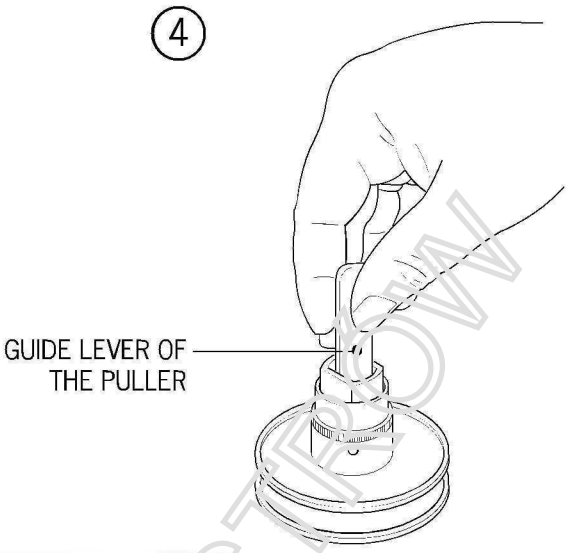
9. Driving Belt Device & The Starting Lever

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



The Clutch/Transmission Pulley Assembly

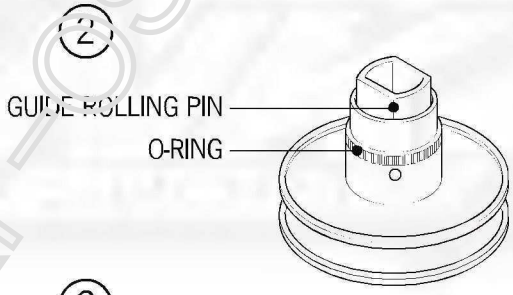
1. Assemble the transmission pulley guide pin and oil seal.

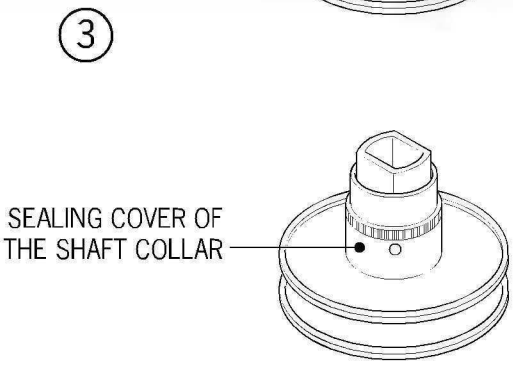
2. Install the sealing cover of the collar.

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





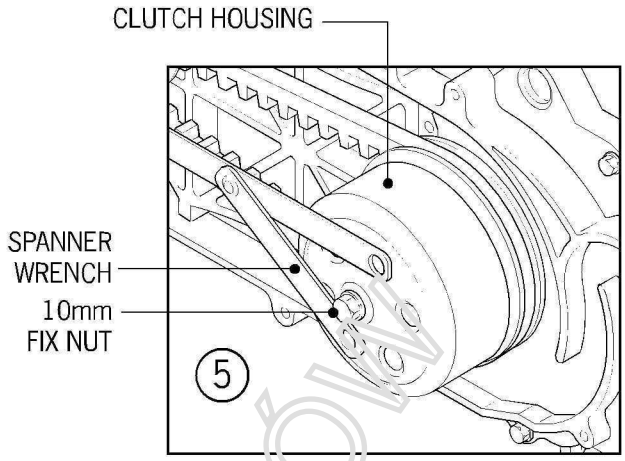
9. Driving Belt Device & The Starting Lever

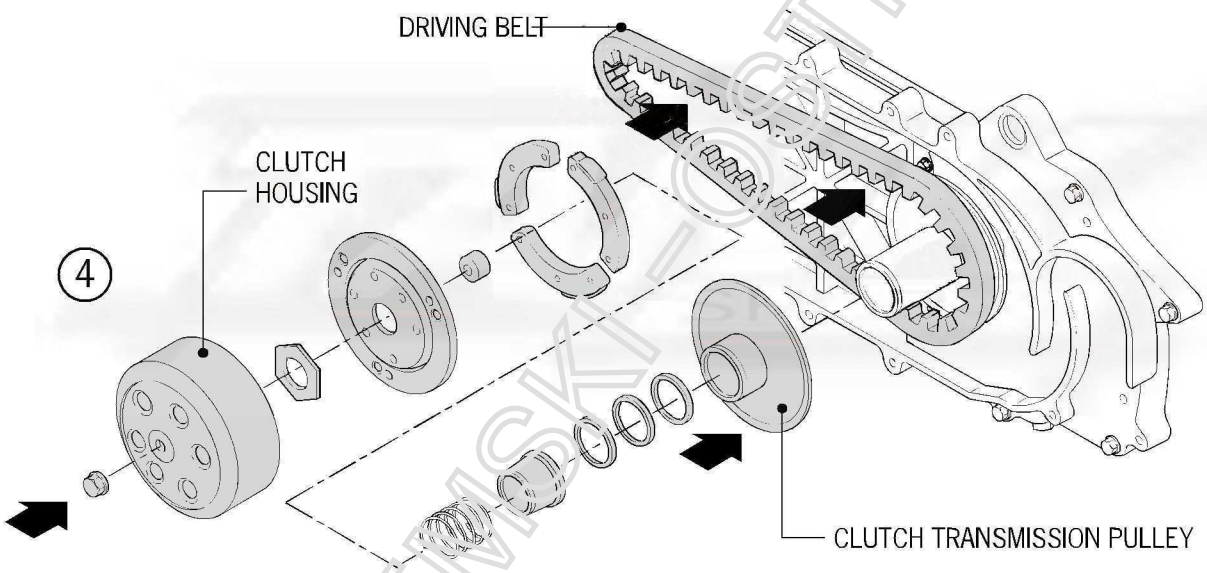
4. Assembling the clutch/transmission pulley, put the driving belt onto the clutch/transmission pulley, then onto the driving shaft.

Assembling the Clutch Housing

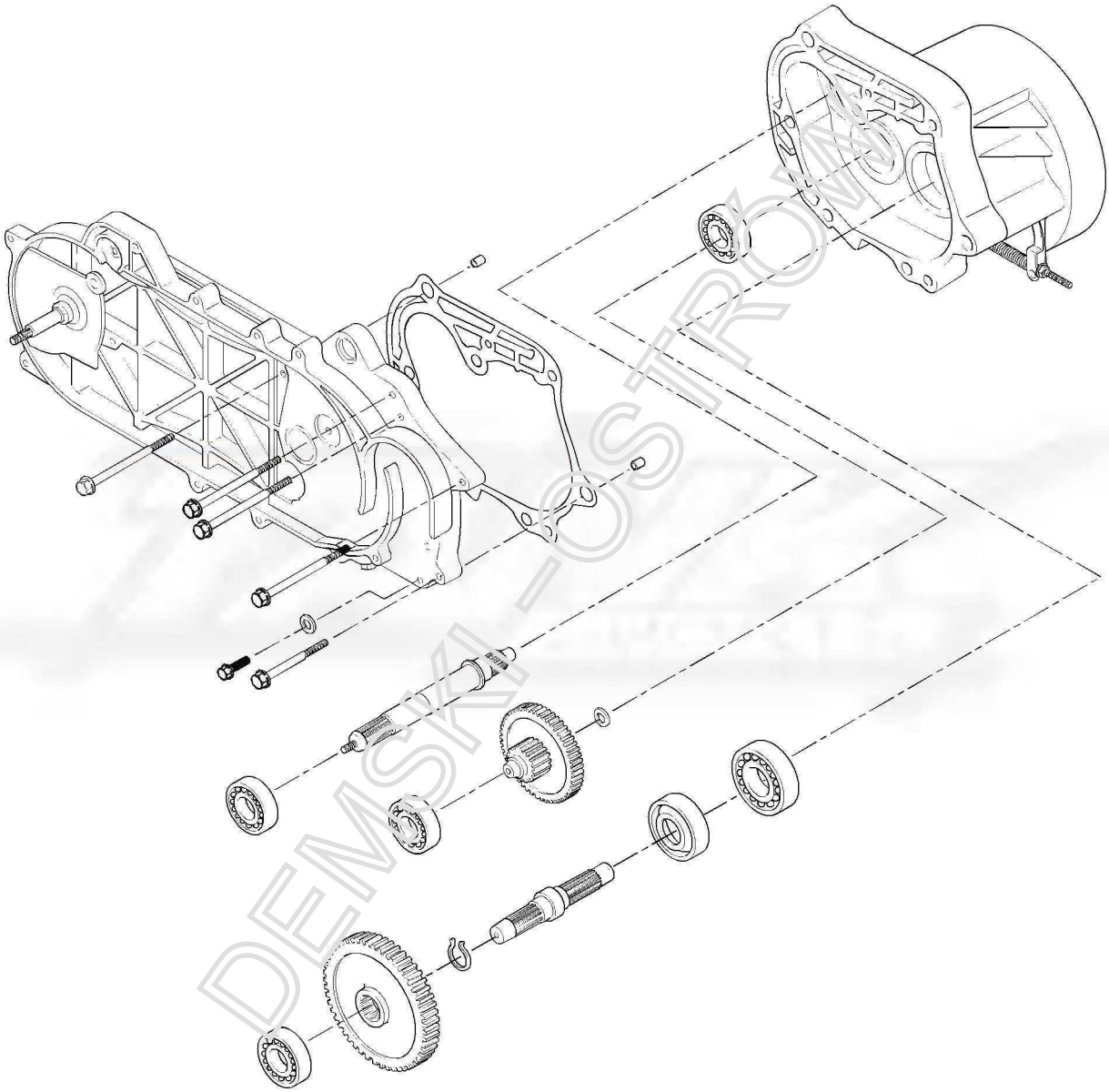
5. Use a spanner wrench to hold the housing, then install the 10mm (.39 in.) nut and tighten it.

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





10. The Final Transmission Assembly



10. The Final Transmission Assembly

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).

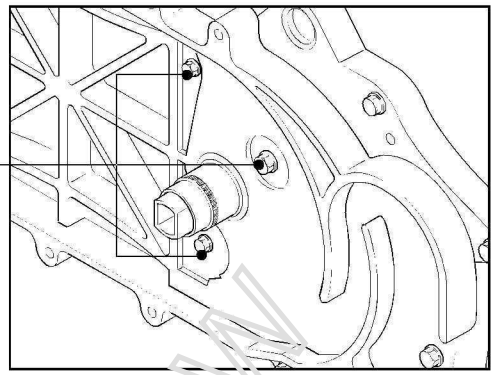
4. Remove the driven pulley of the clutch (refer to 9-5).

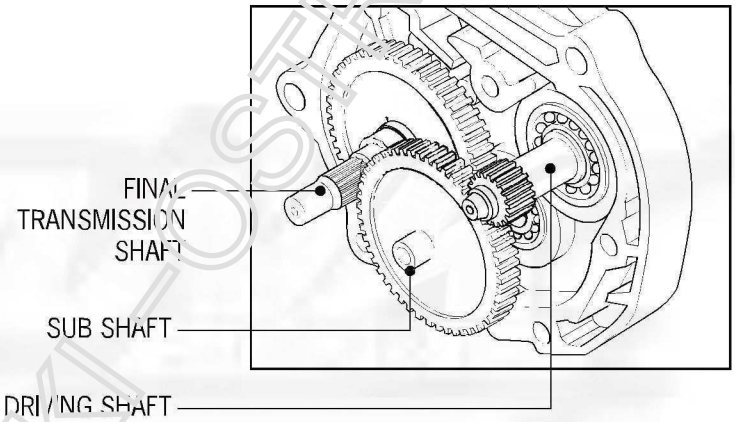
5. Drain the oil out of the final transmission.

6. Remove the bolts of the final transmission gearbox.

7. Remove the transmission gearbox cover.

8. Remove the gasket and the locating pin.



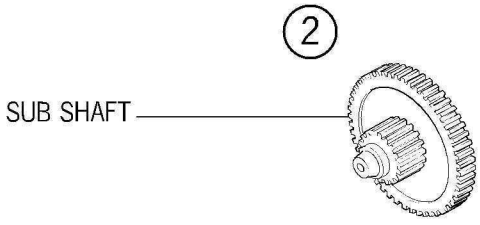


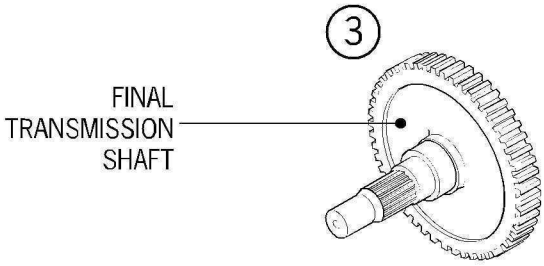
Detach the final transmission gearbox cover

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





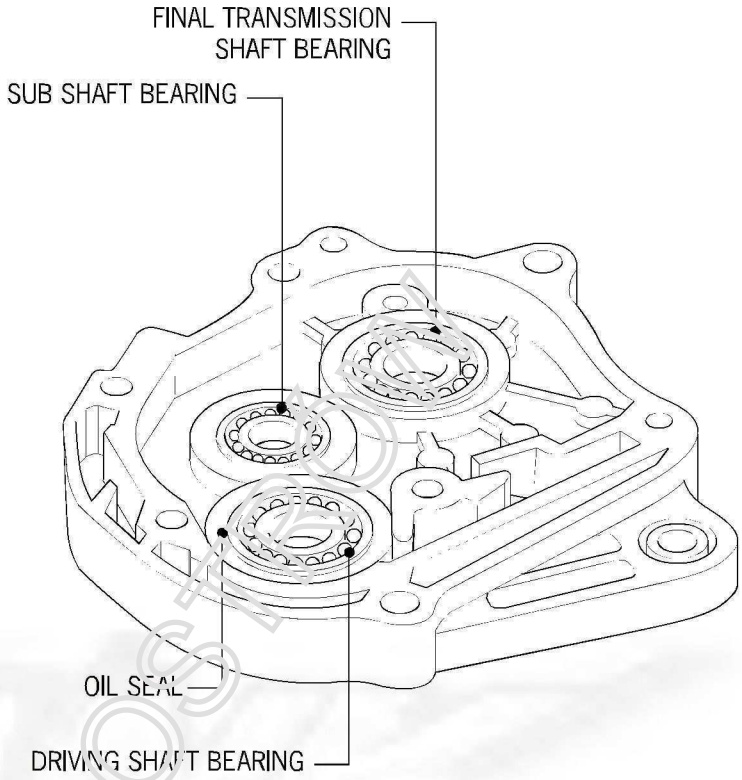
10. The Final Transmission Assembly

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.

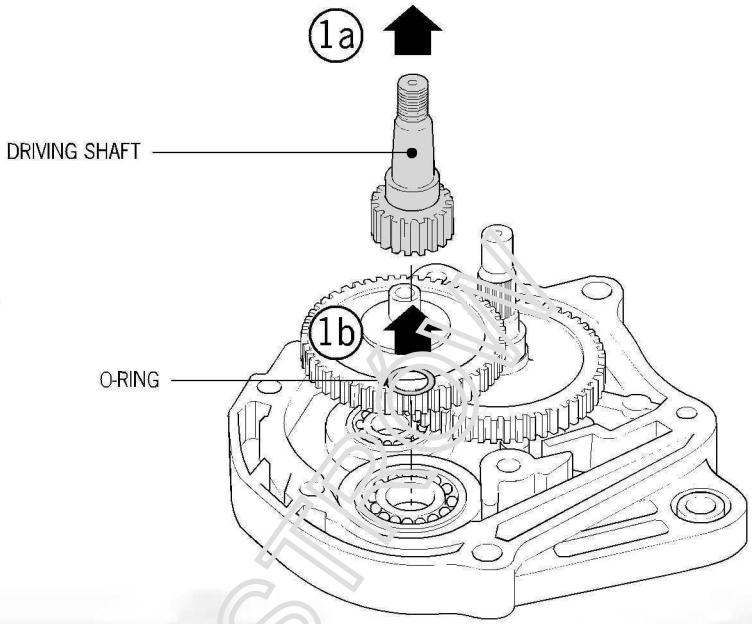
10. The Final Transmission Assembly

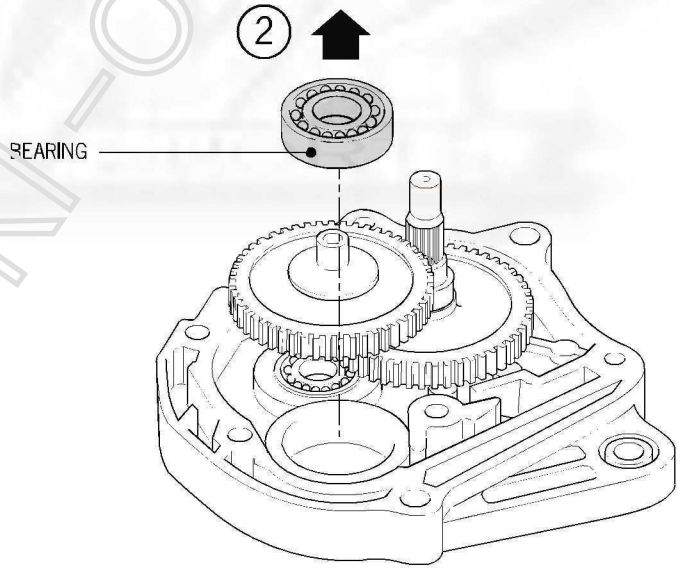
Replacing the Bearing (on the side of the crankcase)

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).

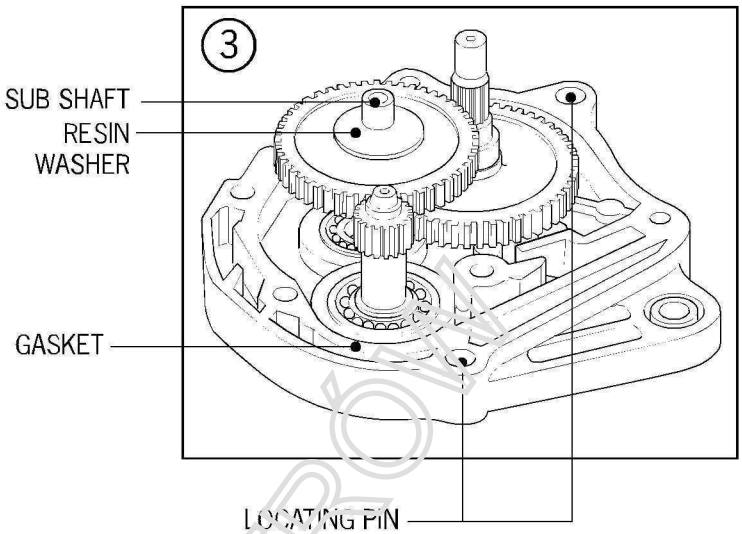
Designated gear oil: SAE 90#
Volume of the gearbox:
Filling: 0.12L 4 ounces
Changing: 0.10L 3.5 ounces

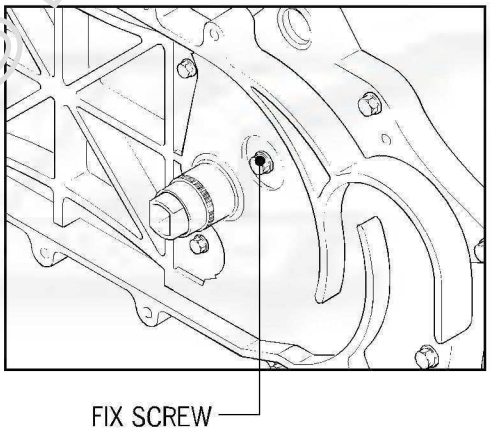
8. Screw up the oil screw and tighten it.

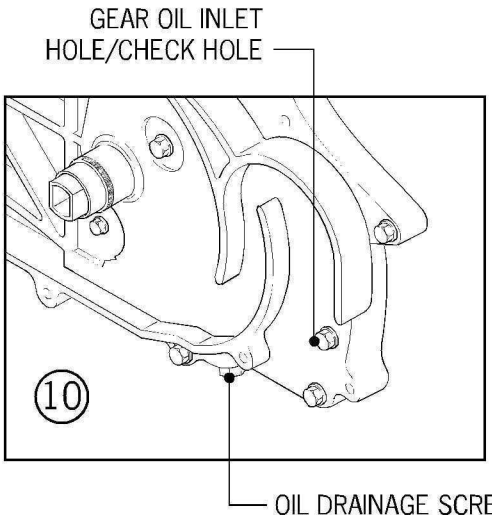
Torque: 1.0-1.4kg/m 8-10ft lbs

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

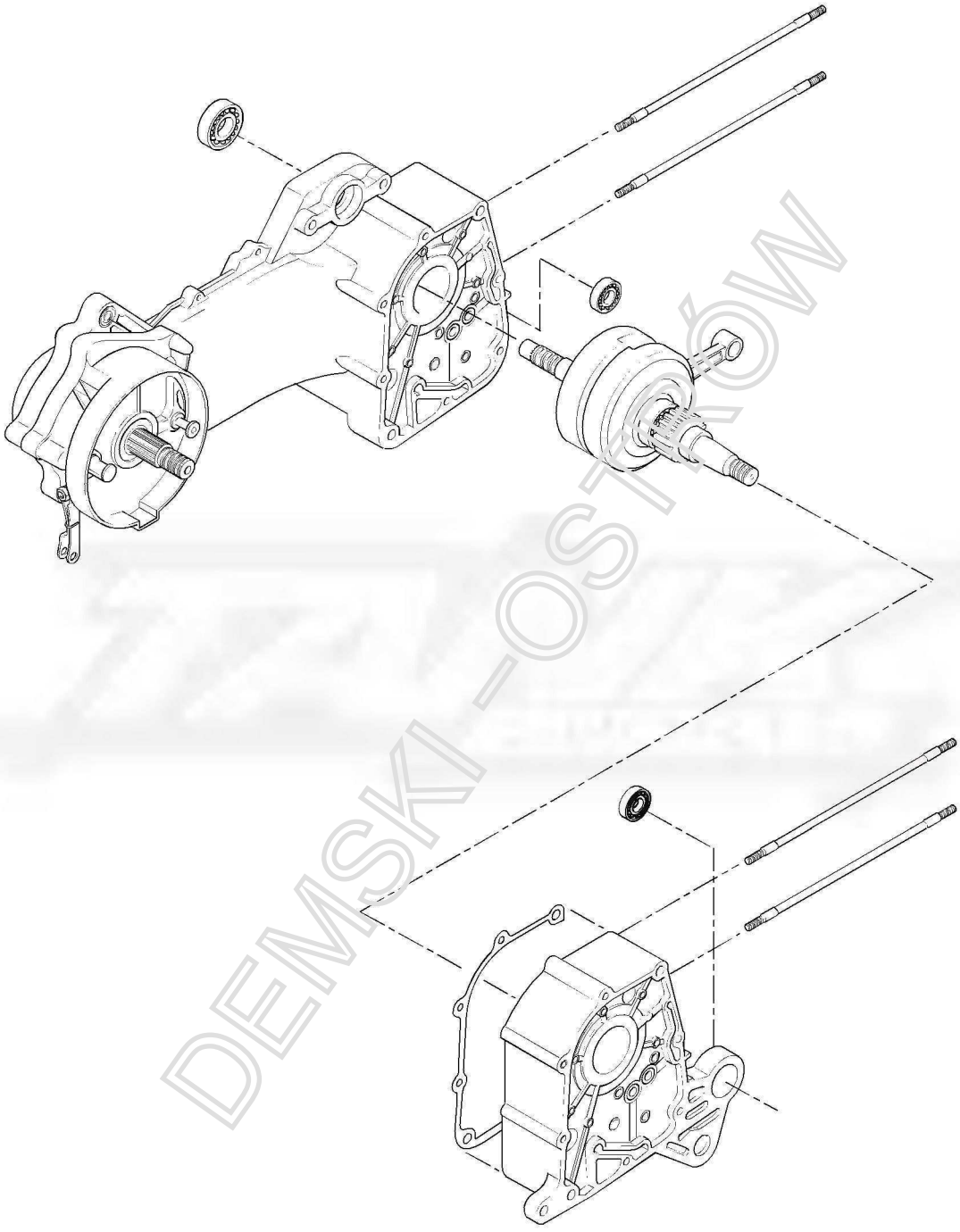
10. Check the oil level. Replenish it with the designated gear oil when the oil is not sufficient (through the oil checking hole).







11. The Crankcase and the Crankshaft



11. The Crankcase and the Crankshaft

Topic	Page

Important Points

•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

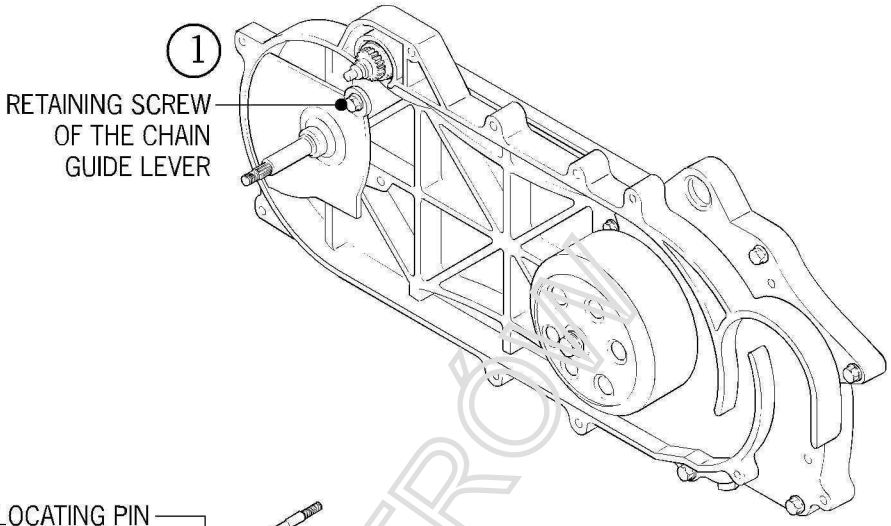
11. The Crankcase and the Crankshaft

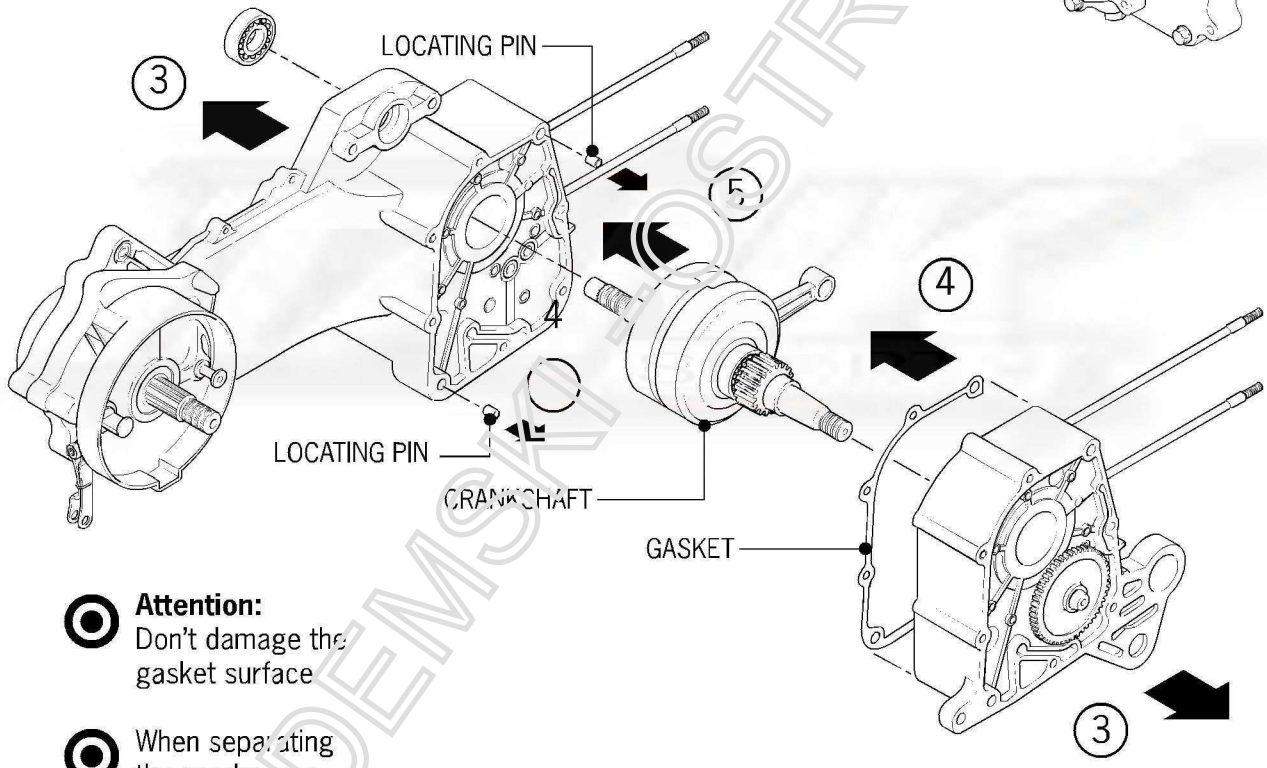
Dismantling the Crankcase

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.

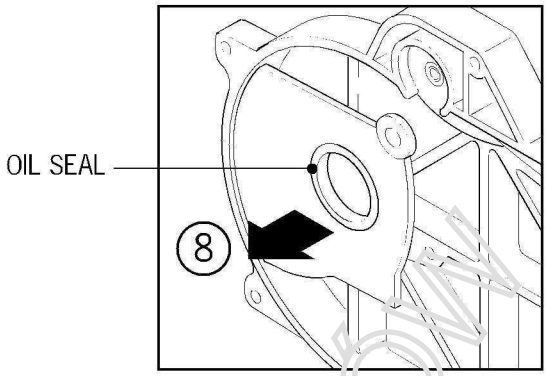
11. The Crankcase and the Crankshaft

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.

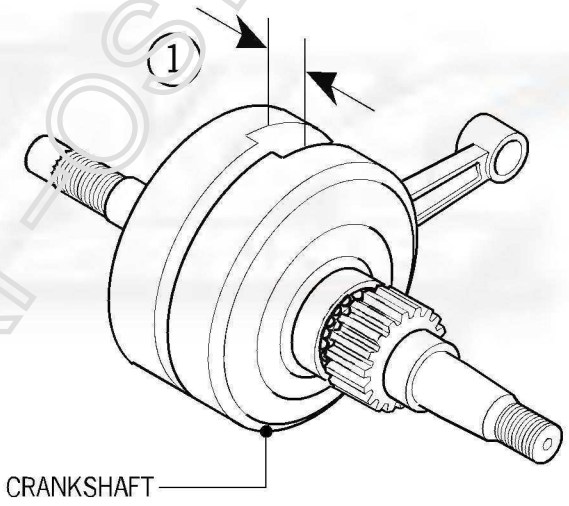
9. Remove the oil seal from the right crankcase.



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.

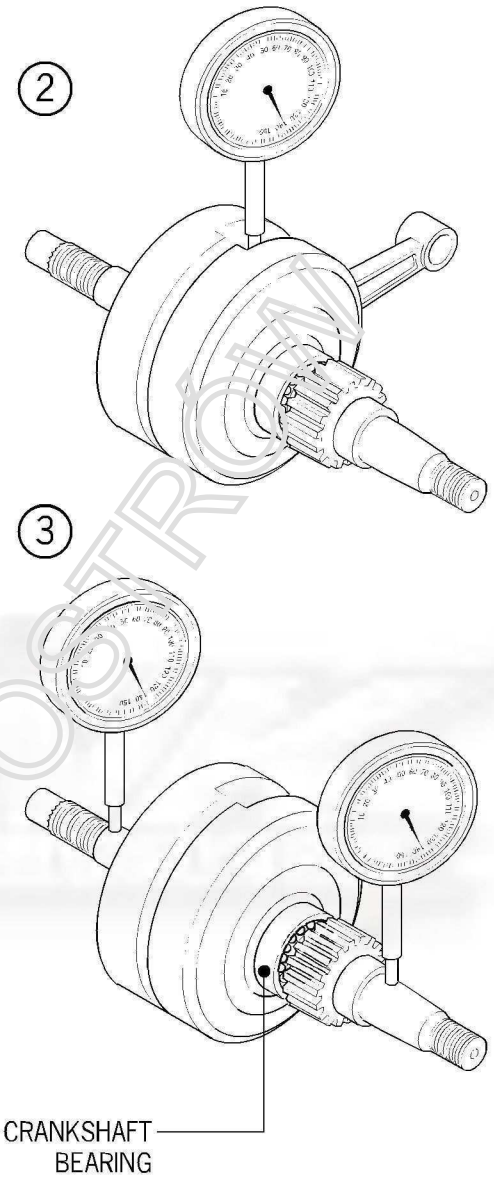
Maximum service allowance;
Replace when it goes beyond 0.10mm (.004 in.).

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:

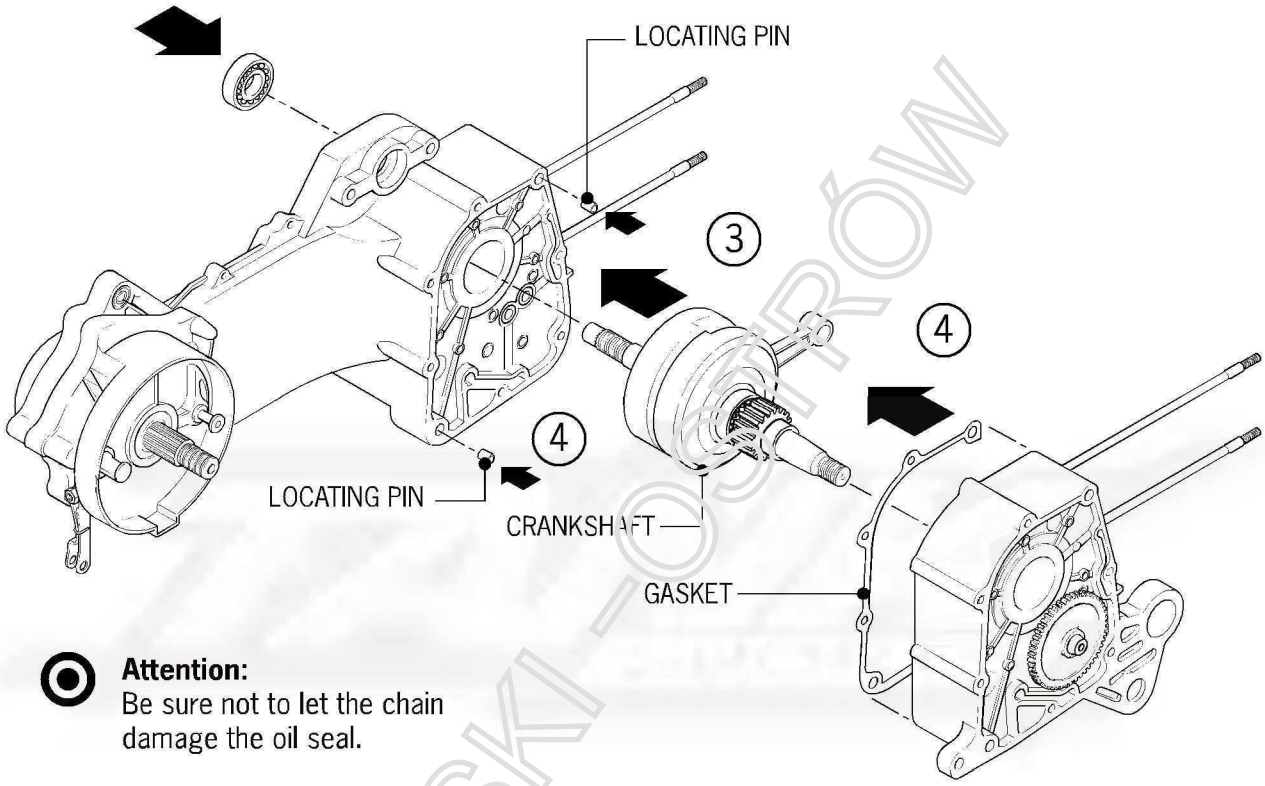
- Bearing outer race driver
- Bearing outer race 32x35mm (1.26 in. x 1.38 in.)



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

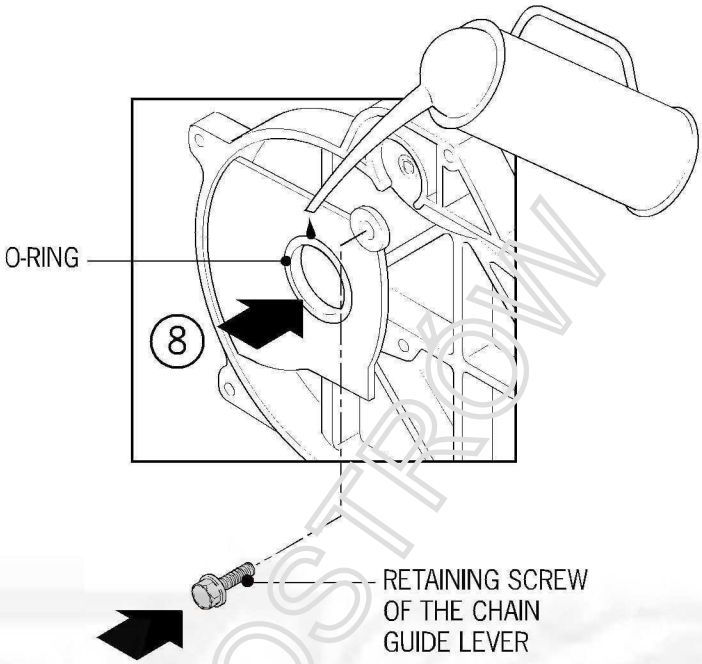
6. Install the cam chain adjusting lever.

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.

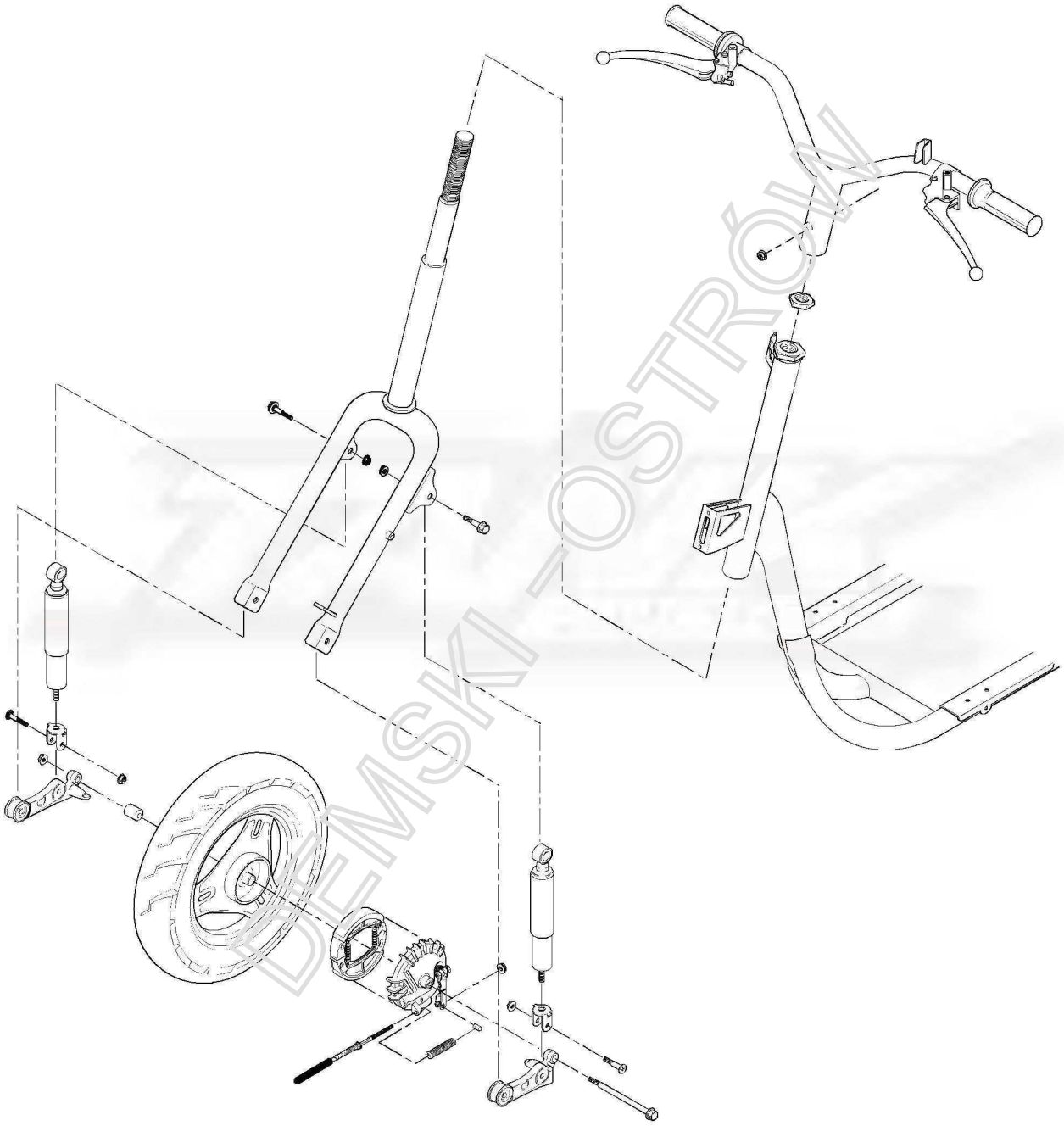


11. The Crankcase and the Crankshaft

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

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

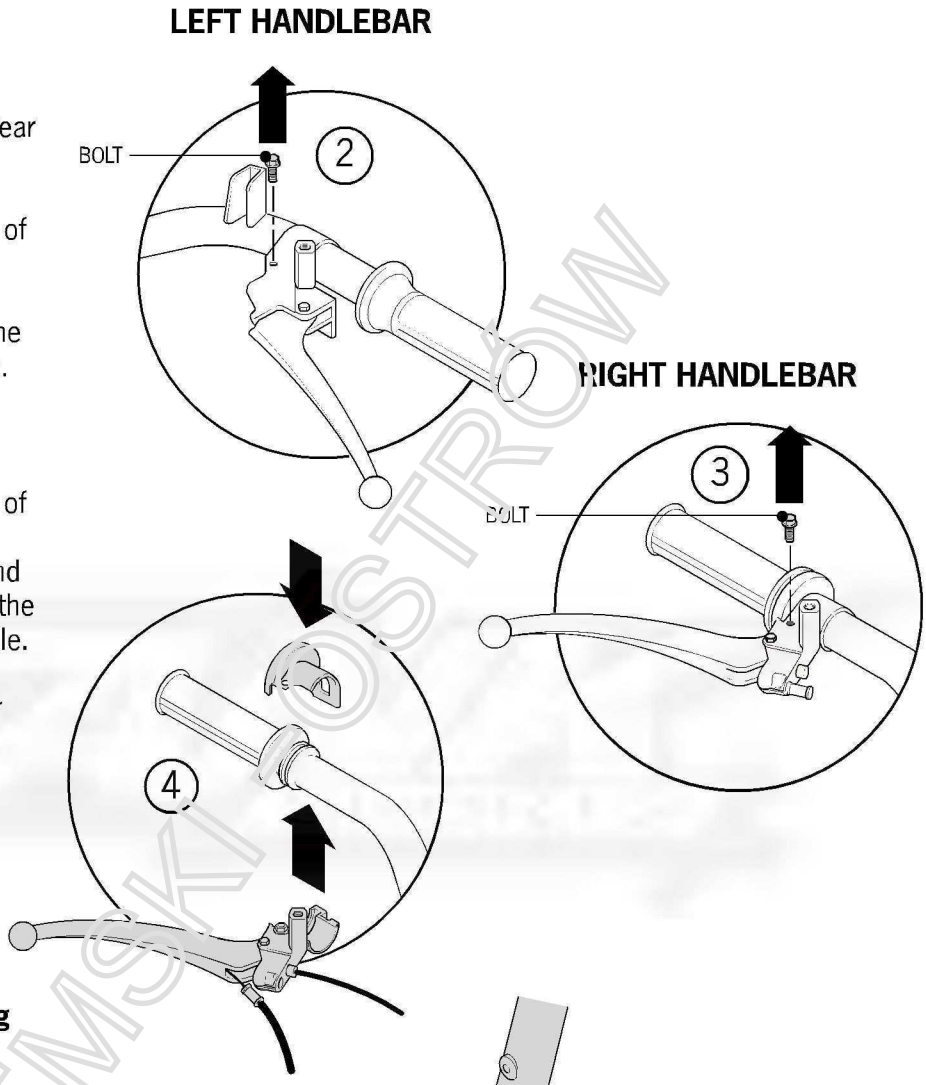
1. Detach the front and rear covers of the handlebars.

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.

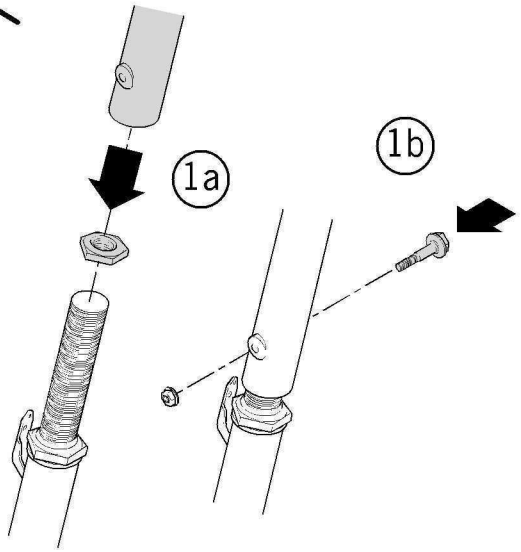
5. Remove the handlebar clamp bolts.



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



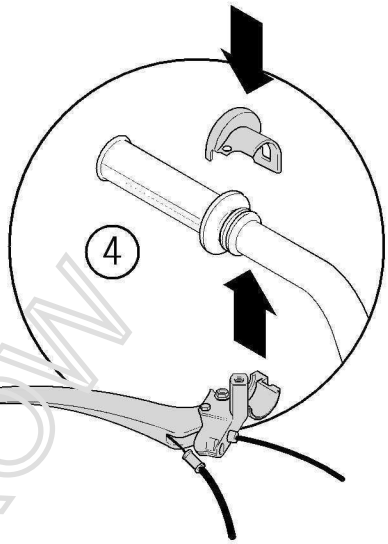
12. The Front Wheel, Front Brake,

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.



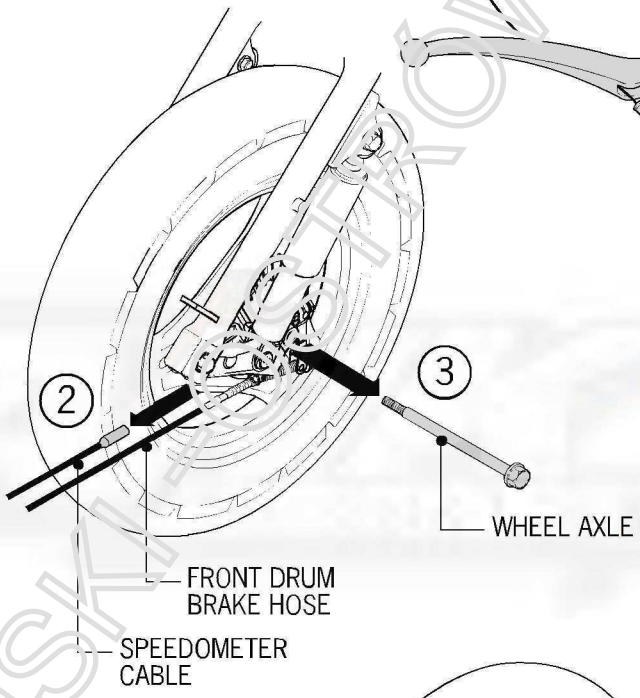
Front Wheel Removal

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.

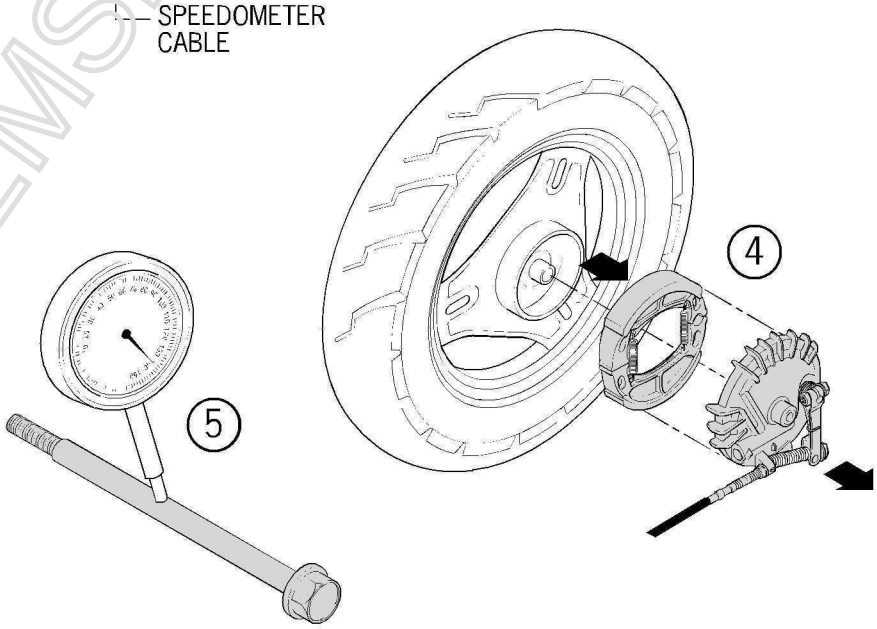
4. Remove the drum disk and the collar.



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,

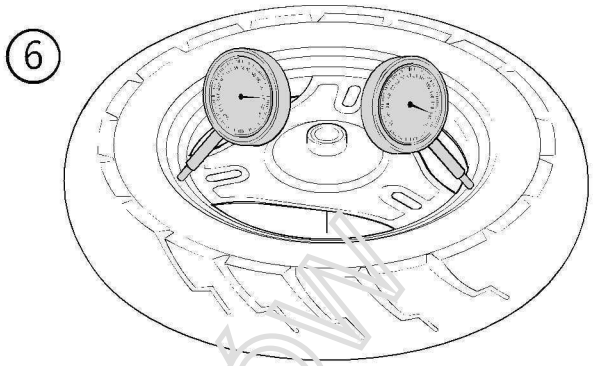
Front Buffer and the Front Fork

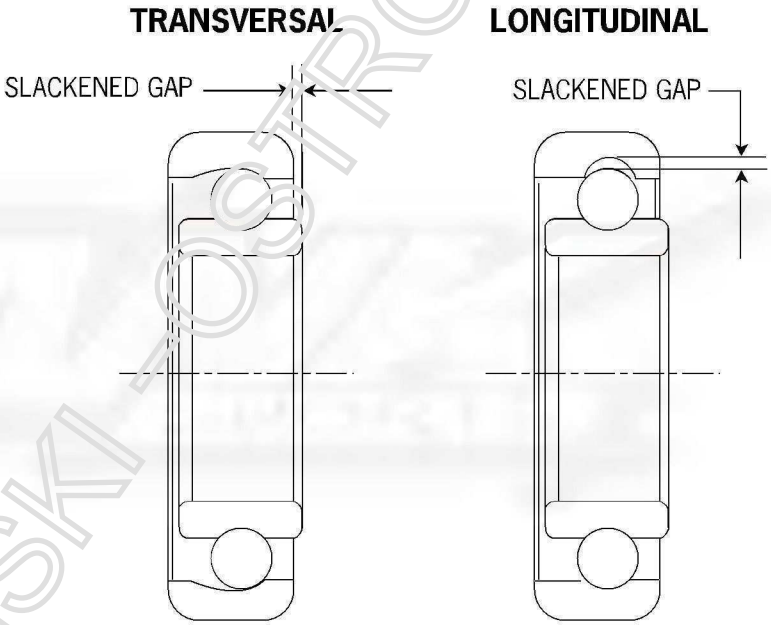
6. Check the run-out of the wheel rim.

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

7. Replace when it goes beyond the above value.

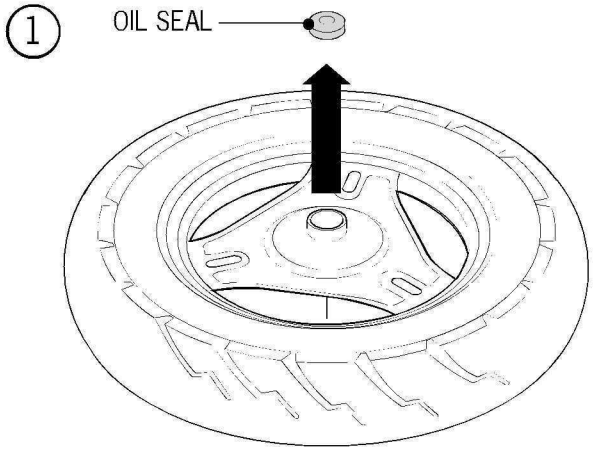
8. Replace the bearing when it produces abnormal noise or gets loose.





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.

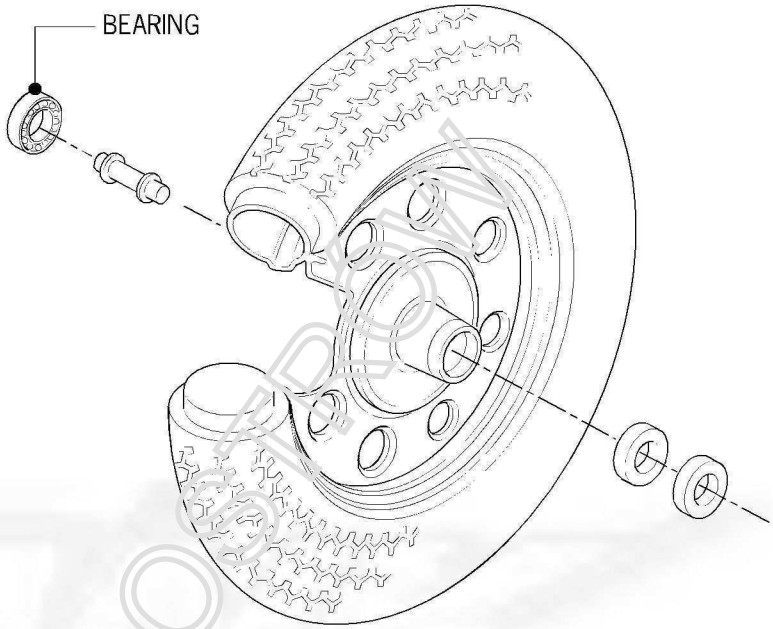
Assembly of Wheel

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.

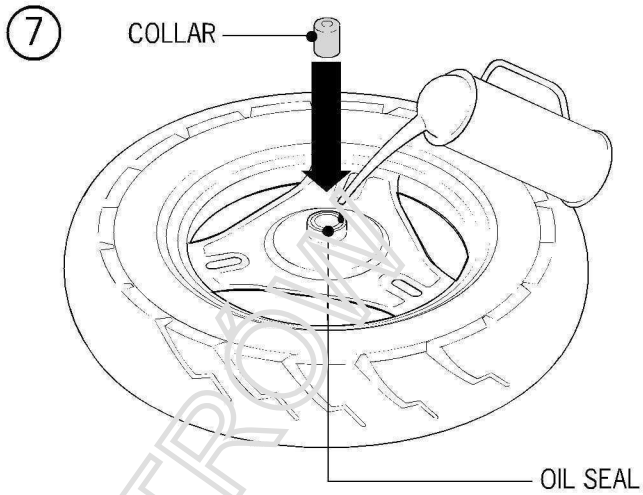
Assembling the front wheel.

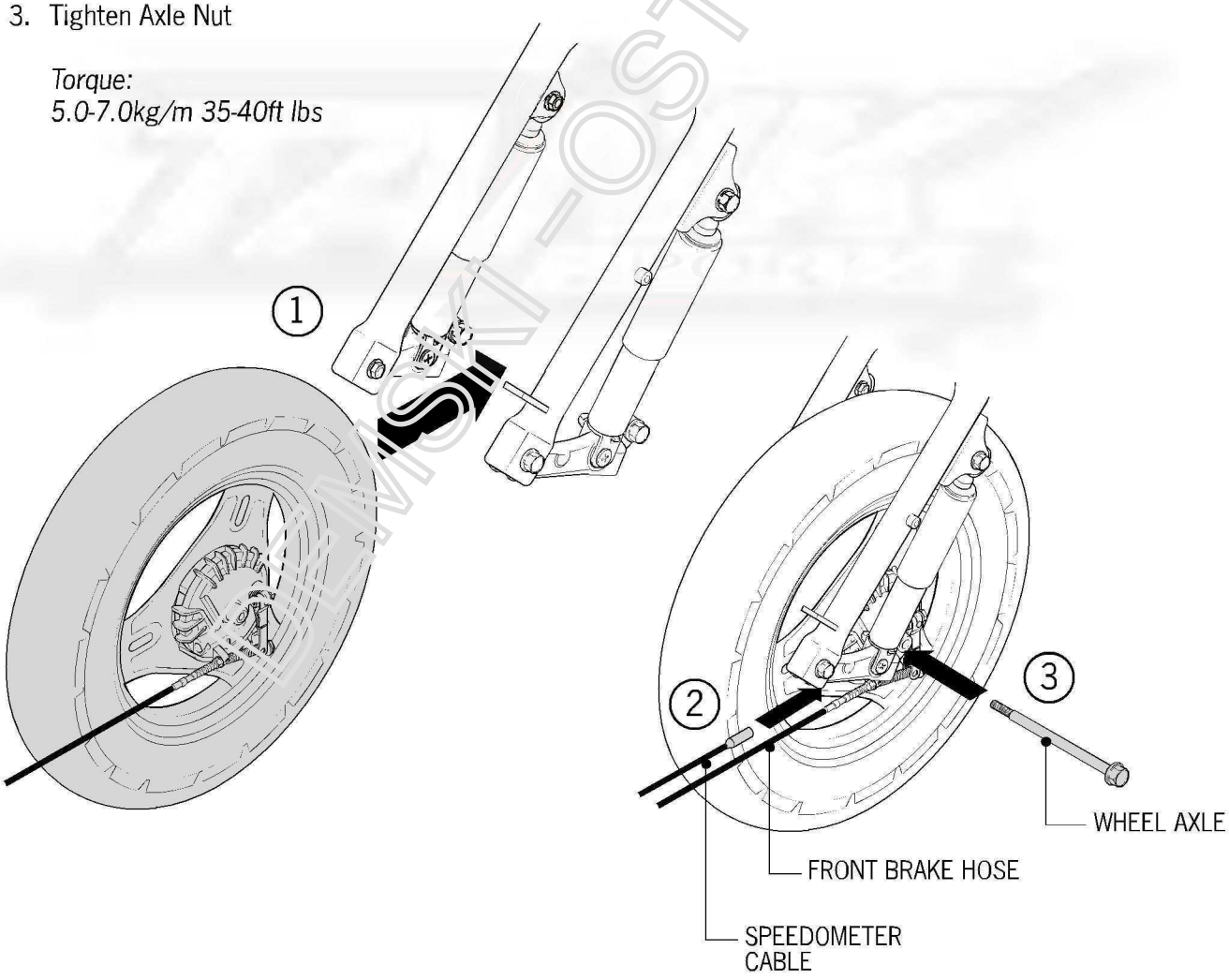
1. Point the lug of the gear bank of the speedometer to the notch of the front fork leg. Then assemble the front wheel.

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

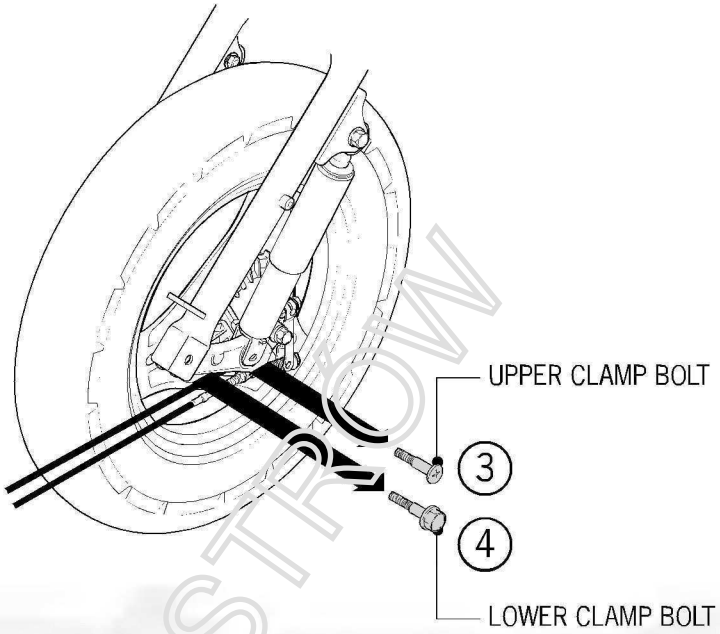
Dismounting the Front Shock

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.

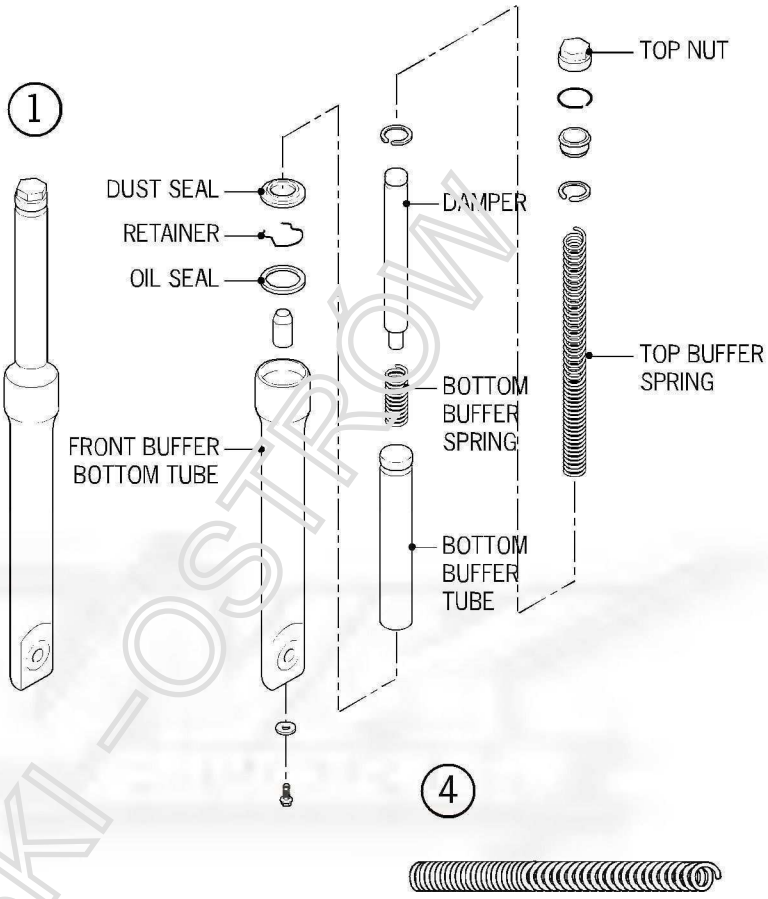
2. Remove the outer retainer.
Use a bench vise to hold the front fork bottom tube to remove the guide lever of the damper, the socket hex-head bolt and the copper washer.
Use a bench vise to hold the front fork tube.

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.

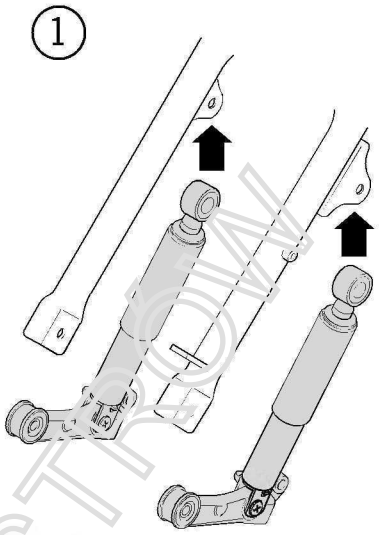
Attention:
When laying down the spring, keep the coil-tight of it down.

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.



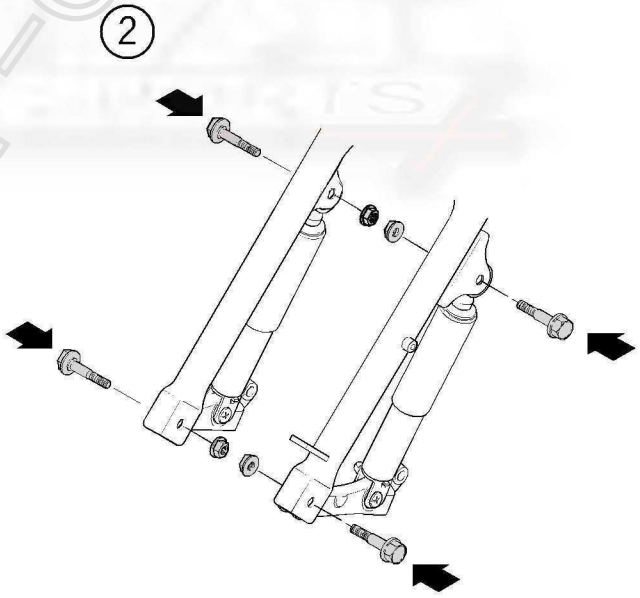
Assembling Sequence

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

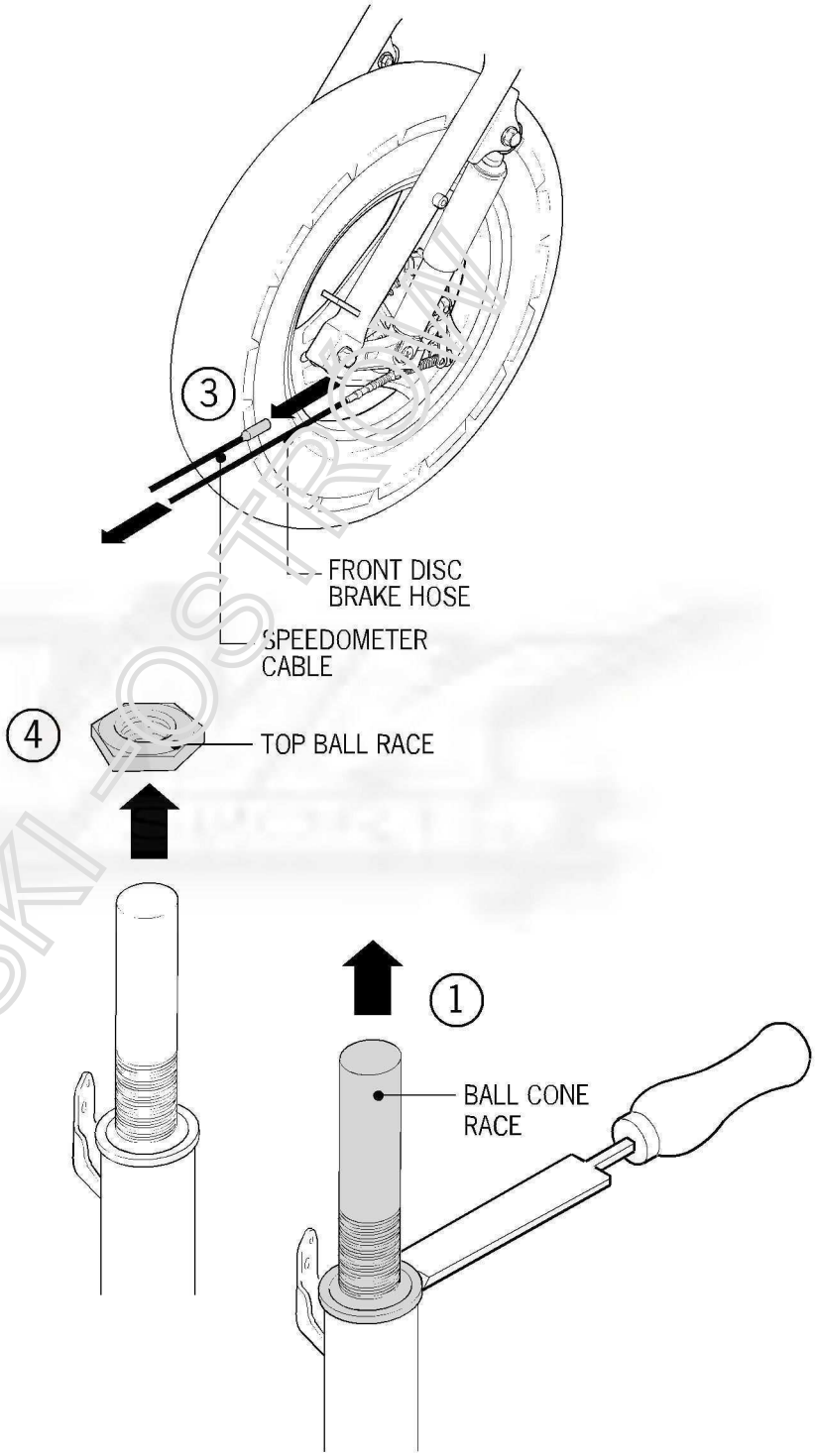
1. Remove the race with a chisel and hammer.

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.

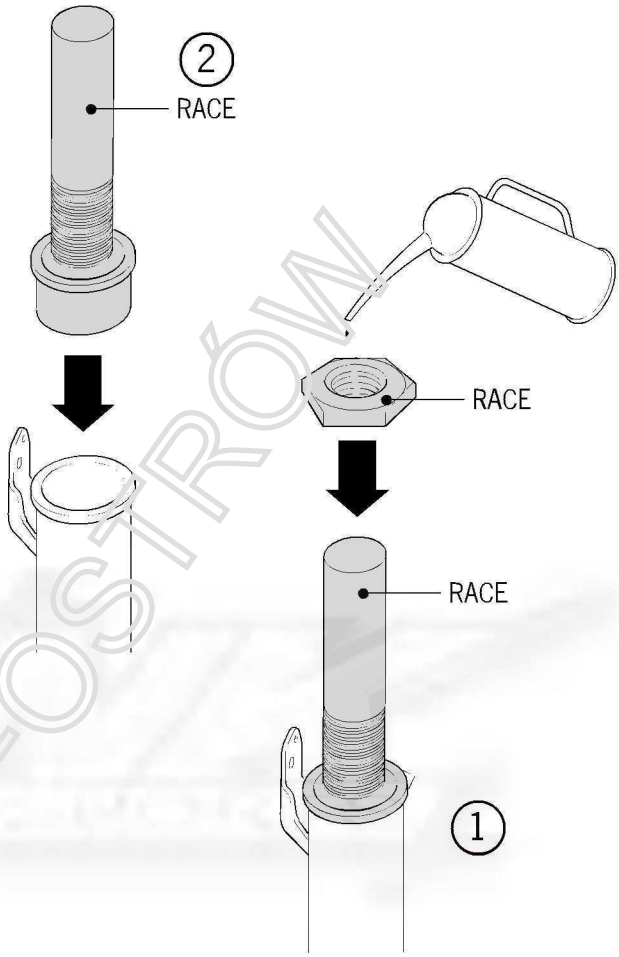
5. Install the top race, and then tighten the upper nut.

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).



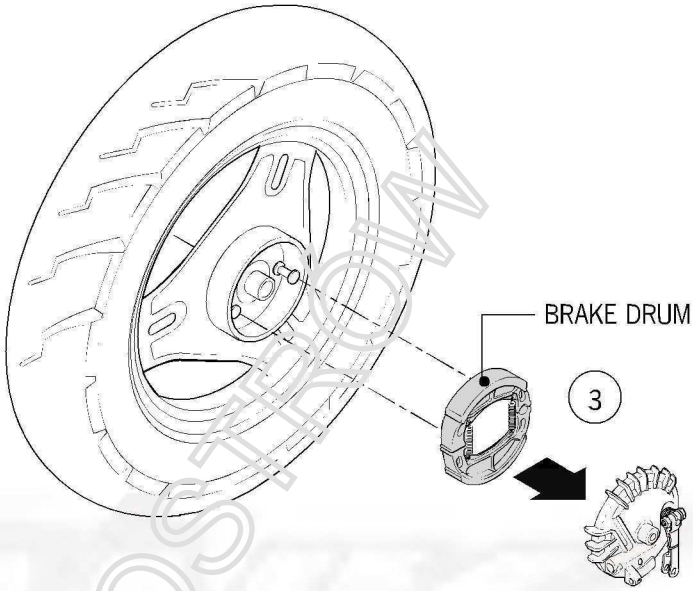
12. The Front Wheel, Front Brake,

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.



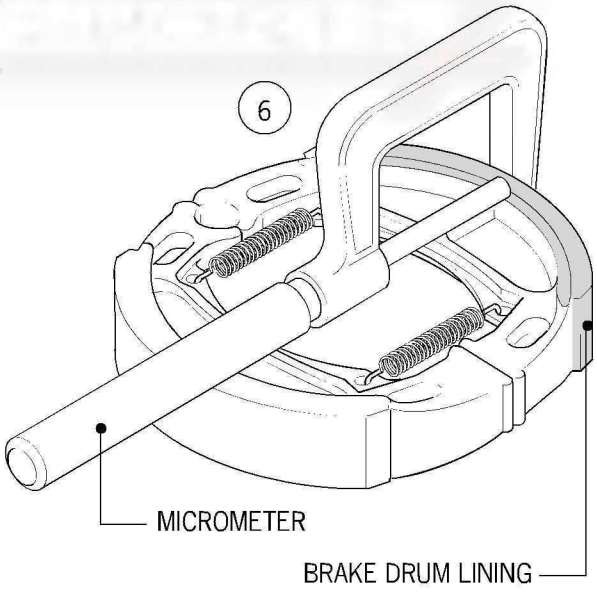
Dismantling the Front Brake

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

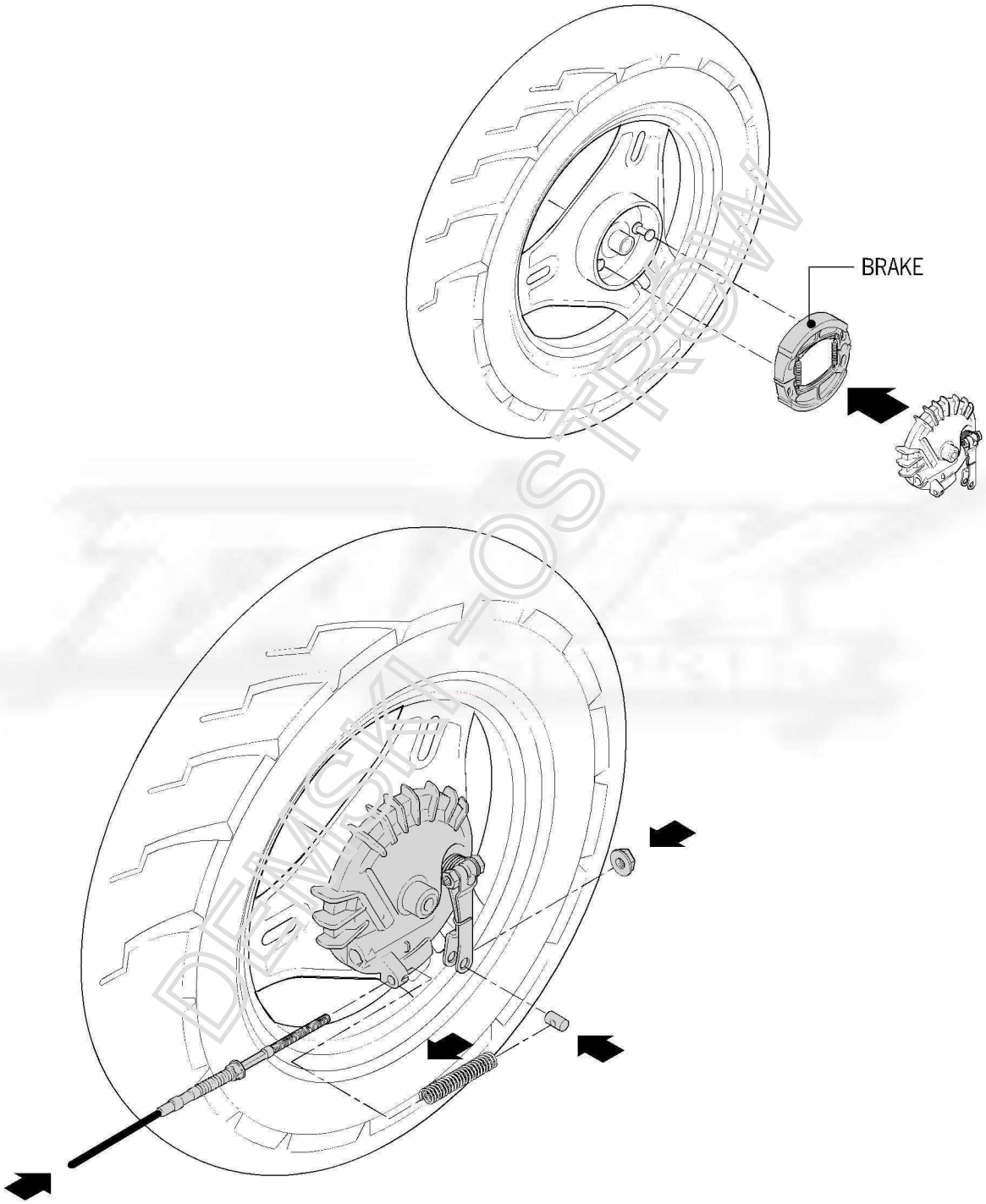
8. Spread grease on the moving parts of the lining and of the fix pin (locating pin).

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

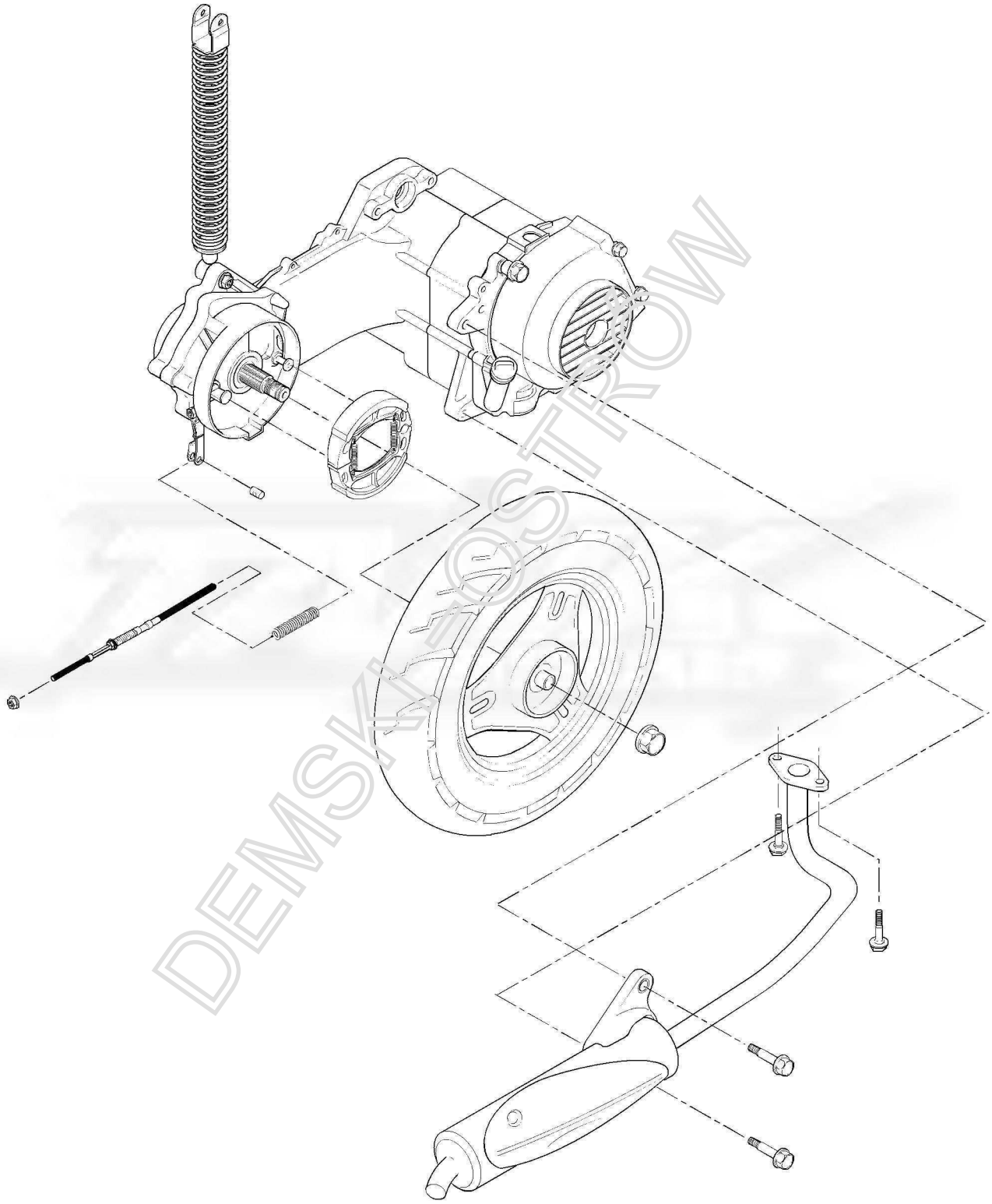


12. The Front Wheel, Front Brake,

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

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*

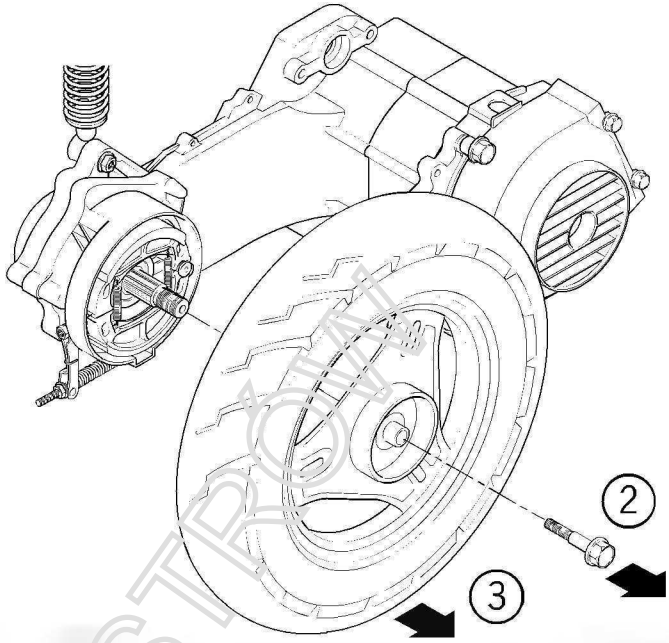
Diagnosis

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.

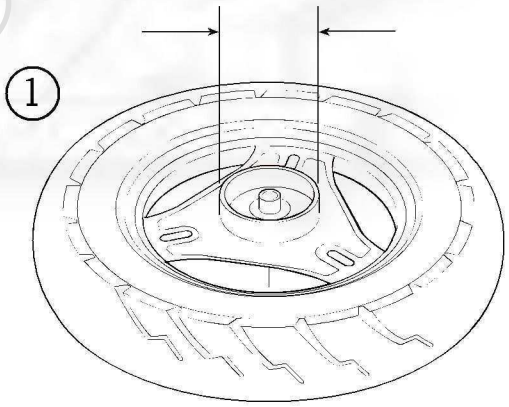
   Maximum service allowance:
   Longitudinal: 2.0mm (.079 in.) Hop
   Transversal: 2.0mm (.079 in.) Wobble

   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.

   The 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

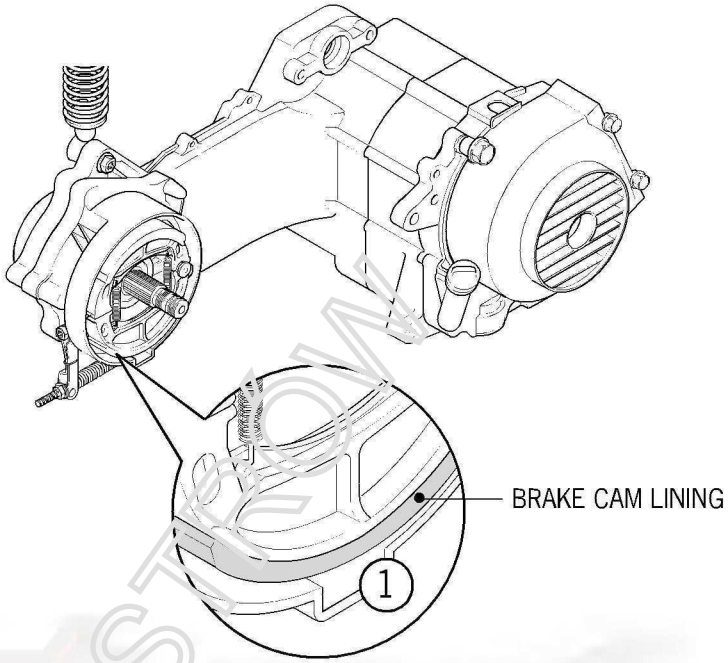
Attention:
When assembling the exhaust pipe, first fasten the connection at the bend, and then install the support bolt.

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

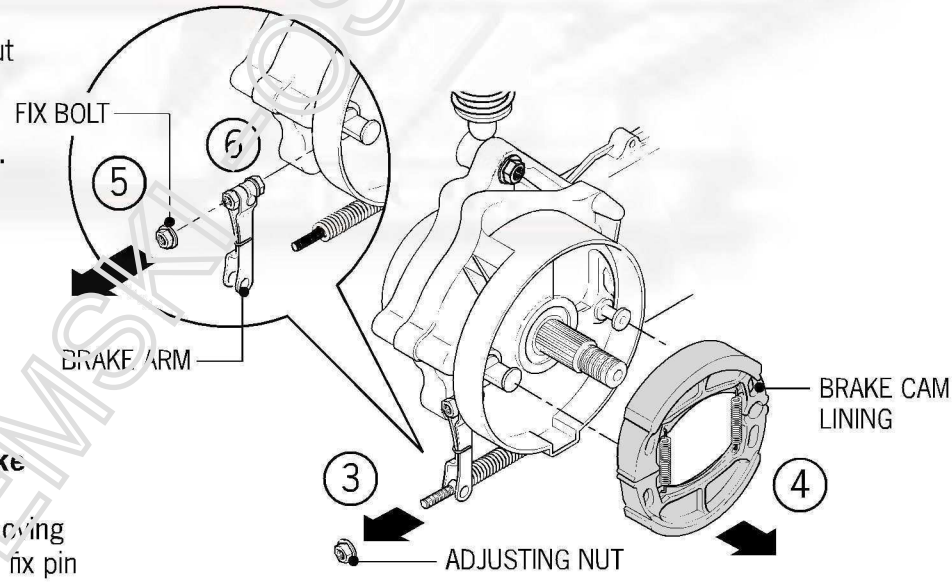
3. Remove the adjusting nut of the rear brake.

4. Remove the brake lining.

5. Remove the fix bolt of the brake arm.

6. Remove the brake arm.

7. Remove the brake cam.

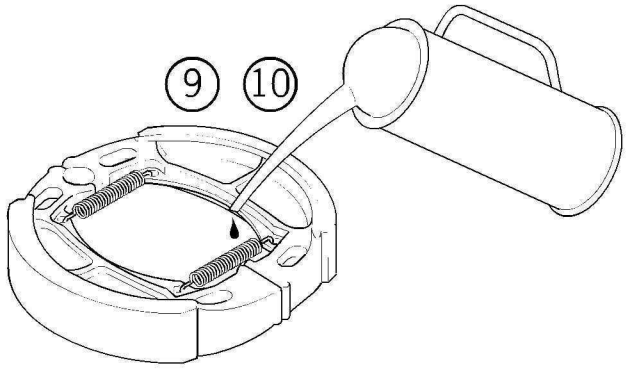


Assembling the Rear Brake

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.