

SERVICE AND REPAIR MANUAL



4 STROKE ENGINE

PDF processed with CutePDF evaluation edition www.CutePDF.com

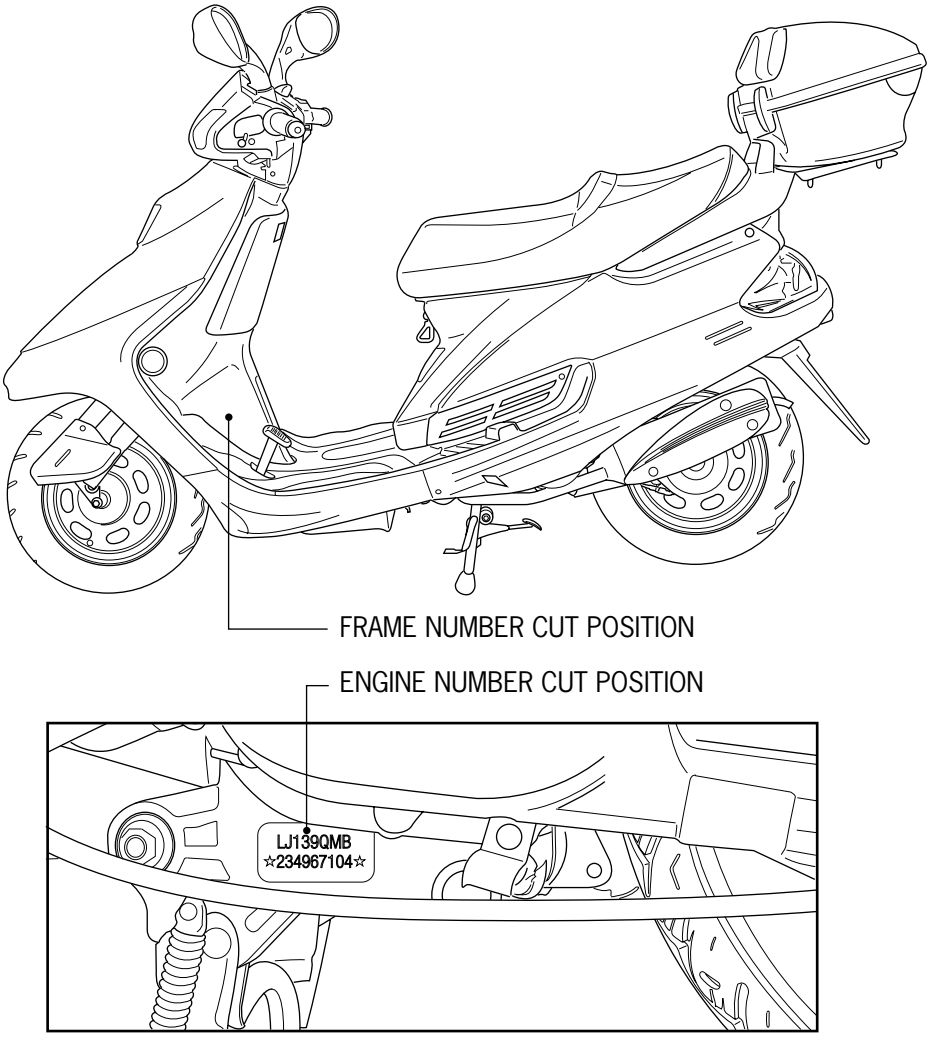
Table of Contents

Chapter	Topic	Page
CHAPTER 1:	Introduction	2
CHAPTER 2:	Body Cover and Exhaust System	28
CHAPTER 3:	Scheduled Maintenance	33
CHAPTER 4:	Lubricating System	45
CHAPTER 5:	Fuel System	52
CHAPTER 6:	Engine Removal and Installation	67
CHAPTER 7:	Cylinder Head Valve	71
CHAPTER 8:	Cylinder and Piston	88
CHAPTER 9:	Driving Belt Device & The Starting Lever	96
CHAPTER 10:	The Final Transmission Assembly	110
CHAPTER 11:	The Crankcase and the Crankshaft	116
CHAPTER 12:	The Front Wheel, Front Brake, Front Buffer and the Front Fork	124
CHAPTER 13:	The Rear Wheel, the Rear Brake & Rear Shock	140
CHAPTER 14:	The Battery and the Charging System	146
CHAPTER 15:	Ignition System	160
CHAPTER 16:	Starter System	166
CHAPTER 17:	Meters, Switches and Lighting System	173
INDEX		180

1. General Information

Topic	Page	Topic	Page
Engine and Frame Number Positions	1-1	Tools	1-12
Product Specifications and Technical Data	1-2	Oil and Grease Supply Chart	1-13
		Control Cables and Wiring Diagram	1-14
Technical Tips	1-3	Failure Diagnostics	1-21
Torque Settings	1-11		

Location for: Engine Number/Frame Number



1. General Information

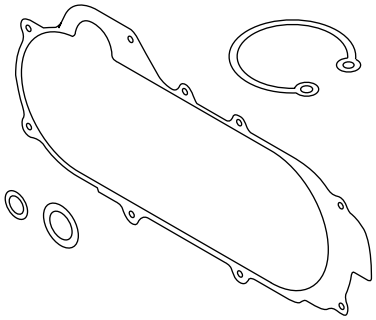
Product Specifications and Technical Data

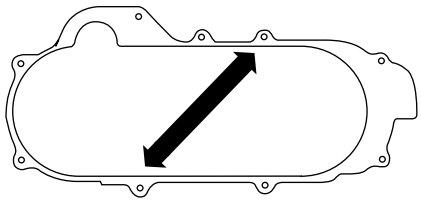
Scooter Model	JL50QT-18 JL50QT-X1/8 JL50QT-14
Length	1685mm (66.5 inches)
Width	660mm (26 inches)
Height	1070mm (42 inches)
Wheel base	1195mm (47 inches)
Engine type	4-stroke OHC
Displacement	49.5cc
Fuel requirements	Lead-free gasoline
Dry weight	
Front	35kgs (77 lbs)
Rear	56kgs (123 lbs)
Total	91kgs (200 lbs)
Curb weight	
Front	37kgs (81.5 lbs)
Rear	60kgs (132 lbs)
Total	97kgs (213.5 lbs)
Tire size	
Front	3.00 x 10
Rear	3.00 x 10
Ground clearance	80mm (3.25 inches)
Stopping distance	4m from 30km/hr 16 ft from 18 mph.
Turning radius	1.65m (5.5 ft)
Engine Specs	
Type	4-stroke SI
Starting	Electric/kick start
Cylinders	Single
Combustion chamber	Hemispherical
Valve train	Single OHC
Bore	39mm (13.34 inches)
Stroke	41.4mm (1.63 inches)
Displacement	49.5cc
Compression ratio	10.5:1
Compression pressure	15kg/cm 215psi
Power	2.2 HP @ 8000 RPM
Torque	4.5 ft lbs @ 6000 RPM
Intake timing	6˚ BTDC-28˚ ATDC
Exhaust timing	38˚ BBDC-6˚ BTDC
Valve lash	.05mm
Idle speed	1850-1900RPM
Oil system	Pressure/splash
Oil pump	Internal gear
Oil filter	Full-flow filter and screen
Oil capacity	.8L (32 oz)
Cooling	Ducted forced air
Air cleaner	Foam and paper
Carburetor type	CVK 50
Venturi	18mm
Throttle mechanism	Butterfly type
Ignition system	CDI type 13˚BTDC @ 2000 RPM
Spark plug	NGK C7HSA Champion Z9Y
Gap	.5-.6mm (.022-.024 inch)
Battery	12V 4AH
Drive system	
Clutch	Dry multi plate
Transmission	CVT
Shifting	Automatic
Final Drive	Double reduction
1st step	3.2:1
2nd step	3.4:1
Steer tube angle	64˚
Steering angle	45˚
Tire pressure front	1.75kg/cm (26psi)
Tire pressure rear	2.25kg/cm (35psi)
Front brake	Hydraulic disc
Rear brake	Mechanical drum
Suspension front	Telescopic
Suspension rear	Trailing arm
Shock absorber front	Coil spring/hydraulic
Shock absorber rear	Coil over hydraulic shock
Frame type	Tubular space frame

1. General Information

Technical Tips

•Replace all gaskets, o-rings, circlips and cotter pins when performing maintenance on the scooter. Nuts and bolts on all engine covers should be tightened in a diagonal pattern to uniformly distribute clamp force.

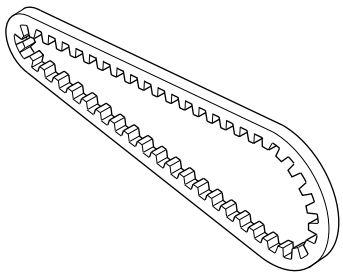




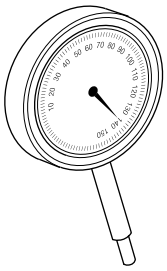
•Use lubricants recommended in this manual at all times to assure peak performance from the scooter.



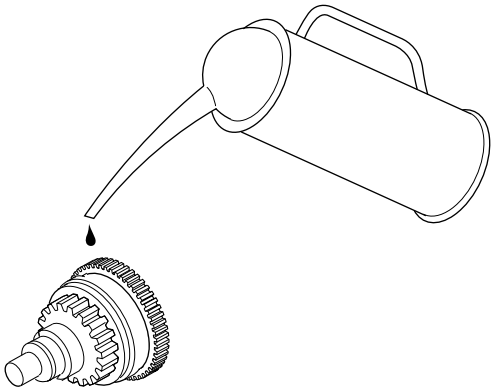
•Use only genuine replacement parts when performing repairs to the scooter.



•Special service tools may be required to perform maintenance and repairs on this scooter. Always use the proper tools to prevent damage to the scooter.



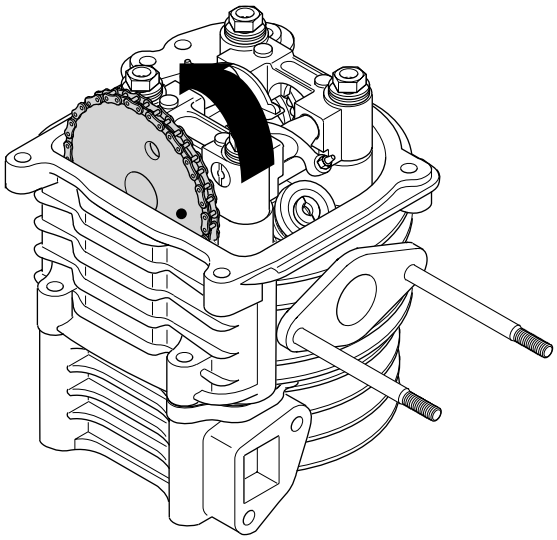
•Clean and lubricate all engine parts during the disassembly and reassembly process to prevent damage to the engine.



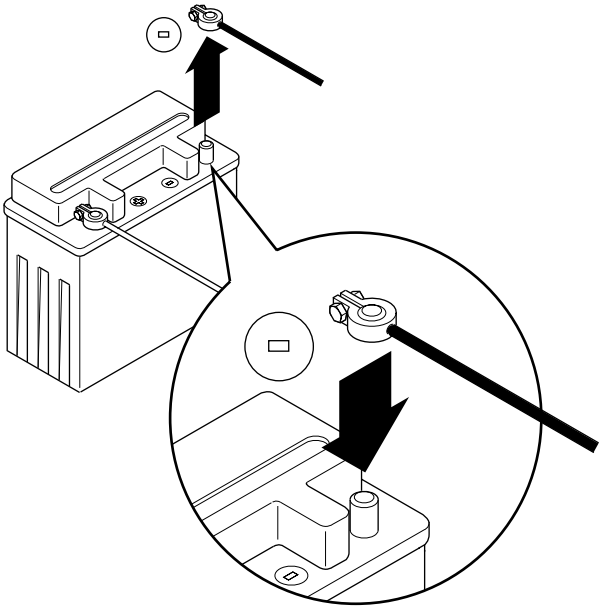
1. General Information

Technical Tips (continued)

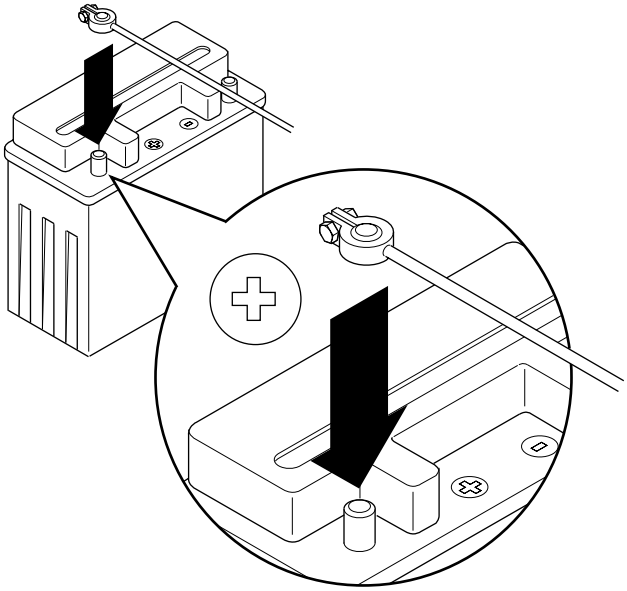
•When performing maintenance on the scooter, make sure that all moving parts and controls move freely and return to their proper position.



•When disconnecting the battery, always disconnect the negative terminal first.



•When connecting the battery, always connect the positive terminal first.



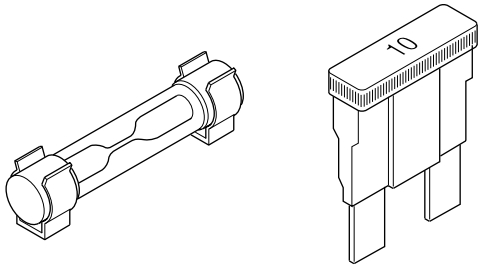
•Make sure that tools and service equipment do not come in contact with both battery terminals.

•Cover both battery terminals with a light coat of grease to prevent corrosion.

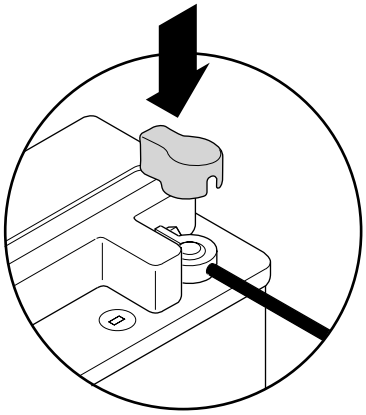
1. General Information

Technical Tips (continued)

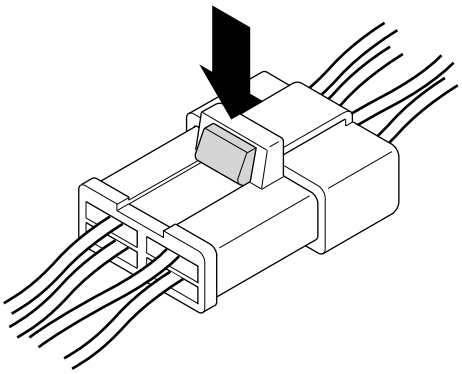
•When replacing fuses, always use an exact replacement. Do not use fuses of a higher amp rating!



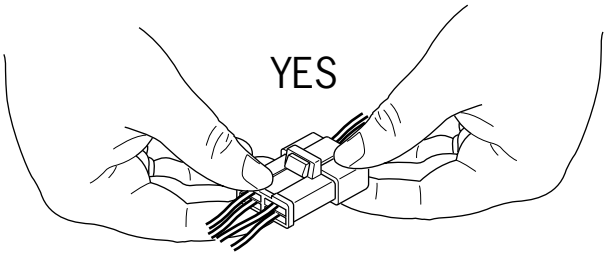
•Replace all rubber caps on wire connectors after performing maintenance.

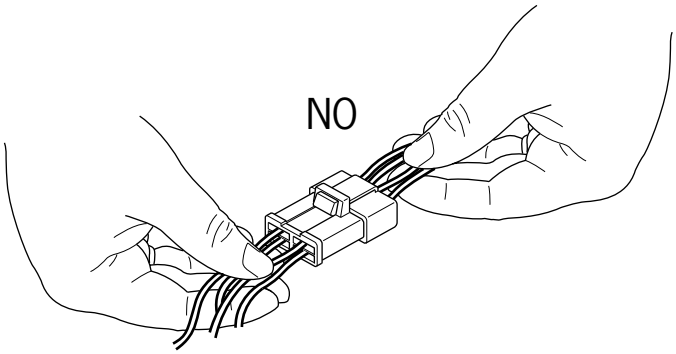


•When disconnecting wire connectors, press firmly on the locking tab and pull the body of the connectors. Never pull on the wires



•When assembling wire connectors, press firmly to assure the lock tab fully engages.





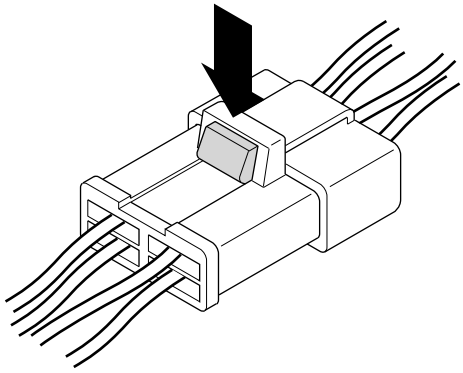
•Make sure that all wire terminals are properly in place before attempting to assemble any wire connector.

1. General Information

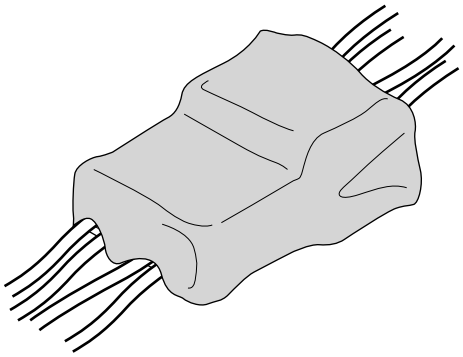
Technical Tips (continued)

•Make sure that all wiring connectors are fully seated and lock tubs engaged.

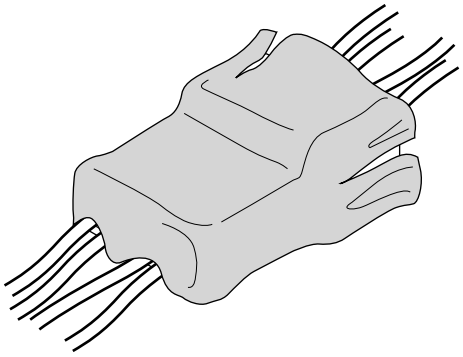
•Check if almuce of connector is covered and fixation is tight.



•Make sure that all protective covers are properly in place over the wiring connectors.



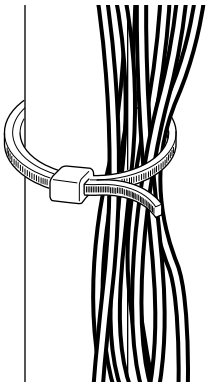
•Never reuse damaged wire terminals or connectors.



•Never reuse damaged wire terminals or connectors.

•Replace all rubber covers on wire connectors to prevent water from getting into the connector.

•Strip of main wire must be fixed on assigned position.



•Insulator of aluminum strip must be affixed to wires.

•Make sure that all wiring harness retainers are properly placed.

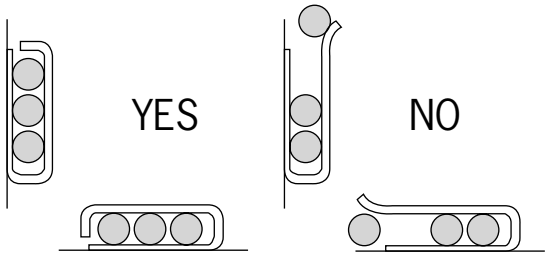
•Do not over tighten wiring ties to prevent pinching of wires.

•Do not allow wiring harness to hang in loose loops.

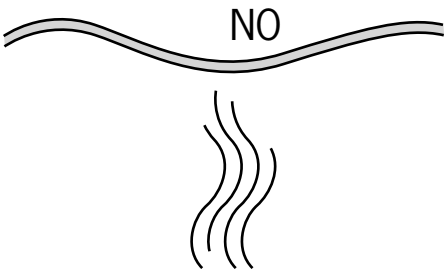
1. General Information

Technical Tips (continued)

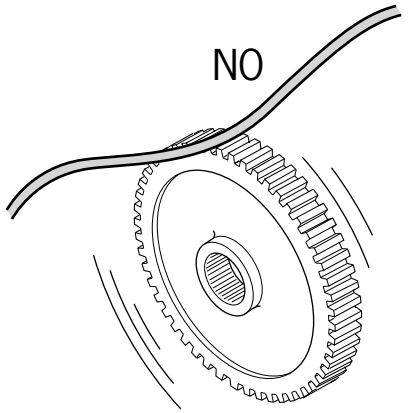
•Make sure that all wire clips are properly attached.

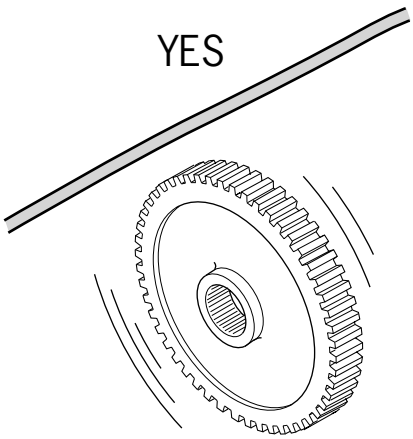


•Make sure that the wiring harness and all wires do not contact hot components or surface parts of the scooter.

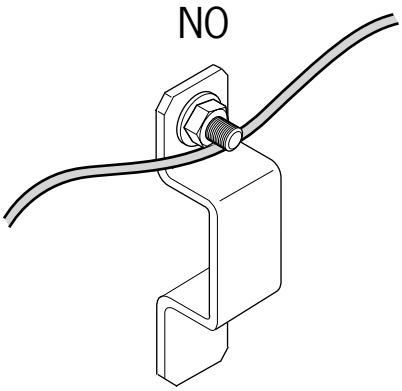


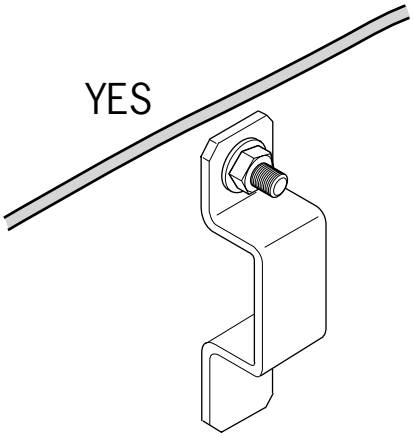
•Make sure that the wiring harness and all wires do not contact moving or rotating parts of the scooter.





•Make sure that the wiring harness and all wires do not contact sharp edges or parts of the scooter. Use tape to prevent damage to wires on sharp edges.





1. General Information

Technical Tips (continued)

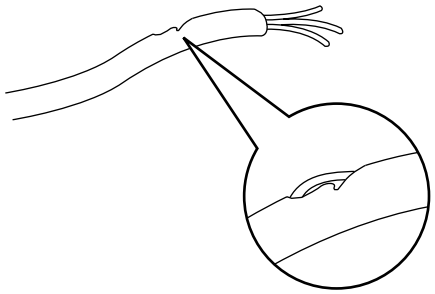
•Do not pull wires too tightly.

•Use tape to protect against sharp edges.

•Make sure that all rubber grommets are in place to protect the wiring harness.

•Do not reuse broken or frayed wires.

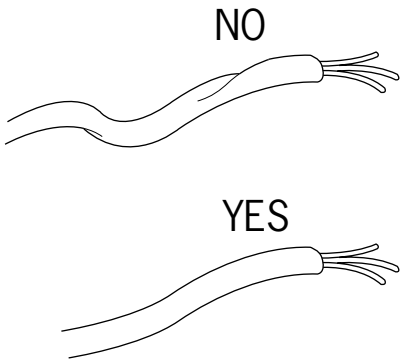
•Repair or replace wires as necessary.



1. General Information

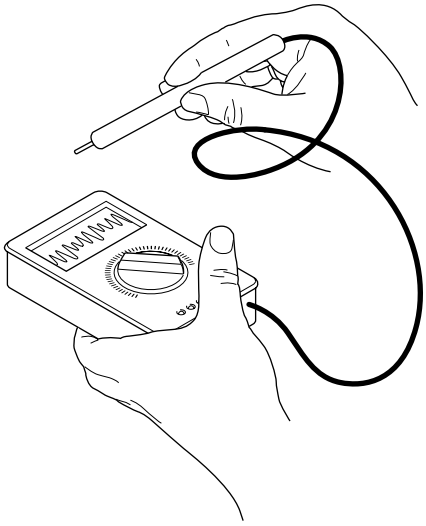
Technical Tips (continued)

•Do not twist or knot wires when performing maintenance on the scooter.



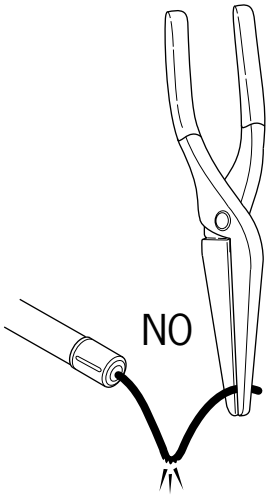
•Make sure the wiring harnesses to the handlebars are not too tight or too loose by turning the handlebars both right and left while making sure there is no pinching or pulling of the wires.

•Make sure that you understand the proper use of test equipment to perform maintenance on the scooter. This will prevent accidental damage to the electrical system of the scooter.



•Use electrical contact cleaner and abrasive paper to clean corrosion from any wire terminals.

•Take care to prevent inadvertent damage to wiring and cables.



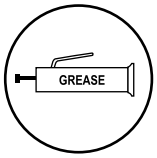
1. General Information

Technical Tips (continued)

Definitions of diagrams
The following icons are used to highlight important operations in the service of the scooter.



Lubricating oil required.



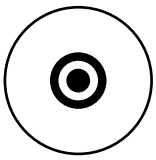
Grease required.



Engine oil required.



Special tools required.



Special attention required.



Dangerous and important, special care required.

1. General Information

Torque Settings

Standard Torque Settings

General Torque Requirements for Standard Fasteners

Fastener Type	Torque	Fastener Type	Torque
5mm Cap Screw	.5 kg/cm	5mm Socket Head Screw	.4 kg/cm
6mm Cap Screw	1 kg/cm	6mm Socket Head Screw	.9 kg/cm
8mm Cap Screw	2.2 kg/cm	8mm Flange Head Screw	1.2 kg/cm
10mm Cap Screw	3.5 kg/cm	10mm Flange Head Screw	2.7 kg/cm
12mm Cap Screw	5.5 kg/cm	12mm Flange Head Screw	4.0 kg/cm

Special Torque Settings

Torque Requirements for Engine Fasteners

Fastener Type	Number Used	Dia. (mm)	Torque kg m (in. lbs)	Comments
Cylinder Bolt A	2	8	.9	
Cylinder Bolt B	2	8	.9	
Oil Filter Screen Cap	1	30	1.5	
Exhaust Pipe Flange Bolt	2	6	.9	
Flange Screw Belt Pulley	4	8	2.0	Lubricate with Engine Oil
Valve Adjusters	2	5	.9	Lubricate with Engine Oil
Cam Chain Adjuster	1	6	1.0	
Guide Plate Screw / Oil Fill Screw	1	8	1.3	
Clutch Cover Screw	1	12	5.5	
Clutch Driven Unit Mounting Screw	1	12	5.5	
Starter Motor Mounting Screw	2	6	1.0	
Oil Pump Mounting Screw	3	6	1.2	
Clutch Driver Mounting Screw	1	12	5.5	
ACG coil Mounting Screw	3	6	1.0	
Cam Chain Adjuster Screw	1	6	.5	
Spark Plug	1	10	1.2	

Torque Requirements for Frame Fasteners

Fastener Type	Number Used	Dia. (mm)	Torque kg m (in. lbs)	Comments
Cylinder Bolt A	1	25.4	8-12	
Cylinder Bolt B	1	10	4-5	
Oil Filter Screen Cap	1	14	8-10	
Exhaust Pipe Flange Bolt	1	10	3-4	
Flange Screw Belt Pulley	1	8	2-3	Use Soft Set Lock-Tite
Valve Adjusters	1	5	.5	

1. General Information

Tool Requirements

epair of the scooter, a complete basic set of metric sized tools is required. This should include; Open-end wrenches, sockets and ratchet, hex keys, straight and Philips screw drivers, standard pliers, needle-nosed pliers, wire cutters, wire strippers, scraper, pin punch, hammer and soft faced mallet.

For a more extensive tear down and rebuild of the scooter, there are a variety of special tools that will be required. These include the following:

- Valve spring compressor
- Valve guide reamer
- Feeler gage set
- Slide hammer bearing and seal remover
- Bearing press
- Torque wrench
- Ring compressor
- Clutch spring compressor
- Fly wheel puller
- Electronic multi meter

1. General Information

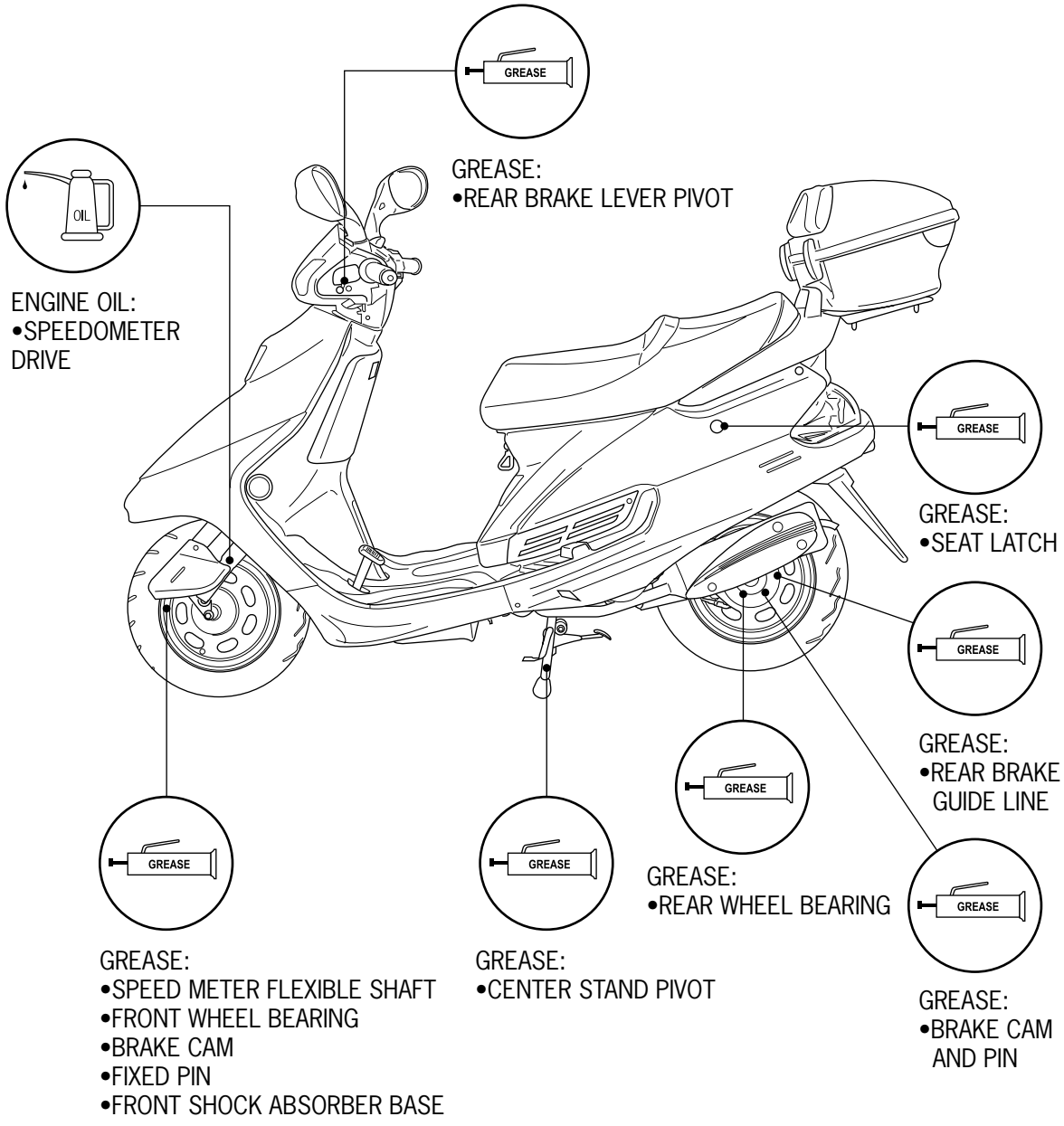
Lubrication Requirements: Engine

Item Location	Recommended Lubricant
valve guide valve stem moving part	SAE 5W 30 Engine Oil
cam shaft lug surface	API-SG Grade Engine Oil
valve rocking arm friction surface	oil
camshaft drive chain	grease
cylinder fixed screw bolts and nuts	oil
around piston and piston ring groove	oil
around piston pin	oil
cylinder surface	oil
connecting rod, piston pin bore	oil
connecting rod big end	oil
crankshaft R, L side oil seal starter reduction rear engaging (mating) part	oil
coundershaft gear engaging part	oil
final gear engaging part	oil
each bearing rotational part	grease
o-ring surface	oil
oil seal lip	oil
starter idle gear	oil
friction spring moving part, shaft moving part	grease
shaft moving groove part	oil
starter drive axle	grease
AC-generator connector	adhesive

1. General Information

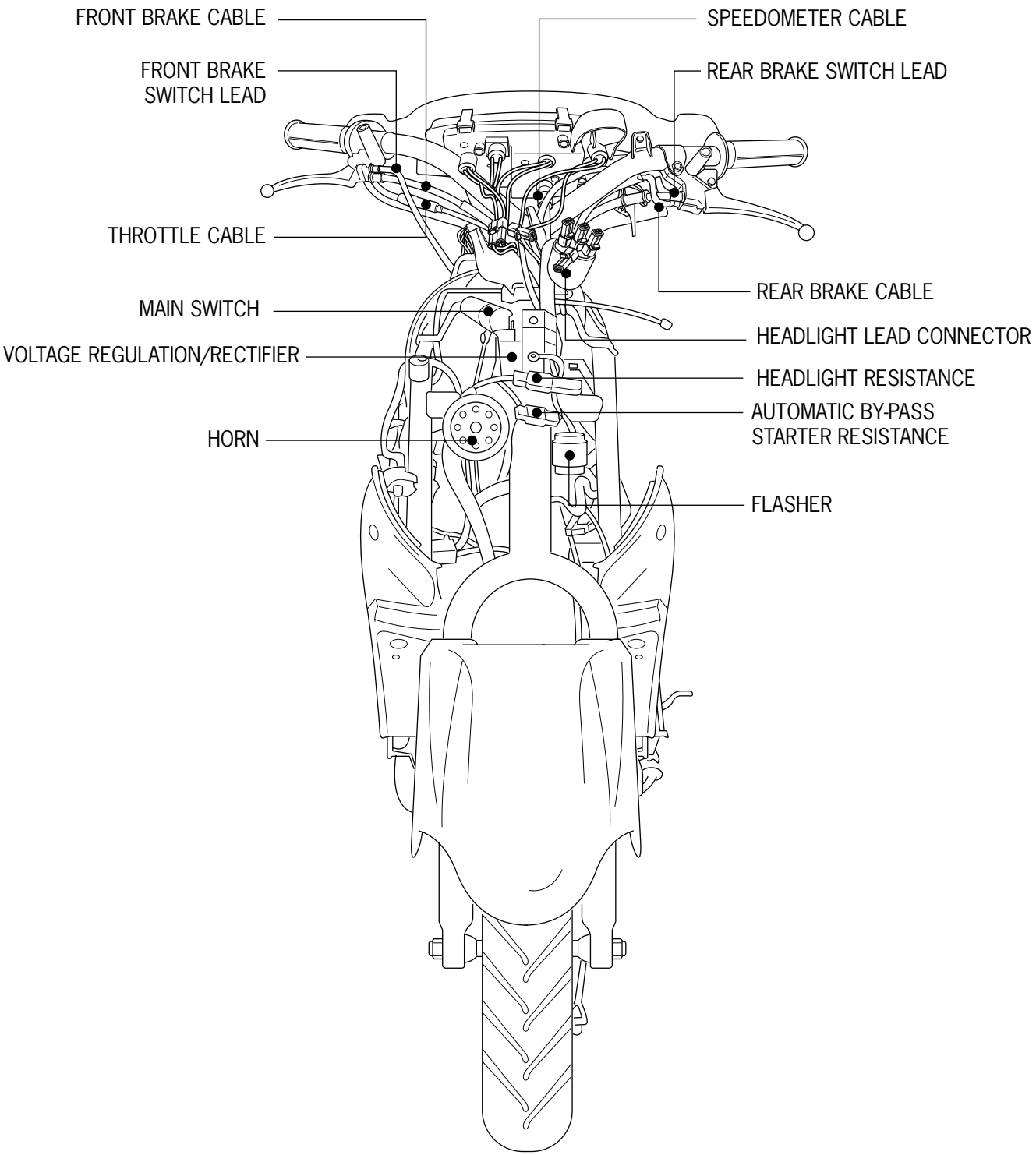
Chassis

•Apply oil to the following parts.
•Use grease in the parts other than specified ones.
•Apply engine oil or grease to the moving parts to prevent abnormal noise and to raise durability.

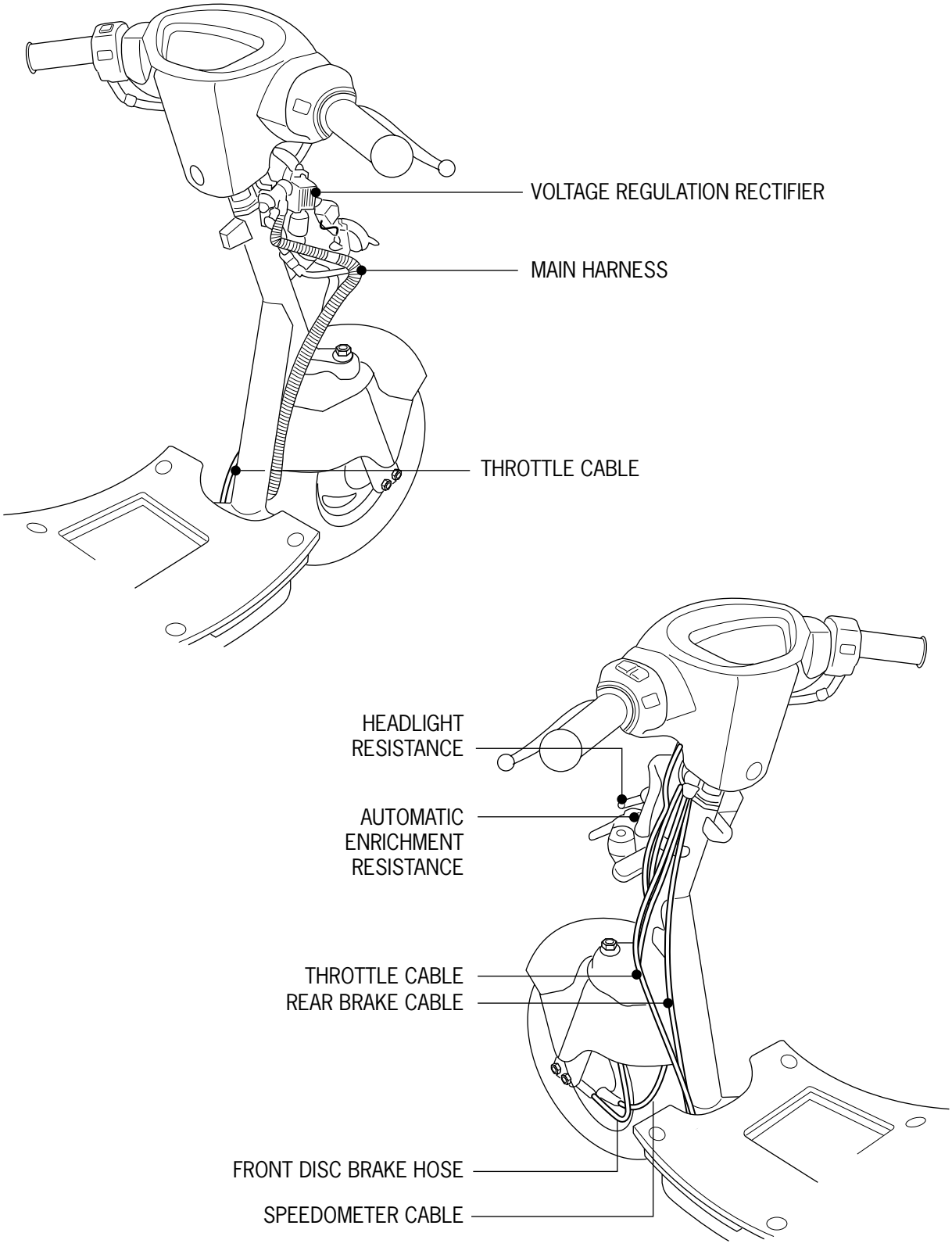


1. General Information

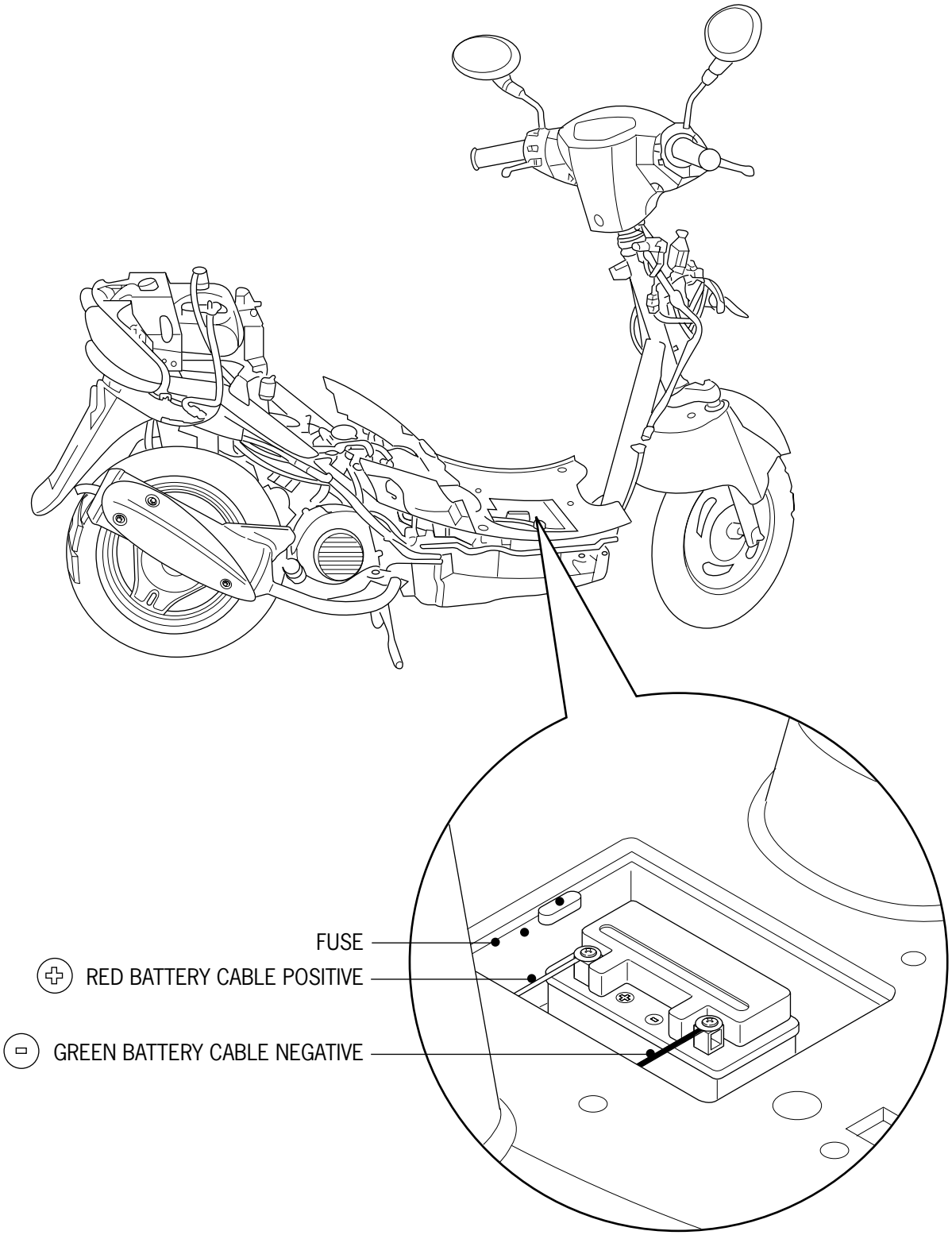
Cable Routing Diagram



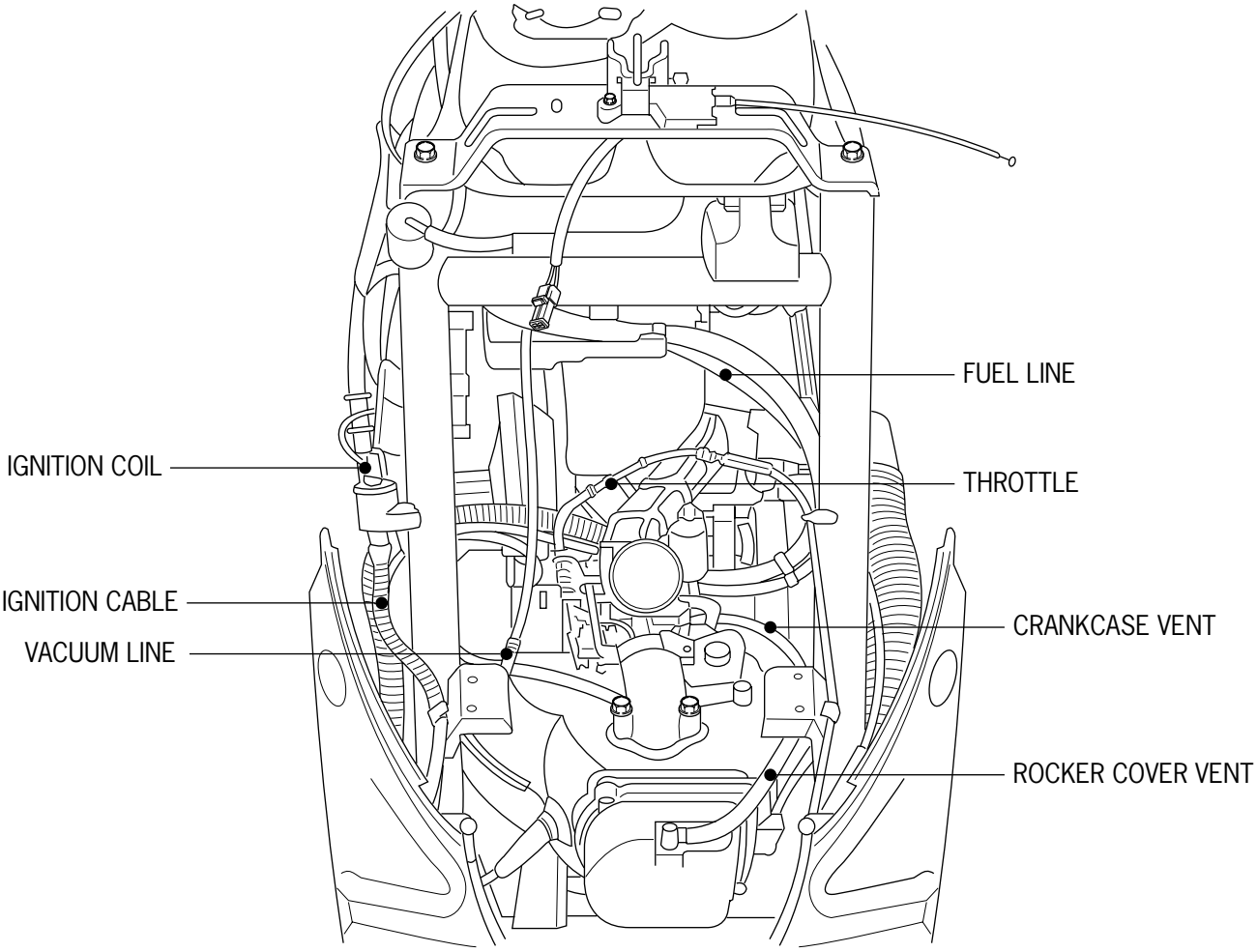
1. General Information



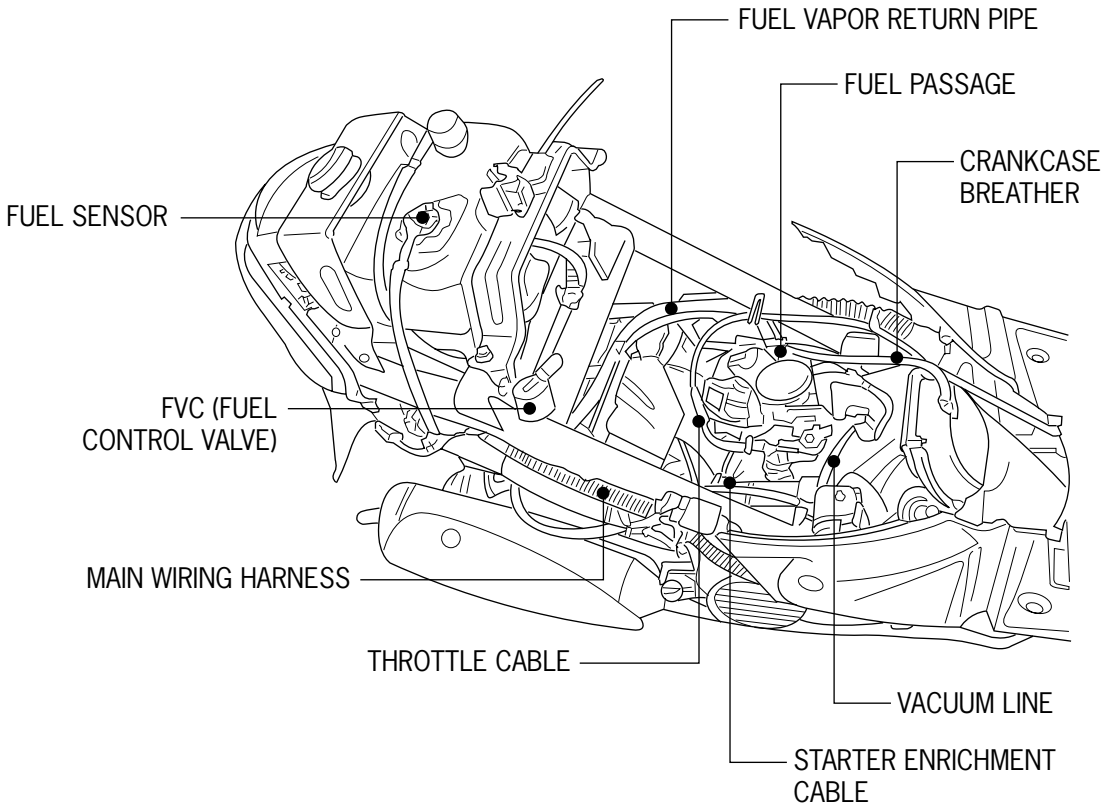
1. General Information

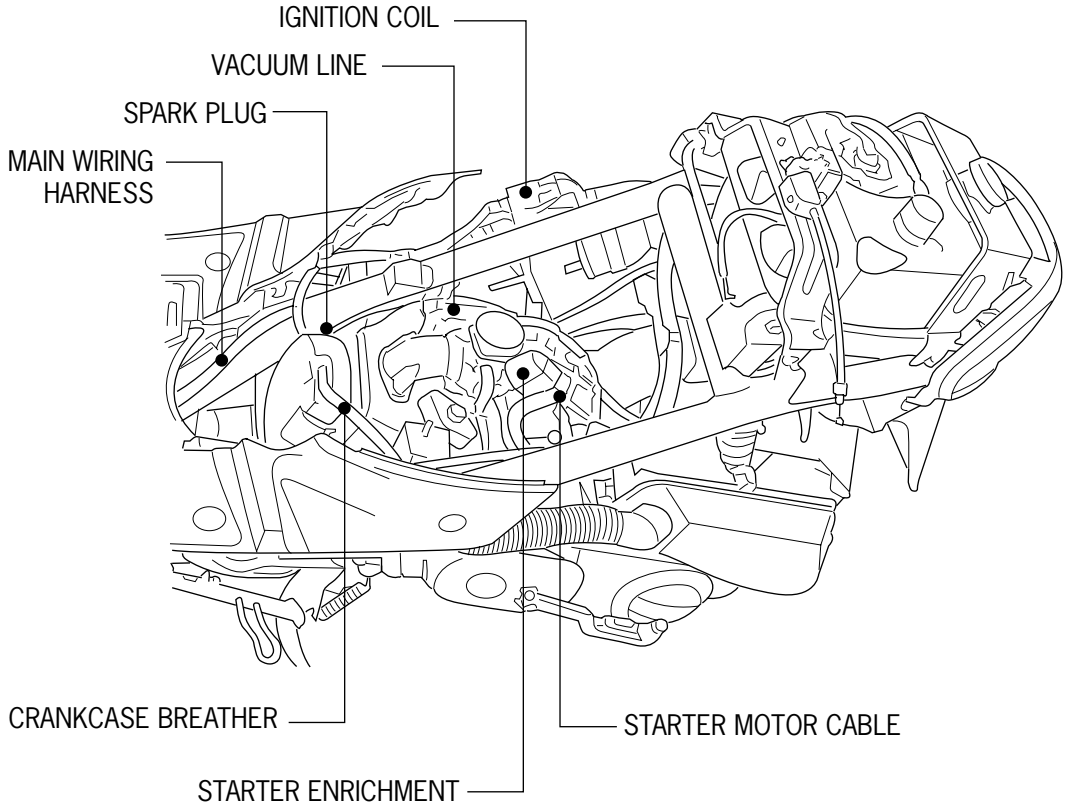


1. General Information

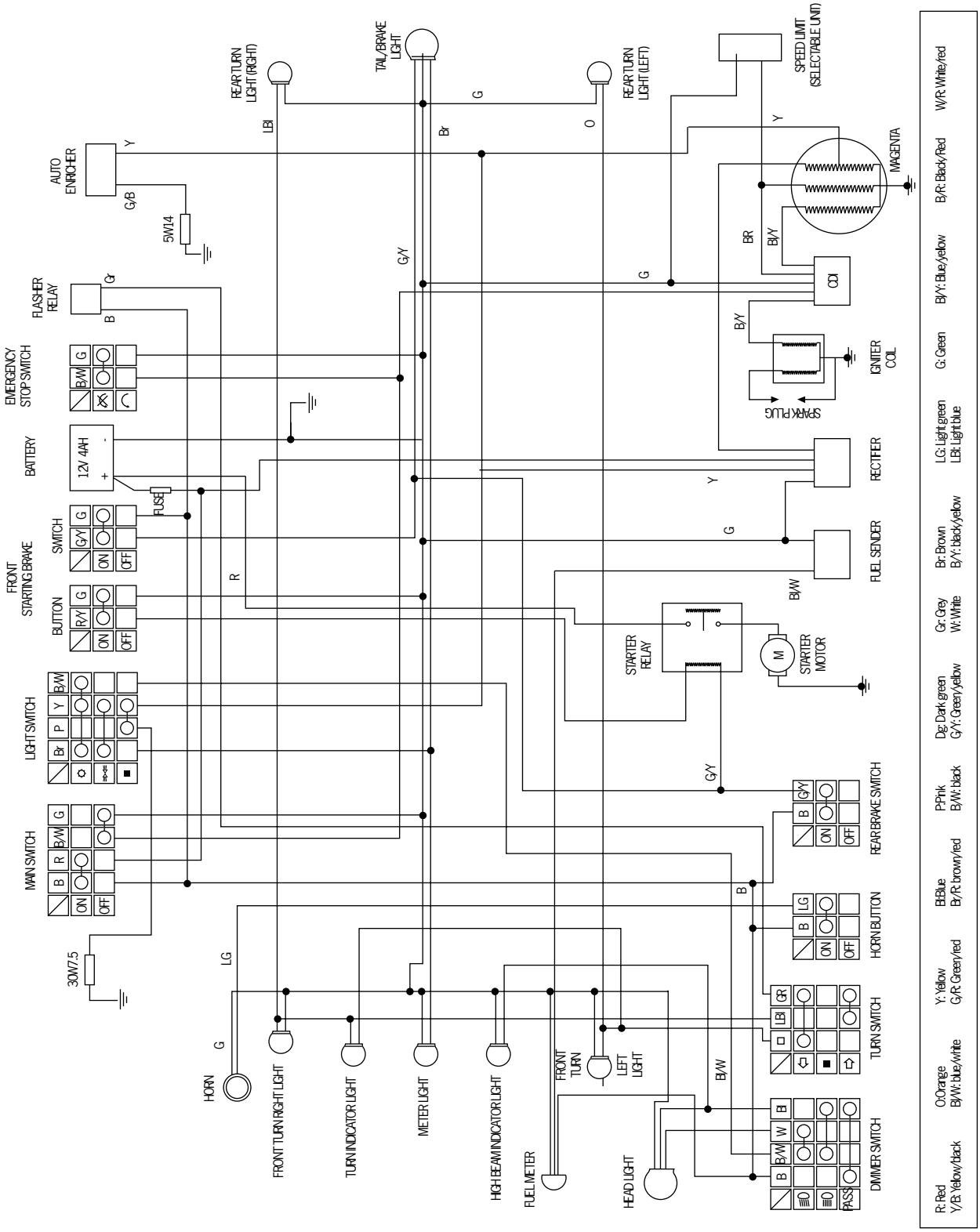


1. General Information



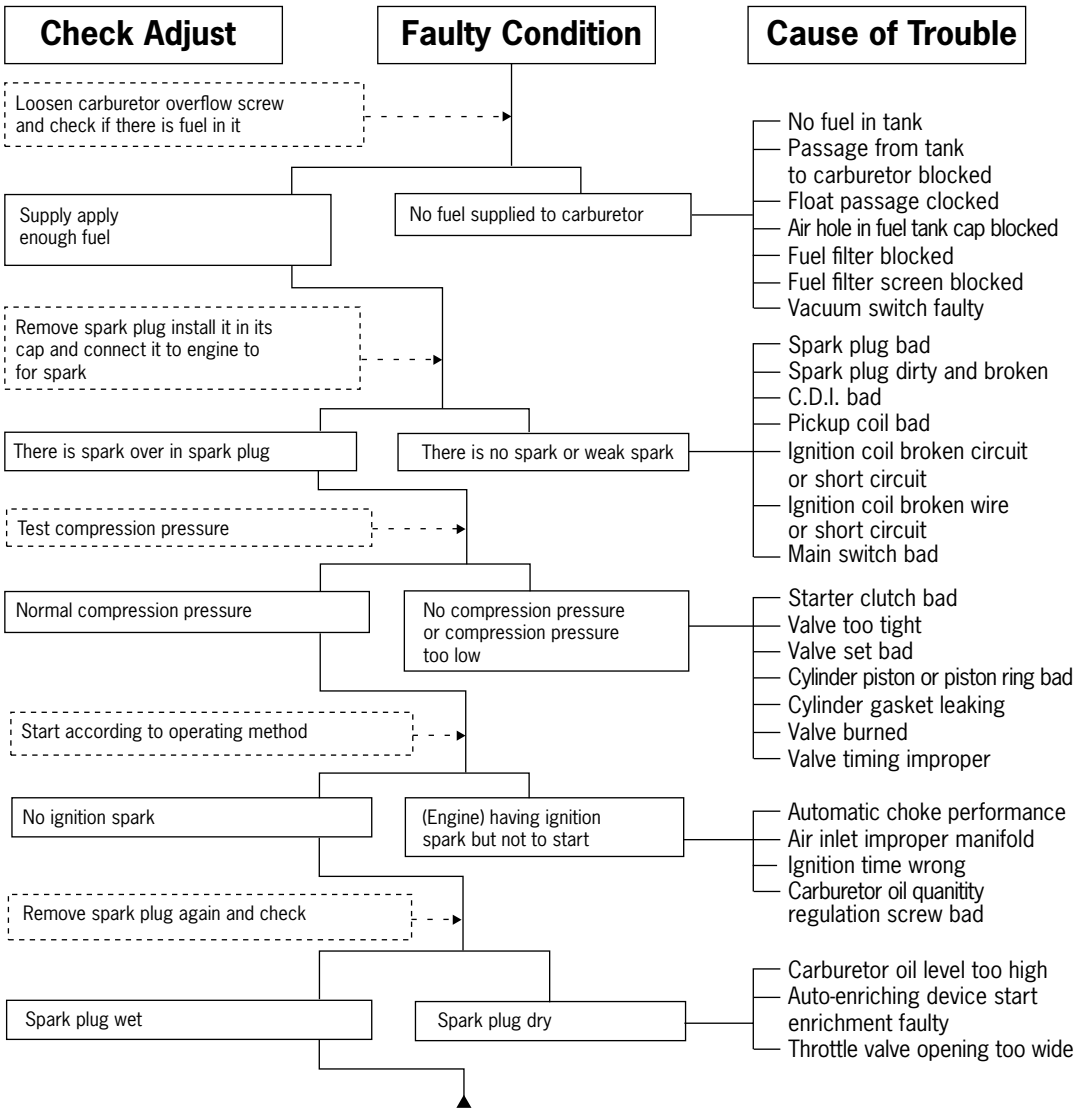


1. General Information



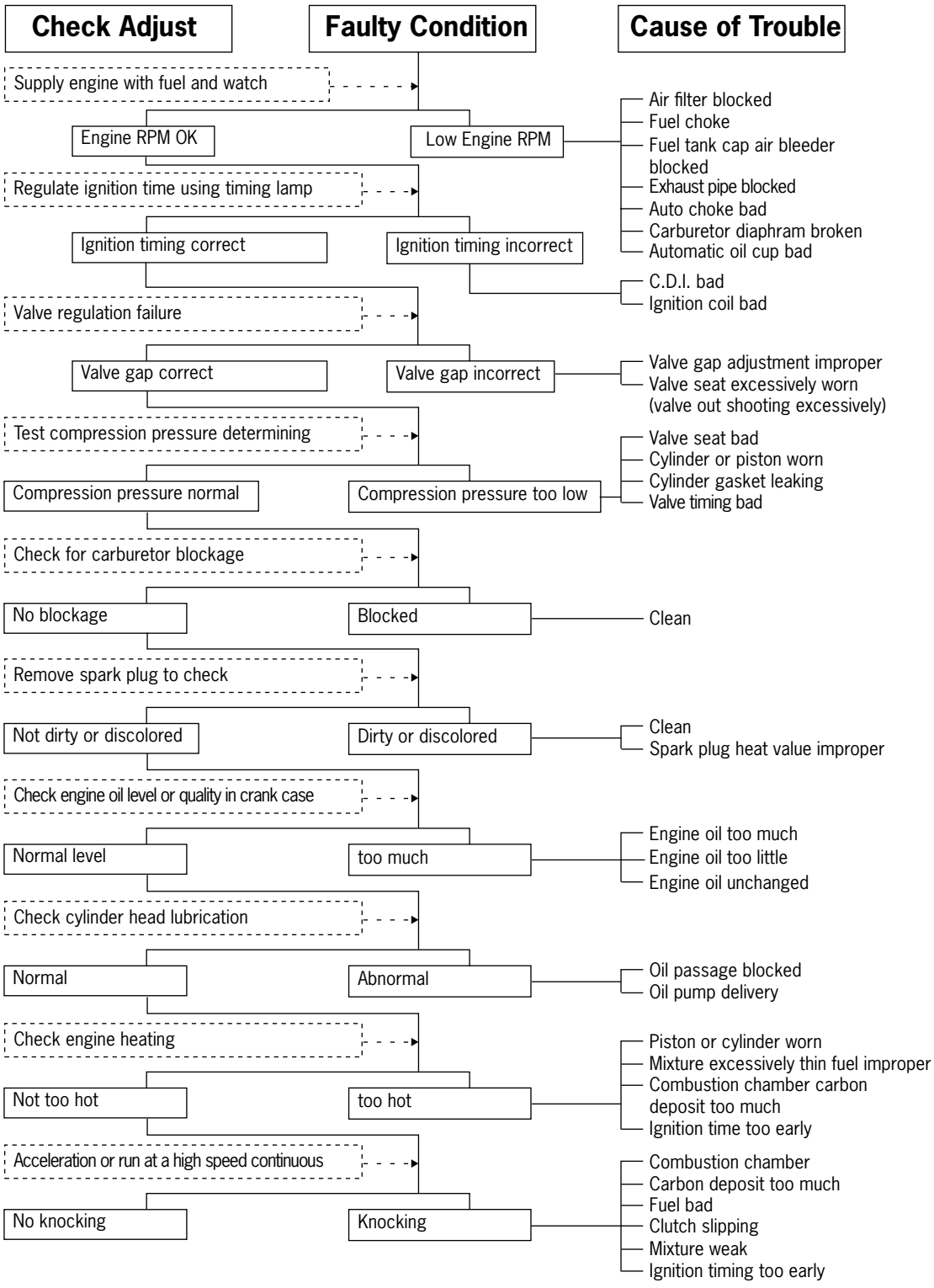
1. General Information

Trouble Shooting Guide
Starter Failure or Hard Starting



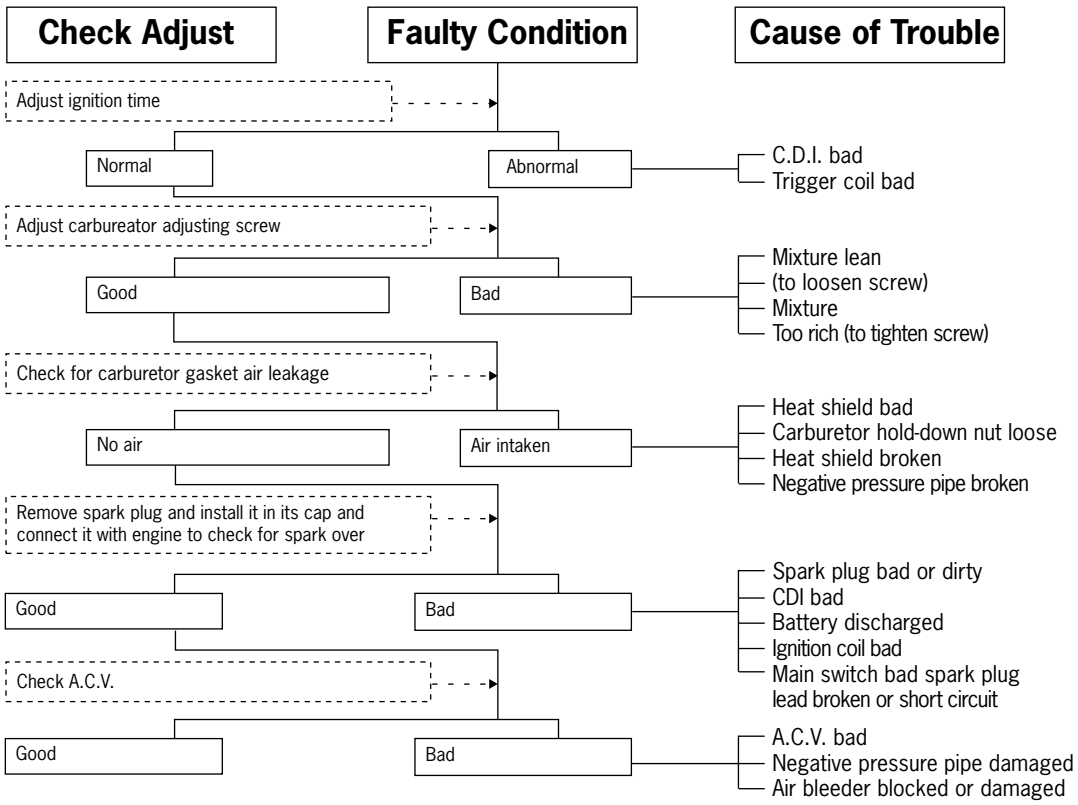
1. General Information

Trouble Shooting Guide (under speed, no power)



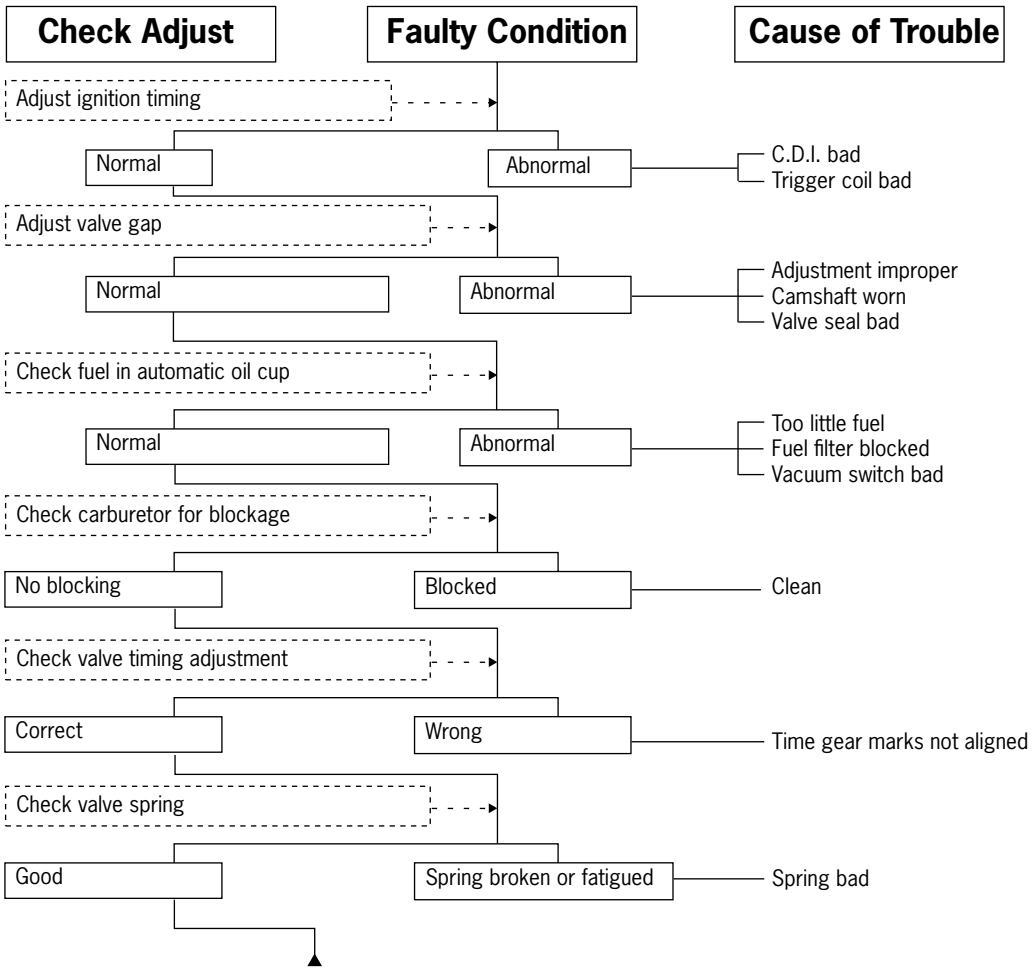
1. General Information

Trouble Shooting Guide (under speed, no power)



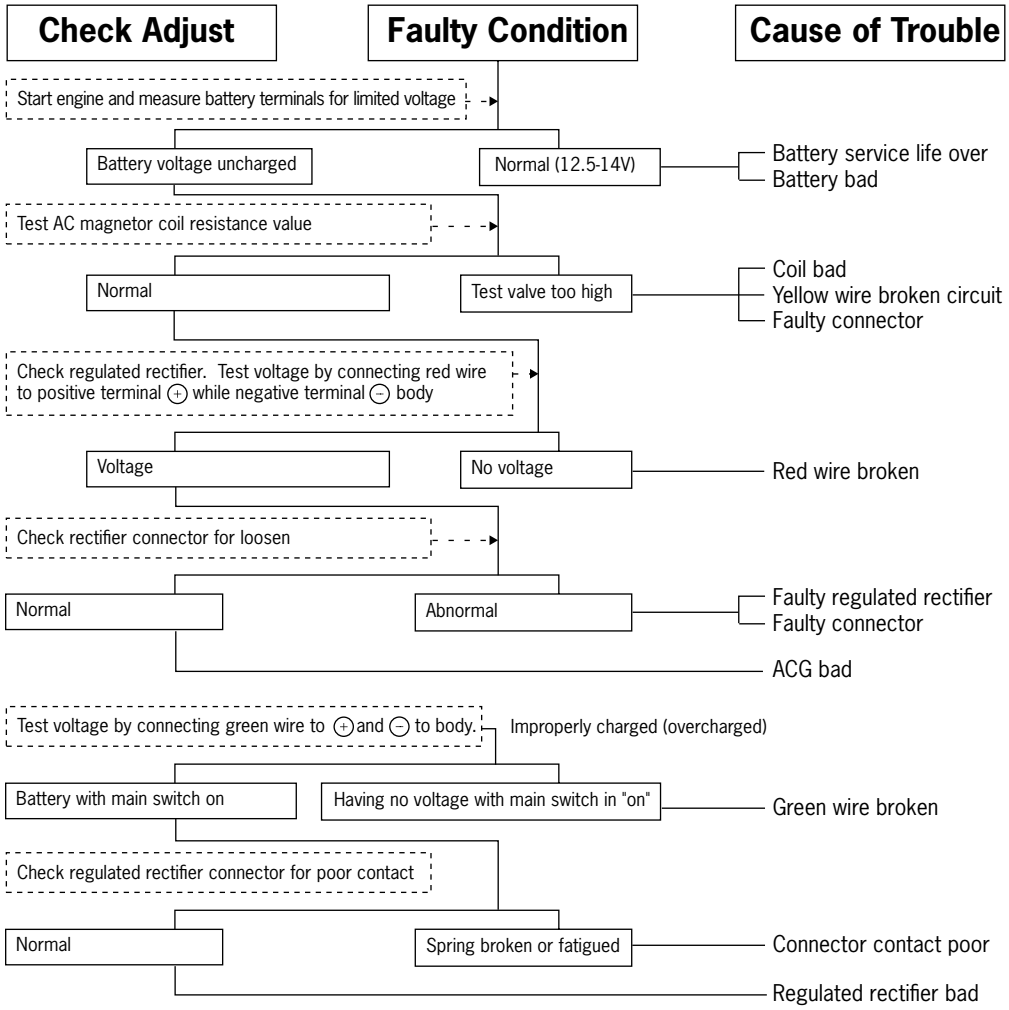
1. General Information

Trouble Shooting Guide (high speed)



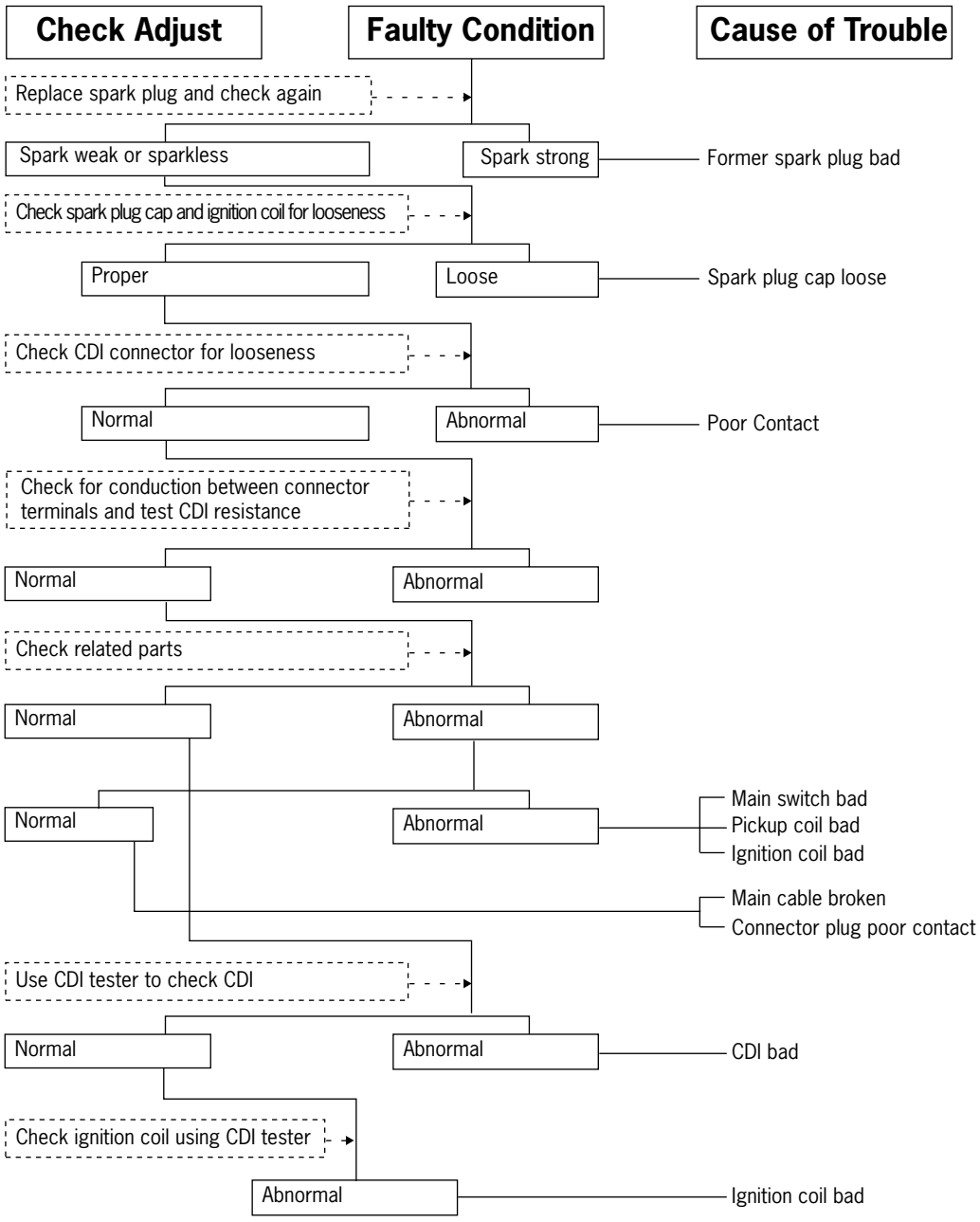
1. General Information

Trouble Shooting Guide-Improper Battery Charging (Battery overdischarge or overcharge)



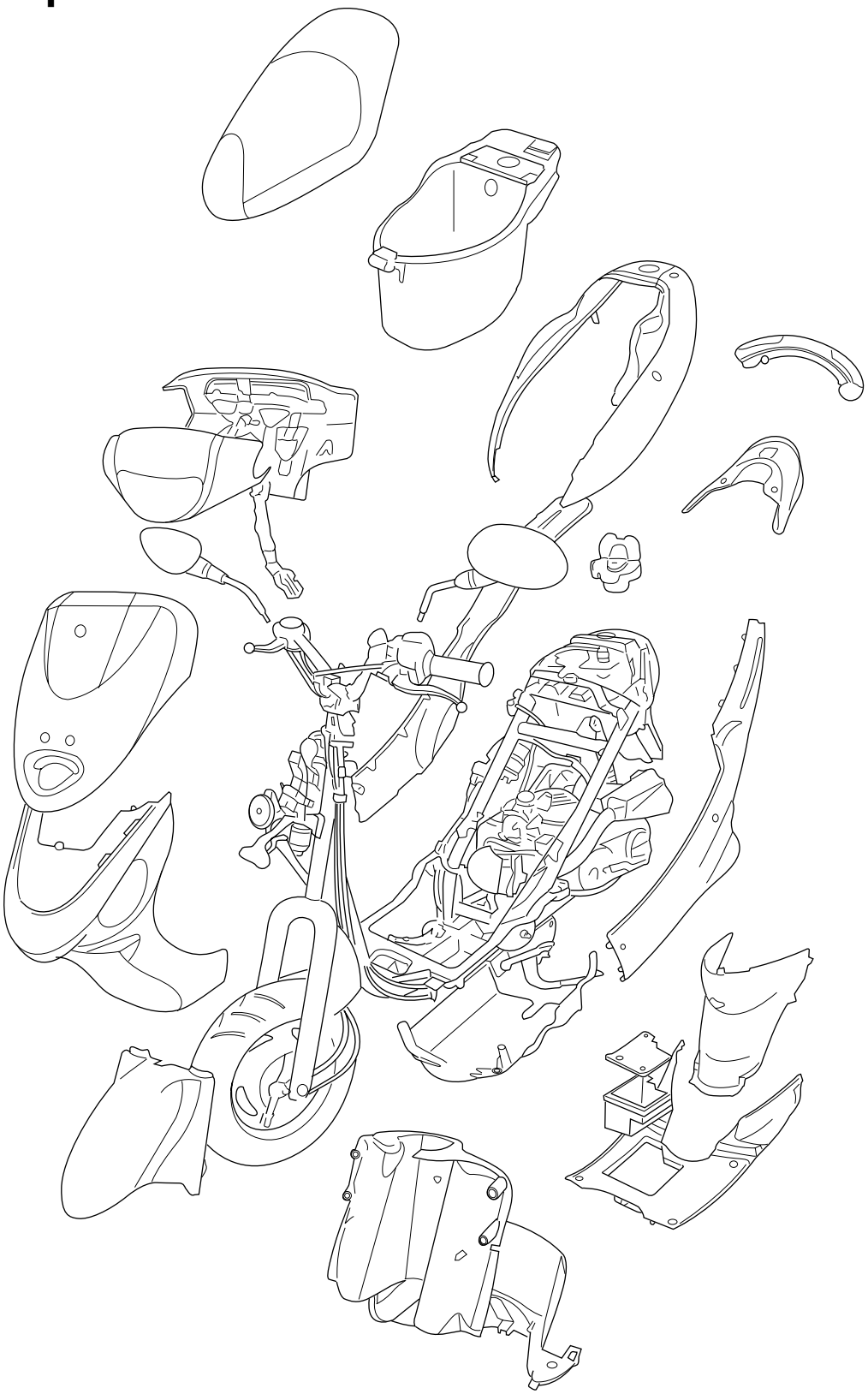
1. General Information

Trouble Shooting Guide (no spark)



1. General Information

Body Exploded View



2. Body Cover and Exhaust System

Topic	Page
General Information	2-1
Body Cover Removal	2-2
Exhaust System Removal	2-4

General Information

•Do not use excessive force when removing body panels. Use a firm, consistent force to disengage the tabs and remove the panels.

•Do not pry or pound on the body panels. The mounting tabs are not designed to withstand prying, pounding or twisting.

Parts to be removed and sequence of removal.
•Front headlight and meter cover.
•Back headlight and meter cover.
•Front fender.
•Front body cover.
•Front body panel.
•Seat and helmet box.
•Rear handhold and taillight assembly.
•Footboard cover and battery cover.
•Footboard and rear cover.
•Front frame cover.
•Covers and body side panels.
•Bottom cover.

Torque requirements
•Body mounting nuts and screws 1.2kg-m
•Exhaust pipe bolts 35kg-m

2. Body Cover and Exhaust System

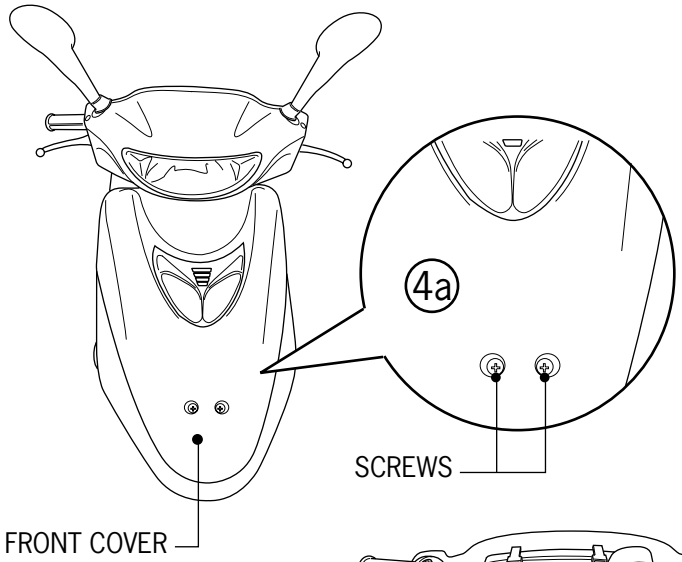
Body Cover Removal

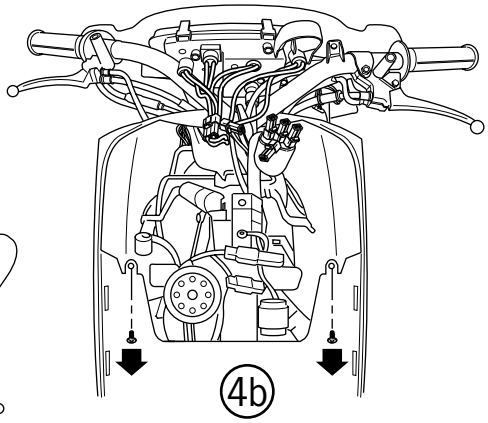
Front Panel Removal

1. Remove one front cover screw from front of panel.
2. Remove two screws on both left and right sides. Remove front panel. Install front panel in the reverse order.

Front Cover Removal

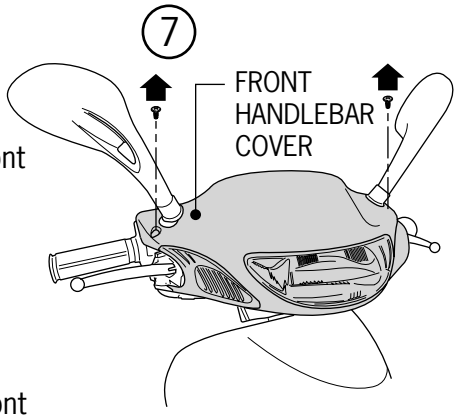
3. Remover rear cover, left and right side covers and front wheel.
4. Remove two screws in front cover (4a).
and remove two screws on each side (left and right) (4b). Remove front cover.
5. Install front cover in the reverse removal order.
6. Make sure to support the scooter while removing the front wheel to prevent it from falling.

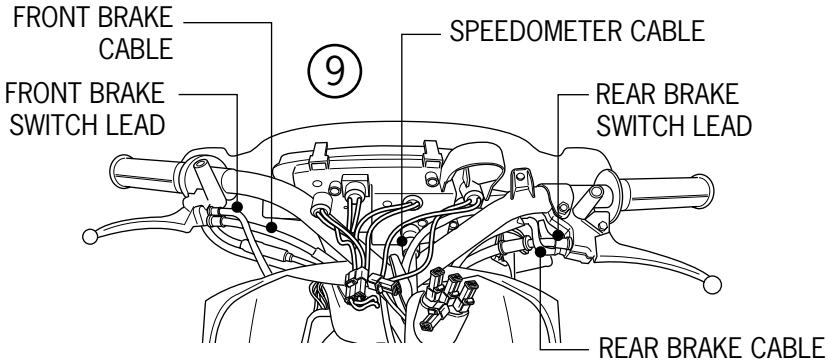




Front and Rear Handlebar Cover Removal

7. Remove two screws on front of handlebar cover and remove one screw in both right and left sides of rear handlebar cover.
8. Disconnect headlight lead and remove front handlebar cover.
9. Disconnect speedometer lead, left and right switches and brake switch connector. Remove one fix screw in rear handlebar cover.
10. Remove the fix screw in each side of rear handlebar cover. Remove rear handlebar cover.
11. Remove the removal order for installation.





2. Body Cover and Exhaust System

Body Cover Removal

1. Remove middle luggage box after opening the seat and removing the four lock nuts.

2. Remove two center cover screws.

3. Remove center cover.

4. Remove left and right cover. (2-3)

5. Remove three rear-rack screws.

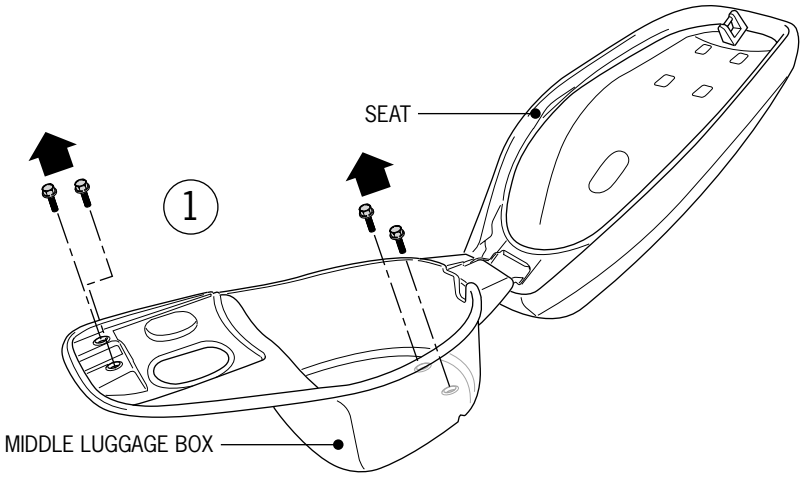
6. Remove rear rack.

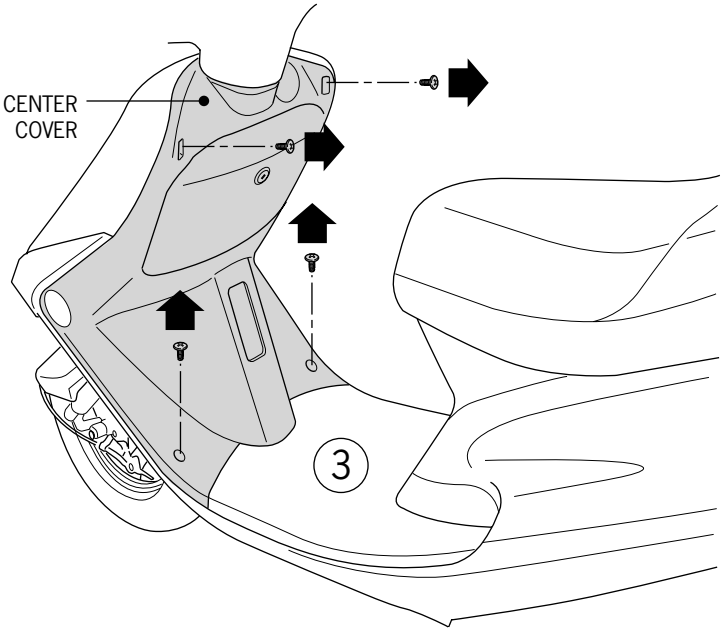
7. Remove screws in rear of body panel.

8. Remove the two screws in the front of the body panel.

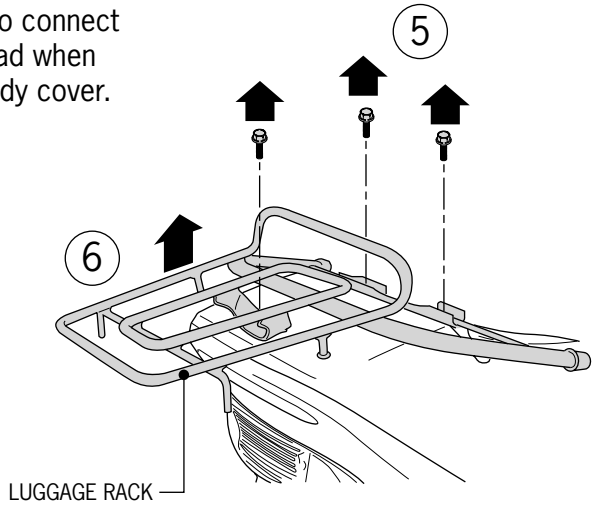
9. Disconnect seat lock lead.

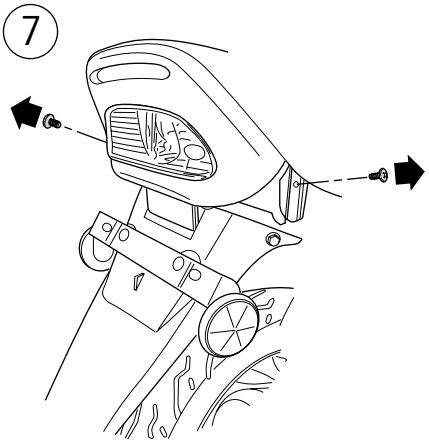
10. Remove the removal order for installation.





Make sure to connect seat lock lead when installing body cover.





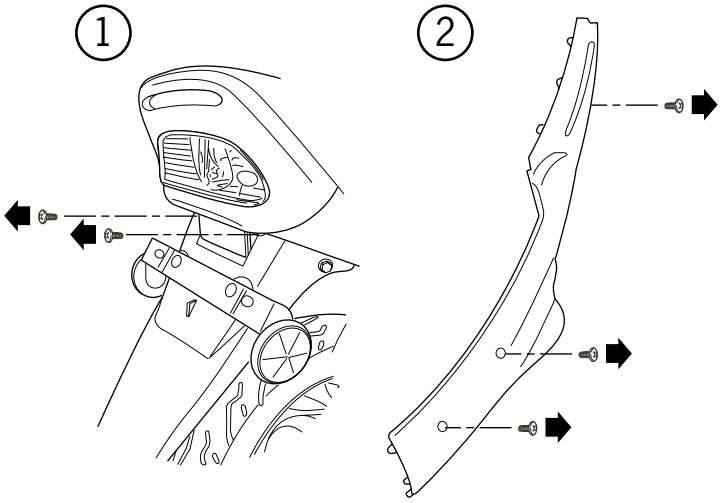
2. Body Cover and Exhaust System

Right and Left Side Mold Removal

1. Remove two rear body screws.

2. Remove three screws in either side of mold.

3. Remove left and right side panels.



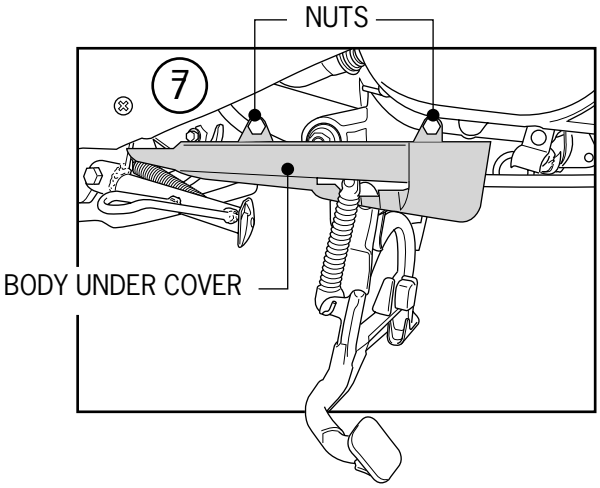
Body under Cover Removal

5. Remove rear body panel.

6. Remove left and right side panels.

7. Remove two nuts in either side of body under cover.

8. Remove body cover.



Floor Panel Removal

1. Remove battery cover, disconnect battery lead and dismount battery.

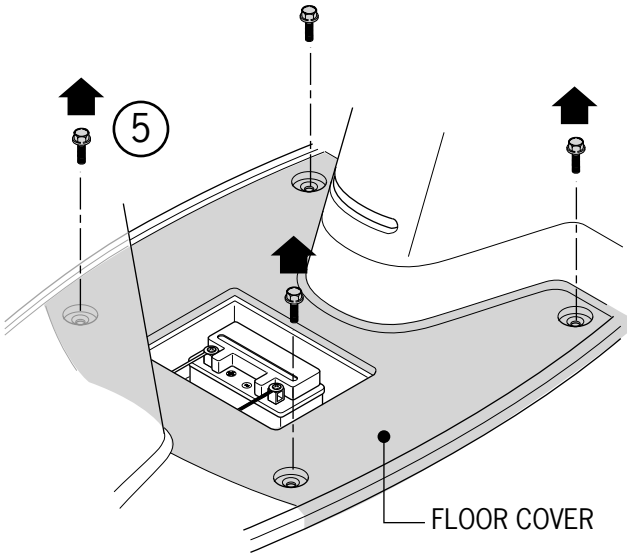
2. Disconnect C.D.I. wire and take it out of battery box.

3. Remove body cover.

4. Remove the speed-limiting governor.

5. Remove four check bolts in the floor panel.

6. Remove floor panel.



2. Body Cover and Exhaust System

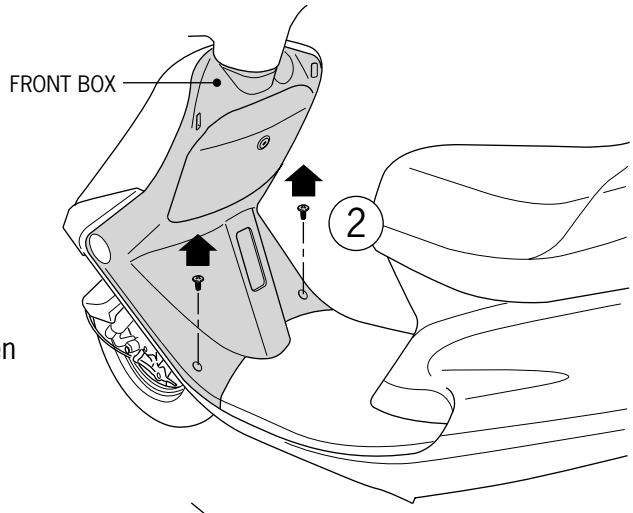
Front Box Removal

1. Remove front cover and front panel.

2. Remove two catch bolts in the front of the floor panel.

3. Remove the front box catch bolt.

4. Remove main switch outer ring and then remove front box outwardly and upwardly.



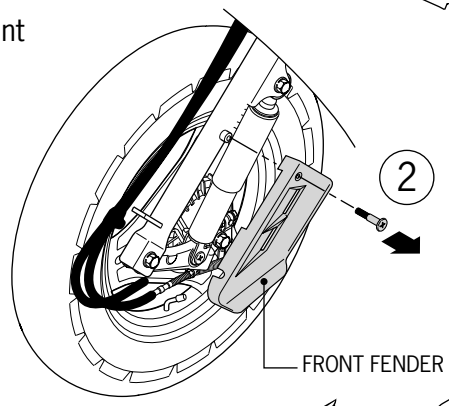
Front and Rear Fenders Removal

1. Remove the two fix screws in the front fender.

2. Dismount the front fender.

3. Remove the two catch bolts in the rear fender stay.

4. Remove the rear fender stay.



Exhaust Pipe Removal

1. Remove the two nuts in the pipe joint.

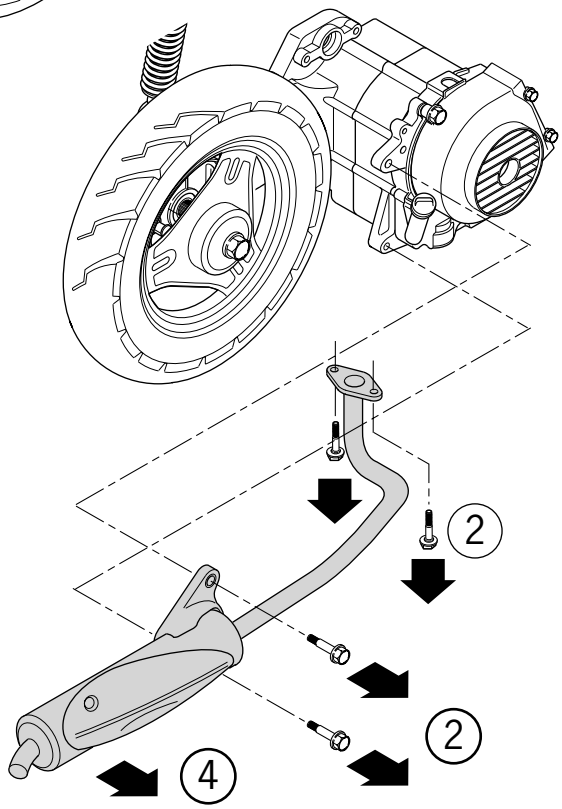
2. Remove the two pipe catch bolts.

3. Remove the exhaust pipe.

4. Remove the joint ring.

•Install exhaust pipe joint ring before installing exhaust pipe.
•Install exhaust pipe joint nuts and fasten them and then install exhaust pipe catch bolts and fasten them.

Torque:
•Exhaust pipe catch bolt 3.5kg/m
•Exhaust pipe joint jam nut 1.2kg/m
•Use a new exhaust pipe carrier ring when reassembling the exhaust system.



3. Scheduled Maintenance

Topic	Page	Topic	Page
Frame and Tire Type	3-2	Drive Belt	3-8
Maintenance Chart	3-3	Rear Brake Arm	3-9
Fuel Filter	3-4	Brake System Front Brake	3-9
Throttle Operation Lever	3-4	Rear Brake	3-9
Air filter	3-5	Front Lamp Adjustment	3-10
Replacing Frequency	3-5	Clutch Engagement	3-10
Spark Plug	3-5	Front Suspension	3-10
Valve Adjustment	3-6	Rear Suspension	3-10
Carburetor Idle Speed	3-6	Nut and Bolt Tightness	3-11
Ignition Timing	3-7	Collar Rim Tire	3-11
Cylinder Pressure	3-7	Air Pressure	3-11
Removing the Spark Plug	3-7	Tire Standards	3-11
Final Reduction Gear Engine Oil	3-8	Steering System	3-12

General Information

Warning
Always make sure you are in a well-ventilated area before the engine starts. Never start the engine in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death. Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

3. Scheduled Maintenance

Frame
•Front brake lever free play: 10-20mm
•Rear brake lever free play: 10-20mm

Tire unit: kg/cm^2

	1 Person	2 Persons
Front	1.5, 17 psi	1.75, 19 psi
Rear	2.0, 23 psi	2.2, 28 psi

Tire type
•Front: 3.00 x10
•Rear: 3.00 x10

Torque:
•Front wheel axle nut 4.0-5.0kg/m
•Rear wheel axle nut 8.0-10.0kg/m

3. Scheduled Maintenance

Maintenance Chart
Perform regular maintenance, according to maintenance handbook.

I: Inspect, clean, lubricate, add fix or replace when necessary.
A: Adjust B: Clean C: Replace D: Tighten

Frequency / Item	Whichever comes first	Mileage (Km)											
		km 1000 / mi 620	km 2000 / mi 1240	km 3000 / mi 1860	km 4000 / mi 2480	km 5000 / mi 3100	km 6000 / mi 3720	km 7000 / mi 4340	km 8000 / mi 4960	km 9000 / mi 5580	km 10000 / mi 6200	km 11000 / mi 6820	km 12000 / mi 7440
Engine oil		the first 300km/ 186 mi	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter		300km/ 186 mi			C				C				
Fuel filter screen										R			
Gear oil	Note 3	new R 300km/ 186 mi				R				R			
Valve gap			A		A				A				A
Carburetor					I				I				I
Air filter	Note 2, 3	I				R					R		
Spark plug		Clean every 3000Km Replace when necessary											
Brake system			I	I	I	I	I	I	I	I	I	I	I
Drive belt									I				
Suspension					I				I				I
Screws and nusts									I				
Tire					I								I
Steering stem bearing		I					I						I

•For safety reasons, it is recommended that service be performed by a dealer.

Note:
1. For mileage higher than what is specified in the chart, the maintenance should be repeated at the same interval listed.

2. More frequent maintenance is required if the vehicle is used in dusty areas or in rain.

3. More frequent replacement is required if the vehicle is subjected to sever use, such as heavy load operation, long trips or operation in rain.

3. Scheduled Maintenance

Fuel Filter

1. Remove luggage box (2-2)

2. Check fuel line for ageing or damage.

3. Replace with a new one in case damaged or leaking.

Throttle Lever Operation

1. Check throttle for proper operation.

2. Check throttle grip free play.
   Free play: 2-6mm (.078 in.-.236 in.).

3. Adjust free play using the adjusting nut in the throttle cable and the adjuster at the carburetor.

•Major adjustment should be made at carburetor.

•Adjust it by loosening the jam nut and rotating adjusting nut.

•Fine adjustment should be made at the throttle grip.

•Remove outer cover, loosen jam nut and rotate adjusting nut to adjust it.

3. Scheduled Maintenance

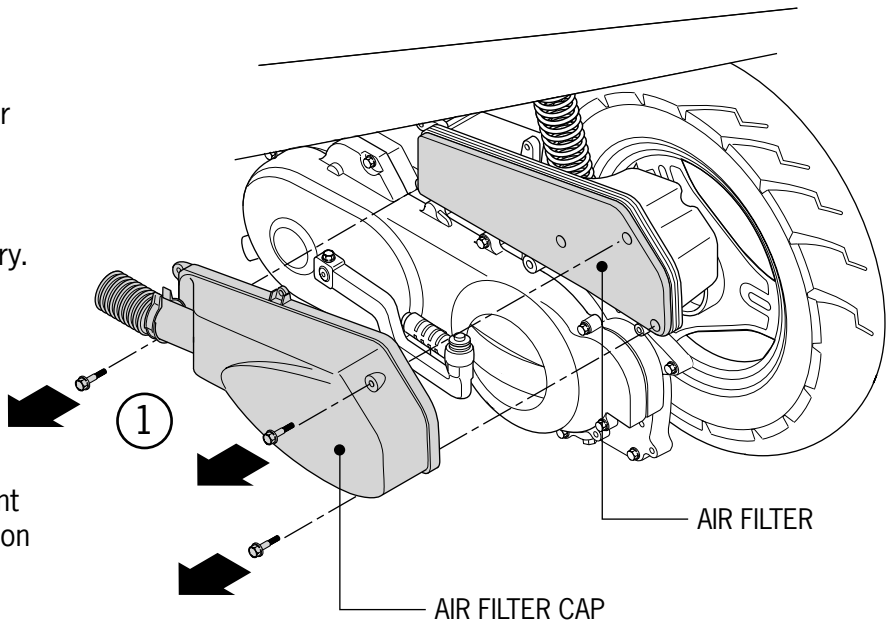
Air Filter

Filter Replacement

1. Remove air filter cap, fix screw and remove the air filter cap.

2. Check filter for dirt or damage. Replace as necessary.

Do not attempt to clean the filter element.



Replacing Frequency

1. More frequent replacement is required if vehicle is driven on dusty roads or in the rain.

2. Make sure the air filter cover is securely in place.

Spark Plug

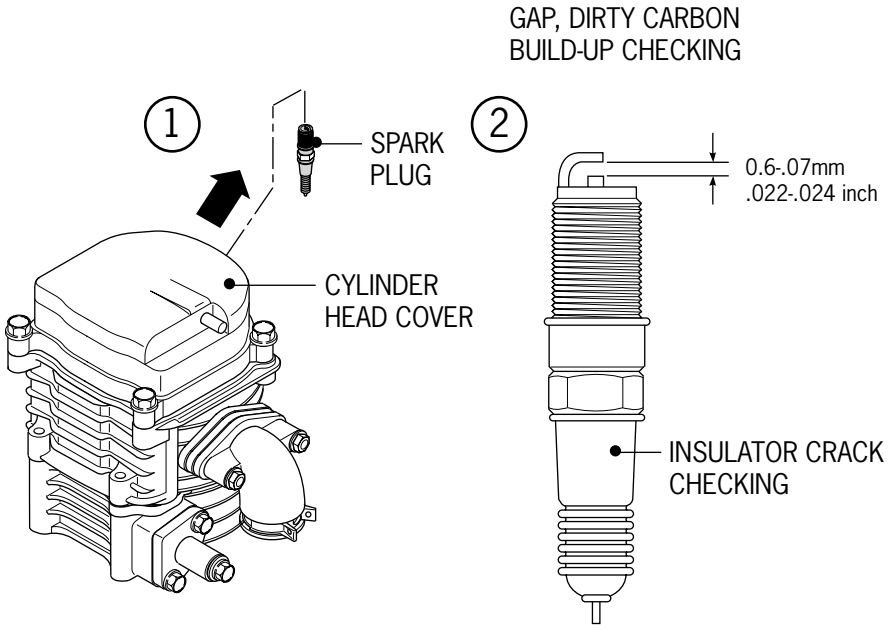
1. Remove spark plug.

2. Check spark plug for burning, dirt or deposit.

3. Clean it with a spark-plug cleaner or steel brush in case of dirt or carbon deposits.

Specified spark plug:
NGK: C7HSA Champion
Check spark plug gap
Gap: 0.6-.07mm (.022-.024 in.)

4. Check plug for dirt, carbon build-up or cracking of insulator.



3. Scheduled Maintenance

Valve Adjustment

Always check and adjust with engine temperature lower than 35˚C (95˚F)

1. Remove cylinder head cover.

2. Rotate cooling fan to camshaft. Locate mark at center top, aligning magneto fly wheel mark with that on crankcase. Magneto “T” mark and box crankshaft mark.

   Valve gap checking and adjustment valve gap:
   IN: 0.05mm (.00197 in.)
   EX: 0.05mm (.00197 in.)

3. To adjust the valve gap, loosen am nut and rotate adjusting nut.

Valve Adjustment Wrench

Be sure to check valve gap again, after locking jam nut.

Carburetor Idle Speed

Idle adjustment should be made with the engine warmed up.

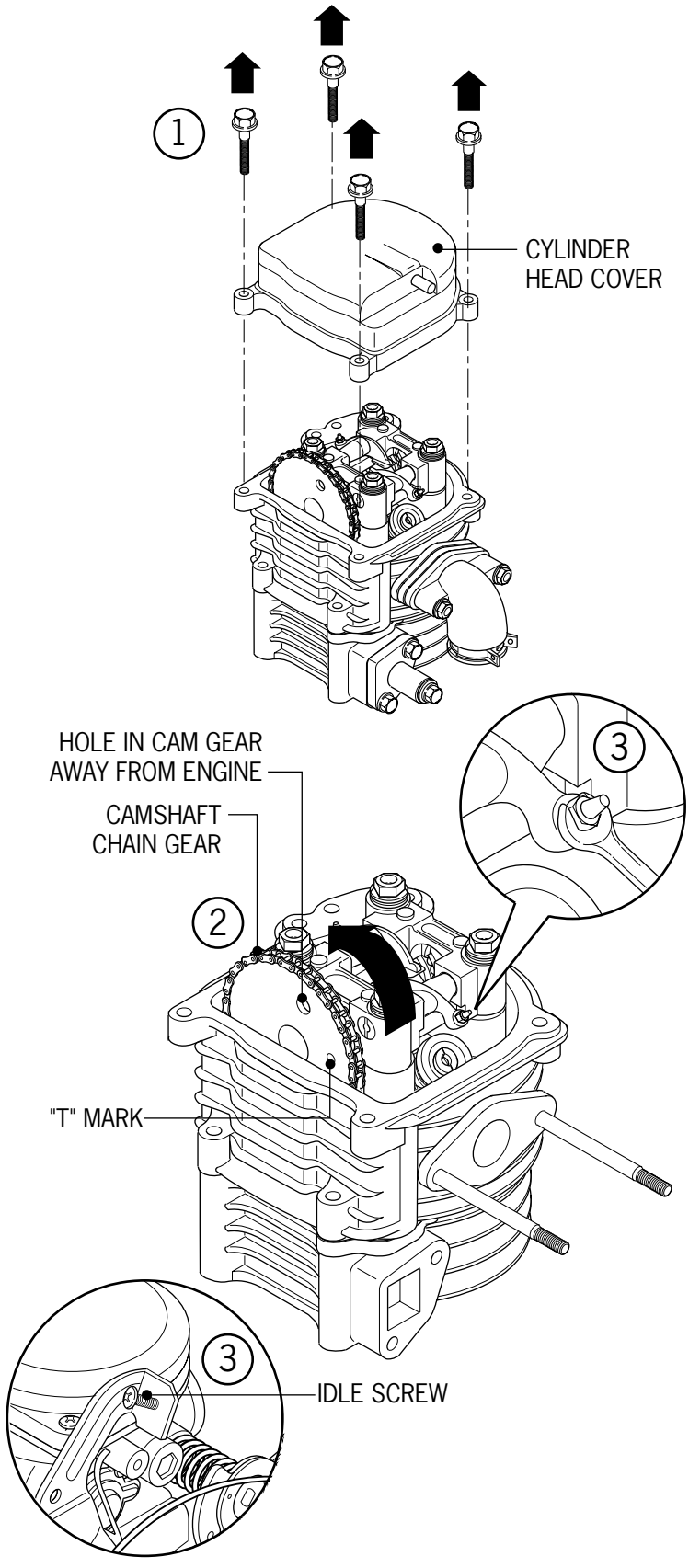
1. Remove cover.

2. After the engine warms up, connect it to an engine revolution counter.

3. Adjust idle screw until specified revolution is obtained.

   Minimum idling speed: 1900+190rpm

4. Readjust the screw if the idle speed is not steady or fuel cannot be properly applied.



3. Scheduled Maintenance

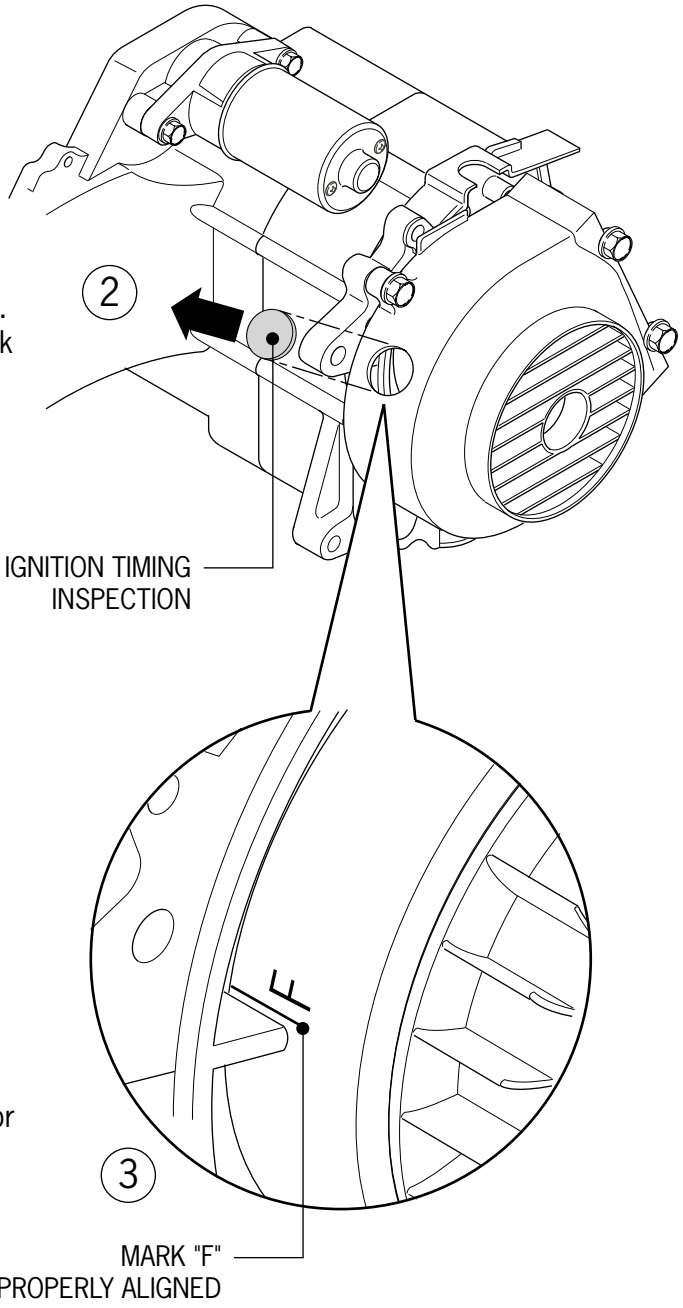
Ignition Time

Equipped with CDI, there is no need for ignition setting.

Check ignition system if ignition time is incorrect.

1. Dismount right body cover.
2. Remove ignition timing inspection.
3. Check ignition timing using the timing light. Crankcase mark must be aligned with mark “F” on flywheel while engine is at idle speed. The timing should advance as the RPM is increased.

   The timing mark should align with the crankcase mark at 3000 RPM.



Cylinder Pressure

1. Measure cylinder pressure with the engine warmed up.
2. Dismount middle luggage box and middle cover (2-2).

Remove spark plug.

1. Install cylinder pressure gauge.
2. With throttle valve fully open, start starter motor to measure cylinder pressure. (213psi)
3. Compression pressure: 15kg/cm2 -600rpm.
4. If the pressure is excessively low, check for the following:

   - •Valve leakage
   - •Valve gap too tight
   - •Cylinder head gasket damaged
   - •Piston ring worn
   - •Piston or cylinder worn

5. Check combustion chamber and piston top for excessive deposit if compression pressure is too high.

3. Scheduled Maintenance

Final check of gear engine oil reduction

Checking oil volume, build up main foot rest so that build up body becomes vertical on plain ground.

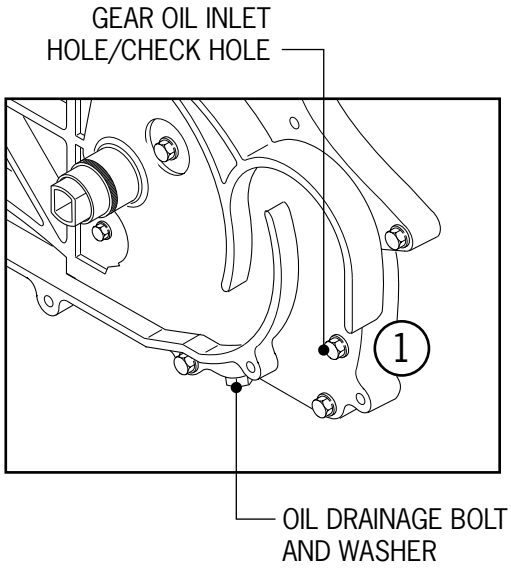
1. Dismount gear oil adjusting bolt after stopping engine.

2. The oil level should be just under the regulation screw bolt hole. Add gear oil when oil level is too low.

    •Gear oil recommended: SAE 90W

3. Build up gear oil regulator screw bolt.

4. Confirm whether or not the packing washer is broken.



Changing Gear Oil

1. Remove gear oil adjusting bolt and drain oil.

2. Confirm whether or not packing washer is broken.

3. Add recommended gear oil.

    •Gear oil capacity: 0.12l-40ES
    •Bolt torque: 0.9kg-m 780 lbs.

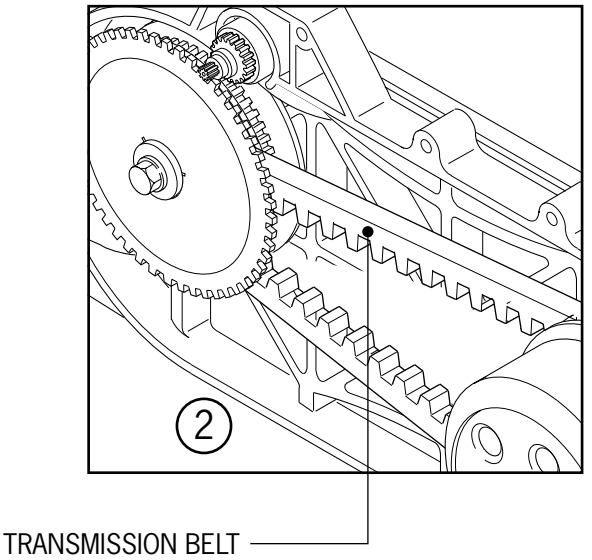
4. Check if there is any leakage after work is performed.

Transmission Belt

1. Detach the left crankcase cover (9-2).

2. Check whether there is wear and tear of transmission belt.

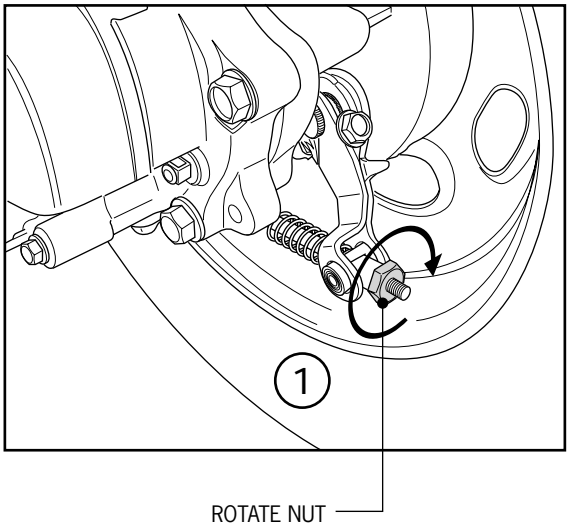
3. Change with new one when necessary or during timely maintenance.



3. Scheduled Maintenance

Rear Brake Arm

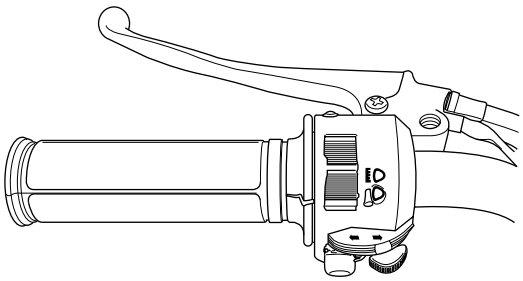
1. Change new pedal when brake bar is pulled to stopping position and the sparrow of brake arm is in alignment with the brake plate mark.



Brake System-Front Brake

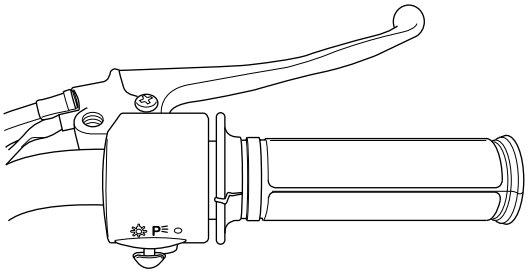
1. Check free gap of front brake bar.
   •Free gap: 10-20mm (0.5 in.).

2. Rotate adjusting nut to regulate free gap of brake bar.



Rear Brake

•Check free gap of rear brake bar.
•Free gap: 10-20mm (0.5 in.).



3. Scheduled Maintenance

Front Lamp Adjustment

1. Rotate nut to adjust free gap when it exceeds proper adjustment.

2. Turn main switch to “on” and start engine.

3. Rotate adjusting screw of front lamp to aim the light.

Clutch Engagement

1. Start engine and increase RPM slowly to check performance of clutch.

- Clutch should engage at 2200 RPM.
- Service and replace clutch as necessary should slippage occur.

Front Suspension

1. Pull front brake bar tightly and compress front for up and down to check its performance.

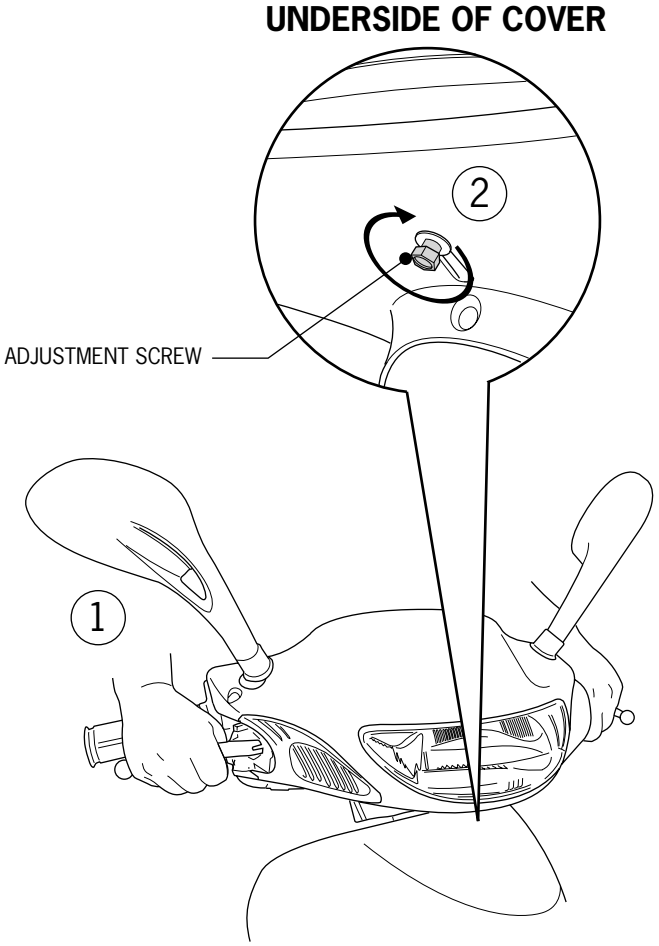
2. Check for leakage of front for and/or soft springs.

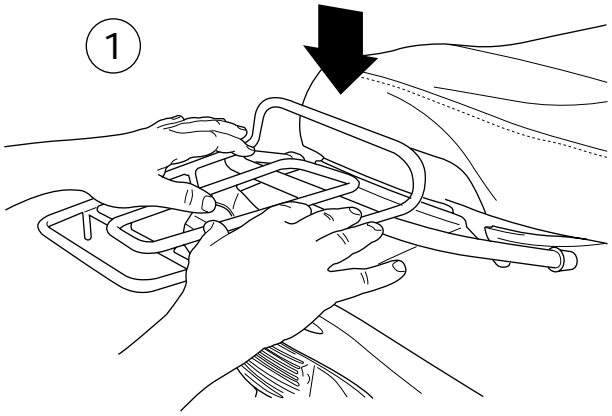
Rear Suspension

1. Compress rear shocks up and down to check performance.

2. Check for leakage of rear shock or soft springs.

3. Suspend rear wheel and push it left and right to check engine suspension sleeve for wear.





3. Scheduled Maintenance

Nut and Bolt Tightness

1. Check all nuts and bolts for proper tightness.

2. Adjust torque as necessary.

Collar Rim Tire

1. Check tire pressure.

Measure tire pressure when tire is cold.

Air Pressure

Front Tire	1.75kg/cm	17psi
Rear Tire	2.00kg/cm	23psi

Tire Standards

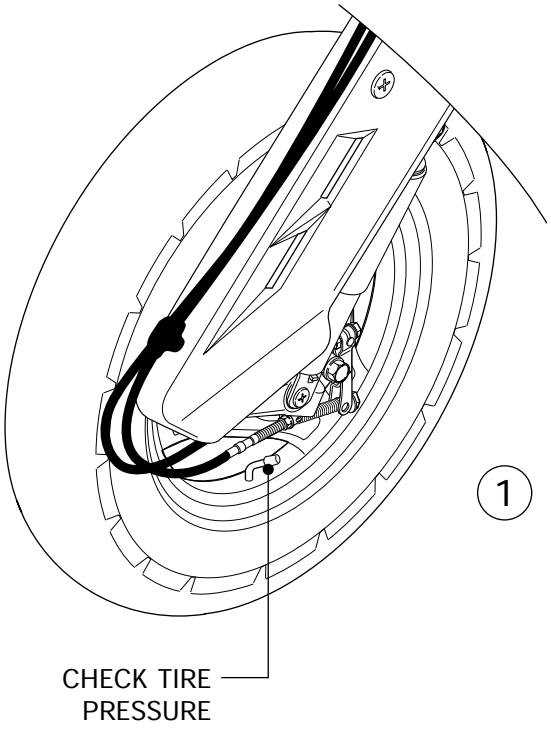
•Front tire: 3.00 x 10
•Rear tire: 3.00 x 10

1. Check if front wheel axle has slack.

2. Check if rear wheel axle nut has slack.

3. Tighten when necessary to stipulated torque if there is slack.

Torque:
•Front wheel axle nut 4.0-5.0 kg-m 28-32 ft lbs
•Rear wheel axle nut 8.0-10.0 kg-m 55-65 ft lbs



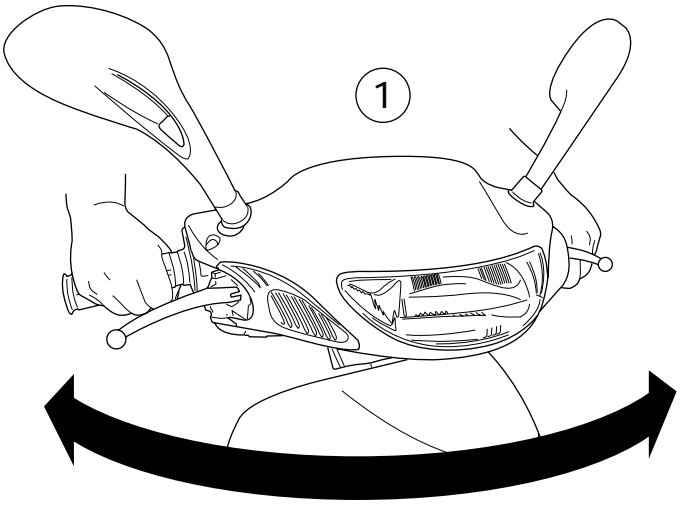
3. Scheduled Maintenance

Steering

1. Swing handlebars left and right to check if there is interference from the wires.

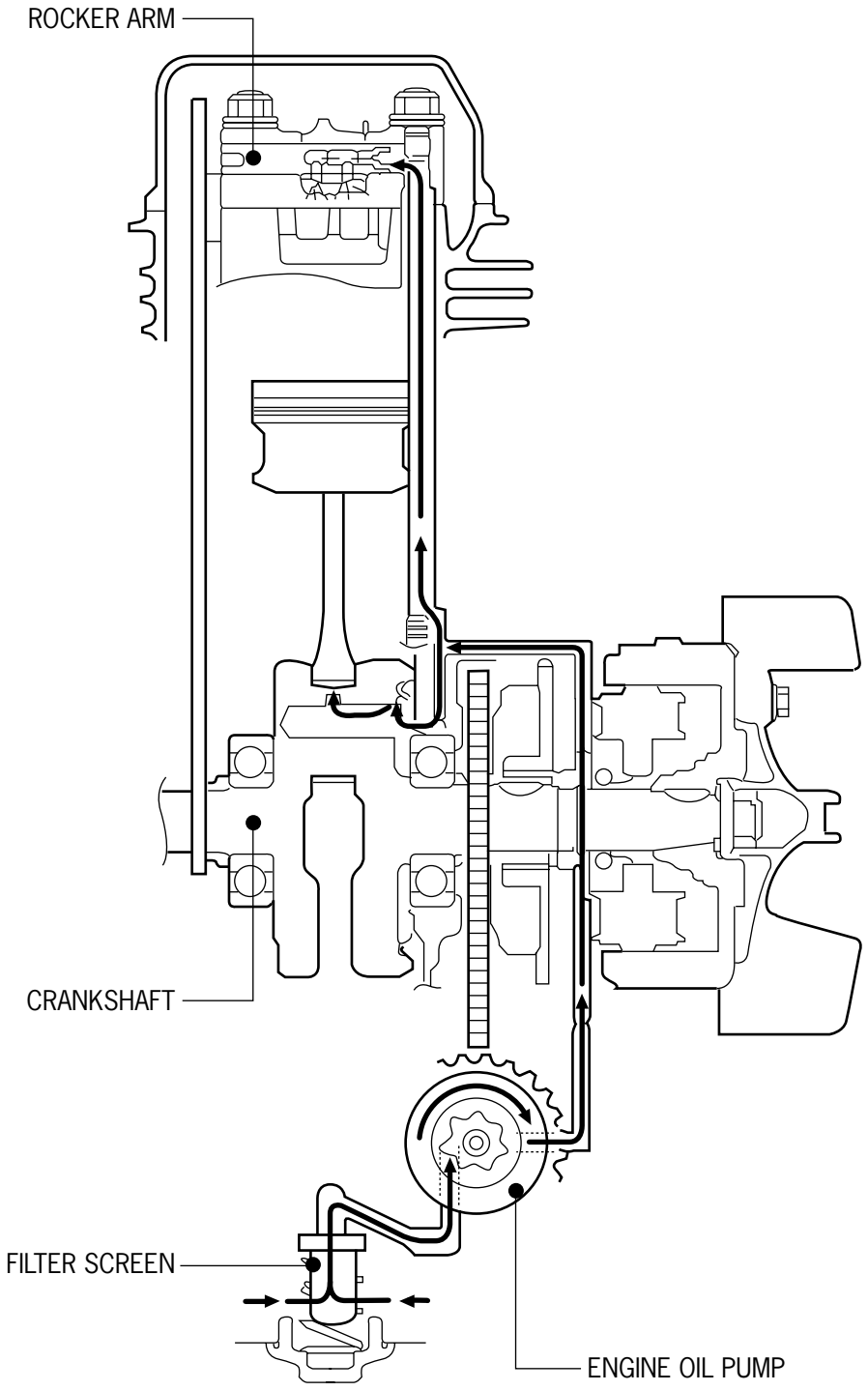
2. Grasp handlebars and rotate from left to right while holding the front wheel straight. There should be slippage.

3. Check steering bearing adjustment. Fork should turn freely with play in bearing.



4. Lubricating System

Lubricating System



4. Lubricating System

Topic	Page	Topic	Page
Overall engine requirements	4-2	Engine Oil Pump Removal	4-4
Problem diagnosis	4-2	Oil Pump Disassembly	4-5
Engine oil/filter screen	4-3	Checking	4-5
Oil Volume	4-3	Assembling	4-6
Oil Changed	4-3	Installation	4-6

Overall Engine Requirements

Special Attention
Use proper motor oil SAE 10W 30.
Use only clean, fresh oil.
Do not rebuild oil pump. Replace with a new pump when needed.
Check for leakage after replacing pump.

Basic Material

Item		Nunmul value	Replace at
Engine oil pump	Gap between inner rotator and external rotor	–	0.12mm .005in
	Gap between external rotor and pump body	–	0.12mm .005in
	Gap between and surface of rotor and pump body	0.05-0.10mm .001-.004in	0.2mm .008in

Problem Diagnosis

Loss of engine oil
•Engine oil natural consumption.
•Engine oil leakage.
•Piston ring wear, bad assembly.
•Valve guide oil seal is worn.

No oil pressure
•Pump worn.
•Use of wrong oil.
•Oil level low.

Engine burning excessive oil
•Blocked oil passage.
•Use of wrong oil.
•Worn rings.
•Valves worn or damaged.

4. Lubricating System

Engine Oil/Filter Screen

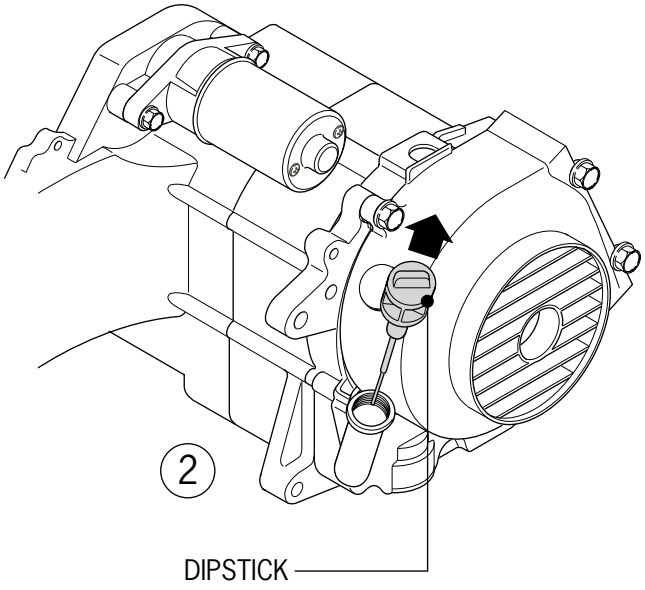
Oil Volume

1. Check oil with scooter parked on level ground on center stand.

◉ Scooter must be on center stand when oil volume is checked.

◉ Run engine for two or three minutes and then turn it off. After two to three minutes, check the oil level.

2. Check the oil level when the oil dipstick is unscrewed and out.
3. Add oil to upper limit level on the dipstick.



Oil Changed

◉ It is easier to drain oil when motor is warm.

1. Remove drain bolt to completely drain oil.
2. Disassemble the oil filter screen cover and take off the oil filter screen. Use high-pressure air to clean the filter screen. Wash with solvent and dry before reinstalling.

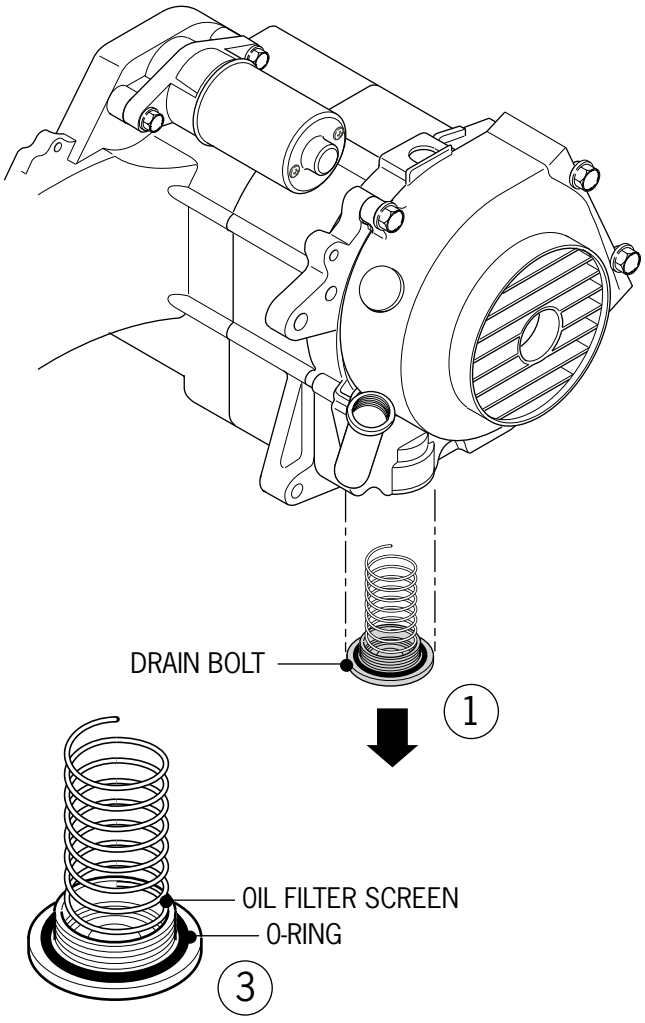
3. Check o-ring for damage. Replace if necessary.
4. Assemble engine oil filter screen and filter screen cover.

   •Torsion value: 1.4kg-m
   1300 ft lbs

5. Add assigned oil to determined volume.

   •Engine oil capacity: 0.8L
   •320ES

6. Check for oil leaks.
7. Run engine for 1-2 minutes at idle speed.
8. Turn engine off and check oil level. Add oil if needed.



4. Lubricating System

Oil Pump Removal

1. Remove engine right outer cover fan magnetor.

2. Remove alternator rotor.

3. Remove stator pules coil.

4. Remove eight bolts of right crankshaft case cover and take off crankshaft case cover.

5. Remove washer and fixed pin.

6. Remove the fixed nut of the gear in the oil pump.

7. Take off the gear of the oil pump.

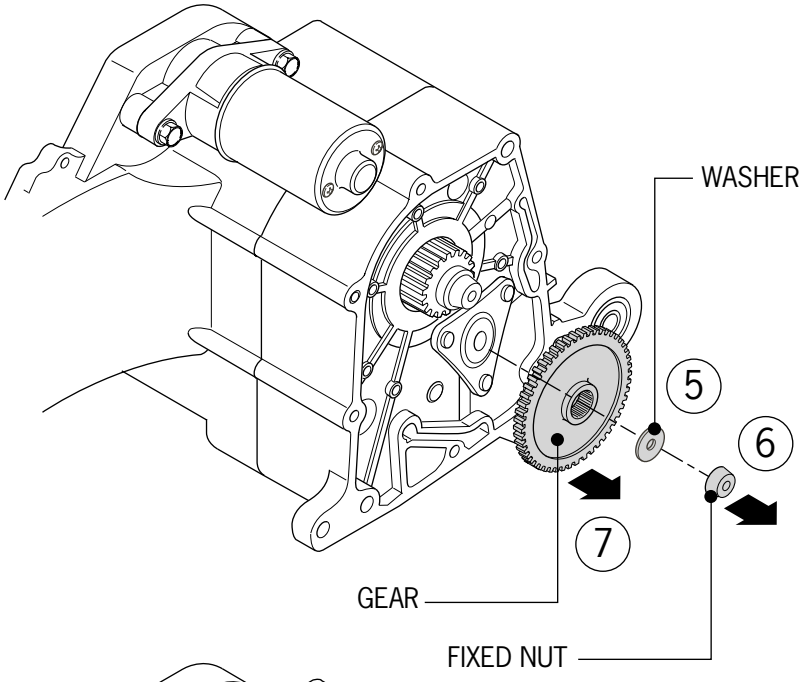
8. Remove fixed bolts of oil pump module body.

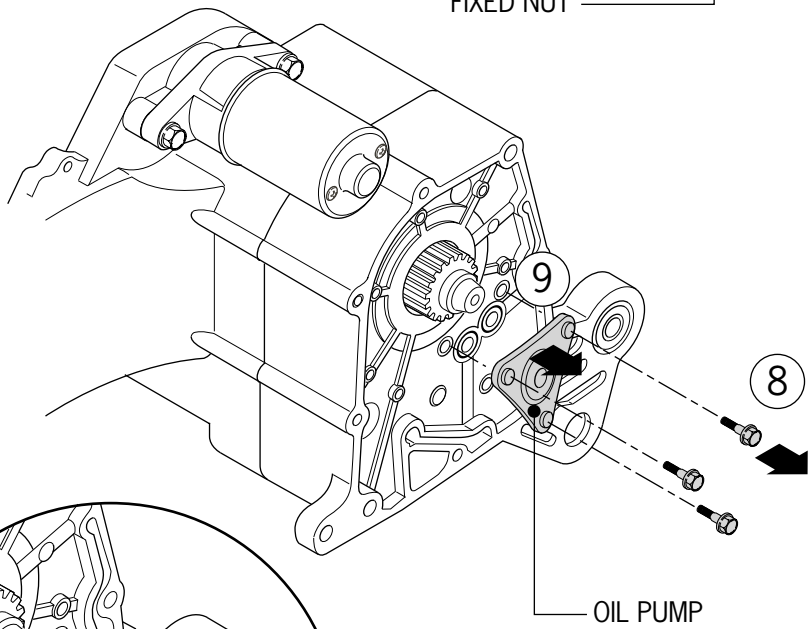
9. Take off oil pump.

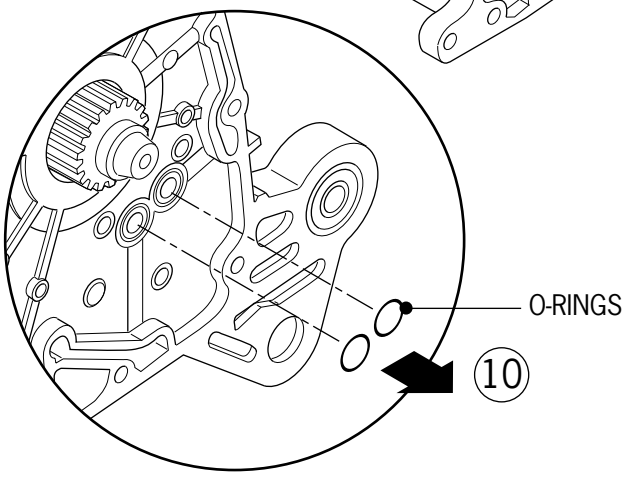
10. Take off two o-rings.

11. Check o-rings for damage.

12. Replace if necessary.





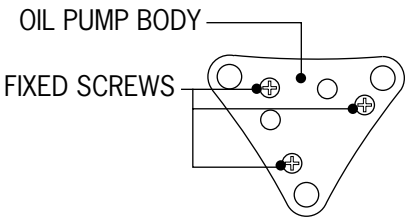


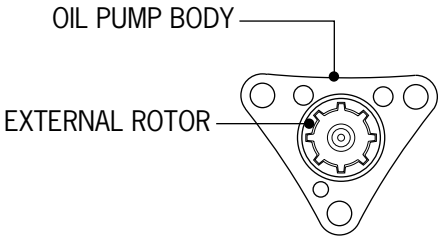
4. Lubricating System

Oil Pump Disassembly

1. Remove three fixed screws in oil pump body.

2. Disassemble oil pump.





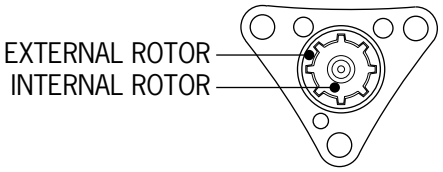
Checking

1. Check the gap between the oil pump module body and the external rotator.

   •Used limit: 0.12mm (.005 in.).

2. Check the gap between the surface of the rotator and the body.

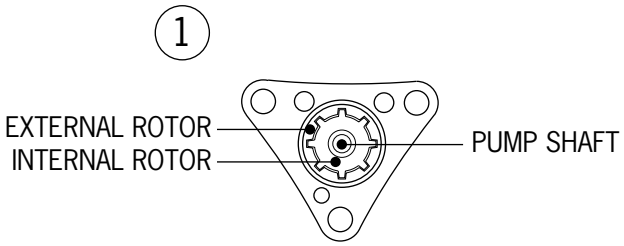
   •Used limit: 0.2mm (.008 in.).



4. Lubricating System

Assembling

1. Assemble inner and outer rotators and oil pump shaft.



Be careful of alignment between pump bearing unfilled corner and inner rotator unfilled corner.

2. Assemble pump cover and tighten screws.

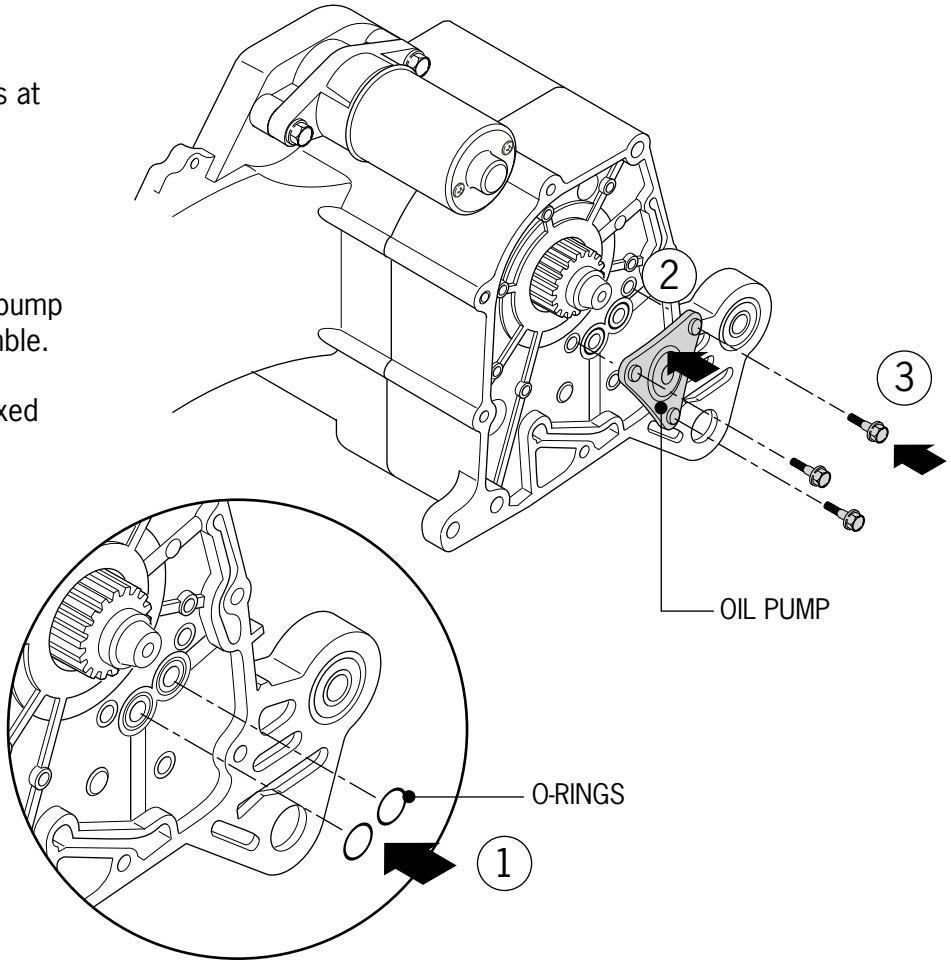
Installation

1. First put two o-rings at the oil pump seat.

2. Put oil pump in the crankshaft case.

First add oil to pump and then assemble.

3. Tighten the three fixed screws.



4. Lubricating System

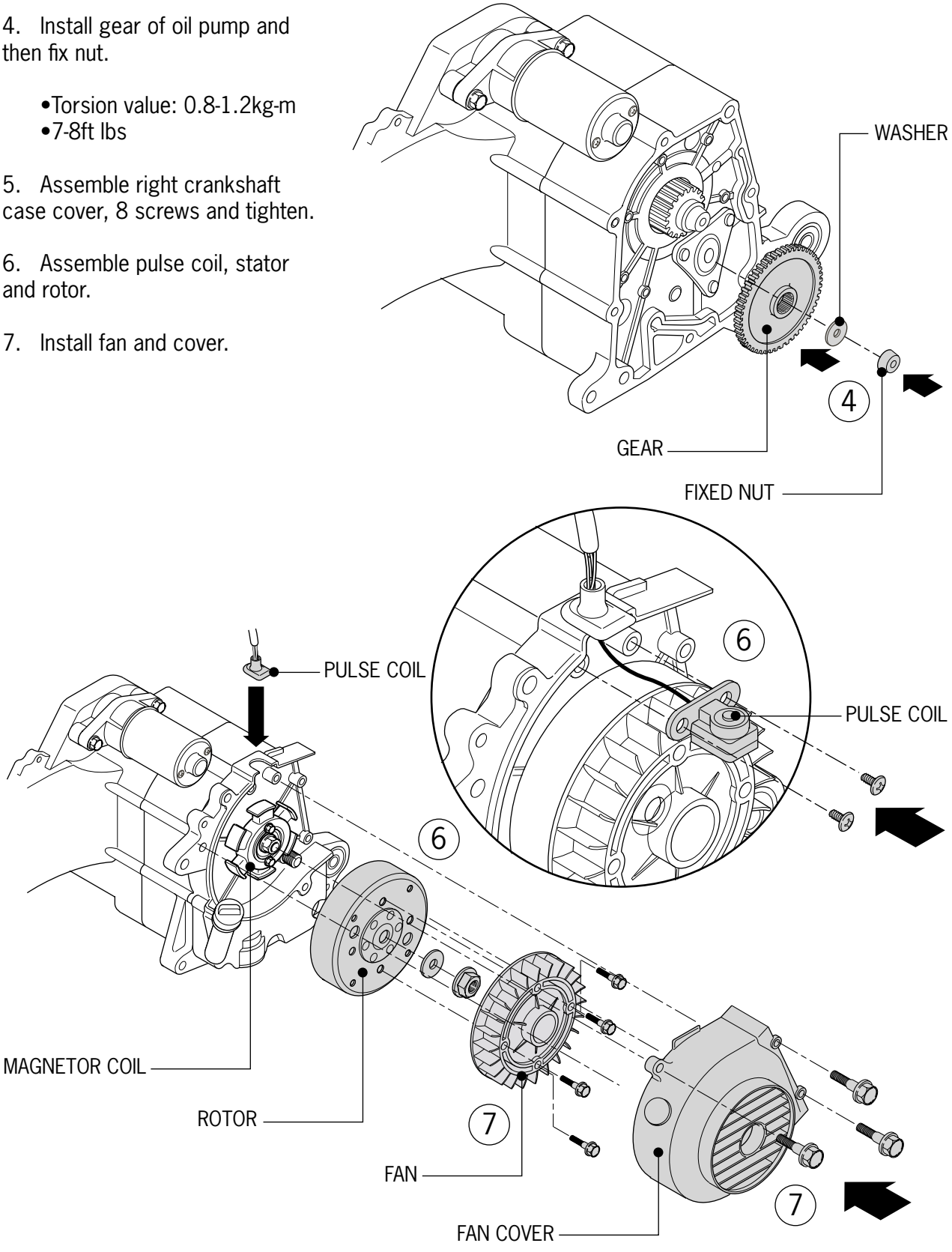
4. Install gear of oil pump and then fix nut.

- Torsion value: 0.8-1.2kg-m
- 7-8ft lbs

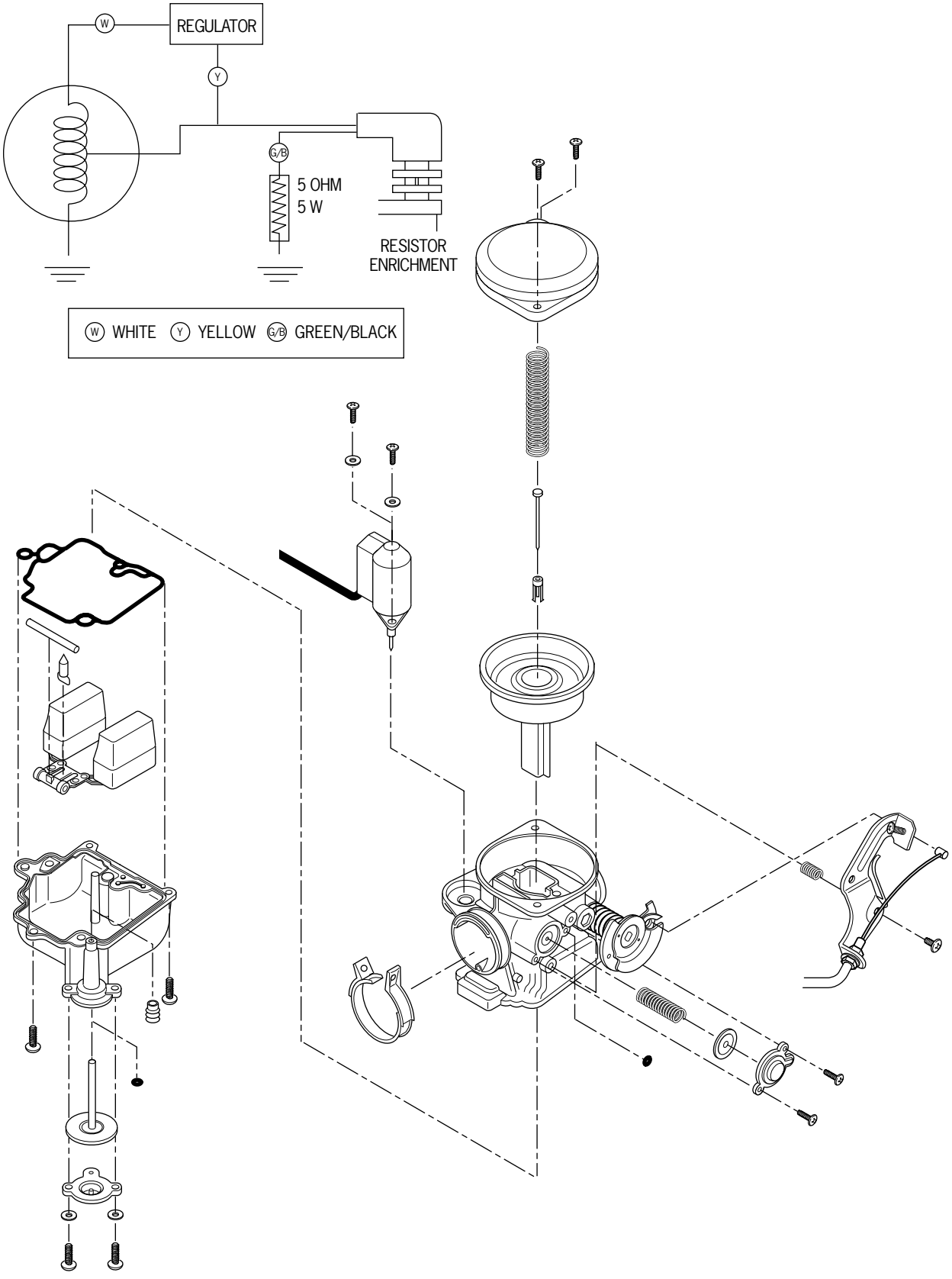
5. Assemble right crankshaft case cover, 8 screws and tighten.

6. Assemble pulse coil, stator and rotor.

7. Install fan and cover.



5. Fuel System



5. Fuel System

Topic	Page	Topic	Page
General information	5-2	Disassembly of Accelerator Pump	5-10
Troubleshooting	5-3	Checking Accelerator Pump	5-10
Disassembly of Carburetor	5-4	Assembly of carburetor	5-11
Checking Auto-choke	5-4	Disassembling Fuel tank	5-12
Air cutoff valve	5-6	Assembly of Fuel Tank	5-12
Assembling	5-6	Carburetor Adjustment	5-13
Vacuum Chamber-Break Down	5-7	Automatic Fuel Valve	5-14
Assembly of Vacuum Chamber	5-7	Fuel Meter Sending Unit	5-14
Float bowl and Disassembly	5-8	Air Filter Inspection	5-15
Checking Float Valve	5-9		

General Information

Warning!
Work on the fuel system in a well-ventilated area that is free of sparks or open flames. Do not breathe the vapors from the gasoline. Wear protective gloves to prevent skin irritation.

•Open the bowl drain and allow all gasoline in the carburetor to drain into an appropriate container prior to removing or servicing it.

•Remove control cables and wires carefully to prevent damage.

•Check all o-rings for damage. Replace as necessary.

•Remove carburetor from the scooter before attempting to service the fuel bowl or vacuum canister.

•When cleaning the carburetor, remove the vacuum diaphragm before using air or solvents for cleaning. This will prevent damage to the diaphragm.

•When storing the scooter for a period of time exceeding one month, use a quality fuel stabilizer to prevent deterioration of the fuel and damage to the carburetor.

Repairing material

Specification	Standard valve
Carburetor type	Constant velocity-CVK
Venturi Bore	17mm (.67 in.)
Fuel Level	mm
Main jet	
Idle jet	.27 mm (.12 in.)
Idle speed	1600 RPM
Throttle free play	5mm (.125 in.)
Mixture screw setting	3 turns out

5. Fuel System

Troubleshooting

Engine is hard to start
- •No spark
- •Low compression
- •No fuel in carburetor
  - -Blocked fuel line
  - -Blocked fuel filter
  - -Blocked vacuum line
  - -Leaky vacuum line
  - -Dirty float needle
  - -Float set too high

Too much fuel to engine
- -Blocked air filter
- -Manifold air leak
- -Bad auto choke
- -Blocked air passage in carburetor

Air/fuel mixture too rich or too lean
- •Bad auto choke
- •Plugged idle jet
- •Float needle stuck or dirty
- •Float height too high or too low
- •Blocked air passage in carburetor
- •Dirty air filter
- •Air leak at carburetor or manifold

Misfire under acceleration
- •Poor spark
- •Air mixture screw too lean
- •Bad accelerator pump

Poor drivability
- •Weak spark/bad ignition system
- •Blocked fuel line
- •Blocked fuel filter
- •Bad fuel
- •Water in fuel
- •Air leak at carburetor or manifold
- •Improper float level
- •Bad auto choke
- •Obstructed jet in carburetor
- •Vacuum slide stuck
- •Damaged vacuum diaphragm
- •Dirt in carburetor

5. Fuel System

Disassembly of carburetor

1. Remove seat and helmet storage tub.

2. Remove right side body panel.

3. Disconnect cable connector for auto choke.

4. Loosen carburetor drain screw and drain fuel from float bowl.

5. Loosen clumps in intake tube and main fold.

6. Loosen throttle cable and remove from support and from throttle control plate.

7. Remove fuel line from carburetor.

8. Remove air inlet tube from carburetor and pull carburetor straight back out of intake manifold.

9. Remove auto choke from carburetor.

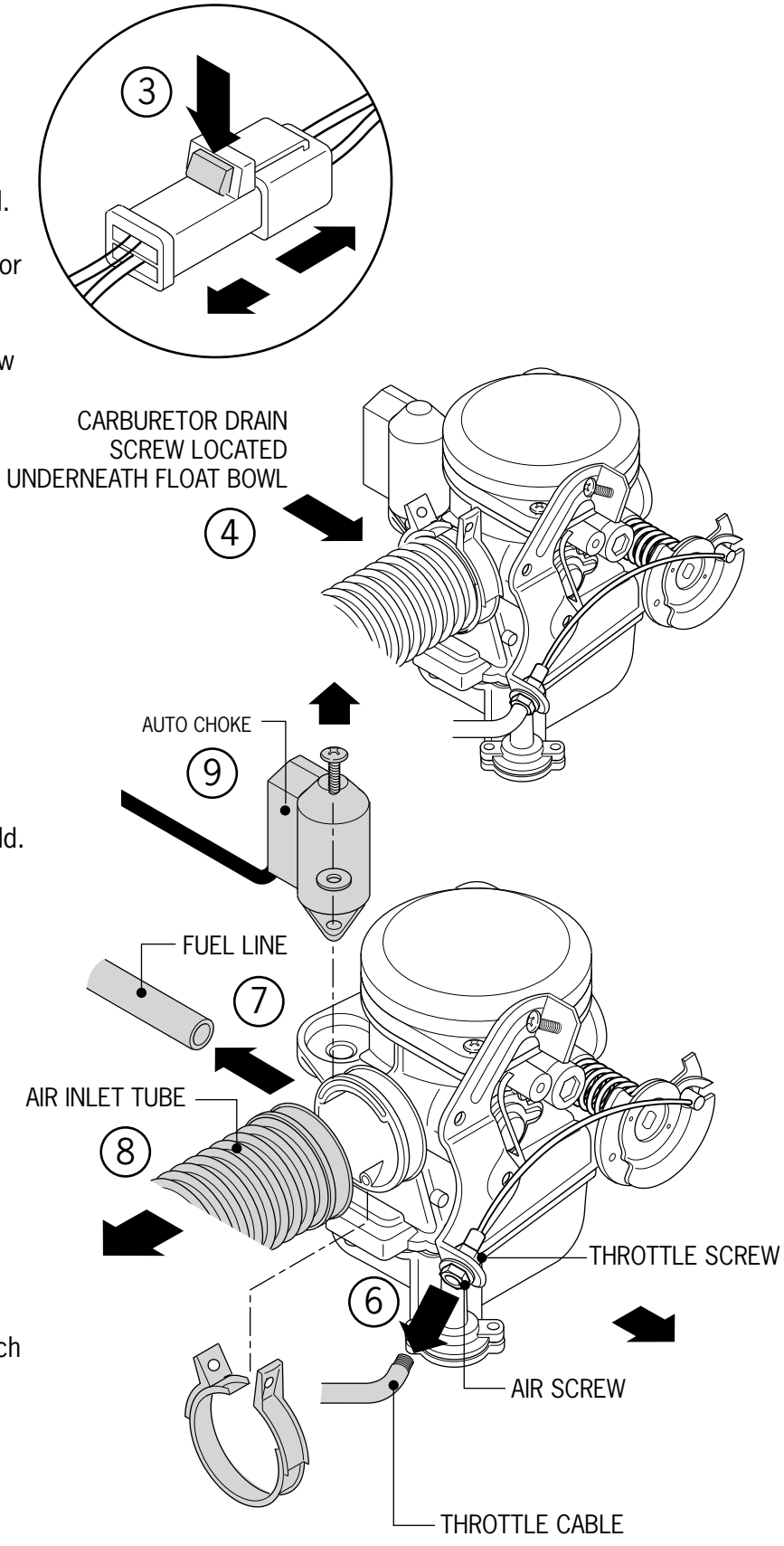
Checking Auto Choke

1. Check resistance volume.

2. Standard value below 5 when cold.

3. Connect auto choke to 12V battery.

4. Plunger should extend 3/8 inch in 5 minutes.



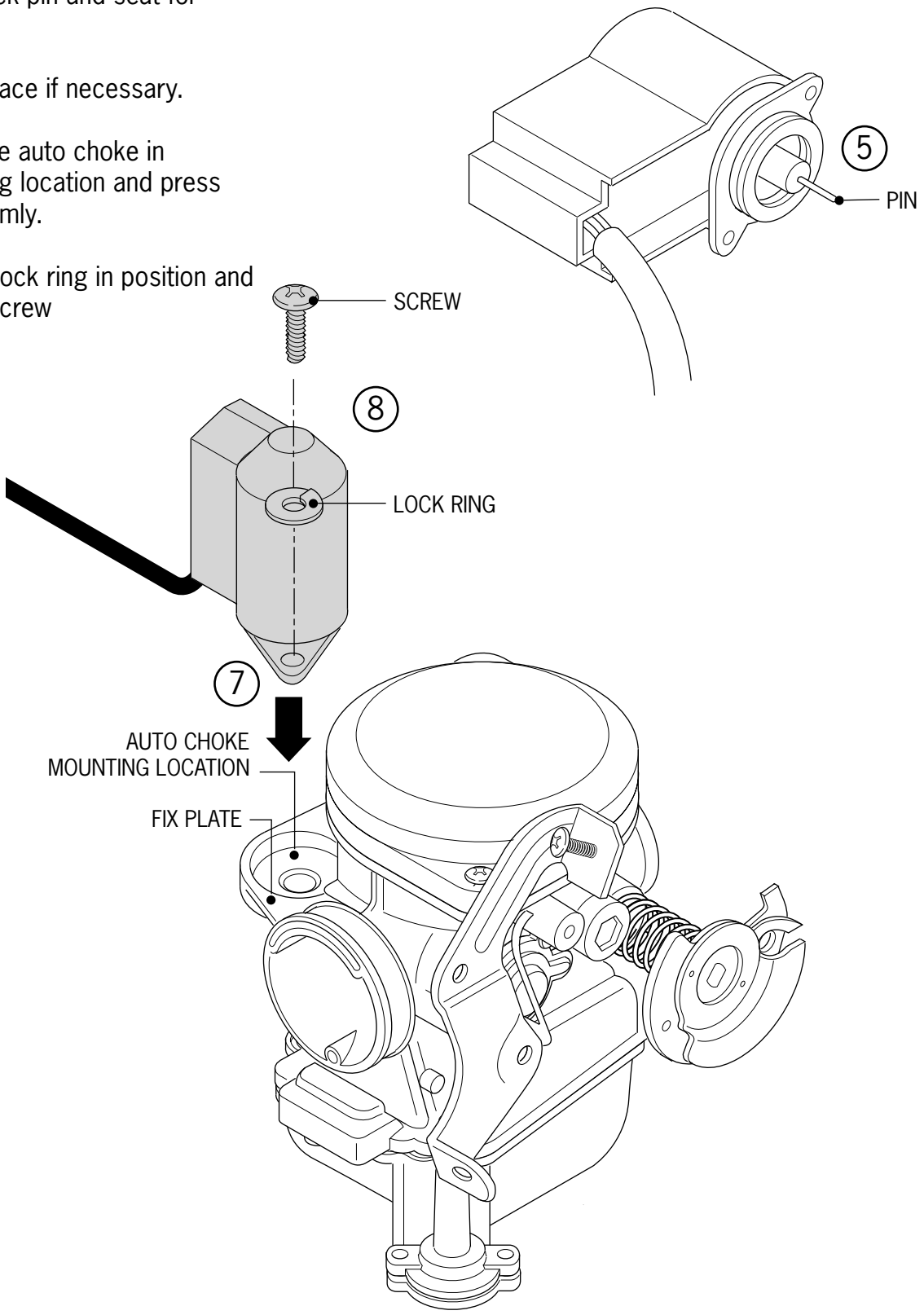
5. Fuel System

5. Check pin and seat for wear.

6. Replace if necessary.

7. Place auto choke in mounting location and press down firmly.

8. Put lock ring in position and fasten screw



5. Fuel System

Air Cut Off Valve

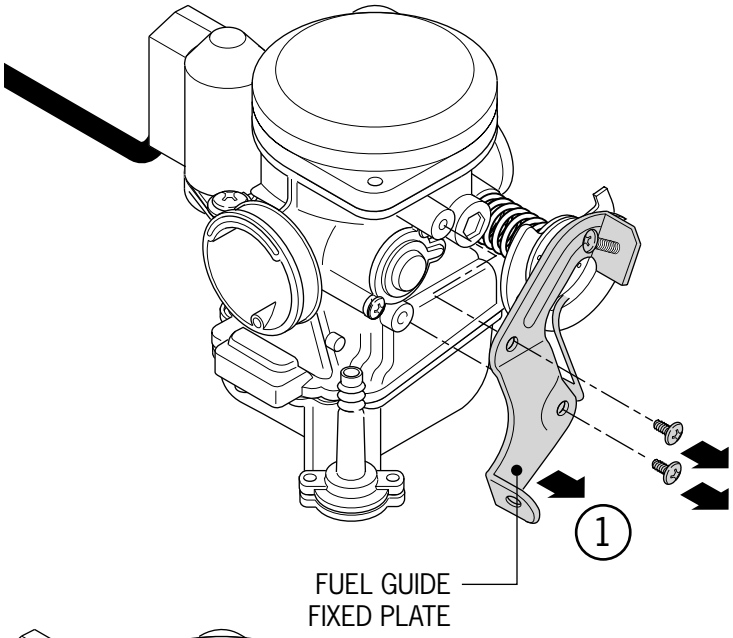
1. Disassemble two screws in fuel guide fixed plate and remove fixed plate.

2. Disassemble two screws in air cut off valve.

3. Take off spring and vacuum plate.

4. Check for wear on plate, replace if necessary.

5. Clean the passage way to remove dirt or varnish.



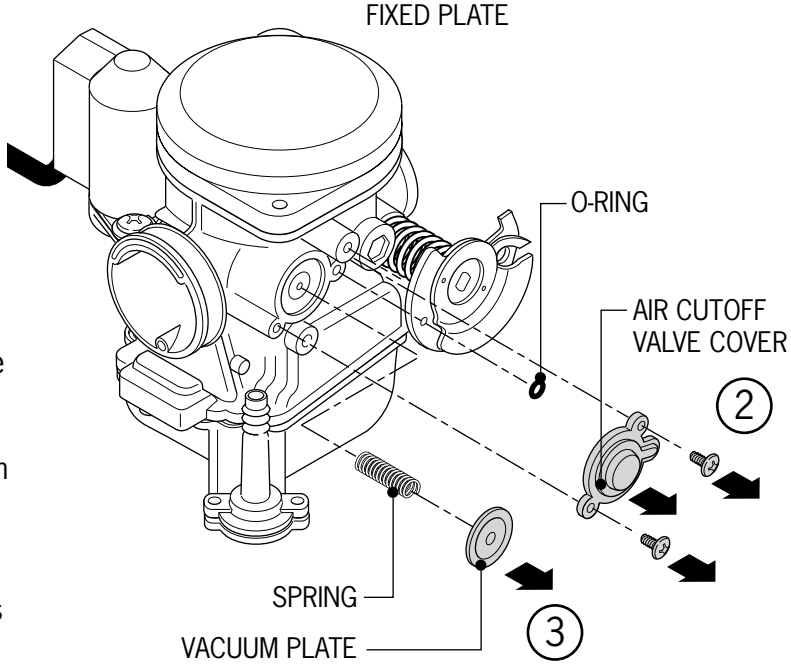
Assembling

1. Install plate to carburetor.

2. Install spring and cover of air cut-off valve.

3. Build up fuel guide line fixed plate and tighten two screws.

- Be sure that furrow of vacuum plate is aligned with the carburetor glove.
- Make sure that cover tightens into place.



5. Fuel System

Vacuum Chamber-Break down

1. Remove two screws and take off cover.

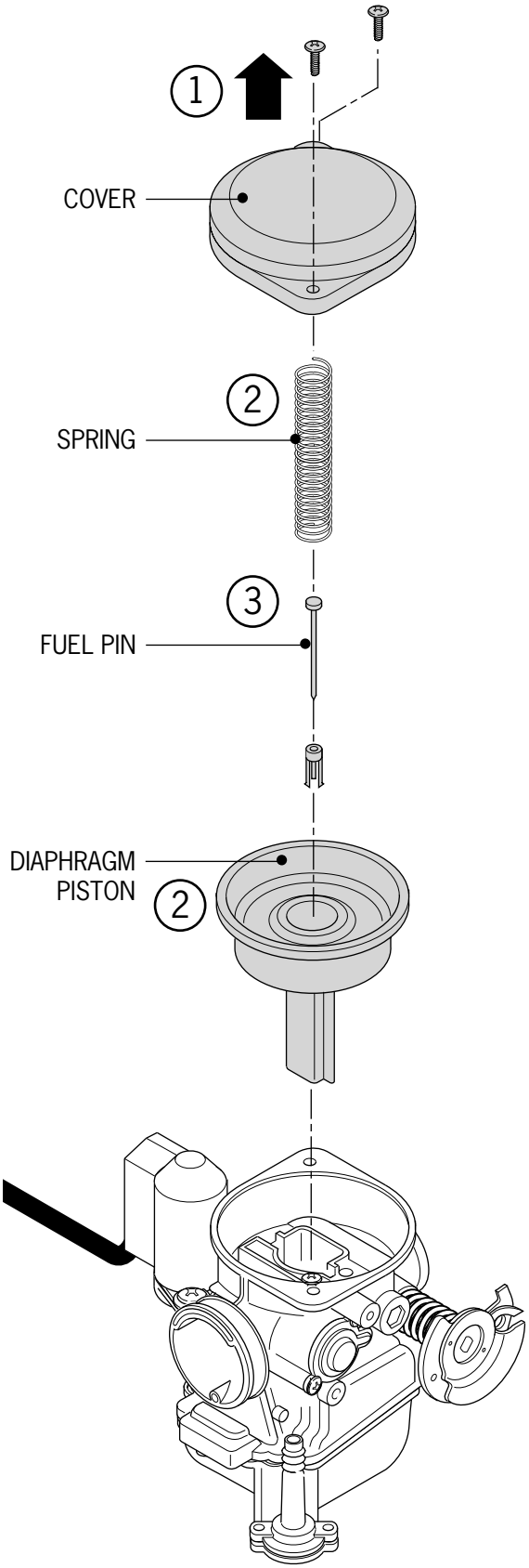
2. Remove spring, diaphragm piston.

3. Remove fuel pin and slide.

◉ Take special care not to damage diaphragm. Replace if damaged.

Checking

1. Check pin for wear and replace if necessary.



Assembling

1. Install piston or plate to body of carburetor.

2. Push the button of the piston to vacuum chamber side and keep open completely. Install spring and cover.

3. Install screw.

◉ Be sure to hold slide and piston in up position when installing cover and tighten screw.

5. Fuel System

Float Bowl

Disassembling

1. Disassemble three screws and take off float bowl.

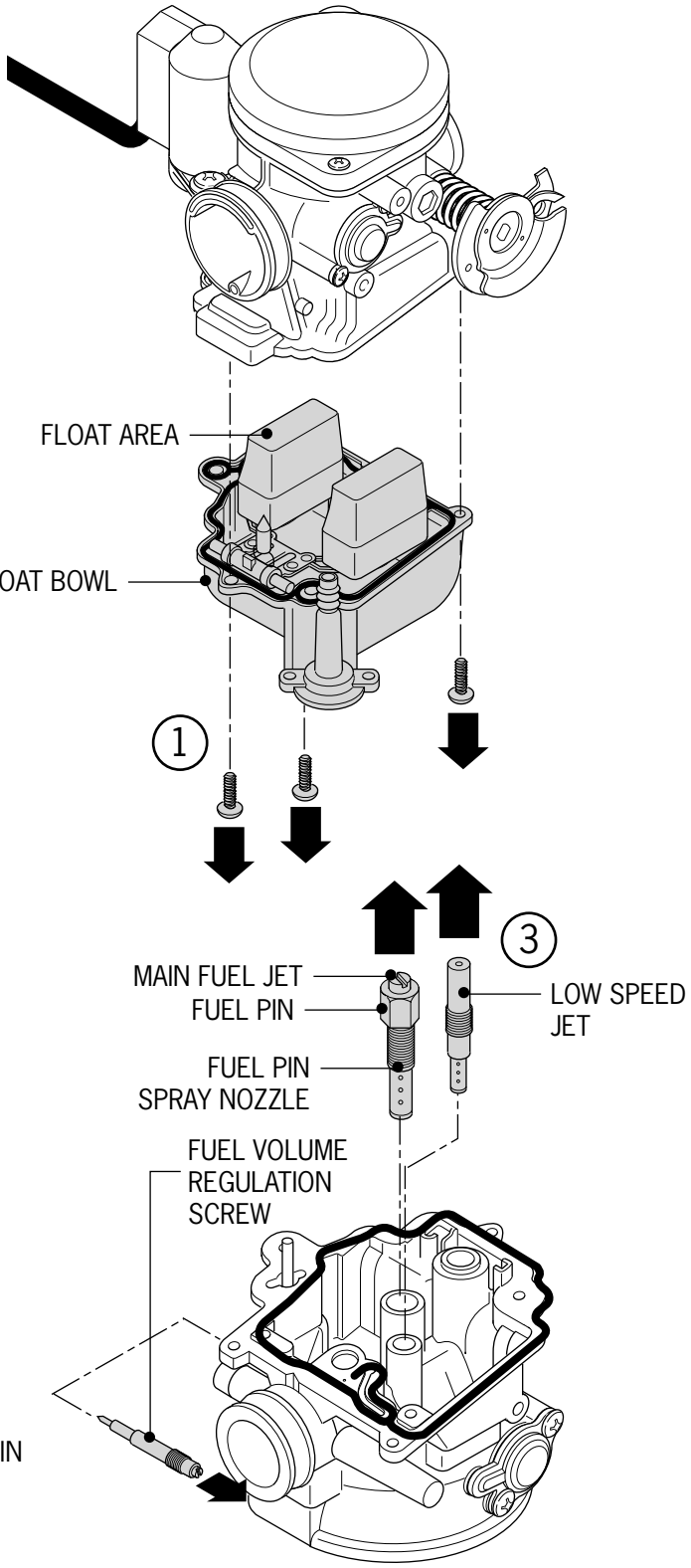
2. Remove float pin spring.

3. Remove high-speed jet, low-speed jet and fuel volume control screw.

- Be careful not to break the fuel jets and control screw.
- Count the turns when removing the fuel volume control screw.
- When reinstalling jets and screws, do not over tighten.

4. Clean jets with solvent and compressed air.

5. Clean body of carburetor by blowing air through all passages.



5. Fuel System

Checking

1. Check float valve and valve seat for damage.

2. Check float valve and valve seat wear, pitting or buildup of dirt.

3. Any leakage of the valve or a buildup of dirt will affect the fuel level in the float bowl and cause drivability problems.

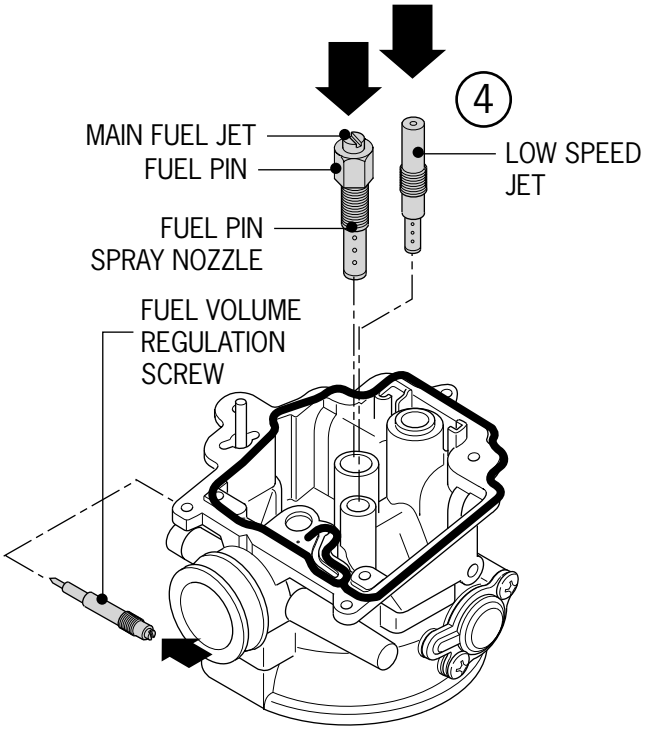
4. Assemble the low speed jet, fuel pin spray nozzle, fuel pin spray seat and main jet into the bottom of the carburetor housing.

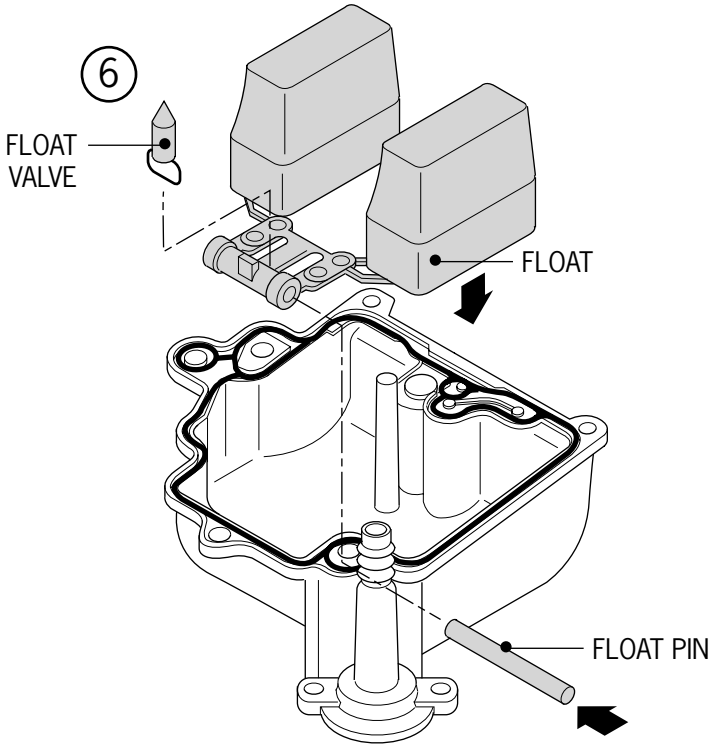
5. Set the fuel level in the bowl by adjusting the fuel regulation screw. The standard setting is 2 turns, plus or minus a 1/4 turn.

6. Assemble the float valve, float and float pin to the bottom of the carburetor using the retainer pin.

7. Check the operation of the float and valve. All parts should move freely and not bind.

8. After assembling the float, check for proper fuel level using a small ruler or a float gage. The proper fuel level is 20.5mm (.807 in.).





5. Fuel System

Accelerator Pump

1. Remove two screws on pump and take off cover.

2. Take off spring and acceleration pump plate.

Checking

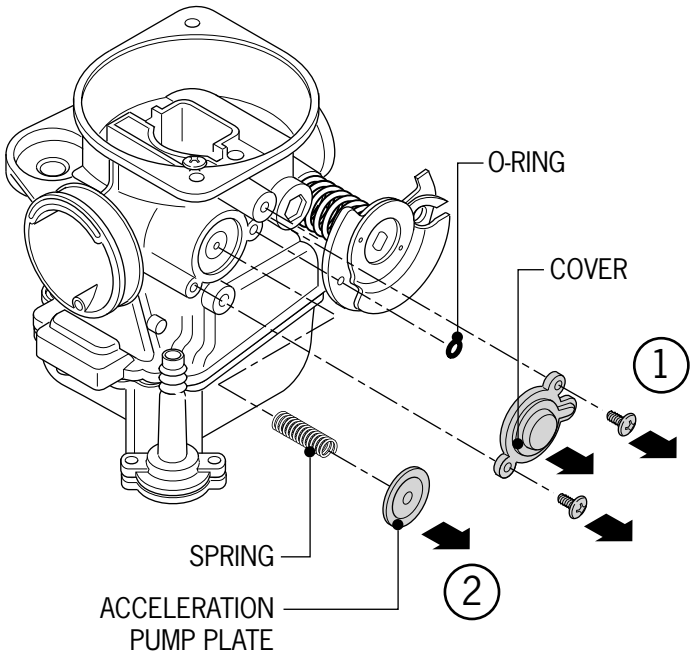
1. Check acceleration pump plate for cracks or hardening of the rubber. Replace as necessary.

2. Check for blocked fuel passages.

3. Clean by high pressure air.

4. Reverse steps to reassemble.

5. Take special care with the accelerator pump plate to avoid damage.



5. Fuel System

Assembly of Carburetor

1. Slide carburetor carefully into the manifold, making sure to align the tab on the manifold with the notch on the carburetor. Securely tighten the clamp screw to fix the carburetor in place. Do not over tighten the screws as this can cause damage to the manifold.

2. Attach the inlet pipe to the rear of the carburetor and tighten the clamp screw.

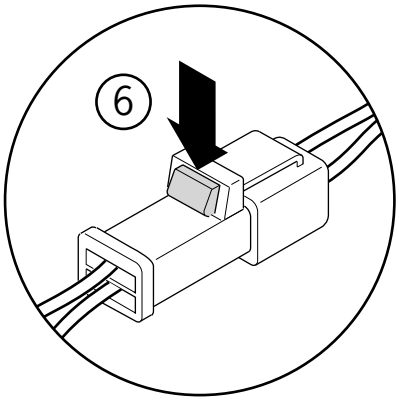
3. Attach the throttle cable to the throttle by installing the cable lug into the notch on the throttle plage. Insert the outer casing of the throttle cable into the cable support bracket. Make sure to align the “D” shape of the adjusting sleeve with the ‘D” shape hole of the bracket.

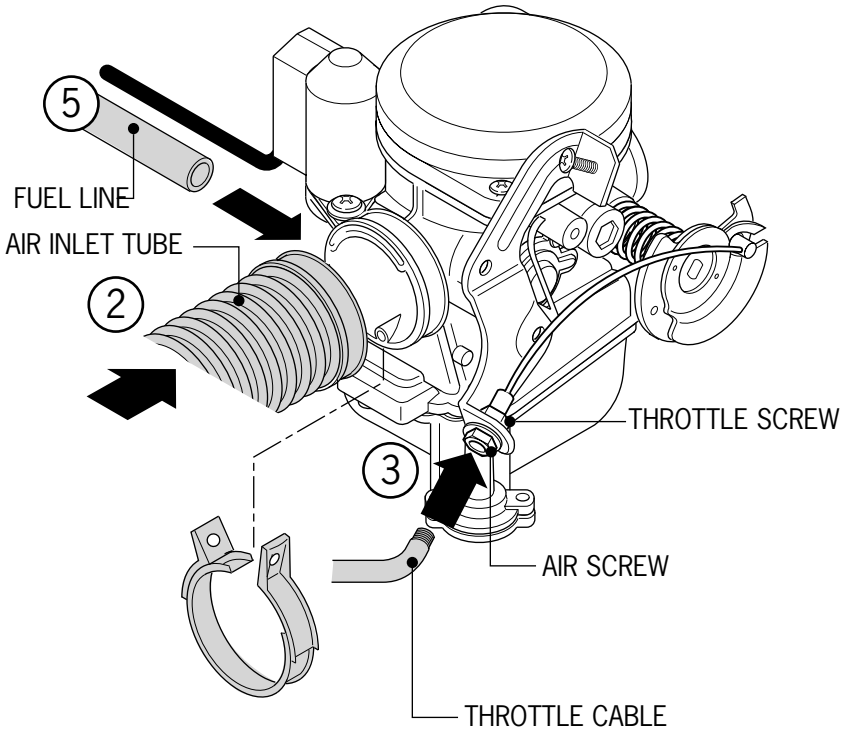
4. Use the adjusting nut and stop nut to set the cable tension. Correct adjustment should allow 1/4 inch of free play in the cable.

5. Attach the fuel line from the tank to the inlet on the carburetor and clamp securely.

6. Connect the wiring harness from the auto choke to the proper connection on the main wiring harness.

7. After starting the engine, set the idle speed using the idle adjusting screw.





5. Fuel System

Disassembling Fuel Tank

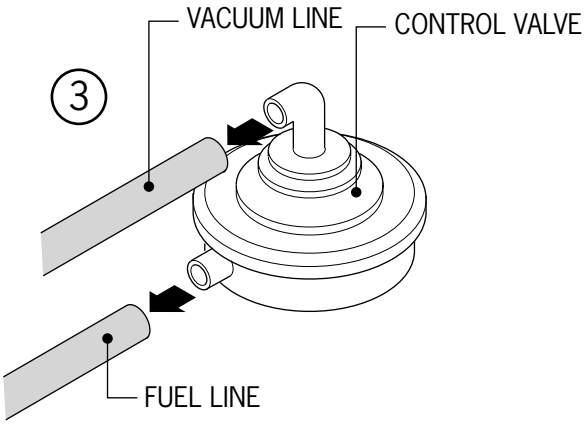
1. Disassemble the body cover.

2. Disconnect the wiring harness from the fuel level sending unit.

3. Disconnect the fuel line and vacuum line from the auto fuel valve.

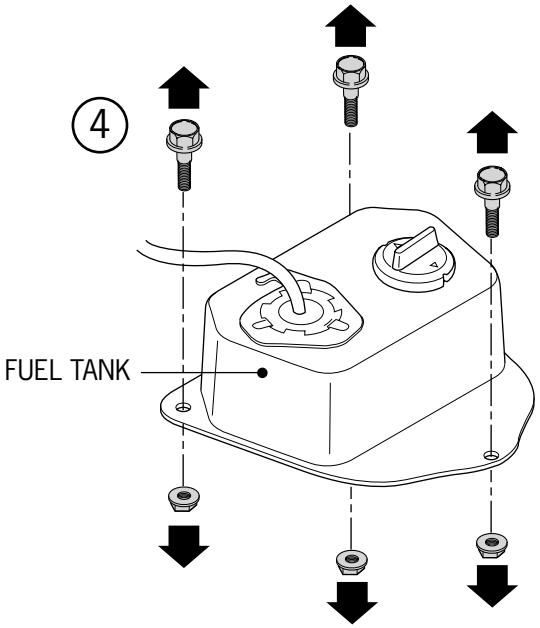
4. Remove three bolts and nuts to loosen the fuel tank.

5. Remove the fuel tank from the frame.



Assembly of Fuel Tank

1. Reverse steps for reassembly.



5. Fuel System

Carburetor Adjustment

It is generally not necessary to adjust the mixture screw on the side of the carburetor. This screw is preset at the factory and will have little effect on the performance of the carburetor.

1. If this screw has been removed for cleaning of the carburetor, it should be reset carefully. The standard setting is two turns out, plus or minus 1/4 turn.

2. To set this position, run the engine until warm and allow it to idle. Turn the screw in or out a little at a time and measure the idle RPM. The correct setting is achieved when the idle speed is maximized.

3. Adjust the idle speed of the engine once the engine has been warmed up.

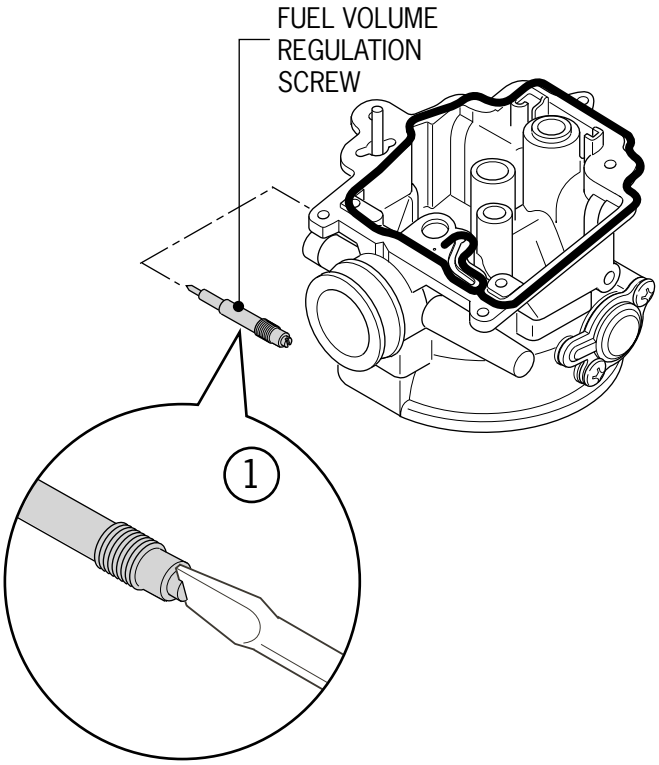
4. Set the warm idle speed to 1900RPM, plus or minus 100RPM.

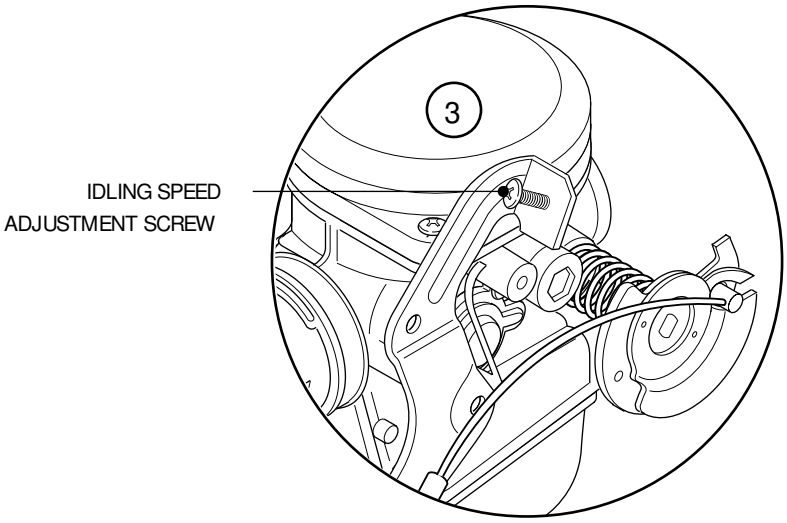
5. Check for engine return to idle speed after running at part throttle.

6. Make sure that the throttle cable allows the throttle control plate to return to the stop screw.

7. If needed, readjust the mixture screw to help stabilize idle performance.

NOTE: SOME COMPONENTS REMOVED FOR CLARITY.





5. Fuel System

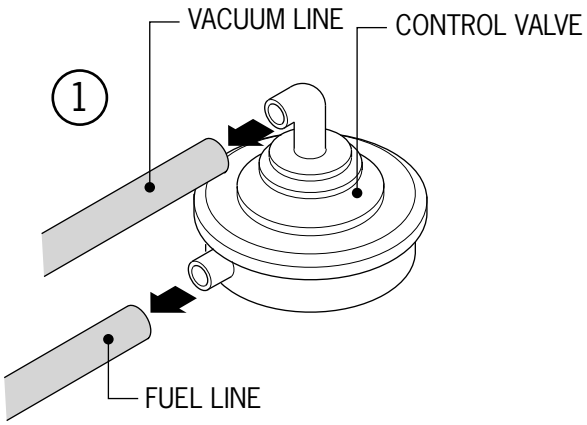
Automatic Fuel Valve

1. Disconnect the fuel line and the vacuum line from the control valve and from the carburetor and intake manifold. Carefully inspect these lines. Any blockage, deterioration, damage, or cracking of these lines can cause improper functioning of the fuel valve. Replace these lines as necessary.

2. Always make sure that the clamps work properly when replacing these lines in order to assure a tight seal of the lines at the fittings on the valve, carburetor and manifold.

3. To check the operation of the valve, apply a vacuum to the input fitting of the valve. Fuel should flow freely when the vacuum is applied and stop when it is removed.

4. Never attempt to clean the valve with high-pressure air. This will damage the valve and require replacement.



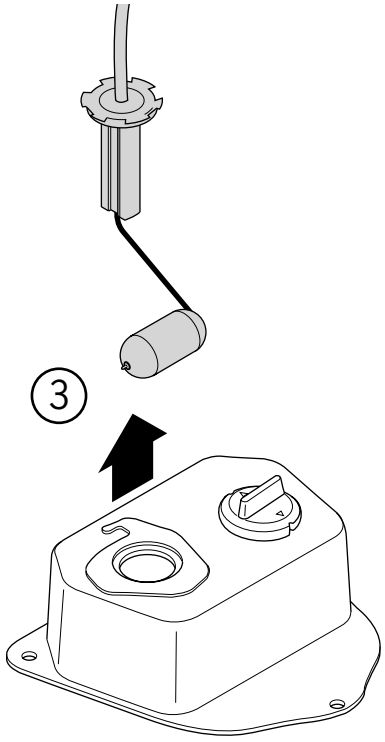
Fuel Meter Sending Unit

1. Disconnect the sending unit wiring harness.

2. Disconnect four mounting screws.

3. Lift and turn the sending arm to allow the float arm and float to be removed from the fuel tank. Take care not to bend or damage the float arm as this can cause improper readings.

4. Check the movement of the arm. It should move freely without binding or hesitation. Check the continuity of the coil. If it is open, the unit needs replacement. When reassembling the sending units, make sure that the gasket is not damaged to avoid leakage.



5. Fuel System

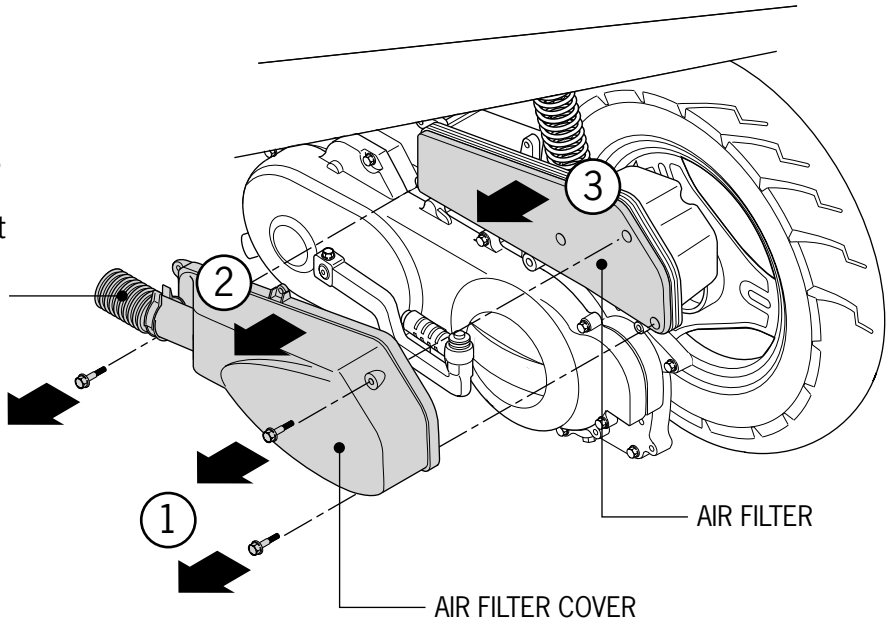
Air Filter Inspection

1. Remove air filter cover screws.

2. Remove cover.

3. Remove air filter element.

4. Remove clamp on air inlet tube.



5. Disconnect air tube from carburetor.

6. Remove air box. Make sure that the element is clean and free of dirt and oil. Excessive dirt and oil on the element can reduce engine performance.

7. During reassembly, make sure that the cover and tube connections are tight and do not leak. Air filter box leakage can reduce engine performance.

6. Engine Removal and Installation

Topic	Page
Special requirements	6-1
Engine removal	6-2
Engine installation	6-4

Special Requirements

- Remove all body panels carefully to provide ease of access to the engine.

- Use care when disconnecting the battery cables and fuel lines.

- Use protective clothing such as gloves and safety glasses to protect your body.

6. Engine Removal and Installation

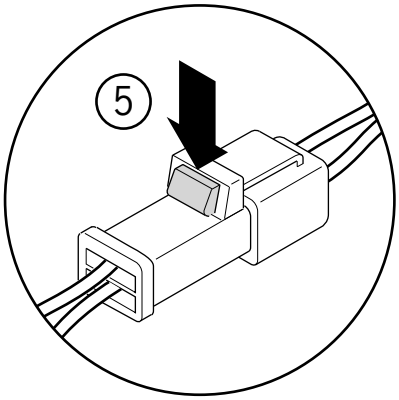
Engine Removal

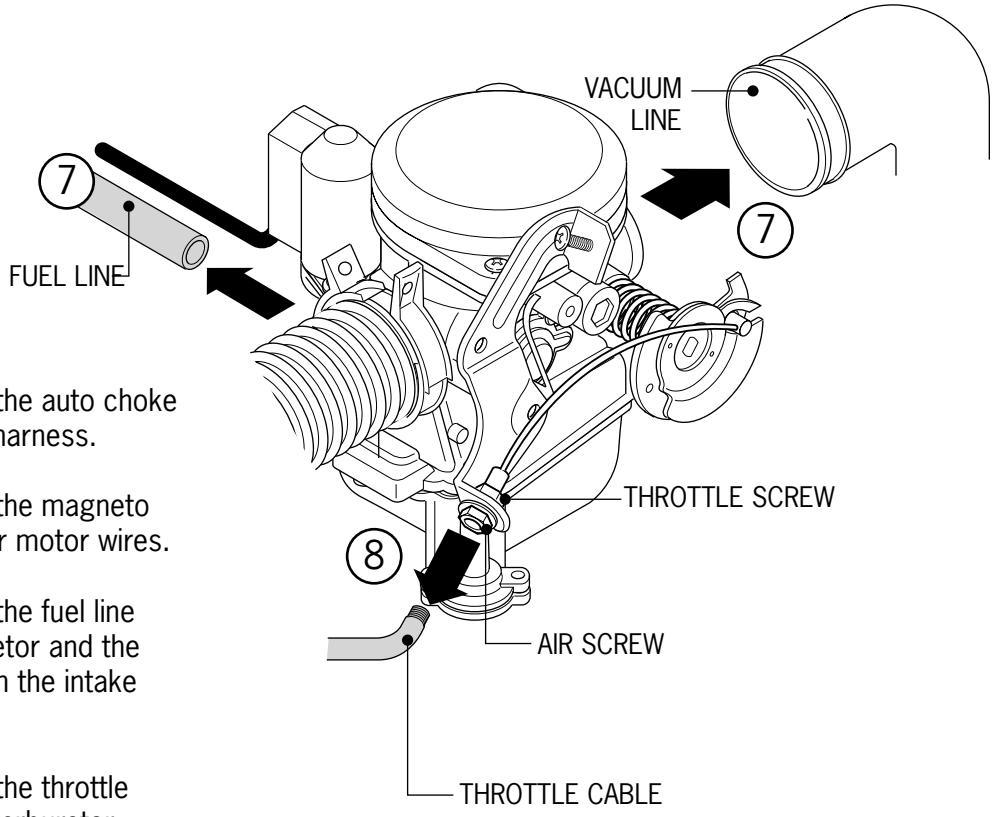
1. Disconnect the battery ground wire.

2. Remove body panels to expose engine.

3. Disconnect the engine ground wire.

4. Remove the spark plug cable from the spark plug and the ignition coil.





5. Disconnect the auto choke from the wiring harness.

6. Disconnect the magneto wires and starter motor wires.

7. Disconnect the fuel line from the carburetor and the vacuum line from the intake manifold.

8. Disconnect the throttle cable from the carburetor.

9. Remove the air filter box.

6. Engine Removal and Installation

10. Disassemble the brake control cable from the brake control arm.

11. Remove the rear shock absorber.

12. Remove the engine support bolt and move the chassis up the forwards.

13. Support the chassis in position temporarily.

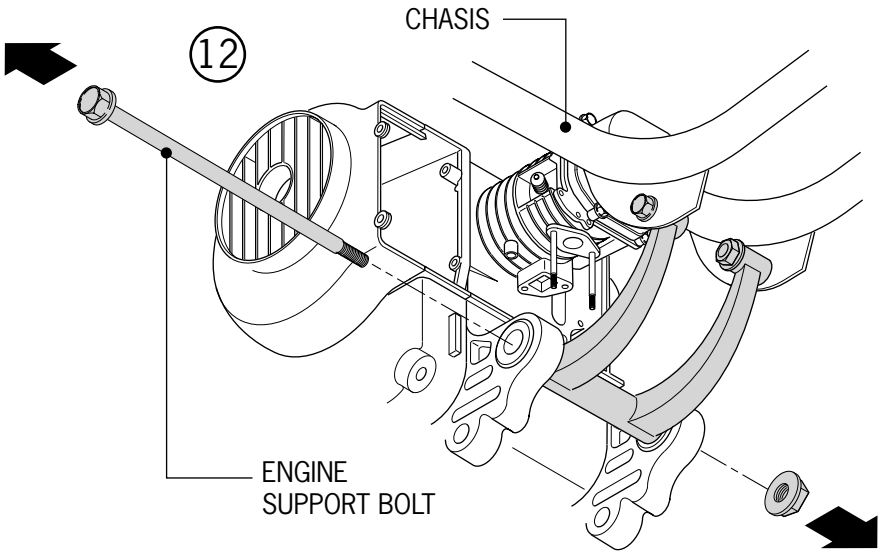
14. Remove the side stand spring and side stand.

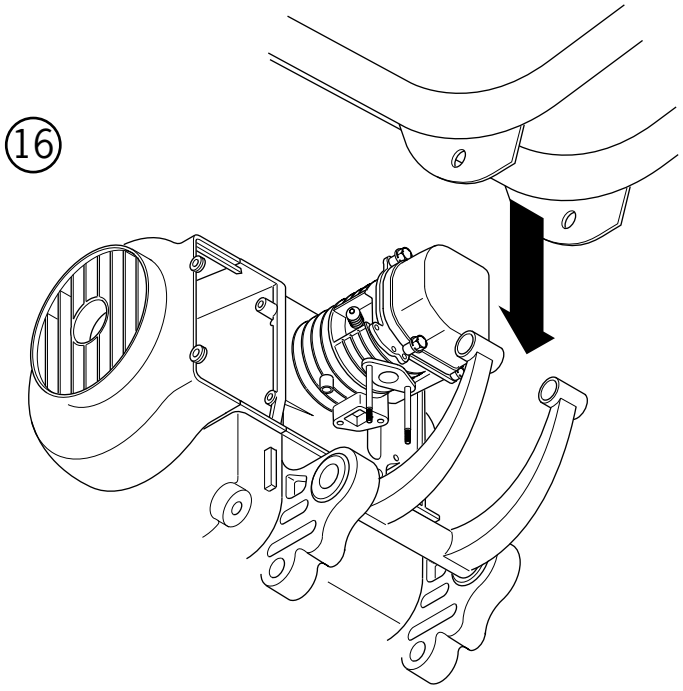
15. Remove the front engine support bolt to disconnect the engine from the chassis.

16. Separate the engine from the chassis.

17. Check the condition of the engine support isolation mounts. If they are worn or damaged, replace them during the engine installation process.

UNDERSIDE OF SCOOTER





6. Engine Removal and Installation

Engine Installation

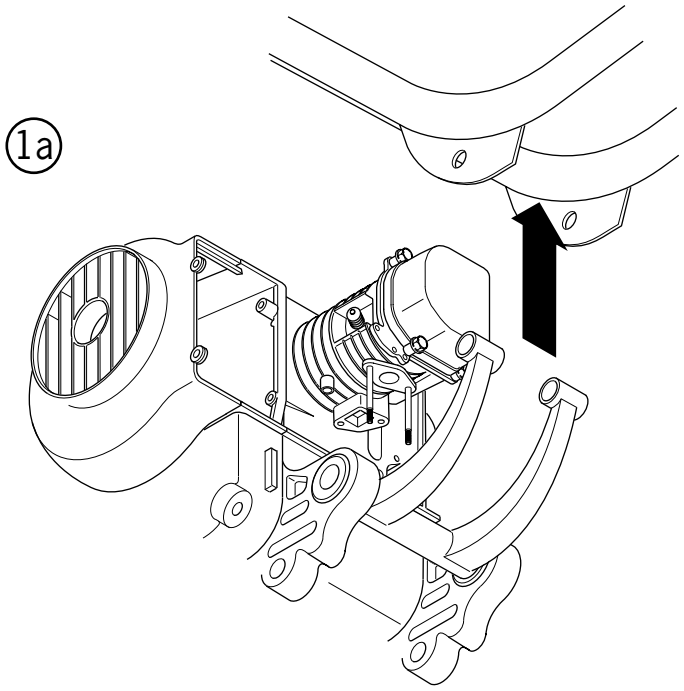
1. Attach front engine support bolt into position and tighten to 5kg-m (35 ft-lbs).

2. Slide chassis to the rear to align the rear mount and install the mounting bolt. Tighten to 5 kg-m (35 ft-lbs).

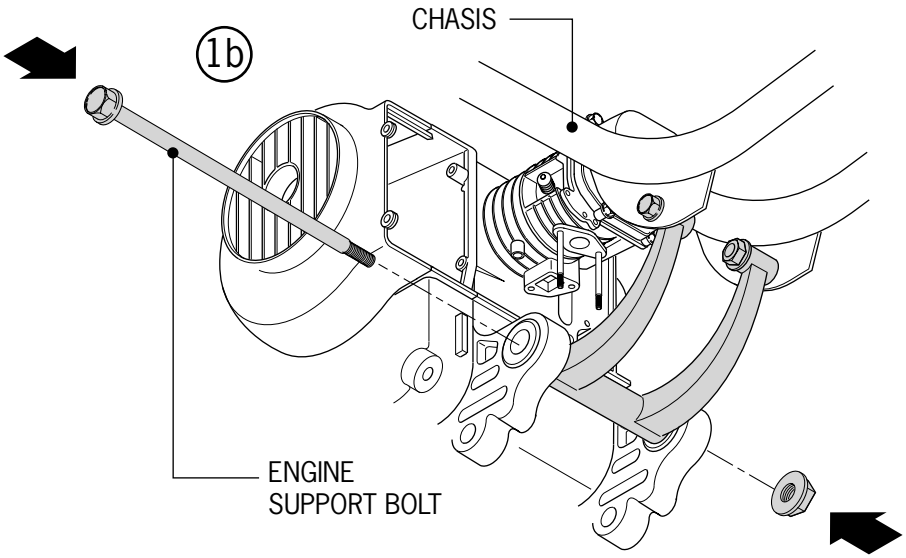
3. Attach the rear shock absorber and tighten to 4 kg-m (28 ft-lbs).

4. Complete the remainder of the assembly process in reverse order of the disassembly.

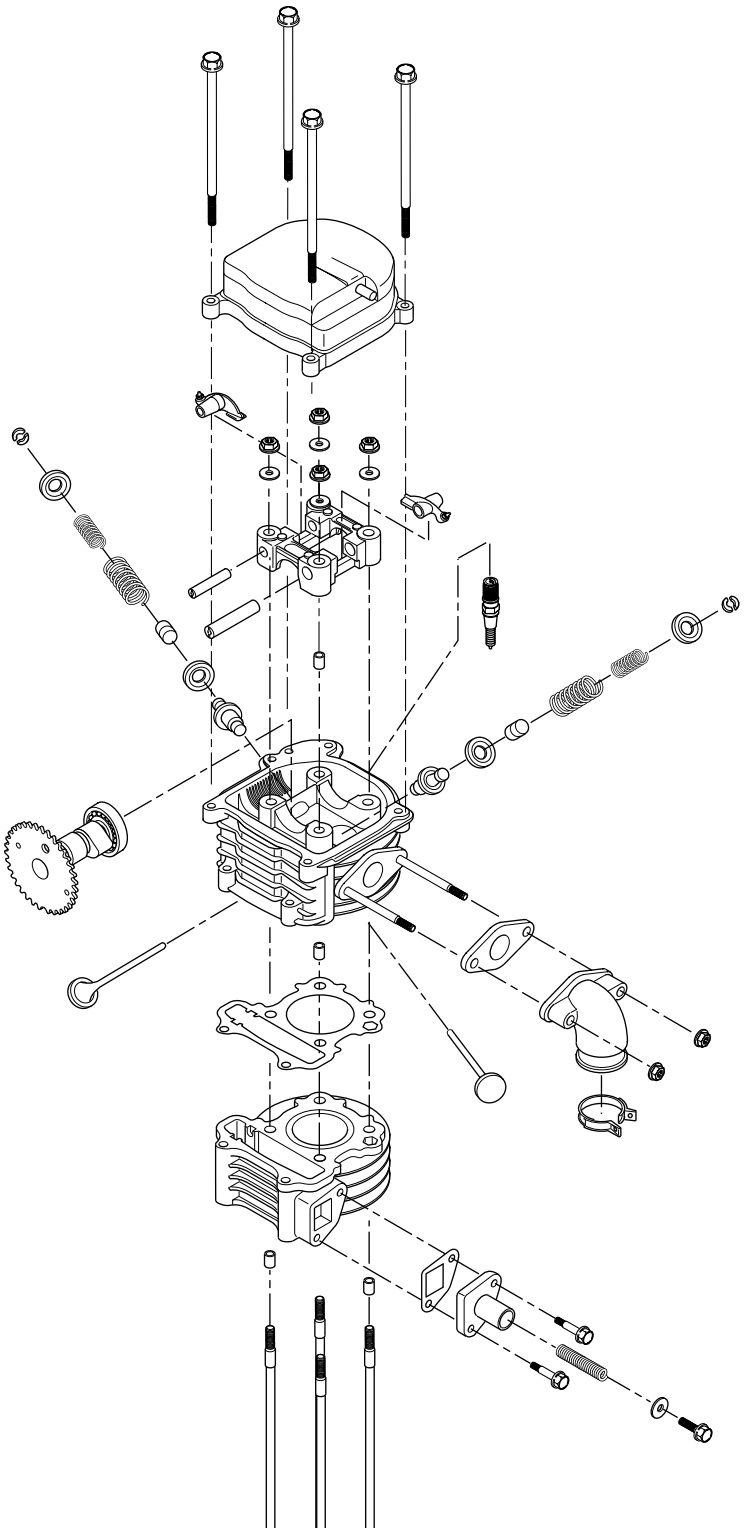
5. When assembly is complete, make sure to check the throttle adjustment and brake adjustment before attempting to ride the scooter.



UNDERSIDE OF SCOOTER



7. Cylinder Head Valve



7. Cylinder Head Valve

Topic	Page	Topic	Page
Important information	7-2	Valve Seat Chamfer Cutting Tools	7-12
Trouble diagnosis	7-3	Valve Seat Cutting	7-12
Camshaft Disassembly	7-4	Building up of Cylinder Head	7-13
Checking of Camshaft Bearing Rocker Arm	7-7	Installing Cylinder Head	7-14
Cylinder Head Disassembly	7-7	Camshaft Assembly	7-15
Cylinder Head Break Down	7-9	Camshaft Chain Regulator Assembling	7-16
Checking Cylinder Head	7-9		
Valve and Valve Guide	7-10		

Important Information

•When working on the cylinder head and valve train, always use engine oil to lubricate sliding parts when assembling. Never assemble dry parts into the valve train.

•The camshaft is lubricated by engine oil supplied via an oil passage in the cylinder head. Make sure that this passage is clean and open when you reassemble the head.

•When measuring parts to determine wear, wash the parts with solvent and dry them in order to get accurate measurements.

•When disassembling the valve components, keep them in order and reinstall them in the reverse order.

Item		Standard valve	Used Limit
Valve gap (cold)	IN	(0.04) 0.05	——
	EX	(0.04) 0.05	——
Cylinder head compressed pressure		15kg/cm^2-600rpm	——
Cylinder head surface twisting			0.05
Camshaft cover angle height	IN	25,761	25.681
	EX	25,604	25.24
Valve rocker arm inner diameter	IN	10,000-10.015	10.10
	EX	10,000-10.015	10.10
Valve rocker arm bearing outer diameter	IN	9,972-9,987	9.91
	EX	9,972-9,987	9.91
Valve seat angle	IN	1.0	1.8
	EX	1.0	1.8
Valve bar outer diameter	IN	4,975-4,900	4.9
	EX	4.955-4,970	4.9
Valve guide pipe inner diameter	IN	5,000-5,012	5.3
	EX	5,000-5,012	5.3
Gap between valve bar and guide pipe	IN	0.010-0.037	0.08
	EX	0.030-0.057	0.10
Valve spring	Inner spring	29.1	26.1
	Outer spring	33.5	30.5

7. Cylinder Head Valve

Torque Value
- Camshaft bolt 16 ft lbs
- Lubricate threads with oil
- Valve gap adjusting screw cap 7 ft lbs



General tools
- Valve spring compressor
- 45 degrees IN/EX
- Valve seat reamer 24.5mm
- Plane reamer 30 degrees IN
- Valve seat reamer25mm
- Plane reamer 32 degrees EX
- Valve seat reamer 22mm
- Plane reamer 60 degrees IN/EX
- Valve seat reamer 26mm
- Reamer damping fixture 5mm



Special tools
- Valve spring compressor accessories
- Valve gap regulatory spanner
- Valve guide screwdriver
- Valve guide reamer

Trouble Diagnosis
- Confirm poor operation of cylinder head by measuring pressure or by noise produced by engine upper end.

Slow Speed Hitch
Compression pressure too low
Bad valve gap
Burning or curving of valve
Bad valve timing
Broken valve spring
Bad valve seat
Leakage of cylinder head gasket
Warped cylinder head surface or cracking
Bad spark plug

Compression Pressure Too High
- Too much carbon buildup in combustion chamber

White Smoke from Exhaust Pipe
- Wearing of valve guide
- Broken oil seal

Abnormal Noise
- Bad valve gap
- Broken or burning of valve or valve spring
- Wearing and breaking of camshaft
- Wearing of inner chain adjusting plate
- Wearing of cam shaft and valve rocker arm

7. Cylinder Head Valve

Disassembling of Camshaft

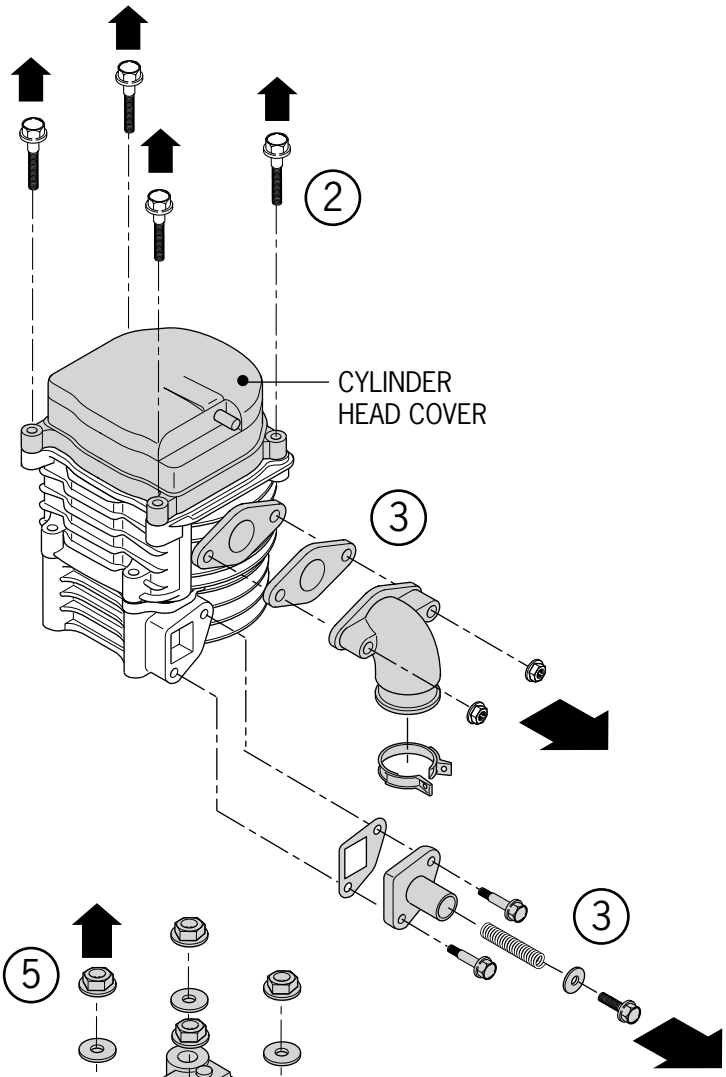
1. Disassemble middle cover. (2-2)

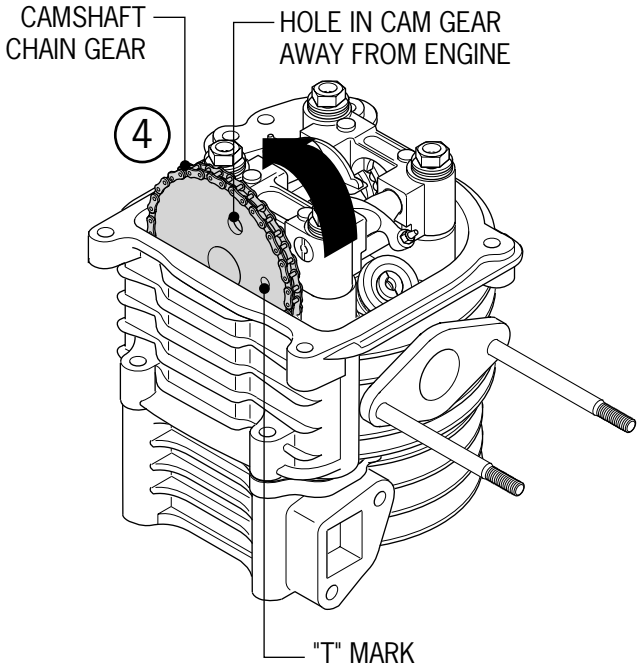
2. Remove four bolts and two nuts, take off valve cover.

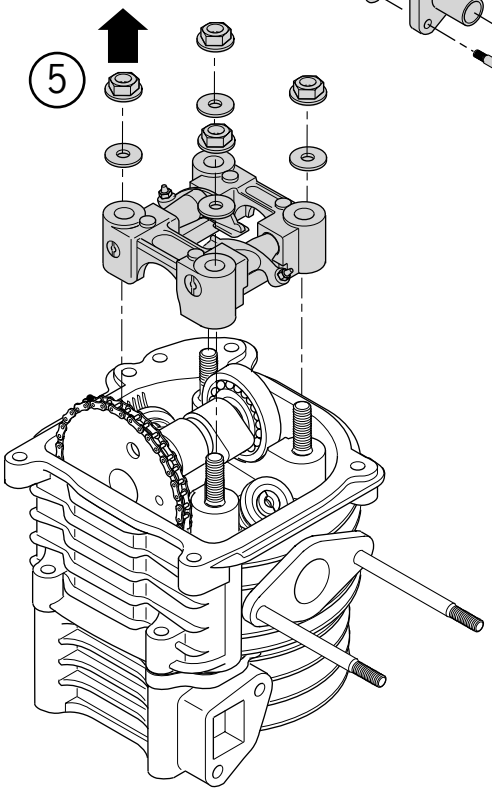
3. Disassemble cam chair adjusting bolt and spring.

4. Use the kick-start lever to slowly turn engine until “T” mark on flywheel lines up with indicator on crankcase. Check position of camshaft to find if both valves are closed. The hole in the cam gear should be away from the engine. If this is not correct, rotate the crank one revolution to achieve this alignment.

5. Remove four bolts and remove camshaft caps.







7. Cylinder Head Valve

6. Remove rocker arms and pivots.

7. Remove camshaft gear from camshaft chain.

8. Remove camshaft.

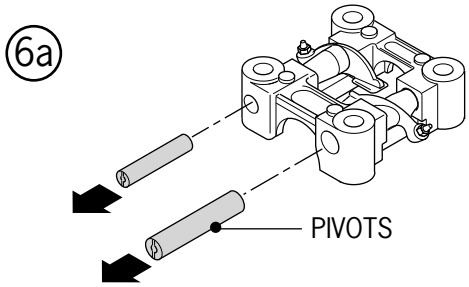
9. Check Camshaft

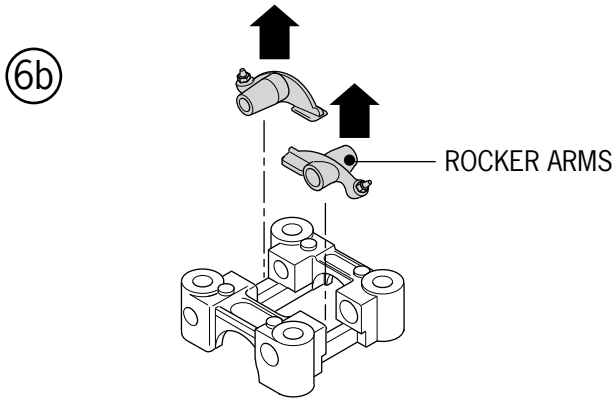
10. Check cam lift.
    - •Use limit: IN: 25.681mm below change
    - •EX: 25.524mm below change

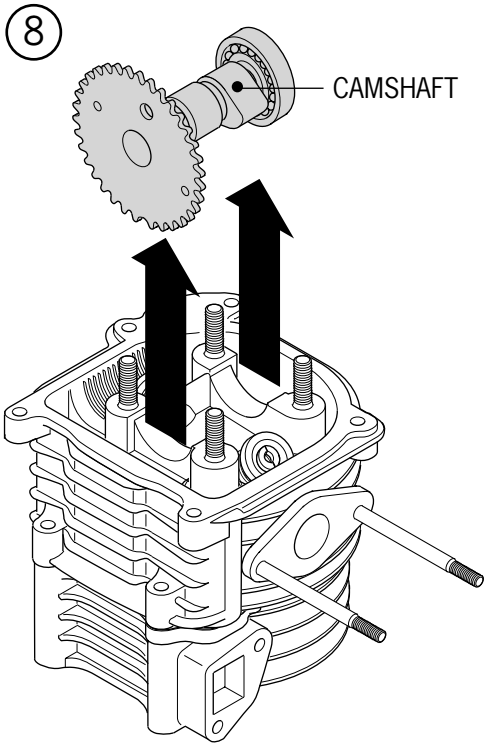
11. Check surface of cam lobes for weary surface breakdown, scuffing or cracking.

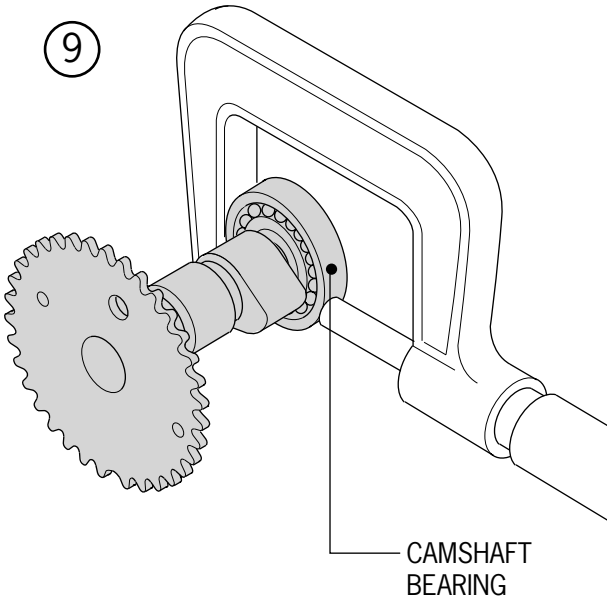
12. Check camshaft and bearing for loose fit or damage.

13. If any excessive wear or damage is found, replace the camshaft.









7. Cylinder Head Valve

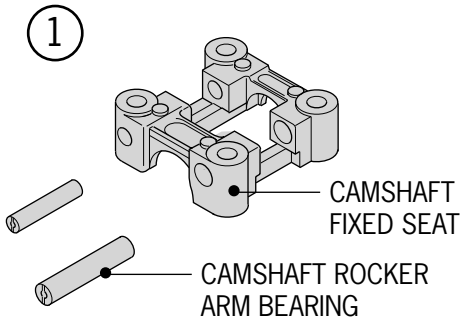
MEMO

7. Cylinder Head Valve

Checking of Camshaft Bearing Rocker Arm

1. Check if camshaft bearing fixed seat and camshaft rocker arm and camshaft rocker bearing is worn or broken.

2. Measure outer diameter of camshaft bearing fixed seat and camshaft rocker arm. Used limit: 9.91mm (.390 in.). Change if worn larger.

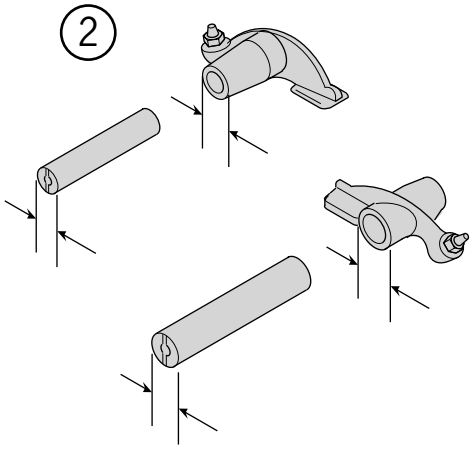


- Inner diameter of camshaft rocker arm. Used limit: 10.10mm (.398 in.). Change if worn larger.

- Outer diameter of camshaft rocker arm bearing and camshaft rocker arm. Used limit: 9.91mm (.390 in.).Change if worn larger.

- The gap between camshaft rocker arm and camshaft rocker arm bearing.

  Used limit: 0.10mm (.004 in.). Change if worn larger.



Disassembly of Cylinder Head

1. Remove camshaft bearing. (7-4)

2. Remove carburetor (5-4)

3. Remove exhaust pipe. (2-4)

3. Remove inlet manifold.

7. Cylinder Head Valve

4. Remove fan cover.

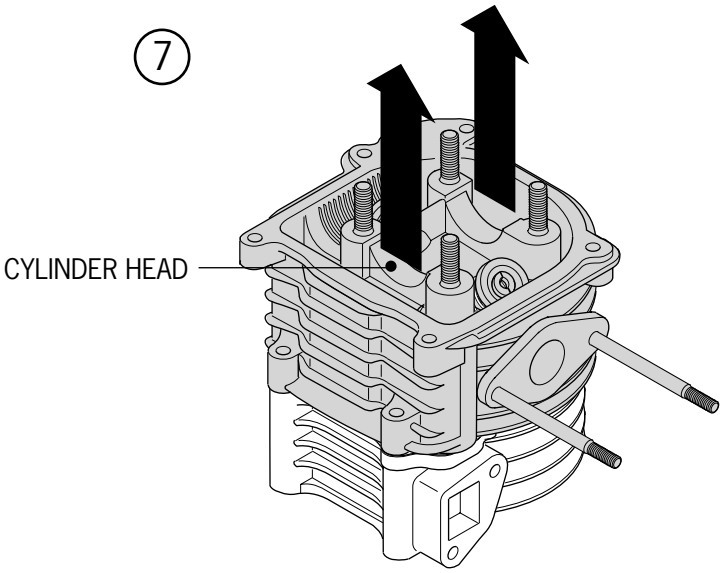
5. Remove bolt and screw of engine cover.

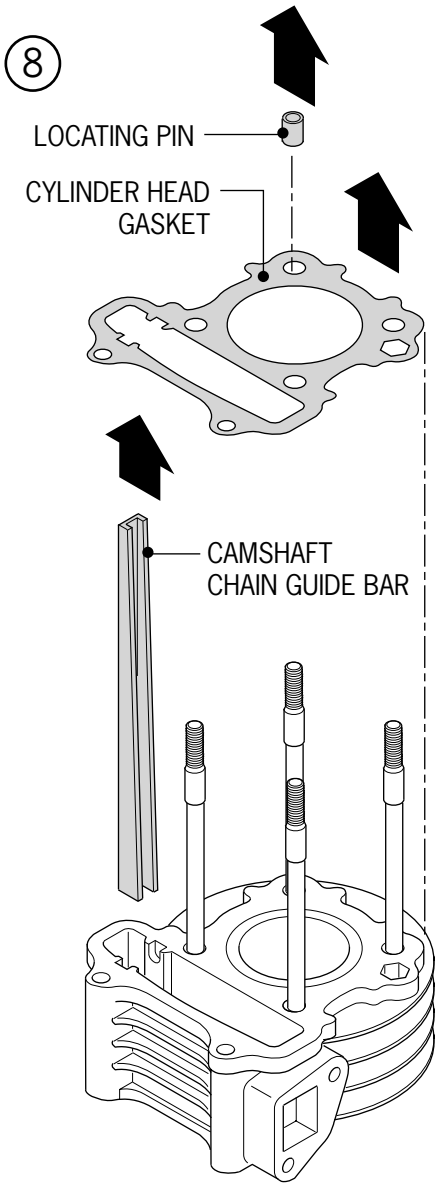
6. Disassemble and remove engine cover.

7. Pull up on cylinder head to break gasket and slide off cylinder stands.

8. Take off location pin and cylinder head gasket.

9. Take off camshaft chain guide bar.

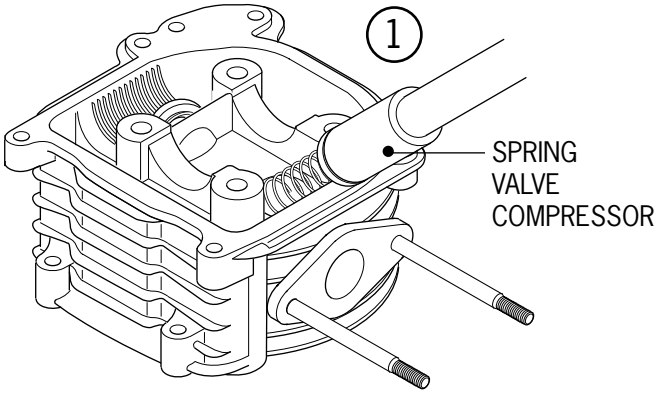




7. Cylinder Head Valve

Breaking Down of Cylinder Head

1. Use valve spring compressor to take off lock clip and supporter and valve spring, spring seat valve.

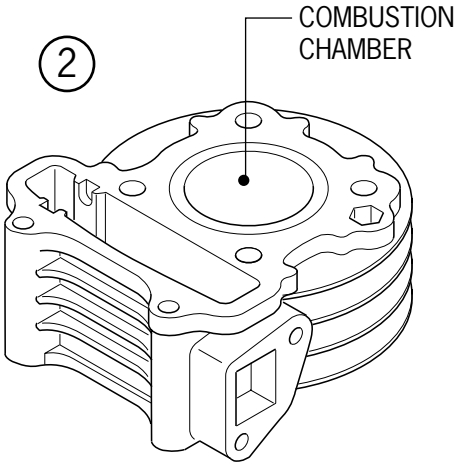


Place parts in sequence after disassembling and assemble in reverse order during reassembly.

2. Clean carbon deposits from combustion chamber.

3. Remove gasket material on cylinder head surface.

Don't damage cylinder head sealing surface.

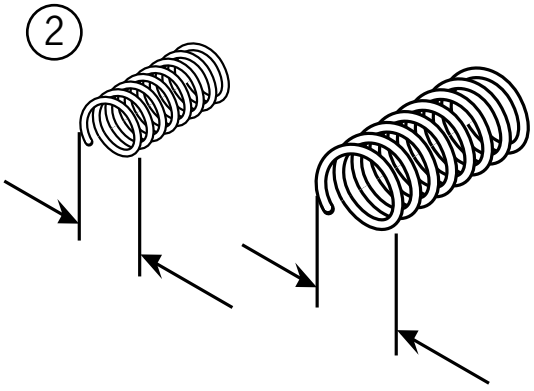


Checking Cylinder Head

1. Check spark plug hole for damage.
2. Check valve spring seats for alignment.

   Used limit: 0.05mm (.002 in.) above align
   •Measure length of inner and outer springs.

   Used limit:
   •Change if inner spring below 26.1mm (1.03 in.).
   •Change if outer spring is below 30.5mm (1.2 in.).



7. Cylinder Head Valve

Valve and Valve Guide

1. Check if valve is beat, burnt or broken.

2. Check if valve and valve guide are blocked.

3. Measure every valve stem's outer diameter.
   •Used limit: Change if below 4.9mm.

Remove carbon deposits from valve guide using a reamer.

SPECIAL TOOLS

Rotate reamer in proper direction and do not stop rotation to push in or pull out.

4. Measure inner diameter of every valve guide.

Used limit:
IN: Change if above 5.3mm.
EX: Change if above 5.3mm.

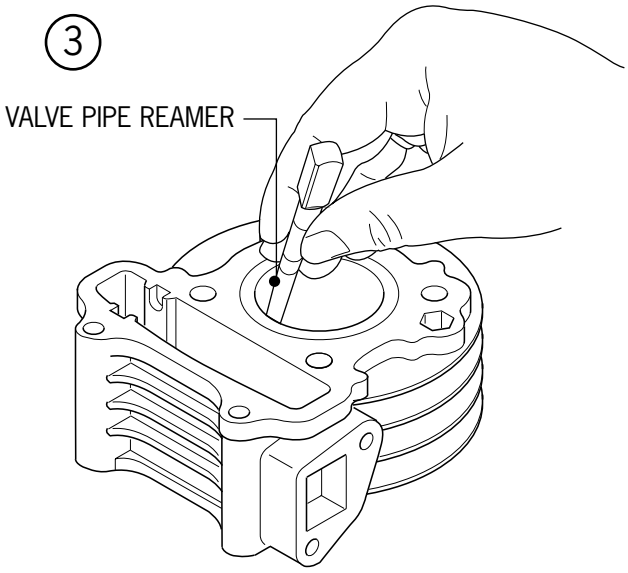
Valve guide replacement

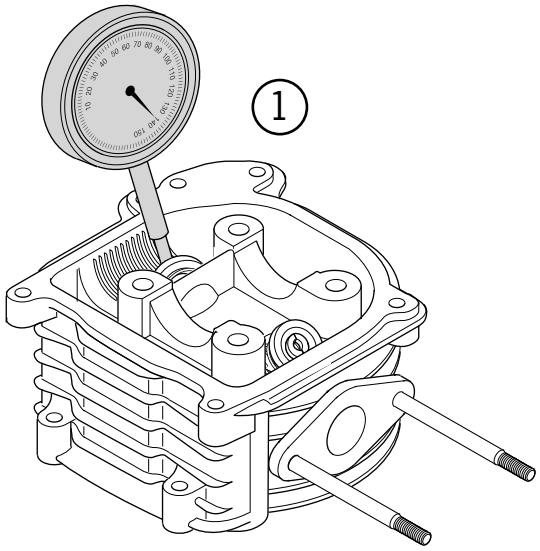
1. Operate cylinder at the temperature of about 100˚C-15˚C 212˚F.

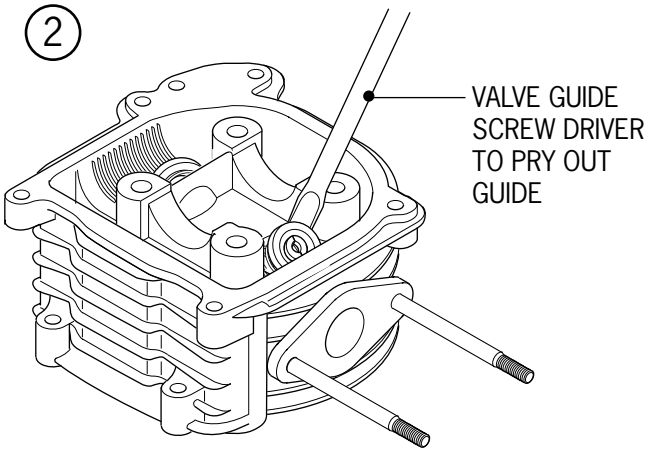
Heat cylinder head quickly and evenly to prevent warping.

2. Press, cut or pry out the valve guide.

Be careful to not damage cylinder head surface.







7. Cylinder Head Valve

3. Press in the new valve guide. Spread engine oil on new o-ring and build up new valve guide pipe. Make sure cylinder head is still warm when pressing in new guides.

4. Size valve guide with reamer after installing.

Use cutting oil on reamer. Rotate reamer in proper direction and do not stop rotation to punch in or pull out.

5. Clean cylinder head and get rid of cut bits of metal and dust.



Special tools
•Valve guide pipe reamer
•Valve Seat Checking and Correcting
•Valve Seat Checking

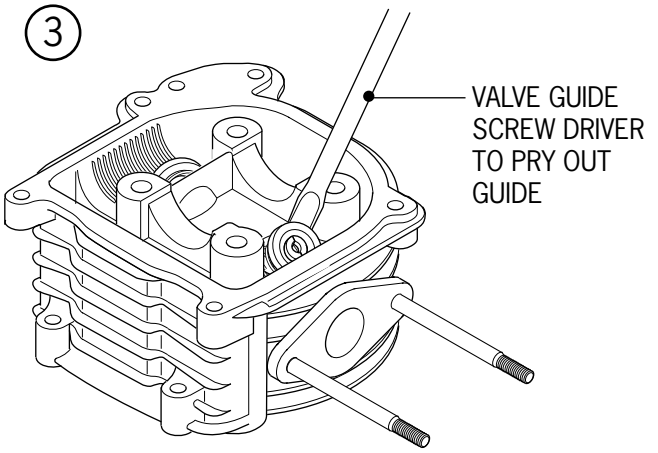
6. Remove carbon deposit from combustion chamber valves.

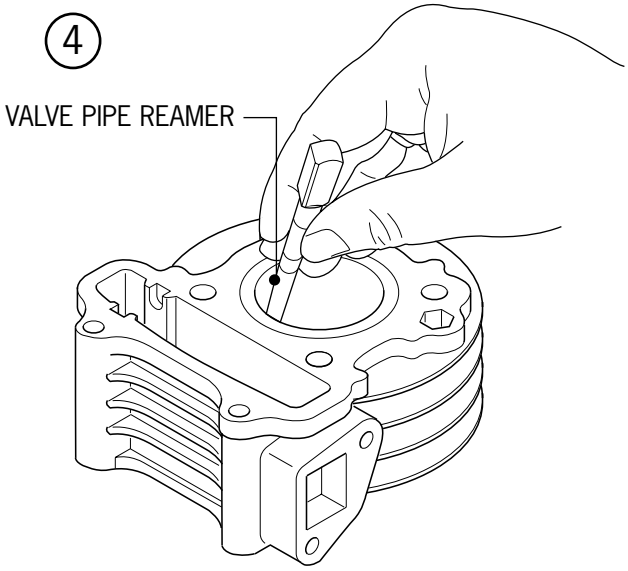
7. Spread emery on seat surface between valve and valve seat. Use polishing bar to wear in valve.

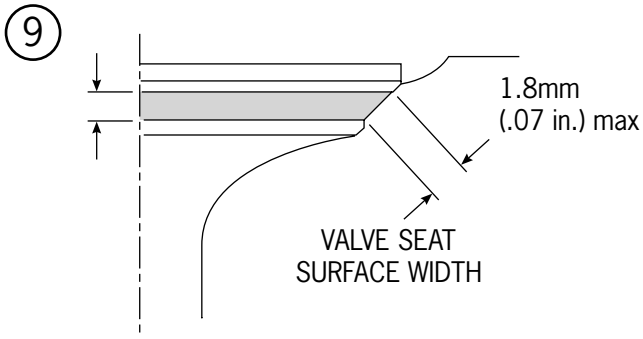
8. Take out valve and check valve seat surface. Change if valve surface is course or facial polished.

Valve seat surface width checking
Used limit: above 1.8mm (.07 in.) correct.

9. Correct valve seat with chamfered tool if surface width is not even, too wide or too narrow.







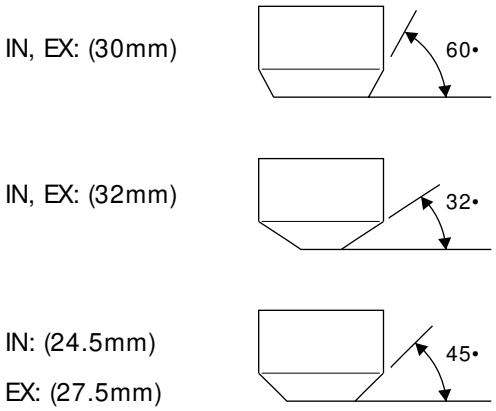
7. Cylinder Head Valve

Valve Seat Chamfer Cutting Tools

Refer to valve chamfered tool handbook for details.

1. Press and rotate with 4-5kg 10-12 lb force to polish and cut when correcting.

Use chamfered tool after spreading engine oil on it.



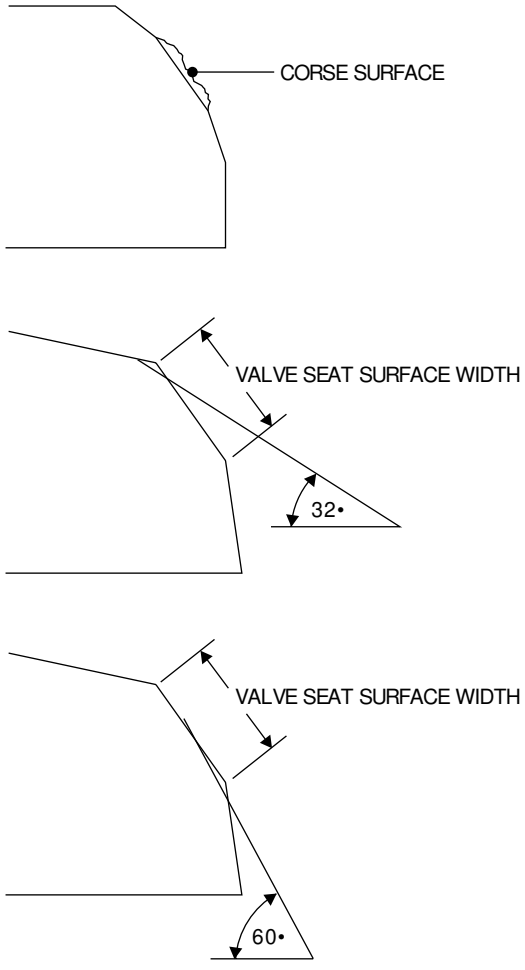
Valve Seat Cutting

1. Do not polish or cut excessively.

2. Cut primary surface with 450 cutting head.

3. Chamfer inner edge with 320 cutting head.

4. Correct inner surface by sixty-degree chamfered tool.



7. Cylinder Head Valve

5. Trim valve seat to assigned seat width and valve seat width with 45 degree chamfered cutting tool.

Standard valve: 1.0 mm (.393 in.)
Check contact place of valve seat.

6. Polish with 30-degree chamfered cutting tool if he contact place is too high. Trim to assigned width with 45-degree chamfered cutting tool. Polish valve contact surface with emery and polishing bar after correcting bar.

7. Wash and clean cylinder and valve after polishing and grinding.

Rotate and press softly when polishing. Don't put emery into valve and valve guide pipe when polishing.

8. Spread red ink on 45-degree seat surface and confirm if the center of the contact surface of the valve is even after correction.

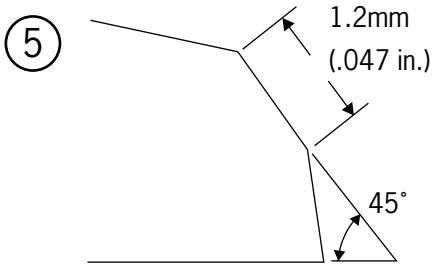
Building Up of Cylinder Head

1. Build Up Spring Seat

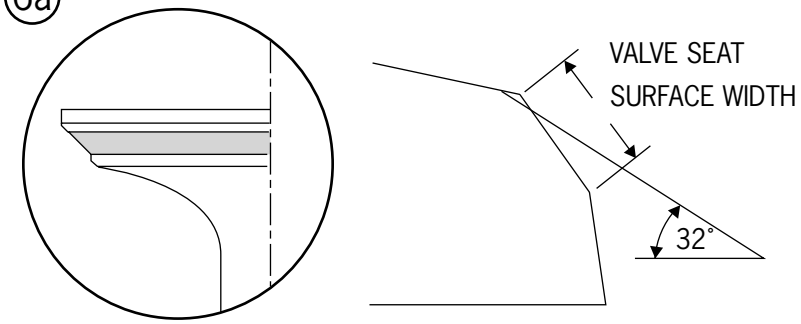
Use new oil seals when reassembling.

2. Spread engine oil on valve stem and put into valve guide.

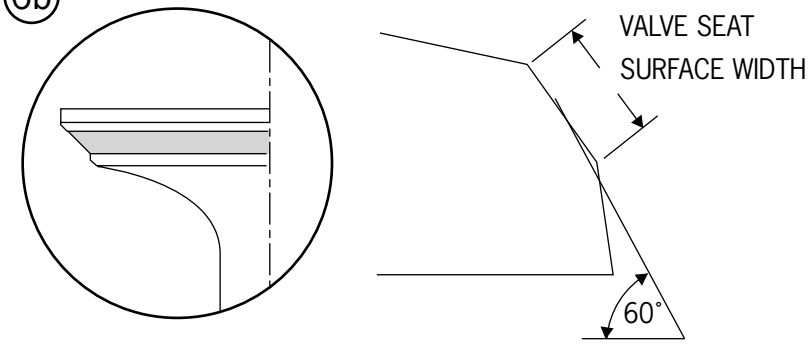
3. Build up inner and outer valve spring and put in valve collar using spring compressor.

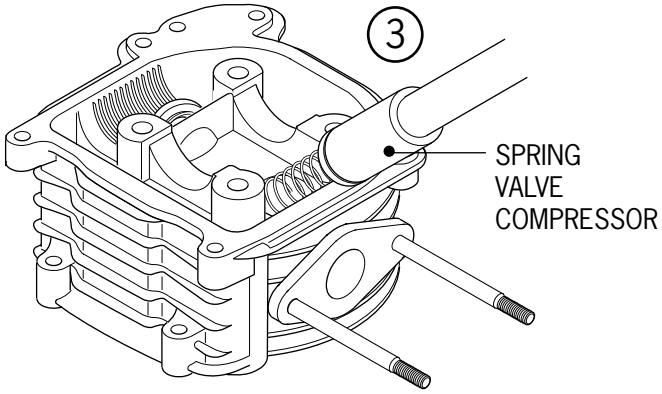


CONTACT PLACE TOO HIGH



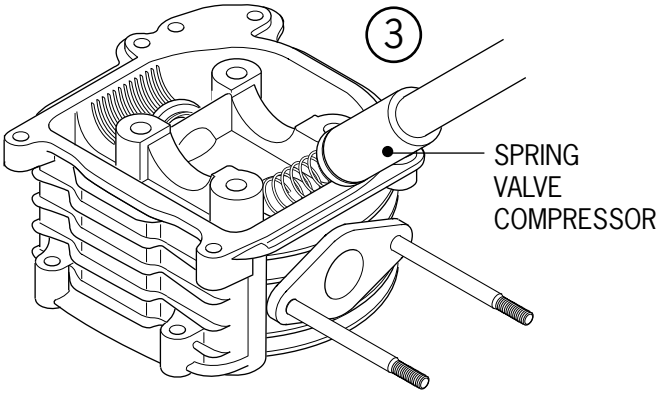
CONTACT PLACE TOO LOW





7. Cylinder Head Valve

4. Use valve spring compressor accessory to make valve contact with valve collar. Tap with plastic mallet two or three times, softly, on the ends of the valve to seat collars.



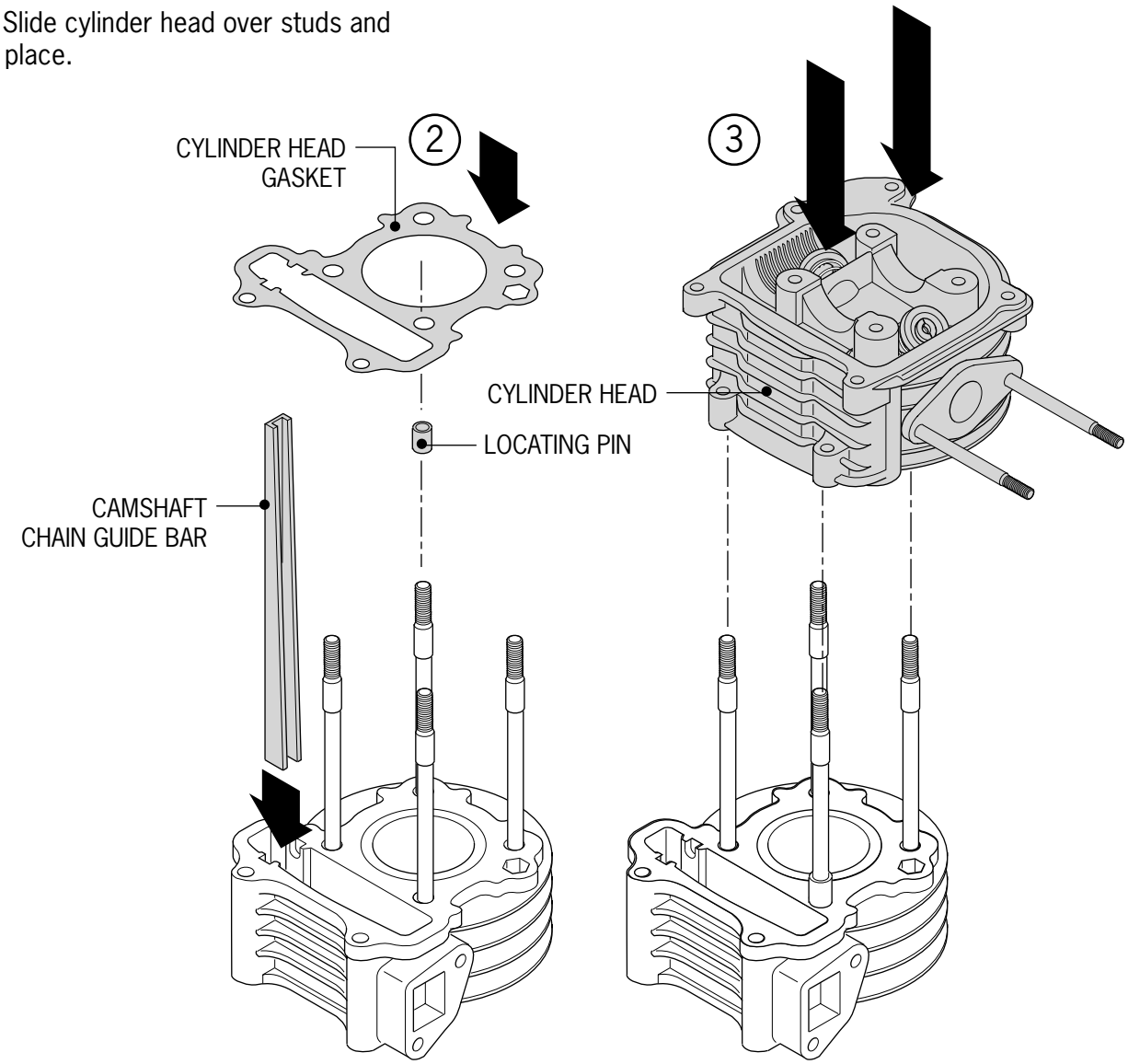
When using mallet, be careful to not damage valves.

Installing Cylinder Head

1. Install locating pin and gasket.

2. Install cam chain adjuster plate.

3. Slide cylinder head over studs and into place.



7. Cylinder Head Valve

Camshaft Assembly

1. Assemble rocker arm and rocker shaft.

Make alignment between shaft end and fixed screw bolt hole of camshaft seat when valve rocker shaft is assembled.

2. Install the camshaft into the cylinder head. Seat the camshaft into the fixed seat and check alignment.

3. Install camshaft fixed seat.

4. Rotate flywheel and align “T” mark on flywheel with crankshaft mark.

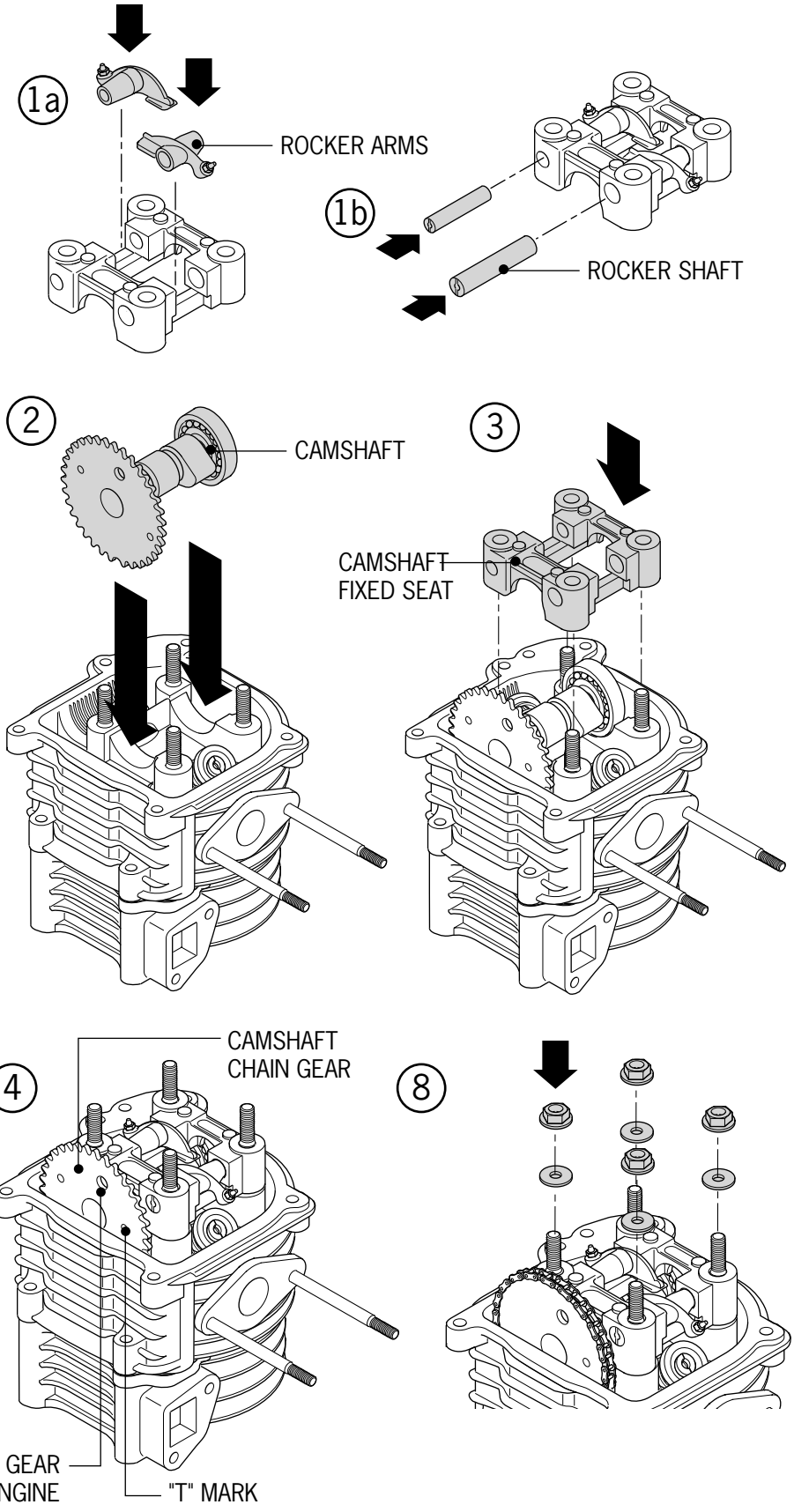
5. Align the camshaft chain gear round hole away from engine.

6. Install camshaft chain on camshaft gear.

7. Assemble fixed studs.

8. Assemble camshaft seat, space and nut into cylinder head. Tighten cylinder head nut and bolt securely.

Torque valve:
Camshaft fixed nut:
2.0kg-m 15 ft lbs



7. Cylinder Head Valve

Camshaft Chain Regulator Assembling

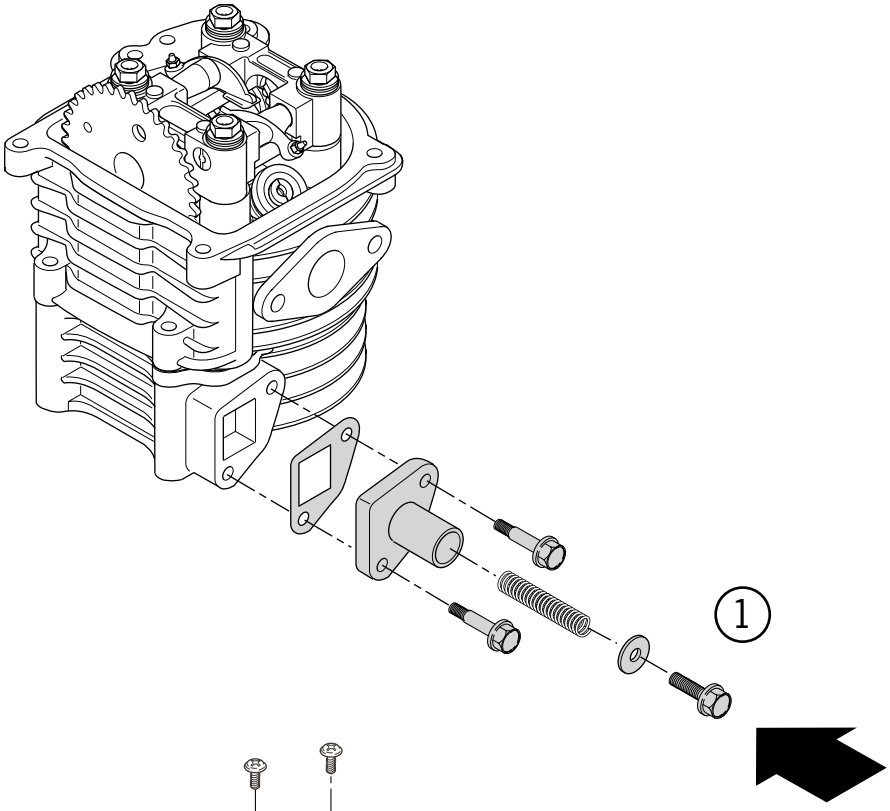
1. First, build up camshaft chain regulator and spacer. Second, lock two fixed bolts. Third, put spring into camshaft chain regulator. Last, assemble the o-ring and fixed bolt.

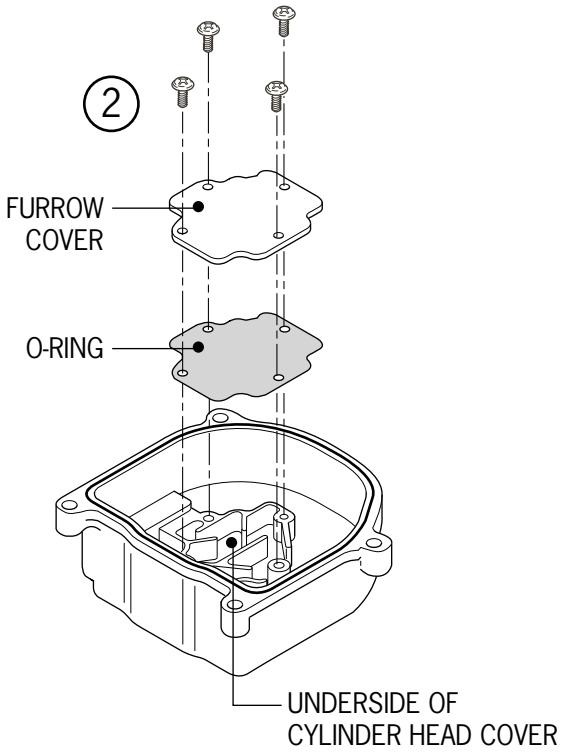
Press down regulator master jaw and drive down driving bar when camshaft chain regulator is assembled.

Torsion valve: 0.3-0.5 kg-m
Regulate valve gap: (3-5)

2. Change the ring of he cylinder head cover and assemble the cylinder head cover.

Put o-ring into furrow.





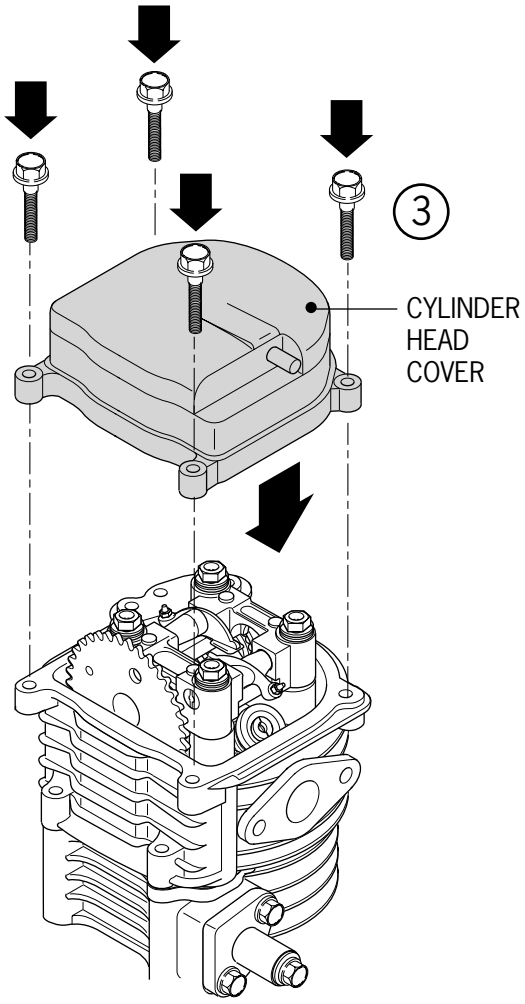
7. Cylinder Head Valve

3. Lock fixed screw bolt of cylinder head cover.

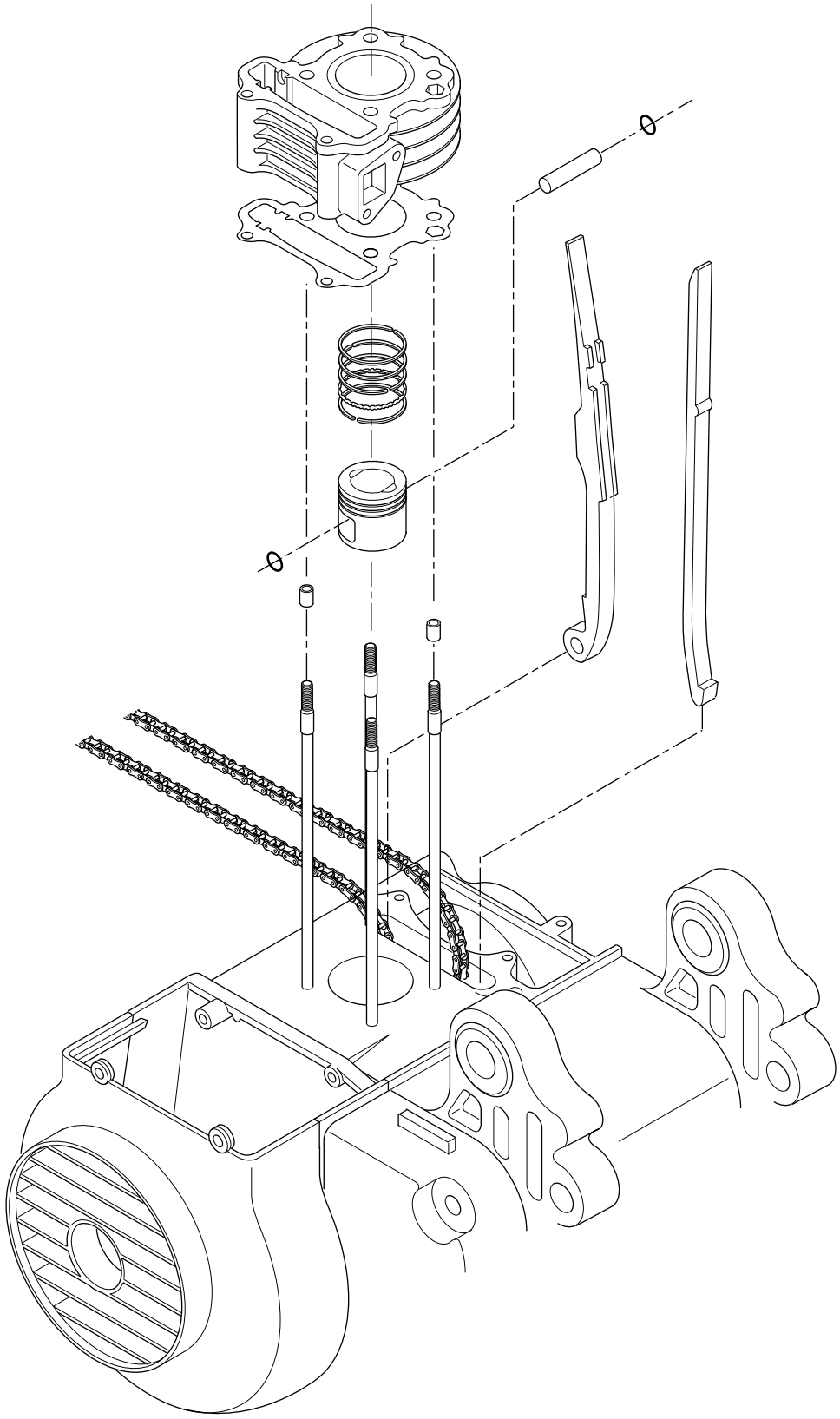
Torsion valve: 0.8-1.2 kg-m

4. Spread grease on threading position of camshaft fixed seat screw bolt.

5. Lock two or three times at diagonal of camshaft fixed seat screw cap.



8. Cylinder and Piston



8. Cylinder and Piston

Topic	Page	Topic	Page
Material	8-2	Removing the piston	8-3
Troubleshooting	8-2	Assembling the piston	8-7
Removing the cylinder	8-3	Assembling the cylinder	8-8
Checking the Cylinder	8-5		

Important Points

•The work on the cylinder and piston can be done on the engine without complete disassembly.
•After taking them apart, clean and dry the cylinder and piston with the compressed air before measuring and testing.

unit: mm

Item			Normal size	Max. Service Allowance
Cylinder	ID		(0.04) 0.05	39.10
	Distortion		——	0.05
	Cylindricity		——	0.05
	Out-of-roundness		——	0.05
Piston	Clearance between the ring and the ring groove		0.015-0.055	0.09
			0.015-0.055	0.09
	Compressed gap		0.08-0.20	0.45
			0.05-0.20	0.45
			0.20-0.70	——
Piston ring	OD of piston		38.980-38.780	38.7
	Check point of OD		9mm away from skirt	——
	Clearance between piston and cylinder		0.010-0.040	0.1
	ID of the piston pin hole		13.002-13.008	13.04
OD of the piston pin			12.994-13.000	12.96
Clearance between the piston pin and the hole			0.002-0.014	0.02
ID of the small end of the connecting rod			13.016-13.034	13.06

Troubleshooting

•In case of difficulty starting or unsteady running at low speeds, check if there is white smoke coming out of the air hole pipe of the crankcase. If that is the case, the piston ring is worn, burnt or broken.

Low Compression Pressure

•The piston ring is worn, burnt or broken.
•The piston/cylinder is worn or damaged.

Compression Pressure is Too High

•Carbon deposits on the piston and the combustion chamber.

White Smoke Coming Out of the Exhaust Pipe

•The piston ring is worn or damaged.
•The piston/cylinder is worn or damaged.

Knocking Noise by the Piston

•The cylinder, the piston or the piston ring is worn.
•The piston pin and its hole are worn.

8. Cylinder and Piston

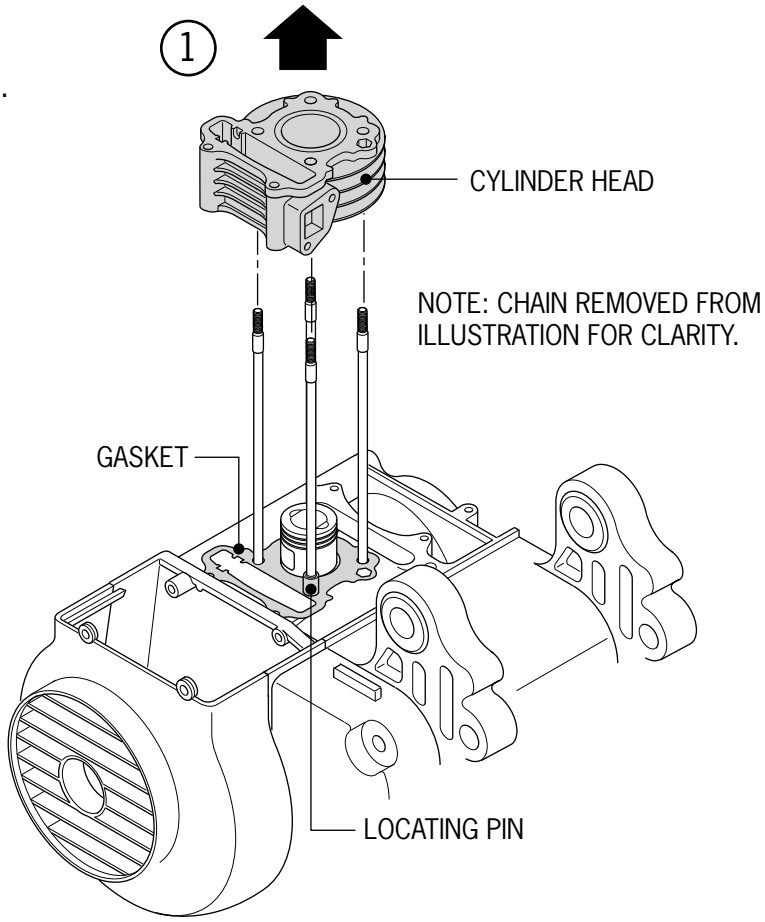
Removing the Cylinder

1. Detach the cylinder head (refer to 7-6).

2. Remove the chain guide of the cam chain.

3. Remove the cylinder.

4. Remove the cylinder gasket and the locating pin from the top of the cylinder and the base of the cylinder.



Removing the Piston

1. Remove the piston pin snap ring.

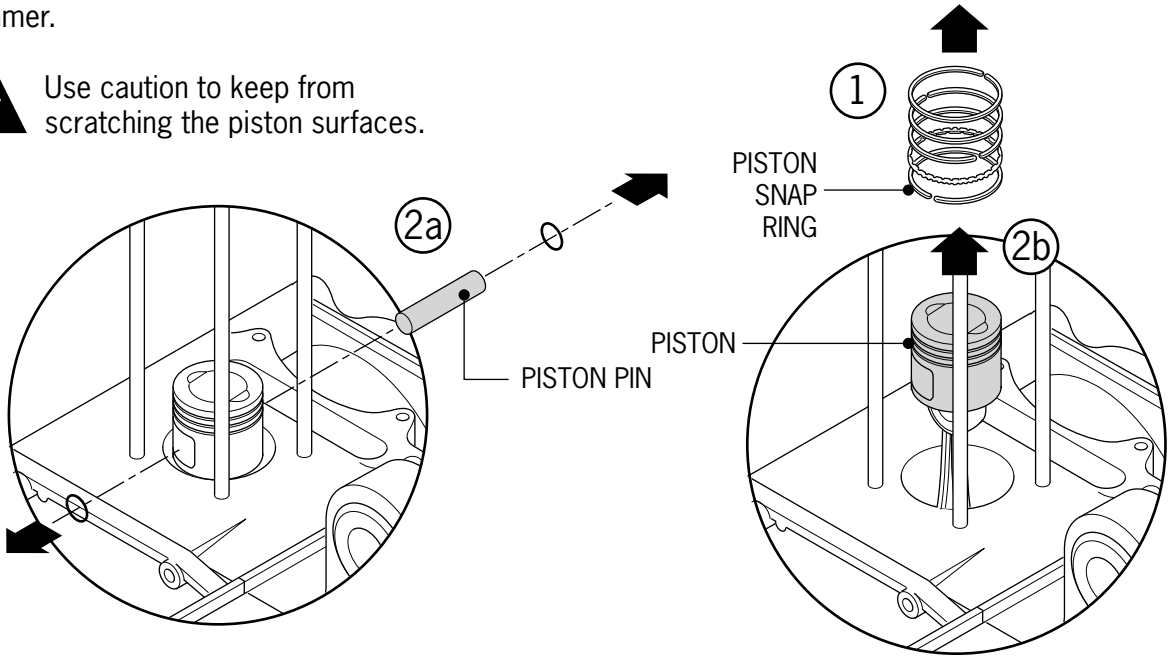
Attention:
Don't drop the snap ring into the crankcase.

2. Take out the piston pin and then the piston.

3. Push the piston pin from the side opposite the removed snap ring.

4. Use a small punch or drift pin if necessary and top gently with a soft-faced bummer.

Use caution to keep from scratching the piston surfaces.



8. Cylinder and Piston

Checking the piston, the piston pin and the piston ring.

Attention:
Don't damage or break the ring.

1. Remove all of the carbon deposits from the ring groove.

2. Mount the ring and measure the clearance of the ring groove.

   Maximum service allowance:
   The top ring: Replace when it goes beyond 0.09mm (.035 in.).

   The second ring: Replace when it goes beyond 0.09mm (.035 in.).

3. Remove the piston rings.
Install the piston rings into the bottom of the cylinder.

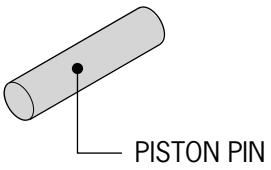
Attention:
Use the piston head to press the rings into place in the cylinder.

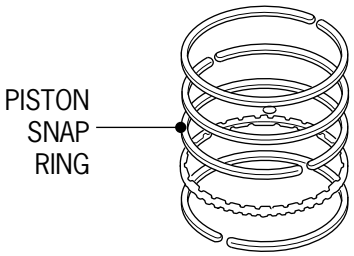
4. Measure the piston ring gap in bore.

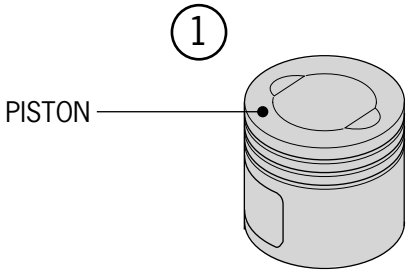
   Maximum service allowance:
   Replace when it goes beyond 0.45mm (.018 in.).

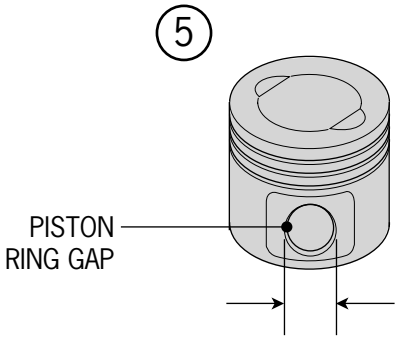
5. Measure the ID of the piston pin hole.

   Maximum service allowance:
   Replace when it goes beyond 13.04mm (.51 in.).





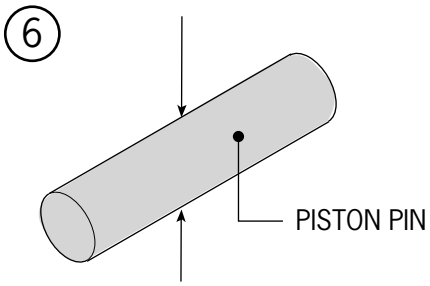




8. Cylinder and Piston

6. Measure the OD of the piston pin.

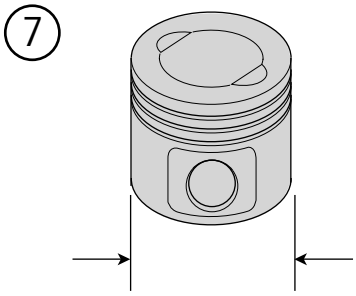
Maximum service allowance:
Replace when it is below 12.96 mm, (.51 in.).



7. Measure the OD of the piston.

Attention:
Measure it in a position which forms 90 degree with the center of the piston pin and which is 9mm away from the skirt.

Maximum service allowance:
Replace when it is below 38.7 mm (1.52 in.).



8. Measure the clearance between the piston pin and the pin hole.

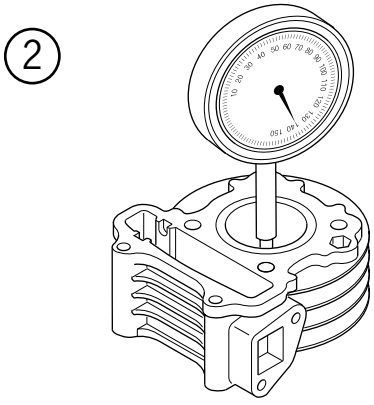
Maximum service allowance:
Replace when it goes beyond 0.02 mm (.0008 in.).

Checking the Cylinder

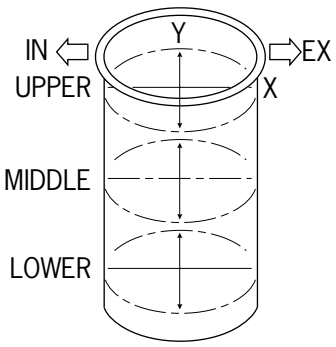
1. Check whether it's scratched, worn or damaged in its inner surface.

2. Measure its ID in three positions (upper, middle and lower) which form 90 degrees (x-y direction) with the piston hole.

Maximum service allowance:
Repair or replace when it goes beyond 0.1mm (.004 in.).
The difference between X and Y directions is out-of-roundness.



The cylindricity is the ID difference (between X and Y directions), measuring at three positions (upper, middle and lower). The largest measured value will be considered the result. This indicates a taper of the cylinder.



Maximum service allowance:
Out-of-roundness:
Repair or replace when it goes beyond 0.05mm (.002 in.).
Cylindricity:
Repair or replace when it goes beyond 0.05mm (.002 in.).

8. Cylinder and Piston

3. Check the distortion of the cylinder.

Maximum service allowance: Repair or replace when it goes beyond 0.05mm (.002 in.).

4. Measure the ID of the small end of the connecting rod.

Maximum service allowance: Replace when it goes beyond 13.06mm (.51 in.).

Attention:
Don't scratch the piston or break the piston ring.

When replacing the ring, keep the surface with the "T" mark up.

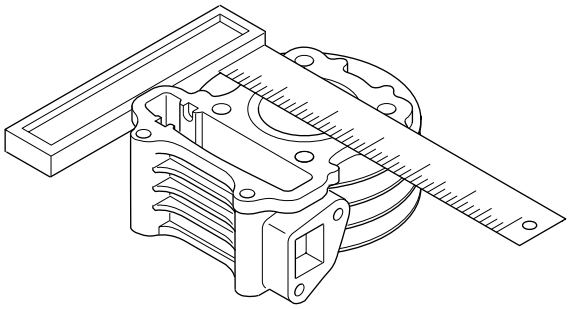
After assembling, make sure that the ring can be turned freely in the ring groove.

5. Lightly coat the rings with engine oil before installing them on the piston.

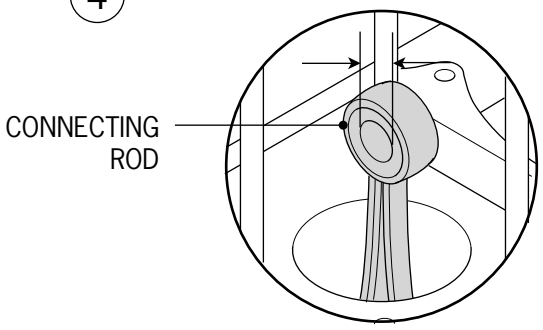
6. Make sure to keep ring end gaps rotated at 120° increments.

7. Cover piston and rings with a light coat of engine oil.

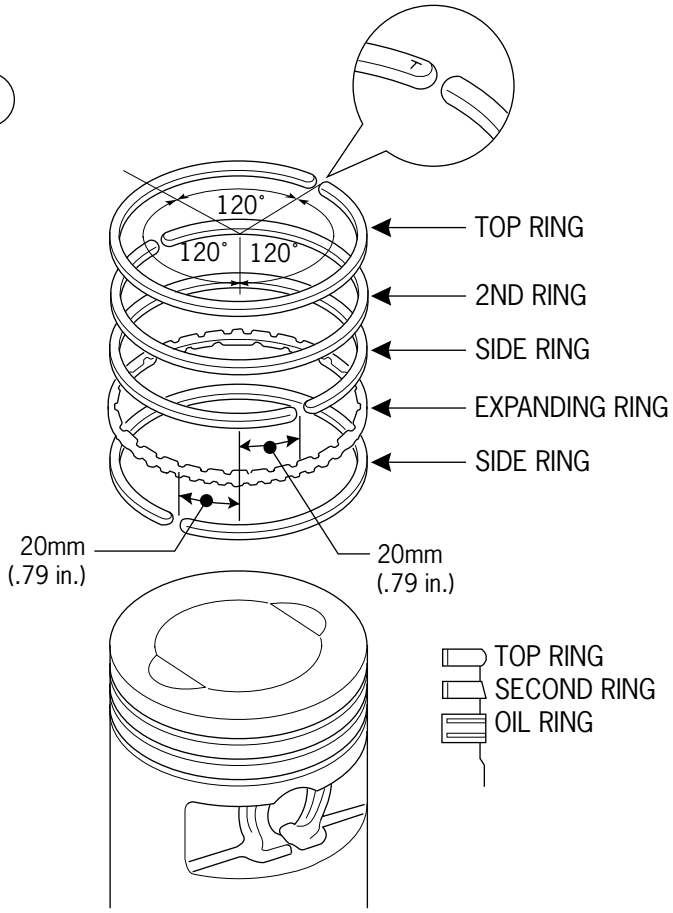
2



4



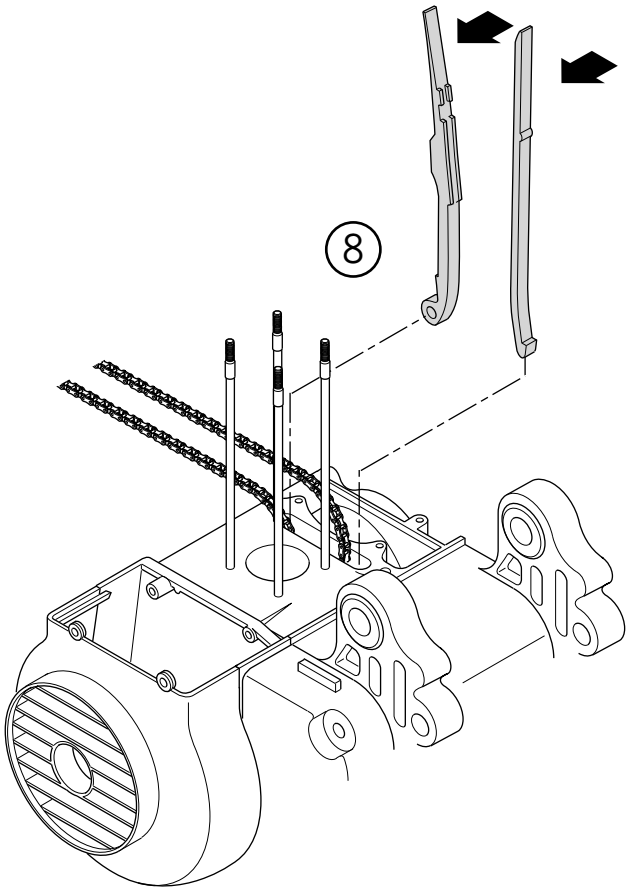
6



8. Cylinder and Piston

8. Install the chain guide lever of the cam.

Attention:
Make sure that the lug of the guide lever enters the notch of the cylinder.



Assembling the Piston

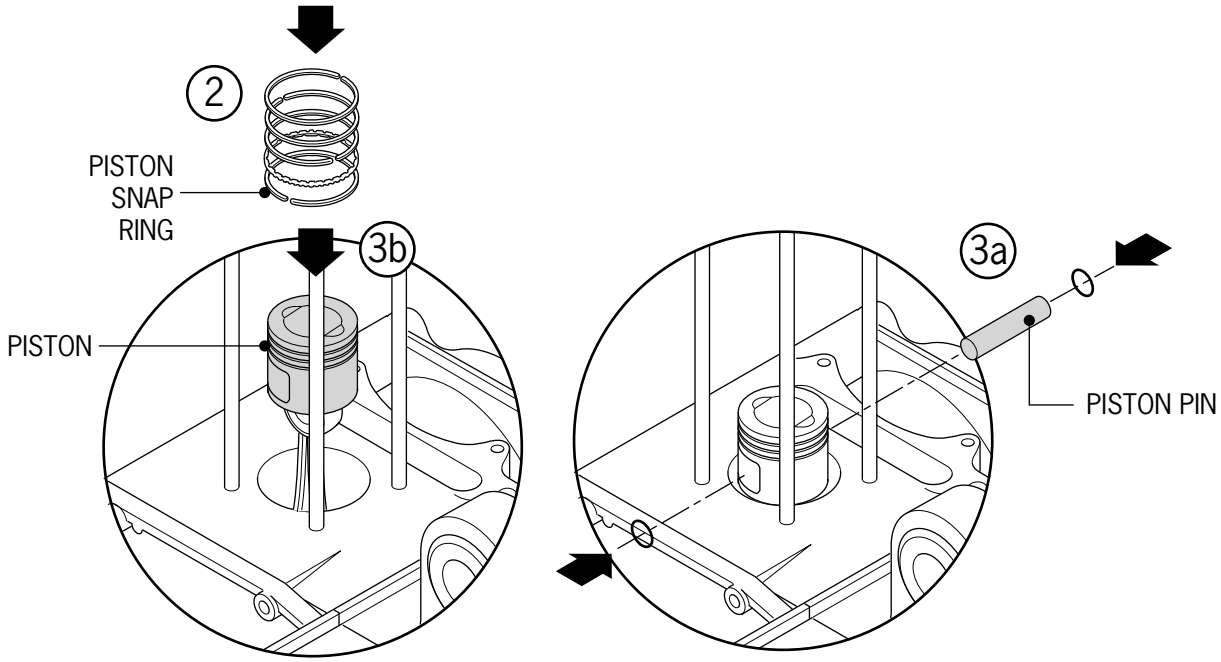
1. Scrape away the gasket adhering on the surface of the crankcase.

Attention:
Be sure not to let any matter drop into the crankcase.

2. Assemble the piston and the piston pin.

Attention:
When assembling, keep the mark “in” (on the top of the piston) toward the inlet valve.

Be sure not to let the piston pin snap ring fall into the crankcase. Use a cloth to keep debris out of the crankcase.



8. Cylinder and Piston

Assembling the Cylinder

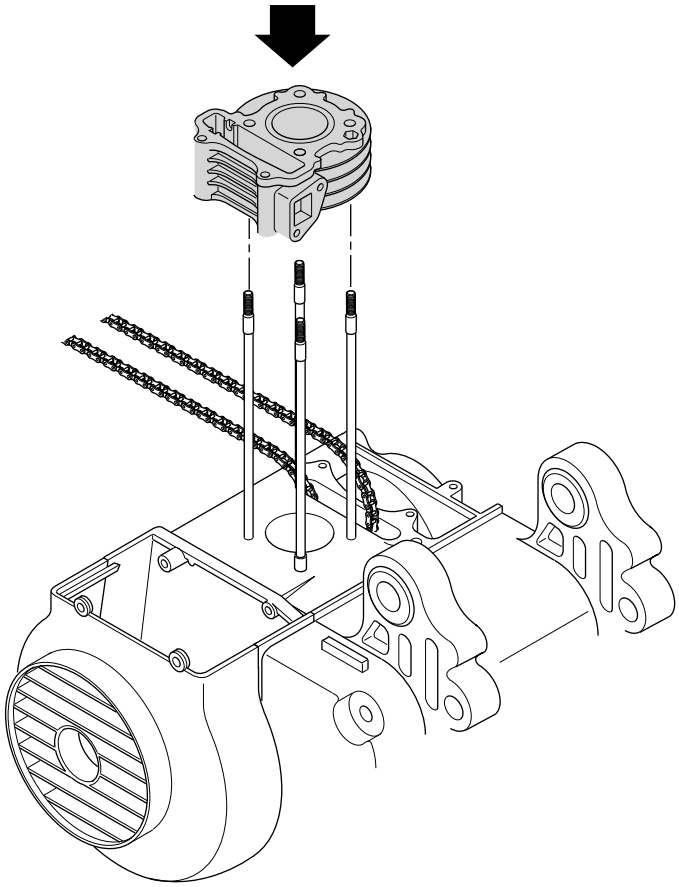
3. Install the locating pin and the gasket to the crankcase.

4. Coat the inner surface of the cylinder, the piston and the piston ring with oil.

5. When assembling the piston rings, they must be compressed into the cylinder.

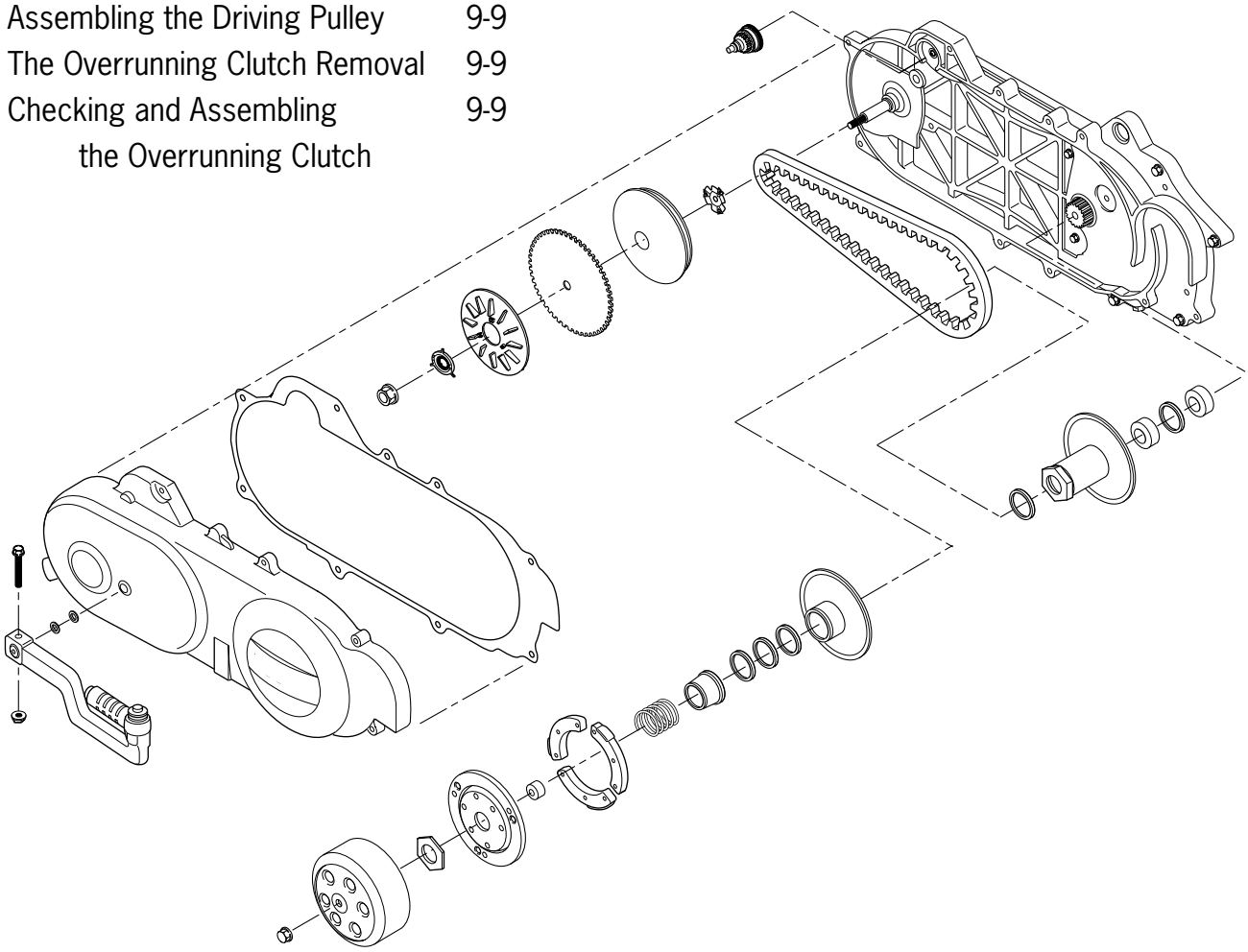
Attention:
Don't damage or break the piston ring.

Be sure not to make the position of the ring gap point to the inlet and outlet valves and parallel with the piston ring.



9. Driving Belt Device & The Starting Lever

Topic	Page	Topic	Page
Important Points	9-2	The Clutch/Transmission Pulley Removing the Clutch/ Transmission Pulley	9-10
Troubleshooting	9-2		
Detaching the Left Crankcase Cover	9-3		
Removing the Starting Pivot	9-3	Disassembling the Clutch/ Transmission Pulley	9-10
Checking the Starting Pivot	9-4		
Installing the Starting Assembly	9-4	Checking the Clutch Transmission Pulley	9-11
Assembling the Left Crankcase Cover	9-5		
Checking the Driving Belt	9-6	Replacing the transmission pulley and the bearing	9-12
Replacing the Driving Belt	9-6		
Assembling the Driving Belt	9-7	The Clutch/Transmission Pulley Assembly	9-13
The Driving Pulley-Dismounting	9-7		
Taking the Driving Pulley Apart	9-7	Assembling the Clutch Housing	9-14
Checking the Driving Pulley	9-8		
Assembling the Driving Pulley	9-9		
The Overrunning Clutch Removal	9-9		
Checking and Assembling the Overrunning Clutch	9-9		



9. Driving Belt Device & The Starting Lever

Important Points

•This chapter is about the driving unit, the clutch/driven unit and the starting lever.

•The work on them can be done on the engine, without the disassembly.

•The surface of the driving belt and the drive units are not allowed to have oil adhering to them. If there is any, remove it to minimize the slip between the belt and the drive units.

Tech Criterion

Item	Normal Size	Max. Serice Allowable
ID of the sleeve of the sliding driving plate	23.989-24.05-	24.24
OD of the hub of the sliding driving plate	20.010-22.025	19.97
Width of the driving belt	18	17
Thickness of the clutch brake lining		2.0
ID of the clutch housing	107.0-107.22	107.5
Free length of the driven belt spring	98.1	107.5
OD of the driving plate	33.965-33.985	92.8
ID of the sliding driving plate	34.0-34.25	34.06
OD of the roller	13.0	12.4

Torque

The nut of the driving plate
3.8kg/m 28ft lbs
The nut of the clutch housing
5.5kg/m 40ft lbs
The bolt of the driving plate
0.3kg/m 40in lbs
The nut of the clutch/driving plate
0.45kg/m 40in lbs



•Universal stand



•Compressing device for clutch spring
•Socket (39mm) for
Socket (39mm) for the fix nut
•Bearing driver

Troubleshooting

The motorcycle doesn't run after the engine is started
•The driving belt is worn
•The driving plate is broken
•The brake lining is worn or broken
•The spring of the driven plate is fractured

Sudden breakdown during running
•The spring of the brake lining is fractured

Power can't develop fully
•The driving belt is worn
•Distortion of the driven belt spring
•The roller is worn
•The driving plate surface is dirty