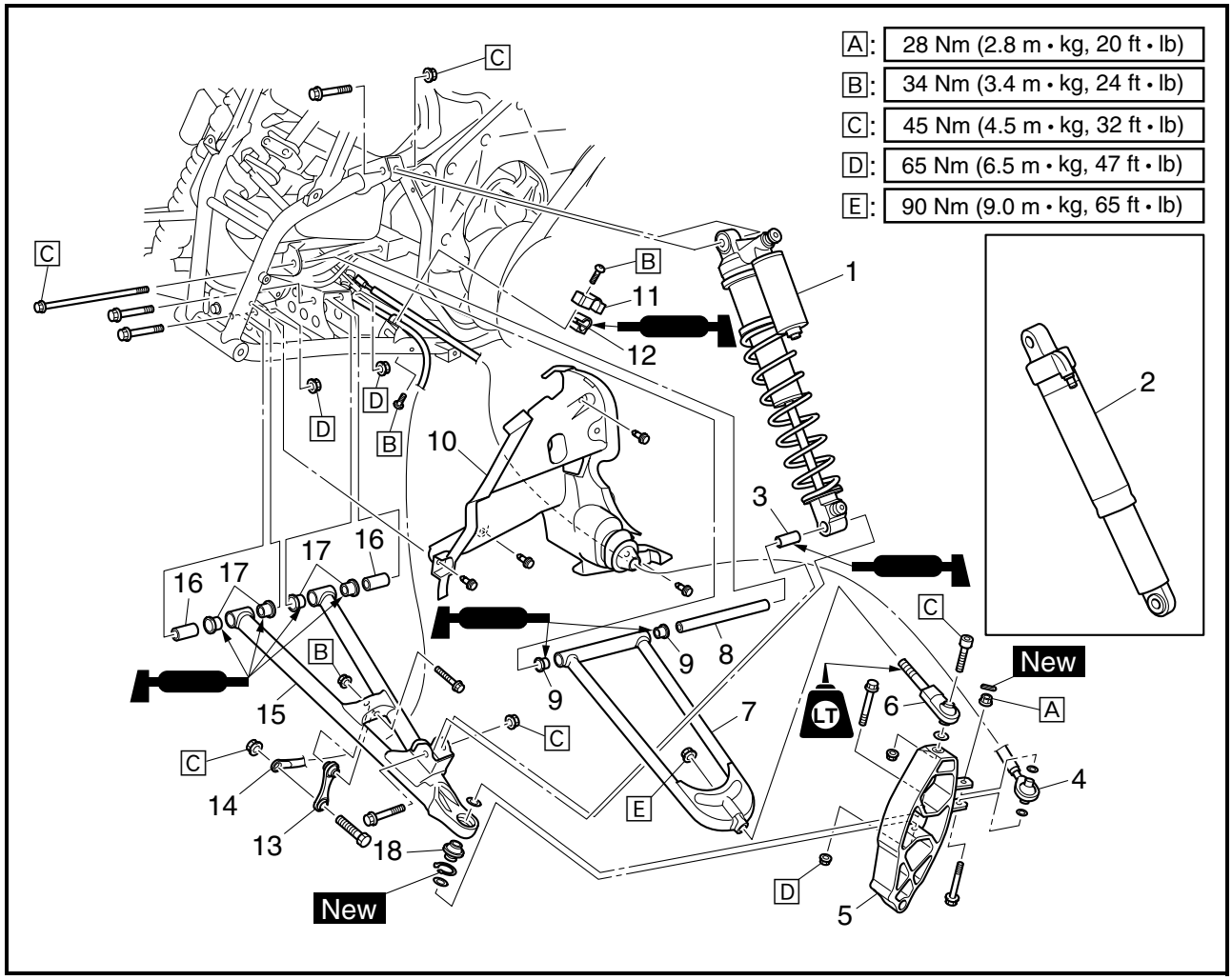
1. Inspect:
   - Ski
   - Ski runner
   - Ski stopper
   - Ski handle
     Wear/cracks/damage → Replace.
   - Mounting bolt
   - Collars
     Wear/damage → Replace.

FRONT SUSPENSION

FX10/FX10RT/FX10RTR/FX10RTRA

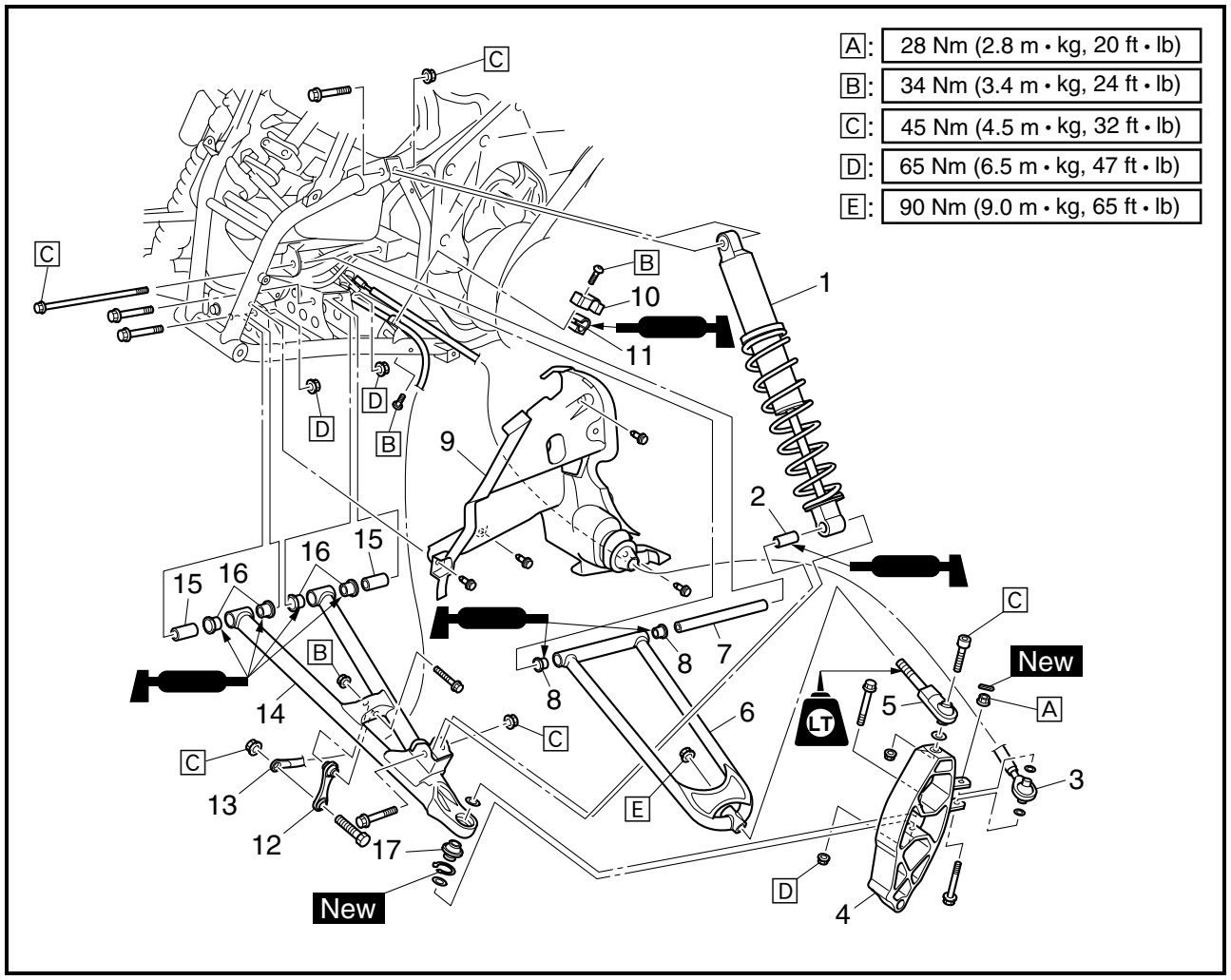


Order	Job name/Part name	Q'ty	Remarks
	Front suspension removal		Remove the parts in the order listed below.
			The following procedure applies to both of the front suspension.
	Lower cover/Front bumper		Refer to "COVERS".
	Ski		Refer to "SKI".
1	Shock absorber	1	FX10
2	Shock absorber	1	FX10RT/FX10RTR/FX10RTRA
3	Collar	1	FX10
4	Tie rod	1	Disconnect.
5	Steering knuckle	1	
6	Upper arm ball joint	1	
7	Upper arm	1	
8	Collar	1	
9	Bushing	2	
10	Pivot arm cover	1	
11	Stabilizer holder	1	
12	Bushing	1	

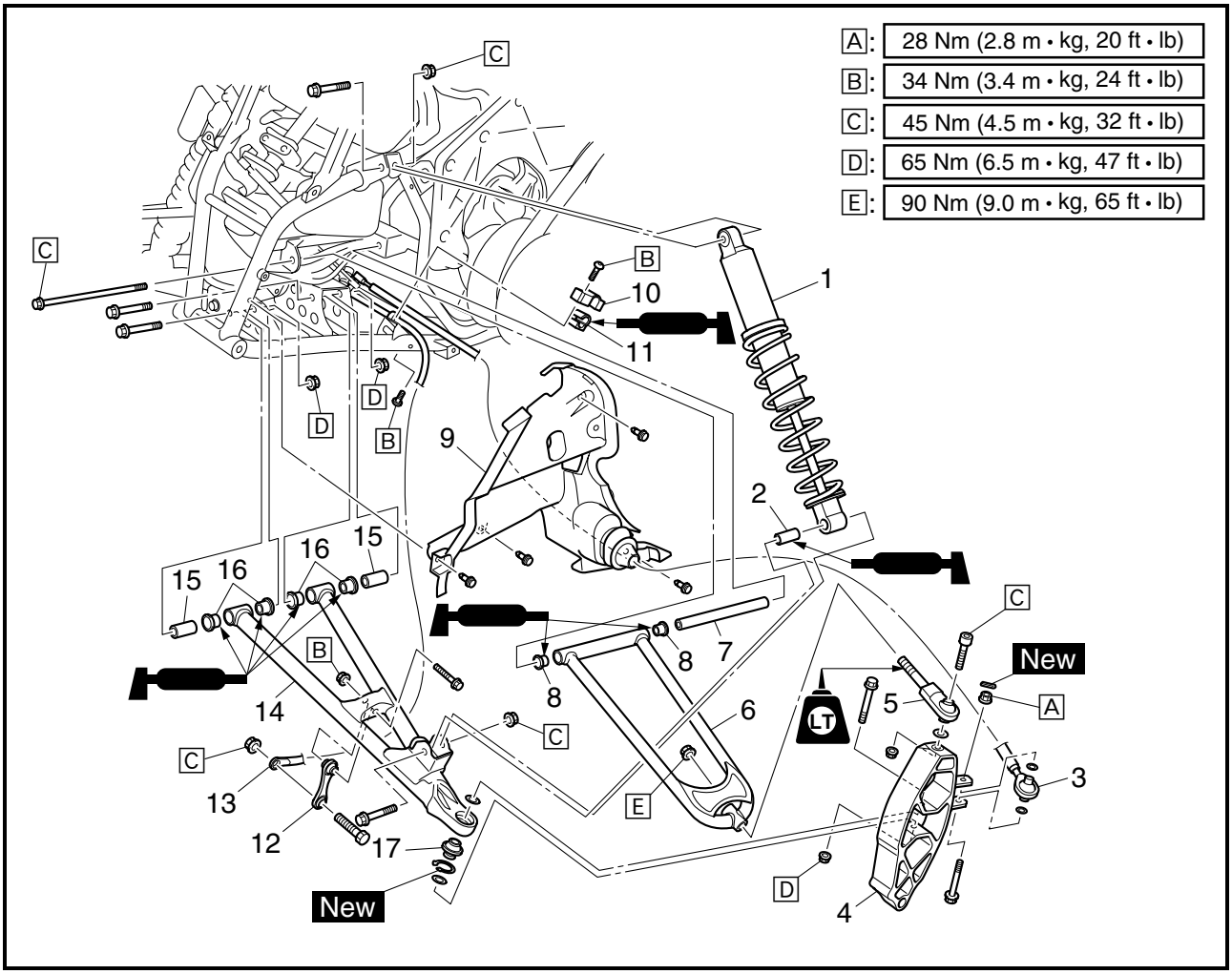


Order	Job name/Part name	Q'ty	Remarks
13	Stabilizer joint	1	
14	Stabilizer	1	
15	Lower arm	1	
16	Collar	2	
17	Bushing	4	
18	Lower arm ball joint	1	
			For installation, reverse the removal procedure.

FX10MT/FX10MTR/FX10MTRA



Order	Job name/Part name	Q'ty	Remarks
	Front suspension removal		Remove the parts in the order listed below. The following procedure applies to both of the front suspension.
	Lower cover/Front bumper		Refer to "COVERS".
	Ski		Refer to "SKI".
1	Shock absorber	1	
2	Collar	1	
3	Tie rod	1	Disconnect.
4	Steering knuckle	1	
5	Upper arm ball joint	1	
6	Upper arm	1	
7	Collar	1	
8	Bushing	2	
9	Pivot arm cover	1	
10	Stabilizer holder	1	
11	Bushing	1	



Order	Job name/Part name	Q'ty	Remarks
12	Stabilizer joint	1	
13	Stabilizer	1	
14	Lower arm	1	
15	Collar	2	
16	Bushing	4	
17	Lower arm ball joint	1	
			For installation, reverse the removal procedure.

HANDLING NOTES

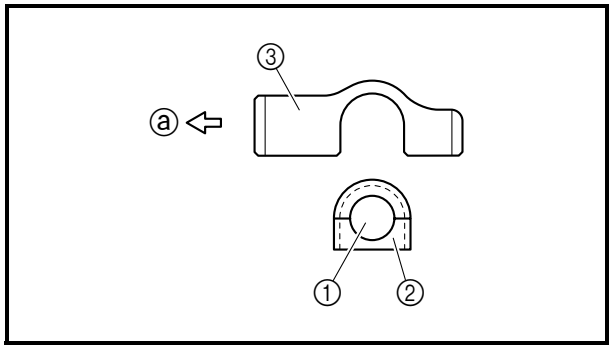
⚠ WARNING

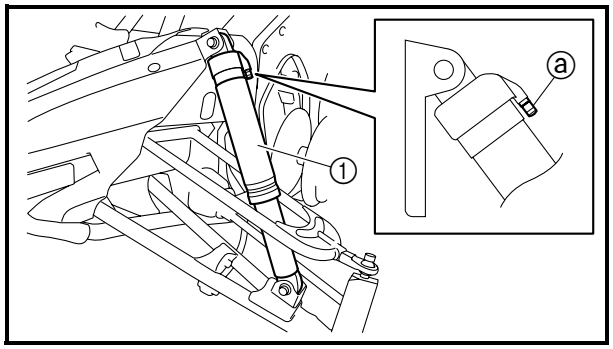
This shock absorber contains highly compressed nitrogen gas. Before handling the shock absorber read and make sure that you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

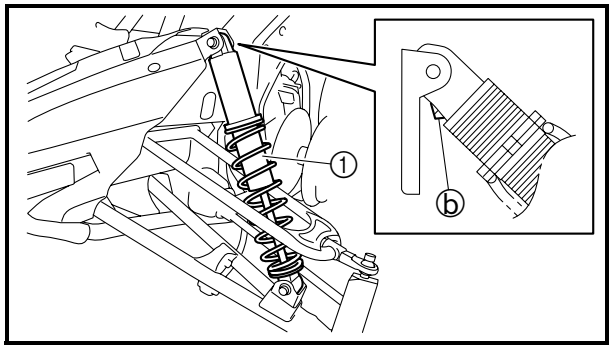
- **Do not tamper or attempt to open the gas chamber.**
- **Do not subject the shock absorber to flames or any other source of high heat. This may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the gas chamber in any way. Gas chamber damage will result in poor damping performance.**

INSPECTION

1. Inspect:
   - Shock absorbers
     Oil (gas) leaks/bends/damage → Replace.
2. Inspect:
   - Steering knuckles
     Cracks/bends/damage → Replace.
3. Inspect:
   - Upper arms
   - Lower arms
     Cracks/bends/damage → Replace.
   - Bushings
     Wear/scratches/damage → Replace.
   - Upper arm ball joints
   - Lower arm ball joints
     Damage/pitting → Replace.
4. Inspect:
   - Stabilizer
     Cracks/bends/damage → Replace.
   - Bushings
     Wear/scratches/damage → Replace.
   - Stabilizer joints
     Damage/pitting → Replace.







INSTALLATION

1. Install:
   - Stabilizer ①
   - Bushing ②
   - Stabilizer holder ③

NOTE:

Install the stabilizer holder in the direction shown in the illustration.

ⓐ Forward

2. Install:
   - Shock absorber ①

NOTE:

- Install the shock absorber with the air valve ⓐ facing outward. (FX10RT/FX10RTR/FX10RTRA)
- Install the shock absorber with the charging valve ⓑ facing inward. (FX10MT/FX10MTR/FX10MTRA)

Ski alignment

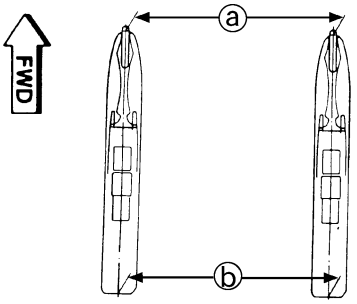
NOTE:

Be sure to verify the spring preload setting before adjusting the ski toe-out since this adjustments may affect the ski toe-out setting.

Point the skis straight forward and measure the amount of ski toe-out.

Ski toe-out:
0 ~ 15 mm (0 ~ 0.59 in)

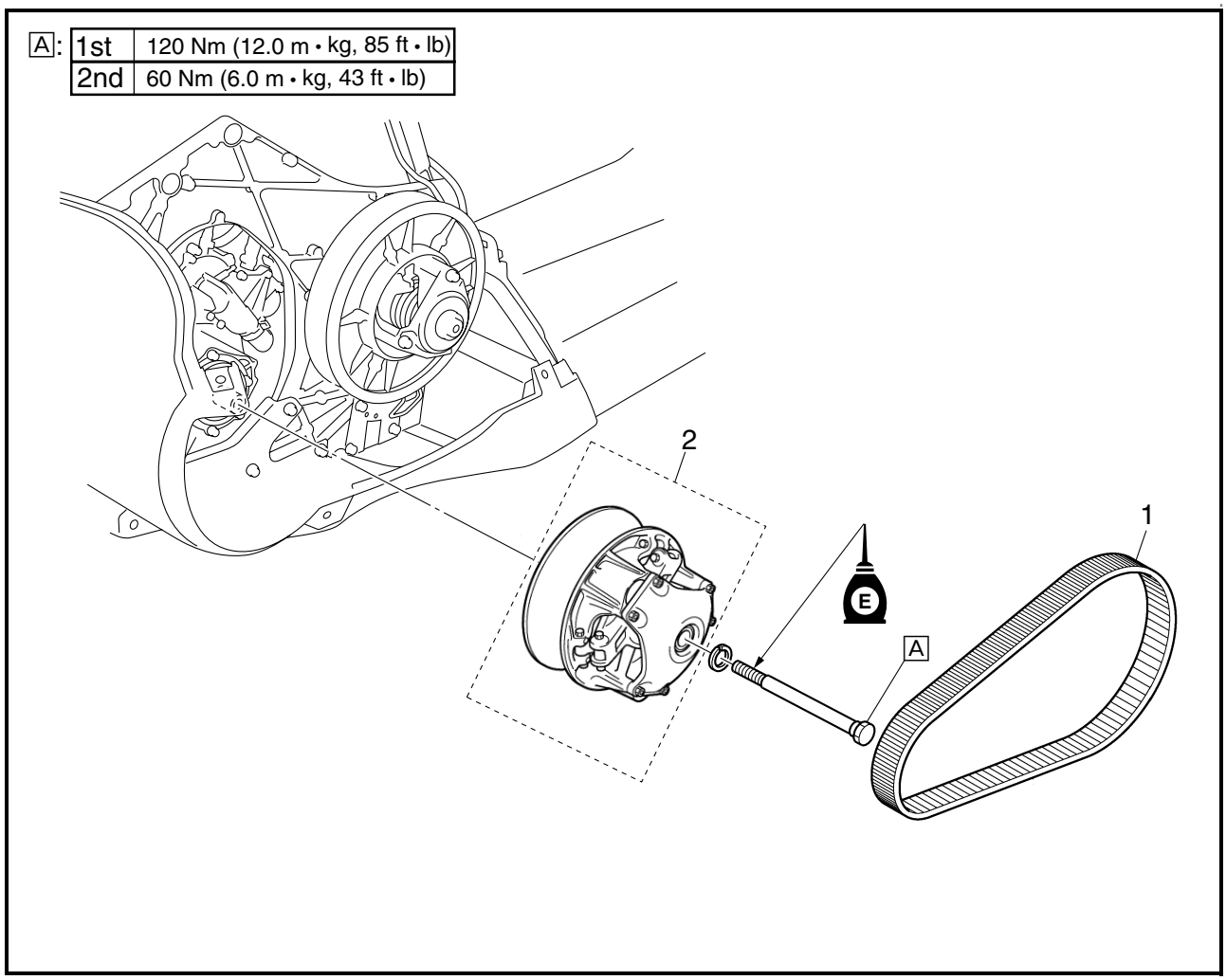
ⓐ – ⓑ = Toe-out



Refer to “STEERING SYSTEM” in CHAPTER 2.

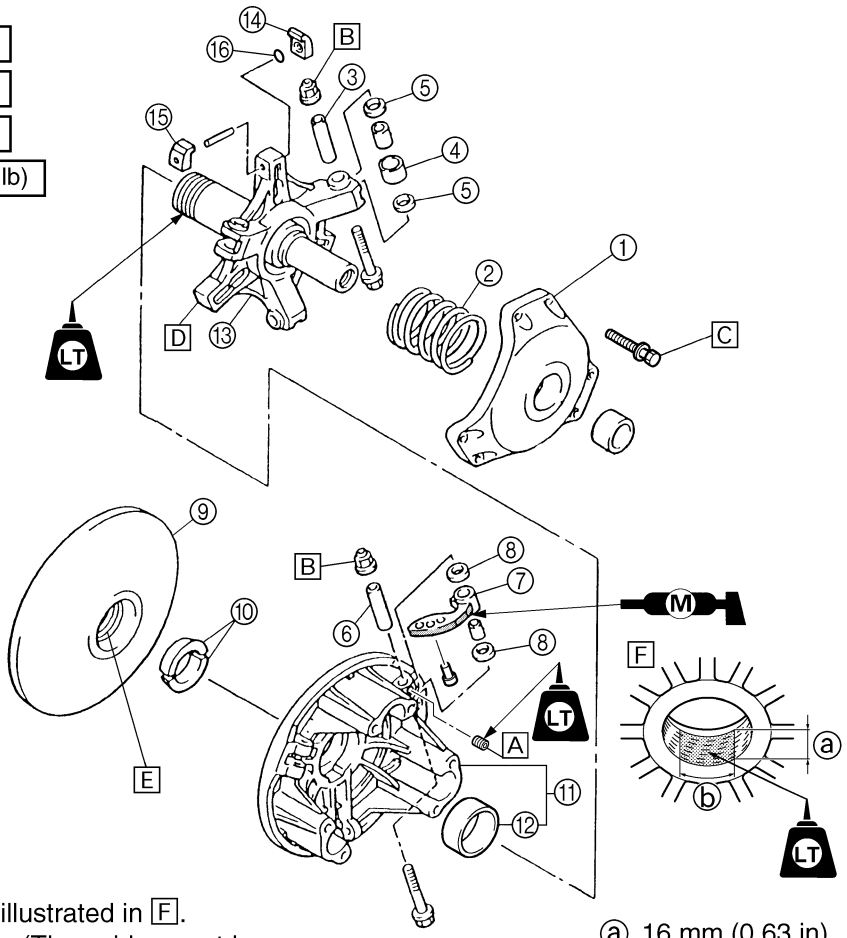
POWER TRAIN

PRIMARY SHEAVE AND DRIVE V-BELT



Order	Job name/Part name	Q'ty	Remarks
	Primary sheave and drive V-belt removal		Remove the parts in the order listed below.
	Left side cover/Drive guard		Refer to "COVERS" in CHAPTER 3.
1	V-belt	1	
2	Primary sheave assembly	1	
			For installation, reverse the removal procedure.

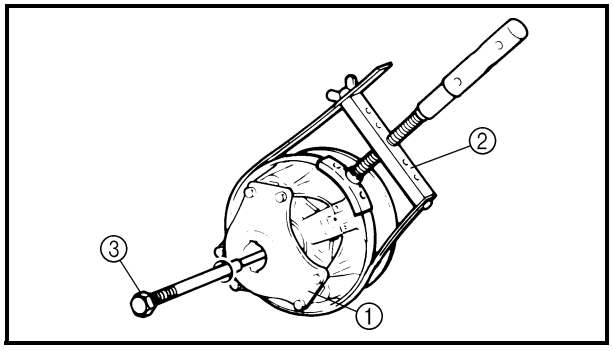
A: 4 Nm (0.4 m • kg, 2.9 ft • lb)
B: 6 Nm (0.6 m • kg, 4.3 ft • lb)
C: 14 Nm (1.4 m • kg, 10 ft • lb)
D: 200 Nm (20.0 m • kg, 145 ft • lb)



E : Clean the threads.
Apply LOCTITE® #648 as illustrated in F.
And then tighten the spider. (The spider must be turned counterclockwise to be tightened.)

ⓐ 16 mm (0.63 in)
ⓑ 30 mm (1.18 in)

Order	Job name/Part name	Q'ty	Remarks
	Primary sheave disassembly		Remove the parts in the order listed below.
①	Primary sheave cap	1	
②	Primary sheave spring	1	
③	Collar	3	
④	Roller	3	
⑤	Washer	6	
⑥	Collar	3	
⑦	Weight	3	
⑧	Washer	6	
⑨	Fixed sheave	1	
⑩	Stopper	2	
⑪	Sliding sheave	1	
⑫	Bushing	1	
⑬	Spider	1	Left-handed thread.
⑭	Slider	3	
⑮	Slider	3	
⑯	O-ring	3	
			For assembly, reverse the disassembly procedure.



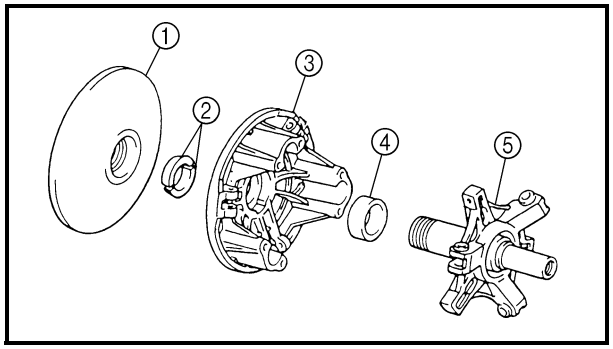
REMOVAL

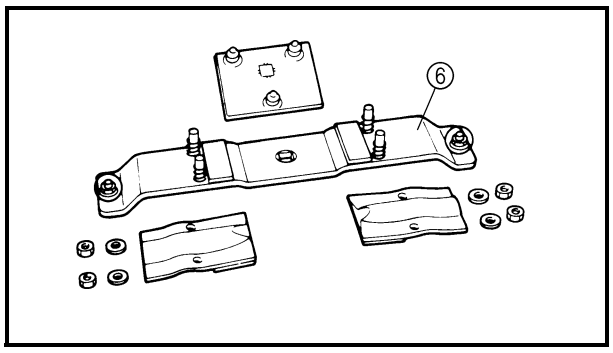
1. Remove:
   - Primary sheave assembly ①

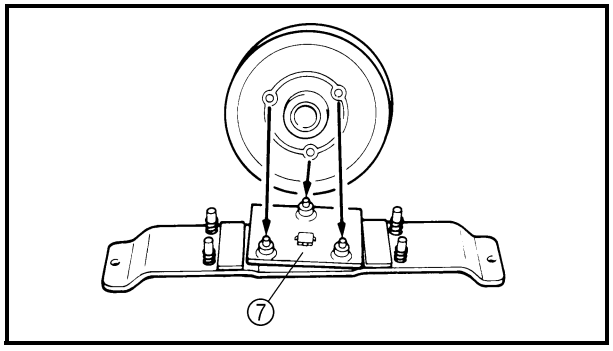
NOTE:

Use the primary sheave holder ② and primary sheave puller ③.

Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A
Primary sheave puller (18 mm):
90890-01898,
YS-01881-A, YS-01881-1







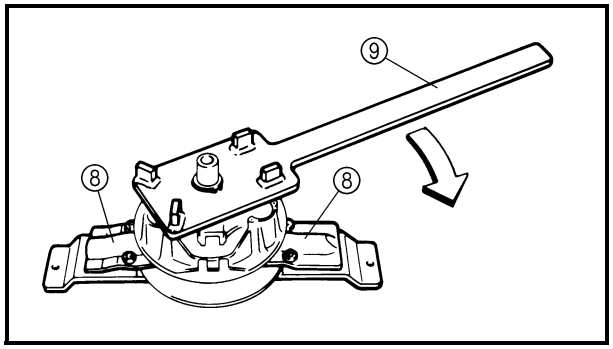
DISASSEMBLY

1. Remove:
   - Fixed sheave ①
   - Stopper ②
   - Sliding sheave ③
   - Bushing ④
   - Spider ⑤

Removal steps:

- Immerse the primary sheave assembly in 80 ~ 100 °C (176 ~ 212 °F) water for several minutes.
- Attach the lower piece of the clutch spider separator ⑥ onto a rigid table using suitable mounting bolts.
- Then, install the clutch separator adapter ⑦ onto the separator.

Clutch spider separator:
90890-01711, YS-28890-C
Clutch separator adapter:
90890-01740, YS-34480



- Fit the primary sheave assembly onto the adapter and secure the supporting plates ⑧.

NOTE:

Securely fit the projections on the adapter into the fixed sheave holes.

- Set the bar wrench ⑨ onto the spider and turn the special tool clockwise to loosen the spider.

Clutch spider separator (bar wrench):
90890-01711, YS-28890-C

CAUTION:

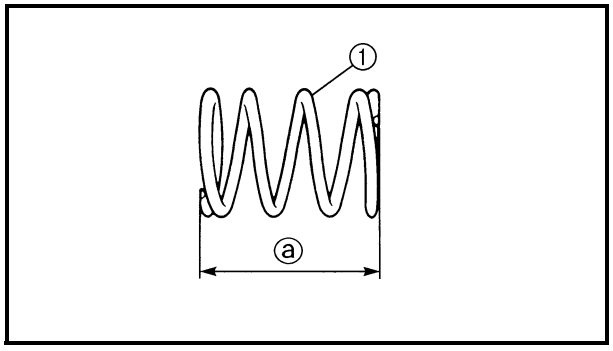
- **The spider has a left-handed thread.**
- **Since a high torque is required to loosen the spider, make sure that the spider, fixed sheave and special tool are well secured. Loosen the spider carefully to prevent cracks and damage to the sheaves and spider.**

- Remove the fixed sheave, fixed sheave stopper, and sliding sheave from the spider.

INSPECTION

1. Inspect:
   - Spider
   - Sliding sheave
   - Fixed sheave
   - Primary sheave cap

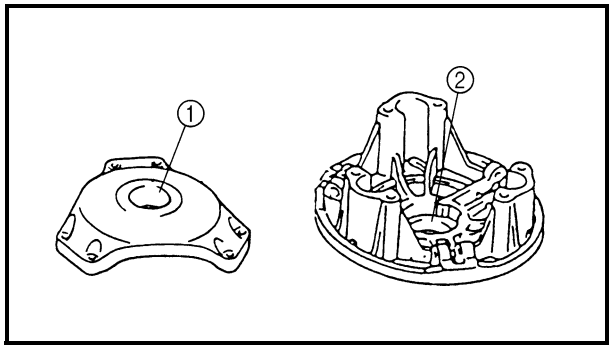
   Cracks/damage → Replace.



2. Inspect:
   - Primary sheave spring ①
     Cracks/damage → Replace.
3. Measure:
   - Primary sheave spring (standard) free length ⓐ
     Out of specification → Replace the primary sheave spring.

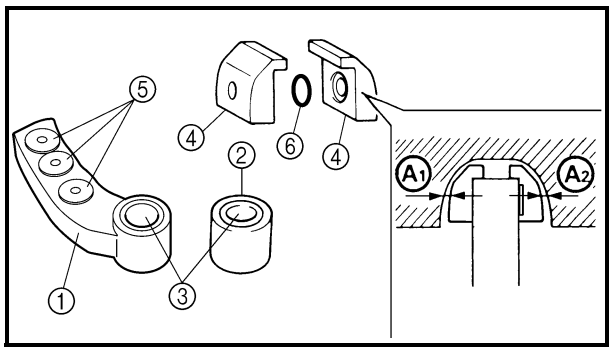
Primary sheave spring (standard) free length:
FX10/FX10RT/FX10RTR/FX10RTRA
87.4 mm (3.44 in)
FX10MT "USA/Canada"/FX10MTR "USA/Canada"
89.8 mm (3.54 in)
FX10MTR "Europe"/FX10MTRA "Europe"
98.4 mm (3.87 in)

NOTE:
When changing the primary sheave springs, refer to "GEAR SELECTION" in CHAPTER 2.



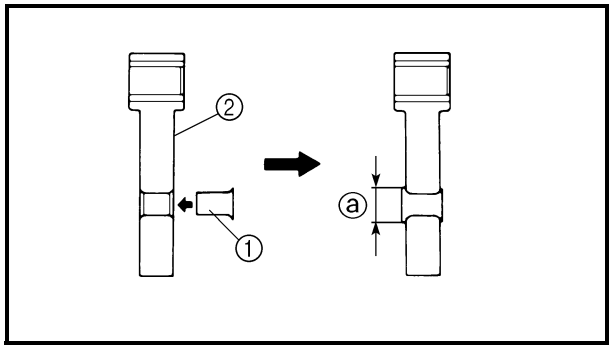
4. Inspect:
   - Primary sheave cap bush ①
   - Sliding sheave bush ②
     Cracks/damage → Replace.

Clutch bushing press:
90890-01529, YS-42424

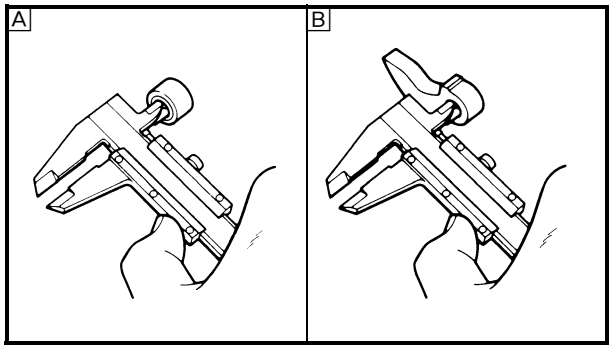


5. Inspect:
   - Weight ①
   - Roller ②
   - Bushing ③
   - Slider ④
   - Rivet ⑤
   - O-ring ⑥
   - Collar
     Wear/scratches/damage → Replace.

Slider inside clearance Ⓐ1 + Ⓐ2 :
Min. 0 mm (0 in)
Max. 0.3 mm (0.0118 in)

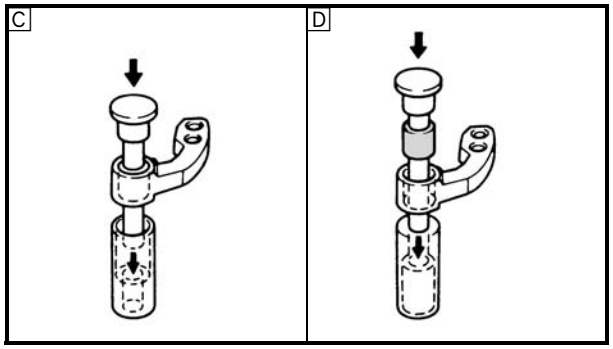


Rivet replacement steps:
- Remove old rivet with the appropriate drill.
- Insert the rivet ① from the ID mark ② side.
- Press or peen the rivet head so that the diameter ⓐ of the rivet head measures 8.2 mm (0.32 in) or larger.



6. Measure:
   - Bushing inside diameter
     Out of specification → Replace as a set.

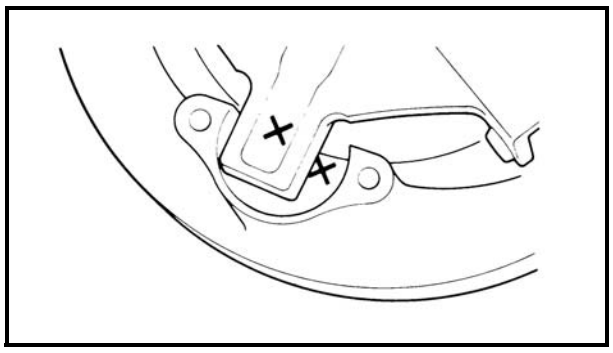
Bushing inside diameter:
Roller A:
New: 9.077 mm (0.357 in)
Wear limit: 9.3 mm (0.366 in)
Weight B:
New: 8.077 mm (0.318 in)
Wear limit: 8.3 mm (0.327 in)



NOTE:
When replacing the weight and roller bushings, use the YXR clutch bushing jig kit.

YXR clutch bushing jig kit:
90890-01528, YS-39752

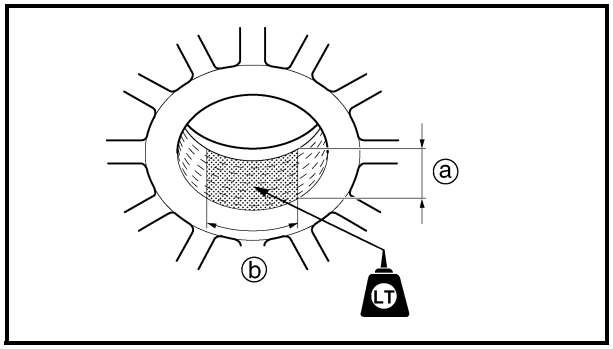
C Removing
D Installing



ASSEMBLY

1. Install:
   - Sliding sheave
     (onto the spider)

NOTE:
Be sure the sliding sheave match mark (X) is aligned with the spider match mark (X).

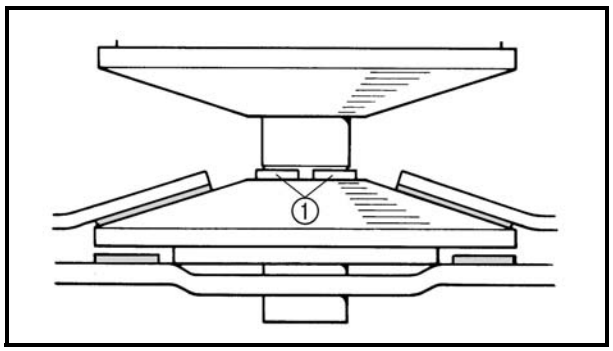


2. Install:
   • Fixed sheave
     (onto the spider)

NOTE:
- Clean the threads.
- Apply LOCTITE® #648 to the fixed sheave as shown.

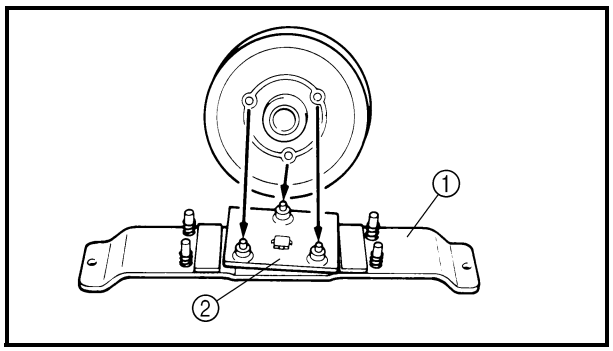
CAUTION:
LOCTITE® should be applied only to the specified area. Never apply it to the bushings and other areas.

ⓐ 16 mm (0.63 in)
ⓑ 30 mm (1.18 in)



3. Install:
   • Fixed sheave stoppers ①

NOTE:
Stopper tapered portion should face fixed sheave.

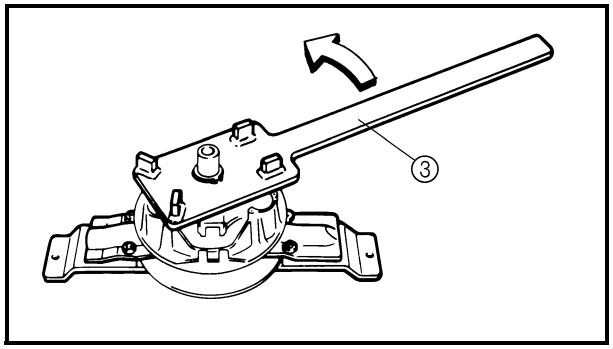


4. Tighten:
   • Spider

Tightening steps:
- Finger-tighten the spider until it is stopped by the fixed sheave stopper.
- Hold the fixed sheave with the clutch spider separator ①.

Clutch spider separator:
90890-01711, YS-28890-C

NOTE:
Securely fit the projections on the clutch separator adapter ② into the fixed sheave holes.



- Tighten the spider to specification using the bar wrench ③.

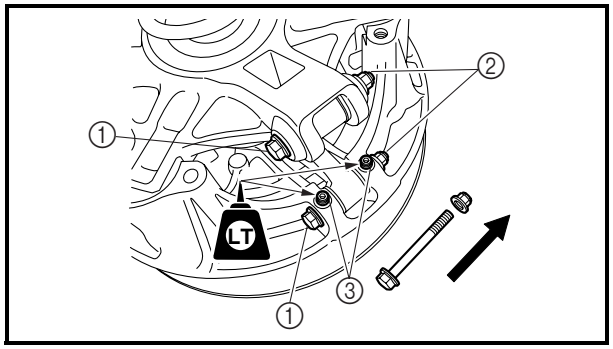
	Clutch spider separator (bar wrench): **90890-01711, YS-28890-C**
	Spider: **200 Nm (20.0 m · kg, 145 ft · lb)**

CAUTION:

The spider has a left-handed thread.

⚠ WARNING

- **Do not operate the primary sheave until the LOCTITE® has dried completely. Wait 24 hours before operating the primary sheave.**
- **Since a high torque is required to tighten the spider, make sure the spider, fixed sheave, and special tool are well secured. Tighten the spider carefully to prevent cracks and damage to the sheaves and spider.**

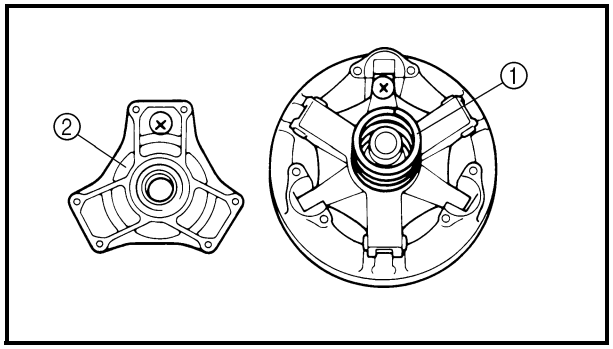


5. Install:
   - Weight
   - Bolts ①
   - Nuts ②
   - Set bolts ③

	Nut: **6 Nm (0.6 m · kg, 4.3 ft · lb)** **Set bolt:** **4 Nm (0.4 m · kg, 2.9 ft · lb)** **LOCTITE®**

NOTE:

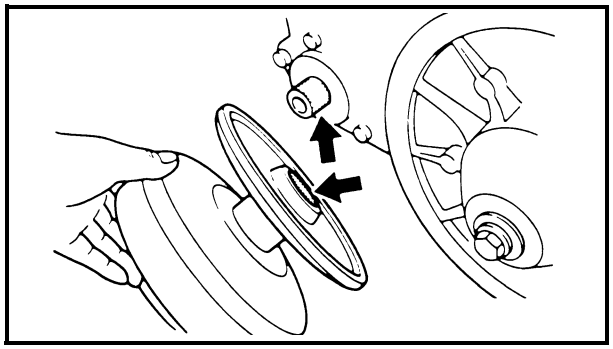
To maintain the primary sheave balance, the bolts ① must be installed with their threaded portions pointing in a counterclockwise direction, as illustrated.



6. Install:
   - Primary sheave spring ①
   - Primary sheave cap ②

NOTE:
Be sure the sheave cap match mark (X) is aligned with the spider match mark (X).

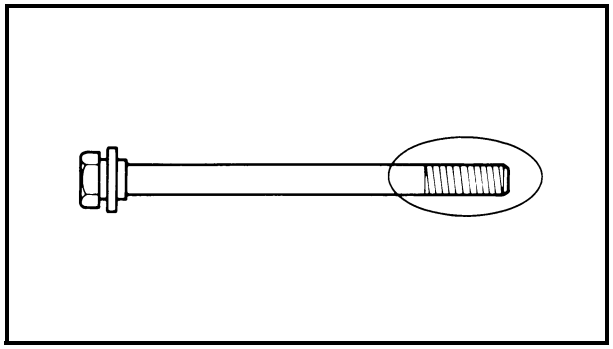
Primary sheave cap bolt:
14 Nm (1.4 m · kg, 10 ft · lb)



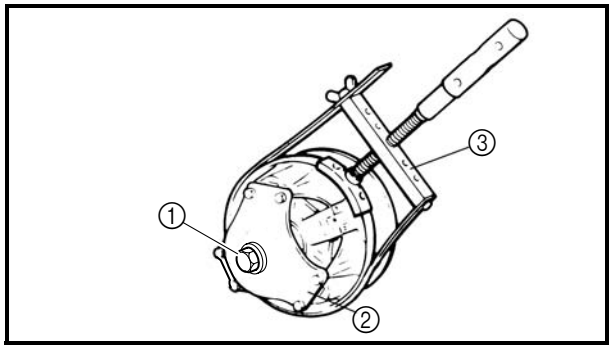
INSTALLATION

1. Install:
   - Primary sheave assembly

CAUTION:
Be sure to remove any oil or grease from the tapered portion of the crankshaft and spider using a cloth dampened with thinner.



2. Apply:
   - Engine oil (to threads of primary sheave bolt)



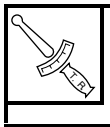
3. Tighten:
   - Primary sheave bolt ①

Tightening steps:
- Hold the primary sheave ② using the sheave holder ③ and tighten the primary sheave bolt to specification.

Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A

Primary sheave bolt:
1st:
120 Nm (12.0 m · kg, 85 ft · lb)

- Loosen the primary sheave bolt completely.
- Retighten the primary sheave bolt to specification.

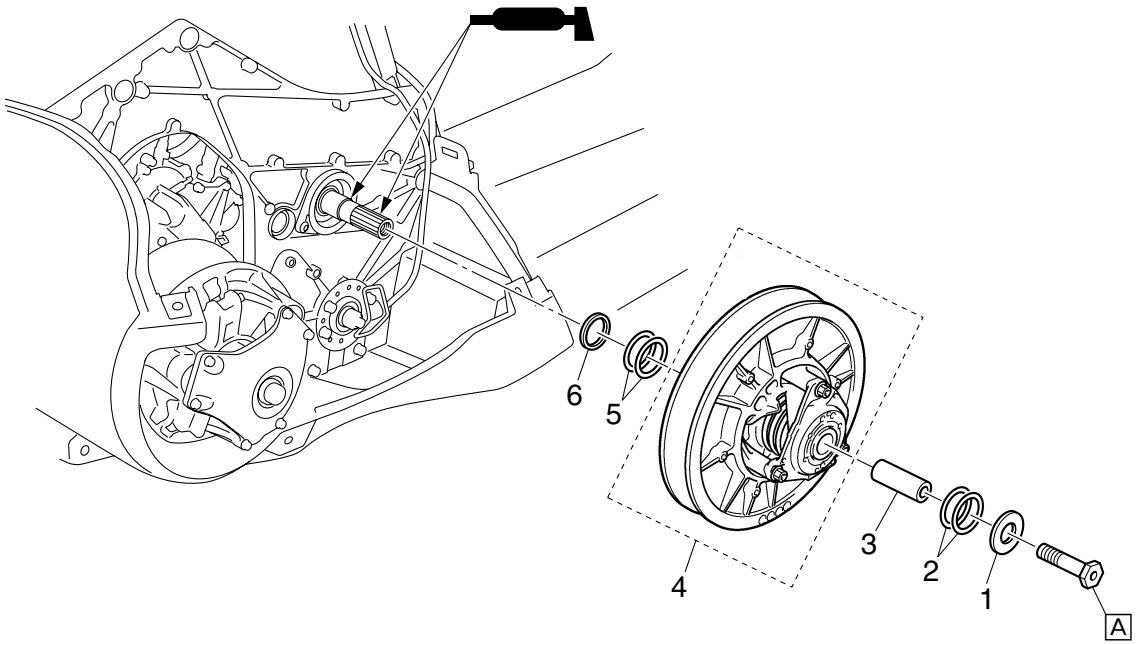


Primary sheave bolt:
2nd:
60 Nm (6.0 m · kg, 43 ft · lb)

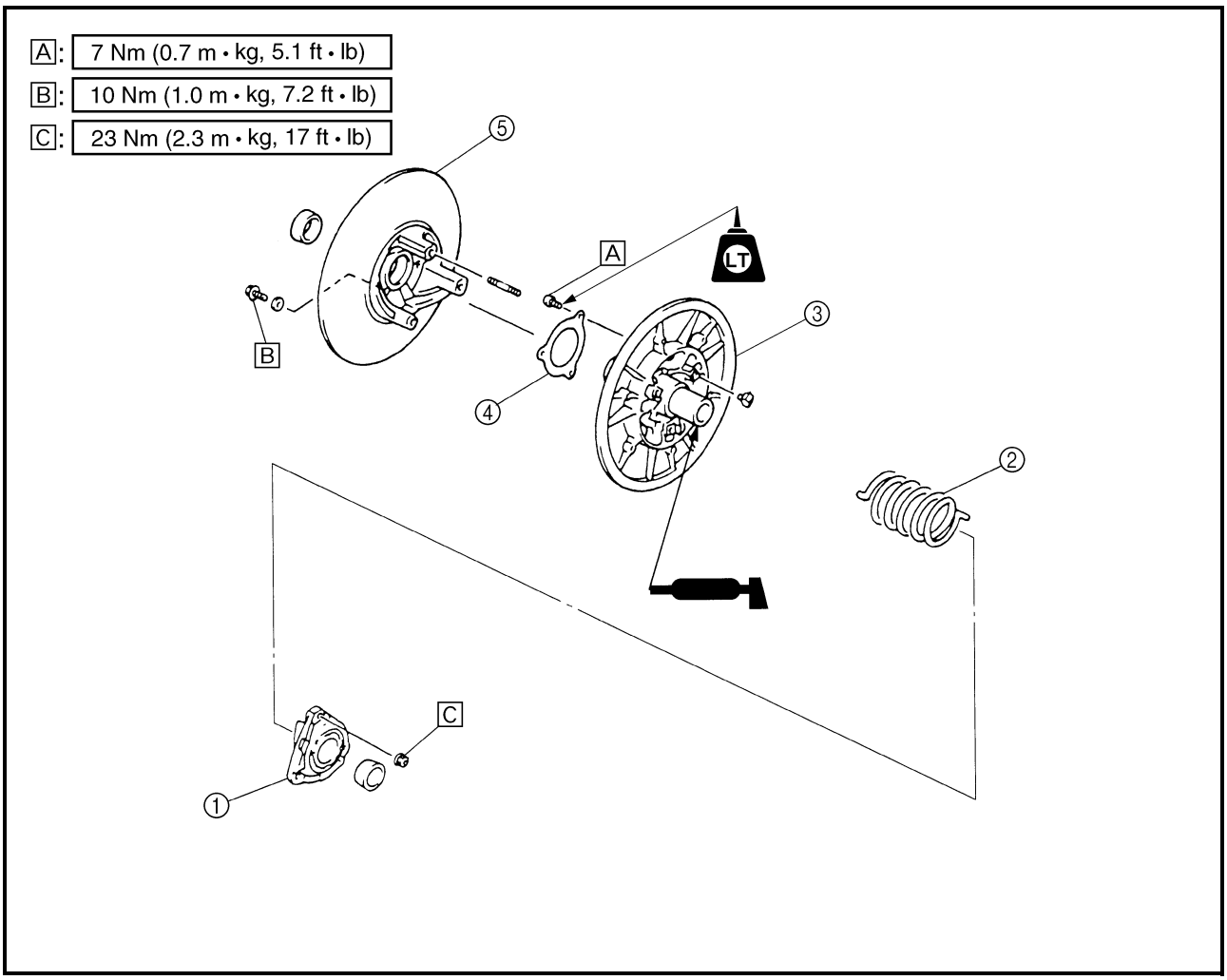
4. Adjust:
   - V-belt position
     Refer to “DRIVE V-BELT” in CHAPTER 2.
   - Sheave offset
   - Secondary sheave free play (clearance)
     Refer to “SHEAVE OFFSET ADJUSTMENT” in CHAPTER 2.

SECONDARY SHEAVE

A: 64 Nm (6.4 m • kg, 46 ft • lb)



Order	Job name/Part name	Q'ty	Remarks
	Secondary sheave removal		Remove the parts in the order listed below.
			NOTE: Apply the brake to lock the secondary sheave.
	Left side cover/Drive guard		Refer to "COVERS" in CHAPTER 3.
	V-belt		Refer to "PRIMARY SHEAVE AND DRIVE V-BELT".
1	Washer	1	
2	Shim (left)	—	Refer to "SHEAVE OFFSET ADJUSTMENT" in CHAPTER 2.
3	Collar	1	
4	Secondary sheave assembly	1	
5	Shim (right)	—	Refer to "SHEAVE OFFSET ADJUSTMENT" in CHAPTER 2.
6	Washer	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Secondary sheave disassembly		Remove the parts in the order listed below.
①	Spring seat	1	
②	Secondary sheave spring	1	
③	Fixed sheave	1	
④	Stopper	1	
⑤	Sliding sheave	1	
			For assembly, reverse the disassembly procedure.

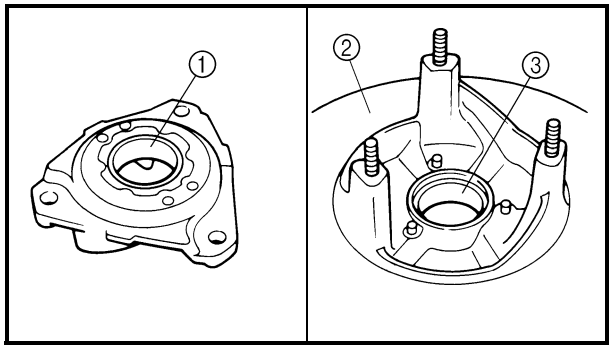
DISASSEMBLY

⚠ WARNING

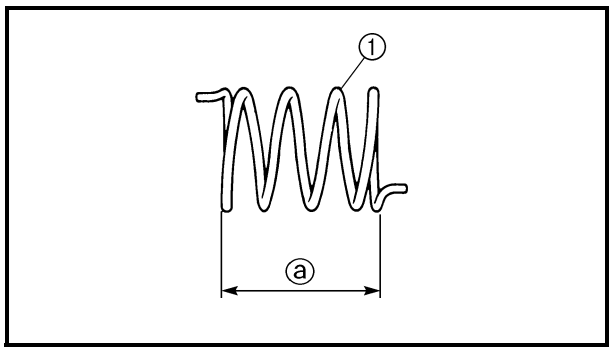
- **Use extreme CAUTION when disassembling the secondary sheave since serious injury can occur due to the sudden release of spring tension. Use the sheave compressor to contain the spring tension before removing the spring seat nuts.**
- **Do not attempt this procedure unless you have the proper tools and understand the instructions thoroughly.**

INSPECTION

1. Inspect:
   - Sliding sheave
   - Fixed sheave
   - Spring seat
     Cracks/damage → Replace.
   - Stopper
     Wear/damage → Replace.

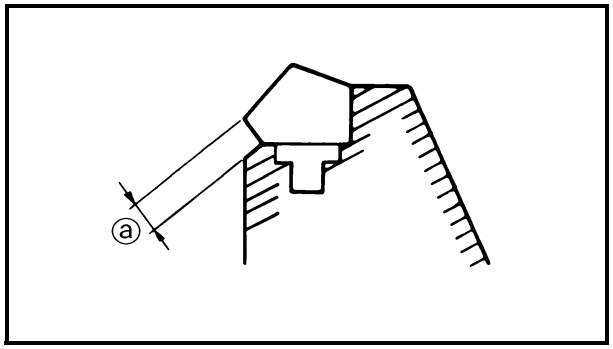


2. Inspect:
   - Bushing (spring seat) ①
   - Sliding sheave (V-belt contact surface) ②
     Scratches/wear/damage → Replace.
   - Sliding bushing ③
     Unsymmetrical wear/damage → Replace.



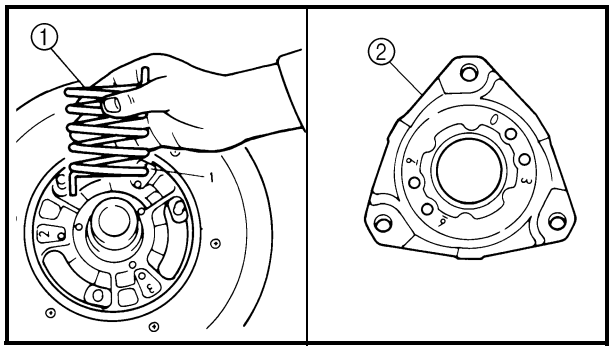
3. Inspect:
   - Secondary sheave spring ①
     Cracks/damage → Replace.
4. Measure:
   - Secondary sheave spring (standard) free length ⓐ
     Below specification → Replace the secondary sheave spring.

Secondary sheave spring (standard) free length:
75.0 mm (2.95 in)



5. Measure:
   - Ramp shoe thickness ⓐ
     Out of specification → Replace the ramp shoe.

Wear limit:
1.0 mm (0.04 in)

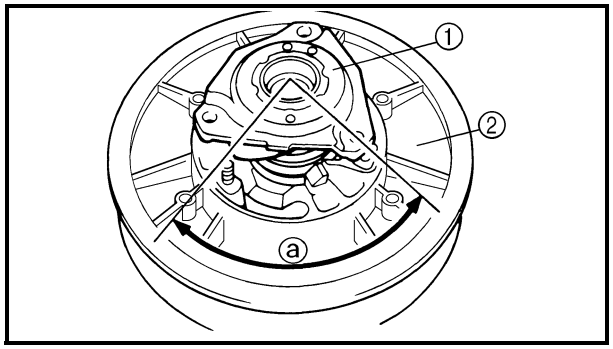


ASSEMBLY

1. Install:
   - Secondary sheave spring ①
   - Spring seat ②

NOTE:
Hook the end of the secondary sheave spring into the spring holes in the fixed sheave. Hook the other end of the spring into the holes in the spring seat.

Standard spring position:
2-6 (FX10/FX10RT/FX10RTR/FX10RTRA)
1-6 (FX10MT/FX10MTR/FX10MTRA)

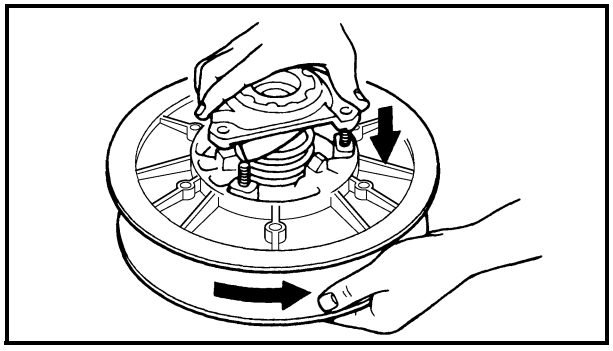


Installation steps:
- Hold the spring seat ① and turn the fixed sheave ② counterclockwise to the specified angle ⓐ.

NOTE:
The holes in the spring seat should align with the bolts on the sliding sheave.

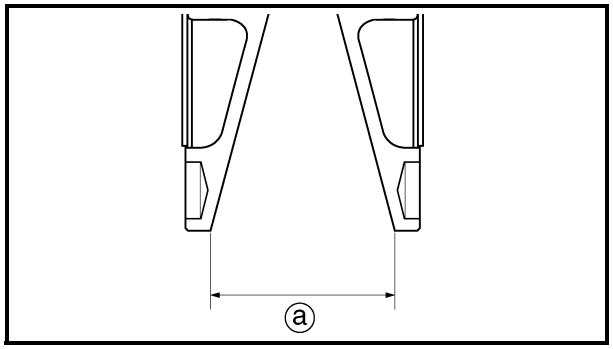
ⓐ = (sheave hole number + spring seat hole number) × 10

Twist angle:
80° (FX10/FX10RT/FX10RTR/FX10RTRA)
70° (FX10MT/FX10MTR/FX10MTRA)



- Push down on the spring seat until the bolts come through the holes.
- While pushing down on the spring seat, install the nuts and tighten them to the specified torque.

Spring seat nut:
23 Nm (2.3 m · kg, 17 ft · lb)



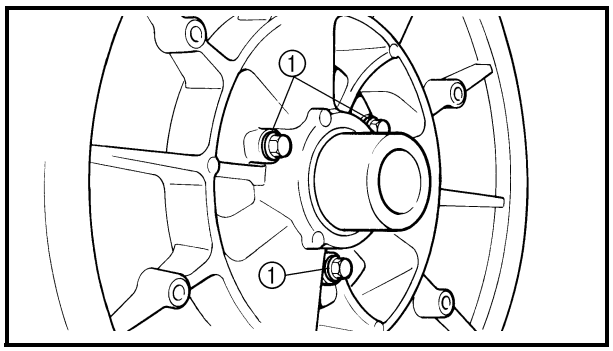
2. Measure:
   • Secondary sheave clearance ⓐ
   Out of specification → Adjust.

Secondary sheave clearance:
35.0 ~ 35.8 mm (1.38 ~ 1.41 in)

3. Calculate:
   • Shim thickness

NOTE:
For example, if the clearance is 36 mm (1.42 in), install a 0.5 mm (0.02 in) shim on each bolt so the clearance is 35.5 mm (1.40 in).

4. Adjust:
   • Secondary sheave clearance



Adjustment steps:
- Disassemble the secondary sheave.
- Remove the bolts and original shims ①.
- Install new shims of the proper thickness and reassemble the secondary sheave.
- Measure the secondary sheave clearance again.
  Repeat these steps until the clearance is within specification.

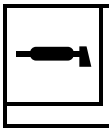
NOTE:
Yamaha recommends keeping the original shims.

Shims:

Part number	Thickness
90201-061H1	0.5 mm (0.02 in)
90201-06037	1.0 mm (0.04 in)

INSTALLATION

1. Lubricate:
   - Splines (fixed sheave)



Recommended grease:
ESSO beacon 325 grease or
Aeroshell grease #7A

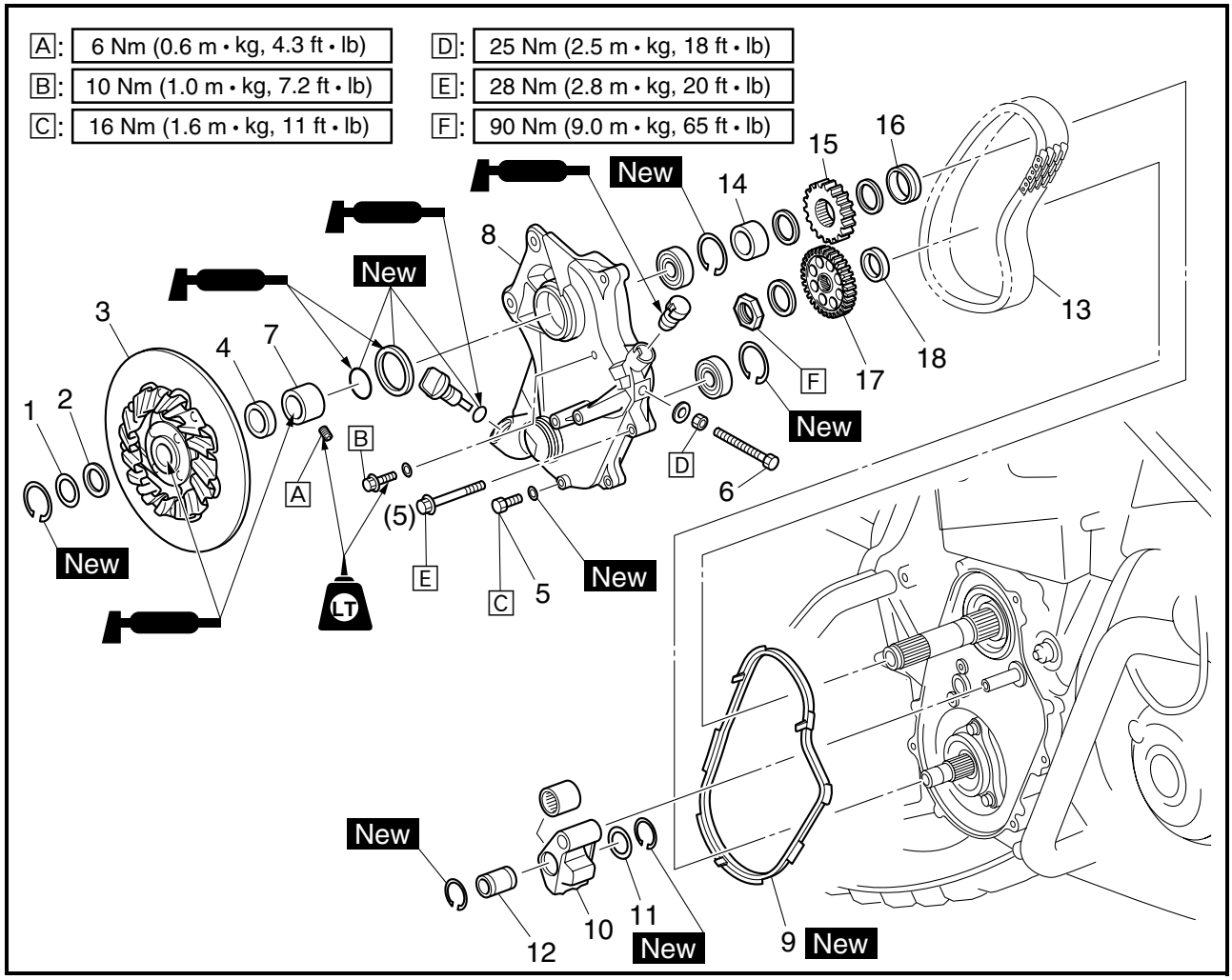
2. Tighten:
   - Secondary sheave bolt

Secondary sheave bolt:
64 Nm (6.4 m · kg, 46 ft · lb)

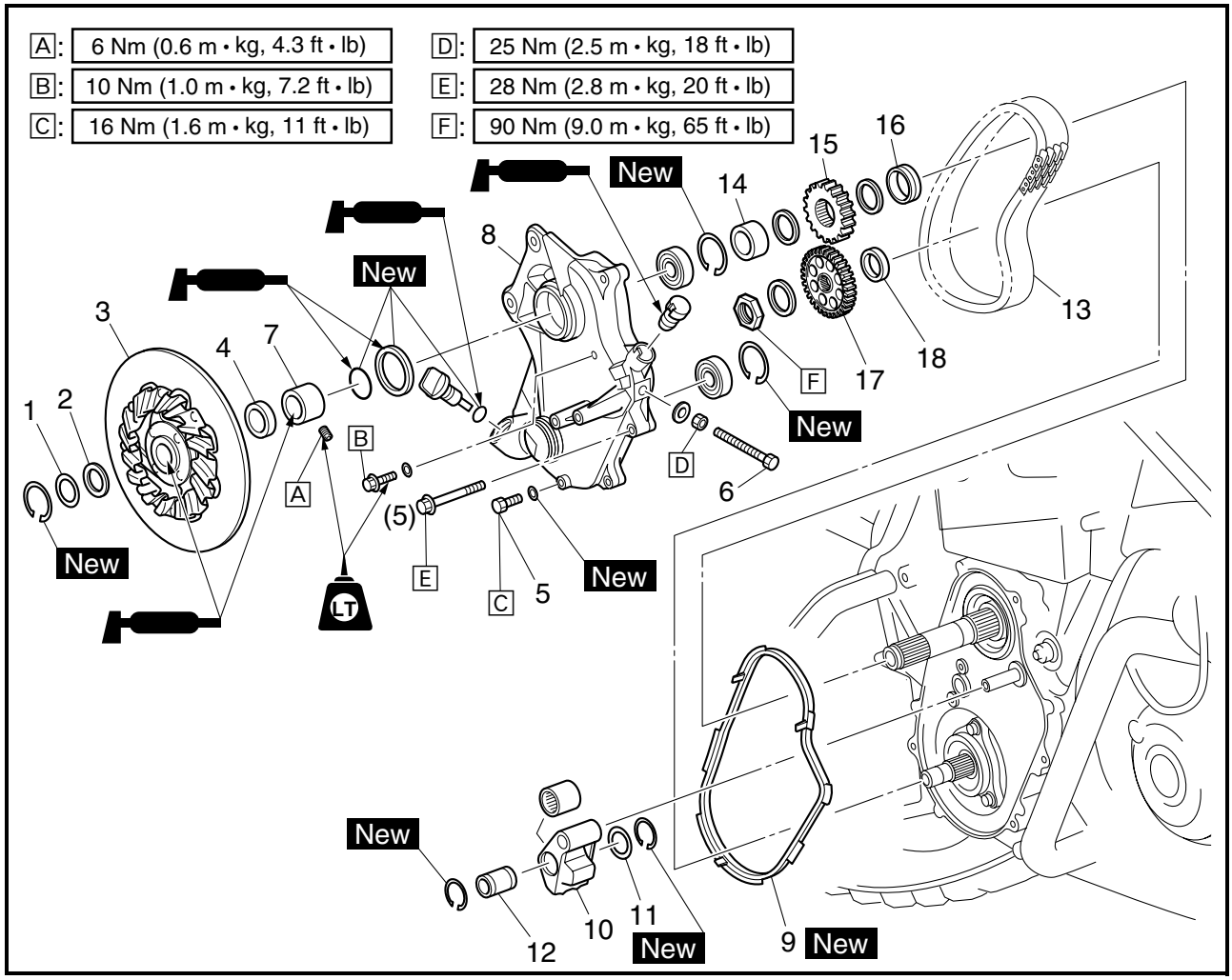
3. Adjust:
   - V-belt position
     Refer to “DRIVE V-BELT” in CHAPTER 2.
   - Sheave offset
   - Secondary sheave free play (clearance)
     Refer to “SHEAVE OFFSET ADJUSTMENT” in CHAPTER 2.

DRIVE CHAIN

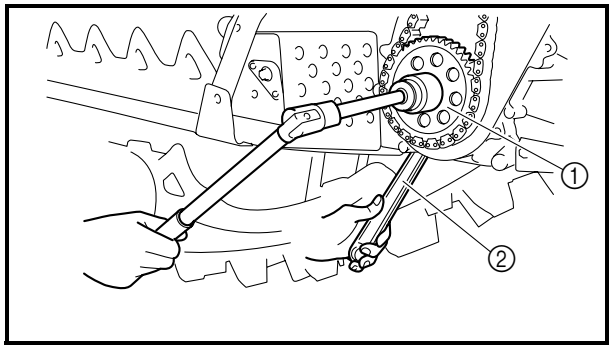
WITHOUT REVERSE MODEL



Order	Job name/Part name	Q'ty	Remarks
	Drive chain removal		Remove the parts in the order listed below.
	Right lower cover		Refer to "COVERS" in CHAPTER 3.
	Brake caliper/Parking brake		Refer to "BRAKE".
1	Shim	—	t = 0.5
2	Washer	1	t = 1.0
3	Brake disc	1	
4	Collar	1	
5	Drain bolt	1	Drain.
6	Chain tension adjusting bolt	1	Loosen.
7	Collar	1	
8	Drive chain cover	1	
9	Rubber seal	1	
10	Chain tensioner	1	
11	Washer	1	t = 0.5
12	Collar	1	



Order	Job name/Part name	Q'ty	Remarks
13	Drive chain	1	
14	Collar	1	
15	Drive sprocket	1	
16	Collar	1	
17	Driven sprocket	1	
18	Collar	1	
			For installation, reverse the removal procedure.



REMOVAL

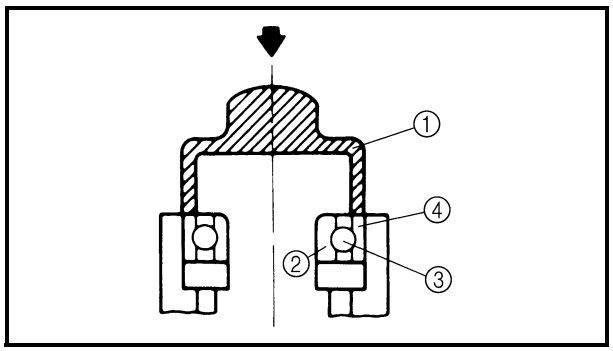
1. Remove:
   - Driven sprocket ①

NOTE:

While holding the front axle assembly with spanner wrench ②, loosen the driven sprocket nut.

INSPECTION

1. Inspect:
   - Drive chain cover
     Cracks/damage → Replace.
   - Oil seals (drive chain cover)
     Wear/damage → Replace.
   - Bearings
     Pitting/damage → Replace.



Replacement steps:

- Remove the circlip (drive chain cover).
- Remove the bearing(s) using a general bearing puller.
- Install the new bearing(s).

NOTE:

Use a socket ① that is the same size as the outside diameter of the bearing race.

CAUTION:

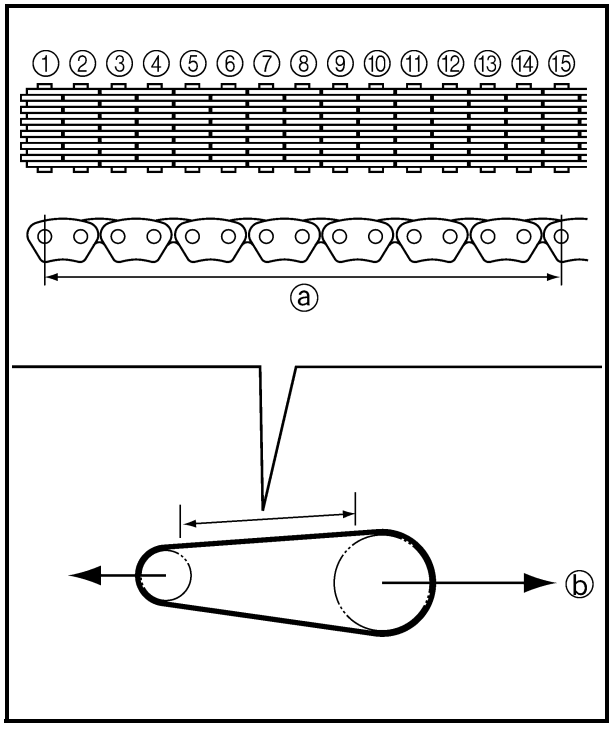
Do not strike the inner race ② or ball bearings ③. Contact only the outer race ④.

- Install a new circlip (drive chain cover).

CAUTION:

Always use new circlips.

2. Inspect:
   - Drive sprocket
   - Driven sprocket
   - Chain tensioner
     Pitting/wear/damage → Replace the defective part(s).



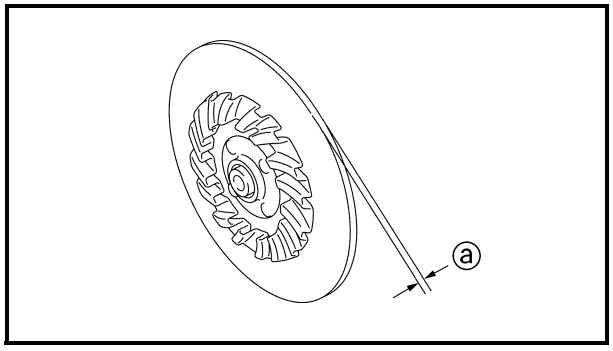
3. Measure:
   - 14 link section ⓐ of the drive chain
     Using a spring scale, pull on the drive chain with 36 kg (80 lb) of force ⓑ.
     Out of specification → Replace the drive chain.

Maximum 14 link drive chain section length:
133.35 mm (5.25 in)
Limit: 137.35 mm (5.41 in)

NOTE:
- Measure the length between drive chain pin ① and ⑮ as shown.
- Perform this measurement at two or three different places.

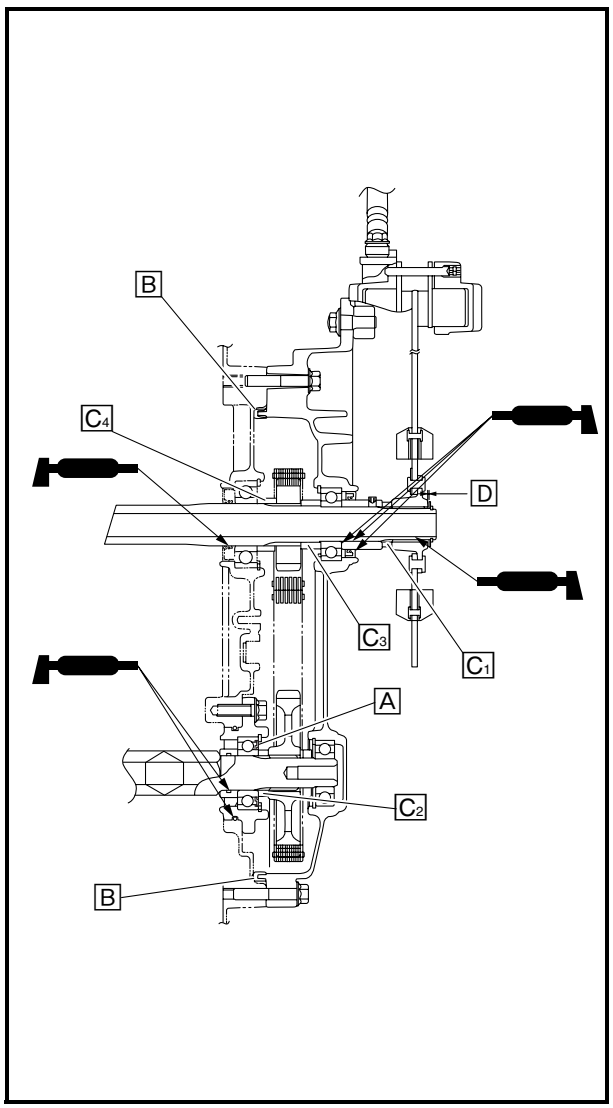
If replacement is necessary, always replace the chain and the sprockets as a set.

4. Inspect:
   - Drive chain
     Stiffness → Clean and lubricate or replace.



5. Measure:
   - Brake disc thickness ⓐ
     Measure the brake disc thickness 1 ~ 3 mm (0.04 ~ 0.12 in) from the edge of the brake disc.
     Out of specification → Replace.

Minimum thickness:
3.5 mm (0.14 in)



INSTALLATION

1. During installation, pay attention to the following.

A Make sure that the bearing seals face towards the drive chain as shown.

B Properly install the rubber seal onto the drive chain cover, making sure that there are no gaps.

C1 C2 C3 C4 Be sure to install the collars in their original positions, otherwise the brake disc and secondary shaft will stick.

D 0.2 ~ 0.7 mm (0.008 ~ 0.028 in)

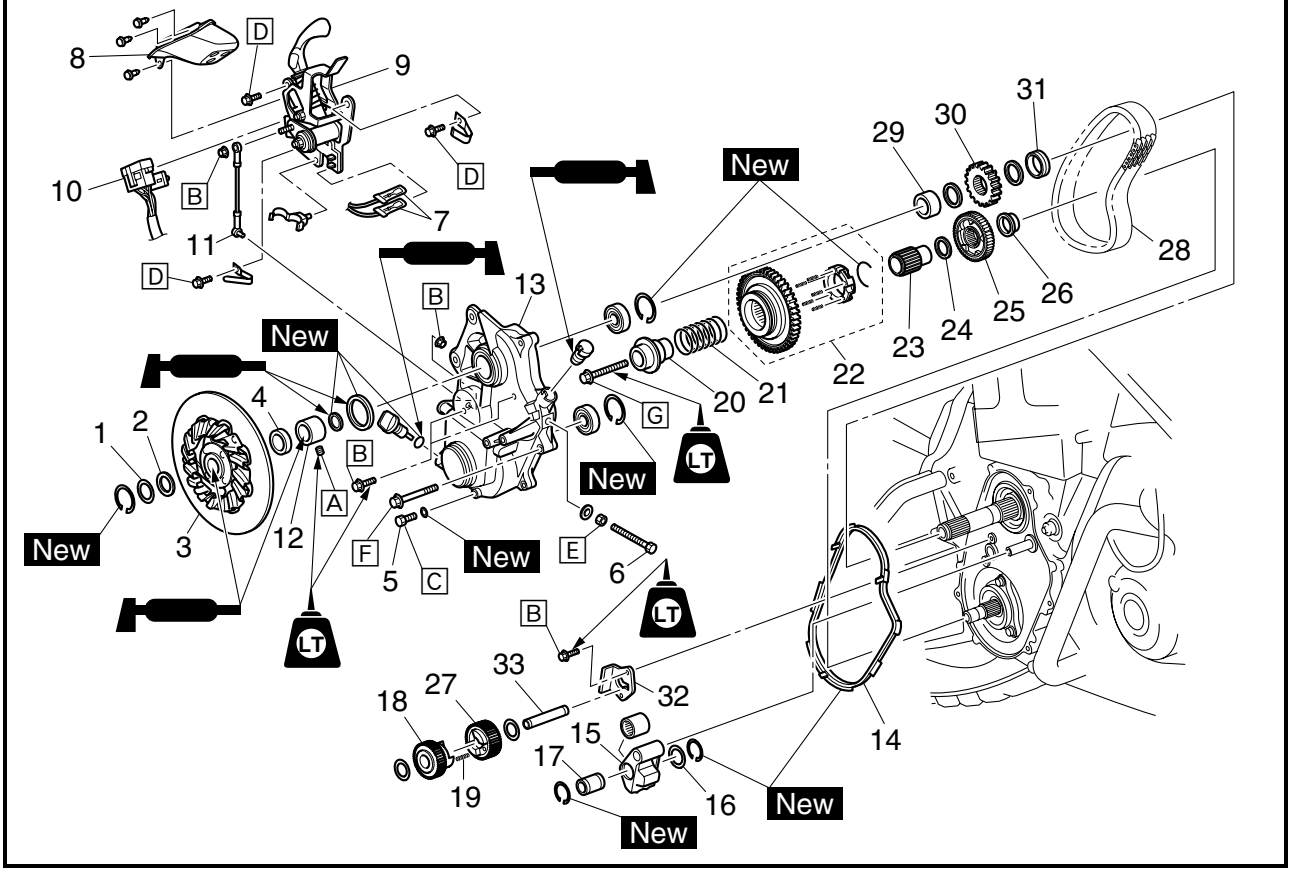
: ESSO beacon 325 grease or Aeroshell grease #7A

For the secondary shaft and drive chain cover installation, refer to “SECONDARY SHAFT”.

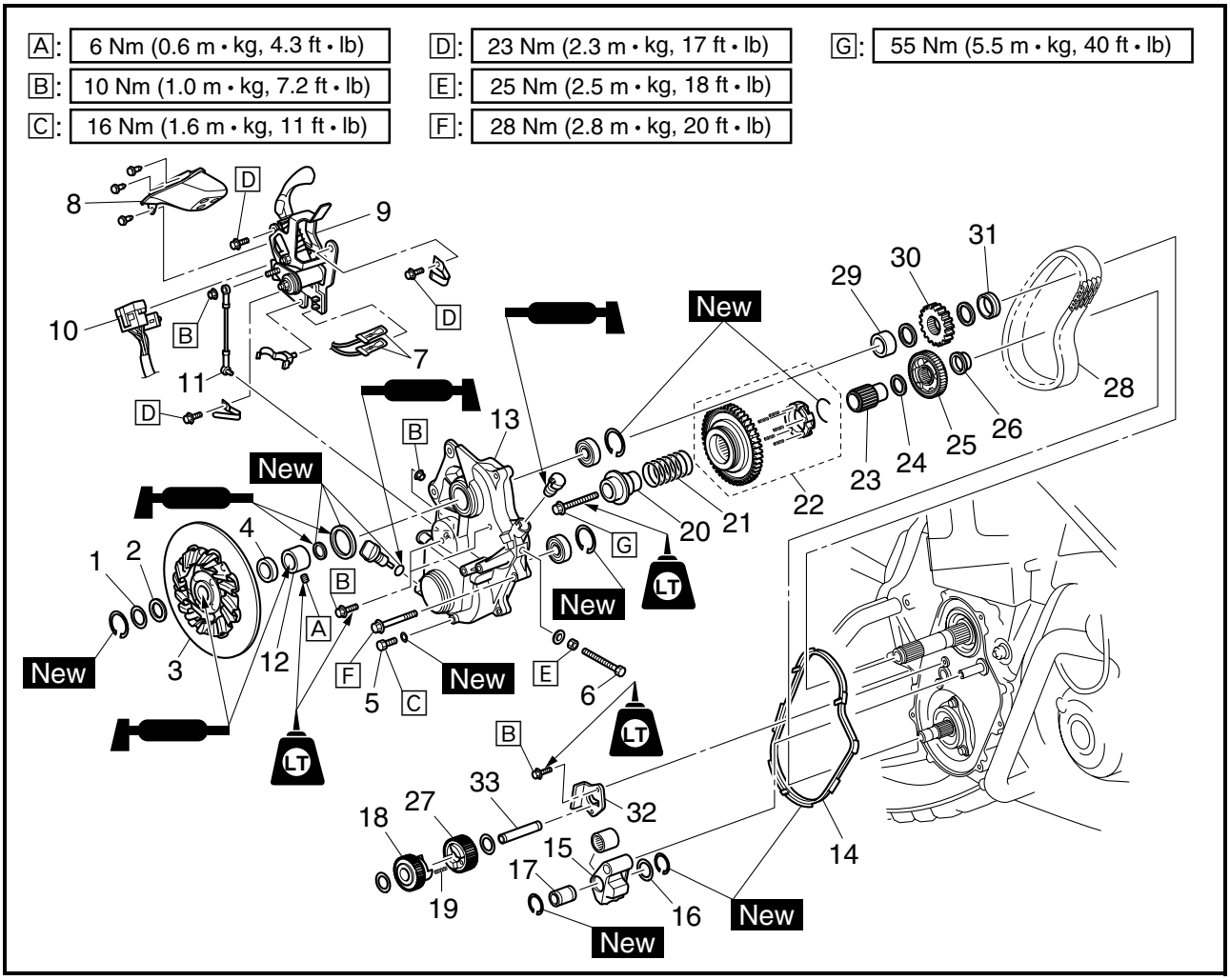
2. Fill:
   - Drive chain oil
     Refer to “DRIVE CHAIN” in CHAPTER 2.
3. Adjust:
   - Drive chain slack
     Refer to “DRIVE CHAIN” in CHAPTER 2.

WITH REVERSE MODEL

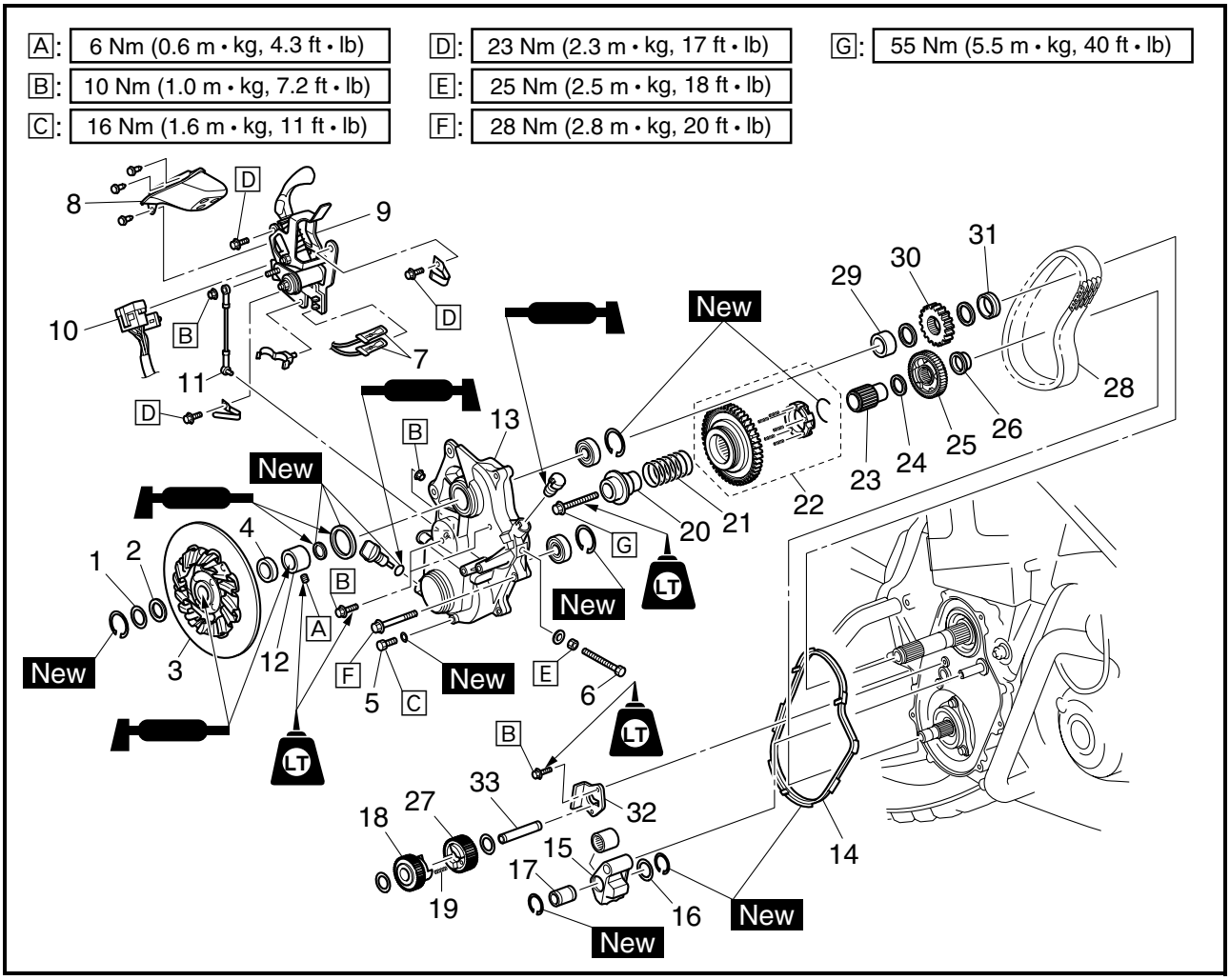
A: 6 Nm (0.6 m • kg, 4.3 ft • lb)
B: 10 Nm (1.0 m • kg, 7.2 ft • lb)
C: 16 Nm (1.6 m • kg, 11 ft • lb)
D: 23 Nm (2.3 m • kg, 17 ft • lb)
E: 25 Nm (2.5 m • kg, 18 ft • lb)
F: 28 Nm (2.8 m • kg, 20 ft • lb)
G: 55 Nm (5.5 m • kg, 40 ft • lb)



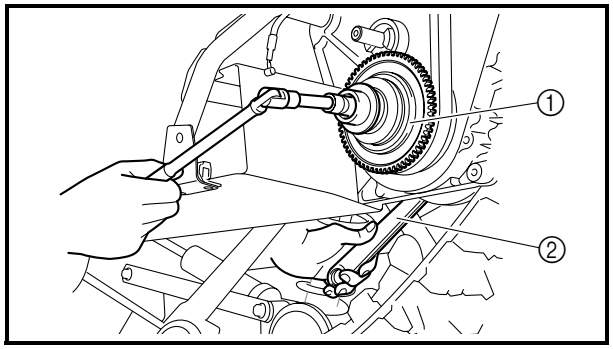
Order	Job name/Part name	Q'ty	Remarks
	Drive chain removal		Remove the parts in the order listed below.
	Right lower cover		Refer to "COVERS" in CHAPTER 3.
	Brake caliper/Parking brake		Refer to "BRAKE".
1	Shim	—	t = 0.5
2	Washer	1	t = 1.0
3	Brake disc	1	
4	Collar	1	
5	Drain bolt	1	Drain.
6	Chain tension adjusting bolt	1	Loosen.
7	Gear position switch connector	2	Disconnect.
8	Cover	1	
9	Shift lever assembly	1	
10	Fuse holder	1	
11	Shift rod	1	
12	Collar	1	



Order	Job name/Part name	Q'ty	Remarks
13	Drive chain cover	1	
14	Rubber seal	1	
15	Chain tensioner	1	
16	Washer	1	t = 0.5
17	Collar	1	
18	Counter gear	1	
19	Spring	1	
20	Retainer	1	
21	Spring	1	
22	Reverse driven gear assembly	1	
23	Journal	1	
24	Washer	1	
25	Forward driven sprocket	1	
26	Collar	1	
27	Reverse drive gear	1	
28	Drive chain	1	



Order	Job name/Part name	Q'ty	Remarks
29	Collar	1	
30	Drive sprocket	1	
31	Collar	1	
32	Plate	1	
33	Shaft	1	
			For installation, reverse the removal procedure.



REMOVAL

1. Remove:
   - Reverse driven gear ①

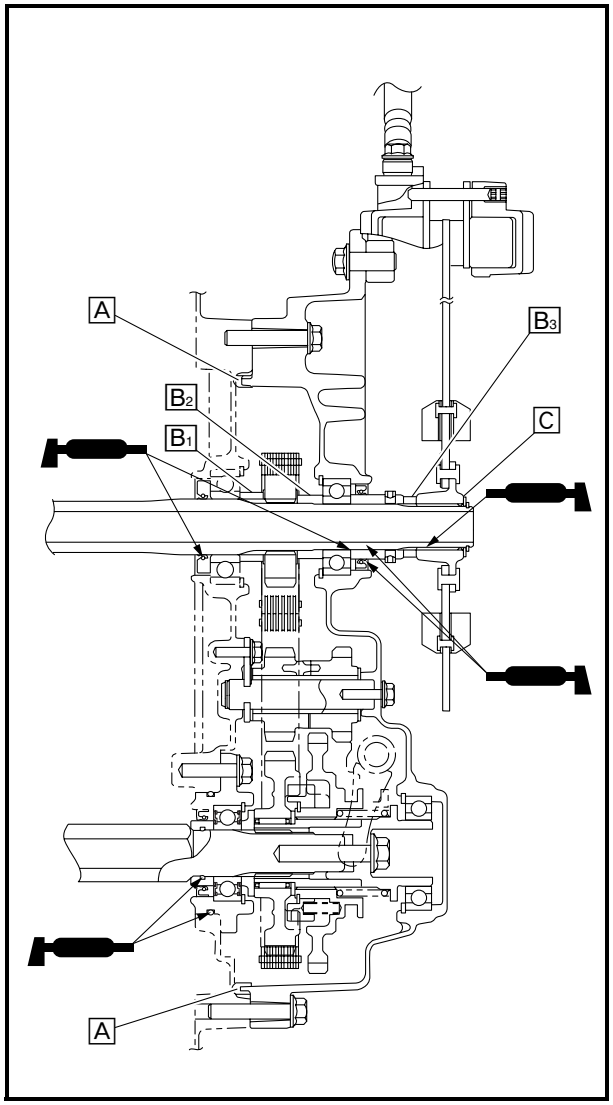
NOTE:

While holding the front axle assembly with spanner wrench ②, loosen the reverse driven gear bolt.

INSPECTION

1. Inspect:
   - Drive chain cover
     Cracks/damage → Replace.
   - Shift fork
     Pitting/wear/damage → Replace.
   - Oil seals
     Wear/damage → Replace.
   - Bearings
     Pitting/damage → Replace.
2. Inspect:
   - Drive sprocket
   - Forward driven sprocket
   - Reverse drive gear
   - Counter gear
   - Journal
   - Chain tensioner
     Pitting/wear/damage → Replace the defective part(s).
   - Reverse driven gear
   - Reverse gear dog
     Wear/damage → Replace the reverse driven gear assembly.
   - Spring
     Damage → Replace the reverse driven gear assembly.
   - Drive chain
     Wear/damage → Replace.
     Shift → Clean or replace.
   - Shift lever assembly
     Wear/damage
   - Bearings
     Pitting/damage → Replace.

For the bearing replacement and drive chain inspection, refer to “WITHOUT REVERSE MODEL”.



INSTALLATION

1. During installation, pay attention to the following.

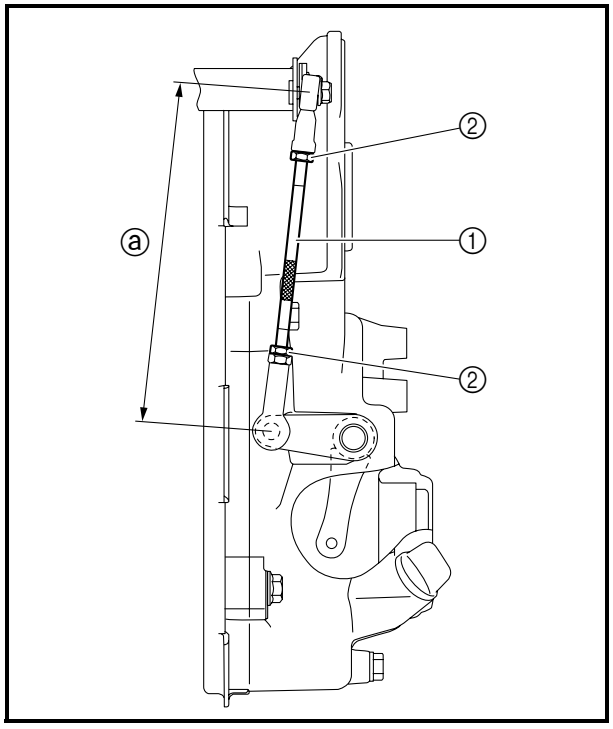
[A] Properly install the rubber seal onto the drive chain cover, making sure that there are no gaps.

[B1] [B2] [B3] Be sure to install the collars in their original positions, otherwise the brake disc and secondary shaft will stick.

[C] 0.2 ~ 0.7 mm (0.008 ~ 0.028 in)

: ESSO beacon 325 grease or Aeroshell grease #7A

For the secondary shaft and drive chain cover installation, refer to “SECONDARY SHAFT”.



2. Install:
   - Shift rod ①
3. Adjust:
   - Shift rod length ⓐ

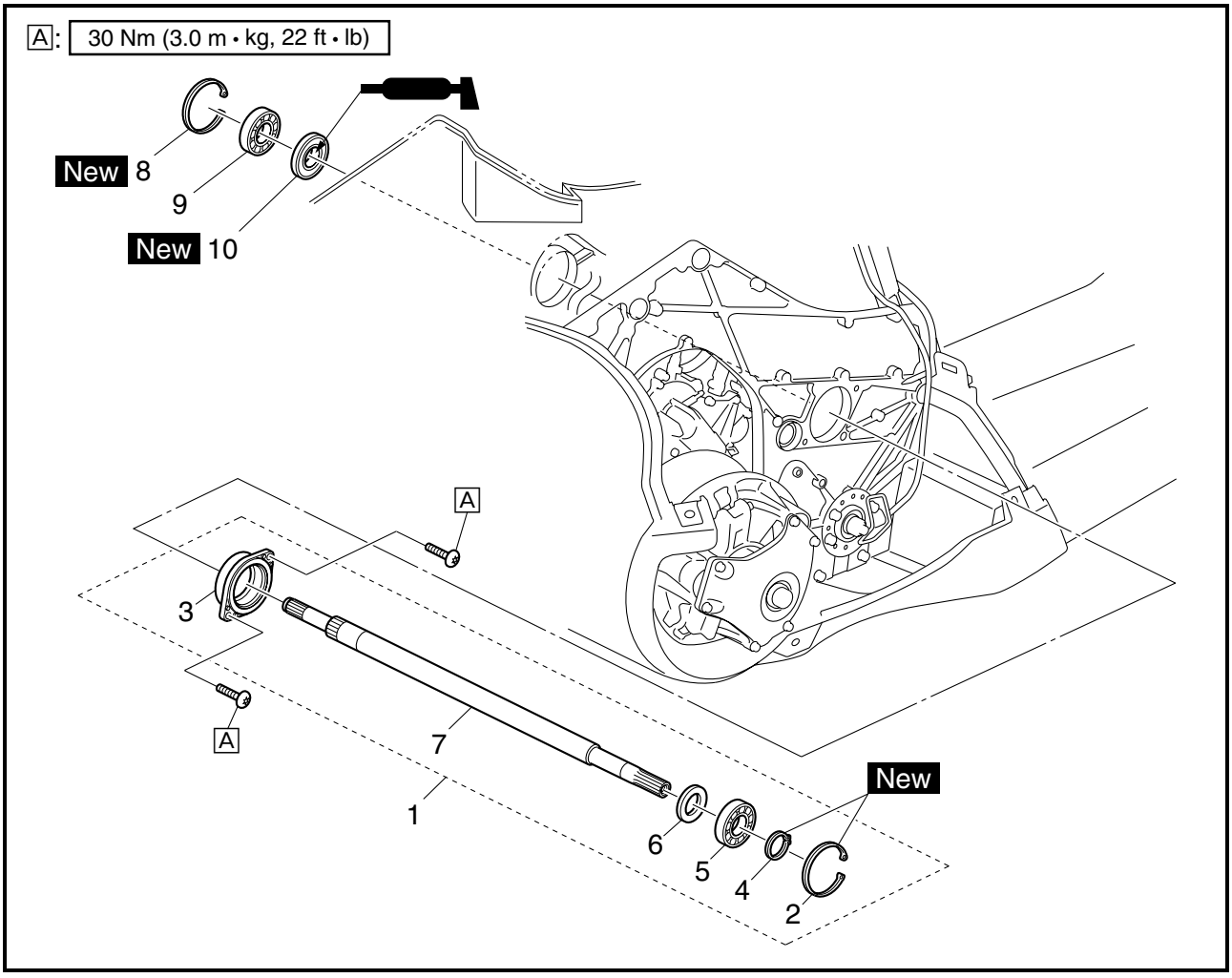
Adjustment steps:

- Move the shift lever to the “FWD.” position.
- Loosen the locknuts ②.
- Turn the shift rod ① so that shift rod free play is 0 mm (in direction where ⓐ can be shortened appropriately) and then turn back the shift rod 1/2 turns.
- Tighten the locknuts.

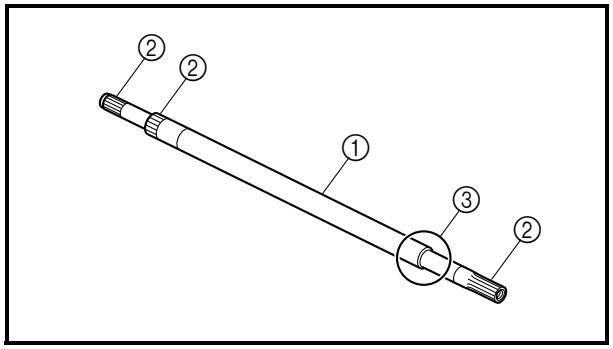
	**Shift rod end locknut:** **7 Nm (0.7 m · kg, 5.1 ft · lb)**

4. Fill:
   - Drive chain oil
     Refer to “DRIVE CHAIN” in CHAPTER 2.
5. Adjust:
   - Drive chain slack
     Refer to “DRIVE CHAIN” in CHAPTER 2.

SECONDARY SHAFT

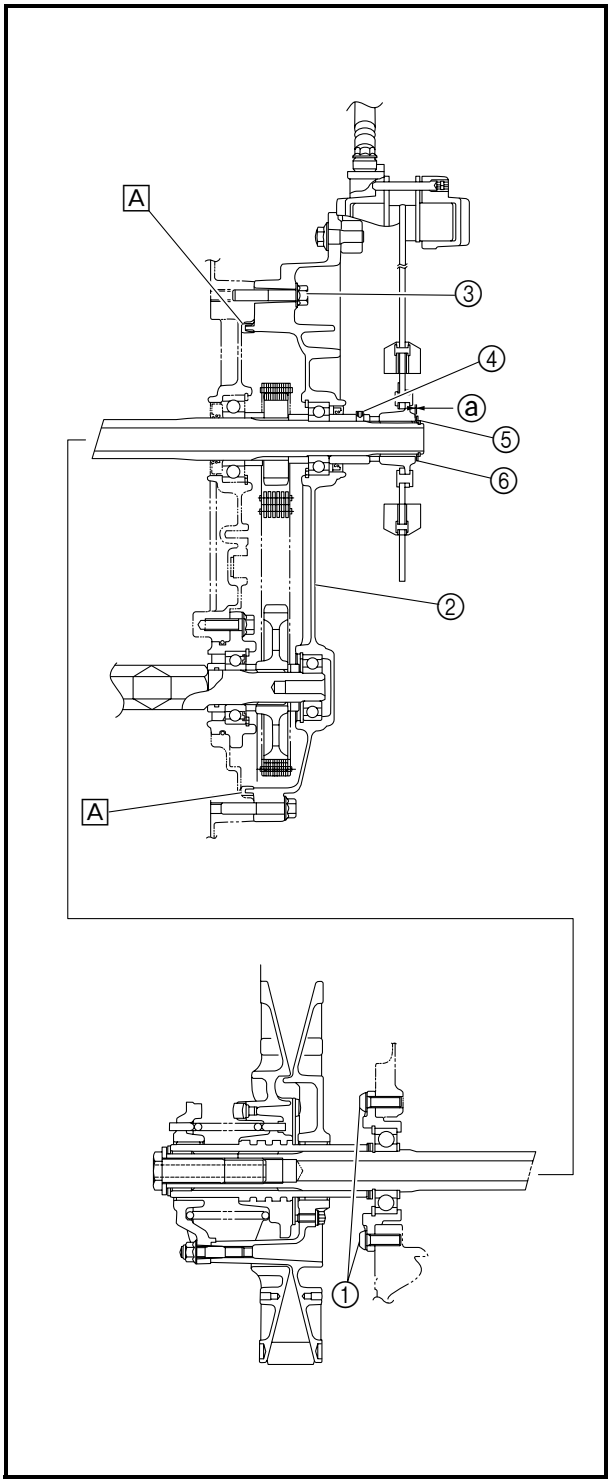


Order	Job name/Part name	Q'ty	Remarks
	Secondary shaft removal		Remove the parts in the order listed below.
	Secondary sheave		Refer to "SECONDARY SHEAVE".
	Drive chain		Refer to "DRIVE CHAIN".
1	Secondary shaft assembly	1	
2	Bearing housing	1	
3	Circlip	1	
4	Circlip	1	
5	Bearing	1	
6	Washer	1	
7	Secondary shaft	1	
8	Circlip	1	
9	Bearing	1	
10	Oil seal	1	
			For installation, reverse the removal procedure.



INSPECTION

1. Inspect:
   - Secondary shaft ①
     Scratches (excessive)/damage → Replace.
   - Splines ②
     Wear/damage → Replace the secondary shaft.
   - Bearing contact surface ③
     Scratches/wear/damage → Replace the secondary shaft.



SECONDARY SHAFT AND DRIVE CHAIN COVER INSTALLATION

1. Install:
   - Secondary shaft
   - Drive chain cover

Installation steps:

- Install the secondary shaft.
- Tighten the bolts ①.

Bearing housing bolt:
30 Nm (3.0 m · kg, 22 ft · lb)

- Install the drive chain, drive sprocket and driven sprocket.
- Install the drive chain cover ②.

A Properly install the rubber seal onto the drive chain cover, making sure that there are no gaps.

- Tighten the bolts ③.

Drive chain cover bolt:
M8 bolt:
28 Nm (2.8 m · kg, 20 ft · lb)
M6 bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)
LOCTITE®

- Install the collar.
- Tighten the collar set bolt ④.

Collar set bolt:
6 Nm (0.6 m · kg, 4.3 ft · lb)
LOCTITE®

- Install the brake disc.
- Adjust the brake disc clearance.

2. Measure:
   - Brake disc clearance ⓐ
     Out of the specification → Adjust.

Brake disc clearance:
0.2 ~ 0.7 mm (0.008 ~ 0.028 in)

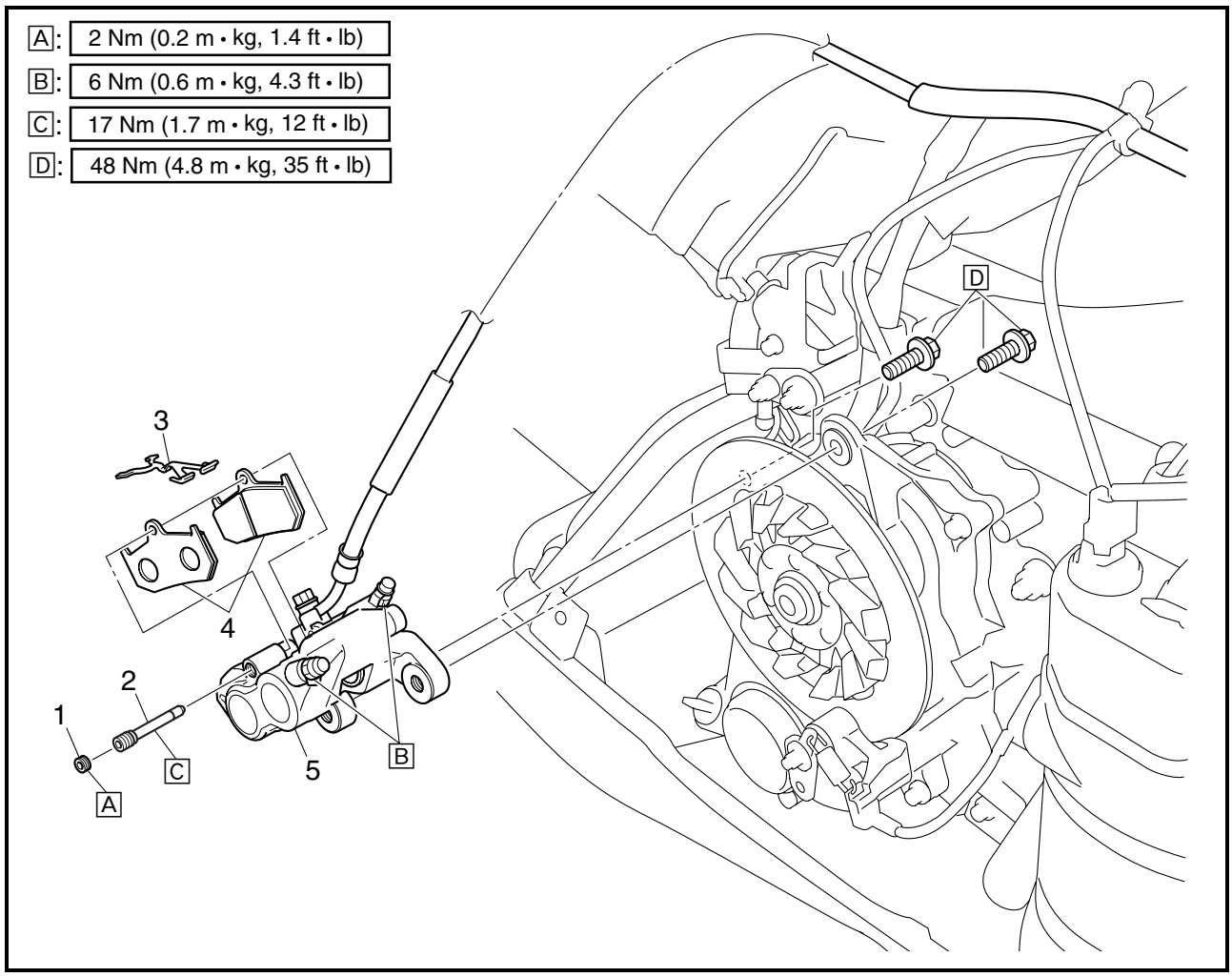
3. Adjust:
   • Brake disc clearance

Adjustment steps:
- Remove the circlip ⑤.
- Adjust the brake disc clearance by adding or removing shim(s) ⑥.

Shim size	
Part number	**Thickness**
90201-222F0	**0.5 mm (0.02 in)**
90201-225A4	**1.0 mm (0.04 in)**

- Install the new circlip.

BRAKE
BRAKE PAD



Order	Job name/Part name	Q'ty	Remarks
	Brake pad removal		Remove the parts in the order listed below.
	Right side cover		Refer to "COVERS" in CHAPTER 3.
	Battery		Refer to "BATTERY INSPECTION" in CHAPTER 2.
1	Screw plug	1	
2	Retaining pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Brake caliper assembly	1	
			For installation, reverse the removal procedure.

CAUTION:

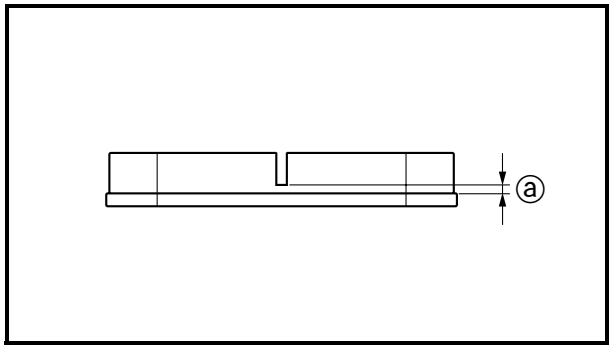
Disc brake components rarely require disassembly. DO NOT:

- **Do not disassemble components unless absolutely necessary.**
- **Do not use solvents on internal brake components.**
- **Do not use contaminated brake fluid for cleaning.**
- **Use only clean brake fluid.**
- **Do not allow brake fluid to contact the eyes, otherwise eye injury may occur.**
- **Do not allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Do not disconnect any hydraulic connection, otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

BRAKE PAD REPLACEMENT

NOTE:

It is not necessary to disassemble the brake caliper and brake hose in order to replace the brake pads.

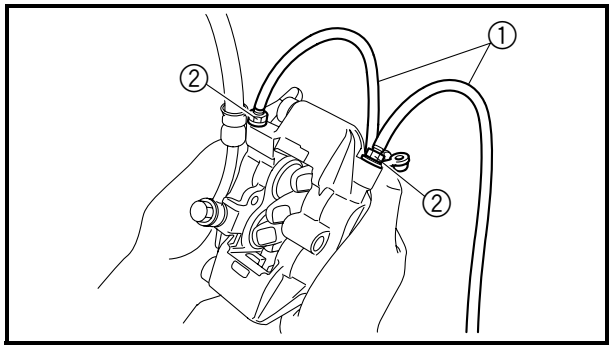


1. Remove:
   - Brake pads

NOTE:

- Do not depress the brake lever when the caliper or disc is off the snowmobile otherwise the brake pads will be forced shut.
- Install a new brake pad spring when the brake pads are replaced.
- Replace the pads as a set if either one is found to be worn to the wear limit ⓐ.

Wear limit:
1.5 mm (0.06 in)



2. Install:
   - Brake pads
   - Brake pad spring

Installation steps:

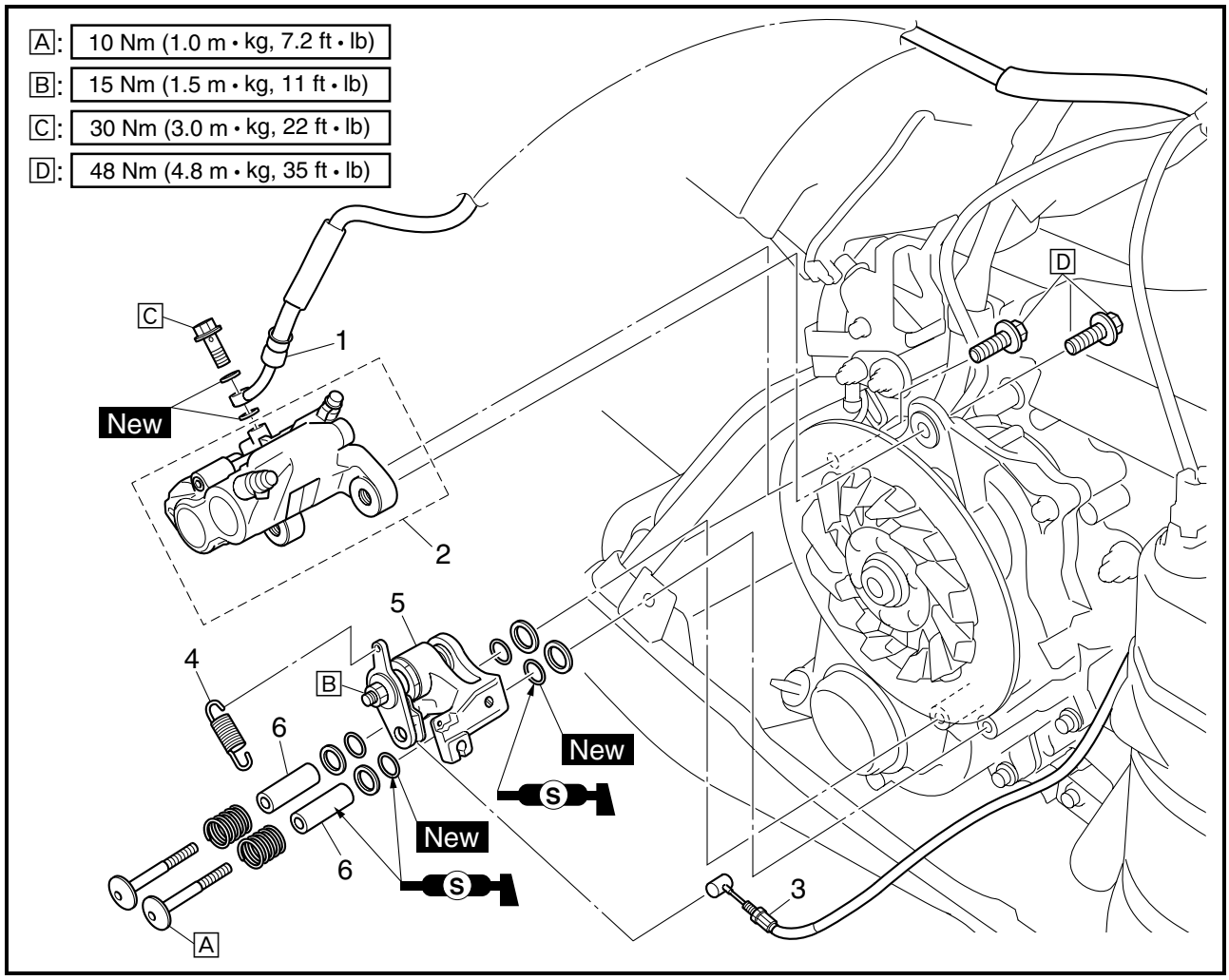
- Connect suitable hoses ① tightly to the caliper bleed screws ②. Put the other end of each hose into an open container.
- Loosen the caliper bleed screws and push the pistons into the caliper with your finger.
- Tighten the caliper bleed screws ②.

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

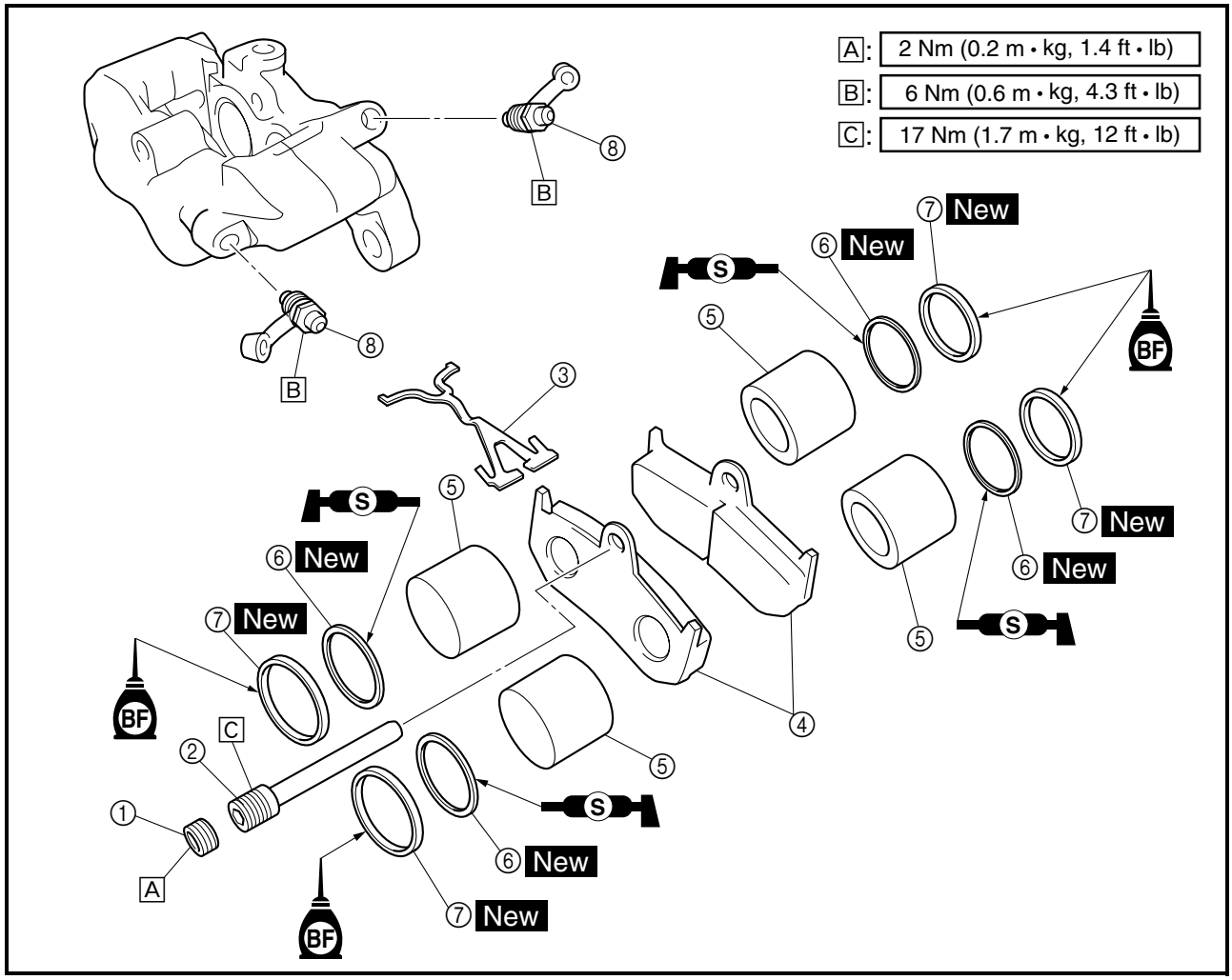
- Install the brake pads and brake pad spring.

3. Check:
   - Brake fluid level
     Refer to “BRAKE FLUID LEVEL INSPECTION” in CHAPTER 2.
4. Check:
   - Brake lever operation
     A soft or spongy feeling → Bleed brake system.
     Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 2.

BRAKE CALIPER AND PARKING BRAKE



Order	Job name/Part name	Q'ty	Remarks
	Brake caliper and parking brake removal		Remove the parts in the order listed below.
	Right side cover		Refer to "COVERS" in CHAPTER 3.
	Battery		Refer to "BATTERY INSPECTION" in CHAPTER 2.
	Brake fluid		Drain.
1	Brake hose	1	Disconnect.
2	Brake caliper assembly	1	
3	Parking brake cable	1	Disconnect.
4	Spring	1	
5	Parking brake assembly	1	
6	Collar	2	
			For installation, reverse the removal procedure.



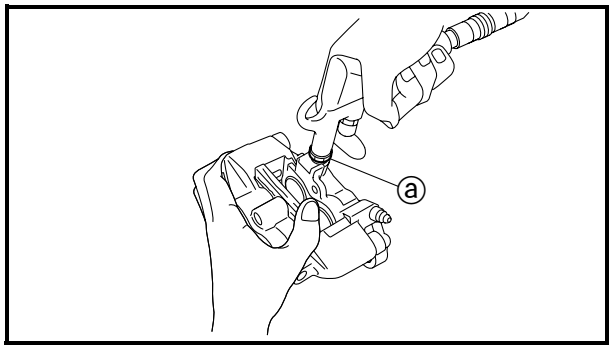
Order	Job name/Part name	Q'ty	Remarks
	Brake caliper disassembly		Remove the parts in the order listed below.
①	Screw plug	1	
②	Retaining pin	1	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Brake caliper piston	4	
⑥	Brake caliper piston dust seal	4	
⑦	Brake caliper piston seal	4	
⑧	Bleed screw	2	
			For assembly, reverse the disassembly procedure.

BRAKE CALIPER DISASSEMBLY

NOTE:

Before disassembling a caliper, drain brake fluid from brake hose, master cylinder, brake caliper and brake reservoir of their brake fluid.

1. Remove:
   - Brake caliper pistons
   - Brake caliper piston dust seals
   - Brake caliper piston seals



Removal steps:

- Using a piece of wood, lock the pistons.
- Blow compressed air into the hose joint opening ⓐ to force out the pistons from the caliper body.

⚠ WARNING

Never try to pry out the pistons.

BRAKE CALIPER INSPECTION AND REPAIR

Recommended brake component replacement schedule	
Brake pads	**As required**
Piston dust seals	**Every two years**
Piston seals	**Every two years**
Brake hose	**Every four years**
Brake fluid	**Only when brakes are disassembled.**

⚠ WARNING

All internal brake components should be cleaned only with new brake fluid. Do not use solvents as they will cause seals to swell and distort.

1. Inspect:
   - Brake caliper pistons
     Scratches/rust/wear → Replace the caliper assembly.
   - Brake caliper cylinder
     Wear/scratches → Replace the caliper assembly.
   - Brake caliper body
     Cracks/damage → Replace.
   - Brake fluid delivery passage (caliper body)
     Blow out with compressed air.

⚠ WARNING

Replace the piston seals and piston dust seals whenever a caliper is disassembled.

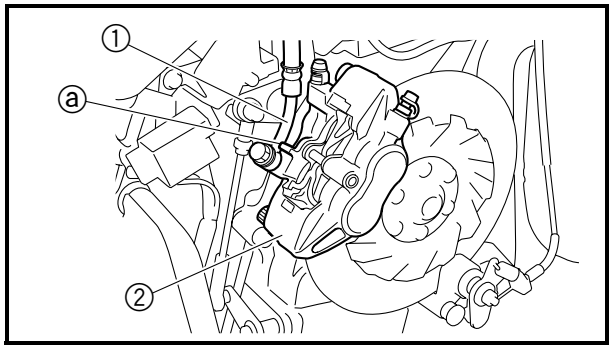
BRAKE CALIPER ASSEMBLY

⚠ WARNING

- **All internal parts should be cleaned only with new brake fluid.**
- **Internal parts should be lubricated with brake fluid when installed.**

Recommended brake fluid:
DOT 4

- **Replace the piston seals and piston dust seals whenever a caliper is disassembled.**



BRAKE CALIPER INSTALLATION

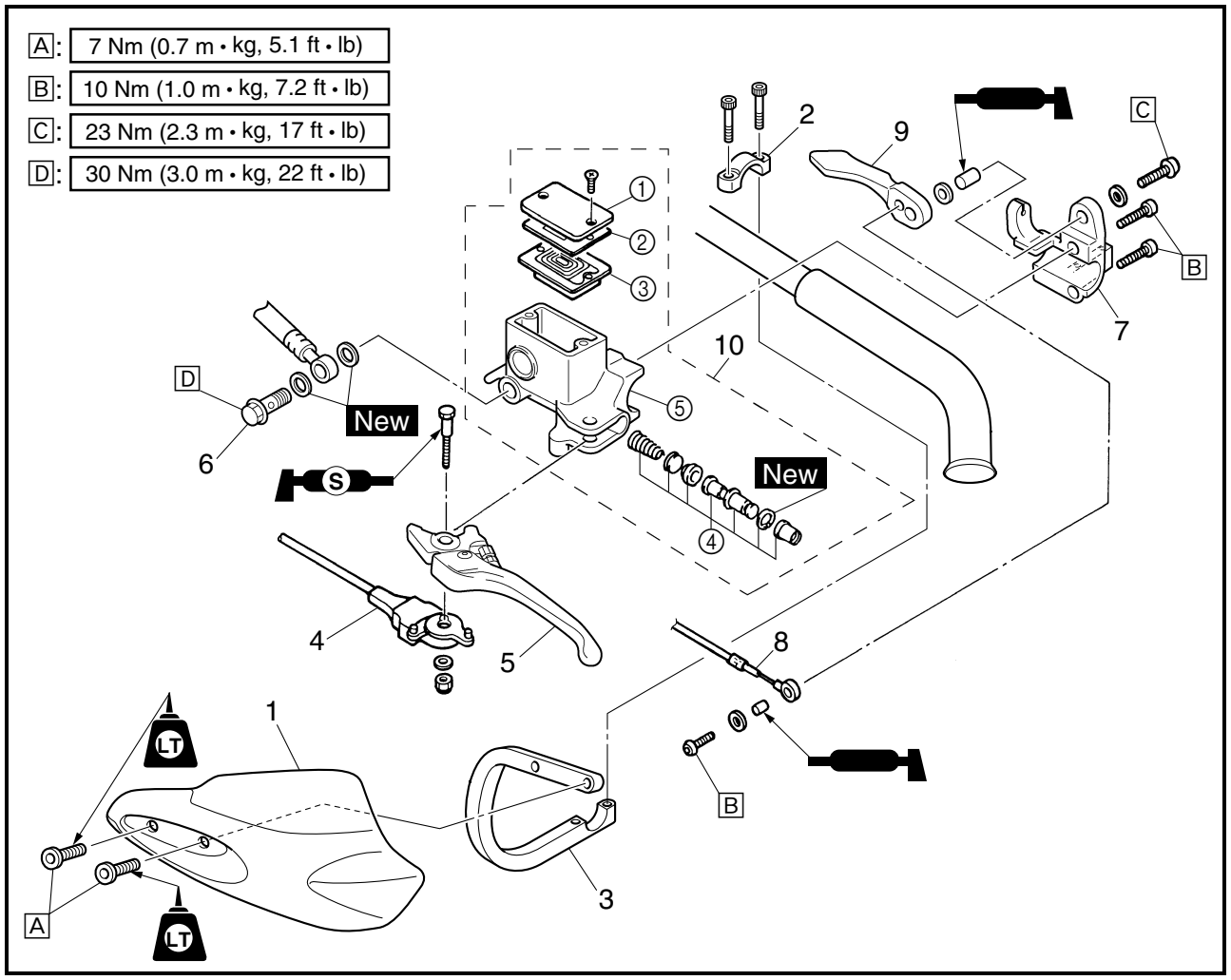
1. Install:
   - Brake hose ①

CAUTION:

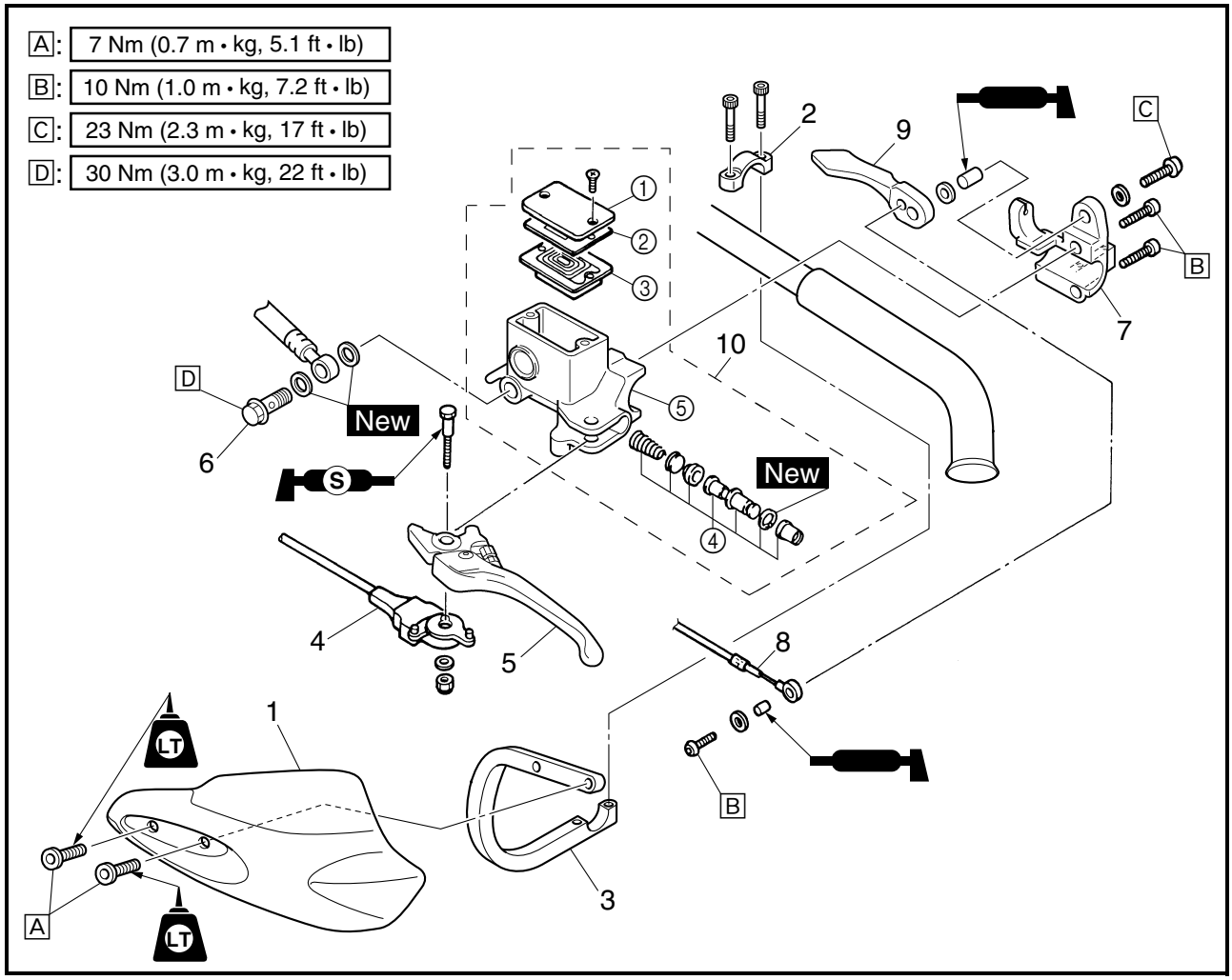
When installing the brake hose ① onto the brake caliper ②, make sure that the brake pipe touches the projection ⓐ on the brake caliper.

Brake hose union bolt:
30 Nm (3.0 m · kg, 22 ft · lb)

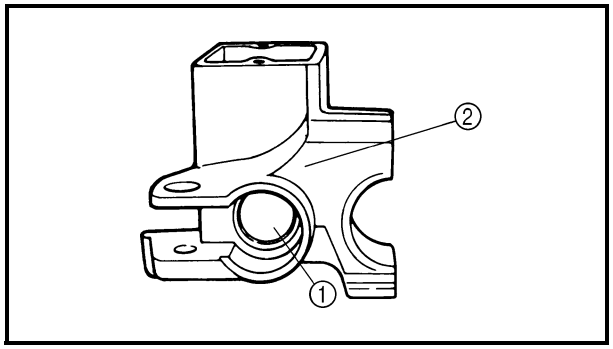
BRAKE MASTER CYLINDER



Order	Job name/Part name	Q'ty	Remarks
	Brake master cylinder removal		Remove the parts in the order listed below.
	Brake fluid		Drain.
	Left handlebar switch		Refer to "STEERING" in CHAPTER 3.
1	Left wind deflector	1	
2	Wind deflector bracket holder	1	
3	Left wind deflector bracket	1	
4	Brake switch	1	
5	Brake lever	1	
6	Brake hose union bolt	1	
7	Brake master cylinder holder	1	
8	Parking brake cable	1	Disconnect.
9	Parking brake lever	1	
10	Master cylinder assembly	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Brake master cylinder disassembly		Remove the parts in the order listed below.
①	Brake master cylinder reservoir cap	1	
②	Brake master cylinder reservoir diaphragm holder	1	
③	Brake master cylinder reservoir diaphragm	1	
④	Brake master cylinder kit	1	
⑤	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.



INSPECTION

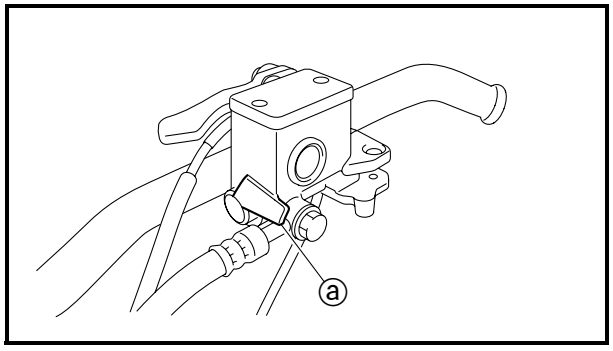
1. Inspect:
   - Brake master cylinder ①
     Wear/scratches → Replace the master cylinder assembly.
   - Brake master cylinder body ②
     Cracks/damage → Replace.
   - Brake fluid delivery passage (master cylinder body)
     Blow out with compressed air.
2. Inspect:
   - Brake master cylinder kit
     Scratches/wear/damage → Replace as a set.
3. Inspect:
   - Brake master cylinder reservoir
     Cracks/damage → Replace.
   - Brake master cylinder reservoir diaphragm
     Damage/wear → Replace.
4. Inspect:
   - Brake hose
     Cracks/damage/wear → Replace.

BRAKE MASTER CYLINDER ASSEMBLY

⚠ WARNING

- **All internal parts should be cleaned only with new brake fluid.**
- **Internal parts should be lubricated with brake fluid when installed.**

Recommended brake fluid:
DOT 4



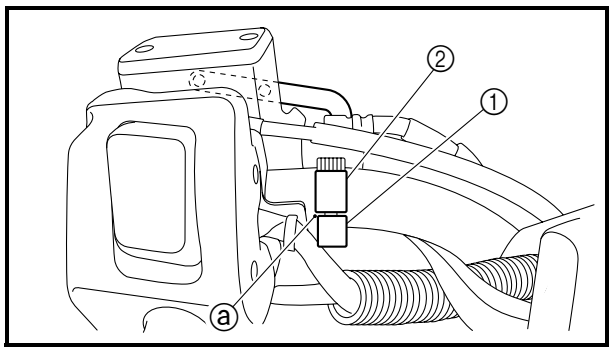
INSTALLATION

1. Install:
   - Brake hose

CAUTION:

When installing the brake hose onto the brake master cylinder, make sure that the brake pipe touches the projection ⓐ as shown.

	Union bolt (brake hose): 30 Nm (3.0 m · kg, 22 ft · lb)



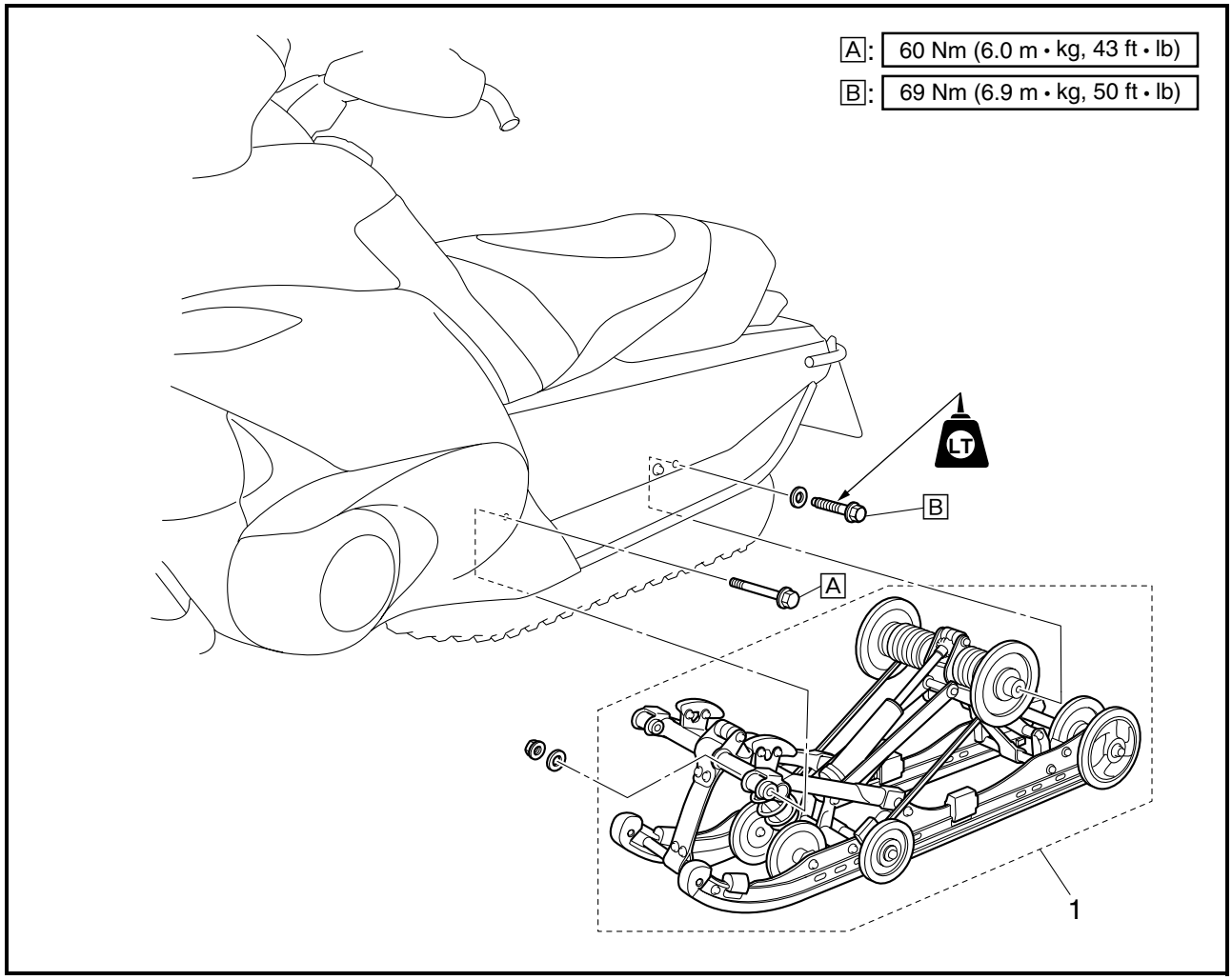
2. Install:
   - Left wind deflector bracket ①
   - Wind deflector bracket holder ②

NOTE:

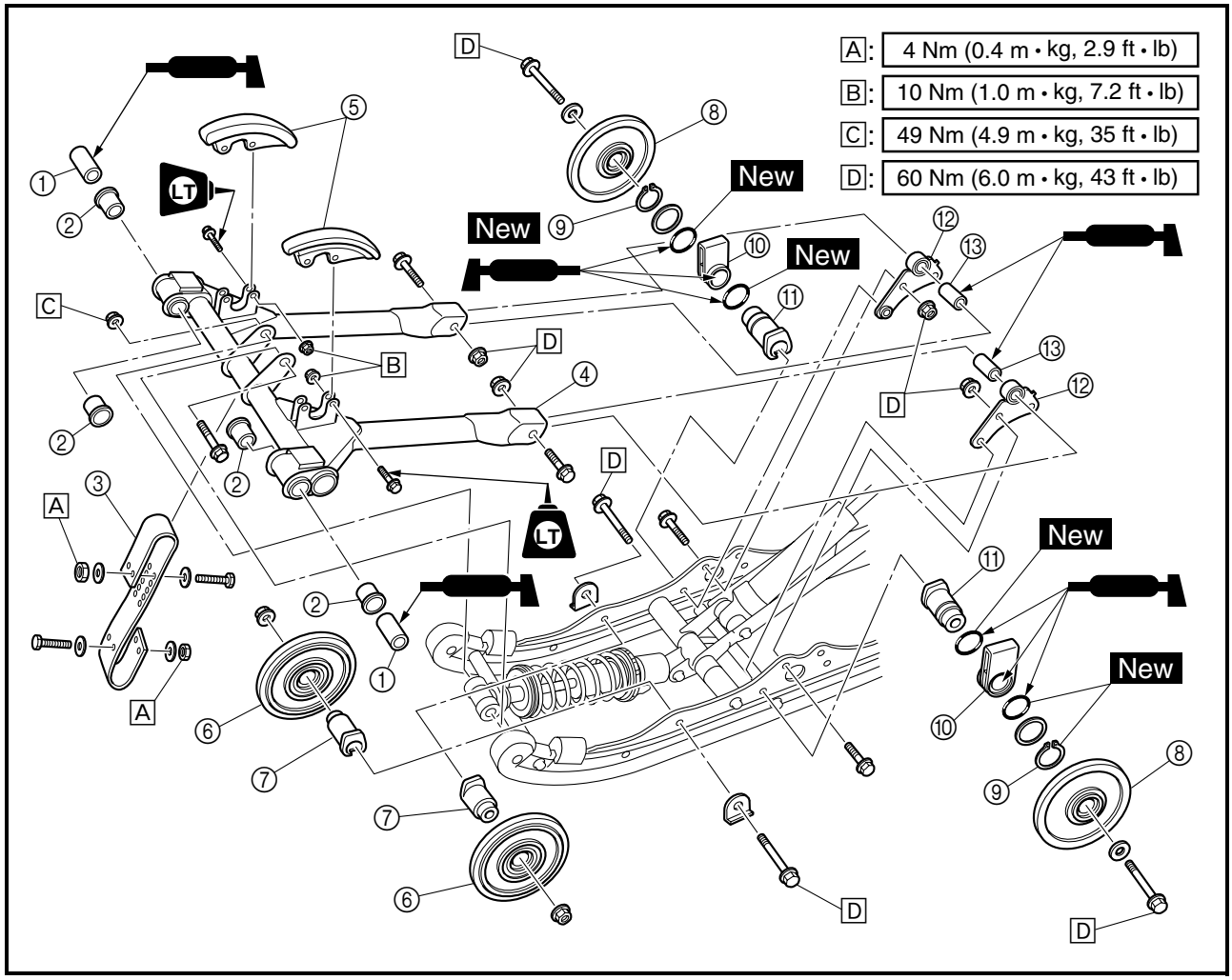
Align the end of the wind deflector bracket with the punch mark ⓐ on the handlebar.

SLIDE RAIL SUSPENSION

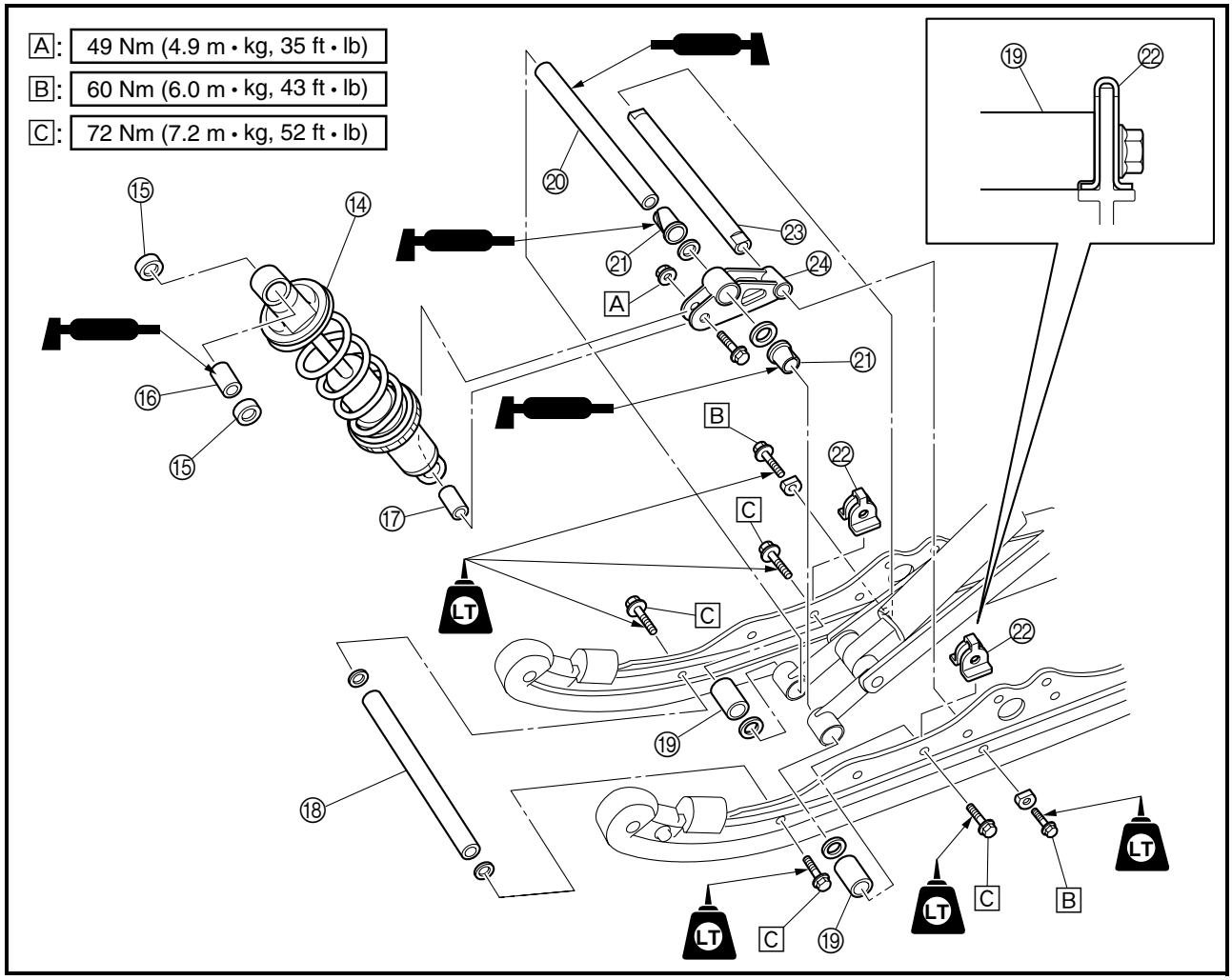
FX10



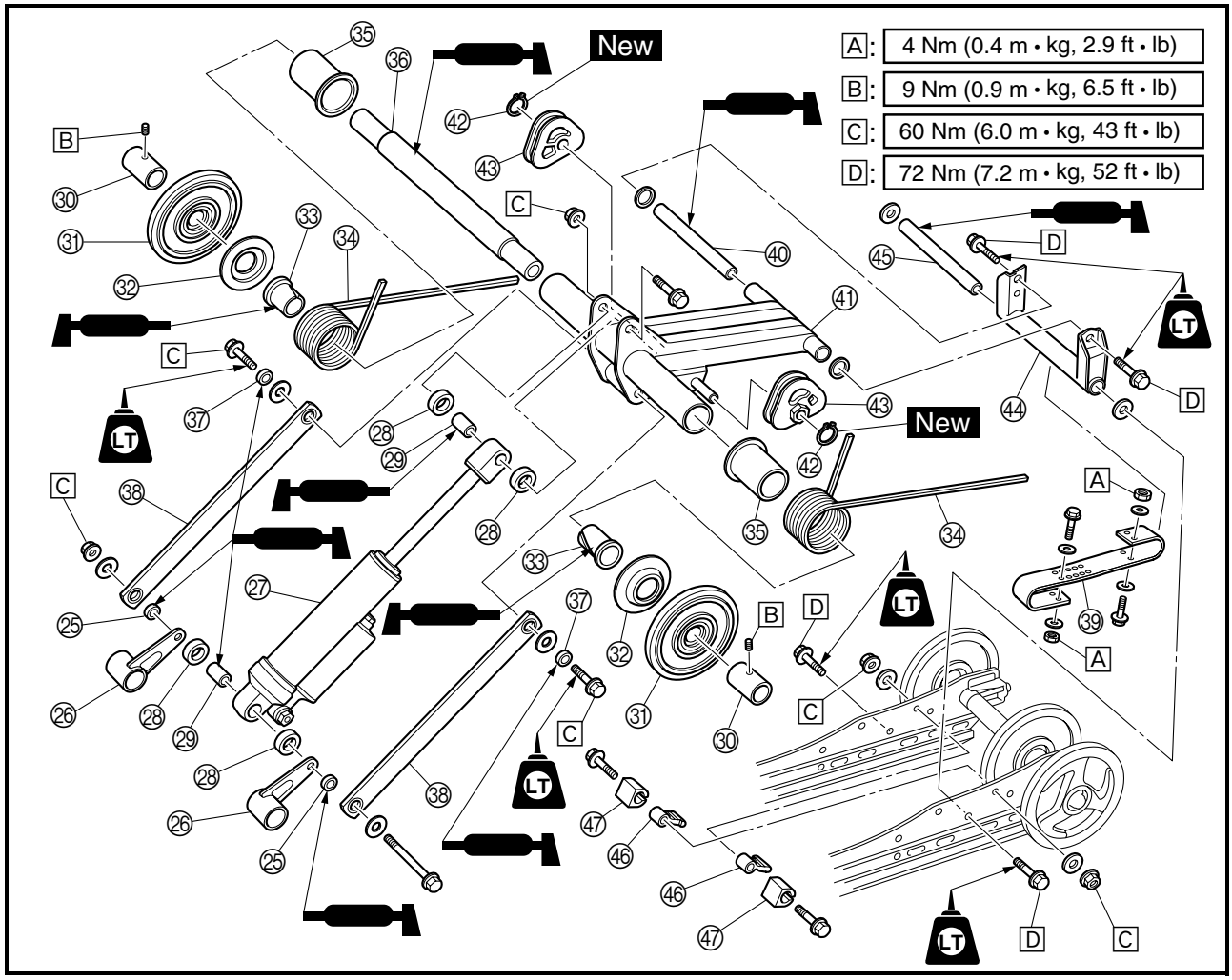
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension removal		Remove the parts in the order listed below.
	Rear axle nut		Loosen.
	Tension adjuster		Loosen.
1	Slide rail suspension	1	For installation, reverse the removal procedure.



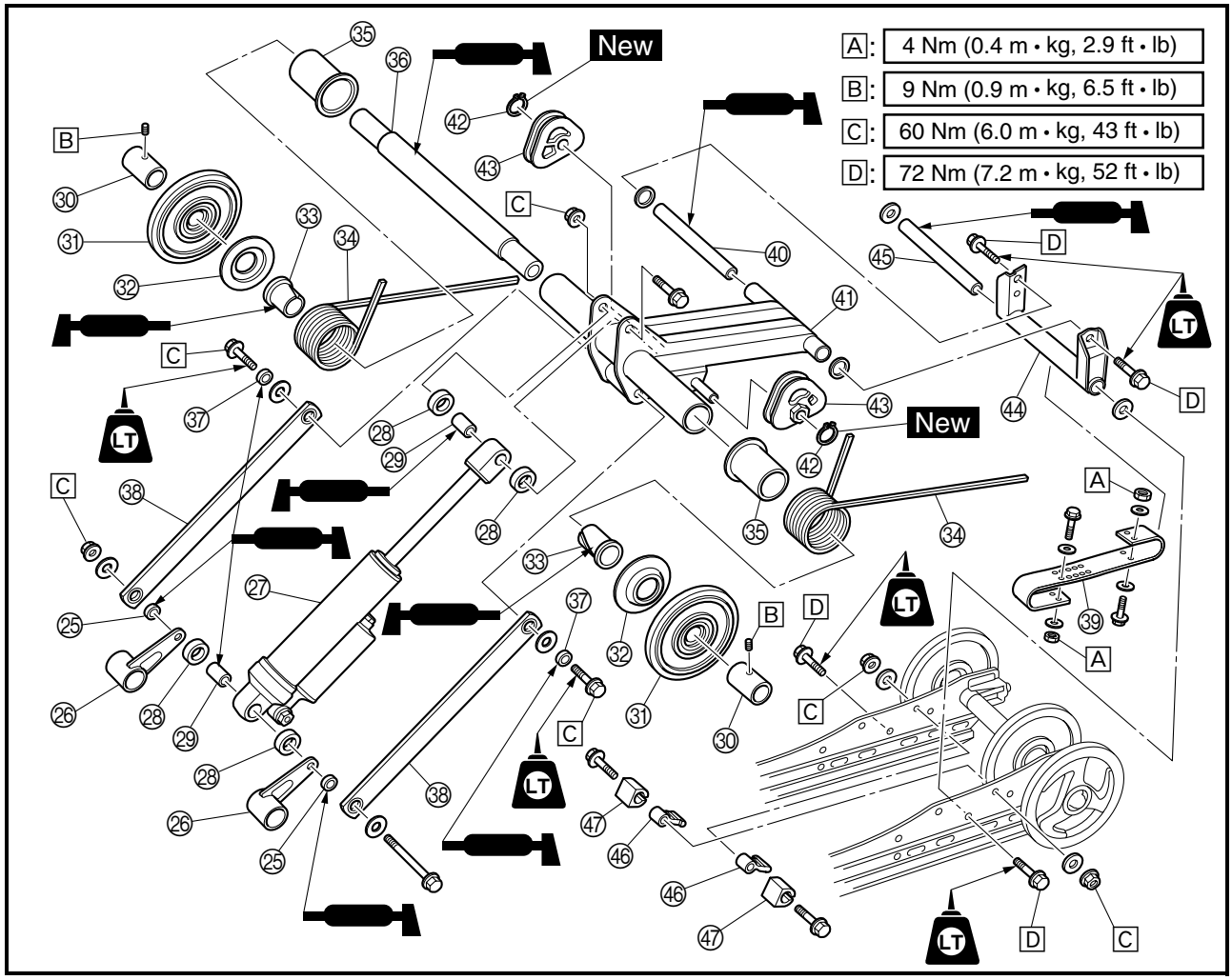
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension disassembly		Remove the parts in the order listed below.
①	Collar	2	
②	Bushing	4	
③	Stopper band	1	
④	Front pivot arm	1	
⑤	Slide runner	2	
⑥	Suspension wheel	2	
⑦	Suspension wheel bracket	2	
⑧	Suspension wheel	2	
⑨	Circlip	2	
⑩	Spring end guide	2	**NOTE:** Apply grease to the inner surface of each spring end guide.
⑪	Spring end guide bracket	2	
⑫	Front pivot arm bracket	2	
⑬	Collar	2	



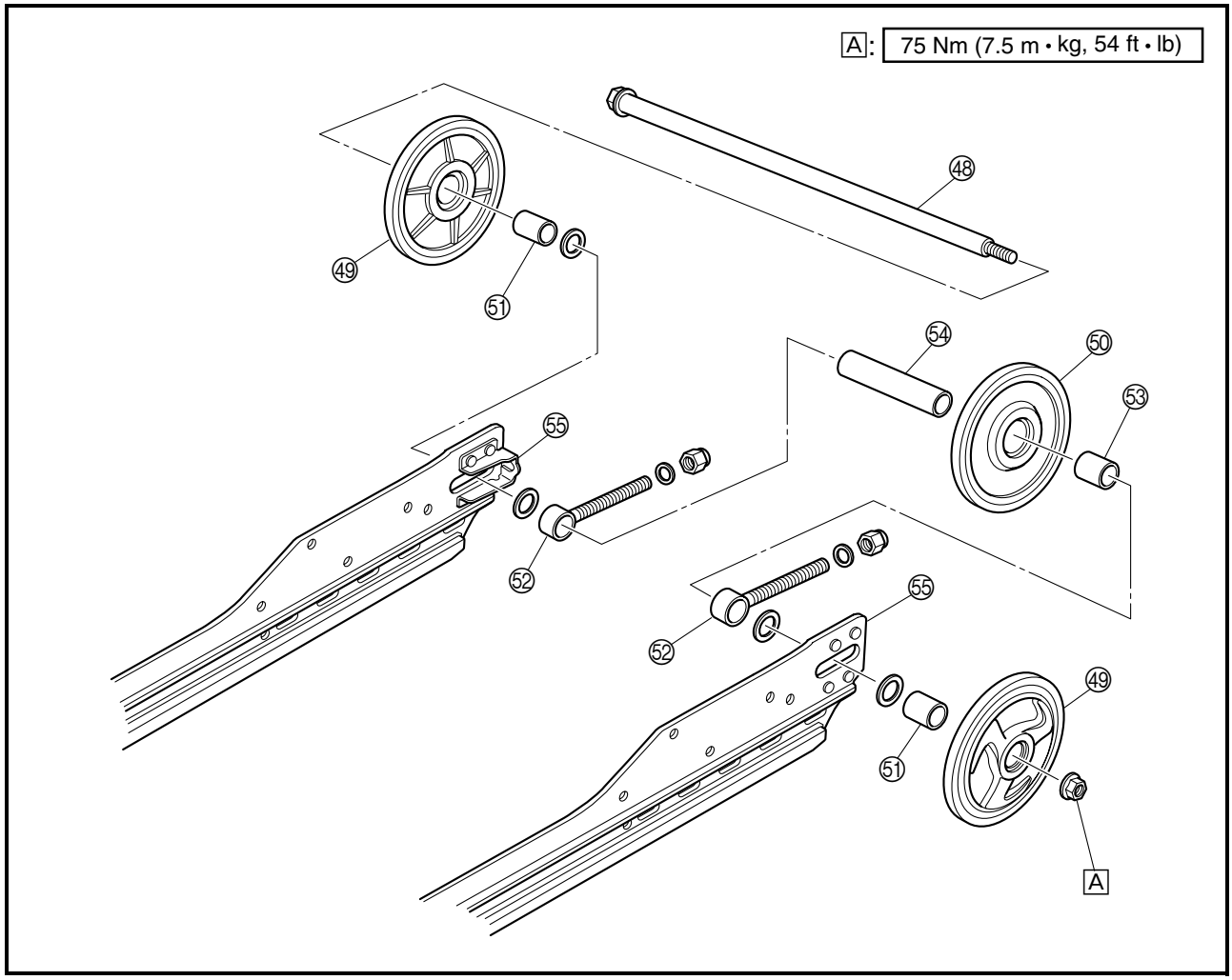
Order	Job name/Part name	Q'ty	Remarks
⑭	Front shock absorber	1	
⑮	Spacer	2	
⑯	Collar	1	
⑰	Collar	1	
⑱	Shaft	1	
⑲	Collar	2	
⑳	Shaft	1	
㉑	Bushing	2	
㉒	Washer	2	
㉓	Shaft	1	
㉔	Front suspension bracket	1	



Order	Job name/Part name	Q'ty	Remarks
㉕	Collar	2	
㉖	Rear suspension bracket	2	
㉗	Rear shock absorber	1	
㉘	Spacer	4	
㉙	Collar	2	
㉚	Wheel bracket	2	
㉛	Guide wheel	2	
㉜	Guide plate	2	
㉝	Bushing	2	
㉞	Tension spring	2	
㉟	Collar	2	

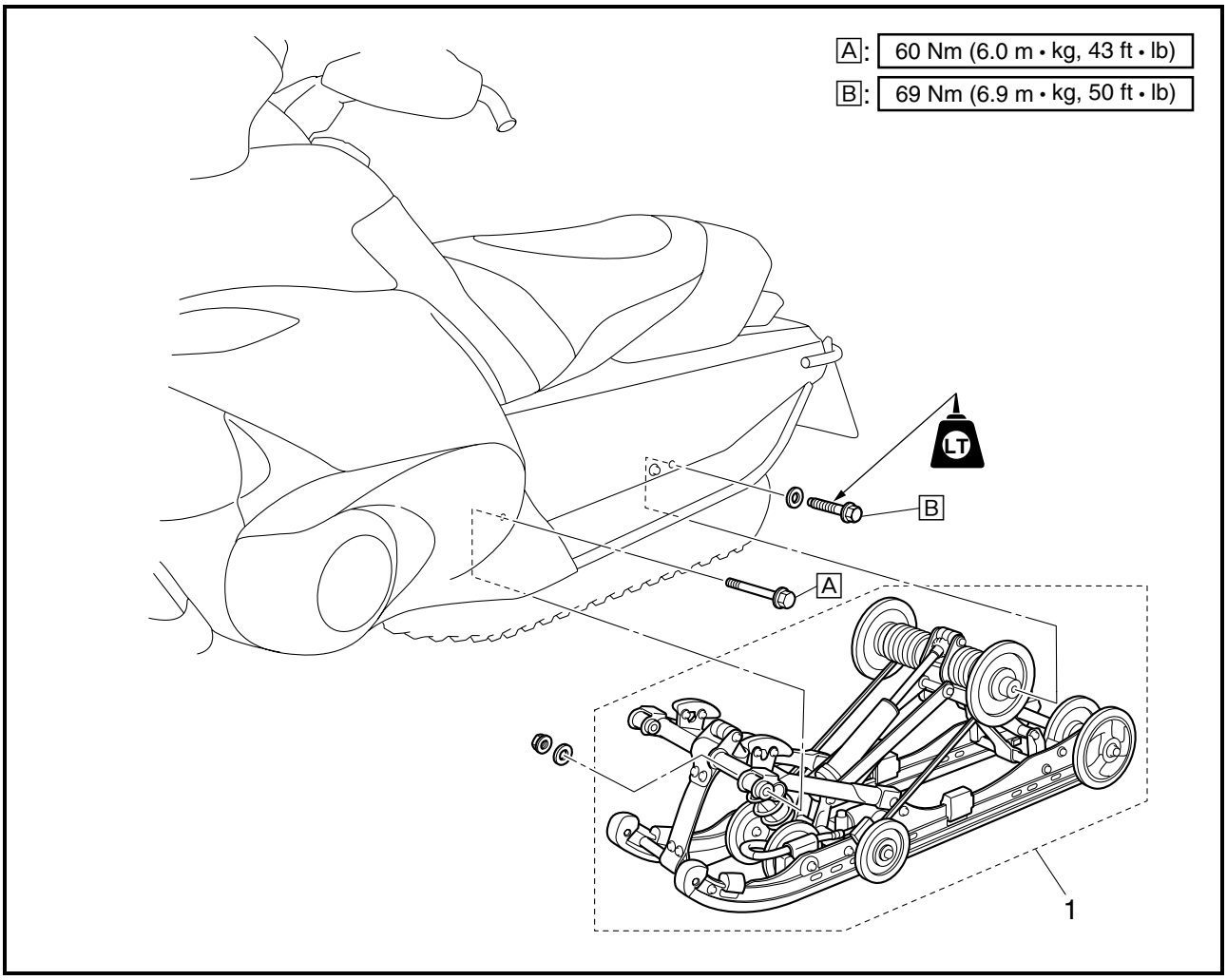


Order	Job name/Part name	Q'ty	Remarks
㊱	Shaft	1	
㊲	Collar	2	
㊳	Pull rod	2	
㊴	Stopper band	1	
㊵	Shaft	1	
㊶	Rear pivot arm	1	
㊷	Circlip	2	
㊸	Adjuster	2	
㊹	Rear pivot arm bracket	1	
㊺	Shaft	1	
㊻	Collar	2	
㊼	Stopper	2	

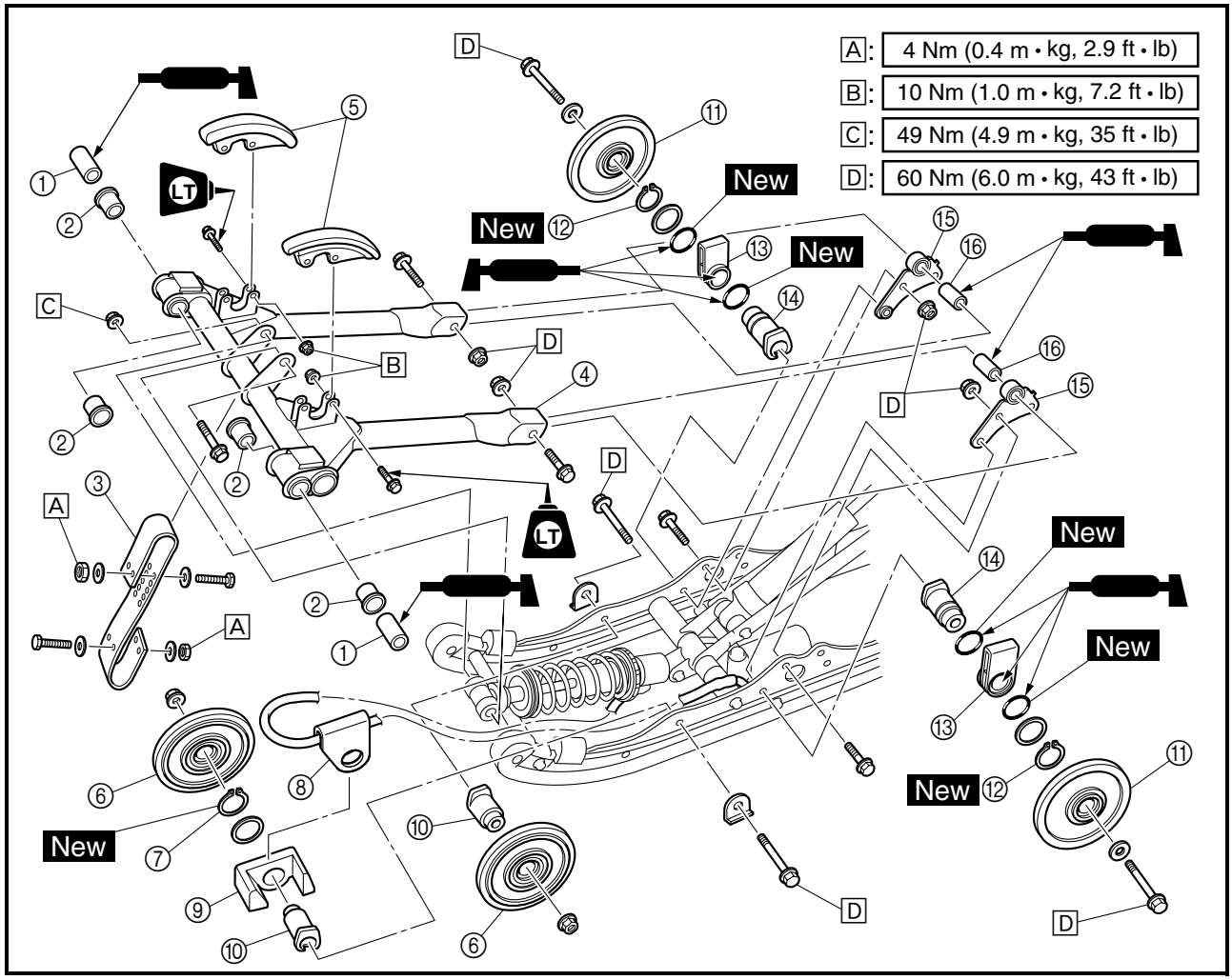


Order	Job name/Part name	Q'ty	Remarks
㊽	Rear axle	1	
㊾	Guide wheel	2	
㊿	Guide wheel	1	
(51)	Collar	2	
(52)	Tension adjuster	2	
(53)	Collar	1	
(54)	Collar	1	
(55)	Sliding frame	2	
			For assembly, reverse the disassembly procedure.

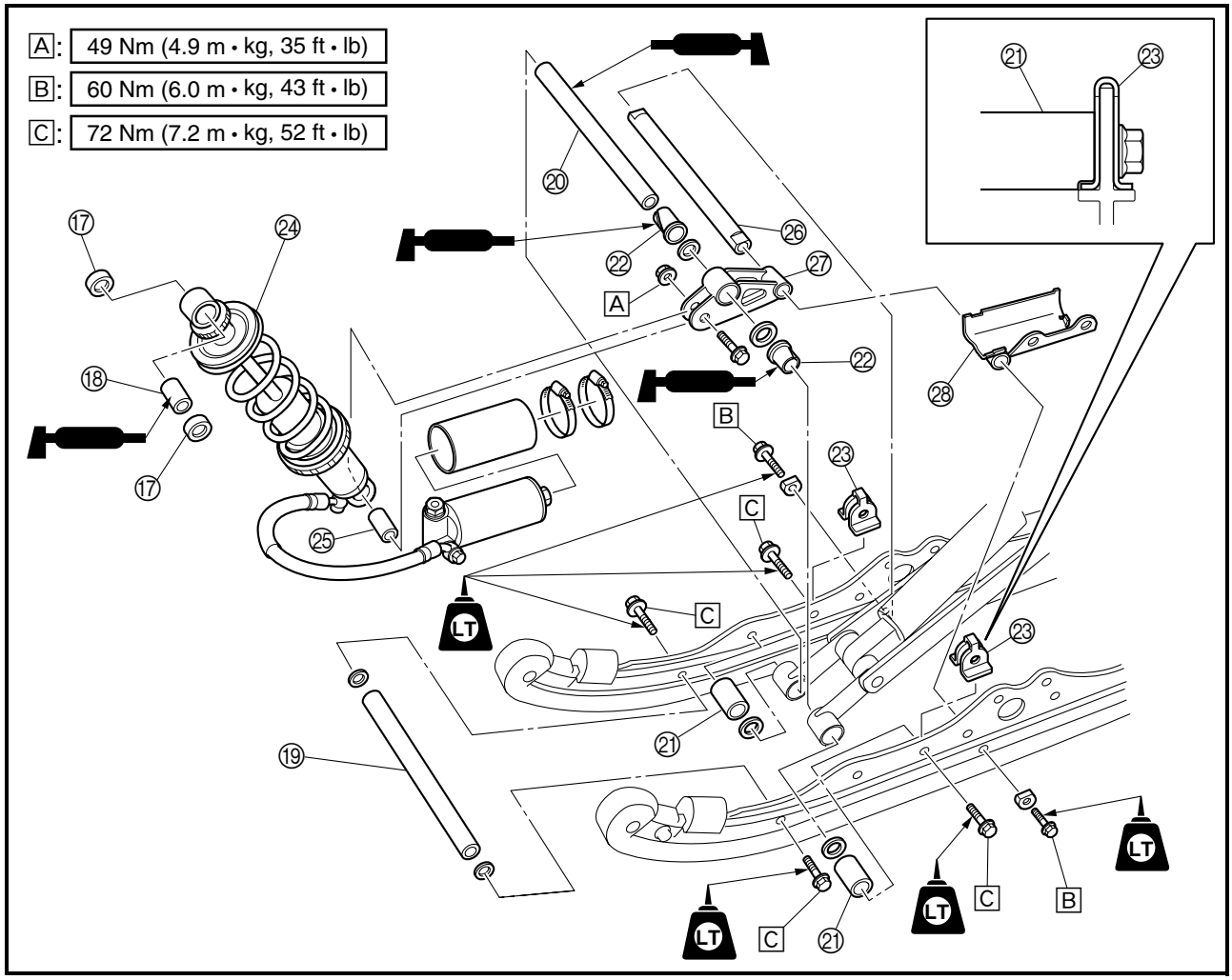
FX10RT/FX10RTR/FX10RTRA



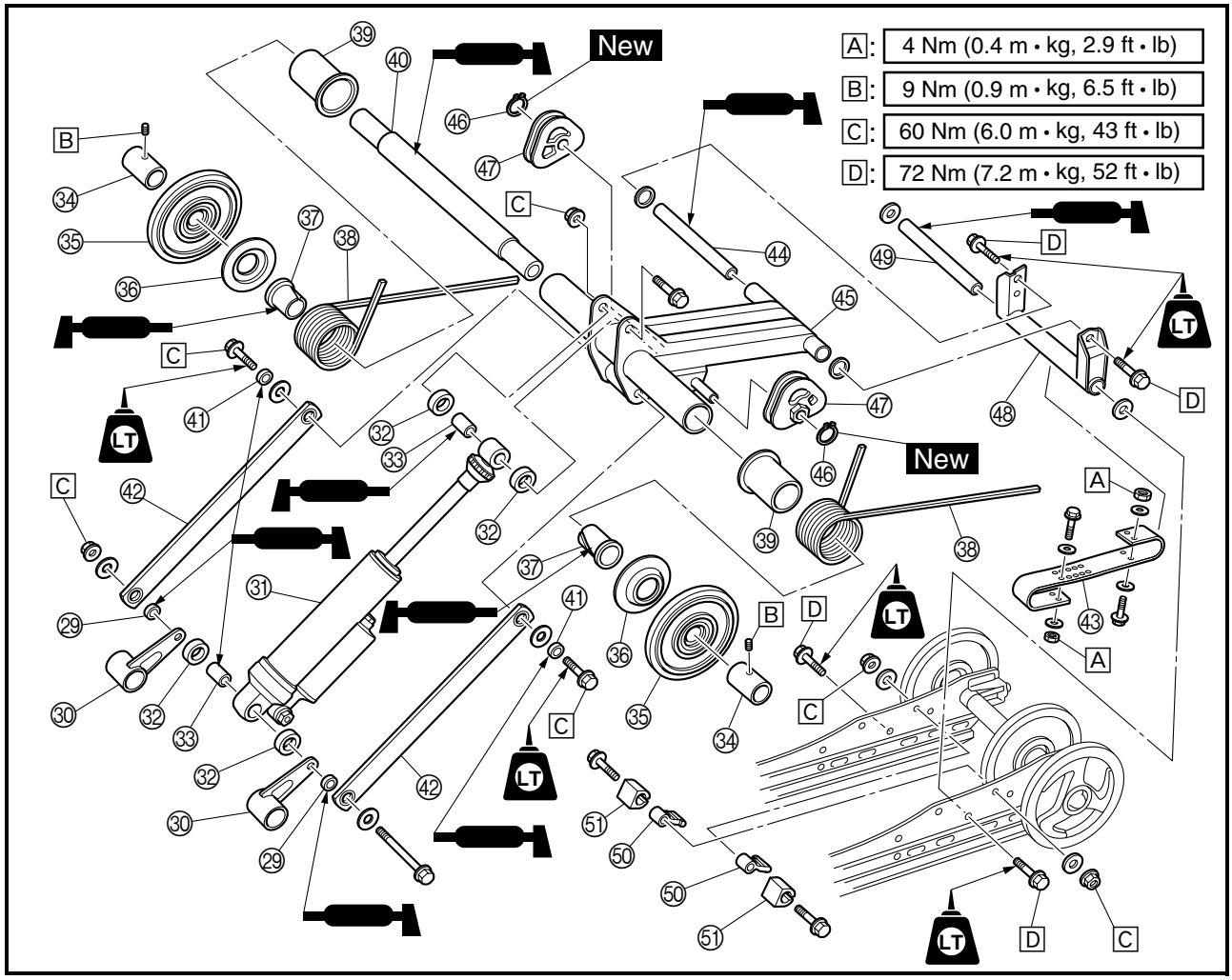
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension removal		Remove the parts in the order listed below.
	Rear axle nut		Loosen.
	Tension adjuster		Loosen.
1	Slide rail suspension	1	For installation, reverse the removal procedure.



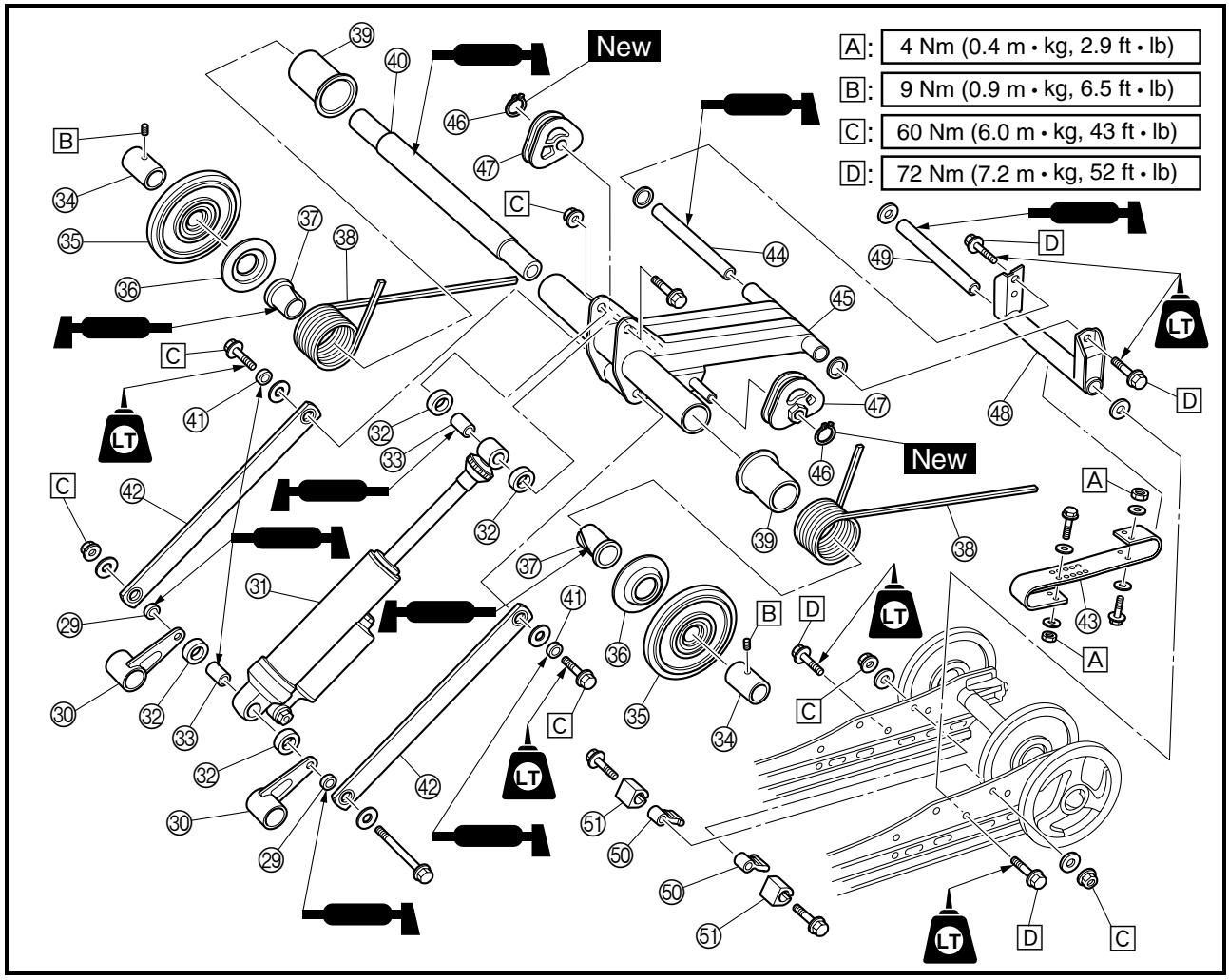
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension disassembly		Remove the parts in the order listed below.
①	Collar	2	
②	Bushing	4	
③	Stopper band	1	
④	Front pivot arm	1	
⑤	Slide runner	2	
⑥	Suspension wheel	2	
⑦	Circlip	1	
⑧	Holder	1	
⑨	Bracket	1	
⑩	Suspension wheel bracket	2	
⑪	Suspension wheel	2	
⑫	Circlip	2	
⑬	Spring end guide	2	**NOTE:** Apply grease to the inner surface of each spring end guide.
⑭	Spring end guide bracket	2	
⑮	Front pivot arm bracket	2	
⑯	Collar	2	



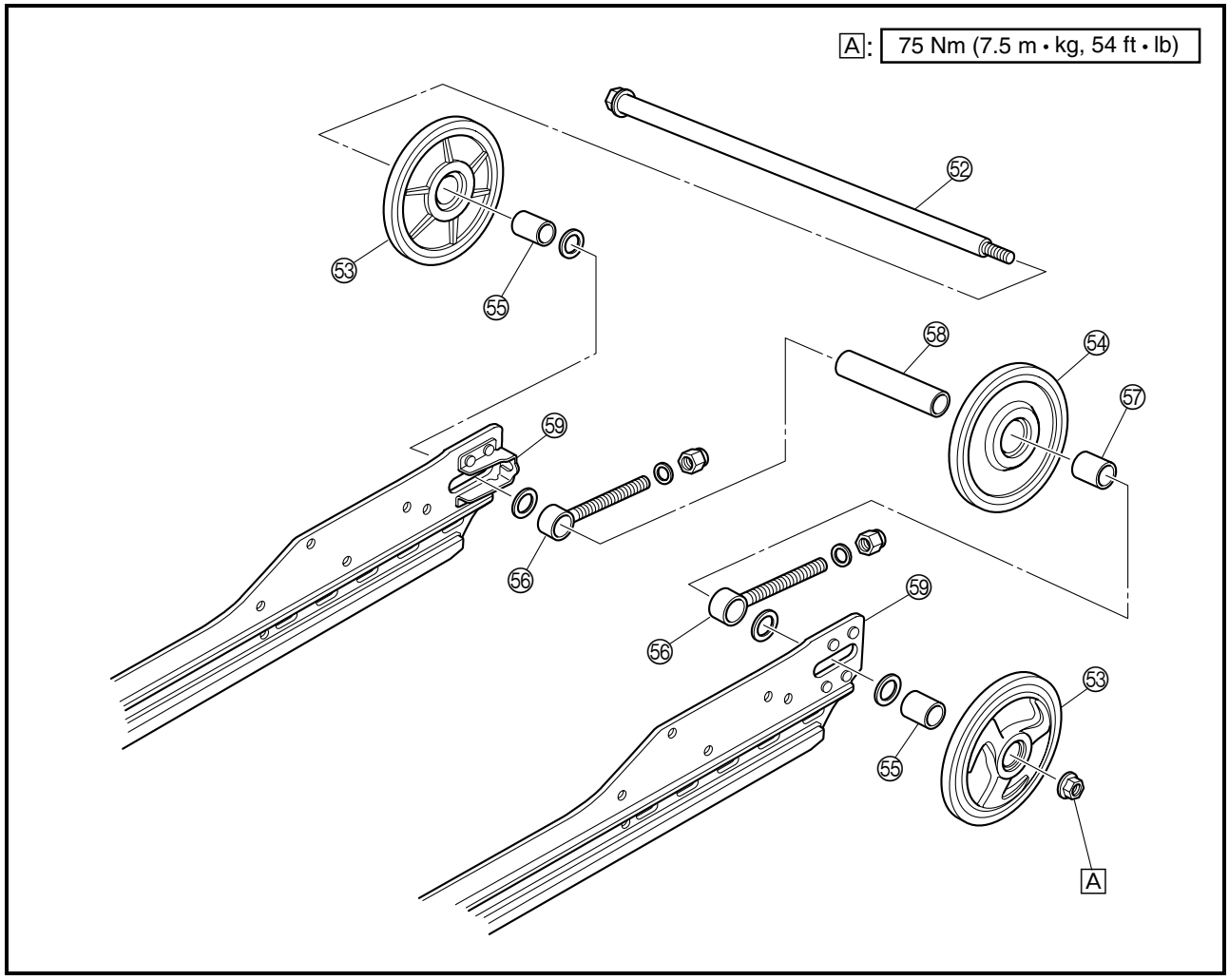
Order	Job name/Part name	Q'ty	Remarks
⑰	Spacer	2	
⑱	Collar	1	
⑲	Shaft	1	
⑳	Shaft	1	
㉑	Collar	2	
㉒	Bushing	2	
㉓	Washer	2	
㉔	Front shock absorber	1	
㉕	Collar	1	
㉖	Shaft	1	
㉗	Front suspension bracket	1	
㉘	Gas cylinder bracket	1	



Order	Job name/Part name	Q'ty	Remarks
㉙	Collar	2	
㉚	Rear suspension bracket	2	
㉛	Rear shock absorber	1	
㉜	Spacer	4	
㉝	Collar	2	
㉞	Wheel bracket	2	
㉟	Guide wheel	2	
㊱	Guide plate	2	
㊲	Bushing	2	
㊳	Tension spring	2	
㊴	Collar	2	

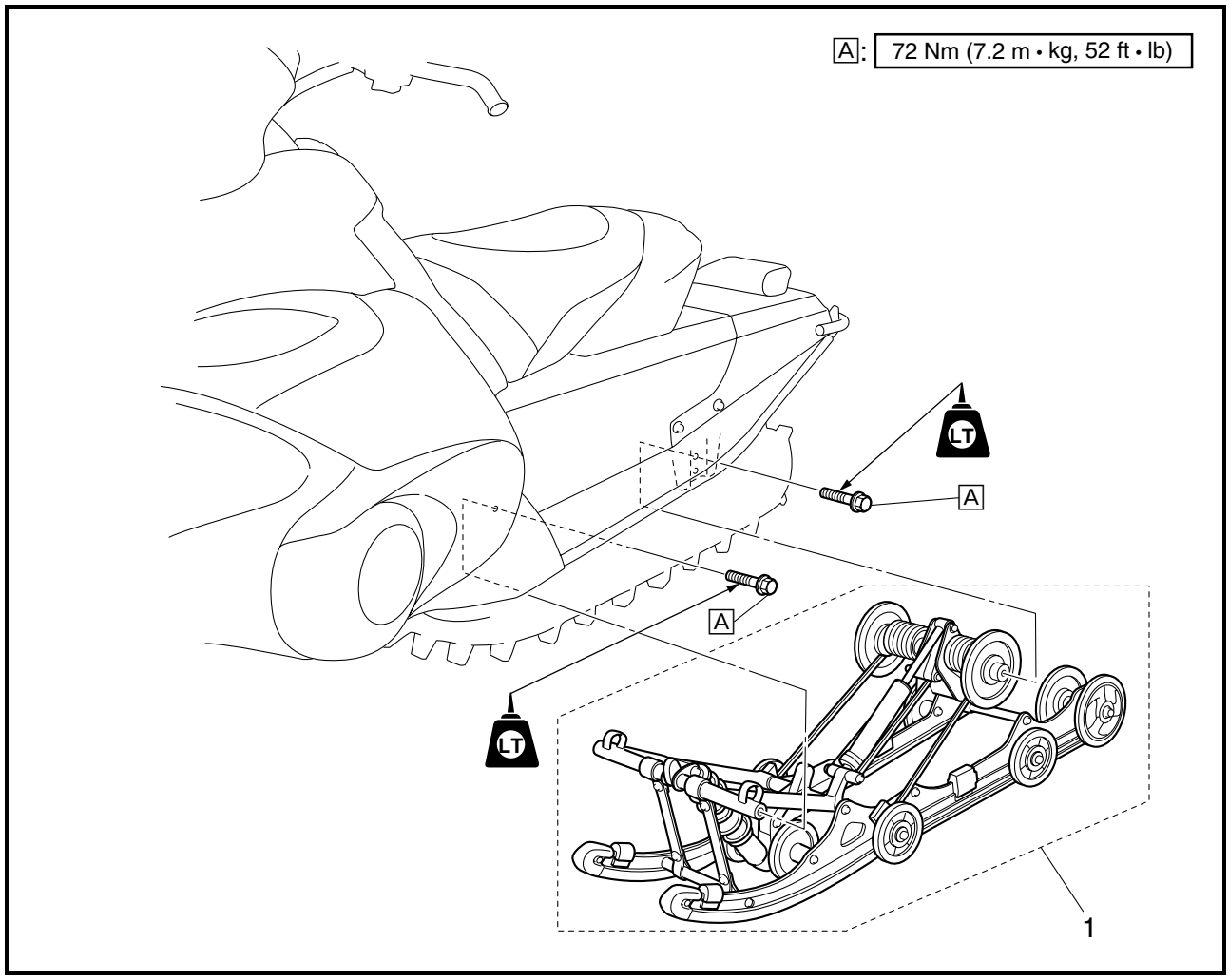


Order	Job name/Part name	Q'ty	Remarks
㊵	Shaft	1	
㊶	Collar	2	
㊷	Pull rod	2	
㊸	Stopper band	1	
㊹	Shaft	1	
㊺	Rear pivot arm	1	
㊻	Circlip	2	
㊼	Adjuster	2	
㊽	Rear pivot arm bracket	1	
㊾	Shaft	1	
㊿	Collar	2	
(51)	Stopper	2	

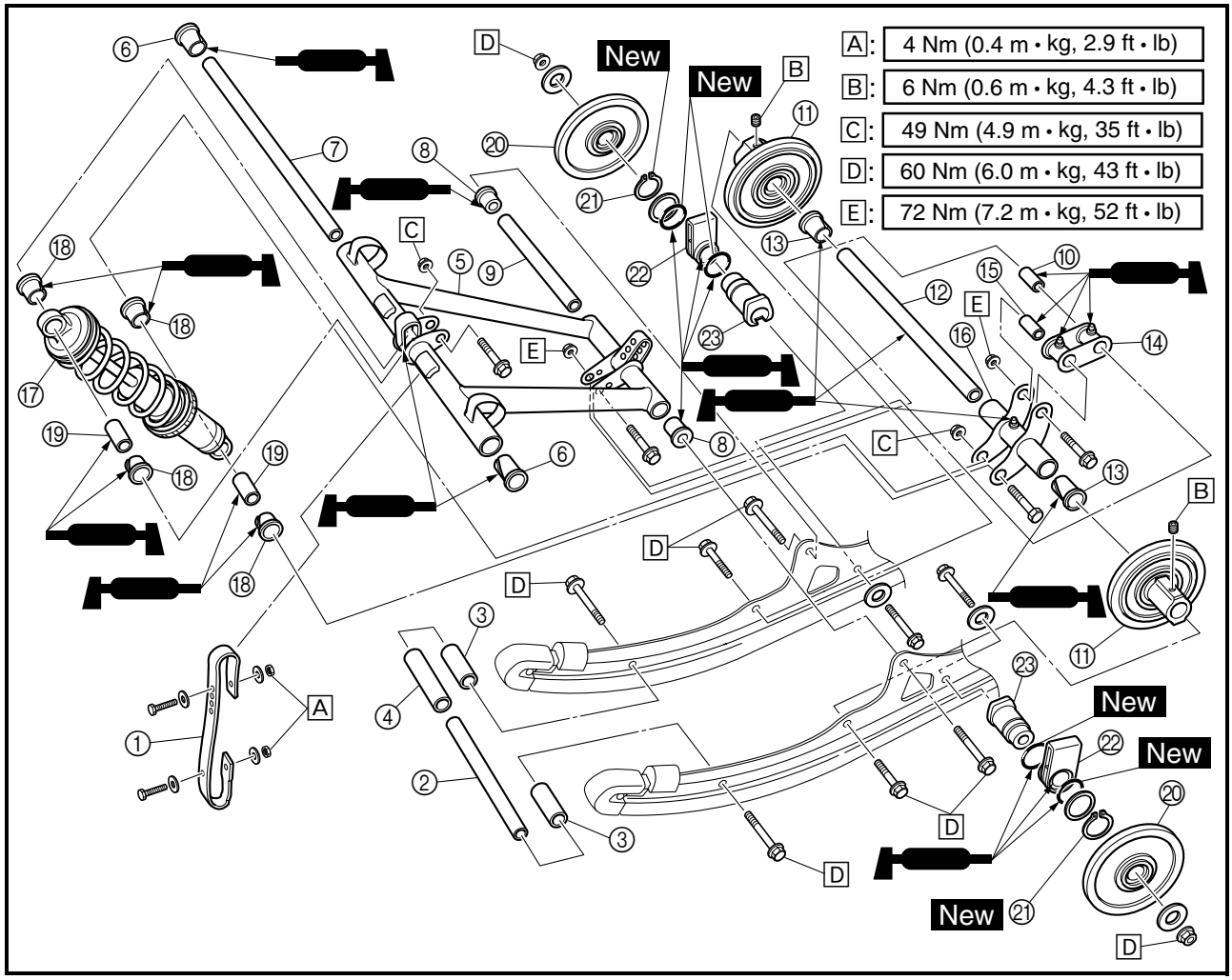


Order	Job name/Part name	Q'ty	Remarks
⑫	Rear axle	1	
⑬	Guide wheel	2	
⑭	Guide wheel	1	
⑮	Collar	2	
⑯	Tension adjuster	2	
⑰	Collar	1	
⑱	Collar	1	
⑲	Sliding frame	2	
			For assembly, reverse the disassembly procedure.

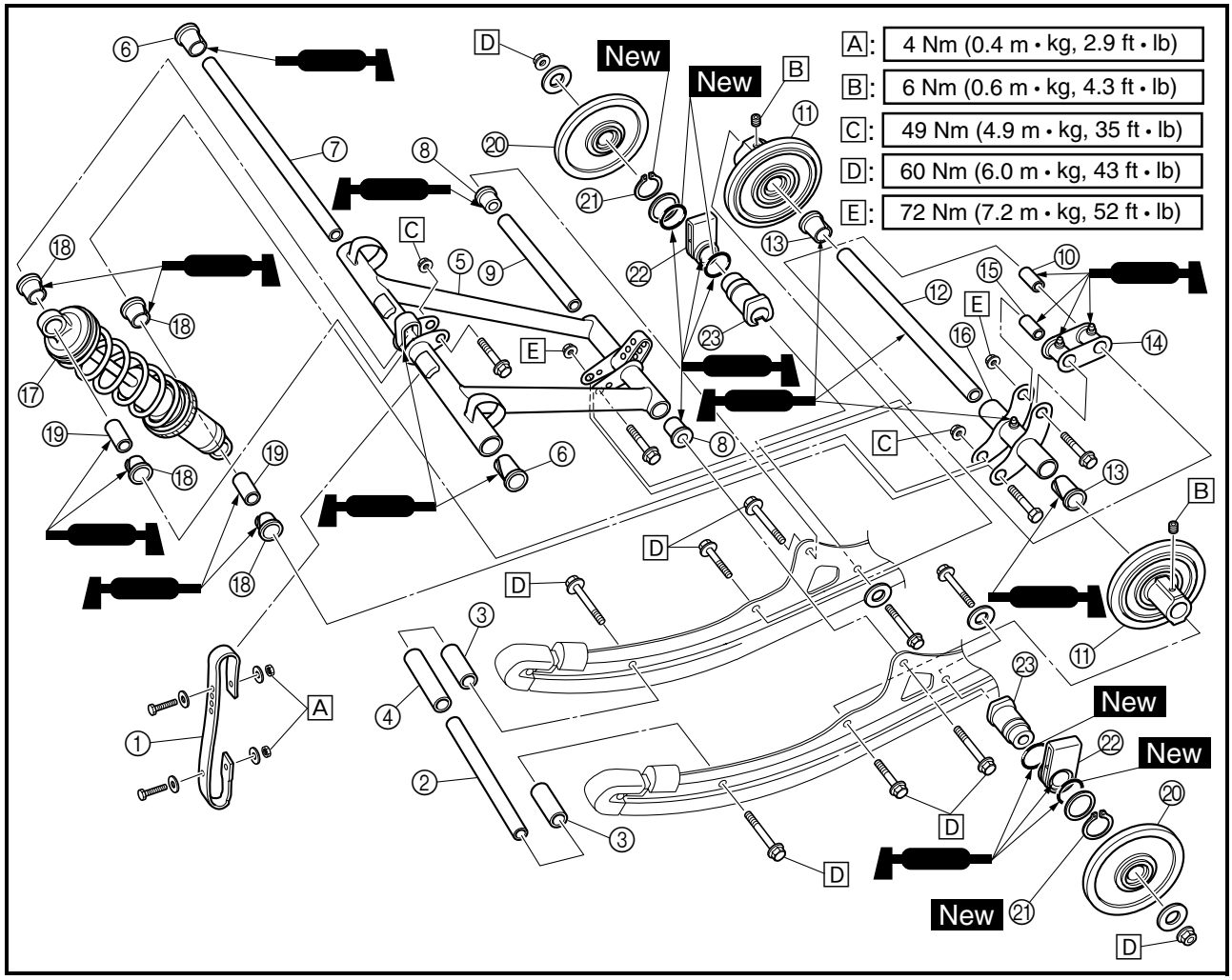
FX10MT/FX10MTR/FX10MTRA



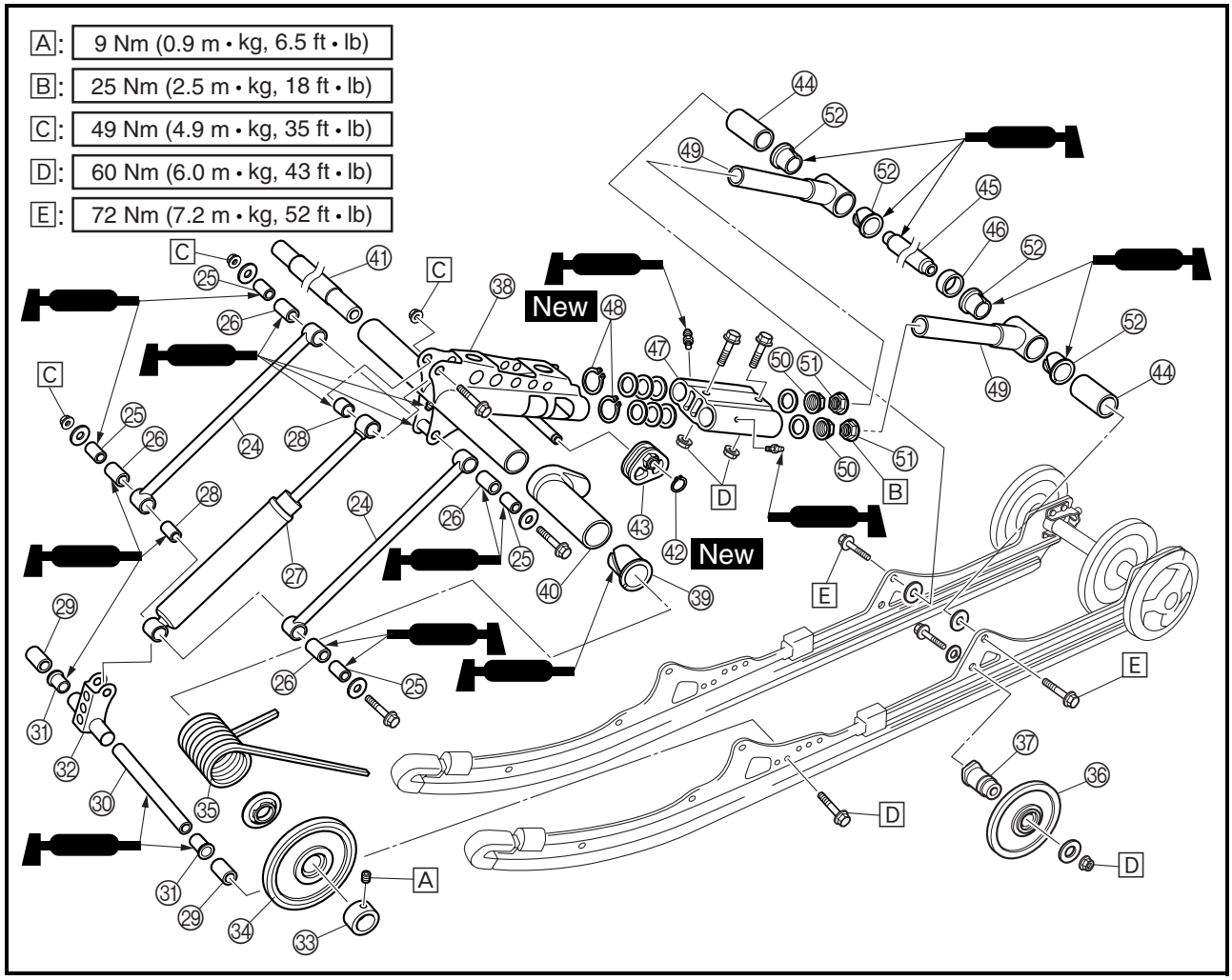
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension removal		Remove the parts in the order listed below.
	Rear axle nut		Loosen.
	Tension adjuster		Loosen.
1	Slide rail suspension	1	For installation, reverse the removal procedure.



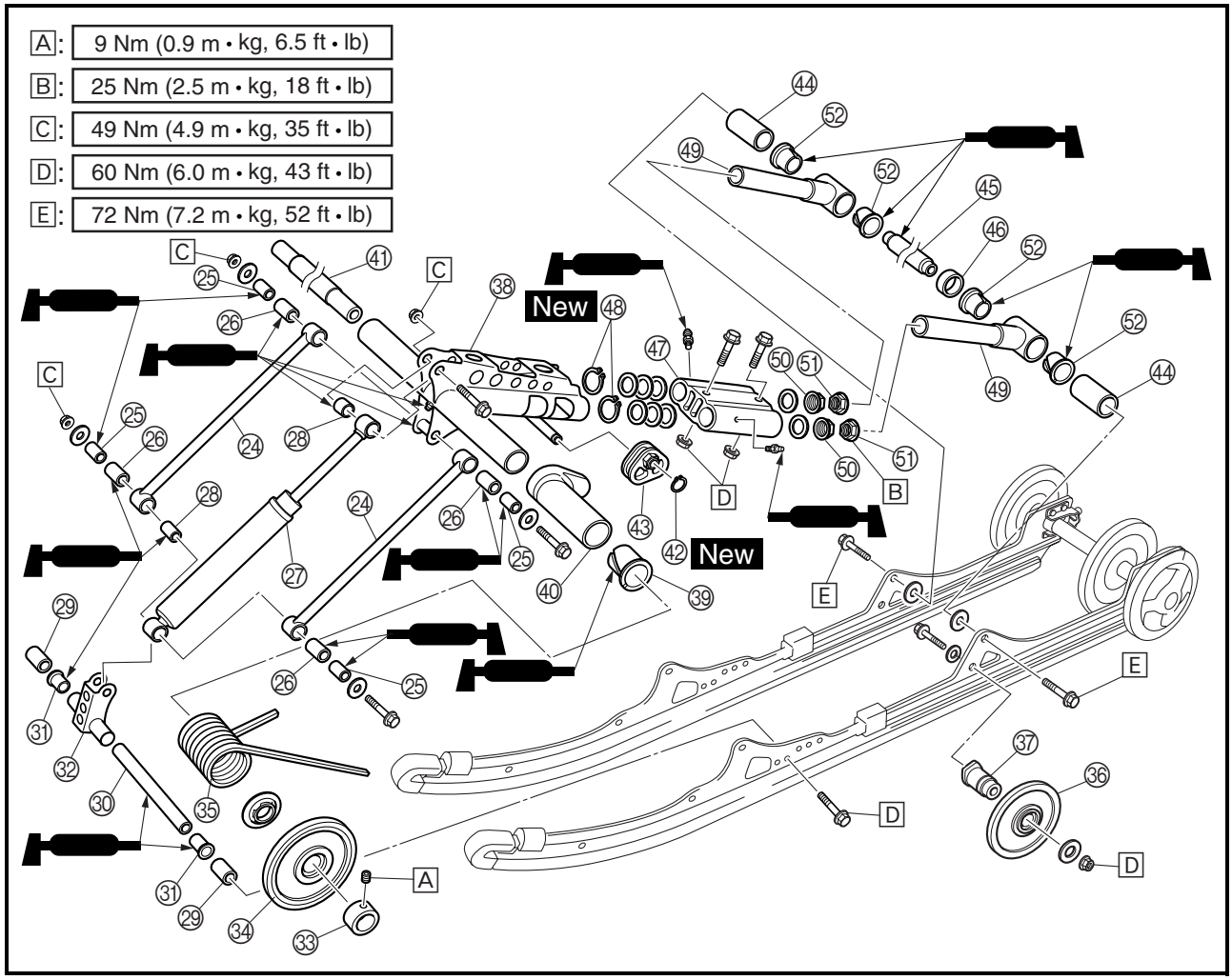
Order	Job name/Part name	Q'ty	Remarks
	Slide rail suspension disassembly		Remove the parts in the order listed below.
①	Stopper band	2	
②	Shaft	1	
③	Collar	2	
④	Collar	1	
⑤	Front pivot arm	1	
⑥	Bushing	2	
⑦	Shaft	1	
⑧	Collar	2	
⑨	Shaft	1	
⑩	Collar	1	
⑪	Suspension wheel	2	
⑫	Shaft	1	
⑬	Bushing	2	



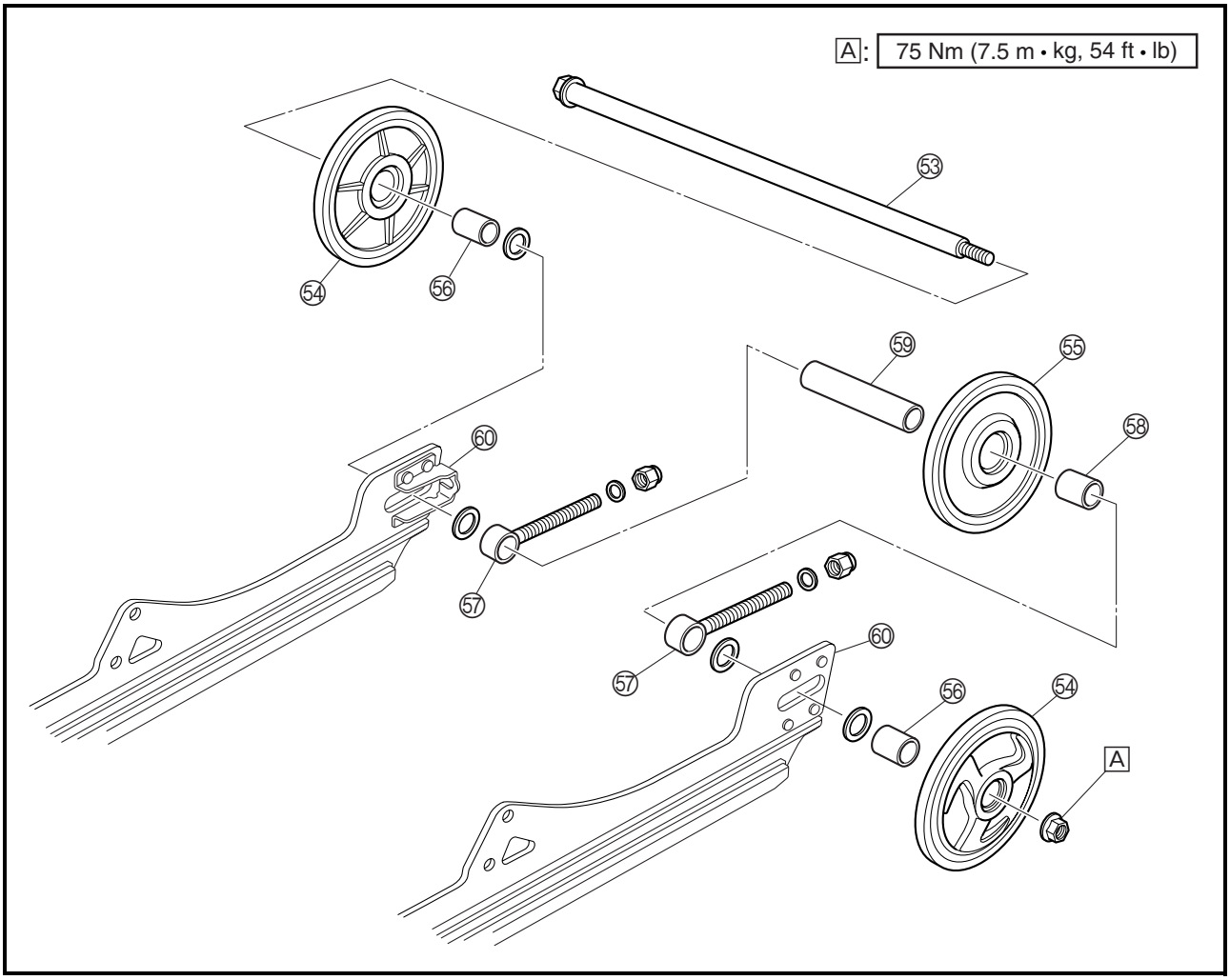
Order	Job name/Part name	Q'ty	Remarks
⑭	Connecting arm	1	
⑮	Collar	1	
⑯	Front suspension bracket	1	
⑰	Front shock absorber	1	
⑱	Bushing	4	
⑲	Collar	2	
⑳	Suspension wheel	2	
㉑	Circlip	2	
㉒	Spring end guide	2	**NOTE:** Apply grease to the inner surface of each spring end guide.
㉓	Spring end guide bracket	2	



Order	Job name/Part name	Q'ty	Remarks
㉔	Pull rod	2	
㉕	Collar	4	
㉖	Bushing	4	
㉗	Rear shock absorber	1	
㉘	Collar	2	
㉙	Collar	2	
㉚	Shaft	1	
㉛	Bushing	2	
㉜	Rear suspension bracket	1	
㉝	Collar	2	
㉞	Guide wheel	2	
㉟	Torsion spring	2	
㊱	Suspension wheel	2	
㊲	Wheel bracket	2	
㊳	Rear pivot arm	1	



Order	Job name/Part name	Q'ty	Remarks
㊴	Bushing	2	
㊵	Rear pivot arm protector	2	
㊶	Shaft	1	
㊷	Circlip	2	
㊸	Adjuster	2	
㊹	Collar	2	
㊺	Shaft	1	
㊻	Collar	1	
㊼	Control rod stopper	1	
㊽	Circlip	2	
㊾	Control rod	2	
㊿	Locknut	2	
(51)	Adjusting nut	2	
(52)	Bushing	4	



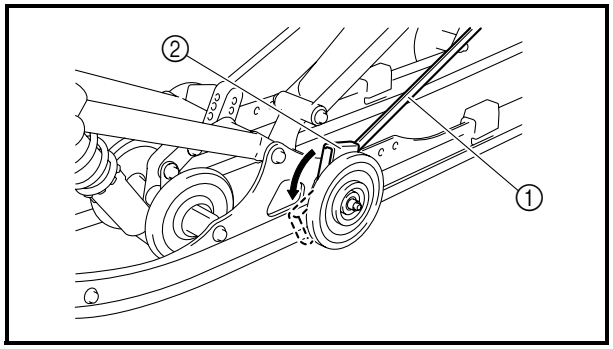
Order	Job name/Part name	Q'ty	Remarks
53	Rear axle	1	
54	Guide wheel	2	
55	Guide wheel	1	
56	Collar	2	
57	Tension adjuster	2	
58	Collar	1	
59	Collar	1	
60	Sliding frame	2	
			For assembly, reverse the disassembly procedure.

HANDLING NOTES

⚠ WARNING

This shock absorber contains highly compressed nitrogen gas. Before handling the shock absorber read and make sure that you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

- **Do not tamper or attempt to open the gas chamber.**
- **Do not subject the shock absorber to flames or any other source of high heat. This may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the gas chamber in any way. Gas chamber damage will result in poor damping performance.**



REMOVAL

1. Unhook the torsion spring ①

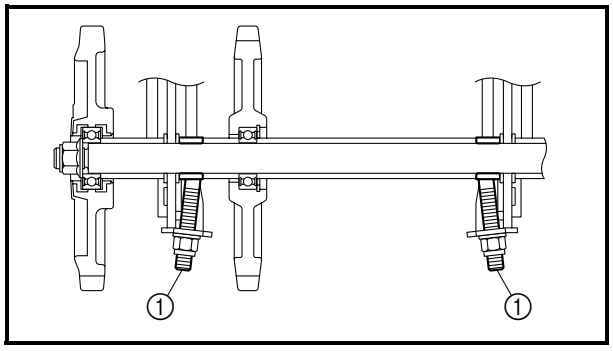
NOTE:

Rotate the spring end guide ② in the direction of the arrow shown to unhook the end of the torsion spring.

INSPECTION

1. Inspect:
   - Suspension wheel
   - Guide wheel
     Cracks/damage → Replace.
   - Wheel bearing
     Wheel turns roughly → Replace.
2. Inspect:
   - Stopper band
     Frayed/damage → Replace.
   - Pull rod
     Bends/damage → Replace.
   - Shock absorber
     Oil (gas) leaks/damage → Replace.
   - Bushings
     Wear/cracks/damage → Replace.
   - Front pivot arm
   - Rear pivot arm
   - Rear pivot arm bracket
     (FX10/FX10RT/FX10RTR/FX10RTRA)

- Suspension wheel bracket
- Front suspension bracket
- Rear suspension bracket
- Connecting arm
- Sliding frame
  Cracks/damage → Replace.
- Slide runner
  Wear/damage → Replace.

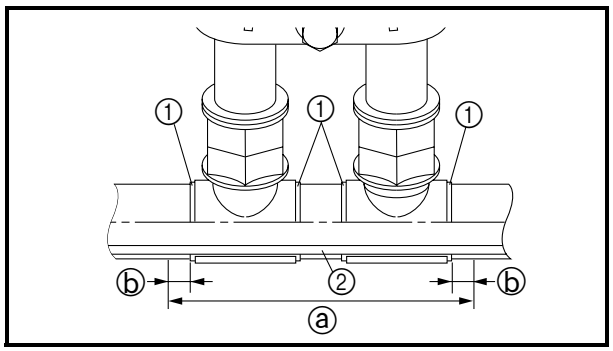


ASSEMBLY

1. Install:
   - tension adjusters ①

NOTE:

Install the tension adjusters so that they are angled outward as shown in the illustration.

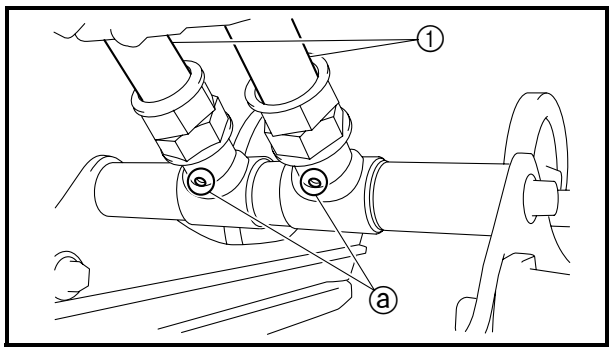


2. Apply:
   - ESSO beacon 325 grease or Aeroshell grease #7A (FX10MT/FX10MTR/FX10MTRA)

NOTE:

Apply grease to the bushings ① and the shaft ② in the area ⓐ shown in the illustration.

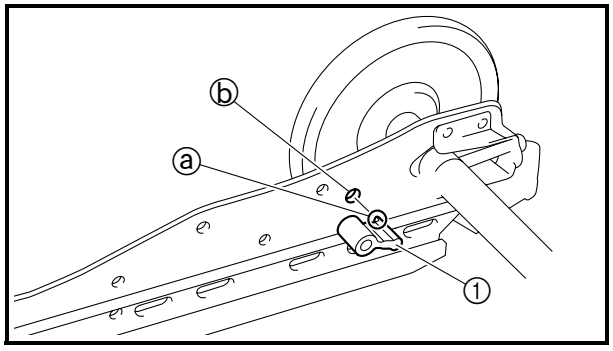
ⓑ 5 ~ 15 mm (0.20 ~ 0.59 in)



3. Install:
   - Control rods ①
     (FX10MT/FX10MTR/FX10MTRA)

NOTE:

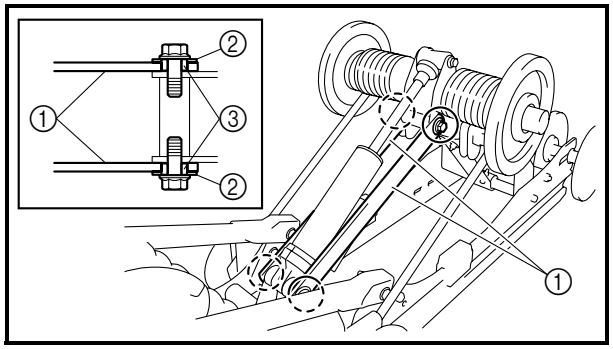
Install the control rods with the water drain holes ⓐ facing downward.



4. Install:
   - Collars ①
     (FX10/FX10RT/FX10RTR/FX10RTRA)

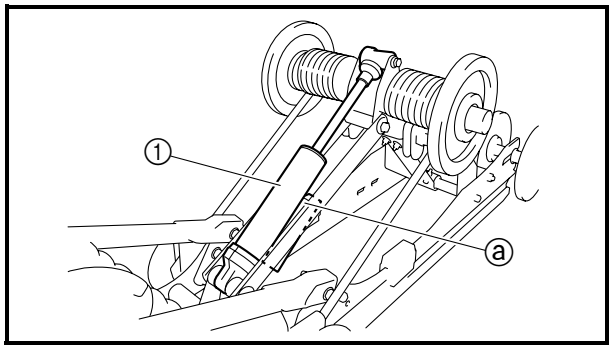
NOTE:

Fit the projection ⓐ on each collar into the hole ⓑ in its respective sliding frame.



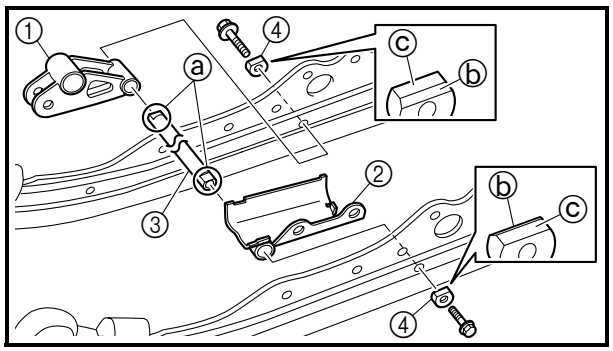
5. Install:
   FX10/FX10RT/FX10RTR/FX10RTRA
   - Pull rods ①
   - Collars ②
   - Washers ③

NOTE:
Be sure not to pinch the washers when installing the pull rods. After installing the pull rods, make sure that the washers rotate.



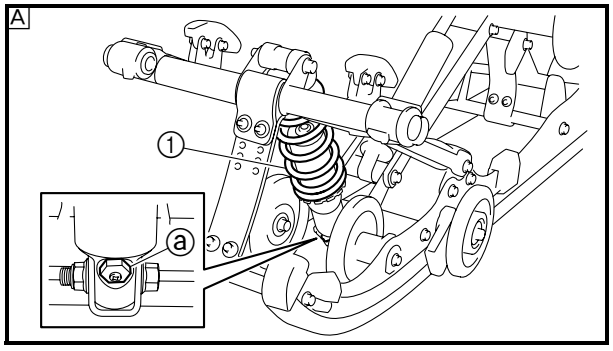
6. Install:
   - Rear shock absorber ①
     (FX10/FX10RT/FX10RTR/FX10RTRA)

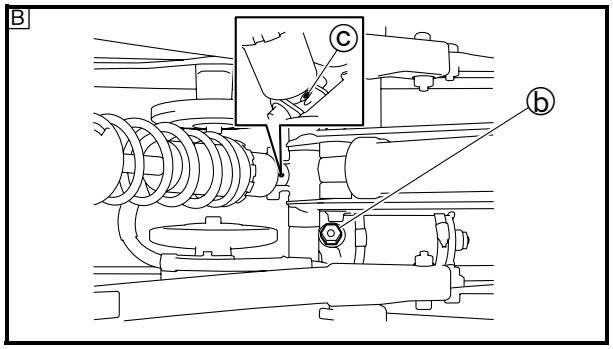
NOTE:
Install the rear shock absorber with its gas cylinder ⓐ facing downward.

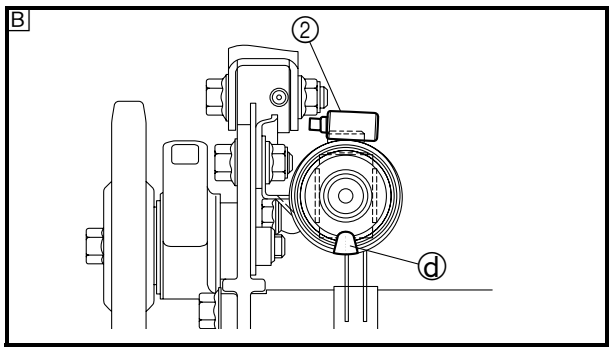


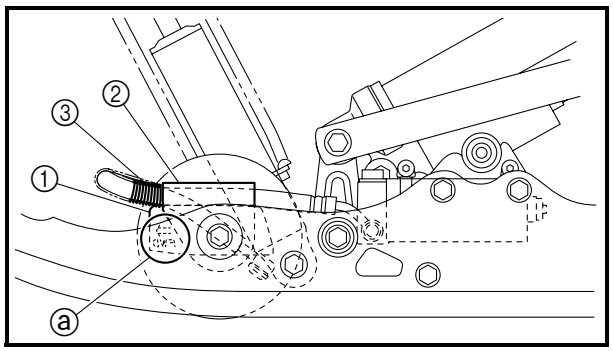
7. Install:
   FX10/FX10RT/FX10RTR/FX10RTRA
   - Front suspension bracket ①
   - Gas cylinder bracket ②
     (FX10RT/FX10RTR/FX10RTRA)
   - Shaft ③
   - Washers ④

NOTE:
- Install the shaft into the sliding frames with its flat portions ⓐ facing upward.
- Install each washer with its chamfered edge ⓑ facing inward and its flat edge ⓒ facing upward.









8. Install:
   - Front shock absorber ①
     (FX10/FX10RT/FX10RTR/FX10RTRA)

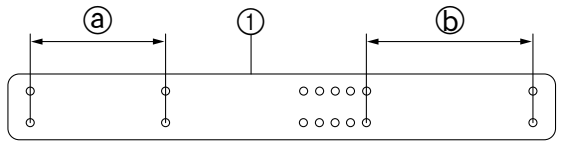
NOTE:
- For FX10:
  Install the front shock absorber with the charging valve ⓐ facing downward.
- For FX10RT/FX10RTR/FX10RTRA:
  Install the gas cylinder with the adjuster ⓑ facing upward.
  Install the front shock absorber with the valve ⓒ facing upward.
- Make sure that the gas cylinder contacts the projection ⓓ on the gas cylinder bracket.
- Be sure to install the screw clamps ② used to secure the gas cylinder so that the fastener of each clamp is on top of the cylinder and the screw is horizontal.

A FX10
B FX10RT/FX10RTR/FX10RTRA

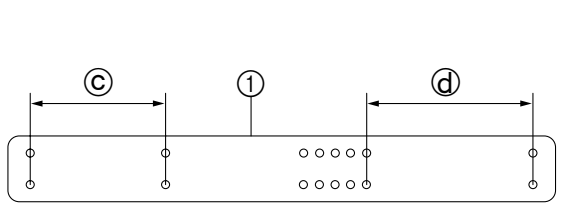
9. Install:
   FX10RT/FX10RTR/FX10RTRA
   - Suspension wheel brackets
   - Bracket ①
   - Holder ②
   - Circlips
   - Suspension wheels

NOTE:
- Install the bracket ① with the mark ⓐ on the inner side of the bracket facing forward.
- Fasten the hose (front shock absorber to gas cylinder) with the holder ②, making sure to position the hose protector ③ toward the shock absorber. Do not install the holder on the hose protector.

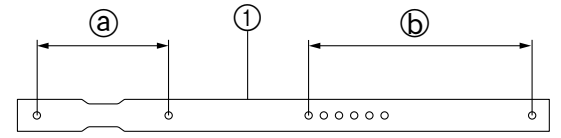
A



B



C



10. Install:
    - Stopper band ①

NOTE:

- Install the stopper band with ⓐ toward the front pivot arm and ⓑ toward the shaft.
- Install the stopper band with ⓒ toward the rear pivot arm and ⓓ toward the rear pivot arm bracket.

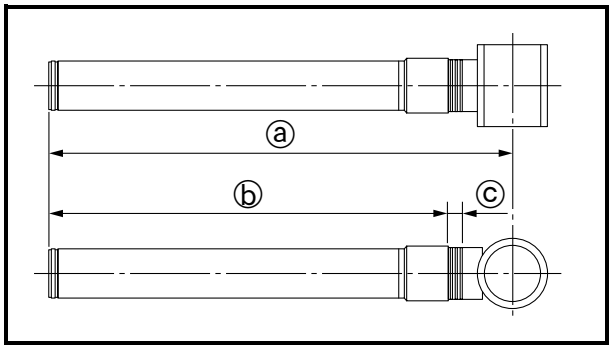
A FX10/FX10RT/FX10RTR/FX10RTRA (front side)
B FX10/FX10RT/FX10RTR/FX10RTRA (rear side)
C FX10MT/FX10MTR/FX10MTRA

Stopper band nut:
4 Nm (0.4 m · kg, 2.9 ft · lb)

INSTALLATION

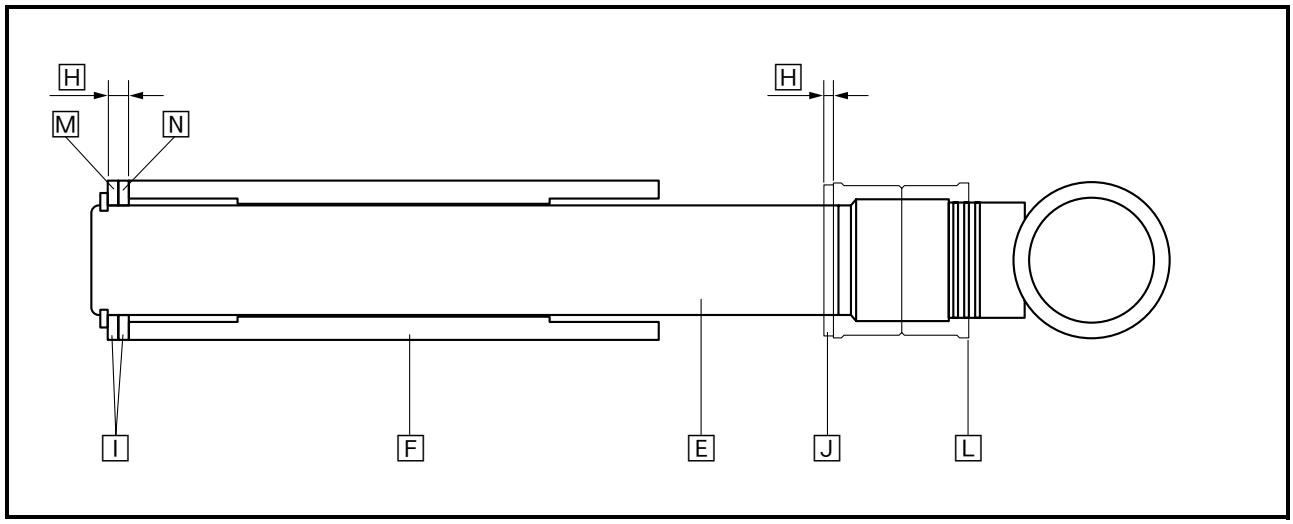
1. Adjust:
   - Track tension
     Refer to "TRACK TENSION ADJUSTMENT" in CHAPTER 2.

Control rod part numbers (FX10MT/FX10MTR/FX10MTRA)



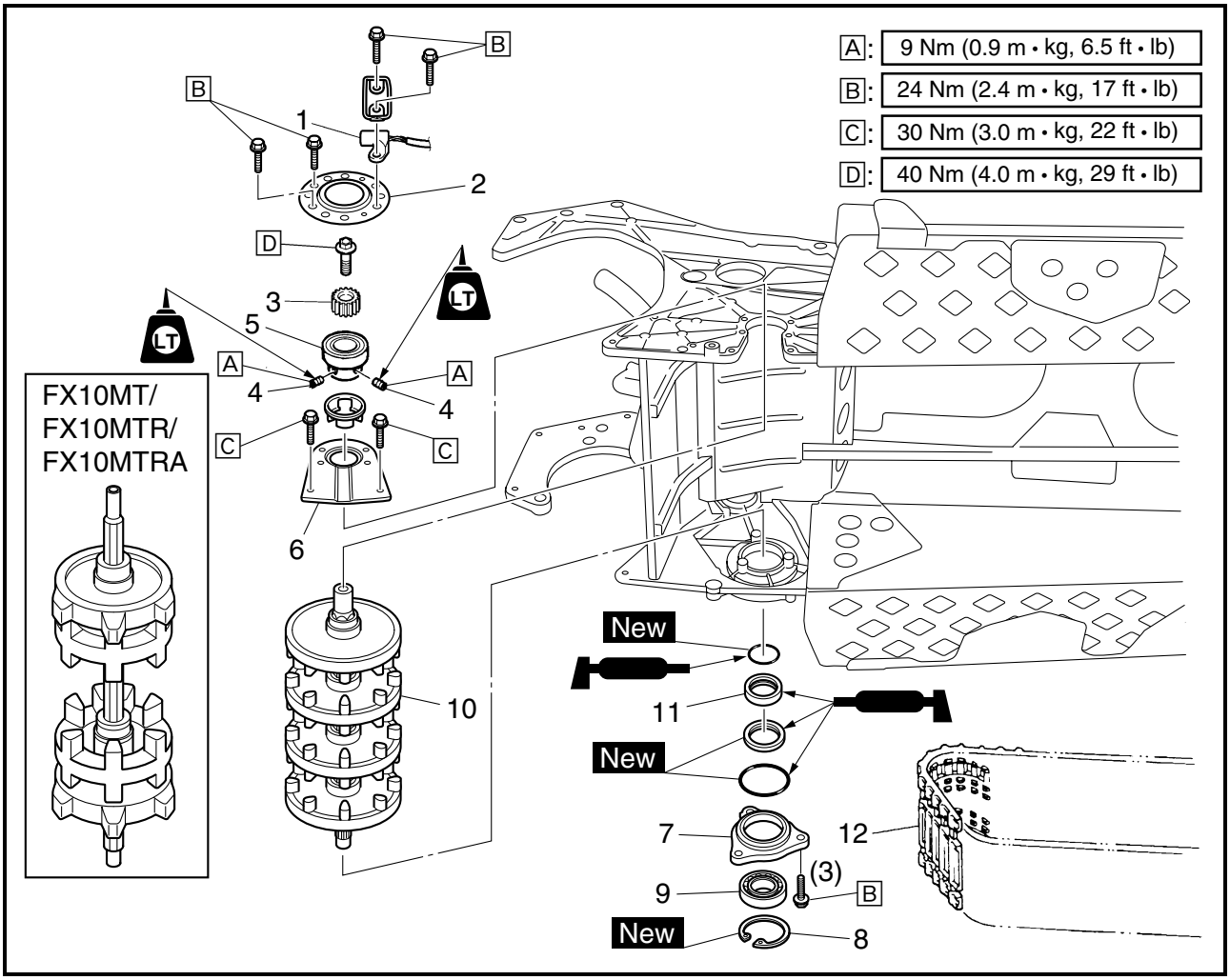
A Control rod 1	B Length ⓐ mm (in)	C Length ⓑ mm (in)	D Length ⓒ mm (in)
FX10MT/FX10MTR/ FX10MTRA	238.3 (9.38)	199.7 (7.86)	2.5P × 2 = 5 (0.098P × 2 = 0.197)

E Control rod 1 part number	F Control rod stopper part number	G Washer part numbers H Washer thickness mm (in)			
		I Upper	K Q'ty	J Lower	K Q'ty
8HA-4745A-00 (FX10MT/FX10MTR/ FX10MTRA)	8ES-4745D-00	90202-25001 2.0 (0.079)	1	90202-25001 2.0 (0.079)	1
		90201-24015 2.0 (0.079)	1		

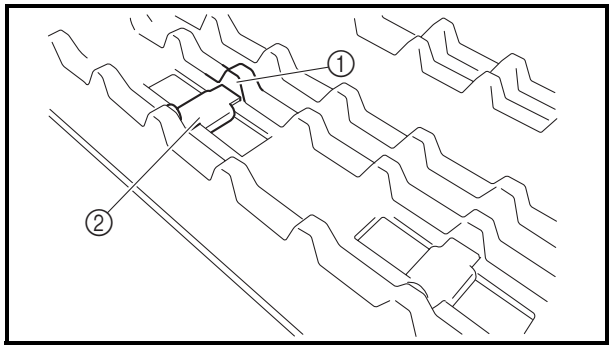


L Standard position M Metal washer(s) N Plastic washer(s)

FRONT AXLE AND TRACK

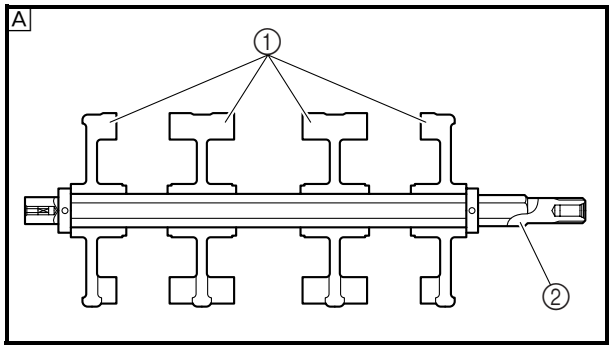


Order	Job name/Part name	Q'ty	Remarks
	Front axle and track removal		Remove the parts in the order listed below.
	Drive chain		Refer to "DRIVE CHAIN".
	Slide rail suspension		Refer to "SLIDE RAIL SUSPENSION".
	Secondary sheave		Refer to "SECONDARY SHEAVE".
1	Speed sensor	1	
2	Bearing housing	1	
3	Gear unit	1	
4	Set bolt	2	
5	Bearing	1	
6	Bearing housing	1	
7	Bearing housing	1	
8	Circlip	1	
9	Bearing	1	
10	Front axle assembly	1	
11	Spacer	1	
12	Track	1	
			For installation, reverse the removal procedure.



INSPECTION

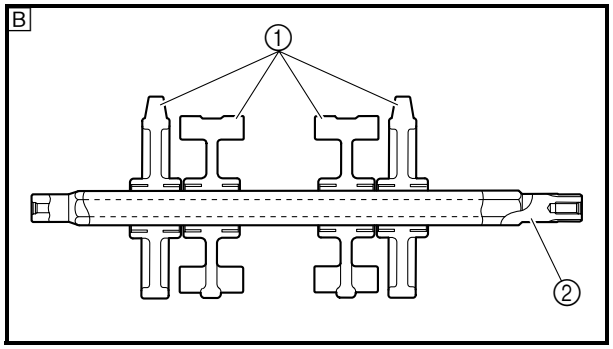
1. Inspect:
   - Track ①
   - Slide metal ②
     Wear/cracks/damage → Replace.

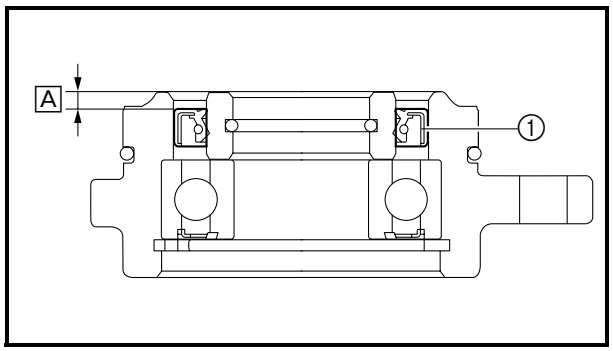


2. Inspect:
   - Sprocket wheels ①
     Wear/break/damage → Replace.
   - Front axle ②
     Bends/scratches (excessive)/damage → Replace.

A FX10/FX10RT/FX10RTR/FX10RTRA
B FX10MT/FX10MTR/FX10MTRA

3. Inspect:
   - Bearing
     Pitting/damage → Replace.





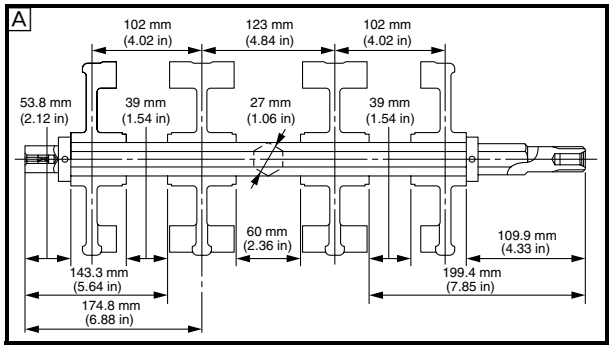
INSTALLATION

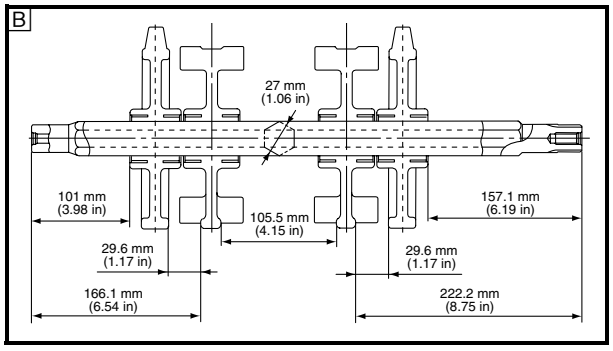
1. Install:
   - Oil seal ①

NOTE:

Press the oil seal onto the bearing housing as shown.

A 2.5 ~ 3.5 mm (0.10 ~ 0.14 in)

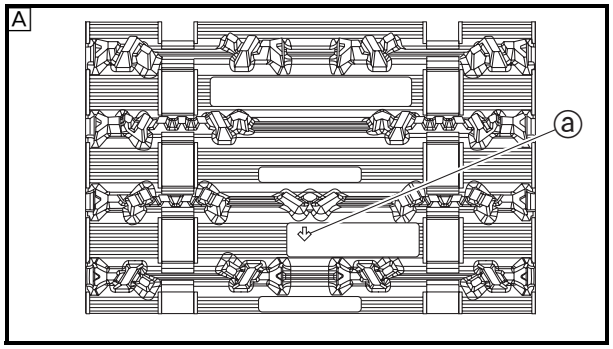


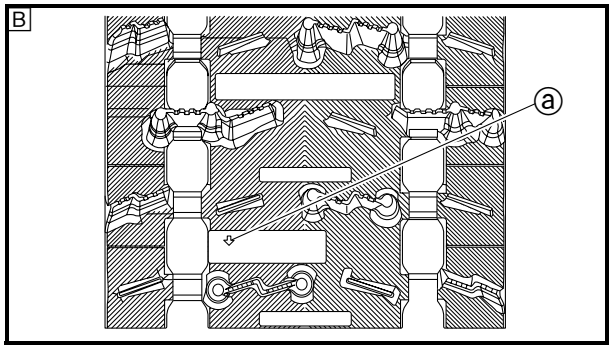


2. Install:
   - Sprocket wheels
   - Guide wheels

NOTE:
- When pressing the sprocket wheels onto the front axle, align the lugs on each sprocket wheel.
- Position each sprocket wheel on the axle as shown in the illustration.

A FX10/FX10RT/FX10RTR/FX10RTRA
B FX10MT/FX10MTR/FX10MTRA





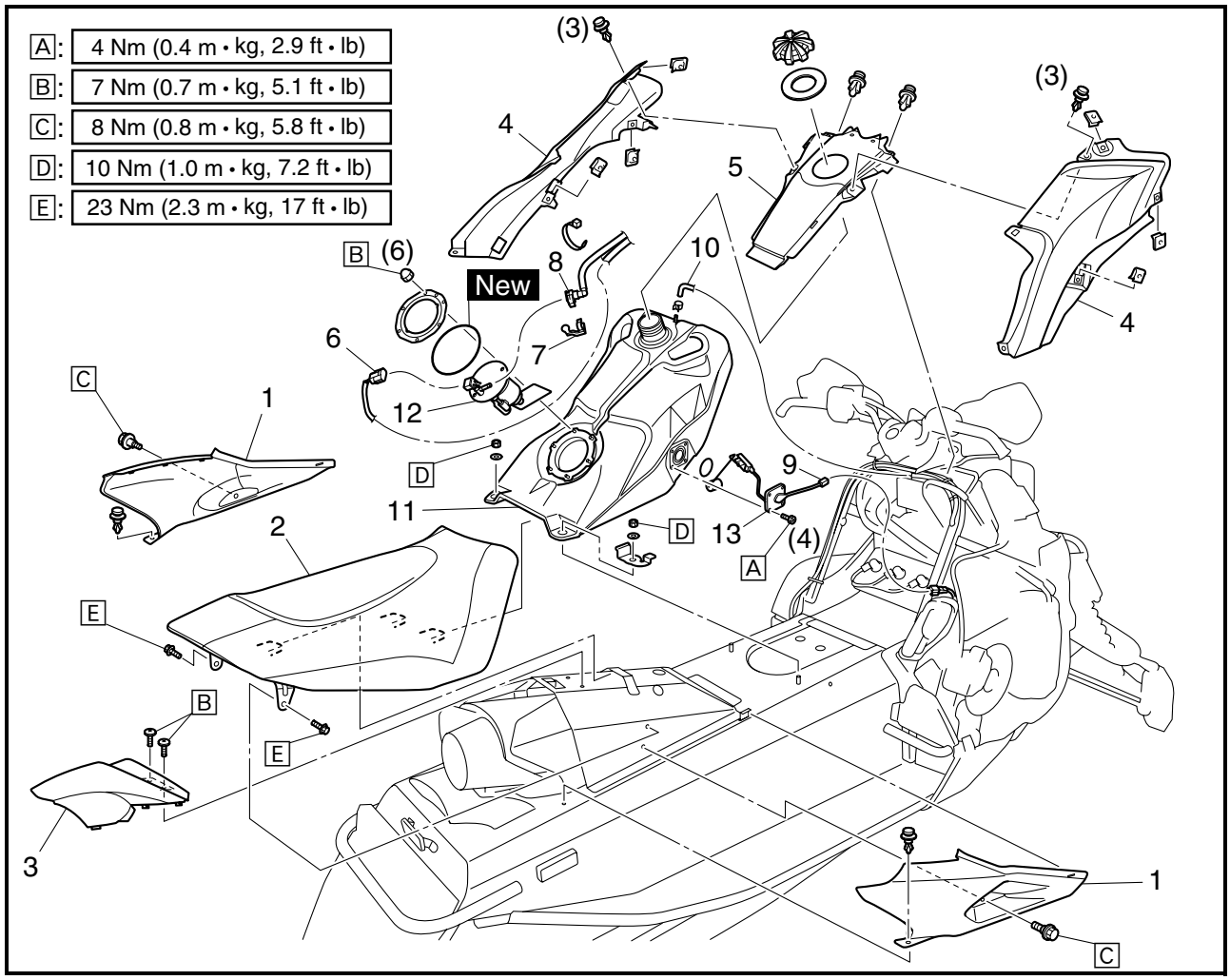
3. Place the track in the chassis.

NOTE:
For track with a direction of rotation mark ⓐ:
Install the track with the mark pointing in the direction of track rotation.

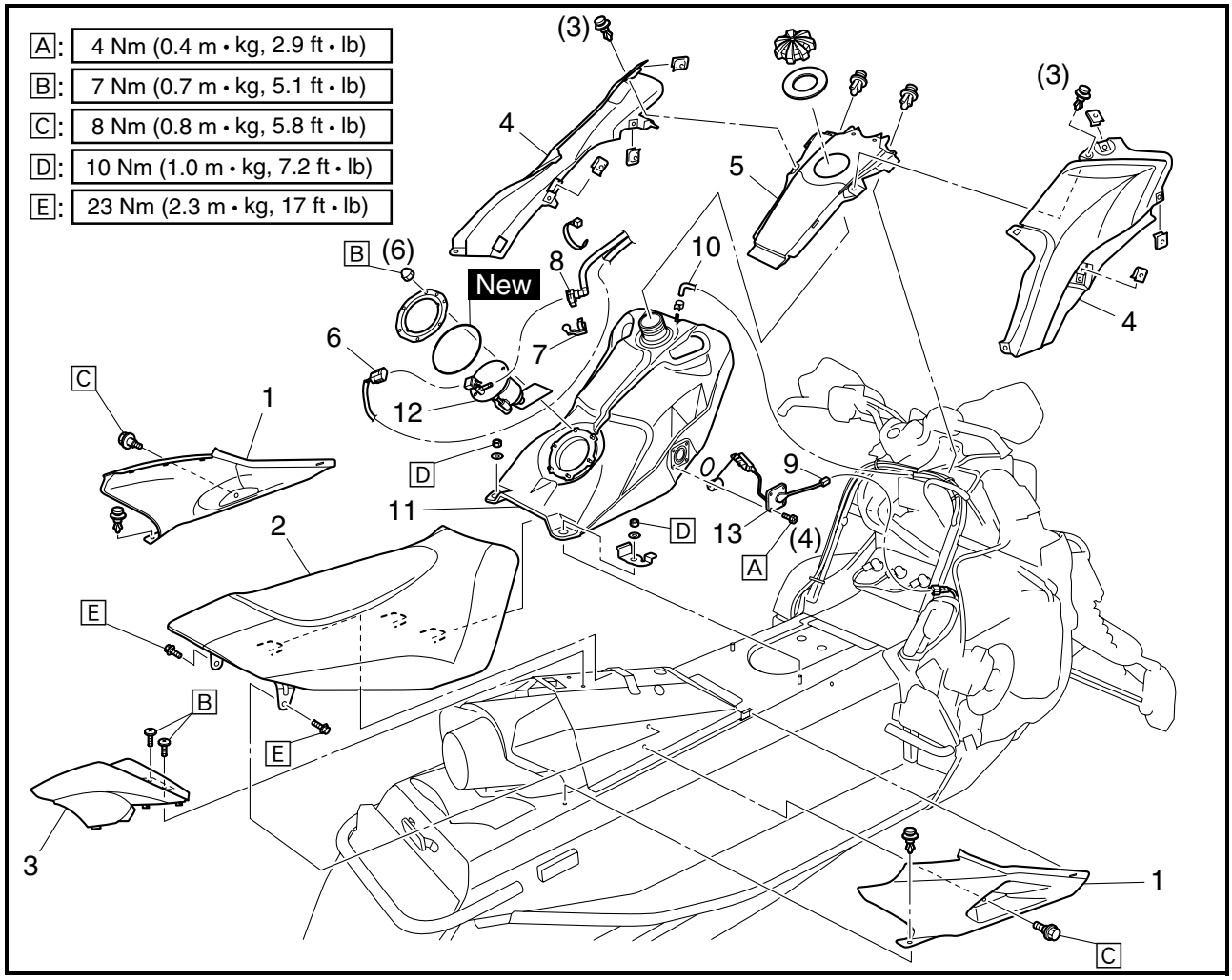
A FX10/FX10RT/FX10RTR/FX10RTRA
B FX10MT/FX10MTR/FX10MTRA

ENGINE

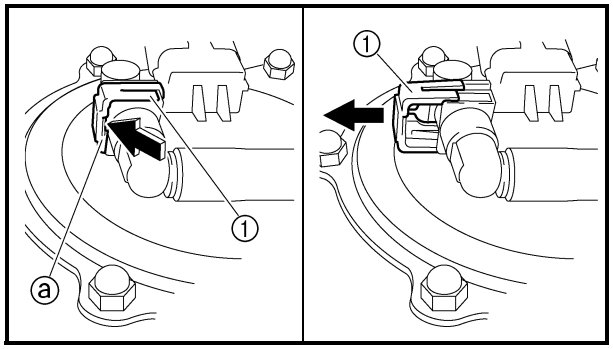
SEAT AND FUEL TANK



Order	Job name/Part name	Q'ty	Remarks
	Seat and fuel tank removal		Remove the parts in the order listed below.
	Side cover		Refer to "COVERS" in CHAPTER 3.
1	Rear side cover (left and right)	2	
2	Seat	1	
3	Rear upper cover	1	
4	Fuel tank cover (left and right)	2	
5	Fuel tank upper cover	1	
6	Fuel pump coupler	1	Disconnect.
7	Fuel hose connector holder	1	
8	Fuel hose	1	Disconnect.
9	Fuel sender coupler	1	Disconnect.
10	Fuel tank breather hose	1	Disconnect.



Order	Job name/Part name	Q'ty	Remarks
11	Fuel tank assembly	1	
12	Fuel pump	1	
13	Fuel sender	1	
			For installation, reverse the removal procedure.



REMOVAL

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel hose connector holder
   - Fuel hose

CAUTION:

- **Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.**
- **Although the fuel has been removed from the fuel tank be careful when removing the fuel hose, since there may be fuel remaining in it.**

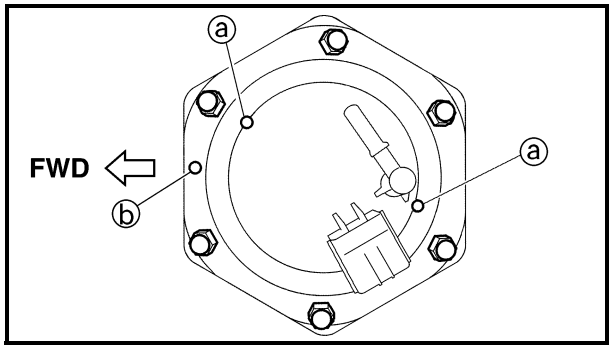
NOTE:

- When removing the fuel hose from the fuel pump, remove the fuel hose connector holder first, and next, insert a slotted head screwdriver etc. in the slot part ⓐ of the fuel hose connector cover ①, then slide the screwdriver in the direction of the arrow, and remove the fuel hose.
- Before removing the hose, place a few rags in the area under where it will be removed.

3. Remove:
   - Fuel pump bracket
   - Fuel pump
   - Fuel pump gasket
   - Fuel sender

CAUTION:

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**



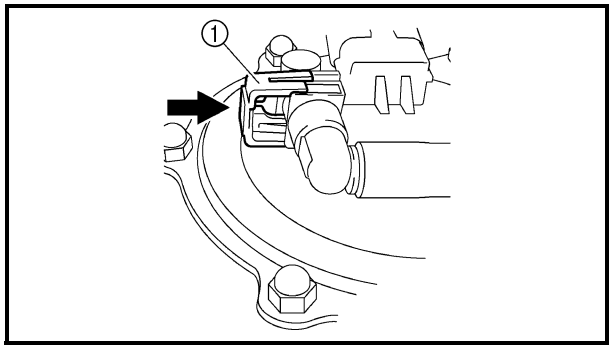
INSTALLATION

1. Install:
   - Fuel pump gasket New
   - Fuel pump
   - Fuel pump bracket

Fuel pump nut:
7 Nm (0.7 m · kg, 5.1 ft · lb)

NOTE:

- Do not damage the installation surface of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump in the direction shown in the illustration.
- Install the fuel pump bracket by aligning the projection ⓐ on the fuel pump with the projection ⓑ on the fuel tank.
- Tighten the bolts in stages and in a crisscross pattern.



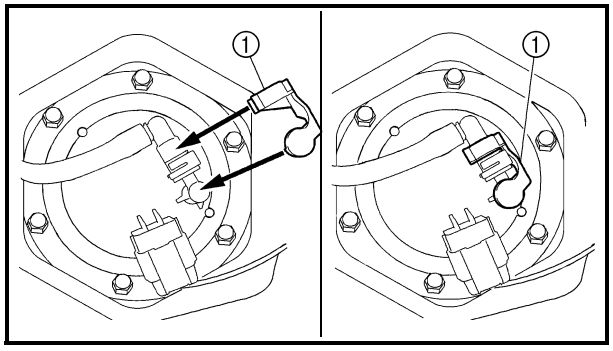
2. Install:
   - Fuel hose

CAUTION:

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

NOTE:

Install the fuel hose connector cover ① securely onto the fuel pump until a distinct “click” is heard.



3. Install:
   - Fuel hose connector holder ①

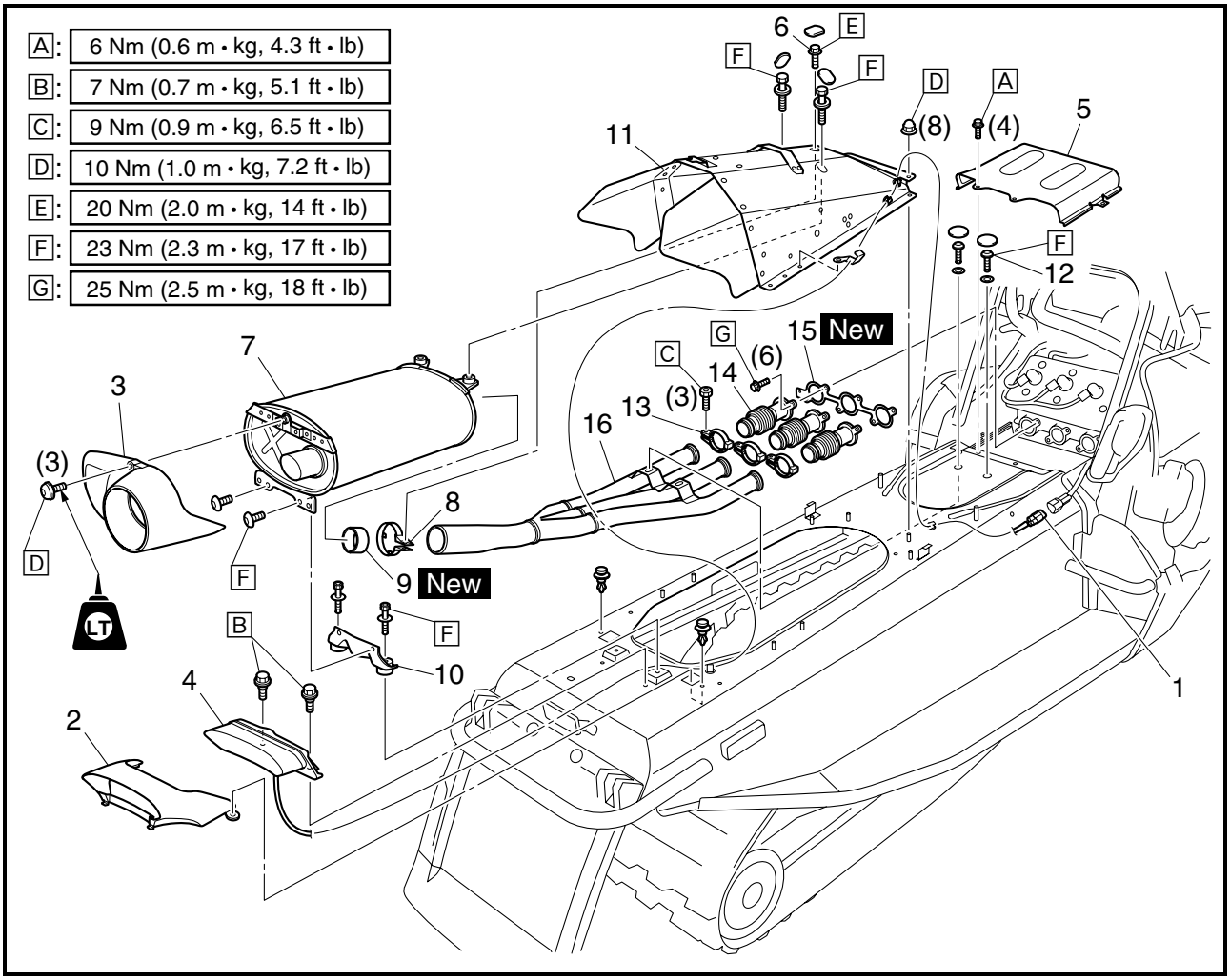
CAUTION:

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector holder is in the correct position, otherwise the fuel hose will not be properly installed.

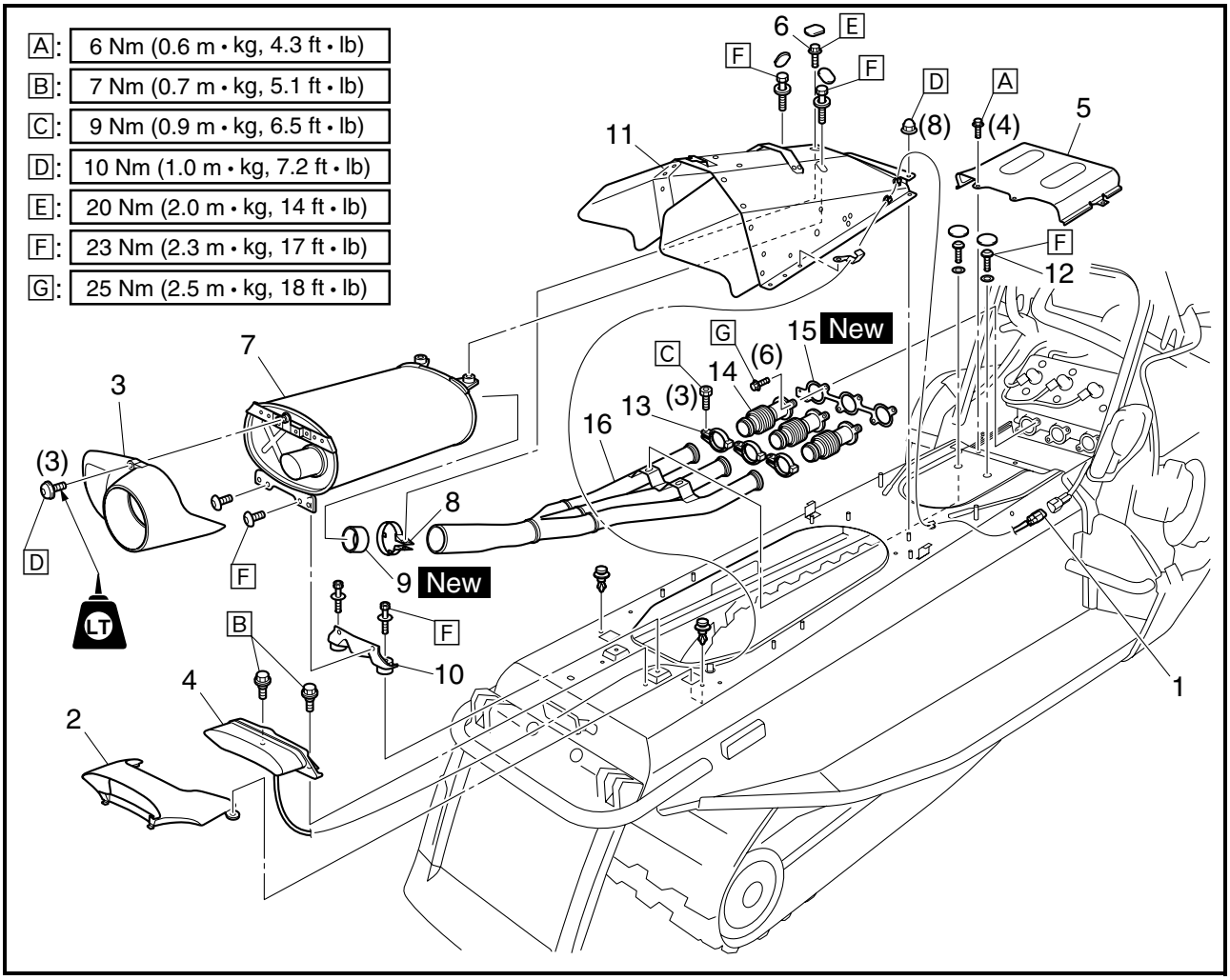
NOTE:

Install the fuel hose connector holder ① securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose.

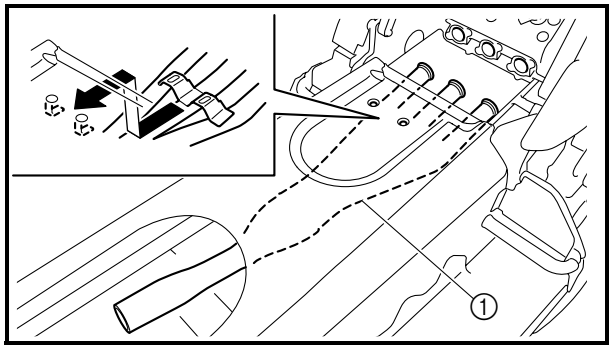
EXHAUST PIPE AND MUFFLER



Order	Job name/Part name	Q'ty	Remarks
	Exhaust pipe and muffler removal		Remove the parts in the order listed below.
	Fuel tank		Refer to "SEAT AND FUEL TANK".
1	Tail/brake light coupler	1	Disconnect. FX10/FX10RT/FX10RTR/FX10RTRA
2	Tail/brake light cover	1	
3	Muffler end cover	1	
4	Tail/brake light assembly	1	Disconnect. FX10/FX10RT/FX10RTR/FX10RTRA
5	Exhaust pipe joint cover	1	
6	Muffler band bolt	1	Loosen.
7	Muffler	1	
8	Muffler band	1	
9	Muffler gasket	1	
10	Muffler stay	1	



Order	Job name/Part name	Q'ty	Remarks
11	Muffler cover	1	
12	Exhaust pipe bolt	2	Loosen.
13	Exhaust pipe band	3	
14	Exhaust pipe joint	3	
15	Exhaust pipe joint gasket	1	
16	Exhaust pipe	1	
			For installation, reverse the removal procedure.



INSTALLATION

1. Install:
   - Exhaust pipe ① (temporarily)

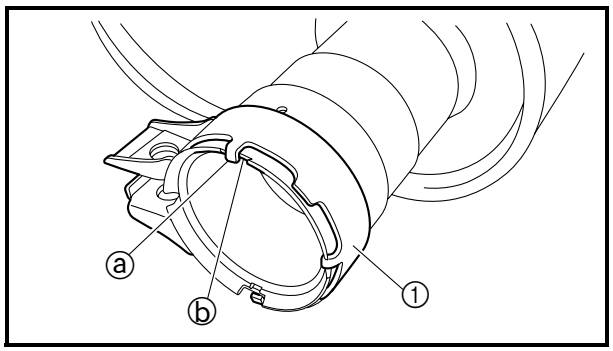
NOTE:

Install the exhaust pipe to the brackets on the frame, making sure to position it as far rearward as possible, and then temporarily tighten the exhaust pipe bolts.

2. Install:
   - Exhaust pipe joint gasket New
   - Exhaust pipe joint
   - Exhaust pipe band

NOTE:

- After installing the exhaust pipe joints, fit the exhaust pipe into them.
- Temporarily tighten the exhaust pipe band bolts; do not torque them at this point.

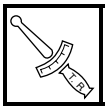


3. Install:
   - Muffler band ①
   - Muffler

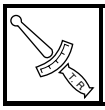
NOTE:

- Align the projection ⓐ on the muffler band with the slot ⓑ on the muffler.
- Temporarily tighten the muffler band bolt and muffler bolts; do not torque them at this point.

4. Tighten:
   - Exhaust pipe band bolts

	**Exhaust pipe band bolt:** **9 Nm (0.9 m · kg, 6.5 ft · lb)**

5. Tighten:
   - Muffler bolts

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

NOTE:

First tighten the bolts on the rear side of the muffler, and then tighten the bolts on the front side.

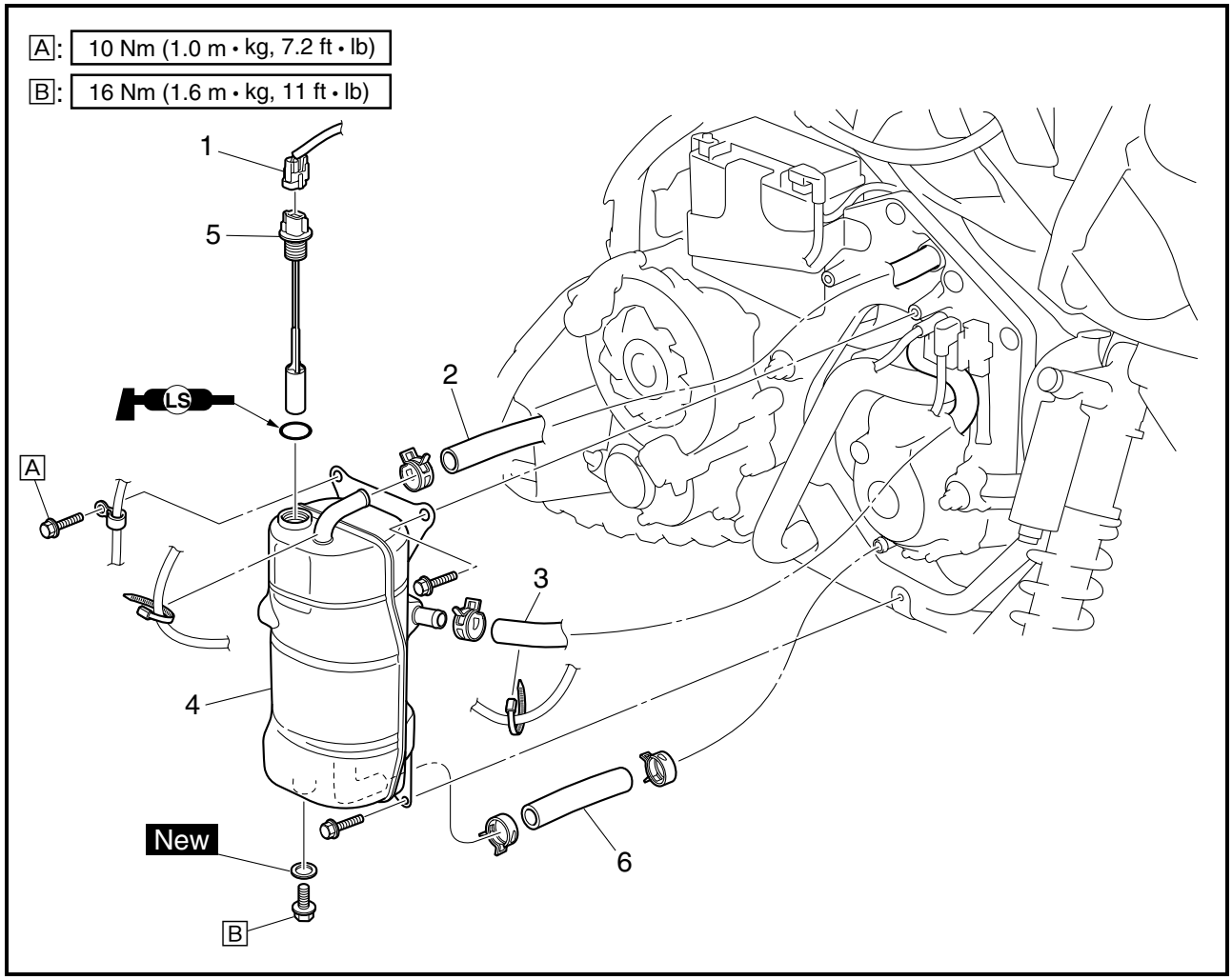
6. Tighten:
   - Muffler band bolt

	**Muffler band bolt:** **20 Nm (2.0 m · kg, 14 ft · lb)**

7. Tighten:
   - Exhaust pipe bolts

	**Exhaust pipe bolt:** **23 Nm (2.3 m · kg, 17 ft · lb)**

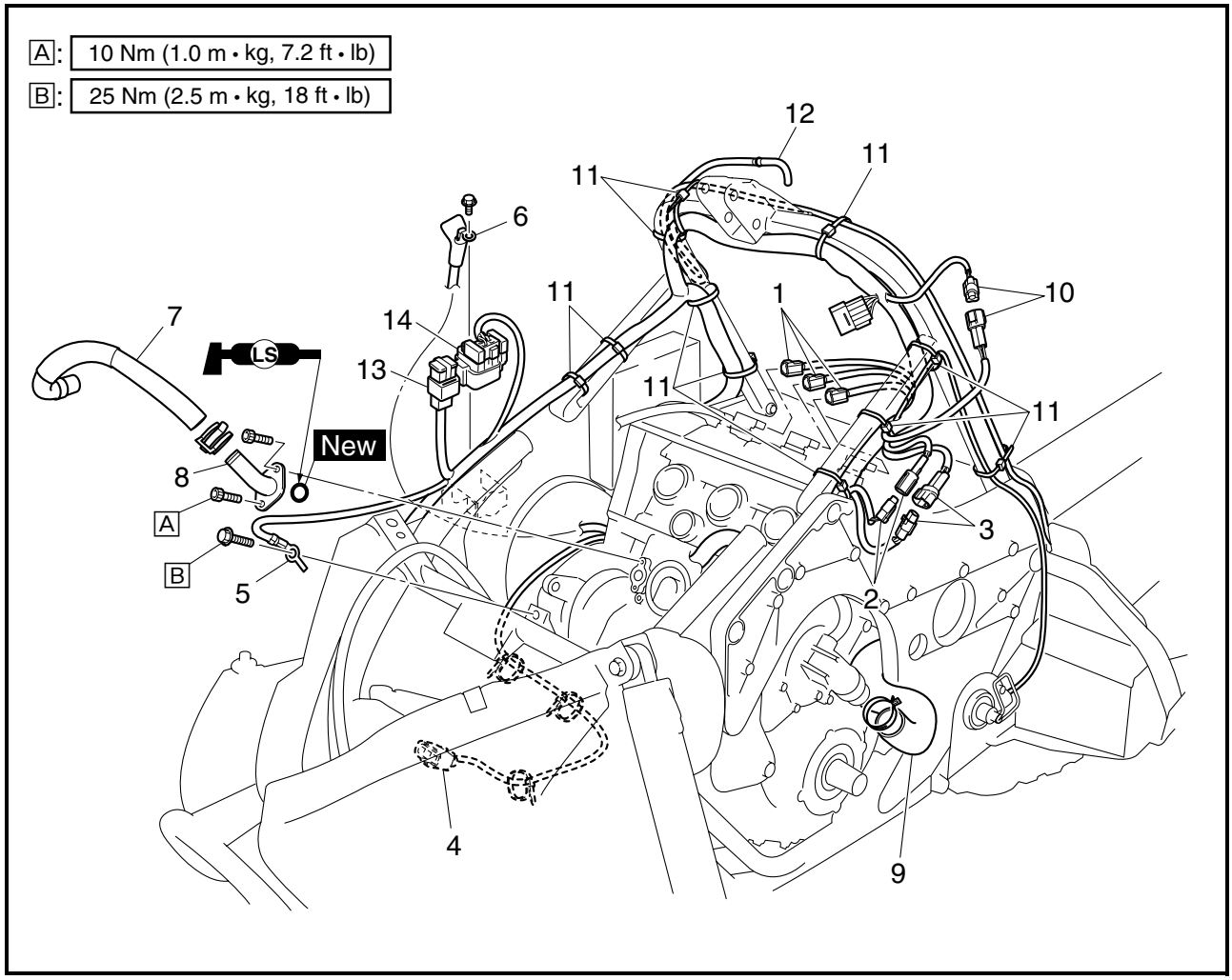
OIL TANK



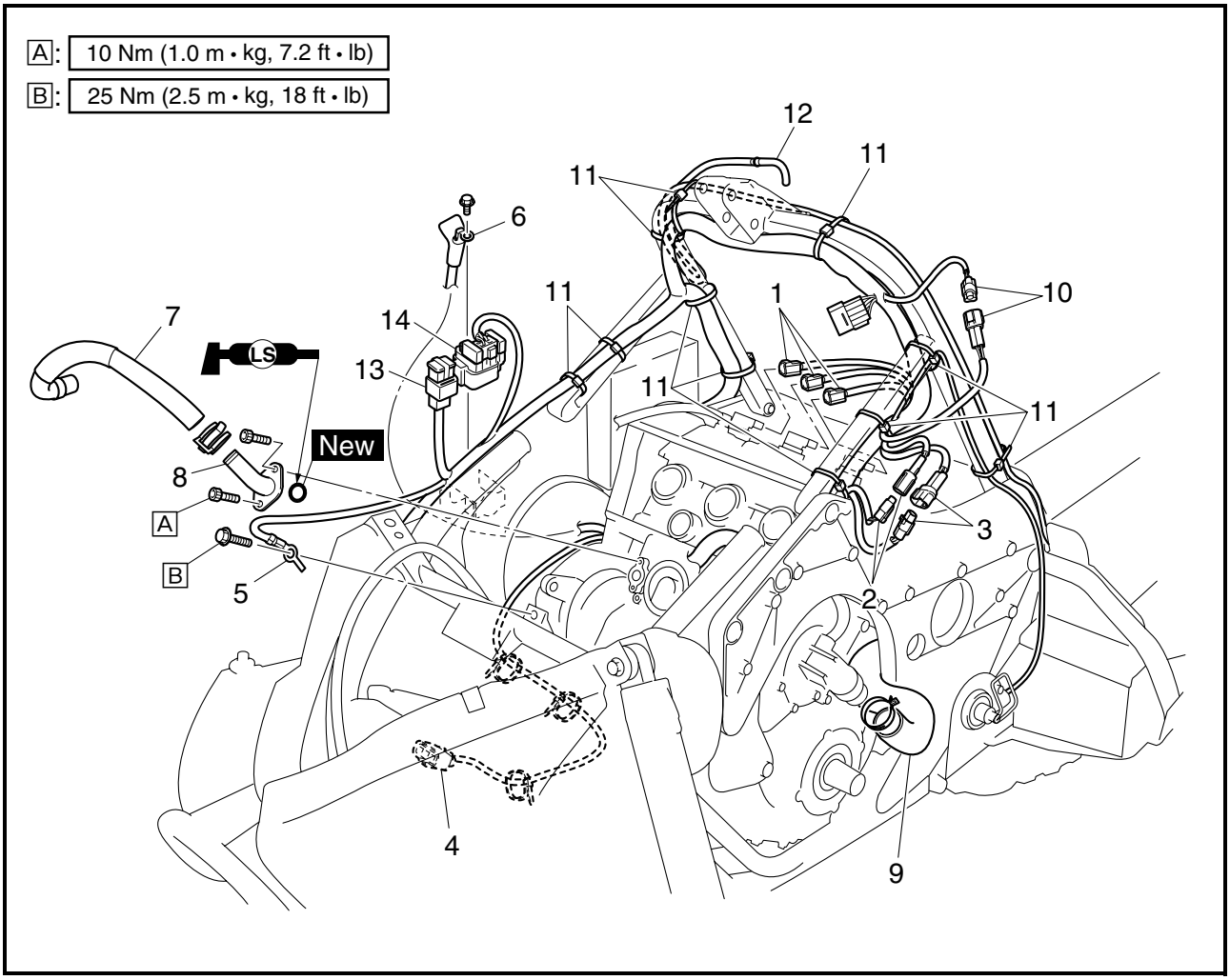
Order	Job name/Part name	Q'ty	Remarks
	Oil tank removal		Remove the parts in the order listed below.
	Lower side cover (left and right)		Refer to "COVERS" in CHAPTER 3.
	Engine oil		Drain. Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 2.
1	Oil level switch coupler	1	Disconnect.
2	Oil tank breather hose	1	Disconnect.
3	Oil tank inlet hose	1	Disconnect.
4	Oil tank	1	
5	Oil level gauge	1	
6	Oil tank outlet hose	1	Disconnect. For installation, reverse the removal procedure.

ENGINE ASSEMBLY

HOSES AND LEADS

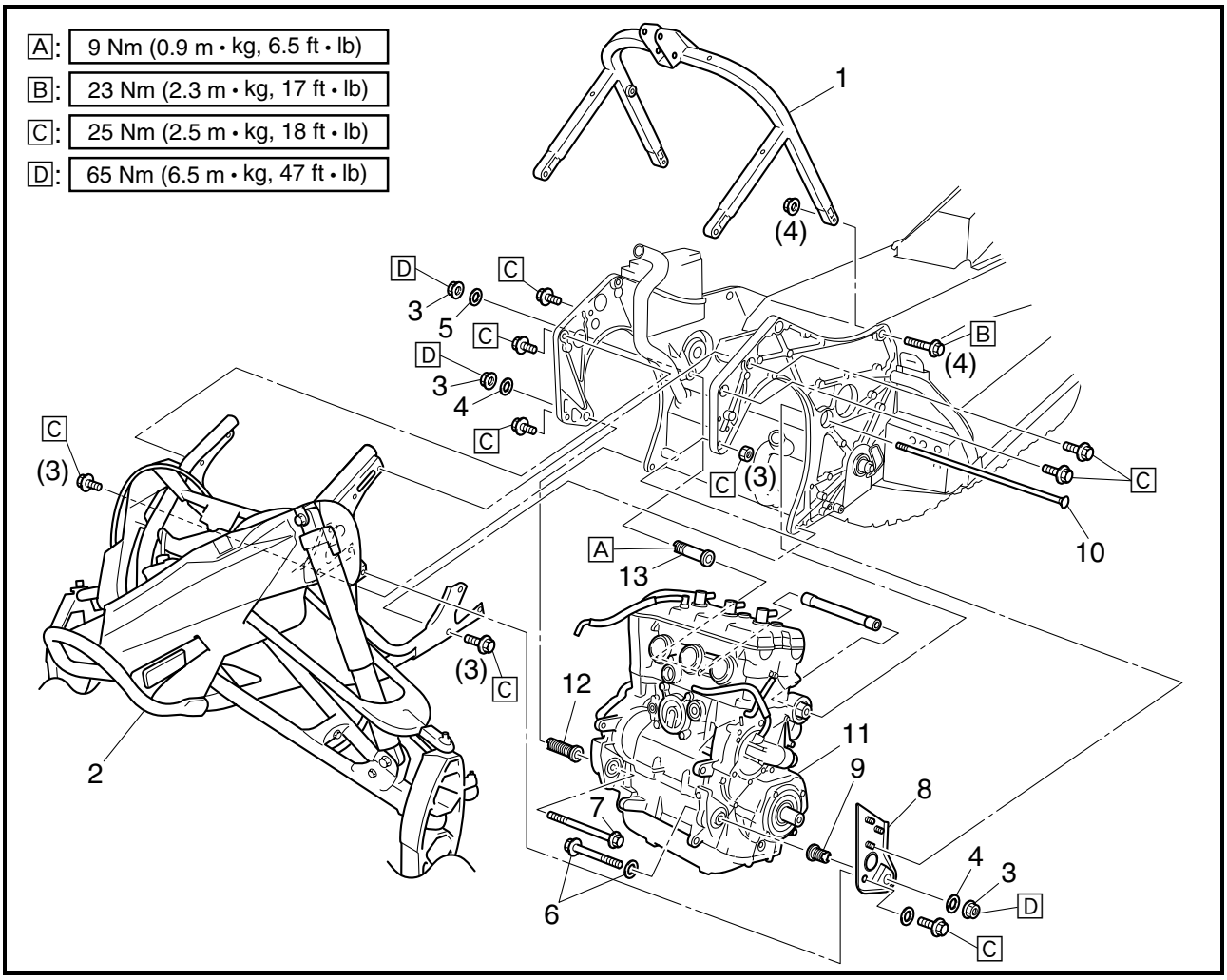


Order	Job name/Part name	Q'ty	Remarks
	Hoses and leads removal		Remove the parts in the order listed below.
	Coolant		Drain. Refer to "COOLING SYSTEM" in CHAPTER 2.
	Engine oil/Oil filter cartridge		Drain. Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 2.
	Handlebar/Steering column		Refer to "STEERING" in CHAPTER 3.
	Air filter case		Refer to "AIR FILTER CASE" in CHAPTER 7.
	Throttle body		Refer to "THROTTLE BODY" in CHAPTER 7.
	Primary sheave		Refer to "PRIMARY SHEAVE AND DRIVE V-BELT" in CHAPTER 4.
	Secondary sheave		Refer to "SECONDARY SHAFT" in CHAPTER 4.
	Secondary shaft		Refer to "SECONDARY SHAFT" in CHAPTER 4.
	Radiator/Radiator bracket		Refer to "RADIATOR" in CHAPTER 6.
	Thermostat		Refer to "THERMOSTAT" in CHAPTER 6.
	Oil tank		Refer to "OIL TANK".



Order	Job name/Part name	Q'ty	Remarks
	Fuel tank		Refer to "SEAT AND FUEL TANK".
	Exhaust pipe/Muffler		Refer to "EXHAUST PIPE AND MUFFLER".
1	Ignition coil coupler	3	Disconnect.
2	Oil pressure switch coupler	1	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Stator coil coupler	1	Disconnect.
5	Frame ground lead	1	Disconnect.
6	Starter motor lead	1	Disconnect.
7	Oil tank inlet hose	1	
8	Oil tank inlet pipe	1	
9	Water pump inlet hose	1	Disconnect.
10	Speed sensor coupler	1	Disconnect.
11	Plastic band	11	
12	Fuel tank breather hose	1	
13	Main fuse	1	
14	Starter relay	1	
			For installation, reverse the removal procedure.

ENGINE ASSEMBLY



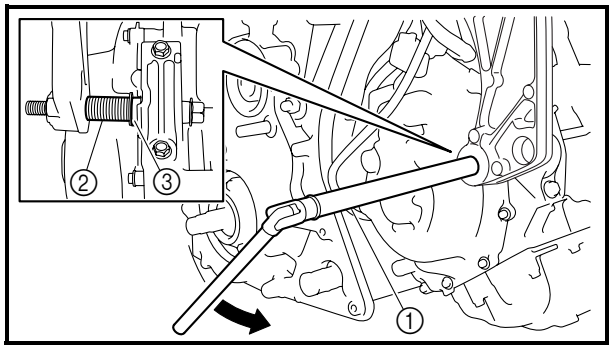
Order	Job name/Part name	Q'ty	Remarks
	Engine assembly removal		Remove the parts in the order listed below.
1	Rear frame cross member	1	
2	Front frame assembly	1	
3	Engine mounting nut	3	
4	Washer	2	
5	Washer	1	
6	Left front engine mounting bolt/washer	1/1	
7	Right front engine mounting bolt	1	
8	Engine mounting bracket	1	
9	Left front engine mounting bolt spacer	1	
10	Rear engine mounting bolt	1	
11	Engine assembly	1	
12	Right front engine mounting bolt spacer	1	
13	Rear engine mounting bolt spacer	1	
			For installation, reverse the removal procedure.

REMOVAL

1. Remove:
   - Rear engine mounting nut
   - Front engine mounting nuts
   - Washers

NOTE:

Do not remove the engine mounting bolts.



2. Remove:
   - Engine assembly

Removal steps:

- Screw in the engine mounting bolt spacers (front and rear) using the engine mount spacer wrench ① so that there is a gap between each engine mounting bolt spacer ② and engine damper ③.

	Engine mount spacer wrench: 90890-01516, YS-01516

- Remove the engine mounting bolts, and then remove the engine assembly.

INSTALLATION

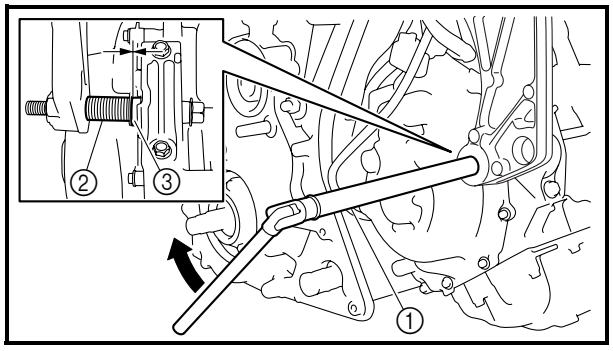
NOTE:

After installing all parts, refer to “CABLE ROUTING” in CHAPTER 9, to check the cable, lead and hose routing.

1. Install:
   - Engine assembly

NOTE:

Use the engine mount spacer wrench to tighten the engine mounting bolt spacers.



Installation steps:

- Install the engine mounting bolt spacers (right front and rear).
- Install the engine assembly and then, install the rear engine mounting bolt, right front engine mounting bolt and washers.
- Install the left front engine mounting bolt spacer to engine mounting bracket and then install the engine mounting bracket, left front engine mounting bolt and washer.

Engine mounting bracket nut:
25 Nm (2.5 m · kg, 18 ft · lb)

- Tighten the rear engine mounting bolt spacer to specification with an engine mount spacer wrench ①.

Rear engine mounting bolt spacer:
9 Nm (0.9 m · kg, 6.5 ft · lb)

Engine mount spacer wrench:
90890-01516, YS-01516

- Tighten the rear engine mounting nut.

Rear engine mounting nut:
65 Nm (6.5 m · kg, 47 ft · lb)

- Tighten the front engine mounting bolt spacers ② (right and left) until they come to contact with the engine damper ③.

NOTE:

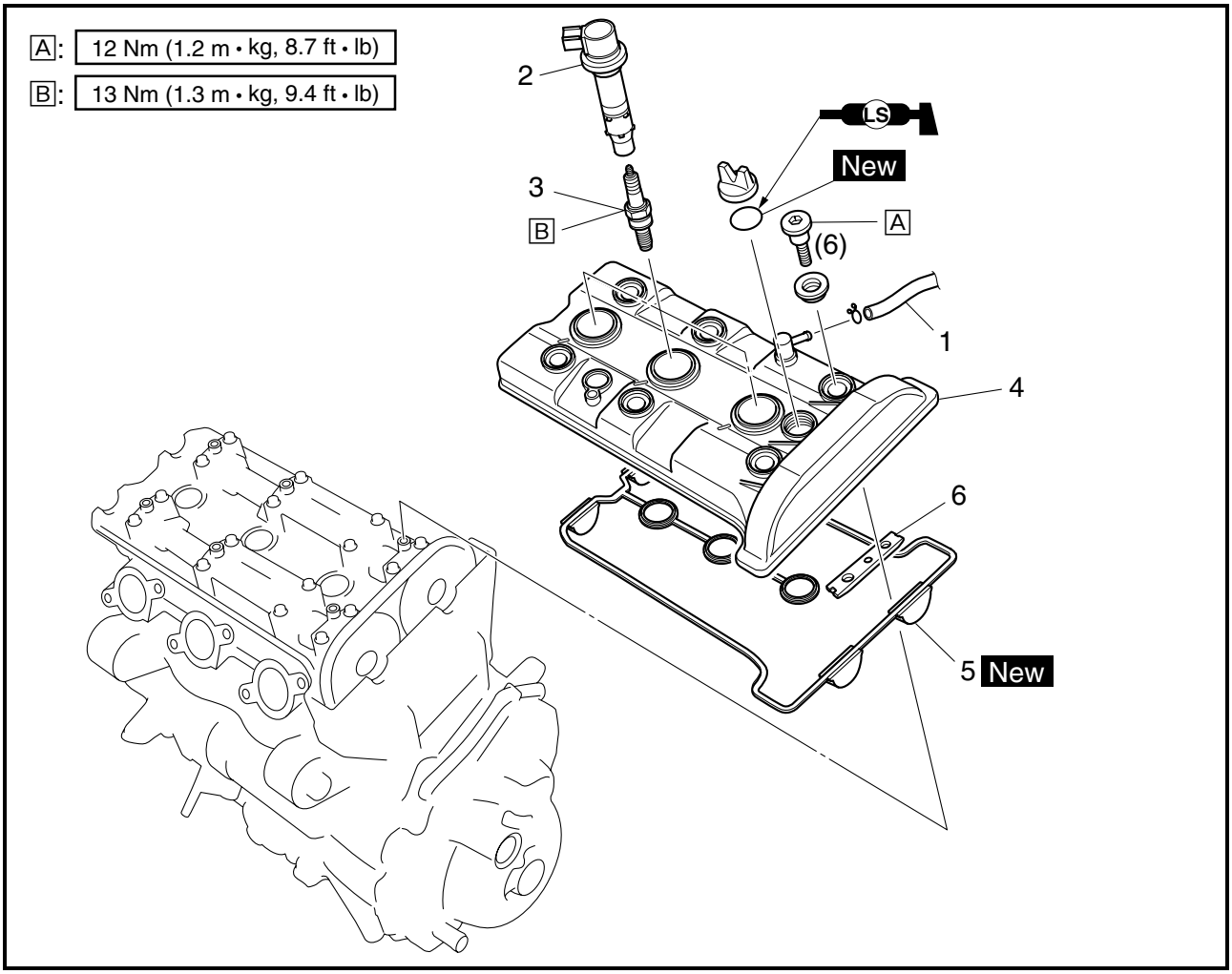
Do not apply torque to the front engine mounting bolt spacers.

- Install the washers and nuts and then, tighten the front engine mounting nuts (right and left).

Front engine mounting nut:
65 Nm (6.5 m · kg, 47 ft · lb)

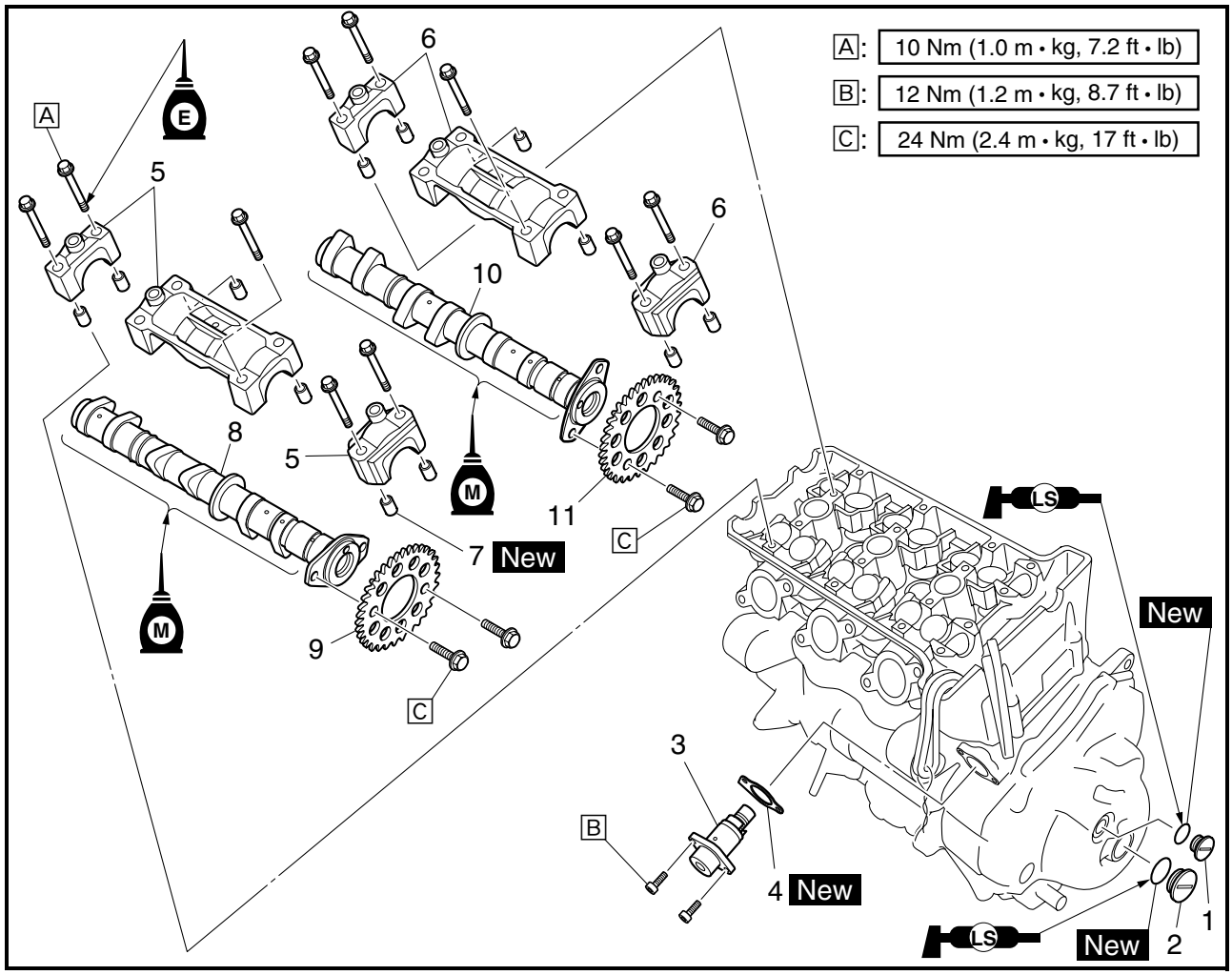
CAMSHAFTS

CYLINDER HEAD COVER

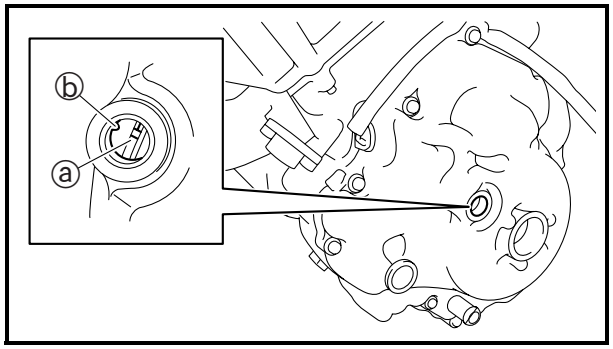


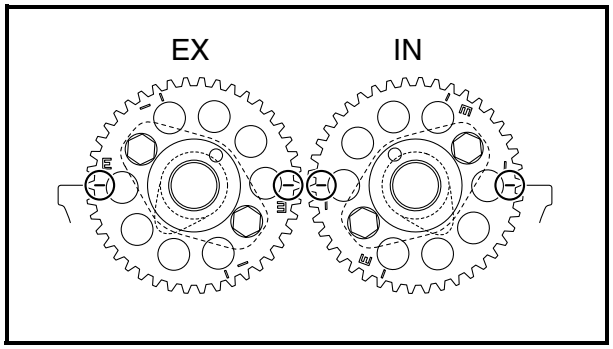
Order	Job name/Part name	Q'ty	Remarks
	Cylinder head cover removal		Remove the parts in the order listed below.
	Fuel tank		Refer to "SEAT AND FUEL TANK".
1	Cylinder head breather hose	1	
2	Ignition coil	3	
3	Spark plug	3	
4	Cylinder head cover	1	
5	Cylinder head cover gasket	1	
6	Timing chain guide (top side)	1	
			For installation, reverse the removal procedure.

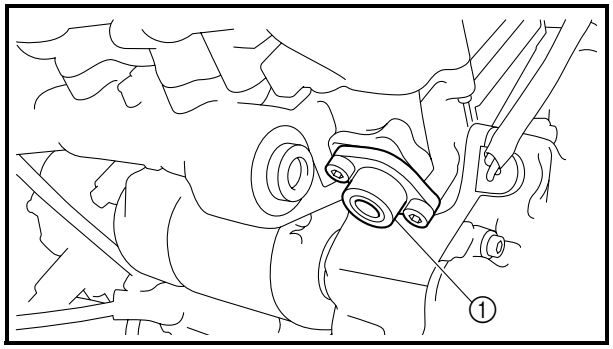
CAMSHAFTS

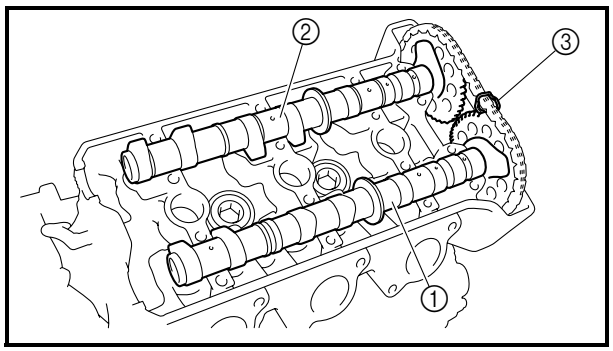


Order	Job name/Part name	Q'ty	Remarks
	Camshafts removal		Remove the parts in the order listed below.
	Engine		Refer to "ENGINE ASSEMBLY".
1	Timing accessing screw	1	
2	Crankshaft end cover	1	
3	Timing chain tensioner	1	
4	Timing chain tensioner gasket	1	
5	Exhaust camshaft cap	3	**NOTE:** During removal, the dowel pins may still be connected to the camshaft caps.
6	Intake camshaft cap	3	
7	Dowel pin	12	
8	Exhaust camshaft	1	
9	Exhaust camshaft sprocket	1	
10	Intake camshaft	1	
11	Intake camshaft sprocket	1	
			For installation, reverse the removal procedure.









REMOVAL

1. Remove:
   - Timing accessing screw
   - Crankshaft end cover
2. Align:
   - "I" mark ⓐ on the AC magneto rotor (with the stationary pointer ⓑ on the AC magneto cover)

NOTE:

- Turn the crankshaft clockwise.
- When piston #3 is at TDC on the compression stroke, align the "I" mark ⓐ on the AC magneto rotor with the stationary pointer ⓑ on the AC magneto cover.
- TDC on the compression stroke can be found when the camshaft lobes for cylinder #3 are turned away from each other.

3. Remove:
   - Timing chain tensioner ①
   - Gasket

4. Remove:
   - Camshaft caps
   - Dowel pins

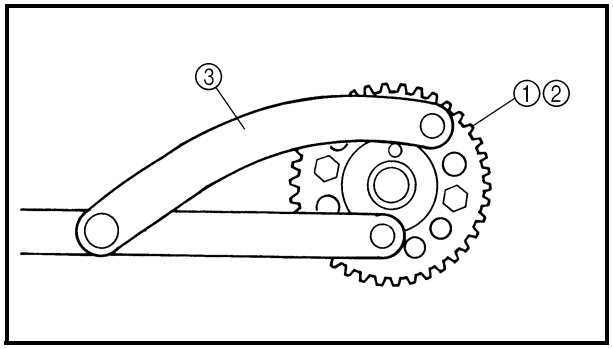
CAUTION:

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.

5. Remove:
   - Exhaust camshaft ① (with camshaft sprocket)
   - Intake camshaft ② (with camshaft sprocket)

NOTE:

To prevent the timing chain from falling into the crankcase, fasten it with a wire ③.

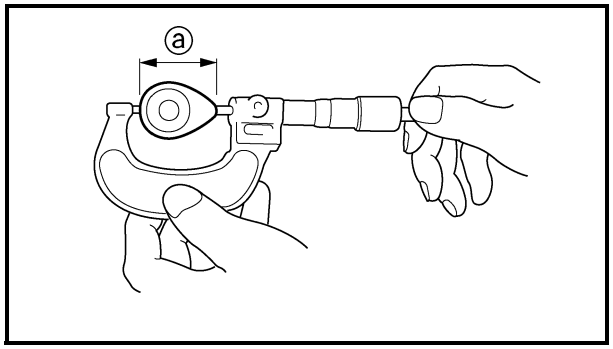


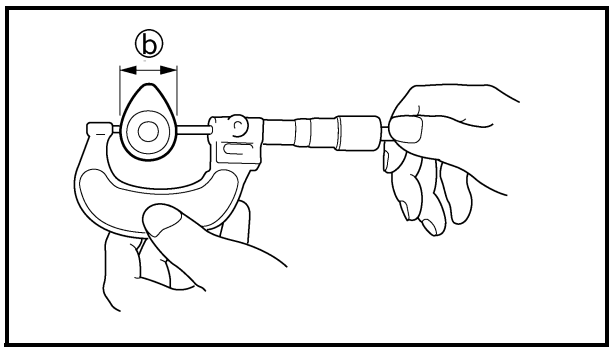
6. Remove:
   - Exhaust camshaft sprocket ①
   - Intake camshaft sprocket ②
     (Use the special tool ③)

Rotor holding tool:
90890-01235
Universal magneto & rotor holder:
YU-01235

INSPECTION

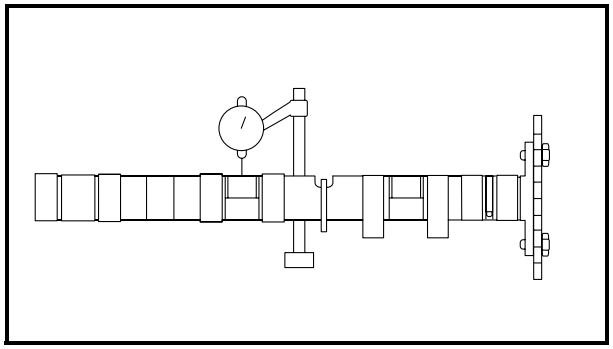
1. Inspect:
   - Camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.





2. Measure:
   - Camshaft lobe dimensions ⓐ and ⓑ
     Out of specification → Replace the camshaft.

Camshaft dimensions:
Intake:
<Limit>:
ⓐ 34.250 mm (1.3484 in)
ⓑ 24.850 mm (0.9783 in)
Exhaust:
<Limit>:
ⓐ 33.850 mm (1.3327 in)
ⓑ 24.850 mm (0.9783 in)

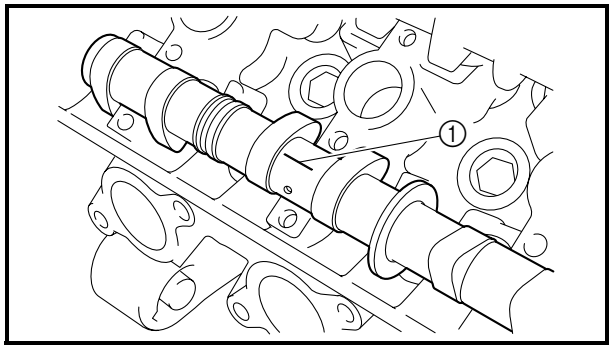


3. Measure:
   • Camshaft runout
   Out of specification → Replace.

Camshaft runout:
0.030 mm (0.0012 in)

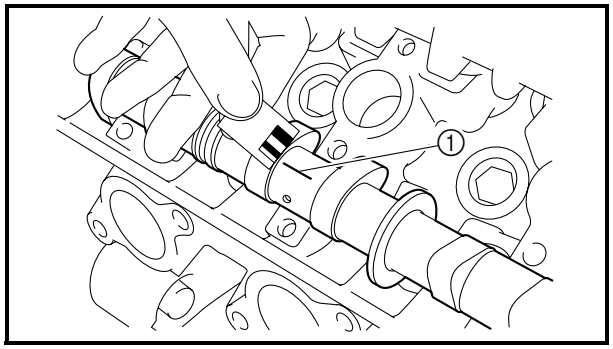
4. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance:
0.028 ~ 0.062 mm
(0.0011 ~ 0.0024 in)



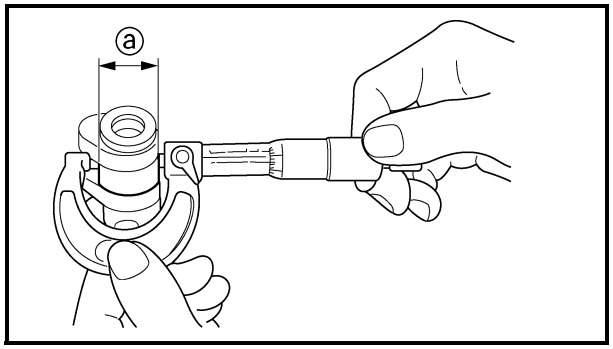
Measurement steps:
- Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
- Position a strip of Plastigauge® ① onto the camshaft journal as shown.
- Install the dowel pins and camshaft caps.

NOTE:
- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



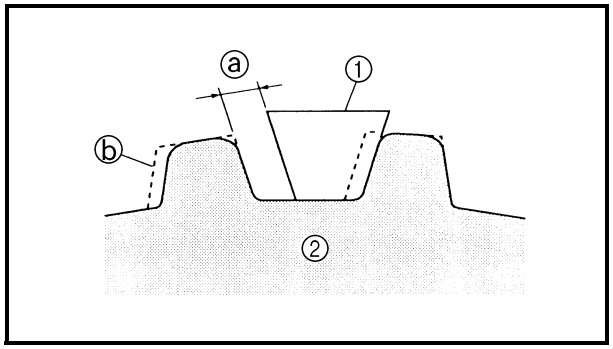
Camshaft cap bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)

- Remove the camshaft caps and then measure the width of the Plastigauge® ①.



5. Measure:
   • Camshaft journal diameter ⓐ
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

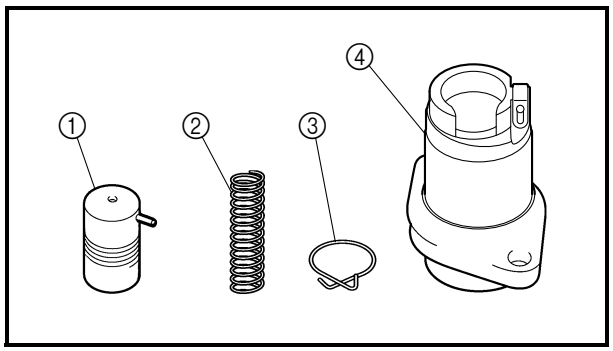
Camshaft journal diameter:
24.459 ~ 24.472 mm
(0.9630 ~ 0.9635 in)



6. Inspect:
   - Camshaft sprocket
     More than 1/4 tooth ⓐ wear → Replace the camshaft sprockets, timing chain, and crankshaft as a set.

ⓐ 1/4 tooth
ⓑ Correct
① Timing chain roller
② Camshaft sprocket

7. Inspect:
   - Timing chain guide (top side)
     Damage/wear → Replace

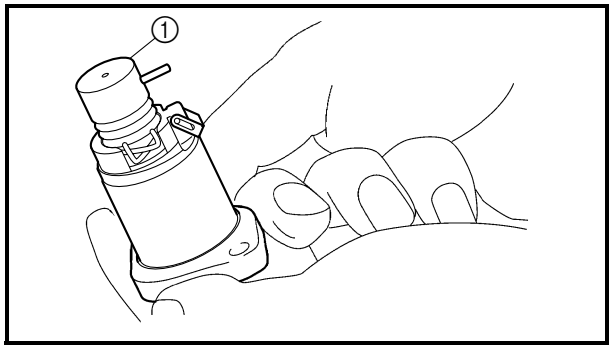


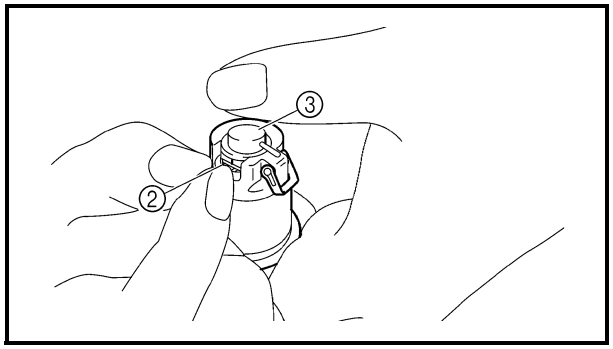
8. Remove:
   - Timing chain tensioner rod ①
   - Timing chain tensioner spring ②
   - Timing chain tensioner housing ④

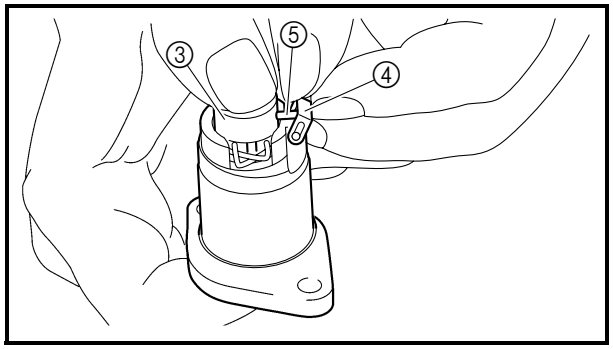
NOTE:
Squeeze the timing chain tensioner clip ③, and then remove the timing chain tensioner rod and timing chain tensioner spring.

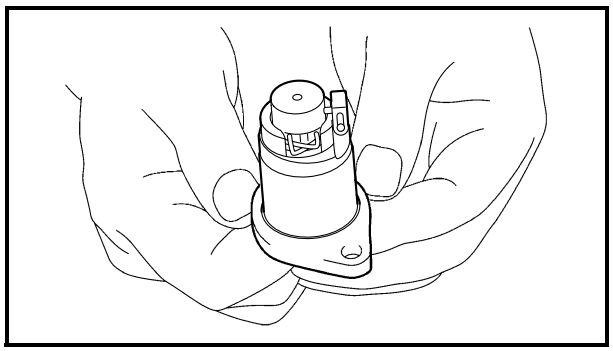
9. Inspect:
   - Timing chain tensioner housing
   - Timing chain tensioner rod
   - Timing chain tensioner spring
     Damage/wear → Replace the as a set.
10. Assemble:
   - Timing chain tensioner spring
   - Timing chain tensioner rod

NOTE:
Prior to installing the timing chain tensioner rod, drain the engine oil from the timing chain tensioner housing.









Assembly steps:

- Install the timing chain tensioner spring and timing chain tensioner rod ①.
- Squeeze the timing chain tensioner clip ②, and then push the timing chain tensioner rod ③ into the timing chain tensioner housing.

NOTE:

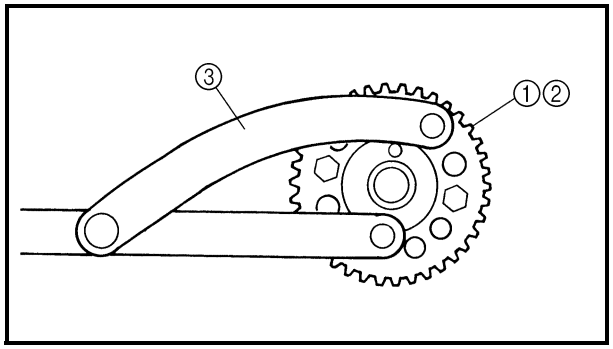
Do not release the timing chain tensioner clip while pushing the rod into the housing, otherwise the rod may be ejected.

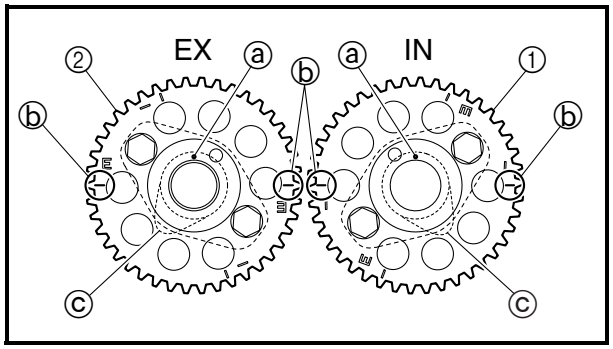
- Hook the clip ④ to the timing chain tensioner rod ③.

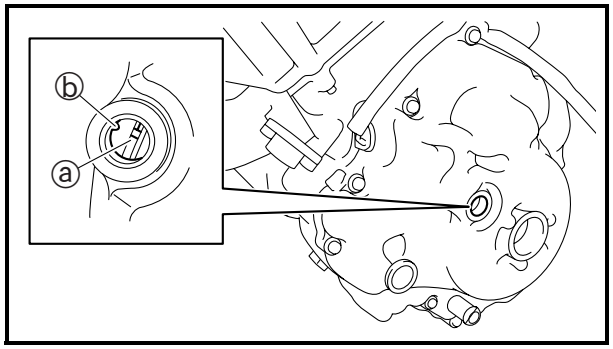
NOTE:

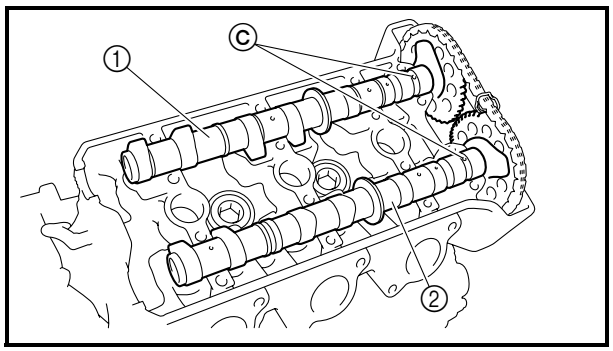
Hook the timing chain tensioner rod pin ⑤ to the center of the clip ④. After the installation, check that the clip ④ can come off by its own weight by pushing the timing chain tensioner rod ③ at the position of installation.

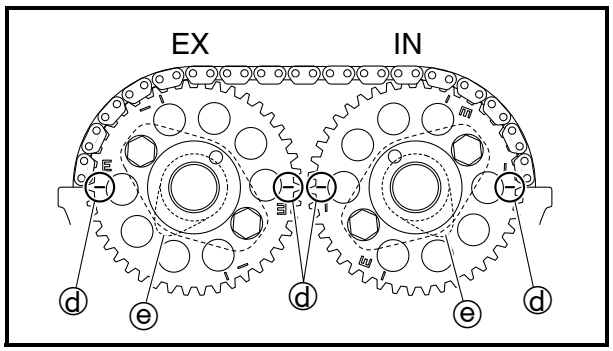
11. Inspect:
    - All parts
      Damage/wear → Replace the defective part(-s).











INSTALLATION

1. Install:
   - Intake camshaft ①
   - Exhaust camshaft ②
     (with the special tool ③)

Rotor holding tool:
90890-01235
Universal magneto & rotor holder:
YU-01235

   - Camshaft sprocket bolts

Camshaft sprocket bolt:
24 Nm (2.4 m · kg, 17 ft · lb)

NOTE:

Make sure that the holes ⓐ in the cylinder #3 cam and marks ⓑ on the camshaft sprockets are in the position shown in the illustration.
ⓒ: Cylinder #3 - cam

2. Install:
   - Intake camshaft ①
     (with the camshaft sprocket)
   - Exhaust camshaft ②
     (with the camshaft sprocket)

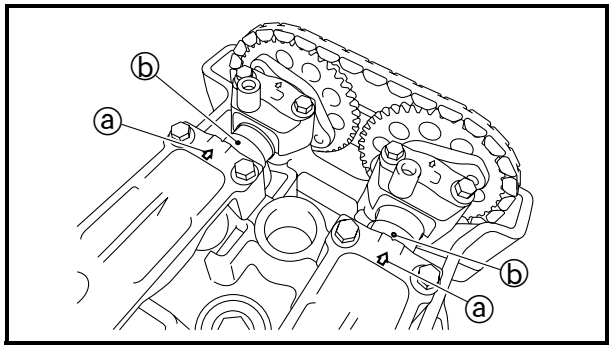
Installation steps:

- Turn the crankshaft clockwise.
- When piston #3 is at TDC on the compression stroke, align the "I" mark ⓐ on the AC magneto rotor with the stationary pointer ⓑ on the AC magneto cover.
- Install the timing chain onto both camshaft sprockets, and then install the camshafts.

NOTE:

- Install the camshafts with the hole ⓒ in the cylinder #3 - cam facing up.
- When installing the timing chain, start with the intake camshaft and be sure to keep the timing chain as tight as possible on the intake side.
- Make sure the marks ⓓ on the timing chain sprockets are parallel with the edge of the cylinder head.

ⓔ: Cylinder #3 - cam



3. Install:
   - Dowel pins
   - Intake camshaft caps
   - Exhaust camshaft caps

NOTE:

- The "I" mark refers to the intake camshaft caps and the "E" mark refers to the exhaust camshaft caps.
- Install the camshaft caps with the arrow mark ⓐ pointing towards the right side of the engine.
- Make sure the holes ⓑ in the camshaft are aligned with the arrow mark ⓐ on the camshaft caps.

4. Install:
   - Camshaft cap bolts

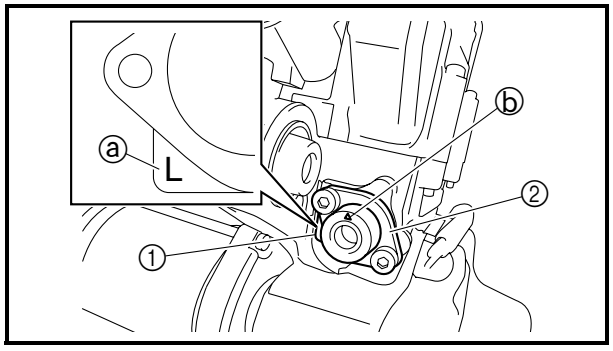
Camshaft cap bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

CAUTION:

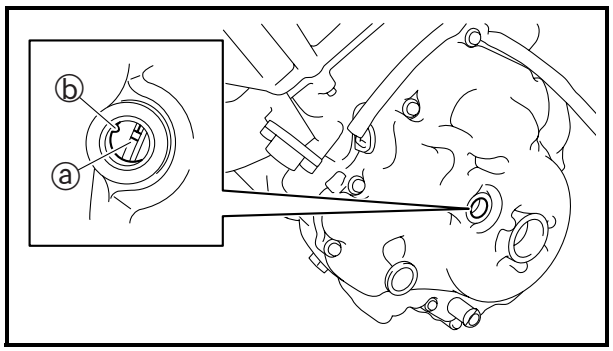
- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

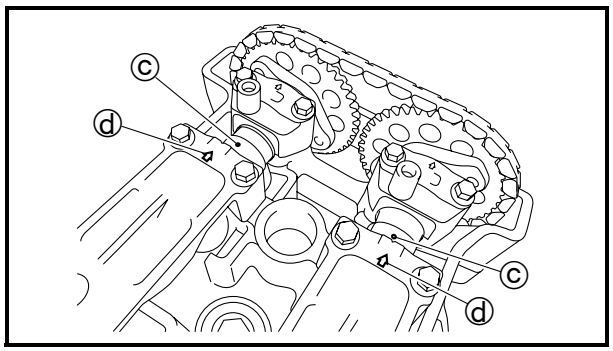


5. Install:
   - Timing chain tensioner gasket ① New
   - Timing chain tensioner ②

	Timing chain tensioner bolt: 12 Nm (1.2 m · kg, 8.7 ft · lb)

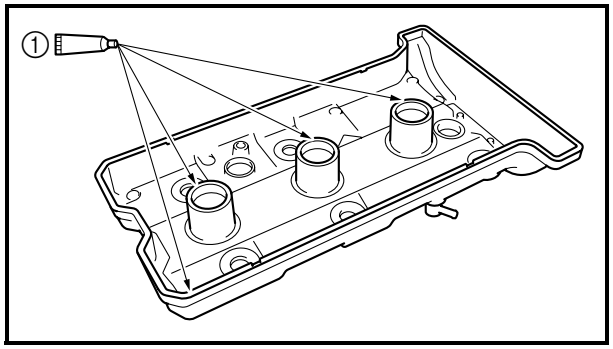
NOTE:
- Be sure to install the timing chain tensioner gasket so that its section with the "L" mark ⓐ is protruding from the lower left side of the timing chain tensioner.
- The arrow mark ⓑ on the timing chain tensioner should face up.

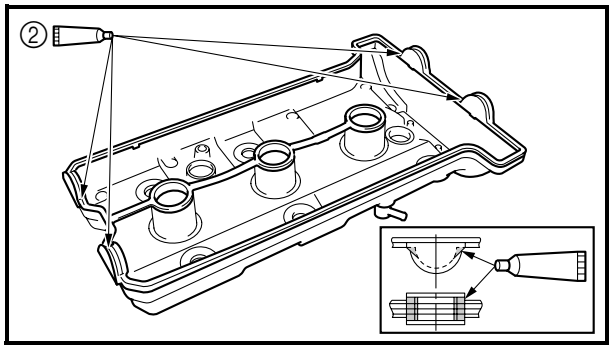




6. Turn:
   - Crankshaft
     (several turns clockwise)
7. Inspect:
   - "I" mark
     Make sure the "I" mark ⓐ on the AC magneto rotor is aligned with the stationary pointer ⓑ on the AC magneto cover.
   - Camshaft holes
     Make sure the holes ⓒ in the cylinder #3 - cam are aligned with the arrow marks ⓓ on the camshaft caps.
     Out of alignment → Adjust.
     Refer to the installation steps above.

8. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "VALVE CLEARANCE ADJUSTMENT" in CHAPTER 2.





9. Install:
   - Cylinder head cover gasket New
   - Cylinder head cover

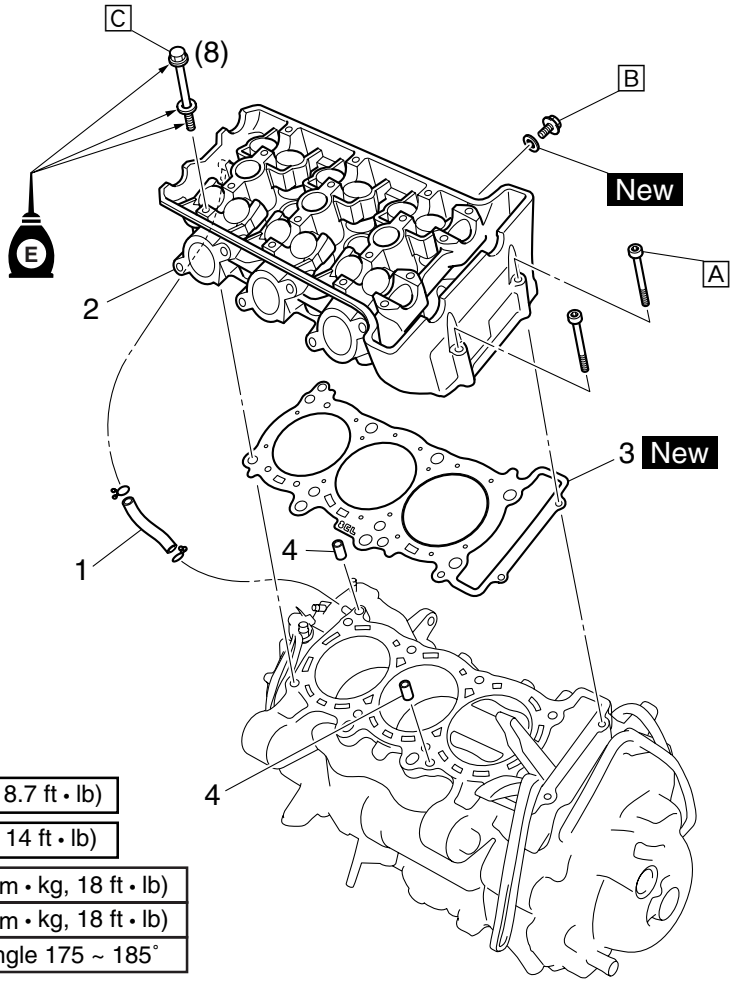
Cylinder head cover bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)

NOTE:

- Apply bond TB1541® ① onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply Yamaha bond No. 1215 ② onto the mating surfaces of the cylinder head cover gasket.
- Tighten the cylinder head cover bolts stages and in a crisscross pattern.

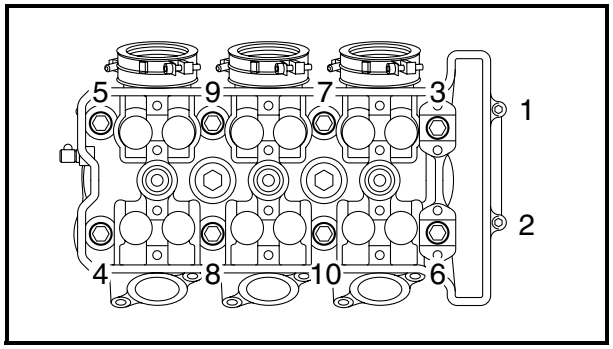
Yamaha bond No. 1215:
90890-85505
(Three Bond No.1215®)

CYLINDER HEAD



A:	12 Nm (1.2 m • kg, 8.7 ft • lb)	
B:	20 Nm (2.0 m • kg, 14 ft • lb)	
C:	1st	25 Nm (2.5 m • kg, 18 ft • lb)
	2nd	25 Nm (2.5 m • kg, 18 ft • lb)
	Final	Specified angle 175 ~ 185°

Order	Job name/Part name	Q'ty	Remarks
	Cylinder head removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE ASSEMBLY".
	Camshafts		Refer to "CAMSHAFTS".
1	Oil delivery hose	1	
2	Cylinder head	1	
3	Cylinder head gasket	1	
4	Dowel pin	2	
			For installation, reverse the removal procedure.



REMOVAL

1. Remove:
   - Cylinder head bolts

NOTE:

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.

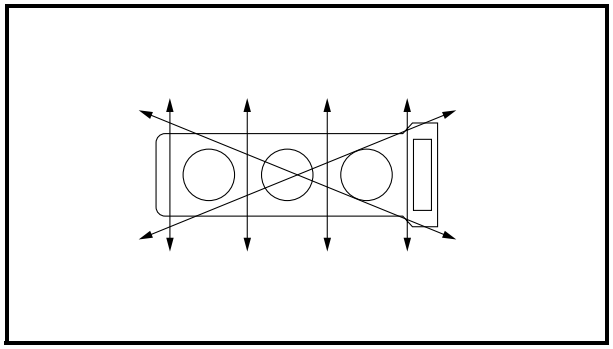
INSPECTION

1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

NOTE:

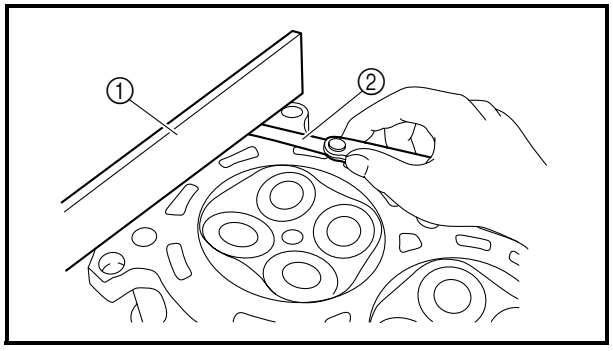
Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats



2. Check:
   - Cylinder head
     Damage/scratches → Replace.
   - Cylinder head water jacket
     Mineral deposits/rust → Eliminate.
3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

Maximum cylinder head warpage:
0.10 mm (0.0039 in)



Measurement steps:

- Place a straightedge ① and a thickness gauge ② across the cylinder head.
- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

NOTE:

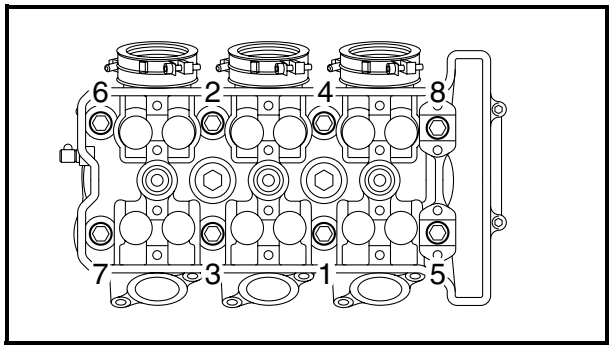
To ensure an even surface, rotate the cylinder head several times.

INSTALLATION

1. Install:
   - Cylinder head

NOTE:

Pass the timing chain through the timing chain cavity.



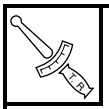
2. Tighten:
   - Cylinder head bolts (M10)

NOTE:

The tightening procedure of the cylinder head bolts is angle controlled, therefore tighten the bolts using the following procedure.

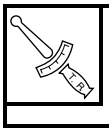
Tightening steps:

- Lubricate the cylinder head bolts and washers with engine oil.
- Install the washers and cylinder head bolts.
- Tighten the cylinder head bolts in the proper tightening sequence as shown.

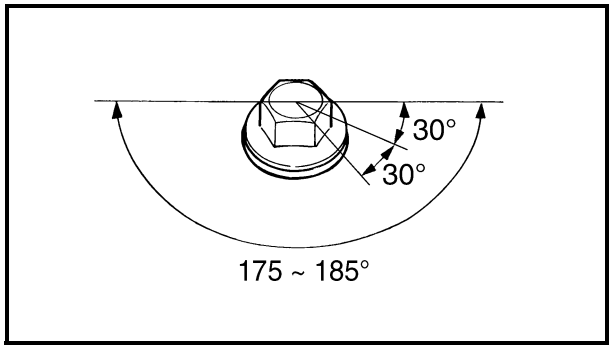


Cylinder head bolt (M10):
1st:
25 Nm (2.5 m · kg, 18 ft · lb)

- Loosen and retighten the cylinder head bolts in the proper tightening sequence as shown.



Cylinder head bolt (M10):
2nd:
25 Nm (2.5 m · kg, 18 ft · lb)



- Tighten the cylinder head bolts further to reach the specified angle 175 ~ 185° in the proper tightening sequence as shown.

Cylinder head bolt (M10):
Final:
Specified angle 175 ~ 185°

⚠ WARNING

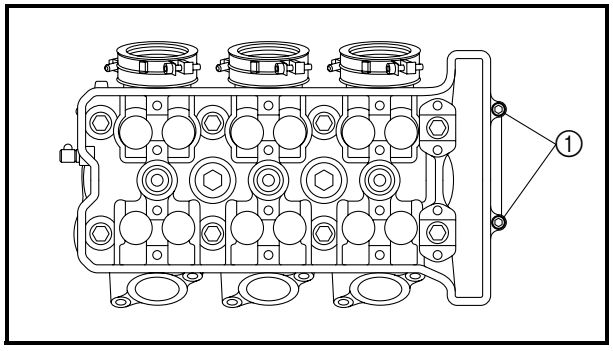
When the bolts are tightened more than the specified angle, do not loosen the bolt and then retighten it.
Replace the bolt with a new one and perform the procedure again.

CAUTION:

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is at the specified angle.**

NOTE:

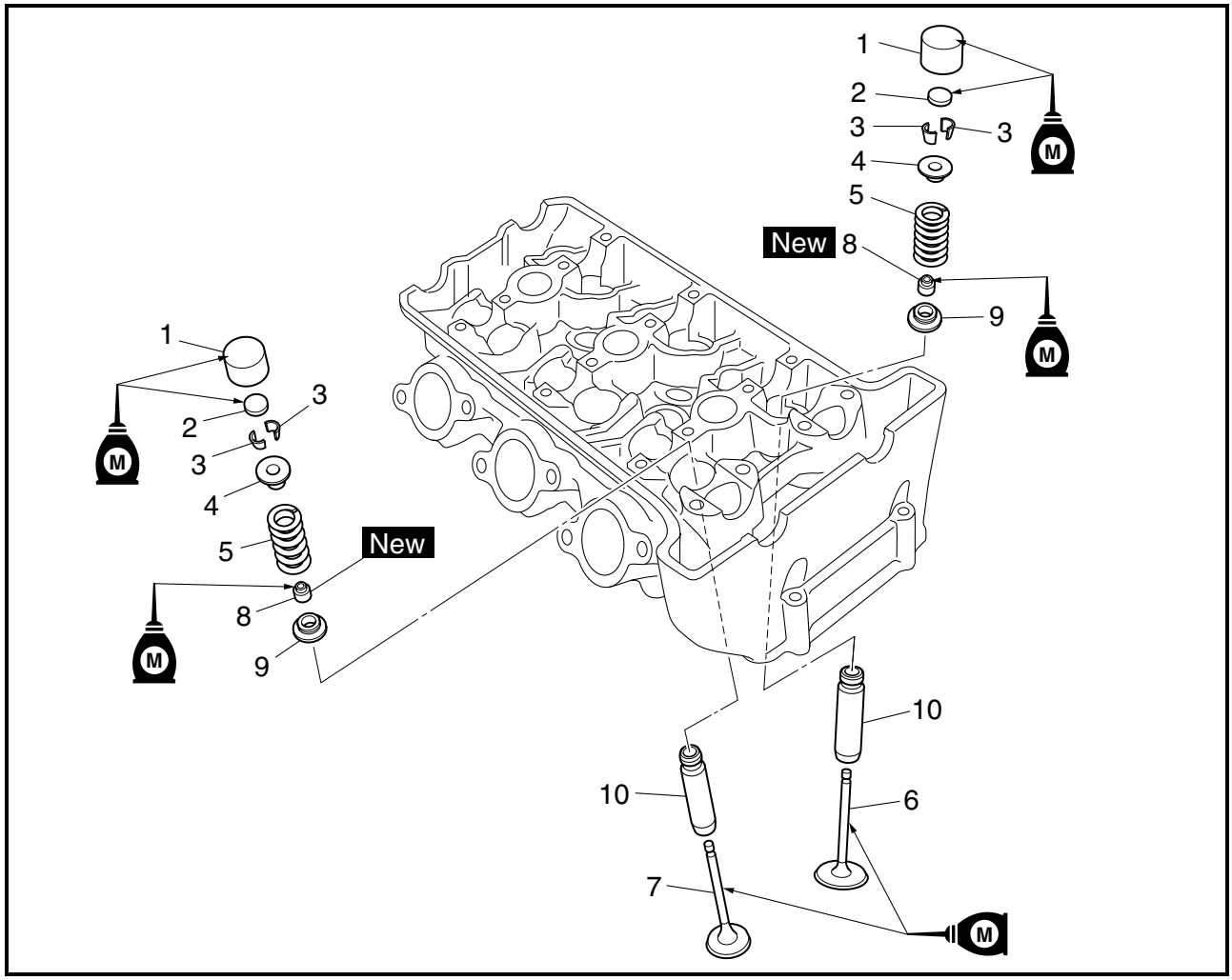
When using a hexagonal bolt, note that the angle from one corner to another is 60°.



3. Tighten:
   - Cylinder head bolts (M6) ①

Cylinder head bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)

VALVES AND VALVE SPRINGS



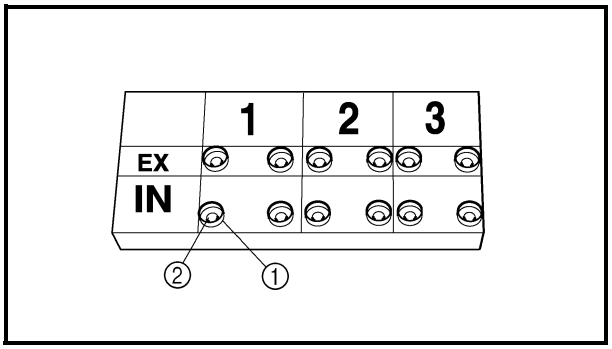
Order	Job name/Part name	Q'ty	Remarks
	Valves and valve springs removal		Remove the parts in the order listed below.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Valve lifter	12	
2	Valve pad	12	
3	Valve cotter	24	
4	Upper spring seat	12	
5	Valve spring	12	
6	Intake valve	6	
7	Exhaust valve	6	
8	Valve stem seal	12	
9	Lower spring seat	12	
10	Valve guide	12	
			For installation, reverse the removal procedure.

REMOVAL

The following procedure applies to all of the valves and related components.

NOTE:

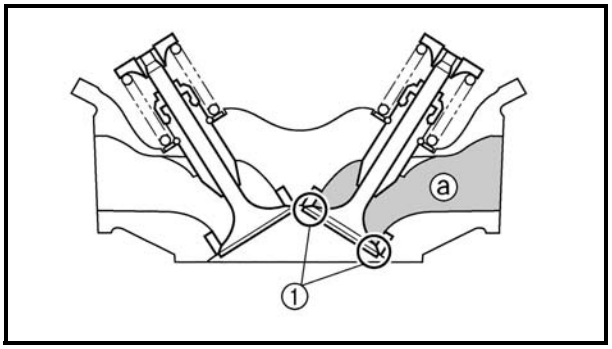
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.



1. Remove:
   - Valve lifter ①
   - Valve pad ②

NOTE:

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



2. Inspect:
   - Valve
     (for leakage)
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.

Inspection steps:

- Pour a clean solvent ⓐ into the intake and exhaust ports.
- Check that the valves properly seal.

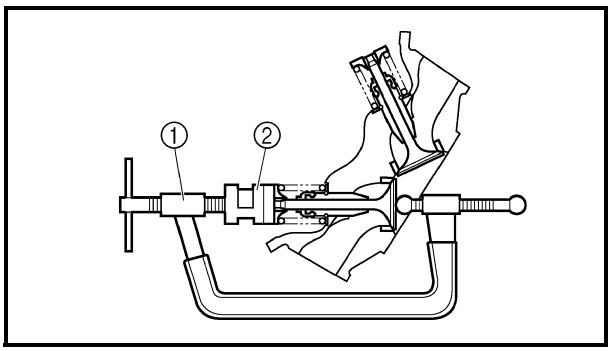
NOTE:

There should be no leakage at the valve seat ①.

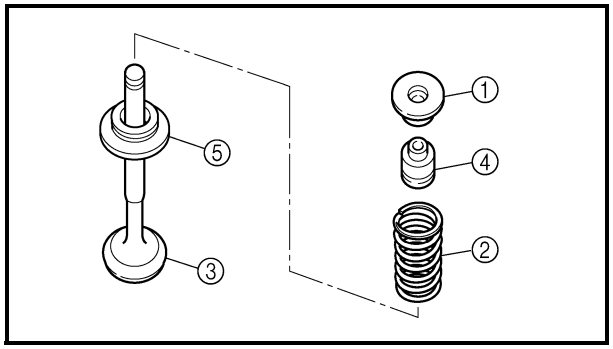
3. Remove:
   - Valve cotters

NOTE:

Remove the valve cotters by compressing the valve spring with the valve spring compressor ① and valve spring compressor attachment ②.

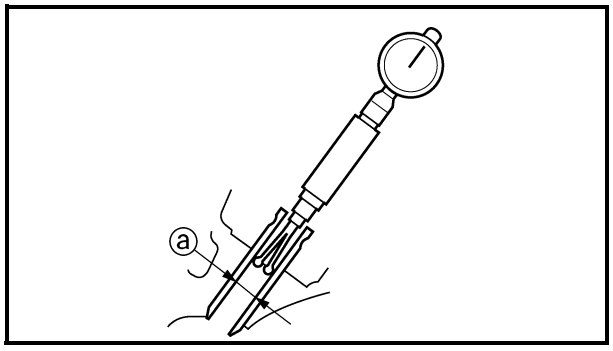


Valve spring compressor:
90890-04019, YM-04019
Valve spring compressor attachment:
90890-04114
Valve spring compressor adapter 19.5 mm:
YM-04114



4. Remove:
   - Upper spring seat ①
   - Valve spring ②
   - Valve ③
   - Valve stem seal ④
   - Lower spring seat ⑤

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

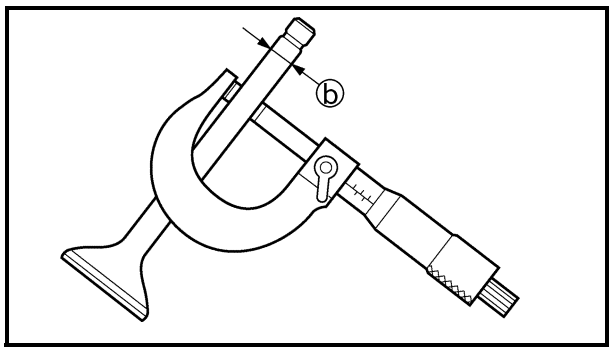


INSPECTION

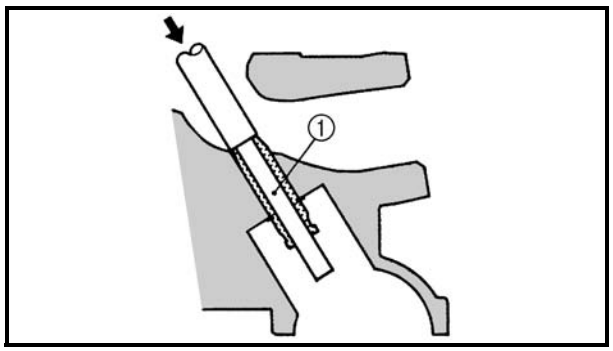
1. Measure:
   - Valve-stem-to-valve-guide clearance

Valve-stem-to-valve-guide clearance =
Valve guide inside diameter ⓐ –
Valve stem diameter ⓑ

Out of specification → Replace the valve guide.

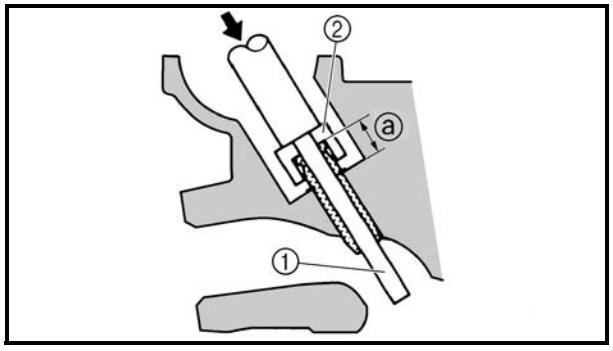


Valve-stem-to-valve-guide clearance:
Intake:
0.010 ~ 0.037 mm
(0.0004 ~ 0.0015 in)
<Limit>: 0.080 mm (0.0031 in)
Exhaust:
0.025 ~ 0.052 mm
(0.0010 ~ 0.0020 in)
<Limit>: 0.100 mm (0.0039 in)



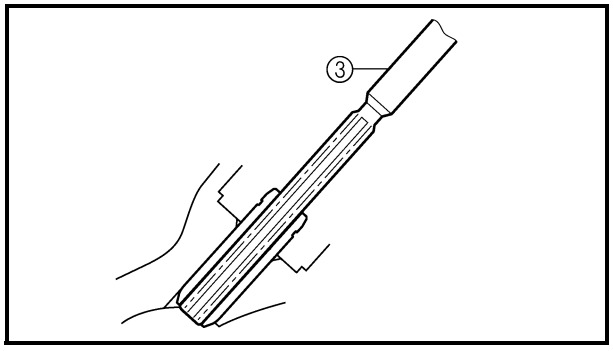
2. Replace:
   - Valve guide

NOTE:
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.



Replacement steps:
- Remove the valve guide with the valve guide remover ①.
- Install the new valve guide with the valve guide installer ② and valve guide remover ①.

Valve guide position ⓐ:
14.8 ~ 15.2 mm
(0.583 ~ 0.598 in)



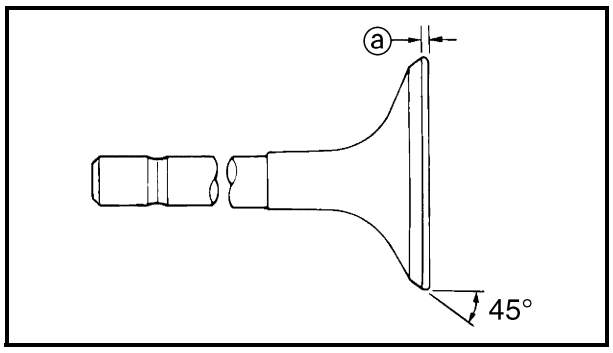
- After installing the valve guide, bore the valve guide with the valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

NOTE:

After replacing the valve guide, reface the valve seat.

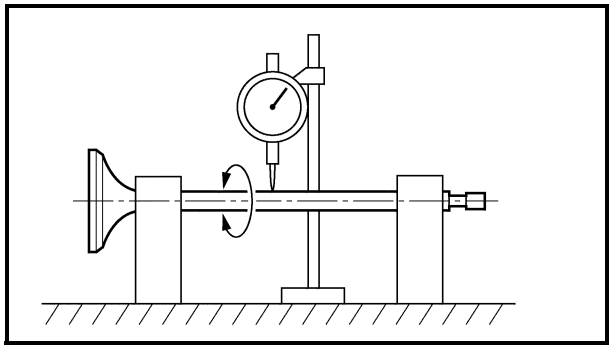
Valve guide remover (ø4.5):
90890-04116
Valve guide remover (4.5 mm):
YM-04116
Valve guide installer (ø4.5):
90890-04117
Valve guide installer (4.5 mm):
YM-04117
Valve guide reamer (ø4.5):
90890-04118
Valve guide reamer (4.5 mm):
YM-04118

3. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
4. Inspect:
   - Valve face
     Pitting/wear → Grind the valve face.
   - Valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



5. Measure:
   - Valve margin thickness ⓐ
     Out of specification → Replace the valve.

Valve margin thickness:
Intake:
0.80 ~ 1.20 mm
(0.0315 ~ 0.0472 in)
Exhaust:
0.50 ~ 0.90 mm
(0.0197 ~ 0.0354 in)

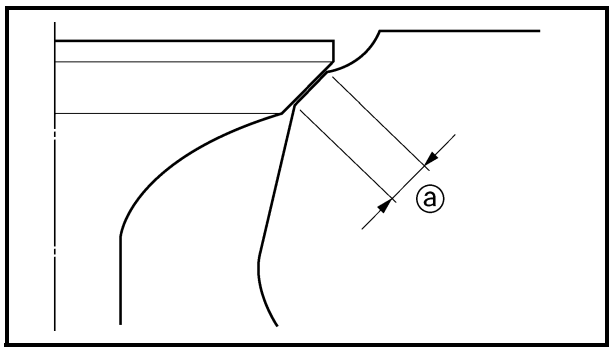


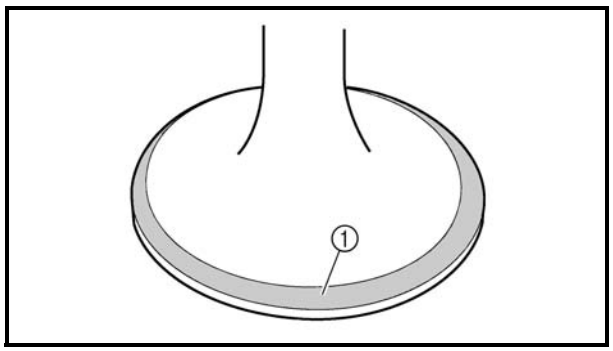
6. Measure:
   • Valve stem runout
     Out of specification → Replace the valve.

NOTE:
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout:
0.010 mm (0.0004 in)

7. Eliminate:
   • Carbon deposits
     (from the valve face and valve seat)
8. Inspect:
   • Valve seat
     Pitting/wear → Replace the cylinder head.



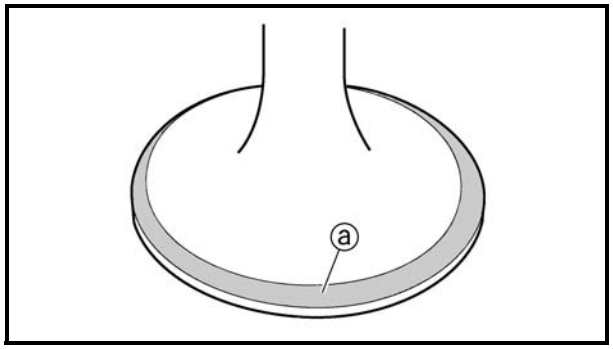


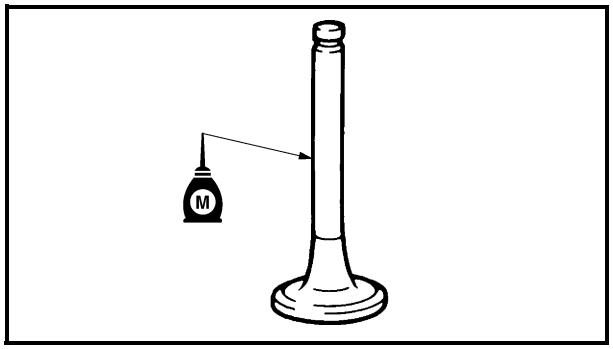
9. Measure:
   • Valve seat width ⓐ
     Out of specification → Replace the cylinder head.

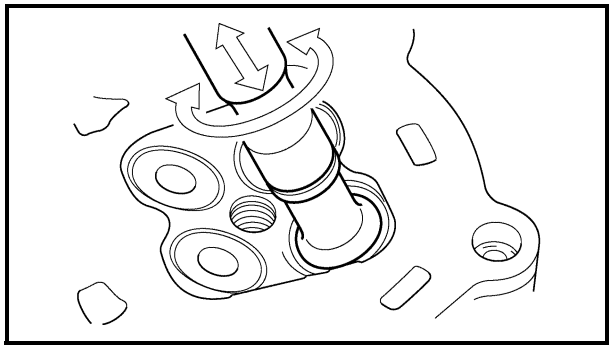
Valve seat width:
Intake:
0.90 ~ 1.10 mm
(0.0354 ~ 0.0433 in)
<Limit>: 1.6 mm (0.0630 in)
Exhaust:
0.90 ~ 1.10 mm
(0.0354 ~ 0.0433 in)
<Limit>: 1.6 mm (0.0630 in)

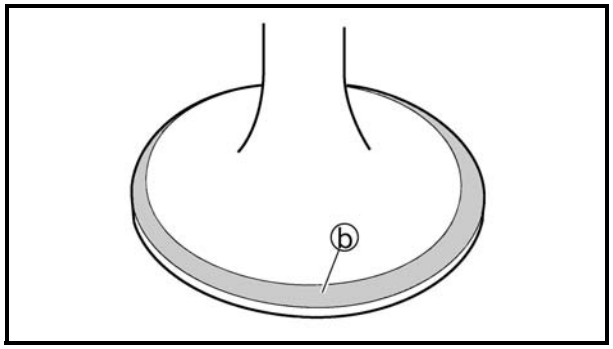
Measurement steps:
- Apply Mechanic's blueing dye (Dykem) ① onto the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear impression.
- Measure the valve seat width.

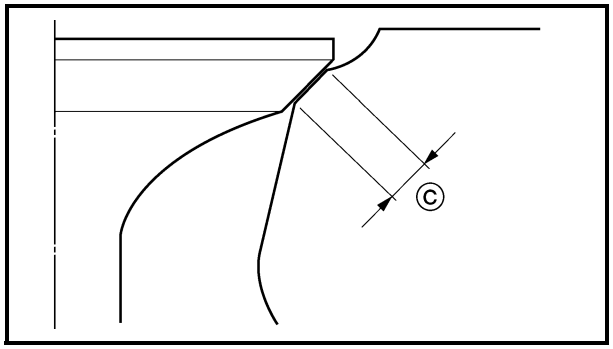
NOTE:
Where the valve seat and valve face contacted one another, the blueing will have been removed.











10. Lap:
    - Valve face
    - Valve seat

NOTE:

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

Lapping steps:

- Apply a coarse lapping compound ⓐ to the valve face.

CAUTION:

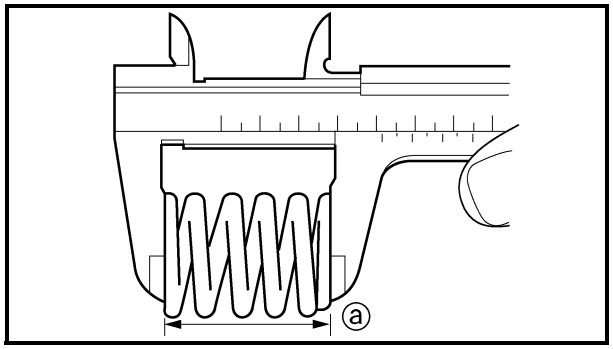
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

- Apply molybdenum disulfide oil onto 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 of the lapping compound.

NOTE:

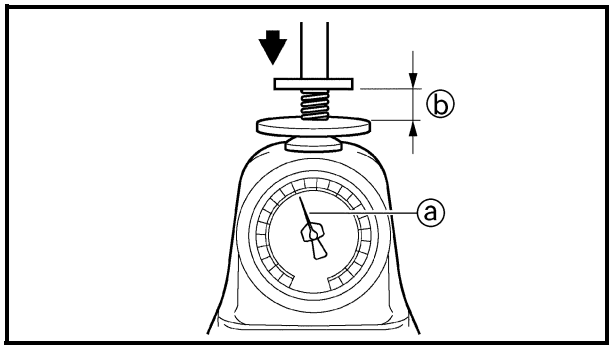
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

- Apply a fine lapping compound to the valve face and repeat the above steps.
- After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- Apply Mechanic's blueing dye (Dykem) ⓑ onto 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 impression.
- Measure the valve seat width ⓒ again. If the valve seat width is out of specification, reface and lap the valve seat.



11. Measure:
    - Valve spring free length ⓐ
      Out of specification → Replace the valve spring.

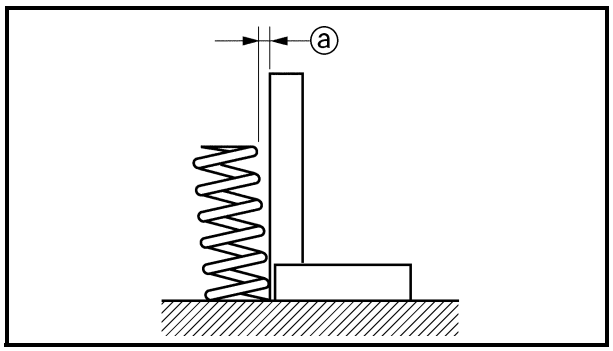
Valve spring free length (intake and exhaust):
39.57 mm (1.56 in)
<Limit>: 37.59 mm (1.48 in)



12. Measure:
    - Compressed valve spring force ⓐ
      Out of specification → Replace the valve spring.

ⓑ Installed length

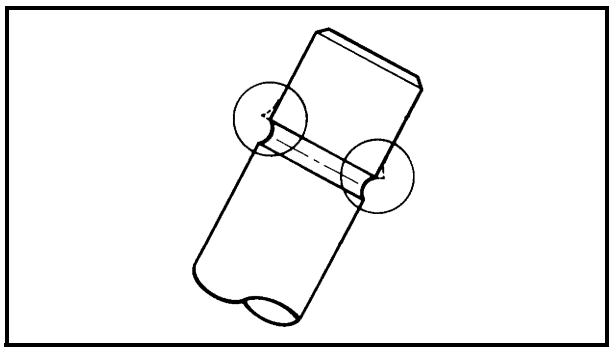
Compressed valve spring force (installed):
112.30 ~ 129.30 N at 34.60 mm
(11.45 ~ 13.18 kg at 34.60 mm,
25.24 ~ 29.07 lb at 1.36 in)



13. Measure:
    - Valve spring tilt ⓐ
      Out of specification → Replace the valve spring.

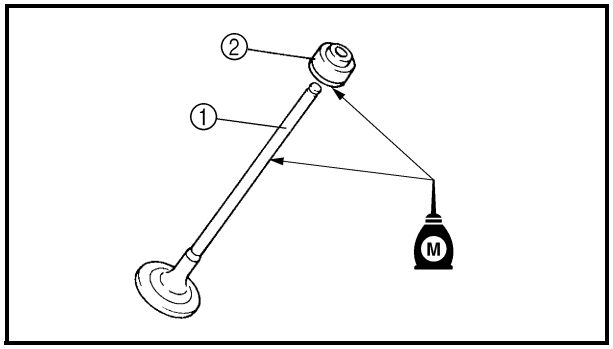
Maximum valve spring tilt:
2.5°/1.7 mm (2.5°/0.07 in)

14. Inspect:
    - Valve lifter
      Damage/scratches → Replace the valve lifters and cylinder head.



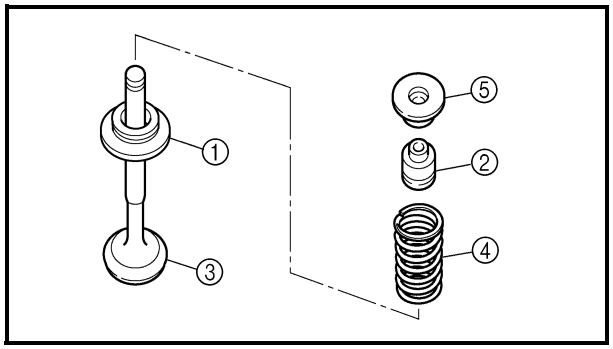
INSTALLATION

1. Deburr:
    - Valve stem end
      (with an oil stone)



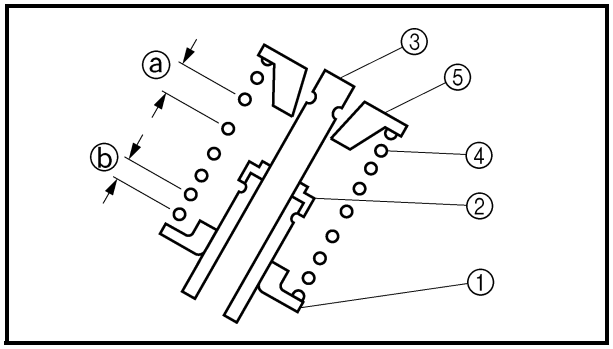
2. Lubricate:
   - Valve stem ①
   - Valve stem seal ②
     (with the recommended lubricant)

	Recommended lubricant: **Molybdenum disulfide oil**

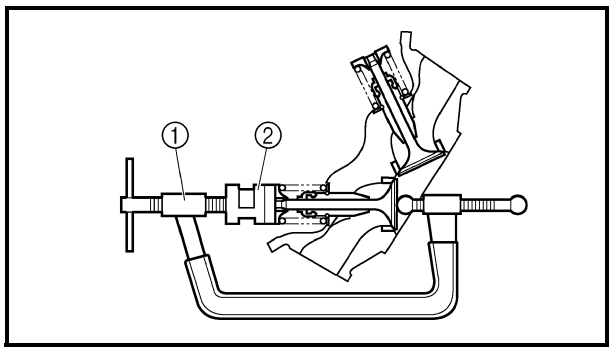


3. Install:
   - Lower spring seat ①
   - Valve stem seal ② New
   - Valve ③
   - Valve spring ④
   - Upper spring seat ⑤
     (into the cylinder head)

NOTE:
- Make sure each valve is installed in its original place.
- Install the valve spring with the larger pitch ⓐ facing up.



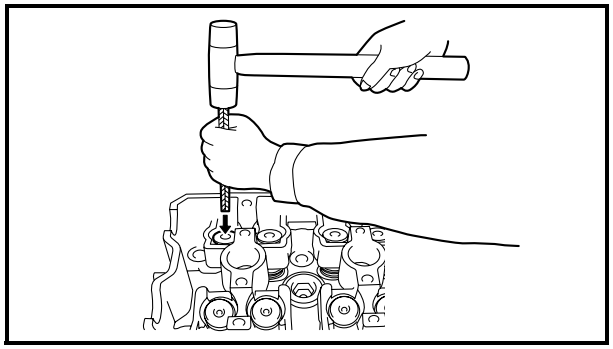
ⓑ Smaller pitch



4. Install:
   - Valve cotters

NOTE:
Install the valve cotters by compressing the valve spring with the valve spring compressor ① and valve spring compressor attachment ②.

	Valve spring compressor: **90890-04019, YM-04019** **Valve spring compressor attachment:** **90890-04114** **Valve spring compressor adapter 19.5 mm:** **YM-04114**



5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION:

Hitting the valve tip with excessive force could damage the valve.

6. Lubricate:
   - Valve pad
   - Valve lifter
   (with the recommended lubricant)

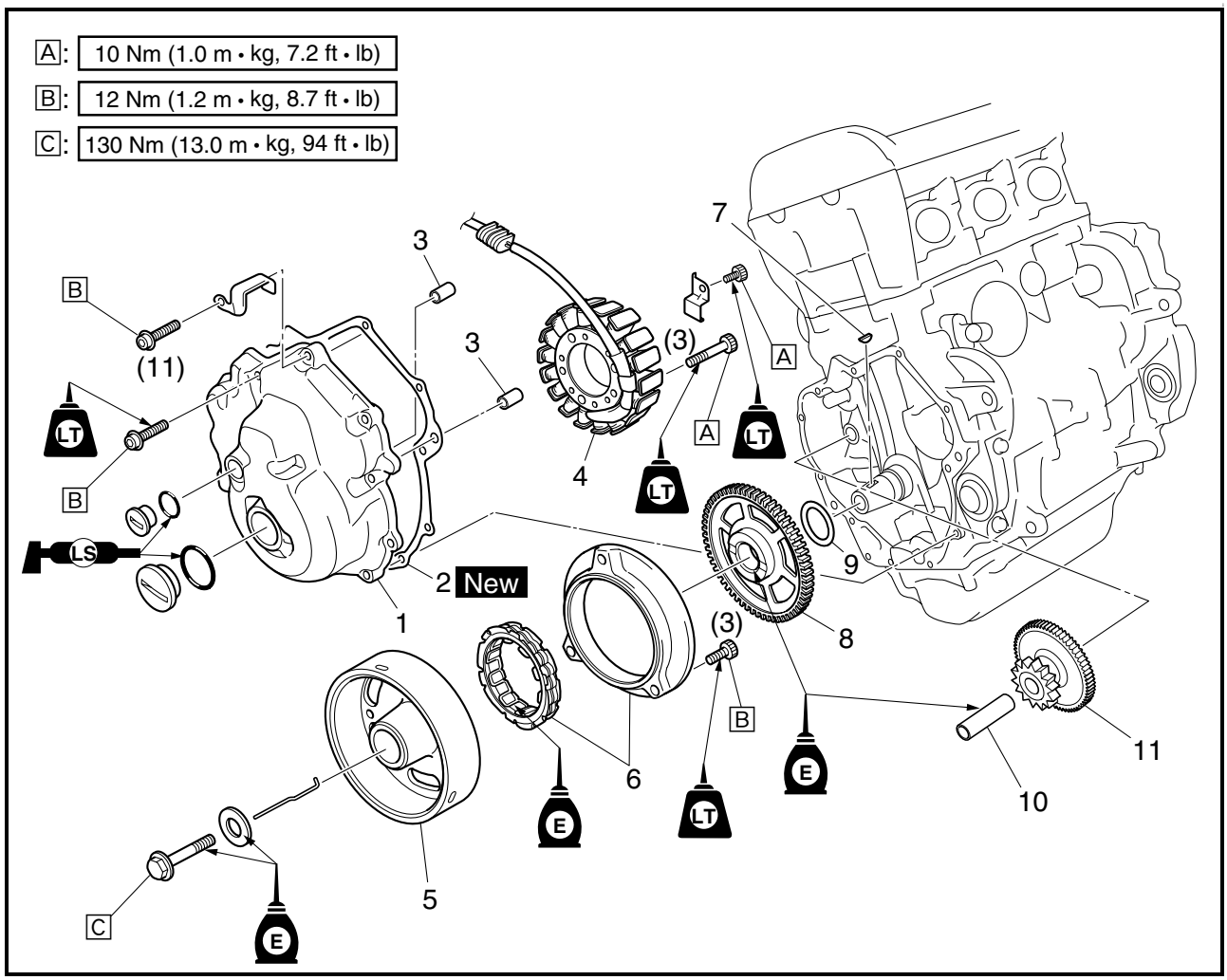
	Recommended lubricant: Molybdenum disulfide oil

7. Install:
   - Valve pad
   - Valve lifter

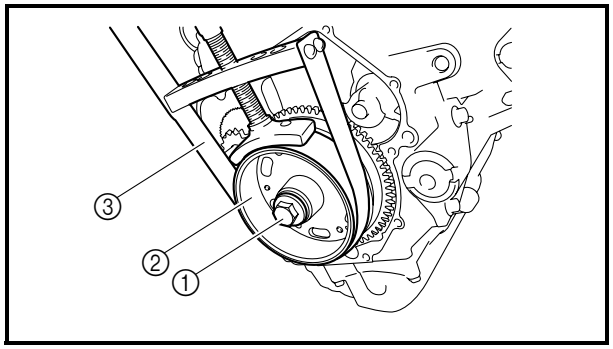
NOTE:

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

AC MAGNETO ROTOR AND STARTER CLUTCH



Order	Job name/Part name	Q'ty	Remarks
	AC magneto rotor and starter clutch removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE ASSEMBLY".
1	AC magneto rotor cover	1	
2	AC magneto rotor cover gasket	1	
3	Dowel pin	2	
4	Stator coil	1	
5	AC magneto rotor	1	
6	Starter clutch	1	
7	Woodruff key	1	
8	Starter clutch gear	1	
9	Washer	1	
10	Idle gear shaft	1	
11	Starter clutch idle gear	1	
			For installation, reverse the removal procedure.



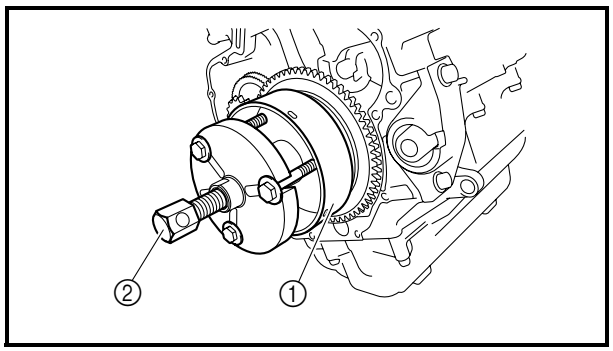
REMOVAL

1. Remove:
   - AC magneto rotor bolt ①
   - Washer

NOTE:

While holding the AC magneto rotor ② with the sheave holder ③, loosen the AC magneto rotor bolt.

Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A



2. Remove:
   - AC magneto rotor ①
     (with the flywheel puller ② and flywheel puller attachment)
   - Woodruff key

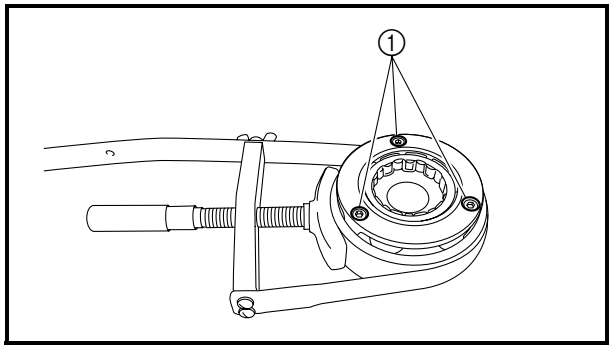
CAUTION:

To protect the end of the crankshaft, place a flywheel puller attachment between the flywheel puller set's center bolt and the crankshaft.

NOTE:

Make sure the flywheel puller is centered over the AC magneto rotor.

Flywheel puller:
90890-01362
Heavy duty puller:
YU-33270-B
Flywheel puller attachment:
90890-04089
Crankshaft protector:
YM-33282



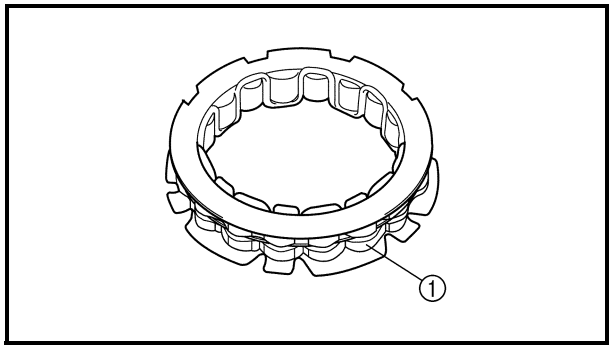
3. Remove:
   - Starter clutch

NOTE:
While holding the AC magneto rotor with the sheave holder, remove the starter clutch bolts ①.

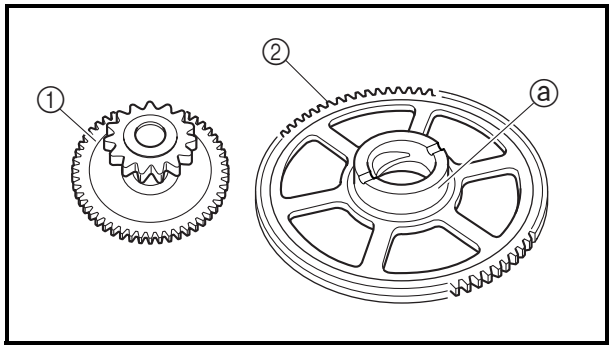
Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A

INSPECTION

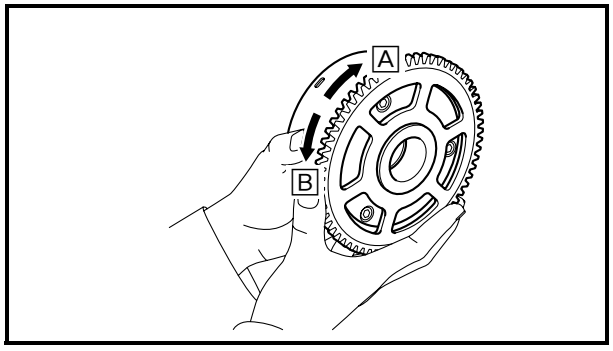
1. Inspect:
   - Stator coil
     Damage → Replace the stator coil.



2. Inspect:
   - Starter clutch rollers ①
     Damage/wear → Replace.



3. Inspect:
   - Starter clutch idle gear ①
   - Starter clutch gear ②
     Burrs/chips/roughness/wear → Replace the defective part(s).
   - Starter clutch gear contacting surfaces ⓐ
     Damage/pitting/wear → Replace the starter clutch gear.



4. Inspect:
   - Starter clutch operation

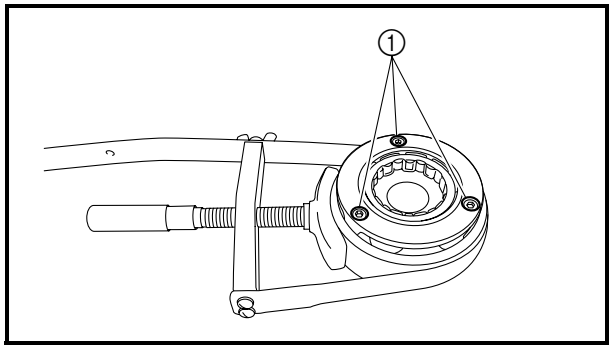
Installation steps:
- Install the starter clutch gear onto the starter clutch and hold the AC magneto rotor.
- When turning the starter clutch gear clockwise [A], it should turn freely, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch gear counterclockwise [B], the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.

INSTALLATION

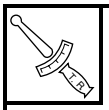
1. Install:
   - Starter clutch

NOTE:
While holding the AC magneto rotor with the sheave holder, tighten the starter clutch bolts.

Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A



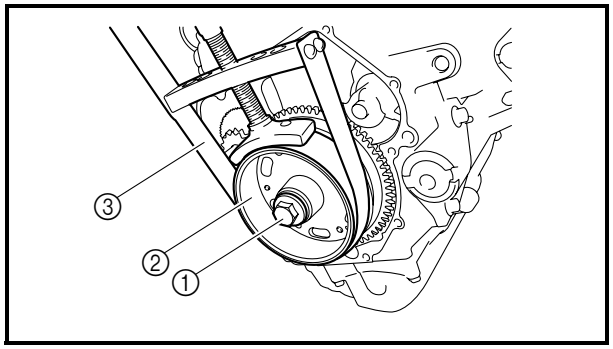
2. Tighten:
   - Starter clutch bolts ①



Starter clutch bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)
LOCTITE®

3. Install:
   - Woodruff key
   - AC magneto rotor
   - Washer
   - AC magneto rotor bolt

NOTE:
- Clean the tapered portion of the crankshaft and the AC magneto rotor hub.
- When installing the AC magneto rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.

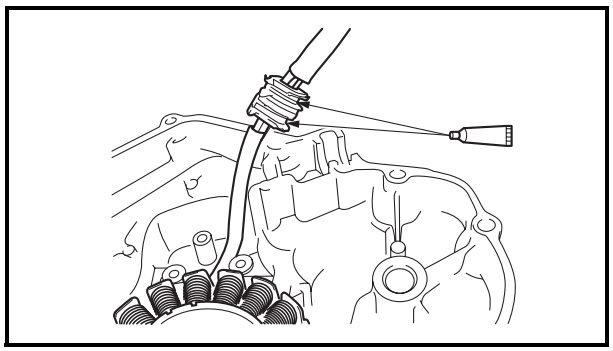


4. Tighten:
   - AC magneto rotor bolt ①

AC magneto rotor bolt:
130 Nm (13.0 m · kg, 94 ft · lb)

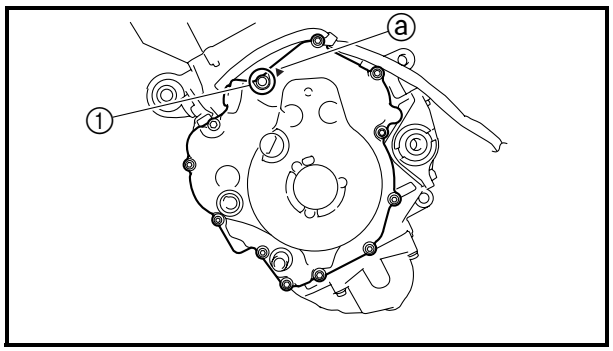
NOTE:
- Lubricate the AC magneto rotor bolt and washer with engine oil.
- While holding the AC magneto rotor ② with the sheave holder ③, tighten the AC magneto rotor bolt.

Sheave holder:
90890-01701
Primary clutch holder:
YS-01880-A



5. Apply:
   - Sealant
     (onto the AC magneto lead grommet)

Yamaha bond No. 1215:
90890-85505
(Three Bond No.1215®)

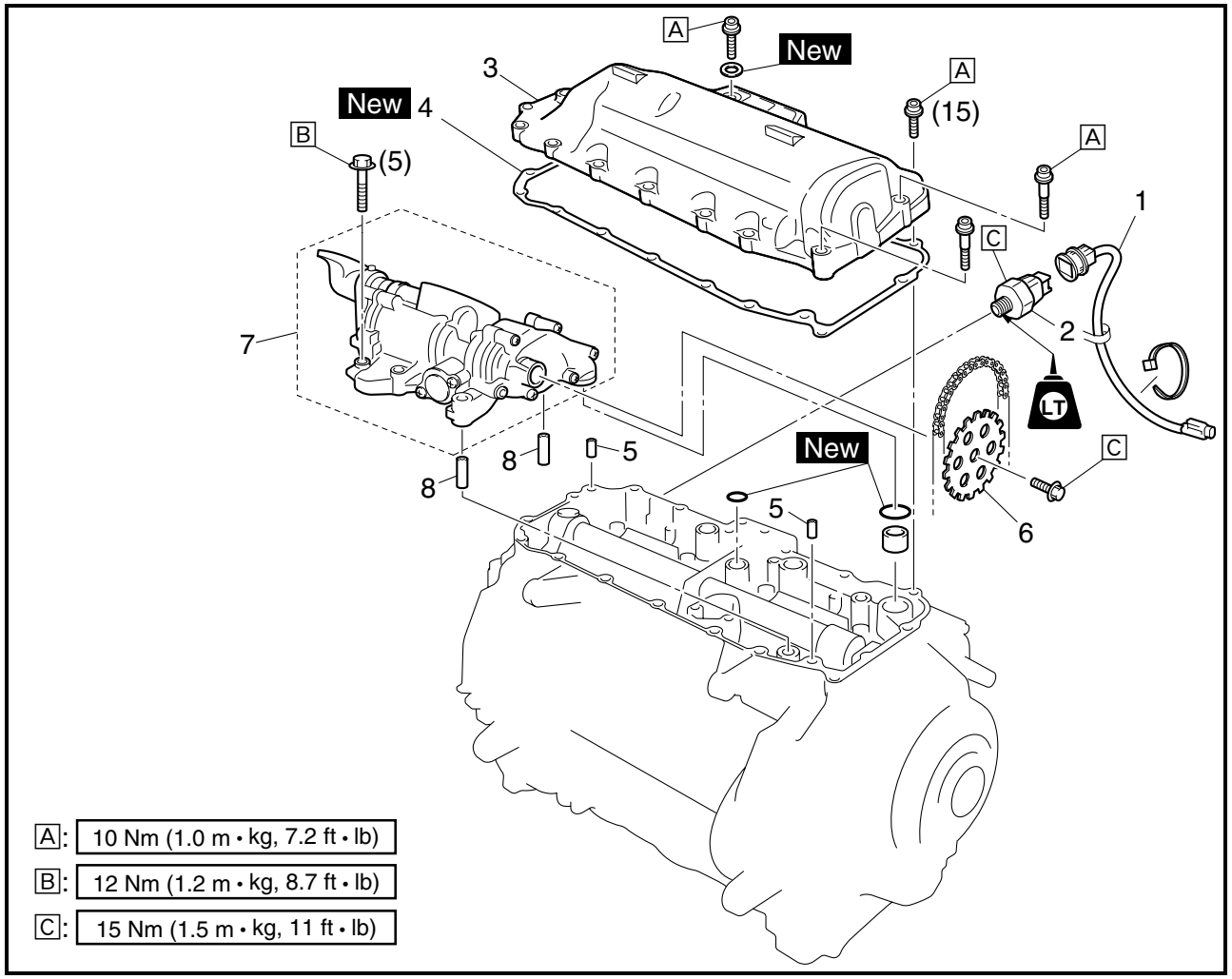


6. Install:
   - AC magneto rotor cover

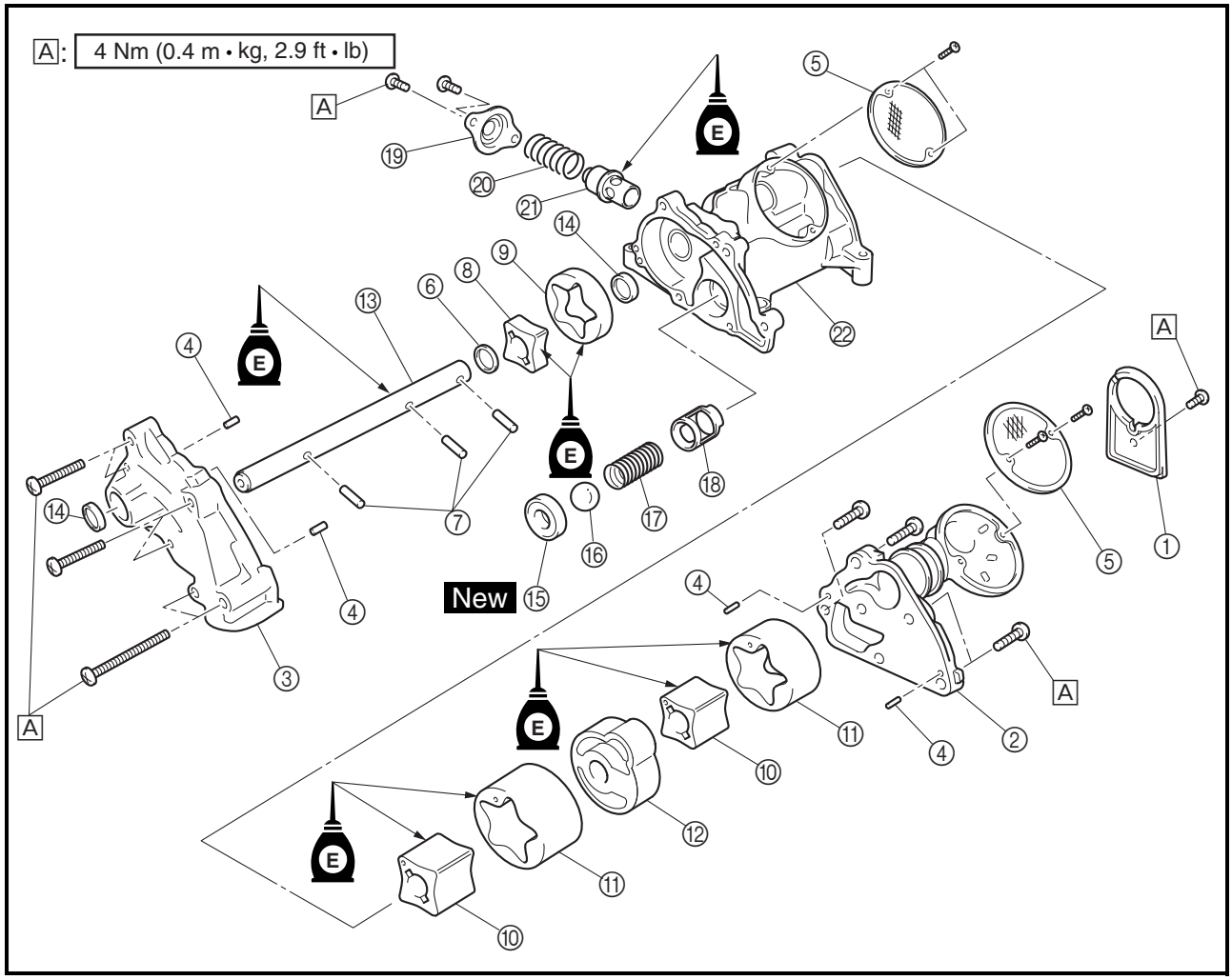
AC magneto rotor cover bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)
LOCTITE®

NOTE:
Apply locking agent (LOCTITE®) to the threads of the bolt ①, which is indicated by the "▲" mark ⓐ on the AC magneto rotor cover.

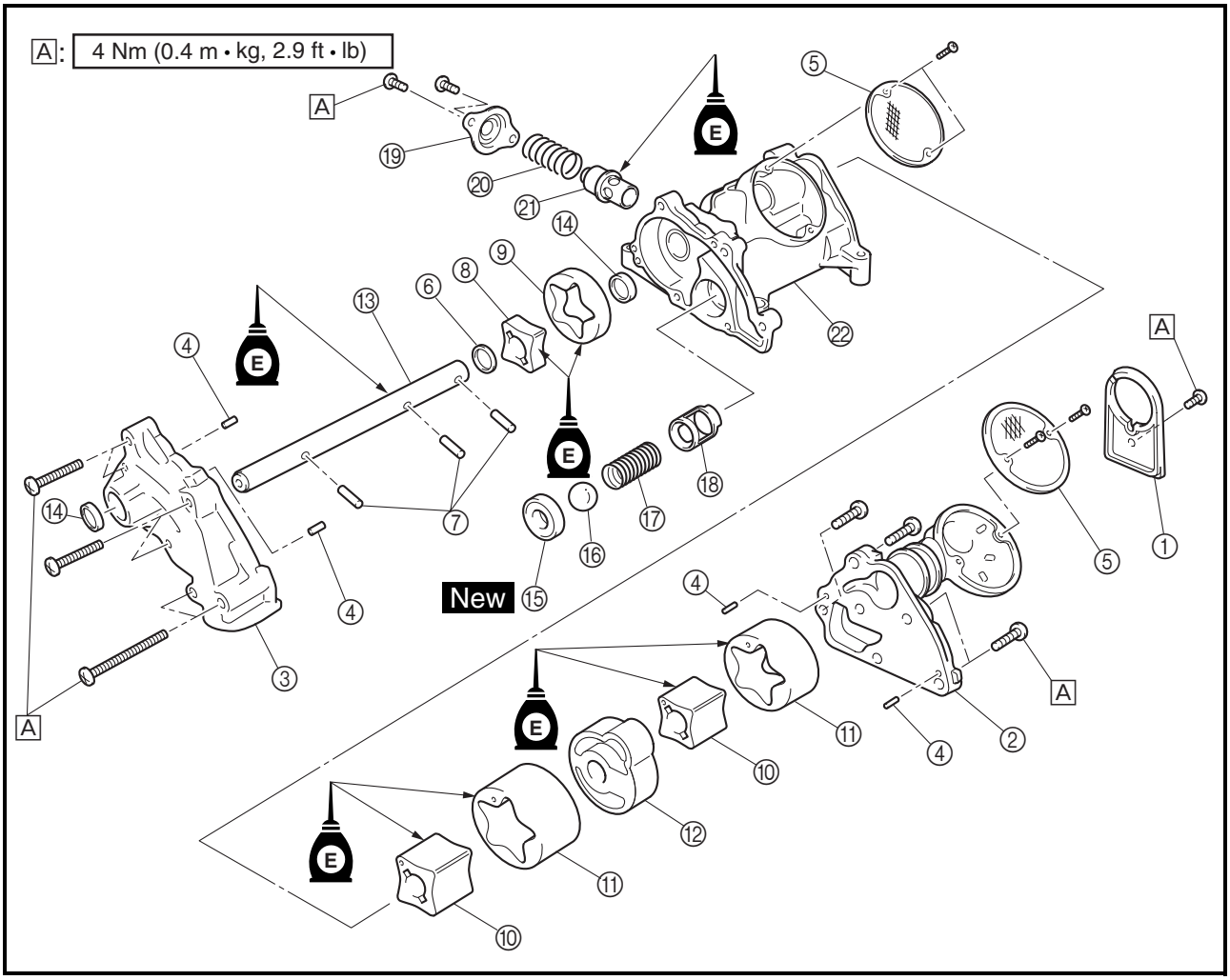
OIL PAN AND OIL PUMP



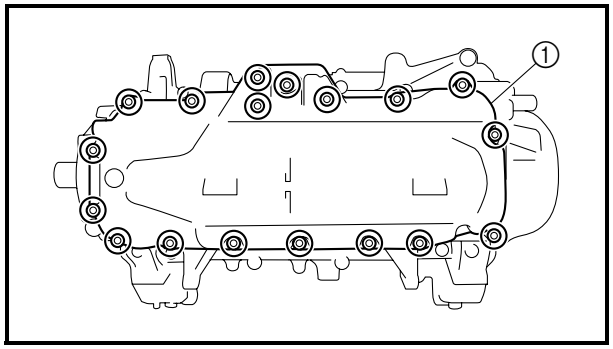
Order	Job name/Part name	Q'ty	Remarks
	Oil pan and oil pump removal		Remove the parts in the order listed below.
	Engine		Refer to "ENGINE ASSEMBLY".
1	Oil pressure switch sub-lead	1	
2	Oil pressure switch	1	
3	Oil pan	1	
4	Oil pan gasket	1	
5	Dowel pin	2	
6	Oil pump driven gear	1	
7	Oil pump assembly	1	
8	Dowel pin	2	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Oil pump disassembly		Remove the parts in the order listed below.
①	Oil pan divider	1	
②	Oil pump housing cover 1	1	
③	Oil pump housing cover 2	1	
④	Pin	4	
⑤	Oil strainer	2	
⑥	Washer	1	
⑦	Pin	3	
⑧	Oil pump inner rotor 1	1	
⑨	Oil pump outer rotor 1	1	
⑩	Oil pump inner rotor 2	2	
⑪	Oil pump outer rotor 2	2	
⑫	Spacer	1	



Order	Job name/Part name	Q'ty	Remarks
⑬	Oil pump shaft	1	
⑭	Oil seal	2	
⑮	Check ball seat	1	
⑯	Check ball	1	
⑰	Spring	1	
⑱	Spacer	1	
⑲	Relief valve cover	1	
⑳	Spring	1	
㉑	Relief valve	1	
㉒	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

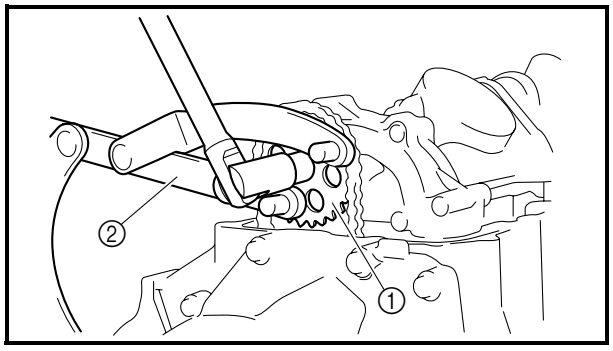


REMOVAL

1. Remove:
   - Oil pan ①

NOTE:

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



2. Remove:
   - Oil pump driven gear ①

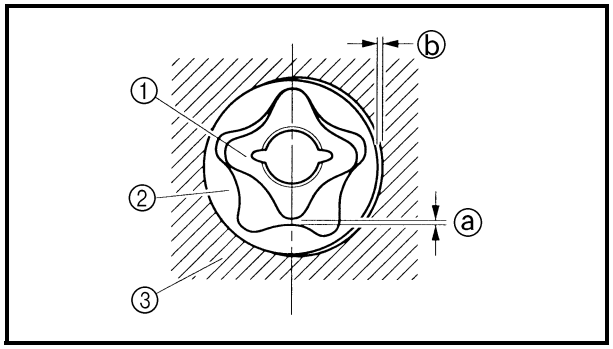
NOTE:

- While holding the oil pump driven gear with the rotor holding tool ②, loosen the oil pump driven gear bolt.
- To prevent the oil pump chain falling into the crankcase, fasten it with a wire.

Rotor holding tool:
90890-01235
Universal magneto & rotor holder:
YU-01235

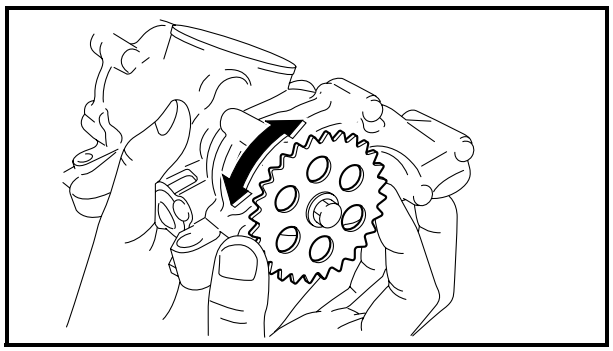
INSPECTION

1. Inspect:
   - Oil pump housing
   - Oil pump covers
     Cracks/damage/wear → Replace the defective part(-s).



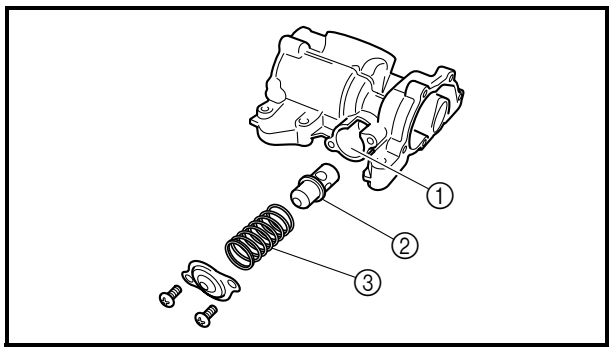
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance ⓐ (between inner rotor ① and outer rotor ②)
   - Outer-rotor-to-oil-pump-housing clearance ⓑ (between outer rotor ② and pump housing ③)
   Out of specifications → Replace oil pump assembly.

Inner-rotor-to-outer-rotor-tip clearance:
0.090 ~ 0.150 mm
(0.0035 ~ 0.0059 in)
Outer-rotor-to-oil-pump-housing clearance:
0.030 ~ 0.080 mm
(0.0012 ~ 0.0032 in)



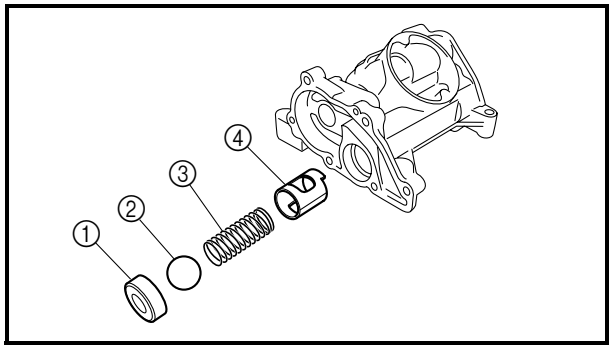
3. Inspect:
   - Oil pump operation
   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

NOTE:
Install the oil pump gear to check the oil pump operation.



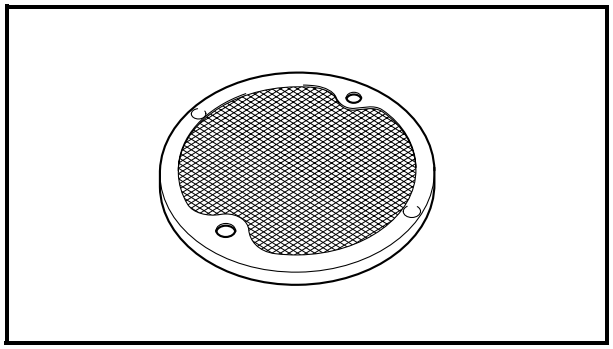
4. Inspect:
   - Relief valve body ①
   - Relief valve ②
   - Spring ③
   Damage/wear → Replace the defective part(s).

5. Inspect:
   - Oil pump driven gear
   Cracks/damage/wear → Replace.



6. Inspect:
   - Check ball seat ①
   - Check ball ②
   - Spring ③
   - Spacer ④

   Damage/wear → Replace the defective part(-s).



7. Inspect:
   - Oil strainer

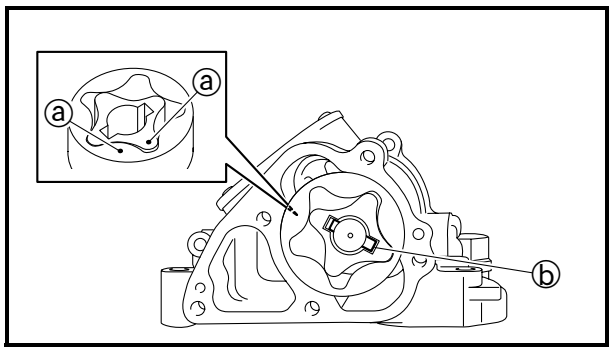
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.
   Contaminants → Clean with engine oil.

INSTALLATION

1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft

   (with the recommended lubricant)

	Recommended lubricant: Engine oil



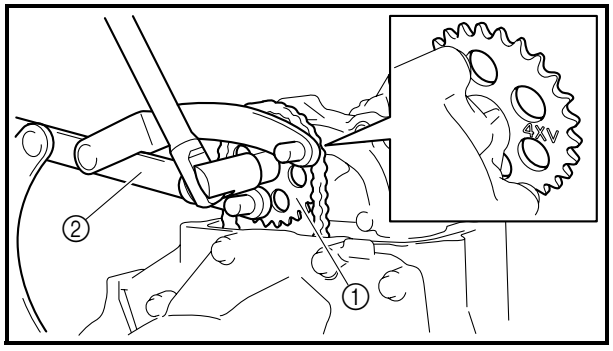
2. Install:
   - Pin
   - Inner rotor
   - Outer rotor

NOTE:

- Each set of inner and outer rotors should be installed with both punch marks ⓐ facing in the same direction, either away from or towards the oil pump assembly.
- When installing the inner rotor, align the pin in the oil pump shaft with the groove ⓑ on the inner rotor.

3. Inspect:
   - Oil pump operation

   Unsmooth operation → Replace.



4. Install:
   - Oil pump driven gear ①

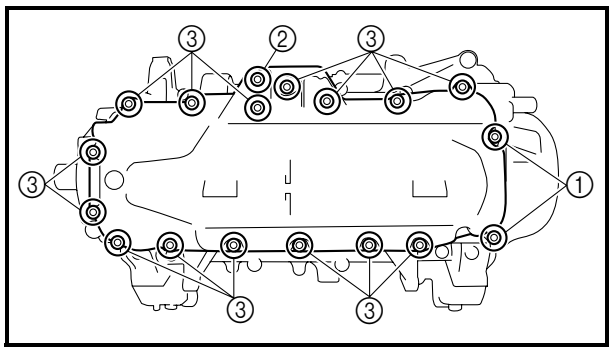
	Oil pump driven gear bolt: **15 Nm (1.5 m · kg, 11 ft · lb)**

NOTE:

- Install the oil pump driven gear with the stamped mark “4XV” facing towards the oil pump assembly.
- While holding the oil pump driven gear with the rotor holding tool ②, tighten the oil pump driven gear bolt.

	Rotor holding tool: **90890-01235** **Universal magneto & rotor holder:** **YU-01235**

5. Install:
   - Dowel pin
   - Oil pan gasket New
   - Oil pan
   - Gasket New
   - Oil pan bolts



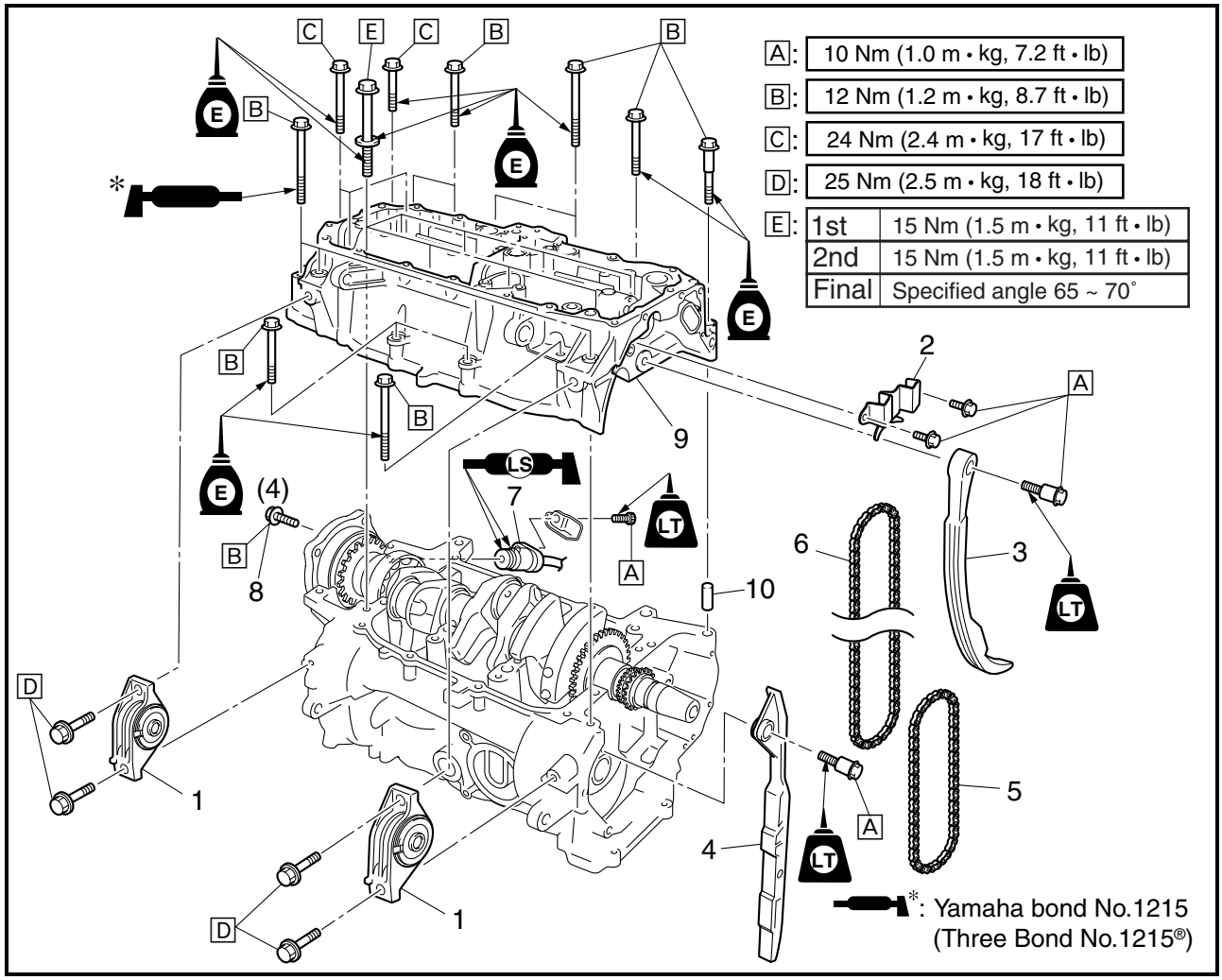
	Oil pan bolt: **10 Nm (1.0 m · kg, 7.2 ft · lb)**

NOTE:

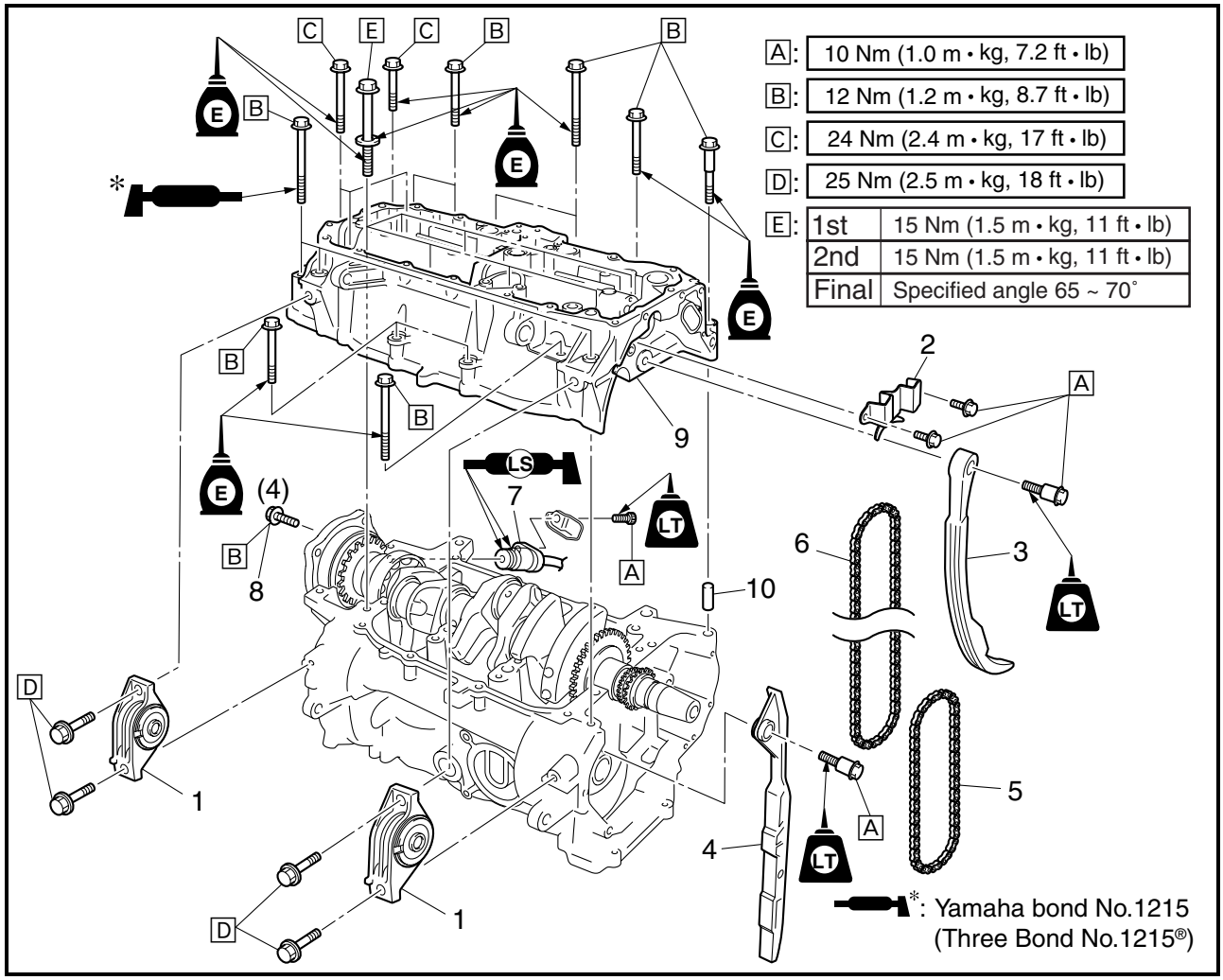
Tighten the oil pan bolts in stages and in a criss-cross pattern.

M6 × 35 mm bolts: ①
M6 × 30 mm bolt: ②
M6 × 25 mm bolts: ③

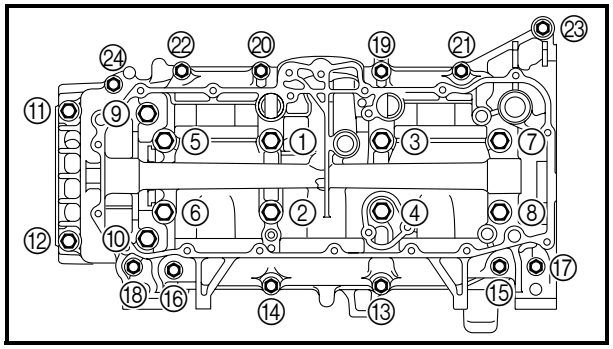
CRANKCASE



Order	Job name/Part name	Q'ty	Remarks
	Crankcase separate		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE ASSEMBLY".
	Cylinder head		Refer to "CYLINDER HEAD".
	AC magneto rotor/Starter clutch gear		Refer to "AC MAGNETO ROTOR AND STARTER CLUTCH".
	Oil pump		Refer to "OIL PAN AND OIL PUMP".
	Water pump		Refer to "WATER PUMP" in CHAPTER 6.
	Starter motor		Refer to "STARTER MOTOR" in CHAPTER 8.
1	Engine mounting bracket	2	
2	Oil pump drive chain guide	1	
3	Timing chain guide (exhaust side)	1	
4	Timing chain guide (intake side)	1	
5	Oil pump drive chain	1	
6	Timing chain	1	
7	Crankshaft position sensor	1	



Order	Job name/Part name	Q'ty	Remarks
8	Primary sheave drive shaft assembly bolt	4	
9	Lower crankcase	1	
10	Dowel pin	1	
			For installation, reverse the removal procedure.



REMOVAL

1. Remove:
   - Crankcase bolts

NOTE:

- Place the engine upside down.
- Loosen the bolts in decreasing numerical order of the embossed numbers on the crankcase.
- Loosen each bolt 1/4 of a turn at a time. After all of the bolts are fully loosened, remove them.

2. Remove:
   - Lower crankcase

CAUTION:

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

INSPECTION

1. Inspect:
   - Crankcase:
     Cracks/damage → Replace.

NOTE:

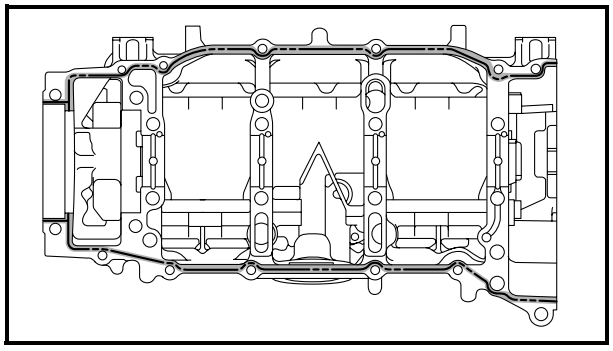
- Thoroughly wash the crankcase halves in a mild solvent.
- Thoroughly clean all the gasket surfaces and crankcase mating surfaces.

   - Oil delivery passages
     Obstruction → Blow out with compressed air.
2. Inspect:
   - Timing chain
   - Oil pump drive chain
     Damage/stiffness → Replace the chain and sprocket as a set.
3. Inspect:
   - Timing chain guide (intake side)
   - Timing chain guide (exhaust side)
     Damage/wear → Replace the timing chain guide(-s).

INSTALLATION

1. Lubricate:
   - Crankshaft journal bearings
     (with the recommended lubricant)

	Recommended lubricant: **Engine oil**



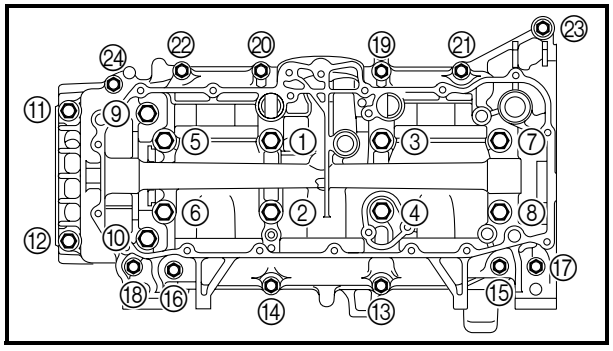
2. Apply:
   - Sealant
     (onto the crankcase mating surfaces)

	Yamaha bond No. 1215: **90890-85505** **(Three Bond No.1215®)**

NOTE:

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 ~ 3 mm (0.08 ~ 0.12 in) of the crankshaft journal bearings.

3. Install:
   - Lower crankcase
     (onto the upper crankcase)

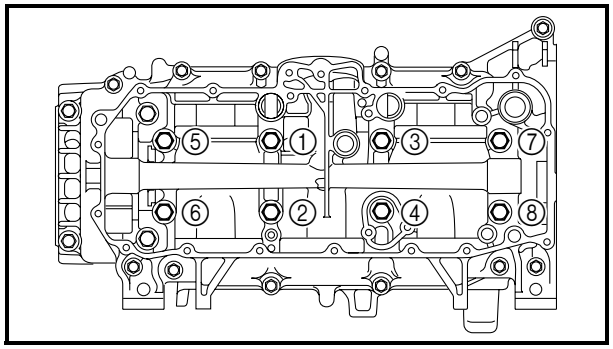


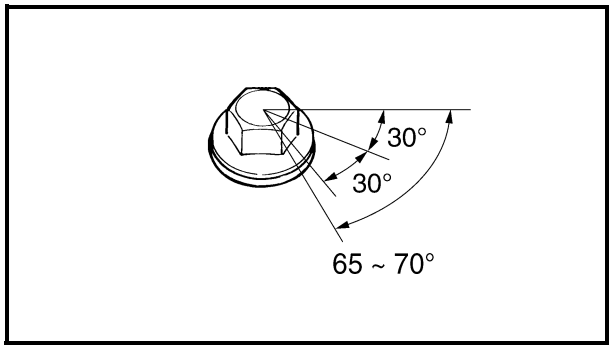
4. Install:
   - Crankcase bolts

NOTE:

- Lubricate the bolts ① ~ ⑧ thread and washers with engine oil.
- Lubricate the bolts ⑨ ~ ⑮, ⑲ ~ ㉔ thread part and mating surface with engine oil.
- Apply Yamaha bond No. 1215 to the threads of the bolts ⑯ ~ ⑱.
- Finger tighten the crankcase bolts.

M9 × 105 mm bolts: ① ~ ⑧
M8 × 70 mm bolts: ⑨, ⑩, ⑫
M8 × 55 mm bolt: ⑪
M6 × 80 mm bolts: ⑮, ⑲, ⑳
M6 × 80 mm bolts (black): ⑯ ~ ⑱
M6 × 55 mm bolts: ⑬, ⑭, ㉑, ㉒, ㉔
M6 × 52 mm bolt: ㉓





5. Tighten:
   - Crankcase bolts (M9 × 105 mm) ① ~ ⑧

NOTE:
Tighten the bolts in the order of the embossed numbers on the crankcase.

- Tighten the crankcase bolts.

Crankcase bolt ① ~ ⑧:
1st:
15 Nm (1.5 m · kg, 11 ft · lb)

- Loosen and retighten the crankcase bolts.

Crankcase bolt ① ~ ⑧:
2nd:
15 Nm (1.5 m · kg, 11 ft · lb)

- Tighten the crankcase bolts further to reach the specified angle 65 ~ 70°.

Crankcase bolt ① ~ ⑧:
Final:
Specified angle 65 ~ 70°

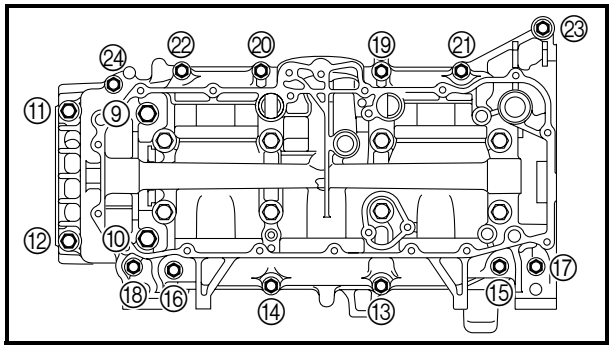
⚠ WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

CAUTION:

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is at the specified angle.**

NOTE:
On a hexagonal bolt, note that the angle from one corner to another is 60°.



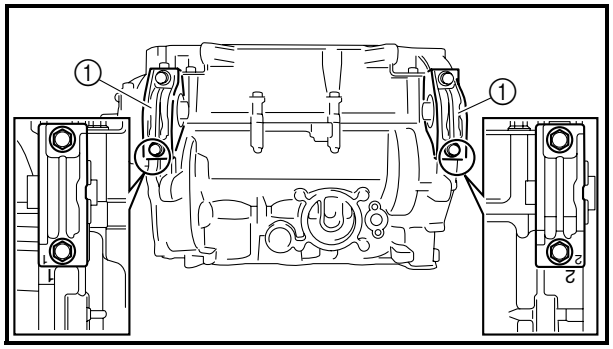
6. Tighten:
   - Crankcase bolts ⑨ ~ ㉔

NOTE:
Tighten the bolts in the order of the embossed numbers on the crankcase.

Crankcase bolt ⑨ ~ ⑫:
24 Nm (2.4 m · kg, 17 ft · lb)
Crankcase bolt ⑬ ~ ㉔:
12 Nm (1.2 m · kg, 8.7 ft · lb)

7. Install:
   - Primary sheave drive shaft assembly bolts

Primary sheave drive shaft assembly bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)

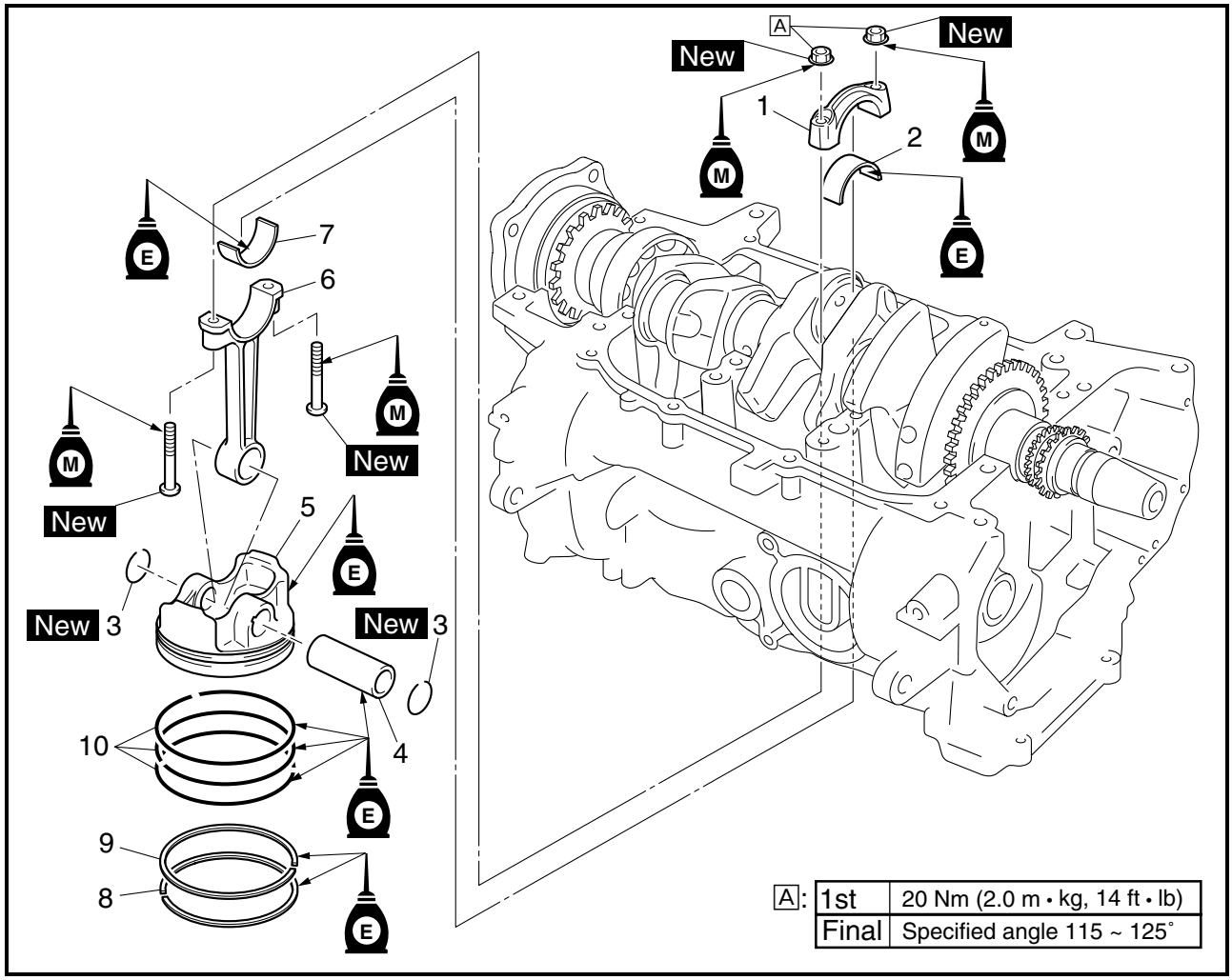


8. Install:
   - Engine mounting brackets ①
   - Engine mounting bracket bolts

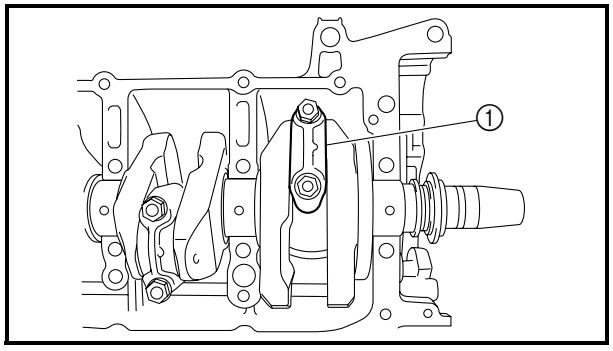
NOTE:
When installing the engine mounting brackets, make sure that the number on each side of the upper crankcase is aligned with the identical number on the brackets.

Engine mounting bracket bolts:
25 Nm (2.5 m · kg, 18 ft · lb)

CONNECTING RODS AND PISTONS



Order	Job name/Part name	Q'ty	Remarks
	Connecting rods and pistons removal		Remove the parts in the order listed below.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Connecting rod cap	3	
2	Big end lower bearing	3	
3	Piston pin clip	6	
4	Piston pin	3	
5	Piston	3	
6	Connecting rod	3	
7	Big end upper bearing	3	
8	Top ring	3	
9	2nd ring	3	
10	Oil ring	3	
			For installation, reverse the removal procedure.

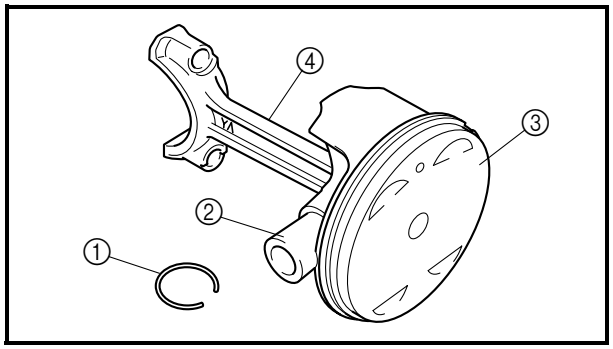


REMOVAL

1. Remove:
   - Connecting rod cap ①
   - Big end bearings

NOTE:

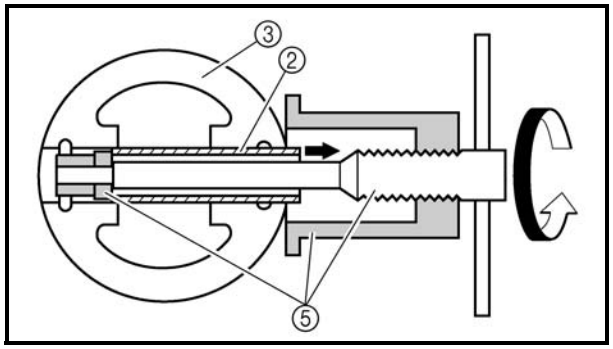
Identify the position of each big end bearing so that it can be reinstalled in its original place.



2. Remove:
   - Piston pin clips ①
   - Piston pin ②
   - Piston ③
   - Connecting rod ④

CAUTION:

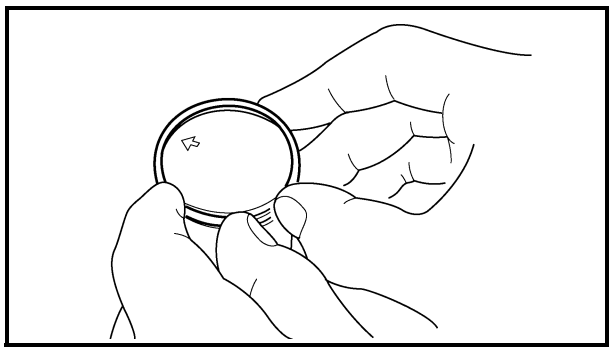
Do not use a hammer to drive the piston pin out.



NOTE:

- For reference during installation, put identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set ⑤.

Piston pin puller set:
90890-01304
Piston pin puller:
YU-01304



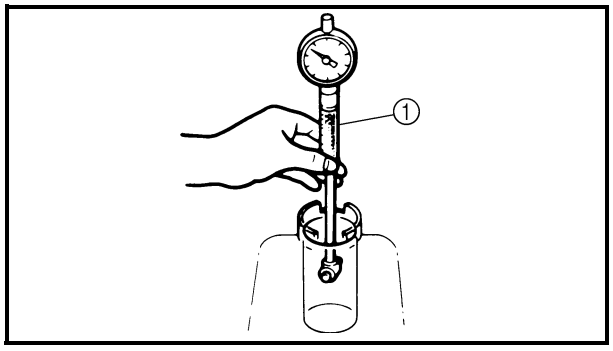
3. Remove:
   - Top ring
   - 2nd ring
   - Oil ring

NOTE:

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

INSPECTION

1. Inspect:
   - Piston wall
   - Cylinder wall
     Vertical scratches → Replace the crankcase, and replace the piston and piston rings as a set.



2. Measure:
   - Piston-to-cylinder clearance

Measurement steps:

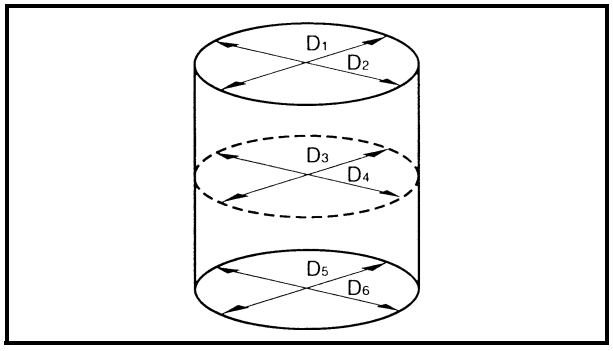
1st step:

- Measure cylinder bore "C" with the cylinder bore gauge ①.

NOTE:

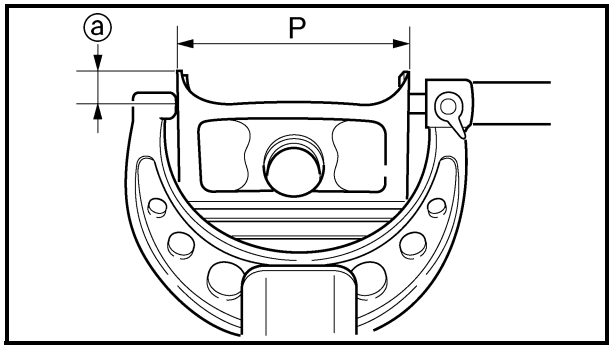
Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore "C"	**82.000 ~ 82.010 mm (3.2283 ~ 3.2287 in)**
Taper limit "T"	**0.050 mm (0.0020 in)**
Out of round "R"	**0.050 mm (0.0020 in)**



"C" = maximum of D_1 ~ D_6
"T" = maximum of D_1 or D_2 – maximum of D_5 or D_6
"R" = maximum of D_1 D_3 or D_5 – maximum of D_2 D_4 or D_6

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



2nd step:
- Measure piston skirt diameter "P" with the micrometer.

ⓐ 11.0 mm (0.43 in) from the bottom edge of the piston.

Piston size (standard) (P):
81.950 ~ 81.965 mm
(3.2264 ~ 3.2270 in)

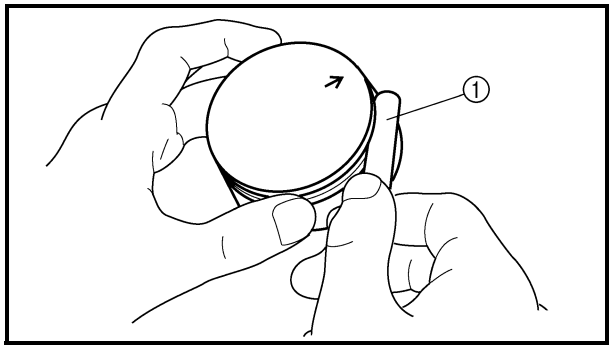
- If out of specification, replace the piston and piston rings as a set.

3rd step:
- Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "C" –
Piston skirt diameter "P"

Piston-to-cylinder clearance:
0.035 ~ 0.060 mm
(0.0014 ~ 0.0024 in)
<Limit>: 0.120 mm (0.0047 in)

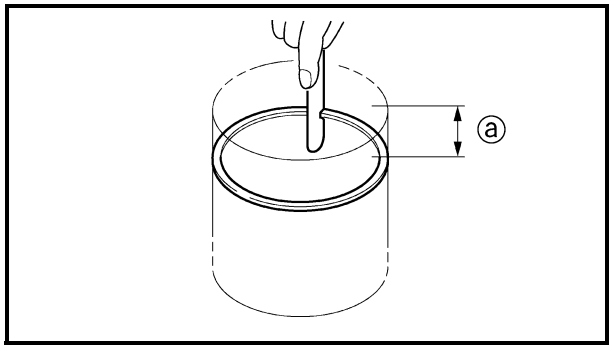
- If out of specification, replace the crankcase, and the piston and piston rings as a set.



3. Measure:
   - Piston ring side clearance
     Use the thickness gauge ①.
     Out of specification → Replace the piston and piston rings as a set.

NOTE:
Eliminate the carbon deposits from the piston ring grooves and rings before measuring the side clearance.

Piston rings side clearance:
Top ring:
0.030 ~ 0.070 mm
(0.0012 ~ 0.0028 in)
2nd ring:
0.020 ~ 0.060 mm
(0.0008 ~ 0.0024 in)



4. Install:
   - Piston ring
     (into the cylinder)

NOTE:
Level the piston ring in the cylinder with the piston crown.

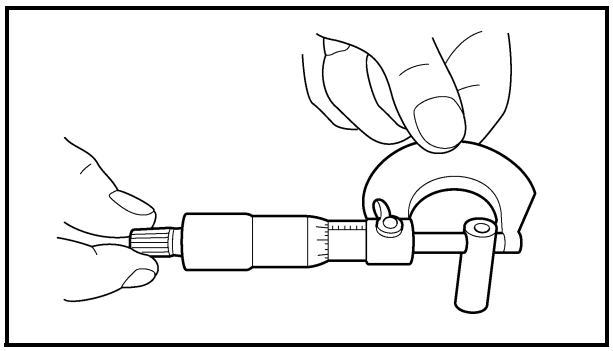
ⓐ 5.0 mm (0.20 in)

5. Measure:
   - Piston ring end gap
     Out of specification → Replace the piston rings as a set.

NOTE:
The oil ring expander spacer end gap cannot be measured. If the oil ring rail gap is excessive, replace all three piston rings.

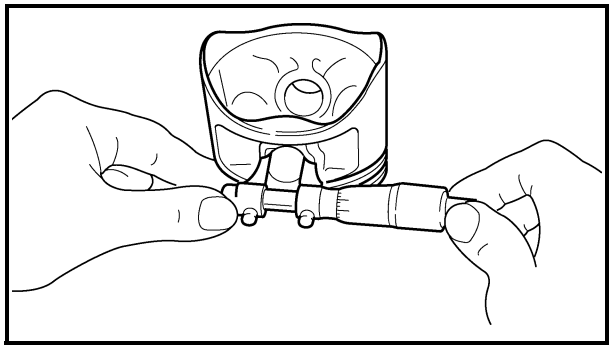
Piston ring end gap:
Top ring:
0.33 ~ 0.45 mm (0.013 ~ 0.018 in)
2nd ring:
0.70 ~ 0.85 mm (0.028 ~ 0.033 in)
Oil ring:
0.20 ~ 0.60 mm (0.008 ~ 0.024 in)

6. Inspect:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.



7. Measure:
   - Piston pin outside diameter
     Out of specification → Replace the piston pin.

Piston pin outside diameter:
18.991 ~ 19.000 mm
(0.7477 ~ 0.7480 in)



8. Measure:
   - Piston pin bore inside diameter
     Out of specification → Replace the piston.

Piston pin bore inside diameter:
19.004 ~ 19.015 mm
(0.7482 ~ 0.7486 in)

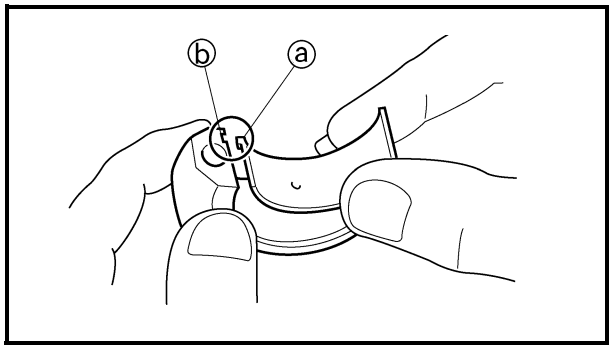
9. Calculate:
   - Piston pin to piston pin bore clearance
     Out of specification → Replace the piston pin and piston as a set.

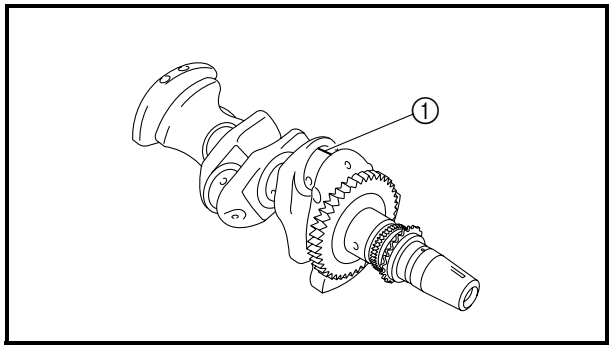
Piston pin to piston pin bore clearance =
Piston pin bore size –
Piston pin outside diameter

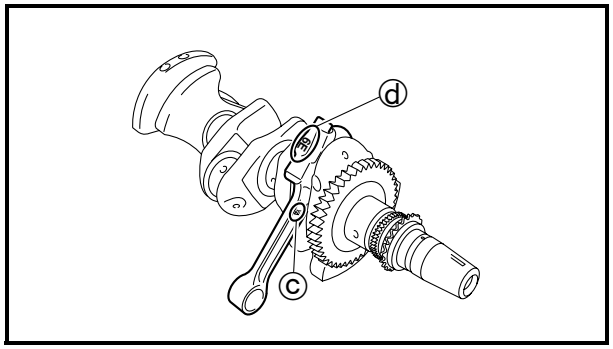
Piston pin to piston pin bore clearance:
0.004 ~ 0.024 mm
(0.0002 ~ 0.0009 in)
<Limit>: 0.074 mm (0.0029 in)

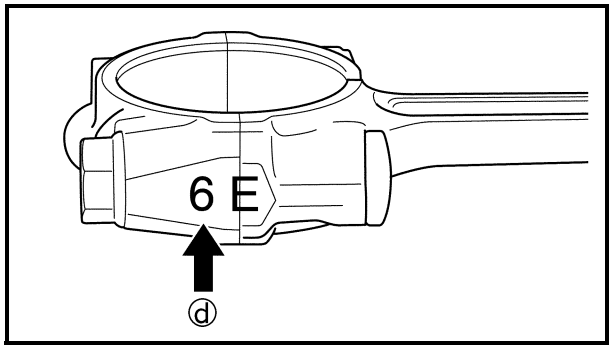
10. Measure:
    - Crankshaft-pin-to-big-end-bearing clearance
      Out of specification → Replace the big end bearings.

Crankshaft-pin-to-big-end-bearing clearance:
0.033 ~ 0.050 mm
(0.0013 ~ 0.0020 in)









Measurement steps:

CAUTION:

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

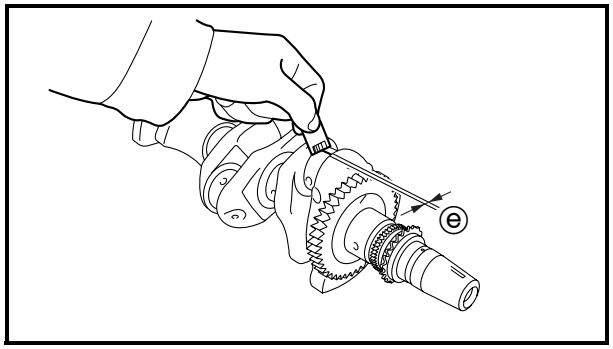
NOTE:

Align the projections ⓐ on the big end bearings with the notches ⓑ in the connecting rod and connecting rod cap.

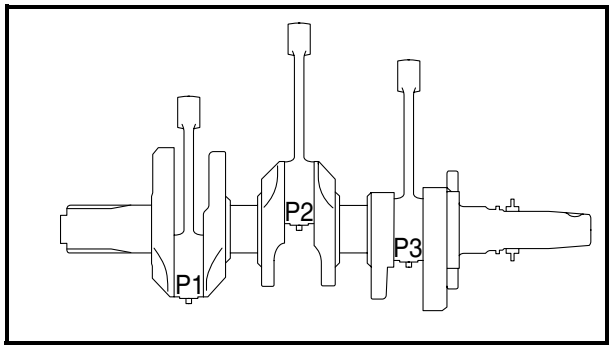
- Put a piece of Plastigauge® ① on the crankshaft pin.
- Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nut seats.
- Make sure that the "Y" mark ⓒ on the connecting rod faces towards the right side (AC magneto rotor side) of the crankshaft.
- Make sure that the characters ⓓ on both the connecting rod and connecting rod cap are aligned.



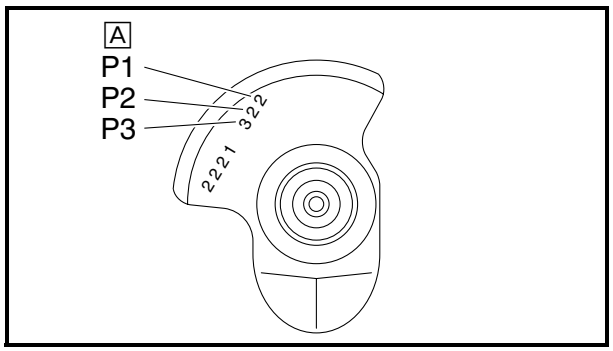
- Tighten the connecting rod nuts.
  Refer to "INSTALLATION" in "CONNECTING RODS AND PISTONS" on page 5-65.
- Remove the connecting rod and big end bearings.
- Measure the compressed Plastigauge® width ⓔ on the crankshaft pin.
  If the clearance is out of specification, select replacement big end bearings.



11. Select:
    - Big end bearings (P1 ~ P3)

NOTE:

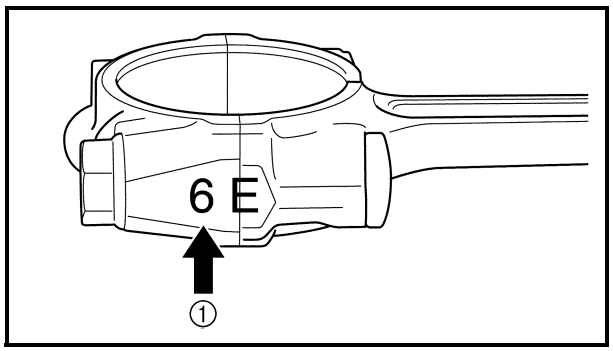
- The numbers Ⓐ stamped into the crankshaft web and the numbers ① on the connecting rods are used to determine the replacement big end bearing sizes.
- "P1" ~ "P3" refer to the bearings shown in the crankshaft illustration.



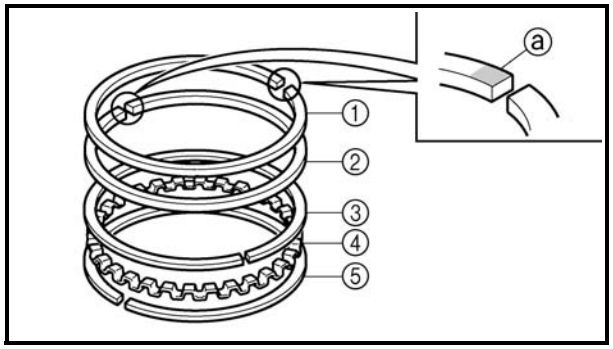
Selection of bearings:

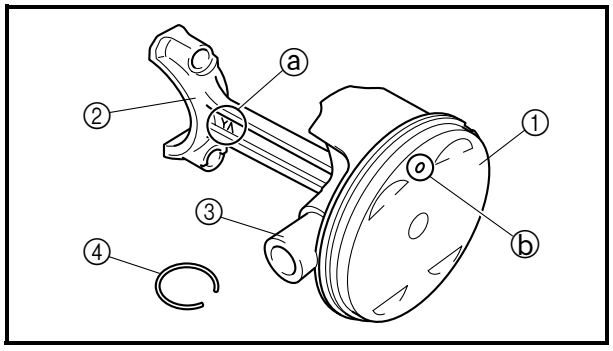
- For example, if the connecting rod "P1" and the crankshaft web "P1" numbers are "6" and "2" respectively, then the bearing size for "P1" is:

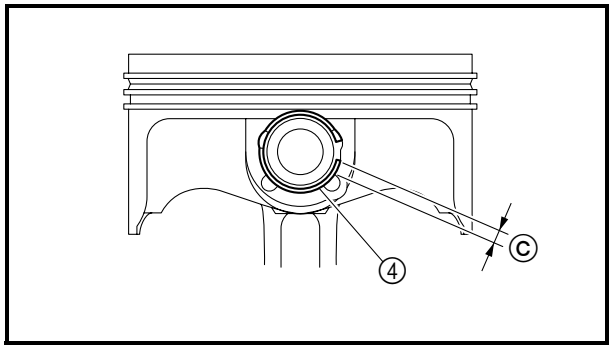
Bearing size for "P1":
"P1" (connecting rod) – "P1" (crankshaft web) – 1 = 6 – 2 – 1 = 3 (brown)

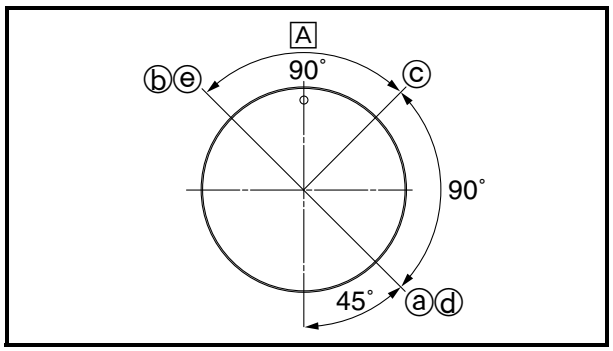


BIG END BEARING COLOR CODE	
0	white
1	blue
2	black
3	brown
4	green
5	yellow









INSTALLATION

1. Install:
   - Top ring ①
   - 2nd ring ②
   - Upper oil ring rail ③
   - Oil ring expander ④
   - Lower oil ring rail ⑤

NOTE:

Be sure to install the piston rings so that the manufacturer marks ⓐ face up.

2. Install:
   - Piston ①
     (onto the respective connecting rod ②)
   - Piston pin ③
   - Piston pin clips ④ New

NOTE:

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark ⓐ on the connecting rod faces left when the punch mark ⓑ on the piston is pointing up. Refer to the illustration.
- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) ⓒ or more from the cutout in the piston.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #3).

3. Offset:
   - Piston ring end gaps

ⓐ Top ring
ⓑ 2nd ring
ⓒ Upper oil ring rail
ⓓ Oil ring expander
ⓔ Lower oil ring rail
Ⓐ Exhaust side

4. Lubricate:
   - Piston
   - Piston rings
   - Cylinder
   (with the recommended lubricant)

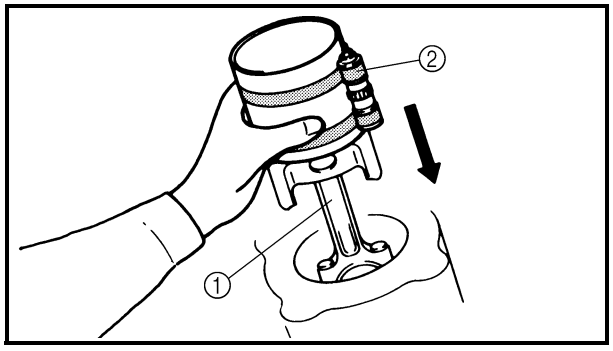
	Recommended lubricant: **Engine oil**

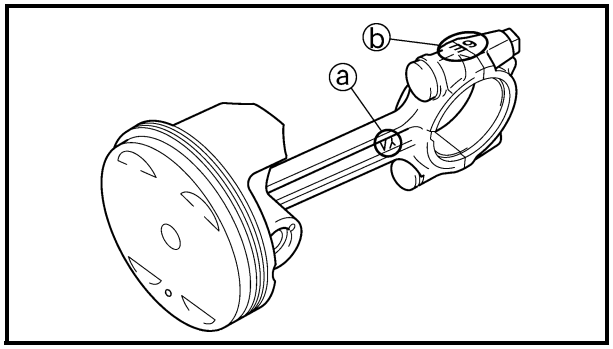
5. Lubricate:
   - Bolt threads
   - Nut seats
   (with the recommended lubricant)

	Recommended lubricant: **Molybdenum disulfide grease**

6. Lubricate:
   - Crankshaft pins
   - Big end bearings
   - Connecting rod inner surface
   (with the recommended lubricant)

	Recommended lubricant: **Engine oil**





7. Install:
   - Big end bearings
   - Connecting rod assembly ①
   (into the cylinder and onto the crankshaft pin).
   - Connecting rod cap
   (onto the connecting rod)

NOTE:

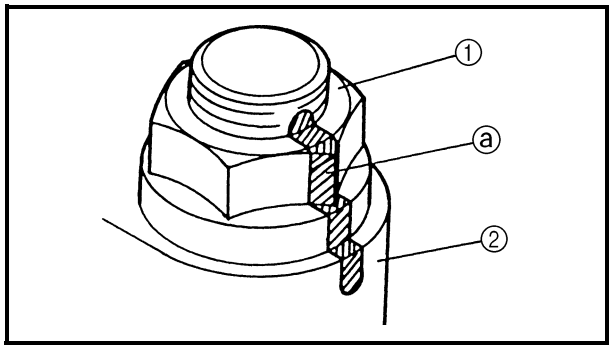
- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with piston ring compressor ②, install the connecting rod assembly into the cylinder with the other hand.
- Make sure that the "Y" marks ⓐ on the connecting rods face towards the right side (AC magneto rotor side) of the crankshaft.
- Make sure that the characters ⓑ on both the connecting rod and connecting rod cap are aligned.

	Piston ring compressor: **90890-05158, YM-08037**

8. Align:
   • Bolt heads
     (with the connecting rod caps)
9. Tighten:
   • Connecting rod nuts

⚠ WARNING

Replace the connecting rod bolts and nuts with new ones.



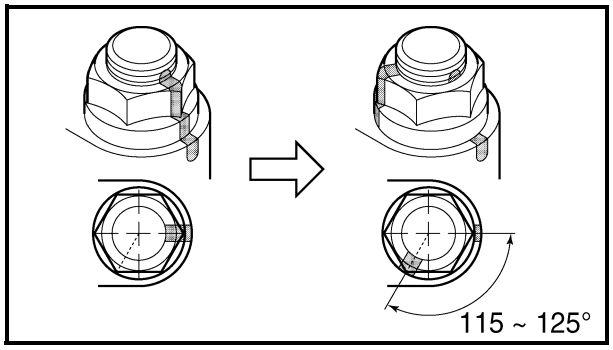
CAUTION:

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts and nuts.

- Clean the connecting rod bolts and nuts.
- Tighten the connecting rod nuts.

Connecting rod nut:
1st:
20 Nm (2.0 m · kg, 14 ft · lb)

- Put a mark ⓐ on the corner of the connecting rod nut ① and the connecting rod ②.
- Tighten the connecting rod nut further to reach the specified angle (115 ~ 125°).



Connecting rod nut:
Final:
Specified angle 115 ~ 125°

⚠ WARNING

When the nut is tightened more than the specified angle, do not loosen the nut and then retighten it.
Replace the bolt and nut with a new one and perform the procedure again.

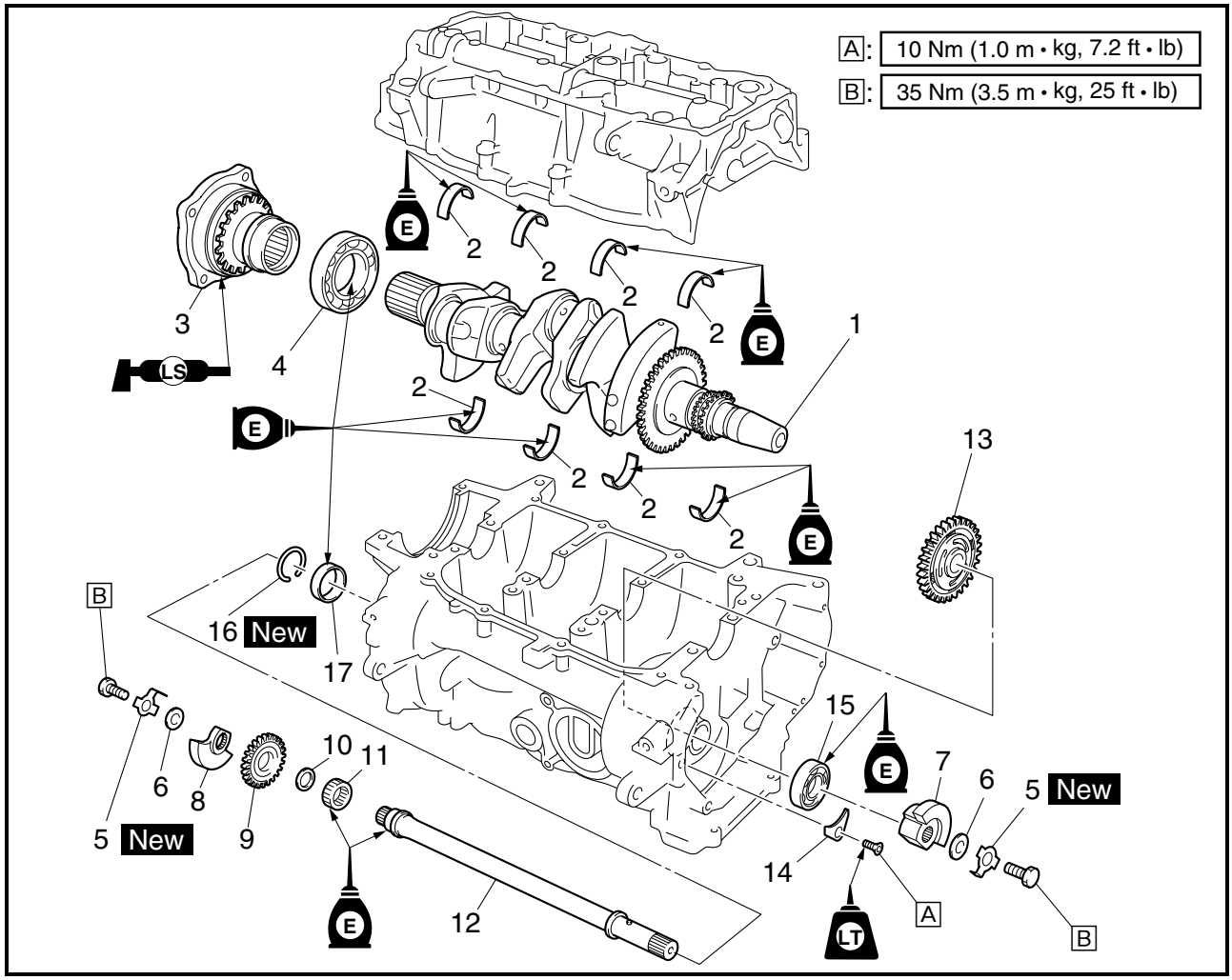
CAUTION:

- **Do not use a torque wrench to tighten the nut to the specified angle.**
- **Tighten the nut until it is at the specified angles.**

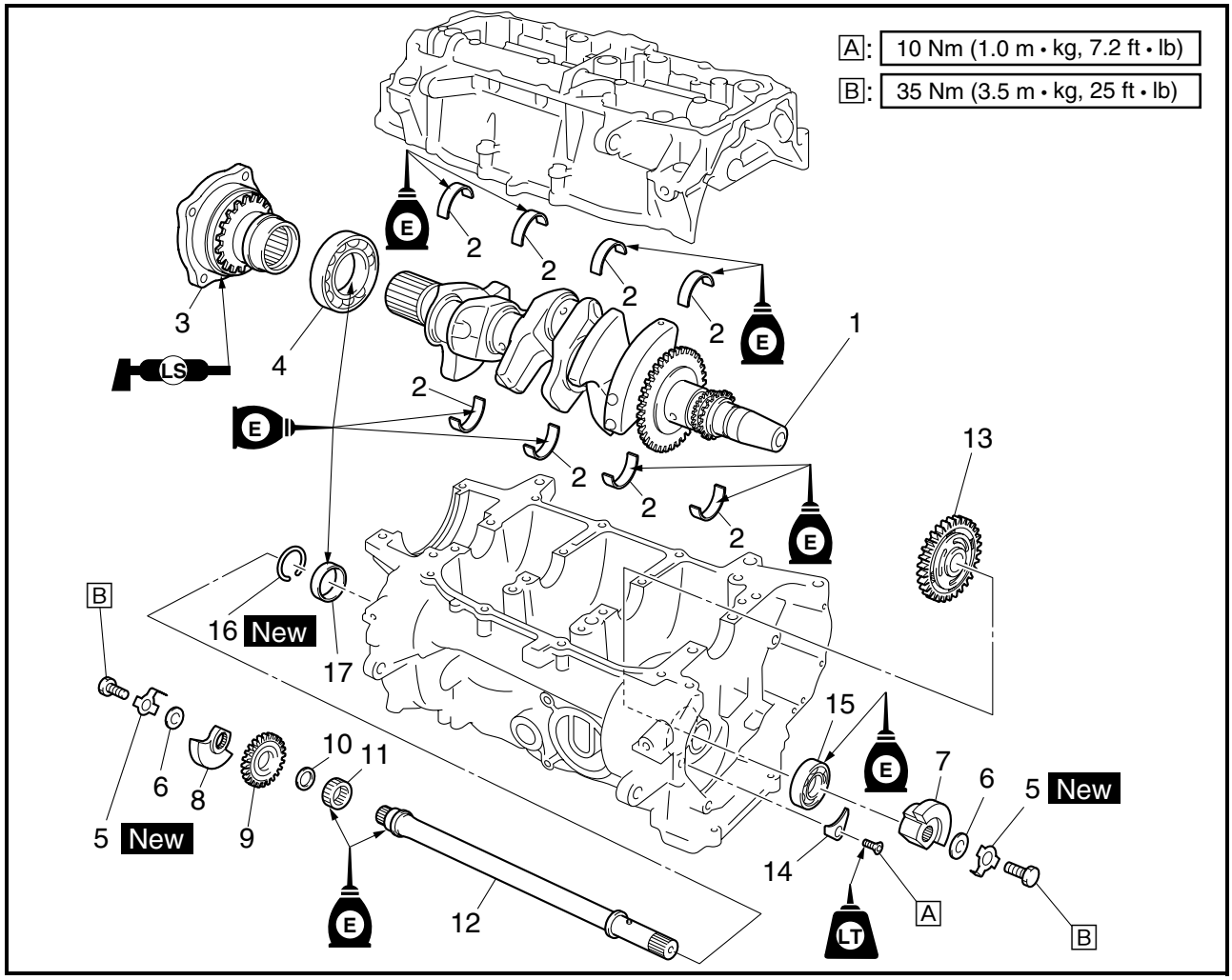
NOTE:

When using a hexagonal nut, note that the angle from one corner to another is 60°.

CRANKSHAFT AND BALANCER SHAFT



Order	Job name/Part name	Q'ty	Remarks
	Crankshaft and balancer shaft removal		Remove the parts in the order listed below.
	Crankcase		Separate. Refer to "CRANKCASE".
	Connecting rod caps		Refer to "CONNECTING RODS AND PISTONS".
1	Crankshaft	1	
2	Crankshaft journal bearing	8	
3	Primary sheave drive shaft assembly	1	
4	Bearing	1	
5	Lock washer	2	
6	Washer	2	
7	Right balancer weight	1	
8	Left balancer weight	1	
9	Water pump drive gear	1	
10	Spacer	1	
11	Bearing	1	



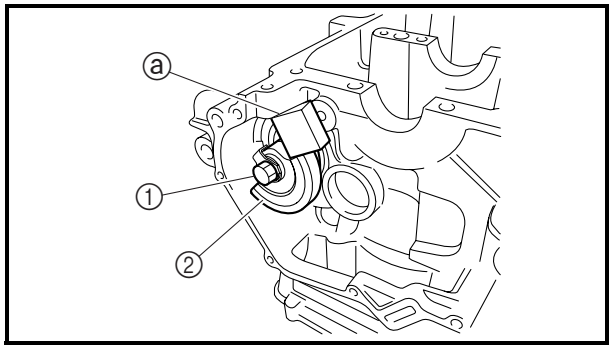
Order	Job name/Part name	Q'ty	Remarks
12	Balancer shaft	1	
13	Balancer driven gear	1	
14	Bearing retainer	1	
15	Bearing	1	
16	Circlip	1	
17	Bearing	1	
			For installation, reverse the removal procedure.

REMOVE

1. Remove:
   - Crankshaft journal lower bearings (from the lower crankcase)
   - Crankshaft journal upper bearings (from the upper crankcase)

NOTE:

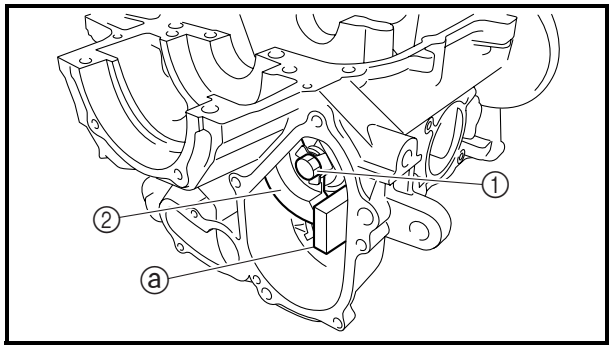
Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.



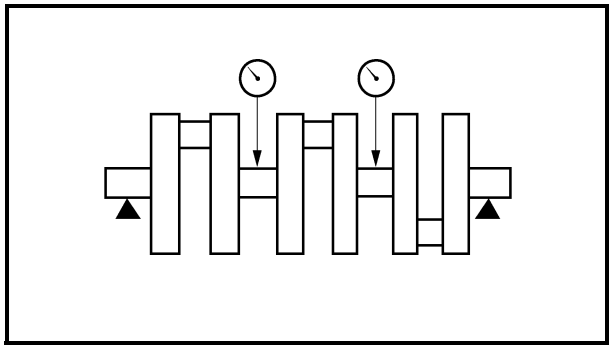
2. Straighten the lock washer tab.
3. Loosen:
   - Balance weight bolts ①

NOTE:

Place a piece of wood ⓐ between the balancer weight ② and crankcase.



4. Remove:
   - Right balancer weight
   - Left balancer weight



INSPECTION

1. Measure:
   - Crankshaft runout
     Use the V-blocks and a dial gauge.
     Out of specification → Replace the crankshaft.

Dial gauge:
90890-03097
Dial indicator gauge:
YU-A8428

Crankshaft runout:
0.03 mm (0.0012 in)

2. Inspect:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
3. Inspect:
   - Bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger.
     Rough movement → Replace.
4. Inspect:
   - Balancer drive gear
   - Balancer driven gear
     Damage/wear → Replace the crankshaft assembly and balancer driven gear as a set.
     Excessive noise during operation → Replace the crankshaft assembly and balancer driven gear as a set.
5. Inspect:
   - Primary sheave drive shaft assembly
     Damage → Replace.
6. Measure:
   - Crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

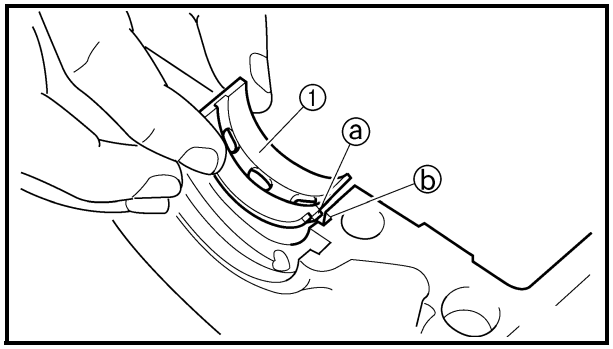
Crankshaft-journal-to-crankshaft-journal-bearing clearance:
0.027 ~ 0.045 mm
(0.0011 ~ 0.0018 in)

Measurement steps:

CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

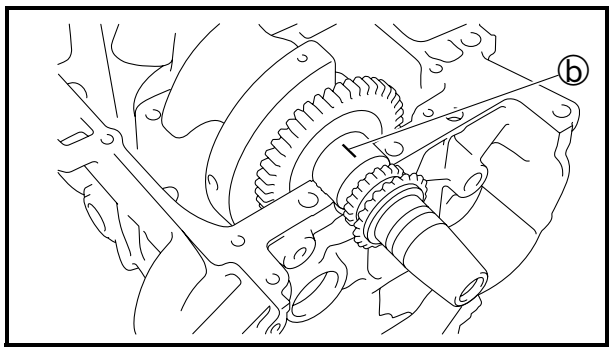
- Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- Place the upper crankcase upside down on a bench.



- Install the crankshaft journal upper bearings ① and the crankshaft into the upper crankcase.

NOTE:

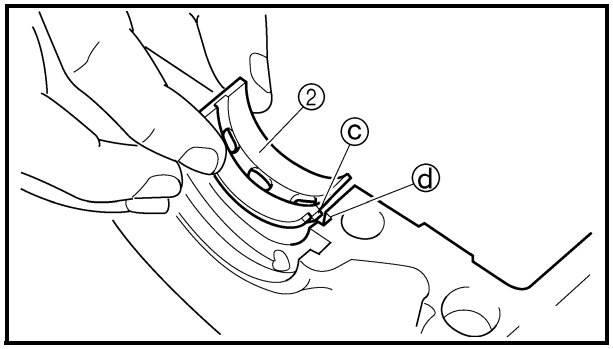
Align the projections ⓐ of the crankshaft journal upper bearings with the notches ⓑ in the crankcase.



- Put a piece of Plastigauge® ⓑ on each crankshaft journal.

NOTE:

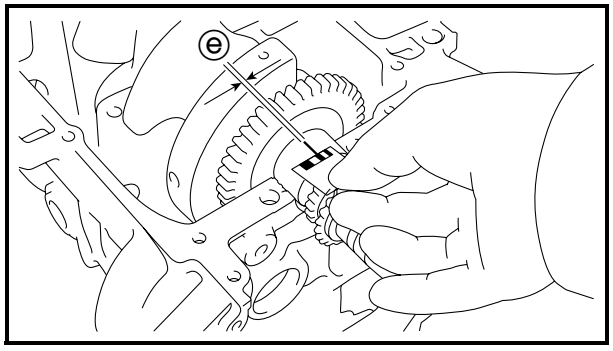
Do not put the Plastigauge® over the oil hole in the crankshaft journal.

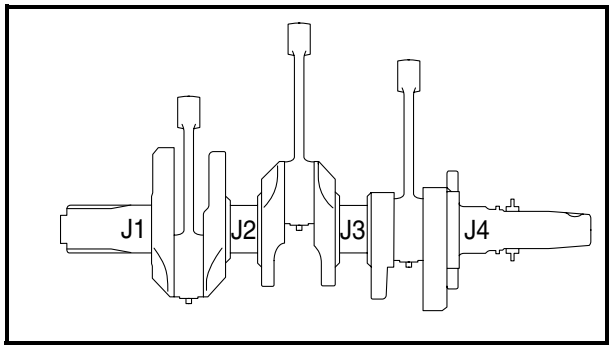


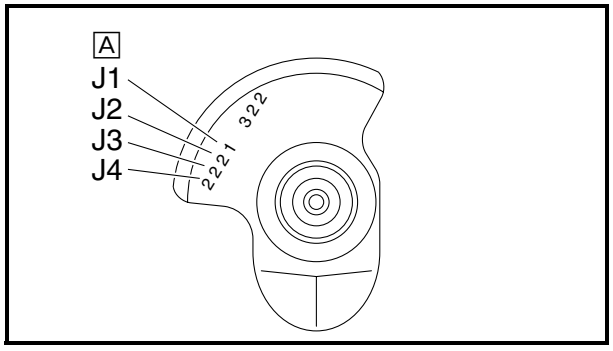
- Install the crankshaft journal lower bearings ② into the lower crankcase and assemble the crankcase halves.

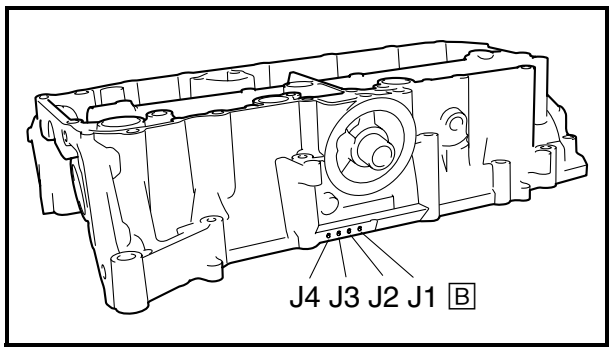
NOTE:

- Align the projections ⓒ of the crankshaft journal lower bearings with the notches ⓓ in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.









- Tighten the bolts in the order of the embossed numbers on the crankcase.
  Refer to "INSTALLATION" in "CRANKCASE" on page 5-54.
- Remove the lower crankcase and the crankshaft journal lower bearings.
- Measure the compressed Plastigauge® width ⓔ on each crankshaft journal.
  If the clearance is out of specification, select replacement crankshaft journal bearings.

7. Select:
   - Crankshaft journal bearings (J1 ~ J4)

NOTE:

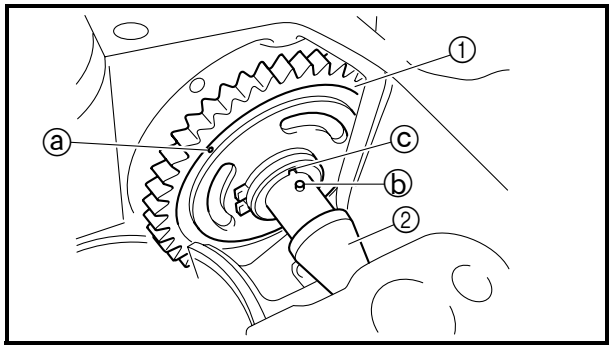
- The numbers A stamped into the crankshaft web and the numbers B stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- "J1 ~ J4" refer to the bearings shown in the crankshaft web and lower crankcase illustration.
- If "J1 ~ J4" are the same, use the same size for all of the bearings.

Selection of bearings:

For example, if the crankcase "J1" and crankshaft web "J1" numbers are "6" and "1" respectively, then the bearing size for "J1" is:

Bearing size for J1:
J1 (crankcase) – J1 (crankshaft web) + 2
= 6 – 1 + 2 = 7

CRANKSHAFT JOURNAL BEARING COLOR CODE	
2	**black**
3	**brown**
4	**green**
5	**yellow**
6	**pink**
7	**red**
8	**white**

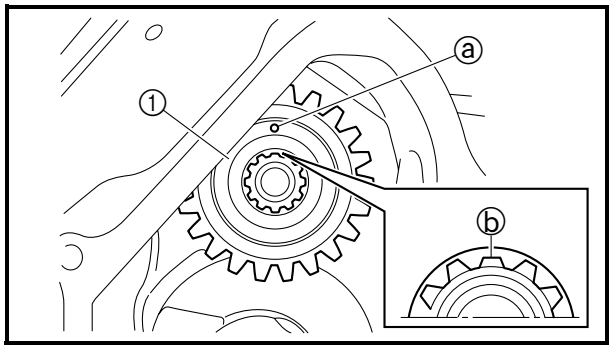


INSTALLATION

1. Install:
   - Balancer driven gear ①
   - Balancer shaft ②

NOTE:

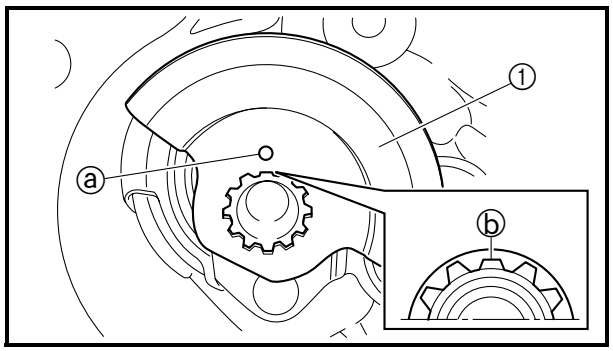
- Face the punch mark ⓐ on the balancer driven gear inward.
- Align the projection ⓑ on the balancer shaft with the slot ⓒ in the balancer driven gear.



2. Install:
   - Water pump drive gear ①

NOTE:

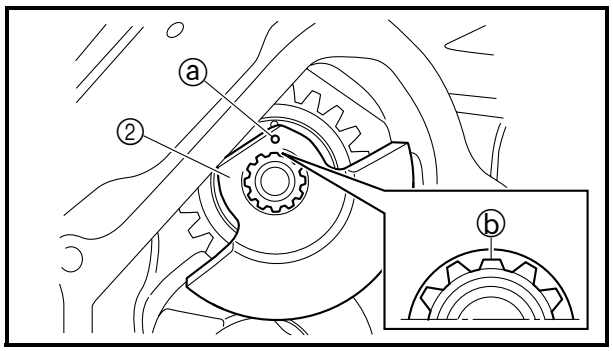
Align the punch mark ⓐ on the water pump gear with the shorter spline ⓑ on the balancer shaft end.

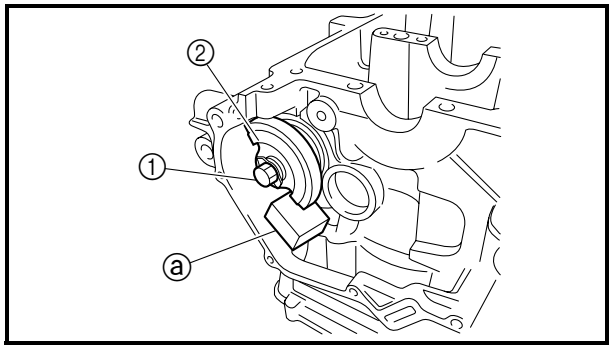


3. Install:
   - Right balancer weight ①
   - Left balancer weight ②
   - Washers
   - Lock washers New
   - Balancer weight bolts

NOTE:

Align the punch mark ⓐ on the balancer weight with the shorter spline ⓑ on the balancer shaft end.



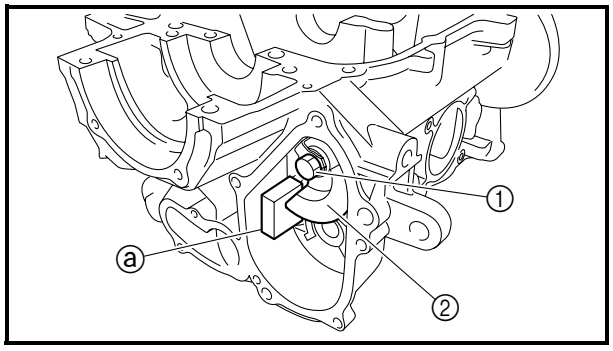


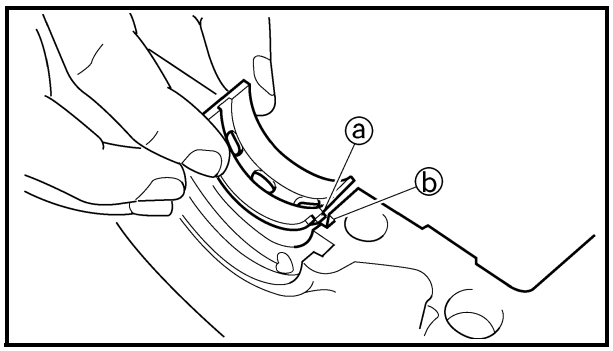
4. Tighten:
   - Balancer weight bolts ①

NOTE:
Place a wood ⓐ between the balancer weight ② and crankcase.

	Balancer weight bolt: **35 Nm (3.5 m · kg, 25 ft · lb)**

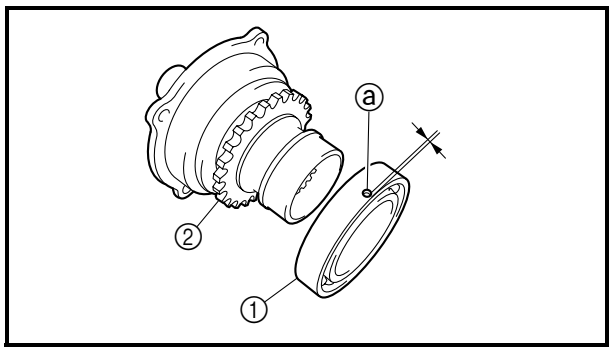
5. Bend the lock washer tab.





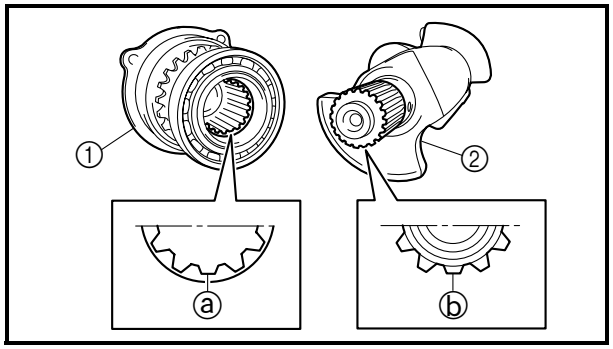
6. Install:
   - Crankshaft journal upper bearings (into the upper crankcase)
   - Crankshaft journal lower bearings (into the lower crankcase)

NOTE:
- Align the projections ⓐ on the crankshaft journal bearings with the notches ⓑ in the crankcase.
- Be sure to install each crankshaft journal bearing in its original place.



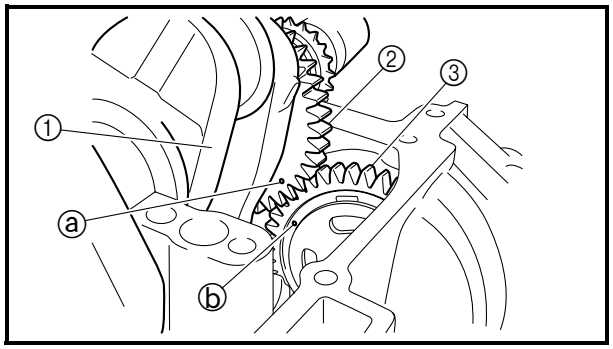
7. Install:
   - Bearing ①
     (to the primary sheave drive shaft assembly ②)

NOTE:
Be sure to install the bearing so that its hole ⓐ is near the bearing edge that is facing away from the primary sheave drive shaft assembly.



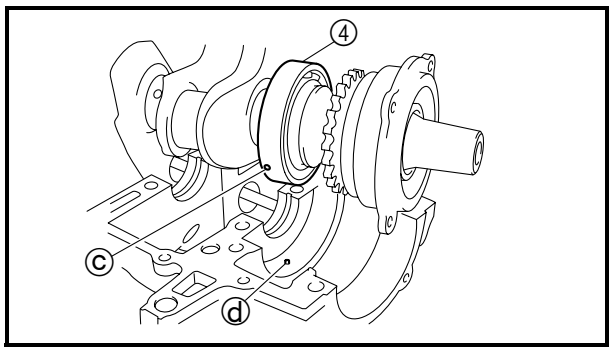
8. Install:
   - Primary sheave drive shaft assembly ①
     (to the crankshaft ②)

NOTE:
Align the shallow groove ⓐ in the primary drive shaft assembly with the low spline ⓑ of the crankshaft.



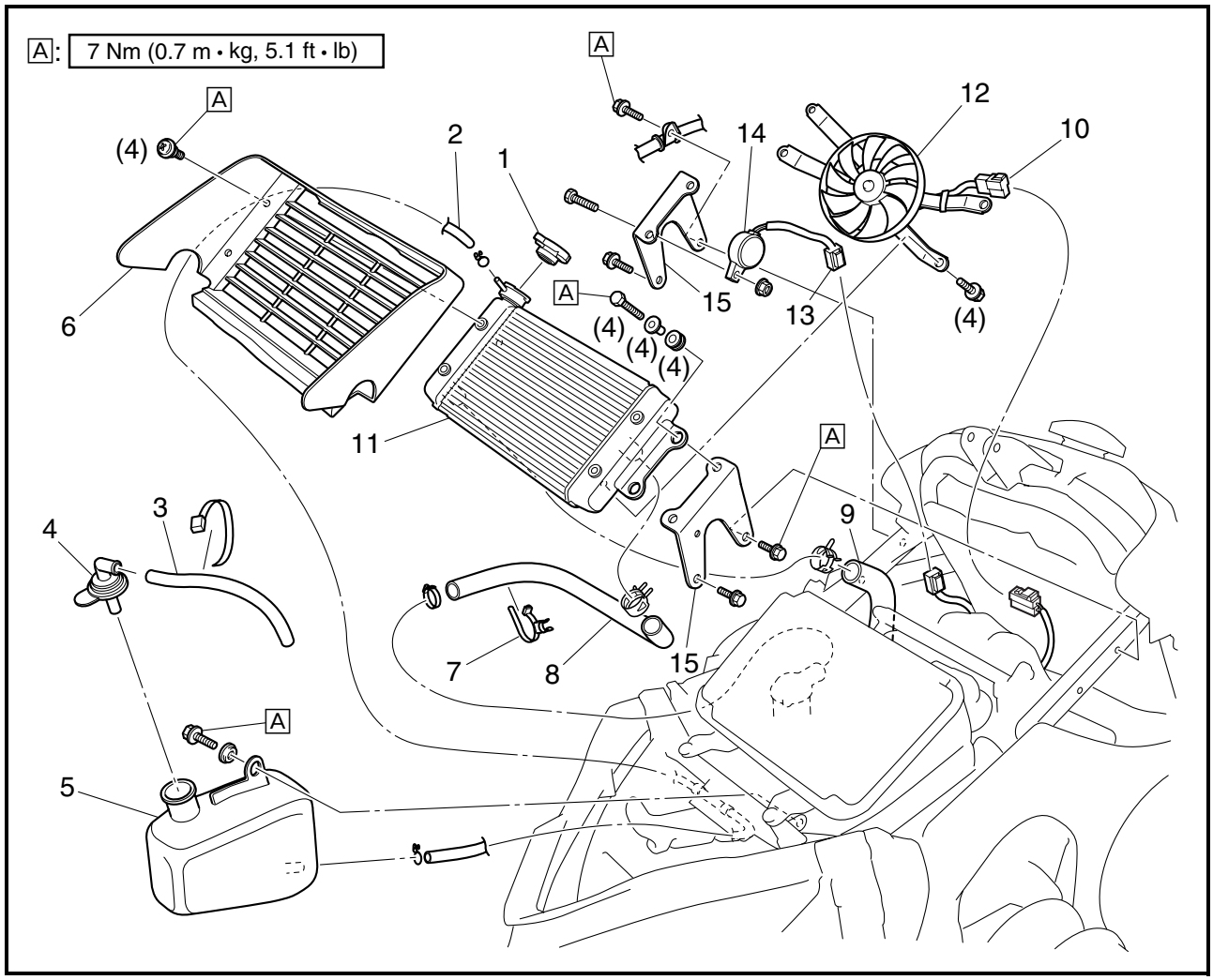
9. Install:
   - Crankshaft ①
     (with primary sheave drive shaft assembly)

NOTE:
- Align the punch mark ⓐ of the balancer drive gear ② on the crankshaft with the punch mark ⓑ of the balancer driven gear ③.
- Align the hole ⓒ in the bearing ④ with the projection ⓓ on the upper crankcase.

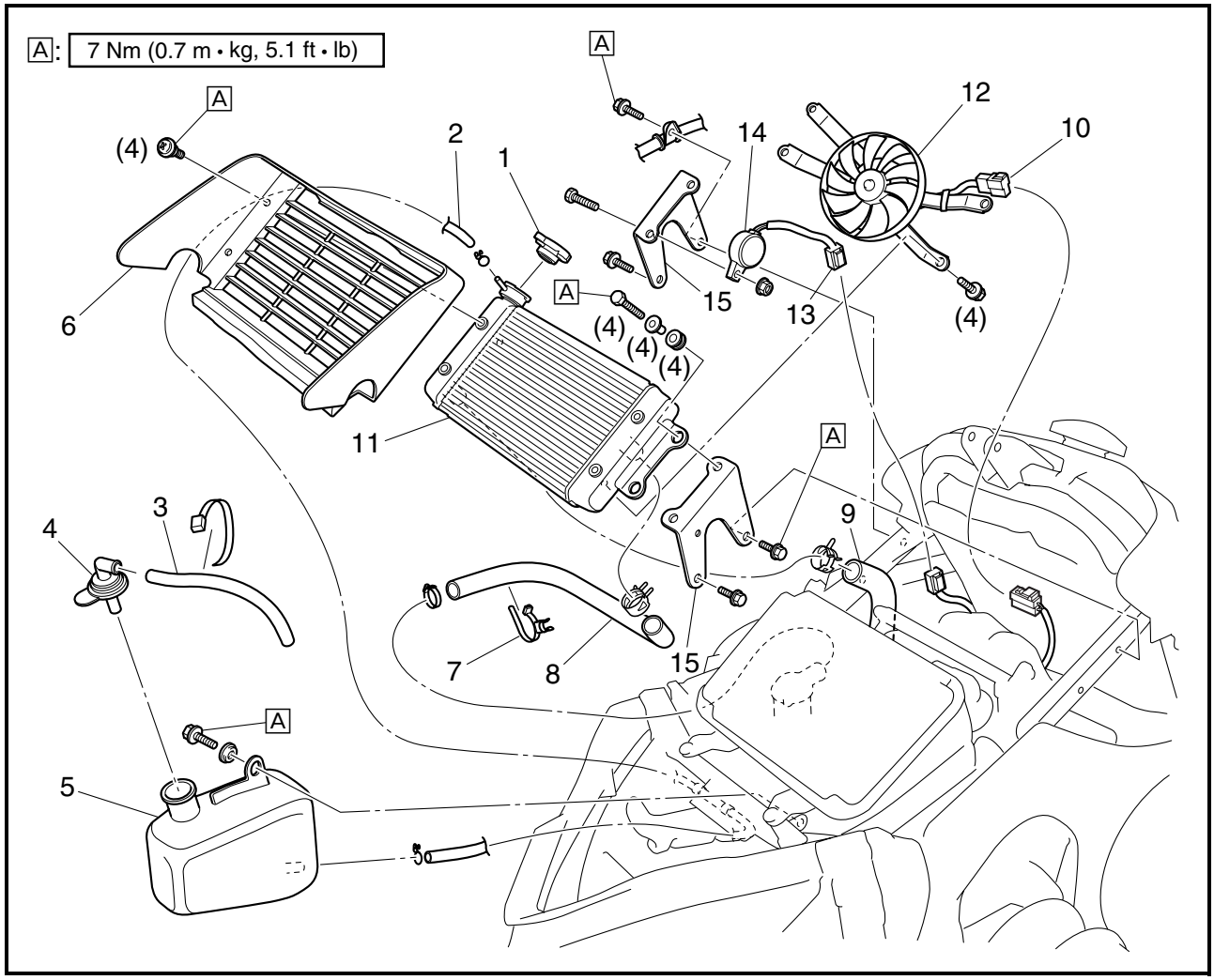


COOLING SYSTEM

RADIATOR



Order	Job name/Part name	Q'ty	Remarks
	Radiator removal		Remove the parts in the order listed below.
	Coolant		Drain. Refer to "COOLING SYSTEM" in CHAPTER 2.
	Steering column		Refer to "STEERING" in CHAPTER 3.
1	Radiator cap	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir breather hose	1	
4	Coolant reservoir cap	1	
5	Coolant reservoir	1	
6	Radiator cover	1	
7	Plastic band	1	
8	Radiator inlet hose	1	
9	Radiator outlet hose	1	Disconnect.
10	Radiator fan motor coupler	1	Disconnect.

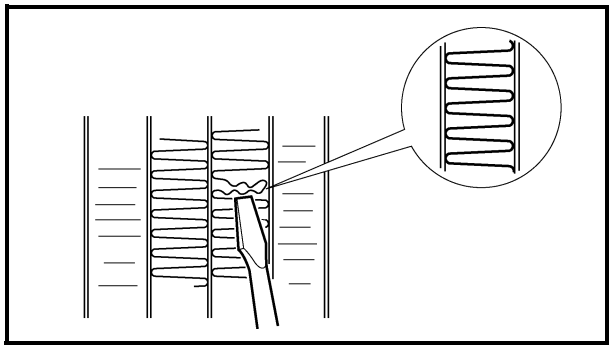


Order	Job name/Part name	Q'ty	Remarks
11	Radiator	1	
12	Radiator fan motor	1	
13	DC back buzzer coupler	1	Disconnect. Reverse model only
14	DC back buzzer	1	Reverse model only
15	Radiator stay	2	
			For installation, reverse the removal procedure.

INSPECTION

1. Inspect:
   - Radiator inlet hose
   - Radiator outlet hose
   - Coolant reservoir hose

   Cracks/damage → Replace.



2. Check:
   - Radiator fins

   Obstruction → Clean.

   Apply compressed air to the rear of the radiator.

   Damage → Repair or replace.

NOTE:

Straighten any flattened fins with a thin, flat-head screwdriver.

3. Measure:
   - Radiator cap opening pressure

   Cap opens with a pressure below the specified pressure → Replace.

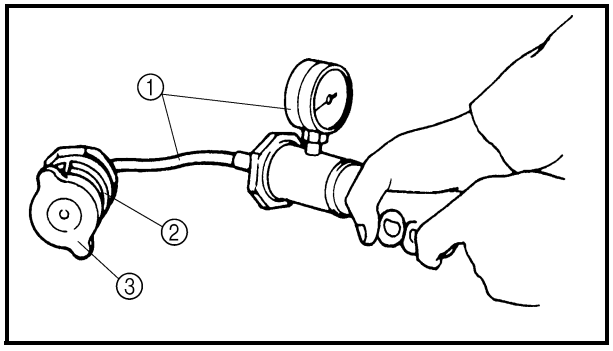
Radiator cap opening pressure:
107.9 ~ 137.3 kPa
(1.08 ~ 1.37 kg/cm^2, 15.3 ~ 19.5 psi)

4. Check:
   - Radiator fan

   Damage → Replace.

   Malfunction → Check and repair.

   Refer to "COOLING SYSTEM" in CHAPTER 8.

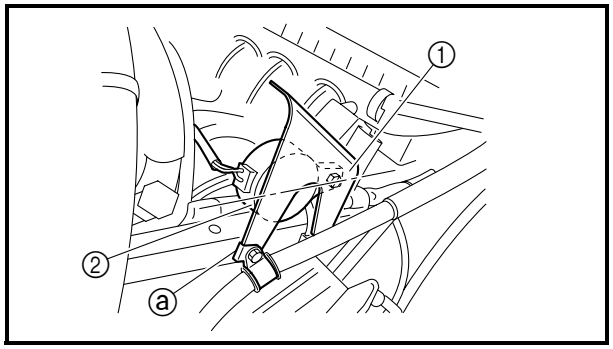


Measurement steps:

- Attach the radiator cap tester ① and radiator cap tester adapter ② to the radiator cap ③.

Radiator cap tester:
90890-01325
Radiator pressure tester:
YU-24460-01
Radiator cap tester adapter:
90890-01352
Radiator pressure tester adapter:
YU-33984

- Apply the specified pressure for 10 seconds and make sure there is no pressure drop.



INSTALLATION

1. Install:
   - Radiator stay ①
   - DC back buzzer ② (For reverse model)

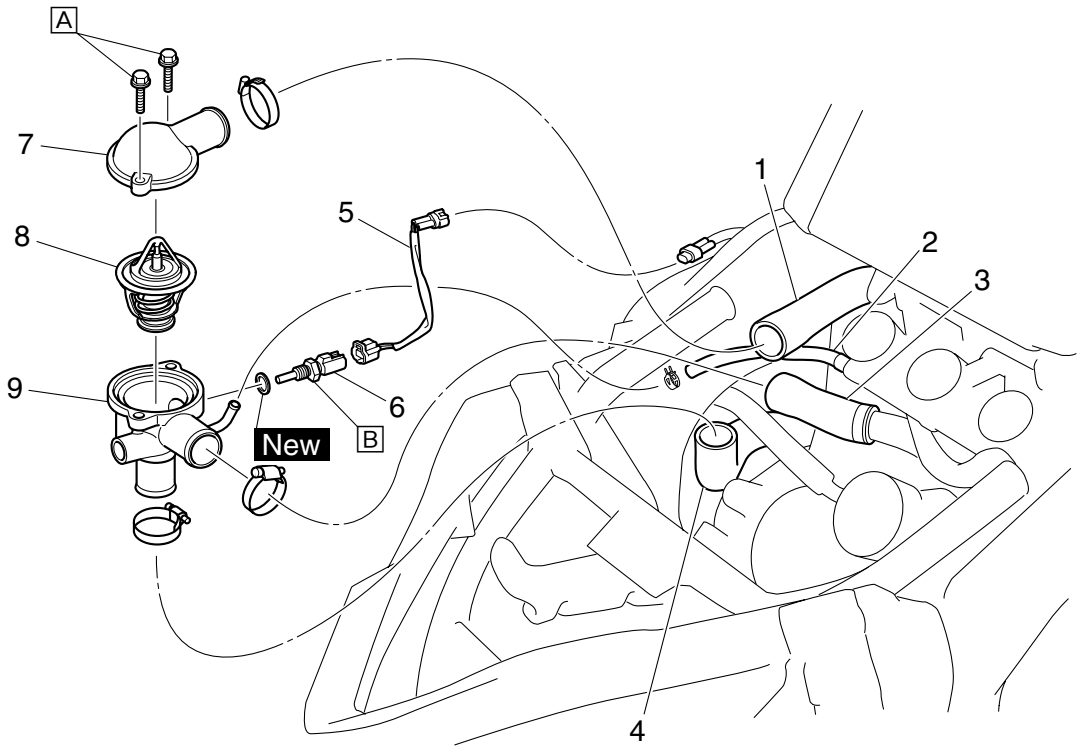
Radiator stay bolt:
7 Nm (0.7 m · kg, 5.1 ft · lb)

NOTE:

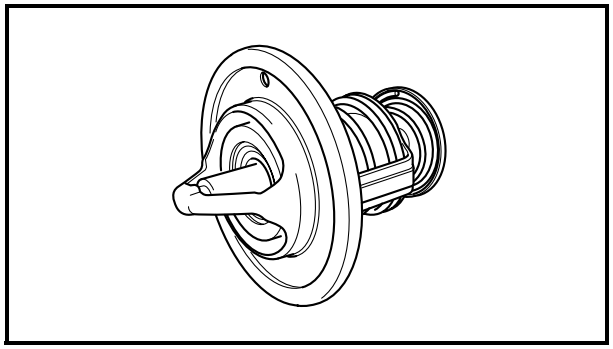
- Hook the hooked portion ⓐ of the brake hose holder onto the radiator stay, and then fasten the holder with the bolt.
- Be sure to install the DC back buzzer so that a line drawn through the center of the buzzer is parallel to the rear frame cross member as shown in the illustration. (For reverse model)

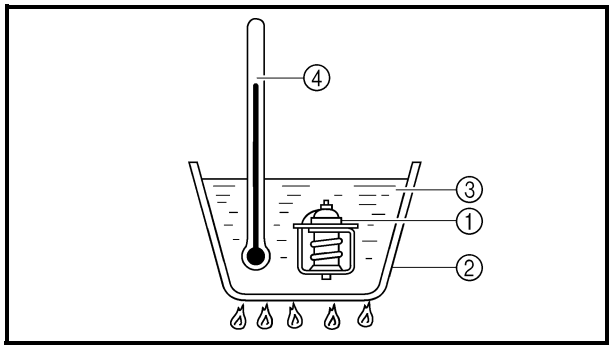
THERMOSTAT

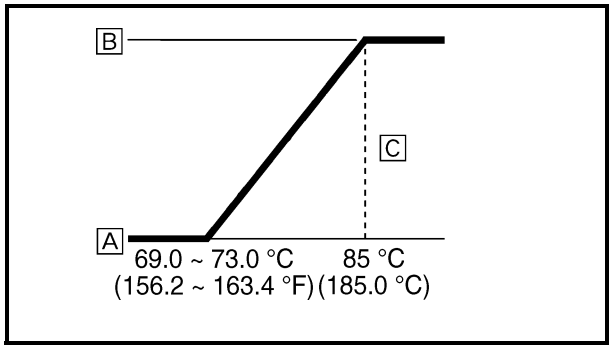
A: 10 Nm (1.0 m • kg, 7.2 ft • lb)
B: 23 Nm (2.3 m • kg, 17 ft • lb)

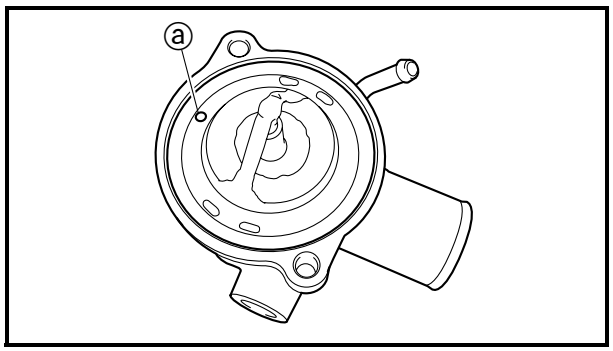


Order	Job name/Part name	Q'ty	Remarks
	Thermostat removal		Remove the parts in the order listed below.
	Coolant		Drain. Refer to "COOLING SYSTEM" in CHAPTER 2.
	Air filter case		Refer to "AIR FILTER CASE" in CHAPTER 7.
1	Radiator inlet hose	1	Disconnect.
2	Throttle body heater inlet hose	1	Disconnect.
3	Thermostat inlet hose	1	Disconnect.
4	Thermostat outlet hose	1	Disconnect.
5	Coolant temperature sensor sub-lead	1	
6	Coolant temperature sensor	1	
7	Thermostat housing cover	1	
8	Thermostat	1	
9	Thermostat housing	1	
			For installation, reverse the removal procedure.









INSPECTION

1. Inspect:
   - Thermostat
     Does not open at 69.0 ~ 73.0 °C (156.2 ~ 163.4 °F) → Replace.

Inspection steps:

- Suspend the thermostat ① in a container ② filled with water.
- Slowly heat the water ③.
- Place a thermometer ④ in the water.
- While stirring the water, observe the thermostat and thermometer's indicated temperature.

A Fully closed
B Fully open
C More than 8 mm (0.31 in)

NOTE:

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Inspect:
   - Thermostat housing cover
   - Thermostat housing
   - Thermostat inlet hose
   - Thermostat outlet hose
   - Throttle body heater inlet hose
     Cracks/damage → Replace.

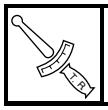
INSTALLATION

1. Install:
   - Thermostat
     (into the thermostat housing)

NOTE:

Install the thermostat with its breather hole ⓐ as shown in the illustration.

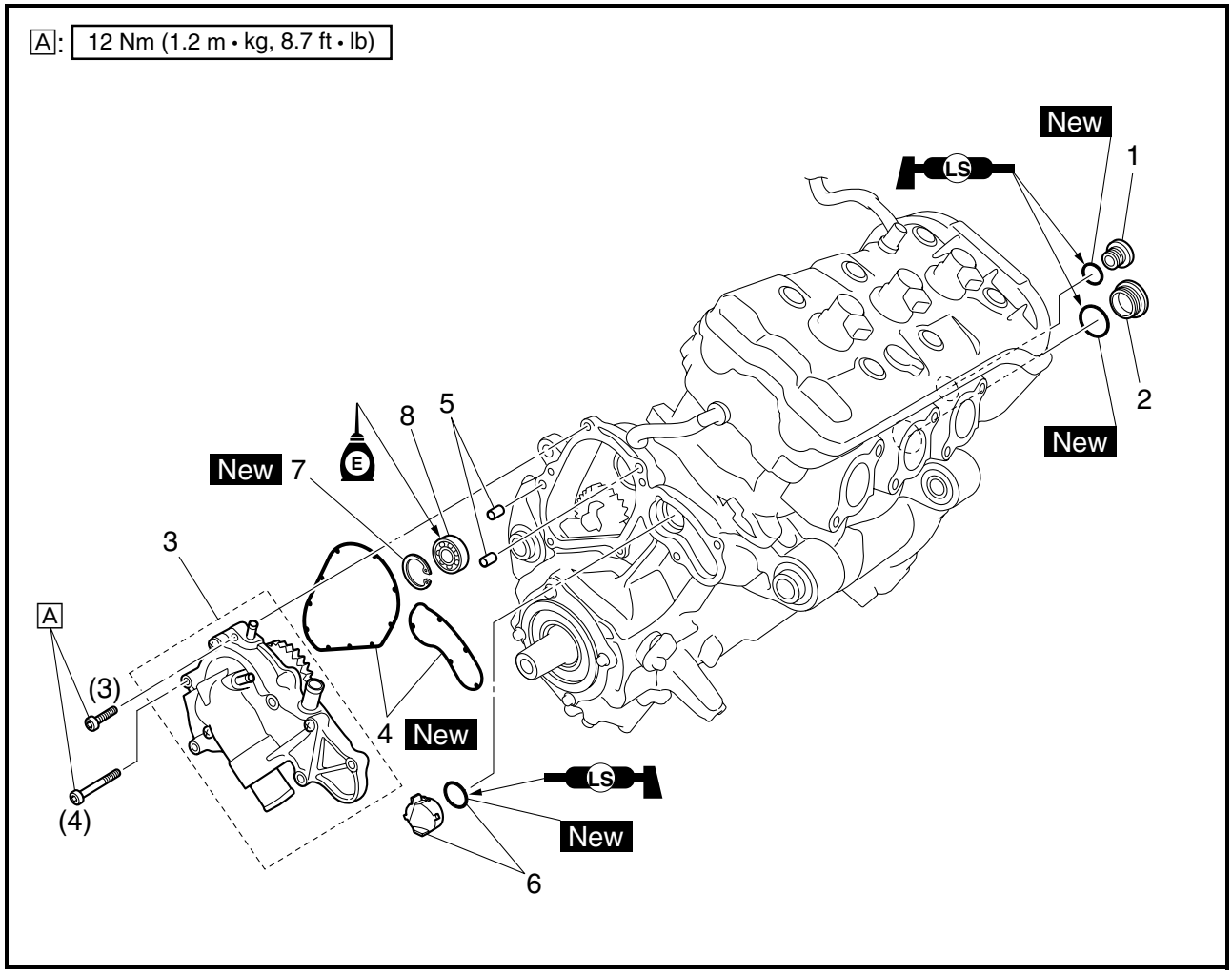
2. Install:
   - Coolant temperature sensor
     (to the thermostat housing)

	**Coolant temperature sensor: 23 Nm (2.3 m · kg, 17 ft · lb)**

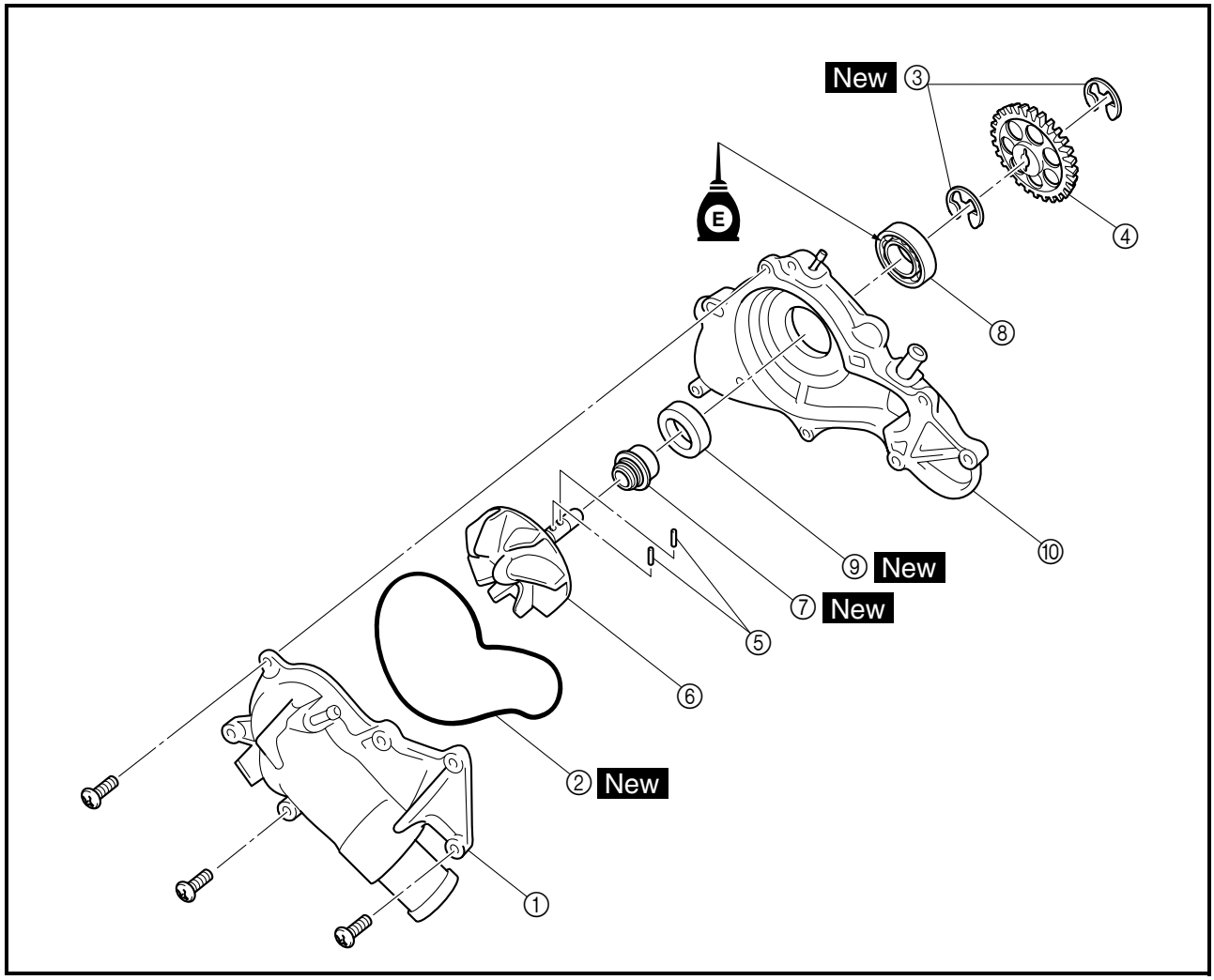
CAUTION:

Use extreme care when handling the coolant temperature sensor. Replace any part that was dropped or subjected to a strong impact.

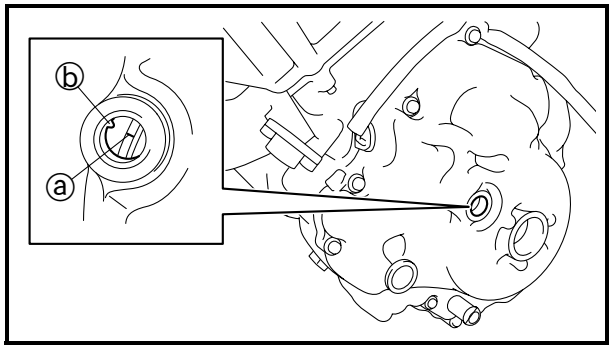
WATER PUMP



Order	Job name/Part name	Q'ty	Remarks
	Water pump removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE ASSEMBLY" in CHAPTER 5.
1	Timing mark accessing screw	1	
2	Crankshaft end cover	1	
3	Water pump assembly	1	
4	Gasket	2	
5	Dowel pin	2	
6	Plug/O-ring	1/1	
7	Circlip	1	
8	Bearing	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	Water pump disassembly		Remove the parts in the order listed below.
①	Water pump housing cover	1	
②	Gasket	1	
③	Circlip	2	
④	Impeller shaft gear	1	
⑤	Pin	2	
⑥	Impeller shaft assembly	1	
⑦	Water pump seal	1	
⑧	Bearing	1	
⑨	Oil seal	1	
⑩	Water pump housing	1	
			For assembly, reverse the disassembly procedure.



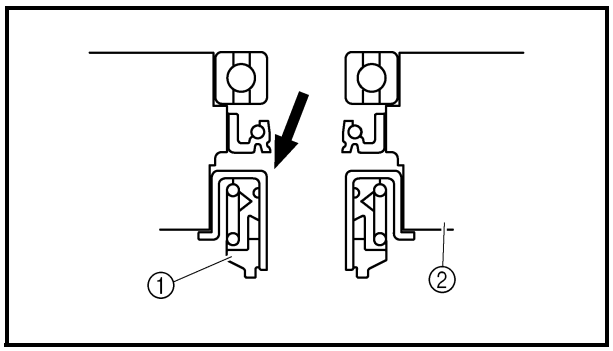
REMOVAL

1. Remove:
   - Timing mark accessing screw
   - Crankshaft end cover
2. Align:
   - "I" mark ⓐ on the AC magneto rotor (with the stationary pointer ⓑ on the AC magneto cover)

NOTE:

Turn the crankshaft clockwise.

3. Remove:
   - Water pump assembly

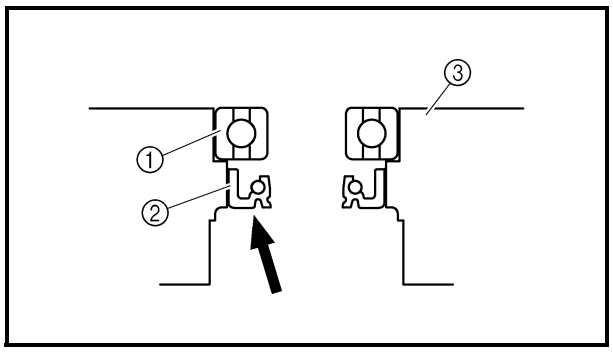


DISASSEMBLY

1. Remove:
   - Impeller
   - Water pump seal ①

NOTE:

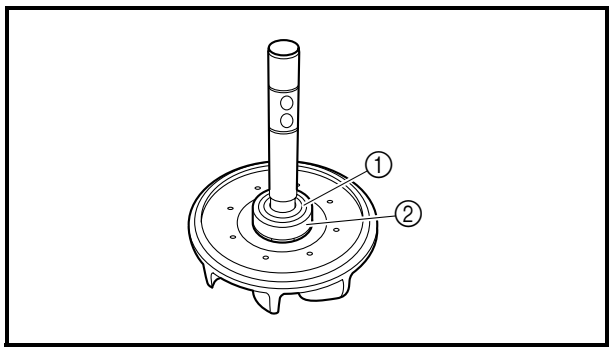
Remove the water pump seal from the inside of the water pump housing ②.



2. Remove:
   - Bearing ①
   - Oil seal ②

NOTE:

Remove the bearing and oil seal from the inside of the water pump housing ③.



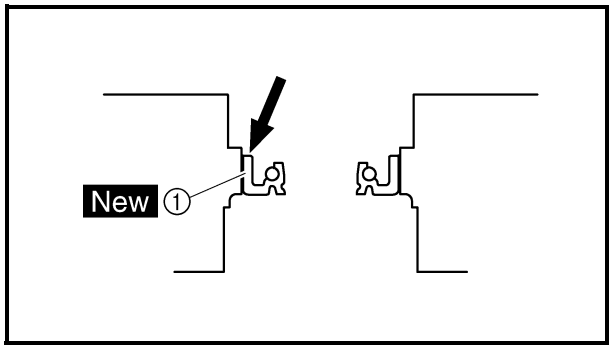
3. Remove:
   - Rubber damper holder ①
   - Rubber damper ②
     (from the impeller with a thin flat-head screwdriver)

NOTE:

Do not scratch the impeller shaft.

INSPECTION

1. Inspect:
   - Water pump housing cover
   - Water pump housing
   - Impeller shaft
     Cracks/damage/wear → Replace.
2. Inspect:
   - Bearing
     Rough movement → Replace.



ASSEMBLY

1. Install:
   - Oil seal ① New
     (to the water pump housing)

NOTE:

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.

2. Install:
   - Bearing

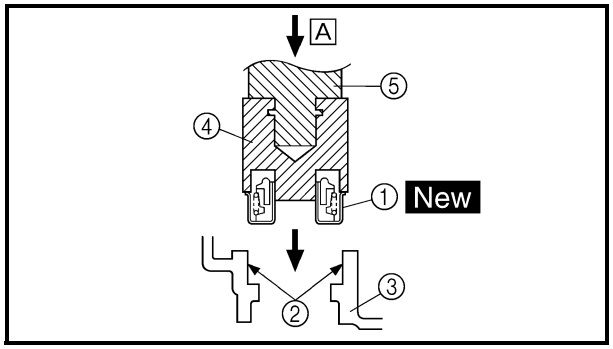
NOTE:

Install the bearing with a socket that matches its outside diameter.

3. Install:
   - Water pump seal ① New

CAUTION:

Never apply oil or grease onto the water pump seal surface.

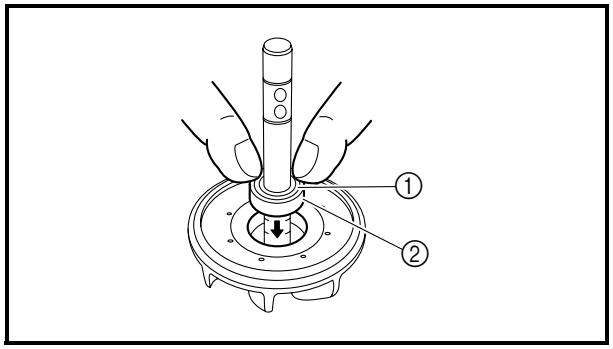


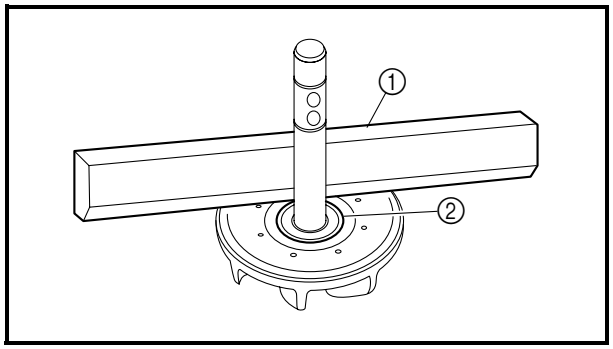
NOTE:

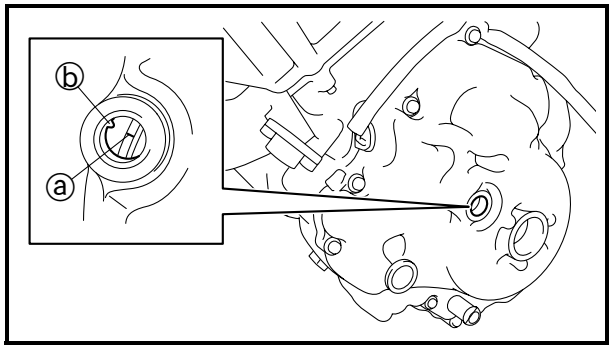
- Install the water pump seal ① with the mechanical seal installer ④ and middle driven shaft bearing driver ⑤.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond No.1215®) ② to the water pump housing ③.

Mechanical seal installer:
90890-04145
Middle driven shaft bearing driver:
90890-04058
Bearing driver 40 mm:
YM-04058
Yamaha bond No. 1215:
90890-85505
(Three Bond No.1215®)

A Push down







4. Install:
   - Rubber damper holder ①
   - Rubber damper ②

NOTE:
Before installing the rubber damper, apply tap water or coolant onto its outer surface.

5. Measure:
   - Impeller shaft tilt
     Out of specification → Repeat steps (4) and (5).

CAUTION:
Make sure the rubber damper and rubber damper holder are flush with the impeller.

Max. impeller shaft tilt:
0.15 mm (0.0059 in)

① Straightedge
② Impeller

INSTALLATION

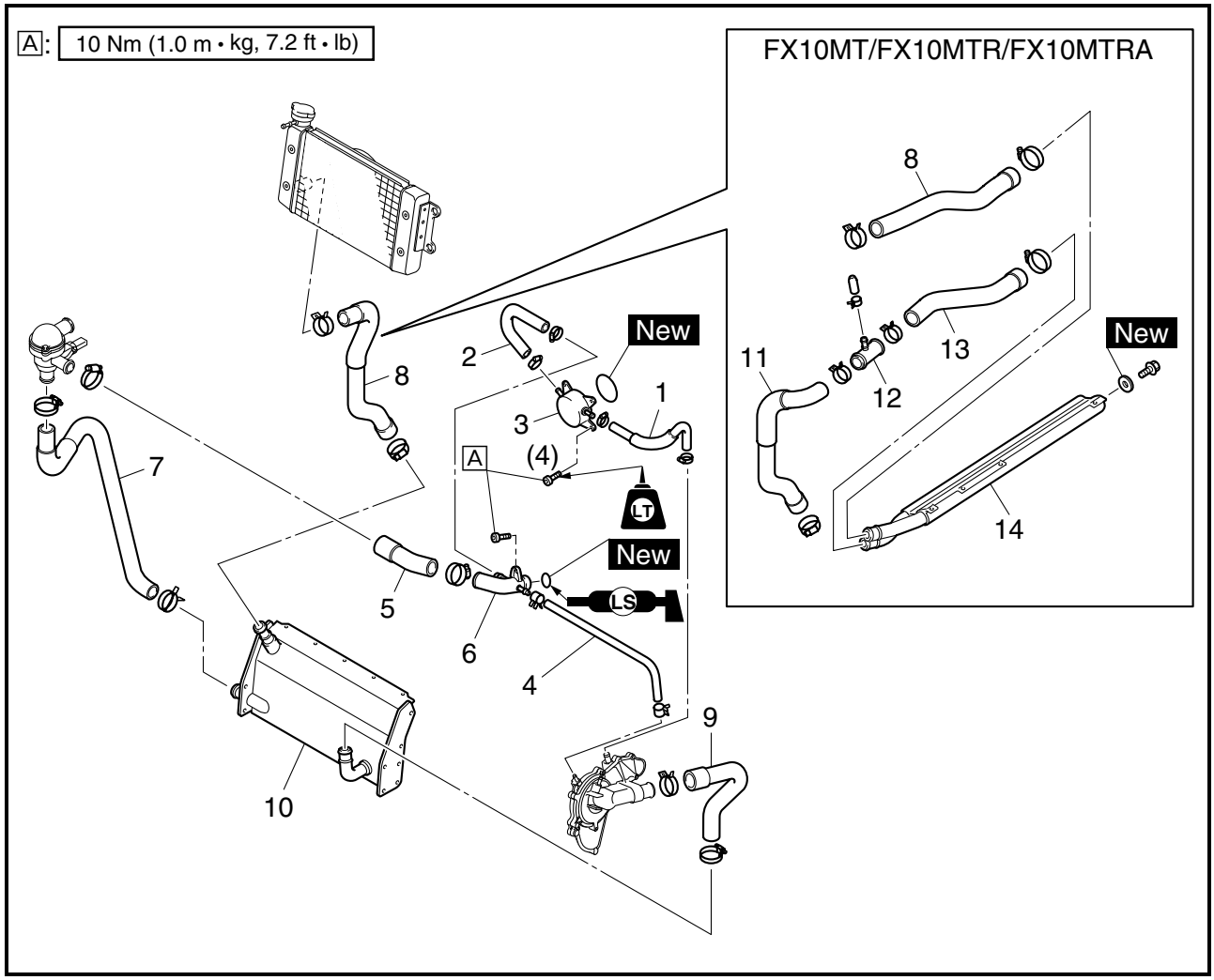
1. Align:
   - "I" mark ⓐ on the AC magneto rotor (with the stationary pointer ⓑ on the AC magneto cover)

NOTE:
Turn the crankshaft clockwise.

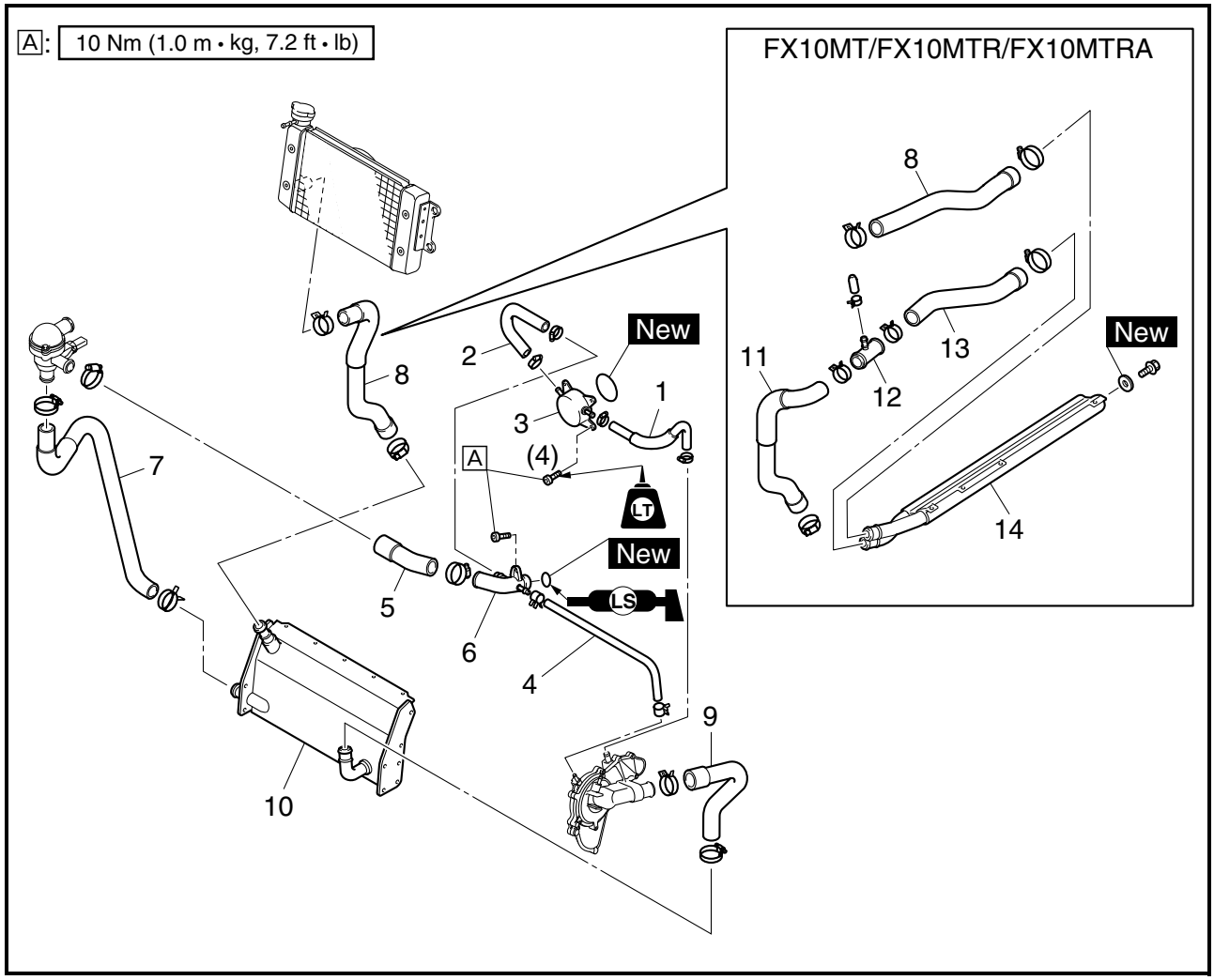
2. Install:
   - Water pump assembly

Water pump assembly bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)

OIL COOLER AND HEAT EXCHANGER



Order	Job name/Part name	Q'ty	Remarks
	Oil cooler and heat exchanger removal		Remove the parts in the order listed below.
	Coolant		Drain. Refer to "COOLING SYSTEM" in CHAPTER 2.
	Engine assembly		Refer to "ENGINE ASSEMBLY" in CHAPTER 5.
1	Water pump outlet hose	1	
2	Oil cooler outlet hose	1	
3	Oil cooler	1	
4	Water pump breather hose	1	
5	Thermostat inlet hose	1	
6	Cylinder head water jacket	1	
7	Thermostat outlet hose	1	
8	Radiator outlet hose	1	
9	Water pump inlet hose	1	
10	Heat exchanger	1	



Order	Job name/Part name	Q'ty	Remarks
11	Heat exchanger hose 1	1	
12	Heat exchanger pipe	1	
13	Heat exchanger hose 2	1	
14	Heat exchanger	1	
			For installation, reverse the removal procedure.

INSPECTION

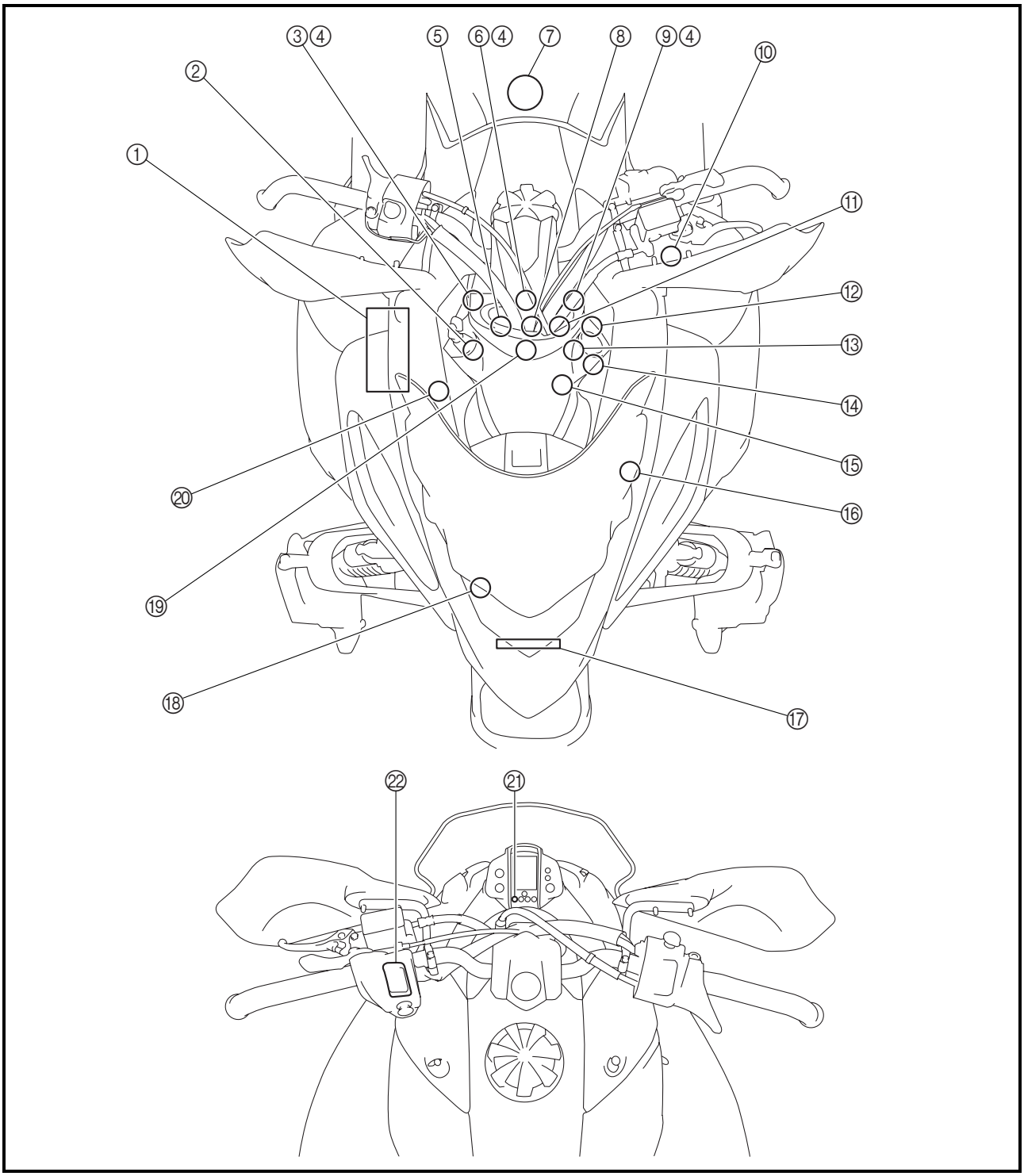
1. Inspect:
   - Heat exchanger(s)
   - Oil cooler
   - Cylinder head water jacket
   - Oil cooler hose
   - Water pump hoses
   - Heat exchanger hoses
   - Heat exchanger pipe

   Cracks/damage → Replace.

FUEL INJECTION SYSTEM

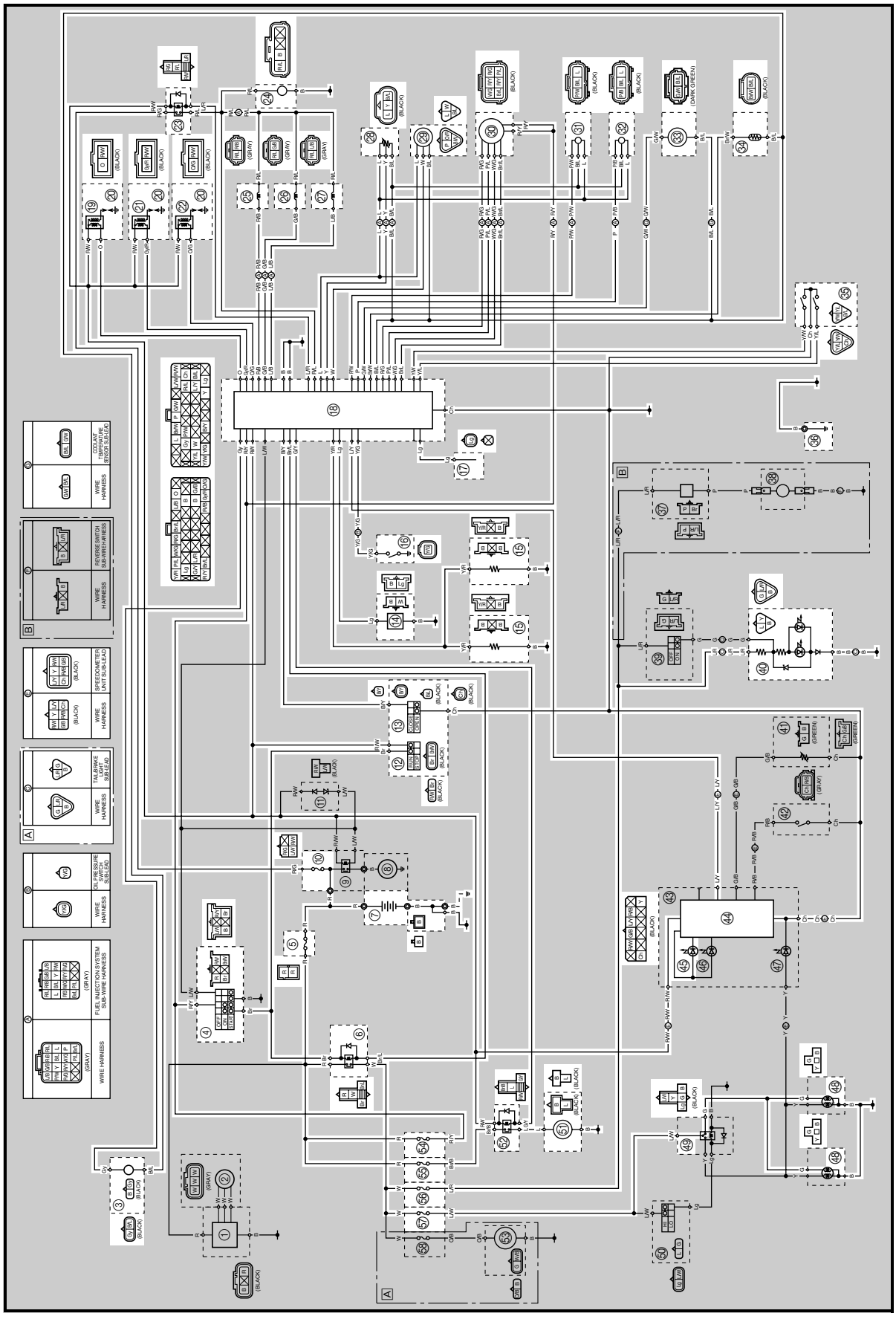
FUEL INJECTION SYSTEM

① Battery
② Injector #3
③ Cylinder-#3 ignition coil
④ Spark plug
⑤ ISC (idle speed control) unit
⑥ Cylinder-#2 ignition coil
⑦ Fuel pump
⑧ Intake air pressure sensor 1 (cylinders #1, #2, and #3)
⑨ Cylinder-#1 ignition coil
⑩ Speed sensor
⑪ Intake air pressure sensor 2 (cylinder #1)
⑫ Throttle position sensor
⑬ Injector #1
⑭ Crankshaft position sensor
⑮ Oil pressure switch
⑯ Intake air temperature sensor
⑰ ECU (engine control unit)
⑱ Fuel injection system relay
⑲ Injector #2
⑳ Coolant temperature sensor
㉑ Warning light
㉒ Grip/thumb warmer adjustment switch



7

CIRCUIT DIAGRAM



③ Crankshaft position sensor
④ Main switch
⑤ Main fuse
⑥ Load control relay
⑦ Battery
⑩ Fuel injection system fuse
⑫ Engine stop switch
⑬ Throttle switch
⑭ Thumb warmer
⑮ Grip warmer
⑯ Oil pressure switch
⑰ CO adjustment coupler
⑱ ECU (engine control unit)
⑲ Cylinder-#1 ignition coil
⑳ Spark plug
㉑ Cylinder-#2 ignition coil
㉒ Cylinder-#3 ignition coil
㉓ Fuel injection system relay
㉔ Fuel pump
㉕ Injector #1
㉖ Injector #2
㉗ Injector #3
㉘ Throttle position sensor
㉙ Speed sensor
㉚ ISC (idle speed control) unit
㉛ Intake air pressure sensor 1 (cylinders #1, #2, and #3)
㉜ Intake air pressure sensor 2 (cylinder #1)
㉝ Coolant temperature sensor
㉞ Intake air temperature sensor
㉟ Grip/thumb warmer adjustment switch
㊱ Frame ground
㊵ Tail/brake light
㊹ Multi-function meter
㊺ Warning light
㊽ Headlight
㊾ Headlight relay
㊿ Radiator fan motor
(52) Radiator fan motor relay
(54) Ignition fuse
(55) Radiator fan motor fuse
(56) Signal fuse
(57) Headlight fuse

[A] FX10MT/FX10MTR/FX10MTRA

ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and the warning light and self-diagnostic warning indicator on the LCD flash to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and the warning light and self-diagnostic warning indicator on the LCD flash to alert the rider of the detected malfunction.
- The lowest fault code number appears on the odometer/tripmeter/engine speed meter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the snowmobile is being driven, the warning light and self-diagnostic warning indicator on the LCD flash to alert the rider that a malfunction has occurred and the ECU provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

Self-Diagnostic-Function table

Fault code No.	Item	Symptom	Able/unable to start	Able/unable to drive
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor 1 (cylinders #1, #2, and #3) (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor 1 (cylinders #1, #2, and #3) (hose line)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sensor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sensor (stuck)	Stuck throttle position sensor detected.	Able	Able
21	Coolant temperature sensor	Coolant temperature sensor: open or short circuit detected.	Able	Able
22	Intake air temperature sensor	Intake air temperature sensor: open or short circuit detected.	Able	Able
25	Intake air pressure sensor 2 (cylinder #1) (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
26	Intake air pressure sensor 2 (cylinder #1) (hose line)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
30	Oil pressure dropped	Engine stops when an oil pressure drop is detected.	Unable	Unable
33	Cylinder-#1 ignition coil (faulty ignition)	Malfunction detected in the primary lead of the cylinder-#1 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Cylinder-#2 ignition coil (faulty ignition)	Malfunction detected in the primary lead of the cylinder-#2 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
35	Cylinder-#3 ignition coil (faulty ignition)	Malfunction detected in the primary lead of the cylinder-#3 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)

Fault code No.	Item	Symptom	Able/unable to start	Able/unable to drive
37	ISC (idle speed control) valve (stuck fully open)	Engine speed is high when the engine is idling.	Able (unable if valve stuck fully closed)	Able
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
43	Fuel system voltage (monitor voltage)	Power supply to the fuel injectors and fuel pump is not normal.	Able or unable depending on the conditions	Able or unable depending on the conditions
44	Error in writing the amount of CO adjustment on EEPROM	Error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Snowmobile system power supply (monitor voltage)	Power supply to the ECU is not normal.	Able	Able
50	ECU internal malfunction (memory check error)	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable
81	Grip warmer	Grip warmer: open or short circuit detected.	Able	Able
83	Thumb warmer	Thumb warmer: short circuit detected.	Able	Able
84	T.O.R.S.	Conditions requiring T.O.R.S. operation are detected.	Able	Unable
85	Oil pressure switch	Oil pressure switch: open circuit detected.	Able	Able

Communication error with the meter

Fault code No.	Item	Symptom	Able/unable to start	Able/unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	Unable	Unable
Er-2	ECU internal malfunction (output signal error)	No signals are received from the ECU within the specified signal time.	Unable	Unable
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	Unable	Unable
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	Unable	Unable

TROUBLESHOOTING CHART

Engine operation is not normal or the warning light and self-diagnostic warning indicator on the LCD flash.
* The warning light and self-diagnostic warning indicator on the LCD may not flash even if the engine operation is not normal.

The warning light and self-diagnostic warning indicator on the LCD flash.

Check the fault code number displayed on the meter.

Identify the system with the malfunction. (Refer to "Self-Diagnostic-Function table".)

Identify the probable cause of the malfunction. (Refer to "Fault code table".)

Check and repair the probable cause of the malfunction.

Fault code No.	No fault code No.
Check and repair. (Refer to "TROUBLESHOOTING DETAILS".) Monitor the operation of the sensors and actuators in the diagnostic mode. (Refer to "Diagnostic mode table".)	Check and repair.

Perform the fuel injection system reinstatement action. (Refer to "Reinstatement method" in "TROUBLESHOOTING DETAILS".)

Turn the main switch off, turn the main switch back on, and then check if the fault code number is still displayed.

Fault code number displayed

Fault code number not displayed

The warning light and self-diagnostic warning indicator on the LCD does not flash.

Check the operation of the following sensors and actuators in the diagnostic mode. (Refer to "Diagnostic mode table".)

- 01: Throttle position sensor (throttle angle)
- 03, 04: Intake air pressure
- 05: Intake air temperature
- 06: Coolant temperature
- 07: Snowmobile speed pulse
- 09: Fuel system voltage (battery voltage)
- 30: Cylinder-#1 ignition coil
- 31: Cylinder-#2 ignition coil
- 32: Cylinder-#3 ignition coil
- 36: Injector #1
- 37: Injector #2
- 38: Injector #3

OK → Engine malfunction → Check and repair the inner parts of the engine. (Refer to CHAPTER 5.) → OK

NG → Defective sensor or actuator → Check and repair the corresponding sensor or actuator. → OK

Check the engine condition.

OK

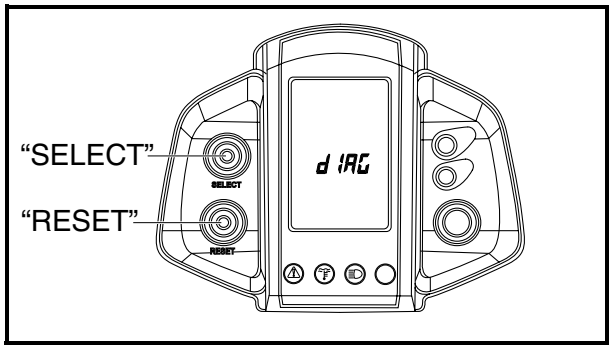
Repairs completed

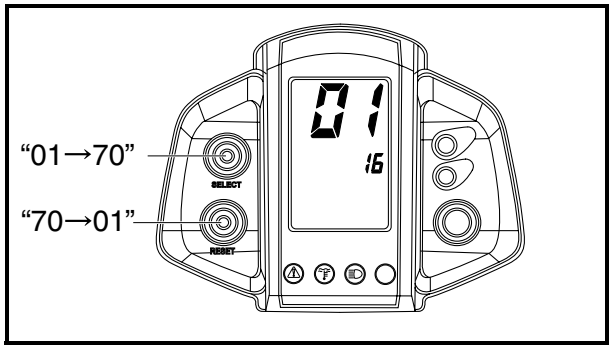
Erasing the malfunction history:*
The malfunction history is stored even if the main switch is turned off.
The malfunction history must be erased in the diagnostic mode. (Refer to the "Diagnostic mode table (Diagnostic code No. 62)".)

* Operated when the warning light and self-diagnosis warning indicator flash.

DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators without connecting the measurement equipment by simply switching the meter indication from the normal mode to the diagnostic monitoring mode.





Setting the diagnostic mode

1. Turn the main switch off and set the engine stop switch to "RUN".
2. Disconnect the wire harness coupler from the fuel pump.
3. Simultaneously press and hold the "SELECT" and "RESET" buttons, turn the main switch on, and continue to press the buttons for 8 seconds or more.

NOTE:

- All displays on the meter disappear except the odometer/tripmeter/engine speed meter displays.
- "dIAG" appears on the odometer/tripmeter/engine speed meter LCD.

4. Check that "dIAG" appears, and then simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number "01" appears on the speedometer LCD.
5. Select the diagnostic code number corresponding to the fault code number by pressing the "SELECT" and "RESET" buttons.

NOTE:

- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" button for 1 second or longer to automatically increase the diagnostic code numbers.

6. Verify the operation of the sensor or actuator.
   - Sensor operation
     The data representing the operating conditions of the sensor appears on the odometer/tripmeter/engine speed meter LCD.
   - Actuator operation
     Push the grip warmer side of the grip/thumb warmer adjustment switch to operate the actuator.
     If the grip warmer side of the switch is pushed again while the actuator is operating, the actuator operation will stop and restart from the beginning.
7. Turn the main switch off to cancel the diagnostic mode.

NOTE:
To perform a reliable diagnosis, make sure to turn off the power supply before every check and then start right from the beginning.

Fault code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
12	No normal signals are received from the crankshaft position sensor.	• Open or short circuit in wire harness. • Defective crankshaft position sensor. • Malfunction in pickup rotor (primary sheave drive shaft assembly). • Malfunction in ECU. • Improperly installed crankshaft position sensor.	—
13	Intake air pressure sensor 1 (cylinders #1, #2, and #3): open or short circuit detected.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Defective intake air pressure sensor 1. • Malfunction in ECU.	03
14	Intake air pressure sensor 1 (cylinders #1, #2, and #3): hose system malfunction (clogged or detached hose).	• Intake air pressure sensor 1 hoses are detached, clogged, kinked, or pinched. • Malfunction in ECU.	03
15	Throttle position sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Defective throttle position sensor. • Malfunction in ECU. • Improperly installed throttle position sensor.	01
16	Stuck throttle position sensor detected.	• Stuck throttle position sensor. • Malfunction in ECU.	01
21	Coolant temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Open or short circuit in coolant temperature sensor sub-lead. • Defective coolant temperature sensor. • Malfunction in ECU.	06
22	Intake air temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Defective intake air temperature sensor. • Malfunction in ECU.	05
25	Intake air pressure sensor 2 (cylinder #1): open or short circuit detected.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Defective intake air pressure sensor 2. • Malfunction in ECU.	04
26	Intake air pressure sensor 2 (cylinder #1): hose system malfunction (clogged or detached hose).	• Intake air pressure sensor 2 hose is detached, clogged, kinked, or pinched. • Malfunction in ECU.	04
30	Engine stops when an oil pressure drop is detected.	• Oil pressure dropped.	—
33	Malfunction detected in the primary lead of the cylinder-#1 ignition coil.	• Open or short circuit in wire harness. • Malfunction in cylinder-#1 ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition system.	30
34	Malfunction detected in the primary lead of the cylinder-#2 ignition coil.	• Open or short circuit in wire harness. • Malfunction in cylinder-#2 ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition system.	31
35	Malfunction detected in the primary lead of the cylinder-#3 ignition coil.	• Open or short circuit in wire harness. • Malfunction in cylinder-#3 ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition system.	32

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
37	Engine speed is high when the engine is idling.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Malfunction in throttle body. • Malfunction in throttle cable. • ISC valve is stuck fully open due to disconnected ISC unit hose or coupler. (High engine idle speed is detected with the ISC valve stuck fully open even though signals for the valve to close are continuously being transmitted by the ECU.) • Malfunction in ECU.	54
42	No normal signals are received from the speed sensor.	• Open or short circuit in wire harness. • Defective speed sensor. • Malfunction in ECU.	07
43	Power supply to the fuel injectors and fuel pump is not normal.	• Open or short circuit in wire harness. • Malfunction in ECU.	09
44	Error is detected while reading or writing on EEPROM (CO adjustment value).	• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory.)	60
46	Power supply to the fuel injection system is not normal.	• Malfunction in the charging system. (Refer to "CHARGING SYSTEM" in CHAPTER 8.)	—
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)	—
81	Grip warmer: open or short circuit detected.	• Open or short circuit in wire harness. • Defective grip warmer. • Malfunction in ECU.	26
83	Thumb warmer: short circuit detected.	• Short circuit in wire harness. • Defective thumb warmer. • Malfunction in ECU.	27
84	Conditions requiring T.O.R.S. operation are detected.	• Open or short circuit in wire harness. • Open or short circuit in fuel injection system sub-wire harness. • Defective throttle position sensor. • Defective throttle switch. • Defective speed sensor. • Malfunction in ECU. • Improperly installed throttle position sensor.	01 07 24
85	Oil pressure switch: open circuit detected.	• Open circuit in wire harness. • Open circuit in oil pressure switch sub-lead. • Defective oil pressure switch. • Malfunction in ECU.	—
Er-1	No signals are received from the ECU.	• Open or short circuit in wire harness. • Malfunction in speedometer unit. • Malfunction in ECU. • Defective wire connection of the ECU coupler.	—
Er-2	No signals are received from the ECU within the specified signal time.	• Improper connection in wire harness. • Malfunction in speedometer unit. • Malfunction in ECU.	—
Er-3	Data from the ECU cannot be received correctly.	• Improper connection in wire harness. • Malfunction in speedometer unit. • Malfunction in ECU.	—
Er-4	Non-registered data has been received from the meter.	• Improper connection in wire harness. • Malfunction in speedometer unit. • Malfunction in ECU.	—

Diagnostic mode table

Switch the meter display from the regular mode to the diagnostic mode. To switch the display, refer to "DIAGNOSTIC MODE".

NOTE:

- Check the intake air temperature and coolant temperature as close as possible to the intake air temperature sensor and the coolant temperature sensor respectively.
- If it is not possible to check the intake air temperature, use the ambient temperature as reference.

Diagnostic code No.	Item	Description of action	Data displayed on meter (reference value)
01	Throttle angle	Displays the throttle angle. • Check with throttle fully closed. • Check with throttle fully open.	0 ~ 125 degrees • Fully closed position (15 ~ 18) • Fully open position (94 ~ 100)
03	Intake air pressure sensor 1 (atmospheric pressure and intake air pressure)	Displays the intake air pressure for cylinders #1, #2, and #3.	• Not cranking: atmospheric pressure • Cranking: intake air pressure decreases to less than the atmospheric pressure.
04	Intake air pressure sensor 2 (atmospheric pressure and intake air pressure)	Displays the intake air pressure for cylinder #1.	• Not cranking: atmospheric pressure • Cranking: intake air pressure decreases to less than the atmospheric pressure.
05	Intake air temperature	Displays the intake air temperature. • Check the temperature in the air filter case.	Compare it to the value displayed on the meter. (Minimum displayed value: –30 [°C])
06	Coolant temperature	Displays the coolant temperature. • Check the temperature of the coolant.	Compare it to the value displayed on the meter. (Minimum displayed value: –30 [°C])
07	Snowmobile speed pulse	Displays the cumulative number of snowmobile pulses that are generated when the track is spun.	(0 ~ 999; resets to 0 after 999) OK if the numbers appear on the meter.
09	Fuel system voltage (battery voltage)	Displays the fuel system voltage (battery voltage).	0 ~ 18.7 V Normally, approximately 12.0 V
24	Throttle switch	Displays that the switch is on or off.	Throttle open: on Throttle closed: off
26	Grip warmer operation	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the grip warmer and displays the self-diagnosis warning indicator for 120 seconds.	—
27	Thumb warmer operation	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the thumb warmer and displays the self-diagnosis warning indicator for 120 seconds.	—
30	Cylinder-#1 ignition coil	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the cylinder-#1 ignition coil and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that a spark is produced five times.
31	Cylinder-#2 ignition coil	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the cylinder-#2 ignition coil and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that a spark is produced five times.
32	Cylinder-#3 ignition coil	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the cylinder-#3 ignition coil and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that a spark is produced five times.
36	Injector #1	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates injector #1 and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that the injector operates five times by listening to its operating sound.

Diagnostic code No.	Item	Description of action	Data displayed on meter (reference value)
37	Injector #2	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates injector #2 and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that the injector operates five times by listening to its operating sound.
38	Injector #3	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates injector #3 and displays the self-diagnosis warning indicator (five times at one-second intervals).	After pushing the switch, check that the injector operates five times by listening to its operating sound.
50	Fuel injection system relay	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the fuel injection system relay and displays the self-diagnosis warning indicator (five times at one-second intervals). (The indicator is off when the relay is on and it is on when the relay is off.)	After pushing the switch, check that the fuel injection system relay operates five times by listening to its operating sound.
51	Radiator fan motor relay	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the radiator fan motor relay (on/off) and displays the self-diagnosis warning indicator (for five cycles of five seconds each). (The relay and indicator are on for two seconds and off for three seconds.)	After pushing the switch, check that the radiator fan motor relay operates five times by listening to its operating sound. (At that time, the fan motor rotates.)
52	Headlight relay	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the headlight relay (on/off) and displays the self-diagnosis warning indicator (for five cycles of five seconds each). (The relay and indicator are on for two seconds and off for three seconds.)	After pushing the switch, check that the headlight relay operates five times by listening to its operating sound. (At that time, the headlight and taillight come on.)
54	ISC (idle speed control) unit	If the grip warmer side of the grip/thumb warmer adjustment switch is pushed, actuates the ISC (idle speed control) valve (fully closes/opens) for three cycles of four seconds each and displays the self-diagnosis warning indicator. (The valve fully closes in two seconds and opens in two seconds.)	After pushing the switch, check that the ISC unit vibrates. The ISC vibrates when the ISC valve operates.
60	EEPROM fault code display	• Displays the cylinder number if an error is detected in the EEPROM CO adjustment value for the cylinder as fault code No. 44. • If multiple cylinders are defective, the display alternates every 2 seconds.	(01 ~ 03) Displays the cylinder number. (00) Displays when there is no malfunction.
61	Malfunction history code display	• Displays the code numbers of past malfunctions (i.e., a code number of a malfunction that occurred once and which has been corrected). • If more than one code number is detected, the display alternates every 2 seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.	12 ~ 85 (00) Displays when there is no malfunction.
62	Malfunction history code erasure	• Displays the total number of codes that are being detected through self diagnosis and the fault codes in the past history. • Erases only the history codes when the grip warmer side of the grip/thumb warmer adjustment switch is pushed.	00 ~ 23 (00) Displays when there is no malfunction.
70	Control number	• Displays the program control number.	00 ~ 255

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given.
After the check and service of the malfunctioning part have been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the meter when the engine failed to work normally. (Refer to “Fault code table”.)

Diagnostic code No.:

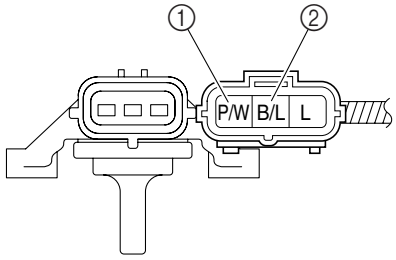
Code number to be used when the diagnostic mode is operated. (Refer to “Diagnostic mode table”.)

Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.
Diagnostic code No. – –			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of crankshaft position sensor.	Check for looseness or pinching.	Cranking the engine.
2	Connections Crankshaft position sensor coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the crankshaft position sensor coupler and ECU coupler. Gray – Gray Black/Blue – Black/Blue	
4	Defective crankshaft position sensor.	Replace if defective. Refer to “IGNITION SYSTEM” in CHAPTER 8.	

Fault code No.	13	Symptom	Intake air pressure sensor 1 (cylinders #1, #2, and #3): open or short circuit detected.

Diagnostic code No. 03 (intake air pressure sensor 1 (cylinders #1, #2, and #3))

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Intake air pressure sensor 1 (cylinders #1, #2, and #3) coupler Wire harness ECU coupler Fuel injection system sub-wire harness coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Open or short circuit in wire harness and/or fuel injection system sub-wire harness.	Repair or replace if there is an open or short circuit. Between the intake air pressure sensor 1 (cylinders #1, #2, and #3) coupler and ECU coupler. Pink/White – Pink/White Black/Blue – Black/Blue Blue – Blue	
3	Defective intake air pressure sensor 1 (cylinders #1, #2, and #3).	Execute the diagnostic mode (code No. 03). Replace if defective. 1. Connect the pocket tester (DC 20 V) to the intake air pressure sensor 1 (cylinders #1, #2, and #3) coupler terminals as shown. **Positive tester probe → Pink/White ①** **Negative tester probe → Black/Blue ②**  2. Turn the main switch on. 3. Measure the intake air pressure sensor 1 (cylinders #1, #2, and #3) output voltage. **Intake air pressure sensor 1 (cylinders #1, #2, and #3) output voltage:** **3.75 ~ 4.25 V** 4. Is the intake air pressure sensor 1 (cylinders #1, #2, and #3) OK?	

Fault code No.	14	Symptom	Intake air pressure sensor 1 (cylinders #1, #2, and #3): hose system malfunction (clogged or detached hose).

Diagnostic code No. 03 (intake air pressure sensor 1 (cylinders #1, #2, and #3))

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Intake air pressure sensor 1 (cylinders #1, #2, and #3) hoses are detached, clogged, kinked, or pinched.	Repair or replace the intake air pressure sensor 1 (cylinders #1, #2, and #3) hoses.	Starting the engine and operating it at idle.
2	Intake air pressure sensor 1 (cylinders #1, #2, and #3) malfunction at intermediate electrical potential.	Check and repair the connection. Replace it if there is a malfunction.	
3	Connections Intake air pressure sensor 1 (cylinders #1, #2, and #3) coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	
4	Defective intake air pressure sensor 1 (cylinders #1, #2, and #3).	Execute the diagnostic mode (code No. 03). Replace if defective. Refer to “Fault code No. 13”.	

Fault code No.	15	Symptom	Throttle position sensor: open or short circuit detected.

Diagnostic code No. 01 (throttle position sensor)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of throttle position sensor.	Check for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODY”.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Connections Throttle position sensor coupler Wire harness ECU coupler Fuel injection system sub-wire harness coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness and/or fuel injection system sub-wire harness.	Repair or replace if there is an open or short circuit. Between the throttle position sensor coupler and ECU coupler. Black/Blue – Black/Blue Yellow – Yellow Blue – Blue	
4	Throttle position sensor lead open circuit output voltage check.	Check for open circuit and replace the throttle position sensor. Black/Blue – Yellow	

Open circuit item	Output voltage
Ground wire open circuit	5 V
Output wire open circuit	0 V
Power supply wire open circuit	0 V

5	Defective throttle position sensor.	Execute the diagnostic mode (code No. 01). Replace if defective. Refer to “THROTTLE BODY”.	

Fault code No.	16	Symptom	Stuck throttle position sensor detected.
Diagnostic code No. 01 (throttle position sensor)			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of throttle position sensor.	Check for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODY”.	Starting the engine, operating it at idle, and then racing it.
2	Defective throttle position sensor.	Execute the diagnostic mode (code No. 01). Replace if defective. Refer to “THROTTLE BODY”.	

Fault code No.	21	Symptom	Coolant temperature sensor: open or short circuit detected.
Diagnostic code No. 06 (coolant temperature sensor)			

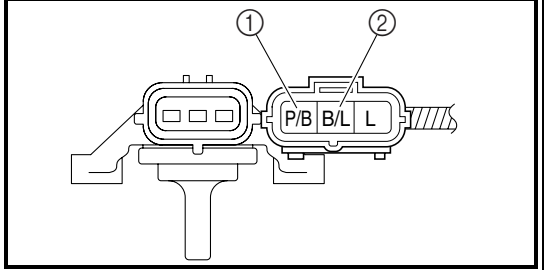
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Coolant temperature sensor coupler Wire harness ECU coupler Coolant temperature sensor sub-lead coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Open or short circuit in wire harness and/or coolant temperature sensor sub-lead coupler.	Repair or replace if there is an open or short circuit. Between the coolant temperature sensor coupler and ECU coupler. Black/Blue – Black/Blue Green/White – Green/White	
3	Defective coolant temperature sensor.	Execute the diagnostic mode (code No. 06). Replace if defective. Refer to “SIGNAL SYSTEM” in CHAPTER 8.	

Fault code No.	22	Symptom	Intake air temperature sensor: open or short circuit detected.
Diagnostic code No. 05 (intake air temperature sensor)			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Intake air temperature sensor coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the intake air temperature sensor coupler and ECU coupler. Black/Blue – Black/Blue Brown/White – Brown/White	
3	Defective intake air temperature sensor.	Execute the diagnostic mode (code No. 05). Replace if defective. Refer to “INTAKE AIR TEMPERATURE SENSOR”.	

Fault code No.	25	Symptom	Intake air pressure sensor 2 (cylinder #1): open or short circuit detected.

Diagnostic code No. 04 (intake air pressure sensor 2 (cylinder #1))

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Intake air pressure sensor 2 (cylinder #1) coupler Wire harness ECU coupler Fuel injection system sub-wire harness coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Open or short circuit in wire harness and/or fuel injection system sub-wire harness.	Repair or replace if there is an open or short circuit. Between the intake air pressure sensor 2 (cylinder #1) coupler and ECU coupler. Pink/Black – Pink/Black Black/Blue – Black/Blue Blue – Blue	
3	Defective intake air pressure sensor 2 (cylinder #1).	Execute the diagnostic mode (code No. 04). Replace if defective. 1. Connect the pocket tester (DC 20 V) to the intake air pressure sensor 2 (cylinder #1) coupler terminals as shown. **Positive tester probe → Pink/Black ①** **Negative tester probe → Black/Blue ②**  2. Turn the main switch on. 3. Measure the intake air pressure sensor 2 (cylinder #1) output voltage. **Intake air pressure sensor 2 (cylinder #1) output voltage:** **3.75 ~ 4.25 V** 4. Is the intake air pressure sensor 2 (cylinder #1) OK?	

Fault code No.	26	Symptom	Intake air pressure sensor 2 (cylinder #1): hose system malfunction (clogged or detached hose).

Diagnostic code No. 04 (intake air pressure sensor 2 (cylinder #1))

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Intake air pressure sensor 2 (cylinder #1) hose is detached, clogged, kinked, or pinched.	Repair or replace the intake air pressure sensor 2 (cylinder #1) hose.	Starting the engine and operating it at idle.
2	Intake air pressure sensor 2 (cylinder #1) malfunction at intermediate electrical potential.	Check and repair the connection. Replace it if there is a malfunction.	
3	Connections Intake air pressure sensor 2 (cylinder #1) coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	
4	Defective intake air pressure sensor 2 (cylinder #1).	Execute the diagnostic mode (code No. 04). Replace if defective. Refer to “Fault code No. 25”.	

Fault code No.	30	Symptom	Engine stops when an oil pressure drop is detected.

Diagnostic code No. – –

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Oil pressure dropped.	Place the snowmobile on a level surface, and then check the oil pressure after warming up the engine. Refer to “ENGINE OIL REPLACEMENT” in CHAPTER 2.	Starting the engine and operating it at idle.
2	Short circuit in oil pressure switch lead. Short circuit in oil pressure switch sub-lead.	Disconnect the ECU coupler, and then use the circuit tester to check for continuity between the engine ground and the oil pressure switch coupler (yellow/green). Repair or replace if there is no continuity.	
3	Defective oil pressure switch.	Start the engine, warm it up for 1 minute, and then use the circuit tester to check for continuity between the oil pressure switch coupler (yellow/green) and the switch body. Replace if there is continuity.	

Fault code No.	33	Symptom	Malfunction detected in the primary lead of the cylinder-#1 ignition coil.

Diagnostic code No. 30 (cylinder-#1 ignition coil)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Cylinder-#1 ignition coil coupler Wire harness ECU couplers	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the cylinder-#1 ignition coil coupler and ECU couplers. Orange – Orange Red/White – Red/White	
3	Detective cylinder-#1 ignition coil.	Execute the diagnostic mode (code No. 30). Test the primary and secondary coils for continuity. Replace if defective. Refer to “IGNITION SYSTEM” in CHAPTER 8.	

Fault code No.	34	Symptom	Malfunction detected in the primary lead of the cylinder-#2 ignition coil.

Diagnostic code No. 31 (cylinder-#2 ignition coil)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Cylinder-#2 ignition coil coupler Wire harness ECU couplers	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the cylinder-#2 ignition coil coupler and ECU couplers. Gray/Red – Gray/Red Red/White – Red/White	
3	Defective cylinder-#2 ignition coil.	Execute the diagnostic mode (code No. 31). Test the primary and secondary coils for continuity. Replace if defective. Refer to “IGNITION SYSTEM” in CHAPTER 8.	

Fault code No.	35	Symptom	Malfunction detected in the primary lead of the cylinder-#3 ignition coil.

Diagnostic code No. 32 (cylinder-#3 ignition coil)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Cylinder-#3 ignition coil coupler Wire harness ECU couplers	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the cylinder-#3 ignition coil coupler and ECU couplers. Orange/Green – Orange/Green Red/White – Red/White	
3	Detective cylinder-#3 ignition coil.	Execute the diagnostic mode (code No. 32). Test the primary and secondary coils for continuity. Replace if defective. Refer to “IGNITION SYSTEM” in CHAPTER 8.	

Fault code No.	37	Symptom	Engine speed is high when the engine is idling.

Diagnostic code No. 54 (ISC (idle speed control) unit)

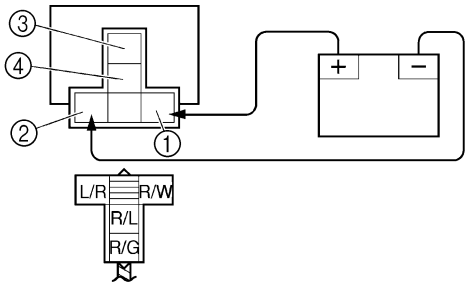
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Throttle valve does not fully close.	Check the throttle body. Refer to “THROTTLE BODY”. Check the throttle cable. Refer to “THROTTLE CABLE FREE PLAY ADJUSTMENT” in CHAPTER 2.	ISC valve returns to its original position by setting the engine stop switch to “RUN” and turning the main switch on and off. Reinstated if the engine idle speed is within specification after starting the engine.
2	ISC valve is stuck fully open due to disconnected ISC unit coupler. (High engine idle speed is detected with the ISC valve stuck fully open even though signals for the valve to close are continuously being transmitted by the ECU.)	Check that the ISC unit coupler is not disconnected. The ISC valve is stuck fully open if it does not operate when turning the main switch off. (Touch the ISC unit with your hand and check if it is vibrating to confirm if the ISC valve is operating.) **NOTE:** Do not remove the ISC unit.	
3	ISC valve is not moving correctly.	Execute the diagnostic mode (code No. 54). After the ISC valve is fully closed, it opens to the standby opening position. This operation takes approximately 12 seconds. Start the engine. If the error recurs, replace the throttle body assembly.	

Fault code No.	42	Symptom	No normal signals are received from the speed sensor.
Diagnostic code No. 07 (speed sensor)			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Speed sensor coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and inputting the snowmobile speed signals by operating the snowmobile at a low speed of 20 to 30 km/h.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the speed sensor coupler and ECU coupler. Blue – Blue White – White Black/Blue – Black/Blue	
3	Defective speed sensor.	Execute the diagnostic mode (code No. 07). Replace if defective. Refer to “SIGNAL SYSTEM” in CHAPTER 8.	
4	Gear for detecting snowmobile speed has broken.	Replace if defective. Refer to “FRONT AXLE AND TRACK” in CHAPTER 4.	

Fault code No.	43	Symptom	Power supply to the fuel injectors and fuel pump is not normal.

Diagnostic code No. 09 (fuel system voltage)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Fuel injection system relay coupler Wire harness ECU coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the fuel injection system relay coupler and ECU coupler. Blue/Red – Blue/Red Between the fuel injection system relay coupler and engine stop switch coupler. Red/White – Red/White Between the engine stop switch coupler and main switch coupler. Brown – Brown	
3	Malfunction or open circuit in fuel injection system relay.	Execute the diagnostic mode (code No. 09). Replace if defective. **NOTE:** When the leads are disconnected, the voltage check by the code No. 09 is impossible. 1. Disconnect the fuel injection system relay from the wire harness and remove it. 2. Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the fuel injection system relay terminals as shown. **Positive battery terminal → Red/White ①** **Negative battery terminal → Blue/Red ②** **Positive tester probe → Red/Green ③** **Negative tester probe → Red/Blue ④**  3. Does the fuel injection system relay have continuity between the red/green and red/blue terminals?	

Fault code No.	44	Symptom	Error is detected while reading or writing on EEPROM (CO adjustment value).

Diagnostic No. 60 (EEPROM improper cylinder indication)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Malfunction in ECU.	Execute the diagnostic mode (code No. 60). 1. Check the faulty cylinder. (If multiple cylinders are defective, the display alternates every 2 seconds.) 2. Readjust the CO of the displayed cylinder. Replace ECU if defective.	Setting the engine stop switch to "RUN" and turning the main switch on.

Fault code No.	46	Symptom	Power supply to the ECU is not normal.

Diagnostic code No. – –

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Wire harness ECU coupler	Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Faulty battery.	Replace or charge the battery. Refer to "BATTERY INSPECTION" in CHAPTER 2.	
3	Malfunction in rectifier/regulator.	Replace if defective. Refer to "CHARGING SYSTEM" in CHAPTER 8.	
4	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the battery and main fuse. Red – Red Between the main fuse and ignition fuse. Red – Red Between the ignition fuse and main switch coupler. Red/Yellow – Red/Yellow Between the main switch coupler and engine stop switch coupler. Brown – Brown Between the engine stop switch coupler and ECU coupler. Red/White – Red/White	

Fault code No.	50	Symptom	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)

Diagnostic code No. – –

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Malfunction in ECU.	Replace the ECU.	Setting the engine stop switch to "RUN" and turning the main switch on.

Fault code No.	81	Symptom	Grip warmer: open or short circuit detected.
Diagnostic code No. 26 (grip warmer operation)			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between the grip warmer coupler and ECU coupler. Yellow/Red-Yellow/Red	Setting the engine stop switch to “RUN” and turning the main switch on.

Fault code No.	83	Symptom	Thumb warmer: short circuit detected.
Diagnostic code No. 27 (thumb warmer operation)			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Short circuit in wire harness.	Repair or replace if there is a short circuit. Between the thumb warmer coupler and ECU coupler. Light green-Light green	Setting the engine stop switch to “RUN” and turning the main switch on.

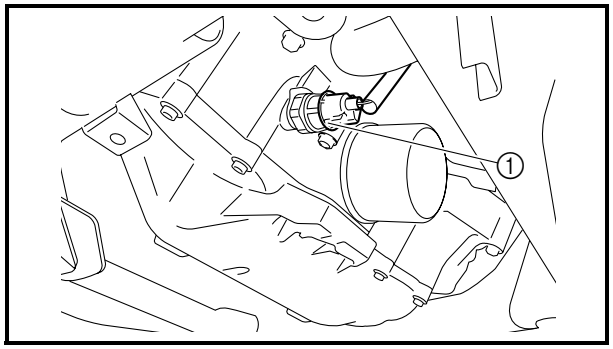
Fault code No.	85	Symptom	Oil pressure switch: open circuit detected.
Diagnostic code No. – –			

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Oil pressure switch coupler Wire harness ECU coupler Oil pressure switch sub-lead coupler	Check the couplers for any pins that may have pulled out. Check the locking condition of the couplers. If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open circuit in wire harness and/or oil pressure switch sub-lead.	Repair or replace if there is an open circuit. Between the oil pressure switch coupler and ECU coupler. Yellow/Green – Yellow/Green	
3	Defective oil pressure switch.	With the engine stopped, check that there is continuity between the oil pressure switch terminals and oil pressure switch body metal components or engine ground. Replace if there is no continuity. Refer to “OIL PRESSURE SWITCH”.	

Fault code No.	Er-1	Symptom	No signals are received from the ECU.
	Er-2	Symptom	No signals are received from the ECU within the specified signal time.
	Er-3	Symptom	Data from the ECU cannot be received correctly.
	Er-4	Symptom	Non-registered data has been received from the meter.

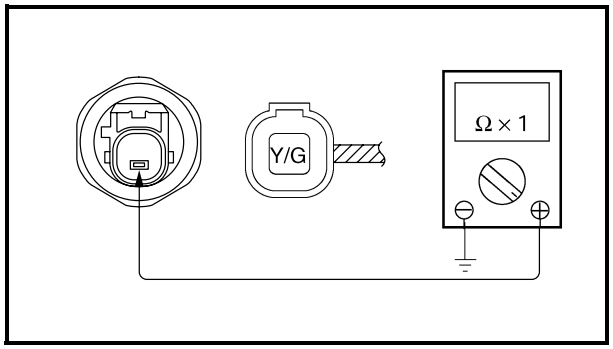
Diagnostic code No. – –

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections Wire harness ECU coupler Speedometer unit sub-lead coupler	Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect the coupler securely.	Setting the engine stop switch to “RUN” and turning the main switch on.
2	Open or short circuit in wire harness and/or speedometer unit sub-lead.	Repair or replace if there is an open or short circuit. Between speedometer unit coupler and ECU coupler. Blue/Yellow – Blue/Yellow	
3	Malfunction in speedometer unit.	Replace the speedometer unit.	
4	Malfunction in ECU.	Replace the ECU.	

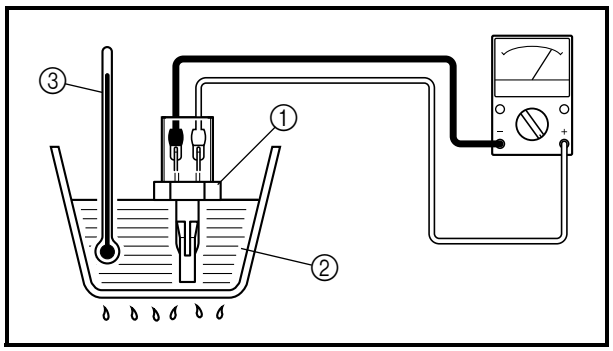


OIL PRESSURE SWITCH

1. Disconnect:
   - Oil pressure switch coupler ①
2. Connect:
   - Pocket tester
     (between the engine ground and oil pressure switch terminal)



3. Check:
   - Oil pressure switch continuity
     No continuity → Replace the oil pressure switch.



INTAKE AIR TEMPERATURE SENSOR

1. Remove the intake air temperature sensor.

CAUTION:

Handle the intake air temperature sensor with special care. Never subject it to shock or allow it to be dropped. If it is dropped, it must be replaced.

2. Connect:
   - Pocket tester
     (to the intake air temperature sensor)

NOTE:

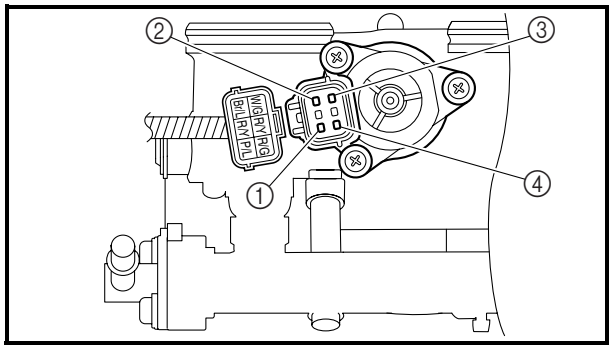
Set the tester selector to the "Ω × 100" position.

3. Immerse the intake air temperature sensor ① in water ② and check the intake temperature sensor operation.

Intake air temperature sensor resistance:
290 ~ 390 Ω at 80 °C (176 °F)

③ Thermometer

4. If the intake air temperature sensor operation is defective, replace it.
5. Install the intake air temperature sensor.



ISC (IDLE SPEED CONTROL) UNIT

NOTE:

Do not remove the ISC (idle speed control) unit completely from the throttle body.

1. Inspect:
   - ISC (idle speed control) unit

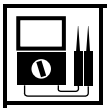
Inspection steps:

- Disconnect the ISC (idle speed control) unit coupler from the ISC (idle speed control) unit.
- Connect the pocket tester ($\Omega \times 10$) to the terminals of the ISC (idle speed control) unit.

Positive tester probe → Red/Green ①
Negative tester probe → White/Green ②
Positive tester probe → Brown/Blue ③
Negative tester probe → Pink/Blue ④

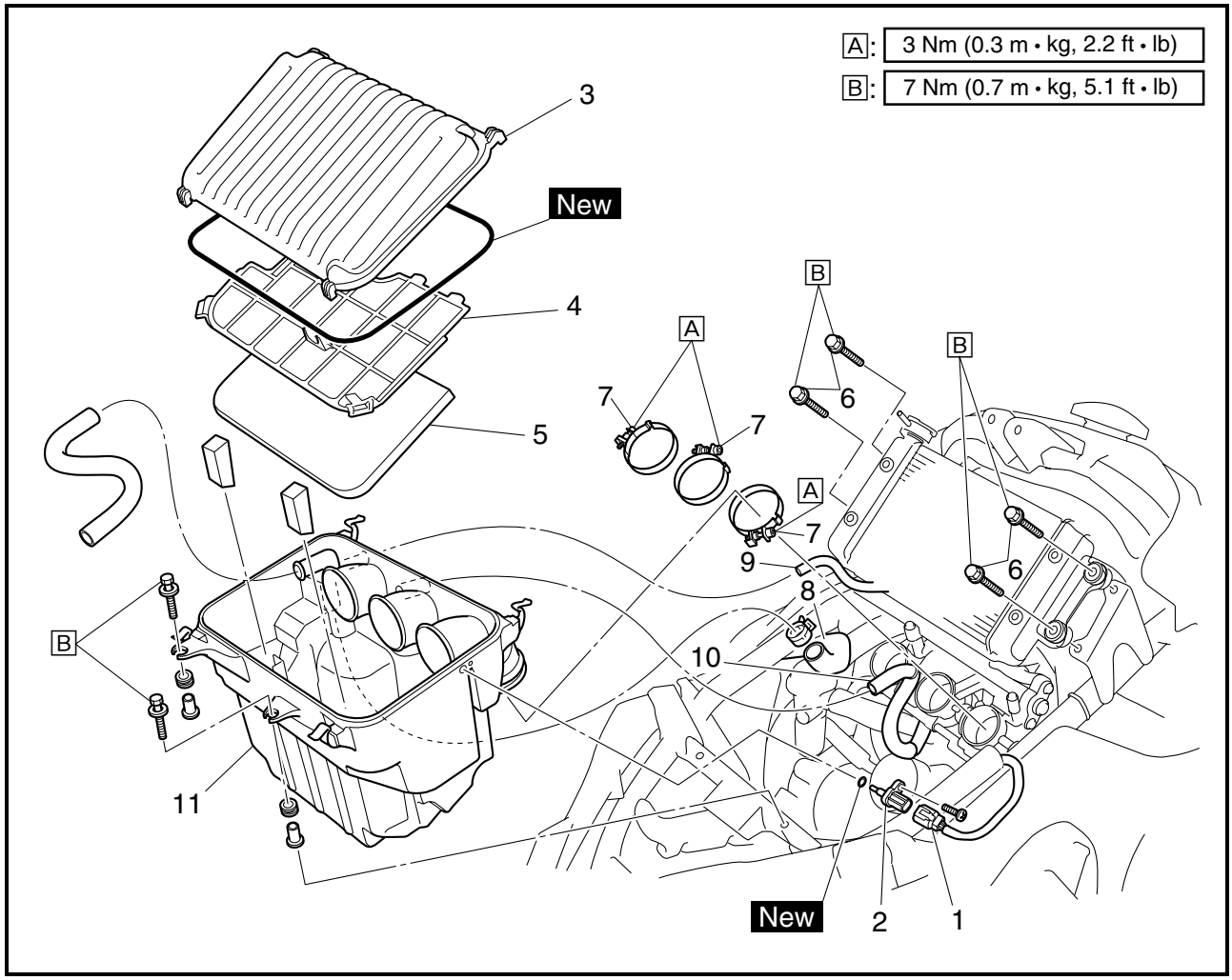
Pocket tester:
90890-03112
Analog pocket tester:
YU-03112-C

- Measure the ISC (idle speed control) unit resistance.
  Out of specification → Replace the throttle body.



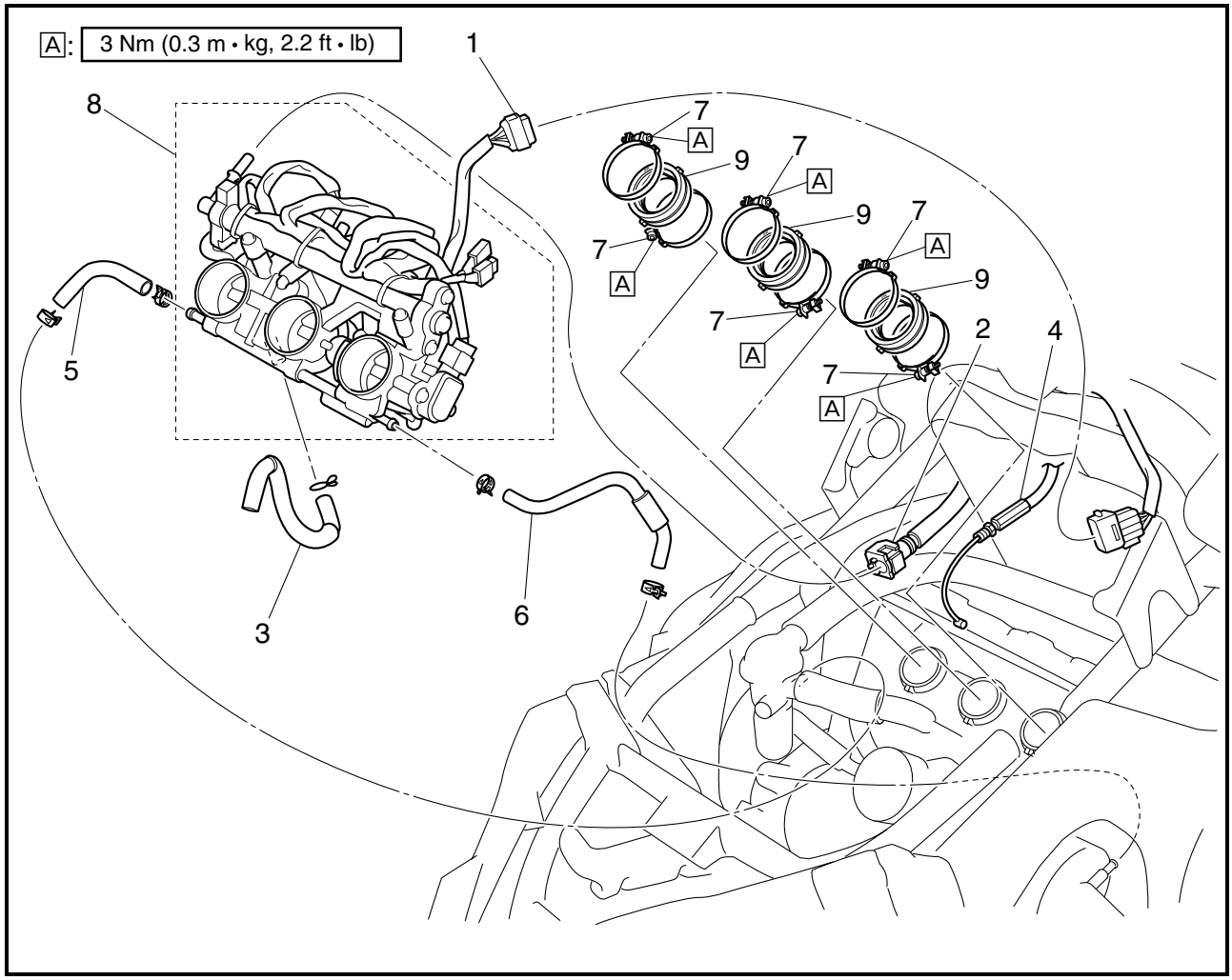
ISC (idle speed control) unit resistance:
57 ~ 63 Ω at 20 °C (68 °F)

AIR FILTER CASE



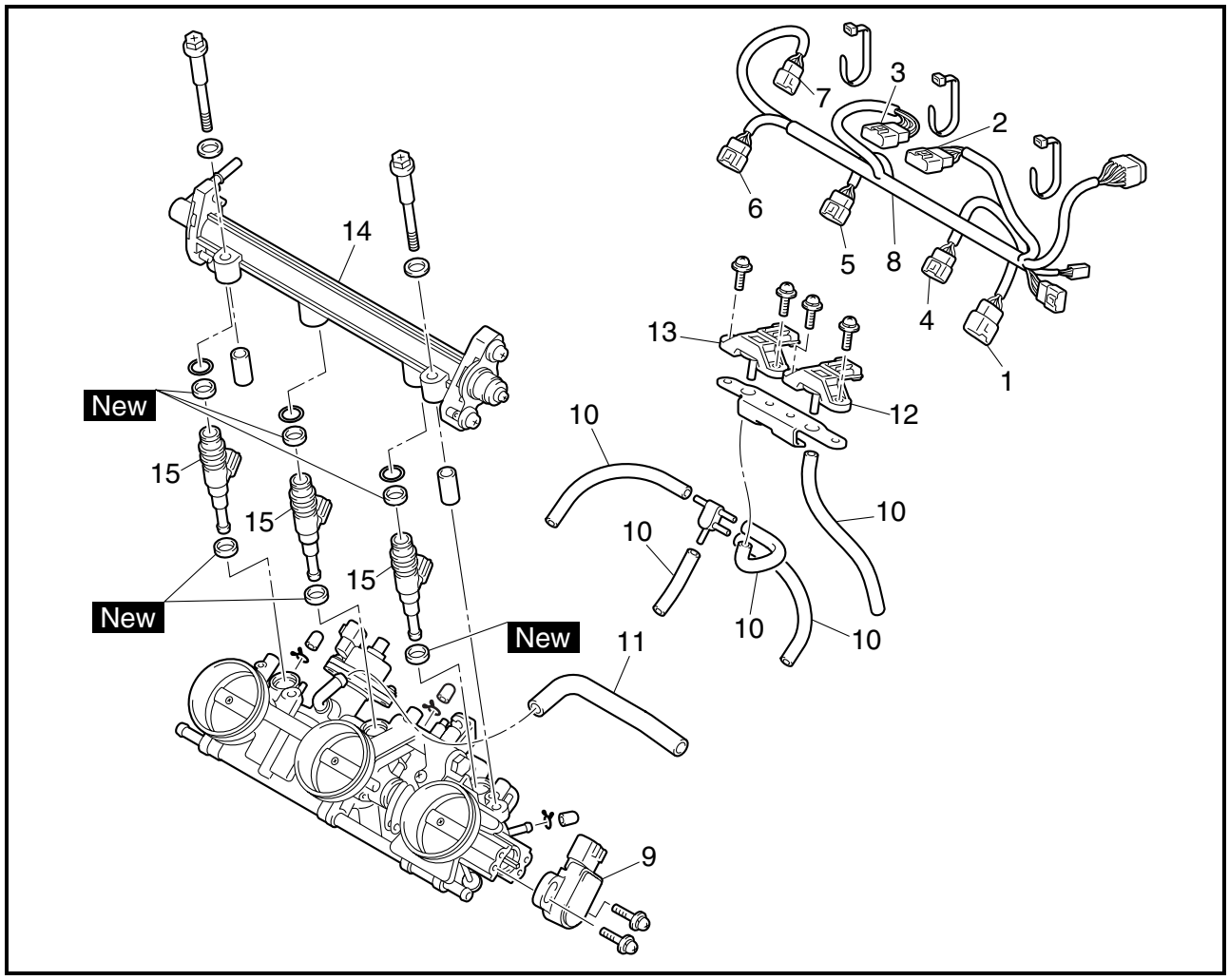
Order	Job name/Part name	Q'ty	Remarks
	Air filter case removal		Remove the parts in the order listed below.
	Steering column		Refer to "STEERING" in CHAPTER 3.
	Radiator cover		Refer to "RADIATOR" in CHAPTER 6.
1	Intake air temperature sensor coupler	1	Disconnect.
2	Intake air temperature sensor	1	
3	Air filter case cover	1	
4	Air filter element frame	1	
5	Air filter element	1	
6	Radiator bolt	4	
7	Air filter case joint clamp screw	3	Loosen.
8	Oil tank breather hose	1	Disconnect.
9	Cylinder head breather hose	1	Disconnect.
10	Air vent hose	1	Disconnect.
11	Air filter case	1	
			For installation, reverse the removal procedure.

THROTTLE BODY

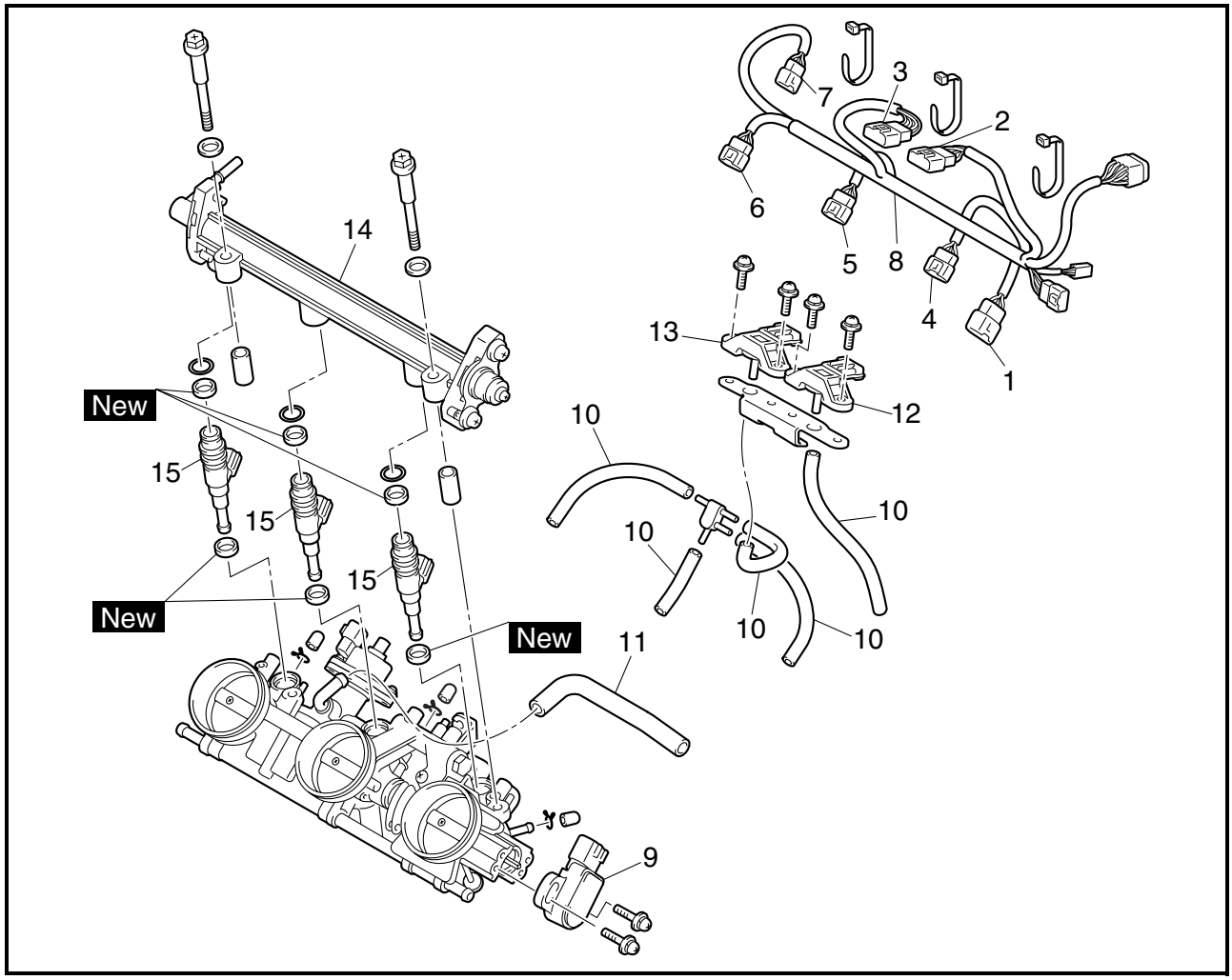


Order	Job name/Part name	Q'ty	Remarks
	Throttle body removal		Remove the parts in the order listed below.
	Coolant		Drain. Refer to "COOLING SYSTEM" in CHAPTER 2.
	Steering column		Refer to "STEERING" in CHAPTER 3.
	Radiator		Refer to "RADIATOR" in CHAPTER 6.
	Air filter case assembly		Refer to "AIR FILTER CASE".
1	Fuel injection system sub-wire harness coupler	1	Disconnect.
2	Fuel hose	1	Disconnect.
3	Air vent hose	1	
4	Throttle cable	1	
5	Throttle body heater inlet hose	1	
6	Throttle body heater outlet hose	1	
7	Throttle body joint clamp screw	6	Loosen.
8	Throttle body assembly	1	
9	Throttle body joint	3	
			For installation, reverse the removal procedure.

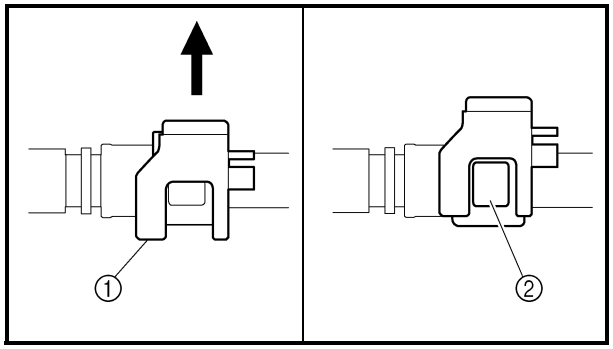
INJECTORS



Order	Job name/Part name	Q'ty	Remarks
	Injectors removal		Remove the parts in the order listed below.
1	Throttle position sensor coupler	1	Disconnect.
2	Intake air pressure sensor 2 (cylinder #1) coupler	1	Disconnect.
3	Intake air pressure sensor 1 (cylinders #1, #2, and #3) coupler	1	Disconnect.
4	Cylinder-#1 injector coupler	1	Disconnect.
5	Cylinder-#2 injector coupler	1	Disconnect.
6	Cylinder-#3 injector coupler	1	Disconnect.
7	ISC (idle speed control unit) coupler	1	Disconnect.
8	Fuel injection system sub-wire harness	1	
9	Throttle position sensor	1	
10	Negative pressure hose	5	
11	ISC (idle speed control) unit hose	1	
12	Intake air pressure sensor 2 (cylinder #1)	1	



Order	Job name/Part name	Q'ty	Remarks
13	Intake air pressure sensor 1 (cylinders #1, #2, and #3)	1	
14	Fuel rail	1	
15	Injector	3	
			For installation, reverse the removal procedure.



REMOVAL

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel hose

CAUTION:

- **Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.**
- **Although the fuel has been removed from the fuel tank be careful when removing the fuel hose, since there may be fuel remaining in it.**

NOTE:

- To remove the fuel hose from the throttle body, slide the fuel hose connector cover ① on the end of the hose in direction of the arrow shown, press the two buttons ② on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.

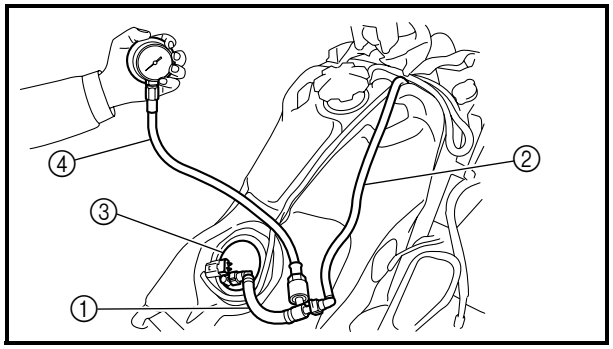
INSPECTION

1. Inspect:
   - Injectors
     Damage → Replace the defective parts.
2. Inspect:
   - Throttle body
     Cracks/damage → Replace the throttle body.
3. Check:
   - Fuel passages
     Obstructions → Clean.

NOTE:

- Use a petroleum based solvent for cleaning.
- Blow out all passage with compressed air.

4. Check:
   - Throttle body joints
     Cracks/damage → Replace the defective parts.



FUEL PRESSURE INSPECTION

1. Inspect:
   - Fuel pressure

Measurement steps:

- Remove the fuel hose connector holder, and then disconnect the fuel hose.
  Refer to “SEAT AND FUEL TANK” in CHAPTER 5.
- Connect the fuel pressure adapter ① between the fuel hose ② and fuel pump ③.
- Connect the pressure gauge ④ to the fuel pressure adapter.

Pressure gauge:
90890-03153
YU-03153
Fuel pressure adapter:
90890-03176
YM-03176

- Start the engine.
- Measure the fuel pressure.

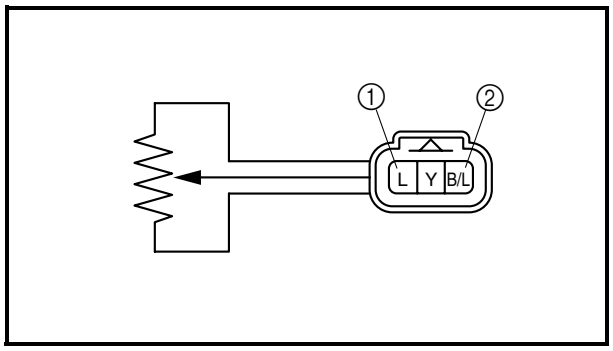
Fuel pressure:
324 kPa (3.24 kg/cm^2, 46.1 psi)

Faulty → Replace the fuel pump.

INSPECTION AND ADJUSTMENT

1. Inspect:
   • Throttle position sensor

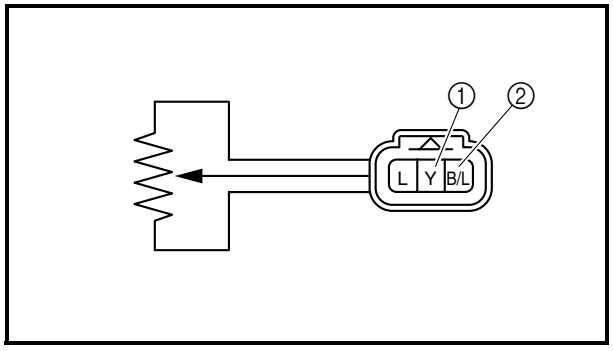
Inspect steps:
- Disconnect the throttle position sensor coupler.
- Remove the throttle position sensor from the throttle body.
- Connect the pocket tester (Ω × 1k) to the throttle position sensor.



Positive tester probe → Blue terminal ①
Negative tester probe →
Black/Blue terminal ②

- Measure the maximum throttle position sensor resistance.
  Out of specification → Replace the throttle position sensor.

Maximum throttle position sensor resistance:
2.64 ~ 6.16 kΩ at 20 °C (68 °F)
(Blue – Black/Blue)

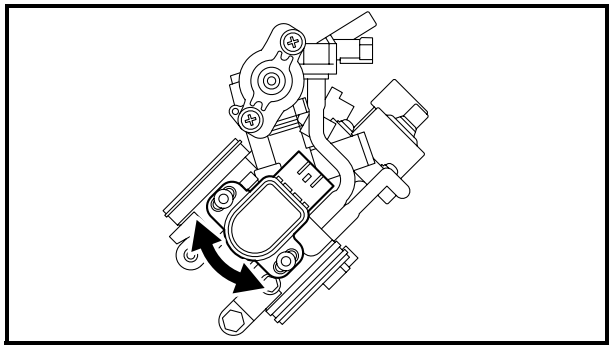


2. Adjust:
   • Throttle position sensor angle

Adjustment steps:
- Connect the fuel injection system sub-wire harness coupler to the wire harness.
- Connect the digital circuit tester to the throttle position sensor.

Positive tester probe → Yellow terminal ①
Negative tester probe → Black/Blue terminal ②

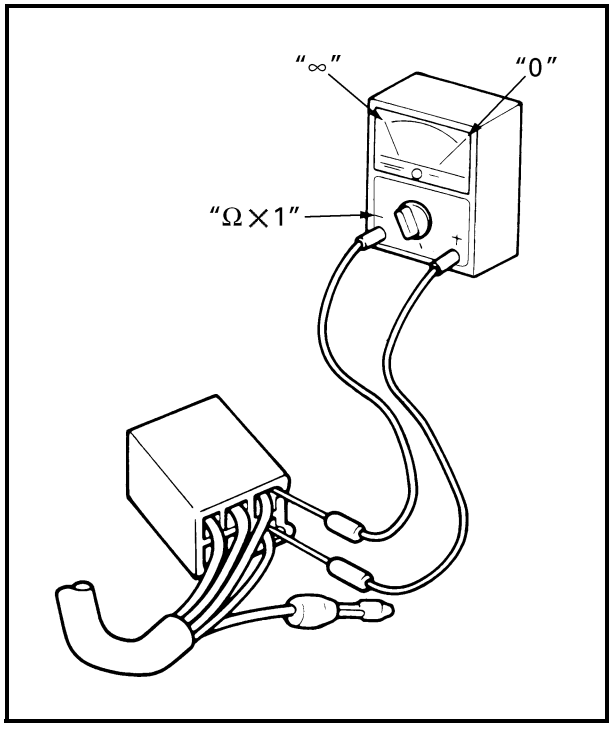
Digital circuit tester:
90890-03174
Model 88 Multimeter with tachometer:
YU-A1927

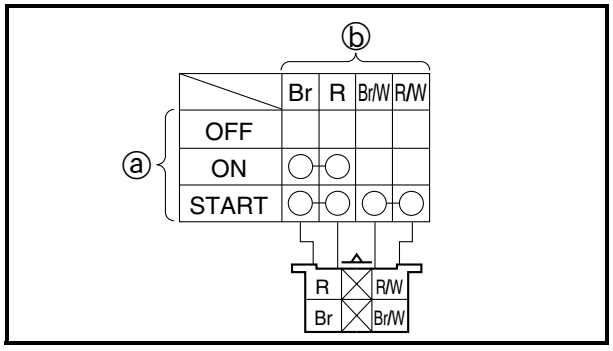


- Measure the throttle position sensor voltage.
- Adjust the throttle position sensor angle so the measured voltage is within the specified range.

Throttle position sensor voltage:
0.63 ~ 0.73 V
(Yellow – Black/Blue)

- After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.





ELECTRICAL

SWITCH INSPECTION

SWITCH INSPECTION

Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.

Pocket tester:
90890-03112
Analog pocket tester:
YU-03112-C

NOTE:

- Set the pocket tester to "0" before starting a test.
- When testing the switch for continuity the pocket tester should be set to the "Ω × 1" range.
- When checking the switch turn it on and off a few times.

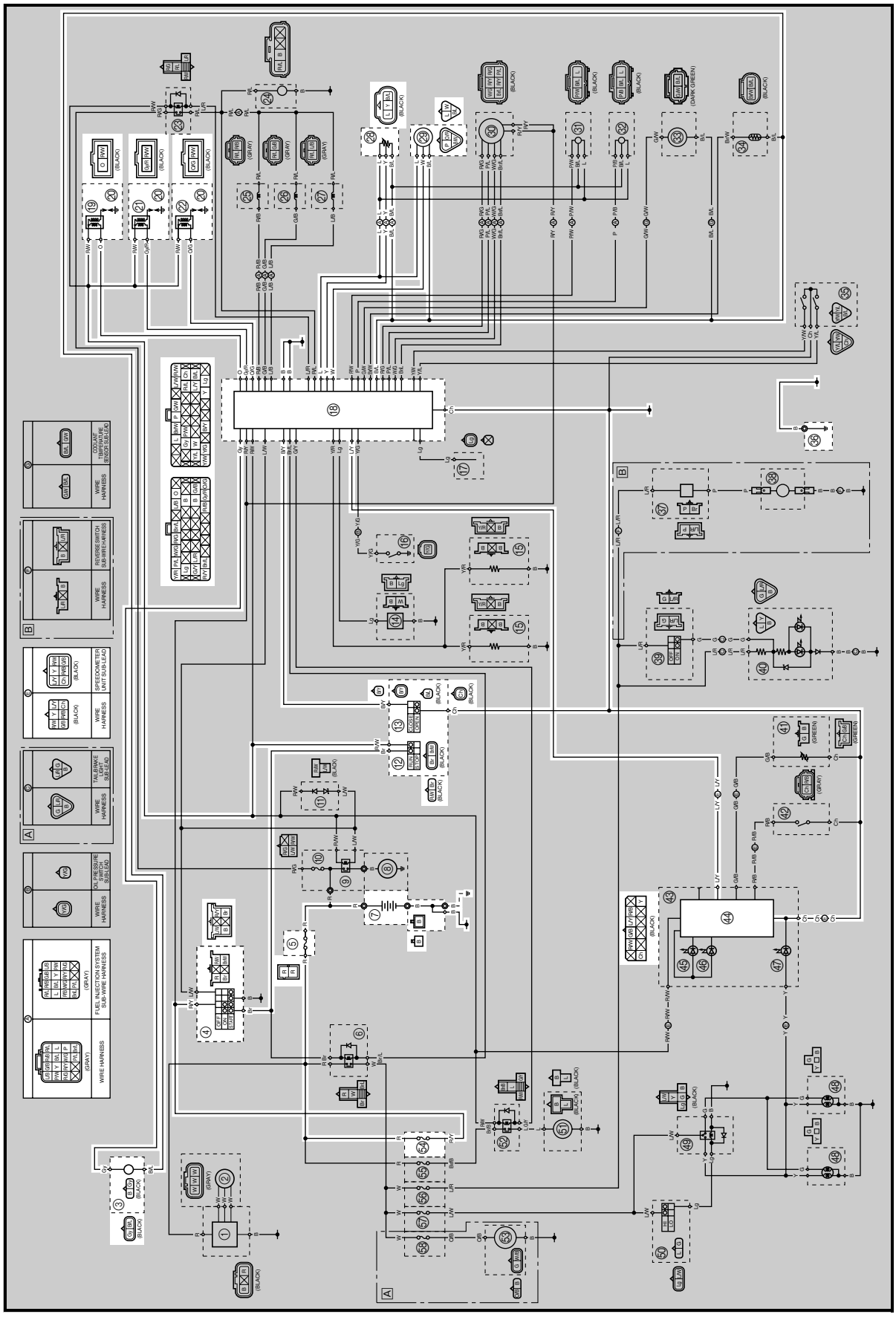
INSPECTING A SWITCH SHOWN IN THE MANUAL

The terminal connections for switches (main switch, handlebar switch, engine stop switch, light switch, etc.) are shown in a chart similar to the one on the left. This chart shows the switch positions ⓐ in the column and the switch lead colors ⓑ in the top row. For each switch position, "○——○" indicates the terminals with continuity.

The example chart shows that:
There is continuity between the brown and red leads when the switch is set to "ON".
There is continuity between the brown and red and between the brown/white and red/white leads when the switch is set to "START".

8

IGNITION SYSTEM
CIRCUIT DIAGRAM



IGNITION SYSTEM

CIRCUIT DIAGRAM

③ Crankshaft position sensor
④ Main switch
⑤ Main fuse
⑦ Battery
⑫ Engine stop switch
⑬ Throttle switch
⑱ ECU (engine control unit)
⑲ Cylinder-#1 ignition coil
⑳ Spark plug
㉑ Cylinder-#2 ignition coil
㉒ Cylinder-#3 ignition coil
㉘ Throttle position sensor
㉙ Speed sensor
㊱ Frame ground
㊹ Multi-function meter
㊿ Ignition fuse

TROUBLESHOOTING

NO SPARK OR WEAK SPARK.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the spark plug gap.
Refer to “SPARK PLUGS” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Repair or replace the spark plug(s).
Refer to “SPARK PLUGS” in CHAPTER 2.

Check the ignition spark gap.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the ignition coil(s).

Check the ignition coil resistance.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the ignition coil(s).

Check the crankshaft position sensor.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the crankshaft position sensor.

Check the engine stop switch, throttle switch and main switch.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the throttle position sensor.
Refer to “THROTTLE BODY” in CHAPTER 7.

OK ⇩

FAULTY ⇨ Replace the throttle position sensor.
Refer to “THROTTLE BODY” in CHAPTER 7.

Check the ignition system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the ignition system wiring.

Correct the connection and/or replace the ECU.

T.O.R.S. OPERATES.

Is self-diagnosis code 15, 16, or 42 displayed?

NO ⇩

YES ⇨ Check the affected item(s).

Has throttle body icing occurred or is foreign material stuck in the throttle body?

NO ⇩

YES ⇨ Perform throttle body maintenance.

Is the throttle switch malfunctioning?

NO ⇩

YES ⇨ Repair or replace the right handlebar switch.

Is the throttle cable free play out of specification?

NO ⇩

YES ⇨ Adjust the throttle cable free play. Refer to “THROTTLE CABLE FREE PLAY ADJUSTMENT” in CHAPTER 2.

Was the engine revved with the V-belt removed?

NO ⇩

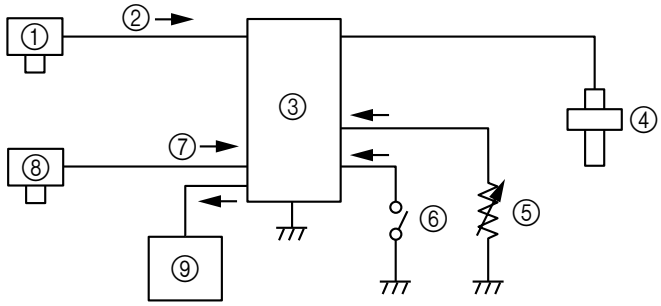
YES ⇨ When the engine is revved with the V-belt removed, the speed sensor is diagnosed as malfunctioning and T.O.R.S. operates.

Is the throttle position sensor, speedometer unit, or speed sensor installed incorrectly?

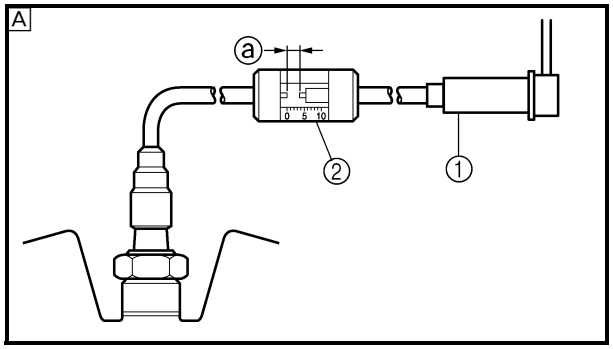
NO ⇩

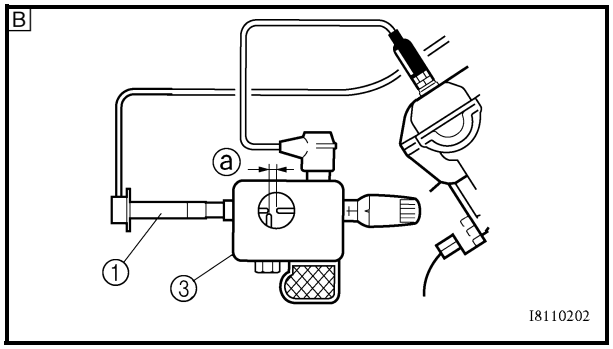
YES ⇨ Install correctly.

Correct the connection and/or replace the speedometer unit and/or ECU.



① Crankshaft position sensor
② Engine speed
③ ECU (engine control unit)
④ Ignition
⑤ Throttle position sensor
⑥ Throttle switch
⑦ Speed
⑧ Speed sensor
⑨ Speedometer unit





IGNITION SPARK GAP

The following procedure applies to all of the ignition coils.

1. Measure:
   - Ignition spark gap
     Out of specification → Replace the ignition coil(s).

Measurement steps:

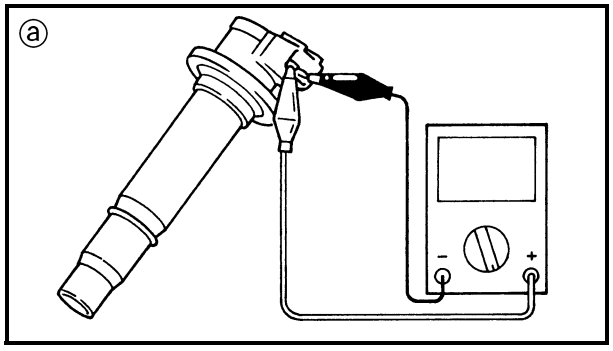
- Disconnect the ignition coil ① from the spark plug.
- Connect the opama pet-4000 spark checker ② or ignition checker ③.

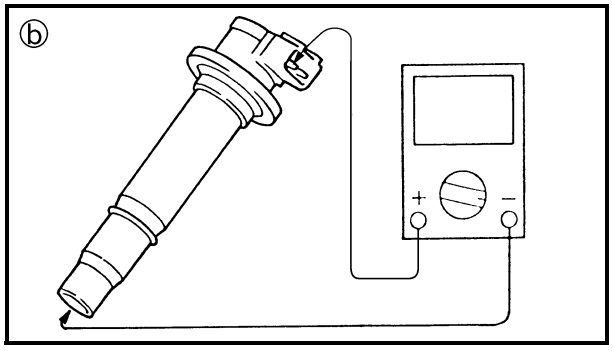
Opama pet-4000 spark checker:
YM-34487
Ignition checker:
90890-06754

- Measure the ignition spark gap ⓐ.
- Crank the engine by setting the engine stop switch to “RUN” and turning the main switch to start and gradually increase the spark gap until a misfire occurs.

Ignition spark gap:
6.0 mm (0.24 in)

A For USA/Canada
B For Europe



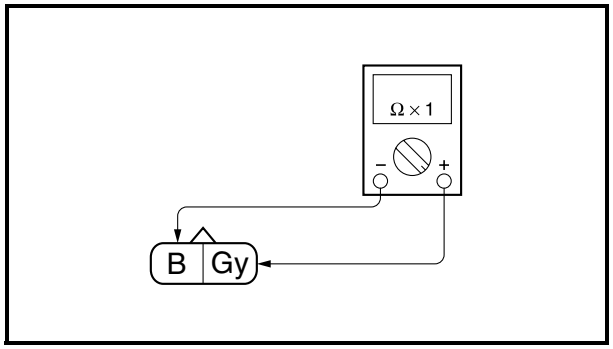


IGNITION COIL

The following procedure applies to all of the ignition coils.

1. Disconnect:
   - Ignition coil coupler
2. Connect:
   - Pocket tester
     (to the ignition coil)
3. Measure:
   - Primary coil resistance ⓐ
   - Secondary coil resistance ⓑ
     Out of specification → Replace the ignition coil(s).

Primary coil resistance:
1.19 ~ 1.61 Ω at 20 °C (68 °F)
Secondary coil resistance:
8.5 ~ 11.5 kΩ at 20 °C (68 °F)



CRANKSHAFT POSITION SENSOR

1. Disconnect:
   - Crankshaft position sensor coupler
2. Connect:
   - Pocket tester
     (to the crankshaft position sensor coupler)
3. Measure:
   - Crankshaft position sensor resistance
     Out of specification → Replace.

Crankshaft position sensor resistance:
336 ~ 504 Ω at 20 °C (68 °F)
(Gray – Black)

THROTTLE OVERRIDE SYSTEM (T.O.R.S.)

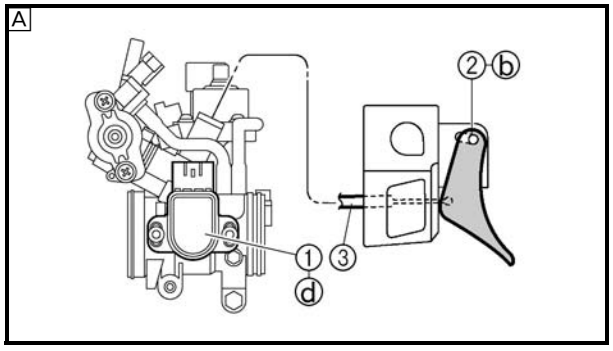
⚠ WARNING

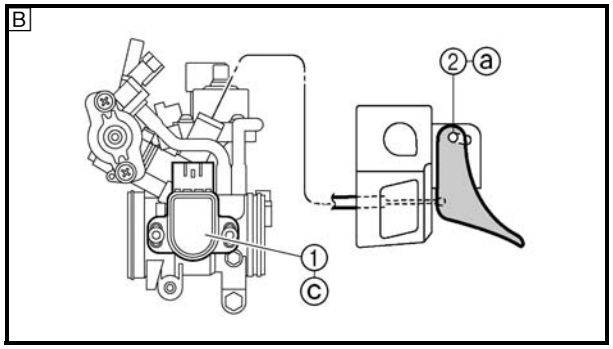
- **If the T.O.R.S. is activated, make sure that the cause of the malfunction has been corrected and that the engine can be operated without a problem before restarting the engine.**
- **Be sure to use the specified spark plug and ignition coil. Otherwise, the T.O.R.S. will not work properly.**

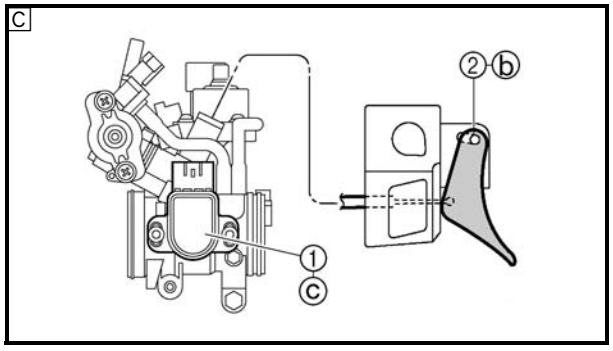
If the throttle bodies or throttle cable malfunctions during operation, the T.O.R.S. will operate when the throttle lever is released.
The T.O.R.S. is designed to override the fuel injection and limit the engine speed to less than the clutch engagement speed if the throttle valves fail to return to the idle position when the throttle lever is released.

Engagement speed:
FX10/FX10RT/FX10RTR/FX10RTRA
3,550 ~ 3,950 r/min
FX10MT/FX10MTR "USA/Canada"/ FX10MTRA "USA/Canada"
3,300 ~ 3,700 r/min
FX10MTR "Europe"/FX10MTRA "Europe"
3,100 ~ 3,500 r/min

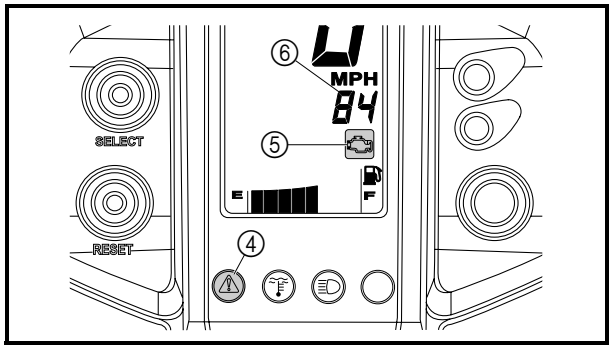
Mode / Item	A Idling/ starting	B Running	C Trouble
Throttle switch	Off	On	Off
Throttle position sensor	Closed	Open	Open
Engine	Run	Run	T.O.R.S. will operate

A


B


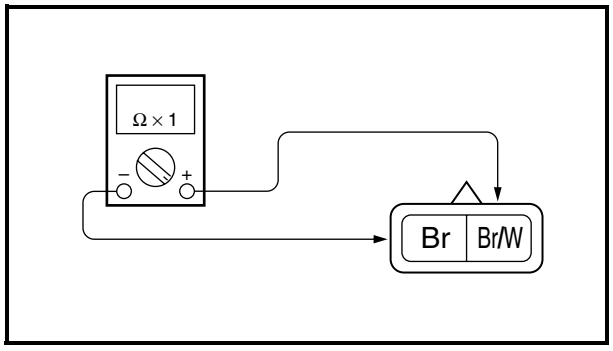
C


A Idling/starting
B Running
C Trouble
① Throttle position sensor (throttle valve position)
② Throttle switch
③ Throttle cable
ⓐ On
ⓑ Off
ⓒ Open
ⓓ Closed



NOTE:

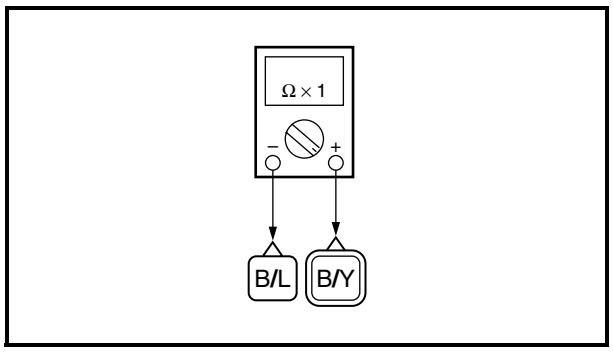
- When the T.O.R.S. is activated, the warning light ④ and self-diagnosis warning indicator ⑤ will flash and the two-digit code "84" ⑥ will flash in the odometer/tripmeter/engine speed meter LCD.
- The T.O.R.S. monitors the condition of the throttle position sensor, speedometer unit, and speed sensor, and will operate if any of the monitored items is disconnected or malfunctioning.



ENGINE STOP SWITCH

1. Disconnect:
   - Engine stop switch coupler
2. Connect:
   - Pocket tester
     (to the engine stop switch coupler)
3. Check:
   - Engine stop switch continuity
     Faulty → Replace the right handlebar switch.

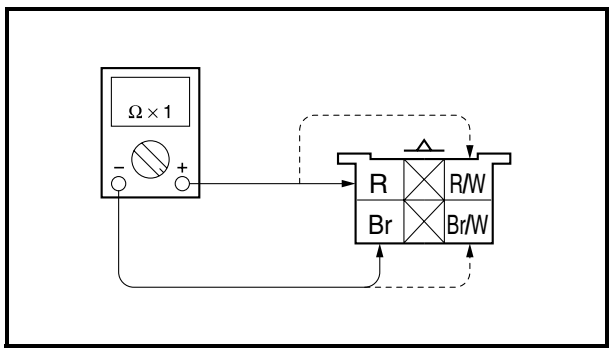
Switch position	Continuity
RUN (pulled out)	Yes
OFF (pushed in)	No



THROTTLE SWITCH

1. Disconnect:
   - Throttle switch couplers
2. Connect:
   - Pocket tester
     (to the throttle switch couplers)
3. Check:
   - Throttle switch continuity
     Faulty → Replace the right handlebar switch.

Throttle switch position	Continuity
Throttle lever is operated.	Yes
Throttle lever is not operated.	No



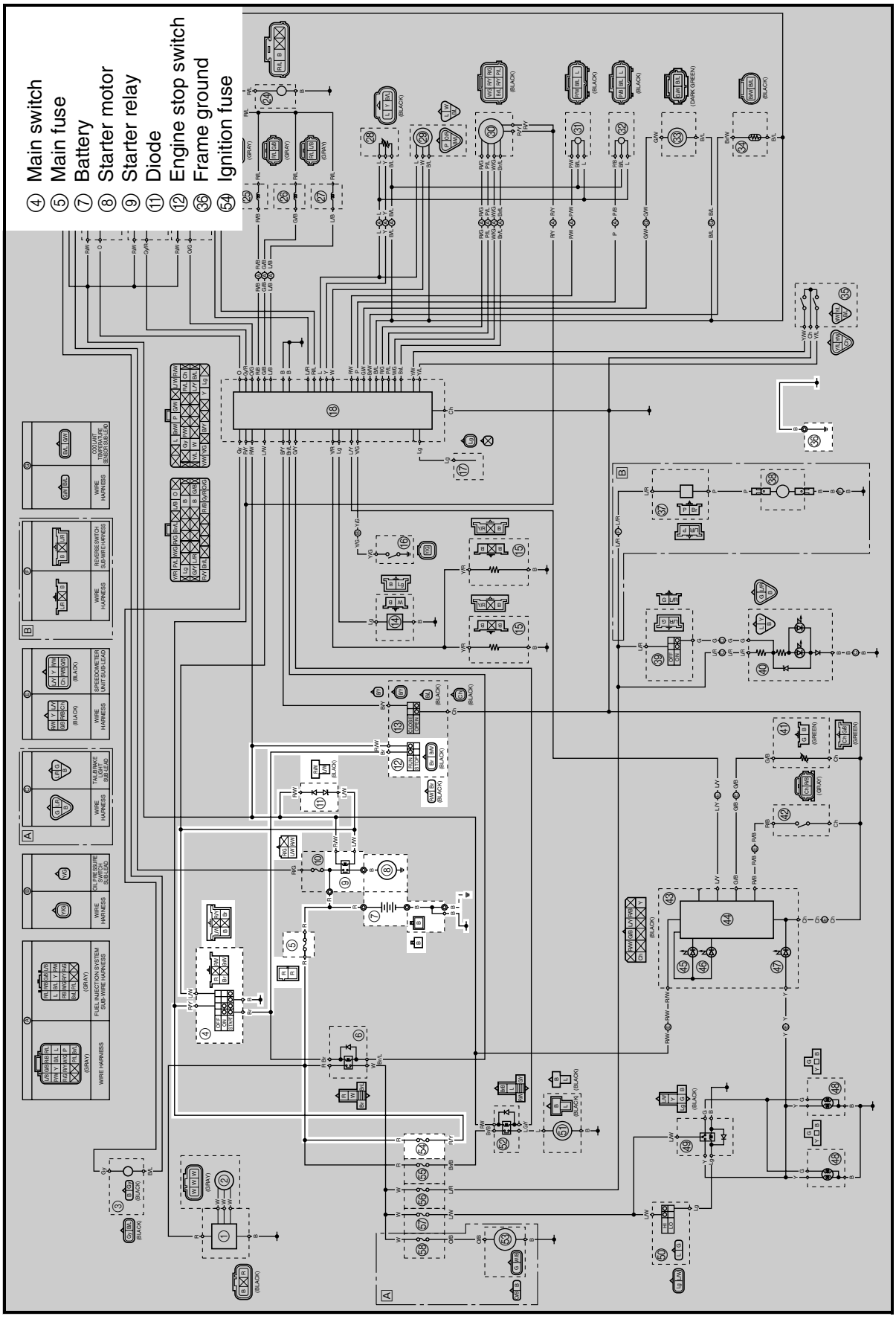
MAIN SWITCH

1. Disconnect:
   - Main switch coupler
2. Connect:
   - Pocket tester
     (to the main switch coupler)
3. Check:
   - Main switch continuity
     Faulty → Replace.

Switch position	Color code			
	Br	R	Br/W	R/W
OFF				
ON	○	○		
START	○	○	○	○

○——○ Continuity

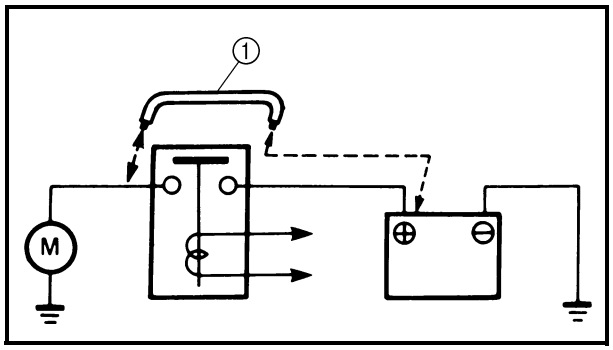
ELECTRICAL STARTING SYSTEM
CIRCUIT DIAGRAM



TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.

1. Connect:
   - Starter relay terminals
     (battery side and starter motor side)

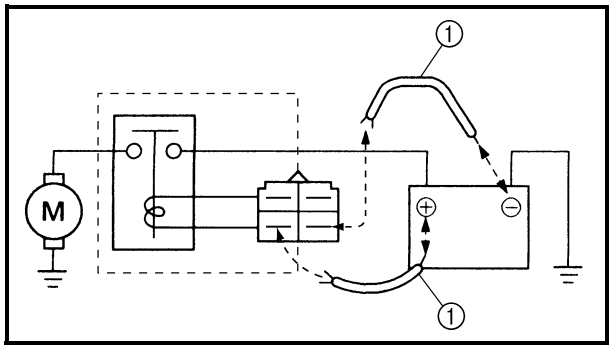


① Jumper lead

2. Check:
   - Starter motor operation

OK ⇩

3. Disconnect:
   - Starter relay coupler
4. Connect:
   - Starter relay coupler terminals



① Jumper lead

5. Check:
   - Starter motor operation

OK ⇩
*

NO ⇩

Check the battery and connectors.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩ NO ⇩

Charge or replace the battery. Refer to “BATTERY INSPECTION” in CHAPTER 2.

Repair or replace the starter motor.

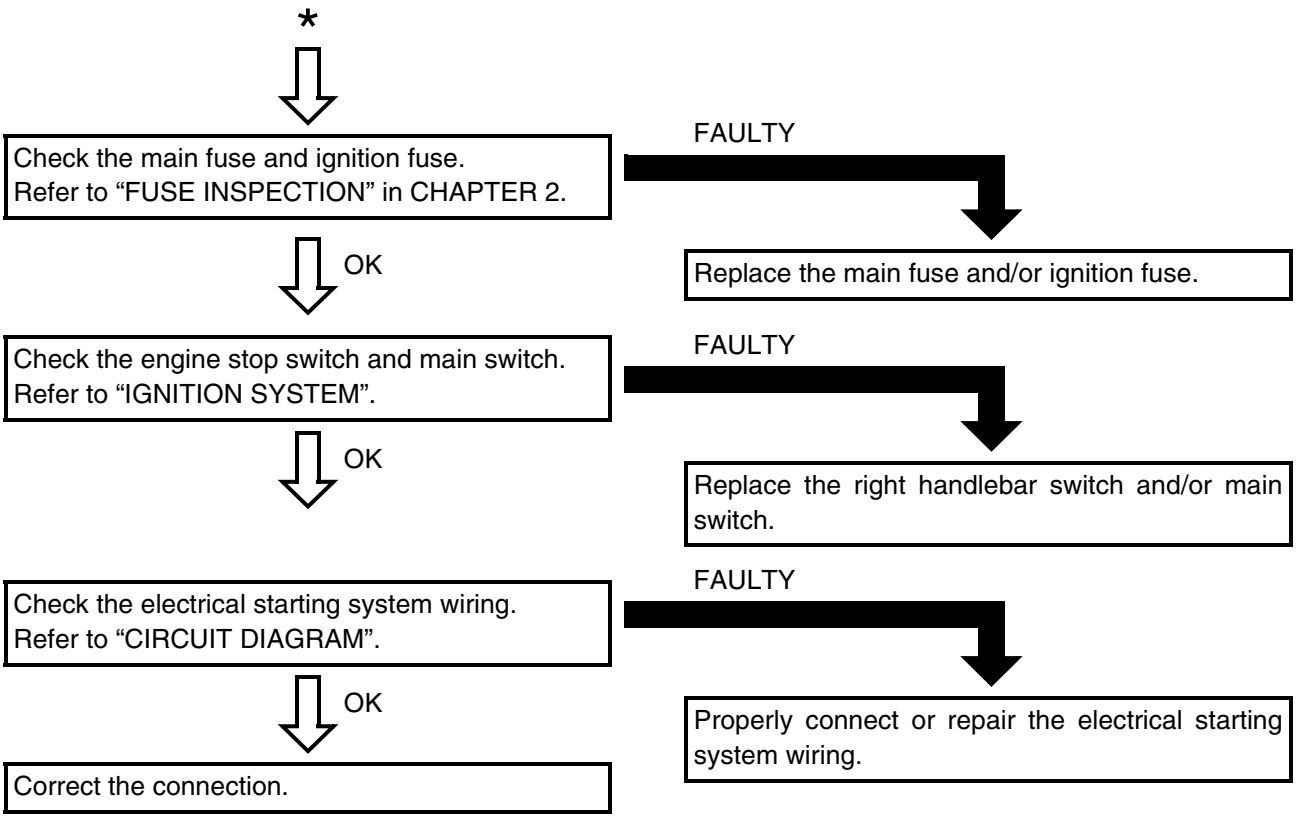
⚠ WARNING

A wire for the jumper lead ① must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.

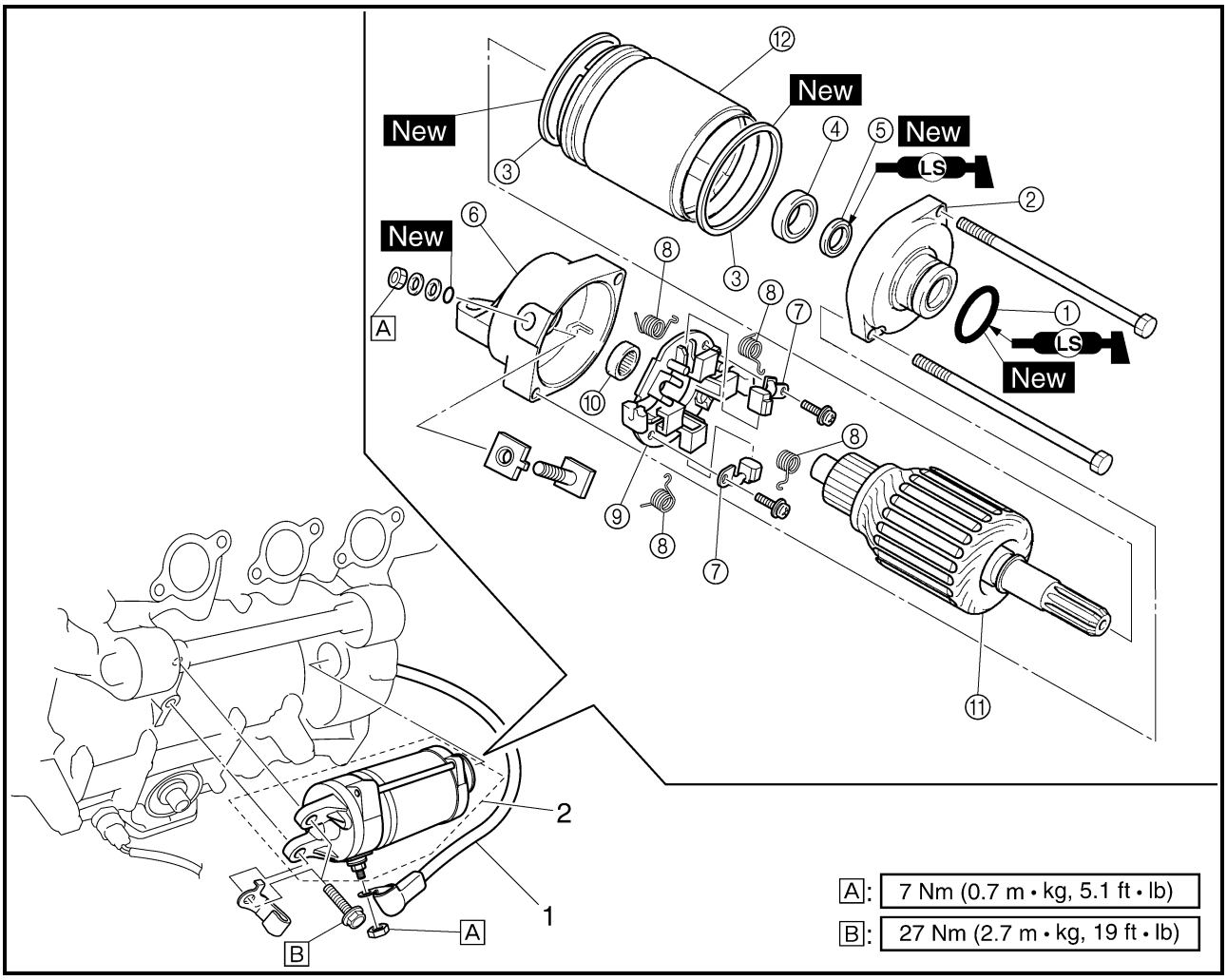
This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

NO ⇩

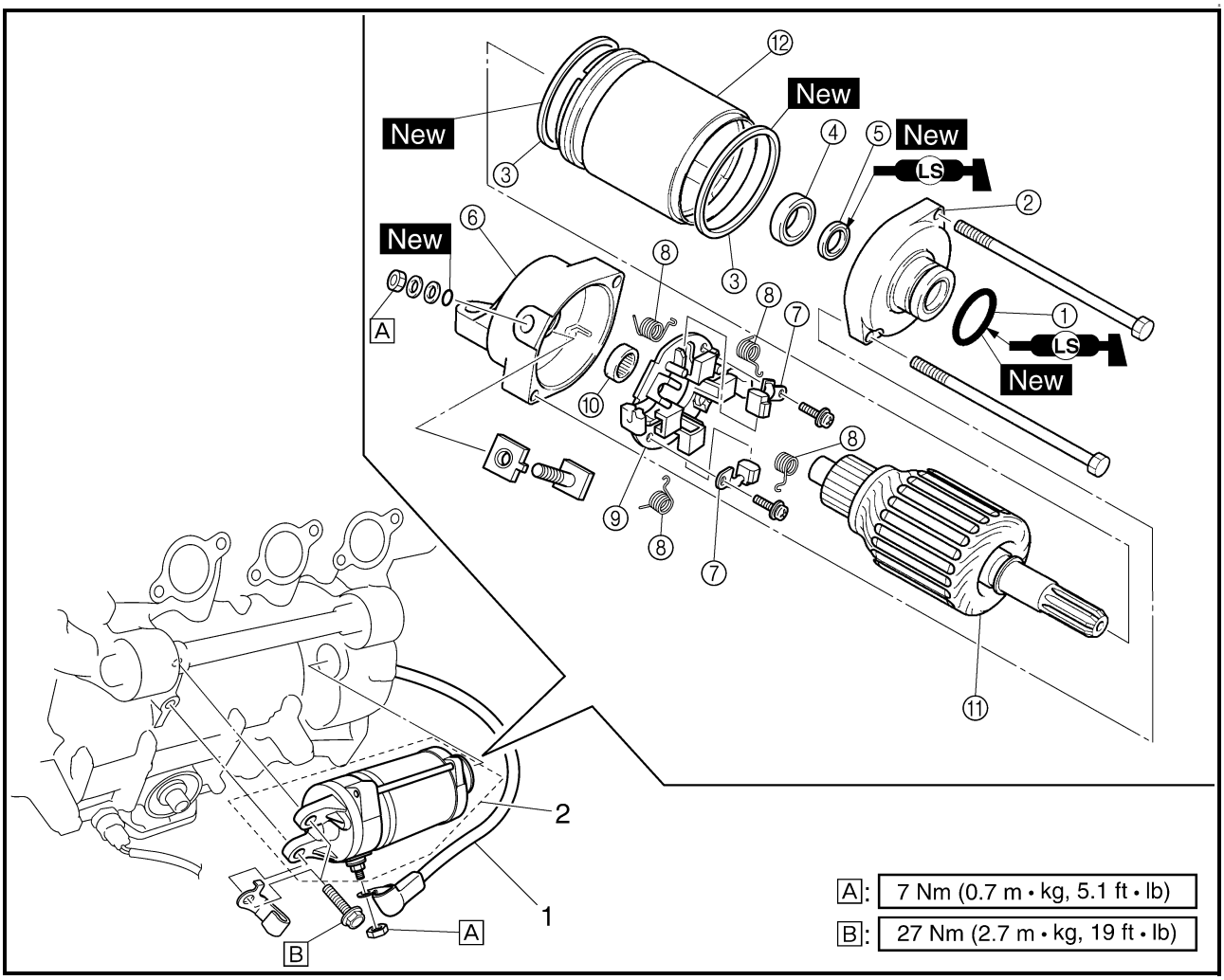
Replace the starter relay.


*
Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.
FAULTY
Replace the main fuse and/or ignition fuse.
OK
Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.
FAULTY
Replace the right handlebar switch and/or main switch.
OK
Check the electrical starting system wiring.
Refer to “CIRCUIT DIAGRAM”.
FAULTY
Properly connect or repair the electrical starting system wiring.
OK
Correct the connection.

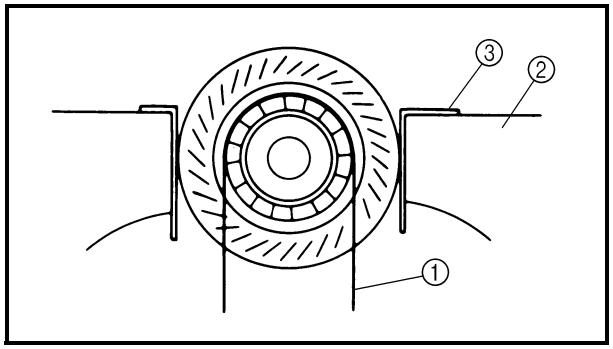
STARTER MOTOR



Order	Job name/Part name	Q'ty	Remarks
	Starter motor removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE ASSEMBLY" in CHAPTER 5.
1	Starter motor lead	1	
2	Starter motor assembly	1	
			For installation, reverse the removal procedure.
	Starter motor disassembly		Remove the parts in the order listed below.
①	O-ring	1	
②	Front bracket	1	
③	Gasket	2	
④	Bearing	1	
⑤	Oil seal	1	
⑥	Rear bracket	1	
⑦	Brush	2	
⑧	Brush spring	4	



Order	Job name/Part name	Q'ty	Remarks
⑨	Brush holder	1	
⑩	Bearing	1	
⑪	Armature assembly	1	
⑫	Starter motor yoke	1	
			For assembly, reverse the disassembly procedure.

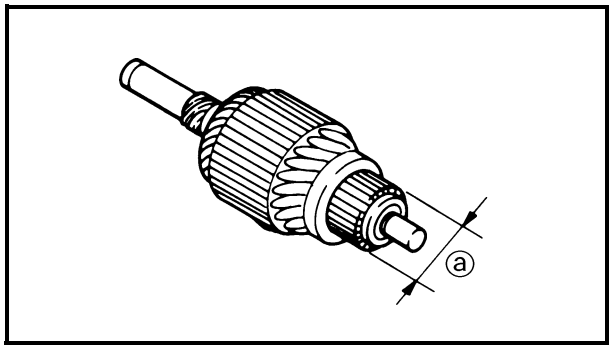


Inspection

1. Inspect:
   - Commutator (outer surface)
     Dirty → Clean with #600 grit sandpaper ①.
     Hold the armature in a vise ② and copper or aluminium plate ③.

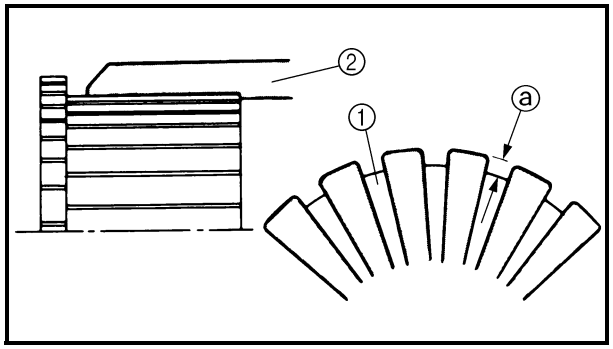
CAUTION:

Lightly grip the armature with a vise.



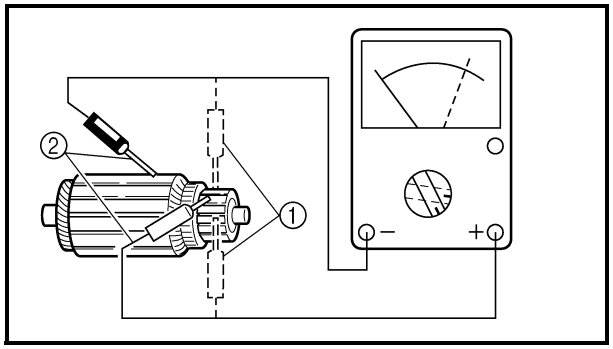
2. Measure:
   - Commutator diameter ⓐ
     Measure the diameter ⓐ of the commutator at points where the brush comes in contact.
     Out of specification → Replace the starter motor.

Commutator diameter wear limit:
27.0 mm (1.06 in)



3. Measure:
   - Mica undercut (insulation depth) ⓐ
     (between commutator segments)
     Out of specification → Scrape mica ① to proper limits.
     Use a hacksaw blade ② that is ground to fit.

Mica undercut:
1.0 mm (0.04 in)



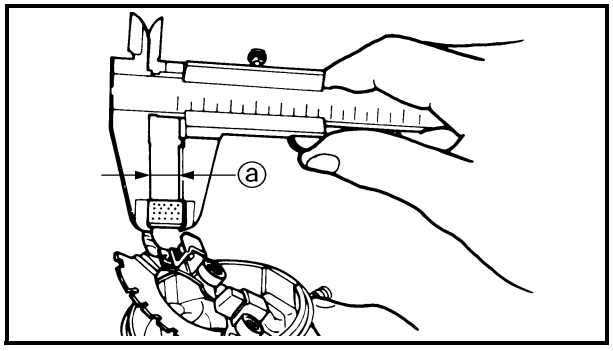
4. Measure:
   - Armature coil resistance
     (insulation/continuity)
     Out of specification → Replace the starter motor.

Inspecting steps:

- Connect the pocket tester for the continuity check ① and the insulation check ②.
- Measure the armature coil resistances.

Armature coil resistance:
Continuity check:
0.0081 ~ 0.0099 Ω at 20 °C (68 °F)
Insulation check:
Above 1 MΩ at 20 °C (68 °F)

- If the resistance is incorrect, replace the starter motor.



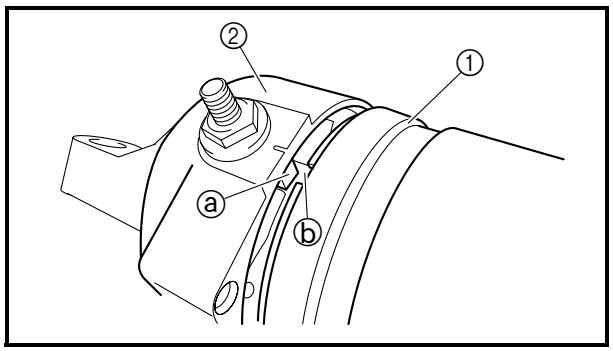
5. Measure:
   • Brush length ⓐ
   Out of specification → Replace the brushes as a set.

Brush length wear limit:
4.4 mm (0.17 in)

6. Measure:
   • Brush spring pressure
   Fatigue/out of specification → Replace the brush spring as a set.

Brush spring pressure:
7.36 ~ 11.04 N
(750 ~ 1,126 g, 26.49 ~ 39.74 oz)

7. Check:
   • Bearings
   • Oil seal
   Damage/wear → Replace the starter motor.

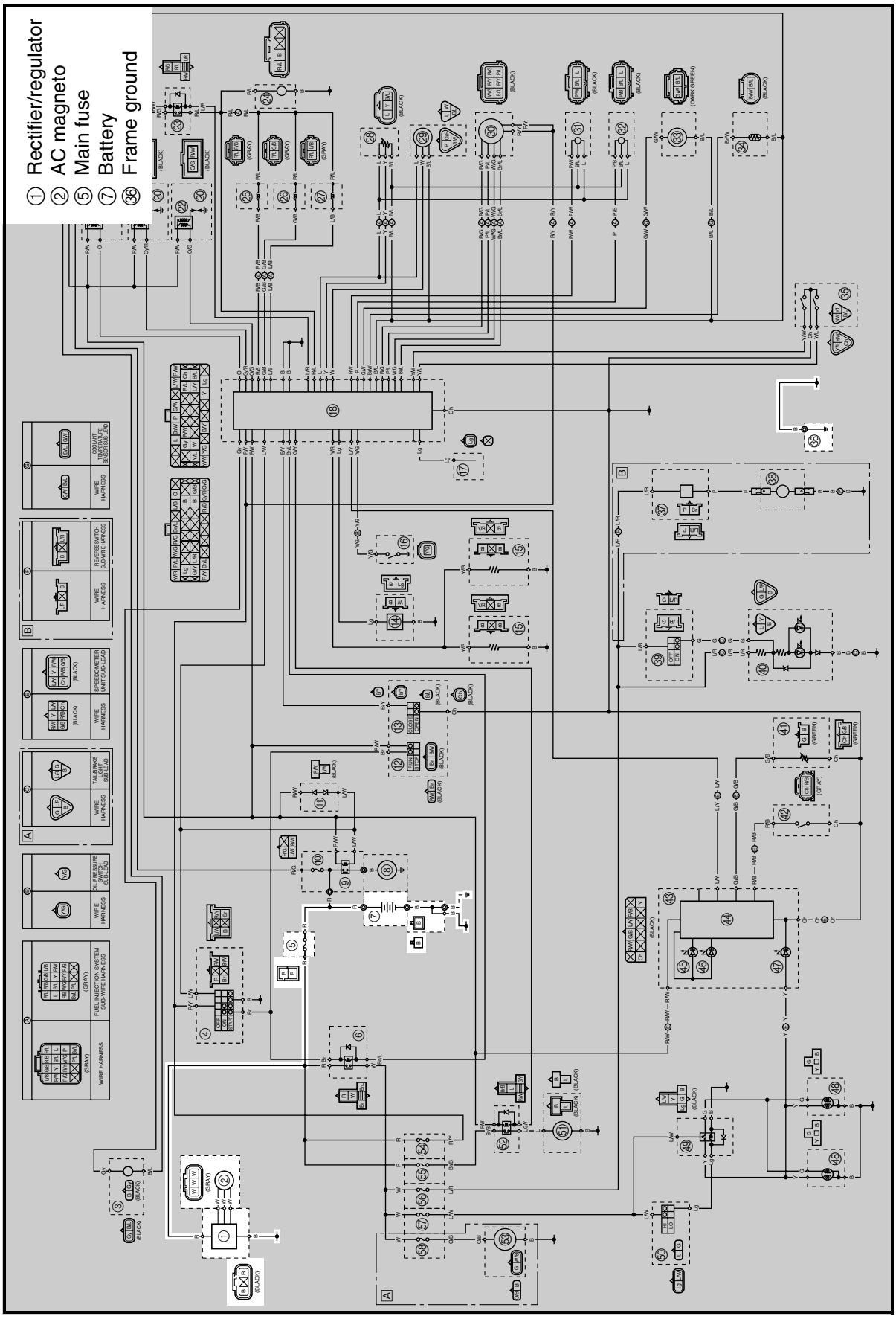


Assembly

1. Install:
   • Gaskets New
   • Starter motor yoke ①
   (to the rear bracket ②)

NOTE:
Align the projection ⓐ on the rear bracket with the slot ⓑ on the starter motor yoke.

CHARGING SYSTEM
CIRCUIT DIAGRAM



TROUBLESHOOTING

BATTERY IS NOT CHARGED.

1. Connect:
   - Pocket tester
     (to the battery terminals)
2. Measure:
   - Battery voltage

Battery voltage:
More than 12 V at 20 °C (68 °F)

OUT OF SPECIFICATION

- Check the battery.
- Replace or charge the battery.
  Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK

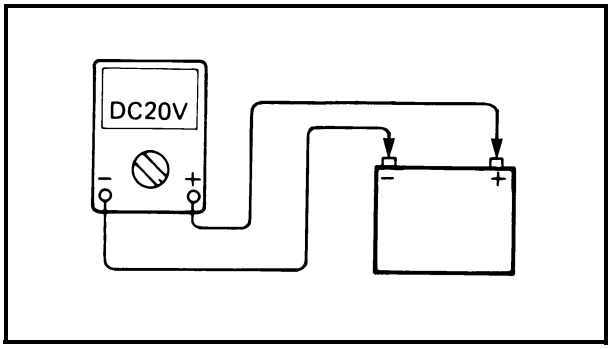
3. Start the engine and accelerate to 5,000 r/min.

NOTE:
Place the snowmobile onto a suitable stand to raise the track off of the ground.

4. Measure:
   - Charging voltage

Charging voltage:
14 V/5,000 r/min

OUT OF SPECIFICATION



- Check the main fuse.
  Refer to “FUSE INSPECTION” in CHAPTER 2.
- Check the stator coil.

OK

FAULTY

Replace the main fuse and/or the stator coil.

CAUTION:
Never disconnect the battery leads while the generator is operating; otherwise, the rectifier/regulator will be damaged.

Replace the rectifier/regulator.

OK

Check the charging system wiring.
Refer to “CIRCUIT DIAGRAM”.

FAULTY

OK

Correct the connector.

Properly connect or repair the charging system wiring.

BATTERY

Inspection

1. Inspect:
   - Battery condition
     Refer to “BATTERY INSPECTION” in CHAPTER 2.

Battery Storage

The battery should be stored if the snowmobile is not going to be used for a long period.

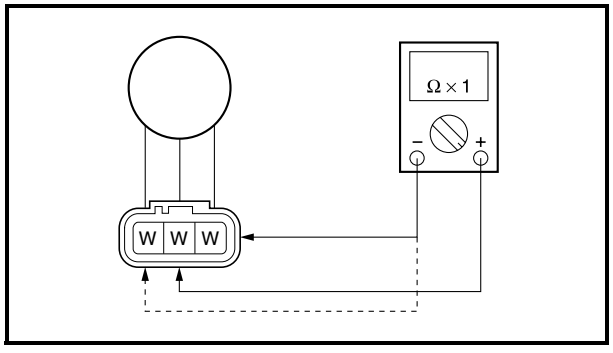
1. Remove:
   - Battery

⚠ WARNING

When removing the battery, disconnect the negative battery lead first.

Battery storage and maintenance tips:

- Recharge the battery periodically.
- Store the battery in a cool, dry place.
- Recharge the battery before reinstalling.
  Refer to “BATTERY INSPECTION” in CHAPTER 2.

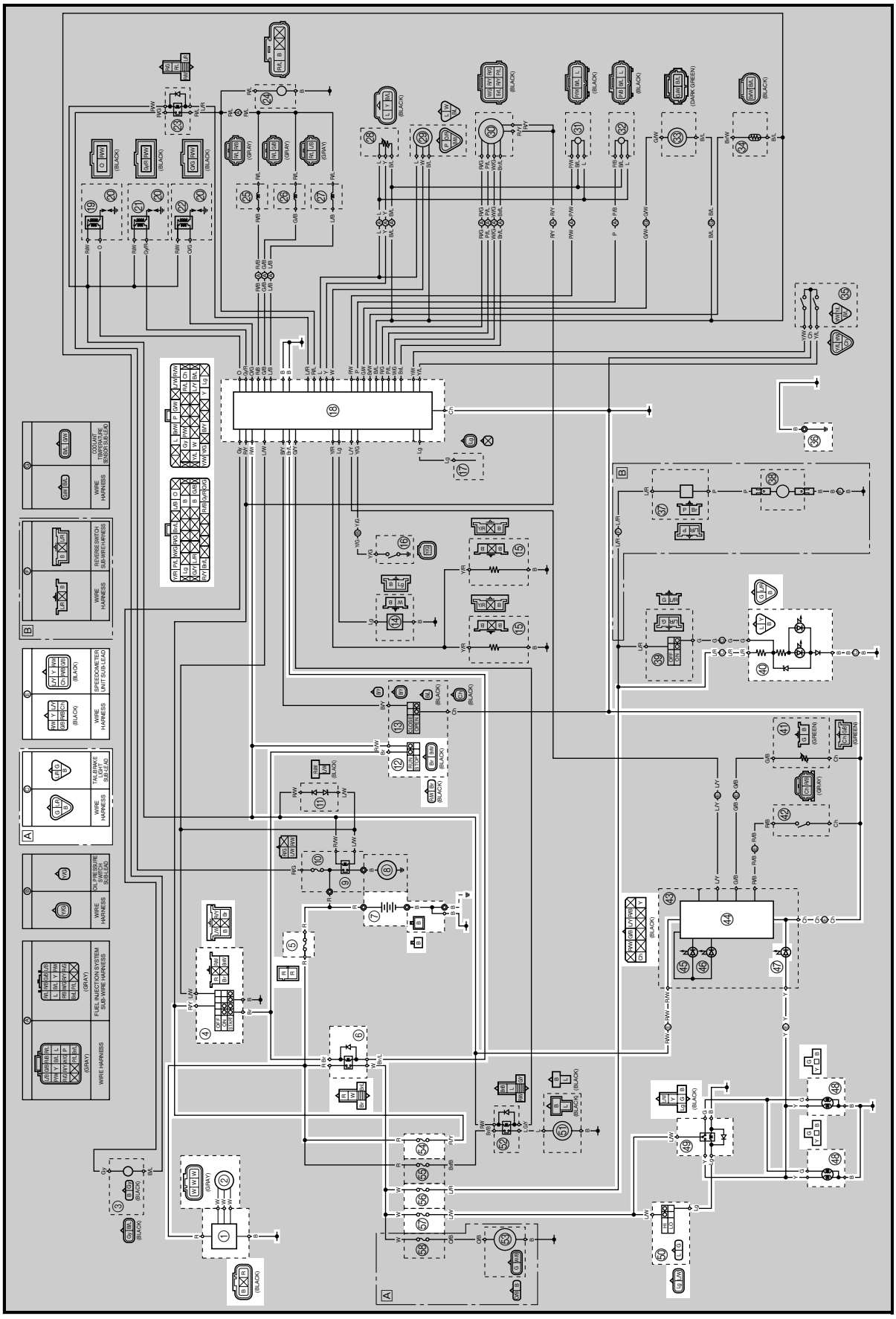


STATOR COIL

1. Disconnect:
   - Stator coil coupler
2. Connect:
   - Pocket tester
     (to the stator coil coupler)
3. Measure:
   - Stator coil resistance
     Out of specification → Replace.

Stator coil resistance:
0.22 ~ 0.26 Ω at 20 °C (68 °F)
(White – White)

LIGHTING SYSTEM
CIRCUIT DIAGRAM



LIGHTING SYSTEM

CIRCUIT DIAGRAM

① Rectifier/regulator
② AC magneto
④ Main switch
⑤ Main fuse
⑥ Load control relay
⑦ Battery
⑫ Engine stop switch
⑱ ECU (engine control unit)
㊱ Frame ground
㊵ Tail/brake light
㊹ Multi-function meter
㊼ High beam indicator light
㊽ Headlight
㊾ Headlight relay
㊿ Headlight beam switch
(54) Ignition fuse
(56) Signal fuse
(57) Headlight fuse

[A] FX10MT/FX10MTR/
FX10MTRA

TROUBLESHOOTING

HEADLIGHT AND/OR HIGH BEAM INDICATOR LIGHT DO NOT COME ON.

Check the headlight bulb(s).

OK ⇩

NO CONTINUITY ⇨ Replace the bulb(s).

Check the main fuse, ignition fuse, and headlight fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse, ignition fuse, and/or headlight fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the stator coil.
Refer to “CHARGING SYSTEM”.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the stator coil.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the headlight beam switch.

OK ⇩

FAULTY ⇨ Replace the left handlebar switch.

Check the headlight relay.

OK ⇩

FAULTY ⇨ Replace the headlight relay.

Check the load control relay.

OK ⇩

FAULTY ⇨ Replace the load control relay.

Check the lighting system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the lighting system wiring.

Correct the connection and/or replace the speedometer unit, rectifier/regulator, and/or ECU.

METER LIGHT DO NOT COME ON.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the lighting system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the lighting system wiring.

Correct the connection and/or replace the speedometer unit.

TAIL LIGHT DOES NOT COME ON.

Check the main fuse, ignition fuse, and signal fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse, ignition fuse, and/or signal fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the stator coil.
Refer to “CHARGING SYSTEM”.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the stator coil.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the load control relay.

OK ⇩

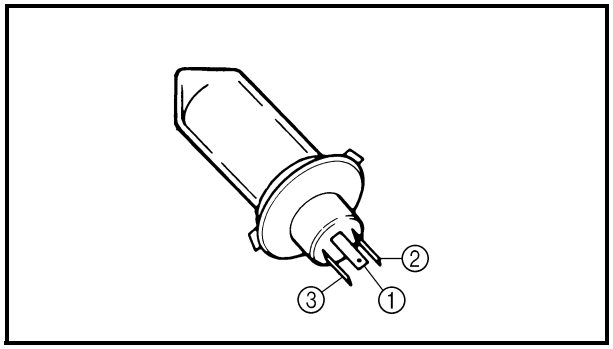
FAULTY ⇨ Replace the load control relay.

Check the lighting system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the lighting system wiring.

Correct the connection and/or replace the tail/brake light, rectifier/regulator, and/or ECU.



BULB(S)

NOTE:

Do not check any of the lights that use LEDs.

1. Remove:
   - Headlight bulb
2. Connect:
   - Pocket tester
     (to the bulb terminals)

⚠ WARNING

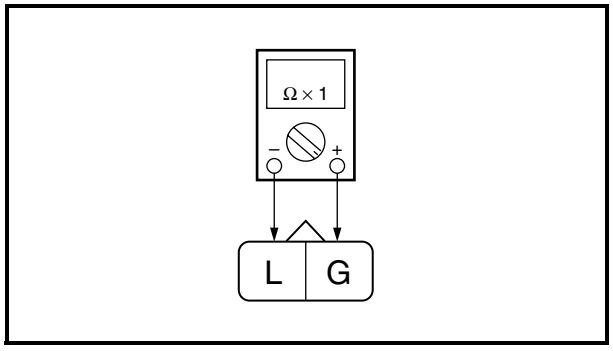
Keep flammable products and your hands away from the bulb while it is on; it will be hot. Do not touch the bulb until it cools down.

3. Check:
   - Bulb(s)

Terminal	Continuity
① – ③	Yes
② – ③	Yes

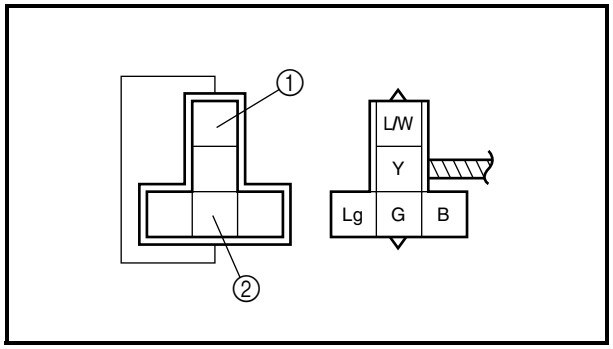
HEADLIGHT BEAM SWITCH

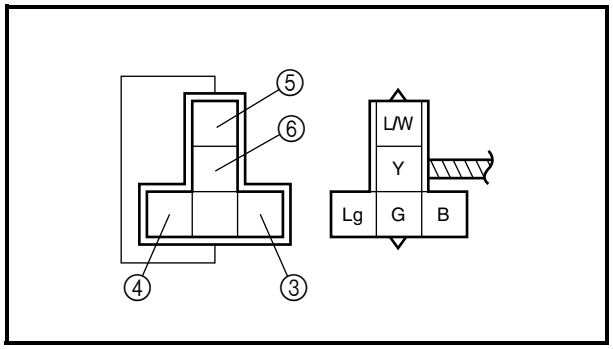
1. Disconnect:
   - Headlight beam switch coupler
2. Connect:
   - Pocket tester
     (to the headlight beam switch coupler)



3. Check:
   - Headlight beam switch continuity
     Faulty → Replace the left handlebar switch.

Switch position	Continuity
HI	Yes
LO	No





HEADLIGHT RELAY

1. Remove:
   - Headlight relay (with the black coupler)

Inspection steps:

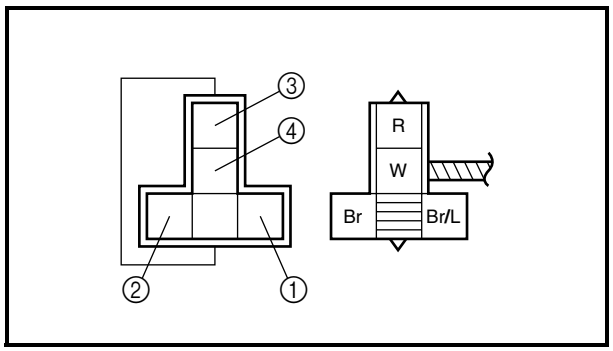
- Connect the pocket tester ($\Omega \times 1$) to the headlight relay terminals as shown.

Positive tester probe → Blue/White ①
Negative tester probe → Green ②

- If headlight relay does not have continuity between the blue/white and green terminals, replace it.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the headlight relay terminals as shown.

Positive battery terminal → Light green ③
Negative battery terminal → Black ④
Positive tester probe → Blue/White ⑤
Negative tester probe → Yellow ⑥

- If headlight relay does not have continuity between the blue/white and yellow terminals, replace it.



LOAD CONTROL RELAY

1. Remove:
   - Load control relay

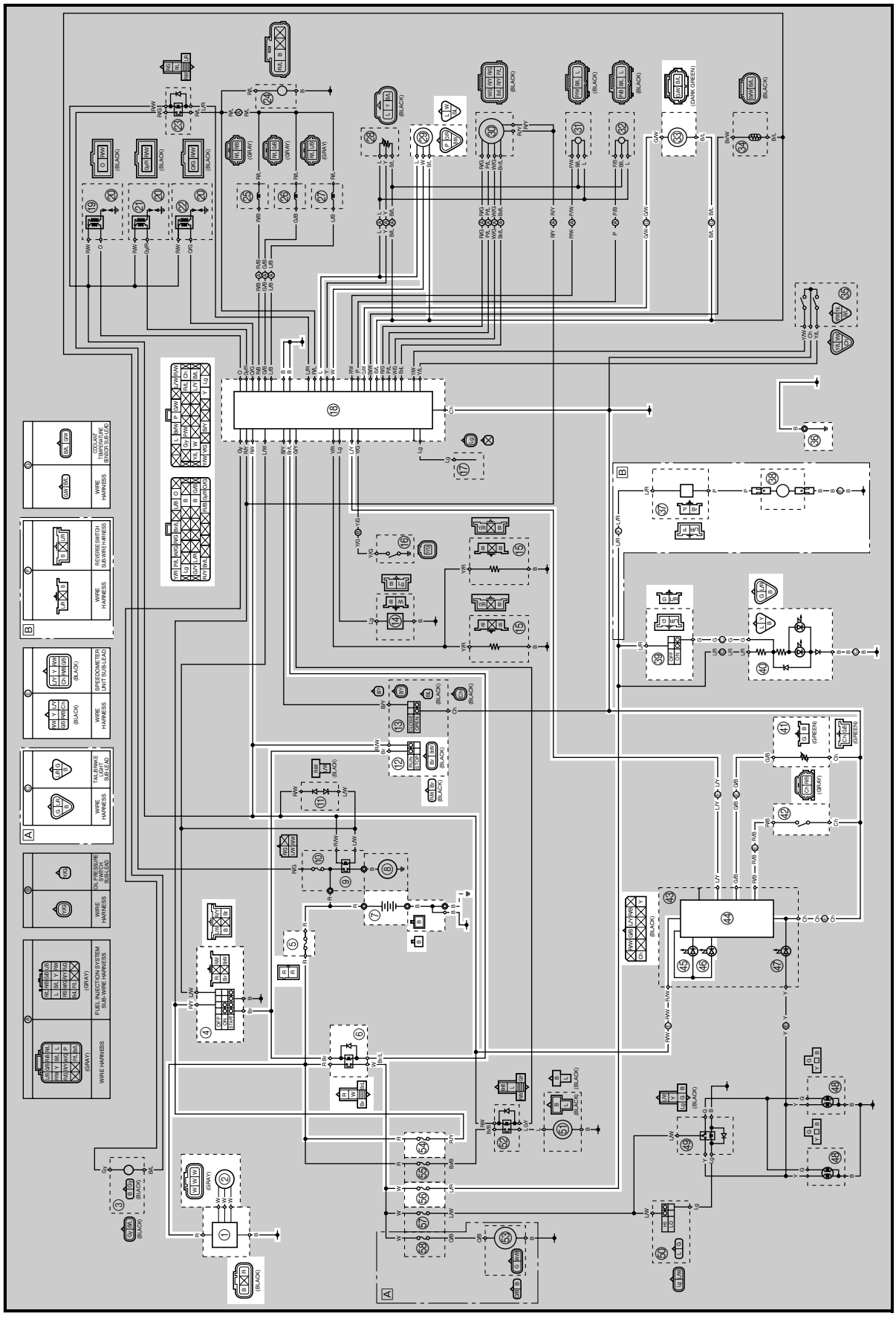
Inspection steps:

- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the load control relay terminals as shown.

Positive battery terminal → Brown ①
Negative battery terminal → Brown/Blue ②
Positive tester probe → Red ③
Negative tester probe → White ④

- If load control relay does not have continuity between the red and white terminals, replace it.

SIGNAL SYSTEM
CIRCUIT DIAGRAM



SIGNAL SYSTEM

CIRCUIT DIAGRAM

① Rectifier/regulator
② AC magneto
④ Main switch
⑤ Main fuse
⑥ Load control relay
⑦ Battery
⑫ Engine stop switch
⑱ ECU (engine control unit)
㉙ Speed sensor
㉝ Coolant temperature sensor
㊱ Frame ground
㊲ DC back buzzer
㊳ Gear position switch
㊴ Brake light switch
㊵ Tail/brake light
㊶ Fuel sender
㊷ Oil level switch
㊹ Multi-function meter
㊺ Warning light
㊻ Low coolant temperature indicator light
㊿ Ignition fuse
(56) Signal fuse

[A] FX10MT/FX10MTR/FX10MTRA
[B] FX10/FX10RTR/FX10RTRA/FX10MTR/FX10MTRA

TROUBLESHOOTING

BRAKE LIGHT DOES NOT COME ON.

Check the main fuse, ignition fuse, and signal fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse, ignition fuse, and/or signal fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the stator coil.
Refer to “CHARGING SYSTEM”.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the stator coil.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the brake light switch.

OK ⇩

FAULTY ⇨ Replace the brake light switch.

Check the load control relay.
Refer to “LIGHTING SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the load control relay.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

Correct the connection and/or replace the tail/brake light, rectifier/regulator, and/or ECU.

LOW COOLANT TEMPERATURE INDICATOR LIGHT, COOLANT TEMPERATURE WARNING INDICATOR AND/OR WARNING LIGHT DO NOT COME ON.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the coolant temperature sensor.

OK ⇩

FAULTY ⇨ Replace the coolant temperature sensor.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

Correct the connection and/or replace the speedometer unit and/or ECU.

FUEL METER AND/OR FUEL LEVEL WARNING INDICATOR AND/OR WARNING LIGHT DO NOT COME ON.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the fuel sender.

OK ⇩

FAULTY ⇨ Replace the fuel sender.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

Correct the connection and/or replace the speedometer unit and/or ECU.

OIL LEVEL WARNING INDICATOR AND/OR WARNING LIGHT DO NOT COME ON.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the oil level switch.

OK ⇩

FAULTY ⇨ Replace the oil level switch.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

Correct the connection and/or replace the speedometer unit and/or ECU.

SPEEDOMETER DOES NOT OPERATE.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the speed sensor.

OK ⇩

FAULTY ⇨ Replace the speed sensor.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

Correct the connection and/or replace the speedometer unit and/or ECU.

BACK BUZZER DOES NOT SOUND. (FX10/FX10RTR/FX10RTRA/FX10MTR/FX10MTRA)

Check the main fuse, ignition fuse, and signal fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse, ignition fuse, and/or signal fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the stator coil.
Refer to “CHARGING SYSTEM”.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace the stator coil.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the right handlebar switch and/or main switch.

Check the load control relay.
Refer to “LIGHTING SYSTEM”.

OK ⇩

FAULTY ⇨ Replace the load control relay.

Check the DC back buzzer.

OK ⇩

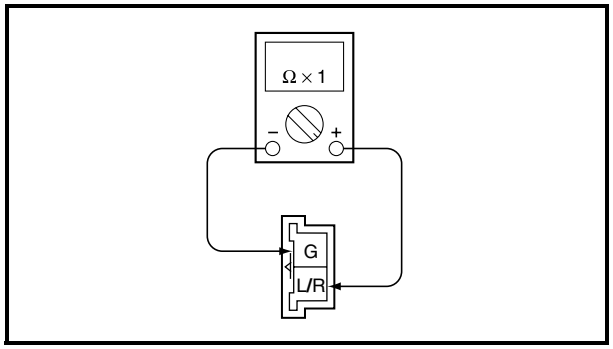
DOES NOT SOUND ⇨ Replace the DC back buzzer.

Check the signal system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the signal system wiring.

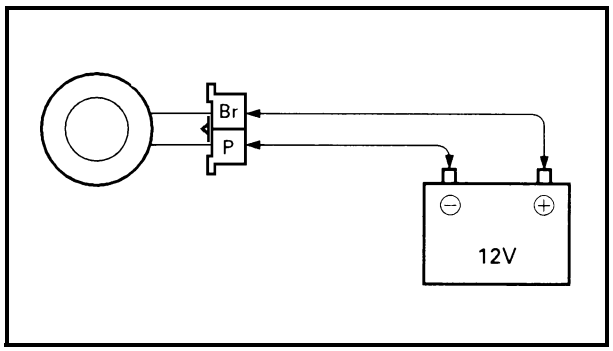
Correct the connection and/or replace the rectifier/ regulator and/or ECU.



BRAKE LIGHT SWITCH

1. Disconnect:
   - Brake light switch coupler
2. Connect:
   - Pocket tester
     (to the brake light switch coupler)
3. Check:
   - Brake light switch continuity
     Faulty → Replace.

Switch position	Continuity
Brake lever operates	Yes
Brake lever does not operate	No



DC BACK BUZZER (FX10/FX10RTR/ FX10RTRA/FX10MTR/FX10MTRA)

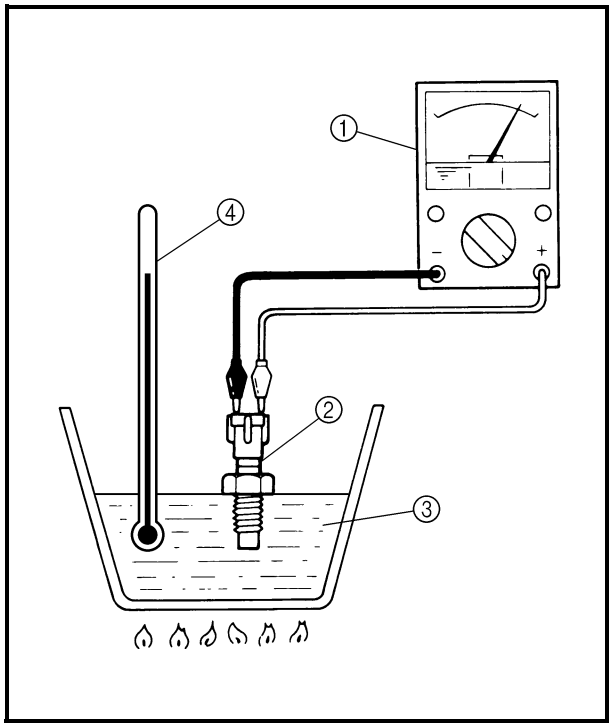
1. Disconnect:
   - DC back buzzer coupler
2. Connect:
   - Battery
     (to the DC back buzzer coupler)
3. Check:
   - DC back buzzer
     Does not sound → Replace.

COOLANT TEMPERATURE SENSOR

1. Remove the coolant temperature sensor.

CAUTION:

Handle the coolant temperature sensor with special care. Never subject it to shock or allow it to be dropped. If it is dropped, it must be replaced.



2. Connect:
   - Pocket tester ①
     (to the coolant temperature sensor)

NOTE:

Set the tester selector to the "Ω × 1k" position.

3. Immerse the coolant temperature sensor ② in coolant ③ and check the coolant temperature sensor operation.

Coolant temperature sensor resistance:
5.21 ~ 6.37 kΩ at 0 °C (32 °F)
0.290 ~ 0.354 kΩ at 80 °C (176 °F)

④ Thermometer

CAUTION:

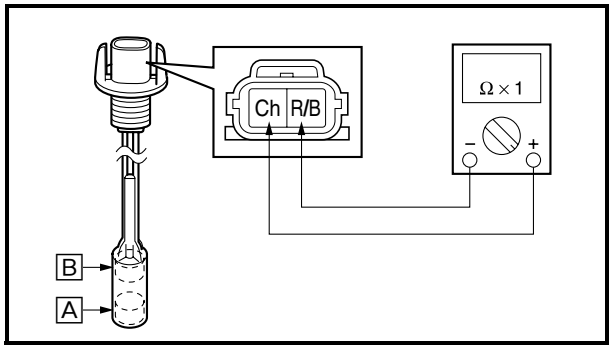
Never heat the coolant to a temperature of 120 °C (248 °F) or more.

4. If the coolant temperature sensor operation is defective, replace it.
5. Install the coolant temperature sensor.

Coolant temperature sensor:
23 Nm (2.3 m · kg, 17 ft · lb)

CAUTION:

Do not overtighten the coolant temperature sensor.

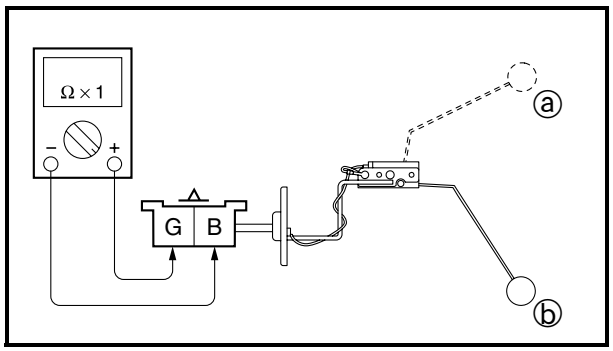


OIL LEVEL SWITCH

1. Remove:
   - Oil level switch
2. Connect:
   - Pocket tester
     (to the oil level switch coupler)
3. Check:
   - Oil level switch continuity
     Faulty → Replace.

Switch position		Good condition	Bad condition		
A	Down position	○	×	×	○
B	Up position	×	○	×	○

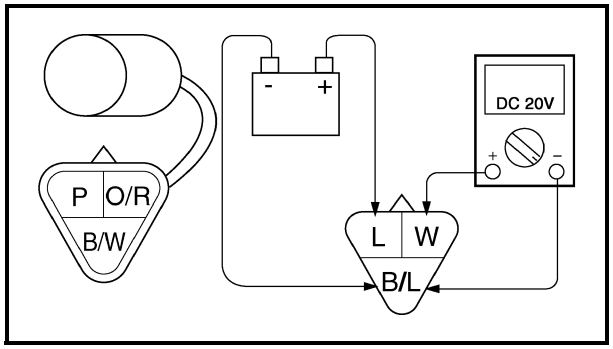
○: Continuity × : No continuity



FUEL SENDER

1. Remove:
   - Fuel sender
     (from the fuel tank)
2. Connect:
   - Pocket tester
     (to the fuel sender coupler)
3. Measure:
   - Fuel sender resistance (full ⓐ)
   - Fuel sender resistance (empty ⓑ)
     Out of specification → Replace.

Fuel sender resistance (full):
10 ~ 12 Ω at 20 °C (68 °F)
Fuel sender resistance (empty):
179 ~ 185 Ω at 20 °C (68 °F)



SPEED SENSOR

1. Inspect:
   - Speed sensor

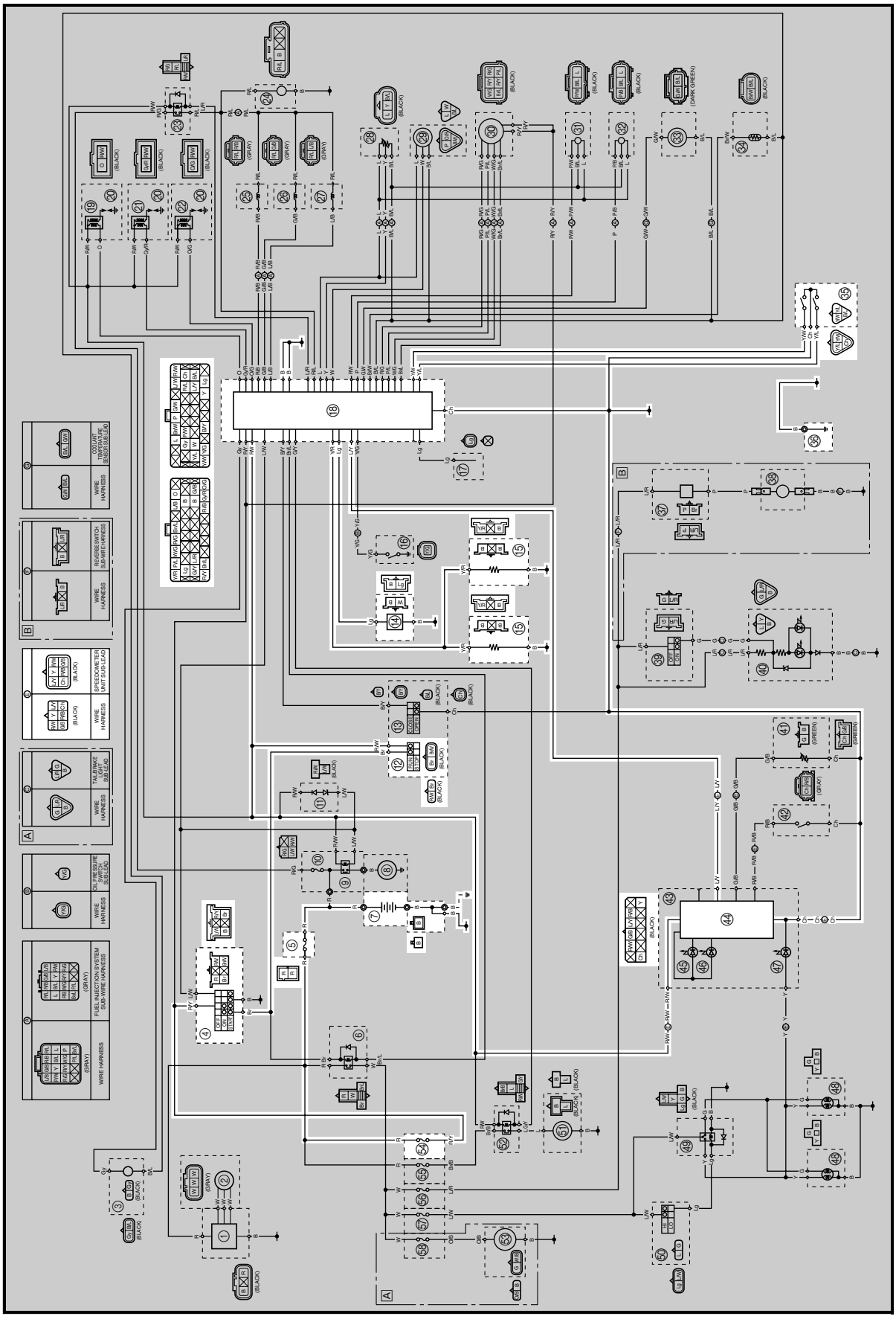
Inspection steps:

- Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.

Positive tester probe → White
Negative tester probe → Black/Blue
Positive battery terminal → Blue
Negative battery terminal → Black/Blue

- Elevate the track and slowly rotate it.
- Measure the voltage (DC 5 V) of white and black/blue. With each full rotation of the track the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.
  Out of specification → Replace.

GRIP WARMER SYSTEM
CIRCUIT DIAGRAM



GRIP WARMER SYSTEM

CIRCUIT DIAGRAM

④ Main switch
⑤ Main fuse
⑦ Battery
⑫ Engine stop switch
⑭ Thumb warmer
⑮ Grip warmer
⑱ ECU (engine control unit)
㉟ Grip/thumb warmer adjustment switch
㊱ Frame ground
㊹ Multi-function meter
㊿ Ignition fuse

TROUBLESHOOTING

GRIP WARMER AND THUMB WARMER DO NOT OPERATE.

Check the main fuse and ignition fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse and/or ignition fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

NO CONTINUITY ⇨ Replace the right handlebar switch and/or main switch.

Check the grip warmer and thumb warmer.

OK ⇩

NO CONTINUITY ⇨ Replace the grip warmer and/or thumb warmer.

Check the grip/thumb warmer adjustment switch.

CORRECT ⇩

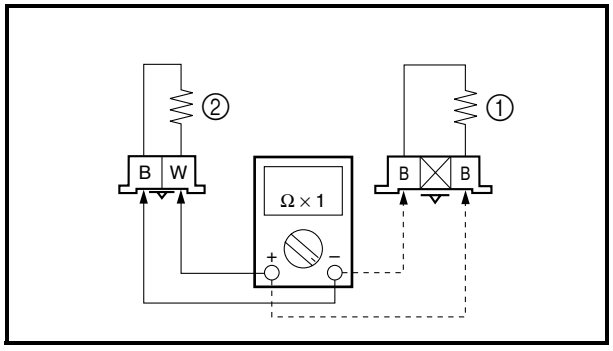
NO CONTINUITY ⇨ Replace the left handlebar switch.

Check the grip warmer system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the grip warmer system wiring.

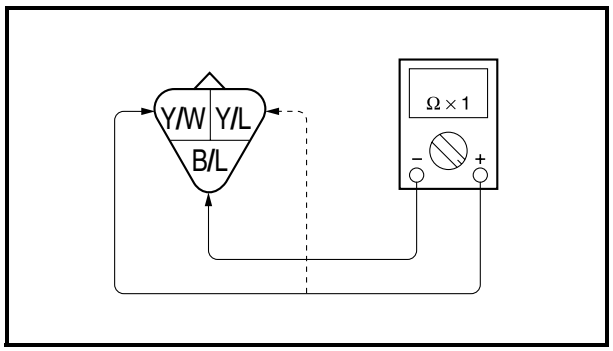
Correct the connection and/or replace the speedometer unit and/or ECU.



GRIP WARMER AND THUMB WARMER

1. Disconnect:
   - Grip warmer couplers
   - Thumb warmer coupler
2. Connect:
   - Pocket tester
     (to the grip warmer couplers and/or thumb warmer coupler)
3. Measure:
   - Grip warmer resistance ①
   - Thumb warmer resistance ②
     Out of specification → Replace the defective part(s).

Grip warmer resistance:
6.12 ~ 7.48 Ω at 20 °C (68 °F)
(Black – Black)
Thumb warmer resistance:
36.99 ~ 45.21 Ω at 20 °C (68 °F)
(White – Black)



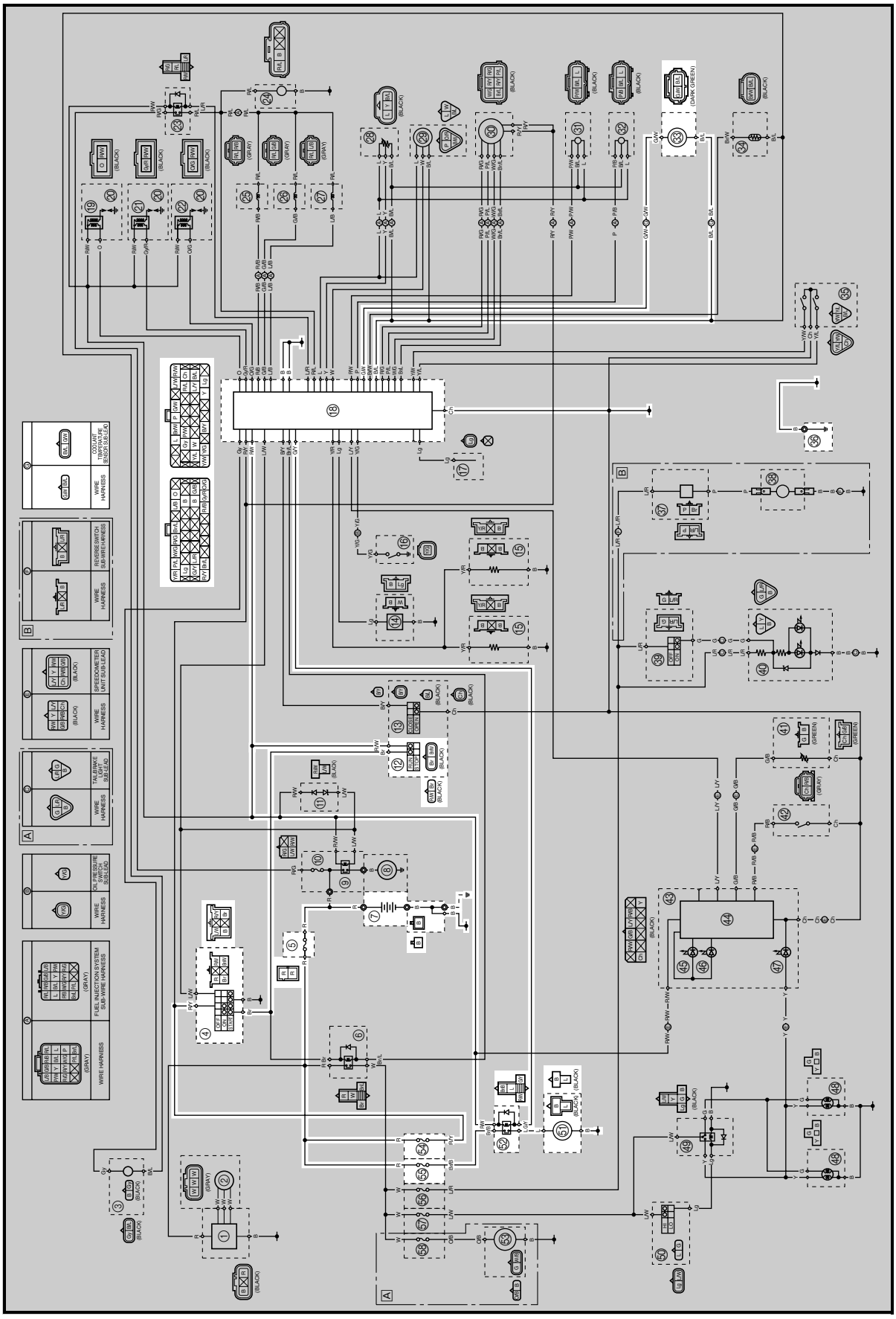
GRIP/THUMB WARMER ADJUSTMENT SWITCH

1. Disconnect:
   - Grip/thumb warmer adjustment switch coupler
2. Connect:
   - Pocket tester
     (to the grip/thumb warmer adjustment switch coupler)
3. Check:
   - Grip/thumb warmer adjustment switch continuity
     Faulty → Replace the left handlebar switch.

Switch position	Color code		
	Y/W	B/L	Y/L
THUMB	○——○		
OFF			
GRIP		○——○	

○——○ Continuity

COOLING SYSTEM
CIRCUIT DIAGRAM



COOLING SYSTEM

CIRCUIT DIAGRAM

④ Main switch
⑤ Main fuse
⑦ Battery
⑫ Engine stop switch
⑱ ECU (engine control unit)
㉝ Coolant temperature sensor
㊱ Frame ground
㊶ Radiator fan motor
㊷ Radiator fan motor relay
㊹ Ignition fuse
㊺ Radiator fan motor fuse

TROUBLESHOOTING

THE RADIATOR FAN MOTOR DOES NOT MOVE

Check the main fuse, ignition fuse, and radiator fan motor fuse.
Refer to “FUSE INSPECTION” in CHAPTER 2.

OK ⇩

FAULTY ⇨ Replace the main fuse, ignition fuse, and/or radiator fan motor fuse.

Check the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

OK ⇩

OUT OF SPECIFICATION ⇨ Replace or charge the battery.
Refer to “BATTERY INSPECTION” in CHAPTER 2.

Check the engine stop switch and main switch.
Refer to “IGNITION SYSTEM”.

OK ⇩

NO CONTINUITY ⇨ Replace the right handlebar switch and/or main switch.

Check the radiator fan motor.

OK ⇩

FAULTY ⇨ Replace the radiator fan motor.

Check the radiator fan motor relay.

OK ⇩

FAULTY ⇨ Replace the radiator fan motor relay.

Check the coolant temperature sensor.
Refer to “SIGNAL SYSTEM”.

OK ⇩

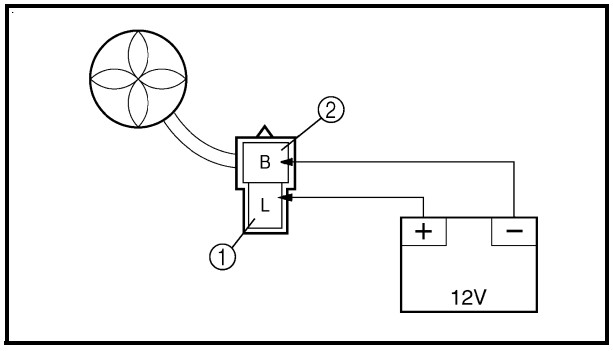
FAULTY ⇨ Replace the coolant temperature sensor.

Check the cooling system wiring.
Refer to “CIRCUIT DIAGRAM”.

OK ⇩

FAULTY ⇨ Properly connect or repair the cooling system wiring.

Correct the connection and/or replace the ECU.

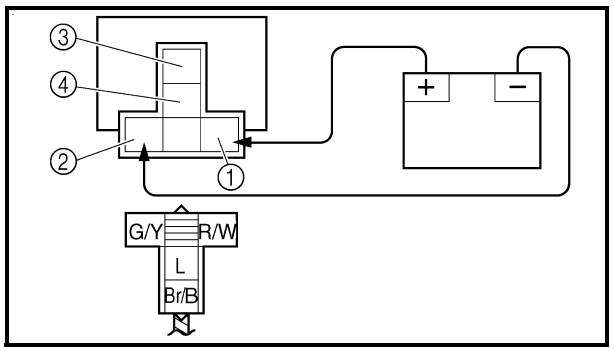


RADIATOR FAN MOTOR

1. Disconnect:
   - Radiator fan motor coupler
2. Connect:
   - Battery
     (to the radiator fan motor coupler)
3. Inspect:
   - Radiator fan motor

Positive battery terminal → Blue ①
Negative battery terminal → Black ②

Does not move → Replace the radiator fan motor.



RADIATOR FAN MOTOR RELAY

1. Remove:
   - Radiator fan motor relay

Inspection steps:

- Connect the pocket tester (Ω × 1) and battery (12 V) to the radiator fan motor relay terminals as shown.

Positive battery terminal → Red/White ①
Negative battery terminal → Green/Yellow ②
Positive tester probe → Brown/Black ③
Negative tester probe → Blue ④

- If radiator fan motor relay does not have continuity between the brown/black and blue terminals, replace it.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Model code number:	8GL1 (FX10 “USA/Canada”) 8GL2 (FX10 “Europe”) 8HJ1 (FX10RT “USA/Canada”) 8HB1 (FX10RTR “USA/Canada”) 8HB2 (FX10RTR “Europe”) 8HB3 (FX10RTRA “USA/Canada”) 8HB4 (FX10RTRA “Europe”) 8HA1 (FX10MT “USA”) 8HA5 (FX10MTR “USA/Canada”) 8HA6 (FX10MTR “Europe”) 8HA7 (FX10MTRA “USA/Canada”) 8HA8 (FX10MTRA “Europe”)
Dimensions:	
Overall length	2,815 mm (110.8 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 3,240 mm (127.6 in) (FX10MT/FX10MTR/FX10MTRA)
Overall width	1,205 mm (47.4 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 1,225 mm (48.2 in) (FX10MT/FX10MTR/FX10MTRA)
Overall height	1,160 mm (45.7 in)
Weight:	
Dry weight	233.0 kg (513.7 lb) (FX10RT) 236.0 kg (520.3 lb) (FX10RTR “USA/Canada”/FX10RTRA “USA/Canada”) 237.0 kg (522.5 lb) (FX10 “USA/Canada”/FX10RTR “Europe”/FX10RTRA “Europe”) 238.0 kg (524.7 lb) (FX10 “Europe”) 247.0 kg (544.5 lb) (FX10MT) 251.0 kg (553.4 lb) (FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 252.0 kg (555.6 lb) (FX10MTR “Europe”/FX10MTRA “Europe”)
Minimum turning radius:	
Clockwise	3.8 m (12.47 ft) (FX10/FX10RT/FX10RTR/FX10RTRA) 4.1 m (13.45 ft) (FX10MT/FX10MTR/FX10MTRA)
Counterclockwise	3.8 m (12.47 ft) (FX10/FX10RT/FX10RTR/FX10RTRA) 4.1 m (13.45 ft) (FX10MT/FX10MTR/FX10MTRA)

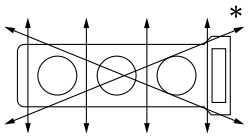
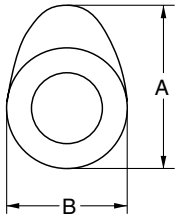
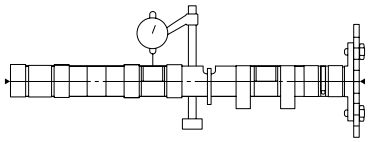
Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Engine:	
Engine type	Liquid-cooled, 4-stroke, DOHC
Cylinder arrangement	Backward-inclined parallel 3-cylinder
Displacement	1,049.0 cm^3
Bore × stroke	82.0 × 66.2 mm (3.23 × 2.61 in)
Compression ratio	11.0 : 1
Maximum hose power r/min	8,750 r/min
Maximum torque r/min	7,000 r/min
Vacuum pressure at engine idling speed	25.37 ~ 28.03 kPa (0.25 ~ 0.28 kg/cm^2, 3.61 ~ 3.99 psi)
Standard compression pressure (at sea level)	1,500 kPa (15.0 kg/cm^2, 213.3 psi) at 400 r/min
Starting system	Electric starter
Lubrication system:	Dry sump
Engine oil:	
Type	YAMALUBE 4-S (0W-30) or SAE 0W-30 (USA/Canada) SAE 0W-30 (Europe)
Recommended grade	API service SG type or higher, JASO standard MA
Oil capacity	
Periodic oil change	3.00 L (2.64 Imp qt, 3.17 US qt)
With oil filter cartridge replacement	3.20 L (2.82 Imp qt, 3.38 US qt)
Total amount	3.90 L (3.43 Imp qt, 4.12 US qt)
Oil tank capacity	2.70 L (2.38 Imp qt, 2.85 US qt)
Oil filter:	
Oil filter type	Cartridge (paper)
Drive chain oil:	
Type	Gear oil “GL-3” 75W or 80W
Capacity	0.20 L (0.18 Imp qt, 0.21 US qt)
Coolant:	
Radiator cap opening pressure	107.9 ~ 137.3 kPa (1.08 ~ 1.37 kg/cm^2, 15.3 ~ 19.5 psi)
Capacity	3.40 L (2.99 Imp qt, 3.59 US qt) (FX10/FX10RT/FX10RTR/FX10RTRA) 4.70 L (4.14 Imp qt, 4.97 US qt) (FX10MT/FX10MTR/FX10MTRA)
Fuel:	
Type	Regular unleaded gasoline only Pump Octane (R + M)/2; 86 or higher (USA/Canada) Research Octane; 91 or higher (Europe)
Tank capacity	28.0 L (6.16 Imp gal, 7.40 US gal)
Throttle body:	
Type/Quantity	41EIDW × 2
Manufacture	MIKUNI
Spark plug:	
Type	CR9E
Manufacture	NGK
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

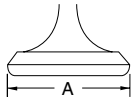
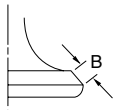
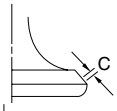
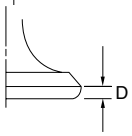
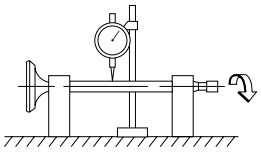
Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Transmission:	
Primary reduction system	V-Belt
Primary reduction ratio	3.80 ~ 1.00 : 1
Clutch type	Automatic centrifugal engagement
Secondary reduction system	Chain
Secondary reduction ratio	1.86 (39/21) (FX10/FX10RT/FX10RTR/FX10RTRA) 1.82 (40/22) (FX10MTR “Europe”/FX10MTRA “Europe”) 2.00 (40/20) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Reverse system	No (FX10RT/FX10MT) Yes (FX10/FX10RTR/FX10RTRA/FX10MTR/FX10MTRA)
Reverse gear ratio	2.38 (FX10/FX10RTR/FX10RTRA) 2.50 (FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 2.27 (FX10MTR “Europe”/FX10MTRA “Europe”)
Chassis:	
Frame type	Monocoque
Caster	23.0°
Ski stance (center to center)	1,050 mm (41.3 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 980 mm (38.6 in) (FX10MT/FX10MTR/FX10MTRA)
Suspension:	
Front suspension type	Double wishbone
Rear suspension type	Slide rail suspension
Track:	
Material	Molded rubber, fiberglass-rod reinforced
Track type	Internal drive type
Track width	381.0 mm (15.00 in)
Length on ground	810 mm (31.9 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 1,092 mm (43.0 in) (FX10MT/FX10MTR/FX10MTRA)
Track deflection mm/100 N (10 kg, 22 lb)	25.0 ~ 30.0 mm (0.98 ~ 1.18 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 30.0 ~ 35.0 mm (1.18 ~ 1.38 in) (FX10MT/FX10MTR/FX10MTRA)
Brake:	
Brake type	Hydraulic disc type (ventilated disc)
Operation method	Handle lever, left hand operated
Electrical:	
Ignition system	T.C.I.
Generator system	AC magneto

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Headlight bulb type:	Halogen bulb
Bulb wattage × Quantity:	
Headlight	12 V, 60/55 W × 2
Tail/brake light	LED
Meter light	LED
Warning light	LED
High beam indicator light	LED
Low coolant temperature indicator light	LED

MAINTENANCE SPECIFICATIONS

ENGINE

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Cylinder head:	
Volume (with spark plug)	25.21 ~ 26.01 cm^3 (1.54 ~ 1.59 cu.in)
<Warpage limit> 	0.10 mm (0.0039 in) ∗ Lines indicate straight edge measurement.
Cylinder:	
Material	Aluminum alloy with dispersion coating
Bore size	82.000 ~ 82.010 mm (3.2283 ~ 3.2287 in)
<Taper limit>	0.050 mm (0.0020 in)
<Out of round>	0.050 mm (0.0020 in)
Camshaft:	
Drive system	Chain drive (right)
Camshaft cap inside diameter	24.500 ~ 24.521 mm (0.9646 ~ 0.9654 in)
Camshaft journal diameter	24.459 ~ 24.472 mm (0.9630 ~ 0.9635 in)
Camshaft-journal-to-camshaft-cap clearance	0.028 ~ 0.062 mm (0.0011 ~ 0.0024 in)
Camshaft lobe dimensions	
Intake “A”	34.350 ~ 34.450 mm (1.3524 ~ 1.3563 in)
<Limit>	34.250 mm (1.3484 in)
“B”	24.950 ~ 25.050 mm (0.9823 ~ 0.9862 in)
<Limit>	24.850 mm (0.9783 in)
Exhaust “A”	33.950 ~ 34.050 mm (1.3366 ~ 1.3406 in)
<Limit>	33.850 mm (1.3327 in)
“B”	24.950 ~ 25.050 mm (0.9823 ~ 0.9862 in)
<Limit>	24.850 mm (0.9783 in)
	
Camshaft runout	0.030 mm (0.0012 in)
	
Timing chain:	
Model/Number of links	98XRH2010/140
Tensioning system	Automatic

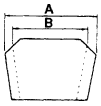
Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Valves, valve seats, valve guides:	
Valve clearance (cold)	
Intake	0.15 ~ 0.22 mm (0.0059 ~ 0.0087 in)
Exhaust	0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)
Valve dimensions	
Valve head diameter A	
	
Intake	30.90 ~ 31.10 mm (1.2165 ~ 1.2244 in)
Exhaust	25.90 ~ 26.10 mm (1.0197 ~ 1.0276 in)
Valve face width B	
	
Intake	1.90 ~ 2.62 mm (0.0748 ~ 0.1031 in)
Exhaust	1.90 ~ 2.62 mm (0.0748 ~ 0.1031 in)
Valve seat width C	
	
Intake	0.90 ~ 1.10 mm (0.0354 ~ 0.0433 in)
Exhaust	0.90 ~ 1.10 mm (0.0354 ~ 0.0433 in)
Valve margin thickness D	
	
Intake	0.80 ~ 1.20 mm (0.0315 ~ 0.0472 in)
Exhaust	0.50 ~ 0.90 mm (0.0197 ~ 0.0354 in)
Valve stem diameter	
Intake	4.475 ~ 4.490 mm (0.1762 ~ 0.1768 in)
<Limit>	4.445 mm (0.1750 in)
Exhaust	4.460 ~ 4.475 mm (0.1756 ~ 0.1762 in)
<Limit>	4.430 mm (0.1744 in)
Valve guide inside diameter	
Intake	4.500 ~ 4.512 mm (0.1772 ~ 0.1776 in)
<Limit>	4.550 mm (0.1791 in)
Exhaust	4.500 ~ 4.512 mm (0.1772 ~ 0.1776 in)
<Limit>	4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance	
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
<Limit>	0.080 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
<Limit>	0.100 mm (0.0039 in)
Valve stem runout limit	0.010 mm (0.0004 in)
	
Valve seat width	
Intake	0.90 ~ 1.10 mm (0.0354 ~ 0.0433 in)
<Limit>	1.6 mm (0.0630 in)
Exhaust	0.90 ~ 1.10 mm (0.0354 ~ 0.0433 in)
<Limit>	1.6 mm (0.0630 in)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Valve spring:	
Free length	
Intake	39.57 mm (1.56 in)
<Limit>	37.59 mm (1.48 in)
Exhaust	39.57 mm (1.56 in)
<Limit>	37.59 mm (1.48 in)
Installed length (valve closed)	
Intake	34.60 mm (1.36 in)
Exhaust	34.60 mm (1.36 in)
Compressed spring force (installed)	
Intake	112.30 ~ 129.30 N (11.45 ~ 13.18 kg, 25.24 ~ 29.07 lb)
Exhaust	112.30 ~ 129.30 N (11.45 ~ 13.18 kg, 25.24 ~ 29.07 lb)
Spring tilt	
Intake	2.5°/1.7 mm (2.5°/0.07 in)
Exhaust	2.5°/1.7 mm (2.5°/0.07 in)
Winding direction (top view)	
Intake	Clockwise
Exhaust	Clockwise
Valve lifter:	
Valve lifter outside diameter	
Intake	26.482 ~ 26.488 mm (1.0426 ~ 1.0428 in)
<Limit>	26.457 mm (1.0416 in)
Exhaust	26.482 ~ 26.488 mm (1.0426 ~ 1.0428 in)
<Limit>	26.457 mm (1.0416 in)
Valve lifter hole inside diameter	
Intake	26.500 ~ 26.518 mm (1.0433 ~ 1.0440 in)
<Limit>	26.548 mm (1.0452 in)
Exhaust	26.500 ~ 26.518 mm (1.0433 ~ 1.0440 in)
<Limit>	26.548 mm (1.0452 in)
Piston:	
Piston size (D)	81.950 ~ 81.965 mm (3.2264 ~ 3.2270 in)
Measuring point (H)	11.0 mm (0.43 in)
Piston to-cylinder clearance	0.035 ~ 0.060 mm (0.0014 ~ 0.0024 in)
<Limit>	0.120 mm (0.0047 in)
Piston pin bore off set	0.5 mm (0.020 in)
Off-set direction	Exhaust side
Piston pin bore inside diameter	19.004 ~ 19.015 mm (0.7482 ~ 0.7486 in)
<Limit>	19.045 mm (0.7498 in)
Piston pin:	
Piston pin outside diameter	18.991 ~ 19.000 mm (0.7477 ~ 0.7480 in)
<Limit>	18.971 mm (0.7469 in)
Piston pin length	52.7 ~ 53.0 mm (2.07 ~ 2.09 in)
Piston pin to piston pin bore clearance	0.004 ~ 0.024 mm (0.0002 ~ 0.0009 in)
<Limit>	0.074 mm (0.0029 in)

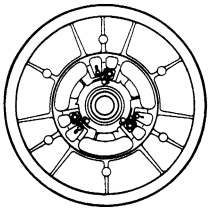
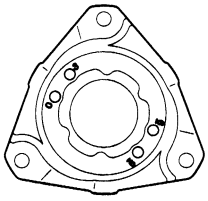
Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Piston ring:	
Top ring	
Ring type	Barrel
Dimensions (B × T)	1.00 × 2.80 mm (0.039 × 0.110 in)
2nd ring	
Top ring (same or no)	No
Ring type	Taper
Dimensions (B × T)	1.00 × 2.90 mm (0.039 × 0.114 in)
Oil ring	
Dimensions (B × T)	1.50 × 2.50 mm (0.059 × 0.098 in)
End gap (installed)	
Top ring	0.33 ~ 0.45 mm (0.013 ~ 0.018 in)
2nd ring	0.70 ~ 0.85 mm (0.028 ~ 0.033 in)
Oil ring	0.20 ~ 0.60 mm (0.008 ~ 0.024 in)
Side clearance (installed)	
Top ring	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)
2nd ring	0.020 ~ 0.060 mm (0.0008 ~ 0.0024 in)
Oil ring	0.040 ~ 0.110 mm (0.0016 ~ 0.0043 in)
Plating/coating	
Top ring	Chrome plated/parkerizing
2nd ring	Parkerizing
Connecting rod:	
Small end diameter	19.005 ~ 19.027 mm (0.7482 ~ 0.7491 in)
Big end diameter	41.000 ~ 41.018 mm (1.6142 ~ 1.6149 in)
Crankshaft-pin-to-big-end-bearing clearance	0.033 ~ 0.050 mm (0.0013 ~ 0.0020 in)
Bearing color code	0 = White 1 = Blue 2 = Black 3 = Brown 4 = Green 5 = Yellow
Crank pin:	
Crank pin outside diameter	37.976 ~ 38.000 mm (1.4951 ~ 1.4961 in)
Crankshaft:	
Measuring point 1	62.0 mm (2.44 in)
Measuring point 2	100.0 mm (3.94 in)
Width A	62.25 ~ 62.65 mm (2.45 ~ 2.47 in)
Width B	234.65 ~ 235.65 mm (9.24 ~ 9.28 in)
Crankshaft runout C	0.03 mm (0.0012 in)
Big end side clearance D	0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in)
Crankshaft-journal-to-crankshaft-journal-bearing clearance	0.027 ~ 0.045 mm (0.0011 ~ 0.0018 in)
Bearing color code	2 = Black 3 = Brown 4 = Green 5 = Yellow 6 = Pink 7 = Red 8 = White

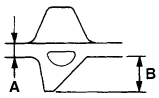
Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Throttle body:	
Type × Quantity	41EIDW × 2
Manufacturer	MIKUNI
I.D. mark	8GL1 00
Throttle valve (Th.V)	818-41005-100 (θ = 10°)
Throttle cable free play	3.0 ~ 4.0 mm (0.12 ~ 0.16 in)
Engine idle speed	1,450 ~ 1,550 r/min
Fuel pump:	
Type	Electrical
Model/Manufacturer	8GL/DENSO
Oil filter:	
Oil filter type	Cartridge (paper)
Bypass valve opening pressure	78 ~ 118 kPa (0.78 ~ 1.18 kg/cm^2, 11.1 ~ 16.8 psi)
Oil pump:	
Oil pump type	Trochoidal
Inner-rotor-to-outer-rotor-tip clearance	0.090 ~ 0.150 mm (0.0035 ~ 0.0059 in)
Outer-rotor-to-oil-pump-housing clearance	0.030 ~ 0.080 mm (0.0012 ~ 0.0032 in)
Relief valve operating pressure	440 ~ 560 kPa (4.40 ~ 5.60 kg/cm^2, 63.8 ~ 81.2 psi)
Oil pressure (hot)	50.0 kPa (0.50 kg/cm^2, 7.3 psi) at 1,400 r/min
Cooling system:	
Radiator cap opening pressure	107.9 ~ 137.3 kPa (1.08 ~ 1.37 kg/cm^2, 15.3 ~ 19.5 psi)
Thermostat opening temperature	69.0 ~ 73.0 °C (156.2 ~ 163.4 °F)
Valve lift	8.0 mm/85.0 °C (0.31 in/185.0 °F)
Water pump type	Single-suction centrifugal pump (Impeller type)
Coolant type	High-quality ethylene glycol antifreeze containing corrosion inhibitors
Coolant mixing ratio (coolant: water)	3 : 2 (60% : 40%)
Capacity	3.40 L (2.99 Imp qt, 3.59 US qt) (FX10/FX10RT/FX10RTR/FX10RTRA) 4.70 L (4.14 Imp qt, 4.97 US qt) (FX10MT/FX10MTR/FX10MTRA)
Max. impeller shaft tilt	0.15 mm (0.0059 in)

POWER TRAIN

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Transmission:	
Type	V-belt automatic
Range of ratio	3.80 ~ 1.00 : 1
Engagement speed r/min	3,550 ~ 3,950 r/min (FX10/FX10RT/FX10RTR/FX10RTRA) 3,300 ~ 3,700 r/min (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 3,100 ~ 3,500 r/min (FX10MTR “Europe”/FX10MTRA “Europe”)
Shift r/min	8,500 ~ 9,000 r/min
Sheave distance	267.0 ~ 270.0 mm (10.51 ~ 10.63 in)
Sheave offset	13.5 ~ 16.5 mm (0.53 ~ 0.65 in)
Secondary sheave free play (clearance)	1.0 ~ 2.0 mm (0.04 ~ 0.08 in)
Secondary sheave clearance	35.0 ~ 35.8 mm (1.38 ~ 1.41 in)
V-belt height (standard)	–0.5 ~ 1.5 mm (–0.02 ~ 0.06 in)
V-belt:	
Part number/Manufacturer 	8DN-17641-01/MITSUBOSHI
Circumference	1,129 ~ 1,137 mm (44.4 ~ 44.8 in)
Width “A”	34.1 mm (1.34 in)
Wear limit “B”	32.5 mm (1.28 in)
Primary sheave spring:	
Part number	90501-582L1 (FX10/FX10RT/FX10RTR/FX10RTRA) 90501-603L3 (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 90501-580A2 (FX10MTR “Europe”/FX10MTRA “Europe”)
Color code	Yellow-Silver-Yellow (FX10/FX10RT/FX10RTR/FX10RTRA) Green-White-Green (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) Blue-Brown-Blue (FX10MTR “Europe”/FX10MTRA “Europe”)
Diameter	59.5 mm (2.34 in)
Wire diameter	5.8 mm (0.228 in) (FX10/FX10RT/FX10RTR/FX10RTRA/FX10MTR “Europe”/FX10MTRA “Europe”) 6.0 mm (0.236 in) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Preload	343 N (34.98 kg, 77.11 lb) (FX10/FX10RT/FX10RTR/FX10RTRA) 441 N (44.97 kg, 99.14 lb) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 490 N (49.96 kg, 110.15 lb) (FX10MTR “Europe”/FX10MTRA “Europe”)
Spring rate	24.5 N/mm (2.50 kg/mm, 139.89 lb/in) (FX10/FX10RT/FX10RTR/FX10RTRA) 27.0 N/mm (2.75 kg/mm, 154.18 lb/in) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 19.6 N/mm (2.00 kg/mm, 111.91 lb/in) (FX10MTR “Europe”/FX10MTRA “Europe”)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Number of coils	4.92 (FX10/FX10RT/FX10RTR/FX10RTRA) 5.08 (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 5.64 (FX10MTR “Europe”/FX10MTRA “Europe”)
Free length	87.4 mm (3.44 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 89.8 mm (3.54 in) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 98.4 mm (3.87 in) (FX10MTR “Europe”/FX10MTRA “Europe”)
Set length	73.4 mm (2.89 in)
Primary sheave weight arm:	
Part number (with bush)	8GL-17605-00 (FX10/FX10RT/FX10RTR/FX10RTRA) 8FS-17605-00 (FX10MT/FX10MTR/FX10MTRA)
Weight (without bush and rivets)	49.43 g (1.745 oz) (FX10/FX10RT/FX10RTR/FX10RTRA) 65.52 g (2.313 oz) (FX10MT/FX10MTR/FX10MTRA)
Additional weight type	Rivet
Rivet:	
Outer	None (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Part number	90261-06015 (FX10/FX10RT/FX10RTR/FX10RTRA) 90261-06033 (FX10MTR “Europe”/FX10MTRA “Europe”)
Material	Steel
Size	10.3 mm (0.406 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 17.2 mm (0.677 in) (FX10MTR “Europe”/FX10MTRA “Europe”)
Quantity	3 pcs
Hole quantity	3 pcs
Center	None (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Part number	90261-06033
Material	Steel
Size	17.2 mm (0.677 in)
Quantity	3 pcs
Hole quantity	3 pcs
Inner	None (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Part number	90261-06033 (FX10/FX10RT/FX10RTR/FX10RTRA) 90266-06002 (FX10MTR “Europe”/FX10MTRA “Europe”)
Material	Steel (FX10/FX10RT/FX10RTR/FX10RTRA) Steel with hole (FX10MTR “Europe”/FX10MTRA “Europe”)
Size	17.2 mm (0.677 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 13.3 mm (0.524 in) (FX10MTR “Europe”/FX10MTRA “Europe”)
Quantity	3 pcs
Hole quantity	3 pcs

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Secondary sheave spring:	
Part number	90508-60012
Color code	Pink
Outside diameter	69.5 mm (2.74 in)
Wire diameter	6.0 mm (0.236 in)
Hole position	
Sheave side-spring seat side (twist angle)	2-6 (80°) (FX10/FX10RT/FX10RTR/FX10RTRA) 1-6 (70°) (FX10MT/FX10MTR/FX10MTRA)
 	
Spring rate	
Compression	12.3 N/mm (1.25 kg/mm, 70.23 lb/in)
Torsion	11,876 N · mm/rad (1,211 kg · mm/rad, 67,811 lb · in/rad)
Number of coils	5.53
Free length	75.0 mm (2.95 in)
Torque cam angle	43° (FX10/FX10RT/FX10RTR/FX10RTRA) 39° (FX10MT/FX10MTR/FX10MTRA)
Drive chain:	
Type	Silent chain enclosed in both
Model/Manufacturer	23RH303-68ASM/Borg Warner Automotive (FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”) 23RH303-70ASM/Borg Warner Automotive (FX10MTR “Europe”/FX10MTRA “Europe”)
Number of links	68L (FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR “USA/Canada” FX10MTRA “USA/Canada”) 70L (FX10MTR “Europe”/FX10MTRA “Europe”)
Secondary reduction ratio	1.86 (39/21) (FX10/FX10RT/FX10RTR/FX10RTRA) 1.82 (40/22) (FX10MTR “Europe”/FX10MTRA “Europe”) 2.00 (40/20) (FX10MT/FX10MTR “USA/Canada”/FX10MTRA “USA/Canada”)
Maximum 14 link drive chain section length	133.35 mm (5.25 in)
<Limit>	137.35 mm (5.41 in)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Track:	
Part number	8FA-47110-00 (FX10/FX10RT/FX10RTR/FX10RTRA) 8HA-47110-00 (FX10MT/FX10MTR/FX10MTRA)
Width	381.0 mm (15.0 in)
Length	3,072.4 mm (120.96 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 3,886.2 mm (153.00 in) (FX10MT/FX10MTR/FX10MTRA)
Pitch	64.0 mm (2.52 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 76.2 mm (3.00 in) (FX10MT/FX10MTR/FX10MTRA)
Number of links	48 (FX10/FX10RT/FX10RTR/FX10RTRA) 51 (FX10MT/FX10MTR/FX10MTRA)
Thickness “A” Height “B” 	5.1 mm (0.20 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 5.5 mm (0.22 in) (FX10MT/FX10MTR/FX10MTRA) 31.8 mm (1.25 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 57.2 mm (2.25 in) (FX10MT/FX10MTR/FX10MTRA)
Track deflection at 100 N (10 kg, 22 lb)	25.0 ~ 30.0 mm (0.98 ~ 1.18 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 30.0 ~ 35.0 mm (1.18 ~ 1.38 in) (FX10MT/FX10MTR/FX10MTRA)
Slide rail suspension (rear suspension):	
Front travel	205.0 mm (8.07 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 183.0 mm (7.20 in) (FX10MT/FX10MTR/FX10MTRA)
Rear travel	368.0 mm (14.49 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 356.0 mm (14.02 in) (FX10MT/FX10MTR/FX10MTRA)
Suspension spring rate	
Front	25.0 N/mm (2.55 kg/mm, 142.7 lb/in) (FX10/FX10RT/FX10RTR/FX10RTRA) 45.0 N/mm (4.59 kg/mm, 257.0 lb/in) (FX10MT/FX10MTR/FX10MTRA)
Rear	1,900 N · mm/deg (193.7 kg · mm/deg, 10,848.8 lb · in/deg) (FX10/FX10RT/FX10RTR/FX10RTRA) 1,300 N · mm/deg (132.6 kg · mm/deg, 7,422.9 lb · in/deg) (FX10MT/FX10MTR/FX10MTRA)
Suspension wire diameter	
Front	7.8 mm (0.31 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 9.0 mm (0.35 in) (FX10MT/FX10MTR/FX10MTRA)
Rear	10.3 mm (0.41 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 10.0 mm (0.39 in) (FX10MT/FX10MTR/FX10MTRA)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Shock absorber: Damping force	
Front	
Extension	1,373 N/0.3 m/s (140.0 kg/0.3 m/s, 308.6 lb/0.3 m/s) (FX10 “USA/Canada”) 1,359 N/0.3 m/s (138.6 kg/0.3 m/s, 305.5 lb/0.3 m/s) (FX10 “Europe”) 1,346 N/0.3 m/s (137.2 kg/0.3 m/s, 302.6 lb/0.3 m/s) (FX10RT/FX10RTR/FX10RTRA) 620 N/0.3 m/s (63.2 kg/0.3 m/s, 139.4 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)
Compression	410 N/0.3 m/s (41.8 kg/0.3 m/s, 92.2 lb/0.3 m/s) (FX10 “USA/Canada”) 891 N/0.3 m/s (90.9 kg/0.3 m/s, 200.3 lb/0.3 m/s) (FX10 “Europe”) 831 N/0.3 m/s (84.7 kg/0.3 m/s, 186.8 lb/0.3 m/s) (FX10RT/FX10RTR “USA/Canada”/FX10RTRA “USA/Canada”) 1,180 N/0.3 m/s (120.3 kg/0.3 m/s, 265.3 lb/0.3 m/s) (FX10RTR “Europe”/FX10RTRA “Europe”) 990 N/0.3 m/s (100.9 kg/0.3 m/s, 222.6 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)
Rear	
Extension	1,244 N/0.3 m/s (126.8 kg/0.3 m/s, 279.6 lb/0.3 m/s) (FX10 “USA/Canada”) 2,207 N/0.3 m/s (225.0 kg/0.3 m/s, 496.1 lb/0.3 m/s) (FX10 “Europe”) 1,682 N/0.3 m/s (171.5 kg/0.3 m/s, 378.1 lb/0.3 m/s) (FX10RT/FX10RTR “USA/Canada”/FX10RTRA “USA/Canada”) 1,993 N/0.3 m/s (203.2 kg/0.3 m/s, 448.0 lb/0.3 m/s) (FX10RTR “Europe”/FX10RTRA “Europe”) 840 N/0.3 m/s (85.7 kg/0.3 m/s, 188.8 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)
Compression	694 N/0.3 m/s (70.8 kg/0.3 m/s, 156.0 lb/0.3 m/s) (FX10 “USA/Canada”) 952 N/0.3 m/s (97.1 kg/0.3 m/s, 214.0 lb/0.3 m/s) (FX10 “Europe”) 578 N/0.3 m/s (58.9 kg/0.3 m/s, 129.9 lb/0.3 m/s) (FX10RT/FX10RTR “USA/Canada”/FX10RTRA “USA/Canada”) 1,301 N/0.3 m/s (132.7 kg/0.3 m/s, 292.5 lb/0.3 m/s) (FX10RTR “Europe”/FX10RTRA “Europe”) 440 N/0.3 m/s (44.9 kg/0.3 m/s, 98.9 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Slide runner:	
Thickness	18.3 mm (0.72 in)
Wear limit	10.5 mm (0.41 in)
Track sprocket wheel:	
Material	Ultra high molecular weight polyethylene
Number of teeth	9 T (FX10/FX10RT/FX10RTR/FX10RTRA) 7 T (FX10MT/FX10MTR/FX10MTRA)
Rear guide wheel:	
Material	High molecular weight polyethylene with rubber
Outside diameter	178.0 mm (7.01 in)
Brake:	
Recommended brake fluid	DOT 4
Pad thickness	10.2 mm (0.40 in)
Pad wear limit	1.5 mm (0.06 in)
Pad to disc clearance	0.025 ~ 0.115 mm (0.0010 ~ 0.0045 in)
Parking brake pad wear limit	1.2 mm (0.047 in)
Parking brake cable distance	43.5 ~ 46.5 mm (1.713 ~ 1.831 in)
Disc outside diameter	200.0 mm (7.87 in)
Disc thickness	4.0 mm (0.16 in)
Disc minimum thickness	3.5 mm (0.14 in)

CHASSIS

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Frame:	
Frame material	Aluminum and Steel
Seat height	770.0 mm (30.31 in)
Luggage box location	Front
Steering:	
Lock-to-lock angle (left)	29.6° (R ski) 35.6° (L ski)
(right)	35.6° (R ski) 29.6° (L ski)
Ski alignment	Toe-out
Toe-out size	0 ~ 15 mm (0 ~ 0.59 in)
Caster angle	23.0°
Ski stance (center to center)	1,050 mm (41.3 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 980 mm (38.6 in) (FX10MT/FX10MTR/FX10MTRA)
Ski:	
Ski material	Plastic
Length	1,021.0 mm (40.20 in)
Width	132.0 mm (5.20 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 182.0 mm (7.17 in) (FX10MT/FX10MTR/FX10MTRA)
Ski runner material	Steel
Ski cover	No
Ski runner wear limit	8 mm (0.31 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 6 mm (0.24 in) (FX10MT/FX10MTR/FX10MTRA)
Plastic ski wear limit	12 mm (0.47 in) (FX10RT/FX10RTR/FX10RTRA) 13 mm (0.51 in) (FX10) 24 mm (0.95 in) (FX10MT/FX10MTR/FX10MTRA)
Ski suspension (front suspension):	
Travel	216.0 mm (8.50 in) (FX10/FX10RT/FX10RTR/FX10RTRA) 225.0 mm (8.86 in) (FX10MT/FX10MTR/FX10MTRA)
Spring type	Coil spring (FX10/FX10MT/FX10MTR/FX10MTRA) Air spring (FX10RT/FX10RTR/FX10RTRA)
Spring rate	25.0 N/mm (2.55 kg/mm, 142.7 lb/in) (FX10) 17.0 N/mm (1.73 kg/mm, 97.07 lb/in) (FX10MT/FX10MTR/FX10MTRA) 517.0 kPa (5.2 kg/cm^2, 75.0 psi) (FX10RT/FX10RTR/FX10RTRA)
Wire diameter	8.8 mm (0.346 in) (FX10) 7.8 mm (0.307 in) (FX10MT/FX10MTR/FX10MTRA)

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Shock absorber: Damping force	
Extension	1,371 N/0.3 m/s (139.8 kg/0.3 m/s, 308.2 lb/0.3 m/s) (FX10 “USA/Canada”) 1,334 N/0.3 m/s (137.1 kg/0.3 m/s, 302.1 lb/0.3 m/s) (FX10 “Europe”) 1,290 N/0.3 m/s (131.5 kg/0.3 m/s, 290.0 lb/0.3 m/s) (FX10RT/FX10RTR/FX10RTRA) 1,704 N/0.3 m/s (173.8 kg/0.3 m/s, 383.1 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)
Compression	612 N/0.3 m/s (62.4 kg/0.3 m/s, 137.6 lb/0.3 m/s) (FX10 “USA/Canada”) 755 N/0.3 m/s (77.0 kg/0.3 m/s, 169.7 lb/0.3 m/s) (FX10 “Europe”) 691 N/0.3 m/s (70.5 kg/0.3 m/s, 155.3 lb/0.3 m/s) (FX10RT/FX10RTR/FX10RTRA) 498 N/0.3 m/s (50.8 kg/0.3 m/s, 112.0 lb/0.3 m/s) (FX10MT/FX10MTR/FX10MTRA)

ELECTRICAL

Model	FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
Voltage	12 V
Ignition system:	
Ignition timing (B.T.D.C.)	5.0° at 1,500 r/min
Advanced type	Digital type
Ignition coil:	
Model/Manufacturer	F6T558/MITSUBISHI
Ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.19 ~ 1.61 Ω at 20 °C (68 °F)
Secondary coil resistance	8.5 ~ 11.5 kΩ at 20 °C (68 °F)
Charging system:	
Type	AC magneto
Nominal output	14 V/less than 35 A at 5,000 r/min
DC-T.C.I.:	
Magneto model/Manufacturer	F074T39771/MITSUBISHI
Standard	14 V 32.8 A, 460 W at 5,000 r/min
Stator coil resistance (color code)	0.22 ~ 0.26 Ω at 20 °C (68 °F) (White – White)
ECU model/Manufacturer	F8T84071/MITSUBISHI (FX10/FX10RT/FX10RTR/FX10RTRA) F8T84073/MITSUBISHI (FX10MT/FX10MTR/FX10MTRA)
Rectifier/regulator:	
Type	Short circuit type
Model/Manufacturer	FH012AA/SHINDENGEN
No load regulated voltage (DC)	14.2 ~ 14.8 V
Capacity (DC)	50.0 A
Withstand voltage	40.0 V
Battery:	
Manufacturer	YUASA
Model	YTX20L-BS
Voltage, capacity	12 V, 18.0 Ah
Ten hour rate amperage	1.8 A
Electric starter system:	
Type	Constant mesh type
Starter motor:	
Model/Manufacturer	8GL/YAMAHA
Output	0.95 kW
Armature coil resistance	
Continuity check	0.0081 ~ 0.0099 Ω at 20 °C (68 °F)
Insulation check	Above 1 MΩ at 20 °C (68 °F)
Brush	
Overall length	9.8 mm (0.39 in)
<Wear limit>	4.4 mm (0.17 in)
Spring pressure	7.36 ~ 11.04 N (750 ~ 1,126 g, 26.49 ~ 39.74 oz)
Commutator diameter	28.0 mm (1.10 in)
<Wear limit>	27.0 mm (1.06 in)
Mica undercut	1.0 mm (0.04 in)
Starter relay:	
Model/Manufacturer	MS5F-571/JIDECO
Amperage rating	180 A
Coil resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)

Model		FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA
T.P.S. (throttle position sensor):		
Model/Manufacturer		8GL/ALPS
Resistance		2.64 ~ 6.16 kΩ at 20 °C (68 °F) (Blue – Black/Blue)
Oil level switch:		
Model/Manufacturer		8GL/ASTI
Fuel sender:		
Model/Manufacturer		8GL/NIPPON SEIKI
Sender resistance	(full)	10 ~ 12 Ω at 20 °C (68 °F)
	(empty)	179 ~ 185 Ω at 20 °C (68 °F)
Fuel injection system relay:		
Model/Manufacturer		ACM33211 M11/MATSUSHITA
Coil resistance		86.4 ~ 105.6 Ω
Headlight relay:		
Model/Manufacturer		G8HN-1C4T-DJ/OMRON
Coil resistance		94.5 ~ 115.5 Ω at 20 °C (68 °F)
Grip warmer:		
Heater resistance	(left)	6.12 ~ 7.48 Ω at 20 °C (68 °F) (Black – Black)
	(right)	6.12 ~ 7.48 Ω at 20 °C (68 °F) (Black – Black)
Thumb warmer:		
Heater resistance		36.99 ~ 45.21 Ω at 20 °C (68 °F) (White – Black)
Fuse:		
Main fuse		40 A × 1
Fuel injection system fuse		10 A × 1
Headlight fuse		20 A × 1
Signal fuse		3 A × 1
Ignition fuse		20 A × 1
Auxiliary DC jack fuse		3 A × 1 (FX10MT/FX10MTR/FX10MTRA)
Radiator fan motor fuse		10 A × 1
Reserve fuse		20 A × 1
Reserve fuse		10 A × 2
Reserve fuse		3 A × 1
Coolant temperature sensor:		
Model/Manufacturer		8CC/MITSUBISHI
Resistance		5.21 ~ 6.37 kΩ at 0 °C (32 °F) 0.290 ~ 0.354 kΩ at 80 °C (176 °F)
Speed sensor:		
Model/Manufacture		8FP/NIPPON SEIKI
Crankshaft position sensor:		
Model/Manufacture		8GL/YAMAHA
Resistance		336 ~ 504 Ω at 20 °C (68 °F) (Gray – Black)
Intake air pressure sensor:		
Model/Manufacture		2CO/DENSO
Intake air temperature sensor:		
Model/Manufacture		8FP/MITSUBISHI
Resistance		290 ~ 390 Ω at 80 °C (176 °F)

TIGHTENING TORQUE

ENGINE

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Spark plug	13	1.3	9.4	
Cylinder head bolt (M10 × 1.25)	See NOTE.*1			Apply the engine oil.
Cylinder head bolt	12	1.2	8.7	
Cylinder head cover bolt	12	1.2	8.7	
Camshaft cap bolt	10	1.0	7.2	Apply the engine oil.
Camshaft sprocket bolt	24	2.4	17	
Timing chain tensioner bolt	12	1.2	8.7	
Timing chain guide (exhaust and intake) bolt	10	1.0	7.2	Apply LOCTITE®
Cylinder head water jacket bolt	10	1.0	7.2	
Thermostat housing cover bolt	10	1.0	7.2	
Coolant temperature sensor	23	2.3	17	
Water pump assembly bolt	12	1.2	8.7	
Coolant reservoir bolt	7	0.7	5.1	
Radiator bolt	7	0.7	5.1	
Radiator cover bolt	7	0.7	5.1	
Radiator stay bolt	7	0.7	5.1	
Bleed bolt (heat exchanger)	4	0.4	2.9	(FX10MT/FX10MTR/FX10MTRA)
Oil cooler bolt	10	1.0	7.2	Apply LOCTITE®
Rear engine mounting bolt spacer	9	0.9	6.5	
Engine mounting nut	65	6.5	47	
Engine mounting bracket bolt	25	2.5	18	
Engine mounting bracket nut	25	2.5	18	
Front frame bolt	25	2.5	18	
Rear frame cross member	23	2.3	17	
Oil pan bolt	10	1.0	7.2	
Oil pan engine oil drain bolt	10	1.0	7.2	
Oil filter cartridge	17	1.7	12	
Oil pump assembly bolt	12	1.2	8.7	
Oil pump drive chain guide bolt	10	1.0	7.2	
Oil pump housing cover screw	4	0.4	2.9	
Oil pan divider screw	4	0.4	2.9	
Relief valve cover screw	4	0.4	2.9	
Oil pump driven gear bolt	15	1.5	11	
Oil tank engine oil drain bolt	16	1.6	11	
Oil tank bolt	10	1.0	7.2	
Oil pressure switch	15	1.5	11	
Oil check bolt	20	2.0	14	
Oil tank inlet pipe bolt	10	1.0	7.2	
Exhaust pipe joint bolt	25	2.5	18	
Muffler band bolt	20	2.0	14	
Exhaust pipe bolt	23	2.3	17	
Exhaust pipe band bolt	9	0.9	6.5	
Muffler bolt	23	2.3	17	
Muffler end cover bolt	10	1.0	7.2	Apply LOCTITE®
Muffler stay bolt	23	2.3	17	
Muffler cover nut	10	1.0	7.2	
Exhaust pipe joint cover bolt	6	0.6	4.3	

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Crankcase bolt (M9 × 1.25)	See NOTE.*2			Apply the engine oil.
Crankcase bolt (M8 × 1.25)	24	2.4	17	Apply the engine oil.
Crankcase bolt (M6 × 1.0)	12	1.2	8.7	Apply the engine oil.
Crankcase bolt (M6 × 1.0)	12	1.2	8.7	Black bolt Apply Yamaha bond No. 1215 (Three Bond No.1215®)
Primary sheave drive shaft assembly bolt	12	1.2	8.7	
Connecting rod nut	See NOTE.*3			Apply the molybdenum disulfide oil.
Balancer weight (left and right) bolt	35	3.5	25	
Balancer shaft bearing retainer bolt	10	1.0	7.2	Apply LOCTITE®
AC magneto rotor bolt	130	13.0	94	Apply the engine oil.
AC magneto rotor cover bolt (M6 × 1.0) × 11	12	1.2	8.7	
AC magneto rotor cover bolt (M6 × 1.0) × 1	12	1.2	8.7	Apply LOCTITE®
Starter clutch bolt	12	1.2	8.7	Apply LOCTITE®
Stator coil bolt	10	1.0	7.2	Apply LOCTITE®
Crankshaft position sensor bolt	10	1.0	7.2	Apply LOCTITE®
Stator coil lead holder bolt	10	1.0	7.2	Apply LOCTITE®
Air filter case bolt	7	0.7	5.1	
Air filter case joint clamp screw	3	0.3	2.2	
Throttle body joint clamp screw	3	0.3	2.2	
Starter motor bolt	27	2.7	19	
Starter motor lead nut	7	0.7	5.1	
Brush terminal nut	7	0.7	5.1	
Fuel pump nut	7	0.7	5.1	
Fuel sender bolt	4	0.4	2.9	
Fuel tank bolt	10	1.0	7.2	
Throttle cable locknut (throttle body side)	6	0.6	4.3	
Rectifier/regulator nut	7	0.7	5.1	
Rectifier/regulator bracket bolt	7	0.7	5.1	
Ground earth lead bolt (engine mounting bracket)	25	2.5	18	
Ground earth lead bolt (Rectifier/regulator bracket)	7	0.7	5.1	
Battery bracket bolt	23	2.3	17	

NOTE:

*1: Tighten the cylinder head bolts to 25 Nm (2.5 m · kg, 18 ft · lb) in the proper tightening sequence, loosen and retighten the cylinder head bolts to 25 Nm (2.5 m · kg, 18 ft · lb) in the proper tightening sequence, and then tighten the cylinder head bolts further to reach the specified angle 175 ~ 185° in the proper tightening sequence.

*2: Tighten the crankcase bolts to 15 Nm (1.5 m · kg, 11 ft · lb) in the proper tightening sequence, loosen and retighten the crankcase bolts to 15 Nm (1.5 m · kg, 11 ft · lb) in the proper tightening sequence, and then tighten the crankcase bolts further to reach the specified angle 65 ~ 70° in the proper tightening sequence.

*3: Tighten the connecting rod nuts to 20 Nm (2.0 m · kg, 14 ft · lb), and then tighten the connecting rod nuts further to reach the specified angle 115 ~ 125°.

POWER TRAIN

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Primary sheave bolt	See NOTE.			
Spider and sliding sheave	200	20.0	145	Left-hand thread. Apply LOCTITE®
Primary sheave cap and sliding sheave bolt	14	1.4	10	
Roller and weight nut (primary sheave)	6	0.6	4.3	
Set bolt (primary sheave collar)	4	0.4	2.9	Apply LOCTITE®
Secondary sheave bolt	64	6.4	46	
Stopper screw (secondary sheave)	7	0.7	5.1	
Spring seat nut (secondary sheave)	23	2.3	17	
Secondary sheave adjusting bolt	10	1.0	7.2	
Drive chain adjusting locknut	25	2.5	18	
Drive chain cover bolt	28	2.8	20	
Drive chain cover bolt	10	1.0	7.2	Apply LOCTITE®
Driven sprocket nut	90	9.0	65	(Without reverse model)
Drive chain oil drain bolt	16	1.6	11	
Set bolt (secondary shaft collar)	6	0.6	4.3	Apply LOCTITE®
Shift lever assembly bolt	23	2.3	17	(With reverse model)
Shift rod end locknut	7	0.7	5.1	(With reverse model)
Shift lever assembly and shift rod nut	10	1.0	7.2	(With reverse model)
Gear position shaft and shift rod nut	10	1.0	7.2	(With reverse model)
Reverse drive gear shaft plate bolt	10	1.0	7.2	(With reverse model) Apply LOCTITE®
Reverse driven gear bolt	55	5.5	40	(With reverse model) Apply LOCTITE®
Counter gear bolt	10	1.0	7.2	(With reverse model) Apply LOCTITE®
Bearing housing bolt	30	3.0	22	
Brake caliper bolt	48	4.8	35	
Brake caliper bleed screw	6	0.6	4.3	
Brake caliper retaining pin	17	1.7	12	
Screw plug	2	0.2	1.4	
Brake hose union bolt	30	3.0	22	
Parking brake assembly bolt	10	1.0	7.2	
Parking brake adjusting locknut	15	1.5	11	
Parking brake cable locknut	6	0.6	4.3	
Parking brake cable and parking brake lever bolt	10	1.0	7.2	
Brake master cylinder holder bolt	10	1.0	7.2	
Brake master cylinder holder and parking brake lever bolt	23	2.3	17	
Slide rail suspension mounting nut	60	6.0	43	(FX10/FX10RT/FX10RTR/FX10RTRA)
Slide rail suspension mounting bolt (M10)	69	6.9	50	(FX10/FX10RT/FX10RTR/FX10RTRA) Apply LOCTITE®
Slide rail suspension mounting bolt (M10)	72	7.2	52	(FX10MT/FX10MTR/FX10MTRA) Apply LOCTITE®
Stopper band nut	4	0.4	2.9	

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Slide runner and front pivot arm	10	1.0	7.2	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Shaft and sliding frame bolt	72	7.2	52	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Shaft and sliding frame bolt	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Shock absorber and front pivot arm nut	49	4.9	35	
Shock absorber and front suspension bracket nut	49	4.9	35	
Front pivot arm and front pivot arm bracket nut	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Front pivot arm bracket and sliding frame nut	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Front pivot arm and connecting arm nut	72	7.2	52	(FX10MT/FX10MTR/FX10MTRA)
Front pivot arm and sliding frame bolt	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Front suspension bracket and connecting arm nut	72	7.2	52	(FX10MT/FX10MTR/FX10MTRA)
Front suspension bracket, rear suspension bracket, shaft, and sliding frame bolt	72	7.2	52	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Front suspension bracket, shaft and sliding frame bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Suspension wheel bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Suspension wheel nut	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Suspension wheel and front pivot arm bracket bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Wheel bracket, shaft, and sliding frame bolt	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Set bolt (wheel bracket)	6	0.6	4.3	(FX10MT/FX10MTR/FX10MTRA)
Set bolt (collar)	9	0.9	6.5	
Collar and sliding frame bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Rear shock absorber and rear pivot arm nut	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Rear shock absorber and rear pivot arm nut	49	4.9	35	(FX10MT/FX10MTR/FX10MTRA)
Pull rod, rear shock absorber, and rear suspension bracket bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA)
Pull rod, rear shock absorber, and rear suspension bracket bolt	49	4.9	35	(FX10MT/FX10MTR/FX10MTRA)
Rear suspension bracket, shaft, and sliding frame	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Rear pivot arm and pull rod bolt	60	6.0	43	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Rear pivot arm and pull rod nut	49	4.9	35	(FX10MT/FX10MTR/FX10MTRA)
Rear shock absorber and rear pivot arm nut	49	4.9	35	(FX10MT/FX10MTR/FX10MTRA)
Rear pivot arm bracket and sliding frame bolt	72	7.2	52	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Rear pivot arm and rear pivot arm bracket bolt	72	7.2	52	(FX10/FX10RT/FX10RTR/ FX10RTRA) Apply LOCTITE®
Rear pivot arm and control rod stopper nut	60	6.0	43	(FX10MT/FX10MTR/FX10MTRA)
Control rod adjusting locknut	25	2.5	18	(FX10MT/FX10MTR/FX10MTRA)

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Control rod shaft and sliding frame	72	7.2	52	(FX10MT/FX10MTR/FX10MTRA)
Rear axle nut	75	7.5	54	
Set bolt (front axle)	9	0.9	6.5	Apply LOCTITE®
Speed sensor	24	2.4	17	
Bearing holder (front axle)	24	2.4	17	
Bearing housing bolt	30	3.0	22	Left side
Bearing housing bolt	24	2.4	17	Right side
Gear unit (speed sensor) bolt	40	4.0	29	

NOTE:

Tightening steps:

1. Tighten the bolt to a torque at 120 Nm (12.0 m · kg, 85 ft · lb).
2. Loosen the bolt completely.
3. Retighten the bolt to a torque of 60 Nm (6.0 m · kg, 43 ft · lb).

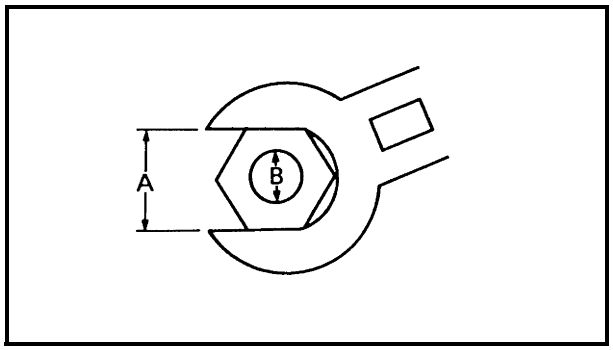
CHASSIS

Parts to be tightened	Tightening torque			Remarks
	Nm	m · kg	ft · lb	
Headlight stay nut	4	0.4	2.9	
Front cover screw	7	0.7	5.1	
Lower cover bolt	7	0.7	5.1	
Front bumper bolt	23	2.3	17	
Seat bolt	23	2.3	17	
Rear upper cover screw	7	0.7	5.1	
Rear side cover bolt	8	0.8	5.8	
Tail/brake light assembly bolt	7	0.7	5.1	
Wind deflector bracket and wind deflector bolt	7	0.7	5.1	Apply LOCTITE® (FX10/FX10RT/FX10RTR/ FX10RTRA)
Handlebar holder bolt	23	2.3	17	
Steering joint holder bolt	23	2.3	17	(FX10RT/FX10RTR/FX10RTRA)
Steering column and rear frame cross member nut	23	2.3	17	
Steering column and front frame nut	23	2.3	17	
Steering shaft and steering column nut	35	3.5	25	
Steering shaft end locknut	25	2.5	18	Apply LOCTITE®
Steering shaft and pivot arm nut	35	3.5	25	
Pivot arm bolt	67	6.7	48	
Tie rod and pivot arm nut	35	3.5	25	
Tie rod and steering knuckle nut	28	2.8	20	
Tie rod end locknut	25	2.5	18	Apply LOCTITE®
Ski and steering knuckle nut	48	4.8	35	
Ski runner nut	19	1.9	13	
Ski and ski handle nut (M8 × 55)	12	1.2	8.7	
Ski and ski handle nut (M8 × 100)	17	1.7	12	
Shock absorber nut (upper)	45	4.5	32	
Shock absorber nut (lower)	45	4.5	32	
Upper arm ball joint and upper arm nut	90	9.0	65	
Upper arm and frame bolt	45	4.5	32	
Upper arm ball joint and steering knuckle bolt	45	4.5	32	
Lower arm and frame nut	65	6.5	47	
Lower arm and steering knuckle nut	65	6.5	47	
Stabilizer and stabilizer joint nut	45	4.5	32	
Stabilizer joint and lower arm nut	34	3.4	24	
Stabilizer holder bolt	34	3.4	24	

GENERAL TORQUE SPECIFICATIONS

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

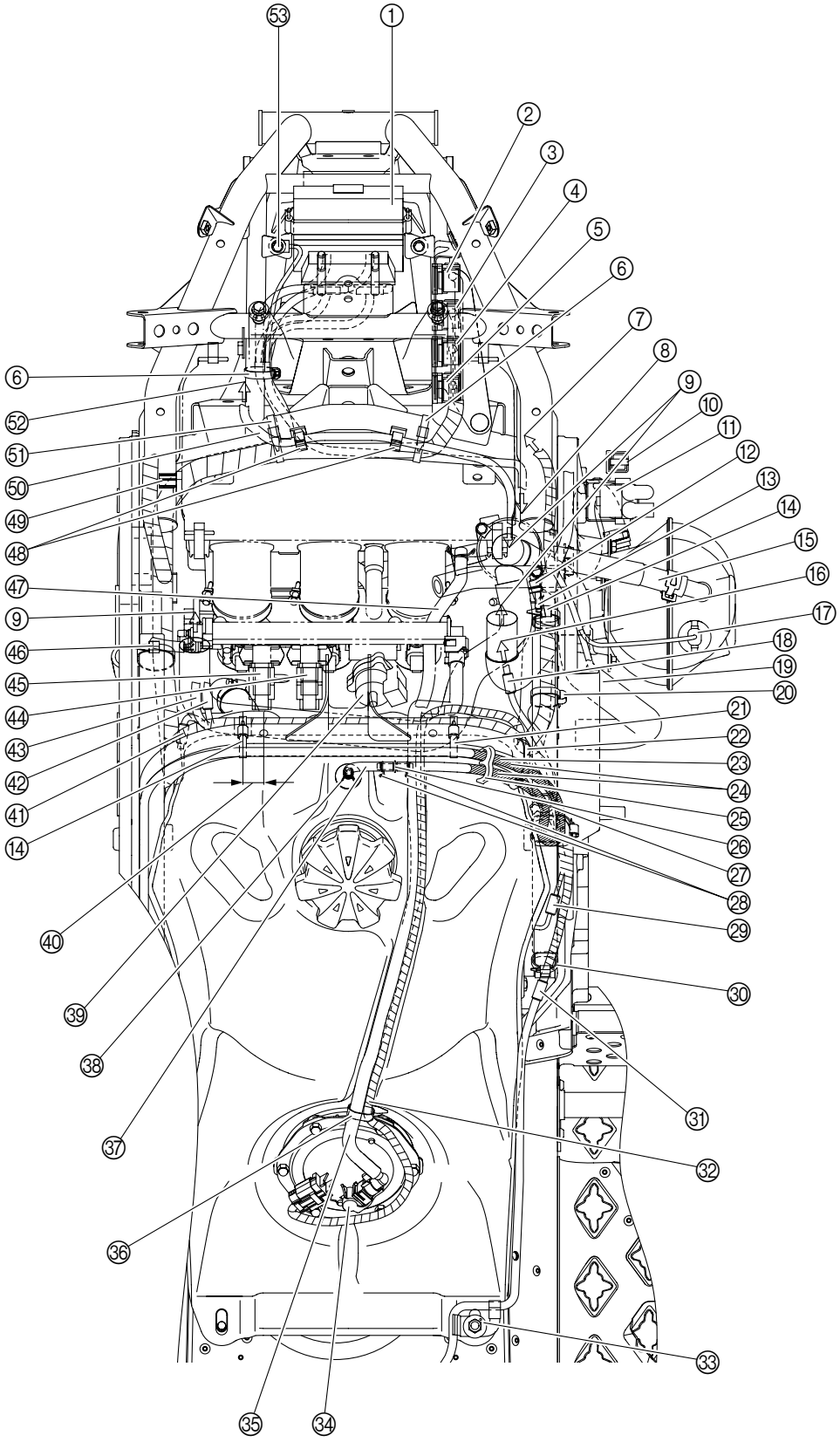
A (nut)	B (bolt)	General torque specifications		
		Nm	m · kg	ft · lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



A: Distance across flats
B: Outside thread diameter

DEFINITION OF UNITS

Unit	Read	Definition	Measurement
mm cm	Millimeter Centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	Kilogram	10^{3} gram	Weight
N	Newton	1 kg × m/sec^2	Force
Nm m · kg	Newton meter Meter kilogram	N × m m × 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	Rotations per minute	—	Engine speed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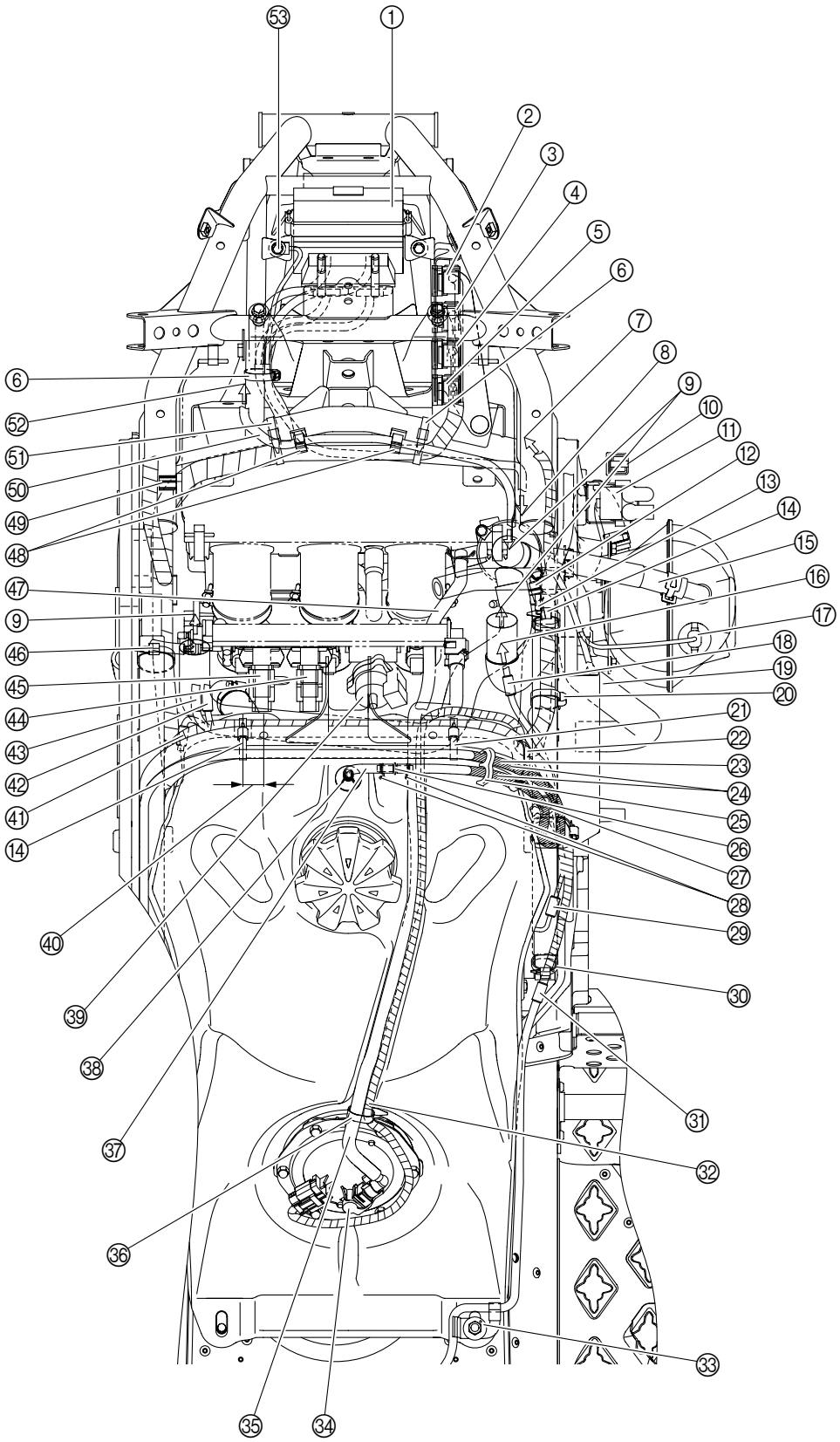
CABLE ROUTING

① ECU (engine control unit)
② Load control relay
③ Headlight relay
④ Fuel injection system relay
⑤ Radiator fan motor relay
⑥ Fasten the wire harness and stator coil lead to the front frame with the plastic band.
⑦ To the left handlebar switch
⑧ To the AC magneto
⑨ To the radiator
⑩ Main fuse
⑪ Starter relay
⑫ Coolant temperature sensor coupler
⑬ Coolant temperature sensor sublead
⑭ Fasten the wire harness at the positioning tape to the rear frame cross member with the plastic band.
⑮ Oil tank breather hose
⑯ To the main switch
⑰ Oil level switch coupler
⑱ Main switch coupler
⑲ Thermostat outlet hose
⑳ Fasten the wire harness to the frame rear cross member with the plastic band.
㉑ Fasten the wire harness and fuel tank breather hose to the frame rear cross member.
㉒ Fasten the hose protector of the fuel tank breather hose to the rear frame cross member with the plastic band, making sure to fasten it after the bend in the hose as shown in the illustration.
㉓ Fuel tank breather hose
㉔ The ends of the hose protector should be 20 mm (0.79 in) or less from each other.
㉕ Fasten the fuel tank breather hose with the holder, making sure to position the portion of the hose from the fuel tank to the rear of the portion after the bend in the hose.
㉖ Face the cutout in the hose joint flange downward.
㉗ Bend the fuel tank breather hose as shown in the illustration, and then fasten it after the bend in the hose with the holder as shown in the illustration. Face the open ends of the holder toward the fuel tank.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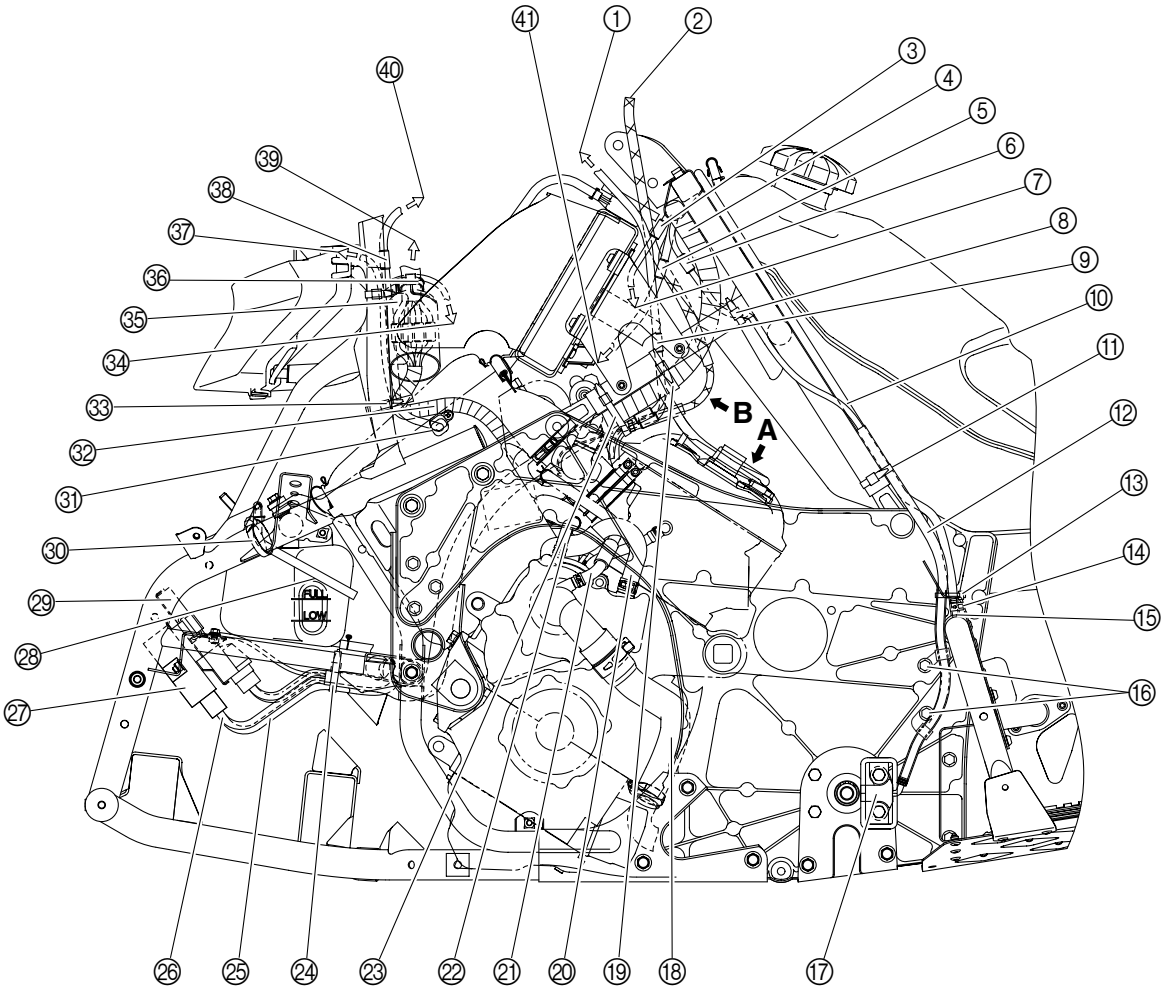
㉘ Face the ends of each hose clamp toward the fuel tank.
㉙ Fuel sender coupler
㉚ Fasten the tail/brake light lead (wire harness side) to the frame rear cross member with the plastic band.
㉛ Tail/brake light coupler
㉜ Fuel pump lead
㉝ Fasten the tail/brake light lead with the holders, making sure to push the lead against the fuel tank.
㉞ Fuel hose connector holder
㉟ Fuel hose
㊱ Fasten the fuel hose and fuel pump lead with the plastic band. Align the plastic band with the positioning tape on the fuel pump lead and install it with its buckle facing toward the fuel tank.
㊲ Be sure to install the fuel tank breather hose with its long end facing to the right.
㊳ Face the ends of the hose clamp rearward.
㊴ ISC (idling speed control) unit
㊵ 20 ~ 40 mm (0.79 ~ 1.57 in)
㊶ Speed sensor coupler
㊷ Radiator fan motor coupler
㊸ Fuel injection system sub-wire harness coupler
㊹ Intake air pressure sensor 1 (cylinders #1, #2, and #3)
㊺ Intake air pressure sensor 2 (cylinder #1)
㊻ Fasten the wire harness, oil pressure switch sub-lead, and crankshaft position sensor lead to the frame rear cross member with the plastic band.
㊼ Cylinder head breather hose.
㊽ Fasten the coolant reservoir hose with the holder.
㊾ Intake air temperature sensor
㊿ Coolant reservoir hose
(51) Fasten the wire harness, at the portion just before the leads split, to the front frame with the plastic band.
(52) To the coolant reservoir
(53) Install the ground lead terminal to the left side of the front frame, making sure to face the crimped portion of the terminal inward.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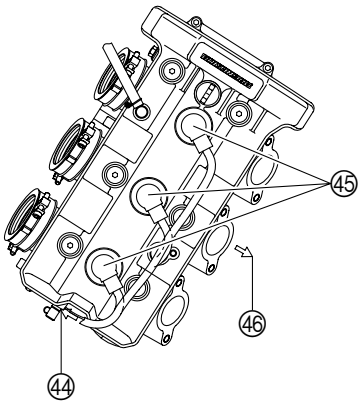
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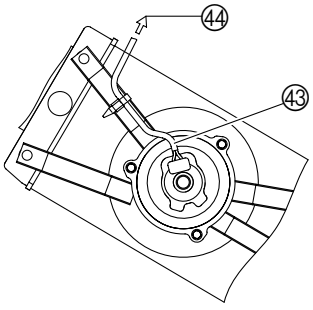
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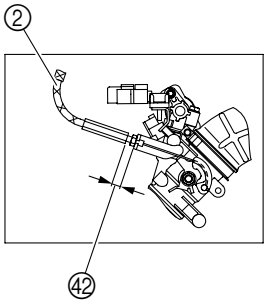
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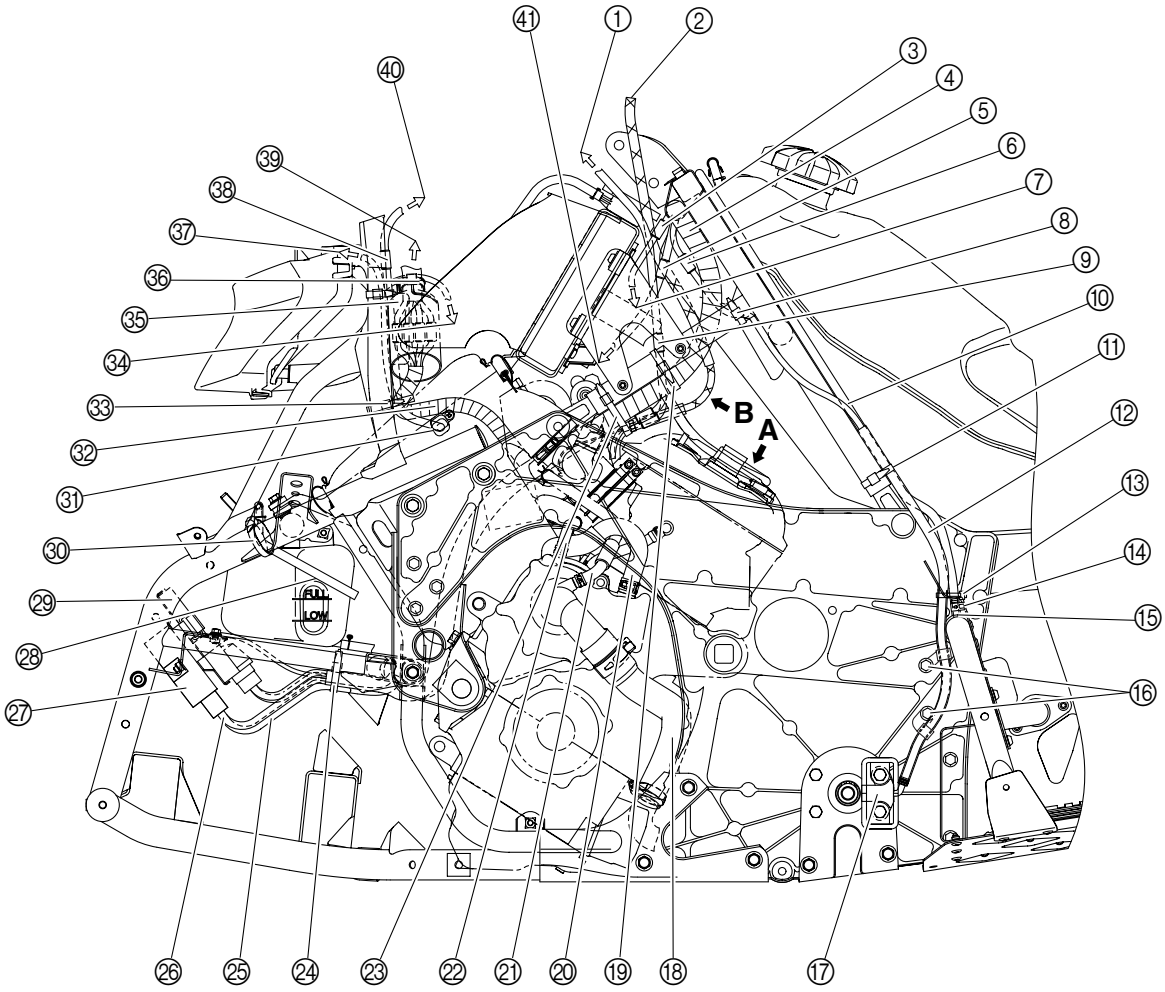
① To the auxiliary DC jack (FX10MT/FX10MTR/FX10MTRA)
② Throttle cable
③ Radiator fan motor coupler
④ Wire harness
⑤ Fuel injection system sub-wire harness coupler
⑥ Speed sensor coupler
⑦ To the radiator fan motor
⑧ Fasten the speed sensor lead to the frame rear cross member with the plastic band.
⑨ Pass the auxiliary DC jack lead between the radiator fan motor lead and the fuel injection system sub-wire harness. (FX10MT/FX10MTR/FX10MTRA)
⑩ Fuel tank breather hose
⑪ Fasten the speed sensor lead and fuel tank breather hose to the frame rear cross member with the plastic band, making sure not to pinch the hose.
⑫ Speed sensor lead
⑬ Fasten the speed sensor lead and fuel tank breather hose to the frame with a plastic locking tie, and then cut off the excess end of the tie.
⑭ Face the ends of the hose clamp rearward.
⑮ Install the fuel tank breather hose completely onto the hose joint, making sure that the end of the hose contacts the frame.
⑯ Fasten the corrugated tube of the speed sensor lead with the holders.
⑰ Speed sensor
⑱ Water pump inlet hose
⑲ Fasten the wire harness, at the portion just before the leads split, to the frame rear cross member with the plastic band.
⑳ Water pump outlet hose (to oil cooler)
㉑ Throttle body outlet hose
㉒ Water pump outlet hose (to water jacket)
㉓ Fasten the wire harness, oil pressure switch sub-lead, and crankshaft position sensor lead to the frame rear cross member with the plastic band.
㉔ Fasten the wire harness and stator coil lead to the front frame with the plastic band.
㉕ Stator coil lead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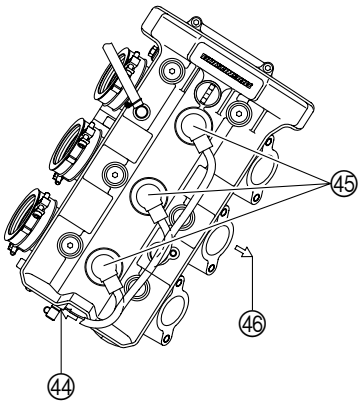
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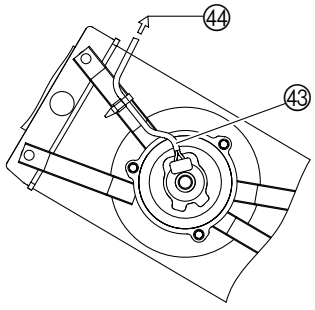
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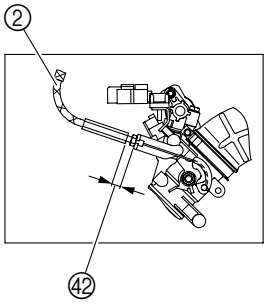
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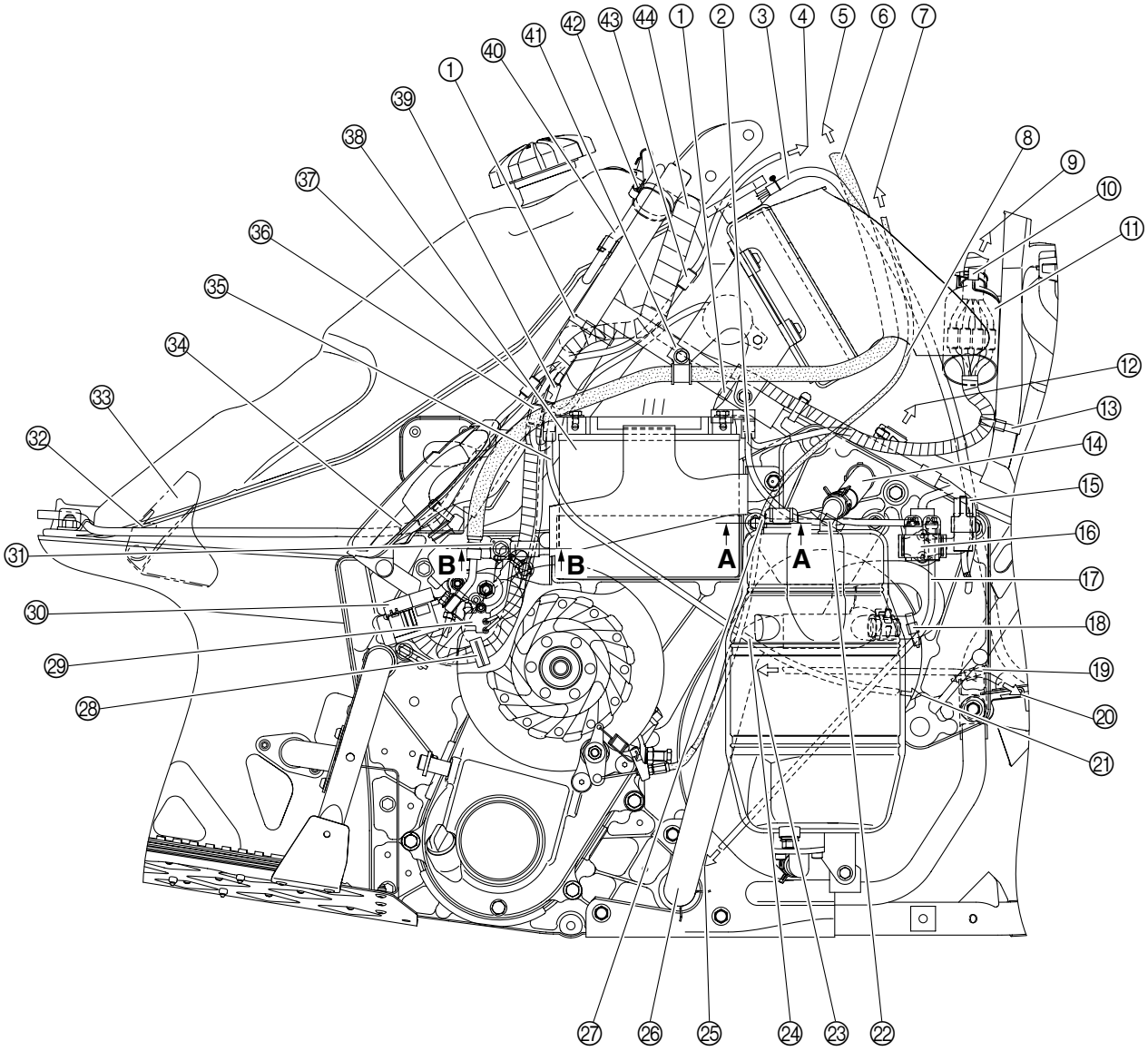
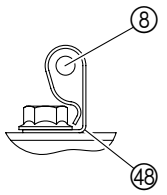
㉖ Rectifier/regulator lead
㉗ Rectifier/regulator
㉘ Route the coolant reservoir breather hose above the coolant reservoir check window.
㉙ ECU (engine control unit)
㉚ Fasten the coolant reservoir breather hose to the front frame with the plastic band, making sure not to pinch the hose.
㉛ Intake air temperature sensor
㉜ Route the wire harness above the intake air temperature sensor.
㉝ Fasten the wire harness, at the portion just before the leads split, to the headlight stay with the plastic band.
㉞ To the headlight (left)
㉟ Slide the rubber coupler over the engine stop switch coupler, throttle switch couplers, right grip warmer coupler, and thumb warmer coupler.
㊱ Pass the plastic band through the holes in the rubber cover, and then fasten the cover with the band, making sure that the band is not fastened over the projections at the top of the cover.
㊲ To the headlight (right)
㊳ Speedometer unit sub-lead coupler
㊴ To the right handlebar switch
㊵ To the speedometer unit
㊶ Route the fuel injection system sub-wire harness (to the throttle body) to the right of the radiator outlet hose.
㊷ 10 mm (0.39 in)
㊸ Radiator fan motor lead
㊹ To the wire harness
㊺ Ignition coils
㊻ Rearward





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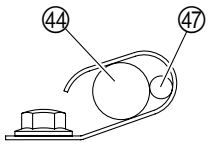
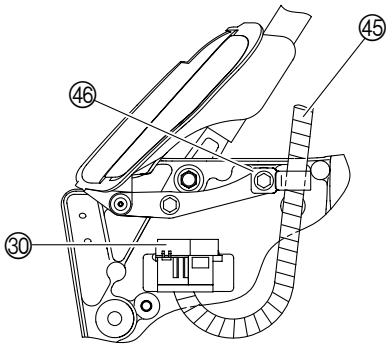
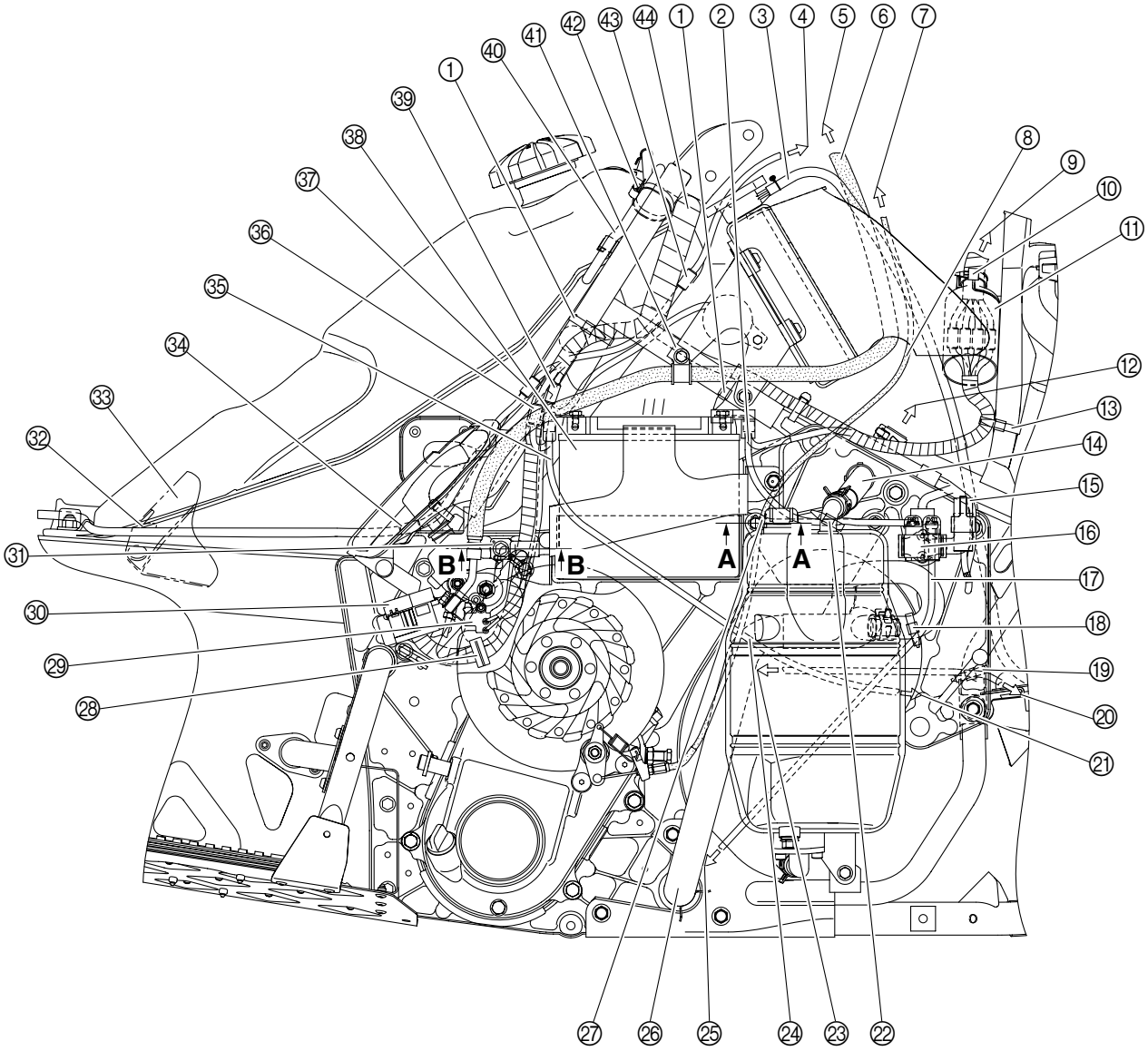
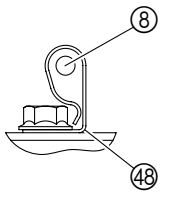


B-B



① Fasten the wire harness to the frame rear cross member with the plastic band. Face the end of the plastic band downward.
② Positive battery lead
③ Coolant reservoir hose
④ To the main switch
⑤ To the brake master cylinder
⑥ Brake hose
⑦ To the parking brake lever
⑧ Parking brake cable
⑨ To the left handlebar switch
⑩ Pass the plastic band through the holes in the rubber cover, and then fasten the cover with the band, making sure that the band is not fastened over the projections at the top of the cover.
⑪ Slide the rubber coupler over the grip/thumb warmer adjustment switch coupler, left grip warmer coupler, brake light switch coupler, and headlight beam switch coupler.
⑫ To the air filter case
⑬ Fasten the wire harness to the headlight stay with the plastic band.
⑭ Oil tank breather hose
⑮ Main fuse
⑯ Starter relay
⑰ Starter motor lead
⑱ Fasten the starter motor lead to the oil tank inlet hose with the plastic band, making sure not to pinch the hose.
⑲ Fasten the stator coil lead to the front frame with the plastic band, making sure to route it to the inside of the frame.
⑳ To the rectifier/regulator
㉑ To the engine
㉒ Fasten the positive battery lead to the oil tank breather pipe with the plastic band.
㉓ To the AC magneto
㉔ Pass the negative battery lead between the parking brake cable and the frame.
㉕ Route the starter motor lead (to the starter motor) to the rear of the engine.
㉖ Thermostat outlet hose
㉗ Pass the parking brake cable through the holder, making sure that the holder is positioned to the front of the bolt.





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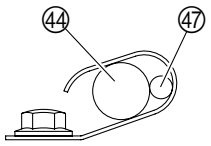

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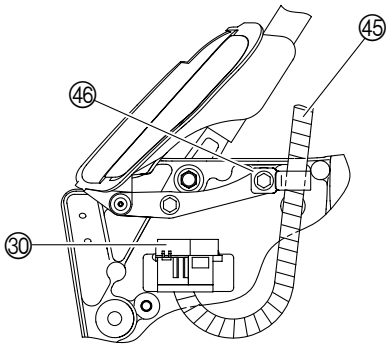
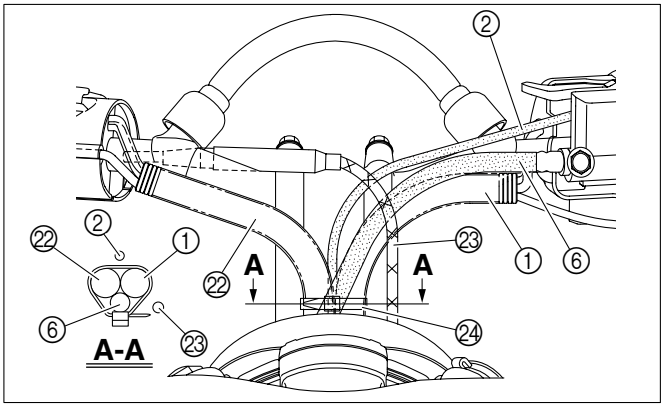


㉘ Make sure that the catch of the holder is facing downward. (FX10/FX10RTR/FX10RTRA/ FX10MTR/FX10MTRA)
㉙ DC back buzzer (FX10/ FX10RTR/FX10RTRA/ FX10MTR/FX10MTRA)
㉚ Fuse box
㉛ Pass the wire harness and DC back buzzer lead through the guide, making sure that the guide is positioned to the front of the bolt. (FX10/FX10RTR/ FX10RTRA/FX10MTR/ FX10MTRA)
㉜ Route the tail/brake light lead below the rib on the fuel tank, making sure not to pinch it between the tank and the right fuel tank cover.
㉝ Right fuel tank cover
㉞ Tail/brake light coupler
㉟ Negative battery lead
㊱ Negative battery lead coupler
㊲ Fuel sender coupler
㊳ Battery
㊴ DC back buzzer coupler (FX10/ FX10RTR/FX10RTRA/ FX10MTR/FX10MTRA)
㊵ Fuel tank breather hose
㊶ Fasten the brake hose with the holder.
㊷ Fasten the fuel tank breather hose to the rear cross member with the plastic band.
㊸ Main switch coupler
㊹ Wire harness
㊺ To the wire harness
㊻ Pass the wire harness through the guide, making sure that the guide positioned to the front of the bolt. (FX10RT/FX10MT)
㊼ DC back buzzer lead (FX10/ FX10RTR/FX10RTRA/ FX10MTR/FX10MTRA)
㊽ Fasten the parking brake cable with the holder, making sure to bend the holder so that its end contacts the side of the bolt head as shown in the illustration.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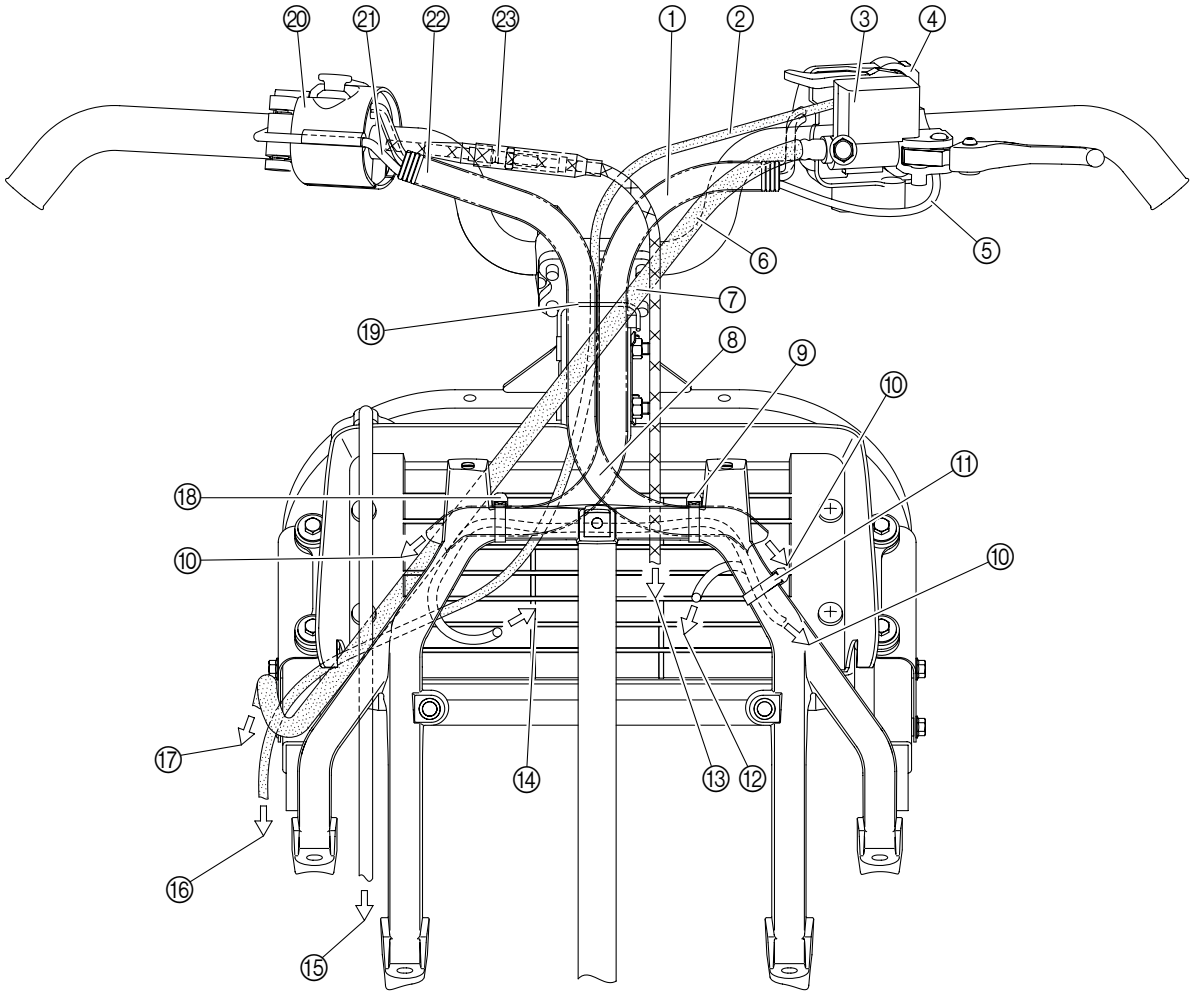
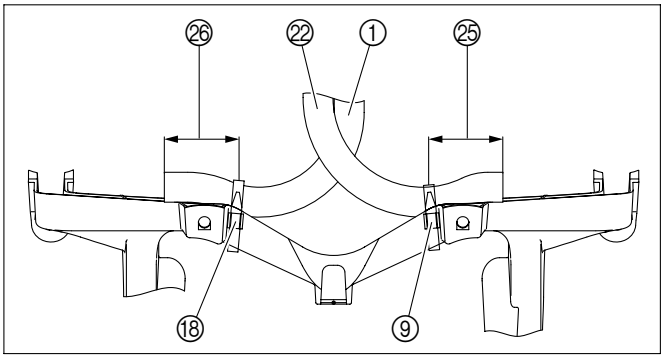
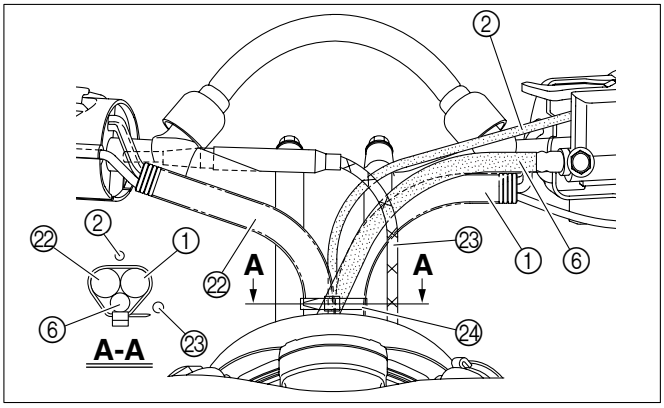




① Corrugated tube (left grip warmer lead, grip/thumb warmer adjustment switch lead, brake light switch lead, and headlight beam switch lead)
② Parking brake cable
③ Brake master cylinder
④ Left handlebar switch
⑤ Left grip warmer lead
⑥ Brake hose
⑦ Route the brake hose behind the throttle cable and in front of the corrugated tubes.
⑧ Route the corrugated tube (engine stop switch lead, throttle switch leads, right grip warmer lead, and thumb warmer lead) in front of the corrugated tube (left grip warmer lead, grip/thumb warmer adjustment switch lead, brake light switch lead, and headlight beam switch lead).
⑨ Fasten the wire harness and corrugated tube (engine stop switch lead, throttle switch lead, right grip warmer lead, and thumb warmer lead) to the headlight stay with the plastic band, making sure to route the tube to the rear of the stay and the harness to the rear of the tube.
⑩ To the wire harness
⑪ Fasten the headlight unit lead and speedometer unit sub-lead to the headlight stay with the plastic band.
⑫ To the headlight (left)
⑬ To the throttle body
⑭ To the headlight (right)
⑮ To the coolant reservoir
⑯ To the parking brake
⑰ To the brake caliper
⑱ Fasten the wire harness and corrugated tube (left grip warmer lead, grip/thumb warmer adjustment switch lead, brake light switch lead, and headlight beam switch lead) to the headlight stay with the plastic band, making sure to route the tube to the rear of the stay and the harness to the rear of the tube.
⑲ Pass the corrugated tubes and parking brake cable through the guide.
⑳ Right handlebar switch
㉑ Right grip warmer lead
㉒ Corrugated tube (engine stop switch lead, throttle switch leads, right grip warmer lead, and thumb warmer lead)
㉓ Throttle cable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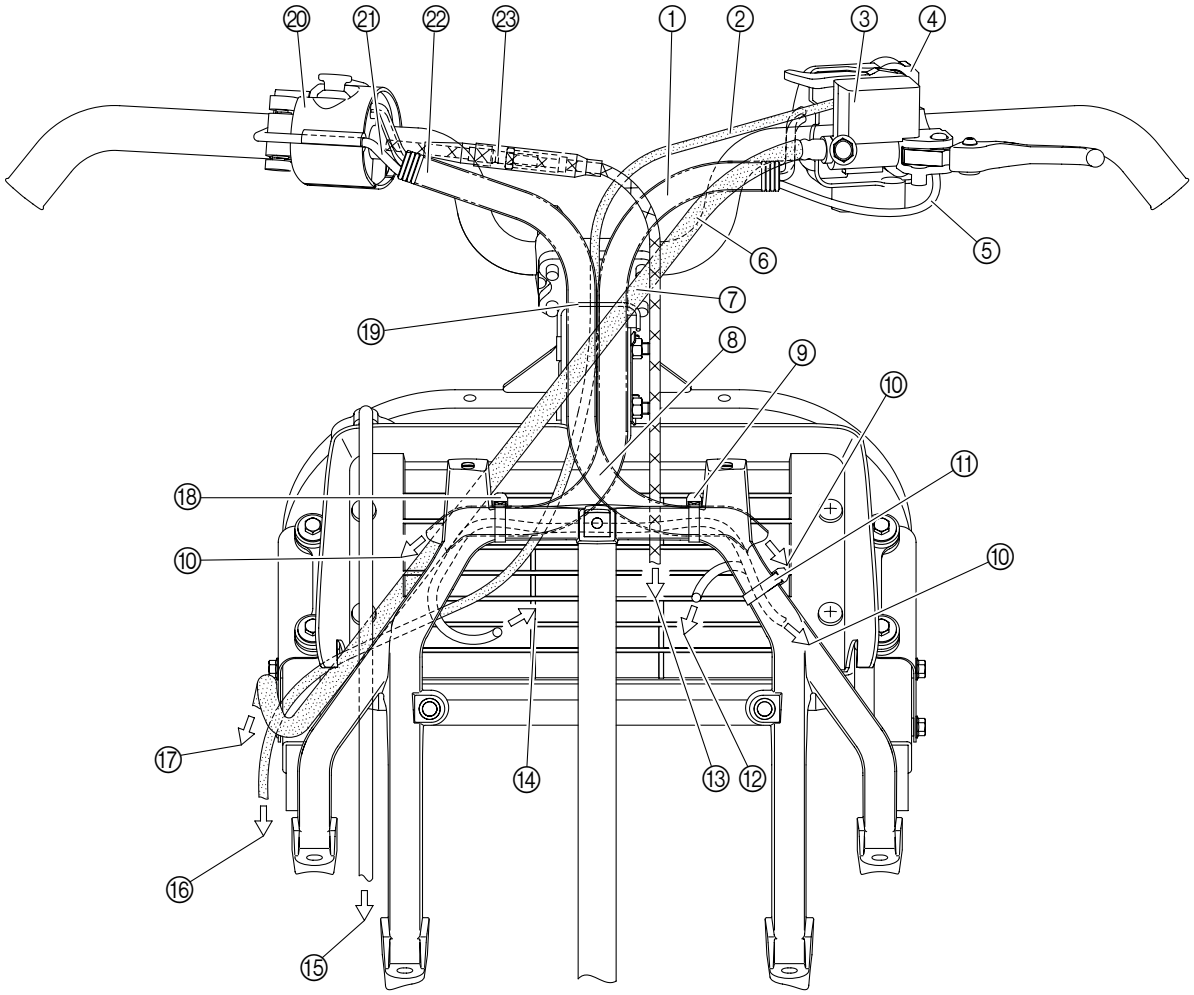
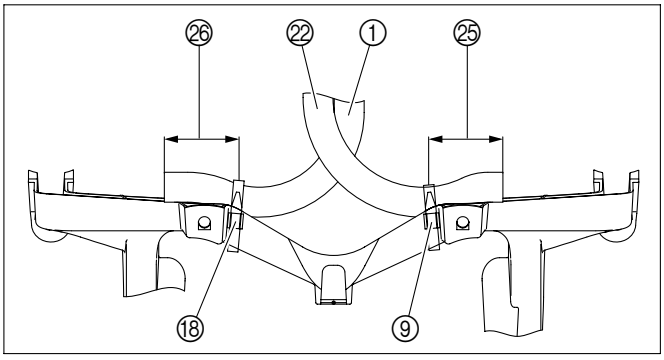
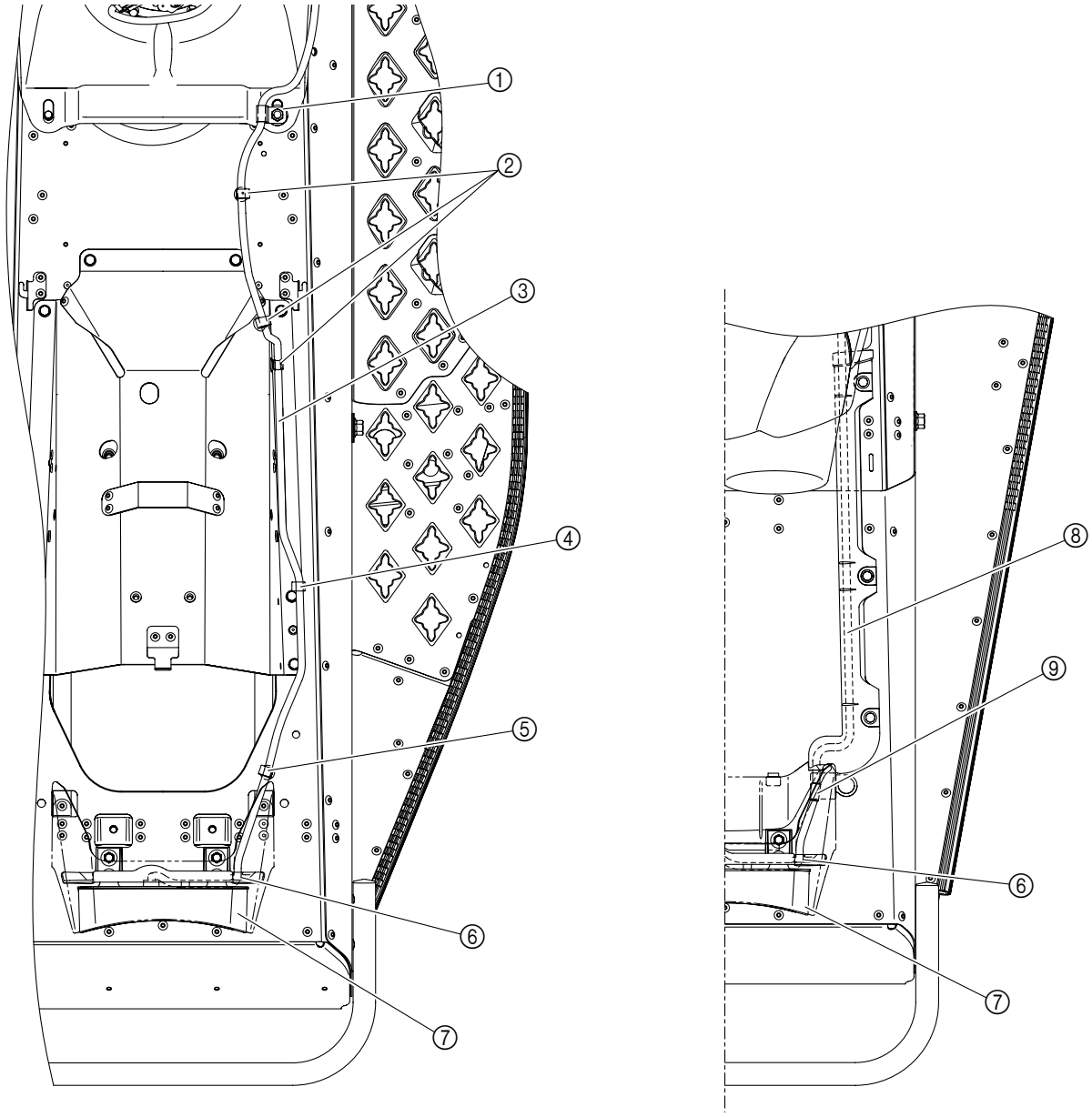




㉔ Fasten the corrugated tube (left grip warmer lead, grip/thumb warmer adjustment switch lead, brake light switch lead, and headlight beam switch lead), corrugated tube (engine stop switch lead, throttle switch leads, right grip warmer lead, and thumb warmer lead), and brake hose with the plastic band (FX10MT/FX10MTR/FX10MTRA).
㉕ 40 ~ 70 mm (1.57 ~ 2.76 in)
㉖ 30 ~ 60 mm (1.18 ~ 2.36 in)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① Fasten the tail/brake light lead with the holder, making sure to push the lead against the fuel tank.
② Fasten the tail/brake light lead with the holder.
③ Tail/brake light lead
④ After routing the tail/brake light lead, bend the holder around the lead to fasten it.
⑤ Fasten the tail/brake light lead with the holder. (FX10/FX10RT/FX10RTR/FX10RTRA)
⑥ Pass the tail/brake light lead through the notch in the tail/brake light bracket.
⑦ Tail/brake light
⑧ Tail/brake light sub-wire harness
⑨ Tail/brake light sub-wire harness coupler

YAMAHA MOTOR CO., LTD.

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WIRING DIAGRAM
FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA 2008
8GL-0F001-00/8HA-0F001-00

① Rectifier/regulator
② AC magneto
③ Crankshaft position sensor
④ Main switch
⑤ Main fuse
⑥ Load control relay
⑦ Battery
⑧ Starter motor
⑨ Starter relay
⑩ Fuel injection system fuse
⑪ Diode
⑫ Engine stop switch
⑬ Throttle switch
⑭ Thumb warmer
⑮ Grip warmer
⑯ Oil pressure switch
⑰ CO adjustment coupler
⑱ ECU (engine control unit)
⑲ Cylinder-#1 ignition coil
⑳ Spark plug
㉑ Cylinder-#2 ignition coil
㉒ Cylinder-#3 ignition coil
㉓ Fuel injection system relay
㉔ Fuel pump
㉕ Injector #1
㉖ Injector #2
㉗ Injector #3
㉘ Throttle position sensor
㉙ Speed sensor
㉚ ISC (idle speed control) unit
㉛ Intake air pressure sensor 1 (cylinders #1, #2, and #3)
㉜ Intake air pressure sensor 2 (cylinder #1)
㉝ Coolant temperature sensor
㉞ Intake air temperature sensor
㉟ Grip/thumb warmer adjustment switch
㊱ Frame ground
㊲ DC back buzzer
㊳ Gear position switch
㊴ Brake light switch
㊵ Tail/brake light
㊶ Fuel sender
㊷ Oil level switch
㊸ Speedometer unit
㊹ Multi-function meter
㊺ Warning light
㊻ Low coolant temperature indicator light
㊼ High beam indicator light
㊽ Headlight
㊾ Headlight relay
㊿ Headlight beam switch
(51) Radiator fan motor
(52) Radiator fan motor relay
(53) Auxiliary DC jack
(54) Ignition fuse
(55) Radiator fan motor fuse
(56) Signal fuse
(57) Headlight fuse
(58) Auxiliary DC jack fuse
[A] FX10MT/FX10MTR/FX10MTRA
[B] FX10/FX10RTR/FX10RTRA/FX10MTR/FX10MTRA

COLOR CODE

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

WIRING DIAGRAM
FX10/FX10RT/FX10RTR/FX10RTRA/FX10MT/FX10MTR/FX10MTRA 2008

8GL-0F001-00/8HA-0F001-00