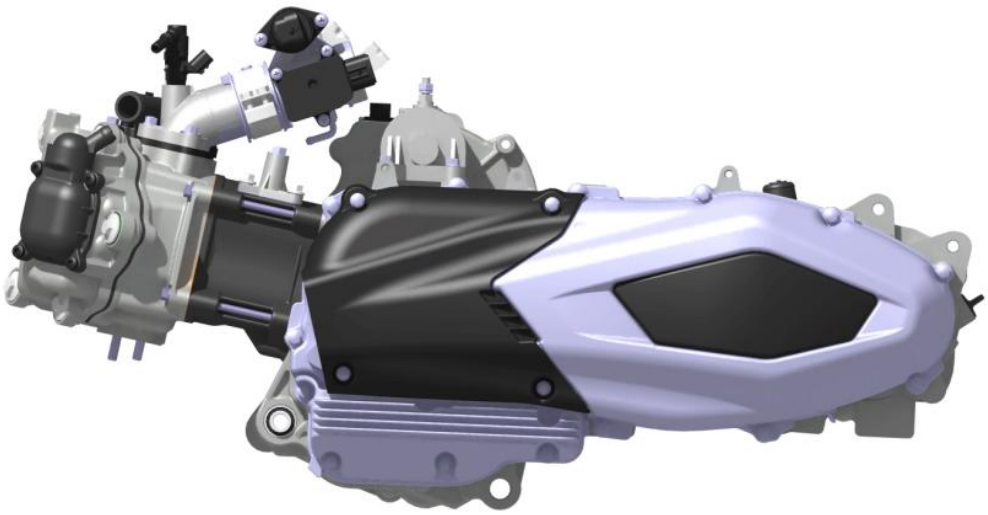
Service Manual for engine KS250

LXFD0901-054



Chongqing Loncin motor engine co. ltd. **September 2023**

Foreword

There are more and more motorcycles getting onto market with each passing day, and new structure and technologies are also adopted. For all the Loncin users and service workers know well about the maintenance, adjustment and repair for engine KS250, we made this service manual and hope which bring you more convenience when you need them.

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1. Summary

Rules for maintenance

1. Please adopt the Loncin motor co. ltd. produced or suggested spare parts, lubricant or other auxiliary materials when maintenance is necessary. In case materials were adopted fail to meet Loncin standard, it may damage your motorcycle.

2. When maintenance is necessary, please adopt the tools, bolt, nut and screw in metric standard, the ones out of metric standard such as imperial standard are not allowed, because they are not interchangeable to metric ones.

3. When parts were replaced or re-assembled, please also replace their washer, o-ring, split pin and locking piece.

4. Please fasten the bolt or nut with bigger diameter or inside first, then fasten the rest in alternative angle sequence, unless there is another specially stipulated sequence.

5. Wash up the removed parts by cleanser. Coat the moving surface with lubricant before re-assembling.

6. When re-assembled, please check and confirm the correct re-assembly and proper operation, turn, move and operate them for checking.

7. Dispose the used oil, lubricant, pollutants and abandoned parts by strictly following laws and other state regulations.

SpecificationS normal specification

	Items	Data
Engine	Specification	LX1P72MM
	Displacement	244ml
	Cylinder arrangement and inclining anle	Single cylinder,10°
	Bore×Stroke	72mm×60mm
	Combustion capacity (Cylinder head)	13.4ml
	Compression ratio	11.5：1
	Max. power and its rotation	17kW/8250r/min
	Max. torque and its rotation	22N•m/6500r/min
	Air valve system	Single cam on top
	Lubrication system	Forced pressure + Splashing
	Cooling system	Water cooling
	Net weight for engine	35kg
Belt driving components	Transmission rario for stepless speed chang （CVT）	0.751～2.39
	1st deceleration rario	3.571（50/14）
	2nd deceleration ratio	2.143（45/21）
Electrical system	Ignition system	FTI 1-2
	Starting system	Electric starting
	Illumination system	Battery
	Specification for spark plug	CR8E（NGK）
	Clearance for spark plug	（0.7～0.8）mm
	Rectifier regulator	Complete wave for 3 phases

Specification for cooling system

Items		Specification
Coolant capacity	Heat radiator and engine	1.4L
	Sub tank	0.1L
Relief pressure for heat radiator cover		（110～135）kPa
Thermostat	Open starting temperature	85℃
	Completely opened temperature	95℃
	Valve rise	≥4mm
Recommended coolant		Meet demands of GB 29743, coolant for light loading engine of glycol and LEC Ⅱ-40

Specification for lubrication system

Unit: mm

Items		Standard	Maintenance limit
Oil capacity	When oil replaced	1.35L	—
	When oil filter disassembled	1.4L	—
	When engine disassembled	1.5L	—
Recommended oil		The oil we suggest: Crankcase ： SL10W/40, Gear box: 80W/90 API quality grande: SL or above （The round label of service API who is marked up of energy saving） JASO T903 standard: MA Viscocity:SAE10W/40,80W/90	—
Openning pressure for oil pressure sensor		80℃ or normal temperature ： (30～60)kPa	—

Rotor for oil pump	Clearance between tips	0.15max	0.20
	Clearance of middle	0.15max	0.20
	Clearance between both sides	0.02～0.08	0.11

Specification for cylinder head/Valves

Unit:mm

Items			Standard	Maintenance limit
Cylinder pressure for electric starting			（500～1000）kPa	450kPa
Valve clearance		Air intake valve	0.08～0.12	0.15
		Air exhaust valve	0.13～0.17	0.2
Swinging arm and its shaft	Inner diameter of swinging arm	Intake/Exhaust	10.000～10.015	10.055
	Outer diameter of swinging arm	Intake/Exhaust	9.972～9.987	9.942
	Clearance between swinging arm and its shaft	Intake/Exhaust	0.013～0.043	0.10
Camshaft	Protrusion height for cam	Intake	30.126～30.226	30.100
		Exhaust	29.877～29.977	29.850
	Clearance between journal and hole		0.020～0.062(Smaller end) 0.025～0.066（Bigger end）	0.10
	Runout		—	0.04
Valve and its guiding tube	Diameter for valve rod	Air intake	4.957～4.972	4.92
		Air exhaust	4.960～4.975	4.92
	Inner diameter for guiding tube of valve	Intake/Exhaust	5.000～5.012	5.040（Intake） 5.050（Exhaust）
	Clearance between valve rod and guiding tube	Air intake	0.028～0.055	0.09
		Air exhaust	0.025～0.052	0.10

	Height of guiding tube	Intake/Exhaust	11.7～12.3	—
	Width for valve base	Intake/Exhaust	1.0～1.2	1.5
Free length for valve spring			39.4	37.4
Flatness for cylinder head		0.05		0.1

Specification for CVT system

Unit：mm

Items		Standard	Limit for using
Driving belt	Width of driving belt	21～22	20
Driving wheel kit for belt	Hole diameter for installation of driving and sliding plate	24～24.021	24.071
	Outer diameter for sleeve of sliding and driving plate	23. 959～23.98	23.92
	Outer diameter of roller	20.9～21.1	20.4
	Hole diameter for installation of driven and sliding plate	41～41.025	41.075
	Shaft diameter for installation of fixing plate kit of driven	40.966～40.991	40.916
	Free length for pressing spring	122.7	117.7
	Thickness for friction materials on clutch shoe	3.25～3.35	1
	Inner diameter for outer plate of clutch mm	134～134.2	135

Specification for magneto and starting clutch

Unit：mm

Items	Standard	Maintenance limit
Outer diameter for shaft sleeve of starting plate-shaped gear	45.660～45.673	45.560

Length for common normal line of driving gear of double gear	23.395～23.445	23.350
Length for common normal line of driven gear of double gear	21.707～21.754	21.650

Specification for crankcase body and transmission system

Unit: mm

Items			Standard	Maintenance limit
Transmission device	Main shaft	Shaft diameter at clutch	14.98～14.99	14.95
		Shaft diameter at left bearing	16.98～16.99	16.95
		Shaft diameter at right bearing	19.98～19.99	19.95
		Length for common normal line of inclining gear	11.875～11.912	11.825
	Transmission counter shaft	Shaft diameter at left and right bearing	14.98～14.99	14.95
		Length for common normal line of inclining gear	13.645～13.688	13.600
	Gear for counter shaft	Length for common normal line of inclining gear	30.079～30.126	30.029
	Output shaft	Shaft diameter at left bearing	14.98～14.99	14.95
		Shaft diameter at right bearing	29.974～29.987	29.944
	Gear for output shaft	Length for common normal line of inclining gear	24.338～24.385	24.290

Specification or cylinder body, piston and crankshaft

Unit: mm

Items	Standard	Maintenance limit

Crankshaft	Clearance at bigger end side of connecting rod		0.2～0.5	0.6
	Clearance between crankshaft pad at bigger end of connecting rod and crankshaft pin		0～0.012	0.05
	Clearance between journal of crankshaft and pad		0.03～0.05	0.09
	Runout		—	0.03
Cylinder	Cylinder bore		72.000～72.012	72.1
	Roundness/Cylindricity		—	0.01
	Flatness		—	0.1
Piston, piston pin and piston ring	Base circle diameter of piston		71.945～71.955	71.905
	Hole diameter of pin		17.004～17.009	17.04
	Diameter for piston pin		16.995～17.000	16.96
	Clearance between piston and piston pin		0.004～0.014	0.07
	Closing clearance for piston ring	1st ring	0.10～0.20	0.4
		2nd ring	0.14～0.27	0.5
		Oil ring	0.20～0.70	1.0
	Clearance between piston ring and its groove	Clearance between 1st ring and its groove	0.030～0.070	0.10
		Clearance between 2nd ring and its groove	0.030～0.070	0.10
Cylinder matching clearance			0.045～0.067	0.13
Inner diameter of smaller end of connecting rod			17.006～17.017	17.037
Matching clearance between connecting rod and pin			0.006～0.022	0.06

Torque

Standard torque

Type for fastening piece	Torque N.m	Type for fastening piece	Torque N.m
5mm Bolt and nut	5.2	5mm screw	4.2

6mm Bolt and nut	10	6mm screw	9.0
8mm Bolt and nut	22	6mm flange bolt（head of 8mm，small flange）	10
10mm Bolt and nut	34	6mm flange bolt（head of 8mm，big flange）	12
12mm Bolt and nut	54	6mm flange bolt （head of 10mm） and nut	12
		8mm flange bolt and nut	27
		10mm flange bolt and nut	39

Engine torque(Normal maintenance)

Items	Qty.	Thread diameter mm	Torque N.m	Note
Nut of cylinder head	4	8	28～32	
Connecting bolt between cylinder head and body	2	6	8～12	
Bolt for cylinder head cover	5	6	8～12	
Bolt for left crankcase cover	10	6	8～12	
Bolt for outer covering plate of breathing groove	4	6	8～12	
Fastening nut for driving belt wheel	1	12	85～95	Need auxiliary tools
Fastening nut for driven belt wheel	1	12	85～95	Need auxiliary tools
Oil drainage screw plug (Valve cap)	1	30	20～25	

Spark plug	1	10	12～16	

Cooling system

Items	Qty.	Thread diameter mm	Torque N.m	Note
Impeller of cooling pump	1	7	12～16	
Installation bolt for water pump cover	3	6	8～12	
Bolt for thermostat cover	1	5	5～9	
Drainage bolt for water pump	1	6	8～12	

Lubrication system

Items	Qty.	Thread diameter mm	Torque N.m	Note
Oil drainage screw plug (Valve cap)	1	30	20～25	
Bolt for oil pump	2	5	5～9	
Oil drainage screw for gear box	1	8	10～15	

Cylinder head and valves

Items	Qty.	Thread diameter mm	Torque N.m	Note
Bolt for cylinder head cover	5	6	8～12	
Screw for tensioner	1	8	6～10	

Fastening bolt for tensioner	2	6	8～12	
Connective bolt between cylinder head and body	2	6	8～12	
Nut for cylinder head	4	8	28～32	
Bolt for pressing plate of pressure relief valve	2	6	8～12	
Bolt for oil gas separator	4	5	5～9	
Bolt for pressing plate of camshaft	2	6	8～12	
Bolt for chain tensioning plate	1	6	8～12	

System CVT

Items	Qty.	Thread diameter mm	Torque N.m	Note
Fastening nut for driving belt wheel	1	12	85～95	Need assistant tools
Fastening nut for driven belt wheel	1	12	85～95	Need assistant tools
Bolt on left crankcase cover	10	6	8～12	
Bolt on outer cover of breathing groove	4	6	8～12	

Bolt on oil bottom case	5	6	8～12	

Magneto and starting clutch

Items	Qty.	Thread diameter mm	Torque N.m	Note
Nut for rotor of magneto	1	16	90～110	
Bolt for stator of magneto	3	6	8～12	Coat thread with Loctite
Fixing bolt for trigger	2	6	8～12	
Bolt on right crankcase cover	10	6	8～12	
Bolt on limit plate of plate-shaped gear	1	6	8～12	

Case body and transmission system

Items	Qty.	Thread diameter mm	Torque N.m	Note
Combination bolt for gear box	7	8	18～22	
Case combination bolt	10	6	8～12	

Position for lubrication and sealing

Engine

Material		Poition	Note
Sealant	1270H	Outer circular surface of water sealing static ring	

	1596	Contact place between left, right crankcase and cylinder body Contact surface for installing bolt for timing chain cover	
	1590	Wire outlet for magneto	
Oil in engine		Surface for crankshaft pad of left and right crankcase Main shaft journal on both ends of crankshaft Place at side clearance of bigger end of crankshaft and connecting rod Inner hole for smaller end of crankshaft and connecting rod Main oil hole on crankcase Internal surface for cylinder bore External surface for piston pin External surface for piston, piston pin’s hole and piston ring’s groove Overall surface for piston ring Sliding surface and rod end for valve rod Rolling surface of camshaft Overall surface for swingsing arm shaft Internal surface of swinging arm and surface of roller Outer circular surface of pin shaft on pressure relief valve Outer circular surface of journal of crankshaft’s plate-shaped gear Surface for inner hole of plate-shaped gear Overall surface for shaft of double gear Overall surface of starting clutch Overall surface of inner and outer rotor Surface of valve core of oil relief valve Surface for main shaft bearing and journal’s oil seal Surface for journal of counter shaft bearing	

	Surface of output shaft bearing and journal’s oil seal Geat teeth (Primary transmission, crankcase and starting deceleration) Turning area for every bearing Surface for every o-ring	
Oil of molybdenum disulfide	Swinging arm Swinging arm shaft Surface of camshaft Hole for camshaft on cylinder head Seal ring for timing chain cover	
Lubricant of multipurpose	Seal ring for starting motor Seal ring for oil filter Seal ring for driving wheel of oil pump	
Degreaser	All contact surfaces	

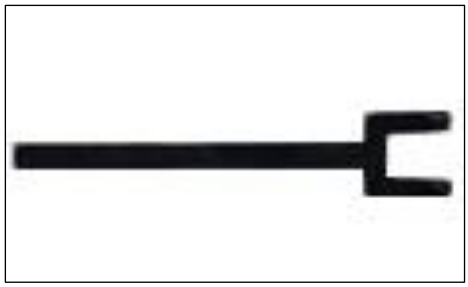
2. Maintenance

Information for maintenance

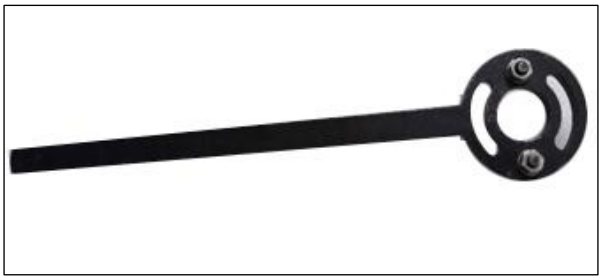
Summary

- Please put motorcycle on horizontal ground before all the operations.

Tools(For this operation only)



Tool for driving wheel of clutch



Tool for driven wheel of clutch



Tool for rotor of magneto

Specification for maintenance

Make periodic maintenance according to its corresponding period in <User Manual>. I: Inspection , clean it up, adjust, lubricate or replace when it is necessary; C: Clean up; R: Replace; L: Lubricate

The maintenance below needs user equipped some knowelge for them, some items (With mark * or **) may need more technologies or tools.

Form list for maintenance period

Ref. No.	Interval / Items	×1000km	1	5	10	15	20
		Month	1	6	12	18	24
*1	Spark plug	\	\	I	I	I	R
*2	Oil in engine	\	R	R	R	R	R
*3	Secondary oil filter	\	R	R	R	R	R
*4	Valve clearance	\	I	I	I	I	I
*5	Coolant	\	I	I	I	I	R
*6	Cooling system	\	\	I	I	I	I
*7	Fuel injector	\	\	\	I	\	I
*8	Clutch	\	\	I	I	I	I
9	Driving belt	\	\	I	I	I	R
10	Throttle valve body	\	\	\	I	\	I

Caution: 1. In case the driving is usually in wet, dusty or other bad conditions, the maintenance shall be more frequent.

2. Mark * means it needs tools data or technology for it only, which shall be done by Loncin dealer.

Breathing tube for crankcase

Caution:

- In case the motorcycle runs in rain or under full speed, includes washing and put it upside down, the more frequent maintenance is necessary. Please check if the sediment in transparent part of breathing tube could be clearly seen.

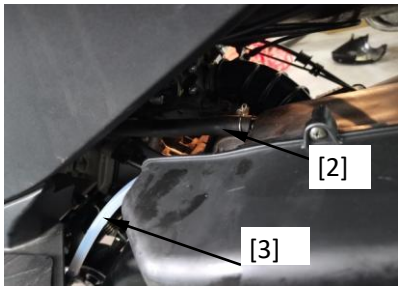
Pull off the tube plug [1] for air filter, get the sediment into suitable containter, then re-assemble the tube plug.



Check if there is crack, aging, damage or flexibility of waste gas tube [2] of crankcase.

Please replace waste gas tube if it is necessary.

Check overflow tube [3] of oil gas separator, in case there is too much sediment, please clean them up timely.



Spark plug

Remove seat and sitting barrle, then remove cap of spark plug.

Remove spark plug [1].

Caution:

Blow and clean up surrounding of base for spark plug by air gun, meanwhile make sure there is not any dust dropping into combustion chamber.

Check if there is crack or damage on insulator, confirm if there is damage, dirt or color changing on electrode, please replace if it is necessary.

Inspection for spark plug:

Clean up electrode of spark plug by iron wire of cleaner for spark plug only.

Check clearance between central electrode and side one by feeler gauge.

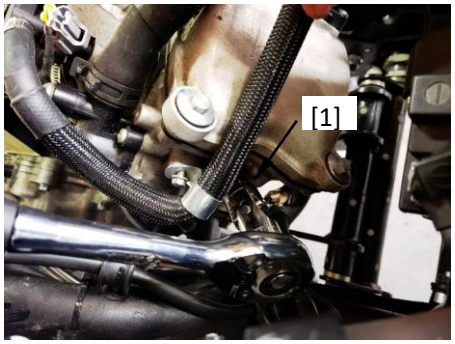
Clearance of spark plug：(0.70～0.80)mm

In case if it is necessary, please get electrode bent for adjustment.

Assemble and fasten spark plug to cylinder head, then fasten the spark plug to given torque.

Torque：14N •m（1.4kgf•m，10.3 lbf •ft）

Insert cap of spark plug in, then assemble sitting barrel and seat.



Valve clearance

Inspection

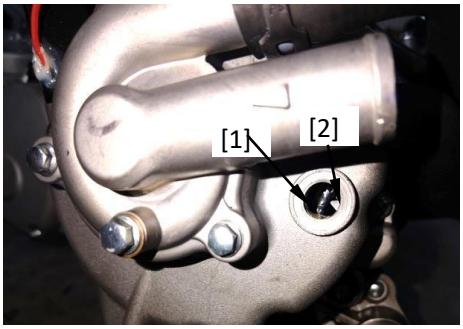
Caution:

- Please check and adjust valve clearance when engine is code (Lower than 35℃).

Remove the parts below：

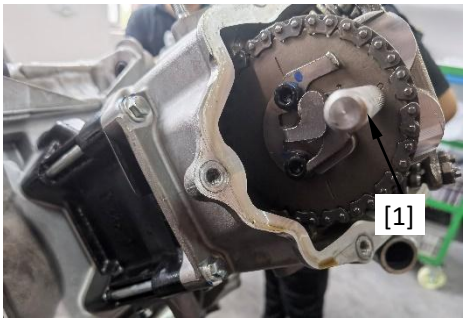
- Cylinder head cover
- View hole cap and o-ring
- Cover of beathing groove
- Screen kit of beathing groove

Turn the crankshaft anticlockwise (Turn the impeller of driving plate of CVT or locking nut of driving wheel), get the scale mark “T”[1] on rotor of magneto to mark [2] for timing protrusion aligned.

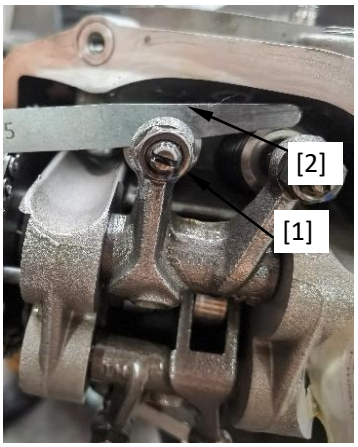


Align the hole of pin on timing driven sprocket wheel to that on cylinder head, then fix it up by timing and inserting pin [1]; Get the mark “-“ on driven wheel parallel to contact surface of cylinder head.

In case the timing mark is not at given position, turn the crankshaft one round anticlockwise (360°), get the scale mark “T” align to timing mark on right crankcase cover.



Adjustment



Caution：

- The adjustment for valve clearance could be done through adjuting screw of valve.

Insert feeler gauge [2] between adjusting screw [1] for swinging arm and top of valve to check the valve clearance.

Valve clearance:

Inlet valve：（0.08～0.12）mm；

Exhaust valve：（0.13～0.17）mm；

Oil in crankcase of engine

Inspection for oil capacity

Start engine and idly run it for 3～5 minutes.

Stop engine and wait for 2～3 minutes.

Put motorcycle on horizontal ground and keep it upright (Tire touch ground horizontally).

Check oil capacity by oil gauge (Turn the oi l gauge to the bottom).

In case oil level is lower than the lowerest line [1], remove oil gauge [2], the fill up with appointed oil to upper oil level [3] on crankcase.

Appointed oil： SL 10W/40

Quality grade of GL-3API: SL or above （Don’t adopt the oil of energy saving with label of round and API service）

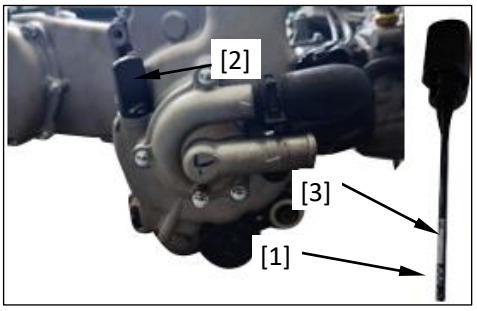
JASO T903vstandard: MA

Viscosity ： SAE10W-40

Check and confirm if the o-ring on oil gauge is in good condition, replace it if it is necessary.

Coat surface of o-ring with oil.

Re-assemble oil gauge.



Replacement for oil

Start engine and get it heating.

Stop engine and removing secondary oil filter [1].。

Remove oil screen cap and o-ring [2], thenvdrain off the oil.

When the oil completely drained off, assemble oil screen cap and replace the o-ring for a new one.

Fasten the oil screen cap to given torque.

Torque：13N •m（1.3kgf•m，9.6 1bf•ft）

Fill up with appointed oil full of crankcase.

Oil capacity：

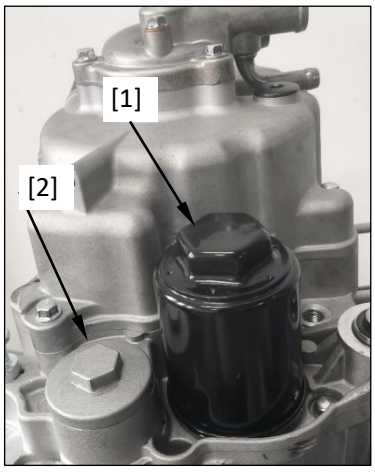
When drained off： 1.35L

When secondary oil filter replaced： 1.4L

When broke down： 1.5L

Check oil capacity.

Make sure there is not any oil leak.



Cleaning up for oil screen net

• Drain off oil.

• Removal for oil screen net[1]。

• Wash up oil screen net by cleaser Of high fire point, then clean up particle on oil screen net.

Warning
Please don’t adopt the cleanser with low fire point for washing screen net, because the gasoline or cleanser with low fire point is combustible and explosive, which is easy to lead to serious scald. Please wash up the oil screen net in the place with good ventilation, and please keep far apart fire or spark, including any indicator light.



• Check if the oil screen net is damaged.

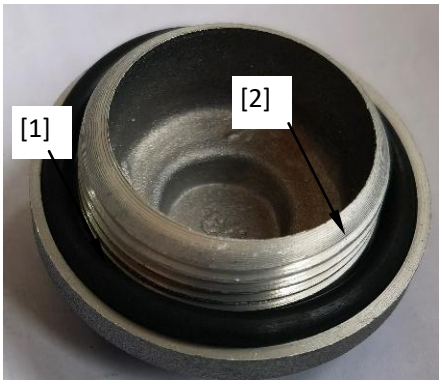
★In case the oil screen net damaged, please replace.

• Replace o-ring [1] for a new one.

•Re-assemble screen cap [2] of oil filter.

Fastening torque for screen cap of oil filter：

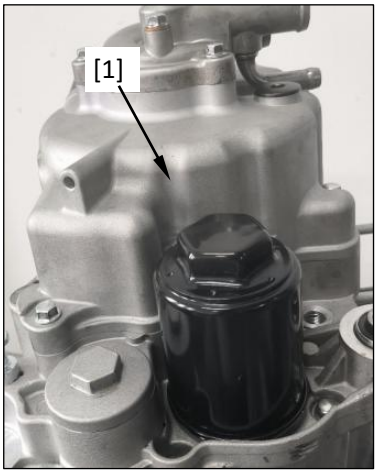
20N・m（1.3kgf•m，9.6 1bf•ft）。



Secondary oil filter

Drain off oil:

Remove oil filter [1] by open end wrench of 30mm or adjustable wrench.



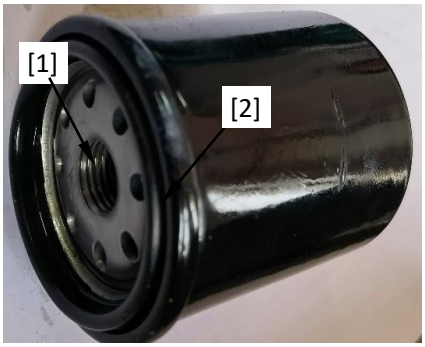
Coat thread [1] of new secondary oil filter with oil, also the place [2] of rubber ring.

Re-assemble secondary oil filter and fasten to given torque.

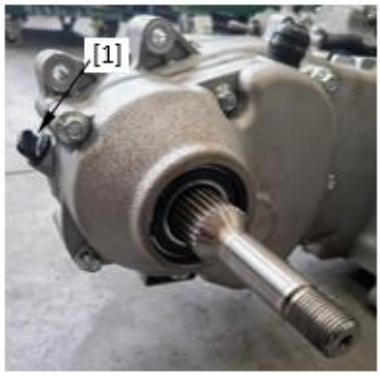
Torque：

11 N • m（1.1kgf•m，8.1 1bf•ft）

Fill up with appointed oil full of crankcase.



Oil in gear box of engine



Inspection for oil of gear

Start engine and idly run it for (3～5) minutes.

Stop engine and wait for (2～3) minutes.

Put motorcycle on horizontal ground and keep it upright.

Check oil capacity of gear by oil gauge [1].

In case the oil level is under lower scale line, please fill some with appointed oil into engine, and confirm the oil level is above middle place between upper and lower scale lines by oil gauge.

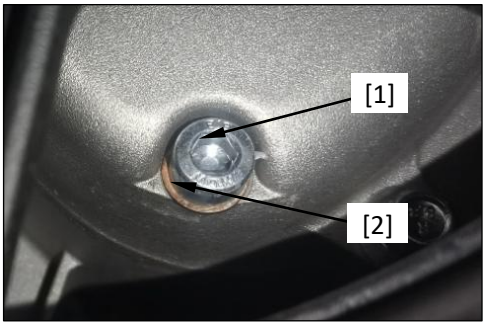
Appointed gear oil: 80W-90

Check if the o-ring is under good condition, please replace if it is necessary.

Coat the surface of o-ring with oil.

Mounting oil gauge

Replacement for gear oil



Start engine and heat it.

Stop engine.

Remove oil drainage bolt [1] and washer [2], then drain off oil for gear.

When the gear oil drained off, assemble the oil drainage bolt and replace the washer for a new one.

Fasten oil drainage bolt to given torque.

Torque：13N•m(1.3kgf•m,9.6 1bf•ft)。

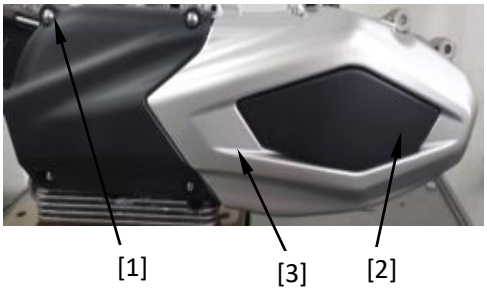
Fill gear box up with appointed gear oil.

Capacity for gear oil：
New engine： By 0.25L；
When engine maintained or after overall maintenance： By 0.25L
Check capacity for gear oil.
Make sure there is not leakage for gear oil.

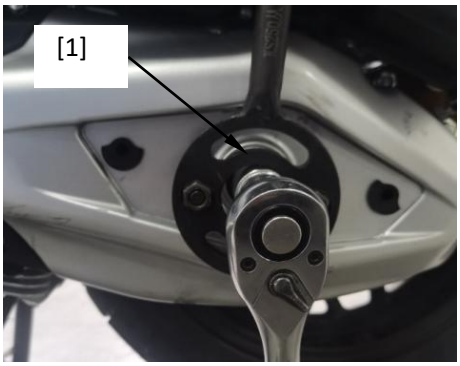
Inspection and replacement for system of CVT

Remove bolt [1] for outer covering plate of breathing plate and left drcorative cover [2].

Remove outer covering plate [3] for breathing groove.

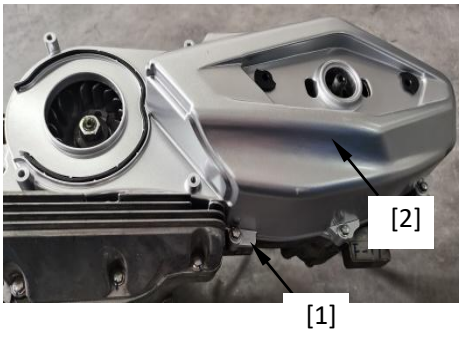


Fastening nut for driven wheel and washer [1]

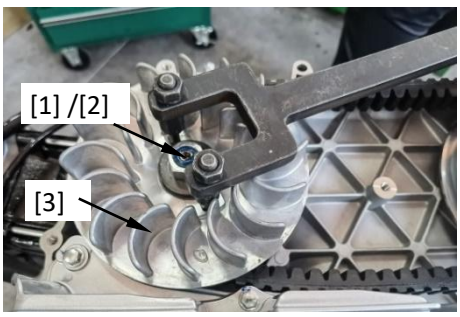


Installation bolt [1] for left crankcase cover.

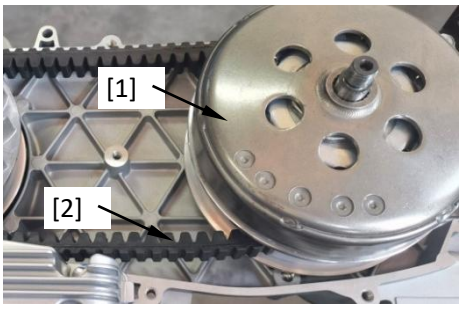
Left crankcase cover [2]



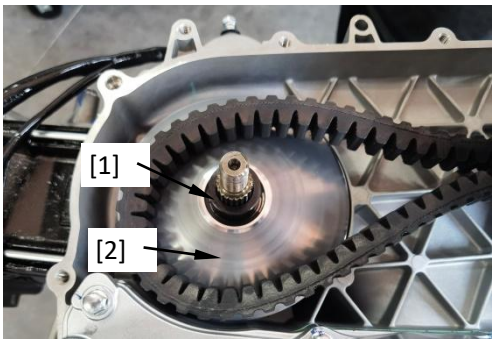
Fastening nut [1] for driving belt wheel and washer [2]
Driving plate [3] for driving belt wheel.



Driven belt wheel kit [1] and driving belt [2]



Sleeve [1] and sliding plate and driving plate kit [2]



The re-assembly is precisely opposite to disassembly.

Engine idling

Caution:

- Check and adjust idling when all the maintenance finished and within stipulation.
- Make inspection below first before adjusting idling：
  - There is not any malfunction light blinking.
  - Condition of spark plug.
  - Working situation for element of air filter.
  - Free play for throttle switch and lever.
- The idling could be precisely checked and adjusted only when engine is hot.

Start engine, get it heated until reached normal working temperature and let it idly run.

Check idling.

Idling speed:（1700±200）r/min

In case the idling speed is out of maintenance limit, please check the components below:

- Problem for air intake amount and engine end.
- Operation for idling speed control valve.

3. Cooling system

Information for maintenance Summary

⚠Warning
Please don’ t remove cover of heat radiator before engine and the heat radiator totally cooled down, otherwise the injecting hot coolant is easy to lead injury.

Caution

In case the coolant is with corrosion resistance of silicate may accelerate wear-out of sealing ring of water pump or block up the passage of heat radiator.

Adopt tap-water may get engine damaged.

- Fill up with coolant into sub water tank, except coolant filling-up and draining off, please don’ t remove the cover of heat radiator.
- When maintaining the cooling system, it needn’ t be removed engine from frame.
- The coolant touches painting surface is not allowed.
- When the cooling system maintained, please check its leakage by testing device for it only.
- Inspection for thermometer of coolant/Liquid temperature sensor.
- Inspection of relay for controlling electric fan.

Specification of cooling system

Items		Specification
Coolant capacity	Heat radiator and egnine	1.4L
	Sub tank	0.1L

Relief pressure for cover of heat radiator		（110～135）kPa
Thermostat	Initial temperature for openning	85℃
	Temperature of completely opened	95℃
	Rise of valve	≥4mm
Recommended coolant		Met the demands of GB 29743 with glycol for coolant of LEC-Ⅱ-40 for engine of light loading.

Troubleshooting

Too hot the engine

- Malfunction in thermometer/Temperature sensor for coolant
- Thermostatic valve failed to open
- Malfunction in cover of heat radiator
- Insufficient coolant
- Passage, soft hose and water tube blocked up.
- Air get into circulation system
- Malfunction on motor of electric fan of cooling system
- Malfunction of relay for controlling electric fan
- Malfunction on water pump

Too low the temperature of engine

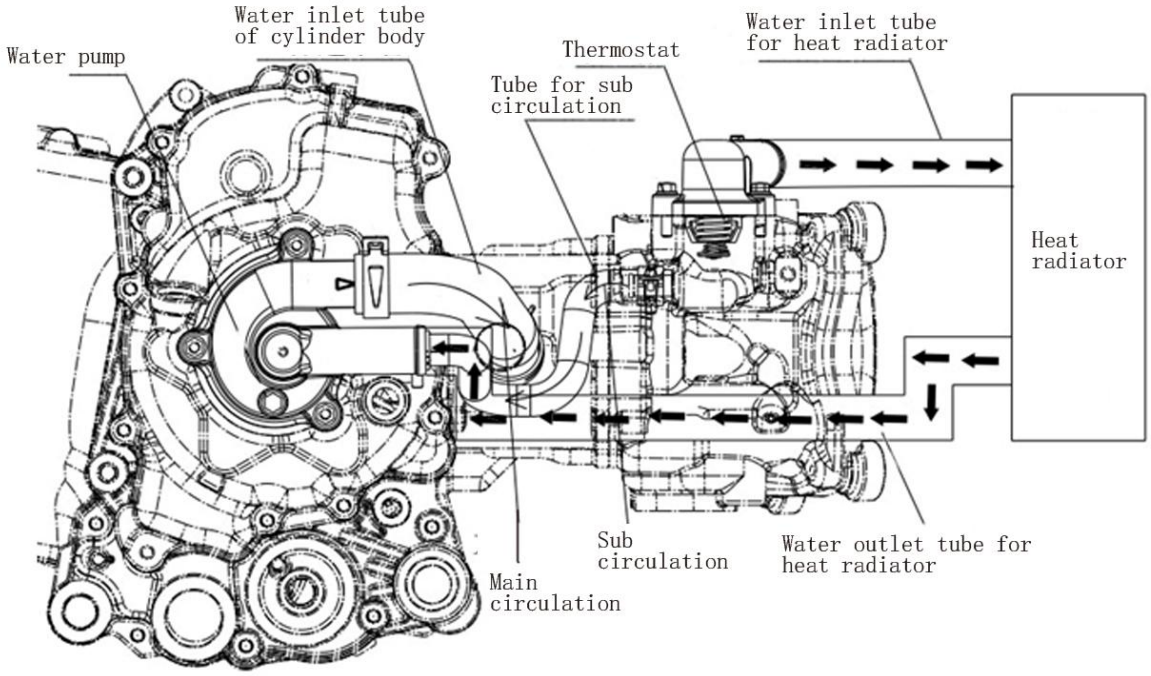
- Thermometer for coolant/Temperature sensor for coolant gets failed
- Thermostatic valve gets opened
- Malfunction in relay for controlling electric fan

Coolant leakage

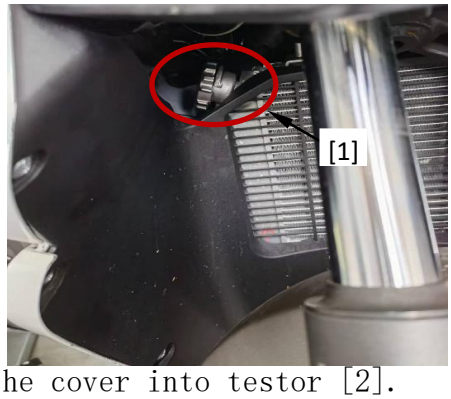
- Defects in water pump
- O-ring gets aged
- Malfunction in cover of heat radiator

- Gasket for cylinder head damaged or aged
- Joint of soft connecting place gets loosened or without tightly grasping
- Soft hose damaged or aged
- Heat radiator damaged
- Cover of thermostat or joint for cover of water pump gets loosened

Procedure mode for system



Test for system



Pressure test for cover of heat radiator/System

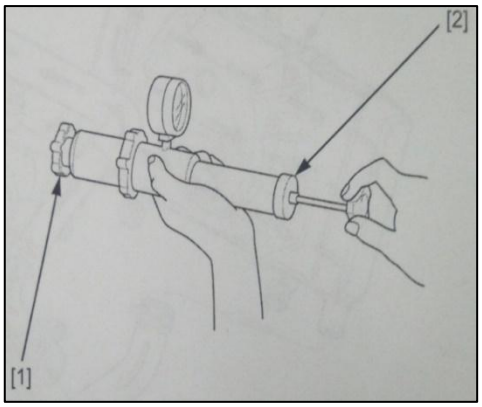
Remove cover [1] of heat radiator

Get gasket for heat radiator wet, then assemble the cover into testor [2].

Lay pressure on cover of heat radiator by testor.

In case the cover of heat radiator failed to keep pressure, too high or low the pressure relief, please replace it.

The cover for heat radiator must bear the pressure above 6 seconds.



Pressure for heat radiator:

（110～135）kPa

Connect the testor onto heat radiator.

Lay pressure on heat radiator and soft hose for engine by testor to check is air sealing performance.

Caution

Overpressure may get parts in cooling system damage, which shall not be over 135kPa.

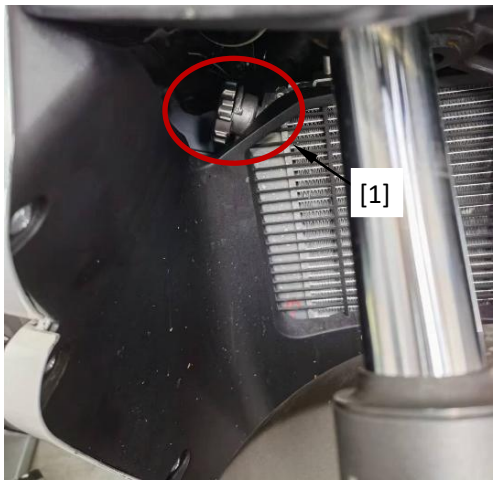
In case the system failed to bear pressure at least 6 seconds, which means it needs repair or parts replacement.

Coolant replacement

Coolant replacement/Air exhaust

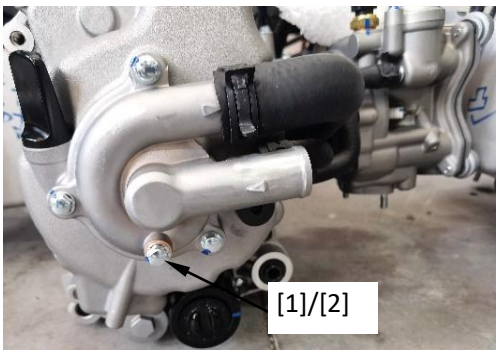
Caution： When filling up sub tank with coolant to check its level, please park motorcycle on horizontal ground and keep it upright (By parking stand)

Remove cover [1] of heat radiator and drain off coolant.



Remove drainage bolt [1] and flat washer[2], then drain off the coolant. Assemble drainage bolt when flat washer was replaced for a new one.

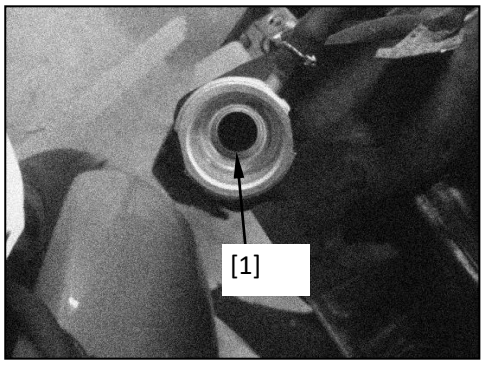
Turn the drainage bolt to given fasteningtorque.



Fastening torque for drainage bolt:

10N．m（1.0 kgf．m，7.4 lbf．ft）

Fill up with recommended coolant to neck [1] of cooling system through filling hole.



Exhaust air by following operatiosn below:

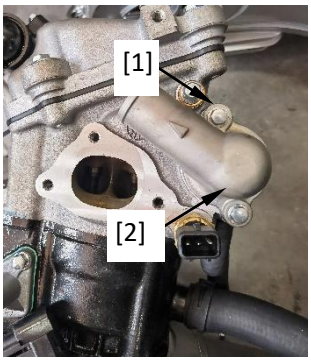
1. Start engine and let it idly run for 2-3 minutes, under the idling, loosen the air exhaust bolt [2] for cylinder head (By tool of T30 of socket hexagon without completely screwing off, get it loosened and air could be exhausted).
   Exhaust the air in water jacket of cylinder head and body untill there is coolant flows out between air exhaust hole and bolt, then fasten the air exhaust bolt to given torque of 10N.m.
2. Get throttle on and off for 3 or 4 times and make sure the air is totally exhausted.
3. Stop the engine, fill up with coolant to neck [1] position if it is necessary.
4. Assemble cover of heat radiator
5. Open filling port on sub tank, then fill up with coolant to its scale mark for upper limit on the tank.

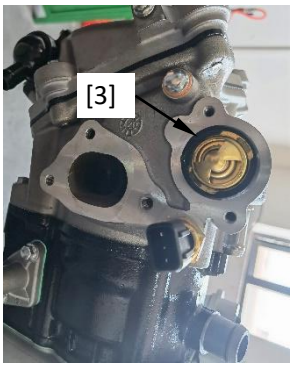


Recommended coolant:

Meet the demand of GB 29743 with coolant of glycol for motorcycle of light loading of LEC-Ⅱ-40

Thermostat





Disassembly/Re-assembly

Drain off the coolant.

Remove bolt [1] and cover [2] of thermostat.

Remove thermostatic valve [3] from cylinder head.

The re-assembly is precisely opposite to disassembly.

Torque:

Bolt for cover of thermostat:

7N·m (0.7kgf·m, 5.2 lbf·ft)



Inspection/Test

If there is damage on appearance of thermostatic valve[1].

In case the thermostatic valve is openunder room temperature, which needs be replaced.

Check if the seal ring[2] damaged, replace if it is necessary.

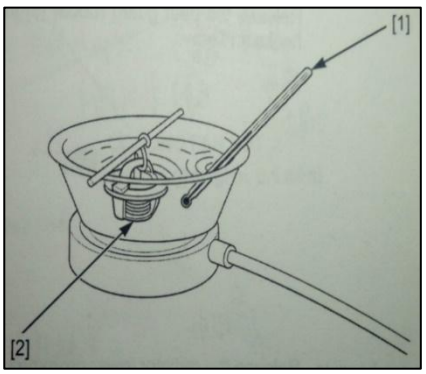
Caution:

Wear gloves for hot-proof and suitably protect eyes.

Please don't let thermostat and thermometer [1] touch bottom part, otherwise the data you read would be wrong.

Heat the water to working temperatureby electric furnace and keep for 5 minutes.

Suspend the thermostat [2] inhot water to check its normal work.



Initial temperature for opening thermostat:

85℃（183℉）

Complete height when valve totally opened:

95℃（203℉） or not less than 4mm(0.16 in)

In case the thermostat failed to open at given temperature, please replace it

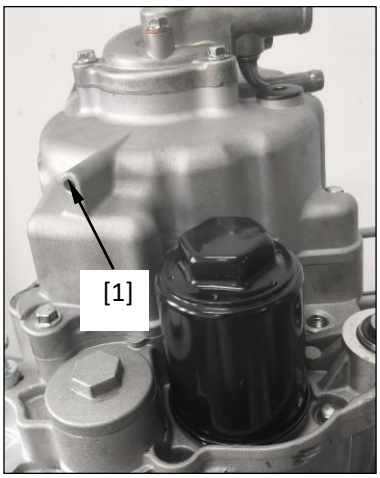
Water pump

Check sealing performance for end surface

Check the overflow hole [1] for water pump, and confirm if there is coolant leakage.

- A few coolant leakage is normal situation.
- Make sure when engine is started while there is not any coolant leaking out.

Please replace water pump kit if it is necessary.



Disassembly/Re-assembly

Caution:

- Lay a clean oil tray under ungine, when removing the water pump, there would be oil flow out. When re-assembled, fill up with appointed oil to given position.

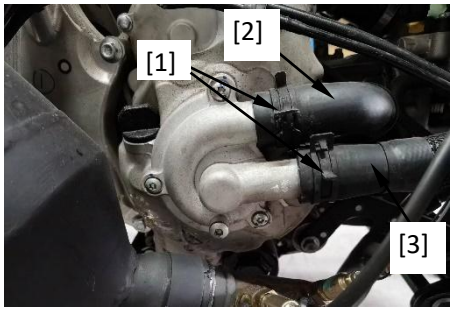
Drain off coolant

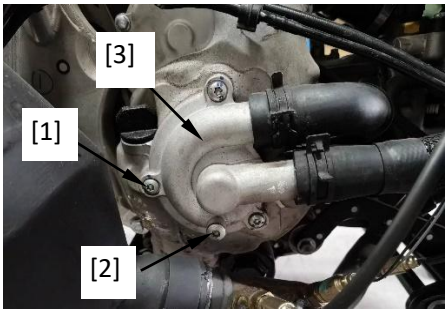
Put motorcycle on horizontal ground and keep upright.

Loosen tube clamp [1], and loosen devices from water pump as below:

- Water outlet tube [2] of water pump
- Water inlet tube [3] of water pump

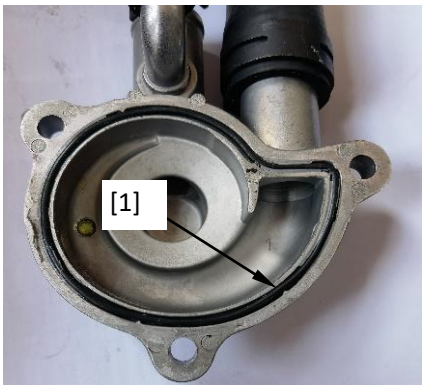
<Refer to <Guidance for lubrication system>).





Remove parts below:

- 3 pieces of bolt [1] of cover of water pump
- Drainage bolt [2]
- Water pump cover [3]



Remove seal ring [1] from cover of water pump.

Remove impeller [1] of water pump from right crankcase cover.



The re-assembly is precisely opposite to disassembly.

Fastening torque:

Impeller:

14N·m (1.4kgf·m, 10.3 lbf·ft)

Bolt on cover of water pump:

10N·m (1.0kgf·m, 7.4 lbf·ft)

Caution:

- Replace o-ring for a new one.
- Please don't coat o-ring with oil.

Check oil capacity

Fill up the cooling system full of coolant.

The recommended coolant:

Meet demands of GB 29743, coolant of glycol for vehicle of light loading LEC-Ⅱ-40

4. Lubrication system

Information for maintenance

Summary

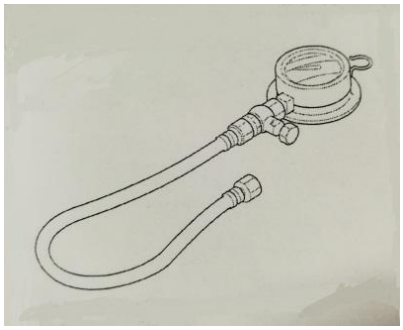
⚠Warning

Repeatedly or long termn contact the used oil may get skin cancer, but this is rarely to be found, unless you do in this way every day, but we suggest wash up hands by soap as soon as possibly could when you contacted the oil.

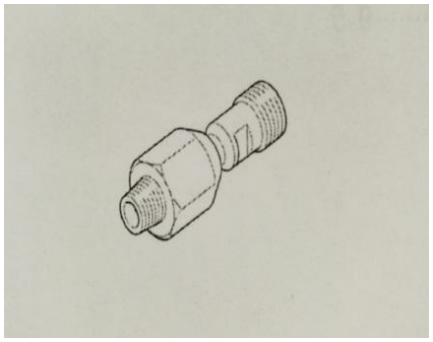
- When maintaining oil, it needn’t remove engine from frame.
- The precondition for operation in this chapter is oil in engine has drained off.
- When disassembling and re-assembling oil pump, please don’t get dust or dirt into engine.
- In case any parts in oil pump wear out or passed maintenance limit, please replace the oil pump kit.
- When oil pump re-assembled, please check if there is leakage or oil pressure is correct.
- Check indicator for oil pressure in engine.

Tool

Oil pressure gauge



Accessory for oil pressure gauge



Specification for lubrication system

Unit: mm

Items		Standard	Maintenance limit
Oil capacity (Crankcase)	When oil replaced	1.35L	—
	When oil filter re-assembled	1.4L	—
	When engine broke down	1.5L	—
Oil capacity (Gear box)	When oil replaced	0.25L	—
	When engine removed	0.25L	—
Recommended oil		Recommended oil for engine: Crankcase: SL 10W/40, Gear box: 80W/90 Quality grade for API: SL or above (Please don't adopt the energy saving oil with service label of circular API) JASO T903 standard: MA Viscosity: SAE10W/40, 80W/90	—
Initial opening pressure for oil pressure sensor		80℃ and normal : (30-60) kPa	—
Rotor of oil pump	Clearance for impeller tips	0.15max	0.20
	Middle clearance	0.15max	0.20
	Clearance for both sides	0.02～0.08	0.15

Troubleshooting

Too low the oil level

- Heavy oil consumption
- Oil leakage from external parts
- Piston ring wear out or fail to assemble in place
- Cylinder body wear out
- Guiding tube of air valve wear out

Too weak the oil pressure

- Too low the oil level

- Oil filtering screen blocked up
- Oil leakage from internal parts
- Incorrect use of oil

0 oil pressure

- Too low the oil level
- The opening for safety valve of oil pressure seized up
- Transmission chain for oil pump break up
- Tooth for driving and driven gear of oil pump break up
- Oil pump broken
- Oil leakage from internal parts

Too high the oil pressure

- Safety valve for oil pressure closed
- Oil filtering screen net, oil returning hole or oil measuring hole blocked up
- Incorrect use of oil

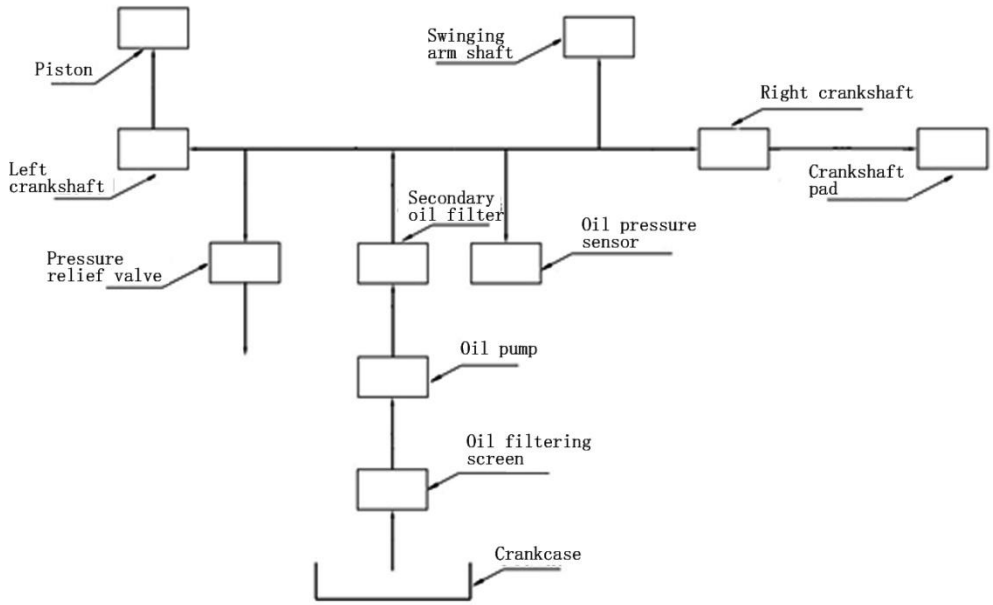
Dirty oil

- Oil or filtering screen net without periodic replacement
- Piston ring damaged

Emulsified oil

- Cylinder head cover expanded or cracked
- Leakage from coolant passage
- Water gets into engine

Diagram for lubrication system



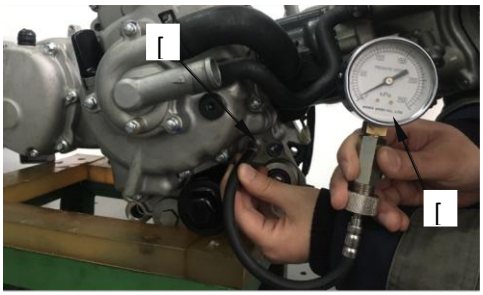
Inspection for oil pressure

Caution:

- When engine is working, in case the oil pressure in engine keeps, check oil pressure gauge before checking the oil pressure.

Remove oil pressure sensor.

Assemble accessory [1] for oil gauge 将 into switch base. Connect the oil pressure gauge [2] to its accessory.



Tool:

Oil pressure gauge
Accessory for oil pressure gauge

Check oil level, in case filling-up is necessary, please adopt the appointed oil, start engine and heat it up to working temperature (Around 80℃/176℉), then control rotation speed of engine at 1700r/min (Idly run), then read the oil pressure.

Standard:

When it is 1700rpm/80℃, the data should be : More than 60kPa (0.6kgf/cm2)

Stop engine and remove tools

Re-assemble oil pressure sensor.

Oil pump

Disassembly/Re-assembly

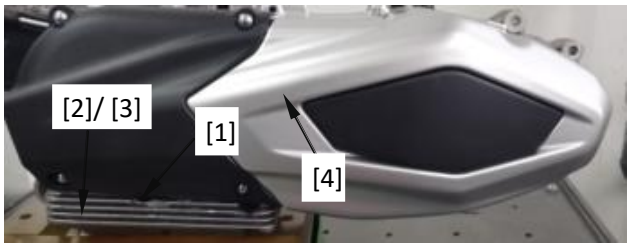
Remove left crankcase cover kit[4], please refer to system CVT.

Remove driving wheel kit (Refer to System CVT).

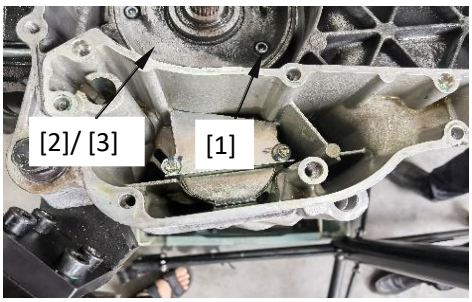
Remove driven wheel kit and its drivingbelt (Refer to system CVT).

Remove bolt [1] on oil bottom case.

Remove oil bottom case [2] and seal washer[3].

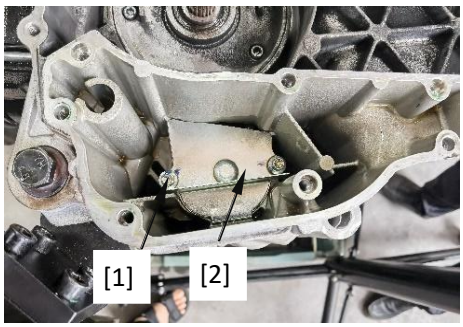


Remove bolt [1]。

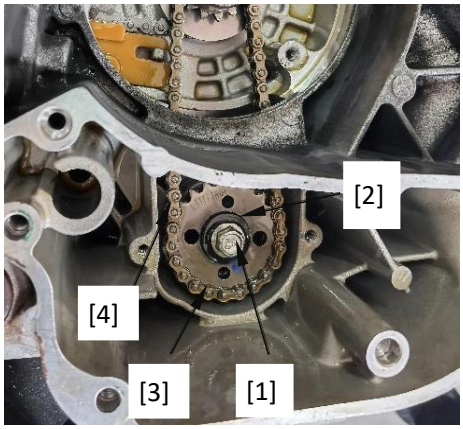


Remove timing chain cap [2] and seal ring [3].

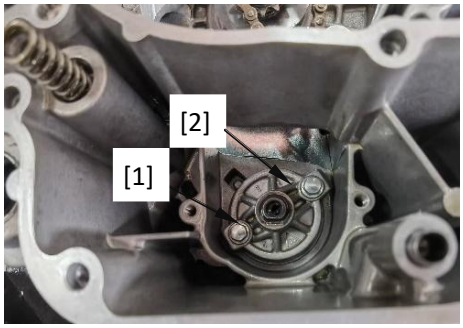
Remove bolt [1] and oil stopping plate [2] for returning.



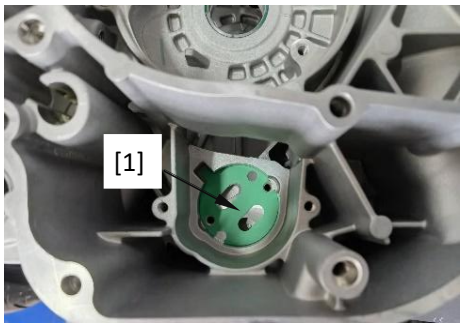
Remove bolt [1] and butterfly-shaped washer [2], which needs turn stopping tools.
Remove driven wheel [3] for oil pump.
Remove chain [4] for oil pump.



Remove bolt [1] and oil pump [2].



Remove gasket [1] for oil pump.



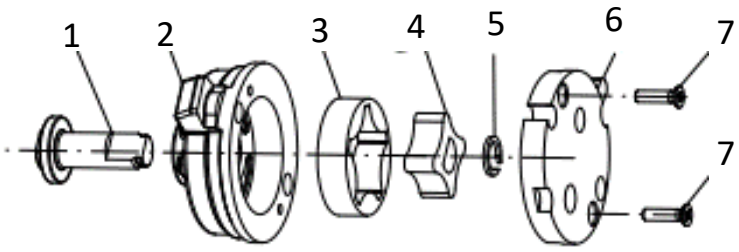
The re-assembly is precisely opposite to disassembly.

Caution:

- Replace shim of oil pump, timing oil bottom case for a new one, cha cap, seal ring and gasket for

Disassembly/Re-assembly

The disassembly and re-assembly for oil pump are shown as below:



1-Transmission shaft for oil pump 2-Base body for oil pump 3-Outer rotor 4-Inner rotor 5-Elastic circlip 6-Oil pump cap 7-Screw

Inspection:

- Inspection for driving, driven wheel and chain of oil pump.

Check if there is damage, wear-out, distortion or burning-out on parts below.

- Transmission shaft for oil pump
- Inner rotor
- Outer rotor
- Base body of oil pump
- Oil pump cap

Please measure clearance for oil pump according to specification of lubrication system.

In case any measured result passed maintenance limit, please replace the oil pump kit.

Oil screen net

Disassembly/Re-assembly

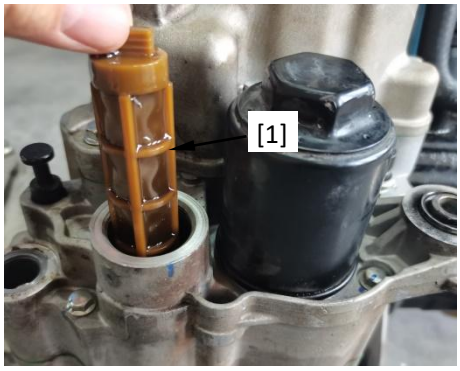
- Disassembly

Drain off oil.

Remove air valve cap [1] and seal ring [2].



Remove oil screen net [1].



- Re-assembly

The re-assembly is precisely opposite to disassembly.

Caution:

1、Replace seal ring for a new one.

2、When screwing up valve, it needs fastening torque.

Fastening torque for valve cap:

13N•m（1.3kgf•m，9.6 1bf•ft）。

Inspection

1. Please check if there is damage on primary screen for oil, in case it is, please replace.
2. Wash primary oil screen by cleanser withhigh fire point, please clean up particle on the filter screen.

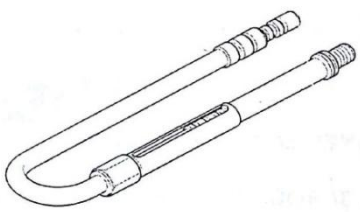
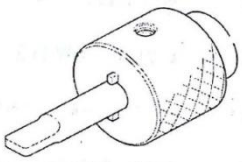
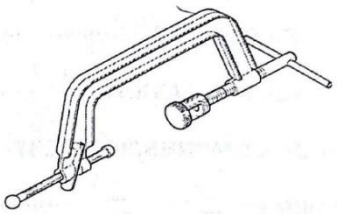
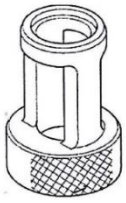
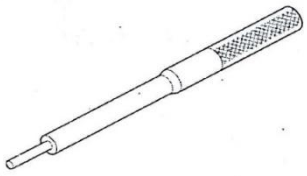
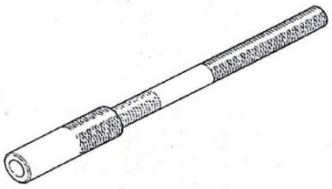
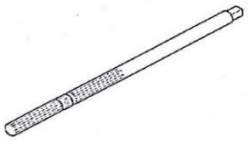
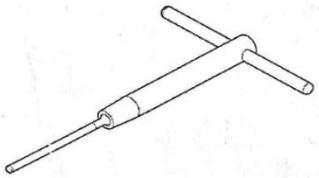
5. Cylinder head and valve

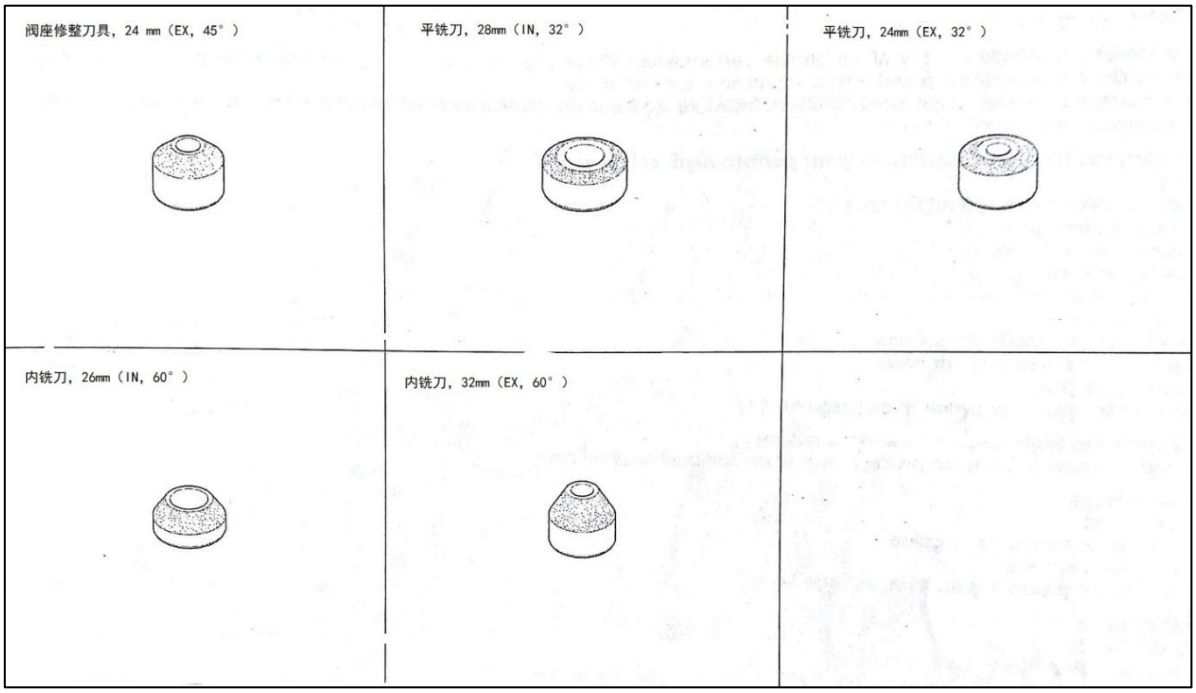
Information for maintenance

Summary

- This chapter contains maintenance and inspection for cylinder head, valve, camshaft and swinging arm.
- When maintaining camshaft, swinging arm, adjusting rod for tensioner, cylinder and valves, it needn't remove engine from frame.
- When breaking up, please mark up the disassembled parts and put them in place for ensure a correct re-assembly.
- Before inspection, clean up all the removed components by cleanser, then dry them up by compressed air.
- The lubricant for camshaft shall be filled up from oil passage on cylinder head and its cover, so please clean up oil passage before installing cylinder head and its cover.
- Please avoild any damage on contact surface when disassembling cylinder head and its cover.

Tool

压缩表附件 	张紧装置夹 B 	气门弹簧压缩工具 
气门弹簧压缩附件 	阀导管驱动装置，4.5mm 	气门导管调整驱动器 
气门导管铰刀，4.5mm 	刀座，4.5mm 	阀座修整刀具，27.5mm（IN，45°） 



Specification for cylinder head/Valve

Unit:mm

Items			Standard	Maintenance limit
Cylinder pressure for electric starting			（500～1000）kPa	450 kPa
Valve clearance		Intake valve	0.08～0.12	0.15
		Exhaust valve	0.13～0.17	0.2
Swinging arm and its shaft	Inner diameter for swinging arm	Intake/Exhaust	10.000～10.015	10.055
	Outer diameter for swinging arm shaft	Intake/Exhaust	9.972～9.987	9.942
	Clearance between swinging arm and its shaft	Intake/Exhaust	0.013～0.043	0.10
Camshaft	Protrusion height for cam	Intake	30.126～30.226	30.100
		Exhaust	29.877～29.977	29.850
	Clearance between journal and hole		0.022 ～ 0.062(Smaller end) 0.025～0.066（Bigger end）	0.10

	Runout		—	0.04
Valve and its guiding tube	Diameter for valve rod	Intake	4.957～4.972	4.92
		Exhaust	4.960～4.975	4.92
	Inner diameter for guiding tube of valve	Intake/Exhaust	5.000～5.012	5.040（Intake） 5.050（Exhaust）
	Clearance between valve rod and guiding tube	Intake	0.028～0.055	0.09
		Exhaust	0.025～0.052	0.10
	Height for guiding tube	Intake/Exhaust	11.7～12.3	—
	Width for valve base	Intake/Exhaust	1.0～1.2	1.5
Free length for valve spring			39.4	37.4
Flatness for cylinder head			0.05	0.1

Troubleshooting

- The malfunction at top of engine is bad for its performance. These malfunctions could be diagnosed by compression test, also the engine noise could be traced by detector rod and stethoscope, whose range even reaches the top end.
- In case engine performance is poor when it is in low rotation, please check if there is white smoke in breathing tube of crankcase. In case soft hose is smoky, please check and confirm if there is jamming on piston rings.

When the engine is working under low rotation, too low the compression is difficult for starting or makes performance poor

- Valve
  - Improper adjustment for valve clearance
  - The valve burned out or got bent
  - Incorrect valve timing
  - The valve spring break up
- Cylinder head
  - Gasket for cylinder head leak or damage
  - Distortion on cylinder head or crack
  - Flexible spark plug
- Wear-out for cylinder, piston and piston rings

Too high the compression, over heat or noise of knocking

- Too much carbon buildup on piston head or in combustion chamber

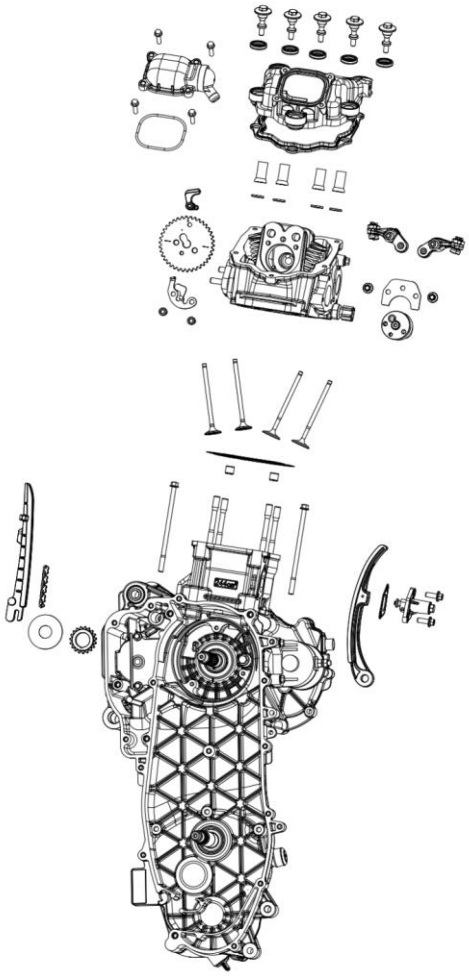
Smoky

- Cylinder head
  - Valve rod or guiding tuve wear out
  - Sealing piece for valve rod damaged
- Cylinder, piston or piston ring wear out

Noisy
- Cylinder head
  - Improper adjustment for valve clearance
  - Valve jamming or valve spring cracked
  - Camshaft wear out or damage
  - Swinging arm or its shaft wear out
  - Swinging arm and end of valve rod wear out
  - Timing driven wheel get flexible or wears out
  - Timing chain wear out
- Cylinder, piston or piston ring wear out

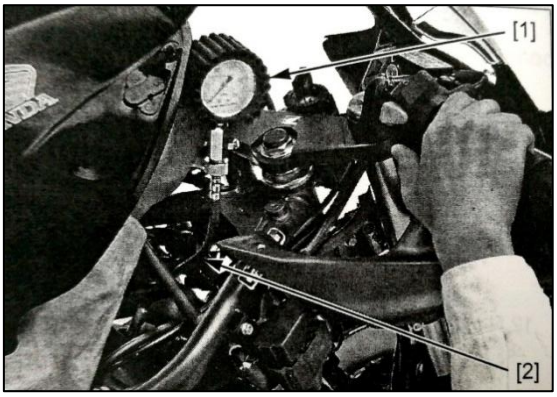
Poor idling
- Too weak compression in cylinder

Components layout



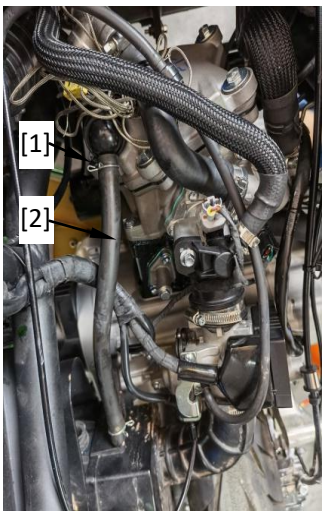
Compression test for cylinder

Heat the engine to normal working temperature.
Stop engine and remove spark plug.
Assemble wire connector for ECM temporarily.
Assemble threaded end of cylinder pressure gauge [1] into hole of spark plug.



Tool:
Accessory for compression gauge [2]
Turn the ignition switch to position “on”, then turn
The engine switch to position “ ”。
Turn the throttle to the top, start engine until its pressure gauge without rise any more.
Usually the maximum data may keep for 4-7 seconds.
Compression force:
When rotation is 在 (450～500) r/min, it is (600～1000) kPa
Analysis for weak pressure:
- Leakage at cylinder head gasket
- Improper adjustment for valve clearance
- Valve leak
- Piston ring or cylinder wears out
- Malfunction in pressure relief valve

Analysis for high pressure:
- Carbon buildup in combustion chamber or on piston top



Cylinder head cover

Disassembly/Re-assembly

Caution:
- The maintenance for cylinder head cover needn’ t remove engine from frame.

Remove seat and sitting barrel.
Remove parts below:
Tube clamp [1] for waste gas tube on crankcase

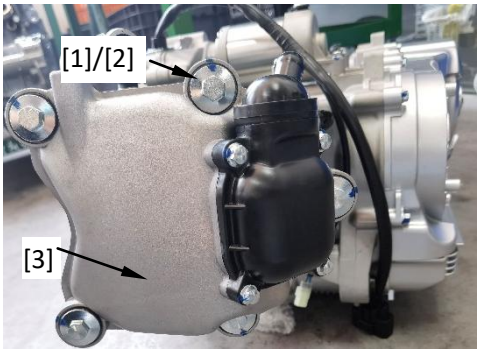
Waste gas tube [2] on crankcase

Remove bolt [1] and rubber base [2] on cylinder head cover.

Remove cylinder head cover [3] from cylinder cover

Caution:

To avoid runout of cylinder head cover, please fix it by adhesive tape.



Remove seal ring [1] from cylinder head cover.

The re-assembly is precisely opposite to disassembly.

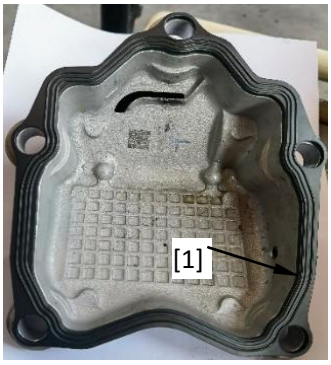
Torque:

Bolt on cylinder head cover.

10N•m (1.0kgf•m, 7.4 lbf•ft)

Caution:

- Please replace seal ring on cylinder head cover for a new one.
- When re-assembling, please install the seai ring for cylinder head cover onto its corresponding groove on the cover.



Tensioner

Removal for tensioner

Caution
This is not a tensioner get back in place automaticall. When pushed out the rod for making up of tightness for timing chain, the pushing rod will not get back in place. Please follow the rules below: When remving the tensioner, please don’ t remove installation bolt on one side only, otherwise the tensioner and timing chain may damage. Once bolt loosened, please remove and return the tensioner according to its description. Please don’ t turn the crankshaft when removing tensioner, otherwise the timing may get wrong or damage valves.

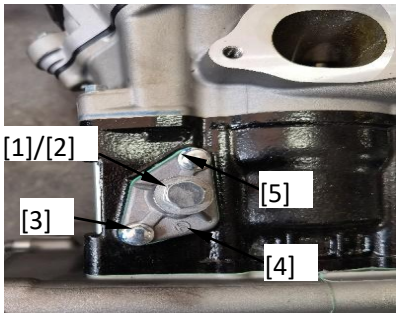
- **Removal:**

Bolt [1] of tensioner and seal ring[2].

Installation bolt [3] for tensioner.

Tensioner [4]

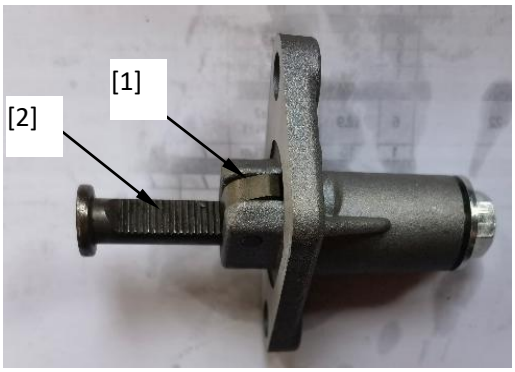
Gasket [5] for tensioner.



parts.

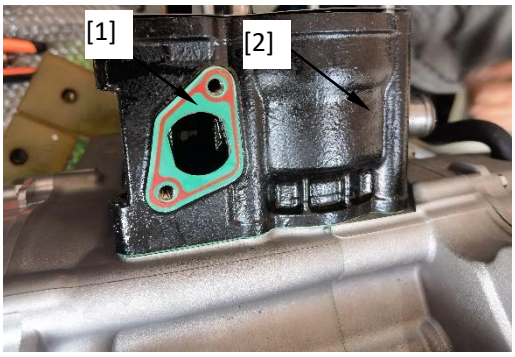
Assemble tensioner

• **Press wedge** [1], push the pushing rod[2]by hand untill it is in place, then release the wedge.



Caution
Please don’ t turn the pushing rod anticlockwise before assembling tensioner, otherwise the pushing rod may get apart and fail to assemble tensioner.

• Replace gasket [1] of tensioner for a new one, then assemble the tensioner with compressed pushing rod onto cylinder body [2].



• Fasten installation bolt [1] for tensioner.

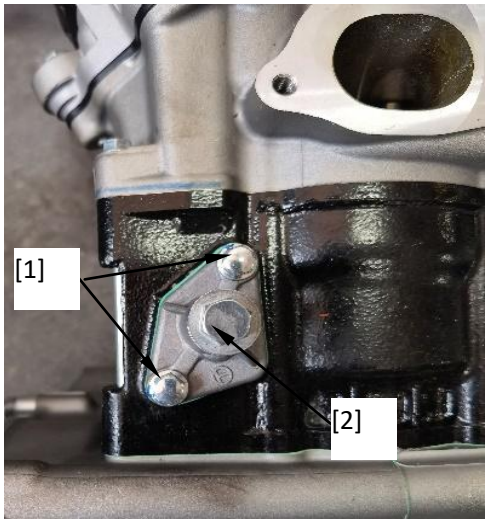
Torque:10N•m(1.0kgf•m,7.4 1bf•ft)。

• Replace seal ring for a new one.

• Coat new seal ring with suitable oil.

•Assemble new seal ring and fasten bolt [2] on tensioner.

• Re-assemble the formerly removed



Swinging arm and its shaft for valve

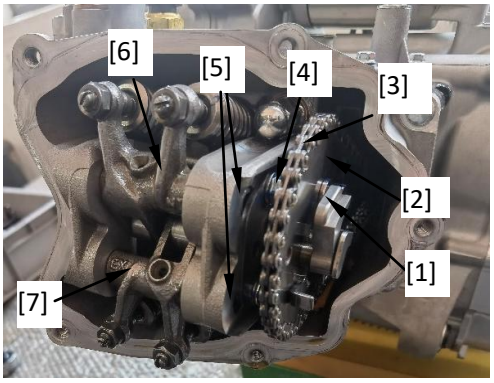
Removal for swinging arm of valve

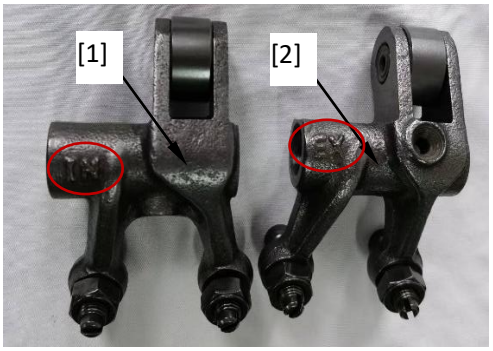
- Removal:
  Installation screw [1] of timing and driven
  Timing and driven wheel [2]
  Hold timing chain [3] by suitabletools.
  Remove installation bolt [4] of pressing plate for camshaft
  Remove swinging arm shaft [5], swinging arm [6] for air intake and that [7] of air exhaust by suitable tool.
- Mark up the position of swinging arm and take into record for correct re-assembly.
- Remove swinging arm and its shaft together.

Caution
Wrong assembly for swinging arm of air intake and exhaust is not allowed, as picture on the right shows, [1] is for air intake with mark “IN” while [2] is for air exhaust with mark “EX”

Re-assembly for swinging arm of valve

- Coat parts below with oil:
  Swinging arm shaft for valve
  Installation hole for swinging arm shaft
- Assemble parts below as picture shows:
  Swinging arm [1] for air intake valve
  Swinging arm [2] for air exhaust valve
  Swinging arm shaft [3] for valve





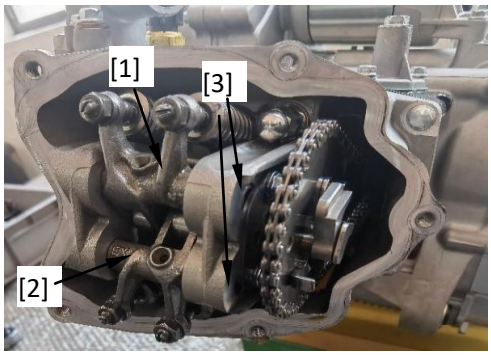
Inspection for swinging arm and its shaft for valves

- Check the outer circle [1] on rolling bearing on swinging arm of valves.

★In case there is scratch, sunk in or other damage, please replace the swinging arm, also please check of tip of camshaft.

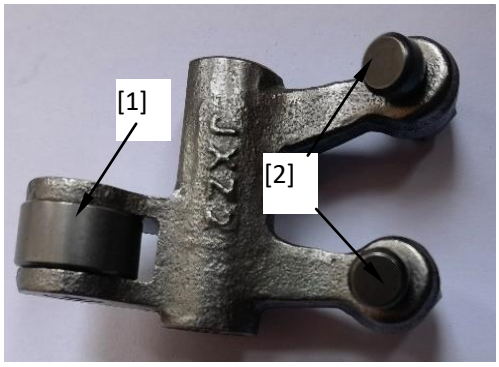
- Check contact position of adjusting screw [2] to valve.

★In case the end of adjusting bolt on valve looks lile mushroom, difficult turning for bolt or other damages, please replace and check the end part of valve.



•Insert the swinging arm shaft into the arm and measure clearance between them.

★In case the clearance is more than limit, please replace them together.



Clearance between swinging arm/shaft for valves

Standard: (0.013～0.043) mm

Limit of use:0.10mm。

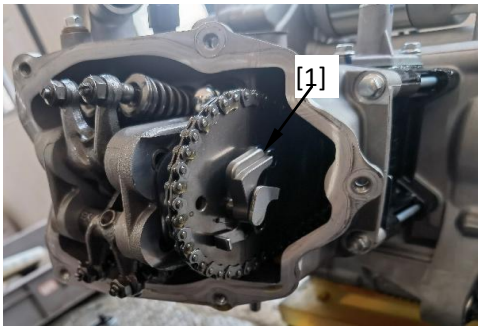
Camshaft

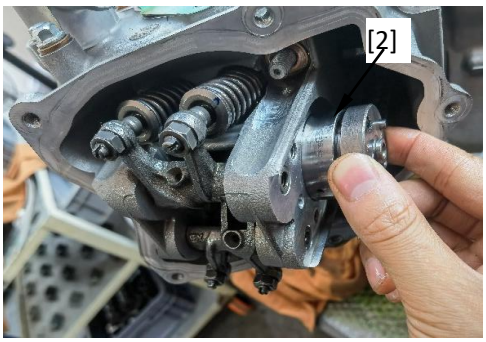
Removal for camshaft

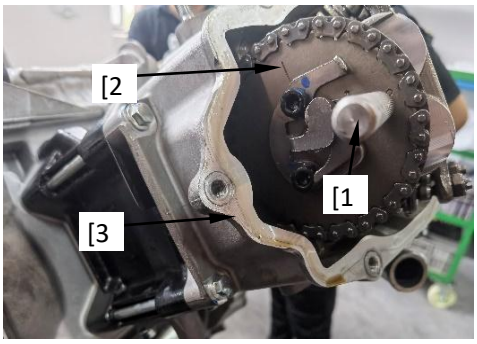
• Removal:
Cylinder head cover
Tensioner
Timing and driven wheel (Turn piston to upper stopping point)
Hold timing chain by suitable tool
Remove bolt for pressing plate of camshaft
Remove swinging arm shaft and the arm for air intake and exhaust valve
Remove pressure relief valve kit [1]
Remove camshaft [2]

Assemble camshaft

• Coat all contact surface of camshaft [2] with oil before its assembly.
• Assemble pressing plate for camshaft and its bolt.。
Torque for bolt:
10N•m (1.0kgf•m, 7.4 1bf•ft)
• Assemble timing chain and driven wheel.
• Assemble pressure relief valve and its pressing plate.
• Assemble installation bolt for driven wheel.。
Torque of bolt:
10N•m (1.0kgf•m, 7.4 1bf•ft)
• Align the timing pin’s hole on driven sprocket wheel to the hole for timing pin on cylinder head, then fix by timing pin [1]; The scale mark [2] of “-“ get in lin while paraller to upper surface [3] on cylinder head (The tip on air intake and exhaust cam face downwards).







Check abrasion for cam

• Remove camshaft first.
• Measure hight A of cam by micrometer
★In case the measured result passed limit for cam, please replace the camshaft.

Cam height

Standard:

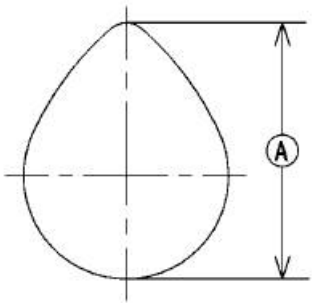
Air intake:(30.126～30.226)mm

Air exhaust:(29.877～29.977)mm

Limit of using:

Intake:30.10mm

Exhaust:29.85mm



Removal for timing chain

• Removal:

Cylinder head cover kit

Cylinder head kit

Guiding plate [1] for chain

Cylinder body

Timing chain cap

Oil bottom case

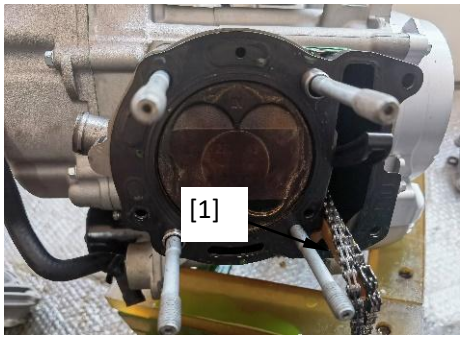
Driven sprocket wheel for oil pump

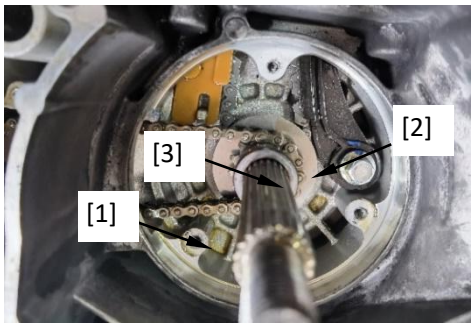
Chain for oil pump

Driving sprocket wheel [1] for oil pump

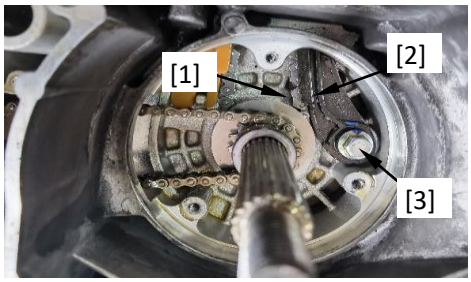
Tensioning plate [2] for chain

Remove timing chain [3] from timing and driving sprocket wheel.





Assembly for timing chain



• Suspend timing chain [1] onto timing and driving sprocket wheel.

• Assemble:

Tension plate [2] of chain

Bolt [3] for tension plate

Fastening torque:

10N•m (1.0kgf•m, 7.4 lbf•ft)。

• Assemble the removed parts。

Check abrasion for guiding and tension plate for chain

• Visually check contact surface between guiding and tension plate

★In case the rubber damaged, cut, or dropped off, please replace guiding and tension plate.

Cylinder head

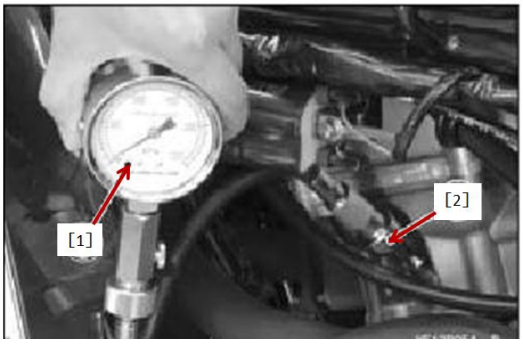
Measure pressure for cylinder

Caution
Charge battery full of power.

- Pre-heat engine, then stop it.
- Remove spark plug.
- Firmly connect cylinder pressure gauge [1] and adapter [2] into hole of spark plug.

  Tool-Cylinder pressure gauge 20kg/cm²

  Adapter M10×1



- Start engine, turn throttle to full until the data on cylinder pressure ggauge without further rise, at this moment, the data is the highest cylinder pressure.。

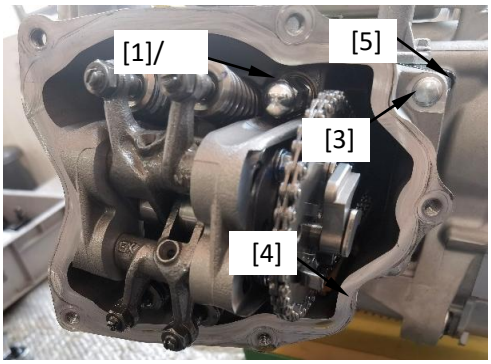
  Allowed cylinder pressure ： (500～1000)kPa。

In case the cylinder pressure is out of allowed range, please refer to form list below:

Problem	Diagnosis	Countermeasure
Cylinder pressure is higher than allowed	Piston carbon buildup, damage on cylinder head or in combustion chamber may be caused of damage on oil shield/oil ring of piston (White smoke)	Clean up carbon buildup and replace damaged parts

range	Incorrect thickness for cylinder head	Replace gasket with standard specification
Cylinder pressure is lower than allowed range	There is air leaks surrounding cylinder head	Replace damaged gasket for a new one and check distortion on gun tip
	Abnormal work for valve spring	Replace when it is necessary
	Incorrect valve clearance	Adjust valve clearance
	Incorrect clearance between piston/cylinder	Replace piston or cylinder for a new one
	Piston scraping	Check cylinder, replace/repair cylinder/or piston when it is necessary
	Abnomal suitation for piston ring/groove	Replace piston/or piston ring for a new one

Removal for cylinder head



- Drain off coolant
- Removal:

  Air intake tube

  Air exhaust tube

  Spark plug cap

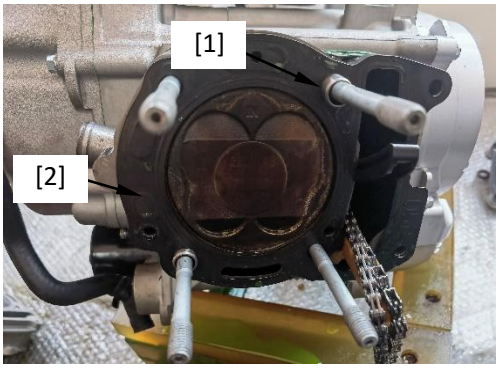
  Timing driven sprocket wheel

  Nut [1] on cylinder headand flat washer [2]

  Hex. flange bolt[3]

  Cylinder head [4] and gasket[5]

Assembly for cylinder head



- Replace gasket for cylinder head for a new one.
- Assembly:

  Positioning pin [1]

  New gasket for [2] for cylinder head

  Cylinder head

  Camshaft

• Fasten nut on cylinder head and hex. flange bolt。

Fastening requirement: Fasten nuts by sequence of alternative and crossin angle, by the torque of 10N•m for pre-fastening first, then fasten by torque of 30N•m. Fastening torque:

30N•m(3.0kgf•m,22.2 1bf•ft)。

Fastening torque for hex. flange bolt :

10N•m (1.0kgf•m, 7.4 1bf•ft)。

Therre is not any distortion on cylinder head

Standard: Without clearance

Using limit：0.1mm

★In case the distortion of cylinder head passed using limit, please replace.

★In case the distortion for cylinder head is lower than using limit, please grind by lower surface by fine sandpaper。

Clean up cylinder head

• Remove cylinder head:

• Scratch and clean up carbon buildup in combustion chamber and air exhaust port:

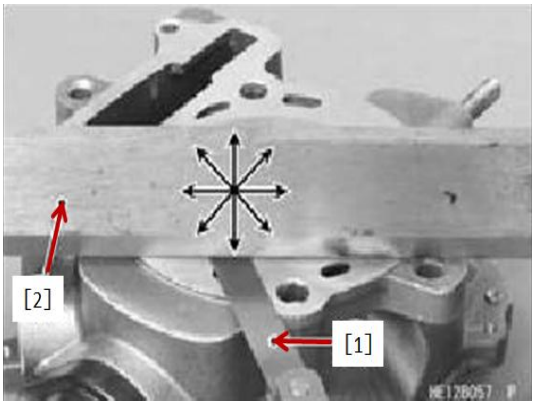
•Clean up cylinder head by cleanser with high fire point.

Check distortion for cylinder head

• Clean up cylinder head;

• Lay a ruler at lower surface of cylinder head;

• Measure clearance between ruller [2] and several positions at lower surface of cylinder head by feeler gauge [1].。



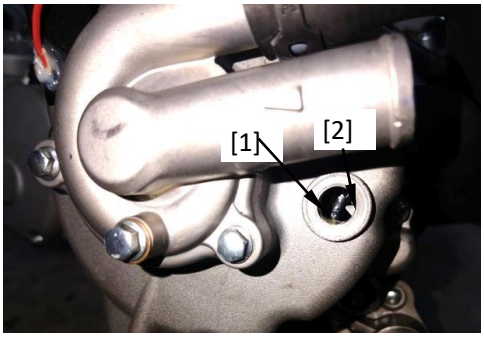
Valves

Check valve clearance

Caution
Valve clearance could be checked only when engine cooled down to room temperature.

• Removal:
Cylinder head cover
Seal ring and view cap on right case cover
Coverting plate for breathing groove
Screen net kit for breathing groove

•Turn the drving belt wheel auticlockwise, untill the scale line {1} mark "T" align to mark [2] of protrusion on right crankcase cover as picture shows, the end of compression stroke in cylinder.



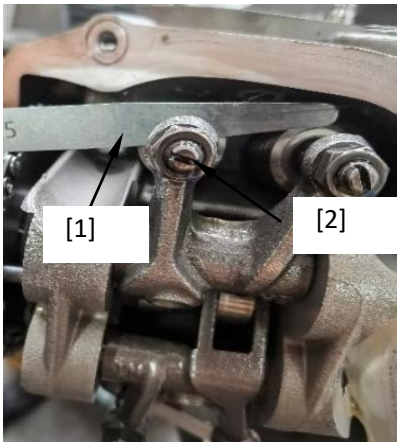
• Measure valve clearance by feeler gauge [1], and measure the clearance between end part of valve rod and adjustable screw [2].

• Valve clearance (When engine is cooled down).

Air intake valve: (0.08～0.12) mm;

Air exhaust valve: (0.13～0.17) mm;

★In case valve clearance is incorrect, please adjust.



Adjustment for valve clearance

• Loosen locking nut, turn the adjustable screw untill clearance got correct:

•Make adjustable screw [1] steady, fasten the locking nut [2];

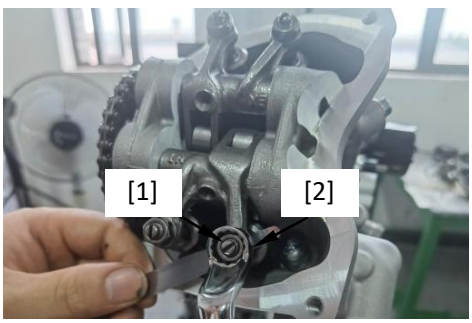
Fastening torque for locking nut: 10N•m (1.0kgf•m, 7.4 1bf•ft)。

Tool-Fixture for adjustable screw

• Check valve clearance once again.

★In case clearance is incorrect, please adjust once again.

★In case clearance is correct, please adjust it for another valve..



Removal for valves

- Removal for cylinder head:
- Mark up position of valves for an easy re-assembly;
- Remove valves by compression device [1] of valve spring and adapter [2].
  Tool-Compression device for valve spring;
  -Adapter。

Re-assembly for valve

- Replace oil shield [3] for a new one.
- In case the valve was replaced for a new one, please check clearance between valve [1] and its guiding tube.
- Too wide or narrow the clearance, please replace cylinder head of valve.
- Coat rod part of valve with oil, then assemble valve and lower base [2] of spring.
- Assemble valve spring [4], whose thinner side face upwards while thicker side face downwards.
- Assemble upper base [5] for valve spring.
- Assemble lock clip[6]

Measure clearance between valve and its guiding tube

- Measure outer diameter for rord part of every valve and inner diameter of guiding tube.。
- Minus outer diameter of rod part of valve by inner diameter of guiding tube, the result is corresponding clearance.

★In case the clearance passed using limit, please replace cylinder head or valve.

Clearance between valve and its guiding tube

Standard:

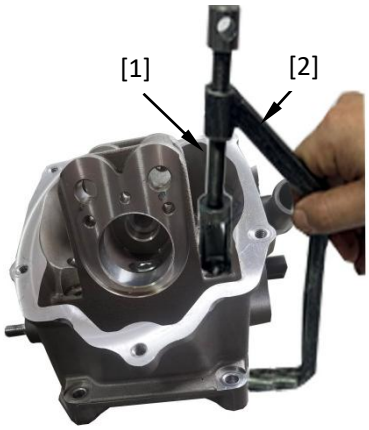
Air intake valve：(0.028～0.055)mm

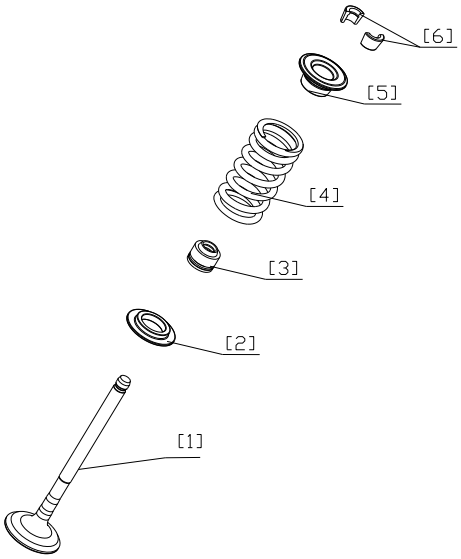
Air exhaust valve:(0.025～0.052)mm

Using limit:

Air intake valve: 0.09mm

Air exhaust valve: 0.10mm





6. System CVT

Information of maintenance

Summary

- This chapter is about maintenance for system CVT, all operations needn't remove engine from frame.

Tool



Tool for clutch driving plate



Tool for clutch driving plate

Specification for system CVT

Unit: mm

Items		Standard	Using limit
Driving belt	Width of driving belt	21～22	20
Driving belt wheel	Diameter for installation hole of sliding and driving plate	24～24.021	24.071
	Outer diameter of sleeve for sliding and driving plate	23.959～23.98	23.92
	Outer diameter of roller	20.9～21.1	20.4
Driven belt wheel	Diameter for installation hole of sliding and driven plate	41～41.025	41.075
	Axial diameter for installation of fixing and driven plate	40.966～40.991	40.916
	Free length of pressure spring	122.7	117.7
	Thickness for friction lining	3.25～3.35	1

	of clutch shoe		
	Inner diameter for outer plate of clutch mm	134～134.2	134.5

Troubleshooting

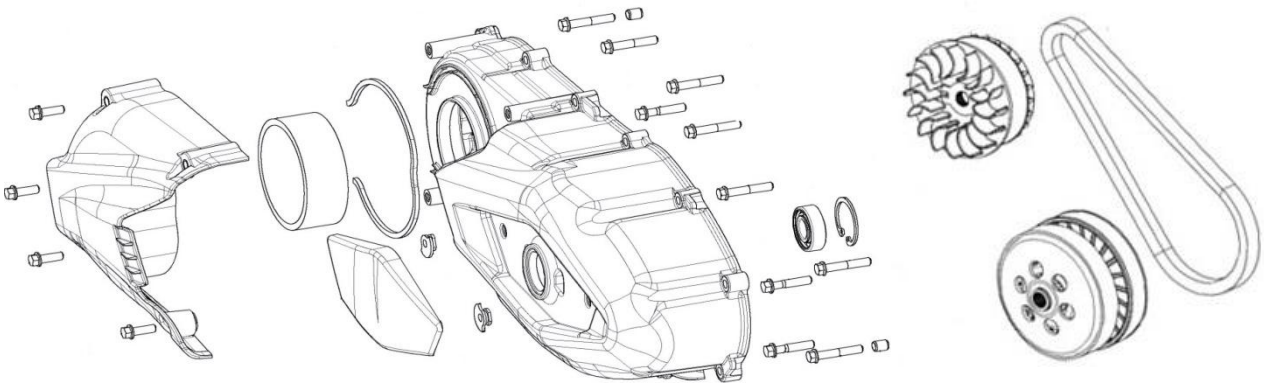
Clutch skidding during acceleration

- Driving belt wear out
- Clutch shoe wear out or burn out

Clutch absornal noise

- Welding joint on friction plate of clutch dropped off
- Lubricant failure for clutch
- Abnormal abrasion for clutch roller
- Abnormal abrasion for inclining plate of clutch
- Abrasion for damping rubber sheet of clutch shoe

Components layout



Left crankcase cover

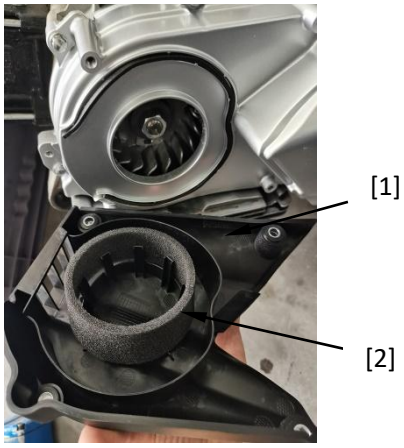
Removal for left crankcase cover

• Removal:

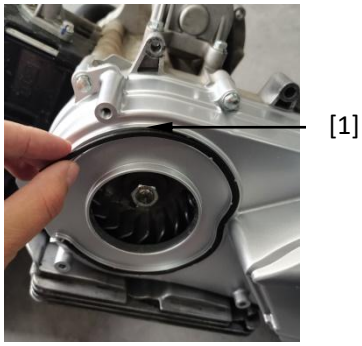
Bolt [1] for outer plate of breathing groove and left decorative cover [2]



Remove outer covering plate [1] for breathing groove and filtering screen [2] of breathing groove



Remove seal strip [1]

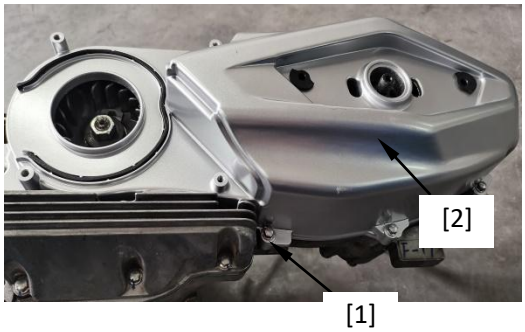


Fastening nut for driven wheel and washer [1]



Installation bolt [1] for left crankcase cover

Left crankcase cover [2]



Assembly for left crankcase cover

• Replace filtering screen of breathing groove for a new one

• Assembly:

Left crankcase cover

Seal strip

Filtering screen net for breathing groove

Outer covering plate for breathing groove

Left decorative cover

• Fasten the bolt on left crankcase cover and outer plate of breathing groove.

Fastening torque for left crankcase cover:

10N•m (1.0kgf•m, 7.4 1bf•ft)

Fastening torque for outer plate of breathing groove:

10N•m (1.0kgf•m, 7.4 1bf•ft)

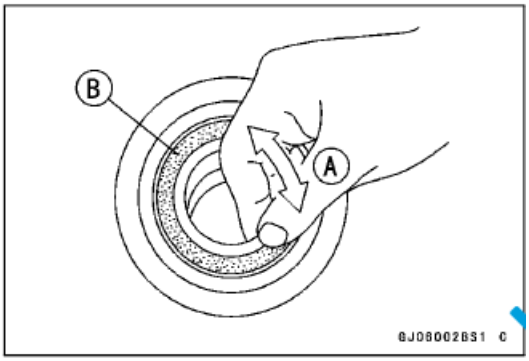
• Inspection for bearings

Caution
Please don't remove bearing for inspection, once it removed, which needs be replaced for a new one.

• Check the clearance and free turning, turn the bearing A around.

★In case there is clearance, roughness or adhesion on bearing, please replace for a new one.

• Check and confirm if there is crack on end surface B of bearing.



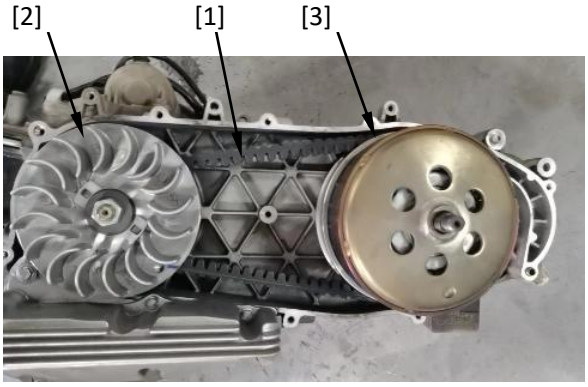
Driving belt

Removal for driving belt

- Remove driving belt wheel kit.
- Remove friction plate of clutch.

Caution
Before removing, please check the information [1] printed on driving belt such as manufacturer name or which side it is faced to for an easy re-assembling, whose turning direction is the same with initial condition.

- Remove driving belt wheel [2] and driven belt wheel [3].



Re-assembly for driving belt

Caution
Make sure the side with information print face to the same direction, in this way, the driving belt could be assembled to its initial turning direction. When re-assembling driving belt, the printed information [1] could be read beside motorcycle.

- The re-assembly is precisely opposite to disassembly.

Abrasion on driving belt

Warning
Any wrong operation, clutch skidding or stalling may seriously damage driving belt, seize up gear box or lock up wheel, which possibly can bring motorcycle out of control, lead to accident, injury even death. Please make maintenance according to its form list.

- Remove left crankcase cover.
- As picture shows, measure width A of driving belt at several positions by a pair of rulers.

★In case the measured result passed the using limit, please replace the driving belt.

- Width of driving belt

  Standard:(21～22)mm

  Using limit:20mm

- Check if there is crack, breaking up or spall from driving belt.
- Clean up or check driving belt each 6000km (6 months), replace according to abrasion, which needs be replaced each 20000km;。

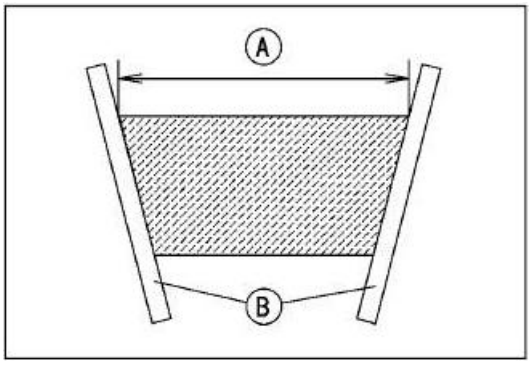
Driving belt A

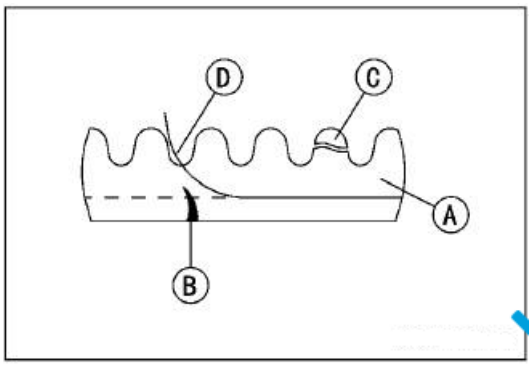
Crack B

Breaking upC

Spall D

Caution
When replacing the driving belt, check driving and driven belt wheel.



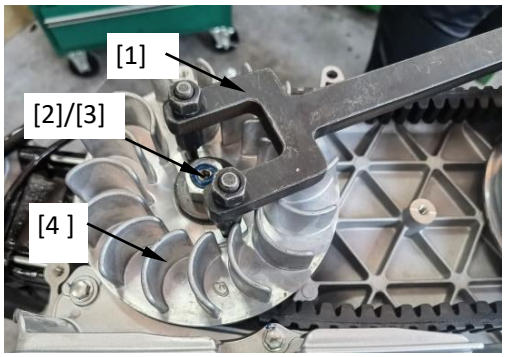


Driving belt wheel kit

Removal for driving belt wheel kit

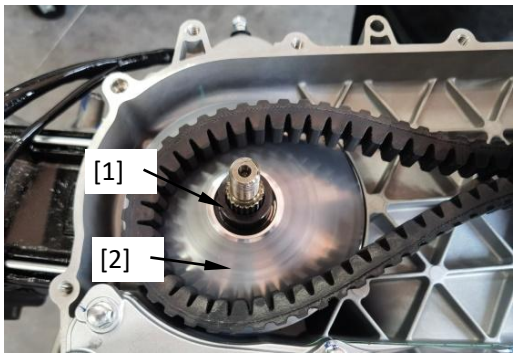
- Remove left crankcase kit.
- Assemble turning stop fixture [1], remove driving belt wheel and assemble nut [2] and washer [3].
- Remove driving plate [4]。

Tool-Turning stop fixture

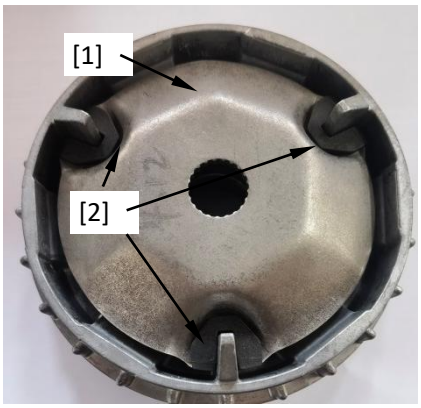


•Remove sleeve [1] for sliding and driving plate.

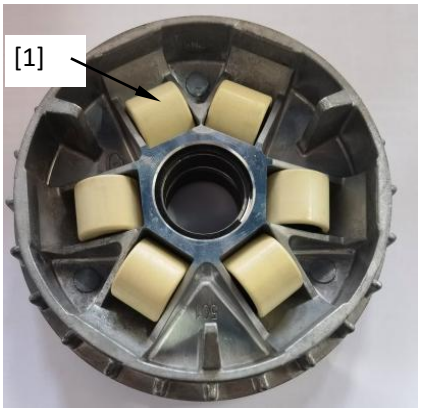
•Remove sliding and driving plate kit [2]



• Remove inclining plate [1] and its side piece [2].



• Remove rollers [1] of counterweight.



Inspection for driving belt wheel

★ In case there is damage on surface [1] of driving belt wheel, please replace sliding plate and /or driving plate.

★In case the installation hole for sliding plate is damaged or worn out, please replace.

•Diameter A for installation hole of sliding plate

Standard:24～24.021mm

Using limit: 24.071mm

★In case the sleeve was damaged or worn out, please replace.

• Outer diameter of collar

Standard:23.959～23.98mm

Using limit: 23.92mm

★Inspect and clean up roller each 6000km (6 months), according to its abrasion, timely replace if it is necessary.

• Outer diameter A for roller

Standard:20.9～21.1mm

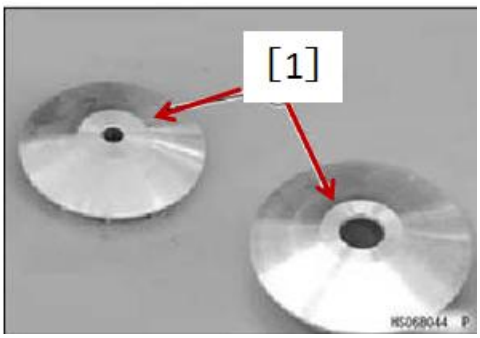
Using limit: 20.4mm

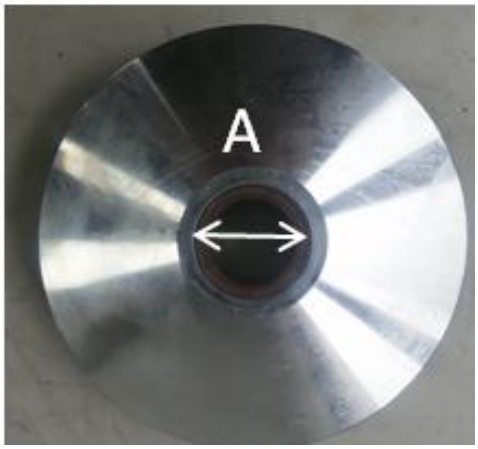
Assembly for driving belt wheel

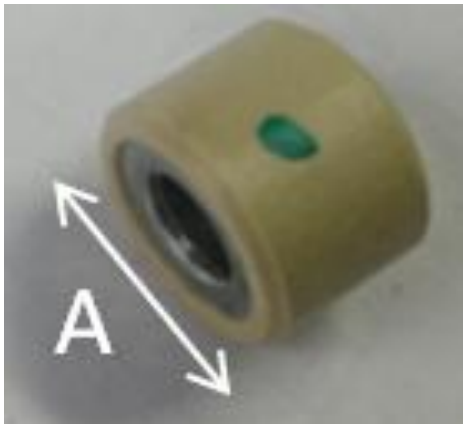
• The re-assembly is precisely opposite to disassembly.。

Caution:

Clean up the parts below by cleanser of degreaser, then wipe up the conical surface of driving plate by dry and clean cloth.







Warning
The common cleanser is combustible, in case breath them in long time is harmful, please pay attention to the warning from their manufacturer.

• When assembling driving plate [1], press the sleeve of sliding plate tight, them move the belt outwards to the lowest position, then assemble washer [2] and nut [3]. Coat threaded part with Loctite before re-assembling.

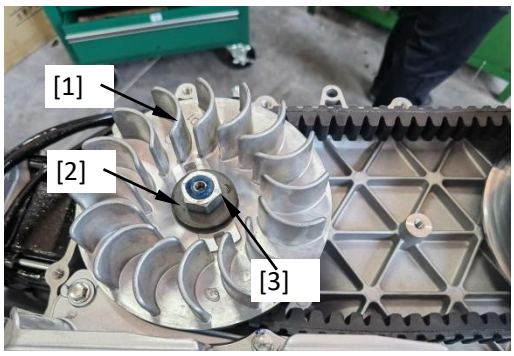
• Assemble turning stop fixture [1]

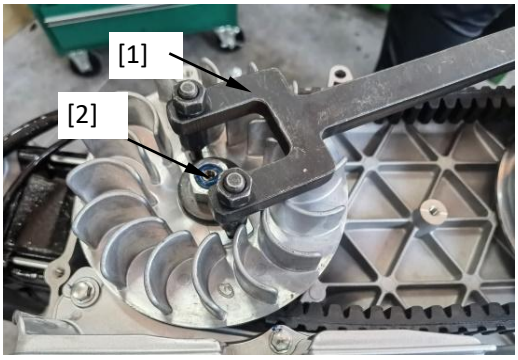
• Fasten nut [2] for belt wheel.

Torque for nut of driving Belt wheel:

90•m (9.0kgf•m, 66.2 lbf•ft)。

Tool-Turning stop fixture





Driven belt wheel kit

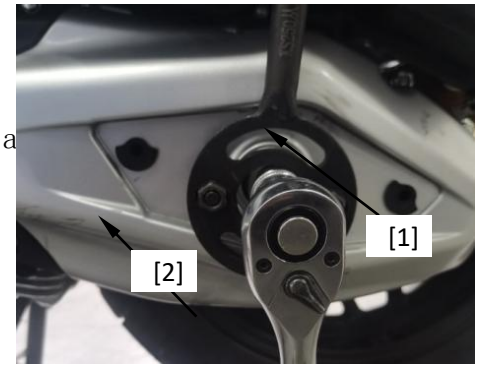
Removal for driven belt wheel

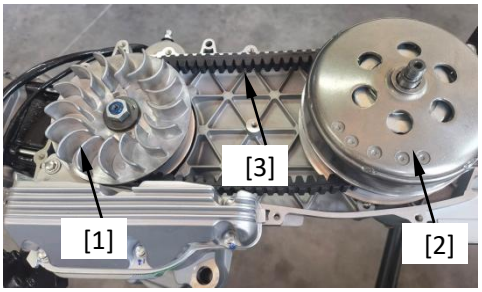
• Remove fastening nut of driven wheel a

• Remove left crankcase cover [2]

•Remove driving belt wheel kit [1]

• Remove driven belt wheel kit [2] and the belt [3]





·Inspection for clutch

·Check if there is damage on clutch shoes.

★In case there is any damage, please replace.

· Measure thickness A for liner piece of clutch.

★In case the thickness of liner piece passed its using limit, please replace clutch shoe.

· Thickness of liner piece of clutch.

Standard: (3.25～3.35) mm

Using limit:1mm

·Check if the outer plate of clutch was damaged.

★In case there is any damage, please replace

·Measure inner diameter A for outer plate of clutch.

★In case the abrasion for outer plate of clutch passed using limit, please replace.

· Inner diameter of outer plate for clutch

Standard: (134～134.2) mm

Using limit:135mm

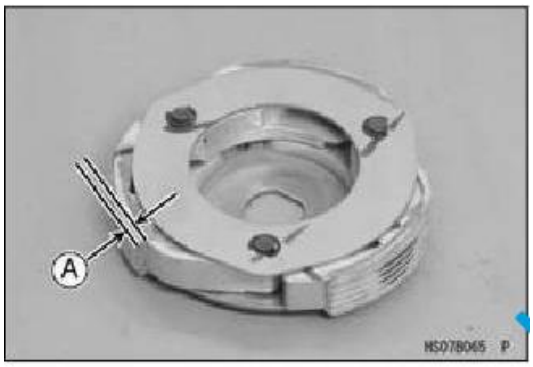
Assemble driven belt wheel kit

·Assemble belt and driven wheel.

·Assemble outer plate of clutch and left crankcase cover.

· Fasten installation nut for driven wheel.

Fastening torque for installation





nut for belt wheel:

90•m (9.0kgf•m, 66.2 lbf•ft)。

Tool-Turning stop fixture.

7. Magneto and starting clutch

Information for maintenance

Summary

- This chapter mainly introduces you maintenance for stator and rotor for magneto, all whose operations needn't remove engine from frame.
- Inspection about trigger.
- Maintenance about starting motor.

Specification for magneto and starting clutch

Unit: mm

Items	Standard	Maintenance limit
Outer diameter for shaft sleeve of starting plate gear	45.660～45.673	45.560
Common normal length for driving gear of double gear	23.395～23.445	23.350
Common normal length for driven gear of double gear	21.707～21.754	21.650

Tools



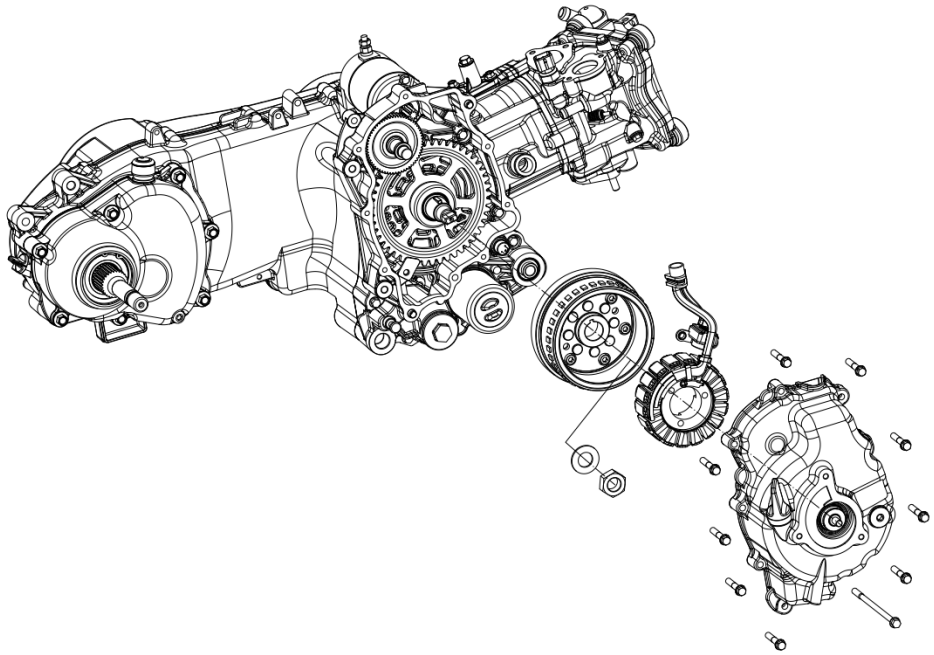
Fixture for rotor of magneto

Troubleshooting

Starting motor is working while engine isn' t

- Malfunction in starting clutch
- Malfunction on double gear of starting motor
- Malfunction or abrasion in smaller gear of starting motor
- Malfunction in driving gear of starting device

Layout for components



Right crankcase cover

Disassembly/Re-assembly

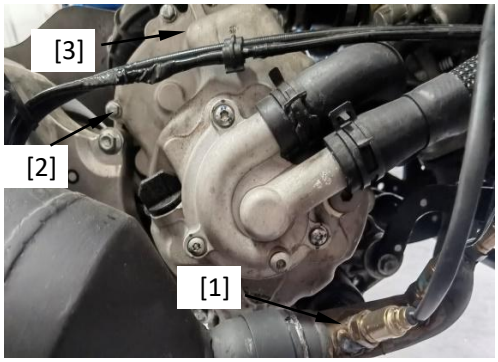
Caution:

- When disassembling right crankcase cover, lay a clean oil tray under engine to avoid oil outflows. When re-assembled, fill up with oil to given position.

Put the motorcycle on horizontal ground and keep it upright, then remove muffler [1].

Put motorcycle on horizontal ground and keep it upright. Remove stator of magneto and wire joint of trigger from frame.

Loosen bolt [2] on right crankcase cover by sequence of diagonal and several steps.



Remove the parts below:

- Bolt
- Right crankcase cover kit [3]

Caution:

- The stator of magneto on right crankcase bears magnetic absorption, please be careful when disassembling or re-assembling.

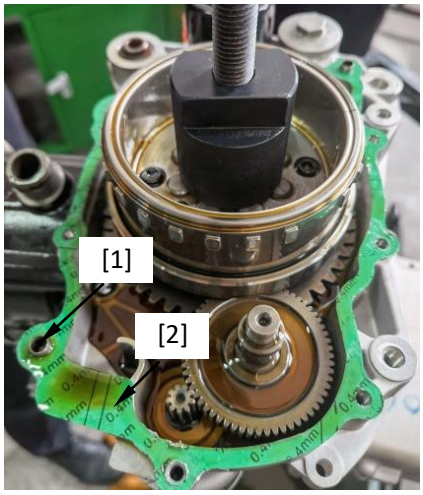
Remove positioning pin [1] and gasket [2].。

Clean up all the residual material for gasket on contact surface between right crankcase and its cover.

The re-assembly is precisely opposite to disassembly.。

Torque:

Bolt on right crankcase cover: **10N•m（1.0kgf•m，7.4 1bf•ft）**



Caution:

- Replace gasket of right crankcase cover for a new one.

Check oil level.

Make sure there is not any oil leakage.

Stator of magneto and trigger

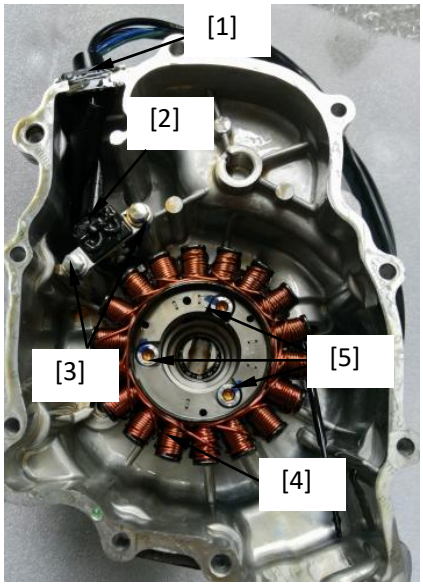
Disassembly/Re-assembly

Remove right crankcase kit.

Remove ring [1] for wire connective jacket between magneto/trigger.

Remove trigger [2] and bolt [3],

Remove stator [4] and bolt [5].



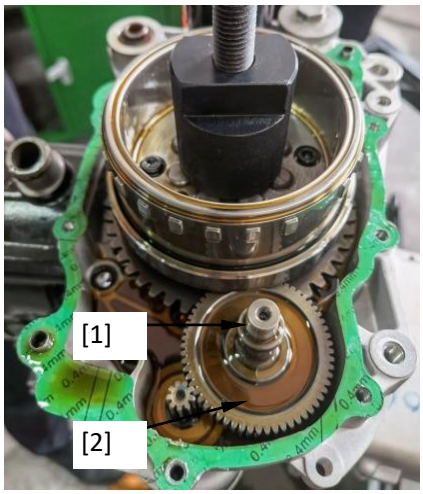
Caution when re-assembling:

- Coat threaded part of stator with Loctite.
- Coat sealing surface of ring for wire connective jacket for magneto/trigger with sealant for end surface.

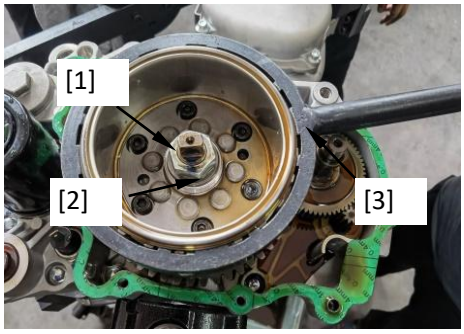
The re-assembly is previsely opposite to disassembly.

Rotor of magneto

Removal



Remove right crankcase cover kit.
Remove shaft [1] of double gears and the double gears [2].



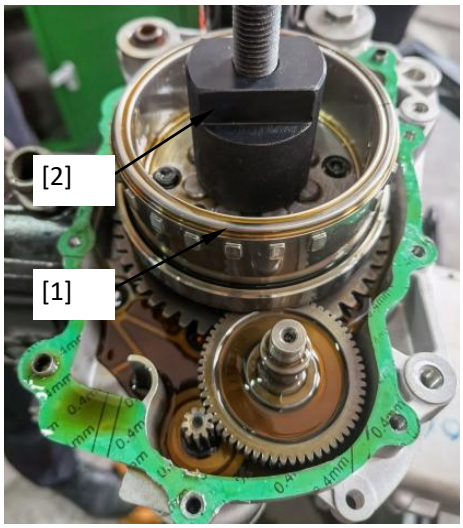
Remove nut [1] and washer [2].

Tool-Turning stop fixure[3].

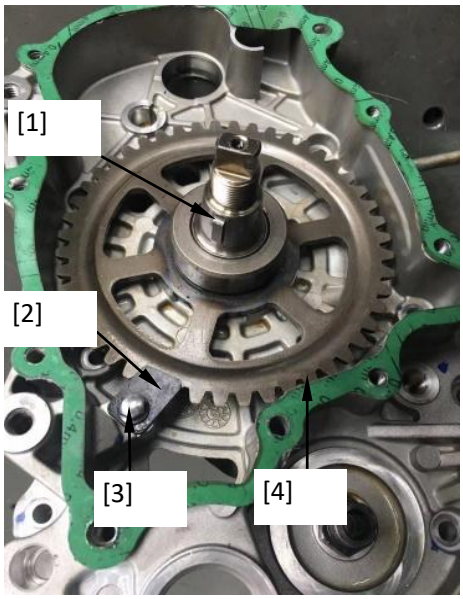
Remove rotor [1] by tool

Tool:

Rotor disassemblller [2]



Remove semi-round key[1].
Remove pressure plate [2] for starting plate gear and bolt [3].
Remove starting plate gear [4].
Please don’ t damage semi-round key and crankshaft.



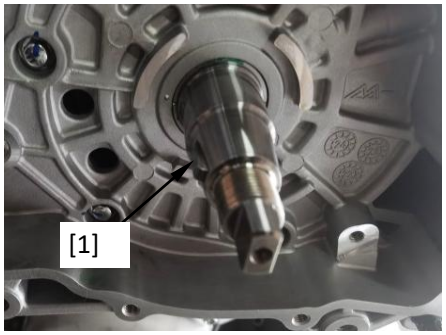
Inspection

Check and confirm if there is scratch, damage, wear-out or distortion on parts below, replace if it is necessary.

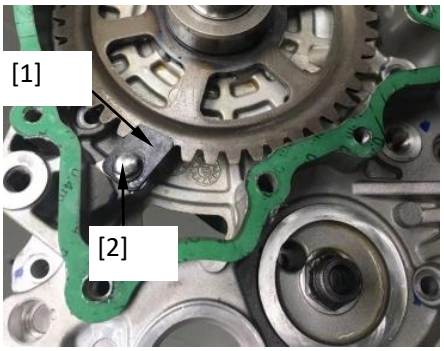
- Double gear shaft
- Double gear
- Semi-round key
- Starting plate gear

Re-assembly

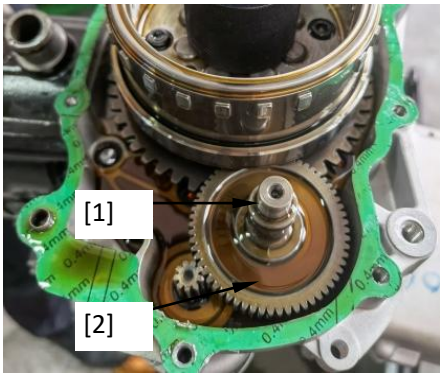
Re-assemble semi-round key [1].
Please don’ t damage groove of semi-round key and crankshaft.



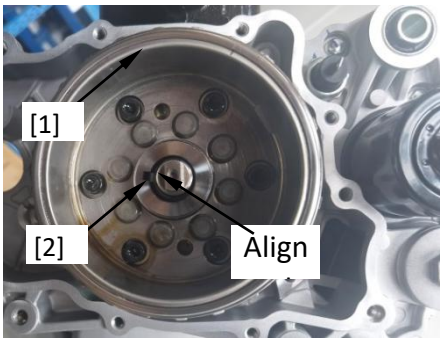
Assemble pressure plate [1] for starting plate gear and bolt [2].
Torque:10N•m (1.0kgf•m, 7.4 lbf•ft)



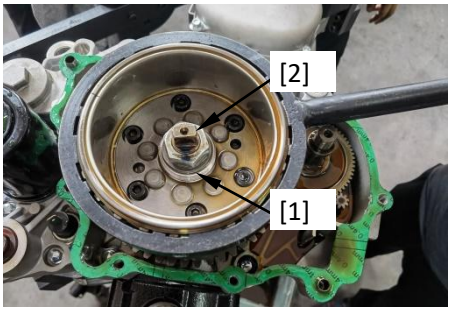
Coat the outer surface of double gear shaft with solvent of molybdenum disulfide.
Assemble shaft [1] and double gear [2].



Totally clean up oil on conical surface of crankshaft and inner hole of rotor
Assemble rotor [1], please align semi round key 2] on crankshaft to its groove on rotor.



Coat the threaded part of bolt for rotor and installation surface with clean engine oil.
Assemble shim [1] and nut [2].
Fasten nut to given torque.
Caution:
●



- Lay fixing piece of fixer for rotor of magneto to avoiding rotor turning.

Torque:100N•m (10kgf•m, 74 lbf•ft)

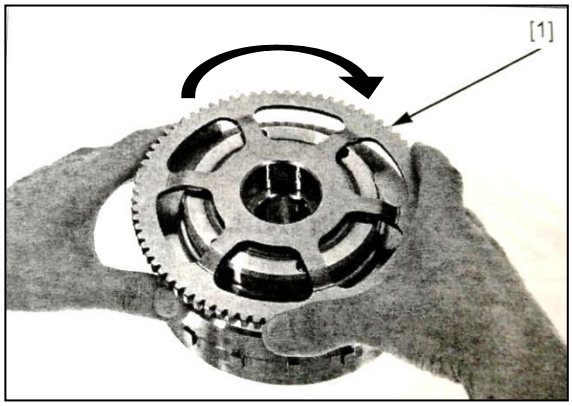
Re-assemble right crankcase cover kit.

Starting clutch

Inspection for starting clutch

Remove rotor

Check operative performance of starting clutch by turning plate-shaped gear [1]. Check smooh work of plate-shaped gear by turning it clockwise or if it is with anticlockwise turning.



Removal

Remove rotor.

Turn the plate-shaped gear clock wise and remove the plate-shaped gear [1].

Inspection

Check if there is scratch, damage, wear-out or distortion on parts below, replace if it is necessary.

- Plate-shaped gear
- Starting clutch

Make sure every part meets specification.

In case it passed maintenenace limit, please replace the component.

Re-assembly

Turn the plate-shaped gear [1] clockwise, then assemble it onto outer case of starting clutch.

Re-assemble rotor, then check perative performance of starting clutch.

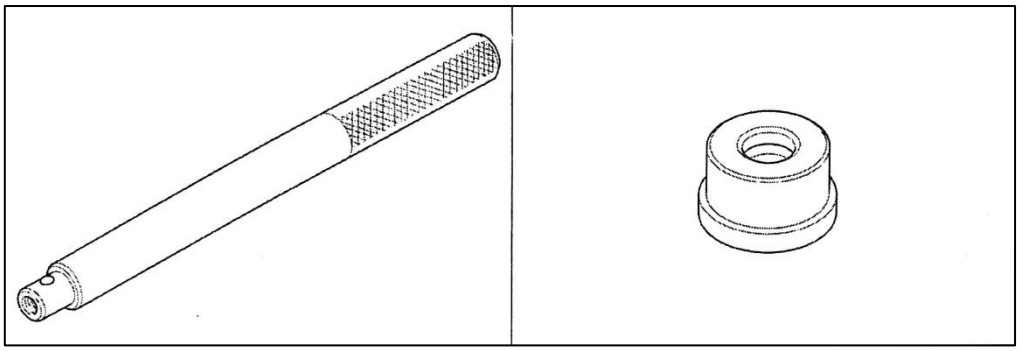
8. Crankcase body and transmission system

Information for maintenance

Summary

- Break up crankcase for maintenance of parts below:
  1. Transmission system
  2. Crankshaft
  3. Piston, connective rod and cylinder body.
- Remove parts below before breaking up crankcase:
  1. Engine
  2. Starting motor
  3. Magneto
  4. Cylinder head comp.
  5. Tensioner
  6. Tensioning and guiding plate
  7. Primary oil filter
  8. Secondary oil filter
  9. Water pump
  10. Water tube
  11. Oil pressure sensor
- Please don’t damage contact surface when maintaining.
- Wash up oil passage before assembling crankcase.
- Mark up crankshaft pads by suitable colors, select the pads according to its corresponding form list, whe the crankshaft pads assembled, check its oil clearance, the incorrect oil clearance may badly damage the engine.

Tools



Specification for crankcase and transmission system

Unit: mm

Items			Standard	Maintenance limit
Transmission system	Main shaft	Shaft diameter at clutch	14.98～14.99	14.95
		Shaft diameter at left bearing	16.98～16.99	16.95
		Shaft diameter at right bearing	19.98～19.99	19.95
		Common normal length of helical gear	11.875～11.912	11.825
	Counter shaft	Shaft diameter at left and right bearing	14.98～14.99	14.95
		Common normal length of helical gear	13.645～13.688	13.600
	Gears of counter shaft	Common normal length of helical gear	30.079～30.126	30.029
	Output shaft	Shaft diameter at left bearing	14.98～14.99	14.95
		Shaft diameter at right bearing	29.974～29.987	29.944
	Gear of output shaft	Common normal length of helical gear	24.338～24.385	24.290

Troubleshooting

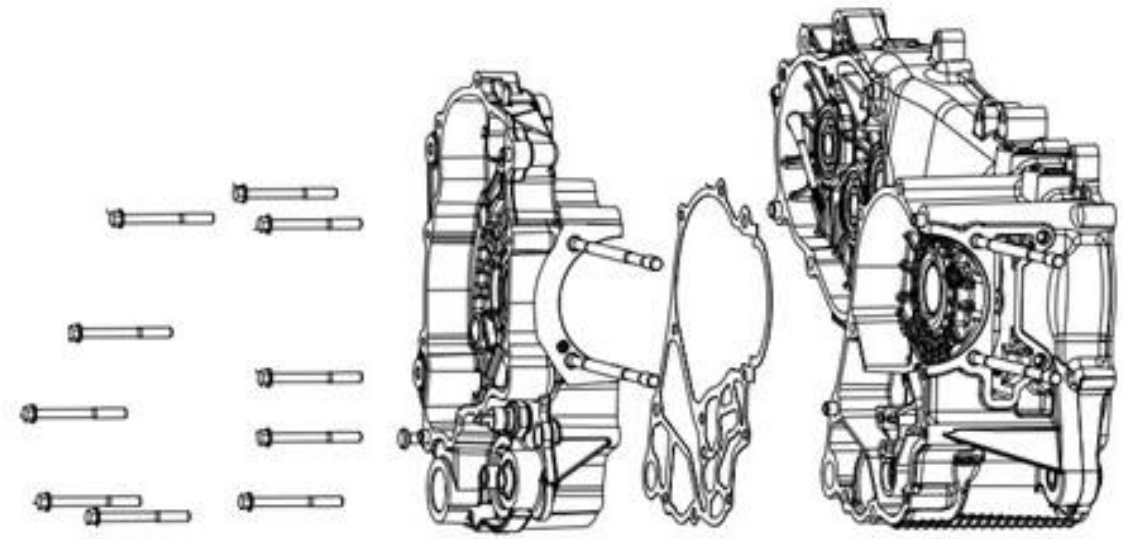
Gear skipping of gearshift system

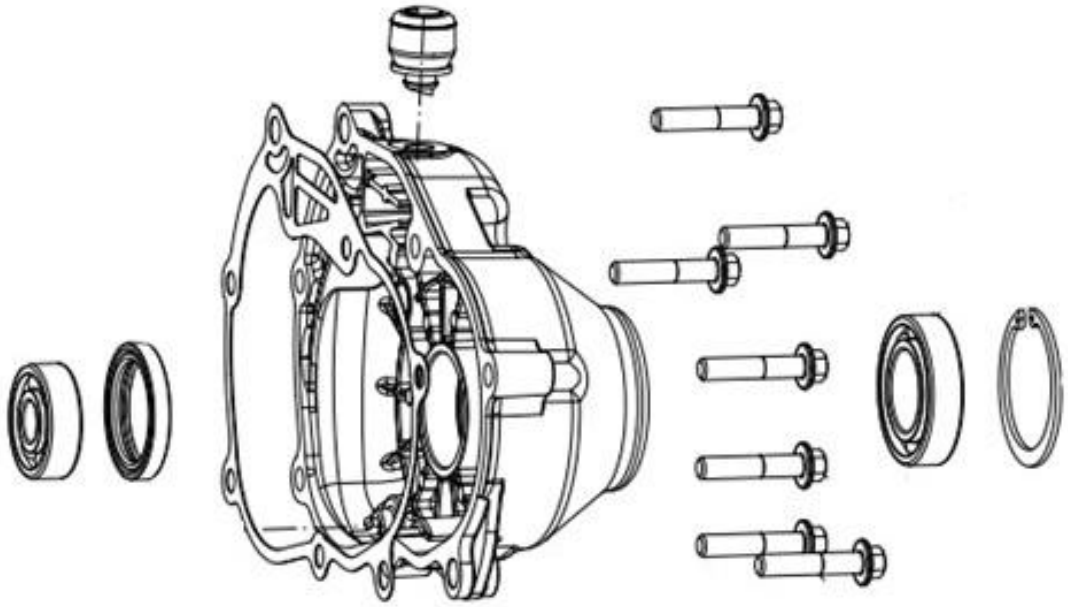
- Gear wear-out
- Distortion of driving belt

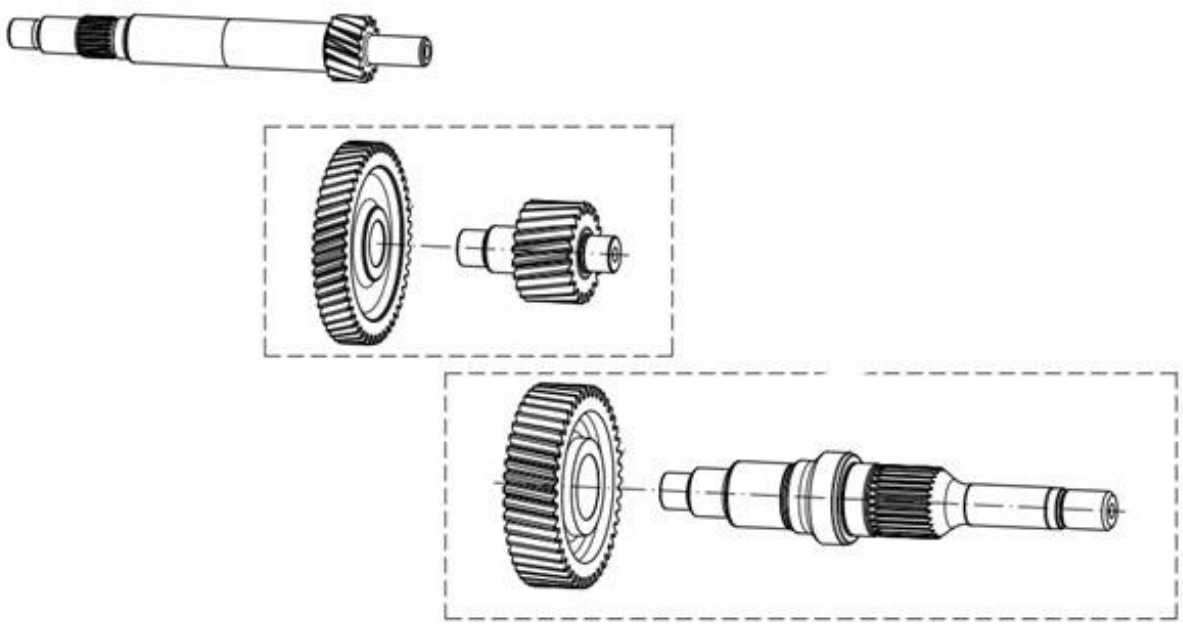
Noise engine

- Transmission gear wore out or damaged
- Transmission bearing wore out or damaged

Components layout



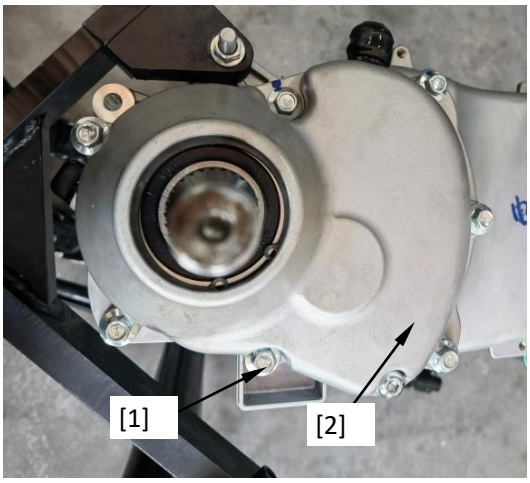




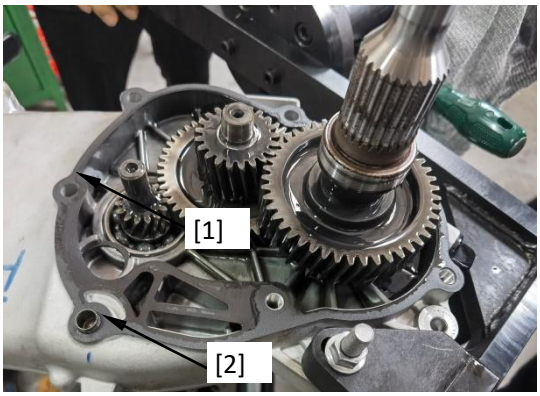
Transmission case/Transmission system

Disassembly and re-assembly

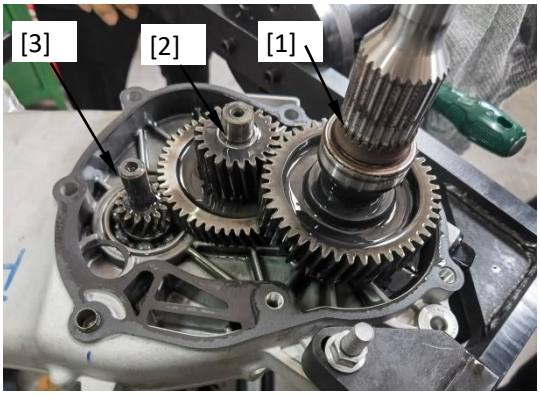
Remove fastening bolt [1] for transmission case , then remove transmission case [2] component.



Remove gasket [1] of transmission case and positioning pin [2].



Remove output shaft [1], counter shaft [2] and main shaft [3].



Caution:

●When removing transmission case, please drain off oil in it before the removing.

Inspection

Check if there is scratch, damage, wear-out or distortion or parts belw, please replace if it is necessary.

- Oil seal
- Gasket
- Bearing

The re-assembly is precisely opposite to disassembly.

Torque: 20N•m (2.0kgf•m, 14.8 1bf•ft)

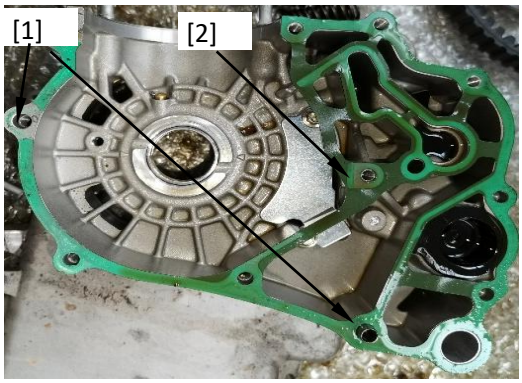
Caution:

- Check if there is runout on output shaft, also the free turning for each gear without abnormal noise.

Case body

Disassembly and re-assembly

Remove case combination bolt [2] alongdirection of right crankcase [1].



Caution:

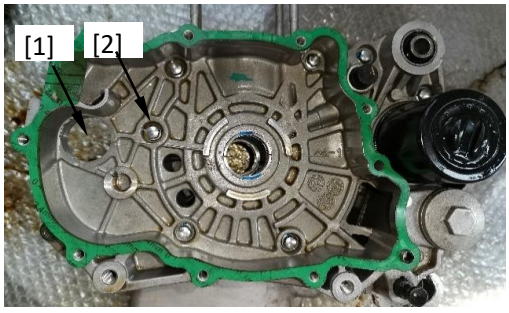
- Please don't knock the crankshaft when breaking u crankcase, if it is necessary, please knock the technique accessory on crankcase.

Assembly

Wash contact surface of left and right crankcase, please don't damage it.

Check oil passage, please clean it up when it is necessary.

Assemble positioning pin and [1] gasket of[2] crankcase, assemble the right crankcase body onto the left one, assemble case combination bolt and fasten to given torque.



Torque: 10N•m (1.0kgf•m, 7.4 1bf•ft)

9. Cylinder body, piston and crankshaft

Information of maitenance

Summary

When maintaining crankshaft, the crankcase must break up, whose method please refer to its corresponding chapter.
Select and match up journal of main shaft and crankshaft pad according to their color, according to the form list for their color. When new crankshaft pad selected, confirm its clearance of oil film by plastic feeler gauge. The incorrect clearance for oil film may badly damage the engine.

Specification for cylinder body, piston and crankshaft

Unit: mm

Items			Standard	Maintenance limit
Crankshaft	Side clearance of bigger end of connective rod		0.2～0.5	0.6
	Clearance between crankshaft pad of bigger end and crankshaft pin		0～0.012	0.05
	Clearance between journal of crankshaft and pad		0.03～0.05	0.09
	Runout		—	0.03
Cylinder	Cylinder bore		72.000～72.012	72.1
	Roundness/Cylindricity		—	0.01
	Flatness		—	0.1
Piston, piston pin and piston ring	Diameter for piston base circle		71.945～71.955	71.905
	Hole diameter for pin		17.004～17.009	17.04
	Diameter for piston pin		16.995～17.000	16.96
	Clearance between piston and piston pin		0.004～0.014	0.07
	Closing clearance for piston ring	1st ring	0.10～0.20	0.4
		2nd ring	0.14～0.27	0.5
		Oil ring	0.20～0.70	1.0

	Clearance between piston ring and their grooves	Clearance between 1st ring and groove	0.030～0.070	0.10
		Clearance between 2nd ring and groove	0.030～0.070	0.10
Cylinder matching clearance			0.045～0.069	0.13
Inner diameter for smaller end of connective rod			17.006～17.017	17.037
Matching clearance between connective rod and crankshaft pin			0.006～0.022	0.006

Troubleshooting

Low cylinder pressure, difficult starting or poor performance under low speed

- Air leaks at gasket of cylinder head
- Piston rings wear out, jamming or damage
- Cylinder head/piston damage or wear out

Too high the pressure in cylinder, cylinder body over heat or cylinder knocking

- Too muc carbon buildup on top of piston or in combustion chamber

Too much waste gas emission

- Wear-out on cylinder body, piston or piston ring
- ncorrectly assembled piston ring
- Scrapping or scratch on piston or cylinder wall

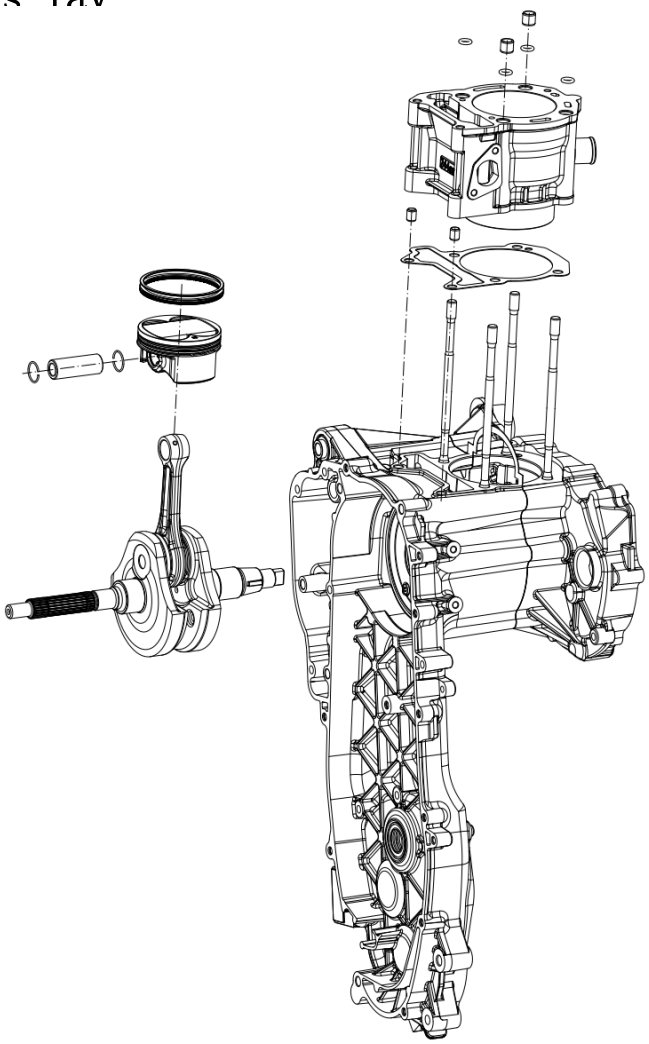
Abnormal noise in engine

- Wear-out on piston pin or its hole
- Wear-out on smaller end of connective rod
- Wear-out of cylinder body, piston and piston ring
- Wear-out on crankshaft pin or pad

Engine shocking

- Too strong the runout on crankshaft

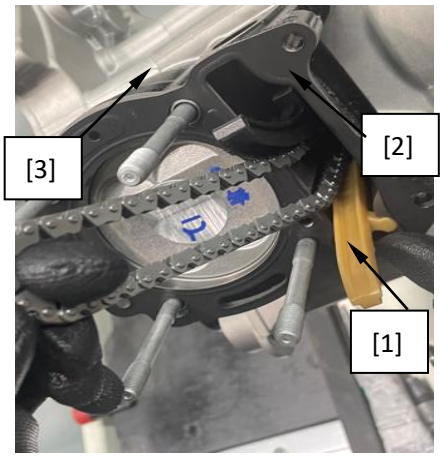
Components lay



Cylinder body

Removal

Remove cylinder head cover and the head itself (Refer to cylinder head and valves)
Guiding plate [1] of chain
Gasket [2] of cylinder body, positioning pin and seal ring
Cylinder body[3]
Pry up cylinder body by rubber hammer and screwdriver, pull it off upwards, get piston out of cylinder hole and remove cylinder body.



passed maintenance limit, plese replace.

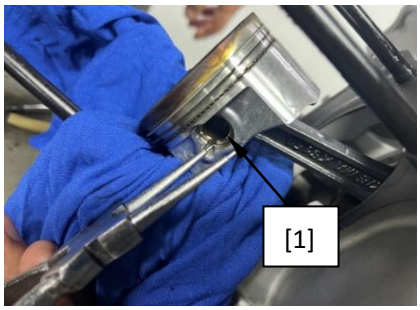
Inspection

Check if there is scratch, damage, wear-out, distortion, burn out or oil passage blocking up on cylinder body. Measure each oart according to corresponding specification of cylinder body, piston and crankshaft, any part

Re-assembly

Chapter for assembly of cylinder body and piston are in one.

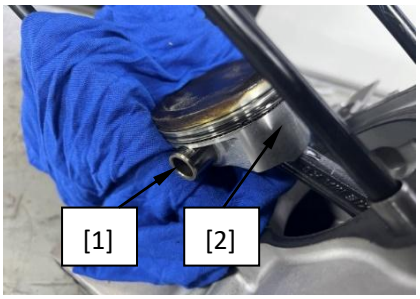
Piston



Removal

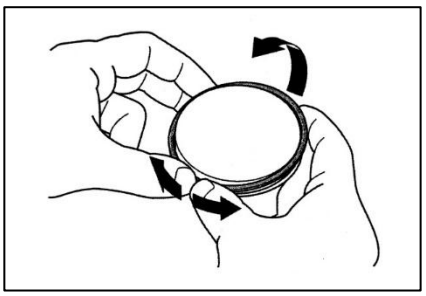
When cylinder body removed, lay a clean cloth under piston, then remove steel wire circlip [1] by sharp nose pliers.

Caution
Please don't use the replaced steel wire circlip. Because it got weak or distorted when removing, which may fall down to scratch or scrap cylinder wall.

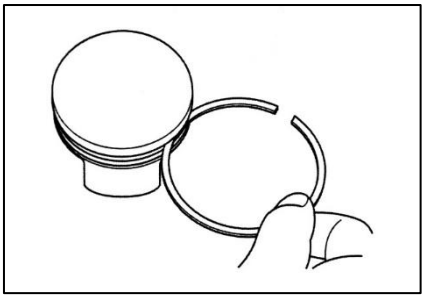


Remove piston pin [1] by suitable tools
Remove piston [2]

Remove piston ring



Get each opening of piston ring apart, then remove it upward along its opposite side
Caution：
Get apart the end ofs of opening tto far is not allowed to avoid damage the piston ring.
Please don't scrap piston when removing its ring.



Clean up carbon buildup in piston ring groove by the ring is about to be thrown away.
Caution：
Adopt steel brush is not allowed, otherwise the piston rings may be damaged.

Inspection

Check if there is scratch, damage, wear-out, distortion, burn-out or oil passage blocking-up on the parts below.

Cylinder body

Piston

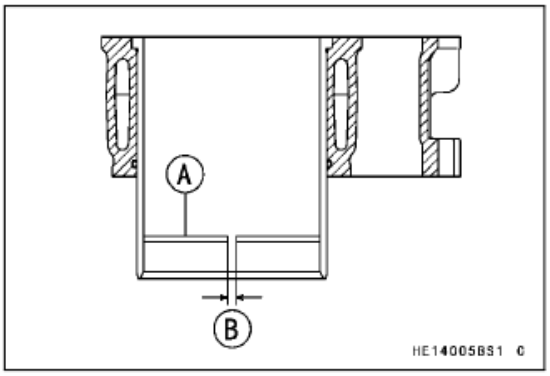
Piston ring

Piston pin

Smaller end of connective rod

Check closing clearance of piston ring, put piston ring A into cylinder, then locate the piston ring to suitable position by piston, Fix it on position with smaller abrasion at cylinder and its bottom, then measure the closing clearance [B] between 2 ends of the ring. In case clearance at any end of ring passed using limit, please replace all piston rings for new ones. Check width of piston ring groove and thickness of piston ring, fix the clearance between piston ring and its groove, in case it passed maintenance limit, please replace piston ring and measure once again, in case still failed to qualification, please replace the piston for a new one.

Measure each part and calculate clearance according to specification of cylinder body, piston and crankshaft, replace the parts once they passed maintenance limit.



Re-assemble piston ring

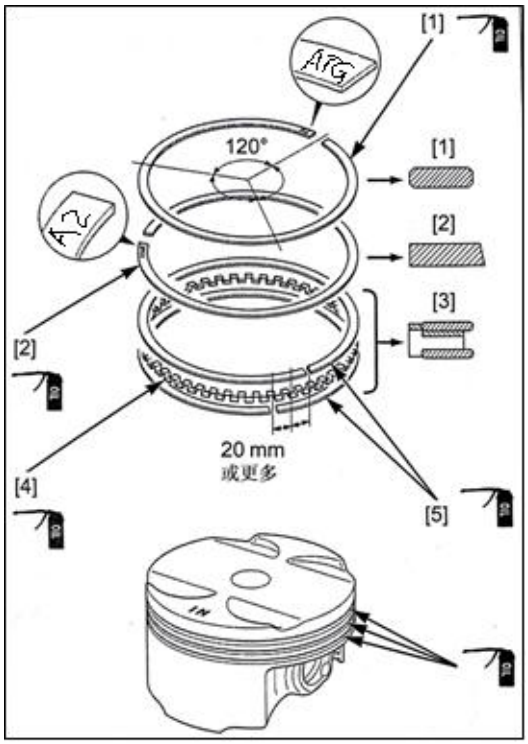
Totally clean up grooves for piston ring, then assemble the rings.

Coat all the surface of piston ring and its groove with oil.

During assembling, damage the piston and its rings are not allowed.

The side of piston ring with mark faces upward.

Mark “1R”: the 1st ring [1].



Mark “RN”: the 2nd ring [2].

When re-assembling oil ring [3], assemble liner ring [4] forstt, then assemble scratch ring [5].

The openting of piston rings mutually cross by 120°.

The staggering position for opening of scratch ring as picture shows.

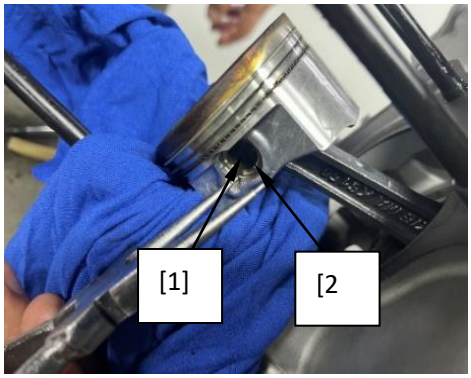
Re-assembly for piston

Coat inner surface of hole for piston pin with

oil.
Coat inner surface on smaller end of connective rod with oil.
Coat outer surface of piston pin with oil.
When re-assembling piston pin [1], fix it by steel wire circlip [2] of a new one.

Caution：

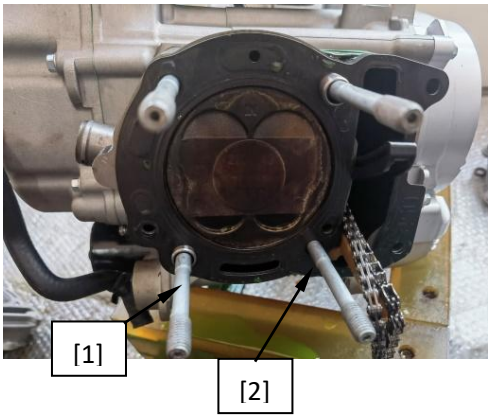
- Make sure assemble the steel wire circlip in place.
- Please don't align the opening of steel wire circlip to the gap on piston.



When Re-assemble positioning pin [1] and new gasket [2] for cylinder body. Coat cylinder wall and pushing surface of piston with oil. Assemble piston into cylinder body by tools could be bought from market (When re-assembling piston set, the side with mark "IN" face to direction of air intake).

Caution:

- When re-assembling piston, please don't damage the upper surface of piston, especially the matching place of cylinder hole.
- Forcedly press-fit cylinder body is not allowed.
- When cylinder body assembled, make sure the piston is at upper stopping point.



Crankshaft

Inspection for side clearance

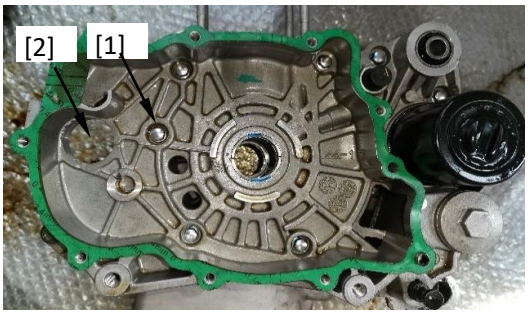
Measure side clearance for connective rod
Maintenance limit ： 0.5mm。
In case the side clearance passed Maintenance limit, please replace connective rod for a new one.
Confirm the side clearance once again, in case still passed limit, please replace the crankshaft for a new one.



Removal

Remove combination bolt [1] for left and right crankcase.
Remove right crankcase body [2].

Remove crankshaft [2] from left crankcase [1].



Inspection

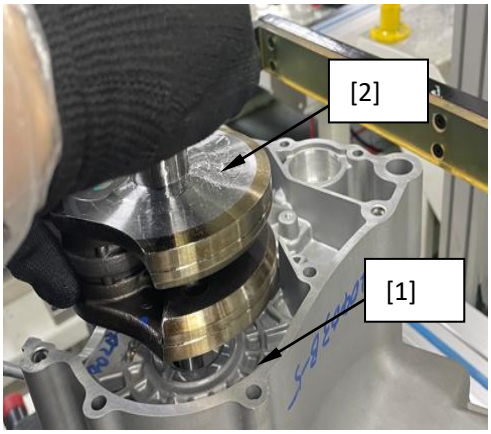
Hold journal of crankshaft at both ends.

Put a micrometer on upper side and middle of journal of main shaft, when putting it, please avoid oil groove and oil hole.。

Turn crankshaft by 2 rounds （720°），

Then read its runout.

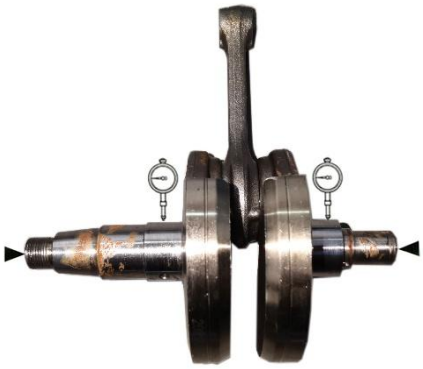
Maintenance limit：0.01 mm。



Re-assembly

Inject suitable lubricant to two ends of journal of main shaft and surface of pad hole on crankcase.

Assemble crankshaft [1] to corresponding hole on left crankcase [2].



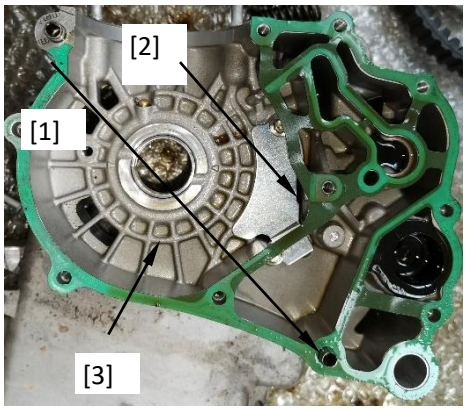
Assemble positioning pin [1] and gasket [2] of crankcase into left crankcase [3].

Caution：

Replace gasket of crankcase for a new one.

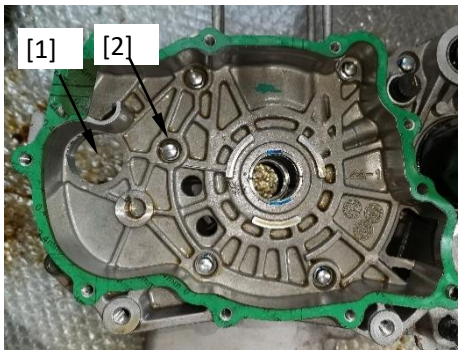
In case there is a scratching trace through combination surface of crankcase, please replace the complete case kit for a new one.

In case the case body or crankcase need be replace, please also replace other related parts in the same kit.

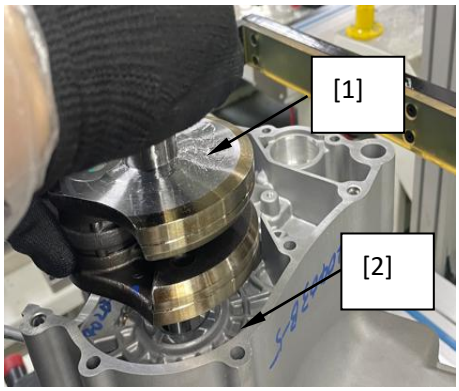


Assemble right crankcase body [1] into left crankcase body.
Clean up case combination bolt (Repeatedly useable) by solvent, then totally dry it up.
Assemble case combination bolt [2].
Torque：
10N•m（1.0kgf•m，7.4 1bf•ft）

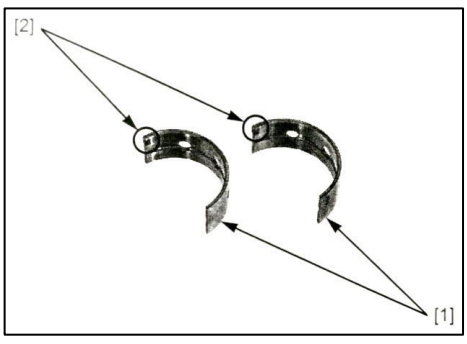
Pad for main shaft journal



Caution：
Please don't change the position of crankshaft pad, which must be assembled at its initial place, otherwise the incorrect oil film clearance may damage engine
Check crankshaft pad
Remove crankshaft.
Check if there is wear-out or spall from pad [1] of main shaft journal.。
Check if there is damage on protrusion [2] of cramkshaft pad.
In case crankshaft pad for main shaft journal was broken, please replace by new ones with same specification.。



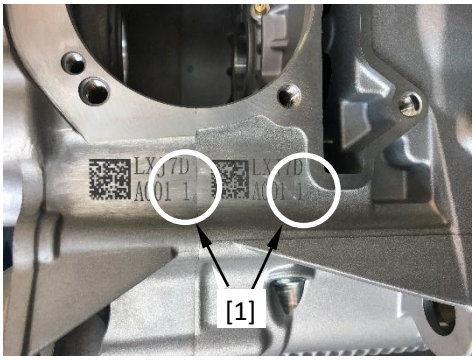
Select crankshaft pad
Take number code [1] for inner diameter of installation hole for crankshaft pad on the left of crankcase into record as picture shows (The number 1, 2 and 3 on combination side of contact surface between left, right crankcase and cylinder body indicates the sequence for inner diameter of installation hole for crankshaft pads).



In case the crankshaft needs be replaced, take corresponding code [1] into record (In number 1 or 2 on counterweight of crankshaft stands for sequence of outer diameter for main shaft journal).

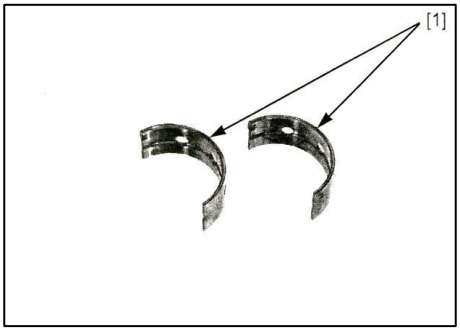
Select changble color [1] for crankshaft pad
By mutually refer number for installation hole of main shaft journal and shaft pad.

Thickness for pad of main shaft journal：



A：Brown：　Thick
B：Green：
C：Yellow：
D：Blue：　Thin





Form list for matching-up of pad for main shaft journal：

			Code for inner diameter of installation hole for shaft pad		
			1	2	3
			32.982～32.988 mm	32.988～32.994 mm	32.994～33.000 mm
Number for outer diameter of main shaft journal	1	29.014～29.020 mm	D（Blue）	C（Yellow）	B（Green）
	2	29.008～29.014 mm	C（Yellow）	B（Green）	A（Brown）

Caution：*When new shaft pad was selected, please measure once again its clearance by plastic feeler gauge.*