Xmotion 125/250

OWNER-MANUAl

MAINTENANCE HANDBOOK

TAIWAN GOLDEN BEE CO.,LTD.

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CHAPTER I
REGULAR INSPECTION

1-1 Delivery Introduction

To inform customers **of** correct methods **to** use: **To** practically and correctly ride **a** scooter according **to** the Instruction **of** Manual and Maintenance Handbook. Customers should also try **in** person according **to** this manual.

1. Starting:

A. Turn the power switch to "ON."

B. Hold the front or rear brake and press the "START" button.

C. If the scooter is not started, release the "START" button and try again after a few minutes. Each start should be less than five seconds to avoid battery consumption.

Note: This is an AUTO-CHOKE scooter, thus there is no choke lever.

The fuel is controlled only by throttle grip.

The accelerator has to return to its original place when the scooter is not in use.

D. If the scooter can not be started by the "START" button, try the kick starter.

2. Fuel:

Inform customers to refill the fuel to no more than 80% of the tank capacity only.

. Lubricant Adopted:

A. WARNING : The engine oil must be refilled when the oil warning lamp lights, otherwise the engine will be burned-out due to insufficient lubrication. Recommended oil : TGB Genuine EXTRA 4X OIL.

B. Genuine TGB HYPOID GEAR OIL(or SAE85W-140) will be adopted as gear oil to be changed on a periodical basis. Gear oil and engine oil are different in their nature. Attention should be paid to avoid mistake when used.

4. Regular Inspection and Maintenance:

Inform customers of the importance of inspection before running and regular inspection.

A. Inspection Before Running: Riders should perform nspection by themselves before running.

B. Regular Inspection: Regular inspection should be performed after the first month and the sixth month and every six months afterwards.

5. Description of Warranty System:

Clearly identify the content of warranty in accordance with the warranty paper.

A. Content and term of warranty.

B. Maintenance items not guaranteed.

C. Items should be followed by customers.

Instruct customers to carry the OWNER'S Manual with them when they come for regular inspection and maintenance. It is because such inspection should be recorded onto the Manual.

1-2 Inspection Before Running

Items to be Inspected Before Running by Customers:

ITEM	CONTENT	GUIDELINE
1. Starter	Is the oil volume proper?	1 .Check Oil Warning Lamp to see if the oil volume is proper?
2 .Fuel	Is the fuel volume sufficient?	1 .Check fuel volume to see if it is enough to the destination.
3. Lamp & Direction Indicator	Is the lamp condition well? Is there any dirt?	1 .Check if the lighting condition of head lamp, tail lamp, licence lamp, brake lamp, direction indicator and other lamp is well. 2. Lamps should be kept clean and undamaged.
4. Back Mirror	Is the reflecting image well?	1. Look at the back mirror from the seat to check if the rear view is clear.
5. License Plate & Reflector	No dirt and damage should appear.	1. License plate should be installed, letters and numbers should be kept clear and clean. 2. Dirt and damage should not appear on the reflector.
6 . Brake	Check the distance of brake handle lever and the brake effect.	1 .Operate the handle lever slowly to the brake begin to effect in order to inspect the moving distance. 2.Test the brake with low speed running to see the brake effect of front and rear brakes.
7. Tire	1.Is the air pressure proper?	1 .Check if the air pressure of tire is sufficient with a gauge or by sight.
	2.Groove should be deep enough.	1 .Check if the groove of tires is enough.
	3.Unusual wear is not desired.	1 .Check landing flat of tire to see if any unusual wear appears.
	4.Breaking and damage are not desired.	1 .Check landing flat and side to see if any breaking or damage appear.
	5.Metal, stone and other articles are not desired.	1 .Cneck if any cracking, stone or any other article sticks into the tire.

1-3 Regular Maintenance Schedule

The chart below lists the recommended intervals for all the returned periodic service work necessarily to keep the motorcycle operating at peak performance and utmost efficiency. Mileages are expressed in terms of kilometers and months. These intervals judged by odometer reading or month whichever comes first.

Item	\~^^^^ Maintenance N, ^^\ kilometer ^^ Maintenance Interval Check Items \	300KM NEW	Every 1000KM 1 Month	Every 3000KM 2 Month	Every 6000KM 3 Month	Every 12000KM 4 Month	Remarks
01	Air cleaner element(Remark)	I		C	C		
02	Oil filter(Screen)	C			R		
03	Engine oil	R	I	Replacement for every 3000KM			
04	Tire, pressure	I	I				
05	Battery	I	I				
06	Spark plug	I		I		R	
07	Carburetor(idle speed)	I			I		
08	Steering bearing and handles	I		I			
09	Check Transmission for leakage	I	I				
10	Check crankcase for leakage	I	I				
11	Transmission oil	R	Replacement for every 5000KM (5 Month)				
12	Drive Belt/roller				I	R	
13	Fuel tank switch and lines	I		I			
14	Throttle valve operation and cable	I	I				
15	Engine bolts and nuts	I		I			
16	Cylinder head, cylinder, and piston				I		
17	Exhaust system/cleaning carbon				I		
18	Cam chain/ignition time	I		I			
19	Valve clearance	I			I		
20	Shock absorbers	I			I		
21	Front/rear suspension	I			I		
22	Main/side stands	I			I/L		
23	Crankcase Blow - by system(PCV)	I		I			
24	Coolant	I	I			R	
25	Cooling fan, lines	I	I				
26	Clutch disk				I		
27	Brake mechanism/brake lining(pad)	I	I				
28	Bolts/nuts for each components	I	I				

*The above maintenance schedule is established by taking the monthy 1000 kilometers as areference which ever comes first.

Code : I ~ Inspection, cleaning, and adjustment R ~ Replacement

C ~ Cleaning(replaced if necessary) L ~ Lubrication

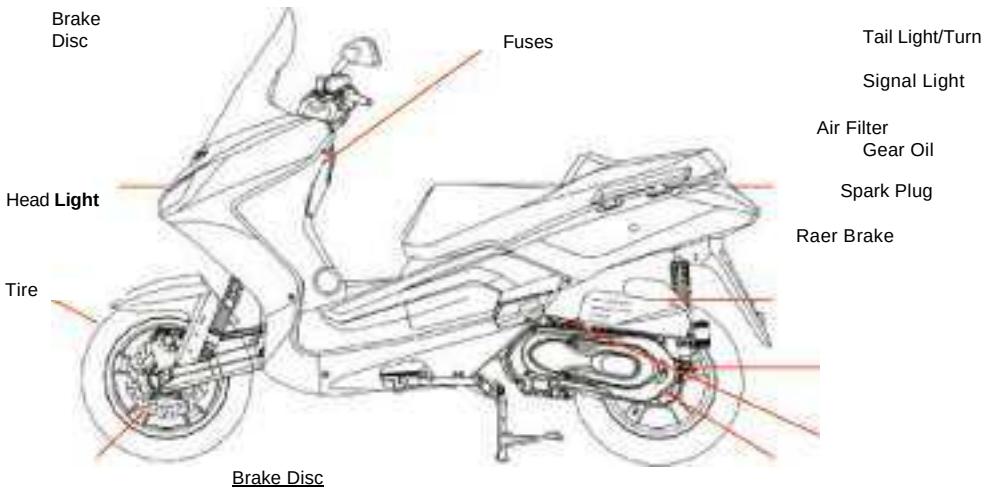
Remark : 1. Clean or replace the air cleanr element more often whe the scooter is operated on dusty roads or in the Heavily - polluted environment.

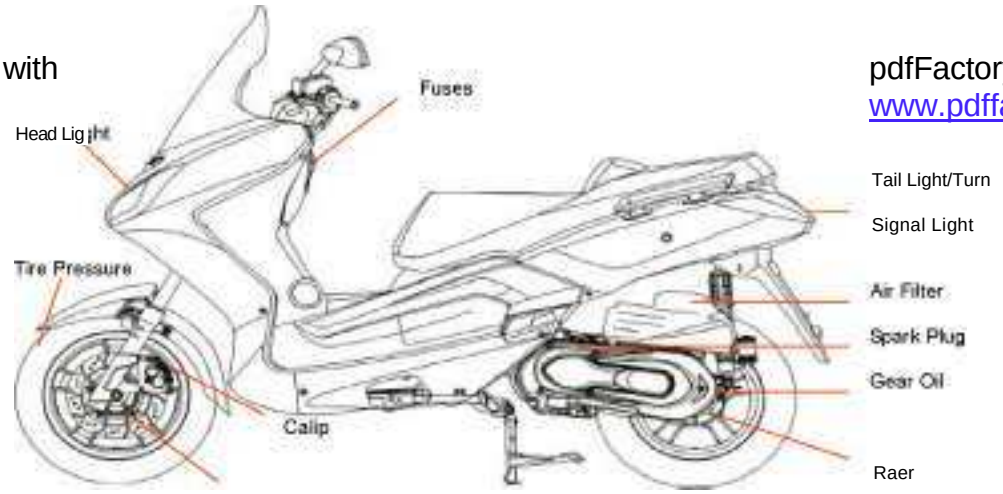
2. Maintenance should be performed more often if the scooter is frequently operated in high speed and after the scooter has accumulated a higher mileage.

1-4 General Inspection General Inspection and Adjustment

*** means adjustable.**

Note: The ignition of this scooter by the use of crank-shaft which is 4 ignitions/revolution. Special attention should be paid while setting the turning speed of Engine by Tachometer.





1-5 Notes for Inspection

ITEM	INSPECTION DETAILS
1	Be aware of smoke and fire while performing maintenance.
2	New Packing, Gasket, O Ring, locking pin should be used while assembling.
3	Only designated TGB oils should be used on spare parts.
4	Clean the vehicle before maintenance to avoid dirt or mud on disconnected parts.
5	The locking sequence of Bolt and Nut should be from inside to outside, or in diagonal step. Reverse the sequence to loose.
6	Special tools should be used when necessary.
7	Attention should be paid to avoid damage or loss of disconnected parts. Clean and grease properly before the assembly. No grease on Bolt's Thread.
8	Reconfirm each function after the assembly.
9	Special attention should be paid to the battery's electrolyte and brake oil which will stam clothes.

CHAPTER 2
MAINTENANCE INFORMATION

2-1 Specification Sheet

CU8 (X-Motion 125)								
Dimension	Length (mm)		2130	Fuel System	Air Filter			Paper Type
	Width (mm)		840		Fuel Capacity			11 L
	Height (mm)		1380		Carburetion	Type		CVK164
	Wheelbase (mm)		1500			Venturi (mm)		25
Mass	Unload mass	Front	55					
		Rear	95	Electric system	Ignition	Type		C.D.I.
		Total	150			Spark		CR8E
	Total mass 2 person/ 150 kg	Front	102			Pointgap (mm)		0.8+0.1
		Rear	198		Battery Type			GTX14-BS
		Total	300					
Tire		Front	120/70-14	Transmis - sion	type			Automatic
		Rear	140/60-13		Clutch type			Centrifugal type
Engine	Engine Type		4 Stroke 4V electroplated ceramic cylinders engine		Transmission type			CVT
	Fuel Type		Petrol		Gear Box	Type		Automatic
	Number of Cylinder		Single cylinder			Gear Ratio	R1	0.79~2.72
	Bore X Stroke (mm)		57 X 48.8				R2	9.67
	Cylinder Capacity		124.5 c.c.					
	Starter		Electric &Kick	Motion system	raked angel (°)			
	Cooling System		Liquid		Tire Pressure (psi)		Front	28
	Lubrication system		Forced circulation & splashing				Rear	32
	Reference and setting range(IN)		**0.12±0.02 mm**		Turn angel (°)		Left	
	Reference and setting range(EX)		**0.12±0.02** mm				Right	...
	MaxSpeed (km/hr)		105 km/h	Braking system			Front	Disk
	Idle speed (rpm)		1800+100 rpm				Rear	Disk
	Max Power (Kw/rpm)		9 kw/8750 rpm	Buffer	Suspension		Front	Hydraulic-pressed Spring type
	Max Torque (Nm/rpm)		10.5Nm/8250rpm				Rear	Hydraulic-pressed Spring type
	Compression Ratio		10.5		Buffer		Front	Hydraulic-pressed Spring
	Oil Spec.		SAE 10W-30				Rear	Hydraulic-pressed Spring
	Oil Capacity (L)		1 L	Frame Type				Welding Tube
	Gear Oil Spec., Capacity		SAE 90, 0.11L					
Lamp	Front Lamp		35W/35W-12V					
	Rear Lamp		5W-12V					
	Brake Lamp		21W-12V					
	Direction Lamp		21W-12V					

CUB (X-Motion 250)								
Dimension	Length (mm)		2130	Fuel System	Air Filter			Paper Type
	Width (mm)		840		Fuel Capacity			11 L
	Height (mm)		1380		Carburetion	Type		...
	Wheelbase (mm)		1500			Venturi (mm)		...
Mass	Unload mass	Front	60					
		Rear	100	Electric system	Ignition	Type		E.C.U.
		Total	160			Spark		CR8E
	Total mass 2 person/ 150 kg	Front	107			Point ga (mm)		0.8±0.1
		Rear	203		Battery Type			GTX14-BS
		Total	310					
Tire		Front	120/70-14	Transm - ission	type			Automatic
		Rear	140/60-13		Clutch type			Centrifugal type
Engine	Engine Type		4 Stroke		Transmission type			CVT
	Fuel Type		Petrol		Gear Box	Type		Automatic
	Number of Cylinder		Single cylinder			Gear Ratio	R1	0.8~2.30
	Bore X Stroke (mm)		71 X 63.3				R2	7.42
	Cylinder Capacity		249.4 c.c.					
	Starter		Electric	Motion system	raked angle (°)			—
	Cooling System		Liquid		Tire Pressure (psi)		Front	28
	Lubrication system		Forced circulation & splashing				Rear	32
	Reference and setting range(IN)		0.1 ±0.02 mm		Turn angel (°)		Left	—
	Reference and setting range(EX)		0.15±0.02 mm				**Right**	—
	Max Speed (km/hr)		128 km/h	Braking system			Front	Disk
	Idle speed (rpm)		1650±100 rpm				Rear	Disk
	Max Power (Kw/rpm)		17.2kw/8750 rpm	Buffer	Suspension		Front	Hydraulic-pressed Spring type
	Max Torque (Nm/rpm)		22.7Nm/8250rpm				Rear	Hydraulic-pressed Spring type
	Compression Ratio		10.8		Buffer		Front	Hydraulic-pressed Spring
	Oil Spec.		SAE 10W-30				Rear	Hydraulic-pressed Spring
	Oil Capacity (L)		1.4 L	Frame Type				Welding Tube
	Gear Oil Spec.,Capacity		SAE 90, 0.18L					
Lamp	Front Lamp		35W/35W-12V					
	Rear Lamp		5W-12V					
	Brake Lamp		21W-12V					
	Direction Lamp		21W-12V					

2-2 Safety Precautions

Warning: Engine Exhaust

Please keep good ventilation during engine operation. Do not operate engine in closed-room. The toxic carbon-oxygen (CO) in exhaust may lead human to loss conscious and even death.

Warning: Gasoline

The gasoline is very easy to burn or explode. Forbid any fire during inspection of gasoline tank or gasoline leak.

Warning: Battery H_2 and Battery Liquid

1. The battery liquid is toxic sodium liquid. Please do not contact the liquid with skin or eye. If any contact happens, please wash with massive clean water and contact with doctor.
2. The released H_2 from battery is explosive. Please keep good ventilation during charging battery and forbid any fire.

Watch: Brake Fluid

The brake fluid can damage the painting on plastic. Please cover the plastic parts with towel or cloth during maintenance of brake disk. If the brake fluid is split on plastic component, please remove the fluid and wash the surface with water right away.

Watch: High Temperature of Engine

The engine cover, cylinder, and exhaust pipe have high temperature after starting of engine. Please wear glove in maintenance of parts during engine operation, or maintenance should be waited until engine is cooled.

2-3 Special Tools

125 ce:

Special tools list	Crank case / transmission oil seal driver
How to use special tools	AC.G. flywheel puller
R/L. Crank case disassemble / install tools	Valve cotter remover / install driver
Bearing driver	Outer / inner bearing puller
Water pump bearing / seal driver	Crank case bush puller

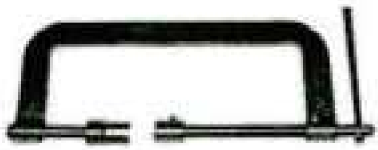
H9A ENG. REMOVE. ASSEMBLY. ADJUSTER SPECIAL TOOLS LIST

1	2	3
		
NAME: R/L. CRANK DISASS. TOOL	NAME: CRANK SHAFT PULLER	NAME: CRANK SHAFT BRG. FIXING SOCKET
NO.: TGB -1120000-H9A	NO.: TGB -1130000-H9A	NO.: TGB -9100210-H9A
PRICE: USD	PRICE: USD	PRICE: USD
4	**5**	**6**
	 (6204)	 (6301)
NAME: L. CRANK SHAFT BRG. DRIVER	NAME: BEARING DRIVER	NAME: BEARING DRIVER
NO.: TGB-9100200-H9A	NO.: 440647	NO.: TGB -9610000
PRICE: USD	PRICE: USD	PRICE: USD
7	**8**	**9**
 (6203/6004UZ)	 (6901)	 (INNER)
NAME: BEARING DRIVER	NAME: WATER PUMP BEARING DRIVER	NAME: WATER PUMP OIL SEAL DRIVER
NO.: TGB -9620000	NO.: 440640	NO.: 440641
PRICE: USD	PRICE: USD	PRICE: USD

SPECIAL TOOLS

10		11		12	
				 (27*42*7)	
NAME	WATER PUMP MECHANICL SEAL DRIVER	NAME	AC.G. FLYWHEEL PULLER	NAME	OIL SEAL DRIVER
NO.	TGB-1721700-H9A	NO.	TGB -3110A00	NO.	TGB -9125500
PRICE	USD	PRICE	USD	PRICE	USD
13		14		15	
 (25*40*8)		 (20*32*6)			
NAME	OIL SEAL DRIVER	NAME	OIL SEAL DRIVER	NAME	UNIVERSAL HOLDER
NO.	TGB-9121600	NO.	TGB -9120200	NO.	440646
PRICE	USD	PRICE	USD	PRICE	USD
16		17		18	
					
NAME	CLUTCH NUT WRENCH	NAME	CLUTCH SPRING COMPRESSOR	NAME	TAPPET ADJUSTING WRENCH
NO.	TGB -9020200	NO.	TGB-2301000	NO.	TGB -9001200
PRICE	USD	PRICE	USD	PRICE	USD

SPECIAL TOOLS

19	20	21
		
NAME VALVE SPRING COMPRESSOR	**NAME** VALVE COTTER REMOVE & ASSEMBLY TOOL	**NAME** UNIVERSAL HOLDER
NO. TGB-1471100	**NO.** TGB-1471110/20	**NO.** TGB-9001210
PRICE USD	**PRICE** USD	**PRICE** USD

22	23	24
	 (φ30mm)	 (φ22mm)
NAME RR CUSHION ADJUSTING WRENCH	**NAME** CRANK CASE BUSH PULLER	**NAME** CRANK CASE BUSH PULLER
NO. TGB-5320000	**NO.** TGB-1120310	**NO.** TGB-1120320
PRICE USD	**PRICE** USD	**PRICE** USD

25	26
	
NAME OUTER BEARING PULLER	**NAME** INNER BEARING PULLER
NO. TGB-6204010	**NO.** TGB-6204020
PRICE US	**PRICE** USD

SPECIAL TOOLS

How to use special tools:

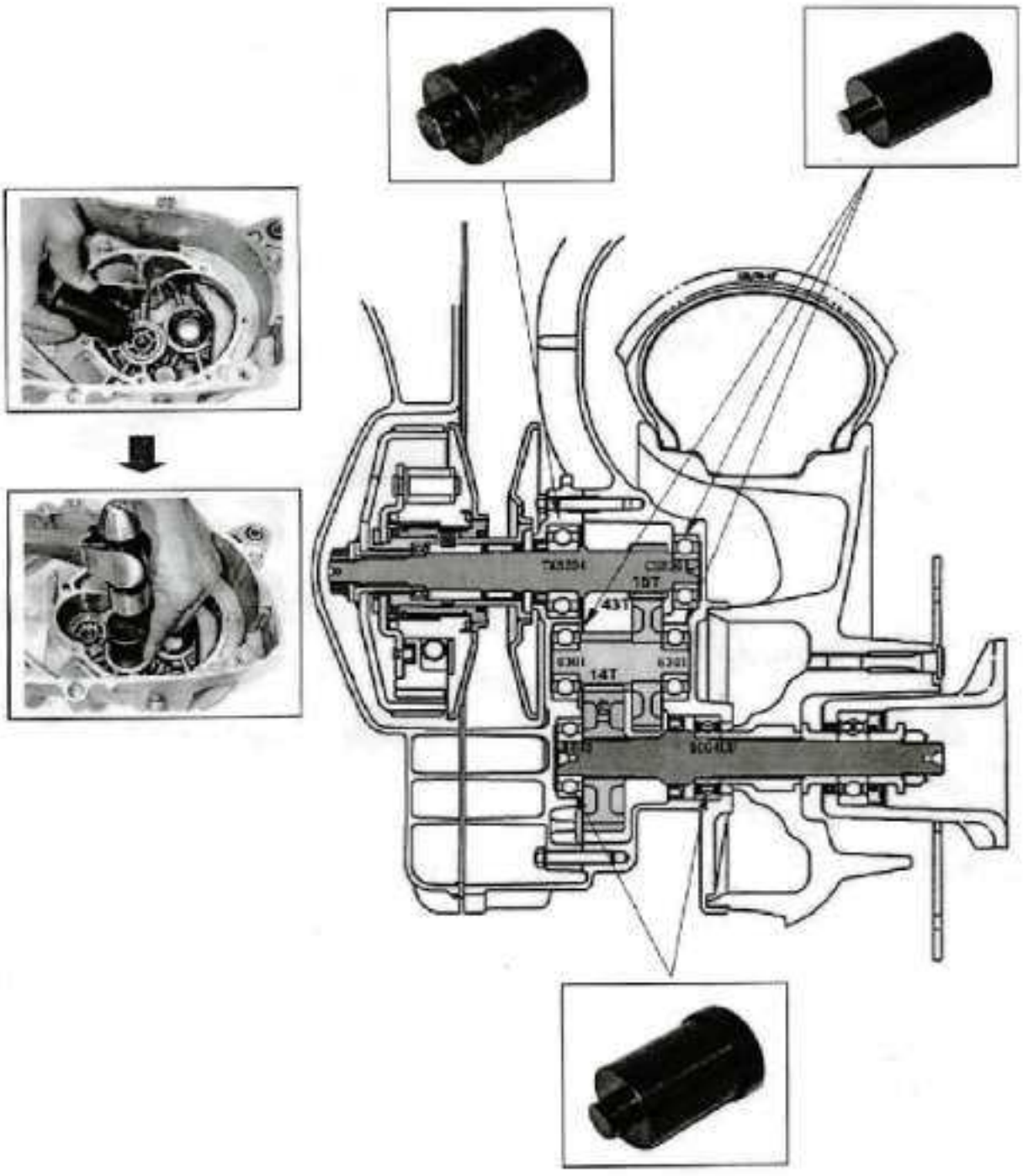
R/L. CRANK CASE PISASS TOOL

Disassemble the crankcase

Install the left crank case bearing

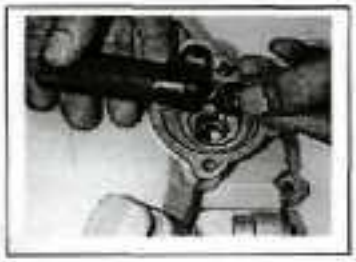
Install the crankshaft

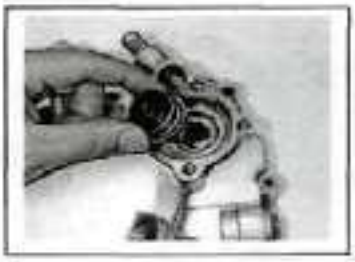
BEARING DRIVER



SPECIAL TOOLS

WATER PUMP BEARING DRIVER	WATER PUMP OIL SEAL DRIVER	
BEARING (6901)	INNER OIL SEAL	MECHANICL SEAL

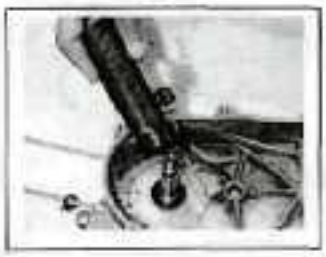




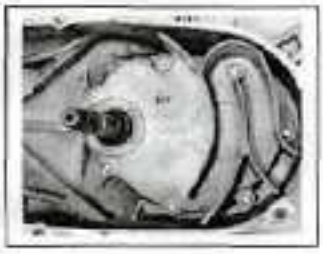
(Seal from transmission side

CRANK CASE / TRANSMISSION OIL SEAL DRIVER

OIL SEAL (25*40*8)



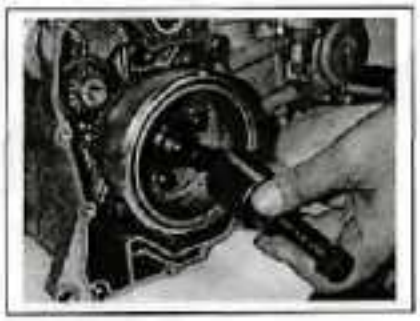
OIL SEAL (20*32*6)



OIL SEAL (25*42*7)

SPECIAL TOOLS

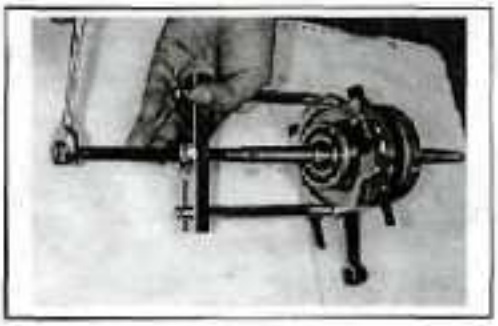
AC.G. FLYWHEEL PULLER

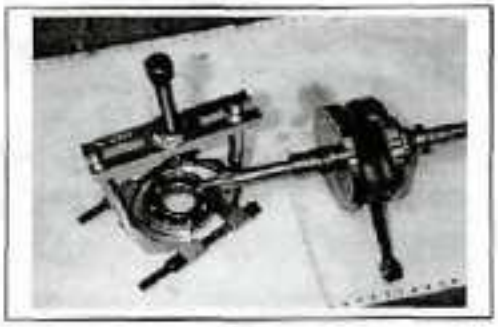


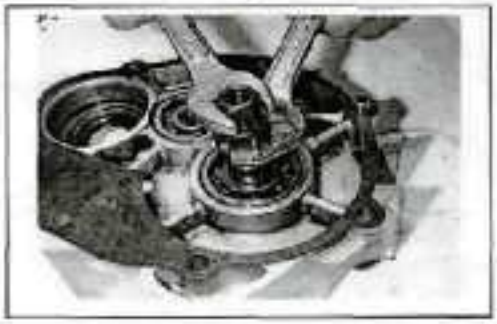
VALVE COTTER REMOVE / INSTALL DRIVER

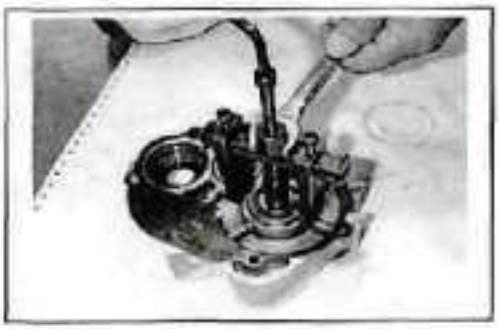
OUTER BEARING PULLER

INNER BEARING PULLER









SPECIAL TOOLS

CRANK CASE BUSH PULLER / DRIVER	
(φ 30mm)	(φ 22mm)
REMOVER	INSTALL

250 cc :

SPECIAL TOOLS

Special Tools List

		
NAME Left crank bearing puller NO TGB-9100100	NAME R/L. crank case disassemble tool NO TGB -1120000-HMA H9A	NAME Valve cotter remove & assembly tool NO TGB-1471110/20
		
NAME L. Crank shaft puller NO TGB -1130000-HMA H9A	NAME Tappet adjusting wrench NO TGB -9001200	NAME Tappet adjusting NO TGB-9001200-08 09 10
		
NAME R. crank case bearing 6201 assembles tool NO TGB-9614000-HMA 6201	NAME Left crankshaft & oil seal assembly socket NO TGB -2341110- HMA RB1	NAME Rocker arm shaft disassemble NO TGB-1445100
		
NAME Bearing driver 6204 NO 440647	NAME Assembly directs puller NO TGB -2341110	NAME Drive shaft puller NO TGB-2341110- HMA RB1

SPECIAL TOOLS

		
NAME Inner bearing puller NO TGB-6204022	NAME Outer bearing puller NO TGB-6204001	NAME Handle stand nut wrench NO TGB -5321100
		
NAME Clutch nut wrench NO TGB-9020200	NAME Universal holder NO 440646	NAME AC.G. Flywheel puller NO 440626
		
NAME Steering head top thread wrench NO TGB -5320010	NAME Bearing driver HK1516 NO TGB -9100200-HMA RB1 HK1516	NAME Bearing puller 6205 NO TGB -9100400 HMA RAI 6205
		
NAME Air operated bearing puller NO TGB-9100410-400 A6205	NAME Oil seal driver 34*52*5 NO TGB -9125500-HMA	NAME Right crankcase cover bearing 6201 puller. NO TGB -9614000-HMA RB1 6201

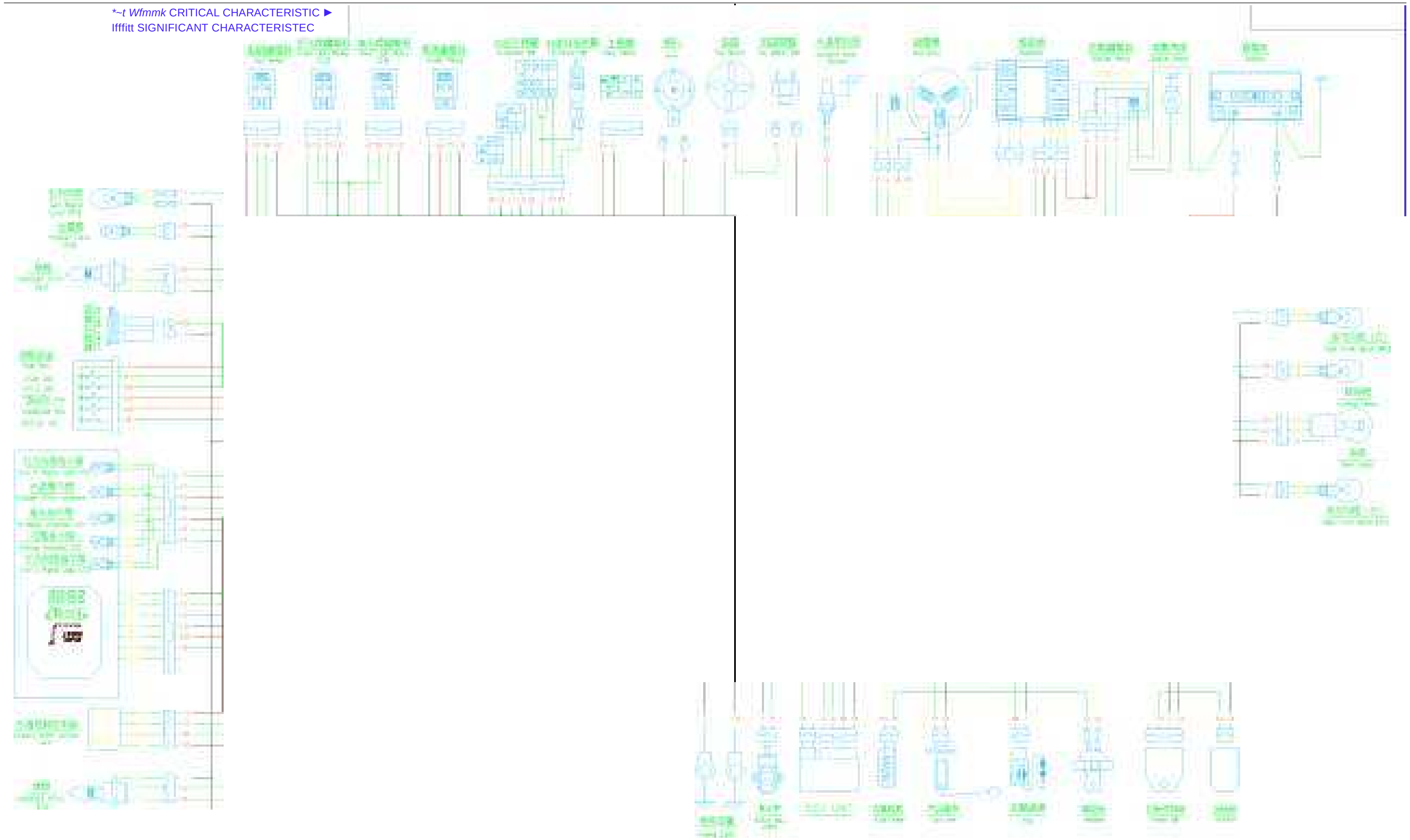
SPECIAL TOOLS

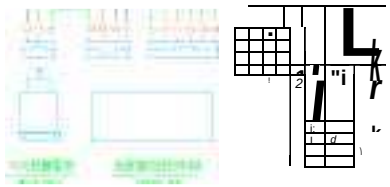
		
NAME Bearing driver 6205	NAME Drive shaft & oil seal (25*40*8) socket	NAME Bearing puller 6303
NO TGB -9615000-6205	NO TGB -9120200-HMA	NO TGB -6303000-HMA H9A 6303
	 (Ø30mm)	 (Ø22mm)
NAME Bearing driver 6201	NAME Crankcase bush puller	NAME Crankcase bush puller
NO TGB -9614000-6201	NO TGB -1120310	NO TGB -1120320
		
NAME Water pump mechanical seal driver	NAME Water pump bearing driver 6901	NAME Water pump oil seal driver (inner)
NO TGB -1721700-H9A	NO 440640	NO 440641
		
NAME AUTO DATA SCAN V70		
NO		

2-4 List of Grease & Oil Adopted:

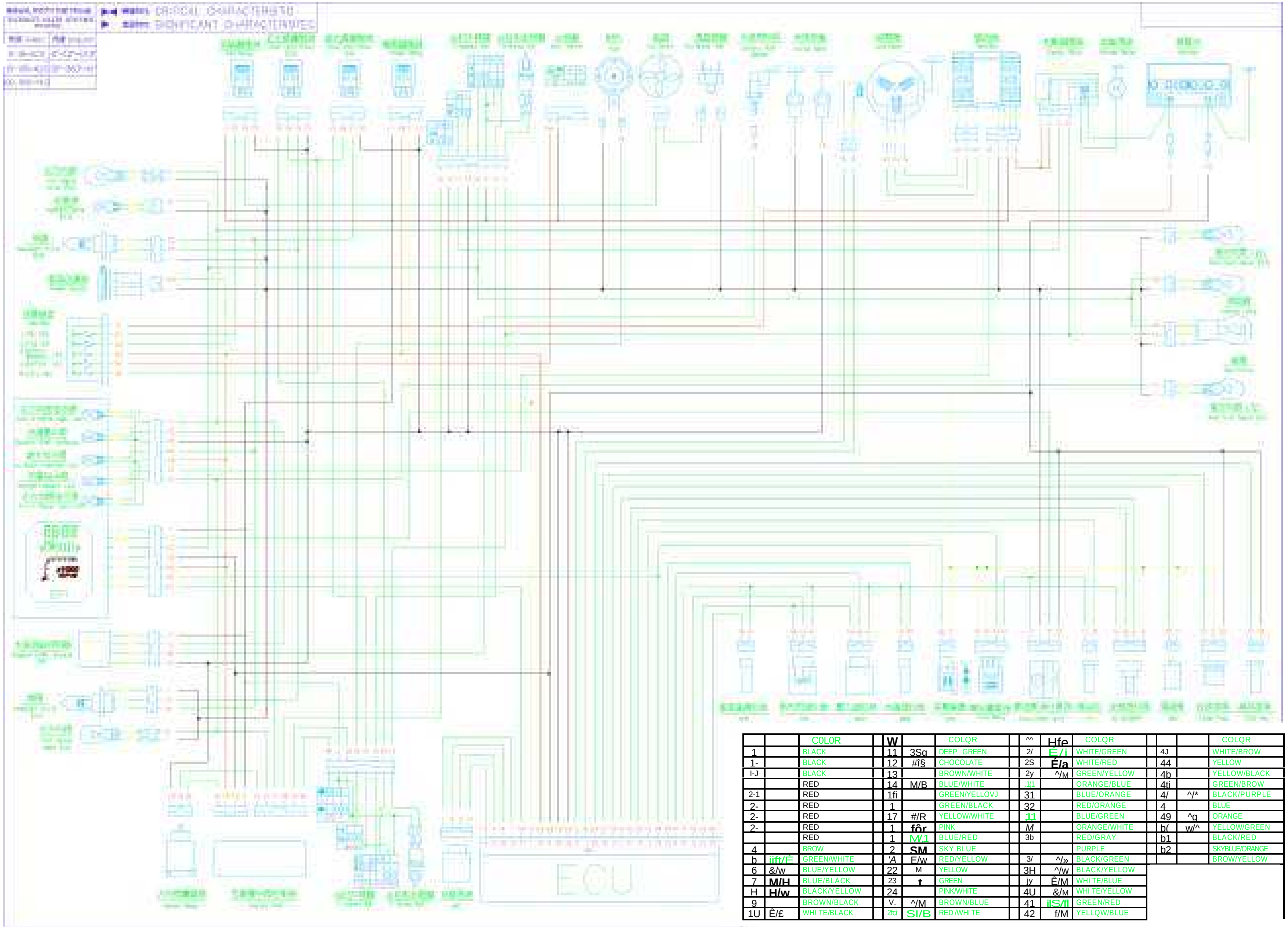
TGB Supper Grease No.0 Apply in Oil Seal.		**Supper Grease No.3** Apply in Axle Shaft, inside of Oil Seal.
1104 Sealing Three-Bond Apply on Right Hand Crank Surface.		**TGB Gear Oil 85w-140** Transmission Gear Oil for Scooters.
TGB Genuine EXTRA 4X OIL Engine Oil Apply in oil tank		Three-Bond 1322 Under M10 Screw (For medium fixing) for Flywheel Magneto.
TGB Supper Grease No. I Apply in Oil Seal.		**DOT-3 Brake Oil** For Brake.
TGB Supper Grease No.2 Apply in Kick Starter.		**TGB Supper Grease No.4** For Movable Drive Face Comp.
Cemedine 575 Apply in Handle Grip		

~t Wfmmk CRITICAL CHARACTERISTIC ►
Ifffitt SIGNIFICANT CHARACTERISTEC





		COLOR			COLOR				COLOR
1		BLACK			CHOCOLATE		28		WHITE/RED
1-		BLACK		13	BROWN/WHITE		29		GREEN/BLUE
1-		BLACK		14	BLUE/WHITE		Jti	*	PURPLE
2	ii	RED		1.	GREEN/YELLOW		37		BLACK/GREEN
2-		RED		16	GREEN/BLACK		3S		BLACK /YELLOW
t->	.81	RED		1 /	YELLOW/WHITE		3U		WHITE/BLUE
2-		RED		ia	PINK		4U		WHITE/YELLOW
2-		RED		19	BLUE/RED		42	^/K	YELLOW/BLUE
J		RED		2	SKY BLUE		4H	SS	BLUE
4		BROW		21	RED/YELLOW		49	*#"*	ORANGE
S)		GREEN/WHITE			YELLOW		bi		BLACK/RED
6	K/w	BLUE/YELLOW		2J	GREEN		b4		YELLOW
lu		WHITE/BLACK		2b	BROWN/BLUE		bb	*	YELLOW
11		DEEP GREEN		26	RED/WHITE				



		COLOR	W		COLQR	^^	Hfe	COLQR			COLQR
1		BLACK	11	3Sg	DEEP GREEN	2/	É/i	WHITE/GREEN	4J		WHITE/BROW
1-		BLACK	12	#î§	CHOCOLATE	2S	É/a	WHITE/RED	44		YELLOW
I-J		BLACK	13		BROWN/WHITE	2y	^/M	GREEN/YELLOW	4b		YELLOW/BLACK
		RED	14	M/B	BLUE/WHITE	.1(1		ORANGE/BLUE	4ti		GREEN/BROW
2-1		RED	1fi		GREEN/YELLOVJ	31		BLUE/ORANGE	4/	^/*	BLACK/PURPLE
2-		RED	1		GREEN/BLACK	32		RED/ORANGE	4		BLUE
2-		RED	17	#/R	YELLOW/WHITE	,11		BLUE/GREEN	49	^g	ORANGE
2-		RED	1	fôr	PINK	M		ORANGE/WHITE	b(	w/^	YELLOW/GREEN
		RED	1	M/,1	BLUE/RED	3b		RED/GRAY	b1		BLACK/RED
4		BROW	2	SM	SKY BLUE			PURPLE	b2		SKYBLUE/ORANGE
b	iift/É	GREEN/WHITE	'A	E/w	RED/YELLOW	3/	^/»	BLACK/GREEN			BROW/YELLOW
6	&/w	BLUE/YELLOW	22	M	YELLOW	3H	^/w	BLACK/YELLOW			
7	M/H	BLUE/BLACK	23	.t	GREEN	jy	Ê/M	WHI TE/BLUE			
H	H/w	BLACK/YELLOW	24		PINK/WHITE	4U	&/M	WHI TE/YELLOW			
9		BROWN/BLACK	V.	^/M	BROWN/BLUE	41	ilS/fl	GREEN/RED			
1U	Ê/£	WHI TE/BLACK	2fci	SI/B	RED /WHI TE	42	f/M	YELLQW/BLUE			

2-6 Troubleshooting

Complaint	Possible Reason	Remedy
No action for starter motor	1. Fuse breaks. 2. No power in battery. 3. Defective action of brake switch. 4 Short circuit of starter relay.	Replace Charging Replace Replace
No sparking or poor sparking	1. Defective spark plug. 2. Defective CDI & ignition coil unit. 3. Defective magneto stator coil. 4. Loose connection of lead wire.	Replace Replace Replace Connect
Unable or Difficult to start	**Plug not sparking** 1. Damaged spark plug or spark plug cap. 2. Dirty or wet spark plug. 3. Defective CDI &ignition coil unit or stator coil. 4.Open or short in high-tension cord. 5. Defective ignition switch. **No fuel reaching the carburetor** 1. No gasoline in fuel tank. 2.Clogged hole in the fuel tank cap. 3.Clogged or defective fuel cock. 4.Clogged fuel hose or defective vacuum hose. **Compression too low** 1. Excessively worn cylinder or piston rings. 2.Spark plug too loose. 3. Broken,cracked or otherwise failed piston.	Replace Clean & dry Replace Replace Replace Replace Clean Clean or replace Clean or replace Replace Tighten Replace
Noisy engine	1 . Piston or cylinder worn down. 2. Combustion chamber fouled with carbon. 3. Piston pin,bearing or piston pin worn. 4. Worn or burnt crankshaft bearings.	Replace Clean Replace Replace
Engine idles poorly	1. Stiff piston ring in place. 2. Excessively worn cylinder or piston rings. 3. Gas leaks from crankshaft oil seal. 4. Defective CDI & ignition coil unit. 5. Clogged jets in carburetor.	Replace Replace Replace Replace Clean or adjust

2-7 Tighting Torque of Screws

*Standard Torque Values of Bolts and Nuts *

Specification	Torque (kg-cm)	Specification	Torque (kg-cm)
5 mm Bolt and Nut	**40**	8 mm Bolt and Nut	**220**
5 mm Flange Bolt and Nut	**50**	8 mm Flange Bolt and Nut	270
6 mm Bolt and Nut	**100**	10 mm Bolt and Nut	350
6 mm Flange Bolt and Nut	**120**	10 mm Flange Bolt and Nut	**400**
6 mm SH Bolt and Nut	**90**	12 mm Bolt and Nut	550

* Torque Values of Chassis Components *

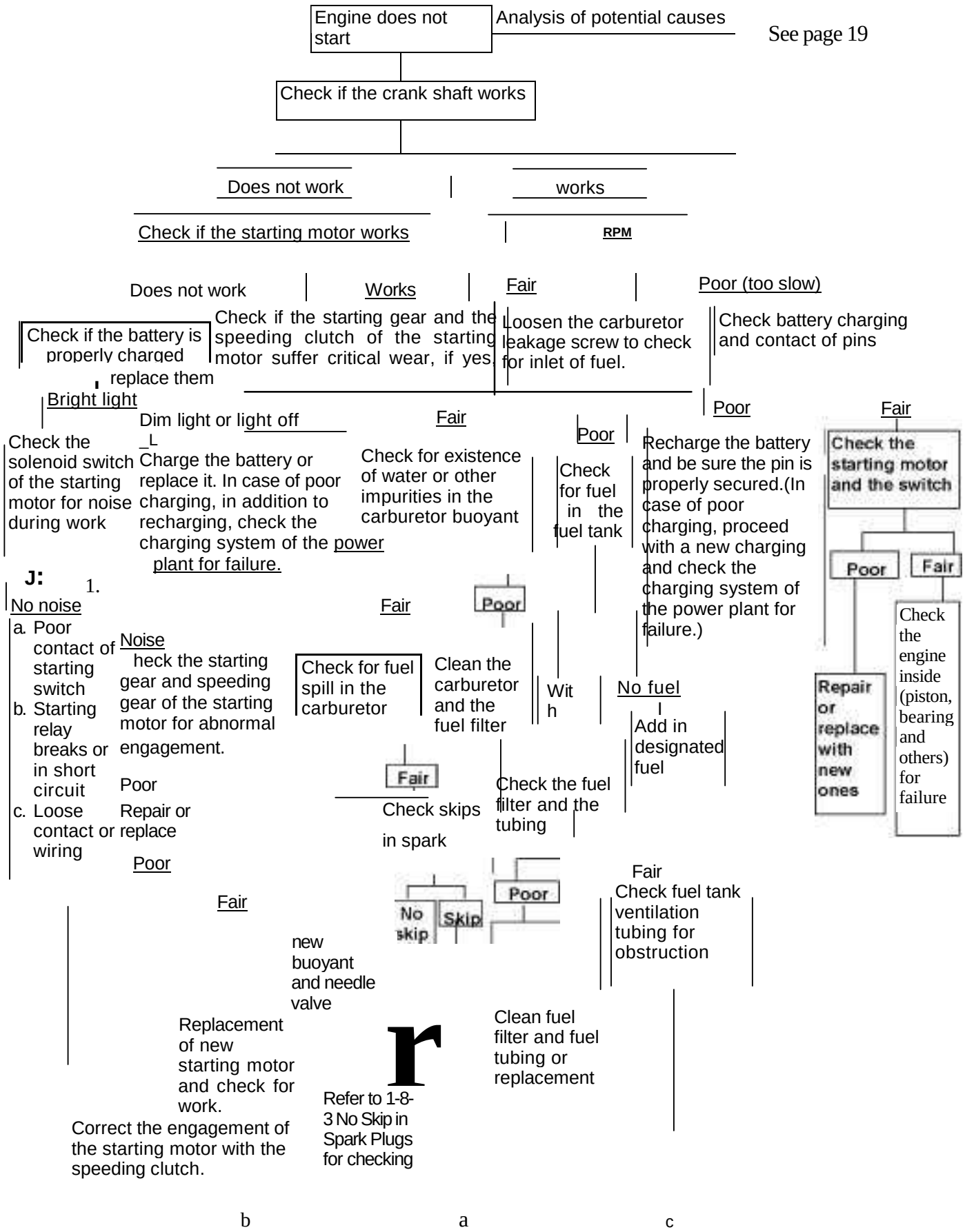
No.	Tightening Location	Specification	Torque
			(kg-cm)
1	Front Wheel Axle Self-lock Nut	M12	500~600
2	Brake Disk Hex Bolt	M5	180~280
3	Brake Clipper Tightening Bolt	M 8x35	210~250
4	Speed Meter Cable Nut	X	60
5	Front Fork Bearing Tightening Nut	M25x1.0	600~650
6	Rear Wheel Axle Self-lock Nut	M16x10	600~900
7	Rear Brake Connecting Rod Bolt	M16x32	50~80
8	Rear Brake Pin Self-lock Nut	M8	250~270
9	Rear Upper Cushion Tightening Bolt	M10*46	200~300
10	Rear Lower Cushion Tightening Bolt	M8*35	200~300

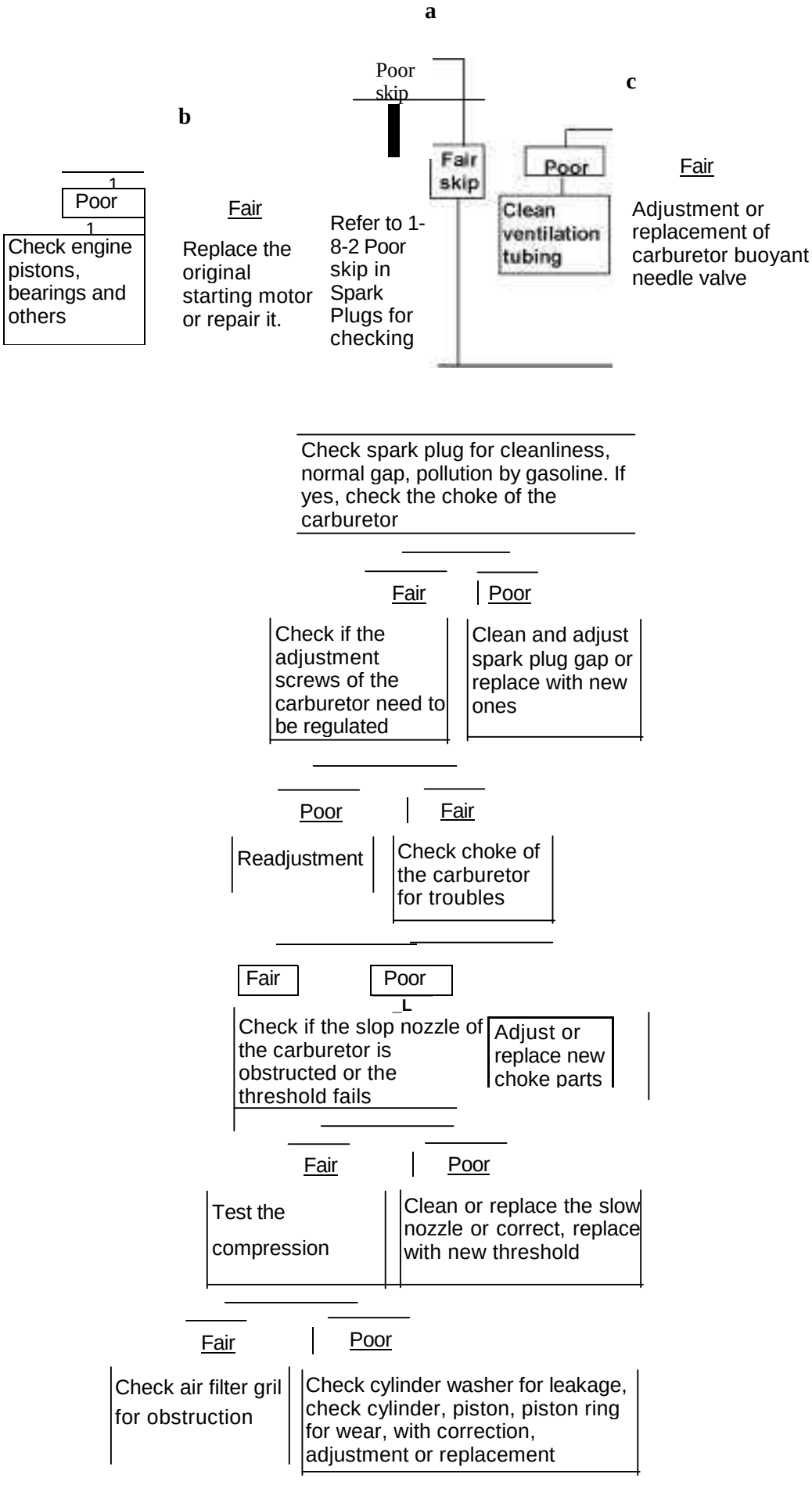
* Torque Values of Engine components *

Tightening Location	Specification	Torque	Quantities
		(kg-cm)	
Cylinder Head Bolt	M6	80~100	4
Cylinder Stud Bolt	M8x182.5	500~800	2
	M8x195.5		2
Cylinder Intake Pipe Stud Bolt	M6x50	500~800	2
Muffler and Exhaust Pipe Tightening Screw	M6	100~120	2
Muffler & Right Crankcase Upper Tightening Screw	M 8x42	300~400	1
Muffler & Right Crankcase Lower Tightening Screw	M 8x38	300~400	1
Spark Plug	M10	100~120	1
Valve Gap Adjust Lock Bolt	M5	50~90	2
Fuel Filter Nut Cap	M30	150~200	1
Cooler Fan Lock CR	M6x18	500~800	4
Wire Assembly Lock Screw	M6x20	800~1000	2
Start Clutch Gear ightening Nut	M22 (R.T.)	800~1000	1
Driven Belt Pully Assembly	M12	400~600	1

Gearbox Cover Tightening Bolt	M6x28	100~1200	3
	M6x35		3
Gearbox Oil Fill Cover Screw	M8	90~150	1
Gearbox Oil Drain Cover Screw	M8x12	90~150	1
Clutch Side Cover Screw	M6x40	50~80	6
	M6x65		2
Starter Arm Tightening Screw	M6x22	100~120	1

2-8 TROUBLESHOOTING 2-8-1 Troubleshooting for failure in starting the engine

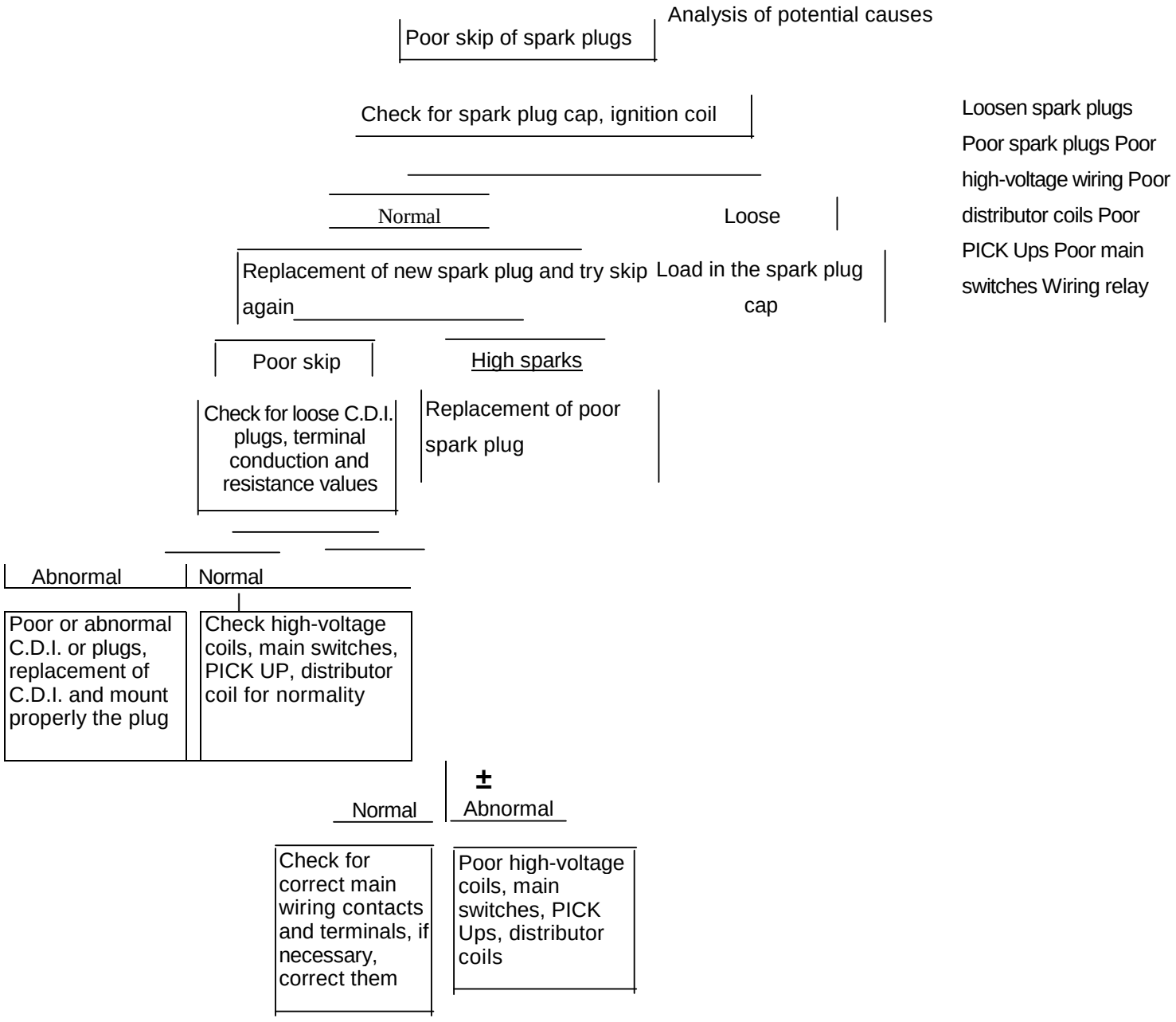




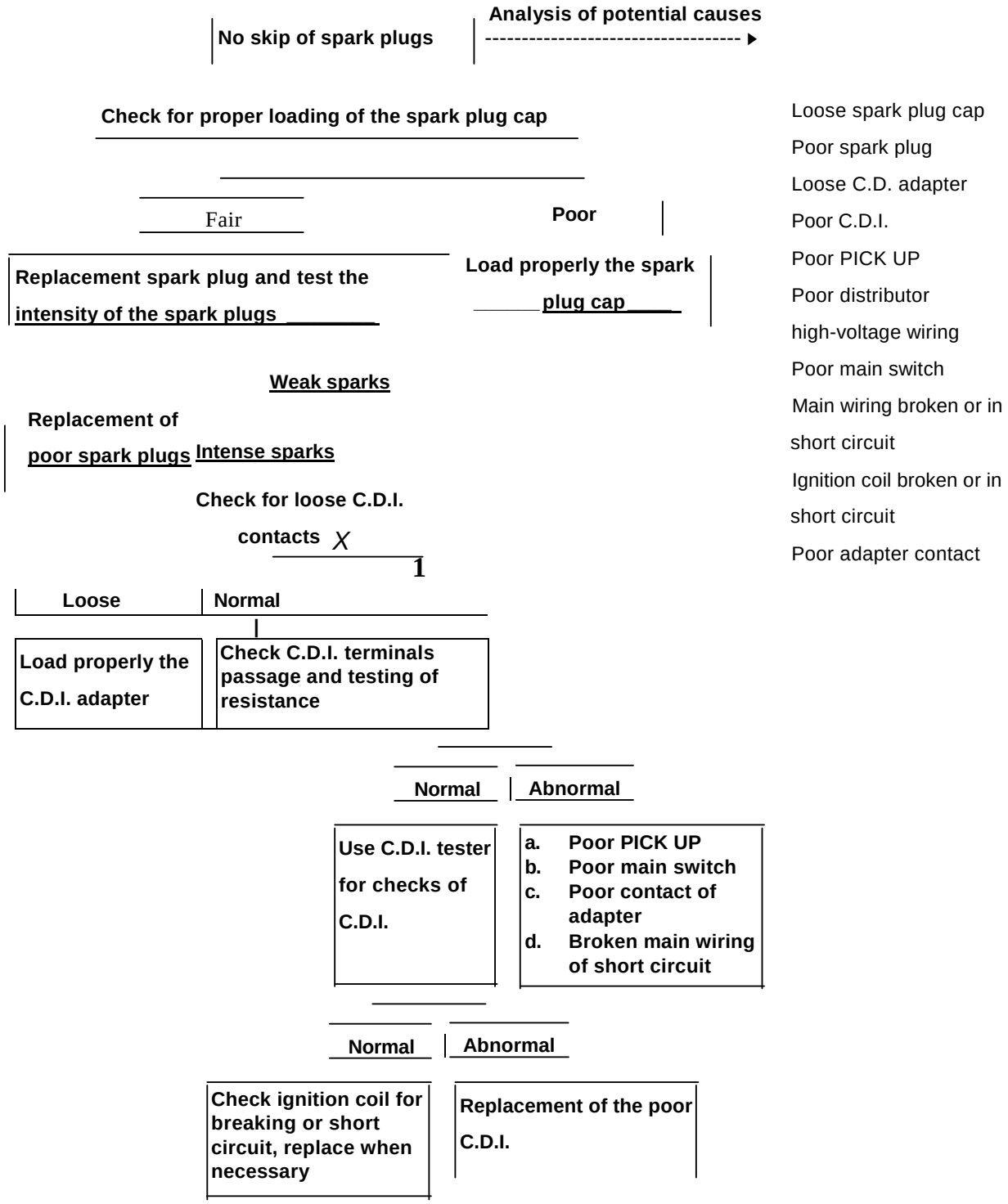
Check item :

- O No fuel
- O Dirty fuel filter
- O Obstructed ventilation tubing of th efuel tank
- O Poor carburector buoyant needle valve
- O Carburetor buoyant with impurities
- O Poor carburetor buoyant
- O No skip in spark plugs
- O Poor skip in spark plugs
- O Dirty spark plugs
- O Incorrect spark plugs gap
- O Dirty and wet spark plugs
- O Loose adjustment screws in the carburetor
- O Carburetor choke
- O Obstructed carburetor slow nozzle
- O Ailing carburetor threshold
- O Obstructed air filter grill
- O Leakage in cylinderwasher
- O Seriously damaged cylinder, piston
- O Dead batte ry
- O Poor contact of batte ry pin and conductors
- O Starting switch with poor or failure
- O Starting relay with broken wire or short circuit
- O Loose contact and wiring
- O Starting gear and speeding clutch gear seriously worn
- O Starting gear and speeding clutch gear in poor engagement
- O Poor starting motor

2-8-2 Troubleshooting for poor skip of spark plugs

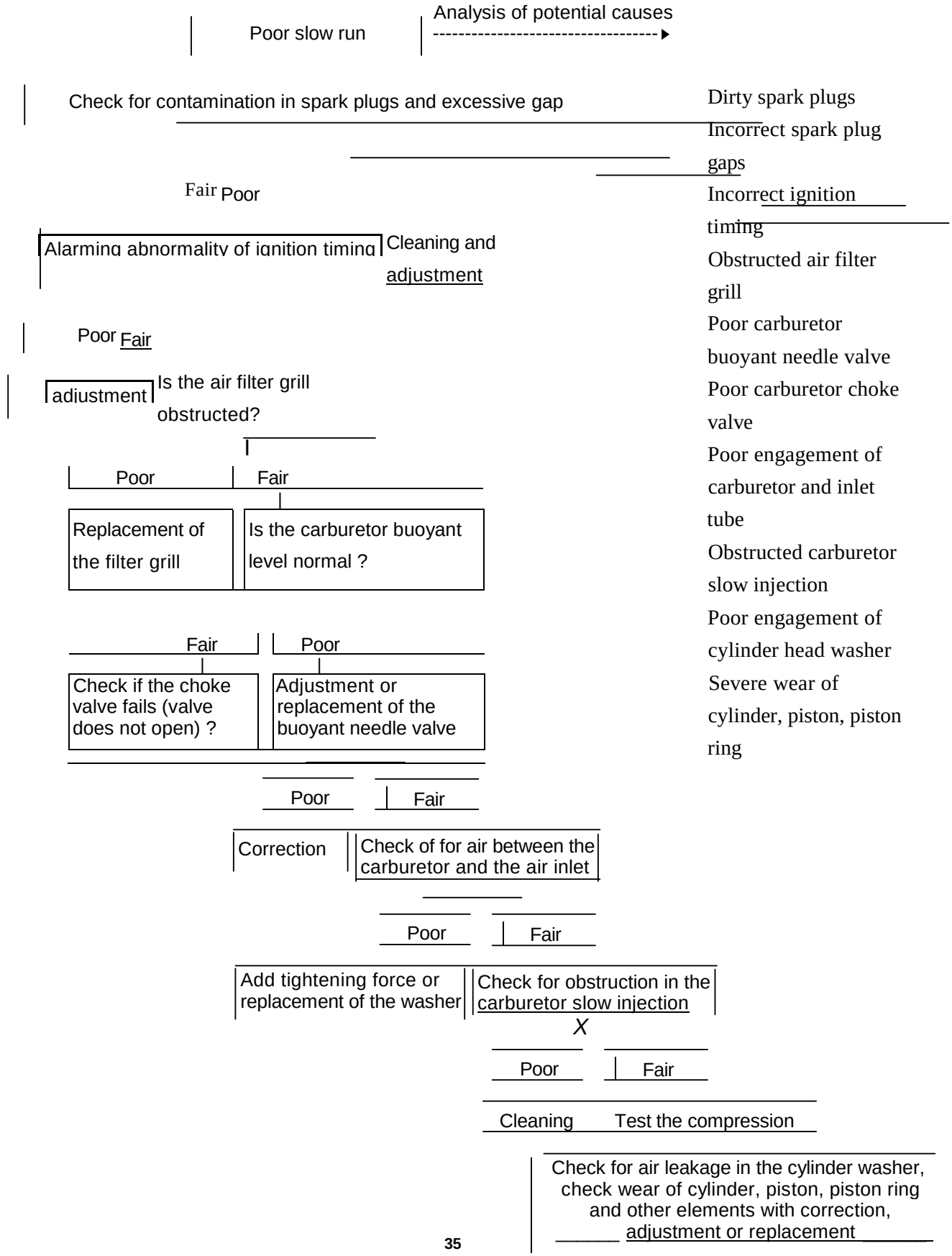


2-8-3 Troubleshooting for no-skip of spark plugs

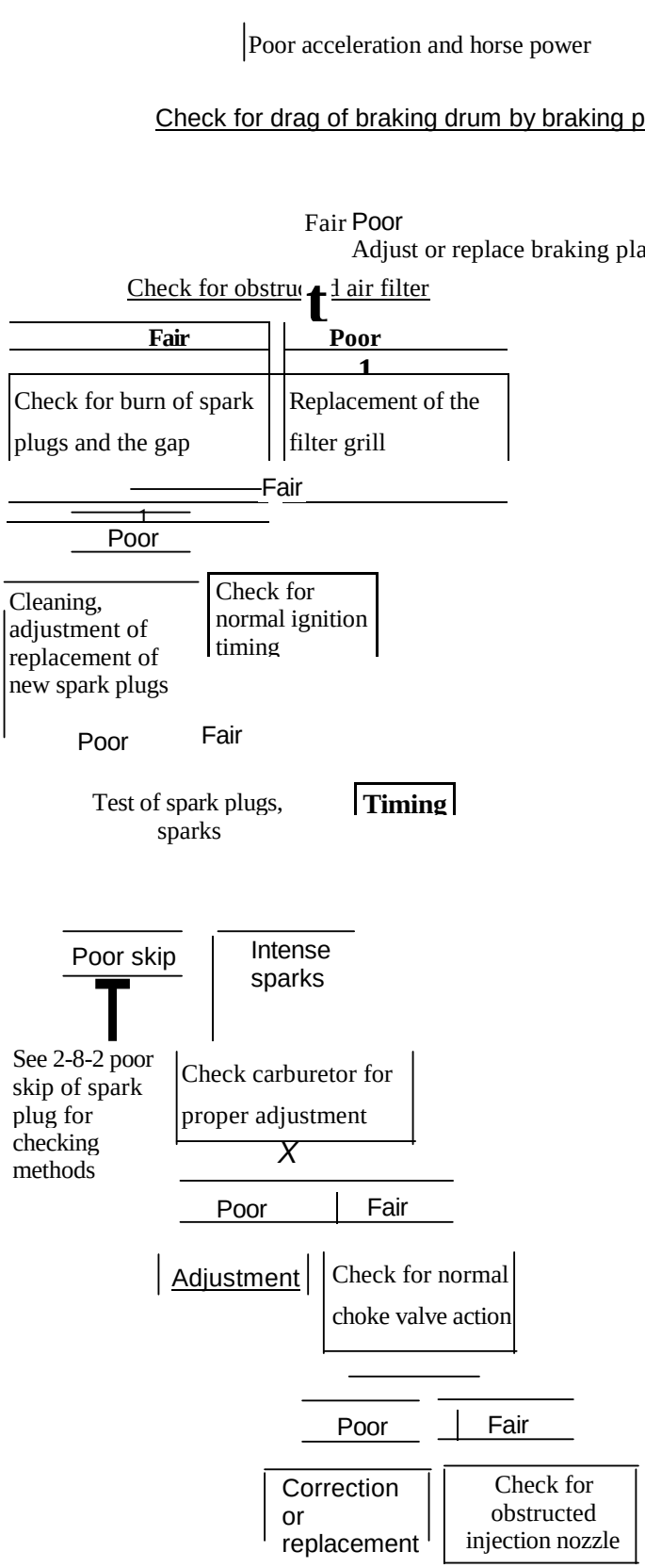


Loose spark plug cap
Poor spark plug
Loose C.D. adapter
Poor C.D.I.
Poor PICK UP
Poor distributor
high-voltage wiring
Poor main switch
Main wiring broken or in short circuit
Ignition coil broken or in short circuit
Poor adapter contact

2-8-4 Troubleshooting for slow run (troubled engine)

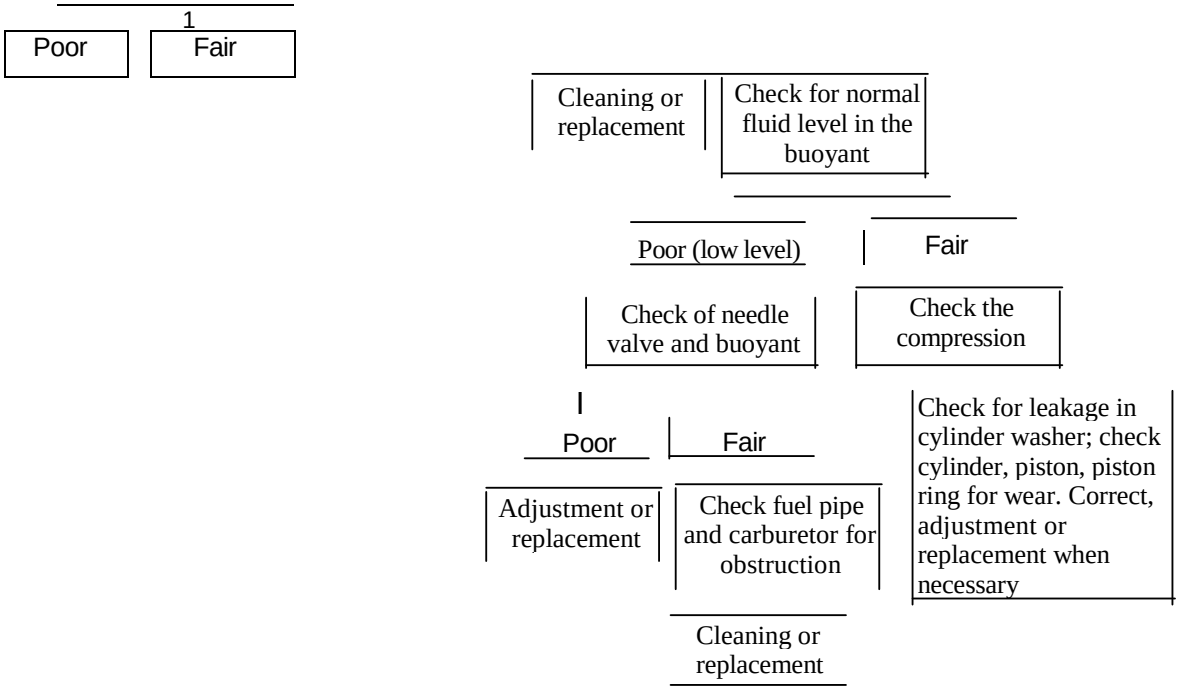


2-8-5 Poor acceleration and horse power



- Braking plate retaining braking drum
- Air filter grill obstructed
- Dirty spark plugs
- Incorrect gap in spark plugs
- Incorrect ignition timing
- Poor skip in spark plugs
- Incorrect adjustment of carburetor adjustment screw
- Poor choke valve in carburetor
- Dirty or obstructed carburetor injection nozzle
- Poor carburetor buoyant needle valve
- Dirty fuel filter
- Obstructed fuel circuitry
- Poor engagement of cylinder washer
- Serious damage of cylinder, piston, piston ring

a



CHAPTER 3 DESCRIPTION OF COMPONENTS AND ASSEMBLY

3-1 ENGINE

3-1-1 Fuel system (For 125c.c.)

3-1-2 Fuel injection system (For 250c.c.)

3-1-3 Lubrication System

3-1-4 Cooling System

3-1-5 Spark Plug

3-2 ELECTRIC SYSTEM

3-2-1 Ignition & Charging Device

3.2-2 Lamps

3-3 BODY

3-3-1 Frame & Cover

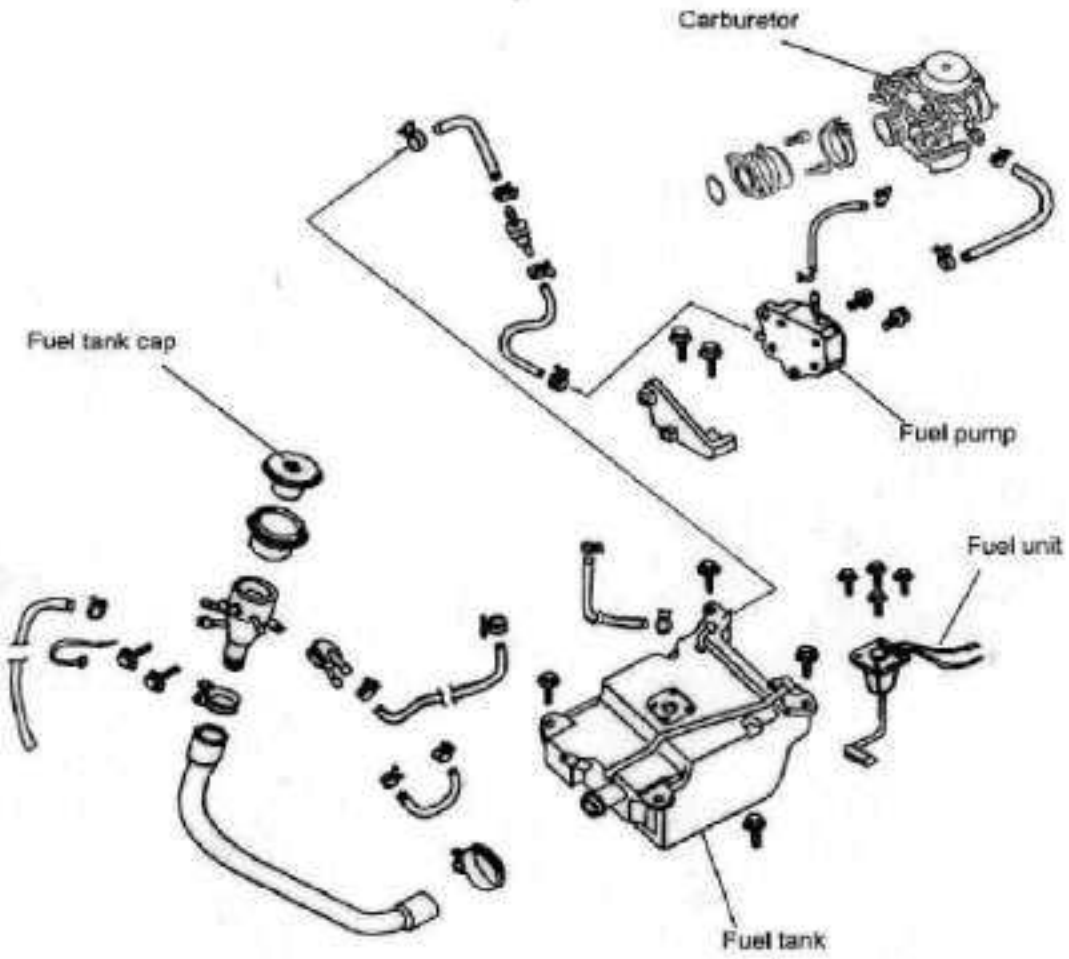
3-3-2 Compartment and Seat

3-3-3 Front & Rear Suspension System

3-3-4 Brake System

3-3-5 Tire & Tire pressure

FUEL SYSTEM



FUEL SYSTEM

PRECAUTIONS IN OPERATION

General Information

⚠ Warning

Gasoline is a low ignition point and explosive materials, so always work in a well-ventilated place and strictly prohibit flame when working with gasoline.

⚠ Cautions

- Do not bend off throttle cable. Damaged throttle cable will make unstable drive-ability.
- When disassembling fuel system parts, pay attention to O-ring position, replace with new one as re-assembly
- There is a drain screw in the float chamber for draining residual gasoline.
- Do not disassemble auto by-starter and air cut valve arbitrarily.

Specification

Item	LA12W	LA15W	LA18W
Carburetor diameter	24 mm	24 mm	25 mm
I.D. number	CVK039	CVK034	CVK066
Fuel level	20.5 mm	20.5 mm	20.5 mm
Main injector	#105	#105	#108
Idle injector	#35	#35	#35
Idle speed	1600±100 rpm	1600±100 rpm	1600±100 rpm
Throttle handle clearance	2~6 mm	2~6 mm	2~6 mm
Pilot screw	2 1/4 turns	2 1/2 turns	1 1/2 turns

Torque value

Fuel valve tightening nut: 1.5~2.0Kgf-m

Tool

Special service tools

Vacuum/air pressure pump

General service tool

Fuel level gauge

TROUBLE DIAGNOSIS

Poor engine start

- No fuel in fuel tank
- Clogged fuel tube
- Too much fuel in cylinder
- No spark from spark plug (malfunction of ignition system)
- Clogged air cleaner
- Malfunction of auto by-starter
- Malfunction of throttle operation
- Malfunction of purge control valve

Stall after started

- Malfunction of auto by-starter
- Incorrect ignition timing
- Malfunction of carburetor
- Dirty engine oil
- Air existing in intake system
- Incorrect idle speed
- Malfunction of purge control valve

Rough idle

- Malfunction of ignition system
- Incorrect idle speed
- Malfunction of carburetor
- Dirty fuel

Intermittently misfire as acceleration

- Malfunction of ignition system

Late ignition timing

- Malfunction of ignition system
- Malfunction of carburetor

Power insufficiency and fuel consuming

- Fuel system clogged
- Malfunction of ignition system

Mixture too lean

- Clogged fuel injector
- Vacuum piston stick and closed
- Malfunction of float valve
- Fuel level too low in float chamber
- Clogged fuel tank cap vent
- Clogged fuel filter
- Obstructed fuel pipe
- Clogged air vent hose
- Air existing in intake system

Mixture too rich

- Clogged air injector
- Malfunction of float valve
- Fuel level too high in float chamber
- Malfunction of auto by-starter
- Dirty air cleaner

AIR CUT-OFF VALVE

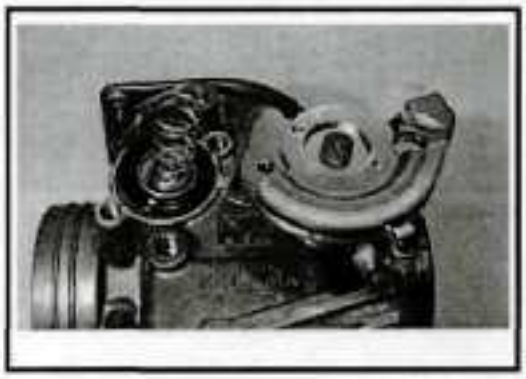
Inspection

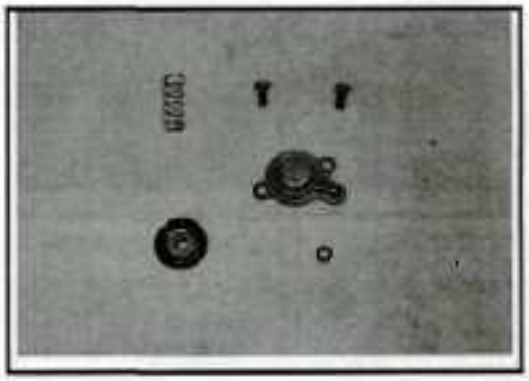
Disconnect vacuum hose and air vent hose from the air cut-off valve.
Connect a hose from vacuum hose connector to vacuum pump.
Connect air pump to air vent hose.
Apply with specified vacuum to air cut-off valve.
Vacuum value: 420~500 mm-Hg
Pump compressed air from air pump to air vent hose.

⚠ Caution

The vacuum can not be over 600 mm-Hg. Or the air cut-off will be damaged.

If the valve is in normal, it will restrict air-flow. f air-flow is no restrict, replace carburetor assembly.

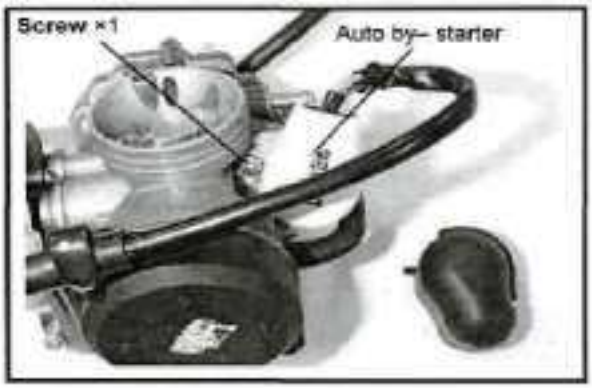


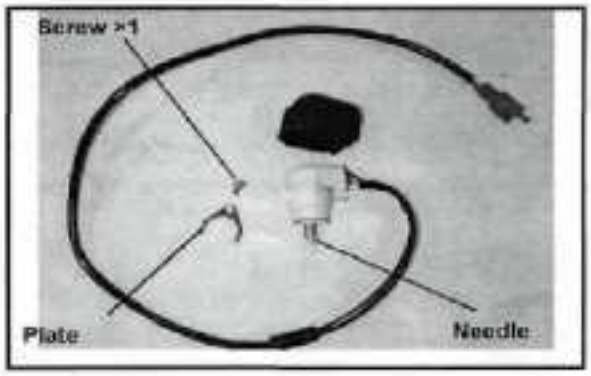


AUTO BY-STARTER

Inspection

Turn off engine and waiting for over 10 minutes for cooling.
Check resistance across the two terminals of the auto by-starter.
Resistance value: Max. 10Ω (Measured after engine stopped for more than 10 minutes)
Replace the auto starter with a new one if resistance value exceeds standard.
Remove carburetor, allow it to cool off for 30 minutes.
Connect a pressure tester from air pump.
Connect by-starter circuit.
Pump compressed air to the circuit.
Replace the auto by-starter if the circuit clogged.
Connect battery posts (12V) to starter's connectors. After 5 minutes, test the by-starter circuit with compressed air. If air flows through the circuit, then, replace the starter.





Removal

Remove fixing plate screw, and then remove the plate and auto by-starter from carburetor.

Valve inspection

Check if auto by-starter and valve needle for damage or wear out.

Installation

Install auto by-starter to the bottom of carburetor body.

Install fixing plate to the upper groove of auto by-starter, and install its flat surface to carburetor. Install screw and tighten it.

Carburetor removal

Remove the luggage box.
Loosen the adjustment nut and fixing nut of throttle valve cable, and release the cable from carburetor.
Remove air cut-off valve hose.
Remove fuel pipe, vacuum hose.
Disconnect automatic by-starter connectors.
Release the clamp strip of carburetor isolation.
Release the clamp strip of air cleaner.

Vacuum chamber

Removal

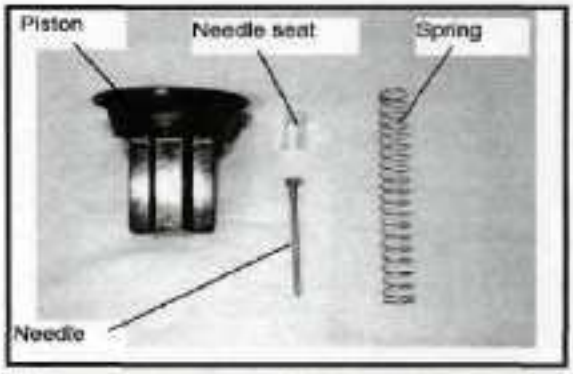
Loosen drain screw, and drain out residual fuel in float chamber.
Remove 2 screws of vacuum chamber cover and the cover.

Remove compress spring and vacuum piston.

Check if the vacuum piston for wear out, crack or other damage.
Check if the diaphragm for damage or crack.

Installation

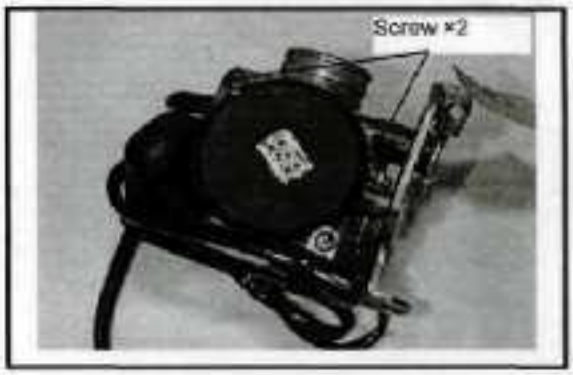
Install needle, spring and needle seat to vacuum piston.



Install vacuum piston to carburetor body and align the indent on the diaphragm.

Install compress spring.

Install vacuum chamber cover and tighten 2 screws.



⚠ Caution

- Do not damage vacuum diaphragm.
- When tightening the vacuum chamber screw, hold down vacuum piston.

FLOAT CHAMBER

Disassembly

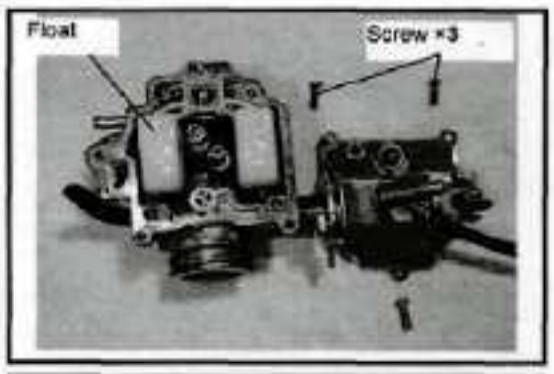
Remove 4 mounting screws and remove float chamber cover.
Remove the float pin and float.

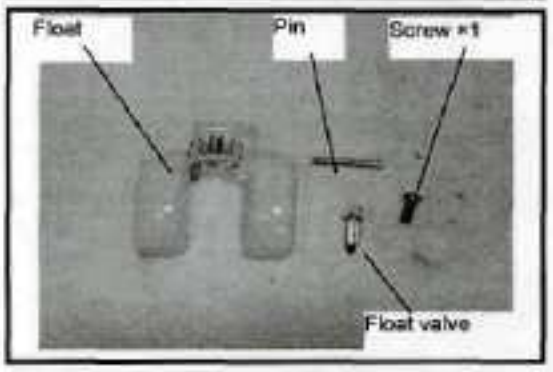
Checking

Check float valve and valve seat for damage, blocking.
Check float valve for wearing, and check valve seat face for wear, dirt.

⚠ Caution

In case of worn out or dirt, the float valve and valve seat will not tightly close causing fuel level to increase and as a result, fuel flooding. A worn out or dirty float valve must be replaced with a new a new one.





Remove main jet, fuel needle jet holder, needle jet, slow jet, pilot screw.

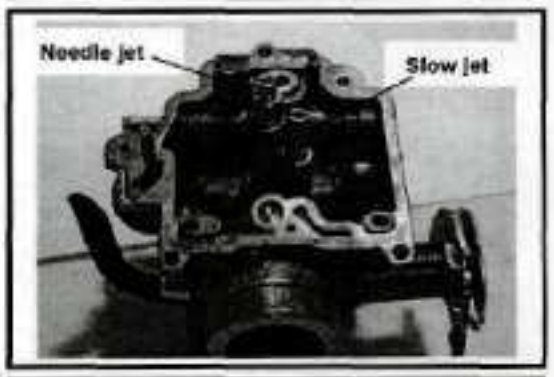
⚠ Caution

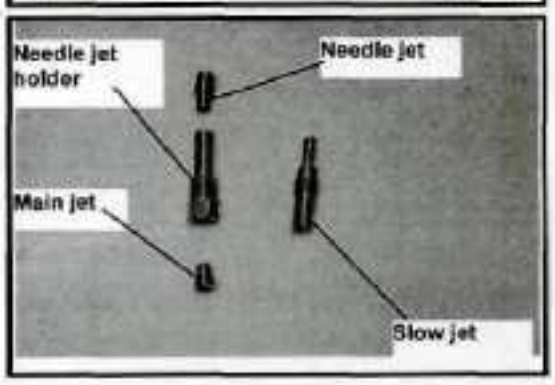
- Take care not to damage jets and adjust screw.
- Before removing adjustment screw, turn it all the way down and note the number of turns.
- Do not turn adjust screw forcefully to avoid damaging valve seat face.

Clean jets with cleaning fluid. Then use compressed air to blow the dirt off.
Blow carburetor body passages with compressed air.

⚠ Caution

Remove vacuum chamber and air cut-off valve as a set.



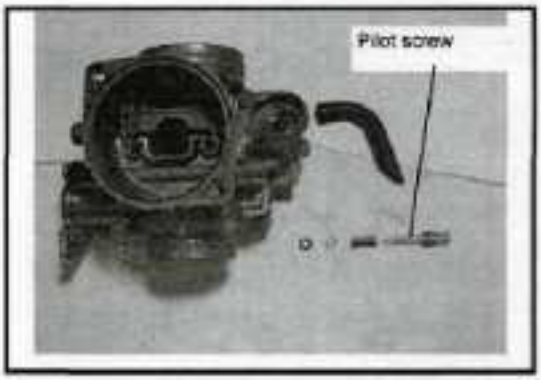


Assembly

Install main jet, fuel needle jet holder, fuel needle jet slow jet and pilot screw.

⚠ Caution

Set the pilot screw in according to number of turns noted before it was removed.



Install the float valve, float, and float pin.

Checking fuel level

⚠ Caution

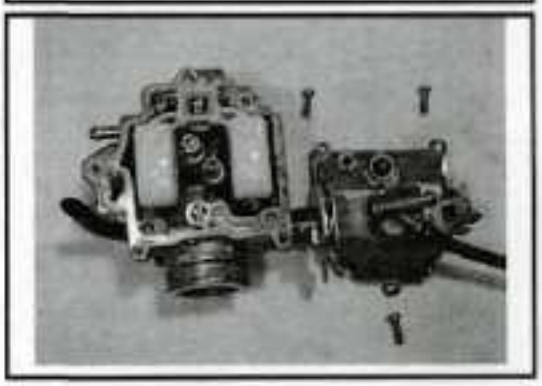
- Check again to ensure float valve, float for proper installation.
- To ensure correct measurement, position the float meter in such a way so that float chamber face is vertical to the main jet.

Fuel level: 20.5 mm

Installation of carburetor

Install carburetor in the reverse order of removal. Following adjustments must be made after installation.

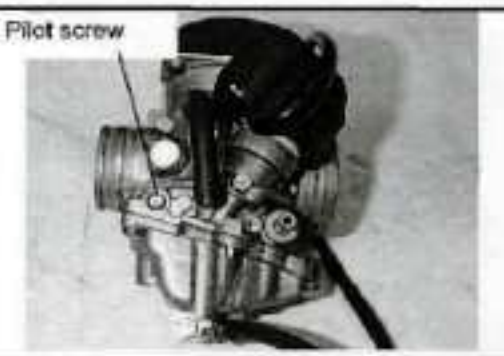
- Throttle cable adjustment.
- Idle adjustment



Adjustment of pilot screw

⚠ Caution

- Pilot screw was set at factory, so no adjustment is needed. Note the number of turns it takes to screw it all the way in for ease of installation.
- The main stand must be used to support the motorcycle to perform the adjustments.



Use a tachometer when adjusting engine RPM. Screw in adjustment screw gently, then back up to standard turns.

Standard turns:

LA12W : 2 ± 1/4 turns

LA15W : 2 ± 1/2 turns

LA18W : 1 ± 1/2 turns

⚠ Caution

Do not screw in forceful to avoid damaging screw seat face.

Warm up engine, adjust the stopper screw of throttle valve to standard RPM.

Idle speed rpm: 1600 ± 100 rpm

Connect the hose of exhaust analyzer to exhaust front end. Press test key on the analyzer. Adjust the pilot screw and read CO reading on the analyzer

CO standard value: 1.0~1.5 %

Accelerate in gradual increments, make sure rpm and CO value are in standard value after engine running in stable. If rpm and CO value fluctuated, repeat the procedures described above for adjusting to standard value.

FUEL TANK

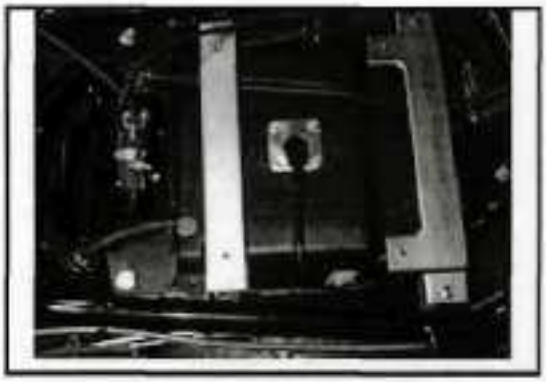
Fuel unit removal

Open the seat.
Remove the luggage box (6 bolts and 1 screw).
Remove rear carrier (3 bolts).
Remove rear bracket (2 bolts).
Remove the rear central cover (4 screws).
Remove the left and right pedals (1 bolt).
Remove the left and right covers (4 bolts).
Remove the central cover (6 screws).
Remove the left & right body covers and the central upper cover (4 screws and 2 bolts).
Remove pedal (4 bolts and 4 screws).
Disconnect fuel unit connector.
Remove fuel unit (4 screws).

⚠ Caution

- Do not bend the float arm of fuel unit
- Do not fill out too much fuel to fuel tank.

Fuel unit inspection (Refer to electrical equipment 17-15).

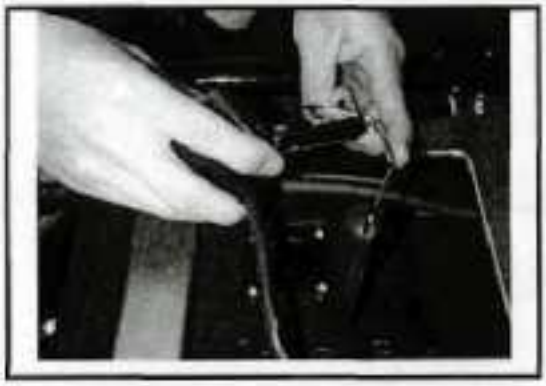


Fuel unit installation

Install the gauge in the reverse order of removal.

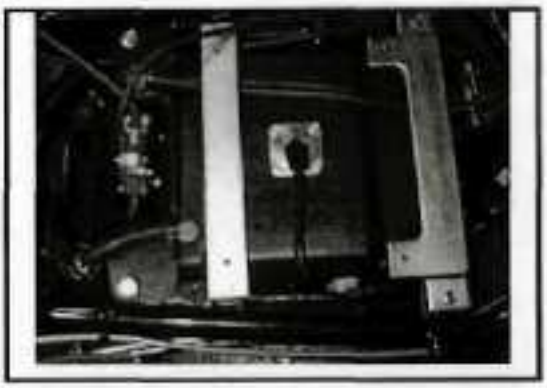
⚠ Caution

Do not forget to install the gasket of fuel unit or damage it.



Fuel tank removal

Open the seat.
Remove the luggage box (6 bolts and 1 screw).
Remove the rear central cover (4 screws).
Remove the left and right pedals (1 bolt).
Remove the left and right covers (4 bolts).
Remove the central cover (6 screws).
Remove pedal (4 bolts and 4 screws).
Disconnect fuel unit connector.
Remove fuel unit (4 screws).
Remove fuel pump (2 bolts).
Remove fuel tank bracket (4 bolts).
Remove vacuum tube and fuel filter.
Remove fuel tank

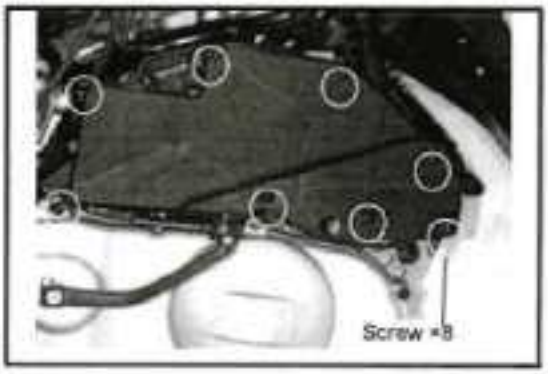


Installation

Install the tank in the reverse order of removal.

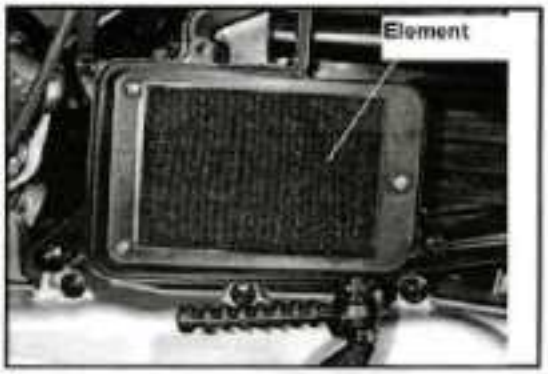
AIR CLEANER

Open the seat.
Loosen the clamp strip of air cleaner.
Remove left cover (2 screws).
Remove mounting bolts for crankcase and gear box (2 bolts).
Remove air cleaner cap (8 screws).
Remove air cleaner set (4 screws).



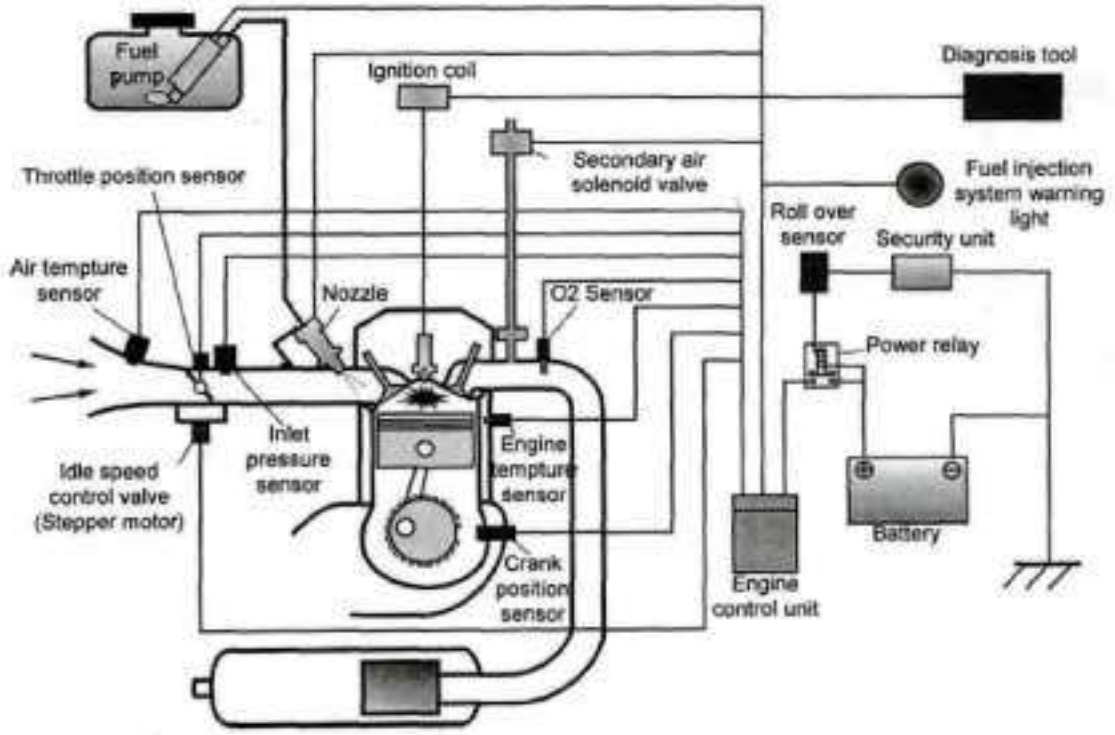
⚠ Caution

The air cleaner element is made of paper so do not soap it into water or wash it with water.



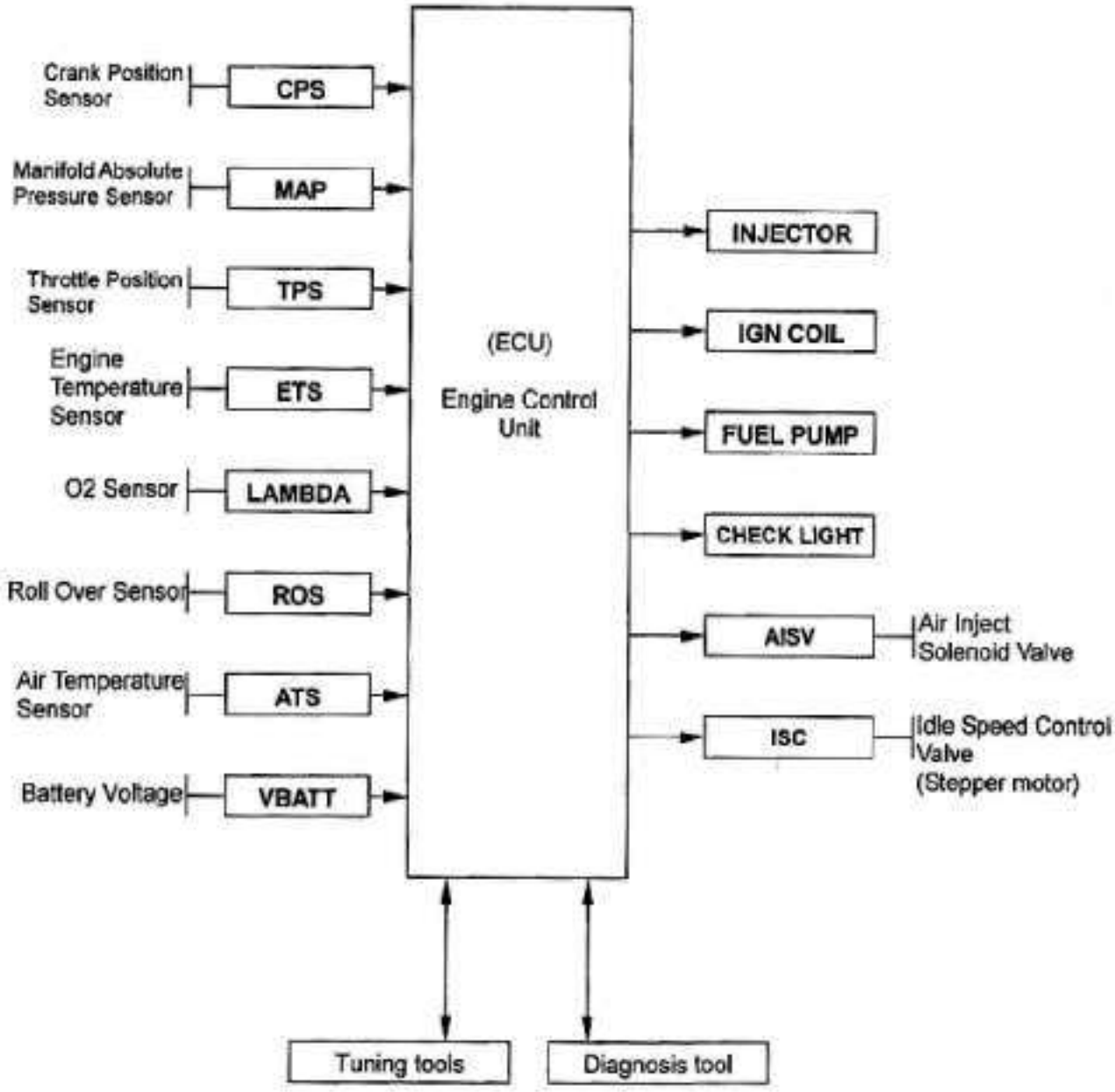
Fuel Injection System

Fuel Injection System Components



Fuel Injection System

Operation of The Fuel Injection System



The Fuel Injection System Introduction

Based on 4-stroke SOHC engine, displacement 250 c.c. Electronically controlled fuel injection, fuel vapor absorbed by carbon canisters. The engine burns off the blow-by fuel-gas in the crankcase through the fuel-air separating device. The O2 sensor enhances the efficiency of the catalyzer, by dynamically controlling the Fuel/Air ratio.

Electronic Fuel Injection Device

Consisting of fuel supply devices: Fuel tank, fuel pump, fuel filter, and pressure regulating valve.
And fuel controller devices: fuel injector, and ECU.
The fuel is pumped from electrical fuel pump in the fuel tank, to the injector on the inlet pipe. The pressure-regulating valve keeps the pressure around 294±6kpr. The signals from ECU enable the injector to spray fuel into the combusting chamber once each two crankshaft-revolutions. The excessive fuel flows back to the fuel tank through the pressure-regulating valve. Fuel pump is placed within the tank to reduce the working noise, and the complicity of fuel pipes. Electrically controlled ignition and injection system effectively reduce fuel consumption rate and pollution.

In traditional gasoline engine, carburetor supplies the fuel. The process is done by engine vacuum, and the negative pressure in the carburetor mixes fuel with air. Under this condition, three major processes are done simultaneously in the carburetor: 1. Air quantity measurement. 2. The determination of fuel quantity. 3. Mix of fuel and air.

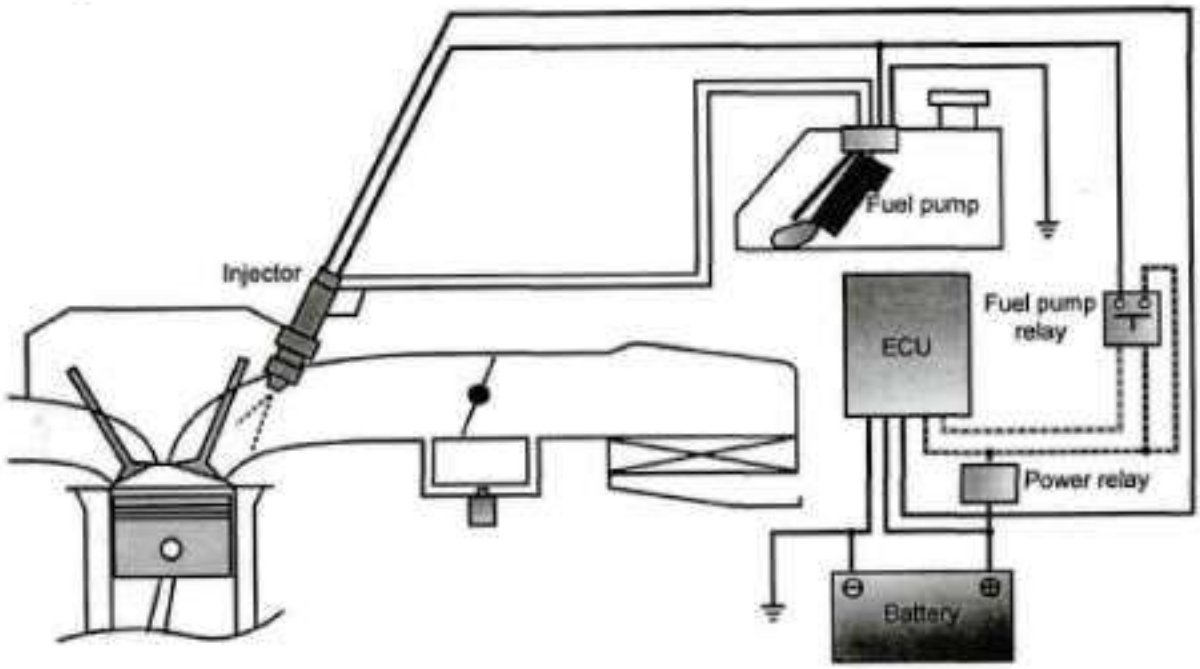
Electric Fuel Injection System separates the three major processes into three different devices: 1. T-MAP gauges the air quantity and temperature and sends the signal to ECU as a reference. 2. ECU decides the amount of fuel to be injected, according to the default A/F rate. 3. ECU enables the injector to spray appropriate fuel amount. The independence of these three functions will raise the accuracy of the whole process.

Our EFI engine uses computer-programmed fuel injection , the main features are:

1. The quantity of fuel injected is decided according the condition of the engine. The engine RPM, and throttle position determines the fuel quantity and injection time-length. This throttle-controlled fuel injection is better responding and more accurate.
2. The quantity of fuel injection, and the determination of injection time length, are all controlled by 8 bit microcomputer.
3. The pressure regulating valve maintains a 294±6kpr pressure difference between inlet pipe and fuel pipe, raising the accuracy of fuel injection.
4. By measuring the air pressure of inlet pipe, this system gives the vehicle better accommodation to the environment.
5. Idle air by-pass system supplies fuel and air to stabilize the idle running, and cold starting.
6. O2 sensor feeds back the signal to minimize the exhaust pollution.

Fuel Injection System

Fuel System Outlined



System Description

1. The fuel tank of fuel pumps in the Key-on, the sensors signal to be sent to the ECU, ECU control fuel pump relay, fuel pump to start operationm, if not start the engine fuel pump will be 2 to 3 seconds after the closure in order to save power. Pressure regulating valve to the fuel manifold pressure maintained at 294 ± 6kpa (about 3 kg / cm ²), injector according to operating conditions and environment appropriate compensation coefficient fuel emissions, Key-off or engine stopped operating, the fuel pump to stop moving.
2. Gasoline filter impurities in the fuel filter should be regularly replaced.
3. When the engine could not start, do not start motor for continuous movement which led to lack of battery power (less than 10 V), the electric fuel pump will not be able to move, the correct way is a new battery lap.

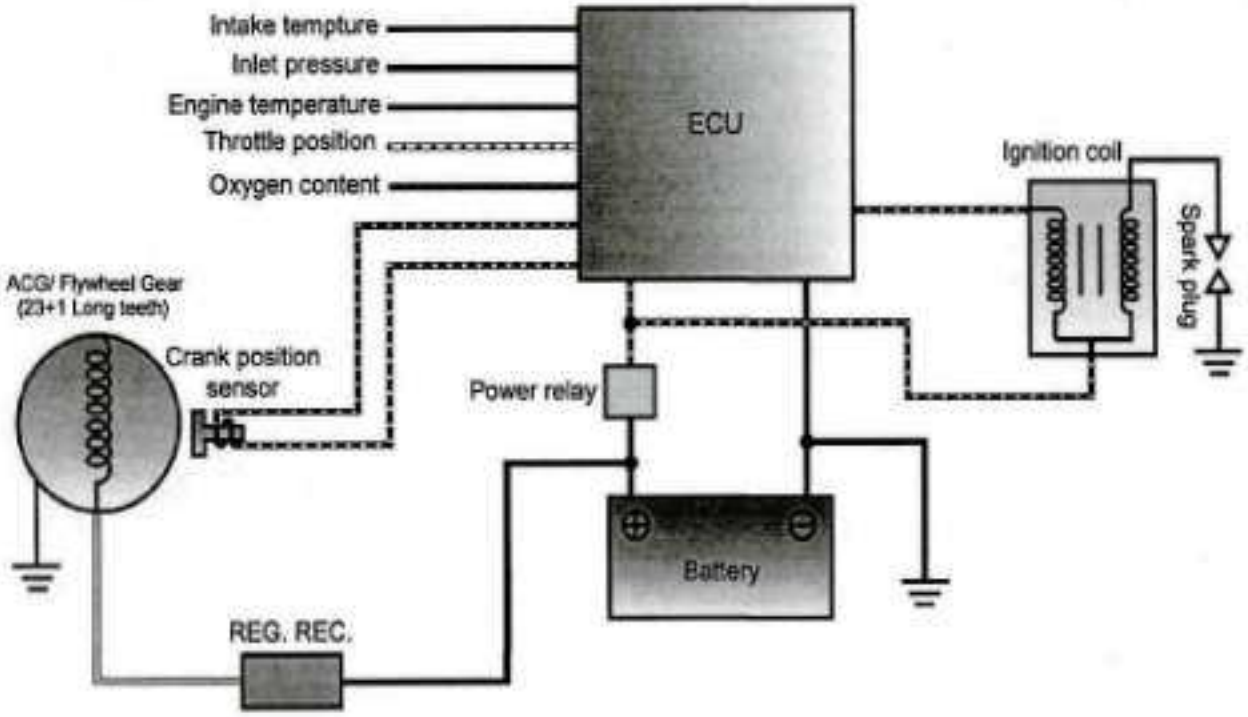
Injector

Double hole type injector to provide two intake valve fuel injection quantity, increase fogging effect, reduce HC emissions, short-fixed cap, can be easily fixed injector and receiving fuel from the fuel pump, fixator limit injector rotation sliding, injector fuel injection quantity from the ECU signal control Pressure Regulating Valve (Regulator), the use of the diaphragm spring and fuel manifold vacuum pressure and maintain pressure in 294 ± 6kpa (about 3 kg / cm ²), the injector can be different engine load conditions, Fuel Injector width (time) to control the fuel injection quantity.

Fuel pump

Electrical fuel pump is mounted inside the fuel tank. Rely on battery power supply from the ECU control opening and closing, idling at the fuel pressure: 294 ± 6kpa (about 3 kg / cm ²).

Ignition System Outlined



Principle

The engine used in a computer program is when the ignition control from the Crank position sensor, Throttle position sensor, O2 Sensor, Inlet pressure sensor, Intake temperature sensor, Engine temperature sensor issued by the signal. With engine speed, 8-bit microcomputer by the appropriate decision when the ignition is, from a current transistor control of intermittent, 25000-30000 V is a secondary hypertension, flashover triggered spark plug. This way not only can be the engine to achieve the maximum output power, but also help improve fuel consumption rates.

Specifications

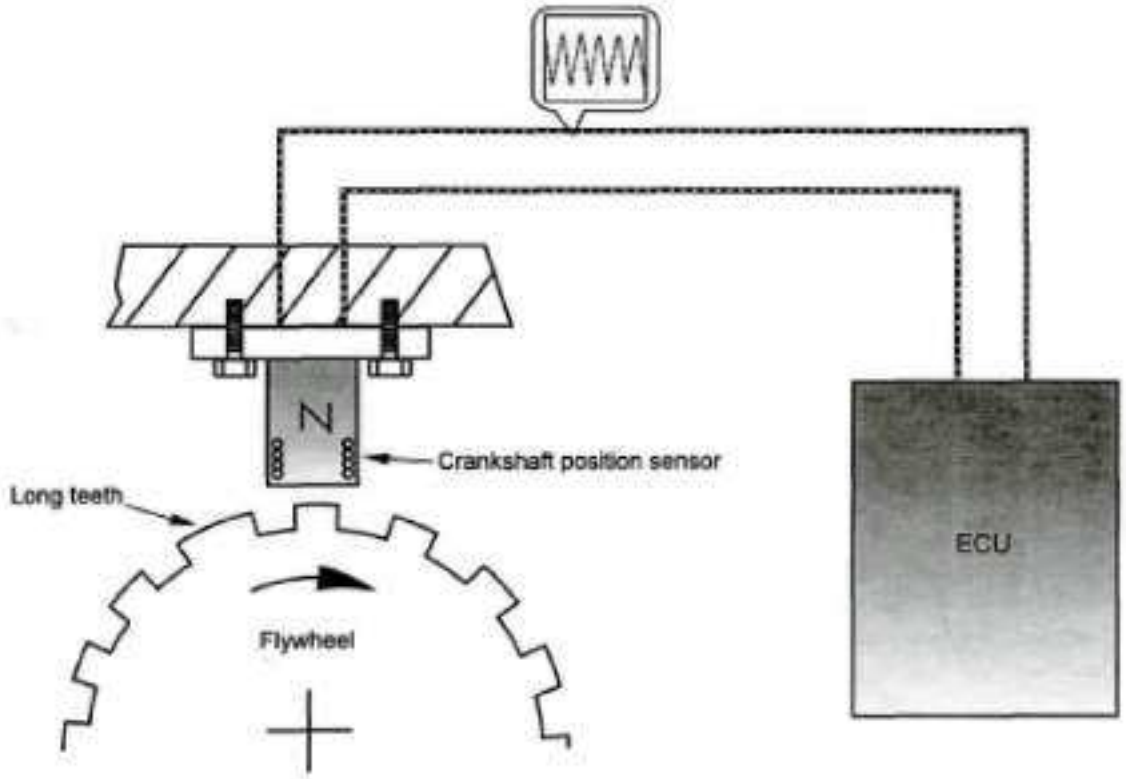
1. Ignition timing: 13 ° BTDC / 1650RPM
2. Spark plug: NGK CR8E Clearance: 0.6 to 0.7 mm
3. ACG crankshaft position sensor coil impedance: 80 ~ 160 Ω (Green / White - Blue / Yellow)
4. Ignition coil primary circuit: 3.6 Ω ± 10% (20 ° C) (Red / Yellow - Black / Yellow)
5. Battery Type / Capacity: YTX12A-BS or GTX12A-BS / 12V 12Ah

Sensors and Drives Outlined

Crankshaft Position Sensor (CPS)

Function

Induction sequence teeth on the flywheel voltage signals will be transmitted to ECU, ECU normal work.



Note

By receiving signals from the various sensors ECU to speed output control perspective Idle Air Control Valve opened, the adjustment to the inlet manifold idle air bypass pipe to amend idle speed, engine operation chemokine normal.

When starting, TDC are not yet known location, so by crankshaft position sensor to detect the long tooth of flywheel, calculated to identify the TDC position, a fixed point of ignition timing to the ignition, when the engine speed reach Software set speed, and then the ignition timing will change to the software.

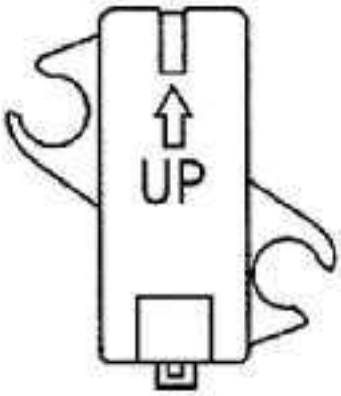
Roll Over Sensor

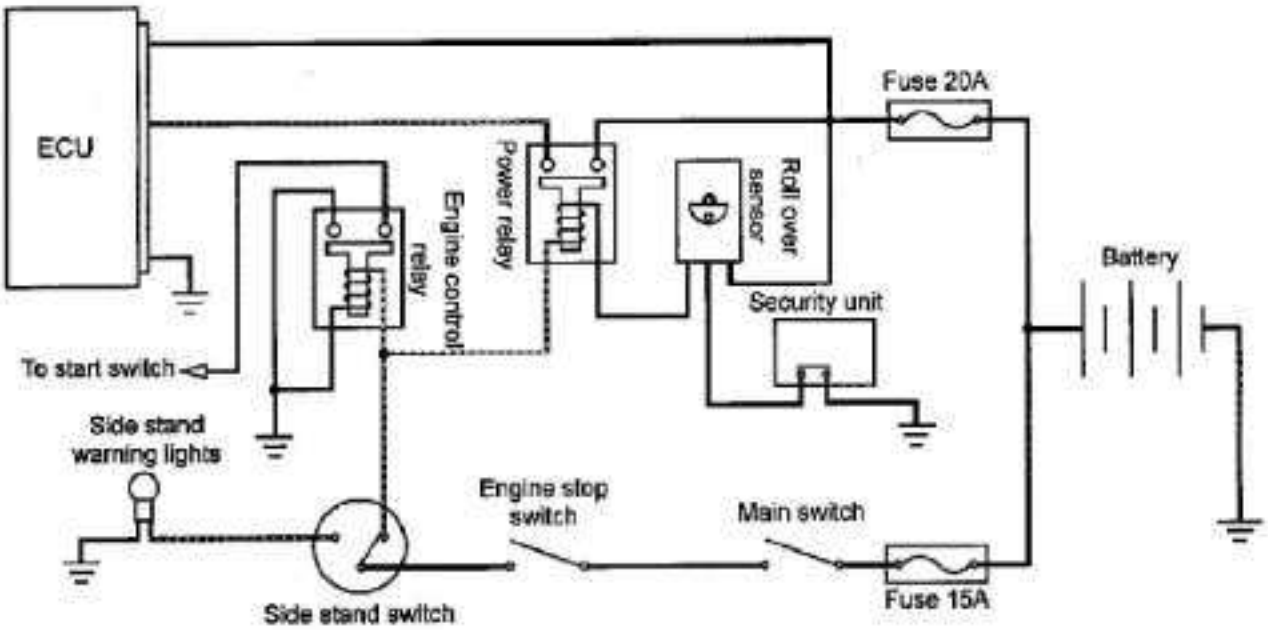
Function

As a safety device, when the motocycle to overturned, it will be cut off power supply of ECU and engine flameout.

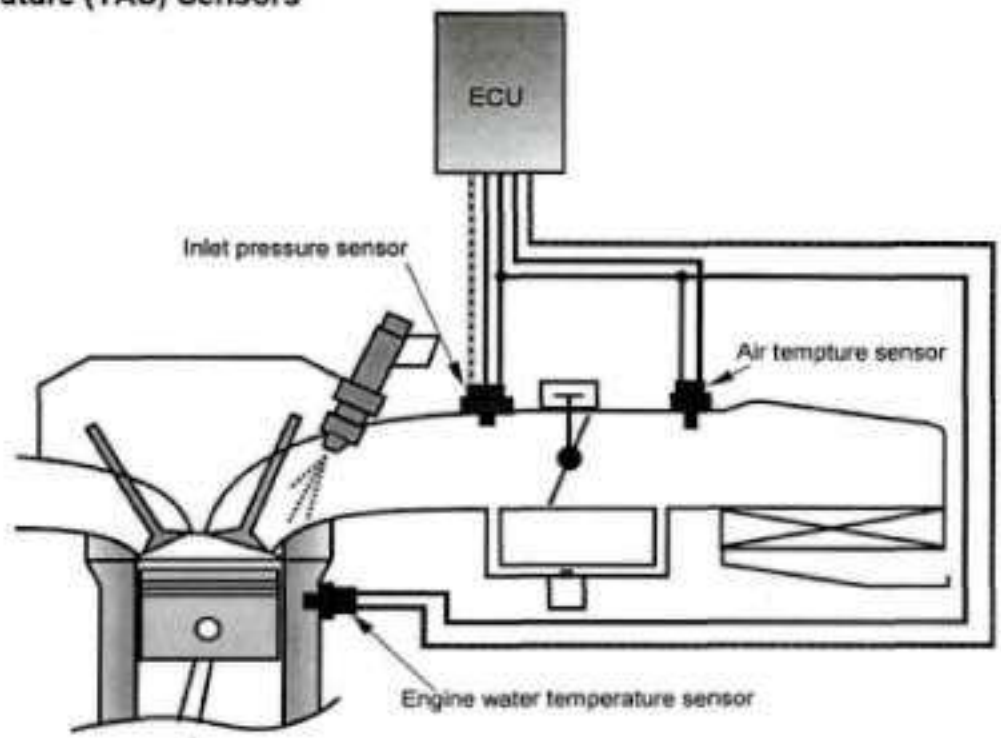
Note

For the heavy hammer-dumping sensor, when vehicles dumping more than 65 degree angle, the executive power of ECU system. At this point once again to restart the engine, the need to re-Key-on the main switch.

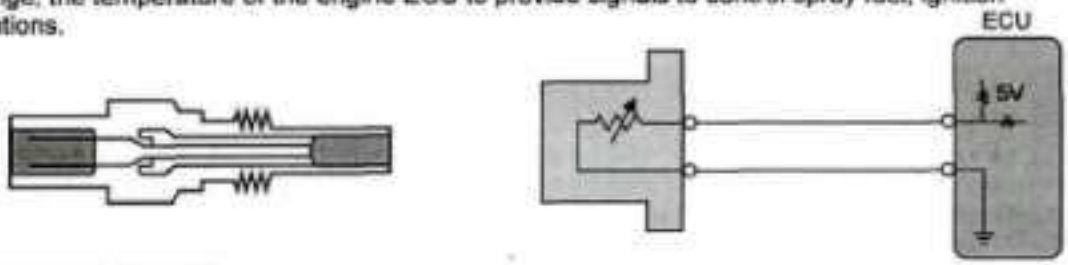




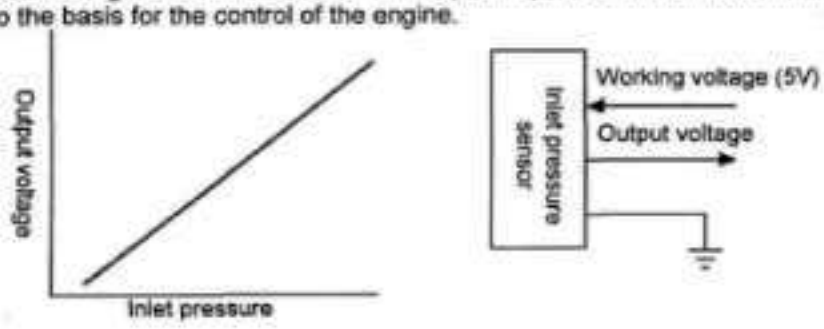
Manifold Absolute Pressure (MPS) / Engine Water Temperature (WTS) / Air Temperature (TAS) Sensors



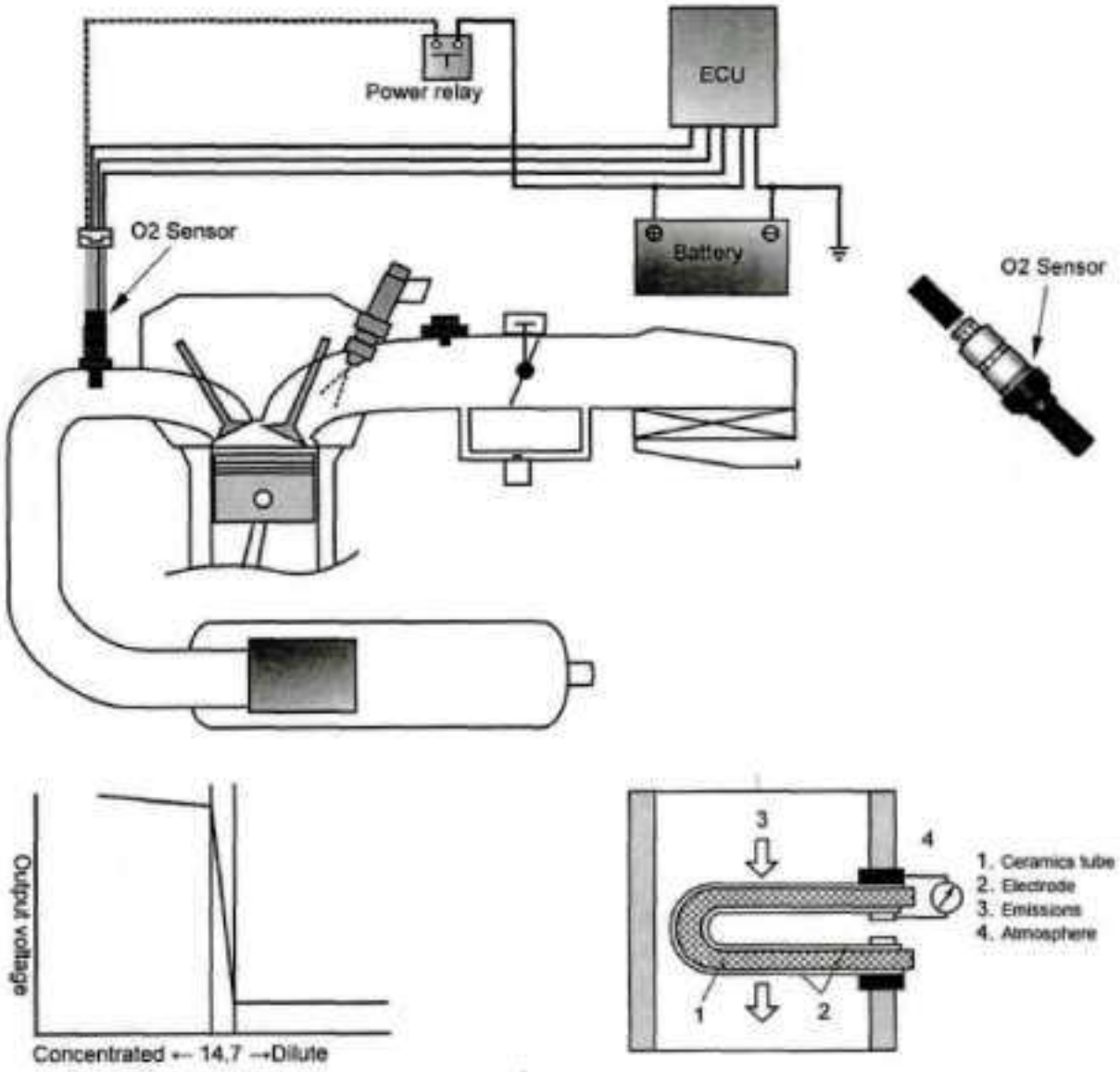
Engine water temperature / Air temperature sensor:
Use negative temperature coefficient of the variable resistor (thermistor) to the outside temperature sensor, when the high temperature resistance values at the smaller, low temperature resistance Instead of change, the temperature of the engine ECU to provide signals to control spray fuel, ignition applications.



Inlet pressure sensor:
Manifold absolute pressure sensor (MAP) is the use of silicon-based thin film resistor pressure flu deterred by the Winston bridge circuit to the sensor atmospheric pressure and intake manifold pressure ECU feedback as to the basis for the control of the engine.



O2 Sensor

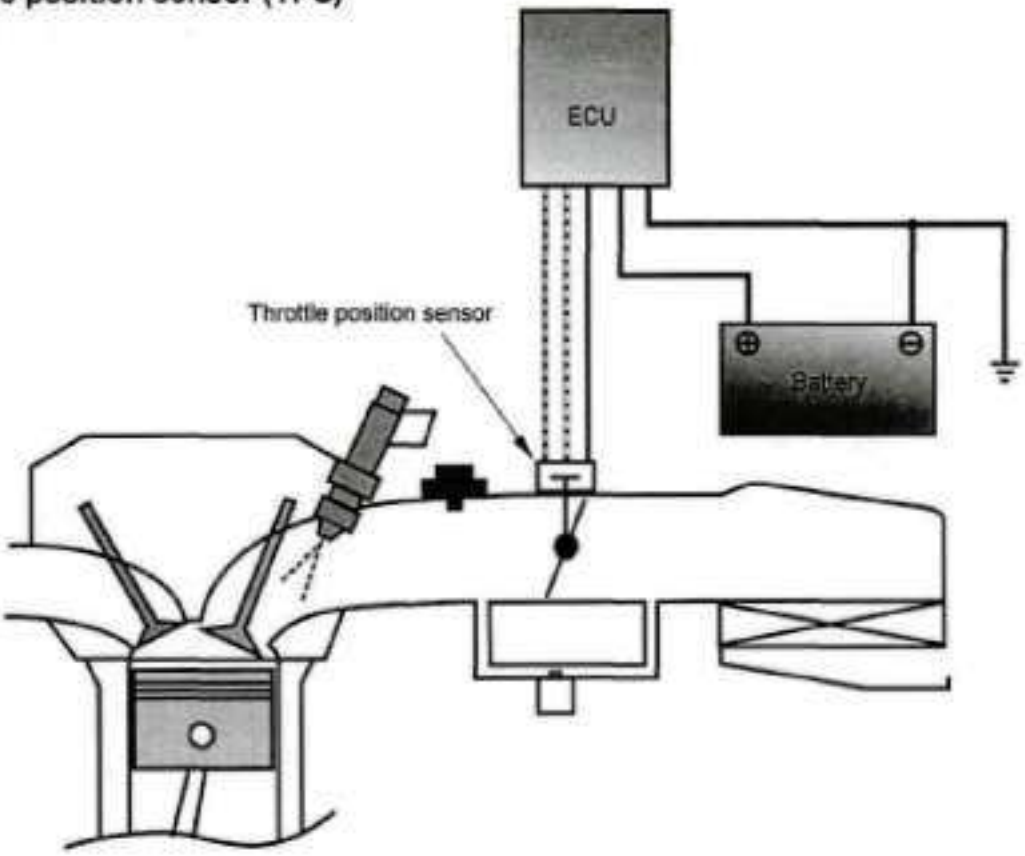


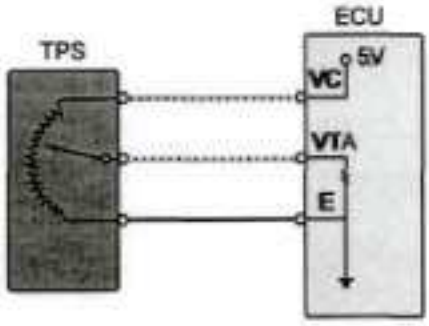
Function

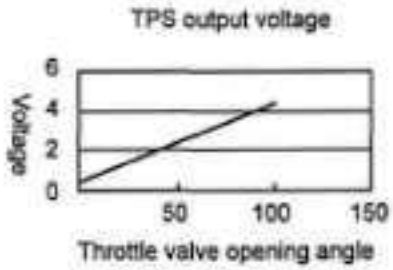
Measurement cylinder emissions of oxygen (O2) concentration <oxygen content>, and will return the computer signal to change the injector fuel injection time, the mixing ratio adjusted diluted concentration. If the oxygen level is too low that the mixture footprint, HC and CO emissions in the concentration will be higher if the oxygen content is too high that the mixture too lean, lean more mixed than the combustion temperature will increase emissions of NOx and the higher the concentration.

1. O2 Sensor output feedback signal to the ECU fuel ratio control in the vicinity of a 14.7 fuel closed-loop control.
2. When the air-fuel ratio control in the near equivalent, CO / HC / Nox had the highest conversion efficiency.
3. Heating resistor (two white line): 6.7 ~ 10.5 Ω
4. O2 Sensor amendment in the voltage value of between 100 ~ 900 mV beatings.

Throttle position sensor (TPS)



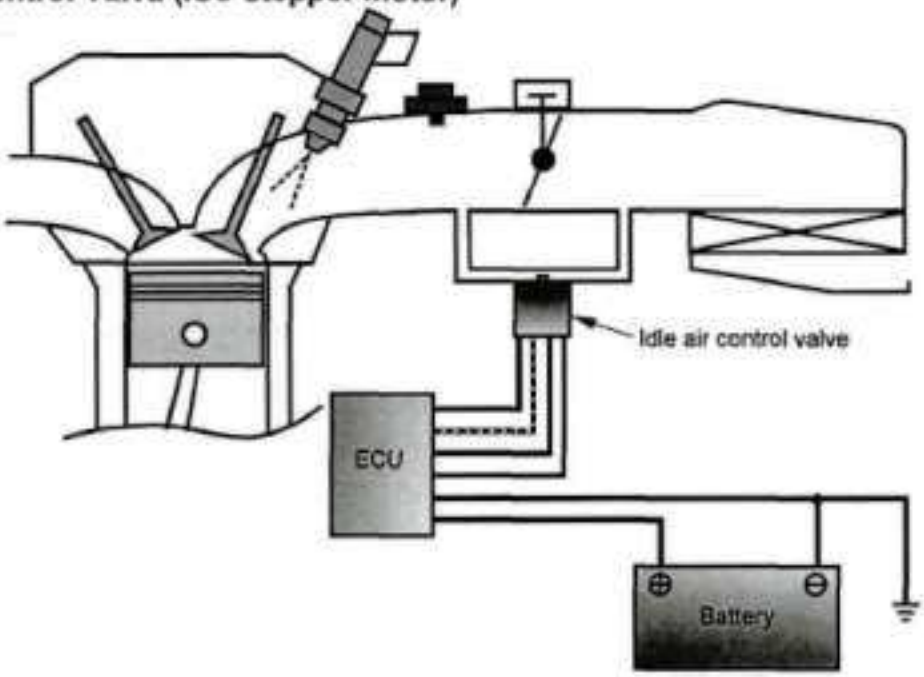


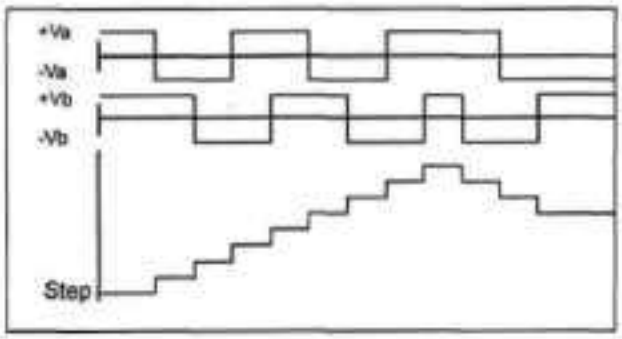


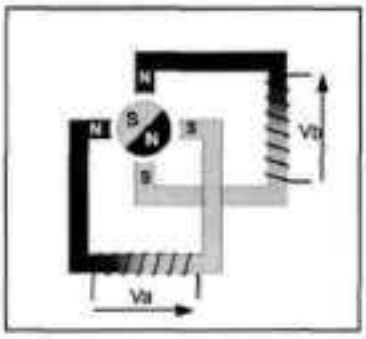
Basic Principle
TPS is a rotary variable resistor, when the resistance values at the moment it will change, voltage values also change, the resulting voltage Keji value to reflect the throttle position.

Function
Measurements throttle valve position feedback to control the engine ECU as the basis.

Idle Air Control Valva (ISC stepper motor)







Function

Stepper motor control to move forward or backward, to maintain the engine running for air (Figure 1), the stepper motor rotor-on currents, generated by cutting the stator magnetic line rotary torque generated, resulting in motor rotor rotation (Figure 2).

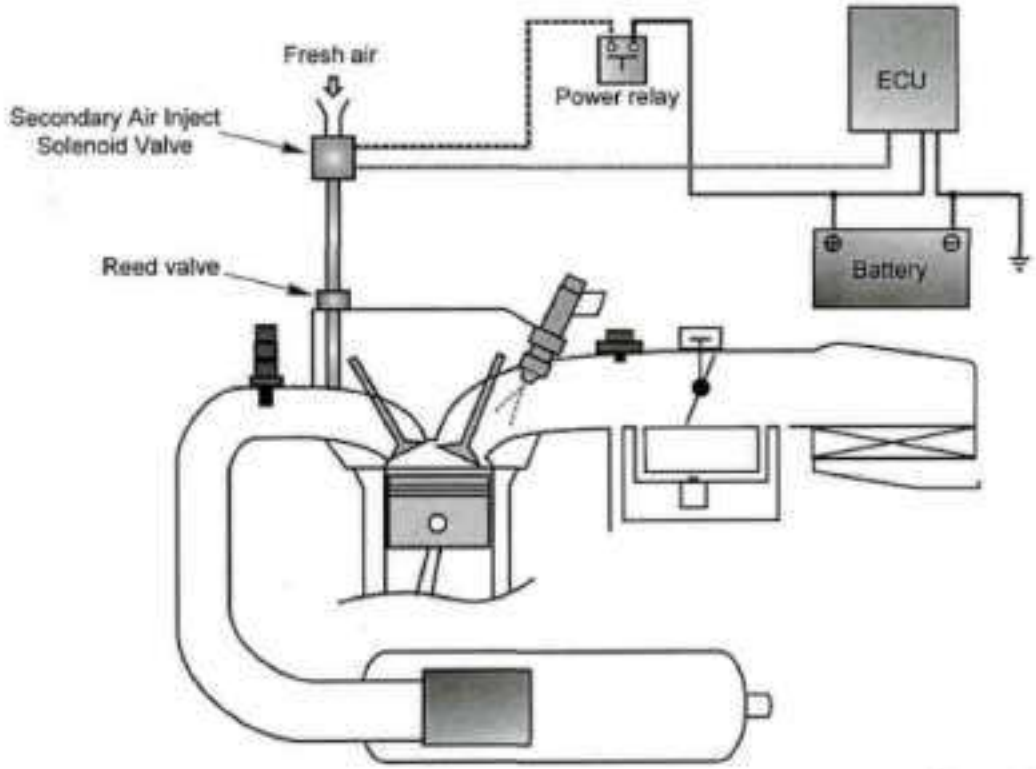
Secondary Air Inject Solenoid Valve (AISV)

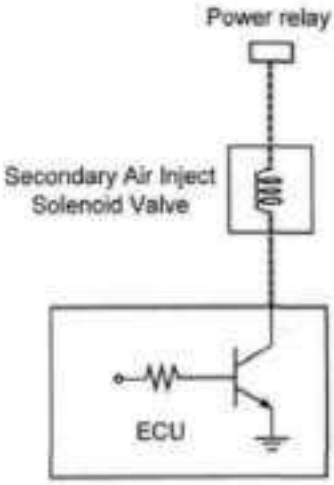
Function

In the low engine load, into appropriate to air in the exhaust pipe to reduce the emission of pollutants.

Basic Principle

When the engine speed and throttle opening greater than the setting, the ECU can control AISV open or closed.





Precautions In Operation

General information

⚠ Warning

- Gasoline is a low ignition point and explosive materials, so always work in a well-ventilated place and strictly prohibit flame when working with gasoline.
- Dismantling fuel pipeline, the first of the fuel system in leak in addition to the fuel pressure, or tubing surrounds the folder of fuel to prevent fuel splash.

⚠ Cautions

- Do not bend or twist throttle cable. Damaged cable will make unstable drive ability.
- When disassembling fuel system parts, pay attention to O-ring position, replace with new one as re-assembly.

Specification

Item	Specifications
Idle RPM	1650±100 rpm
Throttle handle free play	2~6 mm
Fuel pressure	294±6kpr (about 3.0kg/cm²)

Torque value

Engine Temperature sensor	0.74~0.88 kgf-m
O2 Sensor	3.6~4.6 kgf-m

Special Tools

Vacuum/air pressure pump
Injection system diagnostic (Data Scan)
Fuel pipeline folder

EFI System Components Description

ECU (Electronic Control Unit)

Functional Description:

- Powered by DC 8~16V, and has 36-pin socket on the unit.
- The hardware component consists of an 8-bite computer that is its control center. It contains the functional circuit interface of engine condition sensing and the driving actuator for the by-pas valve, fuel injector, and fuel pump, as well as transistor ignition coil.
- Its major software is a monitor strategy operation program that includes with controlling strategy, MAP and self-diagnosis programs.

Testing Procedures:

1. Connect diagnosis tool to the diagnostic connector on the motocycle.
2. Key-on but not to start engine, confirmation ECU and the diagnosis tool can be connected.
3. Diagnosis tool will automatically display Version "certification" of the screen.
4. ECU confirmed the application model, version is correct.
5. Confirm the diagnosis of the fault codes in existence.
6. For the removal of fault diagnosis code.
7. Start engine for the diagnosis of the numerical parameters.

Detection judge:

- Fault code can be read and cleaning, and re-started, the fault code will not occur again.

Treatment of abnormal phenomena:

1. Can not connect→ First determine whether the correct cartridge, ECU check whether abnormal Moreover, the replacement of new parts to confirm
2. Unable to start→ECU relevant parts or abnormal replacement parts to confirm.
3. Fault codes appear→ ECU relevant parts or anomalies, troubleshooting reasons to confirm.

Throttle Body

Throttle positioning screw

Functional Description:

- Throttle body is fuel inject system inlet flow regulating body (similar to the role carburetor).
- Throttle valve shaft of the driven synchronous throttle position sensor, ECU immediately to detect the throttle opening.
- Throttle positioning screw, and the factory has been adjusted at Chatham positioning, in principle, Shall not adjust.
- Above configuration Idle bypass control valve role when engine cold, compensation air to easily start vehicles, hot engine after the engine by reducing demand for air pipe.

Treatment of abnormal phenomena:

- If all fuel injection associated components identified no adverse, and other traditional engine components are also normal, the engine is still not smooth, please confirm whether the throttle body coke serious.
- If coke serious, please clean throttle body, and then adjust the injection system.

Intake Pressure Sensor

Working voltage measurement

Output voltage measurement plains

Functional Description:

- Powered by 5V DC from ECU. It has 3-pin socket on the sensor. One terminal is for power, and 1 terminal are for signal output. And, the rest one is for ground.
- The major component of the intake pressure sensor is a variable transistor IC. Its reference voltage is DC 5V, and output voltage range is DC 0~5V.
- It is a sensor by sensing pressure, and can measure the absolute pressure in intake process. It also conducts fuel injection quantity correction based on environmental position level.

Pin	Wire color	Function
Left	Yellor / Black	5V voltage input
center	Black / Red	Signal output
Right	Green / Red	Ground

Testing Procedures:

1. Inlet pressure sensor connector to properly (using the probe tool).
2. Open the main switch, but not to start engine.
3. Use "volteg meter" DC stalls (DCV) to check inlet pressure sensor voltage.
4. Confirmed working voltage:
   - Volteg meter negative access to the inlet pressure sensor third pin (Green / Red).
   - Voltage meter positive access to the inlet pressure sensor first pin (Yellow / Black).
5. Confirmed plains output voltage values:
   - Volteg meter negative access to the inlet pressure sensor third pin (Green / Red).
   - Voltage meter positive access to the inlet pressure sensor second pin (Black / Red)

⚠ Cautions

- Attentions to the tools required close to the probe wire waterproof apron penetrate skin and internal terminal before measurements to the correct value.

Detection judge:

- Working voltage value: 5.0±0.1V
- Plains output voltage values: 2.87±0.03V (Conditions: In the plains 101.3 kpa Measurement)

⚠ Cautions

- The higher the altitude, the measurement value to the lower voltage.
- Sea-level atmospheric pressure = 1Atm = 101.3kpa = 760mmHg = 1013mbar

Treatment of abnormal phenomena:

- Inlet pressure sensor damaged, or poor contact couplers.
- Check whether the abnormal wire harness lines.
- Inlet pressure sensor anomaly, the proposed replacement of the sensor to measure the output voltage.
- ECU anomaly, the proposed replacement of the ECU to measure the working voltage.

Intake Temperature Sensor

Resistance value measurement

Functional Description:

- Use ECU DC 5V power supply provided, has the two-pin coupler, a voltage output pin; another one for a grounding pin.
- Its main component is a negative temperature coefficient (resistance temperature rise smaller) thermistor.
- Installed in the air cleaner on the intake temperature sensor within the resistance, with the induction to the temperature change, and converted into voltage signals sent to the ECU then calculated the temperature and, in accordance with the ECU temperature and state amendments injection time and ignition angle.

Testing Procedures:

Resistance Value Measurement:

- Dismantled inlet temperature sensor connector.
- Use of the "Ohmmeter" Ohm stalls, inspection sensor resistance.

Detection judge:

Resistance value and the temperature between relationships as follows

Temperature (℃)	Resistance value (KΩ)
-20	18.8 ± 2.4
40	1.136 ± 0.1
100	0.1553 ± 0.007

Treatment of abnormal phenomena:

- Temperature sensor damage or connector poor contact.
- Check whether the abnormal wire harness lines.
- Temperature sensor anomaly, the proposed replacement of the temperature sensor.

Throttle Position Sensor

Functional Description:

- Use ECU provided DC 5V power supply, has the three-pin coupler, one for the power supply pin; one for a voltage output pin; one for a grounding pin.
- Its main component is a sophisticated type of variable resistor.
- Installed on the throttle body beside the throttle through (the accelerator) rotates, the output of linear voltage signal provided ECU perception and judgement then throttle position (opening), and in this signal with have the most appropriate fuel injection and ignition timing control.

Pins	Wire color	Function
Upper	White / Brown	Signal output
Center	Yellow / Black	5V voltage input
Under	Green / Red	Ground

Working voltage measurement

Testing Procedures:

1. Sensor connector to properly (using the probe tool), or can be removed connector to voltage measurements (direct measurement).
2. Opened the main switch, but not to start engine.
3. Use "volteg meter" DC stalls (DCV) to check sensor voltage.
4. Confirmed working voltage:
   - Volteg meter negative access to the inlet pressure sensor third pin (Green / Red).
   - Voltage meter positive access to the inlet pressure sensor first pin (Yellow / Black).
5. Throttle output signal recognition (using the probe tool)
   - Volteg meter negative access to the sensor third pin (Green / Red).
   - Voltage meter positive access to the sensor first pin (white / Brown).
   - Measurements were full throttle at full throttle closed the values of the output voltage.

Throttle output signal measurement - full closed

⚠ Cautions

- Attentions to the tools required close to the probe wire waterproof apron penetrate skin and internal terminal before measurements to the correct value.

Detection judge:

- Working voltage value: 5.0±0.1V
- Full throttle voltage value: 0.6±0.02V
- Full throttle closed voltage value: 3.77±0.1V

Throttle output signal measurement - full

Engine Temperature Sensor

Functional Description:

- Powered by 5V DC from ECU. It has the two-pin socket on the sensor. One terminal is for power output, and 1 terminal are for ground.
- Its main component is a negative temperature coefficient (resistance temperature rise smaller) thermistor.
- Installed in the cylinder head, the engine temperature sensor resistance, with the induction to the temperature change, and converted into voltage signals sent to the ECU was calculated engine temperature, ECU accordance with the engine warm up to amendment the injection time and ignition angle.

Resistivity measurements

Testing Procedures:

- Dismantled engine temperature sensor.
- Use of the "meter" Ohm stalls, inspection sensor resistance.

Detection judge:

Resistance value and the temperature between relationships as follows:

Temperature (℃)	Resistance value (KΩ)
-20	18.8 ± 2.4
40	1.136 ± 0.1
100	0.1553 ± 0.007

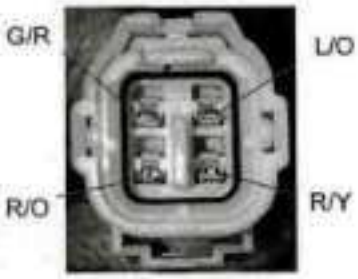
Treatment of abnormal phenomena:

- Temperature sensor damage or couplers to poor contact.
- Check whether the abnormal wire harness lines.
- Temperature sensor anomaly, the proposed replacement of the temperature sensor.

O2 Sensor

Functional Description:

- Use 8 ~ 16V DC power supply, has the 4-pin coupler, a power supply pins for heater; for a heater control pin; signal for a grounding pin; O2 for a signal pin.
- O2 Sensor output feedback signal to the ECU fuel ratio control in the vicinity of 14.5 ~ 14.7, a closed-loop fuel control.
- When the air-fuel ratio control in the near equivalent, CO / HC / Nox to have the highest conversion efficiency.

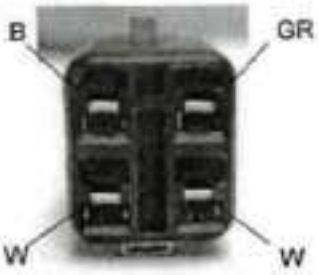


Testing Procedures:

1. Voltage confirmed:

- Removed O2 Sensor and the wire harness between the coupler.
- Open the main switch, but not to start engine.
- Use "volteg meter" DC stalls (DCV) to check inlet pressure sensor voltage.
- Confirmed working voltage:
  Volteg meter negative access to the wire harness sensor coupler 2nd pin (Red / Orange).
  Voltage meter positive access to the wire harness sensor coupler first pin (Red / Yellow).

Confirmed working voltage



2. Resistance Confirmation:

- Removed O2 Sensor and the wire harness between the coupler.
- Use of the "meter" Ohm stalls, Measurement O2 Sensor heater resistance.
- Measurement resistance value
  Ohm meter negative access to the O2 sensor coupler 2nd pin (White).
  Ohm meter negative access to the O2 sensor coupler first pin (White).

Resistance Confirmation

Numerical voltage changes that the situation.

3. Used the diagnosis tool to confirm of O2 sensor work situations:

- Connected the "diagnosis tool" to diagnosis coupler and open the main switch to start the engine.
- Engine to be completely warm-up (idling state operation "5 minutes" above).
- Screen will switch to the diagnosis tool of "DATA STREAM 01/01" screen, select "O2 Sensor" project, and switches to a wave of images, turn the throttle engine speed to about 4500 rpm, Observation O2 Sensor actuator circumstances.
- Observation O2 Sensor voltage values that the situation changes.

Detection judge:

- Working voltage value: above 10V
- Resistance value: 6.7~10.5Ω
- O2 Sensor amendment in the voltage value of between 100 ~ 900 mV beating; representatives pollution closed-loop control system to normal, if contrary to maintain a fixed value for abnormalities.

Treatment of abnormal phenomena:

- O2 sensor damage, heater damaged or couplers to poor contact.
- Check whether the abnormal wire harness lines.
- O2 Sensor anomaly, the proposed replacement of the O2 Sensor , and measurements again.

Roll over sensor

Functional Description:

- Control power of the power relay coil, has the three-pin socket.
- When vehicles tilt angle greater than 65 degrees, roll over sensor will be the implementation of ECU system power off. At this point once again to restart the engine, the need to re-open a main switch.
- This as a safety device, when the dumping of vehicles, be cut off power supply of ECU, and engine stop.

Testing Procedures:

- Because of the roll over sensor for the electronic control agencies, not against removed after a single measurement.
- Normal state, after power is turned on the main switch, measurement of ECU power relays red / yellow line to the Green Line (ground), the power supply voltage measurement can determine whether it is normal for the roll over sensor.

Detection judge:

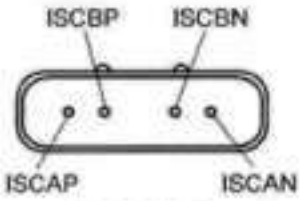
Voltage: Supply voltage = Battery voltage

Treatment of abnormal phenomena:

Vehicle state vertical, power relays or ECU without electricity supply.

- Roll over sensor internal short circuit or open circuit, or coupler bad contact.
- Check whether the abnormal wire harness lines.
- Roll over sensor anomaly, the proposed replacement of the roll over sensor.

Idle Speed Control Valve (stepper motor) :



ISC PINS

A phase measurement of the resistance value

B phase measurement of the resistance value

Functional Description:

- Use ECU provided power, has the four-pin socket.
- 4-pin coupler for the two motor coils of the power supply and grounding wire, grounding ECU power through the control and management of the stepper motor actuators.
- If it's mainly low-power DC motors, drives idle speed control valve (ISC) of the movement to adjust the idle air flow channel size, control of idle speed of the engine in the cold or hot.

Testing Procedures 1:

Resistance Confirmation:

- Idle Air Control Valve will be demolished down coupler (directly in the body, can also measure).
- Use of the "meter" Ohm stalls (Ω), measurement of the two step motor coil resistance values.
  A phase: ISCAP and ISCAN
  B phase: ISCBP and ISCBN

Inspection of the actuation (testing can only be on engine, not a single test):

- Closure of the main switch.
- Use hand to touch Idle Air Control Valve body.
- Open the main switch.
- Feeling the Idle Air Control Valve Actuation.

⚠ Cautions

- Dynamic checking for Idle Air Control valve, can only be tested on the engine, not a single test.

Detection judge:

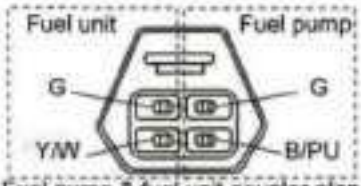
1. Resistance value:
   A phase: 80 ± 10Ω (Environmental conditions: 15 ~ 25 ℃)
   B phase: 80 ± 10Ω (Environmental conditions: 15 ~ 25 ℃)
2. Actuator inspection:
   In the above steps Idle Air Control Valve (ISC) Idling motor actuator control of inspection, ISC will be slightly vibration or "... da... da..." continuous voice.

Treatment of abnormal phenomena:

- Idle air control valve damage, or poor coupler contact.
- Check whether the abnormal wire harness lines.
- Idle Air Control Valve anomaly, the proposed replacement of the Idle Air Control Valve, further inspection of its actuator.

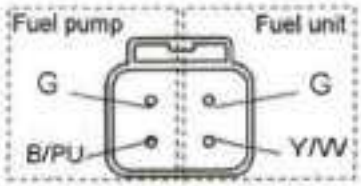
Fuel Injection System

Fuel Pump



Fuel pump & fuel unit coupler plan


Confirmed working voltage



Harness-face coupler plan


Resistance Confirmation

Functional Description:

- Powered by DC 8~16V, and has four-pin socket on the pump.
- The two terminals are connected to power source and ground respective. The ECU is to control and manage the operation of fuel pump through electrical power.
- Its major component is a driving fan pump that equipped with a low electrical consuming DC motor. Powered by 12V voltage and keep fuel pressure inside the fuel pump in 294±6kpa (about 3 kg / cm^2).
- The fuel pump is located inside of the fuel tank, and installed a filter in front of its inlet so that can prevent from foreign materials sucking into the fuel pump to damage it and the fuel injector.

Testing Procedures 1:

Fuel pump working voltage confirmed:

- Fuel pump coupler to properly (using the probe tool), or can be removed coupler working voltage measurements (direct measurement).
- Open the main switch, but not to start engine.
- Use "volteg meter" DC stalls (DCV) to check fuel pump voltage.
- Confirmed working voltage:
  Volteg meter negative access to the wire harness fuel pump coupler 2nd pin (Green).
  Voltage meter positive access to the wire harness fuel pump coupler first pin (Black / Purple).

⚠ Cautions

- Conducting fuel pump voltage measurement, if the main switch to open three seconds after the engine did not started, the ECU will automatically cut off the fuel pump power supply.

Detection judge 1:

1. Working voltage value: Above 10V
2. Resistance value: 1.5±0.5Ω
3. Fuel pressure: 294±6kPa (about 3kg/cm^2)

Testing Procedures 2:

Resistance Confirmation:

- Removed coupler on the fuel pump.
- Use of the "meter" Ohm stalls, Measurement fuel unit resistance (Yellow / White & Green).

Detection judge 2:

- Fuel unit resistance value: 4~107.5Ω

Fuel system pressure measurement

Testing Procedures 3:

Fuel pressure measurement:

- Use fuel pressure gauge, connected in series between the injector and the fuel tank.

⚠ Cautions

- In the implementation of the fuel pressure measurement, will go to the demolition of the fuel hose, such as: injector or fuel pump hose, hydraulic measurements after, be sure to confirm whether there is a leakage of fuel situation in order to avoid danger.

Fuel pressure measurement demolition - injector

Detection judge 3:

1. Fuel pressure: 294±6kPa (about 3kg/cm^2)

Treatment of abnormal phenomena:

1. Fuel pump damage internal coil break, or coupler bad contact.
2. Fuel filter blockage.
3. Fuel pump anomaly, the proposed replacement of the fuel pump.
4. Fuel unit anomaly, the proposed replacement of the fuel unit.

Fuel pressure measurement demolition - fuel pump

Fuel Injection System

Fuel Injector

Functional Description:

- Powered by DC 8~16V, and has two-pin socket on the injector.
- Its major component is the solenoid valve of high resistance driven by electronic current.
- The two terminals are connected to power source and ground respective. It is controlled by ECU to decide the injection timing, and the injector pulse width.

Injector resistance confirmation

Testing Procedures:

1. Resistance Confirmation:
   Use of the "meter" Ohm stalls (Ω), measurement of the injector resistance value.

2. Injector injection state examination:
   - Removed the injector fixed bolt and removed the injector from intake manifold, but not removal of harness coupler.
   - Injector and injector cap tightly by hands, fuel spills should not be the case.
   - Key-on and start the engine, injector injection state examination.

Injection-state atomizing good

Detection judge:

1. Between the two pin resistance values: 11.7±0.6Ω
2. injection state:
   - Fuel atomizing good, with a clear scattering angle → judged as normal.
   - Injection-state such as water, no obvious scattering angle → found abnormal.

Injection-state unusual

Treatment of abnormal phenomena:

1. Injector abnormal, the proposed replacement of the new one injector.
2. Injection-state abnormal, for the following reasons:
   - Injector obstructive→ the proposed replacement of the new one injector.
   - Fuel pressure shortage → confirmed hydraulic pressure, the proposed replacement fuel pump to confirm.

⚠ Warning

- Gasoline is lower ignited explosive materials, in the ventilation premises operations, and prohibited fire.
- In the inspection injector fuel injection state, the outflow of gasoline, and the application of appropriate collection containers, so as to avoid danger.

Transistor ignition coil

First circuit coil resistance measurement

Functional Description:

- Use 8 ~ 16V DC power supply, has the two-pin socket.
- Two-pin socket for the power supply and grounding. Its main components for the high conversion ratio transformer.
- Through computer programs when the ignition is controlled, from ignition timing (TDC) / crank position sensor, the throttle valve position sensor, engine temperature sensor, the inlet pressure sensor and O2 Sensor, issued by the signal, with the engine Speed through the ECU to determine the appropriate ignition is, by the current of a crystal intermittent control, a 25000-30000 volts of secondary hypertension, flashover triggered spark plug, this approach will not only enable the engine to achieve maximum output function, also help to improve the efficiency of fuel consumption and pollution improvements.

Testing Procedures:

Resistance Confirmation:

- Removed coil first circuit plugs on the ignition coil (Red / Yellow & Black / Yellow).
- Use of the "meter" Ohm stalls (Ω), measurement of the ignition coil resistance value.

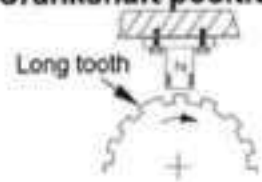
Detection judge:

- Ignition coil first circuit: 3±0.3Ω(20°C)

Treatment of abnormal phenomena:

1. Ignition coil internal coil disconnection damaged, or plugs bad contact.
2. Ignition coil ignition is not abnormal, proposes to replace the ignition coil.

Crankshaft position sensor



Measurement resistance value

Functional Description:

- Do not need for an external power supply, has two-pin of signal plug.
- Constitutes a major change in its reluctance induction coil.
- The spacing of flywheel and sensor should be 0.7 to 1.1 mm.
- Magnetic induction sensor is the use of flywheel on the Gear (23 +1 long tooth) rotary cutting induction coil changes in the magnetic field sensor with the inductive voltage signal for ECU judgement, calculated at the engine speed and crankshaft position, and with a most appropriate time of fuel injection and ignition control.

Testing Procedures:

Resistance Confirmation:

- Removed crankshaft position sensor coupler (Blue / Yellow & Green / White).
- Use of the "meter" Ohm stalls (Ω), measurement of the crankshaft position sensor resistance value.

Detection judge:

- Resistance value: 80~160Ω(20°C)

Treatment of abnormal phenomena:

1. Sensor internal coil interrupted damaged, or coupler bad contact.
2. Check whether the abnormal wire harness lines.
3. Sensor coil anomaly, the proposed replacement of the new one.

Secondary air injection solenoid valve

Functional Description:

- Control power, has two-pin socket, one for the power supply pin, one for grounding pin.
- Secondary air injection solenoid valve at the Idle (3500 rpm below) actuator.
- At Idling, ECU control solenoid valve by the grounding circuit to be moving or closing.

Testing Procedures:

Resistance Confirmation:

- Use of the "meter" Ohm stalls (Ω), measurement of the secondary air injection solenoid valve resistance value.

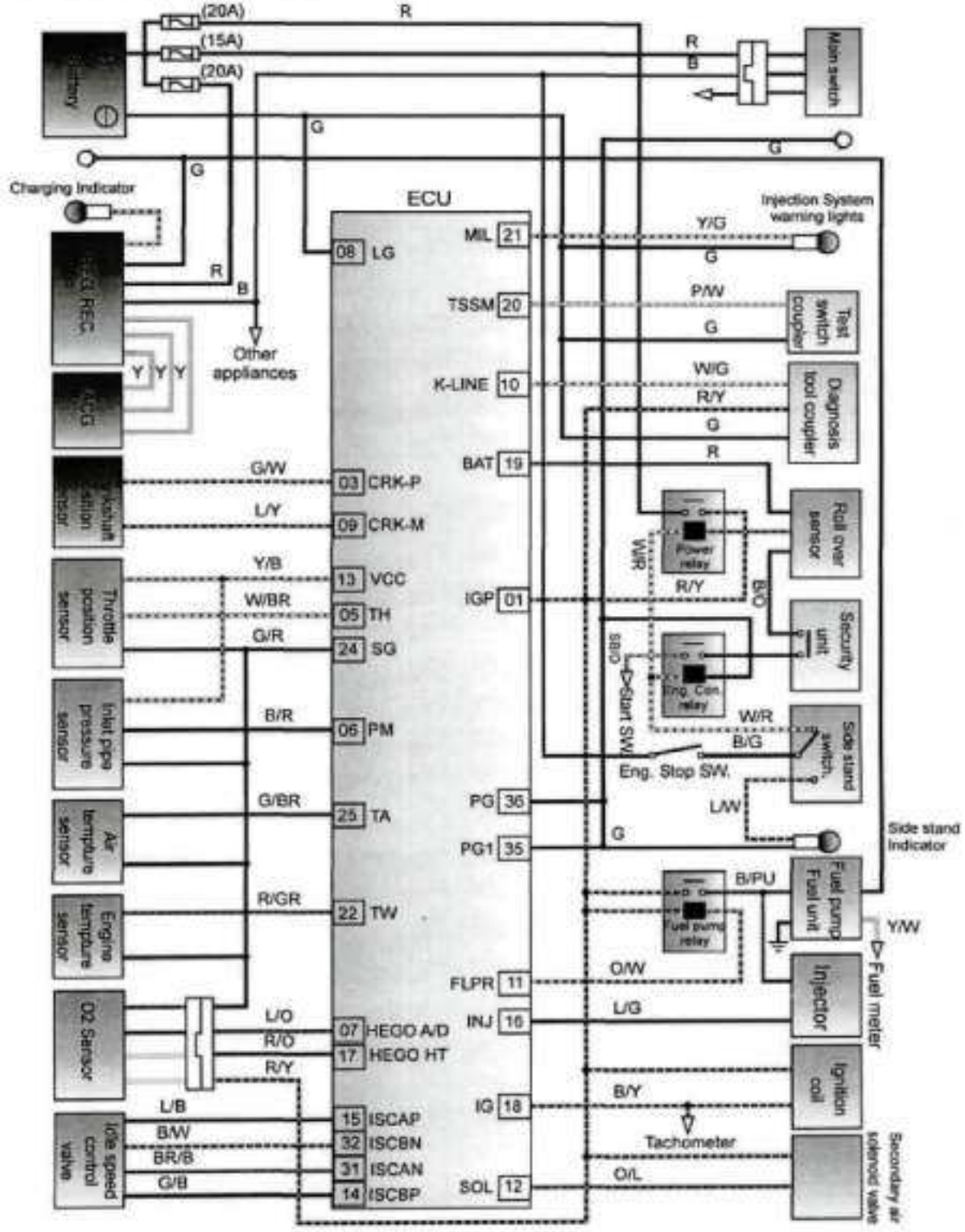
Detection judge:

Resistance value = 26Ω ± 2.6Ω

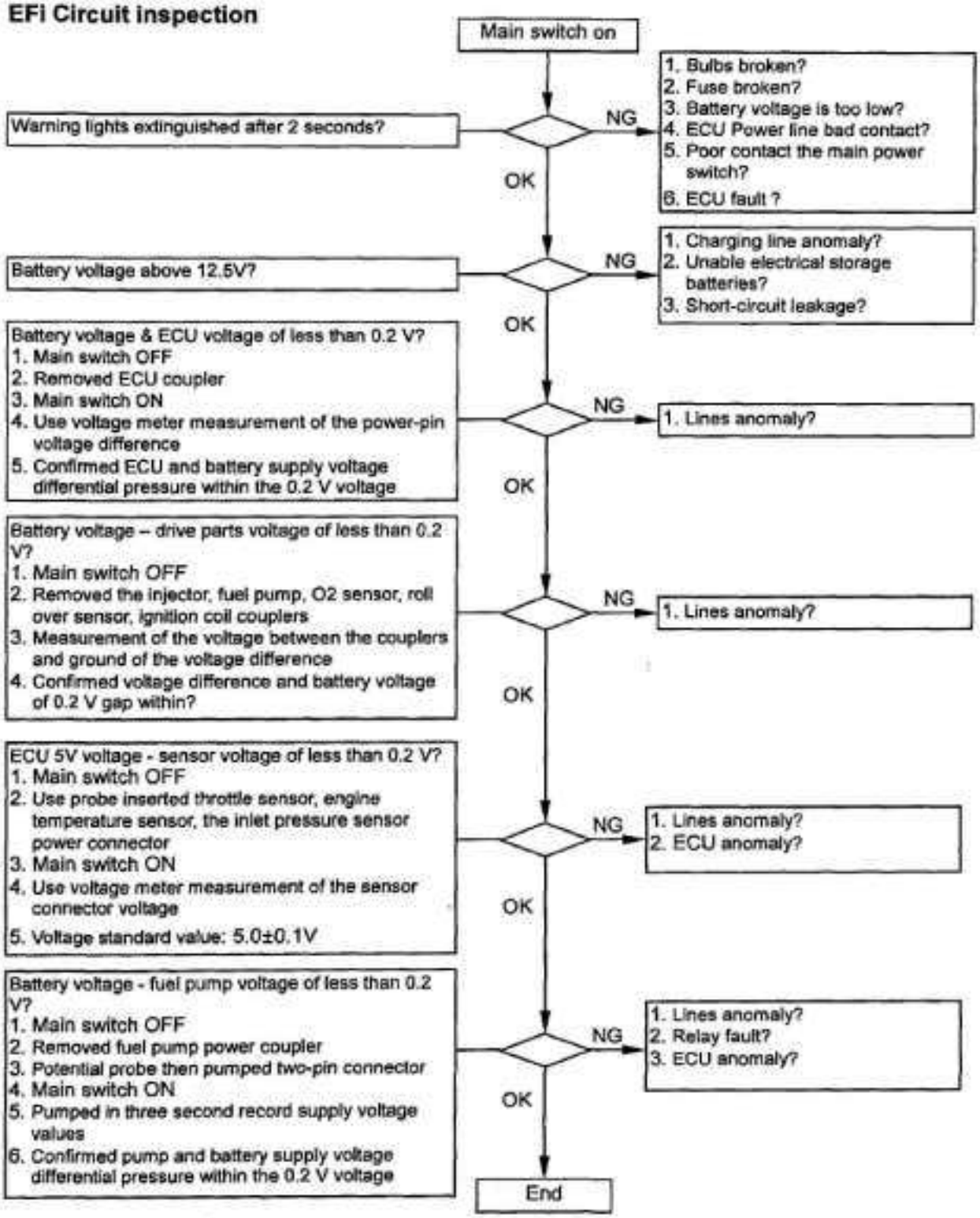
Treatment of abnormal phenomena:

- Secondary air injection solenoid valve internal short circuit or open circuit, or coupler bad contact.
- Check whether the abnormal wire harness lines.
- Secondary air injection solenoid valve anomaly, the proposed replacement of the new one.

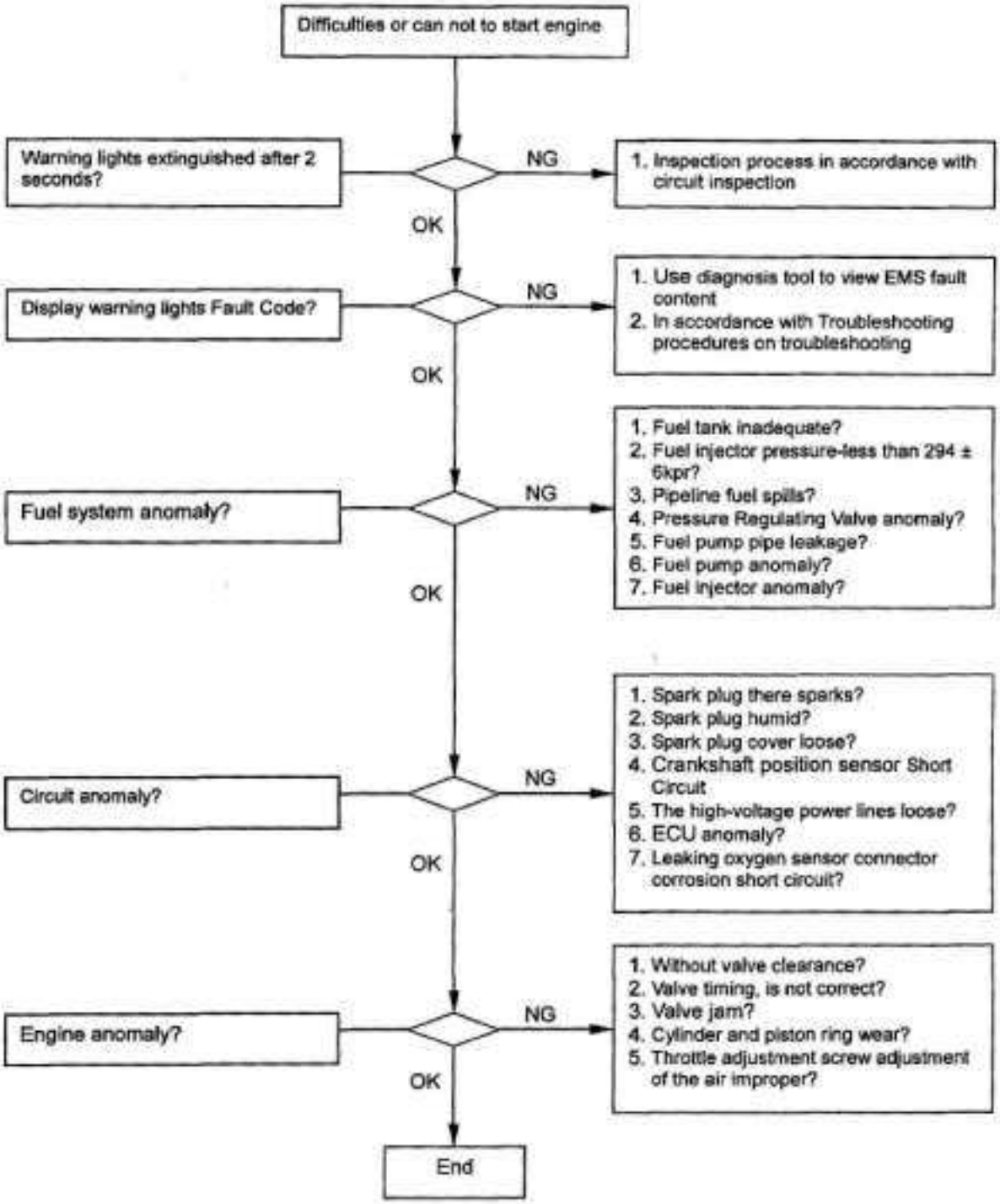
Fuel Injection System Circuit



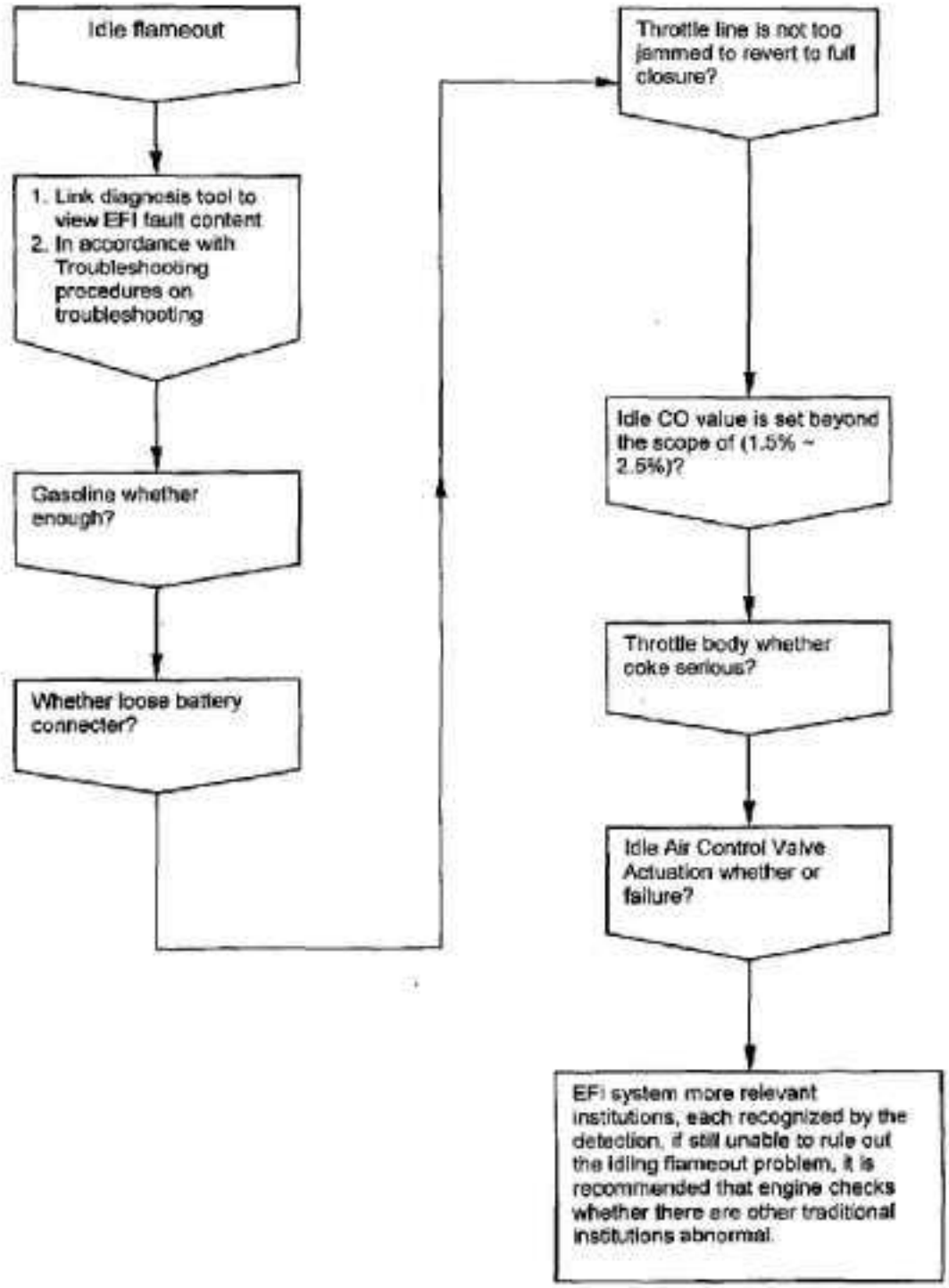
Fault Diagnosis
EFi Circuit inspection



Can not Start the engine or difficult to start inspection

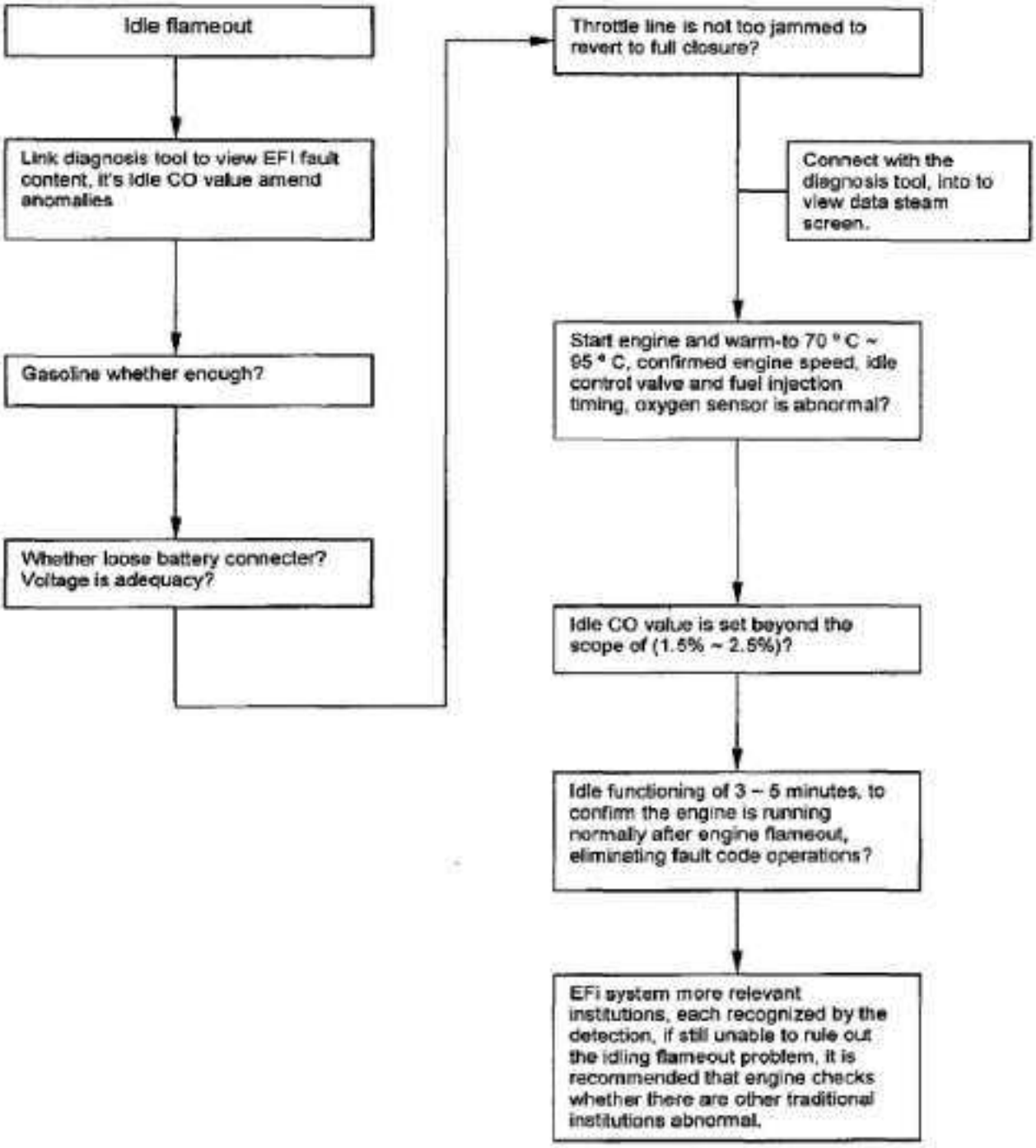


Idle flameout diagnosis

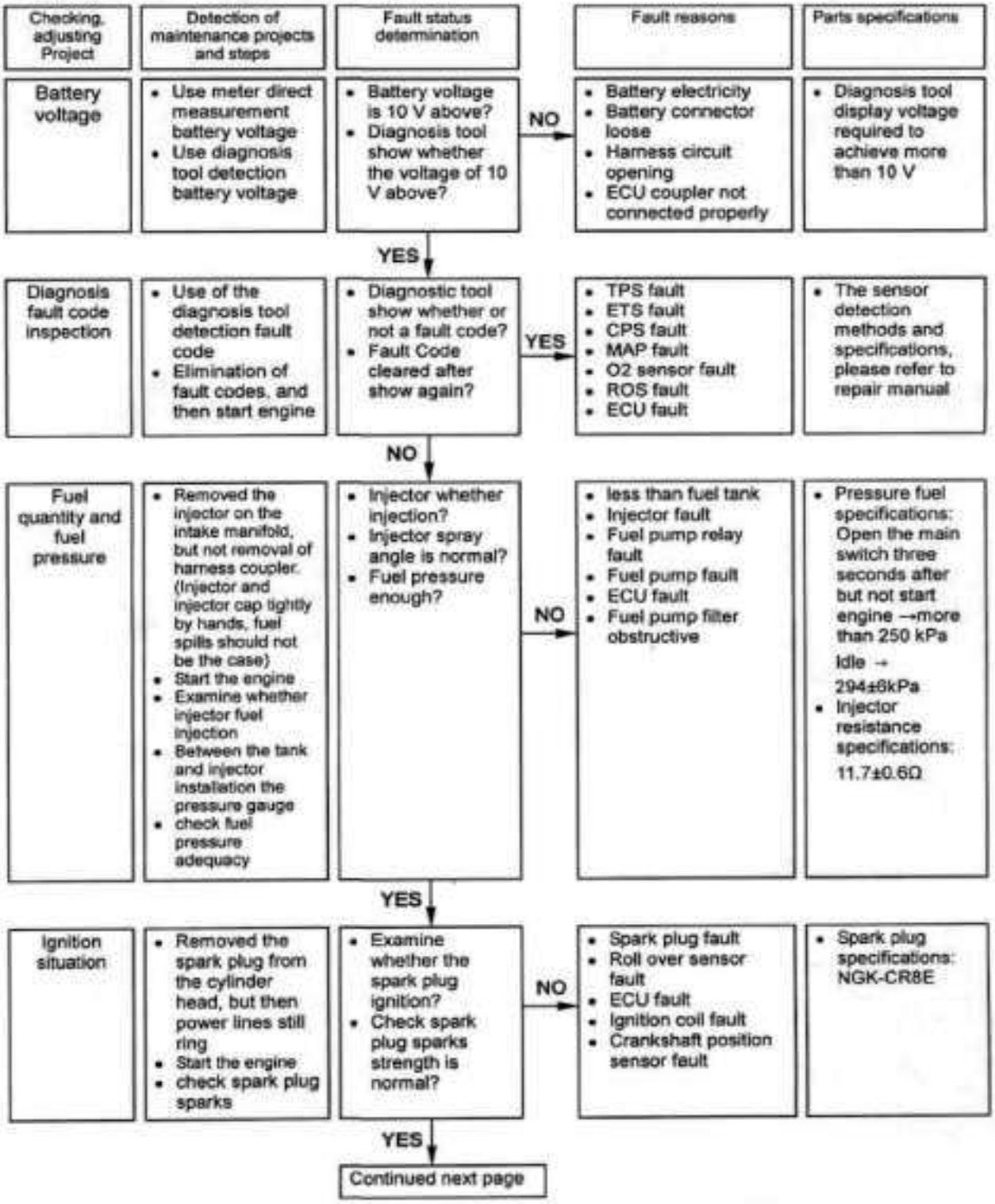


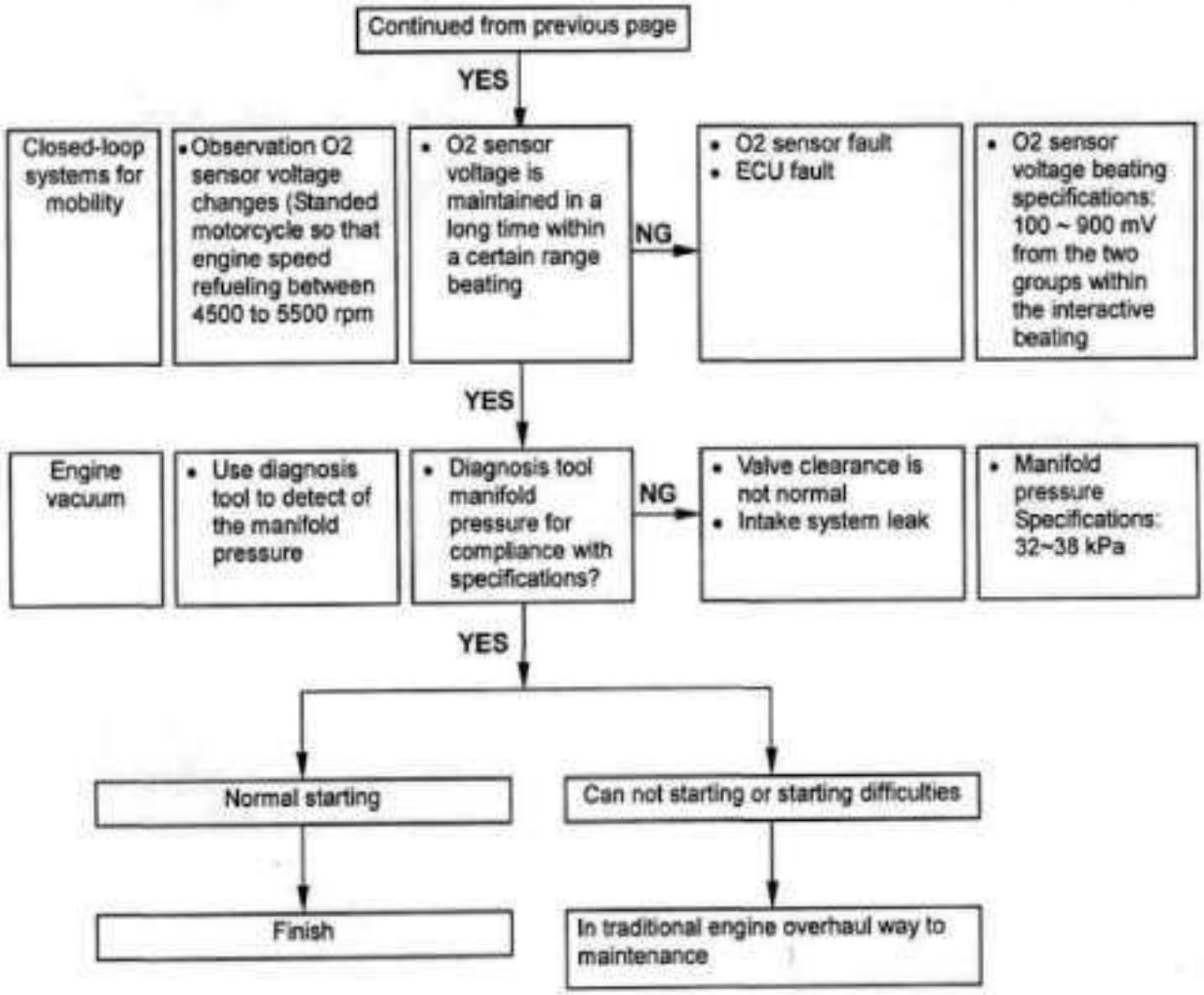
CO value revised anomaly

O2 Sensor equipped with the system, in principle, not adjusted CO value, such as CO value deviated from the normal range, check O2 Sensor and other agencies anomaly.



Integrated Fault Diagnosis Program

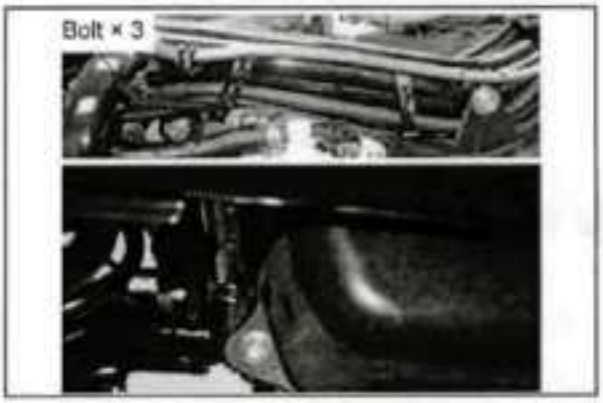




Remove fuel pump/fuel unit
Remove side cover.
Remove rear carrier
Remove rear bodycover.
Remove floor panel.
Remove under cover.
(refer to chapter 14)

Remove fuel pump lines coupler.
Release the fuel tube folder, removed the fuel tube.

Remove the fuel tank fixed bolts (Bolt × 3), remove the fuel tank.



Remove / Install fuel pump and fuel unit
Remove fuel pump fixed bolts (Bolt × 6), remove fuel pump.
Install In the anti-demolition order.

⚠ Cautions

- Then remove fuel pump, fuel in fuel tank internal to confirm not excessive.
- Then install fuel pump and fuel unit, attention direction.
- Confirm whether the fuel filter dirt, obstructive.
- Fuel pump installation, to confirm whether it is normal to the fuel out (the pressure about 3 kg/cm2).

Air Cleaner

Remove

Remove left side body cover and luggage box.
Remove rear carrier and body cover.
Remove fuel gas recover tube.
Remove waste gas purification system pipes.
Remove intake temperature sensor coupler.

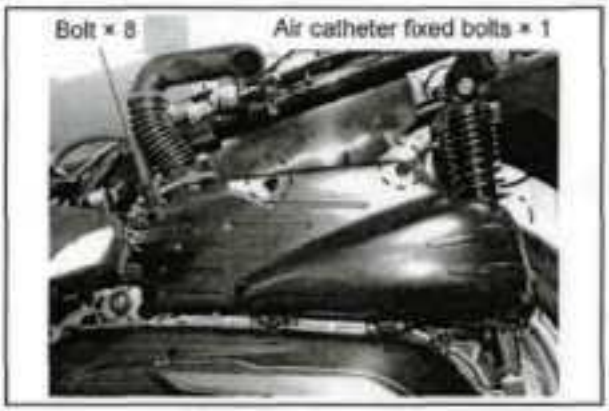
Remove intake tube fixed bolt (bolt×1).
Remove air cleaner fixed bolts (bolt×2).
Remove air cleaner.

Install

Install In the anti-demolition order.

Clean air cleaner filter

Remove air cleaner cover (bolt×8).
Remove air cleaner filter (bolt×6).
Use compressed air to remove the adhesion of dirt, if not too much dirt cleared, please new replacement.

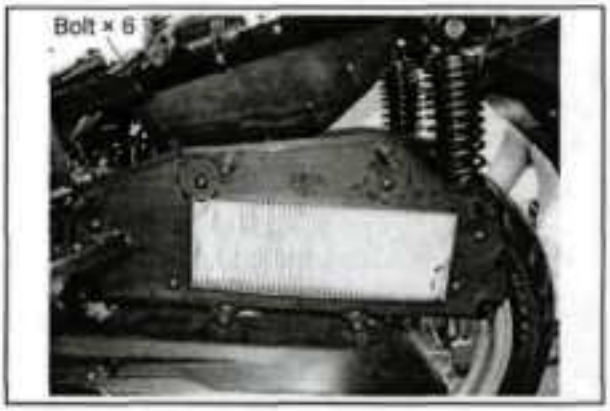


⚠ Cautions

- Air cleaner filter for paper products, must not soak or cleaning by water.

Install air cleaner filter

Install In the anti-demolition order.



⚠ Cautions

- Air cleaner filter and air filter cover should be covered formation is the installation, not to skew a seam, resulting dust, foreign body aspiration in the engine.

Fault Diagnosis Note

When the motorcycle injection system in the wrong signal, causing abnormal functioning of the engine or can not start engine, warning light at the meter will be lighting, to inform drivers to carry out maintenance.

Overhaul, the diagnosis tool can be used for troubleshooting (refer to diagnosis tool use guide), or manually by the meter warning light inspection revealed that the fault codes (refer to checking signal fault codes discriminant method), the two methods for maintenance.

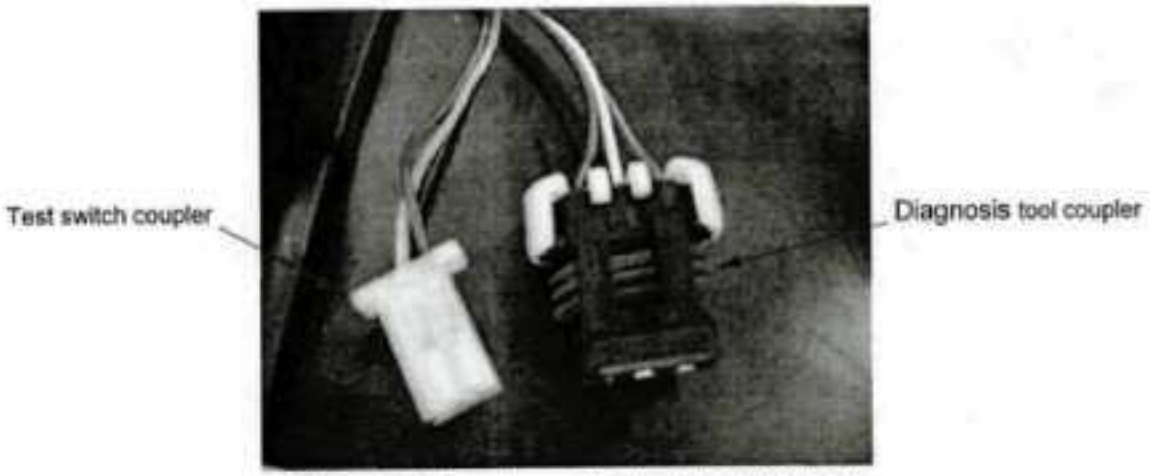
If the fault has been ruled out or repair after the inspection light will be extinguished, but ECU fault code will be recorded, so the need to get rid of fault codes. If a fault exists, this system has two kinds of methods to eliminate fault codes respectively in the diagnosis tool removal and manual removal.

Diagnosis tool for overhaul

Diagnosis tool will connect to the motorcycle for coupler diagnosis, according to the use of diagnostic tool testing methods, when belong fuel injection system fault or parts fault, according to the diagnosis tool of the fault code display messages do describe parts of the inspection testing maintenance and replacement parts. When after the maintenance, the need to get rid of fault codes (Please refer to detailed steps diagnosis tool of instructions), or fault code will always be stored in the ECU.

Maintenance Manual

Use of cross-wiring (wire or paper clips, etc.) to cross-Joints Test Switch for grounding, in the meter of this check light are flashing, it means that the injection system or parts of abnormal situations, but not in the diagnosis tool can be - for the detection, inspection can enjoy for a long time flashing lights flashing and the short period of time to inform the cause of the malfunction (refer to check light fault information fault code table).

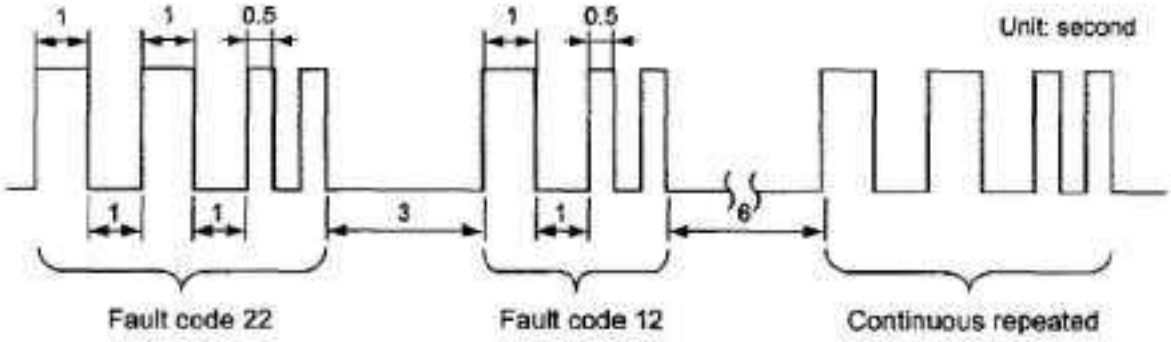


Diagnosis tool coupler and test switch coupler plant

Check Light Fault Codes Discriminant Method

Check light flashing mode

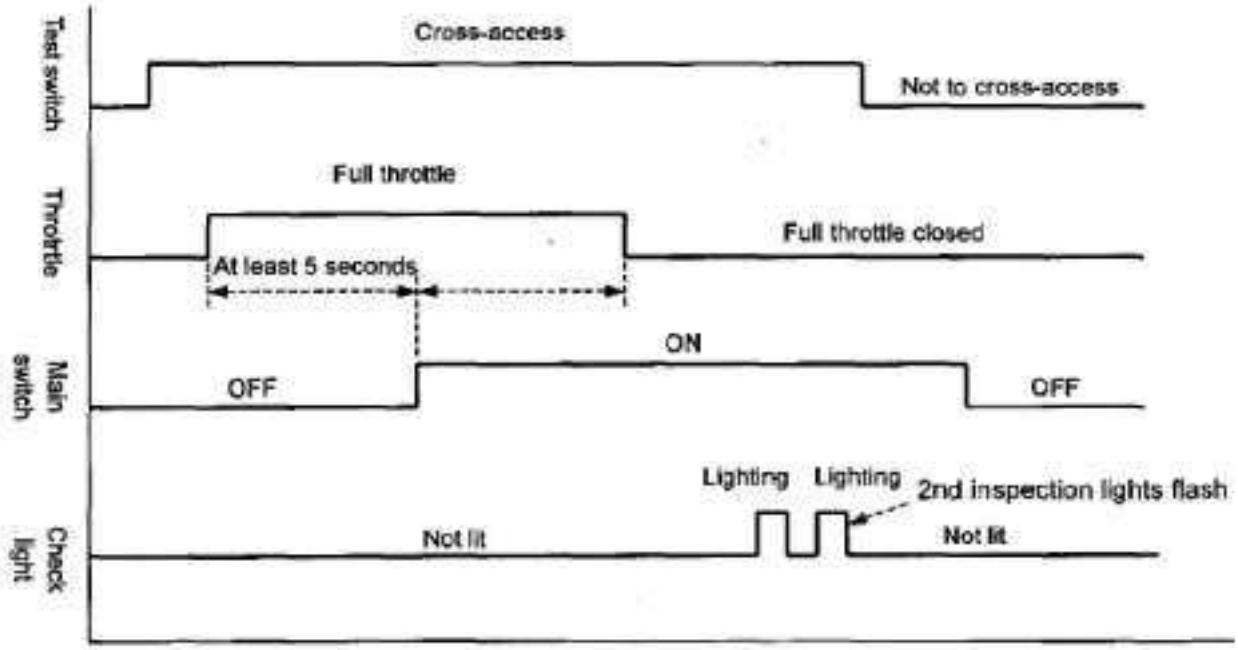
If problem without diagnosis tool to be detected, it can be cross-access the test switch coupler, the motorcycle from the CHK lights flashing signal interpretation, and then the basis for the diagnosis of dynamic information tables on the priorities of light, and prompts you to the motorcycle to the emergence of some warning, or FLASH CODE is to determine what kind of fault, and exclusion.



Fault Code manual removal procedure:

When there is without diagnosis tool, can be manually cleared Fault Code, the implementation of the following steps:

1. Main switch OFF
2. Cross-access the test switch for interconnection access, and without opening up (cross-access movement must indeed).
3. Full throttle and do not open up.
4. Main switch ON
5. Described above, the No. 3 with the No. 4 movements continued liberalization of 5 seconds later, about 5 seconds after inspections at carnivals "flash twice" to complete the removal of fault code.
6. Then remove the cross-wiring.



Fault Code And The Sensors Of The Table

No.	Fault codes	Fault Description	Parts Inspection
1	0120	Throttle position sensor fault	Throttle position sensor and wire
2	0105	Manifold absolute pressure sensor fault	MAP sensorand wire
3	0115	Engine temperature sensor fault (water)	Engine temperature sensor and wire
4	0195	Engine oil temperature sensor fault (oil)	Engine temperature sensor and wire
5	0110	Intake temperature sensor fault	Intake temperature sensor and wire
6	1630	Roll over sensor fault	Roll over sensor and wire
7	0130	O_2 sensor fault	O2 Sensorand wire
8	0201	I N J #1 fault	Injector and wire
9	0351	IG #1 fault	Ignition coil and wire
10	0230	Fuel pump fault	Fuel pump and wire
11	0135	O_2 sensor heater fault	O2 Sensor and wire
12	1505	ISC Idle_speed control motor fault	Ster motor and wire
13	1410	Exhaust 2nd air control solenoid valve fault	2nd air control valve and wire
14	0335	Crank position sensor fault	Crank position sensor and wire
15	1205	PM wire fault	Manifold absolute pressure sensor wire
16	0603	EEPROM fault	EEPROM

Fuel Injection System

Fault Code and Check Light Flashing Lighting Identification Tables

No.	Fault codes	Fault Description	Check light	Check light flashing state	Parts Inspection
1	0120	Throttle position sensor fault	Lighting	long 0 , short 6	Throttle position sensor and wire
		Fault detection procedures Please refer to the "EFI System components description" throttle position sensor (TPS) chapter			
2	0105	Manifold Absolute Pressure sensor fault	lighting	long 0 , short 9	MAP sensorand wire
		Fault detection procedures Please refer to the "EFI System components description" manifold Absolute Pressure sensor (MAP) chapter			
3	0115	Engine temperature sensor fault (water)	lighting	long 1 , short 2	Engine temperature sensor and wire
		Fault detection procedures Please refer to the "EFI System components description" engine temperature sensor (WPS) chapter.			
4	0195	Engine oil temperature sensor fault (oil)	lighting	long 1 , short 1	Engine temperature sensor and wire
		The current reservation			
5	0110	Intake temperature sensor fault	lighting	long 1 , short 3	Intake temperature sensorand wire
		Fault detection procedures Please refer to the "EFI System components description" intake temperature sensor (TAS) chapter.			
6	1630	Roll over sensor fault	lighting	long 1 , short 5	Roll over sensor and wire
		Fault detection procedures Please refer to the "EFI System components description" Roll over sensor chapter.			
7	0130	O_2 sensor fault	lighting	long 1 , short 7	O2 Sensorand wire
		Fault detection procedures Please refer to the "EFI System components description" O2 sensor chapter.			
8	0201	I N J #1 fault	lighting	long 3 , short 3	Injector and wire
		Fault detection procedures Please refer to the "EFI System components description" fuel injector chapter.			
9	0351	IG #1 fault	lighting	long 3 , short 7	Ignition coil and wire
		Fault detection procedures to adhere to the traditional way			
10	0230	Fuel pump fault	lighting	long 4 , short 1	Fuel pump and wire
		Fault detection procedures Please refer to the "EFI System components description" fuel pump chapter.			
11	0135	O2 sensor heater fault	lighting	long 4 , short 5	O2 Sensorand wire
		Fault detection procedures Please refer to the "EFI System components description" O2 Sensor chapter.			
12	1505	ISC motor fault	lighting	long 4 , short 9	Step motor and wire
		Fault detection procedures Please refer to the "EFI System components description" idle speed control valve (ISC) chapter.			
13	1410	Exhaust 2nd air solenoid valve fault	lighting	long 5 , short 4	2nd air control valve and wire
		Fault detection procedures Please refer to the "EFI System components description" 2nd air solenoid valve chapter.			
14	0335	Crankshaft position sensor fault	lighting	long 6 , short 6	Crankshaft position sensor and wire
		Fault detection procedures Please refer to the "EFI System components description" Crankshaft position sensor chapter.			
15	1205	PM wire fault	lighting	long 6 , short 8	Manifold absolute pressure sensor and wire
		Fault detection procedures Please refer to the "EFI System components description" Manifold absolute pressure sensor (MAP) chapter.			
16	0603	EEPROM fault	Not lit	long – , short –	EEPROM
		This fault Please direct replacement ECU			

Fuel Injection System

Troubleshooting Table

Test items / Abnormal phenomena		Comprehensive testing program							Parts		
		Power voltage	Fuel press.	Ignition state	Engine vacuum	Injection state	closed-loop control system	Fault Code Detection	ECU	Throttle position sensor	Engine temp. sensor
Start state	Can't start	O	O	O	O	O		O	O		
	Difficult to start	O	O		O			O		O	O
Idle state	Without idle			O	O	O		O		O	O
	Idle not smooth					O	O	O	O	O*	
	RPM NG							O	O		
	CO NG		O			O	O	O	O		
Acceler-ation	Not smooth		O	O	O	O		O	O	O	O
	Inability and slow		O	O	O	O		O	O	O	O
Flameo-ut	Idle flamecut				O			O			
	Acceleration flameout							O	O		

Related spare parts							
	Roll over sensor	Fuel pump	Ignition coil	Inlet pipe	Injector	O2 sensor	
	Power relay	Fuel pressure adjustment valve	Spark plug	Cylinder head	Fuel pump	Secondary air injection solenoid valve	
	Security unit	Fuel pump relay		Inlet pressure sensor	Fuel pressure adjustment valve		
	Main switch	Fuel filter					
	Battery						

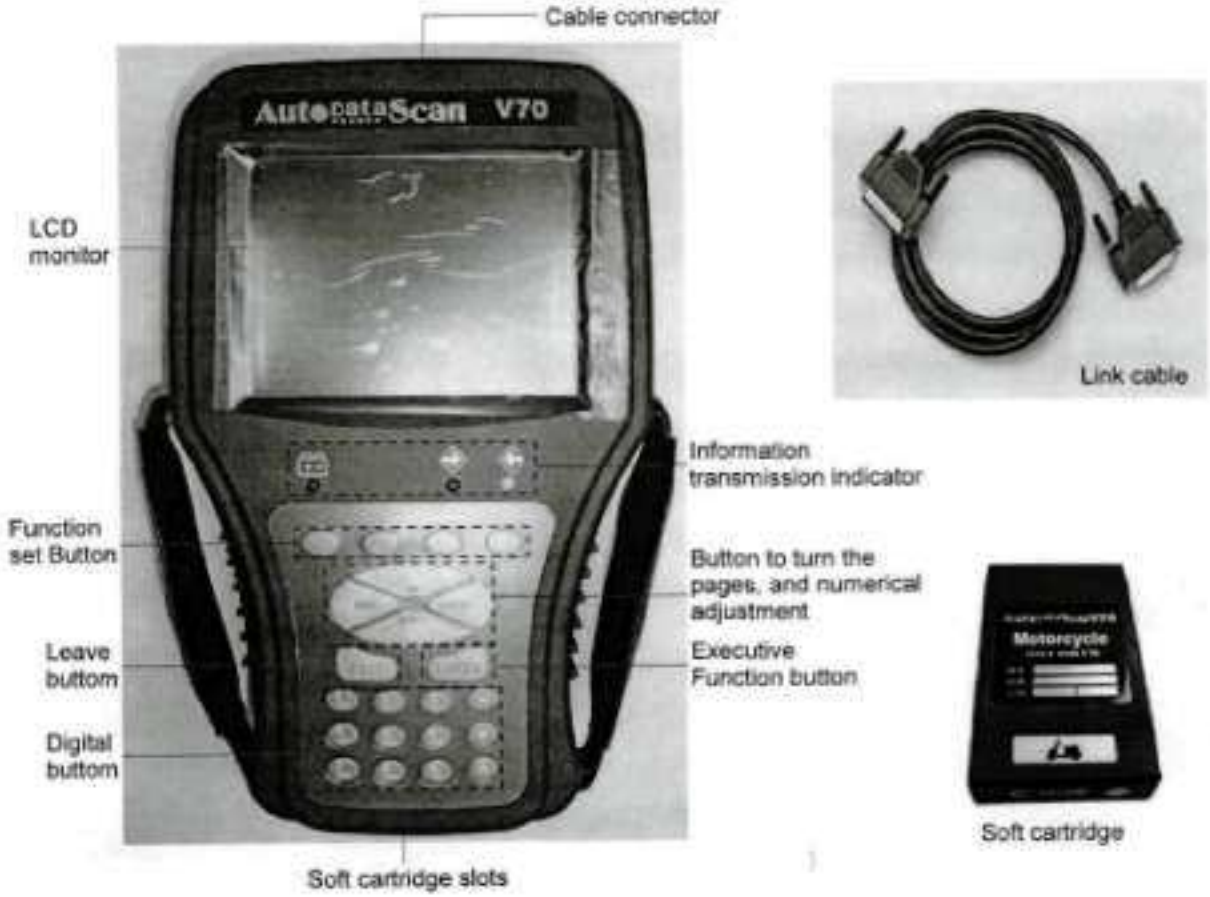
Notes: 1. Integrated test motorcycle, according to the "Comprehensive Maintenance list" implementation.
2. Spare parts, according to the "EFI System components description" implementation.

Comprehensive Maintenance List

No.	Maintenance Project	Testing Procedures	Test items	Determine benchmarks	Fault reasons
1	Power and voltage	• Use meter direct measurement battery voltage • Use diagnosis tool detection of battery voltage	• Battery voltage	• Battery voltage = 10V Above	• Battery electricity • Battery connector loose • Harness circuit opening • ECU coupler not connected properly
2	Fuel pressure	• Use fuel pressure gauge, connected in series between the injector and the Pressure Regulating Valve • Main switch ON, but not start engine • Check fuel pressure • Start engine (idle) • Check change of the fuel pressure • throttle several rotation • check to the change of fuel pressure again	• Open the main switch, but not to start the engine of pressure • Pressure in idle • Rotating throttle, situation of pressure changes	• Open main switch, but not start: pressure = 250kPa (Stable value) • Idle state: pressure = 294±6kPa (Beating situation from top to bottom) • rotation throttle moment: pressure = 294±5kPa (Slightly beating)	• Fuel not enough • Security switch not disarm • Fuel pump relay fault • Fuel pump fault • Injector fault • ECU fault
3	Ignition state	• The spark plug removed from the cylinder head, but the power lines still ring • Start engines or use for the diagnosis tool of output View spark plug ignition conditions	• Spark plug specifications • Whether the spark plug ignition • Spark plug sparks whether it is normal strength	• Specifications: NGK-CR8H • Ignition conditions: With traditional engines found ways	• Spark plug fault • Roll over sensor fault • ECU No. 5 pin fault • Ignition coil fault • Crankshaft position sensor fault
4	Engine vacuum	• Diagnosis tool to detect the use of	• Manifold pressure of diagnosis tool	• Manifold pressure =32~38kPa	• Valve clearance abnormal • Intake system leak
5	Injection state	• The injector removed from the throttle body, but not dismantle pipeline • Main switch ON, but not start engine • Investigation the injector it's leaking fuel? • Once again start engines or use for the diagnosis tool of output function • Check injector fuel injection and the injection situation	• Open the main switch, but did not start engine the injection situation • Injector state when start	• Not started, injector not leaking fuel • In started, the injection state must show fan shape	• Security unit is configured not disarm • Fuel pump relay fault • Fuel pump fault • Injector fault • ECU fault
6	Closed - loop control system	• Use of diagnostic tool observation O2 Sensor voltage changes	• Stable condition, sensor voltage variation (Idle continued 5 minutes later to measurement)	• Idle stable condition: O2 Sensor voltage = 50 ~ 200mV (Show from top to bottom beating phenomenon)	• O2 Sensor fault • ECU fault
7	Fault Code Detection	• Use of the diagnosis tool existing fault-detection code or historical Fault Code • Elimination of the implementation of fault codes, check can be eliminated • Once again start engine • Check fault is it happen again	• Diagnosis tool of the fault code is it can be eliminated • Start again, the fault is it will happen again	• Without any residual Fault Code • If residual Fault Code according to the "Fault Code Maintenance Form" implementation of troubleshooting	• throttle position sensor fault • Engine temperature sensor fault • Intake temperature sensor fault • Manifold pressure sensor fault • O2 Sensor fault • Crankshaft position sensor fault • ECU fault • Roll over sensor fault

Notes: 1.Fuel pressure gauge connected between the fuel tank and injector, open the main switch to repeatedly shut down, fuel system makes pressure stability.
2.Injector and injector cap tightly by hands, fuel spills should not be the case.

Injection System for Use diagnosis - V70



Note:

- When problems arise, can be used for diagnosis tool of the fault is detected, and exclusion.
- In addition to testing, troubleshooting, another of the operation can be carried out data analysis-type monitor.

Method of Use:

1. Maintain engine flameout state, do not open main switch.
2. Opened the luggage box lighting light cover (screw x2), connected to the diagnostic connector for diagnosis tool.
3. Then open the main switch and the diagnosis tool power switch after diagnosis display screen appeared the words connection.
4. Press the "ENTER" button into the main screen (there are 6 major functions: ECU ID, DATA STREAM, FREEZED DATA, TROUBLE CODE, ERASE TB CODE and CO ADAPTION)
5. Use ▲, ▼ select button under the function, press the "ENTER" button access into various functions. Example: select "DATA STREAM," by the "ENTER" button, the screen showed that the existing fault codes; indicates no fault "system is OK."
6. Press "EXIT" buttom to leave of the various functions.
7. Must to close the main switch or power switch of the diagnosis tool after, and then can removal of diagnosis tool coupler.

Diagnosis Use Note

Diagnosis of connectivity

1. For the diagnosis tool coupler access to the motorcycle injection system diagnostic signal coupler.
2. main switch ON.
3. Open the diagnosis left power switch, which turn on the LCD screen, the screen brightness adjustment knob to the appropriate brightness.
4. SYM and cartridge content display on screen (such as icon), by the beginning of the implementation of any button.
5. Display diagnostic software release; press the "ENTER" buttom to the implementation.

Options main functional areas:

1. ECU ID
2. DATA STREAM
3. FREEZED DATA
4. TROUBLE CODE
5. ERASE TB CODE
6. CO ADAPTION

Use "▲" "▼" button, select mobile anti-white subtitles implementation of the project, and then press the "ENTER" key to the implementation.

1. ECU ID

In the directory functions used "▲" "▼" button, select ECU ID project, press the "ENTER" buttom to the implementation of information systems function.

ECU ID containing two functions:

1-1. ECU ID Datas

1-2. ECU Pin Assign

1-1. ECU ID Datas

Use "▲" "▼" button, select ECU ID projects, press the "ENTER" buttom to the implementation. A total of 2 page, use "◄ left" and "right ►" button, view ECU information.

DIAG. ID: 0002000000020 (Diagnosis tool ID)
S/H VER: 001 (Software Version)
DIAG. VER: 03 (Diagnosis Version)
MODEL: SYM GTS250
NAME: HML 00203

H/W VER: (Hardware version)
S/H VER: 001 (Software Version)
CALI ID: (Correction ID Code)
ECU NO: 001

1-2. ECU Pin Assign

Use "▲" "▼" button, select the ECU pin project, press the "ENTER" buttom to the implementation of the ECU pin functions.
ECU pin assign total of 5 pages that can be used "◄ left" and "right ►" button, view the page note.

Page 1:
1: IGP [R/Y] B+
2:
3: CRK-P [G/W] Crankshaft pos. Sensor-
4:
5: TH [W/Br] Throttle angle [A/D]
6: PM [B/R] Manifold Press. SNSR I/P [A/D]
7: HEGO [Pink/B] O2 sensor [A/D]
8: LG [G] shild GND

Page 2:
9: CRK-M [L/Y] Crankshaft pos. Sensor+
10: K-LINE [W/G] K-Line
11: FLPR [O/W] Fuel pump relay O/P
12: SOL [O/L] 2nd air (RV250)
13: VCC [Y/B] Sensor V+ (DC 5V)
14: ISCBP [G/B] Step MTR B+ (RV250)
15: ISCAP [L/B] Step MTR A+ (RV250)
16: INJ [L/G] Injection O/P

Page 3:
17: HEGOHT [R/O] O2 Sensor heater
18: IG [B/Y] Ignition O/P
19: BAT [R] Battery B+ (RV250)
20: TRIG [Pink] Test sw
21: MIL [Y/G] MIL O/P
22: TE [R/Gr] Eng. Temp. Sensor (A/D)
23:
24: SG [G/R] Sensor (A/D) GND

Page 4:
25: TA [G/Br] IAT Sensor (RV250)
26:
27:
28:
29:
30:
31: ISCAN [Br/B] Step MTR A- (RV250)
32: ISCBN [B/W] Step MTR B- (RV250)

Page 5:
33:
34:
35: PG1 [G] System GND
36: PG [G] System GND

2. DATA STREAM

In the directory functions used "▲" "▼" button, select "DATA STREAM" project, press the "ENTER" key to the implementation.

A total of 3 pages, are able to use "◄ left" and "right ►" button, view injection system information. On the any screen, press the "EXIT" button, the function can return to the directory screen.

Data stream (1/3)

The screen showed the ECU captured by the engine of the state immediately.
The following data for the benchmark idling state:

- Engie SPD---RPM (Idle:1550~1750) →Engine idle speed
- FAULT NO.---(Normal:0) →Fault code number
- BATT. VOLT---V (Above 12V) →Battery voltage
- FUEL PUMP---(Idle:ON) →Fuel pump actuator state
- MAP---kPa (Idle:32~38kPa) →Manifold pressure
- TPS position---% (Idle:< 1.5%) →Throttle opening
- TPS position---V (Idle:0.58~0.62) →Throttle sensor voltage
- O_2 SENSOR---mV (Idle:50~200mV) →O_2 sensor voltage
- O_2 HEATER---(Idle:> 3500rpm=ON) →O_2 heater actuator state
- ENGINE TEMP---°C (Stable:85~95°C) →Engine temperature (cooling water temperature)

In the "DATA STREAM" of the screen use "▲" "▼" button to move the left side of the project "→" symbol selected items, press the "ENTER" buttom lock of the project, and press the "F4" button showed that the wave of projects.
Able to use "◄ left" and "right ►" button, can transform View wave numerical size.

Numerical analysis of images (1 / 3), the waveform can be displayed as shown in the following items:

- Engie SPD
- BATT. VOLT
- MAP
- TPS position %
- TPS position Voltage
- O_2 SENSOR Voltage
- ENGINE TEMP

Data stream (2/3)

The screen showed the ECU captured by the engine of the state immediately.
The following data for the benchmark idling state:

- BARO---------- kPa (Above 98kPa) →Atmospheric pressure
- Intake Air---------- °C (Outside Temp.) →Intake air temperature
- 2nd AIR VALVE------ V (Idle:ON) →Secondary air solenoid valve actuator state
- INJECT TIME---- mS(Idle:1~3mS) →Injection time
- IGN. ANGLE---------- (Idle:12~14) →Ignition timing
- STEP MOTOR ------ →Idle air control valve step motor actuator state
- CRANKSHAFT ---------- (Idle:CW) →Crankshaft functioning direction
- TEST TERMINAL-- (Idle:OPEN) →Test terminal state
- IDLE SET---------- RPM (=1650 RPM) →Idle speed goal set value
- ISC STEP---------- (Idle:75~95) →Idle Air Control Valve stepper motor learning step

In the "DATA STREAM" of the screen use "▲" "▼" button to move the left side of the project "→" symbol selected items, press the "ENTER" buttom lock of the project, and press the "F4" button showed that the wave of projects.
Able to use "◄ left" and "right ►" button, can transform View wave numerical size.

Numerical analysis of images (2 / 3), the waveform can be displayed as shown in the following items:

- BARO
- Intaje Air
- INJECT TIME
- IGN. ANGLE
- IDLE SET
- ISC STEP

Data stream (3/3)

The screen showed the ECU captured by the engine of the state immediately.
The following data for the benchmark idling state:

- LEARNED STEP---------- (Set by ECU) →Idle Air Control Valve stepper motor learning step

In the "DATA STREAM" of the screen use "▲" "▼" button to move the left side of the project "→" symbol selected items, press the "ENTER" buttom lock of the project, and press the "F4" button showed that the wave of projects.
Able to use "◄ left" and "right ►" button, can transform View wave numerical size.

Numerical analysis of images (3 / 3), the waveform can be displayed as shown in the following items:

- LEARNED STEP NO.

3. FREEZED DATA

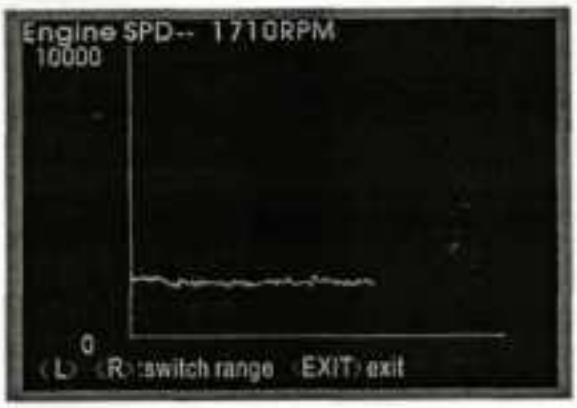
Objective: When a sensor fault, the EMS system will record all the parameters of fault signals, in order to facilitate fault diagnosis.

In the directory functions used "▲" "▼" button, select "FREEZED DATA" project, press the "ENTER" key to the implementation.

Only one page, at any screen, press the "EXIT" button, the function can return to the directory screen.

In the "FREEZED DATA" of the screen use "▲" "▼" button to move the left side of the project "→" symbol selected items, press the "ENTER" buttom lock of the project, and press the "F4" button showed that the wave of projects.

Able to use "◄ left" and "right ►" button, can transform View wave numerical size.



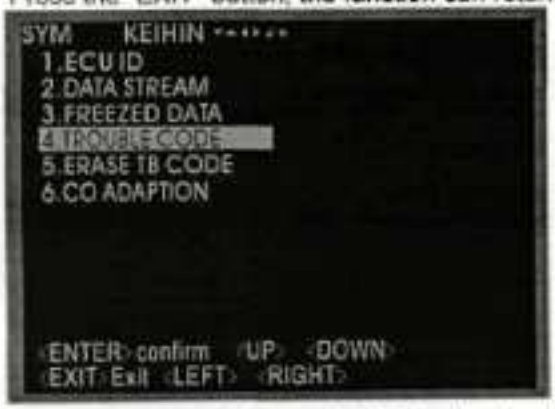
4. TROUBLE CODE

In the functional directory select "TROUBLE CODE" project, press the "ENTER" button implementation, the message began to read fault.

Fault Code: electronic injection system that had happened fault of the message (whether or not completion of repair).

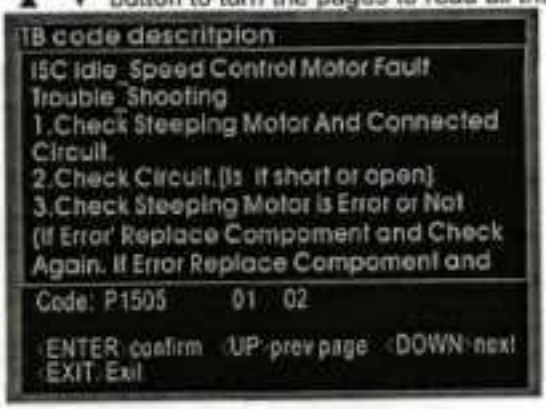
Without any fault is that showing "System is OK".

Press the "EXIT" button, the function can return to the directory screen.



If the system has faulty code, that is showing the fault code, that can be used "◄ left" and "right ►" or "▲" "▼" button selected the fault code (selected before the code "•" tags) that, press the "ENTER" button, the code can be read descriptions and fault handling.

Fault code in the note and treatment of the pages, if the first one page did End, they can press the "▲" "▼" button to turn the pages to read all that.



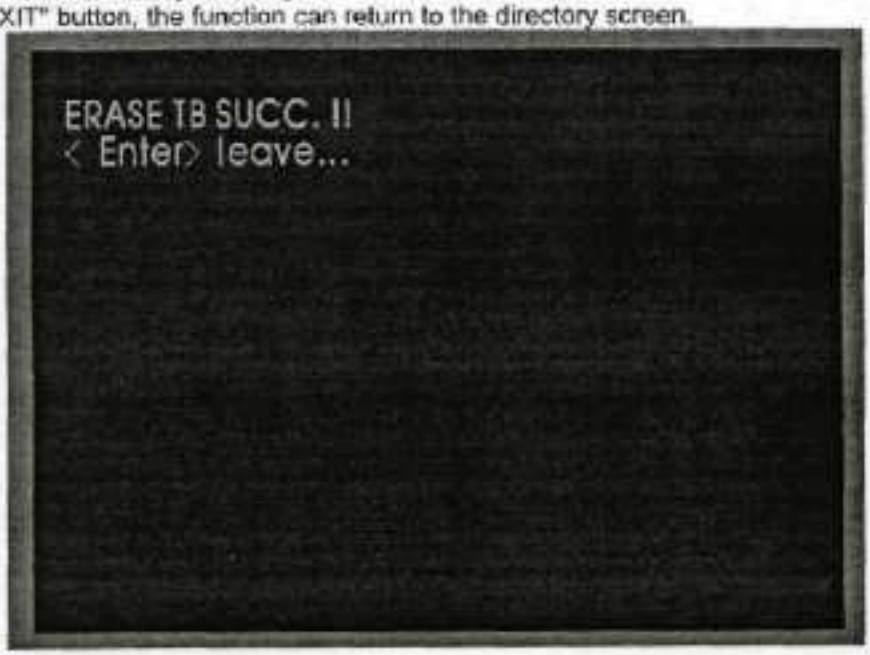
5. ERASE TB CODE

In the directory functions used "▲" "▼" button, select "ERASE TB CODE" project, press the "ENTER" key to the implementation.

Conditions: The main switch "ON", or in the engine running state, the fault code can be removed.

Fault code removed, namely showing the "ERASE TB SUCC.!".

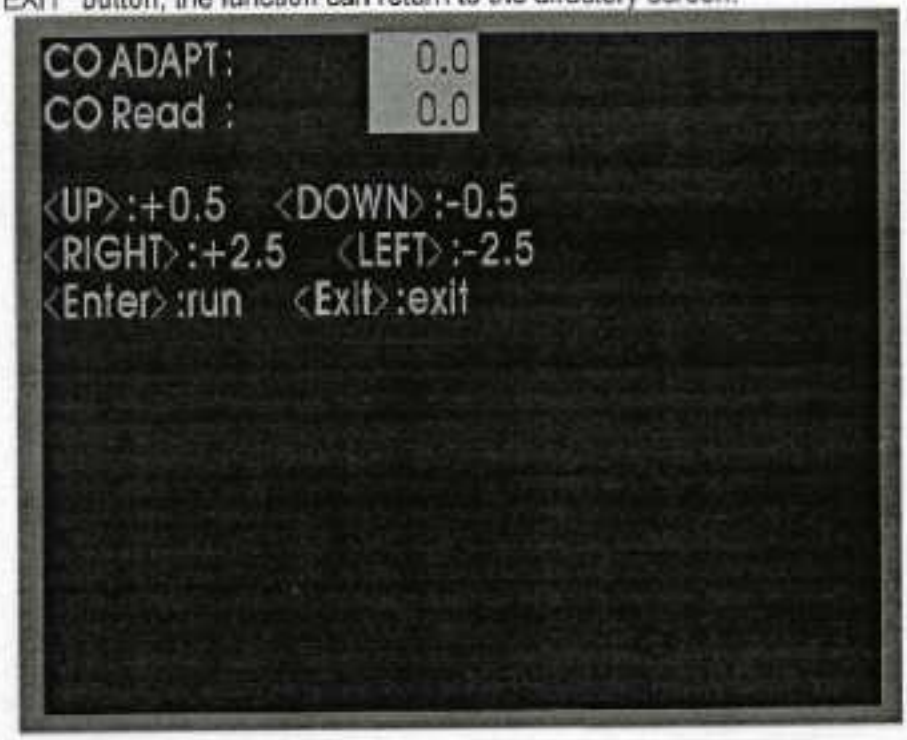
Press the "EXIT" button, the function can return to the directory screen.



6. CO ADAPTION

In the directory functions used "▲" "▼" button, select "CO ADAPTION" project, press the "ENTER" buttom into the CO adjustment screen.

Use "◄ left" and "right ►" or "▲" "▼" button, CO value can be adjusted.
CO ADAPT: CO adjusted value.
CO Read: CO read-back value.
Press the "EXIT" button, the function can return to the directory screen.



LOI

Precautions in operation	Oil pump disassembly
Troubleshooting	Oil pump inspection
Engine oil	Oil pump re-assembly
Engine oil strainer clean	Oil pump installation
Oil pump removal	Gear oil

LUBRICATION SYSTEM

LUBRICATION SYSTEM

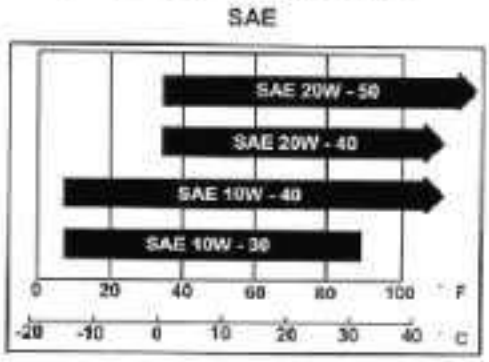
PRECAUTIONS IN OPERATION

General Information:

- This chapter contains maintenance operation for the engine oil pump and gear oil replacement.

Specifications

Engine oil quantity	Disassembly: Change:	1000 c.c. 800 c.c.
Gear oil	Disassembly: Change:	110 c.c. 100 c.c.
Oil	Oil viscosity SEA 10W-30 (Recommended King serial oils)	
Gear oil	Gear oil viscosity SEA 85W-140 (Recommended SYM Hypoid gear oils)	



Items		Standard (mm)	Limit (mm)
Oil pump	Inner rotor clearance	0.15	0.20
	Clearance between outer rotor and body	0.15~0.20	0.25
	Clearance between rotor side and body	0.04~0.09	0.12

Torque value oil strainer	1.3~1.7 Kgf-m
Gear oil drain plug	1.1~1.4 Kgf-m
Gear oil inspection bolt	1.1~1.4 Kgf-m
Oil pump connection bolt	0.8~1.2 Kgf-m

TROUBLESHOOTING

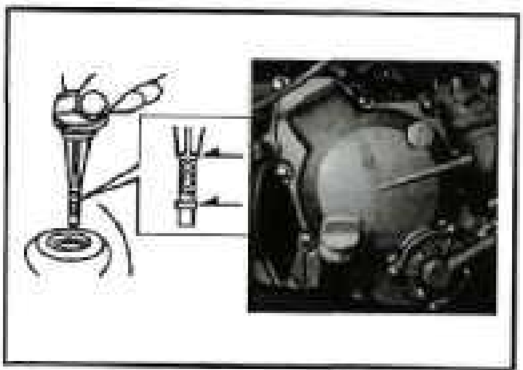
Low engine oil level
- Oil leaking
- Valve guide or seat worn out
- Piston ring worn out

Low oil pressure
- Low engine oil level
- Clogged in oil strainer, circuits or pipes
- Oil pump damage

Dirty oil
- No oil change in periodical
- Cylinder head gasket damage
- Piston ring worn out

ENGINE OIL

Turn off engine, and park the motorcycle in flat surface with main stand.
Check oil level with oil dipstick.
So not screw the dipstick into engine as checking.
If oil level is nearly low level, fill out recommended oil to upper level.

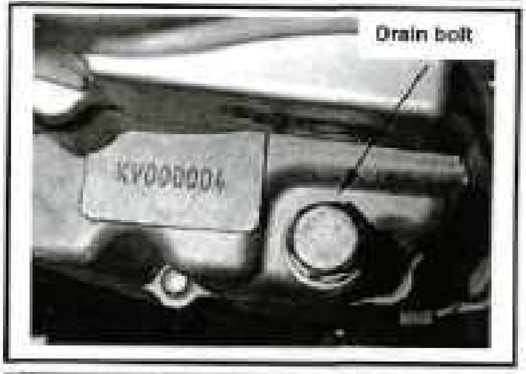


Oil Change

⚠ Caution

Drain oil as engine warmed up so that make sure oil can be drained smoothly and completely.

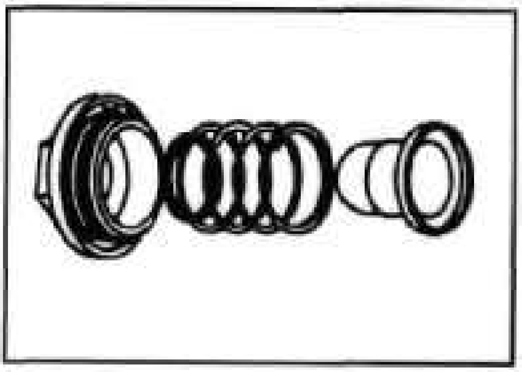
Place a oil pan under the motorcycle, and remove oil drain bolt.
After drained, make sure washer can be re-used.
Install oil drain bolt.
Torque value: 1.1~1.5 Kgf-m
Fill out engine oil (oil viscosity SEA 10W-30).
Recommended using King serial oil.
Engine oil capacity: 0.8L when replacing



Install dipstick, start the engine for running several minutes.
Turn off engine, and check oil level again.
Check if engine oil leaks.

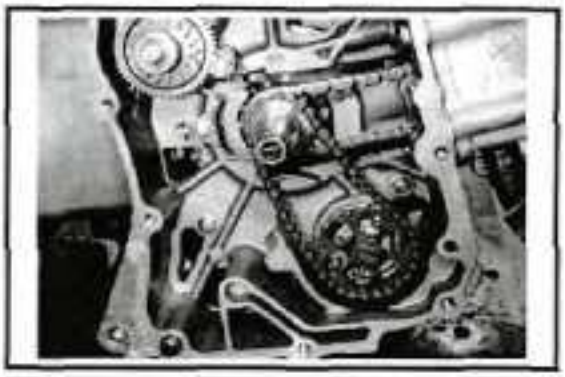
Engine Oil Strainer Clean

Drain engine oil out.
Remove oil strainer and spring.
Clean oil strainer.
Check if O-ring can be re-used.
Install oil strainer and spring.
Install oil strainer cap.
Torque value: 1.3~1.7 Kgf-m
Add oil to crankcase (oil viscosity SAE 10W-30)
Recommended using King serial oil.

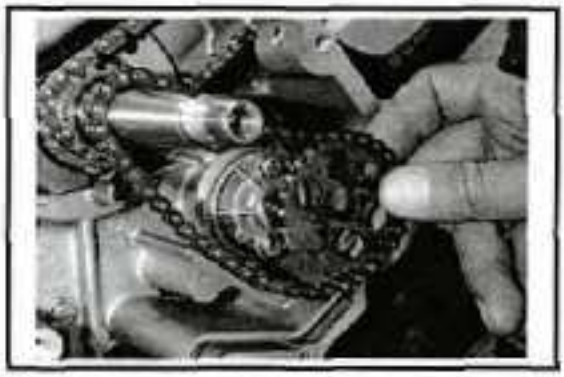


Oil Pump Removal

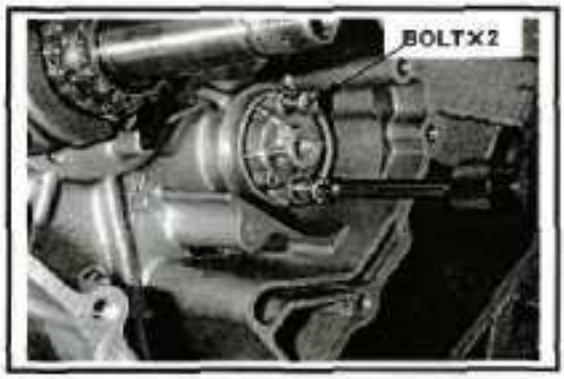
Remove generator and starting gear.



Remove snap ring and take out oil pump driving chain and sprocket.
Torque value: 0.8~1.2 Kg-m
Make sure that pump shaft can be rotated freely.



Remove 2 bolts on the oil pump, and then remove oil pump.



Oil Pump Disassembly

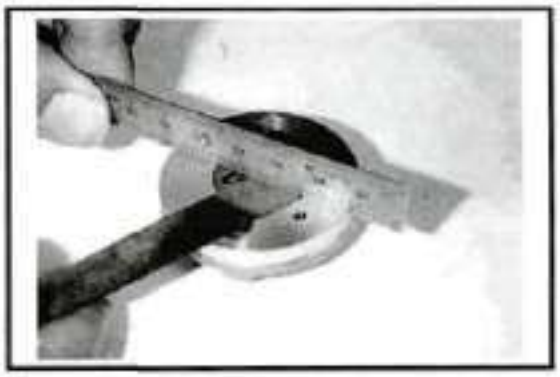
Remove the screws on oil pump cover and disassemble the pump as illustration shown.

Oil Pump Inspection

Check the clearance between oil pump body and outer rotor.
Limit: 0.25 mm

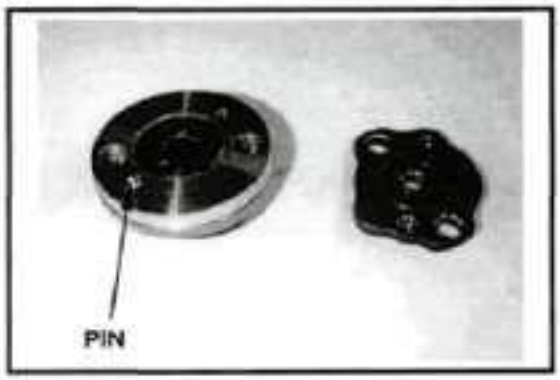
Check clearance between inner and outer rotors.
Limit: 0.20 mm

Check clearance between rotor side face and pump body
Limit: 0.12 mm



Oil Pump Re-assembly

Install inner and outer rotors into the pump body
Align the indent on driving shaft with that of inner rotor. Install the driving shaft
Install fixing pin



Install the oil pump cover and fixing pin properly

Tighten screw
Make sure that oil pump shaft can be rotated freely.

Oil Pump Installation

Install the oil pump, and then tighten bolts.

Torque value: 0.8~1.2 Kg-m
Make sure that oil pump shaft can be rotated freely.
Install oil pump driving chain and sprocket, and then install snap ring onto oil pump shaft.

Install starting gear and generator.

Gear Oil

Oil level inspection
Park the motorcycle on flat surface with main stand.
Turn off engine and remove oil inspection bolt.


Gear oil Inspection Bolt

Gear lubrication oil quantity has to be measured with measure device.
If oil level is too low, add gear oil.
Recommended using King serial oils.
Install oil inspection bolt.
Torque value: 1.0~1.4 Kgf-m


Gear oil drain plug

Gear Oil Change

Remove oil level inspection bolt.
Remove drain plug and drain oil out.
Install the drain plug after drained.
Torque value: 1.0~1.4 Kgf-m
Make sure that the drain plug washer can be re-used.
Add oil to specified quantity from the inspection hole.
Gear Oil Quantity: 100 c.c. when replacing
Make sure that the bolt washer can be re-used, and install the bolt.
Start engine and run engine for 2-3 minutes.
Turn off engine and make sure that oil level is in correct level.
Make sure that no oil leaking.

General Information	Radiator
Trouble Diagnosis	Water Pump
System Test	Temperature sensor
Change of coolant	Thermostat

COOLING SYSTEM

COOLING SYSTEM

General Information

General

⚠ **Warning:**

- While the engine is running, never attempt to open the radiator filler cap, the pressurized hot coolant may shoot out and cause serious scalding injury. No maintenance work is allowed to perform unless the engine is completely cooled down.

- Refill the radiator with distilled water or specified additives.
- Add coolant to the reservoir.
- The cooling system can be serviced on the motorcycle.
- Never spill the coolant to the painted surface.
- Test the cooling system for any leakage after the repair.
- Please refer to Section 17 for inspection of the temperature sensor switch for the fan motor and the water thermometer.

Technical Specification

Item		Specification
Pressure to open filler cap		0.75~1.05 kg/cm²
Capacity of coolant:	Engine + radiator Reservoir upper	780 c.c. 420 c.c.
Thermostat		Begins to activate at 71-80℃ Stroke: 3.5 ~ 4.5 mm/80℃
Boiling point		Not-pressure: 107.7℃ Pressurized: 125.6℃

Torque Value

For water pump rotor 1.0~1.4kgf-m

Tools Requirement

Special tools

Water pump bearing driver (6901)
Water pump oil seal driver (Inner)
Water pump mechanical seal driver
Inner bearing puller

Trouble Diagnosis

The engine temperature is too high

- The water thermometer and the temperature sensor do not work properly.
- The thermostat is stuck to closed.
- Insufficient coolant.
- The water hose and jacket are clogged.
- Fan motor malfunction.
- The filler cap of the radiator malfunction.

The engine temperature is too low

- The water thermometer and the temperature sensor malfunction.
- The thermostat is stuck to open.

Coolant is leaking

- The water pump mechanical seal does not function properly.
- The O ring is deteriorated.
- The water hose is broken or aged.

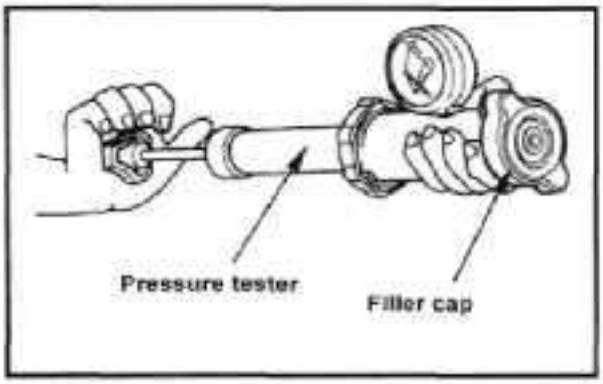
System Test

Test on the filler cap

Hermetically seal the filler cap, apply water and pressure to the filler cap. Replace it with new one if found failing to maintain the specified pressure within a given time limit, or the opening pressure is too high or too low. The specified pressure shall be maintained at least for 6 seconds in the test

Relief pressure for the filler cap: 0.75-1.05 kg/cm^2

Apply pressure to the radiator, engine and water hose to check for any leakage



⚠ Caution

Pressure which is too high may damage the radiator. Never use pressure which exceeds 1.05 kg/cm^2.

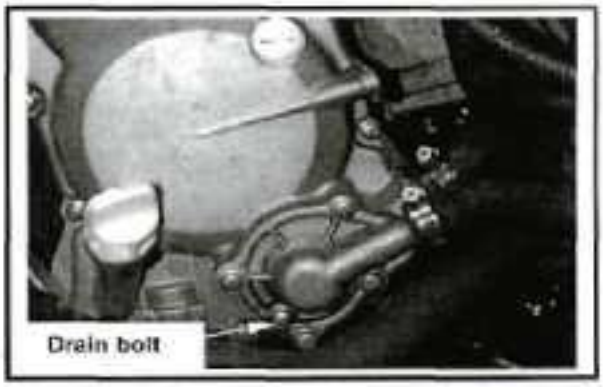
If the system fails to maintain the specified pressure for at least 6 seconds, repair or replace parts.

Change of coolant

⚠ Warning

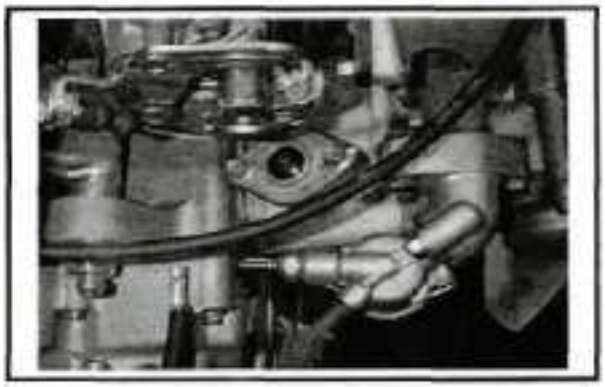
Never attempt to carry out service work on the cooling system unless the engine is completely cooled down, otherwise, you may get scalded.

Remove the filler cap cover and the filler cap.
Place a water pan under the water pump, loosen the drain bolt to drain out the coolant.
Reinstall the drain bolt.

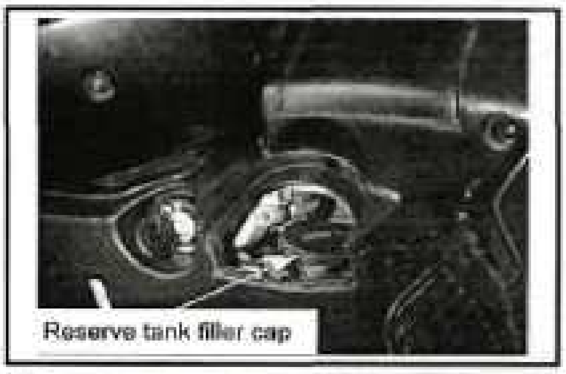


Refilling system with coolant and bleeding the air bubbles.

- Run the engine until the coolant surface becomes stable and there is bubble coming out.
- Stop the engine. Add coolant to proper level if necessary.
- Screw and tighten up the filler cap.



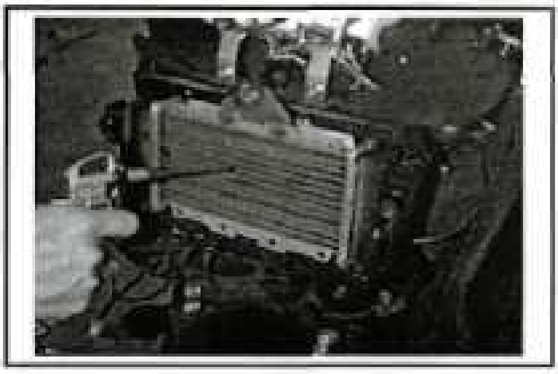
Removing the reserve tank filler cap.
- Check the liquid level in the reservoir. Add coolant to proper level if too low.
- Reinstall the reserve tank filler cap.



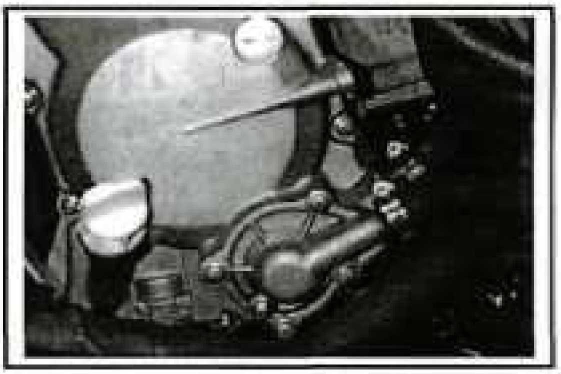
Radiator

Removal

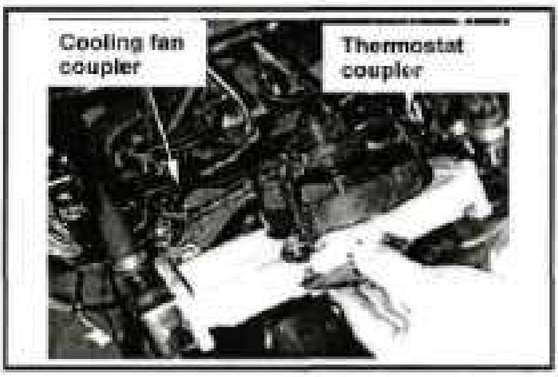
Remove the front guard, check for any leakage from weld seam.
Blow cooling fan clean using compressed air. If the cooling fan is blocked by dirt, use low pressure water jet to clean it.
Care shall be taken when straightening the sink fan.



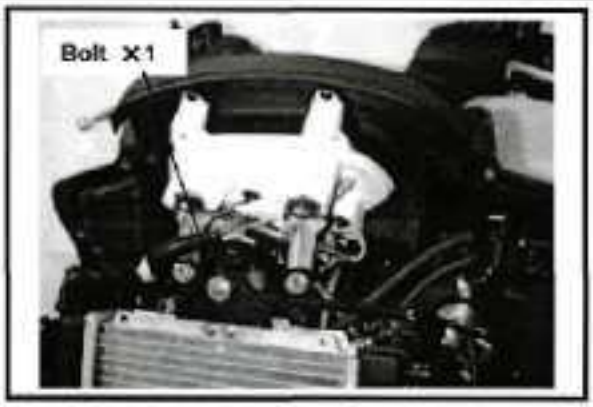
Coolant leakage



Loosen 2 nuts and 4 screws.
Remove the front mudguard by pulling it forward.

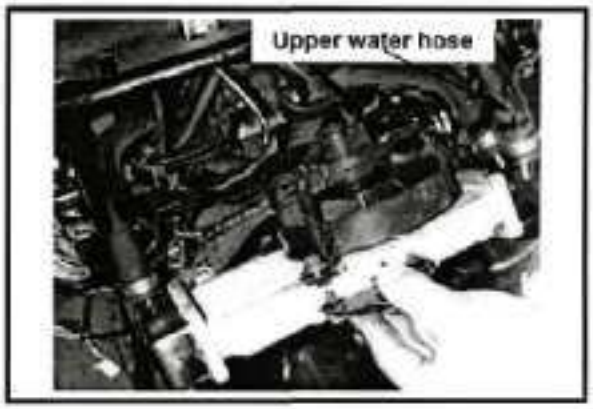


Loosen the hose clamp and remove the upper water hose.
Disconnect the connectors for the thermostat and fan motor.
Loosen the hose clamp and remove the lower water hose.
Disconnect the horn.
Loosen four screws and air duct.
Remove radiator and the fan motor.



Disassembly

Loosen the lock bolt from the fan and remove the fan.
Loosen three screws from the fan motor, and take off the fan motor.

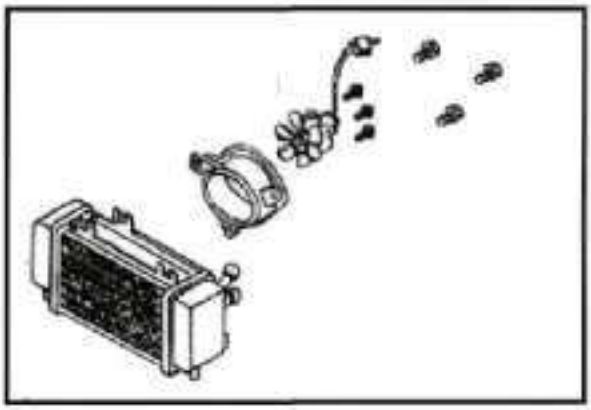


Assembly

Install shroud onto fan motor and insert the fan into the motor shaft.
Apply a coat of the adhesive to the shaft thread of the motor, then install the washer and the lock nut.
Tighten the fan shroud onto the radiator with four bolts. Please refer to Page 16-20 for the inspection of the temperature sensor switch.

⚠ Caution

Liquid packing must be applied to the temperature sensor switch before installing to avoid damaging the radiator.



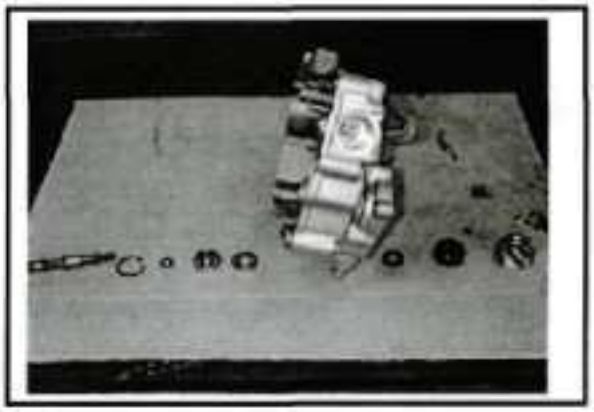
Install the removed parts in the reverse order of removal.

Installation

Install radiator in the reverse order of removal.
Upon completion, check for any leakage.

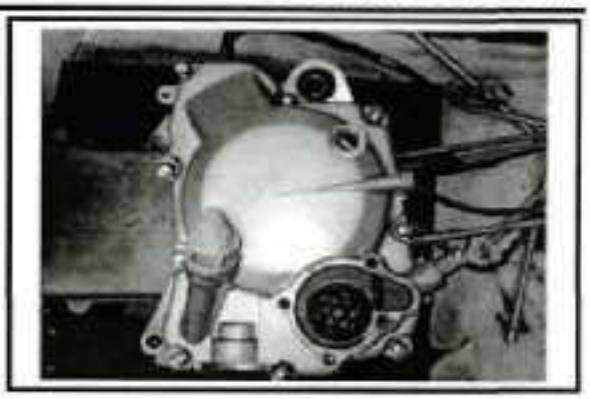
Water Pump

Inspect the mechanical seal.
Check mechanical seal inspection holes for any leakage.
If there is leakage, remove the right crankcase to replace the mechanical seal.



Removal of water pump

Remove the water hose.
Loosen three bolts and remove the pump cover.
Loosen 9 bolts and remove the right cover.
Take off the gasket and dowel pin.



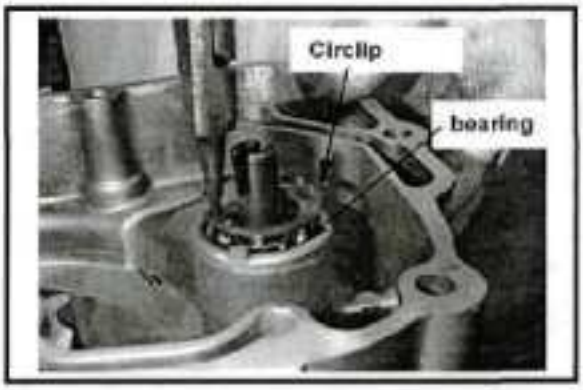
Turn pump rotor clockwise and remove.

⚠ Caution

The rotor is provided with left turn thread.

Removal of Water Pump Shaft

Remove the circlip from the right crankcase cover.
Remove the water pump shaft and the inner bearing.
Remove the outside bearing by inner bearing puller.
Rotate the inner ring of bearing, the bearing shall move smoothly and quietly.
If the bearing does not rotate smoothly or produces a noise, replace it with new one.



Check any wear and damage of the mechanical seal and inside seal .

⚠ Caution

The mechanical seal and inside seal must be replaced as a unit.

Replacement of Mechanical Seal

Drive the mechanical seal and inner seal out of the right crankcase.
Tools required
Water pump bearing driver

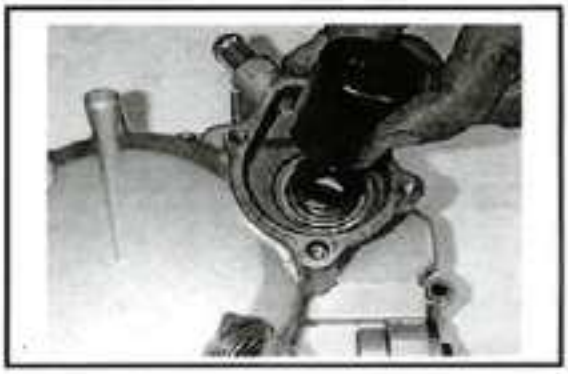
⚠ Caution

Replace a new mechanical seal after removing it.

Install the new inner seal onto the right crankcase.
Tools required
Water pump mechanical seal driver

Apply a coat of sealant to the mating surfaces of the right crankcase before installing the new oil seal.
Install the mechanical seal onto the right crankcase.

Tools required
Water pump mechanical seal driver



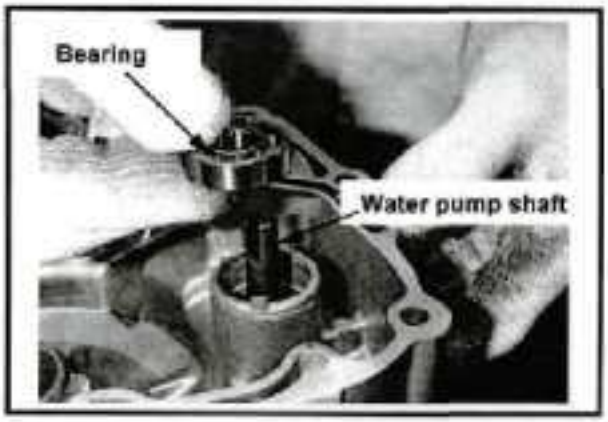
Install a new outside bearing to the right crankcase cover.

Tool required
Water pump bearing (6901) driver

⚠ Caution

Do not reuse old bearing. It must be replaced with a new one once it has been removed.

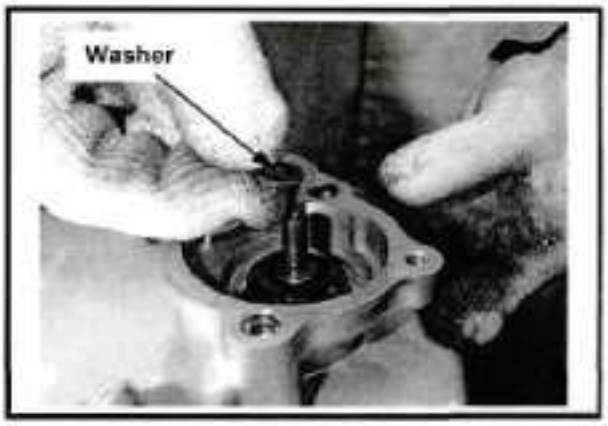
Mount the water pump shaft and the inner bearing to the right crankcase cover.
Install the circlip to hold the inner bearing.



Install water pump rotor.
Install the seal washer into the rotor.

⚠ Caution

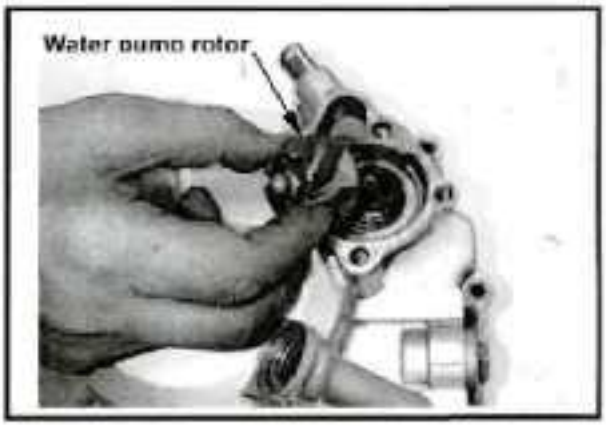
Washer must be replaced together with the mechanical seal.



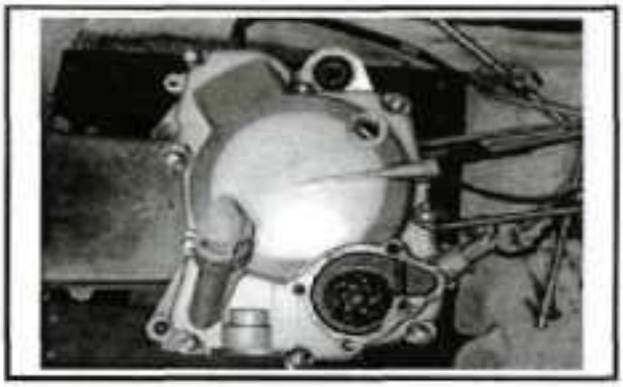
Install the rotor onto the water pump shaft and tighten.
Torque Value: 1.0~1.4 kgf-m

⚠ Caution

The rotor is left thread.



Install the right crankcase cover.(bolt × 9)



Install the dowel pin and new gasket.
Install the water pump cover with three bolts.

Temperature sensor

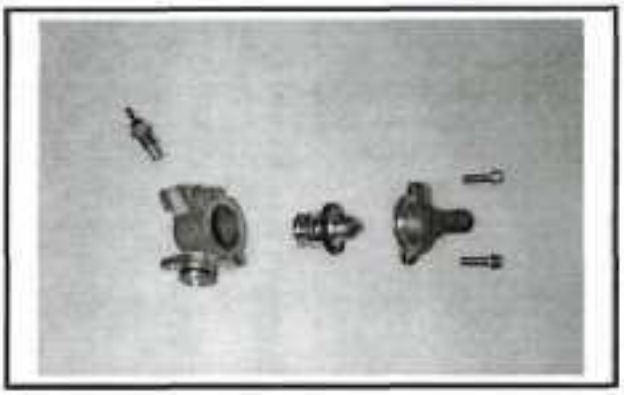
Please refer to chapter 17 for inspection of temperature sensor.

Removal

Remove the body cover.
Drain out the coolant.
Disconnect the cable of temperature sensor.
Remove the temperature sensor.

Installation

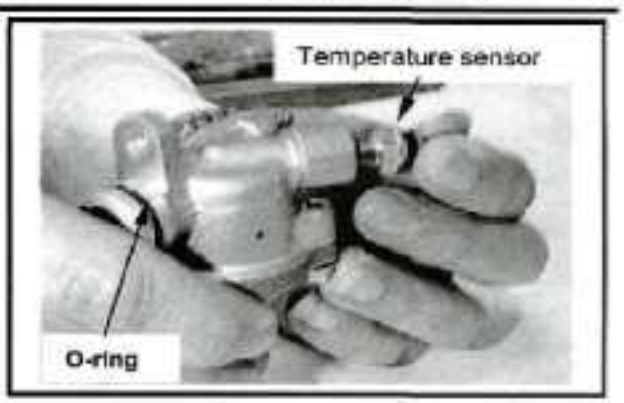
Apply a coat of 3 Bond No. 1212 sealant or equivalent to the thread of temperature sensor and install it on the holder.
Connect the cable to the temperature sensor.
Refill the coolant and bleed out the air bubble (P12-4).
Install the right rear cover.



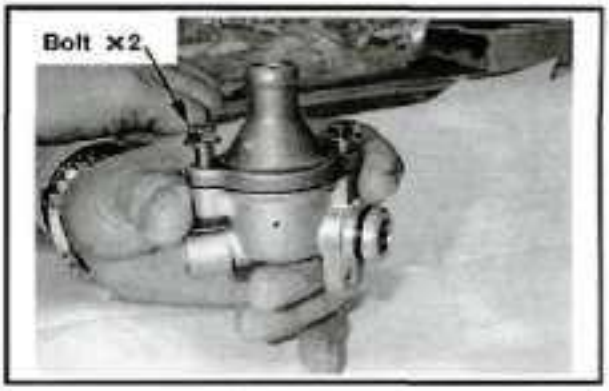
Thermostat

Removal

Remove the rear cover.
Drain out the coolant.
Disconnect the cable from the thermostat.
Remove the water hose from the thermostat holder.
Remove the air vent hose from the holder.
Remove the holder and lock bolt from the cylinder head.
Remove the temperature sensor and O ring from the holder.



Remove two bolts and separate the holder from the cover.



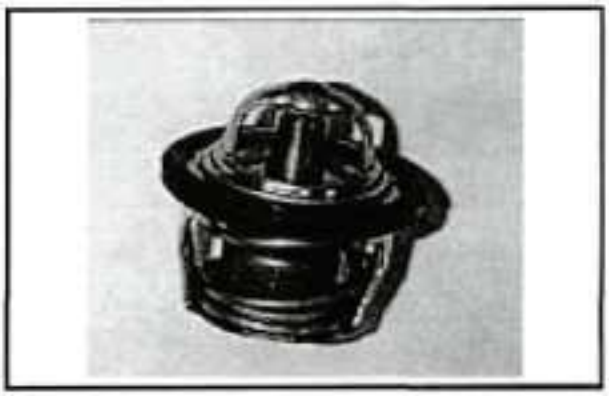
Remove the thermostat.

Inspection

Visually inspect thermostat for any damage.
Place the thermostat into heated water to check its operation.

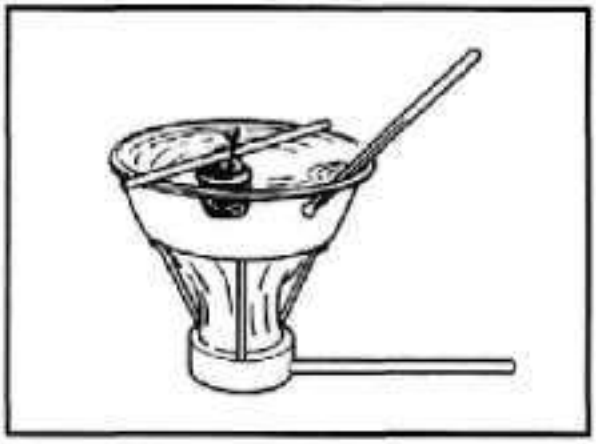
⚠ Caution

Whenever the thermostat and the thermometer are in contact to the wall of heated water container, the reading displayed is incorrect. If the valve of the thermostat remains open at room temperature or the valve operation is not corresponding to the temperature change, then it must be replaced.



Technical Data

Valve begins to open	71 ~ 80℃
Valve stroke	3.5 ~ 4.5 mm at 80℃

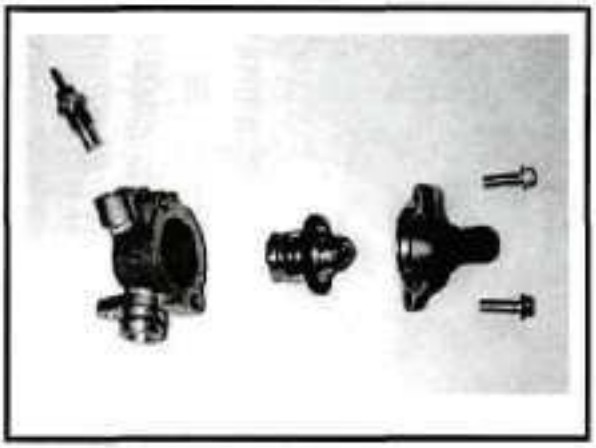


Installation

Install in reverse order of removal.

⚠ Caution

Always use a new oil ring and apply a coat of grease on it before installing.



Refill the specified coolant as necessary.

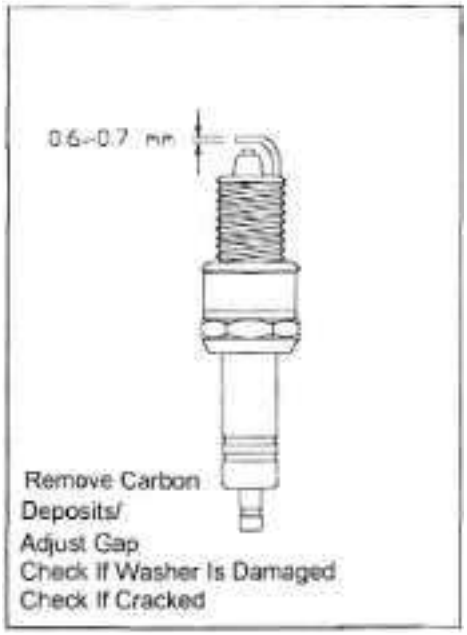
3-1-5 Spark Plug

Disassemble:

© Spark plug cap.

Note: Please blow away deposits around spark plug with blower before removing spark plug. Otherwise, the dust may drop into cylinder and it can damage engine.

Inspection: Check if spark plug has carbon deposits, burned, or cracked. Use steel brush to remove carbon deposits and adjust spark plug gap. Replace burned or cracked spark plug with new one.



Note: Spark plug specification:

Spark plug gap: 0.6 ~ 0.7 mm. **Warning:** First install the spark plug with hand, and then tighten it with spark plug wrench. Please do not over twist the spark plug. **Note:** Torque of spark plug: 100 ~ 120 kg-cm.

3-2 ELECTRIC SYSTEM

3-2-1 Ignition & Charging Device

1. Ignition Device:

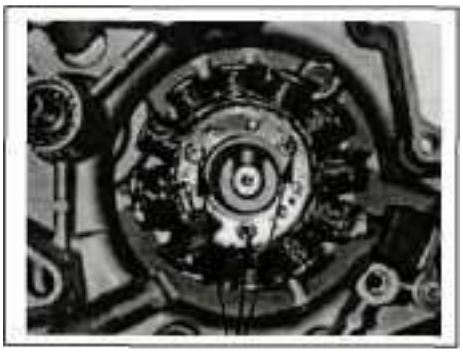
CDI Unit of two ignitions per revolution is adopted.
The ignition Lead is 18°±374,000rpm (OLD)
15°±374,000rpm(NEW)

2. Charging Device:

Power is given by flywheel magneto. The voltage is controlled by voltage regulator. Power is charged to battery.

A. Flywheel Magneto:

Flywheel (rotor) includes four poles, crossed N poles and S poles. The stator consists of one high-tension ignition coil and three low-tension coils for charging and lighting to create change of magnetic field by rotating the flywheel to generate electricity.



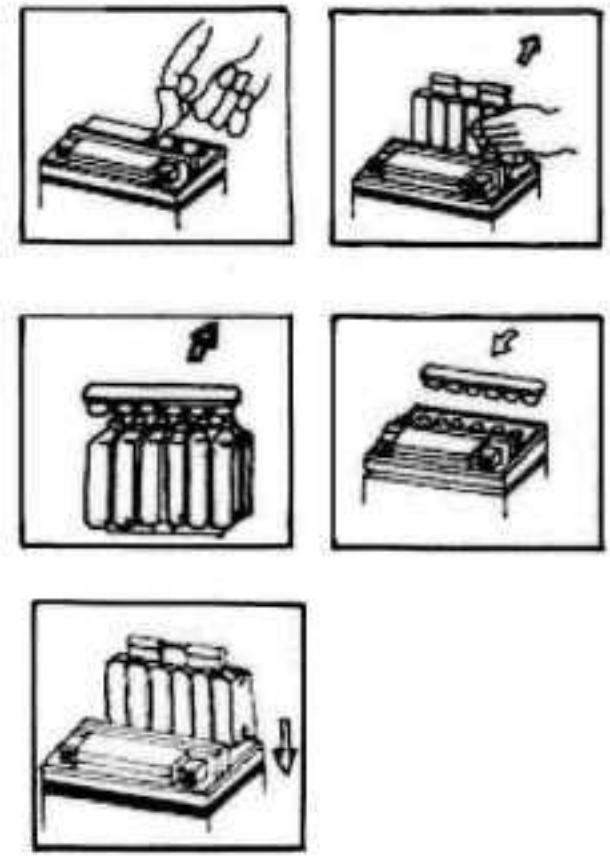
B. Battery :

1. Battery Caution:

1. The electrolyte contains sulphuric acid is poisonous. avoid to contact with eye, skin and clothes. Immediately wash with abundant water and call a doctor at once in case of contact with the eyes or skin. Immediately drink beaten eggs or vegetable oil, call a doctor at once in case of drink.
2. batteries release explosive gases, prohibit to closed to sparks,flames or cigarettes.
3. When charging or using the battery in a closed location, make sure that ventilation is good.
4. Keep off children hands.

2. Instruction for Filling Electrolyte (For Water-adding Free Battery)

1. Remove the Aluminum Seal on the filling hole of battery.
2. Remove the cover bar and battery sealing bolt.
3. Insert the filling hole of electrolyte container into the filling hole of battery. Try not to spillage it.
4. There are three pipes on each side. Tap the bottom of container lightly when the electrolyte bubbles. Pulling it out will be unnecessary.
5. Remove the container from the battery after all electrolyte is filled into battery.
6. Insert the fixing plug in the filling hole of battery and press the fixing plug until it is not higher than the top of cover.



Note : The Battery is completely ready to use, thus do not remove the Aluminum Seal on the closed filling hole until it is to be used. Electrolyte, except those specified, is absolutely forbidden. While filling the electrolyte, only regulated volume of electrolyte can be adopted. The seal plug should not be removed after the electrolyte is added.

3. THE PROCEDURE OF USING NEW BATTERY (FOR WATER-ADDING BATTERY)

1. Use the open long plastics tube to instead of the L-Type closed rubber tube; adjacent to the " + " pole of the battery.
2. Cut off the tip of the electrolyte's bottle, and put on the open rubber tube. Take off the fixing plugs on the battery.
3. Pour the electrolyte into battery carefully to reach the upper level and the density must be1.28/20℃..
4. The battery must be stay to decrease the temperature of the electrolyte to under 35℃. Then begin to charge.
5. Lay the battery for 30 minutes, if battery stay long time, it must recharge again also according to the table .

Time interval after made	Within 3 months	Afte			within 1 year	above 1 year
Charging time	Unnecessary to charge. Pour electrolyte into battery. Lay 30 minutes,then begin to use.	3 months	6 months	10 months	40 hours	60 hours
		10 hours	20 hours	30 hours		

6. Connect the black lead to the " " pole of battery and red to " + " pole put the battery to the location and clamp the rubber band.
7. For the connected plastics long tube to the air vent hole of battery , the other end of the tube must be setted through into the square hole in the plastic leg shield rightly to discharge the erosive air or sulfuric acid to avoid eroding the body. The tube must be without plugging or straight bending to avoid exploding.

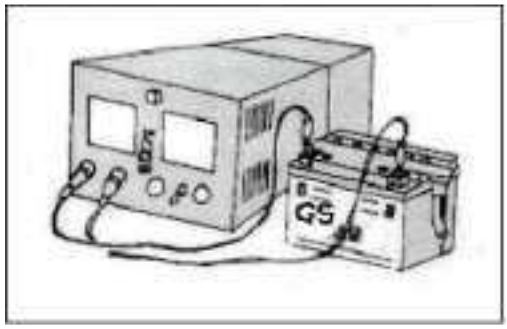
CAUTION:

It's important to use open long tube to instead of close short tube to assure normal output of gas to prohibite of exploding.

4. BATTERY MAINTENANCE: (FOR WATER-ADDING BATTERY)

1. Use the same key of main switch to trun right or left

to open inner box lid, then disconnect the battery band and take out the battery, finally take off cable.



2. Checking electrolyte, add distilled water to refill and adjust to upper level; in case of adding distilled water frequently, checking the over- charging of the battery: No voltage indicated on the terminal or no action on rectifier, means short on the battery, the voltage will higher than normal, and the life will shorten.
3. Inspect charged condition:
   Add electrolyte to the upper level and check by battery hyprometer (as attached drawing). The density of charged battery must be 1.26~1.28 (above 20℃), if the density below 1.2/20℃, it means fully dis-charged and must be recharged;
   The battery must be checked electrolyte level - density and the voltage after charging.

5. RECHARGING OF THE BATTERY

To Take off the fixing plugs of the battery before charging. Use 1/10 current intensity of the capacity to recharge the battery about 15-20 hours at normal condition; connect "+" pole of the battery to "+" pole of the charger, and "—" with "—". **CAUTION:**

1. Keep the battery away from flames,sparks, and cigarettes.
2. If the temperature of the electrolyte is higher than 45℃, it must to change to half of the current intensity or stop to charge until decrease to get under 35℃.
3. After charging the battery, adjusting the electrolyte to upper level and recharge 1-2 hours again,
   then put into the fixing plugs, washing and protect with vaseline.
4. Disassemble the "—" pole terminal at first before taking out the battery from scooter, begin to assemble the "+" pole terminal reversely.
5. If it couldn't reach to 12v, after charging the battery for 15-20 hours, it's necessary to replace new battery.

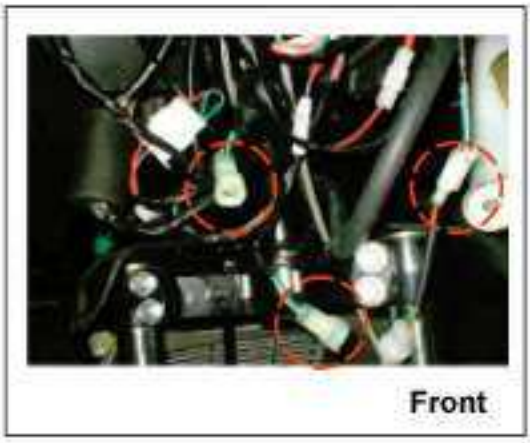
6. REGULAR MAINTENANCE OF THE BATTERY

1. Keep the battery clean and dry.
2. Protect the terminals with vaseline.
3. It can reduce the time to 5-6 hours to charge battery at urgent case.
4. Don't use fuse which above standard, otherwise it'll cause broken of scooter or even firing
5. It must to charge before using new battery to keep the maximum
   performance, if don't charging adequately or the electrolyte under the low level, it may cause broken before normal life.

6.Tap or drinking water contain mineral will reduce the battery's life, it must to use distilled water. (For Water- Adding battery)
7.If scooter is stay a long time, it required charged periodically, otherwise it'll fully discharged by itself above three months.

3-2-2 Lamps

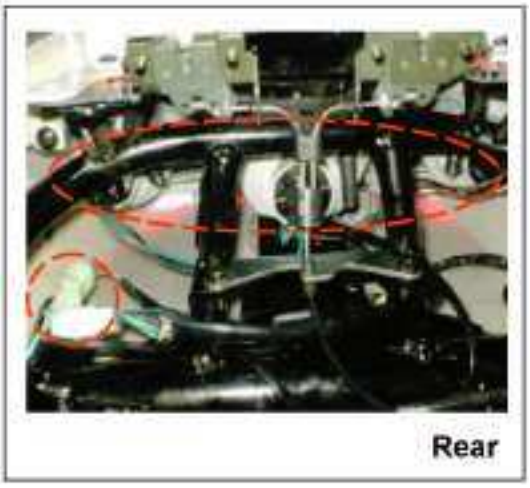
Head lamp:
© Remove the bolts of the cover.
© Cover.
© Remove the head lamp couples



Rear lamp:
© Remove the bolts of the cover.
© Cover.
© Remove the rear lamp couples

Inspection: Check if the lamps is damage, please replace with new one.

Installation:
Install in reverse order of removal procedures.



3-3 BODY

3-3-1 Frame & Cover

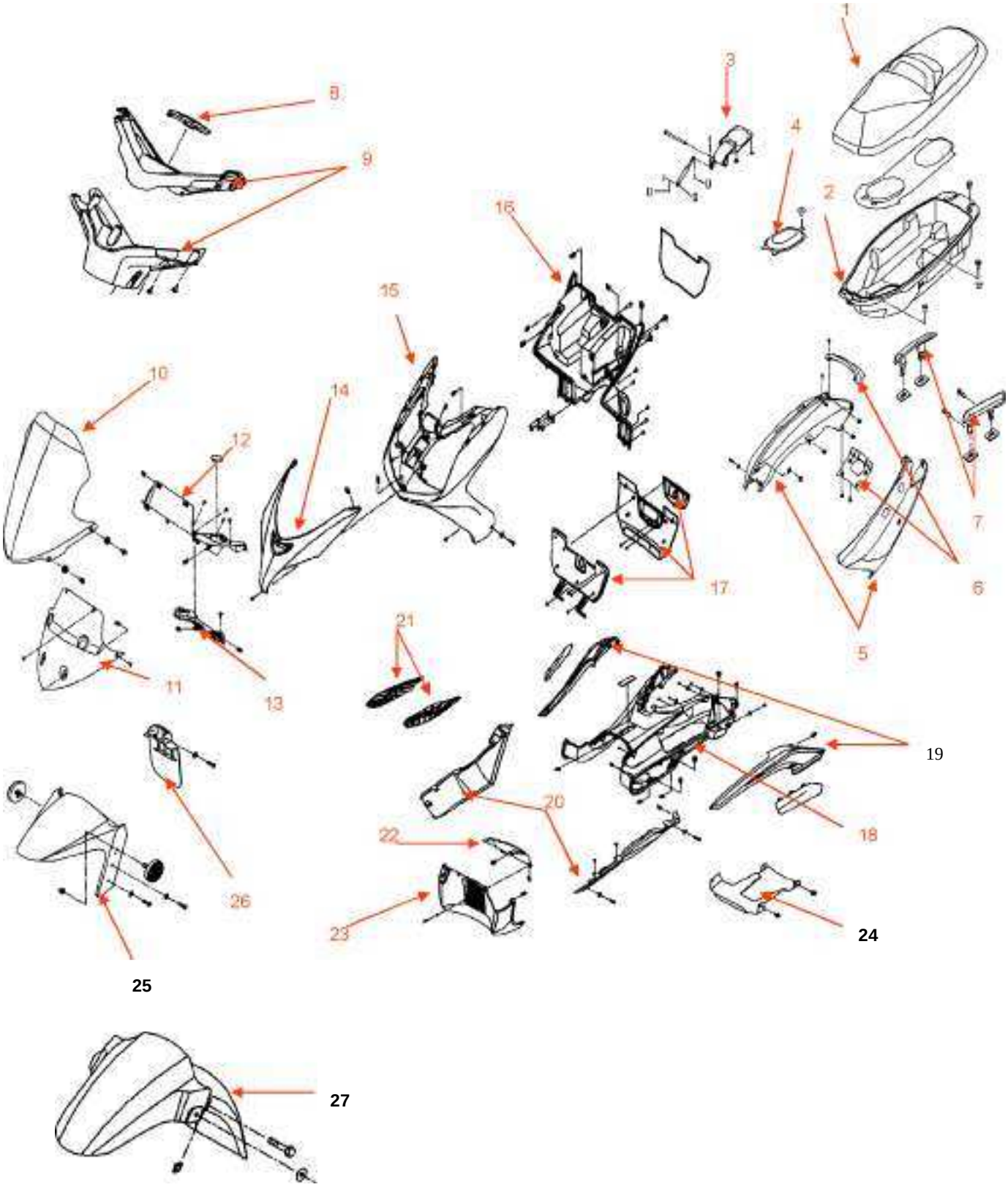
1 . **Frame** :

A. steel pipe and steel sheet are adopted to compose reinforced frame.

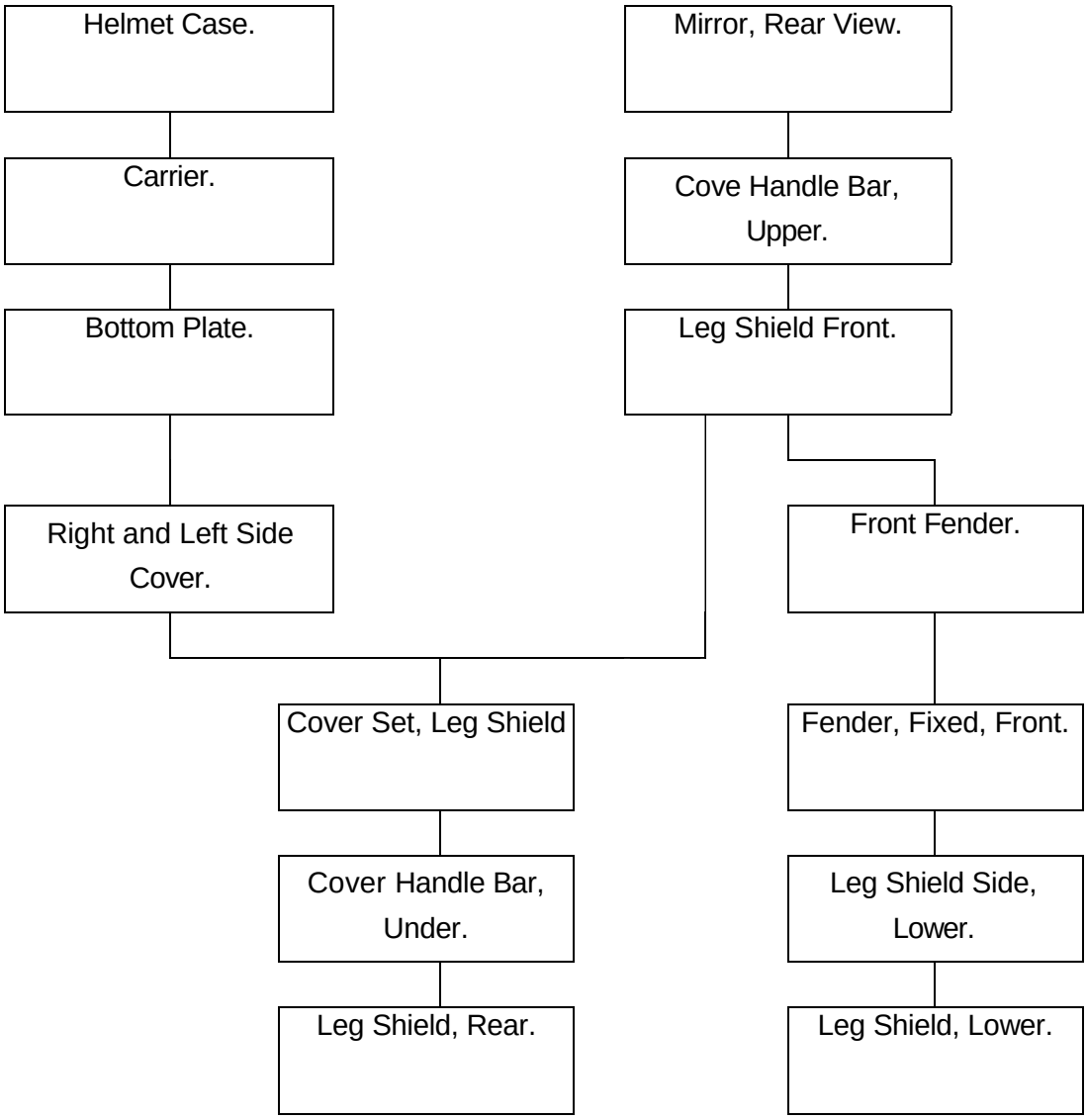
B. A compartment as Personal space for Helmet is set in the Frame center.

2 . **Cover:**

1. **SEAT SET**
2. **HELMET CASE**
3. **BRKT,SEAT**
4. **CAP, HELMET CASE**
5. **COVER SIDE,LH. & RH.**
6. **COVER TAIL,UPPER & UNDER**
7. **HANDLE,LH. & RH.**
8. **ORNAMENTAL,HANDLE BAR**
9. **COVER,HANDLE BAR, UPPER & UNDER**
10. **WIND SHIELD**
11. **FRONT,SPEEDOMETER COVER**
12. **SPEEDOMETER COVER**
13. **SPEEDOMETER COVER**
14. **COVER,LEG SHIELD,FRONT**
15. **LEG SHIELD,FRONT**
16. **COVER SET,LEG SHIELD**
17. **FRONT,LUGGAGE BOX**
18. **LEG SHIELD,REAR**
19. **COVER RIB,LH. & RH.**
20. **LEG SHIELD,SIDE LH. & RH.**
21. **CUSHION,LEG SHIELD,LH. & RH.**
22. **FRONT FENDER,INNER**
23. **LEG SHIELD,LOWER**
24. **FENDER REAR,TANK FUEL**
25. **FRONT FENDER (FOR CUB)**
26. **FRONT FENDER,UNDER**
27. **FRONT FENDER (FOR CUB-B)**



* Dismount floor panels following the sequence shown in the list:



Cautions:

1. Do not damage cover of body panels while dismounting.
2. Handle with care regarding lugs of to avoid damage dismounting.
3. When remounting, do not scratch or crash wiring.
4. While assembling every lug shall be fixated effectively.
5. While assembling, make matching panels and their slots.

3-3-2 Compartment and Seat

1 . Compartment:

A. Located in the center of scooter body, there is a Personal Space for helmet and other, etc.

B. The maximum load capacity of compartment is 10kg.

C. Please don't store precious or easy-to-break articles in the compartment without any protection.

D. The Seat has to be locked. If the Seat is not locked during riding, it will affect the safety and even cause injury.

E. Please pay attention not to let fuel or oil drop into the compartment.

F. The cover of the compartment can be cleaned with vacuum cleaner.
It can also be washed and put back after dried.
(Please do not wash with volatile fluid, such as gasoline.)

G. The seat is controlled by the seat lock on the side.

2 . Helmet Holder:

There is a Helmet Holder at the position of Seat Hinge.
open the Seat to hook or unhook Helmet.

3-3-3 Front & Rear Suspension System

1. Front- Suspension :

A. No suspension on Front Fork.(For B Type)

B. Brake Con-rod and Bracket of Brake Lining are equipped between Front Fork and Disc Brake. Resistant Torque occurrs toward the revolving direction when acting brake. The Torque will become the force to push Front-Fork up by using connection Rod. Therefore, the sink of Front-Fork is stopped and decreases the change of sitting gesture while the brake is used.

2 . **Rear-Suspension** :

A. Suspension Mechanism is 'composed of single telescopic absorber between the crank case and scooter body.

B. Rear Axle Movable by telescopic shock absorber.

3-3-5 Tire & Tire pressure

Inspection: Check if tire has been cracked, damage, worn, inclusions(stone, nail, glass, etc.). If tire is in poor condition, please replace with new one.

Note: Tire specifications: See specification table.

* Tire pressure *

Watch: Please measure cool tire pressure.

Note: Tire pressure.

Front tire: 28 PSI Rear tire: 32 PSI

Warning: Don't over-load the motorcycle.

The tire may explode with over-load and it is dangerous.

CHAPTER 4 . DISASSEMBLY REPAIRS

4-1 NOTICE FOR DISASSEMBLY REPAIRS

4-2 REMOVAL AND INSTALLATION OF ENGINE

4-3 REMOVAL AND INSPECTION OF ELECTRIC ITEMS

4-3-1 OPERATING CAUTIOS & TROUBLESHOOTING
4-3-2 BATTERY
4-3-3 SHORT CIRCUIT TEST
4-3-4 STARTER MOTOR
4-3-5 RESISTOR
4-3-6 CDI

4-4 REMOVAL AND INSPECTION OF BODY PARTS **4-4-1**

Removal and Inspection of Front Fork and Steering 4-4-2
Removal and Assembly of Wheel and Shock Absorber

4-5 BRAKING SYSTEM

4-1 NOTICE FOR DISASSEMBLY INSPECTION

1. In order to avoid mixing and loss of disassembled parts before reassembling, the disassembled parts have to be arranged according to their function during the process.

2. The damage to Cover and Frame should be avoided while disassembling and assembling.

3. Remove the negative (-) terminal of Battery before working.

4. While reassembling, make sure that all parts are normal.

5. Specified oil should be adopted on turning and sliding parts.
   Specified grease should also be applied on specified positions.

6. Dust, dirt and unusual articles should be avoided while reassembling.

7 . While assembling, the main lip of oil seal should face inwards (oil chamber) and the antidust sub-lip should face outwards.
   Apply an even layer of specified grease onto the lip before it is pressed to its location with balanced force by specified jigs.

8 . While pressing the bearing into the hole, apply balanced force to the outer ring of bearing by specified jigs.
   While pressing the bearing into the main shaft, apply balanced force to the inner ring of bearing by specified jigs.

4-2 REMOVAL AND INSTALLATION OF ENGINE

Removal of Engine:

© Remove Seat and Cover.

© Remove Exhaust Muffler.

© Remove Clamp of Air Filter and Air Filter.

© Remove Mud Guard.

© Remove Ignition Coil Lead.
Flywheel Magneto Lead.
Engine Earth Ground Lead.

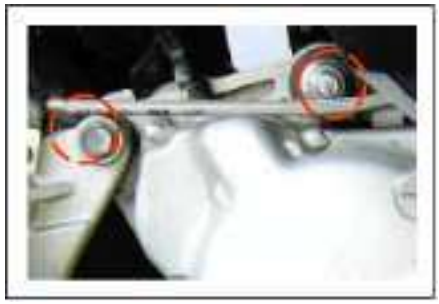
© Remove the Throttle Cable,
on Carburetor Piston.

© Remove Oil Hose.

© Remove Negative Pressure Hose and
Remove rear belt cooling duct.
Remove Fuel Hose.

© Remove Water Hose.

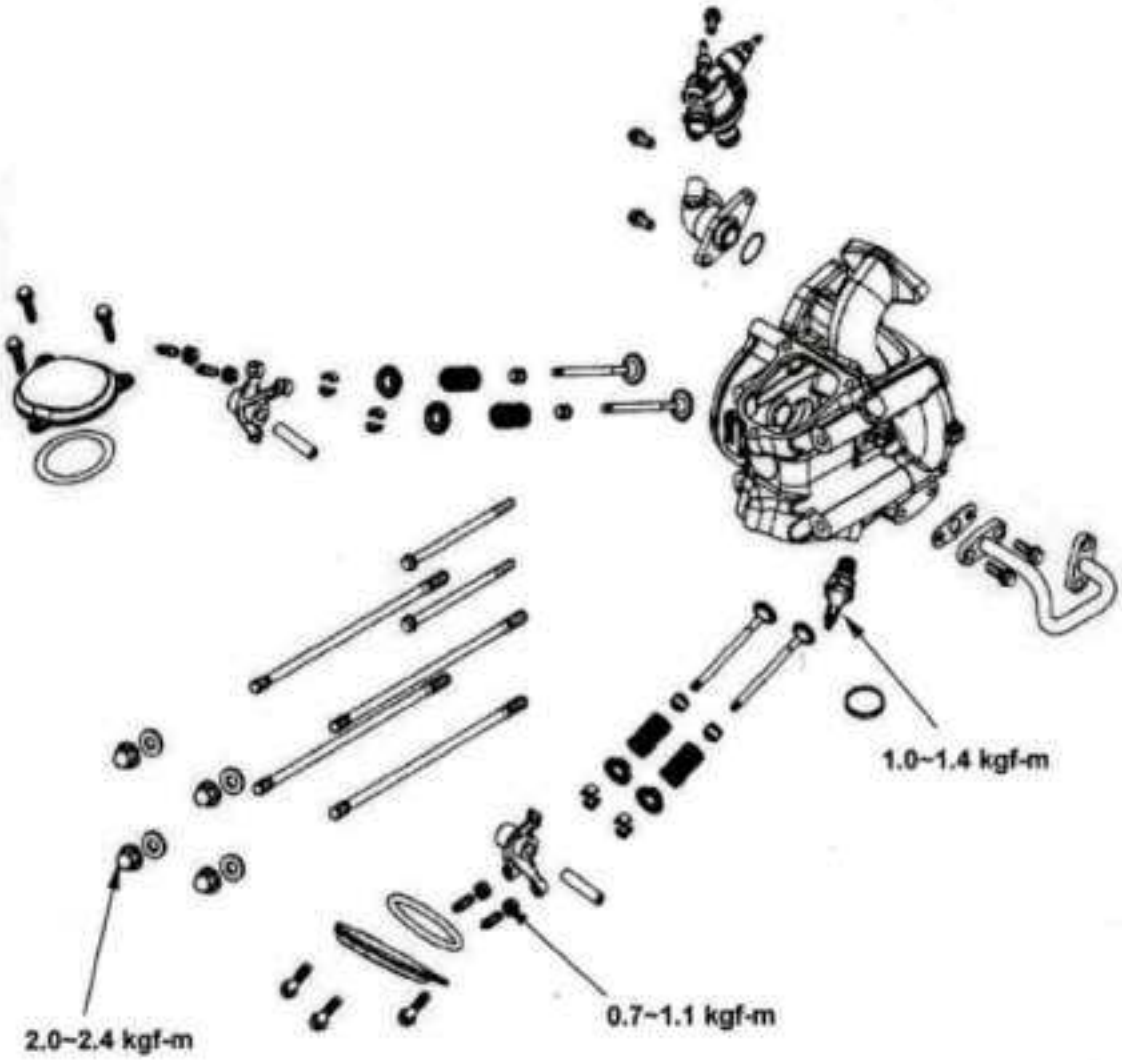
© Remove the engine mounting bolts and nuts.



® Remove the rear-axle shaft bolts and remove rear wheel.

©Installation

Install in reverse order of removal procedures.



PRECAUTIONS IN OPERATION

General Information

- This chapter is contained maintenance and service for cylinder head, valve, and camshaft as well as rocker arm.
- Cylinder head service can be carried out when engine is in frame.

Specification

Item			Standard	Limit
Compression pressure			12+/2 kg/cm2	—
Camshaft	Height of cam lobe	Intake	30.800~30.920	3.075
		Exhaust	30.411~30.531	30.26
Rocker arm	ID of valve rocker arm		12.000~12.018	12.10
	OD of valve rocker arm shaft		11.966~11.984	11.910
Valve	OD of valve stem	Intake	4.975~4.990	4.900
		Exhaust	4.955~4.970	4.900
	Guide seat		5.000~5.012	5.030
	Clearance between valve stem and guide	Intake	0.010~0.037	0.080
		Exhaust	0.030~0.057	0.100
	Free length of valve spring		35.000	31.500
	Valve seat width		1.000	1.6
Tilt angle of cylinder head			—	0.05

Torque Value

Cylinder head bolt (LH)	2.0~2.4 kg-m
Cylinder head Nut	2.0~2.4 kg-m
Sealing bolt of cam chain auto-tensioner	0.8~1.2 kg-m
Bolt of cam chain auto-tensioner	1.2~1.6 kg-m
Cam sprocket cover bolts	0.8~1.2 kg-m
Cam sprocket bolt	1.0~1.2 kg-m

TOOLS

Special service tools

Valve reamer: 5.0mm
Valve guide driver: 5.0mm
Valve spring compressor

Troubleshooting

Engine performance will be effected by troubles on engine top parts. The trouble usually can be determined or by performing cylinder compression test and judging the abnormal noise generated.

Low compression pressure

Valve

- Improper valve adjustment
- Burnt or bent valve
- Improper valve timing
- Valve spring damage

Cylinder head

- Cylinder head gasket leaking or damage
- Tilt or crack cylinder

High compression pressure

- Too much carbon deposit on combustion chamber or piston head

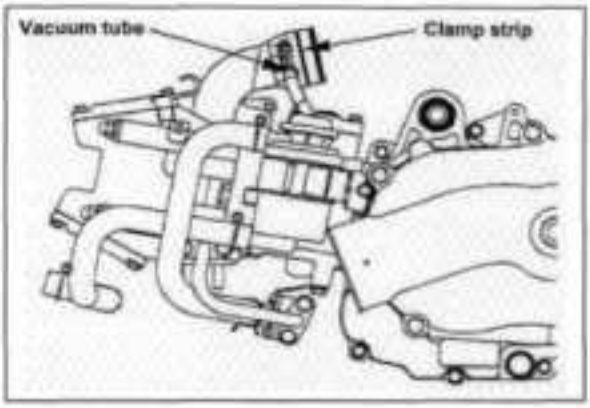
Noise

- Improper valve clearance adjustment
- Burnt valve or damaged valve spring
- Camshaft wear out or damage
- Chain wear out or looseness
- Auto-tensioner wear out or damage
- Camshaft sprocket
- Rocker arm or rocker arm shaft wear out

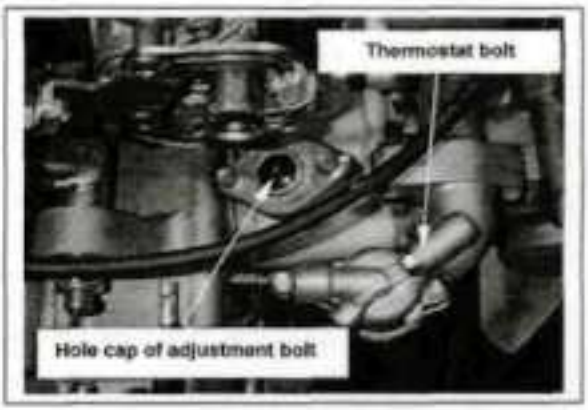
CYLINDER HEAD REMOVAL

Remove cushion and body center cover.

Remove the clamp strip bolt of carburetor, and disconnect vacuum tube from the carburetor insulator.



Remove 1 bolt of thermostat and then remove the thermostat.

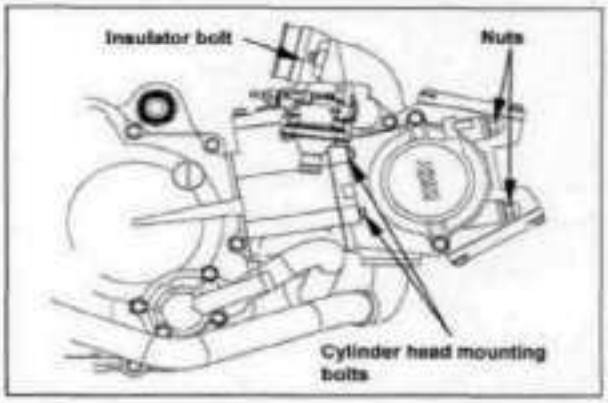


Remove the side cover mounting blot of cylinder head, and then take out the side cover.

Remove hole cap for the adjustment bolt of cam chain tensioner, and then loosen the tensioner by turning a flat-driver in C.W direction.

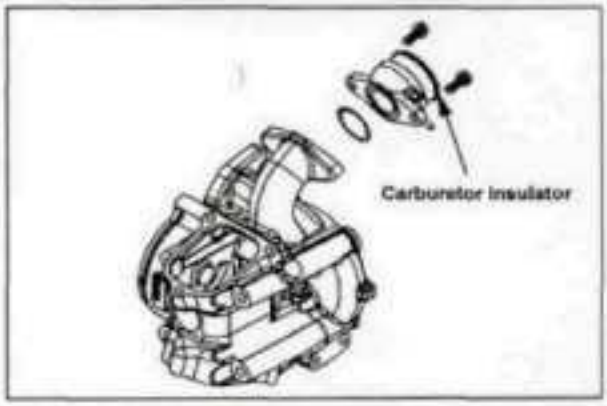
Remove cam sprocket bolt and then remove the sprocket by prying chain out.

Remove the 2 cylinder head mounting bolts from cylinder head side cover, and then remove 4 nuts and washers from cylinder head upper side.



Remove the cylinder head.

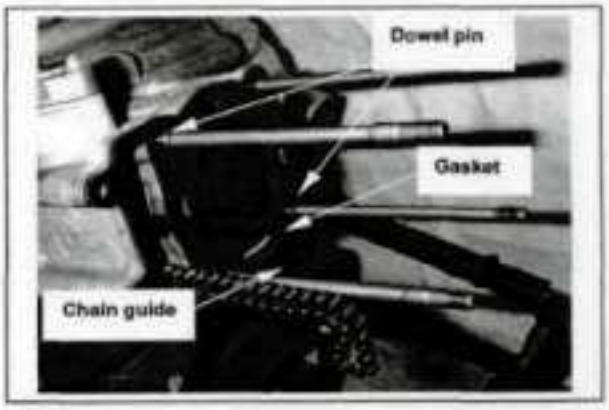
Remove 2 bolts of carburetor insulator and then take the insulator out.



Remove cylinder head gasket and 2 dowel pins.
Remove chain guide.
Clean up residues from the matching surfaces of cylinder and cylinder head.

⚠ **Caution**

- Do not damage the matching surfaces of cylinder and cylinder head.
- Avoid residues of gasket or foreign materials falling into crankcase as cleaning.

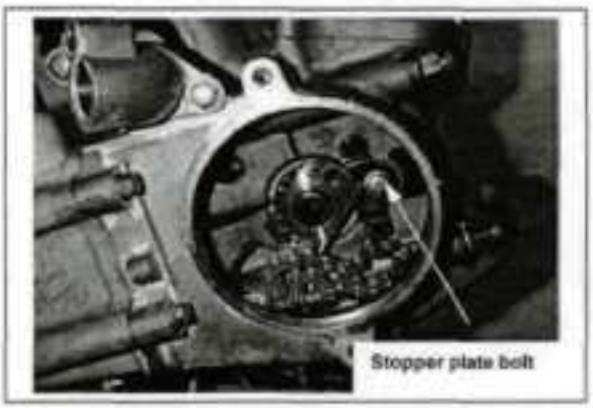


CYLINDER HEAD DISASSEMBLY

Remove the hole cap of intake & exhaust valve clearance adjustment. There are 6 bolts. Then, remove the cap.

Remove the rocker arm pin stopper plate, and then screw a 5mm bolt into the rocker arm pin. Finally, remove the pin and the rocker arm.

Screw a 6 mm bolt into cam sprocket mounting bolt hole, and then pull the camshaft out.



Use a valve compressor to press the valve spring.
After removed valve cotter, release the compressor and then take out spring retainer, valve spring and valves.

⚠ Caution

- In order to avoid loosing spring elasticity, do not press the spring too much. Thus, press length is based on the valve cotter in which can be removed.

Tool: Valve spring compressor

Remove valve stem guide seal.
Clean carbon deposits in combustion chamber.
Clean residues and foreign materials on cylinder head matching surface.

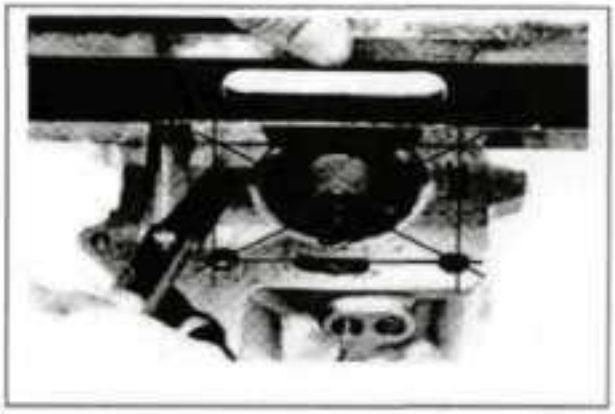
⚠ Caution

- Do not damage the matching surface of cylinder head.

INSPECTION

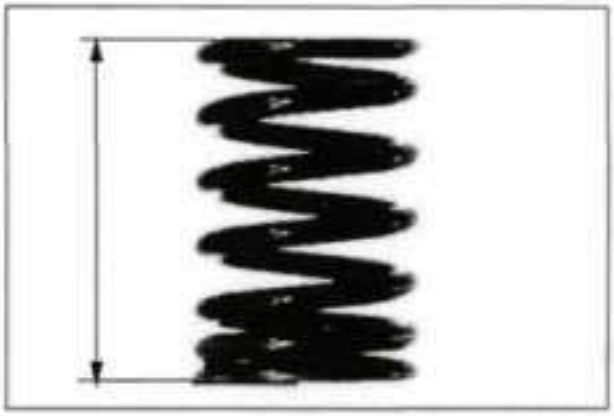
CYLINDER HEAD

Check if spark plug and valve holes are cracked.
Measure cylinder head warp with a straightedge and thickness gauge.
Service limit: 0.5 mm



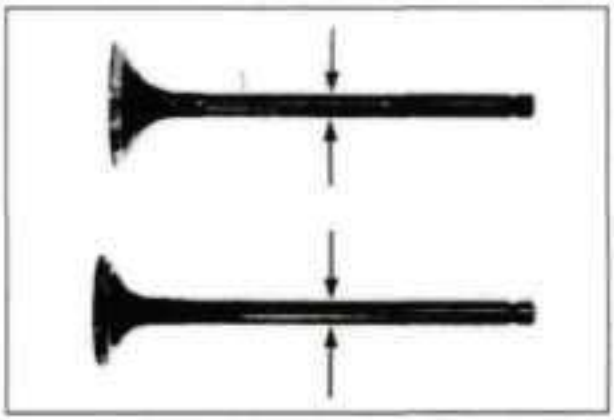
Valve spring free length

Measure the free length of intake and exhaust valve springs.
Service limit: 31.5 mm



Valve stem

Check if valve stems are bend, crack or burn.
Check the operation condition of valve stem in valve guide, and measure & record the valve stem outer diameter.
Service Limit: IN: 4.90 mm
EX: 4.90 mm



Valve guide

⚠ Caution

- Before measuring the valve guide, clean carbon deposits with reamer.

Tool: 5.0 mm valve guide reamer
Measure and record each valve guide inner diameters.
Service limit: 5.03 mm
The difference that the inner diameter of valve guide deducts the outer diameter of valve stem is the clearance between the valve stem and valve guide.
Service Limit: IN→0.08 mm
EX→0.10 mm

⚠ **Caution**

- If clearance between valve stem and valve guide exceeded service limit, check whether the new clearance that only replaces new valve guide is within service limit or not. If so, replace valve guide.

Correct it with reamer after replacement.
If clearance still exceeds service limit after replaced valve guide, replace valve stem too.

⚠ **Caution**

It has to correct valve seat when replacing valve guide.

VALVE STEM REPLACEMENT

Heat up cylinder head to 100~150 ℃ with heated plate or toaster.

⚠ **Caution**

- Do not let torch heat cylinder head directly. Otherwise, the cylinder head may be deformed as heating it.
- Wear on a pair of glove to protect your hands when operating.

Hold the cylinder head, and then press out old valve guide from combustion chamber side.
Tool: Valve guide driver: 5.0 mm

⚠ **Caution**

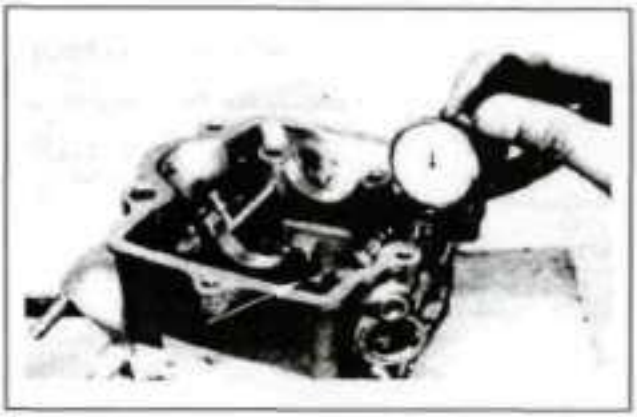
- Check if new valve guide is deformation after pressed it in.
- When pressing in the new valve guide, cylinder head still have to be kept in 100~150℃.

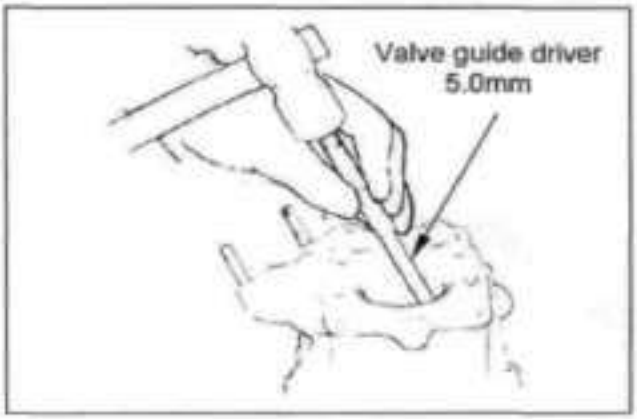
Adjust the valve guide driver and let valve guide height is in 13 mm.
Press in new valve guide from rocker arm side.
Tool: Valve guide driver: 5.0 mm
Wait for the cylinder head cooling down to room temperature, and then correct the new valve guide with reamer.

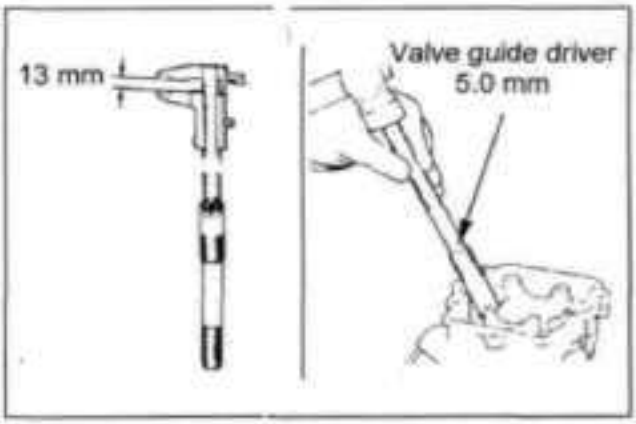
⚠ **Caution**

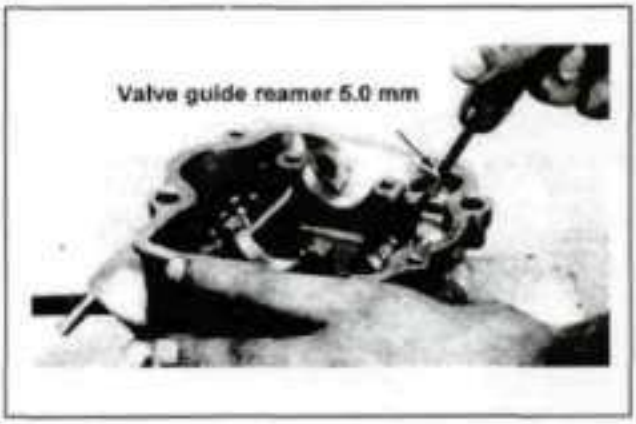
- Using cutting oil when correcting valve guide with a reamer.
- Turn the reamer in same direction when it be inserted or rotated.

Correct valve seat, and clean up all metal residues from cylinder head.
Tool: Valve guide reamer: 5.0 mm









VALVE SEAT INSPECTION AND SERVICE

Clean up all carbon deposits onto intake and exhaust valves.
Apply with emery slightly onto valve contact face.
Grind valve seat with a rubber hose or other manual grinding tool.

⚠ Caution

- Do not let emery enter into between valve stem and valve guide.
- Clean up the emery after corrected, and apply with engine oil onto contact faces of valve and valve seat.

Remove the valve and check its contact face.

⚠ Caution

- Replace the valve with new one if valve seal is roughness, wear out, or incomplete contacted with valve seat.

Valve seat inspection

If the valve seat is too width, narrow or rough, correct it.

Valve seat width

Service limit: 1.6mm
Check the contact condition of valve seat.

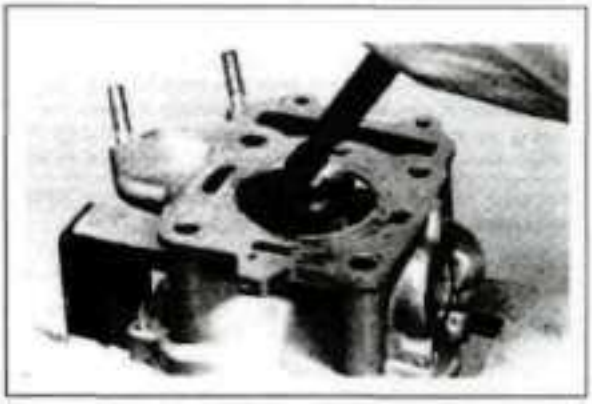
Valve seat grinding

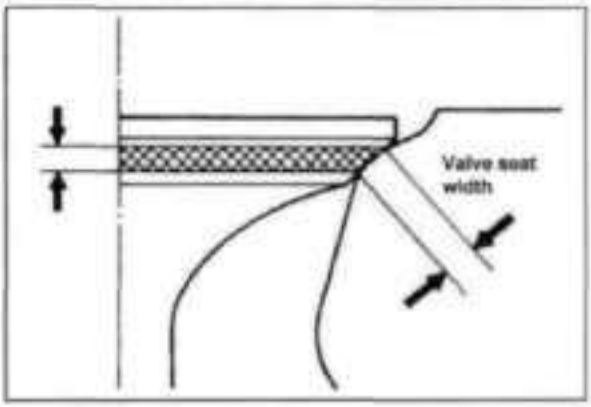
The worn valve seat has to be ground with valve seat chamfer cutter.
Refer to operation manual of the valve seat chamfer cutter.
Use 45° valve seat chamfer cutter to cut any rough or uneven surface from valve seat.

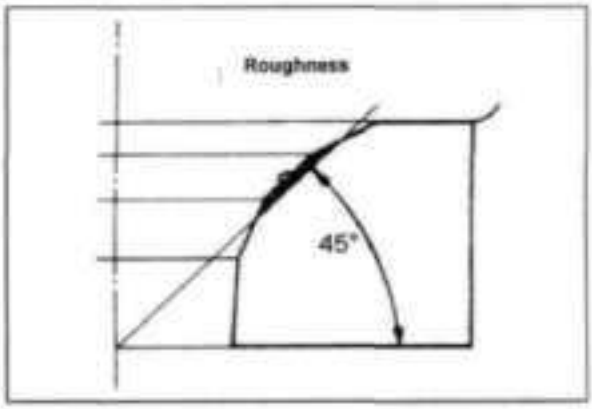
⚠ Caution

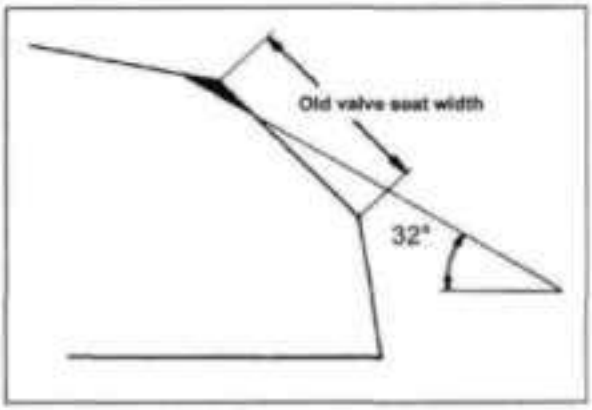
- After valve guide had been replaced, it has to be ground with 45° valve seal chamfer cutter to correct its seat face.

Use 32° cutter to cut a quarter upper part out.

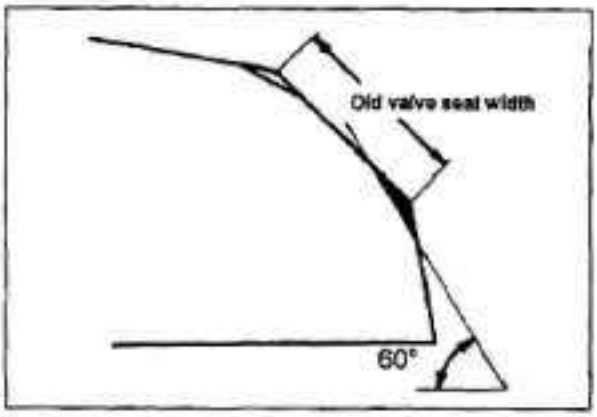








Use 60° cutter to cut a quarter lower part out.
Remove the cutter and check new valve seat.

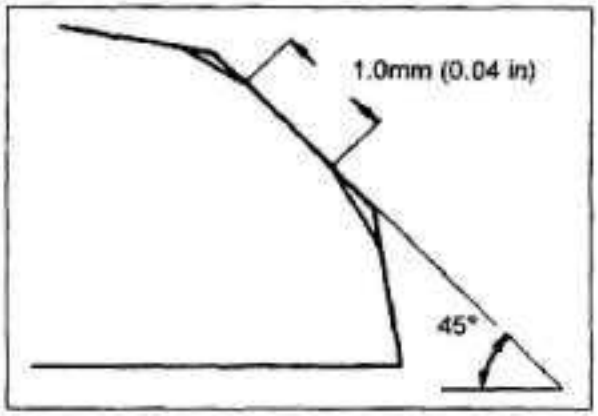


Use 45° cutter to grind the valve seat to specified width.

⚠ Caution

- Make sure that all roughness and uneven faces had been ground.

Grind valve seat again if necessary.

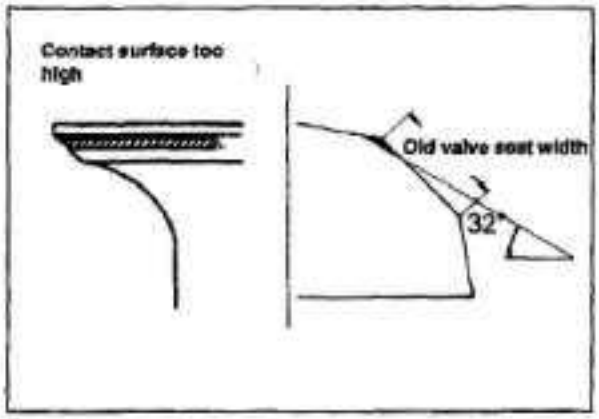


Coat the valve seat surface with red paint.
Install the valve through valve guide until the valve contacting with valve seat, slightly press down the valve but do not rotate it so that a seal track will be created on contact surface.

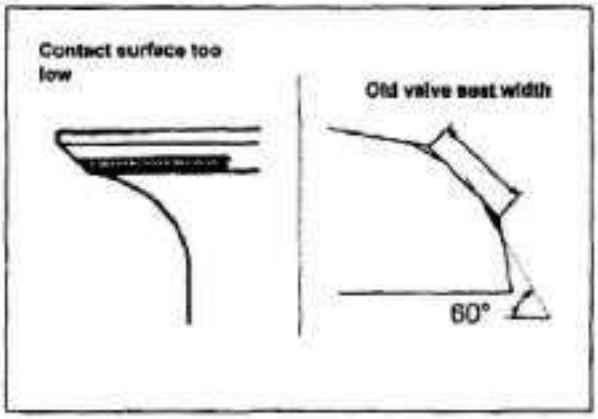
⚠ Caution

- The contact surfaces of valve and valve seat are very important to the valve sealing capacity.

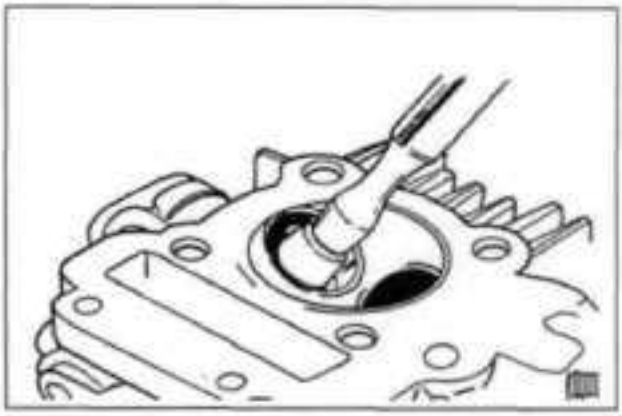
If the contact surface too high, grind the valve seat with 32° cutter.
Then, grind the valve seat to specified width.



If the contact surface too low, grind the valve seat with 60° cutter.
Then, grind the valve seat to specified width.



After the valve seat ground, coat valve seat surface with emery and then slightly press the ground surface.
Clean up all emery coated onto cylinder and valve after ground.

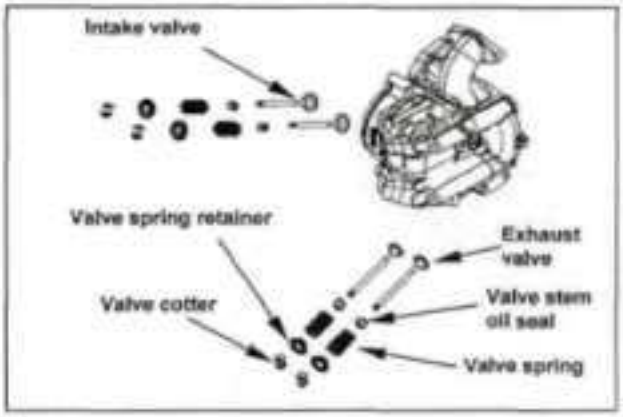


CYLINDER HEAD REASSEMBLY

Lubricate valve stem with engine oil, and then insert the valve into valve guide.
Install new valve stem oil seal.
Install valve springs and retainers.

⚠ Caution

- The closed coils of valve spring should face down to combustion chamber.



Use valve spring compressor to press valve spring.
Install valve cotter and release the valve compressor.

⚠ Caution

- In order to avoid loosing spring elasticity, do not press the spring too much. Thus, press length is based on the valve cotter in which can be removed.

Tool: valve spring compressor.

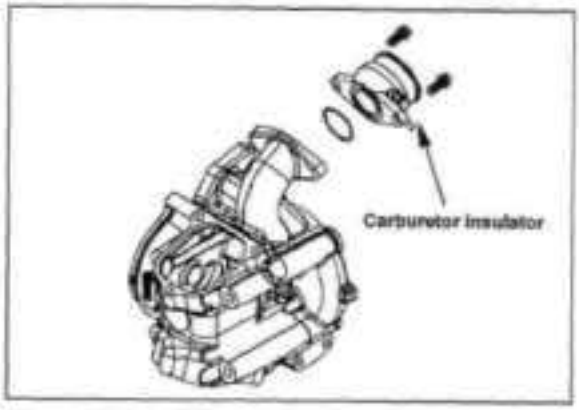
Tap valve stem to make valve retainer and valve stem sealing properly.

⚠ Caution

- Place and hold cylinder head on to working table so that can prevent from valve damaged.

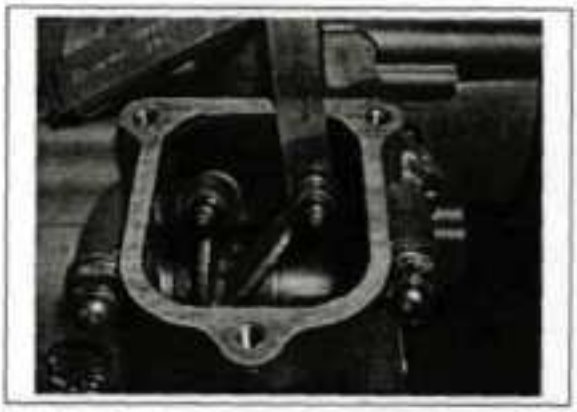
CYLINDER HEAD INSTALLATION

Install a new O-ring into the indent of carburetor insulator, and then install the insulator onto cylinder head with 2 bolts.



Install camshaft into cylinder head, and align rocker pin with rocker arm pin hole. Then, insert the rocker arm pin.
Install rocker arm pin mounting plate.

Loosen valve clearance adjustment nuts and bolts located on valve rocker arm.
Measure and adjust valve clearance with thickness gauge.
After valve clearance had been adjusted to standard value, hold adjustment bolt and then tighten the adjustment nut.
Valve clearance: Intake: 0.12 +/- 0.02 mm
Exhaust: 0.12 +/- 0.02 mm

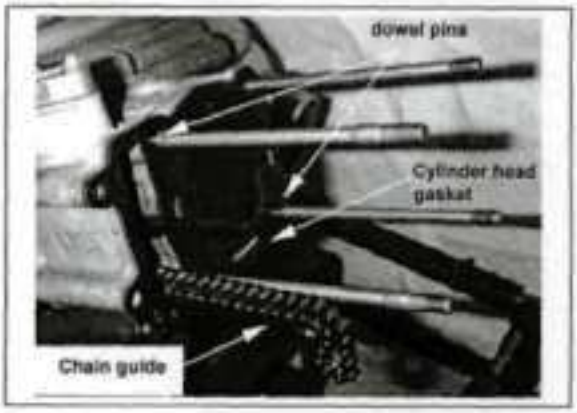


Install valve clearance adjustment hole cap with 3 bolts and tighten the bolts.

Clean up all residues and foreign materials onto the matching surfaces of both cylinder and cylinder head.
Install chain guide.
Install 2 set pins and cylinder head gasket.

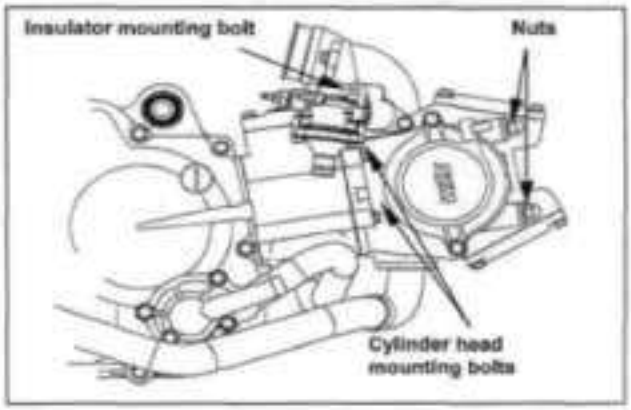
⚠ Caution

- Do not damage the matching surfaces of cylinder and cylinder head.
- Avoid residues of gasket or foreign materials falling into crankcase as cleaning.



Install cylinder head.

Tighten 4 nuts and washers on the cylinder head upper side, and then tighten 2 cylinder head mounting bolts of cylinder head side cover.
Torque value: 2.0~2.4 kgf-m



Install and tighten spark plug
Torque value: 2.0~2.4 kgf-m

⚠ Caution

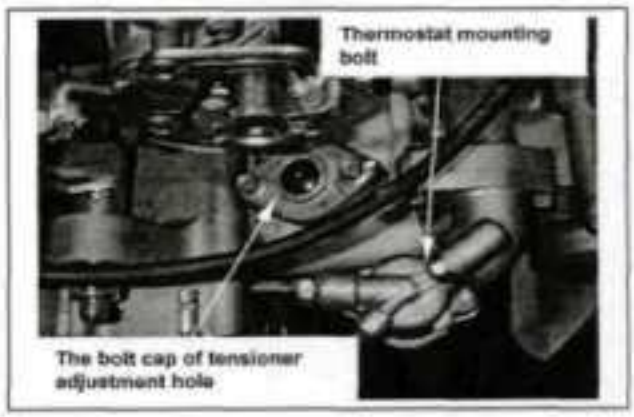
- This model is equipped with more precision 4-valve mechanism so its tighten torque can not be exceeded standard value in order to avoid causing cylinder head deformation, engine noise and leaking so that motorcycle's performance be effected.

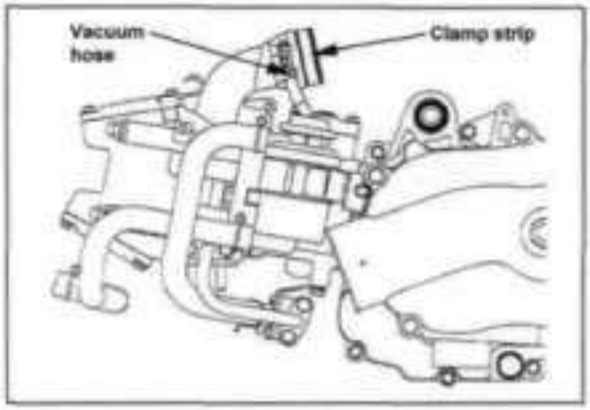
Install cam chain on to sprocket and align the timing mark on the sprocket with that of cylinder head.
Align sprocket bolt hole with camshaft bolt hole.
Tighten the sprocket mounting bolt.

⚠ Caution

- Make sure timing marks are matched.

Install a new O-ring onto thermostat and tighten its mounting bolts.
Loosen sprocket chain tensioner and let it contact with chain plate tightly. Tighten the bolt cap of tensioner adjustment hole.



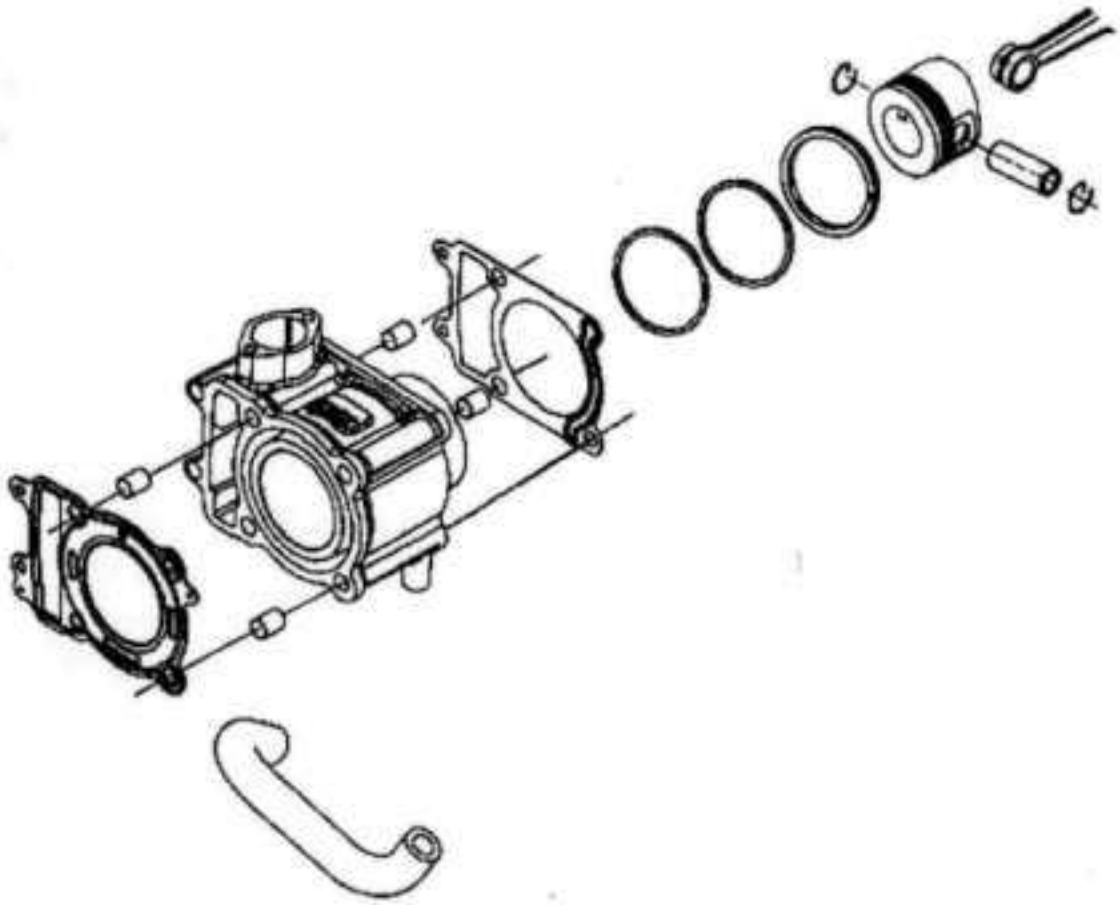


Install carburetor insulator onto carburetor and tighten clamp strip bolt. Install the vacuum hose of carburetor insulator.

Remove the intake valve adjustment hole cap
Start engine, and make sure that lubricant flows to cylinder head.
Turn off engine after confirmed, and install the intake valve adjustment hole cap.
Install seat cushion and body center cover.

⚠ Caution

- If lubricant does not flow to cylinder head, engine components will be worn out seriously. Thus, it must be confirmed.
- When checking lubricant flowing condition, run the engine in idle speed. Do not accelerate engine speed.



CYLINDER/PISTON

PRECAUTIONS IN OPERATION

General Information

- Both cylinder and piston service can be carried out when engine mounted on frame.

Specification

LA12W & LA15W & LA18W

Item			Standard	Limit
Cylinder	ID (LA18W not included)		56.995~57.015	57.016
	Bend		-	0.050
Piston/ Piston ring	Clearance between piston rings	Top ring	0.015~0.050	0.090
		2nd ring	0.015~0.050	0.090
	Ring-end gap	Top ring	0.150~0.300	0.500
		2nd ring	0.300~0.450	0.650
		Oil ring side rail	0.200~0.700	-
	OD of piston (LA18W not included)		56.985~57.005	56.900
	Clearance between piston and cylinder		0.010~0.040	0.100
	ID of piston pin boss		15.002~15.008	15.040
OD of piston pin			14.960~15.000	14.930
Clearance between piston and piston pin			0.002~0.014	0.020
ID of connecting rod small-end			15.016~15.034	15.060

LA18W

Item		Standard	Limit
Cylinder	ID	60.995~61.015	61.016
Piston	OD of piston	60.985~61.005	60.900

TROUBLE DIAGNOSIS

Low Or Unstable Compression Pressure

Cylinder or piston ring worn out

Smoking In Exhaust Pipe

Piston or piston ring worn out
Piston ring installation improperly
Cylinder or piston damage

Knock or Noise

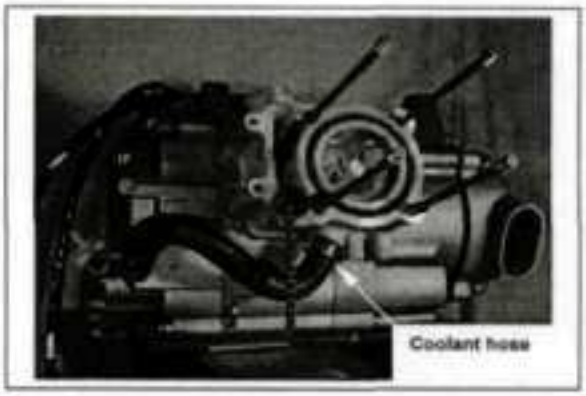
Cylinder or piston ring worn out
Carbon deposits on cylinder head top side
Thermostat burnt

Engine Overheat

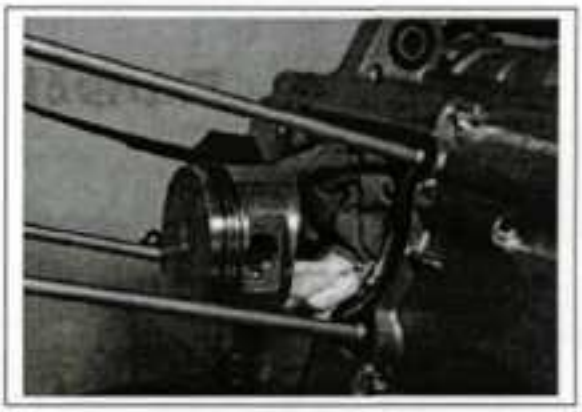
Carbon deposits on cylinder head top side
Cooling pipe clogged or not enough in coolant flow

CYLINDER REMOVAL

Remove cylinder head (refer to chapter 6).
Remove coolant hose from cylinder head.
Remove cylinder.



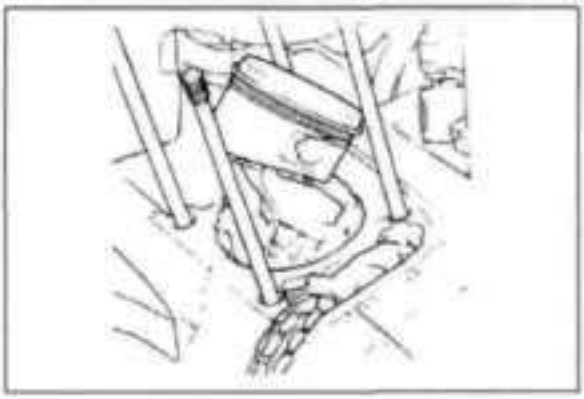
Remove cylinder gasket and dowel pin.



Cover the holes of crankcase and cam chain with a piece of cloth.
Clean up all residues or foreign materials from the two matching surfaces of cylinder and crankcase.

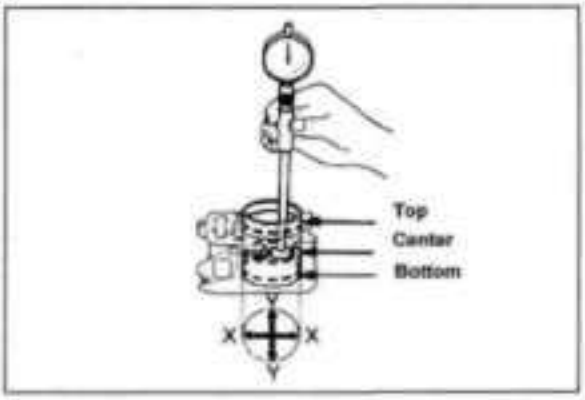
⚠ Caution

Soap the residues into solvent so that the residues can be removed more easily.

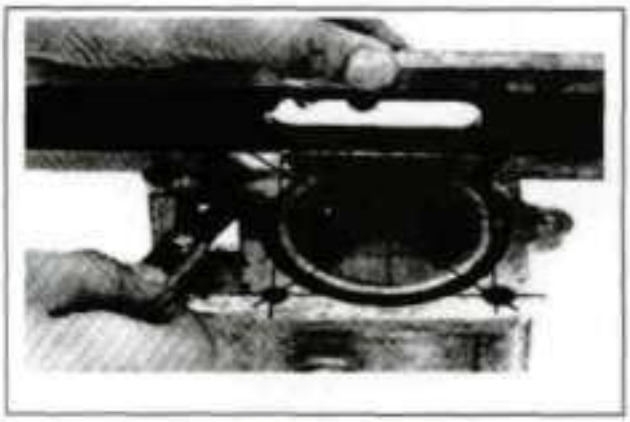


Inspection

Check if the inner diameter of cylinder is wear out or damaged.
In the 3 positions, top, center and bottom, of cylinder, measure the X and Y values respective in the cylinder.
Service limit:
LA12W & LA15W:57.016 mm
LA18W:61.016 mm



Check cylinder if warp.
Service limit: 0.05 mm



PISTON REMOVAL

Plug crankcase opening with a cleaning cloth to prevent from piston pin snap ring or other foreign materials falling into crankcase when disassembling.
Hold another snap ring with pliers.
Push out the piston pin from the side that not removed the snap ring.

Inspection

Measure clearance between piston ring and its grooves.
Service Limit: **Top ring: 0.09 mm**
2nd ring: 0.09 mm

Remove piston rings

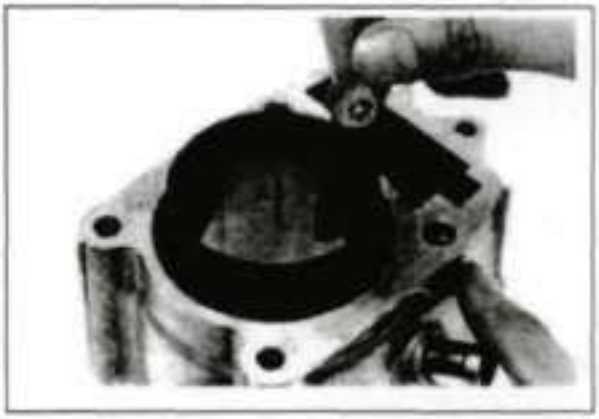
Check if the piston rings are damaged or its grooves are worn.

⚠ Caution

- Pay attention to remove piston rings because they are fragile.

Place piston rings respective into cylinder below 20 mm of cylinder top. In order to keep the piston rings in horizontal level in cylinder, push the rings with piston.

Service Limit: **Top ring: 0.50 mm**
2nd ring: 0.65 mm



Measure the outer diameter of piston pin.

Service Limit: 14.93 mm

Measure the inner diameter of connecting rod small end.

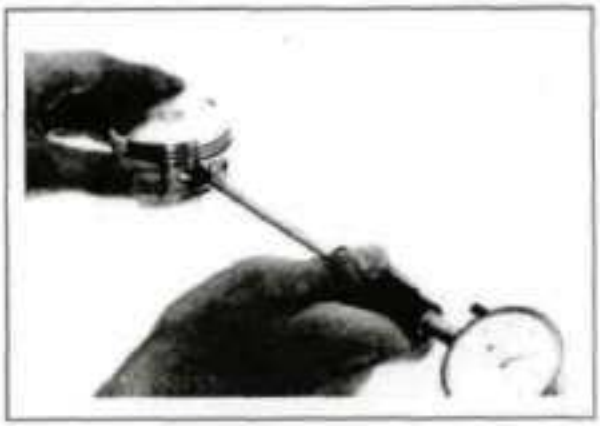
Service Limit: 15.06 mm

Measure the inner diameter of piston pin hole.

Service Limit: 15.04 mm

Calculate clearance between piston pin and its hole.

Service Limit: 0.02 mm



CYLINDER/PISTON

Measure piston outer diameter.

⚠ Caution

- The measurement position is 10 mm distance from piston bottom side, and 90° to piston pin.

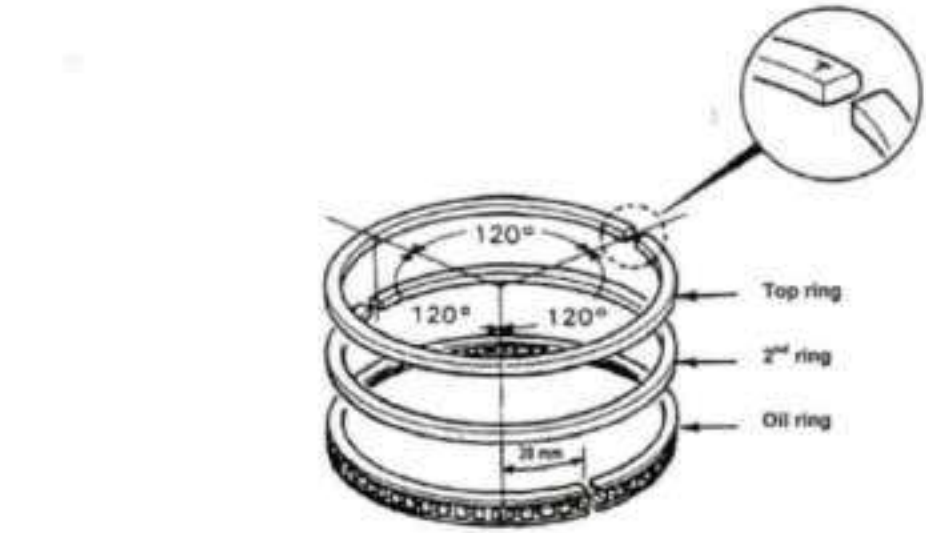
Service limit:
LA12W & LA15W: 56.9 mm
LA18W: 60.9 mm
Compare measured value with service limit to calculate the clearance between piston and cylinder.

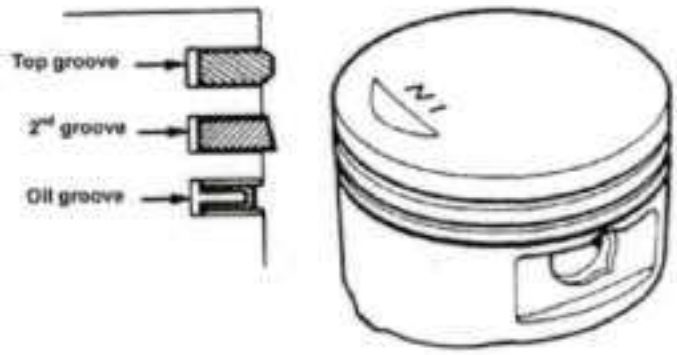
PISTON RING INSTALLATION

Clean up piston top, ring groove, and piston surface.
Install the piston ring onto piston carefully.
Place the openings of piston ring as diagram shown.

⚠ Caution

- Do not damage piston and piston rings as installation.
- All marks on the piston rings must be forwarded to up side.
- Make sure that all piston rings can be rotated freely after installed.





PISTON INSTALLATION

Install piston and piston pin, and place the IN marks on the piston top side forward to intake valve.
Install new piston pin snap ring.

⚠ Caution

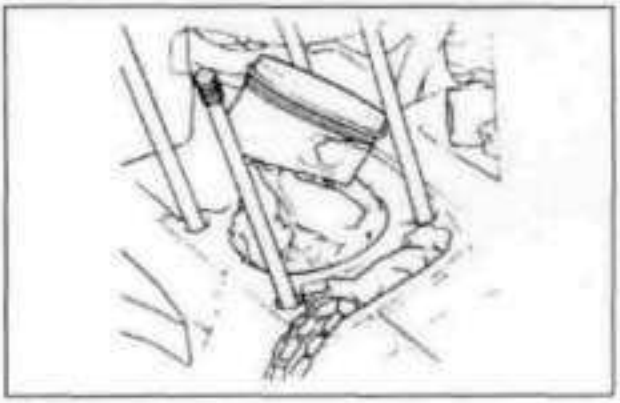
- Do not let the opening of piston pin snap ring align with the opening piston ring.
- Place a piece of cloth between piston and crankcase in order to prevent snap ring from falling into crankcase as operation.

CYLINDER INSTALLATION

Clean up all residues and foreign materials on the matching surface of crankcase. Pay attention to not let these residues and foreign materials fall into crankcase.

⚠ Caution

Soap the residues into solvent so that the residues can be removed more easily.



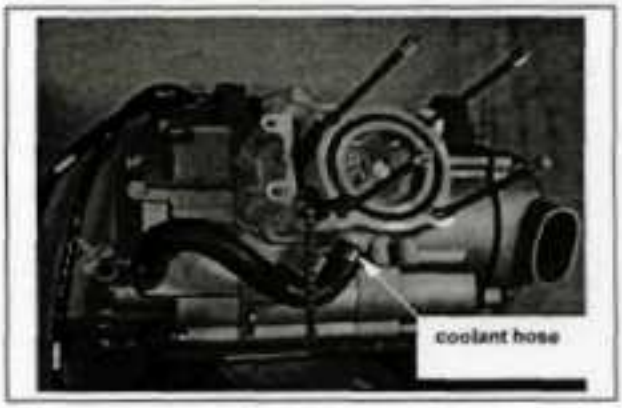
Install dowel pins and new gasket.

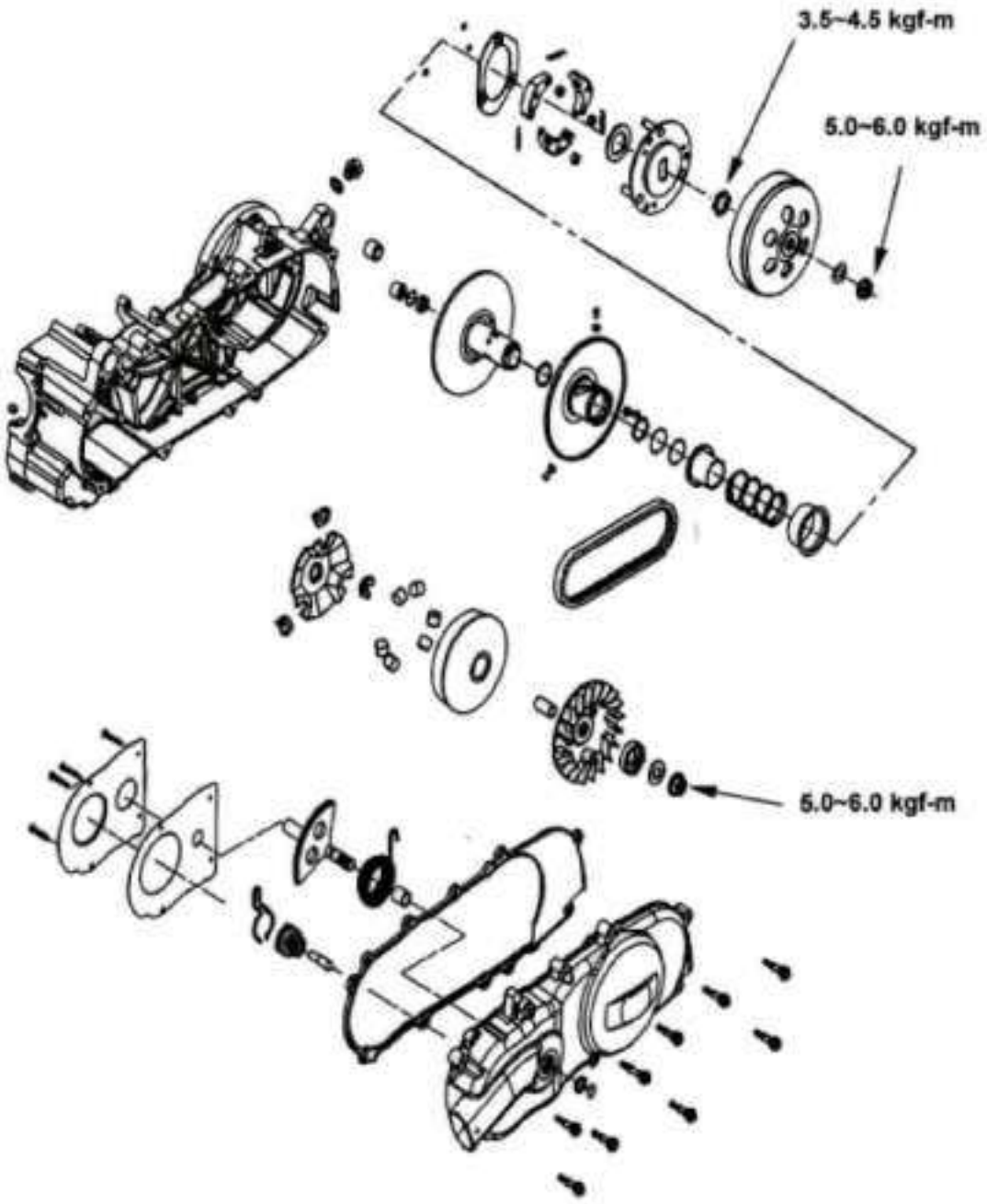
Coat engine oil to inside of cylinder, piston and piston rings.
Care to be taken when installing piston into cylinder. Press piston rings in one by one as installation.

⚠ Caution

- Do not push piston into cylinder forcefully because piston and piston rings will be damaged.

Install coolant hose onto cylinder.
Install cylinder head (refer to Chapter 6).





MAINTENANCE DESCRIPTION

Precautions in Operation

General Information

- Drive face, clutch outer, and driven pulley can be serviced on the motorcycle.
- Driving belt and driving pulley must be free of grease.

Item	Standard value (mm)	Limit (mm)
Driving belt width	19.000	17.500
ID of drive face boss	27.000~27.021	27.060
OD of drive face	26.970~26.990	26.940
OD of roller	19.950~20.100	19.500
ID of clutch outer	130.000~130.200	130.500
Thickness of clutch weight	4.000~4.100	2.000
Free length of driven pulley spring	88.300	83.200
OD of driven pulley	33.965~33.985	33.940
ID of drive face	34.000~34.025	34.060

Torque value

- Driven face nut: 5.0~6.0 kgf-m
- Clutch outer nut: 5.0~6.0 kgf-m

Special Service Tools

- Clutch spring compressor
- Inner bearing puller
- Bearing driver
- Clutch nut wrench 39 x 41 mm
- Universal holder

TROUBLE DIAGNOSIS

Engine can be started but motorcycle can not be moved

1. Worn driving Belt
2. Worn drive face
3. Worn or damaged clutch weight
4. Broken driven pulley

Shudder or misfire when driving

1. Broken clutch weight
2. Worn clutch weight

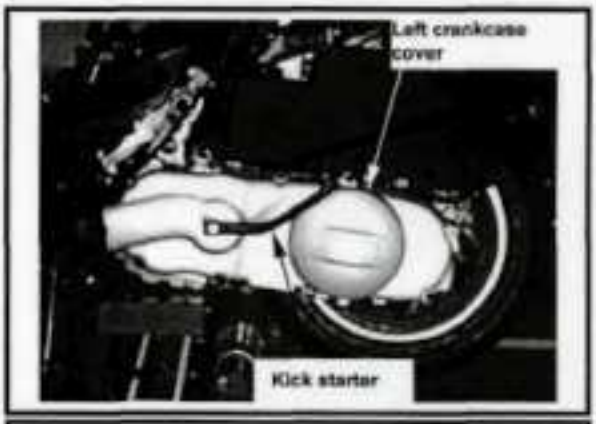
Insufficient horsepower or poor high speed performance

1. Worn driving belt
2. Insufficient spring force of driven pulley
3. Worn roller
4. Driven pulley operation un-smoothly

LEFT CRANKCASE COVER

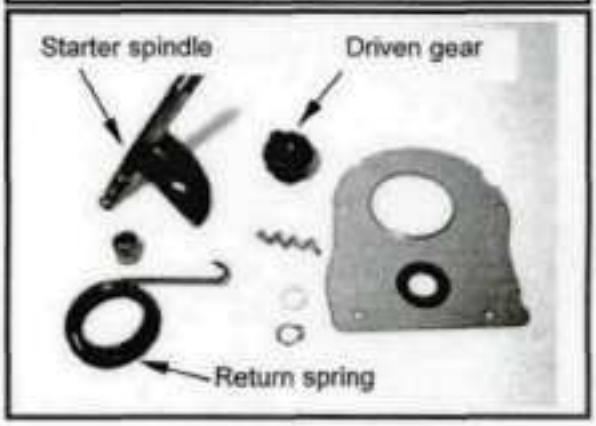
Left crankcase cover removal

Remove body cover.
Remove air cleaner (2 bolts).
Remove kick starter (1 bolt).
Remove L crankcase cover (9 bolts).



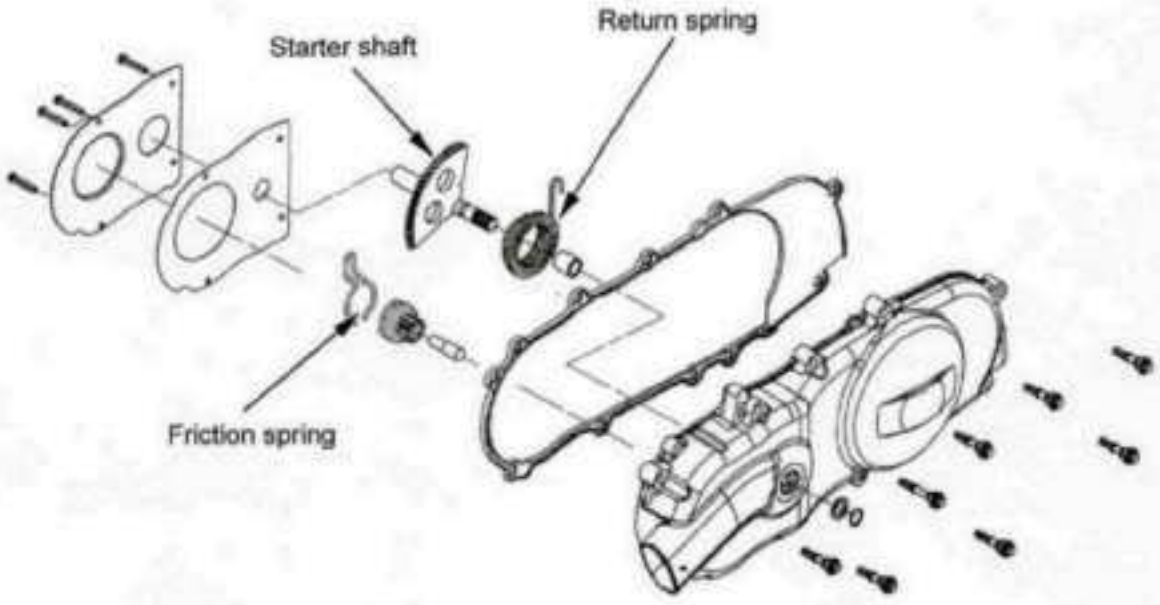
Disassembly of Kick Starter

Remove snap ring and thrust washer from L crankcase cover.
Install kick starter arm, rotate the arm slightly and then remove driven gear and washer.
Remove the kick starter arm, starter spindle, and return spring as well as socket.



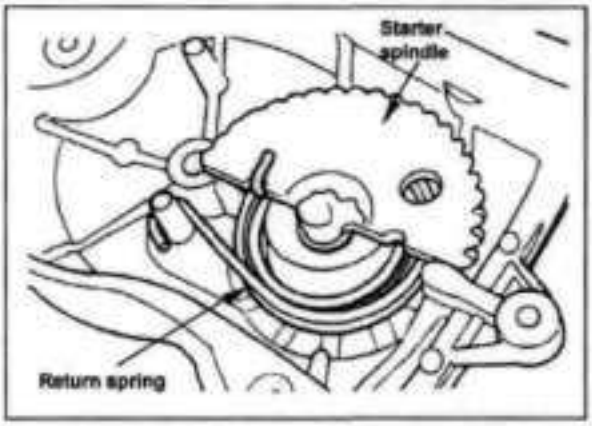
Inspection of Kick Starter

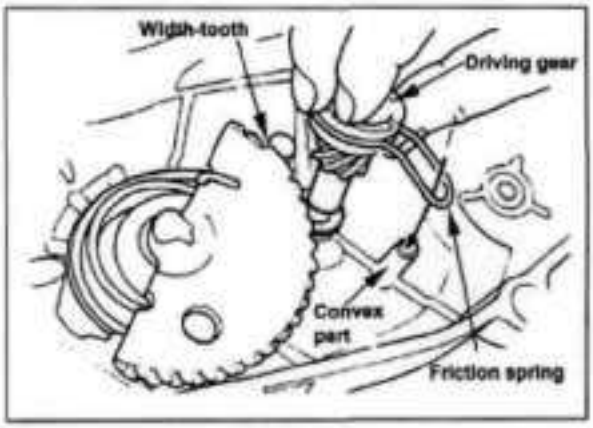
Check if starter spindle, driven gear, socket and bearing hole for wear or damage.



Reassembly of Kick Starter

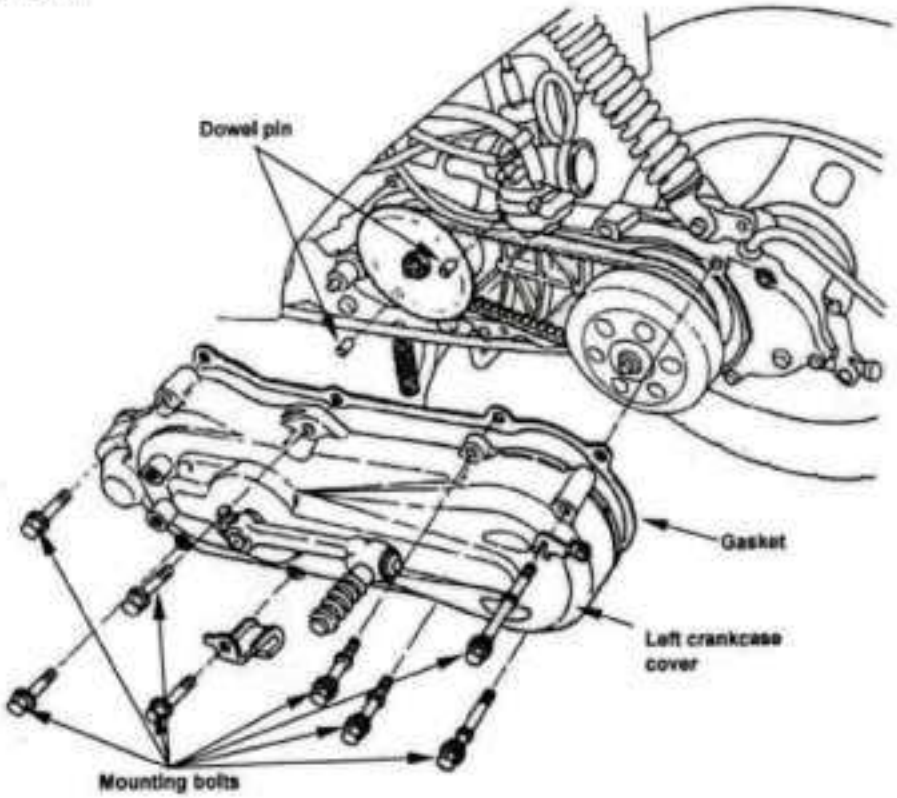
Install socket, return spring and starter spindle as diagram shown.
Install thrust washer and snap ring onto starter spindle.
Install kick starter arm temporary.
Rotate the arm and then align driven gear with width-tooth on the starter spindle.
Install the friction of driving gear onto convex part of the cover.





Installation of the left crankcase cover

Install the left crankcase cover
Install kick starter arm



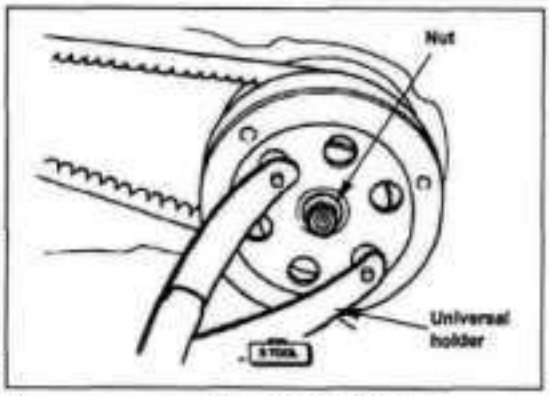
DRIVING BELT

Removal

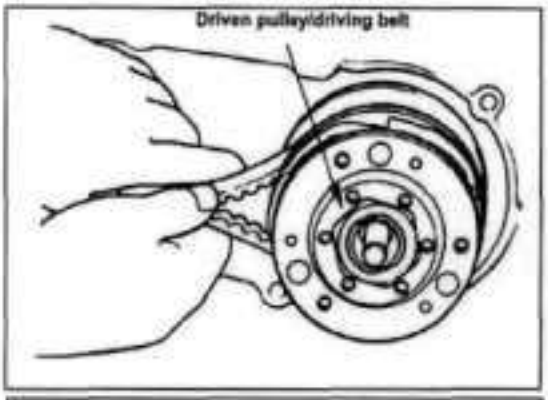
Remove left crankcase cover
Hold clutch outer with universal holder, and remove nut and clutch outer.

⚠ Caution

- Using special service tools for tightening or loosening the nut.
- Fixed rear wheel or rear brake will damage reduction gear system.



Push the driving belt into belt groove as diagram shown so that the belt can be loosened, and then remove the driven pulley.
Remove driven pulley. Do not remove driving belt.
Remove the driving belt from the groove of driven pulley.

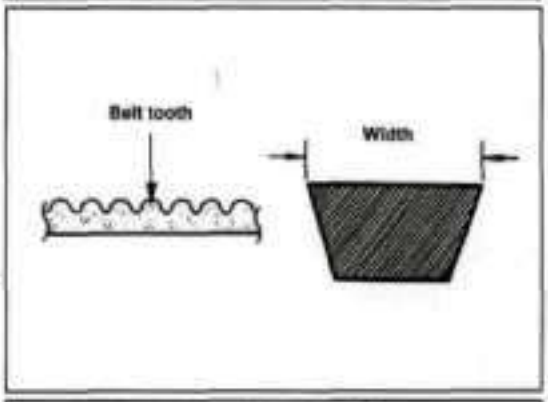


Inspection

Check the driving belt for crack or wear.
Replace it if necessary.
Measure the width of driving belt as diagram shown.
Service Limit: 17.5 mm
Replace the belt if exceeds the service limit.

⚠ Caution

- Using the genuine parts for replacement.
- The surfaces of driving belt or pulley must be free of grease.
- Clean up all grease or dirt before installation.

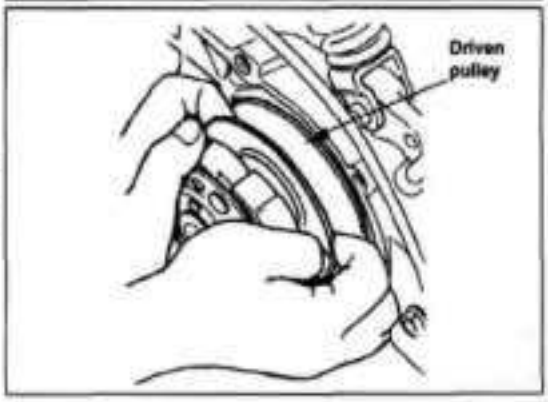


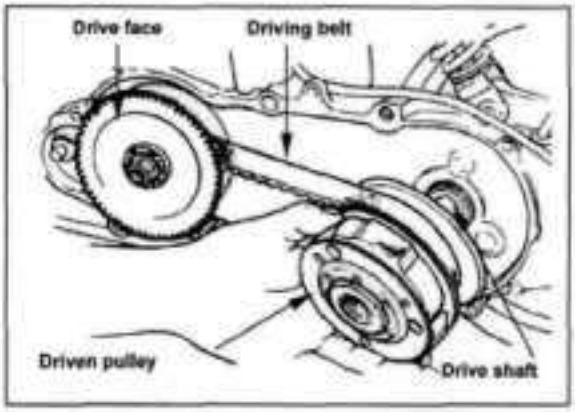
Installation

⚠ Caution

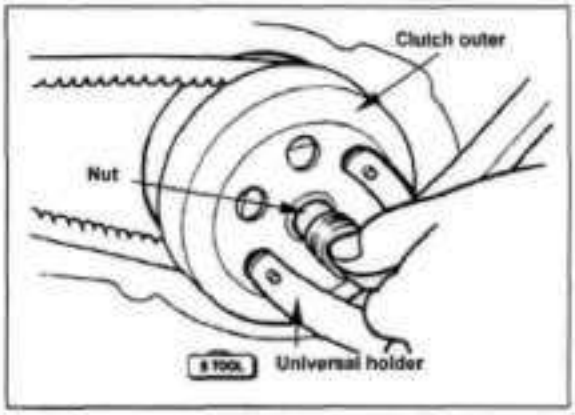
Pull out driven pulley to avoid it closing.

Install driving belt onto driven pulley.
Install the driven pulley that has installed the belt onto drive shaft.





Install the clutch with universal holder, and then tighten nut to specified torque value.
Torque value: 5.0~6.0 kgf-m



DRIVE FACE

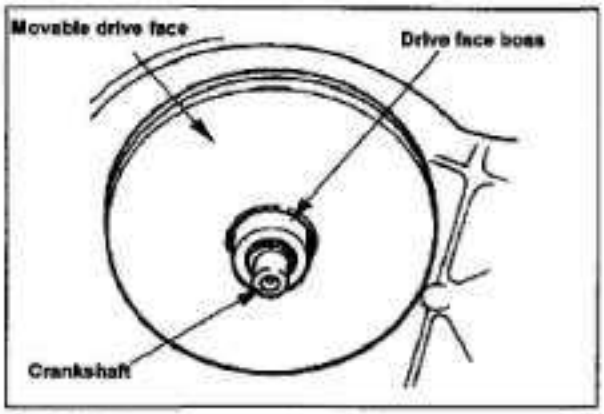
Removal

Remove left crankcase cover.

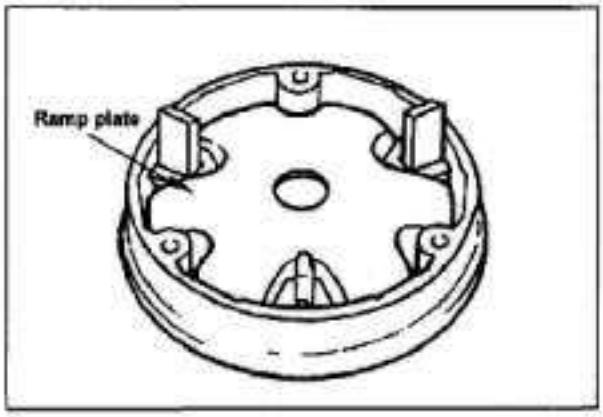
Hold generator flywheel with universal holder, and then remove drive face nut.
Remove drive face.

Removal

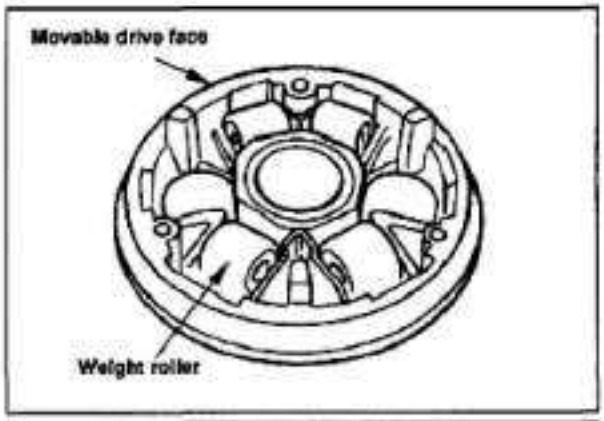
Remove movable drive face comp. and driving belt from crankshaft.



Remove ramp plate.



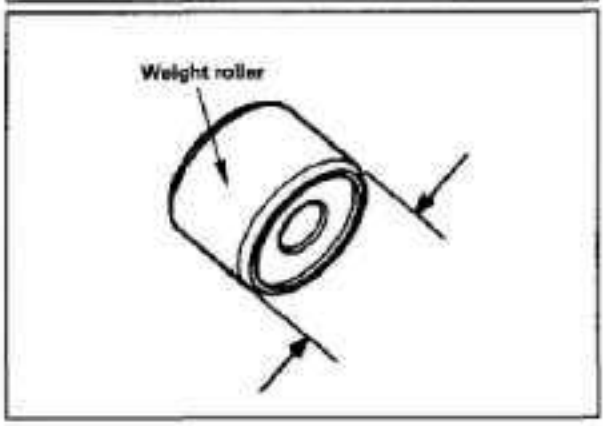
Remove weight rollers from movable drive face.



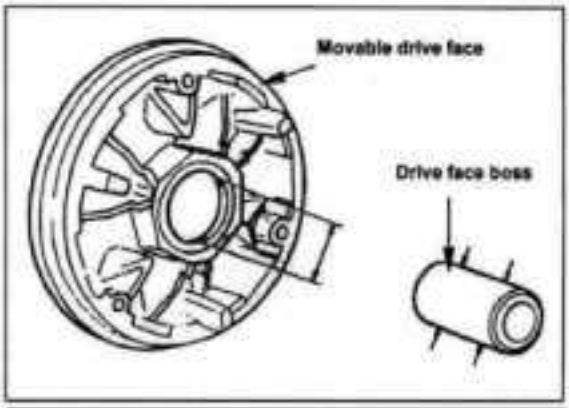
Inspection

The weight rollers are to press movable drive face by means of centrifuge force.
Thus, if weight rollers are worn out or damaged, the centrifuge force will be effected.

Check if rollers are wear out or damage.
Replace it if necessary.
Measure each roller's outer diameter. Replace it if exceed the service limit.
Service limit: 19.50 mm

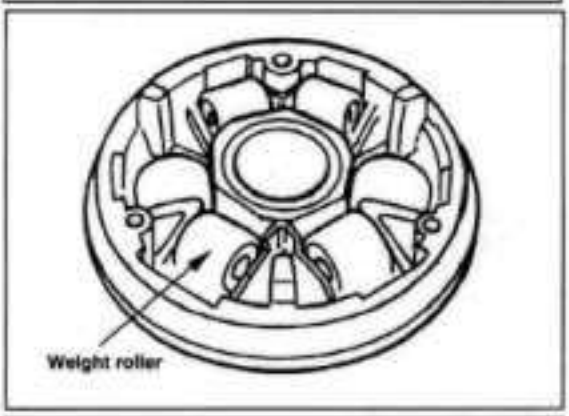


Check if drive face boss is worn or damaged and replace it if necessary.
Measure the outer diameter of movable drive face, and replace it if it exceed service limit.
Service limit: 26.94 mm
Measure the inner diameter of movable drive face, and replace it if it exceed service limit.
Service limit: 27.06 mm

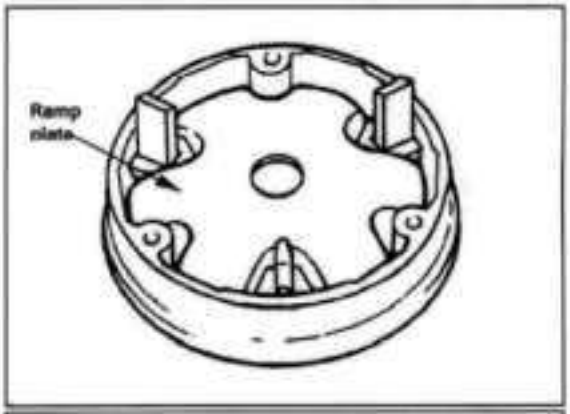


Reassembly/installation

Install weight rollers.

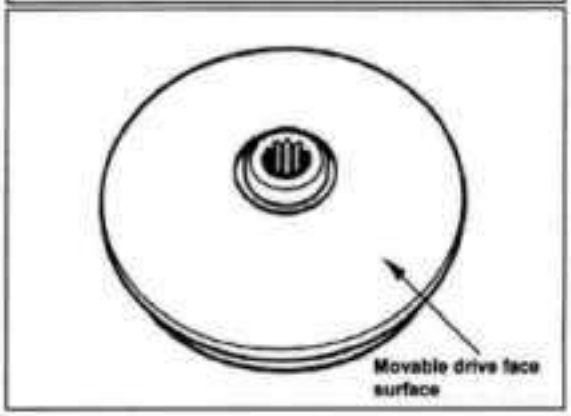


Install ramp plate.

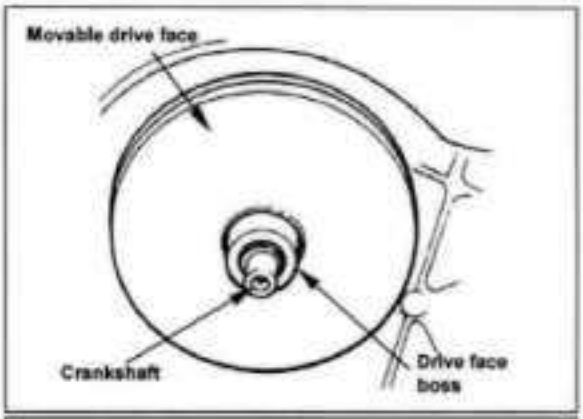


⚠ Caution

The movable drive face surface has to be free of grease. Clean it with cleaning solvent.

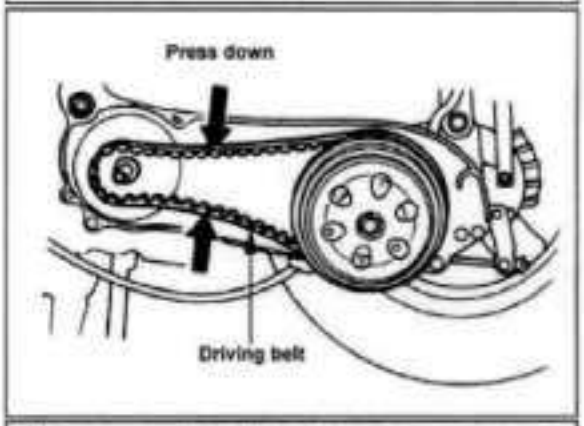


Install movable drive face comp. onto crankshaft.



Driven pulley installation

Press driving belt into pulley groove, and then pull the belt onto drive shaft.



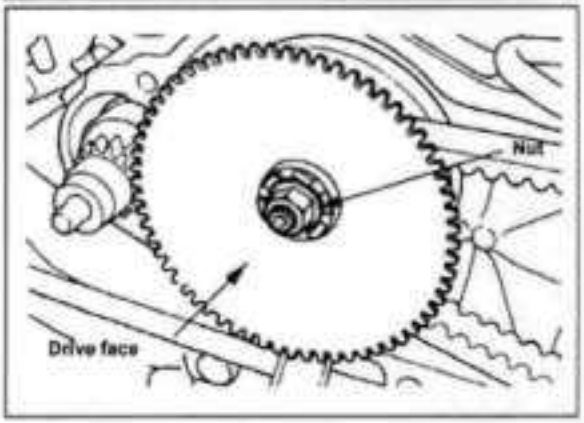
Install driven pulley, washer and nut.

⚠ Caution

Make sure that two sides of pulley surfaces have to be free of grease. Clean it with cleaning solvent.

Hold crankshaft with universal holder.

Tighten nut to specified torque.
Torque value: 5.0-6.0 kgf-m
Install left crankcase cover.



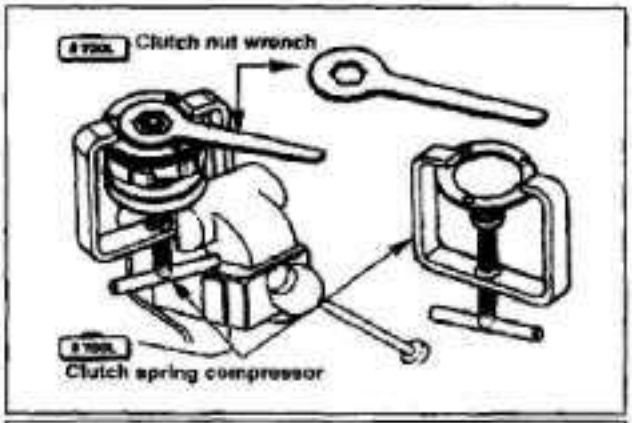
CLUTCH OUTER/DRIVEN PULLEY

Disassembly

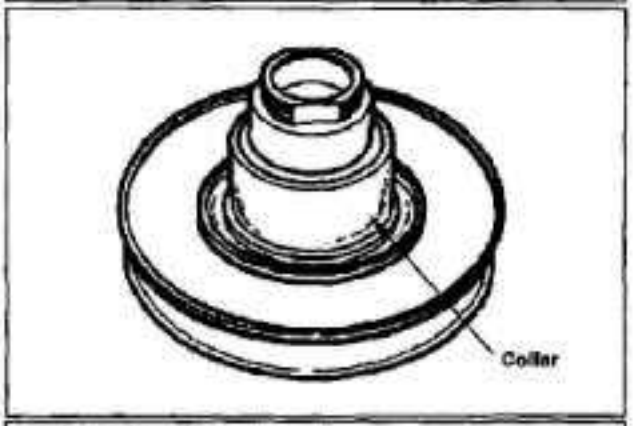
Remove driving belt and clutch outer/driven pulley.
Install clutch spring compressor onto the pulley assembly, and operate the compressor to let the wrench be installed more easily.

⚠ Caution

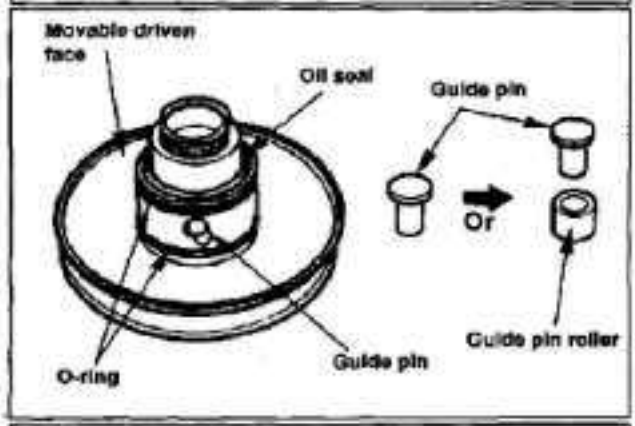
Do not press the compressor too much.



Hold the clutch spring compressor onto bench vise, and then remove mounting nut with special service tool.
Release the clutch spring compressor and remove clutch weight and spring from driven pulley.
Remove collar from driven pulley.



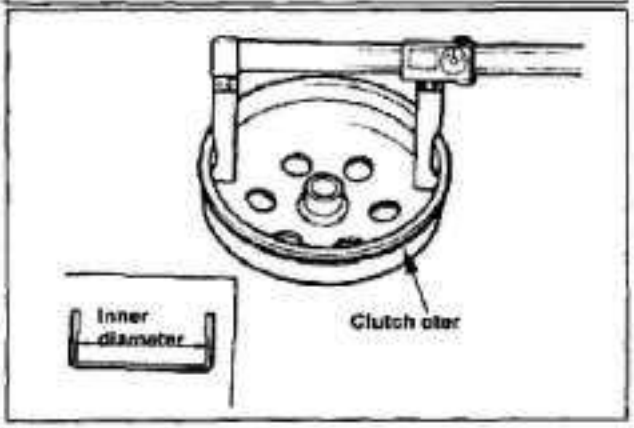
Remove guide pin, guide pin roller, and movable driven face, and then remove O-ring & oil seal seat from movable driven face.



Inspection

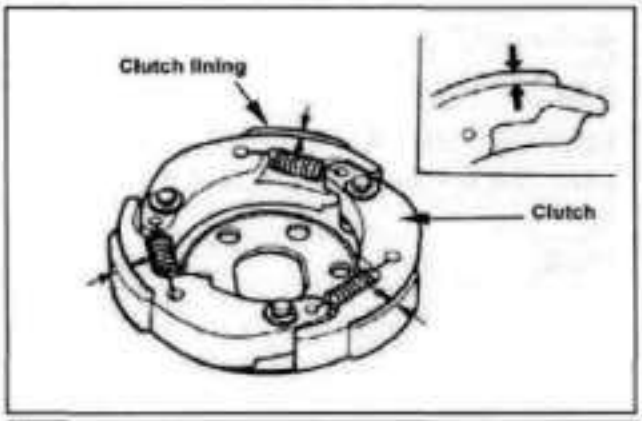
Clutch outer

Measure the inner diameter of clutch outer.
Replace the clutch outer if exceed service limit.
Service limit: 130.5 mm



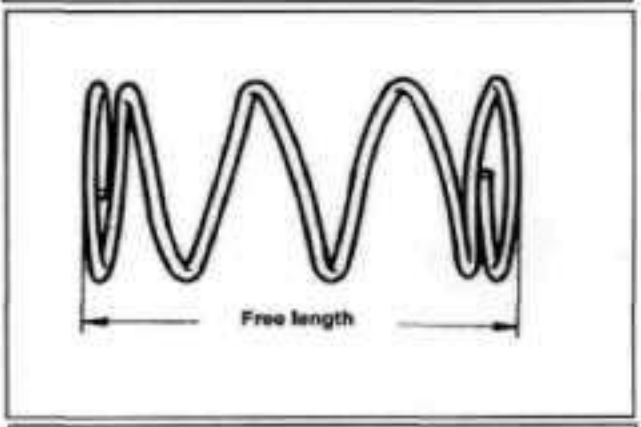
Clutch lining

Measure each clutch weight thickness.
Replace it if exceeds service limit.
Service limit: 2.0 mm



Driven pulley spring

Measure the length of driven pulley spring.
Replace it if exceeds service limit.
Service limit: 83.2 mm

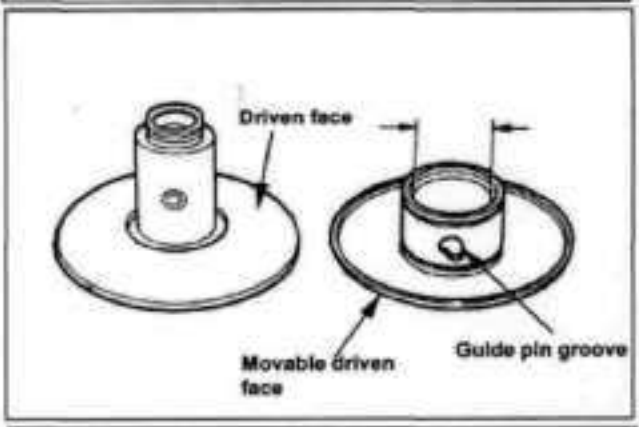


Driven pulley

Check following items:

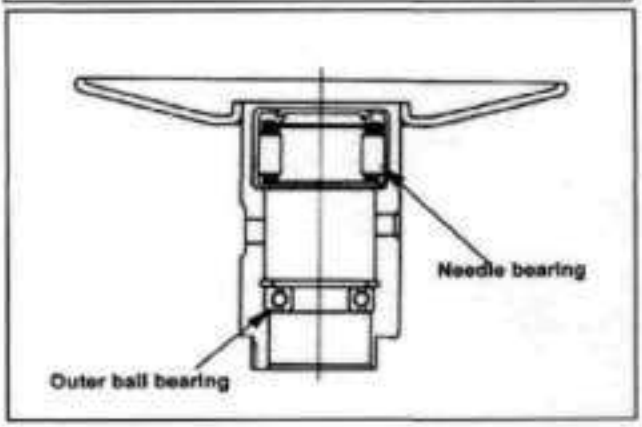
- If both surfaces are damaged or worn.
- If guide pin groove is damaged or worn.

Replace damaged or worn components.
Measure the outer diameter of driven face and the inner diameter of movable driven face.
Replace it if exceeds service limit.
Service limit: Outer diameter 33.94 mm
Inner diameter 34.06 mm



Driven Pulley Bearing Inspection

Check if the inner bearing oil seal is damage.
Replace it if necessary.
Check if needle bearing is damage or too big clearance. Replace it if necessary.
Rotate the inside of inner bearing with fingers to check if the bearing rotation is in smooth and silent. Check if the bearing outer parts are closed and fixed. Replace it if necessary.

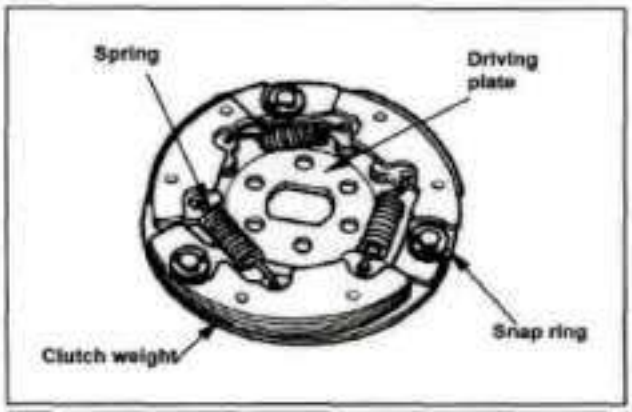


Clutch weight Replacement

Remove snap and washer, and then remove clutch weight and spring from driving plate.

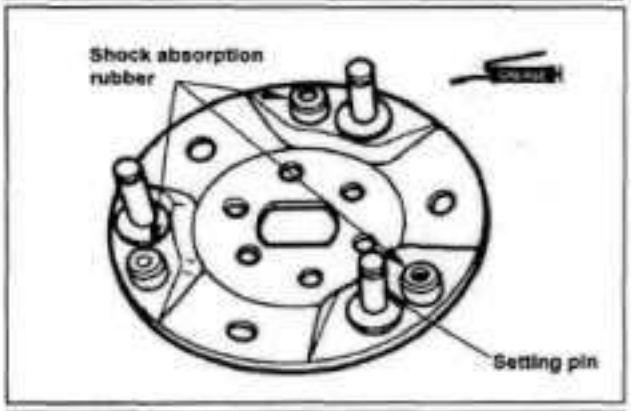
⚠ Caution

Some of models are equipped with one mounting plate instead of 3 snap rings.



Check if spring is damage or insufficient elasticity.

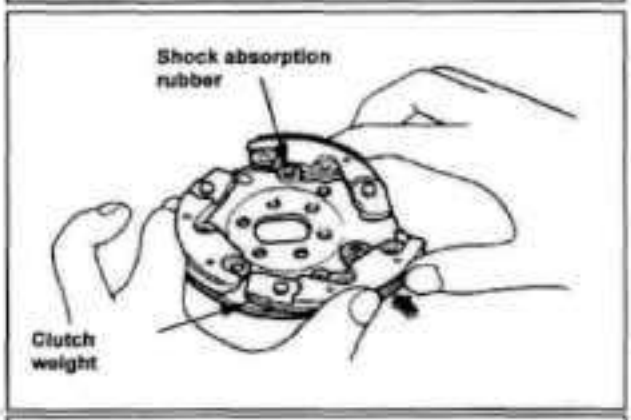
Check if shock absorption rubber is damage or deformation. Replace it if necessary.
Apply with grease onto setting pins.



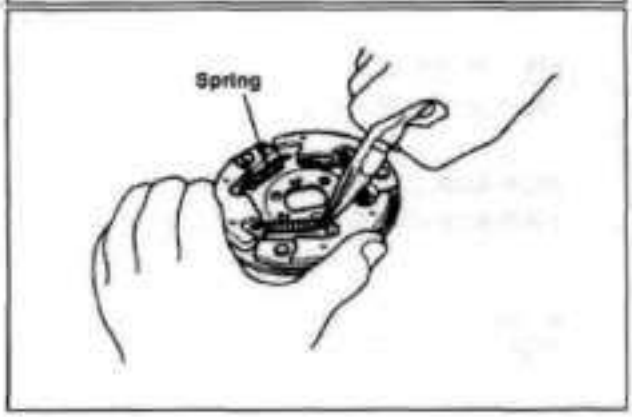
Install new clutch weight onto setting pin and then push to the specified location.
Apply with grease onto setting pins. But, the clutch block should not be greased. If so, replace it.

⚠ Caution

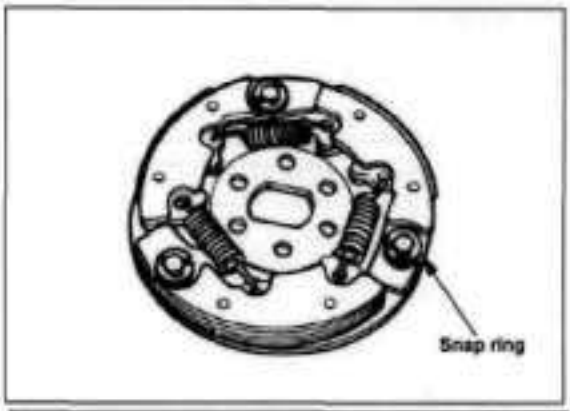
Grease or lubricant will damage the clutch weight and effect the block's connection capacity.



Install the spring into groove with pliers.



Install snap ring and mounting plate onto setting pin.

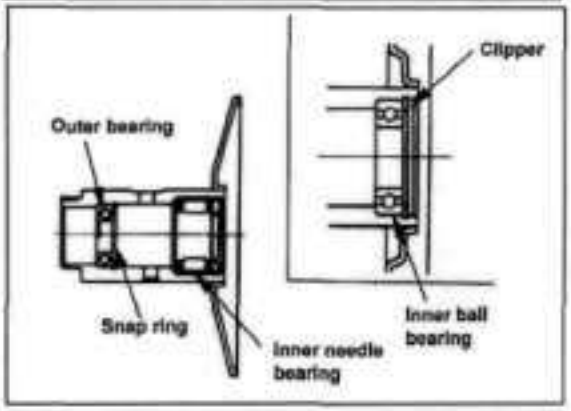


Replacement of Driven Pulley Bearing

Remove inner bearing.

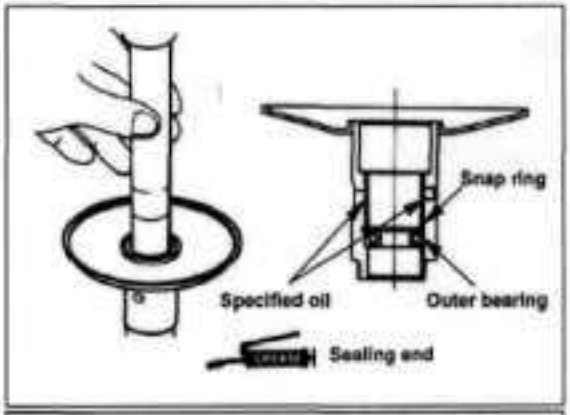
⚠ Caution

- If the inner bearing equipped with oil seal on side in the driven pulley, then remove the oil seal firstly.
- If the pulley equipped with ball bearing, it has to remove snap ring and then the bearing.



Remove snap ring and then push bearing forward to other side of inner bearing.

Place new bearing onto proper position and its sealing end should be forwarded to outside. Apply with specified oil.

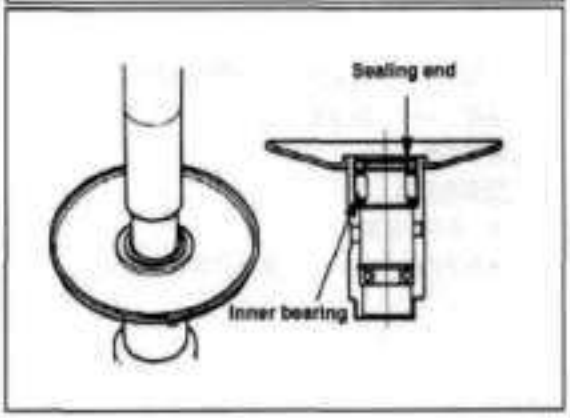


Install new inner bearing.

⚠ Caution

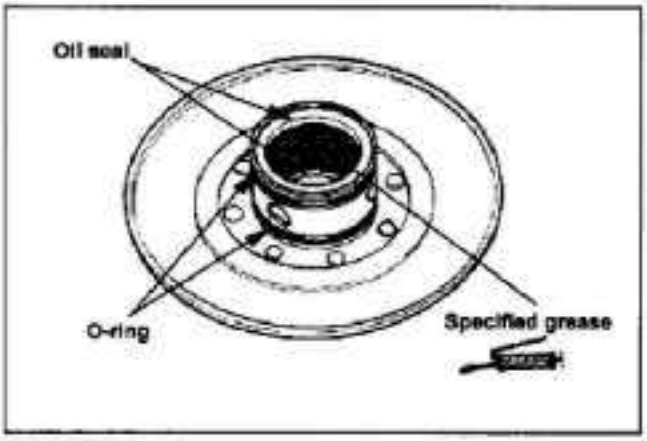
- Its sealing end should be forwarded to outside as bearing installation.
- Install needle bearing with hydraulic presser. Install ball bearing by means of hydraulic presser.

Install snap ring into the groove of driving face. Align oil seal lip with bearing, and then install the new oil seal (if necessary).

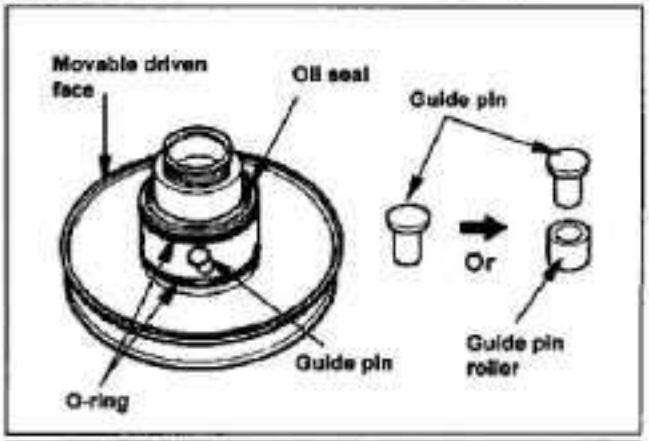


Installation of Clutch OUTER/Driven Pulley Assembly

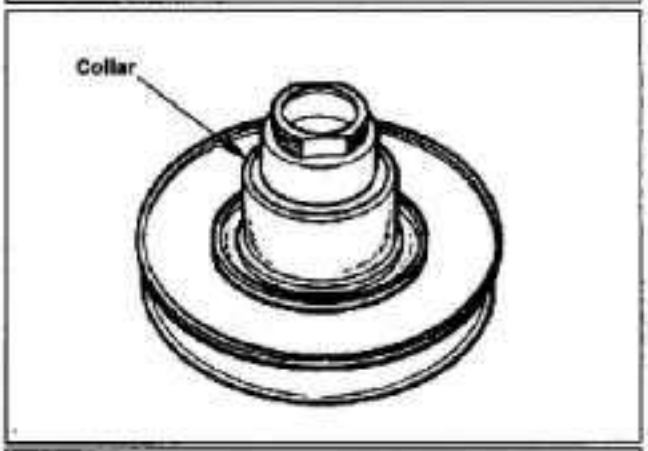
Install new oil seal and O-ring onto movable driven face.
Apply with specified grease to lubricate the inside of movable driven face..



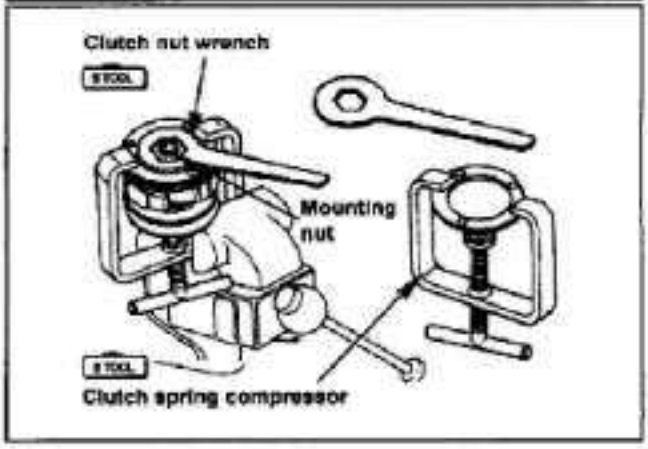
Install the movable driven face onto driven face.
Install the guide pin and guide pin roller.



Install the collar.

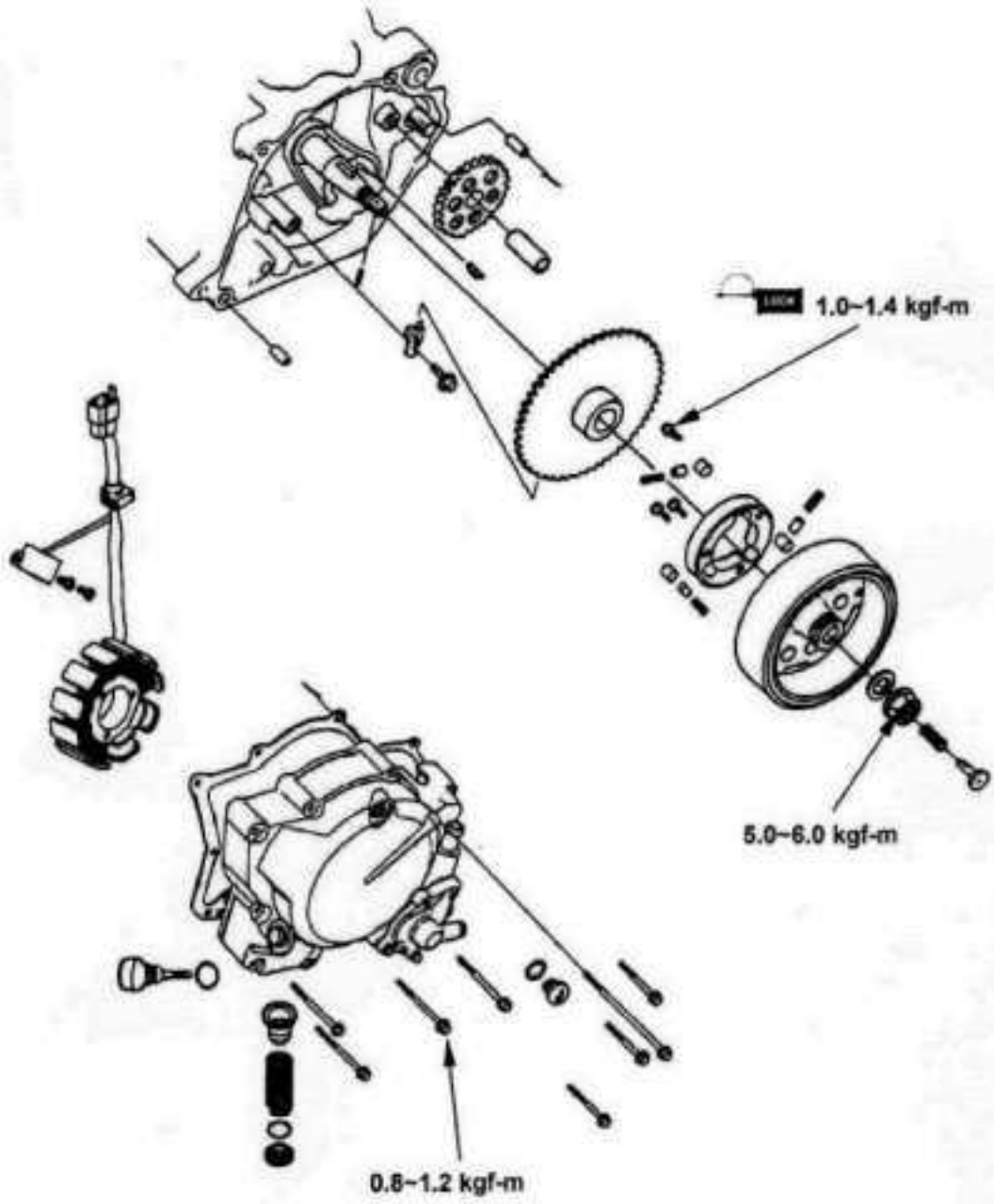


Install driving belt, spring and clutch weight COMP. into clutch spring compressor, and press down the assembly by turning manual lever until mounting nut that can be installed.
Hold the compressor by bench vise and tighten the mounting nut to specified torque with clutch nut wrench.
Remove the clutch spring compressor.
Torque value: 5.0~6.0 kg-m
Install clutch outer/driven pulley and driving belt onto driving shaft.



ALTERNATOR/STARTING CLUTCH

Precautions in Operation	Starting Clutch
Right Crankcase Cover Removal	Flywheel Installation
A.C.G. Set Removal	A.C.G. Set Installation
Flywheel Removal	Right Crankcase Installation



ALTERNATOR/STARTING CLUTCH

Precautions in Operation

General Information

- Refer to chapter 5: Engine removal and installation
- Refer to chapter 16: The troubleshooting and inspection of alternator
- Refer to chapter 16: The service procedures and precaution items of starter motor

Specification

Item	Standard value (mm)	Limit (mm)
ID of starting clutch gear	20.026~20.045	20.100
OD of starting clutch gear	42.175~42.200	42.100

Torque value

Flywheel nut	5.0~6.0 kgf-m
Starting clutch hexagon bolt	1.0~1.4 kgf-m with adhesive
8 mm bolts	0.8~1.2 kgf-m
12 mm bolts	1.0~1.4 kgf-m

Tools

Special tools

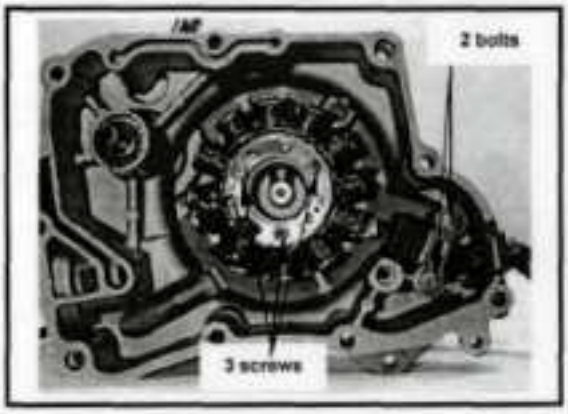
A.C.G. flywheel puller
Universal holder

Right Crankcase Cover Removal

Remove 7 bolts from the right crankcase cover.
Remove the right crankcase cover.
Remove dowel pin and gasket.

A.C.G. Set Removal

Remove 2 mounted bolts from pulse generator and then remove it.
Remove 3 screws from right crankcase cover and A.C.G. set.



Flywheel Removal

Remove oil through from crankshaft.

Remove the pin from crankshaft.

Hold flywheel with flywheel holder, and then remove flywheel nut.
Tool:
Multi-functional holder

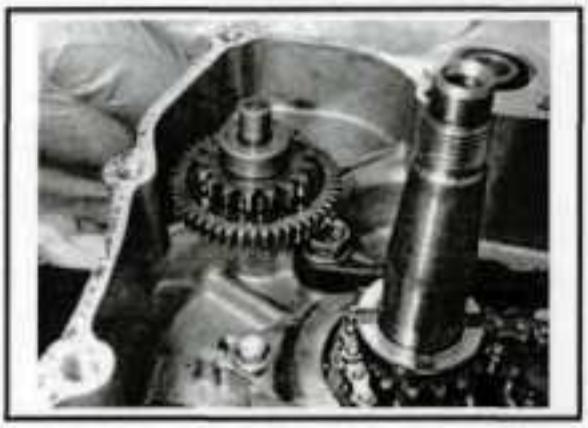
Pull out flywheel with A.C.G. flywheel puller.
Tool:
A.C.G. Flywheel puller

Starting Clutch

Removal

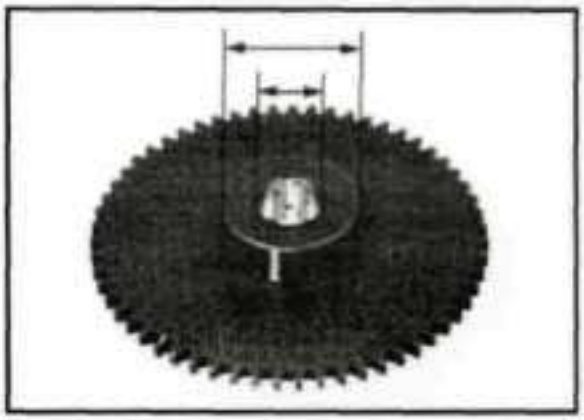
Remove starting driven gear.

Remove mounting plate, starter reduction gear, and the shaft.



Starting Clutch Inspection

Check the starting clutch gear for wear or damage.
Measure the ID and OD of the starting clutch gear.
Service Limit:
ID: 20.1 mm
OD: 42.10 mm

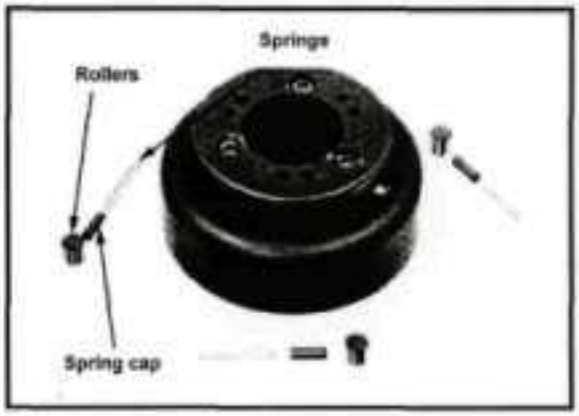


Check the starting reduction gear and shaft for wear or damage.

Install one way clutch onto starting clutch gear.
Hold flywheel and rotate starting clutch gear.
The starting clutch gear should be rotated in C.C.W direction freely, but not C.W direction.
(View as shown in this figure.)

Disassembly
Remove 3 hexagon bolts with air and hex socket wrenches.

Remove the rollers, spring caps, and springs of clutch on the one way clutch that located on the back of flywheel.
Check each roller and plug for wear or damage.
Install rollers, plugs and springs.



Installation

Install the components in the reverse procedures of removal.

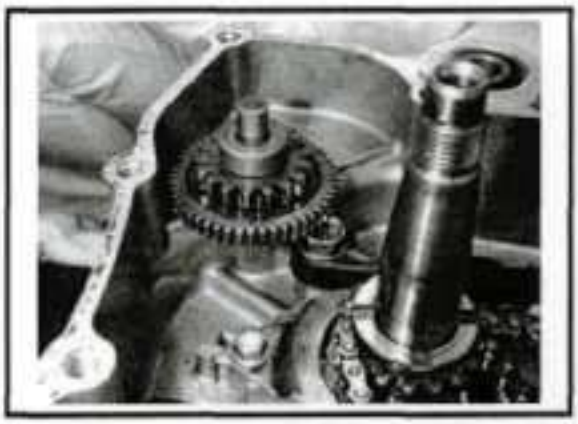
⚠ Caution

Tape a tightening tape onto the thread of hexagon bolt.

Torque value: 1.0~1.4 kg-m

Installation

Install reduction gear shaft and reduction gear.



Install starting clutch gear onto crankshaft.

Flywheel Installation

Insert the pin onto crankshaft.
Make sure that there is no other material stock on it. If so, clean it up.
Align the key on crankshaft with the flywheel groove, and then install the flywheel.
Hold the flywheel with flywheel holder, and tighten its nut.

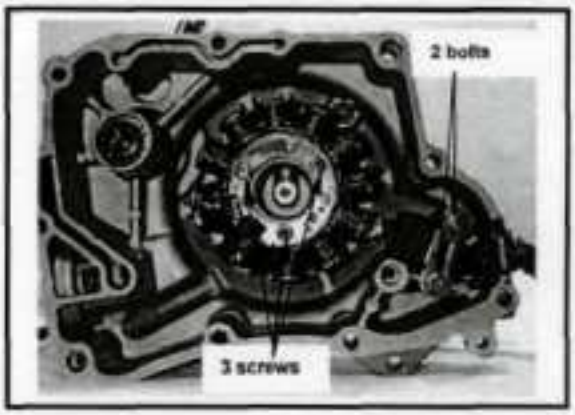
Torque value: 5.0~6.0 kg-m
Tool:
Flywheel holder
Install spring and oil through.

A.C.G. Set Installation

Install the A.C.G. set onto right crankcase cover (3 screws).
Install pulse generator (2 screws).
Tie the wire harness securely onto the indent of crankcase.

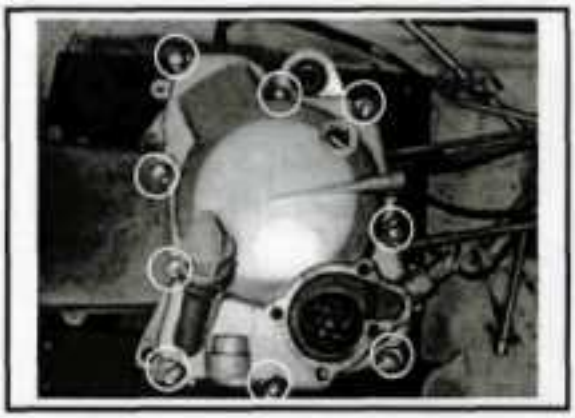
⚠ Caution

Make sure that the wire harness is placed under pulse generator.

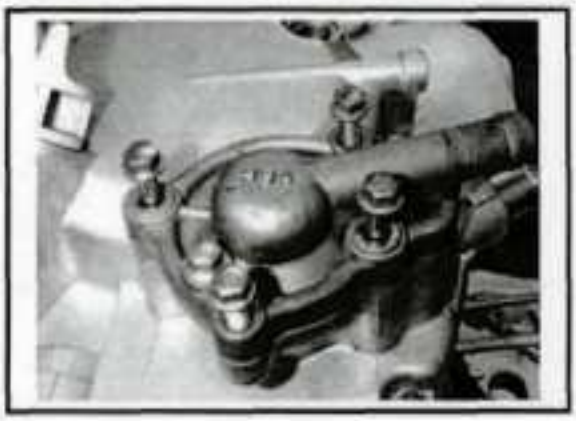


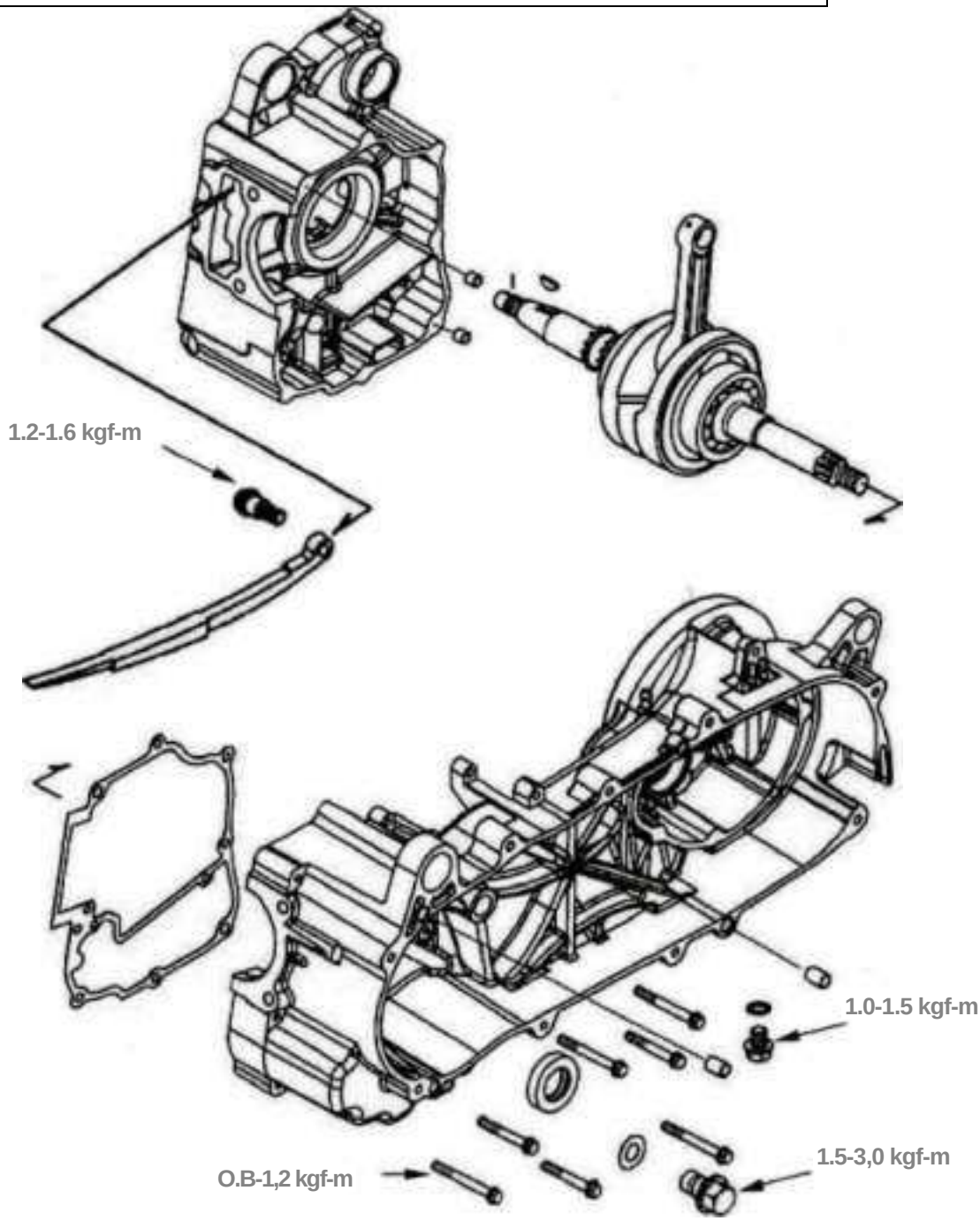
Right Crankcase Cover Installation

Install dowel pin and new gasket.
Install right crankcase cover onto the crankcase. Note that align the water pump shaft indent with the oil pump shaft.
Install right crankcase cover (9 screws).



Connect water hose to the right crankcase cover.
Install the water pump cover onto crankcase cover.





General information

Operational precautions

- This Section concerns disassembly of the crankcase for repair purpose.
- Remove following components before disassembling crankcase.

—Engine	Section 5
—Cylinder head	Section 6
—Cylinder and piston	Section 7
—Drive pulley and driven pulley	Section 8
—AC generator/Start driven gear	Section 10
—Starting motor	Section 16

- In case it requires replacing the crankshaft bearing, the driving chain of engine oil pump or the timing chain, it is preferably to replace crankshaft as a unit.

Service data

Unit: mm

	Item	Standard	Limit
Crankshaft	Connecting rod side clearance of the big end	0.100~0.400	0.600
	Vertical clearance of the big end of the connecting rod	0~0.008	0.050
	Run-out	-	0.100

Torque value

Bolts for crankcase	0.8~1.2kgf-m
Bolts for cam chain adjuster	1.2~1.6kgf-m

Tools

Special tools

R/L. crank disassemble/ install tool
L. crank shaft bearing driver
Crank shaft bearing fixing socket
Crank shaft puller
Outer bearing puller
Inner bearing puller

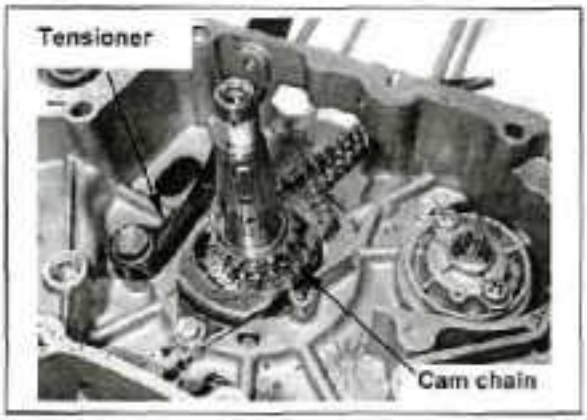
Trouble diagnosis

Engine noise

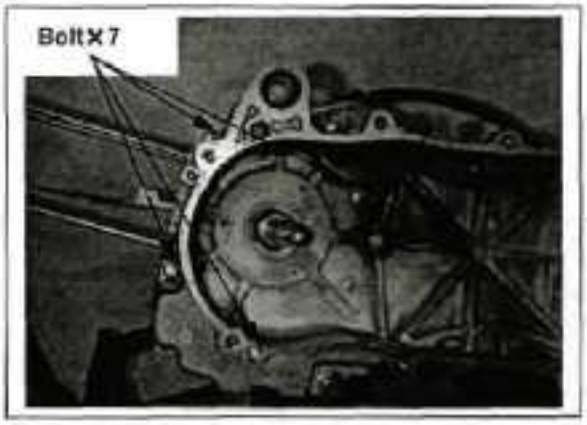
- Loose crankshaft bearing
- Loose crankshaft pin bearing
- Worn out piston pin and pin hole

Disassembly of crankcase

Remove the cam chain.
Loosen the bolt and remove the tensioner.



Loosen seven bolts on the crankcase.

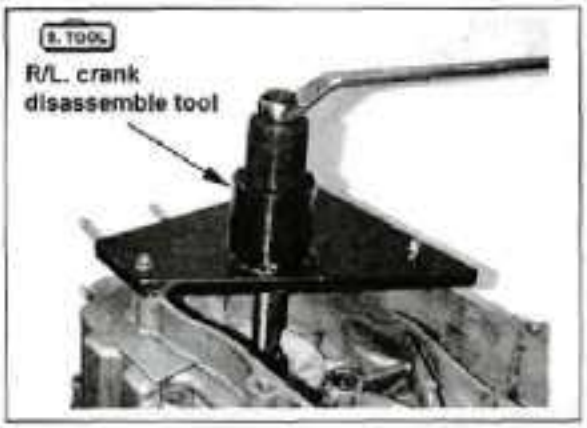


Place right crankshaft case downward and lift up crankcase.

⚠ Caution

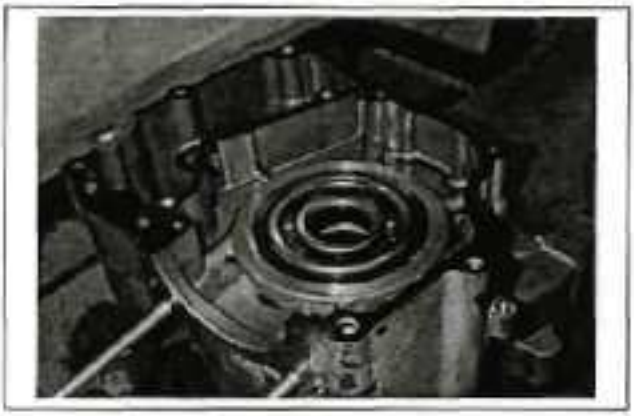
- Care should be taken not to damage the contact surfaces.

Refer to chapter 18: Special tools
Special tool : R/L. crank case disassemble/install tool SYM-1120000-H9A



Remove crankshaft from right crankcase.

Remove gasket and dowel pins.



Scrape gasket residues off the crankcase contact surface.

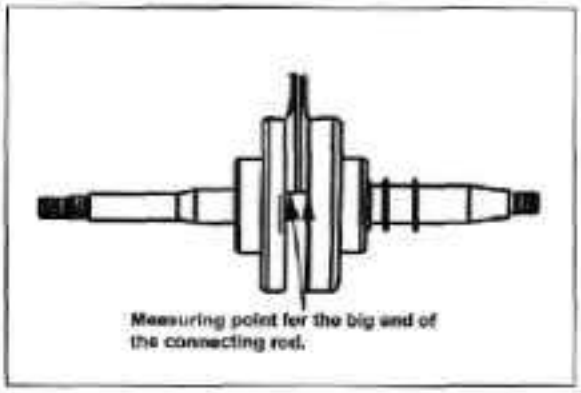
⚠ Caution

- Do not damage contact surface of the gasket.
- It is better to moisten the gasket residue for easy scrapping.

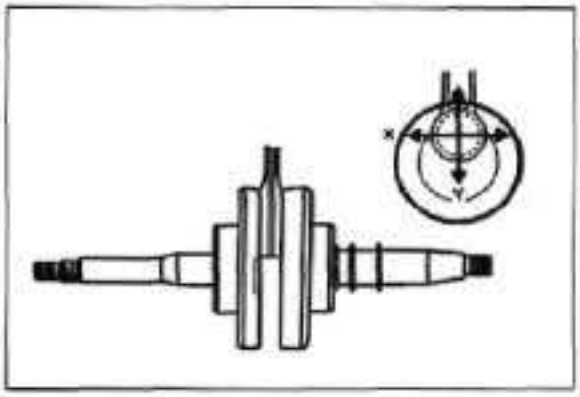
Check any damage in oil seal.
Replace with new one if damaged.

Crankshaft

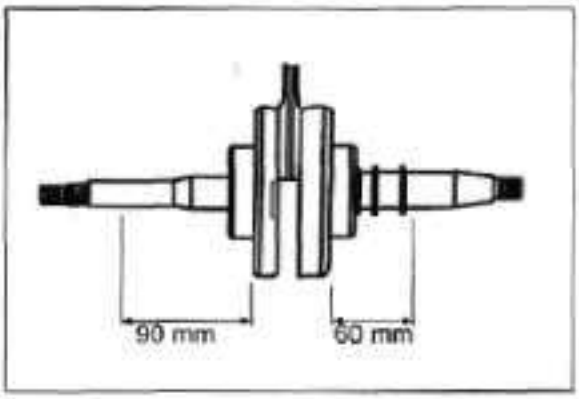
Use a thickness gauge to measure left and right clearance of connecting rod big end.
Service limit: 0.6 mm


Measuring point for the big end of the connecting rod.

Measure the clearance of the big end at the vertical directions.
Service limit: 0.05 mm



Place the crankshaft on a V-block, measure run-out of the crankshaft.
Service limit: 0.10 mm

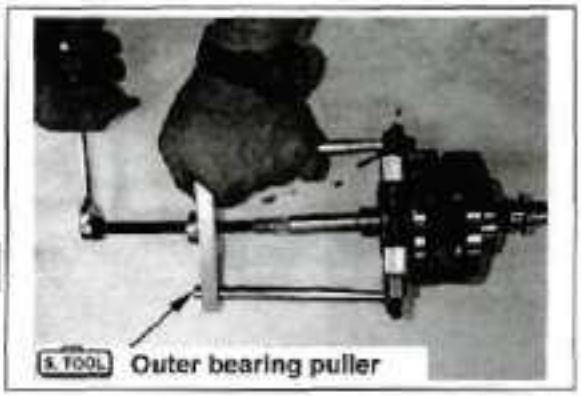


Checking crankshaft bearing.
Use hand to crank the bearing to see it moves freely, smoothly and noiseless.
Check the inner ring to see it links firmly on the bearing.
If any roughness, noise and loose linkage are detected, replace the bearing with new one.

⚠ Caution

- The bearing shall be replaced in pair.

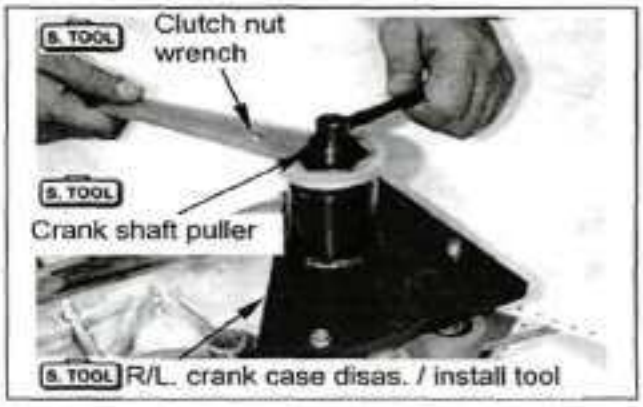
Special tool : outer bearing puller
SYM-6204010


S. TOOL Outer bearing puller

Assembly of crankcase

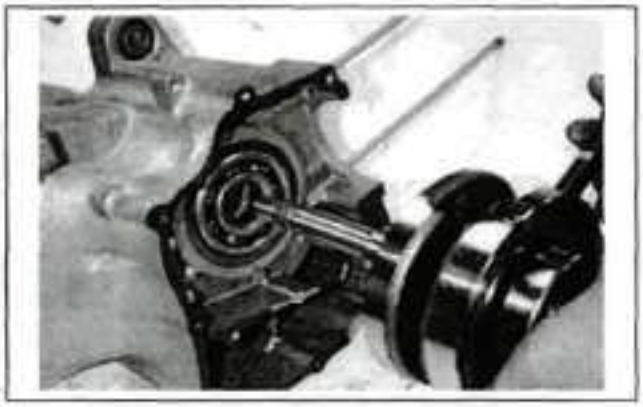
Install a new bearing onto the left crankcase.

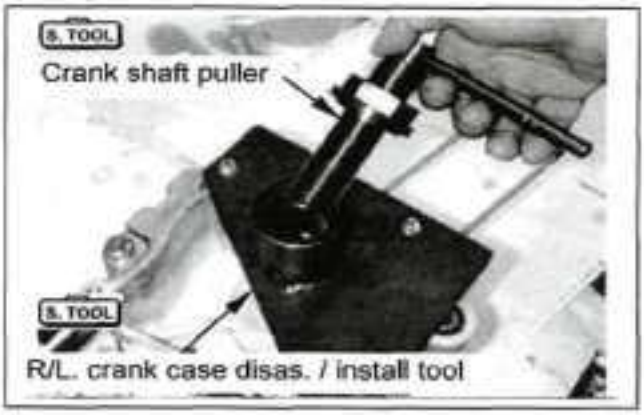
Special tool : left crank shaft bearing driver
SYM-9100200-H9A
R/L. crank case disassemble/install tool
SYM-1120000-H9A
Crank shaft puller
SYM-11130000-H9A
Clutch nut wrench
SYM-9020200

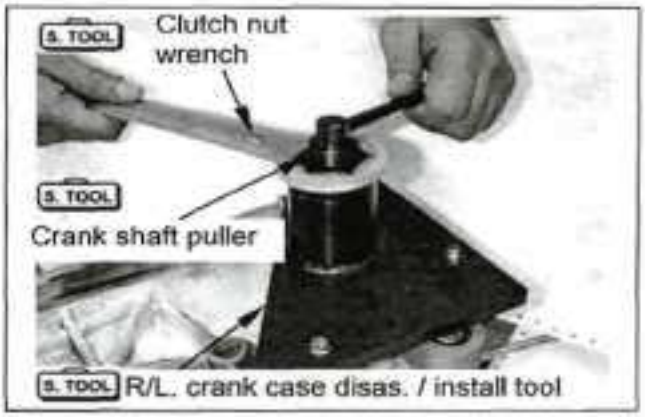


Install crank shaft onto the left crankcase.

Special tool : R/L. crank case disassemble/install tool
SYM-1120000-H9A
Crank shaft puller
SYM-11130000-H9A
Crank shaft bearing fixing scoket
SYM-9100210
Clutch nut wrench
SYM-9020200



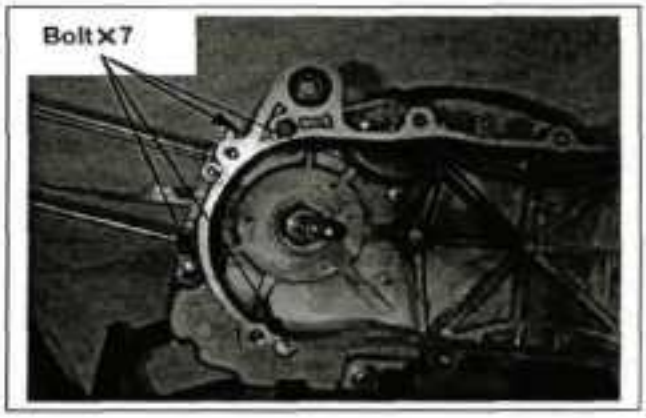




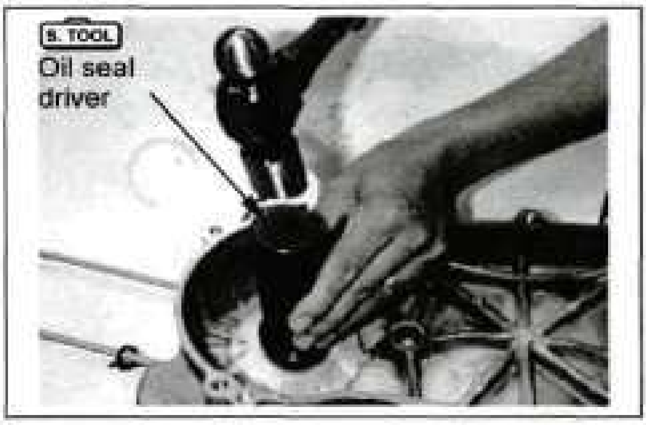
Install new dowel pin and new gasket.

Install the right crankcase onto the left crankcase.

Tighten seven bolts on the crankcase.
Torque value: 0.8~1.2 kgf-m

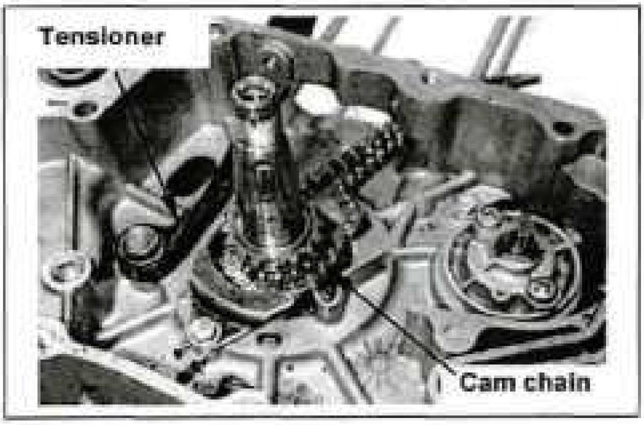


Install the new oil seal.
Apply a layer of grease on the lip of oil seal.
Clean the crankshaft with clean solvent.
Special tool :
Oil seal driver (25*40*8)
SYM-9121600



Install the oil seal in the left crankcase with care not to damage the lip of the oil seal.

Install the tensioner and tighten the bolts.
Torque value: 1.2 ~1.6 kgf-m
Install the cam chain.



4-3 REMOVAL AND INSPECTION OF ELECTRIC ITEMS 4-

3-1 Operating Cautions & Troubleshooting

Operating Cautions:

1. Warning:
   a. The liquid in the battery is diluted sulfuric acid that is dangerous. If, your skin or eye unfortunately get contact with it, please wash with water abundantly and consult immediately a doctor, lest you should lose vision.
   b. If your clothes is touched by the electrolyte, your skin would also be touched. Therefore you should get it off and wash with water abundantly.

2. Check if electrolyte in the battery is sufficient. If not, add distilled water till the liquid level reach the upper limit line.

3. The battery is rechargeable after discharging. If it is unused after discharge, it may deteriorate and shorten service life. It will become less efficient. After usage of 2~3 years, battery capacity will decrease. It can be regained by recharging several times.

4. When there is other loads while igniting, if the voltage will rise again after an abrupt falling, it is normal.

5. If a battery is unused during a long time, its energy storage will decrease by its auto-discharge. Therefore, a recharging is necessary around every 3 months.

6. To charge a battery, it shall be removed from the car and its filler plugs removed. To put the charging current 'ON' or 'OFF', you must operate at the charger's switch. You shall not connect or pull off directly on the battery because electric spark may provoke hydrogen explosion.

7. During battery charging, hydrogen (H_2) is produced. It is an inflammable gas. Fire must be forbidden. 8. At recharging a battery, the temperature of electrolyte shall be lower than 45℃.

9. To test if a battery is fully charged, please use a voltmeter. Never use 'Spark method'.

10. When there is current in an electrical installation, please do not pull off a contact then connect it again, because resulting over voltage may damage electronic parts in the commuter. Therefore, this operation must be done after the main switch is put "OFF".

11 .If fresh electrolyte is poured in a new battery, a voltage will be generated after a certain lapse of time. If the voltage is not sufficient, then a recharging is necessary. A recharged new battery has necessarily a longer lifetime.

12.The C.D.I of the ignition system shall not fall swinging and be shocked. It is a cause of frequent breakdown. Therefore, a special precaution is necessary in its dismounting and remounting.

13.Bad contact between plug and jack causes often the breakdown of the ignition system. Therefore, before undertaking repair, the contact is to be checked at first.

14.Spark plugs of a suitable heat value and gap are to be used. Otherwise, engine will not work smoothly or break.

Troubleshooting:

Battery Recharging System: No voltage:

1. Battery cable fallen or disconnected.
2. Fuse fused.
3. Defective of flywheel magneto.
4. Excessive battery discharging:
    a. Electrolyte leaked.
    b. Chemical reaction in battery.
    c. Short circuit in battery.
    d. Defective rectifier.

Low voltage:

1. Insufficient recharging.
2. Leaking of electrolyte.
3. Defective separator causing short circuit between positive and negative plates.
1. Defective battery terminals.
2. Defective recharging system.
3. Defective rectifier.

Excessive specific weight of electrolyte:

1. Insufficient recharging.
2. Leaking of electrolyte.
3. Reaction between sulfuric acid and pole plates.

Too low capacity:

1. Insufficient recharging.
2. Pole plates react with sulfuric acid.
3. Insufficient electrolyte.
4. Active matter fallen from pole plates because of excessive recharging.

Inefficient recharging system:

1. Bad contact at connectors, short circuitry, or broken circuit.
2. Defective rectifier.
3. Defective of flywheel magneto.
    a. Armature winding short circuited or broken.
    b. Magneto coil short circuited or broken.

Bad electric continuity:

1. Bad contact at battery connection.
2. Ignition system short circuit or bad contact at connectors.
3. Lighting system short circuit or bad contact at connections.

Ignition System: Dysfunctioning
of spark plugs:

1. Defective of flywheel magneto.
2. Defective high-tension coil.
3. Defective C.D.I .
4. Defective spark plugs.
5. Defective conductor contact, breaking, or short circuit, for example:
    a. Conduction between flywheel magneto and C.D.I .
    b. Conduction between C.D.I and the main switch.
    c. Conduction between C.D.I and the high-tension coil.

Engine not running smoothly:

1. Defective ignition first circuit:
    a. Bad contact in circuitry or cable.
    b. Defective of flywheel magneto.
2. Bad ignition secondary circuit.
    (1) The ignition coil insulation defect causing electric leakage.
    (2) Defective magneto coil.
        I. Short circuit between coil layers.
        II. Defective coil.

c. Defective spark plug.
    I. Spark plug covered by carbon.
    II. Electric leakage in ceramic part of spark plug.
d. Electric leakage from spark plug rubber screen.

3. Defective ignition timing.
    a. Defective flywheel magneto.
    b. Defective C.D.I .
    c. Too large gap of spark plug.
    d. Too high electric resistance of spark plug.

Starter System

Starter motor unable to run.

1. Damaged battery.
2. Battery circuit broken, bad contact or too large resistance at connections.
3. Fuse fused.
4. Defective main switch.
5. Defective front and rear brake switches.
6. Defective starter motor switch.
7. Defective starter motor relay.
8. Defective starter motor.
9. Circuitry conductor defective or broken.
10. Starter motor drive pinion locked with the over speed clutch gear.

Weak drive of starter motor:

1. Insufficient recharging of battery.
2. Bad contact on circuit conductors.
3. Strange object introduced in the starter motor pinion.
4. Armature shaft bent.
5. Commutator unclean or worn.
6. Brush worn or spring too weak.
7. Starting motor of relay defective.

4-3-2 BATTERY

A. Cautions in battery inspection and generator charging.

Inspection: Use gravity gauge to measure electrolyte. White is fully charged, yellow means charge is required, and red is broken or almost totally discharged. **Note:** Electrolyte's specific gravity and charge level comparison table (20℃).

Electrolyte Specific Gravity	1.280	1.250	1.220	1.190	1.120
Charge Level	Full	3/4 Charged	1/2 Charged	1/4 Charged	Totally Discharg

B. Charge by generator

Connecting battery and gener terminals by "+" with "+" and "-" with "-". **Warning:** Battery releases explosive gas during charging or use battery. Therefore, it is dangerous to do so in concealed location. Please put battery in good ventilation location during charging, and forbid fire. Note:(1) Standard charging current: 0.6 A for 5~10 hours.

(2) Quick charging current: 6.0 A for 30 minutes.

(3) Please do not use quick charge except for emergency.

(4) Measure the battery voltage 30 minutes after battery is charged. The battery voltage should be higher than 12.8 V.

C. Battery manufactured month and charge time comparison.

anufactue Months	Within 3 mo.	After 3 mo.	6 mo.	10 mo.	Within 1 yr.	Over 1 yr.
Charge Time	Add electrolyte And wait 30 m.	10 hr.	20 hr .	30 hr .	40 hr .	60 hr .

4-3-3 SHORT CIRCUIT TEST

Disassembly:

Disconnect battery negative terminal cable. ■ Measure method: A. Connect megga meter "+" terminal to battery "-" terminal.

B. Connect megga meter "-" terminal to circuit negative cable.

Note: User megga meter "A" current position. ■ Turn main switch to "OFF" position. **Inspection:** Check if there is electrical current. If no current, check the main switch and wire harness for short circuit.

4-3-4 STARTER MOTOR

(1) Please place main stand to park the motorcycle for inspection.

(2) Turn the main switch to "OFF" position before maintenance. Disconnect the battery ground circuit.

To ensure safety, turn the main switch to "ON" position and check if the motor has operated.

Disassembly:

© Remove starter motor cable. © *2* starter motor attaching screws. © *2* motor case attaching bolts. © Starter motor.

Check Starter Commutator **Inspection:**

(1) Check continuity between segments.

Note:A. If continuity is good, then it is normal.

B. If no continuity, then it is broken.

(2) Check continuity between segments and armature shaft.

Note:A. If no continuity, then it is normal.

B. If continuity is good, then it is broken.

(3) Clean the commutators if there is metal powder between segments.

(4) Check the removed parts for damaging, burning (discoloration), and wearing. Replace with a new if necessary.

(5) Check brush length.

Note: A. Initial standard brush length is 112.5 mm.

B. If brush length is smaller than 8.5 mm, please replace with new brush.

Inspection: Check continuity of the brush holder. **Note:** A. If there is no continuity, it is normal.

B.If there is continuity, it is broken.

Please replace with new one. **Installation:** install in reverse order of disassembly procedures.

4-3-5 RESISTOR

Disassembly: Remove front windshield cover. **Measure:** A. Use megga meter's positive terminal to connect resistor wire.
B. Connect the megga meter's negative terminal with frame ground and measure the resistance. **Note:** Resistor standard:

20 W 5.9 Ohm: 5.0~7.0 Ohm. 5W 5.0 Ohm: 4.0~6.0 Ohm.

4-3-6 CDI

Use megga meter to check the following items. A. Exciting Coil Inspection **Disassembly:** The exciting coil connector. **Measure:**

A. Use megga meter's positive terminal to connec t exciting coil's black/red terminal.

B. Connect the megga meter's negative terminal with frame ground and measure the resistance.

B. Pulse Coil Inspection **Disassembly:** The pulse coil connector. **Measure:**

A. Use megga meter's positive terminal to connect pulse coil's blue/yellow terminal.

B. Connect the megga meter's negative terminal with body ground and measure the resistance.

4-4 Removal and Installation of body 4-4-1 Removal and Installation of Seat and Cover

Seat:

© Remove the nuts and pin.

© Seat.

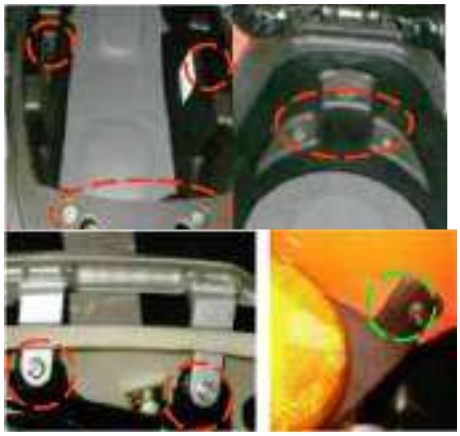
© Remove 6 bolts on the helmet case.

© Helmet case.

Note:

There is a coupler under the helmet case.

And remove it.



Additions of **side** cover:

© Remove the handles.

© Remove the bolts on the side cover.

Leg shield:

© Remove the bolts on the leg shield.

(each side) © leg shield.

Installation:

Install in reverse order of removal procedures.

Front fender:

© Remove the bolts on the front fender.

(each side)

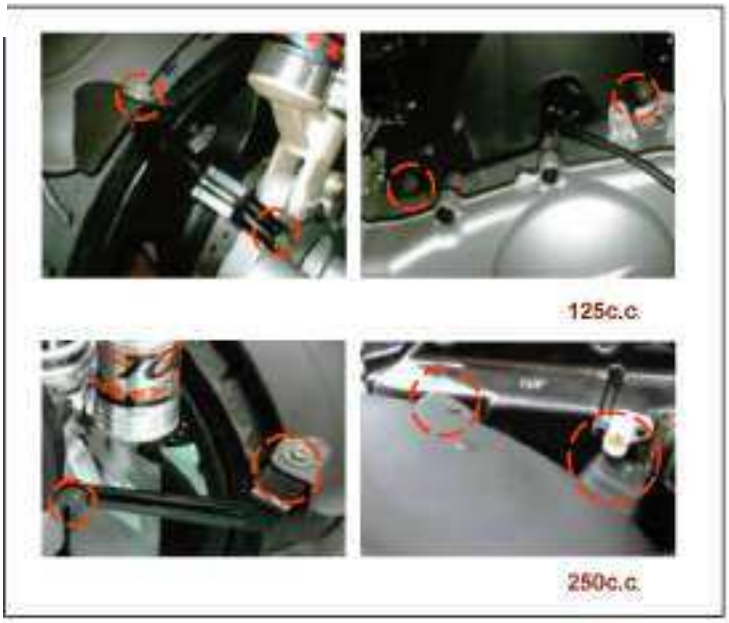
Mud guard:

© Remove the bolts on the mud guard.

(each side)

Installation:

Install in reverse order of removal procedures.



Raer leg shield:

© Remove the bolts on the rearleg shield.

(each side)

Fronnt leg shield cover:

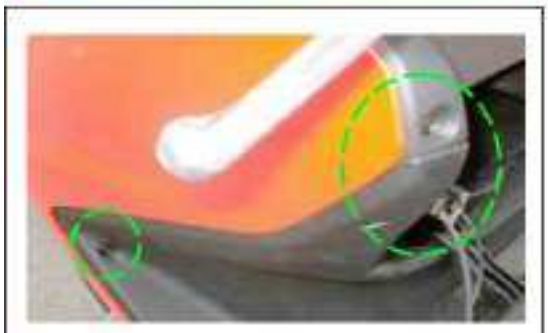
© Remove the nuts and screw on the fronnt leg shield cover.

© Fronnt leg shield cover.

Fronnt leg shield:

© Remove the bolts on the fronnt leg shield. (each side) ©

Fronnt leg shield.



Leg shield cover set:

© Remove the bolts on the leg shield cover set.

Installation:

Install in reverse order of removal procedures.

Wind shield:

© Remove the bolts on the wind shield. (each side) ©

Wind shield.

Front speedometer cover:

© Remove the screws on the Front speedometer cover. (each side)

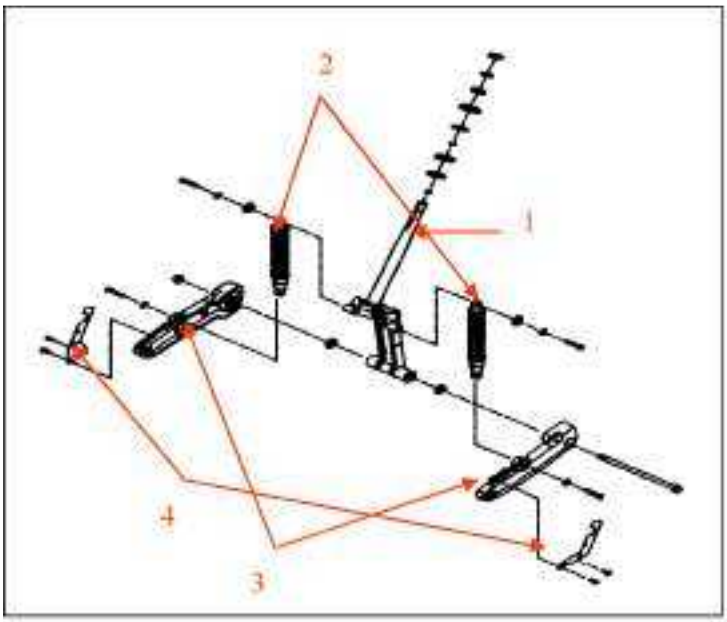
Speedometer cover:

© Remove the screws on the speedometer cover.(each side)

Installation:

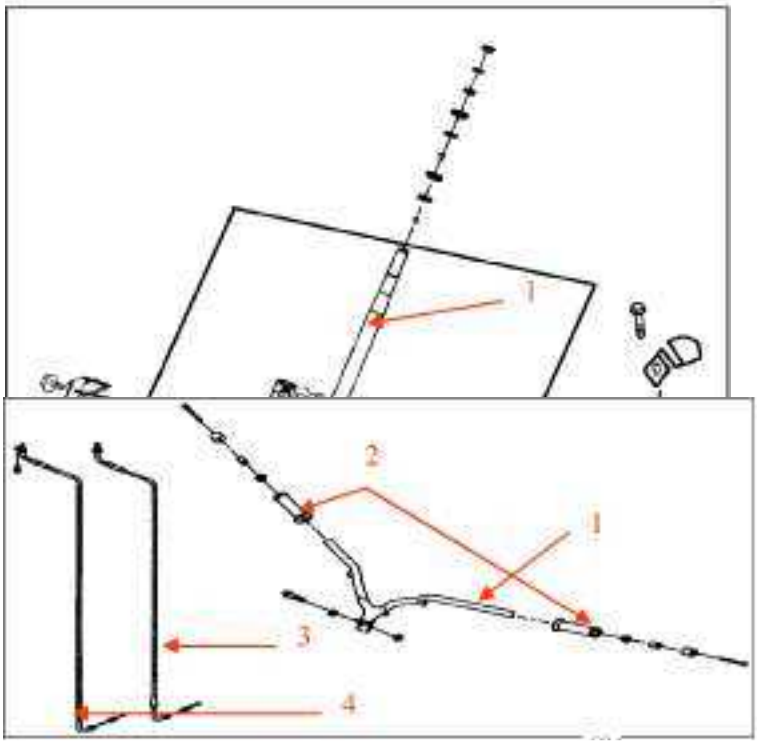
Install in reverse order of removal procedures.

4-4-2 Removal and Inspection of Front Fork & Steering



CU8 & CUB

1. FORK COMP, FRONT
2. SHOCK ABSORBER ASSY
3. SUSPENSION ARM, LH. & RH.
4. FIXED PLATE, LH. & RH.



CU8-B & CUB-B

1. FORK COMP, FRONT
2. FORK COMP, FRONT LH. & RH.

1. HANDLE BAR ASSY
2. GRIP
3. CABLE
4. CABLE, THRORRLE

Z1U

CU8 & **CUB:**

® Remove upper and lower bolts on the shock absorber assy. © Shock absorber assy. © Remove the bolts on the suspension ram. © Suspension ram.

CU8-B & CUB-B:

© Remove the bolts on the fork comp.

© Remove 4 nuts.

© Fork comp, front LH. & RH.

4-4-3 Removal and Assembly of Wheel and Shock absorber

Front wheel:

Watch: Please place main stand to park the motorcycle for maintenance.

Removal:

© Remove 2 bolts on the caliper.

© Caliper.

© Remove bolt and collar.

© Remvoe speed meter cable nut. **Note:** Do not apply brake when removing caliper from brake disk. Otherwise, the lining can contact.

© Front wheel.

Inspection: Check eccentricity and wear condition. **Note:** If eccentricity is higher than 0.2mm, please replace with new one to ensure driving safety.

© Speed meter gear assembly. *Inspection of Wheel Rim* Put wheel rim on rotation stand. Rotate the wheel slowly and use dial-gauge to measure eccentricity **Note:**

(1) The transverse eccentricity should be within 3.0 mm. If the condition is poor, please replace with new one.

(2) The lateral eccentricity should be within 3.0mm. If the condition is poor, please replace with new one.

Rear wheel:

Watch: Please place main stand to park the motorcycle for maintenance.

Removal:

© Remove 2 bolts on the caliper.

© Caliper.

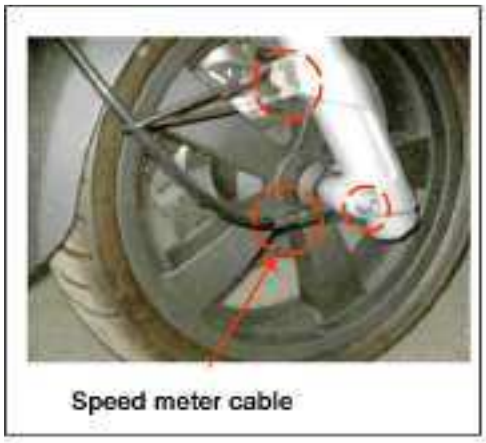
© Remove the nut.

© Rearwheel. **Note:**

(1) Please use vacuum to clean wheel ri m and lining. Try to reduce the contamination of asbestos fiber, which may affect the human breath system or lead to cancer.

(2) The transverse eccentricity should be within 3.0mm. If the condition is poor, please replace with new one.

(3) The lateral eccentricity should be within 3.0 mm. If the condition is poor, please replace with new one.



Speed meter cable

Installation:

Install in reverse order of removal procedures.

Shock absorber:

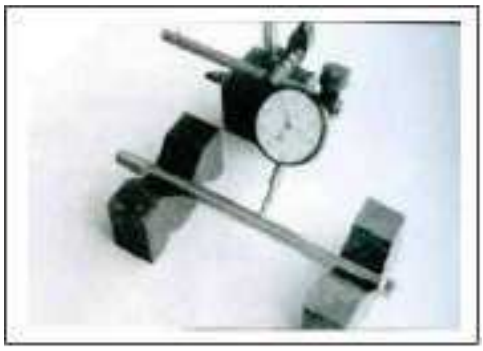
Front:

Watch: Please place main stand to park the motorcycle for maintenance.

Removal:

© Remove upper and lower attaching bolts on front shock absorber.(each side 2 bolts) © Shock absorber.

Inspection: Check if the shock absorber is worn, scratched, leaking, or bent. If its condition is poor, please replace with new one. **Note:** Torque of shock absorber upper and lower attaching bolts: 200 ~ 300 kg-cm.



Rear:

© Remove 2 attaching bolts on air filter.

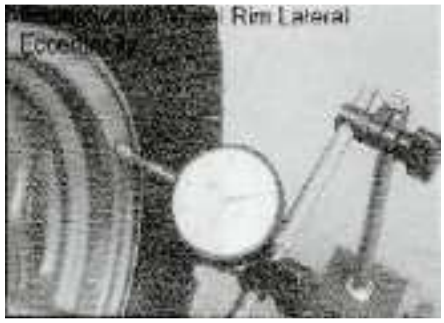
© Airfilter.

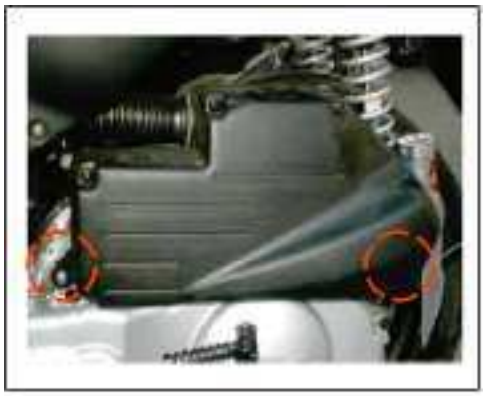
© Remove upper and lower attaching bolts on rear shock absorber.(each side 2 bolts) © Shock absorber.

Inspection: Check if the shock absorber is worn, scratched, leaking, or bent. If its condition is poor, please replace with new one. **Note:** Torque of shock absorber upper and lower attaching bolts: 200 ~ 300 kg-cm

Installation:

Install in reverse order of removal procedures.

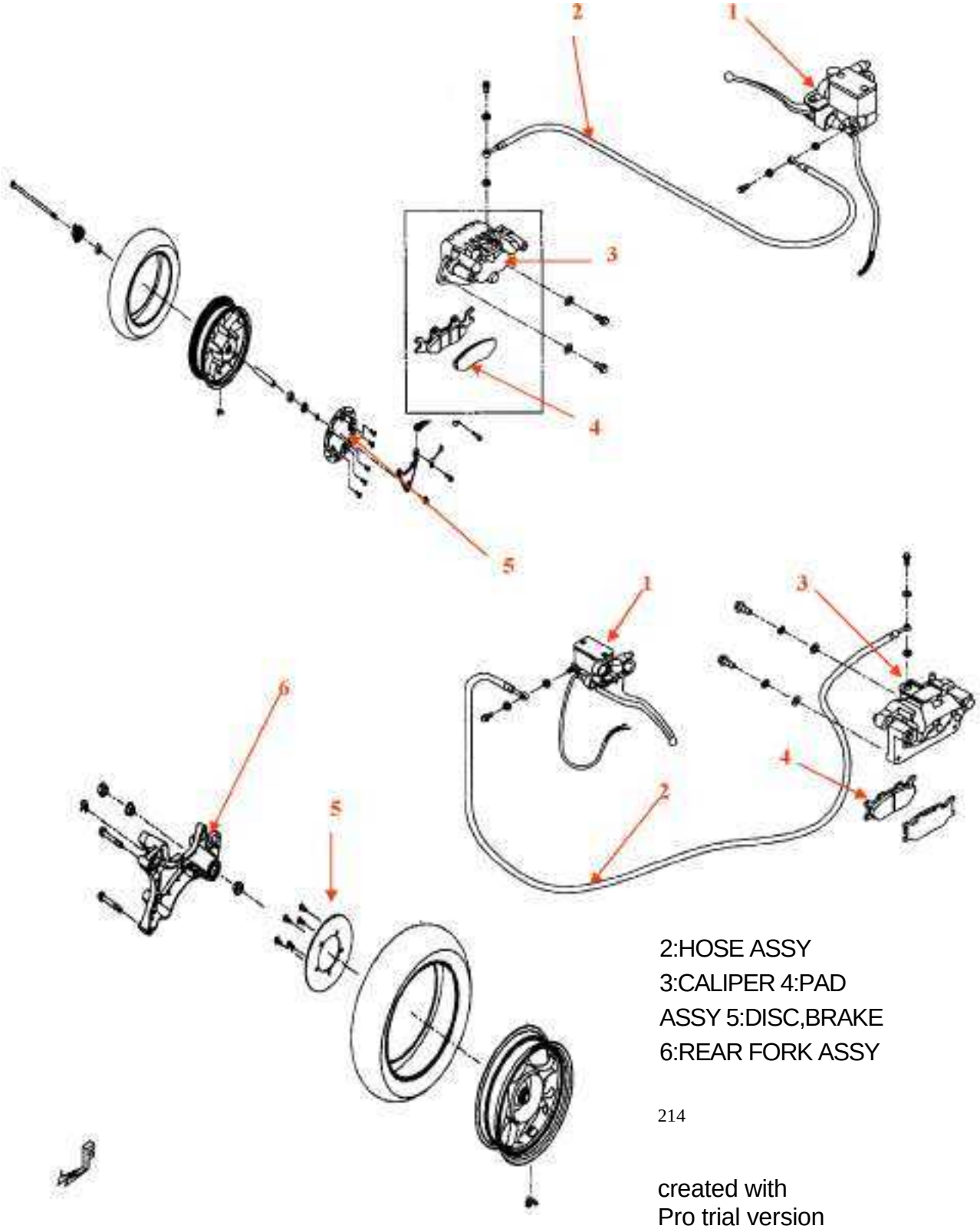




4-5 Brake system:

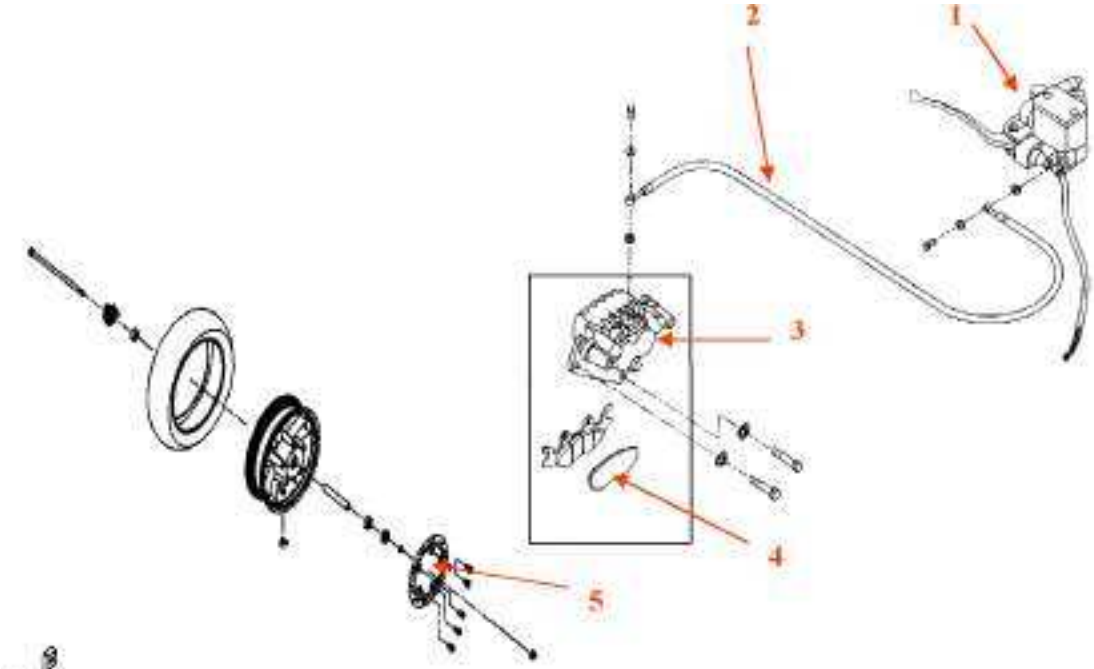
CU8 & **CUB**

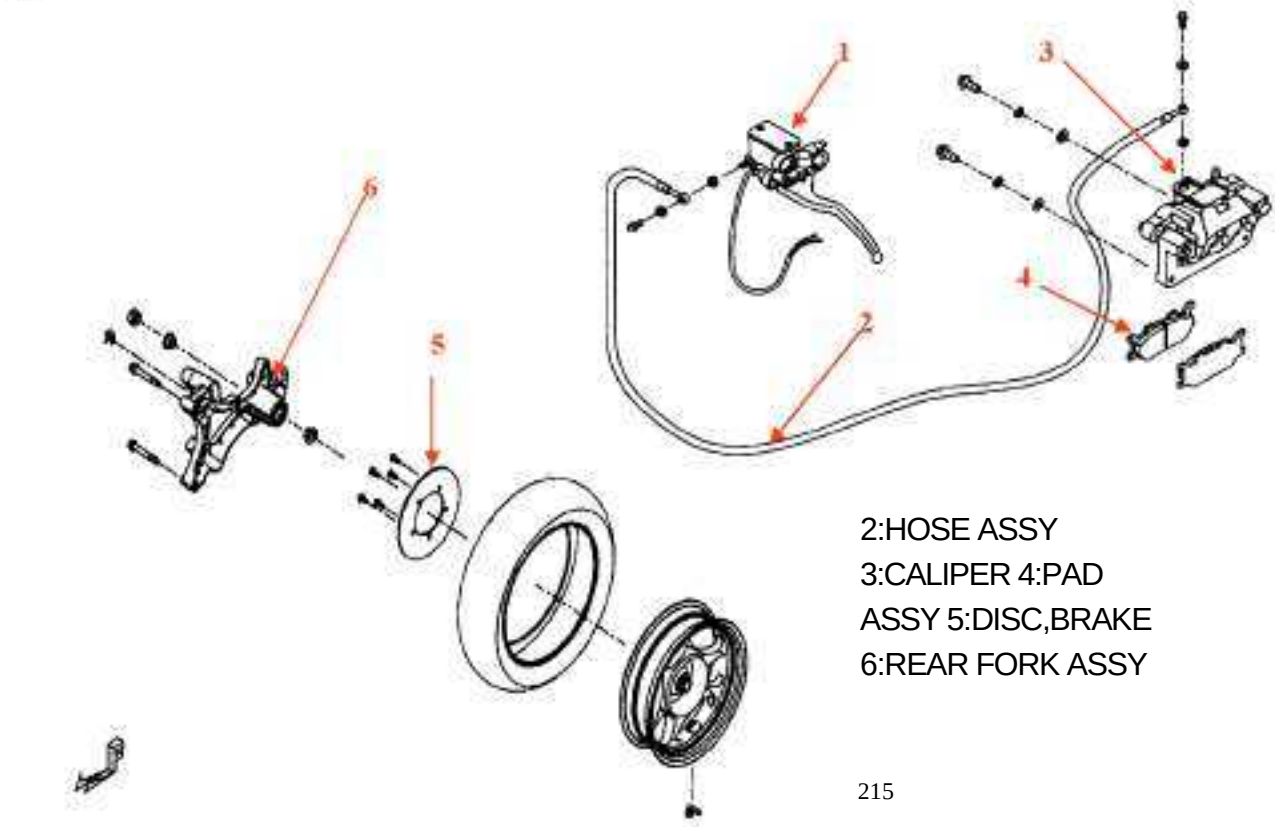
1:MASTER CYLINDER



2:HOSE ASSY
3:CALIPER 4:PAD ASSY 5:DISC,BRAKE
6:REAR FORK ASSY

1:MASTER CYLINDER





2:HOSE ASSY
3:CALIPER 4:PAD
ASSY 5:DISC,BRAKE
6:REAR FORK ASSY

A. Check of braking fluid level

Inspection: The front brake fluid level should above "LOWER". If it is below, refill the brake fluid and check leakage of the brake system.

Adding of braking fluid:

- Stand the scooter at its main rest on a leveled floor.
- Turn open the fuel tank cap and add in designated braking fluid to the maximum.

Warning: 1) Add in designated braking fluid, a different fluid would cause hazardous chemical reaction, leading to failure in braking.

2) Keep water off the fluid cup or the boiling point would drop to produce air block, leading to failure in braking.

3) In case of spill of braking fluid to plastic parts, wipe it off with a rag for aestheticism.

B. **Checking and adjustment** of **free braking gaps. Note:** front brake free gap of 10 ~ 20 mm

Adjustment of braking gap <Remove>: • Front windshield

• Turn lose the securing nuts, tighten the screws.

Remark : 1) Turn it clockwise to enlarge the gap.

2) Turn it counterclockwise to reduce the gap.

3) Keep the free gap at between 10 ~ 20 mm and tighten the nut.

C. Inspection of the Return Spring of Brake Lining:

a. Testing the free length of the spring with a vernier caliper.

b. Check for any wear and crack on the spring.

Free Length of the Return Spring of Brake Lining (mm)			
Standard	32.6-33.0	Limit	Exchanged over 35.0

D. Inspection of the Brake Cam:

a. Check for any rust or unusual wear on the brake cam.

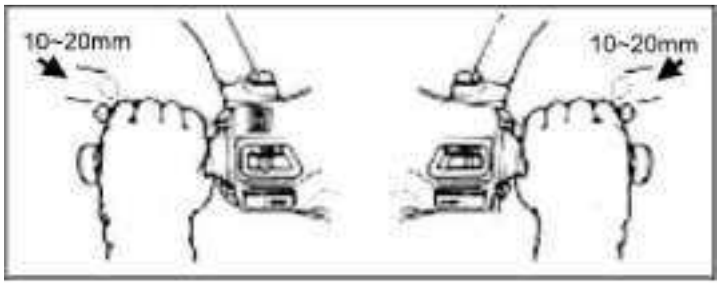
b. Make sure the brake cam runs smoothly.

c. Make sure to apply sufficient grease to the brake cam and lining anchor-pin.

E. Inspection of Front Brake:

a. Check the gap between the ends of front brake lever.

Gap of Front Brake Lever
10 ~20 mm



b. Add brake oil.

c. Check the brake lining.

F. Inspection of Rear Brake:

a. Check the gap between the ends of rear brake lever.

b. Move the adjusting nut of brake cable clockwise to proper gap.

Gap of Rear Brake Lever
10~20 mm