

HYOSUNG



RX 125 D

RX 125 SM



RT 125 D

Kun motor. Udgivet 2009

ServiceManual



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FOREWORD

This manual contains an introductory description on HYOSUNG 『*R125D*』, 『*XR125SM*』 & 『*XR125D*』 and procedures for its inspection / service and overhaul of its engine components. It covers the differences from 『*Karion*』 & 『*RX125*』's engine and please refer to the service manual of 『*Karion* (99000-94610)』 and 『*RX125* (99000-97100)』 for others which are not covered in this manual.

Other information considered as generally known is not included.

Read **GENERAL INFORMATION** section to familiarize yourself with outline of the vehicle and **MAINTENANCE** and other sections to use as a guide for proper inspection and service.

This manual will help you know the vehicle better so that you can assure your customers of your optimum and quick service.

❖ This manual has been prepared on the basis of the latest specification at the time of publication.

If modification has been made since then, difference may exist between the content of this manual and the actual vehicle.

❖ Illustrations in this manual are used to show the basic principles of operation and work procedures.

They may not represent the actual vehicle exactly in detail.

WARNING

This manual is intended for those who have enough knowledge and skills for servicing HYOSUNG vehicles. Without such knowledge and skills, you should not attempt servicing by relying on this manual only.

Instead, please contact your nearby authorized HYOSUNG motorcycle dealer.

NOTE

『*R125*』 model: *Karion*

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SERVICING INFORMATION

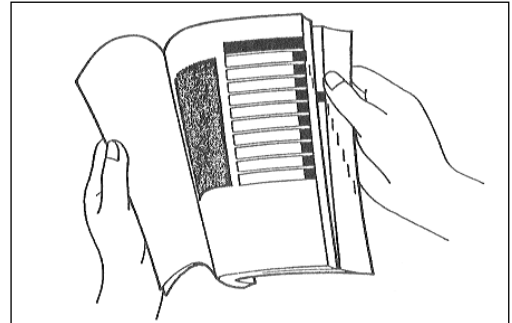
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HOW TO USE THIS MANUAL

















TO LOCATE WHAT YOU ARE LOOKING FOR :

1. The text of this manual is divided into sections.
2. As the title of these sections are listed on the previous page as GROUP INDEX, select the section where you are looking for.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. On the first page of each section, its contents are listed. Find the item and page you need.



SYMBOL

Listed in the table below are the symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is also included in the table.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply THREAD LOCK "1324".
	Apply oil. Use engine oil unless otherwise specified.		Apply or use brake fluid.
	Apply SUPER GREASE "A".		Measure in voltage range.
	Apply SUPER GREASE "C".		Measure in resistance range.
	Apply SILICONE GREASE.		Measure in current range.
	Apply MOLY PASTE.		Measure in diode test range.
	Apply BOND "1215".		Measure in continuity test range.
	Use fork oil.		Use special tool.

WIRE COLOR

B	: Black	Gr	: Gray	Sb	: Light blue
L	: Blue	Lg	: Light green	W	: White
Br	: Brown	O	: Orange	Y	: Yellow
G	: Green	R	: Red		

BL	: Black with Blue tracer	BBr	: Black with Brown tracer
BG	: Black with Green tracer	BO	: Black with Orange tracer
BR	: Black with Red tracer	BW	: Black with White tracer
BY	: Black with Yellow tracer	LB	: Blue with Black tracer
LG	: Blue with Green tracer	LR	: Blue with Red tracer
LW	: Blue with White tracer	LY	: Blue with Yellow tracer
BrB	: Brown with Black tracer	BrW	: Brown with White tracer
GB	: Green with Black tracer	GR	: Green with Red tracer
GY	: Green with Yellow tracer	GrB	: Gray with Black tracer
GrR	: Gray with Red tracer	GrW	: Gray with White tracer
OB	: Orange with Black tracer	OL	: Orange with Blue tracer
OG	: Orange with Green tracer	OR	: Orange with Red tracer
OW	: Orange with White tracer	OY	: Orange with Yellow tracer
RB	: Red with Black tracer	RW	: Red with White tracer
WB	: White with Black tracer	WL	: White with Blue tracer
WR	: White with Red tracer	YB	: Yellow with Black tracer
YL	: Yellow with Blue tracer	YG	: Yellow with Green tracer
YR	: Yellow with Red tracer		

GENERAL INFORMATION

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EXTERIOR PHOTOGRAPH

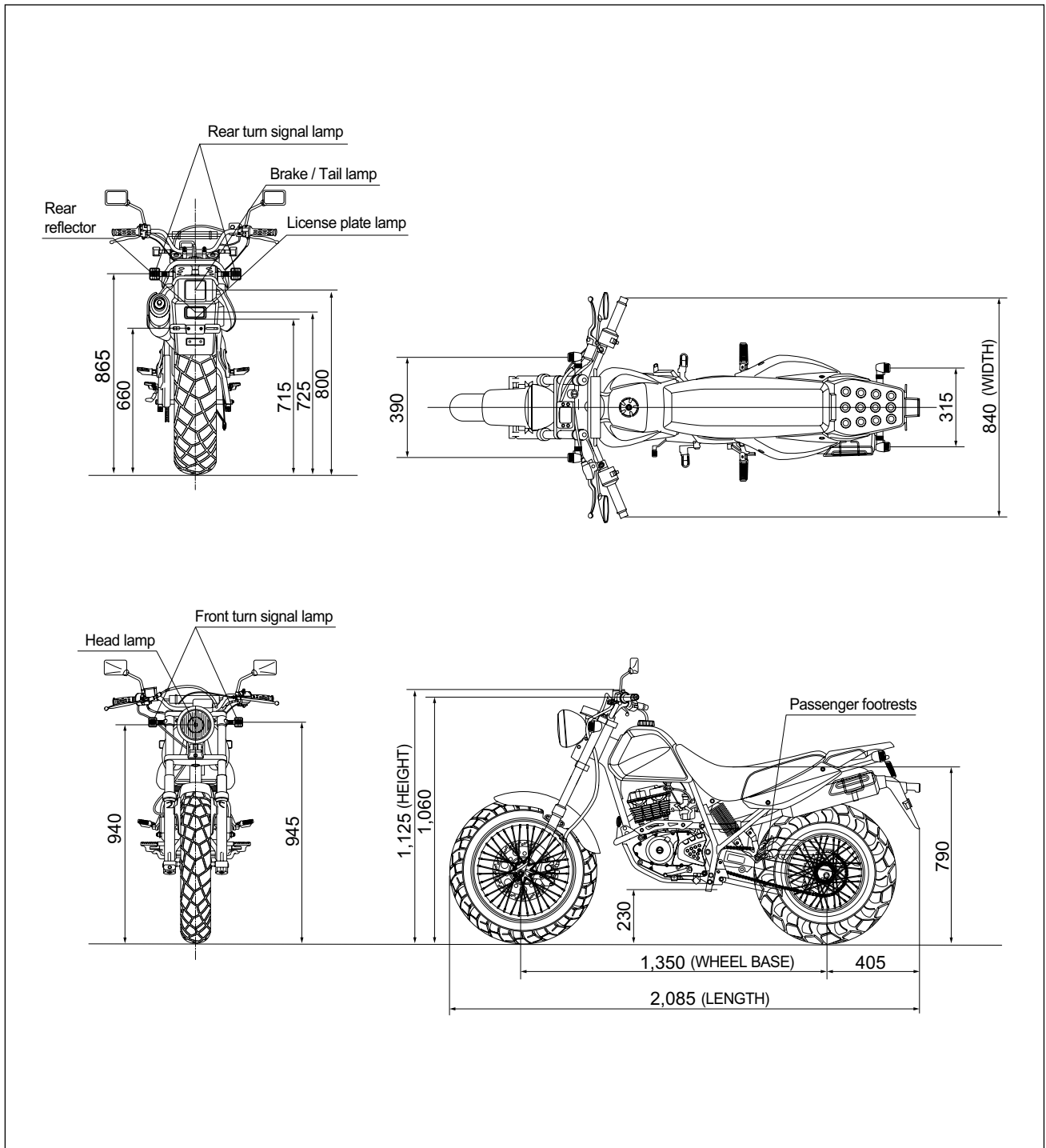


RT125D

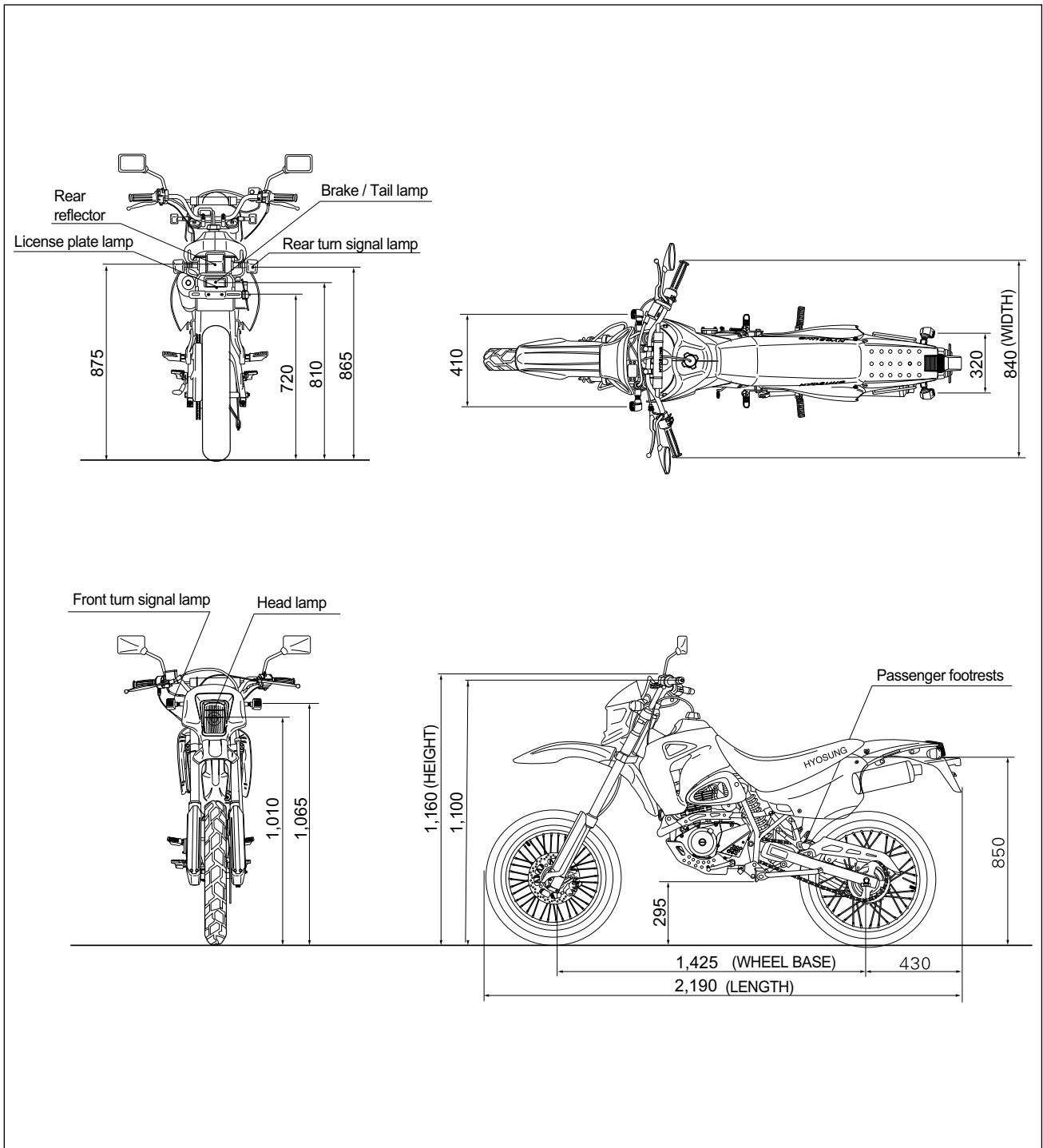


XRX125SM

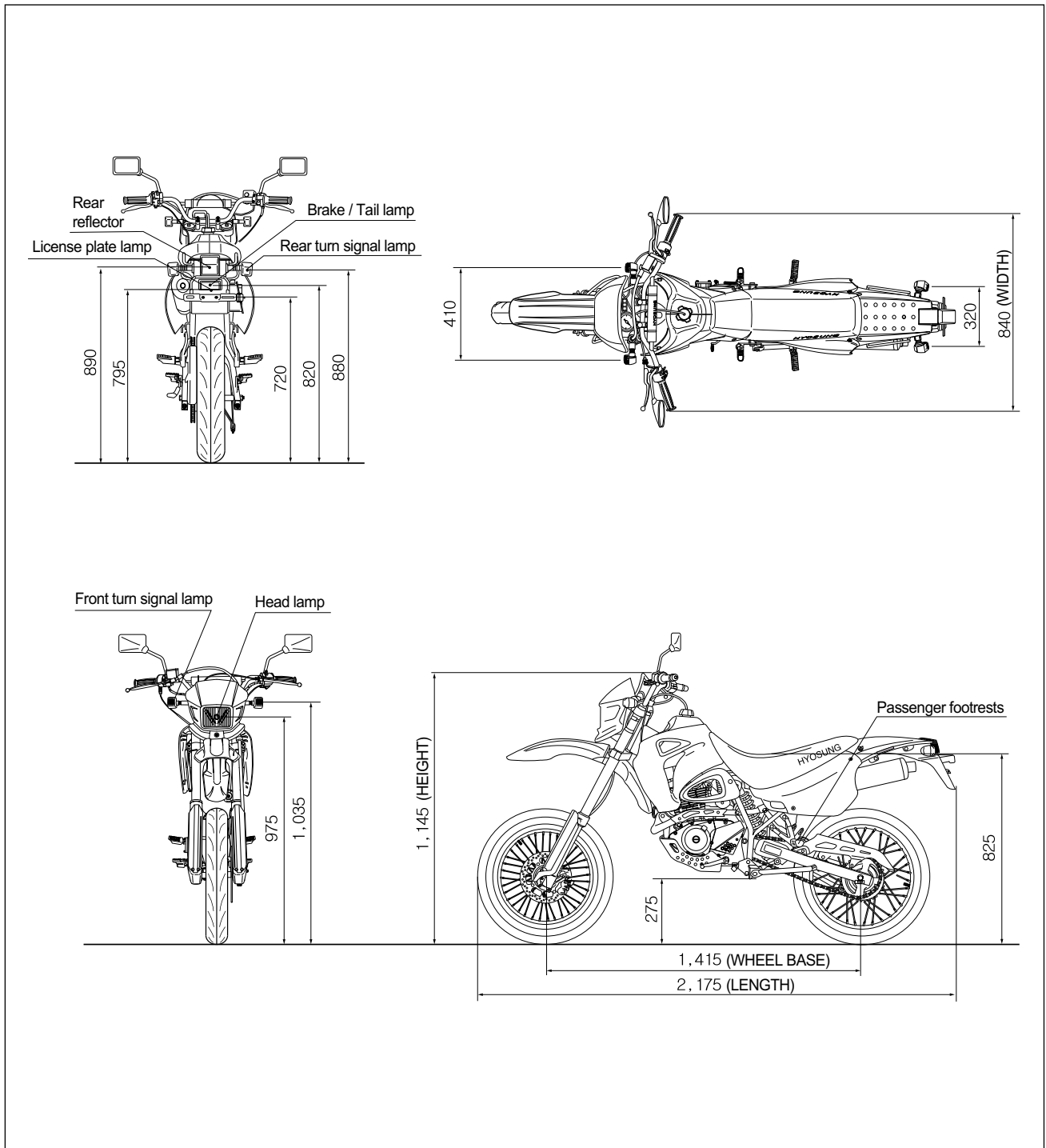
EXTERIOR ILLUSTRATION [*AT125D*]



EXTERIOR ILLUSTRATION [*XRX125D*]



EXTERIOR ILLUSTRATION [*XRX125SM*]



SPECIFICATIONS

⊙ DIMENSIONS AND MASS

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Overall length	2,085 mm (82.1 in)	2,190 mm (86.2 in)	2,175 mm (85.6 in)
Overall width	840 mm (33.1 in)	←	←
Overall height	1,125 mm (44.3 in)	1,160 mm (45.7 in)	1,145 mm (45.1 in)
Wheelbase	1,350 mm (53.2 in)	1,425 mm (56.1 in)	1,415 mm (55.7 in)
Ground clearance	230 mm (9.1 in)	295 mm (11.6 in)	275 mm (10.8 in)
Mass	135 kg (298 lbs)	130 kg (287 lbs)	←

⊙ ENGINE

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Type	Four-stroke, DOHC, Air & oil cooled	←	←
Number of cylinder	1 cylinder	←	←
Bore	57.0 mm (2.24 in)	←	←
Stroke	48.8 mm (1.92 in)	←	←
Piston displacement	124.5 cm ³ (7.6 in ³)	←	←
Fuel system	Carburetor	←	←
Starter system	Electric starter	←	←
Lubrication system	Wet sump	←	←

⊙ TRANSMISSION

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Clutch	Wet multi-plate type	←	←
Transmission	5-speed constant mesh	←	←
Gearshift pattern	1-down, 4-up	←	←
Reduction ratio	3.500	←	←
Gear ratio	1st	2.750	←
	2nd	1.786	←
	3rd	1.368	←
	4th	1.046	←
	5th	0.913	←
Drive chain	428SO, 130 links	428H, 132 links	428H, 130 links

◎ CHASSIS

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Front suspension	Telescopic type	←	←
Rear suspension	Swingarm type	←	←
Steering angle	47 ° (right & left)	45 ° (right & left)	←
Caster	25 °	27.5 °	27 °
Trail	84 mm (3.31 in)	94 mm (3.70 in)	88 mm (3.47 in)
Front brake	Disk brake	←	←
Rear brake	Drum brake	←	Disk brake
Front tire size	130/80 - 18M/C 66P	2.75 - 21 45P	110/70 - 17M/C 58H
Rear tire size	180/80 - 14M/C 78P	4.10 - 18M/C 59P	130/70 - 17M/C 62H
Front fork stroke	160 mm (6.3 in)	250 mm (9.8 in)	←

◎ ELECTRICAL

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Ignition type	"CDI" type	←	←
Ignition timing	6 ° B.T.D.C. at 1,900 rpm and 27 ° B.T.D.C. at 4,250 rpm	←	←
Spark plug	CR8E	←	←
Battery	12 V 6 Ah (MF)	←	←
Fuse	15 A	←	←
Head lamp	HI	12 V - HS1 : 35 W × 1	12 V - H4 : 60 W × 1
	LO	12 V - HS1 : 35 W × 1	12 V - H4 : 55 W × 1
	Position	12 V - W5 W × 1	←
Turn signal lamp	12 V - RY10 W × 4	←	←
Brake / Tail lamp	12 V - P21/5 W × 1	←	←
License plate lamp	12 V - W5 W × 1	←	←
Illumination lamp	LED type	←	←
High beam indicator lamp	12 V - 1.7 W × 1	←	←
Turn signal indicator lamp(right & left)	12 V - 1.7 W × 2	←	←
Neutral indicator lamp	12 V - 1.7 W × 1	←	←

* LED : Light Emitting Diode

◎ CAPACITIES

ITEM	<i>RT125D</i>	<i>XRX125D</i>	<i>XRX125SM</i>
Fuel tank	9.0 ℓ	8.0 ℓ	←
Engine oil	Oil change	850 ml	←
	Oil and filter change	950 ml	←
	Engine overhaul	1,200 ml	←
Front fork oil capacity (One side)	215 ± 2.5 cc	443 ± 2.5 cc	←

NOTE

The specifications are subject to change without notice.

PERIODIC MAINTENANCE

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MAINTENANCE PROCEDURES

This section describes the servicing procedures for each item.


CYLINDER HEAD COVER BOLTS, CYLINDER HEAD & CYLINDER BASE NUTS, EXHAUST PIPE NUTS AND MUFFLER BOLTS

Inspect Interval

Tighten Initial at 1,000 km and Every 4,000 km thereafter.


■ CYLINDER HEAD COVER BOLT

- Tighten the cylinder head cover bolts ① to the specified torque.

 Cylinder head cover bolt
: 12 ~ 16 N · m (1.2 ~ 1.6 kgf · m)


■ CYLINDER HEAD & CYLINDER BASE NUT

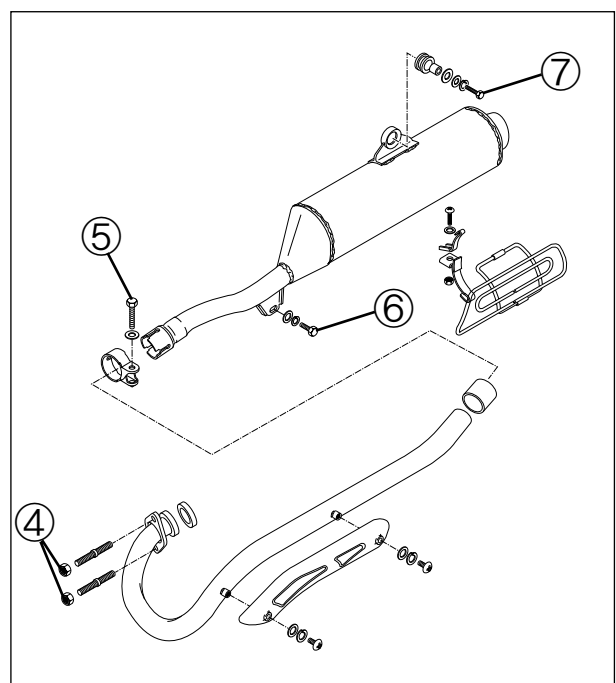
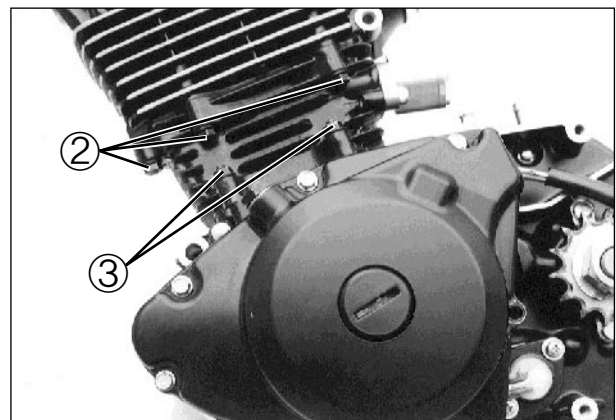
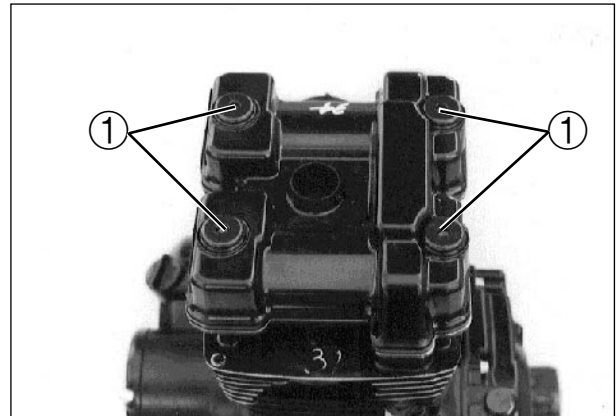
- Tighten the cylinder head base nuts ② and cylinder base nuts ③ to the specified torque.

 Cylinder head base nut
: 7 ~ 11 N · m (0.7 ~ 1.1 kgf · m)
Cylinder base nut
: 7 ~ 11 N · m (0.7 ~ 1.1 kgf · m)

■ EXHAUST PIPE NUTS & MUFFLER BOLTS

- Tighten the exhaust pipe nuts ④, muffler connecting bolt ⑤, and muffler mounting bolts ⑥, ⑦ to the specified torque.

 Exhaust pipe nut
: 18 ~ 28 N · m (1.8 ~ 2.8 kgf · m)
Muffler connecting bolt
: 18 ~ 28 N · m (1.8 ~ 2.8 kgf · m)
Muffler mounting bolt
: 18 ~ 28 N · m (1.8 ~ 2.8 kgf · m)



AIR CLEANER

Inspect Interval

Clean Every 3,000 km,

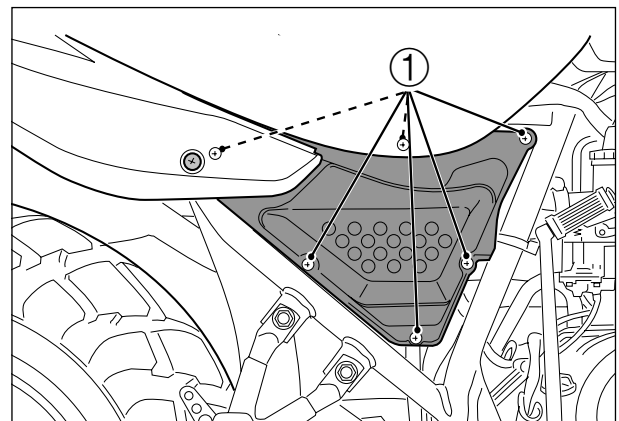
Replace Every 12,000 km.

If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption.

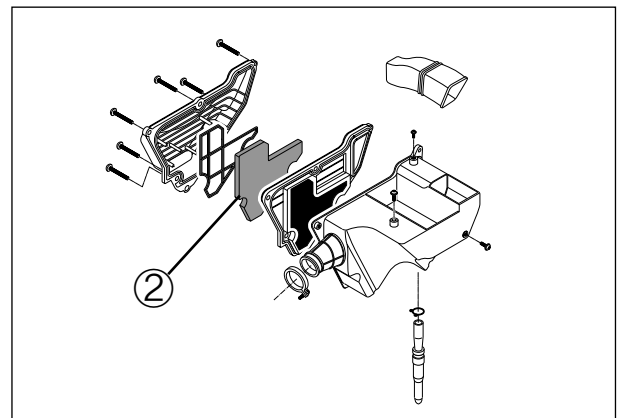
Check and clean the air cleaner element in the following manner :

■ *AT125D*

- Remove the seat and right side cover.
- Remove the six screws ① and remove the air cleaner case cover.

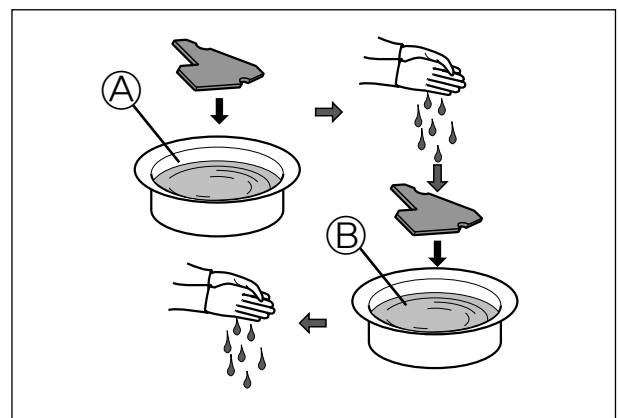


- Take off the air cleaner element ②.



Clean the air cleaner element for the following :

- Fill a washing pan of a proper size with a non-flammable cleaning solvent (A). Immerse the air cleaner element in the cleaning solvent and wash it.
- Gently squeeze the air cleaner element between the palms of both hands to remove the excess solvent : do not twist or wring the element or it will develop tears.
- Immerse the element in HYOSUNG genuine oil (B), and then squeeze out the excess oil leaving the element slightly wet.
- Reinstall the cleaned or new air cleaner element in the reverse order of removal.



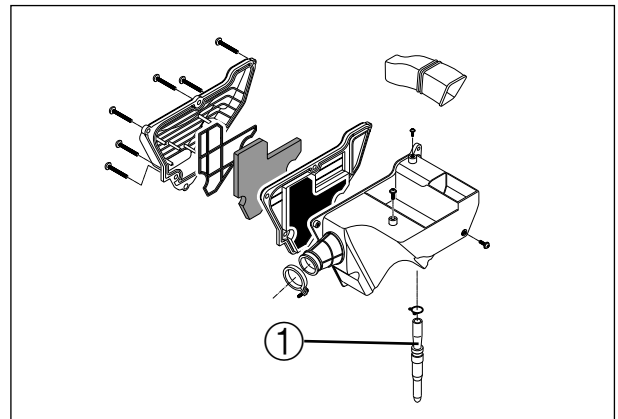
2-5-2 PERIODIC MAINTENANCE

CAUTION

- ❖ Inspect the air cleaner element for tears.
A torn element must be replaced.
- ❖ If driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to operate the engine without the element or with torn element. Make sure that the air cleaner element is in good condition at all times. Life of the engine depends largely on this component!

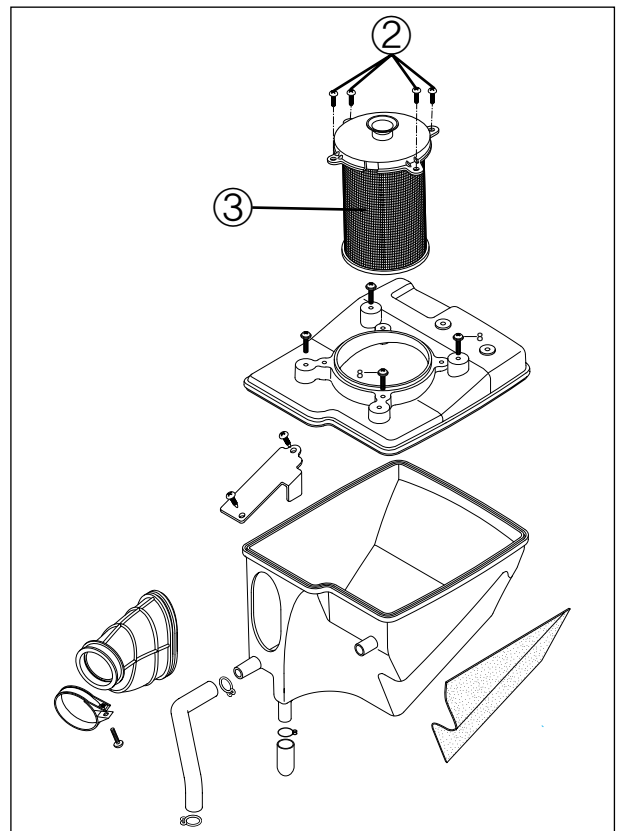
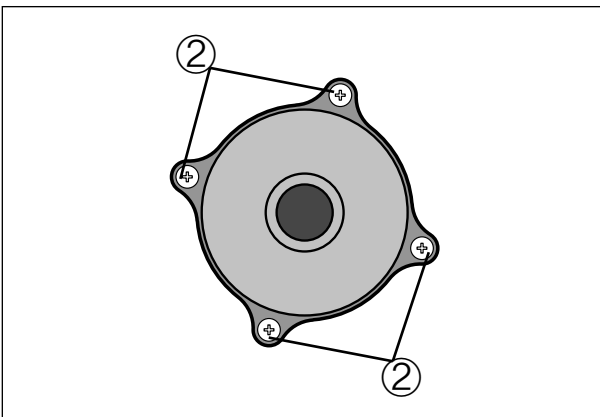
※ AIR CLEANER OIL DRAIN TUBE

Inspect the air cleaner oil drain tube ① and drain water and oil at the periodic interval.
The air cleaner oil drain tube ① is located beneath the air cleaner case.



■ **XRX125D** & **XRX125SM**

- Remove the seat.
- The air cleaner is located under the seat.
- Remove the four air cleaner element bolts ②.
- Pull up the air cleaner element ③.

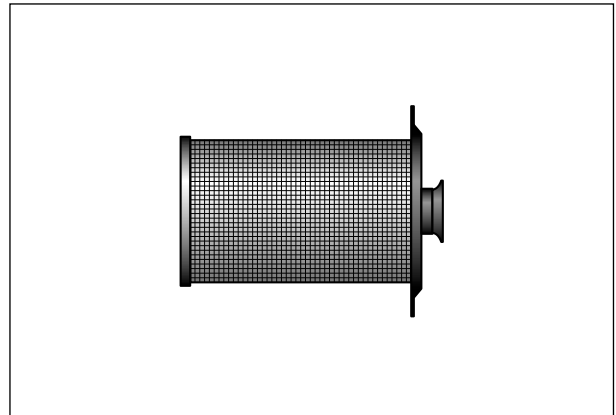


Clean the air cleaner element for the following :

- When the air cleaner element clean with the air gun, necessarily blow at the inside by compressed air.
- Carefully examine the air cleaner element for tears during cleaning. Replace it with a new one if it is torn.
- Assemble the element completely or damage severely the engine.
- Be careful not to allow water to go inside the air cleaner element.

⚠ CAUTION

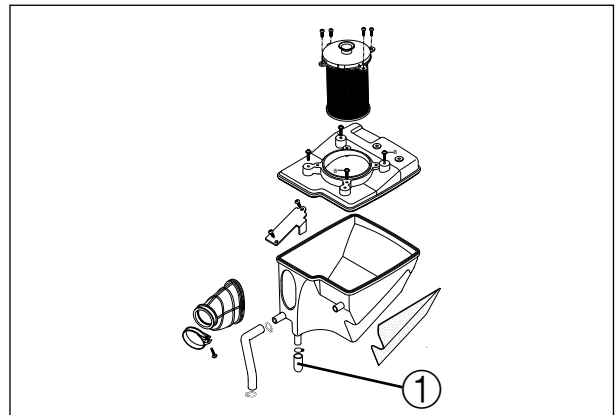
More frequent servicing may be performed on motorcycles that are used under severe conditions, also clean the air cleaner element when replacing the engine oil to prevent damage of the engine.



※ AIR CLEANER OIL DRAIN TUBE

Inspect the air cleaner oil drain tube ① and drain water and oil at the periodic interval.

The air cleaner oil drain tube ① is located beneath the air cleaner case.



VALVE CLEARANCE

Inspect Interval

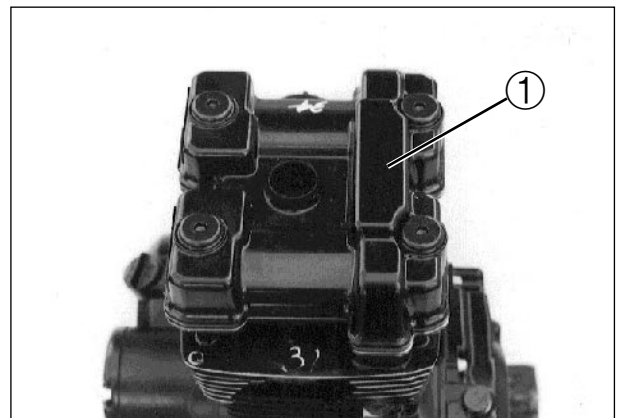
Inspect Initial 1,000 km and Every 4,000 km thereafter.

Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power.

Check the intake and exhaust valve clearances at the distances indicated above and adjust the valve clearances to specification, if necessary.

- Remove the seat and fuel tank.
- Remove the spark plug.

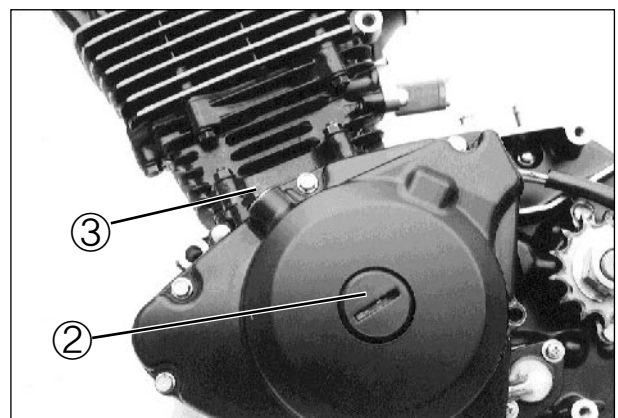
- Remove the cylinder head cover ①.
The valve clearance specification is different for both intake and exhaust valves.
Valve clearance adjustment must be checked and adjusted :
1) at the time of periodic inspection,
2) when the valve mechanism is serviced, and
3) when the camshafts are removed for servicing.



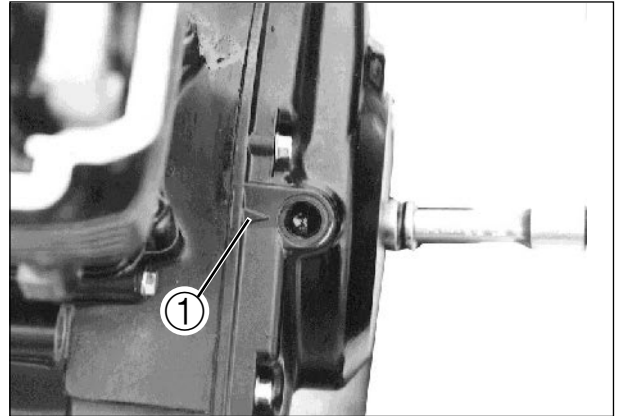
- Remove the magneto cover plug ② and valve timing inspection plug ③.

NOTE

- ❖ *The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the valve clearance.*
- ❖ *The valve clearance should only be checked when the engine is cold.*



- Rotate the magneto rotor clockwise or counter-clockwise with a socket wrench to set the piston at TDC on the compression stroke.
(Rotate the magneto rotor until the "T" index mark on the magneto rotor is aligned with the triangle mark ① on the crankcase.)



- To inspect the valve clearance, insert a thickness gauge between the tappet and the camshaft.

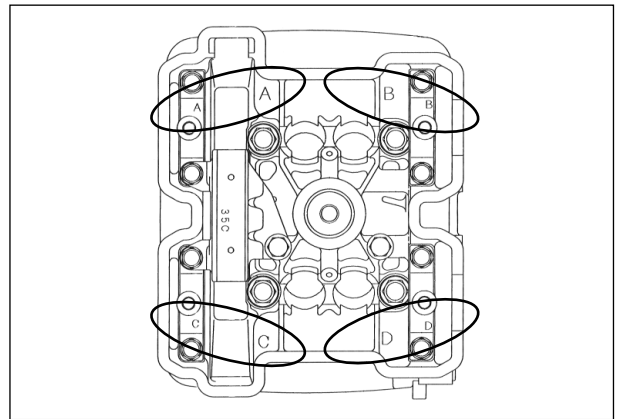
Valve clearance	Standard (When cold)
IN.	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
EX.	0.2 ~ 0.3 mm (0.008 ~ 0.012 in)

 **Thickness gauge : 09900-20806**

- If the clearance is out of specification, first remove the cam chain tension adjuster, camshaft housing, camshaft.
To install the tappet shim at original position, record the shim NO. and clearance to present by "A", "B", "C", "D" mark on the cylinder head.



Select the tappet that agree with tappet clearance (vertical line) and shim NO.(horizontal line) as refer to the tappet shim selection chart.
(Refer to page 90 · 91)



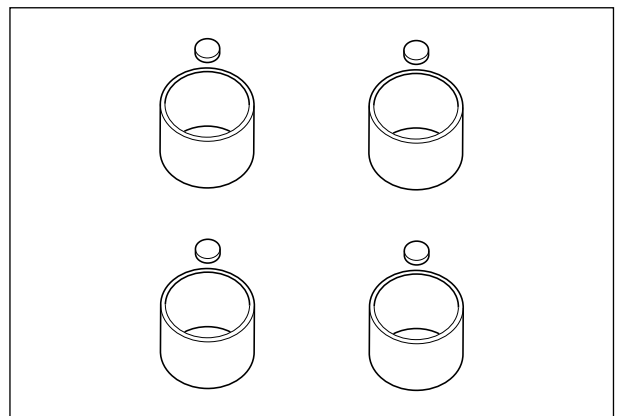
Adjust valve timing, install the camshaft housing and the cam chain tension adjuster.

After the crankshaft rotate about 10 times, measure the valve clearance.

If the clearance be not correct, adjust the standard clearance as the same manner above.

- In case of valve adjustment which is not the tappet shim selection chart, please follow instructions of example in the below.

For example, the intake clearance is 0.4 and the shim is 170 (1.70 mm), select 195 (1.95 mm) of the shim which 170 (1.70 mm) of the shim add up the excess clearance 0.25 mm when adjust with the standard 0.15 as the intake standard clearance 0.1 ~ 0.2 mm.



 **CAUTION**

If you don't rotate the crankshaft about 10 times before measuring the valve clearance, there is no meaning of valve clearance.

SPARK PLUG

Inspect Interval

Clean Initial 1,000 km and Every 4,000 km thereafter.
Replace Every 8,000 km.

- Disconnect the spark plug cap ① and remove the spark plug.

TYPE	SPARK PLUG SPECIFICATION
Hot type	CR7E
Standard type	CR8E
Cold type	CR9E

■ CARBON DEPOSITS

Check to see if there are carbon deposits on the spark plug.

If carbon is deposited, remove it using a wire or pin with a pointed end.

■ SPARK PLUG GAP

Measure the spark plug gap using a thickness gauge.

If the spark plug gap is out of specification, adjust the gap.

Spark plug gap 0.7 ~ 0.8 mm (0.028 ~ 0.032 in)

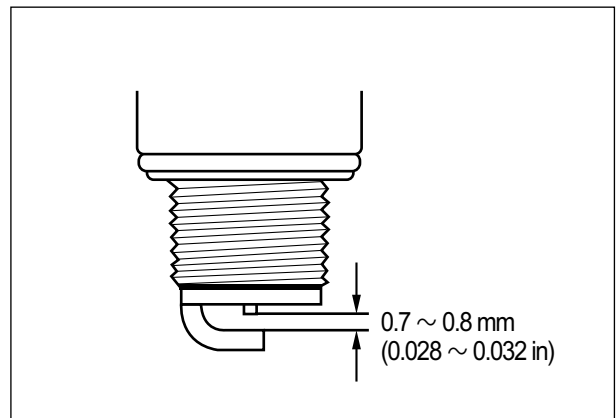
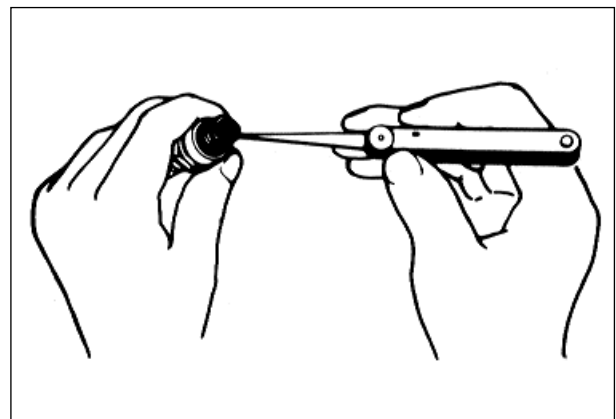
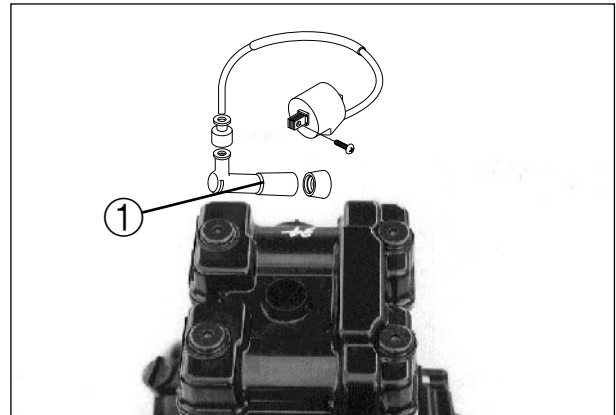
 **Thickness gauge : 09900-20806**

■ ELECTRODE

Check to see the worn or burnt condition of the electrodes.

If it is extremely worn or burnt, replace the spark plug with a new one.

And also replace the spark plug if it has a broken insulator, damaged thread, etc.



CAUTION

To avoid damaging the cylinder head threads ; first, finger tighten the spark plug, and then tighten it to the specified torque using the spark plug wrench.

- Insert the spark plug and finger tighten it to the cylinder head and then tighten it to the specified torque.

🔧 Spark plug

: 20 ~ 25 N · m (2.0 ~ 2.5 kgf · m)

ENGINE OIL

Inspect Interval

Replace Initial 1,000 km and Every 4,000 km thereafter.

Necessary amount of engine oil	
Oil change	850 ml
Oil and filter change	950 ml
Engine overhaul	1,200 ml
Engine oil type	SAE 10W/40 API Over SL

Engine oil should be changed while the engine is warm.

Engine oil filter replacement at the above intervals, should be together with the engine oil change.

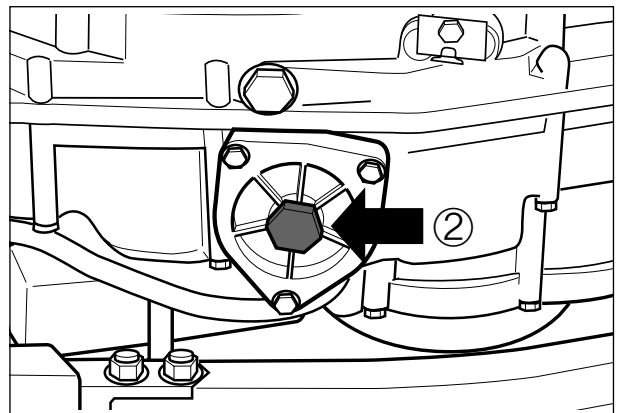
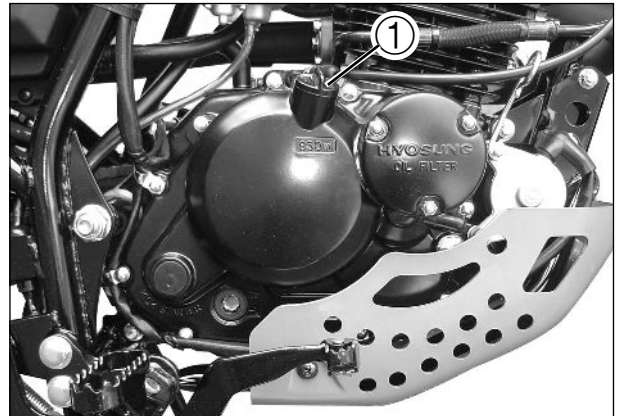
- Keep the motorcycle upright.
- Place an oil pan below the engine, and drain the engine oil by removing the engine oil filler plug ① and drain plug ②.
- Reinstall the drain plug gasket and engine oil drain plug ②.
- Tighten the drain plug ② to the specified torque, and pour fresh engine oil through the engine oil filler hole. Use an engine oil that meets the API service classification of Over SL and that has a viscosity rating of SAE 10W/40.

🔧 Engine oil drain plug

: 25 ~ 30 N · m (2.5 ~ 3.0 kgf · m)

- Install the engine oil filler plug ①.
- Start up the engine and allow it to run for a few minutes at idling speed.
- Turn off the engine and wait about three minutes, and then check the engine oil level through the engine oil level lens.

If the level is below mark “F”, add engine oil to “F” level. If the level is above mark “F”, drain engine oil to “F” level. The motorcycle must be in a level position for accurate measurement.

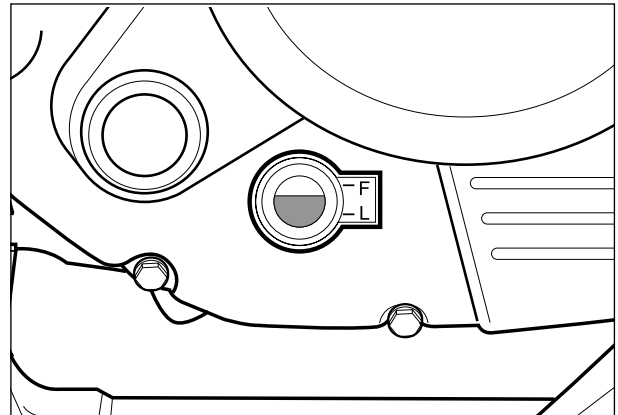


⚠ CAUTION

Never operate the motorcycle if the engine oil level is below the “Lower line mark (L)” in the engine oil level lens. Never fill the engine oil above the “Upper line mark (F)” .

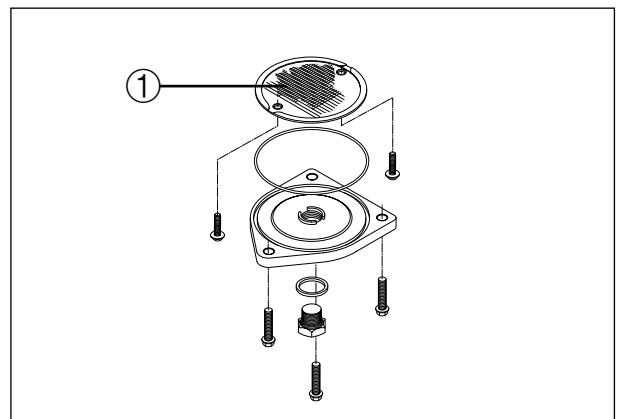
Engine oil level being most suitable about 1 mm under the “Upper line mark (F)” of the engine oil level lens. In case of the engine oil pouring in excessively, the engine output being made insufficient.

Be careful not to pour the engine oil excessively into the engine.



⚠ CAUTION

Necessarily, confirm and clean the oil strainer ① when replace the engine oil (specially, when first replacement).



⚠ CAUTION

More frequent servicing may be performed on motorcycles that are used under severe conditions.

ENGINE OIL FILTER

Inspect Interval

Replace Initial 1,000 km and Every 4,000 km thereafter.

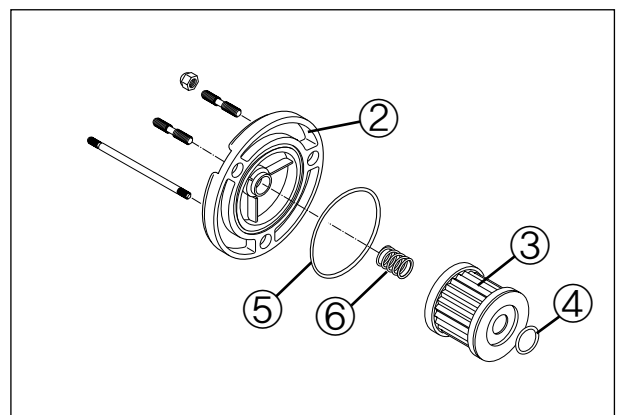
- Drain the engine oil as described in the engine oil replacement procedure.
- Remove the oil filter cap ② by removing the three nuts.
- Remove the oil filter ③.
- Install the new O-ring ④.

- Install the new oil filter.
- Install the new O-ring ⑤ and spring ⑥ to the oil filter cap.
- Install the oil filter cap ②.



⚠ CAUTION

Before installing the oil filter cap, apply engine oil lightly to the new O-ring ⑤.



■ OIL FILTER INSTALLATION

⚠ CAUTION

When installing the oil filter, necessarily, "HYOSUNG" character and "16510H05240" part's NO. is installed toward the outside, otherwise can damage the engine.

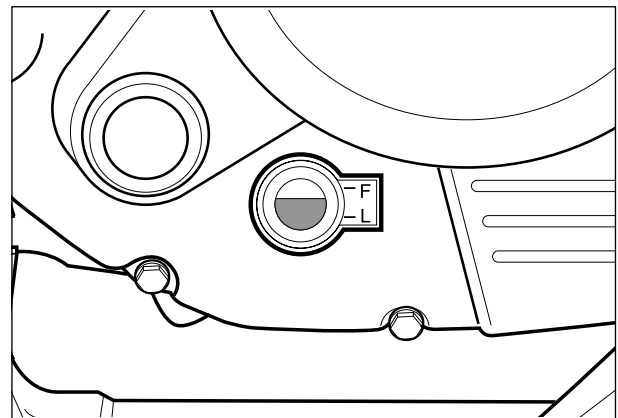
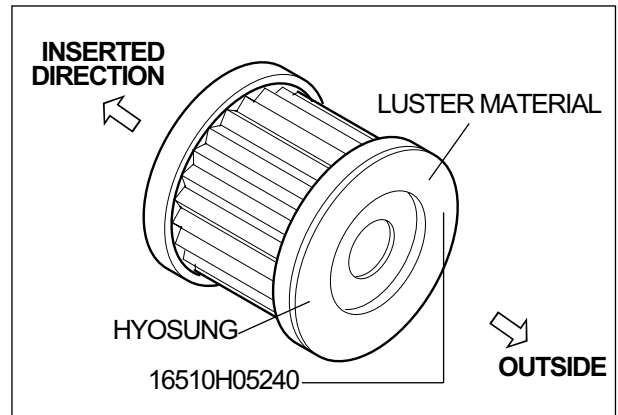
⚠ WARNING

Engine oil and exhaust pipes can be hot enough to burn you.
Wait until the engine oil drain plug and exhaust pipes are cool enough to touch with bare hands before draining oil.

- Add new engine oil and check the engine oil level as described in the engine oil replacement procedure.

⚠ CAUTION

ONLY USE A GENUINE HYOSUNG MOTORCYCLE ENGINE OIL FILTER. Other manufacturer's engine oil filters may differ filtering performance and durability which may lead to engine damage or oil leaks.



CARBURETOR

Inspect Interval

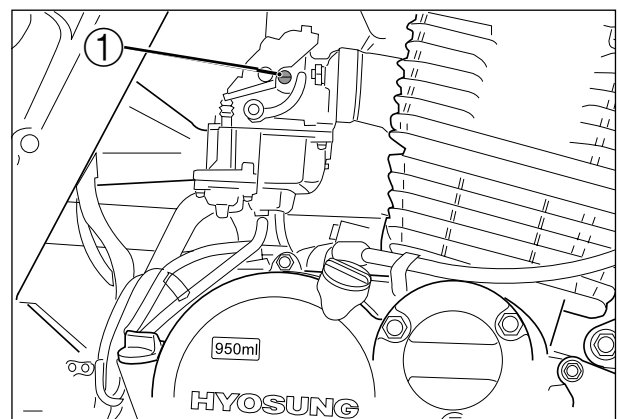
Inspect Initial 1,000 km and Every 4,000 km thereafter.

■ IDLE SPEED

⚠ CAUTION

Make this inspection when the engine is hot.

- Connect an engine tachometer to the high tension cord.
Start up the engine and set its speed at anywhere of the specified value by turning throttle stop screw ①.



PR125D

Engine idle speed 1,400 ~ 1,600 rpm

XR125D & XR125SM

Engine idle speed 1,400 ~ 1,500 rpm

 Engine tachometer : 09900-26006

COMPRESSION PRESSURE CHECK

The compression of a cylinder is a good indicator of its internal condition.

The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression reading for each maintenance service.

Compression pressure	
Standard	14 ~ 16 kgf/cm ²
Service limit	12 kgf/cm ²

Low compression pressure can indicate some of the following conditions :

- Excessively worn cylinder wall
- Worn-down piston or piston rings
- Piston rings stuck in grooves
- Poor valve seating
- Ruptured or otherwise defective cylinder head gasket

NOTE

When the compression pressure goes below specification, check the engine for conditions listed above.

■ COMPRESSION TEST PROCEDURE

NOTE

- ❖ *Before testing the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and valves are properly adjusted.*
- ❖ *Have the engine warmed up by idling before testing.*
- ❖ *Be sure that the battery used is in fully-charged condition.*

Remove the related parts and test the compression pressure in the following manner :

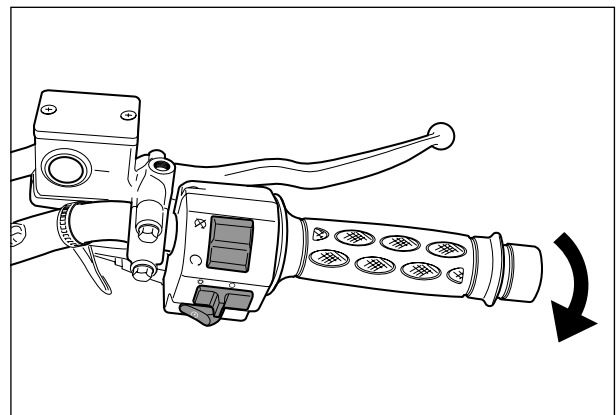
- Remove the spark plug.

WARNING

**The hot engine can burn you.
Wait until the engine are cool enough to touch.**

- Fit the compression gauge in the spark plug hole. Make sure that the connection is tightened.
- Keep the throttle grip in the full-opened position.
- Press the starter switch and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.

 **Compression gauge : 09915-64511**



OIL PRESSURE CHECK

Check the engine oil pressure periodically.
This will give a good indication of the condition of the moving parts.

Oil pressure	Standard
	0.4 ~ 0.6 kgf/cm ² (at 60 °C · 3,000 rpm)

If the engine oil pressure is lower or higher than the specification, the following causes may be considered.

■ LOW OIL PRESSURE

- Clogged oil filter
- Oil leakage from the oil passage way
- Damaged O-ring
- Defective oil pump
- Combination of the above items

■ HIGH OIL PRESSURE

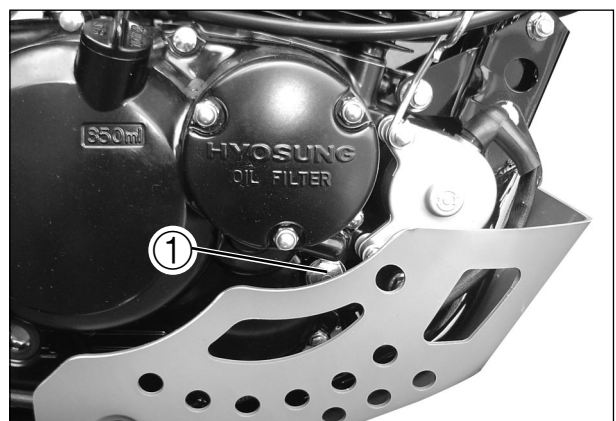
- Engine oil viscosity is too high
- Clogged oil passage way
- Combination of the above items

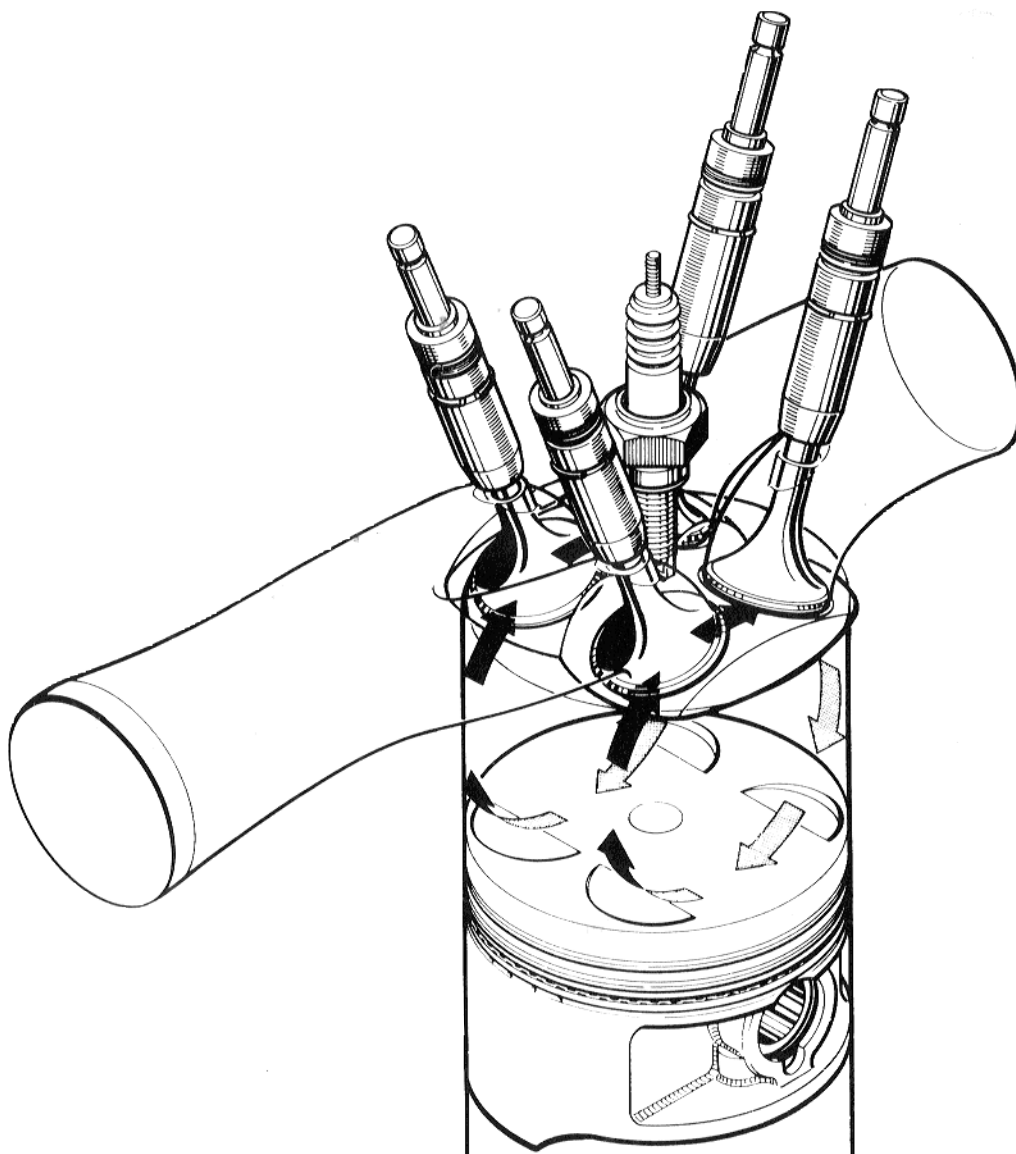
■ OIL PRESSURE TEST PROCEDURE

Check the engine oil pressure in the following manner :

- Remove the oil check plug ① and install the oil pressure gauge and adapter into the oil check plug removed position.
- Connect an engine tachometer.
- Warm up the engine as follows :
Summer : 10 min. at 2,000 rpm.
Winter : 20 min. at 2,000 rpm.
- After warming up, increase the engine speed to 3,000 rpm. (with the engine tachometer), and read the oil pressure gauge.

 **Engine tachometer : 09900-26006**
Oil pressure gauge : 09915-74511





ENGINE

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3

CAUTION

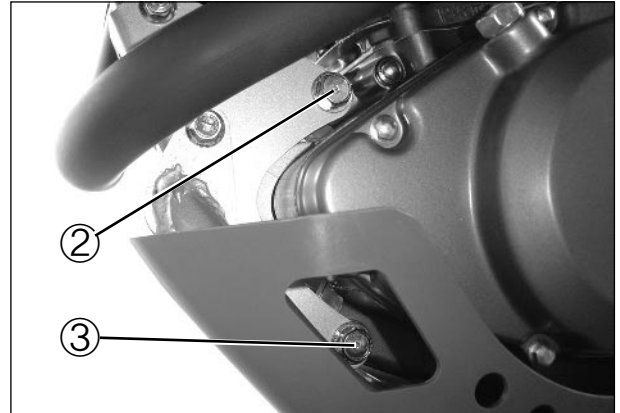
- ❖ Mark an identification of assembly location on each removed part so that each will be restored to the original position during reassembly.
- ❖ Wash clean and dry the removed parts before inspecting and measuring.
- ❖ Oil the rotating or sliding parts before assembly.
- ❖ Make sure to use the correct type of lubricant where specified.
- ❖ Check that each rotating or sliding part moves or operates smoothly after assembly.
- ❖ Make sure to follow the bolt tightening order where specified.
- ❖ If the correct length of the bolt is confused when tightening the crankcase or cover, insert all the bolts and check that the tightening margin is equal in each bolt.

ENGINE REMOVAL AND REMOUNTING

ENGINE REMOUNTING

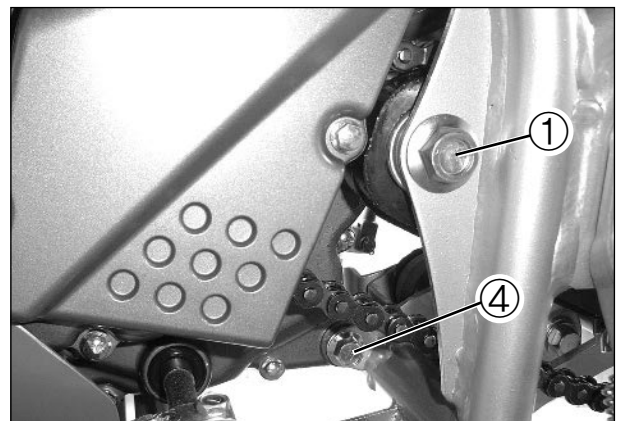
Remount the engine in the reverse order of removal.

- Temporarily fasten the engine mounting bracket before inserting the engine mounting bolts.



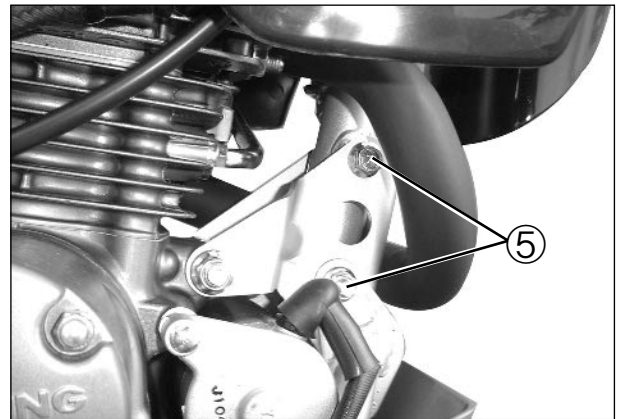
- Tighten the engine mounting bolts and nuts to the specified torque.

- Engine mounting bolt (M10) ①
: 48 ~ 72 N · m (4.8 ~ 7.2 kgf · m)
- Engine mounting bolt (M8) ②, ③, ④
: 22 ~ 33 N · m (2.2 ~ 3.3 kgf · m)



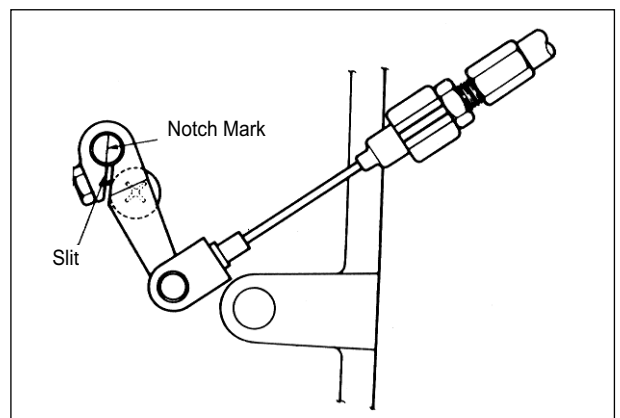
- Tighten the engine mounting bracket bolts and nuts to the specified torque.

- Engine mounting bracket bolt (M8) ⑤
: 22 ~ 33 N · m (2.2 ~ 3.3 kgf · m)



INSTALLING POSITION FOR CLUTCH RELEASE ARM

- Align the clutch release arm slit surface with the notch mark on the clutch release camshaft.



UPPER END COMPONENTS OF ENGINE DISASSEMBLY

NOTE

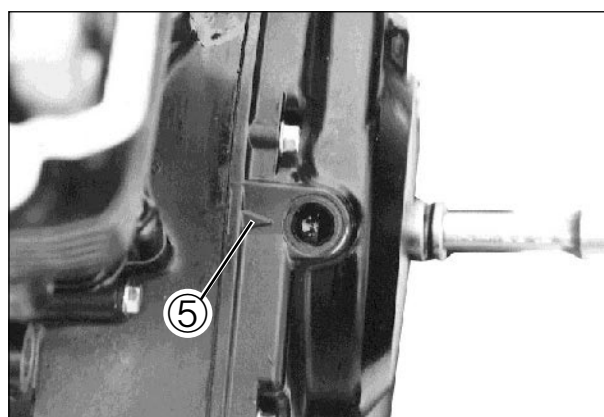
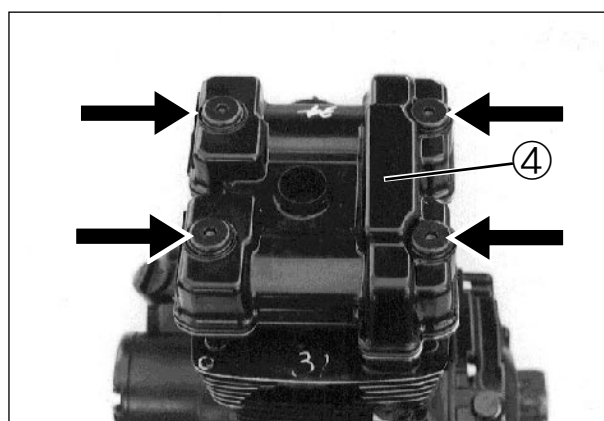
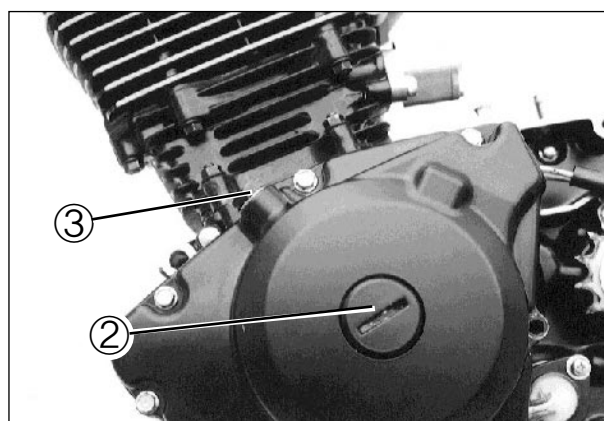
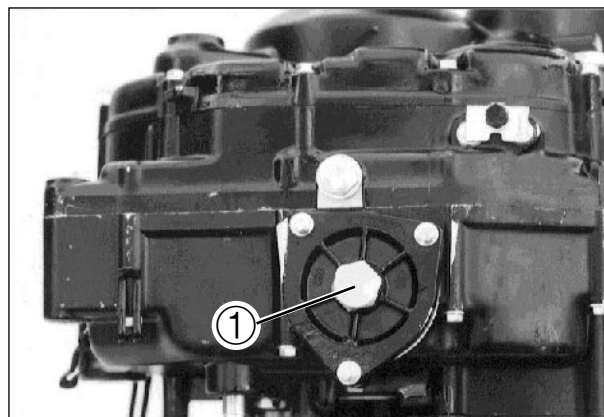
- ❖ *If only the upper end components of the engine is repaired, there is no necessary to remove the engine from the frame.*
- ❖ *Remove the seat and fuel tank so that the upper end components of the engine is disassemble.*

- Drain the engine oil by removing the drain plug ① located on the bottom of the engine.
- Remove the magneto cover plug ② and the timing inspection plug ③.
- Remove the cylinder head cover ④ by removing the four wrench bolts.

- Bring the piston at TDC (Top Dead Center).

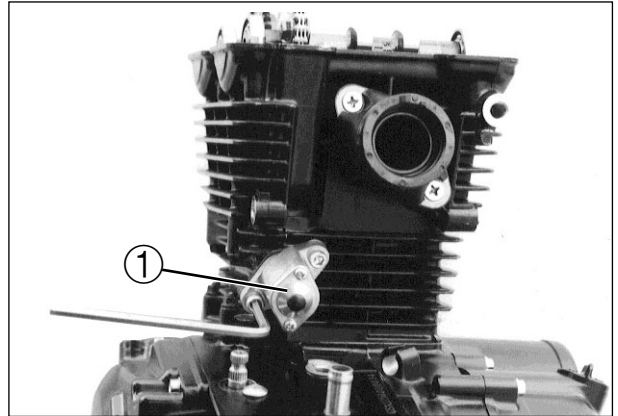
⚠ CAUTION

Align the "T" index mark on the magneto rotor with the triangle mark ⑤ on the magneto cover as turn the crankshaft clockwise or counter-clockwise.

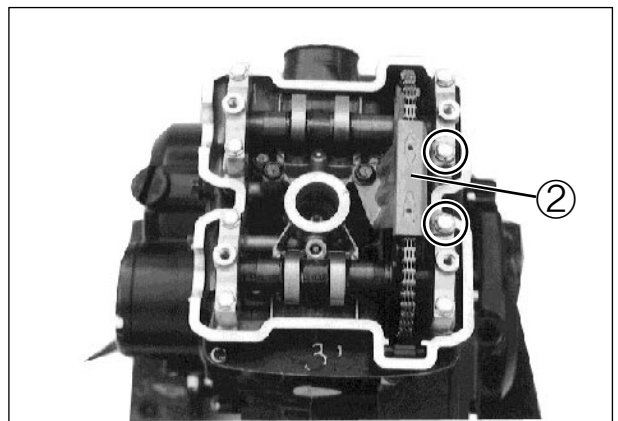


3-7 ENGINE

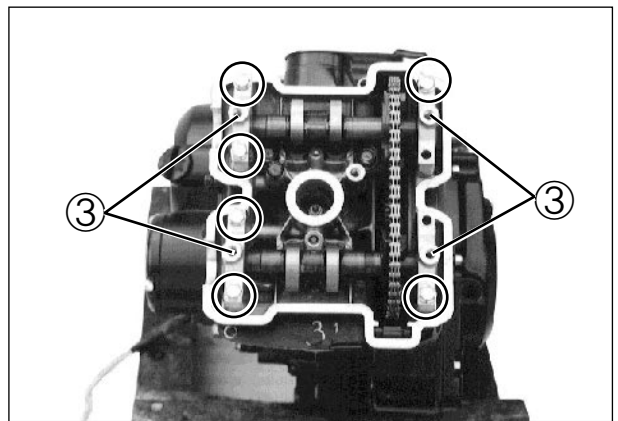
- Remove the cam chain tension adjuster ①.



- Remove the cam chain guide NO.2 ②.



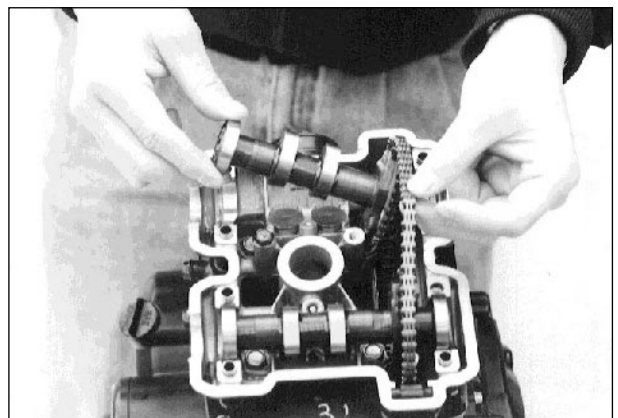
- Remove the camshaft housings ③.



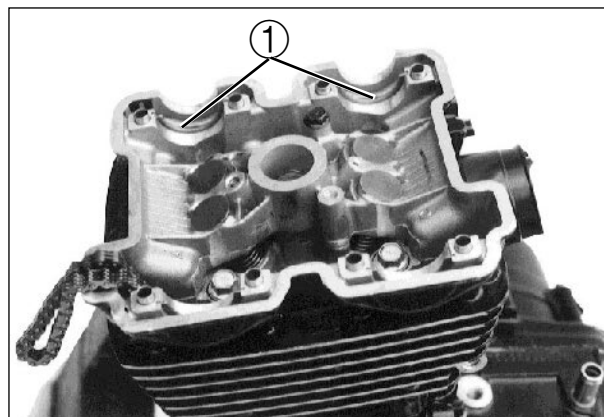
- Remove the dowel pins, intake camshaft and exhaust camshaft.

NOTE

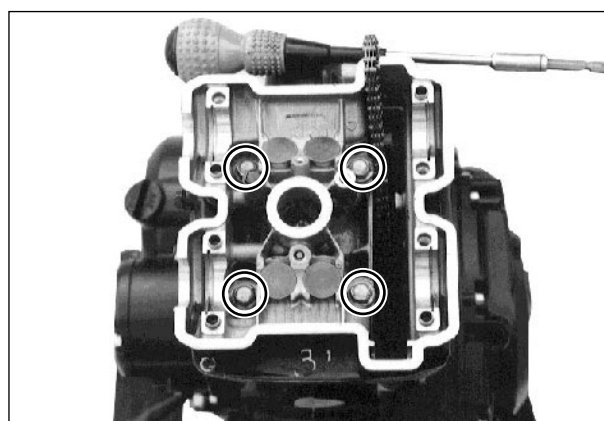
Do not drop the dowel pins and cam chain into the crankcase.



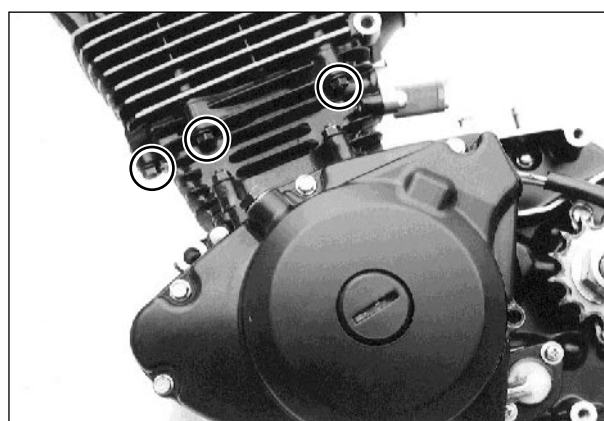
- Remove the camshaft C-rings ①.



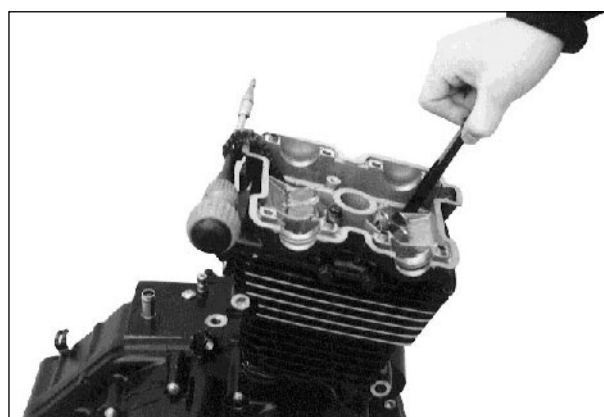
- Loosen the three cylinder head bolts.



- Loosen the three cylinder head base nuts.



- Remove the cam chain guide NO.1.

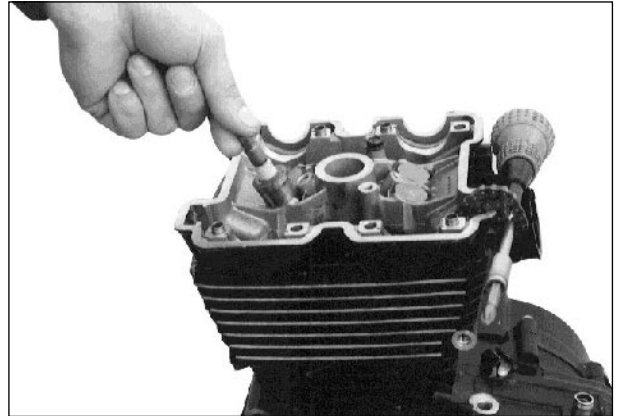


3-9 ENGINE

- Remove the tappet and the shim.

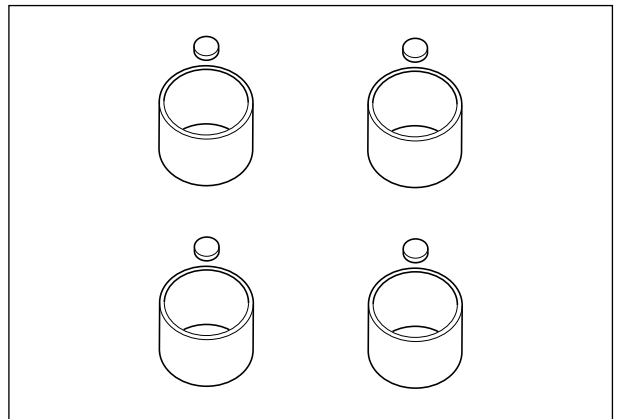
 **CAUTION**

Draw out the tappet and shim with the strong magnet not to be scratched.



 **CAUTION**

The tappet and shim should be lined so that each will be restored to the original position during reassembly.



- Compress the valve spring by using the special tools.

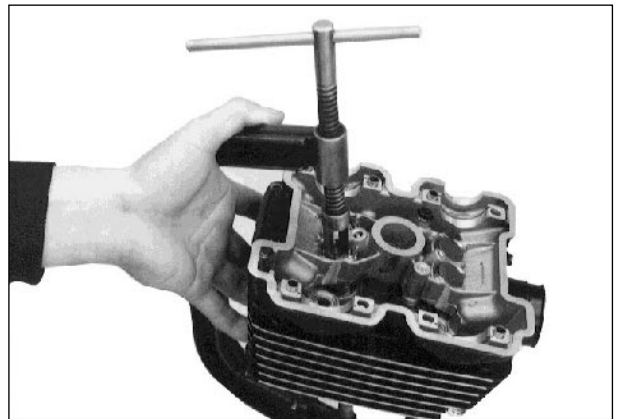


Valve spring compressor

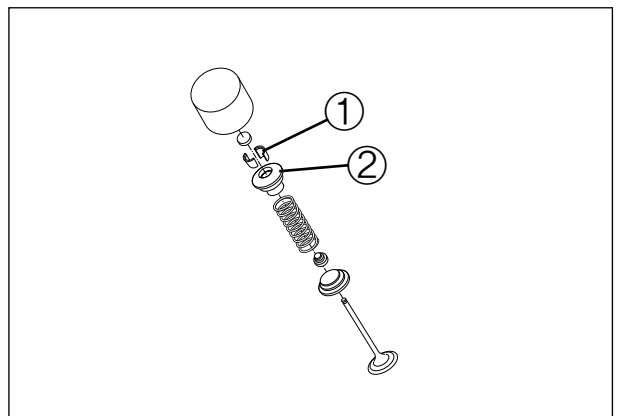
: 09916-14510

Valve spring compressor attachment

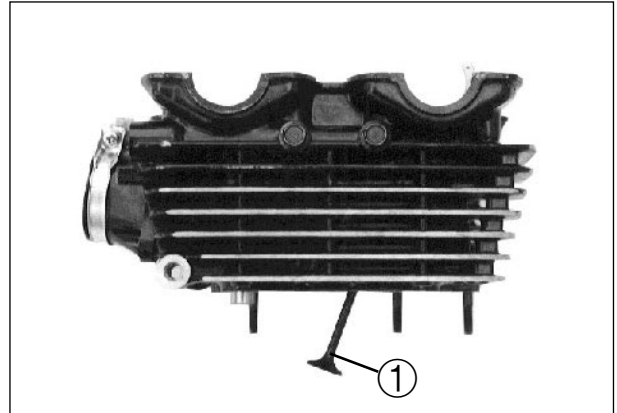
: 09916H35C00



- Take out the valve cotter ① from the valve stem.
- Remove the valve spring retainer ②.



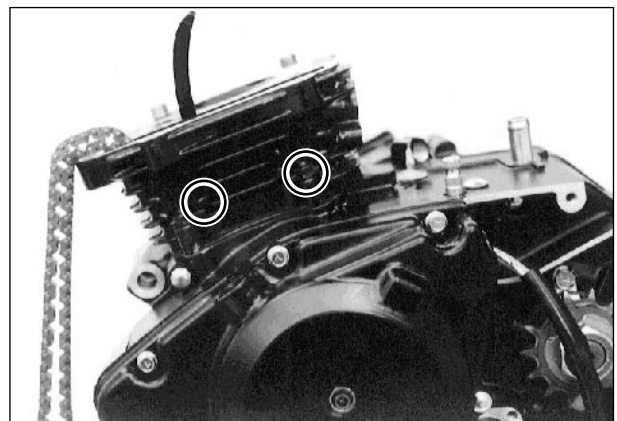
- Pull out the valve ① from the other side.



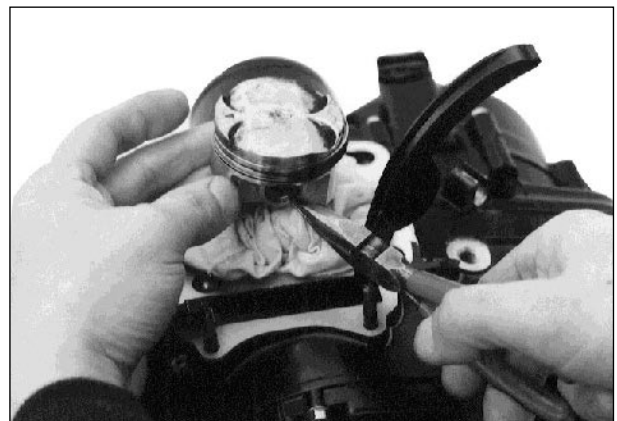
- Remove the two cylinder base nuts and the cylinder.

⚠ CAUTION

If tapping with the plastic hammer is necessary, pay attention to break the fins.

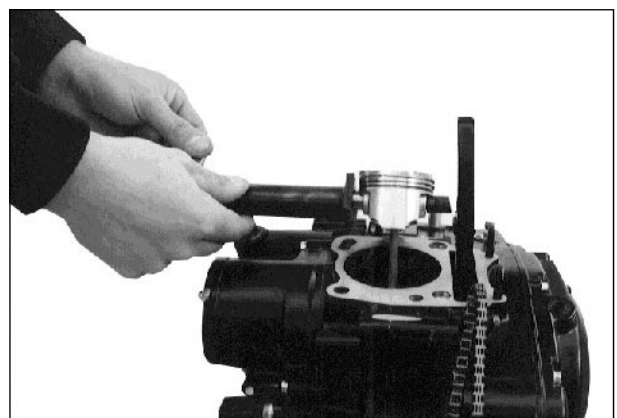


- Place a clean rag over the cylinder base to prevent the piston pin circlips from dropping into the crankcase. Remove the piston pin circlips with the long-nose pliers.



- Remove the piston pin by using the special tool.

🔧 Piston pin puller : 09910-34510



UPPER END COMPONENTS OF ENGINE INSPECTION AND SERVICING

⊙ CYLINDER HEAD DISTORTION

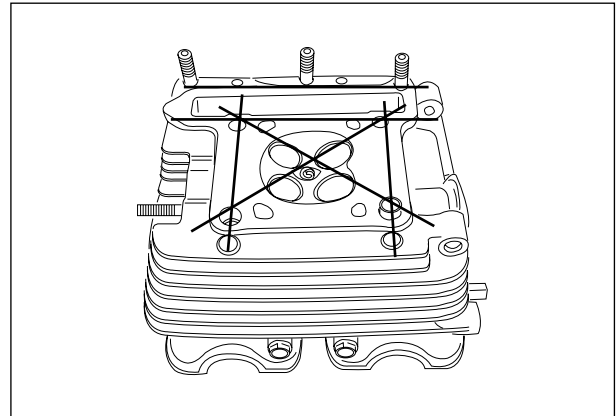
Decarbonize in combustion chamber.

Check the gasket surface of the cylinder head for distortion using a straightedge and thickness gauge. Take clearance reading at several places as indicated.

If any clearance reading exceeds the service limit, replace the cylinder head with a new one.

Cylinder head distortion	Service limit
	0.05 mm (0.002 in)

 Thickness gauge : 09900-20806

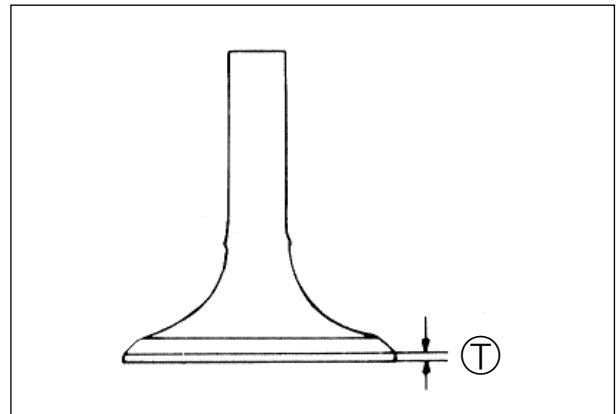


⊙ VALVE FACE WEAR

Visually inspect each valve face for wear or damage. If any abnormal wear is found, replace the respective valve with a new one. The thickness of the valve face decreases as the face wears. Measure the valve head thickness Ⓣ . If the valve head thickness is not within the specified value, replace the valve with a new one.

Valve head thickness Ⓣ (IN. & EX.)	Service limit
	0.5 mm (0.02 in)

 Vernier calipers : 09900-20101

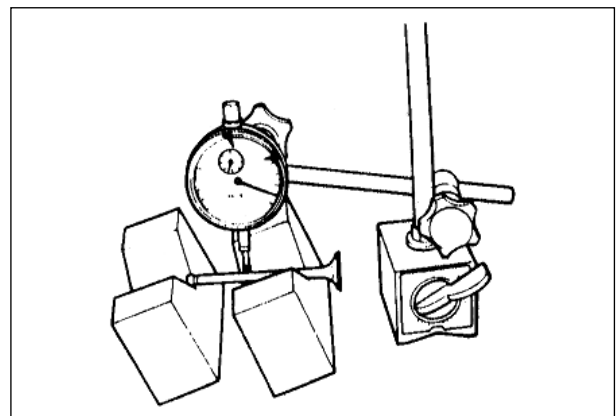


⊙ VALVE STEM RUNOUT

Check the valve stem for abnormal wear or bend. Support the valve using a V-blocks and measure the valve stem runout using the dial gauge, as shown. If the service limit is exceeded or abnormal condition exists, replace the valve with a new one.

Valve stem runout (IN. & EX.)	Service limit
	0.05 mm (0.002 in)

 Dial gauge : 09900-20606
Magnetic stand : 09900-20701
V-block : 09900-21304

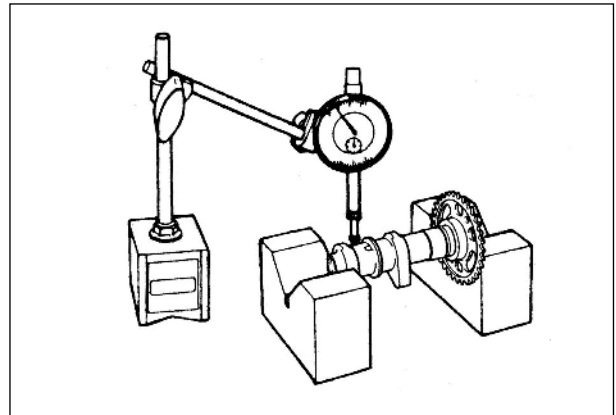


◎ CAMSHAFT RUNOUT

Support the camshaft using a V-blocks and measure the camshaft runout using the dial gauge. If the runout exceeds the service limit, replace the camshaft with a new one.

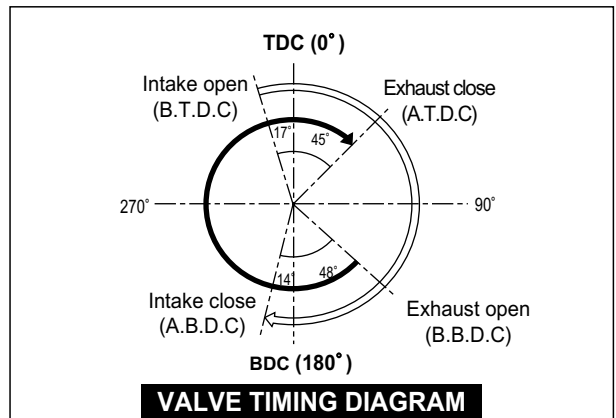
Camshaft runout (IN. & EX.)	Service limit
	0.10 mm (0.004 in)

-  Dial gauge : 09900-20606
- Magnetic stand : 09900-20701
- V-block : 09900-21304



◎ CAMSHAFT

The camshaft should be checked for runout and also for wear of cams and journals if the engine has been noted to produce abnormal noise or vibration or a lack of out-put power. Any of these abnormality could be caused by a worn camshaft.

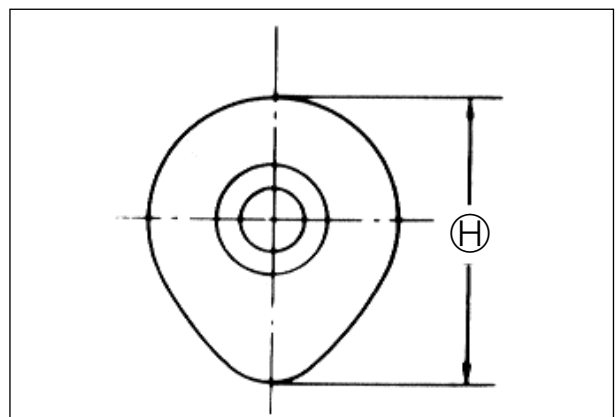


◎ CAMSHAFT WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power. The limit of cam wear is specified for both intake and exhaust cams in terms of cam height Ⓜ , which is to be measured with a micrometer. Replace camshafts if found it worn down to the limit.

Cam height Ⓜ	Service limit
Intake cam	34.17 mm (1.345 in)
Exhaust cam	34.12 mm (1.343 in)

-  Micrometer(25~50 mm) : 09900-20202



⊙ TAPPET & SHIM WEAR

When measuring the valve clearance, the clearance should be within the standard range.

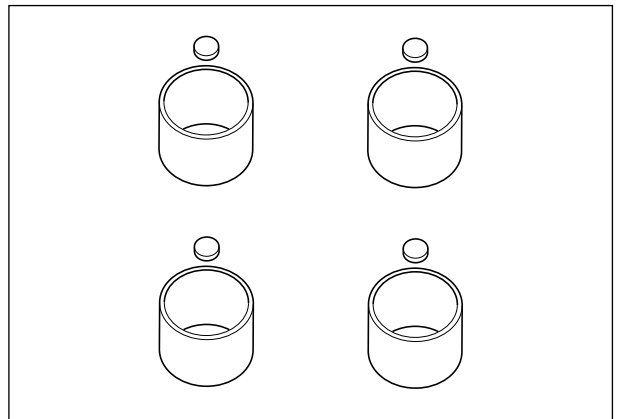
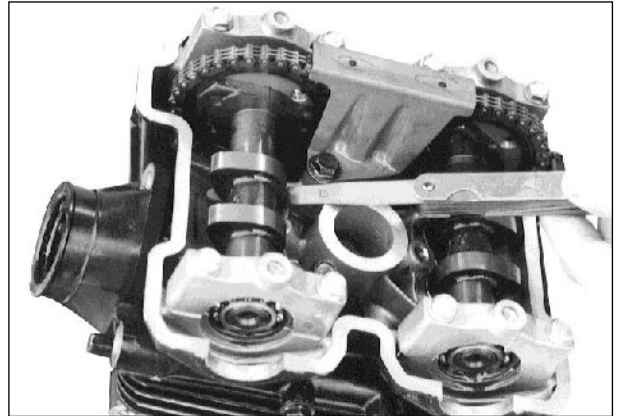
Valve clearance	Standard (When cold)
Intake valve	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
Exhaust valve	0.2 ~ 0.3 mm (0.008 ~ 0.012 in)

 Thickness gauge : 09900-20806

- Inspect the tappet for wear and scratch.
If modification or scratch is present, replace the tappet.
- When you checked the valve clearance, if the valve clearance is wide please replace the present shim into thick one, if the valve clearance is narrow please replace the present shim into thin shim. (Refer to page 90 · 91)

⊙ SHIM KIND

There are 41 kinds of shim which thickness is increased by each 0.025 mm from 1.20 mm to 2.20 mm.

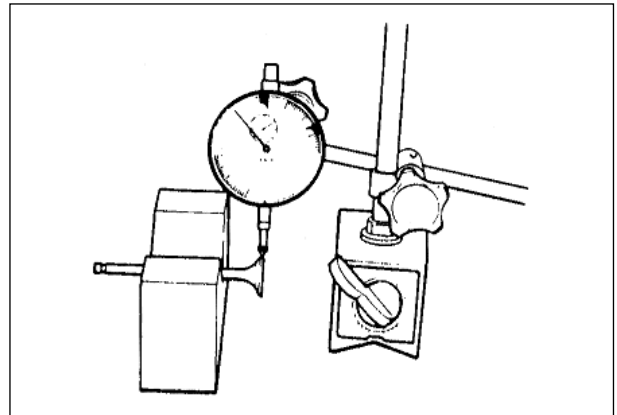


⊙ VALVE HEAD RADIAL RUNOUT

Support the valve using a V-block and measure the valve head radial runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the valve with a new one.

Valve head radial runout (IN. & EX.)	Service limit
	0.03 mm (0.0012 in)

 Dial gauge : 09900-20606
Magnetic stand : 09900-20701
V-block : 09900-21304




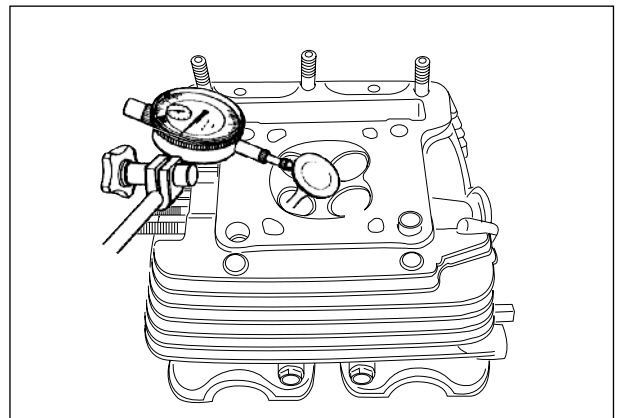
⊙ VALVE STEM DEFLECTION

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other. Position the dial gauge as shown.

If the deflection exceeds the service limit, determine whether the valve or the guide should be replaced with a new one.

Valve stem deflection	Service limit
IN.	0.35 mm (0.014 in)
EX.	0.35 mm (0.014 in)

 Dial gauge : 09900-20606
Magnetic stand : 09900-20701




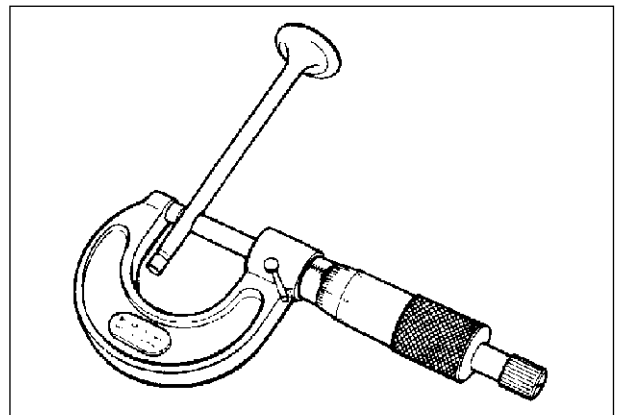
⊙ VALVE STEM DIAMETER

Measure the valve stem outside diameter using the micrometer.

If the diameter measured exceeds the standard, replace the valve.

Valve stem diameter	Standard
IN.	4.475 ~ 4.490 mm (0.1762 ~ 0.1768 in)
EX.	4.455 ~ 4.470 mm (0.1754 ~ 0.1760 in)

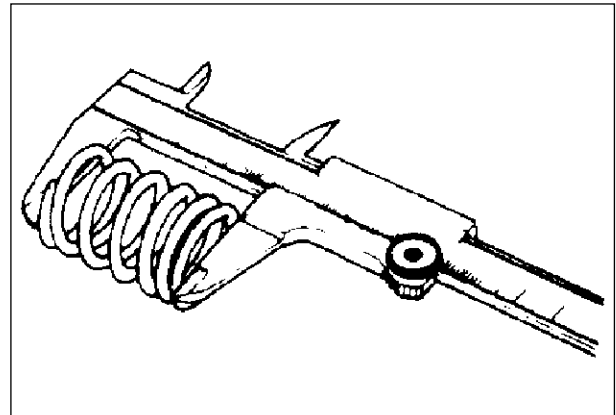
 Micrometer(0~25 mm) : 09900-20201



⊙ VALVE SPRING

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

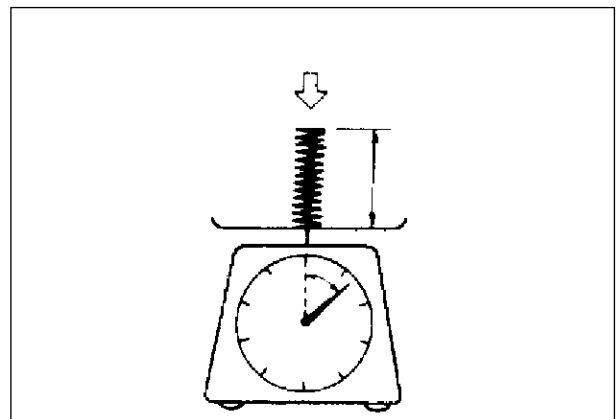
Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the valve spring is not within specification, replace the valve spring.



Valve spring free length (IN. & EX.)	Service limit
	37.80 mm (1.488 in)

 Vernier calipers : 09900-20101

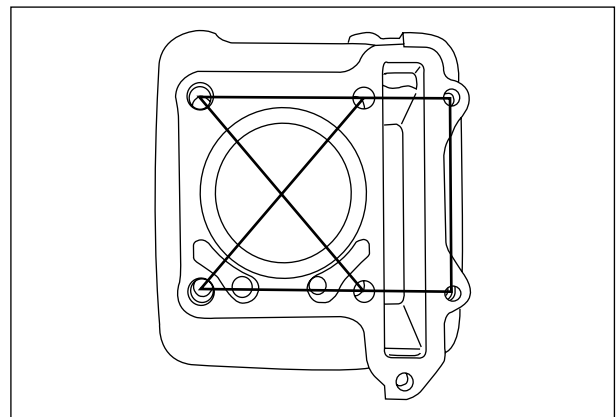
Valve spring tension (IN. & EX.)	Standard
	12.1 ~ 13.9 kgf (26.68 ~ 30.64 lbs) at length 33.7 mm (1.33 in)



⊙ CYLINDER DISTORTION

Check the gasketed surface of the cylinder for distortion using a straightedge and thickness gauge, taking a clearance reading at several places as indicated.

If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.



Cylinder distortion	Service limit
	0.05 mm (0.002 in)

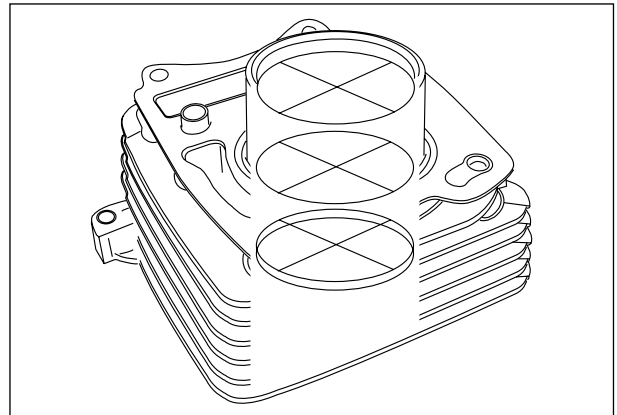
 Thickness gauge : 09900-20806

⊙ CYLINDER BORE

Measure the cylinder bore diameter at six place.
If any one of the measurements exceeds the limit, overhaul the cylinder and replace the cylinder.

	Standard	Service limit
Cylinder bore	57.000 ~ 57.015 mm (2.2441 ~ 2.2447 in)	57.080 mm (2.2472 in)

 **Cylinder gauge set : 09900-20508**




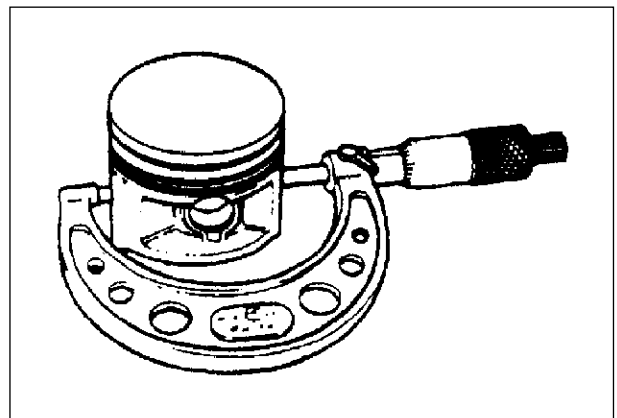
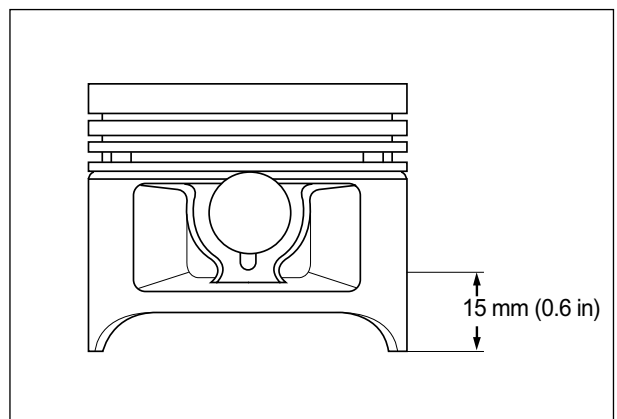
⊙ PISTON DIAMETER INSPECTION

Measure the outside diameter of the piston in the direction perpendicular to the piston pin axis at the height from the skirt as shown in the illustration using a micrometer.

If the measurement is found less than the service limit, replace the piston.

	Service limit
Piston diameter	56.880 mm (2.2394 in)

 **Micrometer(50 ~ 75 mm) : 09900-20203**



⊙ PISTON TO CYLINDER CLEARANCE

To determine the piston to cylinder clearance, calculate the difference between the cylinder bore and outside diameter of the piston.

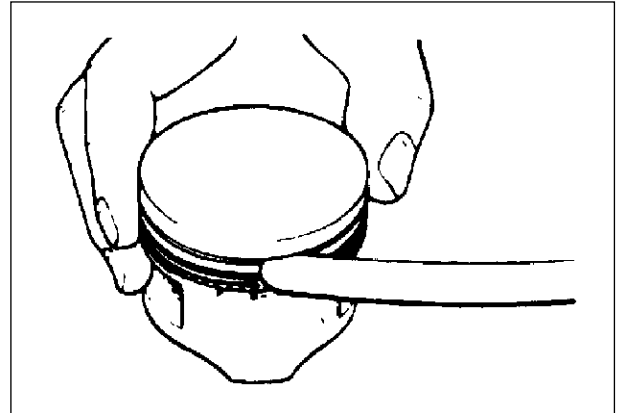
	Standard	Service limit
Piston to cylinder clearance	0.050 ~ 0.060 mm (0.0020 ~ 0.0024 in)	0.120 mm (0.0047 in)

⊙ PISTON RING TO GROOVE CLEARANCE INSPECTION

Remove carbon deposit both from the piston ring and its groove.

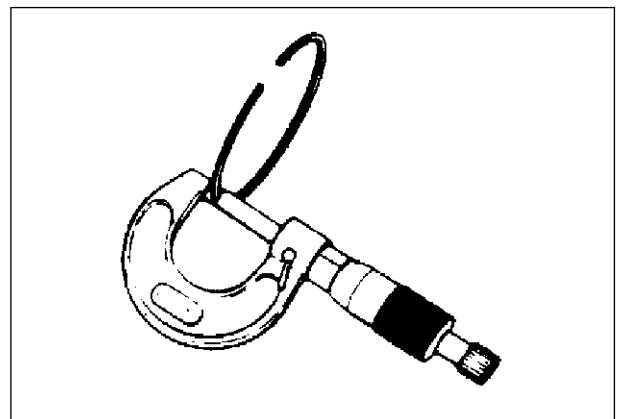
Fit the piston ring into the groove. With the ring compressed and lifted up, measure the clearance on the bottom side of the ring using a thickness gauge.

If any clearance reading exceeds the service limit, replace both the piston and piston rings.




Piston ring-groove clearance	Service limit
1st	0.180 mm (0.007 in)
2nd	0.150 mm (0.006 in)

Piston ring groove width	Standard
1st	1.01 ~ 1.03 mm (0.040 ~ 0.041 in)
2nd	1.01 ~ 1.03 mm (0.040 ~ 0.041 in)
Oil	2.01 ~ 2.03 mm (0.079 ~ 0.080 in)



Piston ring thickness	Standard
1st	0.970 ~ 0.990 mm (0.0382 ~ 0.0390 in)
2nd	0.970 ~ 0.990 mm (0.0382 ~ 0.0390 in)

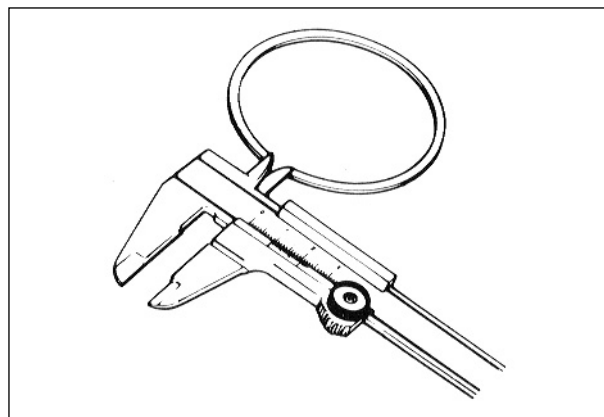
 **Micrometer(0~25 mm) : 09900-20201**
Thickness gauge : 09900-20806

⊙ PISTON RING FREE END GAP INSPECTION

Before installing the piston rings, measure the free end gap of each ring using vernier calipers. If the gap is less than the service limit, replace the ring.

Piston ring free end gap	Service limit
1st	5.7 mm (0.224 in)
2nd	4.6 mm (0.181 in)

 Vernier calipers : 09900-20101



⊙ PISTON RING END GAP INSPECTION (Assembly condition)

Insert the piston ring squarely into the cylinder using the piston head.

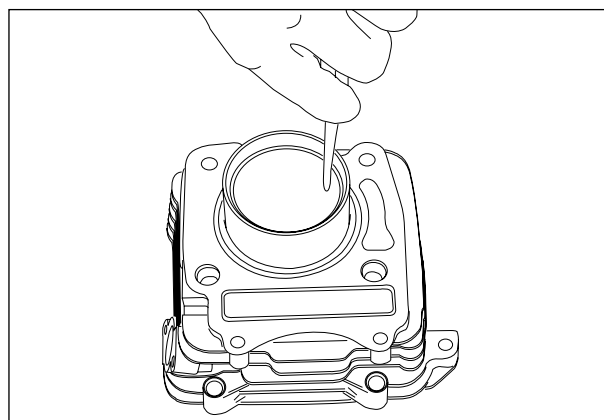
Measure the end gap with a thickness gauge.

If the gap exceeds the service limit, replace the piston ring with a new one.

Piston ring end gap (Assembly condition)	Standard
1st	0.20 ~ 0.32 mm (0.008 ~ 0.013 in)
2nd	0.20 ~ 0.32 mm (0.008 ~ 0.013 in)

Piston ring end gap (Assembly condition)	Service limit
1st	0.50 mm (0.020 in)
2nd	0.50 mm (0.020 in)

 Thickness gauge : 0990-20806

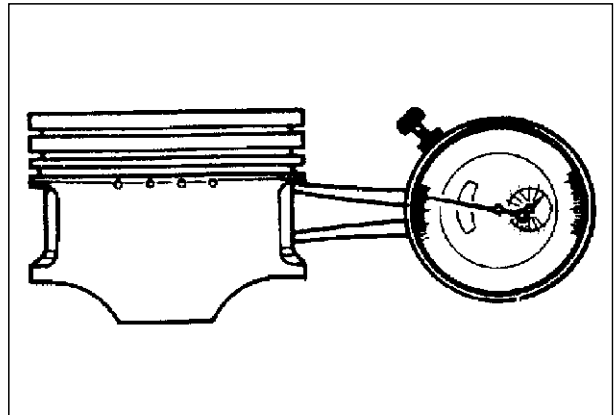


⊙ PISTON PIN HOLE BORE

Using a dial calipers, measure the piston pin hole bore both the vertical and horizontal directions. If the measurement exceeds the service limit, replace the piston with a new one.

Piston pin hole bore	Service limit
	15.030 mm (0.5917 in)

 Dial calipers : 09900-20605




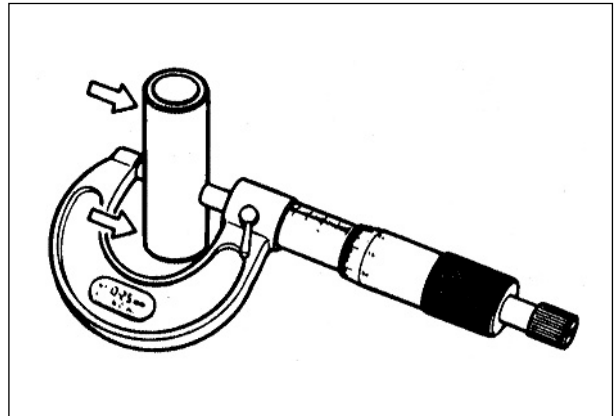
⊙ PISTON PIN DIAMETER INSPECTION

Using a micrometer, measure the piston pin outside diameter at three position, both the ends and the center.

If any of the measurements is founds less than the service limit, replace the pin with a new one.

Piston pin diameter	Service limit
	14.980 mm (0.5898 in)

 Micrometer(0~25 mm) : 09900-20201



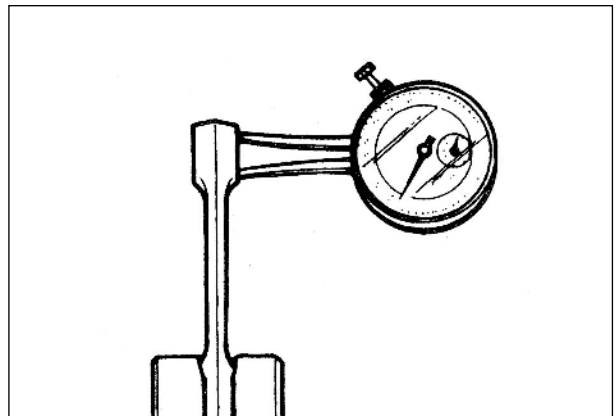
⊙ CONROD SMALL END INSIDE DIAMETER INSPECTION

Using a dial calipers, measure the conrod small end inside diameter both in vertical and horizontal directions.

If any of the measurements exceeds the service limit, replace the conrod.

Conrod small end I.D.	Standard	Service limit
	15.006 ~ 15.014 mm (0.5908 ~ 0.5911 in)	15.040 mm (0.5921 in)

 Dial calipers : 09900-20605



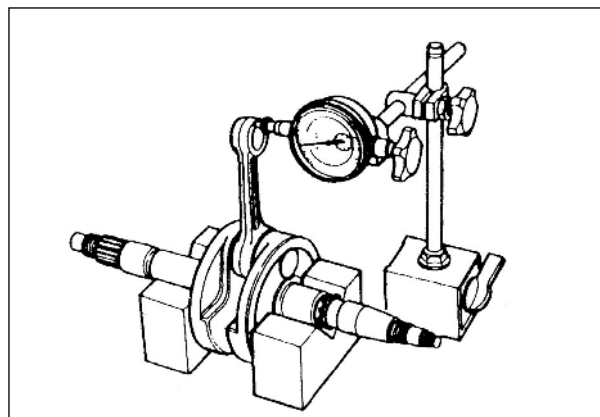
◎ CONROD DEFLECTION INSPECTION

Wear on the big end of the conrod can be estimated by checking the movement of the small end of the conrod.

Turn the conrod and see if it moves smoothly without play and noise. This method can also be used to check the extent of wear on the parts of the conrod's big end.

Conrod deflection	Service limit
	3.0 mm (0.12 in)

 **Dial gauge : 09900-20606**
Magnetic stand : 09900-20701
V-block : 09900-21304

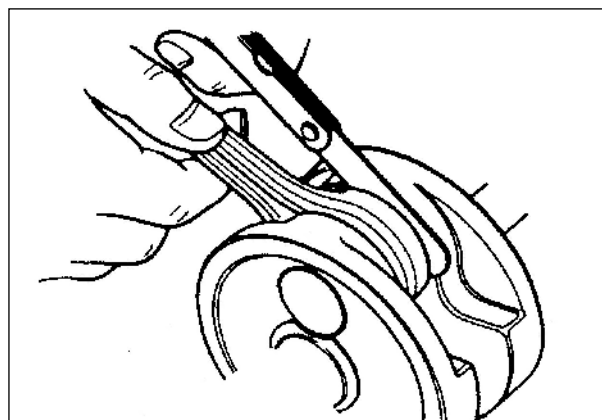


◎ CONROD BIG END SIDE CLEARANCE INSPECTION

Push the big end of the conrod to one side and measure the side clearance using a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly with a new one or bring the deflection and the side clearance within the service limit by replacing the worn parts (conrod, big end bearing, crankshaft, crank pin, etc.) with new ones.

Conrod big end side clearance	Standard	Service limit
	0.10 ~ 0.45 mm (0.004 ~ 0.018 in)	1.00 mm (0.040 in)


 **Thickness gauge : 09900-20806**

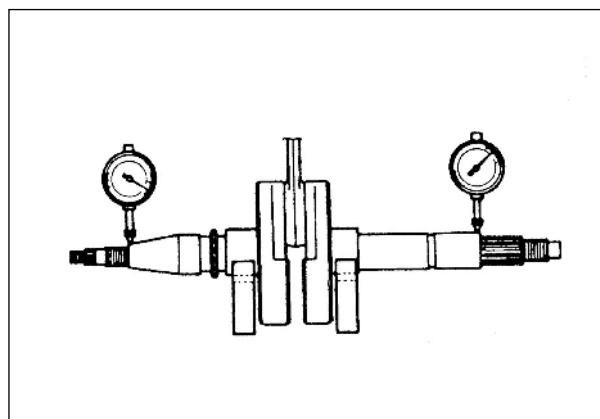


◎ CRANKSHAFT RUNOUT INSPECTION

With the right and left crank journals supported using a V-block, turn the crankshaft slowly. At this time, measure the crankshaft end runout using a dial gauge. If the runout exceeds the service limit, replace the crankshaft with a new one.

Crankshaft runout	Service limit
	0.05 mm (0.002 in)

 **Dial gauge : 09900-20606**
Magnetic stand : 09900-20701
V-block : 09900-21304



UPPER END COMPONENTS OF ENGINE REASSEMBLY

⊙ PISTON RING

- Install the oil ring first, the 2nd ring second, and the 1st ring last.

NOTE

- ❖ The 1st ① and 2nd ② piston rings differ in shape.
- ❖ The 1st and 2nd piston rings should be installed with the mark facing up.

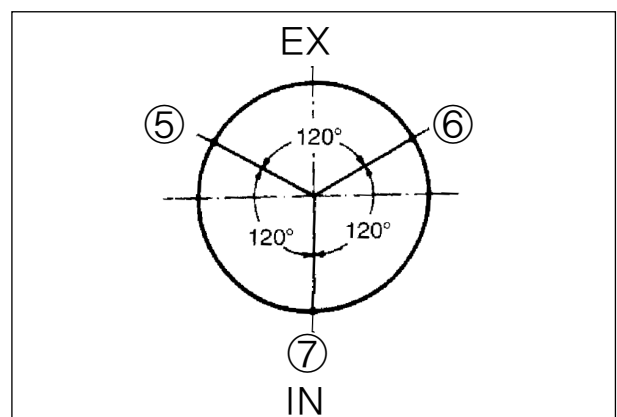
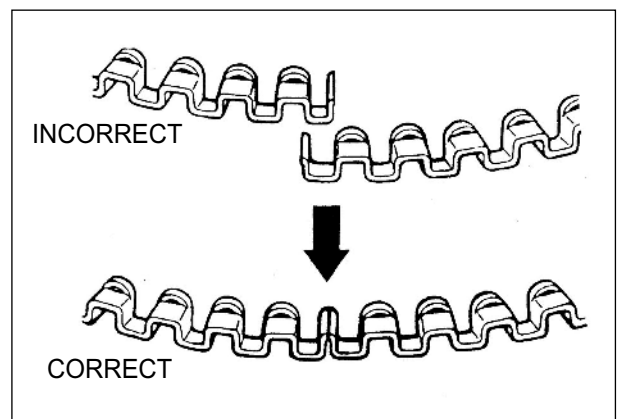
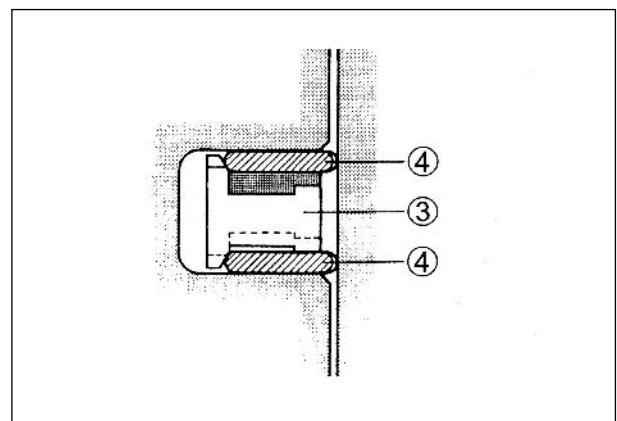
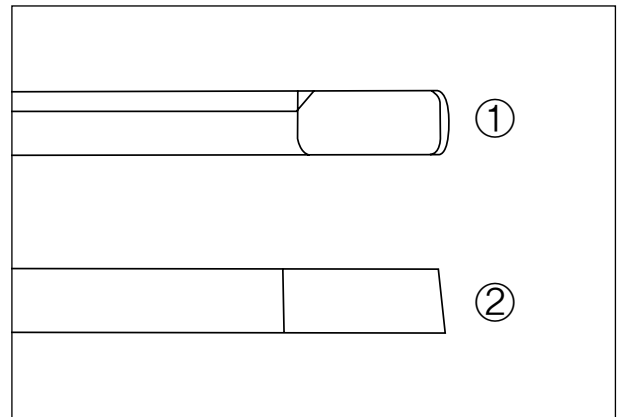
- First, install a spacer ③ into the oil ring groove, and then install the two side rails ④. The spacer and side rails do not have a designated top and bottom. They can be installed in any position.

⚠ CAUTION

When installing the spacer, be careful not to allow its two ends to overlap in the groove.

- Position the piston ring gaps as shown. Before inserting the piston into its cylinder, check that the gaps are properly positioned.

- ⑤ 2nd ring and lower side rail
- ⑥ Upper side rail
- ⑦ 1st ring and spacer



⊙ PISTON AND CYLINDER

- Apply **MOLY PASTE** on the piston pin and small end of the conrod.

MOLY PASTE

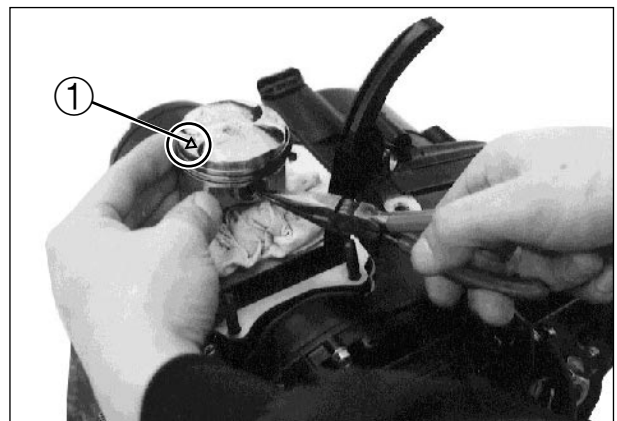
- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase, and then fit the piston pin circlip with the long-nose pliers.

CAUTION

Use a new piston pin circlip to prevent circlip failure with a bent one.

NOTE

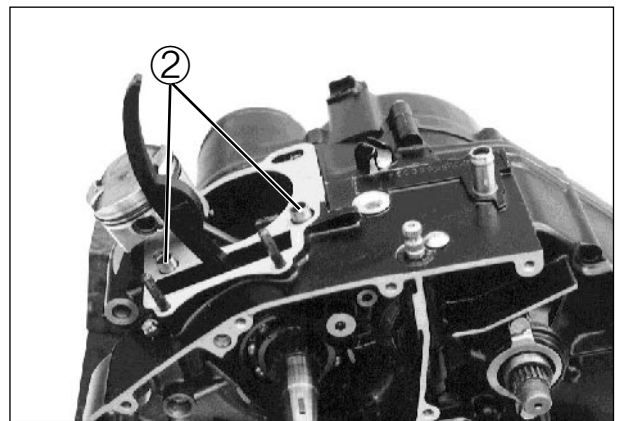
Install the piston with the punch mark ① on the piston head facing toward the exhaust side.



- Apply the engine oil to the sliding surface of the piston and big end of the conrod.
- Install the dowel pins ② and new gasket onto the crankcase.

CAUTION

Use a new gasket to prevent oil leakage.



- Hold each piston ring with the piston ring sections positioned correctly and put it into the cylinder. Make sure that the piston rings are caught by the cylinder skirt.

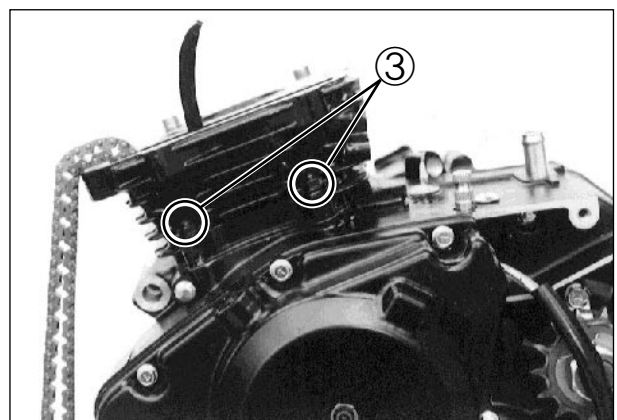
NOTE

When mounting the cylinder, after attaching the cam chain, keep the cam chain taut. The cam chain must not be caught between the cam chain sprocket and crankcase when the crankshaft is rotated.

- Tighten the cylinder base nut ③ to the specified torque.

Cylinder base nut

: 7 ~ 11 N · m (0.7 ~ 1.1 kgf · m)



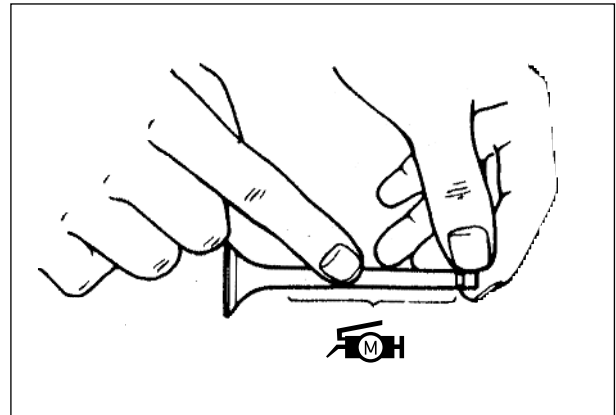
⊙ VALVE AND SPRING

- Apply **MOLY PASTE** to the valve as shown, and then insert them into the valve guides.

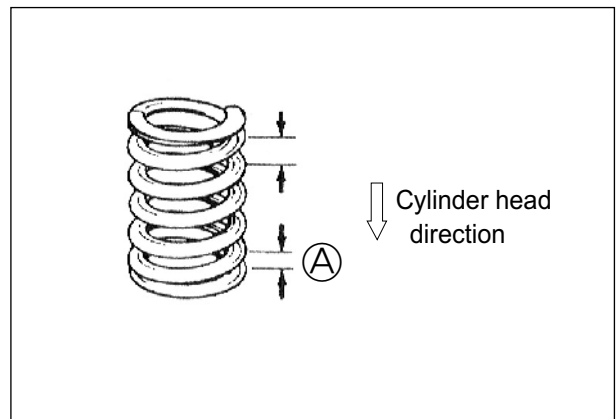
 **MOLY PASTE**

 **CAUTION**

When inserting each valve into the valve guides, make sure not to damage the lip of the oil seal.

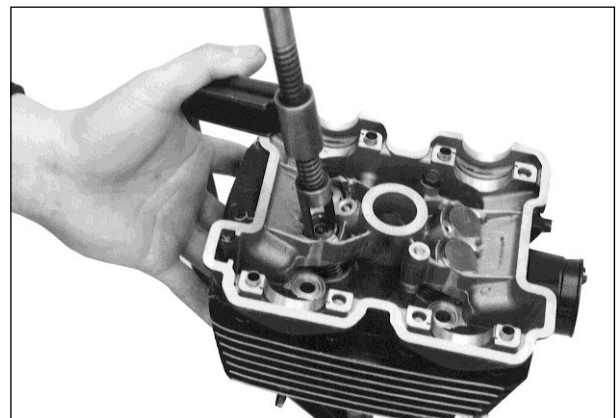


- Install the valve spring with the smaller pitch **A** facing the cylinder head.



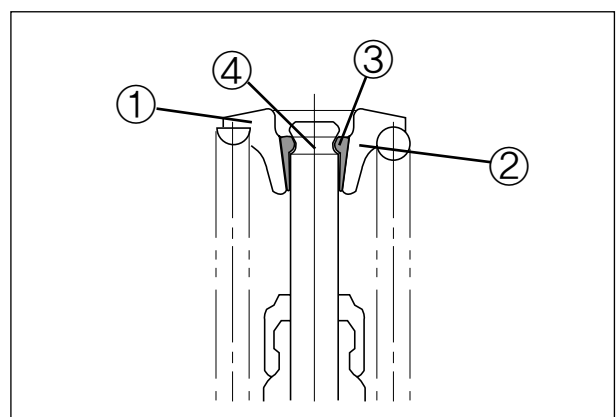
- Put on the valve spring retainer **①**, and using the valve spring compressor, press down the spring, fit the cotter halves to the stem end, and release the valve spring compressor to allow the cotter **②** to wedge in between retainer and stem. Be sure that the rounded lip **③** of the cotter fits snugly into the groove **④** in the stem end.

 **Valve spring compressor : 09916-14510**
Valve spring compressor attachment
: 09916H35C00



 **CAUTION**

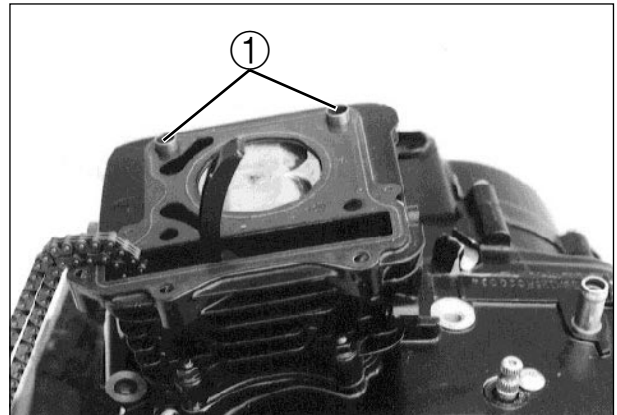
After installing the valve cotter, tap the valve stem end by using the plastic hammer at 2~3 times for assembly of the valve and cotter.



- Install the dowel pins ① and new gasket.

⚠ CAUTION

Use a new cylinder head gasket to prevent gas leakage.



◎ CYLINDER HEAD

- Install the cylinder head ②.
- With the cylinder head snugly seated on the cylinder, secure it by tightening the bolts in diagonal stages. Tighten the cylinder head bolts diagonally to the specified torque.

🔧 Cylinder head bolt
: 21 ~ 25 N · m (2.1 ~ 2.5 kgf · m)

NOTE

- ❖ Apply engine oil to the threaded parts of the cylinder head bolts and its washers.
- ❖ Be sure to install the washer with rounded side facing up.
- ❖ Pay caution to prevent the cam chain from dropping into the crankcase.

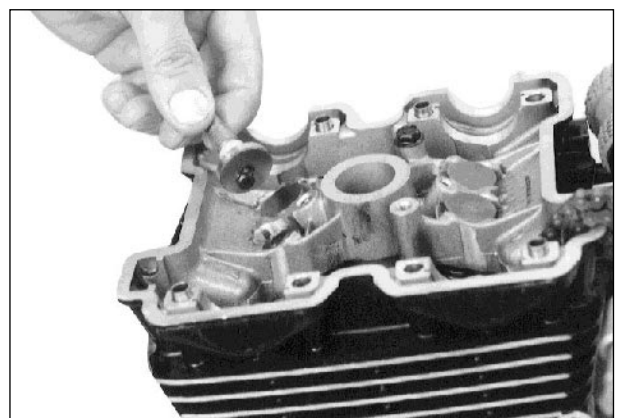
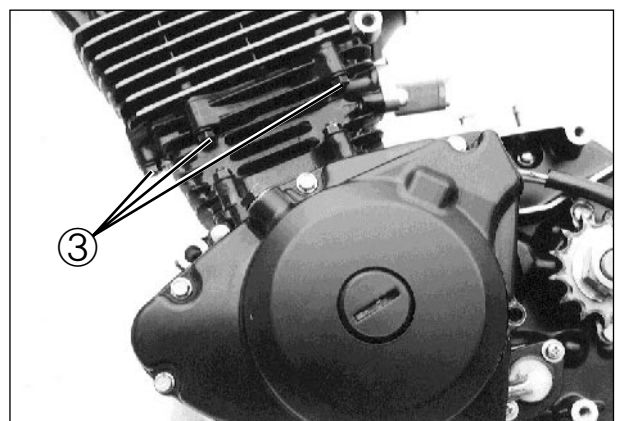
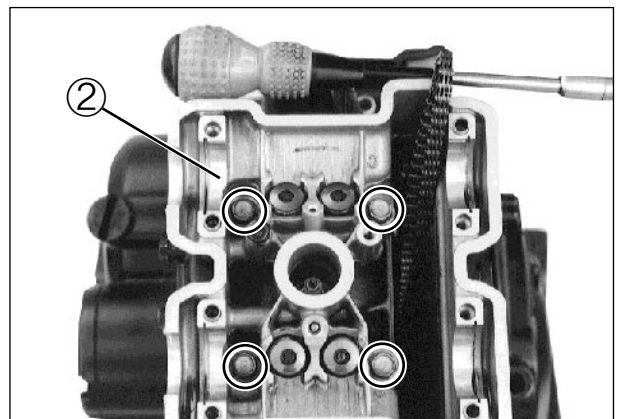
- After tightening the cylinder head bolts to the specification, tighten the cylinder head base nuts ③ to the specified torque.

🔧 Cylinder head base nut
: 7 ~ 11 N · m (0.7 ~ 1.1 kgf · m)

- Install the tappet and shim.

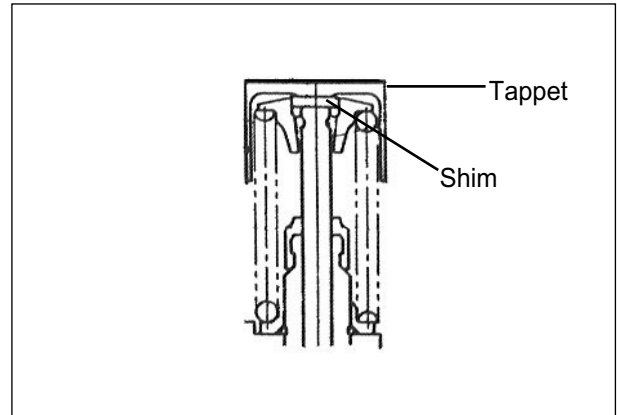
⚠ CAUTION

With the tappet fitted, it should be replaced if it doesn't turn smoothly by the hand.



⚠ CAUTION

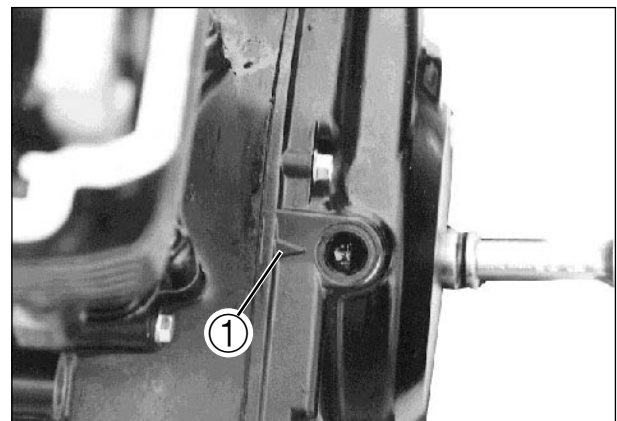
The tappet and shim should be installed at the original position when removed. If otherwise, it is difficult to adjust the valve clearance.



- With pulling up the cam chain, align the “T” index mark of the magneto rotor into the triangle mark ① of the magneto cover to turn the crankshaft.

⚠ CAUTION

If turn the crankshaft without pulling up the cam chain, the cam chain may be fallen off between the crankcase and cam chain drive sprocket.

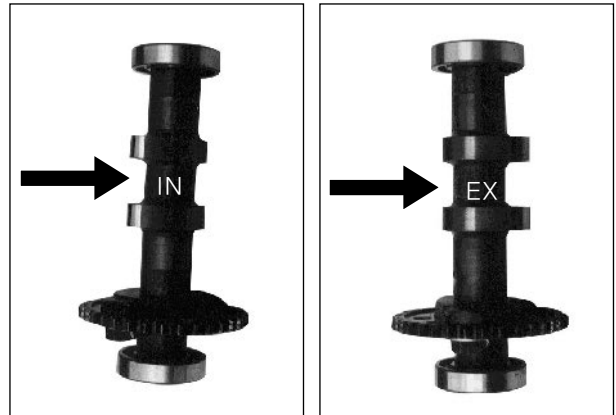


- Fit the cam chain guide NO.1.

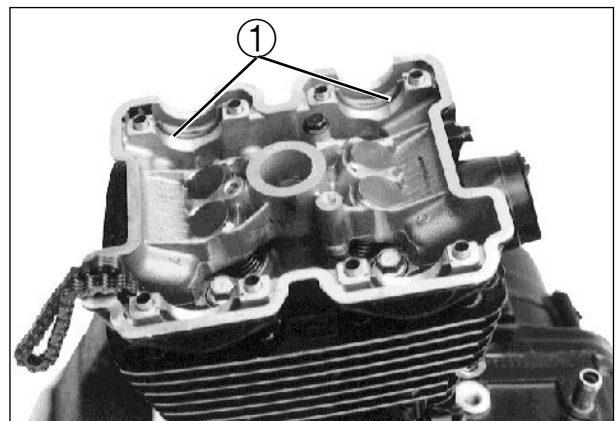


⊙ CAMSHAFT ASSEMBLY

- Distinguish the “EX” mark for the exhaust camshaft, the “IN” mark for the intake camshaft.



- Install the camshaft C-rings ①.



- When installing the camshaft and camshaft sprocket, apply a small quantity of the THREAD LOCK “1324” to the thread portion of the camshaft sprocket bolts.

 **THREAD LOCK “1324”**

- Tighten the camshaft sprocket bolts to the specified torque.

 **Camshaft sprocket bot**
: 10 ~ 12 N · m (1.0 ~ 1.2 kgf · m)

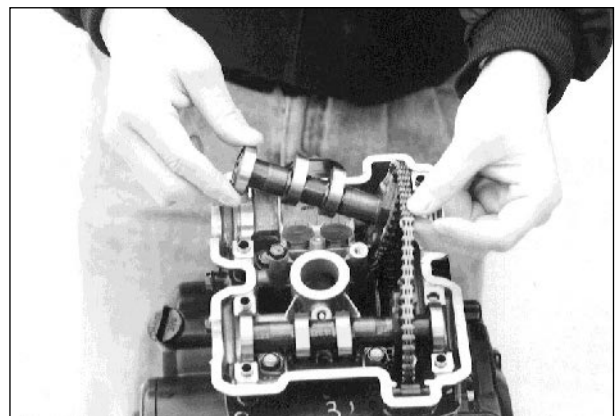
- Apply the engine oil to the camshaft bearings.



- Install the exhaust camshaft first, following the intake camshaft.

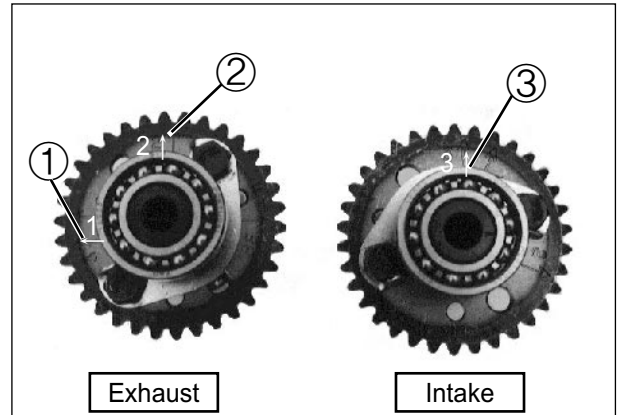
CAUTION

Do not rotate the magneto rotor while doing this operate.

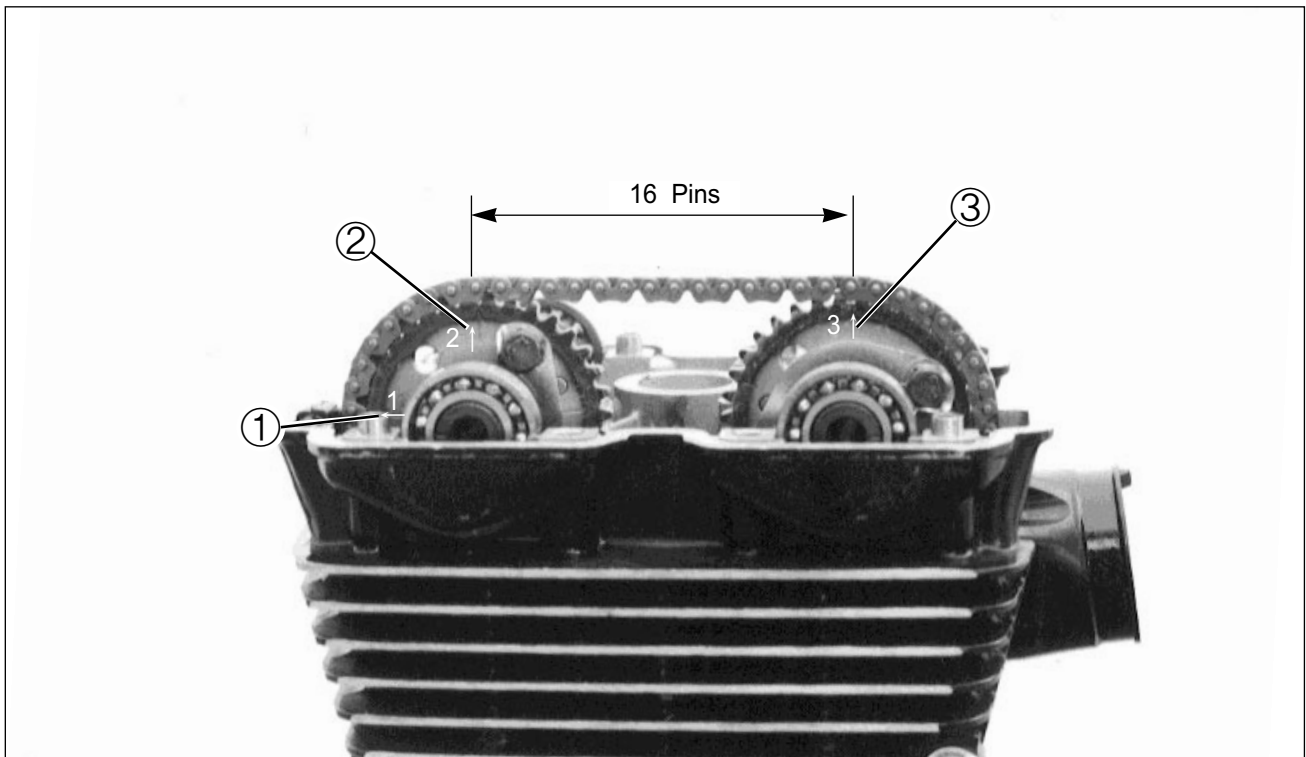


3-27 ENGINE

- With the "T" index mark on the magneto rotor is aligned with the triangle mark on the magneto cover, hold the camshaft steady and lightly pull up the cam chain to remove any slack between the cam chain sprocket and exhaust camshaft sprocket.
- The exhaust camshaft sprocket has an arrow marked "1" ①. Turn the exhaust camshaft so that the arrow marked "1" ① is aligned with the gasket surface of the cylinder head. Engage the cam chain with the exhaust camshaft sprocket.



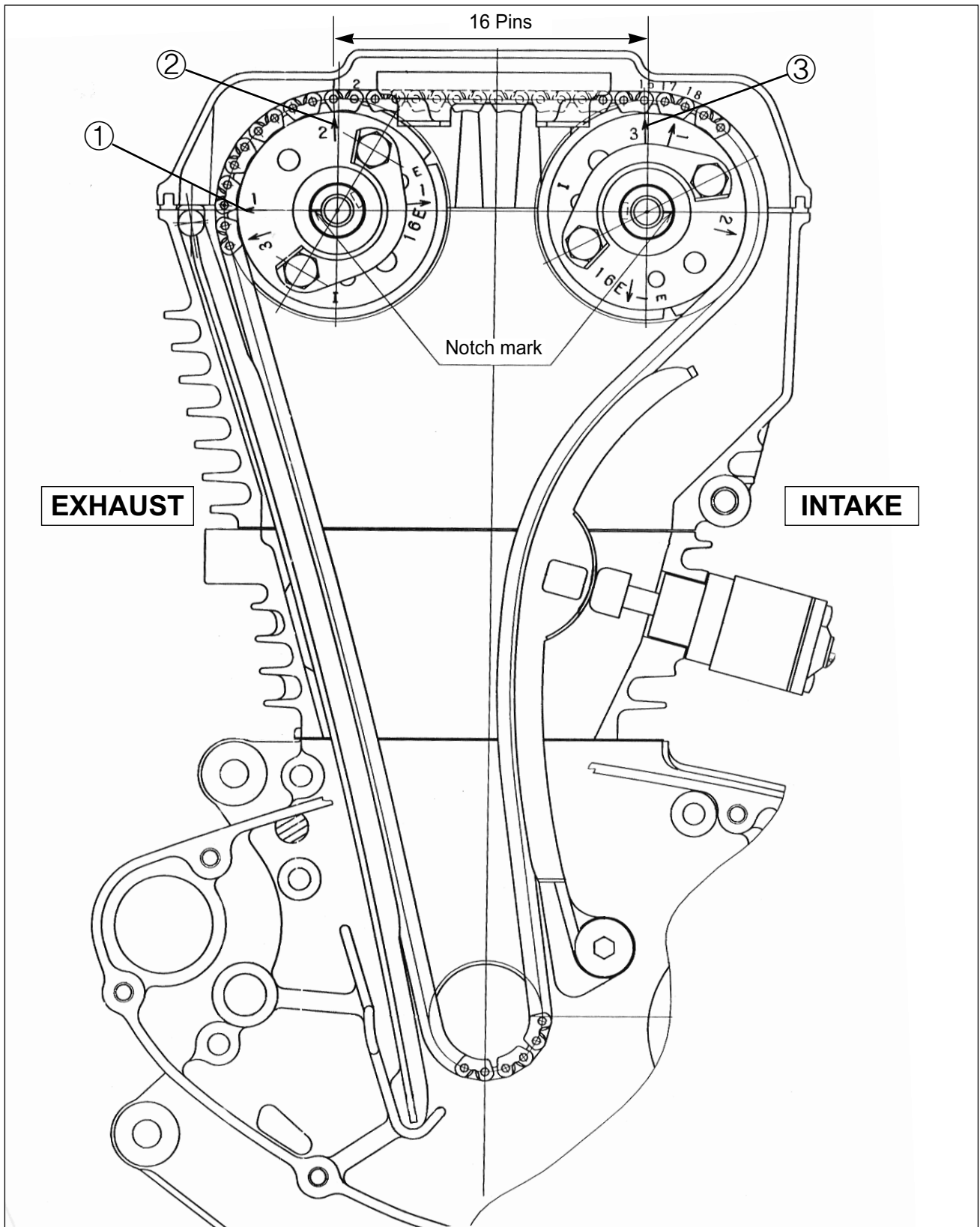
- The other arrow marked "2" ② should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" ②, count out 16 roller pins (from the exhaust camshaft side going towards the intake camshaft side). Engage the 16th roller pin on the cam chain with the arrow marked "3" ③ on the intake sprocket. Refer to the following photograph and illustrations.



NOTE

The cam chain should now be on all three sprockets.

Be careful not to move the crankshaft until the camshaft housings and cam chain tensioner are secured.



3-29 ENGINE

- Each camshaft housing is punched with “A” “B” “C” “D”.

Put on the housing “A” to the “A” of head surface, the housing “B” to the “B”, the housing “C” to the “C” and the housing “D” to the “D” as that “A” “B” “C” “D” is punched also to the cylinder head upper surface.

- Fix the four camshaft housing and cam chain guide NO.2 by tightening of the bolt in order.
Install each bolt diagonally by using the wrench pulling the shaft down.
Tighten the bolt of each camshaft housing with the same torque.

CAUTION

If get damaged the cylinder head or surface of camshaft housing thrust, produce an result that the camshaft housing not was tightened.

- Tighten the camshaft housing bolt with the specified torque.

CAUTION

The camshaft housing bolt is made of the special material.

This bolt is superior at the degree of hardness more than the different high tension bolt.

Pay special caution that the different type of bolt should not be used.

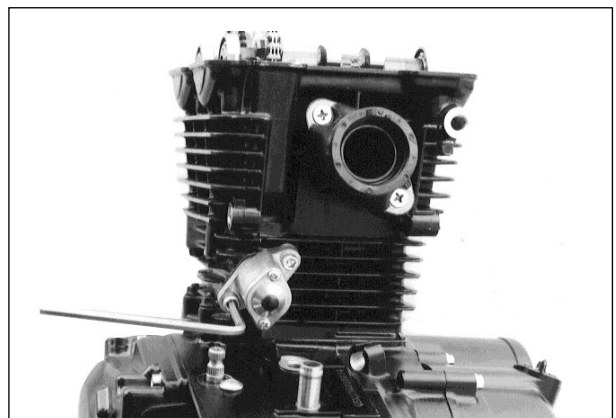
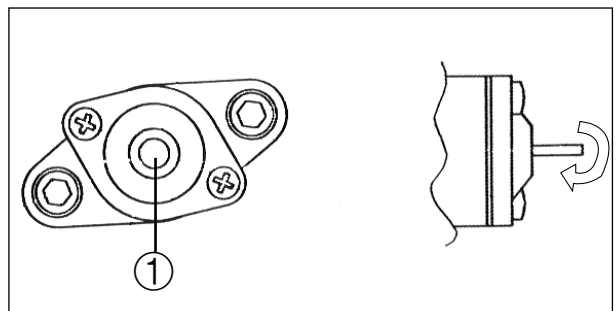
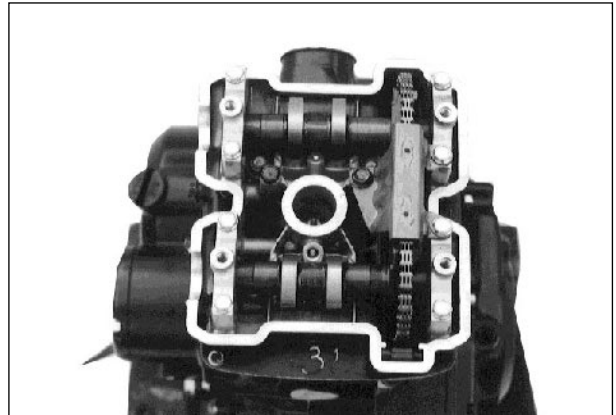
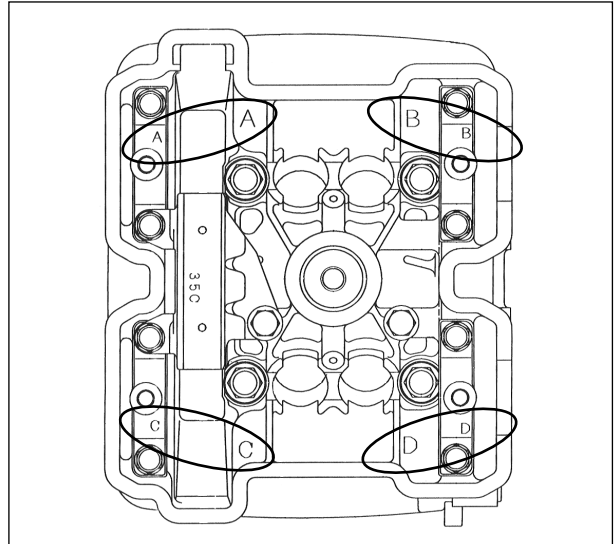
This bolt head is punched the “9” mark.

- 🔧 **Camshaft housing bolt**
: 8 ~ 12 N · m (0.8 ~ 1.2 kgf · m)

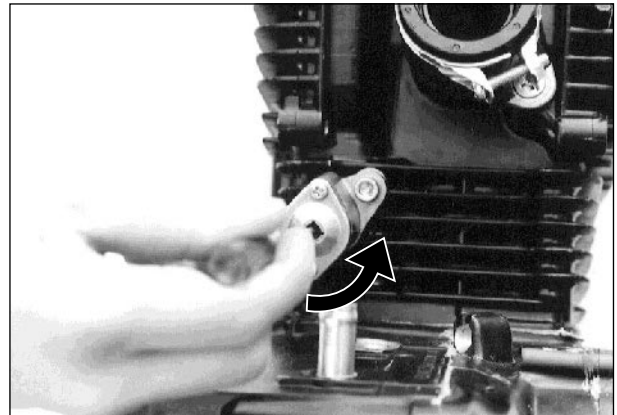
- If turn the lock shaft handle ① of the cam chain tension adjuster in clockwise (↻) direction, the pushrod is inserted in.
Turn the mechanical spring continually until the handle is turned to the end.

- Fix the cam chain tension adjuster into the cylinder block.
- Tighten the cam chain tension adjuster mounting bolt with the specified torque.

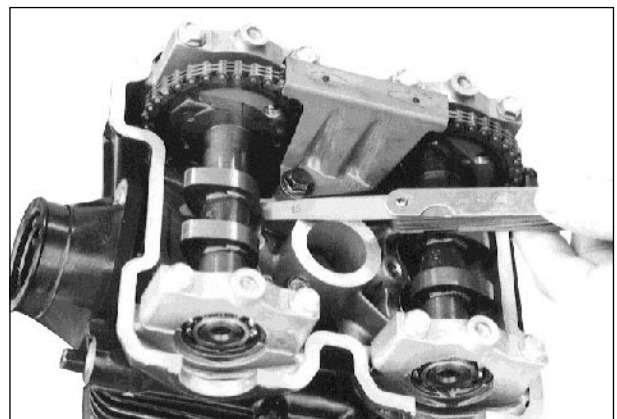
- 🔧 **Cam chain tension adjuster mounting bolt** : 8 ~ 12 N · m (0.8 ~ 1.2 kgf · m)



- Get out the pushrod for the front to turn the lock shaft handle of the cam chain tension adjuster in counter-clockwise (↶).



- Turn the crankshaft about 10 times clockwise or counter-clockwise on the basis of the magneto rotor.
- If the valve clearance is within standard after measured the valve clearance, begin the next operation.
If it is out of standard, adjust the valve clearance within standard limit after disassembled the camshaft and replaced the proper shim.



Valve clearance	Standard (When cold)
IN.	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
EX.	0.2 ~ 0.3 mm (0.008 ~ 0.012 in)

 Thickness gauge : 09900-20806

 **CAUTION**

If you don't rotate the crankshaft about 10 times before measuring the valve clearance, there is no meaning in valve clearance.

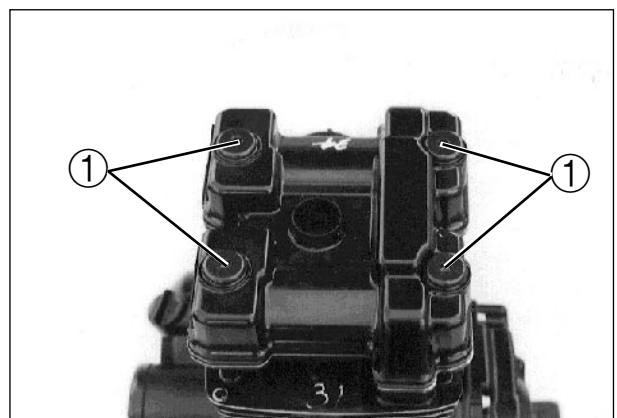
- Apply BOND "1215" to the surface of the cylinder head cover packing block.

 BOND "1215"



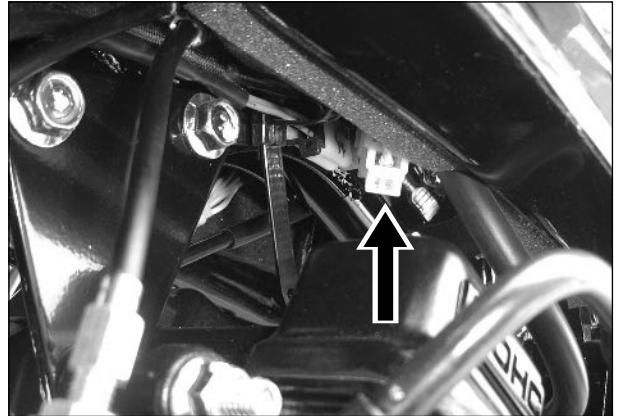
- Tighten the cylinder head cover bolts ① with the specified torque.

 Cylinder head cover bolt
: 12 ~ 16 N · m (1.2 ~ 1.6 kgf · m)



LEFT END COMPONENTS OF ENGINE DISASSEMBLY

- Disconnect the magneto couplers.



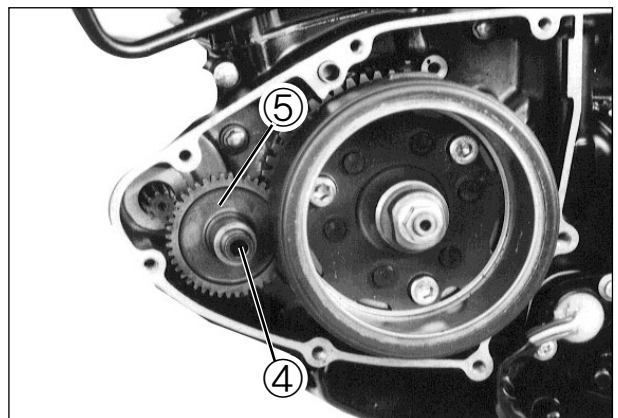
- Remove the engine guard ①.
- Remove the engine sprocket cover ②.



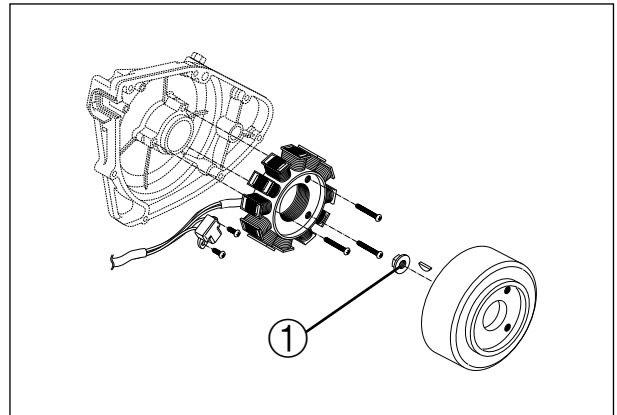
- Remove the magneto cover ③.



- Remove the starter idle gear shaft ④ and starter idle gear ⑤.

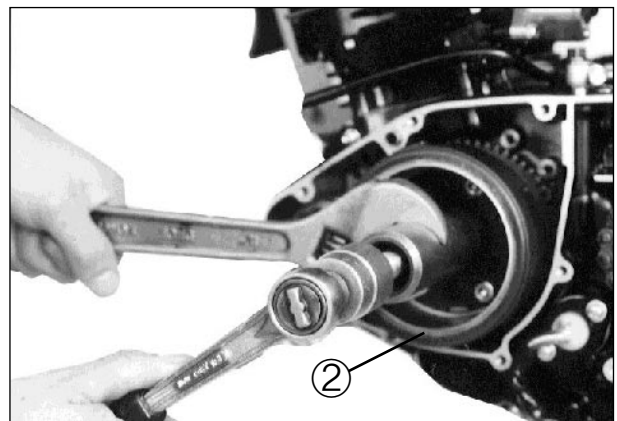


- With the magneto rotor held immovable, loosen the rotor nut ①.

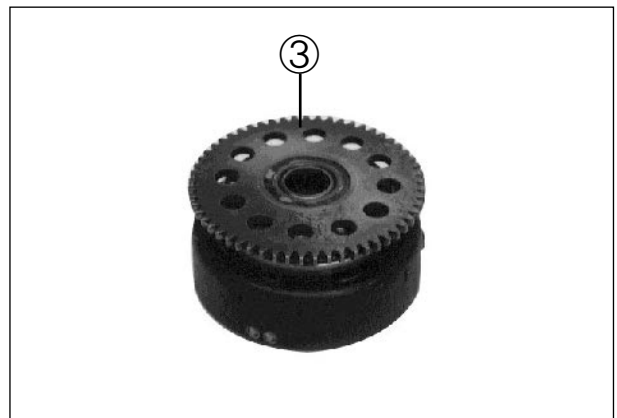


- Remove the magneto rotor ② by using the special tool.

 **Rotor remover : 09930-30162**



- Remove the key.
- Remove the starter clutch gear ③.

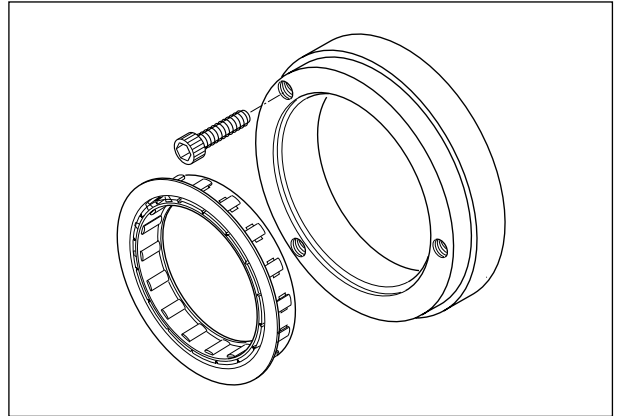


- Remove the starter one way clutch.

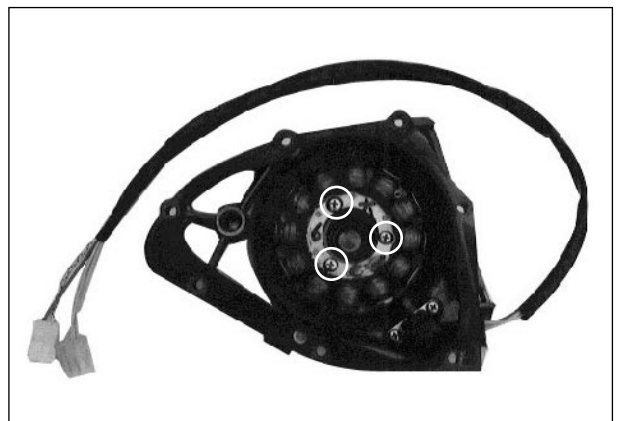


3-33 ENGINE

- The starter one way clutch is constituted as shown in the right illustration.



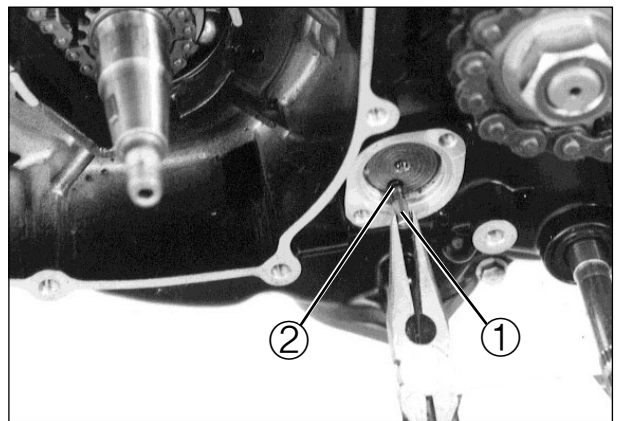
- Separate the stator and magneto cover by removing the stator screws.



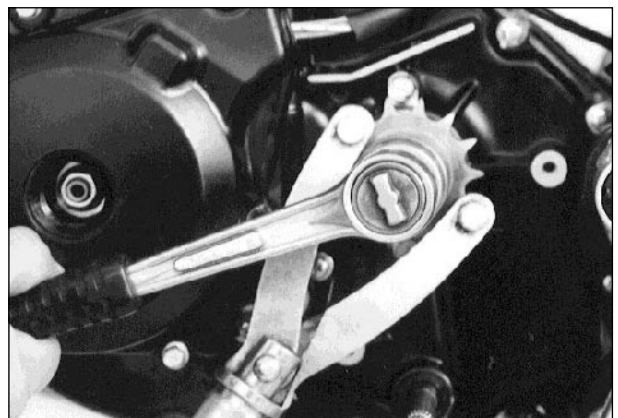
- Remove the gear position switch by removing the screws.
- Remove the switch contact ① and its spring ②.

⚠ CAUTION

Be careful not to lose the O-ring, switch contact and its spring.

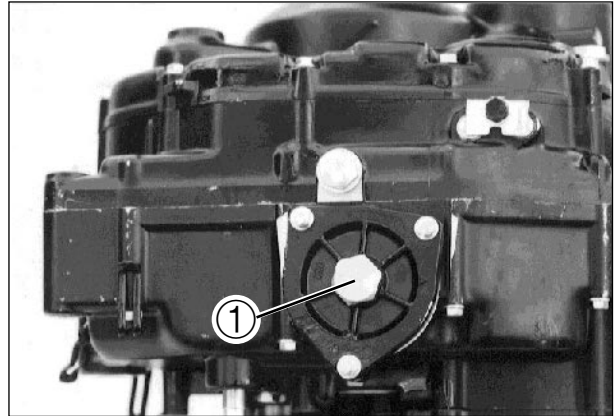


- Flatten the lock washer, and then remove the engine sprocket nut.
- Remove the engine sprocket.

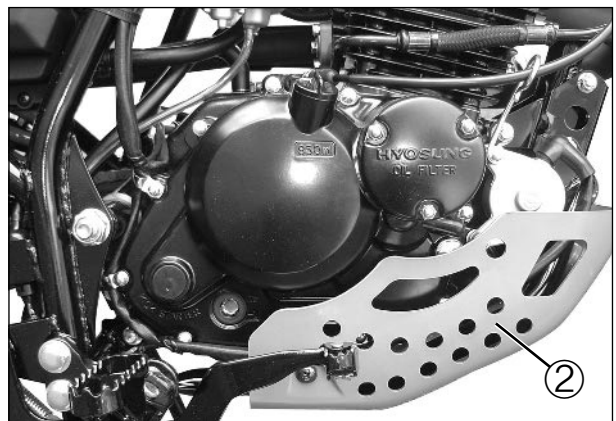


RIGHT END COMPONENTS OF ENGINE DISASSEMBLY

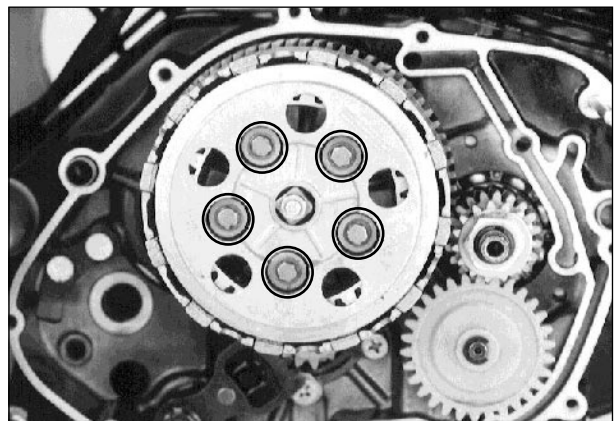
- Drain the engine oil by removing the drain plug ① located on the bottom of the engine.



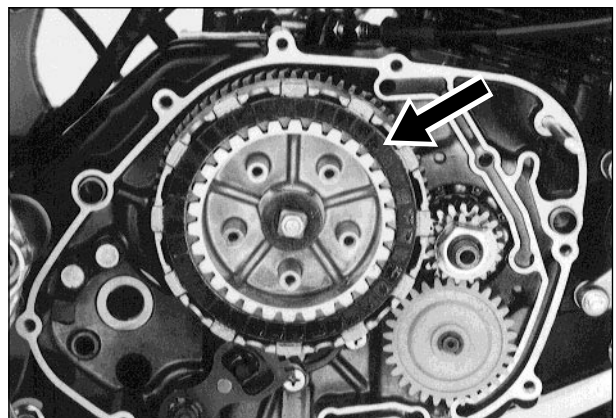
- Remove the engine guard ②.
- Remove the clutch cover bolts and oil filter cap nuts, and detach the clutch cover by tapping with a plastic hammer.



- Remove the clutch spring mounting bolts diagonally while holding the primary driven gear, and remove the clutch pressure plate.

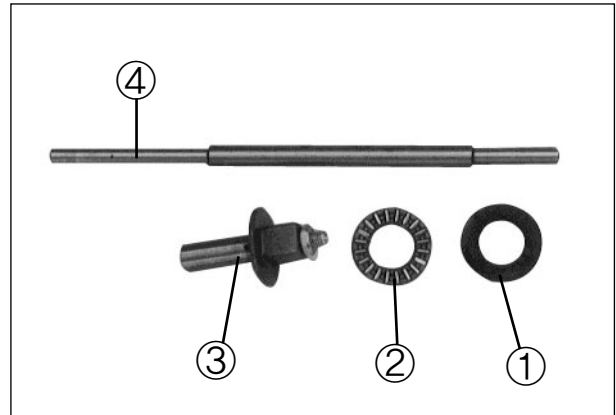


- Remove the clutch drive plates and driven plates.



3-35 ENGINE

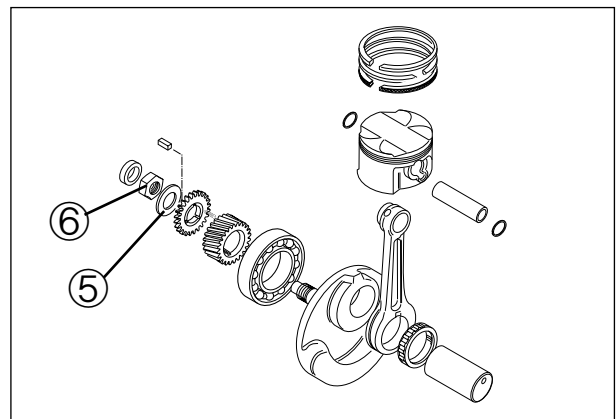
- Remove the thrust washer ①, thrust bearing ②, clutch push piece ③ and clutch push rod ④.



- Flatten the lock washer ⑤.
- With the crankshaft held immovable, remove the primary drive gear nut ⑥.

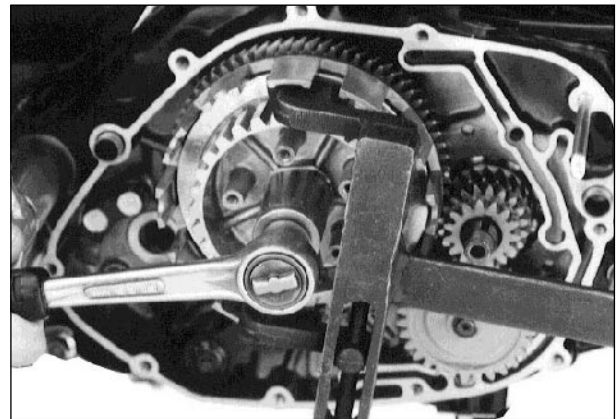
⚠ CAUTION

The primary drive gear nut ⑥ has a left-hand thread. If turning it counter-clockwise (↶), it may cause damage.

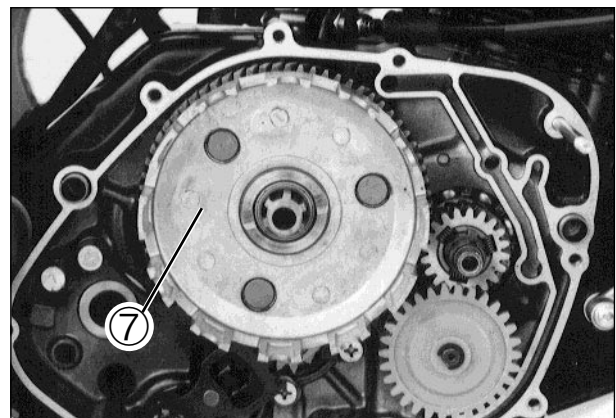


- Flatten the lock washer.
- With the clutch sleeve hub held immovable using the special tool, remove the clutch sleeve hub nut.

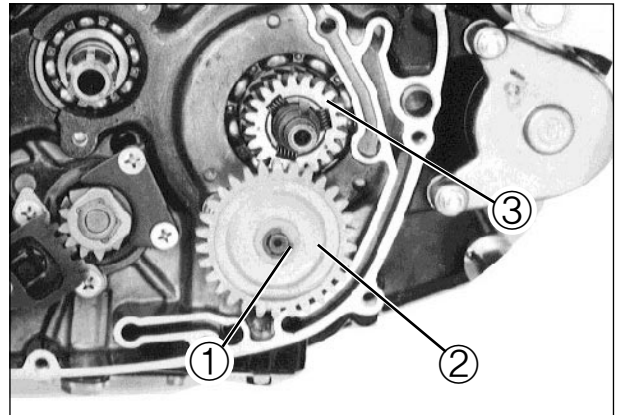
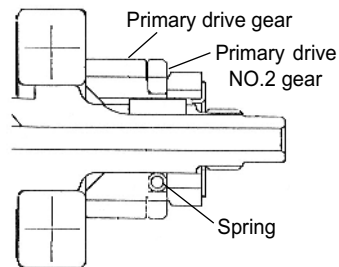
TOOL Clutch sleeve hub holder
: 09920-53710



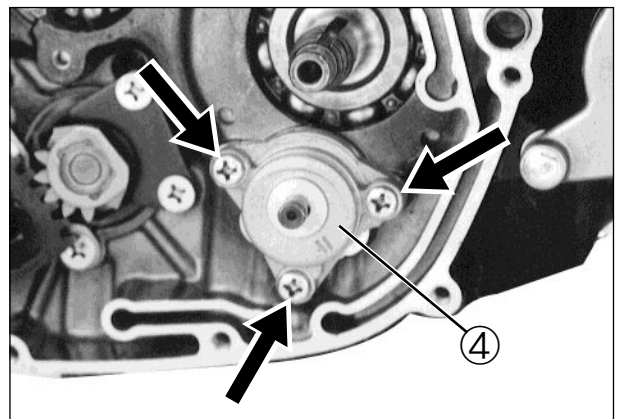
- Remove the clutch sleeve hub and thrust washer.
- Take off the primary driven gear assembly ⑦.



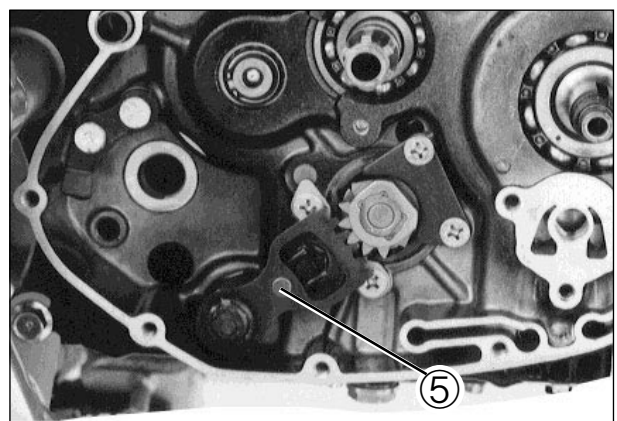
- Remove the circlip ① and oil pump driven gear ②.
- Remove the primary drive NO.2 gear ③ and primary drive gear.



- Loosen the oil pump screws, and then remove the oil pump ④.



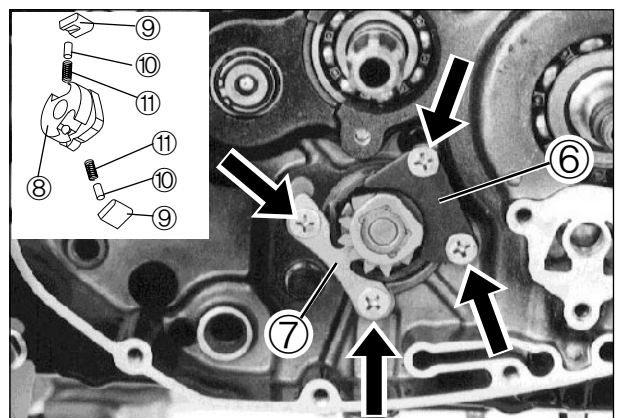
- Draw out the gearshift shaft ⑤.



- Loosen the four screws, and then remove the gear shift pawl lifter ⑥ and gear shift cam guide ⑦.
- Take off the gear shift cam driven gear ⑧.

CAUTION

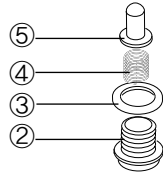
When removing the gear shift cam driven gear ⑧, be careful not to lose the gear shift pawl ⑨, pin ⑩ and return spring ⑪.



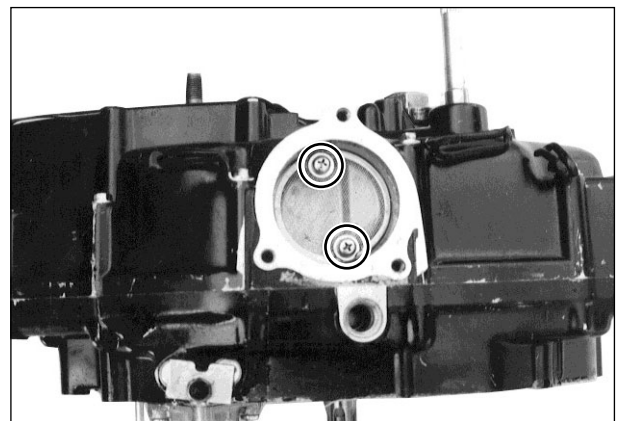
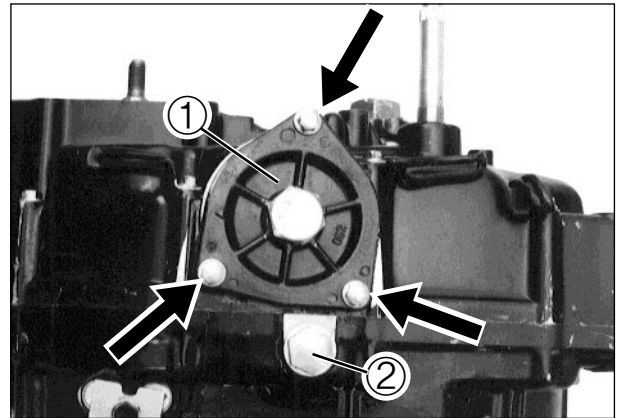
LOWER END COMPONENTS OF ENGINE DISASSEMBLY

⊙ CRANKCASE

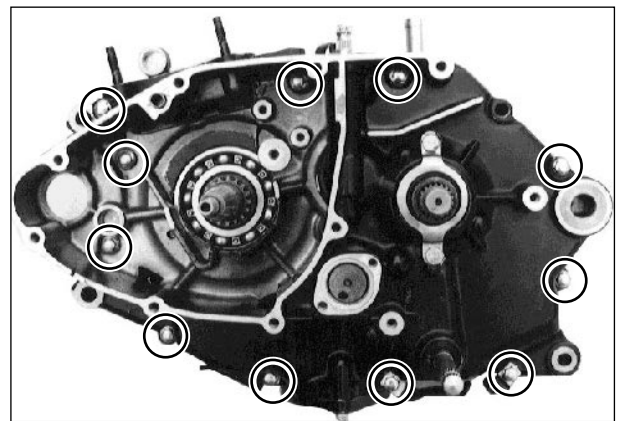
- Remove the oil strainer cap ①.
- Remove the gear shift cam stopper plug ②, washer ③, spring ④ and neutral cam stopper ⑤.



- Remove the engine oil strainer by loosening the screws.



- Loosen the crankcase bolts.

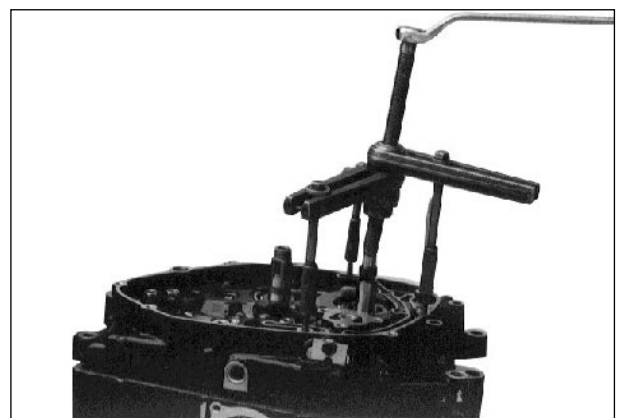


- Separate the crankcase into left and right halves using the special tool.

 Crankcase separator : 09920-13120

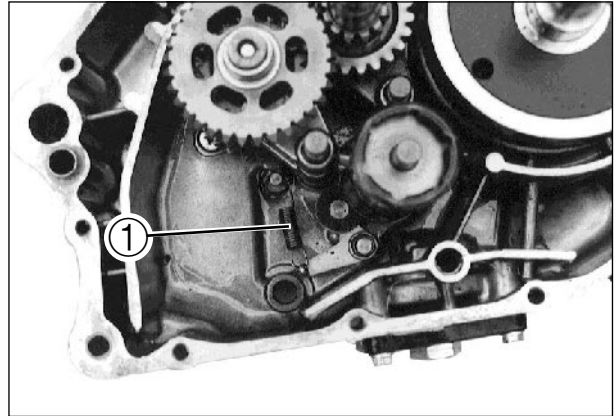
NOTE

- ❖ Fit the crankcase separator, so that the tool arms are in parallel with the side of crankcase.
- ❖ The crankshaft and transmission components should remain in the left crankcase half. This is necessary because the gear shift cam stopper is mounted on the left crankcase half and will be damaged if the transmission components remain in the right half.

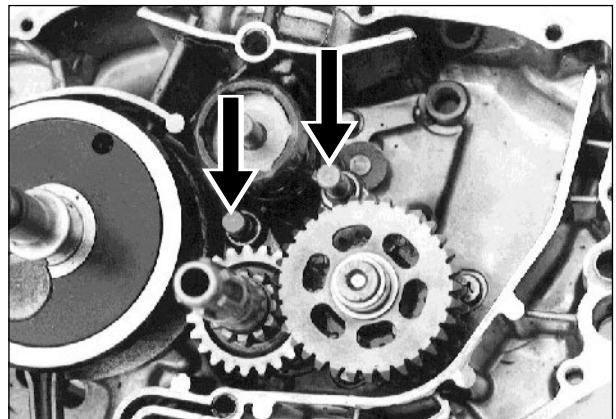


⊙ TRANSMISSION

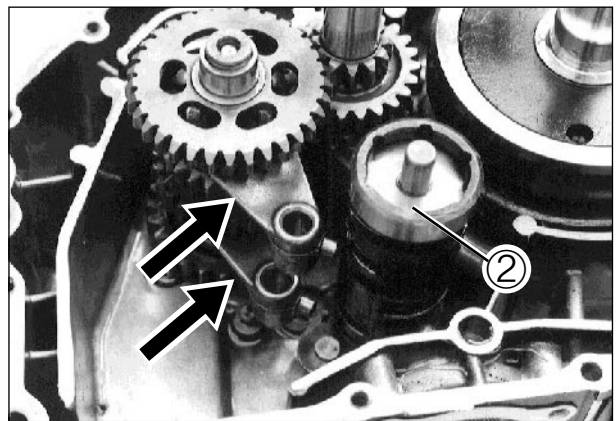
- Remove the gear shift arm stopper spring ①.



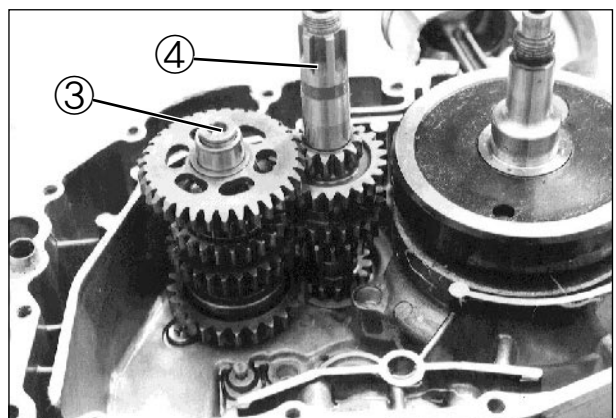
- Draw out the gear shift fork shaft NO.1 & NO.2.



- Take off the gear shift cam ② and gear shift fork NO.1 & NO.2.



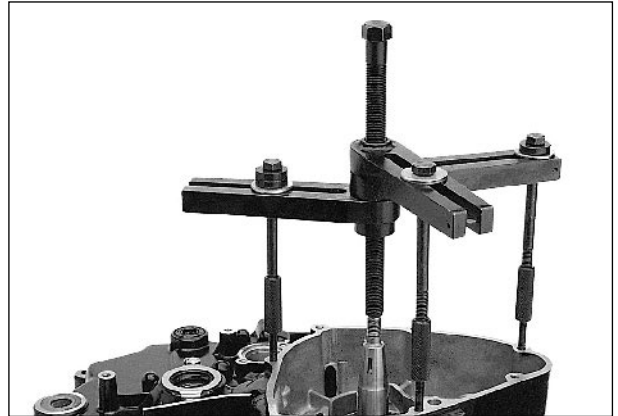
- Remove the driveshaft assembly ③ and countershaft assembly ④.



⊙ CRANKSHAFT

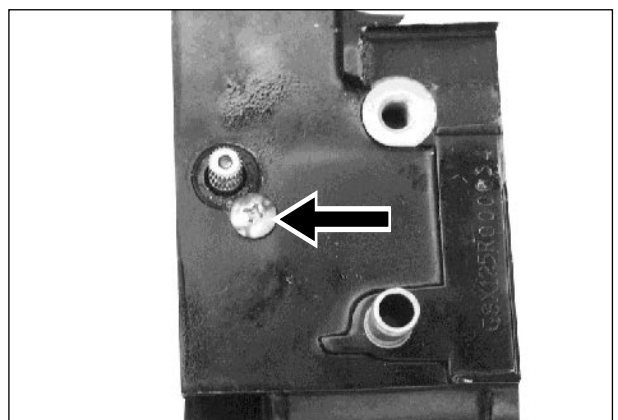
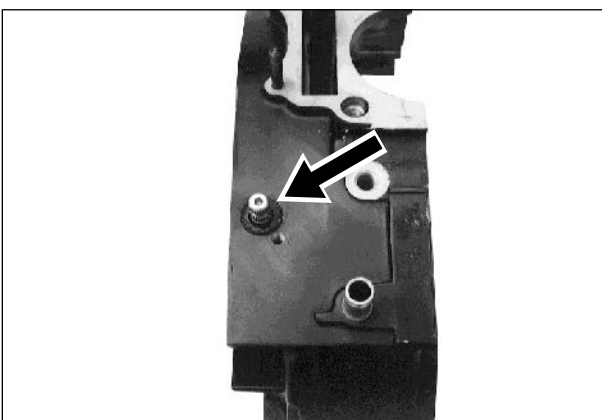
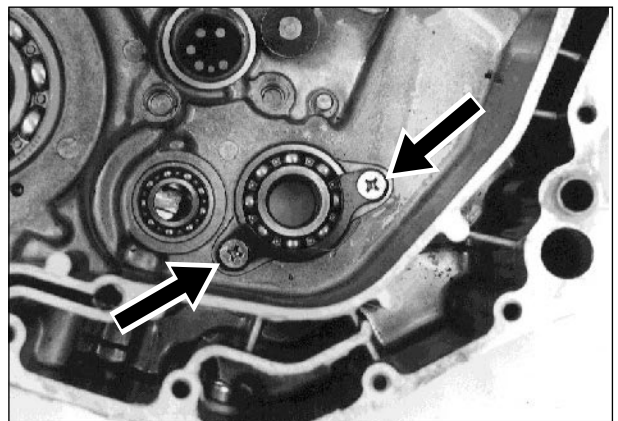
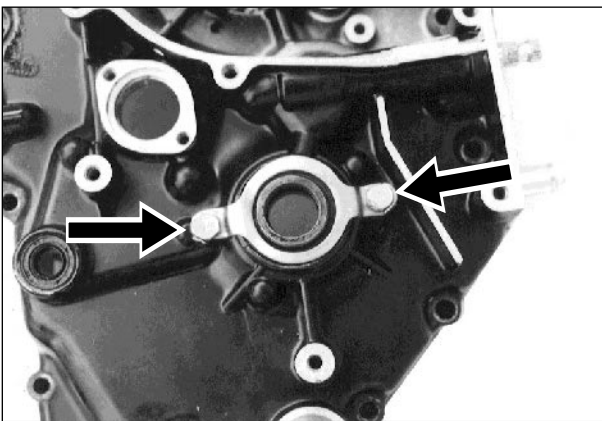
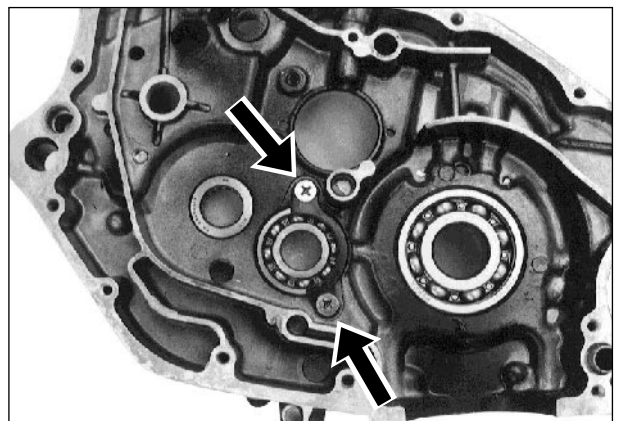
- Remove the crankshaft using the special tool.

 Crankcase separator : 09920-13120



⊙ OIL SEAL AND BEARING

- Remove the retainer, oil seals and bearings, right and left.
- Remove the clutch release camshaft.



LOWER END COMPONENTS OF ENGINE INSPECTION AND SERVICING

⊙ CLUTCH DRIVE PLATES

Measure the thickness and claw width of the clutch drive plates using the vernier calipers.

If the clutch drive plate is not within the the service limit, replace the clutch plates as a set.

Thickness of clutch drive plate	Standard 2.9 ~ 3.1 mm (0.114 ~ 0.122 in)
Thickness of clutch drive plate	Service limit 2.6 mm (0.102 in)
Claw width of clutch drive plate	Standard 11.8 ~ 12.0 mm (0.465 ~ 0.472 in)
Claw width of clutch drive plate	Service limit 11.0 mm (0.433 in)

 Vernier calipers : 09900-20101

⊙ CLUTCH DRIVEN PLATES

Measure each clutch driven plate for distortion using the thickness gauge. If a clutch driven plate is not within the service limit, replace the clutch plates as a set.

Clutch driven plate distortion	Service limit 0.1 mm (0.004 in)
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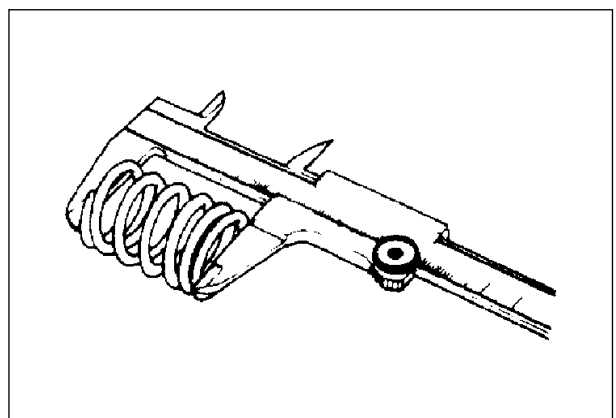
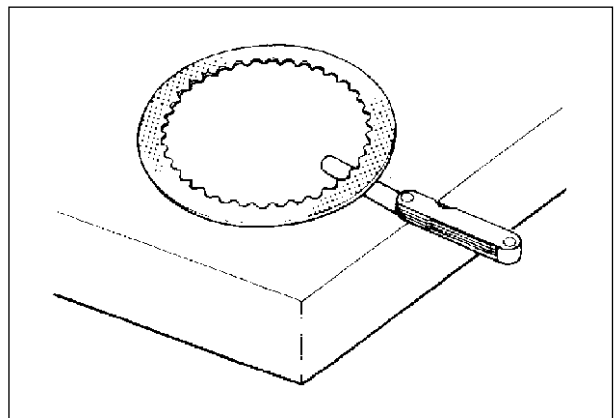
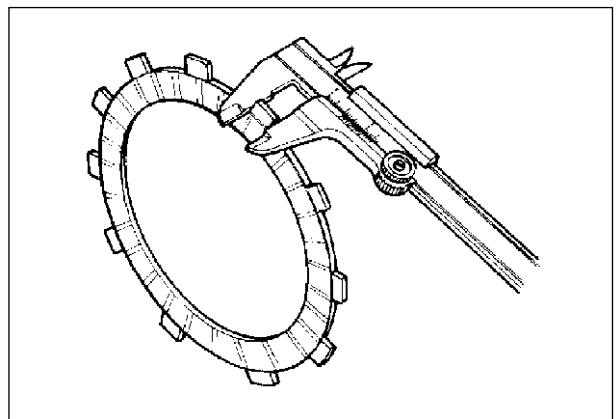
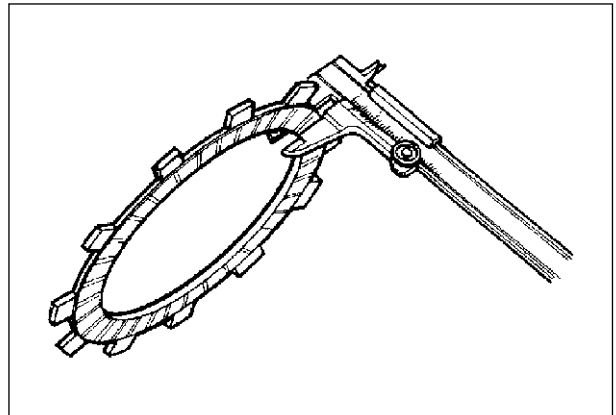
 Thickness gauge : 09900-20806

⊙ CLUTCH SPRING FREE LENGTH

Measure the free length of each clutch spring using the vernier calipers. If any spring is not within the service limit, replace all of the spring.

Clutch spring free length	Service limit 29.5 mm (1.161 in)
----------------------------------	--

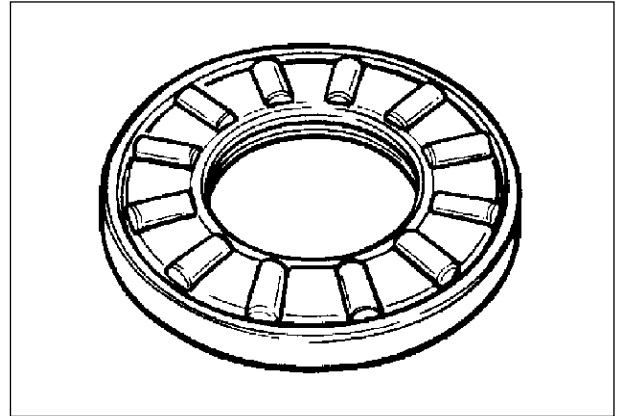
 Vernier calipers : 09900-20101



⊙ CLUTCH RELEASE BEARING

Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.

Smooth engagement and disengagement of the clutch depends on the condition of this bearing.

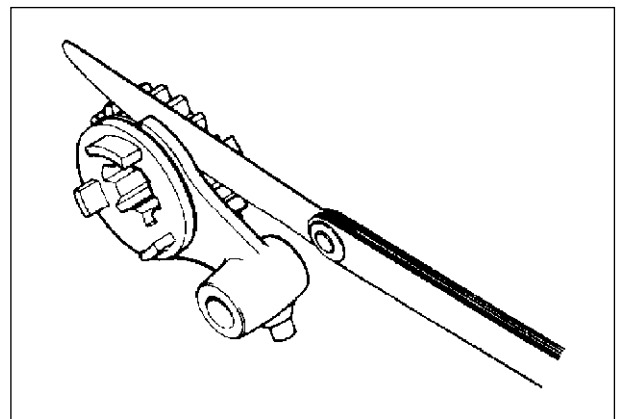


⊙ GEAR SHIFT FORK & GEAR

Using a thickness gauge, check the clearance between the groove of its gear and gear shift fork.

The clearance for each of the three gear shift forks plays an important role in the smoothness and positiveness of shifting action.

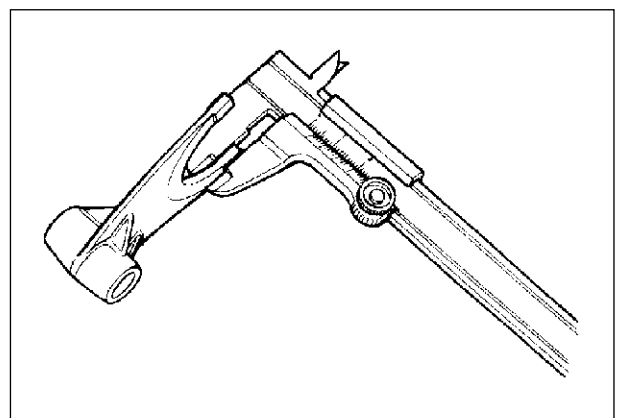
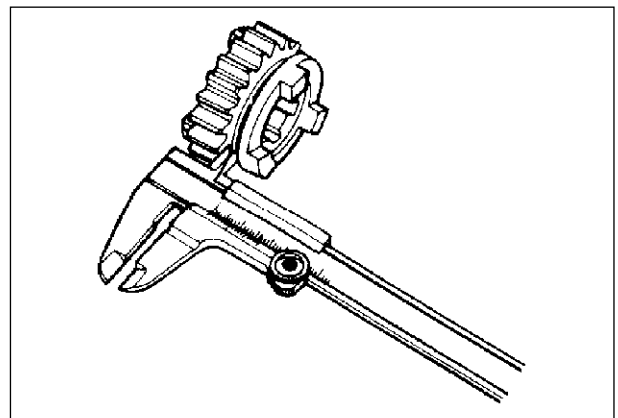
If the checked clearance is noted to exceed the limit specified, replace the fork or its gear, or both.



Shift fork-groove clearance	Standard	Service limit
	0.10 ~ 0.30 mm (0.004 ~ 0.012 in)	0.50 mm (0.020 in)

Shift fork groove width	Standard
NO.1 & NO.2	5.00 ~ 5.10 mm (0.197 ~ 0.201 in)
NO.3	5.50 ~ 5.60 mm (0.217 ~ 0.221 in)

Shift fork thickness	Standard
NO.1 & NO.2	4.80 ~ 4.90 mm (0.189 ~ 0.193 in)
NO.3	5.30 ~ 5.40 mm (0.209 ~ 0.213 in)



 Vernier calipers : 09900-20101
Thickness gauge : 09900-20806

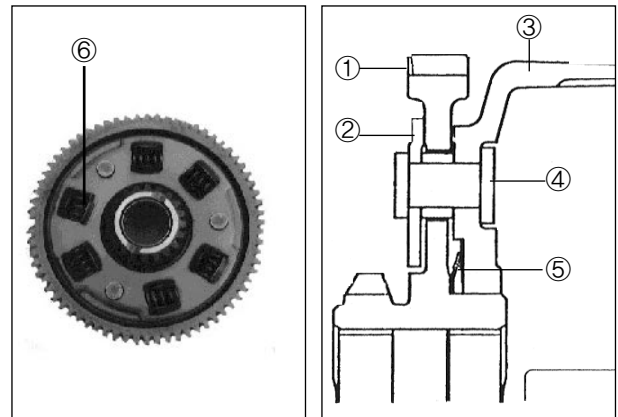
◎ PRIMARY DRIVEN GEAR

The primary driven gear is composed the following parts :

- ① Primary driven gear
- ② Plate
- ③ Clutch housing
- ④ Rivet
- ⑤ Washer
- ⑥ Spring

If the tension of the inner spring of the primary driven gear is not working, get a play and noise between the gear and spring.

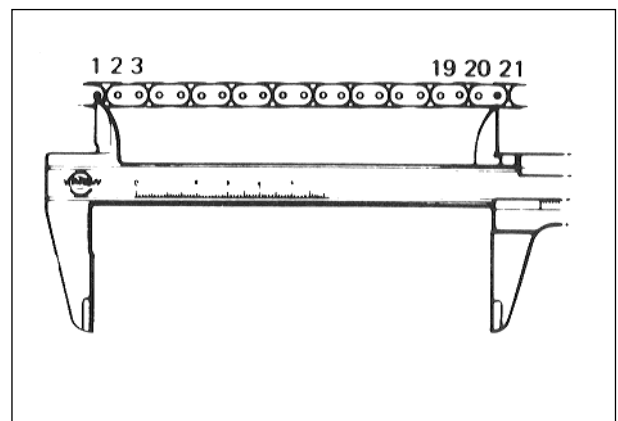
If necessary, replace the primary driven gear assembly with a new one.



◎ CAM CHAIN 20-PITCH LENGTH

Pull the cam chain tight to remove any slack, then using the vernier caliper, measure the 20-pitch (21 pins) length of the cam chain.

If it measures than the limits, replace the cam chain.

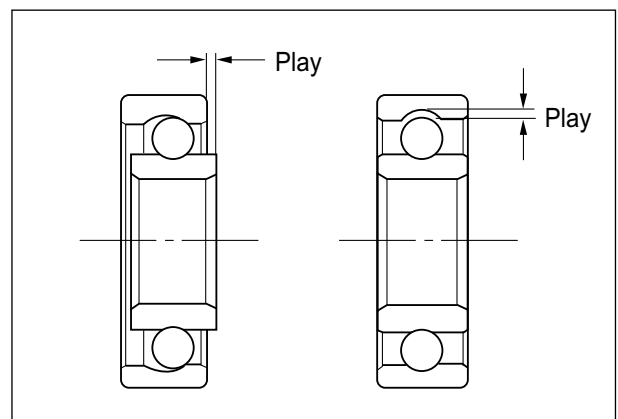


Cam chain 20-pitch length	Service limit
	129.9 mm (5.11 in)

◎ CRANKCASE BEARING

Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

Replace the bearing if there is anything unusual.



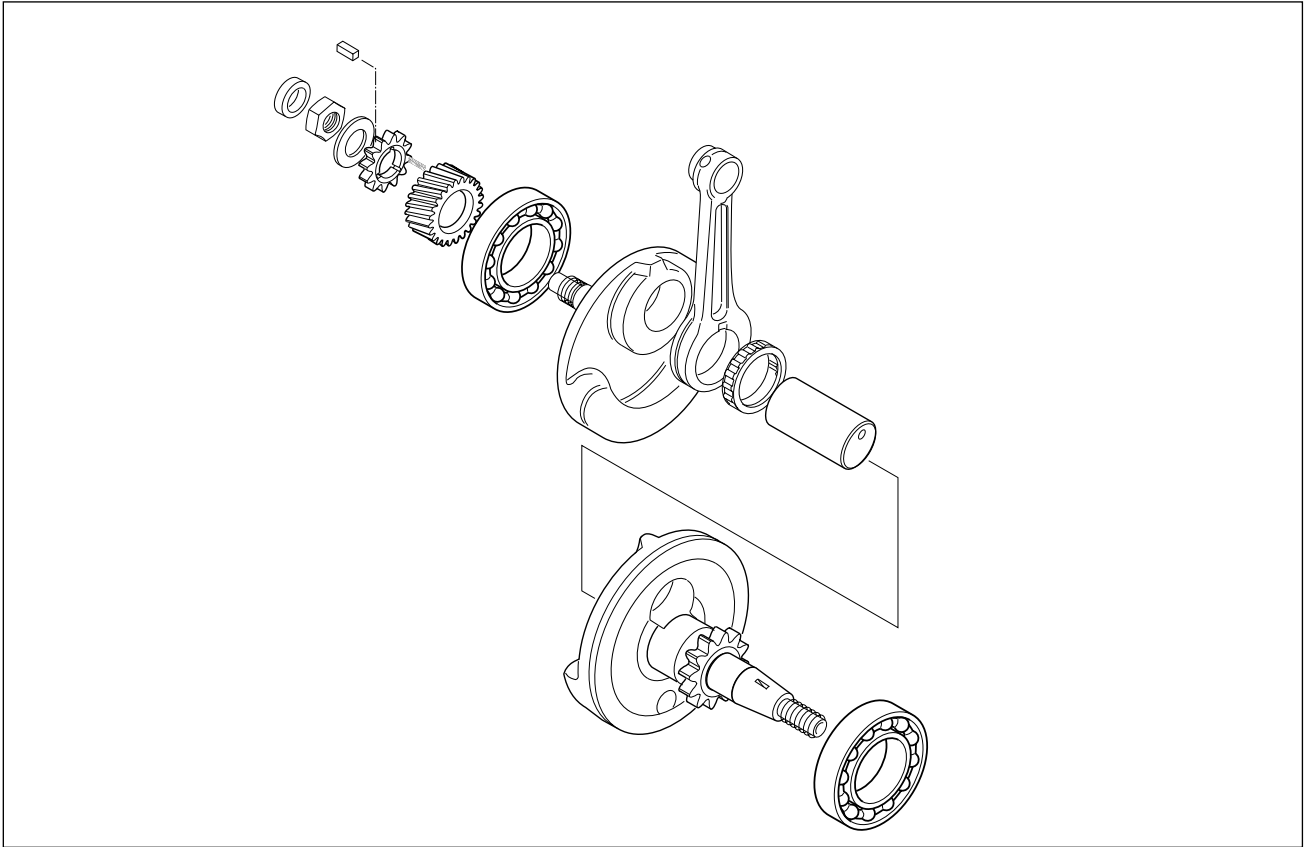
◎ STARTER CLUTCH BEARING

Inspect the bearing for any abnormality, particularly cracks, to decide whether it can reused or should be replaced.



LOWER END COMPONENTS OF ENGINE REASSEMBLY

⊙ CRANKSHAFT

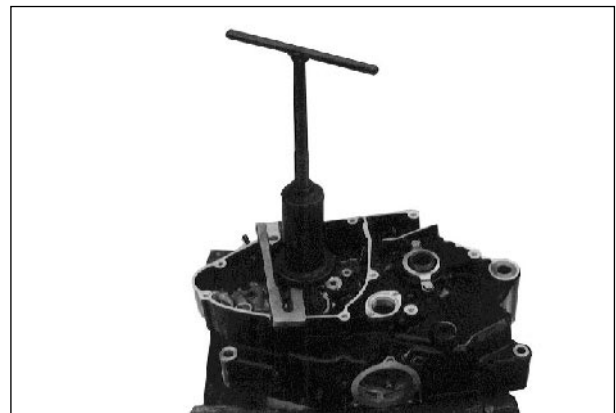
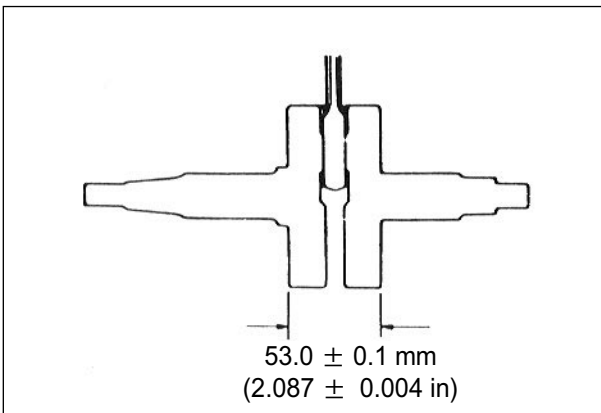


- Inspect the between the webs referring to the below figure when rebuilding the crankshaft.

	Standard
Width between webs	53.0 ± 0.1 mm (2.087 ± 0.004 in)

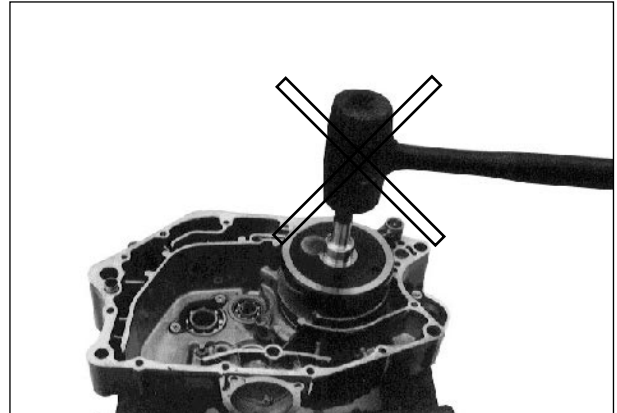
- When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase.

TOOL Crankshaft installer : 09910-32812
 Conrod holder : 09910-20115

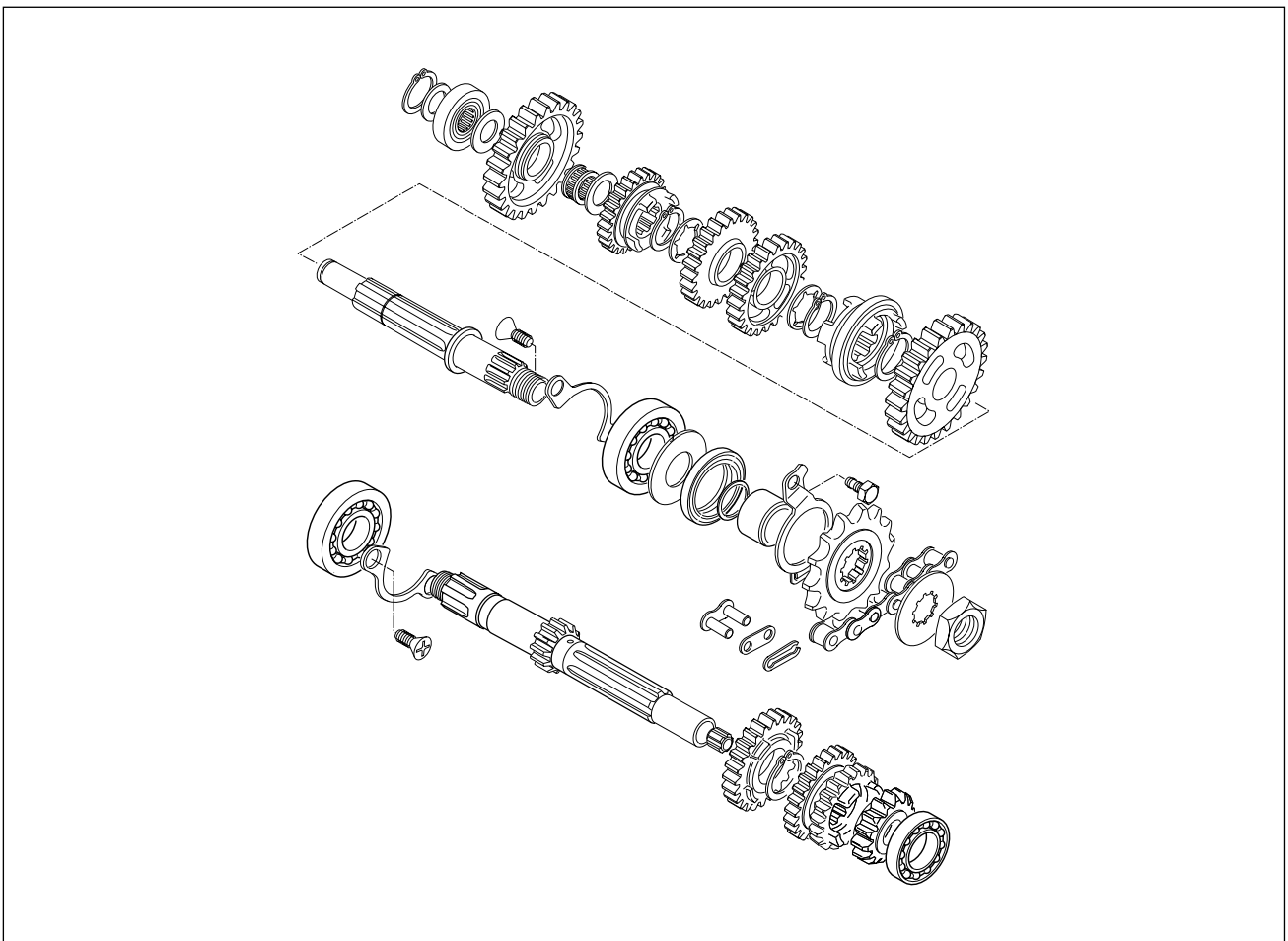


⚠ CAUTION

Never fit the crankshaft into the crankcase by striking it with a plastic hammer.
Always use the special tool, otherwise crankshaft alignment accuracy will be affected.

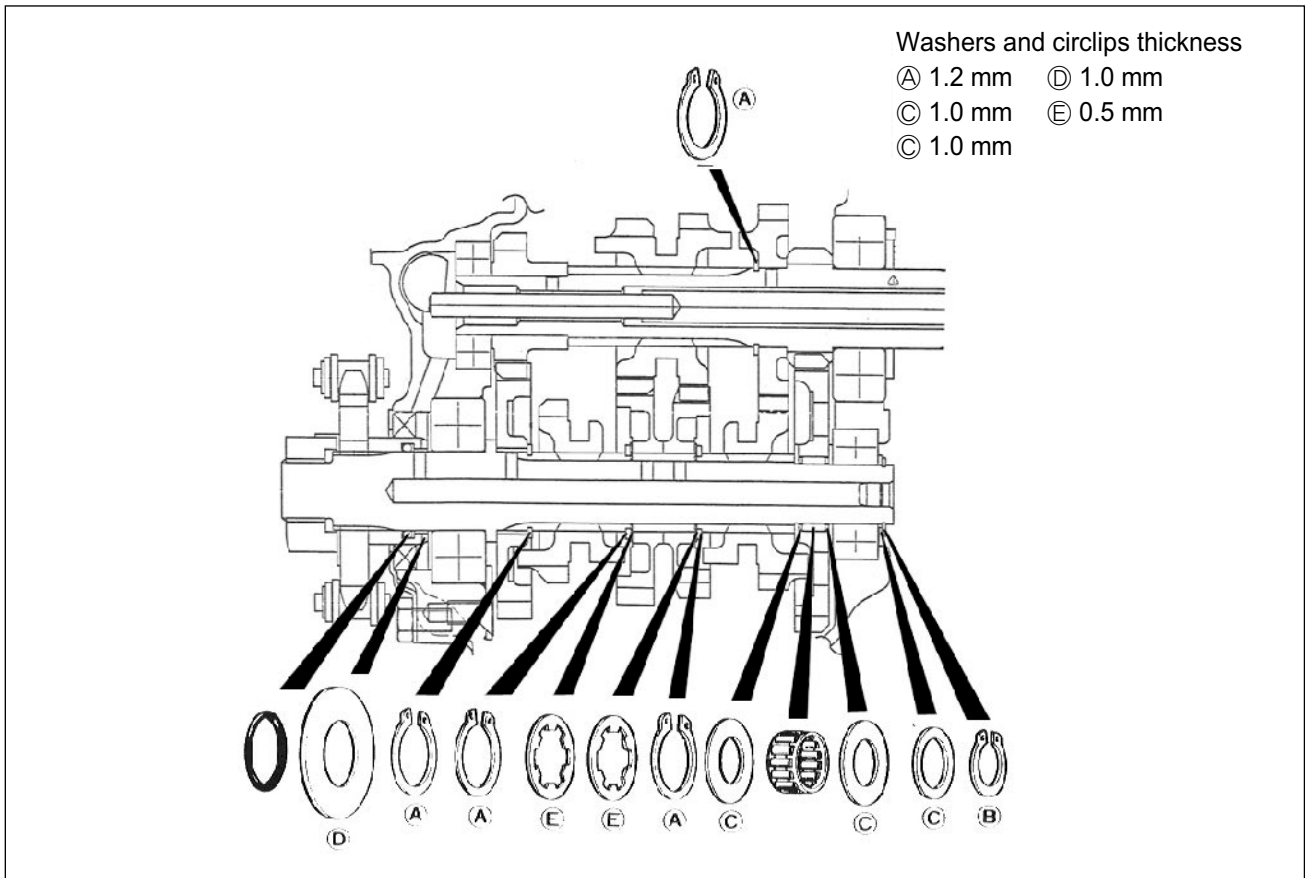


◎ TRANSMISSION



⚠ CAUTION

- ❖ Never reuse a circlip.
After a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.
- ❖ When installing a new circlip, do not expand the end gap larger than required to slip the circlip over the shaft.
- ❖ After installing a circlip, always insure that it is completely seated in its groove and securely fitted.



NOTE

When reassembling the bearing retainer, apply a small quantity of **THREAD LOCK "1324"** to the threaded parts of the bearing retainer screws.
 In reassembling the transmission, attention must be given to the locations and positions of washers and circlips. The cross sectional view shows the correct position of the gears, washers and circlips.

THREAD LOCK "1324"

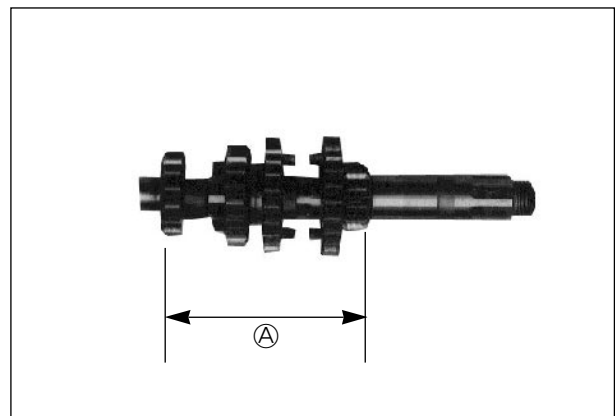
⊙ COUNTERSHAFT

■ MOUNTING 2ND DRIVE GEAR

- Press-fit 2nd drive gear into the countershaft.
 Before reassembling, coat the internal face of the 2nd drive gear with **THREAD LOCK "1324"** and install it so that the length (A) is as shown in the figure.

THREAD LOCK "1324"

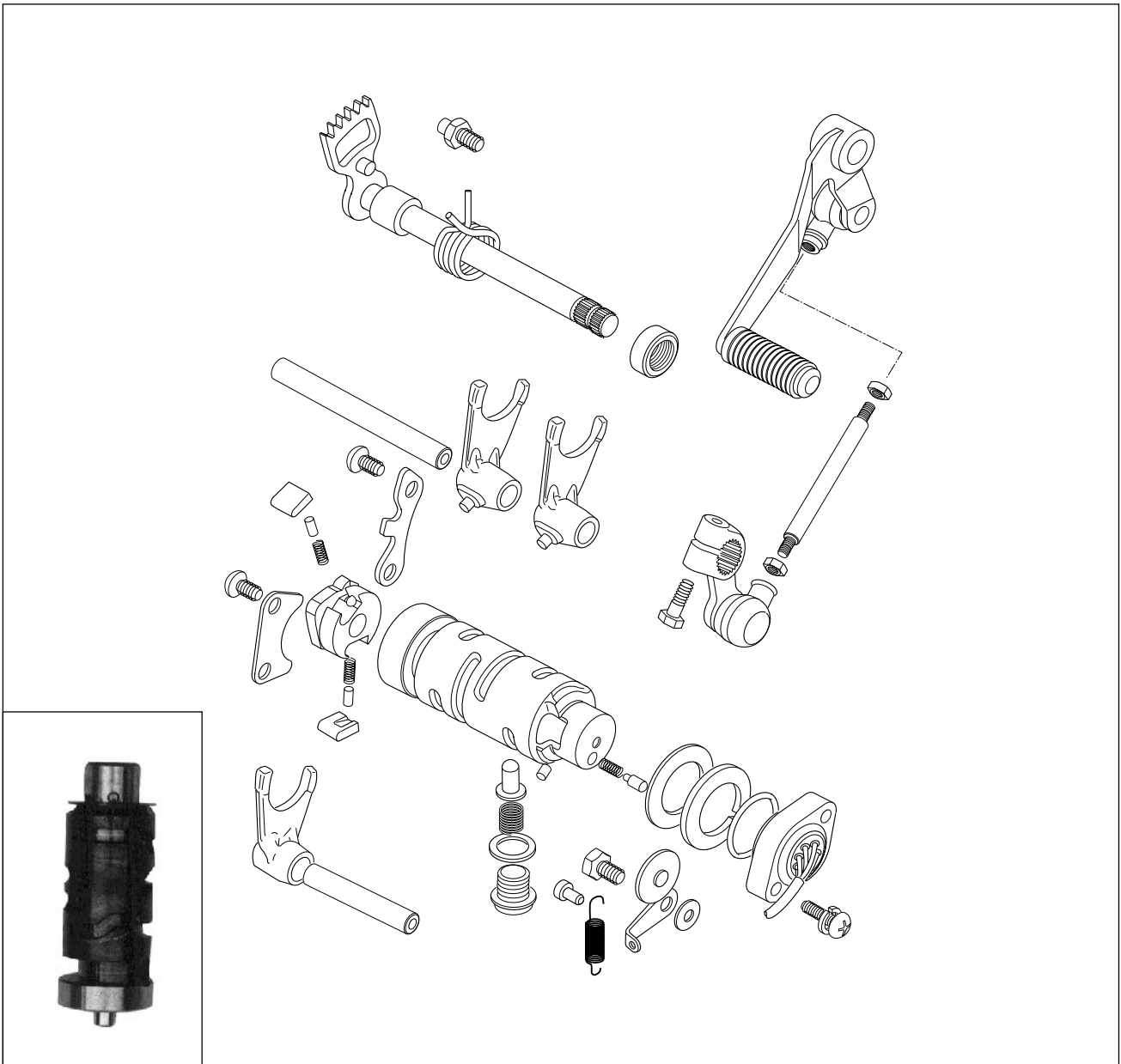
Countershaft length (A) (Low to 2nd)	88.0 ^{+0.1} mm -0.2
	(3.465 ^{+0.004} in) -0.008



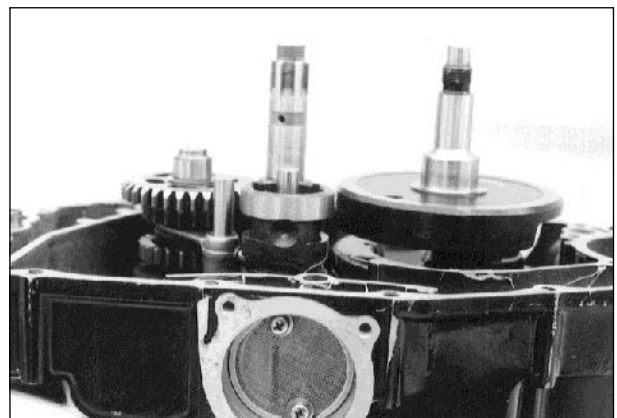
⚠ CAUTION

This procedure may be performed only twice before shaft replacement is required.

◎ GEAR SHIFT CAM AND FORK

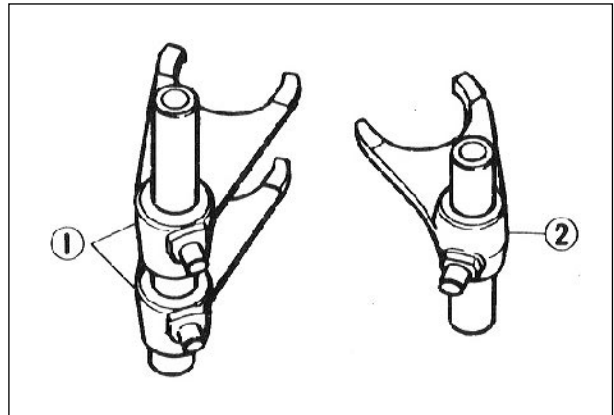


- Fit the gear shift cam on the crankcase.
Position the gear shift cam as shown in the figure so that the gear shift fork can be installed easily.



⚠ CAUTION

Two kinds of the gear shift forks, ① and ②, are used. They resemble each other very closely in external appearance and configuration. Carefully examine as shown in the illustration for correct installing positions and directions.

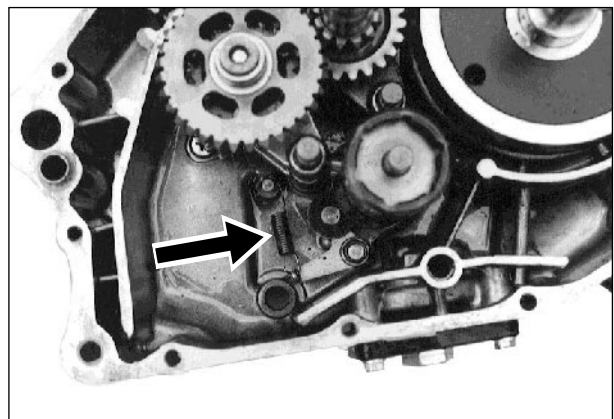


- After the gear shift arm stopper and gear shift forks have been fitted, hook the gear shift arm stopper spring into the crankcase.

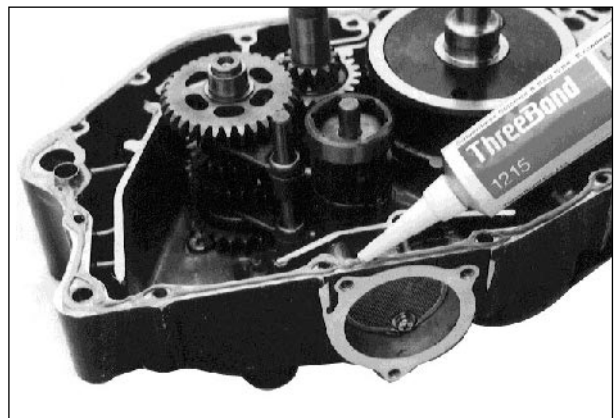
⊙ CRANKCASE

When reassembling the crankcase pay attention to the following.

- Coat SUPER GREASE "A" to the lip of oil seals.
- Remove the sealant material on the fitting surface of right and left halves of the crankcase and thoroughly remove the oil stains.
- Fit the dowel pins on the left side of the crankcase.
- Apply the engine oil to the big end of the crankshaft conrod and all parts of the transmission gears.
- Apply BOND "1215" uniformly to the fitting surface of the left side of the crankcase, and after waiting a few minutes, fit the right half on the left half.



1215 BOND "1215"



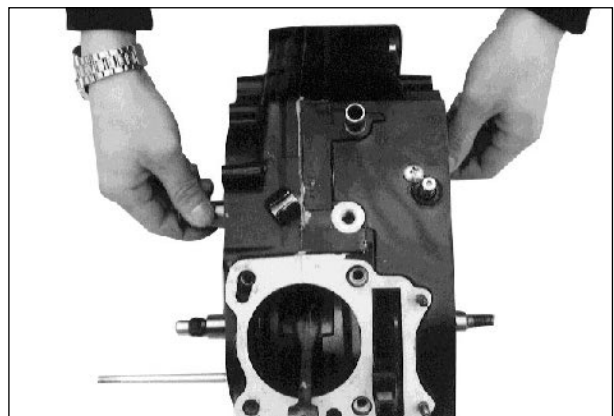
- Tighten the crankcase bolts to the specified torque.

🔧 Crankcase bolt

: 9 ~ 13 N · m (0.9 ~ 1.3 kgf · m)

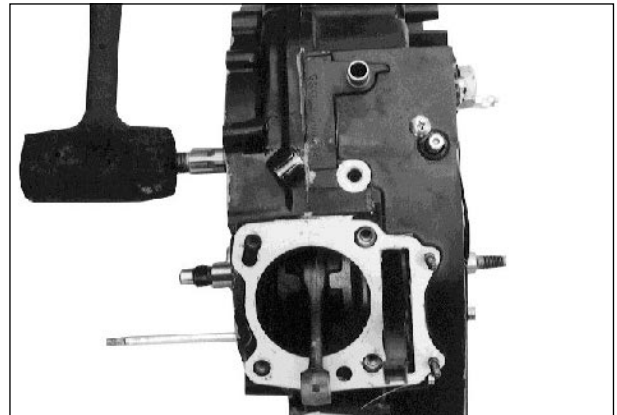
NOTE

Tightening the crankcase bolts, tighten each bolt little by little diagonally.



- After the crankcase bolts have been tightened, check if the driveshaft and countershaft rotate smoothly.

- If a large resistance is felt to rotation, try to free the shafts by tapping the driveshaft or countershaft with a plastic hammer as shown in the figure.

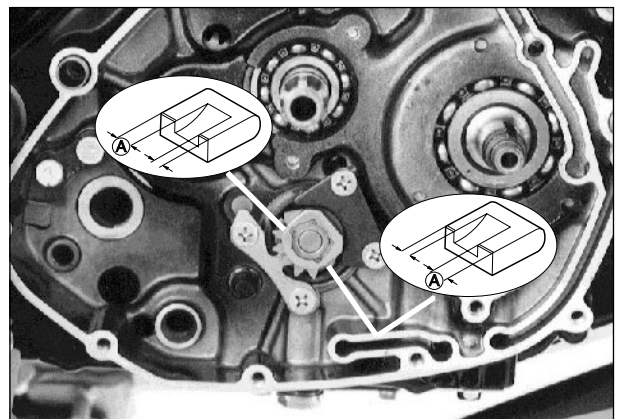


RIGHT END COMPONENTS OF ENGINE REASSEMBLY

⊙ GEAR SHIFT CAM DRIVEN GEAR

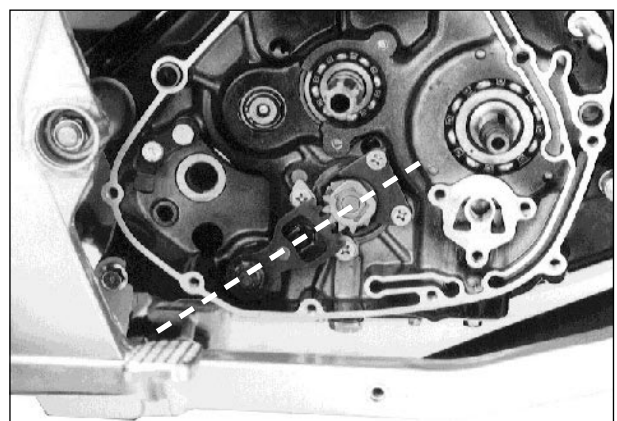
- When installing the gear shift pawls into the gear shift cam driven gear, the large shoulder **A** must face to the outside as shown.
- Next, install the gear shift cam guide and gear shift pawl lifter. Apply a small quantity of THREAD LOCK “1324” to the threaded parts of the securing screws.

 THREAD LOCK “1324”



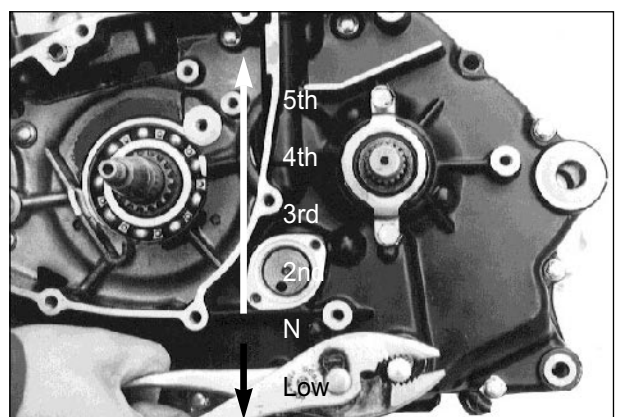
⊙ GEAR SHIFT SHAFT

When installing the gear shift shaft, match the center teeth of the gear on the gear shift shaft with the center teeth on the gear shift cam driven gear as shown.



CAUTION


After the gear shift cam driven gear, gear shift cam guide, gear shift shaft and neutral cam stopper have been fitted, confirm that gear change is normal while rotating the countershaft and driveshaft. If gear change is not obtained, it means that assembly of gears or installation of gear shift fork is incorrect. If this is the case, disassemble and trace the mistake.



- Before mounting the oil pump, apply engine oil to the sliding surfaces of the case, outer rotor, inner rotor and shaft.
- Apply a small quantity of THREAD LOCK “1324” to the threaded parts of the oil pump mounting screws.

 **THREAD LOCK “1324”**

- Tightening the oil pump mounting screws to the specified torque.

 **Oil pump mounting screw**
: 5 ~ 7 N · m (0.5 ~ 0.7 kgf · m)

⊙ OIL PUMP AND PRIMARY DRIVE GEAR

- Install the primary drive gear and primary drive NO.2 gear, and fit the key in the key slot on the crankshaft completely.

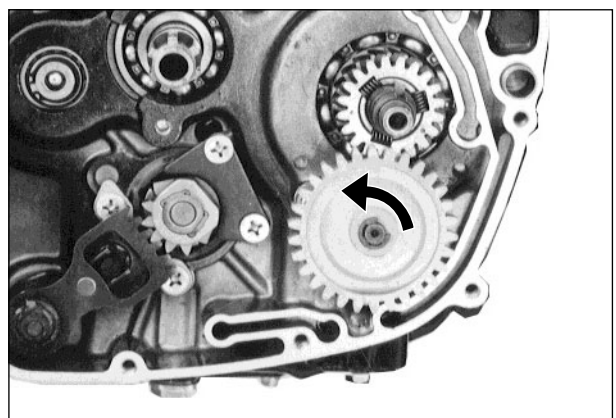
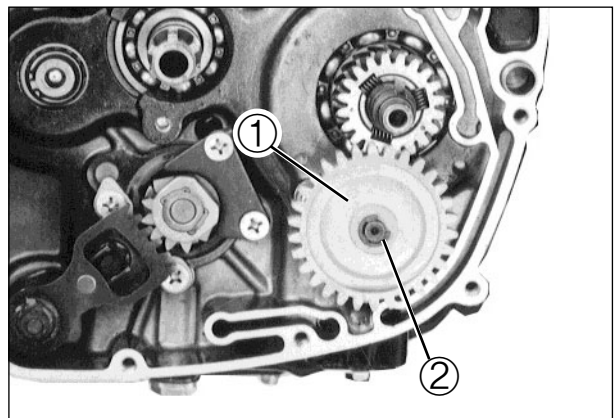
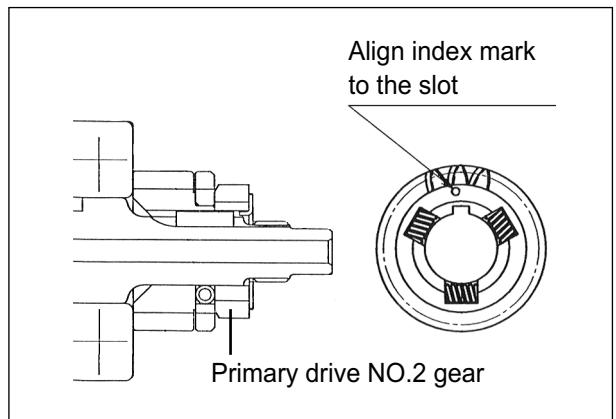
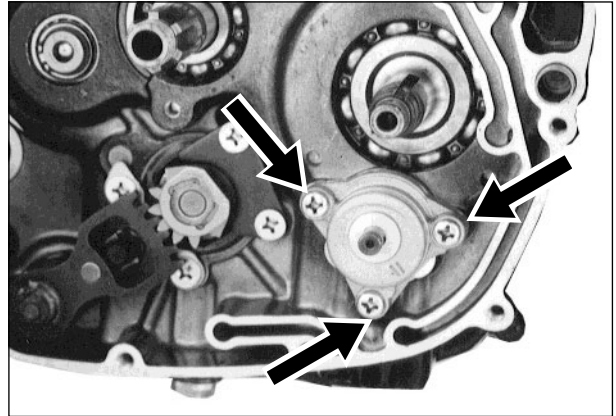
 **CAUTION**

When installing the primary drive NO. 2 gear, align the index mark on the gear to the key slot as show in the illustration.

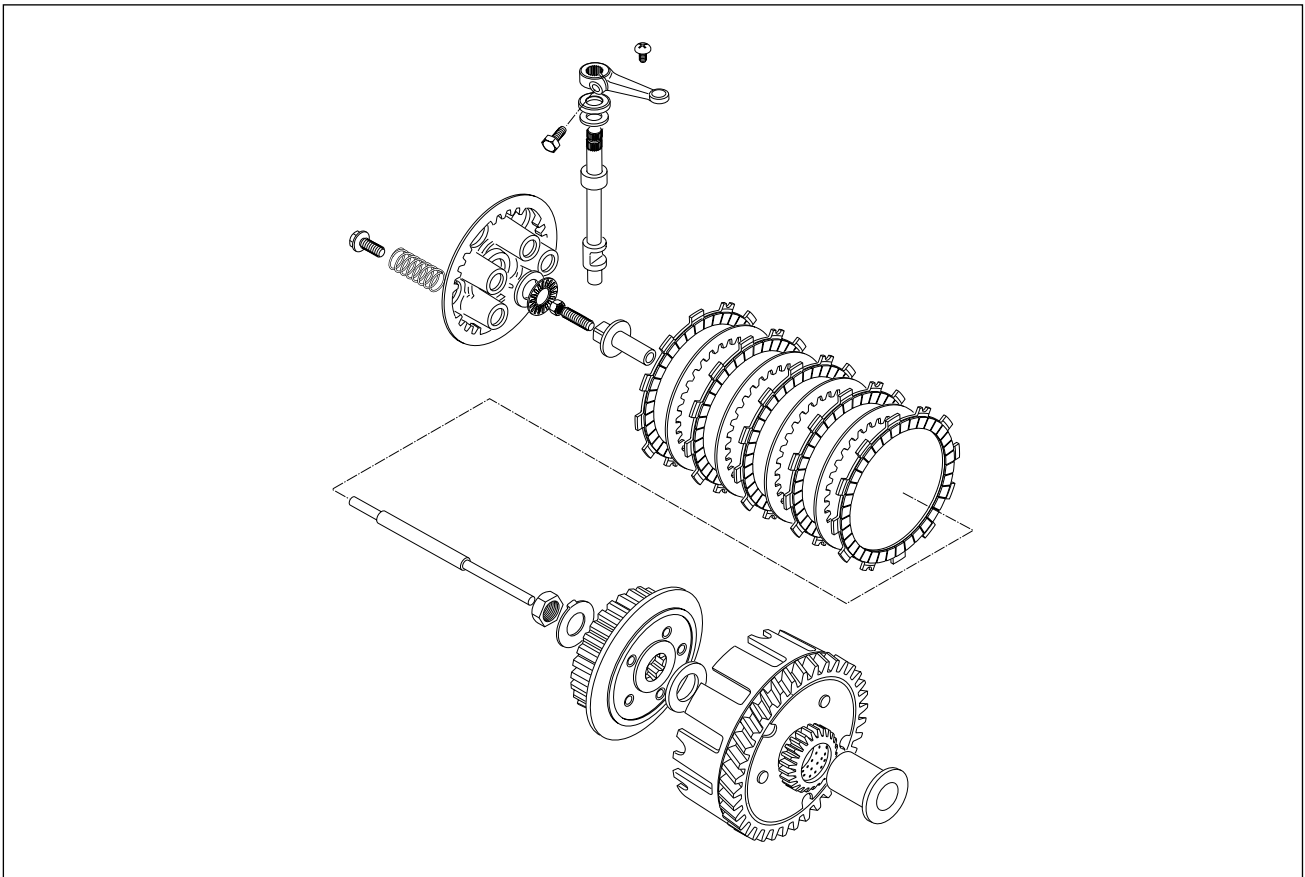
- Fit the oil pump driven gear ① and install the circlip ②.

 **CAUTION**

After mounting the oil pump in the crankcase, rotate the oil pump driven gear by hand to see if it turns smoothly.





◎ CLUTCH



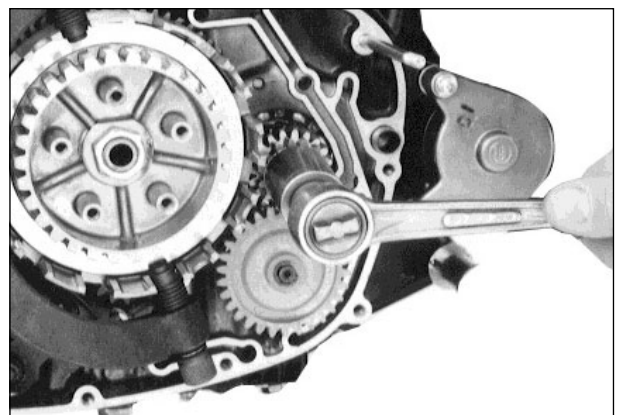
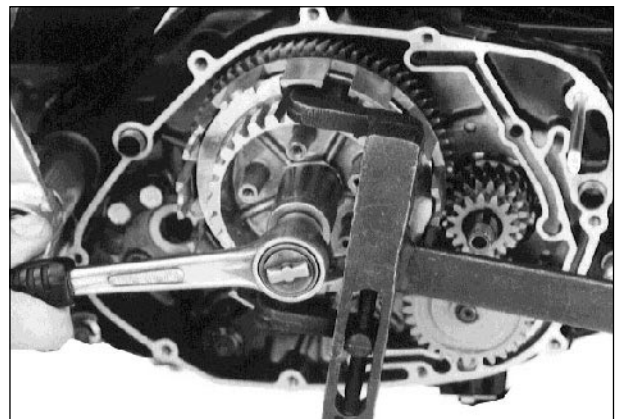
Assemble the clutch in the reverse order of disassembly. Pay attention to the following points :

- When inserting the spacer on the countershaft, apply a small quantity of engine oil to both inside and outside of the spacer.
- Tighten the clutch sleeve hub nut using the special tool to the specified torque.

 **Clutch sleeve hub holder**
: 09920-53710


 **Clutch sleeve hub nut**
: 30 ~ 50 N · m (3.0 ~ 5.0 kgf · m)

- Be sure to lock the nut by firmly bending the tongue of the washer.
- With the clutch sleeve hub held immovable, install the primary drive gear washer and nut, tighten the primary drive gear nut to the specified torque and bend up to the washer.



CAUTION

The primary drive gear nut is a left-hand thread nut.

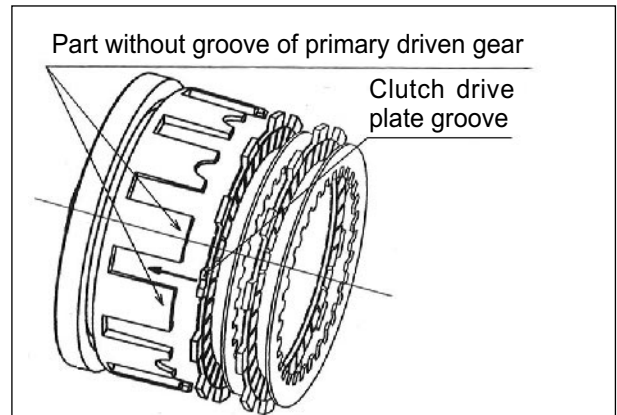
 **Primary drive gear nut**
: 40 ~ 60 N · m (4.0 ~ 6.0 kgf · m)

3-51 ENGINE

- Install the clutch drive plates and driven plates one by one into the clutch sleeve hub.

CAUTION

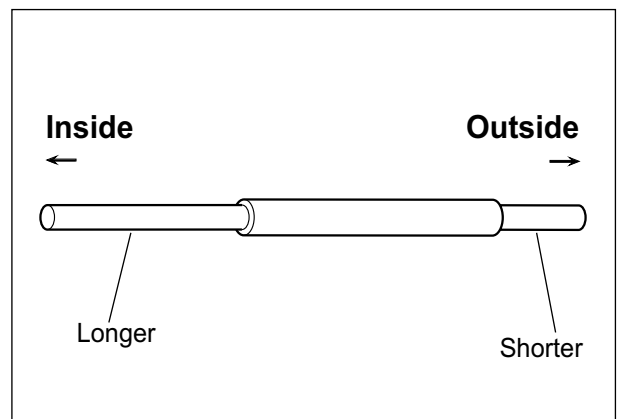
The groove of the first installed clutch drive plate in five drive plates is inserted between the part without the groove of the primary driven gear.



- Insert the clutch push rod in the countershaft.

CAUTION

Insert the longer side of the clutch push rod toward the inside.

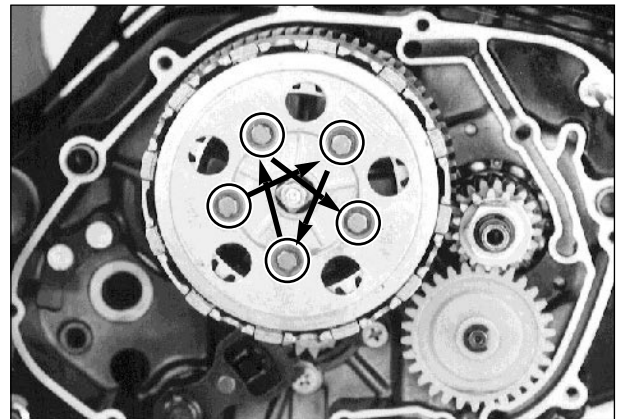


- Install the clutch push piece, thrust bearing and thrust washer to the countershaft.

- Install the clutch pressure plate.
- Tighten the clutch spring set bolts.

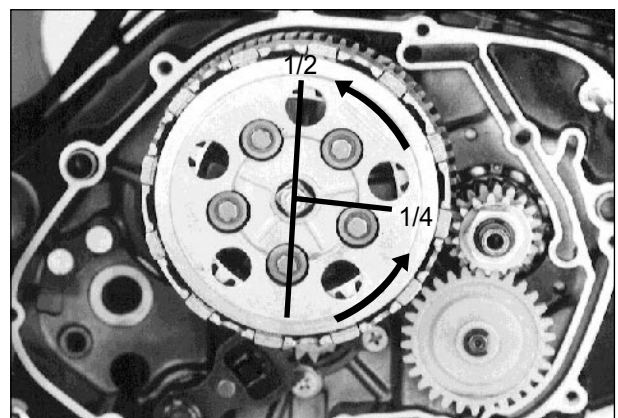
NOTE

Tighten the clutch spring set bolts diagonally.



⊙ CLUTCH RELEASE ADJUSTER SCREW

- Loosen the adjuster nut, and turn clutch release adjuster screw to feel high resistance.
- From that position, turn out the clutch release adjuster 1/4 ~ 1/2 turn, and tighten adjuster nut.



- Install the clutch cover, and tighten the clutch cover bolts securely.

⊙ GEAR SHIFT CAM STOPPER PLUG

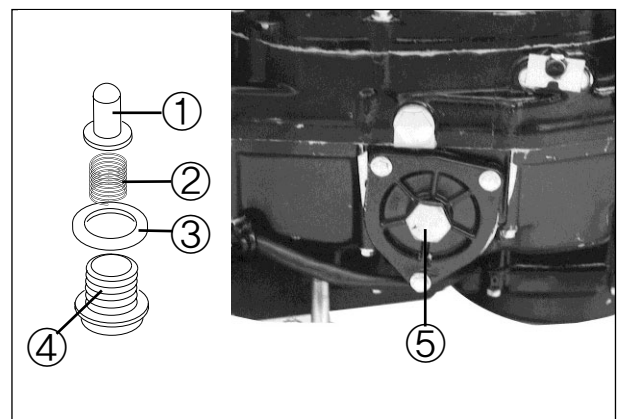
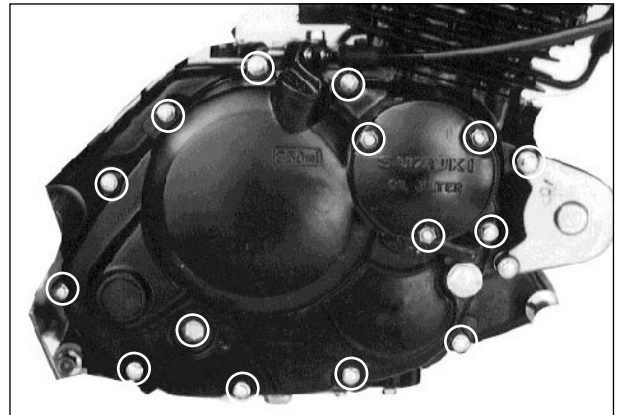
- Insert the cam neutral stopper ①, spring ② and washer ③.
- Tighten the gear shift cam stopper plug ④ to the specified torque.

 Gear shift cam stopper plug
: 20 ~ 25 N · m (2.0 ~ 2.5 kgf · m)

⊙ OIL DRAIN PLUG

- Tighten the engine oil drain plug ⑤ to the specified torque.

 Engine oil drain plug
: 25 ~ 30 N · m (2.5 ~ 3.0 kgf · m)



LEFT END COMPONENTS OF ENGINE REASSEMBLY

⊙ STATOR

- Apply a small quantity of THREAD LOCK “1324” to the thread parts of screws.


 THREAD LOCK “1324”



⊙ STARTER CLUTCH

- When installing the starter clutch and rotor, apply the THREAD LOCK “1324” to the bolts and tighten to the specified torque.

 THREAD LOCK “1324”

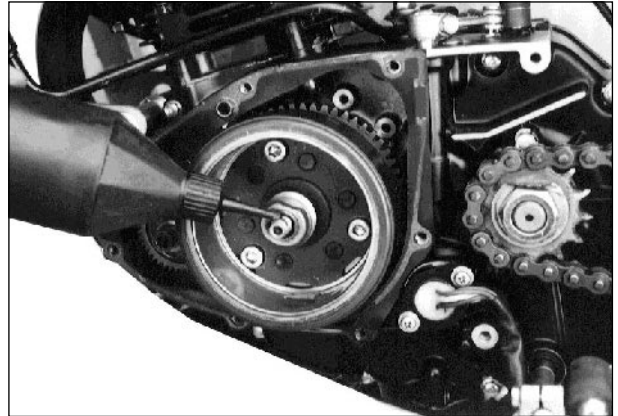
 Starter clutch bolt
: 15 ~ 20 N · m (1.5 ~ 2.0 kgf · m)




⊙ MAGNETO ROTOR

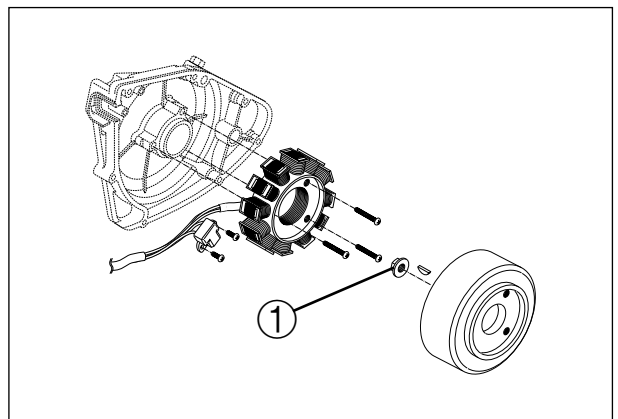
- Fit the key into the key slot on the crankshaft.
- With the magneto rotor, install the starter clutch on the crankshaft.
- Apply a small quantity of THREAD LOCK “1324” to the threaded parts of crankshaft.

 **THREAD LOCK “1324”**



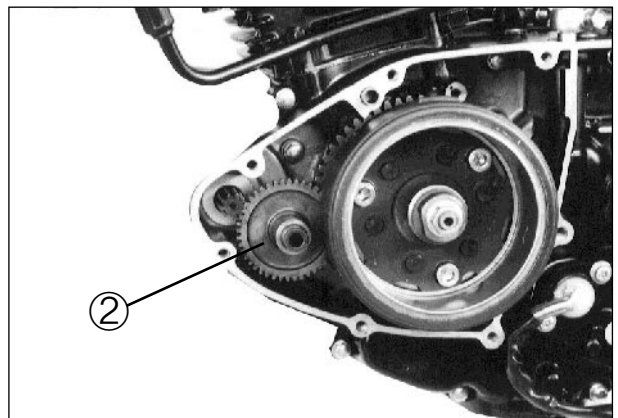
- Hold the magneto rotor, and tighten the magneto rotor bolt ① to the specified torque.

 **Magneto rotor bolt**
: 56 ~ 60 N · m (5.6 ~ 6.0 kgf · m)

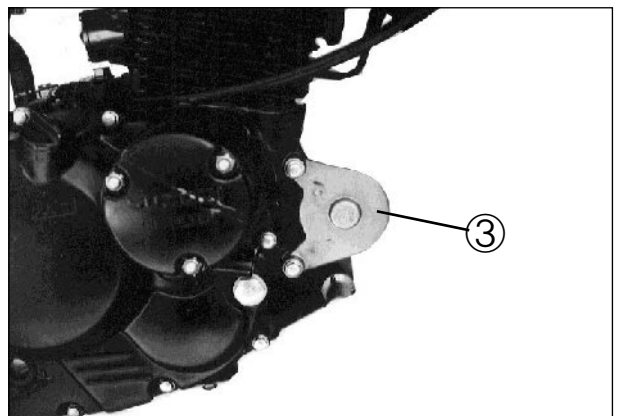


⊙ STARTER IDLE GEAR AND MOTOR

- Install the starter idle gear ②.



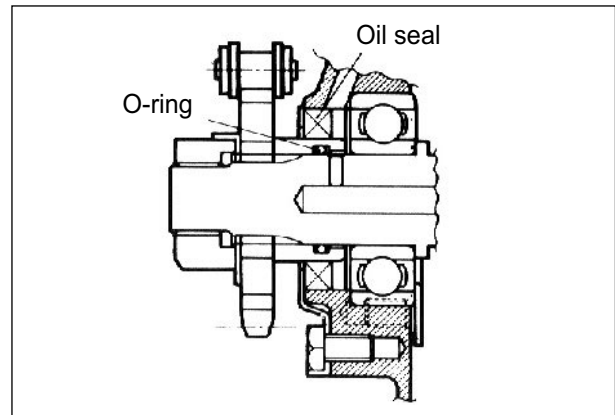
- Install the starter motor ③.



⊙ DRIVESHAFT OIL SEAL AND ENGINE SPROCKET


⚠ CAUTION

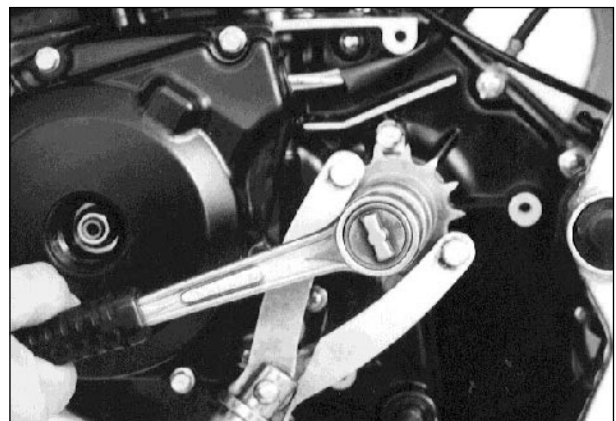
- ❖ Always replace the driveshaft oil seal with a new one every disassembly to prevent oil leakage. Also grease the oil seal lip. On installation, refer to the figure, for correct position and direction.
- ❖ Replace the engine sprocket O-ring with a new one every disassembly.



- Tighten the engine sprocket nut to the specified torque and bend up the lock washer.

 Rotor holder : 09930-40113

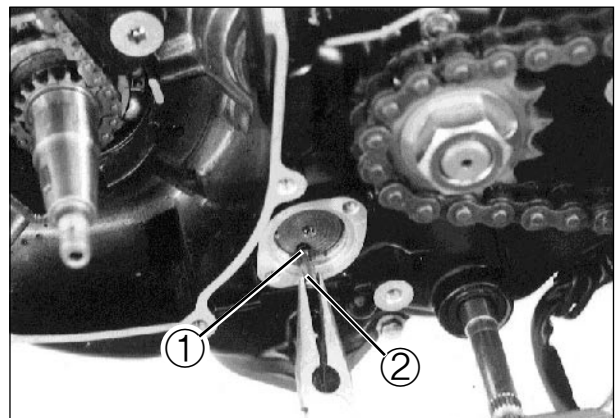
 Engine sprocket nut
: 80 ~ 100 N · m (8.0 ~ 10.0 kgf · m)



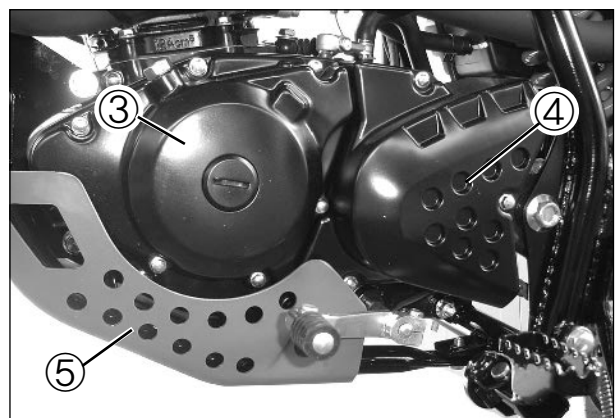
⊙ GEAR POSITION SWITCH

- Install the spring ① and contact ②.
- Apply SUPER GREASE "A" to the O-ring and install the gear position switch.

 SUPER GREASE "A"



- Install the magneto cover ③ and engine sprocket cover ④.
- Install the engine guard ⑤.



SERVICING INFORMATION

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TIGHTENING TORQUE

⊙ ENGINE

ITEM	N · m	kgf · m
Camshaft sprocket bolt	10 ~ 12	1.0 ~ 1.2
Camshaft housing bolt	8 ~ 12	0.8 ~ 1.2
Cam chain tension adjuster mounting bolt	8 ~ 12	0.8 ~ 1.2
Clutch sleeve hub nut	30 ~ 50	3.0 ~ 5.0
Crankcase bolt	9 ~ 13	0.9 ~ 1.3
Cylinder head base nut	7 ~ 11	0.7 ~ 1.1
Cylinder head bolt	21 ~ 25	2.1 ~ 2.5
Cylinder head cover bolt	12 ~ 16	1.2 ~ 1.6
Cylinder base nut	7 ~ 11	0.7 ~ 1.1
Engine mounting bolt (M10)	48 ~ 72	4.8 ~ 7.2
Engine mounting bolt (M8)	22 ~ 33	2.2 ~ 3.3
Engine mounting bracket bolt (M8)	22 ~ 33	2.2 ~ 3.3
Engine oil drain plug	25 ~ 30	2.5 ~ 3.0
Engine sprocket nut	80 ~ 100	8.0 ~ 10.0
Exhaust pipe nut	18 ~ 28	1.8 ~ 2.8
Gear shift cam stopper plug	20 ~ 25	2.0 ~ 2.5
Magneto rotor nut	56 ~ 60	5.6 ~ 6.0
Muffler connecting bolt	18 ~ 28	1.8 ~ 2.8
Muffler mounting bolt	18 ~ 28	1.8 ~ 2.8
Oil cooler bolt	20 ~ 25	2.0 ~ 2.5
Oil pump mounting screw	5 ~ 7	0.5 ~ 0.7
Primary drive gear nut	40 ~ 60	4.0 ~ 6.0
Spark plug	20 ~ 25	2.0 ~ 2.5
Starter clutch bolt	15 ~ 20	1.5 ~ 2.0

SERVICE DATA

⊙ VALVE + GUIDE

Unit : mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	22.0 (0.87)	—
	EX.	19.0 (0.75)	—
Valve clearance (When cold)	IN.	0.1 ~ 0.2 (0.004 ~ 0.008)	—
	EX.	0.2 ~ 0.3 (0.008 ~ 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 ~ 0.037 (0.0004 ~ 0.0015)	—
	EX.	0.030 ~ 0.057 (0.0012 ~ 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500 ~ 4.512 (0.1771 ~ 0.1776)	—
Valve stem O.D.	IN.	4.475 ~ 4.490 (0.1762 ~ 0.1768)	—
	EX.	4.455 ~ 4.470 (0.1754 ~ 0.1760)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.50 (0.02)
Valve seat width	0.9 ~ 1.1 (0.035 ~ 0.043)		—
Valve seat angle	IN. & EX.	45°	—
Valve head radial runout	IN. & EX.	—	0.03 (0.0012)
Valve spring free length	IN.	—	37.80 (1.488)
	EX.	—	37.80 (1.488)
Valve spring tension	IN.	12.1 ~ 13.9 kgf (26.68 ~ 30.64 lbs) at length 33.7 mm (1.33 in)	—
	EX.	12.1 ~ 13.9 kgf (26.68 ~ 30.64 lbs) at length 33.7 mm (1.33 in)	—

⊙ CAMSHAFT + CYLINDER HEAD

Unit : mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	34.47 ~ 34.51 (1.357 ~ 1.359)	34.17 (1.345)
	EX.	34.42 ~ 34.46 (1.355 ~ 1.356)	34.12 (1.343)
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
Cam chain pin (Arrow "3")	16th pin		—
Cam chain 20-pitch length	—		129.9 (5.11)

7-14 SERVICING INFORMATION

⊙ CYLINDER + PISTON + PISTON RING

Unit : mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	14 ~ 16 kgf/cm ²		12 kgf/cm ²
Piston to cylinder clearance	0.050 ~ 0.060 (0.0020 ~ 0.0024)		0.120 (0.0047)
Cylinder bore	57.000 ~ 57.015 (2.2441 ~ 2.2447)		57.080 (2.2472)
Piston diameter	56.945 ~ 56.960 (2.2419 ~ 2.2425) (Measure at 15 mm (0.6 in) from the skirt end)		56.880 (2.2394)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	Approx 7.2 (0.284)	5.7 (0.224)
	2nd	Approx 5.8 (0.228)	4.6 (0.181)
Piston ring end gap (Assembly condition)	1st	0.20 ~ 0.32 (0.008 ~ 0.013)	0.50 (0.020)
	2nd	0.20 ~ 0.32 (0.008 ~ 0.013)	0.50 (0.020)
Piston ring to groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)
Piston ring groove width	1st	1.01 ~ 1.03 (0.040 ~ 0.041)	—
	2nd	1.01 ~ 1.03 (0.040 ~ 0.041)	—
	Oil	2.01 ~ 2.03 (0.079 ~ 0.080)	—
Piston ring thickness	1st	0.970 ~ 0.990 (0.0382 ~ 0.0390)	—
	2nd	0.970 ~ 0.990 (0.0382 ~ 0.0390)	—
Piston pin hole bore	15.002 ~ 15.008 (0.5906 ~ 0.5909)		15.030 (0.5917)
Piston pin O.D.	14.994 ~ 15.000 (0.5903 ~ 0.5906)		14.980 (0.5898)

⊙ CONROD + CRANKSHAFT

Unit : mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	15.006 ~ 15.014 (0.5908 ~ 0.5911)	15.040 (0.5921)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10 ~ 0.45 (0.004 ~ 0.018)	1.00 (0.040)
Conrod big end width	15.95 ~ 16.00 (0.628 ~ 0.630)	—
Crank web to web width	53.0 ± 0.1 (2.087 ± 0.004)	—
Crankshaft runout	—	0.05 (0.002)

⊙ OIL PUMP

ITEM	STANDARD	NOTE
Oil pressure	0.4 ~ 0.6 kgf/cm ² (at 60°C, 3,000 rpm)	—
Oil pump reduction ratio	2.00 (36/15)	—

⊙ CLUTCH

Unit : mm (in)

ITEM	STANDARD	LIMIT
Clutch cable play	4 (0.16)	—
Clutch drive plate thickness	2.9 ~ 3.1 (0.114 ~ 0.122)	2.6 (0.102)
Clutch drive plate claw width	11.8 ~ 12.0 (0.465 ~ 0.472)	11.0 (0.433)
Clutch driven plate distortion	—	0.1 (0.004)
Clutch spring free length	—	29.5 (1.161)

⊙ TRANSMISSION + DRIVE CHAIN

Unit : mm (in)

ITEM	STANDARD	LIMIT
Reduction ratio	3.500 (70/20)	—
Gear ratio	1st	2.750 (33/12)
	2nd	1.786 (25/14)
	3rd	1.368 (26/19)
	4th	1.046 (23/22)
	5th	0.913 (21/23)
Shift fork to groove clearance	0.10 ~ 0.30 (0.004 ~ 0.012)	0.5 (0.020)
Shift fork groove width	NO.1 & NO.2	5.00 ~ 5.10 (0.197 ~ 0.201)
	NO.3	5.50 ~ 5.60 (0.217 ~ 0.221)
Shift fork thickness	NO.1 & NO.2	4.80 ~ 4.90 (0.189 ~ 0.193)
	NO.3	5.30 ~ 5.40 (0.209 ~ 0.213)
Drive chain (<i>R125D</i>)	Type	428SO
	Links	130 LINKS
	20-pitch length	254.0 (10.00)
Drive chain (<i>XR125D</i>)	Type	428H
	Links	132 LINKS
	20-pitch length	254.0 (10.00)
Drive chain (<i>XR125SM</i>)	Type	428H
	Links	130 LINKS
	20-pitch length	254.0 (10.00)
Drive chain slack (<i>R125D</i>)	20 ~ 30 (0.79 ~ 1.18)	
Drive chain slack (<i>XR125D</i> & <i>XR125SM</i>)	50 ~ 60 (1.97 ~ 2.36)	

7-16-1 SERVICING INFORMATION

⊙ CARBURETOR [*R125D*]

Unit : mm (in)

ITEM	SPECIFICATION
Carburetor type	Piston valve type
Bore size	φ 24
Idle rpm	1,400 ~ 1,600 rpm
Float height	12.5 (0.492)
Main jet (M.J.)	# 102
Main air jet (M.A.J.)	# 100
Jet needle (J.N.)	A1FC
Needle jet (N.J.)	φ 2.6
Pilot jet (P.J.)	# 38
Throttle valve (TH.V.)	# 3
Pilot outlet	φ 0.9
Valve seat (V.S.)	φ 2.0
Starter jet	MAX # 500
Pilot air jet (P.A.J.)	# 120
Throttle cable play	0.5 ~ 1.0 (0.02 ~ 0.04)

⊙ CARBURETOR [XR_X125D & XR_X125SM]

Unit : mm (in)

ITEM	SPECIFICATION
Carburetor type	Piston valve type
Bore size	φ 24
Idle rpm	1,400 ~ 1,500 rpm
Float height	12.5 (0.492)
Main jet (M.J.)	# 98
Main air jet (M.A.J.)	# 90
Jet needle (J.N.)	φ 2.6
Needle jet (N.J.)	A1FC-2nd
Pilot jet (P.J.)	# 38
Throttle valve (TH.V.)	# 3
Pilot outlet	φ 0.9
Valve seat (V.S.)	φ 2.0
Starter jet	MAX # 500
Pilot air jet (P.A.J.)	# 150
Throttle cable play	0.5 ~ 1.0 (0.02 ~ 0.04)

7-16-3 SERVICING INFORMATION

⊙ FUEL + OIL

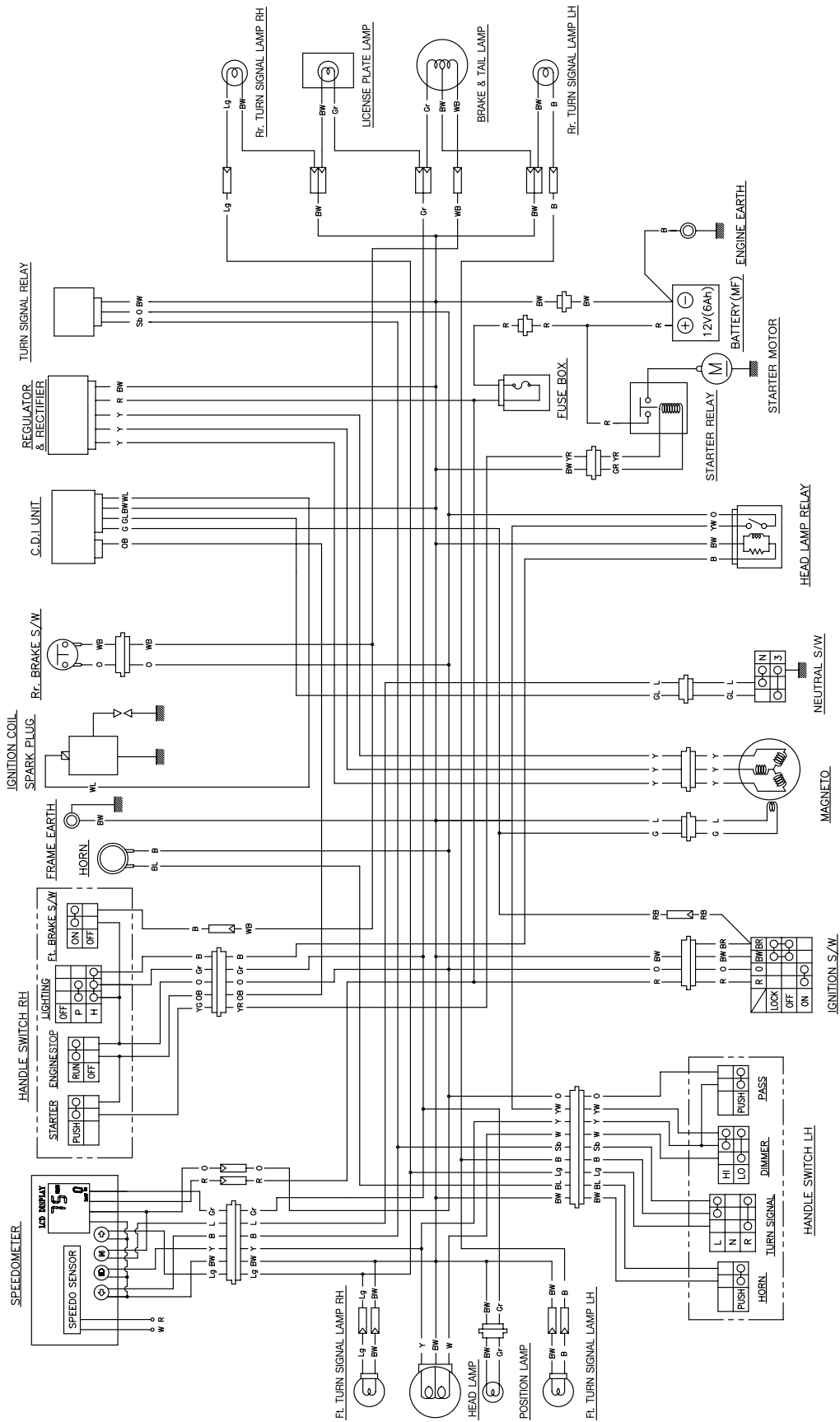
ITEM	SPECIFICATION		NOTE
Fuel type	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		
Fuel tank capacity (<i>AT125D</i>)	9.0 ℓ		
Fuel tank capacity (<i>XR125D</i> & <i>XR125SM</i>)	8.0 ℓ		
Engine oil	API Over SL (SAE 10W/40)		
Engine oil capacity	Oil change	850 ml	
	Oil and filter change	950 ml	
	Engine overhaul	1,200 ml	

⊙ ELECTRICAL

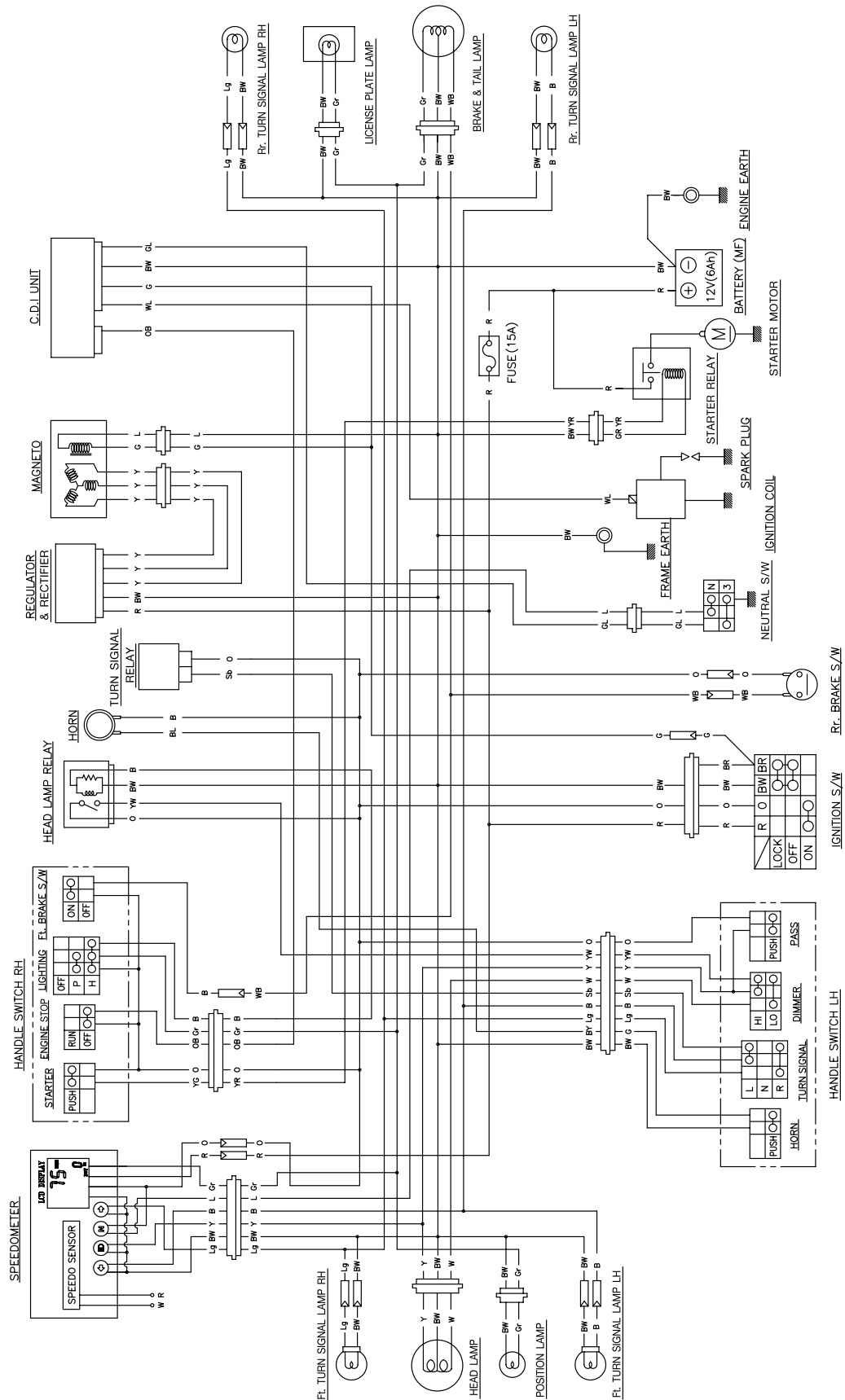
Unit : mm (in)

ITEM	STANDARD		NOTE
Ignition timing	BTDC 6° / 1,900 rpm ~ 27° / 4,250 rpm		
Spark plug	Type	CR8E	
	Gap	0.7 ~ 0.8 (0.028 ~ 0.032)	
	Hot type	CR7E	
	Standard type	CR8E	
	Cold type	CR9E	
Battery	Type	YTX7A-BS	
	Capacity	12V 6Ah	
	Standard electrolyte S.G.	1.320 at 20°C (68°F)	
Fuse size	15A		

WIRING DIAGRAM [R125D]



WIRING DIAGRAM [XR125D & XR125SM]



TAPPET SHIM SELECTION CHART (IN.)

SHIM No.	Specified clearance - Adjustment unnecessary																				
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
MEASURING TAPPET CLEARANCE (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
SHIM THICKNESS AT PRESENT (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.00 ~ 0.04			1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10
0.05 ~ 0.09		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.10 ~ 0.20																					
0.21 ~ 0.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20
0.26 ~ 0.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20
0.31 ~ 0.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20
0.36 ~ 0.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20
0.41 ~ 0.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.46 ~ 0.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.51 ~ 0.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.56 ~ 0.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.61 ~ 0.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.66 ~ 0.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.71 ~ 0.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.76 ~ 0.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.81 ~ 0.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.86 ~ 0.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.91 ~ 0.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.96 ~ 1.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.01 ~ 1.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.06 ~ 1.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.11 ~ 1.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20

HOW TO USE THE CHART

1. Measure the tappet clearance. (When cold)
2. Measure the shim thickness at present.
3. Look for meeting space in that horizontal line for thickness and vertical line for clearance.

(EXAMPLE)

When the tappet clearance is 0.23 mm and the shim thickness at present is 1.70 mm, the shim thickness should be used 1.80 mm.



TAPPET SHIM SELECTION CHART (EX.)

SHIM No.	Specified clearance - Adjustment unnecessary																				
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
MEASURING TAPPET CLEARANCE (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
SHIM THICKNESS AT PRESENT (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.05 ~ 0.09				1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05
0.10 ~ 0.14			1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10
0.15 ~ 0.19		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.20 ~ 0.30																					
0.31 ~ 0.35	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20
0.36 ~ 0.40	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20
0.41 ~ 0.45	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20
0.46 ~ 0.50	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20
0.51 ~ 0.55	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.56 ~ 0.60	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.61 ~ 0.65	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.66 ~ 0.70	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.71 ~ 0.75	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.76 ~ 0.80	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.81 ~ 0.85	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.86 ~ 0.90	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.91 ~ 0.95	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.96 ~ 1.00	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.01 ~ 1.05	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.06 ~ 1.10	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.11 ~ 1.15	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.16 ~ 1.20	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.21 ~ 1.25	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20

HOW TO USE THE CHART

1. Measure the tappet clearance. (When cold)
2. Measure the shim thickness at present.
3. Look for meeting space in that horizontal line for thickness and vertical line for clearance.

(EXAMPLE)

When the tappet clearance is 0.33 mm and the shim thickness at present is 1.70 mm, the shim thickness should be used 1.80 mm.



Prepared by

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