9. Driving Belt Device & The Starting Lever

Detaching the Left Crankcase Cover

1. Unlock the clip for the air tube for the driving belt.

2. Remove eight bolts and then take off the left crankcase cover and the locating pin.

3. Check whether the gasket is damaged or fractured.

Removing the Starting Pivot

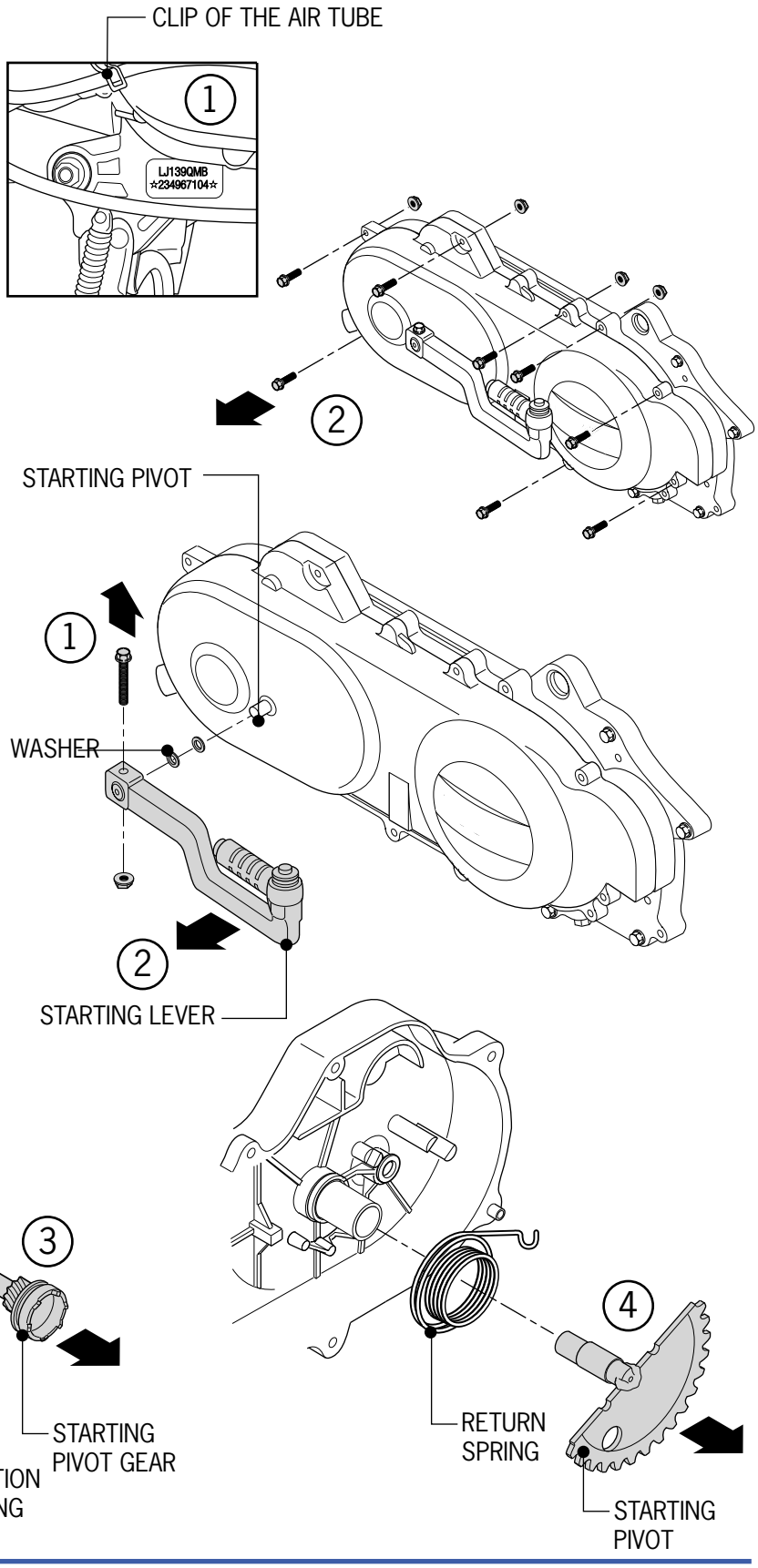
1. Remove the starting lever from the pivot.

2. Remove the retainer and the washer from the starting pivot.

3. Turn the starting pivot gently and remove the driving gear and the friction spring together.

4. Remove the starting pivot and the return spring.

5. Detach the starting pivot sleeve.



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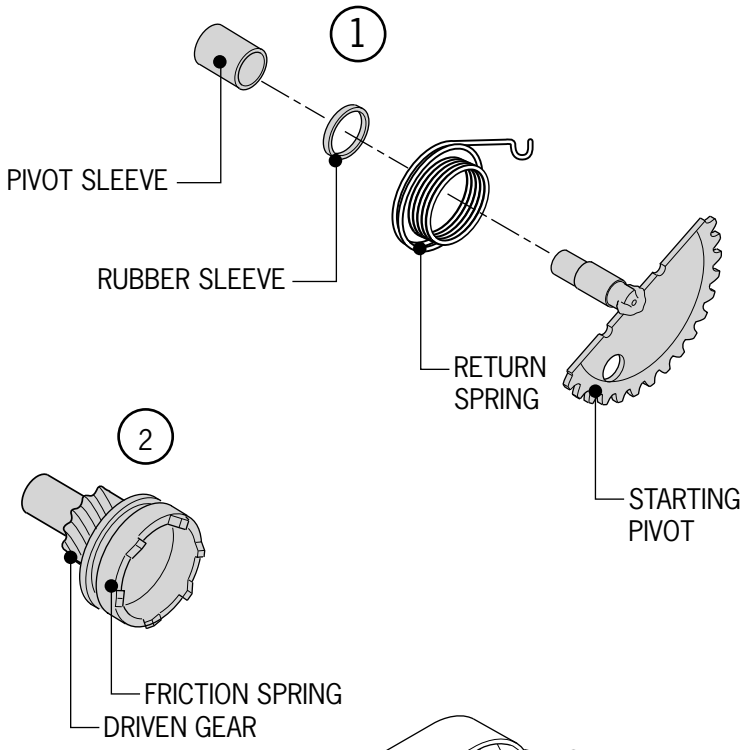
9. Driving Belt Device & The Starting Lever

Checking the Starting Pivot

1. Check if the pivot and the gear are worn. Check if there is any softness of the starting return spring. Check if there is any excessive wear on the pivot sleeve.

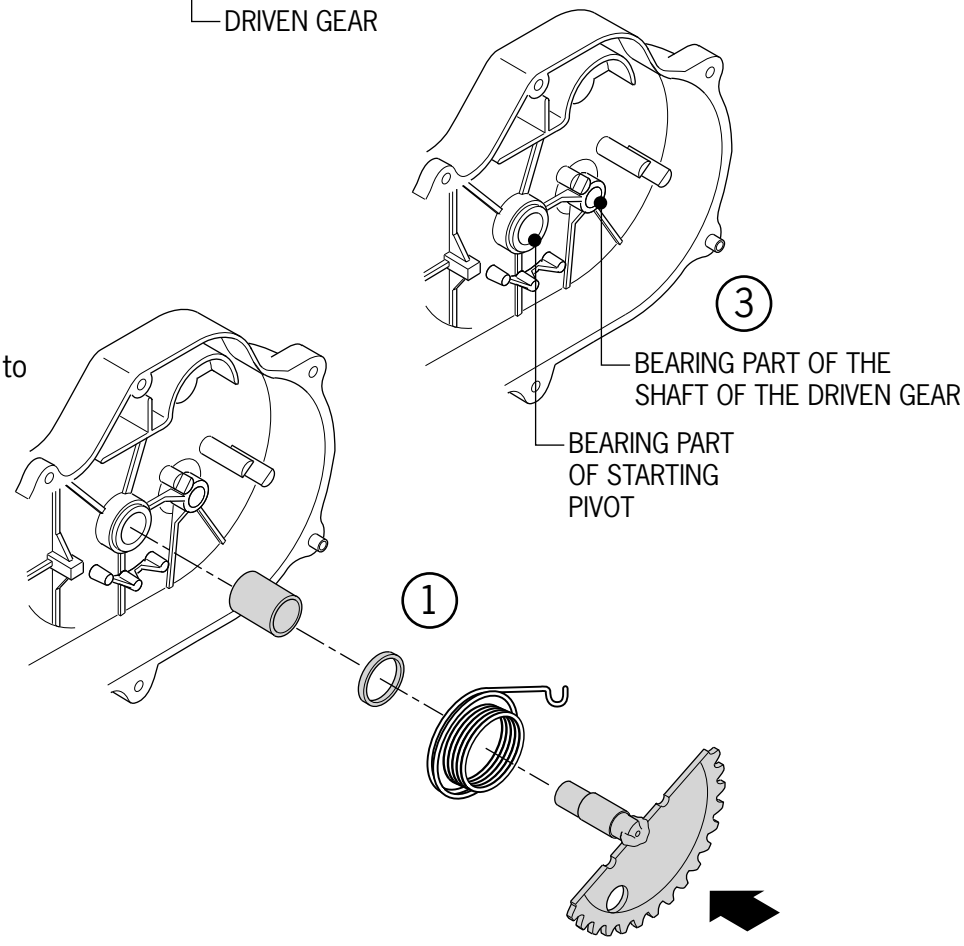
2. Check if the driven gear is worn or has failed. Check if the friction spring is worn or fractured.

3. Check if there is any excessive wear on the bearing part of the starting pivot and of the shaft of the driven gear. Replace any parts showing excessive or unusual wear.



Installing the Starting Assembly

1. Install the starting pivot sleeve and the return spring to the crankcase cover.



9. Driving Belt Device & The Starting Lever

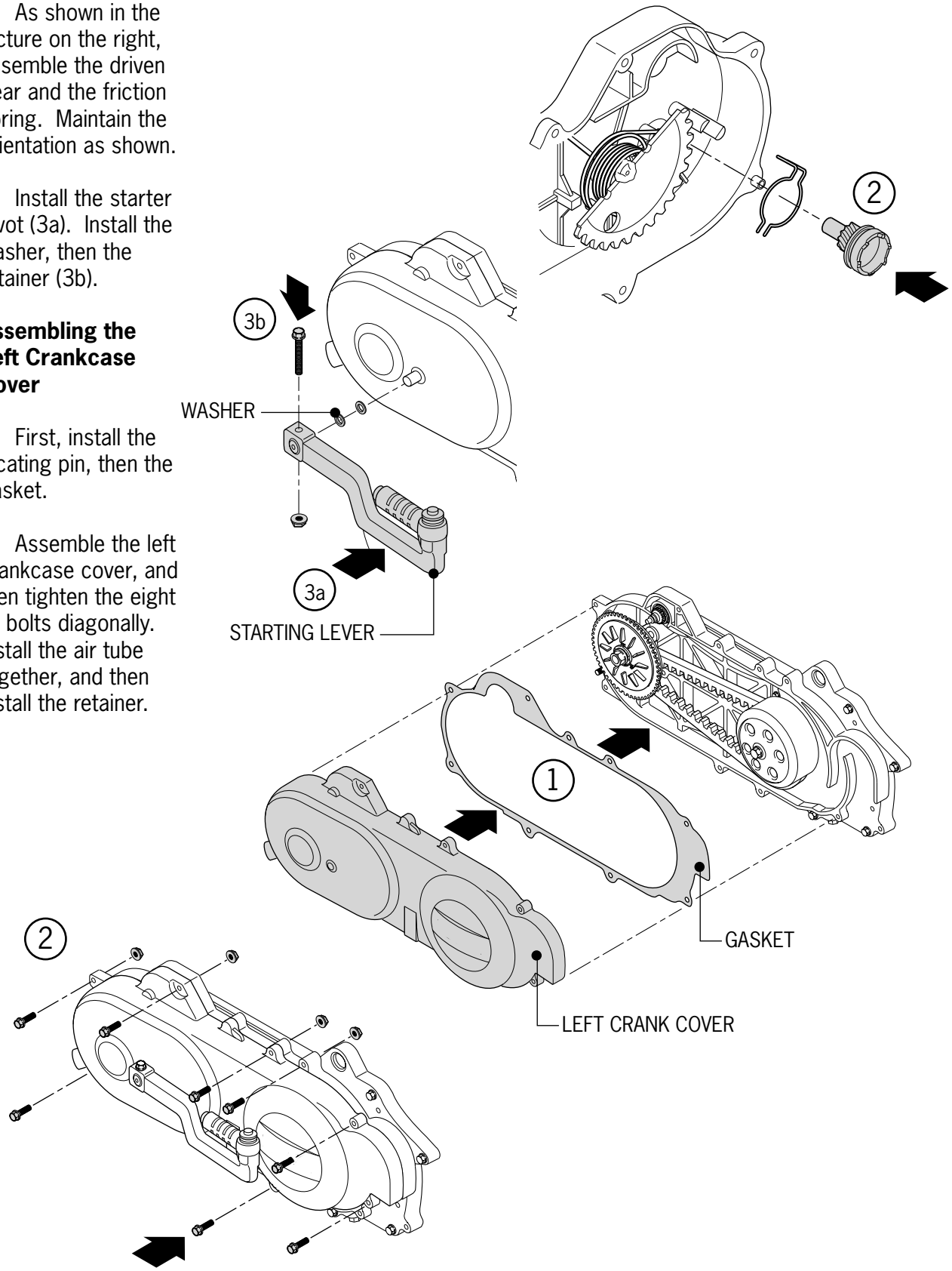
2. As shown in the picture on the right, assemble the driven gear and the friction spring. Maintain the orientation as shown.

3. Install the starter pivot (3a). Install the washer, then the retainer (3b).

Assembling the Left Crankcase Cover

1. First, install the locating pin, then the gasket.

2. Assemble the left crankcase cover, and then tighten the eight fix bolts diagonally. Install the air tube together, and then install the retainer.

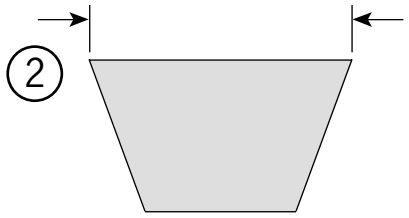


9. Driving Belt Device & The Starting Lever

Checking the Driving Belt

1. Detach the left crankcase cover.

2. Check if the driving belt is cracked, frayed, or if there is abnormal wear. Measure the width of the belt. Maximum service allowance: 17mm (.7 in.).



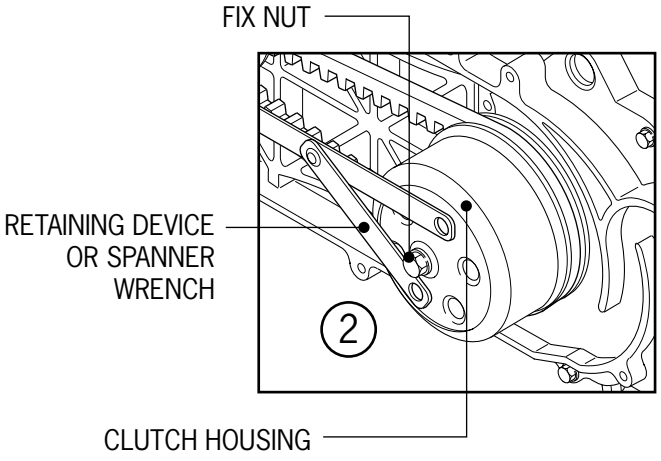
Replacing the Driving Belt

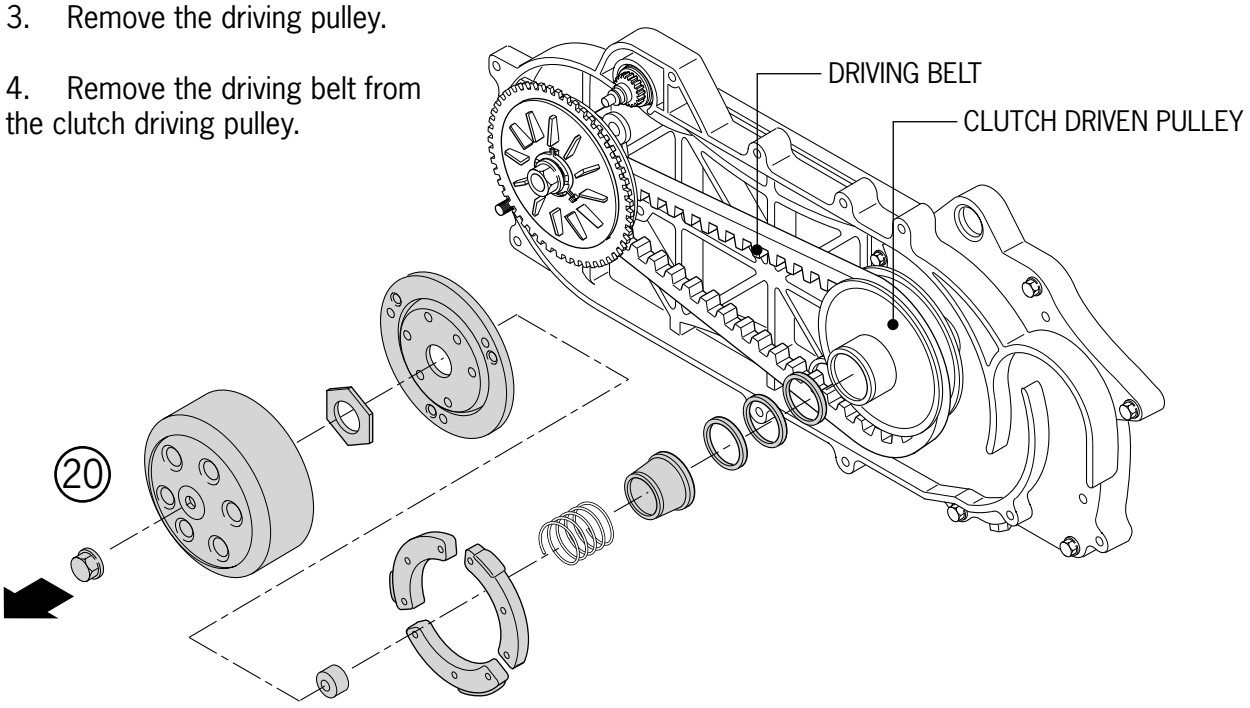
1. Remove the eight fix bolts, then remove he crankcase cover.

2. Remove driving pulley. Use a retaining device to hold the driving pulley and screw out of the 10mm (.39 in.) bolt.

3. Remove the driving pulley.

4. Remove the driving belt from the clutch driving pulley.





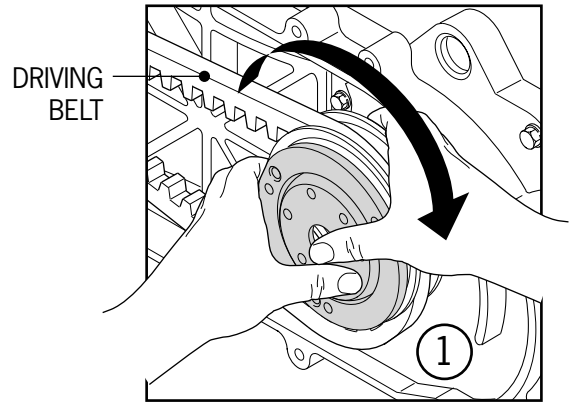
9. Driving Belt Device & The Starting Lever

Assembling the Driving Belt

1. Turn the driving pulley clockwise to keep the notches of the belt in expanded condition. Then install the new driving belt.

2. Install the driving belt on the driving pulley. Install the driving pulley, the starting ratchet and 10mm (.39 in.) washer. Then install and tighten the nut. Torque: 3,8kg/m 28ft lbs

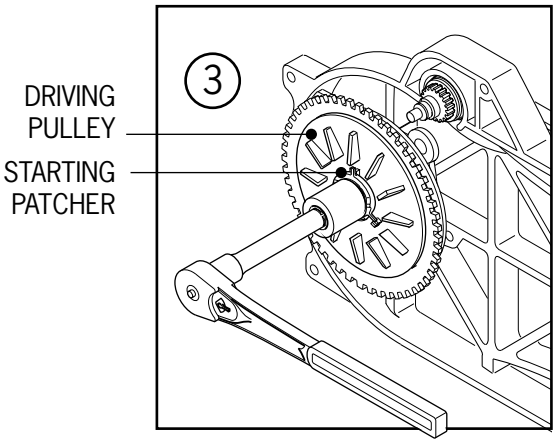
Attention:
During assembly, be sure to align the splints of the driving unit with those on the crank shaft with the ratchet.



The Driving Pulley-Dismounting

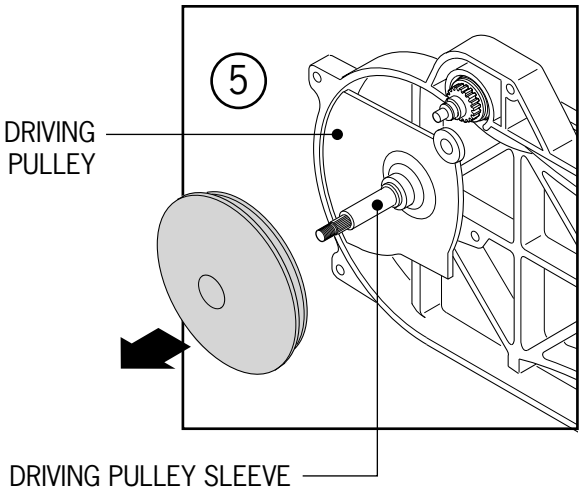
3. Use a retaining device or spanner wrench to hold the driving pulley.

4. Screw out the 10mm (.39 in.) nut, and then remove the ratchet, the 10mm (.39 in.) nut and the driving pulley.



Taking the Driving Pulley Apart

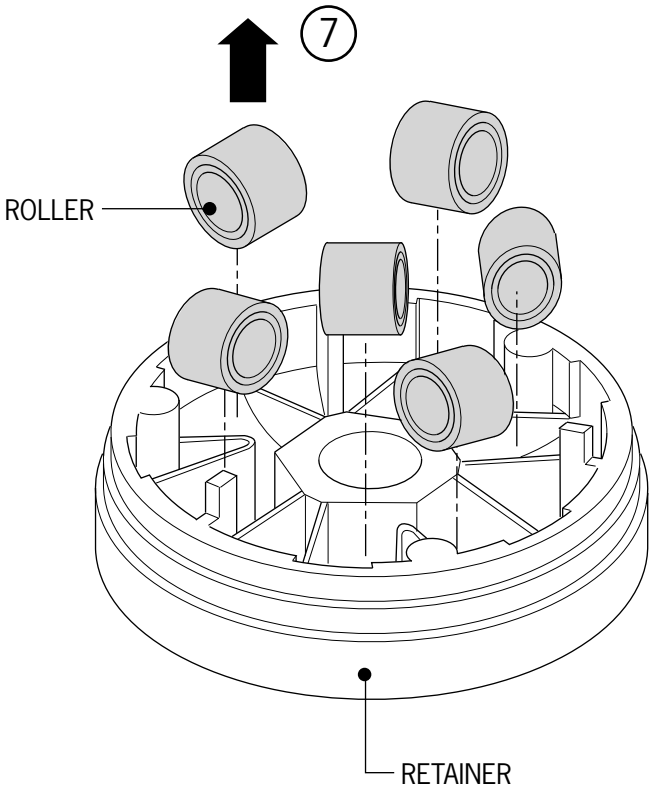
5. Remove the driving pulley and the sleeve from the crankshaft.



9. Driving Belt Device & The Starting Lever

6. Remove the retainer.

7. Remove the rollers.



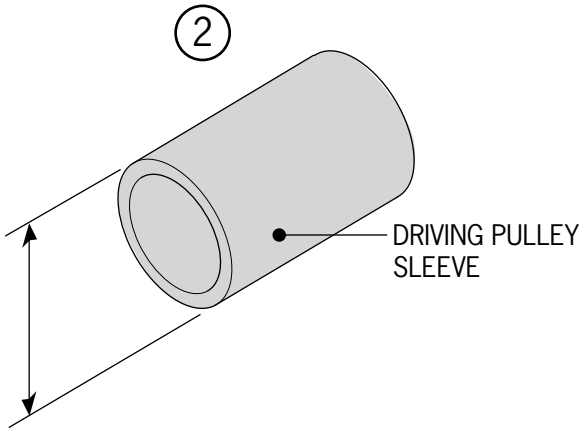
Checking the driving pulley

1. Check the wear of the rollers. Measure the OD of the roller.

Maximum service allowance. Replace when it is below 12.4mm (.47 in.).

2. Check the wear of the driving pulley sleeve. Measure the OD of the moving section of the sleeve.

Maximum service allowance: Replace when it is below 33.94mm (1.37 in.).



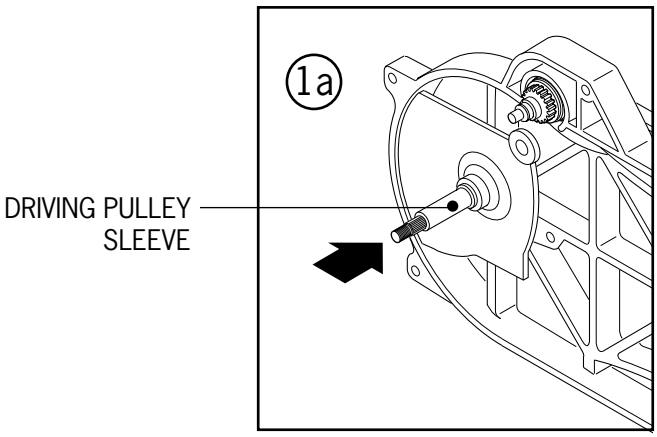
9. Driving Belt Device & The Starting Lever

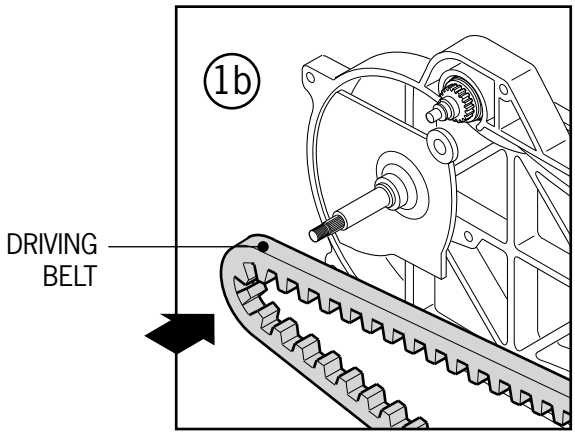
Driving Pulley

Install the driving pulley sleeve and the driving pulley on the crankshaft (1a). Install the driving belt on the crankshaft (1b). Install the driving pulley and the washer (1c).

Tighten 10mm (.39 in.) nut.
Torque: 3.8kg/m 28ft lbs

Attention:
There mustn't be any grease on the surface of the driven belt and the driving pulley.



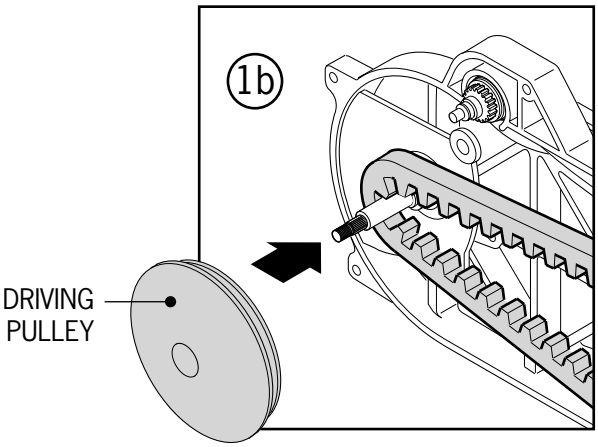


The Overrunning Clutch (Starter Pinion) Removal

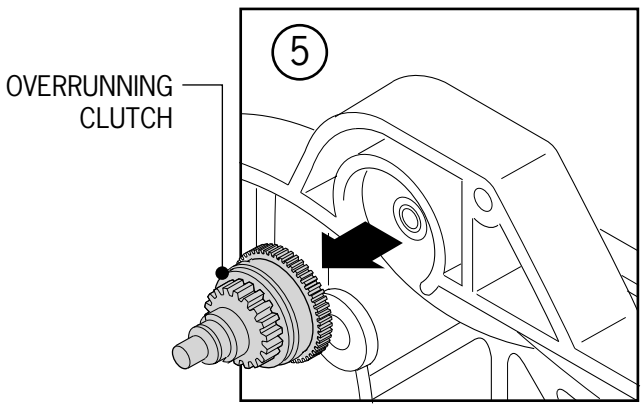
2. Remove the left crankcase cover .
3. Remove the driving pulley.
4. Remove the seat of the overrunning clutch.
5. Remove the overrunning clutch.

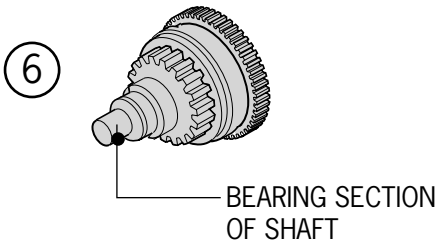
Checking and Assembling

6. Check if the bearing part of the overrunning clutch shaft is worn.
7. Check if the clutch runs smoothly.
8. Check the wear of the gear and the bearing part of the shaft.
9. Coat the bearing part of the clutch shaft with a bit of grease.
10. Assemble it in the opposite sequence of removal.



Overrunning Clutch



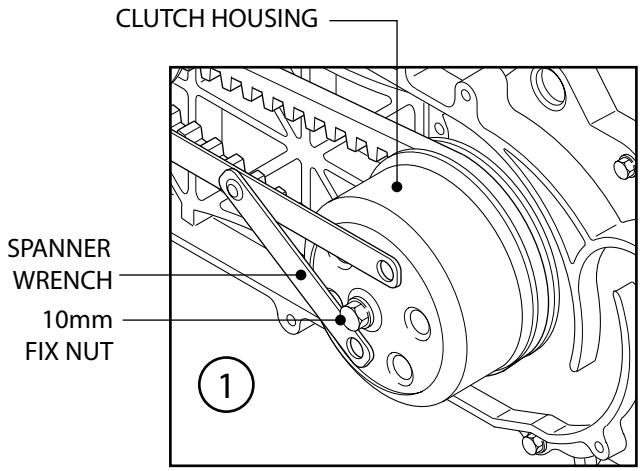


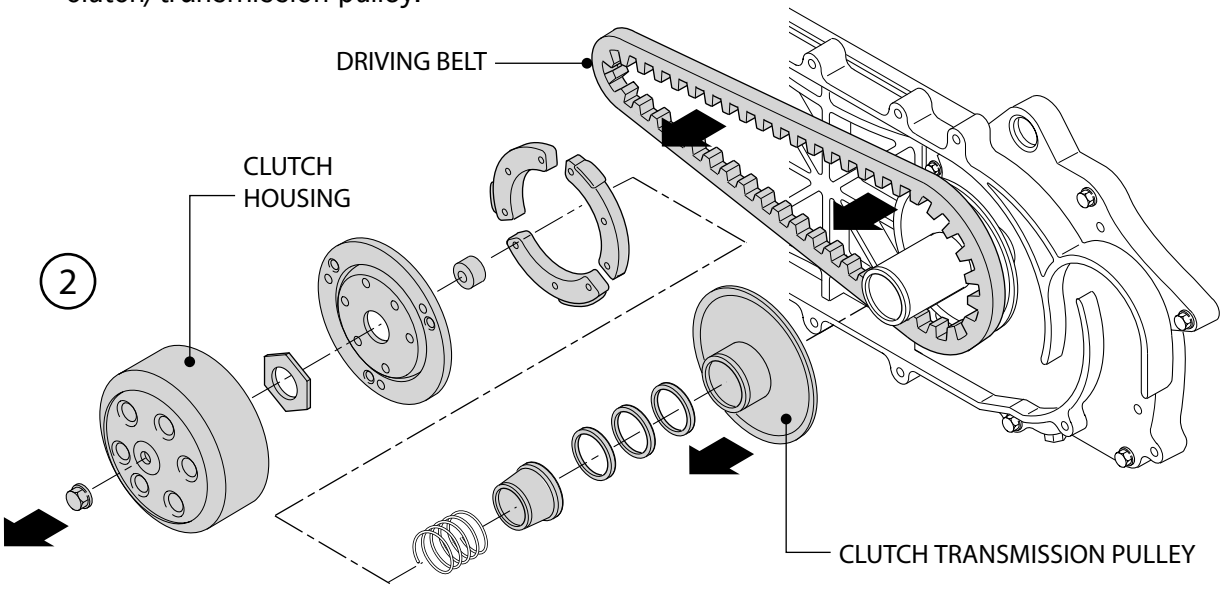
9. Driving Belt Device & The Starting Lever

The Clutch/Transmission Pulley Removing the Clutch/Transmission Pulley

1. Remove the driving pulley. Then use a spanner wrench to hold the clutch housing to screw out the 10mm (.39 in.) nut.

2. Remove the clutch housing. Remove the clutch/transmission pulley. Remove the driving belt from the clutch/transmission pulley.



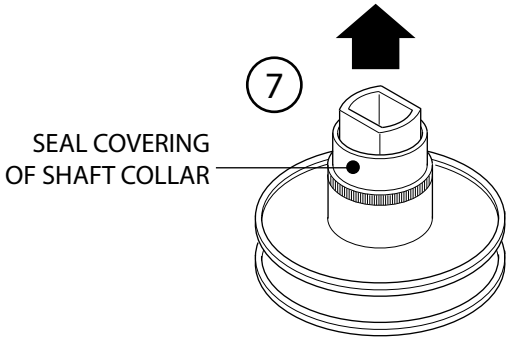


Disassembling the Clutch/Transmission Pulley

5. Use a spring compressor for the clutch spring to press down the transmission pulley spring to remove the special nut (28mm, 1.102 in.).

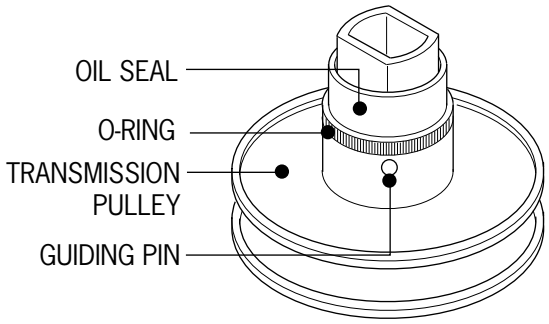
6. Remove the clutch spring.

7. Remove the sealing cover of the shaft collar.



9. Driving Belt Device & The Starting Lever

8. Remove the guide rolling pin from the transmission pulley assembly, and then take out the o-ring and the oil seal.



Checking the Clutch Transmission Pulley

1. Check the wear of the clutch housing. Measure the ID of the clutch housing.

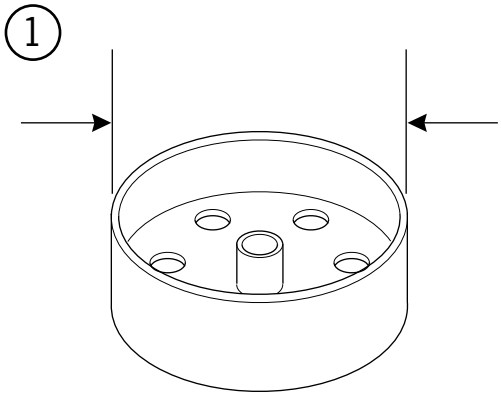
Maximum service allowance: Replace when it goes beyond 107.5mm (4.23 in.).

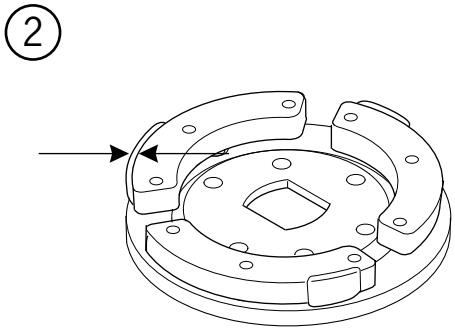
2. Check the wear of the clutch lining. Measure the thickness of the lining.

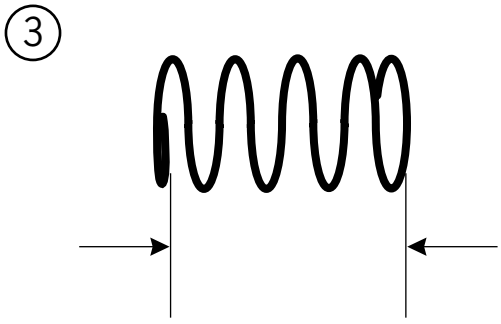
Maximum service allowance: Replace, when it is below 2.0mm (.078 in.).

3. Measure the free length of the transmission pulley spring.

Maximum service allowance: Replace when it below 92.8mm (3.65).







9. Driving Belt Device & The Starting Lever

4. Check the wear of the transmission pulley. Measure the OD of the pulley.

Maximum service allowance:
Replace when it is below 19.97mm (.79 in.).

5. Check the wear of the transmission pulley. Measure the ID of the pulley.

Maximum service allowance:
Replace when it goes beyond 24.24mm (.95 in.).

6. Check if the guide rolling pin is excessively worn or unevenly worn.
Replace as necessary.

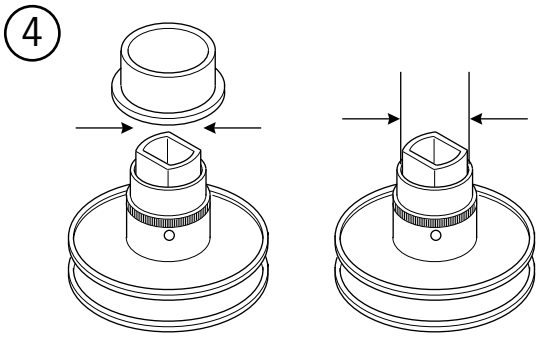
Replacing the transmission pulley and the bearing

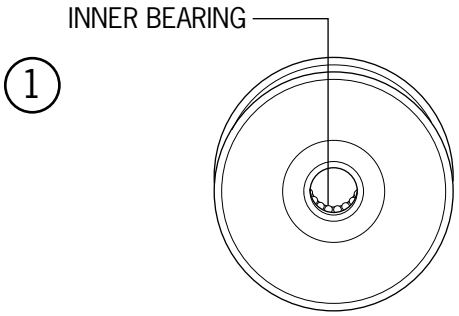
1. Check the needle bearing for wear or excessive free play, gritty feel or noise. Replace as necessary.

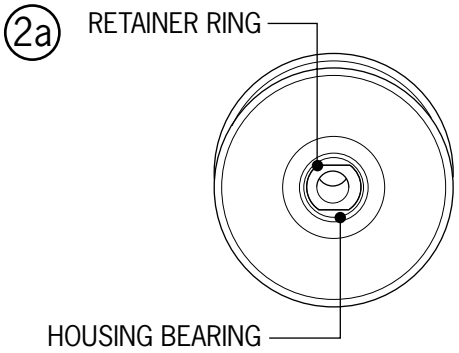
2. Check the housing bearing for wear. Remove the retainer and take out the housing bearing.

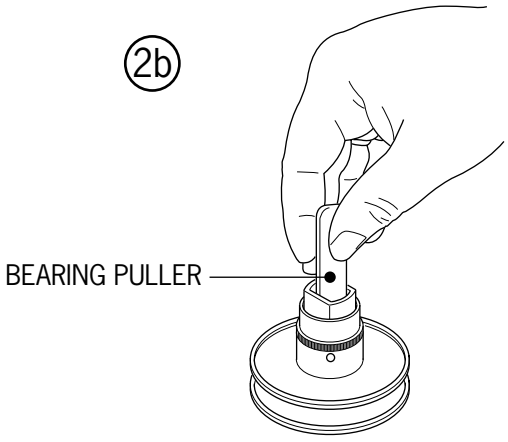
3. Drive in the new housing bearing, keeping the lid side up.

Attention:
Grease new bearings when installing. Grease able to resist > 230˚.



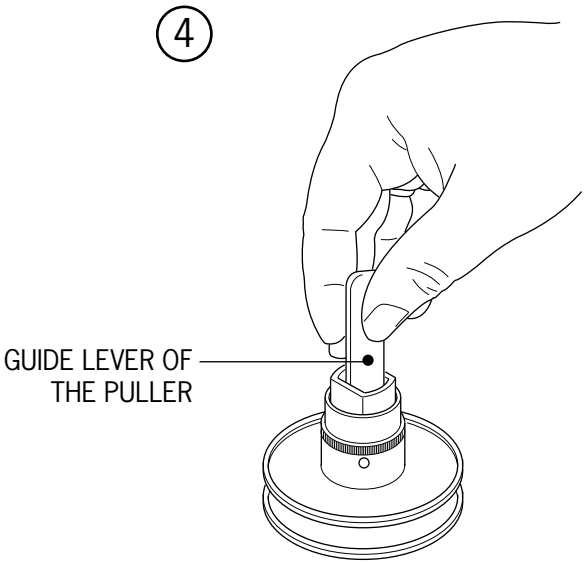






9. Driving Belt Device & The Starting Lever

4. Drive in the new needle bearing, keeping the “mark” side up.



The Clutch/Transmission Pulley Assembly

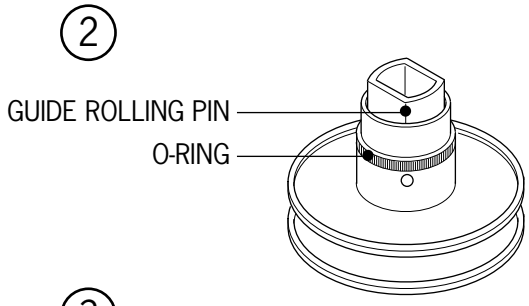
1. Assemble the transmission pulley guide pin and oil seal.

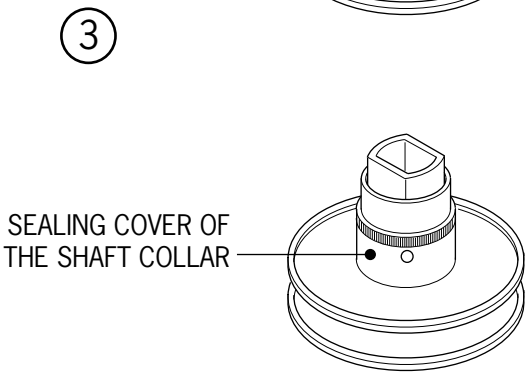
2. Install the sealing cover of the collar.

3. Assemble the transmission pulley disk and the spring to the clutch assembly, pressing down with the spring compressor for the clutch spring.

4. Install the 28mm fix nut and tighten it.

Torque: 5.0-6.0kg/m 35-40ft lbs





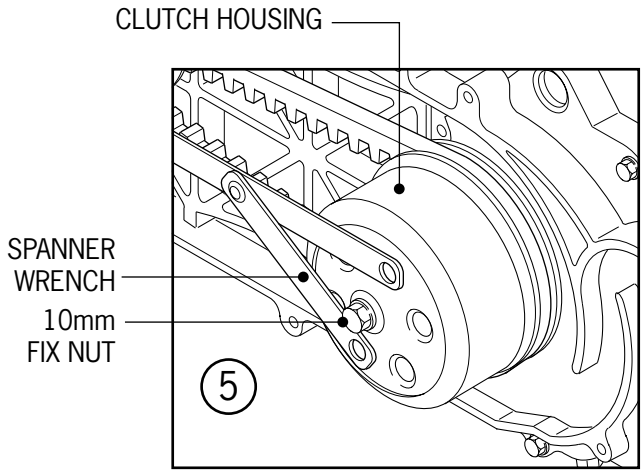
9. Driving Belt Device & The Starting Lever

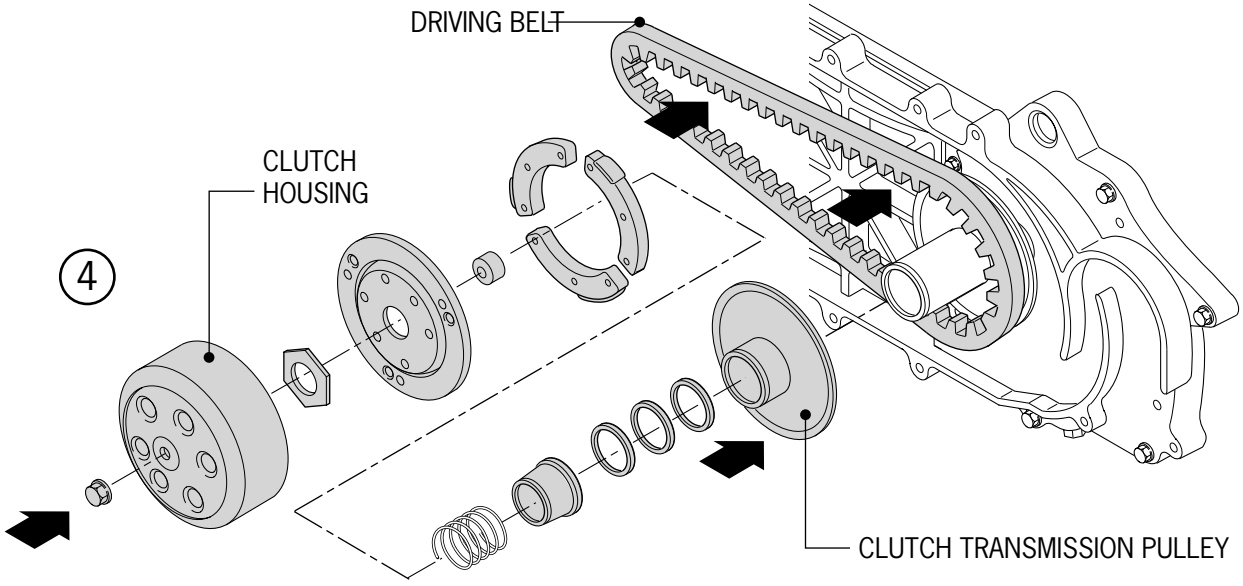
4. Assembling the clutch/transmission pulley, put the driving belt onto the clutch/transmission pulley, then onto the driving shaft.

Assembling the Clutch Housing

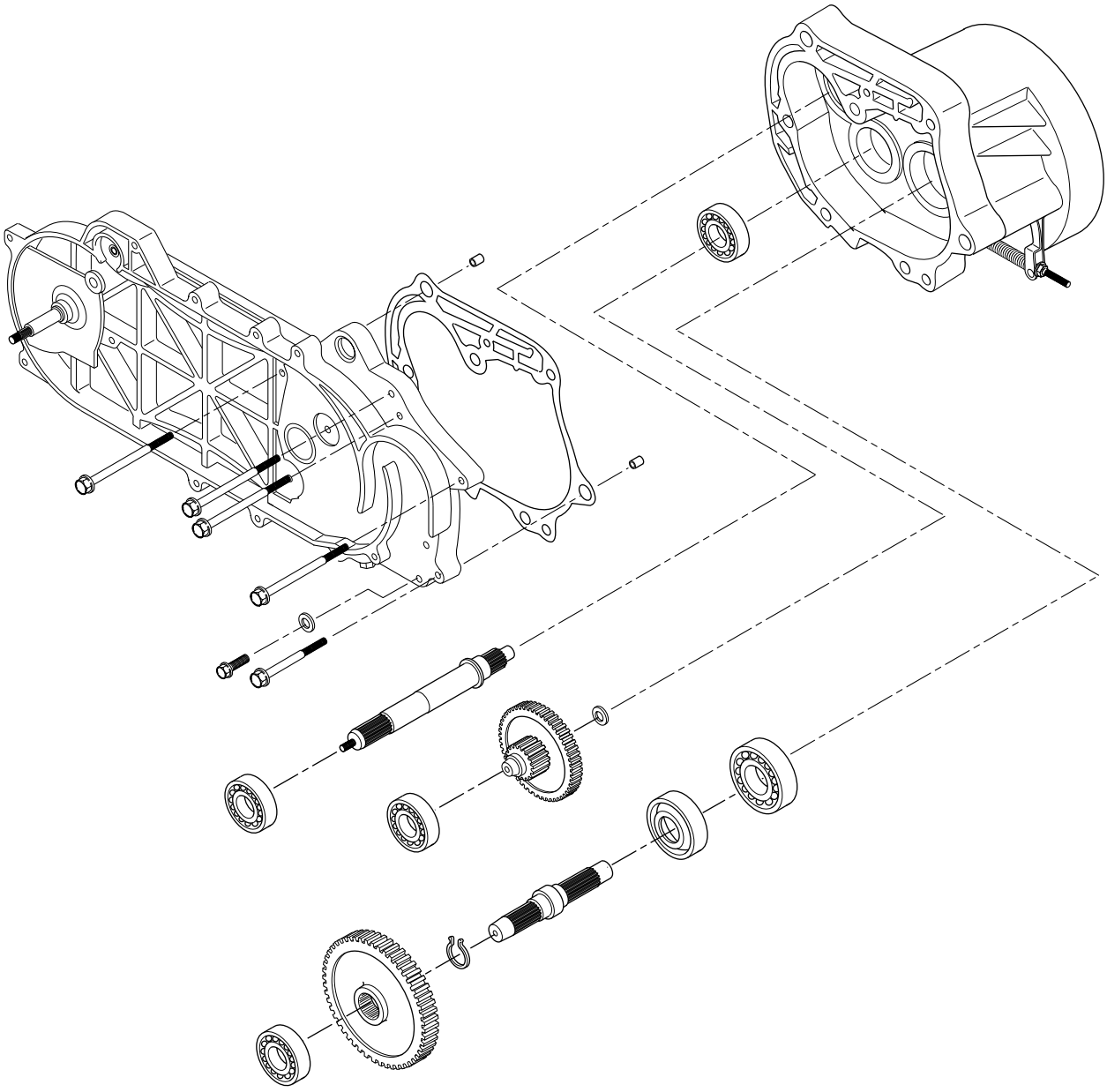
5. Use a spanner wrench to hold the housing, then install the 10mm (.39 in.) nut and tighten it.

Torque: 5.5kg/m 38ft lbs
Assemble the left crankcase cover.





10. The Final Transmission Assembly



10. The Final Transmission Assembly

Topic	Page	Topic	Page
General Information	10-2	Replacing the Bearing (on the side of the crankcase)	10-5
Dismantling the Final Transmission Assembly	10-3	Assembling the Final Gear Set	10-5
Replacing Bearing (on the side of the transmission gearbox cover)	10-4		

General Information

•Designated oil: SAE 90# Gear Oil
•Filling 0.12L 4 ounces
•Changing 0.10L 3.5 ounces



•Bearing pulling set 12mm
•Bearing pulling set 15mm
•Sleeve shaft for assembling the crankshaft
•Sleeve lever for assembling the crankshaft



•Bearing outer race driver 3740mm
•Bearing outer race driver 3235mm
•Guide lever for the bearing driver 17mm
•Guide lever for the bearing driver 15mm
•Guide lever for the bearing driver 12mm
•Bearing driver

Troubleshooting

The scooter doesn't run after the engine is started
•The transmission gear failed
•The driving belt is worn or broken
•The clutch failed

Developing abnormal noise when it runs
•The gear is worn, burnt or has damaged teeth
•The bearing is worn and getting loose

Oil leakage
•Too much oil
•The oil seal is broken

10. The Final Transmission Assembly

Dismantling the final transmission assembly

1. Remove the rear brake cable.

2. Remove the rear wheel (refer to 13-3).

3. Remove the left crankcase cover (refer to 9-2).

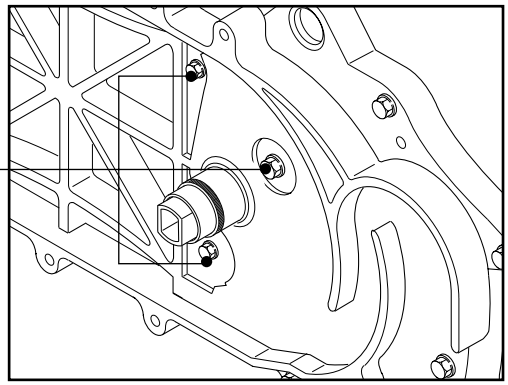
4. Remove the driven pulley of the clutch (refer to 9-5).

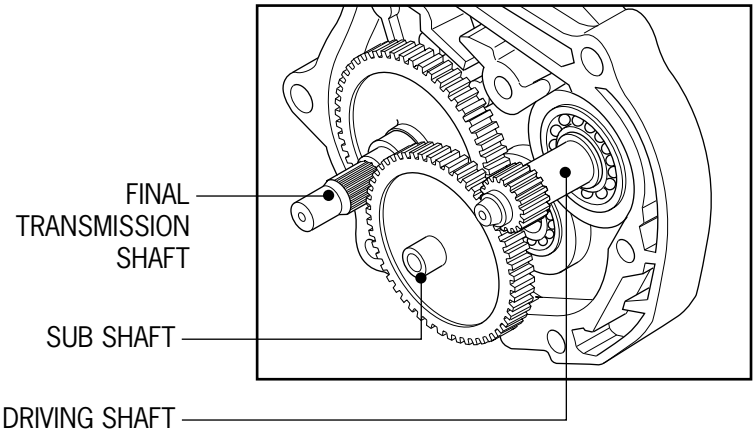
5. Drain the oil out of the final transmission.

6. Remove the bolts of the final transmission gearbox.

7. Remove the transmission gearbox cover.

8. Remove the gasket and the locating pin.



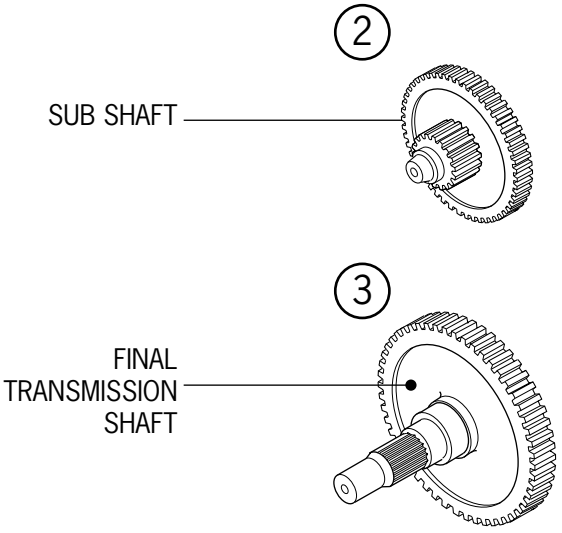


Detach the final transmission gearbox cover

1. Check the final transmission assembly.

2. Check if the sub shaft gear is worn or damaged.

3. Check if the final transmission gear is burnt or damaged.



10. The Final Transmission Assembly

4. Check if the bearing in the left crankcase and the oil seal are worn or damaged.

5. Check if the driving shaft (the main clutch shaft) and the gear are worn or damaged.

6. Check if the oil seal in the bearing of the transmission gearbox cover and that of the bearing of the final gear shaft are worn or have failed.

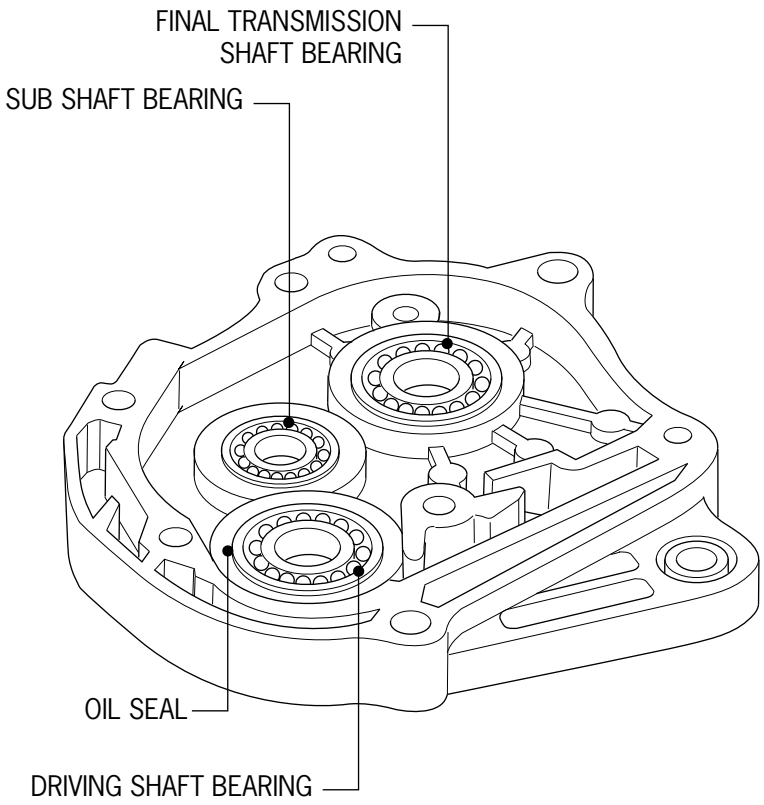
Attention:
Don't dismantle the final transmission gearbox, except that some parts have to be replaced. While replacing the driving shaft, the oil seal must be replaced by new ones.

Replacing Bearing (on the side of the transmission gearbox cover)

1. Use a bearing puller to remove the bearing in the final transmission gearbox.

2. Remove the oil seal on the final transmission shaft.

3. Drive in the new bearing to the final transmission cover.



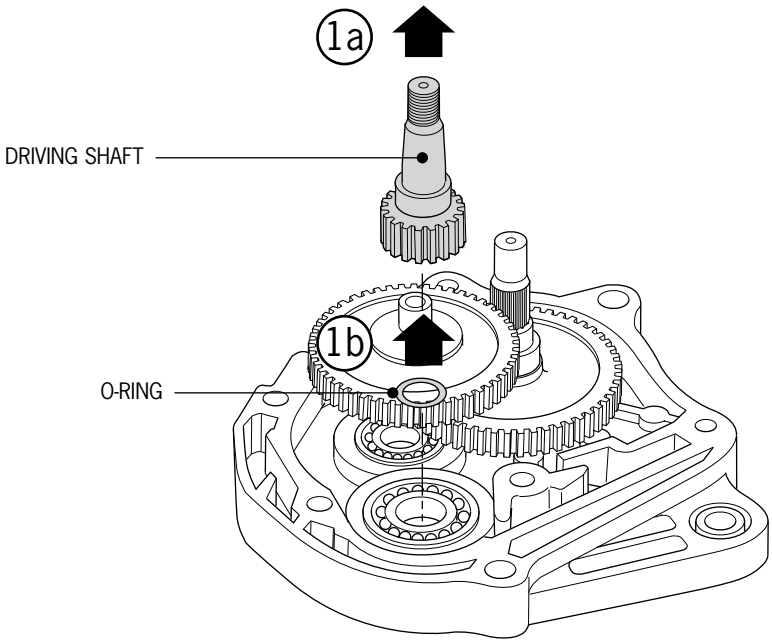
10. The Final Transmission Assembly

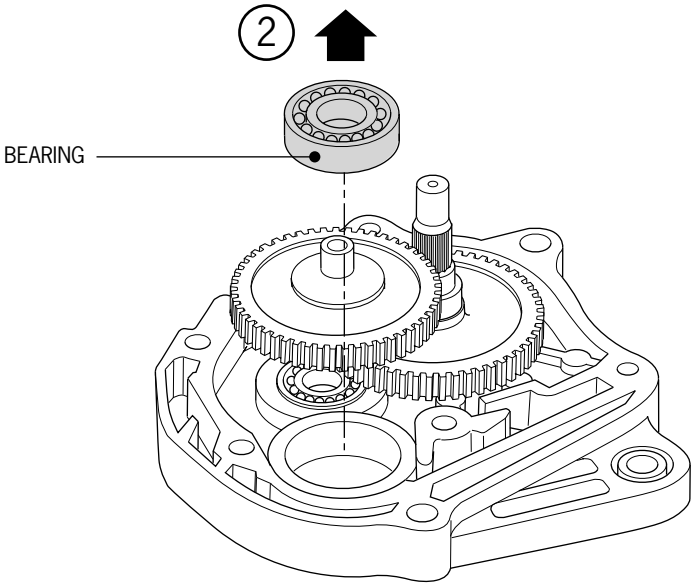
Replacing the Bearing (on the side of the crankcase)

1. Remove the driving shaft (the clutch main shaft).
Then remove the oil seal of the shaft.

2. Use a bearing puller to remove the bearing in the final transmission gearbox.

3. Drive the new bearing into the final transmission gearbox. Install the new oil seal fro the drive shaft.





Assembling the Final Gear Set

1. First, install the drive shaft into the final gearbox. Then install the final transmission gear shaft (output shaft) to the final gearbox.

10. The Final Transmission Assembly

3. Attach the sub shaft and the washer to the final transmission gearbox. Install the resin washer to the sub shaft; install the locating pin and the new gasket.

4. Put on the final gearbox cover.

5. Tighten the bolts of the final gearbox cover.

6. Assemble the clutch/driving pulley disk (refer to 9-8).

7. After assembling, fill the gear box with 90w gear oil (refer to 3-7).

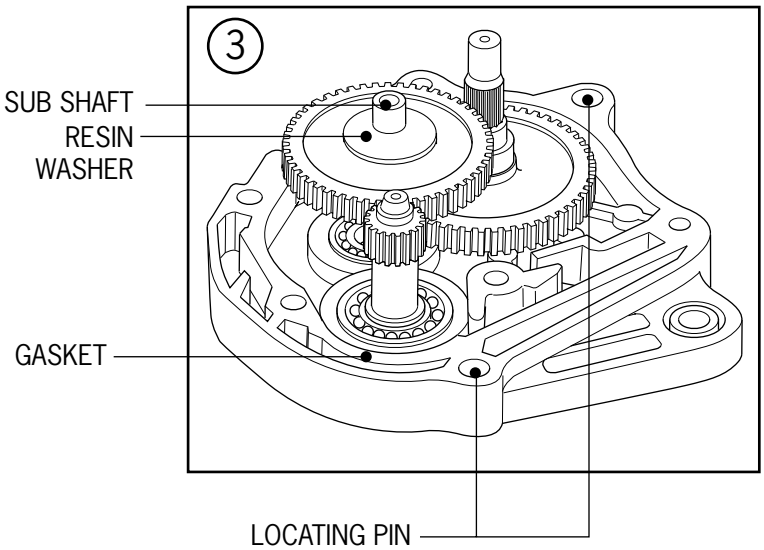
Designated gear oil: SAE 90#
Volume of the gearbox:
Filling: 0.12L 4 ounces
Changing: 0.10L 3.5 ounces

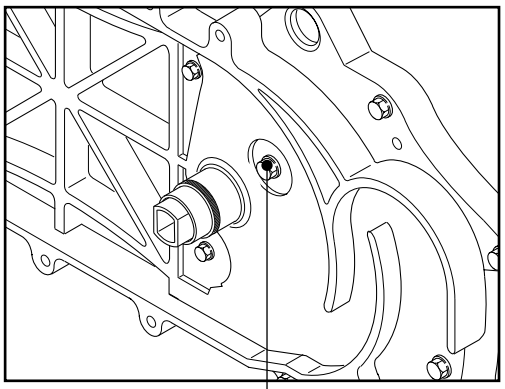
8. Screw up the oil screw and tighten it.

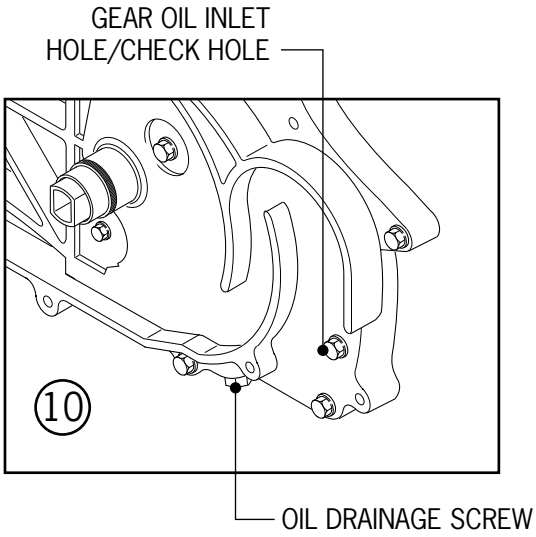
Torque: 1.0-1.4kg/m 8-10ft lbs

9. Start the engine to check if there is oil leakage.

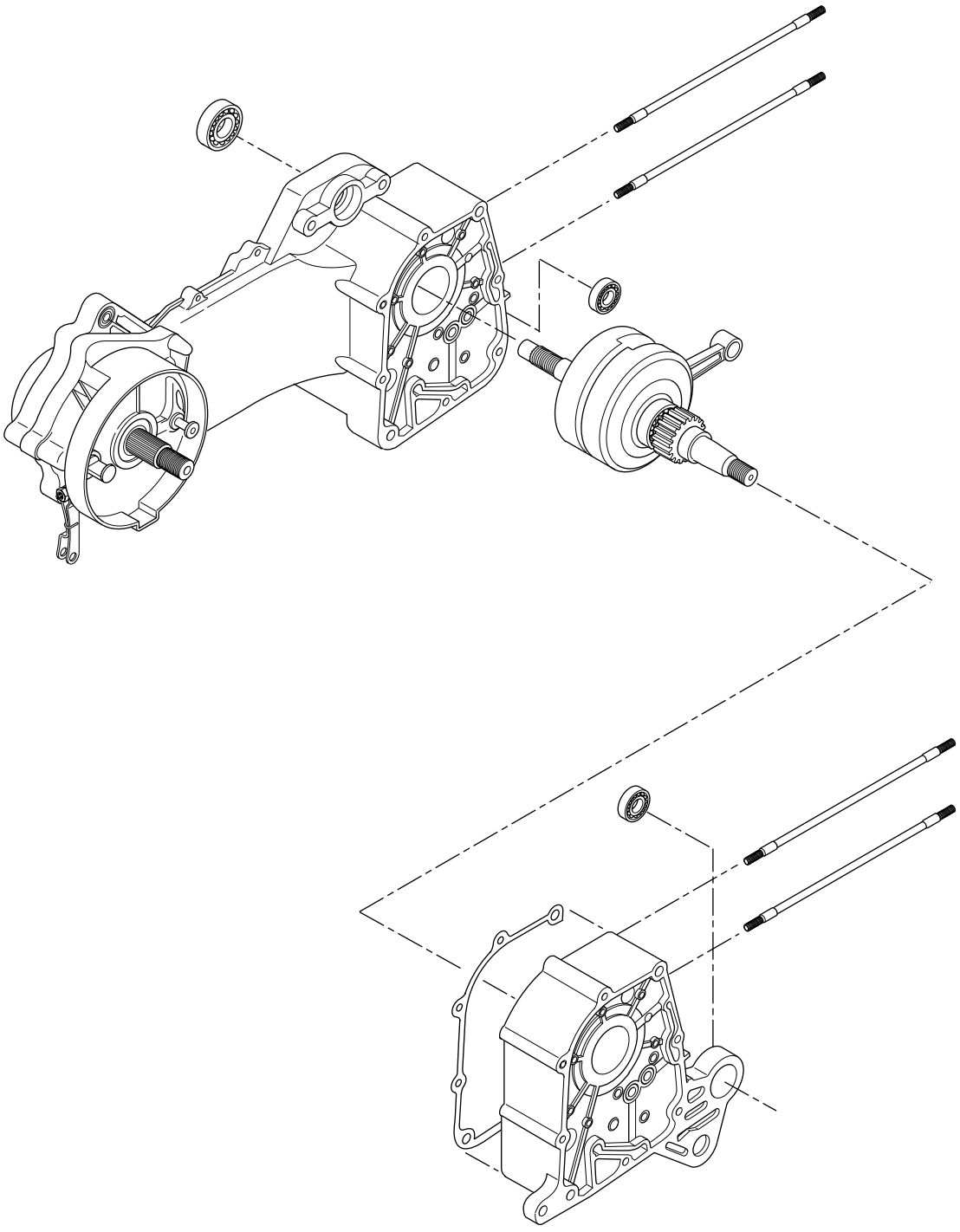
10. Check the oil level. Replenish it with the designated gear oil when the oil is not sufficient (through the oil checking hole).







11. The Crankcase and the Crankshaft



11. The Crankcase and the Crankshaft

Topic	Page
Important points	11-1
Diagnosis	11-1
Dismantling the crankcase	11-3
The crankshaft	11-4
Assembling the crankcase	11-5

Important Points

•The chapter gives instructions related to the crankshaft and dismantling the crankcase. Before striking, it's necessary to take the engine apart.

•Complete the following work before taking the crankcase apart. Remove the following:

•The cylinder head (refer to Chapter 7)

•The cylinder and the piston (refer to Chapter 8)

•The driving plate and the driven plate (refer to Chapter 9)

•AC generator (refer to Chapter 14)

•The carburetor and the air filter (refer to Chapter 14)

•The rear wheel and the rear buffer (refer to Chapter 13)

•The starting motor (refer to Chapter 16)

•The oil pump (refer to Chapter 4)

Tech Criteria

	Item	Normal size	Max. Service Allowance
Crankshaft	The clearance of the both sides of the big end of the connecting rod	0.10-0.35	0.55
	The clearance of X-Y directions of the journal of the big end of the connecting rod	0-0.008	0.05
	Run out		0.10

Torque:

Crankcase bolt	0.9kg/m 7ft lbs
Bolt for the chain adjusting guide lever cam	1.0kg/m 8ft lbs

Troubleshooting

Abnormal noise from the engine

•The crankshaft bearing is getting slack

•The crankshaft pin bearing is becoming loose

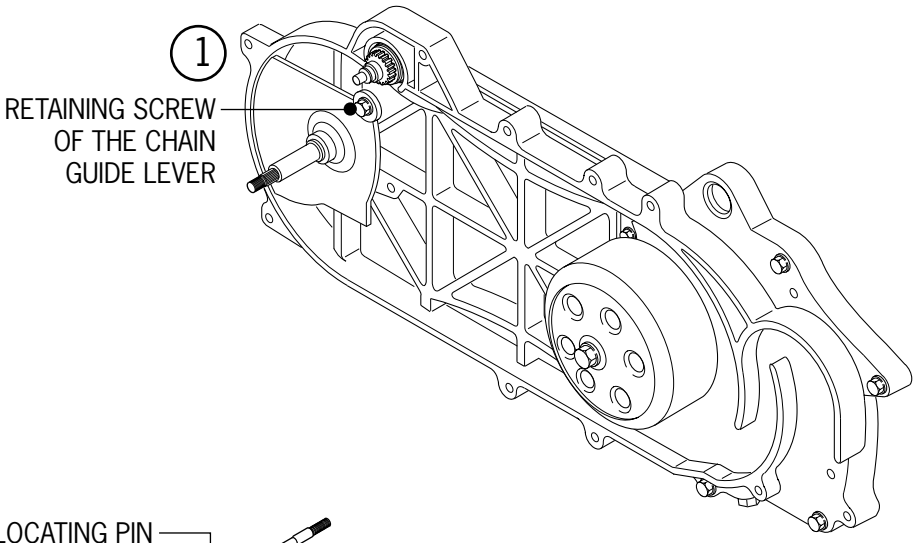
11. The Crankcase and the Crankshaft

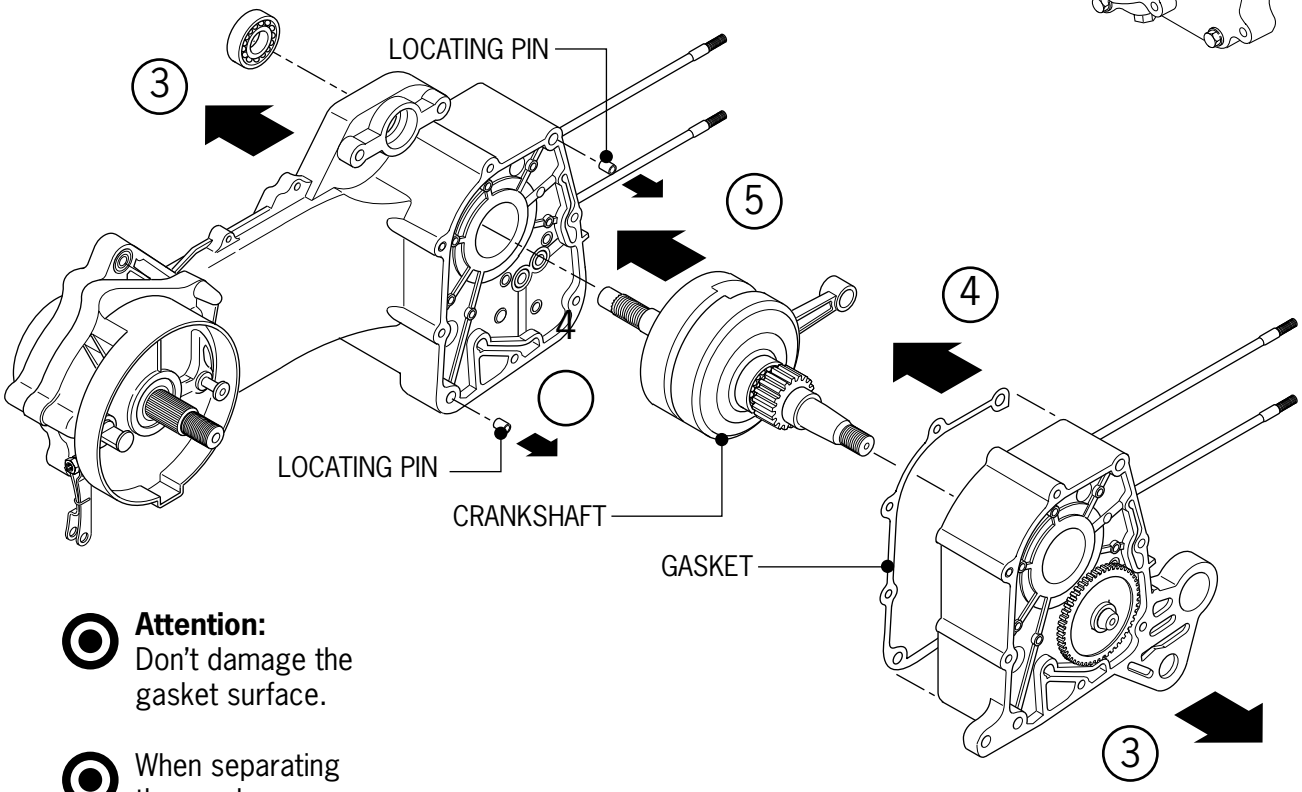
Dismantling the Crankcase

1. Detach the bolt of the chain adjusting guide lever of the cam and remove the lever.

2. Remove assembly bolts of the crankcase.

3. Dismantle the right and left crankcases.





Attention:
Don't damage the gasket surface.

When separating the crankcases, don't use a screwdriver to pry them apart.

4. Remove the gasket and the locating pin.

5. Remove the crankshaft from the crankcase.

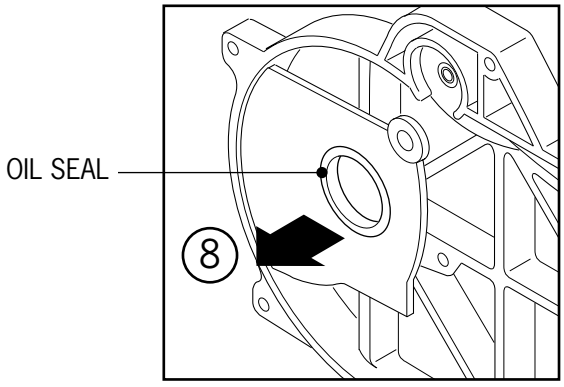
11. The Crankcase and the Crankshaft

7. Scrape the gasket away from the joint surfaces.

Attention: be sure not to scratch the joint surfaces.

8. Remove the oil seal from the left crankcase.

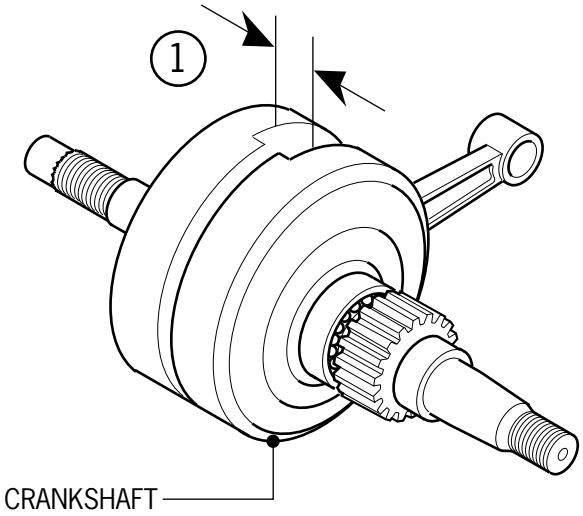
9. Remove the oil seal from the right crankcase.



The Crankshaft

1. Measure the left and right clearance between both sides of the big end of the connecting rod.

Maximum service allowance: Replace when it goes beyond 0.55mm (.02 in.).



11. The Crankcase and the Crankshaft

2. Check the clearance of the journal of the big end of the connecting rod in X-Y directions.

Maximum service allowance:
Replace when it goes beyond 0.05mm (.002 in.).

3. Measure the run-out of the crankshaft.

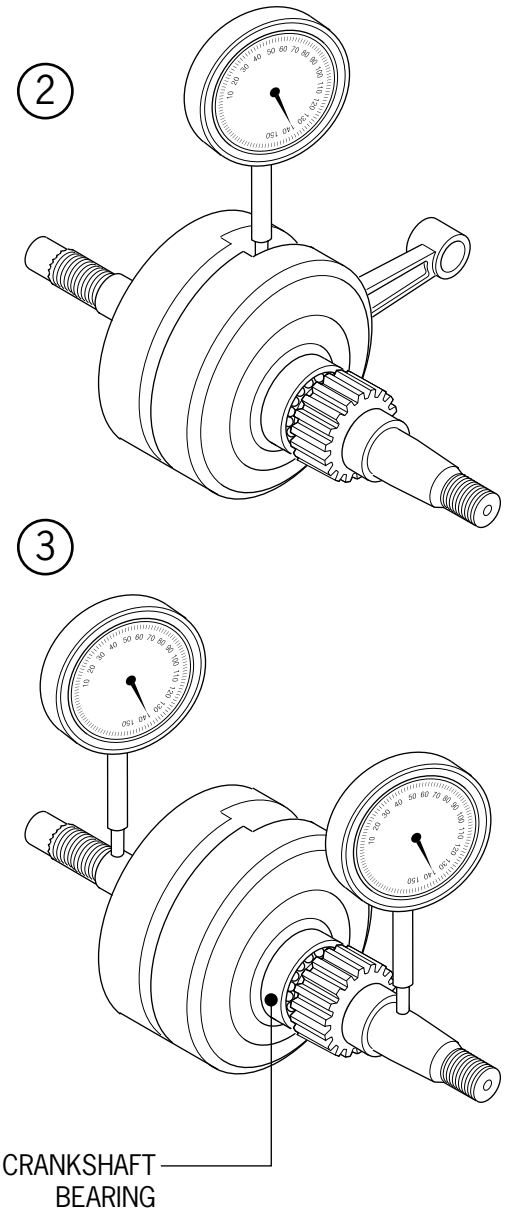
Maximum service allowance;
Replace when it goes beyond 0.10mm (.004 in.).

4. Check if there is any abnormal noise and looseness when the crankshaft bearing revolves. Replace totally if any abnormal noise/looseness is detected.

Assembling the Crankcase

1. Use the following tools to install the oil seal of the crankcase:

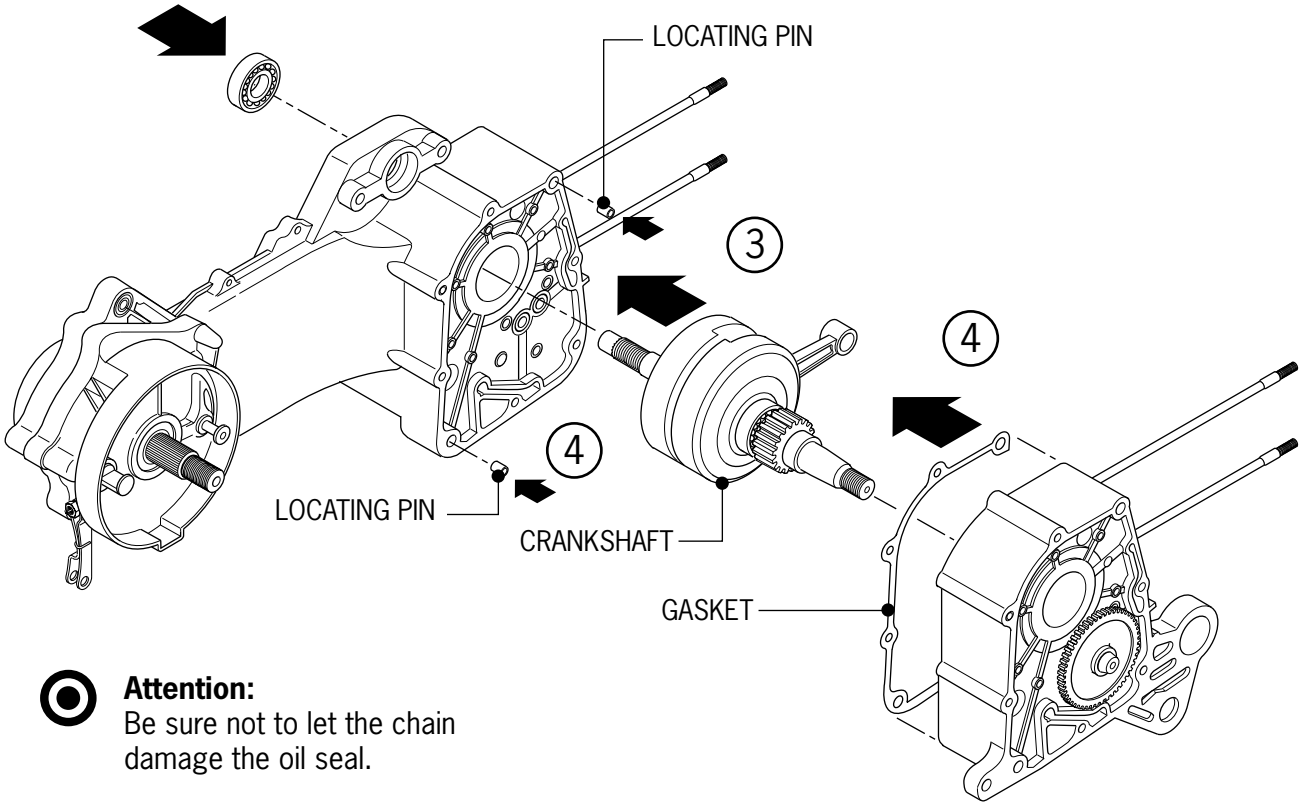
- Bearing outer race driver
- Bearing outer race 32x35mm (1.26 in. x 1.38 in.)



11. The Crankcase and the Crankshaft

2. Install the cam chain into the left crankcase.

3. Assemble the crankshaft into the left crankcase.



Attention:
Be sure not to let the chain damage the oil seal.

4. Put the new locating pin and the gasket onto the left crankcase.

Attention:
Keep the left crankcase downward to assemble with the right crankcase.

5. Tighten the bolts of the crankcase.

Torque: 0.9kg/m 7ft lbs

11. The Crankcase and the Crankshaft

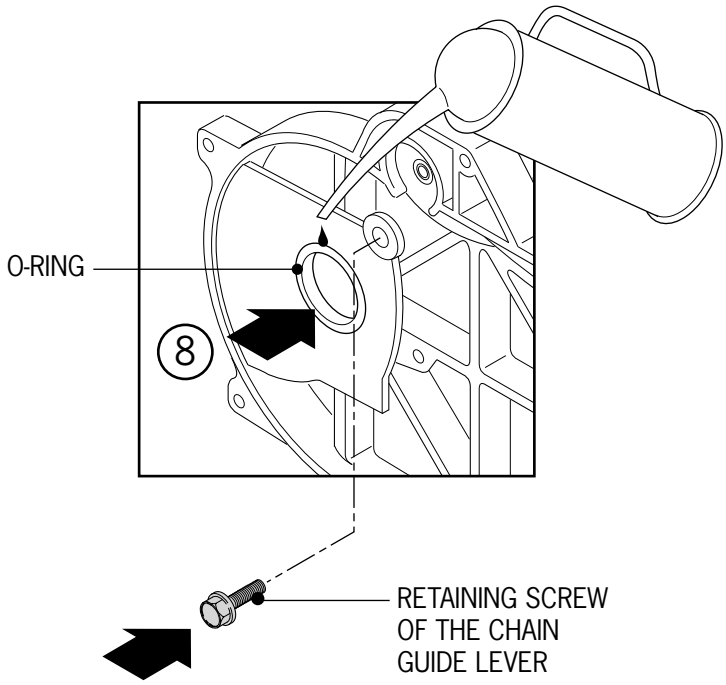
6. Install the cam chain adjusting lever.

7. Install the o-ring onto the bolt of the chain adjusting lever.

8. Coat the o-ring with oil, and then lock it.

Torque: 1.0kg/m 8ft lbs

Attention:
Be sure to put the o-ring into the groove.

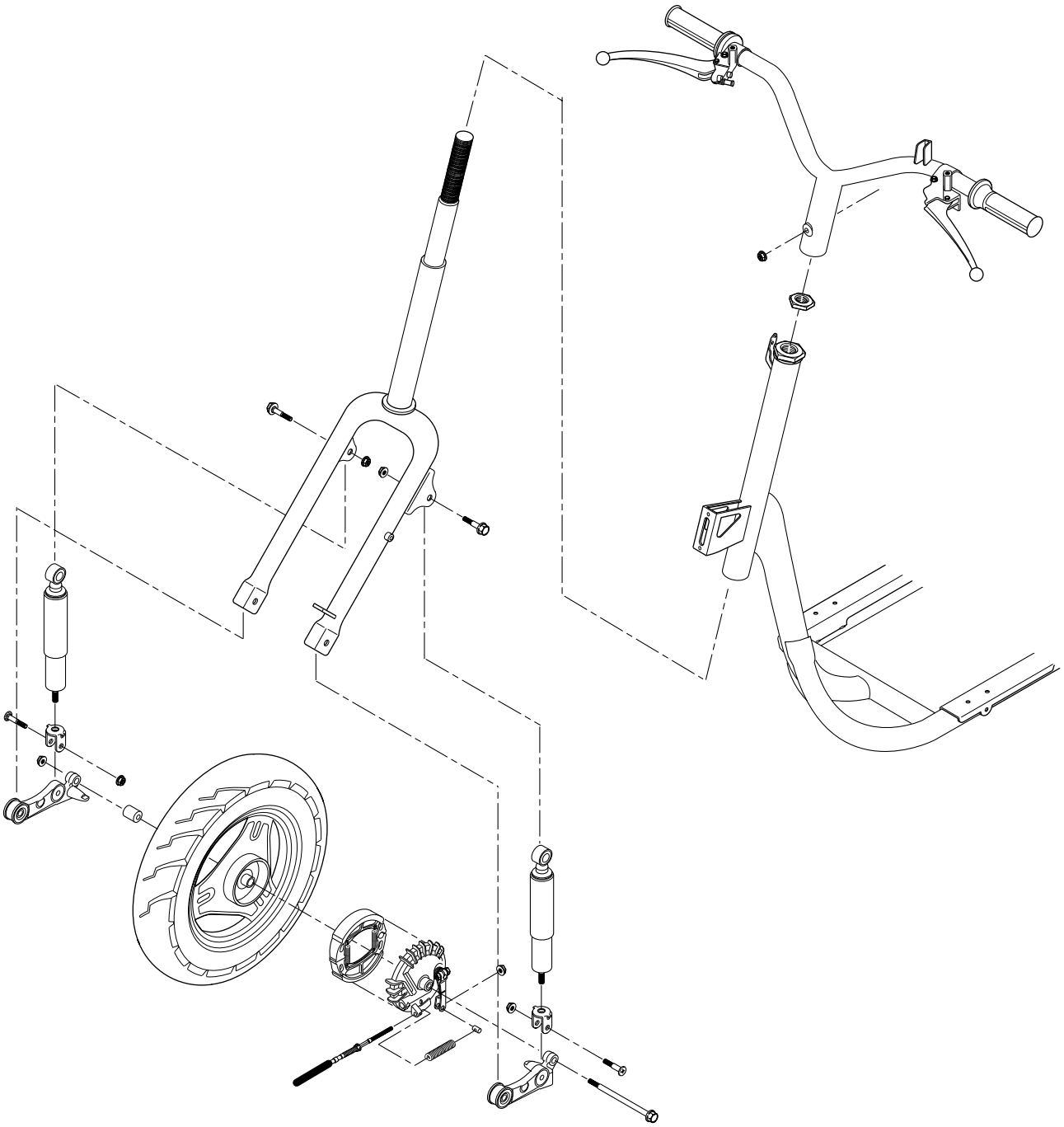


11. The Crankcase and the Crankshaft

MEMO

12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

Topic	Page	Topic	Page
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Troubleshooting	12-3	Assembling Sequence	12-11
Removing the Steering Handlebars	12-4	The Front Fork	12-12
Assembling the Steering Handlebars	12-4	Replacing the Ball Cone Race	12-12
Front Wheel Removal	12-5	Replacing the Upper Race	12-12
Dismantling of Wheel	12-6	Assembling the Upper Race	12-13
Assembly of Wheel	12-7	Checking the Brake Lining	12-14
Assembling the front wheel	12-8	Dismantling the Front Brake	12-14
Dismounting the Front Shock	12-9	Assembling the Front Brake	12-14

Notes:
When detaching the front wheel, use a jack at the bottom of the frame to support it. Make sure that the scooter won't overturn when the front wheel is away from the ground. During operation, be sure not to let oil get into the brake hub or onto the brake lining.

Tech Criterion

Item		Normal Size	Limit (mm)
Bending of the wheel axle		——	0.2 (.197 in.)
Runout of the front wheel rim	Longitudinal Hop	——	2.0 (.079 in.)
	Transversal Wobble	——	2.0 (.079 in.)
ID of the front brake hub		110 (4.33 in.)	111(4.36 in.)
The thickness of the brake lining		4.0 (.157 in.)	2.0 (.079 in.)
The free length of the front shock spring		202.5 (7.97 in.)	198 (7.78 in.)

Torque

The steering lever	*4.0-5.0kg/m 30ft lbs*
The nut of the steering lever	*8.0-12.0kg/m 50-60ft lbs*
The top race of the steering lever	*0.5-1.3kg/m 40-70in lbs*
The nut of the front buffer	*2.0-2.5kg/m 16ft lbs*
The nut of the front wheel axle	*4.5-5.0kg/m 30ft lbs*
The bolt of the brake rock arm	*0.4-0.7kg/m 30-50in lbs*

12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork



Spanner wrench
Outer race puller 28x30mm
Compressor for the shock absorber
Withdrawal tool for the ball bowl
Pliers for the inner retainer ring



Drive bar
Outer race driver 37x40mm
Dismantling lever 10mm
Bearing puller
Bearing puller bar 10mm
Spring compressor

Diagnosis
- The steering lever is too heavy
- The top race of the lever is too tight.
- The ball is broken in the steering mechanism.
- Low tire pressure.

The steering lever is uneven
- The right and left shocks are uneven.
- The front fork is crooked.
- The front axle is bent.

Poor brake function
- Improper brake adjustment.
- Worn brake lining.
- Dirty brake lining.
- Worn camshaft of the brake lining.
- The brake hub is worn.
- Loose brake actuator arm.

Bad brake function (disk brake)
- Air is entering the brake system.
- Brake fluid is deteriorated.
- Dirty and failed brake disk liner and/or brake disk.
- Worn brake pads.
- The oil seal and the piston are worn (of the main cylinder).
- Clogged brake fluid passage.
- Deformed brake disk.
- One side of the brake caliper is worn.

The front wheel wobbles
- Deformed rim.
- Bearing of the front wheel is getting slack.
- Deformed wheel rib.
- Uneven tire mounting or wear.
- Loose axle.

The front shock is too weak
- Spring is soft, worn or broken.
- Low oil level in fork.

The front shock is producing abnormal noise
- Fork is misaligned.
- Bolt of the front fork is getting loose.
- Low oil level in fork.

12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

Removing the Steering Handlebars

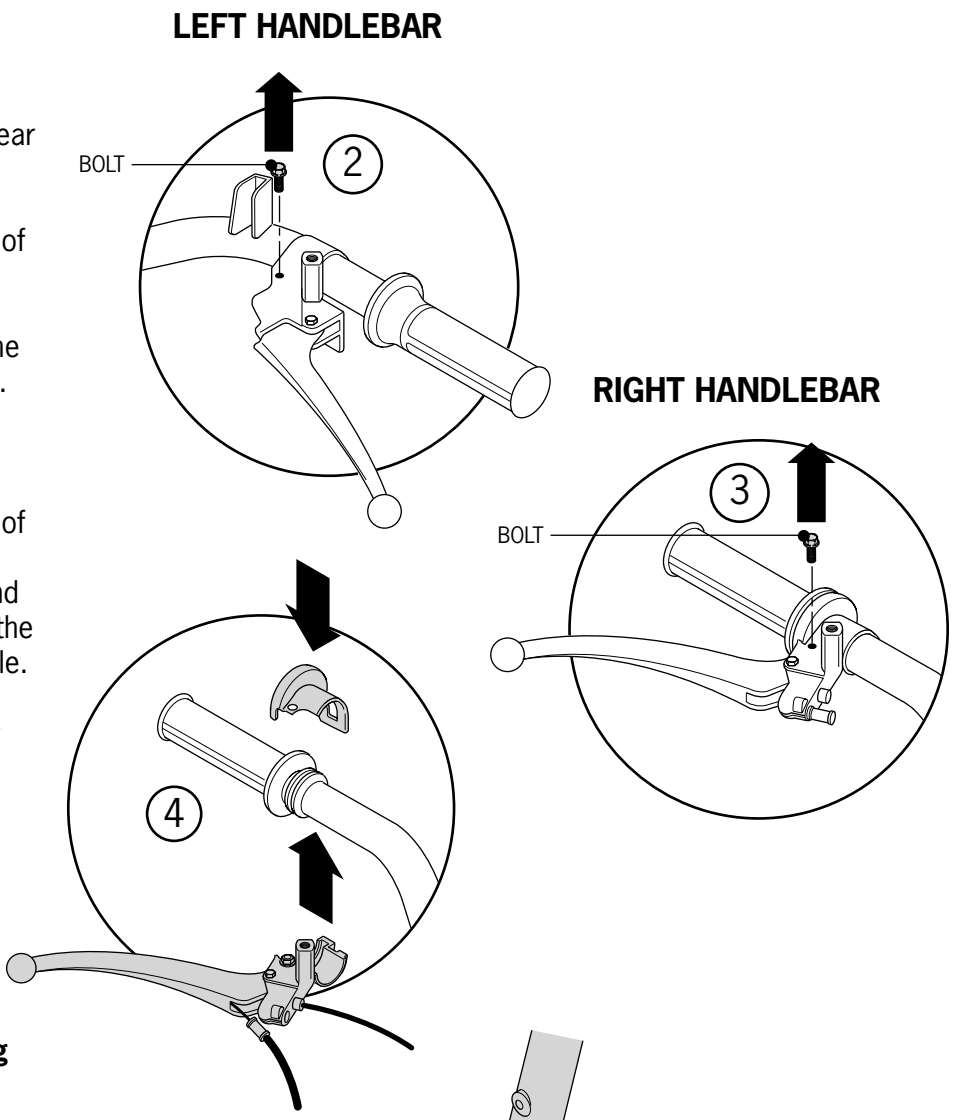
1. Detach the front and rear covers of the handlebars.

2. Remove the two bolts of the left brake lever.

3. Remove the bolts of the right hydraulic brake drum. These parts may be one assembly.

4. Remove the two bolts of the throttle control and remove the throttle grip and the cable. Finally, remove the throttle grip from the handle.

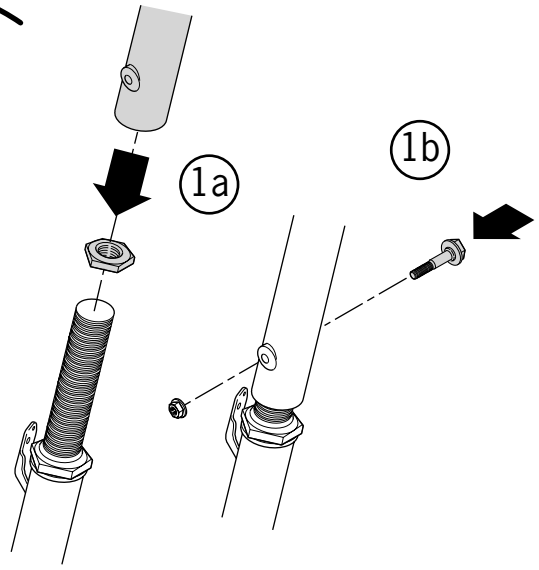
5. Remove the handlebar clamp bolts.



Assembling the Steering Handlebars

1. Align the lug of the handlebar clamp to the groove of the steering lever, then install and tighten the bolt.

Torque: 4.0-5.0 kg/m
28-35ft lbs



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

3. Coat the end of the throttle grip with grease.

4. Install the throttle grip and then the cable.

5. To assemble, reverse order of disassembly steps.

Front Wheel Removal

1. Lift the frame to make sure the front wheel is off the ground. Support the scooter in this position.

2. Detach the screw of the speedometer cable and remove the cable.

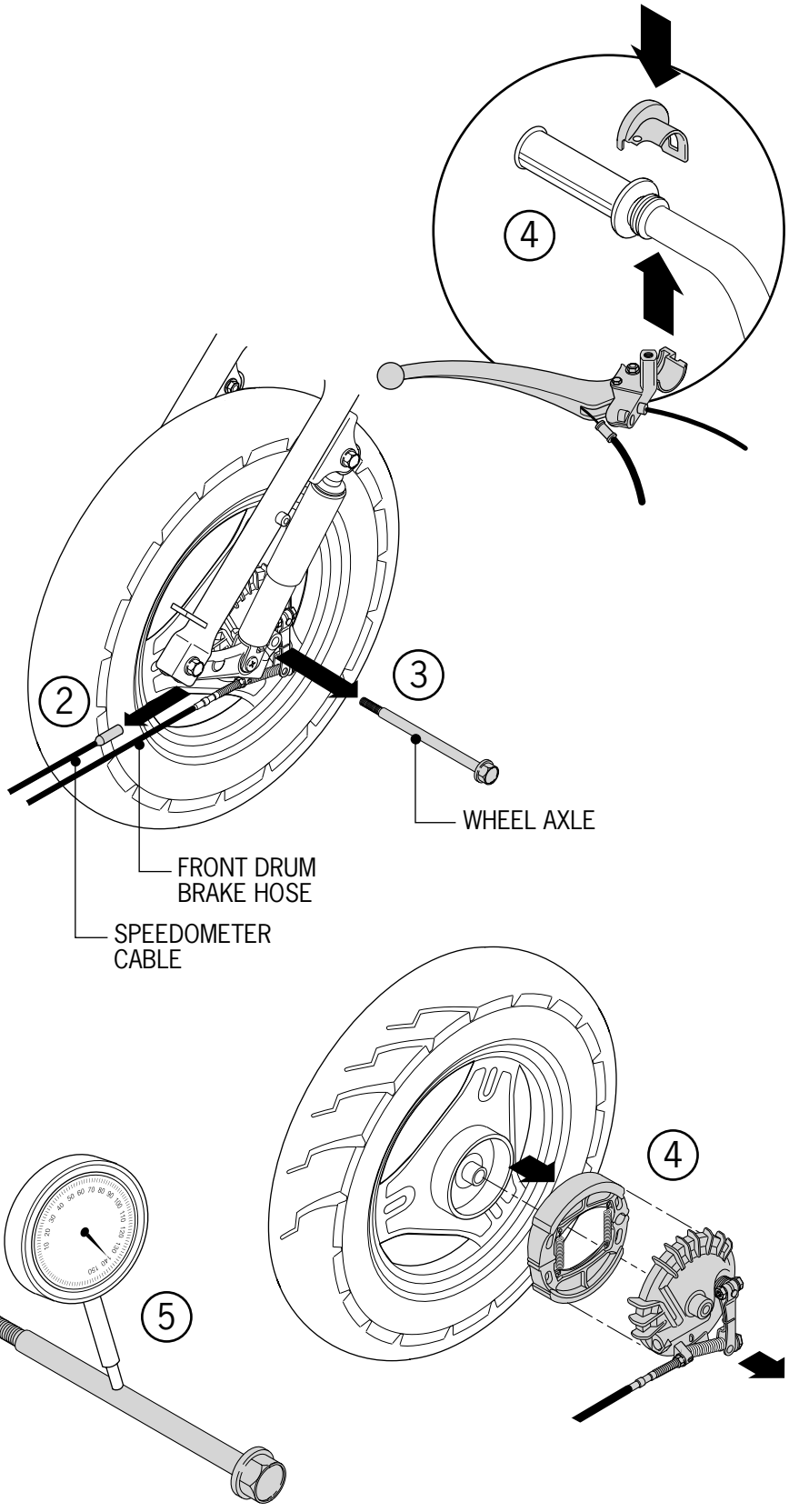
3. Remove the nut of the front wheel axle; take out the axle and the wheel.

4. Remove the drum disk and the collar.

Checking

5. Check the straightness of the axle. The meter indicates 1/2 of the total bending value.

Maximum service allowance: Replace when it goes beyond 0.2mm (.008 in.).



12. The Front Wheel, Front Brake,

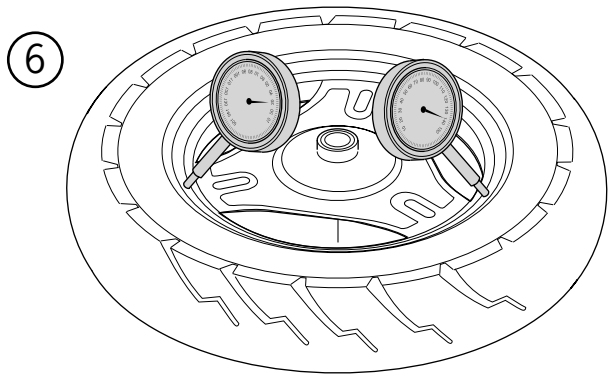
Front Buffer and the Front Fork

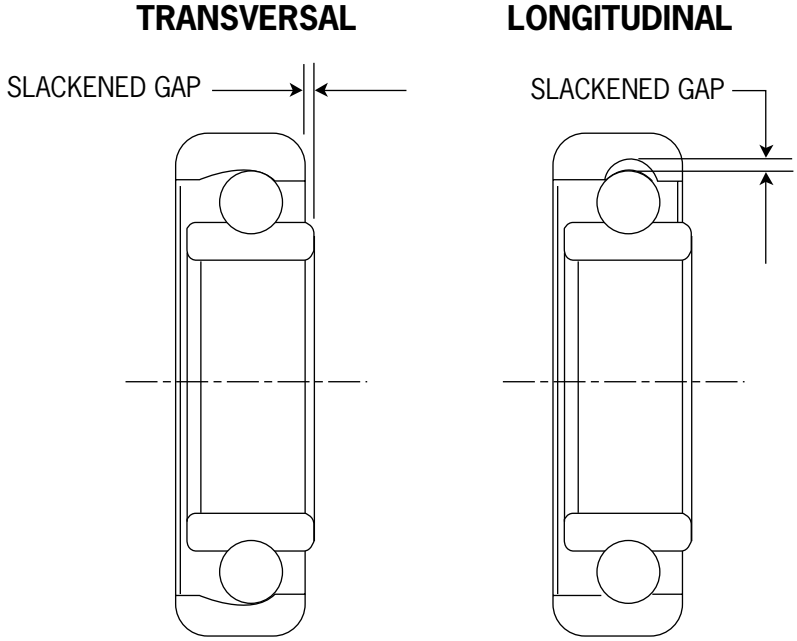
6. Check the run-out of the wheel rim.

   Maximum service allowance:
   Hop-longitudinal 2.0mm (.079 in.)
   Wobble-transversal 2.0mm (.079 in.)

7. Replace when it goes beyond the above value.

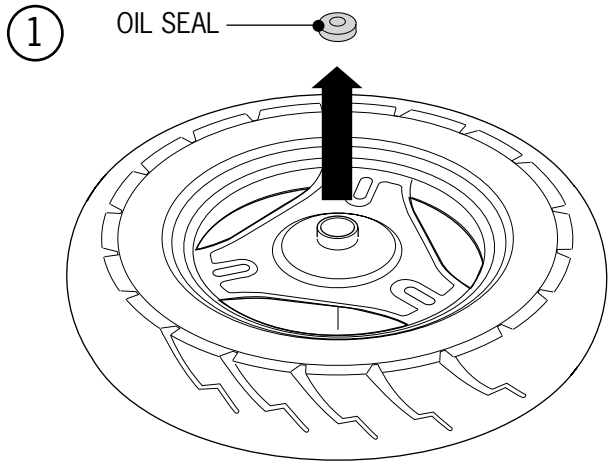
8. Replace the bearing when it produces abnormal noise or gets loose.





Dismantling of Wheel

1. Remove oil seal.



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

2. Detach the rim bearing and the spacer.

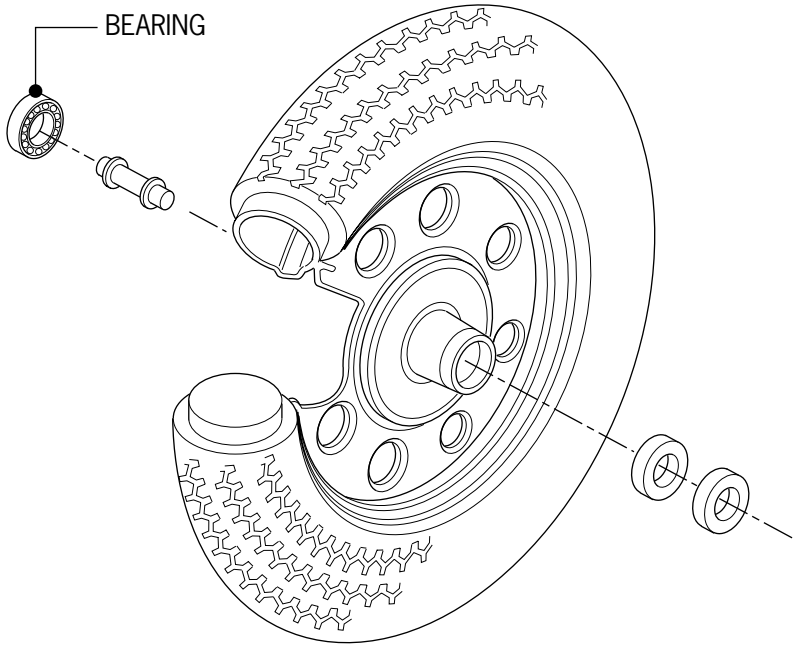
Assembly of Wheel

1. Fill the bearing with grease

2. Drive the left bearing first.

3. Install the spacer, then drive in the right bearing.

Attention:
Keep the oil (dust) seal side of the bearing outwards, then drive it evenly.



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

6. Coat the oil seal with grease, and then install it.

7. Attach the collar.

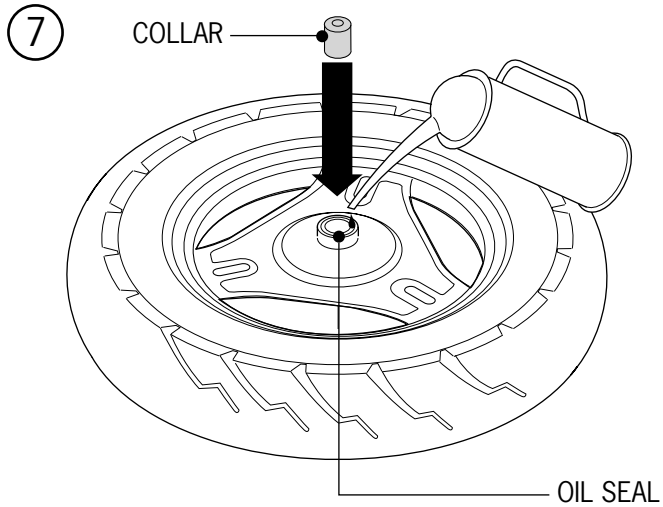
Assembling the front wheel.

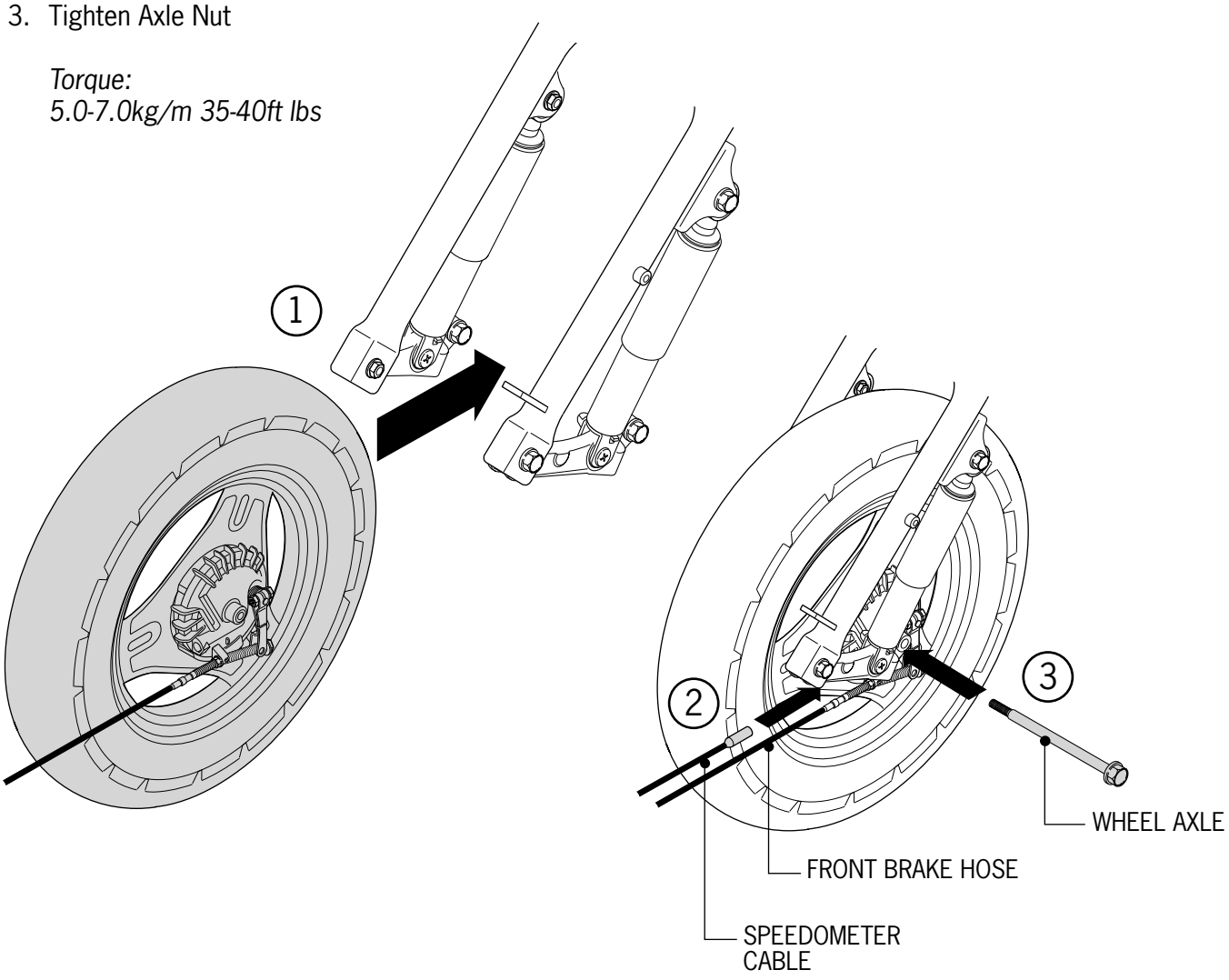
1. Point the lug of the gear bank of the speedometer to the notch of the front fork leg. Then assemble the front wheel.

2. Install the speedometer and adjust its routing.

3. Tighten Axle Nut

Torque:
5.0-7.0kg/m 35-40ft lbs





12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

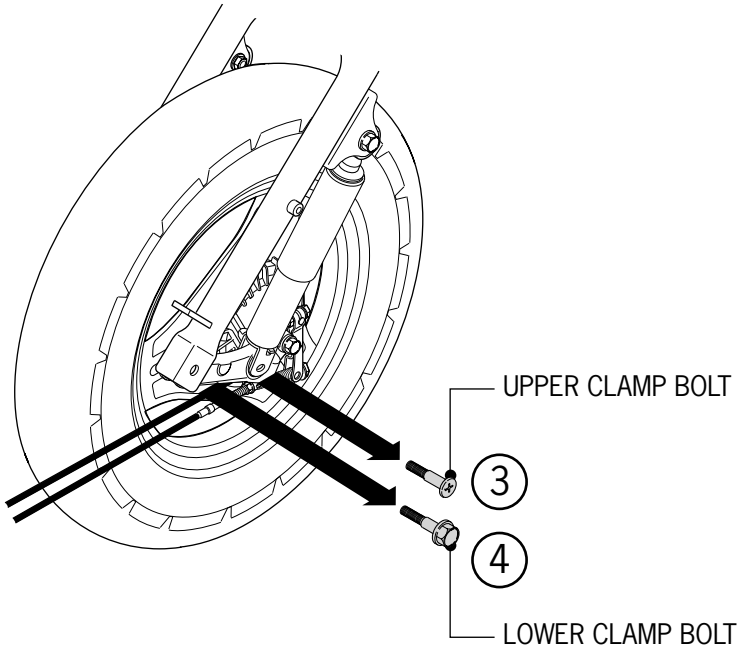
Dismounting the Front Shock

1. Remove the front wheel (refer to 12-4).

2. Remove the lower front cover (refer to 2-1).

3. Remove the upper clamp bolt.

4. Loosen the lower clamp bolt to take out the front shock.



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

Dismantling the Front Shock

1. Remove the oil/dust seal.

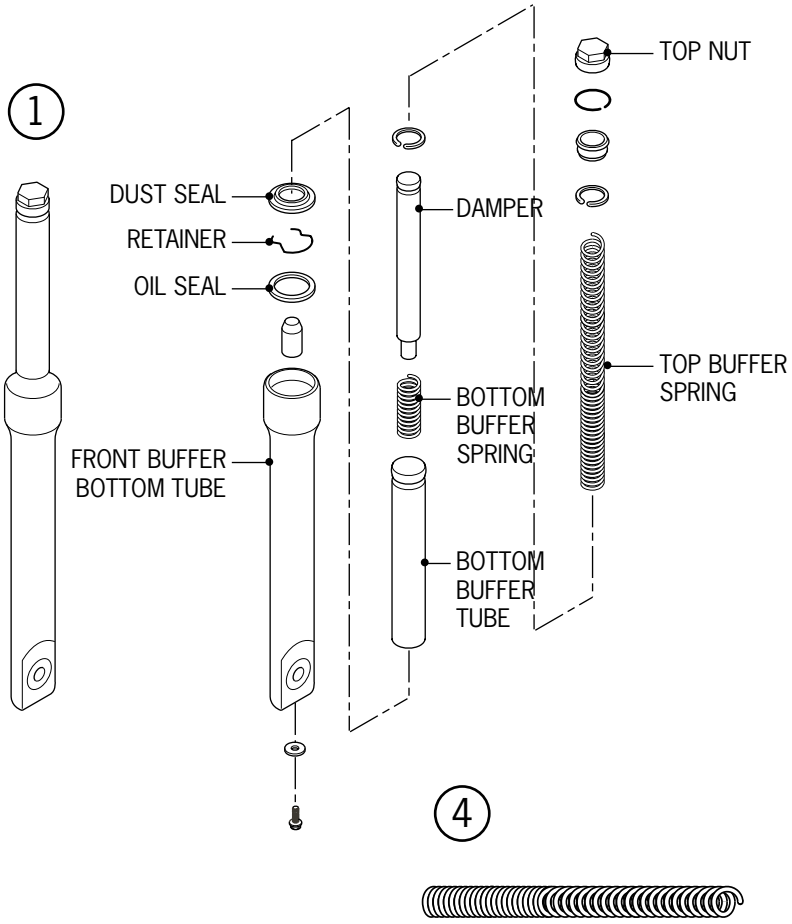
2. Remove the outer retainer.
Use a bench vise to hold the front fork bottom tube to remove the guide lever of the damper, the socket hex-head bolt and the copper washer.
Use a bench vise to hold the front fork tube.

3. Remove the top nut, the spring, the damper and the buffer spring.

Attention:
When fixing the front fork tube, use a cloth to wrap it and don't exert too much force.

4. Measure the free length of the spring.

Max. service allowance:
198mm (7.8 in.)



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

5. Install the buffer spring on the guide lever of the damper, then into the front fork tube. Then install the buffer spring and lock the nuts.

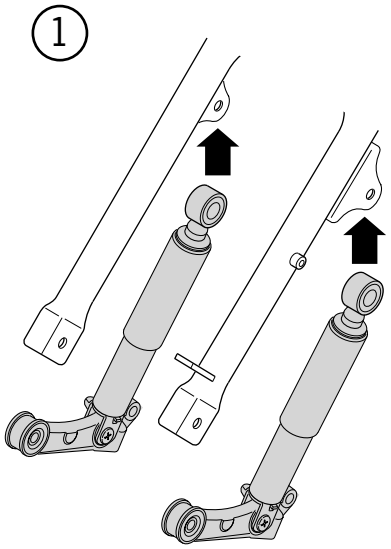
Attention:
When laying down the spring, keep the coil-tight of it down.

6. Use a bench vise to secure the shock bottom tube, and then tighten the socket bolt.

7. Spread the thread locking compound to the washer and the bolt, and then tighten them up together.

Torque: 1.5-3.0kg/m 10-15ft lbs
Designated: Special damper oil
Volume: 85ml (30 ounces)

8. Attach the outer retainer and then the dust-proof cover.



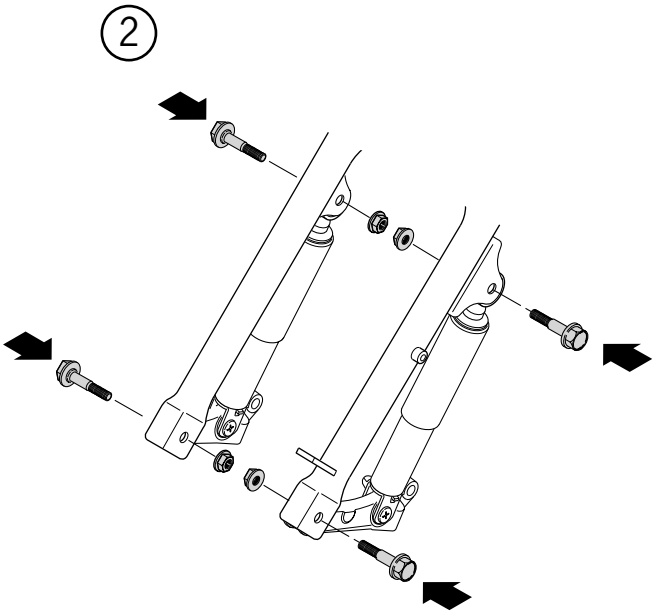
Assembling Sequence

1. Attach the front shock.

2. Install down the upper clamp bolt. Tighten the lower and upper clamp bolts.

Attention:
Make sure that the joint of the upper bolt hole and the groove of the front fork tube (front damper) are properly aligned.

3. Attach the front wheel (refer to 12-4).



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

The Front Fork

Front fork removal

1. Detach the handlebar (refer to 12-3).

2. Remove the front wheel (refer to 12-4).

3. Remove the cable of the speedometer, the rear brake cable, the front brake hose and the front brake caliper.

4. Remove the top race of the steering lever and slide them out of the steering tube.

5. Check if the ball race and the balls on the cone race are worn or failed. Replace as necessary.

Replacing the Ball Cone Race

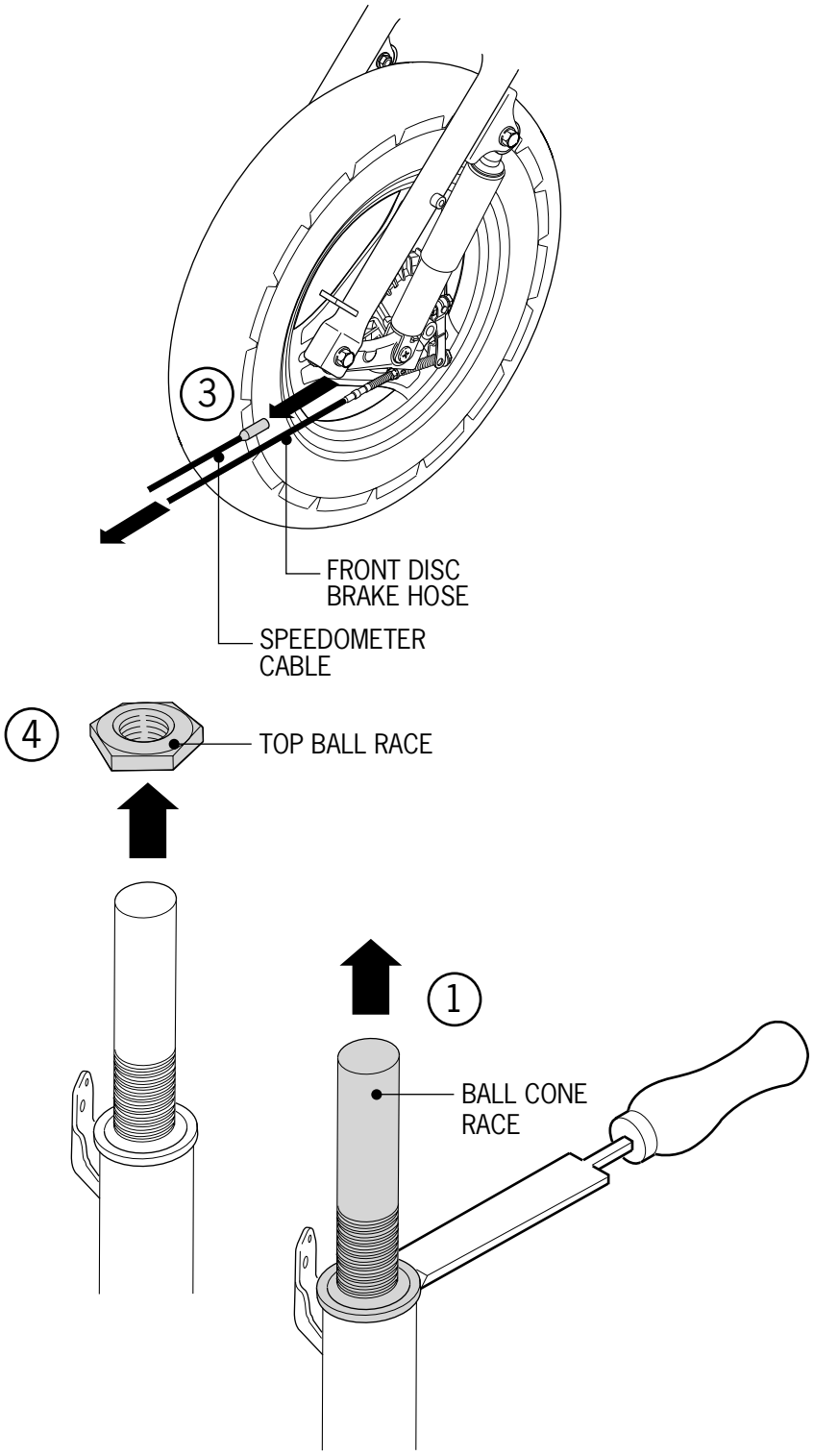
1. Remove the race with a chisel and hammer.

Attention:
Don't damage the steering lever and the front fork.

2. Use a suitable driver to drive in the new cone race into place.

Replacing the Upper Race

1. Remove the upper race using a puller or prying tool.



12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

2. Press in the new race.

Attention:
Be sure to press the race all the way into place.

Assembling the Upper Race

1. Coat the race with grease and set the race into the sleuth. Then coat the race with grease.

2. Install the front fork.

3. Coat the top race with grease and set it in place.

4. After tightening the top race, turn it back and forth several times to make the bearing set into place.

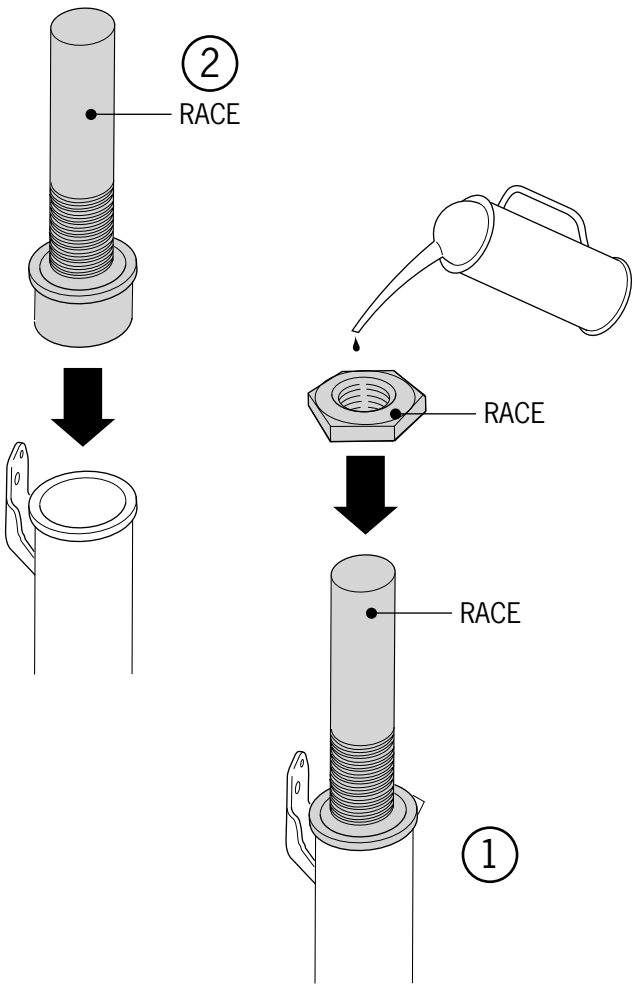
5. Install the top race, and then tighten the upper nut.

Torque: 8.0-12.0kg/m 50-60ft lbs

6. Attach the front wheel (refer to 12-7).

7. Attach the handle (refer to 12-3).

8. Attach the cables (refer to 1-15).



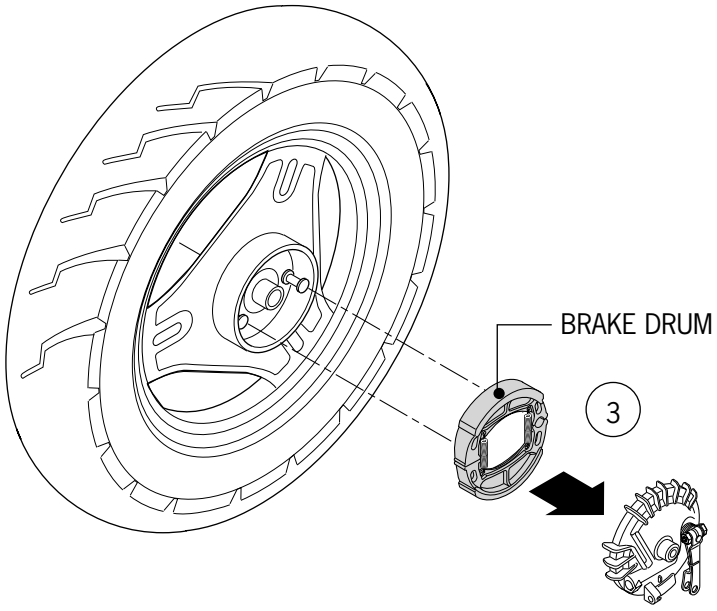
12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

Checking the Brake Lining

1. Measure the thickness of the brake lining. Replace when it is below 2.0mm (.079 in.)

Attention:
Don't allow the oil adhere to the lining surface.



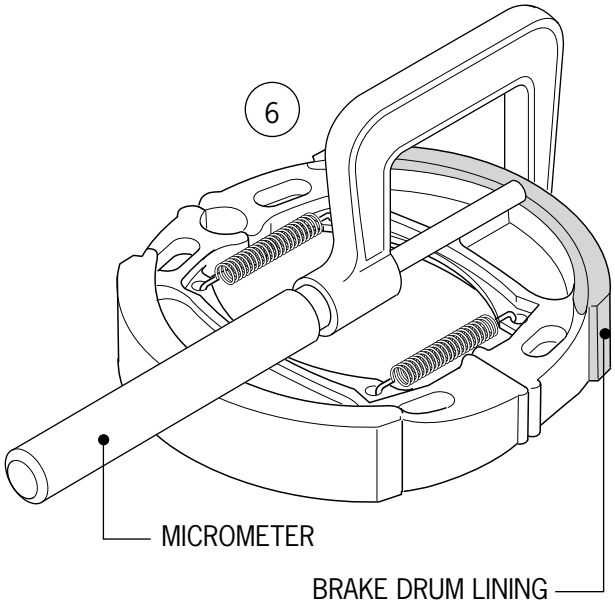
Dismantling the Front Brake

3. Remove the adjusting nut of the front brake.

4. Remove the brake lining.

5. Remove the fix bolt of the brake arm.

6. Remove the brake arm.



Assembling the Front Brake

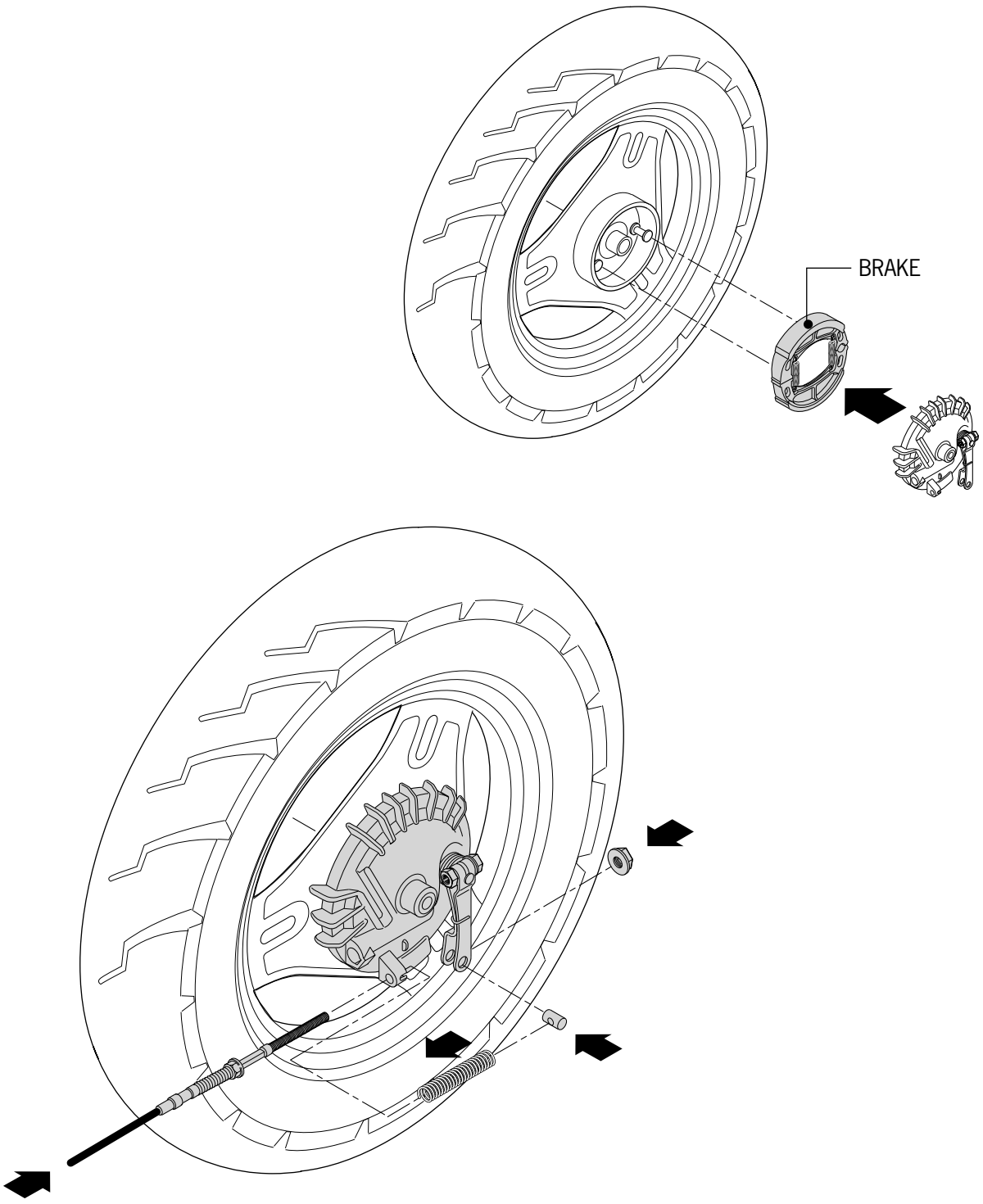
8. Spread grease on the moving parts of the lining and of the fix pin (locating pin).

9. Spread grease on the moving part of the brake cam shaft and then assemble it.

10. Install the brake lining.

12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

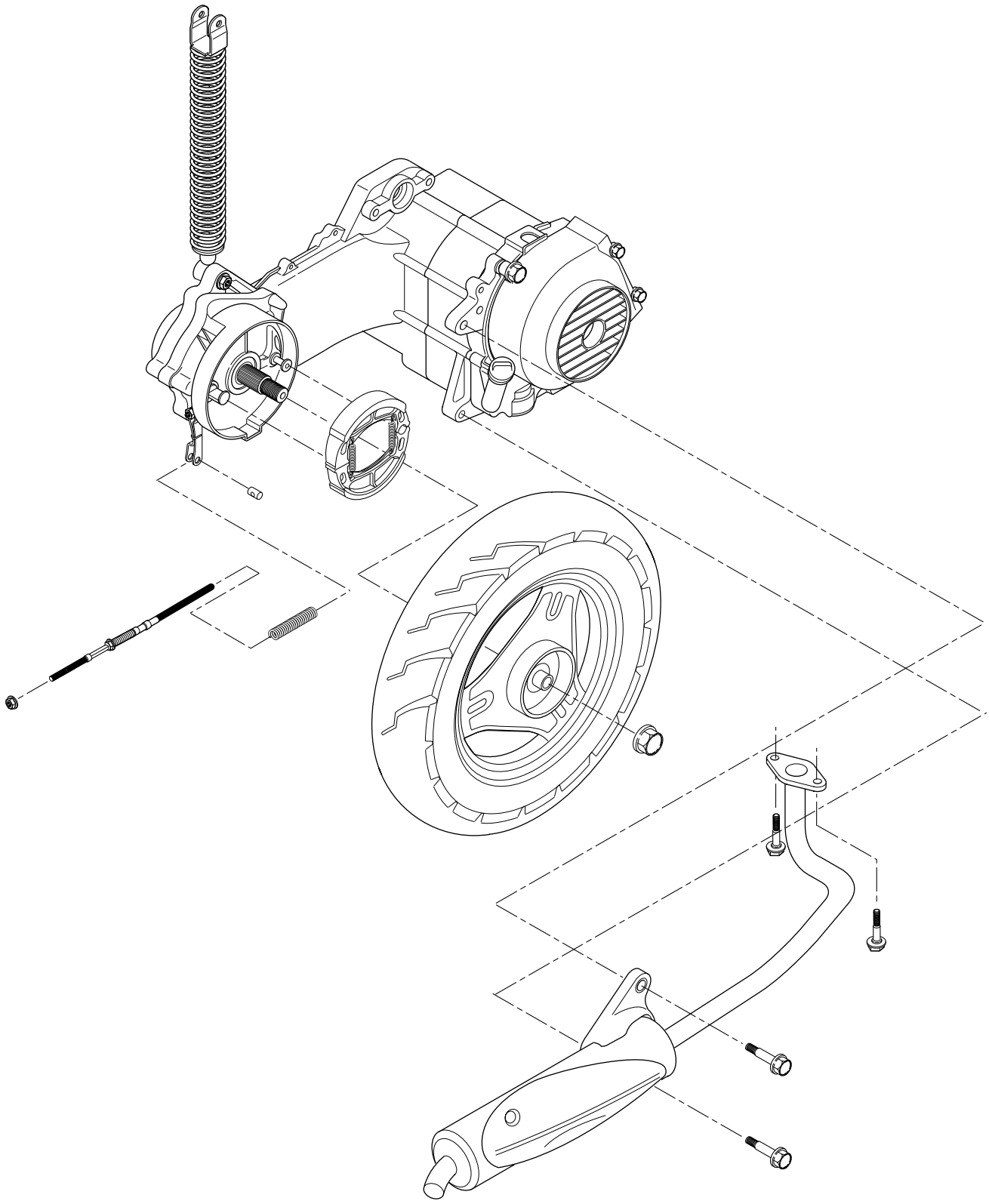


12. The Front Wheel, Front Brake,

Front Buffer and the Front Fork

MEMO

13. The Rear Wheel, the Rear Brake & Rear Shock



13. The Rear Wheel, the Rear Brake & Rear Shock

Topic	Page	Topic	Page
Important points	13-2	Checking the Rear Brake	13-4
Troubleshooting	13-2	Dismantling the Rear Brake	13-4
Detaching the Rear Wheel	13-3	Assembling the Rear Brake	13-4
Checking the Rear Wheel	13-3	Dismounting the Rear Shock	13-5
Assembling The Rear Wheel	13-3	Assembling the Rear Shock	13-6

Important Points

During operation, it's not allowable to have oil adhere to the inner surface of the brake hub and the surface of the lining. Use brake solvent to remove oil.

Tech Criterion

Check Position	Item		Normal Size	Limit (mm)
Rear Wheel	Runout	Longitudinal Hop	——	2.0 (.079 in.)
		Transversal Wobble	——	2.0 (.079 in.)
	ID of the rear brake hub		110 (4.33 in.)	111 (4.36 in.)
	Thickness of the rear brake lining		4.0 (.157 in.)	2.0 (.079 in.)
Free length of the rear shock spring			202.5 (7.97 in.)	198 (7.78 in.)

Torque

The nut of the rear wheel axle	*10.0kg•m*	*75ft lbs*
The top of the rear buffer	*4.5kg•m*	*30ft lbs*
The bottom bolt of the rear buffer	*3.0kg•m*	*20ft lbs*
The connection nut of the silencer	*1.2kg•m*	*10ft lbs*
The fix bolt of the silencer	*3.5kg•m*	*25ft lbs*

Diagnosis

The rear wheel wobbles
- Deformation of the rear rim
- Bad tire mounting or bent

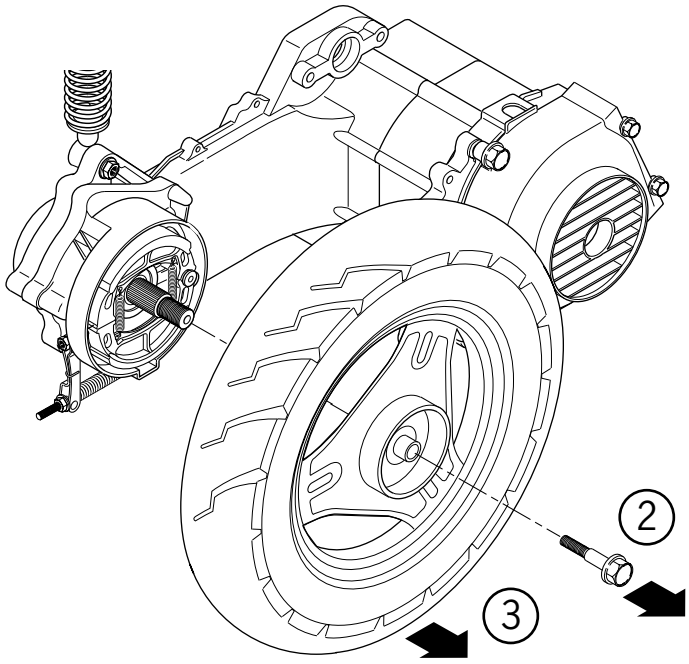
The rear shock is too weak
- Spring bent or broken

Misadjusted brake
- Wear of the brake lining
- Wear of the brake lining cam
- Brake cam worn
- Brake hub worn

13. The Rear Wheel, the Rear Brake & Rear Shock

Detaching the Rear Wheel

1. Detach the exhaust pipe (refer to 2-8)
2. Remove the nut of the rear wheel axle.
3. Remove the rear wheel.



Checking the Rear Wheel

1. Check the run-out of the rear wheel.

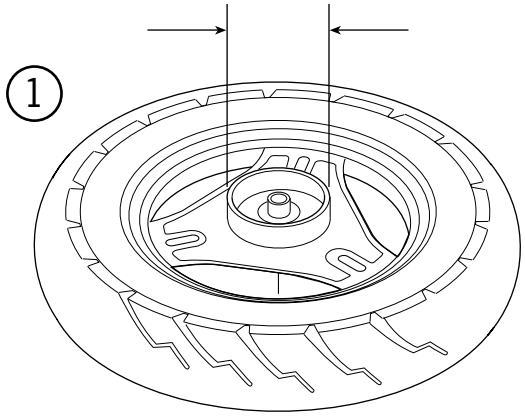
   Maximum service allowance:
   Longitudinal: 2.0mm (.079 in.) Hop
   Transversal: 2.0mm (.079 in.) Wobble

   Replace when it goes beyond the above value.

2. Check the rear brake hub.
3. Measure the ID of the rear brake hub.

   Maximum service allowance:
   111mm (4.37 in.)

   Replace when it goes beyond the above value.



Assembling the Rear Wheel

1. Assemble in the opposite sequence of the dismantling.

   T*he rear wheel axle:*
   Torque: 10.00kg•m 75ft lbs
   Torque of the exhaust pipe:
   Connection nut: 1.2kg•m 10ft lbs
   Fix bolt: 3.5kg•m 25ft lbs

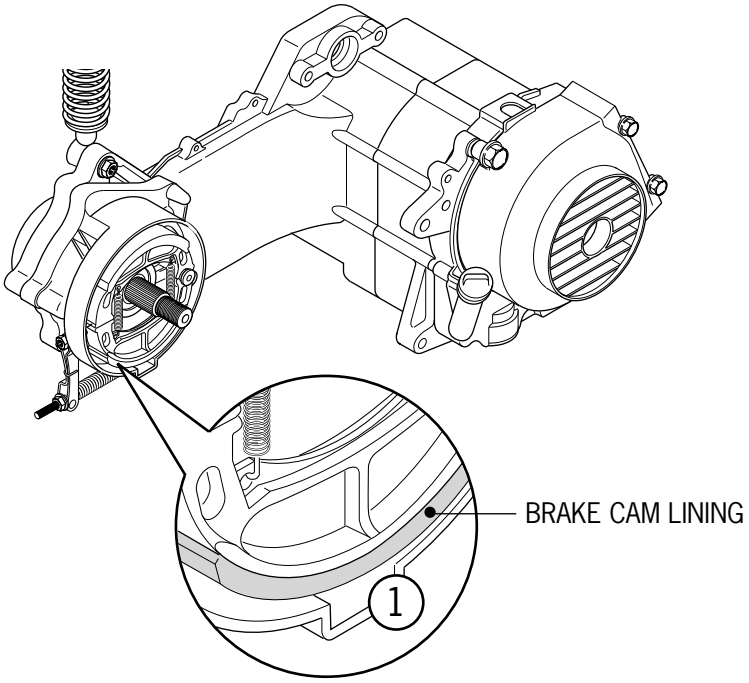
Attention:
When assembling the exhaust pipe, first fasten the connection at the bend, and then install the support bolt.

13. The Rear Wheel, the Rear Brake & Rear Shock

Checking the Brake Lining

1. Measure the thickness of the brake lining. Replace when it is below 2.0mm (.079 in.).

Attention:
Don't allow oil adhere to the lining surface.



Dismantling the Rear Brake

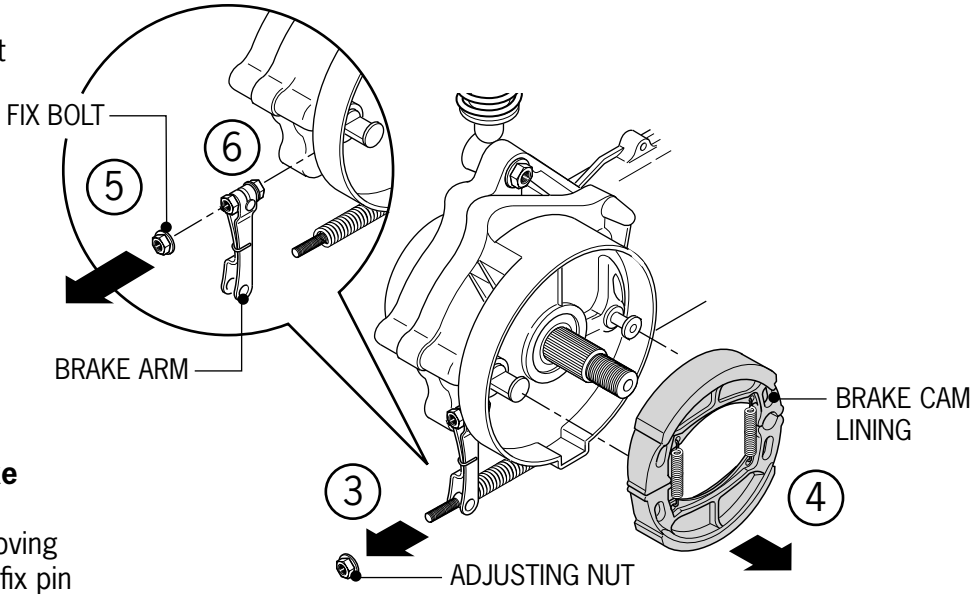
3. Remove the adjusting nut of the rear brake.

4. Remove the brake lining.

5. Remove the fix bolt of the brake arm.

6. Remove the brake arm.

7. Remove the brake cam.

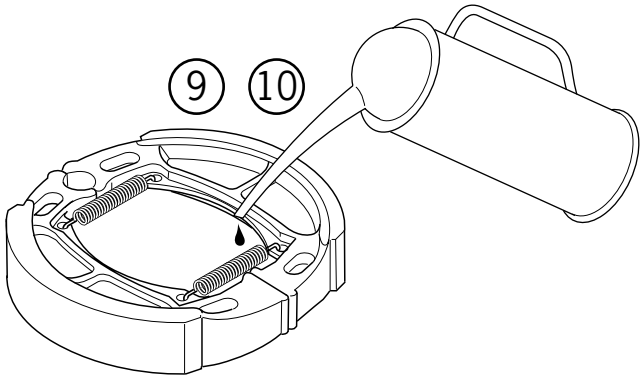


Assembling the Rear Brake

8. Spread grease on the moving parts of the lining and of the fix pin (locating pin).

9. Spread grease on the moving part of the brake cam shaft and then assemble it.

10. Install the brake lining.



13. The Rear Wheel, the Rear Brake & Rear Shock

11. Assemble the wear indication board and the brake arm.

12. Assemble the brake arm and the brake cam.

Attention:
Point the “gullet” mark of the brake arm to the “dot” mark of the brake cam, and then assemble them.

13. Install and tighten the bolt of the brake arm.

14. Install and tighten the fix bolt of the set arm.

15. Install the return spring of the brake arm.

16. Install the pin of the brake arm.

17. Install the adjusting nut of the brake cable.

18. Assemble the rear wheel (refer to 13-2).

19. Adjust the clearance of the brake lever (refer to 13-8).

Dismounting the Rear Shock

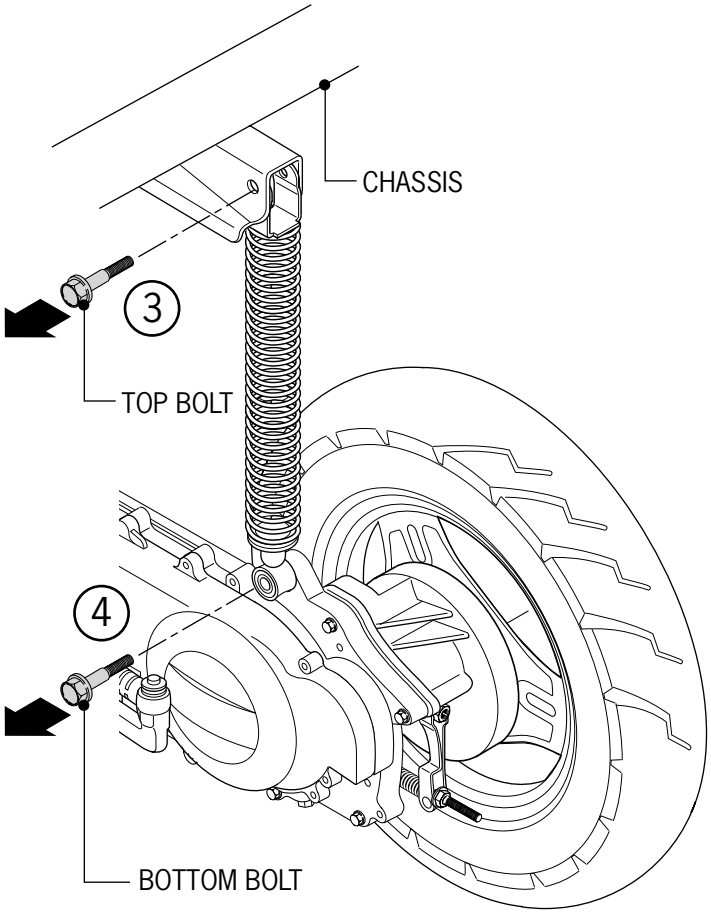
1. Remove the lid of the body (refer to 2-2).

2. Remove the case of the air filter (refer to 3-4).

3. Remove the top bolt of the rear shock.

4. Remove the bottom bolt of the rear shock.

5. Remove the rear shock.



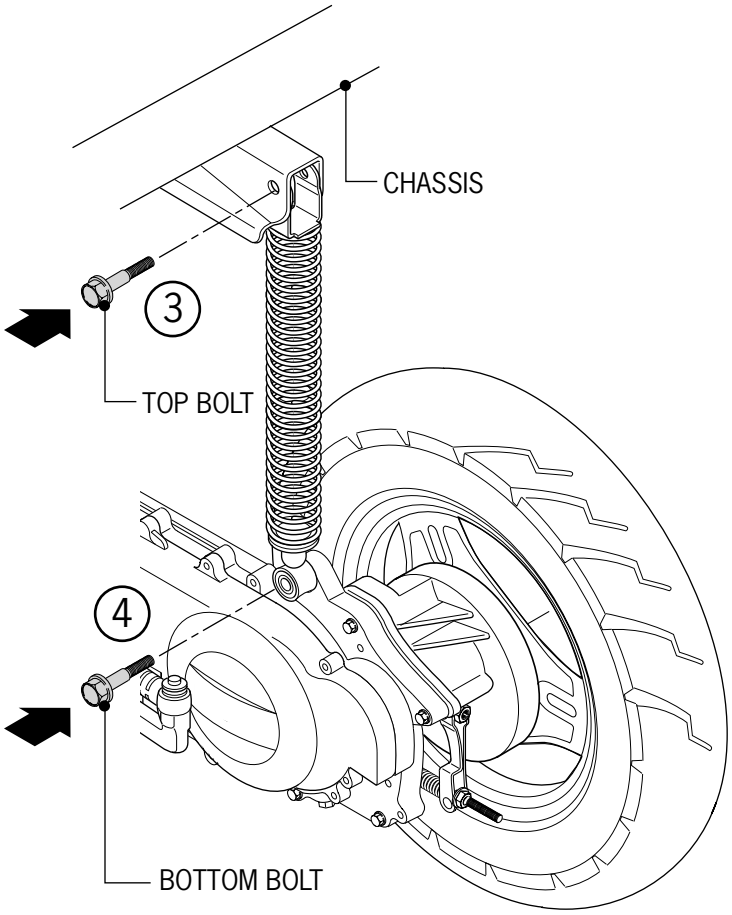
13. The Rear Wheel, the Rear Brake & Rear Shock

Assembling the Rear Shock

1. Attach the rear shock.
2. Install the top bolt of the shock.
3. Install the bottom bolt of the shock.
4. Tighten the nuts and the bolts.

   Torque
   Top bolt: 4.5kg•m 30ft lbs
   Bottom bolt: 3.0kg•m 20ft lbs

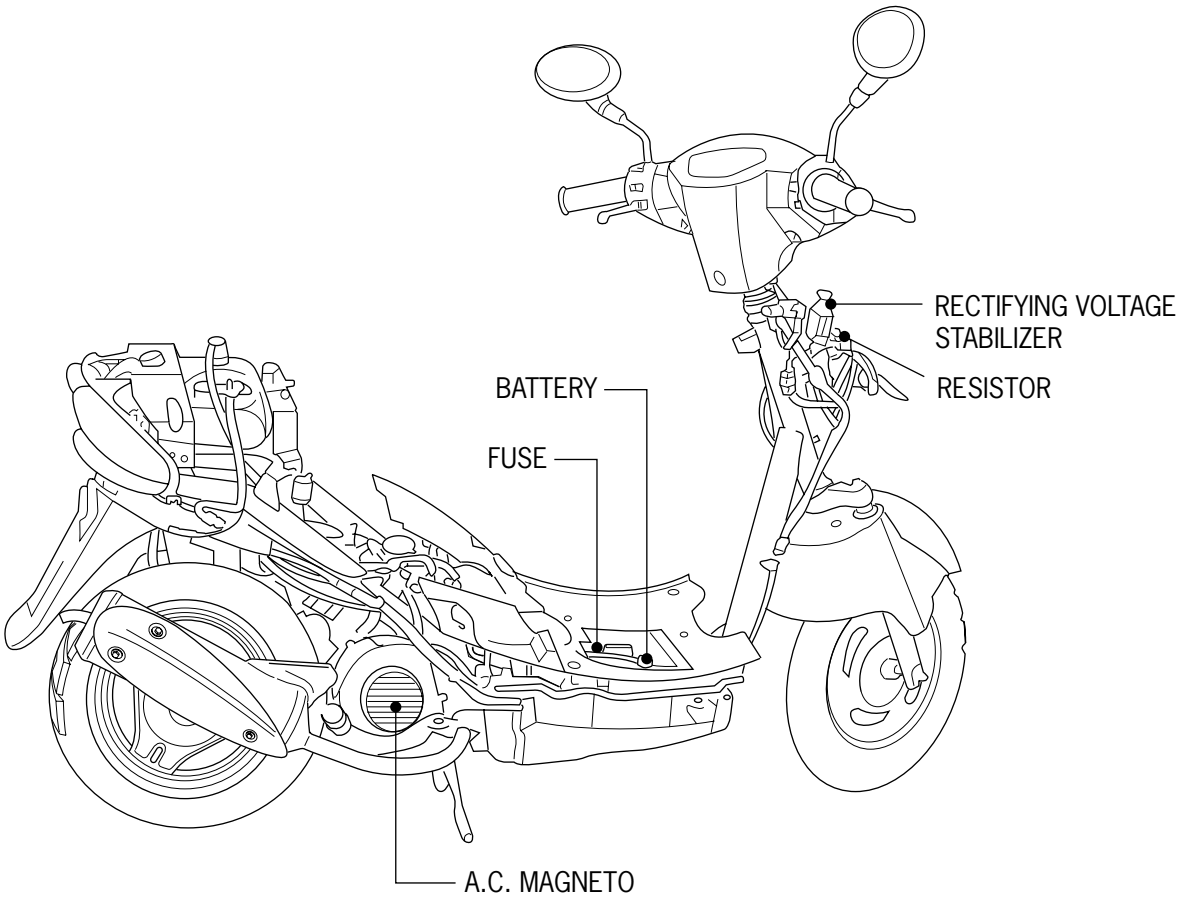
5. Assemble the lid of the body.

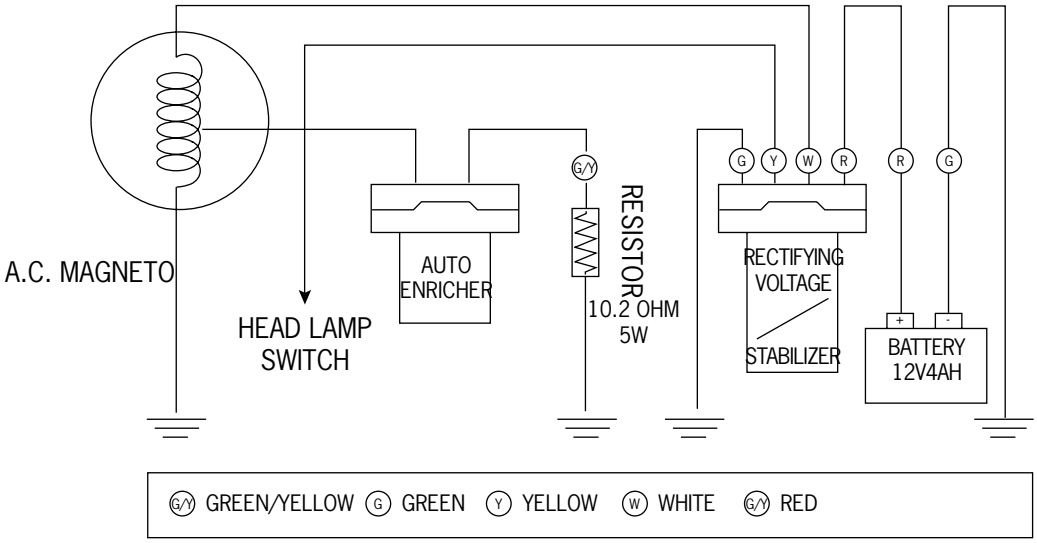


14. The Battery and the Charging System

MEMO

14. The Battery and the Charging System





14. The Battery and the Charging System

Topic	Page	Topic	Page
Instructions	14-1	The Charging System	
Diagnosis	14-2	Testing short circuit	14-7
The battery	14-3	Assembling the magnetor	14-8
The charging system	14-4	The Magneto Charging Coil	14-9
The rectifying voltage stabilizer	14-5	Checking The magneto lighting coil	14-9
The magneto charging coil	14-6	Checking the Resistor	14-9
Checking the resistor	14-6	Dismounting the Magneto	14-9
Dismantling the magneto	14-6	Assembling the Magneto	14-11

Important Points

The electrolyte (diluted sulfuric acid) is very toxic. DO NOT allow acid to splash onto clothes, the skin or eyes to protect them from burning. Eye contact with acid may cause blindness. In case of contact with the acid, use a large amount of clean water to flush and rinse the areas in which the acid came into contact. See a Physician immediately. If the electrolyte acid gets into clothes, it will permeate to the skin. Remove tainted clothes immediately and then put them in water to rinse.

•The battery can withstand numerous cycles of charging and discharging as long as it is not left in a discharged condition for a long period of time.

•If the battery is overcharged, it can be detected by close inspection of the battery itself. If the battery is exposed to an extreme overcharged condition, it can break down and short circuit internally. In this condition, the battery will produce zero voltage under all load and charge conditions. An overcharged battery can “boil off” the electrolyte solution. This problem can be due to excessive time on a battery charger or a failed voltage regulator.

•If the scooter is left to sit for a long time or is stored, the battery will slowly discharge. It is advisable to recharge the battery before attempting to start the scooter after a period of storage.

•When filling a new battery with acid, allow it to sit and “breath” for fifteen minutes before installing it into the scooter or charging it. It is advisable to charge a new battery after filling with acid even though it may appear to have sufficient charge.

•When working on the scooter’s electrical system, make sure that the main switch is turned off and/or the battery is disconnected. Disconnecting and reconnecting of live circuits can cause high instantaneous currents that can damage the battery and cause injury.

•Any short-circuiting of the wiring can cause damage to the battery.

14. The Battery and the Charging System

Tech Criteria

Item			Data	
Battery	Capacity/Type		12 V-4AH or 12V-5AH	
	VOLT (20˚C)	Fully charging	13.1V	
		Low limit	12.3V	
	Charging CUR		Standard: 0.4A; Fast: 2A	
	Charging hours		Standard: 5-10 hrs; Fast 1hr	
Magneto	Capacity		0.144KW/5000rpm	
	Resistance of lighting coil (20˚C)		Between yellow-clean	0.1-1.0 OHM
	Resistance of charging coil (20˚C)		Between white-clean	0.2-1.2 OHM
Rectifing Volt Stabilizer	Type		Single phase, half-wave SCR charging; SCR half-wave short circuit mode	
	Limited volt	Lighting	12-14/5000 rpm (multimeter, RPM meter)	
			13.5 +/- 0.5V	
		Charging	14.5 +/- 0.5V/3000-8000rpm	
	Resistance (20˚C)		5W/4 OHM	
Resistor	Resistance (20˚C)		30W/7.5 OHM	

Torque

The bolt of the triggering coil	*0.5kg·m 40in lbs*
The fix bolt of the coil	*0.9kg·m 4ft lbs*
The fix bolt of the flywheel	*3.8kg·m 25ft lbs*
The bolt of the cooling fan	*0.9kg·m 7ft lbs*

Tool

Universal fixing wrench
Fly wheel puller
Multi-meter

Diagnosis

No power supply
- Battery over-discharging
- Battery wiring improper
- Burnt fuse
- Broken electro switch lock

Unstable current
- Bad battery wiring contact
- Bad contact of discharging system
- Poor contact/short circuit of the lighting system.

Low voltage
- Improper battery charging
- Bad contact
- Poor charging system
- Damaged rectifying volt stabilizer

Poor charging system
- Bad contact, breaking or short circuit of the wiring connector
- Poor rectifying stabilizer
- Damaged magneto

14. The Battery and the Charging System

Detaching the Battery

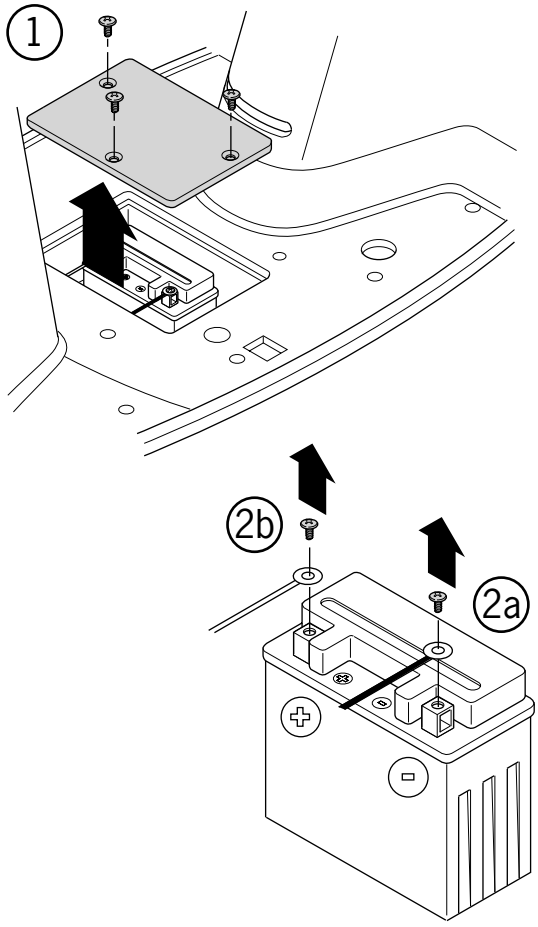
1. Remove the screws of the battery cover under the floor mat.

2. Open the cover and remove the battery cable attachment screws.

Attention:
First detach the negative (-) terminal wire, then the (+) terminal wire. When detaching the positive (+) terminal wire, make sure that the tool does not contact the frame.

3. When assembling, operate in the opposite sequence of dismounting.

Attention:
In order to prevent short circuiting, first connect the (+) terminal wire, then the negative (-) terminal wire



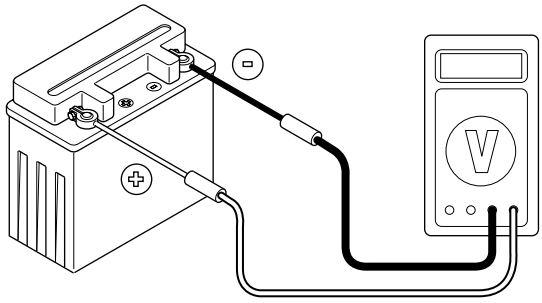
Checking the charging condition (open circuit volt)

1. Open the battery cover and disconnect the battery.

2. Measure the voltage across the terminals of the battery.

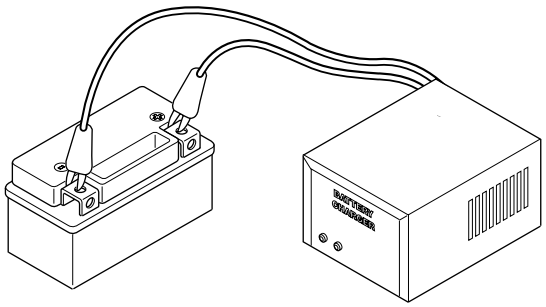
Fully charged: 13.1V
Inadequately charged: 12.3V

Attention:
Use a volt meter to check the charging condition.



Charging

1. Connect the (+) terminal pole of the charger to the (+) terminal pole of the battery and the negative (-) terminal pole of the charger to the negative (-) terminal pole of the battery.



14. The Battery and the Charging System

Attention:
•No sparks should be allowed around the battery.

•Turn off the charger first, either at the beginning or the end of the charging, to prevent sparks, which can cause an explosion.

•When charging, operate at the current and time marked on the battery.

•Unless in an emergency situation, do not use fast charging.

•Measure the voltage only 30 minutes after charging.

Charging current:
Standard 0.4A
Fast: 2A

Charging Hours:
Standard: 5-10hrs
Fast: 1hrs.

When charging ends:
Open-circuit voltage: above 12.8V

Note: During charging, the temperature of the battery is not allowed to go beyond 45˚C (110˚F).

14. The Battery and the Charging System

The Charging System

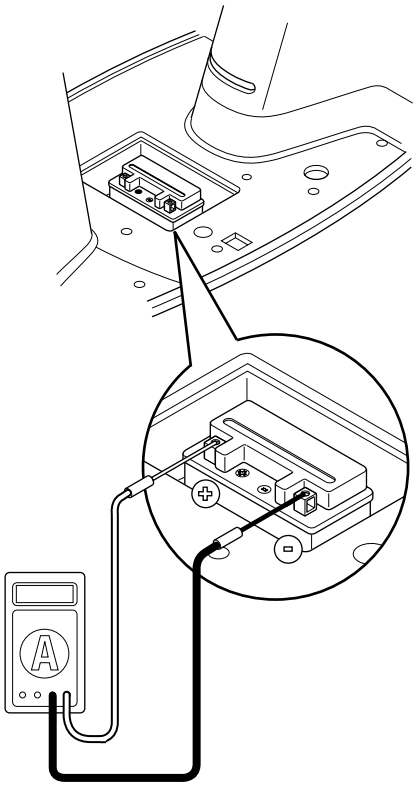
Testing short circuit

1. Detach the earth wire from the battery.

2. Connect the ammeter between the "-" terminal of the battery and the earth wire, the main switch being in the “off” position to check whether it’s short-circuited.

Attention:
The (+) terminal terminal of the multi-meter is connected to the "-" pole of the battery, while negative (-) terminal wire of the multi-meter is connected to the earth wire.

3. When an abnormal sign appears, check if there is a short circuit in the main switch and the main cable.



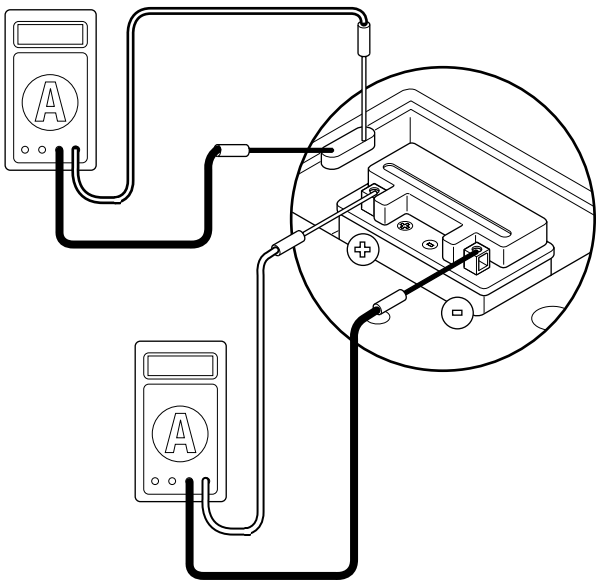
Checking the Charging Condition
1. When the battery is in full charging condition, use a multi-meter to test.

2. After the engine is warmed up, install the fully-charged battery. Connect the voltmeter across the terminals of the battery.

3. Remove the main fuse and connect the ammeter between the terminals.

4. Connect the RPM meter to the engine.

5. Start the engine, when the speed of the engine slowly rises, measure the charging voltage and current.



Limiting Voltage/Current:
Below 14-15V0.5A (Below 5000rpm)

When the limiting voltage goes beyond the above scope, check the rectifying voltage stabilizer (refer to 14-5).

Switch Position / RPM	OFF	P	H
2500	>1.0A	>1.0A	>1.0A
5000	>1.5A	>1.5A	>1.5A

14. The Battery and the Charging System

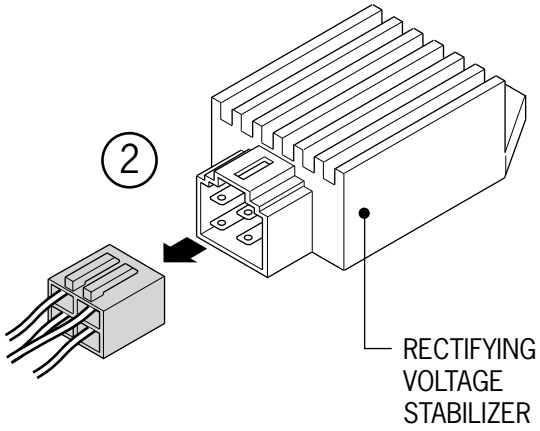
The rectifying voltage stabilizer

1. Checking the main cable circuit.

2. Detach the 4P plug from the rectifying voltage stabilizer.

3. Check the conductivity between terminals of the main cable in the following way:

Item (matching color wire)

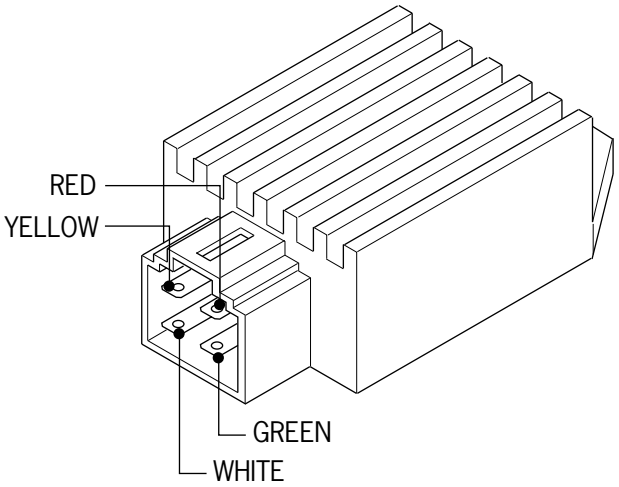


Checking the Rectifying Voltage Regulator

1. After the main cable has been tested and found normal, check the plug of the rectifying voltage stabilizer contact well and measure the resistance among the terminals of the regulator.

Attention:
Make sure that your finger doesn't touch the metal part of the test bar of the multi-meter because the human body has resistance.

- Use a multi-meter to test.
- Test positions per chart.



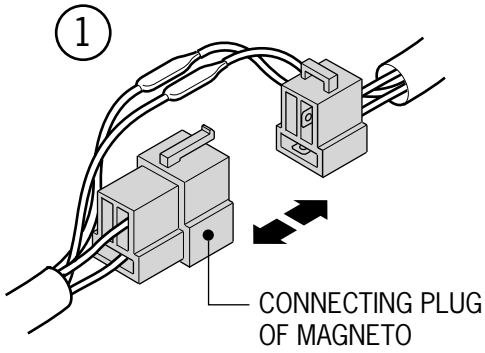
2. When the resistance among the terminals is abnormal, replace the rectifying voltage stabilizer.

Multimeter ⊕ / Multi-meter ⊖	White	Yellow	Red	Green
White		∞	3K-50K	∞
Yellow	∞		∞	5K-100K
Red	∞	∞		∞
Green	∞	5K-100K	∞	

14. The Battery and the Charging System

The Magneto Charging Coil

Attention:
This operation of the magneto charging coil can be accessed within the engine.



Checking

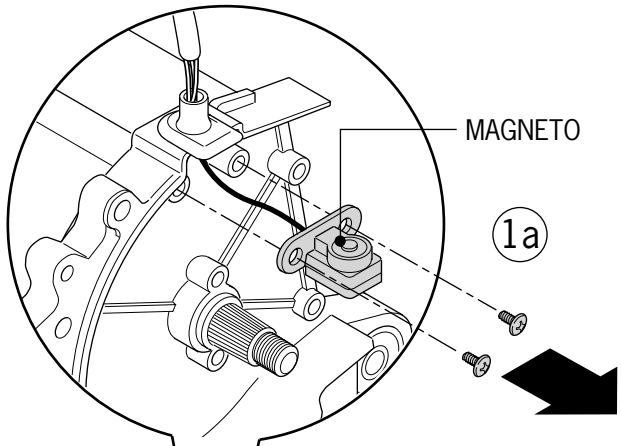
1. Detach the connecting plug of the magneto.

2. Use a multi-meter to measure the resistance between the white wire of the magneto and the ground.

Criterion: 0.2-1.2 OHM (20ºC)
When the value goes beyond the criterion, replace the magneto coil.

Checking The magneto lighting coil

Attention:
This operation of the lighting coil can be accessed within the engine.



1. Detach the connecting plug of the magneto.

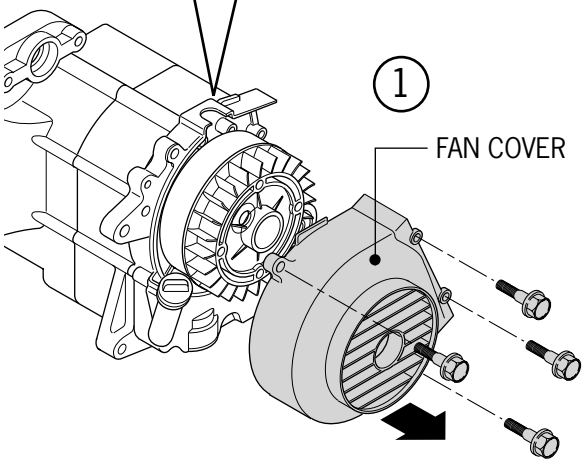
2. Use a multi-meter to measure the resistance between the yellow wire and the ground.

Criterion: 0.1-1.0OHM (20ºC)
When the value goes beyond the criterion, replace the magneto coil.

Checking the Resistor

1. Measure the resistance between the resistor wire and the ground.

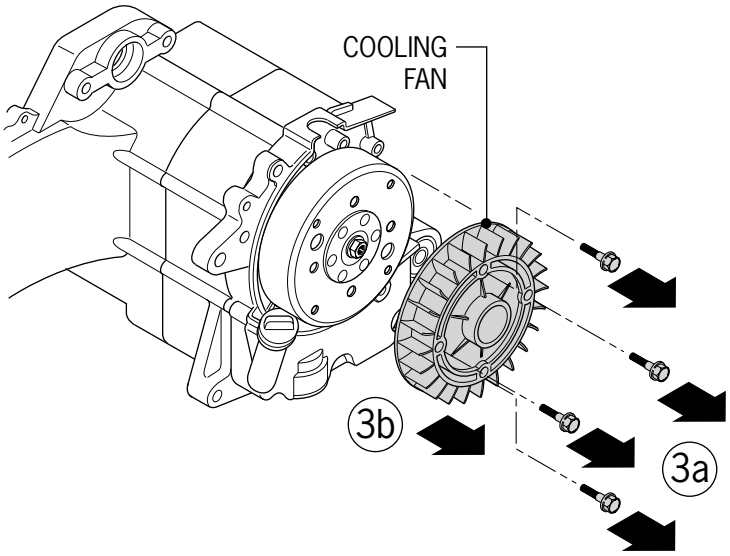
Criterion: 30W7.5 OHM : 6.0-9.0 OHM
5W14 OHM : 13-15 OHM



Dismounting the Magneto

1. Detach the right side guide strip (refer to 2-3) Remove the four bolts, four screws and remove the fan cover.

3. Remove the four bolts and remove the cooling fan.



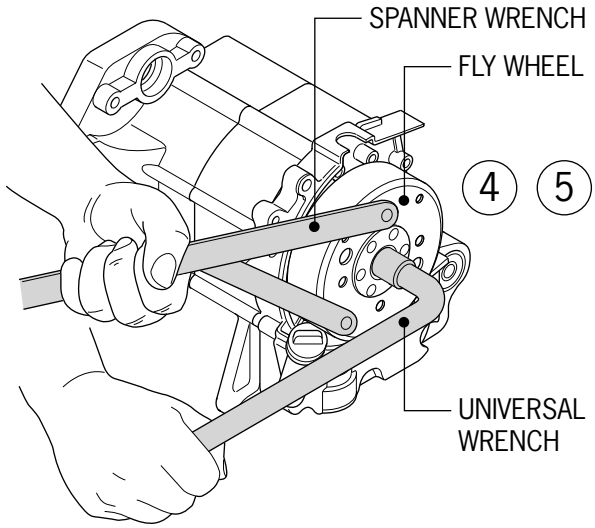
4. Use a universal solid wrench to secure the flywheel. Detach the fix nuts of the flywheel.

5. Use a spanner wrench hold flywheel while removing the retaining nut.

6. Use a flywheel puller to remove the flywheel.

7. Remove and save the key.

8. Detach the connecting wire of the magneto.

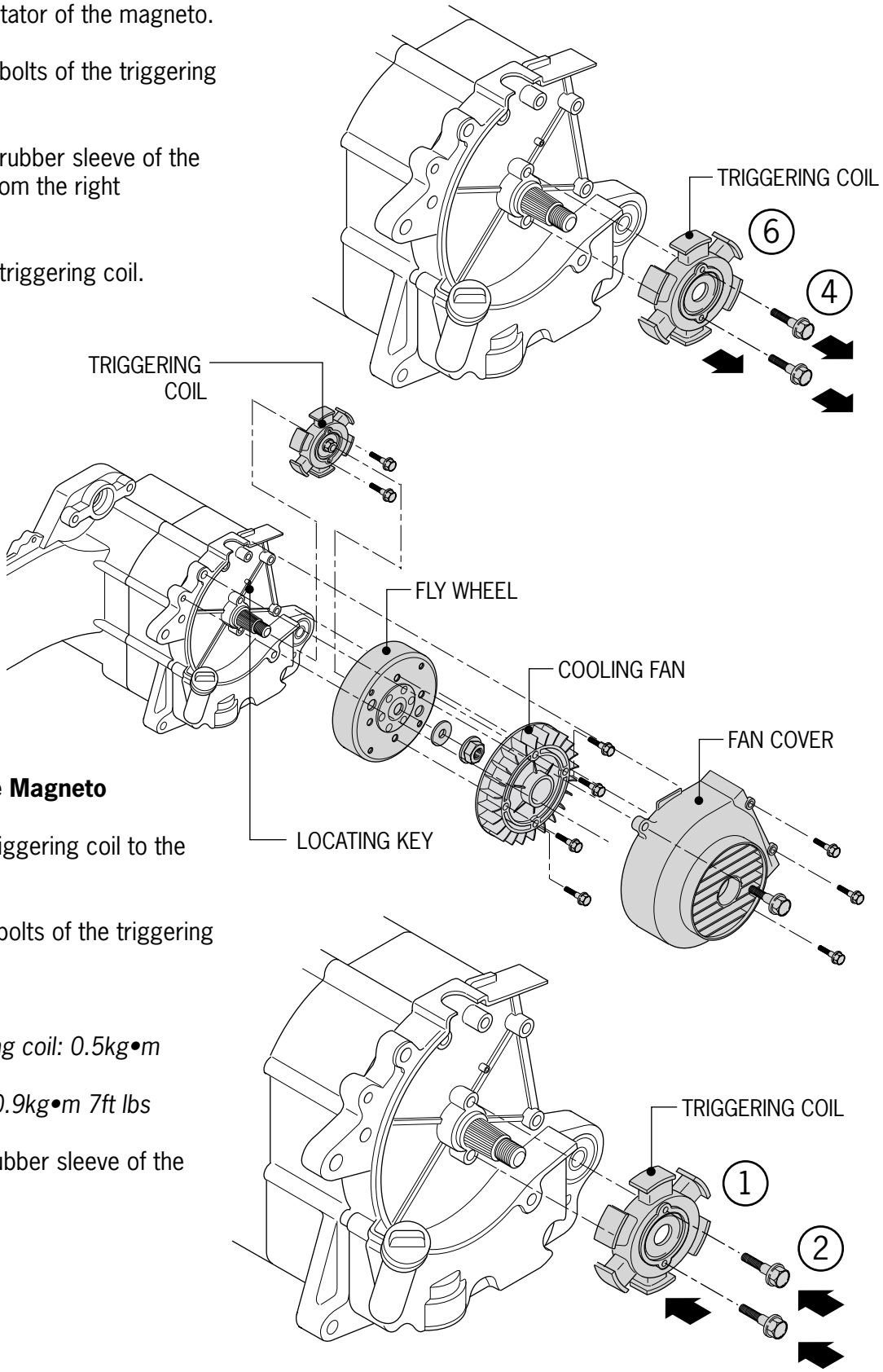


3. Detach the stator of the magneto.

4. Remove the bolts of the triggering coil.

5. Remove the rubber sleeve of the magnetor wire from the right crankcase.

6. Remove the triggering coil.



Assembling the Magneto

1. Attach the triggering coil to the right crankcase.

2. Lock the fix bolts of the triggering coil.

Torque:
The triggering coil: 0.5kg•m 40in lbs
The stator: 0.9kg•m 7ft lbs

3. Set up the rubber sleeve of the magneto wire.

14. The Battery and the Charging System

4. Connect the connecting wire of the magnetor.

5. Clean the cone part of the crankshaft and of the flywheel. Be sure to lay the locating key of the flywheel into the keyway on the crankshaft precisely. Point the groove of the flywheel to the locating key on the crankshaft and then assemble it.

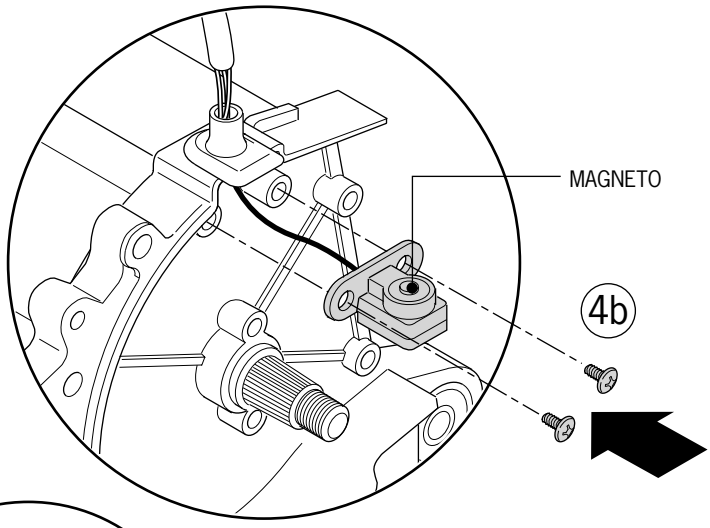
Attention:
Make sure that there is no bolt/nut inside the flywheel, and then assemble it.

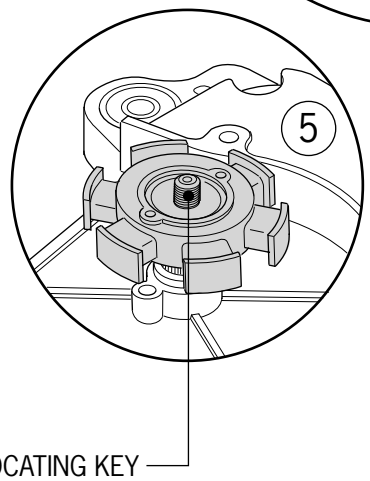
6. Use a universal solid wrench to hold the flywheel, and then lock the nut.

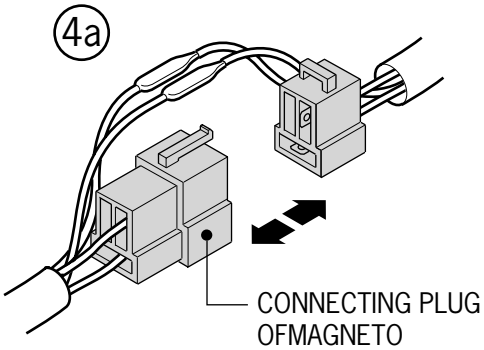
Torque: 3.8•m

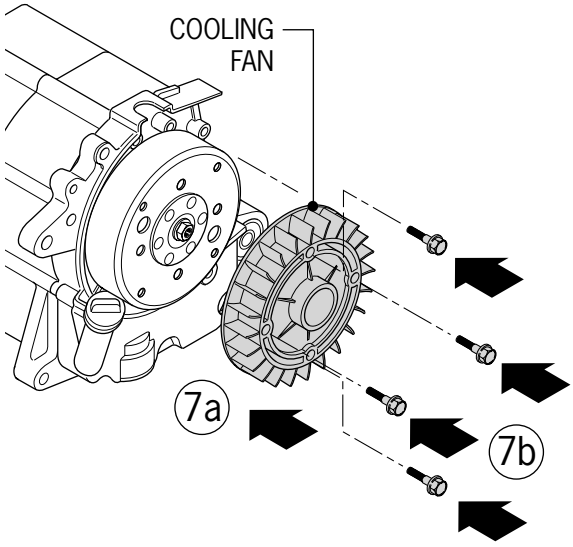
7. Set up the cooling fan

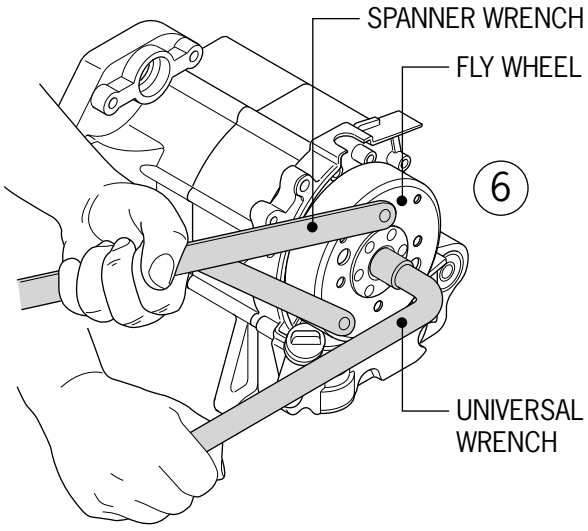
Torque: 0.9kg•m



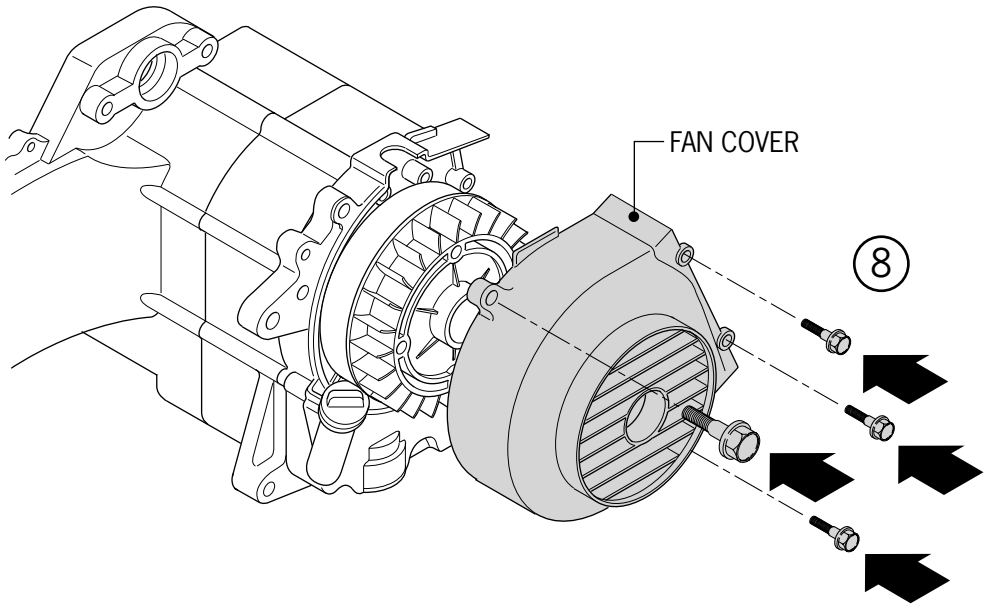








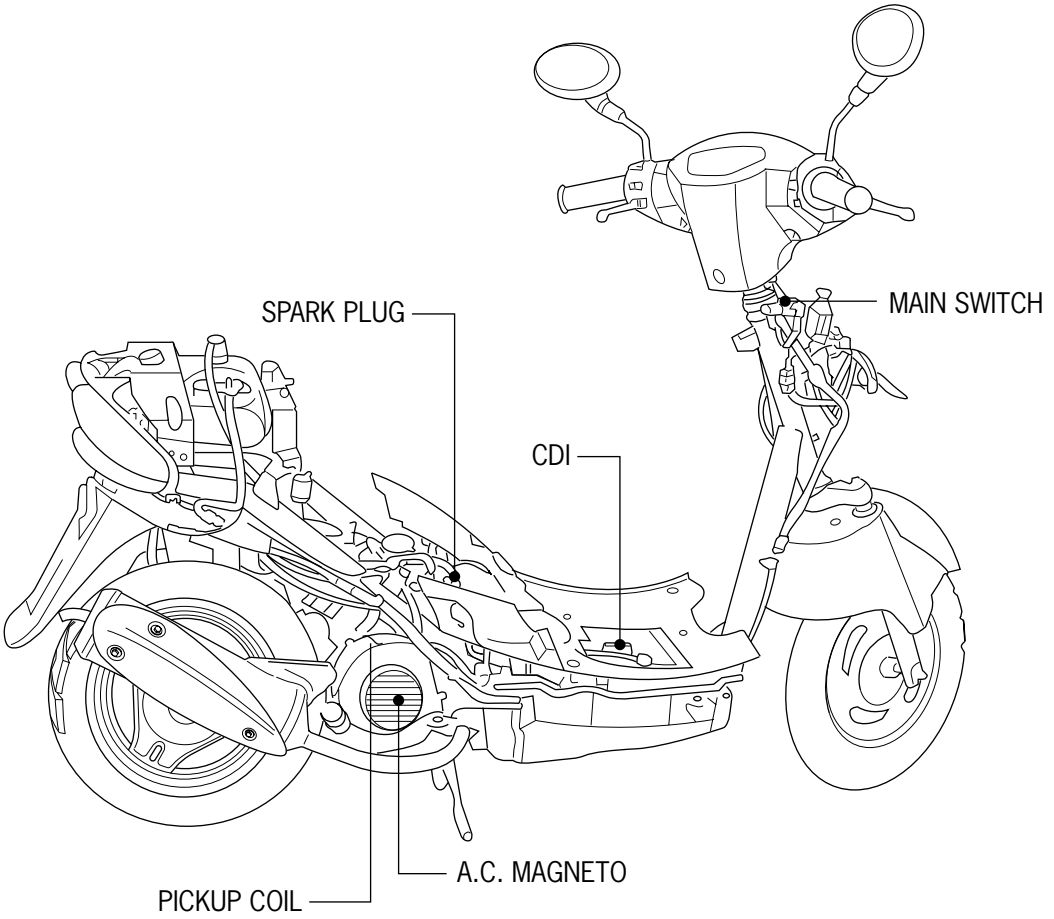
8. Install the fan cover and securely tighten fasteners.

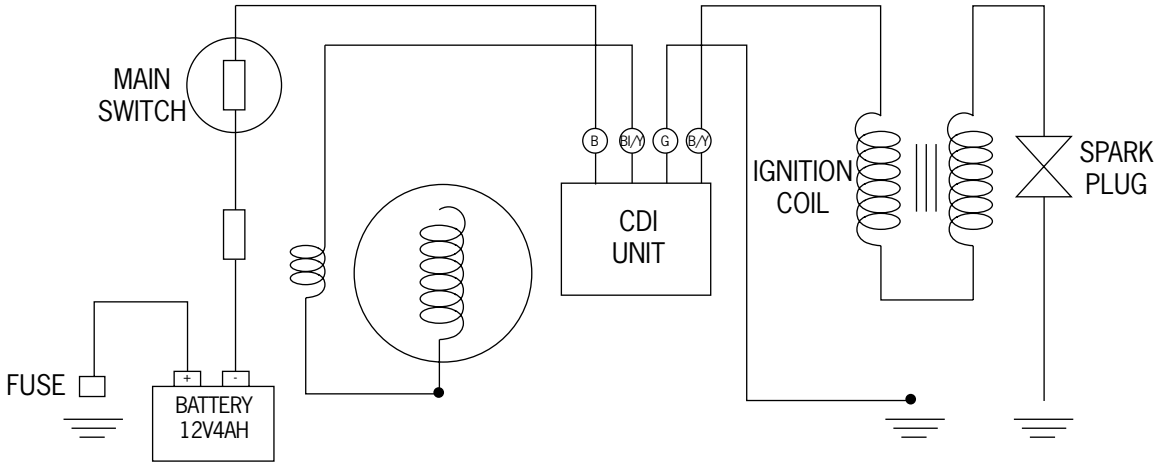


14. The Battery and the Charging System

MEMO

15. Ignition System





B BLUE Bl/Y BLUE/YELLOW BY BLACK/YELLOW G GREEN

15. Ignition System

Topic	Page
General Information	15-2
Troubleshooting	15-3
CDI unit inspection	15-4
Ignition Coil Removal Steps	15-5
Magneto Pickup Coil Inspection	15-6
Spark Advance Angle Inspection	15-6

General Information

•Check ignition system in accordance with the troubleshooting procedure in Section 15-2.

•As the ignition system has an electric automatic spark control in the CDI unit, there is no need for spark advance angle adjustment.

•CDI should not be disconnected or subjected to input. Damage or failure can occur.

•Poor contact may be the cause of many faulty ignition system cases. Check all terminal connections to be sure they are clean and tight whenever troubleshooting an electrical problem.

•Make sure spark plug heat range is correct. Using an incorrect spark plug will result in improper engine operation or spark plug damage.

•Peak voltage is used as reference point in tests. Record coil resistance tests.

•When inspecting spark plug, refer to related instructions in Chapter 3.

•When removing AC generator and pickup coil, refer to instructions in Chapter 14.

Reference Standard

Item			Standard valve
Specific spark plug	Standard		(NGK)C7HSA Champion Z9Y
	Hot		(NGK)C6HSA
	Cold		(NGK)C8HSA
Spark plug gap			0.6-0.7mm
Spark advance angle	Maximum advance in "F" position		13˚ +/- 1˚ (2000r/min)
Ignition coil resistance	Primary coil		0.1-1.0 OHM
	Secondary coil	With cap	7-9K OHM
		Without cap	3-4K OHM
Pickup coil resistance			1-10 OHM
Primary ignition coil peak voltage			Over 120V
Pickup coil peak voltage			Over 2.1V

15. Ignition System

Troubleshooting

High Tension Voltage Too Low
- Crankshaft revolution too slow or battery voltage too low
- Ignition system wiring loose
- Faulty ignition coil
- Faulty CDI unit
- Faulty pickup coil

High Tension Voltage Intermittent
- Faulty main switch
- Poor CDI terminal connection
- Poor CDI ground
- Faulty pickup coil
- Poor high-tension lead terminal connection
- Faulty CDI unit

High Tension Voltage Normal but No Spark
- Faulty spark plug
- Faulty spark plug cap

No High Tension Voltage
- Faulty main switch
- Battery discharged or faulty rectification system
- Faulty charge system
- Faulty ignition coil
- Faulty CDI United Equine Foundation No

Intermittent High Tension Voltage
- Faulty ignition coil
- Battery voltage too low
- Faulty charge system

15. Ignition System

CDI Inspection

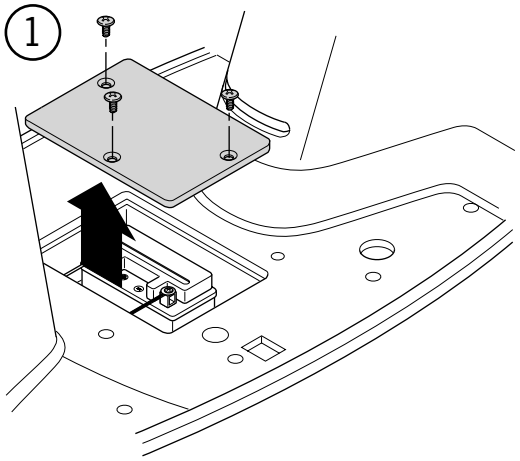
1. Remove the three screws from the battery case cover.

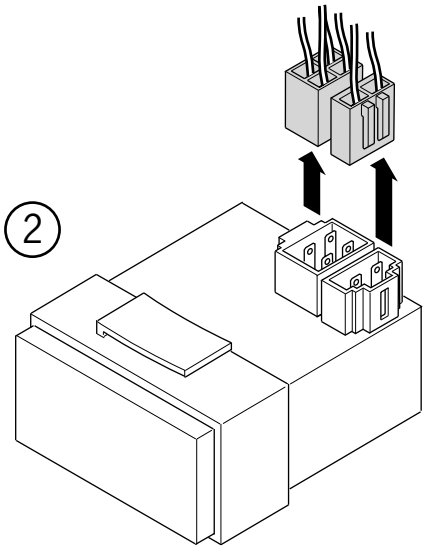
2. Disconnect the CDI module from the wire harness.

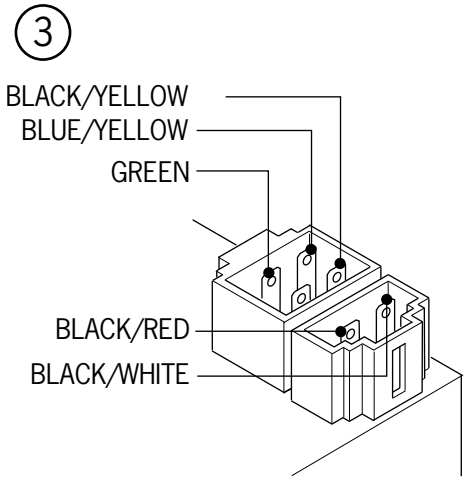
3. Test resistance of the terminals with a multi-meter.

Attention:
Since there is a semiconductor in return circuit, testing results may be significantly different if different multi-meters are used.

If the pointer on the dial flickers and finally stops during testing, it should be regarded as normal. Because the capacitor in the CDI module is charged while being tested, it cannot discharge.







15. Ignition System

Ignition Coil Removal Steps

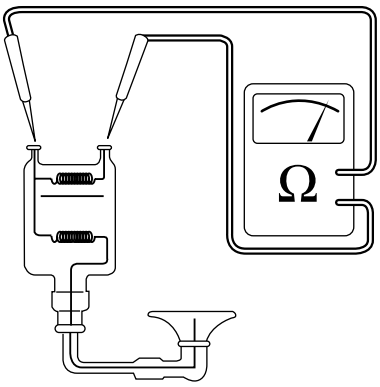
1. Remove the middle box.

2. Remove the spark plug cap.

3. Disconnect the wires, remove the ignition coil jam nuts and remove the ignition coil.
Inspection

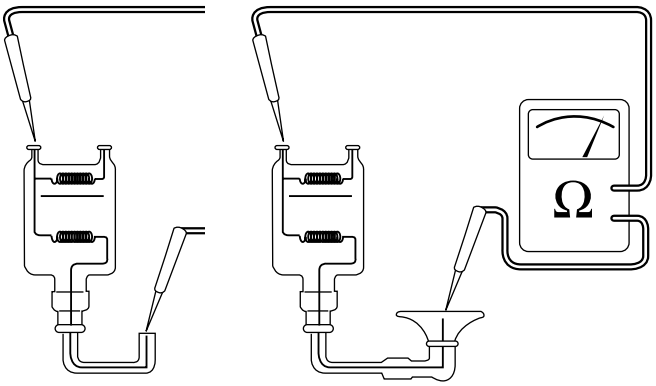
4. Check the ignition coil circuit. The spark advance angle does not need to be adjusted.

If the spark advance is abnormal, check the CDI, pickup coil or magneto. Replace the ignition coil if necessary.



5. Test the primary coil resistance, the standard value of which should be 0.1-1.0Ω.

6. Test the secondary coil resistance from spark plug cap negative terminals. The standard value should be 7-9kΩ (with cap) and 3-4kΩ (without cap).



7. Test coil using after-market spark tester.

8. Perform the following inspection in accordance with the operating instructions in the manual.

   a. Set the ignition coil tester switch to 12V and connect the tester to the ignition coil.

   b. Turn the switch to the ON position to check spark frequency from the inspection door.

   In good condition: Sparking continuously
   In faulty condition: Sparking abnormally.

15. Ignition System

Magneto Pickup Coil Inspection

This test is to be conducted with the stator mounted in the engine.

1. Remove the fan cover.

2. Disconnect the magneto.

3. Test the pickup coil resistance between the blue/yellow and green lead terminals whose standard value is 80-160.

4. Dismounting the magneto (refer to 14-6).

Charging Coil Inspection

1. Test the charging coil resistance between the black/red and the green lead terminals whose standard value is 500-600 .

Spark Advance Angle Inspection

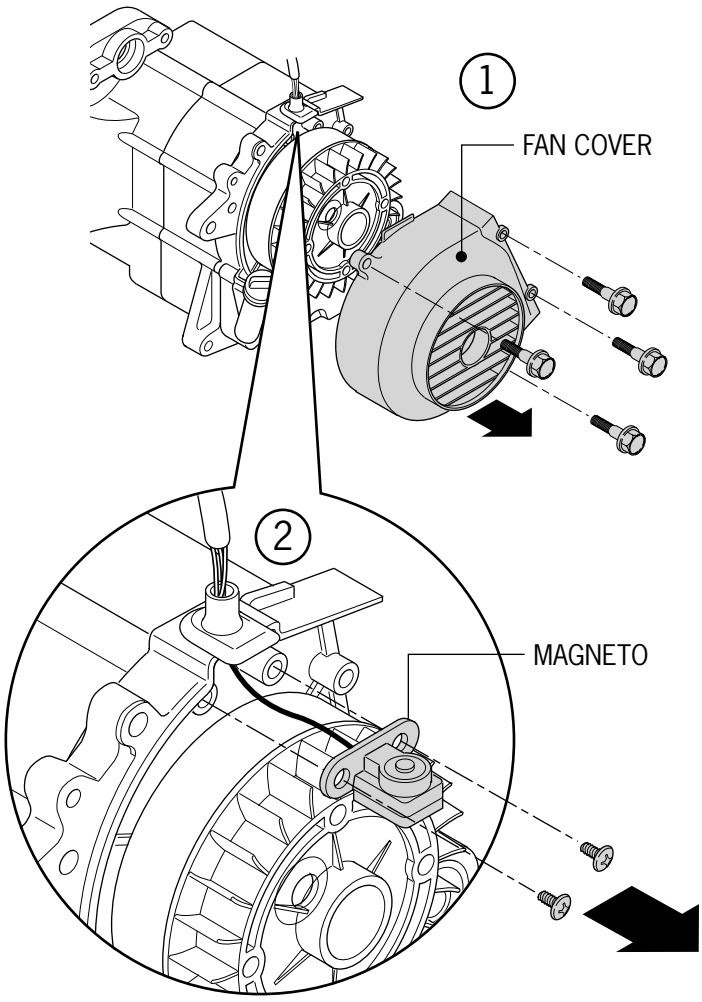
Since a CDI is used, there is no need to adjust the timing advance.

If the spark advance is abnormal, inspect CDI, pickup coil or magneto. Replace if necessary.

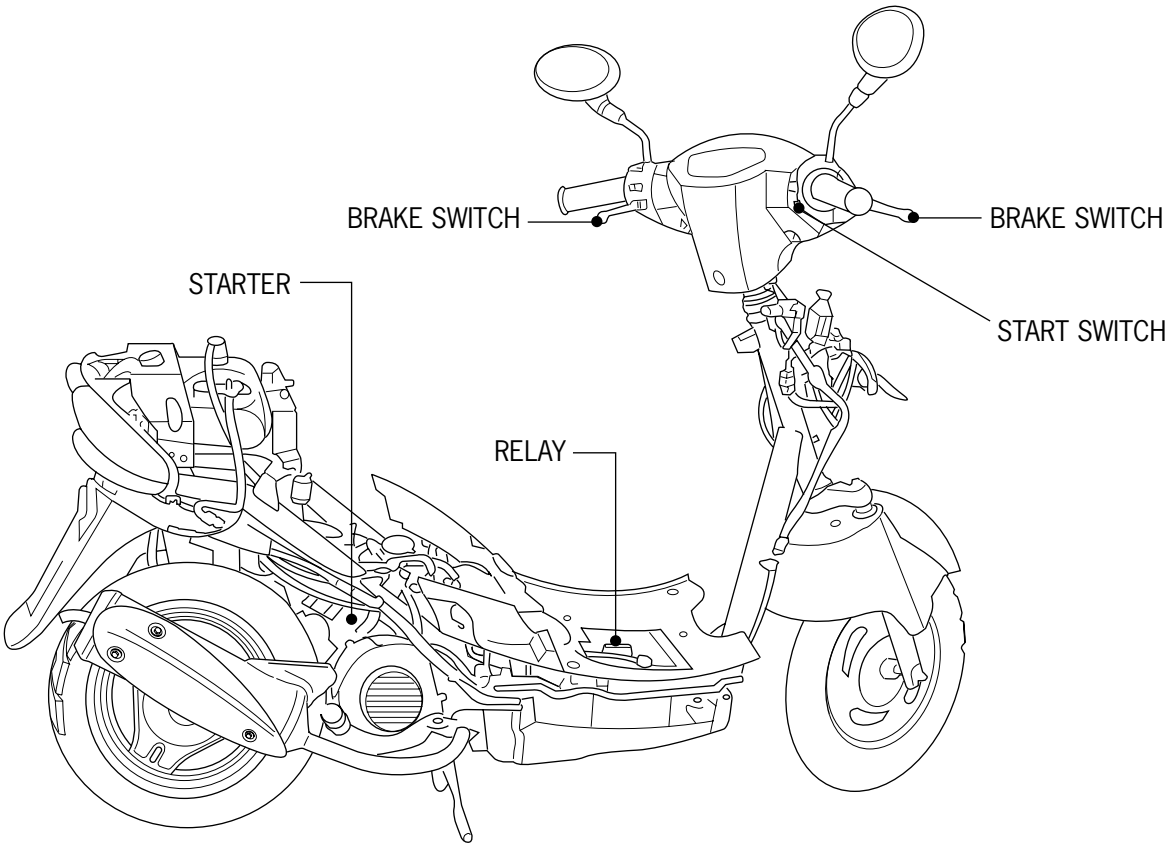
3. Remove timing lid.

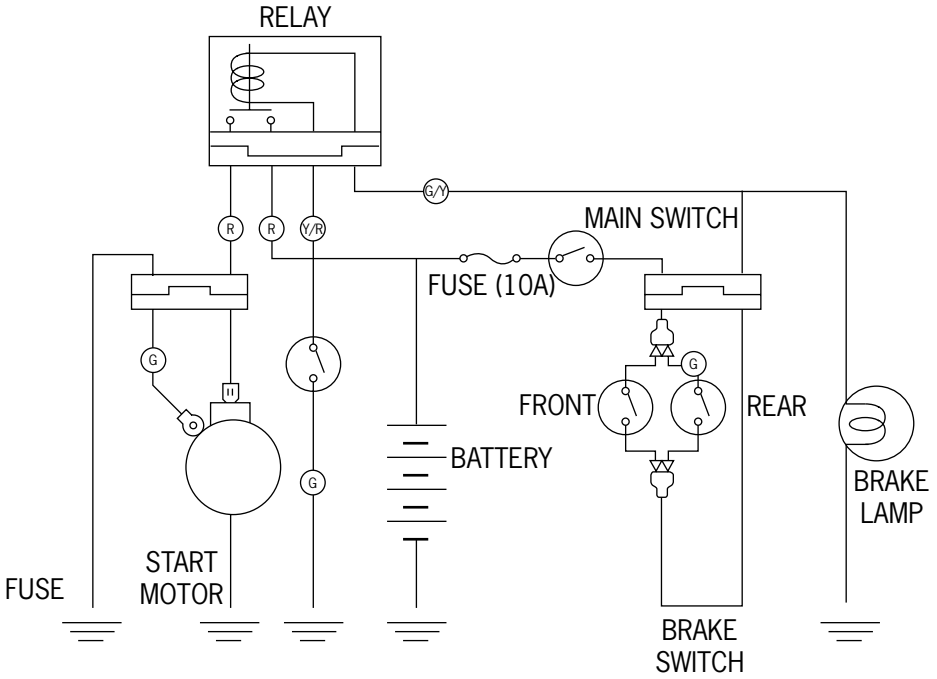
4. After the engine is warmed up, check the spark advance angle by the spark timing lamp. It is proper for “F” to align with + 2˚ with the engine revolving at a speed of 1700rpm.

The spark advance angle should be 13˚ + 1˚ (2000r/min).



16. Starter System





B RED Y/R YELLOW/RED G/Y GREEN/YELLOW G GREEN

16. Starter System

Topic	Page	Topic	Page
General Information	16-2	Starter Motor Inspection	16-6
Troubleshooting	16-2	Starter Motor Installation	16-6
Starter Motor Removal	16-3	Starter Pinion Removal	16-7
Starter Disassembly	16-3	Starter Pinion Inspection	16-7
Starter Inspection	16-3	Starter Pinion Installation	16-7
Inspecting the Starter Relay	16-5		

General Information

•The starter motor can be removed without disassembly of the engine.

Installation Reference Standard

Item	Standard valve	Wear Limit
Starter motor brush length	8.5 mm (.335 in.)	5 mm (.2 in.)

Fastener Torque Specification

Starter motor clutch cover bolt
1.2kg-m 8-9 ft lbs
Starter motor clutch jam nut
9.5kg-m 65-68ft lbs



Hex key



Open end wrenches

Troubleshooting

Starter Motor Does Not Turn
•Fuse broken
•Battery discharged
•Faulty main switch
•Faulty starter clutch
•Faulty brake switch

Starter Motor Turns Over Slowly
•Battery discharged
•Poor or faulty cable connections
•Starter motor gear seized by a foreign object

Starter Motor Turns – Engine Does Not Rotate
•Faulty starter clutch
•Starter motor reversal
•Battery discharged

16. Starter System

Starter Motor Removal

Never work on the starter motor until main switch is turned off and the battery ground wire is disconnected to ensure that the motor cannot turn.

1. Remove the starter motor lead clamp.

2. Remove the two bolts and remove the starter motor.

3. Roll up the water-proof rubber cover to disconnect the starter motor.

Starter Disassembly

1. Remove the two case bolts and remove the motor housing from the internal parts.

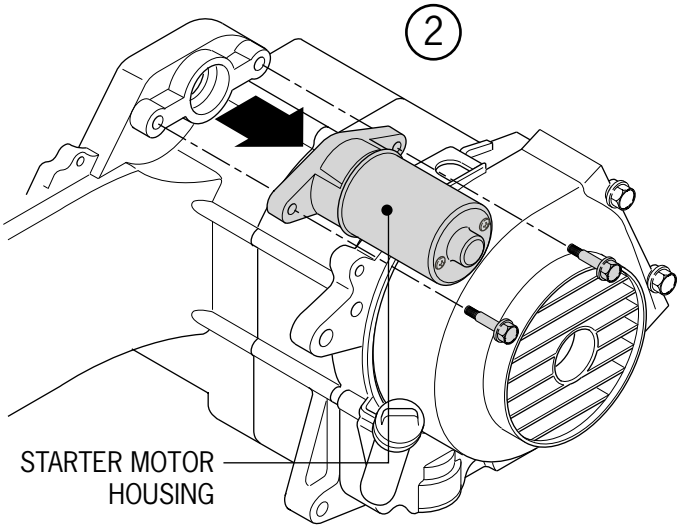
Starter Inspection

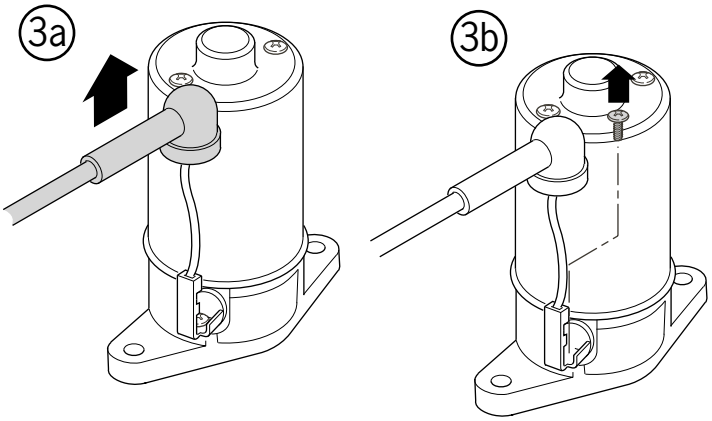
2. Inspect brushes and commutator for wear, damage or discoloration. Replace if necessary.

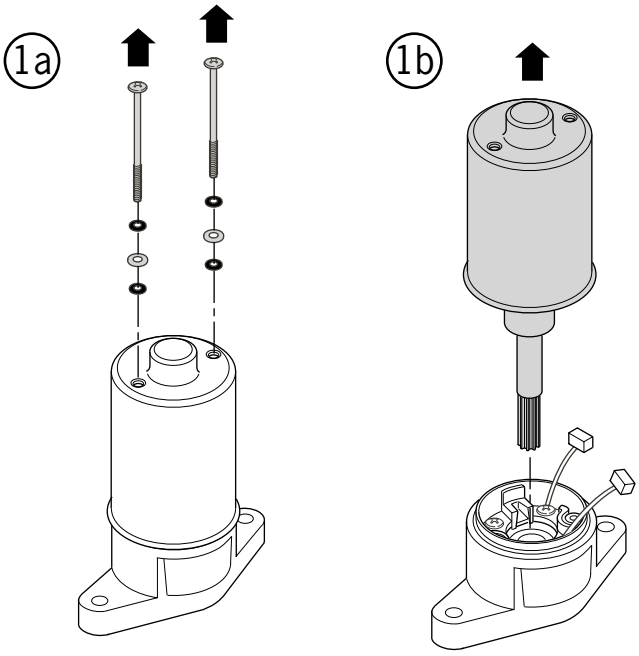
3. Clean attached metal particles from the commutator surfaces.

4. Measure the resistance between each contact surface of the components.

5. Make sure there is no conduction current between each commutator segment and the armature shaft.







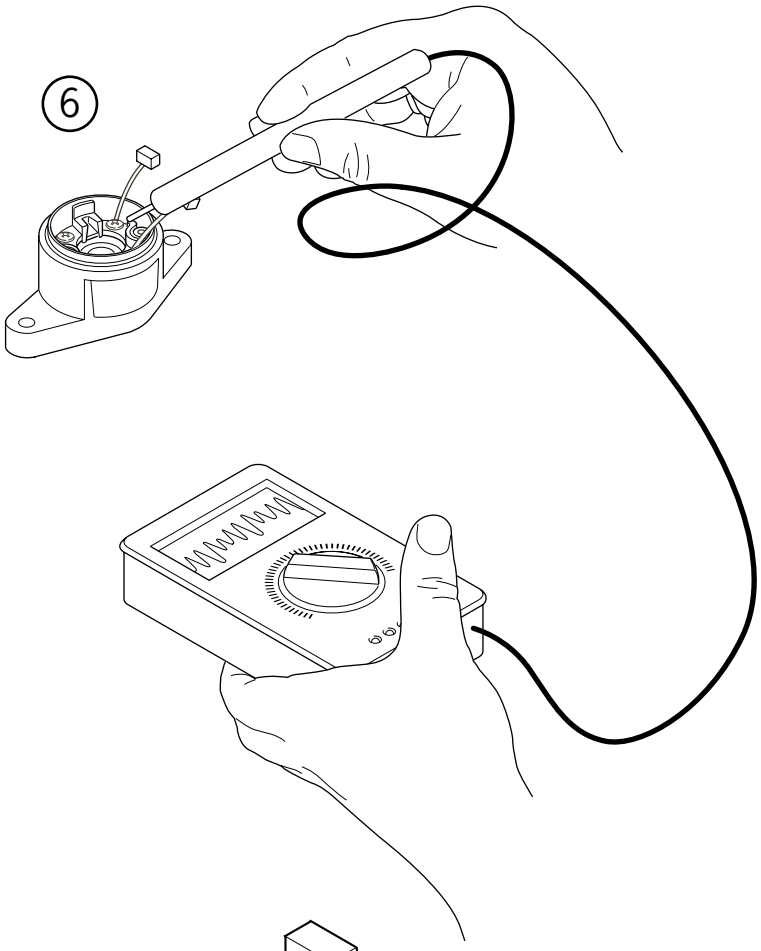
16. Starter System

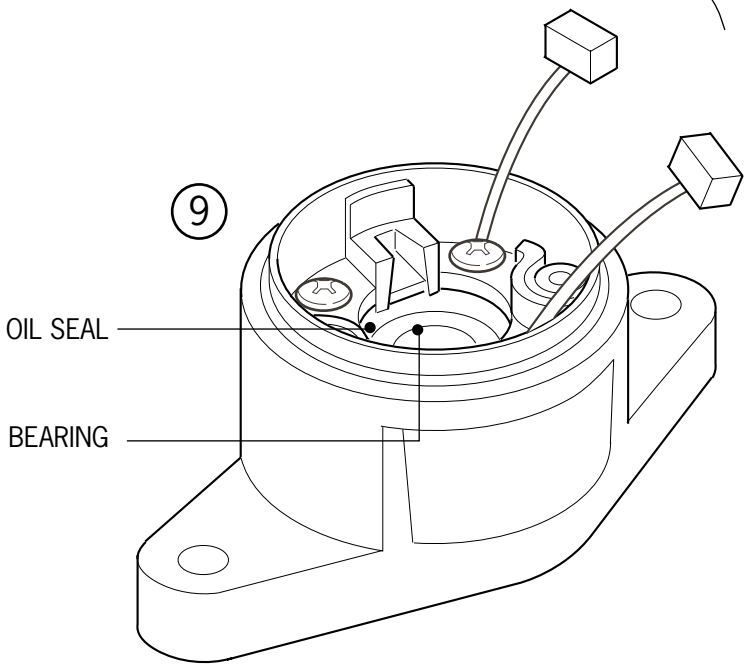
6. Check the starter motor housing conductivity. Be sure there is no conduction current between the cable terminal and the starter motor housing.

7. Check conductivity between the lead terminal and the brush. Replace them if necessary.

8. Measure the brush length. Its service limit is 5mm (.2 in.). Replace it if necessary. Check brush holder for conduction current. Replace if necessary.

9. Inspect bearing in front bracket for smooth rotation and for looseness when installed. Replace it if necessary. Inspect dust cover for wear or damage.





16. Starter System

10. Apply grease to the dust cover.

11. Install spring brush in its holder.

12. Apply a light film of grease to both ends of the sliding surfaces of the armature shaft.

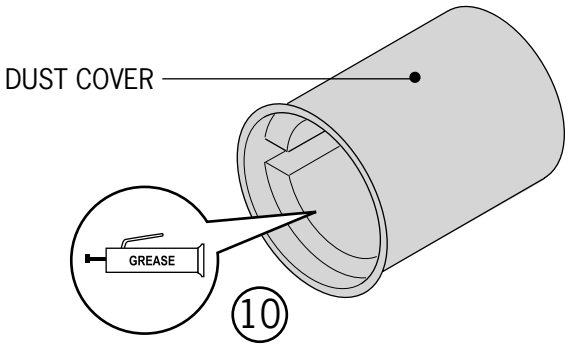
13. Install armature in front bracket.

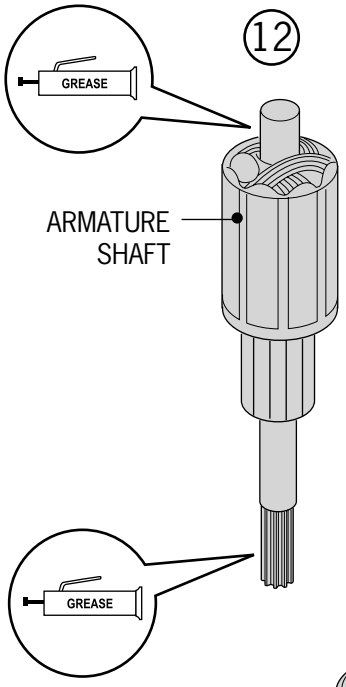
- Make sure the surfaces between the brush and the armature are not damaged.
- Be sure the dust cover lip is not damaged by the armature mount shaft.

14. Install a new o-ring in front bracket.

15. Engage motor housing with that of front bracket. Install two housing bolts.

- When engaging the housing with the front bracket, install the armature first, hold the armature shaft and then install the housing in case the armature is drawn out by the magnet.



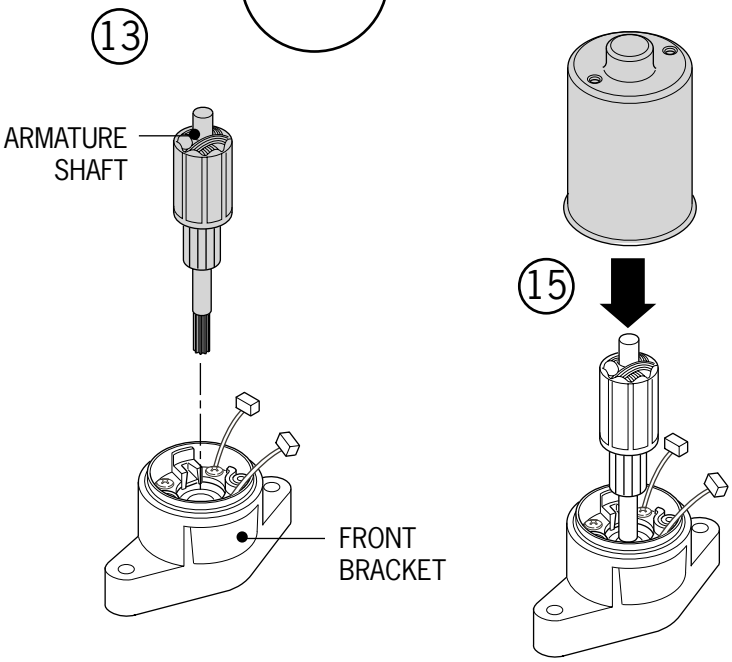


Starter Relay Inspection

1. Remove right side body panel.

2. With main switch in the “on” position, depress the starter button to check for a click, which indicates proper operation of relay. If starter button is depressed without a click, perform the following steps.

- Test starter relay voltage.
- Inspect starter relay ground return circuit.
- Inspect starter relay.



16. Starter System

3. To inspect starter relay voltage: Stand the scooter on is center stand, measure the voltage between the starter relay negative terminal (green/yellow cable) and the ground.

Turn the main switch to “on”, pull the brake levers and make sure the battery voltage is available at the relay (12 volts). If there is no battery voltage, inspect the brake switch electrical conductivity and wiring.

To inspect starter relay:

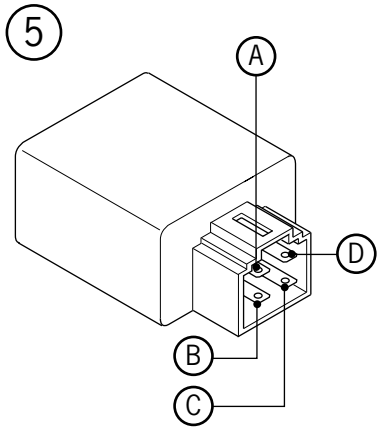
1. Remove the right side body panel.

2. Disconnect the starter relay unit coupler from the wire harness and remove it. Use ohm meter or continuity tester to check coil.

3. Connect the meter to terminals card D. This circuit should read closed. Use ohm meter or continuity tester C.

4. Check contactor.

5. Connect the meter to terminals A and B. This circuit should read open with terminals C and D disconnected and read closed with terminals C and D applied to 12 volt supply.

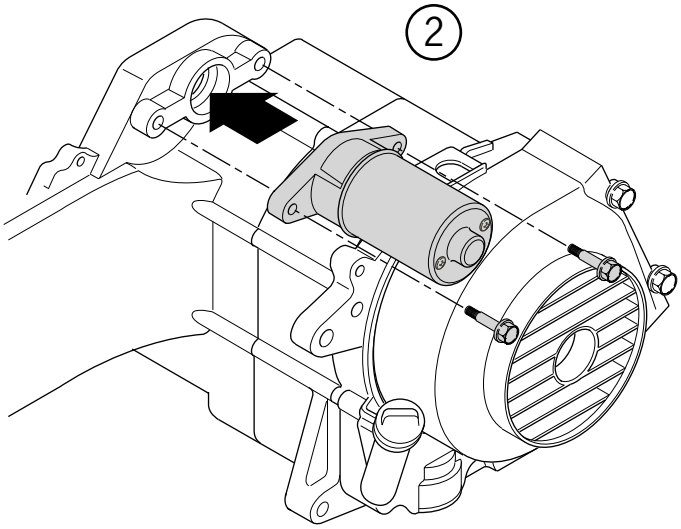


Starter Motor Installation

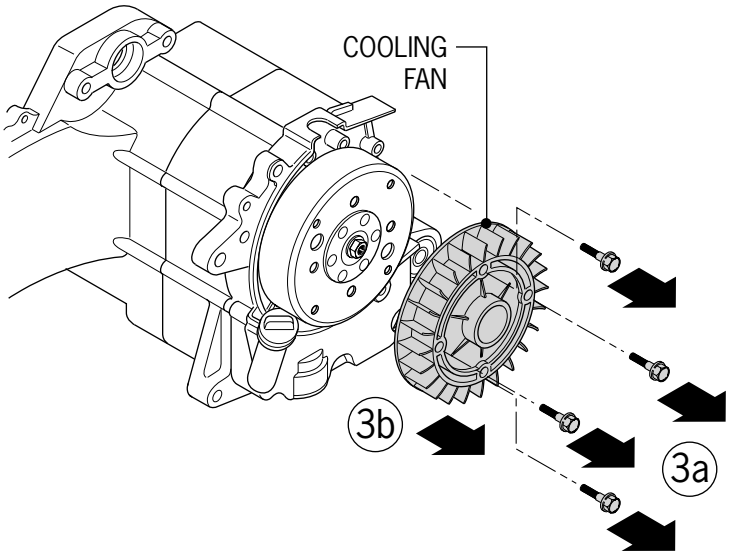
1. Apply grease to the starter motor o-ring and install the starter motor.

2. Install the two bolts.

3. Connect the starter motor terminals to the harness.



3. Remove the four bolts and remove the cooling fan.



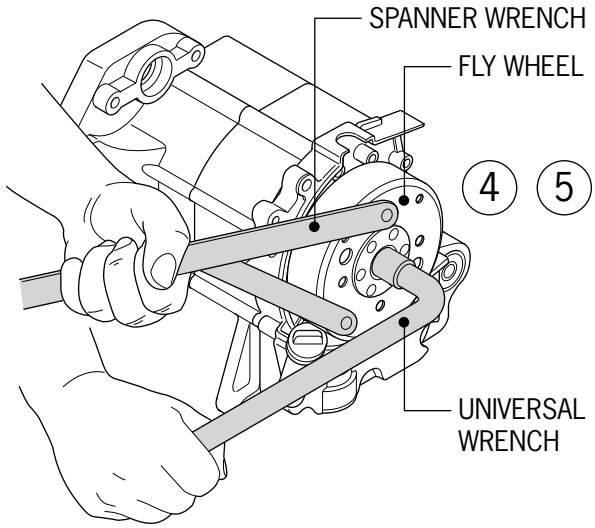
4. Use a universal solid wrench to secure the flywheel. Detach the fix nuts of the flywheel.

5. Use a spanner wrench hold flywheel while removing the retaining nut.

6. Use a flywheel puller to remove the flywheel.

7. Remove and save the key.

8. Detach the connecting wire of the magneto.



17. Meters, Switches and Lighting System

MEMO

17. Meters, Switches and Lighting System

Topic	Page	Topic	Page
Maintenance information	17-2	Replacing the Horn Switch	17-5
Troubleshooting	17-2	Main Switch Inspection	17-5
Fuel Sensor Removal	17-3	Replacing the Main Switch	17-5
Fuel Sensor Installation	17-3	Brake Light Switch Inspection	17-6
Fuel Sensor Testing	17-3	Horn Inspection	17-6
Fuel Gauge Inspection	17-3	Replacing the Horn Switch	17-6
Handlebar switch	17-2	Speedometer Removal and Reinstallation	17-6
Light Switch Inspection	17-4	Headlight Removal and Installation	17-7
Starter Switch Inspection	17-4	Bulb Replacement and Installation	17-7
Dimmer Switch Inspection	17-4	Taillight, brake light, rear position light or license light	17-7
Turn Light Switch Inspection	17-4		
Engine Stop Switch Inspection	17-4		
Horn Switch	17-5		

Maintenance

Operating Points

•Always be sure that colors match when wires are connected, that wires are installed in harness tube or supported by insulating tape after connection and that connectors match wire color in assembly.

•Make sure connectors fit properly to assure connection.

•Be sure to always test switch operation after installation.

Troubleshooting

If the brake light or turn light fails to come on with the ignition switch "ON," it may be caused by:

•Bad bulb
•Faulty switch
•Lead broken
•Fuse blown
•Battery discharged
•Faulty wire matching
•Bad flasher

If the fuel indicator fails to come on:

•Lead disconnected
•Wire broken
•Improper float operation
•Faulty fuel sensor
•Bad meter

If light is dim:

•Faulty magneto lighting coil
•Excessive voltage at matching wire or switch
•Faulty rectifier regulator

If the dimmer switch does not operate properly:

•Bad bulb
•Faulty switch

If fuel indicator pointer moves unsteadily:

Loose lead connection
•Faulty fuel sensor
•Faulty meter

17. Meters, Switches and Lighting System

Fuel Sensor Removal

Avoid sparks and flames when working on the fuel system.

1. Remove the middle luggage box.

2. Remove the right body panel.

3. Disconnect the fuel sensor from the wire harness.

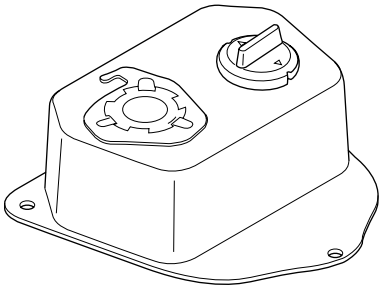
4. Remove the bolt of the fuel sensor.

Make sure not to damage the fuel sensor lead.

5. Remove the fuel sensor.

Be sure that the fuel sensor float is not damaged.

4



Fuel Sensor Installation

6. Reverse the removal procedure for installation.

7. Be sure to align the groove on the fuel sensor with the mark on the fuel tank.

8. The mark on the sensor should be aligned with that on the fuel tank.

Fuel Sensor Testing

1. Remove the fuel sensor.

2. Measure the resistance of each terminal with the float in each position.

Lead Terminal	Float Up	Float Down
Gree-Blue/White	7+/- 2 OHM	96+/- 2 OHM

Fuel Gauge Inspection

With the ignition switch “ON,” connect the lead. Turn on the turn signal to be sure the battery-return circuit is intact before performing the inspection. Check the gauge reading by changing the float position.

Float Position	Reading
Up	F
Down	E

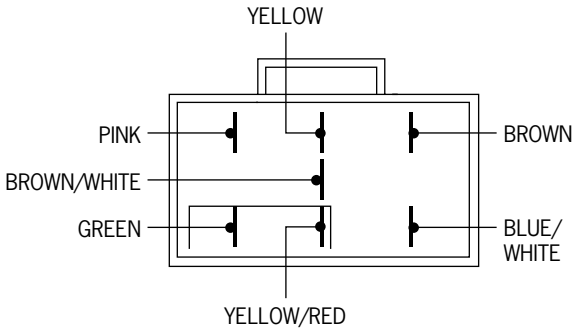
17. Meters, Switches and Lighting System

Handlebar Switches Inspection

1. Remove the speedometer cover.

2. Disconnect the handlebar connector and check each terminal for conduction.

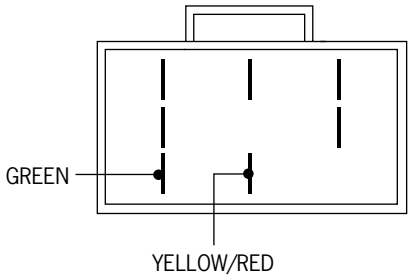
3. Inspect each switch if abnormal.



Lights Switch

Color	Blue/White	Yellow	Brown	Brown/White	Pink
Code	Bl/W	Y	Br	Br/W	P
●		○			○
≡0 0≡		○	○	○	
☼	○	○	○		

Set an Ohm meter at X1 OHM when using it.

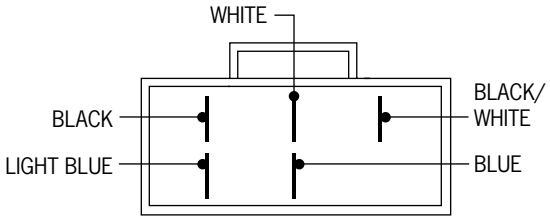


Starter Switch

Color	Yellow/Red	Green
Code	Y/R	G
Released		
Depressed	○	○

Dimmer Switch

Color	Blue/White	Blue	White
Code	Bl/W	Bl	W
≡0 Hi	○	○	
≡0 Lo	○		○

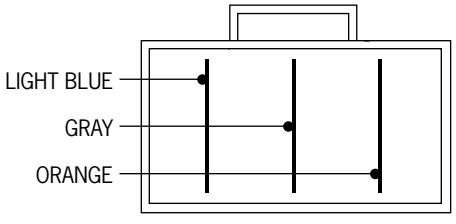


Turn Light Switch

Color	Blue/White	Blue	White
Code	Gr	LBl	O
R	○	○	
Off			
L	○		○

Engine Stop Switch

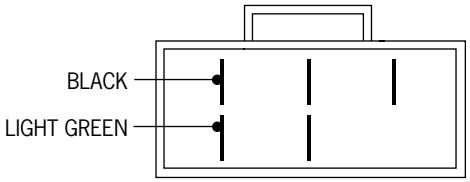
	Black 1	Black 2
Run		
Stop	○	○



17. Meters, Switches and Lighting System

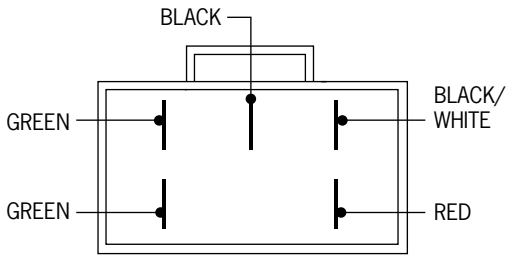
Hom Switch

Color	Light Green	BLACK
Code	LG	B
Released		
Depressed	○——○	



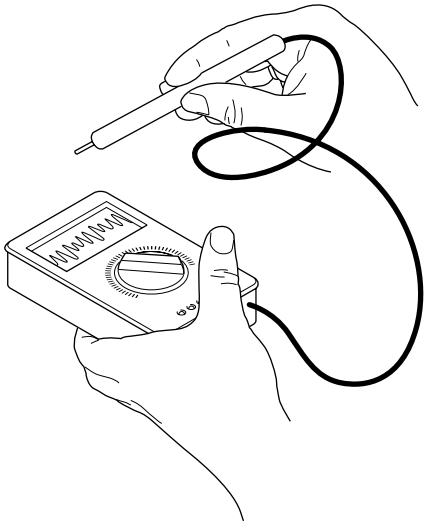
Replacing the horn switch:

1. Remove the front panel.
2. Remove the handlebar cover.
3. Disconnect the wire connector.
4. Remove switch from housing.
5. Reverse the removal procedure for installation.



Main Switch Inspection

1. Remove the front panel.
2. Disconnect the main switch wire connector to check the connection at each terminal.



Main Switch

Color	Red	Black	Black/White	Green
Code	R	B	B/W	G
On	○——○			
Off			○——○	

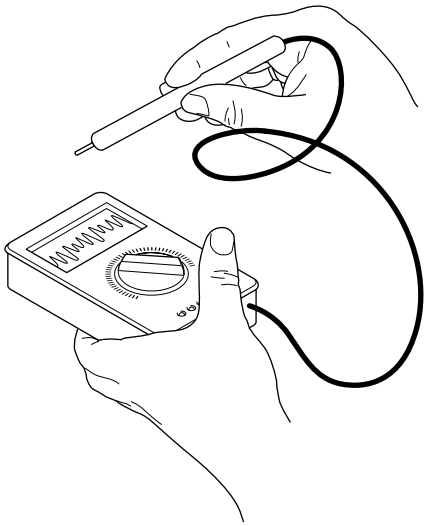
Replacing the main switch:

1. Remove the front panel.
2. Disconnect the main switch wire connector.
3. Remove the two mounting bolts and remove the main switch.
4. Reverse the removal procedure for installation.

17. Meters, Switches and Lighting System

Brake Light Switch Inspection

1. Remove the speedometer cover.
2. Disconnect the front brake switch lead.
3. Operate the front brake lever to check the switch for proper operation.
4. Disconnect the rear brake switch wire connector.
5. Operate the rear brake lever to check for proper operation.
6. The above tests can be conducted with a continuity tester or ohm meter.



Horn Inspection

1. Remove the front panel.
2. Disconnect the horn wire connector and connect the terminal to a battery (12V).
3. The horn is good if it sounds properly.
4. Check operation of switch with ohm meter or continuity tester.

To replace the horn switch:

5. Disconnect the horn switch wire connector.
6. Remove the mounting bolt.
7. Remove the horn.
8. Reverse the procedure for installation.

Speedometer Removal and Reinstallation

1. Remove front and rear handlebar covers (refer to 12-2).
2. Disconnect all the wiring connectors.
3. Remove the three set screws and speedometer.
4. Reverse the removal procedure for installation.

17. Meters, Switches and Lighting System

Headlight Removal and Installation

1. Remove the speedometer cover (refer to 2-1).

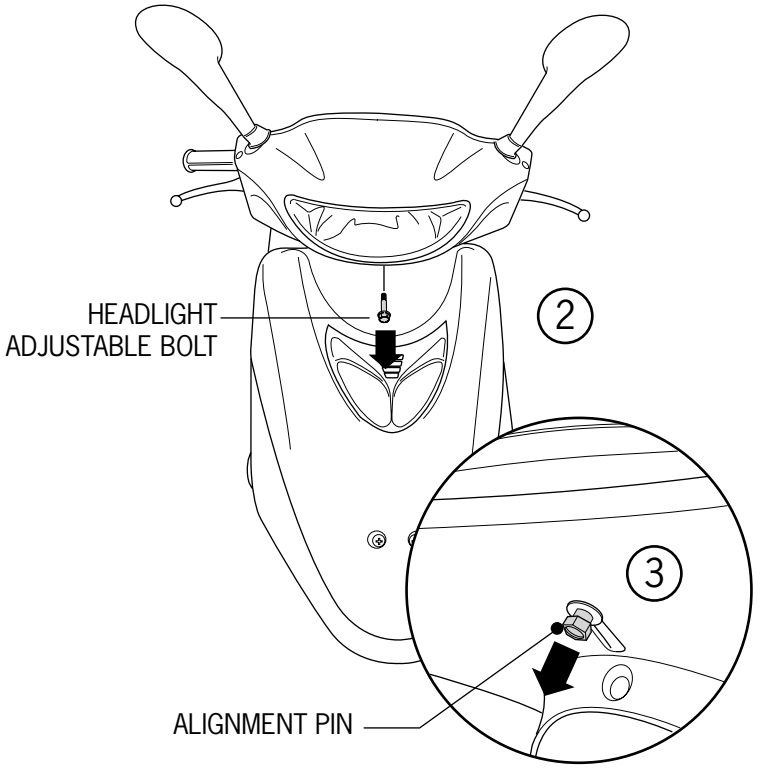
2. Remove the headlight adjustable bolt.

3. Remove the alignment pin and headlight.

4. Reverse the removal procedure for installation.

Be sure to align the headlight tab with groove in odometer cover.

The headlight beam should be adjusted after installation (3-12).



UNDERSIDE OF COVER

Bulb Replacement and Installation

1. Remove the speedometer cover.

2. Remove the headlight or front marker light bulb for replacement.

3. Reverse the procedure for installation.

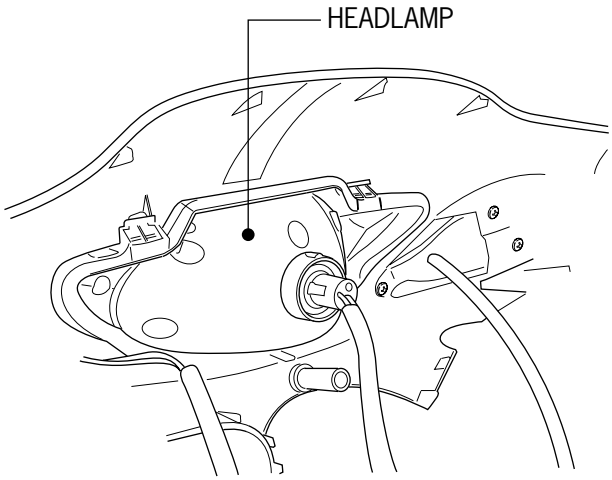
Taillight, brake light, rear position light or license light

1. Remove the two screws in the rear panel.

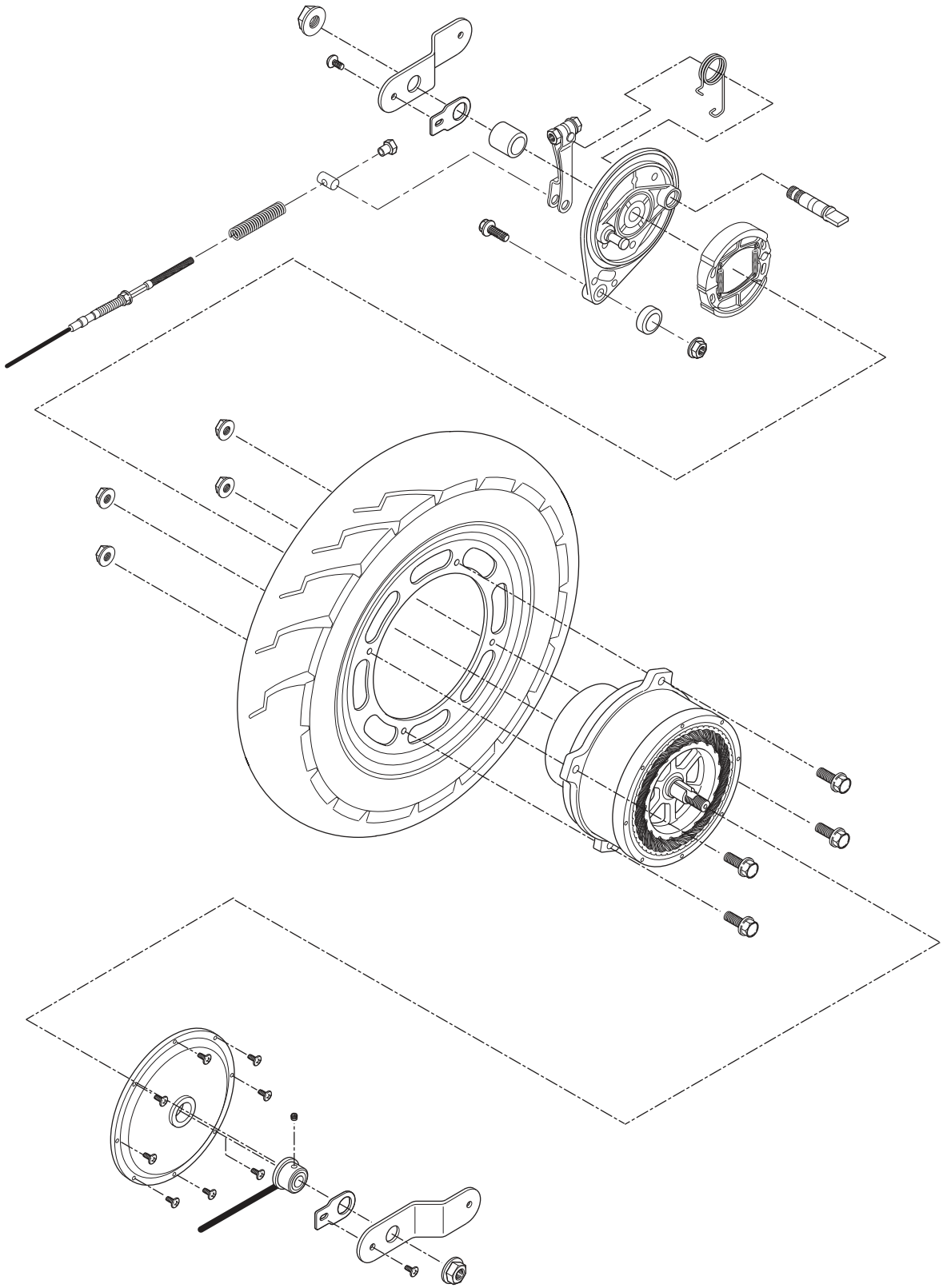
2. Remove the rear panel, two set screws in rear light cover and light cover.

3. Remove the light bulb for replacement.

4. Reverse the procedure for installation.



A. Electric Scooter Assembly



A. Electric Scooter Assembly

Topic	Page	Topic	Page
Important points	A-2	Rear Wheel Removal	A-5
Torque Settings	A-2	Electric Motor Removal	A-8
Scheduled Maintenance	A-3	Motor Dissasembly	A-10
Specifications	A-4	Motor Inspection	A-12
Troubleshooting	A-4	Battery Access and Power	A-13
Rear Wheel Dismantling	A-5	Recharging Batteries	A-16

Important Points

The electrolyte (diluted sulfuric acid) is very toxic. DO NOT allow acid to splash onto clothes, the skin or eyes to protect them from burning. Eye contact with acid may cause blindness. In case of contact with the acid, use a large amount of clean water to flush and rinse the areas in which the acid came into contact. See a Physician immediately. If the electrolyte acid gets into clothes, it will permeate to the skin. Remove tainted clothes immediately and then put them in water to rinse.

•The batteries can withstand numerous cycles of charging and discharging as long as it is not left in a discharged condition for a long period of time.

•If one of the batteries are overcharged, it can be detected by close inspection of the battery itself. If the battery is exposed to an extreme overcharged condition, it can break down and short circuit internally. In this condition, the battery will produce zero voltage under all load and charge conditions. An overcharged battery can “boil off” the electrolyte solution. This problem can be due to excessive time on a battery charger or a failed voltage regulator.

•If the scooter is left to sit for a long time or is stored, the battery will slowly discharge. It is advisable to recharge the battery before attempting to start the scooter after a period of storage.

•When filling a new battery with acid, allow it to sit and “breath” for fifteen minutes before installing it into the scooter or charging it. It is advisable to charge a new battery after filling with acid even though it may appear to have sufficient charge.

•When working on the scooter’s electrical system, make sure that the main switch is turned off and/or the battery is disconnected. Disconnecting and reconnecting of live circuits can cause high instantaneous currents that can damage the battery and cause injury.

•Any short-circuiting of the wiring can cause damage to the battery.

Torque

The nut of the rear wheel axle	*10.0kg•m*	*75ft lbs*
The top of the rear buffer	*4.5kg•m*	*30ft lbs*
The bottom bolt of the rear buffer	*3.0kg•m*	*20ft lbs*
The connection nut of the silencer	*1.2kg•m*	*10ft lbs*
The fix bolt of the silencer	*3.5kg•m*	*25ft lbs*

A. Electric Scooter Assembly

Scheduled Maintenance

Perform regular maintenance on the following parts as the chart indicates.

C = Clean
L = Lubricate
I = Inspect, check, fix, replace when necessary

Item \ Frequency	Mileage (km)						
	124 (200)	621 (1000)	1864 (3000)	3107 (5000)	4972 (8000)	6215 (10000)	7458 (12000)
Controller				C			C
Charger				I			I
Front/rear detent			I	I			I
Wheel bearing		I					I
Front/rear suspension				I			I
Front fork bearing				I			I
Tire				I			I
Major side kickstand				L		L	I
All other body parts		L		L		L	I
All screws & nuts	I	I	I	I	I		
Motor bearing				I		I	

If riding the vehicle in dusty or rainy areas, perform maintenance more frequently.

A. Electric Scooter Assembly

Specifications

No.	Description	Specifications	No.	Description	Specifications
1	Product Size	1700x760x1180mm	13	Speedchanging	Automatic
2	Tread	1180 mm	14	Motor type	Blushless motor
3	Minimum clearance from ground	110 mm	15	Rated power	750W
4	N. W	90 kg	16	Rated current	22A
5	Load weight	<80 kg	17	Rated voltage	48V
6	Maximum speed	>40 kg	18	Working efficiency	>72%
7	Mileage per charge	<40 kg	19	Battery	Sealed, free protective, lead-acid battery
8	Brake distance	<4.5 m	20	Battery capacity	12V 17Ahx4
9	Brake ways	M/M	21	Charger	American
10	Climbing ability	>8°	22	Tire	3.0-10-4PR
11	Max torque	20 N.M	23	Wheel Pressure (FR/RR)	175/225 (kpa)
12	Max noise	64dB(A)			

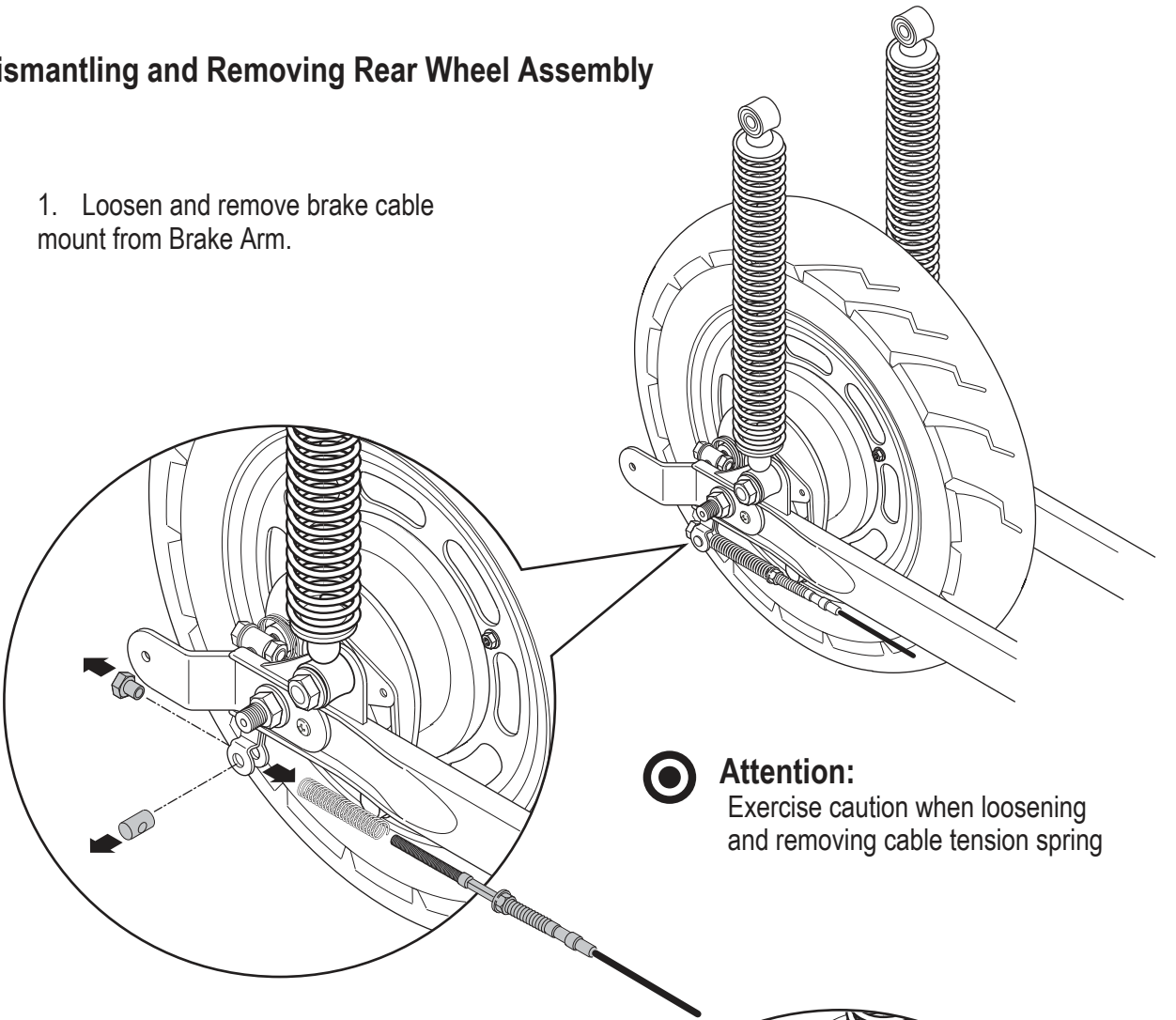
Troubleshooting

Problem	Cause	Solution
Scooter does not start.	No power	Charge or replace battery/batteries.
	Battery connection poor	Reconnect battery terminals.
Scooter runs weak.	Weak battery	Recharge or replace batteries.
Scooter starts but does not move.	Motor inoperative	Replace 750W motor.

A. Electric Scooter Assembly

Dismantling and Removing Rear Wheel Assembly

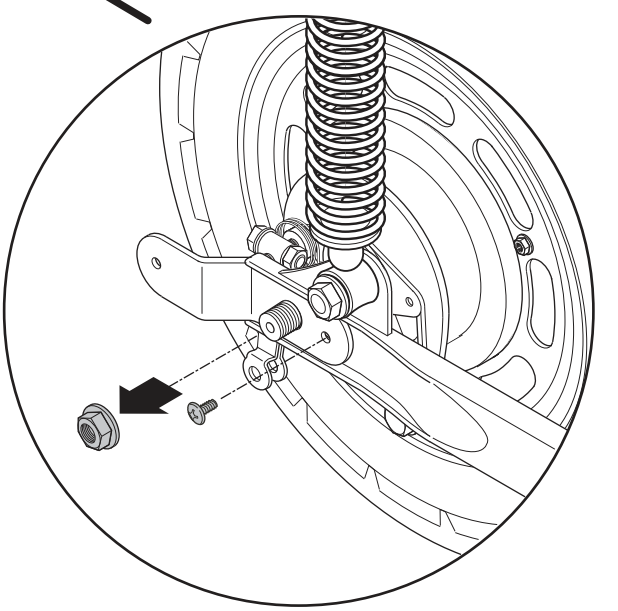
1. Loosen and remove brake cable mount from Brake Arm.



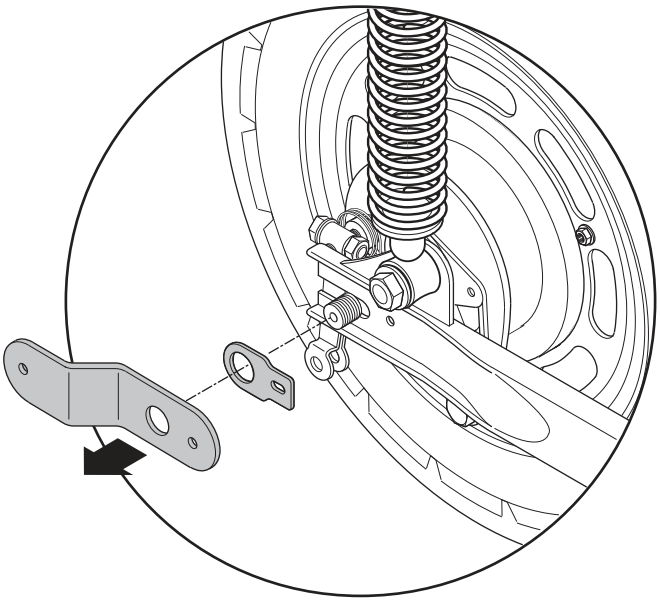
Attention:
Exercise caution when loosening and removing cable tension spring

2. Loosen and remove brake cable tension spring from Brake Arm.

3. Loosen and remove fasteners securing anti-rotational bracket onto frame and rear wheel axle.



A. Electric Scooter Assembly



Dismantling the Rear Brake

4. Remove the adjusting nut of the rear brake.

5. Remove the fix bolt of the brake arm.

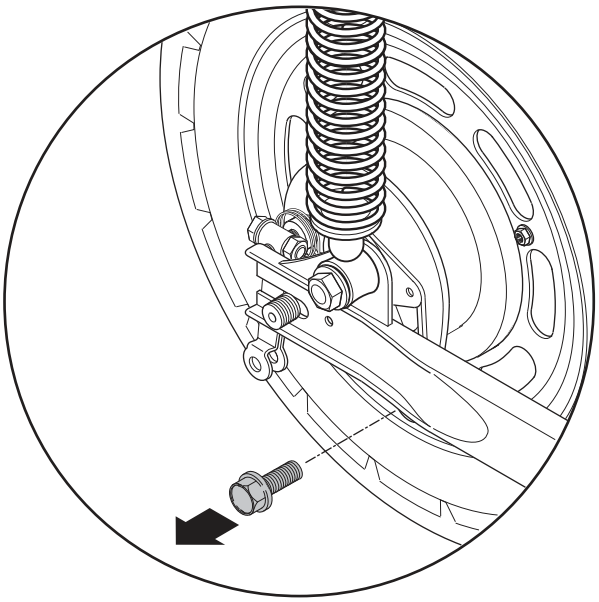
6. Remove the brake arm.

7. Remove the brake cam.

8. Remove anti-rotational brackets.

9. Remove smaller restraining bracket

10. Remove restraining bolt.



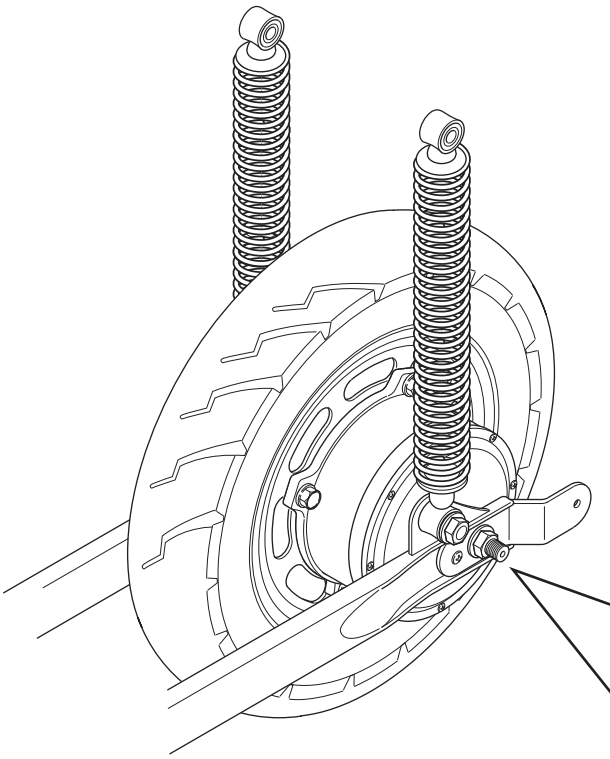
When Assembling the Rear Brake

A. Spread grease on the moving parts of the lining and of the fix pin (locating pin).

B. Spread grease on the moving part of the brake cam shaft and then assemble it.

C. Install the brake lining.

A. Electric Scooter Assembly

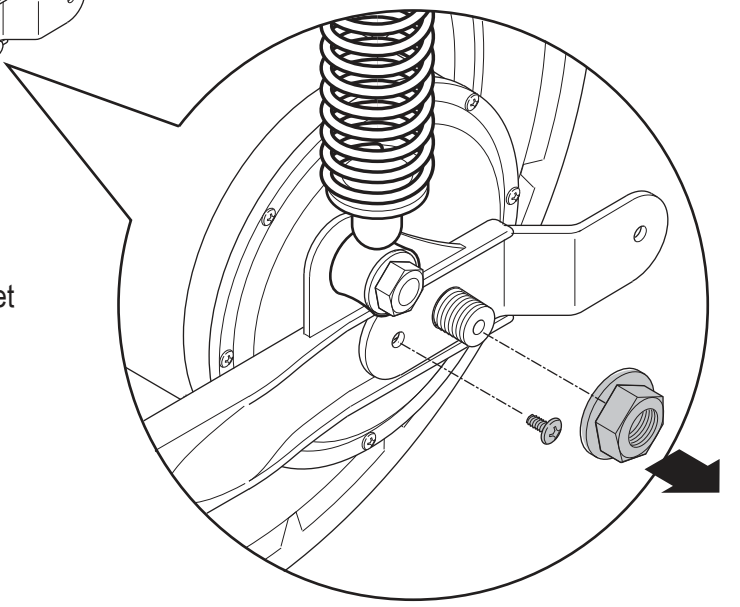


11. Assemble the wear indication board and the brake arm.

12. Assemble the brake arm and the brake cam.

Attention:
Point the “gullet” mark of the brake arm to the “dot” mark of the brake cam, and then assemble them.

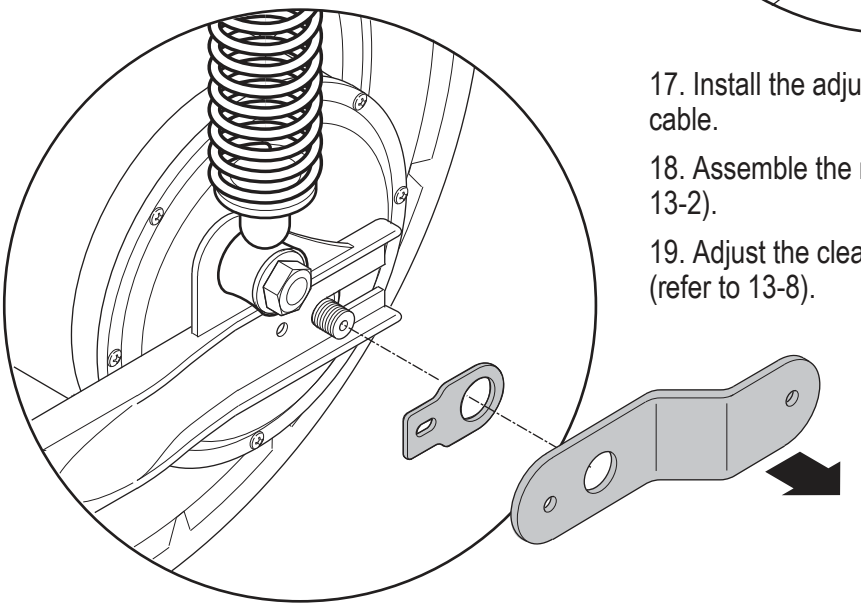
13. Install and tighten the bolt of the brake arm.



14. Install and tighten the fix bolt of the set arm.

15. Install the return spring of the brake arm.

16. Install the pin of the brake arm.



17. Install the adjusting nut of the brake cable.

18. Assemble the rear wheel (refer to 13-2).

19. Adjust the clearance of the brake lever (refer to 13-8).

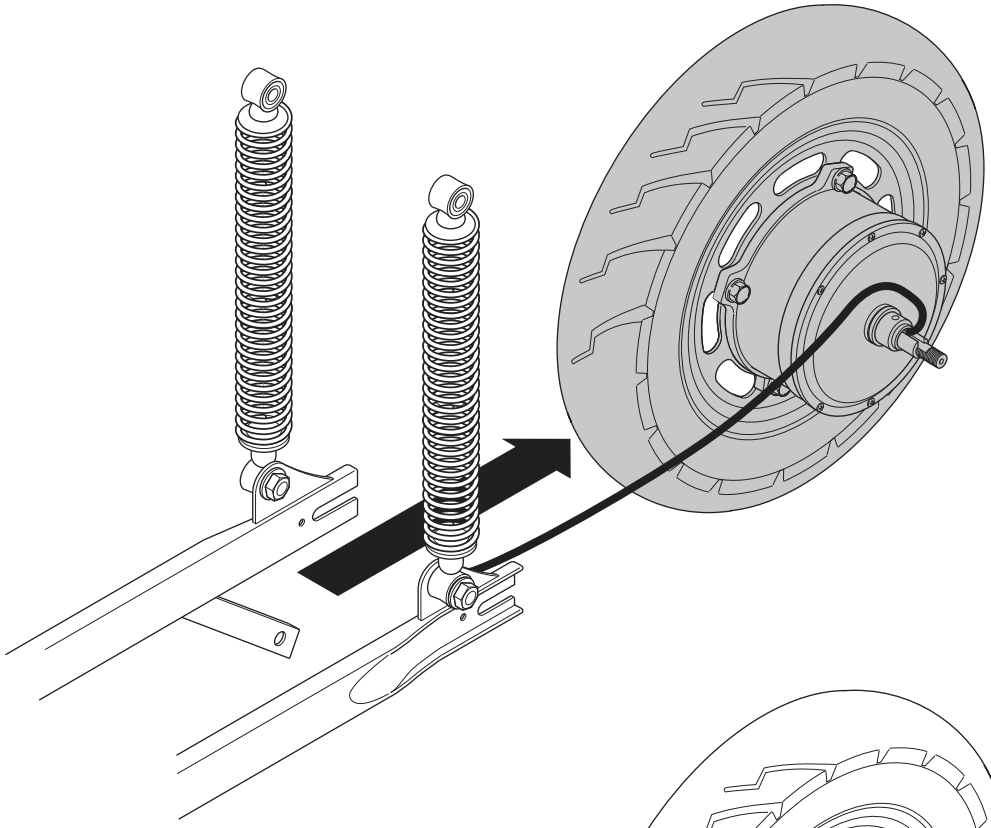
A. Electric Scooter Assembly

20. Slide rear wheel away from frame mounting slots.

21. Slowly remove rear wheel from cam.

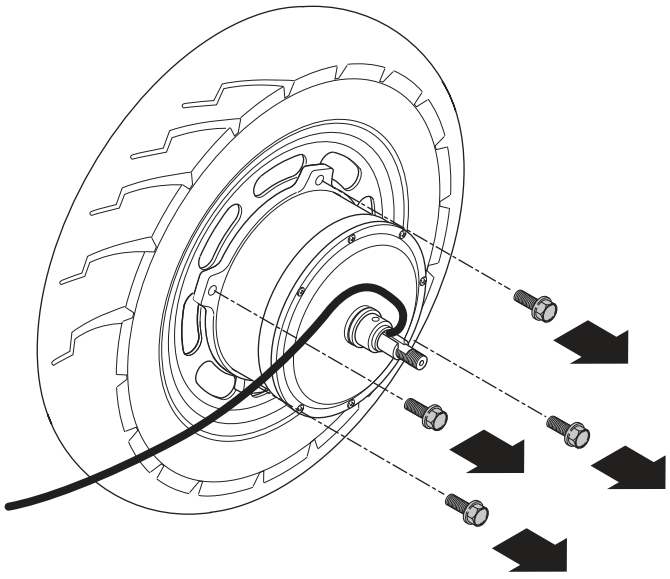
22.Carefully loosen all four mounting bolts securing electric motor to rear wheel.

Attention:
Give particular attention to the power cable, when removing rear wheel.



Electric Motor Removal

1. Loosen and remove four mounting bolts securing 750 watt motor to rear wheel.



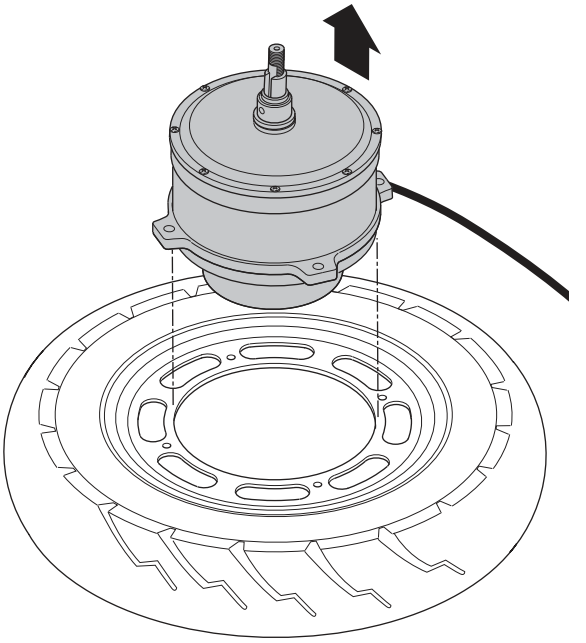
Attention:
The 750 watt electric motor is very heavy. Exercise caution while removing motor mounting bolts.

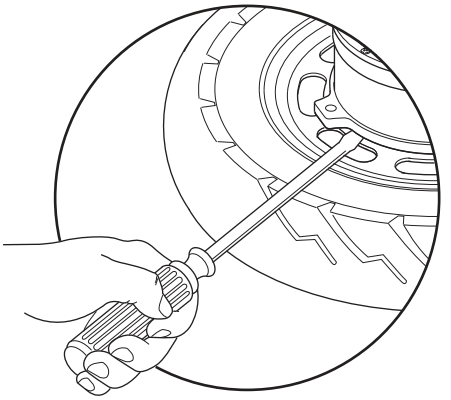
A. Electric Scooter Assembly

2. Carefully place rear wheel onto ground with electric motor facing upwards.

3. Using a flat-head screwdriver, cautiously pry the electric motor from the rear wheel rim.

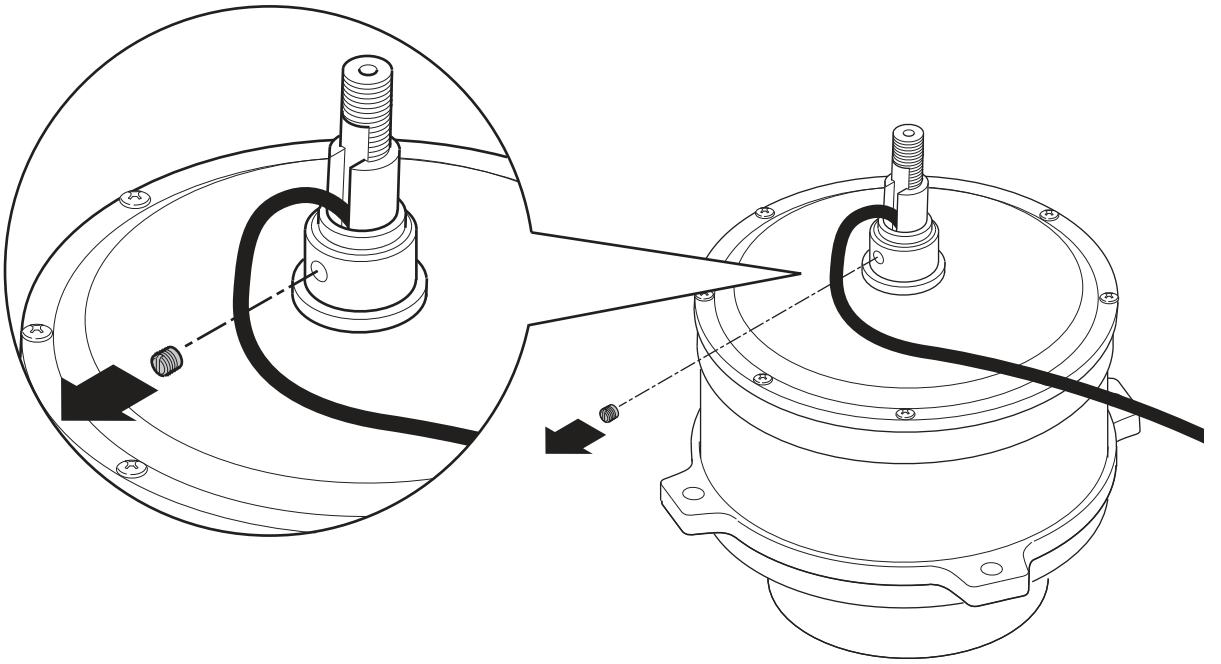
4. Lift and remove electric motor from wheel assembly.





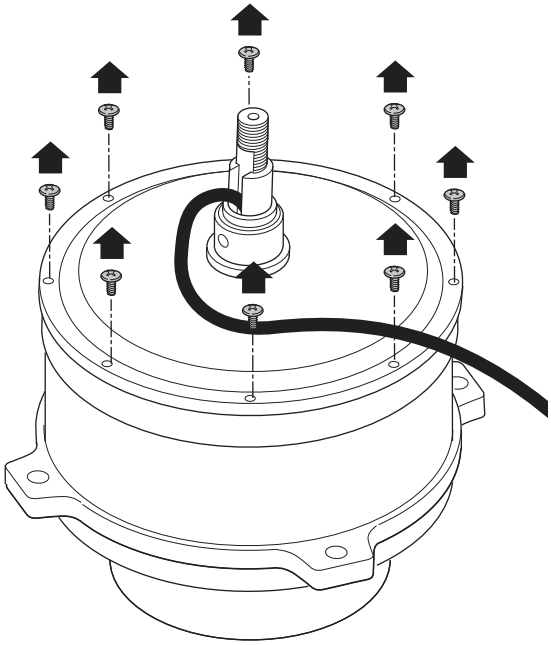
5. Loosen set screw securing collar to motor spindle.

6. Remove and place collar set screw in secure place for reuse.



A. Electric Scooter Assembly

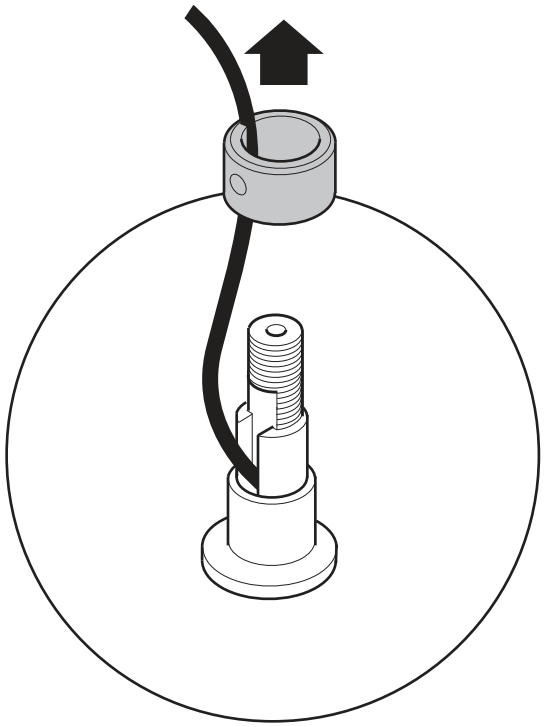
Motor Disassembly



1. Using the proper screwdriver or bit type and size, carefully loosen each screw that is securing the motor cover, .

2. Remove each screw and set aside for reuse.

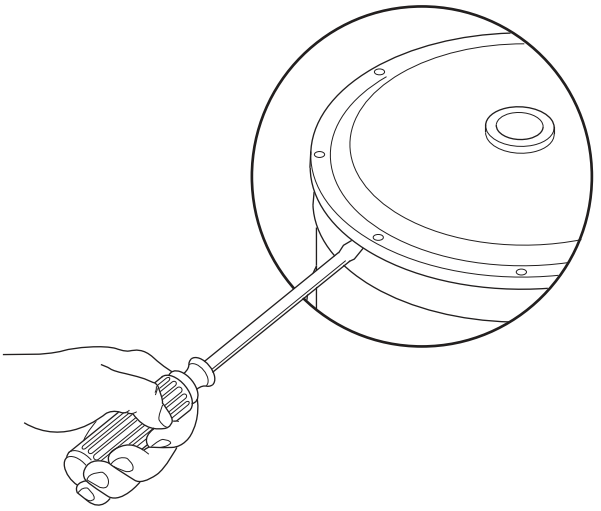
Attention:
Removing the screws in a diagonal pattern is recommended to avoid stripping and damaging the screws and the threads.



3. Gently lift and remove the collar from the motor spindle.

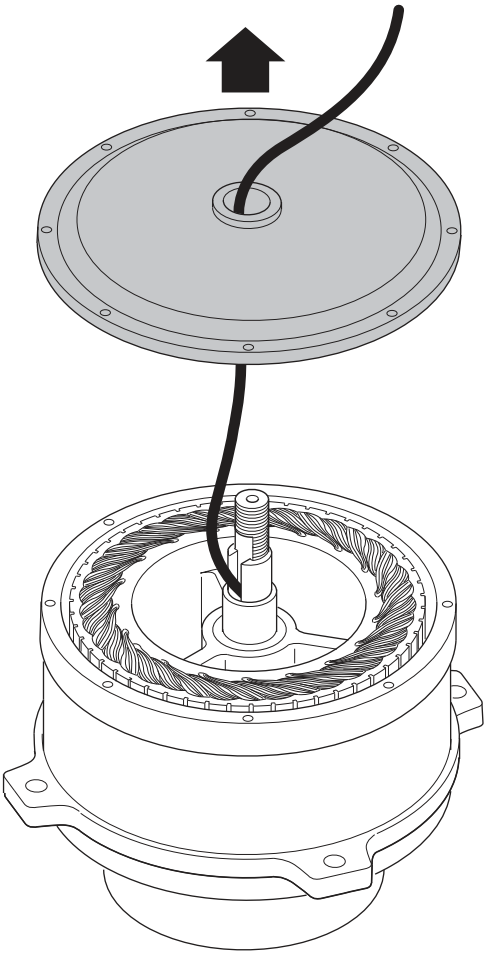
Attention:
Exercise caution with the power cable when removing set collar.

A. Electric Scooter Assembly



Attention:
Always exercise caution when using any tool to pry one surface from another.

4. Once again, using a flat-head screwdriver, carefully pry motor cover from the motor assembly.



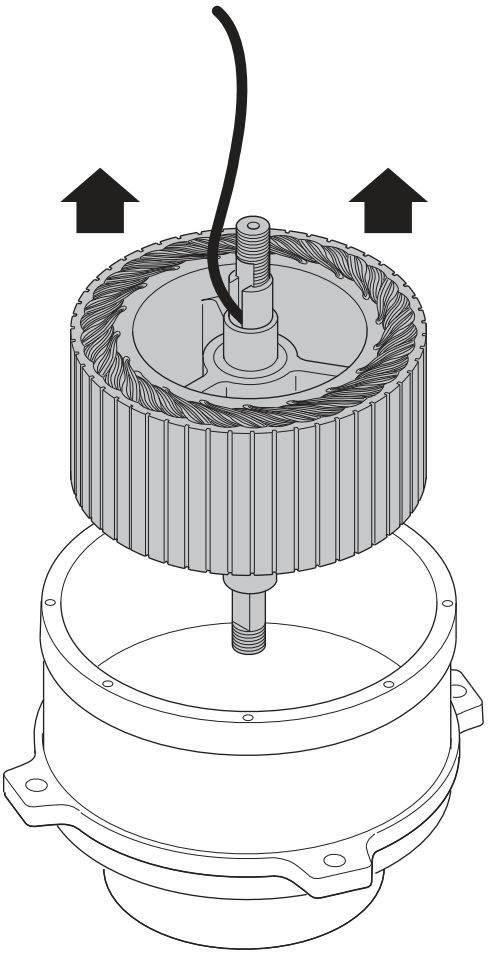
Attention:
Use very mild and steady force when prying, to avoid damaging motor housing and coils.

5.Gently lift and remove the motor cover from the motor assembly.

A. Electric Scooter Assembly

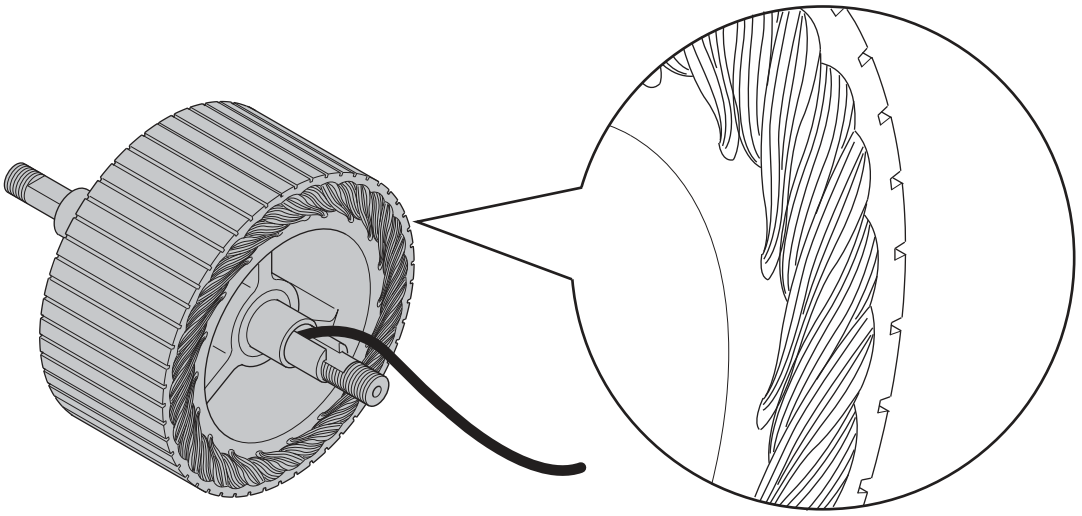
Motor Inspection

1. Carefully lift and remove motor coil sub-assembly from motor housing.



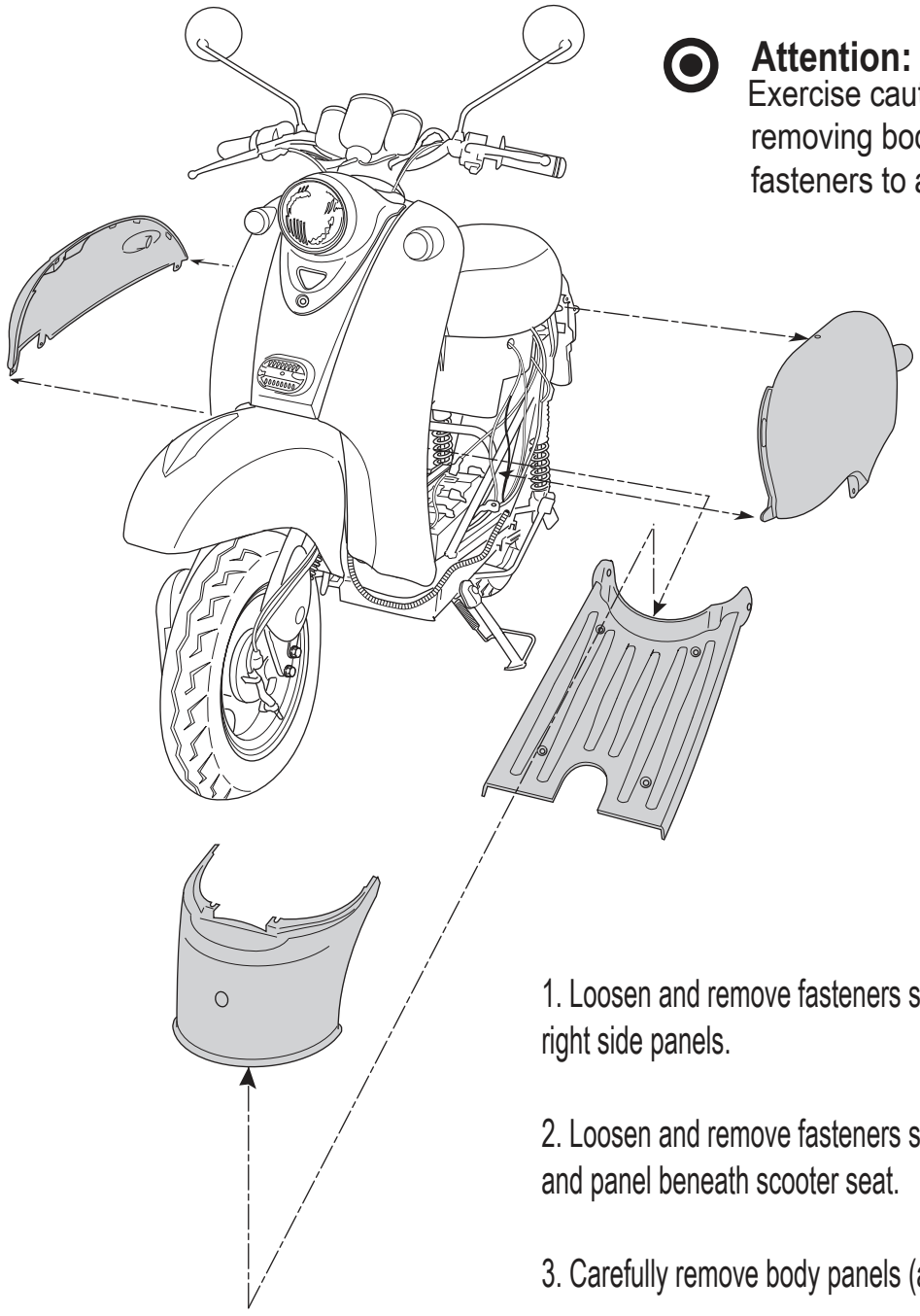
Attention:
Once again, exercise caution when removing motor sub-assembly to avoid damaging motor coils.

2. Thoroughly inspect coils and coil wires for damage.



A. Electric Scooter Assembly

Battery Access and Power



Attention:
Exercise caution when removing body panels and fasteners to avoid damage.

1. Loosen and remove fasteners securing left and right side panels.

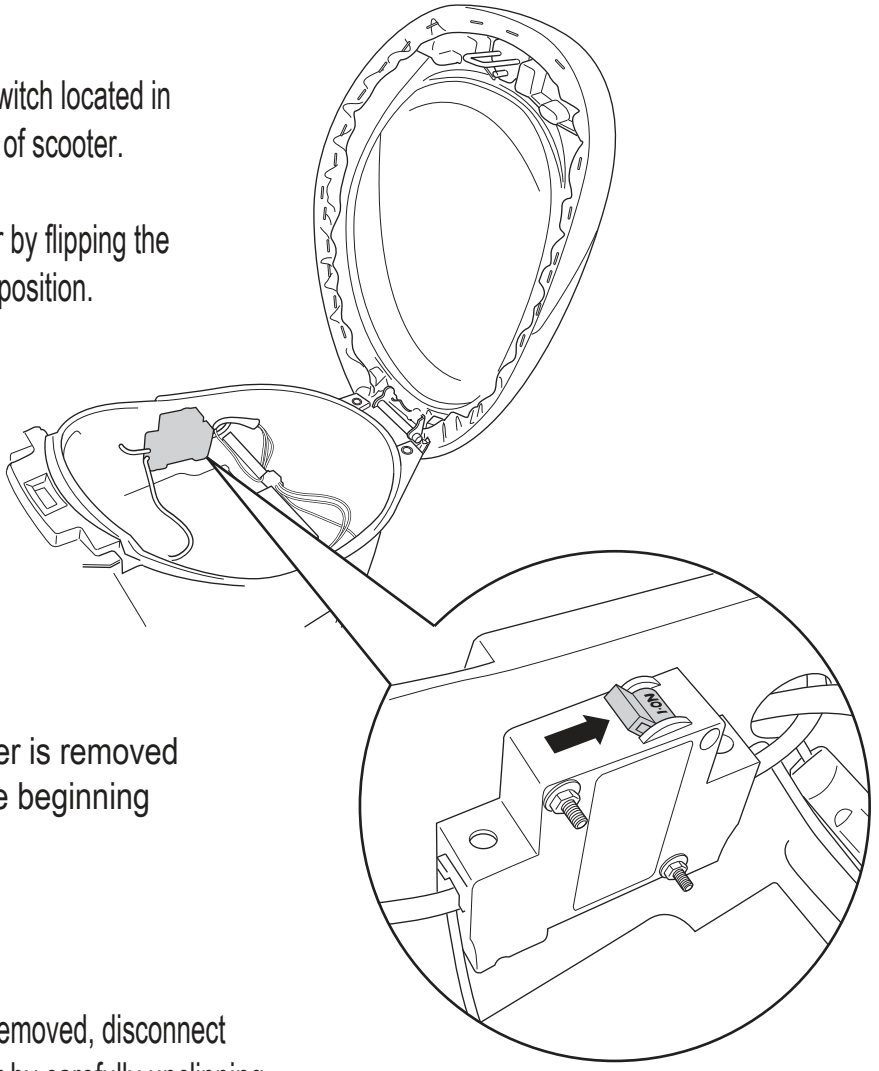
2. Loosen and remove fasteners securing floor panels and panel beneath scooter seat.

3. Carefully remove body panels (as shown).

A. Electric Scooter Assembly

4. Access battery power switch located in rear storage compartment of scooter.

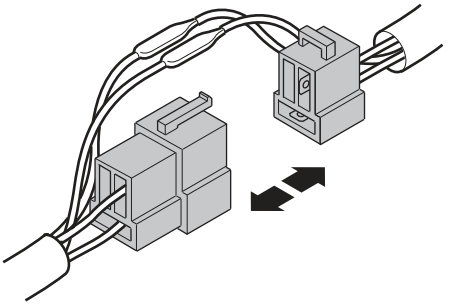
5. Remove power to motor by flipping the power switch to the ‘OFF’ position.



Attention:
Confirm that power is removed from motor before beginning work on vehicle

6. Once power has been removed, disconnect power connection to motor by carefully unclipping and seperating the wire connectors

Attention:
Be sure not to sperate the ground wire connections that are seperate for the connector.



A. Electric Scooter Assembly

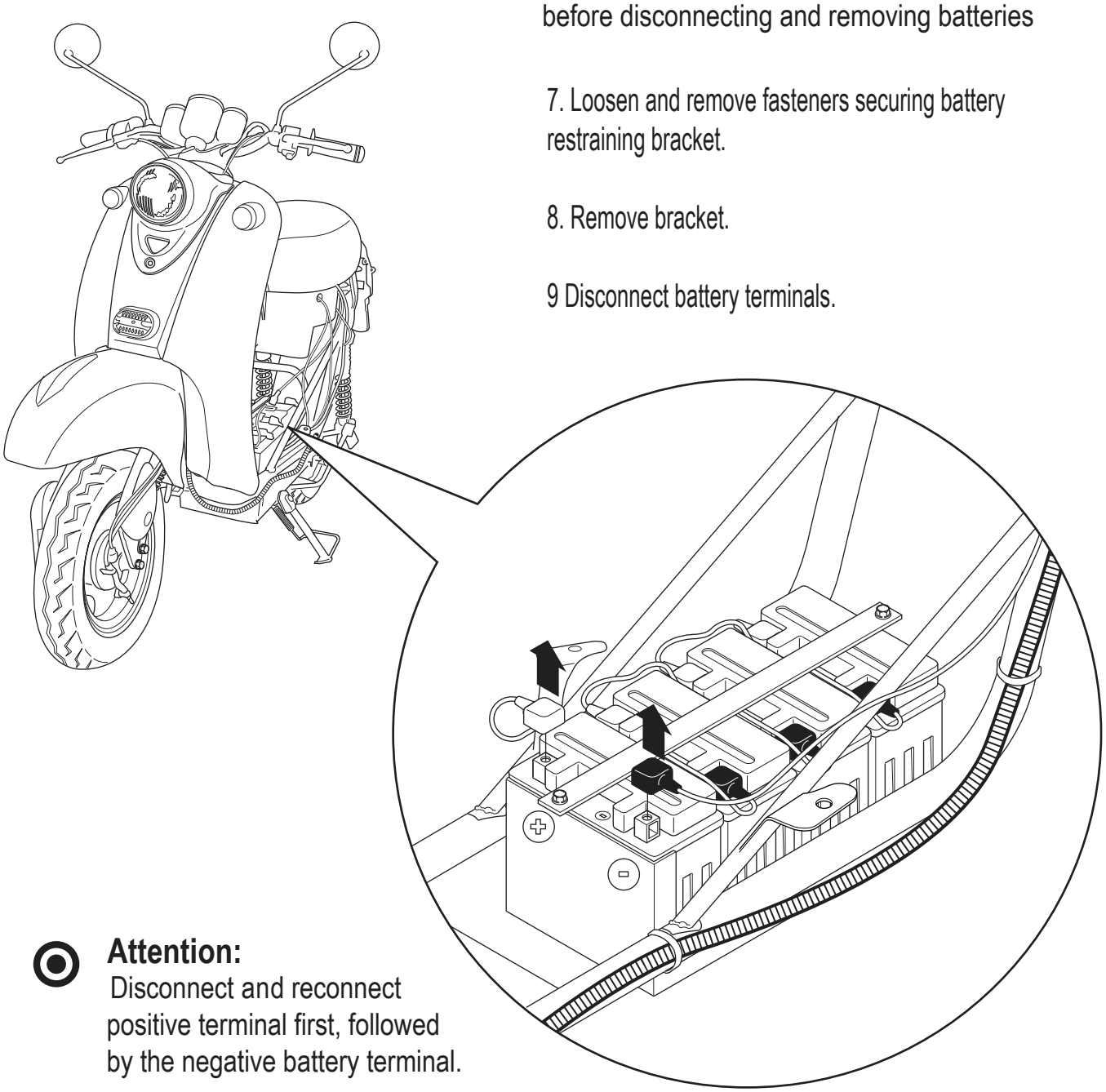
Battery Access and Removal

Attention:
Confirm that power is removed from motor before disconnecting and removing batteries

7. Loosen and remove fasteners securing battery restraining bracket.

8. Remove bracket.

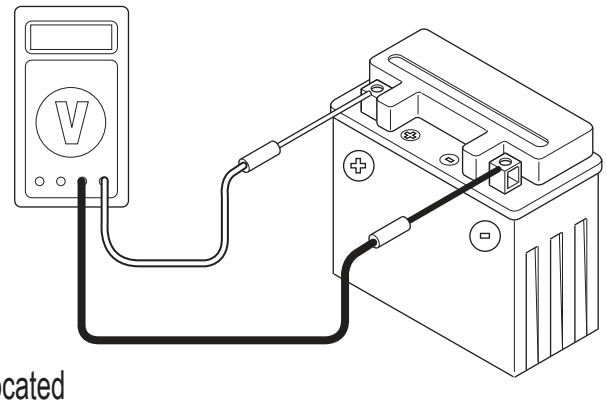
9 Disconnect battery terminals.



Attention:
Disconnect and reconnect positive terminal first, followed by the negative battery terminal.

A. Electric Scooter Assembly

10. Use a volt meter to check battery voltage (as shown).

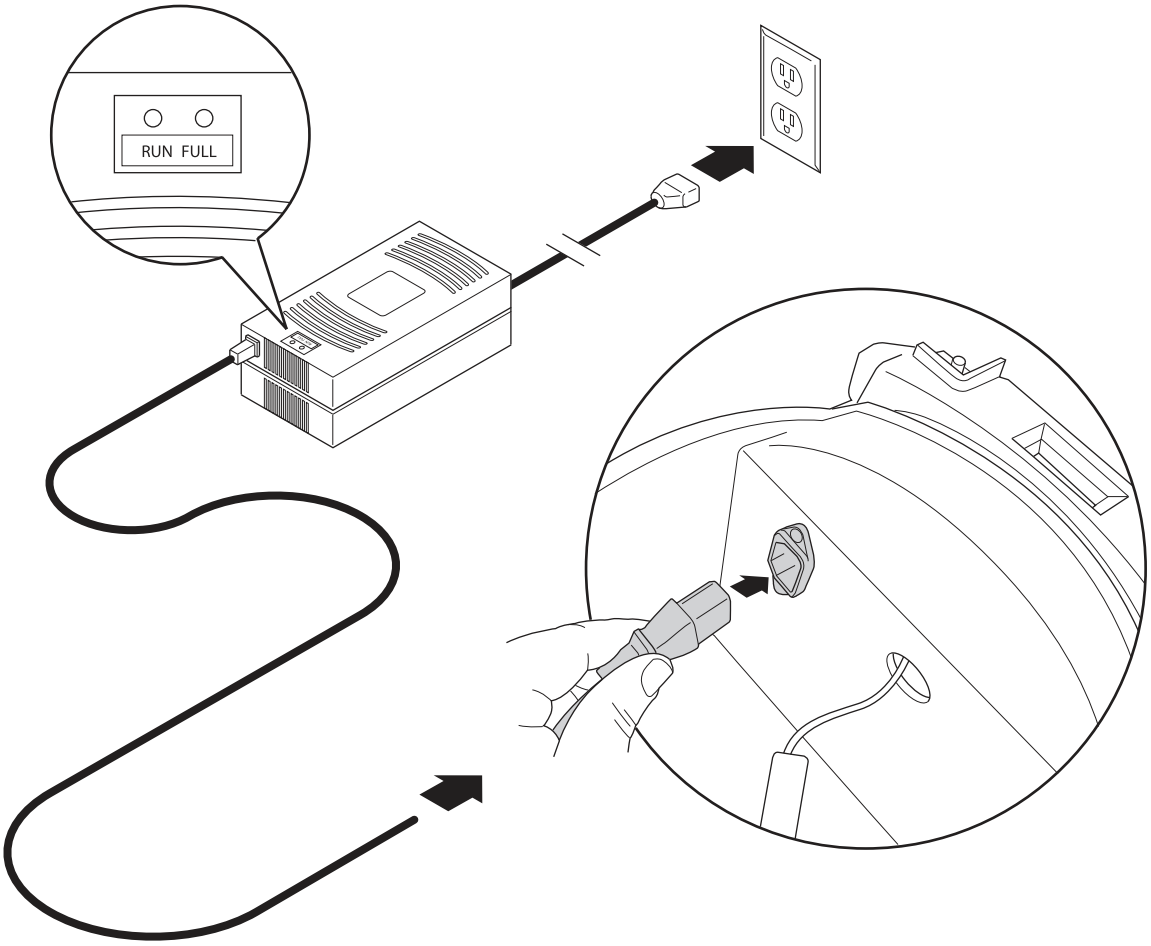


Recharging Batteries

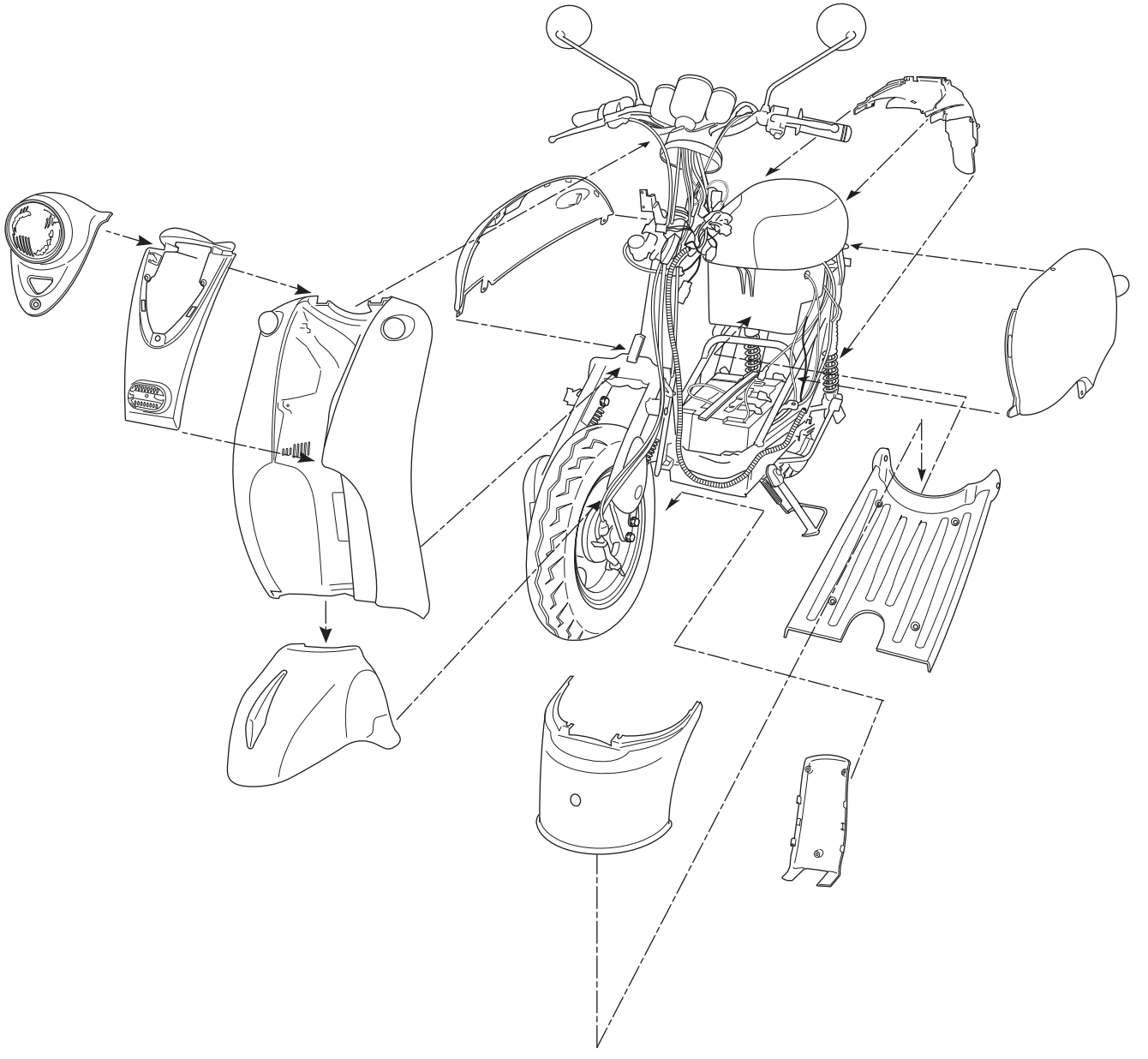
1. Access charging input recepticle, located inside scooter rear storage compartment.

2. Plug charger into charging recepticle as well as into wall outlet (standard AC).

3. Allow batteries to continue charging until indicator shows that batteries are fully charged.



B. Retro Model Scooter Panels



C. Scooter Panels

