REPAIR MANUAL
T58 - ZION 125

Vers. 2014_06

KSR MOTO AUSTRIA

INTRODUCTION

It is important that you read this repair manual carefully before the start of work.
Only use **KSR spare parts**.

KSR Moto is a registered brand by KSR Group GmbH.

This vehicle can only fulfil the demands placed on it if the service work is made by qualified experts and in accordance with the service schedule.

The repair manual was written to correspond to the current state of this model.
We reserve the right to make changes in this manuals in the interest of technical advancements and improvements without a notice.
It is recommended that repair work will be done by a fully educated mechanic.
We will not provide descriptions of general workshop methods, safety rules that necessary in a workshop.

All specifications refers to the current state and are nonbinding. KSR Group GmbH specifically reserves the right to modify the information in this manual without notice and without specifying reasons.

KSR Group GmbH accepts no liability deviations from illustrations and descriptions or misprints and other errors.

The models in this manual partly contain special equipment that does not belong to the regular scope of delivery further the illustrations and pictures are symbolic images, and may differ from the actual components.

Within the meaning of the international quality management standard ISO 9001, KSR Group GmbH uses quality assurance processes that lead to the maximum possible quality of the products.

qualityaustria
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ISO 9001:2008 NR.09049/0

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KSR GROUP

KSR Group GmbH
A-3500 Krems, Austria

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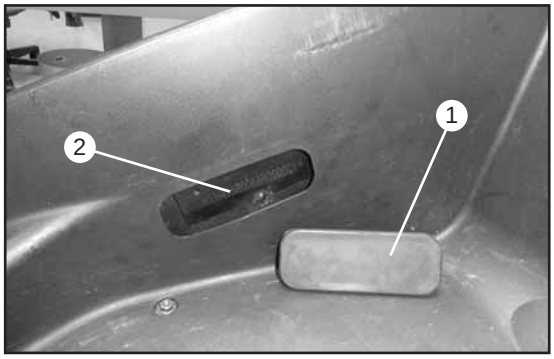
LOCATION OF SEVERAL NUMBERS

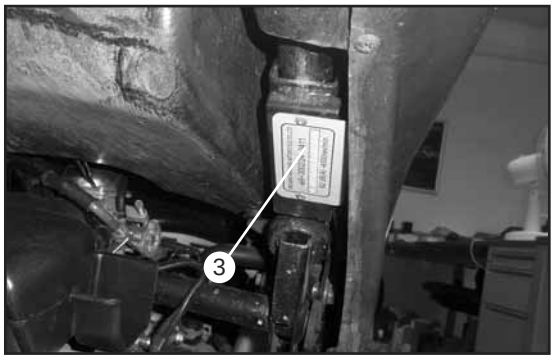
VIN (CHASSIS NUMBER) AND FRAME PLATE

Remove the ruber cover (1).
The vehicle identification number (VIN) (1) is punched into the right side of the frame.



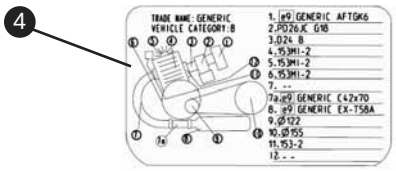
FRAME PLATE

The frame plate (3) is located on the front side of the steering tube.



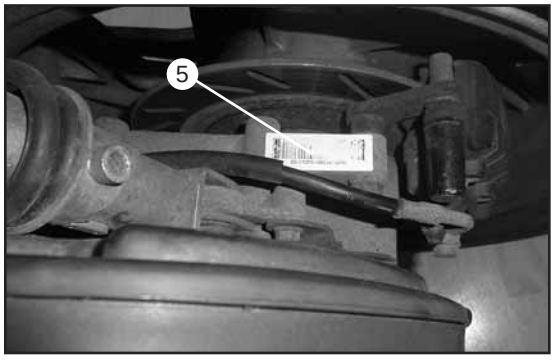
ANTI TEMPERING LABEL

The anti tempering label (4) is fixed on the inner side of the seat bench.



ENGINE NUMBER

The engine number (5) is on the left side of the engine case.



DECRYPTING THE VEHICLE IDENTIFICATION NUMBER

EXAMPLE: LBBT58006AB378179

LBB -	WORLD MANUFACTURER INDEX (NAME OF MANUFACTURER)
T58 -	MODEL TYPE
0 -	VARIANT OF MODEL
0 -	VERSION OF MODEL
6 -	RANDOM NUMBER
A -	YEAR OF PRODUCTION (AB = 2010/ DB = 2013,.....)
B -	ASSEMBLING PLANT (LOCATION OF FACTORY)
378179	SERIAL NUMBER

GENERAL SPECIFICATION

ENGINE
Engine type: Water cooling 4 - stroke
Cylinder arrangement: Single cylinder
Displacement: 125 cm³
Compression ratio: 10.4:1
Max. output (kw/rpm): 9.0 kW/ 8250 rpm
Max. torque (Nm/rpm): 10.9 Nm/ 7500 rpm
Starting system: Electric starter
Lubrication system: Pressure and splash lubrication

ENGINE OIL QUANTITY
Quantity: Replacing: 0.9 L
Dismantling: 1 L
Recommended type: Recommended type: CASTROL Power 1 - Racing 4T 10W-40

TRANSMISSION OIL
Type SAE 80W-90
Niveau bolt
Recommended type: Castrol MTX Part Synth. 80W OR EP 80W-90

AIR FILTER ELEMENT
Type: Dry

FUEL
Recommended fuel: Unleaded gasoline only > 91Oct - (SP 95 - SP 98)
Do not use Bio-Ethanol fuel
Fuel tank capacity: 8.6 L ± 0.2 L

CARBURETTOR
Type/ Manufacturer: PD26JC G18/ CORUNDUM or QJ

SPARK PLUG
Manufacturer/model: NGK (CR8E)

CLUTCH
Clutch type: C.V.T. system

TRANSMISSION TYPE
V-belt automatic
Fly (roller) weights: 5.0 g
Operation: Centrifugal automatic type

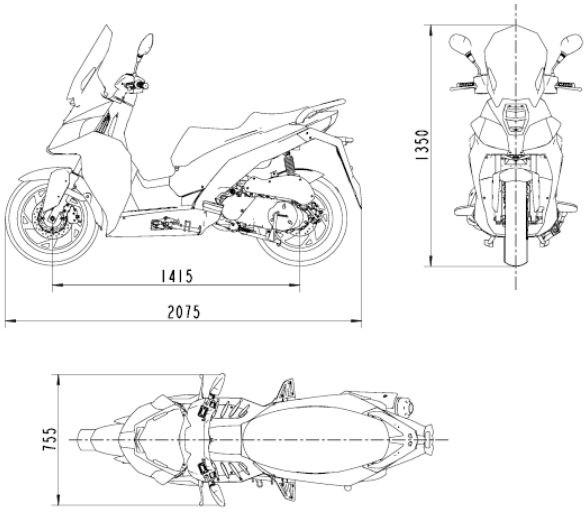
CHASSIS
Frame type: Steel tube backbone

TIRES
Front tire
Type: Tubeless/ Pressure on cold tire: 2.3 ± 0.1 bar
Size: Rim: MT3.75x15
Tire: 120/70-15M/C

Rear tire
Type: Tubeless/ Pressure on cold tire: 2.3 ± 0.1 bar
Size: Rim: MT3.75x14
Tire: 140/60-14M/C

BRAKES
Front brake:
Type: Single Hydraulic disc brake (240 mm)/ Right hand operation
Rear brake:
Type: Single Hydraulic disc brake (220 mm)/ Left hand operation

Brake fluid: DOT4
Recommended brake fluid: (CASTROL SUPER DISK BRAKE FLUID DOT 4.)



Cable operated

FRONT SUSPENSION
Type: Telescopic fork
Spring/shock absorber type: Coil spring/oil damper

REAR SUSPENSION
Type: Unit swing
Spring/shock absorber type: Coil spring/oil damper

ELECTRICAL SYSTEM
Ignition system: CDI
Charging system: CDI magneto

BATTERY
Model: YTX7A-BS/ 12 V, 6.0 Ah

LIGHT AND BULBS

Headlight W/35.0 W	12 V, 35
Tail/brake light: W/21.0 W	12 V, 5.0
Front turn signal light:	12 V, 10.0 W
Rear turn signal light:	12 V, 10.0 W
License plate light:	12 V, 5.0 W
High beam indicator light:	12 V, 3W
Turn signal indicator light:	12 V, 3 W

MAIN FUSE
15 A

SPECIFIC TIGHTNING TORQUES

MODULE	PART	TORQUE / Nm
Electrical System	Bolt in the clutch cover of the startup electrical machinery	12
	Fixing nut in the clutch of the startup electrical machinery	95
	Rectifier bolt	5
	Fixing bolt of ignition coil	9
	Fixing nut of flywheel	5
	Body fender bolt	9
Wheel Axles	Front wheel-axle clamping nut	55-62
	Rear wheel fixed nut	100-113
	Fixing bolt for fuel tank	5-9
	Fixing bolt for rear carrier rack	5-9
	Fixing bolt for rear rack	22-29
	Fixing bolt for seat lock	5-9
Front brake system	Front brake disc fixed bolt	22-29
	Mounting bolt of front brake caliper	22-29
	Fixing bolt of hand brake lever braket	5-9
Rear brake system	Rear brake disc fixed bolt	22-29
	Fixing bolt of rear brake rocker arm	10-12
	Fixing bolt of hand brake lever braket	5-9
Rear shock absorber	Top nut of rear shock absorber	37-44
	Bottom nut of rear shock absorber	22-29
Front fork	Fixing nut in the clutch of the startup electrical machinery	40-60
	Mounting bolt of brake line guide clamp	5-9
	Mounting bolt of fork legs	37-44
Handlebar	Mounting bolt and nut of handle bar	40-60
Muffler	Fixing bolt of muffler	22-29
	Fixing bolt of muffler trim cover	5-9
	Fixed bolt of muffler connector	22-29
Engine	Cylinder cover nut	28-28
	Oil drainage bolt	22-25
	Spark plug	10-15
	Mould assembling bolt	10-12
	Variable- speed chamber bolt	10-12
	Fixing bolt of engine	10-12
	Fixing bolt of oil pump	10-12
	Oil pump chain wheel bolt	10-12
	Lock nut of fly wheel	50-60
	Nuts of engine cooling fan	5-9
	Douple-screw bolt on right cover	10-12
	Douple end stud	18-22
	Chain regulator fixed bolt	10-12
	Setscrew of electric wire clamp	4-7

IMPORTANT NOTES

WARRANTY

The work prescribed in the service schedule must be carried out in an authorized workshop and confirmed in the customer‘s service card, otherwise no warranty claims will be recognized. No warranty claims can be considered for damage resulting from manipulations and/or alterations to the vehicle.

NOTES AND WARNINGS

Pay attention to the notes/warnings in this manual.

⚠ WARNING

- Identifies dangers that will lead to environmental damage if the measures are not taken.
- Identifies dangers that is likely to lead to fatal or serious injury if the measures are not taken.
- Identifies dangers that will lead to considerable machine and material damage if the measures are not taken.
- Identifies dangers that will immediately lead to fatal or serious permanent injury if the appropriate measures are not taken.

REPAIR MANUAL

It is important that you read this manual completely before the start of work. It contains useful information how to repair and maintain the vehicle.

FUEL AND LUBRICANTS

Use only the fuels, oils and lubricants according to specifications as listed in this manual.
Please consider that KSR Group GmbH give no approval for Bio- Ethanol (E 10 or higher) fuel.

SPARE PARTS AND ACCESSORIES

Only use spare parts and accessory that have been approved or recommended by KSR Group GmbH.

PRACTICE

Special tools are required for some work but mostly professional work shop equipment is enough for service, repair and maintenance of the vehicle. Special tools mentioned inside of this manual.
When thread locker is used on connections (e.g., Loctite®), follow the instructions for use from the manufacturer. After disassembly, clean the parts that are to be reused and check them for damage and wear. Replace damaged or worn parts.

IMPORTANT

- After each repair or maintenance work security check and a test drive must be done.
- Before you delivery the vehicle to the customer a road safety test must be done.
- Tighten the bolts of large diameter or the inner ones first, then screw down to the required orders of diagonal, unless otherwise specified.
- Rinse the parts disassemble with cleaner fluid, lubricate all the lubricating surfaces required before assembly.

GENERAL TIGHTNING TORQUES

If no specific torque is given for a bolted assembling use the table below to tighten the screws. If you release a bolted and glued assembling it must be glued in assembling again. For the bonding of screws use Loctite ® 243 ™, follow the instructions for use from the manufacturer.

MAXIMUM TORQUE IN NM REFERRING ISO 898/1 FOR METRIC FASTENERS/ COEFFICIENT OF FRICTION 0.12			
Size	*Strength (R) 3,6	*Strength (R) 8,8	*Strength (R) 12,9
M1.6	0,047 Nm	0,169 Nm	0,285 Nm
M 2	0,10 Nm	0,35 Nm	0,60 Nm
M 2.5	0,21 Nm	0,73 Nm	0,12 Nm
M 3	0,36 Nm	0,12 Nm	0,21 Nm
M 4	0.82 Nm	3.0 Nm	5.1 Nm
M 5	1.6 Nm	5.9 Nm	10.0 Nm
M 6	2.8 Nm	10.1 Nm	17.4 Nm
M 8	6.8 Nm	24.6 Nm	42.2 Nm
M 10	13.7 Nm	48 Nm	83 Nm
M 12	23 Nm	84 Nm	144 Nm
M 14	37 Nm	133 Nm	229 Nm
M 16	57 Nm	206 Nm	354 Nm
M 18	80 Nm	295 Nm	492 Nm
M 20	112 Nm	415 Nm	692 Nm

*The value R (strength) indicates the material property. The lower the value of R is the lower the torque of the bolts.

SPECIAL TOOLS

Special tools are required for some work but mostly professional work shop equipment is enough for service, repair and maintenance of the vehicle.
After disassembly, clean the parts that are to be reused and check them for damage and wear. Replace damaged or worn parts.

NAME	REMARKS
Flywheel extractor	Figure 1
Spacer gauge	Figure 2
Dismounting tools for bearing	Figure 3
Assembling tools for bearing	Figure 4
Oil-seal dismounting tool	Figure 5
Handle of dismounting tools	Figure 6
Piston pin exhaustion apparatus	Figure 7
Piston ring opening pincer	Figure 8
Spark plug circular wrench	Figure 9
Dial dictator - Measure the inner canon of piston pin	Figure 10
Cylinder diameter tester	Figure 11
Inner hexagon wrench	Figure 12
Rest wrench	Figure 13
Micrometer	Figure 14
Circular wrench	Figure 15
Dial indicator	Figure 16
Magnetic stand, V-shape block	Figure 17
Square caliper	Figure 18
Whack-type screw drive	Figure 19
Front fork oil seal dismounting tools	Figure 20
Front part seal element driving-in tools	Figure 21
Steering nut wrench	Figure 22
Universal meter	Figure 23
Spring clip-ring clipper	Figure 24
Ignition tester	Figure 25
Brake bleeder device	no picture

SPECIAL TOOLS

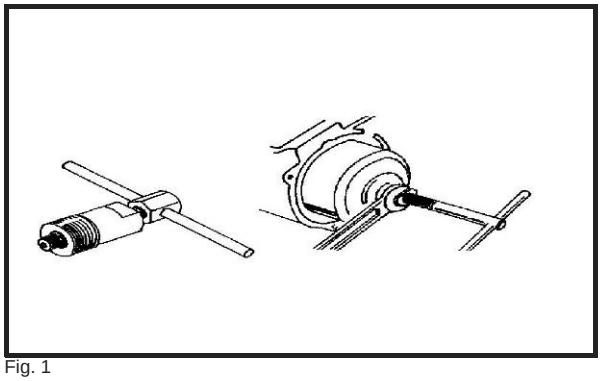
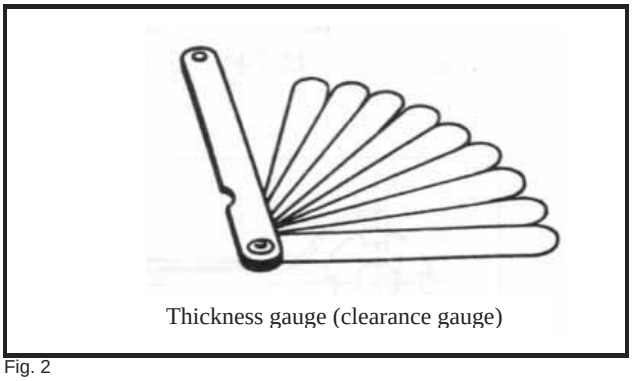


Fig. 1



Thickness gauge (clearance gauge)

Fig. 2

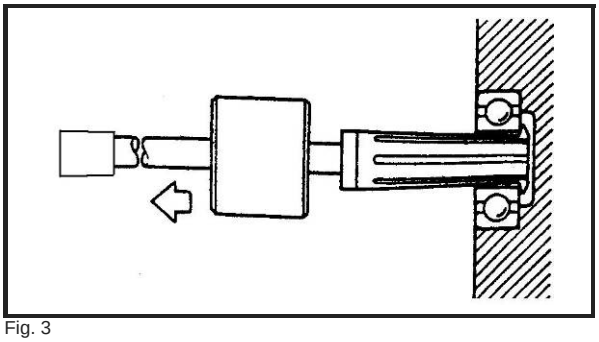


Fig. 3

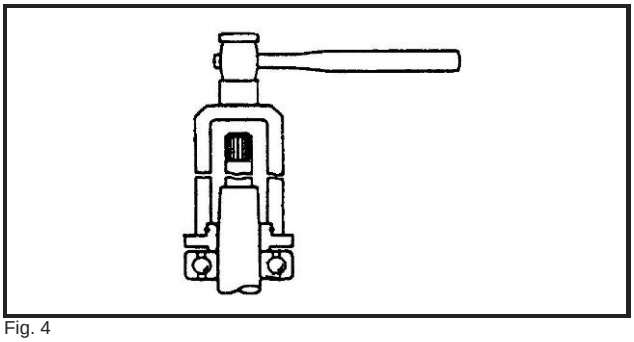


Fig. 4

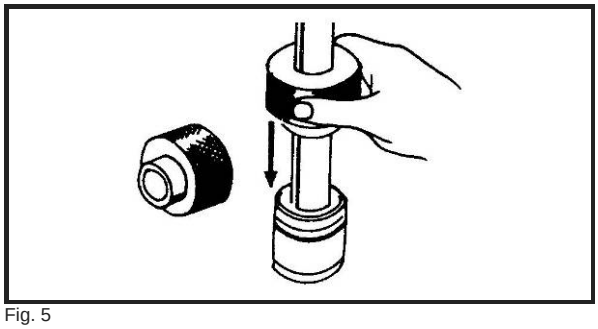


Fig. 5

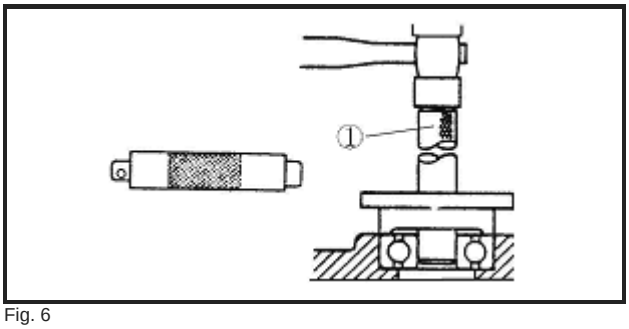


Fig. 6

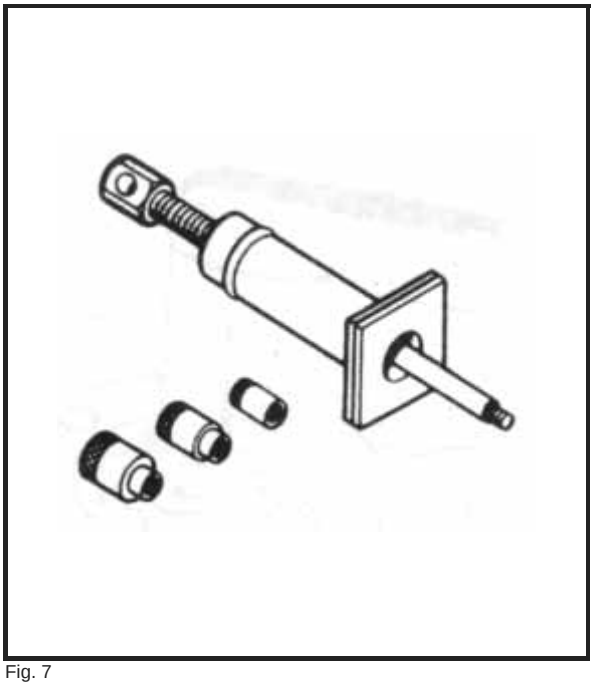


Fig. 7

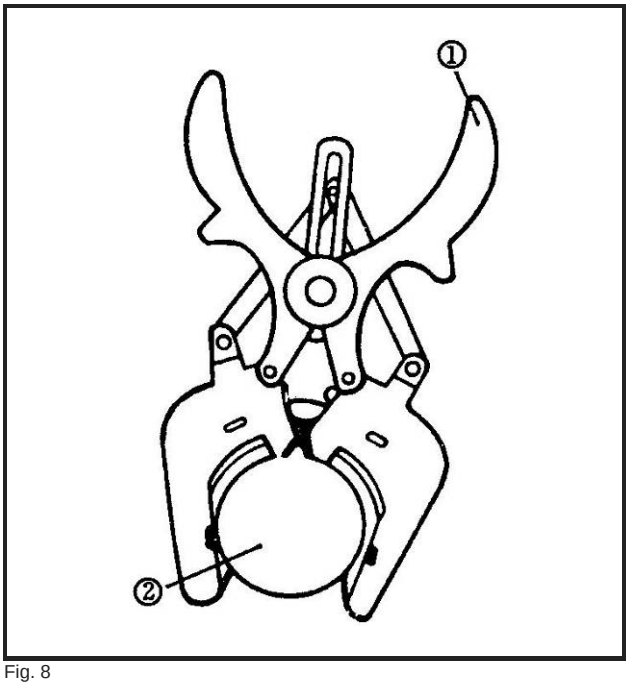


Fig. 8

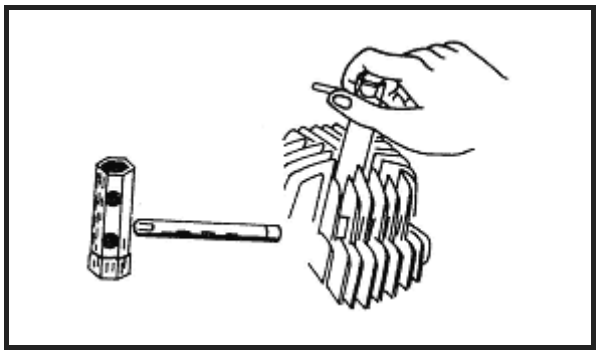


Fig. 9

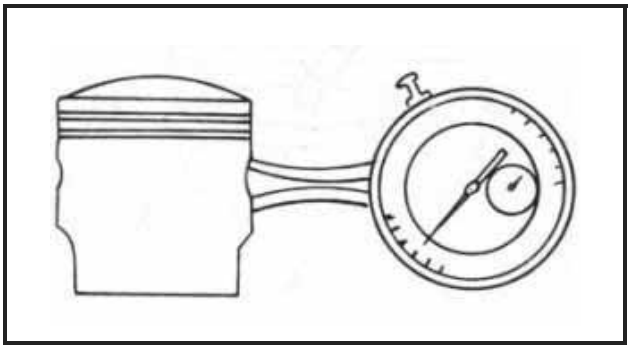


Fig. 10

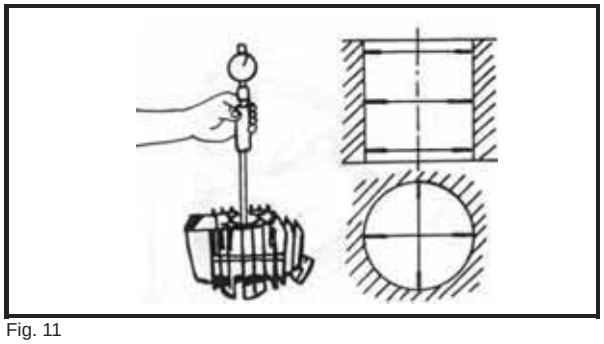


Fig. 11

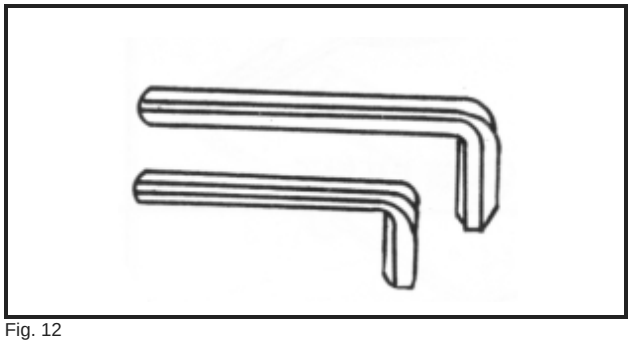


Fig. 12

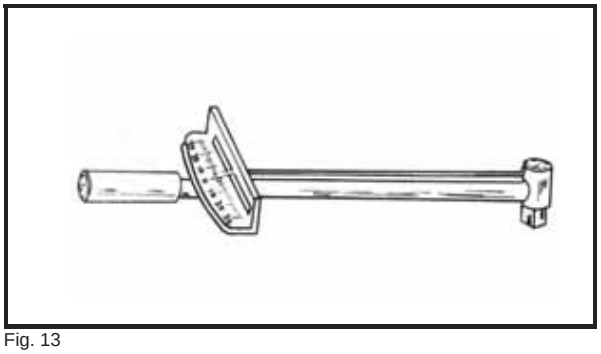


Fig. 13

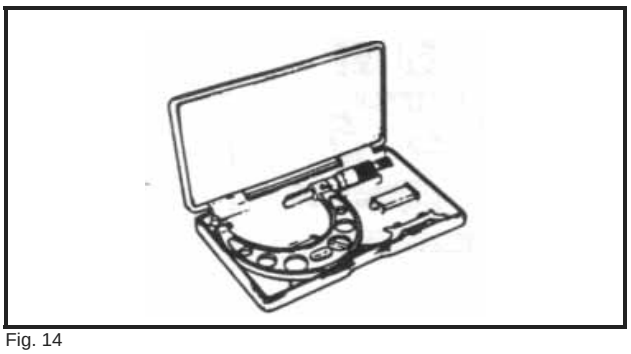
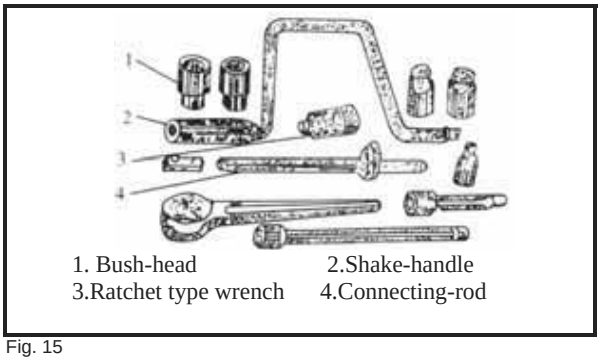


Fig. 14



1. Bush-head 2.Shake-handle
3.Ratchet type wrench 4.Connecting-rod

Fig. 15

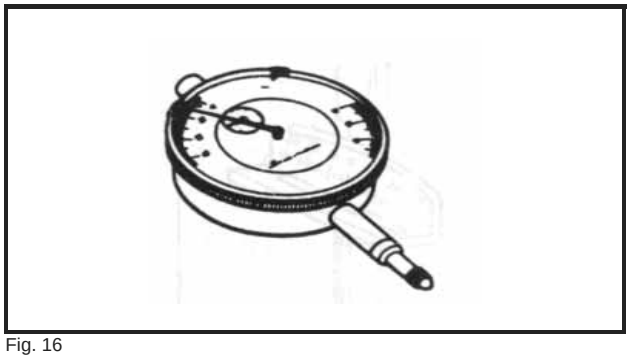


Fig. 16

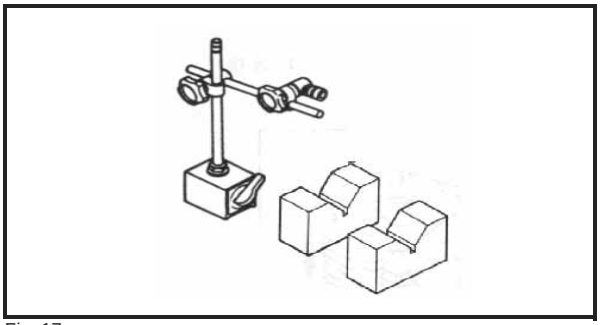


Fig. 17

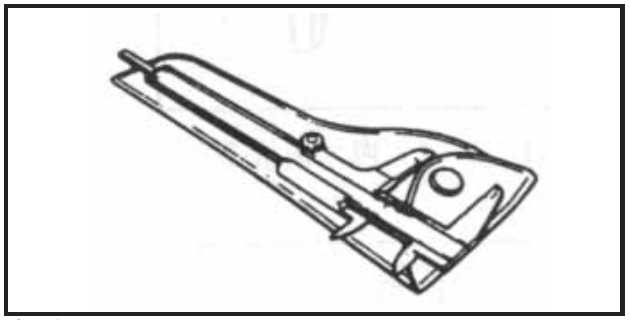


Fig. 18

SPECIAL TOOLS

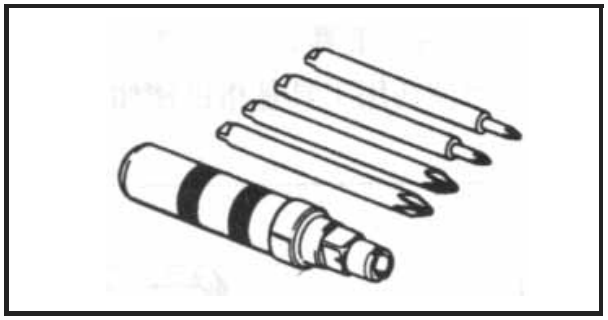


Fig. 19

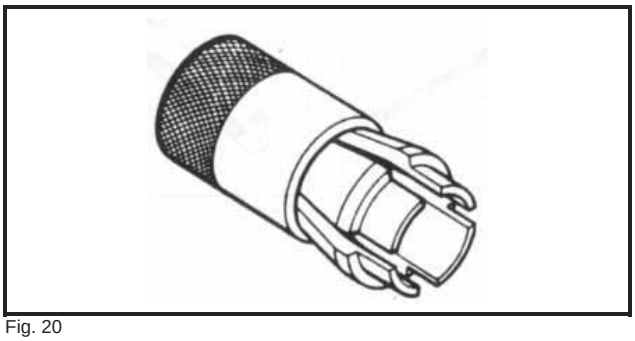


Fig. 20

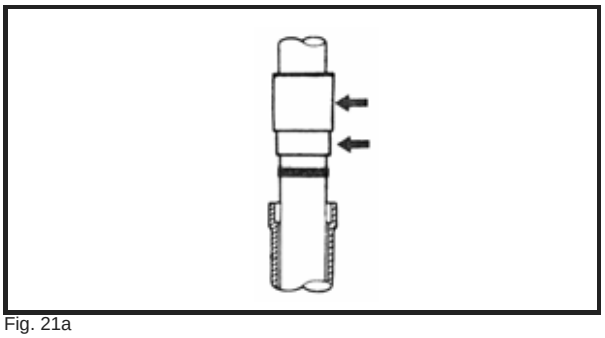


Fig. 21a

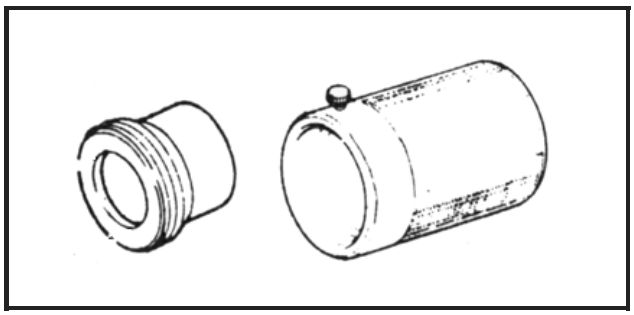


Fig. 21b

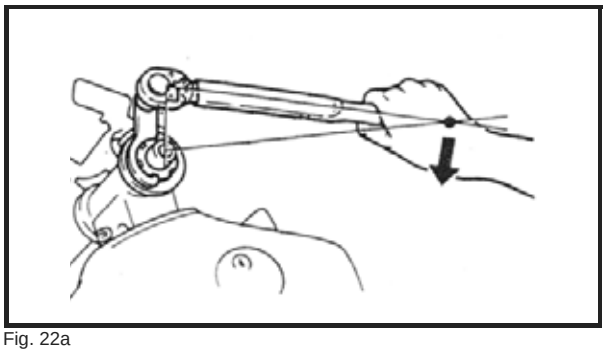


Fig. 22a

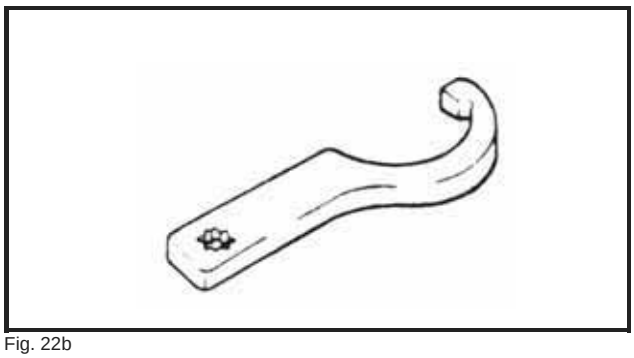


Fig. 22b

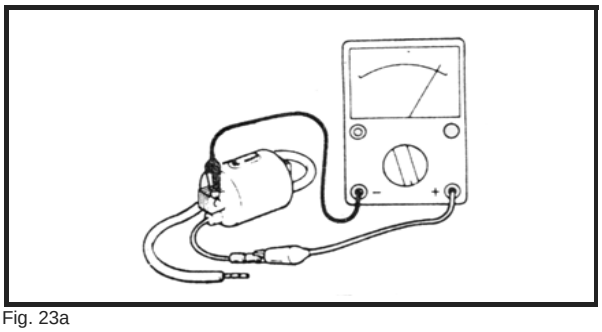


Fig. 23a

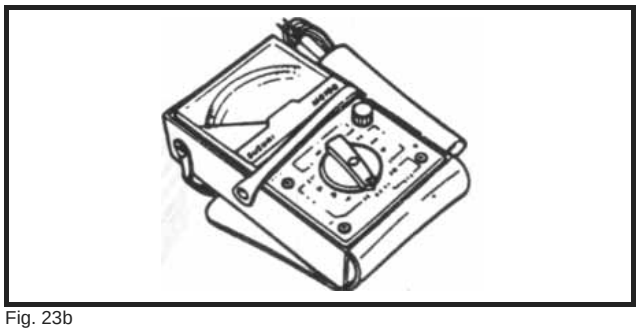


Fig. 23b

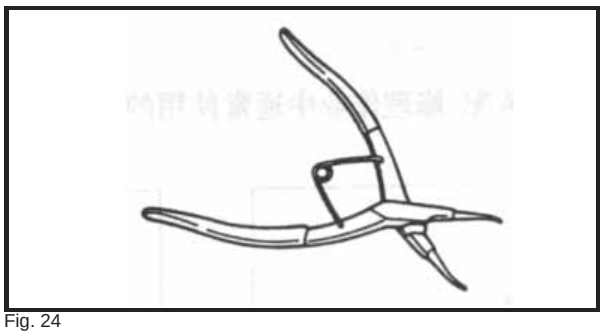


Fig. 24

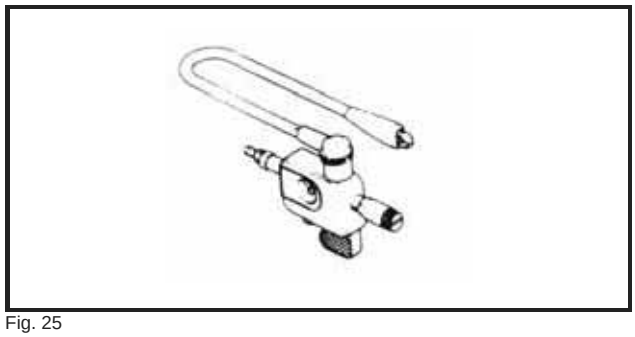


Fig. 25

1. PERIODIC MAINTENANCE

PERIODIC MAINTENANCE CHART

Important maintenance work have to be carried out by an authorized workshop.

CHECKLIST OF CONSTANT MAINTENANCE

The inspection intervals are required, otherwise, no guarantee can be granted.		1000 km or 1. month	4.000 km or 6. month	7.000 km or 12. month	10.000 km or 18. month	13.000 km or 24. month
PART	TO DO					
Air filter	Clean/ exchange	√	√	Exchange	√	√
Wheels, rims	Control	√	√	√	√	√
Tires	Control/ tire pressure		√	√	√	√
Wheel bearing	Control/ exchange		√	√	√	√
Steering bearing	Control/ clean/ lubricate	√	√	√	Lubricate	√
Screws Coverparts	Control/ tighten		√	√	√	√
Brake system	Control/ clean/ exchange		√	√	√	√
Main stand	Control/ clean/ lubricate		√	√	√	√
Front forke	Control		√	√	√	√
Rear suspension	Control		√	√	√	√
Oil pump	Control	√	√	√	√	√
Transmission oil	Exchange	Exchange		Exchange		Exchange
Variomatic belt	Control/ exchange		√	Exchange	√	
Fly wheels	Control/ exchange		√	Exchange	√	
Driven chain/ sproket	Control/ clean/ exchange					
Clutch	Control	√	√	√	√	√
Cable/ bowden	Control/ clean/ lubricate	√	√	√	√	√
Throttle	Control/ clean/ lubricate		√	√	√	√
Lights/ switches	Control/ adjust	√	√	√	√	√
Fuel line/ fuel filter	Control/ exchange			Exchange		
Idle speed	Control/ adjust	√	√	√	√	√
Exhaust system	Control/ tighten		√	√	√	√
Coolant	Control					

CAUTION: Variomatic belt, fly wheels, spark pluge, fuel filter and air filter element have to be exchanged every 7000km. Only use duration coolant. Brake lines have to be exchanged at least every 4 years. From 13.000km or 24th month the inspection should be made every 7000km. The vehicle is constantly checked for rust. The owner is responsible for rust prevention.

IMPORTANT PREPERATION REFERENCES

Cylinder Block / Piston

Item			Standard [mm]	Allowable limits [mm]
Cylinder	Inner Diameter		52.40-52.413	52.413
	Cylinder degree		0.004	0.004
	Roundness		0.005	0.005
	Flatness		0.05	0.05
Piston Piston ring Piston pin	Piston mark direction		“IN” properly opposite to the inlet valve	--
	Measuring points for piston outer diameter		52.36-52.37 (at the bottom of the piston skirt 7mm)	52.37
	Piston pin saddle orifice inner diameter		14.002-14.008	14.04
	Piston pin outer diameter		13.994-13.999	14.97
	Clearance between piston and cylinder		0.03-0.053	0.053
	Clearance between piston ring and ring groove	1st Ring	0.03-0.007	0.10
		2nd Ring	0.03-0.007	0.10
	Clearance between piston and piston pin	1st Ring	0.10-0.25	0.50
		2nd Ring	0.20-0.35	0.60
		Oil ring	0.1-0.6	--
	Clearance between piston and piston pin		0.003-0.014	0.03
	Narrow end diameter of connecting rod		14.010-14.018	14.04
	Clearance between connecting rod and piston rod		0.011-0.024	0.05

Variomatic drive

Item	Standard [mm]	Allowable limits [mm]
Inner diameter of right hemisphere of drive wheel	24.00-24.02	24.04
Outside slippery sleeve	23.967-23.98	23.98
Width of triangle belt	21.8-22.0	20.5
Thickness of clutch friction panel	1.5	1.5
Inner diameter of outside sleeve of clutch	125-125.2	125.5
Free length of clutch press spring	69 ± 1	70
Outside diameter of right hemisphereshaft sleeve of drive gear	42.92-42.98	42.90
Inner diameter of right hemisphere shaft sleeve of drive gear	33.95-33.975	34.00
Outside diameter of rolling ball	20-20.2	19.5

Connection rod

Item		Standard [mm]	Allowable limits [mm]
Crankcase	Left and right clearance of the wide end of the connection rod	0.1-0.35	0.55
	Radial clearance of the wide end of the connection rod	0.008-0.016	0.05

IMPORTANT PREPERATION REFERENCES

Cylinder Cap

Item			Standard [mm]	Allowable limits [mm]
Cylinder pressure			1.25 Mpa	--
Cylinder cap flatness			0.03	0.03
Air valve Valve guid	Air valve clearance	IN	0.10	0.12
		EX	0.13	0.14
	Inner diameter of valve guid	IN / EX	5.00-5.012	5.03
	Clearance between the valve pod and the valve guid	IN	0.010-0.035	0.08
		EX	0.030-0.05	0.10
	Retainer width	IN / EX	1.2	1.7
Air door spring	Free length	IN / EX	35.4	34.9
Rocker	Rocker orifice diameter	IN / EX	10.00-10.015	10.10
	Rocker shaft diameter	IN / EX	9.982-9.988	9.90
	Clearance between the rocker orifice and shaft	IN / EX	0.012-0.033	0.033
Camshaft	Camheight	IN	29.78	29.83
		EX	29.54	29.59

Ignition

Item			Standard value
Recommended spark plug	Standard		C5HSA (NKG)
	Hot		C6HSA (NGK)
	Cold		CHSA (NGK)
Spark plug gap			0.6-0.7 mm
Resistance value of ignition coil (20°C)	Primary coil		4 Ω ± 10%
	Secondary coil	With spark plug cap	8-11 KΩ
		Without spark plug cap	4.5-5.5 KΩ
Resistance of trigger (20°C)			100-200Ω
Max. voltage of ignition coil			95-400V
Voltage of trigger			Above 1.7V

Electric system

Item			Specifications
Battery	Capacity / type		12V-6Ah / dry-charged
	Voltage (20°C)	Full charg	13.1V
		Need to be charged	12.3V (one hour)
	Charging current		Normal: 0.6A, Quick: 6A
	Charging time		Normal: 10-15 hours, Quick: 30 Minutes
Magneto	Capacity		200W/8500rpm
	Coil impedance (20°C)		White-black 3.3-3.5Ω
Voltage regulator	Pattem		Fullwave of three phase
	Charging voltage of battery		14.5 ± 0.5V / 5000 rpm

IMPORTANT PREPERATION REFERENCES

Starting system

Item	Standard value [mm]	Operation limit [mm]
Length of starting motor bush	12.5	8.5
Starting idle gear bushing	--	8.3
OD of strting idle gear	--	7.94

Carburettor

Item	Standard
Main nozzle	B09
Main jet	180#
Idle jet	37.5#
Needle valve	B09-0

Wheels

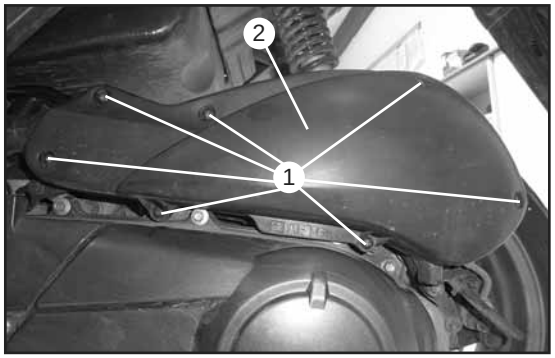
Item		Standard [mm]	Allowable limts [mm]
Run out of wheels	Vertical direction front wheel	--	2.0
	Transverse direction front wheel	--	2.0
	Vertical direction rear wheel	--	2.0
	Transverse direction rear wheel	--	2.0

AIR SYSTEM/ FUEL SYSTEM

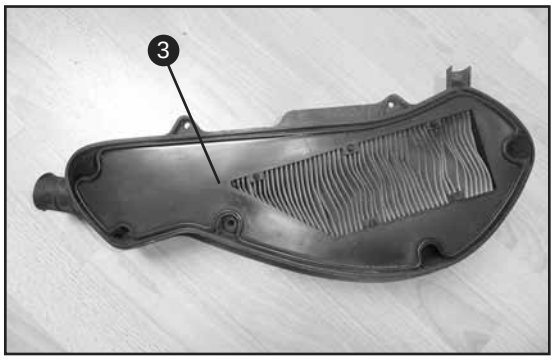
AIR FILTER

Replacement of the air filter element:

1. Remove the the seven screws (1) to remove the air filter cover (2).



2. Pull out the air filter element cover (3).



Check to see if the filter element is polluted or damaged. If it is polluted or damaged, please replace with new one.

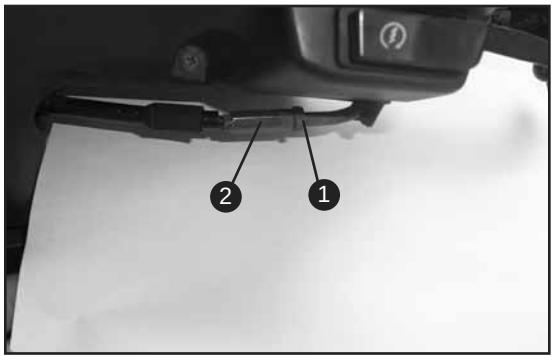
CHANGING INTERVALS
If the motorcycle is frequently driven on bad road or in rain, it should be replaced early. Under normal condition replace it referring the maintenance chart.

Reassemble in reverse order.

THROTTLE CONTROL SYSTEM

Inspection/adjustment of accelerator's pull wire
Check the smoothness of accelerator pull wire.

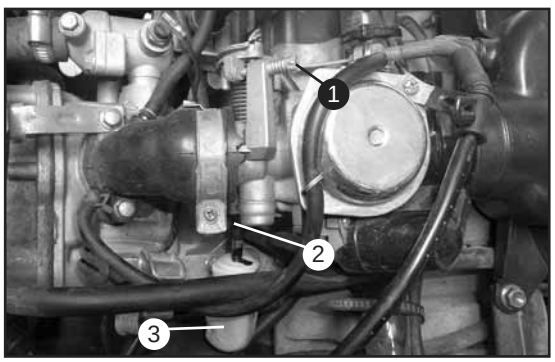
Free displacement: 5-10 mm



The main adjusting position is on the bottom of the throttle.
To adjust the free play of the throttle grip loosen the fixing nut (1) and adjust by turning adjusting nut (2).
After the adjustment is done tighten the nut (1).

IDLE ADJUSTMENT

Start and warm up the engine for about 3 minutes, so that the engine will operate in normal running temperature.
Remove the storage box.
Adjust the idle adjustment screw (1) and set the idle speed to 1800 U/min.
Create a round and stabile engine speed, using the air control screw (2). The air control screw is located on the bottom of the carburettor. To adjust the air control screw usa a fist screwdriver (3)

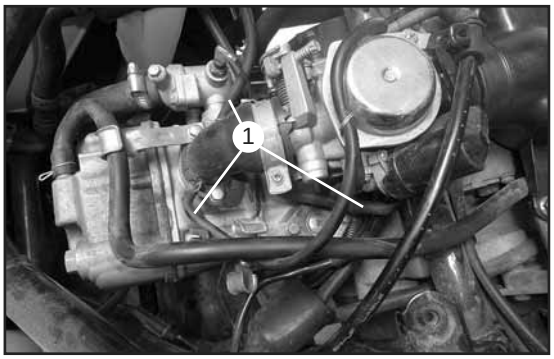


Reset the idle adjustment screw and set the engine speed down to 1200-1500±100 U/min.
Pull the throttle for several times for acceleration and inspect whether the idle speed is steady.

ADJUSTMENT OF CARBURETTOR

Attention: When the vehicle is ready for sell, the idle adjusting bolts have already been adjusted, so they generally require no adjustment. When dismantling the carburettor, the number of turning of the bolts should be recorded because this is very helpful during the installation.
Switch on and warm up the machine for about 3 minutes, so that the engine will operate in normal running temperature;
Adjust the idle adjustment bolts and set engine speed to be 1800 U/min.
Screw the mixture adjustment bolt to the end with proper force.
At this point the engine will stall, if not inspect whether air escapes at the interface of air filter, whether the bolt is tightened and whether the intake of the air filter is blocked;
Withdraw the mixture adjustment bolt for 1 1/2 circle anti-clockwise;
Slowly adjust the mixture adjustment bolts anti-clockwise, till the engine speed reaches its utmost mixture.
Reset the idle adjustment screw and set the engine speed down to 1450±100 U/min.
Pull the throttle for several times for acceleration and inspect whether the idle speed is steady.
Test the outlet and compare it with the specified standards.

FUEL HOSE INSPECTION

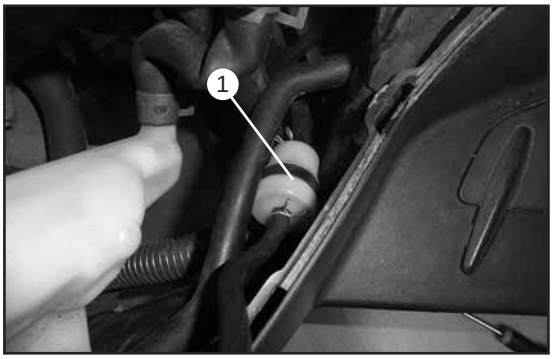


When working on the carburettor, engine and during each maintenance work, check the fuel lines (1). Please note that this may not be brittle or leaking. Leaking fuel can ignite and cause serious injury and damage.

⚠ WARNING

If the fuel line is brittle or leaking it must be replaced immediately.

FUEL FILTER REPLACEMENT

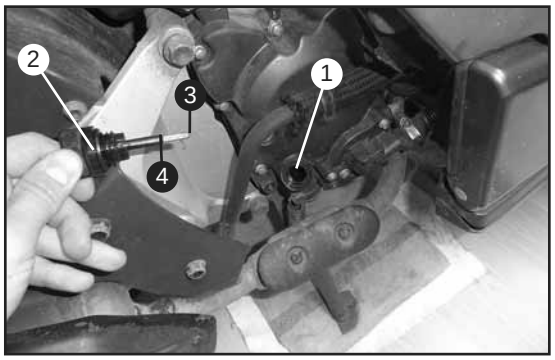


The fuel filter (1) must be changed concerning the maintenance chart or when it is blocked.
Always check the fuel filter during each work on the fuel system.
The fuel filter is placed on the right side of the vehicle on the frame below storage box.

1. Switch of the ignition.
1. Remove the storage box and the right side cover.
2. Block the fuel lines before and after the filter.
3. Exchange the fuel filter with a new one.
4. Reassemble in reverse order.

ENGINE

ENGINE OIL INSPECTION



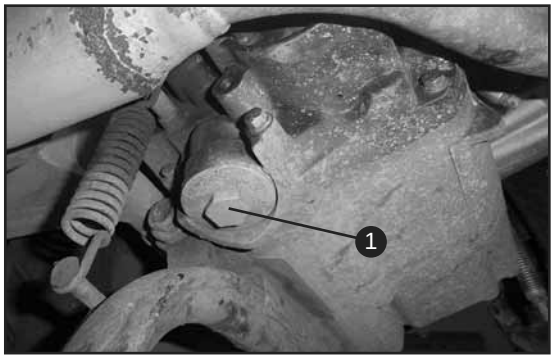
1. The vehicle shall be parked on a even ground when checking the oil level.
2. Run the engine for 2-3 minutes and afterwards wait for 2-3 minutes.
3. The engine oil tank cap (1) is located on the right side of the engine. Remove the engine oil tank cap (2).
4. Check the oil level.
5. Refill the recommended engine oil type between the MIN mark (3) and the MAX mark (4).
6. Reassemble in reverse order.

When it is necessary to refill engine oil please only use the recommended type.

RECOMMENDED ENGINE OIL:
Quantity: 1.00 L
Type: CASTROL Power 1 - Racing 4T 10W-40

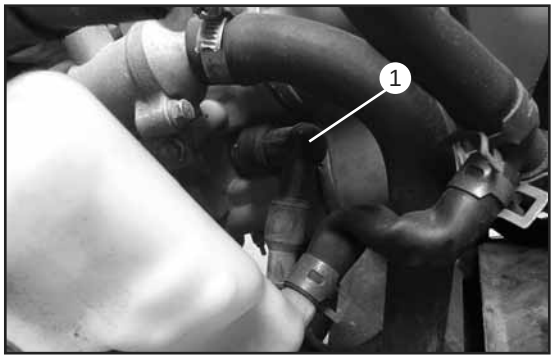
The engine oil level must be checked before every start.

ENGINE OIL REPLACEMENT



1. Remove the bolt (1) on the right underside of the engine.
2. Refill the recommended engine oil type between the MIN mark (3) and the MAX mark (4).
3. Reassemble in reverse order.

SPARK PLUG INSPECTION

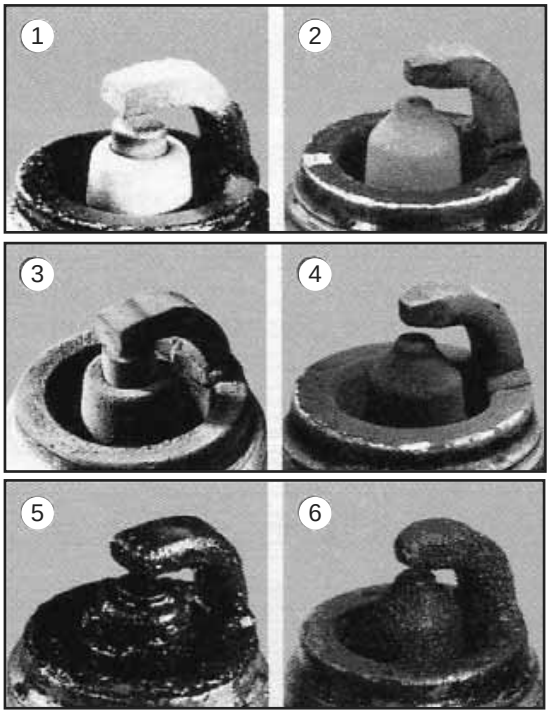


1. Remove the storage box and the right side cover.
2. Remove the spark plug cap (1).
3. Use a spark plug circular wrench to remove the spark plug.
4. Check the over burning, pollution and carbon lay down of spark plug.
5. If the spark plug do not comply, replace it.

RECOMMENDED SPARK PLUG TYPE:
C5HSA (NGK)

Spark plug gap clearance: 0.6-0.7 mm

SPARK PLUG IMAGES AND ANALYSIS



Colour: 1. Gray/ 2. Light brown
Analysis: Engine management ok

Colour: 3. Matt black/ 4. Velvety coating
Analysis: Fuel/ air mixture wrong. To much fuel!
Solution: Fuel/ air mixture need to adjust.
How to adjust see page 21.

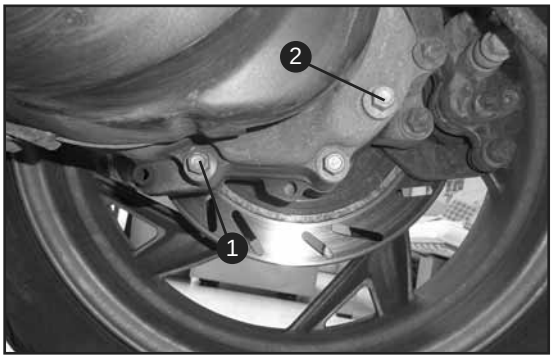
Colour: 5. Oily soot/ 6. Oil coal
Analysis: Too much oil.
Solution: Adjust the oil support.
How to adjust see page 21.

SPARK PLUG REPLACEMENT

1. Follow the steps 1-3 of "**SPARK PLUG INSPECTION"**
2. Reassemble in reverse order.

Item	Torque
Spark plug	10-15 Nm

OIL REPLACEMENT OF THE GEAR CASE



1. Warm-up the engine.
2. Place the vehicle on a smooth surface on the main stand.
3. Place an oil pan under the transmission release bolt (1).
4. Remove the release bolt.
5. Check the seal ring.

OIL LEVEL INSPECTION OF THE GEAR CASE

Oil needs to be replaced according the maintenance table. If there is any leakage visible the transmission need to be disassembled and checked carefully.

1. When the oil leaks on the bolt, replace the seal ring and the release bolt.
2. Fill the transmission oil.
3. Remove the niveau bolt (2) and fill oil till it flows out.
4. Tighten the niveau bolt.

RECOMMENDED OIL:
Castrol MTX Part synthetic 80W or EP 80W-90

⚠ WARNING

Consider there is no filling indicator. Do not over fill the transmission.

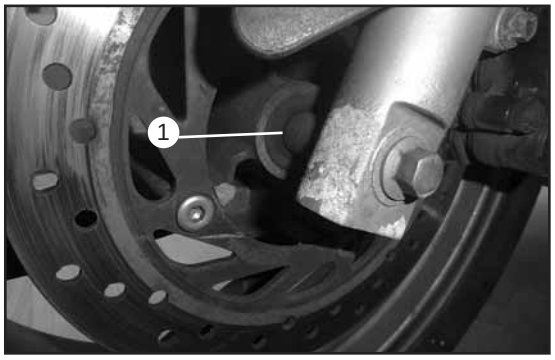
WHEELS AND TIRES/ BRAKES

AIR PRESSURE INSPECTION

⚠ WARNING

Low tire air pressure leads to abnormal wear and overheating of the tire. The tire pressure should be measured under cold condition.
Use a conventional pressure gauge (1) to test the tire pressure.
Correct tire air pressure ensures optimal riding comfort and maximum tire service life.

SPECIFICATION		PRESSURE [BAR]
Front tire	90/90-12	1.9 ± 0.1
Front rim	2.15x12	
Rear tire	3.5-10	210 ± 0.10
Rear rim	2.5x10	



WHEEL BEARING AND WHEEL AXLE DAMAGE INSPECTION

The wheels rotate with difficulties, sounds strange or have too much free play, the wheel-axle bearing (1) or the gear seats are in failure.
To locate the error, the wheel should be removed.

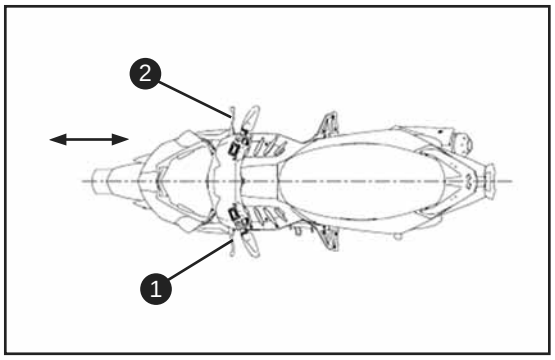
BRAKE FLUID LEAK INSPECTION FRONT AND REAR

If the brake fluid level falls below the MIN mark, this indicates a leakage in the brake system or worn-out brake linings.

1. Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
2. Check the brake fluid level.
3. Check the brake system and do not continue riding if the system is leaking.

Rear brake fluid reservoir (1)
Front brake fluid reservoir (2)

BRAKE OPERATION INSPECTION FRONT/ REAR



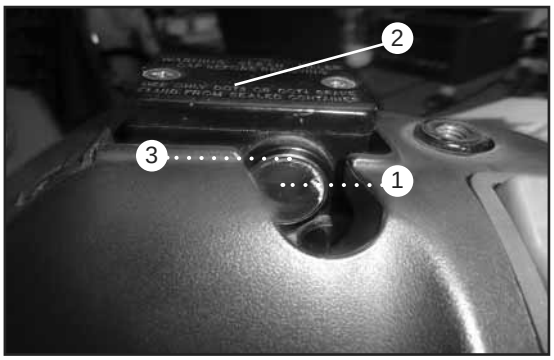
1. Operate the handbrake lever until the brake pads lie on the brake disc and check if there is a pressure point. If there is no pressure point check the brake system.
2. While operate the front brake lever push forward and backward hard on the handlebar to check if the front system is working. If the brake do not work correct check the brake system.
3. Final make a driving test with low speed and check if the brake system is working. If the brake do not work correct check the brake system.

Rear handbrake lever (1)
Front handbrake lever (2)

⚠ WARNING

Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary. Please consider that a dirty brake disc influence the brake performance.
Please consider that the front/ rear brake lever free play is not adjustable..

BRAKE FLUID LEVEL INSPECTION FRONT/ REAR

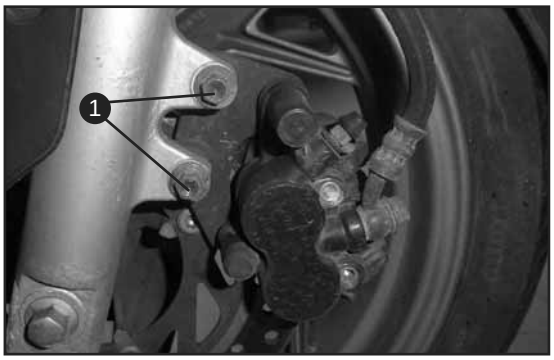


After a certain time the brake pads start to wear out and the brake fluid level falls down. If the brake fluid level falls below the MIN (1) mark, check the brake pads or and the brake system for any leakage. Never add brake fluid only without checking the system.

1. Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
2. Check the brake fluid level.
3. Remove the cover with membrane (2).
4. Add brake fluid between the MAX level (3) and the MIN level (1).
5. Mount the cover with membrane.

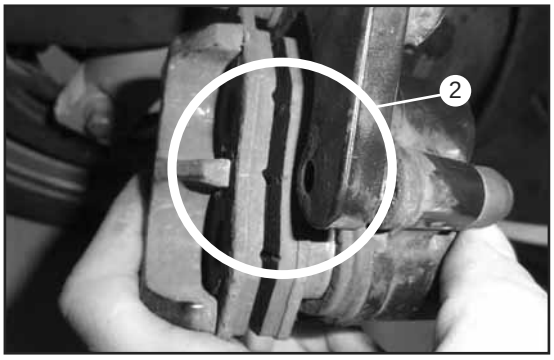
Brake fluid type	CASTROL SUPER DISK BRAKE FLUID DOT 4
Brake fluid boiling temperature	> 170°C
Brake fluid water content	< 3%

FRONT BRAKE PAD WEAR INSPECTION/ REPLACEMENT



Reduced braking efficiency caused by worn brake pads.
Change worn brake pads immediately. Always replace the brake pads in pair.

1. Loose the mounting bolt (1) of the braking calliper bracket.

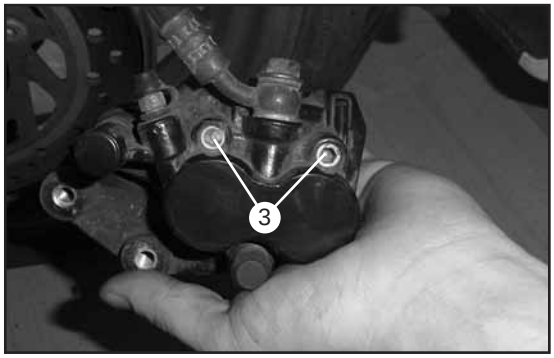


2. If the minimum thickness is less than the indicators (2), damage or cracking is visible change the front brake pads.

3. Remove the two bolts (3).
4. Remove the brake pads in pair.
5. Reassemble in reverse order.

NOTE

Glue in the bolts (1).

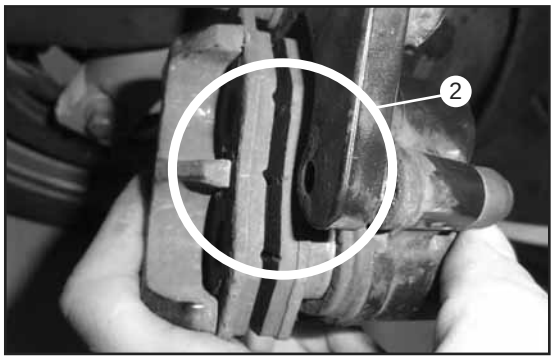


REAR BRAKE PAD WEAR INSPECTION/ REPLACEMENT

Reduced braking efficiency caused by worn brake pads.
Change worn brake pads immediately. Always replace the brake pads in pair.

1. Loose the mounting bolt (1) of the braking calliper bracket.

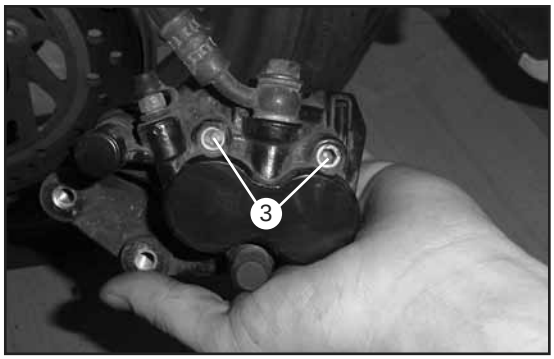
2. If the minimum thickness is less than the indicators (2), damage or cracking is visible change the front brake pads.



3. Remove the two bolts (3).
4. Remove the brake pads in pair.
5. Reassemble in reverse order.

NOTE

Glue in the bolts (1).

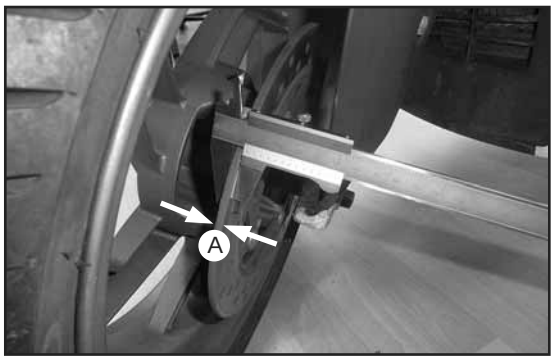


FRONT/REAR BRAKE DISC INSPECTION

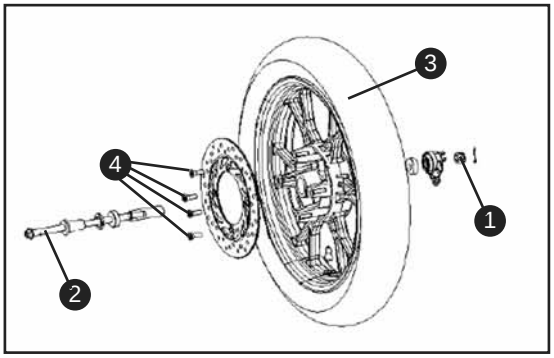
1. Check the thickness of the front/rear disc (1) at several places on the disk to see if it conforms to measurement.

Allowable limit (A): 3 mm

2. If the brake disc thickness is less than the specified value change the brake disk. Check the front disc for damage, cracking and deformation. If the brake disk exhibits damage, cracking or deformation change the brake disc.



FRONT BRAKE DISC REPLACEMENT



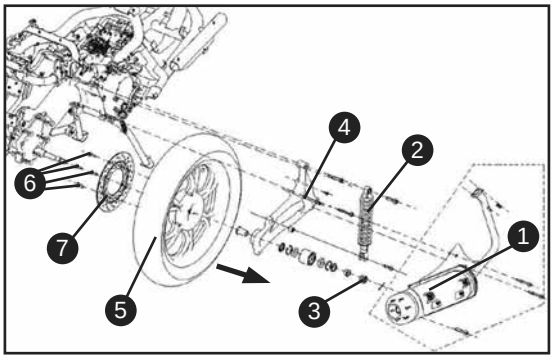
1. Remove the two bolts of the front brake calliper to fold on the side.
2. Place an appropriate supporting stand to raise the front wheel up.
3. Remove the axle nut (1) and the axle (2) to remove the front wheel (3).
4. Remove the four bolts (3) to remove the front brake disc and mount a new one if the old one is worn.
5. Reassemble in reverse order.

NOTE

Take care to the position of the new brake disc.
Glue in the bolts (4).
Take special care that the axle spacer and the speedometer gear installed correct.

Item	Torque
1,2	55-62 Nm
4	5-9 Nm

REAR BRAKE DISC REPLACEMENT



1. Remove the exhaust (1).

⚠ WARNING

After driving the exhaust is hot.

2. Remove the right rear absorber (2).
3. Remove the axle nut (3) and the right swinging arm (4).
4. Now slide the rear wheel (5) sidewards (arrow).
5. Remove the four bolts (6) to remove the rear brake disc (7) and mount a new one if the old one is worn.

Item	Torque
3	100-113 Nm
6	5-9 Nm

NOTE

Take care to the position of the new brake disc.
Glue in the bolts (6).
Take special care that the axle spacer and the speedometer gear installed correct.

FRONT BRAKE HOSE REPLACEMENT

When the front brake hose is leaking, cracked or worn you must replace it.

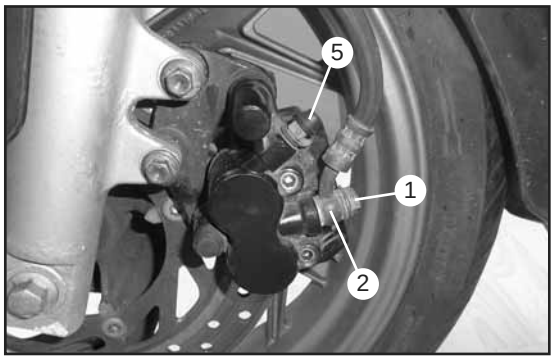
NOTE

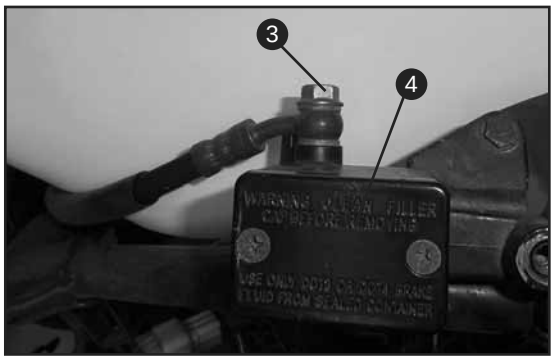
Please consider that there is no need to remove the brake calliper when you need to replace the brake hose.

⚠ WARNING

Brake fluid can cause skin irritation on contact.
Avoid contact with skin and eyes, and keep out of the reach of children.
Wear suitable protective clothing and goggles.
If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.
Brake fluid can damage paint, rubber and plastic parts. When brake fluid dripping on such parts wipe it away immediately.

1. Place a container under the brake calliper.
2. Remove the banjo bolt (1) and empty the brake hose (2).
3. Remove the front and rear handlebar cover and the leg protection panel.
4. Remove the banjo bolt (3) from the master brake cylinder.
5. Replace the brake hose. Take care that the brake hose is installed correct and is connected to all brackets. Use new gaskets when you connect the brake hose.
6. Remove the cover (4) with the membrane.
7. Add brake fluid to the MAX level.
8. Open the bleed valve (5) and add a brake bleeding tool on the valve. Start to aspirate the brake fluid as long as air is in the system. Take care that the brake fluid level in the master brake cylinder will not fall lower than the MIN level otherwise you suck air in the system once again.
   Suck continuously the air out of the system and add brake fluid continuously until the system has been bleeded.
9. Close the vent valve and refill the brake fluid level between the MAX and MIN level.
10. Reassemble all other parts in reverse order.





REAR BRAKE HOSE REPLACEMENT

When the front brake hose is leaking, cracked or worn you must replace it.

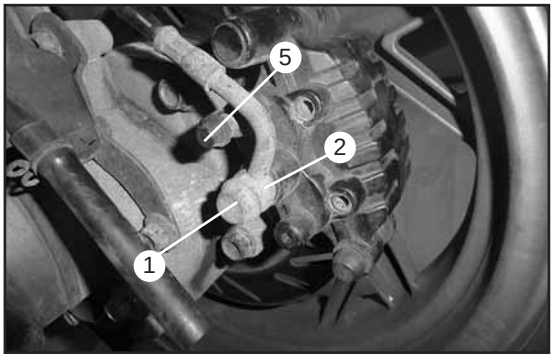
NOTE

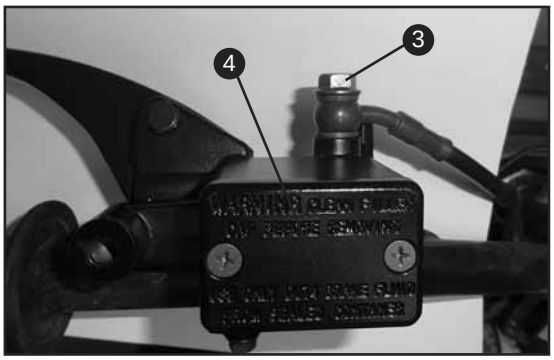
Please consider that there is no need to remove the brake calliper when you need to replace the brake hose.

⚠ WARNING

Brake fluid can cause skin irritation on contact.
Avoid contact with skin and eyes, and keep out of the reach of children.
Wear suitable protective clothing and goggles.
If brake fluid gets into your eyes, rinse thoroughly with water and contact a doctor immediately.
Brake fluid can damage paint, rubber and plastic parts. When brake fluid dripping on such parts wipe it away immediately.

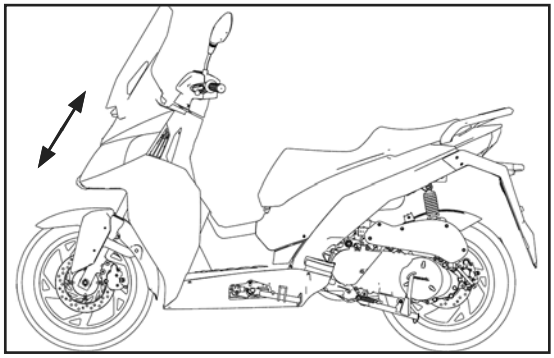
1. Place a container under the brake calliper.
2. Remove the banjo bolt (1) and empty the brake hose (2).
3. Remove the front and rear handlebar cover, storage box and the leg protection panel.
4. Remove the banjo bolt (3) from the master brake cylinder.
5. Replace the brake hose. Take care that the brake hose is installed correct and is connected to all brackets. Use new gaskets when you connect the brake hose.
6. Remove the cover (4) with the membrane.
7. Add brake fluid to the MAX level.
8. Open the bleed valve (5) and add a brake bleeding tool on the valve. Start to aspirate the brake fluid as long as air is in the system. Take care that the brake fluid level in the master brake cylinder will not fall lower than the MIN level otherwise you suck air in the system once again.
   Suck continuously the air out of the system and add brake fluid continuously until the system has been bleeded.
9. Close the vent valve and refill the brake fluid level between the MAX and MIN level.
10. Reassemble all other parts in reverse order.





SUSPENSION

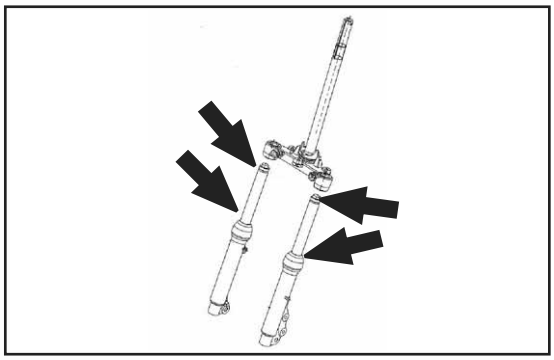
FRONT FORK OPERATION INSPECTION



At every inspection the fork should be controlled.

1. Apply the front brake and compress the front shock absorber up and down (arrows) to check for correct operation.
2. When the fork stick, feel spongy or the free play between the fork tubes is too big replace the defect fork leg.
3. Check if each screw is tightened.

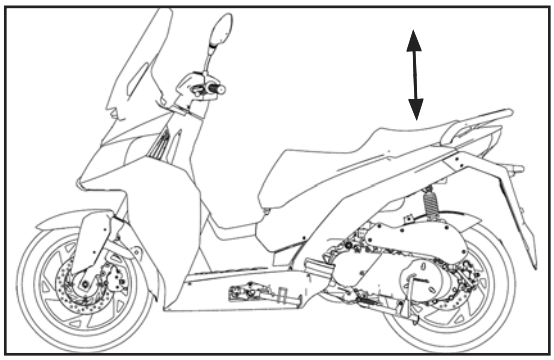
FRONT FORK OIL LEAK INSPECTION



At every inspection check also if the fork is tight.

1. Check the dust/ oil seal between the fork legs and the top end. When oil is leaking replace the affected fork leg.

REAR SHOCK OPERATION INSPECTION

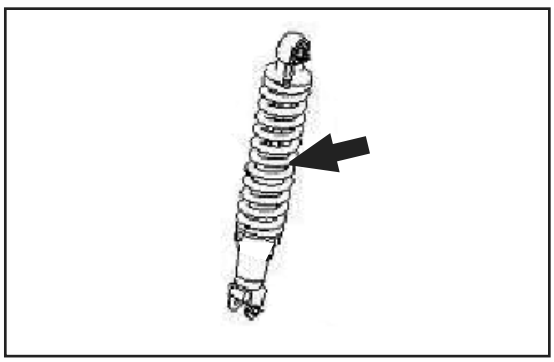


At every inspection the rear shock absorber should be controlled.

1. Compress the rear shock absorber up and down (arrows) to check for correct function.
2. Check whether a part of the rear shock absorber is damaged or loosened.
3. Put the vehicle on the main stand and move the rear wheel up down and left right to check whether any bush or bearing is loosened or has abnormal free play.
4. When the absorber stick, feel spongy or there is any other abnormity replace it.
5. Check if each screw is tightened.

The rear shock absorber is spring loaded. The spring preload can be adjusted with the locknut in five positions. Choose the preferred setting by your self. The factory setting refers to a rider weight of approximately 75 kg.

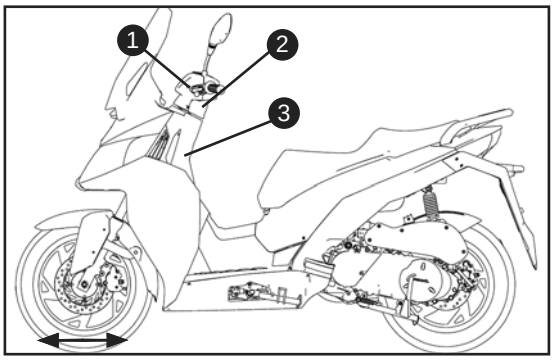
REAR SHOCK OIL LEAK INSPECTION



At every inspection the rear shock absorber should be controlled.

1. Check the dust/ oil seal and check if the spring is in correct condition. When oil is leaking, the spring is cracked or worn replace the shock absorber.

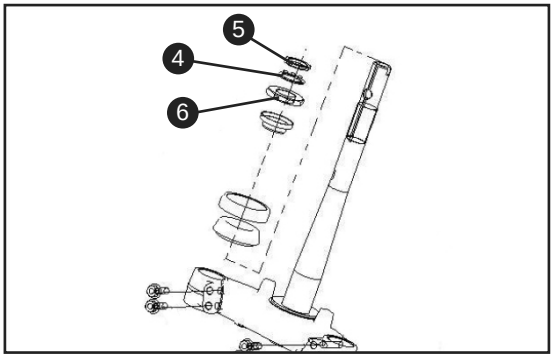
STEERING PLAY INSPECTION



Worn or loose steering bearings may cause danger. Therefore, the operation of the steering must be checked as follows at the intervals specified in the periodic maintenance and lubrication chart.

1. Place a stand under the vehicle to raise the front wheel off the ground.
2. Hold the lower ends of the front fork legs and try to move them forward and backward.
3. If any free play can be felt, adjust or replace the steering bearing.

STEERING PLAY ADJUSTMENT

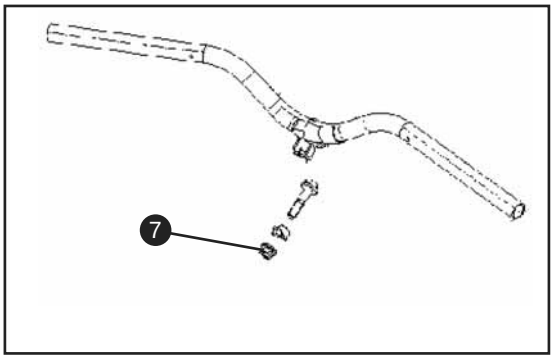


1. Place the vehicle with the front wheel on the ground.
2. Replace the front (1) and the rear (2) handlebar cover and the leg protection panel (3).
3. Unlock the safety washer (4) and release the fixation nut (5).
4. Tighten or loosen the adjustment nut (6) till the correct setting is reached.
5. Test the steering play.

The steering must be adjusted in that way, that it is easy to move the handlebar and the steering is without free play.

6. Finally keep the adjustment nut with a wrench in position, tighten the fixation nut and safe the fixation nut with the safety washer.
7. Test the steering play once again.

STEERING BEARING LUBRICATION



1. Place a stand under the vehicle to raise the front wheel off the ground.
2. Replace the front (1) and rear (2) handlebar cover, the leg protection panel (3).
3. Loose the nut (7) of the handlebar, remove the handlebar, unlock the safety washer and remove the fixation nut.
4. Release the adjustment nut (5) in that way, that you can move the front fork for some centimeters down.

NOTE

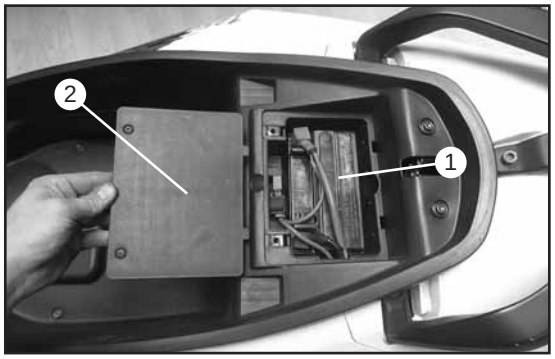
Do not loose the bearing balls.

5. Now you can crease the upper and lower bearings cages. Please use only high quality grease to keep water away.
6. After the bearings are greased replace the parts in reversed order.

ELECTRICAL SYSTEM

BATTERY INSPECTION/ CHARGING

The battery (1) is located in the floorboard of the vehicle. When ever you maintain the battery remove the battery box cover (2). Take care that after each maintenance the lid is closed correct to avoid that water or others penetrate.



1. Please consider that the vehicle will be delivered with a maintenance free battery. Do no more remove the cover (3) after the first fill.
2. The manual for the battery first fill you will receive together with the battery.
3. Before you install the battery first time please charge it for at least 8 hours.
4. Charge the battery with a maximum of 10% of the capacity specified on battery housing.
5. Do not connect the battery with the wire harness of the vehicle when the vehicle is parked in the show room for more than one month.
6. Please maintain/ charge the battery every 2 weeks when the vehicle is not in use.
7. The voltage range of the battery is 12.3 Volt (DC) to 13.1 Volt (DC).
8. To measure the Voltage of the battery use a conventional volt meter (4). Measure between the battery terminals.
9. When you charge the battery installed in the vehicle disconnect the negative cable of the wire harness.
10. When you remove the battery from the vehicle disconnect the negative pole first.
11. When you install the battery to the vehicle connect the plus pole first. Add battery pole grease between the battery poles and the cables.
12. The charging voltage of the vehicle regulator rectifier is approximately 14.5 Volt/ 5000 rpm.

Battery acid and battery gases cause serious cauterization. Keep batteries out of the reach of children. Wear suitable protective clothing and goggles. Avoid contact with battery acid and battery gases. Keep the battery away from sparks or open fire. Charge only in well ventilated rooms. In the event of skin contact, rinse with large amounts of water. If battery acid gets in the eyes, rinse with water for at least 15 minutes and contact a doctor.

LIGHT AND SWITCHES OPERATION INSPECTION

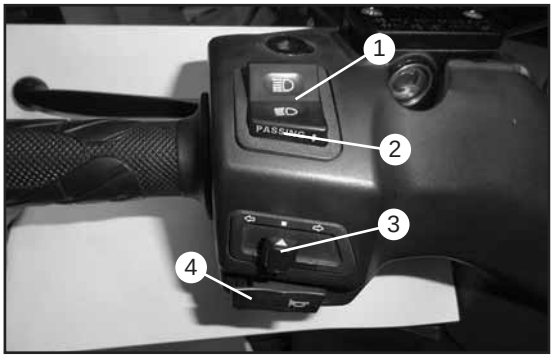
1. Place the vehicle on the main stand and start the engine.

NOTE

Some functions do not work as long the engine is not running.

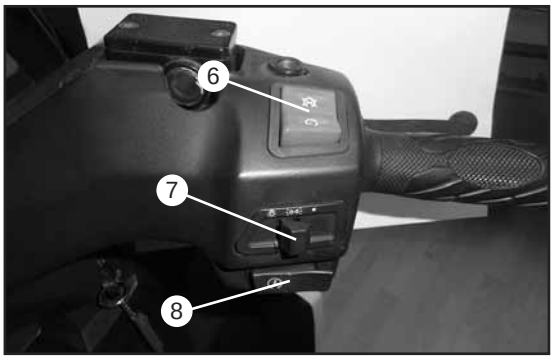
2. Now you can test one by one the functions of all switches, the function of the rear and front light and the brake light.

Switches/ Functions - left side



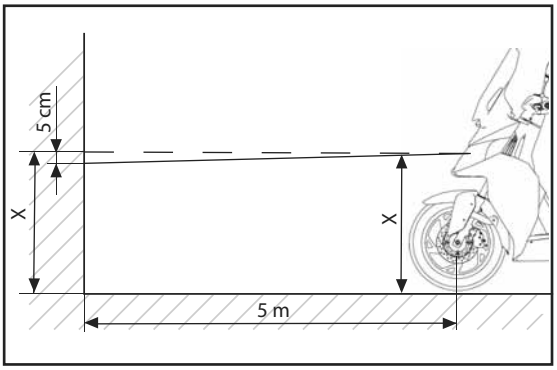
1. **High/ Low beam switch**
2. **PASSING** **Flash light**
3. **Indicator switch**
4. **Horn switch**

Switches/ Functions - right side

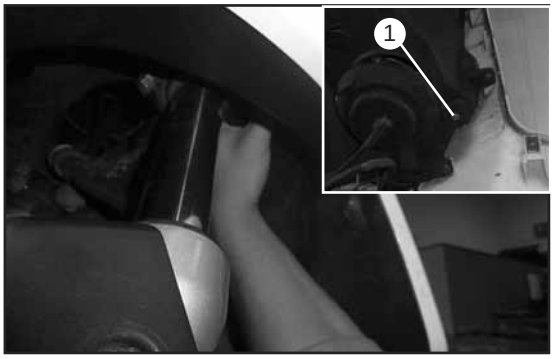


5. **Engine OFF/ON**
6. **Light switch**
7. **Starter Button**

HEADLIGHT AIMING INSPECTION



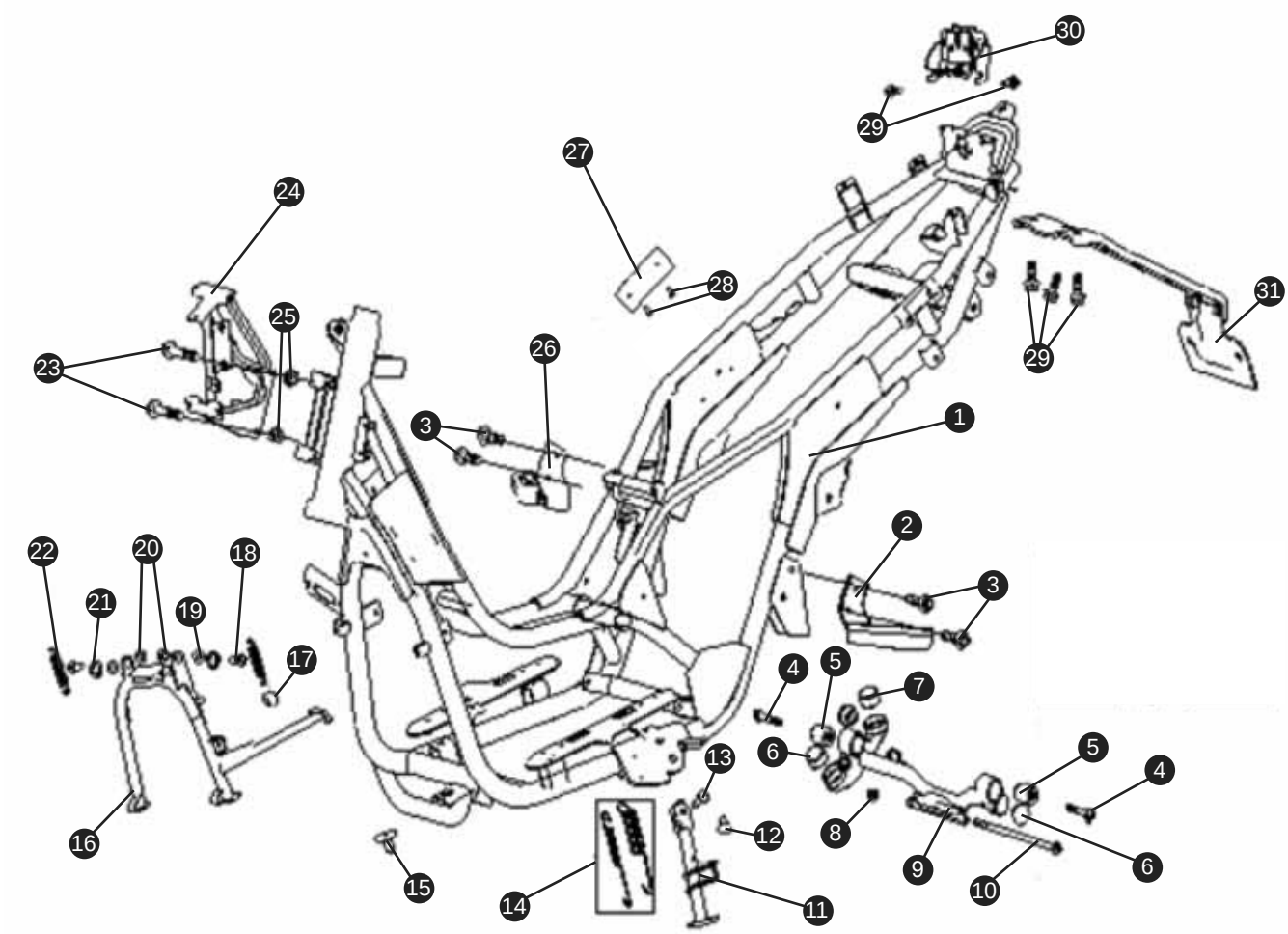
1. Place the vehicle at a distance of 5 meters in front of a wall. The vehicle must be placed horizontally.
2. Measure the distance from the ground to the middle of the headlight bulb (X).
3. Transfer this value to the wall and mark it with an (X).
4. Then make a second (X) 5 centimeter below the first (X).



5. To adjust the headlight, access from below to the headlight.
6. Screw the adjustment nut (1) in or out to set the headlight in correct position.

2. REPAIR AND DIAGNOSTICS

EXPLODED VIEW/ PARTS LOCATION - CHASSIS



PART LIST - CHASSIS

1. Frame
2. Footrest left rear
3. Screw M8x25
4. Screw M10x55x1.25
5. Bush engine carrier
6. Protection cap
7. Buffer
8. Nut M10x1.25
9. Engine carrier
10. Bolt engine carrier
11. Side stand
12. Locking plate
13. Screw
14. Spring
15. Shell
16. Main stand
17. Rubber bad
18. Screw M8x1.25x50
19. Washer M8
20. Bush main stand
21. Snap ring
22. Spring
23. Screw M8x45
24. Bracket
25. Nut M8
26. Footrest right rear
27. Frame plate
28. Rivets
29. Screw M6x12
30. Seat lock
31. Fender bracket

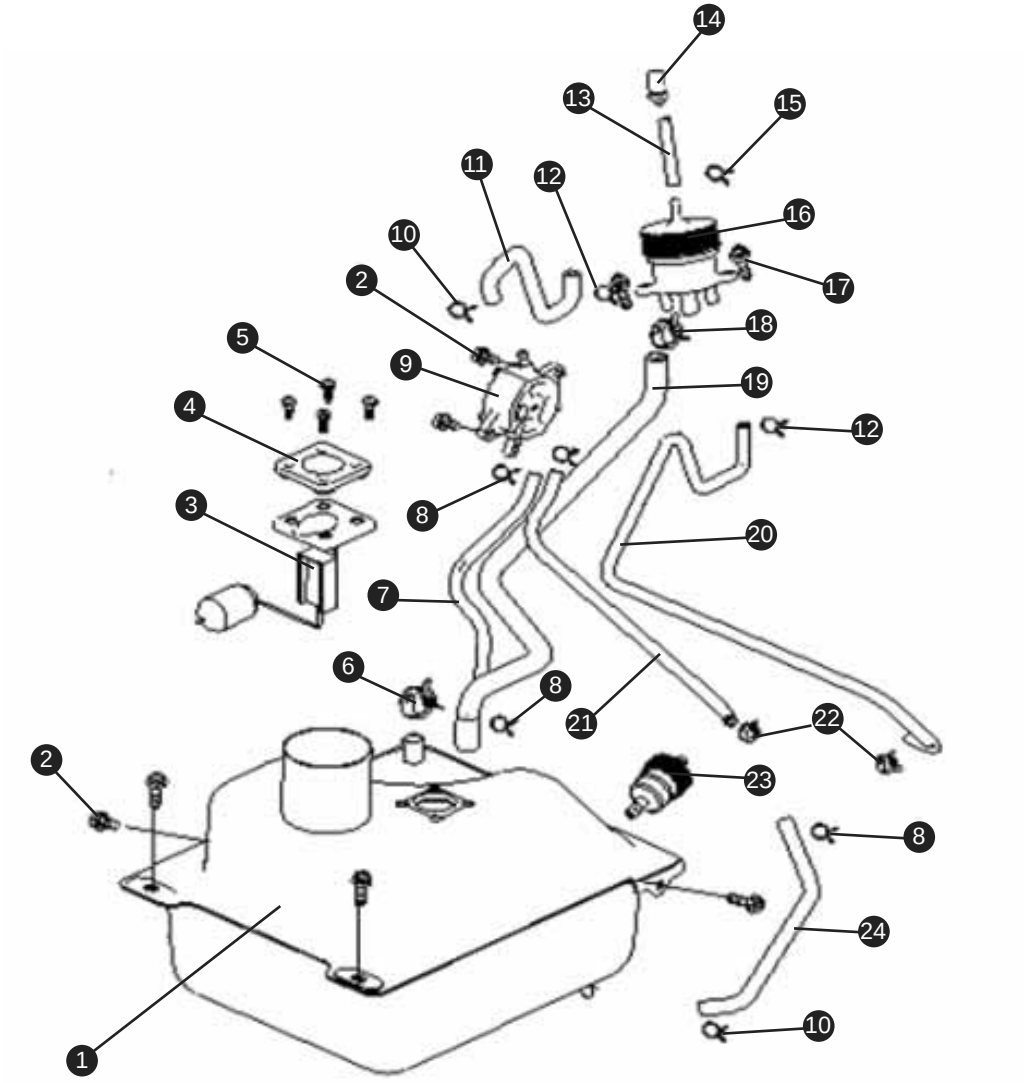
TORQUE LIST

PART NO.	TORQUE
10,8	33-47 NM

For screws that are not listed use standard values (page 10).

FUEL SYSTEM/ FUEL TANK

EXPLODED VIEW/ PART LOCATION - FUEL SYSTEM



PART LIST - FUEL SYSTEM

1. Fuel tank
2. Screw M6x16
3. Fuel tank sensor
4. Seal fuel tank sensor
5. Screw M5x14
6. Clamp for air pipe
7. Fuel pipe
8. Pipe clamp 8mm
9. Fuel pump
10. Pipe clamp
11. Fuel pipe
12. Pipe clamp
13. Fuel pipe (5x9x70)
14. Non return valve
15. Pipe clamp
16. Fuel reserve tap
17. Screw M5x16
18. Pipe clamp
19. Fuel pipe
20. Vacuum pipe
21. Fuel pipe
22. Pipe clamp
23. Fuel filter
24. Pipe clamp

SPECIFICATION - FUEL

Recommended fuel:
Unleaded gasoline only > 91Oct (SP 95 - SP 98)
Do not use any Bio-Ethanol fuel.
Fuel tank capacity: 8.6L ± 0.2L

SYSTEM

Pressurized system (vacuum fuel tap)

SPECIAL TOOLS

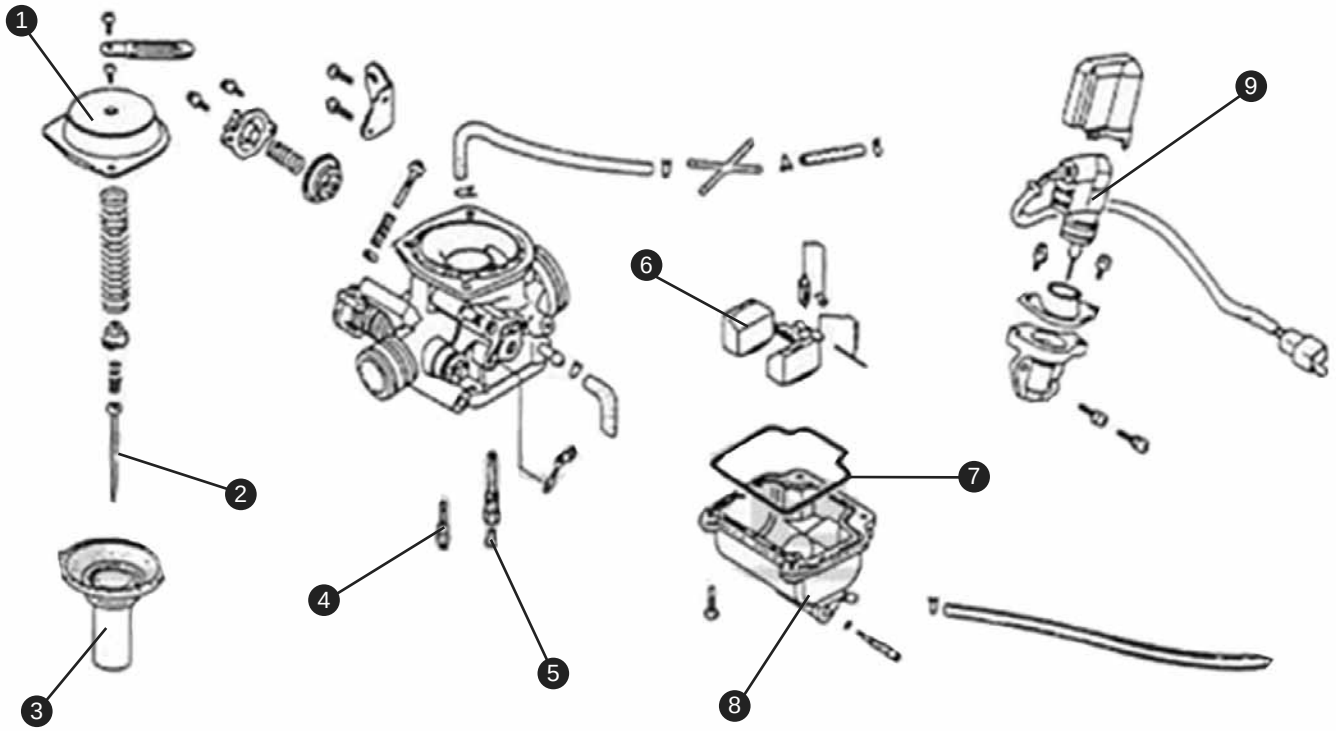
See page 11 - 14

TROUBLESHOOTING - FUEL SYSTEM

FAILURE	CAUSE	TO DO
Engine turns but does not start or die off	Idle speed is not set correctly	Adjsut the idle speed
	No gasoline in the fuel tank	Refill gasoline
	Water in the carburettor or the jet is blocked	Check the carburettor
	Fuel filter is blocked	Clean or replace the fuel filter
Engine have no idle	Idling jet blocked	Check the carburettor
	Adjusting screw on the carburettor distroed	Adjust the idle speed
	Carburetor running over because float needle is worn or blocked	Check the carburettor
	Loose carburettor jet	Check the carburettor
Engine power is poor	Fuel filter contaminated	Clean the filter
	Failure in fuel system	Check the fuel system
	Failure in the pressurzed system	Check the system
	Fuel tank cap is blocked	Check or replace it.

FUEL SYSTEM/ CARBURETTOR

EXPLODED VIEW/ PART LOCATION - CARBURETTOR



PART LIST - CARBURETTOR

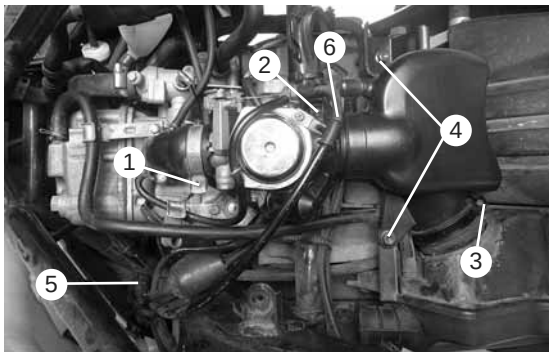
1. Carburettor cover
2. Needle jet
3. Diaphgram
4. Idle jet 37.5
5. Main jet 180
6. Floater
7. Floater chamber gasket
8. Floater chamber
9. Electrical enrichment vlave (Choke)

NOTE

Use a cloth to block the intake manifold after dismounting carburettor to avoid other article entry.

For the detailed specification see page 8 and 19.

CARBURETTOR REMOVAL



1. Remove the storage box.
2. Loosen the hose clamp of the intake manifold (1), and the two hose clamps of the air box (2) and (3).
3. Remove the two bolts (4) of the air box.
4. Disconnect electrical enrichment valve cable (5).
5. Disconnect the throttle cable (6).
6. Disconnect the hoses coming from the carburettor. It is not necessary to disconnect all hoses.

NOTE

In the hoses can be fuel inside.

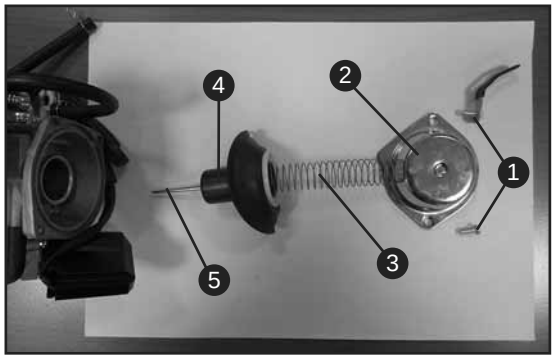
7. Remove the carburettor (5).

⚠ WARNING

Fuel is poisonous and a health hazard.
Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapours. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come into contact with fuel. Store fuel in a suitable canister according to regulations and keep it out of the reach of children.

8. Assemble in reverse order.

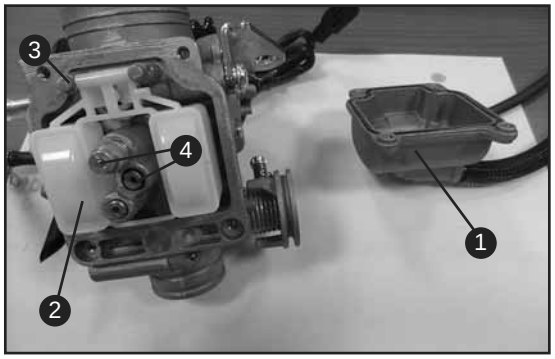
CARBURETTOR UPPER COVER REMOVAL



1. Loosen the bolts (1) and dismantle the upper cover (2).
2. Take out the spring (3), valve piston (4) and the needle (5).
3. Examine the attrition condition of the parts.
4. If one the parts is worn down, it should be replaced.
5. Examine the attrition condition of the needle (5).
6. If the needle is worn down, it should be replaced.
7. Assemble in reverse order.

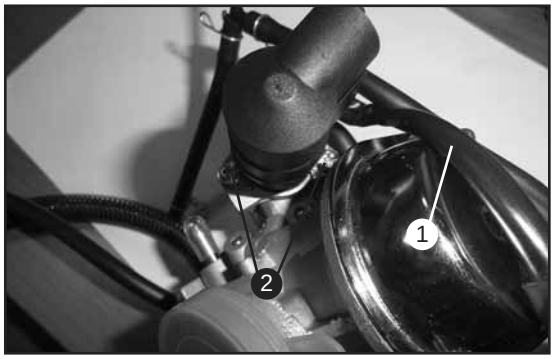
FUEL SYSTEM/ FUEL TANK

FLOAT CHAMBER REMOVAL



1. Loosen screws, take off the float chamber (1).
2. Dismantle the floater (2), floater pin (3) and valves (4).
3. Examine if the needle valve core, needle valve and the float components are damaged or worn.
4. If the needle valve core is damaged or worn down, it should replaced.
5. If the needle valve seat is worn down, then the carburettor body should be replaced.
6. If the float tongue piece is worn down, it should be replaced.
7. Examine the oil needle of the carburettor to see if it is damaged or worn down. If so, the oil needle as well as the main nozzle should be replaced.
8. Examine the idle metering hole, the main metering hole and the main nozzle to see if they are damaged, worn down or stained. If so, they should be replaced.
9. Examine the plunger to see if it is worn down. If so, it should be replaced.
10. Examine the carburettor body and the oil-fired pipe. If they are stained, clean every part with gasoline and blow them dry with pressure air.
11. Assemble in reverse order.

ELECTRICAL ENRICHMENT VALVE (CHOKE) REMOVAL



1. Disconnect the electrical enrichment valve cable (1).
2. Remove the two bolts (2).
3. Check the abrasion of the valve body.
4. Assemble in reverse order.

CARBURETTOR ADJUSTMENT

1. Idle speed and air control adjustment see page 20-21.

FUEL SUPPLY INSPECTION

1. Remove the storage box.
2. Start to check one by one the whole fuel supply system for leaks and wear. If a part is defect please replace it immediately.
3. Assemble in reverse order.

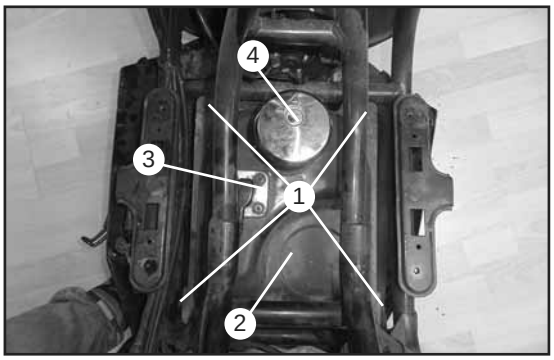
PARTS WHICH MUST BE CHECKED

1. Fuel tank
2. Fuel pump
3. Fuel tubes
4. Hose clamps
5. Fuel filter
6. Fuel sensor
7. Gaskets and seals
8. Carburettor

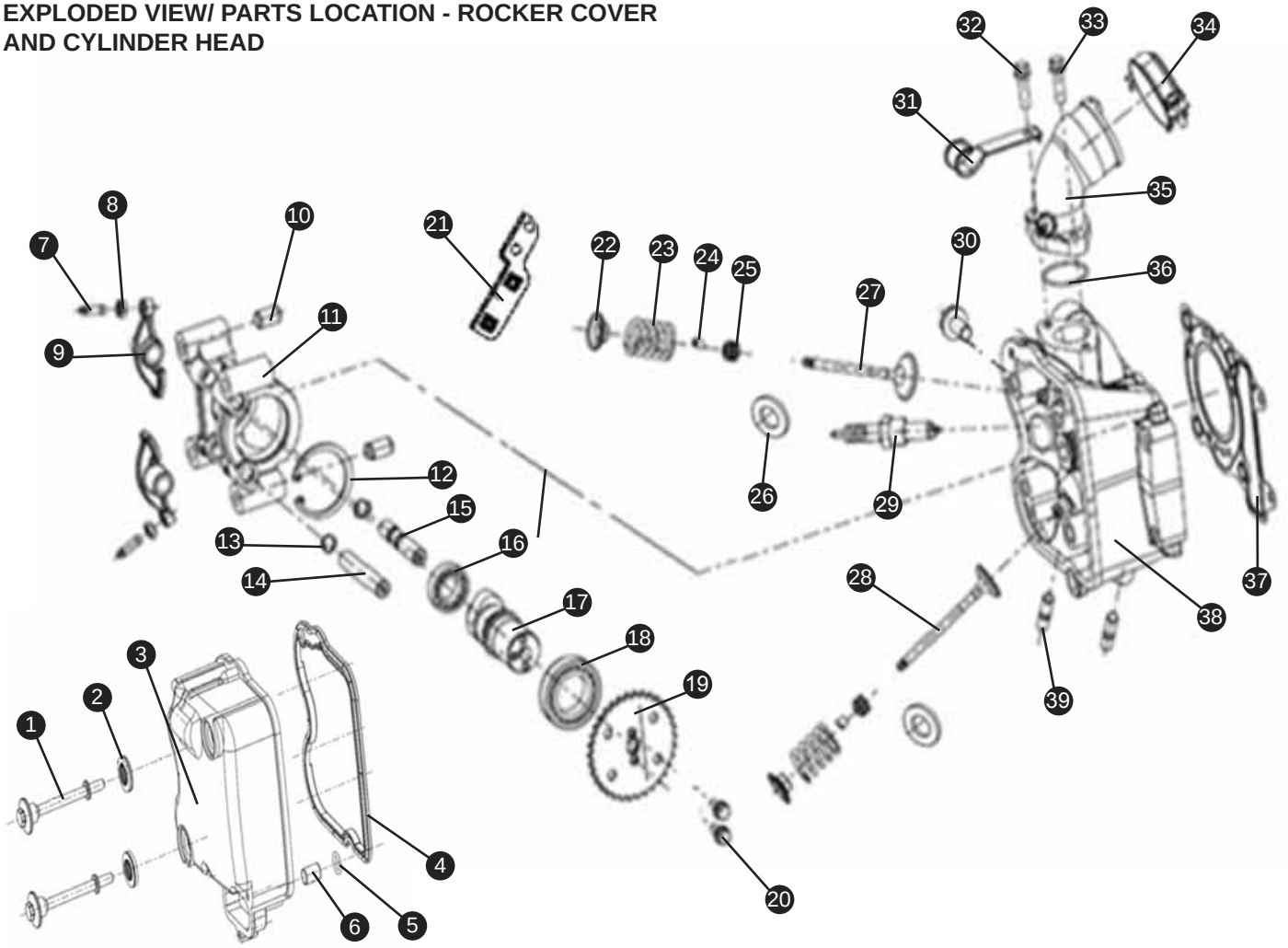
FUEL TANK REMOVAL

1. Remove the leg protection and the under vehicle protection. See in the capitel: **CHASSIS**

2. Train the fuel from the tank.
3. Disconnect all cables coming from the tank.
4. Remove the four screws (1) to remove the tank (2).
5. Remove the fuel level sensor (3) and the tank closure (4).
6. Reassemble in reverse order.



EXPLODED VIEW/ PARTS LOCATION - ROCKER COVER AND CYLINDER HEAD



PART LIST - ROCKER COVER AND CYLINDER HEAD

1. Bolt
2. Sealing washer
3. Rocker cover
4. Rocker cover gasket
5. O-Ring 10x20
6. Collar
7. Valve clearance adjust screw
8. Nut M5
9. Rocker arm
10. Collar
11. Camshaft housing
12. Circlip 42
13. Circlip 10
14. Shaft for exhaust rocker arm
15. Shaft for intake rocker arm
16. Bearing 61902
17. Camshaft
18. Bearing 61905
19. Camshaft sprocket
20. Bolt M5x12
21. Bracket
22. Valve spring retainer
23. Valve spring
24. Collet 2 pcs.
25. Valve stem seal
26. Valve spring seat
27. Intake valve
28. Exhaust valve
29. Spark plug
30. Nut M6x16
31. Bracket
32. Shear bolt M6x20
33. Bolt M6x20
34. Pipe clamp
35. Intake manifolt
36. O-Ring 28x1.8
37. Cylinder head gasket
38. Cylinder head
39. Stud bolt M7x29

NOTE

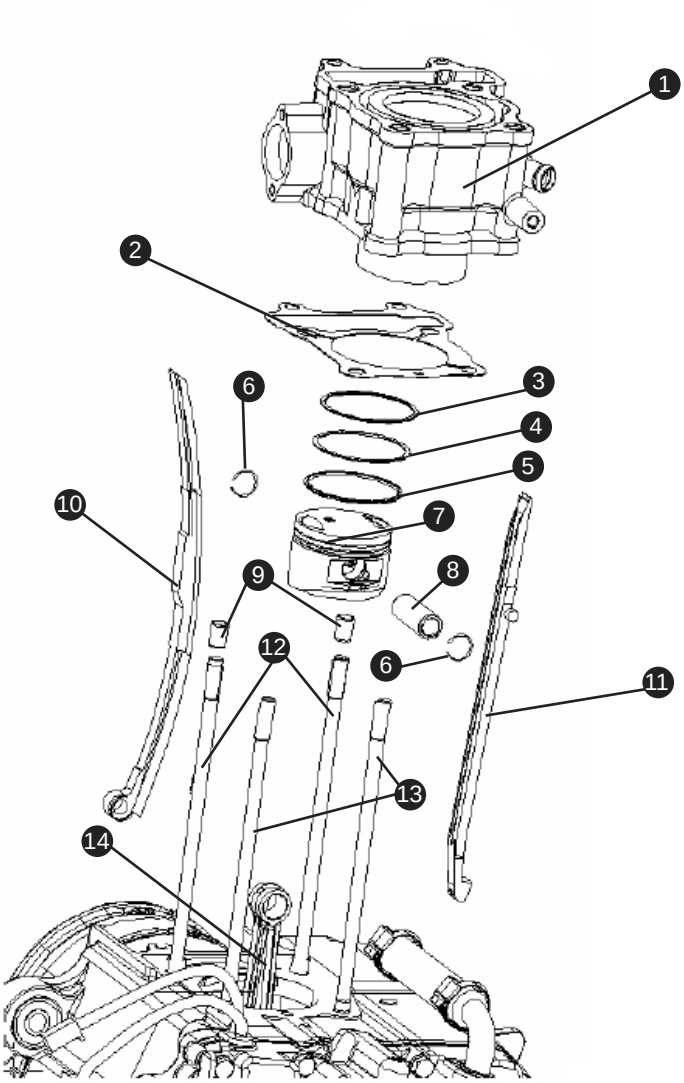
In order to guarantee the sealing between cylinder head and cylinder the cylinder head undertakes a very big Torque.
All parts should clean and blow dry by compressed air before inspecting and measuring.

TORQUE LIST

PART NO.	TORQUE
1	25-28 Nm
29	10-15 Nm

For screws that are not listed use standard values (page 10).

EXPLODED VIEW/ PARTS LOCATION - CYLINDER AND PISTON



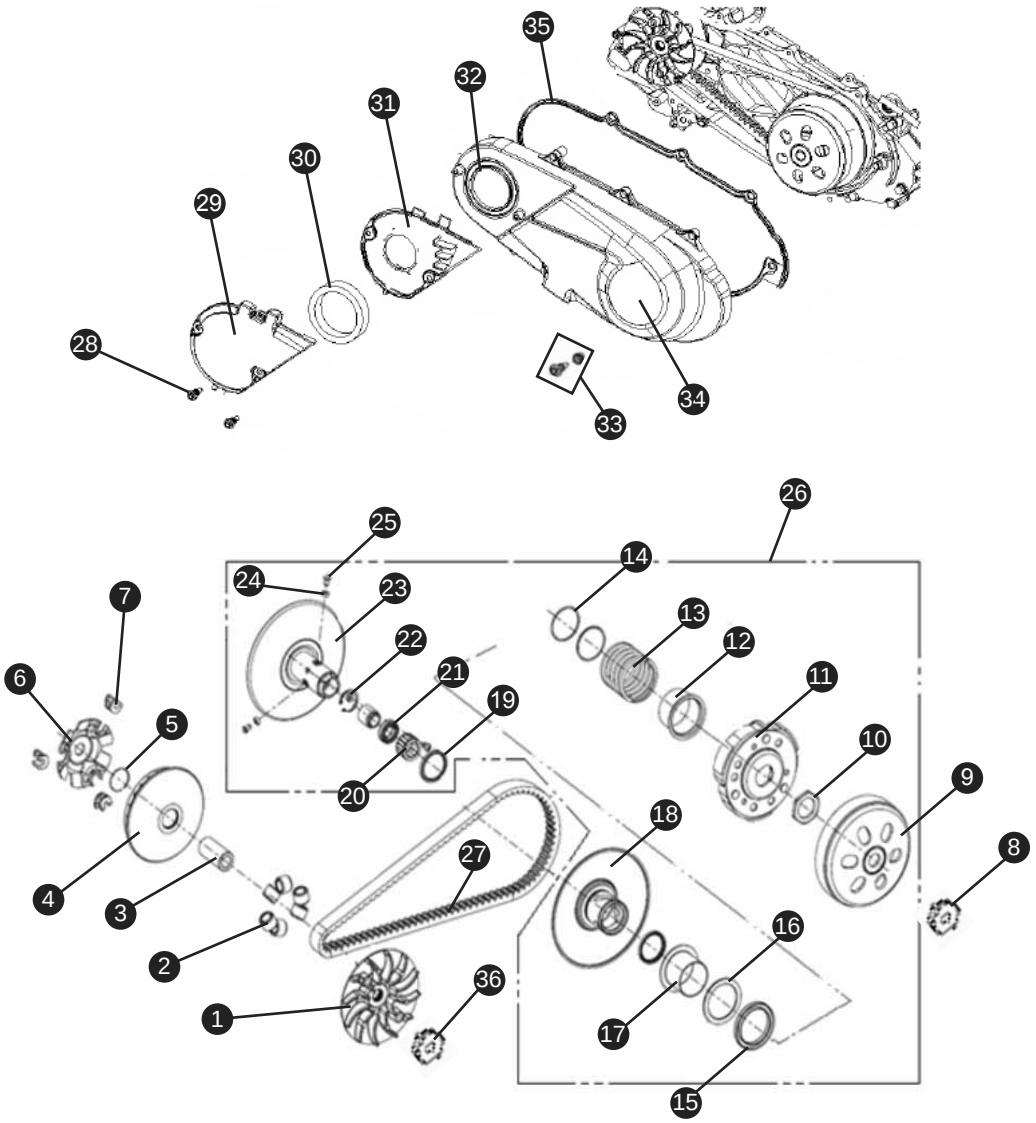
PART LIST - ROCKER COVER AND CYLINDER HEAD

1. Cylinder
2. Cylinder gasket
3. Upper ring
4. Second ring
5. Oil scraper ring
6. Piston pin clip
7. Piston
8. Piston pin
9. Collar
10. Chain guid
11. Chain guid
12. Stud bolt
13. Stud bolt
14. Crankshaft

NOTE

All parts should clean and blow dry by compressed air before inspecting and measuring.

EXPLODED VIEW/ PARTS LOCATION - DRIVE DISC/ CLUTCH/ DRIVEN WHEEL



PART LIST - DRIVE DISC/ CLUTCH/ DRIVEN WHEEL

1. Variomatic disc with fan
2. Flyweight
3. Collar
4. Variomatic drive disc
5. Circlip
6. Plate, movable drive
7. Rubber slide control parts
8. Nut
9. Clutch drum
10. Nut for variomatic
11. Certifugal clutch
12. Spring retainer
13. Pressure spring
14. O-Ring
15. Spring retaining seat
16. Distance washer
17. Spring retainer
18. Variomatic drive disc
19. Sealing washer
20. Bearing
21. Bearing 28x15x7
22. Circlip 28
23. Drive variomatic disc rear
24. Bushing
25. Dowel
26. Certifugal clutch complete
27. Drive belt 922x22x32
28. Mutter M6x16
29. Variomatic cooler
30. CVT air filter
31. Variomatic cooler
32. O-Ring 72x3.5
33. Screw 5 pcs
34. Variomatic cover
35. Gasket for variomatic cover
36. Lock nut of flywheel

NOTE

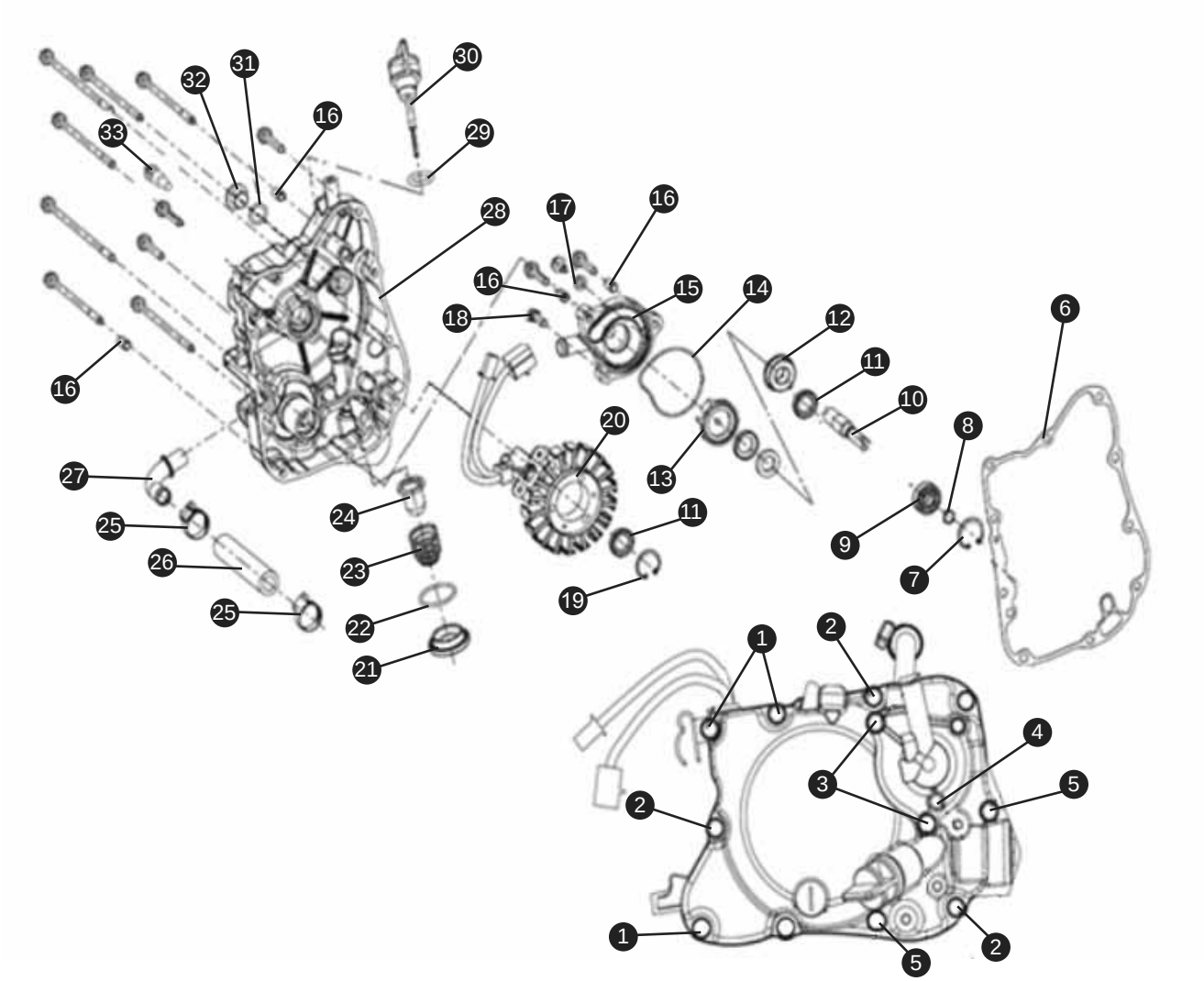
Adhesive grease on the triangel belt surface is forbidden so as to minimize the slippery between the belt and belt wheel in operation.

TORQUE LIST

PART NO.	TORQUE
36	50-60 Nm

For screws that are not listed use standard values (page 10).

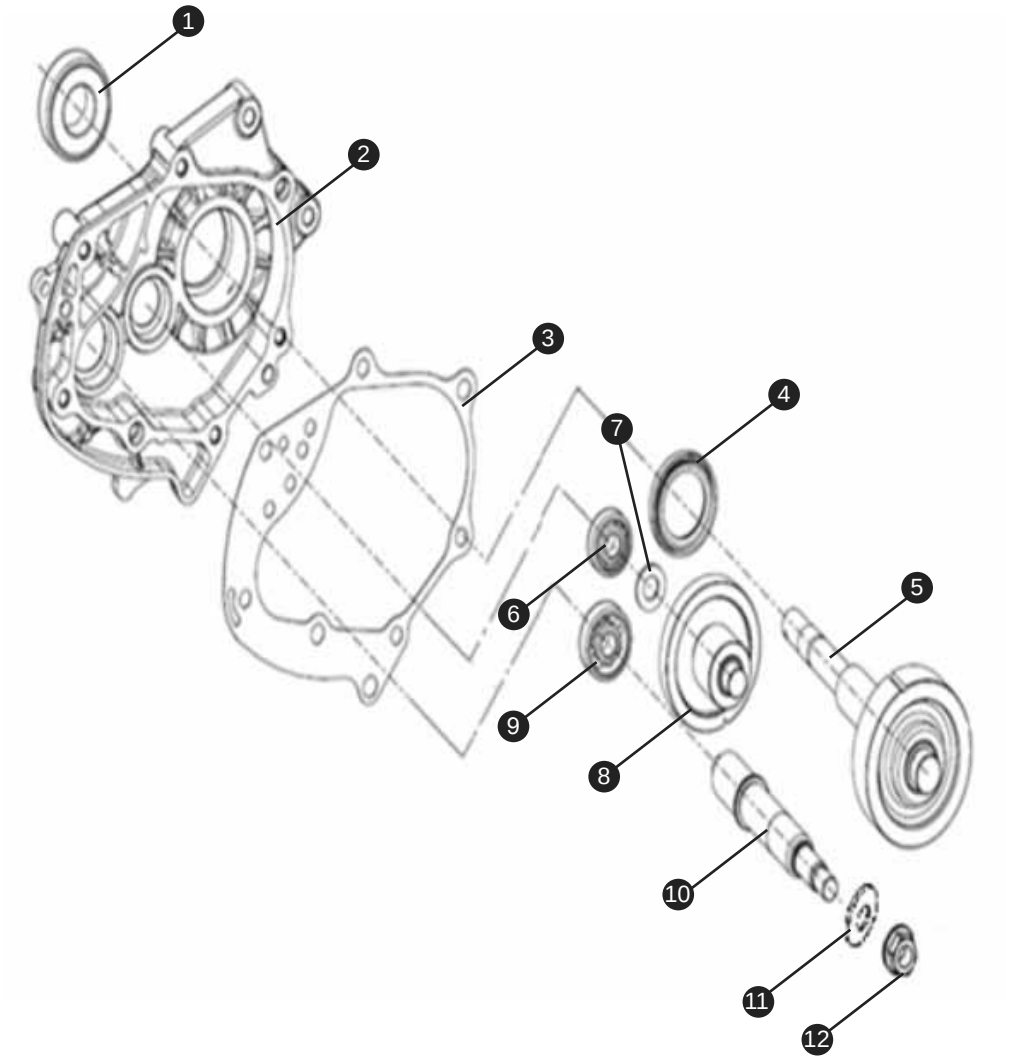
EXPLODED VIEW/ PART LOCATION - RIGHT CRANKCASE



PART LIST - RIGHT CRANKCASE

1. Bolt M6x35
2. Bolt M5x11.5
3. Bolt M6x30
4. Bolt M6x12
5. Bolt M6x139
6. Gasket for generator cover
7. Circlip 26
8. Circlip 10
9. Bearing 6000
10. Drive shaft for water pump
11. Oil seal 13.7x24x5
12. Seal for water pump frive shaft
13. Impeller water pump
14. Gasket for water pump
15. Water pump housing
16. Collar
17. Sealing washer
18. Bolt M6x25
19. Circlip 24
20. Stator for generator
21. Oil drain plug
22. O-Ring
23. Spring
24. Air filter gauze
25. Pipe clamp
26. Collant hose
27. Pipe bend
28. Generator cover
29. O-Ring 18x3.5
30. Oil dipstick
31. O-Ring 14x2.65
32. Bolt
33. Bolt

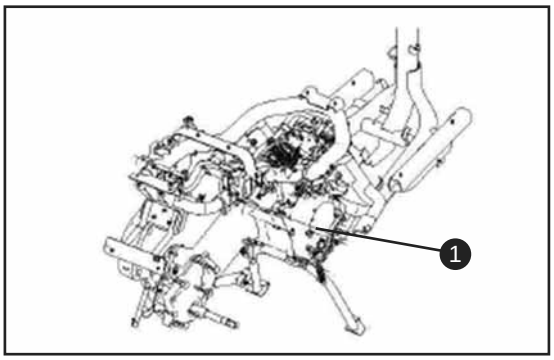
EXPLODED VIEW/ PARTS LOCATION - TRANSMISSION



PART LIST - TRANSMISSION

1. Bearing 6205-2RS
2. Gearbox housing
3. Gasket for gearbox housing
4. Oil seal 35x52x7
5. Output shaft
6. Bearing 6201
7. Distance washer
8. Idler gear in gear box
9. Bearing 6301
10. Gearbox input shaft
11. Washer
12. Nut 12x1.25

PART LOCATION - ENGINE



To reach the top end of the engine proceed as follow.

1. Remove the seat assembly to reach the top engine.
2. Remove the generator cover (1) to expose the top engine.
3. Remove the exhaust.

To work on the top end of the engine is no need to remove the whole engine from the frame.

SPECIFICATION - ENGINE

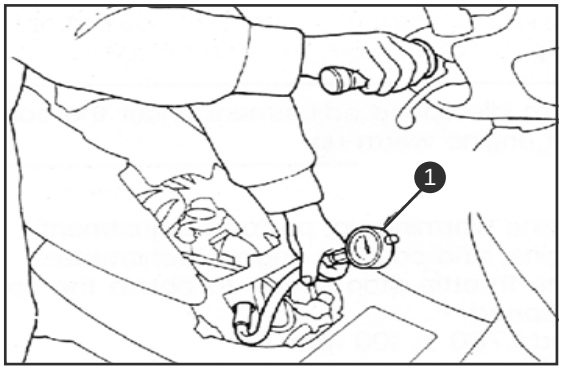
ENGINE TYPE	4 STROKE LIQUID COOLED
Fuel typ	Unleaded gasoline > 91Oct (SP 95 - SP 98) Do not use any Bio - Ethanol fuel
Number of cylinder	1
Bore	125
Start mode	Electric starter
Lubrication	Pressure spray
Air cleaner	Paper element
Carburettor	PD26JC G18
Idling speed - rpm	1500 ± 100
Maximum torque	10.9 Nm/7500 rpm
Maximum power	9.0 kW/8250 rpm
Compression ration	10.4:1
Spark plug	NGK (CR8E)

ENGINE

TROUBLESHOOTING - ENGINE

FAILURE	CAUSE	TO DO
Engine does not start when the electric starter button is pushed	Battery discharged	Charge the battery
		Check the charging of the battery
		Check if the generator is working correctly
	Fuse is blown	Check or replace
	Starter relay defective	Check the starter relay
	Starter motor defective	Check the starter motor
Engine turns but does not start or dies off	A fuse is blown	Check or replace
	Idle speed is not set correctly	Adjust the idle speed
	Spark plug is contaminated	Check or replace
	Wire harness is worn	Check the wiring harness
	Contact problem in a plug	Check the plugs of the wiring harness
	No gasoline in the tank	Refill gasoline
	Water in carburetor, jet blocked or failure in the pressurized system	Check the carburetor and pressurized system
	Problem with the fuel filter	Check or replace
Engine has no idle	Idling jet blocked	Check the carburetor system
	Spark plug defective	Check or replace
	Adjusting screw on carburetor distorted	Adjust the idle speed
Engine does not speed up	Carburetor running over because float needle dirty or worn	Check the carburetor system
	Loose carburetor jets	Check the carburetor system
	Air filter contaminated	Clean the filter
	Fuel filter contaminated	Clean the filter
	Failure in fuel system	Check the fuel system
	Problem with the carburretor	Check the carburretor
	Exhaust system leaky or deformed	Check exaust system
Blue smoke emission	To much oil support	Check the oil pump
Black smoke emission	Fuel/ Air ratio wrong - too much fuel	Check the carburretor
Low compression	Piston, piston rings, gaskets, crankcase or cylinder worn or damaged	Check all parts and replace if necessary
High compression	Combustion chamber and the carbon deposition on the top of the piston.	Check all parts and replace if necessary
Piston noice	Piston, piston rings, piston pin, cylinder, conrod or bearing are worn or damaged	Check all parts and replace if necessary
Heavy smoke	Oil back flow valve defect	Replace the oil back flow valve

CYLINDER PRESSURE INSPECTION



The pressure inspection should be made when the engine is warm.

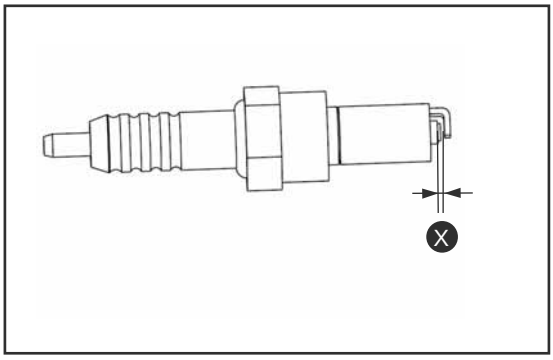
1. Remove the storage box and the right side cover.
2. Remove the spark plug from the engine.
3. Install cylinder pressure meter (1) in the spark plug hole.
4. Pull full throttle and press “Start” to run the engine.
5. Measure the cylinder pressure.

Cylinder pressure: 12.5 bar (+/-0,5 bar)/ 1500 rpm

1. Check the following items if the compression pressure is too low.
   - If the cylinder head gasket is damaged
   - The wear or damage of piston ring
   - The wear of piston and cylinder

2. Check the following items if the compression pressure is too high.
   - Combustion chamber and the carbon deposition on the top of the piston.

SPARK PLUG



1. Open the drop door to reach the spark plug
2. Remove the spark plug cap .
3. Use a spark plug circular wrench to remove the spark plug.
4. Check the over burning, pollution and carbon deposit of spark plug.
5. If the spark plug do not comply replace it.

Recommended spark plug type:
TORCH: A7RTC
Torque for the spark plug: 10-15 Nm

⚠ WARNING

When you need to replace the spark plug always control the installed type in before the replacement. It could be possible that based on technical innovations the type which is described will change.

Spark plug gap clearance X: 0.6-0.7 mm

Spark plug images and analysis

See page 23.

ENGINE

ENGINE OVERHAUL/ REMOVAL

NOTE

It´s not necessary to remove the engine in order to remove the following components:

- Fan cover
- Magneto rotor
- Stator
- Drive gear
- Variomatic

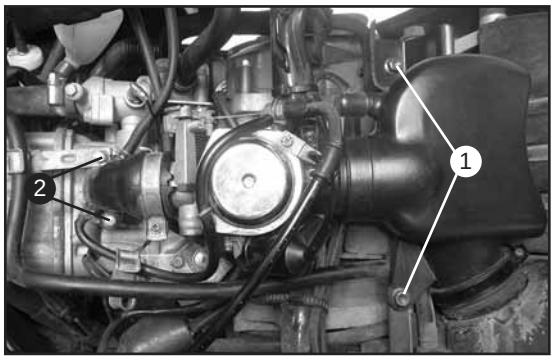
The engine should removed by following parts:

- Cylinder cover
- Cylinder head
- Cylinder
- Piston and piston ring
- Oil pump
- Crankshaft

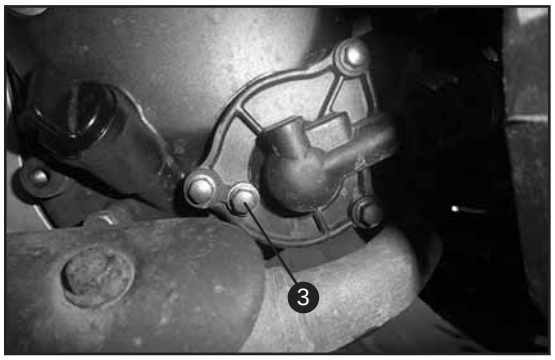
For a better understanding, the following steps are described with replaced engine.

ENGINE PREPARATION

1. Place an appropriate supporting stand under the vehicle, because the main stand is installed on the engine.
2. Remove the storage box, the air filter box, the resonance box screws (1), the rear fender, the rear brake caliper and the exhaust.
3. Remove the two nuts (2) to remove the whole carburettor from the engine.



4. Remove the screw (3) to drain the coolant.
5. Unplug all electrical cables (hoses) coming from the engine (eletric ground, starter cable etc.), remove the spark plug cap, the coolant hose, the second air system hose, the lower shock absorber bolts.



NOTE

Don´t forget the mass-cable on the right engine side.
Take care about the position of the cables and the hoses.

ENGINE REMOVAL

Follow the points 1-5 below and go ahead with point 6.

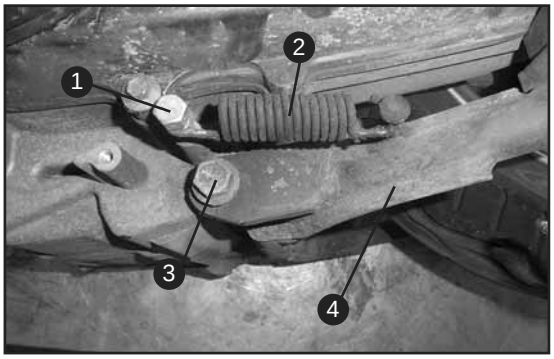
6. It is not necessary to remove the rear wheel. It can ease the transportation.
7. Remove the engine mounting bolt (1).

NOTE

If the engine mounting bolt is difficult to remove, you must move the engine up and down.

8. Pull the engine backwards.
9. Remove the rear wheel.

MAIN STAND REMOVAL



1. Remove the screw (1) to remove the spring (2).
2. Remove the screw (3).

NOTE

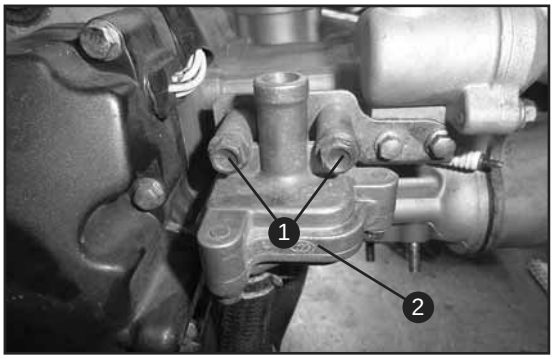
Only the left side is illustrated. Please do the same way on the right side.

3. Remove the main stand (4).

ENGINE OIL REMOVAL

1. Remove the engine oil screw and drain the engine oil.

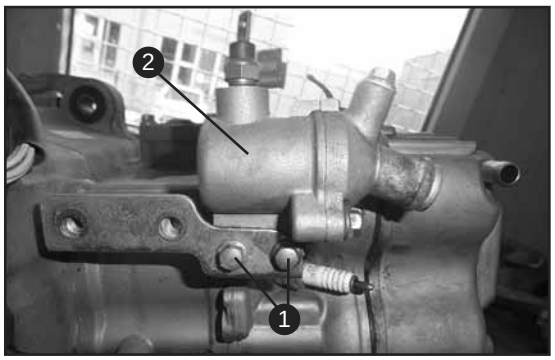
SECONDARY AIR SYSTEM REMOVAL



1. Remove the two screws (1) to remove the secondary air system (2).

THERMOSTAT REMOVAL

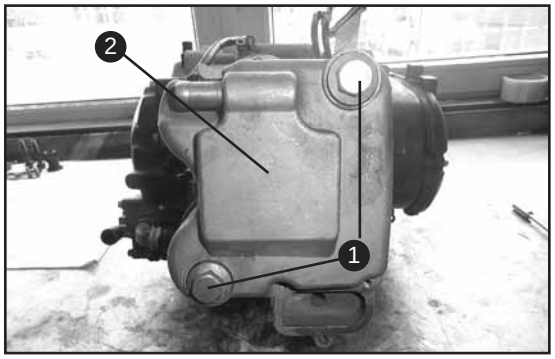
1. Remove the two screws (1).
2. Pull out the thermostat (2).



TOP END REMOVAL

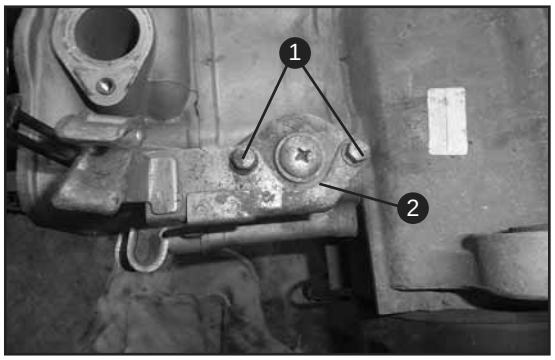
CYLINDER HEAD COVER

1. Remove the two screws (1) to remove the cylinder head cover (2).



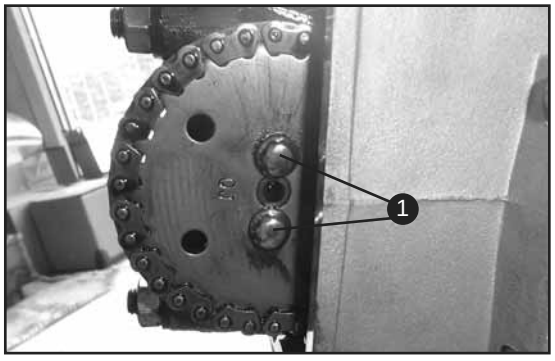
TIMING CHAIN TENSIONING RAIL REMOVAL

1. Remove the two screws (1) to remove the timing chain tensioning rail (2).



CAMSHAFT SPROCKET REMOVAL

1. Remove the two screws (1).

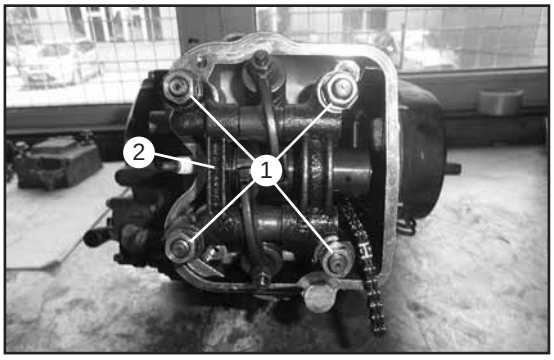


NOTE

If it is not possible to remove the camshaft sprocket screws, remove the variomatic cooler cover and turn the crankshaft (2).

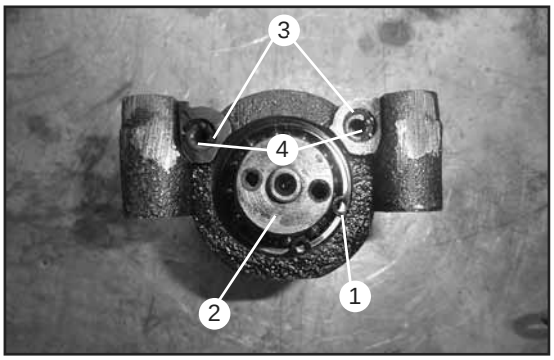
CAMSHAFT HOUSING REMOVAL

1. Remove the four nuts (1) with theire washers.
2. Pull of the camshaft housing (2) with the camshaft.



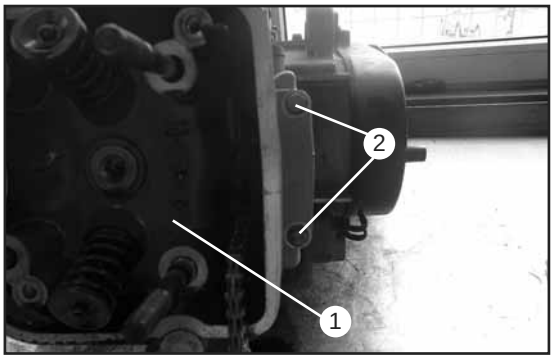
CAMSHAFT AND ROCKER ARM REMOVAL

1. Remove the circlip (1) to remove the camshaft (2).
2. Remove the circlip (3) to remove the rocker arm shafts (4) and so to remove the rocker arms.



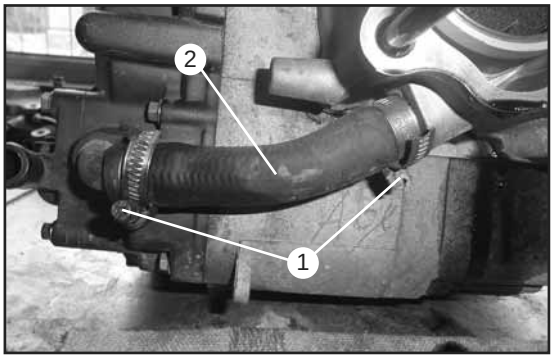
CYLINDER HEAD REMOVAL

1. To pull off the cylinder head (1), remove the two screws (2).



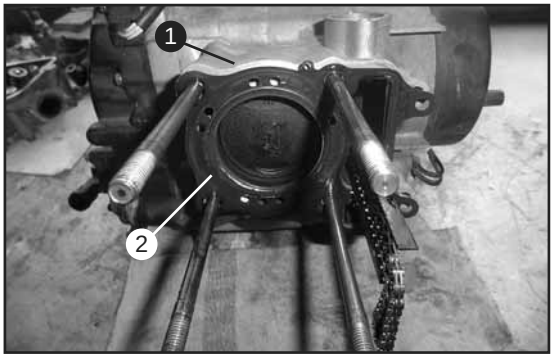
COOLANT HOSE REMOVAL

1. Loosen the two screws (1) to pull off the coolant hose (2).



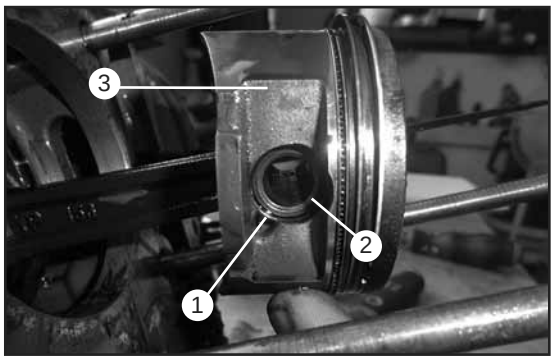
CYLINDER REMOVAL

1. Now it is possible to pull off the cylinder (1) with the cylinder head gasket (2).



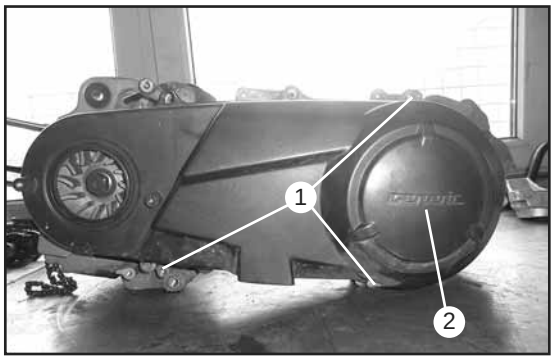
PISTON REMOVAL

1. Remove the C-type piston pin clip (1).
2. Push out the piston pin (2) and remove the piston (3).



VARIOMATIC COVER REMOVAL

1. Remove the three screws (1) to remove the variomatic cover (2).

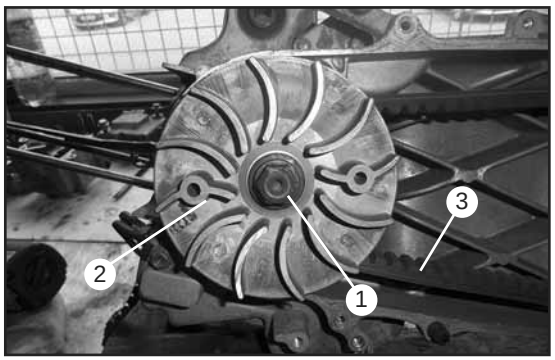


VARIOMATIC DISC WITH FAN REMOVAL

1. Remove the nut (1) with the washer to remove the variomatic disc (2).

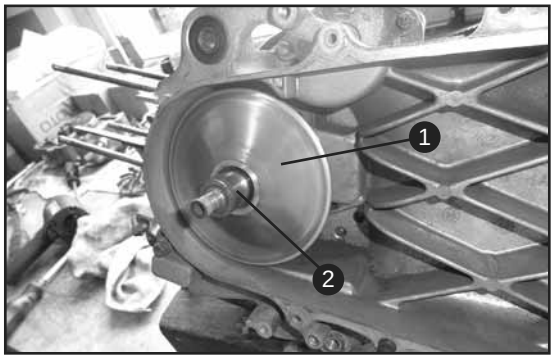
VARIOMATIC BELT REMOVAL

1. Remove the variomatic disc to remove the belt (3).



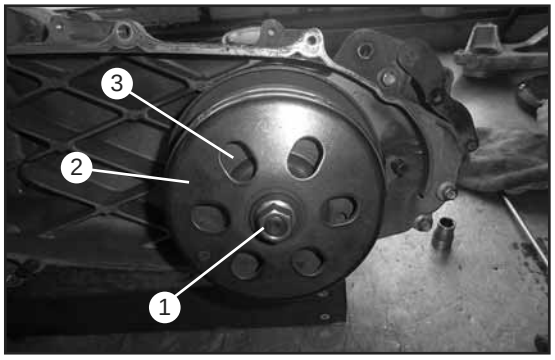
VARIOMATIC DISC REMOVAL

1. Pull off the variomatic disc (1) with the collar (2).



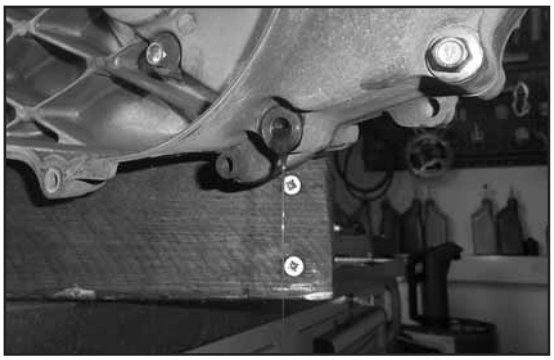
CLUTCH DRUM AND CERTIFUGAL CLUTCH REMOVAL

1. Remove the nut (1) to remove the clutch drum (2) and the certifugal clutch (3).



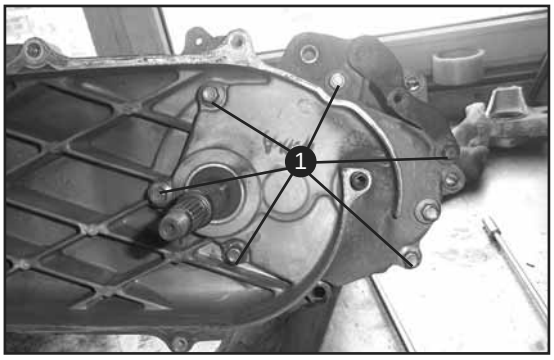
TRANSMISSION OIL REMOVAL

1. Remove the screw and drain the transmission oil.

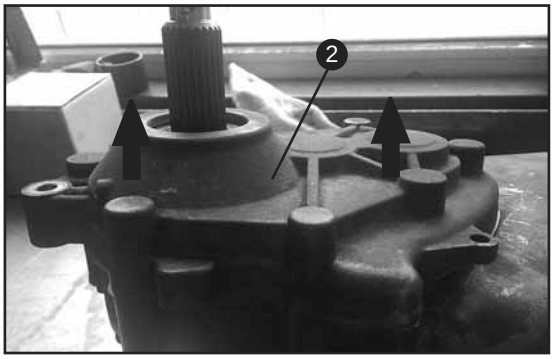


GEARBOX HOUSING REMOVAL

1. Remove the six screws (1).



2. Pull off the gearbox housing (2).

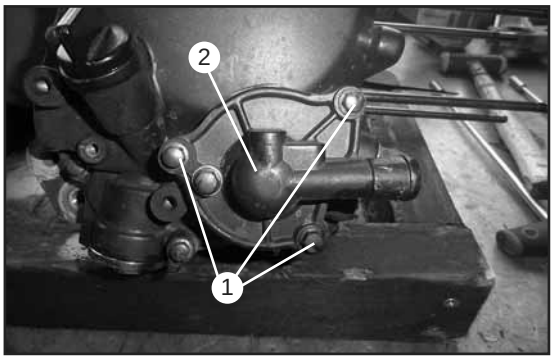


GEARBOX REMOVAL

For more information look on the page 46.

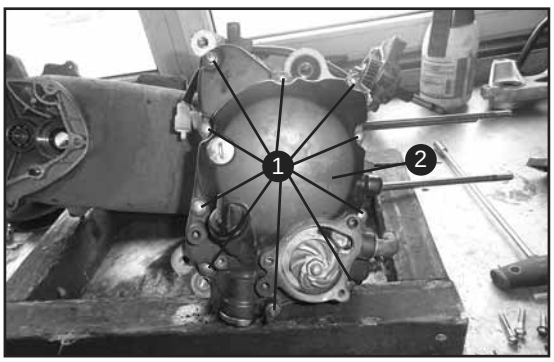
WATER PUMP HOUSING REMOVAL

1. Remove the three screws (1) to remove the water pump housing (2).



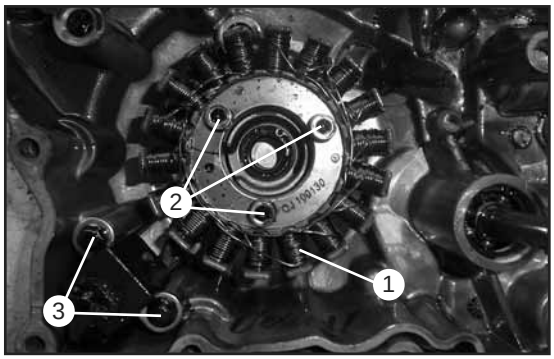
GENERATOR COVER REMOVAL

1. Remove the ten screws (1).
2. Pul off the generator cover (2).



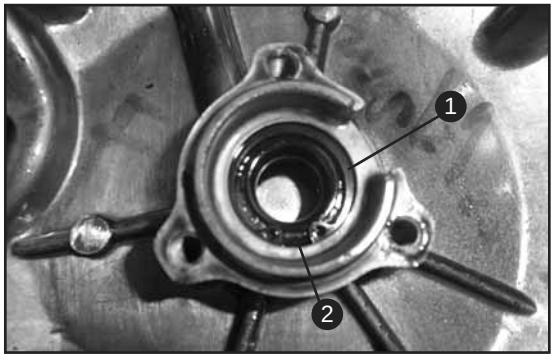
STATOR FOR GENERATOR REMOVAL

1. To remove the stator, remove the three allen head screws (2) and the two screws (3).



OIL SEALING OF STATOR REMOVAL/ INSTALLATION

1. Remove the circlip (1) and pull out the oil seal (2).
2. Reassemble in reverse order.

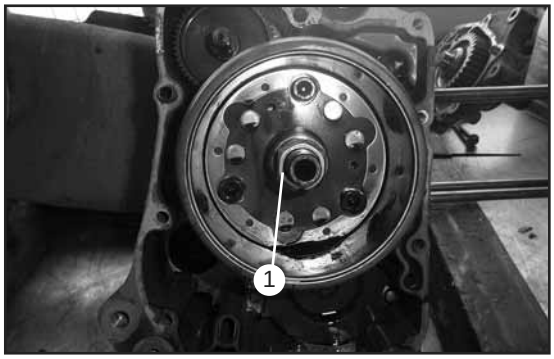


IMPELLER WATER PUMP REMOVAL

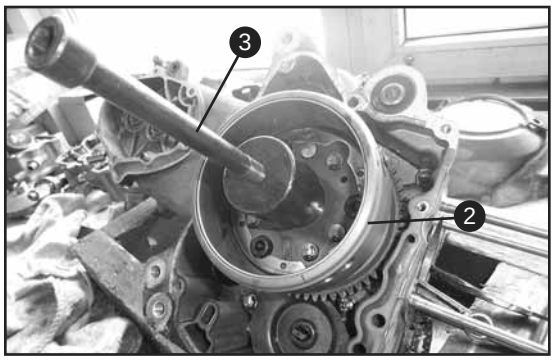
1. Remove the circlip (1).
2. Pull out the impeller water pump (2).

MAGNETO ROTOR REMOVAL

1. Remove the nut (1).

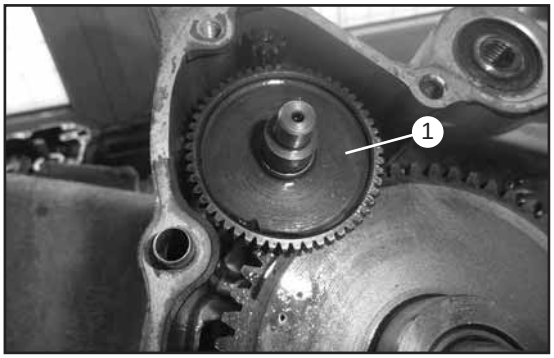


2. Remove the magneto rotor (2) by using a puller (3).



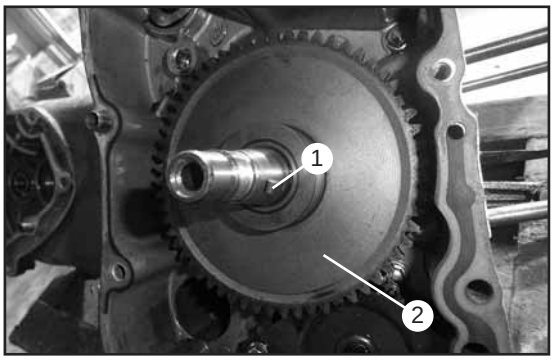
STATER MOTOR PINION REMOVAL

1. Pull off the stater motor pinion (1) with the shaft.



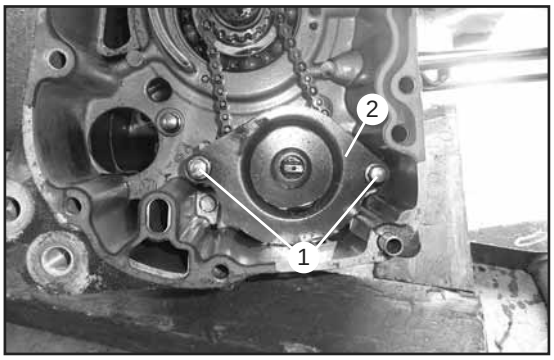
IDLER GEAR REMOVAL

1. Remove the woodruff key (1) to remove the idler gear (2).

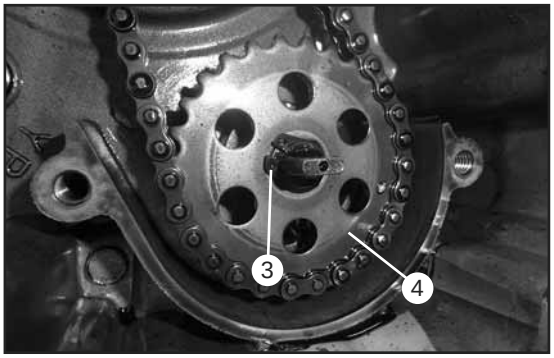


OIL PUMP REMOVAL

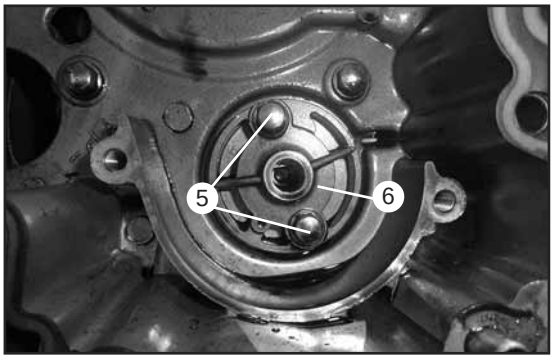
1. Remove the two screws (1) to remove the locking plate (2).



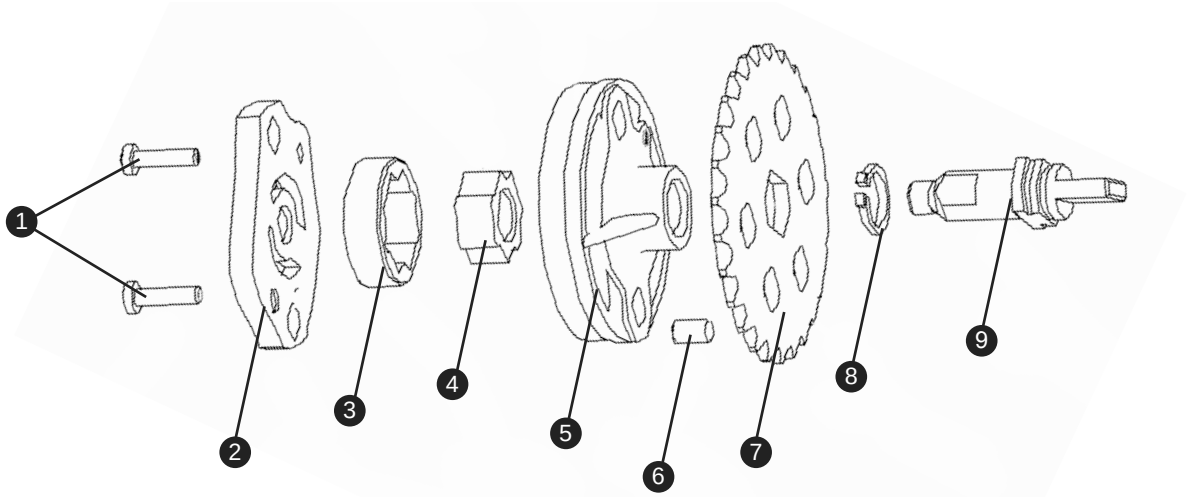
2. Remove the circlip (3).
3. Pull off the drive gear (4) with the shaft.



4. Remove the two screws (5).
5. Pull out the pump body (6).



EXPLODED VIEW/ PARTS LOCATION - OIL PUMP

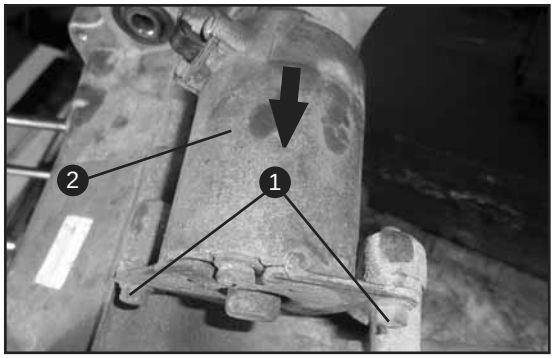


PART LIST - TRANSMISSION

1. Screws
2. Pump cover
3. Outside runner
4. Inner runner
5. Pump body
6. Dowel pin
7. Oil pump sprocket
8. Circlip
9. Pump shaft

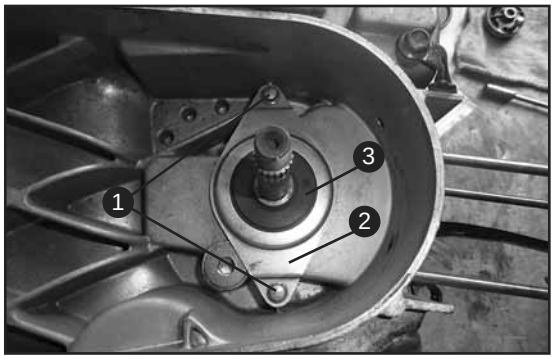
STARTER REMOVAL

1. Remove the two bolts (1).
2. Pull the starter (2) sidewards (arrow).



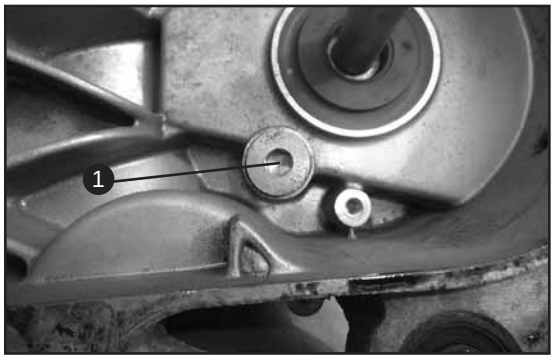
OIL SEAL CRANKSHAFT RIGHT REMOVAL

1. Remove the two screws (1) to remove the locking plate (2).
2. Remove the crankshaft.
3. Now it is possible to pul out the oil sealing (3) of the crankshaft right.



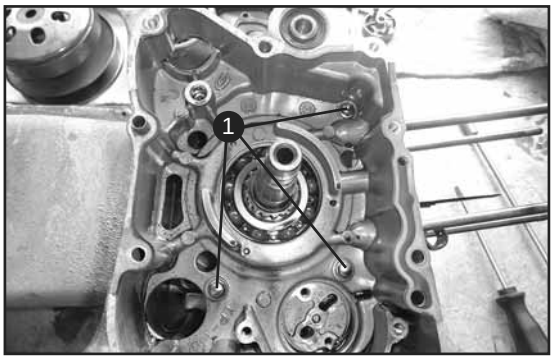
TIMING CHAIN GUID RAIL REMOVAL

1. Remove the screw (1) to remove the timing chain guid.



CRANKCASE REMOVAL

1. Remove the three screws (1).
2. Pull off the right crankcase.

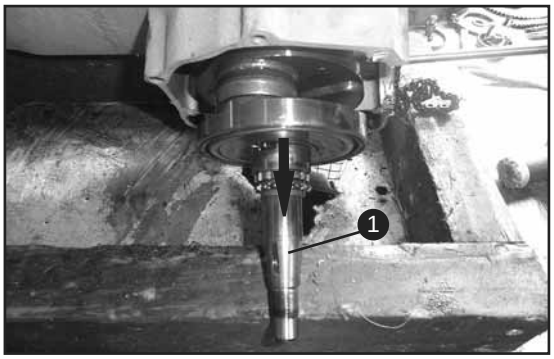


NOTE

- If it is necessary usa a soft hammer to top on the case half.
- Tap only on reinforced portions of case
- Work slowly and carefully
- If the case don´t seperate, check for remaining cases bolts or fitting.
- Don´t force.

CRANKSHAFT REMOVAL

1. Pull out the crankshaft (1) (arrow).

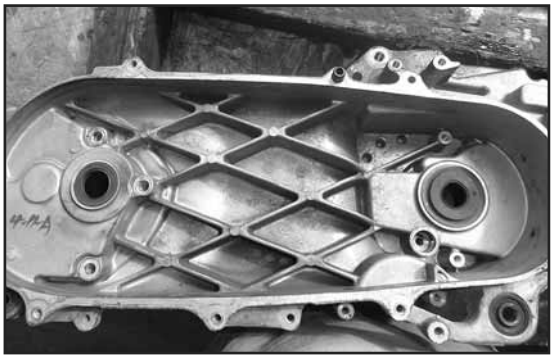


NOTE

If it is difficult to pull out the crankshaft, look to the timing chain.

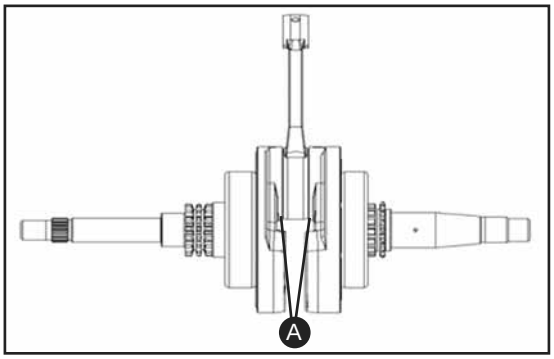
OIL SEALS REMOVAL

1. Replace the oil seals after every disassembly.



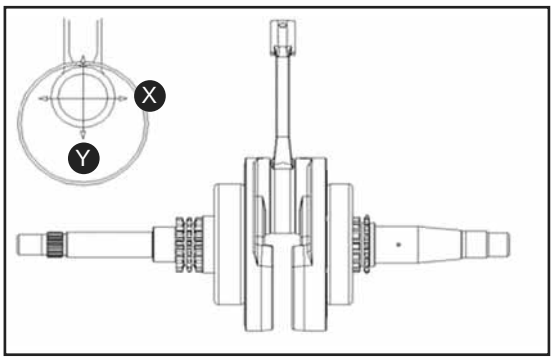
CRANKSHAFT INSPECTION

1. Measure the connecting rod axial side clearance (A).



Allowable Limit (A) : 0.55 mm

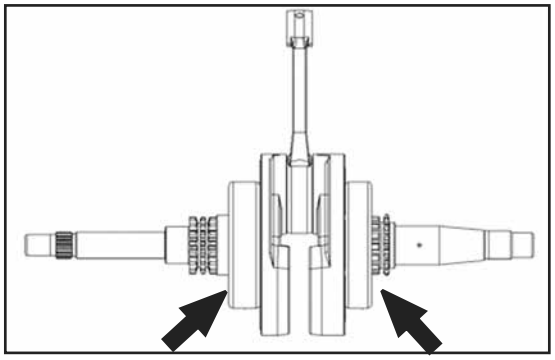
2. Measure the connecting rod radial clearance in X and Y direction.



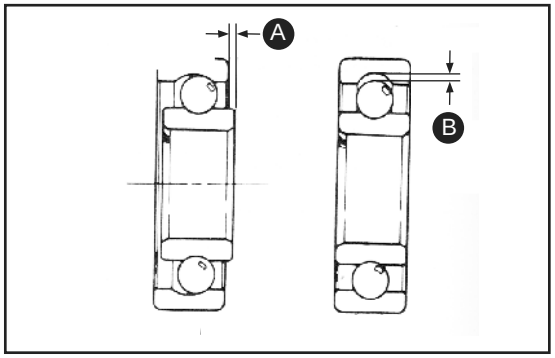
Allowable Limit (X/Y): 0.05 mm

3. Measure the run-out at the bearing pins of the crankshaft.

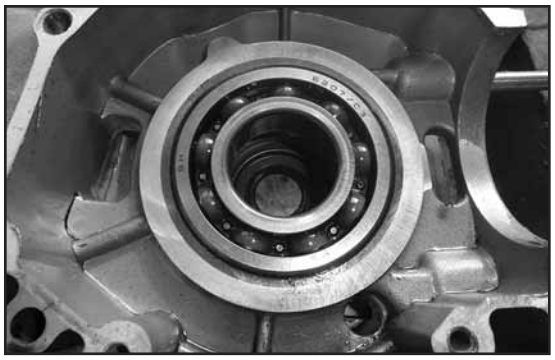
Allowable Limit (A/B): 0.1 mm



4. Check the crankshaft bearings for excessive play. The bearings must be replaced if they are noisy or have excessive play.

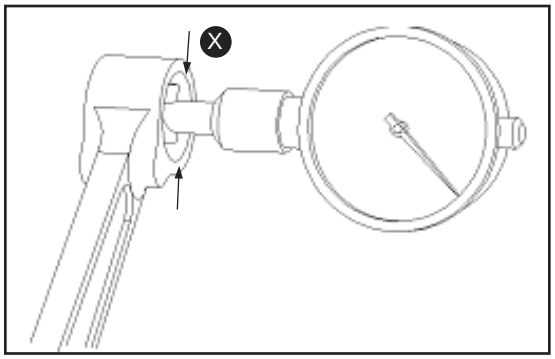


5. If the bearings didn´t work correct, remove the bearings off the crankshaft by using an inner bearing puller or hammer out the bearing from the backward.



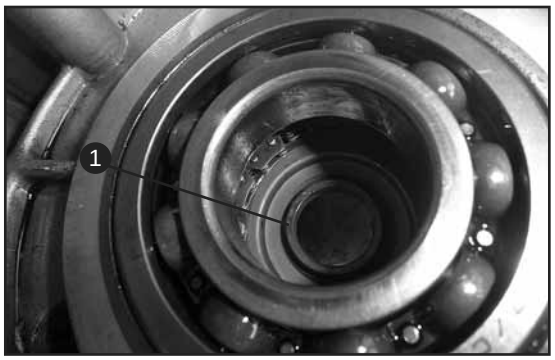
6. Measure the inner diameter of the narrow end of the connectin rod.

Allowable limit (X): 14.04 mm

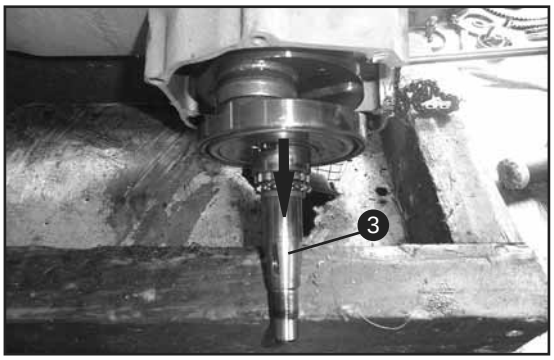


CRANKSHAFT INSTALLATION

1. Replace the oil sealing (1).
2. Place the timing chain (2) in the crankcase.



3. Push in the crankshaft (3) (arrow).



NOTE

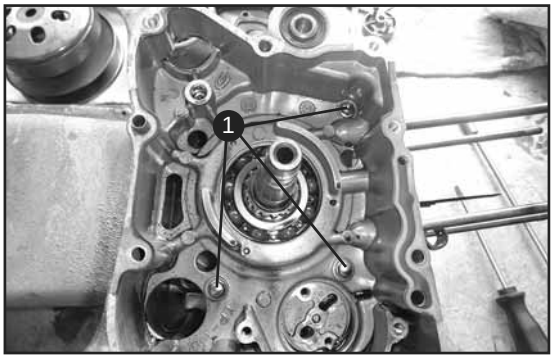
Installation of the crankshaftshould work smooth without force.
If the installation works not smooth, check the timing chain and their position.

GASKETS

1. Replace all gaskets.

CRANKSCASE INSTALLATION

1. Replace the oil sealing.



NOTE

Installation the crankcase should work smooth and with additional force. Watch out the shafts move to the right position before fixing the crankcase.

2. Tighten the three screws (1).

TROUBLESHOOTING - CRANKCASE

FAILURE	CAUSE	TO DO
Noise out from the crankcase	Loosen or damage parts (bearings, gears, ...) in the crankcase	Replace

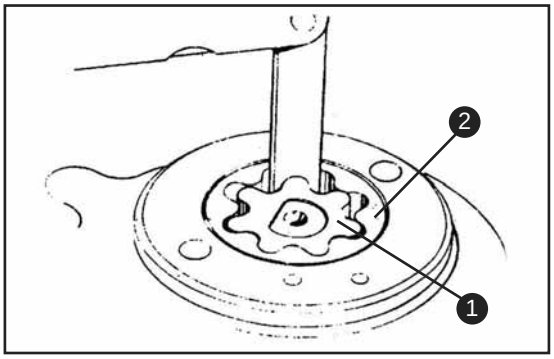
INSPECTION - CRANKCASE

ITEM		STANDARD VALUE [mm]	ALLOWABLE LIMIT [mm]
Crankshaft	Clearance of connecting rod big end in right and left direction	0.1-0.35	0.55
	Radial clearance of the big end of connecting rod	0.008-0.016	0.05

OIL PUMP INSPECTION

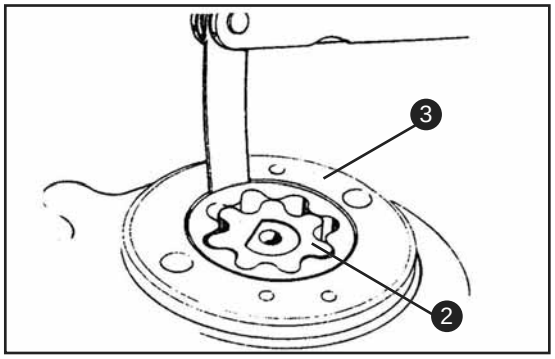
1. Check the radial clearance between the inner (1) and outside (2) runner.

Allowable Limit: 0.20 mm



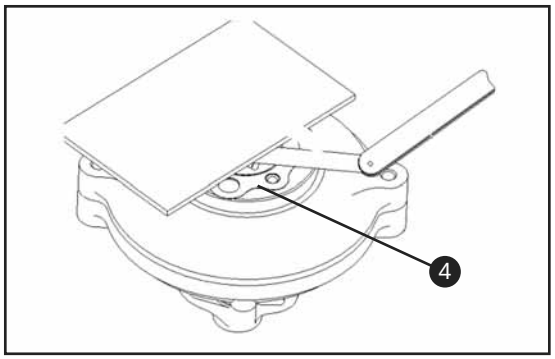
2. Check the cearance between the outside runner (2) and the pump body (3).

Allowable Limit: 0.21 mm



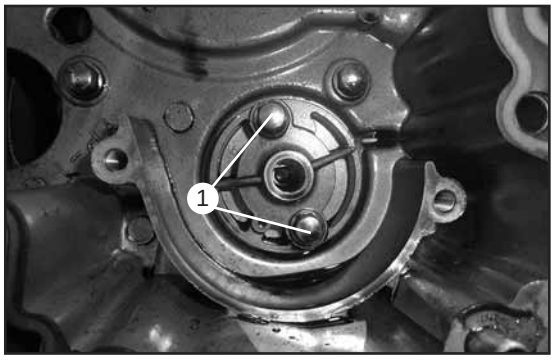
3. Check clearance of runners (4).

Allowable Limit: 0.18 mm



OIL PUMP INSTALLATION

1. The installation sequence is the reverse of removal.
2. Tighten all screws (1) with the specific torque.



TORQUE LIST

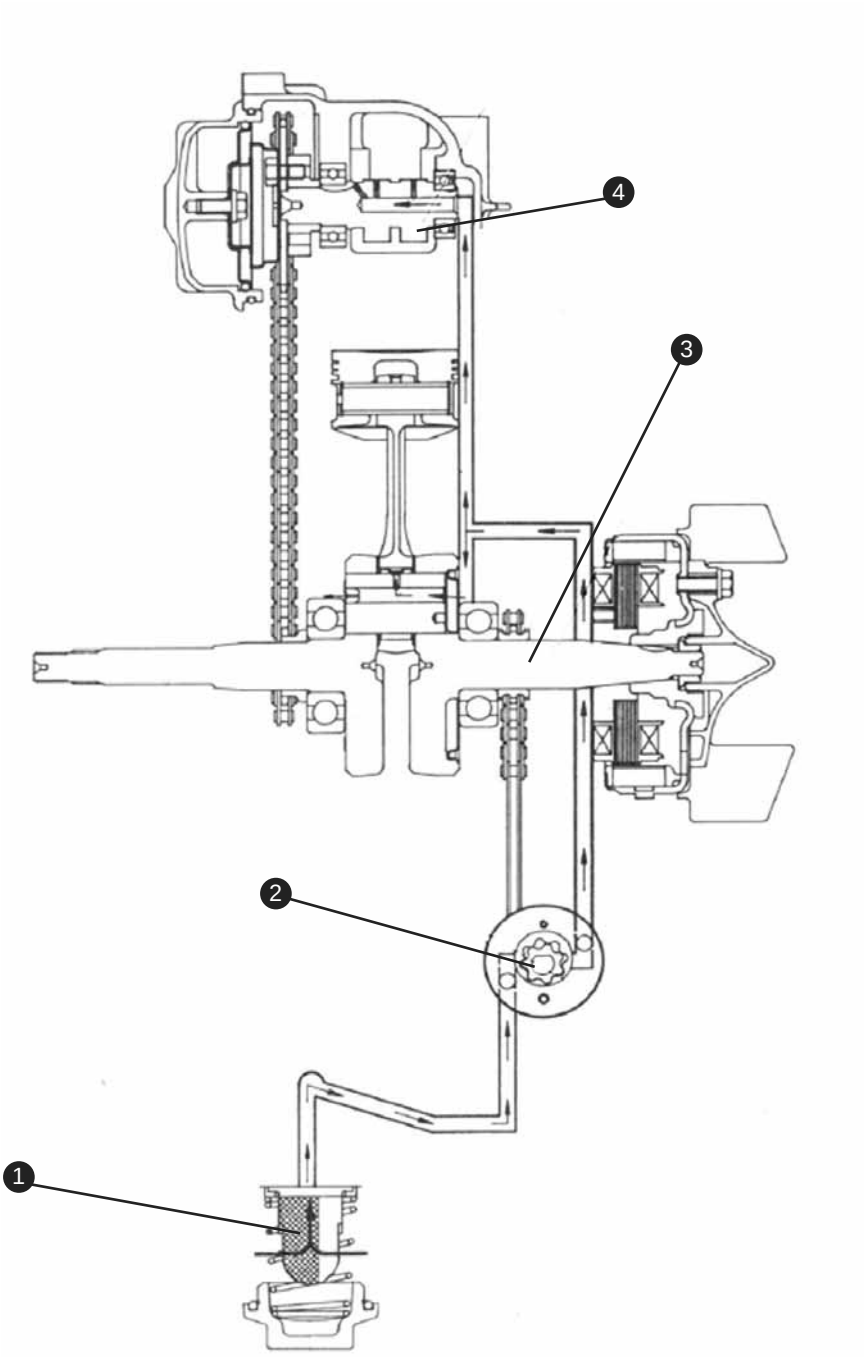
PART NO.	TORQUE
1	5-9 Nm

For screws that are not listed use standard values (page 10).

TROUBLESHOOTING - LUBRICATION

FAILURE	CAUSE	TO DO
Decrease of machine oil	Natural consumption of engine oil.	Consumption: ~ 1L/ 800km
	Engine oil leak.	Check the whole lubrication system for leaks.
	Wear and improper installation of the piston ring.	Check the piston rings as described.
Engine overheated or burnt out/ Seized piston	Absence of oil or oil pressure too low.	Check oil level, settings and tightness of the lubrication system.
	Air inside the lubrication system.	Bleed the lubrication system.
	Oil path blocked.	Check the whole lubrication system for leaks.
Excessive blue smoke or carbon deposits on spark plug	Excessive oil consumption.	Check the carburetor/ oil pump gaswire settings
	Poor quality oil.	Replace the oil to the recommended one. Consider when the vehicle is not often in use the oil should be replaced at least every year.

PART LOCATION - LUBRICATION SCHEME



PART LIST - LUBRICATION SCHEME

1. Oil strainer
2. Oil pump
3. Crankshaft
4. Camshaft

→ Oil flow direction

NOTE

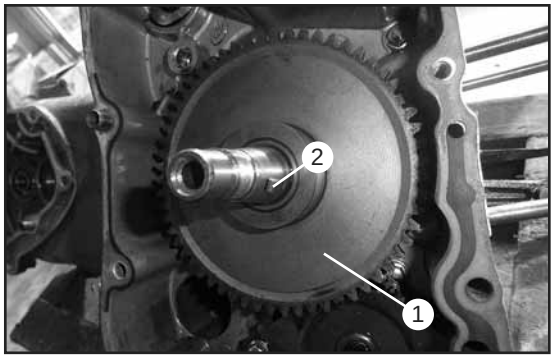
- After removing the oil pump, clean the parts up and below the surface with high pressure air.
- Don´t leave any foreign object into the crankcase during the operation.

STARTER INSTALLATION

1. Install the starter in reverse order.

See page: 58

IDLER GEAR INSTALLTION



1. Install the idler gear (1) in reverse order.

NOTE

Don´t forget the woodruff key (2) on the crankshaft.

STATER MOTOR PINION INSTALLATON

1. Install the starter motor pinion in reverse order.

See page: 57

MAGNETO ROTOR, STATOR AND IMPELLER WATER PUMP INSTALLATION

1. Install the parts in reverse order.

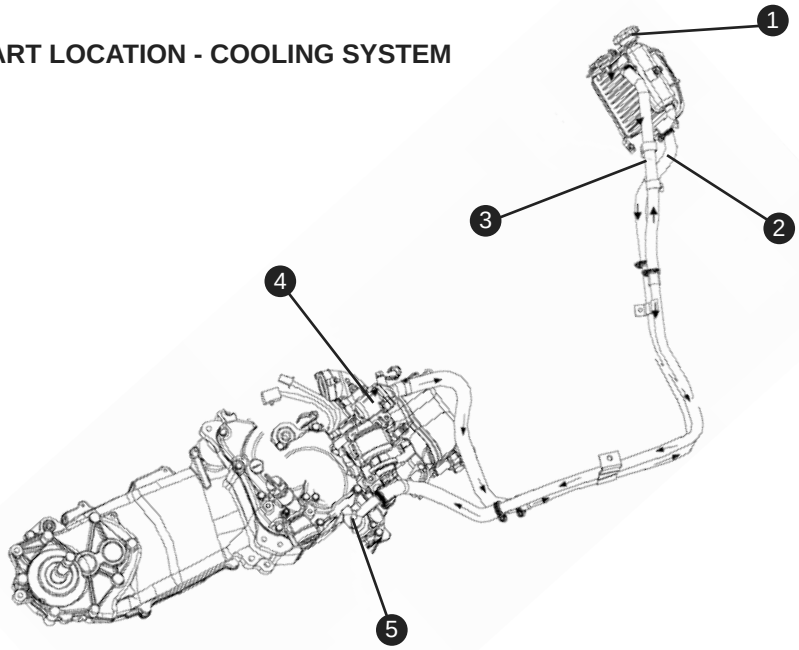
See page: 56

GENERATOR COVER AND WATER PUMP HOUSING INSTALLATION

1. Install the parts in reverse order.

See page: 55

PART LOCATION - COOLING SYSTEM



PART LIST - COOLING SYSTEM

1. Water inlet mouth
2. Water outlet pipe
3. Water inlet pipe
4. Water pump
5. Thermostat

→ Coolant direction

TRANSMISSION INSTALLATION

1. Controll the shafts and the gears if the work correct.
2. IF the shafts or gears are worn, replace it.
3. Install the transmission in reverse order.

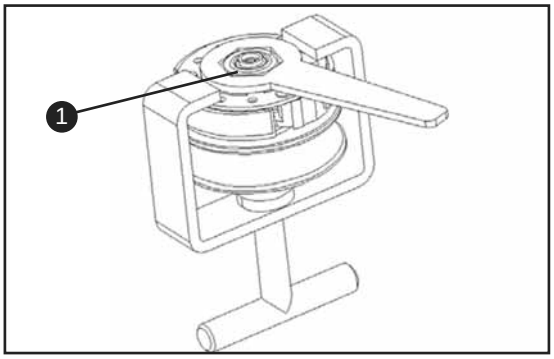
See page: 55

INSPECTION - VARIOMATIC

Item	Standard [mm]	Allowable limits [mm]
Inner diameter of right hemisphere of drive wheel	24.00-24.02	24.04
Outside slippery sleeve	23.967-23.98	23.98
Width of triangle belt	21.8-22.0	20.5
Thickness of clutch friction panel	1.5	1.5
Inner diameter of outside sleeve of clutch	125-125.2	125.5
Free length of clutch press spring	140	139
Outside diameter of right hemisphereshaft sleeve of drive gear	42.92-42.98	42.90
Inner diameter of right hemisphere shaft sleeve of drive gear	33.95-33.975	34.00
Outside diameter of rolling ball	20-20.2	19.5

CLUTCH DISMANTLING

1. Remove the fixing nut (1) nut by using an air impact wrench to remove the clutch.

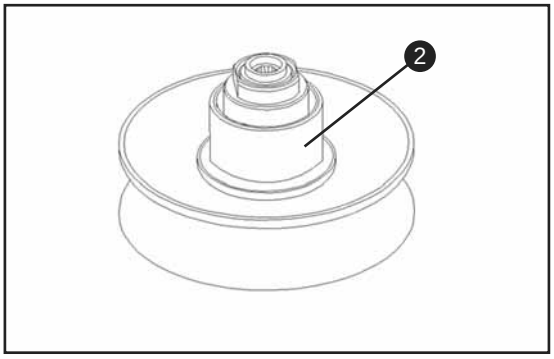


NOTE

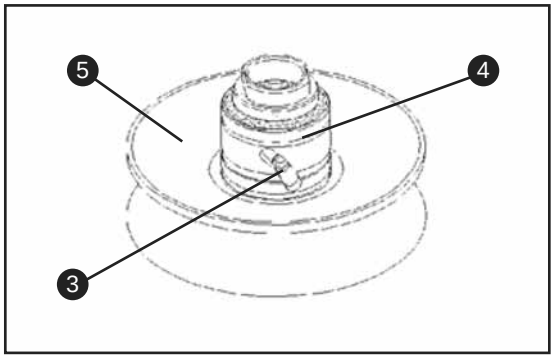
When dismantling the clutch be aware. Use a clutch spring compressor, a big gripper or your hands to compress the spring and ask somebody for help if necessary. The clutch spring is compressed all the time. Never open the fixing nut without compressing the clutch.

DRIVEN DISC DISMANTLING

1. Remove the spring.
2. Remove the spring holder (2).



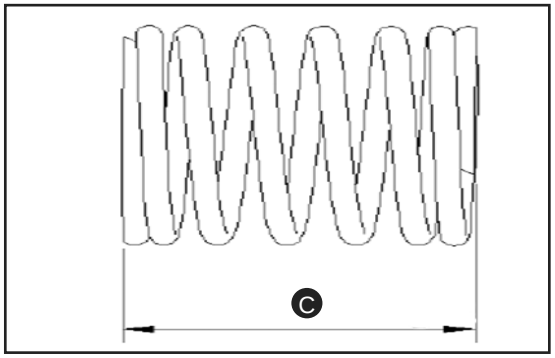
3. Dismantle the guide pin (3).
4. Take off the oil seal (4).
5. Take down the left driven wheel (5).



CLUTCH SPRING INSPECTION

1. Measure the free length (C) of the clutch spring.

Allowable limit (C): 140 mm



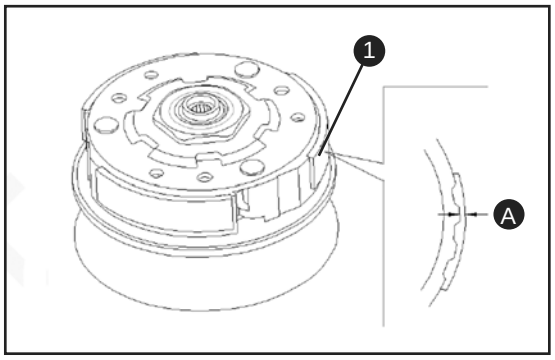
DRIVEN DISC ASSEMBLY

1. Assemble the driven disc in reverse order.

CLUTCH INSPECTION

1. Check abrasion of the friction panel of clutch (1).
2. Measure the thickness (A) of the friction pnael

Allowable limit (A): 1.5 mm



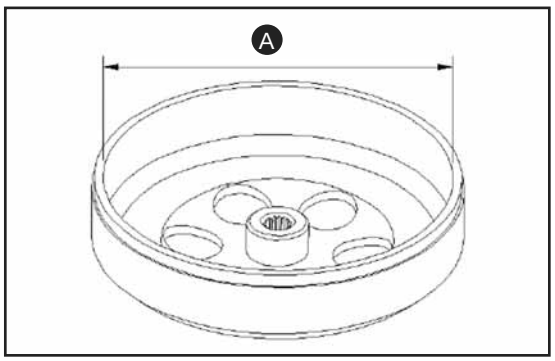
CLUTCH ASSEMBLY

1. Assemble in reverse order.

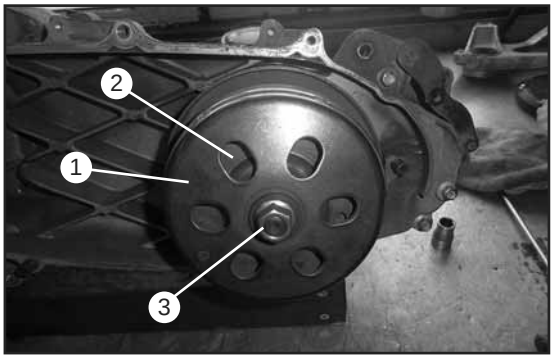
CLUTCH DRUM INSPECTION

1. Check abrasion of the outside sleeve of the clutch.
2. Measure the inner diameter (A) of the outside sleeve.

Allowable limit (A): 125.5 mm



CLUTCH DRUM AND CERTIFUGAL CLUTCH INSTALLATION

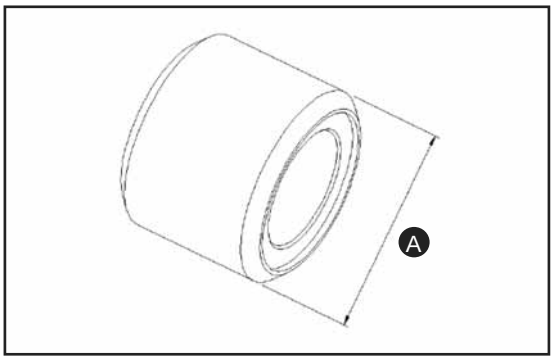


1. Install the clutch drum (1) and the certifugal clutch (2) in reverse order.
2. Tighten the nut (3).

NOTE

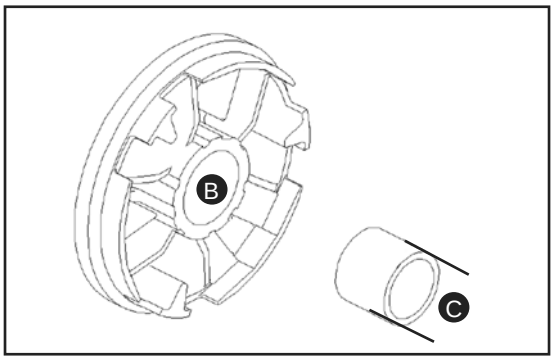
Stick in the nut (3).

VARIOMATIC DRIVE DISC INSPECTION



1. Measure the outside diameter (A) of the rolling balls.

Allowable limit (A): 19.5 mm



2. Measure the inner diameter (B) of the movable drive face.

Allowable limit (B): 24.04 mm

3. Measure the outside diameter (C) of the sleeve.

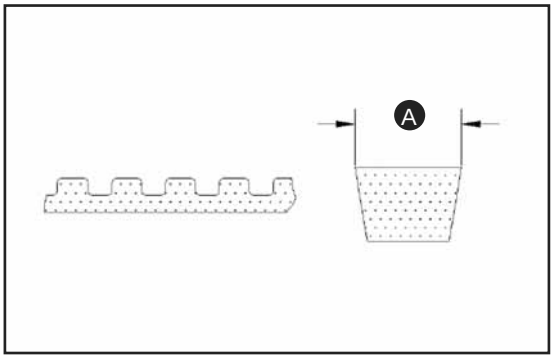
Allowable limit (C): 23.98 mm

VARIOMACTIC DRIVE DISC INSTALLATION

1. Install the variomatic drive disc in reverse order.

See page: 54

BELT INSPECTION



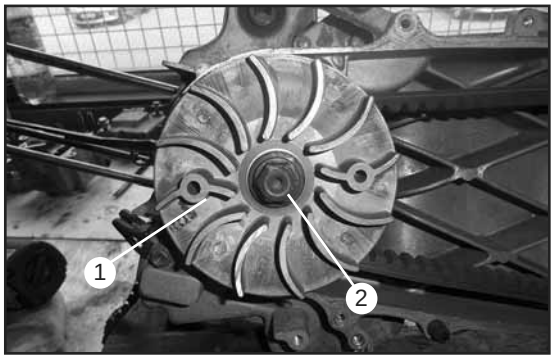
1. Check whether the belt is cracking and wether the rubber and cotton fall of or is abnormally abrased.
2. Check possible shedding or abnormal abrasion.
3. Measure the width (A) of the belt.

Allowable limit (A): 20.5 mm

BELT INSTALALTION

1. Thread the belt in the driven disc.
2. Pushing apart the driven disc and thread the beld above the drive disc shaft.

VARIOMATIC DISC WITH FAN INSTALLATION



1. Push up the disc with fan (1).
2. Tighten the nut (2).

NOTE

Stick in the nut (2).

VARIOMATIC COVER INSTALLATION

1. Install the variomatic cover in reverse order.

See page: 54

TROUBLESHOOTING - VARIOMATIC DISC/ CLUTCH

FAILURE	CAUSE	TO DO
The motor can not move after the engine is started	The triangle belt is worn out	Replace the belt
	The driven face is worn	Replace the driven face
	The clutch friction plate is worn	Replace the clutch friction plates
	The clutch spring plate is broken	Replace the clutch spring
The engine power is not suffciant	The triangle belt is worn out	Replace the belt
	The clutch spring is deformed	Replace the clutch spring
	Ball bearing worn out	Replace the bearings
	The surface of the driving pulley is stained	Replace the driven pulley
There is shaking in the movement	The friction-plate spring of clutch is broken out.	Replace the friction plate

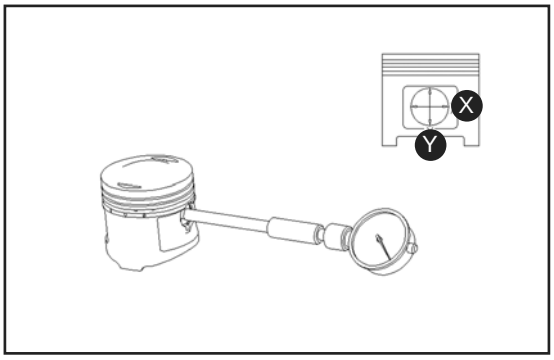
INSPECTION - CYLINDER AND PISTON

Item			Standard [mm]	Allowable limits [mm]
Cylinder	Inner Diameter		52.40-52.413	52.413
	Cylinder degree		0.004	0.004
	Roundness		0.005	0.005
	Flatness		0.05	0.05
Piston Piston ring Piston pin	Piston mark direction		“IN” properly opposite to the inlet valve	--
	Measuring points for piston outer diameter		52.36-52.37 (at the bottom of the piston skirt 7mm)	52.37
	Piston pin saddle orifice inner diameter		14.002-14.008	14.04
	Piston pin outer diameter		13.994-13.999	14.97
	Clearance between piston and cylinder		0.03-0.053	0.053
	Clearance between piston ring and ring groove	1st Ring	0.03-0.007	0.10
		2nd Ring	0.03-0.007	0.10
	Clearance between piston and piston pin	1st Ring	0.10-0.25	0.50
		2nd Ring	0.20-0.35	0.60
		Oil ring	0.1-0.6	--
	Clearance between piston and piston pin		0.003-0.014	0.03
	Narrow end diameter of connecting rod		14.010-14.018	14.04
	Clearance between connecting rod and piston rod		0.011-0.024	0.05

PISTON INSPECTION

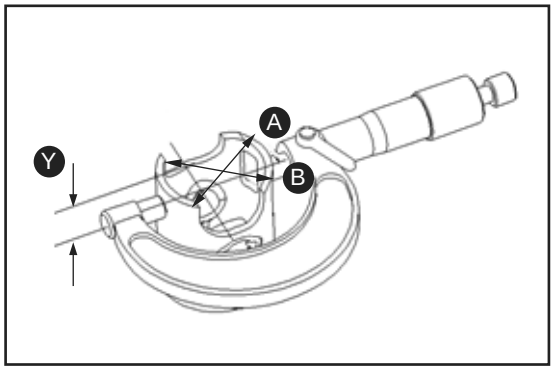
1. Measure the bore diameter of the piston pin hole. Measure both X and Y directions.

Allowable limit: 14.04 mm



2. Measure the outer diameter of the piston at two levels of A and B. Measure about **(Y) 11 mm** below the skirt of the piston.

Allowable limit (A,B): 52.37 mm

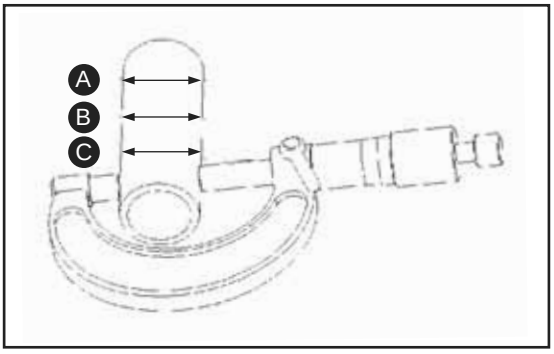


3. Measure the outer diameter of the piston pin at three levels of A, B and C.

Allowable limit (A,B,C): 13.97 mm.

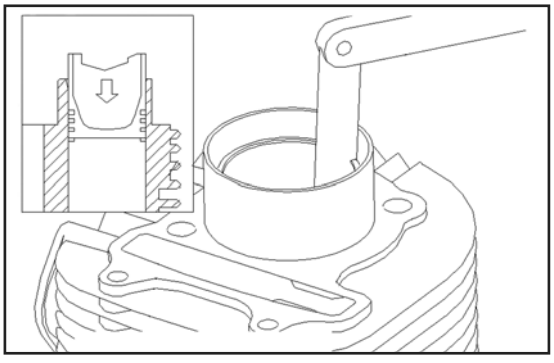
4. Measure the clearance of piston pin hole and piston pin.

Allowable limit: 0.03 mm.



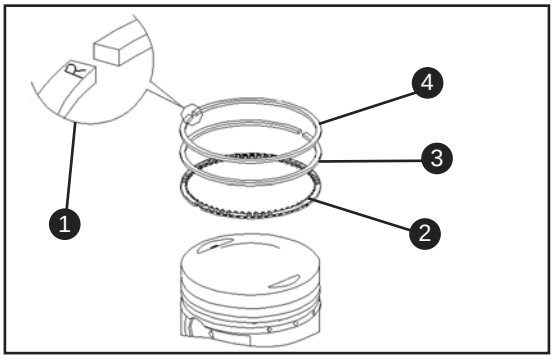
5. Take down the piston ring and install such rings on the bottom of the cylinder.
6. Push the piston ring into the cylinder by the piston head.
7. Measure the clearance of the closure of the piston ring.

Allowable limits: 0.5 mm

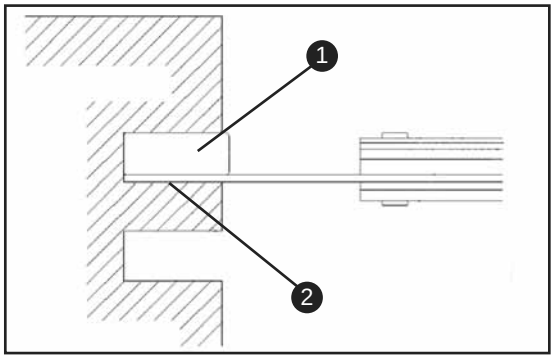


PISTON RING INSTALLATION

1. Put some oil on each piston ring and the piston.
2. Install piston ring to its place with marked (1) upward. Piston shall not be scratched and piston ring shall not be damaged. When the piston ring is installed, it should be able to rotate freely in the groove.
3. Follow this sequence:
   Bottom groove: Oil ring (2)
   Middle groove: Second ring (3)
   Top groove: Upper ring (4)

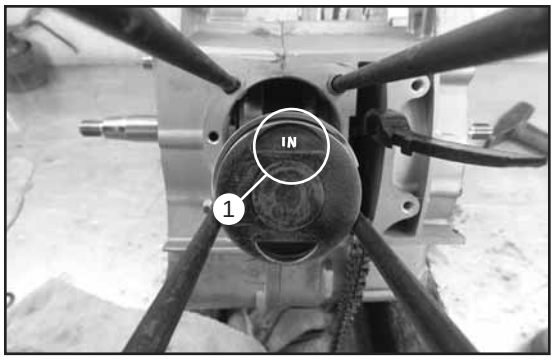


4. Measure the clearance between the piston ring (1) and the piston ring groove (2).



Allowable limits: Upper ring: 0.10 mm
Second ring: 0.10 mm

PISTON INSTALLATION

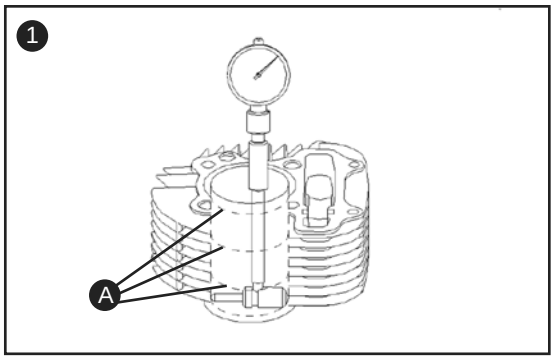


1. Install the “IN” mark (1) on the top of the piston toward the air intake.
2. Install the piston pin and the C-type piston pin clip.

NOTE

Don´t trop anything in the crankcase.
It is recommended to secure the crancase with a rag.

CYLINDER INSPECTION



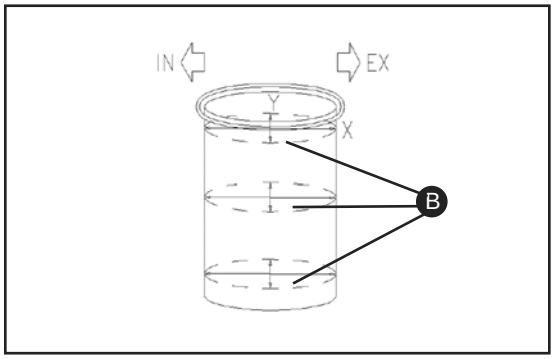
1. Check scratch and abrasion on the inner walls of the cylinder.
2. Measure the inner diameter of the cylinder from three positions (the upper, middle and bottom (A)) with the right angle against the piston pin as shown in picture (1).

Allowable limits(A): 52.413 mm

3. Measure the clearance between the cylinder and the piston and be subject to the maximum data.

Allowable limit: 0.053 mm

4. Measure the roundness of the inner walls of the cylinder (the diameter difference between the X and Y dimensions).



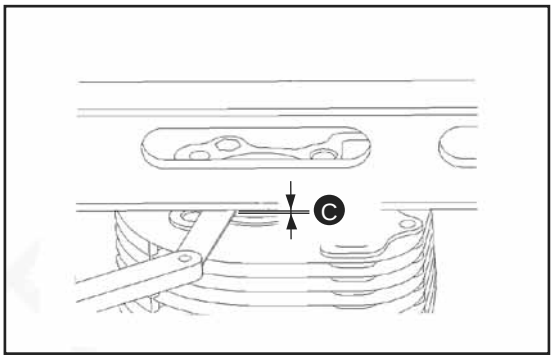
Allowable limits: 0.005 mm

5. Measure the cylinder degree of the inner walls of the cylinder (the diameter differences between the X and Y dimension on the upper, bottom and the middle positions(B).

Allowable limits (B): 0.004 mm

6. Check the flatness (C) of the cylinder surface.

Allowable limit (C): 0.05 mm



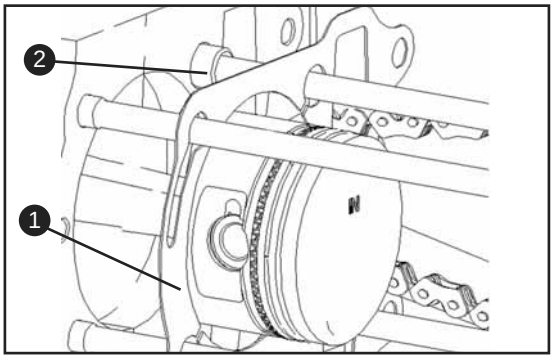
CYLINDER INSTALLATION

1. Controll that the timing chain ist installed correct on the crank-shaft, befor you install the cylinder.
2. Renew the gasket (1).
3. Install the cylinder in reverse order.

NOTE

Don´t forget the guid pins on the crankcases (2) and the cylinder.

4. Install the timing chain guid



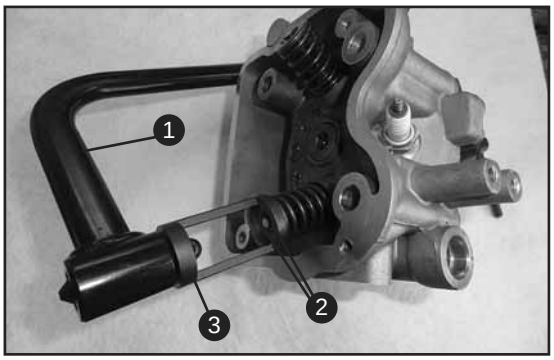
CYLINDER HEAD INSPECTION

AIR VALVE REMOVAL

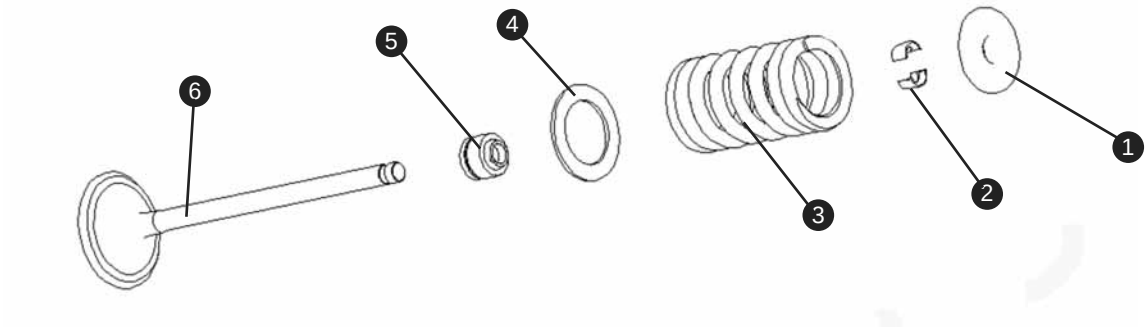
1. Press the air valve spring by special tool (1), and take down the air valve clip (2).

NOTE

Choose the right dimension of the valve spring attachment (3).



EXPLODED VIEW/ PART LOCATION - AIR VALVE



PART LIST - AIR VALVE

1. Spring plate
2. Air valve clip
3. Outside air valve spring
4. Washer
5. Air valve oil seal
6. Air valve

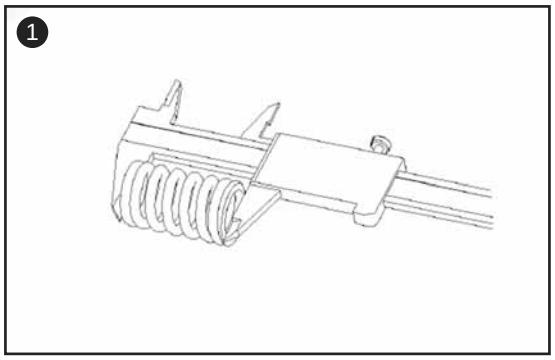
INSPECTION - CYLINDER HEAD

Item			Standards [mm]	Allowable limits [mm]
Air valve Valve guid	Air valve clearance	IN	0.10	0.12
		EX	0.13	0.14
	Inner diameter of valve guid	IN / EX	5.00-5.012	5.03
	Clearance between the valve pod and the valve guid	IN	0.010-0.035	0.08
		EX	0.030-0.05	0.10
	Retainer width	IN / EX	1.2	1.7
Air door spring	Free length	IN / EX	35.4	34.9
Rocker	Rocker orifice diameter	IN / EX	10.00-10.015	10.10
	Rocker shaft diameter	IN / EX	9.982-9.988	9.90
	Clearance between the rocker orifice and shaft	IN / EX	0.012-0.033	0.033
Camshaft	Camheight	IN	29.78	29.83
		EX	29.54	29.59

AIR VALVE INSPECTION

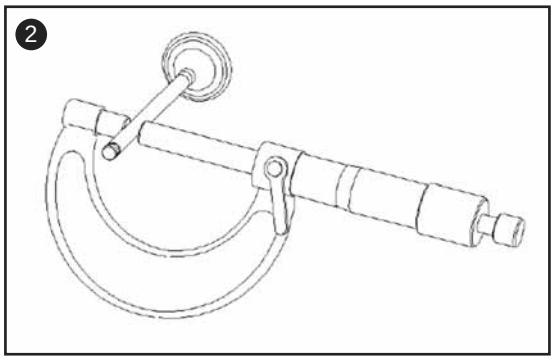
1. Measure the free lenght of air valve spring as shown in picture (1).

Allowable limit: 34.9 mm



2. Measure the outside diameter od the air valve pod as shown in picture (2).

Allowable limit: 4.95 mm

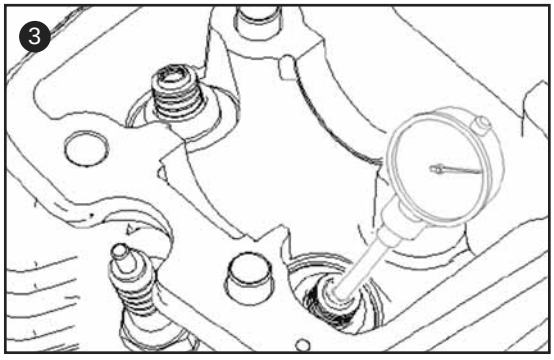


3. Measure the inner diamters of valve guids as shown in picture (3).

Allowable limit: IN/ EX: 5.03 mm

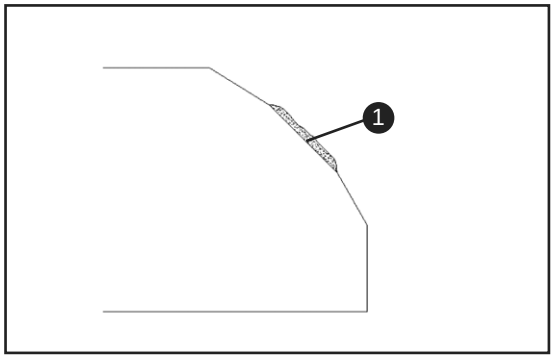
4. Measure the clearance of air valves and valve guid.

Allowable limit: IN: 0.08 mm
EX: 0.10 mm



AIR VALVE ADJUSTMENT

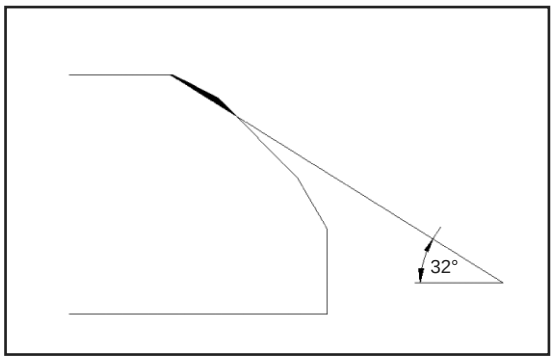
1. Remove ragged residues (1) on the valve race with a 45°angled milling cutter.



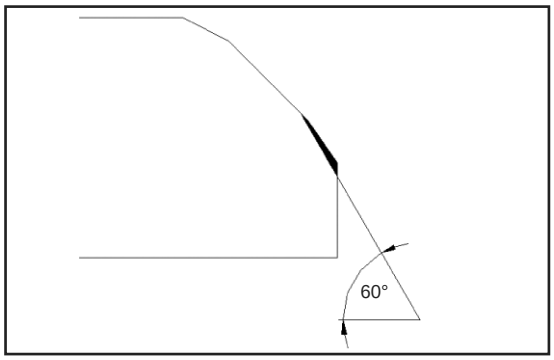
NOTE

Apply a layer of transparent or Prussian blue film onto the valve race so that it can be observed clearly.

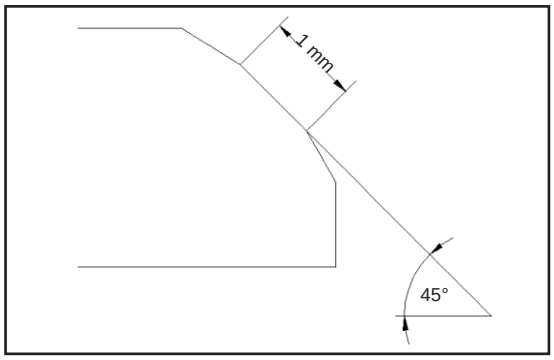
2. Remove 1/4 of external edge of valve race with a 32° angle milling cutter.



3. Remove 1/4 of bottom of valve race with a 60° angle milling cutter. Remove the milling cutter and check the places processed.



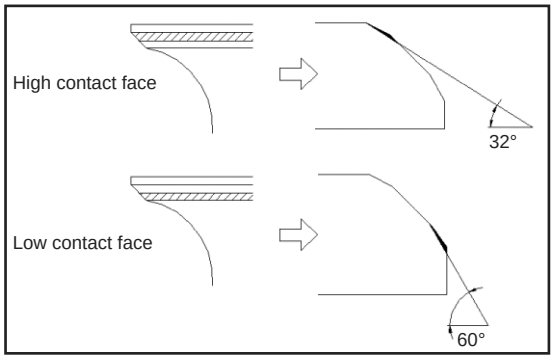
4. Grind and cut valve race with a 45°angle precise milling cutter till it gains a proper width. All the dents and ragged parts must be removed.



Standard valve race width: Intake: 1.0mm
Exhaust: 1.0mm

NOTE

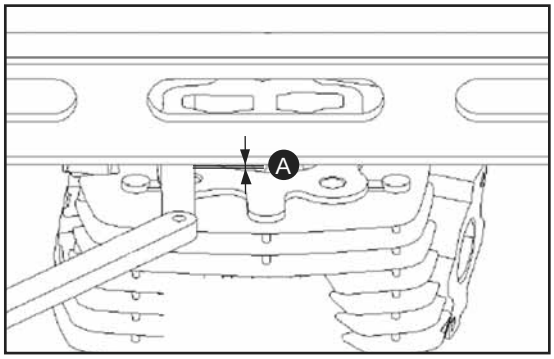
If contacted place is the higher part of valve, please use a 32°angle plain milling cutter to lower the valve race. If contacted place is the lower part of valve, please use a 60°angle internal milling cutter to raise the valve race.
Grind and cut valve race with a 45°angle precise milling cutter till it meets the required specification.
After completion of valve race grinding and cutting, please apply some polishing agent on the surface of valve. Polish valves with cylinder head before installing new one.



CYLINDER HEAD INSPECTION

1. Check the flatness (A) of the cylinder head connecting surface.

Allowable limit (A): 0.05 mm



AIR VALVE INSTALLATION

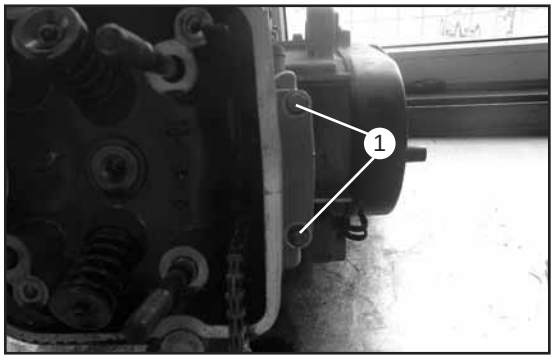
1. Install the air valve in reverse order.

CYLINDER HEAD INSTALLATION

1. Thread in the timing chain.
2. Renew the gasket.
3. Install the cylinder in reverse order.
4. Tighten the two screws. (1).

NOTE

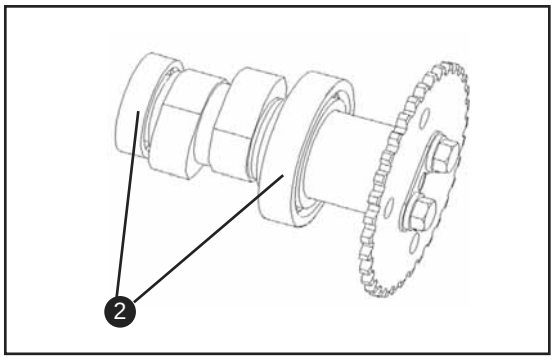
Don´t forget the guid pins.



CAMSHAFT INSPECTION

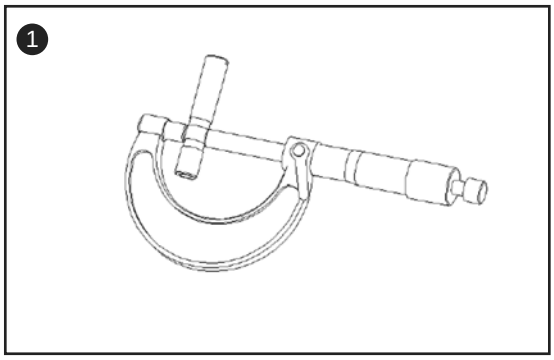
1. Check the outer circle of the bearing (1) for possible unstable or inflexible rotation, if so, replace it.
2. Check the inner circle of the bearing for possible loosen fixation of the camshaft, if so, replace it.
3. Measure the cam height and check its possible abrasion or damage.

Allowable limit (camshaft height): IN: 29.83 mm
EX: 29.59 mm

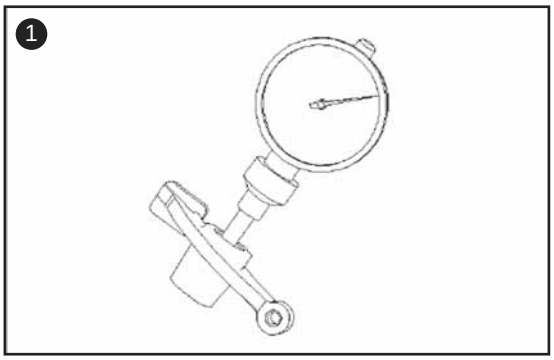


4. Measure the outside diameter of the rocker shaft as shown in picture (1).

Allowable limit: 9.90 mm



5. Measure the inner diameter of the rocker orifice as shown in the picture (1).



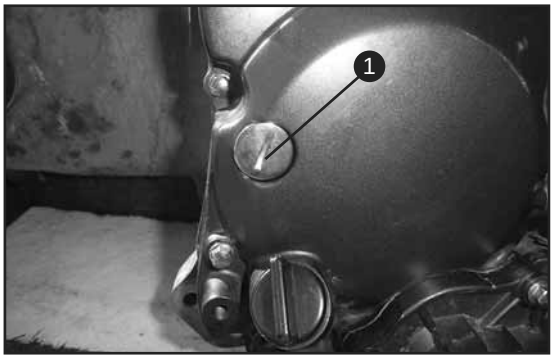
Allowable limit: 10.10 mm

6. Measure the clearance between the rocker shaft and the orifice.

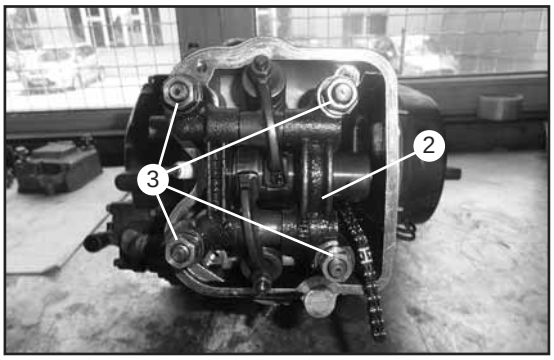
Allowable limit: 0.033 mm

VALVE TIMING ADJUSTMENT/ CAMSHAFT HOUSING INSTALLATION

1. Remove the screw (1) on the right engine side.



2. Install the camshaft housing (2) in reverse order.
3. Tighten the four nuts (3).



NOTE

Don´t forget the guid pins.

TORQUE LIST

PART NO.	TORQUE
3	28-32 Nm

For screws that are not listed use standard values (page 10).

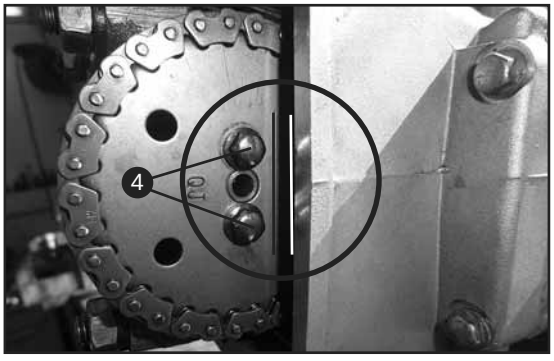
4. Turn the crankshaft so long till the T-mark an the notch in the cover are in line.

NOTE

Look that the timing chain does not drop into the crankcase.

NOTE

Before you tighten the camshaft sprocket, look to the marking line on the camshaft sprocket.
Taking care the marking line is parallel to the cylinder head surface as shown in the picture.
Note that the timing chain tensioning rail can tamper the adjustment.



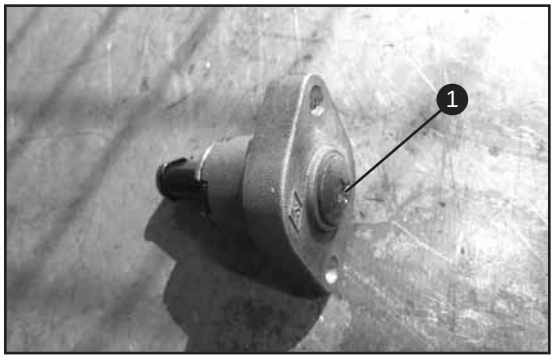
5. Tighten the two screws (4).

NOTE

Stick in the screws (4).

TIMING CHAIN TENSIONING RAIL INSTALLATION

1. Remove the screw (1).

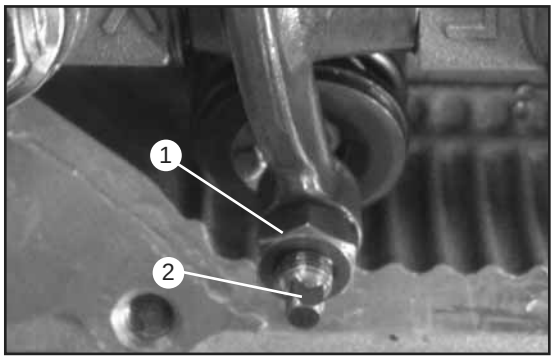


2. Screw the inner screw clockwise to tighten the stretcher.

3. Install the timing chain tensioning rail in reverse order.
4. Tighten the two screws (2).
5. To activate the tensioner, screw the inner screw to the left till the tensioner works alone.
6. Tighten the screw (1).

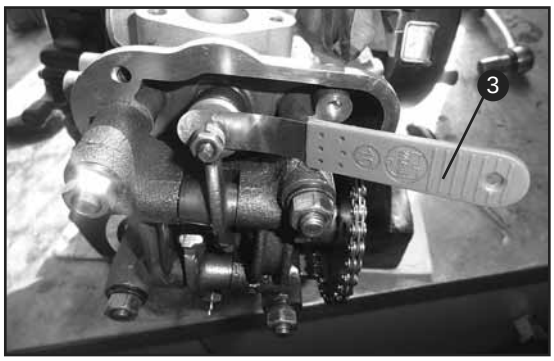
VALVE CLEARANCE ADJUSTMENT

1. Adjust the piston to firing TDC (T-marking line) as described on page 77.
2. To adjust the valve clearance loose the lock nut (1) and turn in or out the valve adjustment screw (2) for the requested clearance.



3. After the successfully settings keep the adjustment screw in position and fix the locknut.

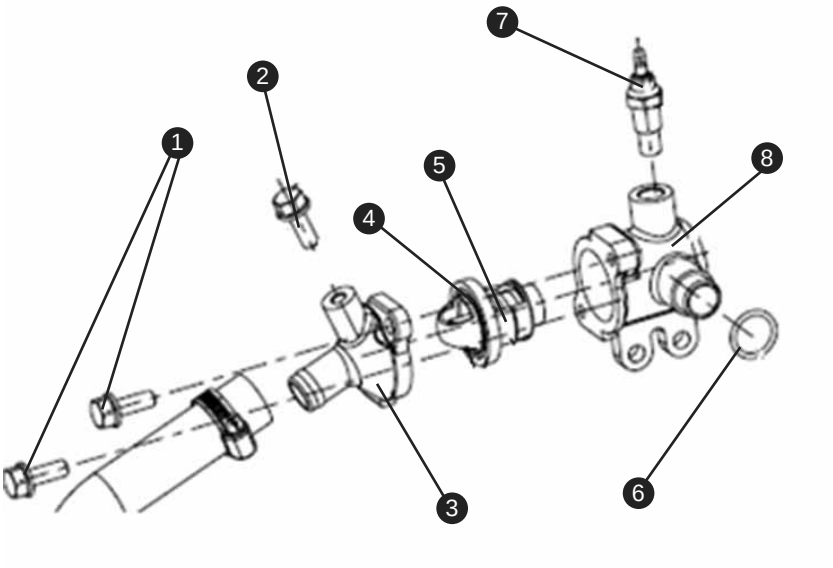
Allowable limit: IN: 0.10 mm
EX: 0.13 mm



NOTE

For an easier processing it´s recommended to use clearance gauges (3) as shown in the picture .

EXPLODED VIEW/ PART LOCATION - THERMOSTAT



PART LIST - THERMOSTAT

1. Screws
2. Bleed screw
3. Thermostat-room body
4. Sealing ring
5. Thermostat component
6. O-type ring
7. Sensor component
8. Upper cover of thermostate room

INSPECTION - THERMOSTAT

Initial startup temperature	72-84°C
Full-open temperature	93-96°C
Lift in full-open state	Over 4.27 mm

THERMOSTAT AND SECONDARY AIR SYSTEM INSTALLATION

1. Install the parts in reverse order.
2. Refill the coolant system.
3. Do not forget the cooler.
4. Remove the bleed screw (1) to bleed the system.
5. Refill the system. By refilling the cooler it can be possible that the cooler hose must be kink to fill the coolant.
6. Tighten the screw (1) and start the engine till the large circuit open.
7. Also refill the whole system, bleed it again and tighten the bleed screw (1).

⚠ WARNING

The coolant is very hot

ENIGNE INSTALLATION

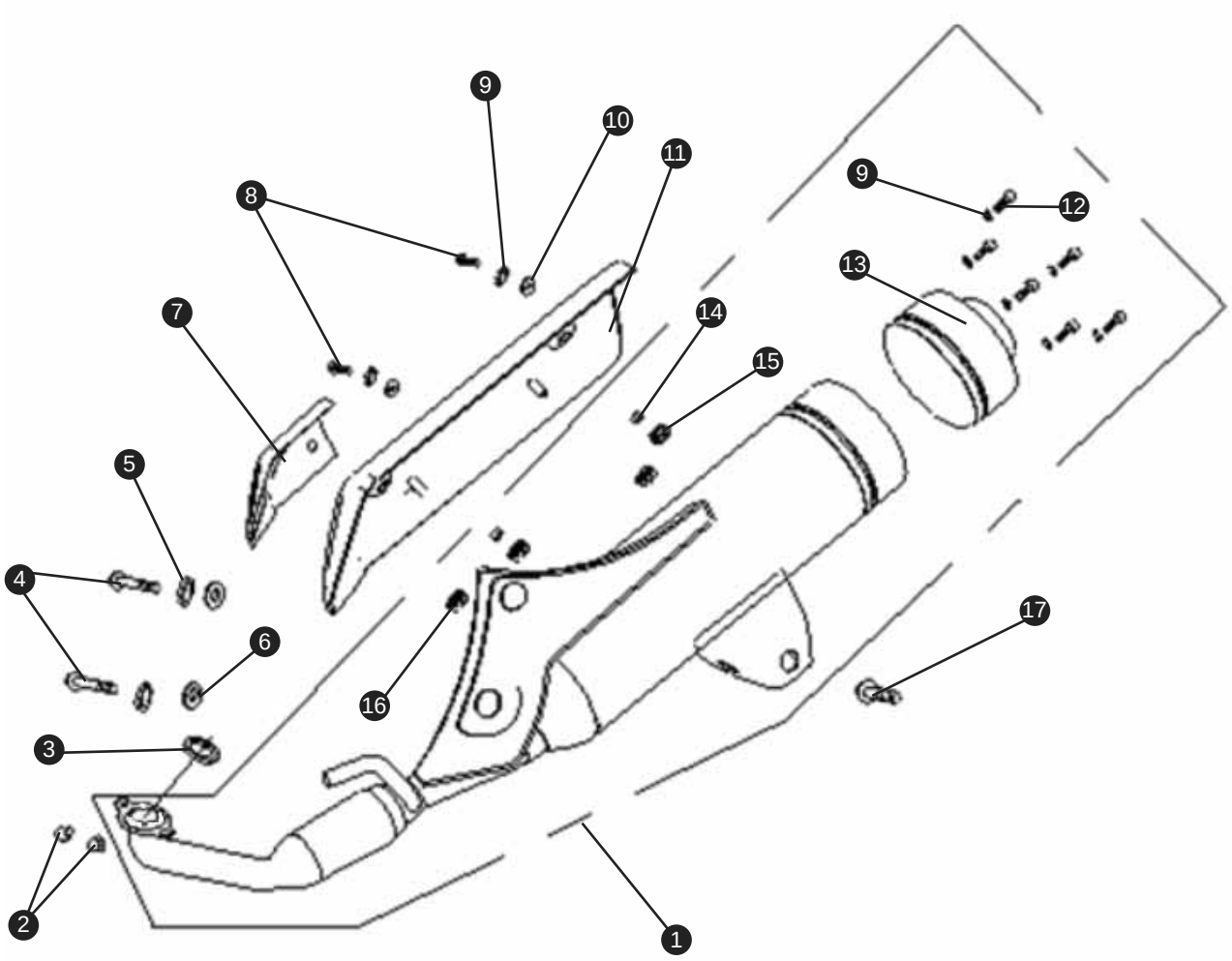
1. Install the engine in reverse order.
2. Refill the engine and the transmission oil -> see page 22-23

TORQUE LIST - ENGINE

Fastening area and fastener name	Tightening torque [Nm]
Cylinder cover nut	25-28
Oil-discharge bolt	22-25
Spark plug	10-15
Mould assembling bolt	10-12
Variable-speed chamber bolt	10-12
Motor fixing bolt	10-12
Oil pump fixed bolt	10-12
Oil pump chain wheel bolt	10-12
Lock nut of flywheel	50-60
Right-cover stud	10-12
Chain regulator fixed bolt	10-12

MUFFLER

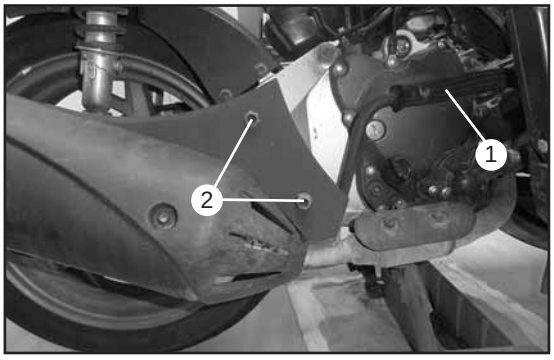
EXPLODED VIEW/ PART LOCATION - MUFFLER



PART LIST - MUFFLER

1. Exhaust system complete
2. Nut M7
3. Exhaust gasket
4. Screws M8x55
5. Washer
6. Washer
7. Heat insulating mat
8. Screw
9. Spring washer M6
10. Washer
11. Heat insulating mat
12. Screw M6x12
13. Exhaust box tail pipe covering
14. Collar
15. Rubber collar
16. Ruber washer
17. Screw M10x1.25x45

EXHAUST

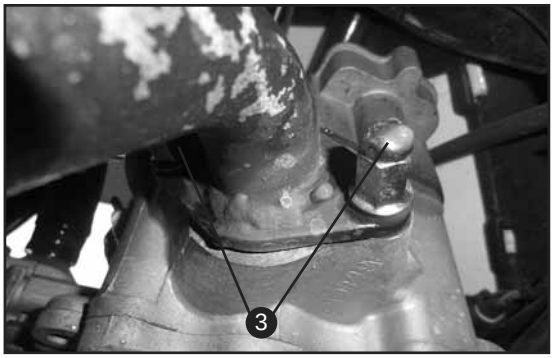


⚠ WARNING

Never remove the exhaust system as long it is hot. Let the system cool down before maintain it.

EXHAUST REMOVAL

1. Disconnect the hose (1) from the second air system.
2. Remove the exhaust muffler joint lock screws (2).



3. Remove the exhaust muffler lock nuts (3) to remove the exhaust muffler.
4. The installation sequence is the reverse of removal.

NOTE

Whenever you remove on the exhaust, check the exhaust gaskets and replace them if necessary.

ENSURE THE EMISSION STANDARDS AND PAY ATTENTION TO THE FOLLOWING MATTERS

1. Please use recommended unleaded gasoline only.
2. Please use machine oil of specified standard only.
3. Please maintain the motorcycle according to stipulations in the regular maintenance table.
4. As to exhaust control system, random adjustment or replacement (including use of spark plug, idle adjustment, ignition timing, carburettor adjustment) is strictly forbidden.
5. The disorder of ignition, charge and fuel system will have great impact on the catalyst device. The exhaust control system of the product conforms to state regulations, so make sure to use only genuine parts when replacing any part of the system.

CATALYTIC CONVERTER

The function of the converter catalyst is to convert HC, CO and NOX after incomplete combustion into innocuous gas such as H2O,CO2 and N2 then discharge them out. The converter contains rare metal like platinum and rhodium and only unleaded gasoline can be used.

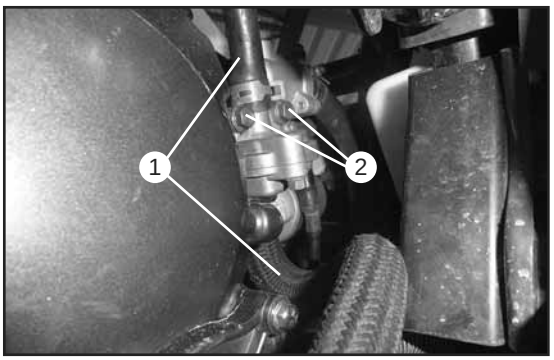
MUFFLER

SECOND AIR SYSTEM

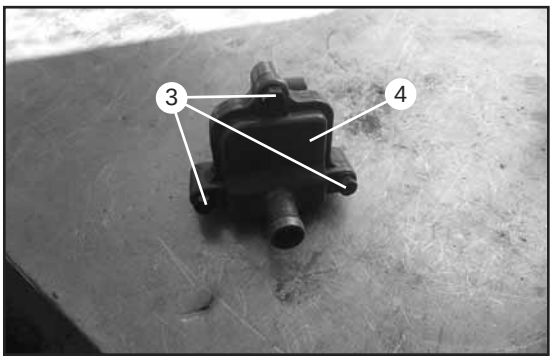
The function of the second air system is to achieve the emission standards. This is achieved by enrichment of the exhaust gases with fresh air. The second air system is controlled by a vacuum device. By automatic opening and closing of this membrane the air supply is regulated.

SECOND AIR SYSTEM INSPECTION

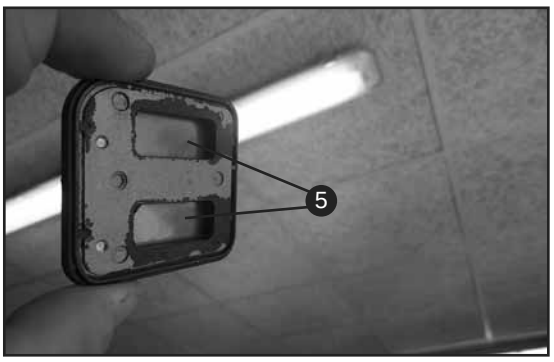
1. Disconnect the two hoses (1).
2. Remove the two screws (2).



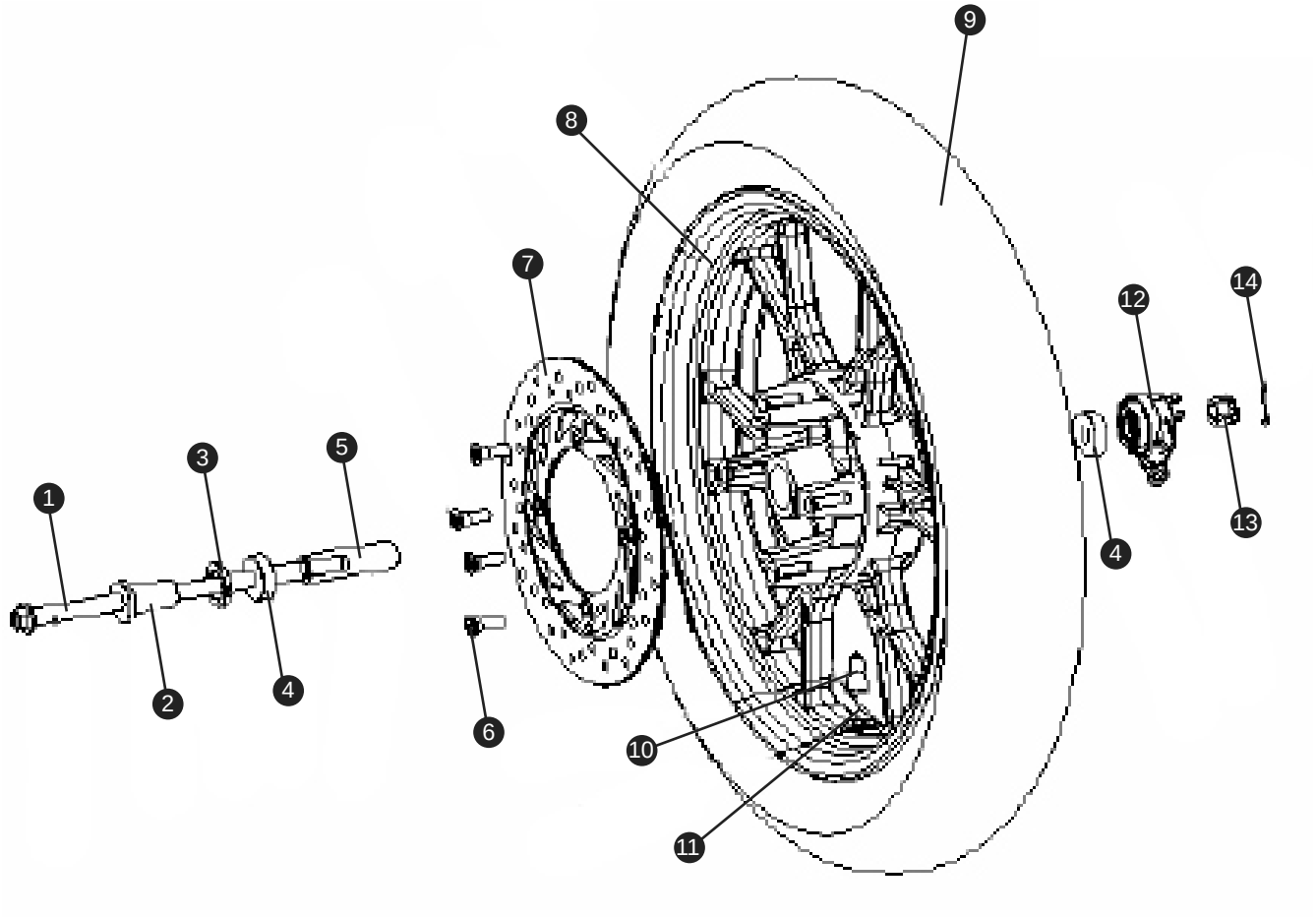
3. Remove the three screws (3) and the second air cover (4).



4. Controll the membrane (5).
5. If the membrane is broken or work wrong please replace the second air system.
6. Install the second air system in reverse order.



EXPLODED VIEW/ PART LOCATION - FRONT WHEEL



PART LIST - RIGHT CRANKCASE

1. Axle
2. Left collar
3. Oil seal
4. Bearing 6201
5. Middle collar
6. Brake disc bolts
7. Brake disc
8. Rim
9. Tire
10. Tire valve cap
11. Tire valve
12. Speedometer drive
13. Nut M12x1.25
14. Splint

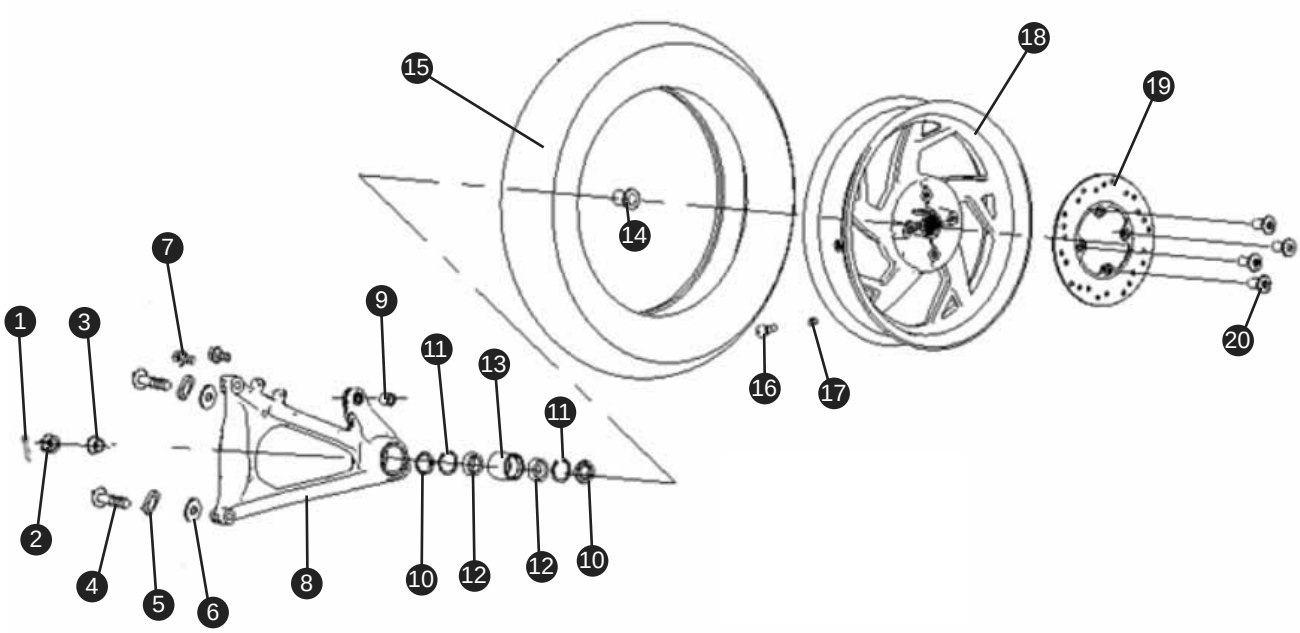
Torque list

Part No.	Torque
6	5-9 Nm
13	55-62 Nm

For screws that are not listed use standard values (page 10).

WHEELS AND TIRES

EXPLODED VIEW/ PARTS LOCATION - REAR WHEEL



PART LIST - RIGHT CRANKCASE

1. Splint
2. Nut M16x1.5
3. Bushing
4. Nut M10x55x1.25
5. Spring washer M10
6. Washer M10
7. Nut M6x12
8. Rear swing arm
9. Bushing
10. Oil seal 22x35x7
11. Washer
12. Bearing 6003
13. Bushing
14. Collar axle drive shaft
15. Tire
16. Tire valve cap
17. Tire valve
18. Rim
19. Brake disc
20. Brake disc bolts

Torque list

Part No.	Torque
2	100-113 Nm
4	37-44 Nm
20	5-9 Nm

For screws that are not listed use standard values (page 10).

SPECIFICATION - WHEELS

ITEM	DIMENSION	PRESSURE [BAR]	MINIMUM TREAD DEPTH
Front tire	120/70-15M/C	2.3 +/- 0.1	technically - 1,6 mm legal value may be different
Front rim	MT3.75x15		
Rear tire	140/60-14M/C	2.3 +/- 0.1	technically - 1,6 mm legal value may be different
Rear rim	MT3.75x14		

SPECIAL TOOLS

See page 11 - 14

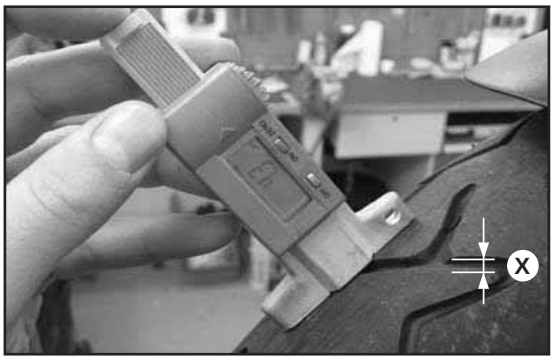
TROUBLESHOOTING - WHEELS

FAILURE	CAUSE	TO DO
It's hard to move the wheels	One wheel bearing is damaged	Replace the bearing
	The tire air pressure is to low	Adjust the air pressure
Wheel unbalanced	Rim damaged	Replace the rim
	Tire worn	Replace the tire or Balance the wheel
Abnormal or scratching noise	Wheel bearing loosened or worn	Replace the bearing
	Speedometer drive defect	Replace the speedometer drive

WHEELS (RIMS)

The wheel rims should be checked for cracks, bends. If any damage is found replace the rim. Do not attempt even the smallest repair of the wheel. The wheel should be balanced whenever either the tire or the rim has been changed or replaced. An unbalanced wheel can result in poor performance, adverse handling characters, and a shortened tire life.

TIRES

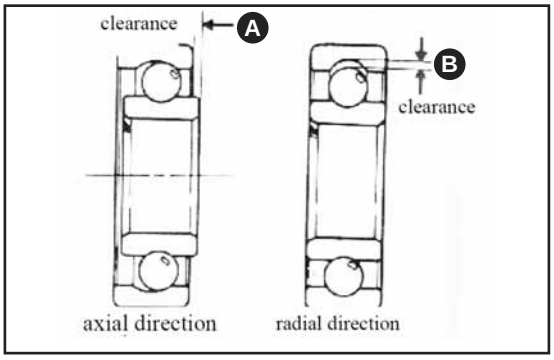


The tires must be checked during each workshop visit. If a tire tread shows crosswise lines (minimum tread depth), the tire has a fragments in it, the sidewall is cracked then replace the tire immediately. Operating the motorcycle with excessively worn tires will decrease the riding stability and can lead to loss of control. Please replace the excessive worn tires immediately.

NOTE

Allowable tread limit (X) : Technically - 1,6 mm
Legal value may be different!

WHEEL BEARING INSPECTION



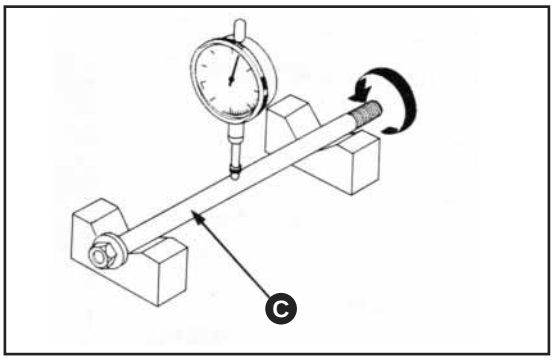
The wheels rotate with difficulties. The wheel-axle bearing or the gear seats are in failure. To find the error, the wheel must be removed.

1. Remove the front/ rear wheel.
2. Controll the bearings of the wheels.
3. Examine the rolling condition of the bearing.
4. If it doesn't roll, or the bearing is damaged or loosened, it should be replaced.

Allowable limit (A): 2 mm
Allowable limit (B): 2 mm

5. Reassemble in reverse order.

BENDING OF THE WHEEL SPINDLE INSPECT



1. Put the wheel axle on a V-shape seat and use dial indicator to measure its eccentricity.

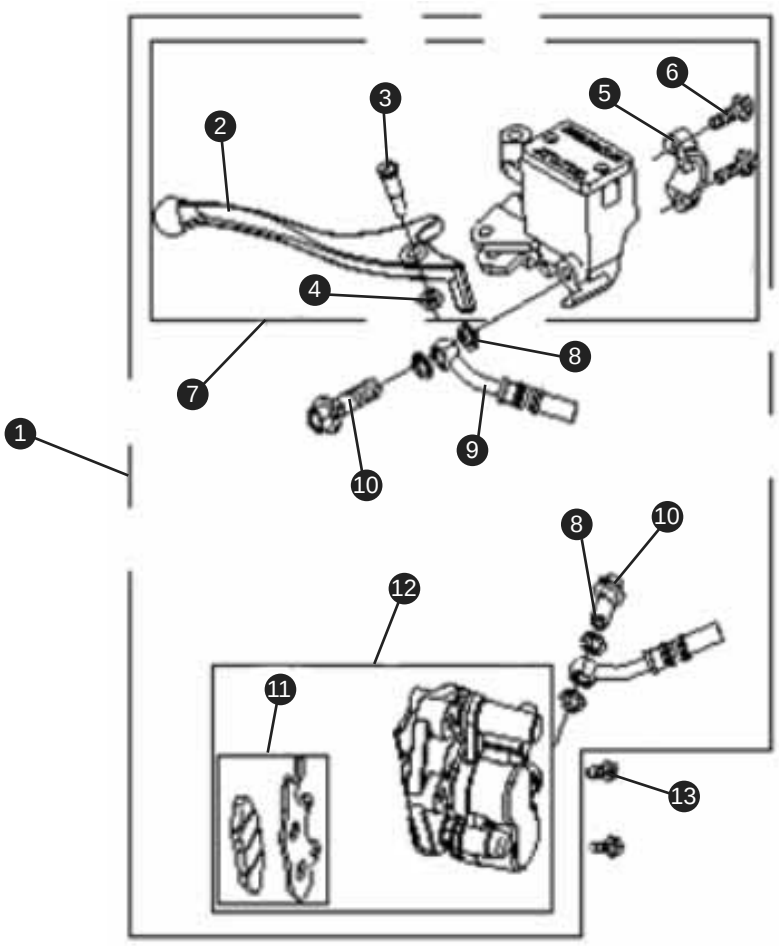
Allowable limit (C): 0.2 mm

BRAKES

EXPLODED VIEW/ PARTS LOCATION - FRONT BRAKE

⚠ WARNING

THE BRAKING COMPONENTS MAY NOT BE SPOIL BY OIL DURING INSTALLATION OR DISASSEMBLY.
RINSE WITH STIPULATED CLEANING AGENT IN ORDER TO AVOID REDUCTION OF BRAKING QUALITY.



PART LIST - FRONT BRAKE

1. Brake system
2. Brake lever
3. Screw M6
4. Nut M6
5. Bracket brake master cylinder
6. Screw M6x23
7. Brake master cylinder complete
8. Sealing washer
9. Front brake hose
10. Filling screw
11. Brake pads front
12. Brake caliper front
13. Screw M8x35

Torque list

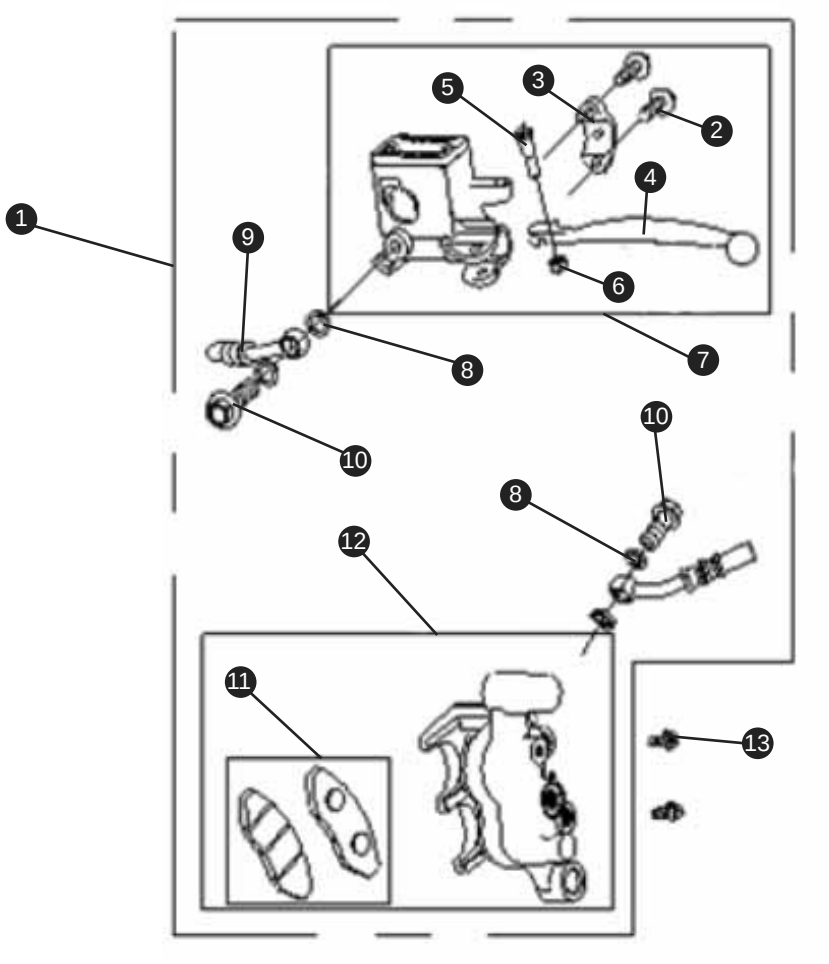
Part No.	Torque
3,4	5-9 Nm
6	5-9 Nm
10	30-35 Nm
13	22-29 Nm

For screws that are not listed use standard values (page 10).

EXPLODED VIEW/ PARTS LOCATION - REAR BRAKE

⚠ WARNING

THE BRAKING COMPONENTS MAY NOT BE SPOIL BY OIL DURING INSTALLATION OR DISASSEMBLY.
RINSE WITH STIPULATED CLEANING AGENT IN ORDER TO AVOID REDUCTION OF BRAKING QUALITY.



PART LIST - FRONT BRAKE

1. Brake system
2. Screw M6x23
3. Bracket brake master cylinder
4. Brake lever
5. Screw M6
6. Nut M6
7. Brake master cylinder complete
8. Sealing washer
9. Front brake hose
10. Filling screw
11. Brake pads rear
12. Brake caliper rear
13. Screw M8x42

Torque list

Part No.	Torque
2	5-9 Nm
5,6	5-9 Nm
10	30-35 Nm
13	22-29 Nm

For screws that are not listed use standard values (page 10).

BRAKES

SPECIAL TOOLS

See page 11 - 14.

TROUBLESHOOTING - BRAKES

FAILURE	CAUSE	TO DO
Poor brake performance	Unfavourable brake adjustment	Adjust the brake system
	Brake pads worn	Replace the brake pads
	Brake pads installed improperly	Install the brake pads proper
	Brake pads or brake disc contaminated	Clean or replace the brake pads and clean the brake disc/ drum
	Air in the front brake hose	Bleed the brake hose
	Gasket(s) leaky	Replace affected gasket
Strange sound during braking	Brake pads glazed	Replace the brake pads
	Burrs	Grind away burr
	Brake pads or brake disc contaminated	Clean or replace the brake pads and clean the brake disc/ drum
Pulsing during braking	Brake disc worn	Replace brake disc
	Brake drum worn	Repalce the rear rim

BRAKE LEVERS

The front brake lever is located on the right side of the handlebar.
The rear brake lever is located on the left side of the handlebar.

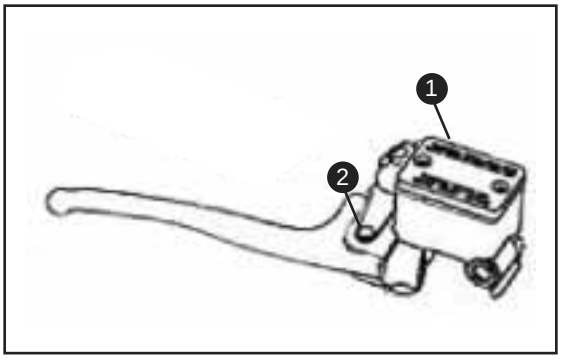
NOTE

This levers operated by hydraulic. It is not possible to adjust the free-play of the front/ rear lever. When the brake lever feels spongy or the brake performance is poor the brake system have to be bleeded.
See page 28 and 29.

FRONT/REAR BRAKE LEVER/ MASTER BRAKE CYLINDER REPLACEMENT

When the performance of the brake is poor it could be possible that the plunger module gaskets are defect.

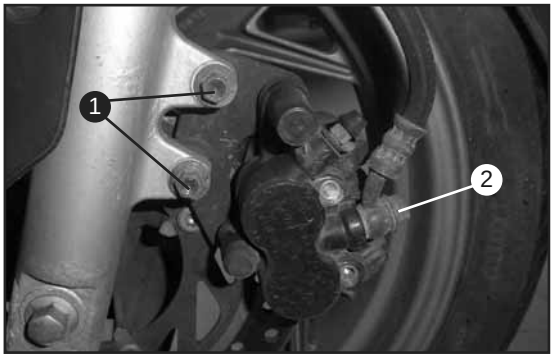
1. Remove the handlebar covers.
2. Drain the brake fluid from the hydraulic brake system.
3. Remove the two bolts attaching the brake master cylinder (1).
4. Remove the brake master cylinder.
5. Remove the brake lever bolt (2) and the brake lever.
6. Replace defect parts and assemble in reversed order.
7. Refill the brake system.
8. Bleed the brake system.



NOTE

The plunger module is not available separately.

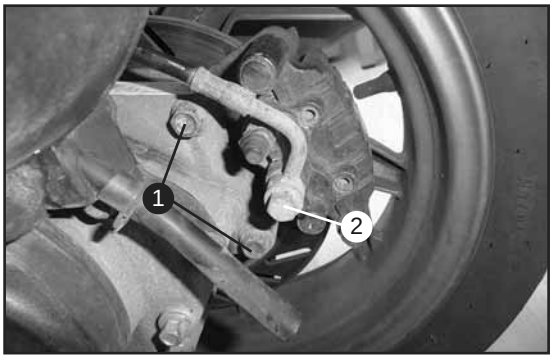
FRONT BRAKE CALLIPER REPLACEMENT



When the performance of the front brake is poor it could be possible that the gaskets of the front brake calliper defect or the brake pads are worn.

1. Drain the brake fluid from the hydraulic brake system.
2. Remove the banjo bolt (1) from the master brake cylinder.
3. Remove the two bolts (2) attaching the brake calliper.
4. Replace the brake calliper.
5. Reassemble in reverse order.
6. Refill the brake system.
7. Bleed the brake system.

REAR BRAKE CALLIPER REPLACEMENT



When the performance of the rear brake is poor it could be possible that the gaskets of the rear brake calliper defect or the brake pads are worn.

1. Drain the brake fluid from the hydraulic brake system.
2. Remove the banjo bolt (1) from the master brake cylinder.
3. Remove the two bolts (2) attaching the brake calliper.
4. Replace the brake calliper.
5. Reassemble in reverse order.
6. Refill the brake system.
7. Bleed the brake system.

FRONT/ REAR BRAKE PAD WEAR INSPECTION/ REPLACEMENT

Reduced braking efficiency caused by worn brake pads.
Change worn brake pads immediately. Always replace the brake pads in pair.

Front: See page: 25
Rear: See page: 26

FRONT/ REAR BRAKE DISC INSPECTION

Check the thickness of the front disc (1) at several places on the disc to see if it confirms to measurement.

See page: 27

WHEELS AND TIRES

BRAKE FLUID

⚠ WARNING

1. Never use dirty or unspecified brake fluid or mix different brake fluids because it will damage the brake system.
2. Brake fluid spilled on brake pads or brake disc will reduce the braking effect. Clean the brake pads and brake disc with a high quality brake degreaser.
3. When servicing the brake system, use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.
4. Do not allow dust or water to enter the brake system during refilling.
5. Brake fluid should be replaced at least every 2 years.

SPECIFICATION - BRAKE FLUID

Brake fluid type	CASTROL SUPER DISC BRAKE FLUID DOT 4
Brake fluid boiling temperature	> 170° C
Brake fluid water content	< 3 %

BRAKE HOSE

1. When the brake hose is leaking, cracked or worn you must replace it.

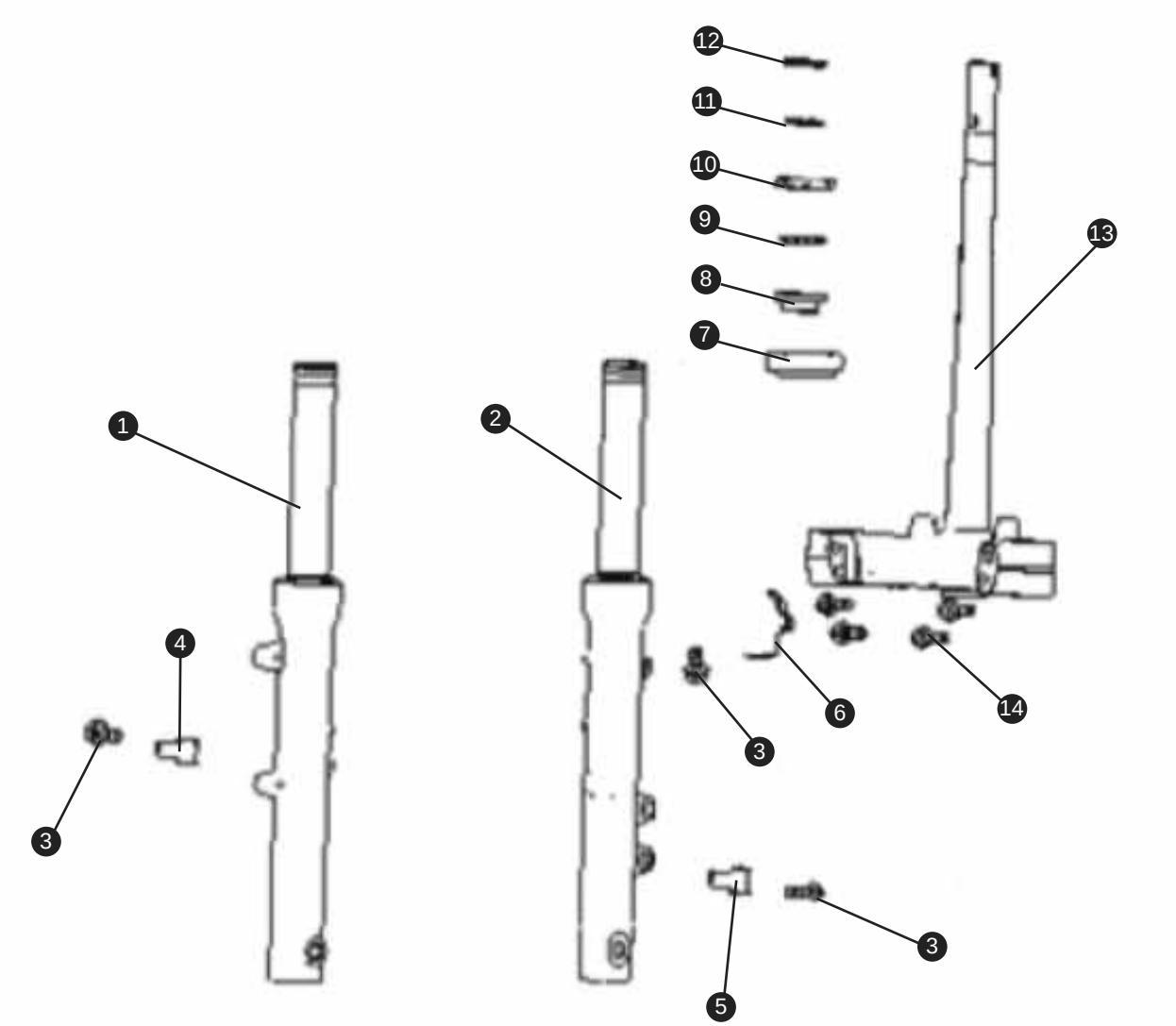
NOTE

Please consider that there is no need to remove the brake calliper when you need to replace the brake hose.

2. When the brake hose need to be replaced use only genuine parts.
3. For brake hose replacement:

Front: see page 28
Rear: see page 29

EXPLODED VIEW/ PARTS LOCATION - FRONT SUSPENSION



PART LIST - FRONT SUSPENSION

1. Shock absorber front right
2. Shock absorber front left
3. Screws M6x12
4. Bracket speedometer cable
5. Bracket brake hose
6. Bracket brake hose
7. Bearing
8. Bearing race lower
9. Ball bearing set
10. Bearing race upper (Adjustment nut)
11. Locking plate
12. Nut
13. Front fork with steering stem
14. Screw M8x45

Torque list

Part No.	Torque
14	22-29 Nm

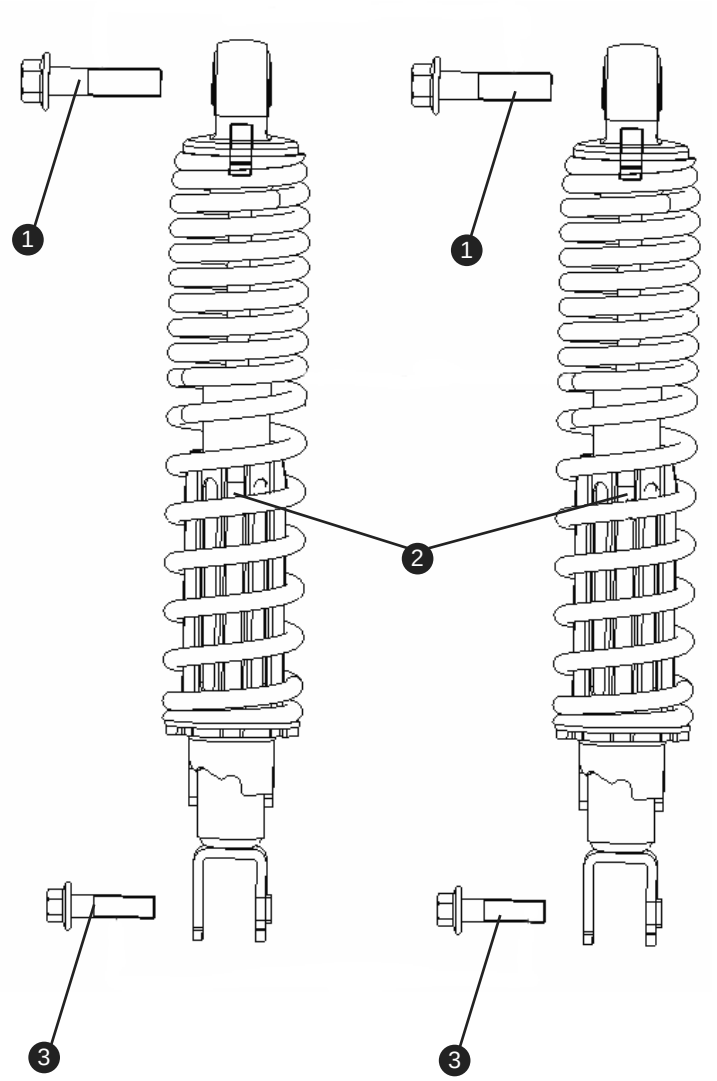
For screws that are not listed use standard values (page 10).

SPECIFICATION - BEARING SUSPENSION

Part No.	DESCRIPTION	VALUE
9	Steel balls Ø 4mm	25 pieces
7	Bearing	32007E

SUSPENSION

REAR SUSPENSION



PART LIST - REAR SUSPENSION

1. Screw M10x1.25x40
2. Shock absorber rear
3. Screw M8x30

Torque list

Part No.	Torque
1	37-44 Nm
3	22-29 Nm

For screws that are not listed use standard values (page 10).

SPECIAL TOOLS

There are no special tools recommended because defect suspension elements may not be dissembled. Always´s replace defect suspension elements.

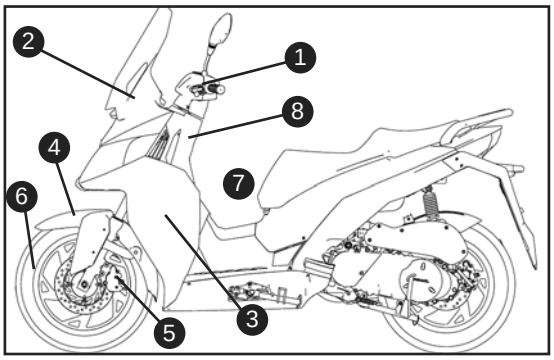
TROUBLESHOOTING - SUSPENSION

FAILURE	CAUSE	TO DO
Vehicle difficult to steer	Insufficient tire pressure	Adjust the tire pressure
	Broken or bent fork leg	Replace the affected fork leg
	Uneven front shock absorbers	Control and adjust or replace affected fork leg
Soft front shock absorber	Weak shock spring	Replace the affected fork leg
	Insufficient damper oil	Replace the affected fork leg
Front shock absorber noise	Broken or bent fork leg	Replace the affected fork leg
	Loose fork fasteners	Tighten the fasteners
	Lack of lubrication	Replace the affected fork leg
Leaking fork leg	Gasket defect	Replace the affected fork leg
Weak rear shock absorber spring	Spring worn or broken	Replace the rear shock absorber
Leaking rear shock absorber	Gasket defect	Replace the rear shock absorber

NOTE

Before each repair of a defect suspension element consider the max. cross weight of the vehicle.

FRONT SUSPENSION REPLACEMENT



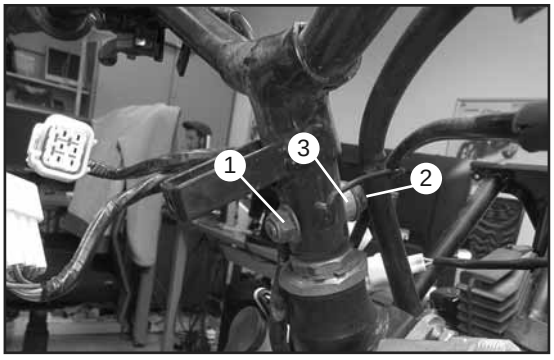
1. Place an appropriate supporting stand under the vehicle in order to raise the front wheel up.
2. Remove the front/rear handlebar cover (1), the windshield (2), the front sidecovers (3), the front fender (4), the front brake caliper (5), the front wheel (6), the middle cover (7) and the leg protection (8).

3.

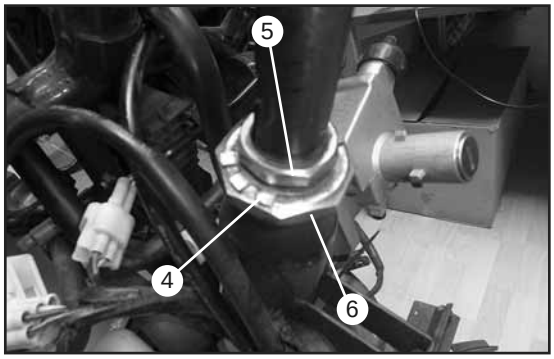
NOTE

- When you replace the front brake calliper you must release the brake hose from the triple tree but it is not recommended to disconnect the brake hose from the front brake calliper or the master brake cylinder.

4. Remove the nut (1) and the bolt (2) with the collar (3).
5. Lift the handlebar up and away.



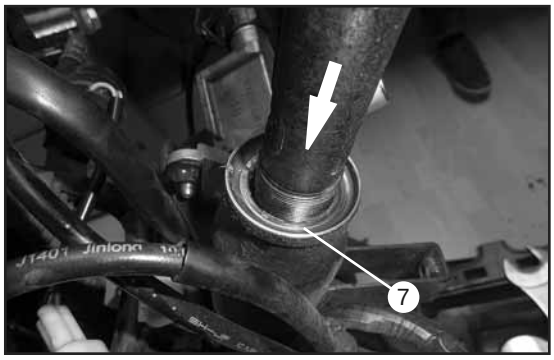
6. Open the secure washer (4) to remove the nut (5) and the upper bearing race - adjustment nut (6).
7. Remove the steel-balls.



⚠ WARNING

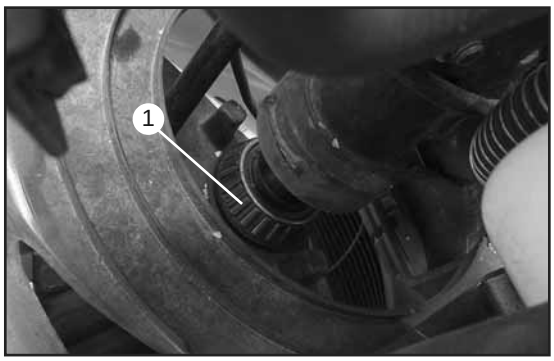
Be careful not to lose the steel-balls .

8. To remove the front suspension pull the suspension down (arrow).



SUSPENSION - BEARING INSPECTION/ INSTALLATION

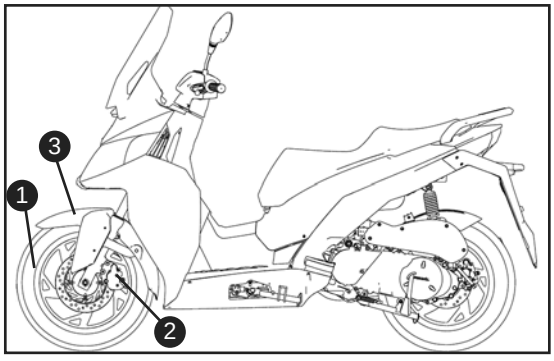
1. Controll if the lower bearing (1) is lubricate.



2. Clean the lower bearing race (7) in the picture above.
3. Afterwards put multi-purpose grease on the lower bearing race and position the 25 steel-balls as shown in the picture (1).
4. Adjust the suspension with the upper bearing race - adjustment nut.
5. Reassemble in reverse order.

FRONT SUSPENSION FORK LEG REPLACEMENT

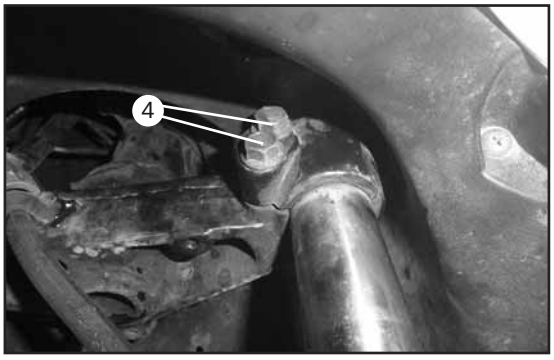
1. Place an appropriate supporting stand under the vehicle in order to raise the front wheel up.
2. Remove the front wheel (1), the front brake caliper (2) and the front fender (3).



NOTE

- When you replace the front brake calliper you must release the brake hose from the triple tree but it is not recommended to disconnect the brake hose from the front brake calliper or the master brake cylinder.

3. Remove the two screws (1).

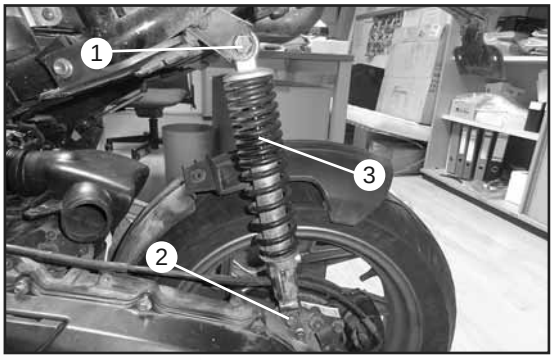


NOTE

Only one side (left side) is illustrated.

REAR SUSPENSION REPLACEMENT

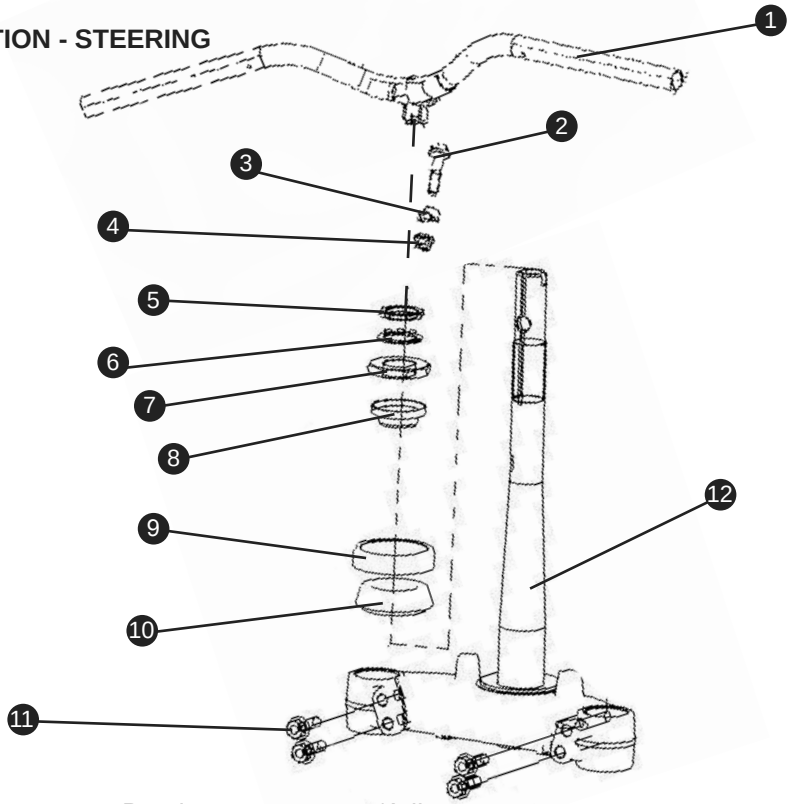
1. Place an appropriate supporting stand under the engine in order to raise the rear wheel up.
2. Remove the air filter box.
3. Remove the Upper bolt M8×1.25×40 (1) and the lower bolt M8×30 (2).
4. Pull out the rear shock absorber (3).
5. Reassemble in reverse order.



NOTE

The rear shock absorber is spring loaded. The spring preload can be not adjusted.

EXPLODED VIEW/ PART LOCATION - STEERING



PART LIST - STEERING

1. Handlebar
2. Screw M10x55x1,25
3. Collar
4. Nut M10
5. Nut
6. Locking plate - secure washer
7. Bearing race upper (Adjustment nut)
8. Bearing race lower
9. Bearing race
10. Bearing
11. Screw 4 pcs
12. Front fork with steering stem

Torque list

Part No.	Torque
2, 4	30-40 Nm
11	37-44 Nm

For screws that are not listed use standard values (page 10).

SUSPENSION

TROUBLESHOOTING - STEERING

FAILURE	CAUSE	TO DO
Vehicle difficult to steer	Steering bearing loose	Retighten the bearing
	Steering bearing worn	Replace the steering components
	Bearing balls lost or broken	Replace the steering components

More troubleshooting see on page 82.

STEERING REPLACEMENT

1. Follow the points of front suspension replacement.
2. Remove the suspension forks.

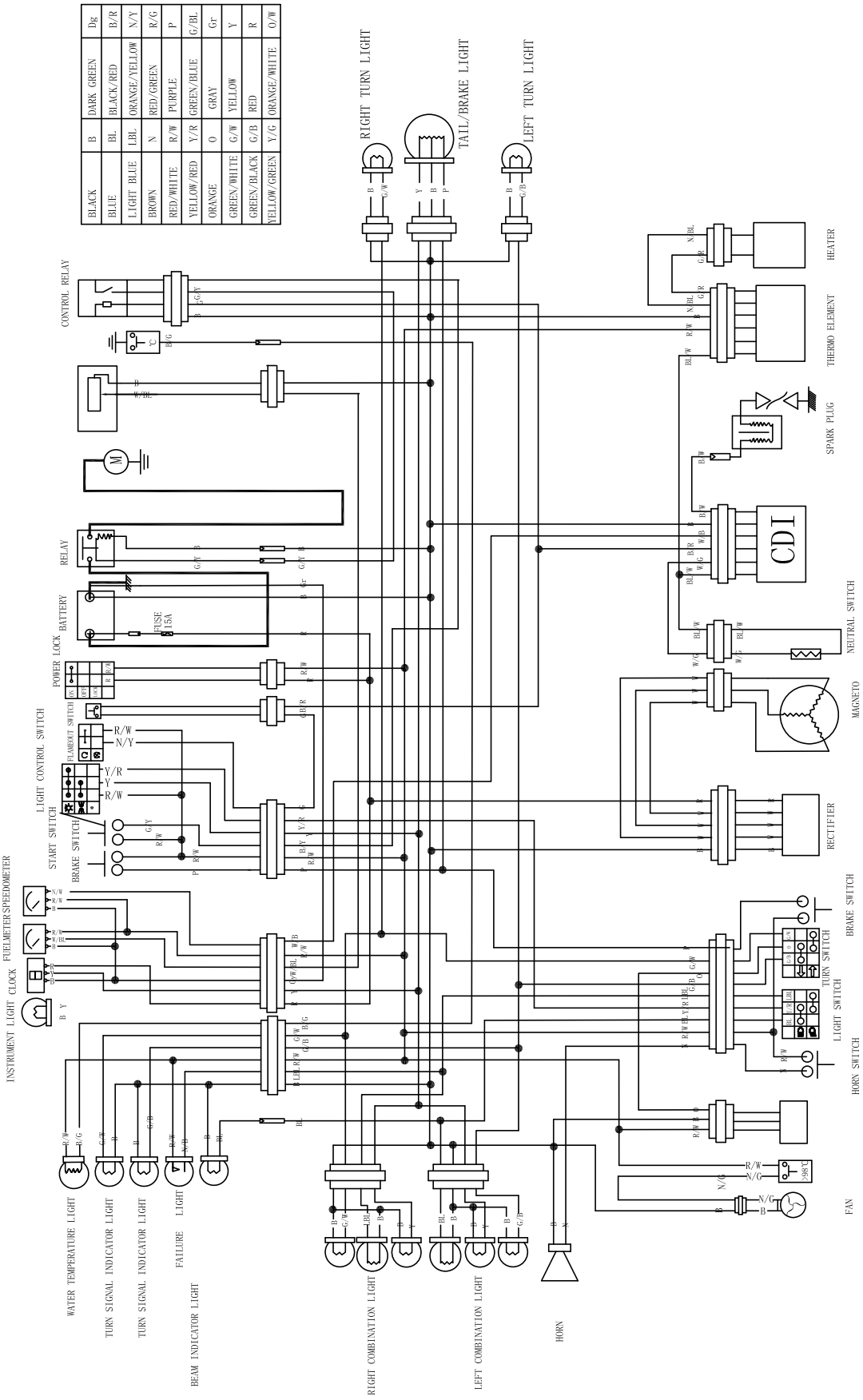
HANDLEBAR REPLACEMENT

1. Remove the front/ rear handlebar cover.
2. Remove all parts from the handlebar.
3. Pull off the left grip from the handle bar would be more difficult as the grip is normally glued with grip glue.

NOTE

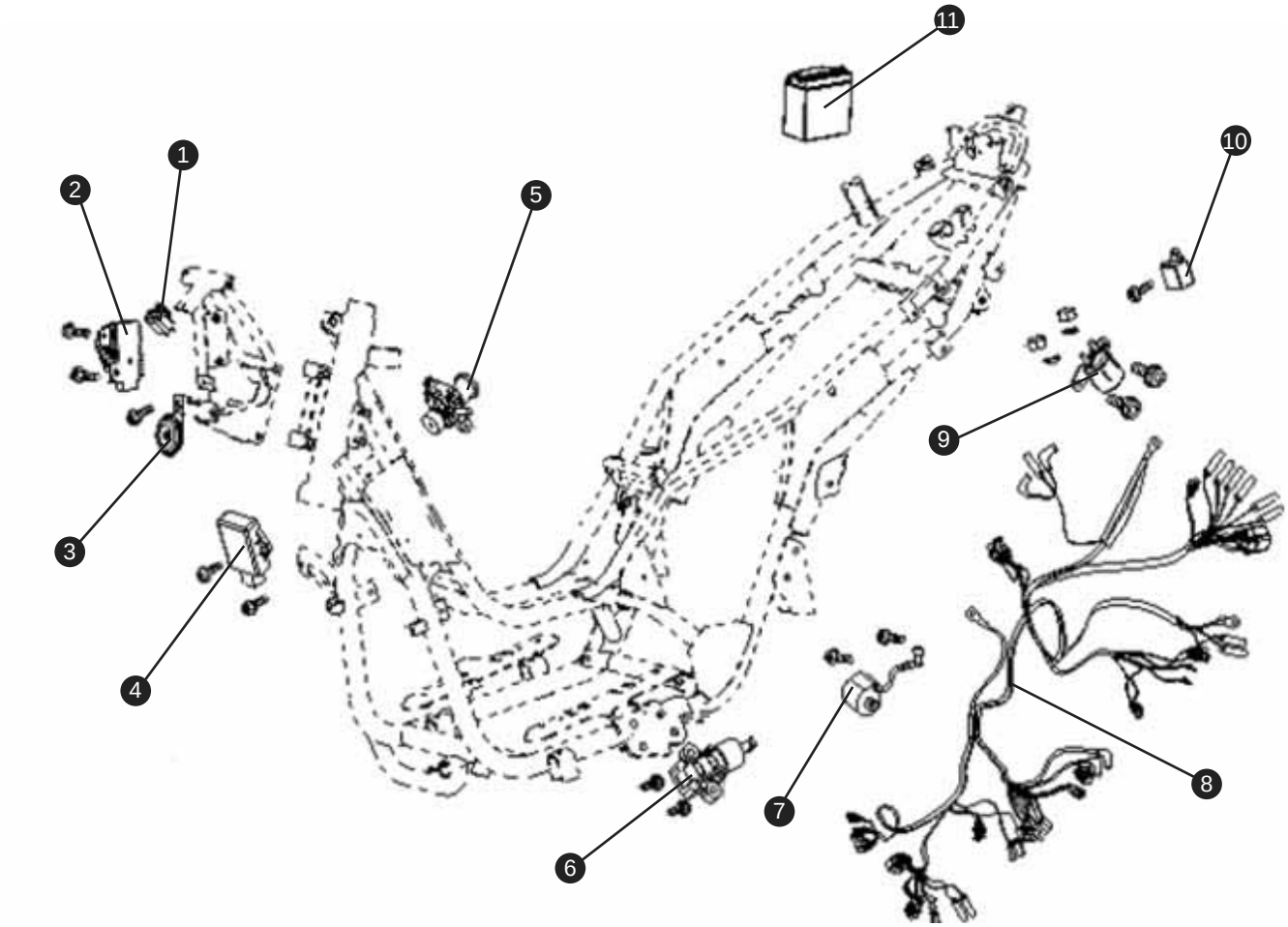
We suggest buying a new left handle grip if it is necessary to replace the handlebar.

WIRING DIAGRAM



ELECTRICAL SYSTEM

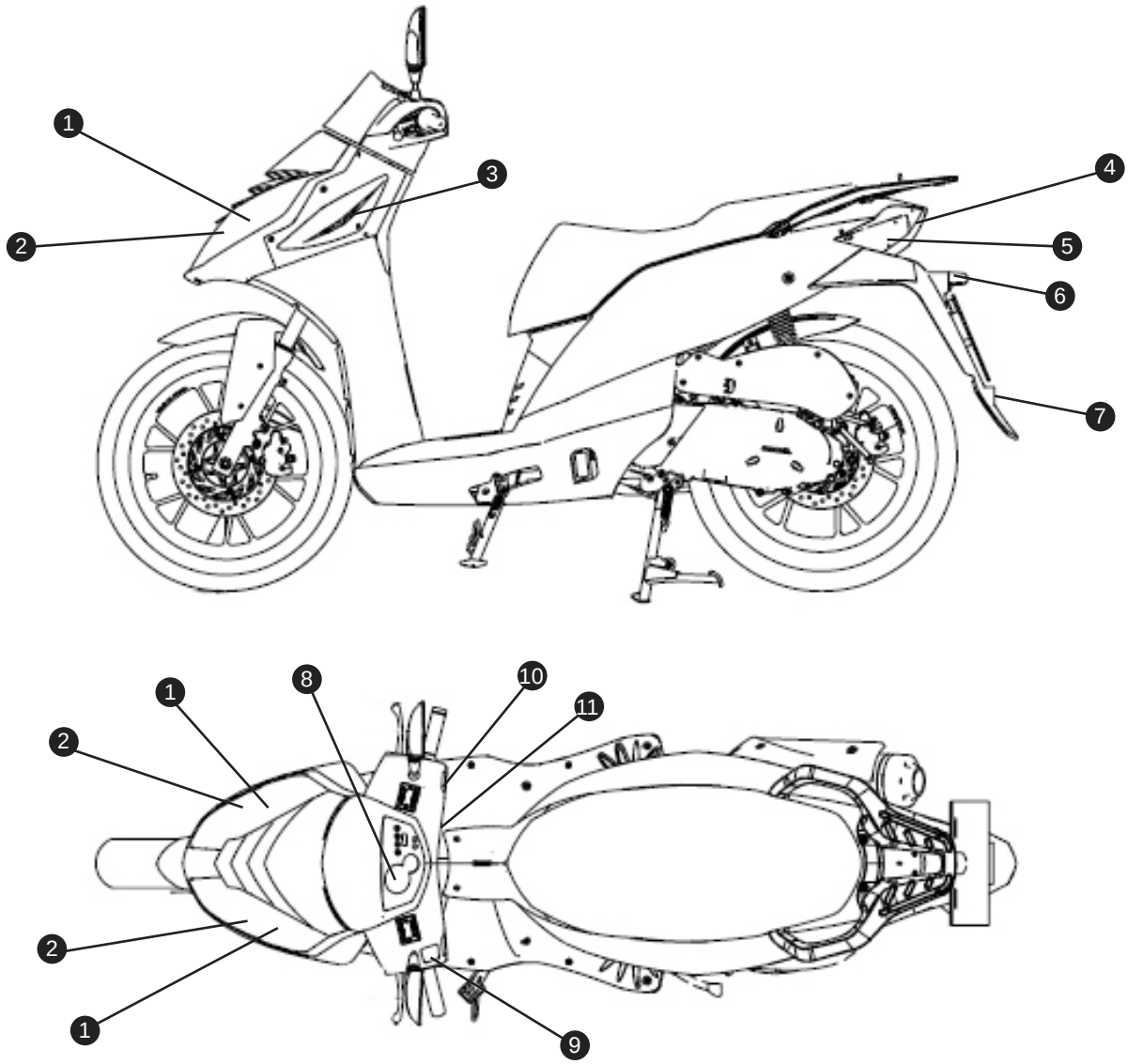
PART LOCATION - ELECTRICAL SYSTEM



PART LIST - STEERING

1. Winker relay
2. Rectifier
3. Horn
4. Igniter (CDI)
5. Main switch/ power lock module
6. Emergency cutout switch
7. Ignition coil
8. Wiring loom
9. Starter relaise
10. Diode
11. Battery

PART LOCATION - LIGHTS/ INSTRUMENTS SWITCHES



PART LIST - LIGHTS/ INSTRUMENTS SWITCHES

1. Head light
2. Position light
3. Turn signal front
4. Rear light and brake light
5. Turn signal rear
6. Number plate light
7. Rear reflector
8. Instrument panel and indicators
9. Switches left
10. Switches right
11. Main switch/ power lock module

CERTIFICATION NO.

PART NO.	CE NO.
No. 1	L: WR-CS-PL-E9-00.1495
	R : WR-CS-PL-E9-00.1492
No. 3	L: 50R-E9-00.1495
	R : 50R-E9-00.1492
No. 4	50R-E9-00.1494
No. 5	50R-E9-00.1494
No. 6	50R-E9-00.1493
No. 7	IA E11 02 0613

ELECTRICAL SYSTEM/ GENERAL

SPECIFICATION - ELECTRICAL SYSTEM

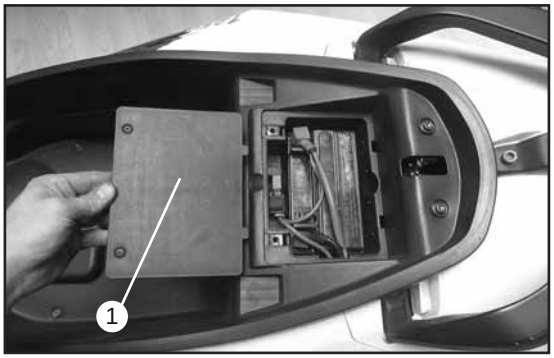
Item				Standard value
Recommended spark plug	Standard			C5HSA (NKG)
	Hot			C6HSA (NGK)
	Cold			CHSA (NGK)
Spark plug gap				0.6-0.7 mm
Resistance value of ignition coil (20°C)	Primary coil			4 Ω ± 10%
	Secondary coil	With spark plug cap		8-11 KΩ
		Without spark plug cap		4.5-5.5 KΩ
Resistance of trigger (20°C)				100-200Ω
Max. voltage of ignition coil				95-400V
Voltage of trigger				Above 1.7V
Battery	Capacity/ type			12V-6Ah / dry charged
	Voltage		Full charg	13.V
			Need to be charged	12.3V
	Charging current			Normal: 0.6, Quick: 6A
	Charging time			Normal: 10-15 hours, Quick: 30 minutes
Magneto	Capacity			200W/ 8500 rpm
	Coil impedance			White-black: 3.3-3.5 Ω
Voltage regulator	Pattem			Fullwave of three phase
	Charging voltage of battery			14.5 ± 0.5V / 5000 rpm
Fuse	1 Mainfuse			15 A

MORE DETAILS SEE ON PAGE: 18-19

SPECIAL TOOL

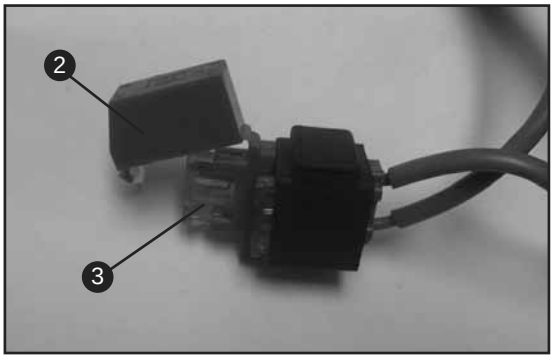
See page 11-14

FUSE REPLACEMENT



If the fuse is burned out, find the cause and repair it. The fuse holder is located behind battery box cover.

1. Turn the main switch off.
2. Remove the battery box cover (1).



3. Open the fuse box (2) and pull off the fuse (3).
4. Replace the blown fuse (3) and then install a new fuse of the specified amperage.

NOTE

Take care that after each maintenance the box cover (1) is closed correct to avoid that water or others penetrate.

⚠ WARNING

Do not use a fuse of a higher amperage rating than recommended to avoid causing extensive damage to the electrical system and possibly a fire.

SPECIFICATION - FUSE

ITEM	DESCRIPTION	VALUE
Fuse	Plug-In fuse	15 Ampere

TROUBLESHOOTING - FUSE

FAILURE	CAUSE	TO DO
Fuse blown	Electrical circuit shorted.	Find the cause and repair it. replace the blown fuse.
	Electrical circuit is overloaded.	Find the cause and repair it. replace the blown fuse.

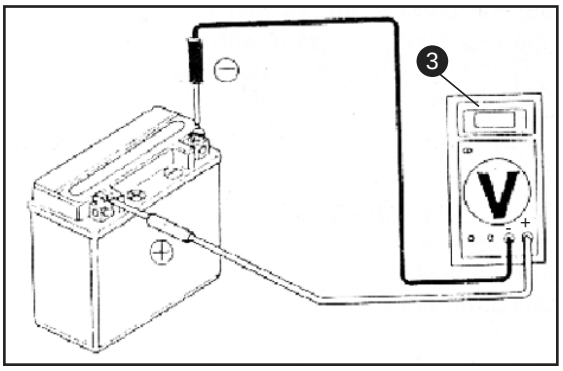
ELECTRICAL SYSTEM/ BATTERY

BATTERY GENERAL INFORMATION

The battery (1) is located in the floorboard of the vehicle. When ever you maintain the battery remove the battery box cover (2). Take care that after each maintenance the lid is closed correct to avoid that water or others penetrate.

NOTE

1. The battery can be charged and discharged over again. If the battery is unused after discharge the service life will shorten and the performance will degrade. Generally the performance of the battery used for 2 or 3 years will degrade. Such battery (capacity declined) may restore it´s voltage after charging but the voltage will drop off rapidly when loaded.
2. Surcharge of battery: Generally surcharge can be observed from the battery proper. If the battery is shorted inside no voltage can be tested at the terminal of the battery or the voltage is very low.
3. Invalidation of the regulator: The battery will have too high voltage which may reduce its service life.
4. Long rest of the battery will result in self discharge and the electric capacity will reduce. Therefore it must be charged at least every 3 months.
5. Inspect the charging system in accordance with the order stipulated in the fault diagnosis table.
6. If there is electric current passes through an electrical unit do not disassemble the connector otherwise over-tension will occur which can damage the electronic parts inside the voltage regulator. The main switch must be turned “off” before any operation.
7. Maintenance free battery does not need inspection, replenish of electrolyte solution or distilled water.
8. Inspect the entire power load.
9. Emergency charging cannot be used except in contingency situations.
10. When ever charging the battery it must be removed from the motorcycle before charging.
11. Please do not use liquid type battery when exchanging batteries.
12. A voltage meter (3) must be used when inspecting the charging conditions. Connecting the positive pole of charger and the positive pole of battery. Connecting the negative pole of charger and the negative pole of battery.



BATTERY REMOVAL

1. Open the battery box cover (2).
2. Dismantle the clamping bar components of battery cell.
3. Disassemble the negative wire and then the positive wire.
4. Take out the battery.

⚠ WARNING

- When ever you remove the battery from the vehicle, disconnect the negative pole first.
- When you install the battery to the vehicle, connect the plus pole first. Add battery pole grease between the battery poles and the cables.

- Keep the battery away from ignition sources.
- Shut off the charger first once charge is started or finished so as to prevent explosion hazard caused by flashes at the interconnecting part.
- Charge operation must follow the marked time on the battery.
- Fast charging cannot be used except in contingency situations.
- Do not measure the voltage until 30 minutes after the charge.

SPECIFICATION - BATTERY

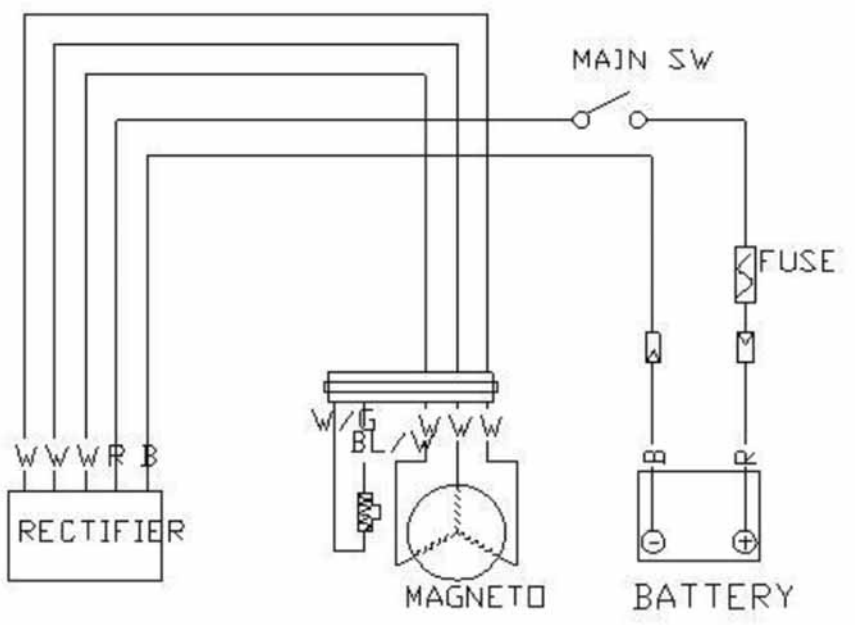
ITEM	STANDARD VALUE		
Battery	Type	Maintenance free	
	Capacity	12V / 6Ah	
	Voltage	13.1 - 12.3 V	
	Charging current	Standard	0.6 A
		Quick	6.0 A
	Charging period	Standard	10-15 h
		Quick	30 min

TROUBLESHOOTING - BATTERY/ CHARGING SYSTEM

FAILURE	CAUSE	TO DO
No power supply	Defect battery	Find the cause and replace the battery.
	Disconnected battery cable	Connect the battery cable.
	Fuse blown	Find the cause, repair it and replace the fuse.
	Faulty main switch	Replace the main switch.
Low power	Weak battery	Charge the battery or replace it.
	Loose battery connectio	Tighten the connection.
	Charging system failure	Check the components step by step and replace the defects parts.
	Faulty regulator/ rectifier	Replace the regulator/ rectifier.
Intermittent power	Loose battery cable connection	Tighten the connection.
	Loose charging system connection	Tighten the connection.
	Loose connection or short circuit in ignition system	Tighten the connection and repair the affected component.
Charging system failure	Loose, broken or shorted wire or connector	Tighten the connection and repair the affected component.
	Faulty regulator/ rectifier	Replace the regulator/ rectifier.
	Faulty generator	Check and replace the generator if necessary.

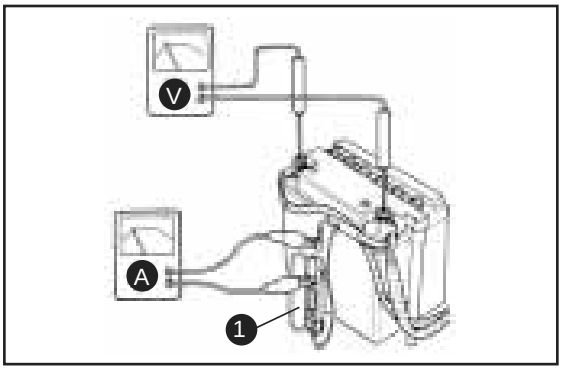
ELECTRICAL SYSTEM/ CHARGING SYSTEM

CHARGING SCHEME



CHARGING PERFORMANCE TEST

1. Remove the battery cover.
2. Stop the engine and open the fuse box (1).
3. Disconnect the wire from the fuse terminal. Connect an ammeter (A) between the wire and fuse terminal.
4. Connect the battery positive (+) terminal to the voltmeter (V) positive (+) probe and battery negative (-) terminal to the voltmeter negative (-) probe.
5. Start the engine, gradually increase engine speed to test the output. If the clamping voltage exceeds the specified value range, inspect the voltage regulator.
6. Inspect the clamping voltage of the lighting system.



Nominal values: ~ 2,0 Ah/ 14,4 V / 5000 rpm

SPECIFICATION - CHARGING SYSTEM

ITEM	NOMINAL VALUE		
Battery	Capacity	12 V / 6 AH	
	Voltage	13.1 - 12.3 V	
	Charging current	Standard	0.6 A
		Quick	6.0 A
	Charging period	Standard	10 - 15 h
		Quick	30 min.
Magneto	Coil impedance (20°C)	Between white and white 3.3-3.5 Ω	
Voltage regulator	Type	Full wave of three phase	
	Charging voltage of battery	14.5 V ± 0.5 V / 5000 rpm	

REGULATOR - RECTIFIER INSPECTION

1. Remove the tachometer.
2. Disassemble the 6P plug (1) of the voltage regulator rectifier (2).
3. Measure the resistances between the terminals.
4. Replace the regulator/rectifier if the values are not within the values in the table below.

Multimeter (-) \ (+)	White (W)	Red (R)	Black (B)
	Unit: MΩ		
White (W)		0.64	-
Red (R)	-		-
Black (B)	0.64	1.017	

ITEM (WIRE COLOUR)	JUDGING METHOD
Between the battery (red) and body ground	There being battery voltage
Between the ground wire (black) and body ground	There being wire
Between the charge coil (white) and body ground	There being resistance in alternator coil = 0,6 Ω
After checking that the main wiring end between illuminating line (green/red) and body ground (resistor plug; plug of automatic side starter; remove lighting switchboard and check in OFF position) is completely normal.	There being resistance in alternator coil = 0,5 Ω

Check plug of voltage and current regulator for poor contact and measure impedance values between terminals on voltage and current regulator body.

NOTE

- The metal area of the ammeter prod mustn't be touched by fingers during inspection.
- Inspect with an ammeter. Different ammeters will give different resistance values and the inspection result is incorrect. If the resistance value between terminals is abnormal the regulator rectifier should be replaced.

CHARGE COIL OF GENERATOR INSPECTION

1. Remove the center body.
2. Disassemble 3P plug (1) of the generator.
3. Measure the resistance value between each white (W) coil of the plug with an multimeter.

Standard value: 0,5 - 2 Ω (20°C)

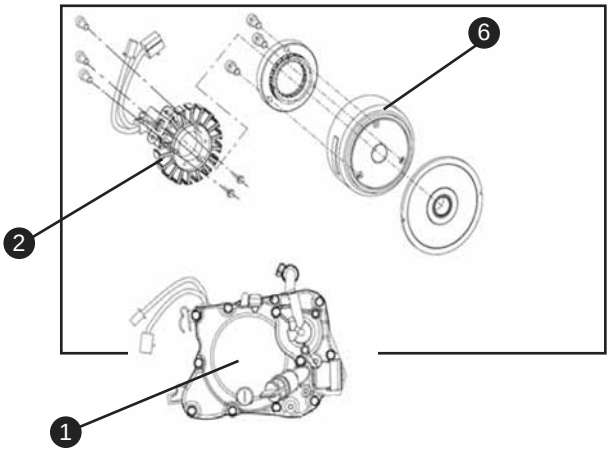
4. If the measured value exceeds the standard value replace the stator.

NOTE

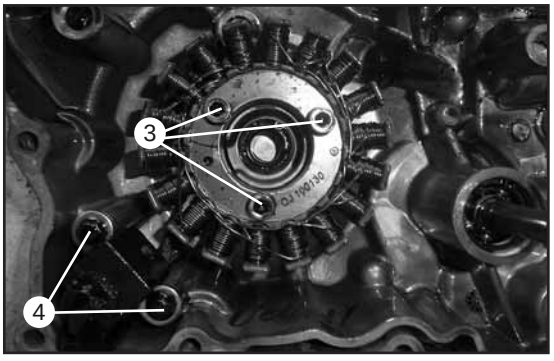
Inspection to charging coil of generator can be performed on engine.

GENERATOR REPLACEMENT

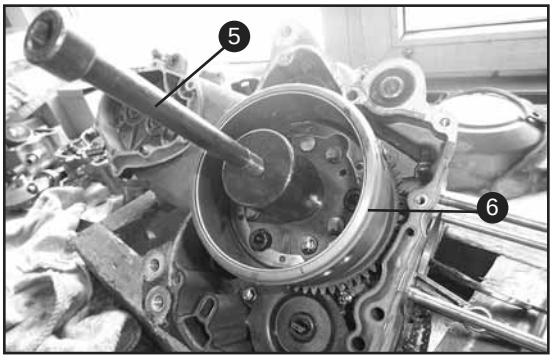
1. Remove the generator cover (1) with the stator (2).



2. To remove the stator, remove the three allen screws (3) and the two screws (4).
3. Remove the nut of the flywheel.



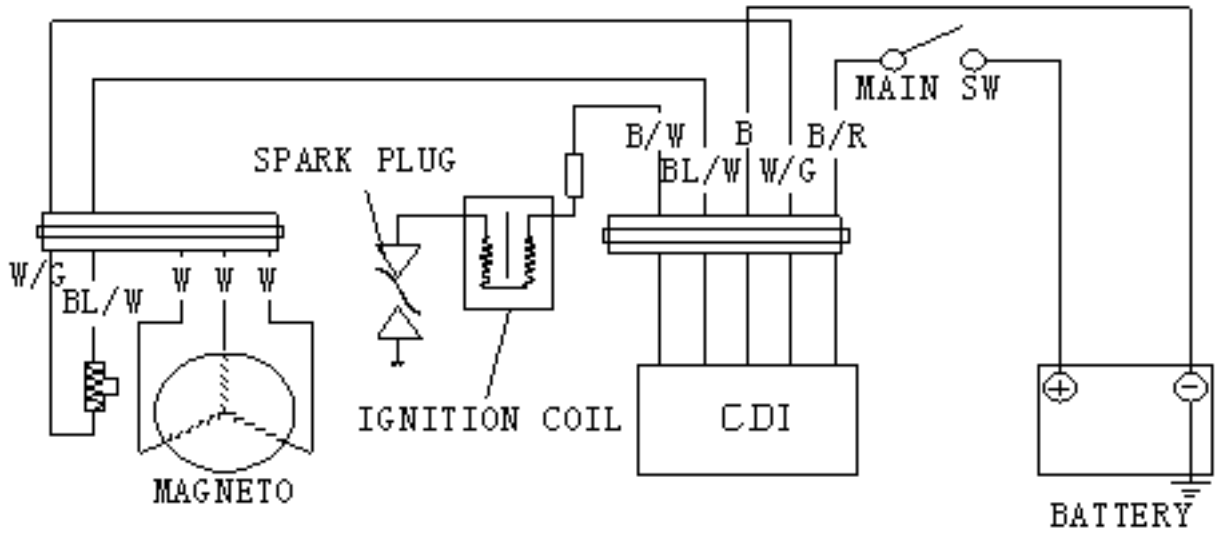
4. Remove the flywheel (5) with a flywheel puller (6).
5. Reassemble in reverse order.



TROUBLESHOOTING - CHARGING SYSTEM

See page: 99

IGNITION SCHEME



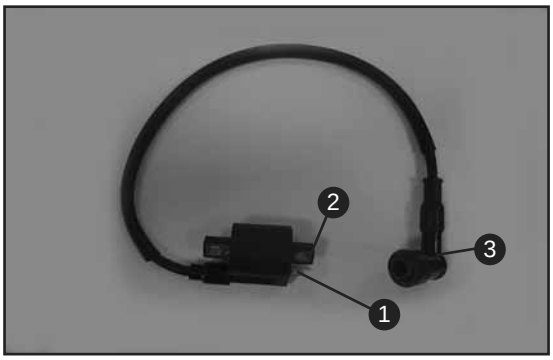
NOTE

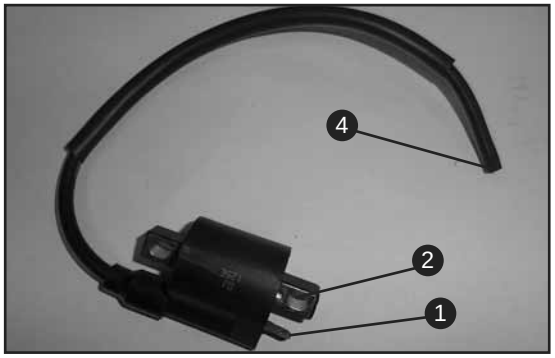
1. Inspect the ignition system in accordance with the order stipulated in the fault diagnosis table.
2. The ignition system is an electronic auto-advance device integrated in the CDI group, therefore the ignition time needs no adjustment.
3. Inspect the ignition system in accordance with the order stipulated in the fault diagnosis table.
4. Take particular care in disassembly that the CDI group of ignition system should not fall off and drop down or should not stricken with might (which is the main cause of fault).
5. Bad socket contact is the main cause of the ignition system fault, so inspect whether the joint of each part is in poor contact or not.
6. Inspect whether the spark plug is utilized at a proper thermal value. Improper spark plug may lead to not smooth operation of engine or burn-out of the spark plug.
7. Inspection in the chapter is based on explanation of peak voltage and the judgment whether the resistance value of ignition coil is OK or not according to records after the inspection.
8. Inspection of the main switch should be performed in accordance with the conduction table.
9. The disassembly of the alternator and stator should be conducted in accordance with the disassembly explanation.

ELECTRICAL SYSTEM/ IGNITION SYSTEM

SPECIFICATION - IGNITION SYSTEM

ITEM	NOMINAL VALUE/ TESTIN TERMINAL		
Spark plug	TORCH/A8RTC		
Spark plug gap	0.6-0.7 mm		
Resistance value of ignition coil (20°C)	Coil black/ white - black	0.4 Ω±10%	
	Coil black - spark plug cover	With spark plug cover	8-11 KΩ
		Without spark plug cover	4.5-5.5 KΩ
Resistance value of trigger (20°C)	Blue/ white - body ground	100-200 Ω	
Measured peak voltage of ignition coil	95-400 V		
Trigger voltage	Above 1.7 V		
Voltage of charge coil	95-400 V		



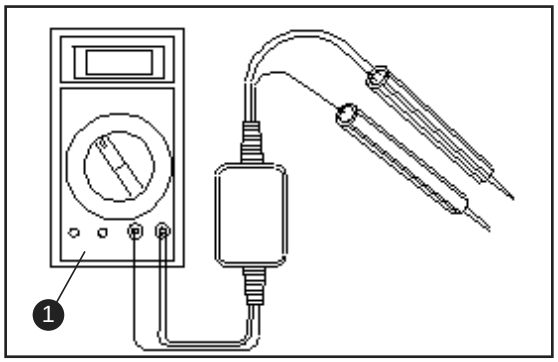


1. Black/white
2. Black
3. with spark plug cover
4. without spark plug cover

IGNITION SYSTEM INSPECTION

NOTE

- When there is no spark in the spark plug inspect whether the wire or part is loosen or in poor contact and confirm whether each voltage value is normal.
- Since there are a great many of multimeter brands with different interior resistance the values tested will differ accordingly.
- Connect the multimeter (1) with a high voltage diverter or an electric meter with **input resistance above 10MΩ.**

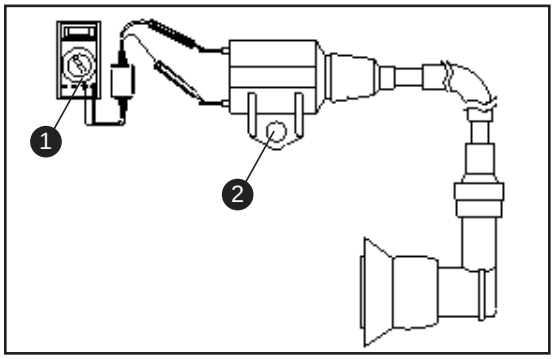


VOLTAGE OF IGNITION COIL

Replace the spark plug with a good one and connect it with the engine.

NOTE

Correctly connect each circuit before the test. Normal compression pressure of the air cylinder is achieved in the test when the spark plug is installed on the cylinder head.



1. Connect the wire of ignition coil (2) and connect the primary coil terminal (black / white) with the diverter at the Ground.
2. Press the startup electrical machinery or step on the actuating lever to measure the primary peak voltage of the ignition coil.

Standard value: 95 V or above

TRIGGER (PICK UP)

NOTE

Install the spark plug on the air cylinder head and inspect with normal compression pressure.

1. Remove the plugs (2P and 3P) of CDI group and connect a peak voltage diverter between the trigger of 2P plug (blue/ white terminal - positive) to the wire and the 2P plug (white/ green terminal - negative).
2. Press the startup electrical machinery to measure the peak voltage of the trigger.

Standard value: 1.7 V or above

NOTE

The metal area of the multimeter prod mustn't be touched by fingers to prevent electroshock.

If the peak voltage of the CDI terminal has an abnormal value disassemble the right body guard and the generator plug.

Connect the trigger (blue / white) with the diverter.
If the tested voltage of CDI is abnormal whereas the tested voltage at the alternator is normal, poor contact or broken line can be determined.
If both are abnormal, bad act of the trigger can be determined. Please refer to inspection of the troubleshooting table.

TRIGGER (PICK UP) INSPECTION

Inspection of the trigger can be conducted on the engine.

NOTE

1. Disassemble the related cover parts.
2. Disconnect the plug of the trigger.
3. Measure the resistance value between the blue/ white terminal at the engine side and the body ground.
4. Standard value: 100-200 Ω (20°C)
5. If the measured value exceed the standard value replace the stator.

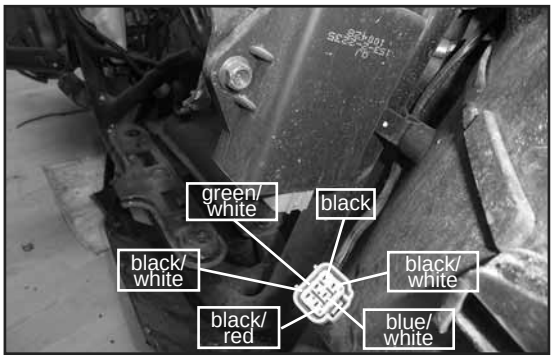
CDI GROUP

CDI SYSTEM INSPECTION

1. Disassemble the CDI group and inspect the parts related with the ignition system at the wire terminal.
2. Disassemble the CDI group and inspect whether the plugs are loosen or eroded.

CDI CIRCUIT INSPECTION

1. Measure the resistance between the terminals.
2. Replace the CDI unit if the readings are not within the specifications in the table below.



ELECTRICAL SYSTEM/ IGNITION SYSTEM

INSPECTION ITEM	TESTING TERMINAL	STANDARD VALUE (25 °C)
Main switch	red/white - red	Conducted main switch at off
Trigger	blue/ white - white/ green	100 - 200 Ω
Primary ignition coil	black/ white - black	0.4 Ω ± 10%
Secondary ignition coil	black/white - spark plug cover	4.5-5.5 KΩ ± 10%
Ground	black and ground	Conducted

IGNITION COIL DISASSEMBLY

1. Disassemble the related cover parts.
2. Disassemble the spark plug cap.
3. Disassemble the primary ignition coil.
4. Disassemble the ignition coil fixing bolts and “unload” the ignition coil.
5. Reassemble in reverse order.

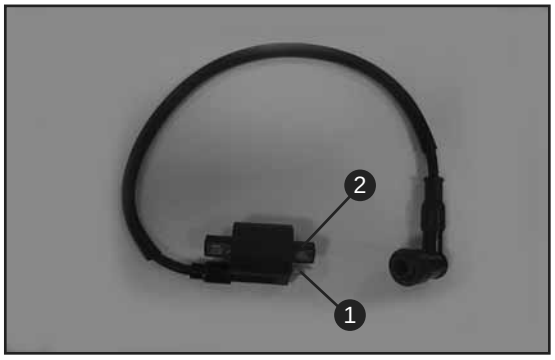
NOTE

The primary coil is installed in accordance with the black/ white wire.

COIL INSPECTION

1. Measure the resistance between terminals of coil (between 1 and 2).

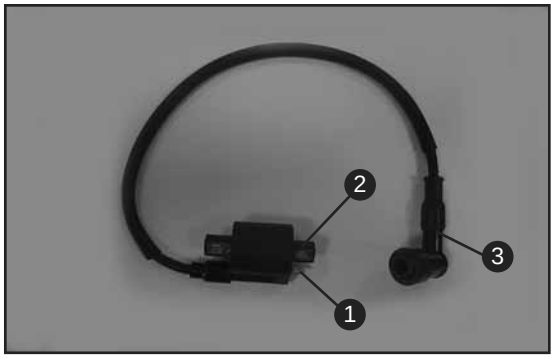
Standard value: 0.6 Ω ± 10% (20°C)



2. If the resistance value is within standard value range the coil is good.
3. The resistance value “∞” stands for broken line in the coil replace it.

4. Measure the resistance value between the wire of spark plug cap (with the spark plug) and the terminal (between 1 and 3).

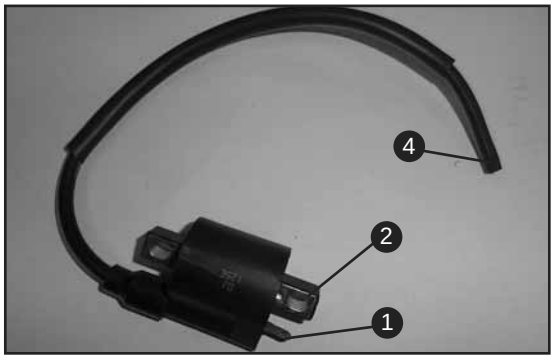
Standard value: 8-11 KΩ (20°C)



5. If the resistance value is within standard value range the primary coil is good.
6. The resistance value “∞” stands for broken line in the coil.

7. Remove the spark plug cover. Measure the resistance value between the wire of spark plug cap and the terminal (between 1 and 4)

Standard value: 4.5-5.5 KΩ ± 10% (20°C)



TROUBLESHOOTING - IGNITION SYSTEM

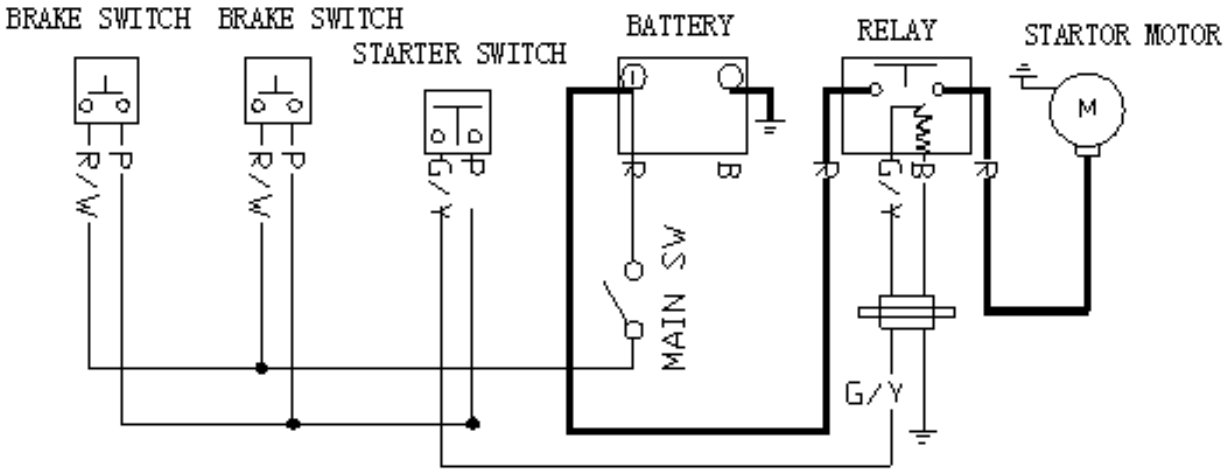
ITEM	FAILURE	CAUSE	TO DO
Ignition coil	High voltage to low	The interior resistance is too low and test it with a designated tester.	Replace
		The cranking speed is too low.	Search for error and repair
		The tester is disturbed	If the voltage measured for several times is above standard, then the value is normal.
		Poor contact of ignition system wire	Check and repair
		Bad act of the ignition coil	Check and replace
		Bad act of the charge coil	Peak voltage test
Side voltage	No high voltage, off-and-on high voltage	Connecting error in tester	Check and repair
		Bad act of the main switch	Check and replace
		Poor contact of CDI joint	Check and repair
		Short circuit or poor contact of CDI ground wire	Check, repair or replace
		Bad act of charge coil	Peak voltage test
		Bad act of trigger	Peak voltage test
		Bad act of connector for high voltage wire	Check, repair or replace
		Bad act of CDI group (when items abnormal or when there is no spark in the spark plug)	Replace
	Normal high voltage, no spark	Bad act of spark plug or power leak in secondary coil	Check and replace
		Bad act of ignition coil	Check and replace
Charge coil	No high voltage	The interior resistance is too low.	Test it with a designated tester.
		The cranking speed is too low.	Search for error and repair
		The tester is disturbed	If the voltage measured for several times is above standard, then the value is normal.
		Bad act of the charge coil (no abnormality in Items)	Peak voltage test
	No high voltage, off-and-on high voltage	Bad act of the ignition coil	Check and replace
		Bad act of the charge coil	Check and replace
Trigger	High voltage too low	The interior resistance is too low.	Test it with a designated tester.
		The cranking speed is too low.	Search for error and repair
		The tester is disturbed	If the voltage measured for several times is above standard, then the value is normal.
		Bad act of the charge coil (no abnormality in Items)	Peak voltage test
	No high voltage, off-and-on high voltage	Bad act of the ignition coil	Check and replace
		Bad act of the charge coil	Check and replace

SPECIAL TOOLS

See page: 11-14

ELECTRICAL SYSTEM/ START UP SYSTEM

START UP SYSTEM

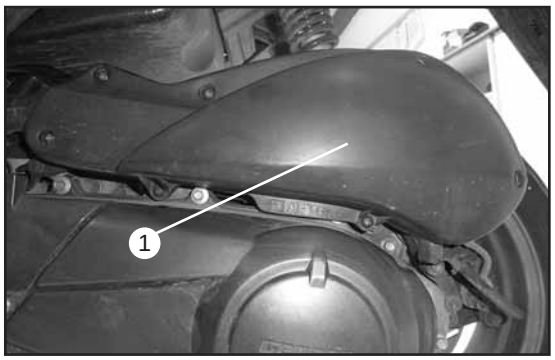


NOTE

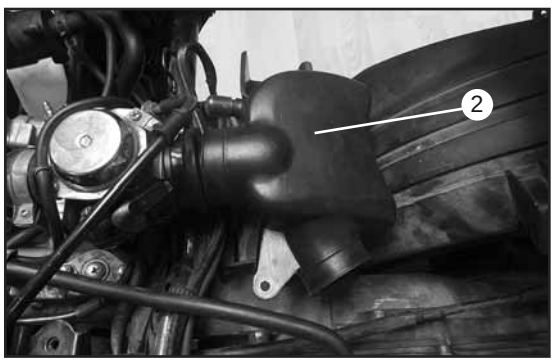
Dismantling of the starter motor can be done conducted on the engine. In case of damage the starter motor need to be replaced complete and does not need to be repaired.

STARTER MOTOR INSPECTION

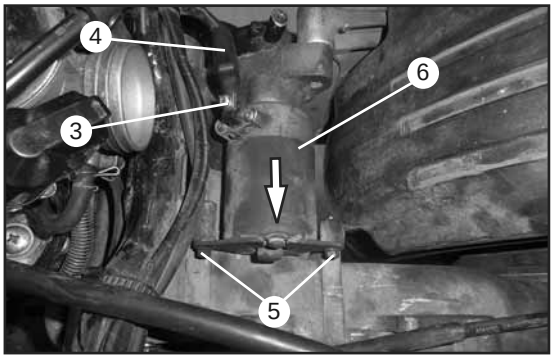
1. Remove the air filter box (1).



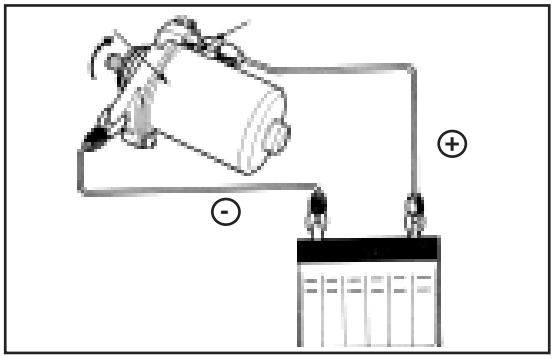
2. Remove the resonant box (2).



3. Remove the screw (3) to disconnect the starter cable (4).
4. Remove the two screws (5) and pull the starter motor (6) sidewards (arrow).

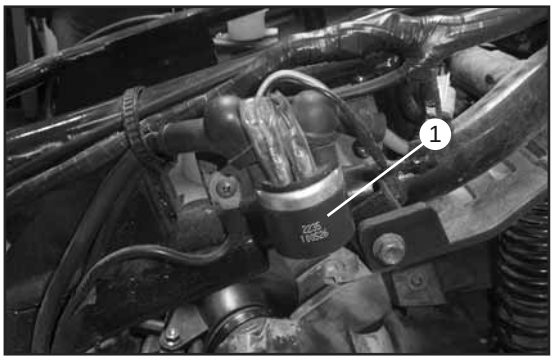


5. Connect a full charged battery to the starter motor and check for operation. If the starter do not operate correct replace it.
6. Check the starter shaft. If it´s worn replace the starter motor.
7. Assembling in reversed order.



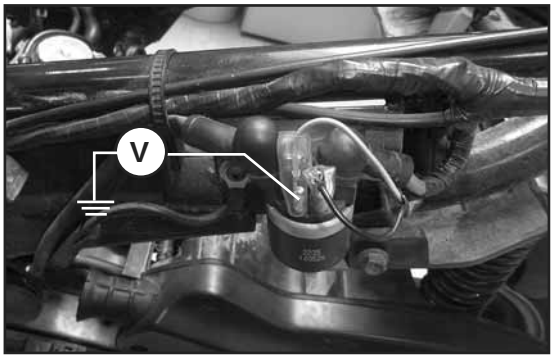
STARTER RELAY INSPECTION

1. Disassemble related cover parts.
2. Push the main switch to “ON” and press the starter button.
3. No action:
   Inspect voltage of the start relay (1).
   Inspect the earth line of the start relay.
   Inspect actuation of the start relay



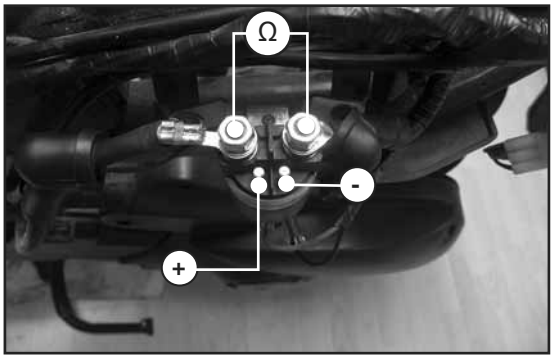
VOLTAGE OF STARTER RELAY INSPECT

1. Disconnect the plug (green/ yellow)
2. Measure the voltage between the ground wire of the frame and the green/yellow line of the starting relay connector.
3. Push the main switch to “ON”. The battery voltage should conform to regulations.
4. If there is no voltage on the starting relay line inspect the wire and conduction of the brake switch.



ACTUATION INSPECTION

1. Connect the starting relay with the battery and connect the terminal of startup electric machinery with the ohmmeter.
2. Connect the fully charged battery between the black line and green/ yellow line of the relay. At this point the relay should give out a “Click” sound and the ohmmeter resistance reads “0”



ELECTRICAL SYSTEM/ START UP S./ LIGHTNING S.

TROUBLESHOOTING - START UP SYSTEM

FAILURE	CAUSE	TO DO
Unable to start up	Fuse blown	Replace fuse
	Power shortage in battery	Replace battery
	Bad acts of main switch	Check and replace
	Bad act of startup clutch	Check and repair/ replace
	Bad act of brake switch	Check and replace
	Bad act of start relay	Check and replace
	Poor contact of connecting wire	Check and repair
	Bad act of starter motor	Check and replace
Rotating force of starter motor too weak	Power shortage in battery or battery empty	Replace or charge
	Poor contact of connecting wire	Check and repair
	Gear of the starter motor jammed with foreign body	Check and repair
No force of starter motor	Bad act of startup clutch	Check and repair
	Reverse revolution of starter motor	Replace
	Power shortage in battery or battery empty	Replace or charge

BULBS REPLACEMENT GENERAL INFORMATION

PREPARATORY DATA

Precautions on operation:
While trouble shooting electric faults, please check continuity of electric component as current flowing over it.
Confirm state of battery before any inspection, including battery voltage.

FAULT DIAGNOSIS

1. Turn on the main switch and the light switch.
2. Check rear light, front position light and low beam.
3. Turn on high beam and check if high beam is working.
4. Apply the front brake and check if brake light is working.
5. Apply the rear brake and check if brake light is working.
6. Turn on the left and right winker and check all winkers are working.

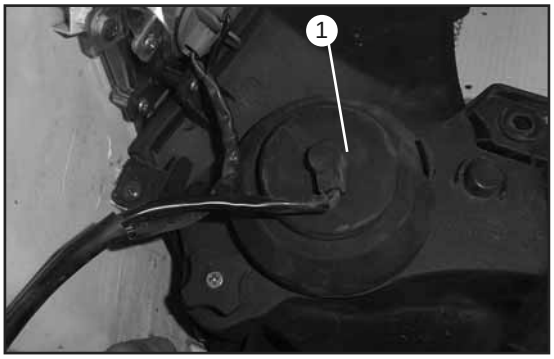
If the relative light is not working a reason could be:
1. A defect bulb.
2. A defect light switch.
3. The connector has a poor contact or the wire is broken.
4. The battery voltage is low.
5. If there is no electric power at all main fuse could be burned also.

HEADLIGHT/ POSITION/ WINKER BULB REPLACEMENT

1. Remove the left or the right front sidecover with the headlight.
See on page: 130-131

NOTE

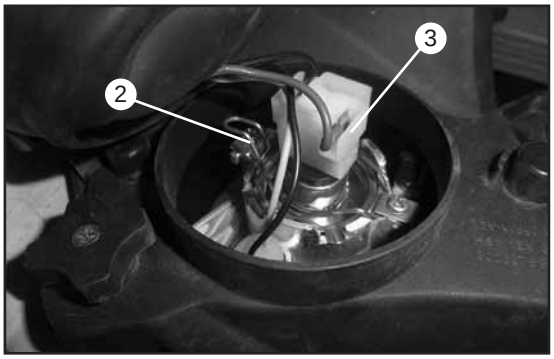
It is not necessary to remove the sidecover.



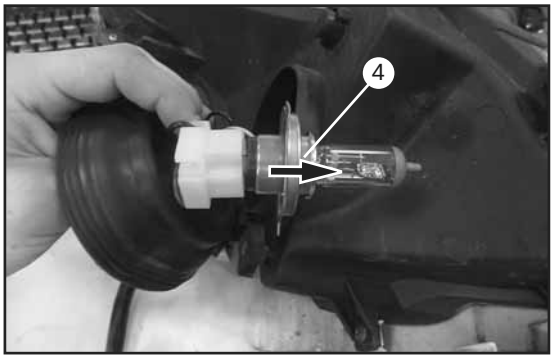
HEADLIGHT BULB

1. Remove the rubber cap (1).

2. Unthread the locking nut (2).
3. Pull out the whole bulb (3).

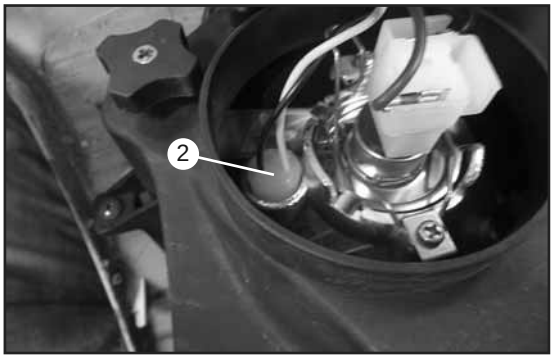


4. Pull out the headlight bulb (4).
5. Reassemble in reverse order.

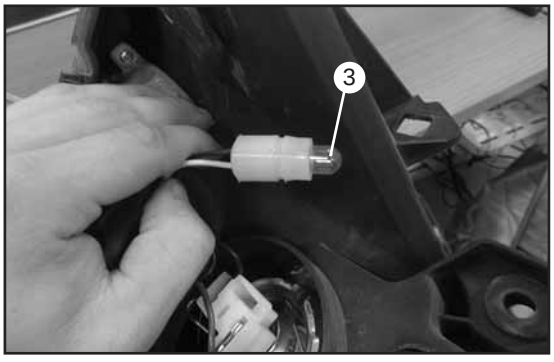


POSITION BULB

1. Remove the rubber cap (1) in the picture above.
2. Pull out the whole bulb (2).

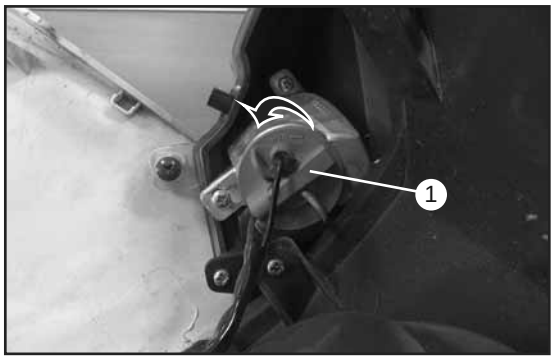


3. Pull out the bulb (3).

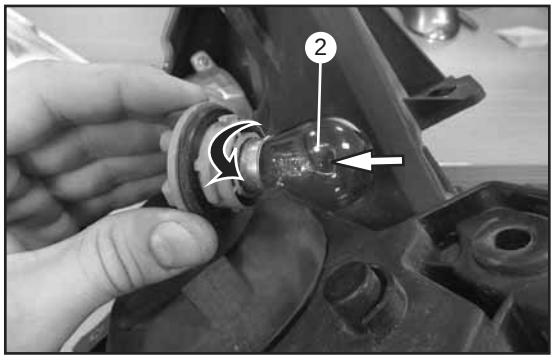


WINKER BULB

1. To remove the bulb bracket (1) turn it counterclockwise.

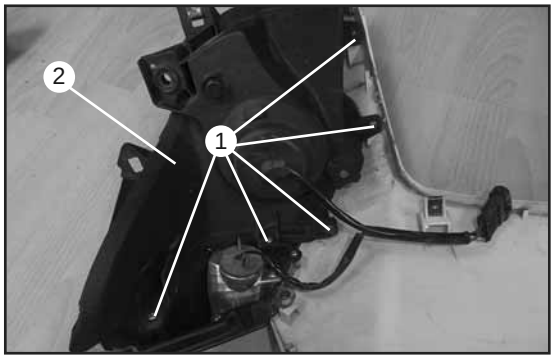


2. Pull the winker bulb (2) in and turn it counterclockwise.
3. Reassemble in reverse order.



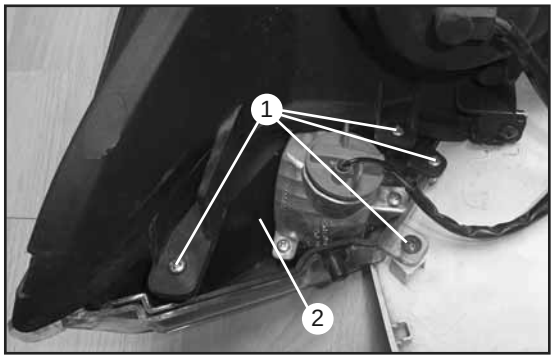
HEADLIGHT REPLACEMENT

1. Remove the left or right front sidecover.
2. Remove the five screws (1) and remove the whole bulb and poistion bulb.
3. Remove the headlight (2).
4. Reassemble in reverse order.



WINKER REPLACEMENT

1. Remove the left or right front sidecover.
2. Remove the four screws (1).
3. Remove the winker (2).
4. Reassemble in reverse order.



REAR LIGHT/ WINKER BULB REPLACEMENT

1. Remove the rear light cover with rear light.

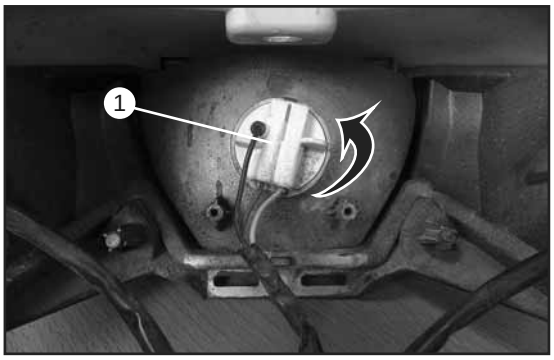
See page: 125

NOTE

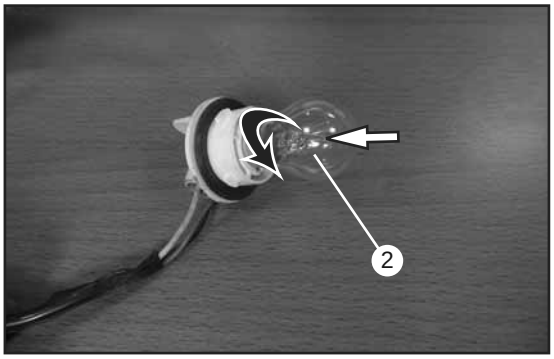
It is not necessary to remove the rear light cover.

REAR LIGHT BULB

1. To remove the bulb bracket (1) turn it counterclockwise.

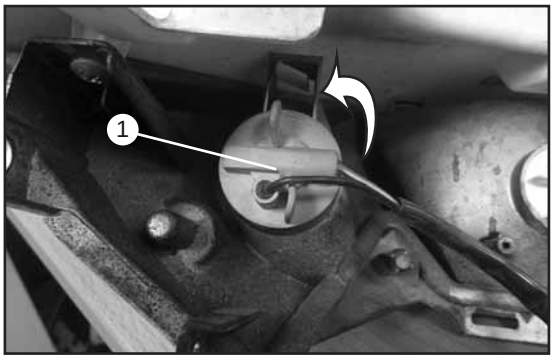


2. To remove the bulb (2) pull it in an turn the bulb counterclockwise.
3. Reassemble in reverse order.

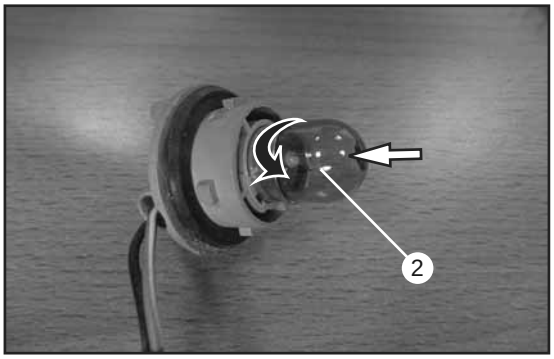


WINKER BULB

1. To remove the bulb bracket (1) turn it counterclockwise.



2. To remove the bulb (2) pull it in an turn the bulb counterclockwise.
3. Reassemble in reverse order.

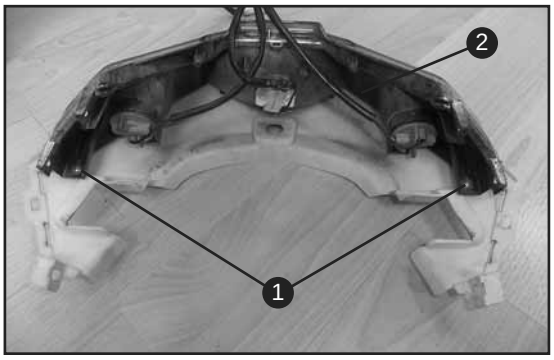


REAR LIGHT REPLACEMENT

1. Remove the rear light cover with the rear light.

See page: 125

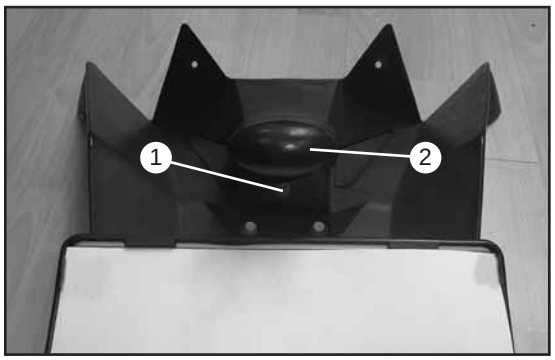
2. Remove the two screws (1) to remove the rear light (2).



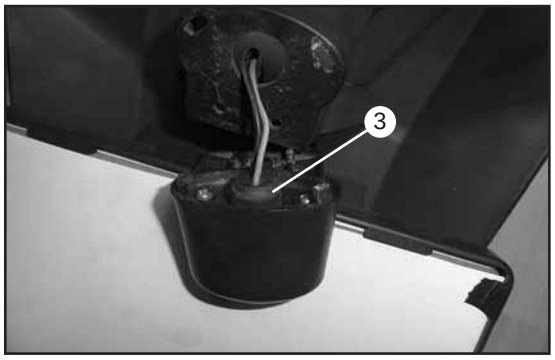
ELECTRICAL SYSTEM/ LIGHTNING SYSTEM

LICENSE PLATE BULB REPLACEMENT

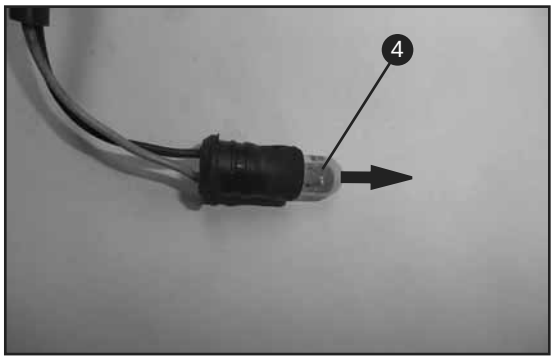
1. Remove the screw (1) to remove the license plate light (2).



2. Pull out the rubber (3).



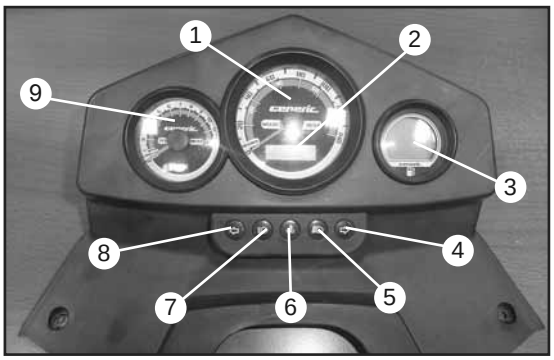
3. Pull out the license plate bulb (4).
4. Reassemble in reverse order.



TROUBLESHOOTING - LIGHTNING SYSTEM

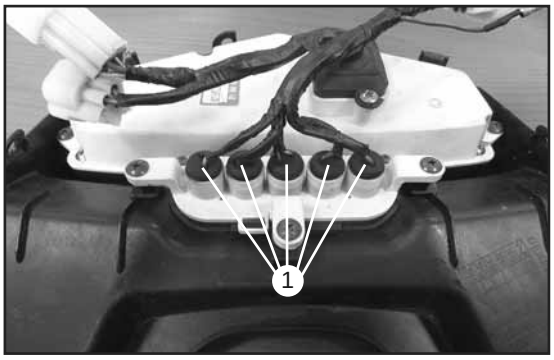
FAILURE	CAUSE	TO DO
Lights do not come on when ignition switch is on.	Burned bulb	Replace bulb
	Faulty switch	Replace switch
	Broken or shorted wire	Check and repair
	Fuse blown	Replace fuse
	Weak battery	Charge battery or replace it
	Poor contact of connecting wire	Check and repair
Light dims	Faulty ignition coil	Replace coil
	Wire or switch resistance too high	Check and clean/ repair
	Faulty regulator/rectifier	Check and replace
Headlight does not change when dimmer switch is turn to Hi or Lo.	Faulty or burned bulb	Replace bulb
	Faulty dimmer switch	Check and replace

SPEEDOMETER DESCRIPTION



1. Speedometer
2. Odometer
3. Fuel gauge
4. Winker indicator right
5. Low beam indicator
6. Water thermometer
7. High beam indicator
8. Winker indicator left
9. Rev meter

SPEEDOMETER INDICATOR LIGHTS REPLACEMENT

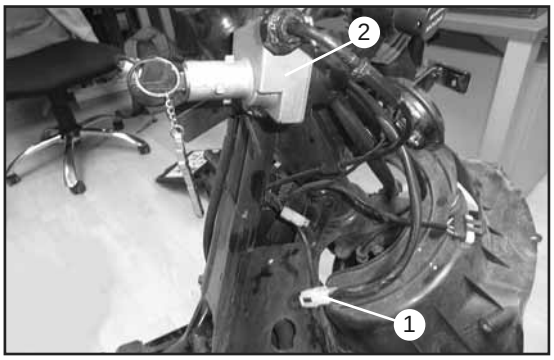


1. Remove the speedometer.

See on page:

2. Pull out the defect indicator light (1) and replace it.
3. Reassemble in reverse order.

MAIN SWITCH INSPECTION



1. Remove the right front sidecover.

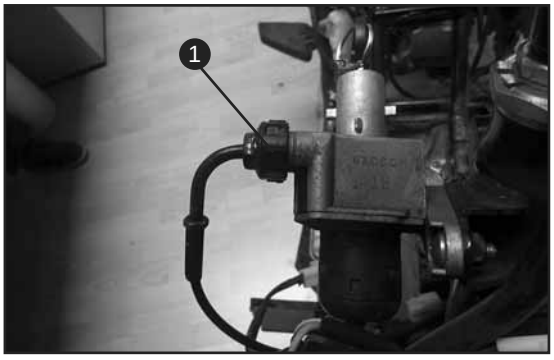
See on page: 131

2. Disconnect the cable (1) coming from the main switch (2).

3. Use a continuity tester to measure the main switch as shown in the illustration.
4. If the main switch do not work correct replace it.
5. Reassemble in reverse order.

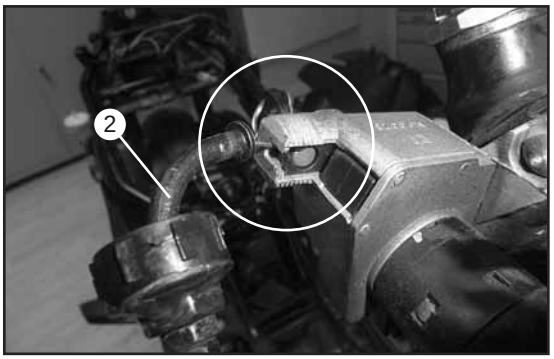
	red	red/white
	○——○	

MAIN SWITCH REPLACEMENT

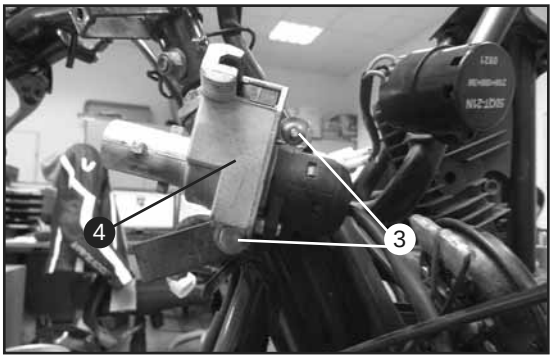


1. Follow the points 1 and 2 from above description.
2. Loose the nut (1).

3. Unthread the seat lock cable (2).

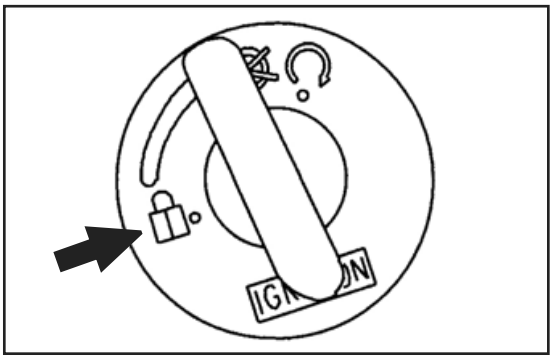


4. Remove the two screws (3) to remove the main switch (4).



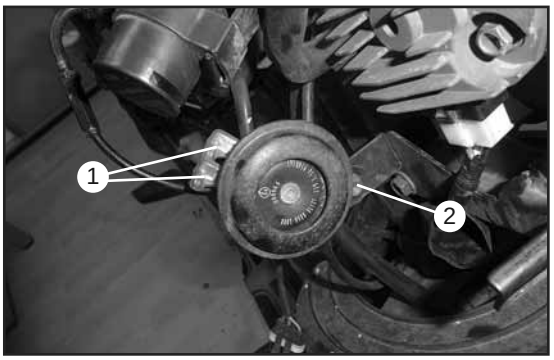
NOTE

The main switch is combined with the steering lock. When you turn the handle bar to the left, pull in the key and turn the key of the main switch to the lock symbol and pull the key out. If the steering lock do not work correct replace the main switch. Follow the description above.



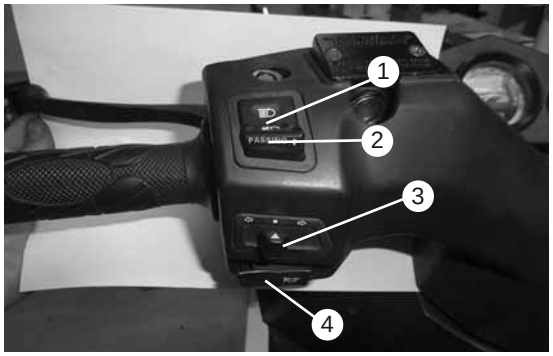
HORN INSPECTION/ REPLACEMENT

1. Remove the right front sidecover.
2. Disconnect the horn wires (1).
3. To remove the horn remove the screw (2).
4. The horn works correct if it sounds when a 12V battery is connected to the terminals (1). Consider the correct connection of plus and minus pole during the inspection.
5. If the horn do not work correct replace it. If the horn work connected to a battery but not when connected to the handle switch check the cables and the horn switch (3) (below).



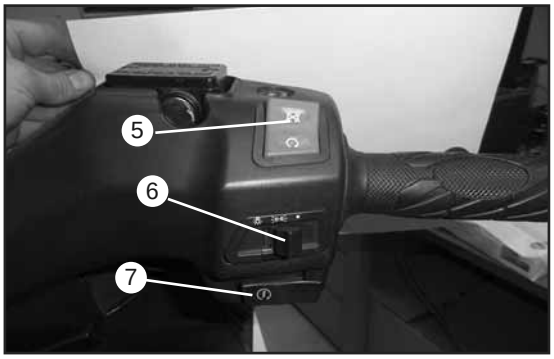
HANDLE SWITCH

Left side



1. Dimmer switch
2. Passing — Pass light switch
3. Turn signal switch
4. Horn switch

Right side



5. Engine “stop switch”
6. Light switch
7. Starter button

NOTE

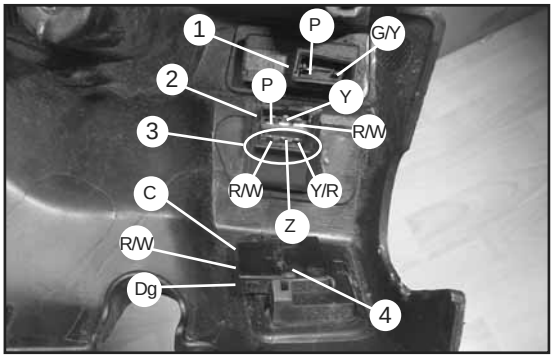
As long the engine stop switch is “ON” (⊗) the vehicle cannot be started.

HANDLE SWITCH INSPECTION

1. Remove the head cover with speedometer and winkers.
2. Disconnect the related handle switch cable.
3. Use a continuity tester to measure the switches as shown in the illustrations below.
4. In case of damage the handle switch need to be replaced complete and does not need to be repaired.

RIGHT HANDLE SWITCH INSPECTION

1. Remove the rear handlebar cover.
2. Use a continuity tester to measure the switches as shown in the illustrations below.
3. In case of damage the handle switch need to be replaced.



Starter switch (1)

	G/Y	P
Starter switch		
Starter switch pressed	○	○

Engine “stop switch“ (4)

	Dg	R/W	C
Stop switch ↻	○	○	
Stop switch pressed ⊗		○	○

Light switch (2)/ (3)

	Y/R	R/W	Y (O/BL)	X	Z
Light off		○		○	
Position light (2)		○	○		
Position light (3)		○			○
Light on (2)		○	○		
Light on (3)	○	○			

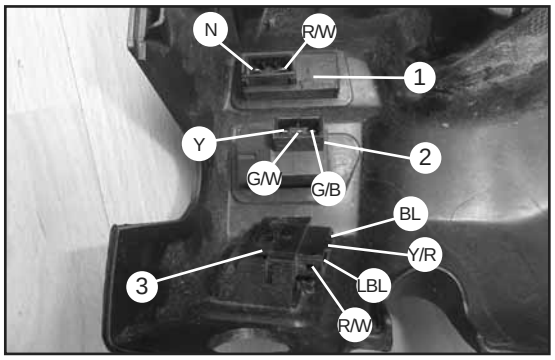
Yellow (Y) can also be Orange/Blue (O/BL).
The letters X, Z and C are simply selected letters.

LEFT HANDLE SWITCH INSPECTION

1. Remove the rear handlebar cover.
2. Use a continuity tester to measure the switches as shown in the illustrations below.
3. In case of damage the handle switch need to be replaced.

Horn switch (1)

	R/W	N
Horn switch		
Horn switch pressed	O	O



Winker (2)

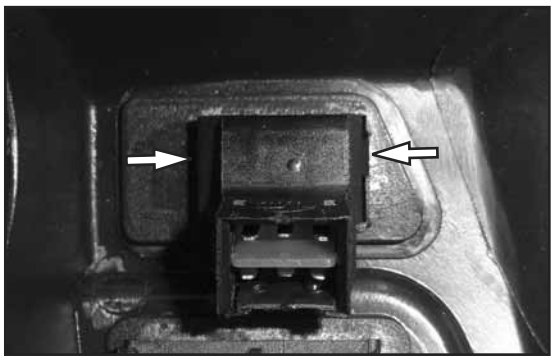
	G/B	G/W	O
Winker off			
Winker left	O		O
Winker right		O	O

Dimmer switch (3)

	BL	LBL	Y/R	R/W
Low beam		O	O	
High beam	O		O	
Passing light switch	O			O

HANDLE SWITCH REPLACEMENT

1. Remove the rear handlebar cover.
2. Press together (arrows) the two clips on the side.
3. Pull out the related switch.
4. Assembling in reversed order.

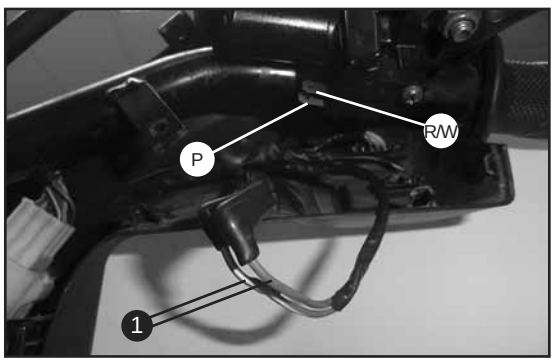


NOTE

Only one switch is illustrated.
Remove the other switches in the same way as described.
Only the dimmer and the engine “stop” switch has one clip.

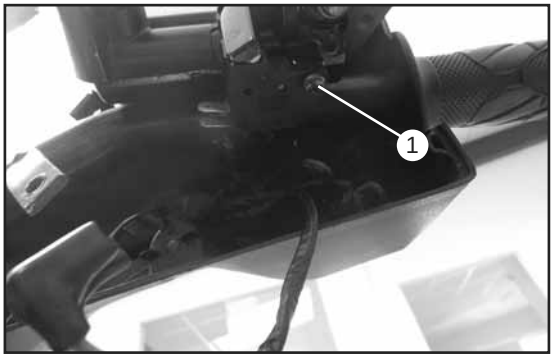
FRONT/ REAR BRAKE LIGHT SWITCH INSPECTION

1. Remove the front handlebar cover.
2. Disconnect the cables (1) of the front/ rear brake light switch.
3. Use a continuity tester to measure the switches as shown in the illustrations below.
4. In case of damage the switch need to be replaced.



	R/W	P
Front/ Rear brake		
Front/ Rear brake pressed	O	O

FRONT/ REAR BRAKE LIGHT SWITCH REPLACEMENT

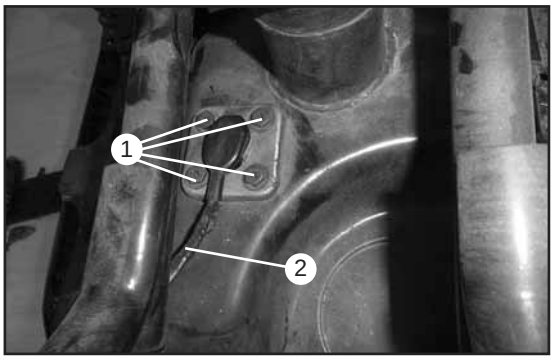


1. Remove the front handlebar cover.
2. Disconnect the cables of the front/ rear brake light switch.
3. Before replacing the front brake switch, double check its function (See above).
4. Remove the screw (1) to remove the front/ rear brake light switch.

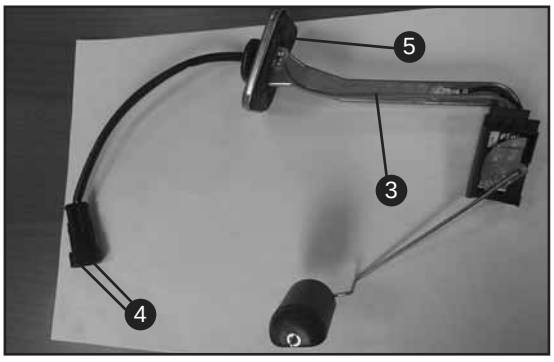
NOTE

Pay attention when assembling the switch of the groove and the notch.

FUEL LEVEL SENSOR INSPECTION

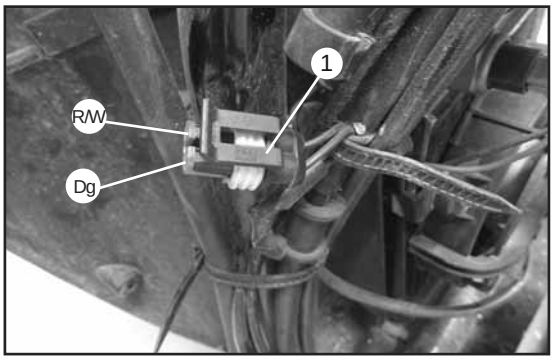


5. Remove the middle cover.
6. Disconnect the fuel level sensor cable (1).
7. Remove the four screws (2) to remove the fuel level sensor (3).
8. Measure the resistance value between the terminals (4).
9. If the measured values do not match the standard value replace the sensor.
10. Check the gasket (5) before reassembling.
11. Assembling in reversed order.



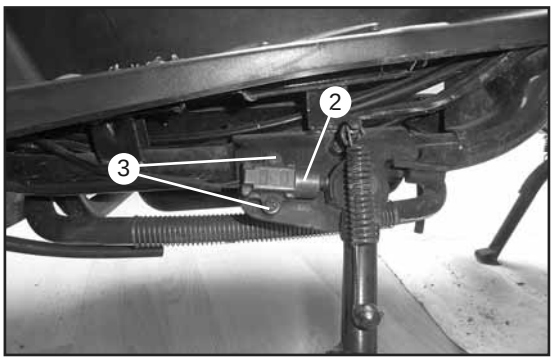
LEVEL	RESISTANT [Ω]
FULL	7 ± 10%
3/4	36 ± 10%
1/2	50 ± 10%
1/4	90 ± 10%
EMPTY	200 ± 10%

EMERGENCY CUTOUT SWITCH INSPECTION/ REPLACEMENT



1. Remove the under vehicle protection, the left front sidecover and the leg protection.
2. Disconnect the cable (1) coming from the switch.
3. Use a continuity tester to measure the switches as shown in the illustrations below.
4. In case of damage the switch need to be replaced.

	Dg	R/W
Side stand down		
Side stand up	○	○

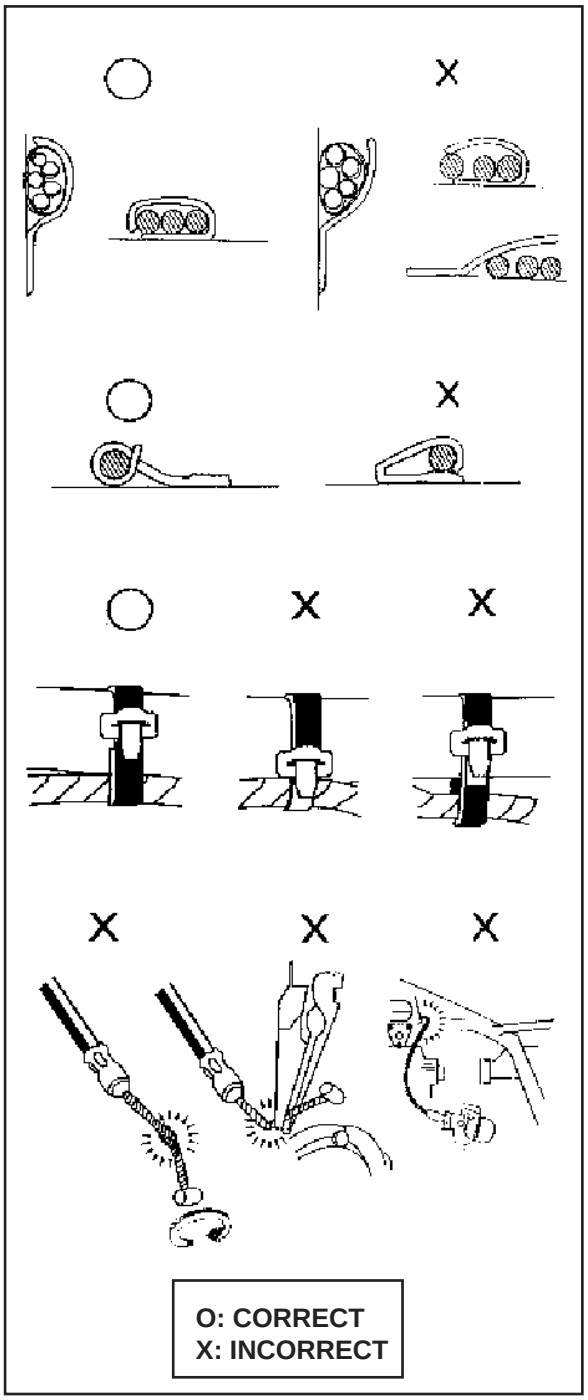


1. To remove the emergency cutout switch (2), disconnect the cable (1) and remove the two screws (3).
2. Reassemble in reverse order.

ELECTRICAL SYSTEM/ CABLES

NOTE

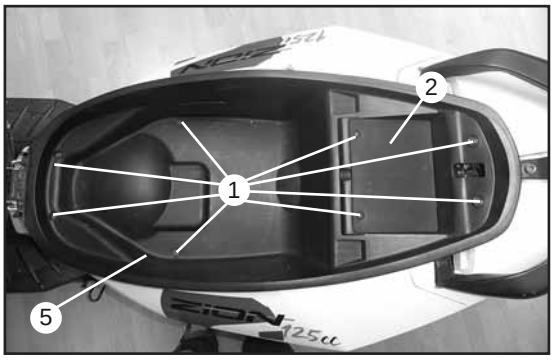
- Loose cable is a hidden trouble to electrical safety. After clamped check each cable to ensure electrical safety.
- It is not allowed to leave any wire clip bending towards bonding points.
- Bind each cable to its designated position.
- It is not allowed to lay a cable to end or a sharp corner on frame.
- It is not allowed to lay a cable to end of a bolt or screw.
- When laying a cable, keep it away from any heat source or any place where may bite it when it is moving.
- When laying a cable along a handle, avoid it being strained too tightly or loosely and it can not interfere with any adjacent part at any turning point.
- All cables should be laid smoothly without twist or knot.
- Before butt-jointing a connector, check if its sheath has been damaged and if it is overstretched.
- If a cable is at a sharp corner or outer corner, use tape or hose to protect it.
- After a cable is repaired, use tape to bind it securely.
- Keep all control cables from bend or twist because dumb control will result in case any control cable is damaged.



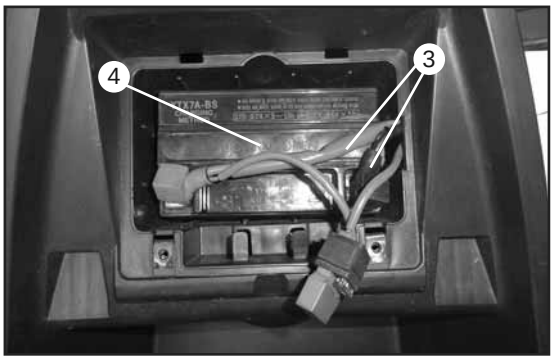
COVER REPLACEMENT

STORAGE BOX REMOVAL

1. Open the seat bench.
2. Remove the six boltsscrews (1) inside the storage box.
3. Remove the battery box (2).

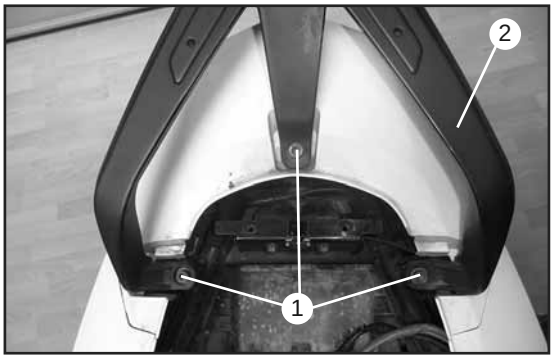


4. Remove the two battery vables (3) to remove the battery (4).
5. Afterwards you can lift the storage box (5).
6. Reassemble in reverse order.



REAR CARRIER REMOVAL

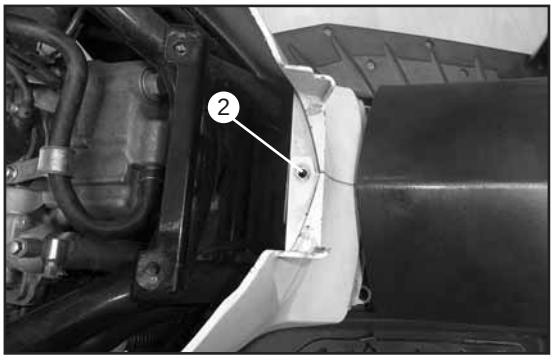
1. Remove the storage box.
2. Remove the three srews (1) to remove the rear carrier (2).



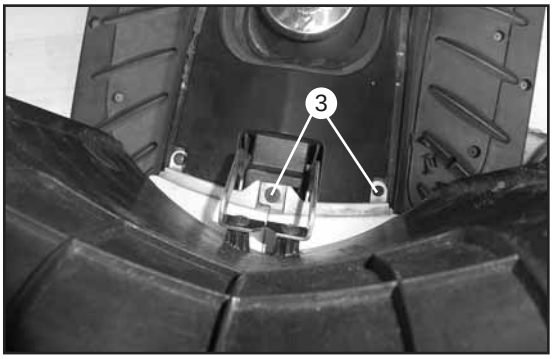
SIDECOVER RIGHT REPLACEMENT

1. Remove the storage box.
2. Remove the screw (1).

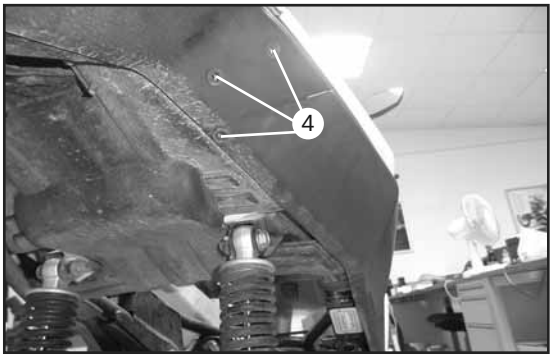
3. Remove the screw (2).



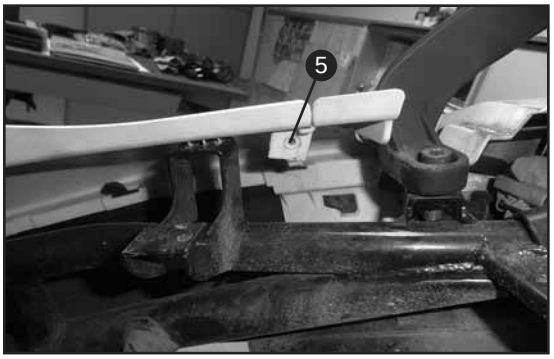
4. Remove the two screws (3).



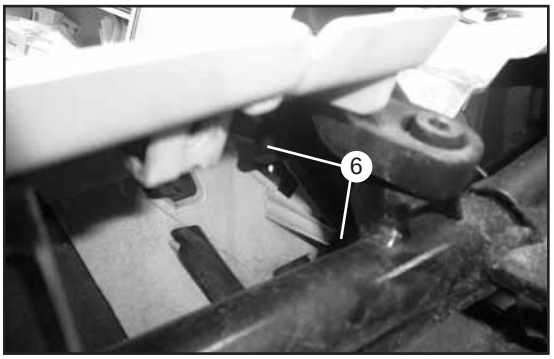
5. Remove the three screws (4).



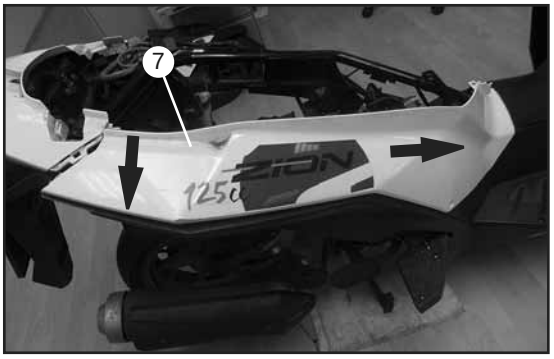
6. Remove the screw (5).



7. Remove the two screws (6).



8. Unthread the sidecover on the frontside and backside.
9. Slide the sidecover (7) sidewards and forwards.
10. Reassemble in reverse order.

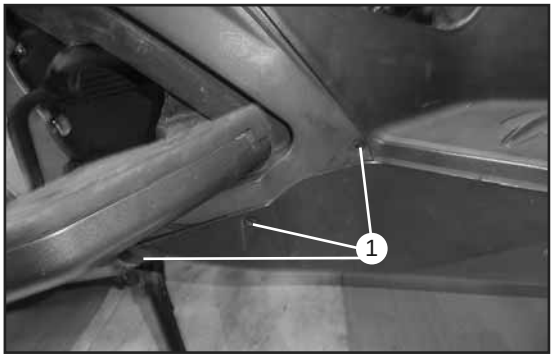


SIDECOVER LEFT REMOVAL

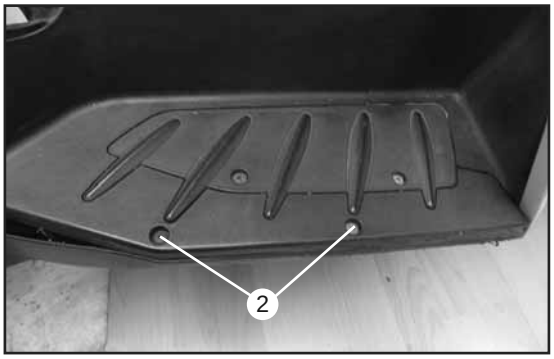
1. Remove the sidecover left in the same way as the sidecover right removal.

LOWER SIDECOVER RIGHT REMOVAL

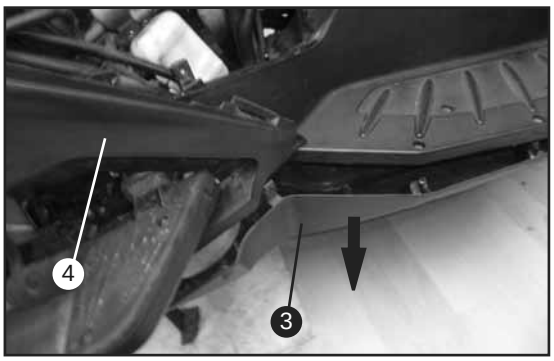
1. Remove the sidecover right.
2. Remove the two screws (1).



3. Also remove the two screws (2) of the middle body cover.



4. Push down the under vehicle protection panel (3) and unthread the lower sidecover (4).
5. Reassemble in reverse order.

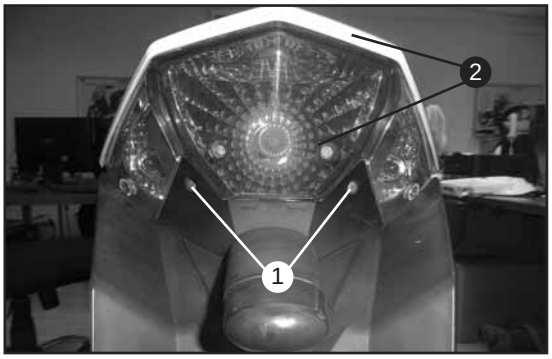


LOWER SIDECOVER LEFT REMOVAL

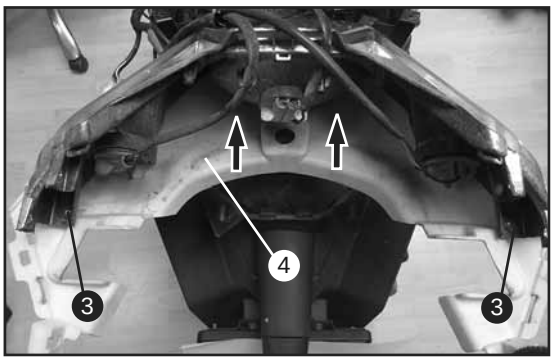
1. Remove the lower sidecover left in the same way as the lower sidecover right removal.

REAR LIGHT COVER WITH REAR LIGHT REMOVAL

1. Remove the both sidecovers.
2. Remove the two screws (1) to remove the rear light cover with the rear light (2).

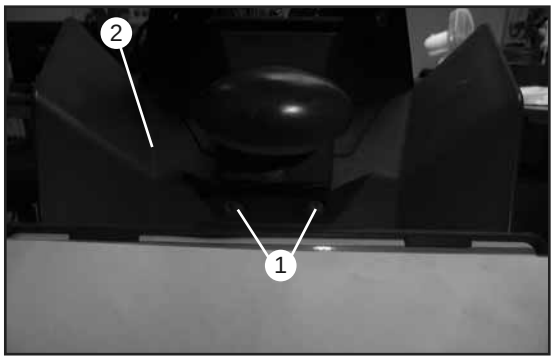


3. Remove the two screws (3).
4. Slide the rear light cover (4) forwards.
5. reassemble in reverse order.



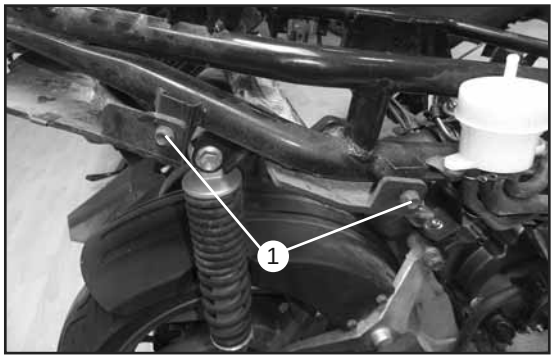
LICENSE PLATE BRACKET

1. Remove the rear light cover with the rear light.
2. Remove the two screws (1) to remove the whole license plate bracket (2).
3. Reassemble in reverse order.



INNER REAR FENDER REMOVAL

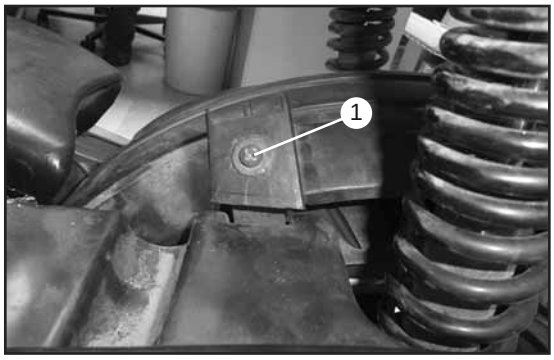
1. Remove the sidecover and the license plate bracket.
2. Remove the two screws (1) on the right and left side.



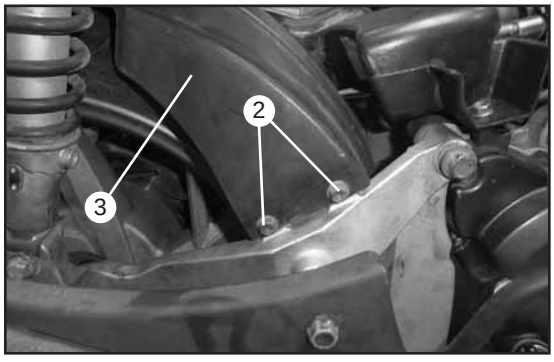
3. Unthread the inner rear fender.

REAR FENDER REMOVAL

1. Remove the screw (1).

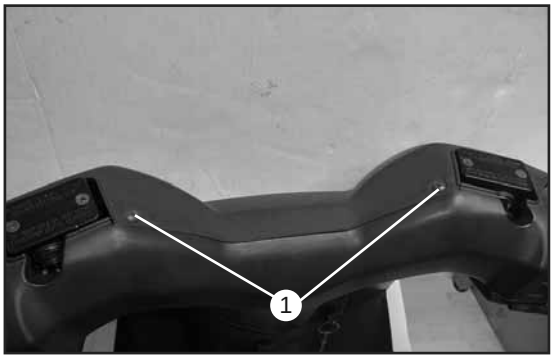


2. Remove the two screws (2) to remove the rear fender (3).

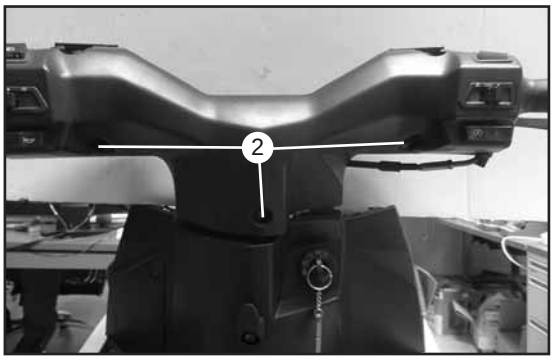


FRONT AND REAR HANDLEBAR COVER REMOVAL

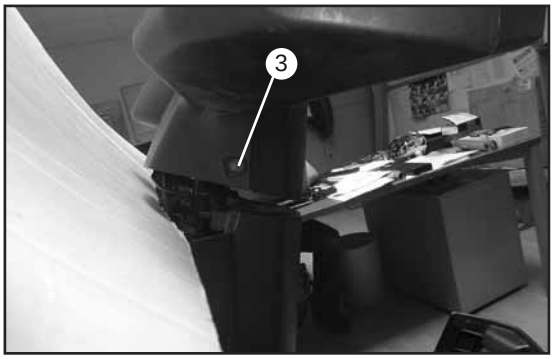
1. Remove the two screws (1).



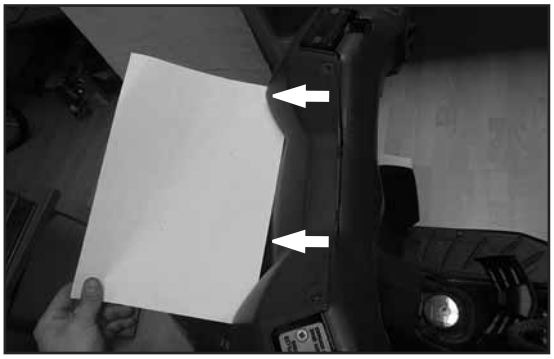
2. Remove the three screws (2).



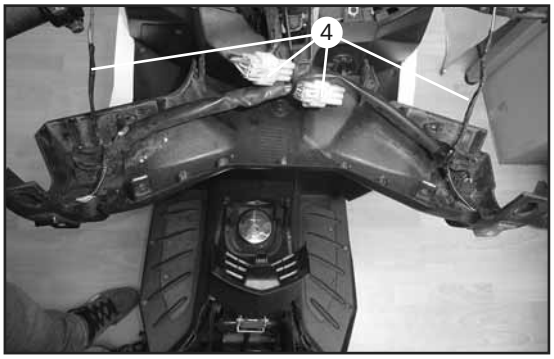
3. Remove the screw (3) on the left and right side.



4. Split the front and the rear handlebar cover.

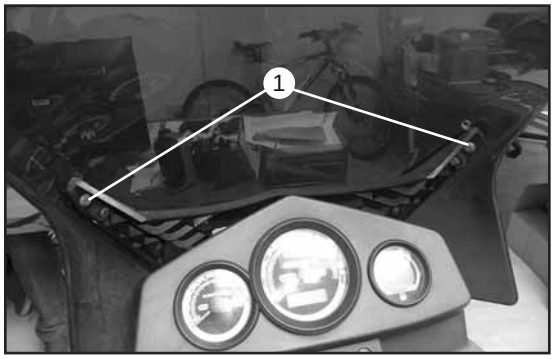


5. To remove the front handlebar cover, disconnect the handlebar cables (4).



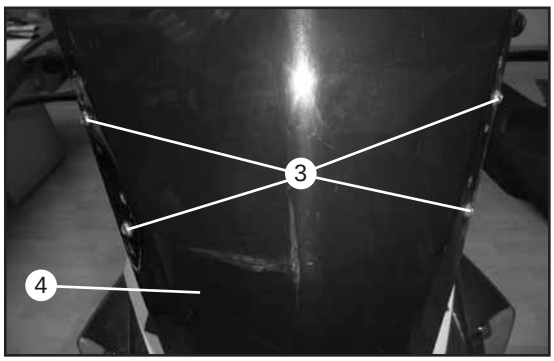
WINDSHIELD REMOVAL

1. Remove the two screws (1).

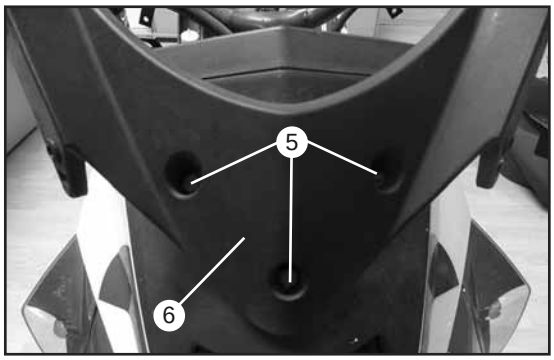


2. Now remove the two protections (2).

3. Remove the four screws (3) to remove the windshield (4).

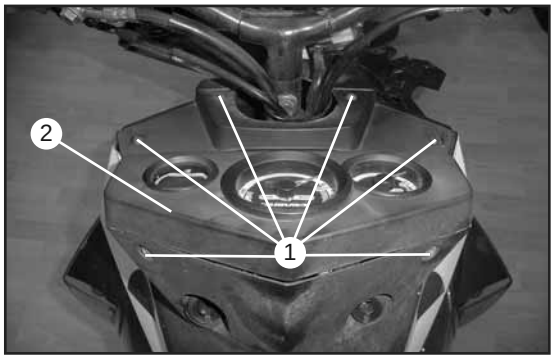


4. Remove the three screws (5) to remove the windshield bracket (6).
5. Reassemble in reverse order.

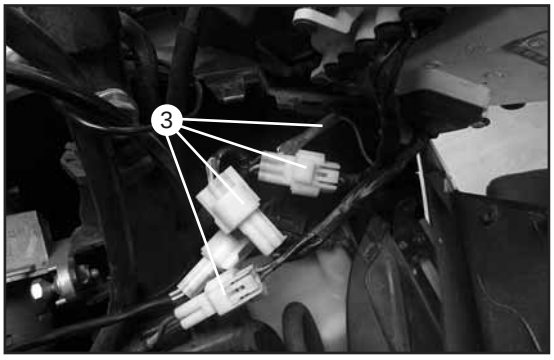


INSTRUMENT PANEL REMOVAL

1. Remove the front handlebar cover and the windshield bracket.
2. Remove the four screws (1) to remove the instrument panel (2).

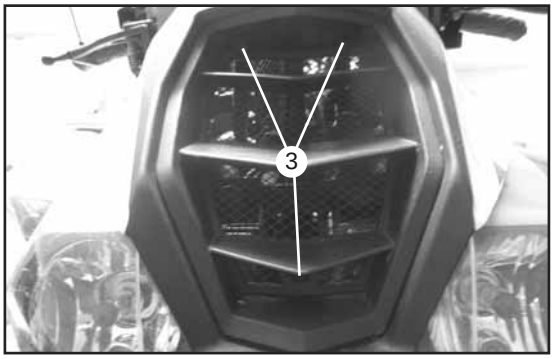


3. Disconnect the cables (3) of the instrument panel.
4. Reassemble in reverse order.



RADIATOR COWLING REMOVAL

1. Remove the three screws (1) to remove the radiator cowling (2).

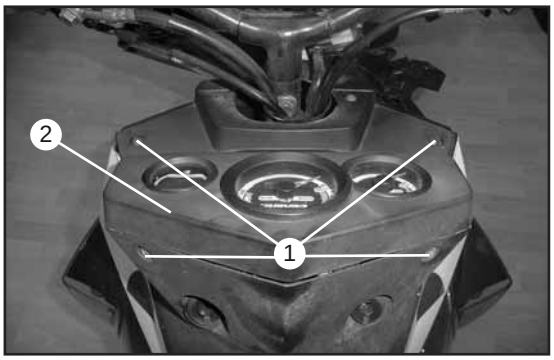


FRONT COVER REMOVAL

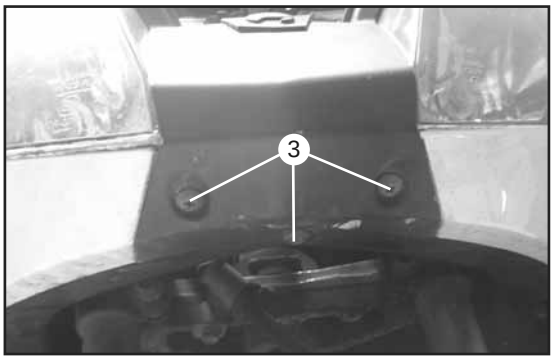
1. Remove the front handlebar cover and the windshiel bracket and the radiator cowling.
2. Remove the the four screws (1) of the instrument panel (2).

NOTE

It is not necessary to remove the whole instrument panel.



3. Remove the three screws (3).



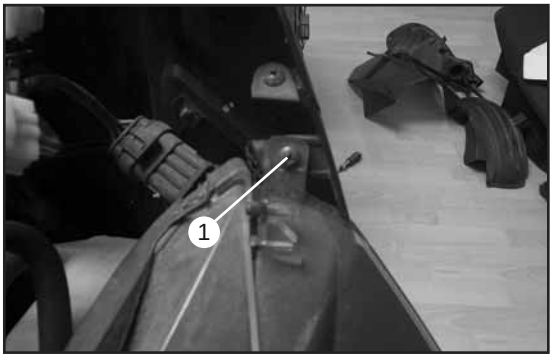
4. Slide the front cover forwards.
5. Reassemble in reverse order.

FRONT SIDECOVER LEFT REMOVAL

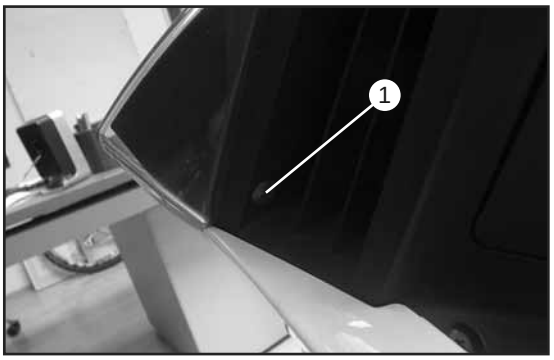
NOTE

It is necessary to remove the front sidecover with the headlight.

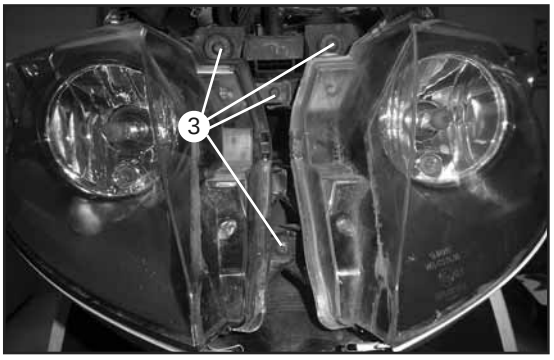
1. Remove the windshield bracket, the front cover and the instrument panel.
2. Remove the screw (1).



3. Remove the screw (2).

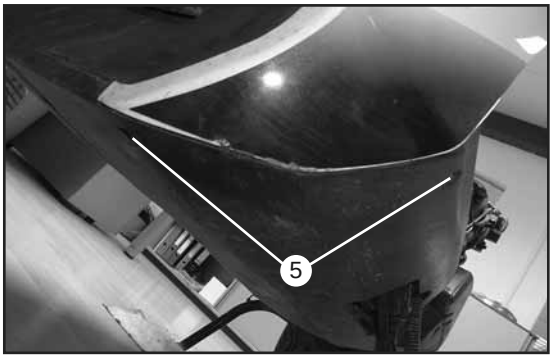


4. Remove the four screws (3).

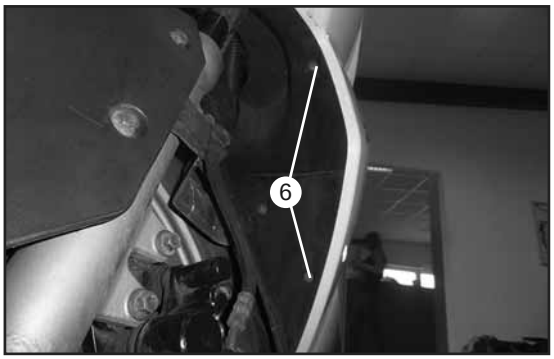


5. Unthread the left headlight from the right headlight as shown in the picture (4).

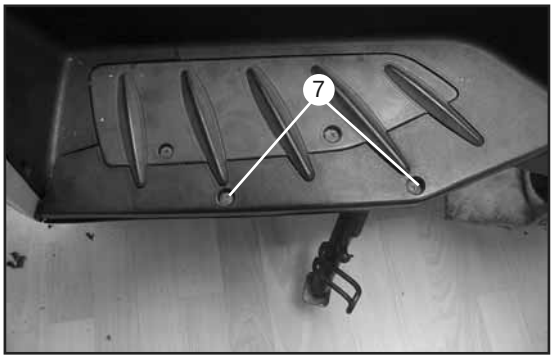
6. Remove the two screws (5).



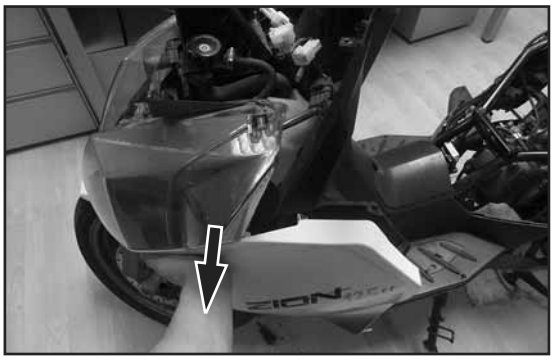
7. Now remove the two screws (6).



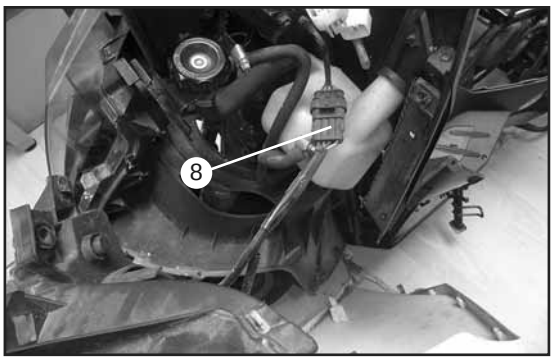
8. Remove the two screws (7).



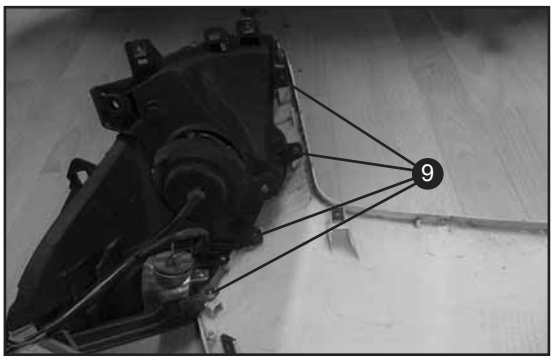
9. Slide the front cover left with the left headlight sidewards.



10. Disconnect the cable (8).



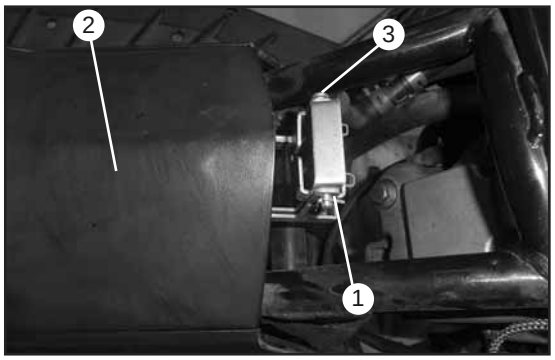
11. To remove the sidecover from the headlight, remove the four screws (9).
12. Reassemble in reverse order.



FRONT SIDECOVER RIGHT REMOVAL

1. Remove the front sidecover right in the same way as the front sidecover left removal.

FUEL TANK COVER REMOVAL

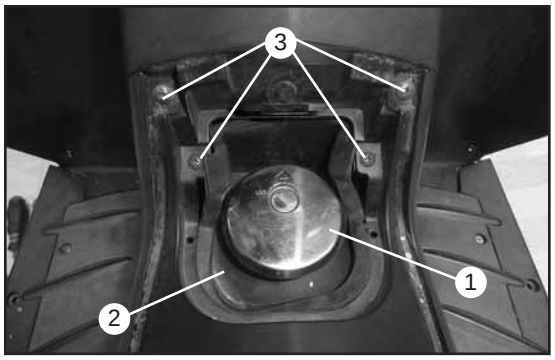


1. Remove the storage box.
2. Remove the splint (1).
3. Open the fuel tank cover (2) and remove the bolt (3).
4. Unthread the fuel tank cover.

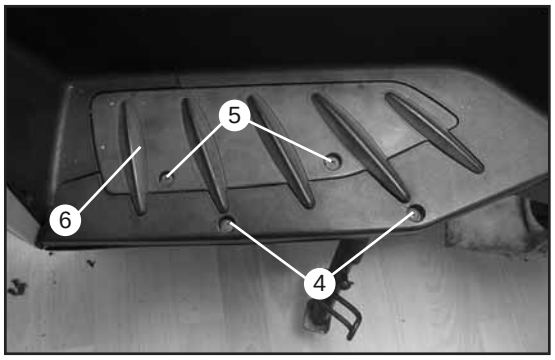
NOTE

It is not necessary to remove the spring.

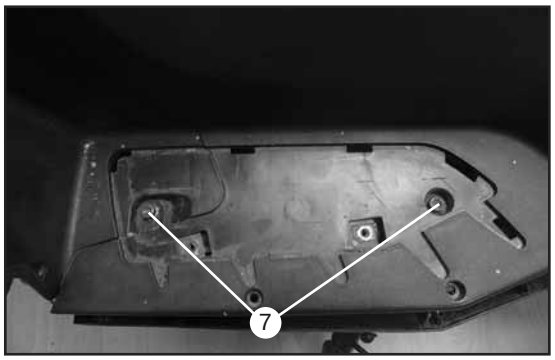
MIDDLE COVER REMOVAL



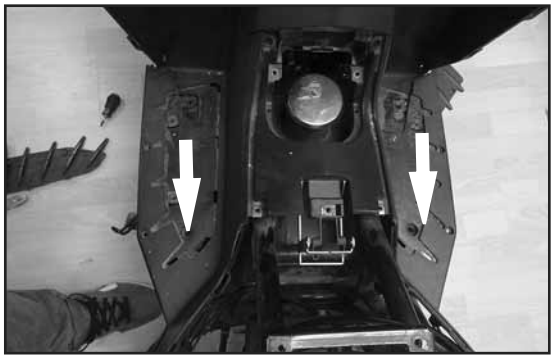
1. Remove the storage box and the fuel tank cover.
2. Remove the tank closure (1).
3. Remove the blanking grommet (2) and close the tank closure.
4. Remove the four screws (3).



5. Remove the two screws (4) on the left and right side.
6. Remove the two screws (5) to remove the cover (6) on the left and right side.



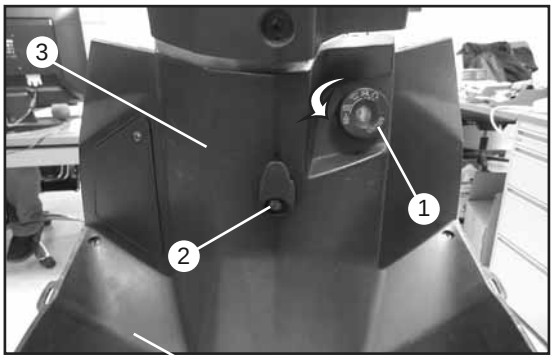
7. Remove the two screws (7) on the lfet and right side.



8. To remove the middle cover slide it backwards (arrows).

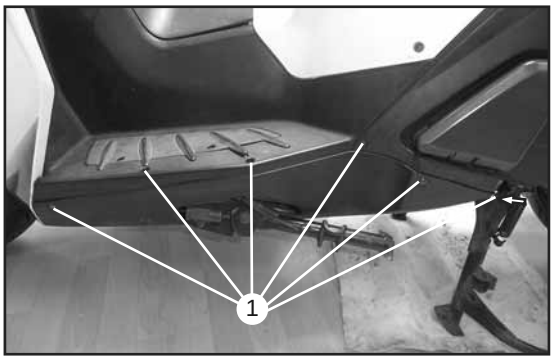
LEG PROTECTION REMOVAL

1. Remove the middle cover and the front sidecovers.
2. Turn the ignition switch cover (1) counterclockwise (arrow) and pull it out.
3. Remove the screw (2).
4. Now it is possible to remove the leg protection (3).

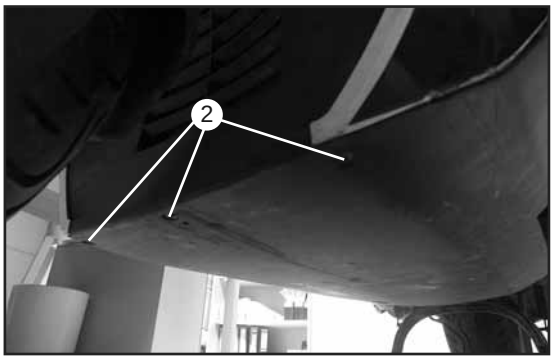


UNDER VEHICLE PROTECTION PANEL REMOVAL

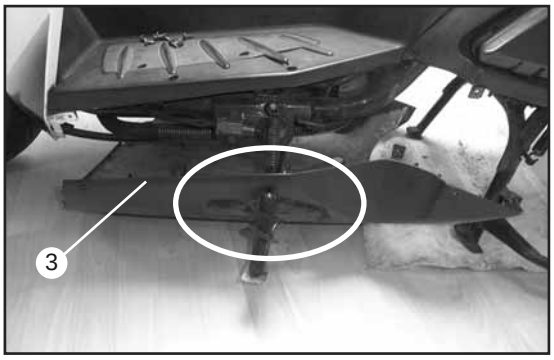
1. Remove the six screws (1) on the left and right side.



2. Remove the three screws (2).

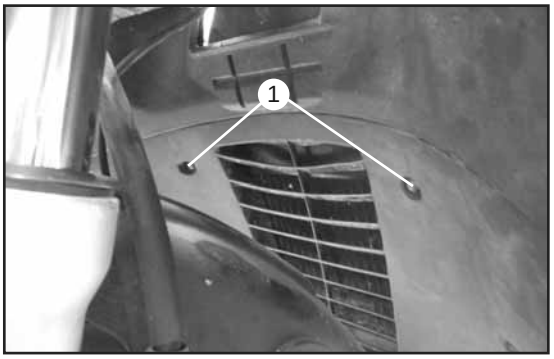


Unthread the under vehicle protection panel (3).

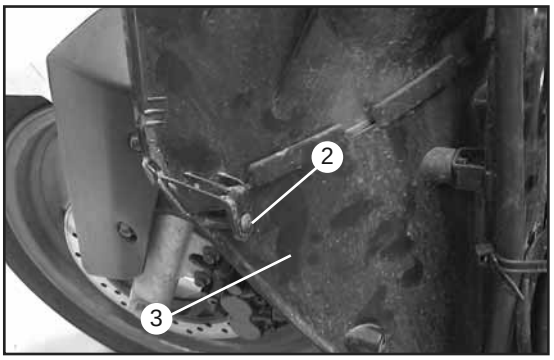


FRONT WHEEL ARCH PANEL REMOVAL

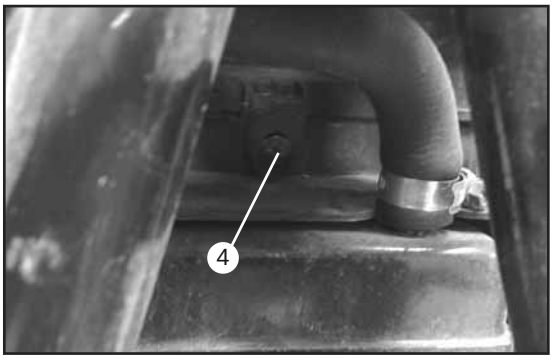
1. Remove the left and right front sidecover, the under vehicle protection panel and the leg protection.
2. Remove the two screws (1).



Remove the screw (2) on left and right side.

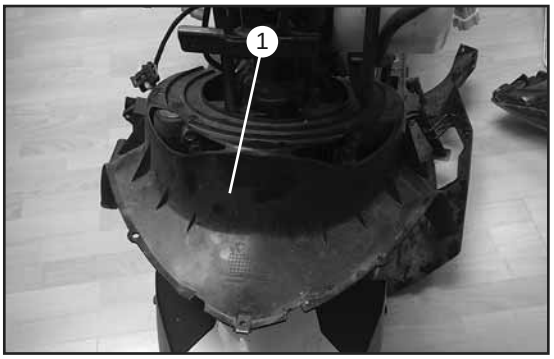


3. To remove the front wheel arch panel (3), remove the screw (4) on the inner side.



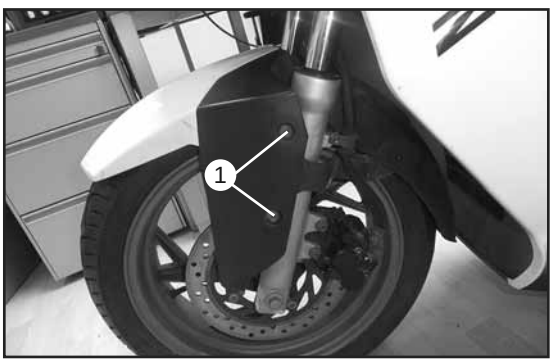
LOWER COVER STEERING COLUMN REMOVAL

1. Remove the front wheel arch panel.
2. Remove the front wheel and one fork.
3. Unthread the lower cover steering column (1).

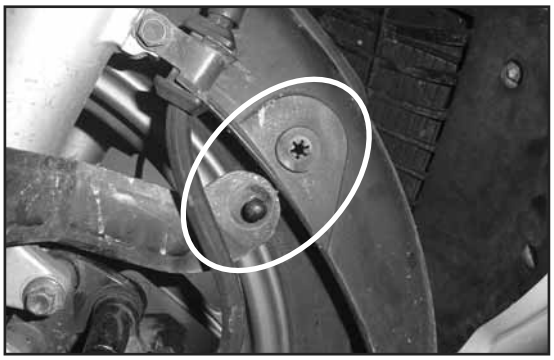


FRONT FENDER REMOVAL

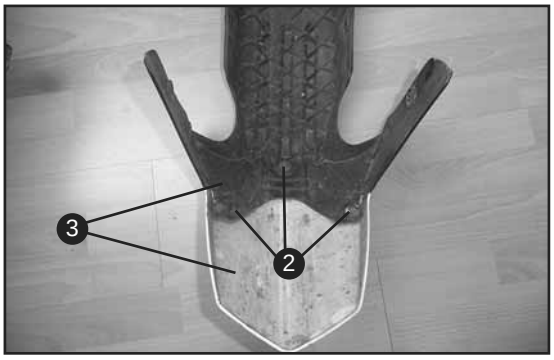
1. Remove the two screws (1) on the left and right side.



2. Unthread the front fender from the bracket.



3. Remove the three screws (2) to split the front fender (3).



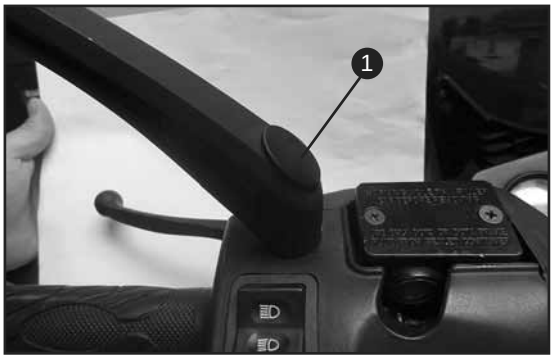
BACK VIEW MIRRORS

NOTE

At all repairs in the area of the handle bar is advised to remove the back view mirrors.
To prevent damage during installation of the back view mirror consider that on the right side is a left-handed thread and vice versa.

MIRRORS REMOVAL

1. Push out the rubber cap (1).



2. To remove the left mirror, remove the screw (2)

NOTE

LEFT SIDE = RIGHT SIDE THREAD
RIGHT SIDE = LEFT SIDE THREAD

Only one side (left side) is illustrated.

BACK VIEW MIRRORS INSTALLATION

1. Position the mirror and if the position is correct, tighten the screw (2).