PGO SCOOTERS

SERVICE MANUAL

PGO SCOOTERS

Manufactured by Motive Power Industry Co., Ltd

PREFACE

This manual provides every service specialist with professional techniques of maintenance and repairing for G-MAX (ALLORO). It provides a detailed guide for those who may concern with how to maintain, repair, reassemble, and change parts of their scooters.

This manual includes 3 kinds of engine displacement:

- **G-MAX 50 (ALLORO 50): abbreviated as "M2-50" is 2 stroke engine (2T), 50cc displacement.**
- **G-MAX 125 (ALLORO 125): abbreviated as "M2-125" is 4 stroke engine (4T), 125cc displacement.**
- **G-MAX 150 (ALLORO 150): abbreviated as "M2-150" is 4 stroke engine (4T), 150cc displacement.**
- **G-MAX 200: abbreviated as "M2-200" is 4 stroke engine (4T), 200cc displacement.**
- **G-MAX 220: abbreviated as "M2-220" is 4 stroke engine (4T), 220cc displacement.**
- **G-MAX 250: abbreviated as "M2-250" is 4 stroke engine (4T), liquid cooled, 250cc displacement.**

At every section, we illustrate each important point by assembling procedures, explosive diagrams and photographs.

Although we have tried our best to make this manual as perfect as possible, please kindly inform us if any fault needs to be corrected in this manual.

Thank you for purchasing our PGO scooters.

FACTORY
Motive Power Industry Co.,Ltd.

CONTENTS：

Page

(6) Cylinder and piston
(7) AC generator
(8) Final transmission mechanism
(9) Crankcase, crank shaft
(10) Carburetor

(D)Steering column, front wheel, front brake comp, front fork

(E)Rear wheel, rear brake, rear damper

(F)Fuel supply

Ⅴ.Electric equipment

(1)Troubleshooting
(2)Battery
(3)Recharge system
(4)Ignition system
(5)Starting system
(6)Switch operation
(7)Wiring diagram

Ⅵ. GMAX-200/220 characteristics , dismantle & inspection

(1) Engine dismantling
(2) engine inspection
(3) Electric system
(4) Maintenance
(5)Engine Management System(EMS)
(6)EMS diagnostic
(7)EMS system Repairing tool
(8)EMS General Electric units

1.1 G-MAX 50

SPECIFICATION							
BRAND			PGO	FRAME			STEEL PIPE
MODEL			M2-50D	SUSPENSION		FRONT	TELESCOPE
DIMENSION	LENGTH		1885 mm			REAR	SWING
	WIDTH		730 mm	TRANSMISSION		PRIMARY	DIRECT
	HEIGHT		1170 mm			2ND	52/13*44/13
	AXLE DISTANCE		1365 mm			CLUTCH	CENTRIGUAL
WEIGHT	GROSS	FRONT	47 KG			SHIFTING	V-BELT C.V.T
		REAR	58 KG	TIRE		FRONT	120/70-12
		TOTAL	105 KG			REAR	130/70-12
	PASSENGER		2 (110KG)	BRAKE		FRONT	DISK
	TOTAL	FRONT	82 KG			REAR	DRUM
		REAR	133 KG	SPEEDOMETER			80 km/hr
		TOTAL	215 KG	LIGGHT		HEAD(HI、LO)	12V-35W/35W
PERFORMAN	TOP SPEED		60 km/hr			REAR	12V-5W
	FUEL CONSUMPTION		45 km/l			BRAKE	12V-21W
	GRADIENT		19°			SIGNAL	12V-10W*4
ENGINE	ENGINE MODEL		P2	HORN			DC 12V
	FUEL		92 UNLEADED	SILENCER			DIFFUSER
	STROKE		2T AIR FORCED	EXHAUS		PARTICLE	BELOW 15 %
	CYLINDE	BORE	φ 40.0 mm			CO	BELOW 4.5%
		STROKE	39.2 mm			HC	BELOW 7000 ppm
		CYLINDER	SINGLE	EXHAUST LAYOUT			RIGHT
	DISPLACEMENT		49 cc	LUBRICATE			SEPARATE PUMP
	C.R.		6.8：1	FUEL TANK			7.5 L
	MAX H..P.		3.5kw/7000rpm				
	MAX TORQUE		5.0N-M/6500rpm				
	LAYOUR		HORIZONAL				
	IGNITION		CDI				
	STARTING		ELECTRIC & KICK				

1.2 G-MAX 125

SPECIFICATION							
BRAND			PGO	FRAME			STEEL PIPE
MODEL			M2-125	SUSPENSION		FRONT	TELESCOPE
DIMENSION	LENGTH		1885 mm			REAR	SWING
	WIDTH		730 mm	TRANSMISSION		PRIMARY	DIRECT
	HEIGHT		1170 mm			2ND	43/14*42/13
	AXLE DISTANCE		1365 mm			CLUTCH	CENTRIGUAL
WEIGHT	GROSS	FRONT	54 KG			SHIFTING	V-BELT C.V.T
		REAR	76 KG	TIRE		FRONT	120/60-13
		TOTAL	130 KG			REAR	130/60-13
	PASSENGER		2 (110KG)	BRAKE		FRONT	DISK
	TOTAL	FRONT	94 KG			REAR	DISK
		REAR	146 KG	SPEEDOMETER			140 km/hr
		TOTAL	230 KG	LIGGHT		HEAD(HI、LO)	12V-35W/35W
PERFORMAN	TOP SPEED		84 km/hr			REAR	12V-5W
	FUEL CONSUMPTION		40 km/l			BRAKE	12V-21W
	GRADIENT		21°			SIGNAL	12V-10W*4
ENGINE	ENGINE MODEL		C1M	HORN			DC 12V
	FUEL		92 UNLEADED	SILENCER			DIFFUSER
	STROKE		4T AIR FORCED	EXHAUS		PARTICLE	BELOW 15 %
	CYLINDE	BORE	φ 51.5 mm			CO	BELOW 4.5%
		STROKE	60.0 mm			HC	BELOW 7000 ppm
		CYLINDER	SINGLE	EXHAUST LAYOUT			RIGHT
	DISPLACEMENT		124.9 cc	LUBRICATE			SEPARATE PUMP & SPLASH
	C.R.		9.2：1				
	MAX H..P.		6.5kw/7500rpm	FUEL TANK			7.5 L
	MAX TORQUE		9.1N-M/6250rpm				
	LAYOUR		HORIZONAL				
	IGNITION		CDI				
	STARTING		ELECTRIC & KICK				

1.3 G-MAX 150

SPECIFICATION							
BRAND			PGO	FRAME			STEEL PIPE
MODEL			M2-150	SUSPENSION		FRONT	TELESCOPE
DIMENSION	LENGTH		1885 mm			REAR	SWING
	WIDTH		730 mm	TRANSMISSION		PRIMARY	DIRECT
	HEIGHT		1170 mm			2ND	42/15*42/13
	AXLE DISTANCE		1365 mm			CLUTCH	CENTRIGUAL
WEIGHT	GROSS	FRONT	55 KG			SHIFTING	V-BELT C.V.T
		REAR	77 KG	TIRE		FRONT	120/60-13
		TOTAL	132 KG			REAR	130/60-13
	PASSENGER		2 (110KG)	BRAKE		FRONT	DISK
	TOTAL	FRONT	95 KG			REAR	DISK
		REAR	147 KG	SPEEDOMETER			140 km/hr
		TOTAL	242 KG	LIGGHT		HEAD(HI、LO)	12V-35W/35W
PERFORMAN	TOP SPEED		87 km/hr			REAR	12V-5W
	FUEL CONSUMPTION		40 km/l			BRAKE	12V-21W
	GRADIENT		24°			SIGNAL	12V-10W*4
ENGINE	ENGINE MODEL		C5M	HORN			DC 12V
	FUEL		92 UNLEADED	SILENCER			DIFFUSER
	STROKE		4T AIR FORCED	EXHAUS		PARTICLE	BELOW 15 %
	CYLINDE	BORE	φ 57.5 mm			CO	BELOW 4.5%
		STROKE	58.6 mm			HC	BELOW 7000 ppm
		CYLINDER	SINGLE	EXHAUST LAYOUT			RIGHT
	DISPLACEMENT		152.1 cc	LUBRICATE			SEPARATE PUMP & SPLASH
	C.R.		9.4：1				
	MAX H..P.		7.7kw/7250rpm	FUEL TANK			7.5 L
	MAX TORQUE		10.6N-M/6250rpm				
	LAYOUR		HORIZONAL				
	IGNITION		CDI				
	STARTING		ELECTRIC & KICK				

1.4 G-MAX200

SPECIFICATION							
BRAND			PGO	FRAME			STEEL PIPE
MODEL			M2-200	SUSPENSION		FRONT	TELESCOPE
DIMENSION	LENGTH		1885 mm			REAR	SWING
	WIDTH		730 mm	TRANSMISSION		PRIMARY	DIRECT
	HEIGHT		1170 mm			2ND	40/16*42/13
	AXLE DISTANCE		1365 mm			CLUTCH	CENTRIGUAL
WEIGHT	GROSS	FRONT	58 KG			SHIFTING	V-BELT C.V.T
		REAR	82 KG	TIRE		FRONT	120/60-13
		TOTAL	140 KG			REAR	130/60-13
	PASSENGER		2 (110KG)	BRAKE		FRONT	DISK
	TOTAL	FRONT	99 KG			REAR	DISK
		REAR	151 KG	SPEEDOMETER			160 km/hr
		TOTAL	250 KG	LIGGHT		HEAD(HI、LO)	12V-55W/60W
PERFORMAN	TOP SPEED		108 km/hr			REAR	12V-5W
	FUEL CONSUMPTION		40 km/l			BRAKE	12V-21W
	GRADIENT		25°			SIGNAL	12V-10W*4
ENGINE	ENGINE MODEL		C7	HORN			DC 12V
	FUEL		92 UNLEADED	SILENCER			DIFFUSER
	STROKE		4T AIR FORCED	EXHAUS		PARTICLE	BELOW 15 %
	CYLINDE	BORE	φ 65.0 mm			CO	BELOW 4.5%
		STROKE	60.0 mm			HC	BELOW 7000 ppm
		CYLINDER	SINGLE	EXHAUST LAYOUT			RIGHT
	DISPLACEMENT		199.1 cc	LUBRICATE			SEPARATE PUMP & SPLASH
	C.R.		9.7：1				
	MAX H..P.		10.2kw/7250rpm	FUEL TANK			7.5 L
	MAX TORQUE		15.0N-M/6000rpm				
	LAYOUR		HORIZONAL				
	IGNITION		TRENISENT				
	STARTING		ELECTRIC				

1.5 G-MAX220

SCOOTER SPECIFICATION							
BRAND			P G O	FRAME			STEEL TUBE
MODEL			M2-220BAE	SUSPENSION		FRONT	TELESCOPE
SCALE	LENGTH		1885 mm			REAR	UNI-ABSORBER
	WIDTH		730 mm	TRANSMISSIO		1ST REDUCTION	0.81~2.43
	HEIGHT		1170 mm			2ND REDUCTION	8.077
	WHEEL BASE		1365 mm			CLUTCH	CENTRIFUGAL
MASS	MASS OF VEHICLE	FRONT	57 KG			GEARBOX	C.V.T.
		REAR	87 KG	TYRE		FRONT	120/60-13
		TOTAL	144 KG			REAR	130/60-13
	RIDER		2 (150KG)	BRAKE		FRONT	DISK
	TOTAL MASS	FRONT	115 KG			REAR	DISK
		REAR	179 KG	SPEEDOMETER			199 km/hr
		TOTAL	294 KG	LIGHT		HEAD LAMP	12V-60W/55W
PERFORMANCE	TOP SPEED		110 km/hr			TAIL LAMP	12V-5W
	FUEL CONSUMPTION		33 km/l			BREAKING LAMP	12V-21W
	HILL CLIMB		30° ↑			TURNING LIGHT	12V-16W*4
ENGINE	TYPE		C8E5	HORN			DC 12V
	FUEL		92 UNLEADED	MUFFLER			C-D ABSORPTION
	CYCLE/COOLING		4T/FORCE AIR&OIL COOL	IDLE EMISSION		PARTICLE	BELOW 15 %
	CYLINDER	BORE	φ67.5 mm			CO	BELOW 3.0%
		STROKE	61.5 mm			HC	BELOW 1600 ppm
		NUMBER	SINGLE	EXHAUST DIRECTION			RIGHT HAND SIDE& BACKWARD
	DISPLACEMENT		220 cc	LUBRICATION			COMPRESS & SPLASH
	COMPRESSION RATIO		10.0 : 1	E. E. C.			NO
	MAX POWER		11.0kw/7000rpm	P. C. V.			YES
	MAX TORQUE		16.5N-M/5500rpm	CATALYST			YES
	ARRANGEMENT		HORIZONTAL	S. A. I.			YES
	IGNITION		TRANSISTOR				
	STARTER		ELECTRIC				
RREMARK	1. FUEL SUPPLY : INJECTION						

1.6 G-MAX250

SPECIFICATION						
BRAND			PGO	FRAME		STEEL PIPE
MODEL			M2-250	SUSPENSION	FRONT	TELESCOPE
DIMENSION	LENGTH		1990 mm		REAR	SWING
	WIDTH		730 mm	TRANSMISSION	PRIMARY	DIRECT
	HEIGHT		1170 mm		2ND	39/15*43/16
	AXLE DISTANCE		1365 mm		CLUTCH	CENTRIGUAL
WEIGHT	GROSS	FRONT	58 KG		SHIFTING	V-BELT C.V.T
		REAR	90 KG	TIRE	FRONT	120/60-13
		TOTAL	148 KG		REAR	140/60-13
	PASSENGER		2 (110KG)	BRAKE	FRONT	DISK
	TOTAL	FRONT	88 KG		REAR	DISK
		REAR	170 KG	SPEEDOMETER		160 km/hr
		TOTAL	258 KG	LIGGHT	HEAD(HI、LO)	12V-35W/35W
PERFORMAN	TOP SPEED		120 km/hr		REAR	12V-5W
	FUEL CONSUMPTION		34 km/l		BRAKE	12V-21W
	GRADIENT		27°		SIGNAL	12V-10W*4
ENGINE	ENGINE MODEL		SH50B	HORN		DC 12V
	FUEL		92 UNLEADED	SILENCER		DIFFUSER
	STROKE		4T LIQUID COOLED	EXHAUS	PARTICLE	BELOW 15 %
	CYLINDE	BORE	φ 72.7 mm		CO	BELOW 4.5%
		STROKE	60.0 mm		HC	BELOW 7000 ppm
		CYLINDER	SINGLE	EXHAUST LAYOUT		RIGHT
	DISPLACEMENT		249.1 cc	LUBRICATE		SEPARATE PUMP & SPLASH
	C.R.		10.3：1			
	MAX H..P.		13.5kw/7250rpm	FUEL TANK		7.5 L
	MAX TORQUE		20.2N-M/6000rpm			
	LAYOUR		HORIZONAL			
	IGNITION		TRENISENT			
	STARTING		ELECTRIC			

Ⅱ.Service information：

(1)The operation notice
(2)Locking torque value
1.For engine
2. For chassis
3. Others
(3) Lubrication instruction
a.For engine
b. For chassis
c. Wheel bearing
(4)Periodical Maintenance Table
(5)Troubleshooting
1.Difficult starting or starting
2.Weak acceleration
3.Engine running not smoothly (low speed)
4.Engine running not smoothly(high speed)
5.Clutch, drive & driven pulley
6.Handlebar steering was astray when running
7.Front and rear damper not balanced
8.Brake disorder
9.Oil indicator malfunction
10. Fuel indicator malfunction
11. Starting motor malfunction
12.No sparking
13.Charging abnormal

(1)**The operation notice：**

1.For parts like the gasket, o-ring, clips and circlets, please change a new part whenever re-assembled.

2.When trying to tighten screws or nuts, please lock tightly according to each recommended locking torque and in the sequence of the ”X” pattern.

3.Please use PGO or PGO recommended parts.

4.After dismantling, please clean all parts involved or used for checking and grease all contact surfaces when reassembling.

5.Use grease recommended by PGO.

6.When removing the battery, please disconnect the negative pole(-) first. However, please connect the positive pole(+) first when assembling.

7.Before installing a new fuse, please be sure that the specification is correct.

8.After reassembling, please re-confirm that all connecting point, locking parts, circuits, polar characteristics are functioning well before selling out.

(2) Locking Torque Value:

1. 2T Engine (50CC)

No	Locking location	Thread Dia (mm)	Locking torque kg-m	Remarks
1	Cylinder head	7	1.0~1.4	When the engine is cold
2	Flywheel outer	10	3.2~4.0	
3	Rear brake lever	6	1.0~1.2	
4	Driving pulley	10	3.2~4.0	
5	Clutch outer	10	3.5~4.0	
6	Right crankcase	6	1.0~1.2	
7	Drive gear box cover	6	1.0~1.2	
8	Left crankcase	6	1.0~1.2	
9	Draining and filler bolt	8	1.8	When the engine is cold
10	Inlet pipe	6	1.0~1.2	
11	Flywheel magneto stator	6	1.0~1.2	
12	Cooling fan	6	1.0~1.2	
13	Muffler nut on cylinder head	6	1.0~1.2	When the engine is cold
14	Starting motor	6	1.0~1.4	When the engine is cold
15	Bracket between eng. and Rubber pad of central stand	6	1.0~1.2	
16	Spark plug	14	2.5~3.0	
17	Fan cover	6	1.0~1.2	
18	Fixed plate, drive clutch	6	1.0~1.4	
19	Nut of rear wheel axle	14	11~13	U TYPE NUT
20	Kick starter	6	1.0~1.2	

2. **4T Engine (125/150/200/220CC)**

NO	Locking location	Q'ty	Thread dia. (mm)	Locking torque (kg-m)
1	Fixing nut (Tappet screw nut)	2	5	0.7~0.8
2	Nut of oil pump sprocket	1	6	0.7~1.0
3	Cylinder head bolt A (intake)	2	6	0.9~1.1
4	Guiding pin bolt, chain extensioner	1	6	0.4~0.6
5	Screw, chain extensioner	2	6	0.9~1.1
6	Cylinder head bolt B (Exhaust)	2	8	2.0~2.3
7	Flange nut, cam shaft holder	4	8	2.0~2.3
8	Gear oil drain bolt	1	8	1.7~2.0
9	Spark plug	1	10	1.2~1.3
10	Nut of fly wheel	1	12	5.0~6.0
11	Fixing nut, clutch outer	1	12	5.0~6.0
12	Nut, driving plate	1	12	5.0~6.0
13	Bolt of engine oil drain	1	12	2.5~3.0
14	Bolt of 2nd oil filter	1	12	0.8
15	Nut (LH thread), one-way clutch	1	22	9.0~10.0
16	Cap, coarse oil filter	1	30	1.5~2.0

3. Chassis

NO	Locking location	Q'TY	Thread dia. (mm)	Locking torque (kg-m)
1	Air bleed bolt of caliper	1	6	0.6
2	Brake arm bolt, front drum	1	6	0.8~1.0
3	Brake arm bolt , rear drum	1	6	0.8~1.0
4	Nut of starter relay	2	6	0.5~0.6
5	Front brake caliper bolt	2	8	2.0 ~ 3.0
6	Bolt of disk	3	8	2.5~3.0
7	Locking nut, steering stem	1	10	3.5~4.5
8	Rear shock absorber bolt(lower)	1	10	3.5 ~ 4.5
9	Rear shock absorber bolt(upper)	1	10	3.5~4.5
10	Chassis bolt, engine hanger bracket	2	10	4.5 ~ 5.0
11	Engine bolt, engine hanger bracket	1	10	3.0 ~ 4.0
12	Hose bolt, master cyl. & caliper	2	10	2.5 ~ 3.0
13	Front axle nut	1	12	4.5 ~ 5.5
14	Nut, swing arm & connecting rod	1	14	4.5 ~ 5.5
14	Rear axle nut	1	16	10.0~11.0

4. Other parts standard torque values:

No	Item	Torque kg-m
1	5mm bolt and nut	0.45-0.6
2	6mm bolt and nut	0.8-1.2
3	8mm bolt and nut	1.8-2.5
4	10mm bolt and nut	3.0-4.0
5	12mm bolt and nut	5.0-6.0
6	5mm screw	0.35-0.5
7	6mm screw	0.7-1.4
8	6mm flange bolt and screw	1.0-1.4
9	7mm flange bolt and screw	1.0-1.4
10	8mm flange bolt and screw	2.0-3.0
11	10mm flange bolt and screw	3.0-4.0

(3)Lubrication instruction

A. 2T Engine (50 cc)

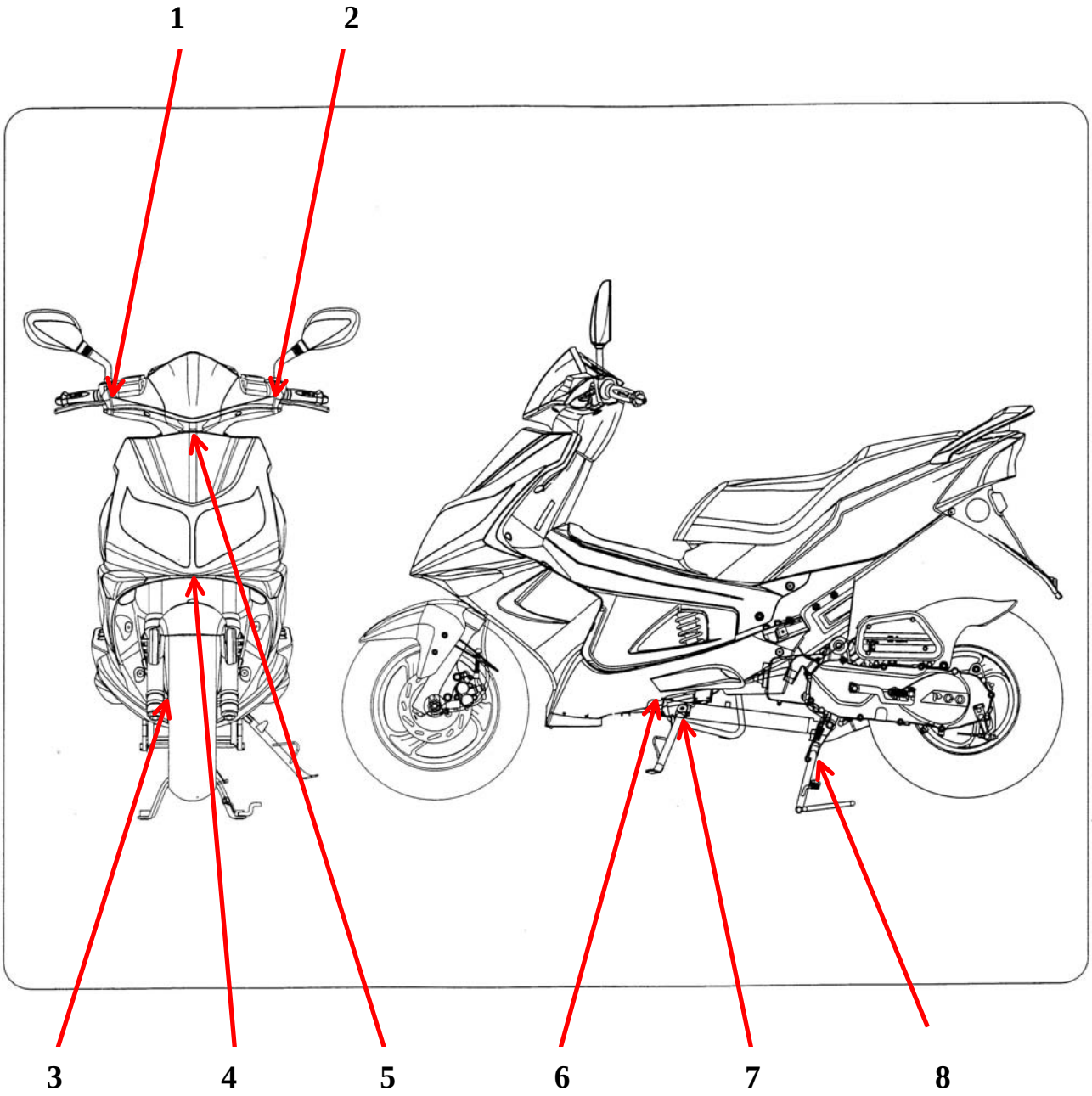
NO	Lubrication location	Oil type	Remarks
1	Crankcase: rotating part, Sliding part	Premium 2 stroke Motorcycle oil Or SAE#30	Separated-pump Lubrication
2	Cylinder: rotating part, Sliding part.		
3	Drive gear box	SAE85-140	Total 110 c.c. Replacement 90c.c
4	Gasket of starter shaft	Clean grease	(#3)
5	Start idle gear sliding parts	Clean grease	(#3)

B. 4T Engine (125/150 /200/220cc)

NO	Lubrication location	Oil type	Remarks
1	Crankcase: rotating part, Sliding part	premium 4 stroke motorcycle oil or SAE15W40	Auto-Separated Lubrication ➢ M2-125/150 Total 900 c.c. Replacement 800c.c ➢ M2-200/220 Total 1400 c.c. Replacement 1000c.c
2	Cylinder: rotating part, Sliding part.		
3-1	Drive gear box(M2-125/150)	SAE85-140	Total 110 c.c. Replacement 90c.c
3-2	Drive gear box(M2-200/220)	SAE85-140	Total 130 c.c. Replacement 110c.c
4	Gasket of starter shaft	Clean grease	(#3)
5	Start idle gear sliding parts	Clean grease	(#3)

C. Chassis appearance

1. Apply oil : #1, #2



2. Apply grease (#3, #4, #5. #6 ,#7, #8)

D.Wheel bearing

Final transmission mechanism gear oil

Speedometer gear: clean grease

(4)PERIODICAL MAINTENANCE TABLE

Item	Model 2T or 4T	Checking Content	MONTHS/DISTANCE(IN KM)FOR CHECKING						
			1 or 300 km	3 or 2500k	6 or 5000k	9 or 7500k	12 or 10000k	15 or 12500k	18 or 15000k
Engine oil	2T	Add	I	According to Oil warning light					
Engine oil*	4T	M2-125/150:800cc, total 1000cc M2-200/220: 1,400CC, total 1,000cc M2-250:900CC, total 1,100cc	R	Replace it initially 300km, and then replace it per 1,000 km					
Oil Filter	M2-125/150 M2-200	Replace	R	replace it per 5000km					
Coarse oil filter* (on oil draining bolt)	4T	Clean or replace it if necessary	C	clean it initially 300km, and then replace it per 3,000 km if necessary					
Air cleaner	ALL	Crack and blockage check.		I	I	I	I	I	I
Air filter	ALL	Clean or replace it if required		I	I	I	R	I	I
Gear oil*	ALL	M2-125/150: 90cc, total 110 cc M2-200/220: 110cc, total 130 cc M2-250: 180cc, total 200cc.	R	R		R		R	
Cooling water, radiator hose	M2-250 only	Leaking check and clean the radiator if necessary	I	I	I	I	R	I	I
Disk & drum brake	ALL	Leaking and function check		I	I	I	I	I	I
Clutch shoes*	ALL	Check or replace it if necessary			I		R		I
Rear brake arm	2T	Function check and adjustment			I		I		I
Tires	ALL	Worn-out check or replace it if necessary		I	I	I	I	I	I
Wheel bearing*	ALL	Fasten tightly if loosen		I	I	I	I	I	I
Front fork*	ALL	Leaking and function check	I		I		I		I
Steering head bearing*	ALL	Check looseness. Adjust it if required			A		A		A
Rear absorber*	ALL	Leaking and function check			I		I		I
Main/Side Stand	ALL	Function check or replace it if required		I	L	I	L	I	L
Nuts, bolts, fasteners	ALL	Tighten it if required		I	I	I	I	I	I
Battery	ALL	Recharge the battery it required. Clear the poles.		I	C	I	C	I	C
Valve gap*	4T	M2-125/150: 0.08mm/ IN&EX M2-200/220: 0.08mm/ IN&EX M2-250: 0.10mm/ IN&EX	Adjust it when necessary						
Carbon cleaning *	2T	Clean combustion carbon when engine output reduced			A		A		A
Spark plug*	ALL	Clear or replace if required		I	R	I	R	I	R
V belt*	ALL	Worn out check or replace if necessary.			A		A		A
Fuel feeding system*	EXCEPT EMS	Crack and blockage check. Replace it if necessary.			I		R		I
Fuel feeding system *	EMS ONLY (Injection)	Inspect hose, clamp, and replace the filter per 15,000km			I		I		R
Engine idle speed*	ALL	2T engine: 1900±100 rpm 4T engine: 1700±100 rpm	A	A	A	A	A	A	A
Carburetor idle A/F Adjustment*	ALL	Check and adjust referring to CO/HC Percentage.	A	A	A	A	A	A	A
EMS function check*	EMS ONLY (Injection)	Inspect EMS function, and clear the defect memory if necessary		I	I	I	I	I	I

REMARKS：

1. **A**: adjust **C**: clean **I**: inspect, or replace if necessary **L**: lubricate **R**: replace
2. Items with "*" mark indicate our recommendation to have it done by PGO dealer.

NOTE 1：

For 4T engine, the engine oil shall be changed completely after run-in period 300km or one month later. This can make sure the engine runs smoothly.

NOTE 2：

The exchange of brake fluid

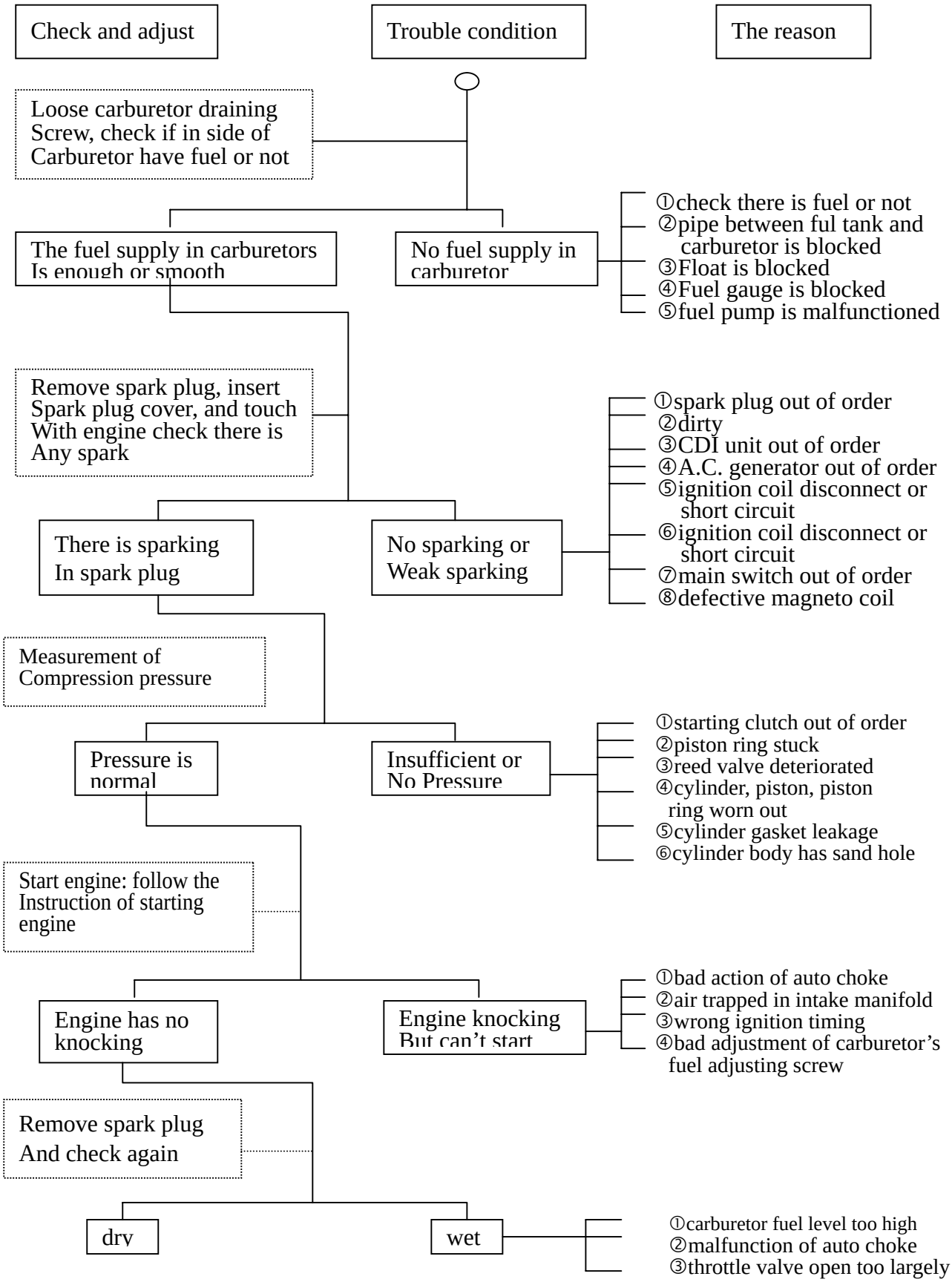
1. After disassembling of brake main cylinder or caliper, do change the new fluid.
2. Check the fluid level often, Refill if necessary.
3. Change the oil seal of main cylinder and caliper every two years.
4. Change the brake fluid hose every four years.

NOTE 3： Available for M2-250 water-cooled engine only

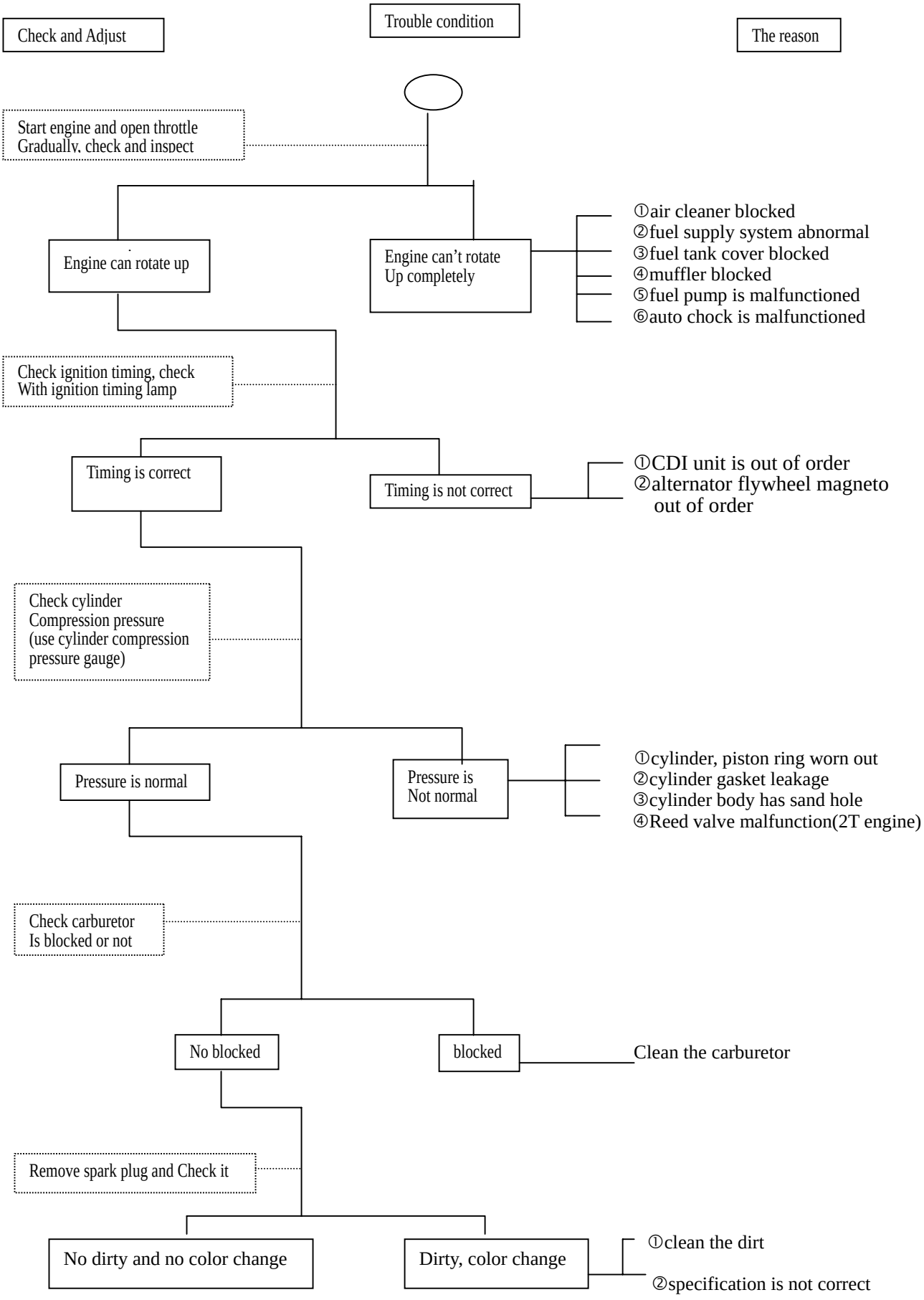
1. Check the clamping and hoses of radiator system initially 1,000 kilometers and per 10,000 kilometers for anti-leaking proof..
2. Replace the engine coolant every year, or every 10,000 kilometers.

(5)Trouble shooting:

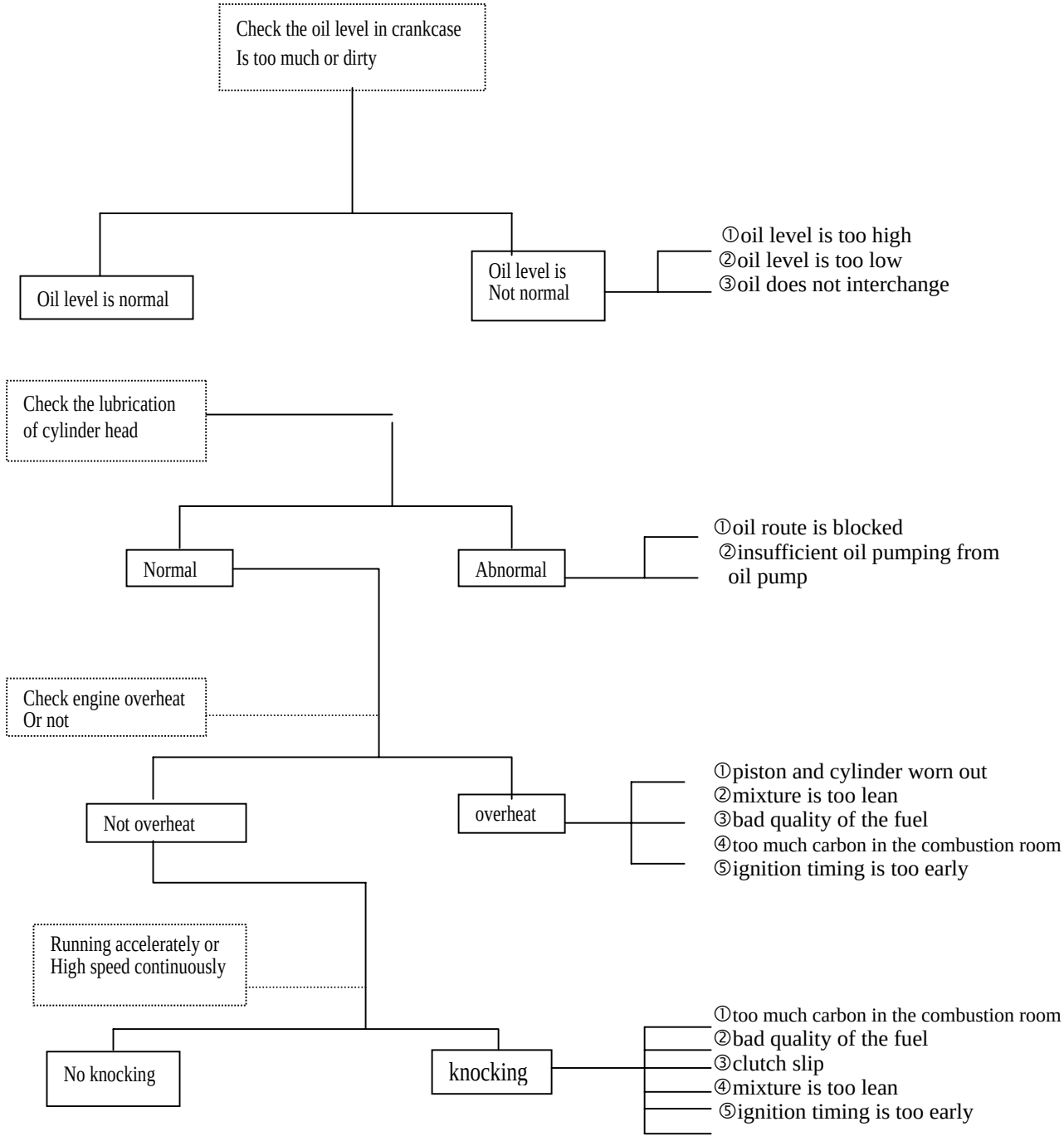
1.difficult starting or can't start:



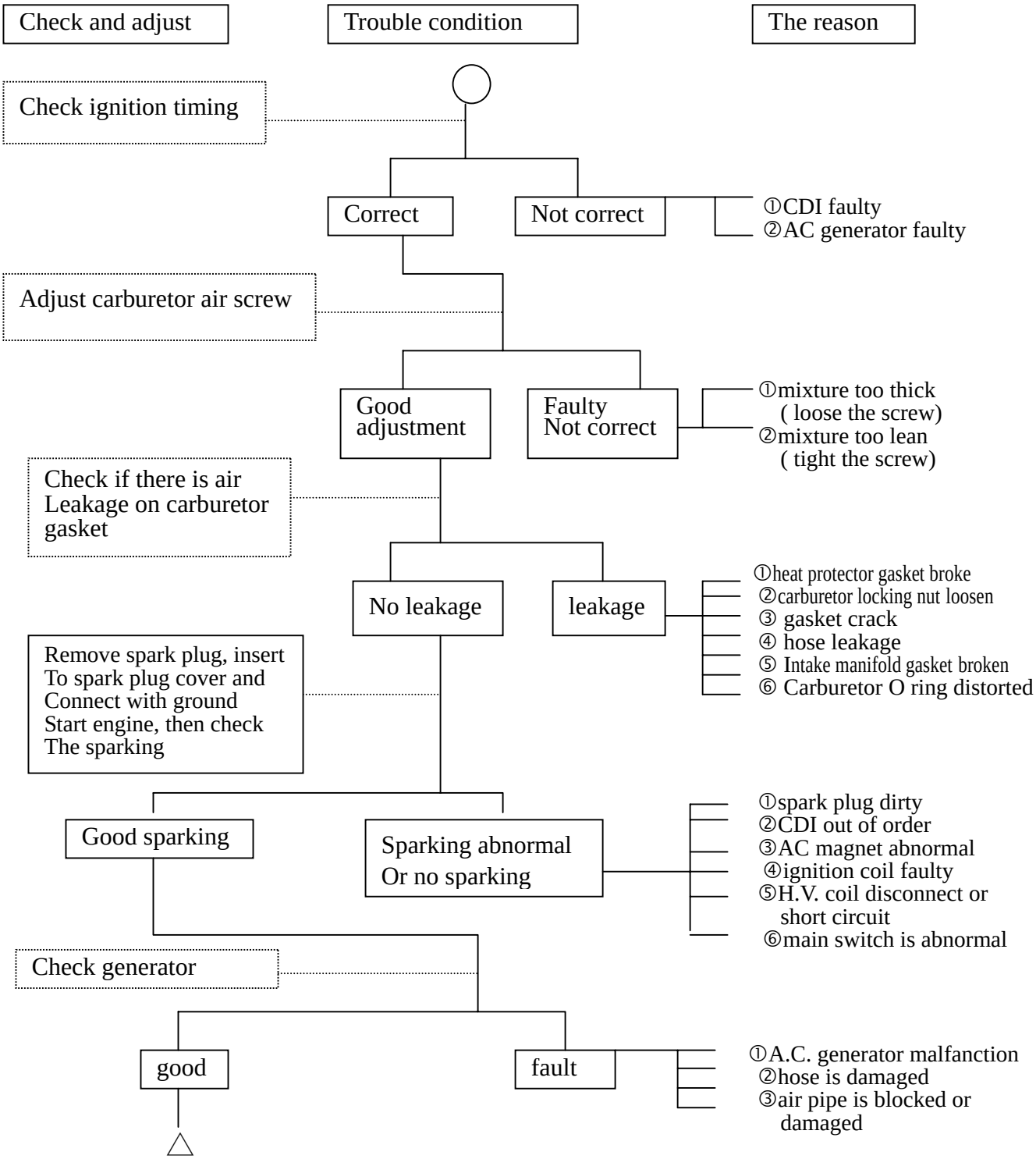
2.Weak acceleration:



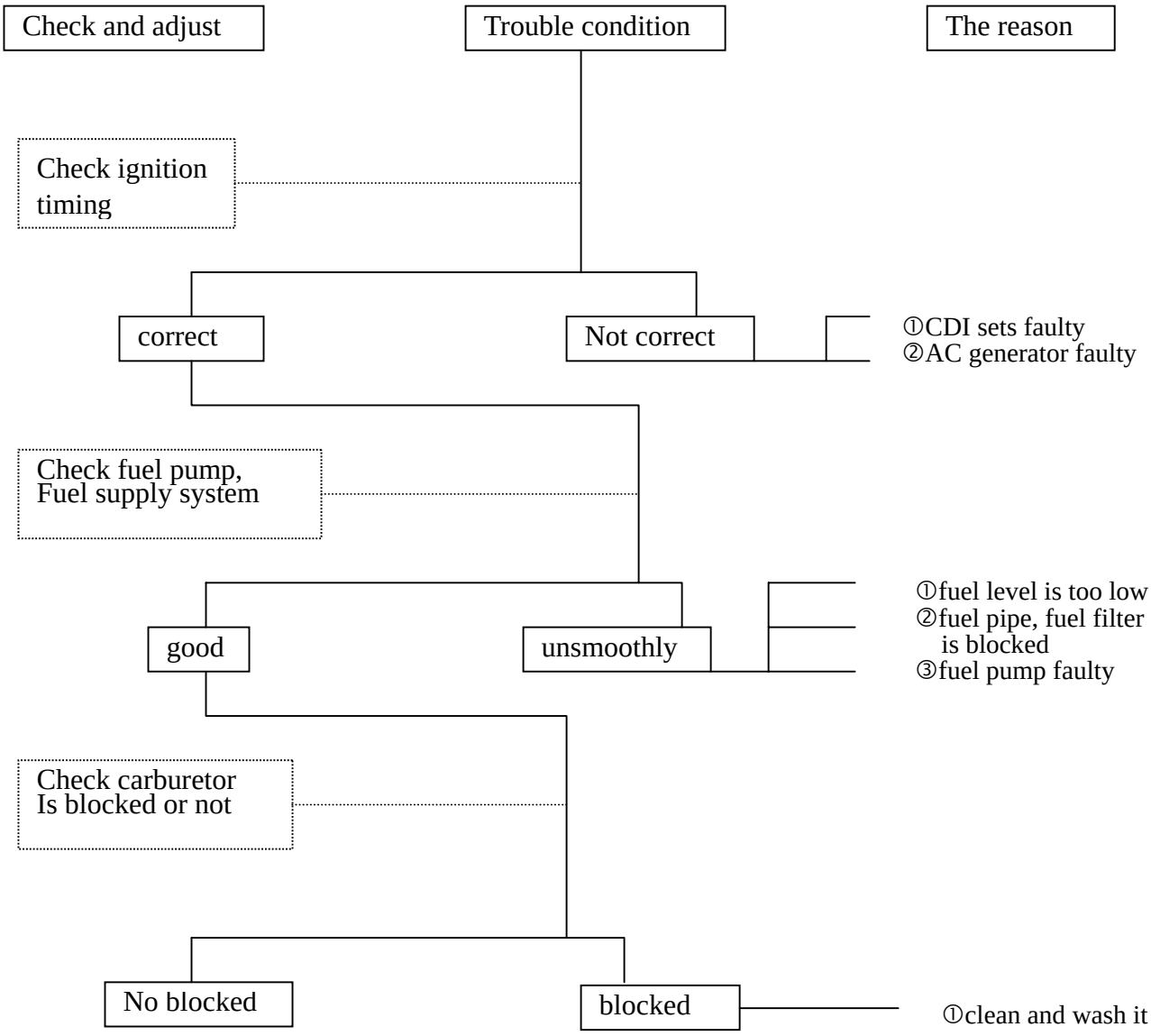
For 4T engine only:



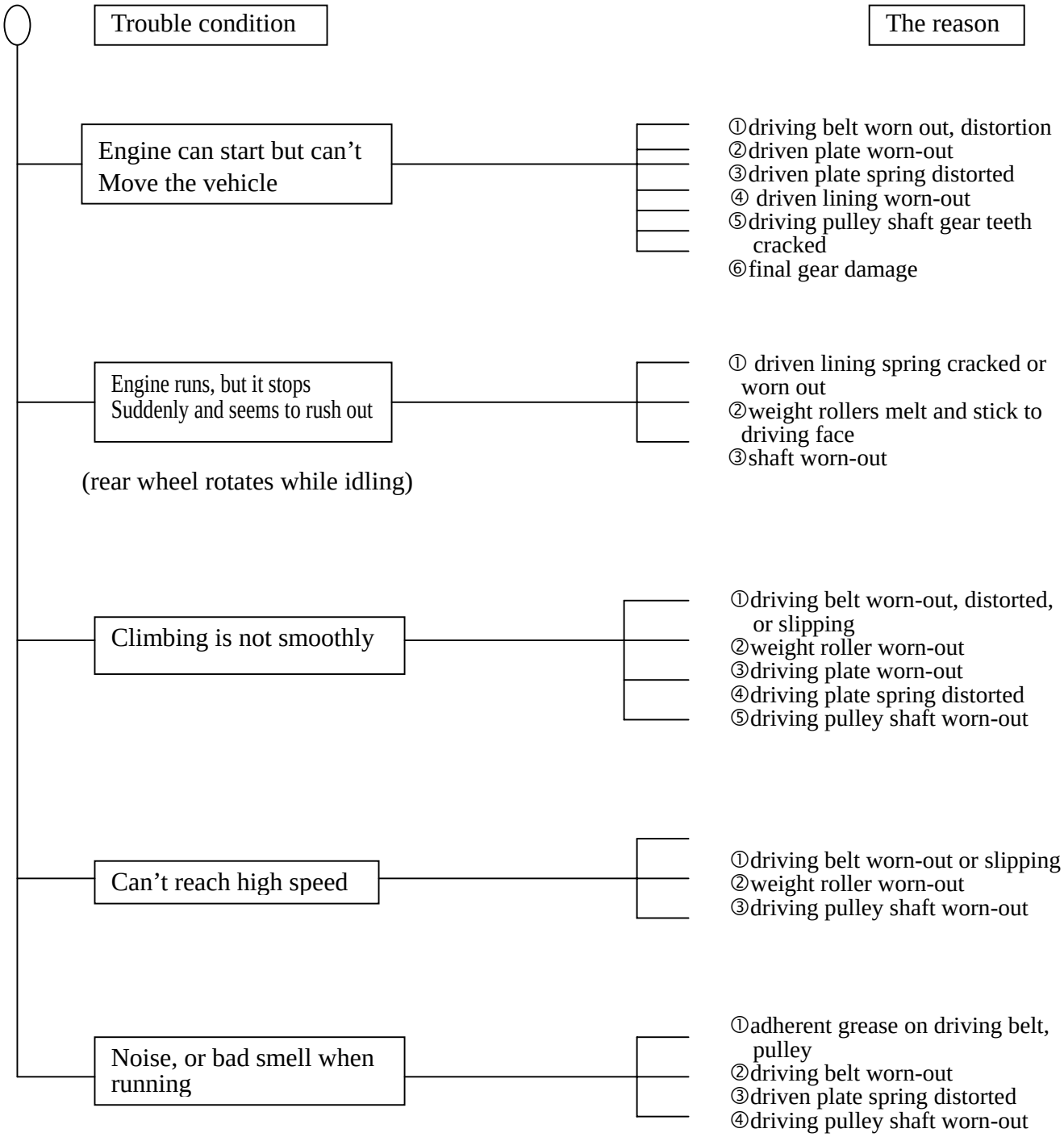
3.Engine running unsmoothly (low speed and idling)



4.Engine running unsmoothly (high speed)



5.Clutch, drive and driven pulley



6.Handlebar steering astrayed when running.

Trouble condition	The reason
	(front and rear wheel pressure are normal)
Handlebar operates heavily	①steering column lock screw locked too tightly ②steel ball cracked
Front and rear wheel swings	①rear, front wheel bearing swings ②front, rear wheel rim distorted ③loosen front axle nut
Handlebar astrayed to one direction	①front and rear wheel center not well-allined ②front fork crooked

7.Front, rear damper not in balanced

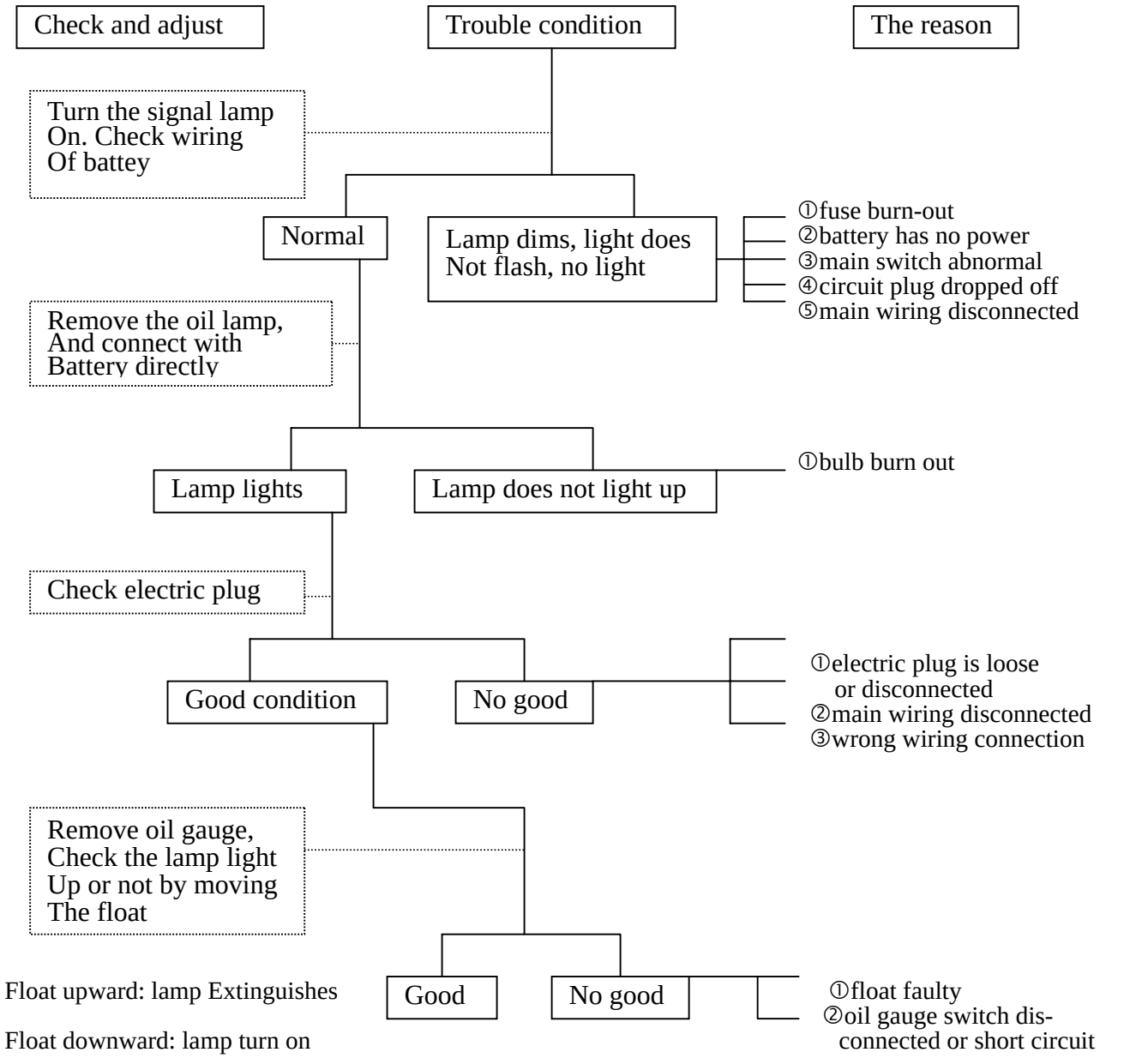
Trouble condition	The reason
	(front and rear wheel pressure is normal)
Damper is too soft	①damper spring is too soft ②carrying weight is too large ③damper oil leakage
Damper is too hard	①front fork guide rod crooked ②damper and damper cover cracked
Damper has abnormal noise	①problems in damper tube and spring ②damper and damper cover cracked

8.Brake disorder.

Trouble condition	The reason
	(adjustment according to standard procedure)
Brake plate"△"mark points to "△"mark	①brake lining worn-out ②bake lining cam worn-out ③brake cam worn-out ④brake hub worn-out
Noise when brake	①brake lining worn-out ②unknown materials attached on brake lining ③Contact surface of the wheel hub becomes rough
Faulty performance	①brake cable over stretching or moving unsmoothly ②brake contacting surface with brake lining does not contact 100% ③water or sand drop into brake mechanism ④some grease on brake lining surface

9.Oil indicator malfunction (Only available for 2T engine)

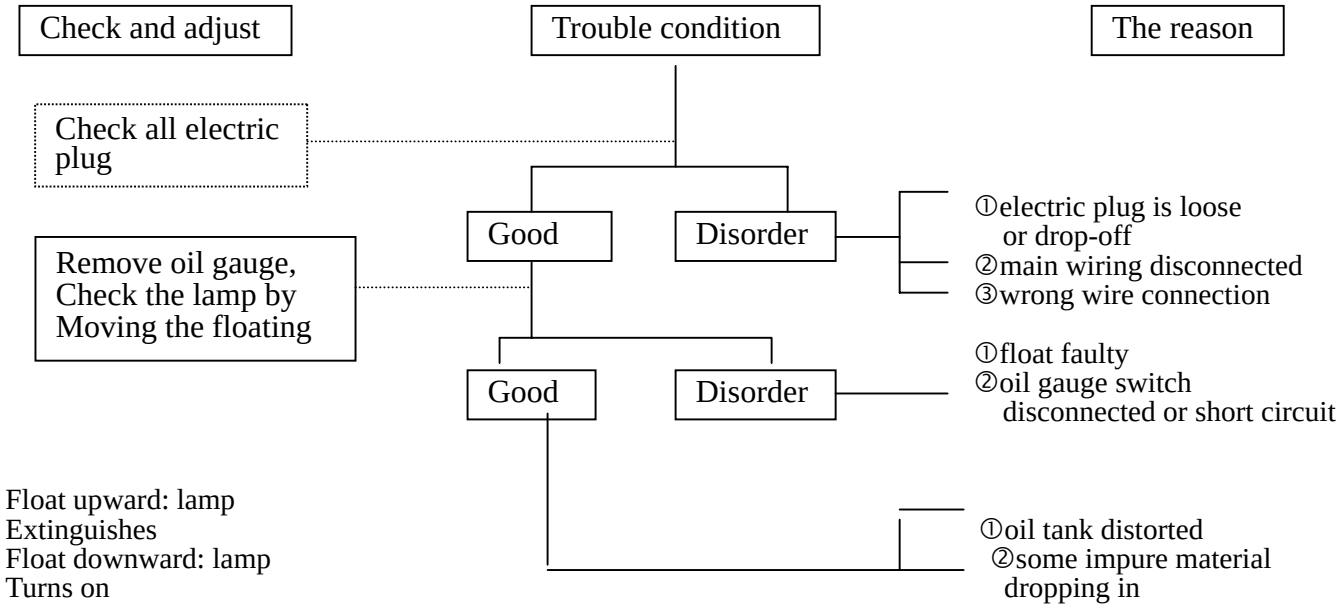
(a)The oil lamp doesn't light up, (when the main switch is at "ON"position)



Float upward: lamp Extinguishes

Float downward: lamp turn on

(b)Oil is enough but the indicator turns on all the time (when the main switch is "ON")

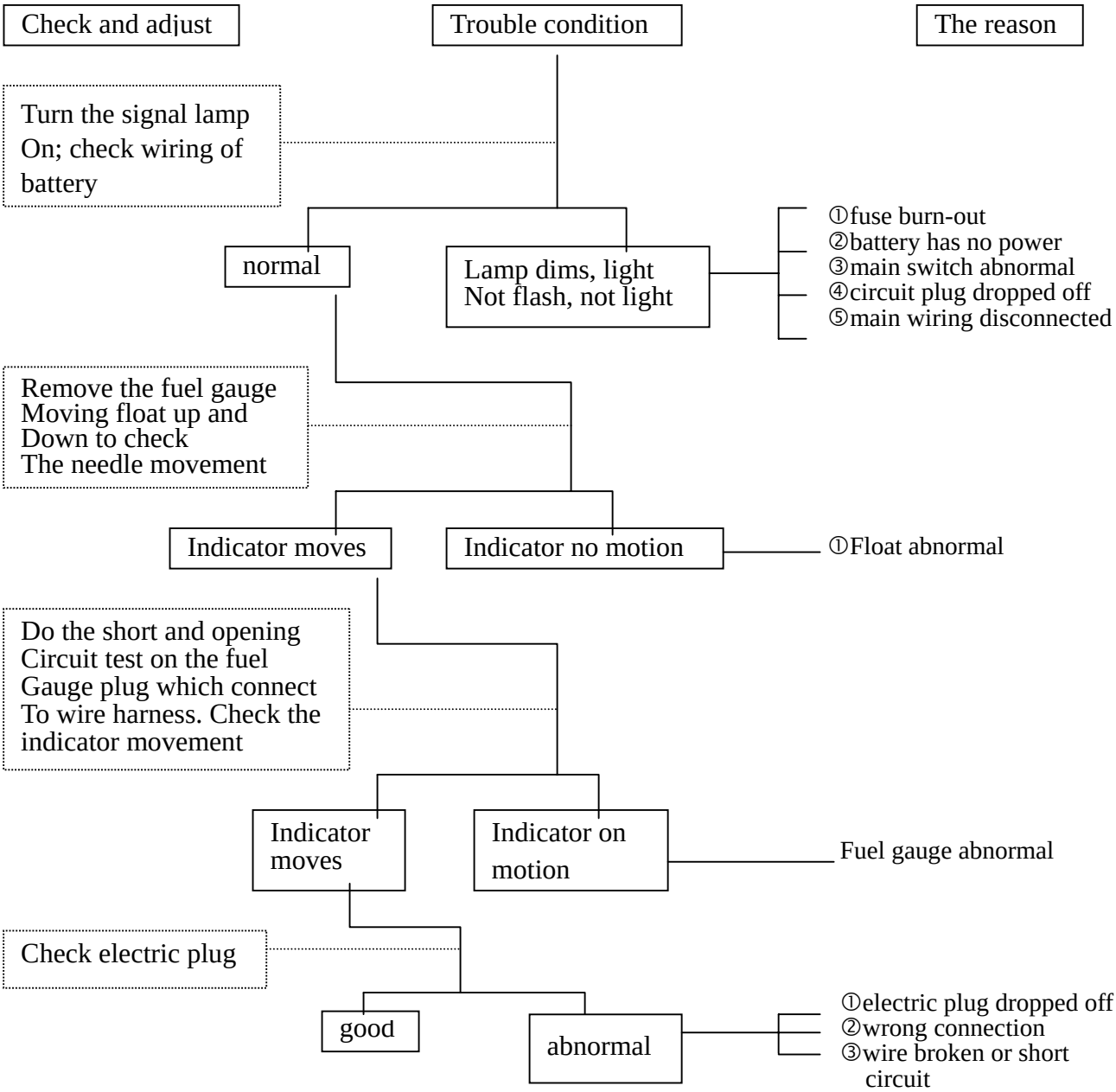


Float upward: lamp Extinguishes

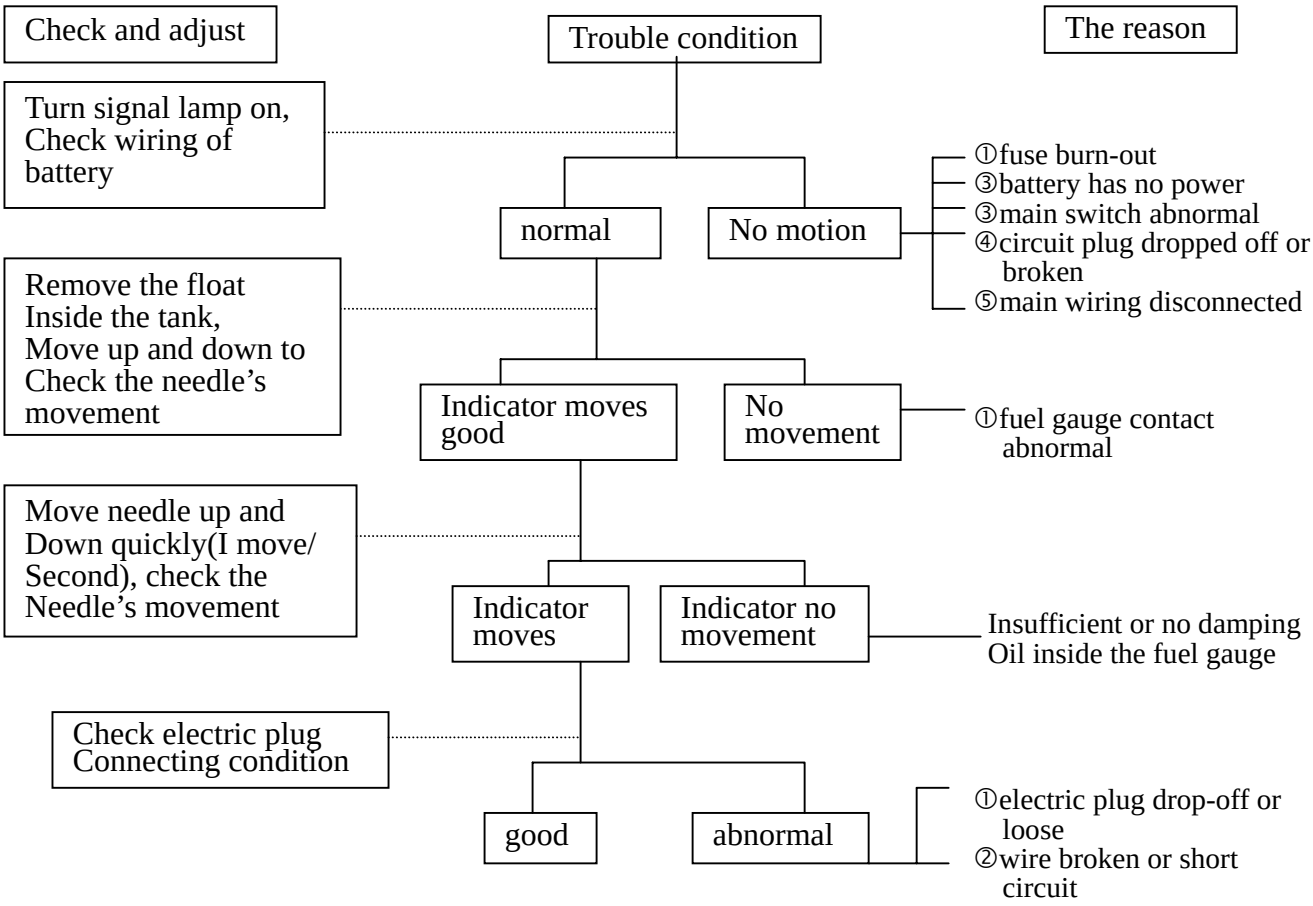
Float downward: lamp Turns on

10.Fuel indication malfunction

(a)wrong fuel level indication(when the main switch is “ON”)

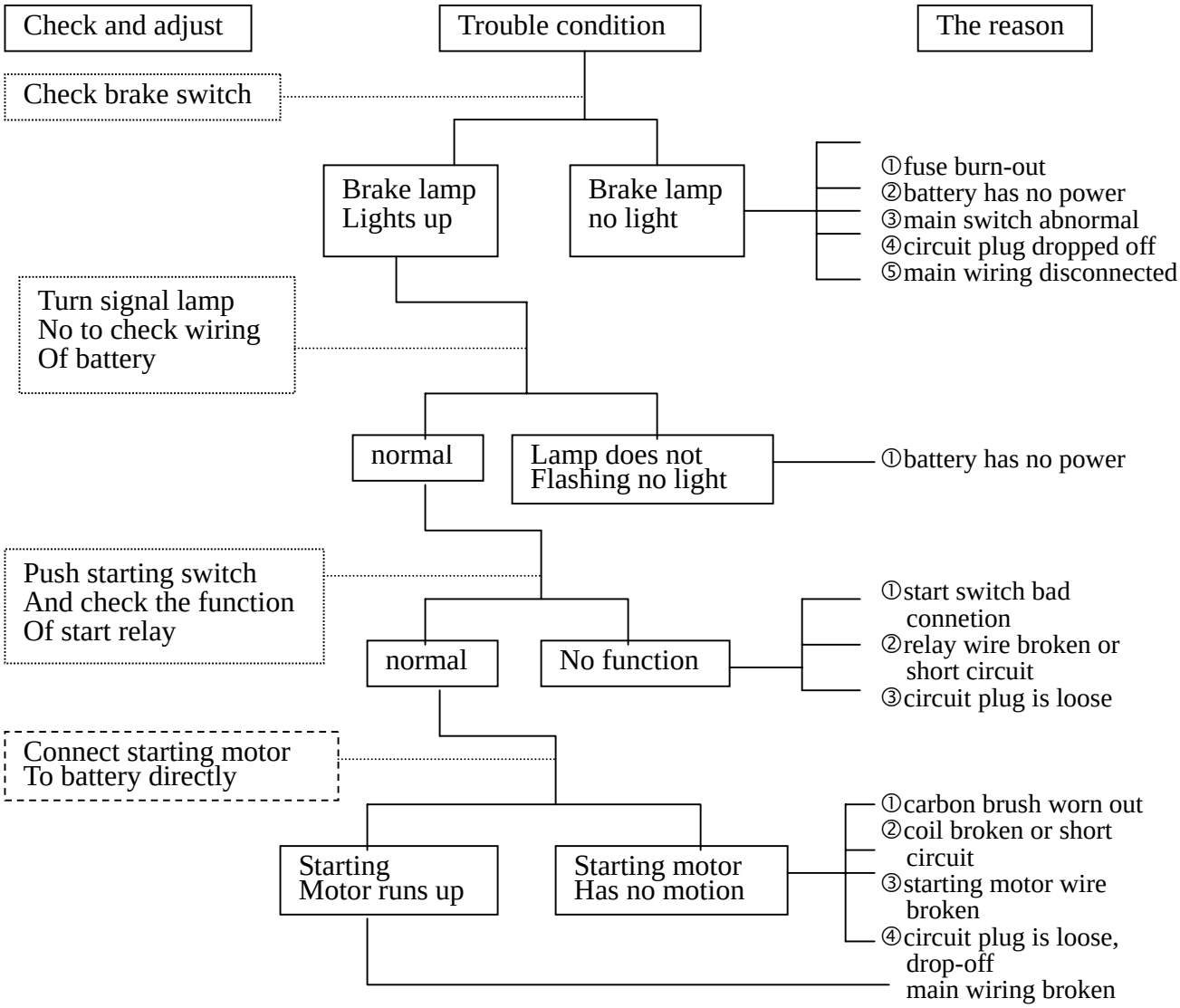


(b)Fuel gauge needle is not steady and sometimes moves up and down (when the main switch is “ON”)

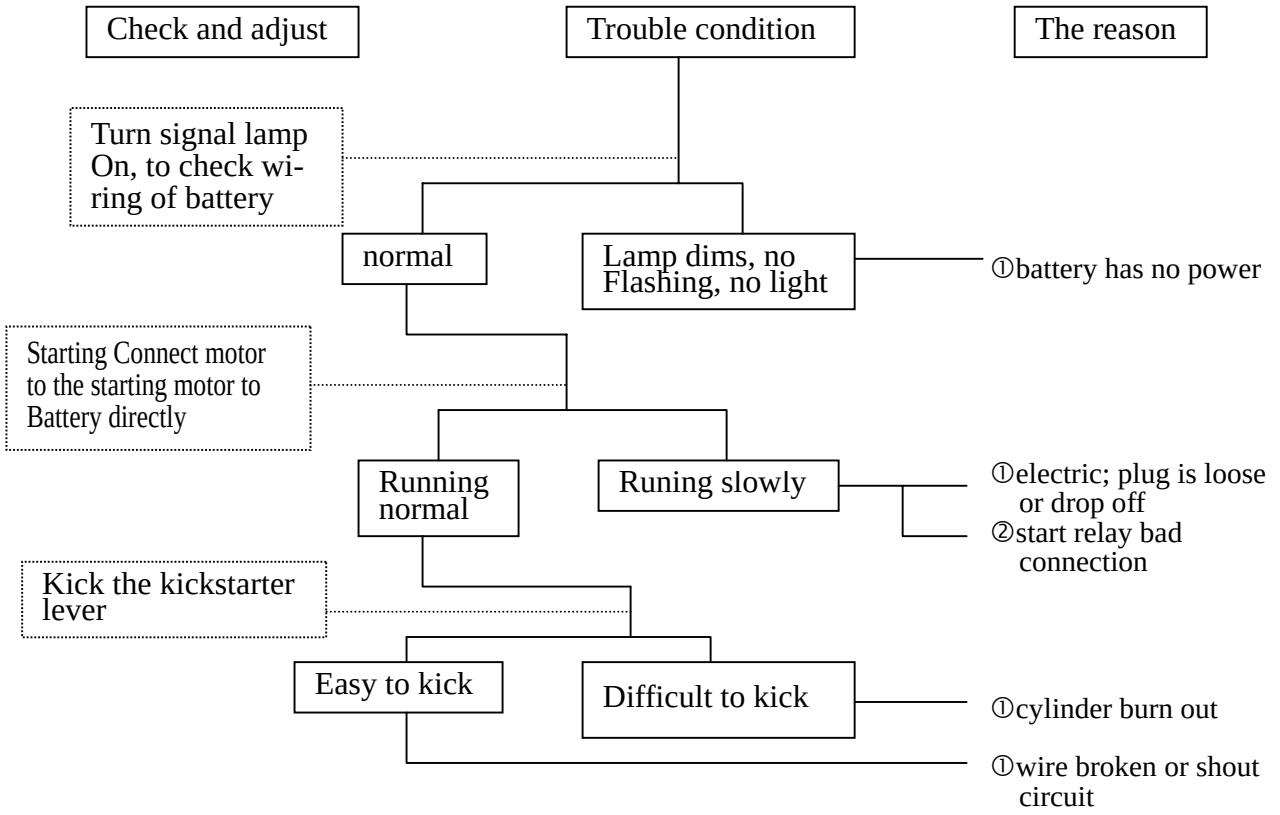


11.The starting motor abnormal

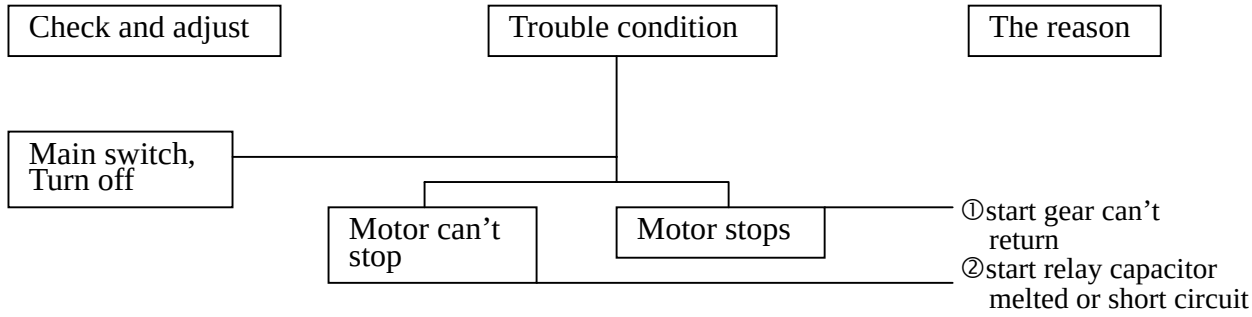
(a)Starting motor can not rotate



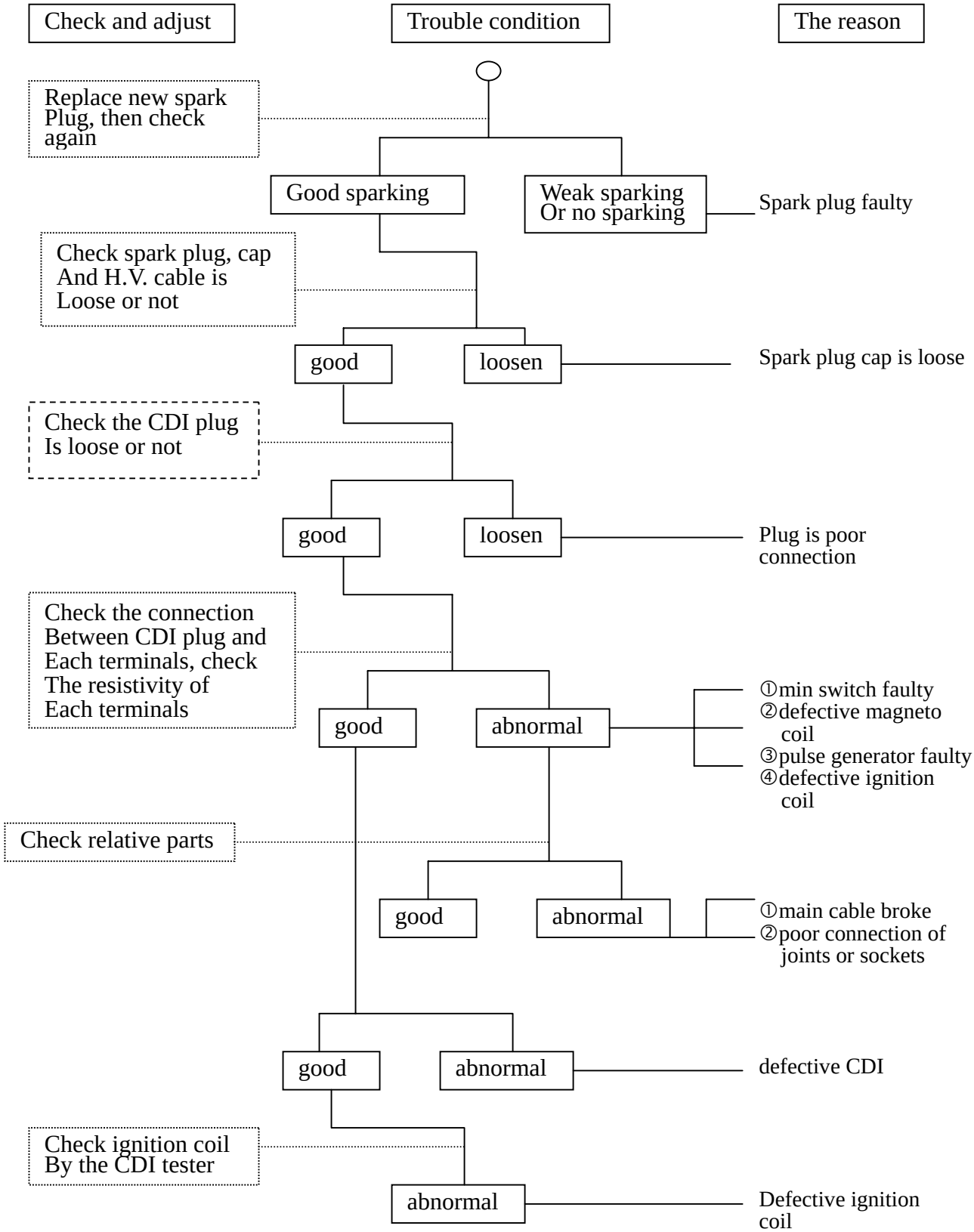
(b)Starting motor running slowly or no pick-up



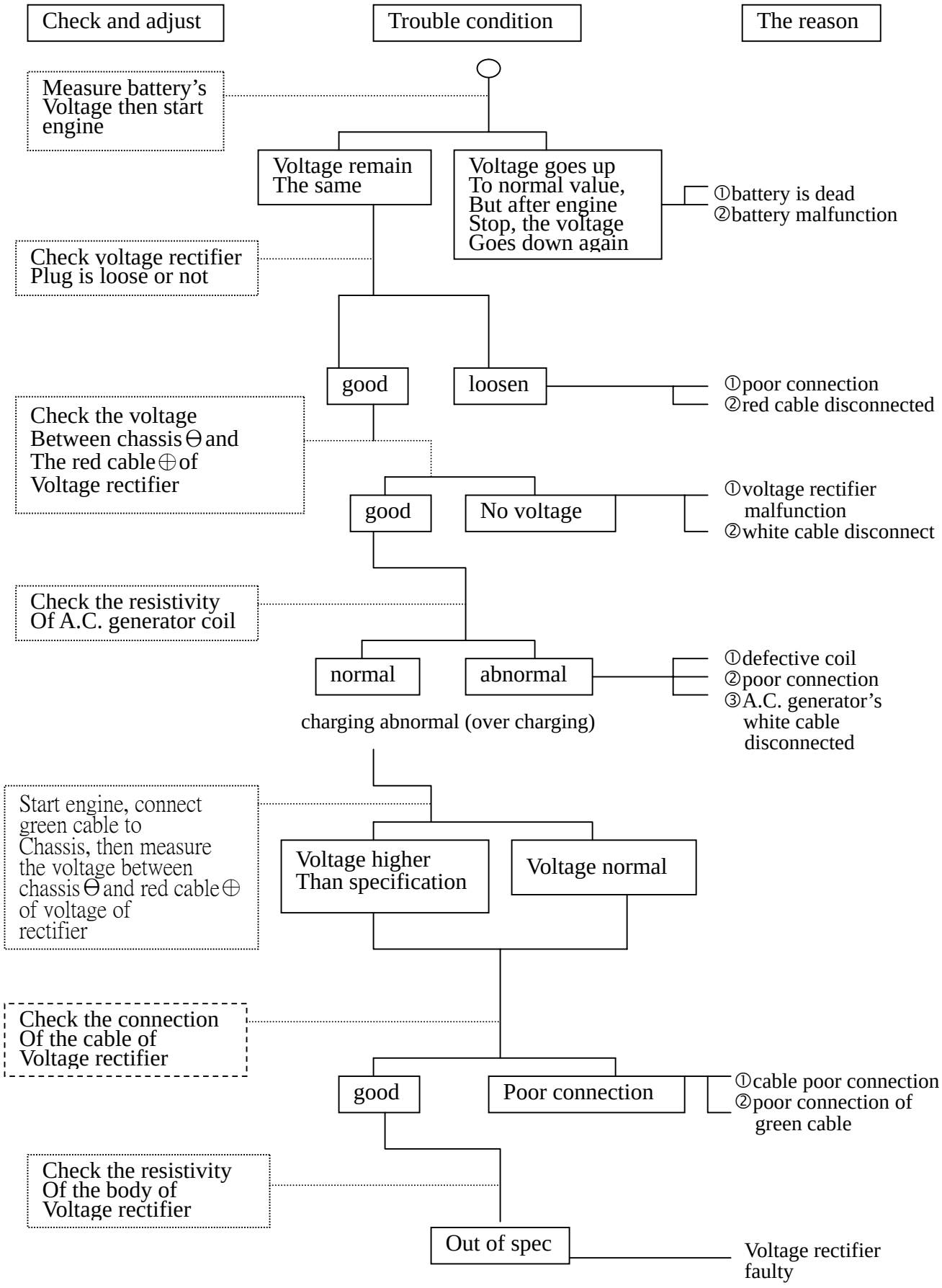
©Starting motor can not stop after starting



12.No sparking



13.Charging abnormal(battery over charging or over discharging)



3. Checking and Adjustment:

(1)Regular checking table

(2)Battery

(3)Clean air cleaner

(4)The final reduction mechanism oil

(5)Spark plug

(6)Compression pressure measurement

(7)Ignition timing

(8)Throttle cables adjustment

(9)Idle adjustment

(10)Front brake adjustment

(11)Rear brake adjustment

(12)Tire

(1)Regular checking table:

1.【〇】mark indicates periodical checking

2.【※】indicates changing the parts

Item			Checking period							Judgement standard	Remark
			gen-eral che-cking	first month or Initial 300km	home		office				
					every6 months or 5000km	every12 months or 10000km	every1 months or 1000km	every3 months or 2500km	every12 months or 10000km		
Suspension	Handlebar steering column	Loose or swing	◯		◯	◯	◯	◯	◯		
		Operation	◯		◯	◯	◯	◯	◯		
		Turning angle				◯			◯		
	front fork	Damaged			◯	◯	◯	◯	◯		
		Shaft fixed condition			◯	◯	◯	◯	◯		Check from Stering column
		Shaft:loose				◯	◯		◯		Check from Stering column
Brake	Lever	a. clearance	◯		◯	◯	◯	◯	◯	Clearance: Front:10~20mm Rear : 10~20mm	
		b. movement of brake	◯	◯	◯	◯	◯	◯	◯		
	Brake cable	loose or damage		◯	◯	◯	◯	◯	◯		
		Change brake cable								※every 2 years	
	Brake cam	worn out							◯		
	Wheel hub and brake shor	a. clearance between hub and lining			◯	◯	◯	◯	◯		
		b. brake shoe and brake lining worn-out				◯		◯	◯		
		c. wheel hub worn and damaged				◯			◯	standard dia:rear:110.0mm limit of use:rear:111.0mm	For M2-50 only
Wheel	Front wheel axle	damaged or distorsion							◯		
	Rear wheel axle	damaged or distorsion							◯		
	tire	Pressure	◯	◯	◯	◯	◯	◯	◯	unit: kg/c ㎡;1 driver front tire: 2.0 / rear tire: 2.0	
		Cracked or damaged	◯		◯	◯	◯	◯	◯		
		tire thread worn out	◯		◯	◯	◯	◯	◯	Change tire according to △mark	
		tire surface or other intruders	◯		◯	◯	◯	◯	◯		
	Axle	Tighten the bolt and nut			◯	◯	◯	◯	◯	Front axle nut torque 5.0-6.0kg-m rear axle nut torque 11.0-13.0kg-m	Nut location
	Rim	swingness and damage condition			◯	◯	◯	◯	◯	Swingness limit Vertical: below 2.0mm Horizontal: below 2.0mm	

Item			Checking period							Judgement standard	Remark
			gen-eral chec-king	first month or Initial 300km	home		office				
					every6 months or 5000km	every12 months or 10000km	every1 months or 1000km	every3 months or 2500km	every12 months or 10000km		
wheel	Bearing	Clearance on Front axle		○	○	○	○	○	○		
		Clearance on rear axle			○				○		
Rear Damper	Spring	Damage Condition	○		○	○	○	○	○		
	Ass'y part	Loose or damaged condition			○	○	○	○	○		
	Connecting part	loose or				○			○		
	Bracket	loose or damage condition				○			○		
	Suspension arm	Looseness on Connecting Part				○			○		
	Absorber	Oil leakage				○		○	○		
		Damaged Condition				○		○	○		
		Loose on ass'y part				○		○	○		
Transmission	Clutch and Shift mec-hanism	Function			○	○	○	○	○		
		Gear oil leakage			○	○	○	○	○		LH crank case
	Gear oil	Change gear oil			○	○	○	○	○	M2-200/220: 110C.C. / replace 130C.C/ total	M2-125/150: 90C.C. / replace 110C.C/ total
Electric	Ignition	Spark plug			○	○	○	○	○	Clearance: 0.6~0.7mm NGK:BP7HS NGK:C7HSA NGK:C7E NGK:CR7E	M2-50 M2-125& M2-150 M2-200 M2-220
	Start Mechanism	Starting motor gear				○		○	○		
	Wiring	Recharge Function			○	○	○	○	○		
	Battery	Electrolyte level			○	○	○	○	○	Level between "UPPER" and "LOWER"	
		Electrolyte gravity				○		○	○	When 20℃ Specific gravity: 1.270-1.290	
	Wire circuit	Looseness or Damage on connection plug			○	○	○	○	○		

Item			Checking period							Judgement standard	Remark
			gen-eral che-cking	first month or Initial 300km	home		office				
					every6 months or 5000km	every12 months or 10000km	every1 months or 1000km	every3 months or 2500km	every12 months or 10000km		
Engine mechanism	Engine parts	Performance, Noise			○	○	○	○	○		
		Low speed, Acceleration			○	○	○	○	○	Idling: 1900±100rpm Idling: 1700±100rpm Idling: 1600±100rpm	M2-50 M2-125&150&200 M2-220
		Exhaustion	○		○	○	○	○	○		Check the color of exhausting-air
		Air cleaner			○	○	○	○	○		
		Cylinder, cy1inder head, inlet pipe, locking Condition							○	Locking torque Cylinder head: (cold) 1.0-1.2KG-m Cam holder nut: 2.0-2.3kg-m	M2-50 M2125&150&200/220
		Compression Pressure (G-MAX 50)				○			○	. 6kg/c ㎡ @ 600rpm	Using starting motor
		Compression Pressure G-MAX 125				○			○	. 12kg/c ㎡ @ 750rpm	Using starting motor
		Compression Pressure G-MAX 150/200/220				○			○	. 11kg/c ㎡ @ 650rpm	Using starting motor
	Lubrication system	Oil leakage			○	○	○	○	○		
		Oil quantity, Dirty			○	○	○	○	○		
		Oil quantity,	○								
		Oil filter blocked				○	○	○	○		
	Fuel system	Fuel quantity	○								
		Fuel leakage			○	○	○	○	○		
		Clean Carburetor			○	○	○	○	○		
		Carburetor's Throttle and Choke function			○	○	○	○	○		
		Carburetor Float height			○	○	○	○	○		
		Carburetor Adjustment			○	○	○	○	○		
		Change fuel pipe								※every 4 years	

Item		Checking period							Judgement standard	Remark
		gen-eral che-cking	first month or Initial 300km	home		office				
				every6 months or 5000km	every12 months or 10000km	every1 months or 1000km	every3 months or 2500km	every12 months or 10000km		
Lamp system	Function	○		○	○	○	○	○		
	Dirty or broken	○		○	○	○	○	○		
Horn, signal Lamp, reflector	Function	○		○	○	○	○	○		
lock	Function			○	○	○	○	○		
Rear view mirror	Dirty or broken	○		○	○	○	○	○		
License plate	Dirty or damaged	○								
Dashboard	Function	○		○	○	○	○	○		
Muffler silencer	Losseness or Damage on Ass'y part			○	○	○	○	○		
	Function				○		○	○		
chassis	Loose or Damaged				○		○	○		
The previous Abnormal case	Confirm it does Not happen Again	○								
others	Chassis Lubrication			○	○	○	○	○		
	Decarbonate on Combustion room And muffler				○			○		

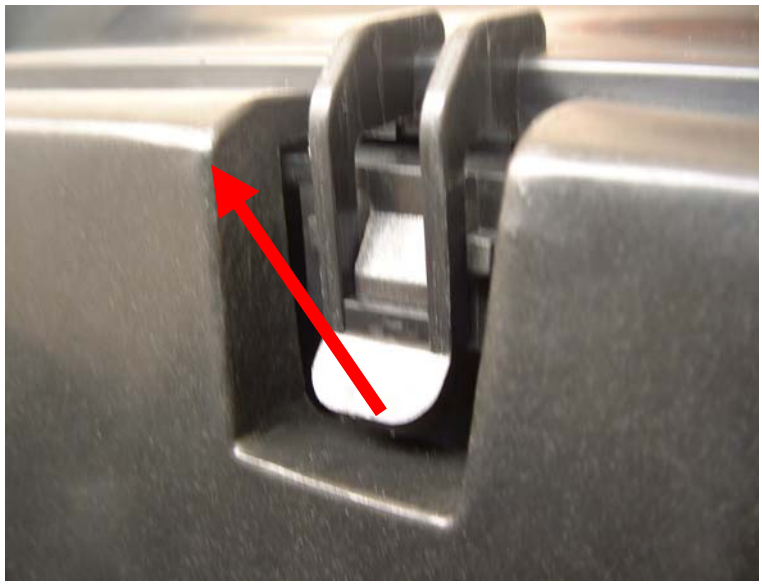
(2)Battery: Recharge when power is out

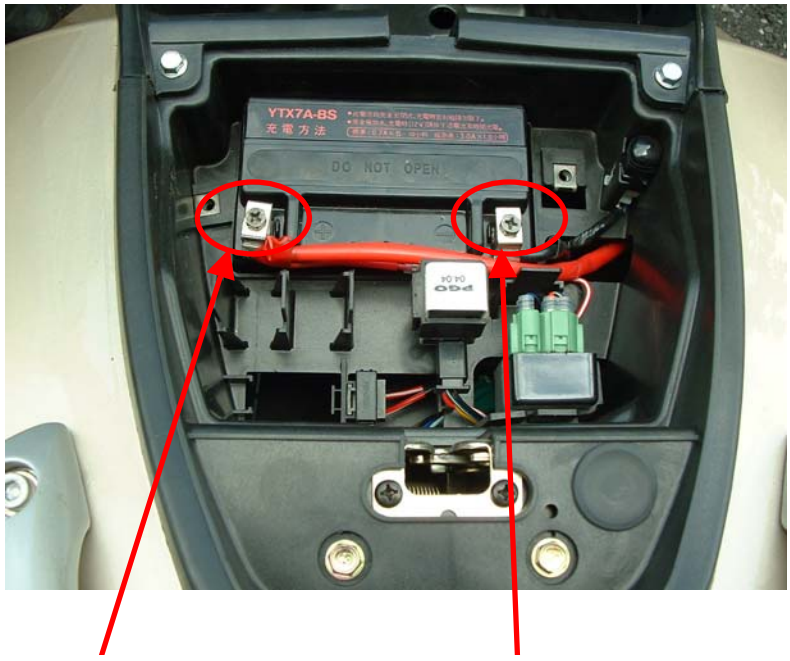
1.Remove the rear luggage cover by hand.

2.Screwing out the two screws on the battery cover. Remove the battery cover. (G-MAX125/150/200/220)

3.Remove the negative cable and then the positive cable,→take out the battery to recharge.

4.To re-assemble the battery, please follow the opposite procedure of disassembling after recharging.





Positive Pole **Negative Pole**

Note:

A. The battery is totally s

B. It's no need to add any electrolyte for this re-filling free battery

Please recharging (12V) by the following currency

G-MAX50: Standard recharging:0.4A* 5-10 hr or rapid recharging:4A* 30min.

G-MAX125/150: Standard recharging:0.7A* 5-10 hr or rapid recharging:3A* 60min.

G-MAX200/220/250: Standard recharging:0.9A* 5-10 hr or rapid recharging:3A*60min.

(3)Cleaning air cleaner

1.Remove air cleaner cover

2.Take out the air cleaner filter

G-MAX50

G-MAX125/150

3.Clean the filter by the compressor air.

M2-250

M2-200/220

4.Assemble the air cleaner by the opposite procedure.

Note: Do not start the engine when the air cleaner is Not installed

(4)The final reduction mechanism oil

1.Change the oil in the gear box:

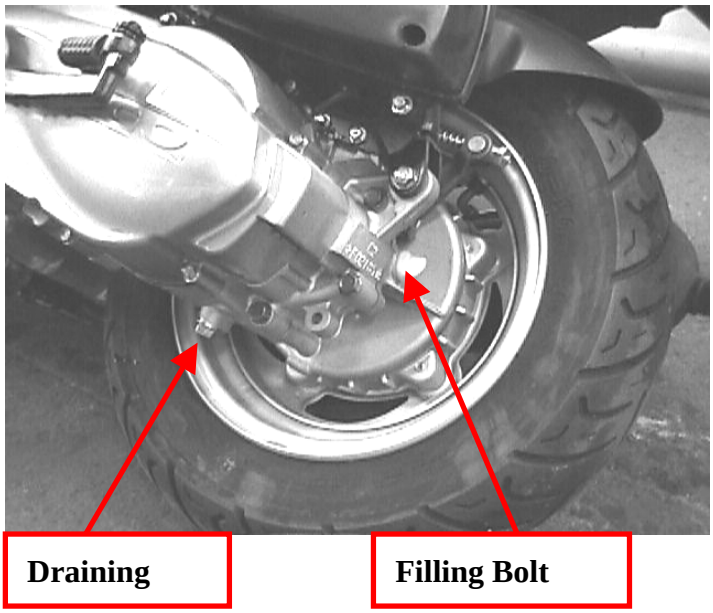
a. Turn off the engine after warm up.

b. Put a bowl under the engine.

c. Remove the draining bolt and Filler bolt to drain the gear oil off.

d. Lock the draining bolt before refill gear oil and then lock the filling bolt.

e. Locking torque: 1.8kg-m



Note: Be sure the crankcase, tire or wheel are cleaned if there is grease/oil on it

(5)Spark plug

1.Remove spark plug

2.Check the spark plug electrode and check if it is Burnt out or not and carbonized or not

3.Clean the electrode, whether it is dirty

4.Spark plug specification

G-MAX50: BP7HS (NGK) or equivalent spec.

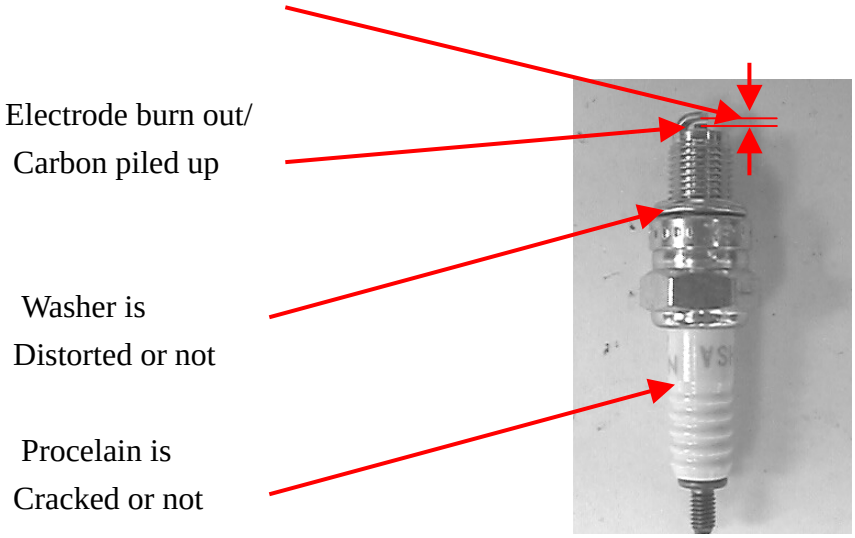
G-MAX125/150: C7HSA (NGK) or equivalent spec.

G-MAX200: C7E (NGK) or equivalent spec.

G-MAX220: CR7E (NGK) or equivalent spec.

G-MAX250: DPR7EA (NGK) or equivalent spec.

Gap of spark plug :0.6~0.7mm(general); 0.9mm(M2-250)



(6)Compression pressure measurement:

1.Measure it when the engine is warm.

2.Remove the cover.

3.Remove spark plug then place compression pressure gauge.

4.Fully open the throttle, and using starting motor 5 seconds continuously, measure the compression pressure.

5.Compression pressure:

50cc: 6 kg/c㎡ @600rpm

125cc: 12 kg/c㎡ @750rpm

150/200/220 cc: 11 kg/c㎡ @650rpm

250 cc: see engine chapter

6.when the compression pressure is too low, check the following:

a. cylinder head gasket cracked.

b. piston cylinder worn out.

c. piston ring worn out.

7.If the compression pressure is too high it may be due to the carbon piled up on combustion chamber and piston tip.

(7) Ignition timing:

This scooter is using CDI set, it is no need to adjust ignition timing.
If ignition timing is not correct, check the CDI sets and AC magneto, change it if it is

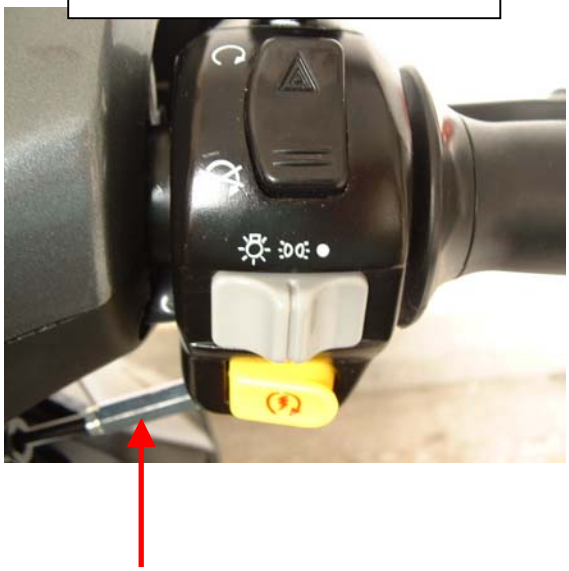
checking ignition timing:

1.remove seat the luggage compartment
2.Remove right body cover
3.Remove the fan case.
4.Check with ignition timing lamp.
keep the engine running at 1,900 ± 100 r.p.m the checking mark should lay in $\pm 3^0$ apart From "F", mark.
5.ignition timing: B.T.D.C.
17° ±3° / 1900rpm

(8)Throttle cables adjustment:

1.check the clearance of throttle.
2.Normal clearance:1.5~3.5mm
3.Adjust it by rotating the adjust nut ; change it if the throttle cables can't be adjusted.

M2-50/125/150/200/220



M2-250

(9) Idle adjustment:

Note: adjust it when the engine is warm.

1.remove left body cover

2.start the engine and connect the tachometer

3.adjust the throttle valve screw
to the specified revolution 1900±100rpm. (M2-50)
1700±100rpm. (M2-125&150&200&250)
1600±100rpm. (M2-220)

4.if the idling rpm is still unsteady or
fuel up is not smooth, please adjust it by
followings.

a. Screw in the air adjust screw clockwise,
then screw out counterclockwise.
Recommended loop: 1 3/8x1/2

b. Rotate air adjust screw clockwise and counterclockwise to find out the highest revolution location.

c. Rotate the throttle valve screw to idling condition.

d. Fuel up gradually until the idling running rpm is steady.

e. If the rpm is still not steady please repeat above procedure.

(10)front brake adjustment:

1.check the clearance of front brake lever.
Clearance:10~20mm

2.if the clearance is beyond, standard check whether:

a. The air mix into the pipe/caliper.

b. The oil brake system is leaking.

Note: Try brake lever to see if it's loose. Check the brake fluid. Once air mixed in The fluid pipe, which will reduce or Damage the brake efficiency or even its Function.

3.check the fluid level:

a. Refill the brake fluid when the level is under the LOWER line.

b. Brake fluid specification: SAE J-1703F-DOT3&DOT4.

Note:

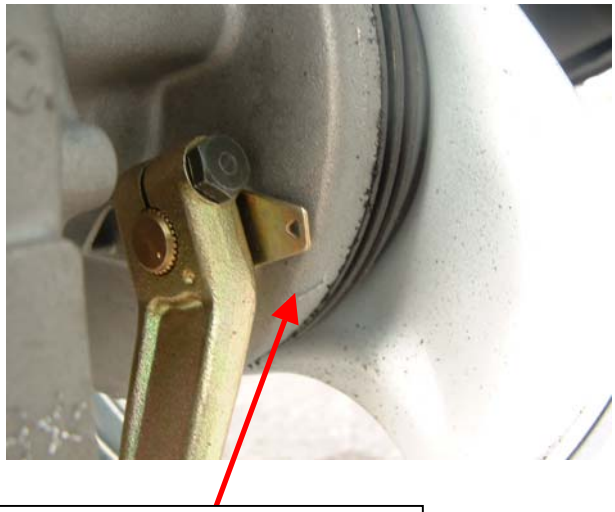
a. To prevent the fluid splitting onto the parts or clothes, put a piece of cloth on the bottom when refilling.

b. Be caution not to mix water or particles into the master cylinder when refilling.

c. Never use the fluid not complied with spec.

d. In case the fluid stains on the eyes, wash with water at once and then ask for medical care immediately.

(11)Rear brake adjustment (drum brake only)



1.Check the clearance
Of rear brake lever.
Clearance: 10-20mm
2.If the clearance is
beyond the above standard,
Adjust it by rotating the screw.
a. Left-handed rotation-enlarge
the clearance.
b. Right-handed rotation-reduce the clearance.

Note:
When the arrow of rear brake indicator align with the arrow of left crankcase, change the brake lining.

(12)Tire:

1.Check the tire air pressure(when it's cold)
2.Tire pressure:
Front tire: 2.0 kg/c ㎡
Rear tire: 2.0 kg/c ㎡
3.Tire dimension:

G-MAX 50:

Front tire: 120/70-12

Rear tire: 130/70-12

G-MAX 125/150/200/220:

Front tire: 120/60-13

Rear tire: 130/60-13

G-MAX 250:

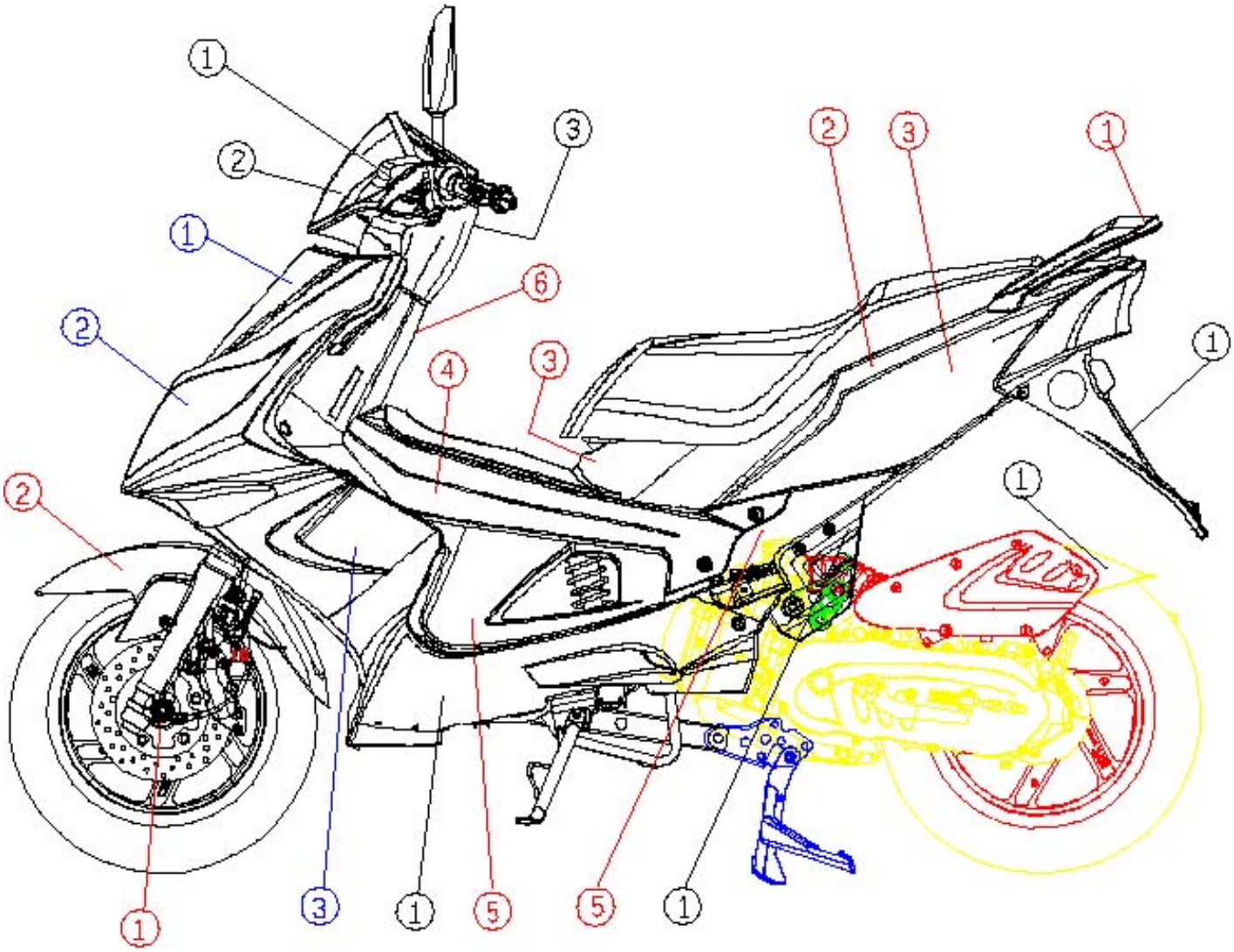
Front tire: 120/60-13

Rear tire: 140/60-13

Note:
a. Check and adjust the tire pressure when it is too low.
The pressure is according to the carrier, Driver, passenger, accessories and cruise Speed.
b. Proper loading is very important for steering, riding, braking, performance and safety.
c. Never carry any parcel unfastened.
d. Load the heaviest parcel on the center of vehicle, balancing the weight on both sides.
e. Beware of the weight loaded properly and check the tire pressure. The total weight of carrier, driver, passenger, and accessories cannot exceed the approved limit, An overload vehicle is easy to cause tire damage and accident for rider.

4.Check is there any sharp Object pierce the tire.
5.Check the depth of tire Thread.
a. Depth(front & rear):
According to mark of tire "▲"to change a new tire

A. Plastic part dismantle Overview



Dismantle the plastic parts according to above figure sequence by sub-assembly, especially pay attention to followings:

- **Before dismantle front fender, dismantle the front wheel assy. First. (G-MAX125/150 only)**
- **Windshield & frt signal lamp cover shall be dismantled together.**
- **LH & RH body cover shall be dismantled together.**

Actual dismantle procedure:

- Dismantle the upper cover & windshield.
- Loosen 2 tapping screws at the upper with the inner cover.
- Withdraw the windshield decorated cover.

- Dismantle the handle upper cover.
- Loosen 5 tapping screw under the handle.

- Dismantle windshield & turn signal front cover.
- Loosen 1 tapping screw under windshield.
- Loosen 1(LH) & 1(RH) tapping screw under turn signal front cover.

- Loosen 3(LH) & 3(RH) tapping screws of front inner cover.

- Loosen 3(LH) & 3(RH) tapping screws of front inner cover.

- Loosen 1 machine screw in the middle of windshield.
- Dismantle windshield & front turn signal cover together.

- Dismantle the front fender.
- Only for G-MAX125/150:
  Loosen nut of front wheel, dismantle the front wheel & brake disc together.
- Loosen screws at LH & RH of front fender, dismantle front fender

- Open the seat.
- Loosen 3 bolts of rear luggage bracket, dismantle it.

- Loosen 4 bolts of front luggage compartment.
- Disconnect the coupling of lighting lamp, dismantle the front luggage compartment.

- Loosen 2 bolts of rear luggage compartment

- Lift the cover with finger, withdraw the cover of rear luggage compartment.
- Withdraw the rear luggage compartment.

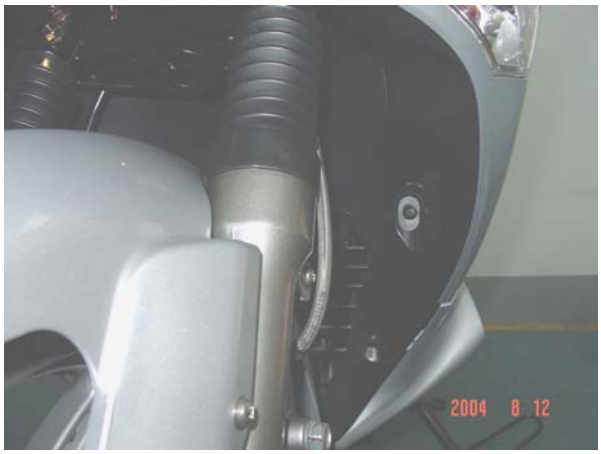
- Turn the tank inner cover counterclockwise a little bit, dismantle it.
- Dismantle the tank upper cover by releasing coupling ribs
- Withdraw fuel tank decorated cover.

- Dismantle the keel cover.
- Loosen 2(LH) & 2(RH) screws at the front upper section.

- Loosen 2(LH) & 2(RH) inner socket screws, dismantle the keel cover.

- Dismantle the LH & RH lower cover
- Loosen 4 tapping screws on the top of LH & RH lower cover
- Dismantle quick plastic screw(2 EA in each side)

- Dismantle 1 tapping screw in the front side.
- Withdraw LH & RH lower cver.



- Dismantle other PP covers.

- Dismantle the license plate
- Push the middle of quick plastic screw.

- Loosen 2 screws at the rear of vehicle.
- Withdraw the license plate.

B. G-MAX 50 Engine dismantle, maintenance, repair and assembly:

(1)Lubrication system

(2)Engine dismantling

(3)Drive pulley, starter, clutch,

(4)Cylinder and, piston

(5)AC Generator

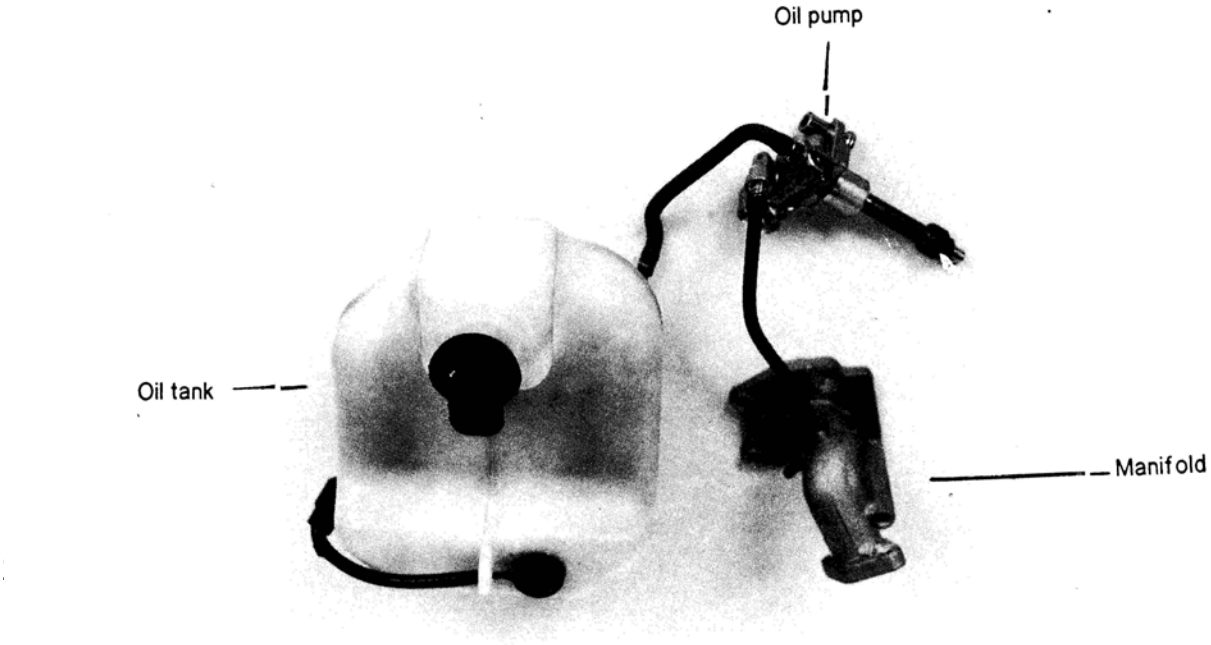
(6)Final transmission mechanism

(7)Crankcase, crankshaft.

(8)Carburetor, reed valve

(1)Lubrication system and oil pump

1.Lubrication system diagram.



B. Engine over heating:

a. The adjustment of oil pump is not properly.(1ack of oil)

b. The quality of oil is not good.

C. Piston over burning.

a. There is air in the oil pump system.

b. Oil pump is out of order.

D. The route from oil tank to oil pump is blocked.

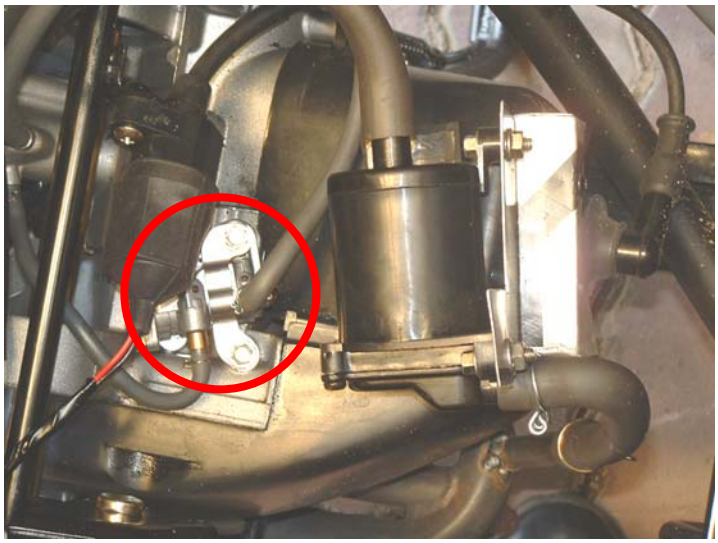
a. Ventilation hole on the tank cover is blocked.

Note:1.When removing oil pump, do not drop any unexpected objects into the oil pipe.

2.Please release the air if there is air trapped in the oil pipe.

3.Locking torque of oil pump:0.8-1.2kg-m

3.Removing the oil pump.



Clean the oil pump and
Crank case before operation

a. Remove the luggage.
b. Remove the input/output oil pipe.
c. Take out the oil pump by removing
The locking screw on oil pump and
Oil gauge cable.

4.check the oil pump.

Remove oil pump and check:

a. O-ring is distorted or not.

b. contact area of crankcase is
injured or not.

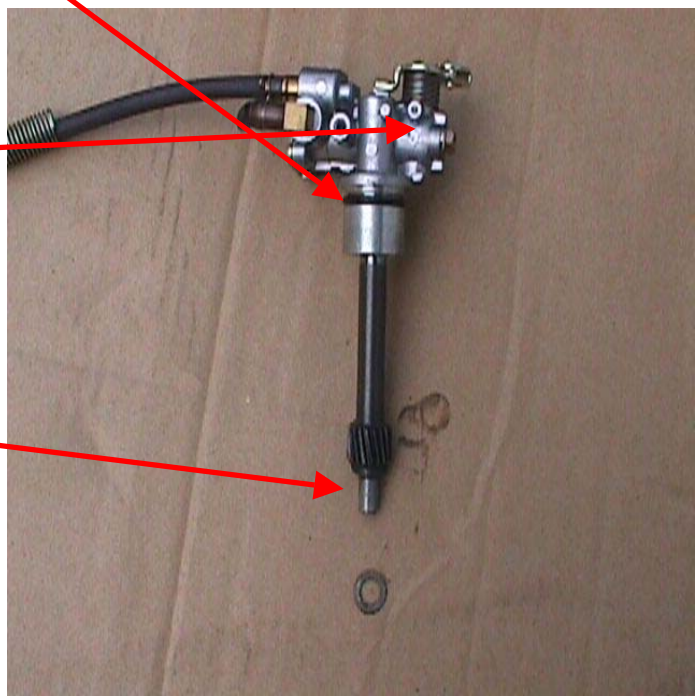
d. Oil pump body is damaged or not

e. The movement of control lever
is free or not (110 cc model only)

f. The gears are damaged or not.

g. Check seal and see if there
Is oil leakage or not.

h. Never dismantle oil pump, it
can not function well after
dismantling.



5.Assemble the oil pump.

a. Assemble the oil pump by reversing above procedure.

> O-ring of oil pump should be lubricated by grease or oil, then place on crankcase.
> The contact surface of oil pump and crankcase should be assembled firmly.
> The gears of oil pump should be lubricated by grease.

b. Be sure oil pump screw is tightened.

> After assembling, check the following:
> a. the adjustment of control cables
> b. Is there air in oil pipe.
> c. oil leakage at any location.

6.Releasing air in the oil pump.

> a. If there is air in the oil pipe, it will cause engine lubrication trouble
> b. Releasing air operation means the release of air trapped in the air pipe and oil pump. Please firstly release air from the oil pipe

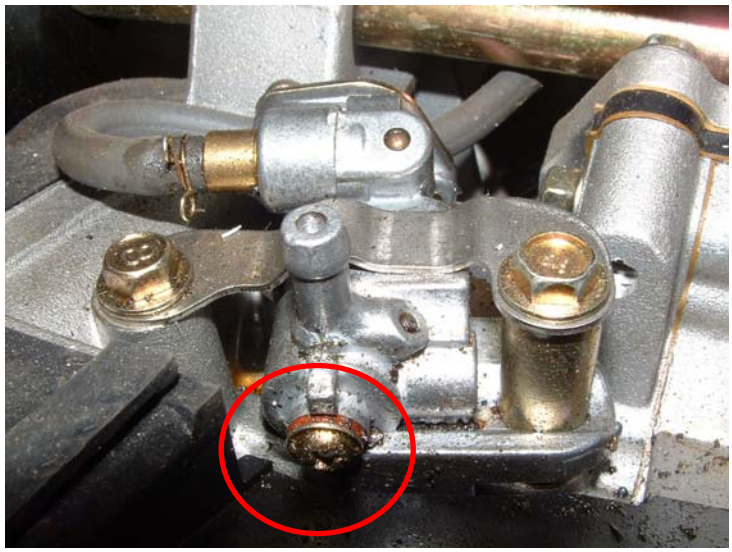
(a)Fill up specific amount of oil to oil tank.

(b)Place dry cloth under the oil pump.

©Remove oil pipe.

(d)Use injector to fill up the oil in the oil pipe and oil pump body . Be sure the oil pipe and oil pump are full of oil before assembling.

(e)After assembling check if there is still air trapped in the oil pipe.



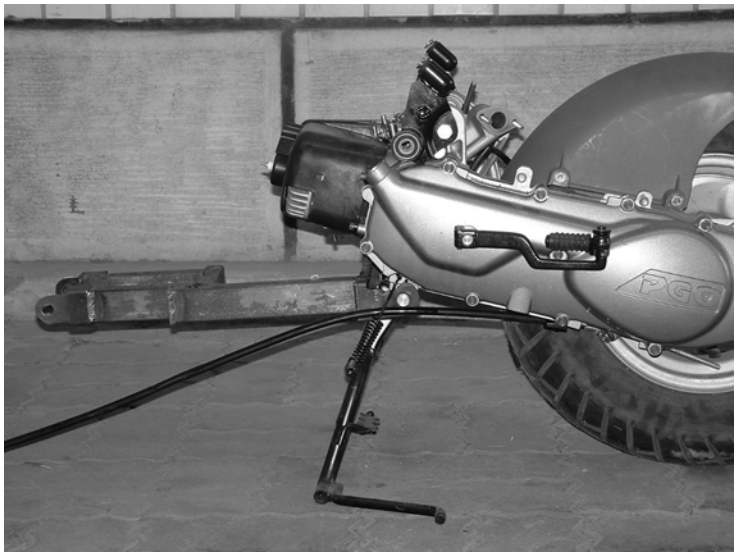
(2)Engine Dismantling

A. Dismantling engine.

1.Take off the luggage compartment.

2.Take off the left and right body covers.

3.Take off the lower mudguard fender.



4.Remove vacuum pipe, fuel pipe, auto choke, cap of spark plug, rear Brake cable carburetor pipe, engine flywheel shelf's nut, starter Motor cable plate and rear damper bolt.

5.Remove the engine.

B. Installing Engine.

1.To install engine, please reverse the above procedures.

2.Locking torque:

M8: 2.0~3.0kg-m

M10: 3.0~4.0kg-m

M12: 5.0~6.0kg-m

3.After installing, please do the following checking and adjustment:

Checking and adjustment:

a. Wiring connection.
b. Throttle cable and oil control cable.
c. Rear brake adjustment.
d. Fuel and oil route.

(3)Drive pulley, starter & clutch

A. Troubleshooting:

a. Engine starts, but vehicle does not move.

1.driving belt worn out

2.driven plate worn out

3.clutch lining worn out

4.driving plate's spring broken

b. The vehicle stops or trembles when running,

1.clutch lining spring cracked or broken.

c. Can't reach high speed, no pick-up

1.driving belt worn out.

2.Driving plate spring distortion.

3.Weight roller worn out.

4.Driving plate abnormal.

Note:

No grease and oil allowed to stain on driving belt and driven plate.

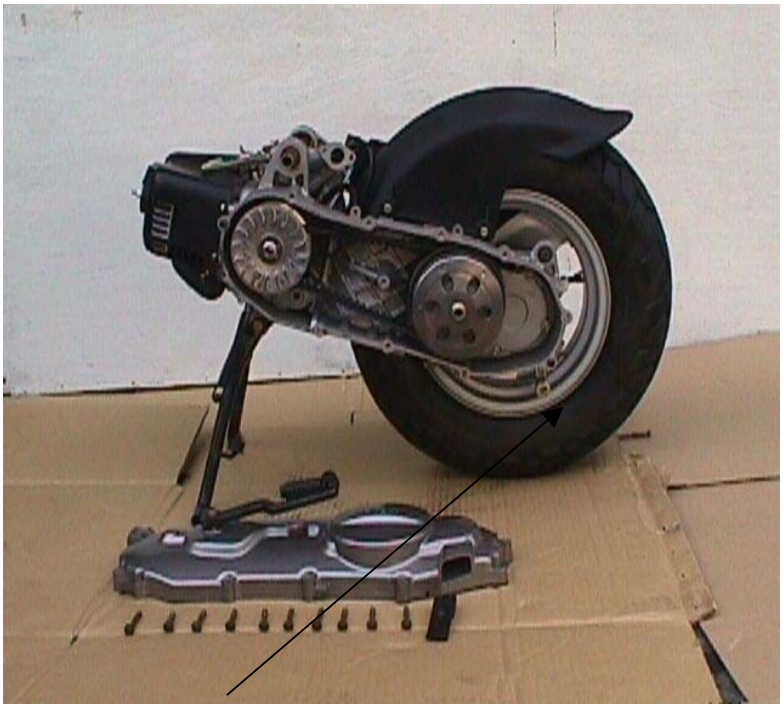
B. CVT parts measurement data

Item	Standard value(mm)	Limit of use(mm)
Model	50cc	50cc
The inner dia. of Slide driving plate	20.035-20.085	20.123
The outer dia..of boss, movable Driving plate	19.960-19.974	19.911
Belt width	18.0-19.0	17.0
Clutch lining thickness	3	1.5
Clutch outer diameter	117.0~117.2	117.5
Driving plate spring, free length	87.9	82.5
The outer diameter of driven plate sets	33.965~34.025	33.95
The inner diameter of slide Driven plate	34.000~34.025	34.070
The outer diameter of weight Roller set	15.992~16.008	15.50

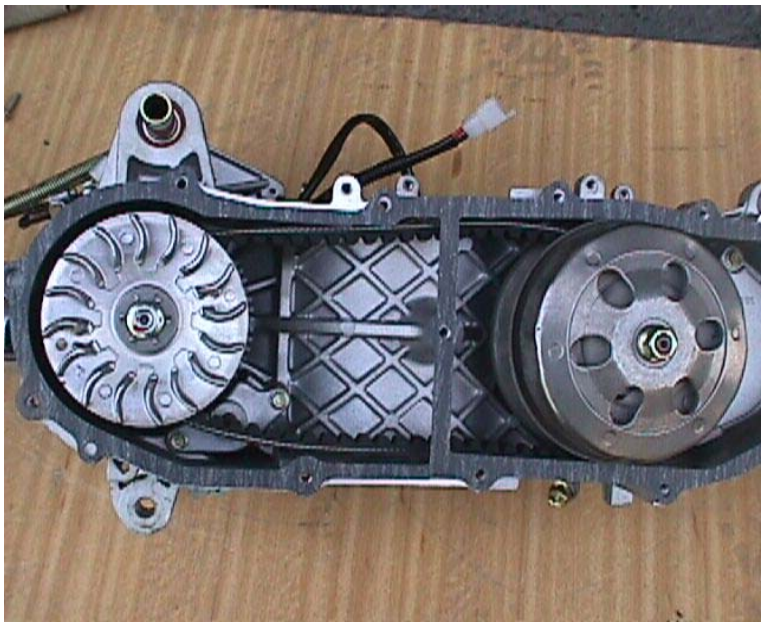
C. Driving pulley.

1.Take off the 10 screws of left Cover, remove the left cover.

2.Take off the left cover.



3.Remove the fixing nut of the clutch.



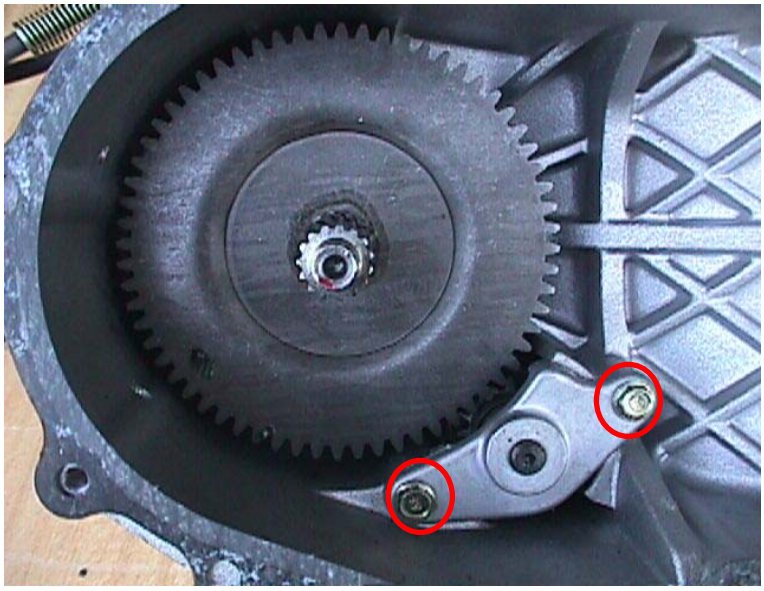
4.Take off the ramp plate.

5.Take off the belt and the rear clutch.

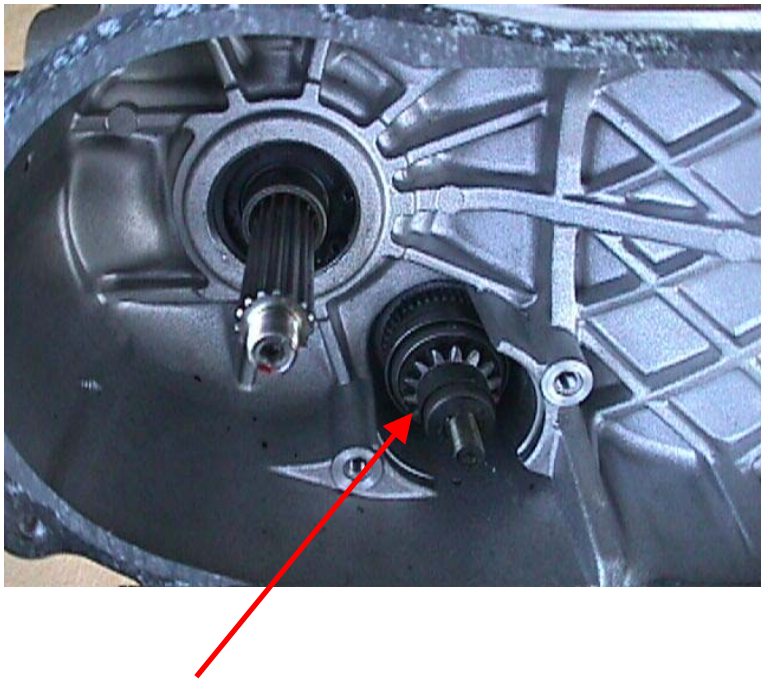
6.Take off the driving plate.

- Take off the driving gear start set.

7.Remove the start idle gear fixing plate.



8.Take off the idle gear.



9.To assemble the driving pulley, please reverse above procedure.

Locking torque: 1.Nut of driving pulley:M10: 3.2~4.0kg-m 2.Locking nut of clutch:M10: 3.5~4.0kg-m

10.Checking the driving belt

(1)check whether it is cracked or not or its rubber and fiber are loose or not check also if they are extraordinarily worn out.

(2)driving belt width:

limit of use : change it below 17.0mm.

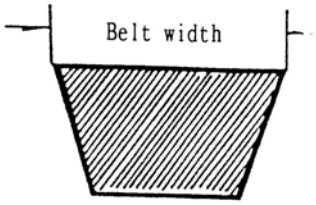
11. Disassemble the slide driving plate set

(1)Remove the bush of slide driving plate

(2)Remove the screw, and disassemble the cover of slide driving plate.

(3)Remove RAMP plate.

(4)Remove weight roller.



12.Checking list:

(1)Check the wearing condition of the weight roller.

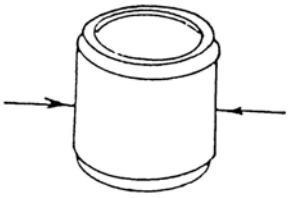
limit of use:change it when below 15.5mm.

(2)Check inner dia of slide driving plate's gasket.

Limit of use: 50cc:Change it when above 20.123 mm

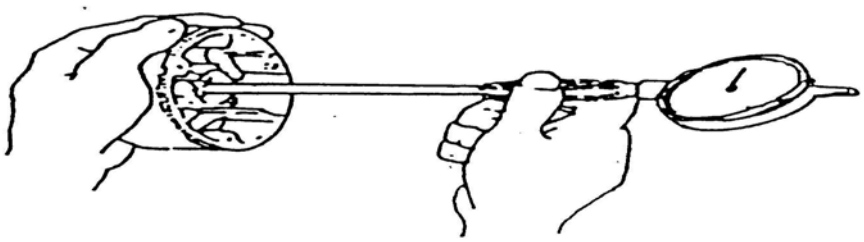
(3)Check the wearing condition for driving pulley surface.

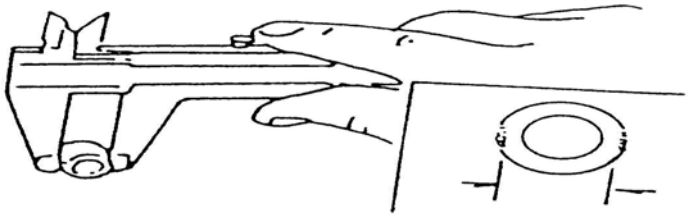
(4)Check the outer diameter of the driving plate's boss.



Check the wearing condition

Limit of use: change it when below 19.911mm





13.Assemble the slide driving plate.

(1)Clean the inner surface of slide driving plate, then assemble the roller.

(2)Assemble the ramp plate.

(3)Please reverse the procedures of disassembling to finish assembling.

D. Starter dismantling

1.Dismantle the left crankcase cover

2.Remove the hexagon nut, then remove the starter lever.

3.Remove five screws of isolating plate.

4.Remove the stater spring from the start returning positioner.

5.Remove the driven gear comp of kick starter.

6.Remove the retaining c-type clip

7.Remove the spindle comp.

Of kick starter.

8.Checking the starter

a. Check the wearing condition of the outer diameter of the spindle comp and the inner diamter of bush and gear.

b. Check the wearing condition of the shaft of driven gear comp, gear sets and ratchet.

9.Assembling the starter

To assemble the starter, please follow the opposite procedures of dismantling.

Locking torque: M6:1.0~1.2kg-m

Note:

①Make sure that on end of the torsion spring is hooked on the groove of driven gear, and another end of the torsion spring is hooked on the poled inside the left crankcase.

②Put some grease on shaft and gear sets before assembling.

E. Clutch driven pulley

1.Dismantle the clutch

a. Remove left crankcase cover.

b. Remove driving plate.

c. Remove driving belt.

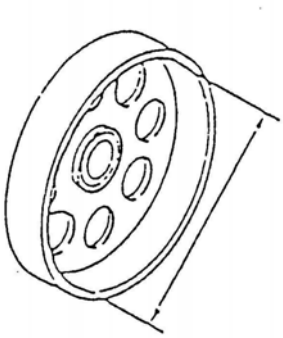
d. Remove the M10 locking nut, then the clutch.

2.Assembling the clutch: please follow the opposite procedure of dismantling.

Locking torque: M10: 3.5~4.0kg-m

3.Checking the clutch:

Dismantling the clutch needs the special Tool. please contact your dealers.



a. Check the clutch driven face.

Check the clutch cover about its wearing

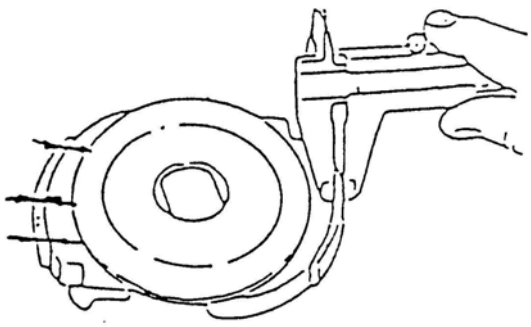
Condition and inner diameter measurement.

Limit of use: 50cc:Change it when above 117.5mm

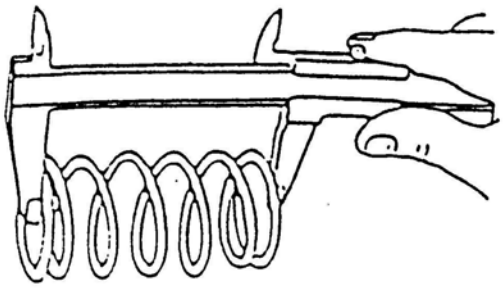
b. Check the clutch lining wearing condition

and measure the lining thickness

limit of use:change it below 2.5mm.



c. Check driven spring free
length: standard: 87.9mm
Limit of use:change it as it
Is below 82.5mm(50cc)



d. Check wearing condition of
driving plate set.
Outer diameter measurement:
Limit of use:change it as it
Is above 33.950mm

e. Check wearing condition of
slide driven plate.
Inner diameter measurement:
Limit of use:change it as it
Is above 34.070mm

f. Check is there any wearing
occur to the ditch.

g. Check wearing condition of
seal location, if necessary
change a new one.

(4)Cylinder and piston:

A. Troubleshooting.

a. compression pressure is too low, difficult to start engine and running unsmoothly.

1. Cylinder head gasket cracked.
2. Spark plug is not well-locked.
3. Piston ring worn out or cracked.
4. Cylinder, piston worn out.
5. Reed valve is defective.

b. compression pressure is too high, engine overheating or abnormal noise.

1.piston tip has too much carbon piled up.

c. Abnormal piston noise

1. cylinder and piston worn out.
2. Piston pin hole or piston pin worn out.
3. Connecting rod small-end or bearing worn out.

d. Abnormal piston or cylinder noise

1.piston ring worn out or cracked.
2.Cylinder worn out or cracked.

B. The operation notice:

1.clean before operation to avoid particles dropping into engine.
2.The connect surface of gasket must be clean.
3.Dismantle the cylinder and the cylinder head by screw driver.
Do not scratch the contact surface.
4.Cylinder inner surface and piston outer surface can't be scratched.
The contact surface should be lubricated by specified oil.

C. PISTON & CYLINDER DATAS:

Part name/description			Standard Value (mm)	Limit of use (mm)
Cylinder head	Flatness			0.100
cylinder	Bore		39.995~40.015	40.050
Piston/ Piston ring	Clearance b/w Piston ring piston and	Lst ring	0.05~0.06	0.10
		2nd ring	0.05~0.06	0.10
	Piston outer diameter		39.950~39.970	39.895
	Measuring location of piston outer dia. (12mm from the lower end of skirt)			
	Clearance b/w piston and cylinder		0.045~0.065	0.10
	Piston pin hole inner dia		13.022~13.013	13.045
Piston pin hole inner diameter			10.002~10.008	10.025
Piston pin outer diamerer			9.994~10.000	9.970
Clearance between piston and piston pin			0.004~0.018	0.030
Connecting rod small end inner dia			13.996~14.007	14.025

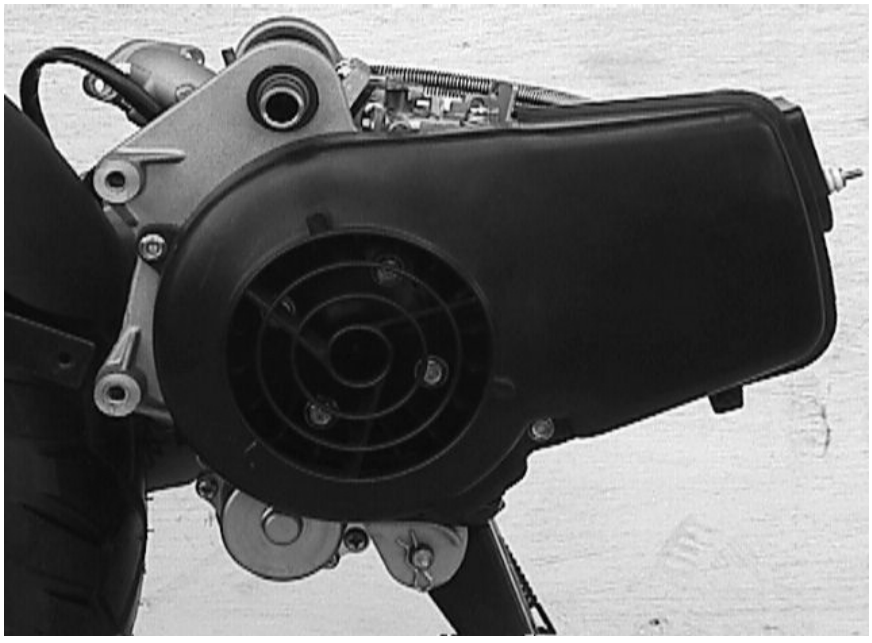
D. cylinder head, cylinder, and piston dismantling.

1.Remove the engine.

2.Screwing out the two M6-bolt of cooling cowl.

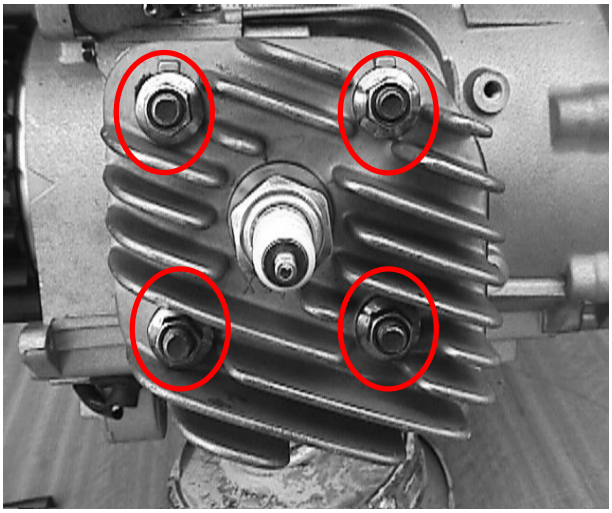
3.Screwing out the two M6-blot of fan cover.

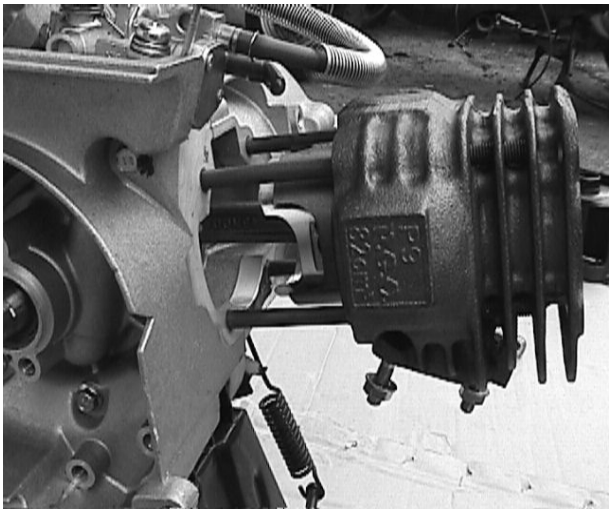
4.Remove the cooling cowl and fan cover.



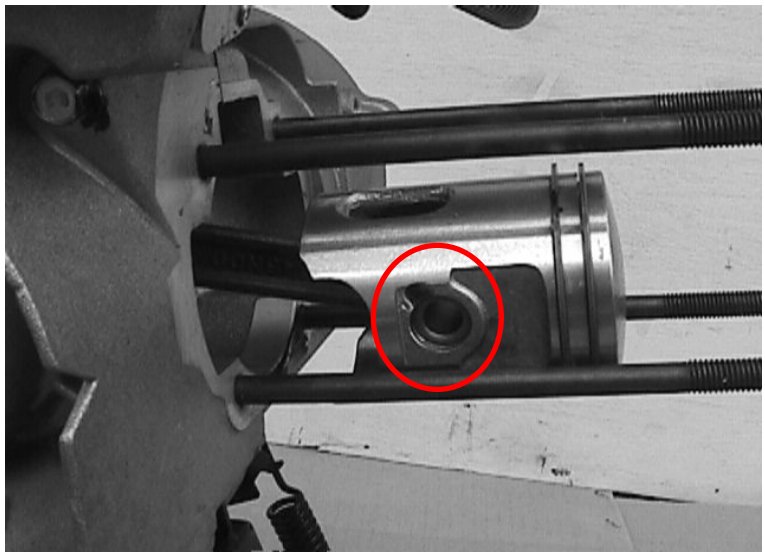
5.Remove the spark plug.
6.Remove the two M6 nuts on the muffler and cylinder.
Also remove the two M8-bolt of crankcase.
7.Remove muffler.

8.Remove the four M7-nut on the cylinder head, then remove the cylinder head and cylinder head gasket.





9.Remove the Cylinder and the gasket.



10.Remove the c type clip on the piston and piston pins by the nipper.

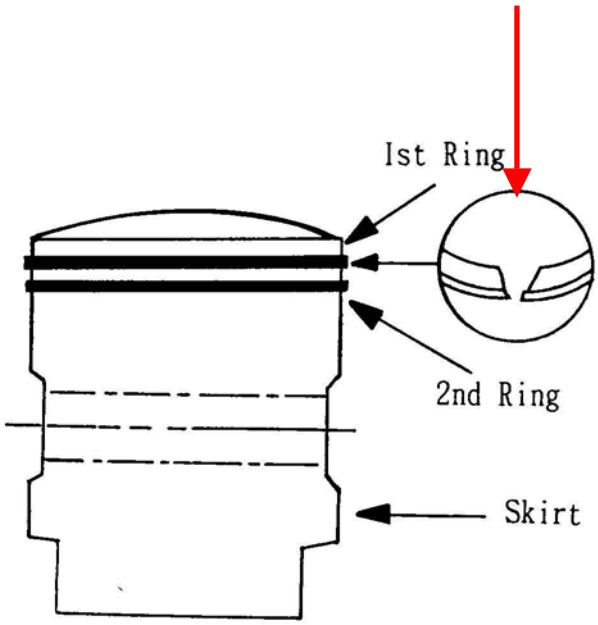
•Take off piston.

11.Dismatling of the piston ring Take off the first piston ring then the second ring.

12.When assembling please reverse the procedures of dismantling.

Locking torque:
M7:1.0-1.4kg-m
M6:1.0-1.2kg-m

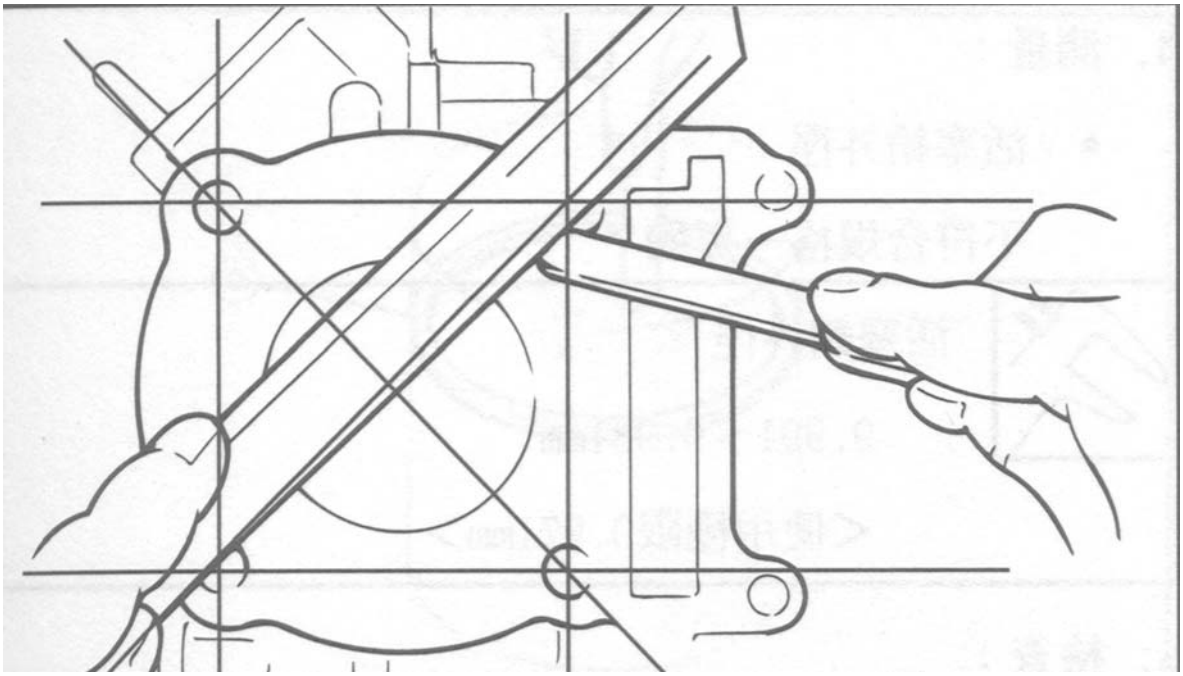
Opening end of piston ring



E. Check for the flatness of cylinder head & cylinder.

Check the flatness of contact surface of cylinder head & cylinder.

Limit of use: If it exceeds 0.1mm Change a new one.



F. Combustion chamber cleaning

●Clean out the carbon piled up in combustion chamber.

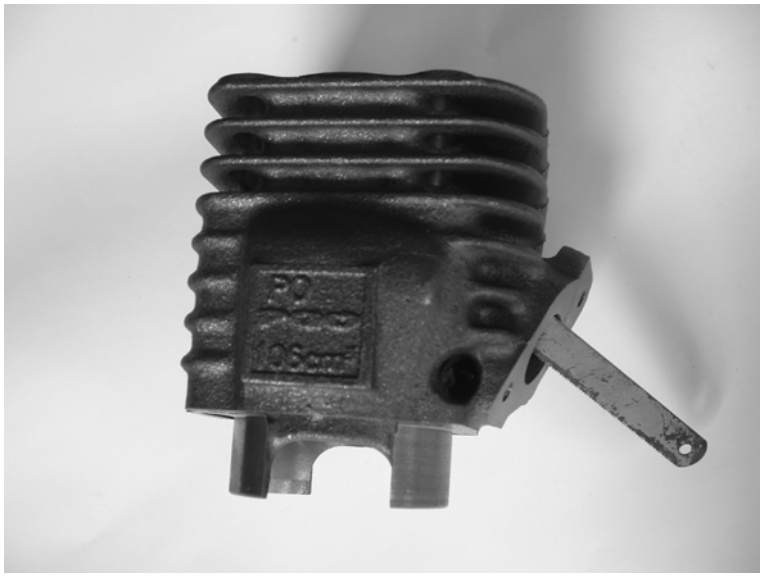
●Do not scratch the combustion chamber and contact surface of the cylinder during cleaning operation

G. Check cylinder and piston:

1.Check the wearing and damage condition on the contact surface of the cylinder and piston.

2.Clean out the carbon on the cylinder exhausting port.

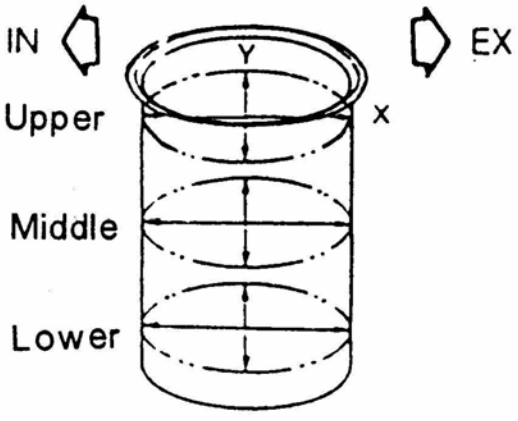
Be careful not to scratch the inner Surface of cylinder.

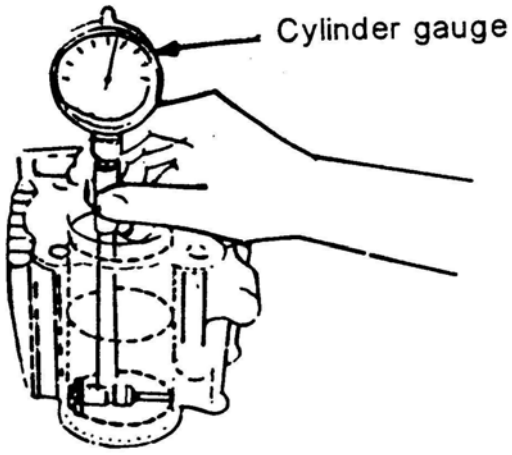


3.Cylinder bore measurement:

(1)Measure each point (A)(B)(C) orderly, and in X.Y. axis to find the smallest value.

(2)Limit of use: 50cc-change it when over 40.050mm

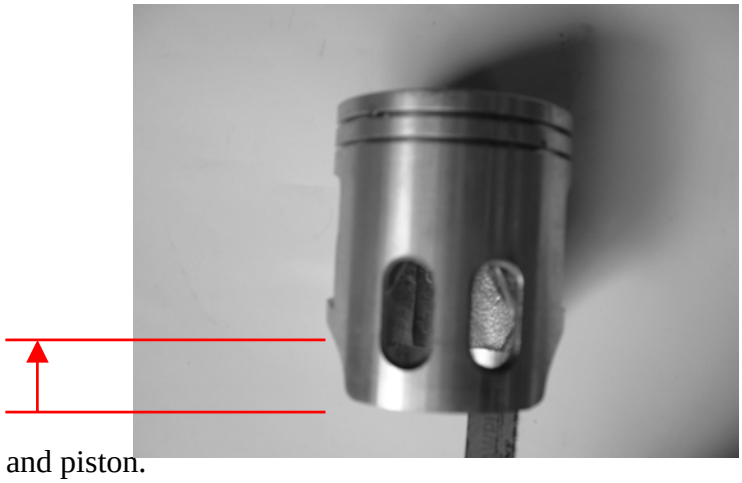




4.Piston outer diameter measurement:

(1)Measure at the skirt area where is 12 mm from the skirt lower end of skirt.

(2)Limit of use: 50cc-change if when below 39.895mm

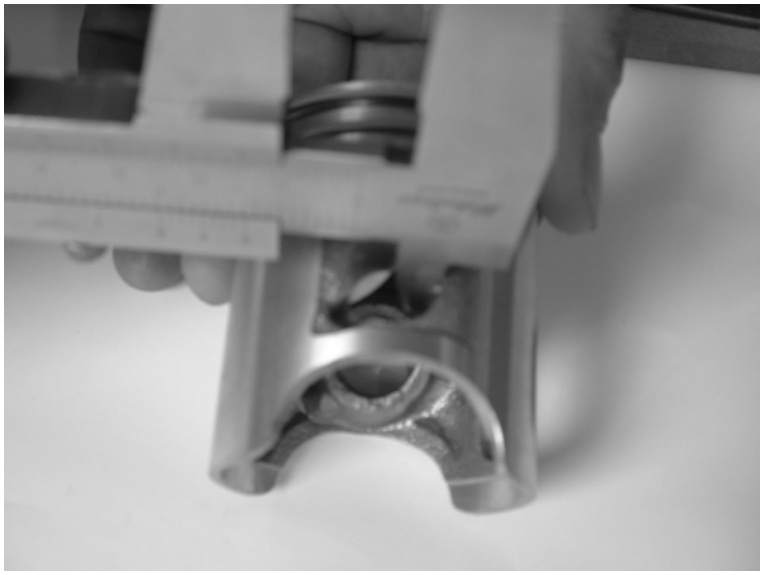


(3)Calculate the clearance between the cylinder and piston.

Limit of use: change it when over 0.100mm

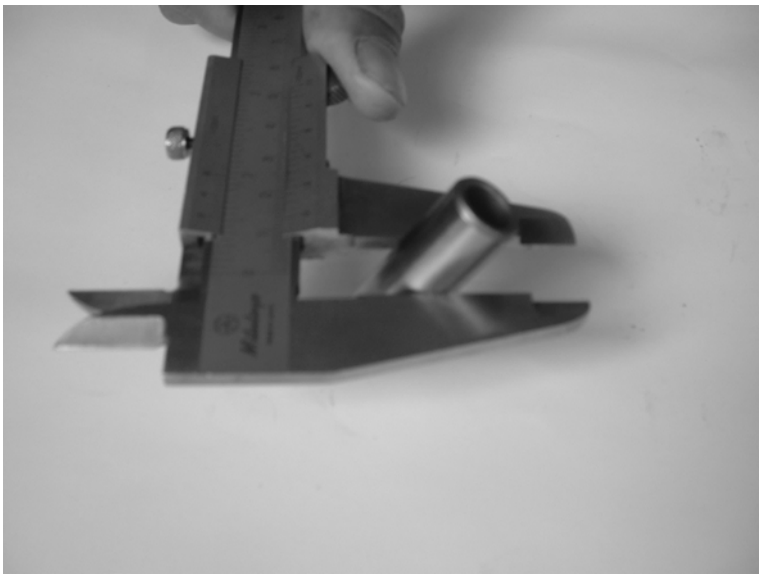
5.Inner diameter measurement of the piston pin hole

Limit of use: change it when over 14.032mm



6.Outer diameter measurement of the piston pin

limit of use: change it when under 9.970mm(G-MAX 50cc)



7.Check piston ring:

Measure piston ring gap:

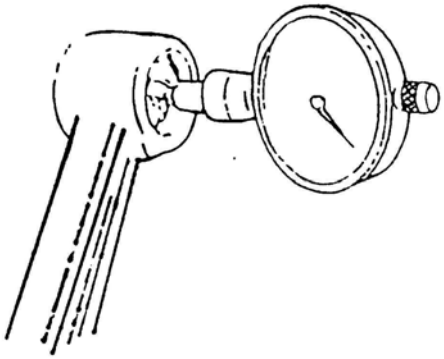
Limit of use: change new ones when the first ring and second ring are over 0.4mm

Push the piston ring into the cylinder By piston, the measure the gap

8.Check connecting rod small end

(1)lnstall piston pin, bearing onto the connecting rod small end, then check the looseness of the piston pin.

(2)Measure the inner diameter of the connecting rod small end.



Limit of use: replace a new one when over 14.025mm.(G-MAX 50cc)

H. Installing cylinder and piston

1.Place the piston ring into the second ring ditch first, then install the piston ring into the first ditch.

2

a. Piston ring should be installed into piston ring ditch by even force

b. After assembling, be sure that the piston ring sliding surface is at the same height as the piston outer surface.

c. If the piston ring can not fit into the ditch, please clean up the carbon in the piston ring ditch or piston ring itself.

3.

a. Piston ring must be installed in the correct location.

b. After installing the piston ring, it should be able to rotate freely.

c. If it is necessary to change the new piston ring, it must change the whole set.

4.

a. The location of the piston ring gap and the lock pin must be in opposite side.

b. The mark"→" on the piston tip must be pointing to the exhausting port.

c. Lubricate the piston pin before installation.

5.Please follow the opposite procedure of dismantling to install cylinder and cylinder head.

(5)A.C. Generator, Flyweel

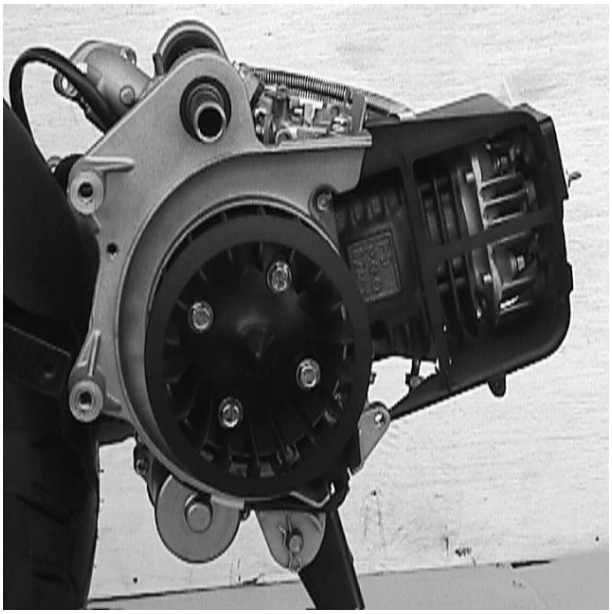
A.Dismantling AC generator

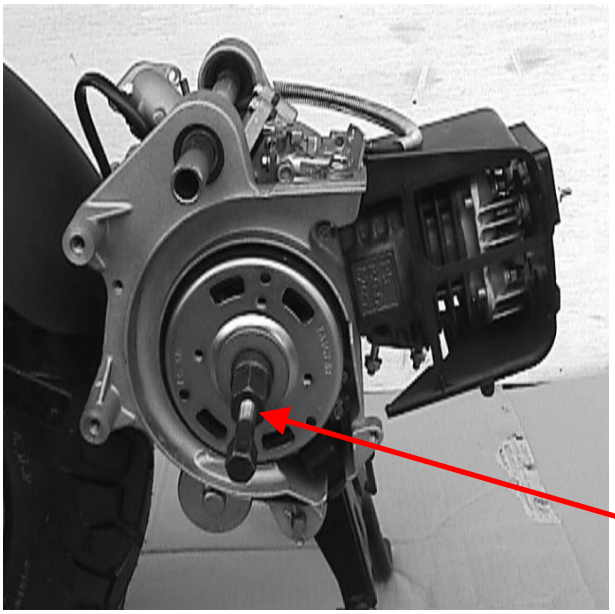
1.Remove fan cowl.

2.Remove the M6 screws(4)

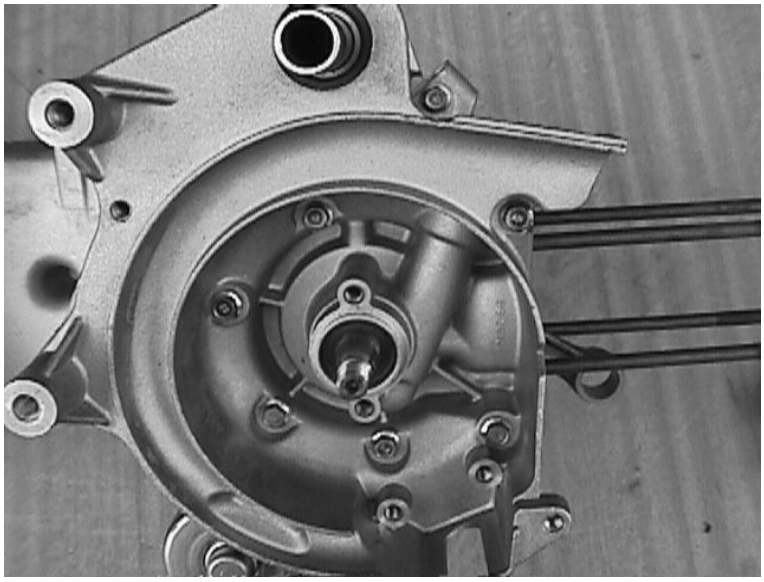
3.Remove Screws of flywheel magneto

4.Remove the AC flywheel magneto by special tool.





5.Remove the flywheel.

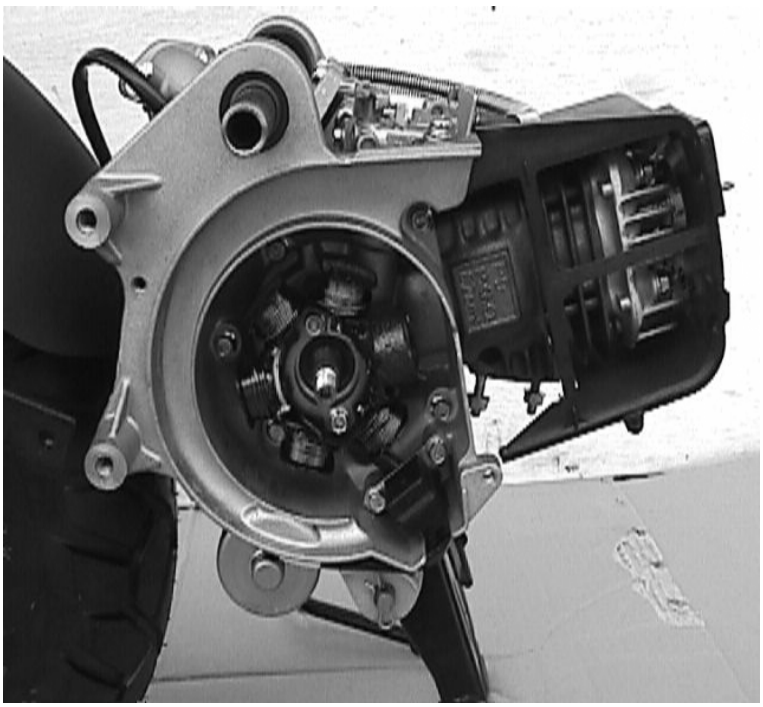


6.Remove the electric plug of AC Flywheel magneto.
Take out the magneto.

B. Install AC generator

To install, please reverse the dismantling procedures.

Locking torgue:
M6: 1.0~1.2kg-m
M10: 3.2~4.0kg-m



(6)Final Transmission Mechanism

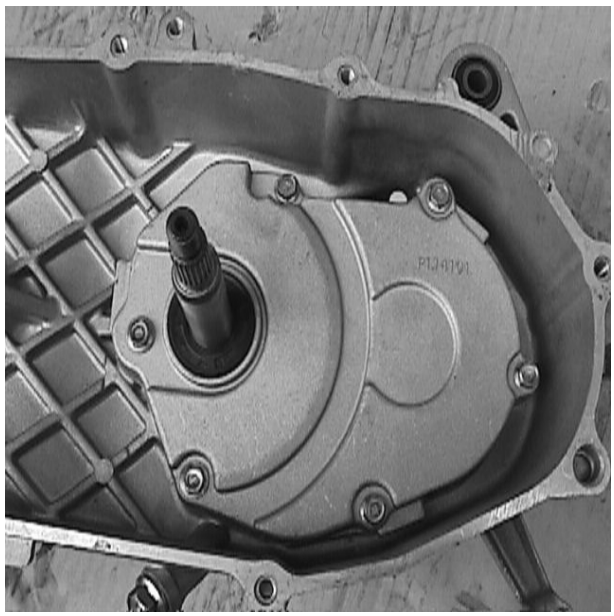
A. Trouble shooting

- ●Engine can be started, but vehicle doesn't move.
  1.Gear worn-out or cracked.
  2.Gear burnt out.
- ●Noise occurs when running.
  1.Gear worn out, burnt or gear surface damaged.
  2.Bearing worn out or loosen.
- ●Oil leakage
  1.Too much oil.
  2.Seal worn out or damaged.

B. Disassemble the final transmission mechanism.

1.Remove the rear wheel.

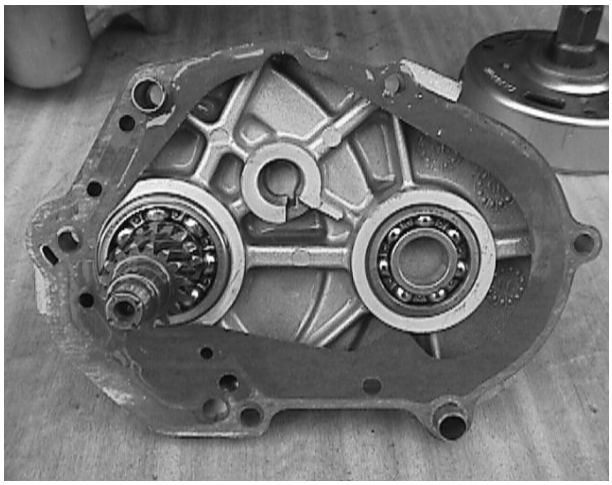
2.Drain off the oil in the gear box.

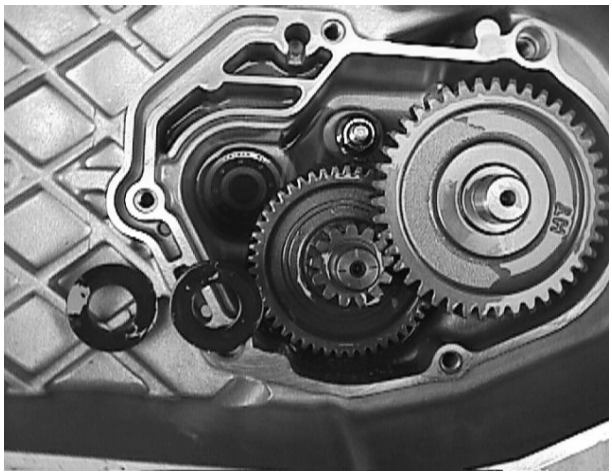


3.Remove the 6 bolt in gear box cover

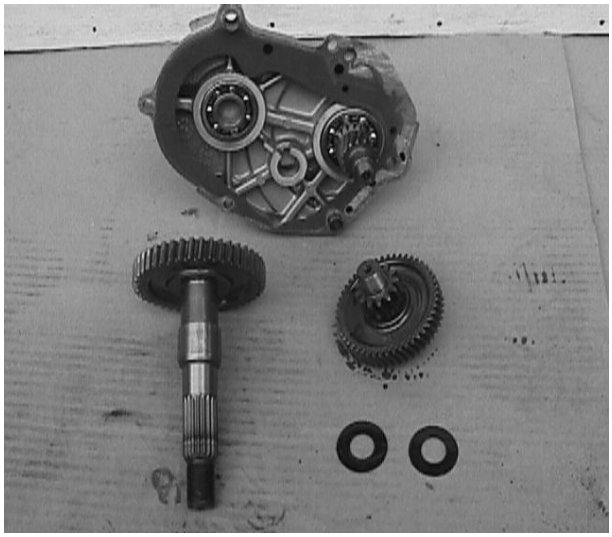
4.Take off the gear box.

5.Take out the final reduction gear and idle gear shaft.



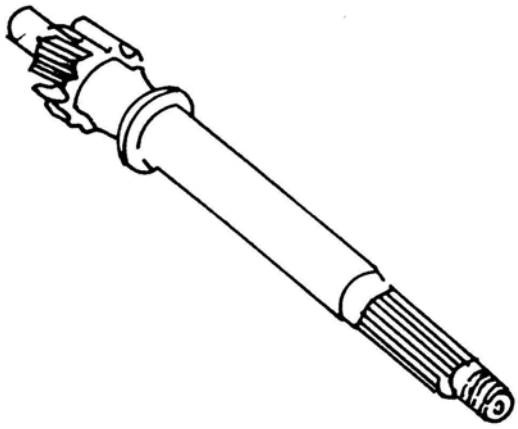


6.Clean up the gear box

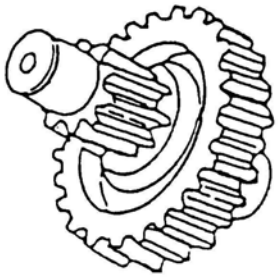


C. Check the final transmission mechanism

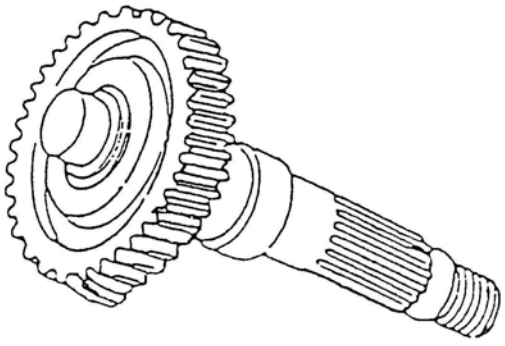
1.Check the wearing condition of the driving shaft and gears.



2.Check the wearing condition of the idle gear shaft and idle gears.



3.Check the wearing condition of the final reduction gear.



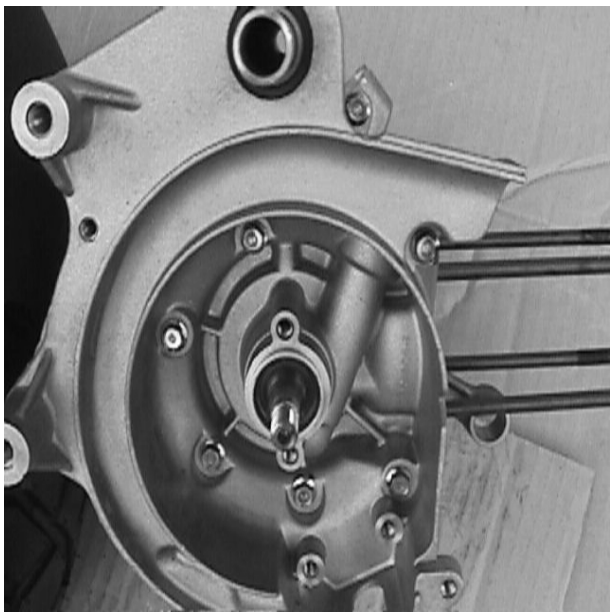
4.Check the wearing condition of the oil seal and bearing.

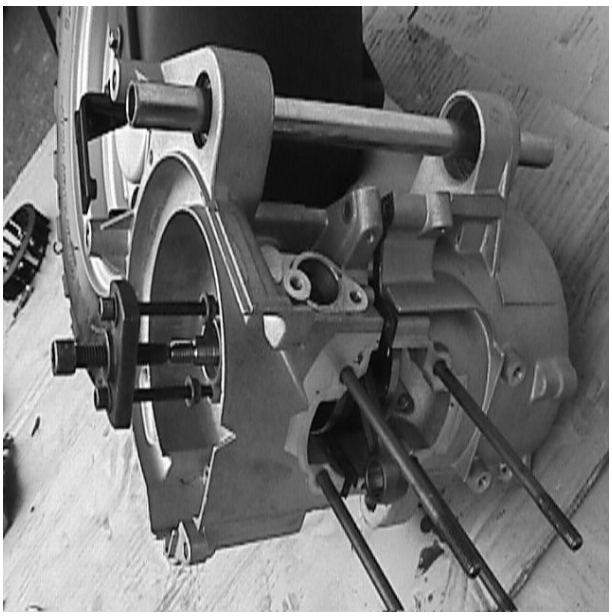
D. Assemble the final transmission mechanism:please follow the opposite procedures Of disassembling. After locking the drain bolt, refill 90c.c of gear oil, SAE 85W/140.

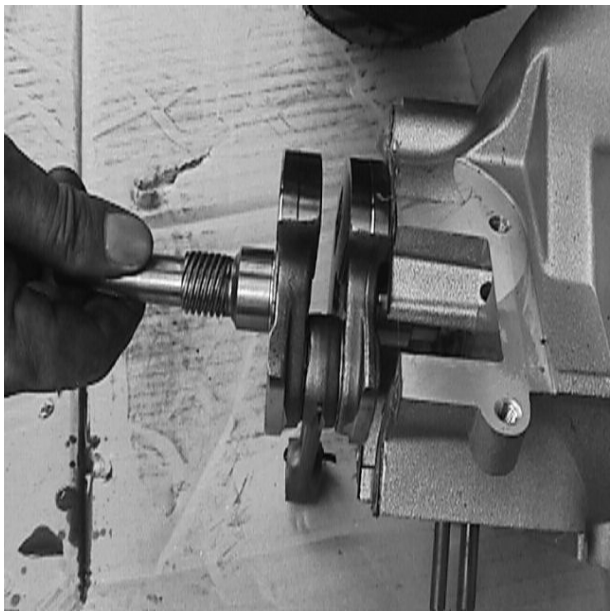
Locking torque:	M6: 1.0~1.2 kg-m
	M10: 3.5~4.0 kg-m
Drain bolt:	M8: 1.8 kg-m

(7)Crankcase, Crankshaft:

A. Disassembling diagram







B. Troubleshooting.

Engine noise:

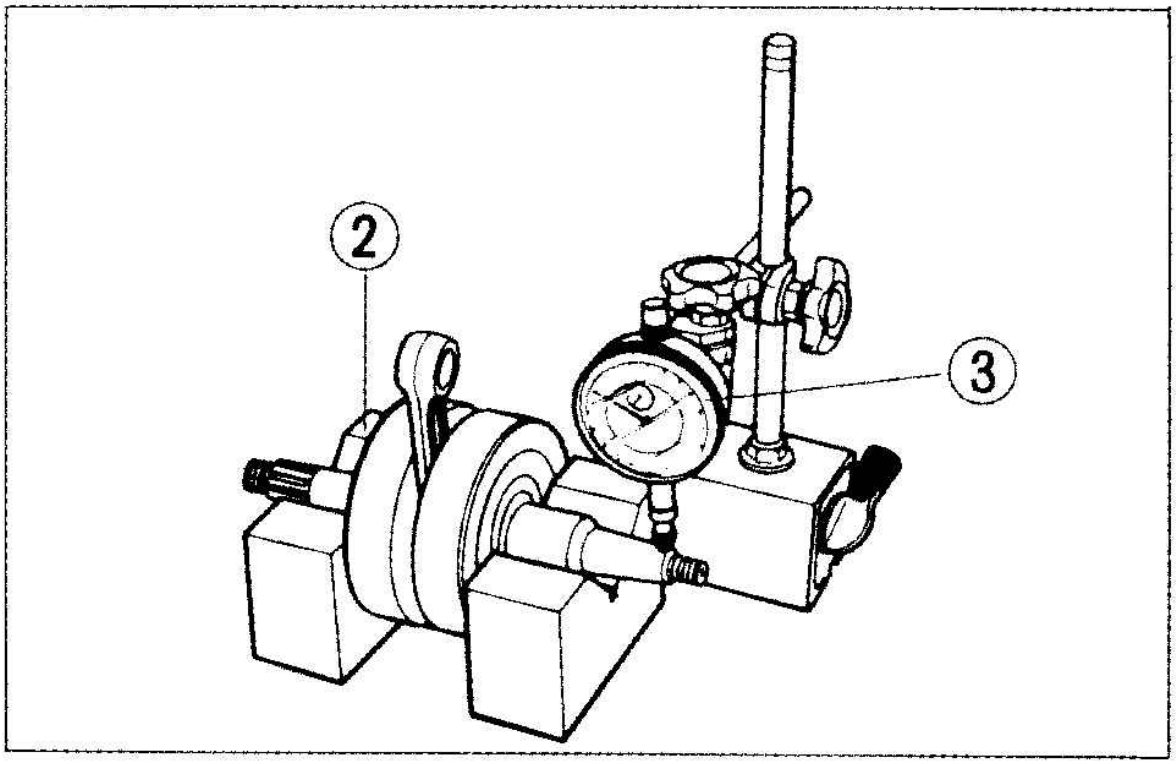
1.The bearing of final transmission mechanism is loose.

2.Crank pin bearing is loose.

3.The bearing of gear box is loose.

C. Data

Measuring Item	Standard value	Limit of use.(mm)
Clearance of connecting rod big end (Parallel direction to rod)	0.20-0.50	0.71(50cc)
Clearance of connecting rod big end (Perpendicular direction to rod)	-	0.04
Swingness of the crank shaft neck	0.03	0.10

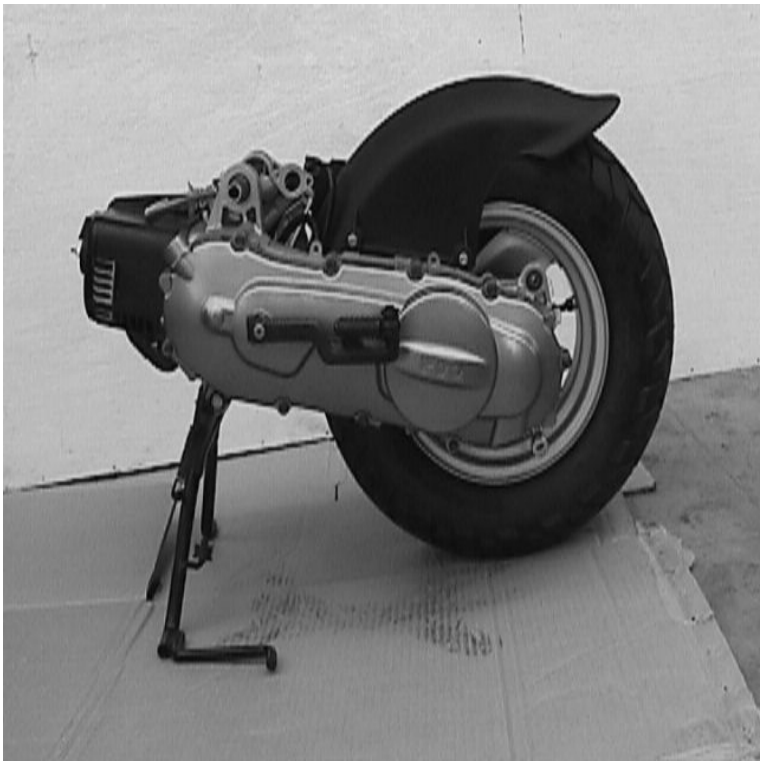


D. Dismantle the crankcase and crankshaft please follow the following procedures:

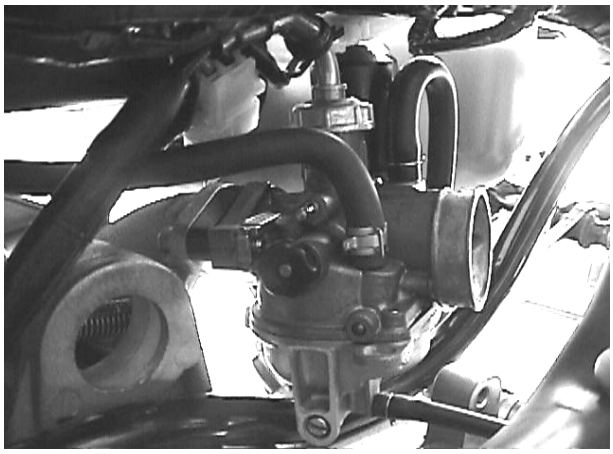
1.Remove the engine.

2.Remove the left crank case, the driving pulley (driving plate) clutch and belt.

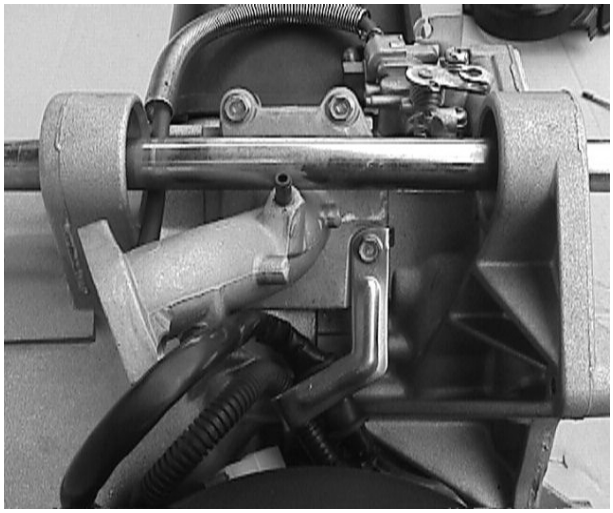
3.Remove the air cleaner.



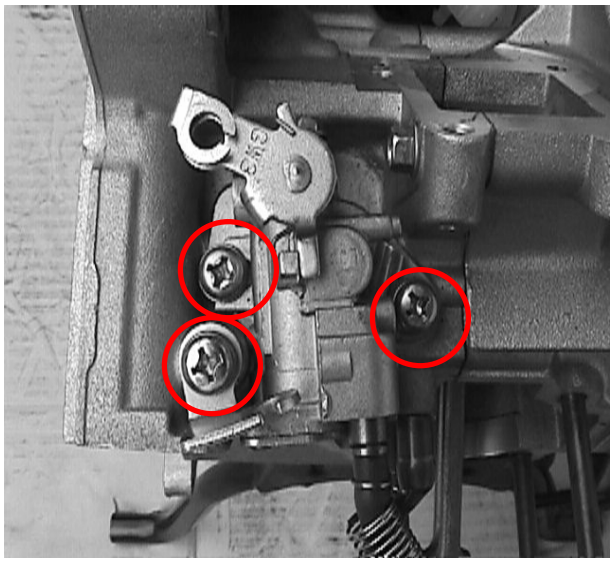
4.Remove the carburetor.



5.Remove the intake manifold and reed valve.

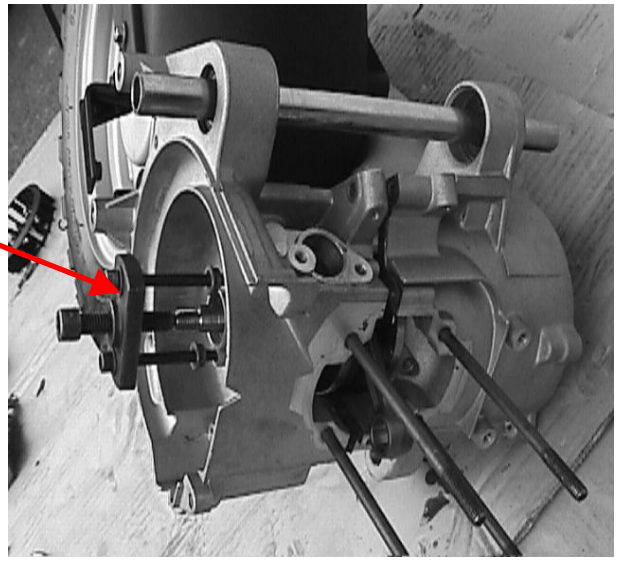


6.Remove the oil pump, fan cowl and fan itself.

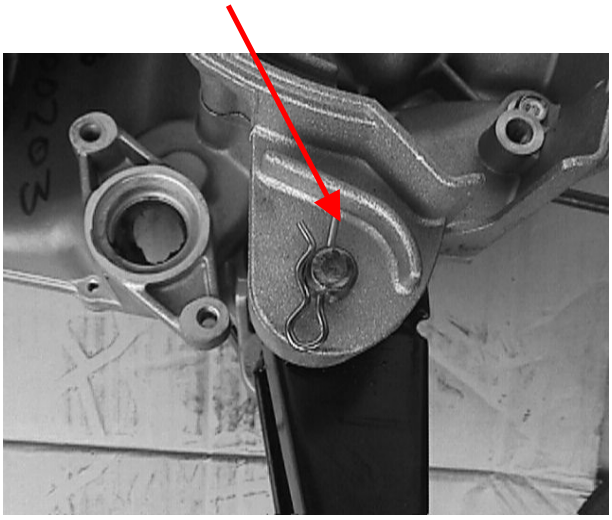


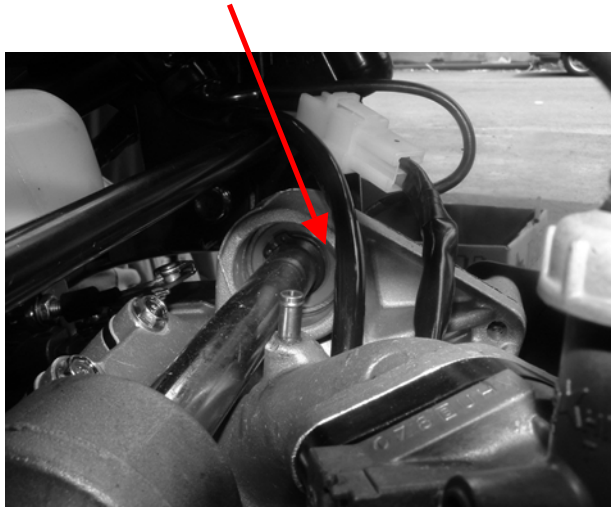
7.Remove the AC flywheel magneto.

8.Dismantle the right and left crankcase.
There are all together 7 bolts.



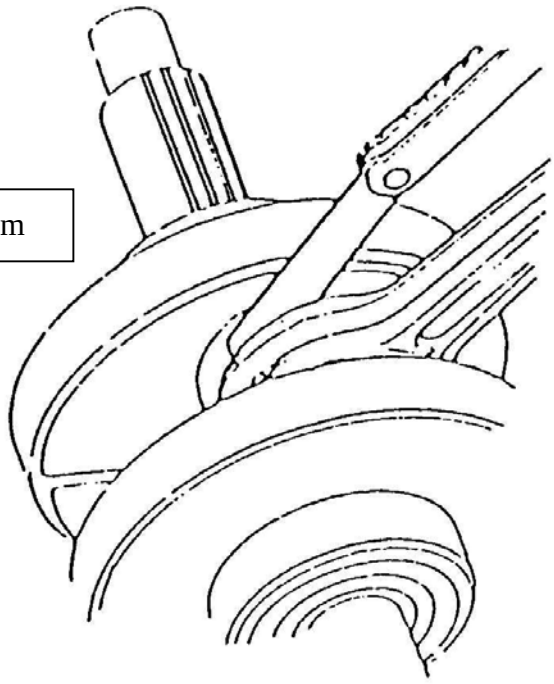
9.Remove center stand, left and right crankcase and take out the crankshaft.





E. Check the crankshaft:

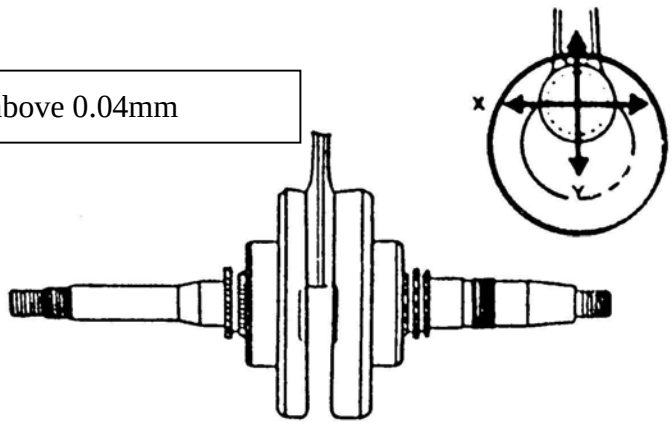
1.measure the clearance between crank shaft and co-rod big end.(Parallel direction to rod)



Limit of use: Replace a new when above 0.71mm

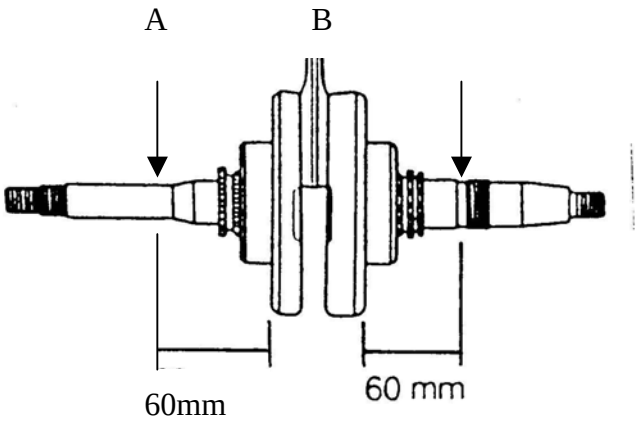
2.check the looseness on X.Y. axis of the connecting rod big end(Perpendicular directions to rod)

Limit of use: Replace a new one when above 0.04mm

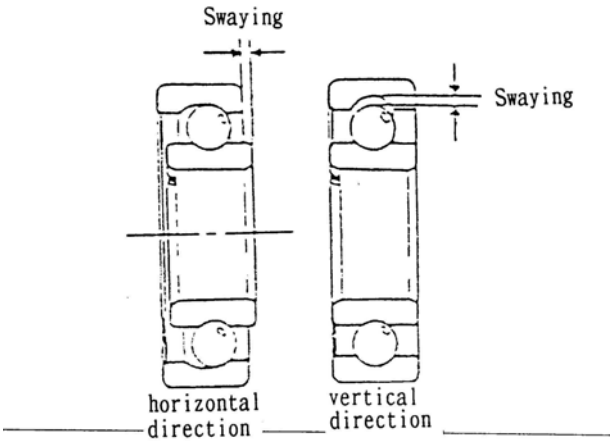


3.measure the swingness of crank shaft neck.

Limit of use	
A	B
Change it when Above 0.1mm	Change it when Above 0.1mm



4.check the slackness of crankshaft bearing,
if it is slack, change a new one.



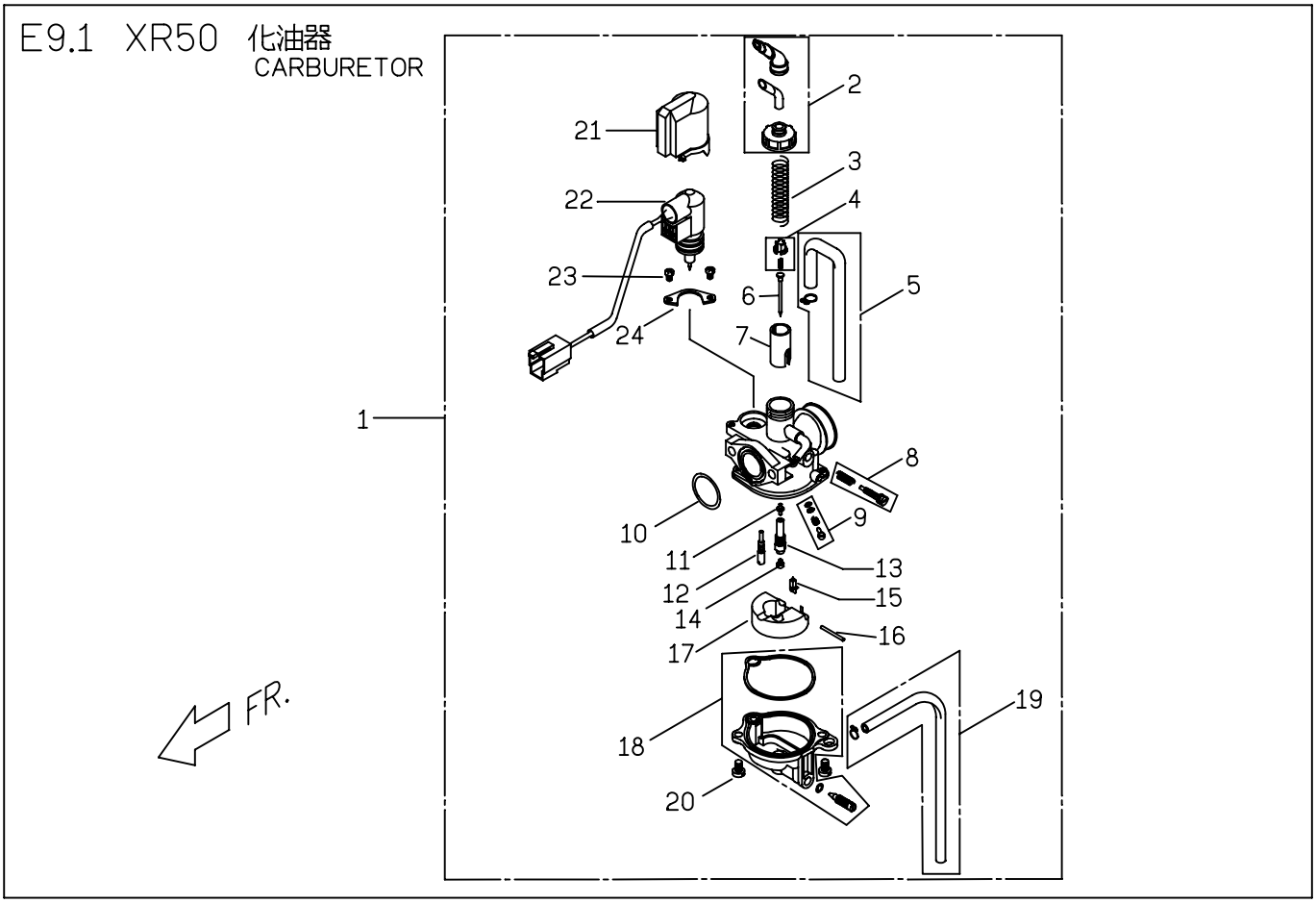
F. Assemble the crankcase.

1.To assemble the crankcase, please reverse the procedures of disaseembling.

2.The locking torque value for bolts and nuts are all described in the previous chapters Please refer.

(8)Carburetor, Reed Valve

A: Carburetor dismantling diagram



01	CARBURETOR ASSY.	13	HOLDER, NEEDLE JET
02	TOP SET	14	MAIN JET
03	SPG., COMP.	15	FLOAT VALVE SET
04	PLATE SET	16	PIN, ARM
05	TUBE SET	17	FLOAT SET
06	JET NEEDLE	18	FLOAT CHAMBER SET
07	THROTTLE VALVE	19	TUBE SET
08	SCREW SET	20	"SCREW, WASHER"
09	SCREW SET (A.S)	21	CAP HOLDER
10	O RING	22	AUTO BYSTARTER SET
11	NEEDLE JET	23	SCREW, WASHER
12	SLOW JET	24	PLATE SET

B. Troubleshooting:

a. Engine can not be started.

1.No fuel in the fuel tank.

2.Fuel pipe is blocked.

3.There is too much fuel in the cylinder.

4.Air cleaner is blocked.

b. Engine idling(RPM) unsteady, running not smoothly

1.Improper adjustment of the carburetor idling.

2.Ignition disorder.

3.Compression pressure is too low.

4.Air mixture is too thick.

5.Air mixture is too lean.

6.Air cleaner is blocked.

7.Air injection is not in good function.

8.Fuel is dirty.

c. Air mixture is too lean.

1.Carburetor main jet is blocked

2.The ventilation hole of the fuel tank cover is blocked.

3.Fuel filter is blocked.

4.Fuel pipe bended, squeezed or blocked.

5.Float valve is abnormal.

6.Fuel level is too low.

7.Air pipe is blocked.

d. Air mixture is too thick

1.Float valve is abnormal.

2.Fuel level is too high.

3.Air jet is blocked.

C. Dismantling carburetor

1.Remove the luggage box.

2.Loose the hose clamp between the carburetor and the air cleaner.
Then remove the air cleaner.

3.Unscrew the fuel draining screw of the carburetor. Drain off the fuel inside the carburetor.

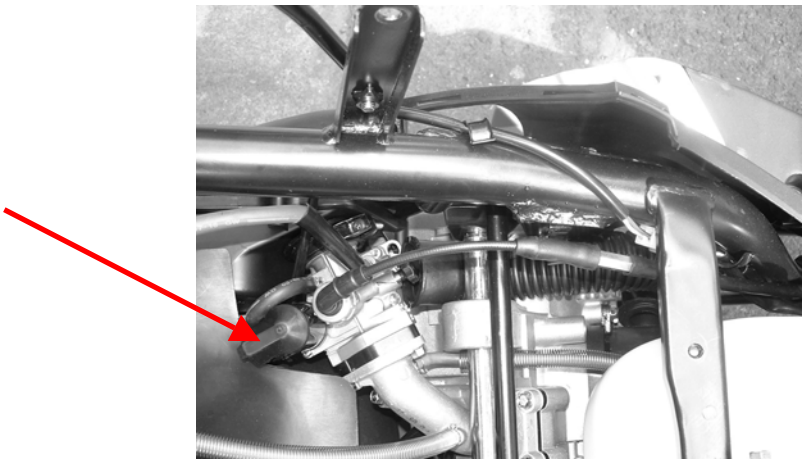
4.Remove the fuel pipe and the vacuum pipe on the carburetor.

5.Remove the oil pile on the carburetor.

6.Remove the bolts on the intake manifold and carburetor.

D. Dismantling float, nozzle

Note:
The auto choke has been properly adjusted already. Please do not adjust it further.
When there is blockage in the carburetor, please clean it by air compressor.



E. Reed valve

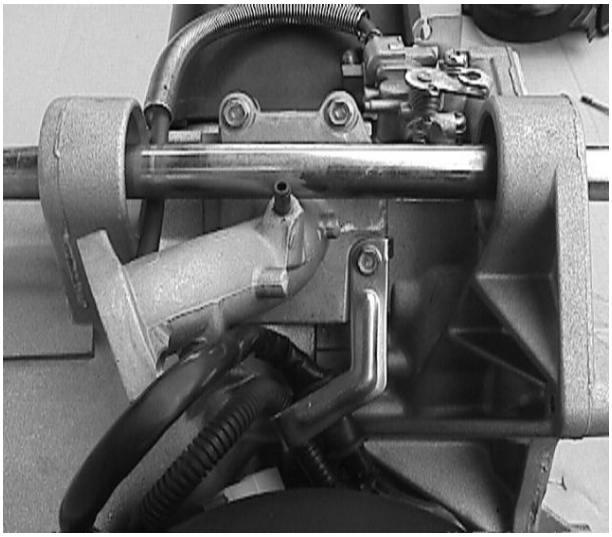
1.Dismantling reed valve.

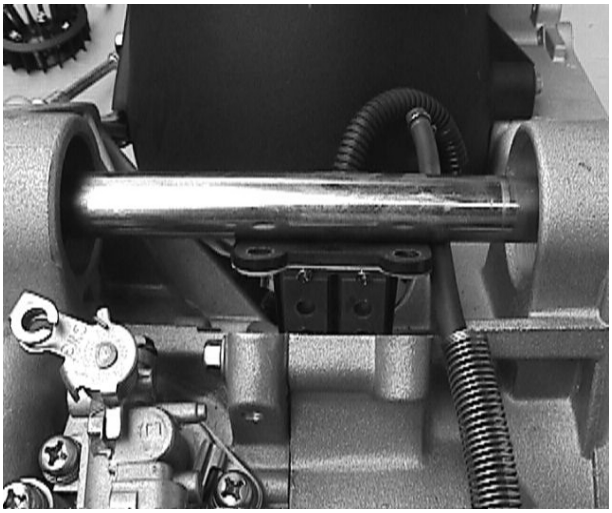
(1)Take off the luggage box

(2)Remove the air cleaner

(3)Remove the carburetor.

(4)Unscrew the locking screw of the intake manifold.





(5)Remove the intake manifold.

(6)Remove the reed valve.

2.checking for the reed valve.

- change a new one when the reed valve is worn out or distorted.
- change a new one too when the base of the reed valve is cracked, injured or distorted.

4. G-MAX 125/150 engine Dismantling, Maintaining, Repairing and assembling operation

(1) Lubrication system

(2) Engine dismantling

(3) Install Engine

(4) Drive pulley, starter, clutch, driven pulley

(5) Cylinder head and valve

(6) Cylinder and piston

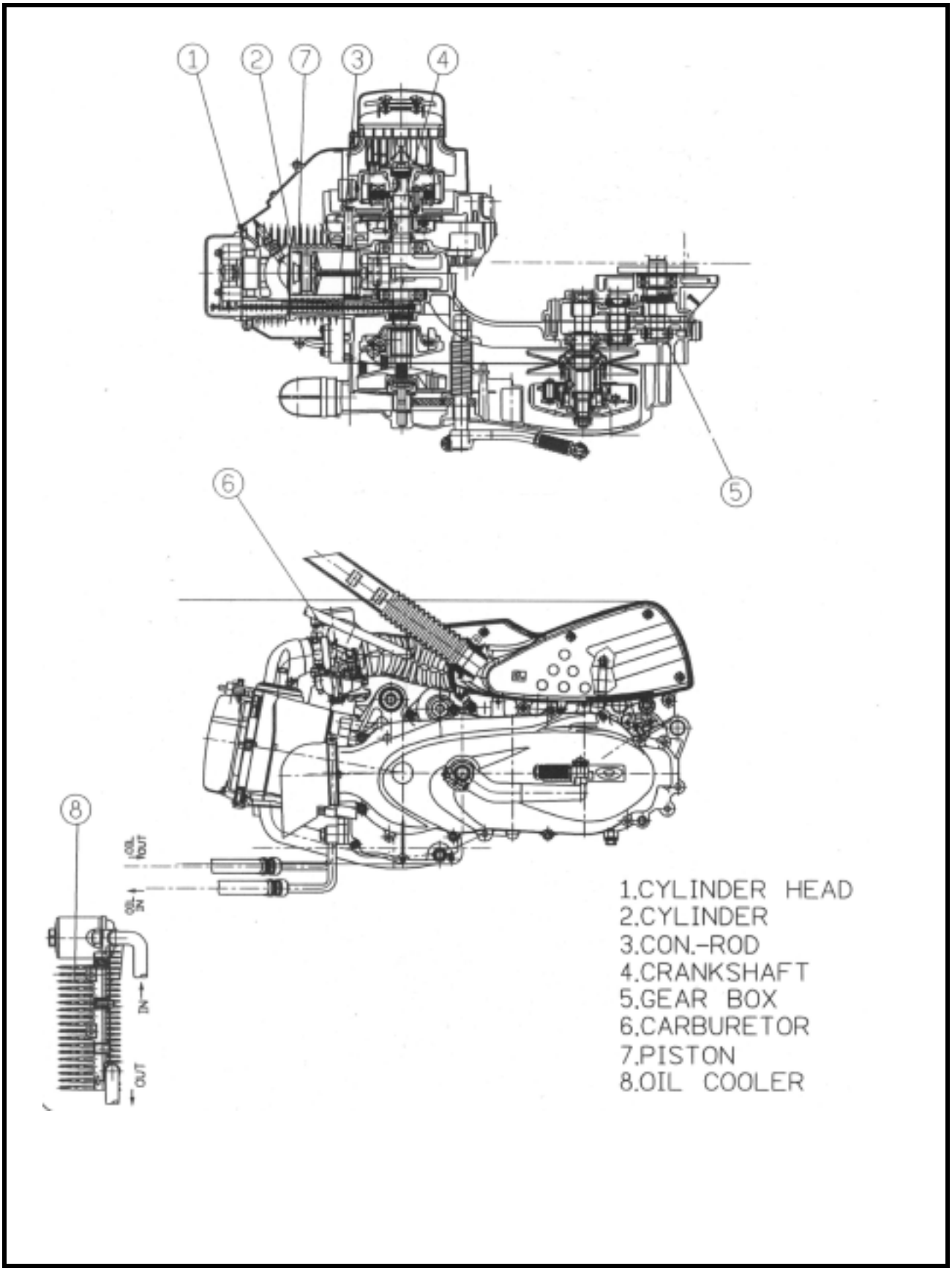
(7) AC generator

(8) Final transmission mechanism

(9) Crankcase, crank shaft

(10) Carburetor

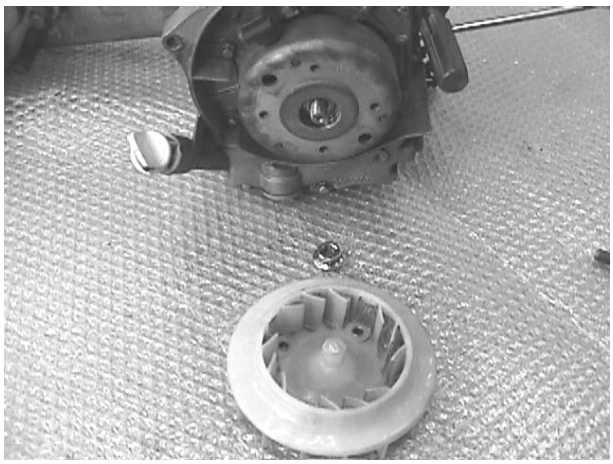
(1)Lubrication System



■ Oil Pump Dismantling

1.Remove the rear section of muffler.

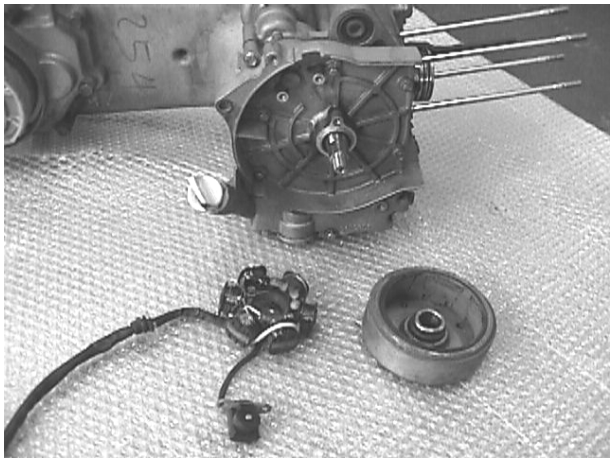
2.Remove the AC flywheel magneto.



3.Remove the AC generator coil.

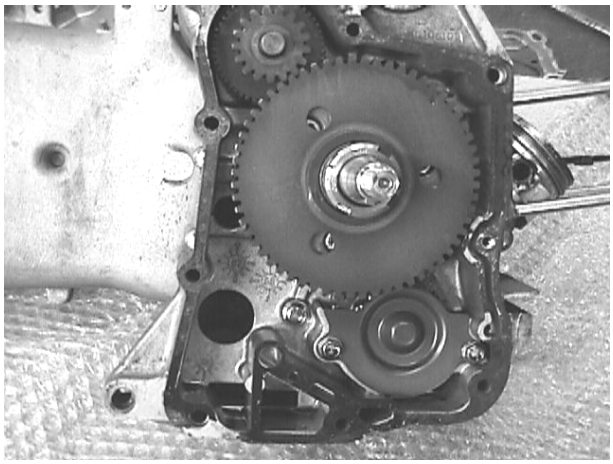
4.Tale off the locking bolts of the right crankcase cover.

5.Remove the crankcase cover

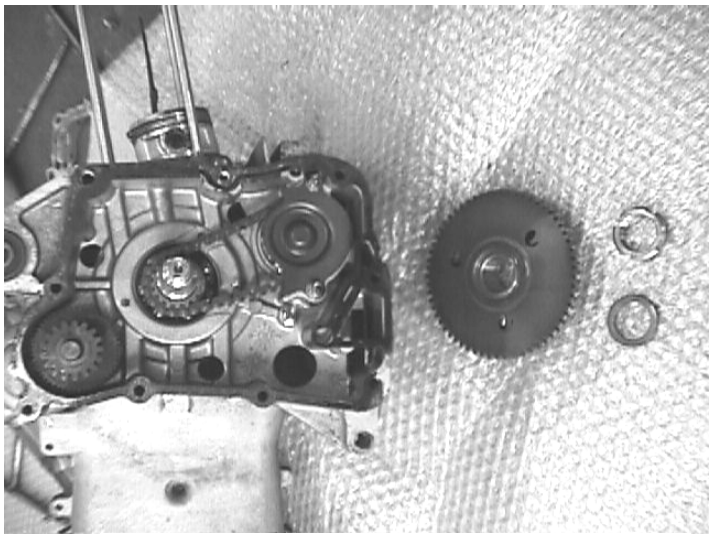


6.Remove the washer, lock pin

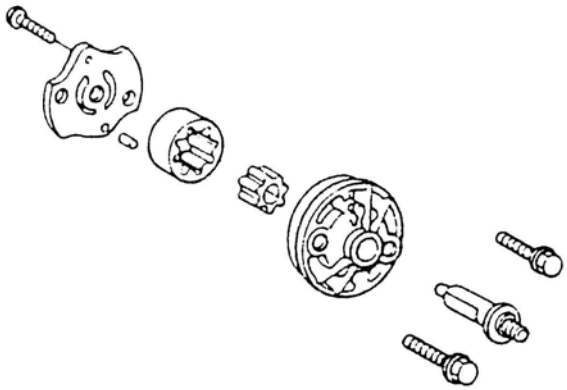
7.Remove starter reduction gear and the starting clutch.



8.Remove oil pump separate plate by taking off the 2 bolts.
9.Remove the bolts from oil pump driving gear
10.Take off the driving gear and chain.
11.Remove the oil pump by taking off the locking bolt of the oil pump.

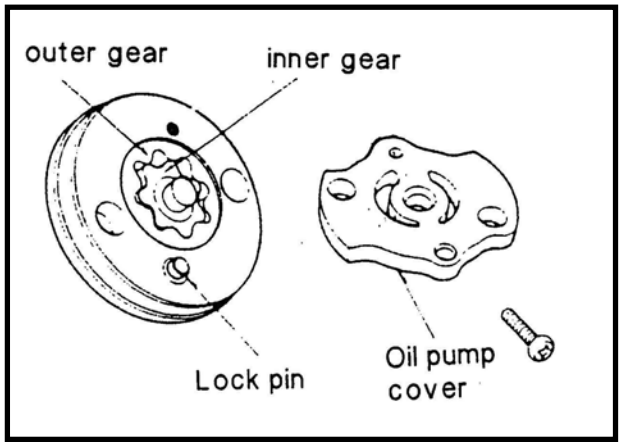


■ Oil pump Assembly



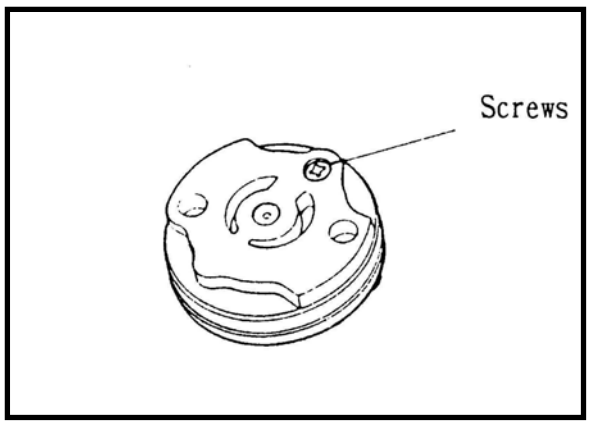
1.Install the inner and outer of the oil pump.
2.Install the oil pump shaft.

Note:
The notch of the oil pump shaft should comply With the notch of the inner gear.



3.Install the lock pin.
4.Match the lock pin hole to the pump cover and install the oil pump cover.
5.Put on the screws and tighten them.
6.After installing, turn the shaft lightly to assure installation.
7.Place the oil pump into the crankcase.

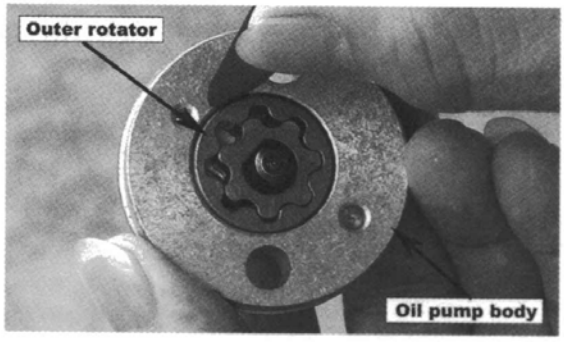
Note:
When installing, the arrow on the oil pump body should be pointed upwards. Then fill in the recommended oil before the installation.

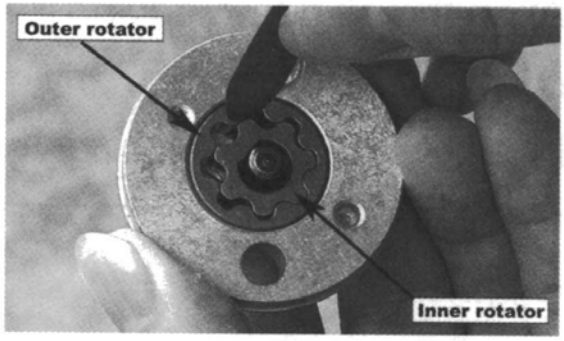


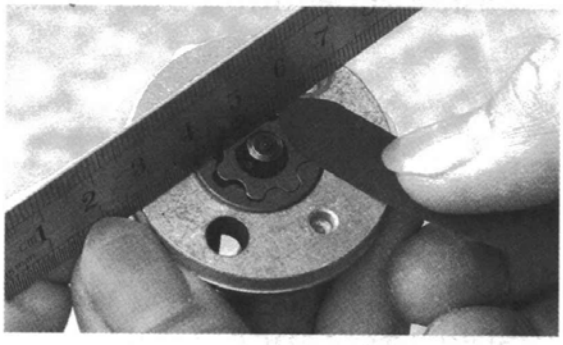
8.Tighten the oil pump after installation.

Measurement data

item		Standard Value (mm)	Limit of use (mm)
Oil pump	Clearance between the inner gear And outer gear	–	0.12
	Clearance between the outer gear And oil pump body	0.045-0.10	0.12
	Clearance between gear end and Oil pump body	0.045-0.10	0.12







Troubleshooting

<u>Reduction in fuel oil volume</u>

a. Natural consumption

b Leakage of fuel

c.Piston loop seizes, or improperly install-ation

d.Worn out of valve’s oil seal

Engine burning-out

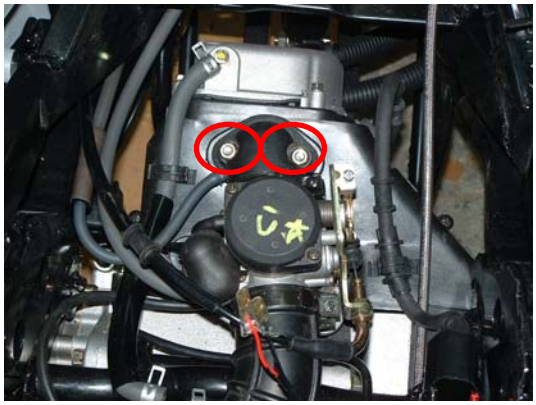
a. Zero or too low oil pressure
b. Blockage in oil route
c. Did not use the fuel oil recommended

(2) Engine dismantling

1.Take off the luggage compartment.

2.Take off the left and right body covers.

3.Take off the air cleaner fixing screws.



4.Loosen 2 nuts of intake manifold, withdraw intake system assembly.

5.Remove vacuum pipe, fuel pipe ,auto choke, cap of spark plug, rear brake cable carburetor pipe, starter motor cable.

6.Remove the rear section of muffler, dismantle the 2 bolts of rear brake caliper, then remove the rear brake system assembly away from rear fork.

7.Loosen bolts of upper & lower engine hanger.

8.Remove the engine.

(3).Installing Engine

1.To install engine, please reverse the Above procedures.

2.Locking torque:

M8: 2.0-3.0kgf.m

M10: 3.0-4.0kgf.m

M12: 5.0-6.0kgf.m

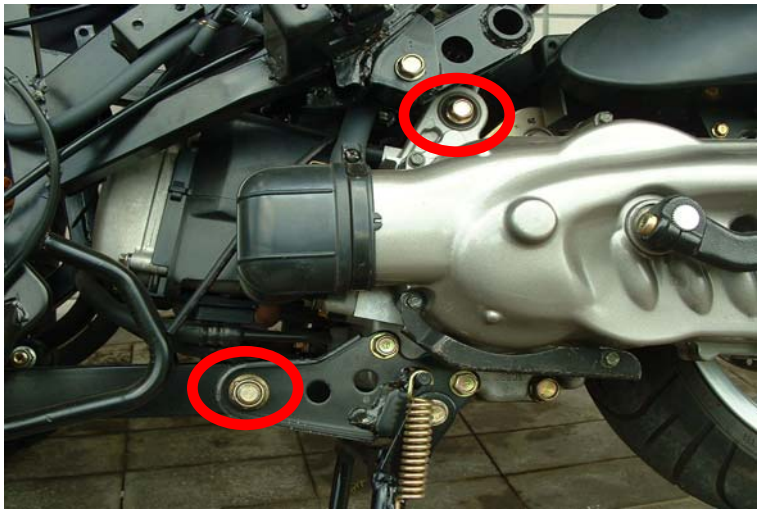
3.After installing, pleas do the following Checking and adjustment:

a. Wiring for each circuit.

b. Throttle cable

c. Rear brake check.

d. fuel and oil route



(4) Drive pulley, starter clutch. driven pulley

A. Troubleshooting

B. Measurement data

C. Driving pulley

D .Starter

E. Clutch driven pulley

A.Troubleshooting:

a.Engine starts, but vehicle don’t move.

1.driving belt worn out

2.driving plate worn out

3.clutch lining worn out

4.driving plate’s spring broken

b.the vehicle stops or tremble when running.

1.clutch lining spring cracked or broken.

c.Can’t reach high speed, no pick-up

1.driving belt worn out.

2.Driving plate spring distortion.

3.Weight roller worn out

4.Driving plate dirty.

Note:

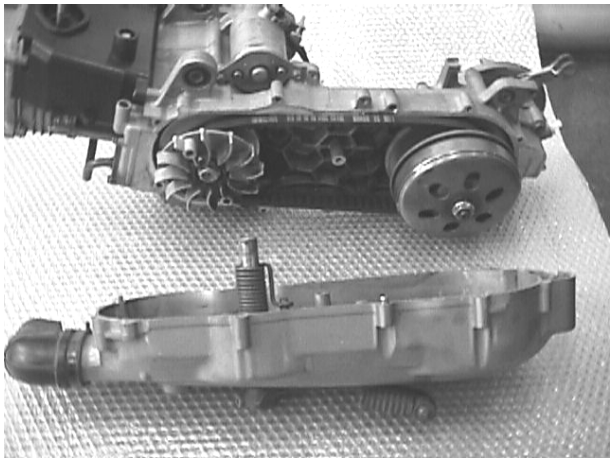
No grease and oil should be distributed over driving belt and driving plate.

B. Measurement data

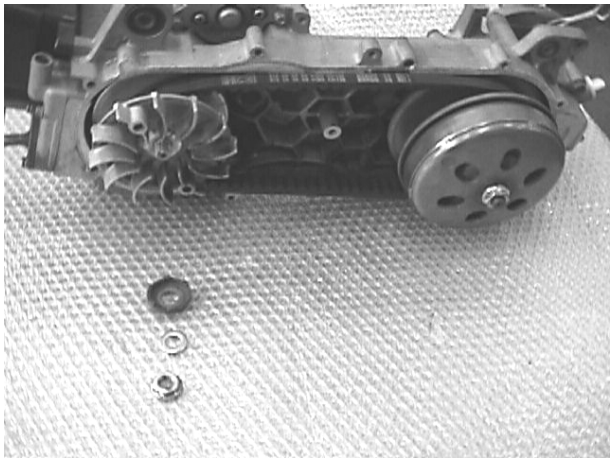
Item	Standard value (mm)	Limit of use (mm)
The inner dia. Of slide driving plate	24.011~24.052	24.10
The outer dia. Of boss, movable Driving plate	23.960.~23.974	23.940
Belt width	20.0~21.0	19.0
Clutch lining thickness	3	1.5
Clutch outer inner diameter	125.0~125.2	125.5
Driven plate spring, free length	151	127
The outer diameter of driven Plate sets	33.965~34.025	33.95
The inner diameter of slide Driven plate	34.000~34.025	34.06
The outer diameter of weight Roller set	17.920~18.080	17.40

(C)Driving Pulley

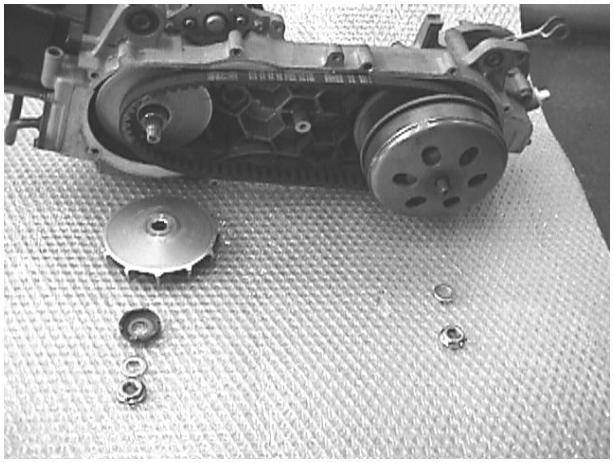
1.Take off the screws of
left cover, remove the left cover.



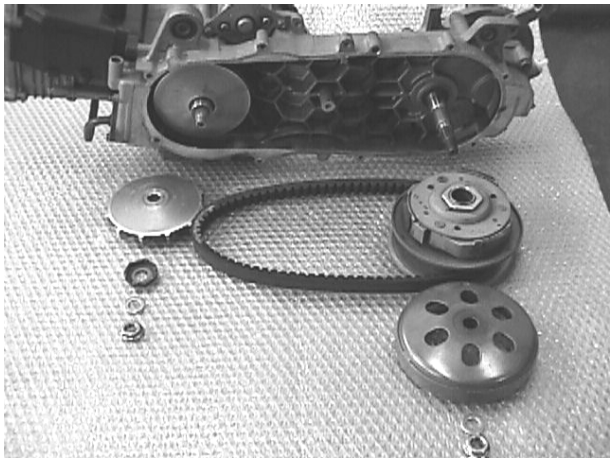
2.Remove the lock nuts of driving
Plate and the nuts of Starter gear
And clutch.



3.Take off the ramp plate,
Belt and clutch.



4.Take off the boss and driving plate.



5.Continuous Various Transmission engagement speed inspection

- Connect an electric tachometer.
- Seated on the motorcycle with on level ground, increase the engine's speed slowly and notice the RPM at which the motorcycle begins to move forward.

Specified Engagement RPM : 3100 ± 300 rpm

6.Clutch "LOCK-UP" inspection

- Apply the rear brake as firm as possible
- Briefly open the throttle fully and notice the maximum engine RPM sustained during the test cycle.

Specified Clutch "LOCK-UP" RPM : 5200 ± 400 rpm

5.To assemble the driving pulley, reverse the whole procdeure.

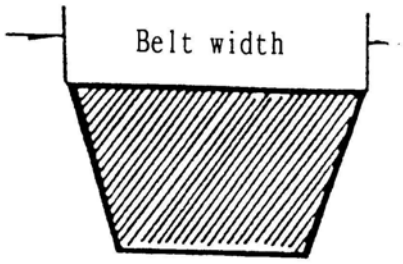
Locking torque: 1.Nut of driving pulley M12: 4.0-5.5kg/m. 2.Locking nut of clutch M12: 4.0-5.5kg/m

6.Checking driving belt

(1)check driving belt is cracked or not rubber and fiber is loosened or not also check if they are extraordinary worn out.

(2)driving belt width:

limit of use :change it below 19mm



7.Disassemble slide driving plate set.

(1)Remove bush of slide driving plate.

(2)Remove screw, and disassemble the cover of slide driving plate.

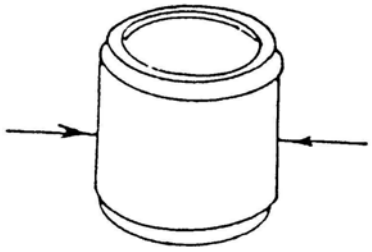
(3)Remove ramp plate.

(4)Remove weight roller.

8.Checlomg

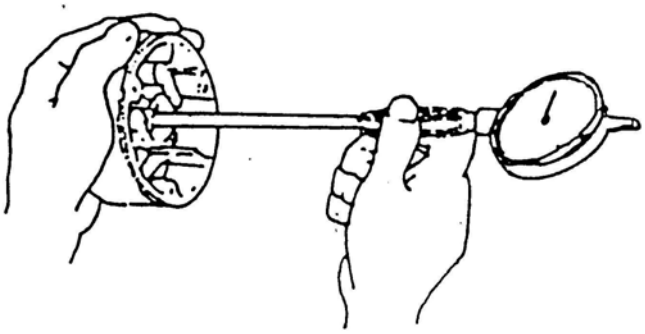
(1)Check the wearing condition of weight roller.

Limit of use : change it below 17.4mm



Check the wearing condition

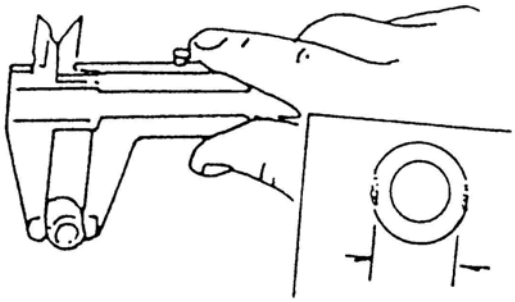
(2)Check gasket inner dia of slide driving plate: limit of use : change it over 24.1mm.



(3)Check the driving pulley surface wearing condition.

(4)Check the outer diameter of the contact surface of the movable driving plate.

limit of use : change it below 23.94mm.

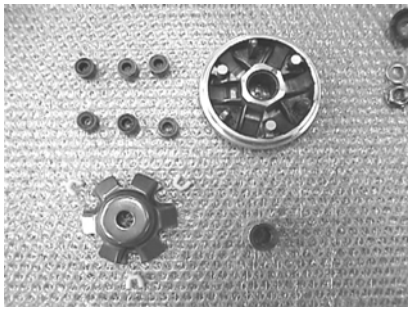


9.Assemble the slide driving plate.

(1)Clean up the inside surface of slide driving plate, then assemble the roller.

(2)Assemble the ramp plate.

(3)Other procedure refers to the opposite procedure of disassembling.



D.Starter dismantle

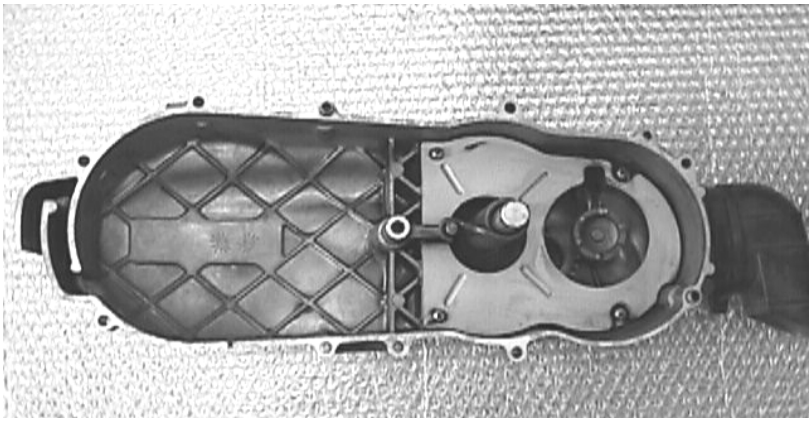
1.Dismantle left crankcase cover

2.Remove hexagon nut, then remove the starter lever.

3.Remove five screw of separated plate.

4.Remove start spring from start returning position.

5.Remove driven gear comp. of kick starter.



6.Remove the retaining C-type Ring.

7.Remove spindle comp. of kick starter.

8.Checking starter

a. Check the wearing condition of the outer diameter of spindle comp and the inner diameter of bush and gear.

b. Check the wearing condition of shaft of driven gear comp. Gear sets and ratchet.

9.Assembling the starter

Assemble the starter follows the.

Opposite procedure of dismantling.

Locking torque : M6: 1.0~1.2kg/m.

Note:

①Make sure one end of the torsion spring is hooked on the groove of driven gear, and another end of torsion spring is hooked on the pole of inside of left crankcase.

②Put some grease in every shaft and gear sets before assembly.

E. Clutch driven pulley

1.Dismantling the clutch

a. Remove left crankcase cover.

b. Remove driving plate.

c. Remove driving belt.

d. Remove locking nut, then remove clutch.

2.Assemble the clutch : follows the opposite procedure of dismantling.

Locking torque:
M12: 4.0~5.5kg.m

3.Checking clutch:

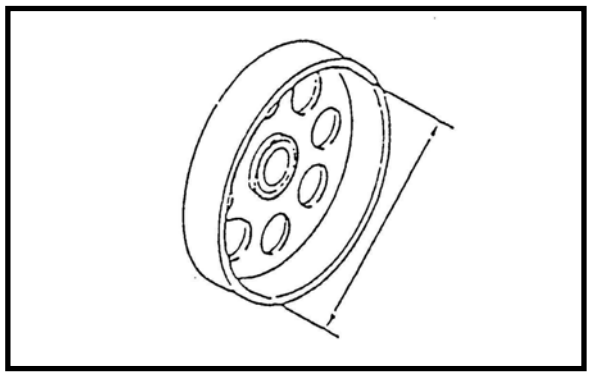
dismantling tool

a.Check clutch driving face.

Check clutch cover about its wearing condition

And inner diameter measurement.

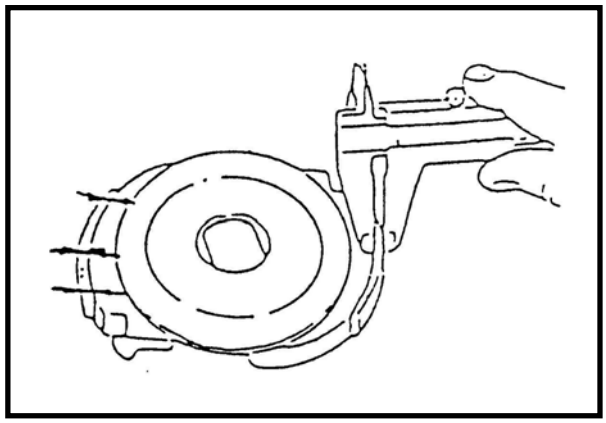
●limit of use: change it above 125.5mm



b.Check clutch lining wearing condition and

Measure the lining thickness.

●limit of use : change it below 1.5mm.

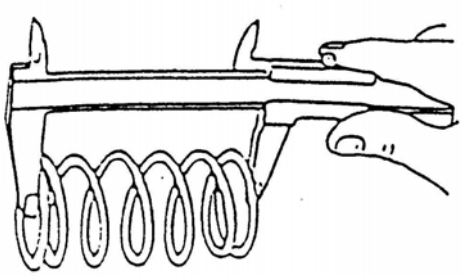


c.Check driving spring free length.

Standard: 151mm

Limit of usage:

Change it below 127 mm



d. Check wearing condition of driving plate sets. And measure outer diameter.

●limit of use: change it above 33.95mm.

e.Check wearing condition of slide driven plate. And measure its Inner diameter.

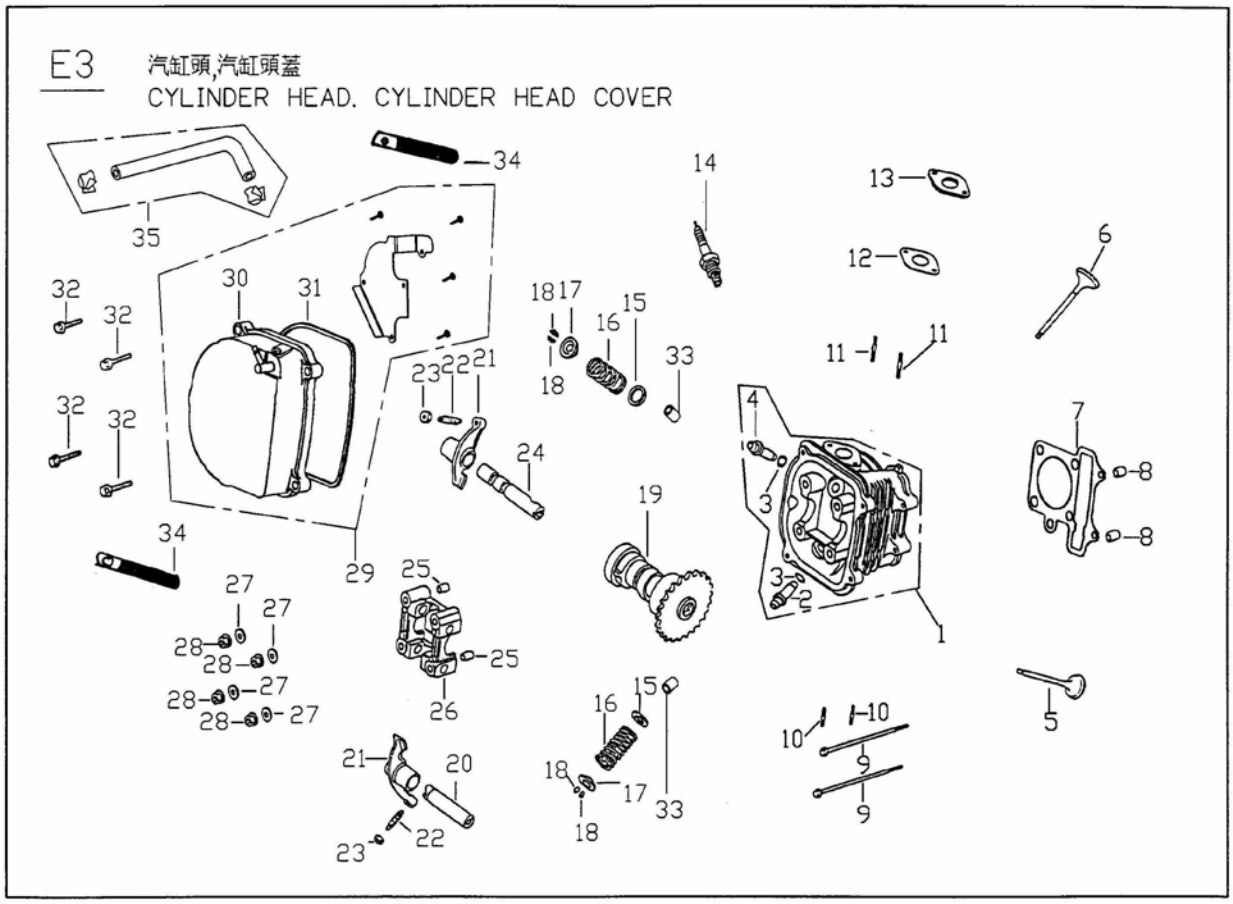
●limit of use : change it above 34.00mm.

f.Check is there any wearing occur to the ditch

g.Check wearing condition of oil seal, if necessary, change a new one.

(5)Cylinder head and valve

A.Trouble shooting
B.The operation data information



1	HEAD COMP. CYLINDER	19	"CAM,SHAFT ASSY."
2	"GUIDE,EXH VALVE "	20	"SHAFT,EX.ROCKER ARM"
3	O-RING	21	VALVE RXKER ARM
4	"GUIDE,IN VALVE "	22	SCREW TOPPED ADJUSTER
5	VALVE EXHAUST	23	HEXAGON NUT
6	VALVE INLET	24	"SHAFT,EX.ROCKER ARM "
7	GASKET HEAD CYL.	25	LOCK PIN
8	LOCK PIN (D10*14L)	26	CAMSHAFT HOLDER
9	HEXAGON FLANGE BOLT	27	PLAIN WASHER
10	STUD BOLT	28	HEXAGON FLANGE NUT
11	STUD BOLT	29	CYL.HEAD COVER COMP.
12	INSULATOR CARB GASKET	30	CYL.HEAD COVER
13	INSULATOR CARB	31	"PACKING,CYL. HEAD COVER "
14	IGNITION PLUG (CR7HSA)	32	HEXAGON FLANGE BOLT
15	PLAIN WASHER	33	VALVE SEAL
16	"SPRING,VALVE "	34	CLIP
17	RETAIER VALVE SPRING	35	TUBE CYL. COMP.

A.Troubleshooting.

If the cylinder head is malfunctioned, usually it can tell from the measurement of the Compression pressure or from the noise that comes from the upper part of the engine.

1.Unsmooth idle speed

-Compression pressure is too low.

2.Insufficient compression pressure.

-Poor adjustment of valve clearance

-Valve being burned out or bent

-Valve timing is not correct

-Valve spring is damaged.

-Poor sealing of valve base.

-Leakage in Cylinder head gasket.

-Cylinder head twisted or cracked.

-Spark plug is not properly installed.

3.Compression pressure is too high.

-There is too much carbon accumulated in the combustion chamber.

4.There is white fume coming out from the exhaust pipe.

-The valve stem or valve guide pipe is worn out.

-Valve stem's oil seal is damaged.

5.Abnormal noise

-Poor adjustment of valve clearance

-Valve burned or damaged spring

-Camshaft is worn out.

–Chain adjuster is worn out.

–Camshaft, valve rocker arm is worn out.

B.The operation data information

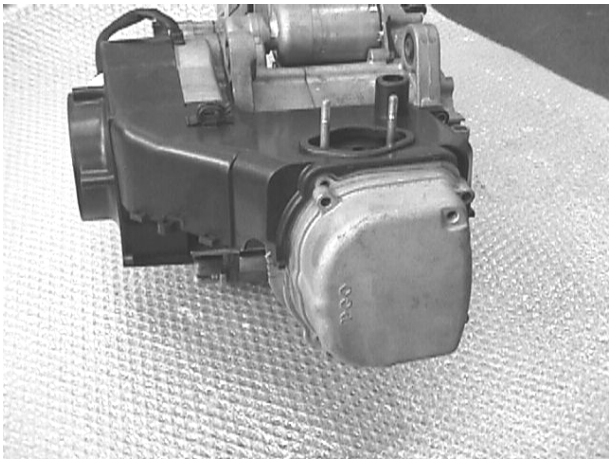
Description	IN/EX	Standard Value (mm)	Limit of use (mm)
Clearance between adjuster tapped Screw and valve stem (Before warm up)	IN	0.08	—
	EX	0.08	—
Compression pressure(throttle open full)		11kg/650rpm	(150CC)
Height of the cam's convex part	IN	26.625(150CC)	26.23(150CC)
	EX	26.53(150CC)	26.13(150CC)
Inner diameter of rocker arm shaft	IN	10.00~10.015	10.10
	EX	10.00~10.015	10.10
Outer diameter of rocker arm shaft	IN	9.972~9.987	9.91
	EX	9.972~9.987	9.91
Valve base angle	IN&EX	1.0	1.8
Outer diameter of valve stem	IN	4.975~4.900	4.90
	EX	4.955~4.970	4.90
Inner diameter of valve guide	IN	5.000~5.012	5.30
	EX	5.000~5.012	5.30
Clearance between valve stem and Valve guide	IN	0.010~0.037	0.08
	EX	0.030~0.057	0.10

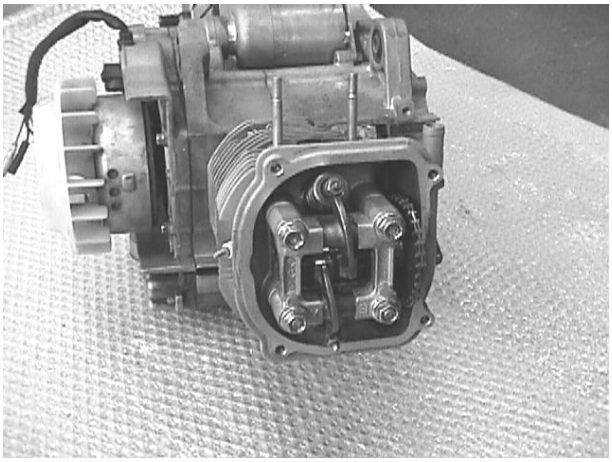
C.Dismantling and installing the Cam shaft

1.Take off the left cover.

2.Remove the intake pipe from the Cylinder head cover.

3.Take off the 4 bolts of the cylinder head cover and take off the cylinder head cover.



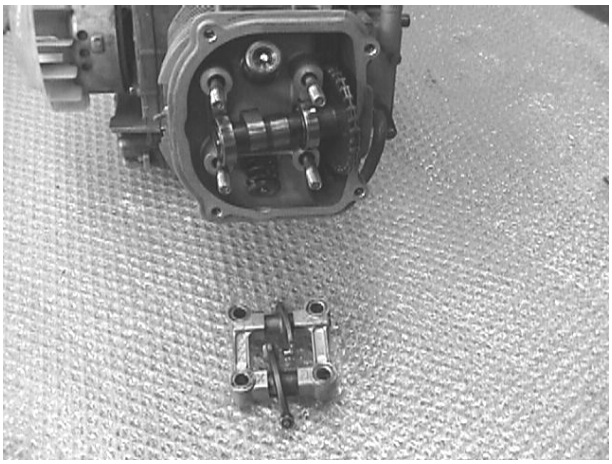


4.Turn the flywheel counterclockwise and let the ”T” mark on the flywheel point to the crankcase mark and make the round hole on the cam chain gear point upwards. This is the upper dead point of compression.

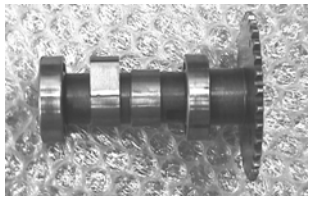
5.Take off the cam shaft holder, the nut and the locking pin.

6.Remove the cam gear from the cam chain.

7.Remove the cam shaft.



Check cam shaft
Check the convex surface and the height and see whether it has Been damaged.

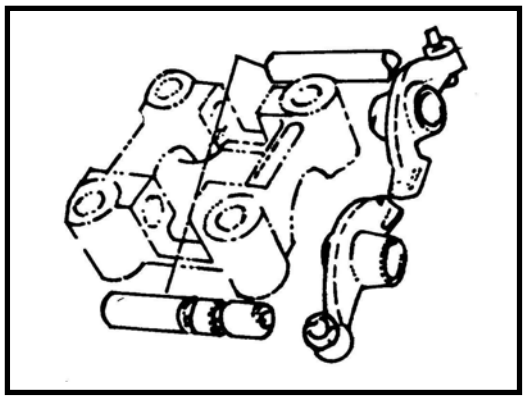


Limit of Use:
IN :replace it below 25.90(125CC), 26.23mm(150CC)
EX :replace it below 25.90(125CC), 26.13mm(150CC)

Check camshaft. If the bearing is loosen or worn out, change the whole set if necessary.

Check cam shaft holder

1.Check the cam shaft holder, cam rocker arm, and cam Rocker arm shaft and see whether it is loosen or worn out.



NOTICE:
Do check if there is any damage on the cam rocker arm Sliding surface.

2.Cam shaft holder and cam rocker arm outer dia measurement:

Limit of use : replace it above 10.10mm.

3.Cam rocker arm inner dia measurement:

Limit of use : replace it above 10.10mm.

4.Cam rocker arm shaft and rocker arm outer dia measurement:

Limit of use : replace it below 9.91mm.

5.Clearance between the Cam rocker arm and rocker arm shaft.

Limit of use : replace it above 0.10mm.

WHEN INSTALLING:

1.The mark “EX” on the cam shaft holder is the exhaust rocker arm, one-way stopper. Install the exhaust rocker arm, the inlet rocker arm, and the rocket arm shaft.

NOTICE:
a.The tangen angle of the heat side of intake valve’s rocker arm shaft is to match with the bolt of the cam holder.
b.The tangent angle of the exhaust valve’s rocker arm shaft is to match with the bolt of the cam holder.

2.Turn the flywheel to make the T mark pin correctly. The hole on the cam chain gear should point upwards. Both the left and right concave points and the cylinder head are at parallel position (convex part of cam shaft points upwards), then install the cam shaft on the cylinder head.

3.Install the cam chain onto the cam shaft gear.

4.Install the locking pin.

5.Install the camshaft holder, washer and nuts on the cylinder head.

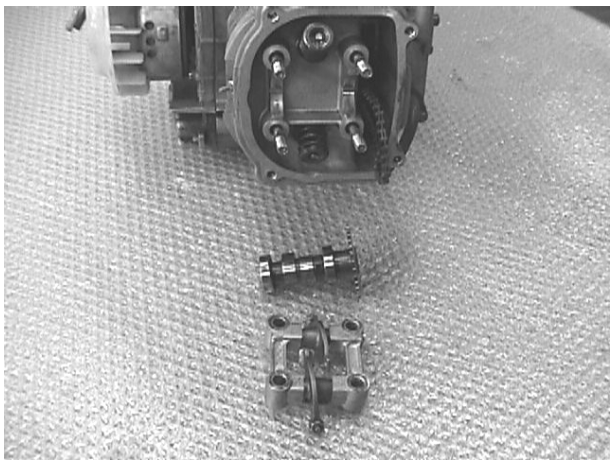
6.Lock tightly the cylinder head nuts.
Locking torque: Cam shaft holder nuts:2.0kg-m

NOTICE:
a.Put some grease on the bolt thread of cam shaft holder
b.Lock the nuts of the cam shaft bracket in “cross” sequence for 2-3 times.

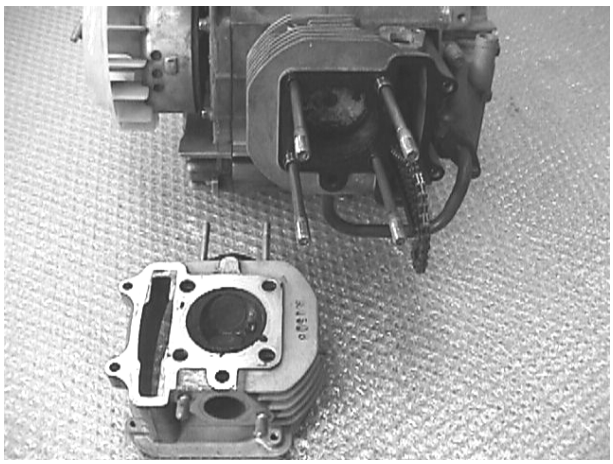
7.Adjust the valves clearance.

Dismantling the cylinder head:

1.Remove the carburetor.
2.Remove the muffler.
3.Remove the fan cover.
4.Remove the bolts on the engine cover.
5.Remove the camshaft.



6.Remove the cylinder head
7.Remove the lock pin, cylinder head gasket.
8.Remove cam chain guide



Notice:
●Not to injure the contact
Surface of the cylinder.
●Avoid any object dropping info the engine.

Further dismantling

●Use the valve contracting tool to remove valve pin, supporter, the vlave spring collar, valve spring and valve stem oil seal.

Notice:
●Valve Spring has to be operated by the valve spring contractor.
●To assemble the cylinder head, please follow the opposite procedure as above.

(6)Cylinder and piston

A.Trouble shooting

B.The Operation notice

C.Data

D.Dismaniling cylinder, piston

E.Installing cylinder, piston

C.Data (150CC)

Part name /description			Standard value (mm)	Limit of use (mm)
Cylinder	Bore		57.490~57.510	57.600
	Curve		-	0.005
	Cylindrility		-	0.005
	Roundness		-	0.005
Piston/ Piston ring	Clearance b/w Piston and Piston ring	lst ring	0.03~0.07	0.10
		2nd ring	0.02~0.06	0.10
	Clearance of cutting section	lst ring	0.10~0.25	0.50
		2nd ring	0.10~0.25	0.50
		side ring	0.2~0.7	---
	Piston outer diameter		57.470~57.490	57.400
	Measuring location of piston outer dia.		Down to 5 mm from the piston skirt	---
	Clearance b/w piston and cylinder		0.025~0.035	0.10
	Piston pin hole inner dia		15.006~15.012	15.030
Piston pin outer diameter			14.990~14.992	14.96
Clearance between piston and piston pin			0.020~0.017	0.025
Connecting rod small end inner dia			15.010~15.028	15.060

A.Troubleshooting.

a.Compression pressure is too low, difficult to start engine and engine running unsmoothly.

1.Cylinder head gasket cracked
2.Spark plug is not well locked
3.Piston ring worn out or cracked
4.Cylinder, piston worn out.
5.Reed valve is out of order.

b.Compression pressure is too high; Engine overheating; abnormal noise.

1.piston tip has too much carbon accumulated.

c.Abnormal piston noise

1.Cylinder and piston worn out.
2.Piston pin hole or Piston pin worn out.
3.Connecting rod small end or bearing worn out.

d.Abnormal piston or cylinder noise

1.Piston ring worn out or cracked
2.Cylinder worn out or cracked

B.The operation notice

1.Clean before operation to avoid particles dropping into the engine.
2.The contact surface of gasket must be clean.
3.Dismantle cylinder and cylinder head by screw driver. Do not injure the contact surface.
4.Cylinder inner surface and piston outer face can't be injured. Contact Surface should lubricate by specified oil.

C.Data (125CC)

Part name /description			**Standard value** (mm)	**Limit of use** (mm)
Cylinder	Bore		51.490~51.510	51.60
	Curve		-	0.005
	Cylindrility		-	0.005
	Roundness		-	0.005
Piston/ Piston ring	Clearance b/w Piston and Piston ring	lst ring	0.03~0.07	0.10
		2nd ring	0.02~0.06	0.10
	Clearance of cutting section	lst ring	0.15~0.35	0.50
		2nd ring	0.15~0.35	0.50
		side ring	0.2~0.8	-
	Piston outer diameter		51.460~51.480	51.40
	Measuring location of piston outer dia.		Down to 7mm from the piston skirt	-
	Clearance b/w piston and cylinder		0.025~0.035	0.10
	Piston pin hole inner dia		13.022~13.013	13.045
Piston pin outer diameter			12.996~13.00	12.96
Clearance between piston and piston pin			0.02~0.017	0.025
Connecting rod small end inner dia			13.015~13.028	13.060

D.Dismantling

a.Dismantling Cylinder

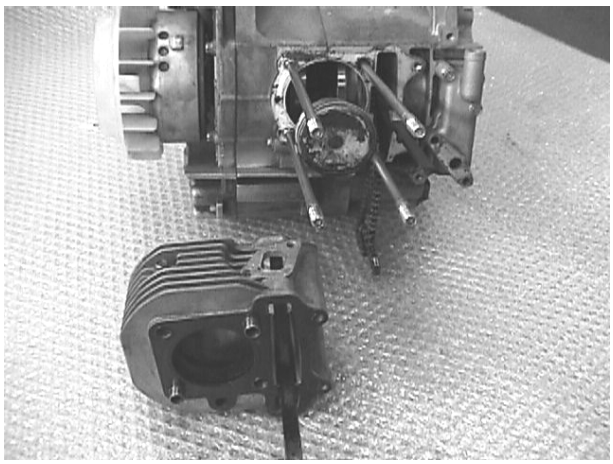
1.Remove the cylinder head.

2.Remove 2 bolts, then the camshaft chain adjuster

3.Remove CAM chain guide.

4.Remove cylinder.

5.Remove the cylinder gasket, lock pin and clean the gasket on the cylinder.



b.Dismantling piston

1.Remove the piston pin clip.

NOTICE:

Dot' drop the clip into the crankcase.

2.Remove the piston pin and take off the piston.

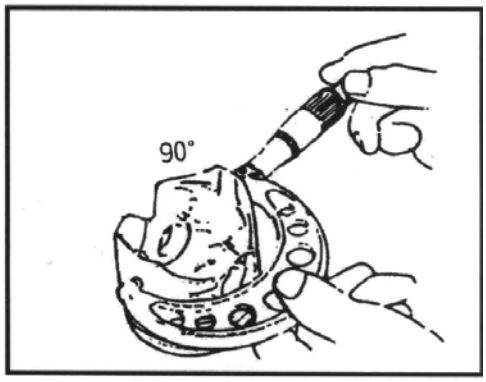
3.Check piston, piston pin, piston ring.

4.Remove the piston ring

NOTICE: NOTICE:

Don't make piston ring worn out or damaged

5.Clean the carbon in the groove of the piston ring.



c.PISTON OUTER DIA MEASUREMENT:

1.Measuring location:

Perpendicular to the piston pin hole, down to 7mm(125CC), or 5mm(150CC) form the piston skirt.

Limit of use : change it when less than 51.4mm.(125CC) Limit of use : change it when less than 57.4mm.(150CC)

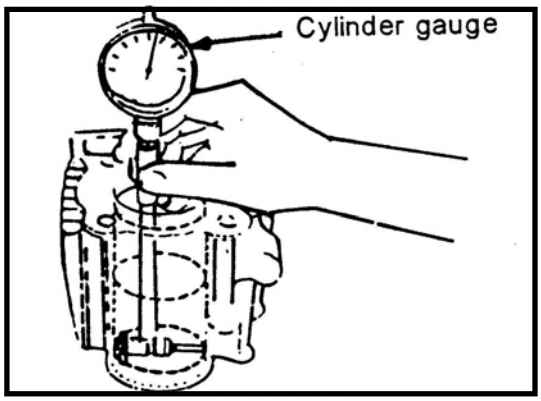
2.The clearance between the piston and piston pin:

Limit of use : change it when above 0.005m.

3.Checking any wearing, damage inside the cylinder.

Vertical to piston pin, and in X-Y direction to measure cylinder bore from the upper, middle and lower location.

Limit of use : Change it when above 51.6mm.(125CC) 57.6mm(150CC)

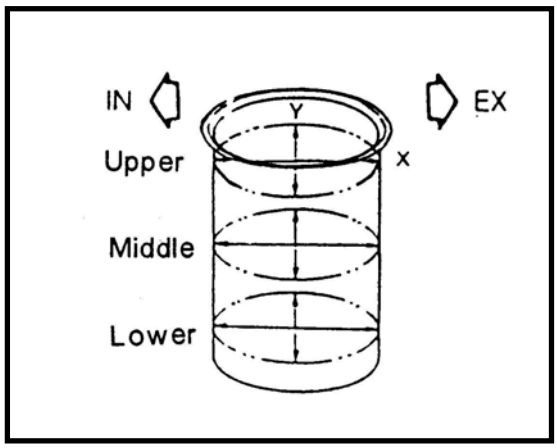


4.The maximum clearance between the cylinder and piston pin.

Limit of use : Change it when above 0.1mm.

5.The difference between the X and y is the roundness.

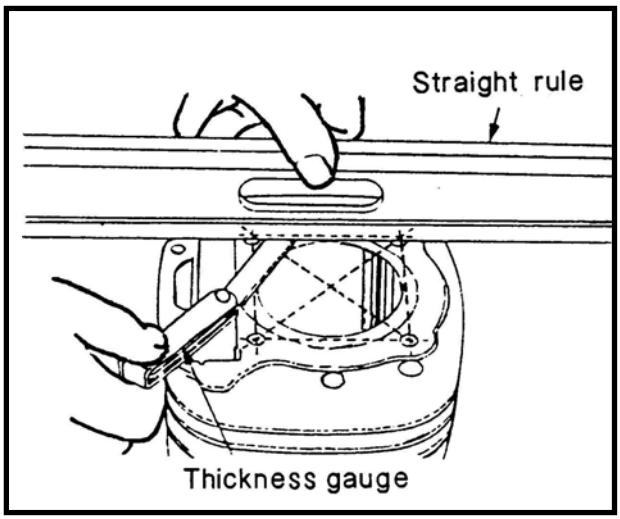
6.The cylindrility is the max value of the difference between the upper, Middlle and lower position of the inner dia in X or Y direction.



Limit of use : Roundness:change it when above 0.005mm. Cylindrility:change it when above 0.005mm.

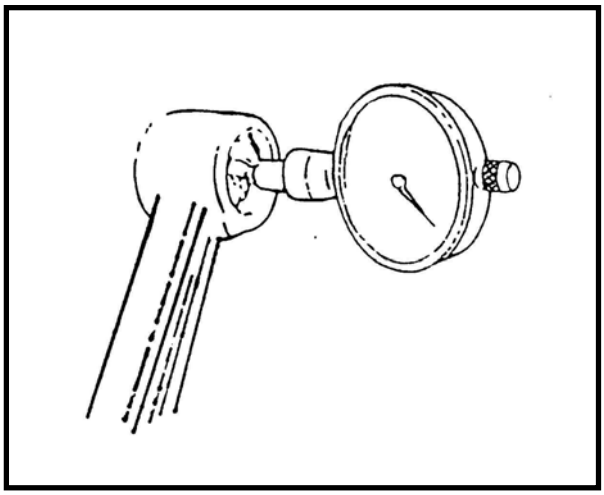
d.Checking the flatness of cylinder contact surface.

Limit of use : change it when above 0.05mm.



e.Connecting rod small end inner diameter measurement.

Limit of use : change a new one when above 13.06mm.(125CC) 15.06mm.(150CC)



E.Installing Cylinder and piston

a.Installing piston and piston rings

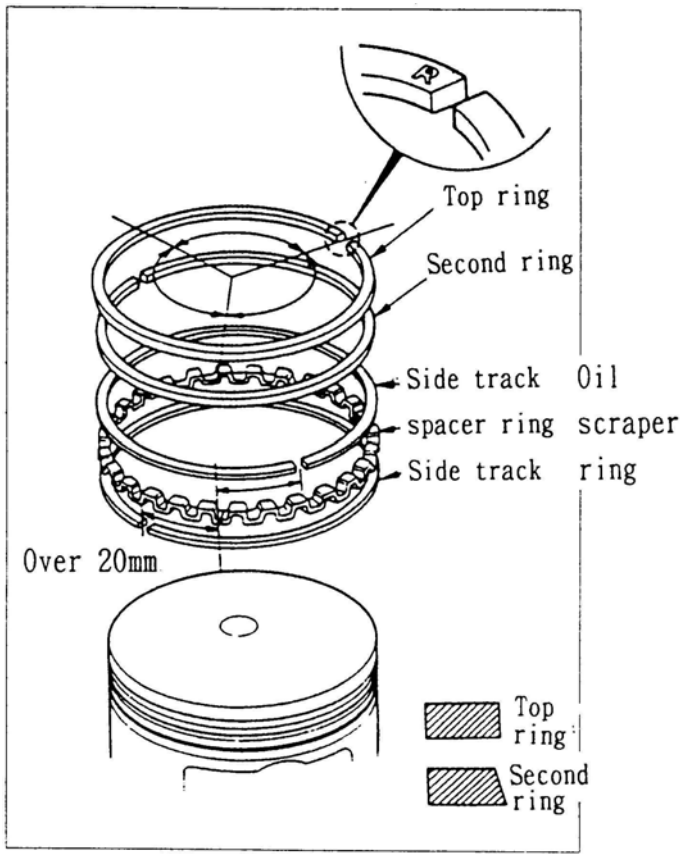
1.Lubricate the piston rings by motor oil.

NOTICE:

a.Be careful not to scratch the piston and not to break the piston ring.

b.The mark (on the ring) should be upward when installing.

c.after installing, the ring should be smoothly rotated.



2.Clean up the residual gasket on the crankcase.

NOTICE:
Do not drop other objects into the crankcase.

3.Assembly the piston, piston pin and piston pin clip.

NOTICE:
a.The mark “IN” on the piston tip should face to the INLET side.
b.Do not drop the piston pin clip into the crankcase and to clog the crankcase with rags.

b.Installing piston

1.Fix the lock pin and gasket on the crankcase.

2.Lubricate the Cylinder inner surface, piston and piston rings by Motor Oil.

3.Install the piston ring into the cylinder carefully.

NOTICE:

a.The piston ring cannot be damaged or cracked.

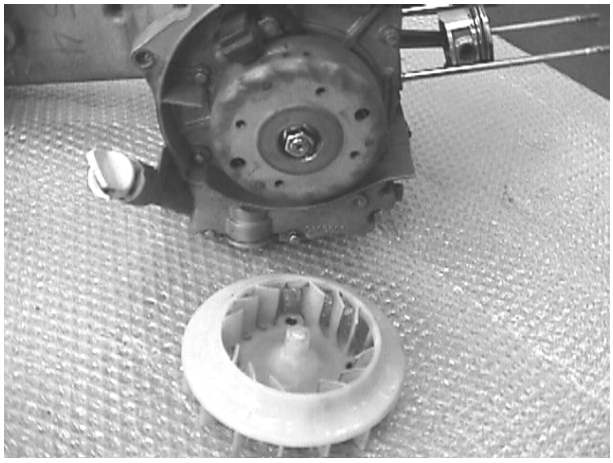
b.The cutting section of three rings must be arranged at intervals of 120°

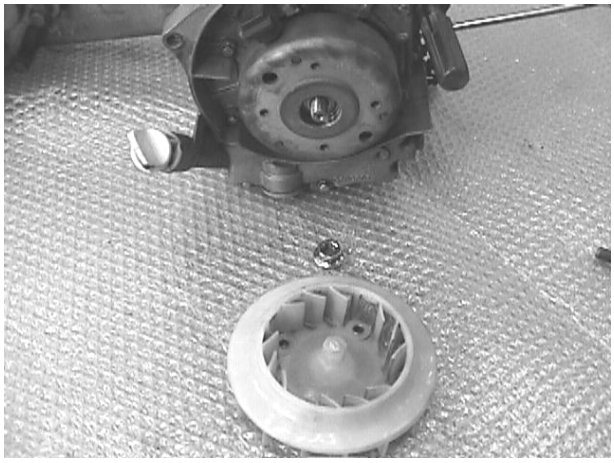
(7)A.C. Generator

A.Dismantling AC generator
B.Installing AC generator

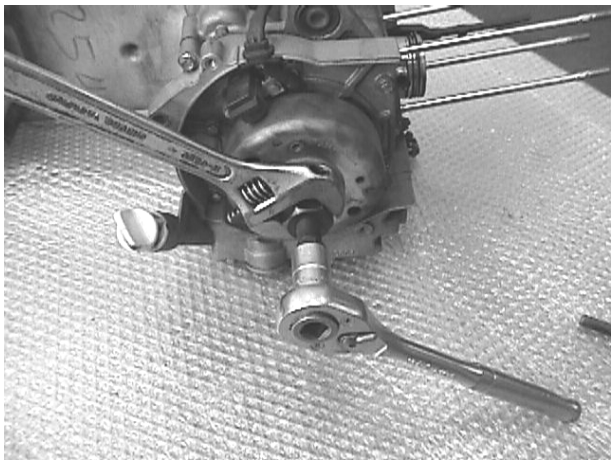
Dismantling AC generator

1. Dismantle the rear section of muffler.
2. Remove fan cowl.
3. Remove the M6 screws
4. Remove screws of flywheel magneto.
5. Remove the AC flywheel magneto by special tool.





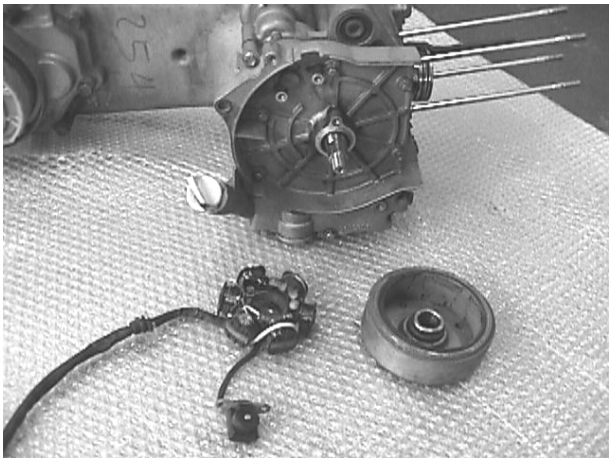
6. Remove the flywheel.
7. Remove the electric plug of AC flywheel magneto.



B.Installing AC generator

To install, please reverse the dismantling procedure.

Locking torque:	
M6:	1.0~1.2kg/m
M12:	3.2~4.0kg/m



(8)Final transmission mechanism

A. Troubleshooting.

B. Dismantle the final transmission mechanism.

C. Check the final transmission mechanism.

D. Assemble the final transmission mechanism.

A. Troubleshooting

●Engine can be started, but the vehicle doesn’t move.

1.Gear worn-out or cracked.

2.Gear burnt out.

●Noise occur when running.

1.Gear worn out, burnt or gear surface.

2.Bearing worn out of loosen.

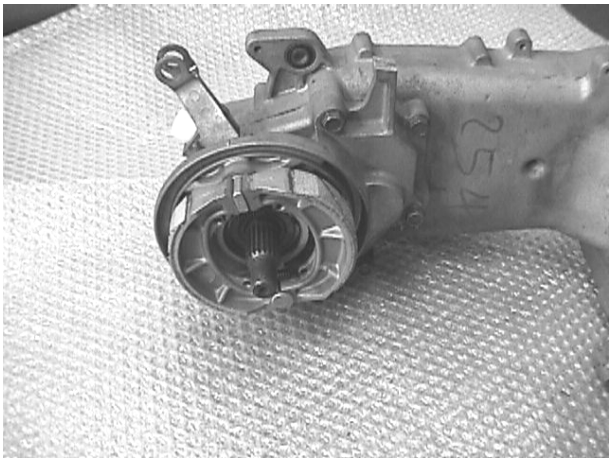
●Oil leakage

1.Too much oil

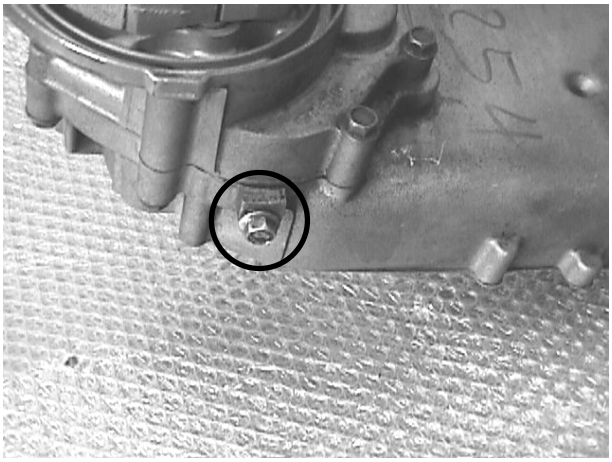
2.Seal worn out or damaged.

B. Disassemble the final transmission mechanism:

1.Remove the rear wheel.

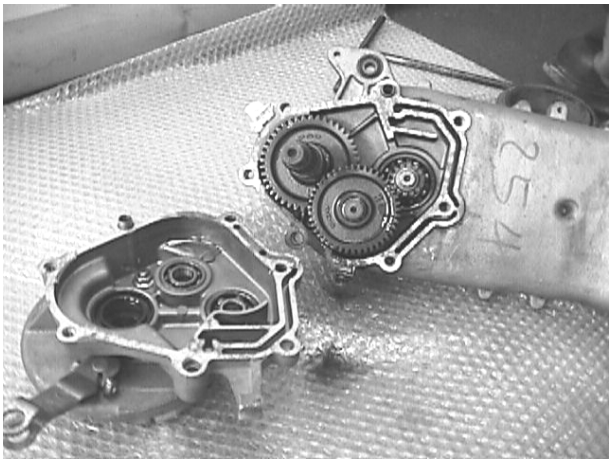


2.Drain the oil in the gear box.



3.Remove the bolt in the gear box cover.

Take off the gear box.



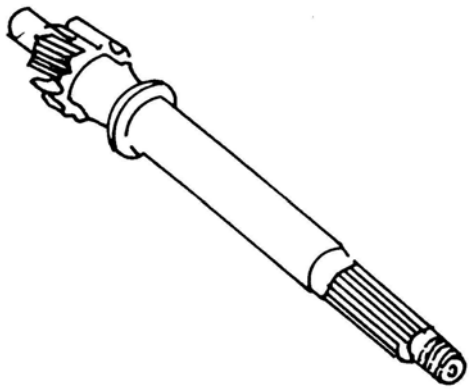
3.Remove the final reduction gear
And idle gear.

5.Clean up the gear box.

C. Check the final transmission mechanism

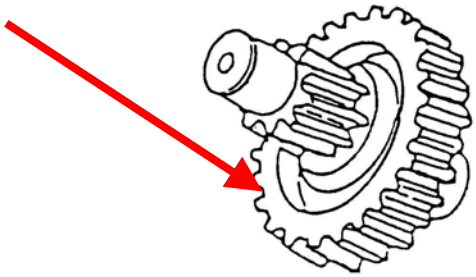
1.Check the wearing condition of driving shaft and gears.

Gear teeth number: 14 T (125CC) ; 15 T (150CC)

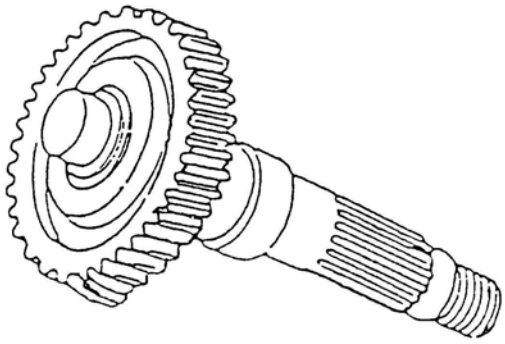


2.Check the wearing condition of idle gear shaft
and idle gears.

Gear teeth number 43 T (125CC) ;
42 T (150CC)



3.Check the wearing condition of the final
reduction gear.



4.Check the wearing condition of the oil seal and bearing.

D. Assemble the final transmission mechanism, please follow the opposite procedure
Of disassembling. After locking the drain bolt, refill 90cc of gear oil SAE90.

Locking torque:	M6: 1.0~1.2kg/M
	M10: 3.5~4.0kg/M
Drain bolt:	M8: 1.8kg/M

(9)Crankcase, Crankshaft:

A. Disassembling diagram.

B. Troubleshooting.

C. Data

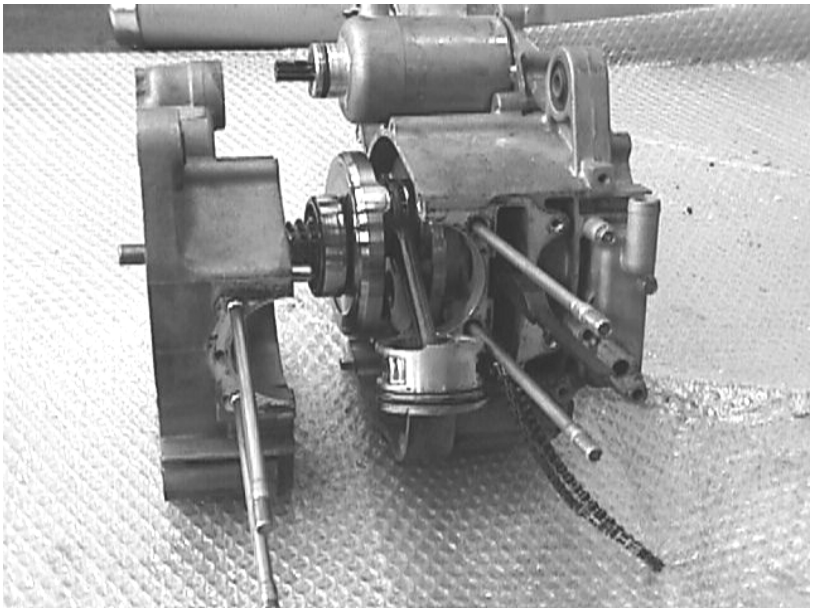
D. Remove crankcase and crankshaft.

E. Check crankshaft.

F. Assemble the crankcase.

A. Disassembling diagram

Torque: 1.0~1.2kg-m



B. Troubleshooting

Engine noise:

1.The bearing of final transmission mechanism is loosen.

2.Crank pin of bearing is slack.

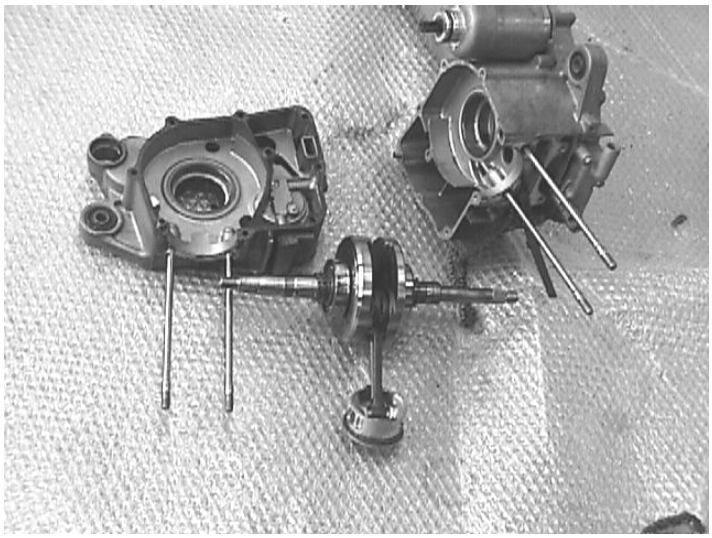
3.The bearing of gear box is loosen.

C.Data

Item	Standard value(mm)	Limit of use.(mm)
Clearance of connecting rod big end axle direction	0.10~0.35	0.55
Clearance of connecting rod big end vertical direction.	-	0.04
Swingness of the crank shaft journal.	0.03	0.10

D. Remove the crankcase and crankshaft by the following procedures:

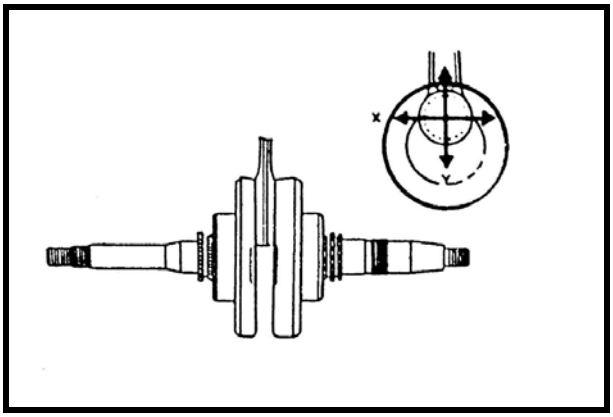
1.Remove the engine.
2.Remove the muffler.
3.The carburetor.
4.Engine corer.
5.Cylinder head.
6.Cylinder.
7.The driving plate.
8.AC flywheel magneto.
9.The starter clutch.
10.Oil pump.
11.Bolts of left/right crankcase.



E.Check crankshaft

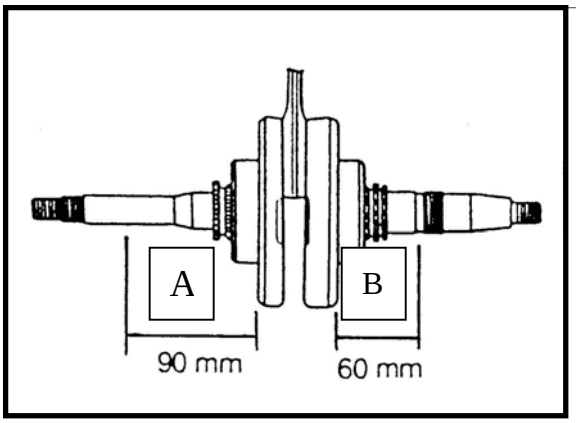
1.Measure the difference of the connecting rod big end between the X and Y

Limit of use : replace it when above 0.04mm.

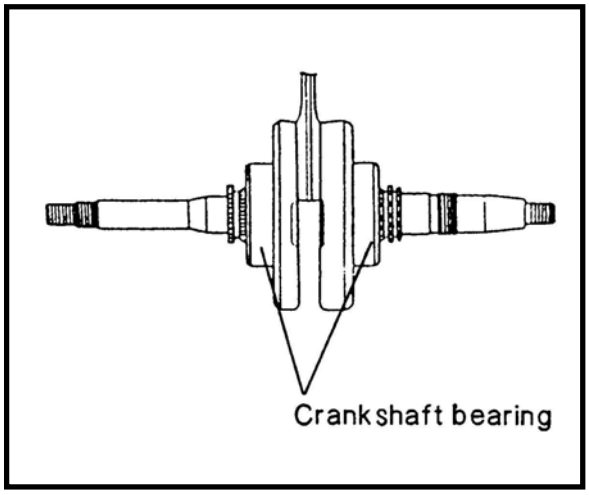


2.Measure the swing ness of the crankshaft journal.

Limit of use	
A	B
Change it when above 0.1mm	Change it when above 0.1mm



3.Check the looseness of crankshaft bearing.
If it is loosen, replace to a new one.



F.Assemble crankcase:

1.assemble crankcase according to the opposite procedure of disassembling.

2.The locking torque of bolts and nuts are described in previous chapter please refer.

(10)Carburetor:

A.General theory

B.Troubleshooting.

C.Dismantling the carburetor.

D.Dismantling the float and nozzle.

CARBURETOR SPECIFICATIONS:

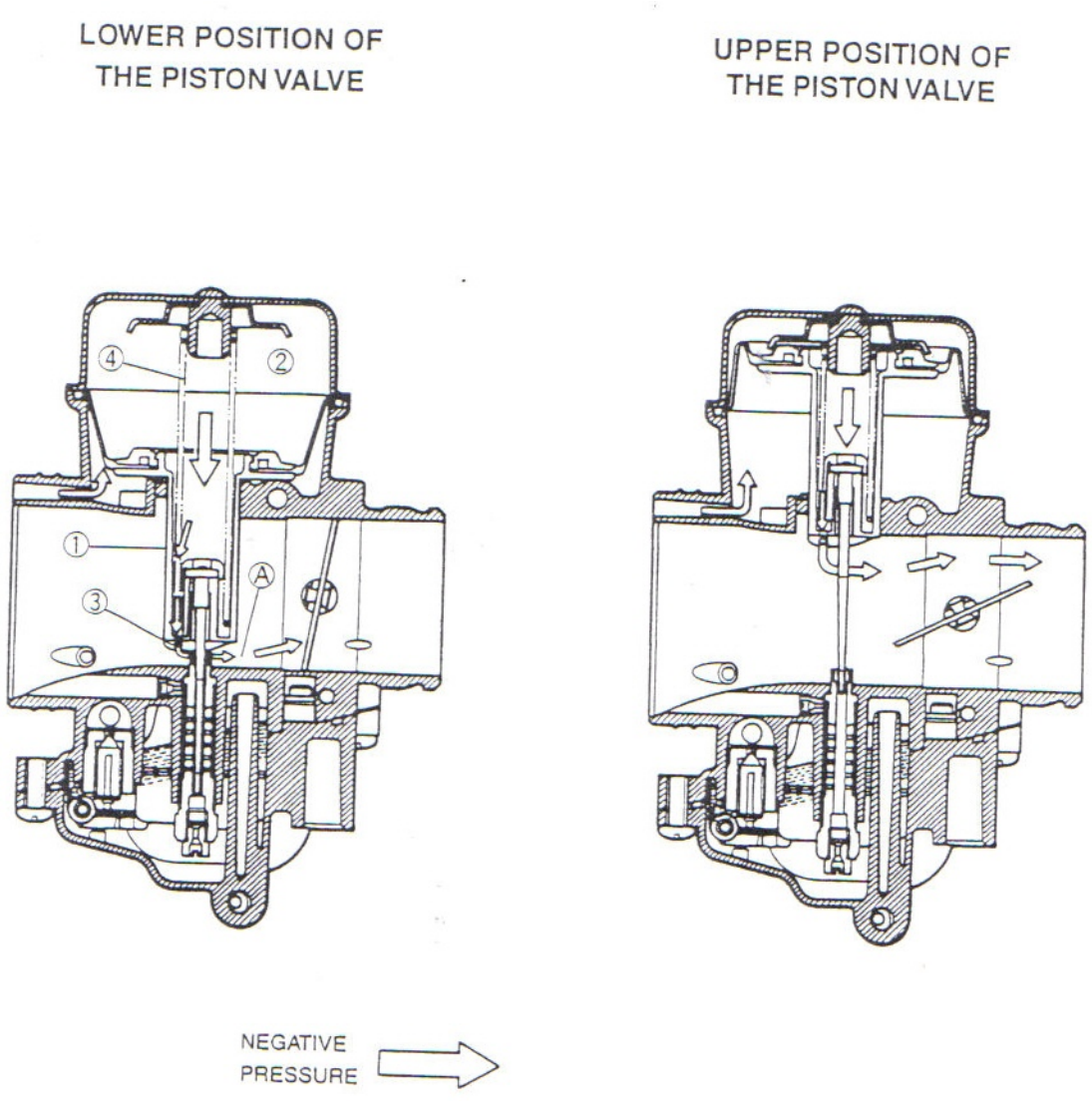
ITEM	SPECIFICATION	SPECIFICATION
Model	**M2-125**	**M2-150**
Carburetor type	**KEIHIN CVK24**	**KEIHIN CVK24**
Bore size	**24mm**	**24 mm**
I.D. NO	**013**	**046**
Idle r/min	**1700 ± 100**	**1700 ± 100**
Float height	**18.0 ± 0.5 mm**	**18.0 ± 0.5 mm**
Main jet	**#102**	**#102**
Jet needle	**4HGGN**	**4HLGL**
Needle jet	**P-O**	**P-O**
Pilot jet	**#35**	**#35**
Pilot screw (PRE-OPENING)	**2 1/4 turns out**	**1 1/ 2 turns out**

(A) General theory

DIAPHRAGM AND PISTON OPERATION

The carburetor is a variable-venturi type, whose venturi cross sectional area is increased or decreased automatically by the piston valve①. The piston valve moves according to the negative pressure present on the downstream side of the venturi A. Negative pressure is admitted into the diaphragm chamber ② through an orifice ③ provided in the piston valve①.

Rising negative pressure overcomes the spring ④ force, causing the piston valve ① to rise into the diaphragm chamber and prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel atomization and precise air/fuel mixture.

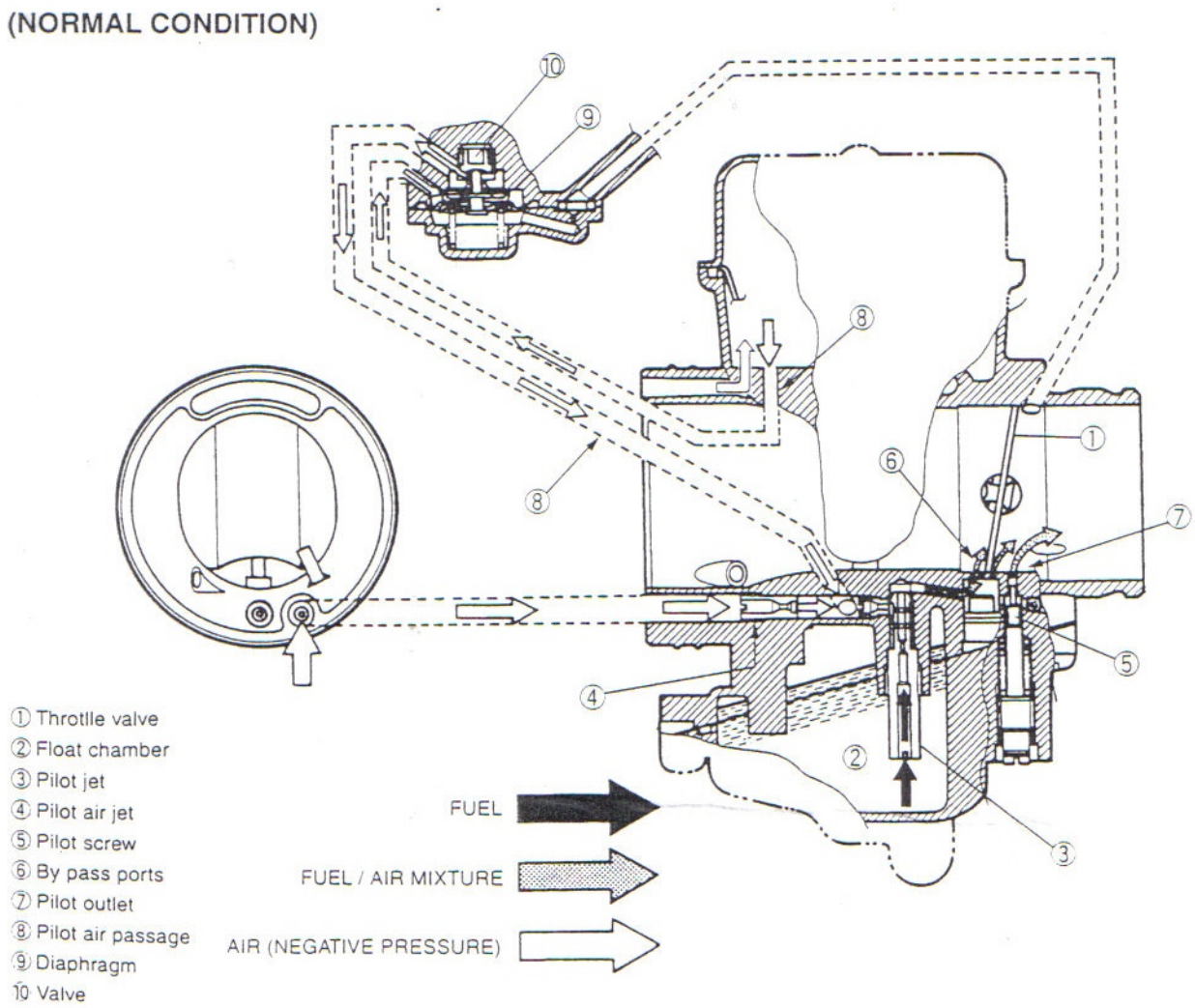


SLOW SYSTEM

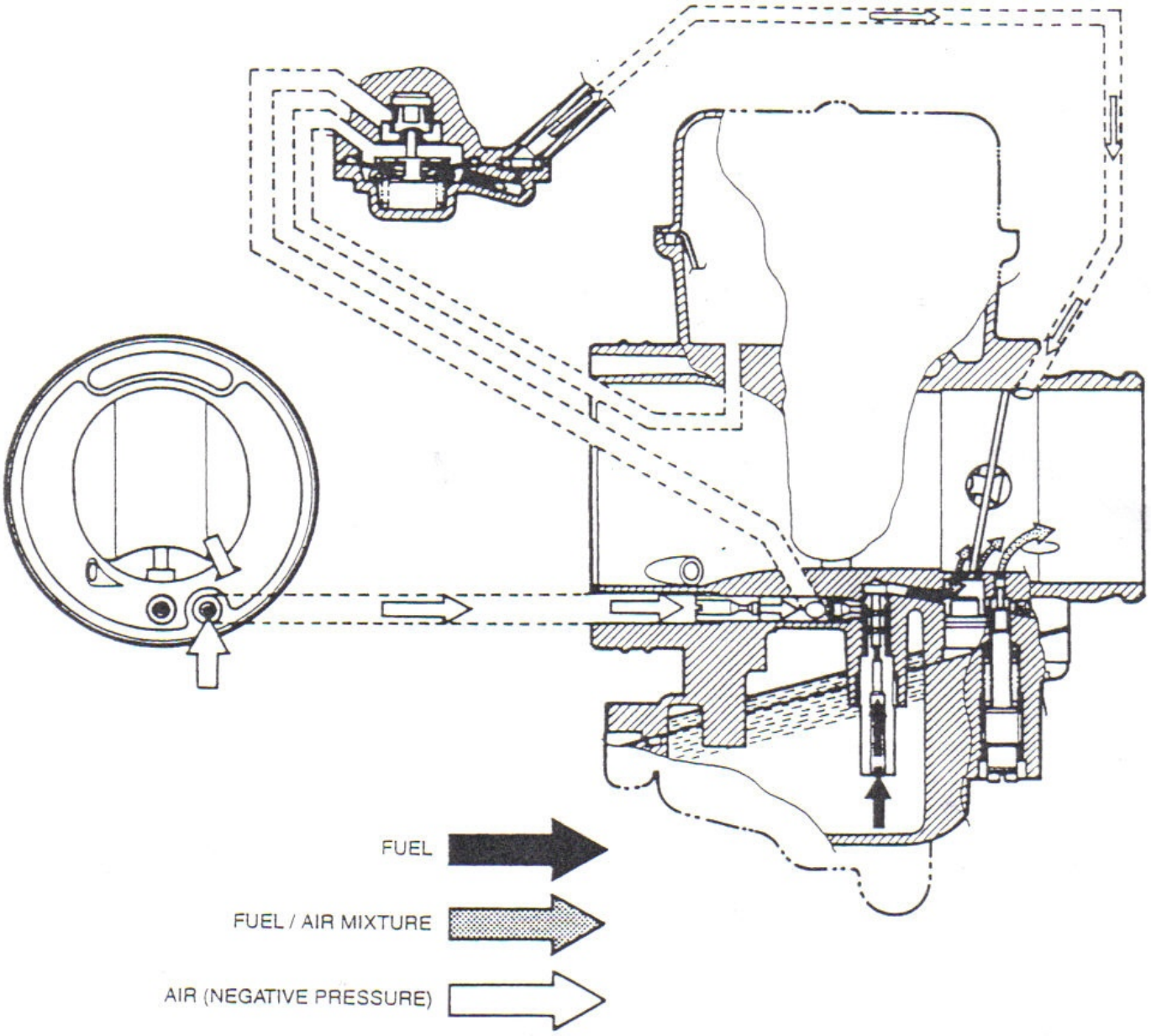
This system supplies fuel during engine operation when the throttle valve ① is closed or slightly opened. The fuel from the float chamber ② is metered by the pilot jet ③ where it mixes with air coming in through the pilot air jet ④. This mixture, rich with fuel, then goes up through the pilot passage to the pilot screw ⑤. Part of the mixture is discharged into the main bore through bypass ports ⑥. The mixture is metered by the pilot screw ⑤ and sprayed into the main bore through the pilot outlet port ⑦.

COASTING ENRICHMENT SYSTEM

The coasting enrichment system is included in the slow system. At the normal running operation, Joining of the air from upper part of then carburetor inlet side to pilot air passage ⑧ which obtains proper fuel/air mixture ratio. But if the throttle valve is closed suddenly, a large negative pressure generated in the cylinder which is applied to the diaphragm ⑨. The valve ⑩ which interlocks with the diaphragm ⑨ closes an air passage ⑧, thus, the fuel/air mixture ratio by controlling air flow in the pilot circuit.



(LARGE NEGATIVE PRESSURE GENERATED CONDITION)



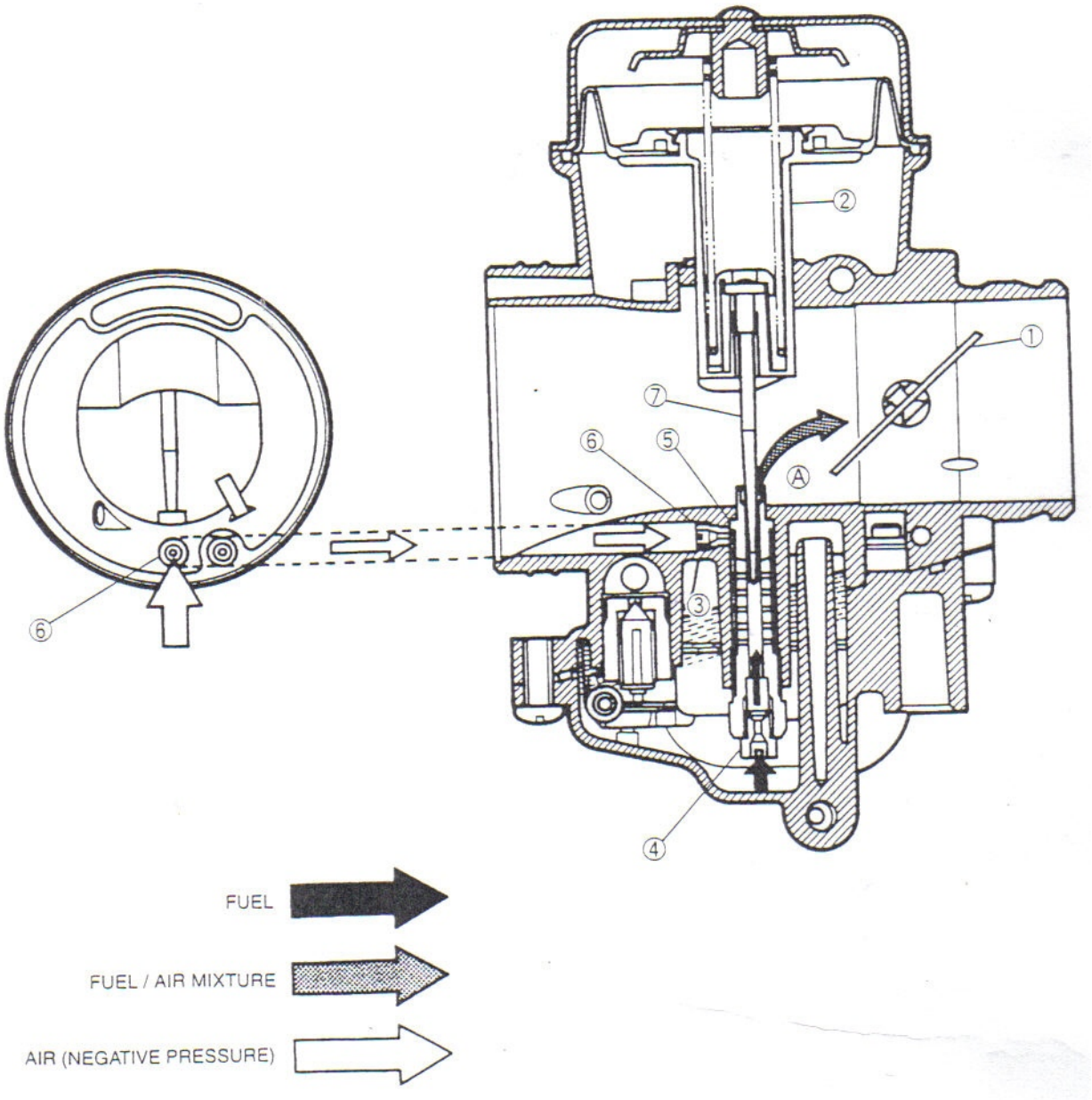
MAIN SYSTEM

As the throttle valve ① is opened, engine speed rises and negative pressure in the venturi A increases. This causes the piston valve ② to move upward.

The fuel in the float chamber ③ is metered by the main jet ④. The metered fuel enters the needle jet ⑤, mixes with the air admitted through the main air jet ⑥ and forms an emulsion.

The emulsified fuel then passes through the clearance between the needle jet ⑤ and jet needle ⑦ and is discharged into the venturi A, where it meets the main air stream being drawn by the engine.

Mixture proportioning is accomplished in the needle jet ⑤. The clearance through which the emulsified fuel must flow ultimately depends on throttle position.



AUTO-ENRICHENER (AUTO-CHOKE) SYSTEM

The automatic enrichener (automatic choke) device consists of the PTC heater A, the thermo-wax B and the plunger/needle ①. When the thermo-wax B is cold, the plunger/needle ① moves upward, Fuel is drawn into the enrichener circuit from the float chamber ②.

Enrichener jet ③ meters this fuel, which then flows into fuel pipe ④ and mixes with the air coming From the upper part of the float chamber ⑤. The mixture, rich in fuel content, reaches upper part of The fuel pipe and mixes again with the air coming through a passage extending from main bore ⑥.

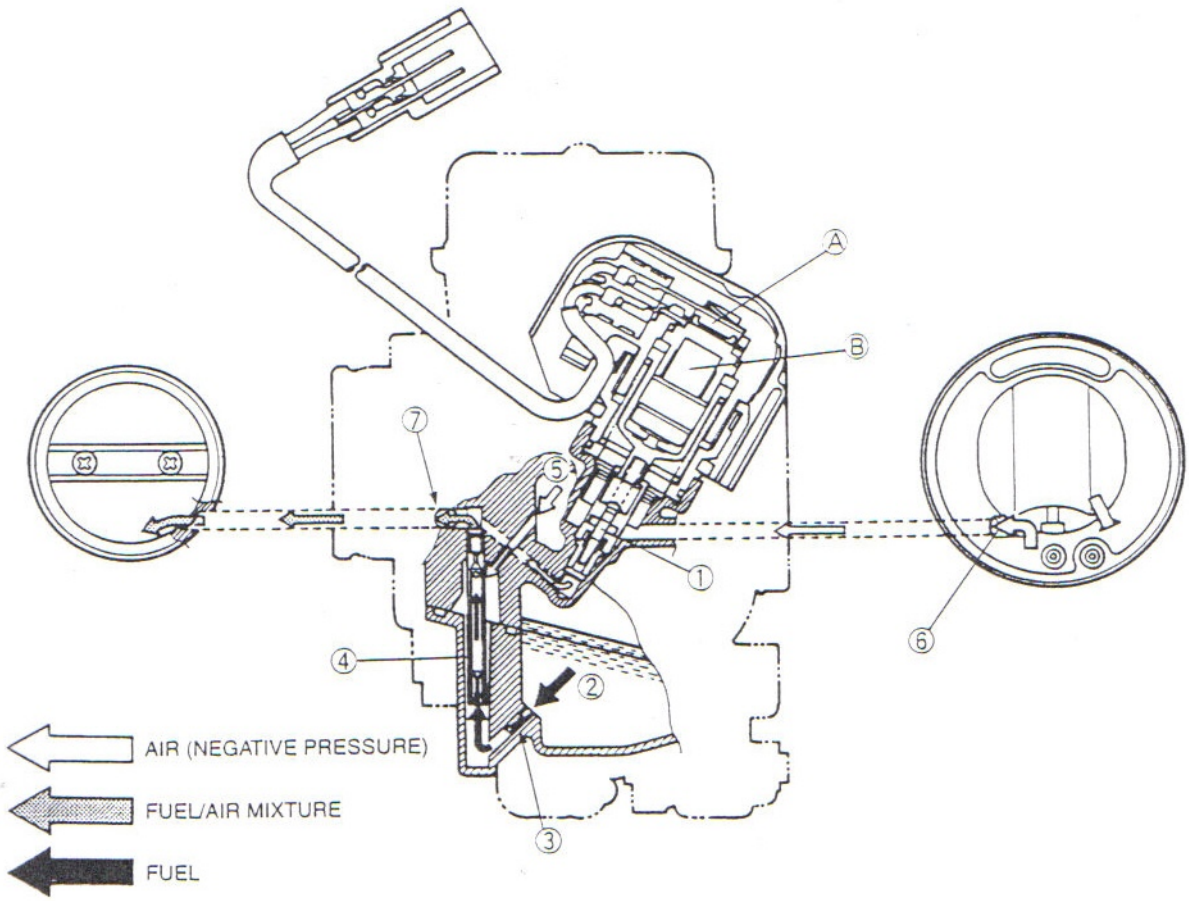
The two succesive mixings of fuel with air are such that proper fuel/air mixture for starting is produced when the mixture is sprayed out through outlet port ⑦ into the main bore.

NOTE:

An enrichener is operated almost the same way as a choke.

When the engine is cold:
The automatic enrichener passage is always open as the thermo-wax remains atomospheric temperature.

When the engine is started:
According to the PTC heater temperature, the thermo-wax gradually expands and closes enrichener passage by the needle of the plunger.

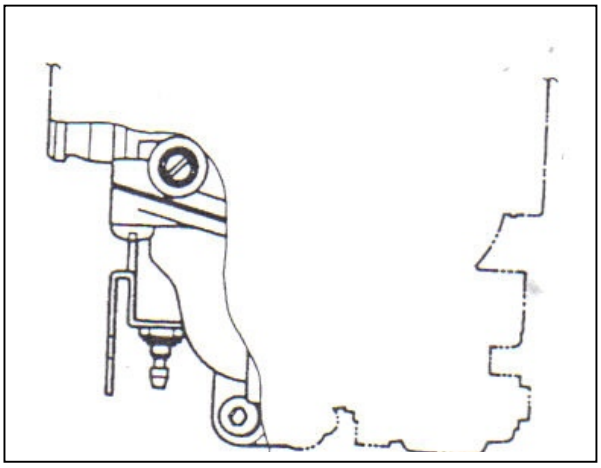


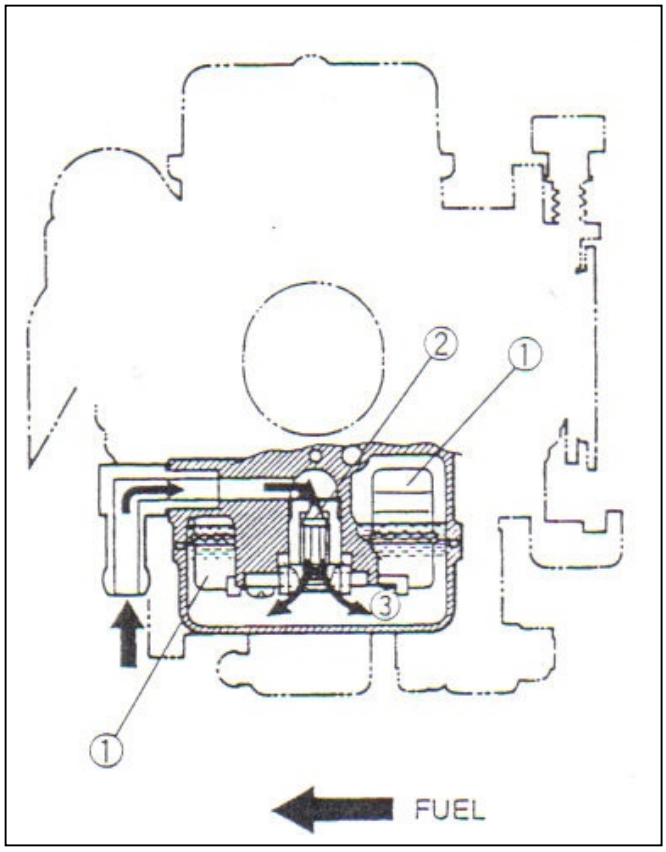
FLOAT SYSTEM

The float ① and needle valve ② work in conjunction with one another. As the float chamber ③, the float ① rises and the needle valve ② pushes up against the valve seat. When this occurs, no fuel enters the float chamber③.

As the fuel level falls, the float ①lowers and the needle valve ② unseats itself; admitting fuel into the float chamber ③.

In this manner, the needle valve ② admits and shuts off fuel to maintain the appropriate fuel level inside the float chamber ③.

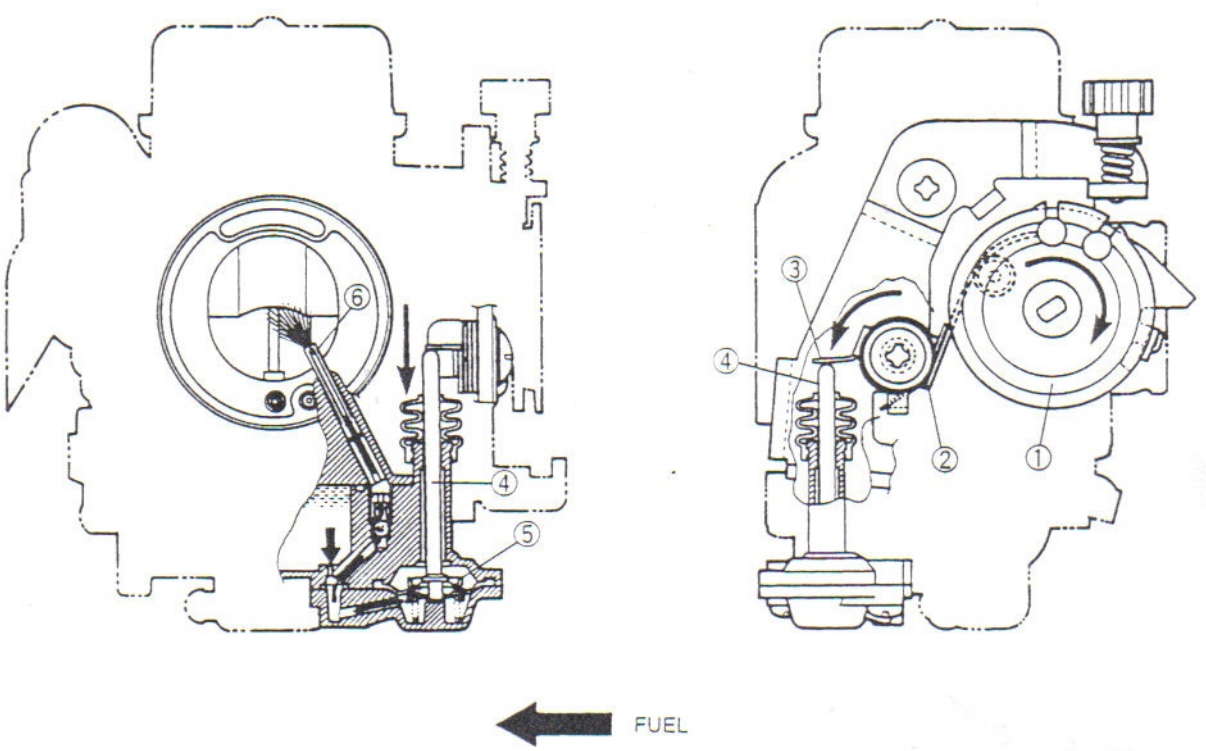




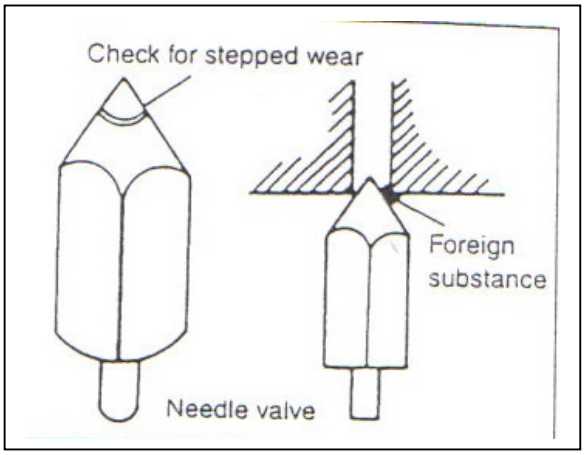
ACCELERATOR PUMP SYSTEM

This system works only when the rider opens throttle grip quickly as pump send the necessary amount of fuel to the carburetor bore for correcting fuel/air mixture ratio. When the rider open the throttle grip quickly, the intaken air volume becomes large and air velocity at the bottom of the throttle valve (piston valve)is slow and sucking volume of fuel is less.

The throttle valve lever ① pulls lever ② with the cable, and lever ③ turns and pushes rod ④. The rod ④ pushes plunger ⑤. This plunger pushes out the fuel through outlet pipe ⑥, spraying fuel into the main bore.



INSPECTION

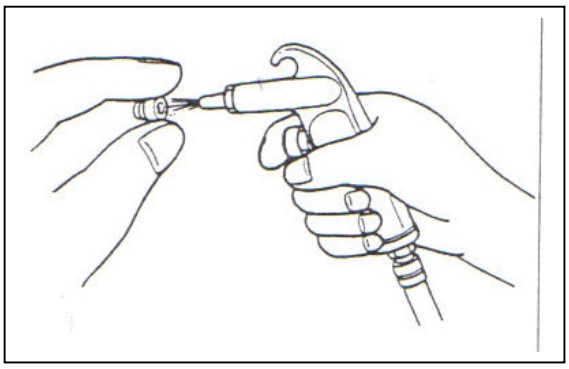


Check the following parts for damage and clogging.

* Pilot jet
* Main jet
* Main air jet
* Pilot air jet No.1 & No.2
* Needle jet holder
* Float
* Jet needle
* Piston valve
* Starter jet
* Gaskets and O-rings
* Pilot outlet and bypass
* Coasting enrichement valve
* Needle valve
* Valve seat

if any abnormal condition is found, wash the part clean. If damage or clogging is found, replace the part with a new one.

CARBURETOR CLEANING



!WARNING

Some carburetor cleaning chemicals, especially diptype soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.

- Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.
- Clean all circuits of the carburetor thoroughly-not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak, if necessary, to loosen dirt and varnish. Blow the body dry using compressed air.

!CAUTION

Do not use a wire to clean the jets or passageways. A wire can damage the jets and passageways, if the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow The chemical manufacturer's instructions for proper use and cleaning of the carburetor components.

- after cleaning, reassemble the carburetor with new seals and gaskets.

AUTO-ENRICHENER INSPECTION

- Disconnect the lead wire coupler①.
- Remove the cover②.
- Connect the positive ⊕ terminal of a 12V battery to Yellow/white lead and the negative ⊖ terminal to Black/ White.
- Check that the auto-enrichener section ③ (PTC heater built-in area)is heated in 5 minutes after the battery has been connected.

NOTE:

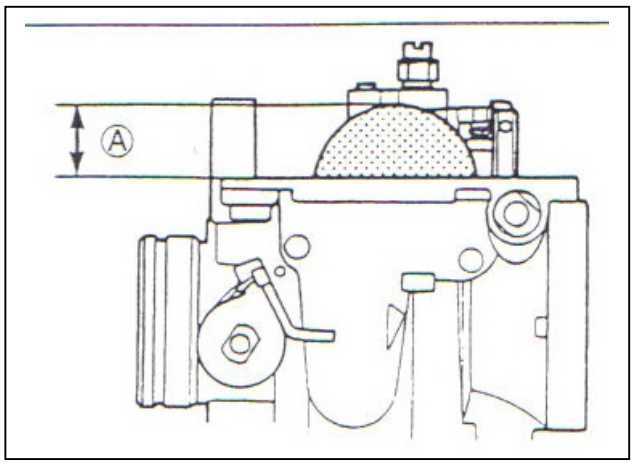
To inspect the function, check for change of temperature from the cold condition.

!CAUTION

Do not attempt to disassemble the auto-enrichener for the purpose of checking temperature.

FLOAT HEIGHT ADJUSTMENT

To check the float height, turn the carburetor upside down. Measure the float height A while the float arm is just contacting the needle valve using vernier calipers.
Bend the tongue as necessary to bring the float height A To the specified level.
Float height A: 20.8 ± 1.0mm



(B) Troubleshooting

●Difficult to start

1.No sparking in spark plug.

2.Compression pressure too low.

3.No fuel in the carburetor

-air cleaner blocked

-oil pipe blocked

-bad adjustment of the fuel level

float valve is jell

●Mixed air too dilute

1.Main jet blocked

2.Float valve blocked

3.Fuel level too low

4.Fuel system blocked

5.Second air sucked into intake system

6.Bat vacuums during piston movement

7.Throttle valve malfunction

●Too much fuel in the engine

1.Air cleaner blocked

2.Mixed air is too dilute in the idle system

●Sparking unsteady while increasing speed

1.Ignition system malfunction.

2.Air mixture is too dilute

●Difficult to start, Ignition off, Unstable idling

1.Fuel system blocked

2.Ignition system malfunction

3.Air mixture is too dilute or too thick

4.Fuel deterioration

5.Second air sucked into intake system.

6.Bad idle adjustment

7.Bad fuel volume adjustment

8.Idle system or fueling system blocked

9.Bad adjustment of fuel level

●Mixture air too thick

1.Auto chock system malfunction

2.Float valve malfunction

3.Fuel level is too high

4.Air route blocked

5.Dirty air cleaner

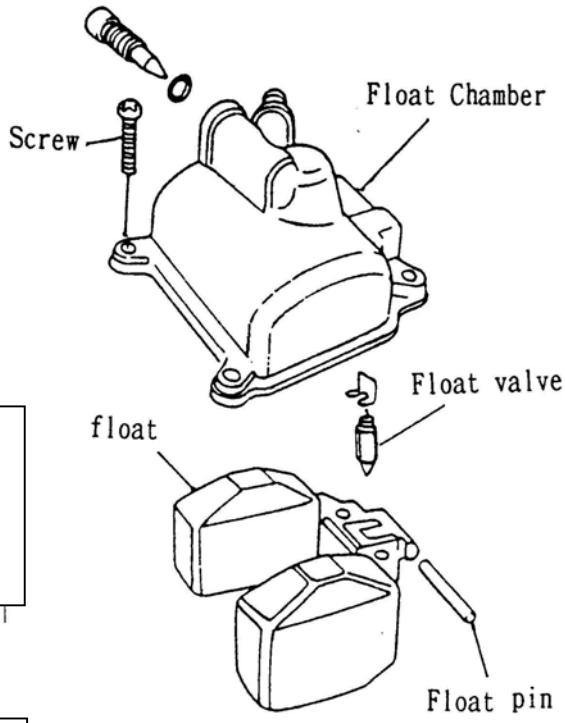
6.Fuel overwhelming in carburetor

(D)The float nozzle

1.Dismantling

●Remove the screws to take off the float chamber.

●Remove the float, the float pin, and float valve.



2.Checking

●Check the float valve, valve base to see whether it is blocked or damaged.

●Check the float valve, valve base surface if sectional worn out or dirty.

△Note:
When the valve is too dirty or severely worn-not, the Valve base will not close completely thus will result In increasing of fuel level and fuel leakage problem. A new replacement is needed.

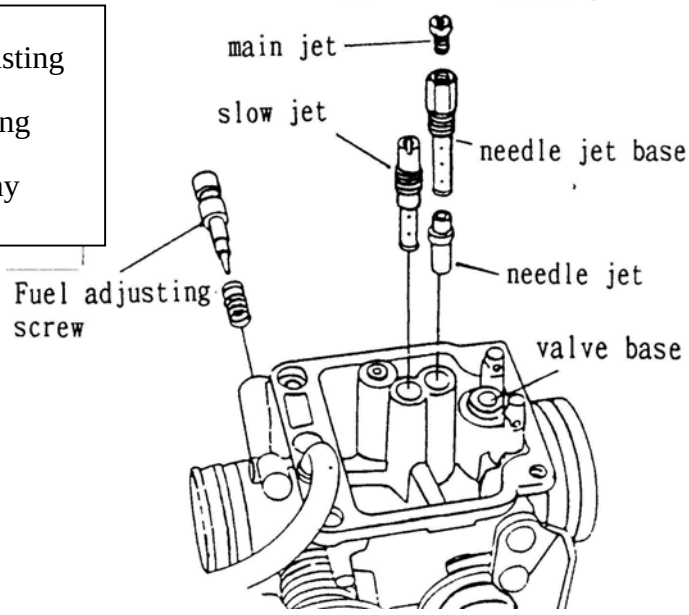
●Remove the main jet, needle jet base, needle jet, slow jet and fuel adjusting screws.

△Note:
●Avoid any damage on the jets and the fuel adjusting screws.
●Before dismantling, record the number of turning loops.
●No screwing-in movement by force to avoid any damages.

●Use the detergent solution to clean the jets. Fuel adjusting

After cleaning off the blockage and the dirt, screw

blow dry by compressed air.

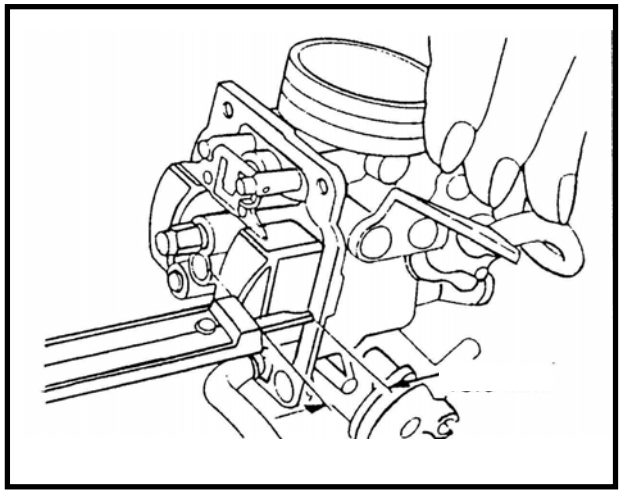


Note:
Remove the vacuum and air-interrupt valve for Cleaning.

3.Assembling

●Assemble the slow jet, needle jet, main jet and fuel adjusting screws.

●Notice
Record the number of turning loops before dismantling



●Assemble the float valve, float and float pin.

4.Checking fuel level

△Notice
●Check after the checking on the float valve and the float is done.
●Put the float gauge on the float chamber perpendicularly to the main jet for measurement.

(D)Handle bar, front wheel, front brake and front fork:

A. Troubleshooting

1.steering handlebar is abnormal, too tight.

a.steering mechanism; washer of conical bush locked too tightly.

b.steering mechanism; steel ball is cracked.

c.steering mechanism; steel ball base and washer of conical base is damaged.

d. wheel pressure is too low.

2.steering handlebar is aslant.

a.left and right damper are not even.

b.Front fork is crooked.

c.The axle of front fork is crooked or the wheel is aslant.

3.front wheel swings.

a.wheel rim is distorted.

b.bearing of front axle is loose.

c.wheel spoke is distorted.

d.Tire worn out.

e.The wheel axle is improperly assembled.

4.front damper is too soft, or spring fatigue.

5.Noise in front damper.

a.noise comes form the shock absorber tube.

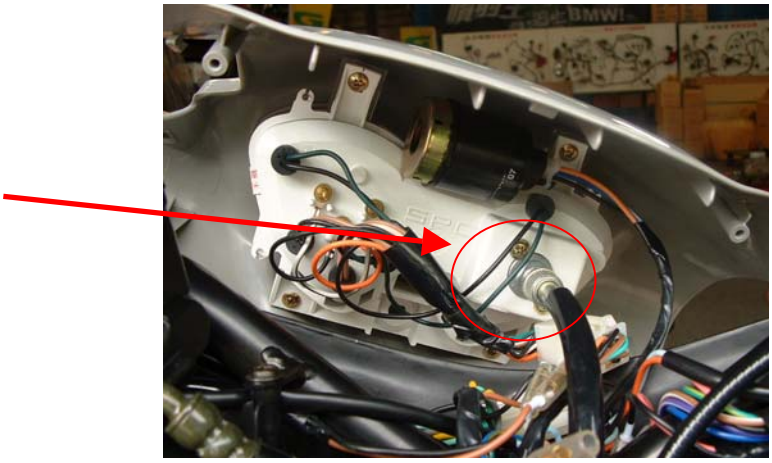
b.locking screw of damper is loose.

B. Data

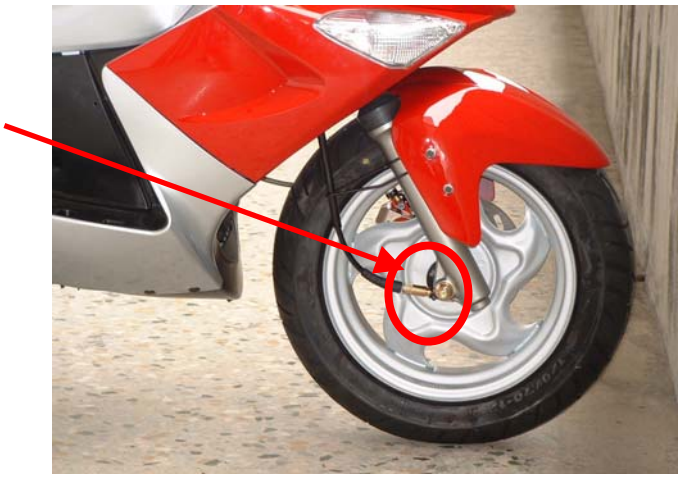
Item	Model	Standard value(mm)	Limit of use.(mm)
thickness of frt pad	M2-50	5.3	3.3
thickness of frt pad	M2-125/150/200/250	8.3	5.3
Disk of frt brake	M2-50	3.5	3.0
Disk of frt brake	M2-125/150/200/250	4.0	3.5
thickness of REAR pad	M2-125/150/200/250	10.0	7.0
Swingness of frt/rr wheel	M2-50/125/150/200/250	-	2.0
The lining of rr Brake	M2-50	4.0	2.0

C. Change the speedometer cable:

1.Remove the front handle cover.



2.Remove the nut of the speedometer cable.



3.Remove the fixed screw of the speedometer cable on the front wheel.

4.Pull out the damaged speedometer cable.

5.To assemble the new cable, please follow the opposite of dismantling procedures.

Note: Put some grease onto the inner cable before assembling.

(D)Steering handlebar

1.Remove the LH/RH back mirrors.

2.Remove the upper handle cover.

3.Remove the nuts on front fork and handlebar.

4.Take off the fixing bolt.

5.Remove the nut and bolt of the front fork fixed on
The handlebar.

6.Take off the handle bar.

7.When assembling, please follow the opposite procedures.

Locking Torque: M6 : 1.0-1.2kg-m M10 : 3.0-4.0kg-m

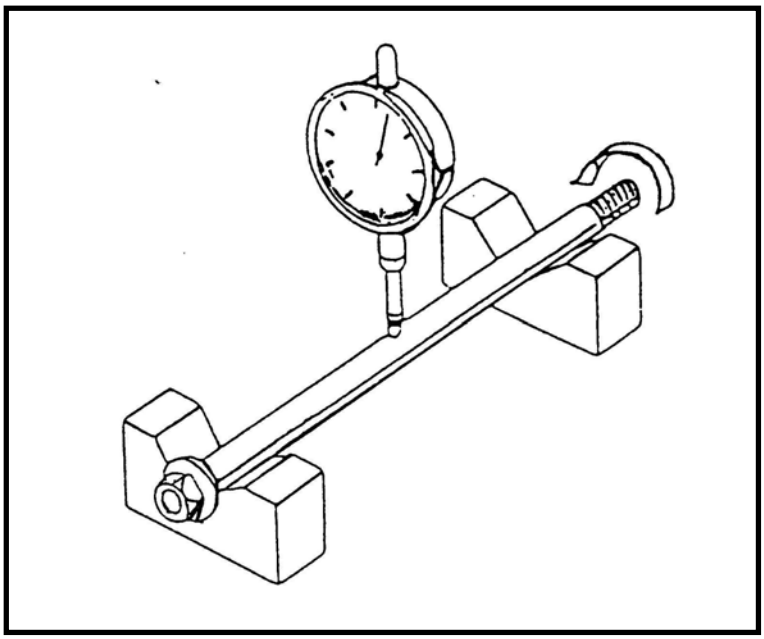
8.Before assembling, please add grease on each cable.

(E)Front wheel

1.Remove the locking nut of the front wheel on the right side.
2.Draw out the axle of front wheel, remove the ring and take off the gear sets of speedometer.
3.Remove the front wheel assy.
4.Assemble the front wheel follows the opposite procedure of dismantling.
Locking Torque:
M10: 3.0-4.0kg-m

Note:
1.Put the lock block of speedometer gear assy upon the extrusion of the front fork.
2.Put the grease onto the grease sets of speedometer before assembling.
5.Checking the front wheel axle

a. Check the bending degree of the front axle.
b. Take note of the bending degree on the middle of axle.
c. Limit of use: Change it when above 0.2 mm.

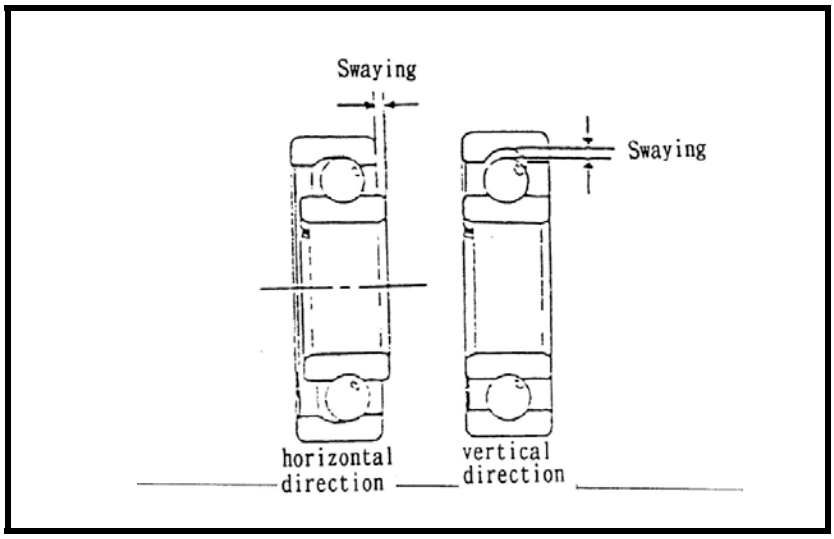


6.Front wheel bearing checking

Turn the tire. If the bearing is

Loosen or any occurrence for noise,

Please change a new one.



7.Front wheel rim checking

(1)Check the swing of the front wheel rim.

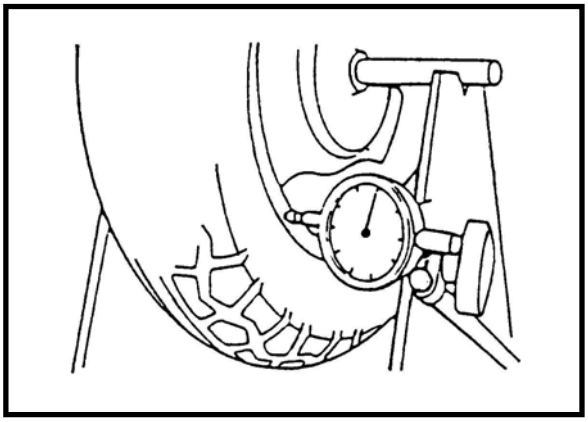
(2)Limit of use:

●Horizontal direction:

Change a new one when above 2.0mm.

●Vertical direction:

Change a new one when above 2.0mm.



3.Front fork checking:

If it is bent or cracked, please replace with a new one.

4.Front shock absorber checking

Check is there any unusual damage or worn-out condition, and whether the guide rod of the Front fork is crooked or not.

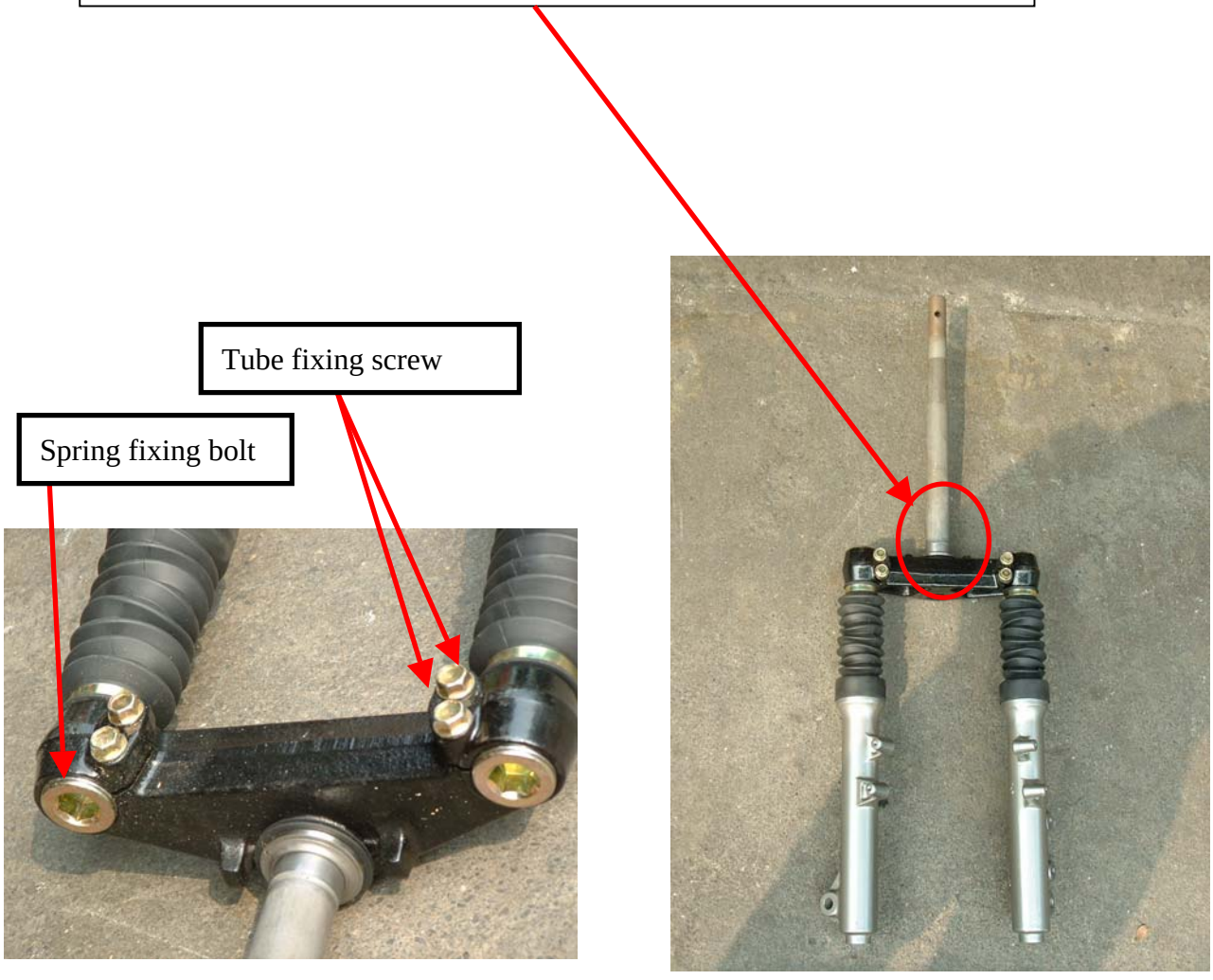
Fork oil type: SAE 10W20

Capacity (each side): 84 CC (M2-50)

Capacity (each side): 95 CC (M2-125/150/200/250)

NOTE:

If the guide rod is crooked, it should be replaced by a new one or repaired.



5.Disassembling and assembling the front brake-disk.

a. Remove the front wheel.

b. Remove bolts on the disk.

c. Remove the disk.

d. Assemble the disk follows the disassembling procedure.

Locking torque M8: 2.0~3.0kgm

6.Checking the front brake-disk.

Standard thickness of disk: 3.5 mm (M2-50); 4.0 mm (M2-125/150/200/220/250)

Limit of usage: change it when below 3.0 mm (M2-50); 3.5 mm (M2-125/150/200/220/250)

7.Checking the front brake-PAD.

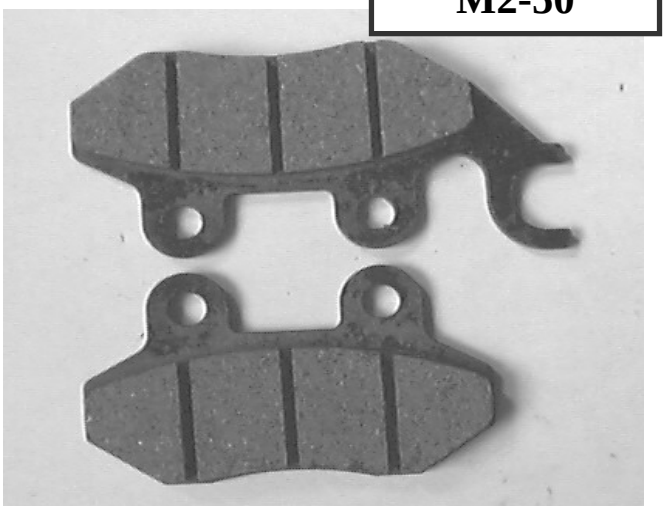
a. standard thickness: 5.3mm(M2-50); 8.3mm(M2-125/150/200/220/250).

limit of use: As the thickness is below using limit, change it.

Note: No grease on the lining.

M2-125/150/200/220/250

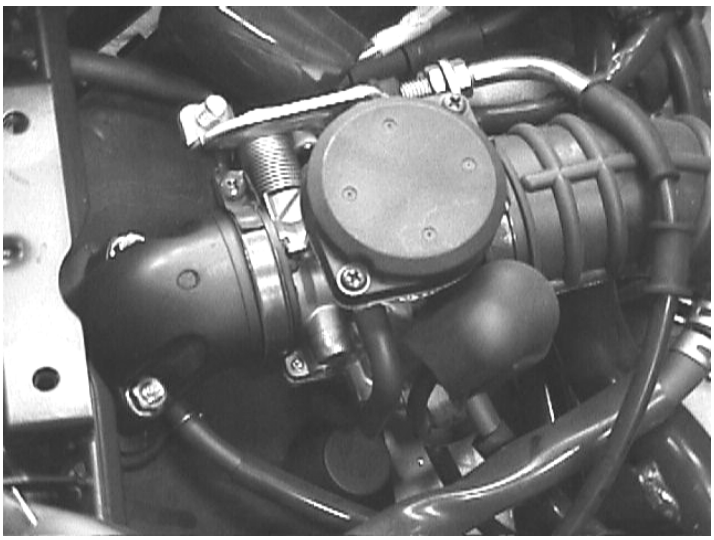
M2-50



(C)Dismantling the carburetor

1.Remove the auto starter connector.

2.Remove the throttle cable, then the fuel pipe from the carburetor.



3.Remove the screws on the intake manifold.

4.Unscrew the fixing belt on the connecting pipe.

5.Remove the carburetor.

Assembling the carburetor

To assemble the carburetor, please follow the reversed procedures of the dismantling and do the following adjustment after installation is finished:

-Adjust the throttle cable

-Idle adjustment

Adjustment of fuel volume adjusting screws

Note :Fuel volume adjusting screws have been set up properly before sale thus there is no need for self-adjustment. However, when dismantling, a record of the turning loop has to be dept for future assembling purpose. Put up the center stand while adjustment.

1.After the engine is warm up, adjust the stopping screw throttle of throttle valve to the standard rpm.
Idle rpm 1,700±100rpm

2.Adjust the fuel volume adjusting screws to the highest stable rotation.
This rotation value is the optimum setting of throttle

3.Fuel up for several times, make sure that the idle rpm is within the standard rpm.
Repeat the above procedure if the idle rpm is unstable.

(E)Rear wheel, rear brake, rear damper:

A. Troubleshooting.

1.Rear wheel swings.

a. Wheel rim is distorted.

b. Tire worn out.

c. The wheel axle is improperly assembled.

2.rear damper is too soft.

a. Spring fatigue.

3.Bad braking

a. The adjustment of brake is not proper.

b. The brake lining is dirty.

c. The brake lining worn out.

d. The cam of brake lining is worn out.

e. The brake cam lever worn out.

f. The wheel hub worn out or damage.

g. The operation on the brake arm tooth is not good.

B. Data

Item	Model	Standard value(mm)	Limit of use(mm)
The swingness of rear wheel	G-MAX	-	2.0
Wheel hub (inner diameter)	M2-50	110.0	111.0
Thickness of brake lining	M2-50	4.0	2.0
Brake disc thickness	M2-125/150/200/220/250	4.0	3.5
Thickness of brake pad	M2-125/150/200/220/250	8.3	5.3

C. Disassembling and assembling the rear wheel.

1.Remove the rear mudguard and the exhaust pipe.

2.Remove the locking nut of the rear wheel

3.Remove the rear wheel

4.To assemble the rear wheel please reverse the dismantling procedure.

Locking torque: M6 : 0.7-1.1kg-m M14: 8.0-10.0kg-m

D. Checking the rear wheel

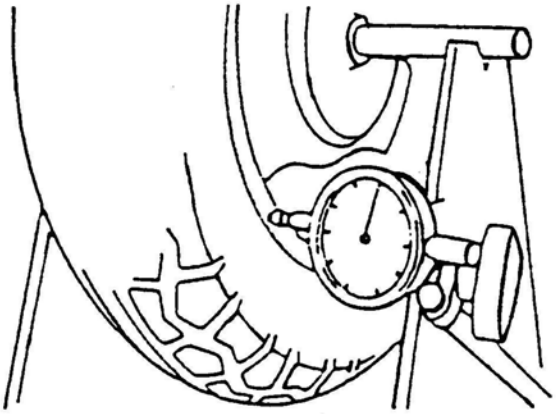
a. check the swingness of rear wheel.

b. vertical direction:

change it when above 2.0mm

c. horizontal direction:

change it when above 2.0mm



E. Rear brake: (M2-50)

1.Rear brake disassembling diagram.

(1)Checking the rear brake hub:

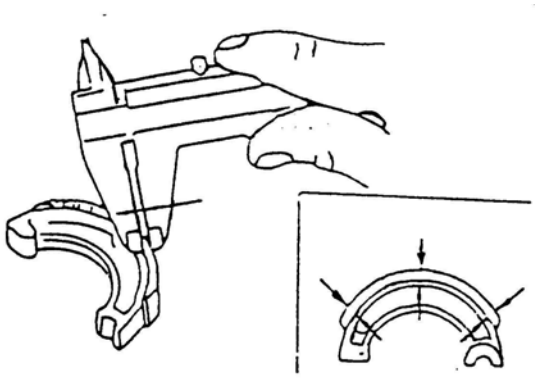
a.measure the inner diameter of rear brake hub.

b.Limit of use: change it when above 111.0mm

2.Checking the brake lining: (M2-50)

a.measure the thickness of the rear brake lining.

b.linit of use: As the thickness is less than 2.0 mm, change it.

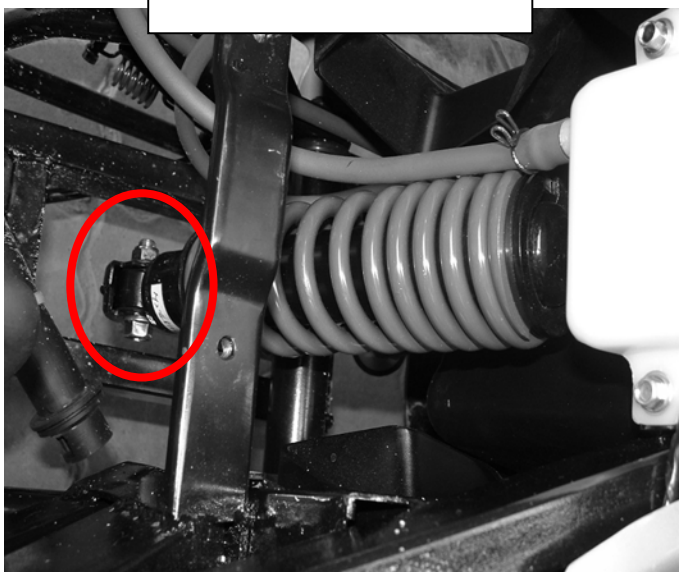


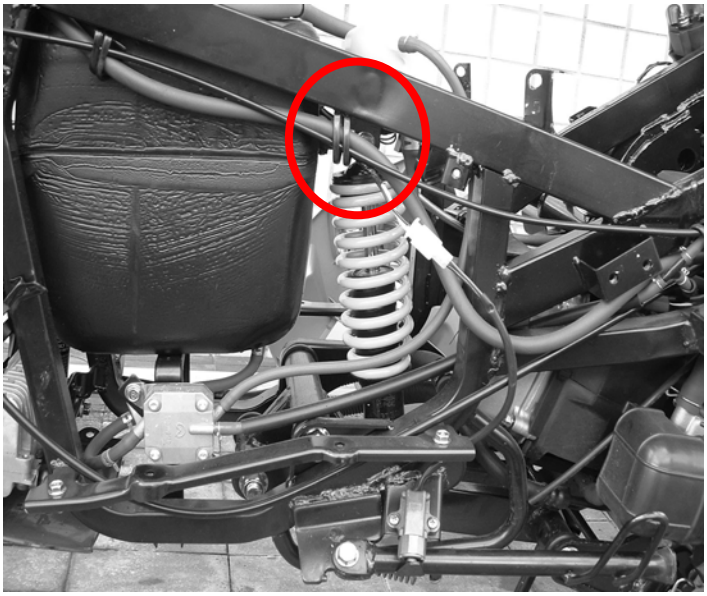
3. Brake pad inspection for M2-125/150/200/220/250

F. Rear absorber

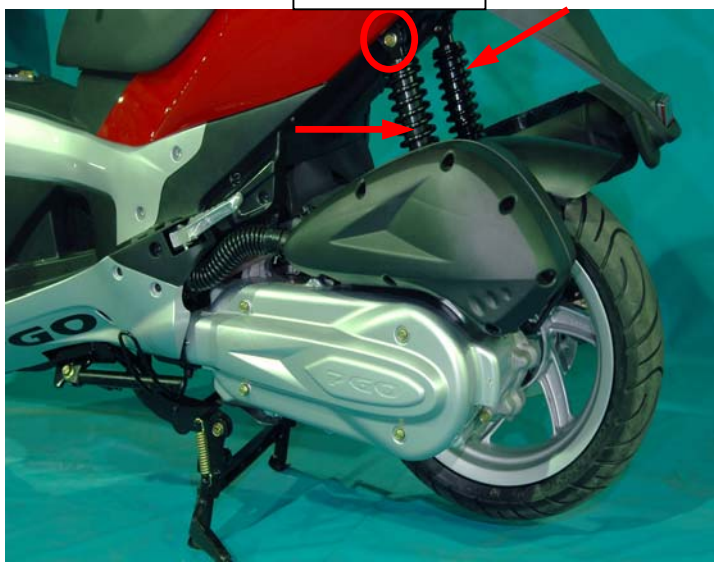
1. Check the locking torque of rear absorber at lower & upper.
2. Both locking torque is 3.5~4.5 kg-m.
3. Oil leakage check is always necessary.

M2-50/125/150/200/220





M2-250



(F)Fuel supply

A. Troubleshooting.

1.Engine can’t start:

a. No fuel in fuel tank.

b. Fuel pipe is blocked.

c. Auto cock and filter is blocked.

d. The membrane of fuel pump is over swell.

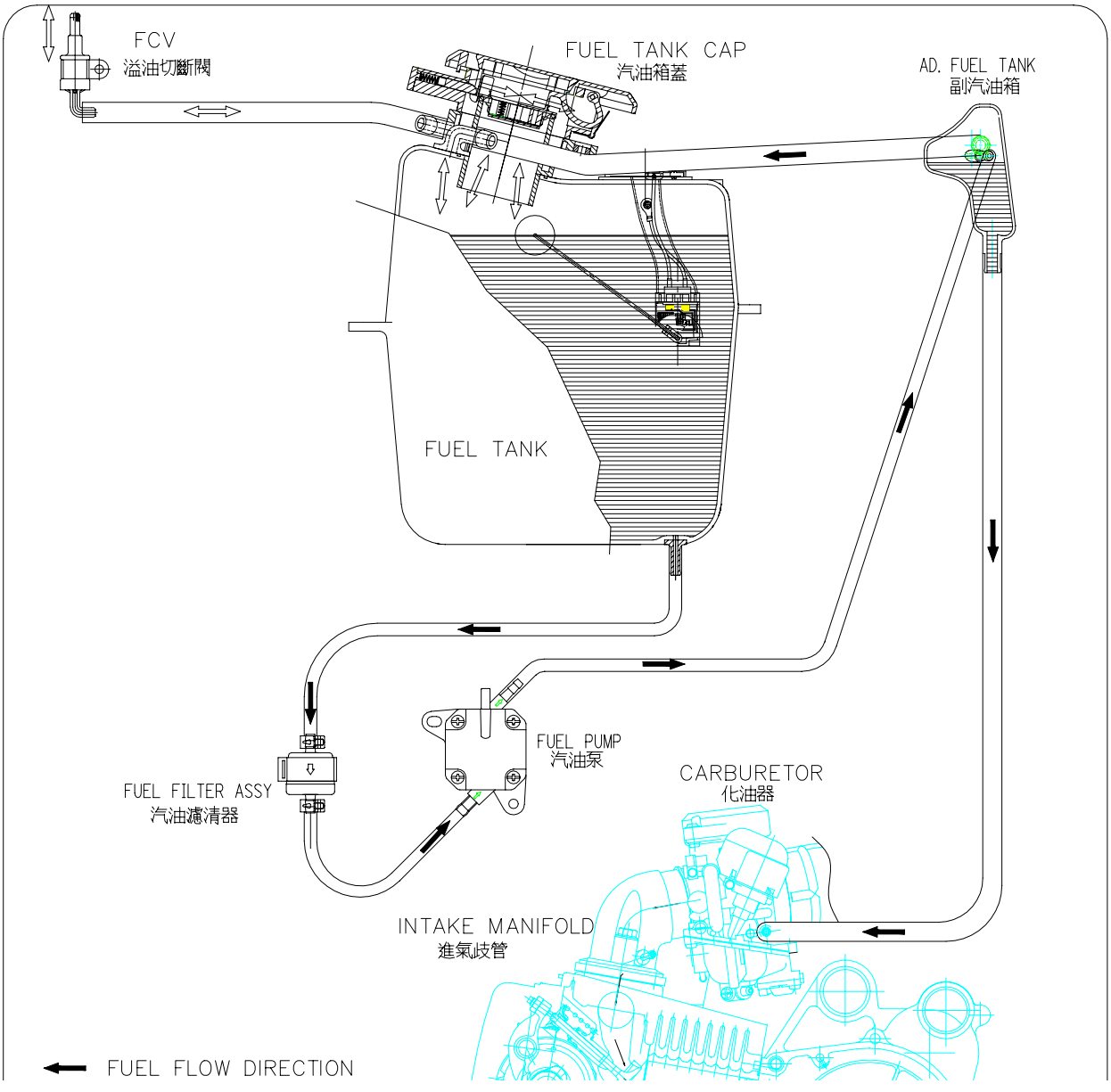
2.The membrance of auto cock is over-extended.

a. Fuel tank cover’s ventilation hole is blocked.

b. Fuel pipe is crooked, squeezed, or blocked.

c. fuel pump and fuel filter is dirty.

B. Fuel supply system diagram:



C. Dismantling and assembling

Fuel Tank

1.Remove the front luggage box.

Open the fuel tank cover cap.

2.Remove the fuel tank cover..

.

3.Remove the fuel pipe.

4.Remove the connecting terminal of the fuel gauge.

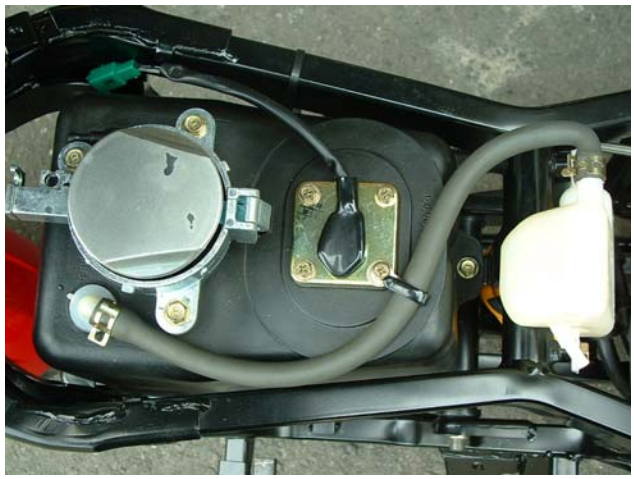
5.Remove the fuel gauge.

6.Remove the fixing blot of the fuel tank.

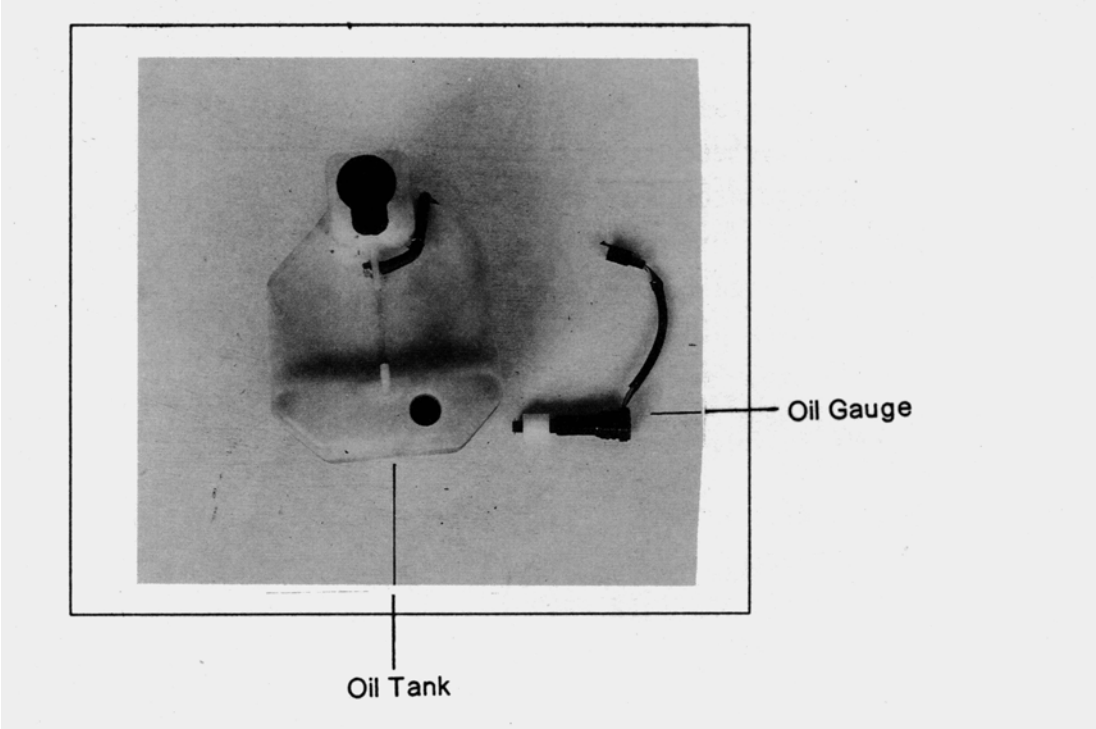
7.Take off the fuel tank.

8.When re-assembling, please follow the opposite procedure of disassembling.

Locking torque: M6: 1.0-1.2kgf-m



D. Oil tank disassembling diagram: (only available for M2-50)



E.Dismantling and assembling oil tank: (only available for M2-50)

1.Drain off the oil.

2.Disconnect plug of oil gauge.

3.Remove the oil tank.

4.Clean the oil tank.

5.To assemble the oil tank, please follow the opposite procedures of dismantling.

V. Electric equipment:

(1)Troubleshooting

(2)Battery

1.Check the cells of battery

2. recharging

3.Test the recharging performance

(3)Recharge system

1. the wiring diagram of recharge system
2. check A.C. flywheel magneto.
3. Check regulator/rectifier.

(4)Ignition system

1. the wiring of ignition
2. check spark plug
3. check H.T. cable and H.V. coil
4. check C.D.I. set

(5)Starting system

1. the wiring of starting
2. checking the starter
3. dismantling the starting motor
4. checking the starting motor

(1)Troubleshooting:

A. Recharge system:

•No power:

1.Battery over discharging

①No electrolyte in battery.

②Battery is bleached

③Short circuit in the Battery.

④Regulator malfunction

2.The battery wires are disconnected.

3.Fuse is broken.

4.Ignition switch is abnormal.

•Voltage is too low:

1.Battery recharges insufficiently.

2.The bad connection on wiring system.

3.Recharge system is abnormal.

4.Regulator malfunction.

B. Ignition system:

•The sparking of spark plug is abnormal:

1.Spark plug is dead.

2.Wire connectsion is broken or short Circuit.

①between A.C. generator and CDI sets

②between CDI sets and High Voltage coil.

③between CDI sets and main switch.

④between main switch and spark plug.

3.Main switch is out of order.

4.H.V. coil is not in good function.

5.CDI sets is out of order.

6.A.C. generator is not in good function.

C. Starting system:

•Starting motor can't rotated:

1.The fuse is broken.

2.Battery recharges in sufficiently.

3.Main switch is out of order.

4.Starting motor switch is out of order.

5.Front/rear brake switch is out of order.

6.Starter relay is out of order.

7.Wire disconnects or broken.

8.Starting motor is out of order.

•Currency is unstable.

1.The wiring of batter connection is not good.

2.Ignition system connection is not good.

3.Ignition system is short circuit.

4.Lamp system connection is not good or short circuit.

•Abnormal recharge system:

1.The plug connection is not good. wire broken or short circuit.

2.Rectifier is out of order.

3.A.C. flywheel magneto is abnormal.

D. Engine running unsmoothly:

1.Ignition primary circuit.

①the wire or plug of wiring connection is not good.

②main switch disconnects.

2.Ignition secondary circuit.

①Ignition coil is not in good function

②Spark plug is dead.

③H.V. coil is not in good function.

④The spark plug cap is not in good function.

3.Ignition timing

①A.C. generator is out of order.

②A.C. coil is not in good function.

③C.D.I. sets is out of order.

•Starting motor runs weakly.

1.Battery recharges insufficiently.

2.Wiring system disconnects.

3. The alien objects drop in the motor or gear.

•Starting motor can rotate, but engine can't start up.

1.Starting gear is abnormal.

2. Starting motor is reversedly rotating.

3.Battery is out of order.

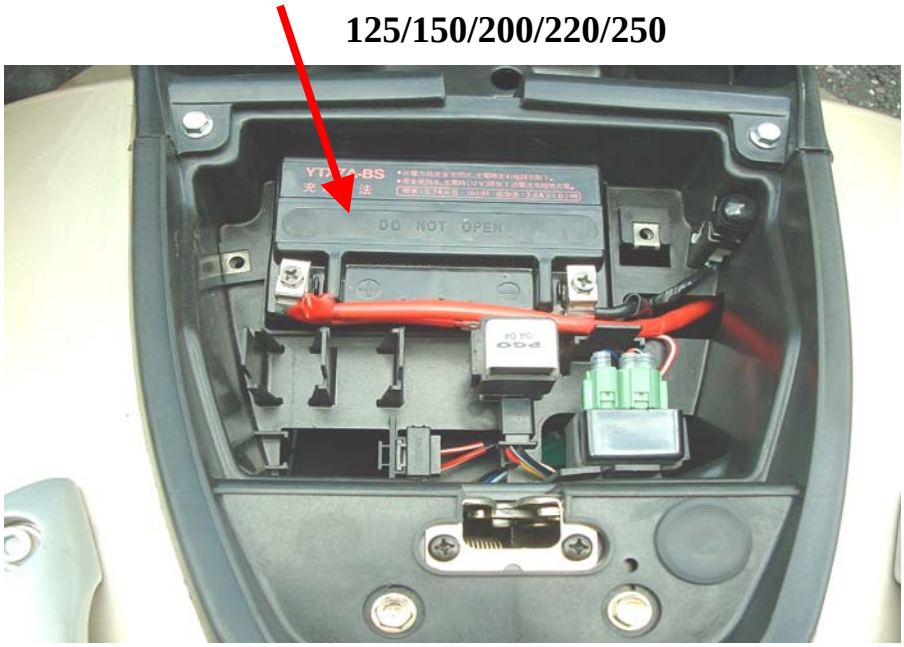
(2)Battery:

1.Check the cells of battery.

Always remove the battery negative Cable(-)first, then positive cable (+). But connect the positive cable (+)first, then connect the Negative cable(-) when assembling.

M2-50

M2-125/150/200/220/250



2.Recharge

•Connection procedure:

connect the positive cable(+) of the negative cable(+) of the battery, and the negative cable(-) of the recharge to the negative cable(-) of the battery.

•Recharging currency:

Please recharge (12V) according to the following current and time.

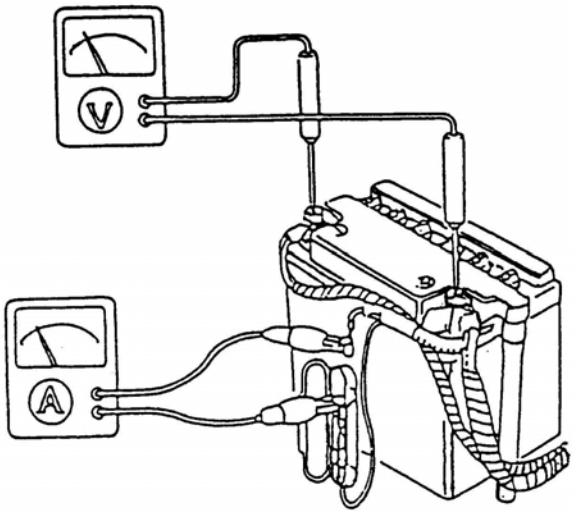
Standard: 0.4A * 4~10Hr or Rapid:3A * 60min(50cc)

Standard: 0.7A * 5~10Hr or Rapid:3A * 60min(125/150cc)

Standard: 0.9A * 5~10Hr or Rapid:3A * 60min(200/220/250cc)

NOTICE:
This battery is totally sealed. Do not remove seal bolt when recharging.

Notice:
•Keep away from fire when recharging.
•The “ON” or “OFF” of recharging. currency must be operated by the switch of recharge. It will cause spark or explosive if plug or unplug the cable directly.



3.Testing the recharging performance

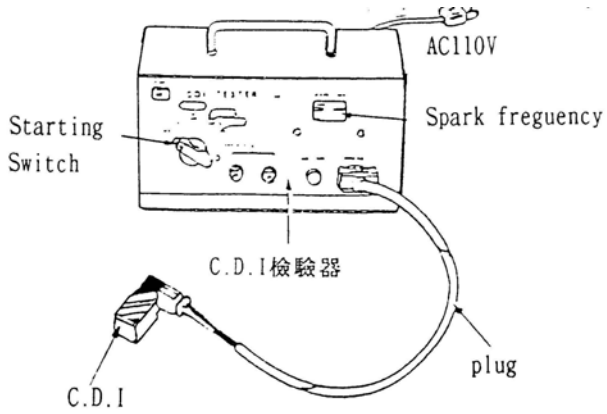
•This test needs to be done when the battery is fully recharged. •This test needs to be done after engine is warm-up.

a. Disconnect the orange cable of regulator.

b. Open the fuse box, to remove the white cable.

c. Connect currency meter between red/white cable and fuse.

While testing, the red wire cable must not touch the frame.



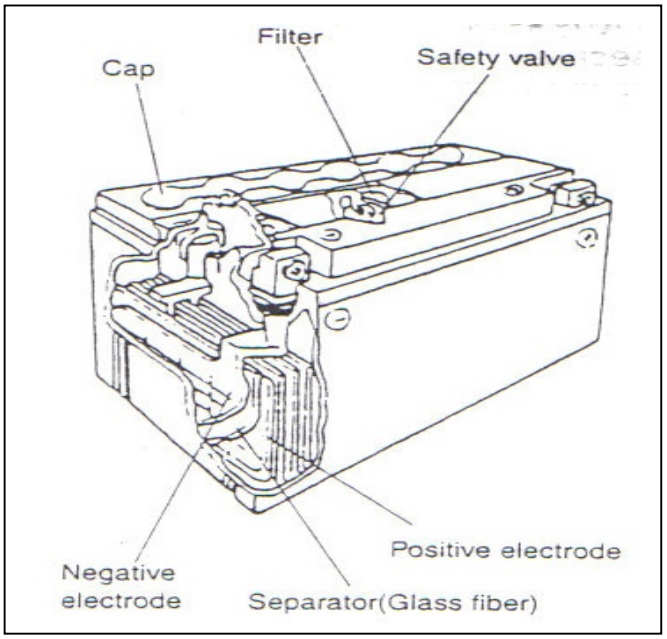
d. Set the head lamp switch at “OFF”, engine revolution is at 2000 rpm while testing. Then increase the rpm slowly. (Assume the battery is fully charged. situation)

Head Lamp Switch	Recharging rpm	2,500rpm	6,000prm
OFF(DAY)	Under2,000rpm	0.6A(MIN)	1.5A(MIN)
ON(NIGHT)	Under2,000rpm	0.6A(MIN)	1.5A(MIN)

e. If the testing result does not match the standard value, check the regulator.

BATTERY

CONSTRUCTION



PGO sscooters uses an MF (Maintenance Free) battery. As shown in the right illustration, the battery consists of electrodes, separators, safety valve, filter, etc. Fine glass fiber is used for constructing the separator which holds electrolyte inside.

When a discharged conventional open type battery is re-charged fully, lead sulfate turns to lead dioxide and sponge-like lead. If recharging is further continued, charging current is consumed for electrolytic action producing oxygen gas from the positive and hydrogen gas from the negative electrodes. This causes electrolyte to be lost thereby requiring addition of water.

In an MF battery, however, no water loss is caused. In this Battery, the negative electrode is designed not to fully turn To lead (sponge-like lead) even under fully charged condition. For this reason, the negative electrode remains always in non-complete charged condition producing no hydrogen gas. Oxygen gasses produced at the positive electrode will immediately react With an active material (lead) at the negative electrode to turn back to water, thus preventing water from losing.

PRECAUTION WHEN HANDLING BATTERY ELECTROLYTE

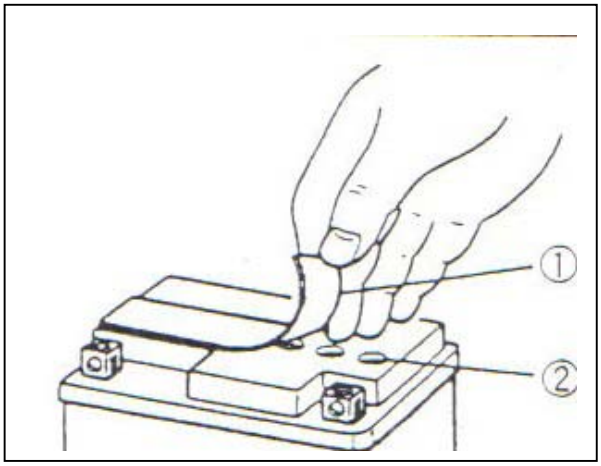
- Take most care so as not to cause battery acid to contact a person and the vehicle.
- If battery acid has contacted the skin, clothes or vehicle, immediately flush with plenty of water. If battery acid remains contacted, burns of skin, damage to clothes, peeling or discoloration of paint will occur.
- Should battery acid gets in eyes, immediately flush with plenty of water and call physician.

ELECTROLYTE FILLING

! CAUTION

Make sure to use electrolyte specified for each Battery type.

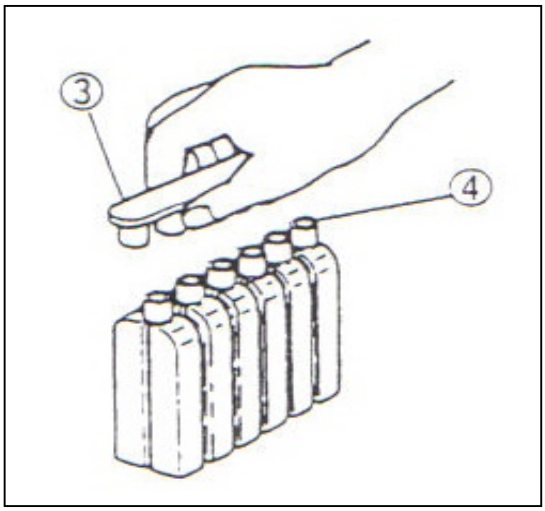
Using electrolyte designed for other battery type can cause Electrolyte leak, performance deterioration or shortened life.



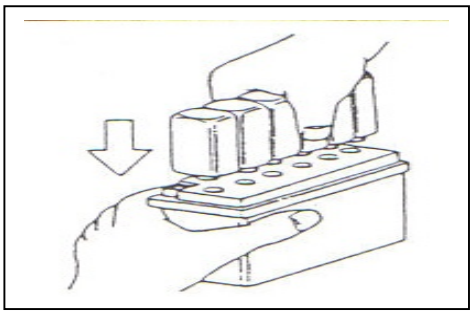
- Remove the aluminum tape ① sealing the battery electrolyte filler holes ②.
- Remove the cap ③ from the electrolyte container.

!CAUTION

- Handle the removed cap carefully after filling electrolyte as the cap is reused for sealing the battery filler holes.
- Do not remove or pierce the sealed areas ④ of the electrolyte container.



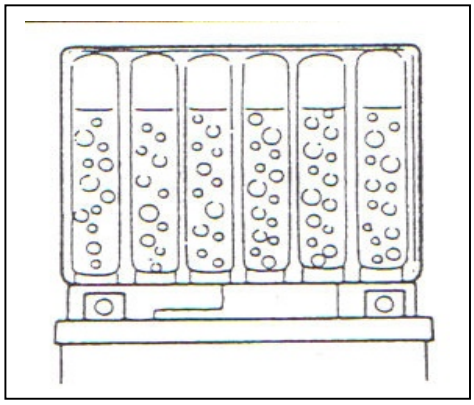
• Insert the nozzles of the electrolyte container into the battery's electrolyte filler holes, holding the container securely.



! CAUTION

- Take precaution not to allow any of the fluid to spill.
- Insert the nozzles squarely to the battery.

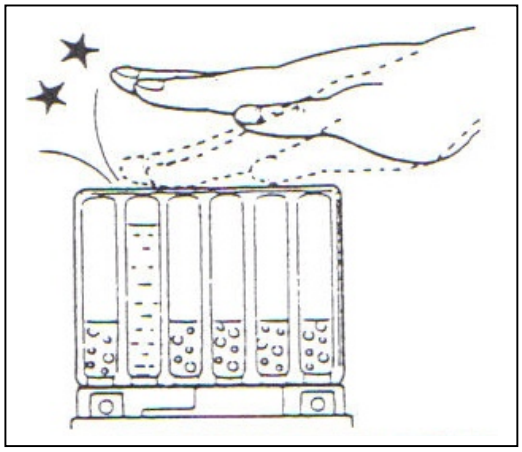
• Check that air bubbles are coming up from each electrolyte container and leave in this position for more than 20 minutes.



NOTE:
If no air bubbles are coming up from the filler port, tap the Bottom of the container two or three times.
Never remove the container from the battery.

! CAUTION

Make sure to fill all the amount of electrolyte into The battery.



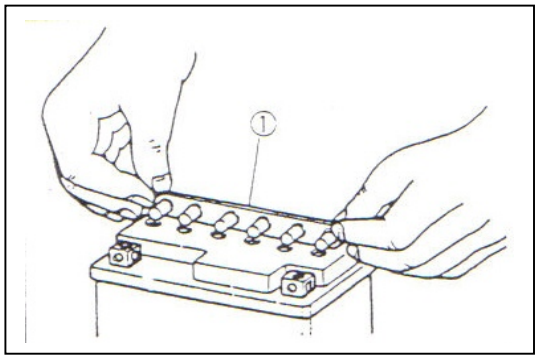
it is important to check all the cells are filled with electrolyte completely because insufficient filling of electrolyte in even one cell will result in deteriorated performance and shortened life.

INSERTING CAP (SEALING PLUG)

! CAUTION

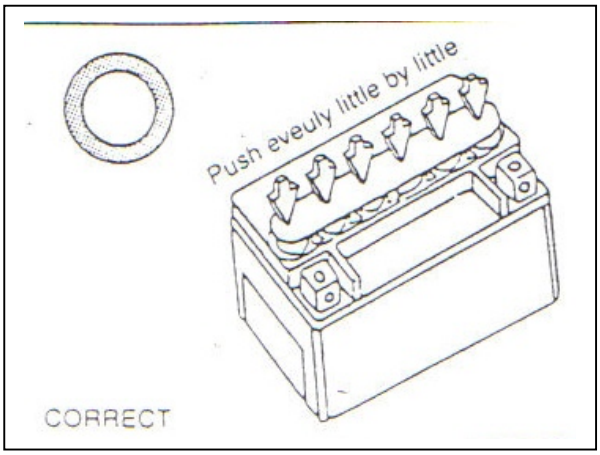
Fit the cap securely.

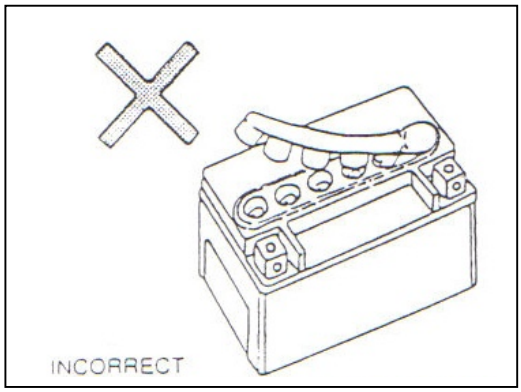
To install the cap, temporarily fit the cap to all the cells Lightly, thereafter press the cap little by little into each filler Hole evenly and horizontally.
Inserting the cap at once in one cell and then in the next Cell will cause the cap to deform resulting in poor sealing.



! CAUTION

- Wipe completely if the filler hole is wet with electrolyte.
- Do not remove the caps once it has been installed to the battery.

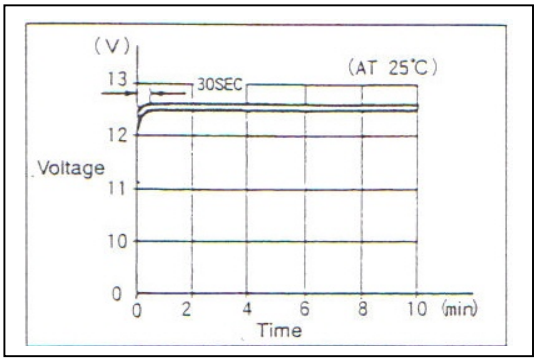




PRECAUTION FOR HANDLING BATTERY

The battery produces combustible gasses and therefore can explode if handled improperly. Use Caution for the following in addition to general service precautions.

- Never allow the battery to short-circuit. Keep away from sparks and fire.
- Charging of the battery must be operated in an open and well ventilated area and never operate in an closed indoor.
- Using pocket tester, measure the battery terminal voltage. The tester should indicate more than 12.5 – 12.6V. If the battery voltage is lower than the specification, recharge the battery with a battery charger in accordance with the following instructions.

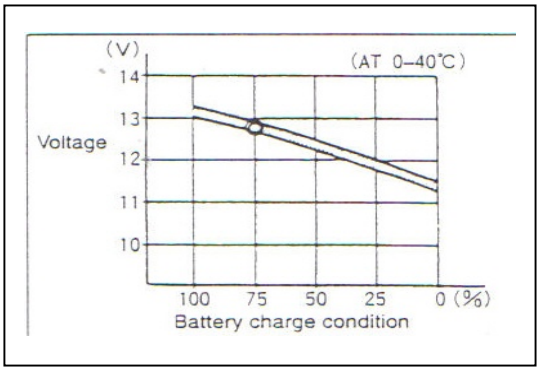


NOTE:

Initial charging of a new battery is recommended if two years or longer have elapsed since the date of manufacture.

RECHARGING

- Using the pocket tester, check the battery voltage. If the voltage reading is less than the 12.0V, recharge the battery with a battery charger.
- When recharging the battery, remove the battery from the motorcycle.
- Practice the standard charging unless otherwise necessary.



Recharging	
Standard	0.7A*5-10 hours
Quick	3A*1hour

- After recharging, wait for more than 30 minutes and check the battery voltage with a pocket tester.
- If the battery voltage is less than the 12.5V, recharge the battery again in the same condition. If battery voltage is still less than 12.5V after recharging, replace the battery with a new one.

NOTE:

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery from deterioration.

! CAUTION

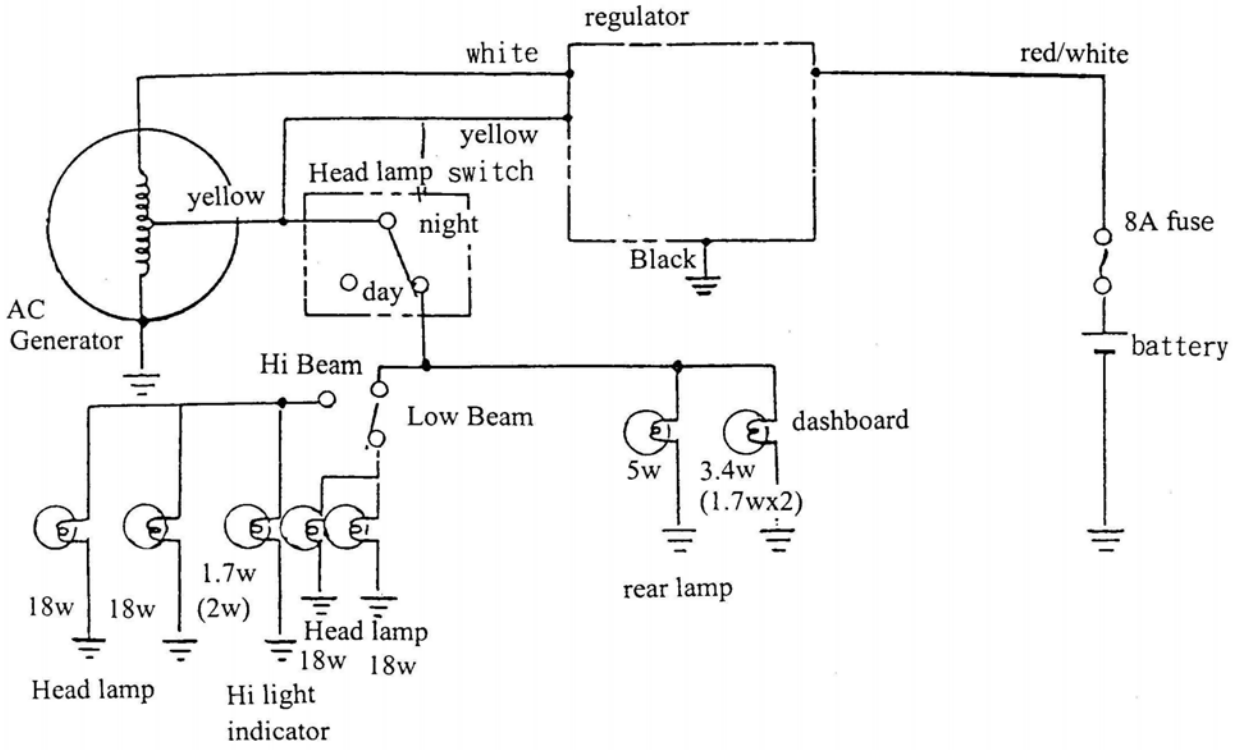
The charging system on this model is designed For MF battery and therefore do not use a battery of other specification.

BATTERY REMOVAL

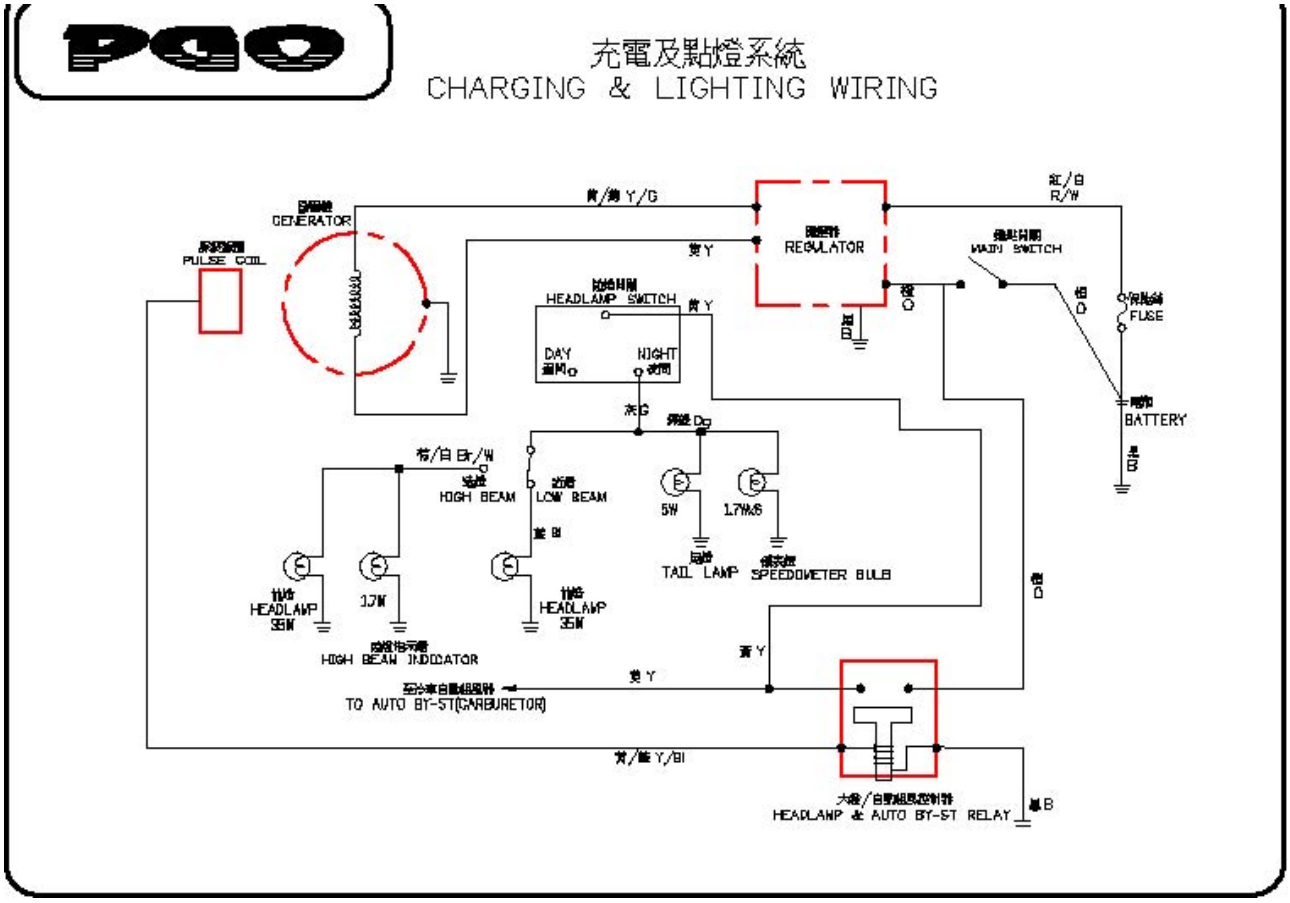
1. Open the rear luggage cover. 2. Remove the battery cover①.
3. Disconnect the battery ⊖ lead first.
4. Disconnect the battery ⊕ lead. 5.Remove the battery.

(3)Recharge system:

A. Recharge system diagram for M2-50



B. Recharge system diagram for M2-125/150

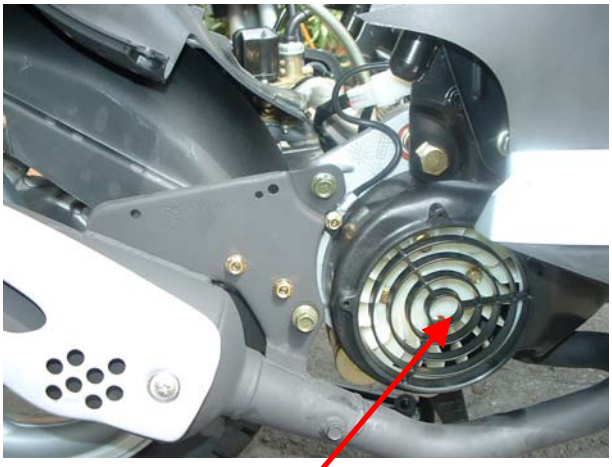


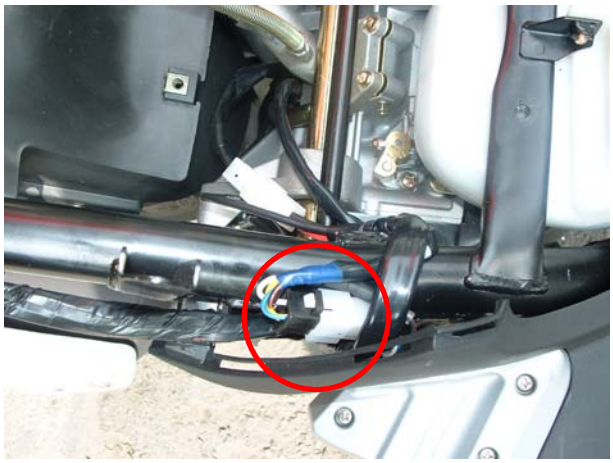
2.Check A.C. Generator

a. Open the seat cover and remove the luggage box.

b. Measure the resistance value of terminals.

Yellow V.S. black 0.1-1.0 White V.S. black 0.2-2.0





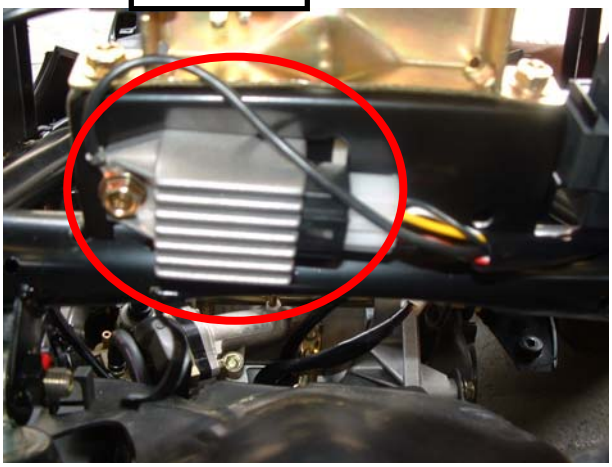
ACG inside

3.Check regulator

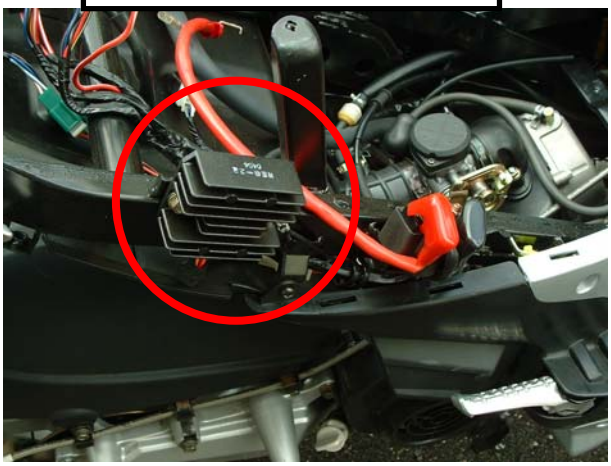
Measure the resistance value between each terminal,

It should be in the specified range, otherwise change a new one.

M2-50

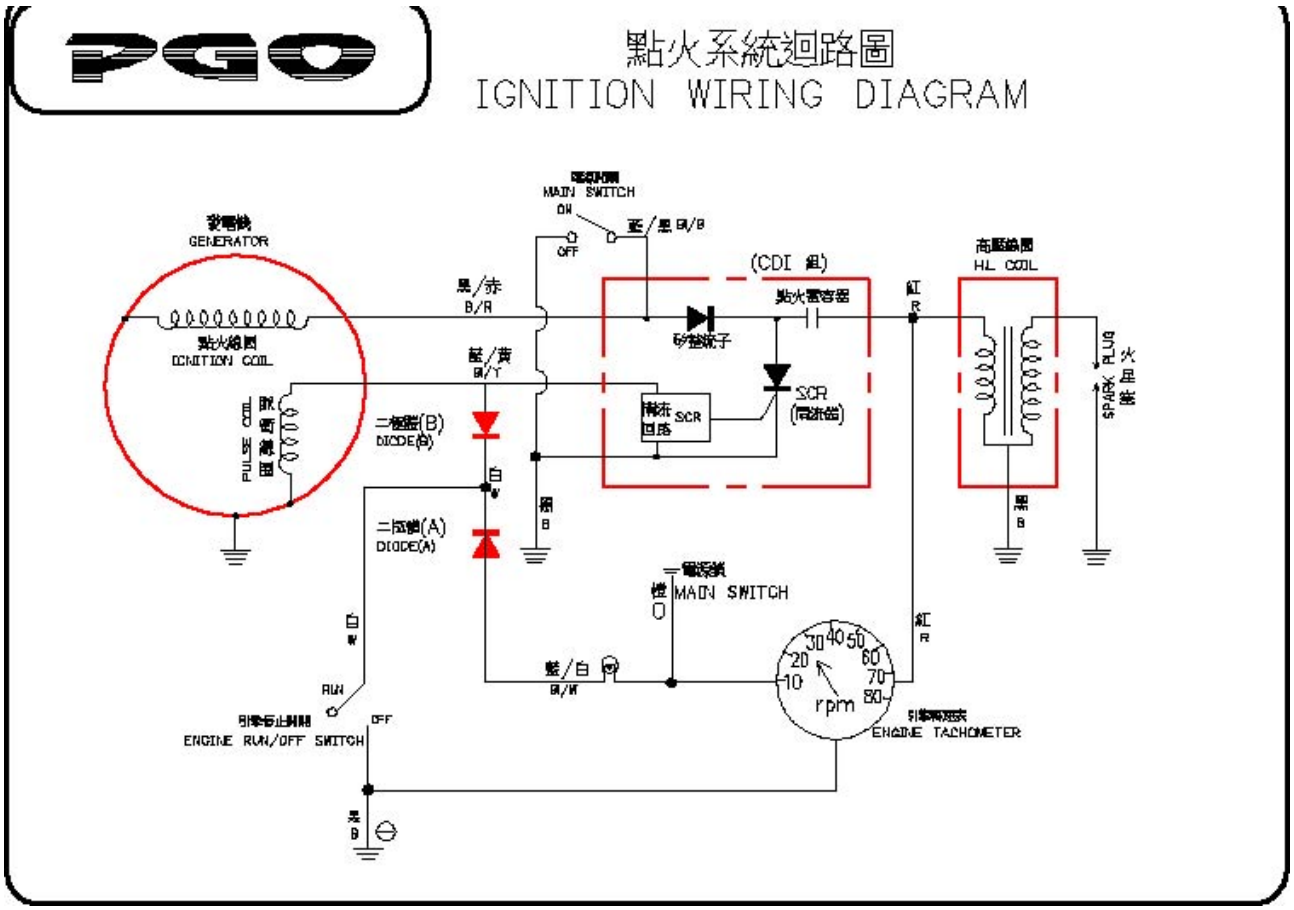


M2-125/150/200/220/250



(4)Ignition system:

1.the wiring or ignition



2.Check spark plug.

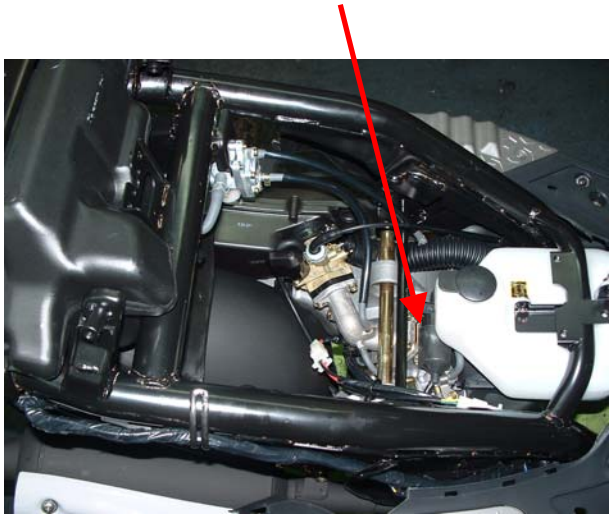
3.Check the H.V. cable and H.V. coil by using the CDI tester.

4.CDI sets checking.

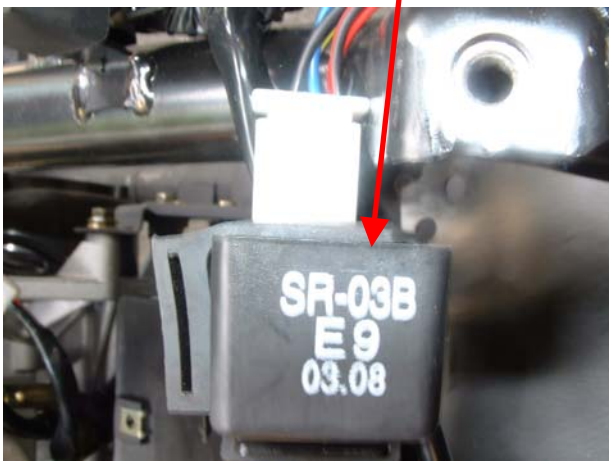
Check with the CDI tester and please follow the instruction manual.

If the CDI test failed, please change a new one.

Ignition coil

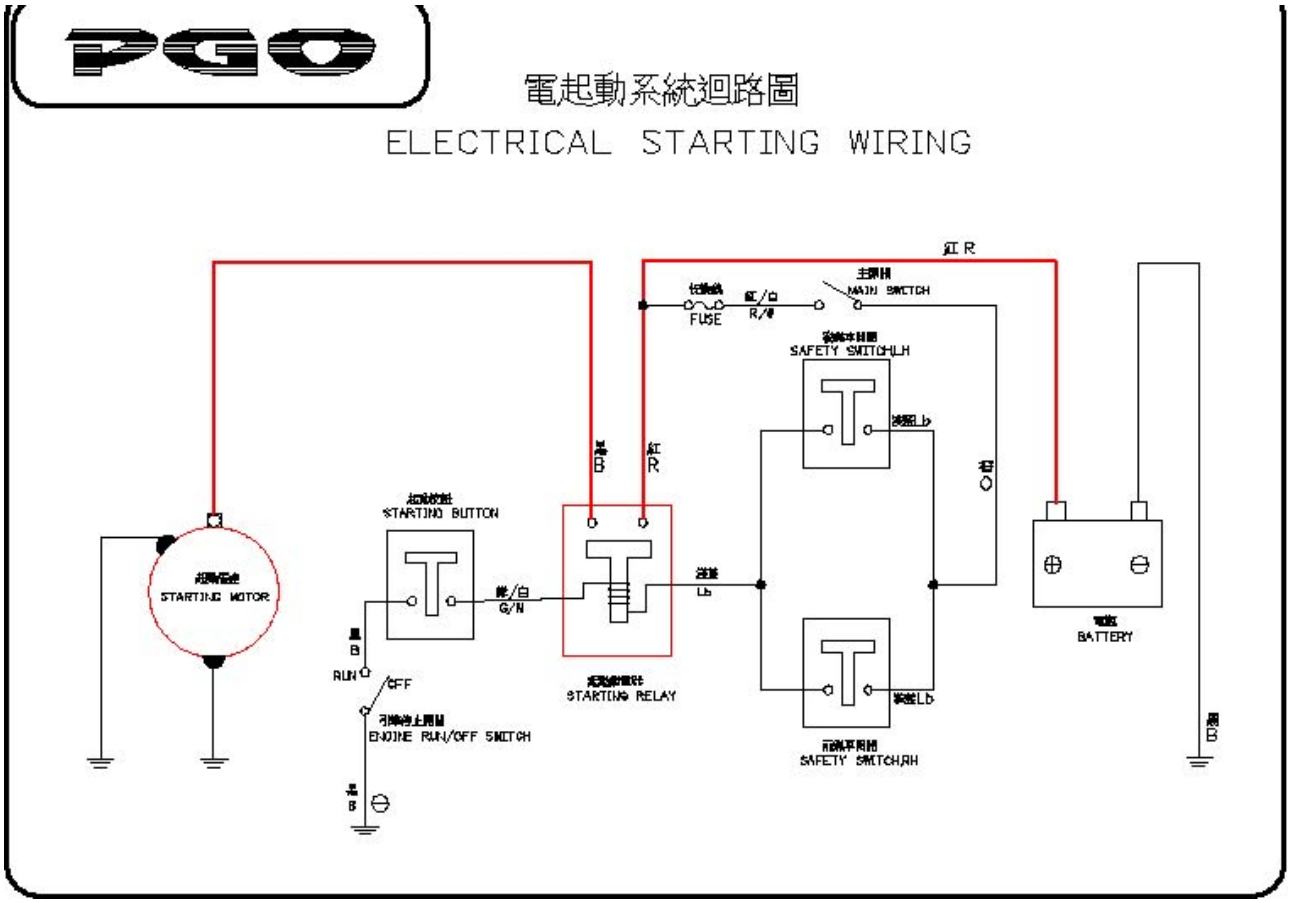


CDI



(5)The starting system:

1.The wiring of starting

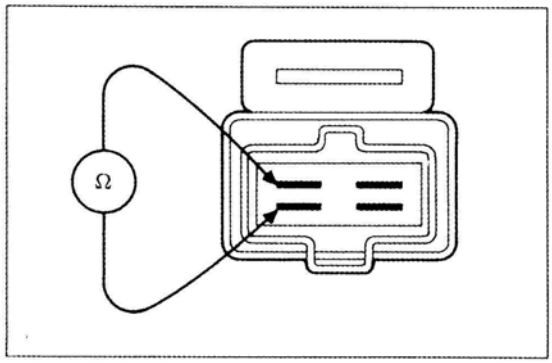


2.Make sure the Engine RUN/OFF switch is in “Run” position.

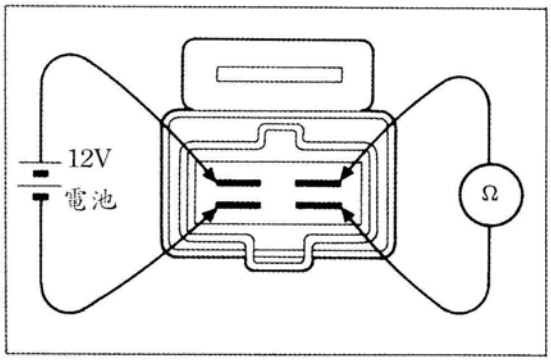
3.Check the safety switch by operating the brake lever, and the brake lamps shall light on.

4.check the starting relay

a. Find the control coil by measuring the resistance.



b. Connect green/white cable to positive pole of battery, connect black cable of negative pole of battery, It means starter is function well if above connection and both Red Black cable of staring motor have currency passing through.



3.Dismantling the starting motor

(a)Remove 2 screws on starting motor.

(b)Remove starting motor cables.

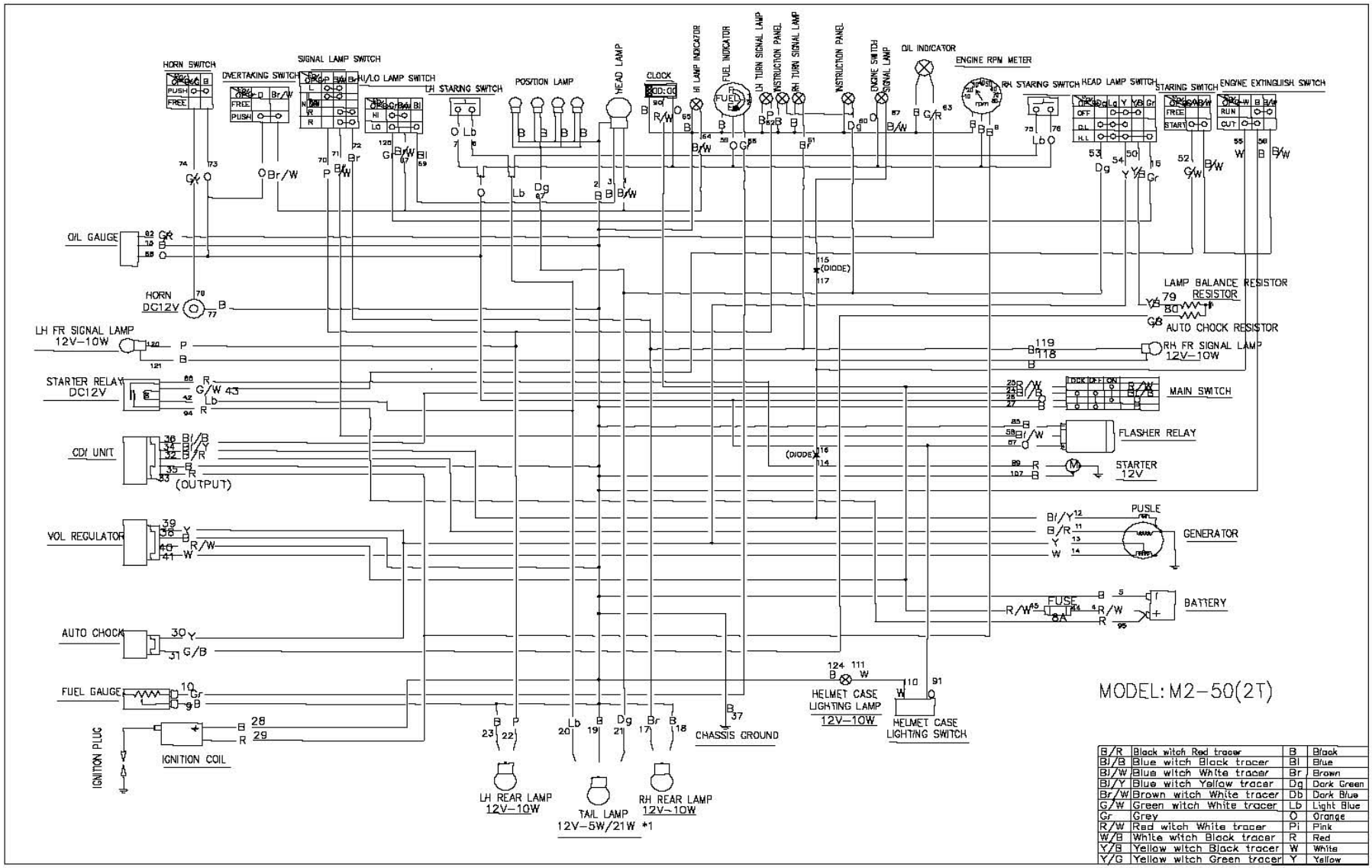
4.Checking the starting motor

•Check the function by connecting the starting motor to battery.

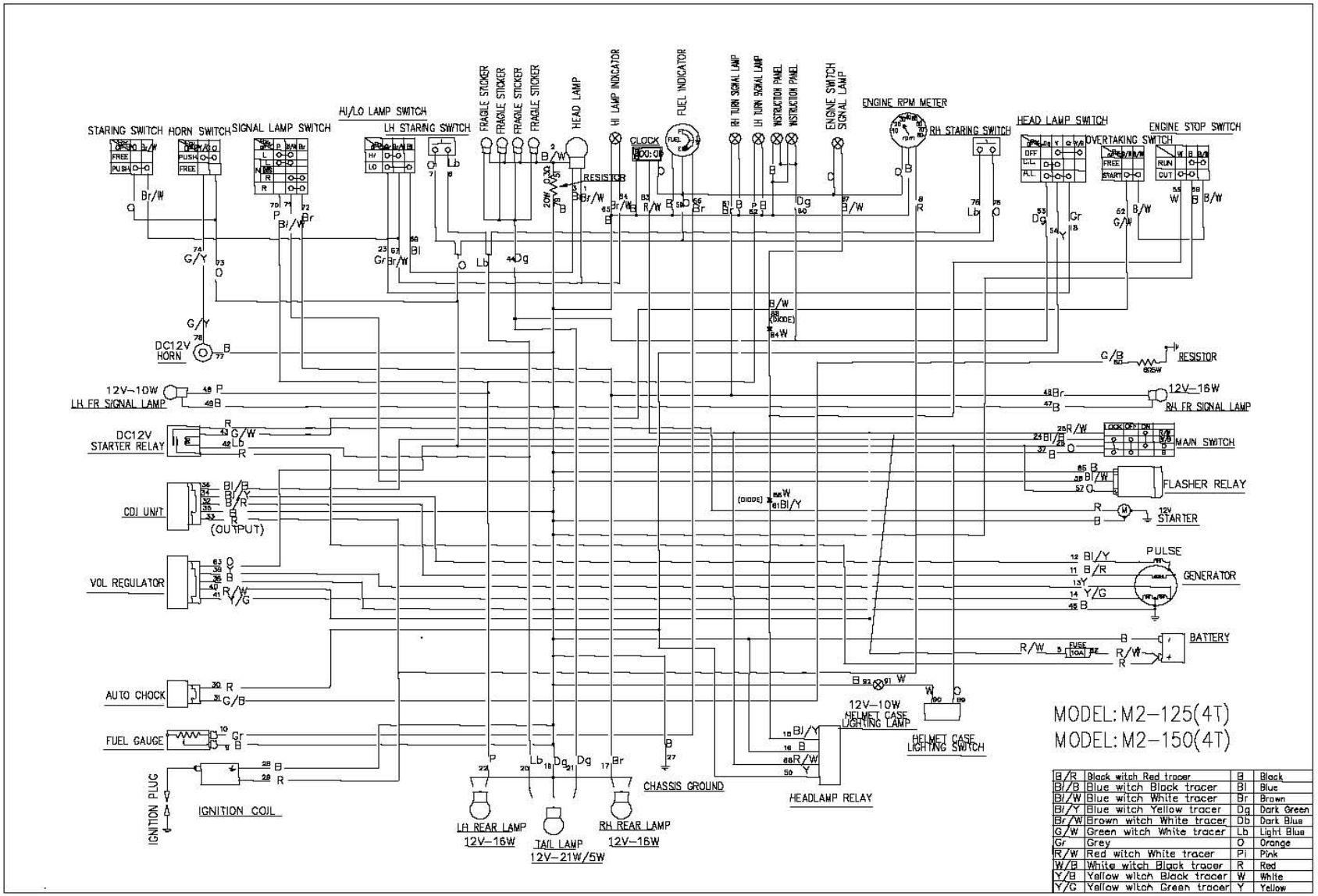
(Check if it is rotating counter clockwise)

Note: Do not operate starting motor for a long time (over 5 seconds).

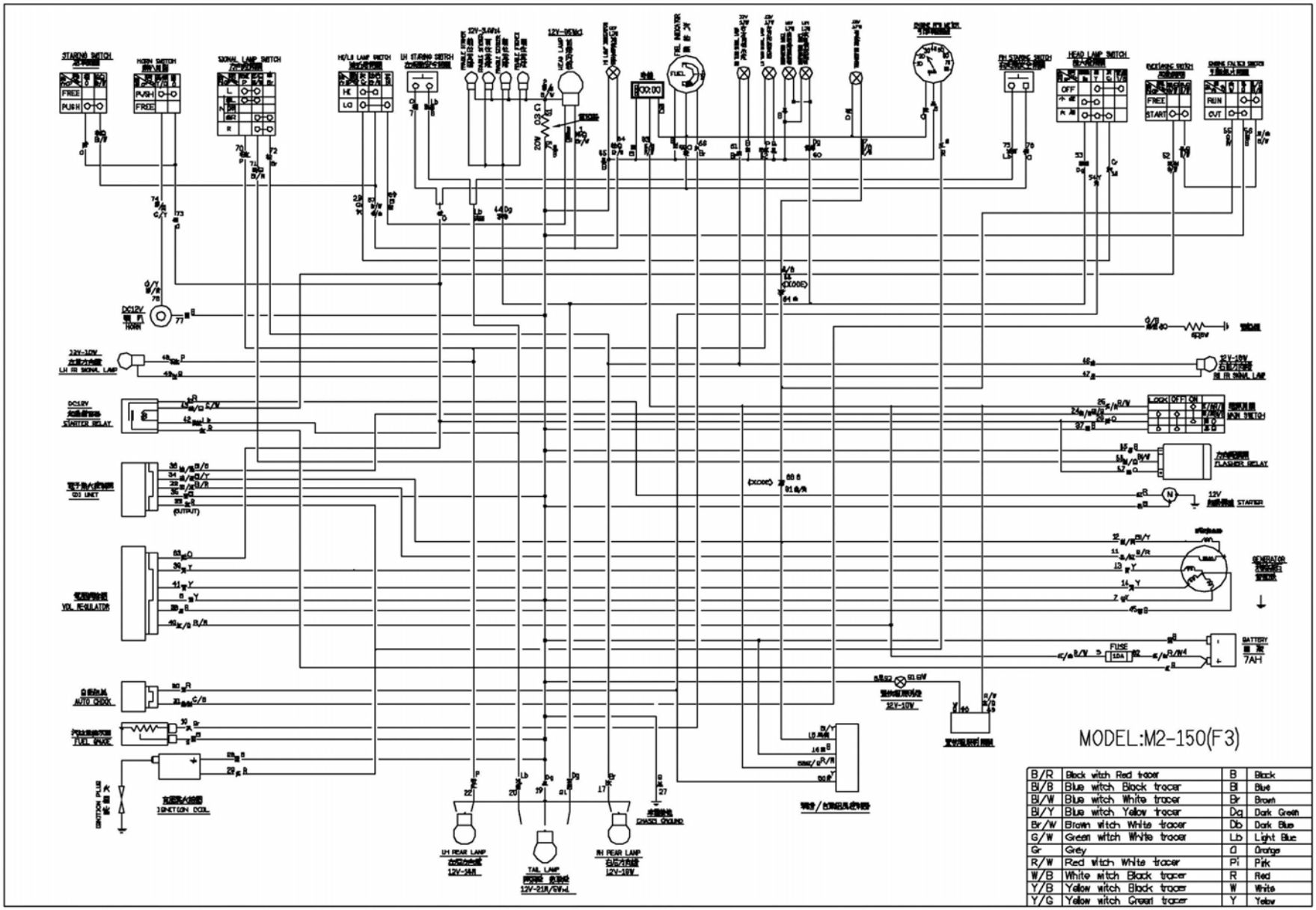
■ Wiring diagram for M2-50:



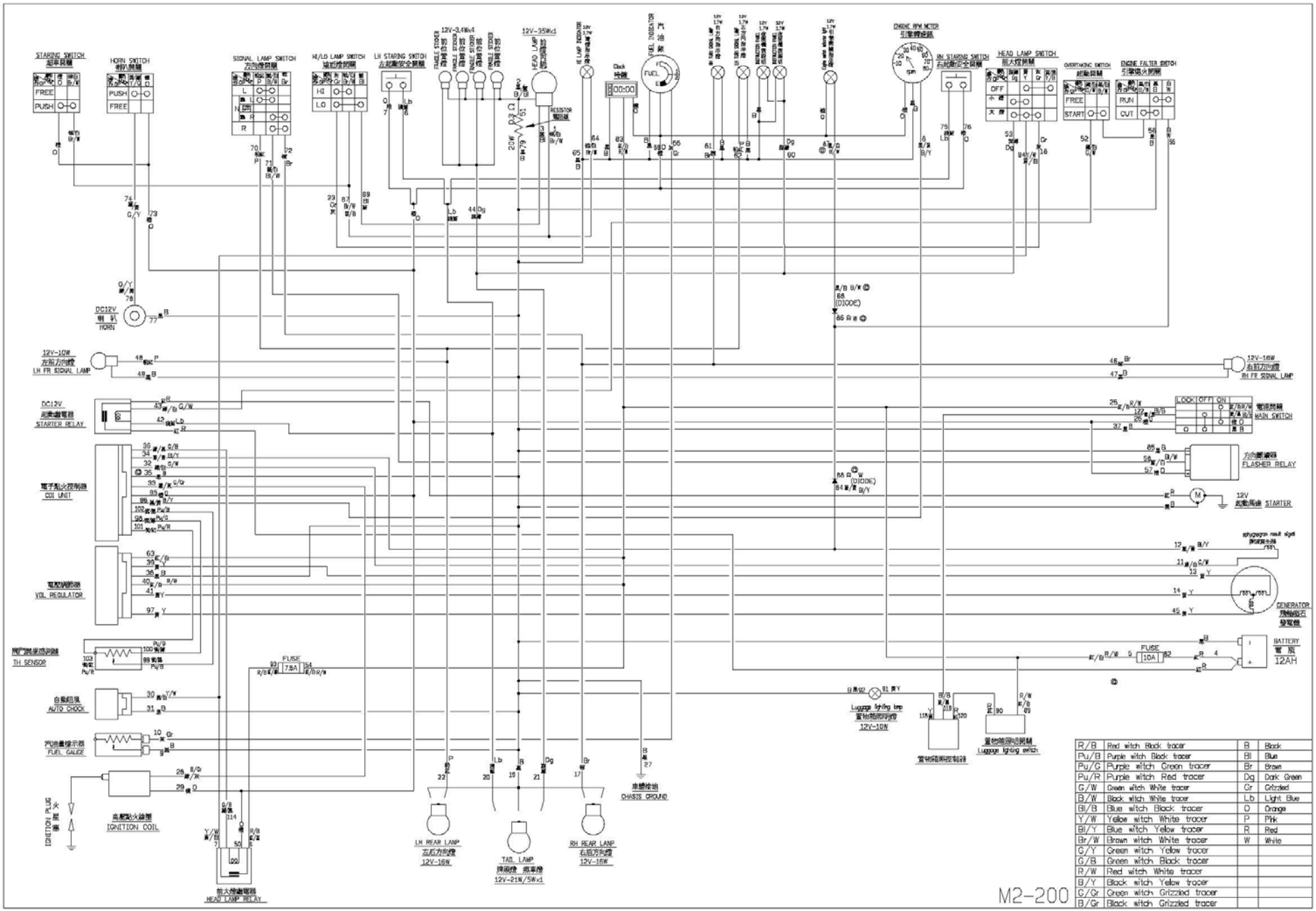
■ Wiring diagram for M2-125/150:



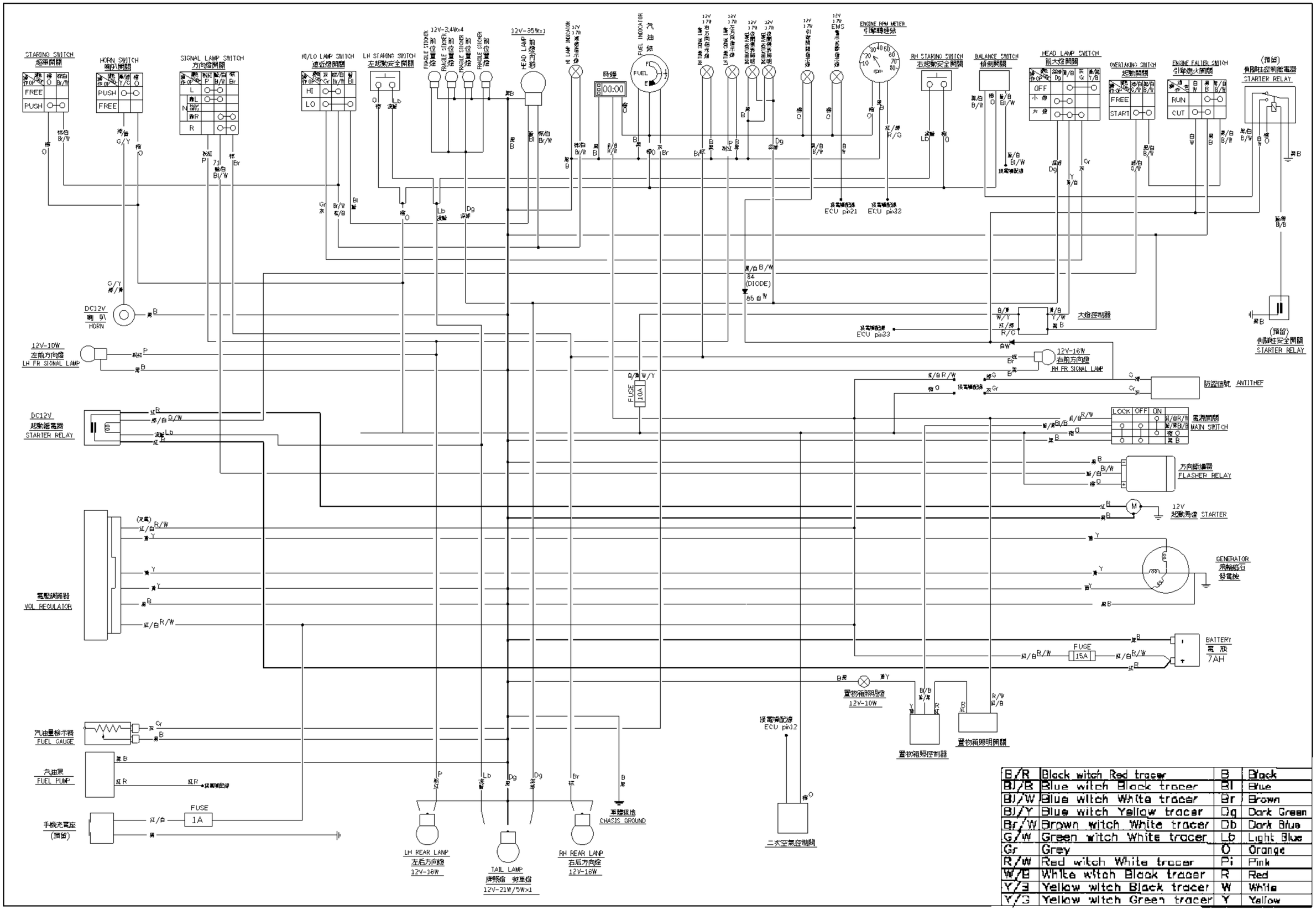
■ **Wiring diagram for M2-150(4V):**



■ Wiring diagram for M2-200:

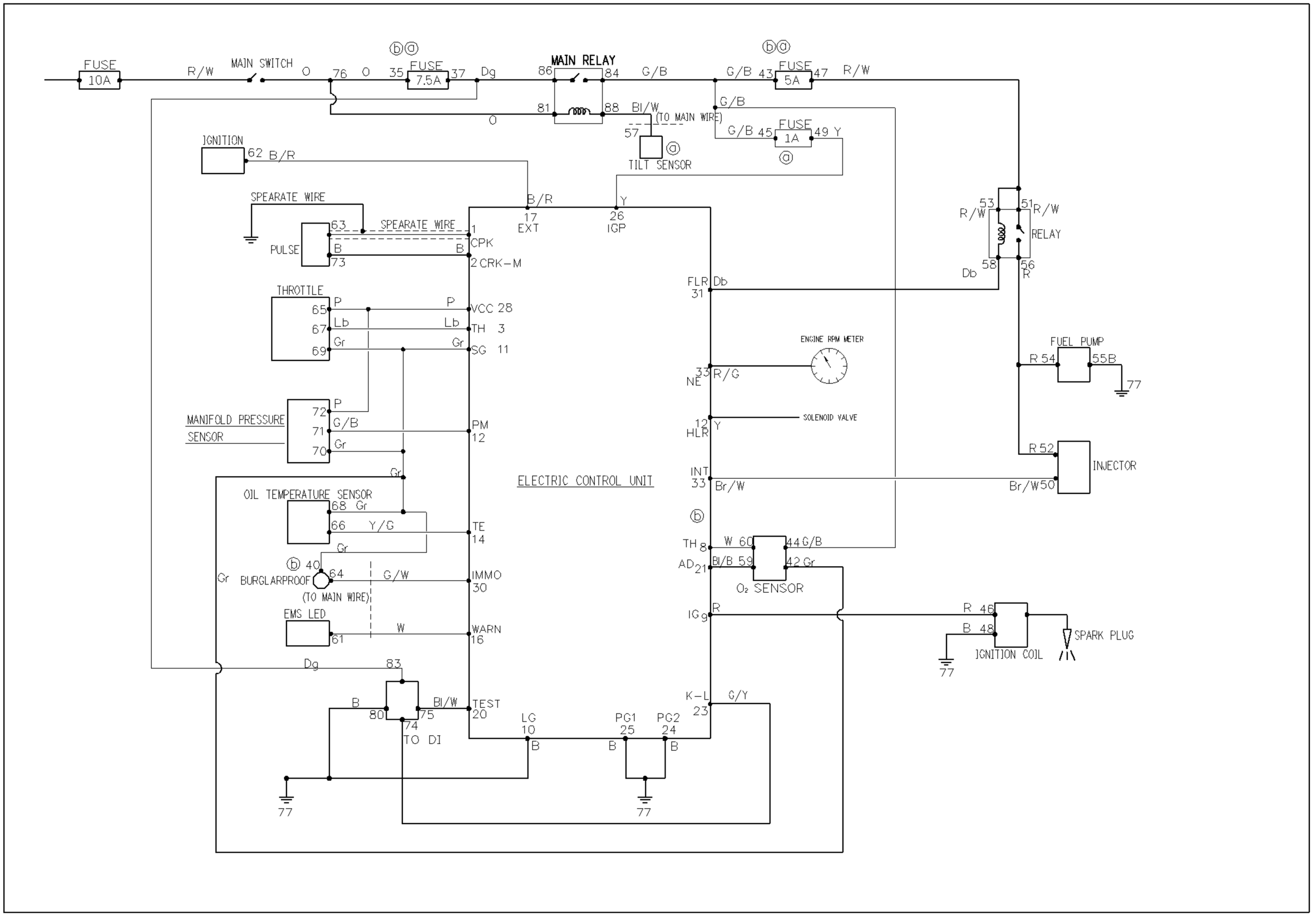


■ Wiring diagram for M2-220EFI

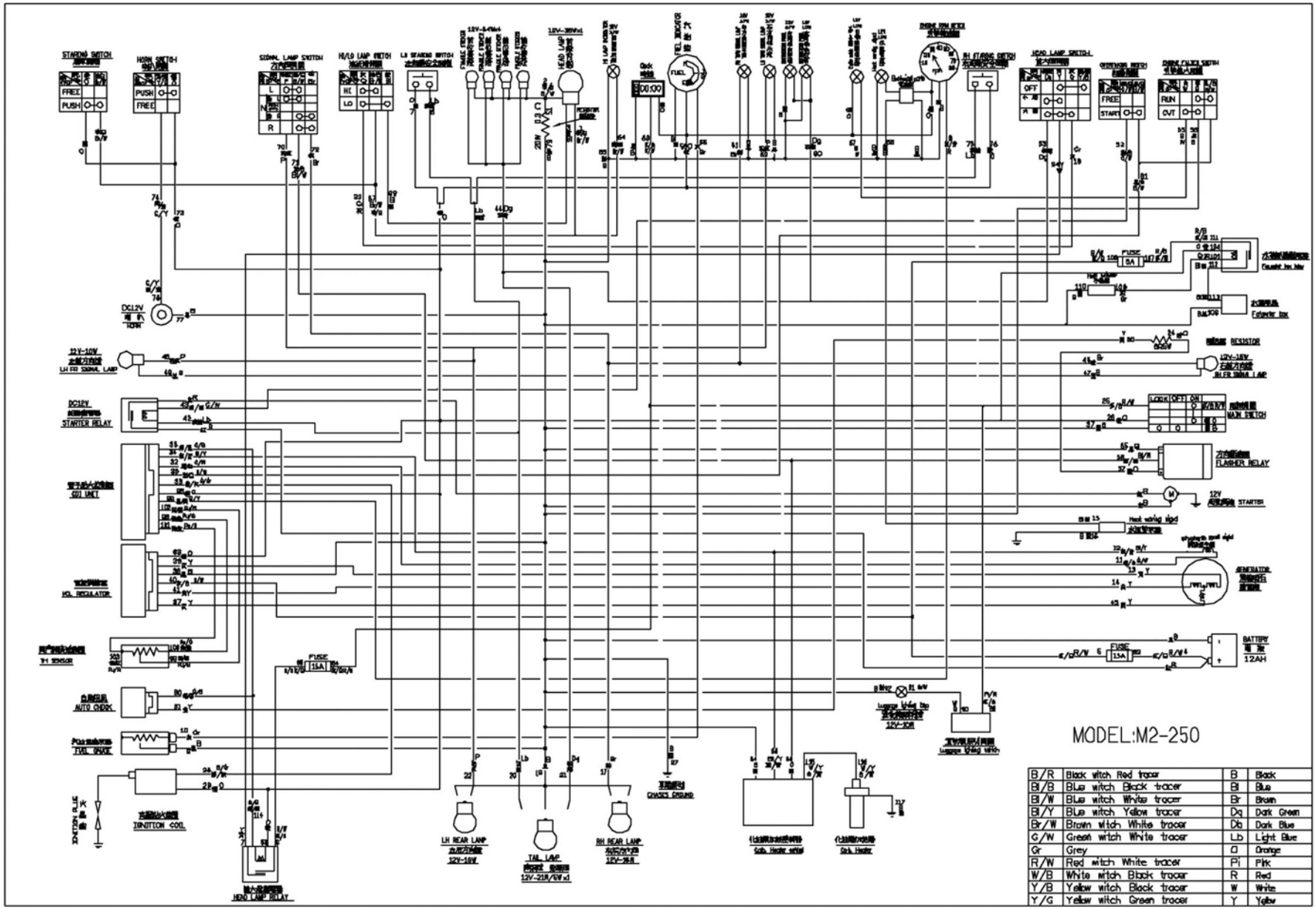


B/R	Black witch Red tracer	B	Black
Bl/B	Blue witch Black tracer	Bl	Blue
Bl/W	Blue witch White tracer	Br	Brown
Bl/Y	Blue witch Yellow tracer	Dg	Dark Green
Br/W	Brown witch White tracer	Db	Dark Blue
G/W	Green witch White tracer	Lb	Light Blue
Gr	Grey	O	Orange
R/W	Red witch White tracer	Pi	Pink
W/B	White witch Black tracer	R	Red
Y/B	Yellow witch Black tracer	W	White
Y/G	Yellow witch Green tracer	Y	Yellow

■ Wiring diagram for M2-220EFI (ECU)



■ **Wiring diagram for M2-250:**



Ⅵ. GMAX-200/220 characteristics , dismantle & inspection

(1) Engine dismantling

(2) Engine inspection

(3) Electric system

(4) Maintenance

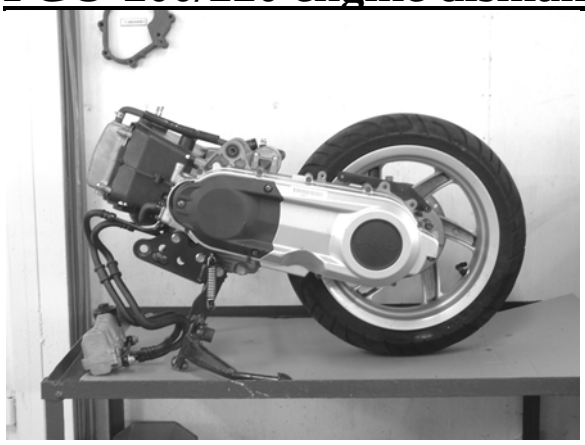
(5) Engine Management System(EMS)

(6) EMS diagnostic

(7) EMS system Repairing tool

(8) EMS General Electric units

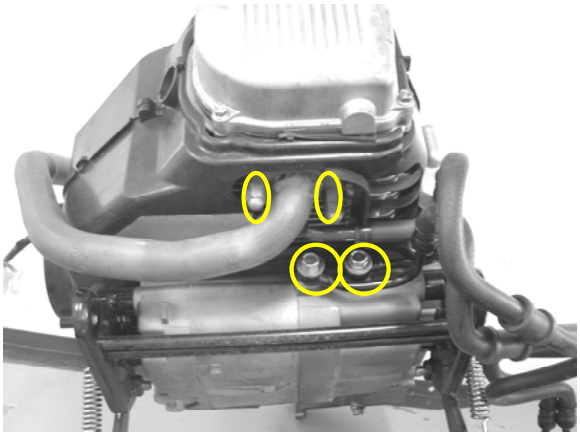
PGO-200/220 engine dismantle



Engine assembly

1. dismantle the chassis parts connected to engine

2. take off engine assembly

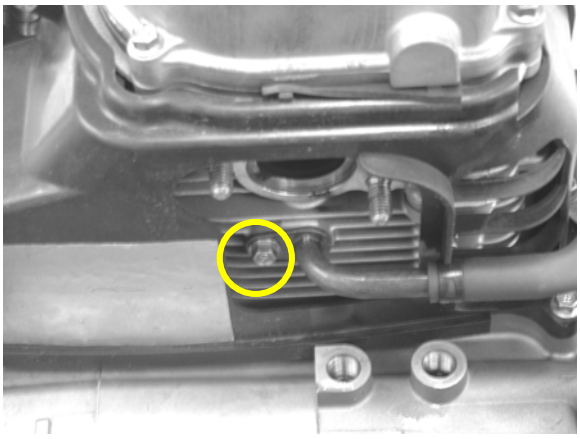


Front section muffler

1. dismantle 2 castle nuts
2. take off front section

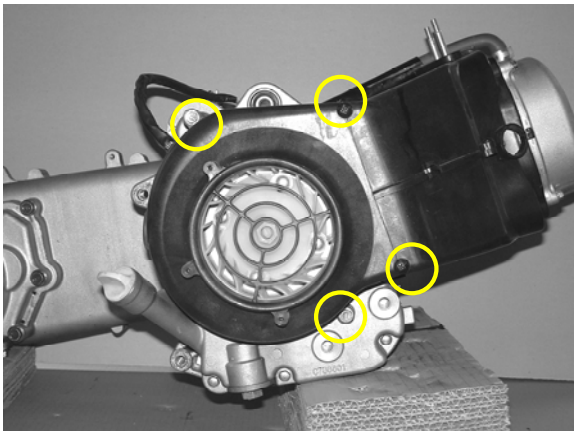
oil cooler

1. loosen 2 bolts
   remark：there are 2 washers
2. dismantle the oil cooler



Second Air Injection (SAI)

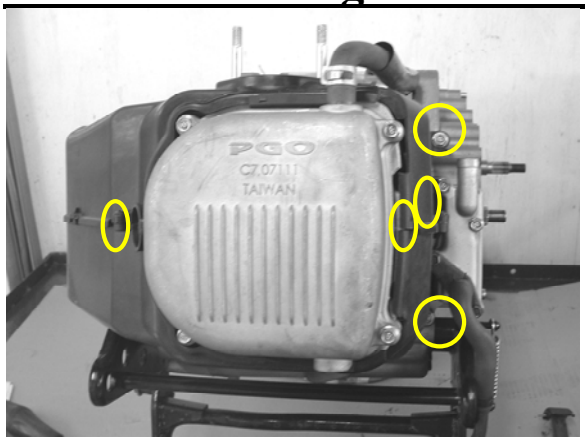
1. dismantle 1 bolt
2. take off the SAI

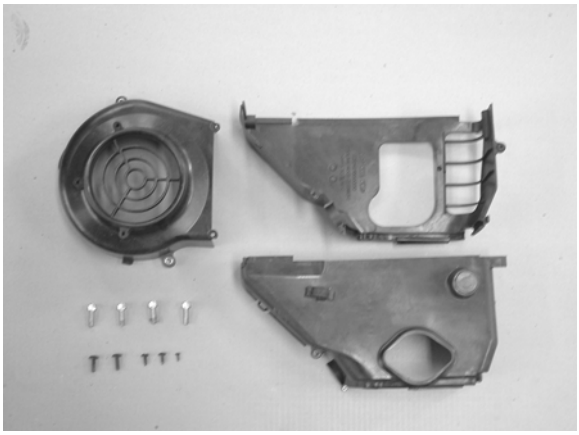


Fan cover

1. dismantle 2 bolts
2. dismantle 2 screws
3. take off the fan cover

PGO-200/220 engine dismantle

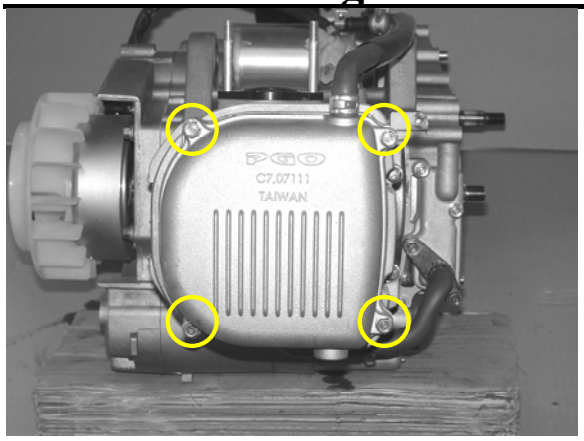




Cooling cowl

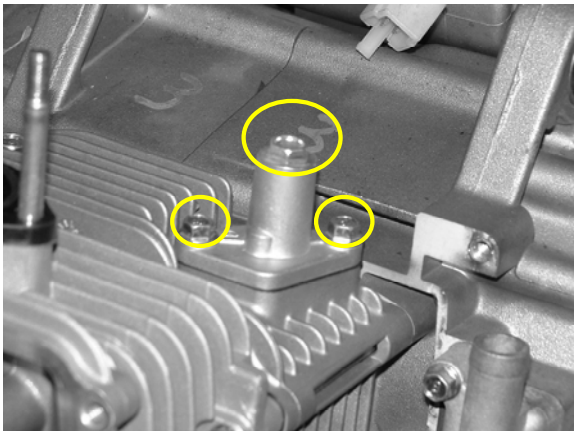
1. dismantle 3 tapping screws
2. dismantle 1 upper hexagon bolt
3. take off upper cooling cowl
4. dismantle 1 lower hexagon bolt
5. take off lower cooling cowl

PGO-200/220 engine dismantle



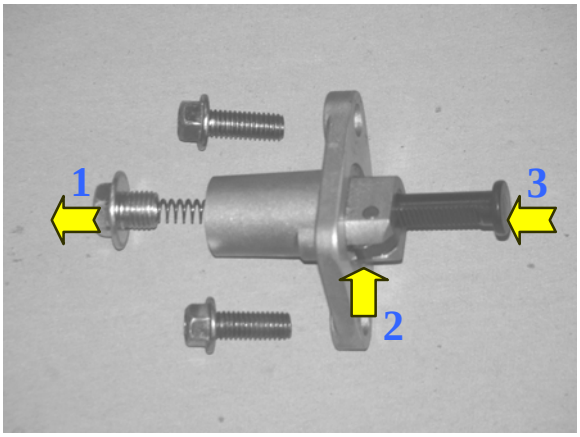
Cylinder head cover

1. loosen 4 hexagon bolts
2. dismantle cylinder head cover



Chain tensioner

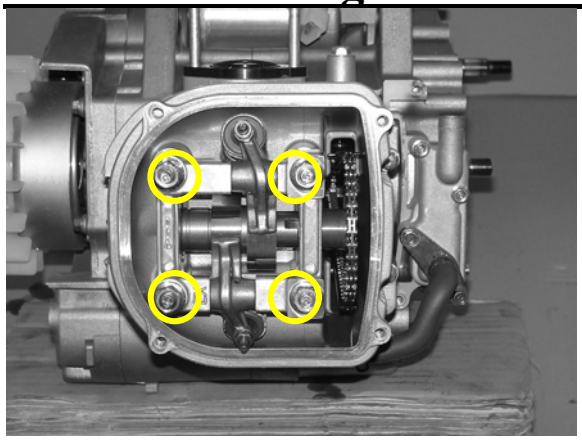
1. loosen the middle bolt
2. dismantle the spring
3. loosen 2 bolts of the body
4. dismantle the chain tensioner body
5. take off the packing



Recover the chain tensioner

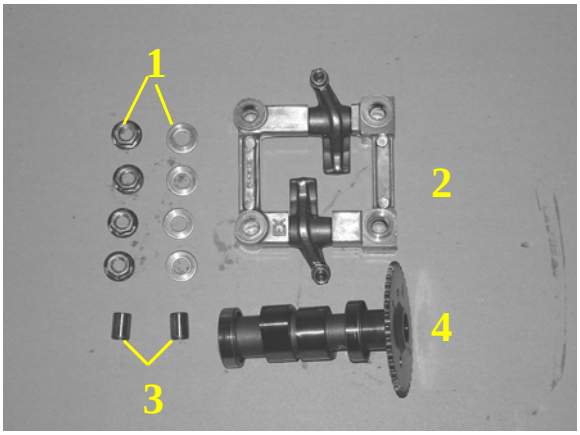
1. dismantle the bolt & spring
2. push the lock
3. push back to the body

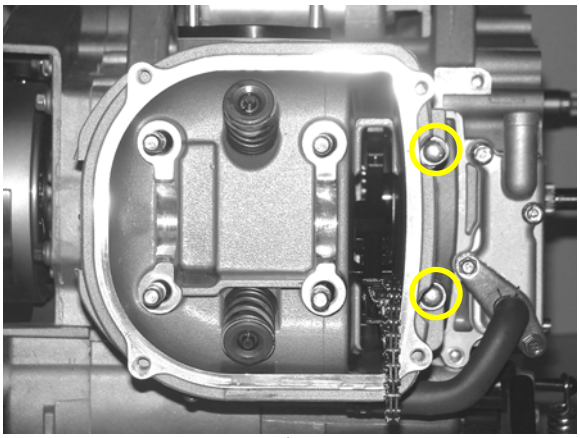
PGO-200/220 engine dismantle



Camshaft holder

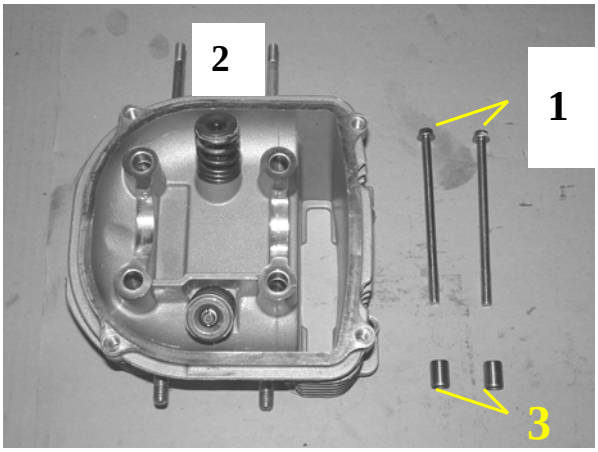
1. loosen 4 nuts & washers
2. dismantle the holder
3. dismantle 2 lock pins
4. dismantle the camshaft



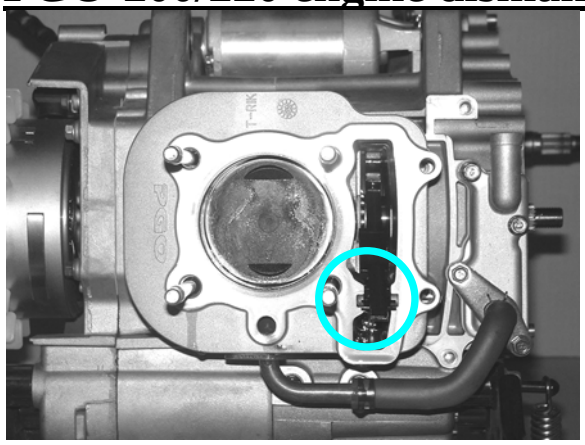


Cylinder head

1. loosen 2 hexagon bolts
2. dismantle cylinder head
3. dismantle 2 lock pins
4. take off the gasket

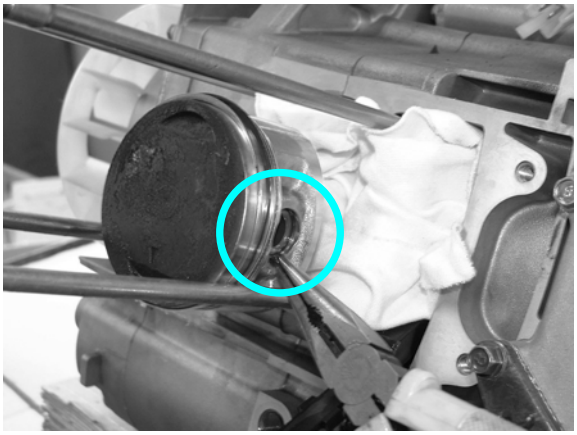


PGO-200/220 engine dismantle



Cylinder

1. dismantle the lower chain tensioner
2. take off the cylinder
3. dismantle 2 lock pins
4. take off the packing

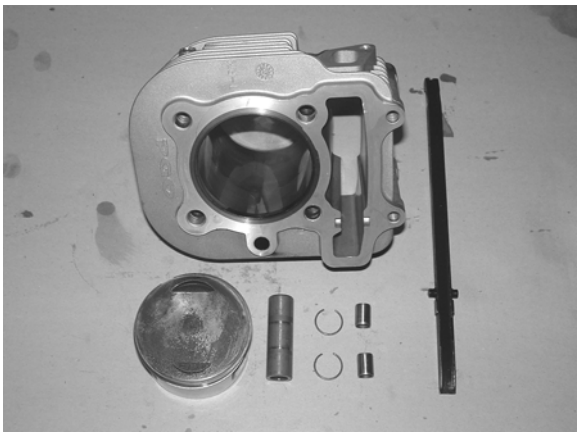


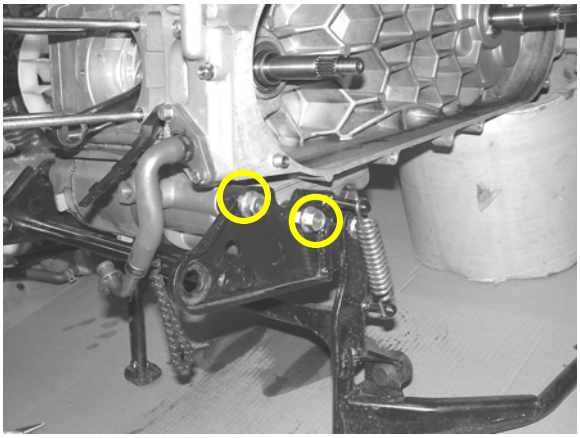
Piston

1. dismantle 2 clips
2. dismantle piston pin
3. take off the piston

Attention!

To prevent clip falling down the crankcase, use clothes to cover the crankcase.

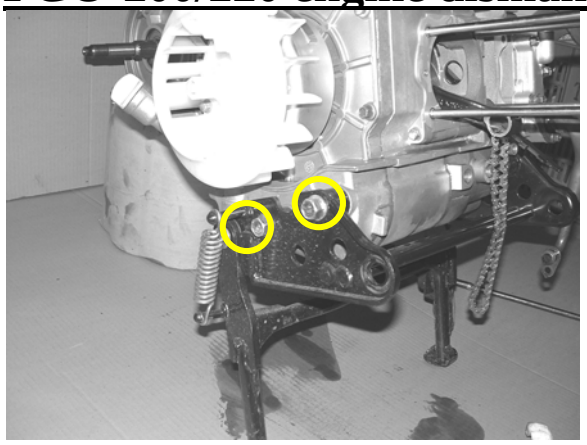




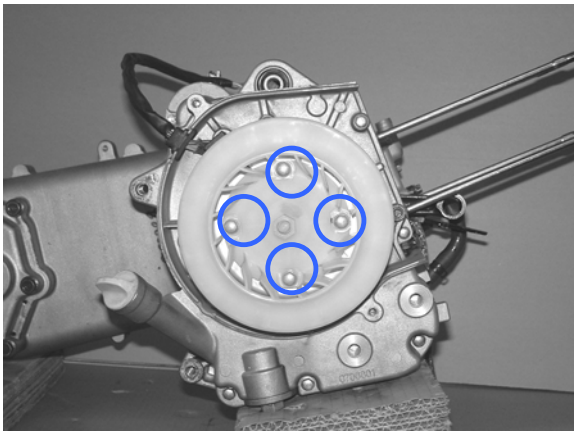
Engine lower hanger

1. loosen left 2 hexagon bolts

PGO-200/220 engine dismantle

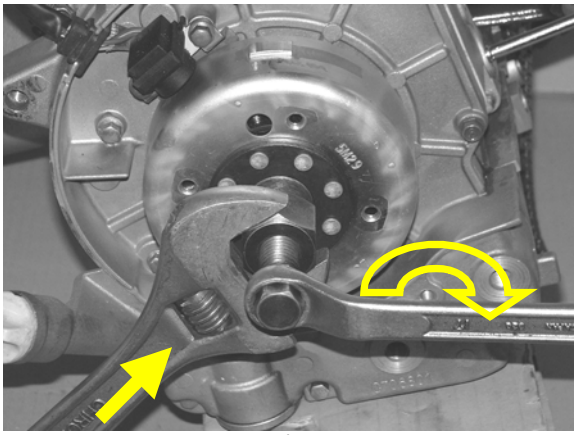


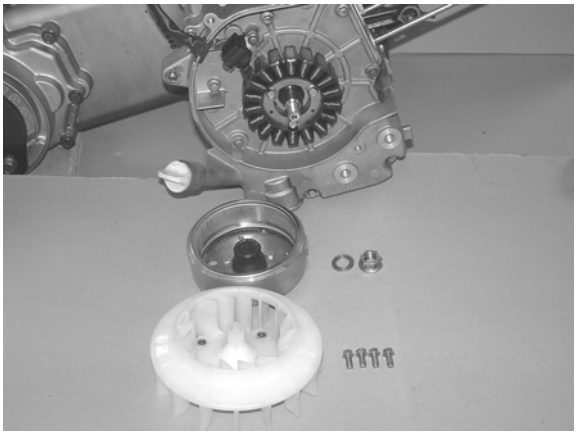
2. loosen right 2 hexagon bolts
3. dismantle the engine lower hanger



Cooling fan

1. loosen 4 bolts
2. dismantle the fan



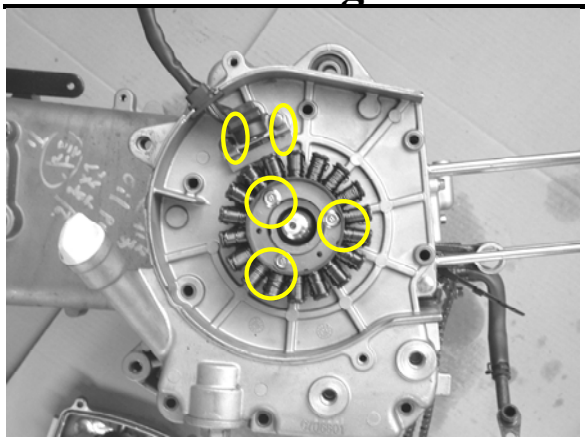


Generator outer

1. Loosen 1 nut & washer
2. use special tool:
   turn the outer counterclockwise，
   lock the inner bolt clockwise
3. dismantle the outer

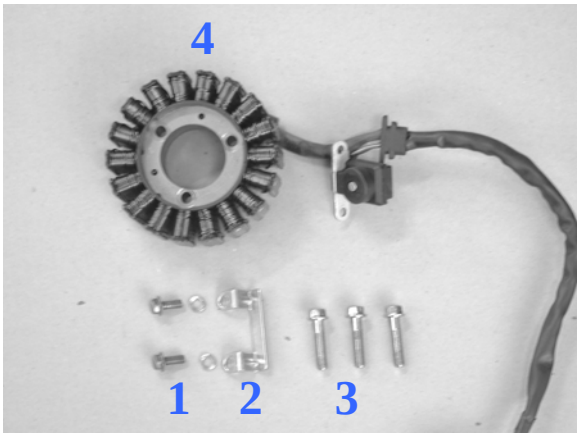
ACG special tool: S620505G01

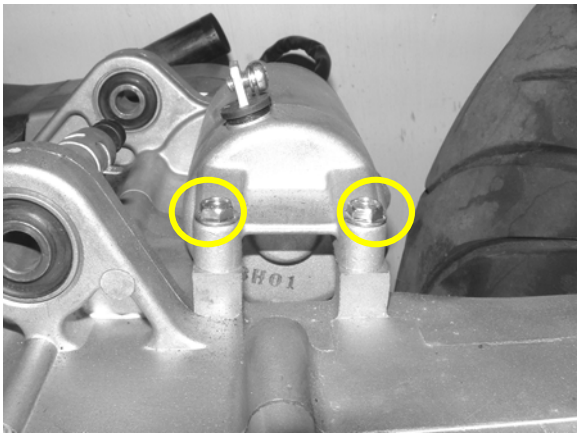
PGO-200/220 engine dismantle



Generator stator

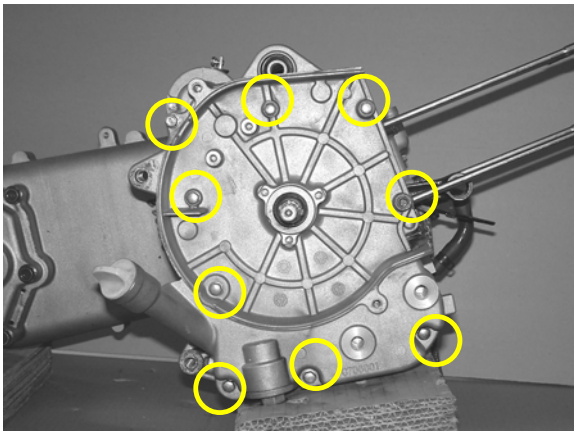
1. loosen 2 bolts & washers of pulser
2. dismantle the bracket of pulser
3. loosen 3 socket bolt
3. dismantle the stator





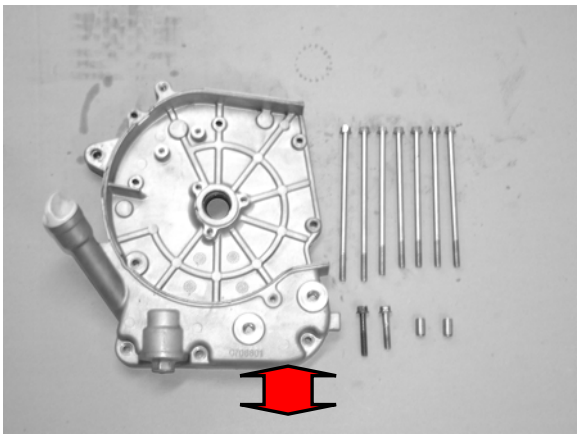
Starting motor

1. loosen 2 hexagon bolts
2. dismantle starting motor



PGO-200/220 engine dismantle

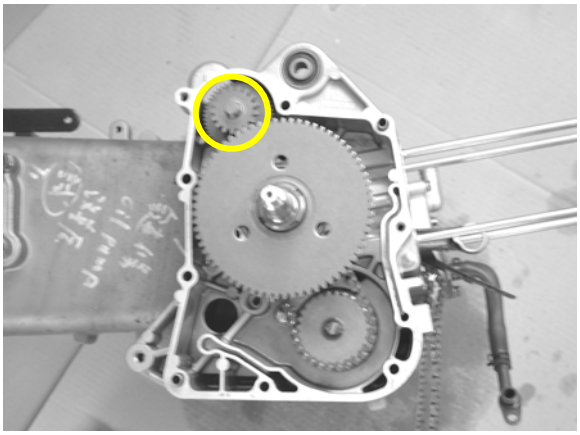
Right crankcase cover



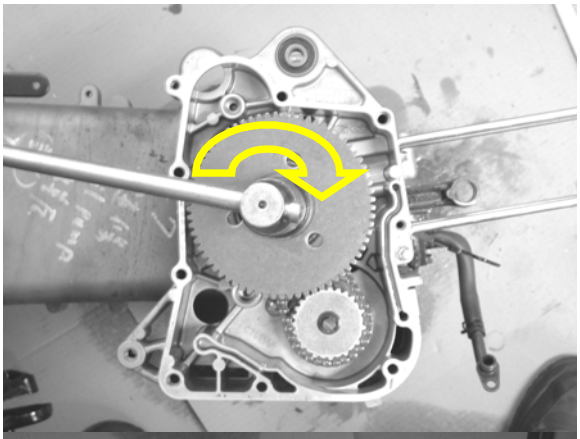
1. loosen 9 bolts
2. dismantle the right crankcase cover
3. dismantle 2 lock pins
4. dismantle the packing

Attention!

Be careful of the surface, don't defect it to avoid oil leaking.

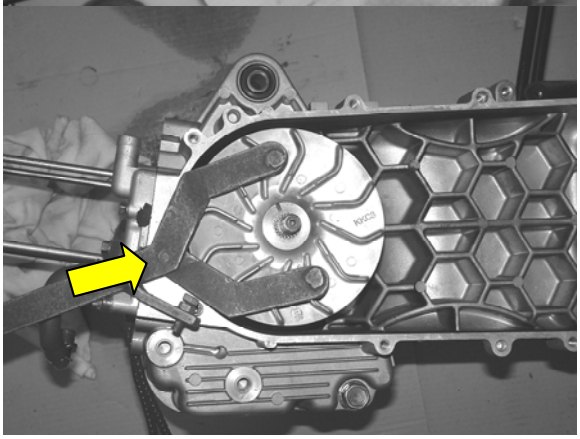


Starting idle gear



1. dismantle the shaft
2. dismantle the body

One way Clutch

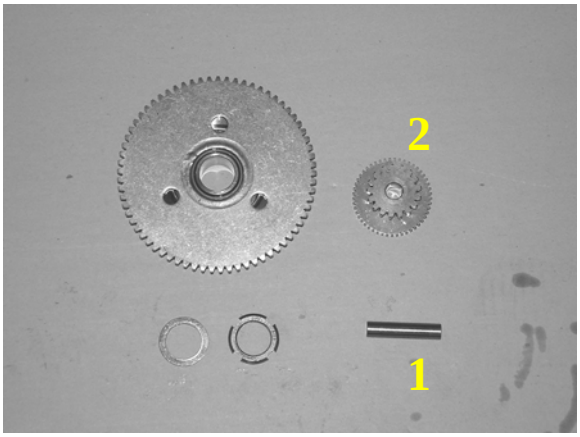


1. loosen the nut & washer with special tool
2. dismantle the one way clutch

Attention!

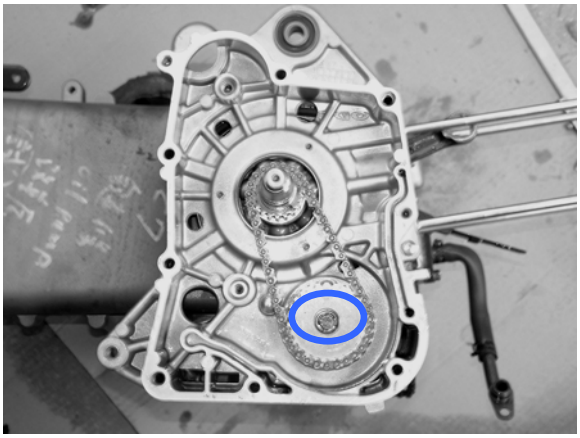
1. the thread of nut is left-hand direction,
   clockwise to loosen,

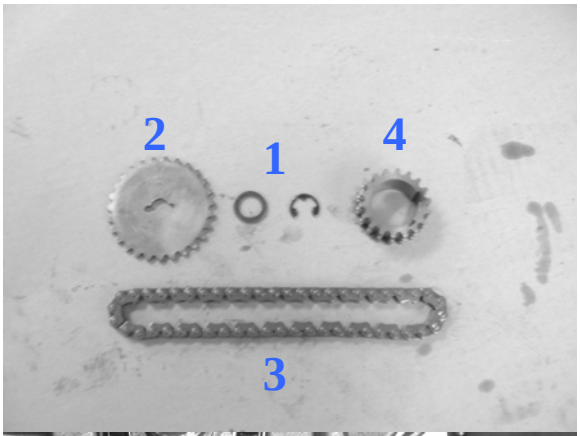
and counterclockwise to lock



2. use the compressed air wrench to loosen nut, or use the tool to fix the crankshaft.

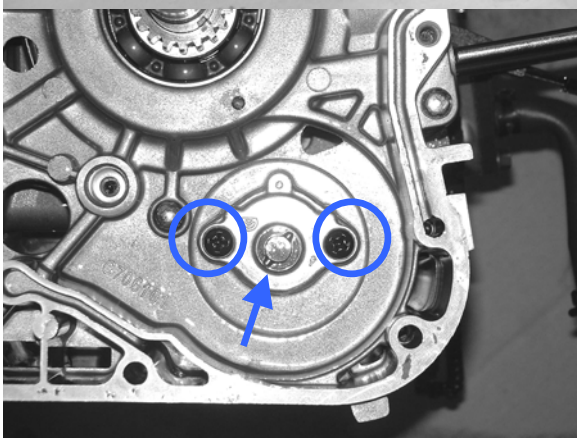
- Special tool (one way clutch) S620504G01





Sprocket of oil pump

1. dismantle E clip & washer
2. dismantle the sprocket & chain
3. dismantle the sprocket of crankshaft



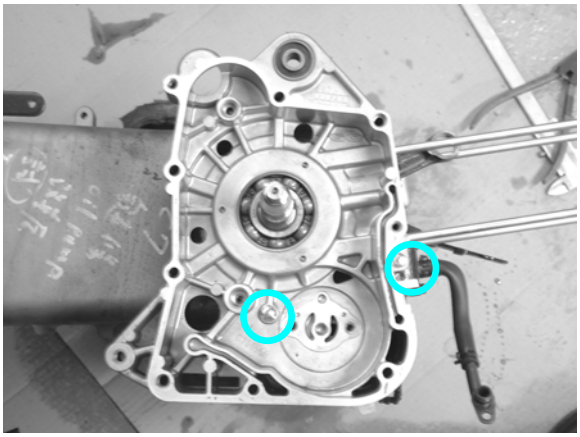
PGO-200/220 engine dismantle

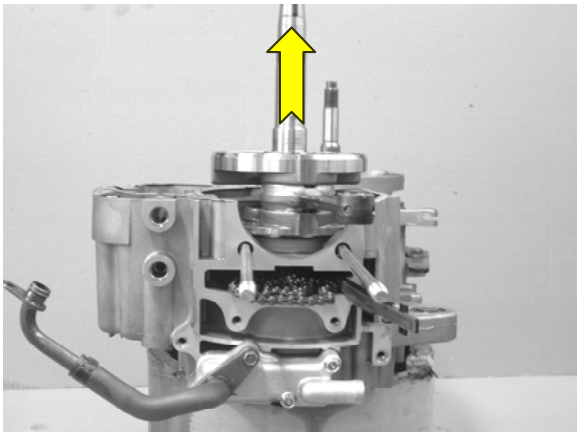
Oil pump

1. loosen 2 bolts
2. dismantle oil pump body

Attention!

There is a lock pin in the shaft of oil pump, don't miss it.





Right crankcase

1. loosen 2 bolts
2. dismantle the right crankcase
3. dismantle 2 lock pins
4. take off the packing

Attention!

Be careful of the surface, don't defect it to avoid oil leaking.

Crankshaft

1. dismantle the crankshaft assembly (including a ball bearing in the left side)
2. take off the timing chain

Attention!

Be careful to take off the

crankshaft from the left crankcase, don’ t damage the oil & impact the crankshaft!

6.2 Engine inspection data

- **CVT parts**

Inspection data

Item	standard(mm)	using limit(mm)
The inner dia. Of slide drivingplat	27.011~27.021	27.10
The outer dia. Of boss, movable Driving	26.970~26.990	26.95
Belt width	18.7~19.3	17.70
Clutch lining thickness	3	1.50
Clutch outer inner diameter	130.0~130.2	130.50
Driven plate spring, free length	160	145.00
outer diameter of drivenPlate sets	33.965~33.985	33.95
inner diameter of slideDriven plat	34.000~34.025	34.06
outer diameter of weightRoller set	19.920~20.080	19.40

- **Camshaft & valves**

名　　稱		Standard(mm)	Using limit(mm)
Clearance between adjuster tapped Screw and valve stem (Before warm up)	IN & EX	0.08	
Compression pressure(throttle open full)		13kg/650rpm	
Height of the cam's convex part	IN	26.625	26.23
	EX	26.530	26.13
Inner diameter of rocker arm shaft	IN & EX	10.000~10.015	10.10
Outer diameter of rocker arm shaft	IN & EX	9.972~9.987	9.91
Valve base angle	IN	1.0	1.8
	EX	1.0	1.8
Outer diameter of valve stem	IN	4.975~4.990	4.900
	EX	4.955~4.970	4.900
Inner diameter of valve guide	IN	5.000~5.012	5.30
	EX	5.000~5.012	5.30
Clearance between valve stem and Valve guide	IN	0.010~0.037	0.08
	EX	0.030~0.057	0.10

● Piston & Cylinder inspection (200CC)

Part name /description			Standard value (mm)	Limit of use (mm)
Cylinder	Bore		64.990~65.010	65.100
	Curve		-	0.005
	Cylindrility		-	0.005
	Roundness		-	0.005
Piston/ Piston ring	Clearance b/w Piston and Piston ring	lst ring	0.04~0.08	0.15
		2nd ring	0.02~0.06	0.15
	Clearance of cutting section	lst ring	0.10~0.25	0.50
		2nd ring	0.30~0.45	1.0
		side ring	0.2~0.7	---
	Piston outer diameter		64.980~64.960	64.890
	Measuring location of piston outer dia.		Down to 8 mm from the piston skirt	---
	Clearance b/w piston and cylinder		0.025~0.035	0.10
	Piston pin hole inner dia		16.004~16.010	16.040
Piston pin outer diameter			15.992~15.990	15.98
Clearance between piston and piston pin			0.020~0.017	0.025
Connecting rod small end inner dia			16.010~16.016	16.060

● Piston & Cylinder inspection (220CC)

Part name /description			Standard value (mm)	Limit of use (mm)
Cylinder	Bore		67.485~67.505	67.595
	Curve		-	0.005
	Cylindrility		-	0.005
	Roundness		-	0.005
Piston/ Piston ring	Clearance b/w Piston and Piston ring	lst ring	0.04~0.08	0.15
		2nd ring	0.02~0.06	0.15
	Clearance of cutting section	lst ring	0.10~0.25	0.50
		2nd ring	0.30~0.45	1.0
		side ring	0.2~0.7	---
	Piston outer diameter		67.460~67.480	67.390
	Measuring location of piston outer dia.		Down to 8 mm from the piston skirt	---
	Clearance b/w piston and cylinder		0.025~0.035	0.10
	Piston pin hole inner dia		16.004~16.010	16.040
Piston pin outer diameter			15.992~15.990	15.98
Clearance between piston and piston pin			0.020~0.017	0.025
Connecting rod small end inner dia			16.010~16.016	16.060

● Crankshaft

Item	Standard value(mm)	Limit of use.(mm)
Clearance of connecting rod big end axle direction	0.005~0.013	0.05
Clearance of connecting rod big end vertical direction.	0.10~0.40	0.8
Swingness of the crank shaft journal.	0.03	0.10

6.3 Electric system

- Carburetor model electric
- General maintenance
- Engine Management System

6.3 Electric system

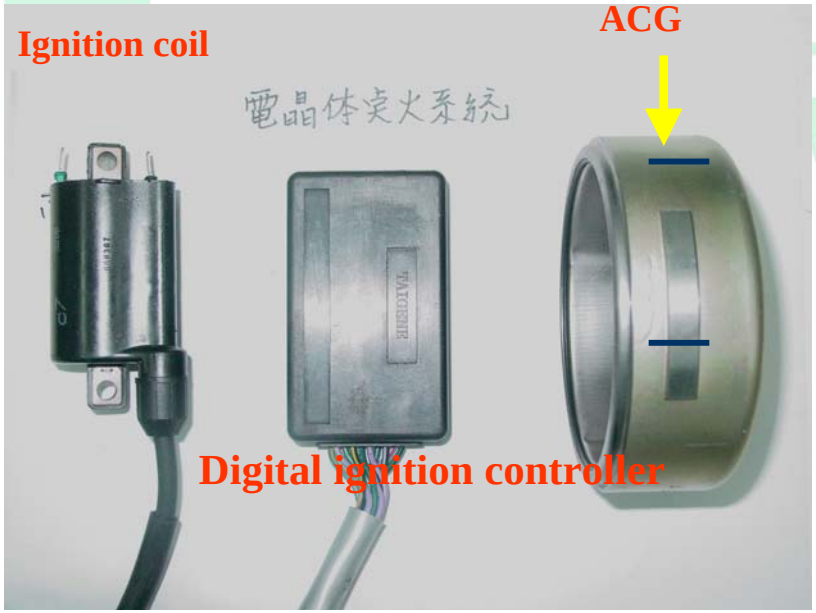
◆What is transistor ignition?

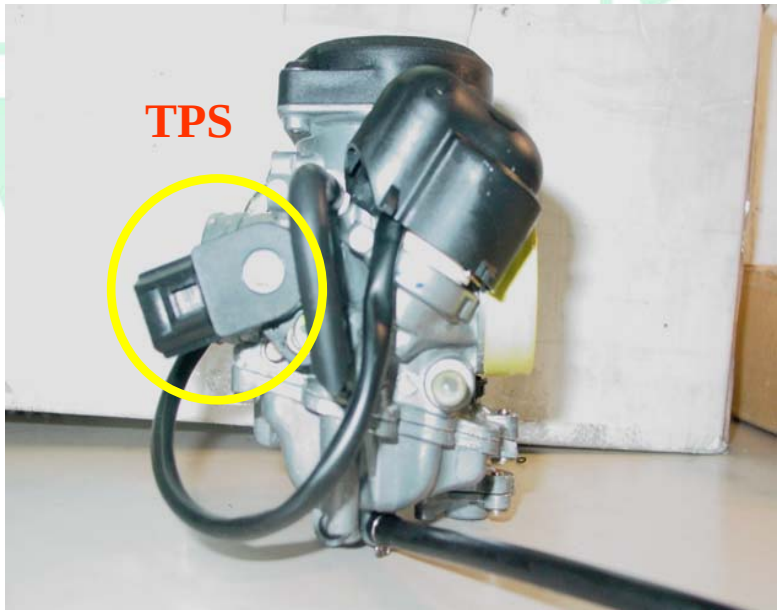
Transistor Ignition System

- Transistor: a kind of semi-conductor that can control electric current, has the switch function
- Apply transistor to engine ignition control, called transistor ignition

Major components of Transistor ignition

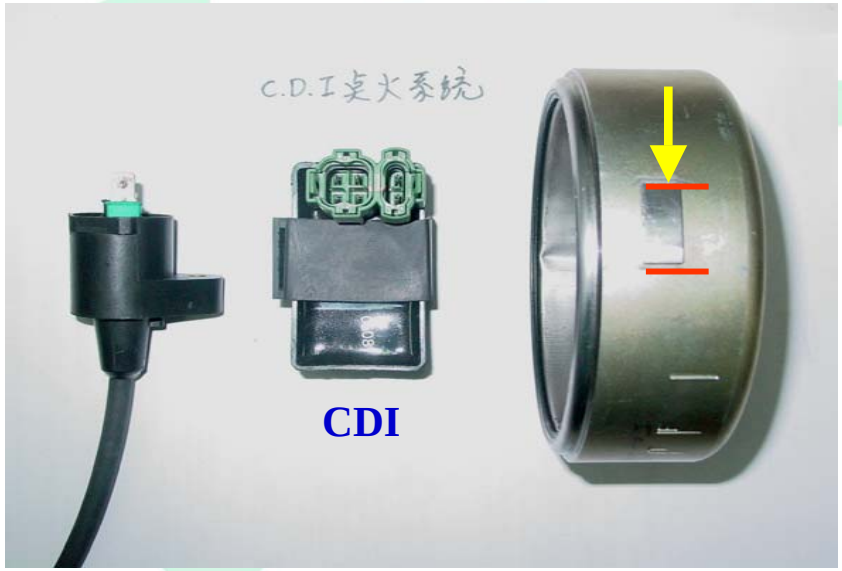
- Digital ignition controller
- Ignition coil
- DC-generator, with longer pulse flange
- TPS: Throttle Position Sensor (optional part of Carburetor)



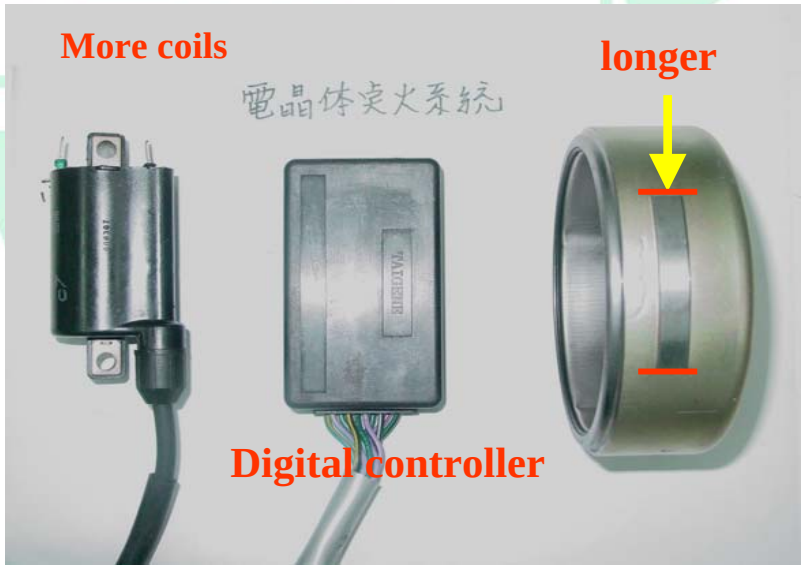


Comparision of Transistor V.S. CDI ignition

item	parts	Traditional CDI	G-MAX 200/220 transistor
1	TPS	no	yes
2	Digital controller	no	yes
3	CDI	yes	no
4	ACG flange	shorter	longer
5	Ignition coil	Less coils	More coils



Traditional C.D.I

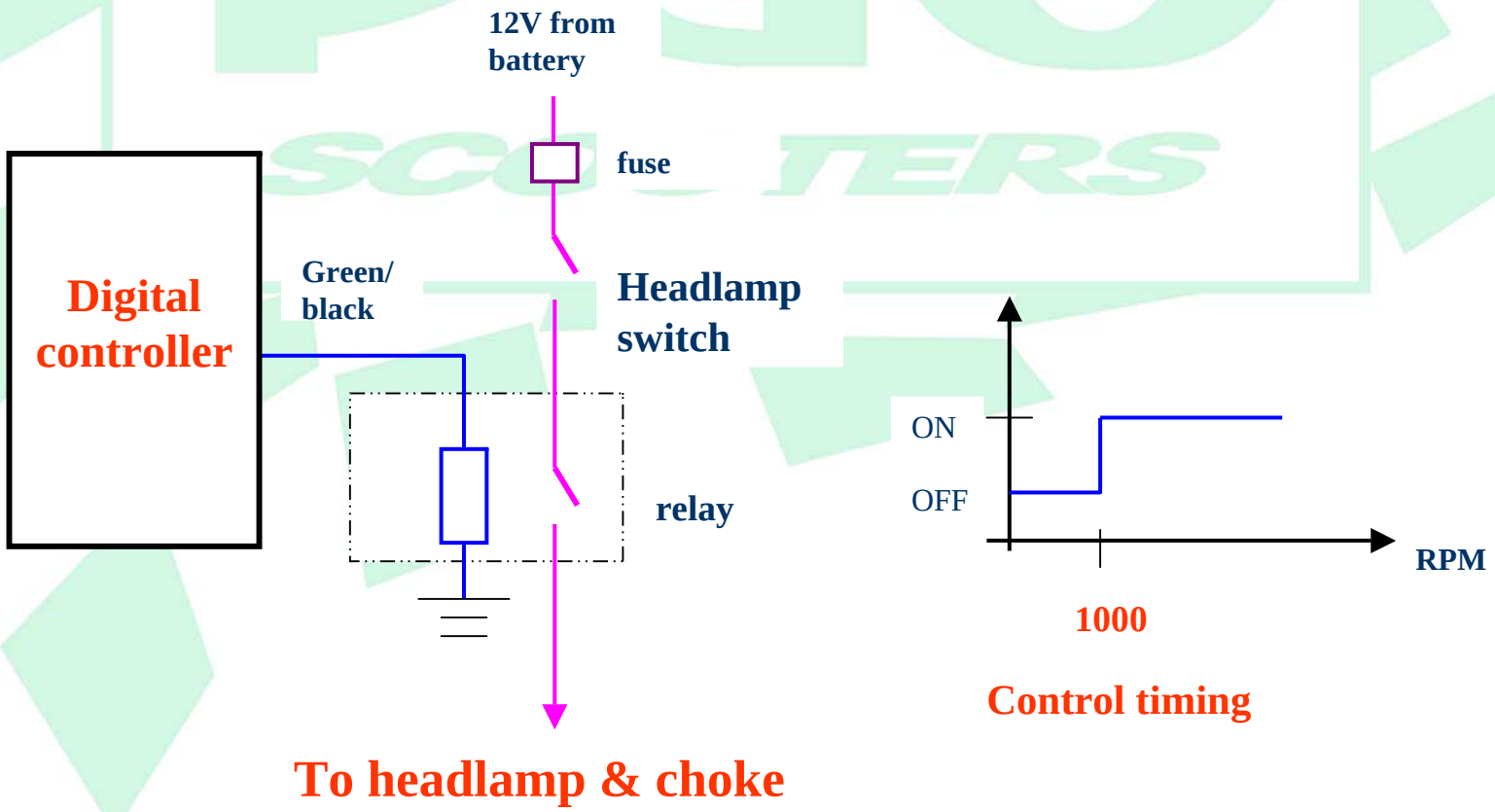


Transistor ignition

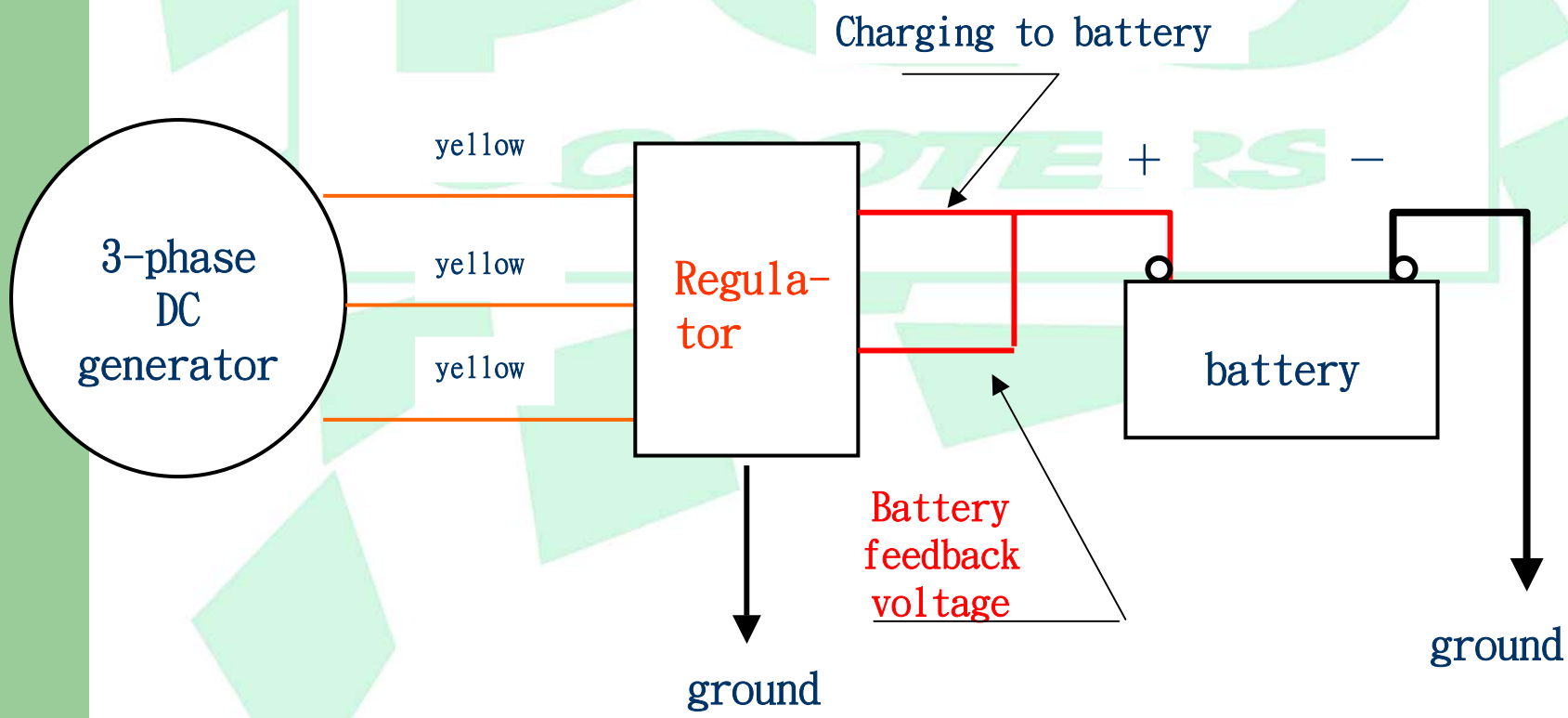
G-MAX 200/220 Electric system

◆Headlamp & choke (carburetor) diagram

●When engine speed > 1000rpm,the digital controller permits the relay to conduct the circuit

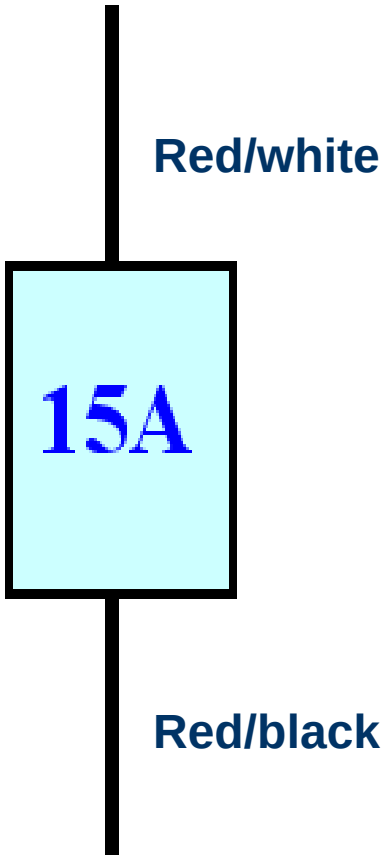


Charging system diagram

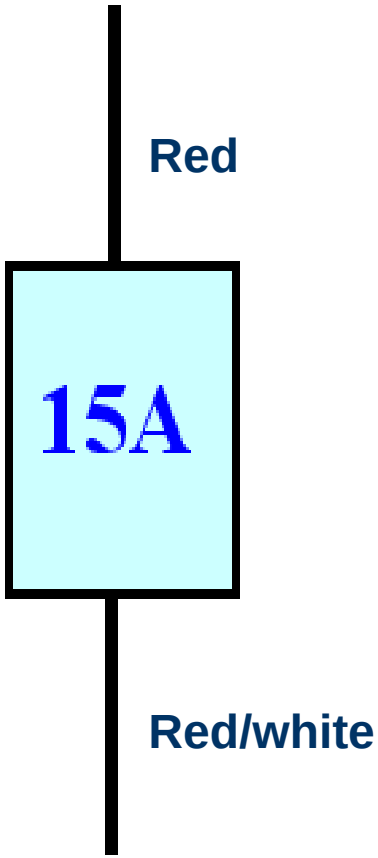


Fuse wire:

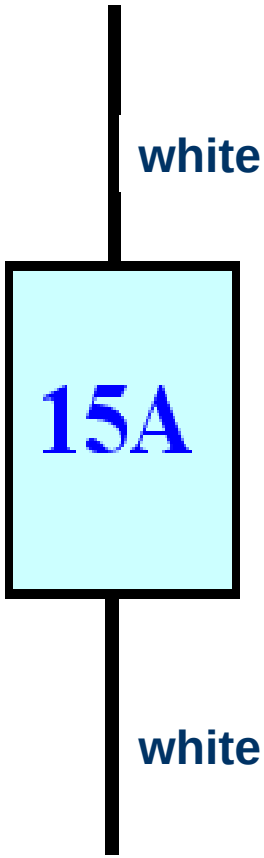
Main fuse layout



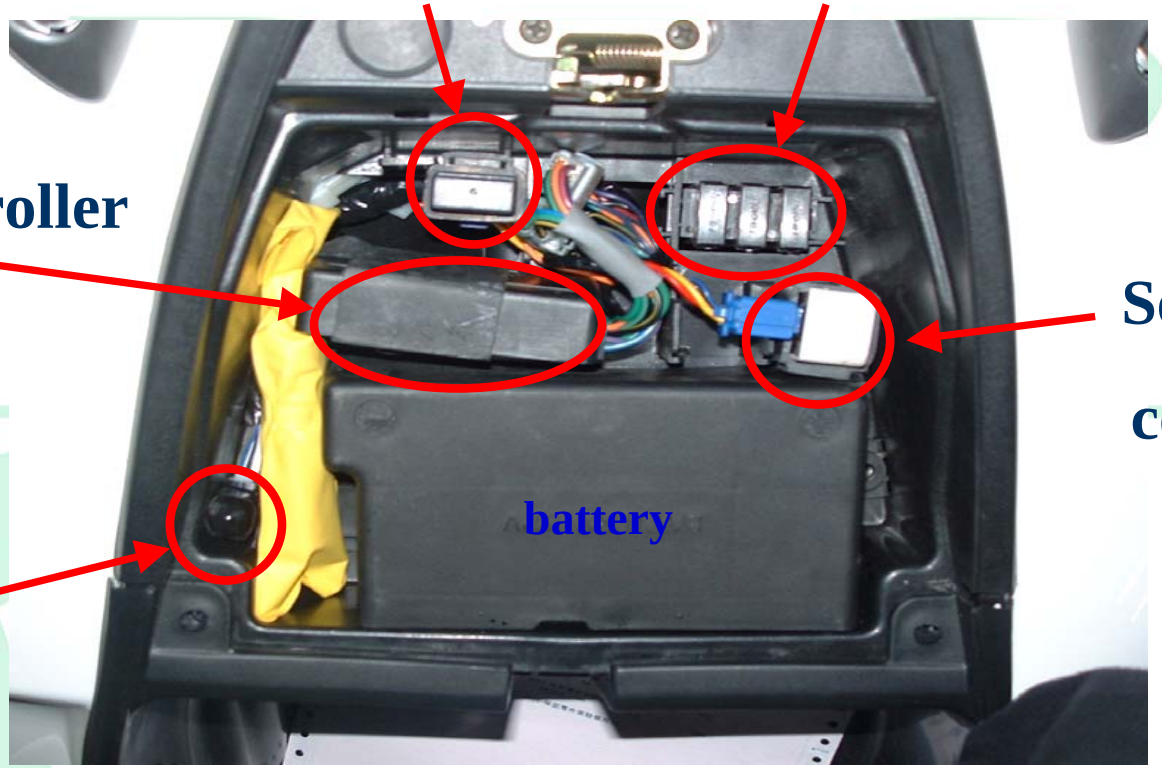
relay fuse layout



reserved fuse layout



G-MAX 200/220 Electric parts



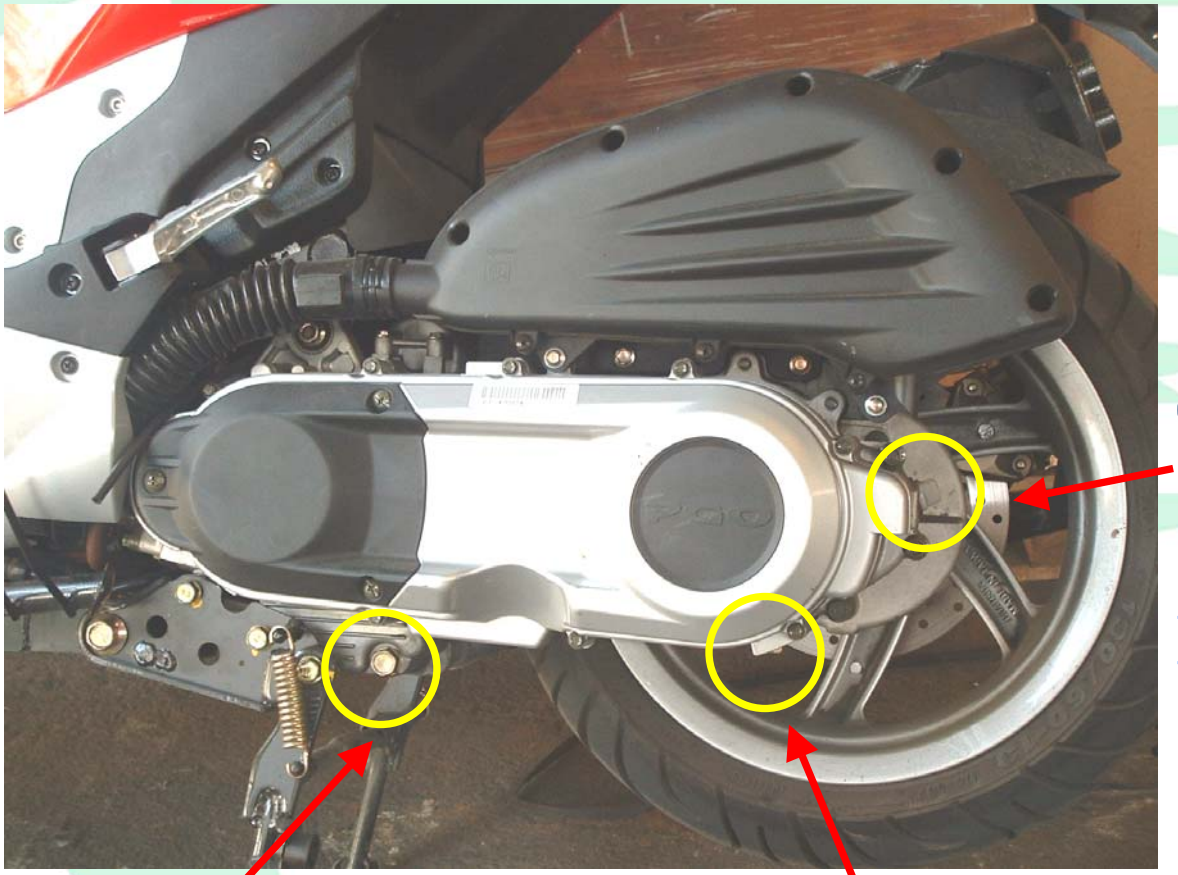
Remarks: If dismantle the battery, engine will cease fire!

6.4 General maintenance

	G-MAX 200/220	G-MAX125/150
Engine oil	Replace 1000cc Total 1400cc	Replace 800cc Total 1000cc
Gear oil	Replace 110cc Total 130cc	Replace 90cc Total 110cc
Oil filter	2nd filter	2nd filter
Air element	Wet paper(bigger)	Wet paper
CVT sponge	Circle shape	Oval shape
headlamp	H4 55W/60W	HS1 35W/35W

G-MAX 200/220 Specified engine oil (synthetic 1000ml)

Engine oil、gear oil:



Gear oil filling

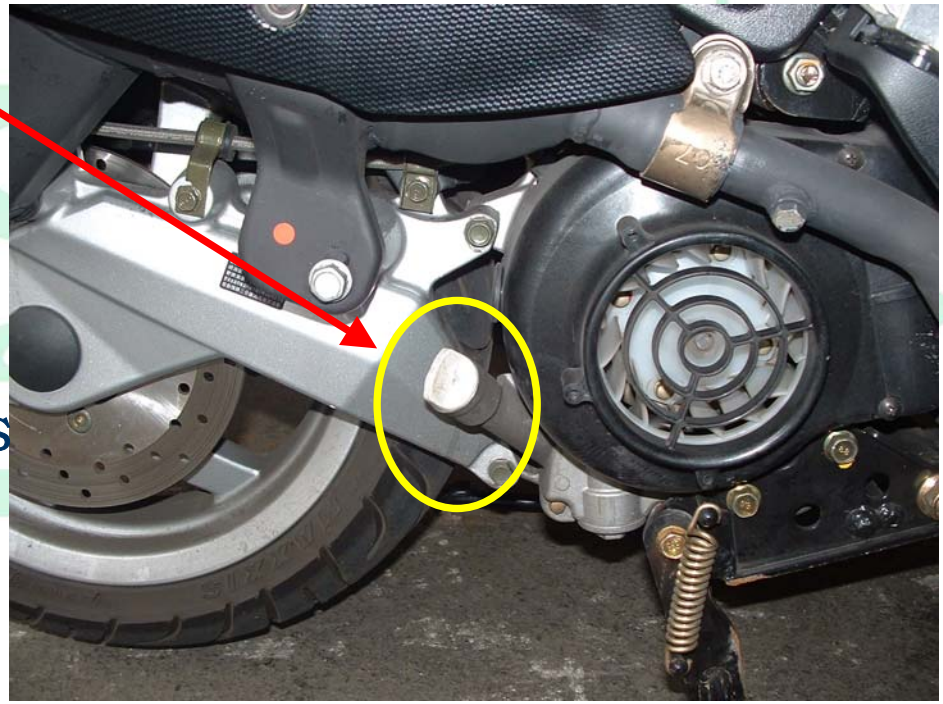
Replace 110cc
total 130cc

Drain of engine oil

drain of gear oil

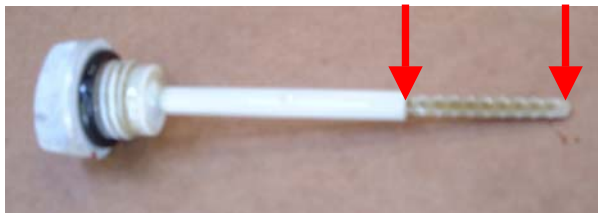
Engine oil、gear oil:

Engine oil filling & gauge
replacement 1000cc
total 1400cc



Check the oil level:
1. park in flat area
2. keep in idle for 3 minutes
3. cold down 3 minutes
4. take off the gauge

5. when lower the lowest limit, add oil to upper limit



Replace the 2nd oil filter

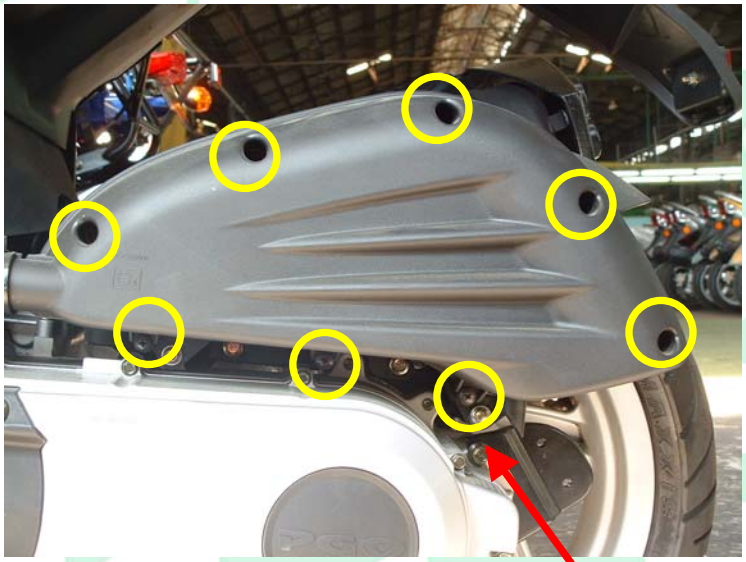
1.dismantle the right lower cover

2.replace the filter

＊keep the surface clean

apply grease to the O-ring before installing!

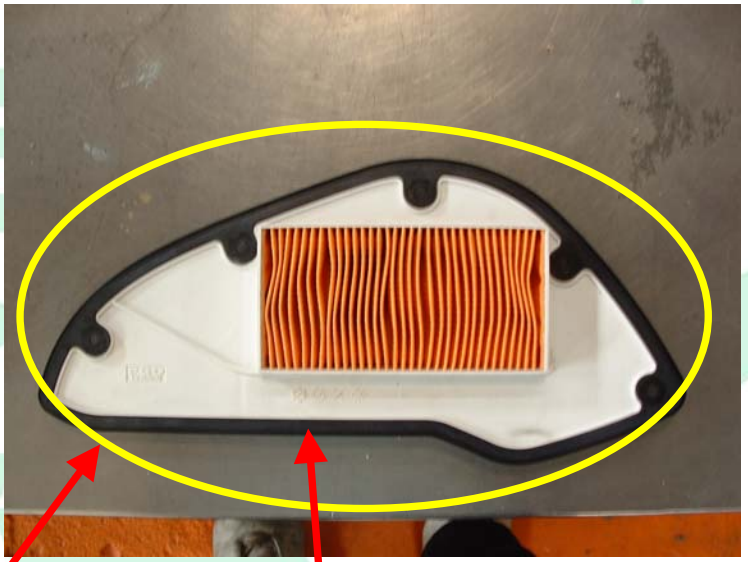
Air element



1. loosen 8 screws

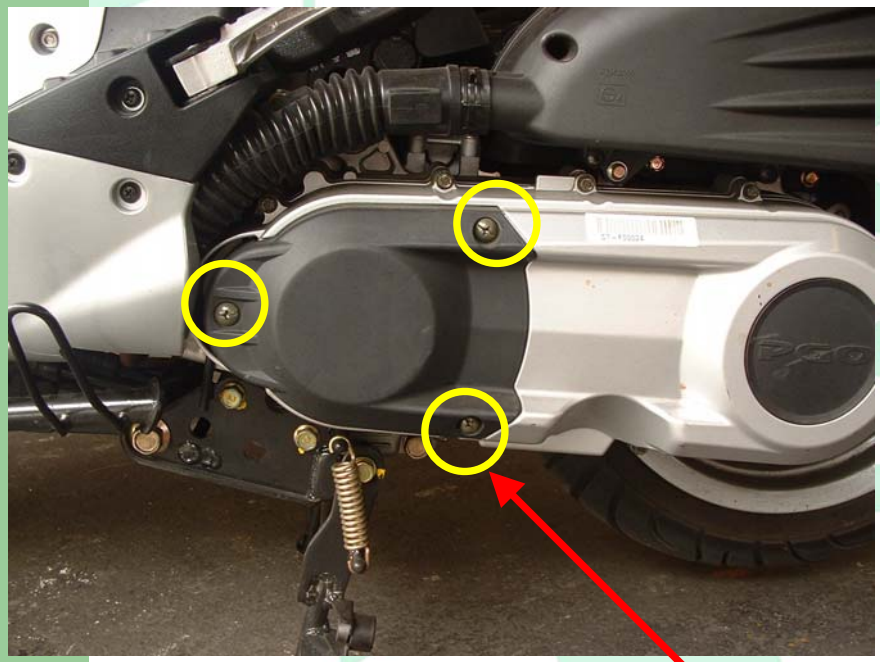
2. dismantle the cover,

Take off the element

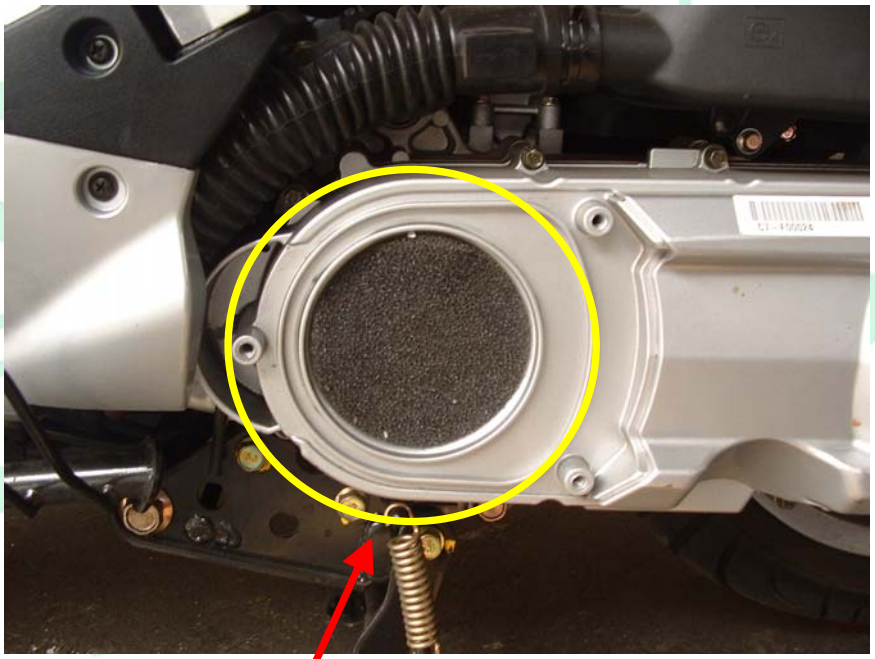


Don’t forget to install the black-rubber packing back to the element

CVT sponge

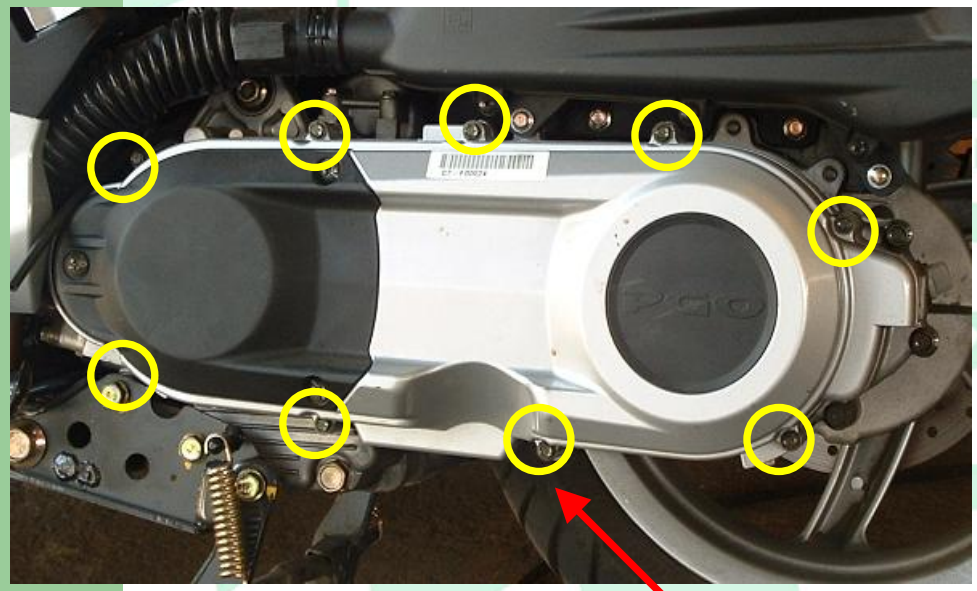


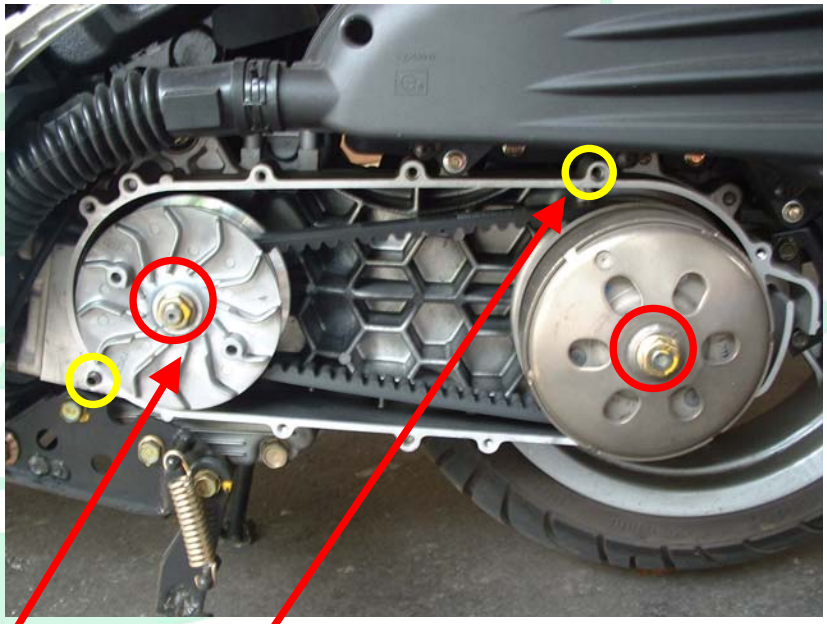
1. loosen 3 bolts
2. take off the sponge



Clean with compressed air, or replace a new one

CVT dismantle



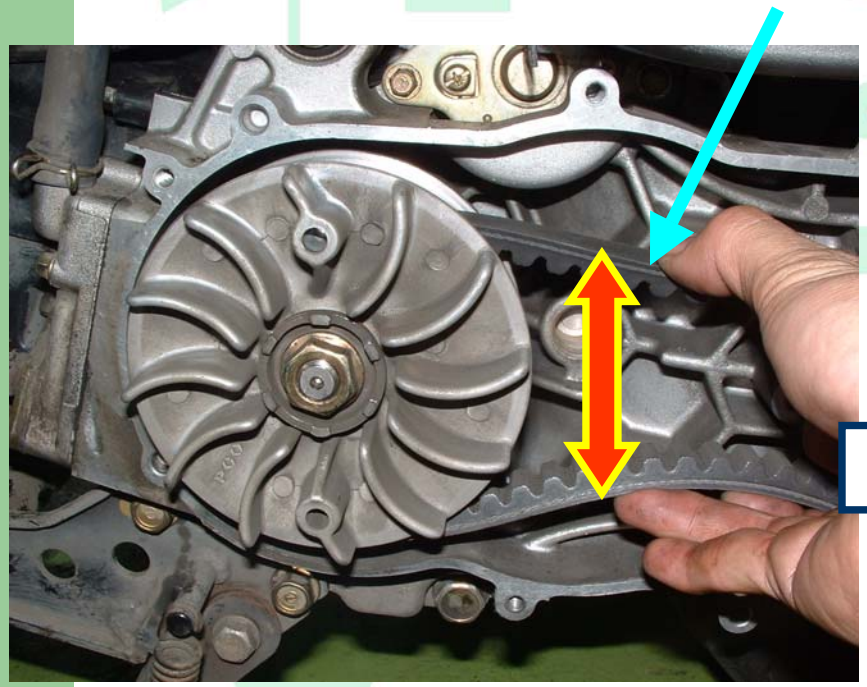


1. loosen the outer bolts
2. dismantle the cover
3. loosen 2 hexagon nuts

Don't miss the lock pin falling into the crankcase

CVT install notes:

1. keep the words of belt facing to operator
2. push the belt to bottom
3. lock the nuts



Spark plug

Dismantle the right lower cover

Loosen with the special tool

Spark plug: C7E(carburetor) or
CR7E(EMS model)

Ignition coil:

Dismantle the right lower cover

You can see the ignition coil clearly

Front brake system:

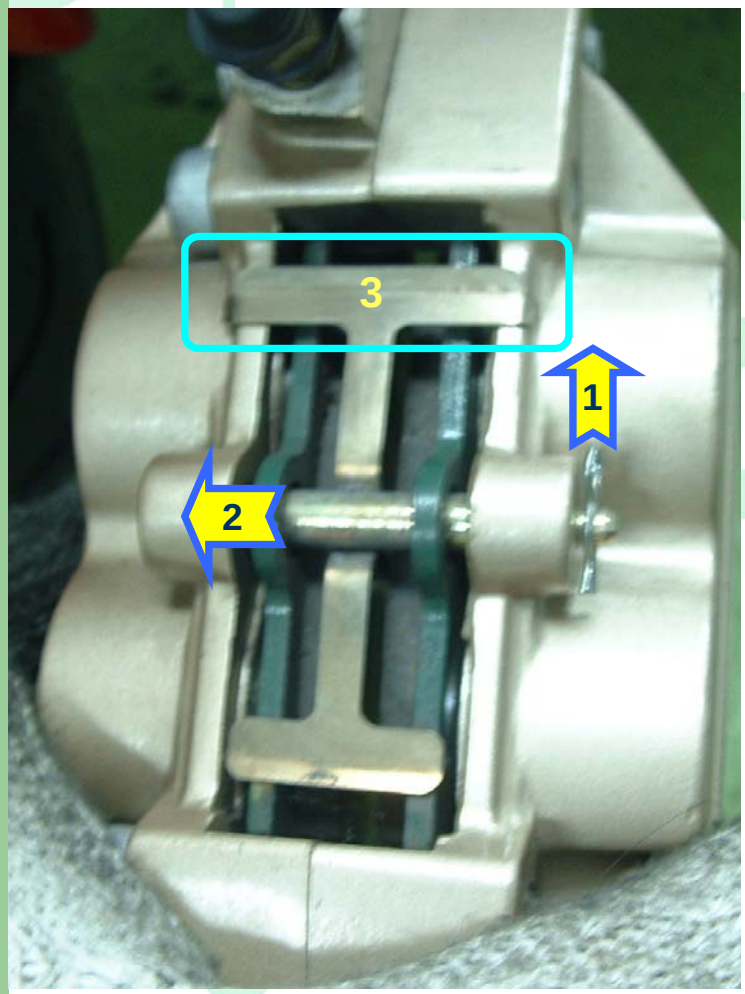
Service data:

◎tire pressure:**2.0 kg/cm²**

◎using limit of Disk thickness: **3.5mm**

◎ using limit of pad thickness: to groove

Replace the front pads



- dismantle
  1. dismantle clip
  2. take off the pin
  3. take off the yoke
  4. dismantle the pads

- install
  reverse procedure of dismantle

Front brake system:

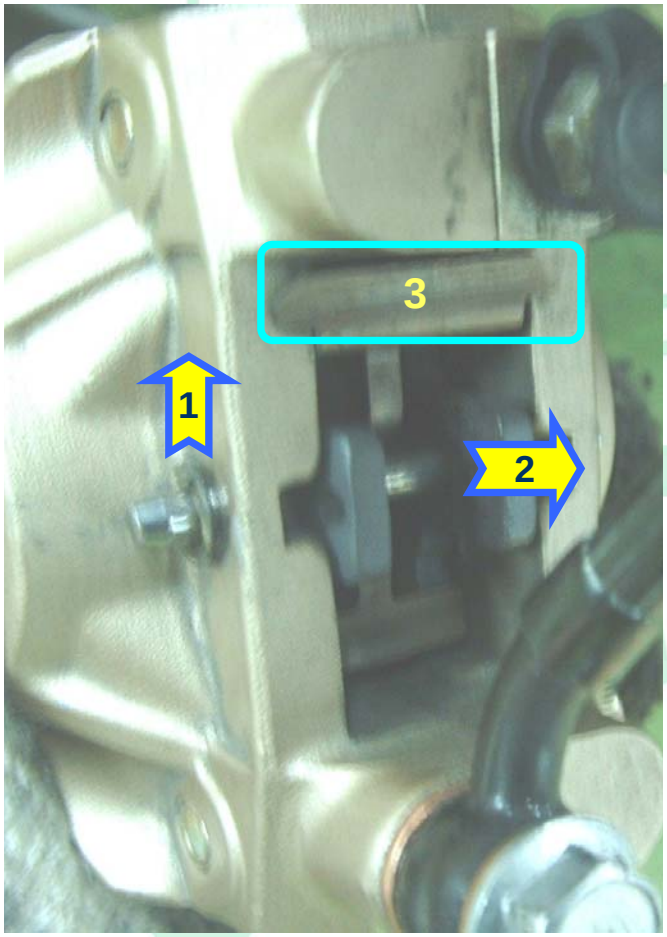
Service data:

◎ tire pressure:**2.0 kg/cm²**

◎ using limit of Disk thickness: **3.5mm**

◎ using limit of pad thickness: to groove bottom

Replace the rear pads



●dismantle

1.dismantle clip

2.take off the pin

3.take off the yoke

4.dismantle the pads

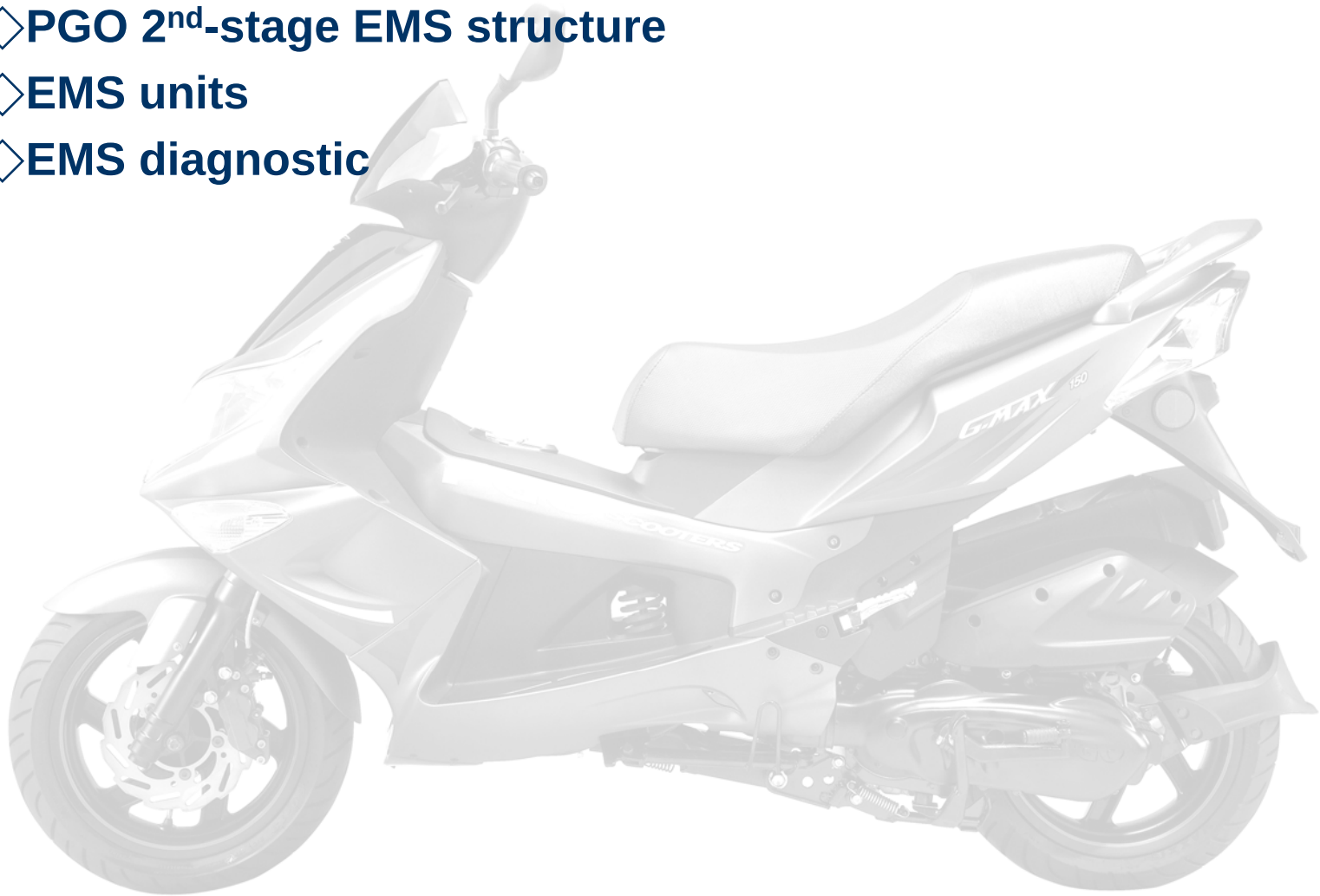
●install

reverse procedure of dismantle

6.5 Engine Management System (EMS)

EMS index

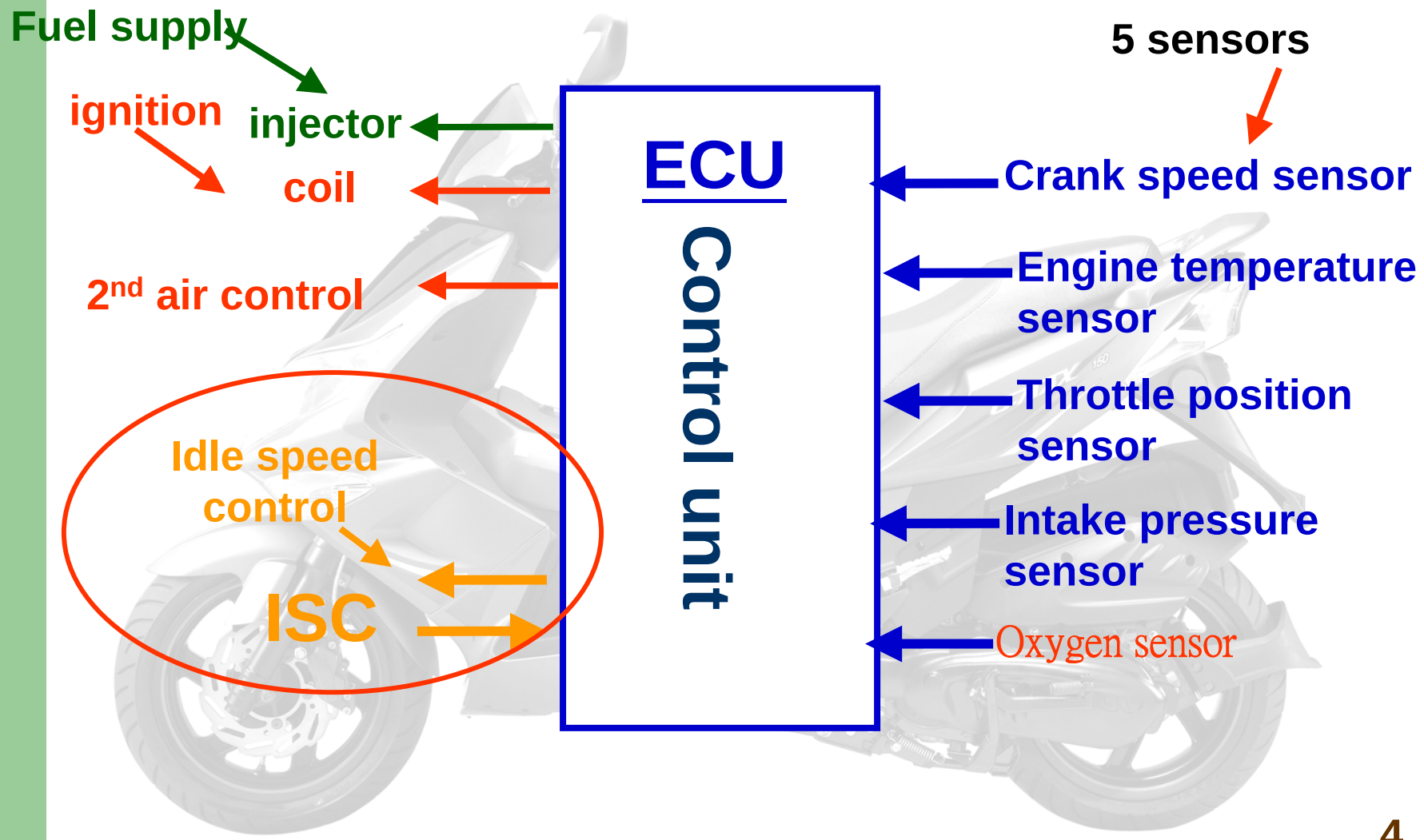
- ◇PGO 2nd-stage EMS structure
- ◇EMS units
- ◇EMS diagnostic



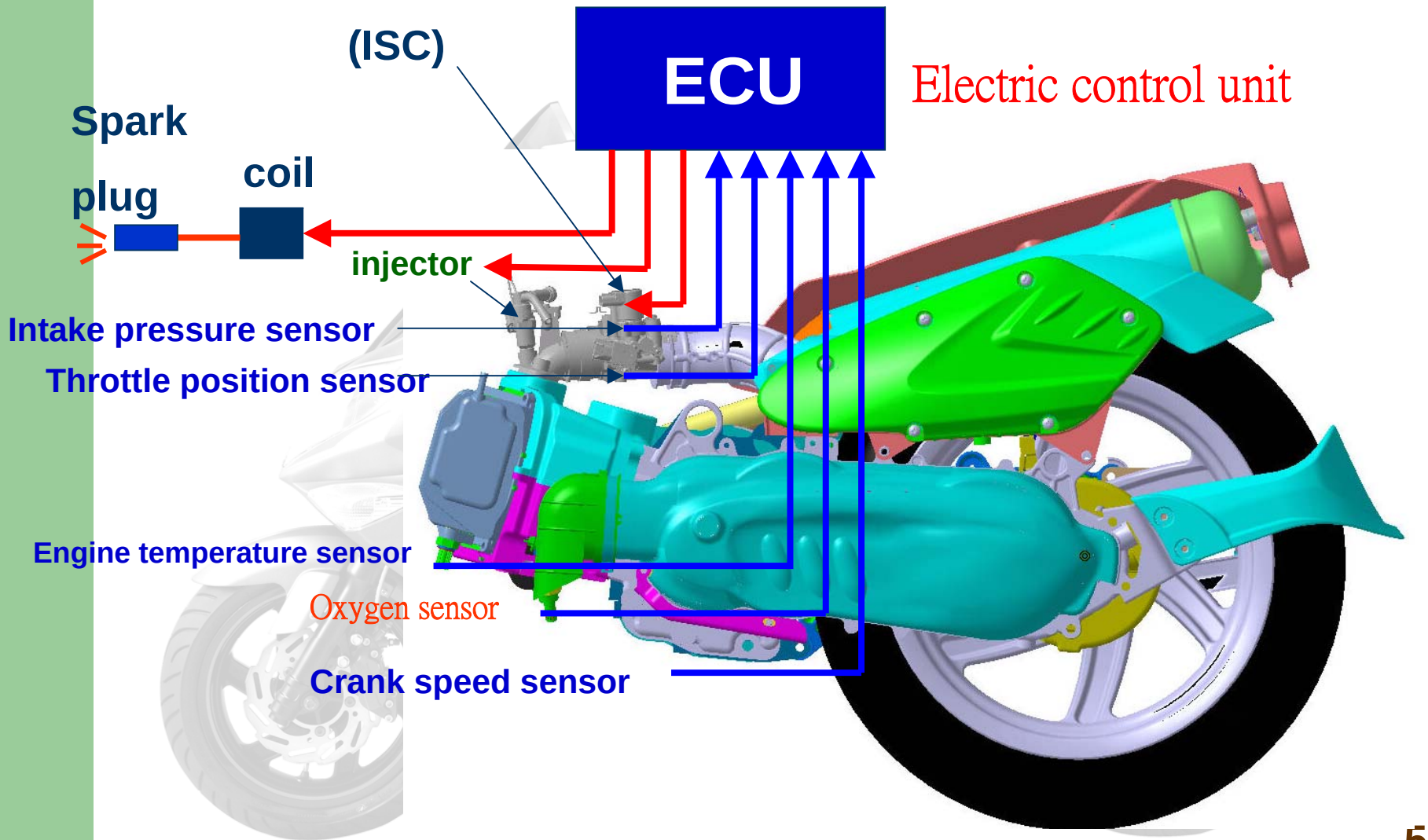
Feature of PGO 2nd-stage EMS

* feature
  1. small, light
  2. integrity
  3. accuracy
  4. simple

EMS structure (A)

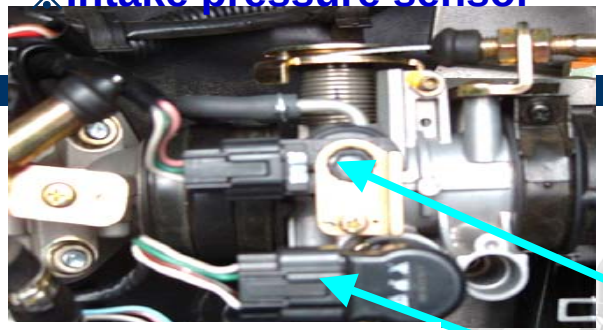


EMS structure (B)

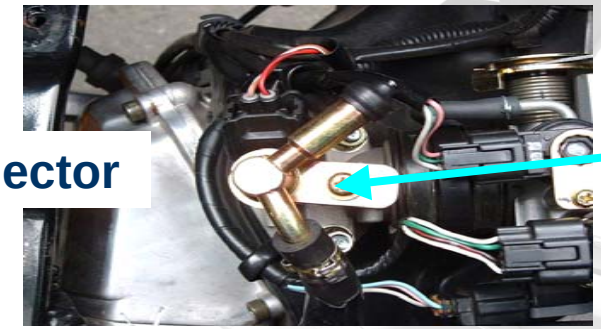


EMS units

※Intake pressure sensor

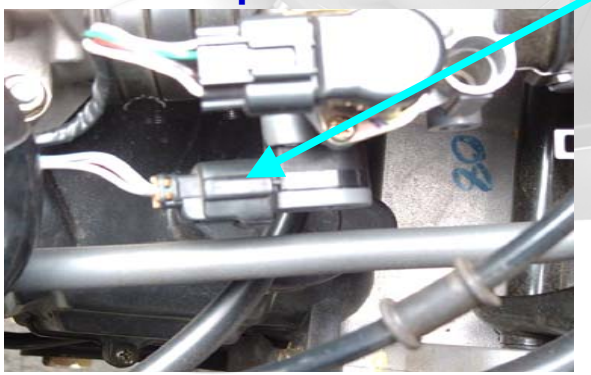


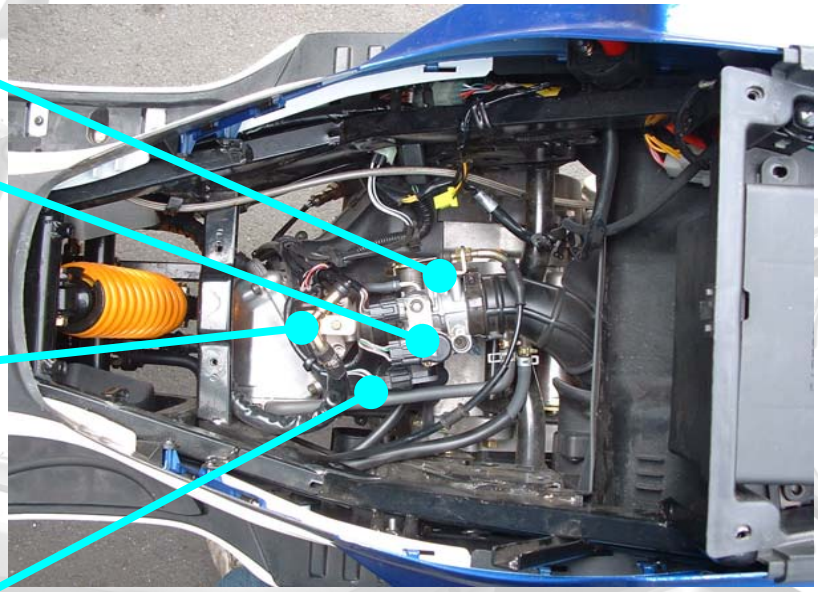
Idle Speed Controller



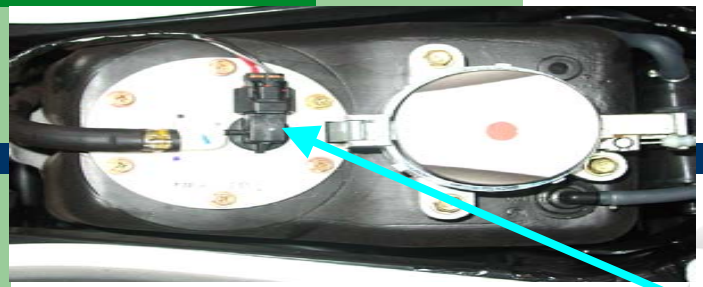
injector

※ Throttle position

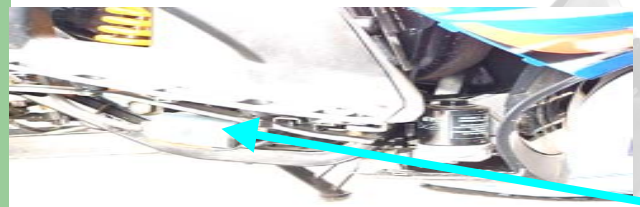




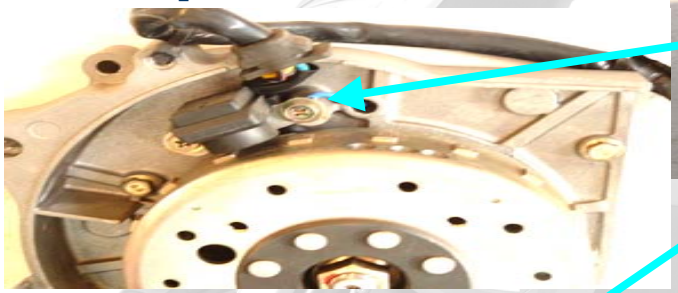
※Fuel pump Assy



※Transistor ignition coil comp

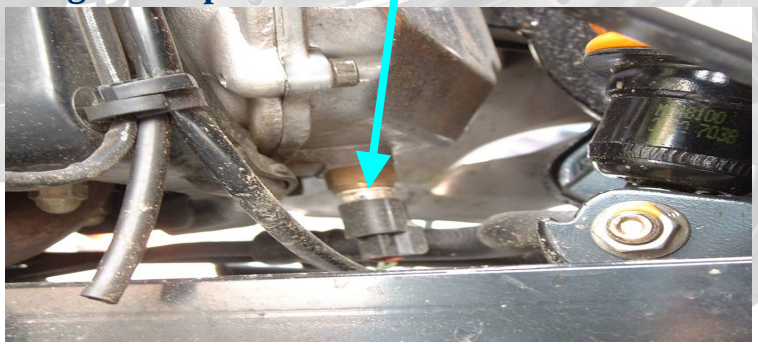


※crank speed sensor



※Oxygen sensor

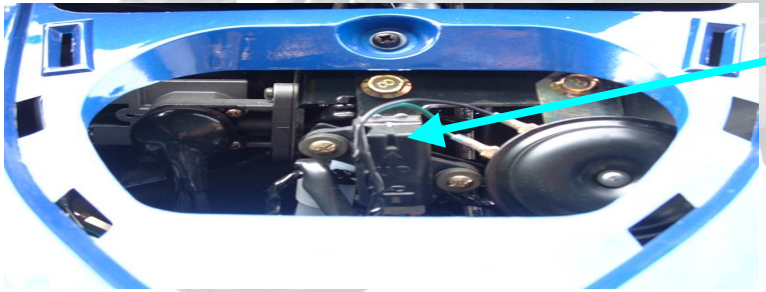
※Engine temperature sensor



※ **Second air solenoid**

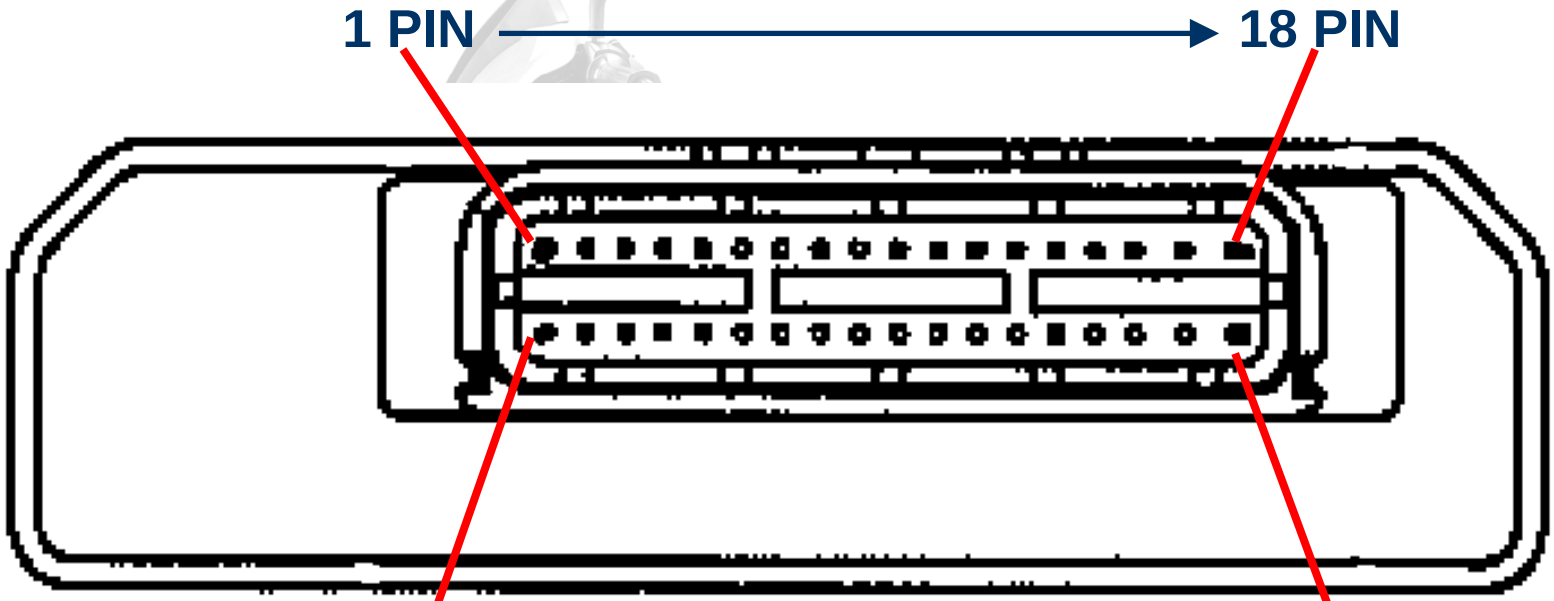
※ECU Electronic Control Unit

※ Topple snsor



Important PIN no.# of ECU

＊ECU (PIN)



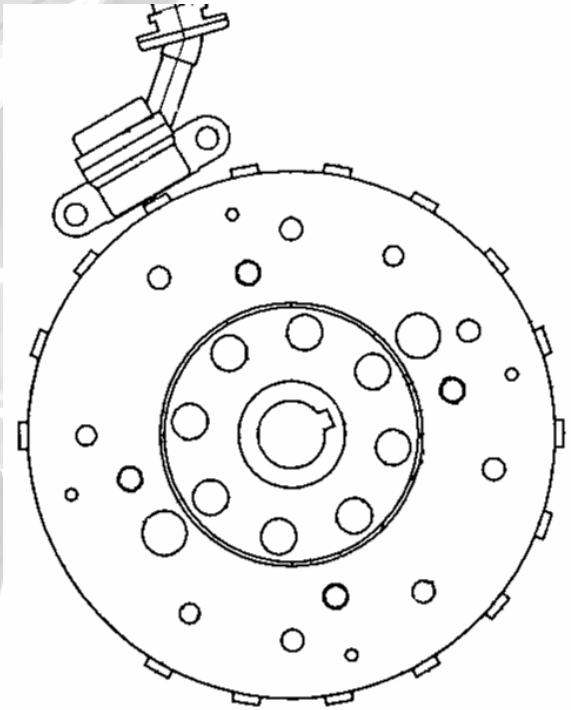
Important PIN no.# of ECU

* **Important PIN** no.# of ECU

PIN NO.	function
11.	Control pole of fuel pump
12.	Control pole of headlamp relay
13.	supply(5V) voltage to sensors
16.	Control pole of injector
18.	Control pole of coil
19.	Input voltage from battery

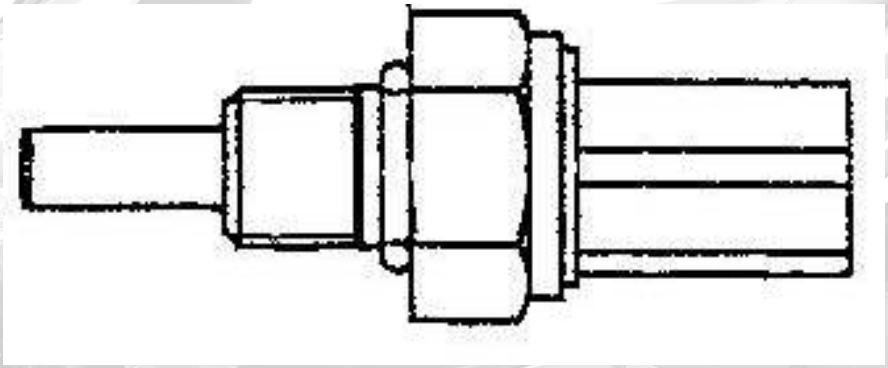
Function of Crank speed sensor

- function：induct the engine speed, tell ECU to control inject fuel & ignition
- theory：calculate the interval time of each flange on the outer



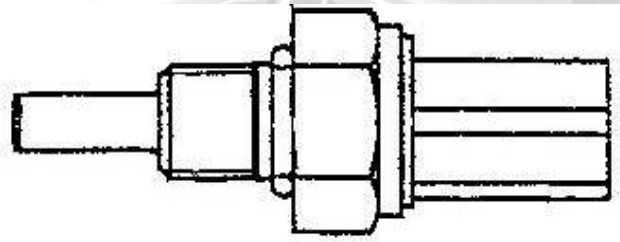
Engine temperature sensor

- function：induct engine oil temperature, then ECU knows engine is cold or hot
- theory：different temperature vary resistence



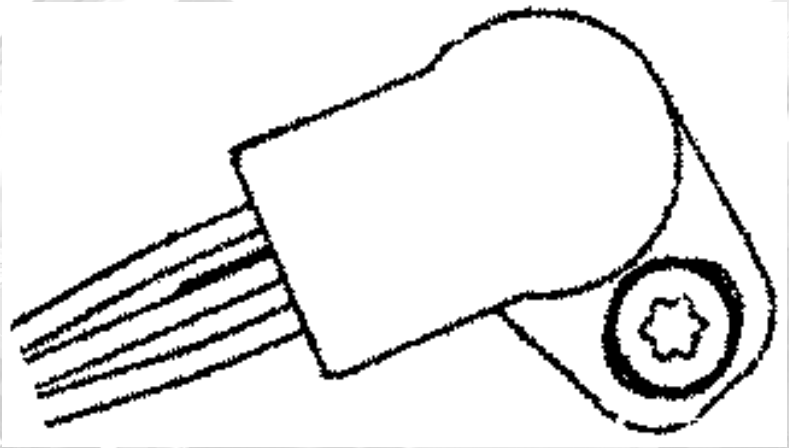
Measure engine temperature sensor

T(℃)	resistance(KΩ)
-20℃	18.800 KΩ
40℃	1.136 KΩ
100℃	0.155 KΩ
usually	1.5~5.5 KΩ



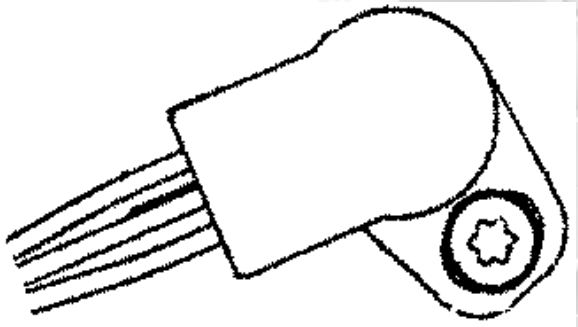
Throttle position sensor **(TPS)**

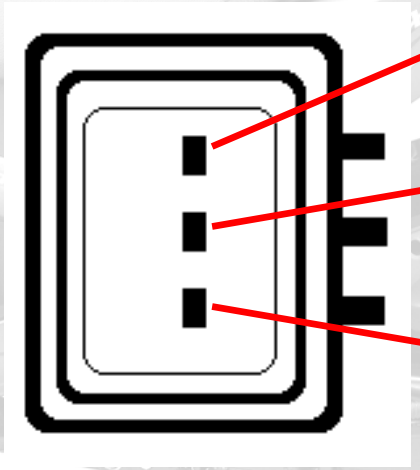
- function：induct throttle angle, provides the road load condition to ECU
- theory：angle changes, resistance changes!



Throttle position sensor **(TPS)**

throttle	Lb(+) / Gr(-) output(V)
close	0.6 ±0.02V
WOT	3.8 ±0.10V





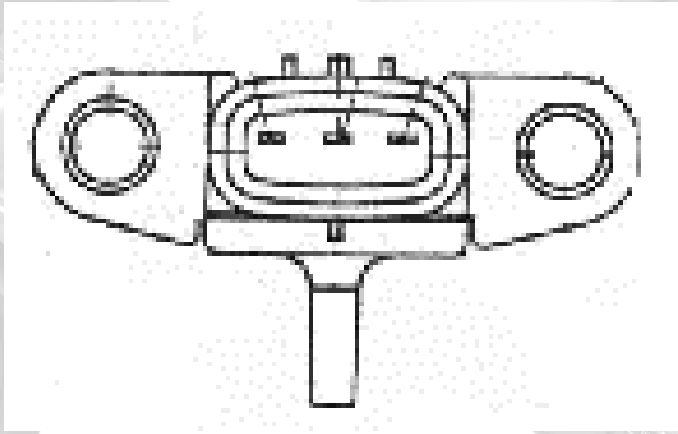
＊Lb <output>

＊Pu <power(5V)>

＊Gr <ground>

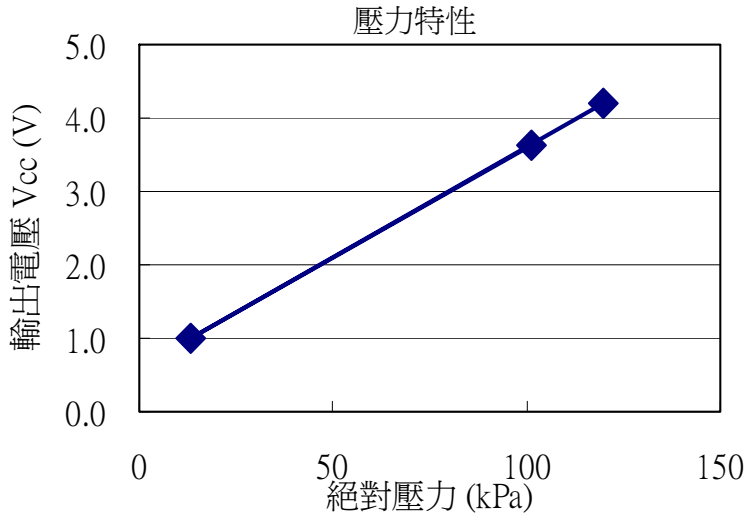
Intake pressure sensor

- function： induct intake air pressure, ECU judge intake or compress stroke to decide injection & ignition
- theory：different pressure outputs diferent resistance



Intake pressure sensor

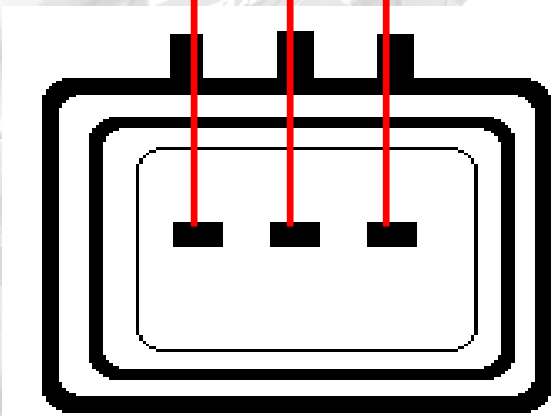
press(KPa)	G/B(+) / Gr(-) output(V)
13.3KPa	0.5V
120 KPa	3.4V



＊Pu
<output(5V)>

＊G/B
<output>

＊Gr
<ground>



Intake pressure sensor

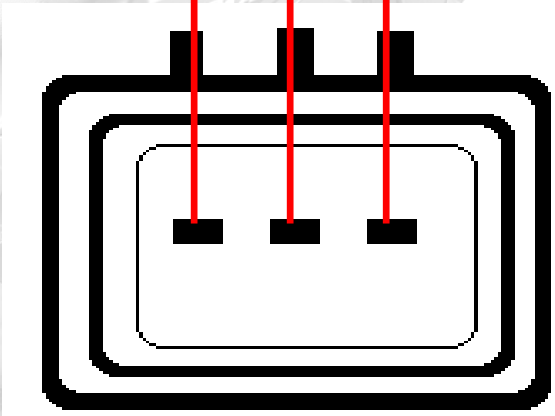
＊average resistance in ambient

wire	R(KΩ)
Pu(+)+Gr(-)	2~4KΩ
G/B(+)+Gr(-)	2~4KΩ

＊Pu
<output(5V)>

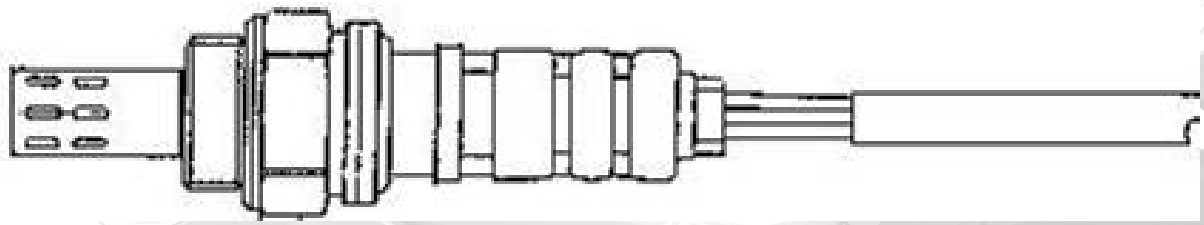
＊G/B
<output>

＊Gr
<ground>

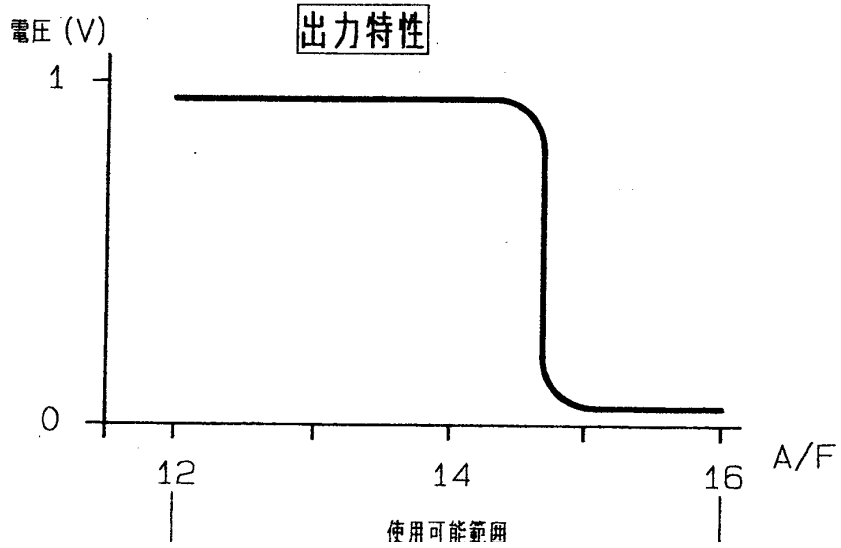


Oxygen sensor

- function：induct the A/F ratio, feedback to ECU , and decide the injection time; modify to the best 14.7 ratio
- others：there is heater inside, help it reach the working temperature quickly



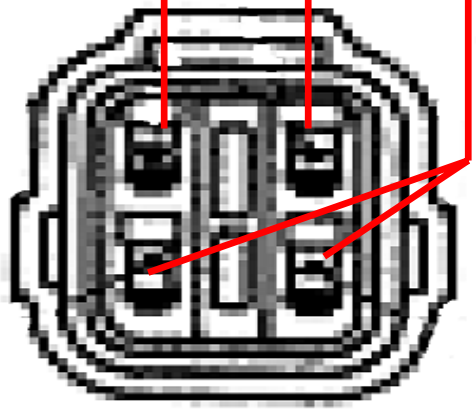
Oxygen sensor



＊W
<heater(12V)>
2 couple~8Ω

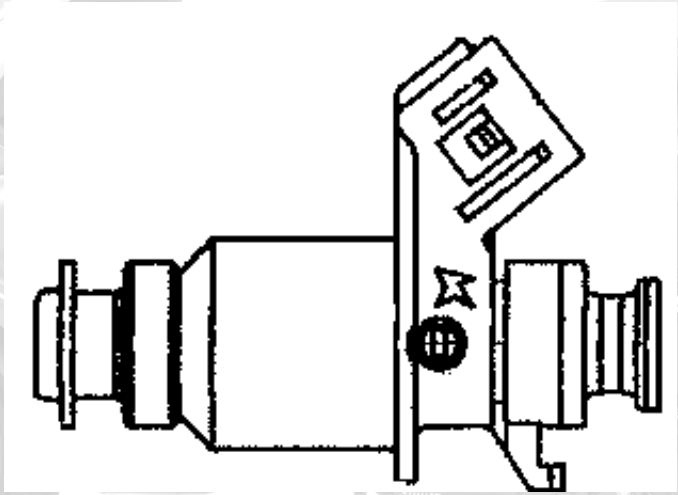
＊Gr
<ground>

＊B
<output>

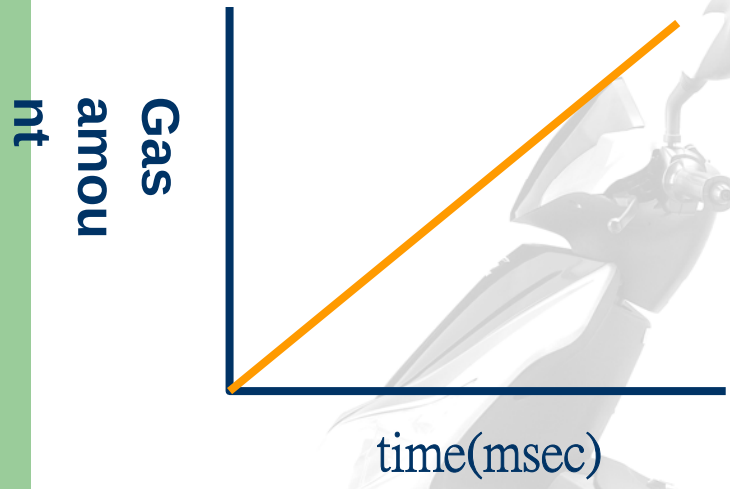


injector

＊function：inject the gas, mixed with air＊
theory：control the opening time interval to decide the gas amount



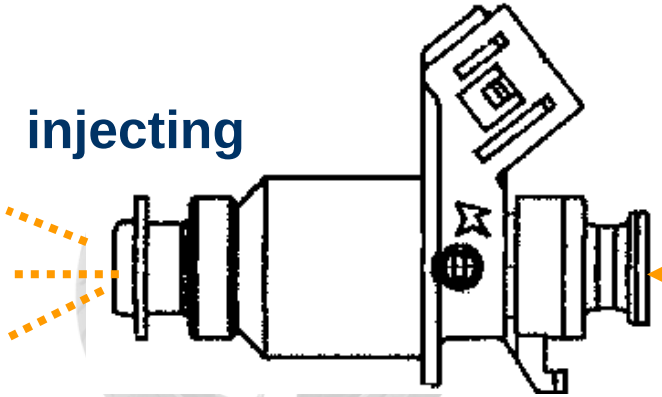
injector



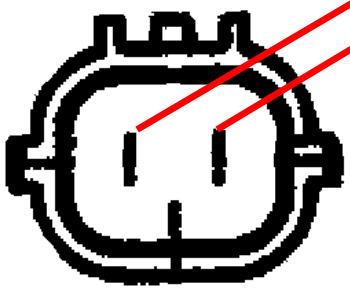
∗R/B(+)
<output(12V)>

∗Br/W(+)
<output(12V)>

∗each terminal virus ground is 12V



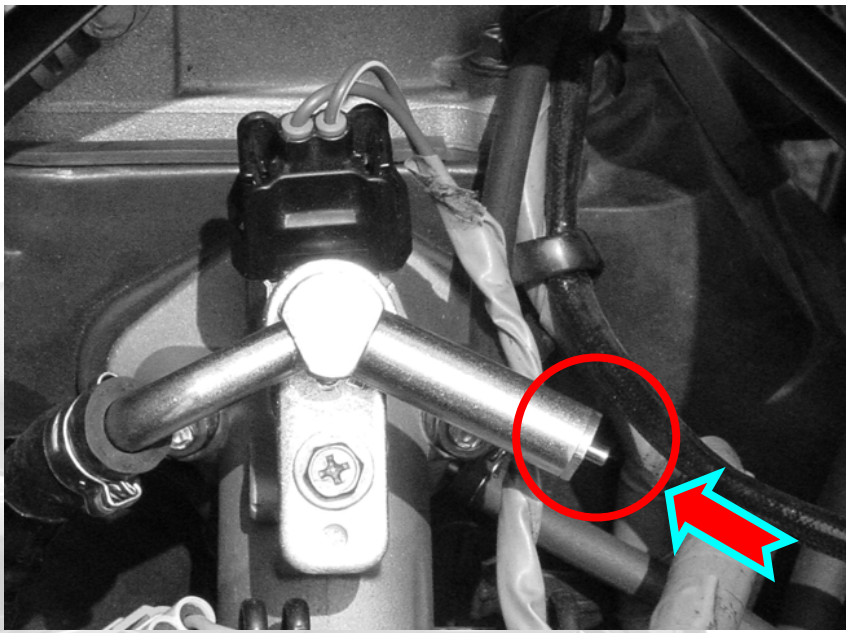
feeding



Draining cap of injector

＊bleed the air

Used when replace the fuel pump, pipe…etc.

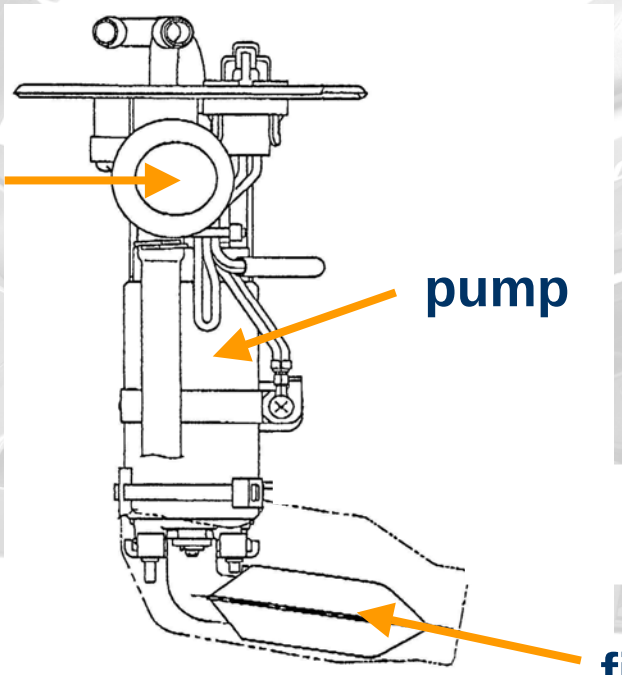


＊drain the gas

The gas inside the pipe may become poor quality after storage, drain it before start the engine

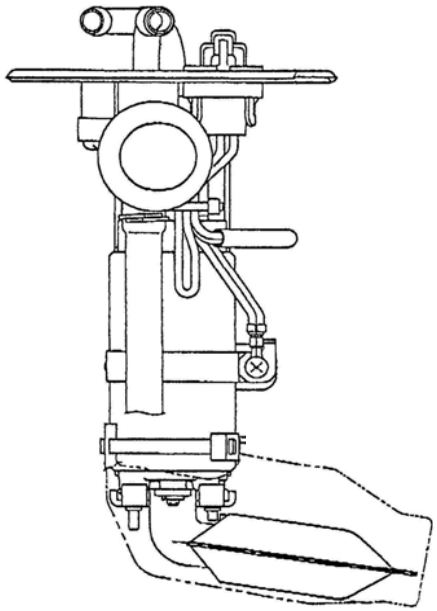
Fuel pump

* function：pumping the gas to injector, and keep the constant pressure as **3kgf/cm²**
* theory：the regulator keeps constant pressure



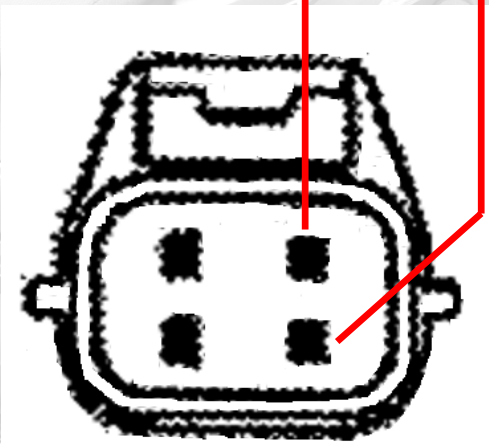
Fuel pump

	R/B(+)+B(-)
voltage	~12V
resistance	<1KΩ



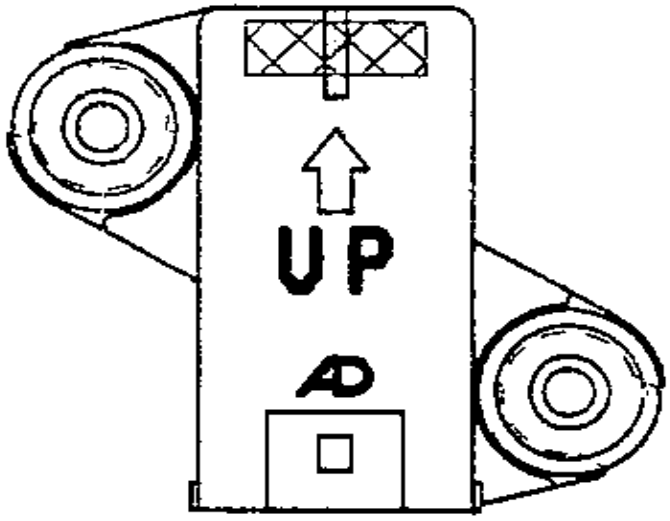
＊R/B(+)
<output(12V)>

＊B(-)
<ground>



Fall down sensor

- function：when vehicle fall down more than 65degree, then EMS cut off the power and cease the engine
- theory：there is ball mechanism inside the sensor, act by gravity and conduct the wiring.



Fall down sensor

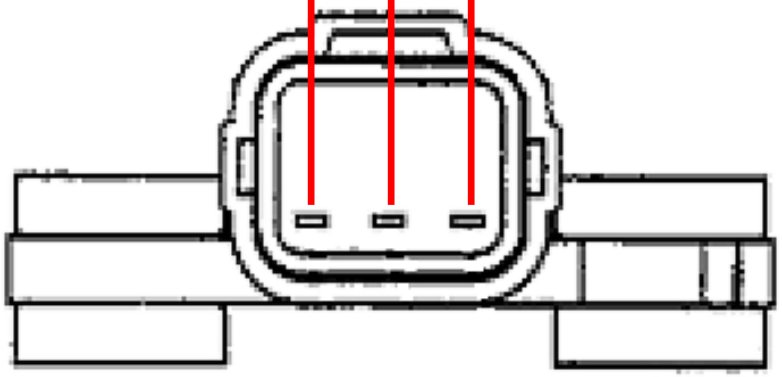
power	degree	output(+) +ground(-)
OFF	any	OFF
ON	<65	ON
ON	>65	OFF

＊to recover the sensor function after fall down：

1.turn OFF the key

2.turn ON the key

＊O
<input(12V)>
＊Bl/W
<output>
＊B
<grounding>

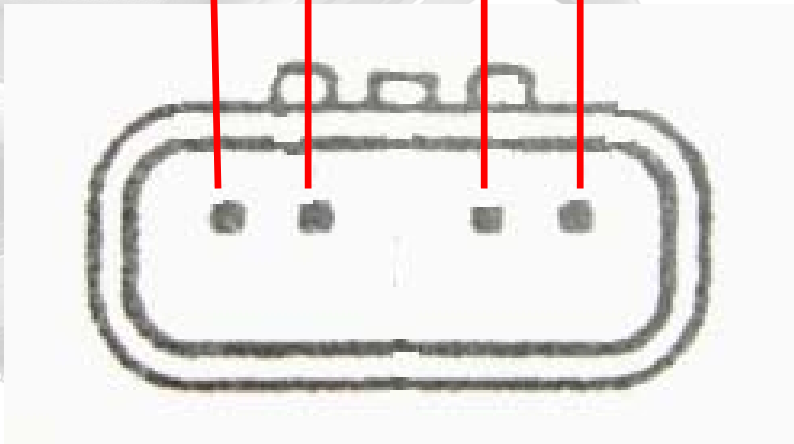


ISC(Idle Speed Control)

＊ISC unit

	R
A(+) + A*(-)	~80Ω
B(+) + B*(-)	~80Ω

＊W
<ISC-A*>
＊R/B
<ISC-B*>
＊G
<ISC-B>
＊Gr
<ISC-A>



ISC(Idle Speed Control)

∗what is ISC ?

(IDLE SPEED CONTROL)

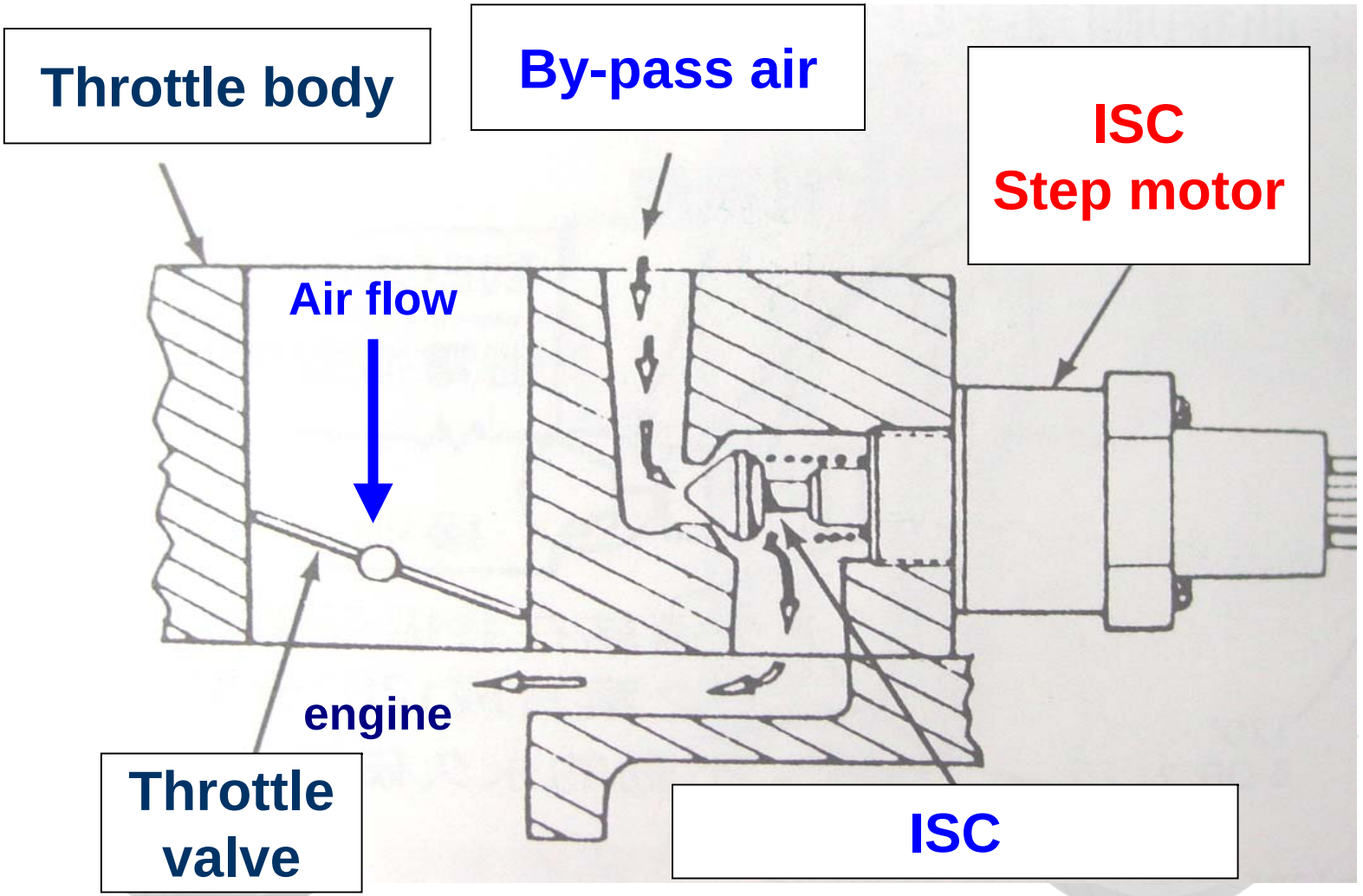
∗control method of ISC

when engine is at idle, ECU refer the sensors and decide how much air is required, then tell the ISC to act forward or backward.

∗sample

when cold engine, ECU tell ISC enrich the by-pass air to increase the engine speed. After warm-up, ECU tell ISC reduce the by-pass air to decrease the engine speed.

ISC(Idle Speed Control)

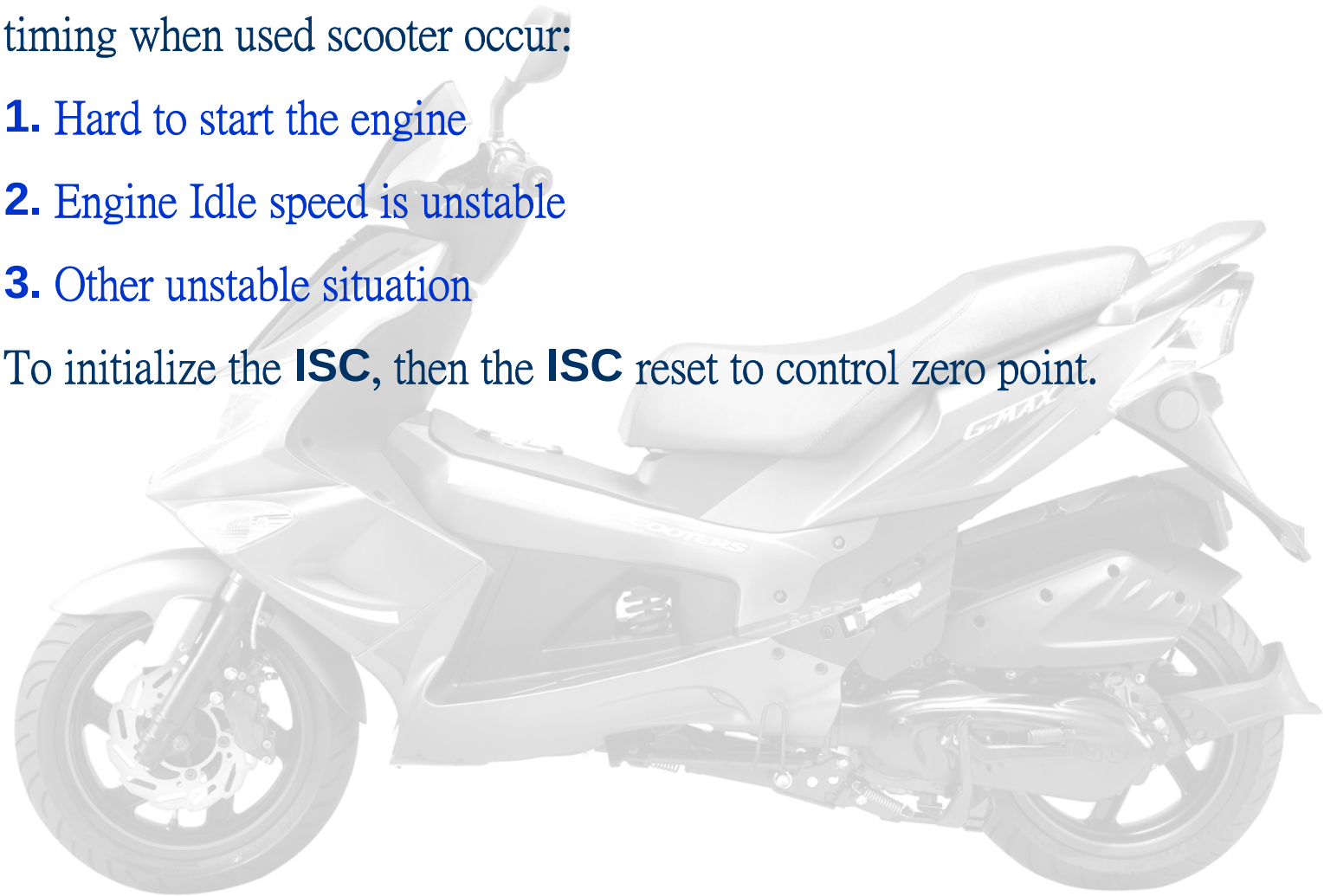


ISC initialization timing

＊timing when used scooter occur:

1. Hard to start the engine
2. Engine Idle speed is unstable
3. Other unstable situation

To initialize the **ISC**, then the **ISC** reset to control zero point.



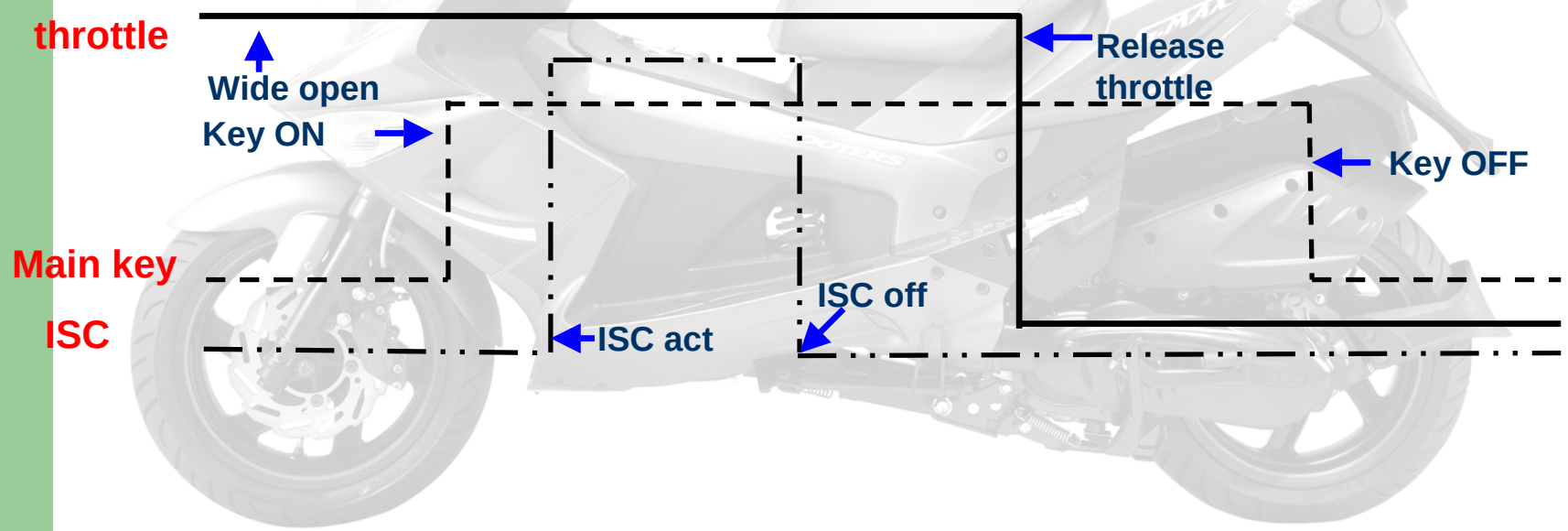
Procedure of ISC initialization

1.don't plug quick- diagnostic

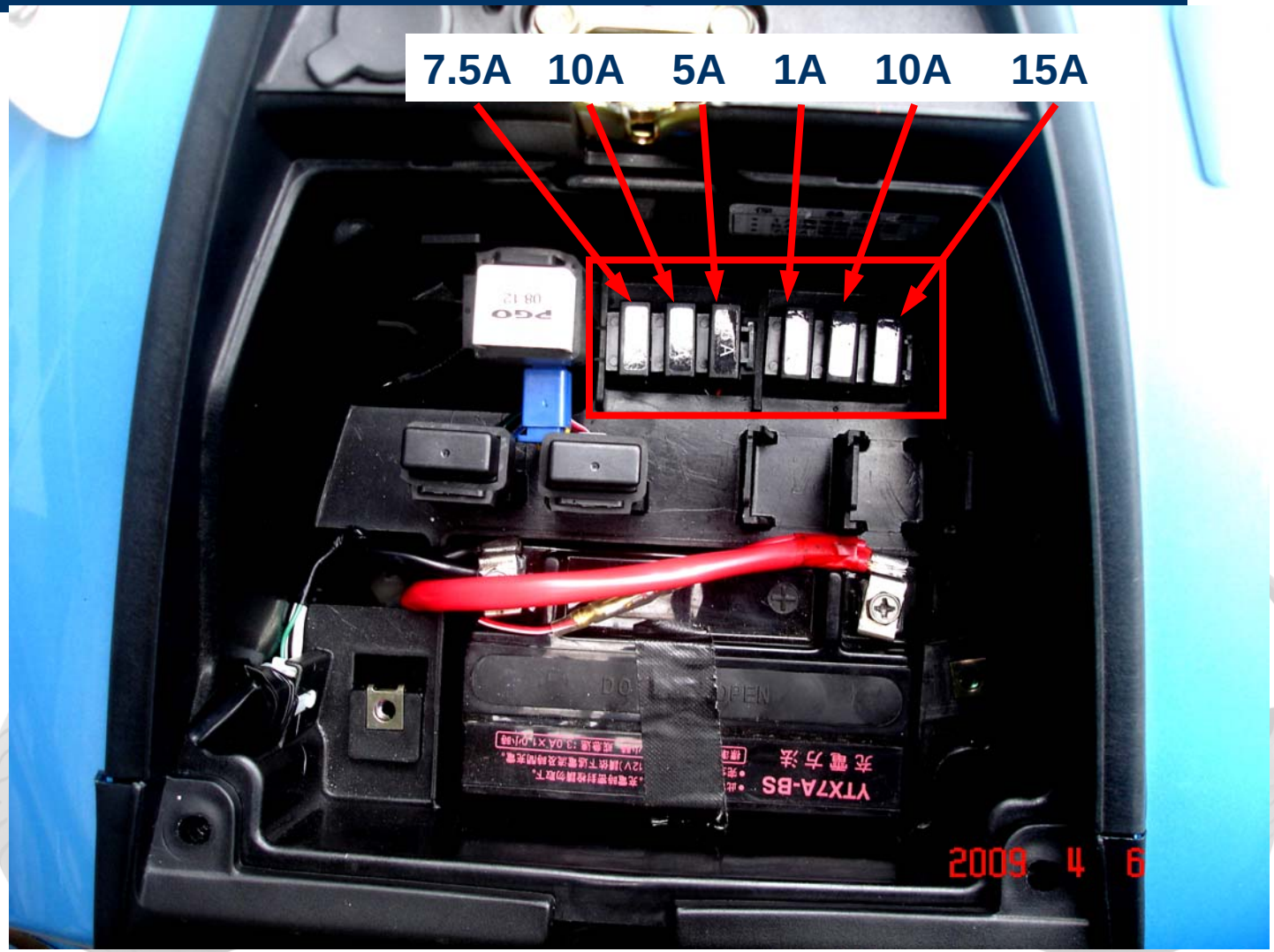
2.wide open throttle; turn on the key; the **ISC** sounds "da da…"

3.release the throttle after the **ISC** stop acting.

4.turn off the key, finish initialization!



EMS fuses



Main purpose of EMS fuses

＊ (FUSE) 1A / 5A / 7.5A / 10A / 15A

protect the units when extra-current occurs

1A <Y+G/B> ： protect the (ECU)

5A <R/W+G/B> ： protect fuel pump & injector

7.5A <O+G/B> ： protect ignition wiring(EMS)

10A <O+Dg> ： protect EMS system wiring

15A <R/W+R/W> ： protect whole vehicle wiring

6.6 EMS **diagnostic**

Quick diagnostic

part no.：**S320840G01**

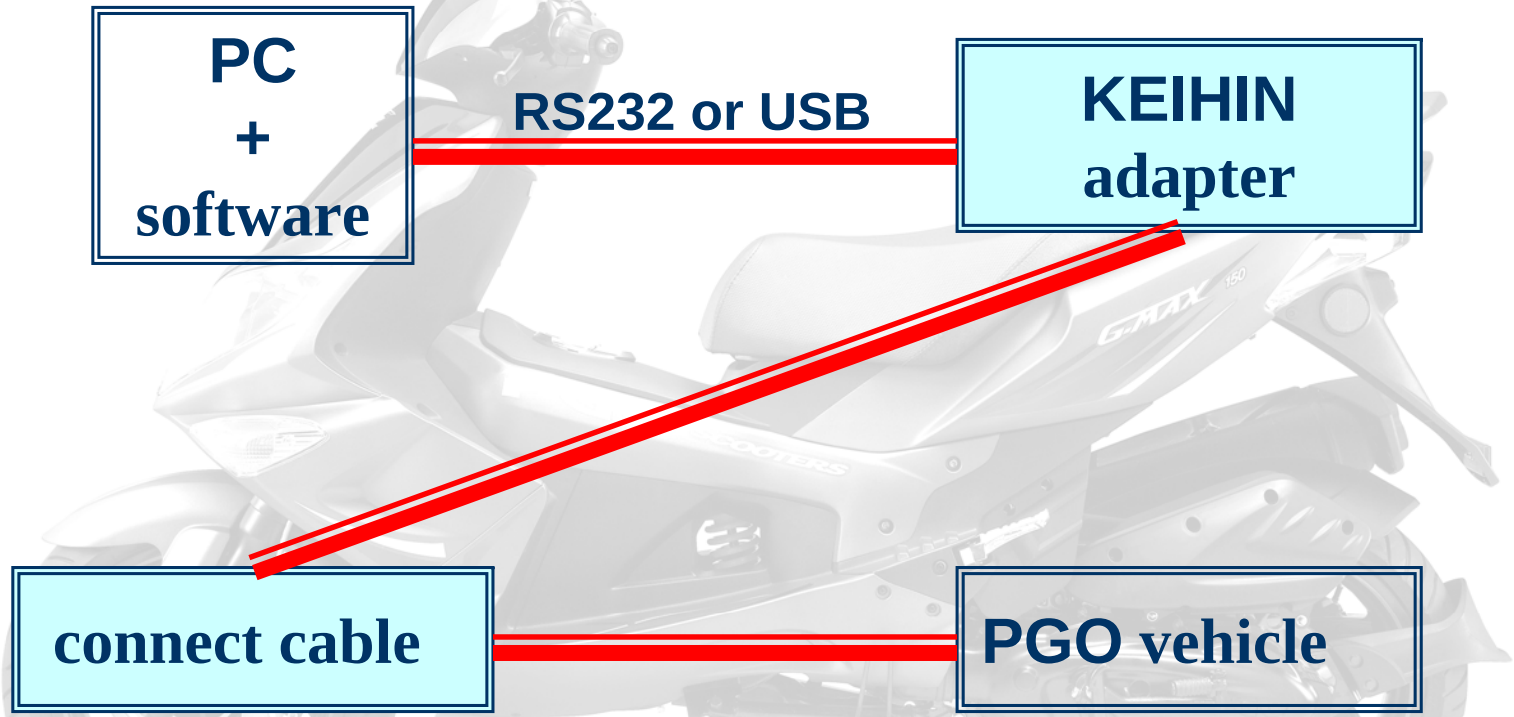
name：quick diagnostic

How to use quick diagnostic

1. Prepare quick diagnostic
2. Open the rubber cover beside the battery
3. Plug in the quick-diagnostic
4. turn on the key
5. wait for about 8 seconds
6. observe the EMS led on dash board

PC diagnostic

PC diagnostic assy.： **S320891G01 + S320838G01**
(software & adapter + connect cable)



PC diagnostic

part number：**S320891G01**

name： (software & adapter)

＊software

＊adapter

PC diagnostic

part number：S320838G01

name：connect cable

Quick diagnostic table

part	Defect code
Throttle position sensor	0 long 6 short
Intake manifold pressure sensor	0 long 9 short
Engine temperature sensor	1 long 1 short
Oxygen sensor	1 long 7 short
injector	3 long 3 short
Ignition coil	3 long 7 short
Fuel pump	4 long 1 short
Heater of oxygen sensor	4 long 5 short
ISC motor	4 long 9 short
Crankshaft position sensor	6 long 6 short
ECU	Always on
System is all right!	Always off

Clear the defect code memory

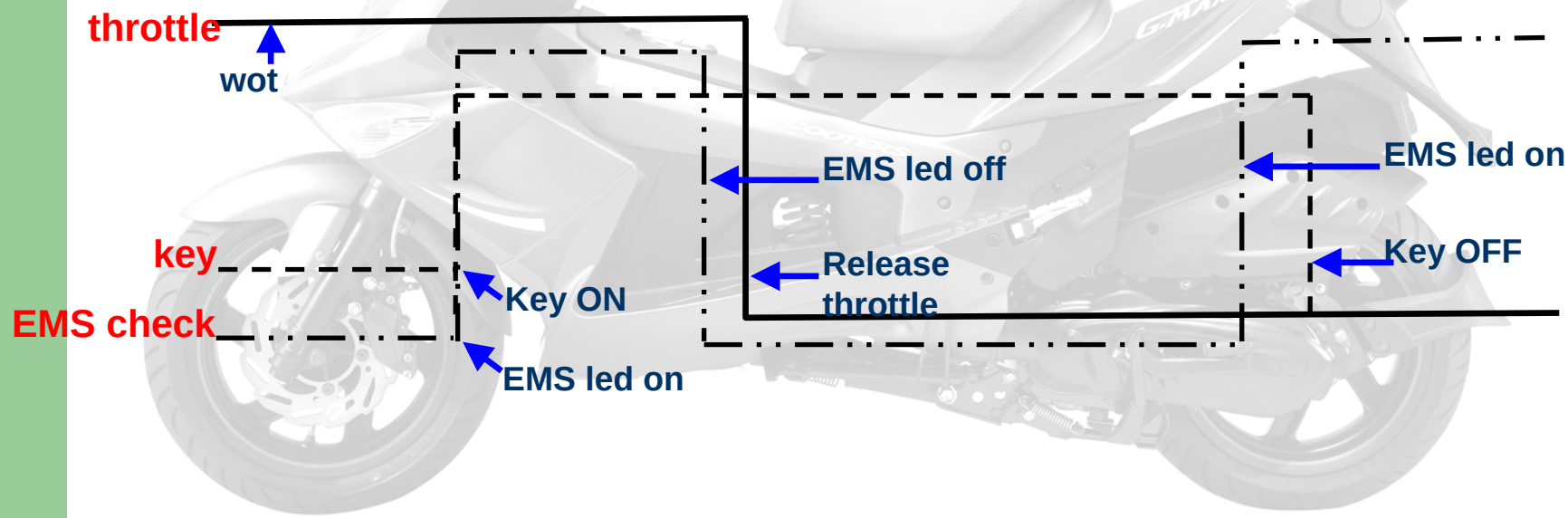
1.plug quick diagnostic into vehicle seat

2.wide open the throttle, turn on the key

3.after the EMS led off, release the throttle

4.don't turn off the key until EMS led on again.

5.turn on the key to confirm again.



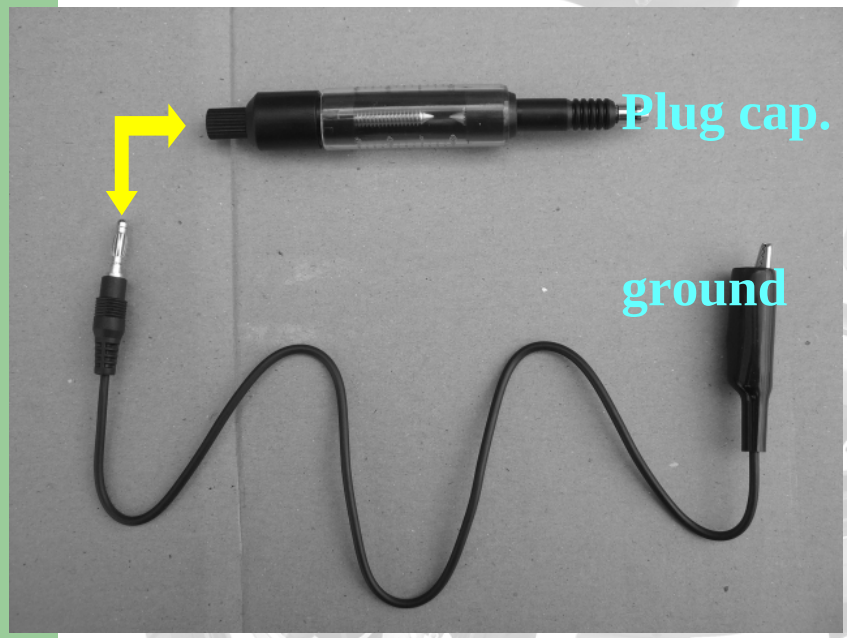
6.7 EMS system Repairing tool

pocket tester wiring

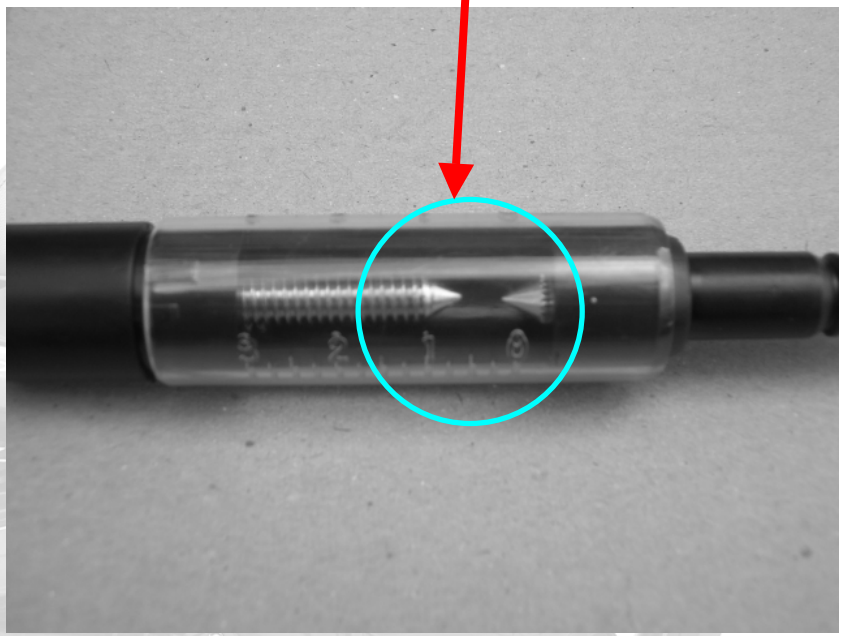
＊pocket tester wiring
part no.：S905310005

Ignition gauge

∗connect



∗minimum distance 6mm



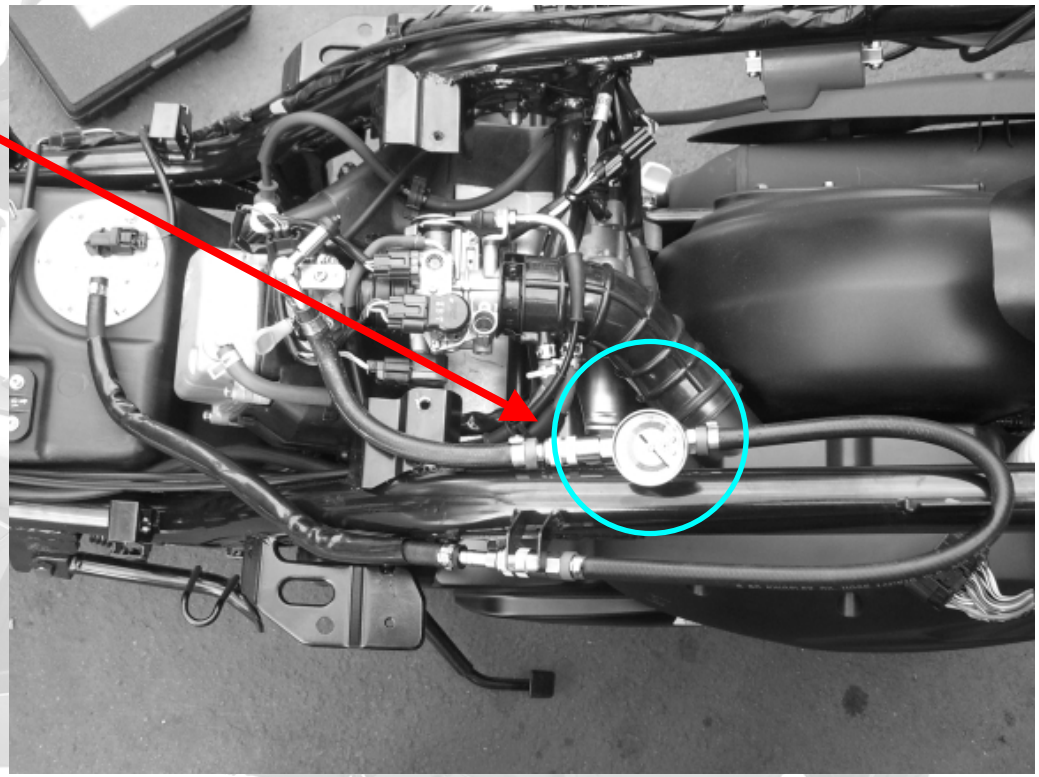
Fuel pressure gauge

＊fuel pressure gauge
part no.：S905330008

Connect to the vehicle

＊measure the fuel pressure
standard 3kgf/cm²

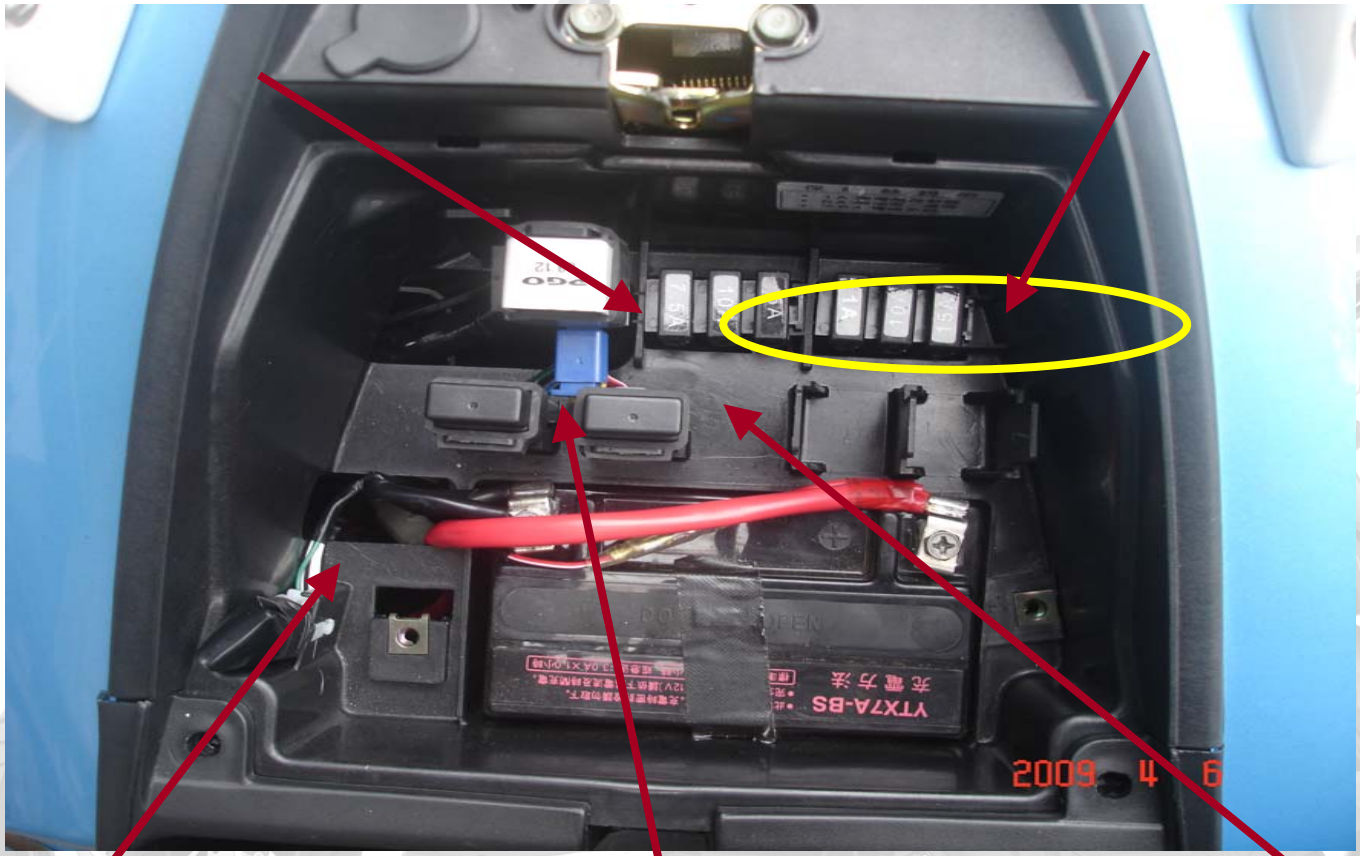
＊usage
1.dismantle the hose to injector
2.connect the gauge assembly to the pipe
3.turn on the key
4.read the pressure



6.8 General Electric units

Storage light controler

fuse



diode

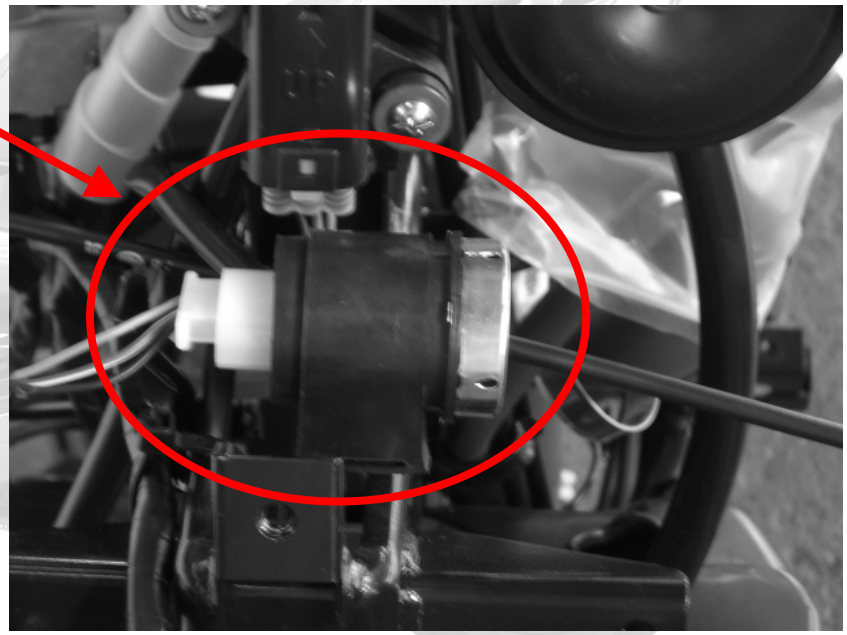
Fuel pump Assy & fuel jet relay

relay

Signal flasher relay (LED)

∗ within the leg-shield cover

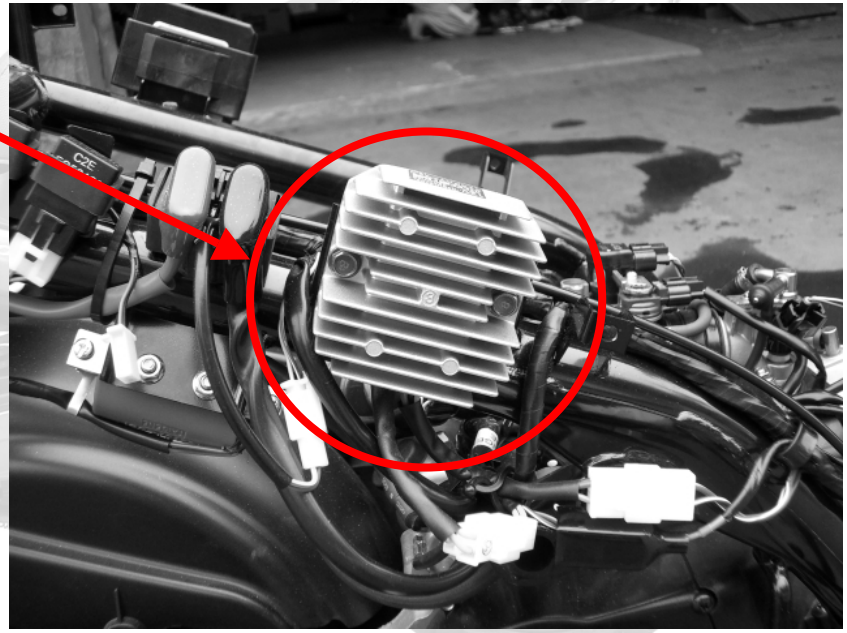
∗ dismantle the leg-shield cover first



regulator

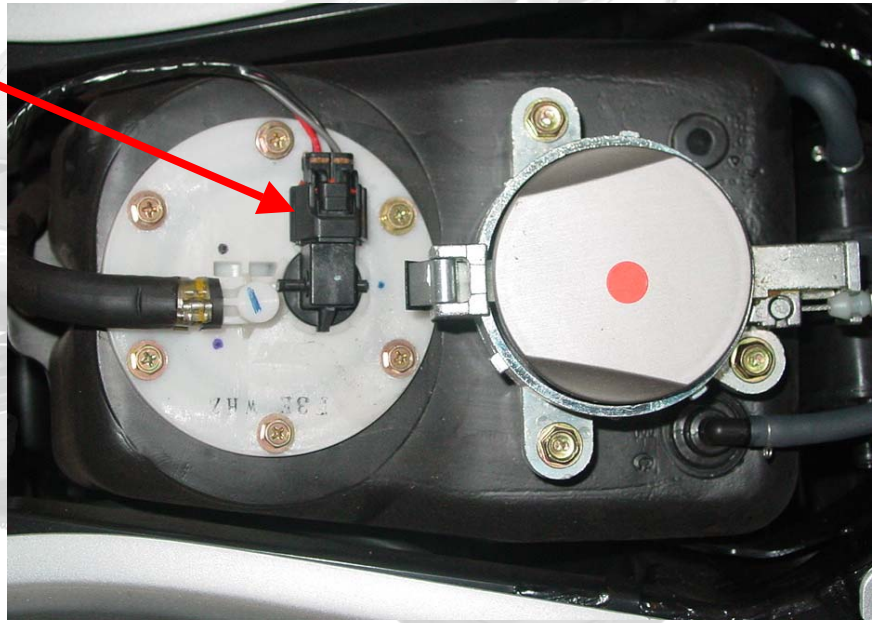
∗within the right body cover

∗dismantle 1.luggage comp.
2 rear rack
3.body cover



Fuel gauge

∗dismantle 1.middle cover

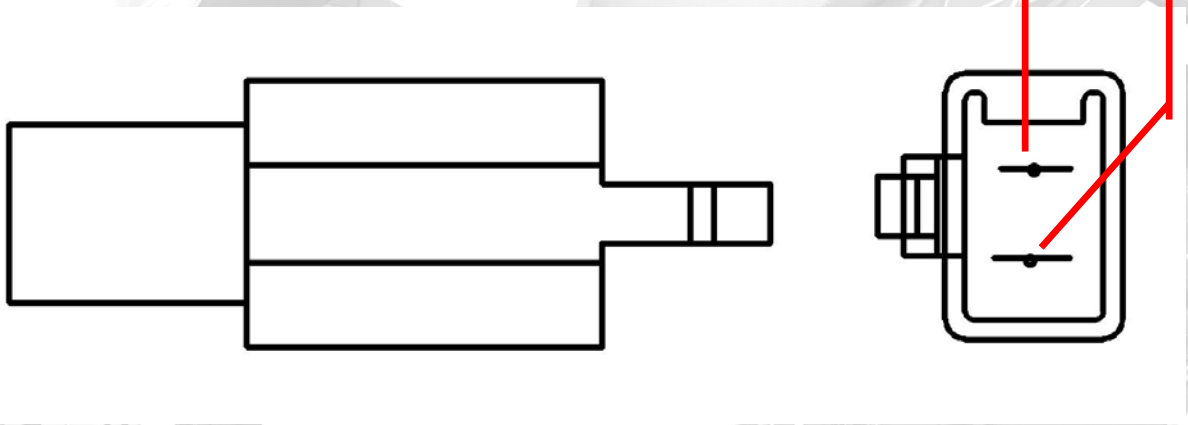


∗below the **middle cover**

Measure the fuel gauge

	gray(+)+black(-)
F	4~10Ω
E	80~90Ω

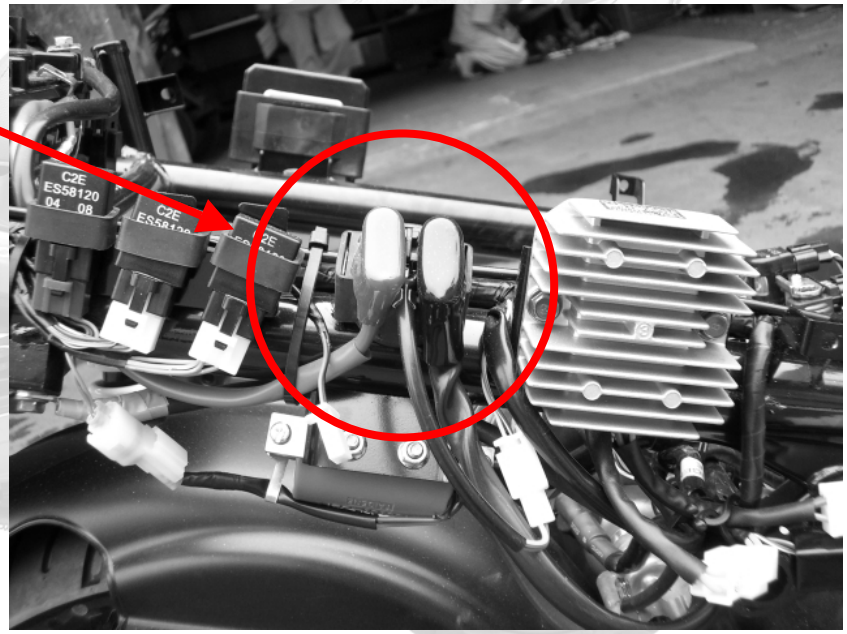
＊gray(+)
<output>
＊black(-)
<ground>



Starting relay

＊within the right body cover

＊dismantle 1.luggage comp.
2.middle cover
3.rear rack
4.body cover



(F)Front brake

1. Disassembling and assembling of the front brake comp.

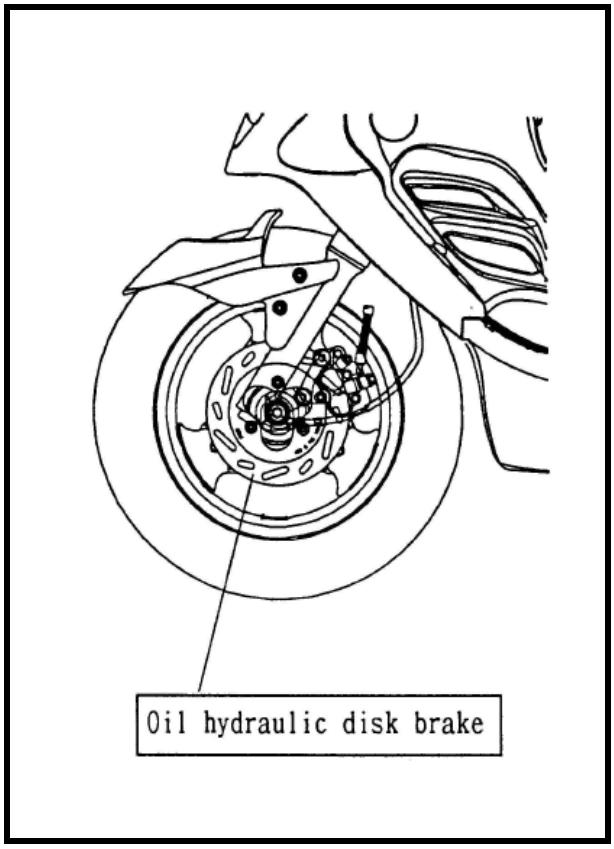
a. Remove two bolts fixed on the front brake comp and the front fork.

b. Remove the front brake comp.

c. Assemble the front brake comp. Follows the opposite procedure of dismantling.

Locking Torque:

M8: 2.0~3.0kg-m



2.Air releasing of the front brake comp

The procedure of air releasing

a .Fill the enough brake oil to the container

b. Do not let the brake oil overflow from the master cylinder or container when assemble the master cylinder cover.

c. Put the spanner upon the drain screw.

d. Lock and unlock the screw several times to release the bubbles.

e. Operate slowly the brake lever several times.

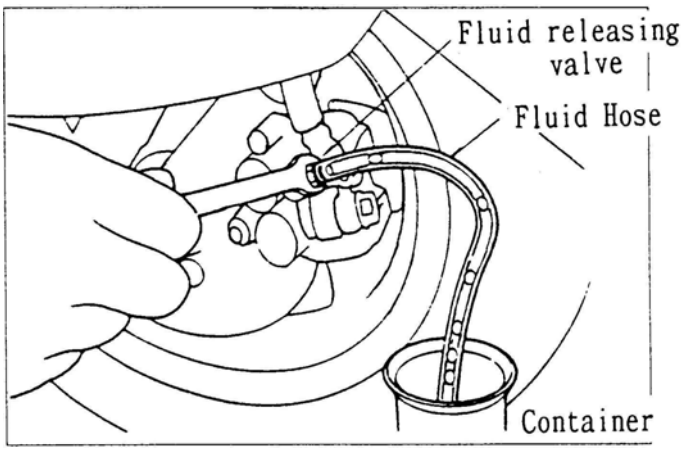
f. Clamp the brake lever to the end.

g. Loose the drain screw, then open the lever completely.

h. Locking the drain screw and then loose it when the lever is opened completely.

i. Repeat above procedure until all the air in the brake system has been released Completely.

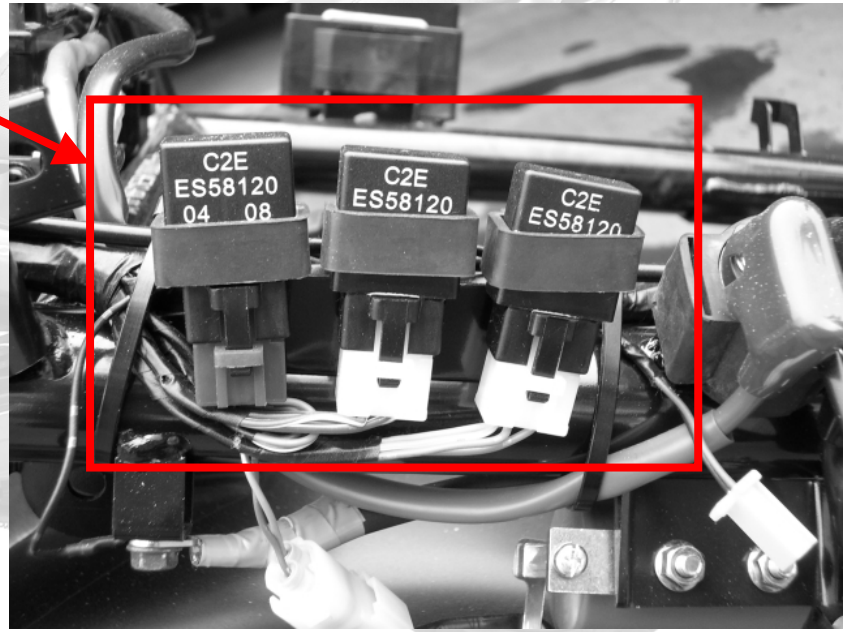
Locking torque of leaking screw: 0.6 kg-m



EMS relays

＊within the right body cover

＊dismantle 1.luggage comp.
2.middle cover
3.rear rack
4.body cover



EMS relays wiring

∗A.EMS system

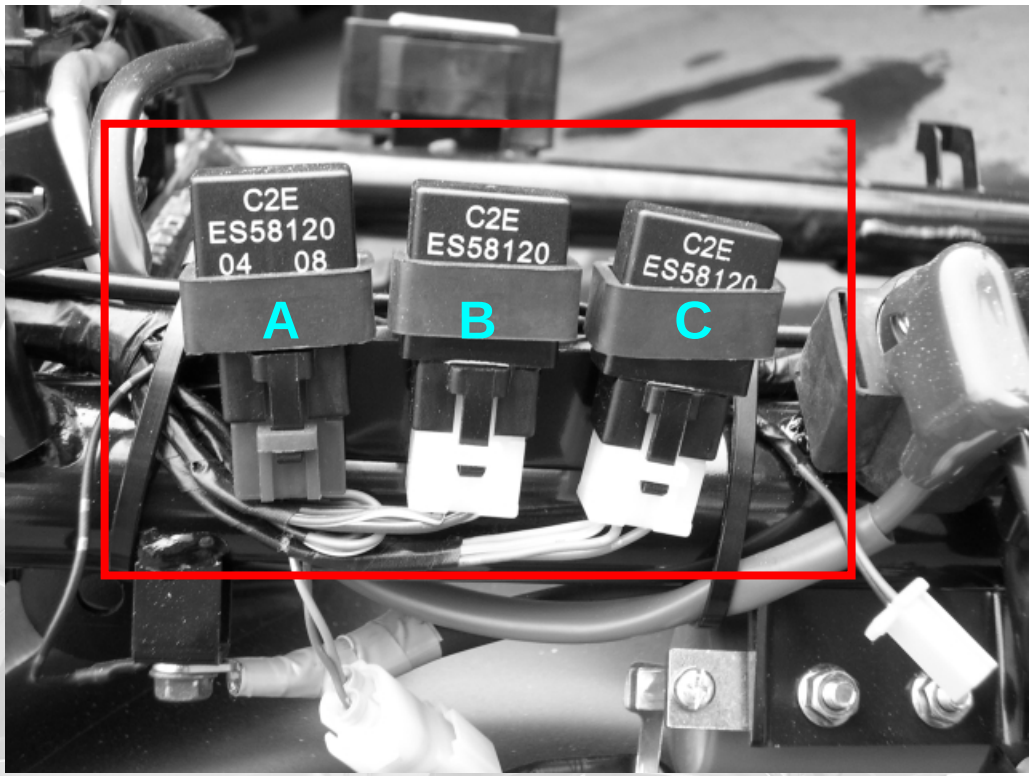
Dg	O
Gr/B	Bl/W

∗B.fuel pump/injector

R/W	R/W
R/B	Db

∗C.headlamp

O	O
Y/W	Y



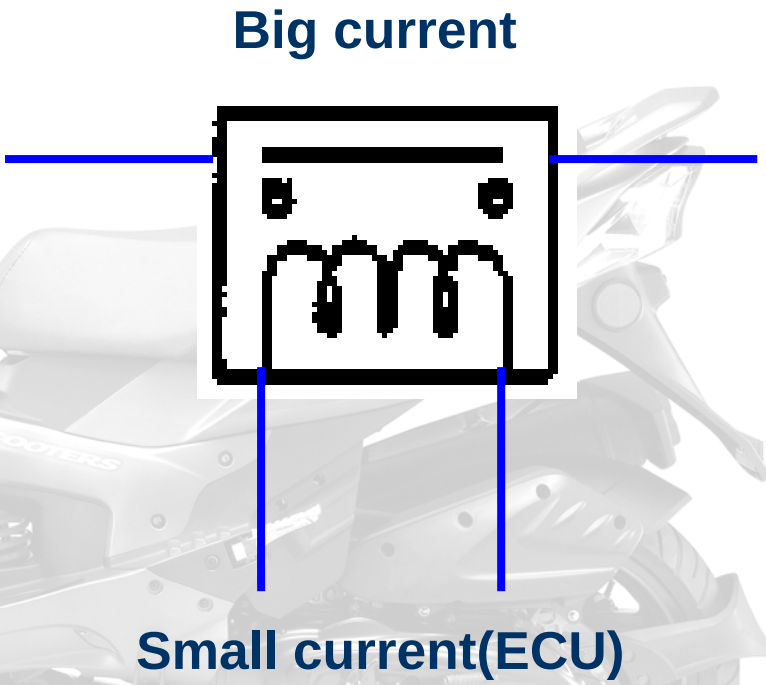
Control of relays

* (Relay) 15A
* theory： use small current to control big current
* Usage：

  fuel pump & injector

  EMS whole system

  headlamp



Measure the relays

∗use the pocket tester

1.find the control coil

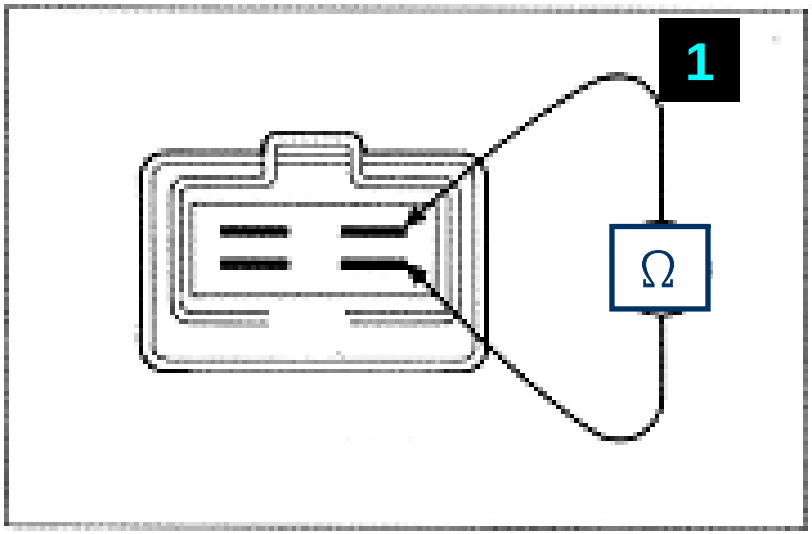
2.fit 12V to the control coil

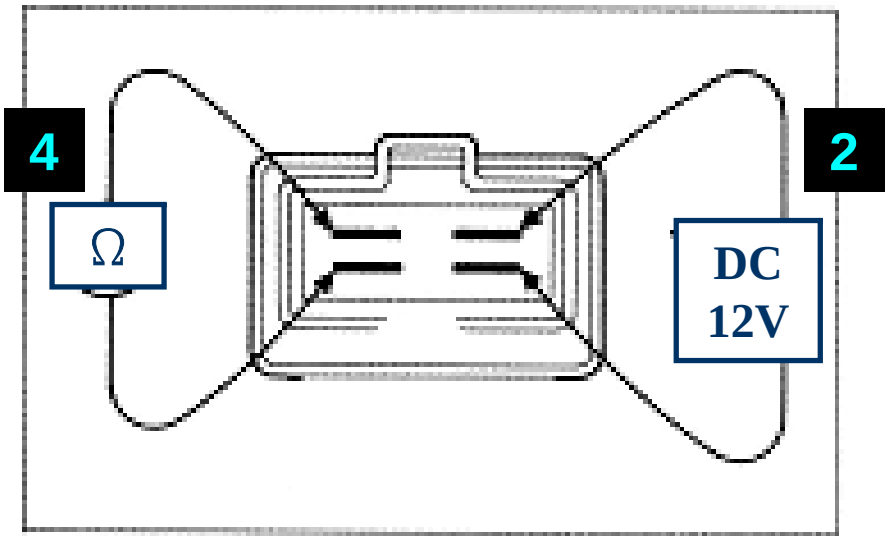
3.the relay sounds “ka”

4.measure the resistance

<disconnect-->NG

connected-->OK>





PGO
SCOOTERS