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**FRONT WHEEL/  
FRONT SUSPENSION\STEERING SYSTEM**

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# 14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM



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## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Jack the machine front wheel off the ground and be careful to prevent the machine from falling down.
- During servicing, keep oil or grease off the brake disk
- Inspect the brake system before riding.

### SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Front wheel rim run out	Radial	—	2 (0.08)
	Axial	—	2 (0.08)
Tie rod length		299.5±0.5 (11.98±0.02)	—
Rod-end (tie rod) angle		180°	—

### TORQUE VALUES

Steering stem nut	7 kgf-m (70 Nm, 50 lbf-ft)
Front swing arm nut	4.5 kgf-m (45 Nm, 32 lbf-ft)
Front wheel nut	4.5 kgf-m (45 Nm, 32 lbf-ft)
Front wheel hub nut	7 kgf-m (70 Nm, 50 lbf-ft)
Steering knuckle nut	3.5 kgf-m (35 Nm, 25) lbf-ft)
Front shock absorber upper mount bolt	4 kgf-m (40 Nm, 29 lbf-ft)
Front shock absorber lower mount bolt	4 kgf-m (40 Nm, 29 lbf-ft)

### SPECIAL TOOLS

Oil seal and bearing install E014

### TROUBLESHOOTING

#### Hard steering (heavy)

- Insufficient tire pressure

#### Steers to one side or does not track straight

- Uneven front shock absorbers
- Bent front arm
- Bent steering knuckle

#### Front shock absorber noise

- Slider bending
- Loose arm fasteners
- Lack of lubrication

#### Front wheel wobbling

- Bent rim
- Excessive wheel bearing play
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

#### Soft front shock absorber

- Weak shock springs
- Insufficient damper oil

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## FRONT WHEEL

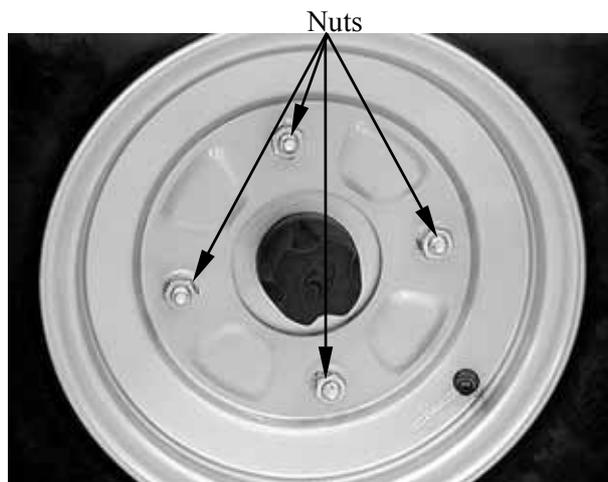
### REMOVAL AND INSPECTION

Place the machine on a level place.

Remove four nuts attaching the front wheel hub and front wheel.

Elevate the front wheels by placing a suitable stand under the frame.

\* **Support the machine securely so there is no danger of it falling over.**



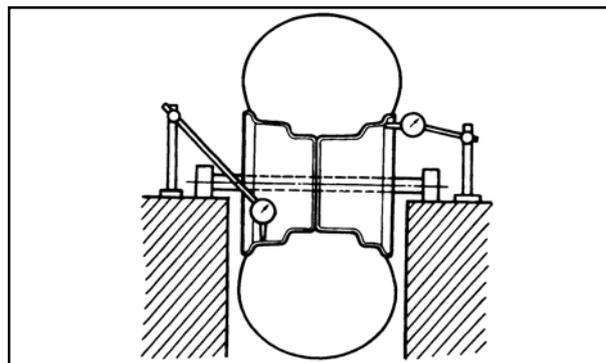
Measure the wheel run out.

Replace wheel or check bearing play if out of specification

### Rim run out limits:

Vertical: 2 mm (0.08 in)

Lateral: 2 mm (0.08 in)

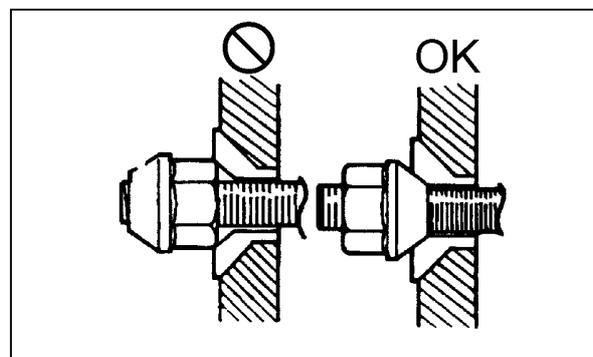


## INSTALLATION

When reinstalling a wheel, tighten the wheel nuts in a crisscross (rather than a circular) pattern.

**Torque:** 4.5 kgf-m (45 Nm, 32 lbf-ft)

\* **Be sure the tapered side of the wheel nuts face the wheel rim.**



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## FRONT WHEEL HUB

### REMOVAL AND INSPECTION

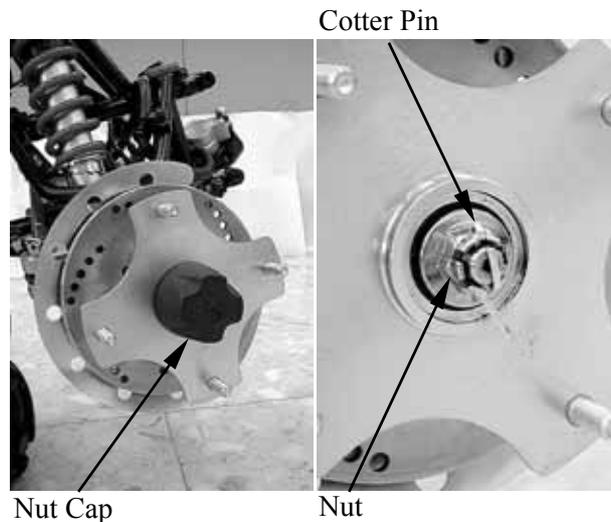
Place the machine on a level place.  
Remove the front wheel (⇒14-3) and  
caliper. (⇒13-9)  
Elevate the front wheels by placing a  
suitable stand under the frame.

\* **Support the machine securely so  
there is no danger of it falling over.**

Remove the nut cap.

Remove the cotter pin.

Remove nut from the front wheel hub and  
then remove front wheel hub.



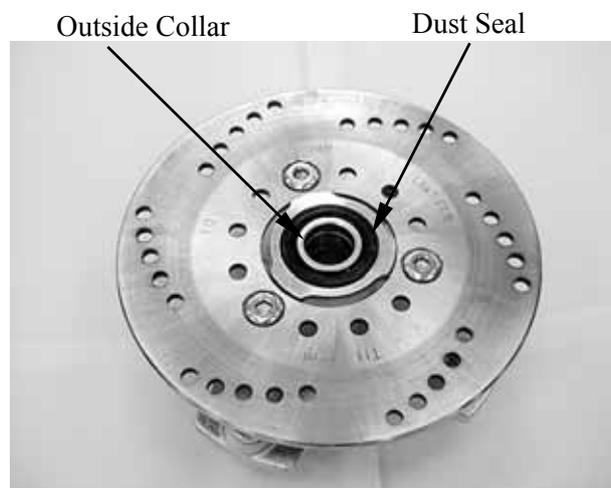
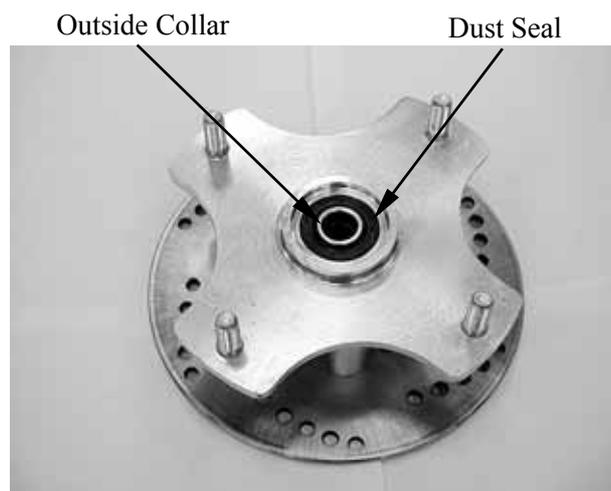
### DISASSEMBLY

Remove the outside collars.

Inspect the dust seals for wear or damage.  
If any defects are found, replace the dust  
seal with a new one.

Remove the dust seals by a flat-head screw  
driver.

\* **Place a wood block against the outer  
edge to protect this edge.**

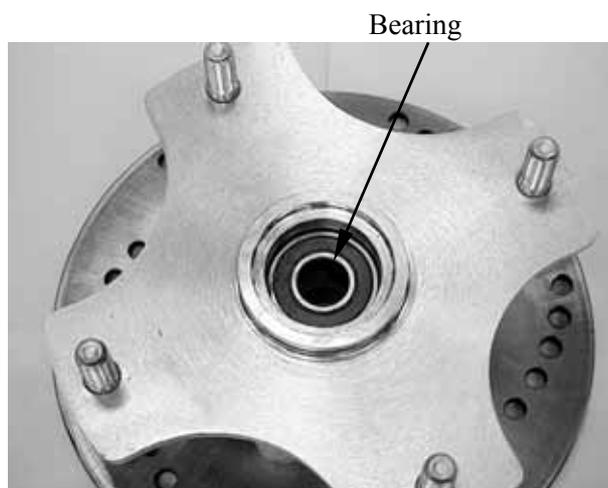


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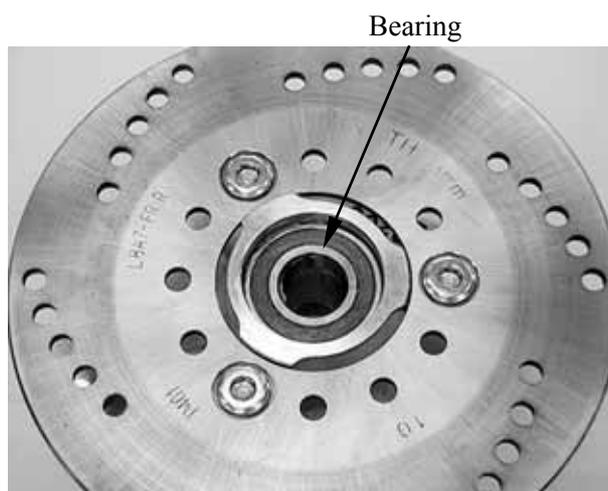


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Inspect the bearings for allow play in the front wheel hub or the wheel turns roughly.



If any defects are found, replace the bearings



Remove the bearings using a general bearing puller.

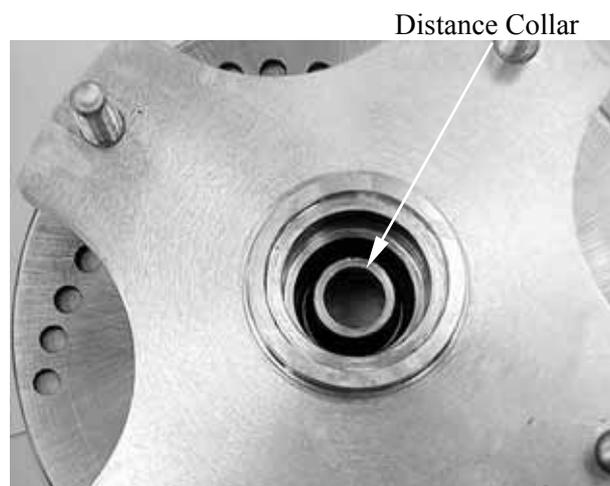


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Remove the distance collar from the front wheel hub.



## ASSEMBLY

Install the left new bearing and dust seal into the front wheel hub.

Special

Oil seal and bearing install E014

- \* Apply the grease onto the oil seal lips, bearing.



Install the distance collar.

- \* Be sure the tapered side of the distance collar face the wheel.



Distance Collar

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Install the right new bearing and dust seal into the front wheel hub.

- \* Apply the grease onto the oil seal lips, bearing.

Special

Oil seal and bearing install E014

- \*
  - Do not allow the bearings to tilt while driving them in.
  - Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.
  - Pack all bearing cavities with grease.
  - Drive in the bearing squarely with the sealed end facing out.

## INSTALLATION

Reverse the “FRONT WHEEL HUB REMOVAL AND INSPECTION” procedures.

- \* Apply grease onto the bearing and dust seal lips of the wheel panel.

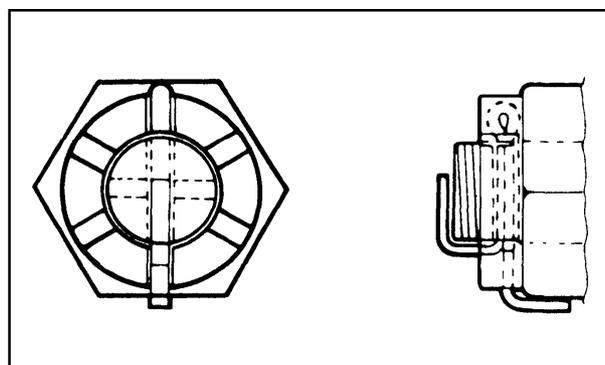
Tighten the front wheel hub nut.

**Torque:** 7 kgf-m (70 Nm, 50 lbf-ft)

Install the cotter pin and band ends of cotter pin.

- \* Do not loosen the wheel hub nut after torque tightening. If the wheel hub nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the wheel hub nut. Always use a new cotter pin.

- \* Always use a new cotter pin.



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## FRONT SUSPENSION

### REMOVAL AND INSPECTION

Elevate the front wheels by placing a suitable stand under the frame.

★

Support the machine securely so there is no danger of it falling over.

Remove the front wheel (⇒14-3), caliper (⇒13-9) and front wheel hub. (⇒14-4)

Remove the two bolts and brake disk protection plate.

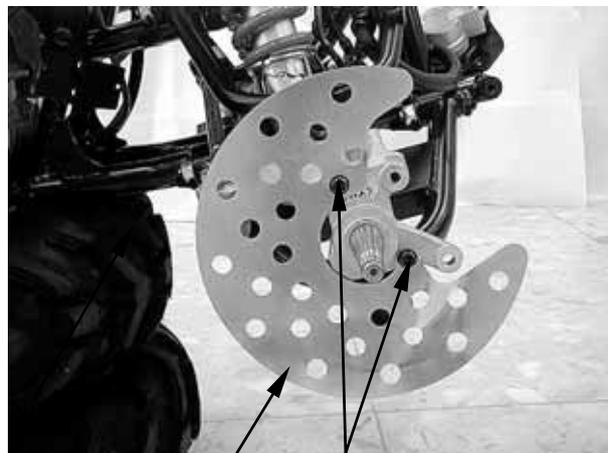
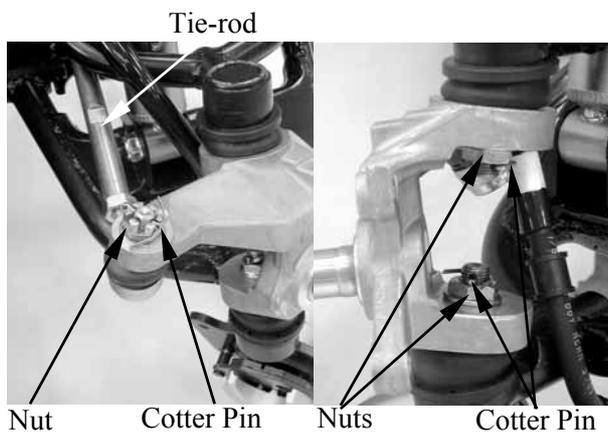


Plate Bolts

Remove the cotter pins, washer and nuts from tie-rod, upper and lower front arm. Disconnect the tie-rod ball from the steering knuckle.



Tie-rod  
Nut Cotter Pin Nuts Cotter Pin

Release the ball joints of the upper and lower arms off the knuckle, using the special tool according to the following instructions.

**Special tool: Ball joint remover F012**

Apply grease to the ball joint remover at the point shown.

This will ease installation of the tool and prevent damage to the pressure bolt threads. Insert the jaws carefully, making sure that you do not damage the ball joint boot.

Adjust the jaw spacing by turning the pressure bolt.

Tighten the pressure bolt with a wrench until the ball joint stud pops loose.

Remove the knuckle from the upper and lower arms



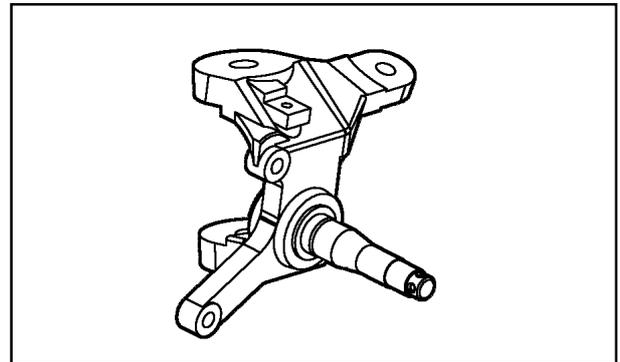
Ball Joint Remover

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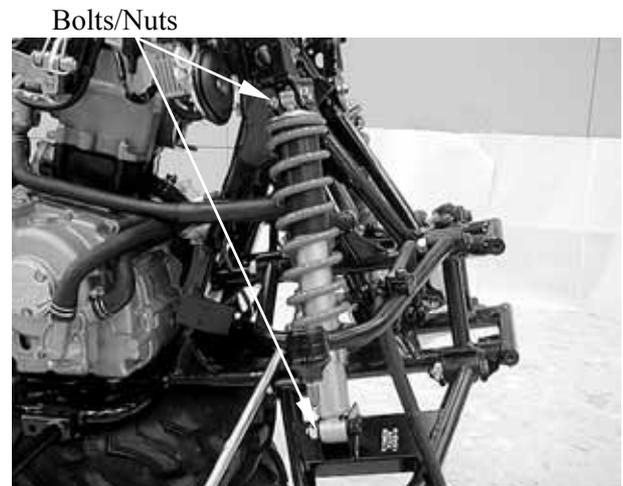


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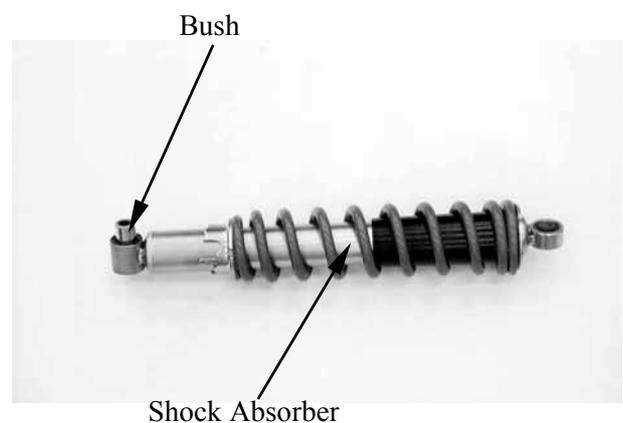
Inspect the steering knuckle for cracks, pitting or damage.  
If any defects are found, replace the steering knuckle with a new one.



Remove the front shock absorber upper mount and lower mount bolts/nuts, then remove the front shock absorber and bush.



Inspect the shock absorber rod.  
Bends/damage → Replace the shock absorber assembly.  
Inspect the shock absorber.  
Oil leaks → Replace the shock absorber assembly.  
Inspect the spring of the shock absorber by move the spring up and down.  
Fatigue → Replace the shock absorber assembly.  
Inspect bush.  
Wear/damage → Replace.



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Check the upper front arm brackets of the frame.

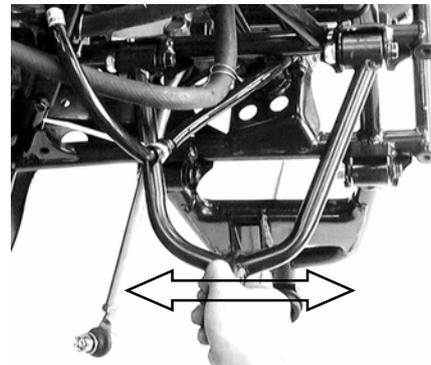
If bent, cracked or damaged, repair or replace the frame.

Check the tightening torque of the front arms securing nuts.

**Torque:** 4.5 kgf-m (45 Nm, 32 lbf-ft)

Check the upper front arm side play by moving it from side to side.

If side play noticeable, replace the inner collars and bushes as a set.



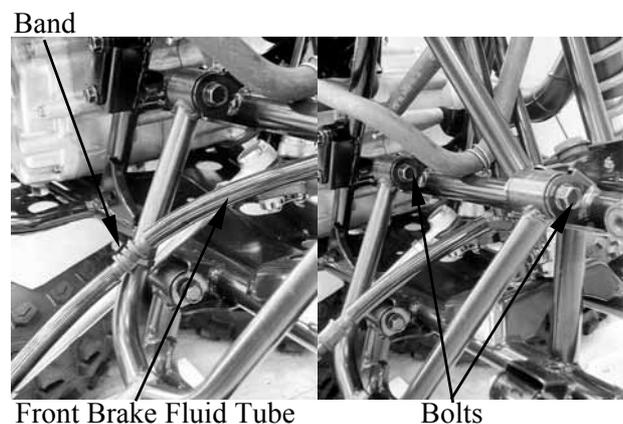
Check the front arm vertical movement by moving it up and down.

If vertical movement is tight, binding or roughs, replace the inner collars and bushes as a set.



Remove the band and then disconnect the front brake fluid tube from the upper front arm.

Remove the two nuts and two bolts attaching the upper front arm, then remove the upper front arm and bushes.



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Inspect the front arm.  
Cracks/bends/damage →Replace.

\*

Do not attempt to straighten a bent arm,  
this may dangerously weaken the arm.

Inspect bushes.  
Wear/damage →Replace.



Check the lower front arm brackets of the frame.

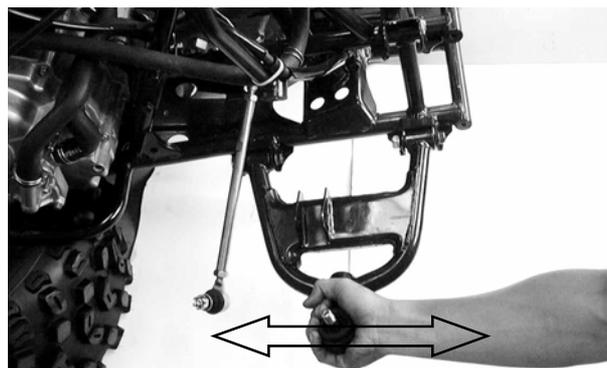
If bent, cracked or damaged, repair or replace the frame.

Check the tightening torque of the front arms securing nuts.

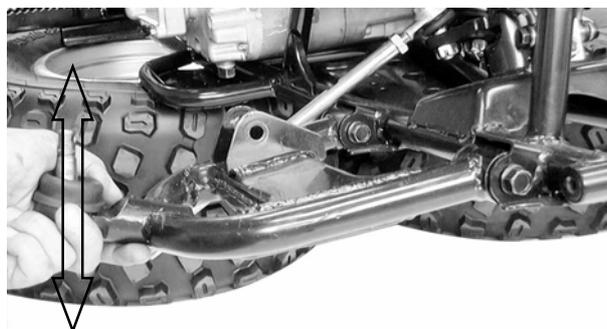
**Torque:** 4.5 kgf-m (45 Nm, 32 lbf-ft)

Check the lower front arm side play by moving it from side to side.

If side play noticeable, replace the inner collar and bushes as a set.



Check the lower front arm vertical movement by moving it up and down.  
If vertical movement is tight, binding or roughs, replace the inner collar and bushes as a set.

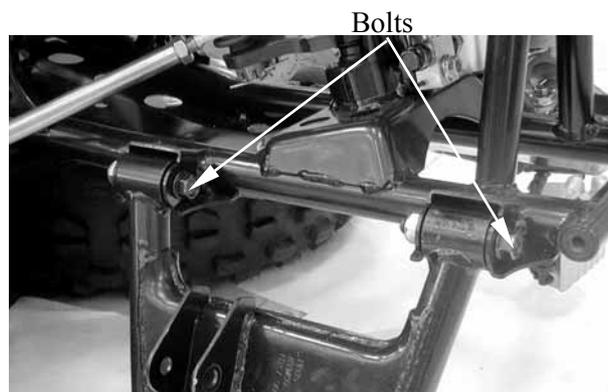


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Remove the two nuts and two bolts attaching the lower front arm, then remove the lower front arm and bushes.

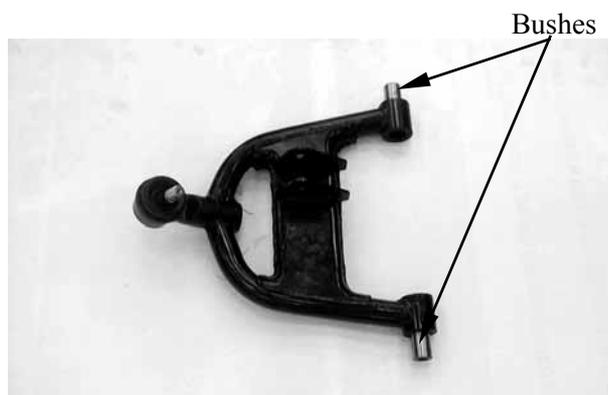


Inspect the lower front arm.  
Cracks/bends/damage → Replace.

★

Do not attempt to straighten a bent arm,  
this may dangerously weaken the arm.

Inspect bushes.  
Wear/damage → Replace.



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## INSTALLATION

Reverse the “FRONT SUSPENSION  
REMOVAL AND INSPECTION”  
procedures.

★

Apply the grease onto the bushes and  
inner collars

Install the lower and upper front arms nuts  
onto the frame and tighten the nuts.

**Torque:** 4.5 kgf-m (45 Nm, 32 lbf-ft)

Install the steering knuckle onto the upper  
and lower front arms and tighten the nuts.

**Torque:** 3.5 kgf-m (35 Nm, 25 lbf-ft)

Install the tie-rod and washer onto the  
steering knuckle and tighten the nut.

**Torque:** 2.1 kgf-m (21 Nm, 15 lbf-ft)

Install the all cotter pins and band ends of  
cotter pins.

★

Always use a new cotter pin.

Apply the grease onto the bush, then install  
the shock absorber and tighten the upper  
mount and lower mount bolts.

**Torque:** 4 kgf-m (40 Nm, 29 lbf-ft)

Install the front wheel hub (⇒14-7), caliper  
(⇒13-11) and front wheel. (⇒14-3)

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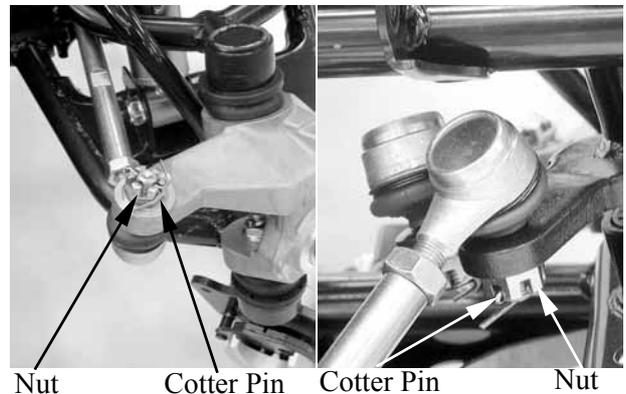
## TIE-ROD

### REMOVAL/INSPECTION

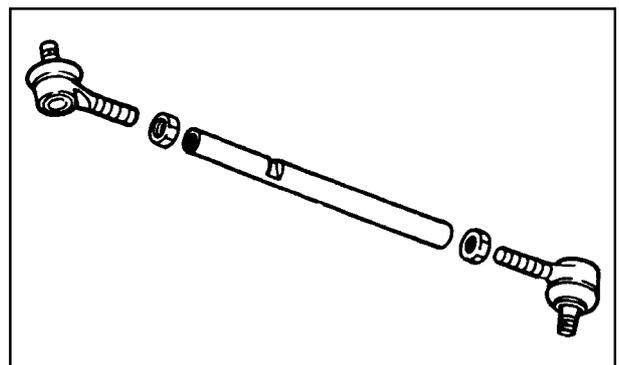
Remove the cotter pin and nut attaching the tie-rod and steering column.

Remove the cotter pin, washer and nut attaching the tie-rod and steering knuckle.

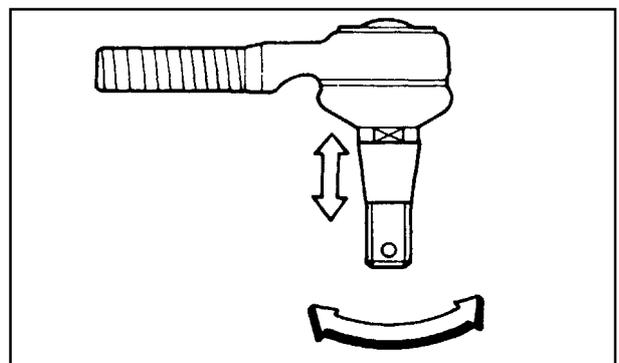
Then remove tie-rods.



Inspect the tie-rod.  
Bend/damage → Replace.



Check the tie-rod end movement.  
Tie-rod end exists free play or turns roughly → Replace.  
Check the tapered surface of the tie-rod end.  
Pitting/wear/damage → Replace.



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Adjust the tie-rod length.

Adjustment steps:

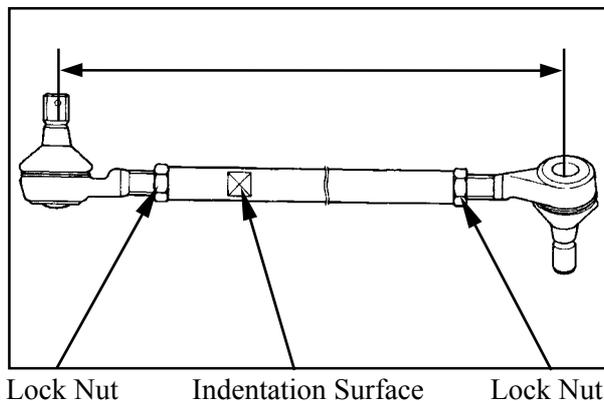
(The following procedures are done on both tie-rods, right and left.)

Loosen the lock nuts.

Adjust the tie-rod length by tuning both tie-rod ends.

**Tie rod length:**

299.5±0.5 mm (11.98±0.02 in)



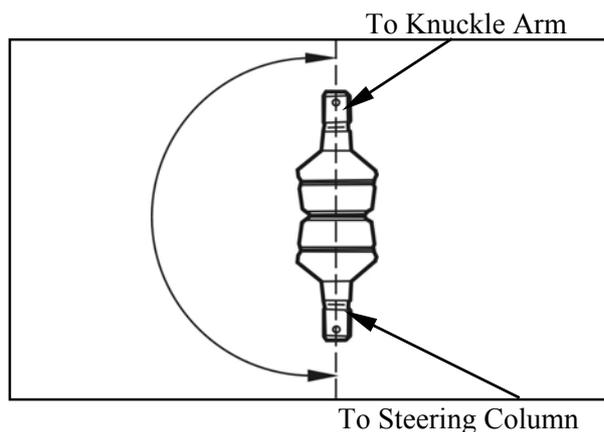
Set the rod-end (steering column side) in an angle where the indentation surface of the tie-rod is parallel to the rod-end shaft, and then tighten the lock nut.

**Torque:** 3 kgf-m (30 Nm, 22 lbf-ft)

Set the other rod-end (knuckle arm side) in an angle as shown (right-hand tie-rod and left-hand tie-rod), and then tighten the lock nut.

Rod-end (tie rod) angle: 180°

**Torque:** 3 kgf-m (30 Nm, 22 lbf-ft)

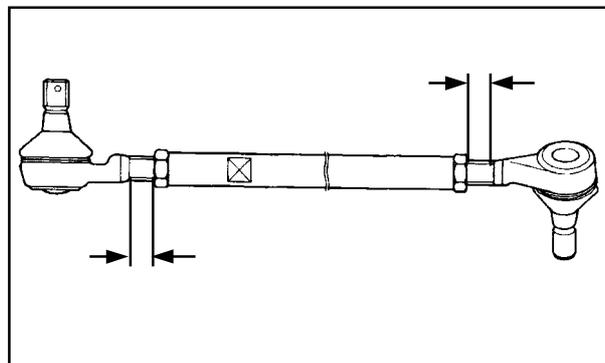


★

After making adjustment on both tie rods be sure to mark them R and L for identification.

★

The threads on both rod-end must be of the same length.



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## INSTALLATION

Reverse the “REMOVAL/INSPECTION” procedures.

Install the tie-rod and washer onto the steering knuckle and steering column, then tighten the nuts.

### Torque:

Steering knuckle side:

2.1 kgf-m (21 Nm, 15 lbf-ft)

Steering column side:

3.5 kgf-m (35 Nm, 25 lbf-ft)

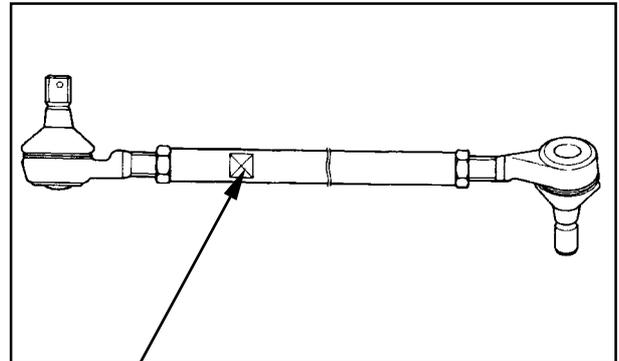
★

Be sure that the rod-end on the indentation surface side is connected to the steering knuckle.

Install the all cotter pins and band ends of cotter pins.

★

Always use a new cotter pin.



Indentation Surface

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## HANDLEBAR

### REMOVAL/INSPECTION

Remove the following parts:

Seat, front cover, fuel tank cover, front fender and handlebar cover.

Refer to the "FENDERS" section in the CHAPTER 2

Remove the right and left master cylinder and remove bands then disconnect the rear and front fluid tube from the handlebar.



Bolts

Brake Fluid Tube

Remove the two screws and remove the handlebar switch.

Remove the two screws and remove throttle unit.

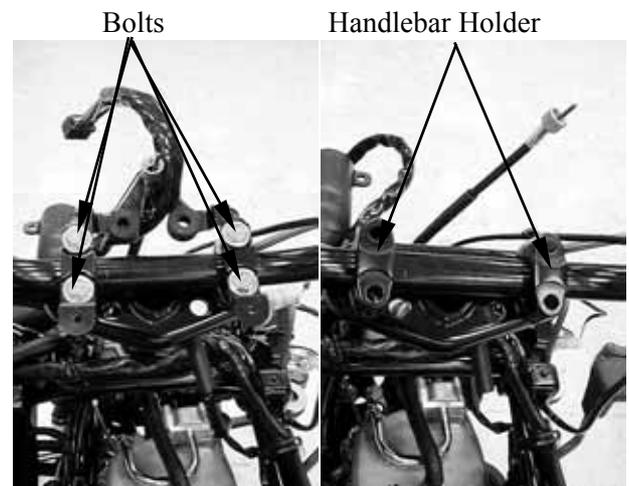


Screws



Screws

Remove the four handlebar holder bolts, then remove handlebar cover and handlebar holder.



Bolts

Handlebar Holder

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## INSPECTION

Inspect the handlebar.

Cracks/bends/damage → Replace.

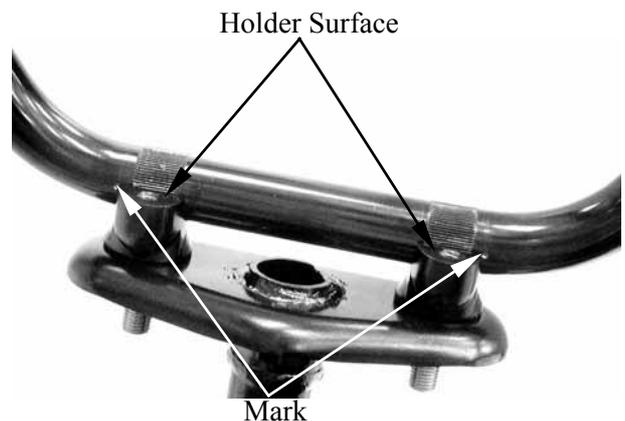


## INSTALLATION

Install handlebar and handlebar holder, then tighten the four bolts.

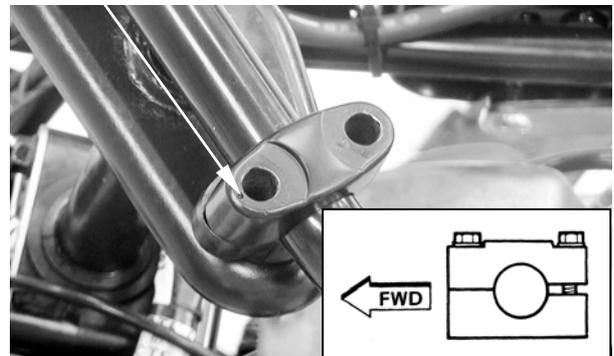
**Torque:** 2.2 kgf-m (22 Nm, 16 lbf-ft)

- \* Align the mark on the handlebar with the lower handlebar holder surface.



- \*
  - Be sure the upper handlebar holder mark face to front.
  - First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.

Forward Mark

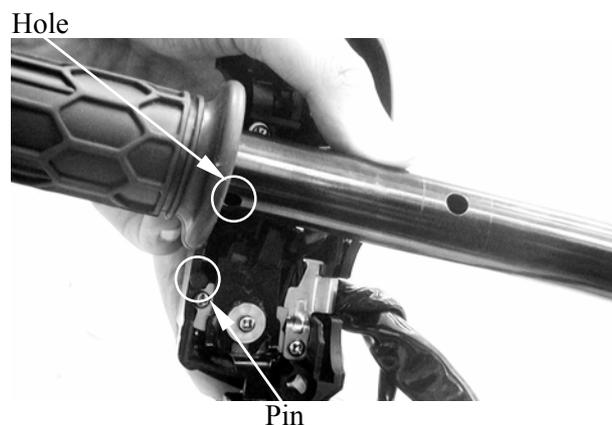


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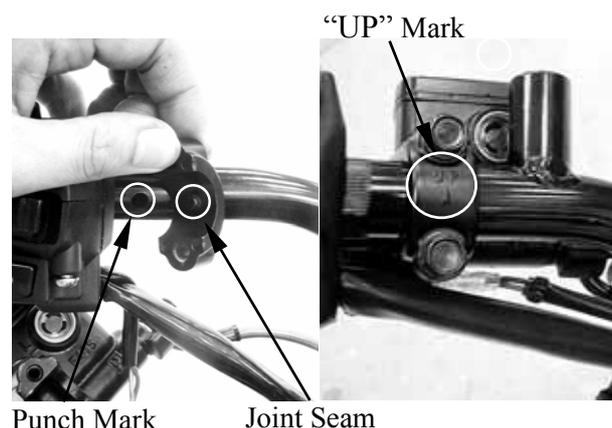
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Install the handlebar switch by aligning the pin on the handlebar switch with the hole in the handlebar and then tighten the two screws.



Place the right and left brake master cylinder on the handlebar and install the master cylinder holder with the “UP” mark facing up, aligning the punch mark on the handlebar with the holder joint seam. First tighten the upper bolt and then tighten the lower blot.

Torque: 1 kg-m (10 Nm, 7.2 lbf-ft)

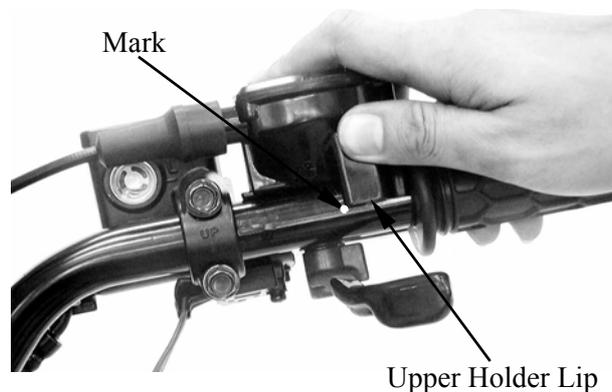


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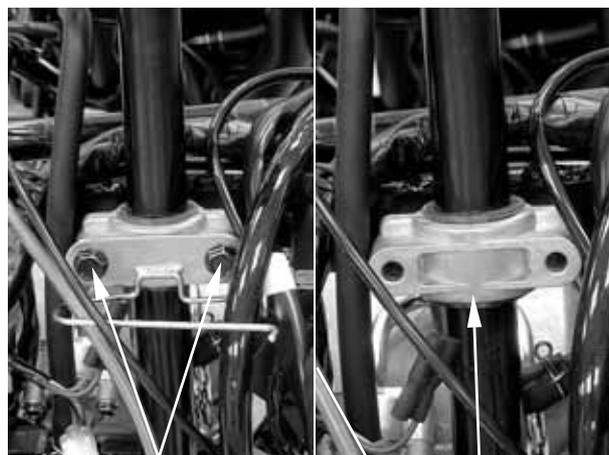
Install the throttle unit by aligning the upper holder lip with the mark in the handlebar and then install the lower holder and tighten the two screws.



## STEERING COLUMN REMOVAL AND INSPECTION

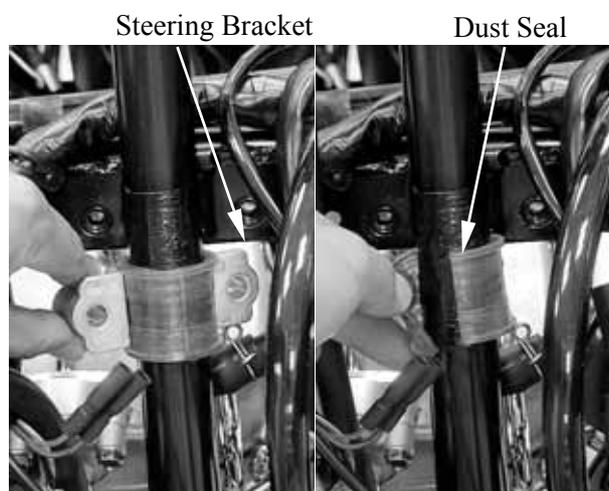
Remove handlebar. (⇒ 14-17)

Remove the two bolts and remove the cable holder, steering brackets and dust seal.



Bolts

Steering Bracket



Steering Bracket

Dust Seal

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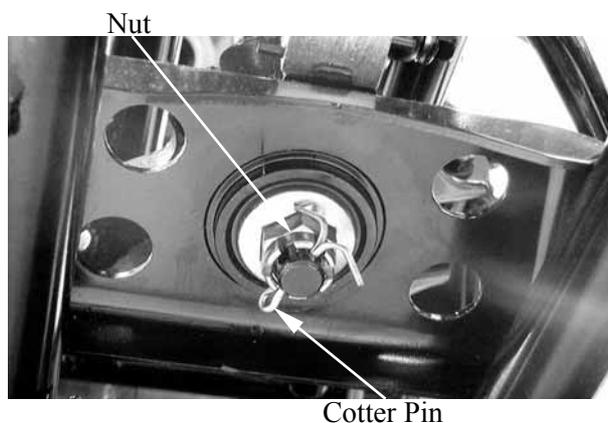


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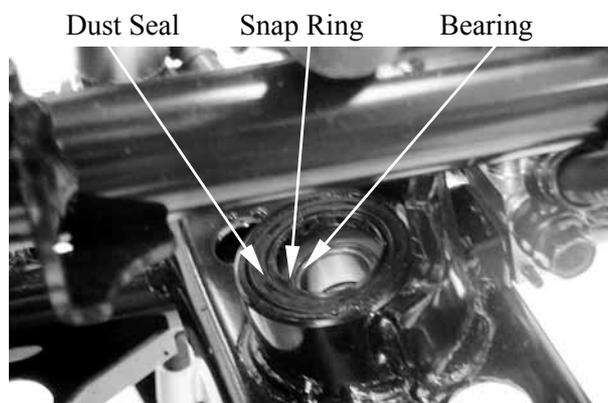
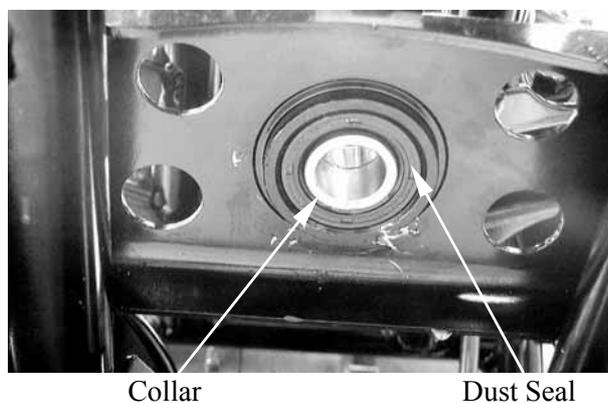
Remove the cotter pins and nuts attaching the tie-rods, then disconnect the tie-rods from the steering column.



Remove the cotter pin and nut attaching the steering column under the frame body, then remove steering column and collar.



Inspect the collar, dust seals, snap ring (under the dust seal) and bearing.  
Wear/damage → Replace.



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Inspect the steering column.

Bends/damage →Replace.

★

Do not attempt to straighten a bent shaft, this may dangerously weaken the shaft.

Inspect the steering brackets and oil seal.

Wear damage →Replace.



## INSTALLATION

Reverse the “REMOVAL” procedures.

★

Apply the grease onto the collar, dust seals, and bearing.

Install the steering column and collar, then tighten the nut under the frame body.

**Torque:** 7 kgf-m (70 Nm, 50 lbf-ft)

Install the cotter pin and band ends of cotter pin.

★

Always use a new cotter pin.



Assembly the steering column and tighten the two bolts.

**Torque:** 2.2 kgf-m (22 Nm, 16 lbf-ft)

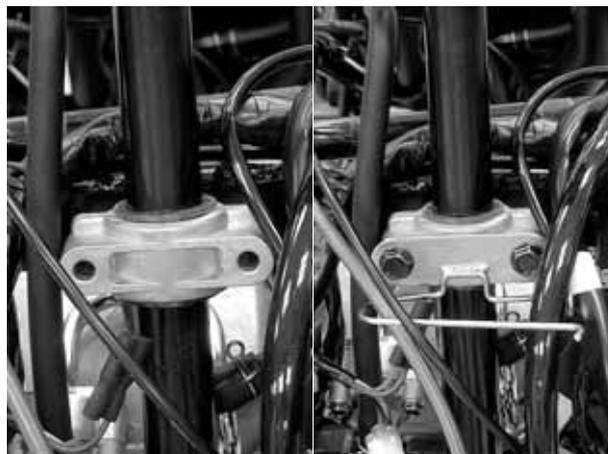
Install the tie rods and washer, then tighten the nut.

**Torque:** 3.5 kgf-m (35 Nm, 25 lbf-ft)

Install the cotter pins and band ends of cotter pins.

★

Always use a new cotter pin.



Refer to the “TOE-IN ADJUSTMENT” section in the CHAPTER 3 to adjust toe-in.