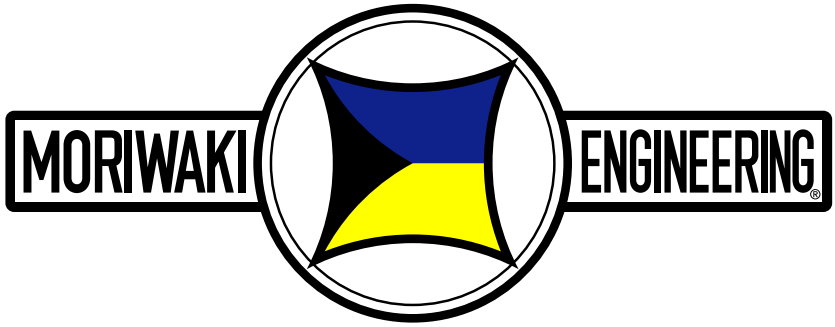


MORIWAKI MD250H
SERVICE MANUAL

Important notice

・MD250 is designed and manufactured to be used only in race circuits
・Observe operational regulations of each race circuit and race regulations
・Specification of products as well as price of products are subject to change without notice
・Sales tax is not included in the indicated price
・No price is indicated for the engine due to its overseas specification
・Consult us for detail of each part
・All products for racing use are out of the scope of the warranty
・MD250 is not approved by Ministry of Land, Infrastructure and Transport to be used on streets (as described in Clause 6 of Article 2 of the Road Transport Vehicle Law and Clause 1 of Article 2 of Road Traffic Law). Use of MD250 on streets will be subject of violation of Road Transport Vehicle Law and Road Traffic Law. Therefore, MD250 should never be used on streets including other public use areas such as private roads, temples, shrines, parks, agricultural roads, forest roads and embankments. Use of MD250 must be restricted at race circuits only.
・Longer lead-time of parts supply will be required during race season. Purchasing of "periodic replacement parts" or "consumables" prior to race season is highly recommended.

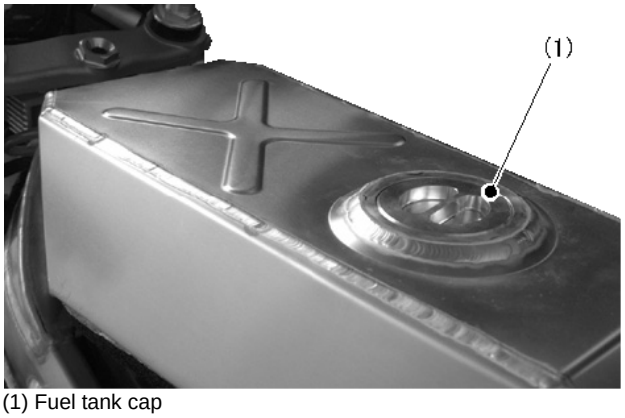
Refueling

Remove the tank cover.
Remove the fuel tank cap.

⚠DANGER

Gasoline is explosive. It can cause you to be burned or seriously hurt due to explosion.

When you handle gasoline;
- Engine must be stopped. The work area must be free form flames, sparks or heat source.
- Work in a well ventilated area.
- If you spill gasoline, wipe and remove it immediately.



(1) Fuel tank cap

Fuel tank capacity: 7.0 liter
Fuel: Unleaded high-octane gasoline

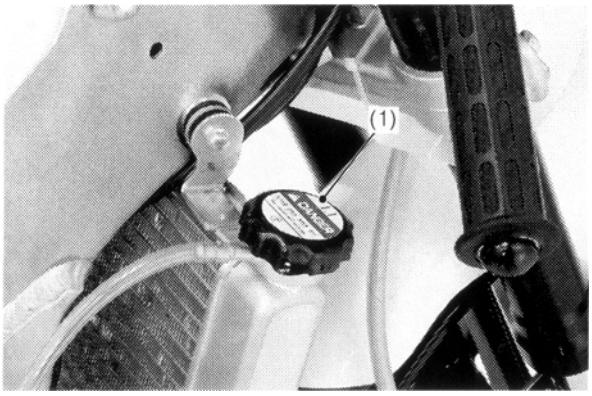
Be sure to install the fuel tank cap and breather tube before ride.

Coolant

MD250H uses water for its engine cooling system.
Remove the radiator cap and fill the radiator with coolant water up to the filler neck.

Coolant: Tap water (soft water) or drinking water

The "DANGER" label on the top of the radiator cap indicates potential danger.

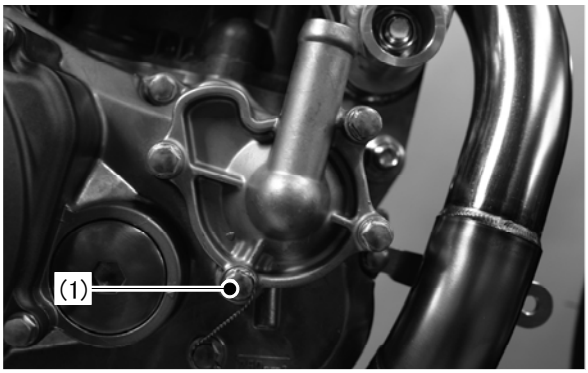


(1) Radiator cap

⚠WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you.

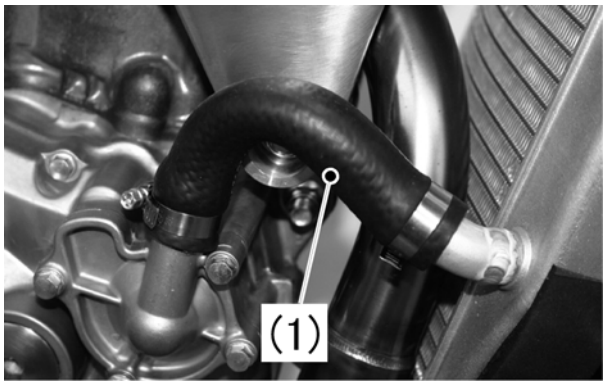
Always let the engine and radiator cool down before removing the radiator cap.



(1) Drain bolt

Be sure to bleed any air trapped in the coolant system after refilling the coolant. Remaining air may cause the engine over heating.

Air bleeding procedure:
1. Remove the radiator cap and fill the radiator with coolant slowly up to the filler neck.
2. Loosen the drain bolt and release any trapped air.
3. Hold the handle bars and lean the bike left to right for a few times to release air. If the coolant level drops, add more coolant.
4. Repeat above procedure until the coolant level doesn't drop.
5. Reinstall the radiator cap and fasten it securely.



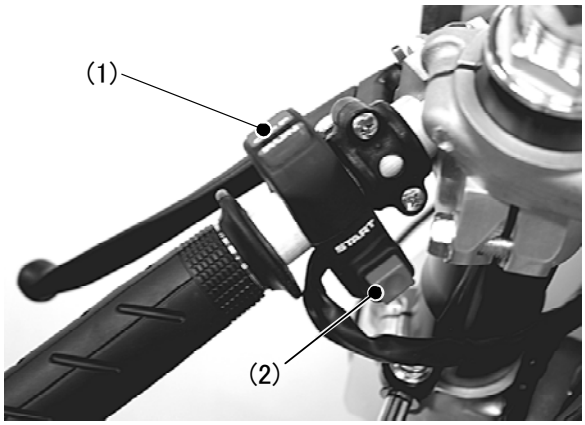
(1) Radiator hose

Notice

The radiator cap has a double-lock fasten system.
Be sure to fasten the radiator cap completely, otherwise the system will not hold the required pressure and cause coolant leakage and serious troubles.

6. Remove the radiator cap and start the engine when it is cold. Check the coolant flow at the filler neck (coolant will not flow if there is trapped air in the system). Stop the engine and re-check the coolant level. Add more coolant if necessary, then reinstall the radiator cap.

Drain any coolant in the catch tank before ride.
Drain coolant from the cooling system after finish riding to avoid troubles in the system such as corrosion or clogging.



(1) Main switch (2) Starter button

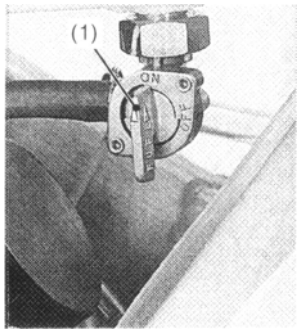
Riding

Starting

Check the coolant level before start the engine. (→1-1)

Cold start:

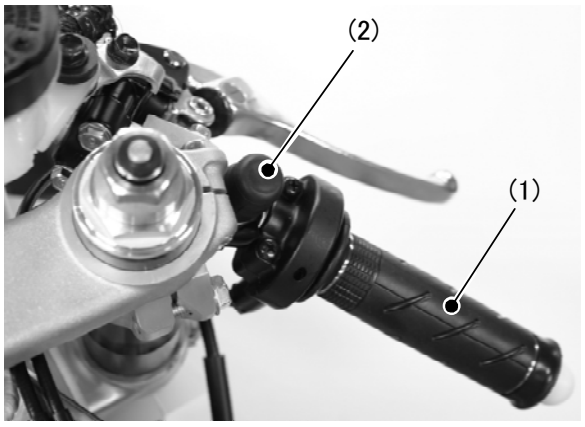
1. Switch the main switch to "RUN".
   Tachometer and water temp. indicator start operating (Power ON)
   Tachometer: Indicator goes all the way and back to the minimum value; 3000rpm and the back light turns on.
   Water temp. indicator: Start indicating the coolant temperature.
2. Turn the fuel valve to "ON".
3. Open and close the throttle 2 to 3 times in quick motion.
4. Push the starter button to start the engine.



(1) Fuel valve

Warm start:

Follow the "Cold start" procedure above except #3 and start the engine.



(1) Throttle grip (2) Engine stop button

Stopping

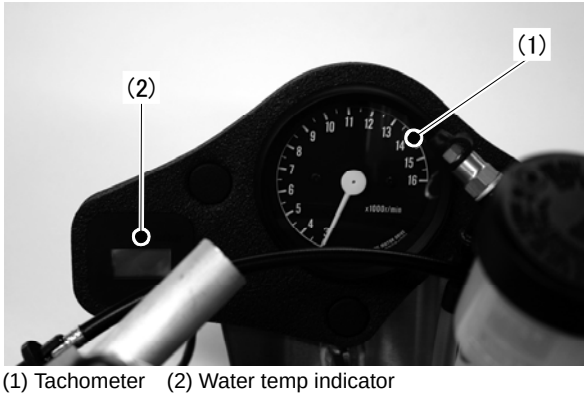
1. Shift the transmission into neutral.
2. Turn the fuel valve to "OFF".
3. Push the engine stop button when the engine rev drops and keep until the engine stops completely.
4. Switch the main switch to "OFF".

Leaving the fuel valve "ON" may cause starting difficulty especially when the carburetor overflow the gasoline.

Engine warm up

Do not run the engine at high rev idle for too long during the warming up.

1. Start the engine, then open the throttle instantaneously while obtaining 5,000rpm～6,000rpm until the coolant temperature rises to 40～50℃.
2. Then, open the throttle further in same instantaneous motion up to 8,000rpm until the temperature rises to 70℃, and stop the engine.
3. To stop the engine, close the throttle and push the engine stop button until the engine stops.



(1) Tachometer (2) Water temp indicator

Break-in ride

First break-in ride

Keep the engine rev constant at the specified rpm during break-in ride. Shift speed up and down below the specified rpm. Use relatively high gears and observe function of each part. Use 4 to 5 speed gears when riding through straight section of circuit tracks.

Up to 7,000rpm…… about 50km (approx. 30min)
Up to 8,000rpm…… about 15km
Up to 9,000rpm…… about 15km
Up to 10,000rpm …… about 15km

Total: approx. 1hr or 95km

After parts change

- Perform same amount of break-in ride as first break-in when cylinder or crankshaft is replaced: approx. 1hr (95km)
- In case of replacement of engine parts such as piston, piston rings and gears:
  Up to 7,000rpm…… about 20km
  Up to8,000rpm…… about 10km
  Up to 9,000rpm…… about 10km
  Up to 10,000rpm…… about 10km

  Total: approx. 30min or 50km

- Replace the transmission oil (⇒3-6) after break-in rides. Check the contamination and foreign substances in used oil.

Operation system

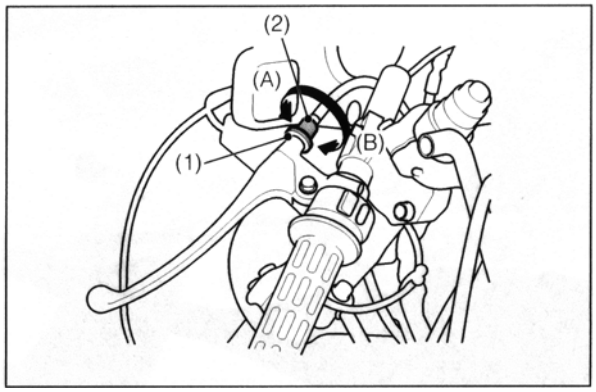
Clutch

Check the clutch lever free play at the lever end.

Free play: 10 – 20mm

Minor adjustments can be made at the cable end adjuster on the lever.

- Turning the cable end adjuster in direction A will increase free play
- Turning the cable end adjuster in direction B will decrease free play.

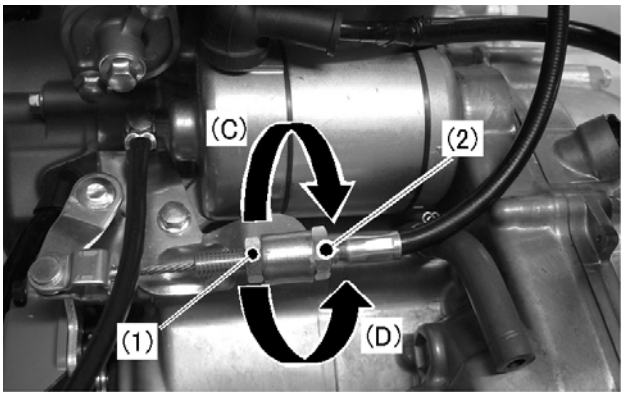


(1) Lock nut (2) Adjuster
(A) Increase the free play (B) Decrease the free play

Major adjustments can be made with the in-line cable adjuster located behind the starter motor.

- Turning the adjuster in direction C will increase free play
- Turning the adjuster in direction D will decrease free play

Start the engine and check the clutch for disengaging or slips.



(1) Lock nut (2) Adjuster
(C) Increase the free play (D) Decrease the free play

Throttle grip

Throttle grip free play

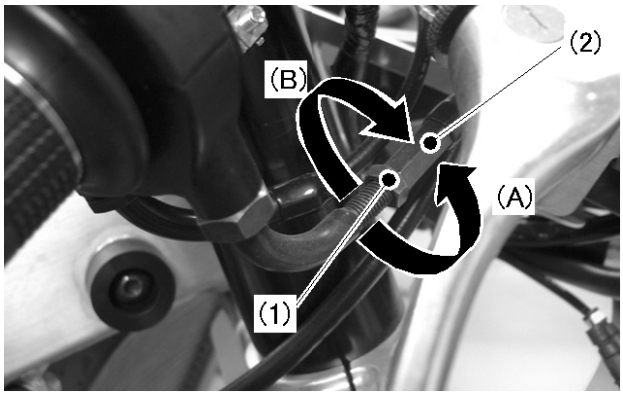
Check the free play at the throttle grip flange.

Free play: 3mm

Minor adjustments are made with the throttle grip side adjuster.

- Turning the adjuster in direction A will increase free play
- Turning the adjuster in direction B will decrease free play

Tighten the lock nut after adjustment.
Check the throttle grip for its operation.

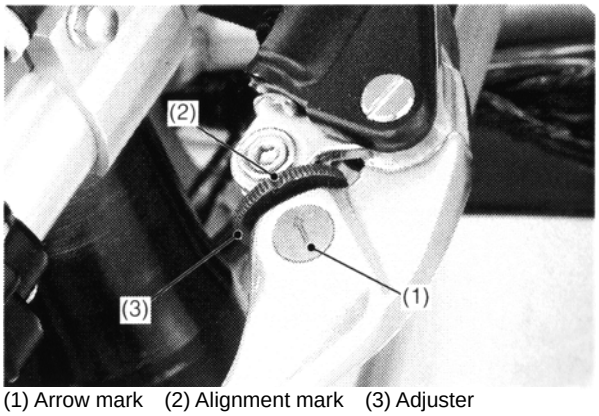


(1) Lock nut (2) Adjuster
(A) Increase free play (B) Decrease free play

Front brake lever adjustment

The brake lever position can be adjusted by adjuster.

Adjust the brake lever to appropriate position by using the arrow and alignment marks as reference.

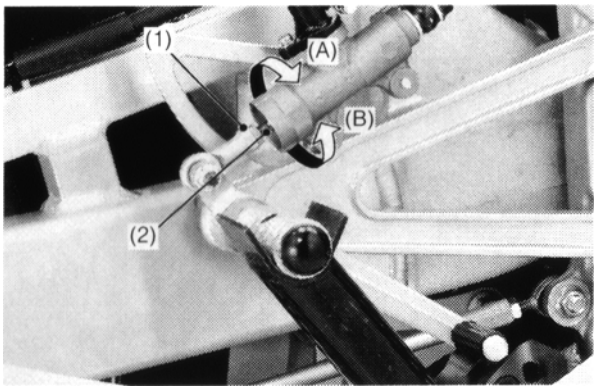


(1) Arrow mark (2) Alignment mark (3) Adjuster

Brake pedal height

Adjust the brake pedal to the desired height by loosening the lock nut and turning the push rod.

Apply grease to the brake pedal axle at every ride.



(1) Lock nut (2) Adjuster
(A) Pedal goes higher (B) Pedal goes lower

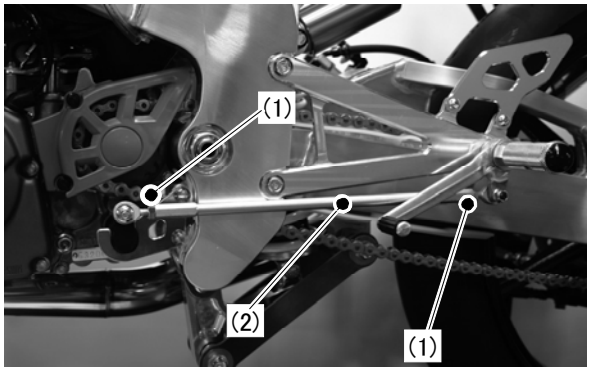
Gear shift linkage

The change pedal height can be adjusted by changing the length of the change rod.
Loosen the lock nuts at both ends and turn the change rod to adjust the change pedal height. Measure the distance between 2 pillow balls as a reference to the pedal height.

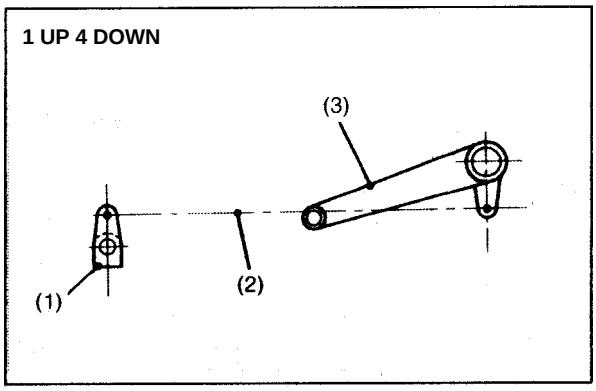
Change rod adjustable length (between the pillow balls)
minimum length: 311mm
maximum length: 332mm

One of 2 ends of the change rod had reverse threads.

Shift pattern: 1 up 4 down



(1) Lock nut (2) Change rod

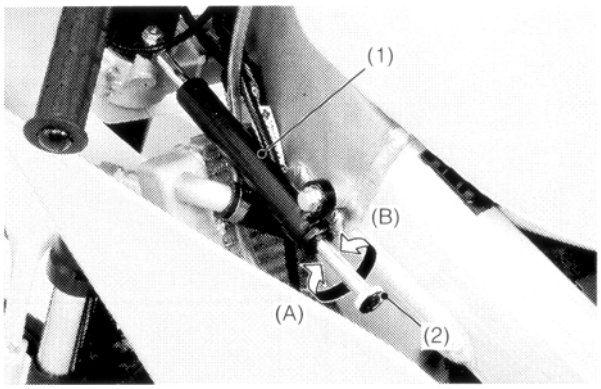


(1) Change arm (2) Change rod
(3) Change pedal

Steering damper

The steering damper damping force can be adjusted by its adjuster.
The damping force is adjusted in 7steps. The damping force increases as turning the adjuster clockwise and obtain the maximum damping force at the turning end.
The damping force decrease as turning the adjuster counter-clockwise.

Standard setting: Minimum damping force

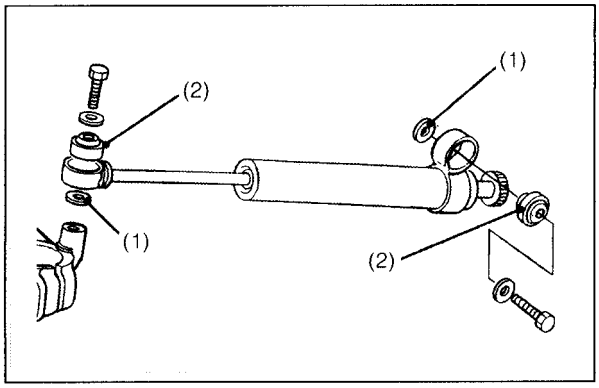


(1) Steering damper (2) Adjuster
(A) Increase damping force (B) Decrease damping force

⚠CAUTION

Do not start the steering damper setting from its maximum damping force position. It will cause problem in handling of the motorcycle.

Always start the steering damper setting from its minimum damping force position.



(1) Washers (2.3mm) (2) Spherical bearings

Note

- Do not turn the adjuster to clockwise further than its turning end. It will break the stopper in the steering damper and cause damping force adjustment malfunction.
- Be sure to install the steering damper within the tolerance of 2 spherical bearings movement. Inappropriate installation will create unnecessary stress on the piston rod and disturb steering movement.
- Do not damage the sliding surface of the piston rod. Score marks or hitting marks cause damper oil leaks.
- Make sure that the steering damper is not fully stretched at both steering ends. Also check the steering damper for interference with the frame or other parts of the motorcycle.
- Do not disassemble the steering damper unit
- Make sure to use the thick washers (2.3mm) between the frame and spherical bearing, and bottom bridge and spherical bearing, then tighten the bolts.

Service specification

Unit: mm

ITEM					STANDARD	SERVICE LIMIT
LUBRICATION SYSTEM SPECIFICATIONS	Recommended transmission oil				HONDA Ultra-G1 (4-stroke motorcycle oil)	
	Recommended engine oil				HONDA Ultra-G1 (4-stroke motorcycle oil)	
FUEL SYSEM SPECIFICATIONS	Venturi diameter				40	
	Carburetor identification number				FCR12C A	
	Float level				6.0	
	Main jet				#160	
	Slow jet				#42	
	Jet needle				NCYR	
	Pilot screw initial opening				1-1/4 turns out	
	Jet needle clip position(Standard)				4th groove from top	
COOLING SYSEM SPECIFICATIONS	Coolant				Tap water (soft water) or drinking water	
	Radiator cap relief pressure				1.1－1.4kgf/c ㎡	
CLUTCH SPECIFICATION	Clutch spring free length				38.8	38.0
	Clutch disc thickness				2.92-3.08	2.85
	Clutch plate warpage				－	0.10
CYLINDER HEAD/VALVE SPECIFICATION	Cylinder compression				392kPa(0.95-1.25kgf/c ㎡)	－
	Cylinder head warpage				－	0.05
	Camshaft	Cam lobe height		IN	35.580–35.660	35.44
				EX	25.081–25.161	24.98
	Valve lifter	Valve lifter O.D.			22.478-22.493	22.47
		Valve lifter bore I.D.			22.510-22.526	22.54
	Valve and valve guide	Valve clearance		IN	0.12±0.3	－
				EX	0.28±0.3	－
		Valve stem O.D.		IN	4.975-4.990	－
				EX	4.965-4.980	4.955
		Valve guide I.D.		IN/EX	5.000-5.012	5.052
		Stem-to-guide clearance		IN	0.010-0.037	－
				EX	0.020-0.047	－
		Valve guide projection above cylinder head		IN	14.8-15.0	－
				EX	19.9-20.1	－
		Valve seat width		IN/EX	0.90-1.10	1.7
	Valve spring	Valve spring free length		IN	39.47	38.5
				EX	43.07	42.1
	Rocker arm	Rocker arm I.D.			12.016-12.034	12.07
		Rocker arm shaft O.D.			11.977-11.985	11.93
		Rocker arm-to-shaft clearance			0.031-0.057	0.11
CYLINDER/PISTON SPECIFICATIONS	Cylinder	Warpage			－	0.05
		I.D.			78.00-78.015	78.025
	Piston	Circularity / Cylindricity			－	0.010
		O.D. (7mm from the bottom of skirt)			77.970-77.980	77.940
		Cylinder-to-piston clearance			0.020-0.045	0.085
	Piston pin	Piston pin bore I.D.			16.002-16.008	16.03
		Piston pin O.D.			15.994-16.000	15.98
		Piston-to-piston pin clearance			0.002-0.014	0.04
	Piston ring	Piston ring end gap		Top ring	0.15-0.25	0.39
				Oil ring	0.20-0.70	0.90
		Piston ring-to ring groove clearance (Top)			0.065-0.100	0.08
	Connecting rod small end I.D.				16.016-16.038	16.04
	Connecting rod-to-piston pin clearance				0.016-0.044	0.06

ITEM				STANDARD		SERVICE LIMIT
WHEEL/TIRE SPECIFICATION	Cold tire pressure		FRONT	1.8kgf/c ㎡		—
			REAR	1.9kgf/c ㎡		—
	Axle runout			—		0.5mm
	Wheel rim runout		Radical	—		0.3mm
			Axial	—		0.3mm
	Drive chain slack			20mm±2mm		—
	Drive chain slider thickness			—		2.0mm
FRONT SUSPENSION SPECIFICATION	Fork tube runout			—		0.20mm
	Fork oil (type)			HONDA Ultra Cushion Oil Special (SAE5W), SHOWA SS05 or equivalent		—
	Fork oil level			R	L	
			(Std)	111mm	106mm	—
			(Upper)	92mm	87mm	—
			(Lower)	152mm	147mm	—
	Fluid capacity		(Std)	233 c ㎥		—
			(Upper)	257 c ㎥		—
			(Lower)	210 c ㎥		—
	Compression damping adjuster standard position			10 clicks out from full in		—
	Rebound damping adjuster standard position			6 clicks out from full in		—
REAR SUSPENSION SPECIFICATION	Damper gas pressure			10.0-13.0kgf/c ㎡		—
	Damper rod compressed force (at 10mm compressed)			15.4-20.0kgf		—
	Spring installed length			147mm		—
	Compression damping adjuster standard position			6 clicks out from full in		—
	Rebound damping adjuster standard position			10 clicks out from full in		—
HYDRAULIC BRAKE SPECIFICATION	Brake fluid			DOT 4		—
	Front	Brake disk thickness		4.0mm		3.5mm
		Brake disc runout		—		0.3mm
		Master cylinder I.D.		12.700-12.743mm		12.755mm
		Master piston O.D.		12.657-12.684mm		12.650mm
	Rear	Brake disk thickness		4.0mm		3.5mm
		Brake disc runout		—		0.3mm
		Master cylinder I.D.		12.700-12.743mm		12.755mm
		Master piston O.D.		12.657-12.684mm		12.650mm
		Caliper cylinder I.D.		27.000-27.005mm		27.06mm
		Caliper piston I.D.		26.900-26.950mm		26.85mm

Tightening torque values

Engine

ITEM	THREAD DIA.(mm)	QTY	TORQUE N·m(kgf·m)	REMARKS
Engine oil drain bolt	8	1	16 (1.6)	Apply engine oil
Transmission oil drain bolt	8	1	16 (1.6)	Apply engine oil
Timing hole cap	1 4	1	6.0 (0.6)	Apply grease
Crankshaft hole cap	3 0	1	15 (1.5)	Apply grease
Rocker arm shaft cap	1 4	1	6.0 (0.6)	
Spark plug	1 0	1	16 (1.6)	
Throttle drum cover bolt	5	1	3.4 (0.3)	
Needle jet	7	1	1.8 (0.2)	
Main jet	5	1	1.5 (0.2)	
Slow jet	6	1	1.5 (0.2)	
Starter jet	5	1	1.5 (0.2)	
Leak jet	4	1	0.3 (0.03)	
Maintenance cover bolt	4	2	2.1 (0.2)	
Carburetor top cover bolt	4	2	2.1 (0.2)	
Throttle shaft screw	4	1	2.1 (0.2)	Apply locking agent
Float chamber screw	4	4	2.1 (0.2)	
Diaphragm cover screw	4	3	2.1 (0.2)	
Carburetor drain plug	1 8	1	4.9 (0.5)	
SE valve lock nut	1 2	1	2.1 (0.2)	
Hot start cable nut	—	1	2.1 (0.2)	
Needle holder	8	1	2.1 (0.2)	
Throttle position sensor mount torx screw	5	1	3.9 (0.4)	Apply locking agent
Water pump impeller	7	1	12 (1.2)	Reverse thread
Cylinder head cover bolt	6	2	10 (1.0)	
Camshaft holder bolt	7	4	16 (1.6)	Apply engine oil
Cylinder head nut	9	4	39 (4.0)	Apply engine oil
Cam chain tensioner bolt	6	1	12 (1.2)	Apply locking agent
Decompressor cam stopper bolt	5	1	10 (1.0)	
Shift drum center bolt	8	1	22 (2.2)	Apply locking agent
Shift drum stopper arm bolt	6	1	12 (1.2)	
Clutch center lock nut	1 8	1	69 (7.0)	
Clutch spring bolt	6	5	12 (1.2)	
Gear shift return spring pin	8	1	22 (2.2)	
Crankshaft bearing set plate torx screw	6	2	20 (2.0)	Apply locking agent (TB1373N or equivalent)
Countershaft bearing set plate screw	6	2	10 (1.0)	Apply locking agent
Mainshaft bearing set plate bolt	6	2	10 (1.0)	Apply locking agent
Shift drum bearing set plate bolt	6	2	10 (1.0)	Apply locking agent
Drive sprocket bolt	8	1	31 (3.2)	
Primary drive gear bolt	1 2	1	108 (11.0)	
Balancer shaft nut	1 4	1	44 (4.5)	Apply engine oil
Oil jet mounting bolt	6	1	10 (1.0)	Apply locking agent
Flywheel nut	1 2	1	64 (6.5)	Apply engine oil
Pulse generator mounting bolt	5	2	5.2 (0.5)	Apply locking agent
Stator mounting screw	4	3	2.6 (0.3)	Apply locking agent
Clutch cover bolt	6	5	10 (1.0)	

FRAME

ITEM	THREAD DIA.(mm)	QTY	TORQUE N·m(kgf·m)	REMARKS
Engine mounting bolt (1 crankcase bolt)	10	3	41.2(4.2)	Apply grease
Steering thread	26	1	6(0.6)	Apply oil
Steering stem bolt	18	1	59(6.0)	Apply grease
Top / bottom bridge pinch bolt	8	6	23(2.3)	
Axle nut	14	2	69(7.0)	Apply grease
Axle holder bolt	8	4	22(2.2)	
Fork bolt	39	2	34(3.5)	
Fork damper rod lock nut	20	2	34(3.5)	
Fork socket bolt	10	2	34(3.5)	
Swingarm pivot adjusting bolt	30	1	15(1.5)	Apply grease
Swingarm pivot adjusting bolt lock nut	30	1	44(4.5)	Apply grease
Swingarm pivot nut	18	1	95(9.7)	Apply grease
Chain guard bolt	6	2	8(0.8)	
Rear cushion spring lock nut	50	1	49(5.0)	
Upper joint lock nut	16	1	64(6.5)	
Front brake caliper mounting bolt	10	2	49(5.0)	
Rear caliper pad pin	10	2	18(1.8)	
Rear caliper pad pin plug	10	2	1(0.15)	
Front brake hose oil bolt	10	2	24(2.4)	
Rear brake hose oil bolt	10	2	24(2.4)	
Front brake bleeder bolt	8	3	24(2,4)	
Front caliper bleeder screw	10	1	7(0.7)	
Brake bleeder screw	8	1	7(0.7)	
Front brake disc bolt	6	6	12(1.2)	
Rear brake disc bolt	8	3	42(4.3)	
Torque rod end nut	8	2	18(1.8)	
Fuel valve lock nut	18	12	19(1.9)	
Handle holder pinch bolt	8	1	23(2.3)	
Clutch cable nut	8	1	10(1.O)	
Clutch lever holder screw	5	2	4(0.40)	
Step holder socket bolt	8	4	15(1.5)	
Tw sensor	12	1	11(1.1)	Apply grease

・Do not apply oil or grease to fasteners unless otherwise specified in the table.

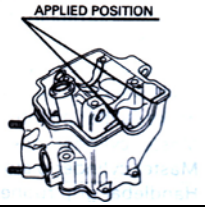
STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m(kgf·m)
5 mm bolt and nut	5 (0.5)
6 mm bolt, SH flange bolt and nut	10 (1.0)
8 mm bolt and nut	22 (2.2)
10mm bolt and nut	34 (3.5)
12mm bolt and nut	54 (5.5)
5 mm screw	4 (0.40)
6 mm screw	9 (0.9)
6 mm flange bolt (NSHF type) and nut	12 (1.2)
8 mm flange bolt and nut	26 (2.7)
10mm flange bolt and nut	39 (4.0)

LUBRICATION & SEAL POINTS

ENGINE

ITEM	LOCATION	MATERIAL
Camshaft	Cam lobe, journal	Molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 1 : 1)
Rocker arm	Shaft, slipper surface	
Valve stem	Valve guide sliding surface, stem end	
Valve lifter	Outer surface	
Crankshaft	Big end, small end	
Clutch outer guide	Sliding surface	
Clutch lifter lever	Cam area	
Connecting rod	Small end inner surface	
Mainshaft	Spline area, sliding surface	
Countershaft	Spline area, sliding surface	
Shift fork	Claw, guide pin, sliding surface	
Shift fork shaft	Outer surface	
Each gears	Groove	
Engine oil drain bolt	Threads	Engine oil
Transmission oil drain bolt	Threads	
Camshaft holder bolt	Threads	
Crankshaft	Oil seal outer surface	
Cylinder	Bore	
Cylinder head nut	Threads, seating surface	
Decompressor cam	Sliding area	
Balancer shaft nut	Threads, seating surface	
Piston	Outer surface, pin hole	
Piston pin	Outer surface	
Piston ring	Whole surface	
Clutch outer	Sliding area	
Clutch lifter	Needle bearing contact area	
Clutch disc / plate	Lining surface	
Clutch center lock nut	Threads, seating surface	
Primary drive gear bolt	Threads, seating surface	
Flywheel nut	Threads, seating surface	
Shift drum	Guide groove	
Shift spindle	Serration area	
Oil pump rotor	Sliding area	
Seal ring	Whole surface	
Each bearings	Rolling contact area	
Each O-rings	Whole surface	
Crankshaft hole cap	Threads	Multi-purpose grease
Timing hole cap	Threads	
Rocker arm shaft cap	Threads	
Camshaft set ring	Whole surface	
Oil filter spring	Contact area	
Dust seal	Lips	
Water seal	Lips	
Oil seals	Lips	

ITEM	LOCATION	MATERIAL
Shift drum center bolt Stator screw Pulse generator bolt Mainshaft bearing set plate bolt Countershaft bearing set plate screw Shift drum bearing set plate bolt Oil jet mounting bolt Breather plate bolt Cam chain tensioner pivot bolt Throttle shaft screw Throttle position sensor torx bolt Brake pedal pivot bolt Decompressor cam stopper plate bolt Oil guard plate bolt	Threads(Coating width: 6.5±1mm/ from 1～2mm off tip) Threads(Coating width: 3.0±1mm) Threads(Coating width: 4.5±1mm) Threads Threads(Coating width: 3.5±1mm) Threads Threads(Coating width: 6.5±1mm/ from 1～2mm off tip) Threads(Coating width: 6.5±1mm/ from 1～2mm off tip) Threads(Coating width:6.5±1mm/ from 1～2mm off tip) Threads Threads Threads Threads(Coating width: 6.5±1mm/ from 1～2mm off tip) Threads	Locking agent
Crankshaft bearing set plate torx screw	Threads(Coating width: 6.5±1mm)	High strength locking agent (TB1373N or equivalent)
AC generator wire grommet Cylinder head	Seating surface Semi-circular portion 	Liquid sealant

FRAME

LOCATION	MATERIAL	REMARKS
Handle lever pivot bolt sliding area Cable adjuster bolt threads Axle shaft outer surface Driven sprocket washer seating surfaces Driven sprocket collar O-ring Steering head bearing / race Steering stem bolt threads / seating area Caliper bracket both surfaces Brake pedal pivot sliding area Shift pedal pivot sliding area Swingarm pivot ball bearing / needle bearing Swingarm pivot dust seal lip Swingarm pivot adjuster bolt threads / seating area Cushion arm needle bearing Cushion arm dust seal lip Tw sensor threads	Multi-purpose grease	
Master cylinder pivot sliding area / piston contact area Rear brake caliper pin bolt Rear brake caliper piston seal	Silicone grease	
Silencer joint area	Heat resistant sealing agent (ME30)	MORIWAKI
Drive chain slider screw threads	Locking agent	
Steering thread	Honda Ultra U	
Handle grip / Throttle pipe	Honda Bond A	The material must not come out more than 3mm

※Heat resistant sealing agent (ME30) Part number: 860-806-0600

MAINTENANCE SCHEDULE

Perform maintenance operation according to following chart to obtain performance of your MD250H. The maintenance schedule may differ depending on condition of use. Machines subjected to severe use require more frequent servicing.
I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. L: Lubricate

FREQUENCY / ITEMS	Inspection	Replace	Note
Throttle operation	I		
Carburetor box	C		
Breather tube	I		Bend, Break
Cooling system	I		
Engine oil	I	500 km	
Engine oil filter	I	1,000 km	
Transmission oil	I	500 km	Replace every after wet race
Camshaft	1,000 km	4,000 km	Score, wear
Valve, Intake	1,000 km	2,000 km	Bend, seat damage, Do not lap the intake valve
Valve, Exhaust	1,000 km	4,000 km	Bend, seat damage
Cylinder head	1,000 km	4,000 km	Valve seat face damage
Valve spring	1,000 km	2,000 km	Break, Valve spring fatigue
Piston	1,000 km	2,000 km	Score, wear, Replace in case of a collision with valves
Piston rings	1,000 km	2,000 km	Score, wear
Crankshaft	2,000 km	4,000 km	Runout check, Service limit: L 0.05, R 0.03
Clutch	I	Every race	Clutch spring fatigue
Spark plug	1,000 km	2,000 km	
Drive chain	I･L		
Drive chain slider	I		
Drive / Driven sprocket	I		
Brake fluid	I		Replace every 3 races (Replace every after wet race)
Brake system	I		
Control cables	I･L		Clutch, Axel
Exhaust silencer	I		
Suspension	I		Overhaul operation is recommended after every 2,000km or every 4 races
Swingarm / Cushion linkage	C		
Fork oil	I		Replace after the first 100km, then replace after every 3 races
Wheels / Tires	I		
Nuts, Bolts, Fasteners	I		

Pre-ride inspection

- Fuel leak, oil leak and coolant leak
- Coolant level
- Engine oil level
- Transmission oil level
- Spark plug burning condition, coloration, tightening, cap loose
- Clutch lever play, clutch operation
- Throttle grip free play, throttle valve operation
- Steering head operation, loose, deformation or damages
- Frame damages, cracks
- Tire pressure, wear
- Front and rear suspension operation, oil leak
- Brake lever and pedal free play, brake performance, fluid level
- Drive chain slack, lubrication
- Drive chain slider damage, wear
- Exhaust spring fatigue, damage
- Nuts, bolts, fasteners tightening, loose (oil drain bolt wire-lock, specially)

⚠WARNING

Improper inspection or maintenance service can be a cause of unpredictable troubles or serious accidents.
- Be sure to perform inspection and maintenance service correctly
- Perform Pre-ride inspection before use
- All defectives or abnormalities must be repaired before use

During engine warm-up

・Thermometer, rev counter operation
・Fuel leak, oil leak and coolant leak

During running

・Thermometer, tachometer indicating value
・Carburetor setting
・Gear ratio setting
・Control system (shift pedal, throttle or others) operation
・Brake performance

Post-ride inspection

・Fuel leak, oil leak and coolant leak
・Nuts, bolts, fasteners tightening, loose or fall

Note
Periodic replacement parts and consumables must be checked every after riding and replaced if necessary.

・Parts replacement schedule is based upon sprint race conditions and therefore, it is reference for your use. Machines subjected to severe use require more frequent replacement operation. MORIWAKI ENGINERRING is not responsible for lifetime of any periodic replacement parts or consumables.

ITEMS	REMARK
Engine	
Clutch disc, plates	Thickness, discoloring, wear
Clutch springs	Fatigue
Drive sprocket	Wear, damage
Spark plug	Wear on electrode, gap, insulator damage
Frame	
Tires	Wear
Brake pads	Wear
Drive chain slider	Wear
Driven sprocket	Wear, damage
Exhaust spring	Fatigue, damage
Silencer glass wool	Exhaust noise increase

Engine oil / Oil filter

Oil level inspection

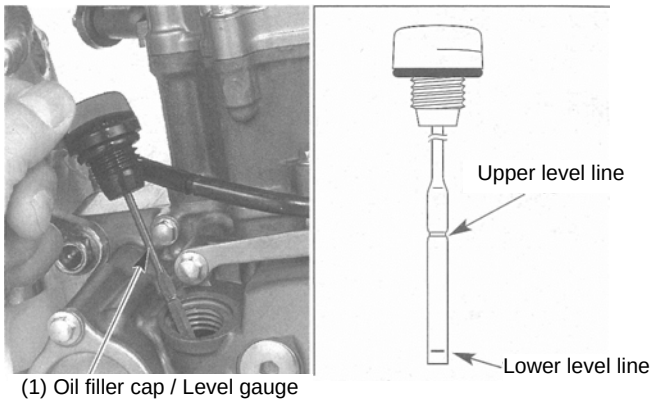
⚠CAUTION

- Support the machine upright on a level surface when you perform oil level inspection or adding oil.
- Be aware that the engine and the transmission have individual lubrication systems.

Start the engine and let it idle for 3 minutes.
Stop the engine and wait 3 minutes.
Remove the oil filler cap / level gauge and wipe the oil with a clean cloth.

Insert the level gauge without screwing it in, remove it and check the oil level.

Oil level must be within upper and lower level lines.



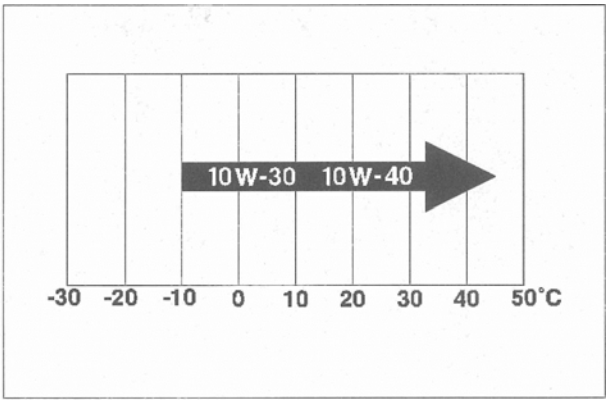
(1) Oil filler cap / Level gauge

If the oil level is below or near the lower level line on the level gauge, add the recommended engine oil to the upper level line

SUGGESTED OIL:
- **Honda Ultra G1 (4-stroke motorcycle oil) SAE10W-30**

Or an equivalent oil with following specifications.
- **API classification: SG, SH or SJ**
- **JASO standard: MA**
- **SAE viscosity: Refer to the chart**

Oils with API classification specified above may not be suitable to your machine due to slight difference in characteristics.



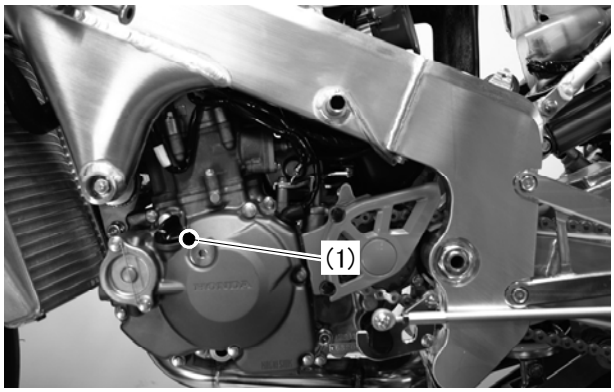
Engine oil / Oil filter change

Note
It is easier to drain the engine oil when it is warm.

Start the engine and let it idle for 3 minutes. Stop the engine and support the machine upright on a level surface.

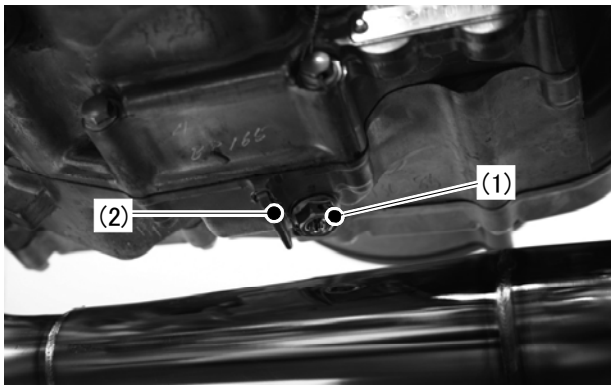
Remove the oil filler cap / level gauge.

Remove the engine oil drain bolt and sealing washer, and drain the engine oil.



(1) Oil filler cap / Level gauge

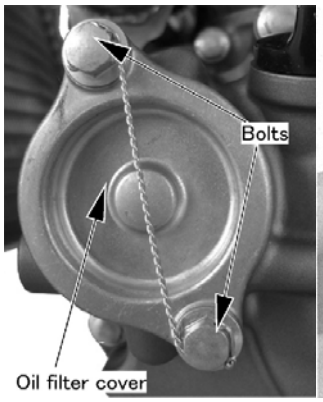
Note
Operate the starter motor for a few seconds while pushing the engine stop button, so the engine oil completely drains.

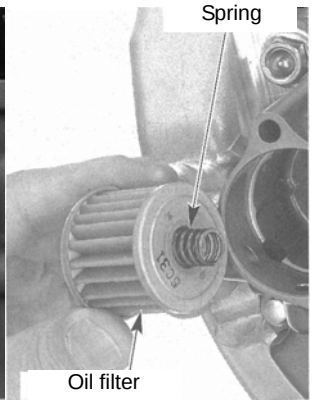


(1) Drain bolt / Sealing washer (2) Wire-lock

Remove the bolts and oil filter cover.

Remove the oil filter and spring.

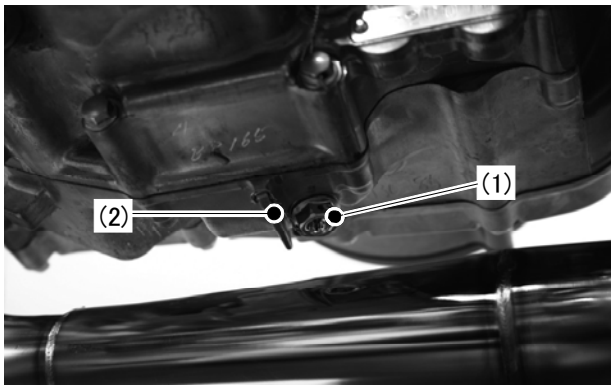




Install the engine oil drain bolt with a new sealing washer after engine oil completely drains.
Tighten the drain bolt to the specified torque.

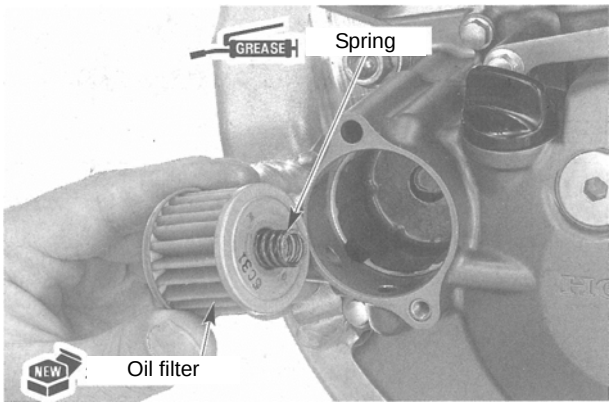
Torque: 16N·m (1.6 kgf·m)

Wire-lock the drain bolt with the engine case.



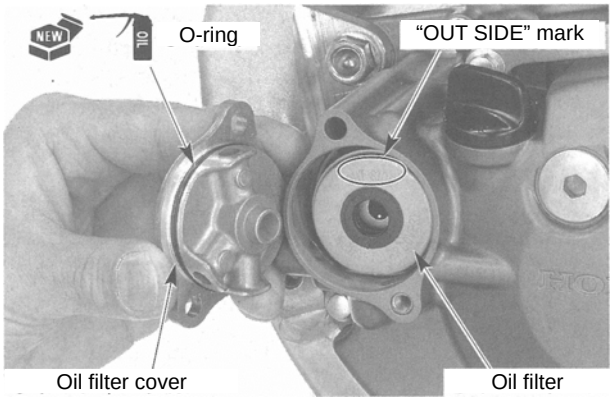
(1) Drain bolt / Sealing washer (2) Wire-lock

Apply grease to the filter side of the spring end, then install the spring into the new oil filter.



Install the oil filter assembly.

⚠CAUTION
Be sure to install the oil filter with the "OUTSIDE" mark facing out



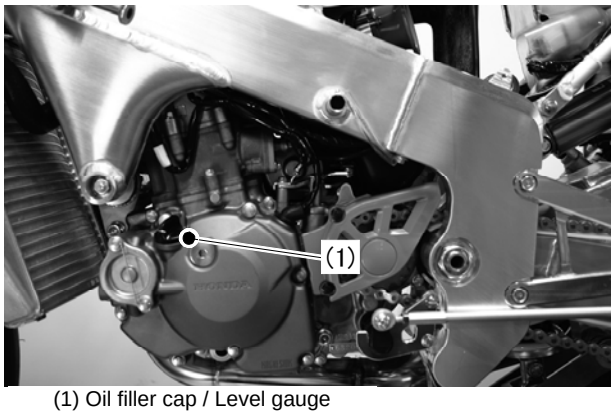
Apply engine oil to a new O-ring and install it to the oil filter cover.
Install the oil filter cover and tighten the bolts securely.

Torque: 10N·m (1.0 kgf·m)
Wirelock the bolts to each other.

Fill the engine with the recommended oil.

Oil capacity:
0.66 liter (at draining)
0.69 liter (at oil filter change)
0.85 liter (at engine disassemble)

Install the oil filler cap / level gauge and tighten it securely.



(1) Oil filler cap / Level gauge

Start the engine and make sure there are no oil leaks.
Stop the engine and check the oil level.
Wirelock the bolts to each other.

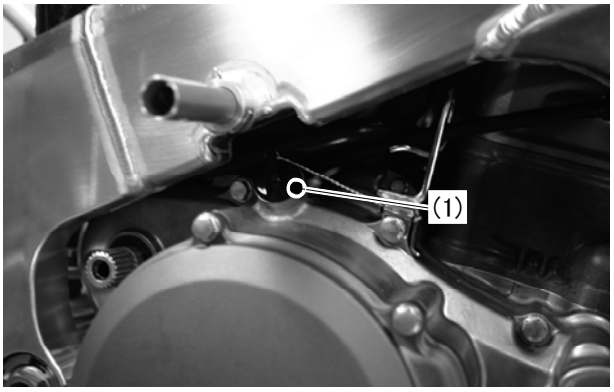
Transmission oil

Transmission oil level inspection

⚠CAUTION

- Support the machine upright on a level surface when you perform oil level inspection or adding oil.
- Be aware that the transmission and engine have individual lubrication systems.

Start the engine and let it idle for 3 minutes.
Stop the engine and wait 3 minutes.
Support the motorcycle upright on a level surface, and remove the oil filler cap, oil check bolt and sealing washer. A small amount of oil should flow out of the check bolt hole. If a large amount of oil come out from the hole, let it drain until stops. If no oil flows out of the check bolt hole, add oil slowly through the oil filler hole until oil starts to flow out of the check bolt hole. Install the oil filler cap and oil check bolt with a new sealing washer, then restart the engine and repeat the procedures above.

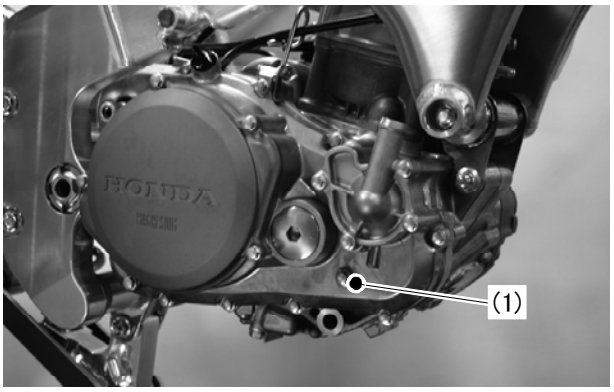


(1) Oil filler cap

Wir-lock the oil filler cap.

⚠CAUTION

After checking the oil level or adding oil, tighten the oil check bolt and oil filler cap securely. And make sure there are no oil leaks.



(1) Oil check bolt / Sealing washer

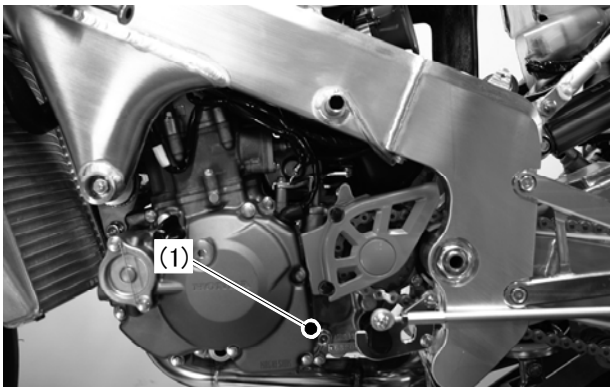
Transmission oil change

Note

Warm-up the engine before draining the oil. Support the motorcycle upright on a level surface to drain the oil.

Remove the oil filler cap from the right crankcase cover and the oil drain bolt from the left crankcase to drain oil.
After the oil has drained completely, apply transmission oil to the drain bolt threads and install the drain bolt with a new sealing washer. Tighten the transmission oil drain bolt to the specified torque.

Torque: 16 N·m (1.6 kgf·m)



(1) Drain bolt / Sealing washer

Add the recommended transmission oil.

Recommended transmission oil:
- **Honda Ultra G1 (4-stroke motorcycle oil)**
  SAE10W-30

Or an equivalent oil with following specifications.
- **API classification: SG, SH or SJ**
- **JASO standard: MA**

Oils with API classification specified above may not be suitable to your machine due to slight difference in characteristics.

Transmission oil capacity: 0.67 liter (at draining)
: 0.75 liter (at disassembly)

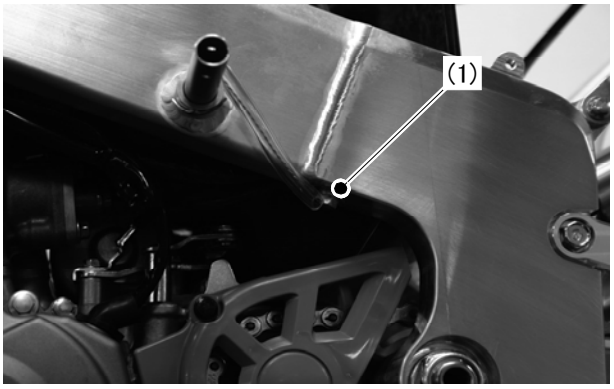
Check the oil level after performing the oil change operation.

Wire-lock the transmission oil drain bolt.

Oil catch tank

Oil catch tank is build-in to the left hand side of the main frame.
Insert the breather tube of the crankcase to the carburetor box attachment.
Remove the drain bolt to drain any oil left in the oil catch tank before ride.

After the oil has drained completely, tighten the drain bolt securely and wire-lock it.



(1) Drain bolt

Cooling system

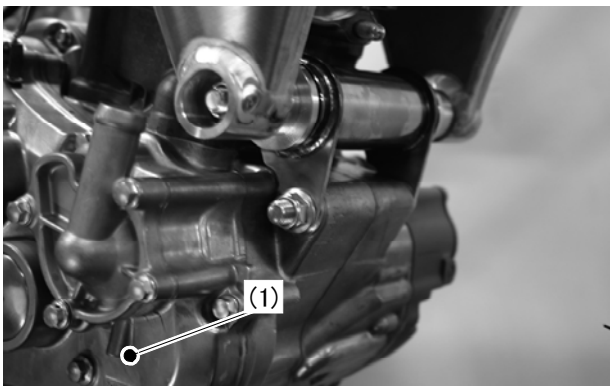
Cooling system inspection

⚠WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

1. Check on coolant leak
2. Inspect the radiator houses for cracks or deterioration, or loose of bands
3. Inspect the radiator installation
4. Check the overflow tube for its installation status and clogging.
5. Check the radiator air passages for clogging.
6. Inspect the telltale hole for signs of coolant leakage
   - If there is coolant leakage, the water pump sealing is defective and it must be replaced.
   - If there is oil leakage, the oil seal is defective and it must be replaced.

(1) Overflow tube



(1) Telltale hole

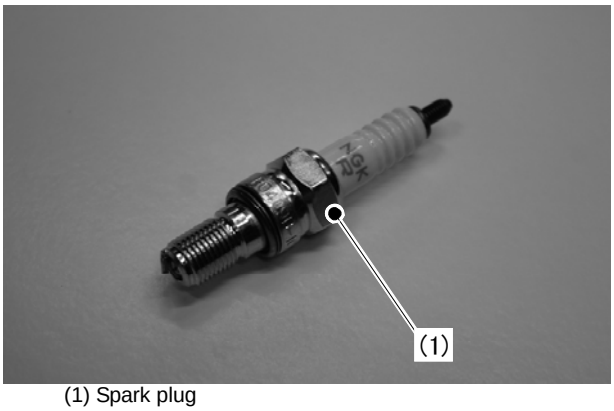
Coolant overflow catch tank

Coolant overflow catch tank is attached on right hand side of the main frame with tei-wraps.
Make sure to put an end of the overflow tube into the catch tank.
Drain any coolant in the catch tank by taking it off from the frame before ride.

(1) Overflow tube
(2) Overflow catch tank

Spark plug

Recommended spark plug
NGK: R0409B-10 (Standard)



(1) Spark plug

Always use spark plug with correct thermal value.

Spark plug gap

Remove the spark plug and measure its gap.

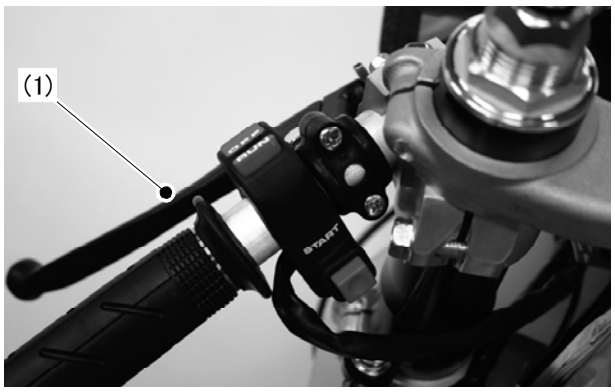
Standard: 0.6—0.7mm

If the spark plug gap is out of specification, replace the plug with a new one.
In case a spark plug with incorrect thermal value is used, it may cause engine malfunctions.

Clutch

Check the smooth operation of the clutch lever. Apply grease to the pivot bolt and the clutch cable if necessary.

Inspect the clutch cable for damage.



(1) Clutch lever

Fuel tank / Fuel strainer

⚠DANGER

Gasoline is explosive. It can cause you to be burned or seriously hurt due to explosion.

When you handle gasoline;

- Engine must be stopped. The work are must be free form flames, sparks or heat source.
- Work in a well ventilated area.
- If you spill gasoline, wipe and remove it immediately.

Fuel strainer cleaning

The fuel strainer is installed inside of the fuel valve which is located below the fuel tank.
Perform the fuel strainer cleaning operation as follows;

1. Remove the seat cowl
2. Turn the fuel valve to OFF position and remove the fuel tank
3. Drain gasoline from the fuel tank
4. Remove the fuel valve and clean the strainer screen with treated oil
5. Open the fuel valve and air-blow it from outlet
6. Inspect the O-ring condition, then reassemble the O-ring and the strainer screen into the fuel valve
7. Install the fuel valve with the outlet facing left.

Torque: 19N·m(1.9kgf·m)

Check the fuel tube for bend or crack.
Make sure there is no gasoline leaks.

Install the fuel tank and refill it with gasoline. Again, make sure there is no gasoline leaks.

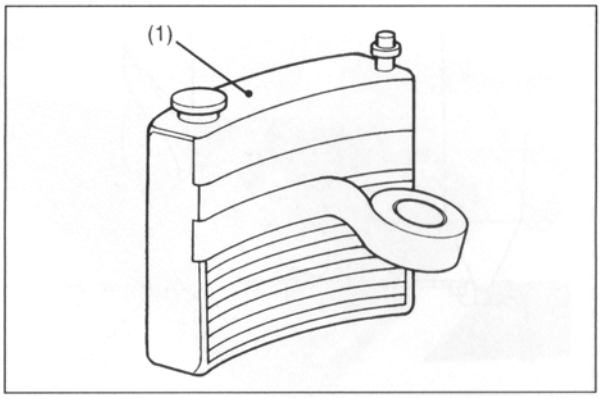
Thermometer

Cover a part of radiator front with packing tape in case the water temperature gets too low during running

Appropriate temperature: 70－80℃

"888" will comes on for 3sec on the water temperature indicator when you turn on the main switch to "RUN", then it will start indicating actual water temperature.
If the indicator shows " - - - ", there will be the thermometer or cable malfunctions.

(1) Water temperature indicator



(1) Radiator

Drive chain slack inspection

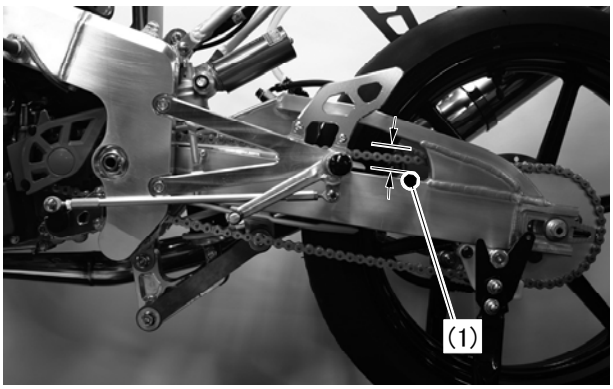
At the first break-in ride or after replacing the drive chain with new one, inspect the initial slack and adjust the chain slack. Always be careful not to catch your fingers between the drive chain and sprockets.

Stop the engine and raise the motorcycle with the maintenance stand.
Put the gear in neutral position, then measure the chain slack at upper side of the chain run near the chain slider

Drive chain slack: 20±2mm

※Indicated chain slack value is out-of-factory value.
The value may differ depending on the chassis setting.

Rotate the rear wheel and measure drive chain slack at a few different areas.
If there is one or more areas have larger chain slack than other areas, replace the drive chain with new one.

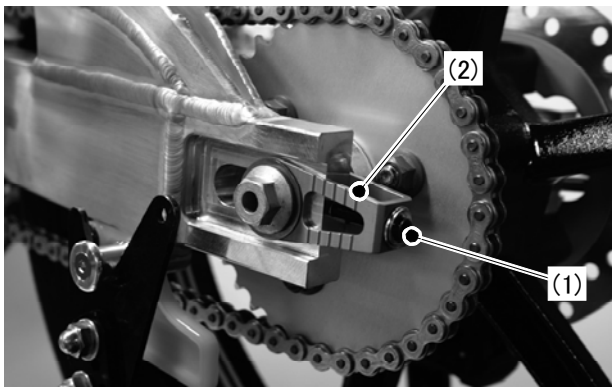


(1) Drive chain slack

Drive chain slack adjustment

Loosen the rear axle nut.

Turn the drive chain adjust bolt and adjust the chain slack. Turn the adjust bolt counter-clockwise to reduce the amount of chain slack



(1) Adjust bolt (2) Alignment mark

⚠CAUTION

Improper drive chain slack will lose not only the engine power but also the motorcycle running performance. Make sure to check the chain slack before ride.

Tighten the axle nut to the specified torque.

Torque: 69N·m(7.0kgf·m)

Advice

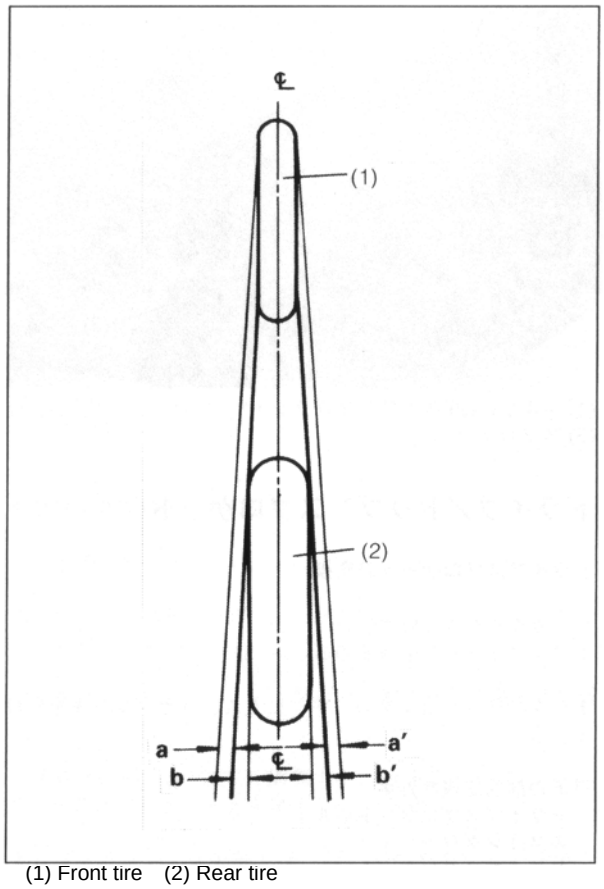
Inspect the drive chain slack again, and check if the wheel rotate smoothly. Then, lubricate the drive chain.

After performing the drive chain slack adjustment, check alignment of wheels and adjust it if necessary.

Wheel alignment

Inspect the alignment of wheels after performing the drive chain slack adjustment.

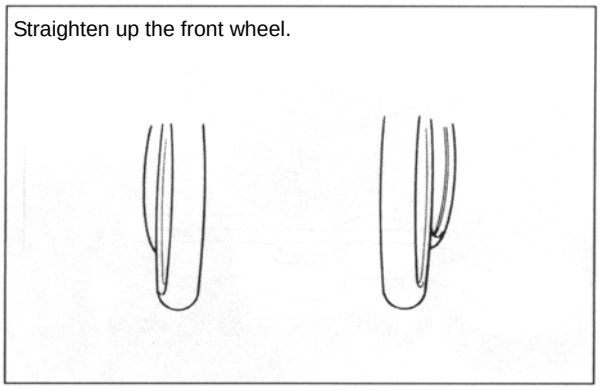
1. Support the motorcycle upright on a level surface
2. Sit 1-2m behind the motorcycle and see both sides of the wheels from axle down.



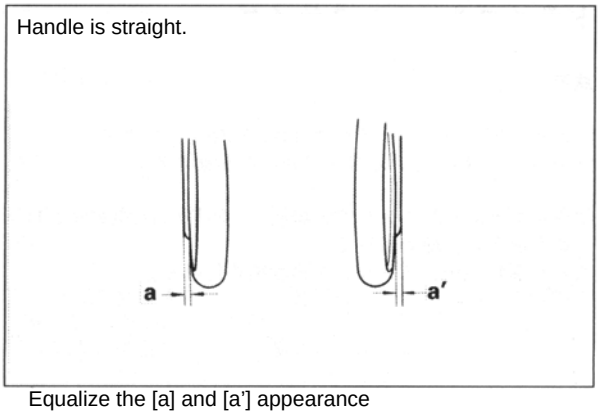
(1) Front tire (2) Rear tire

3. Steer the handle to left and right until the front wheel becomes straight. Align the front edge of the rear tire and rear edge of the front tire, then equalize the amount of visible area of both side of the front tire.

   Loose the axle nut and adjust the wheel adjustment by adjusting the drive chain adjust bolts.



The handle is steered to the right



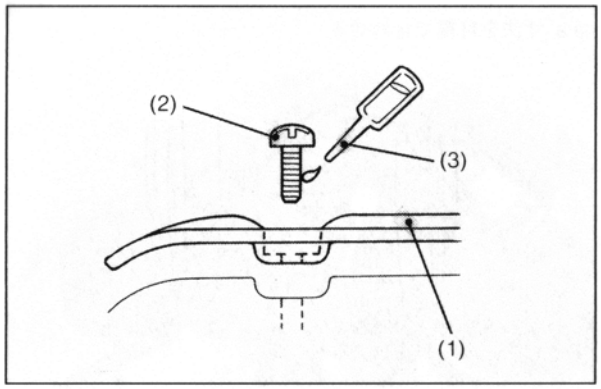
Equalize the [a] and [a'] appearance

Drive chain slider

Inspection

Check the chain slider for wear or damage.
Replace with new one if 2mm or more wear is noticed.

When you install a new drive chain slider, apply locking agent to the screw and tighten it.
Re-tighten the screw after the first break-in ride.



(1) Drive chain slider (2) Screw (3) Locking agent

Drive / Driven sprocket

Drive sprocket change

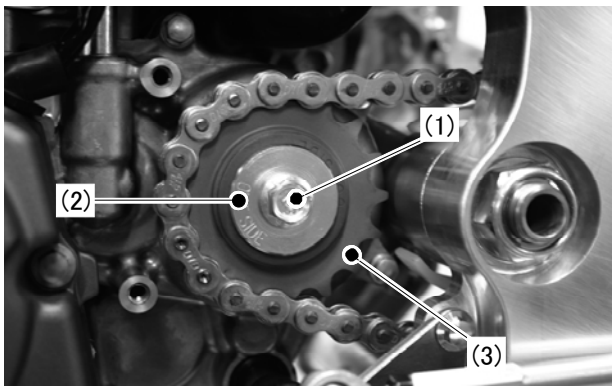
Remove the lower front cowling.
Loosen the drive chain .
Put the motorcycle into the low gear and put the rear brake on.
Remove following parts;

- Drive sprocket cover and chain guide
- Drive sprocket bolt
- Spring washer
- Drive sprocket

If inner surface of the spring washer has scratches, replace it with new one.

Put the motorcycle into the low gear and put the rear brake on.
Apply transmission oil to the thread and seating face of the drive sprocket bolt.
Tighten the drive sprocket bolt to the specified torque.

Torque: 39 N・m (4.0kgf・m)



(1) Drive sprocket bolt (2) Spring washer (3) Drive sprocket

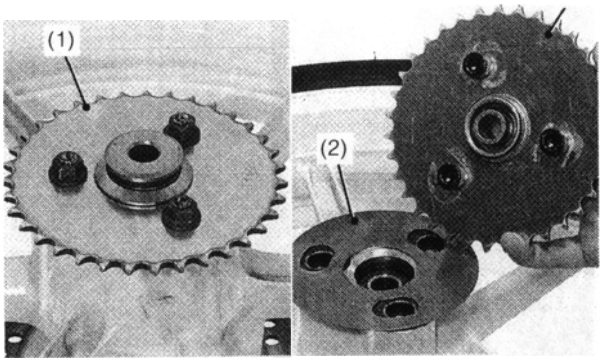
Driven sprocket change

Remove the rear wheel.

Remove the driven sprocket collar, driven sprocket and washer.

Reverse sequence to install the driven sprocket.
※It may require shim adjustment at installation.

Adjust the drive chain slack.
Check the alignment of the wheels.



(1) Driven sprocket (2) Sprocket washer

Advice
- Make sure to check the driven sprocket nut tightening after riding.
- The sprocket nuts must be replaced with new ones after every 3 detaching and attaching operation.
- Always use the specified driven sprocket nuts

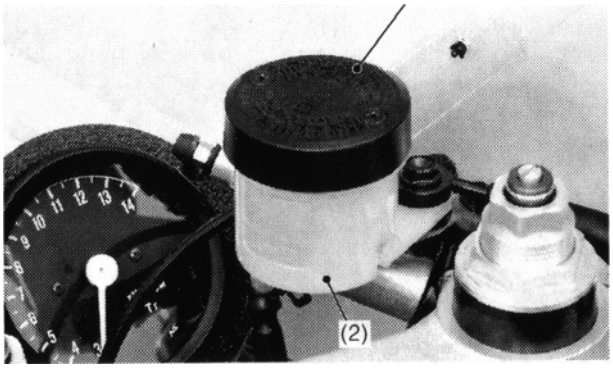
Brake fluid

Front master cylinder

Open the oil cup cap to release remaining pressure in the reservoir and check the brake fluid level.

Remove the screws and oil cup cap.

If the level is near the lower level line, check the brake pads for wear, and replace them if necessary.
Check the brake system for brake fluid leaks.



(1) Oil cup cap (2) Lower level line

- Replace the brake fluid every after 3 races.
- The brake fluid has high hygroscopicity. Performing the brake fluid replacement on high humidity day is not recommended.
- Replace the brake fluid every time after riding in wet condition.

Brake fluid type: DOT4

Rear master cylinder

Open the oil reservoir plug to release remaining pressure in the reservoir and check the brake fluid level before ride.
A vinyl tube is used for the remaster cylinder reservoir.
Measure the brake fluid level from the top of the vinyl tube.

Fluid level: 40－50mm

If the level is near the lower level line, check the brake pads for wear, and replace them if necessary.

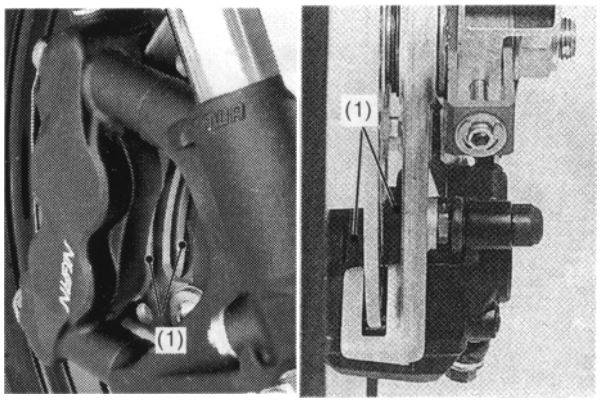
The vinyl tube deteriorates naturally. Replace it every 6 months.

Advice
- The vinyl tube may get smeared with brake fluid. Clean the vinyl tube regularly.
- Do not change the handling of the vinyl tube. Changing the handling may damage the vinyl tube and cause brake fluid leaks.

Brake pads

Visually check the brake pads for wear.
Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Use genuine HRC brake pads.



(1) Brake pads

Brake system

Brake lever position adjustment. (⇒1-4)
Brake pedal height adjustment. (⇒1-5)

Brake disc

Measure the brake disc thickness with a micrometer.

Service limits: Front: 3.5mm
Rear: 3.5mm

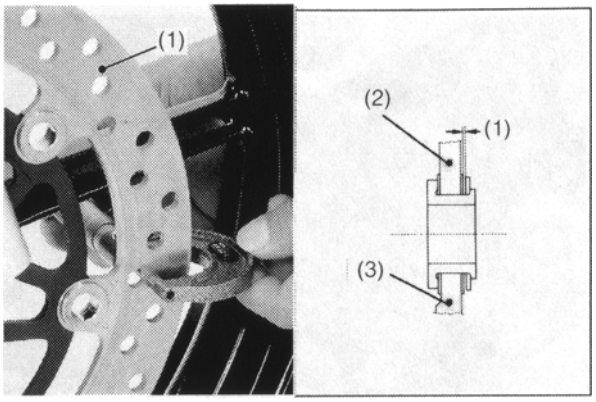
Measure the rear brake disc warpage with a dial indicator.

Service limit: 0.3mm

Measure the floating amount of the front brake with a feeler gauge.

Service limit: 0.5mm

Replace the brake disc if one or more of above measurements exceeds the service limits.
Relace the front brake disc.
Replace the rear brake disc.



(1) Brake disc

(1) Floating amount
(2) Brake disc
(3) Hub

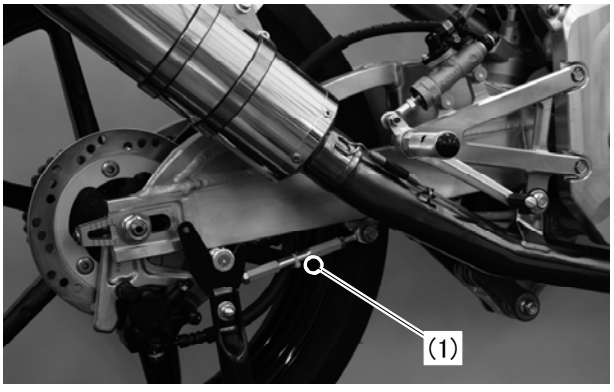
Rear brake torque rod

Standard length: 160mm

The rear brake is floating type.
The rod length must be adjusted around the standard length.

The length is measured between the center of pillow balls.

Maximum length: 167mm



(1) Rear brake torque rod

Handle bar / Head pipe bearings

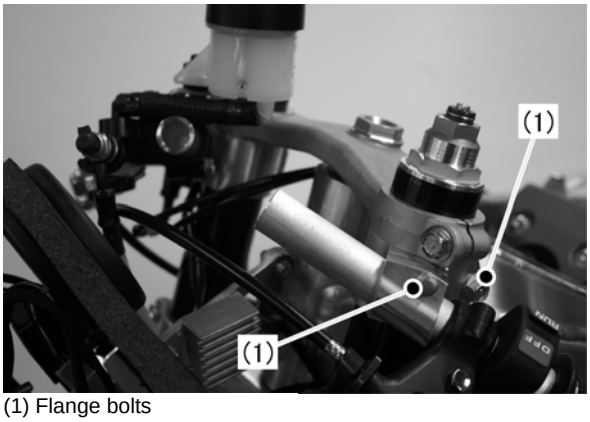
Handle bar

Check the handle bars for bend, crack and damage.
Confirm that the handle bars are on appropriate position.

Handle bar position: Touching the fork top bridge bottom

Make sure that the flange bolts of handle holder and fork top bridge are securely tightened.

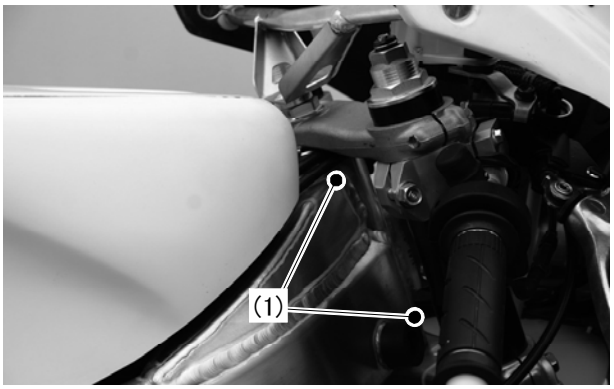
Torque: 23N・m(2.3kgf・m)(8mm bolt)
Torque: 10N・m(1.0kgf・m)(6mm bolt)



(1) Flange bolts

Head pipe bearings

Remove the steering damper.
Raise the front wheel off the ground and check that the handle bar moves freely from side-to-side.
Check the head pipe bearings for play by grabbing the bottom of fork legs and attempting to move the fork toward to engine.
If the movement isn't smooth or excessive play has detected, check the head pipe bearings and make adjustment.



(1) Head pipe bearings

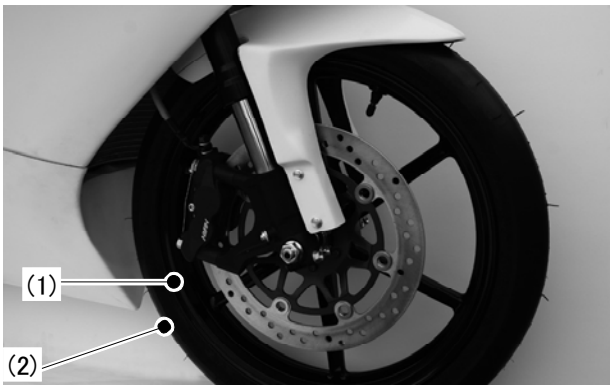
Wheels / Tires

- Choose suitable wheels and tires for race condition.
- Tire pressure influences the motorcycle controllability and durability of the tires. Tire pressure should be checked and adjusted before ride.
- Tire pressure should be checked when the tires are cold. Check the cold tire pressure.

Tire pressure: Front: 1.8 kgf/c㎡
Rear: 1.9kgf/c㎡

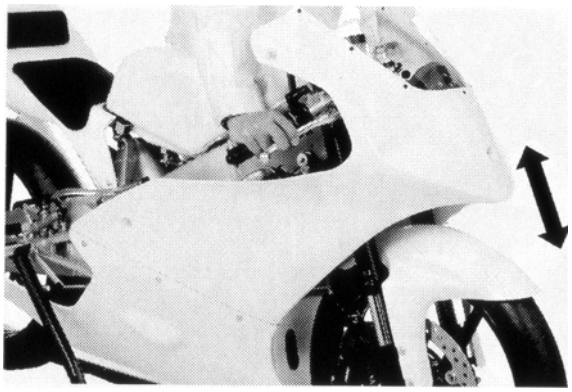
Inspect the wheels for damage.

Check wheels for loose. If excessive play has detected, replace with new one. (⇒2-2)
Check the axle runout and wheel bearing for damage.



(1) Wheel (2) Tire

Front suspension



1. Inspect slide pipes and oil seals for dirt.
2. Check the entire assembly for signs of fork oil leaks. Replace the oil seals with new ones before ride in case oil leak is detected.
3. Check the action of the forks by operating the front brake and compressing the front suspension several times.

Advice
Damage on suspension components will cause severe problems on the machine controllability, therefore, make sure to inspect them before ride..

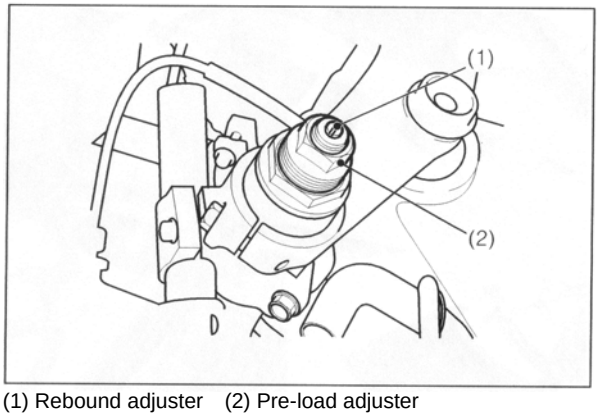
- Perform the first break-in ride for suspension.
- The first break-in ride must be performed under Out-of-factory suspension setting.
- To sustain the performance of the suspension, overhaul at HRC service shop at every 2,000km is recommended.

Fork

Grease is applied to the slide pipes at shipping. This is not a sign of oil leaks.

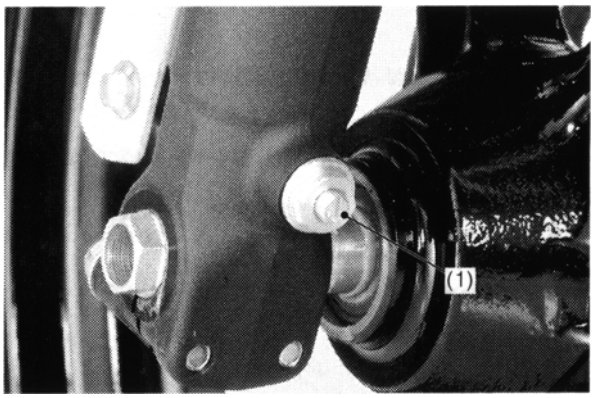
The front suspension is adjustable. Suitable settings for different condition can be obtained by performing following adjustment procedure.

- Rebound adjuster
  The rebound adjuster is located in the center of the fork bolt. Turn the rebound adjuster to change rebound damping force (extending).
- Compression adjuster
  The compression adjuster is located at behind the axle holder. Turn the adjuster to change compression damping force (compressing).
- Turn the pre-load adjuster to change initial pre-load of the fork springs.
- Change the amount of fork oil contained in the fork to change fork travel.
- Different springs can be chosen (harder or softer) to adjust the front suspension.



(1) Rebound adjuster (2) Pre-load adjuster

- To obtain maximum performance of the front fork, disassembly and inspection operation is recommended every after 3hrs of riding.
- Fork oil should be changed every 3 races or after 7.5hrs of riding. See Chapter5 for oil change and oil level check operation.
- Honda Ultra Cushion Oil Special or equivalent oil is recommended to obtain maximum performance.
- Regularly inspect and clean the front suspension components. Check the oil seal for dirt or foreign substance. Deterioration of the fork oil should also be inspected.
- For suspension setting operation, only turn 1 step at a time when you adjust the compression or rebound adjuster. Always set the both fork legs simultaneously, and perform test run after change the settings.
- Always go back to standard setting when you have trouble getting wishful settings, then re-try the setting

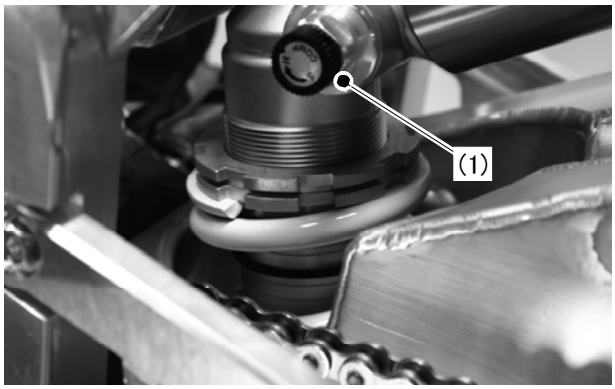


(1) Compression adjuster

Rear Suspension

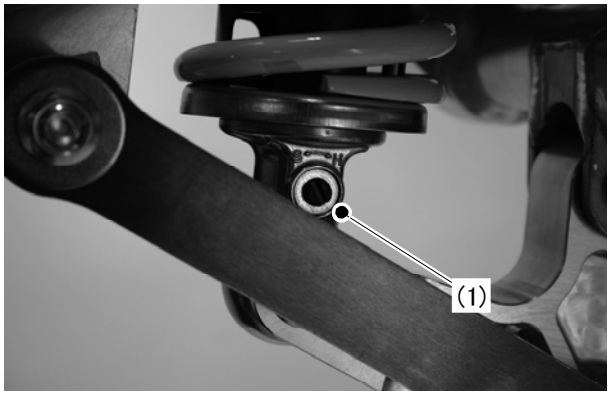
The swing arm is operated with a single suspension unit with a reservoir chamber which contains oil and nitrogen gas.
The rear suspension is adjustable. Suitable settings for different condition can be obtained by performing following adjustment procedure.

- The compression adjuster is located on left side of the reservoir chamber. Turn the adjuster to change compression damping force (compressing).
- The rebound adjuster is located at the bottom of the rear cushion. Turn the rebound adjuster to change rebound damping force (extending).
- Turn the pre-load adjuster located above the cushion spring to change initial pre-load of the springs.
- Different springs can be chosen (harder or softer) to adjust the rear suspension.



(1) Compression adjuster

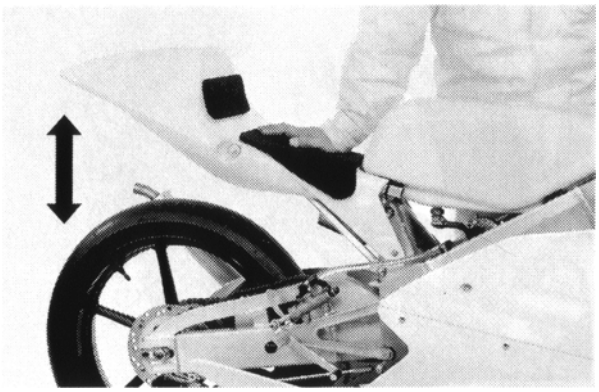
Advice
- Perform the first break-in ride for suspension.
- The first break-in ride must be performed under Out-of-factory suspension setting.
- For suspension setting operation, only turn 1 step at a time when you adjust the compression or rebound adjuster. Perform test run after change the settings.
- Always go back to standard setting when you have trouble getting wishful settings, then re-try the setting



(1) Rebound adjuster

Inspection

1. Inspect the cushion spring for damage or fatigue.
2. Check the action of the suspension by compressing it several times.
3. Check the suspension damper rod for bend and oil leaks.
4. Check for worn swingarm bearings by grabbing the swingarm and attempting to move the swingarm side-to-side.
   Inspect the pivot bearings if the swingarm pivot is loose, and replace the bearings if necessary.



Shim adjustment

Dimension of welded parts may vary within the design tolerance. Apply shims to adjust the difference to avoid having unnecessary stress or crack on welded parts.

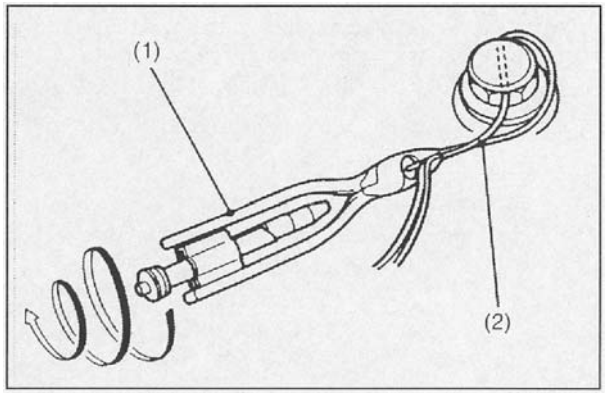
Shim adjustment procedure as follows;

Rear cushion upper pivot
Measure the rear cushion upper pivot width of the frame body while the seat rail is attached. Then measure the upper joint collar width of rear cushion and calculate the difference.
Apply appropriate shims to fill the difference.

Shim;
0.2 mm : 90510-NX4-000
0.6 mm : 90511-NX4-000
1.0 mm : 90512-NX4-000
1.5 mm : 90513-NX4-000

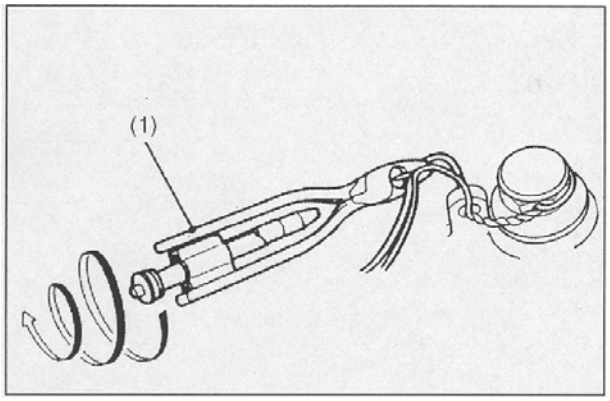
Wire-lock

Be sure to wire-lock the transmission oil drain bolt, oil filler cap, oil filter cover bolt , engine oil drain bolt, oil catch tank drain bolt and brake caliper bolt before ride.



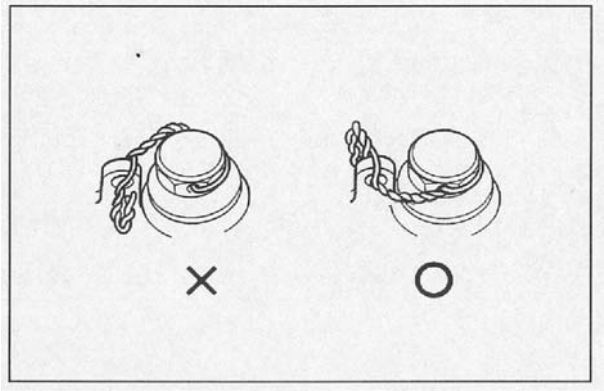
(1) Wire-twister (2) Stainless wire

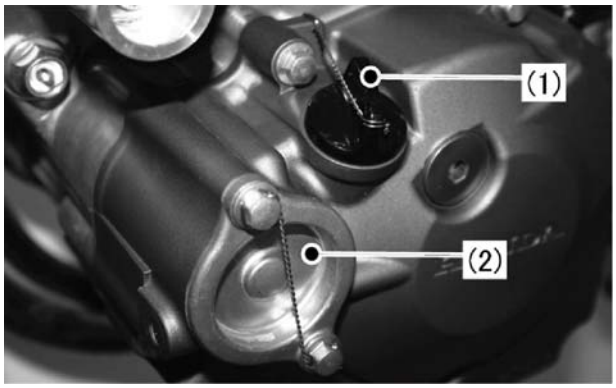
Put a wire through the hole of bolt head and twist the wire with the wire-twister.
Bring the end of the twisted wire to a fixed part of motorcycle and attach it to it.
Cut the excessive wire.



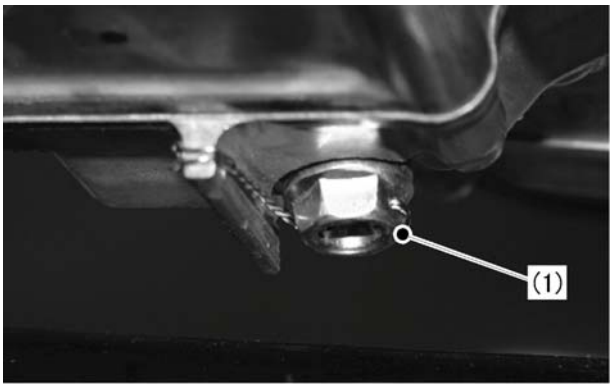
(1) Wire-twister

・Always use new 0.8mm stainless wire.
・Lock bolts in their tightening direction.
・Be careful not to twist wire too much. The wire may break.





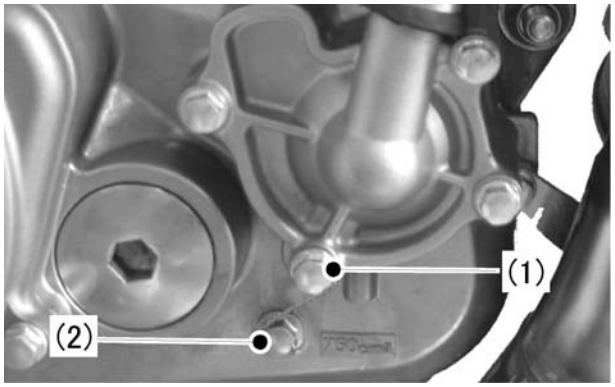
(1) Engine oil filler cap / Level gauge
(2) Oil filter cover bolt



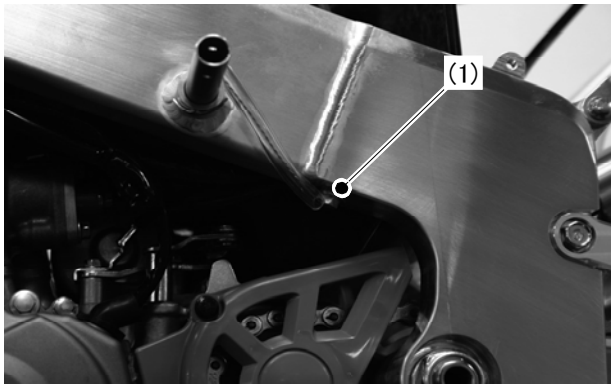
(1) Engine oil drain bolt

(1) Transmission oil filler cap

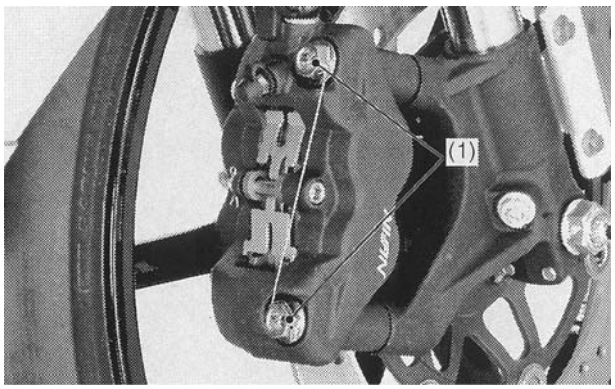
(1) Transmission oil drain bolt



(1) Water pump cover bolt
(2) Transmission oil check bolt



(1) Oil catch tank drain bolt



(1) Brake caliper bolt

Carburetor removal

⚠DANGER

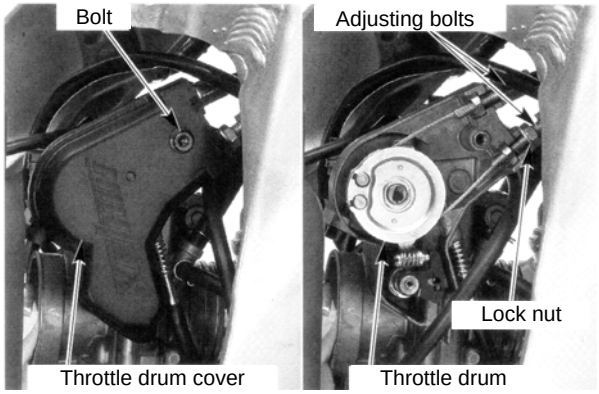
Gasoline is flammable and explosive. Work area must be free from flames or sparks. Perform this operation in a well ventilated area. Vaporized gasoline can cause an explosion.

Remove the following parts;

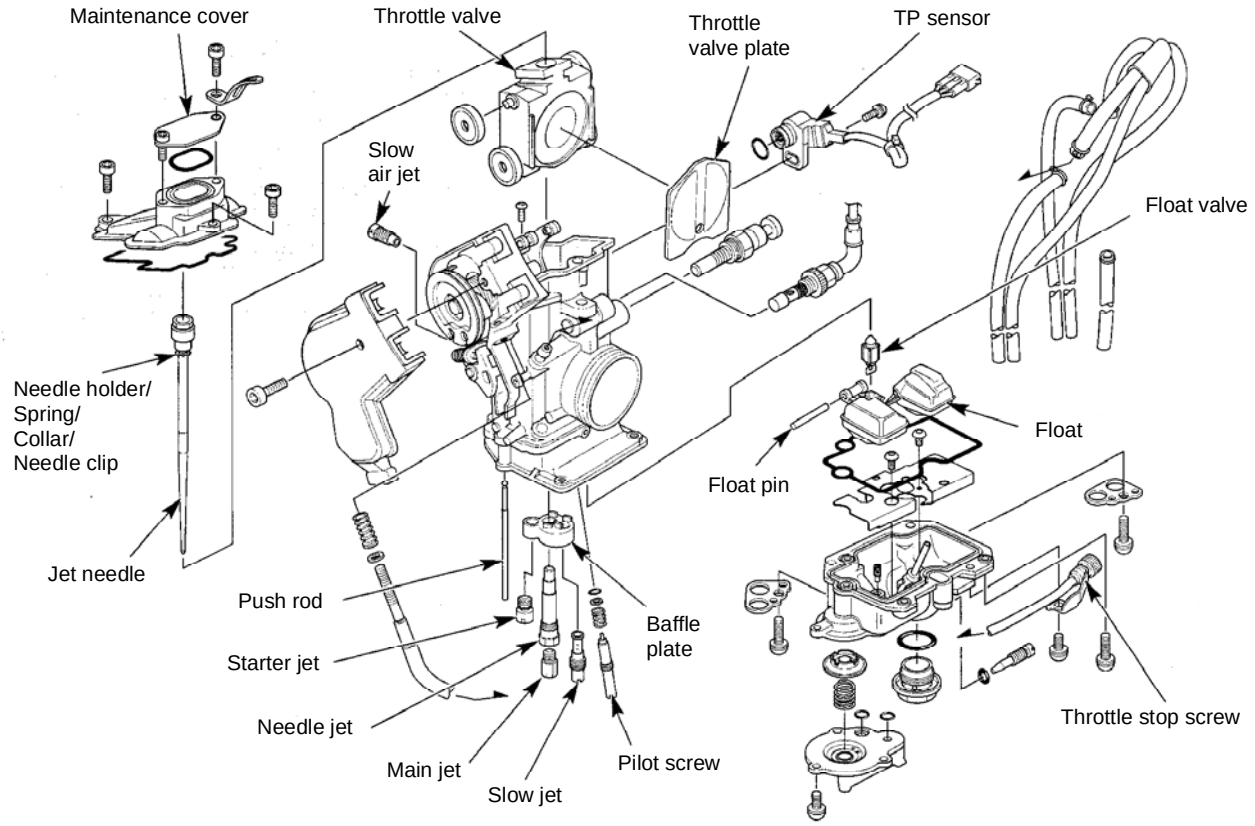
- Fuel tank cover
- Fuel tank

Disconnect the throttle position sensor 3P connector
Loosen the carburetor insulator band screw and remove the carburetor from the insulator.

Remove the bolt and throttle drum cover.
Loosen the lock nut and throttle cable adjusting bolts, and disconnect the throttle cables from the throttle drum.

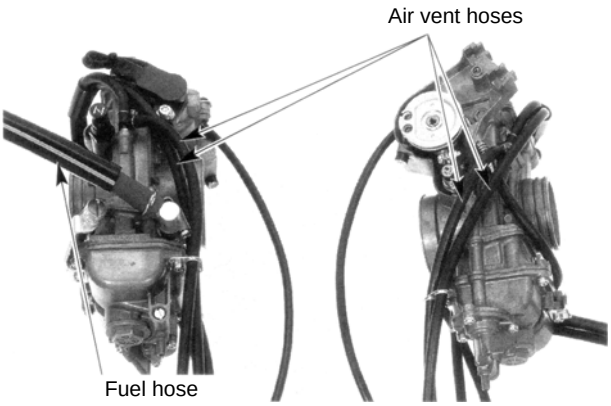


Carburetor components

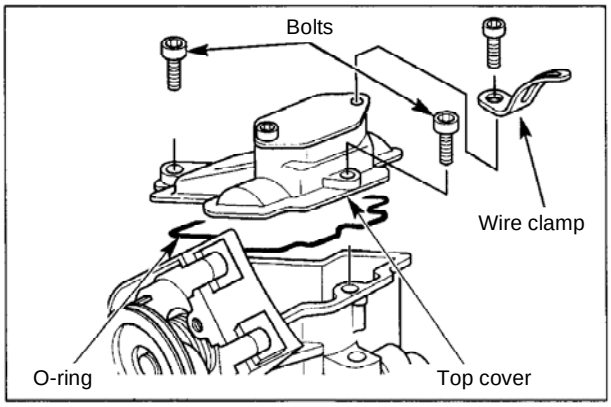


Jet needle / Throttle valve

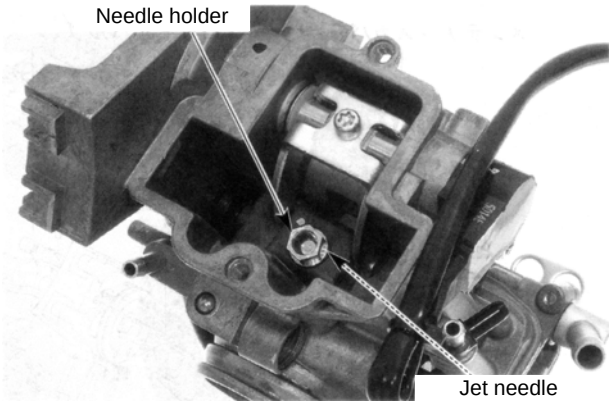
Disconnect the fuel hose, air vent hoses and overflow hose from the carburetor.



Remove the bolts, wire clamp, top cover and O-ring.

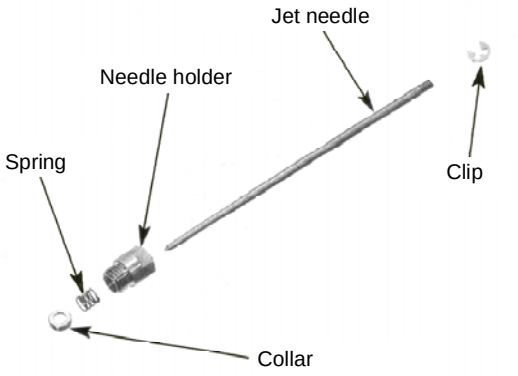


Remove the jet needle / holder assembly.

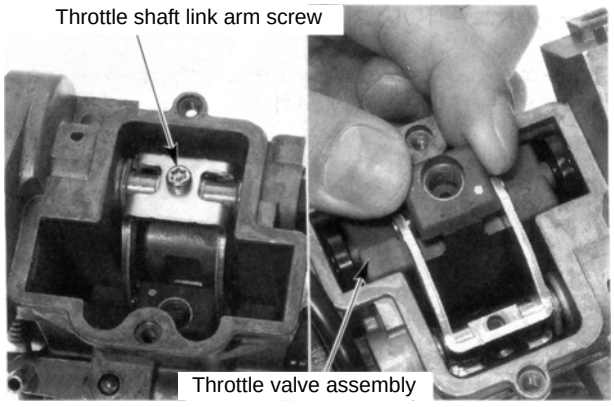


Remove the needle clip from the jet needle, then remove the collar, spring and needle holder.

Check the jet needle for bend, wear, nicks or other damage.



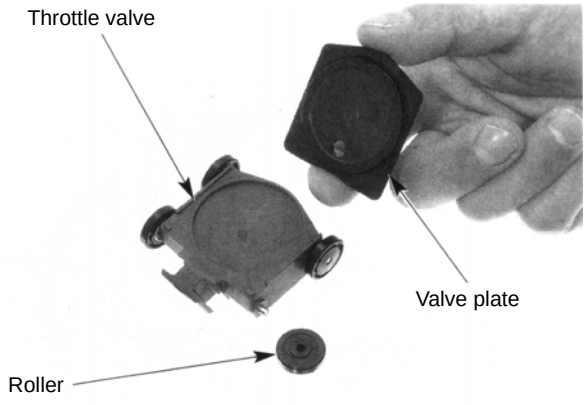
Remove the throttle shaft link arm screw. Lift up the throttle shaft link arm and remove the throttle valve assembly.



Remove the throttle valve plate and roller from the throttle valve.

Check the throttle valve, throttle valve plate for wear or damage, and replace them if necessary.

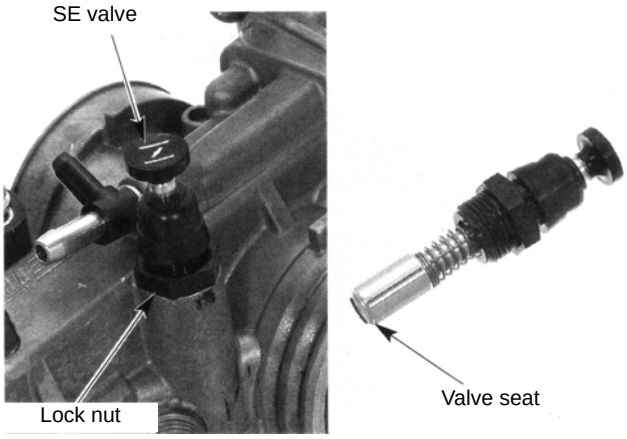
They must be replaced as a Throttle valve assembly.



SE valve / Throttle position sensor

Loosen the lock nut and remove the SE valve.

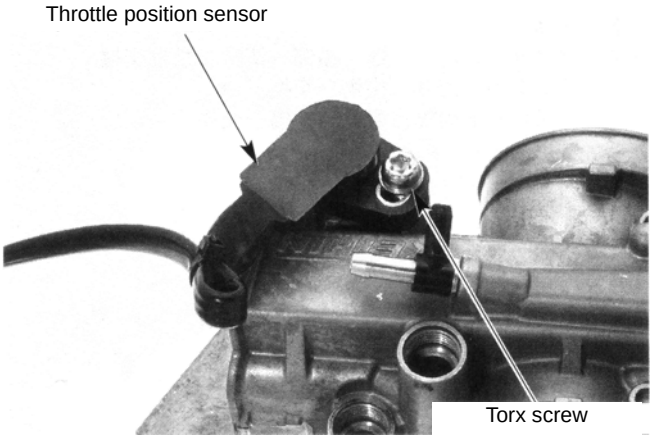
Check the valve seat for scratch, nicks or other damage, and replace it if necessary.



When removing the throttle position sensor, mark the sensor position to ensure that it is reinstalled in the original location.
Remove the torx screw and throttle position sensor.

⚠CAUTION

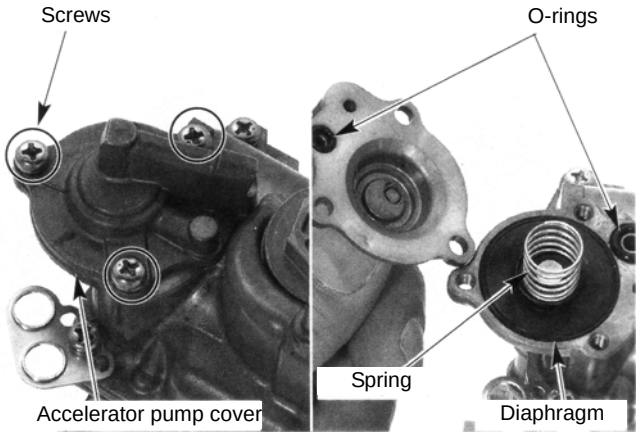
Note
Do not remove the throttle position sensor unless it is replaced.
The throttle position sensor must be adjusted after replacement.



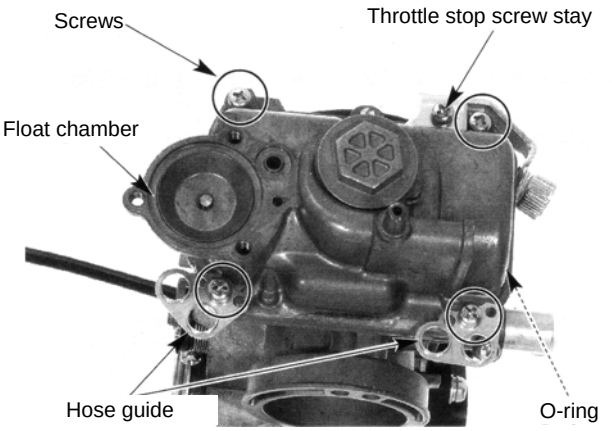
Accelerator pump / Float / jets

Remove the screws and accelerator pump cover.

Remove the spring, diaphragm and O-rings.

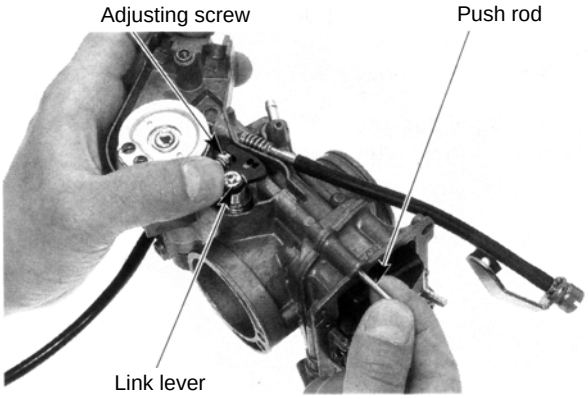


Remove the screw and throttle stop screw stay.
Remove the 4 screws, hose guides, float chamber and O-ring.

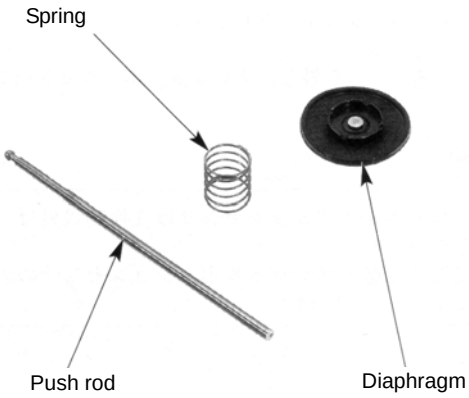


Pull out the push rod while holding the push rod link lever.

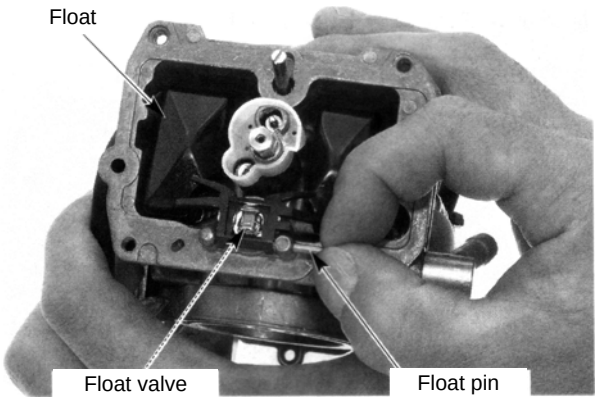
⚠CAUTION
The push rod link lever adjusting screw is factory pre-set. Adjustment and disassembly are not necessary.



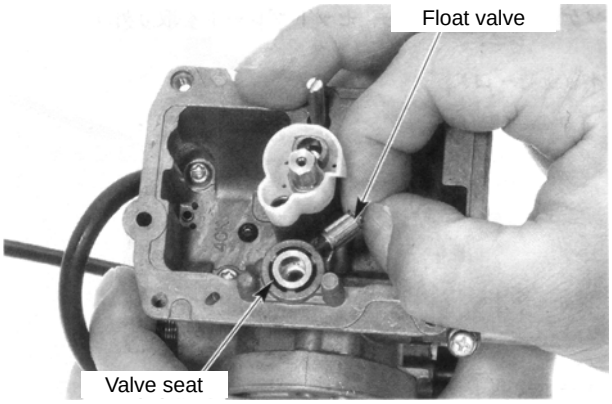
Inspect the following parts;
- Diaphragm for dirt or damage. Clean or replace it with new one if necessary
- Spring for fatigue or damage, and replace it with new one if necessary
- Push rod for scratch, wear or damage, and replace it with new one if necessary



Remove the float pin, float and float valve.

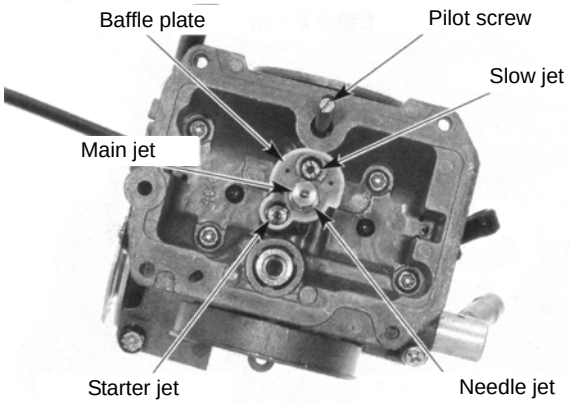


Inspect the following parts;
- Float for damage, and replace it with new one if necessary.
- Float valve and valve seat for scores, scratches, clogging or damage, and clean of replace them if necessary
- Tip of the float valve where it contacts the valve seat for wear, and replace it if necessary.



⚠CAUTION
The valve seat is not detachable from the carburetor body. Replace the carburetor body incase the valve seat needs to be replaced.

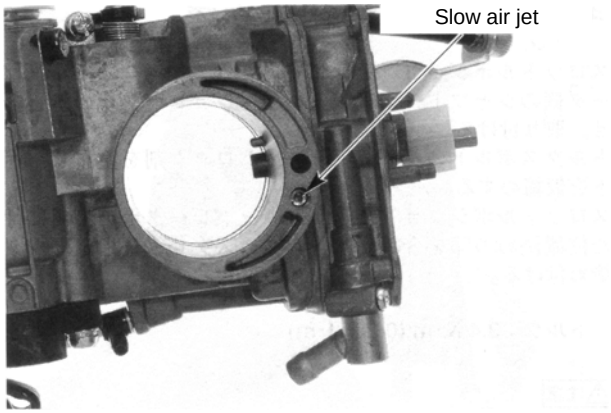
Remove the following parts from the carburetor;
- Main jet
- Needle jet
- Baffle plate
- Starter jet
- Slow jet
- Pilot screw, spring, washer and O-ring



⚠CAUTION
Before removing the pilot screw, counting the number of turns until it seats lightly, so you can return the pilot screw to it s original position when reassembling.

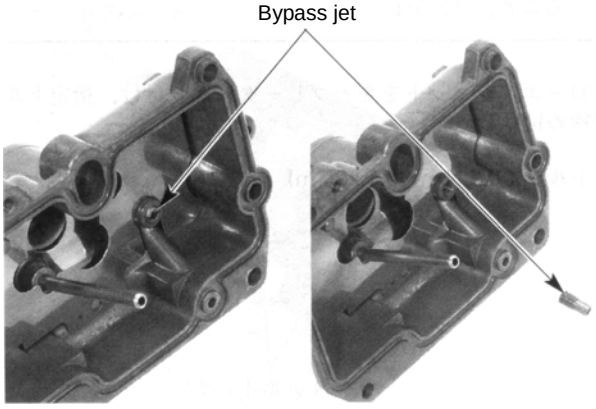
Remove the slow air jet.

Inspect the following parts;
- Main jet, Needle jet, Starter jet, Slow jet and Slow air jet for clogging, and clean them if necessary.
- O-ring, Spring and Pilot screw for damage or fatigue, and replace them with new ones if necessary.

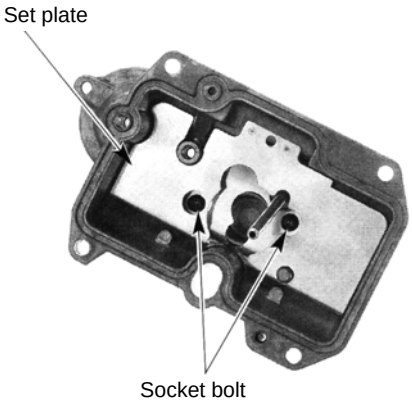


Remove the accelerator pump bypass jet from the float chamber and inspect it.

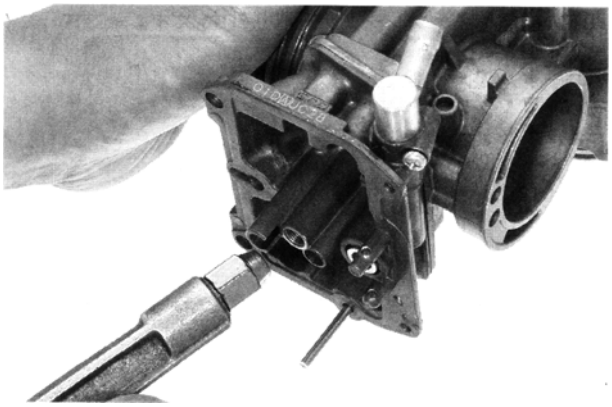
Check the bypass jet for clogging, and clean it if necessary.



Remove the socket bolts and set plate.



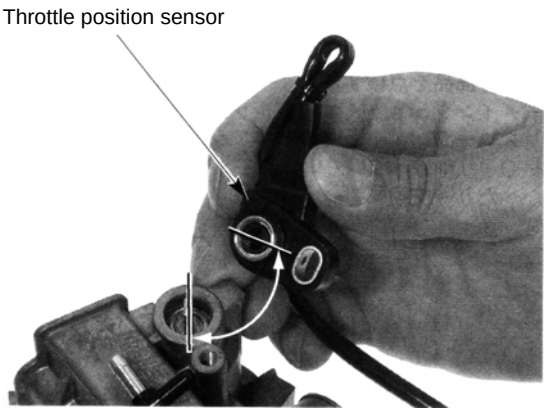
Blow open all carburetor body openings with compressed air.



Carburetor assembly

Install the throttle position sensor by aligning its tabs with the float side of the shaft as shown.
Apply locking agent to the torx screw threads and tighten it by fingers.
Adjust the orientation of the throttle position sensor to its original position as marked during removal, then tighten the torx screw to the specified torque.

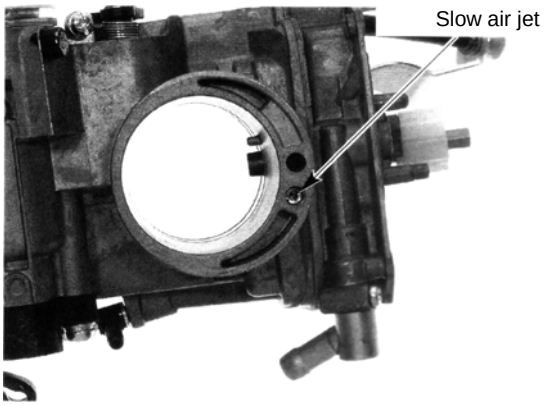
Torque: 3.4 N·m (0.3 kgf·m)



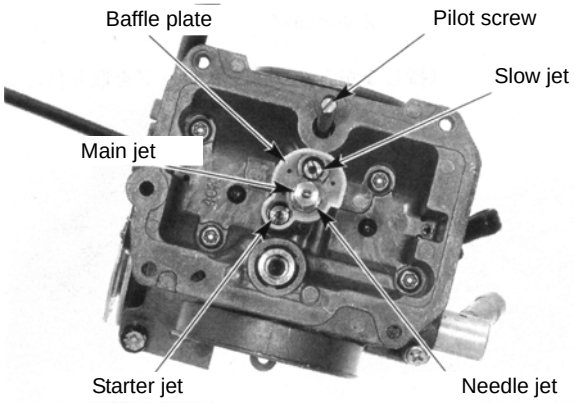
⚠WARNING
The throttle position sensor must be adjusted after replacement.

Install and tighten the slow air jet to the specified torque.

Torque: 0.9 N·m (0.1 kgf·m)



Install the O-ring, washer, spring and pilot screw.

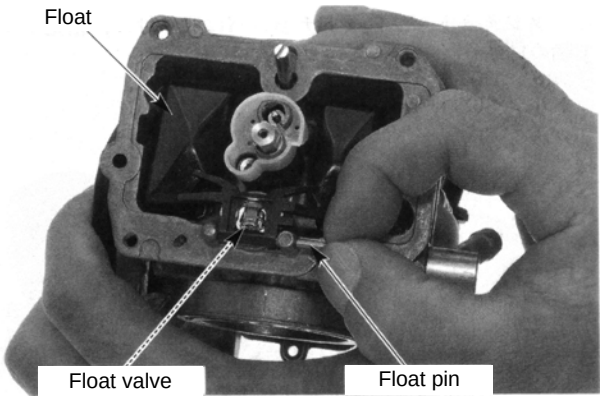


⚠CAUTION
Install the pilot screw and return it to its original position as noted during removal.
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Install the following parts to the carburetor;
- Slow jet
- Starter jet
- Baffle plate
- Needle jet
- Main jet

Torque:
Slow jet: 1.5 N·m (0.2 kgf·m)
Needle jet: 1.8 N·m (0.2 kgf·m)
Main jet: 1.5 N·m (0.2 kgf·m)
Starter jet: 1.5 N·m (0.2 kgf·m)

Install the float with the float valve and insert the float pin.



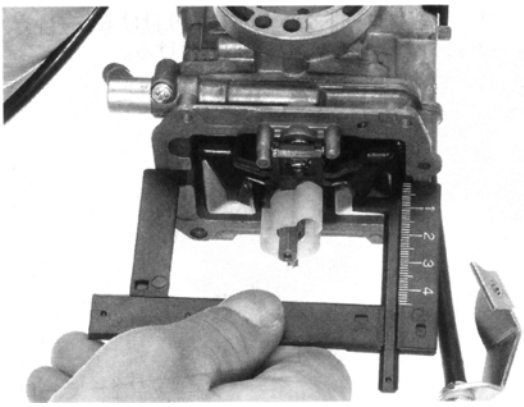
Float level inspection

To measure the float level, set the carburetor so the float valve just contacts the float arm lip.

Float level: 6.0 mm

TOOL

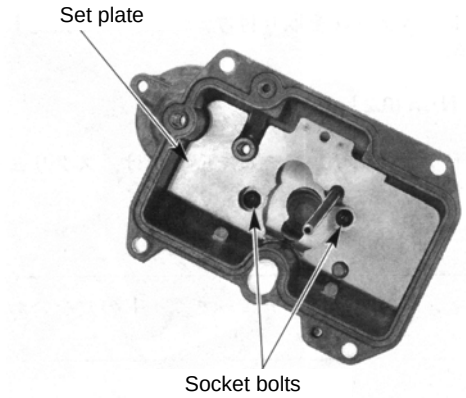
Carburetor float level gauge



⚠CAUTION
Set the float level gauge so it is perpendicular to the float chamber face and in-line with the main jet

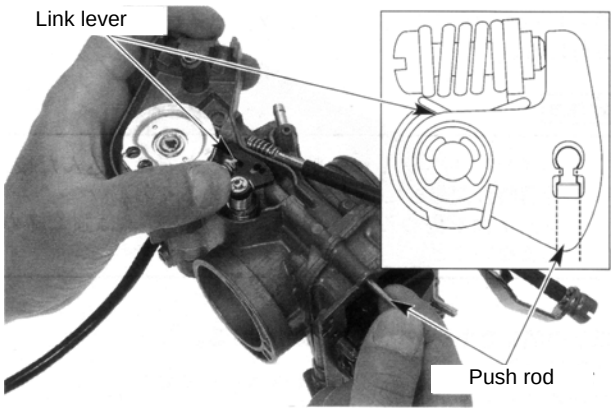
Install the set plate and socket bolts and tighten them to the specified torque.

Torque: 2.0 N·m (0.2 kgf·m)



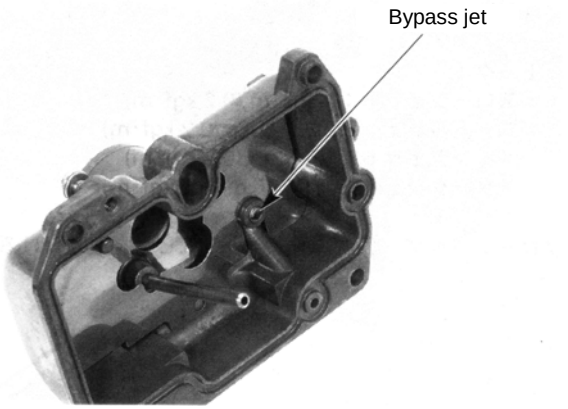
If the float level is out of specification, adjust it by bending the lip.

Install the push rod while holding the push rod link lever.

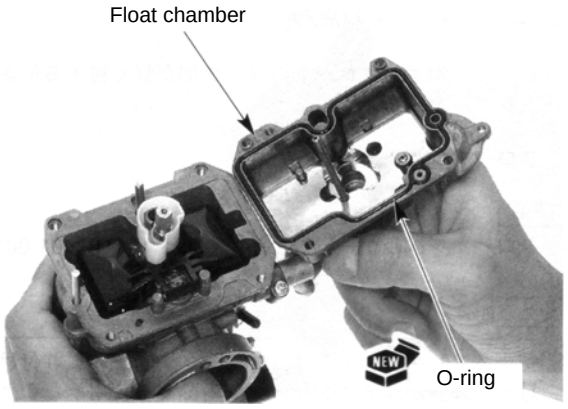


Install the accelerator pump bypass jet into the float chamber and tighten to the specified torque.

Torque: 0.3 N·m (0.03 kgf·m)



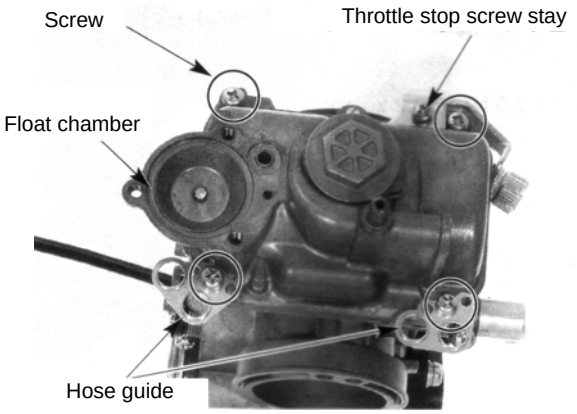
Install a new O-ring to the float chamber.
Install the float chamber to the carburetor.



⚠CAUTION
Install the hose guides and float chamber screws. Tighten the screws to the specified torque.

Torque: 2.1 N·m(0.2 kgf · m)

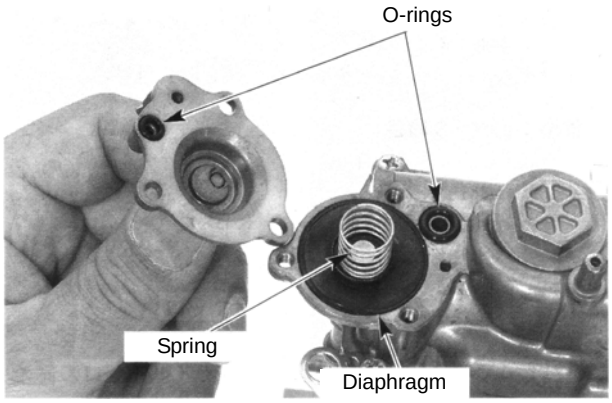
Install the throttle stop screw stay and securely tighten the screw.



Align the hose guides and the locating bump on the float chamber.

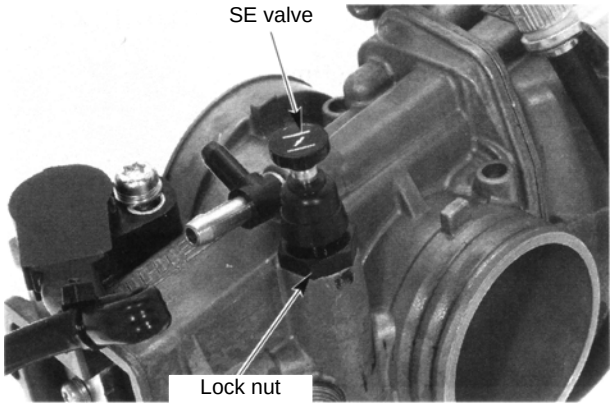
Install the diaphragm, spring, new O-ring and accelerator pump cover, and tighten the screws to the specified torque.

Torque: 2.1 N·m (0.2 kgf·m)



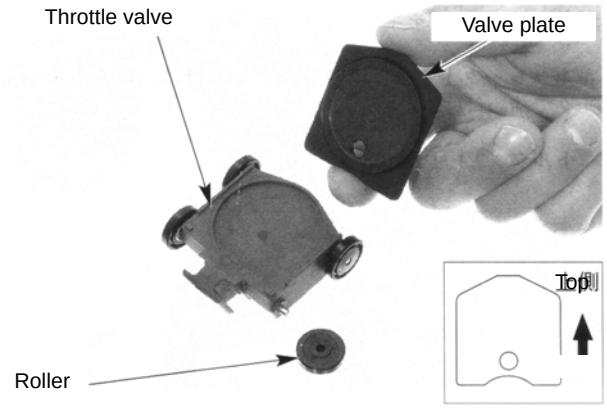
Install the SE valve and tighten the lock nut to the specified torque.

Torque: 2.1 N·m(0.2 kgf·m)



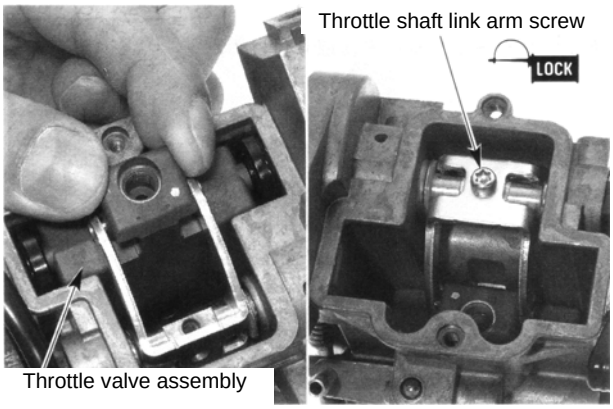
Install the valve plate and rollers to the throttle valve.

⚠CAUTION
Make sure to achieve correct installation direction of throttle valve plate



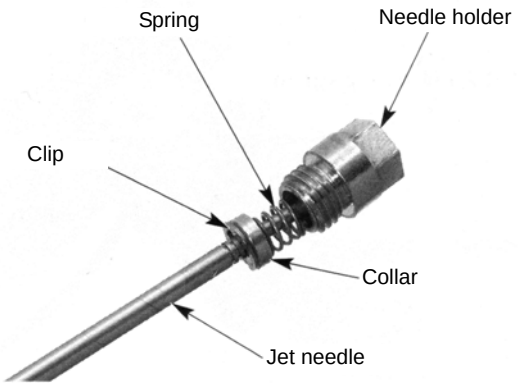
Install the throttle valve assembly into the carburetor.

⚠CAUTION
- make sure the valve plate is facing the engine side when installed.
- Make sure the throttle valve moves smoothly.



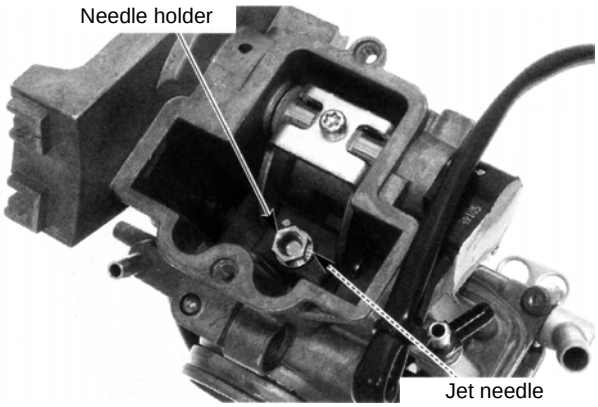
Install the jet needle through the needle holder, spring and collar. Install the needle clop to the jet needle groove.

Standard clip position: 4th position from the top.



Install the jet needle holder into the throttle valve and tighten it to the specified torque.

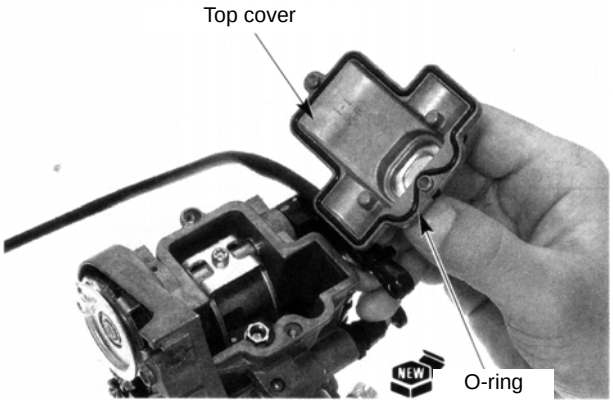
Torque: 2.1 N·m(0.2 kgf·m)



Install a new O-ring to the top cover.

Install the top cover, clamp and bolts and tighten them to the specified torque.

Torque: 2.1 N·m(0.2 kgf·m)

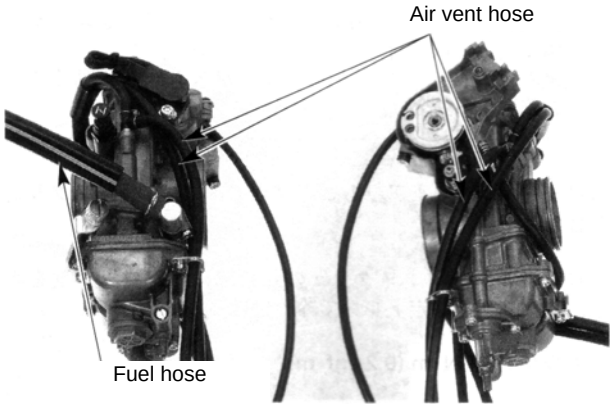


Connect the overflow hose, air vent hoses and fuel hose to the carburetor.

Align the holes in the throttle shaft link arm and throttle shaft.

Apply locking agent to the throttle shaft link arm screw threads and tighten it to the specified torque.

Torque: 2.1 N·m(0.2 kgf·m)

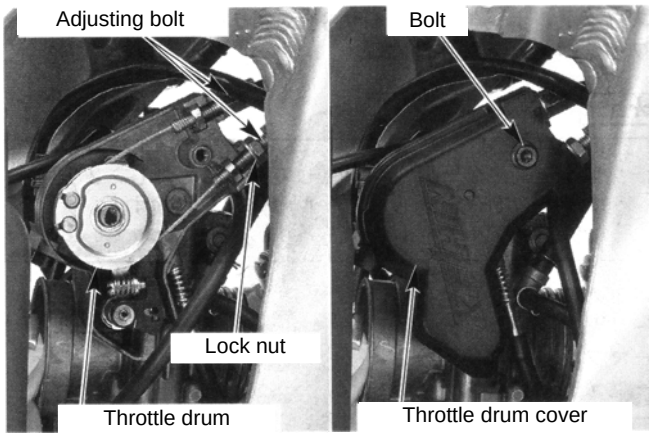


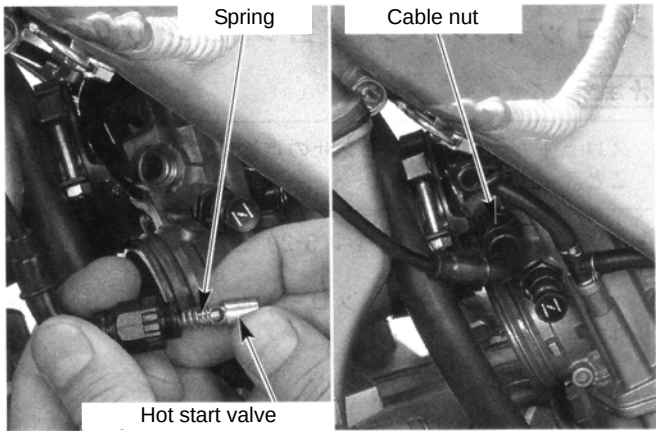
Carburetor installation

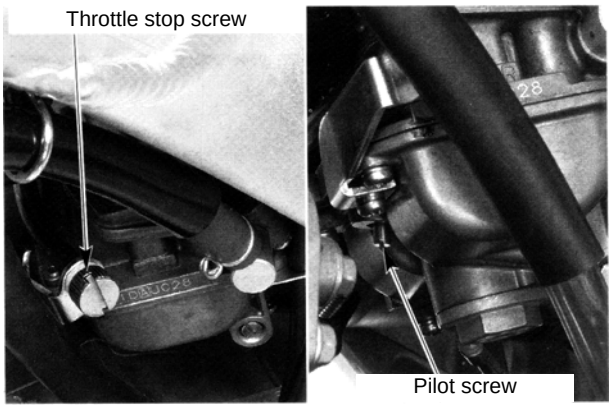
Connect the throttle cables to the throttle drum.
Install the throttle cable to the cable holder and tighten the lock nut.

Install the throttle drum cover and bolt and tighten it to the specified torque.

Torque: 3.4 N·m (0.3 kgf·m)

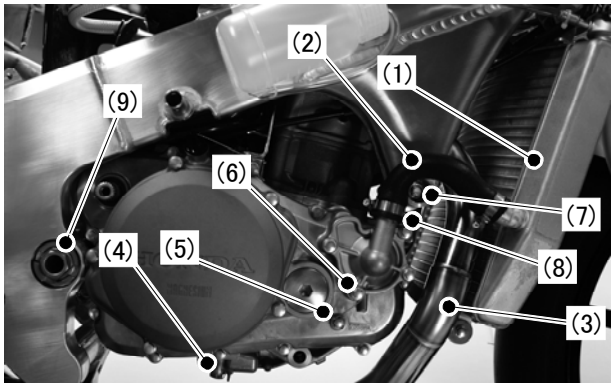






Engine removal

Remove the following parts;
- Cowl assembly
- Fuel tank
- Battery terminal (−disconnect the terminals)
- Radiator hose
- Muffler assembly
- Seat rail assembly
- Carburetor
- Carburetor box
- Shift guide plate
- Gear change arm
- Drive sprocket
- Spark plug cap
- Clutch cable
- Wire harness

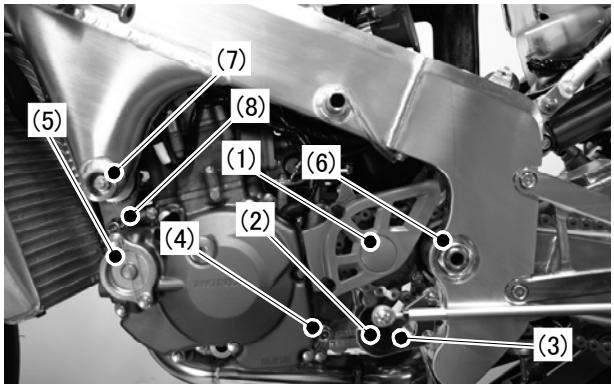


(1) Radiator (2) Radiator hose
(3) Exhaust pipe (4) Drain bolt (Engine oil)
(5) Oil check bolt (6) Drain bolt (coolant)
(7) Engine hanger bolt / nut
(8) Engine mount bolt / nut
(9) Swing arm pivot bolt / nut

Drain the coolant and engine oil and transmission oil.
Hold the motorcycle upright and keep the frame and swingarm steady individually by placing work stand or equivalent.

Remove the swing arm pivot nut.
Loosen the swing arm pivot lock nut.

Place a jack under the engine to support it.
Remove the engine hanger nut.
Remove the engine mount nut.

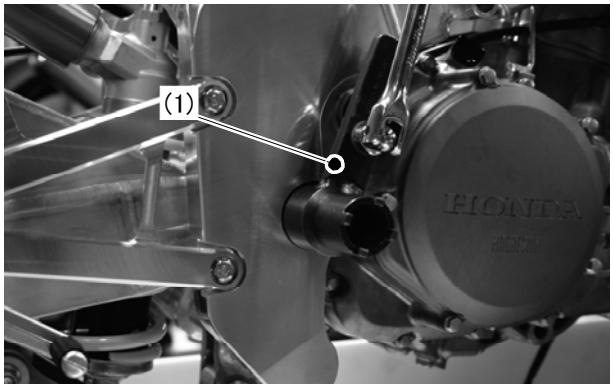


Tool

Lock nut wrench 07HMA-MR70200

Advice
In case shims are used between the engine and frame, mark them as you disassemble so they can go back to original location at reassembly.
Using incorrect shims may cause crack on the frame due to stress.

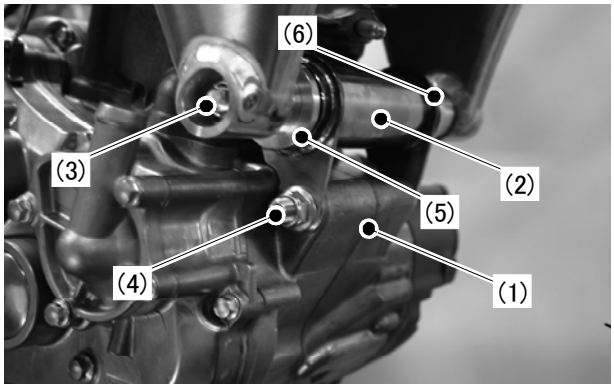
Turn the swing arm pivot bolt and loose the adjusting bolt.
Remove the engine hanger bolt and engine mount bolt, then remove the engine mount collar / engine mount assembly.
Remove the swing arm pivot bolt.
Bring the engine down from the motorcycle by lowering the jack.



(1) Lock nut wrench

Engine installation

Apply grease to the threads of the swing arm adjust bolt.
Install the swing arm adjust bolt to the frame.
Do not tighten the swing arm adjust bolt yet.
The tip of the swing arm adjust bolt should not come out from inner side of the frame to avoid having it interfering with the swing arm.

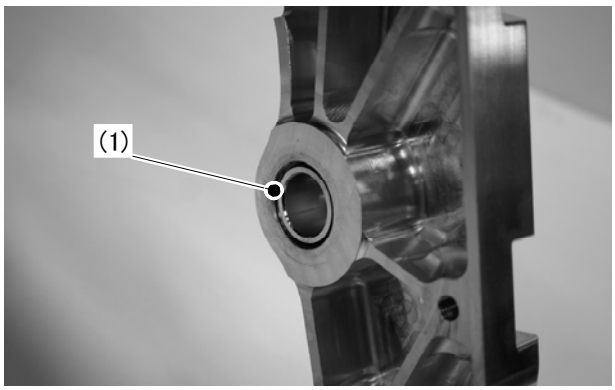


(1) Engine (2) Rubber, engine mount
(3) Engine hanger bolt / nut
(4) Engine mount bolt / nut
(5) Collar, engine mount

Bring the engine upward with a jack and align it with the frame.
Install the engine with the swing arm.
Apply thin coat of grease to the swing arm pivot bolt sliding surface.

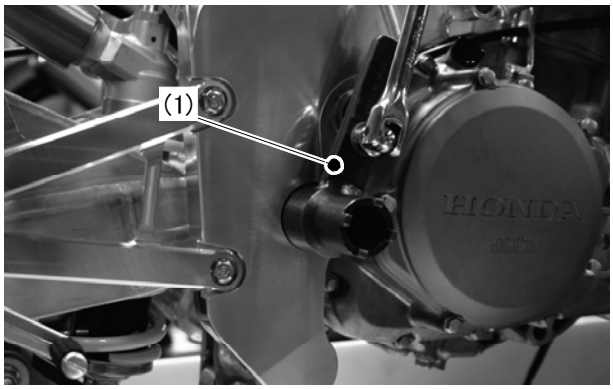
Install the engine mount assembly to the engine and install the engine to the frame by inserting the hanger bolt to the frame.
Tighten the bolt with fingers to position the engine.

Align the pivot bolt and adjusting bolt, then tighten the adjusting bolt to the specified torque.
Torque: 15N·m (1.5kgf·m)



(1) Adjusting bolt

Install the swing arm adjusting bolt lock nut and tighten it to the specified torque.
Tool
Lock nut wrench 07HMA-MR70200
Torque: 44N·m (4.5kgf·m)



(1) Lock nut wrench

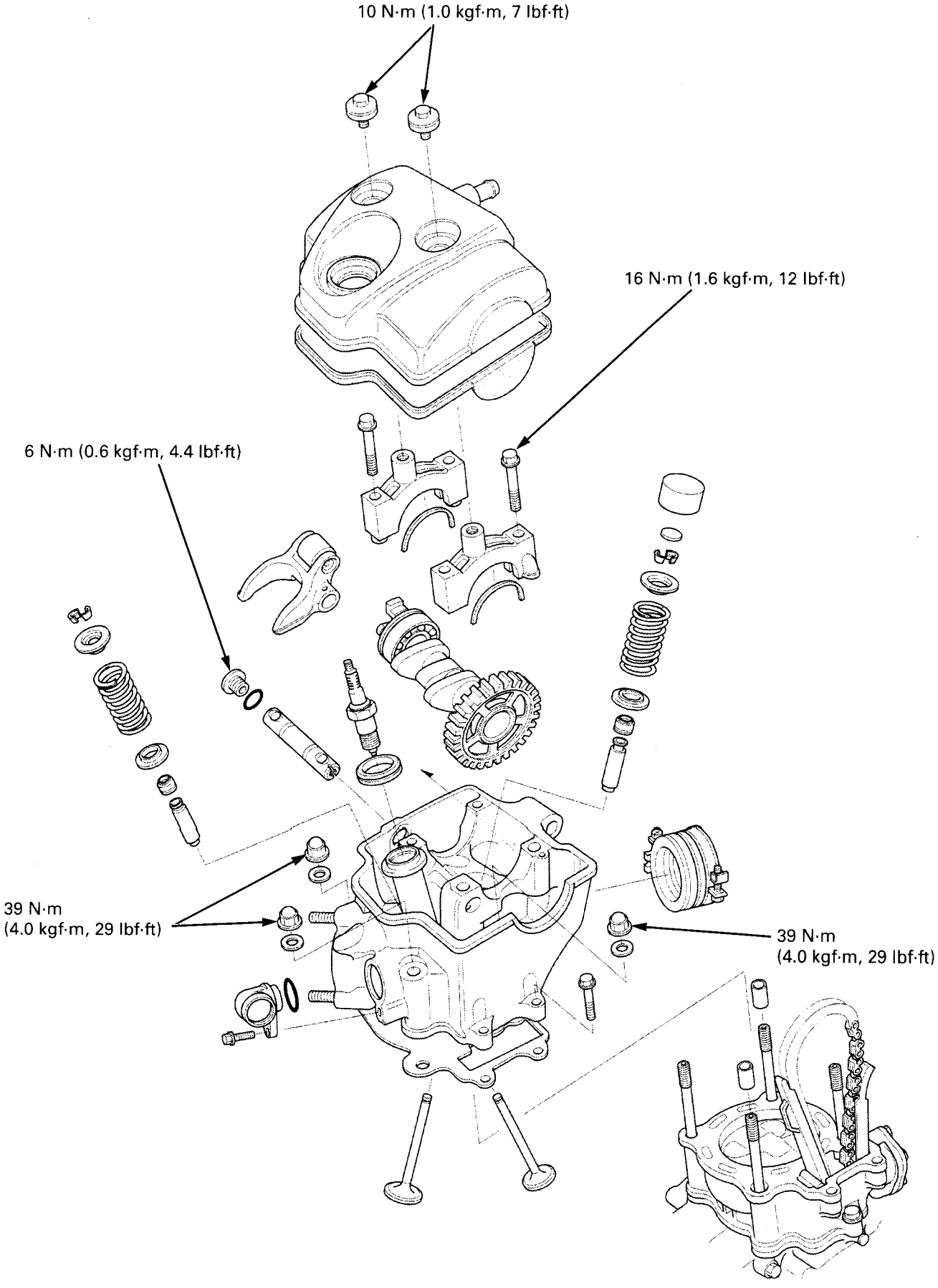
Hold the swing arm pivot bolt and tighten the pivot nut to the specified torque.
Torque: 95N·m (9.7kgf·m)

Tighten the engine hanger nut to the specified torque.
Torque: 42N·m (4.2 kgf·m)

Measure the clearance between the frame and the engine mount collar with feeler gauge.
Install shims to fill the clearance.

Engine mount shim:
0.4mm : 90511-10512-00
1.0mm : 90514-10512-00

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the camshaft, cylinder head and valves. These services can be done with the engine installed in the frame.
- During disassembly, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubrication oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head.

SPECIFICATION

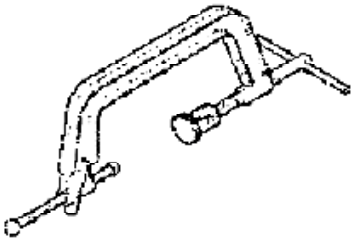
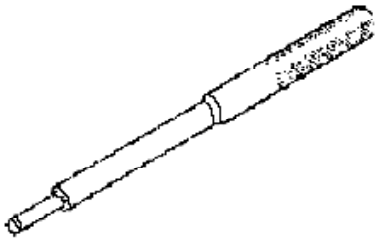
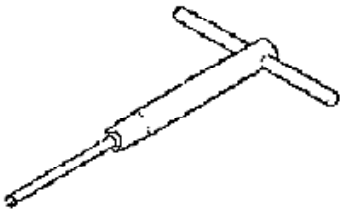
Unit: mm (in)

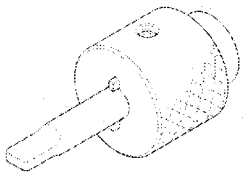
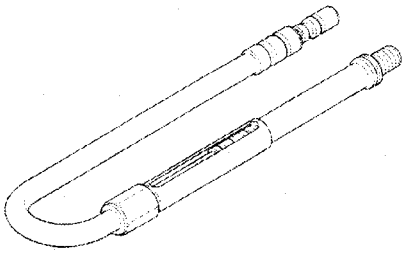
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			392 kPa (4.0 kgf/c ㎡, 57 psi) at 800 min-1 (rpm)	-
Cylinder head warpage				0.05 (0.002)
Valve and valve guide	Valve clearance	IN	0.12 ±0.03 (0.005 ±0.001)	-
		EX	0.28 ±0.03 (0.011 ±0.001)	-
	Valve stem O.D.	IN	4.975 - 4.990 (0.1959 - 0.1965)	-
		EX	4.965 - 4.980(0.1955 - 0.1961)	4.955(0.1951)
	Valve guide I.D.	IN/EX	5.000 - 5.012(0.1969 - 0.1973)	5.052(0.1989)
	Stem-to-guide clearance	IN	0.010 - 0.037 (0.0004 - 0.0015)	-
		EX	0.020 - 0.047 (0.0008 - 0.0019)	-
	Valve guide projection above cylinder head	IN	14.8 - 15.0(0.58 - 0.59)	-
		EX	19.8 - 20.0(0.78 - 0.79)	-
	Valve seat width	IN/EX	0.90-1.10(0.035 - 0.043)	1.7 (0.07)
Valve spring free length		IN	39.47 (1.554)	38.5(1.52)
		EX	43.07 (1.696)	42.1 (1.66)
Rocker arm	Rocker arm I.D.		12.016 - 12.034 (0.4731 - 0.4738)	12.07(0.475)
	Rocker arm shaft O.D.		11.977 - 11.985 (0.4715 - 0.4718)	11.93 (0.470)
	Rocker arm-to-shaft clearance		0.031 - 0.057(0.0012 - 0.0022)	0.11 (0.004)
Camshaft	Cam lobe height	IN	35.580 - 35.660 (1.4008 - 1.4039)	35.44(1.395)
		EX	25.081 - 25.161 (0.9874 - 0.9906)	24.98 (0.983)
Valve lifter O.D.			22.478 - 22.493 (0.8850 - 0.8855)	22.47 (0.885)
Valve lifter bore I.D.			22.510 - 22.526 (0.8862 - 0.8868)	22.54 (0.887)

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder bolt	16 N·m (1.6kgf·m, 12 lbf·ft)	Apply engine oil to the threads and seating surface.
Cylinder head mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	Apply engine oil to the threads and seating surface.
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads.
Rocker arm shaft cap	6 N·m (0.6 kgf·m, 4.4 lbf·ft)	Apply grease to the threads.
Engine hanger plate nut		
engine side:	54 N·m (5.5 kgf·m, 40 lbf·ft)	
frame side:	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	

TOOLS

Valve spring compressor 07757-0010000 	Vaive spring compuressor attach-ment 07JME-KY20100 	Valuve guide driver, 5.0mm 07942-MA60000 
Valuve guide remer, 5.0mm 07984-MA60001 	Valuve seat cutter, 33mm(45° IN) 07780-0010800 	Valuve seat cutter, 27.5mm(45° EX) 07780-0010200 
Flat cutter, 33mm(32° IN) 07780-00129-00 	Flat cutter, 28mm(32° EX) 07780-0012100 	Interior cutter, 37.5mm(60° IN) 07780-0014100 
Interion cutter, 30mm(60° EX) 07780-0014000 	Cutter holder, 5.0mm 07780-0010400  or equivalent commercially avail-able in U.S.A.	Tappet hole protector 07JMG-KY20100  or make your own from 35 mm film canister

Chain tensioner stopper 070MG-0010100	Compression gauge attachment 07RMJ-MY50100
	

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing top-end noise with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring.

Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
- Loose spark plug
- Faulty cylinder and piston

Compression too high

- Excessive carbon build-up in cylinder head or on top of piston

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder and piston

Excessive noise

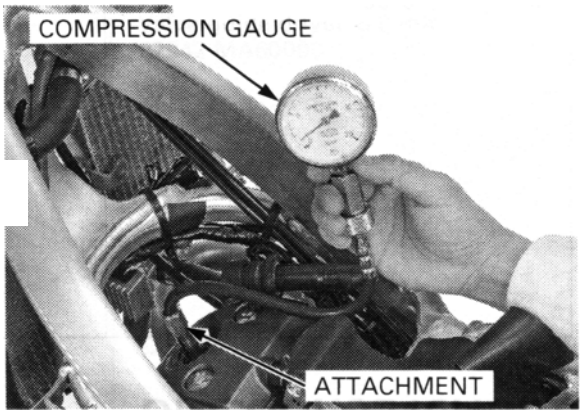
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn or loose cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION TEST

Remove the fuel tank.
Warm up the engine.
Stop the engine and remove the spark plug .
Connect a compression gauge.



TOOL:
Compression gauge attachment 07RMJ-MY50100

Make sure the compression gauge connection does not leak.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION:
392 kPa (4.0 kg/cm2, 57 psi) at 800 min-1 (rpm)
Low compression can be caused by:

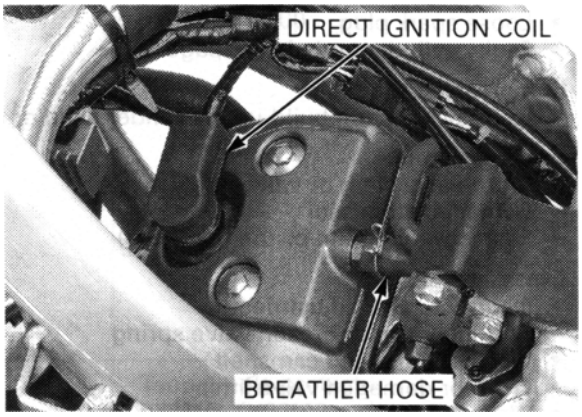
- Improper valve adjustment
- Valve leakage
- Blown cylinder head gasket
- Worn piston ring or cylinder

High compression can be caused by:

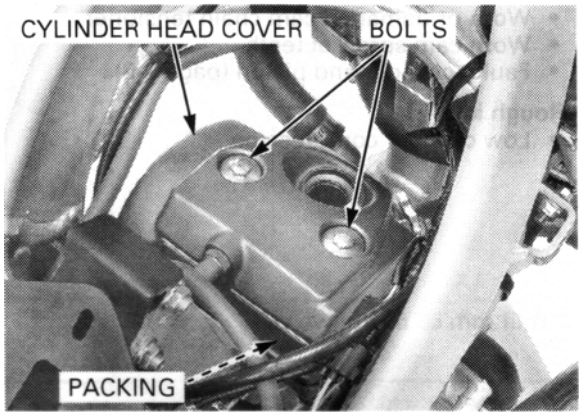
- Carbon deposits in combustion chamber or on piston head
- Faulty decompressor cam

CYLINDER HEAD COVER REMOVAL

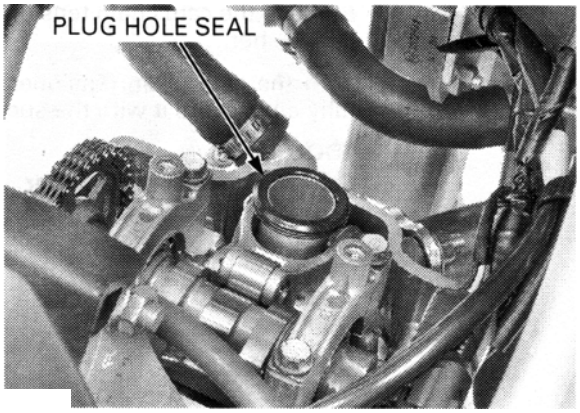
Remove the fuel tank.
Remove the direct ignition coil.
Disconnect the crankcase breather hose.



Remove the bolts, cylinder head cover and packing

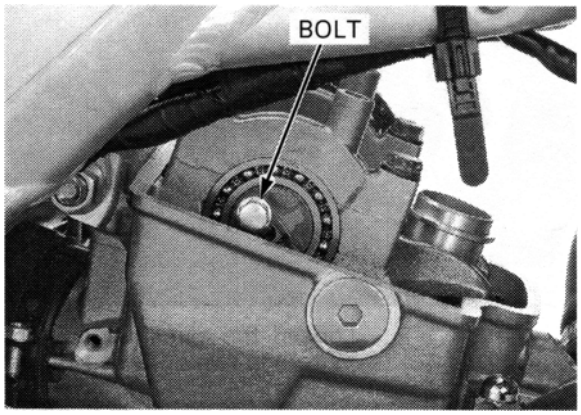


Remove the plug hole seal.

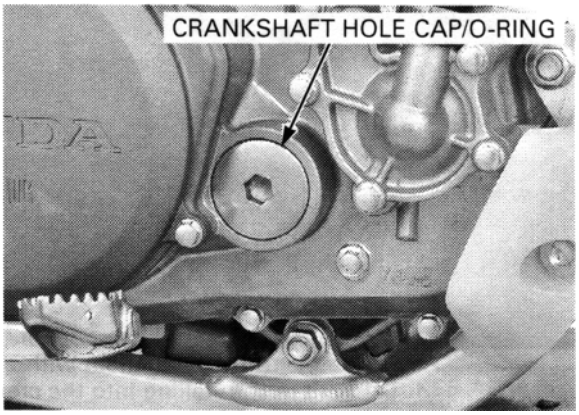


CAMSHAFT/ROCKER ARM REMOVAL

Remove the cylinder head cover.
The decompressor cam will be disassembled later, loosen the stopper plate bolt, but do not remove it yet.



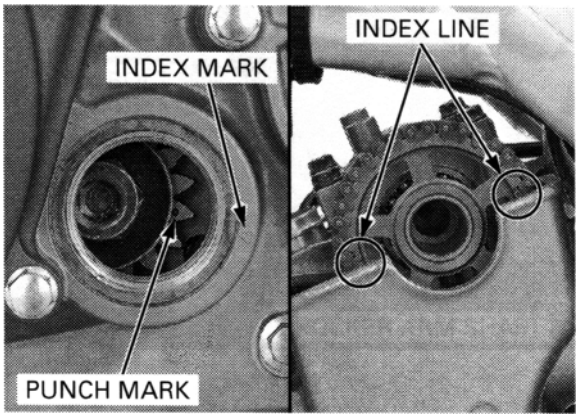
Remove the crankshaft hole cap and O-ring



Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the index mark on the right crankcase cover.
Make sure the piston is at T.D.C. (Top Dead Center) on the compression stroke.

Confirm the intake cam lobes are facing toward rear.

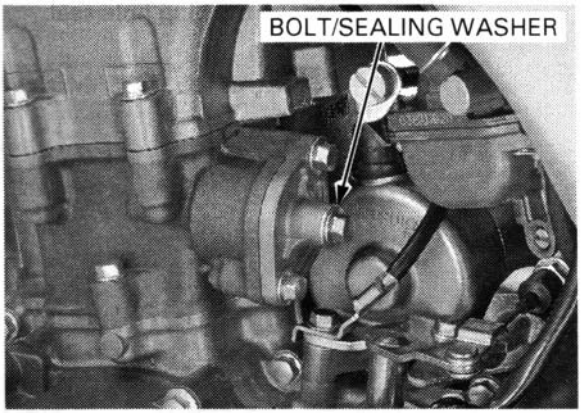
The index lines on the cam sprocket must be flush with the cylinder head surface as shown.



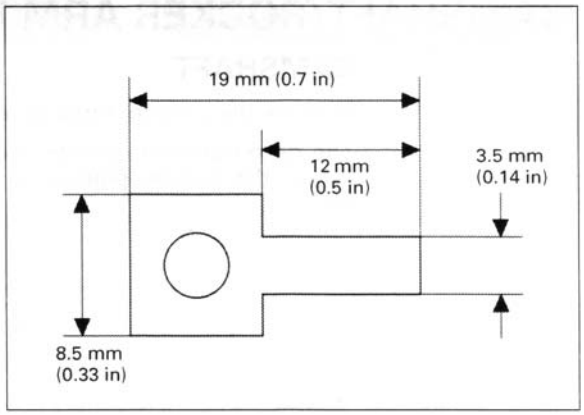
Remove the cam chain tensioner lifter bolt and sealing washer.
Turn the cam chain tensioner lifter shaft clockwise fully and secure it with the special tool.

If a special tool is not available, refer to the next step to make an alternative tool.

TOOL:
Cam chain tensioner stopper 070MG-0010100

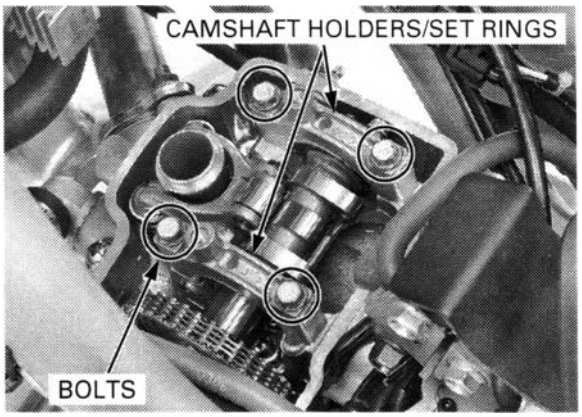


A stopper tool can easily be made from a thin (1mm thick) piece of steel as shown.



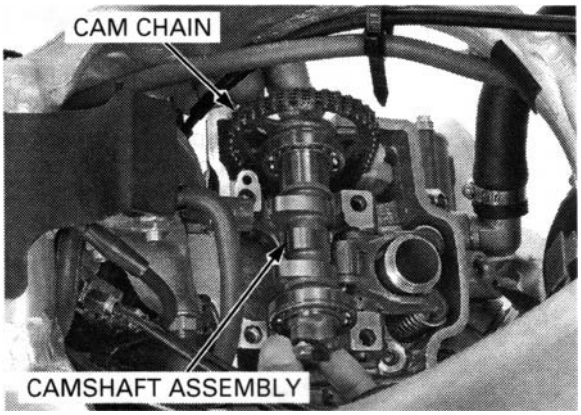
Loosen the camshaft holder bolts in a crisscross pattern in two or three steps.
Remove the camshaft holders and set rings.

Be careful not to let the set rings fall into the crankcase.

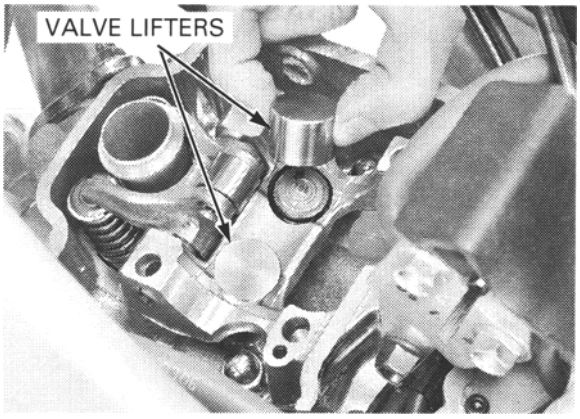


Remove the cam chain from the cam sprocket and suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.

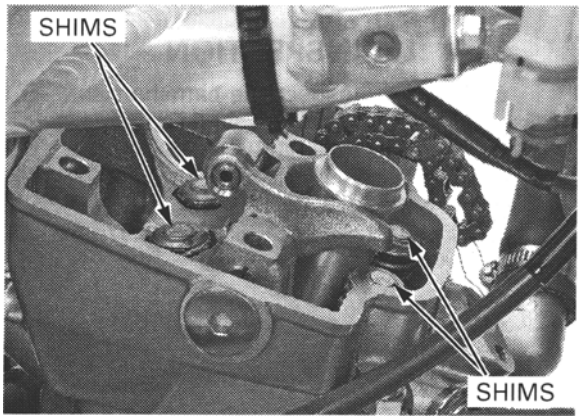
Remove the camshaft assembly.



Remove the valve lifters from the cylinder head.
・ Shims may stick to the inside of the valve lifters.
Do not allow the shims to fall into the left crankcase.
・ Mark the valve lifters to ensure correct reassembly in their original locations.

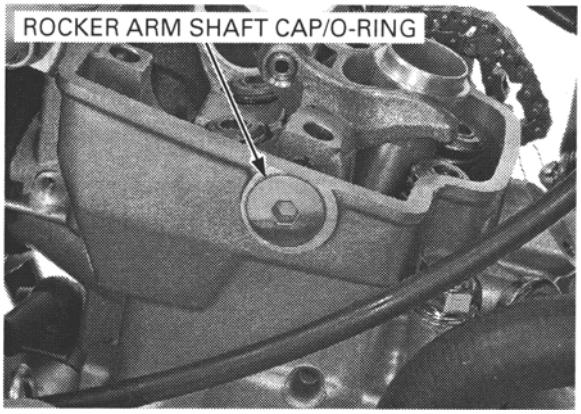


Remove the shims.
・ Be careful not to let the shims fall into the left crankcase.
・ Mark all shims to ensure correct reassembly in their original locations.

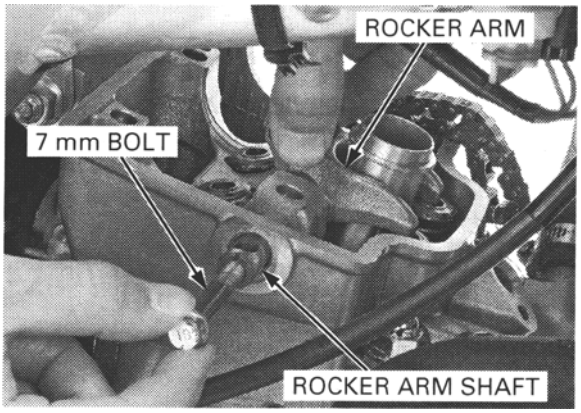


ROCKER ARM

Remove the rocker arm shaft cap and O-ring from the cylinder head.

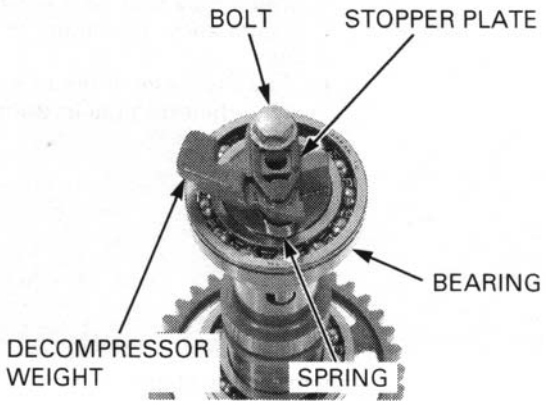


Thread a 7 mm bolt (e.g.; camshaft holder bolt) into the rocker arm shaft and pull the rocker arm shaft out of the cylinder head.
Remove the rocker arm from the cylinder head.



DISASSEMBLY

Remove the bolt, stopper plate, decompressor weight, spring and bearing.

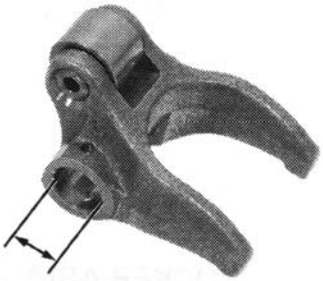


INSPECTION

If the camshaft contact surface of the rocker arm is damaged or abnormally worn, check the cam lobes for damage.

Inspect the camshaft contact surface of the rocker arm for wear or damage.
Inspect the rocker arm oil passage for clog.
Measure the rocker arm I.D.

SERVICE LIMIT: 12.07 mm (0.475 in)

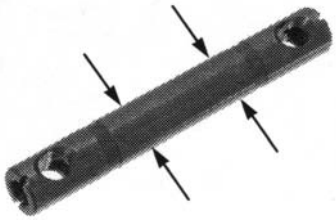


Inspect the rocker arm shaft for wear or damage
Measure the rocker arm shaft O.D.

SERVICE LIMIT: 11.93 mm (0.470 in)

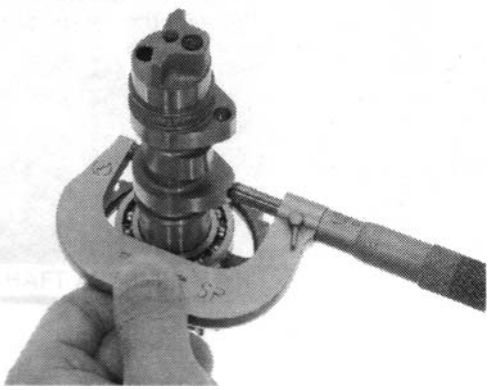
Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.11 mm (0.004 in)

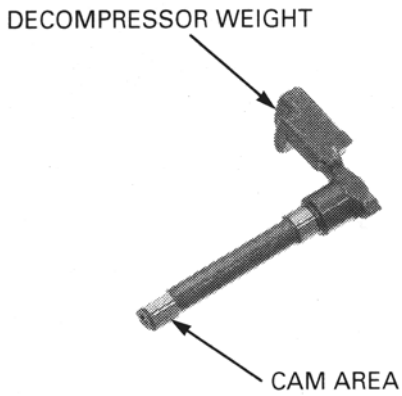


Measure the height of each cam lobe.

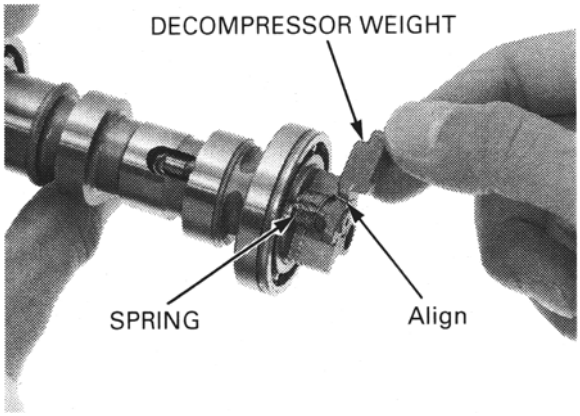
SERVICE LIMITS:
IN: 35.44 mm (1.395 in)
EX: 24.98 mm (0.983 in)



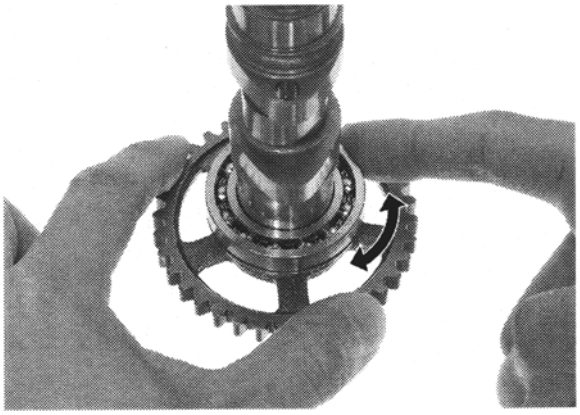
Check the decompressor weight for bend or damage.
Check the decompressor weight cam area for wear or damage.



Temporarily install the spring and decompressor weight into the camshaft.
Check the decompressor cam spring for damage or fatigue.
Check the smooth operation of the decompressor system, and replace if necessary.

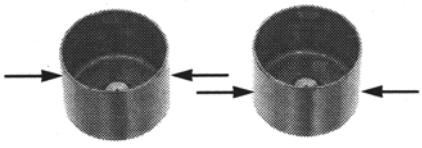


Turn the outer race of each bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the bearing inner races fit tightly on the camshaft.
Replace the camshaft if each bearing does not turn smoothly, quietly, or if they fit loosely on the camshaft.



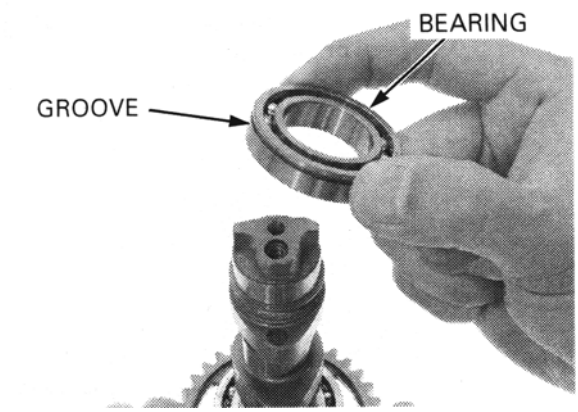
Check the valve lifter for scoring, scratches or damage.
Measure each valve lifter O.D.

SERVICE LIMIT: 22.47 mm (0.885 in)

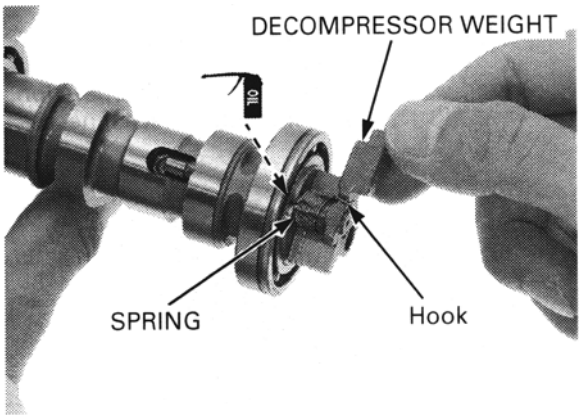


ASSEMBLY

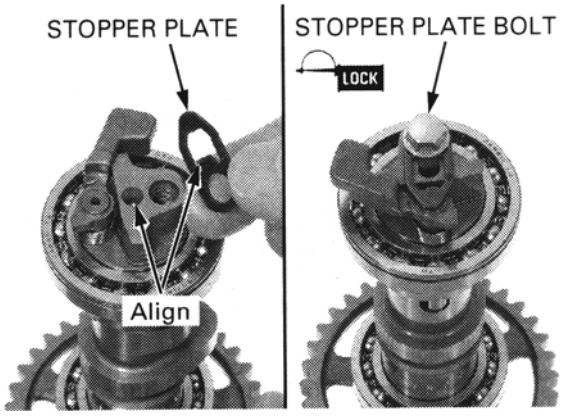
Install the bearing with its ring groove facing out side.



Apply oil to the decompressor weight sliding area.
Install the spring and decompressor weight into the camshaft.
Align the spring end and decompressor cam as shown.



Clean the decompressor cam stopper plate bolt threads and apply a locking agent.
Install the decompressor cam stopper plate by aligning the tab of the stopper plate with the hole of the camshaft as shown.
Loosely install the stopper plate bolt.

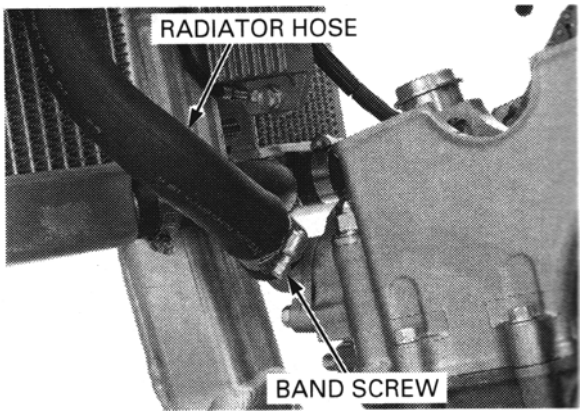


CYLINDER HEAD REMOVAL

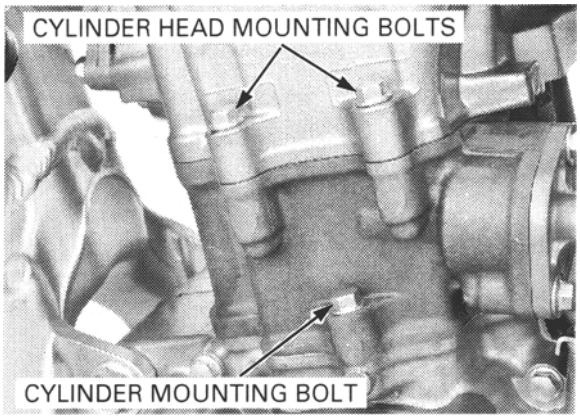
Remove the following:
- Spark plug
- Exhaust pipe
- Carburetor
- Cylinder head cover
- Camshaft
- Rocker arm

Drain the coolant .

Loosen the radiator hose band screw.
Disconnect the radiator hose from the water hose pipe.

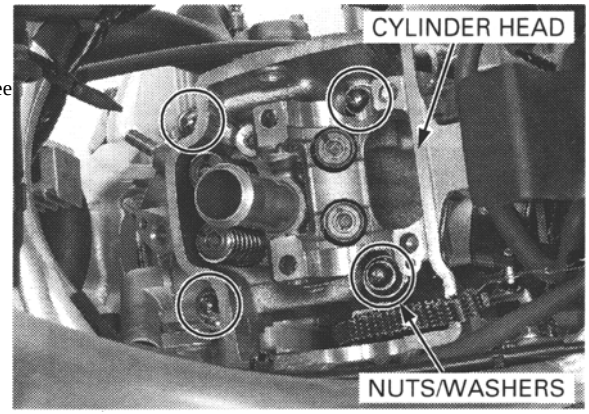


Remove the cylinder head mounting bolts.
Loosen the cylinder mounting bolt.

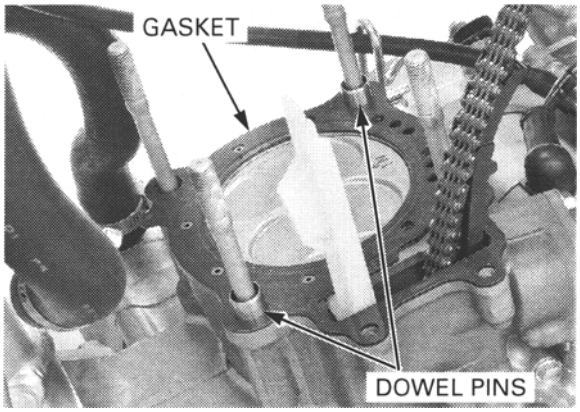


Be careful not to let the nuts and washers fall into the left crankcase.

Loosen the cylinder head nuts in a crisscross pattern in two or three steps.
Remove the nuts, washers and cylinder head.



Remove the gasket and dowel pins.



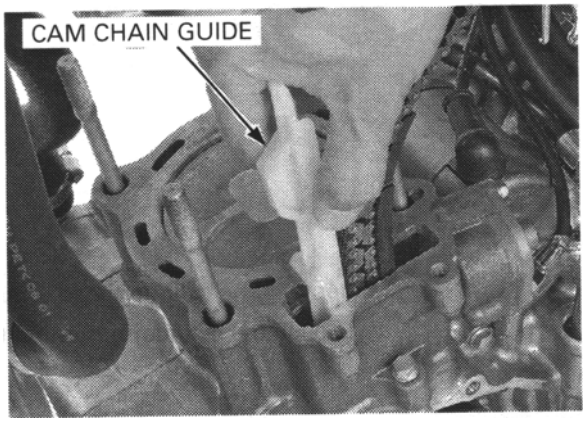
CAM CHAIN TENSIONER/CAM CHAIN GUIDE

REMOVAL

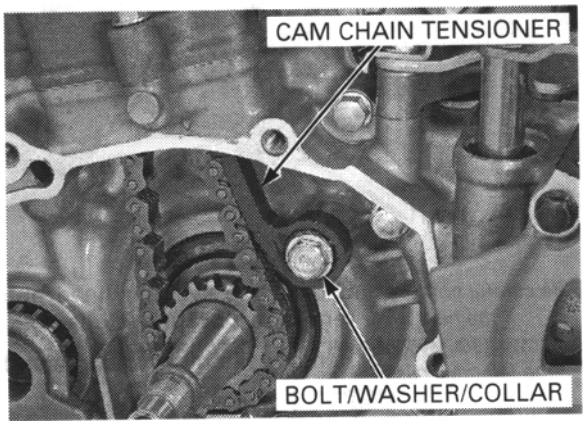
Remove the following:

- Cylinder head
- Left crankcase cover
- Flywheel

Remove the cam chain guide

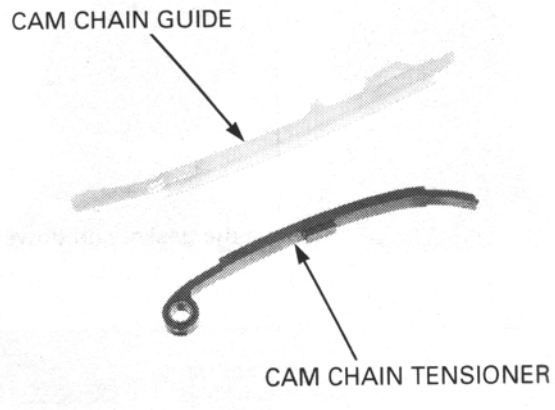


Remove the bolt, collar, washer and cam chain tensioner.



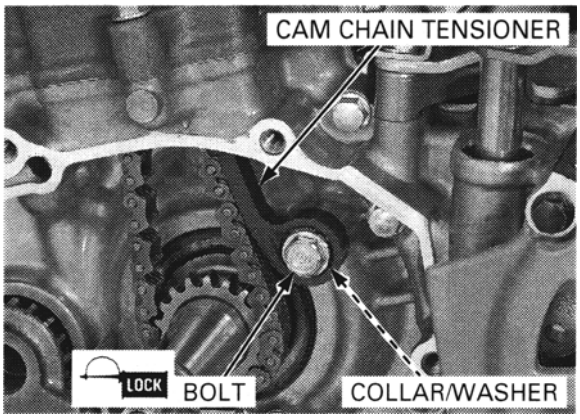
INSPECTION

Inspect the cam chain tensioner and cam chain guide for excessive wear or damage, replace if necessary.



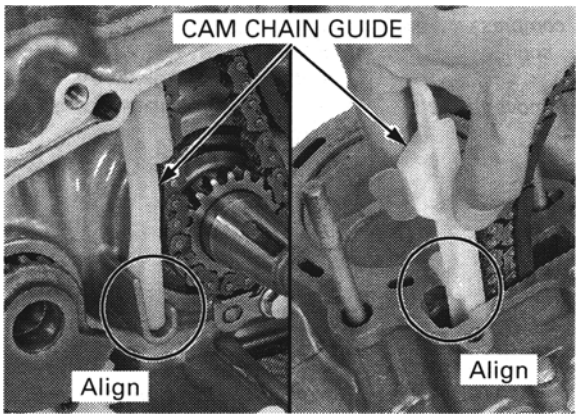
INSTALLATION

Clean the cam chain tensioner bolt threads and apply a locking agent.
Install the washer, cam chain tensioner, collar and bolt.
Tighten the bolt to the specified torque.



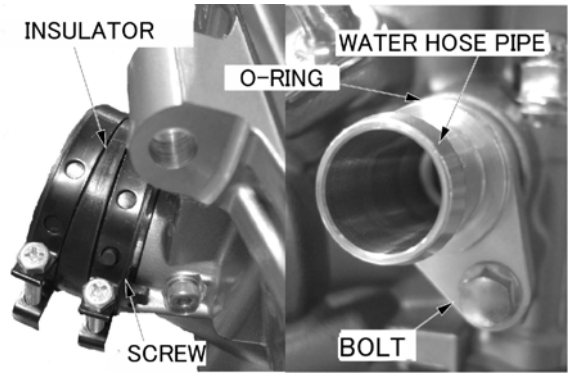
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the cam chain guide by aligning the guide end with the groove in the crankcase and the tab with the groove in the cylinder.
Install the following:
- Flywheel
- Left crankcase cover
- Cylinder head



CYLINDER HEAD DISASSEMBLY

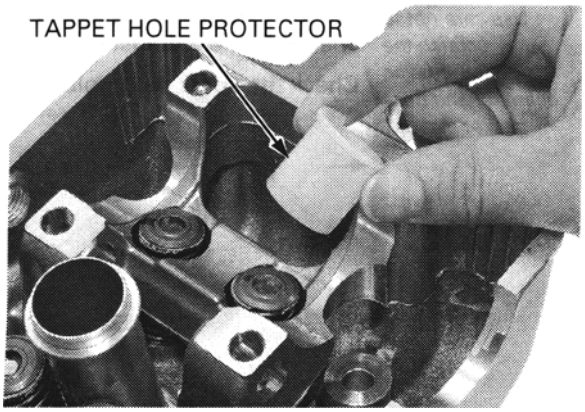
Remove the cylinder head .
Loosen the Insulator band screw and remove the insulator from the cylinder head.
Remove the bolt, O-ring and water hose pipe.



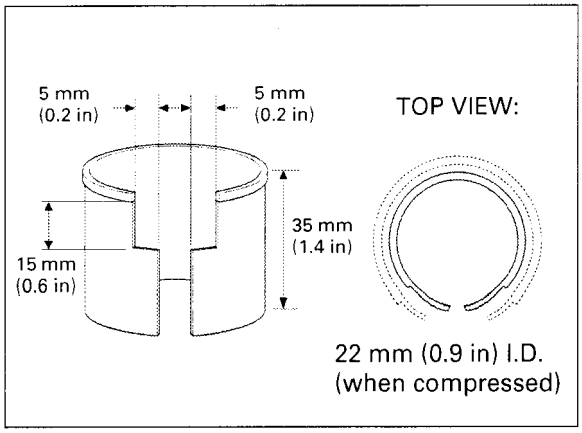
If a special tool is not available, refer to the next step to make an alternative tool.

Install the tappet hole protector into the intake valve lifter bore.

TOOL:
Tappet hole protector **07JMG-KY20100**



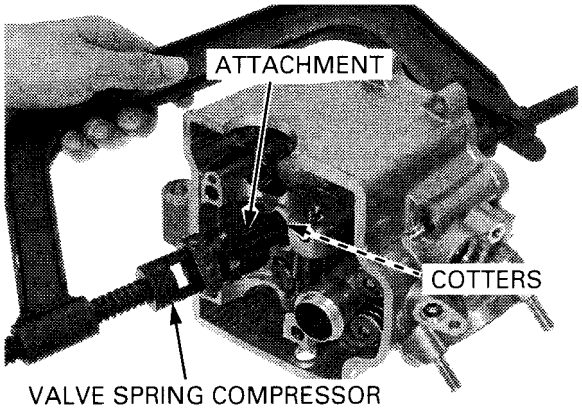
An equivalent tool can easily be made from a plastic 35 mm (1.4 in) film container as shown.



To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

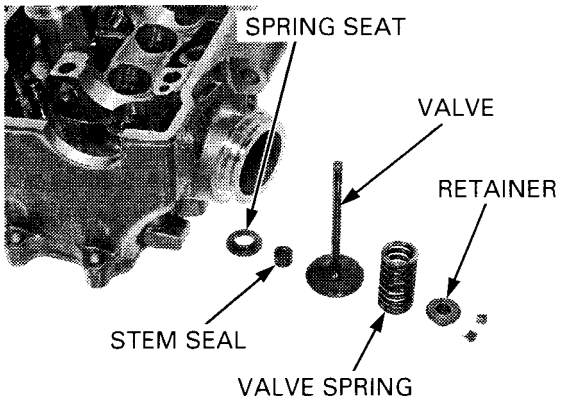
Remove the valve spring cotters using the special tools.

TOOLS:
Valve spring compressor 07757-0010000
Valve spring compressor attachment
07JME-KY20100



Mark all parts during disassembly so they can be reinstalled in their original locations.

Remove the following
- Spring retainer
- Valve spring
- Valve
- Stem seal
- Spring seat

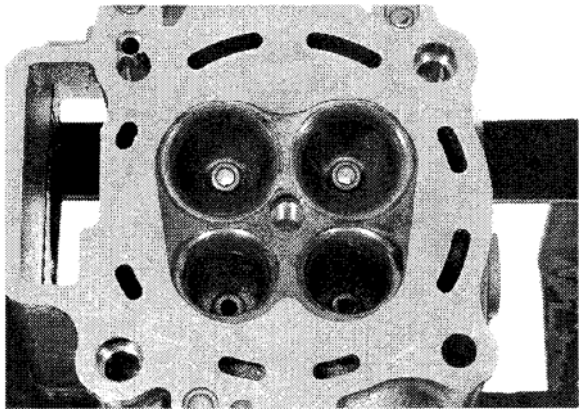


CYLINDER HEAD INSPECTION

CYLINDER HEAD

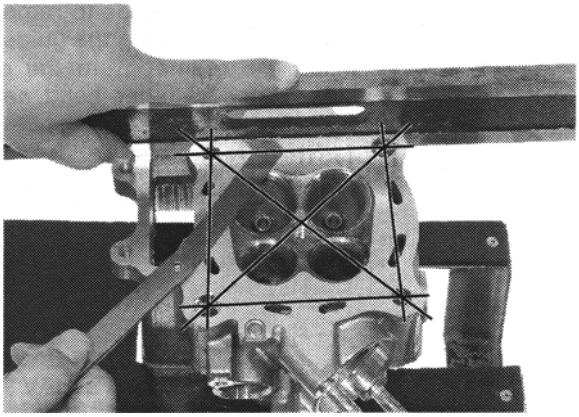
Use care not to scratch the combustion chamber and head gasket surface.

Remove the carbon deposits from the combustion chamber and exhaust port.
Check the spark plug hole and valve area for cracks.



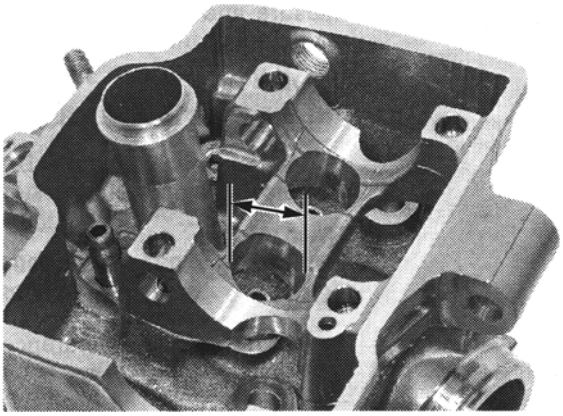
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



Check the valve lifter bore for scoring, scratches or damage.
Measure each valve lifter bore I.D.

SERVICE LIMIT: 22.54 mm (0.887 in)

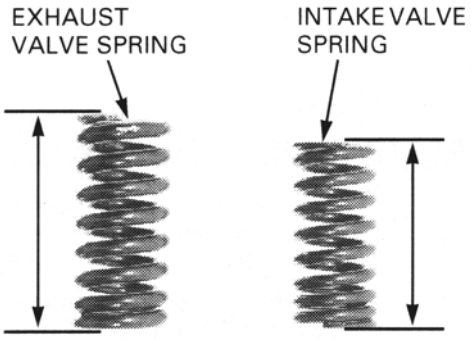


VALVE SPRING

Check the valve springs for fatigue or damage.
Measure the free length of the intake and exhaust valve springs.

SERVICE LIMITS:
IN: 38.5 mm (1.52 in)
EX: 42.1 mm (1.66 in)

Replace the springs if they are shorter than the service limits.



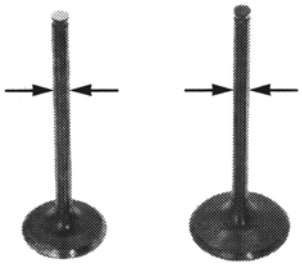
VALVE/VALVE GUIDE

Inspect each valve for out-of-round, burns, scratches or abnormal stem wear.

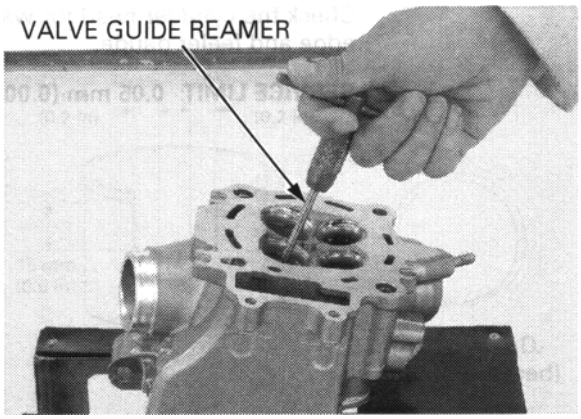
Check the valve movement in the guide.
Measure and record the valve stem O.D.

STANDARD:
IN: 4.975 - 4.990 mm (0.1959 - 0.1965 in)
EX: 4.965 - 4.980 mm (0.1955 - 0.1961 in)

SERVICE LIMIT:
EX: 4.955 mm (0.1951 in)



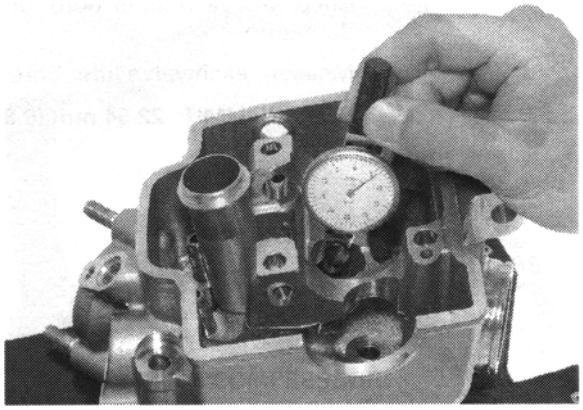
Ream the valve guide to remove any carbon buildup before measuring the guide.
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.



TOOL:
Valve guide reamer, 5.0 mm **07984-MA60001**

Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

SERVICE LIMITS:
IN/EX: 5.052 mm (0.1989 in)



Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

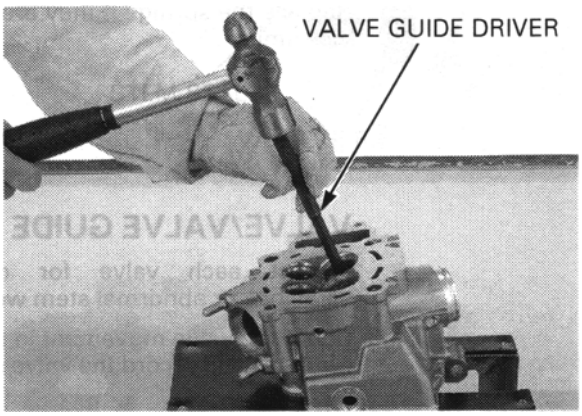
STANDARD:
IN: 0.010 - 0.037 mm (0.0004 - 0.0015 in)
EX: 0.020 - 0.047 mm (0.0008 - 0.0019 in)

Reface the valve seats whenever the valve guides are replaced.

If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace the guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limits with new guides also, replace the valves and guides.

VALVE GUIDE REPLACEMENT

Mark new valve guides at the proper depth (see specification; page 8-3) using a marker. Chill the new valve guides in a freezer for about 1 hour.



Be sure to wear heavy gloves when handling the heated cylinder head.

Heat the cylinder head to 100 - 150 ° C (212 - 302 ° F) with a hot plate or oven. Do not heat the cylinder head beyond 160 ° C (320 ° F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

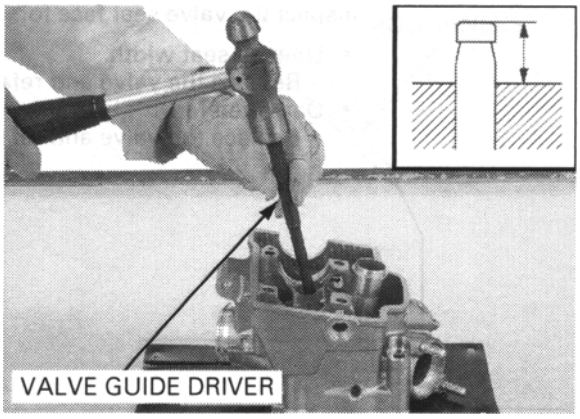
NOTE:

· Using a torch to heat the cylinder head may cause warpage.

Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

TOOL:
Valve guide driver, 5.0 mm 07942-MA60000

While the cylinder head is still heated, drive new valve guides into the cylinder head from the top of the cylinder head (camshaft and rocker arm side).
Remove the guides from the freezer.
Drive in the guides until the marks are parallel with the cylinder head.
Check that the valve guides are at the proper depth, and adjust the height if necessary.

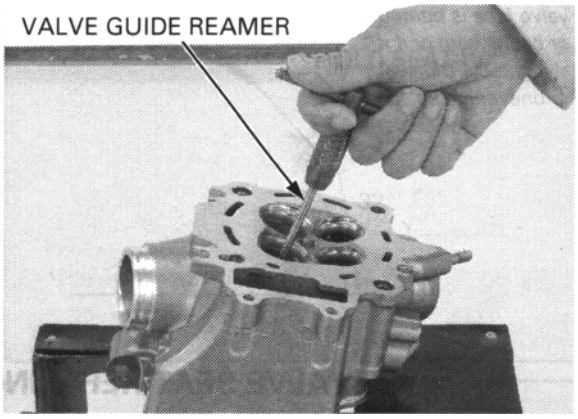


SPECIFIED DEPTH:
IN: 14.8-15.0 mm (0.58-0.59 in)
EX: 19.8-20.0 mm (0.78-0.79 in)

TOOL:
Valve guide driver, 5.0 mm 07942-MA60000

Let the cylinder head cool to room temperature.
Ream the new valve guides.
Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

Use cutting oil on the reamer during this operation. Take care not to tilt or lean the reamer in the guide while reaming.

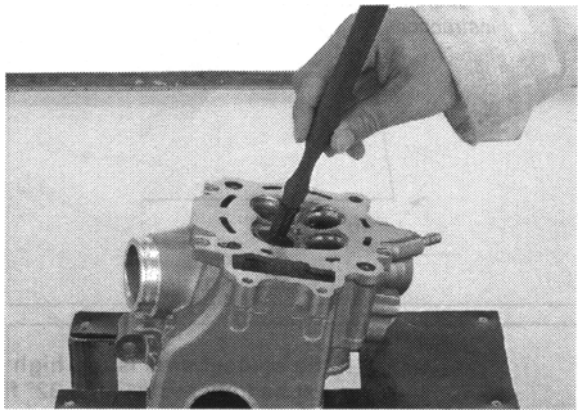


TOOL:
Valve guide reamer, 5.0 mm 07984-MA60001

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seats.

VALVE SEAT INSPECTION/REFACING

Clean the Intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seat.
Tap the valves and seats using a rubber hose or other hand-lapping tool.

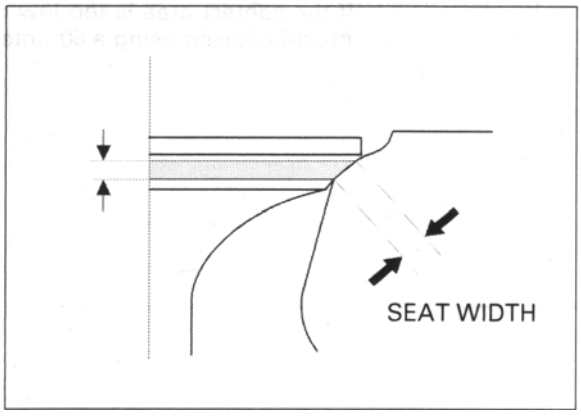


Remove the valve and inspect the valve seat face.
The valve seat contact should be within the specified width and even all around the circumference.

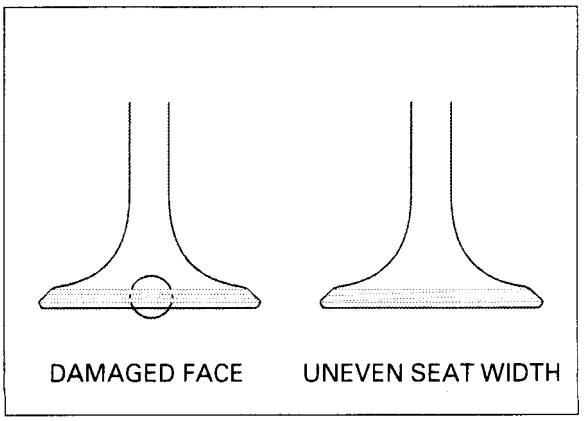
STANDARD:
IN/EX: 0.90 - 1.10 mm (0.035 - 0.043 in)

SERVICE LIMIT:
IN/EX: 1.7 mm (0.07 in)

If the seat width exceeds the service limit, reface the valve seat .

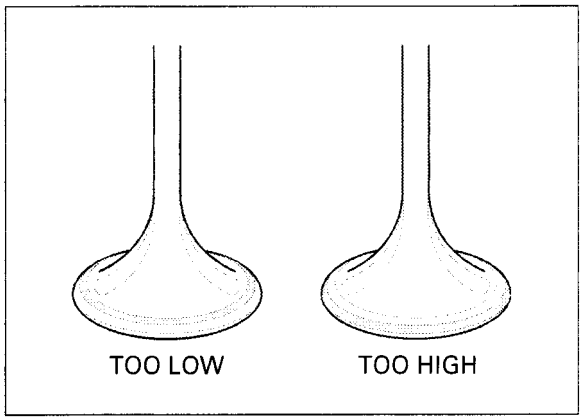


Inspect the valve seat face for:
- Uneven seat width:
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.



The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

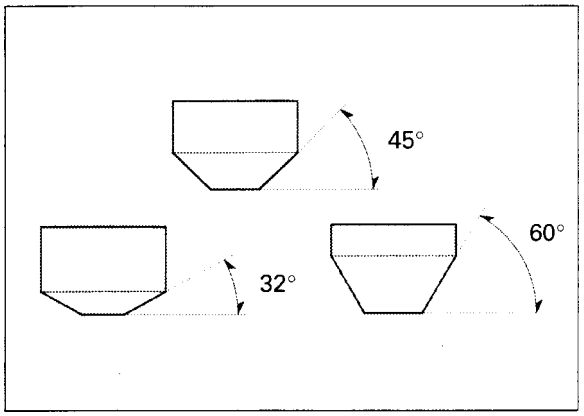
- Contact area (too high or too low)
  - Reface the valve seat.



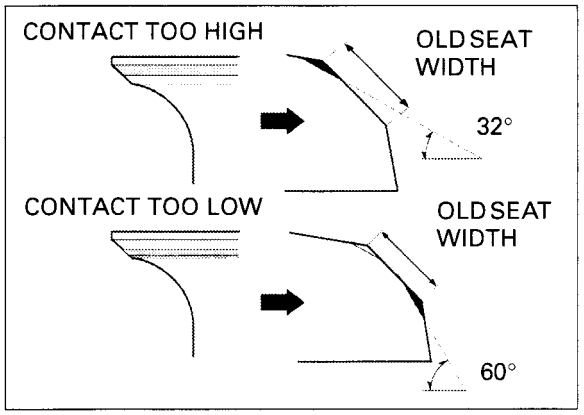
VALVE SEAT REFACING

Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipments are recommended to correct worn valve seats.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.

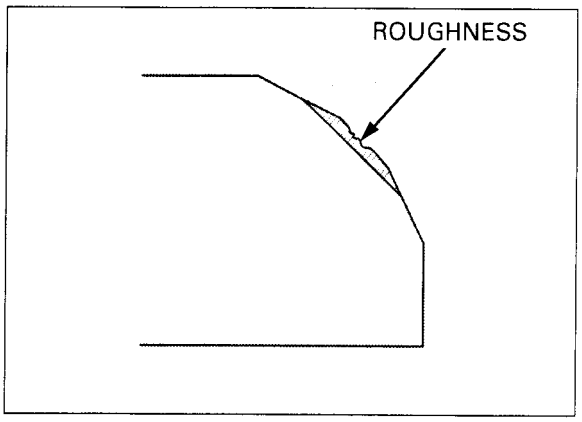


Reface the seat with a 45° cutter whenever a valve guide is

Use a 45° seat cutter, remove any roughness or irregularities from the seat.

TOOLS:

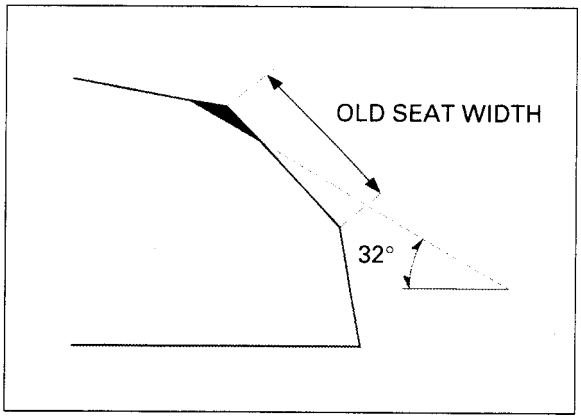
Seat cutter, 33 mm (IN)	**07780-0010800**
Seat cutter, 27.5 mm (EX)	**07780-0010200**
Cutter holder, 5.0 mm	**07781-0010400**



Use a 32° flat cutter, remove 1/4 of the existing valve seat material.

TOOLS:

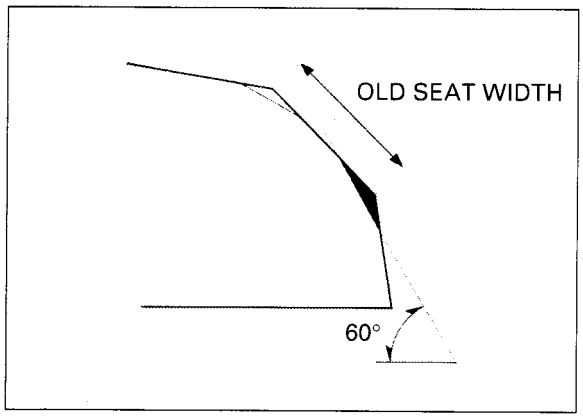
Flat cutter, 33 mm (IN)	**07780-0012900**
Flat cutter, 28 mm (EX)	**07780-0012100**
Cutter holder, 5.0 mm	**07781-0010400**



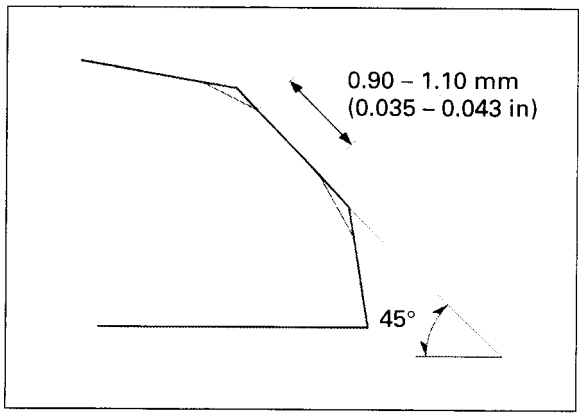
Use a 60° interior cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Interior cutter, 37.5 mm (IN)	**07780-0014100**
Interior cutter, 30 mm (EX)	**07780-0014000**
Cutter holder, 5.0 mm	**07781-0010400**

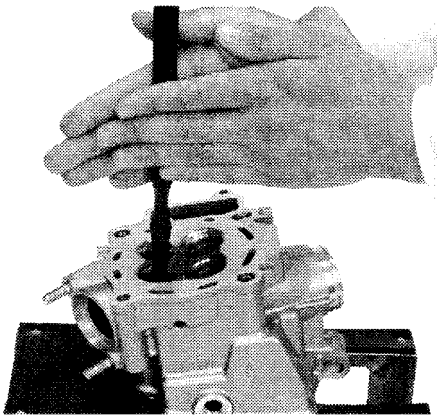


Using a 45° seat cutter, cut the seat to proper width. Make sure all pitting and irregularities are removed. Refinish if necessary.



INTAKE SIDE:

After refacing, wash the cylinder head and valve.
Do not clean the intake valves with sand papers.



⚠CAUTION

- Do not lap the intake valves. They are titamium and have a thin oxide coating.
- Use an used valve to lap the valve seat.

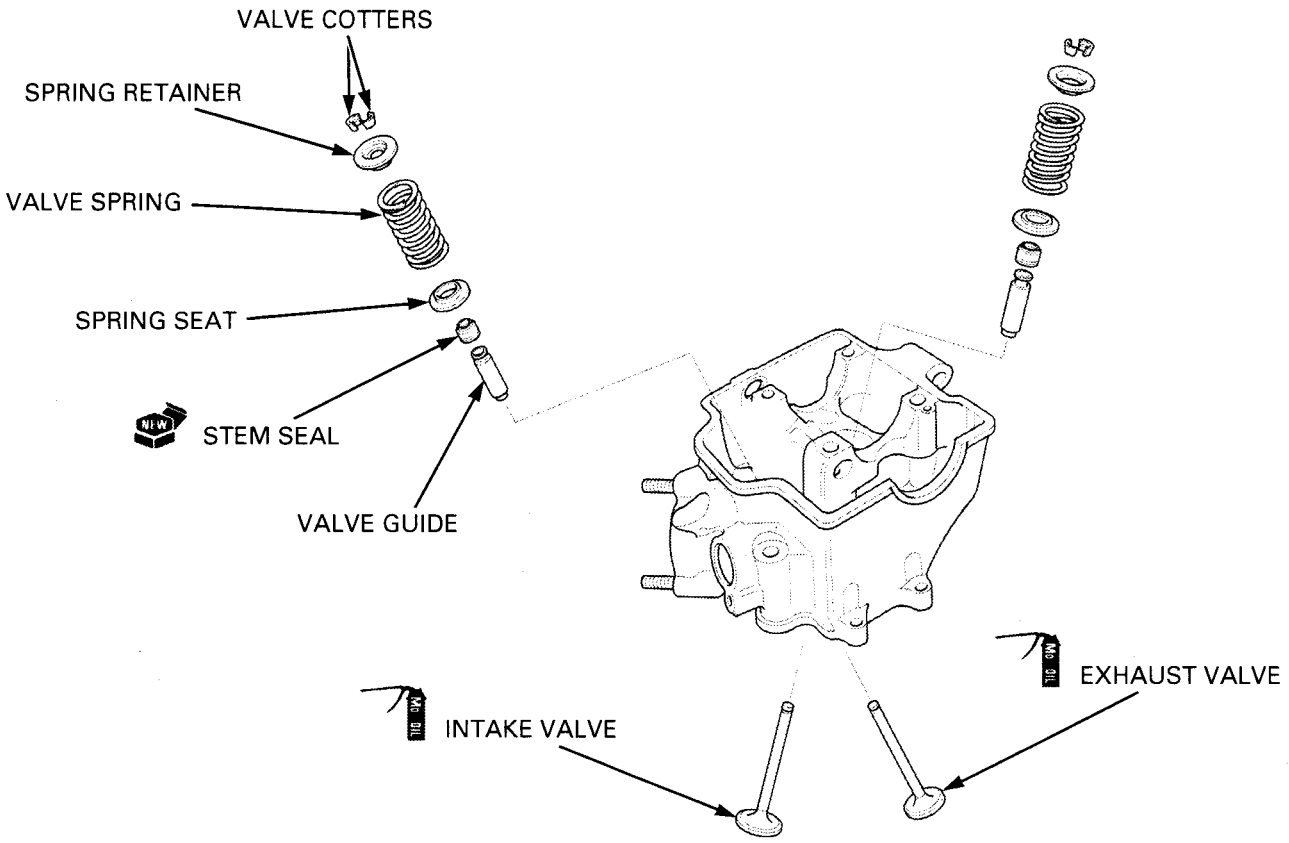
EXHAUST SIDE:

After cutting the exhaust seats, apply lapping compound to the exhaust valve face, and lap the exhaust valve using light pressure.
After lapping, wash any residual compound off the cylinder head and valve.

NOTICE

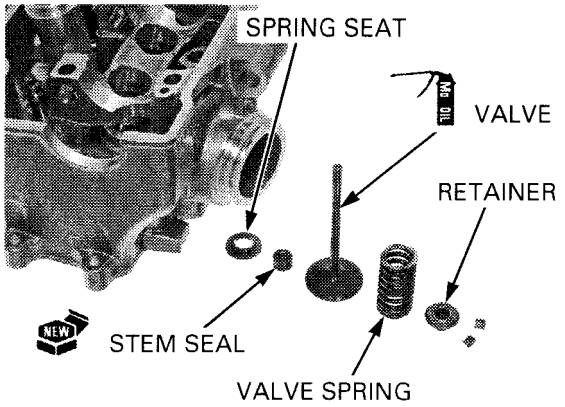
- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of the lapping tool frequently to prevent uneven seat wear.*
- *Do not allow any lapping compound to enter the guides.*

CYLINDER HEAD ASSEMBLY



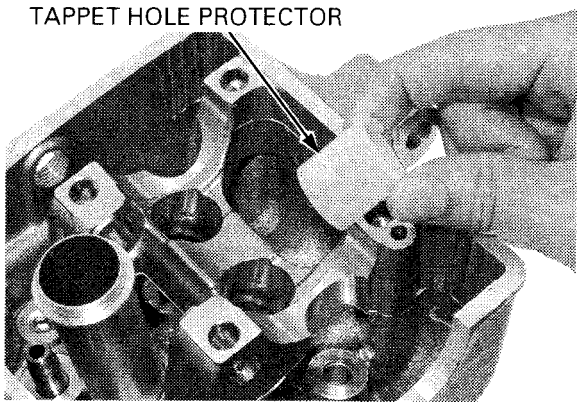
Blow out all oil passages in the cylinder head with compressed air.
Install the spring seat and new stem seal.

Lubricate the valve stem and stem end sliding surface with molybdenum oil solution.
Insert the valve into the guide while turning it slowly to avoid damage to the stem seal.



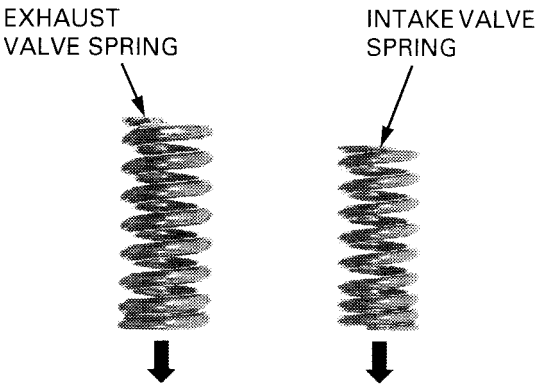
Before installing the intake valve retainer, install the tappet hole protector into the intake valve lifter bore.

TOOL:
Tappet hole protector **07JMG-KY20100**



Install the valve springs with the tightly wound coils facing the combustion chamber.

Install the spring retainers.



Grease the cotters to ease installation.

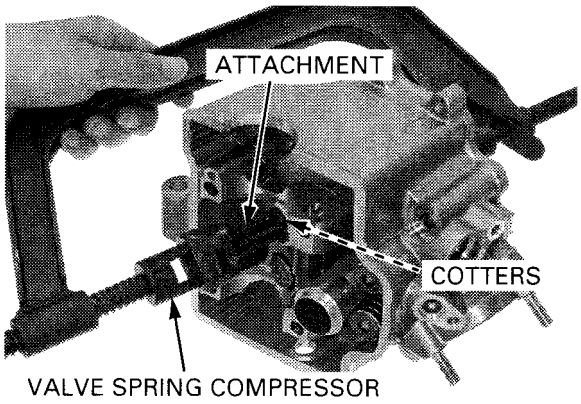
Install the cotters using the special tools.

TOOLS:

Valve spring compressor	**07757-0010000**
Valve spring compressor attachment	**07JME-KY20100**

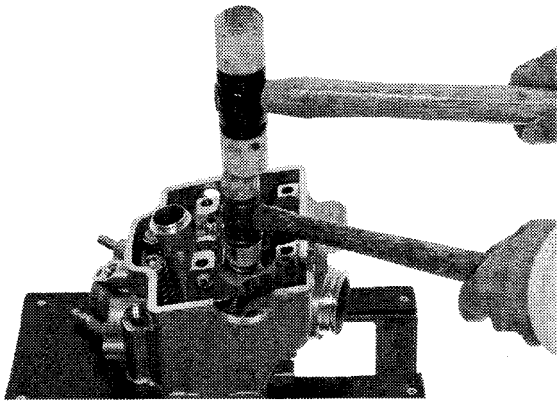
NOTE:

· To prevent loss of tension, do not compress the valve springs more than necessary.



Support the cylinder head so the valve heads do not contact anything that may damage them.

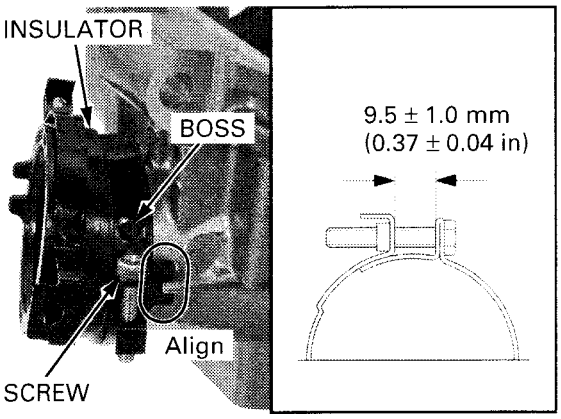
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.



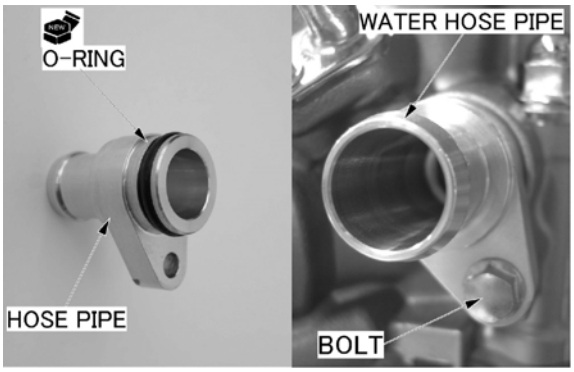
Install the insulator aligning its groove with the lug on the cylinder head.

Align the boss on the insulator with the insulator band hole.

Tighten the insulator band screw so the distance between the band ends is 9.5 ± 1.0 mm (0.37 ± 0.04in).

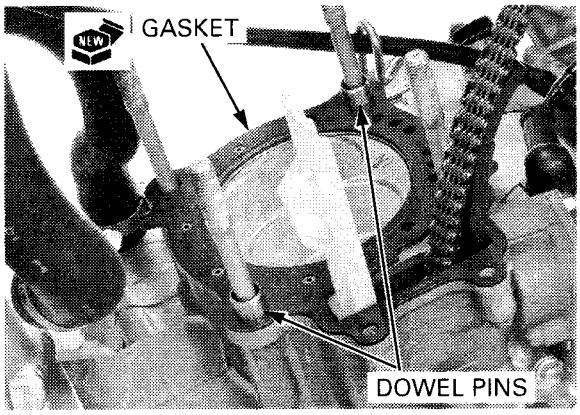


Install a new O-ring, water hose pipe and tighten the bolt.



CYLINDER HEAD INSTALLATION

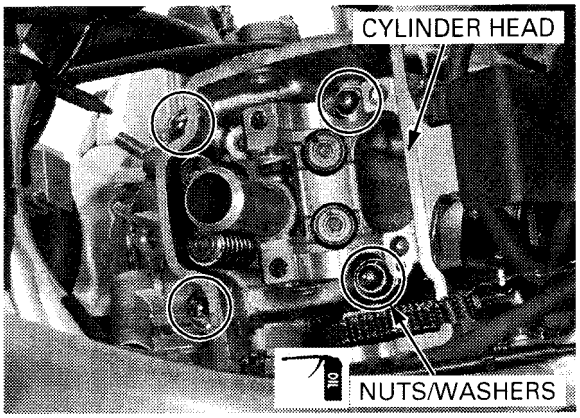
Install the dowel pins and a new gasket.



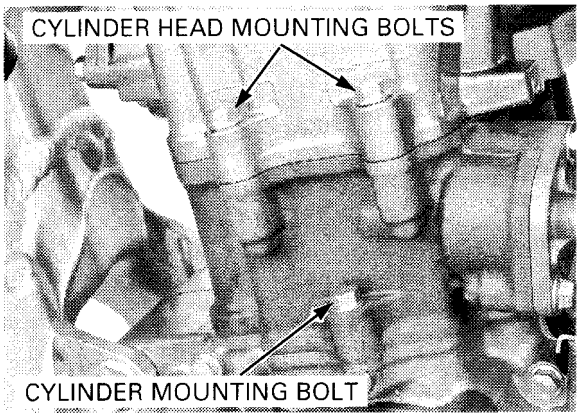
Install the cylinder head onto the cylinder.
Apply oil to the cylinder head nut threads and seating surface.
Install the washers and cylinder head nuts.
Tighten the nuts in a crisscross pattern in two or three steps to the specified torque.

Be careful not to let the nuts and washers fall into the left crankcase

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

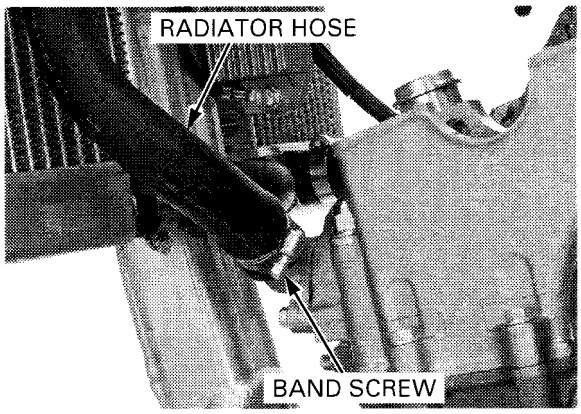


Install the cylinder head mounting bolts.
Tighten the cylinder mounting bolt and cylinder head mounting bolts.



Connect the radiator hose and tighten the band screw securely.
Install the following:
- Rocker arm
- Camshaft
- Cylinder head cover
- Spark plug
- Carburetor
- Exhaust pipe

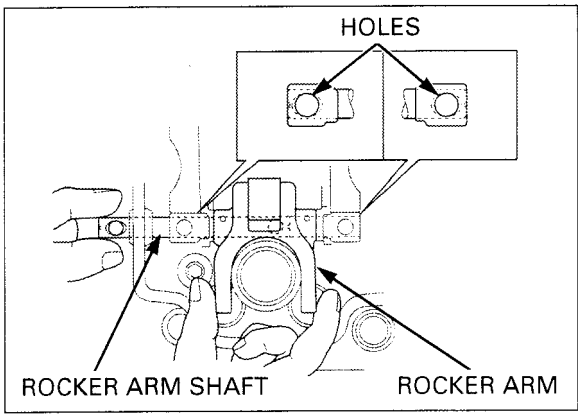
Fill the system with the recommended coolant and bleed the air .



CAMSHAFT/ROCKER ARM INSTALLATION

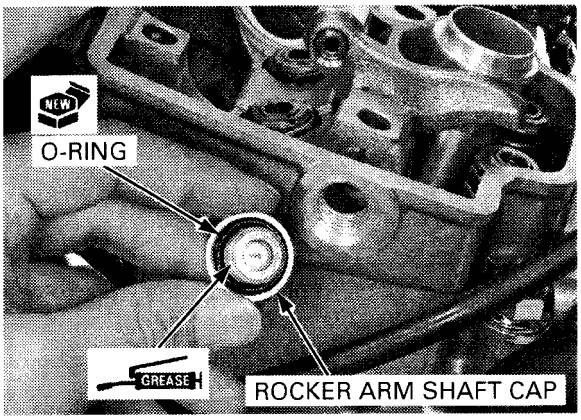
ROCKER ARM

Apply molybdenum oil solution to the rocker arm bore and slipper surfaces.
Install the rocker arm and rocker arm shaft while aligning the camshaft holder bolt holes with the rocker arm shaft holes.



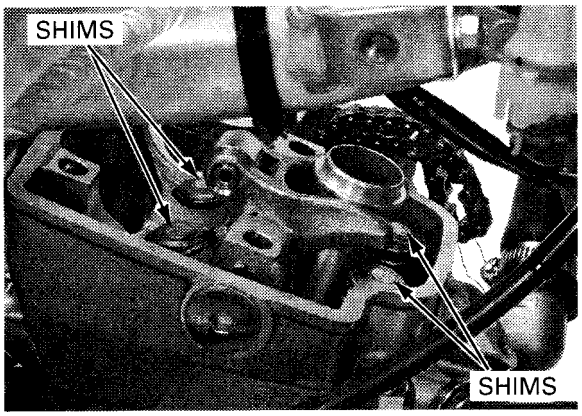
Check that the O-ring is in good condition, and replace if necessary.
Apply oil to the O-ring and install it onto the rocker arm shaft cap.
Apply grease to the rocker arm shaft cap threads.
Install the rocker arm shaft cap and tighten to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.4 lbf·ft)



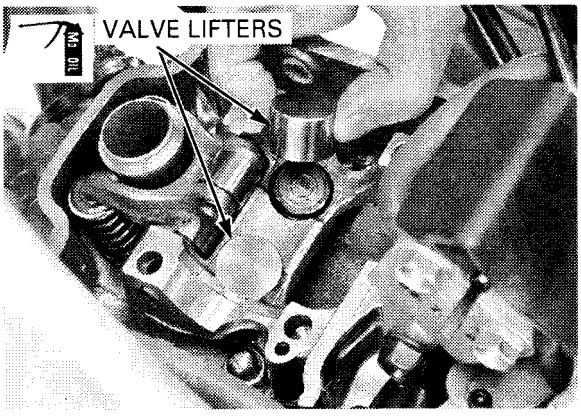
Be careful not to let the shims fall into the left crankcase.

Install the shims in their original locations.

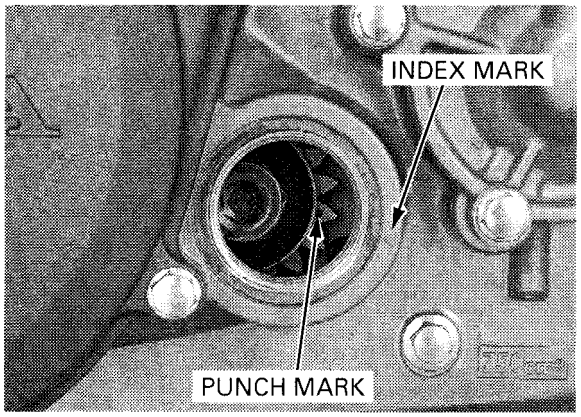


CAMSHAFT

Apply molybdenum oil solution to the outer surface of each valve lifter.
Install the valve lifters in their original locations.

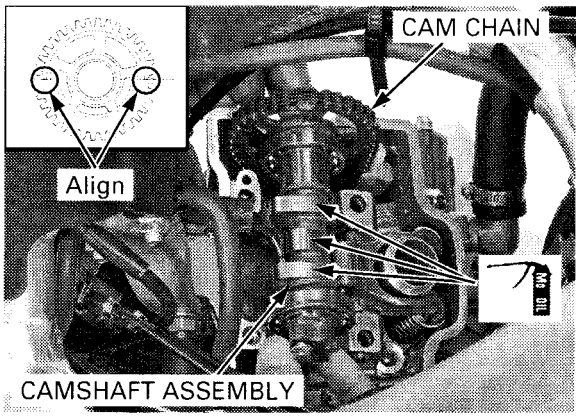


Turn the crankshaft clockwise to align the punch mark with the index mark on the right crankcase cover.
Make sure the piston is at T.D.C. (Top Dead Center).

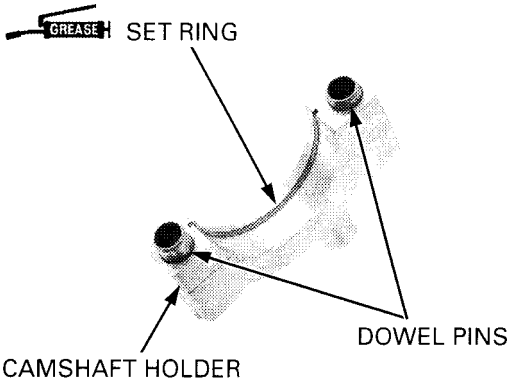


Do not get molybdenum oil solution on the camshaft holder mating surfaces and in the holder bolt holes.

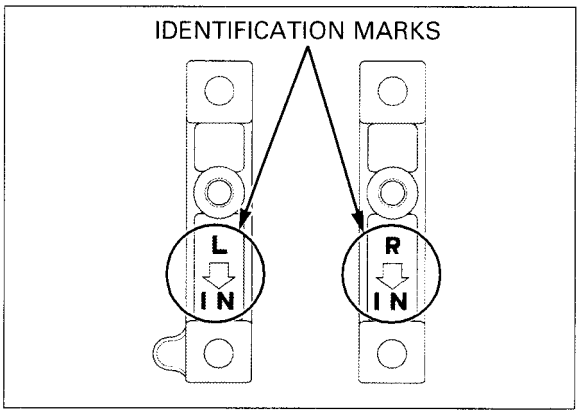
Apply molybdenum oil solution to the cam lobes.
Install the cam chain onto the cam sprocket, then install the cam shaft onto the cylinder head with the intake cam lobes facing rearward.
Align the index line of the cam sprocket with the cylinder head surface.



Check the set ring for damage.
Apply grease to the set ring.
Install the set ring to the camshaft holder groove.
Make sure the dowel pins are installed into the camshaft holder.

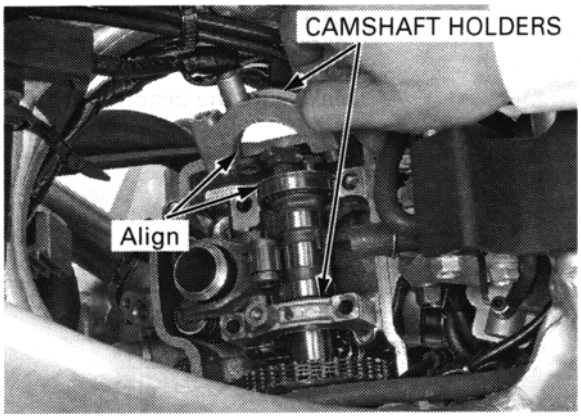


- Each camshaft holder has an identification mark, "L" is for the left side and "R" is for right side.
- Install the camshaft holder with the "IN" (arrow) mark facing to the intake side.



Be careful not to let the set rings fall into the

Install the camshaft holders in their proper position by aligning the camshaft bearing groove with the set ring.



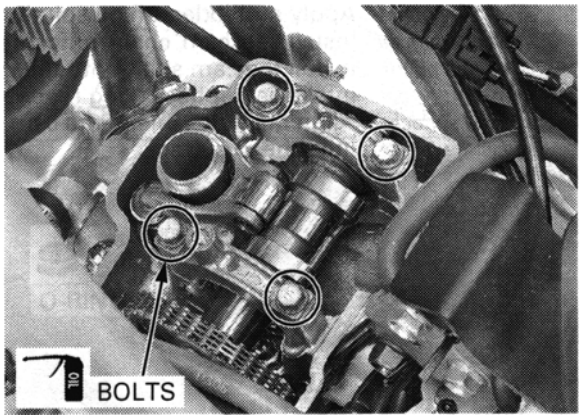
Apply oil to the camshaft holder bolt threads and seating surface.

The exhaust side bolt is longer than the

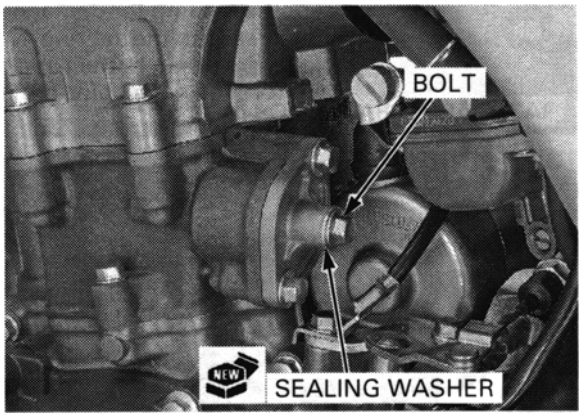
Install the camshaft holder bolts.

Tighten the bolts to the specified torque in a crisscross pattern in two or three steps.

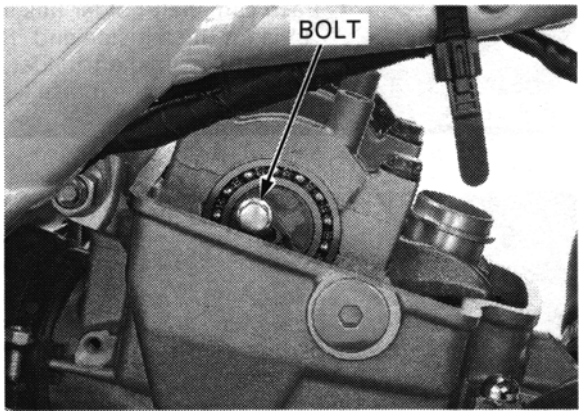
TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



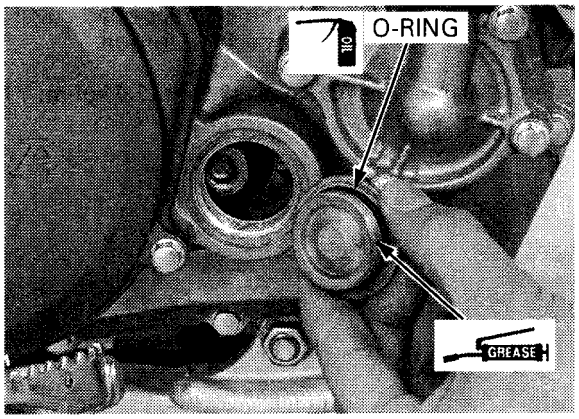
Remove the special tool from the cam chain tensioner lifter.
Install the bolt with a new sealing washer.
Tighten the cam chain tensioner lifter bolt



If decompressor cam is disassembled, tighten the stopper plate bolt.



Check that the O-ring is in good condition, replace if necessary.
Apply transmission oil to the O-ring and install it onto crankshaft hole cap.
Apply grease to the crankshaft hole cap threads.
Install the crankshaft hole cap and tighten it to the specified torque.

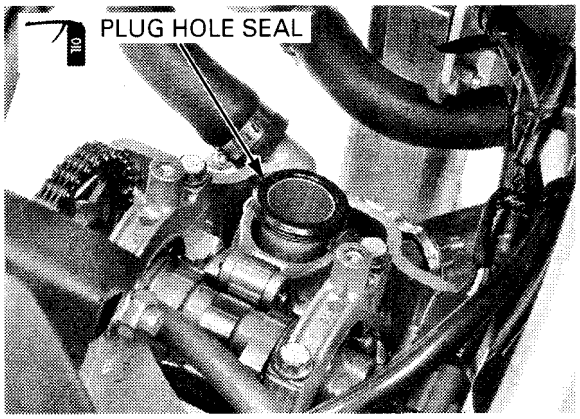


TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

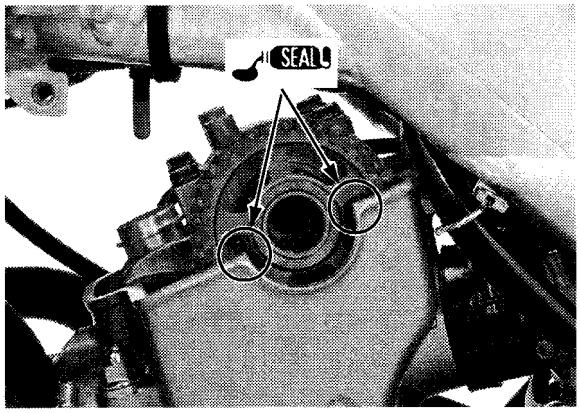
Install the cylinder head cover .

CYLINDER HEAD COVER INSTALLATION

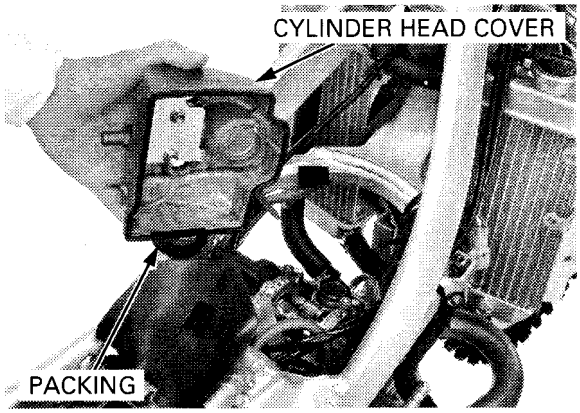
Check the plug hole seal is in good condition, replace if necessary.
Apply oil to the plug hole seal.
Install the plug hole seal.



Apply liquid sealant to the cylinder head and head cover mating surface as shown.

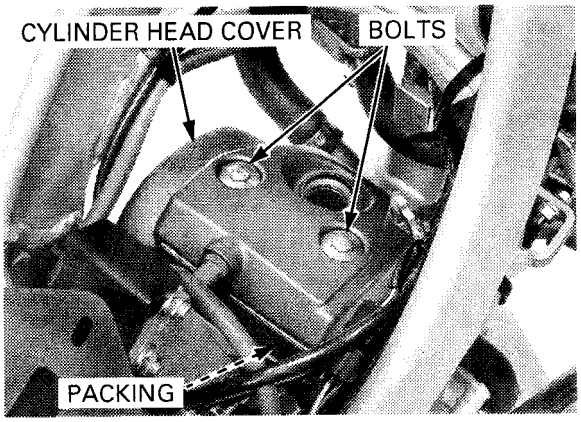


Inspect the cylinder head cover packing for damage or deterioration and replace it with a new one if necessary.

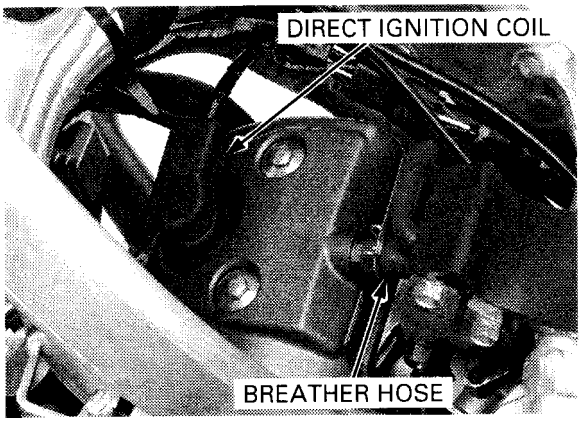


Install the cylinder head cover and tighten the bolts to the specified torque.

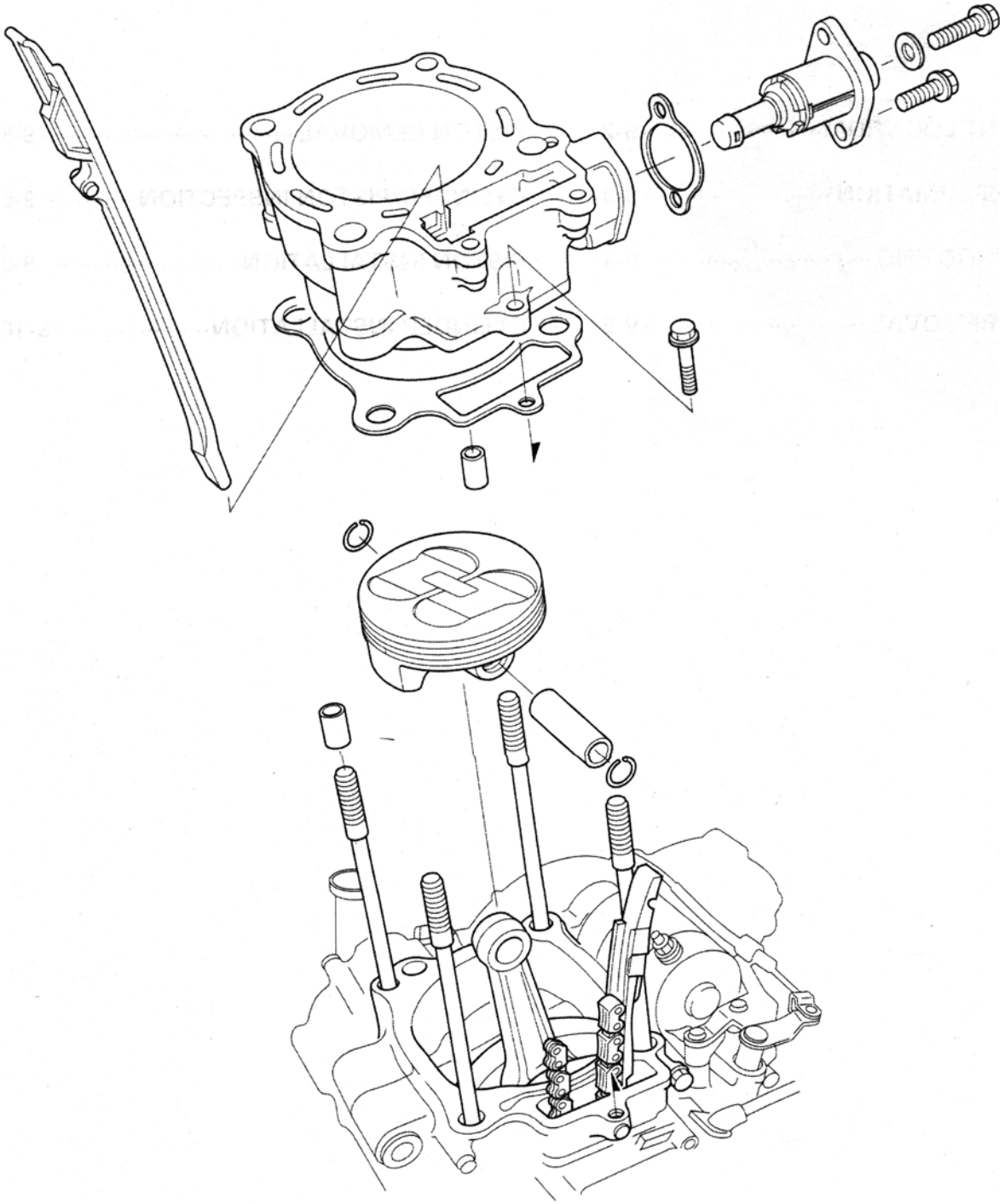
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the cylinder head breather hose.
Install the direct ignition coil.
Install the fuel tank .



COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers maintenance of the cylinder and piston. These procedures can be done with the engine installed in the frame.
- Before disassembly, clean the engine thoroughly to prevent dirt from entering it.
- Be careful not to damage the mating surfaces when removing the cylinder. For example, do not use a screwdriver to pry the cylinder.
- Clean all disassembled parts with clean solvent before inspection, use compressed air to dry the parts.
- Under racing conditions, the piston and piston rings should be replaced after 15 hours of operation. Replace the piston pin after 15 hours of operation.

SPECIFICATION

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		78.000 - 78.015 (3.0709 - 3.0715)	78.025(3.0718)
	Out of round		-	0.010 (0.0004)
	Taper		-	0.010 (0.0004)
	Warpage		-	0.05 (0.002)
Piston, piston ring	Piston mark direction		"IN" mark facing toward the intake side	-
	Piston O.D.		77.970 - 77.980 (3.0697 - 3.0701)	77.940 (3.0685)
	Piston O.D. measurement point		7.0 mm (0.28 in) from the bottom of skirt	-
	Piston pin bore I.D.		16.002 - 16.008 (0.6300 - 0.6302)	16.03(0.631)
	Piston pin O.D.		15.994 - 16.000 (0.6297 - 0.6299)	15.98(0.629)
	Piston-to-piston pin clearance		0.002-0.014(0.0001 -0.0006)	0.04 (0.002)
	Top ring mark		"R" mark side facing up	-
	Piston ring-to-ring groove clearance	Top	0.065 - 0.100 (0.0026 - 0.0039)	0.115(0.0045)
	Piston ring end gap	Top ring	0.15-0.25(0.006-0.010)	0.39(0.015)
		Oil ring (side rail)	0.20-0.70(0.008-0.028)	0.90 (0.035)
Cylinder-to-piston clearance			0.020 - 0.045 (0.0008 - 0.0018)	0.085 (0.0033)
Connecting rod small end I.D.			16.016 - 16.034 (0.6306 - 0.6313)	16.04(0.631)
Connecting rod-to-piston pin clearance			0.016 - 0.040 (0.0006 - 0.0016)	0.06 (0.002)

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing engine noise to the top-end with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring.

Compression too low, hard starting or poor performance at low speed

- Leaking cylinder head gasket
- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston
- Loose soark nlua

Compression too high, over-heating or knocking

- Excessive carbon build-un in cylinder head or on top of piston

Abnormal noise

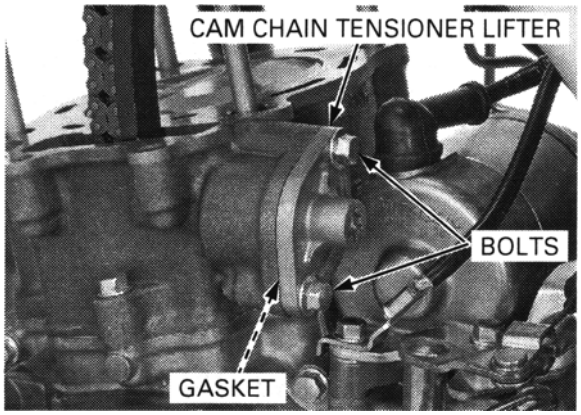
- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn connecting rod big end

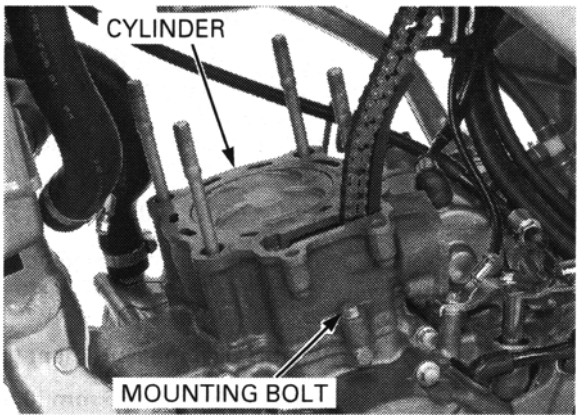
Excessive smoke

- Worn cylinder, piston and piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

CYLINDER REMOVAL

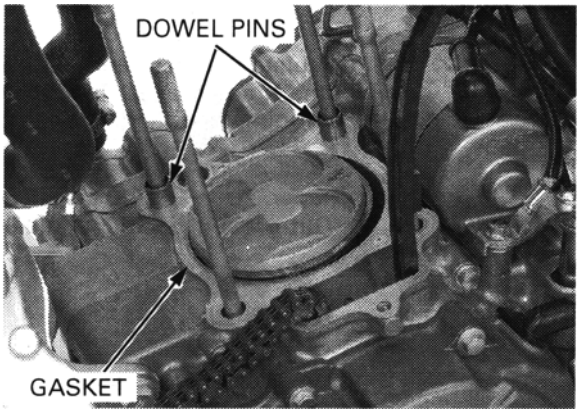
Remove the cylinder head.
Remove the bolts, cam chain tensioner lifter and gasket.
Remove the mounting bolt and cylinder.





Prevent the cam chain from falling into the crankcase.

Remove the dowel pins and gasket.

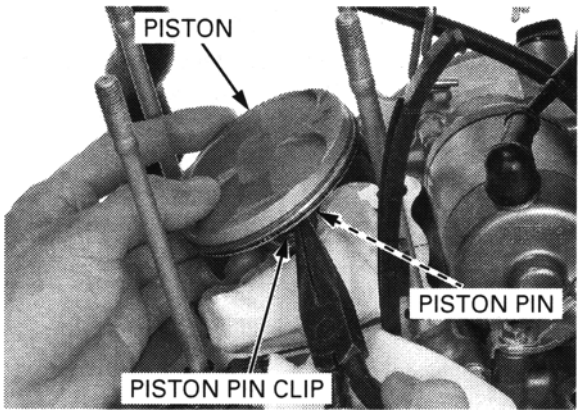


PISTON REMOVAL

Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

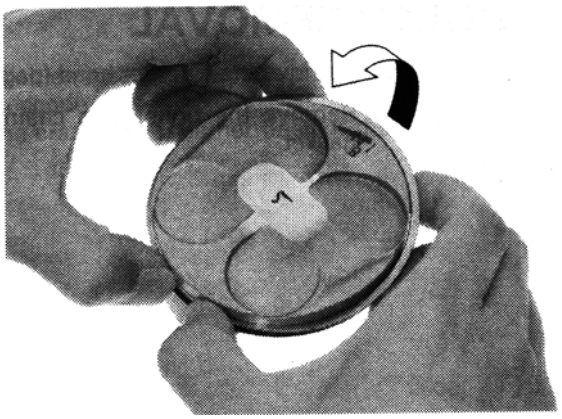
Remove the piston pin clips with pliers.
Press the piston pin out of the piston and remove the piston.

- Under racing conditions, the piston, piston rings and piston pin should be replaced according to the maintenance schedule .



Piston rings are easily broken; take care not to damage them during removal.

Spread the piston rings and remove them by lifting up at a point just opposite the gap.

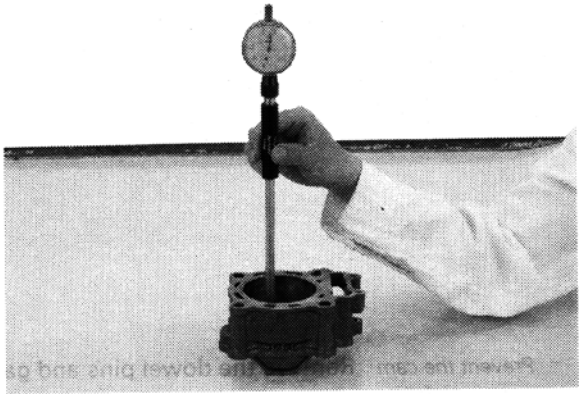


CYLINDER/PISTON INSPECTION

CYLINDER

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in the X and Y axes at three levels.
Take the maximum reading to determine the cylinder wear.

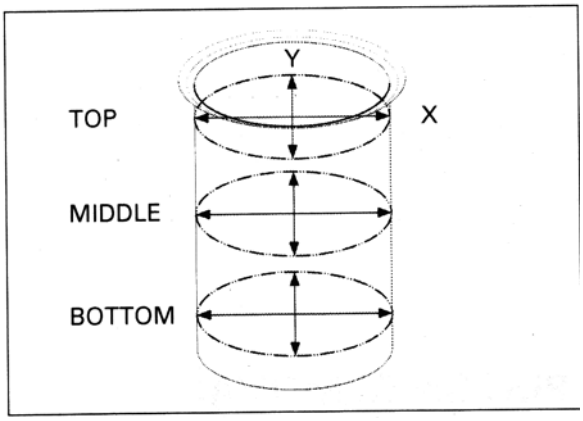
SERVICE LIMIT: 78.025 mm (3.0718 in)



Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.

- Piston O.D measurement

SERVICE LIMIT: 0.085 mm (0.0033 in)

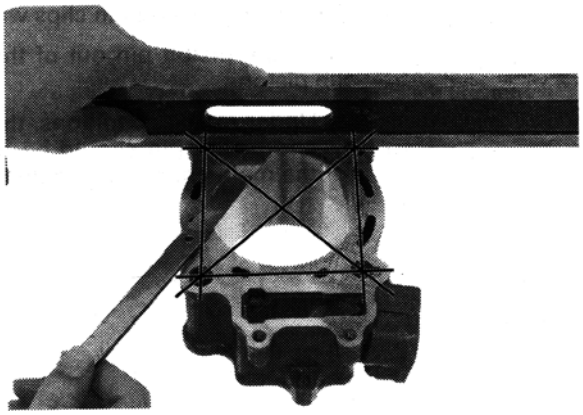


Calculate the taper and out-of-round at three levels in the X and Y axes. Take the maximum reading to determine the cylinder condition.

SERVICE LIMITS:
Taper: 0.010 mm (0.0004 in)
Out-of-round: 0.010 mm (0.0004 in)

Inspect the top of the cylinder for warpaqe.

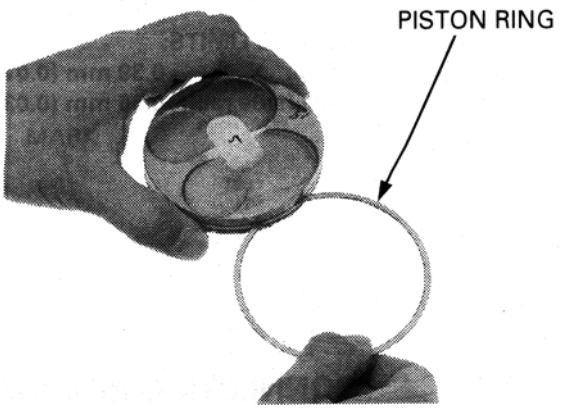
SERVICE LIMIT: 0.05 mm (0.002 in)



PISTON/PISTON RING INSPECTION

Clean carbon deposits from the ring grooves with a ring that will be discarded, never use a wire brush; it will scratch the groove.

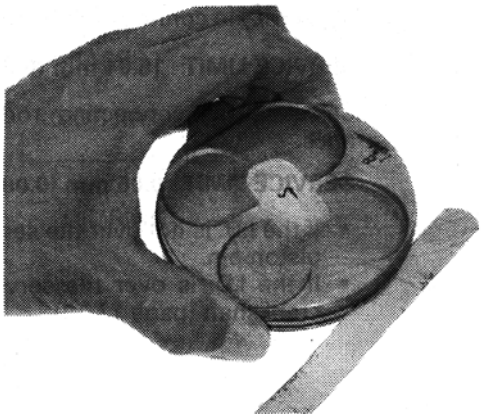
Remove the carbon deposits from the piston head and piston ring grooves.
Inspect the piston for damage, and the ring grooves for wear.



Temporarily install the top ring to their proper position with the mark facing up.
Measure the piston ring-to-groove clearance with the ring pushed into the groove.

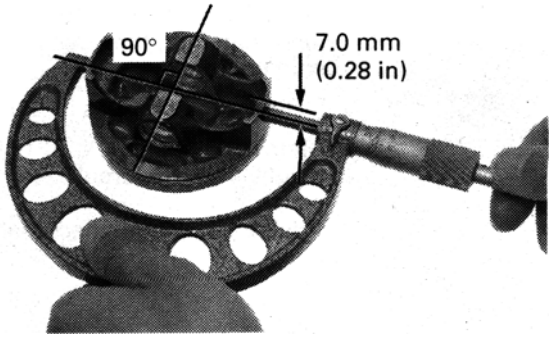
SERVICE LIMIT: 0.115 mm (0.0045 in)

Inspect the piston ring grooves for wear or damage.



Measure the diameter of the piston at 7.0 mm (0.28in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 77.940 mm (3.0685 in)



If the piston O.D. is less than the service limit, or nearly 15.0 hours of running time have elapsed (competition use only), replace the piston with a new one.

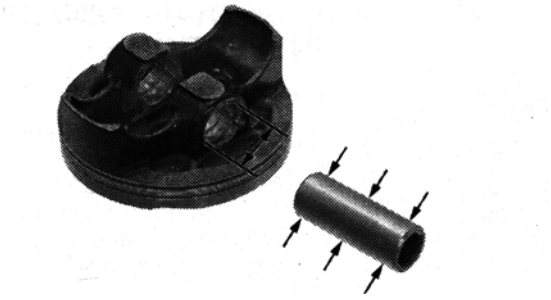
Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.085 mm (0.0033 in)

Measure the piston pin bore I.D.

SERVICE LIMIT: 16.03 mm (0.631 in)

Check the piston pin for wear and excessive discoloration.
Measure the piston pin O.D.



SERVICE LIMIT: 15.98 mm (0.629 in)

If the piston pin O.D. is less than the service limit, or piston pin surface is discolored, or nearly 2000 km of running time have elapsed (competition use only), replace the piston pin.

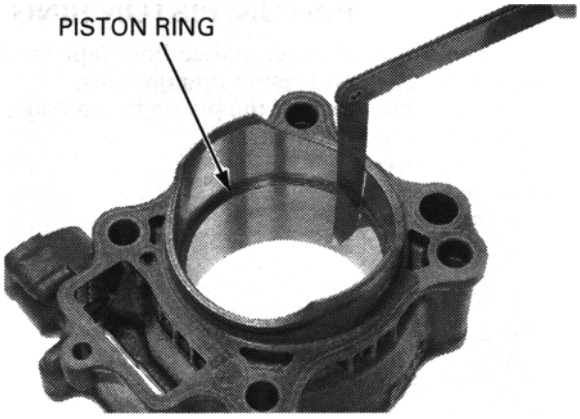
Calculate the piston pin-to-piston clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)

Push the ring into the cylinder with the top of the piston to be sure the ring is squarely in the cylinder.

Insert each piston ring into the cylinder and measure the ring end gap.

SERVICE LIMITS:
Top: 0.39 mm (0.015 in)
Oil (side rail): 0.90 mm (0.035 in)



CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

SERVICE LIMIT: 16.04 mm (0.631 in)

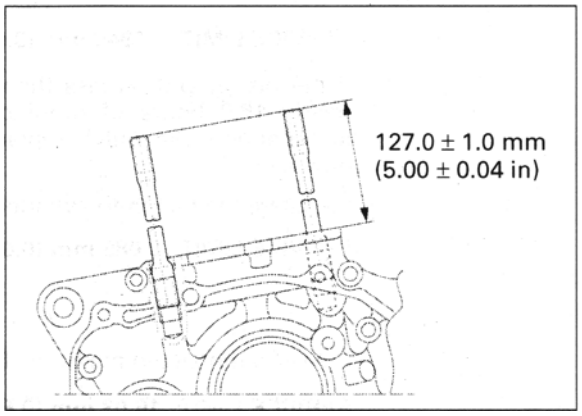
Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

- If the I.D. is not over the service limit, replace the piston pin.
- If the I.D. is over the service limit, replace the crankshaft .

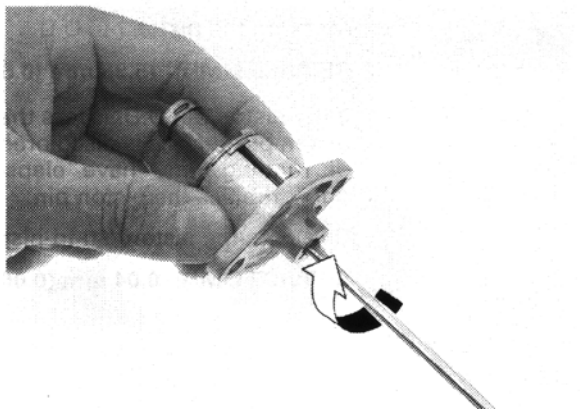
CYLINDER STUD BOLT REPLACEMENT

Thread two nuts onto the stud bolt, and tighten them together, then use wrench on them to turn the stud bolt out.
Install new stud bolts into the crankcase.
After installing the stud bolts, check that the stud height from the crankcase surface is within specification.
Adjust the height if necessary.



CAM CHAIN TENSIONER LIFTER INSPECTION

Check the lifter operation:
- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the body. The shaft should spring out of the body as soon as the screwdriver is released.



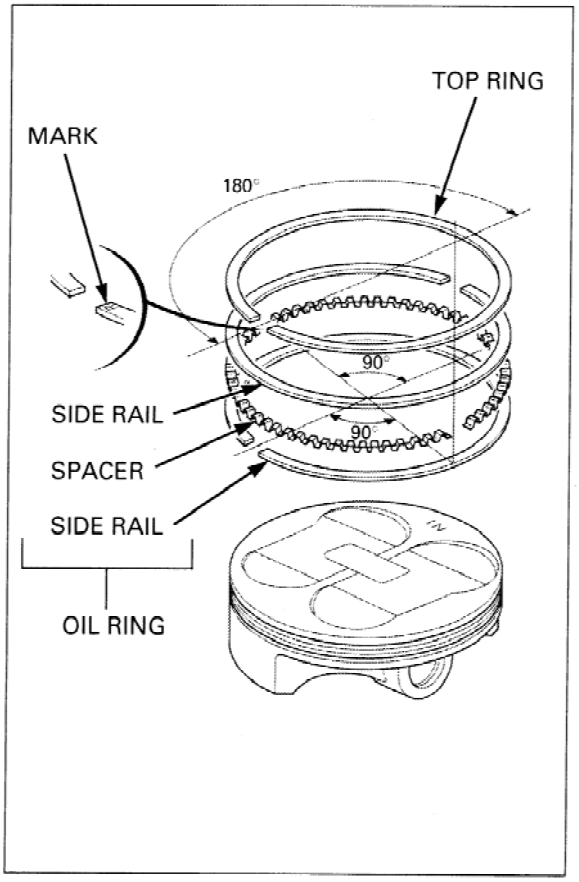
PISTON RING

Install the top ring with the marked side facing up

Clean the piston ring grooves thoroughly.
Apply oil to the piston rings and install them onto the piston.

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston during piston ring installation.
- Do not align the oil ring (side rails) gaps.
- Space each piston ring end as shown.

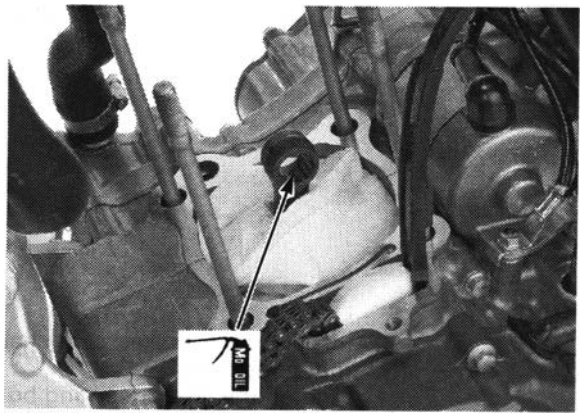
After installation, the rings should rotate freely in the ring grooves.



PISTON INSTALLATION

When cleaning the cylinder mating surface, place a shop towel over the cylinder

Clean any gasket material from the cylinder mating surfaces of the crankcase.
Apply molybdenum oil solution to the connecting rod small end.



Place a shop towel around the piston skirt and in the crankcase to prevent the piston pin clips from falling into the crankcase.

Apply oil to the piston pin outer surface and piston pin hole of the piston.

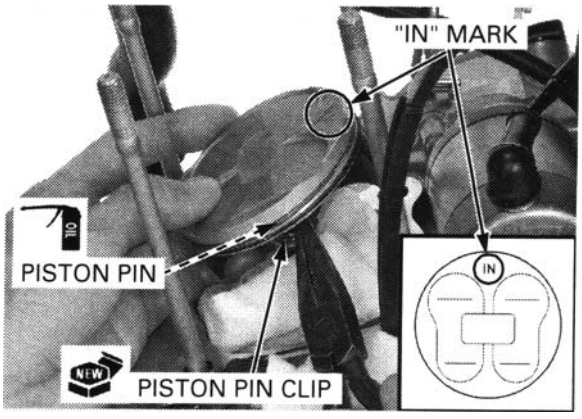
Install the piston with the "IN" mark facing intake side.

Be careful not to drop the piston pin clip into the crankcase.

Install the piston pin and new piston pin clips.

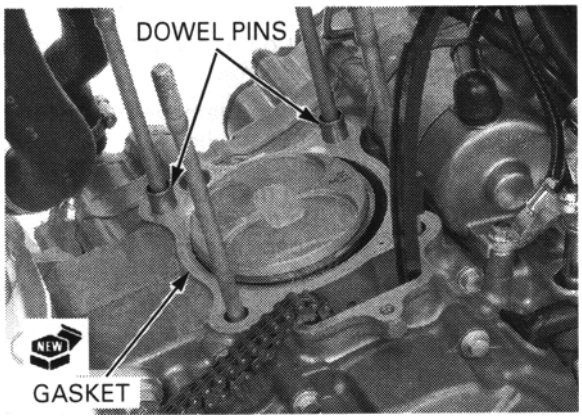
- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

Do not align the piston pin clip end gap with the piston nut-nut



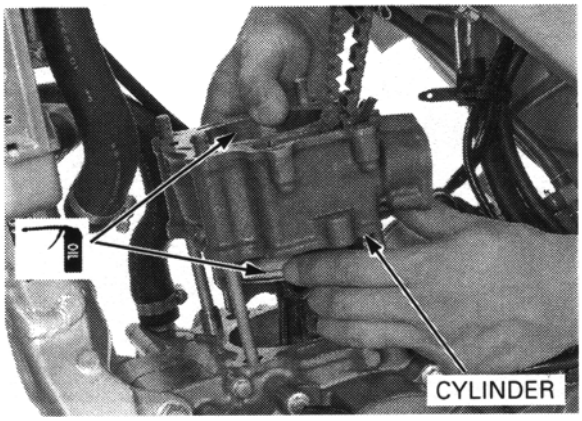
CYLINDER INSTALLATION

Install the dowel pins.
Install a new cylinder base gasket on the crankcase.



Avoid piston ring damage during installation.

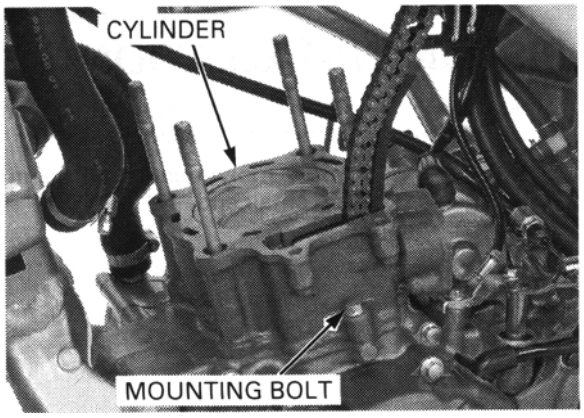
Coat the cylinder bore, piston and piston rings with oil and install the cylinder while compressing the piston rings.



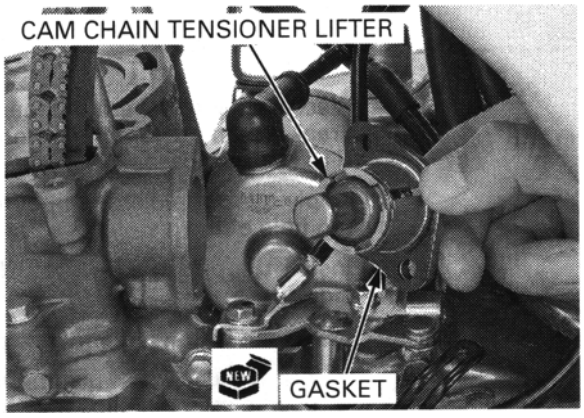
Install the cylinder mounting bolt.

NOTE:

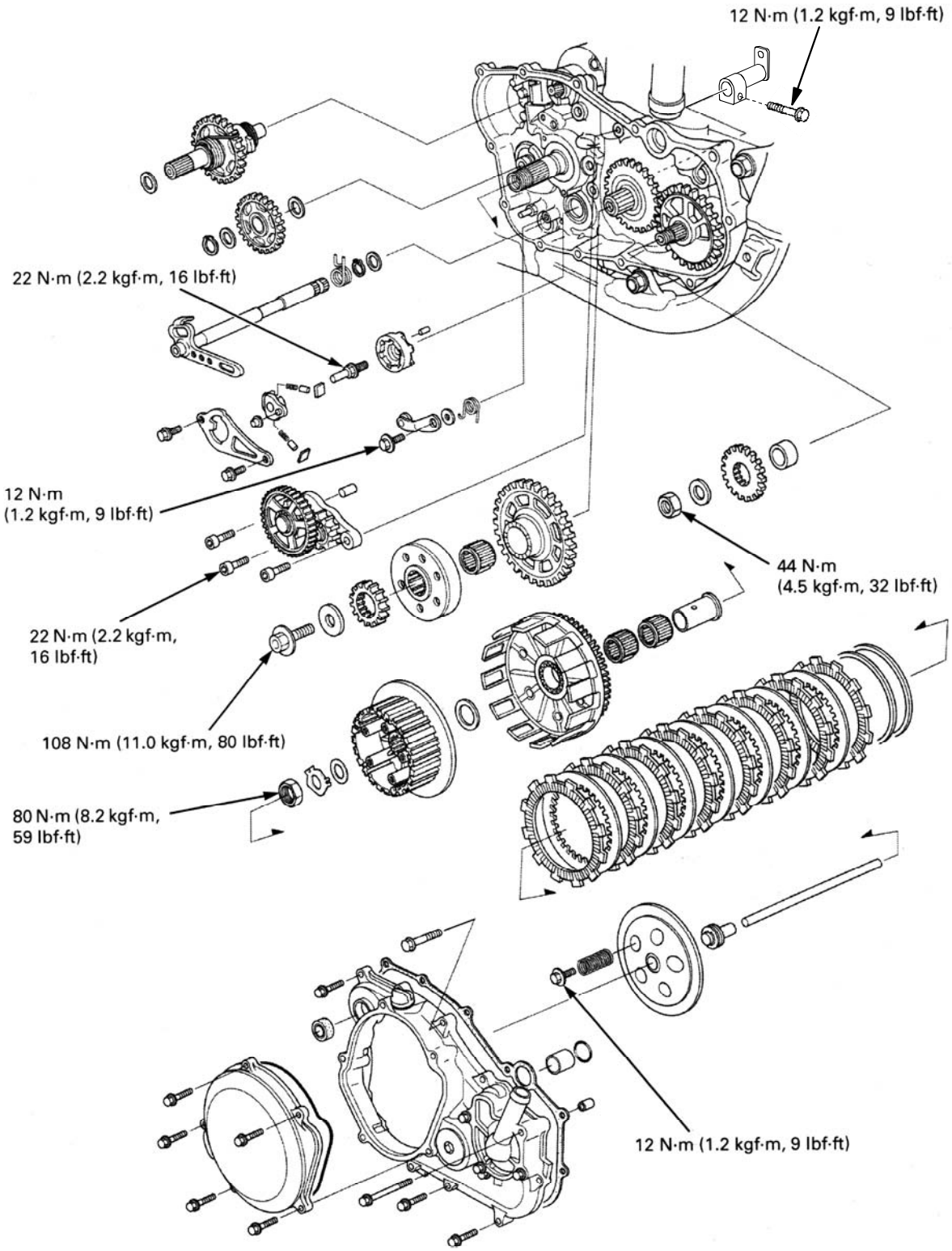
· After tightening the cylinder head mounting nut, tighten the cylinder mounting bolt securely .



Install a new gasket, cam chain tensioner lifter and mounting bolts.
Tighten the lifter mounting bolts securely.
Install the cylinder head .



COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

· This section covers service of the clutch, starter clutch, and gearshift linkage. All service can be done with the engine installed in the frame.
· Transmission oil viscosity and level have an effect on clutch disengagement. Oil additives also affect clutch performance and are not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch pulled in, inspect the transmission oil level before servicing the clutch system.

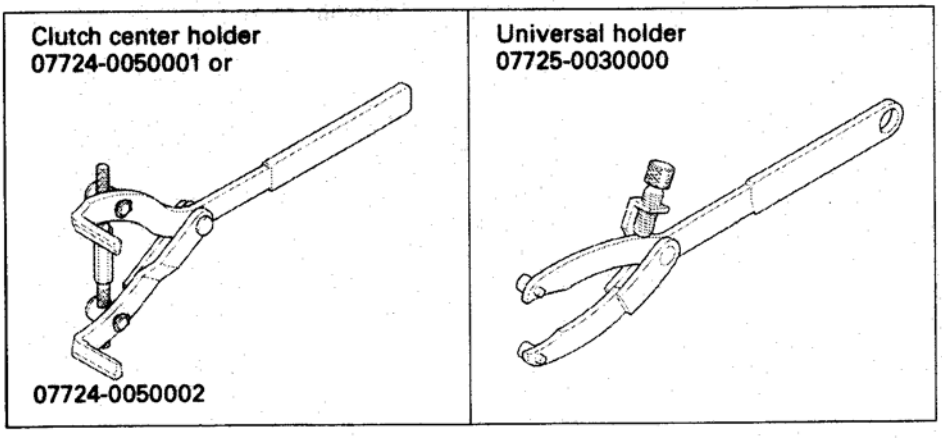
SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10-20(3/8-13/16)	
Clutch spring free length		38.8(1.53)	38.0 (1.50)
Clutch disc A thickness		2.92-3.08(0.115-0.121)	2.85(0.112)
Clutch disc B thickness		2.92 - 3.08 (0.115 - 0.121)	2.85(0.112)
Clutch plate warpage			0.10 (0.004)
Kickstarter pinion gear I.D.		16.516 - 16.534 (0.6502 - 0.6509)	16.55.(0.652)
Kickstarter spindle O.D.		16.466 - 16.484 (0.6483 - 0.6490)	16.46(0.648)
Kickstarter idle gear I.D.		17.016 - 17034 (0.6699 - 0.6706)	1706(0.672)
Countershaft O.D. at kickstarter idle gear		16.983 - 16.994 (0.6686 - 0.6691)	16.97(0.668)
Starter driven gear boss	I.D.	35.009 - 35.034 (1.3783 - 1.3793)	35.07(1.381)
	O.D.	45.660 - 45.673 (1.7976 - 1.7981)	45.64(1.797)
Starter reduction gear I.D.		12.016 - 12.034 (0.4731 - 0.4738)	12.05(0.474)
Starter idle gear I.D.		12.016 - 12.034 (0.4731 - 0.4738)	12.05(0.474)
Starter gear holder shaft O.D.		11.983 - 11.994 (0.4718 - 0.4722)	11.98 (0.472)

TORQUE VALUES

Clutch center lock nut	80 N-m (8.2 kgf-m, 59 lbf-ft)	Apply engine oil to the threads and seating surface.
Clutch spring bolt	12N-m(1.2kgf-m, 9lbf-ft)	
Shift drum center pin	22 N-m (2.2 kgf-m, 16 lbf-ft)	Apply locking agent to the threads.
Shift drum stopper arm pivot bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Starter gear holder mounting bolt	22 N-m (2.2 kgf-m, 16 lbf-ft)	
Kickstarter pedal bolt	38 N-m (3.9 kgf-m, 28 lbf-ft)	
Gearshift pedal pinch bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Gearshift spindle return spring pin	22 N-m (2.2 kgf-m, 16 lbf-ft)	
Primary drive gear bolt	108 N-m (11.0 kgf-m, 80 lbf-ft)	Apply engine oil to the threads and seating surface.
Water pump drive gear nut	44 N-m (4.5 kgf-m, 32 lbf-ft)	Apply engine oil to the threads and seating surface.

TOOLS



TROUBLESHOOTING

Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Bent shift fork claw
- Bent shift fork shaft
- Incorrect clutch adjustment
- Loose guide plate bolt
- Damaged shift drum center and pin

Transmission jumps out of gear

- Worn or damaged shift drum stopper arm
- Weak or broken shift drum stopper arm return spring
- Loose guide plate bolt
- Bent shift fork shaft
- Damaged shift drum guide groove
- Damaged or bent shift fork
- Worn gear engagement dogs or slot

Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift

Clutch slips when accelerating

- Incorrect clutch adjustment
- Worn clutch discs
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additives

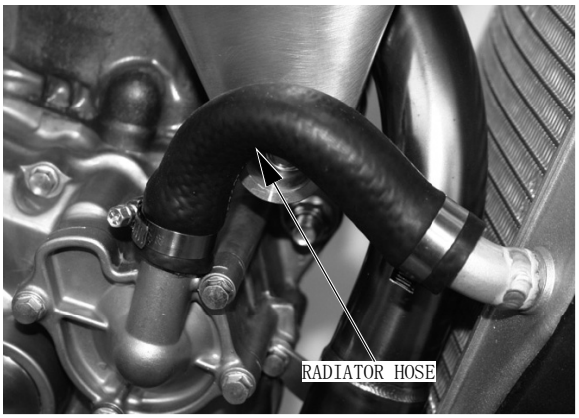
Motorcycle creeps with the engine idling

- Incorrect clutch adjustment
- Clutch plate warped
- Faulty clutch lifter
- Incorrect transmission oil

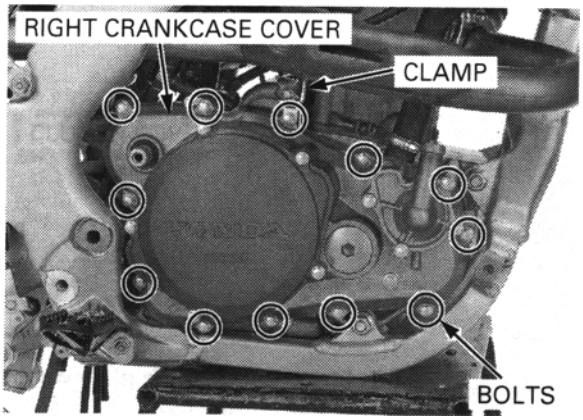
RIGHT CRANKCASE COVER

REMOVAL

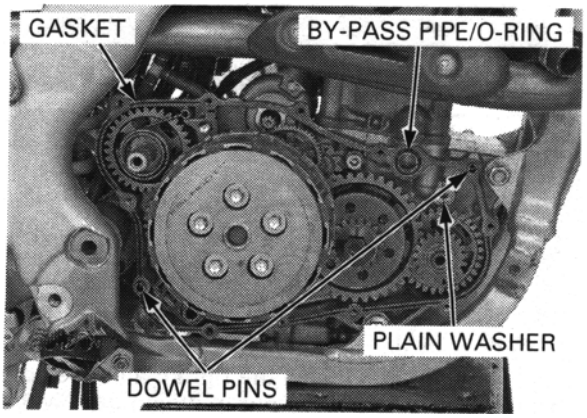
Drain the coolant.
Drain the transmission oil.
-Loosen the hose band screw and disconnect the radiator hose from the water pump cover.



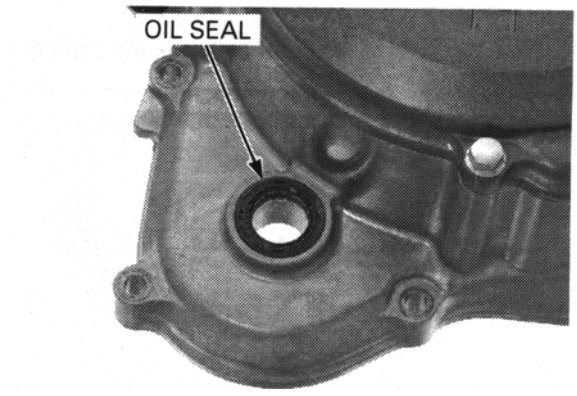
Loosen the right crankcase cover bolts in a crisscross pattern in two or three steps.
Remove the bolts. clamp and right crankcase cover.



Remove the water by-pass pipe and 0-ring
Remove the gasket and dowel pins.
Remove the plain washer.

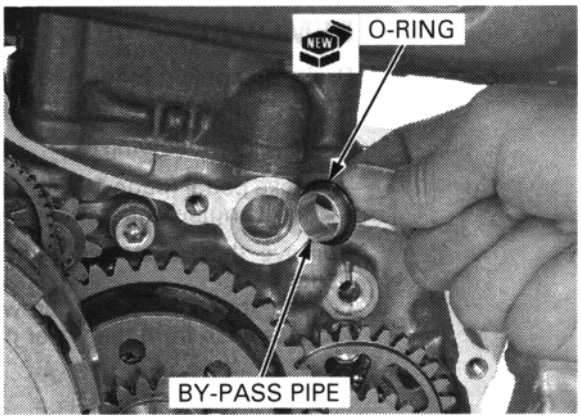


Check the kickstarter spindle oil seal for deterioration or damage.

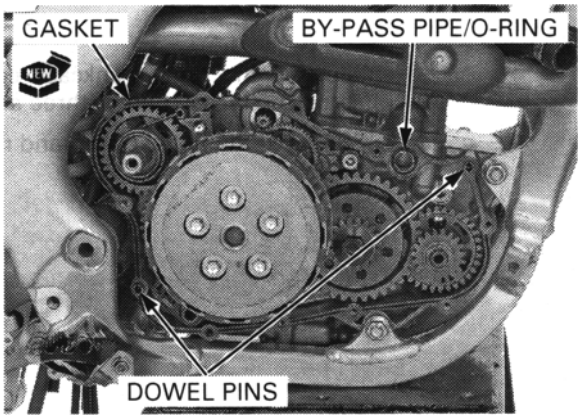


INSTALLATION

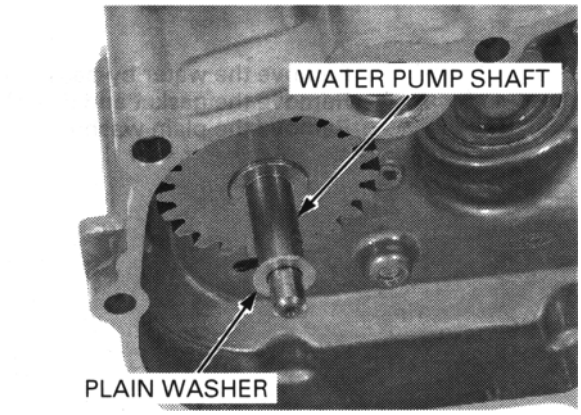
Install a new O-ring onto the by-pass pipe.
Install the by-pass pipe into the crankcase.



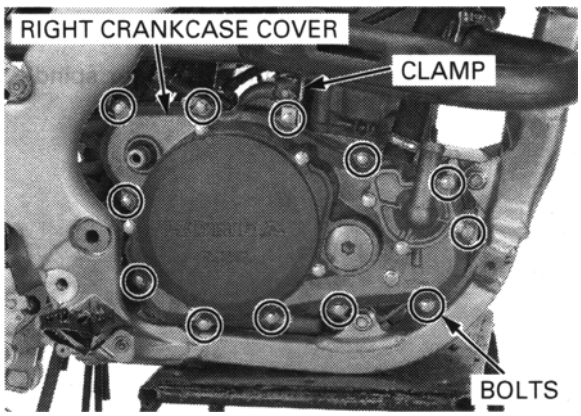
Install the dowel pins and a new gasket



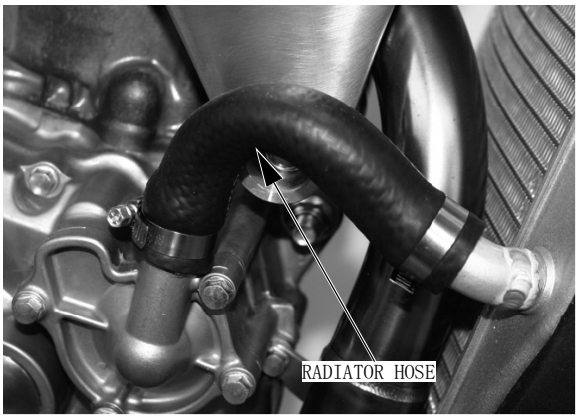
Make sure that the plain washer is installed onto the water pump shaft.



Install the right crankcase cover while engaging the water pump driven gear with the water pump drive gear.
Install the clamp and right crankcase cover bolts.
Tighten the right crankcase cover bolts in a crisscross pattern in two or three steps.



Connect the radiator hose to the water pump cover and tighten the hose band screw securely.

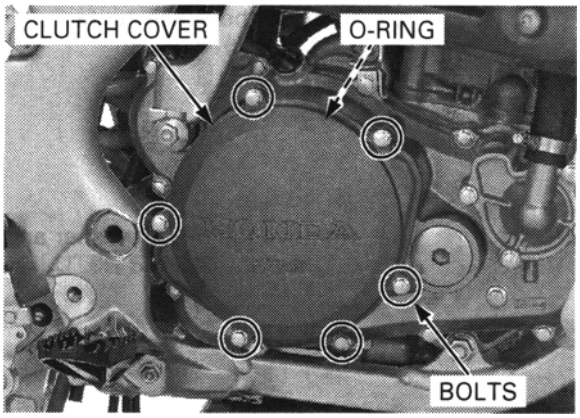


Install the following:
Fill the cooling system with the recommended coolant and bleed the air.
Fill the transmission with the recommended transmission oil.
Check and adjust the rear brake pedal height.
Start the engine and check for oil leaks.

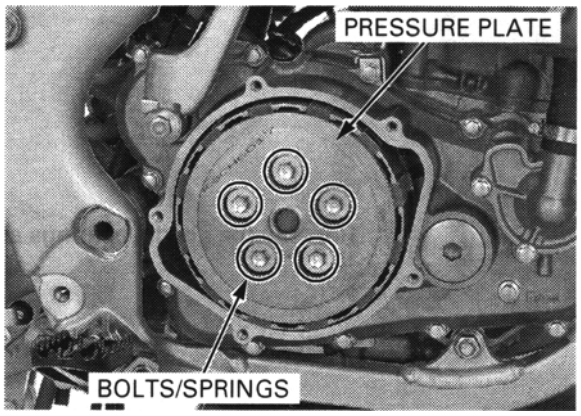
CLUTCH

REMOVAL

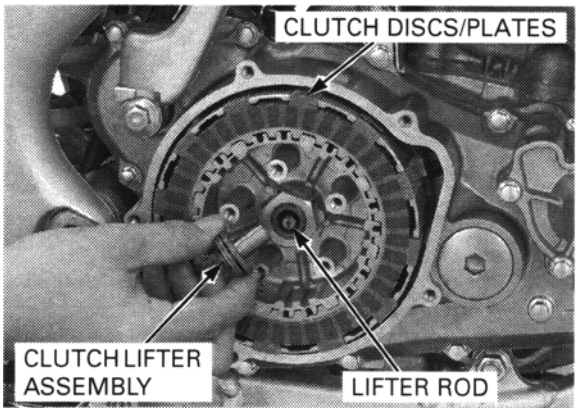
Drain the transmission oil .
Remove the brake pedal .
Remove the bolts, clutch cover and O-ring



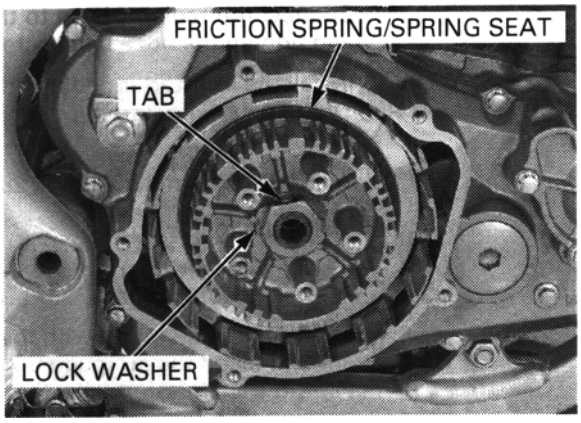
Loosen the five clutch spring bolts in a crisscross pattern in two or three steps.
Remove the bolts and clutch springs.
Remove the clutch pressure plate.



Remove the clutch lifter assembly and clutch lifter rod.
Remove the eight clutch discs and seven clutch plates.



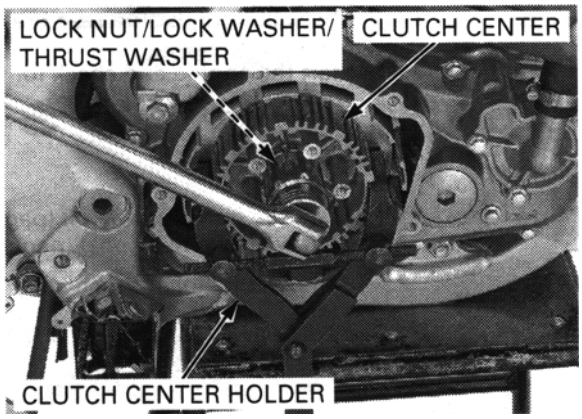
Remove the friction spring and spring seat.
Bend the tabs of the lock washer away from the lock nut.



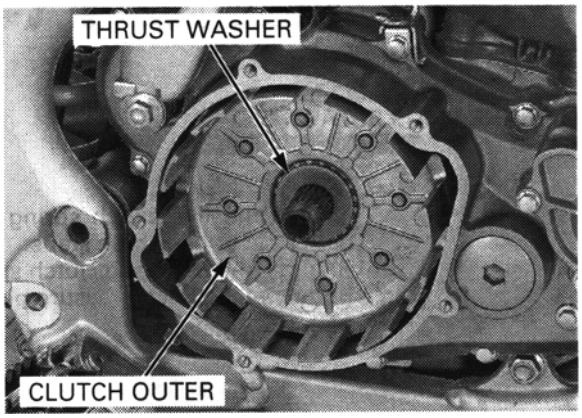
Remove the clutch center lock nut using the special tool.

TOOL:
Clutch center holder **07724-0050001 or 07724-0050002**

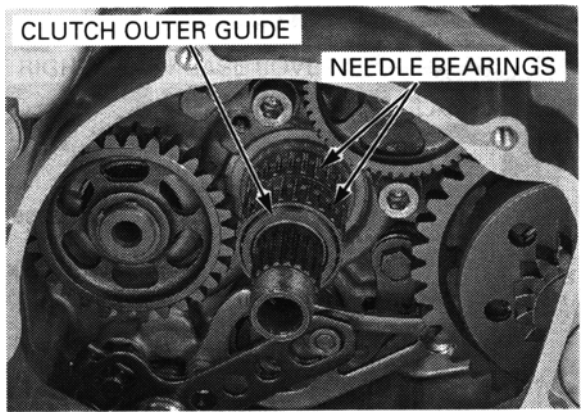
Remove the lock washer and thrust washer
Remove the clutch center.



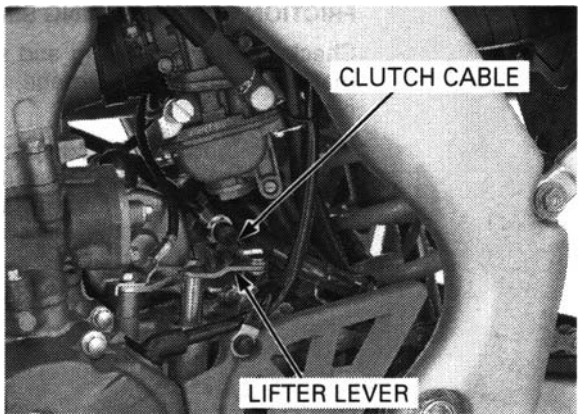
Remove the thrust washer and clutch outer.



Remove the needle bearings and clutch outer guide



Disconnect the clutch cable from the clutch lifter lever.
Remove the clutch lifter lever from the left crankcase.



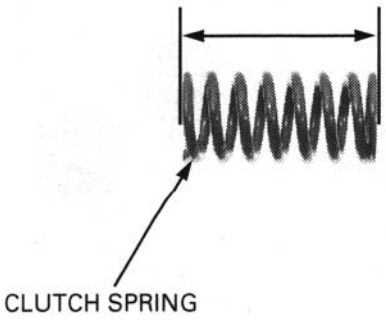
INSPECTION

CLUTCH SPRING

Measure the clutch spring free length.

Clutch springs should be replaced as a set if one or more is less than the

SERVICE LIMIT: 38.0 mm (1.50 in)

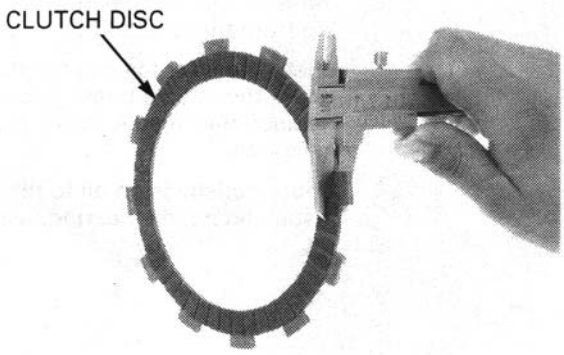


CLUTCH

Check the clutch discs for signs of scoring or discoloration.
Measure the thickness of each disc.

Clutch discs should be replaced as a set if one or more is

SERVICE LIMIT: 2.85 mm (0.112 in)

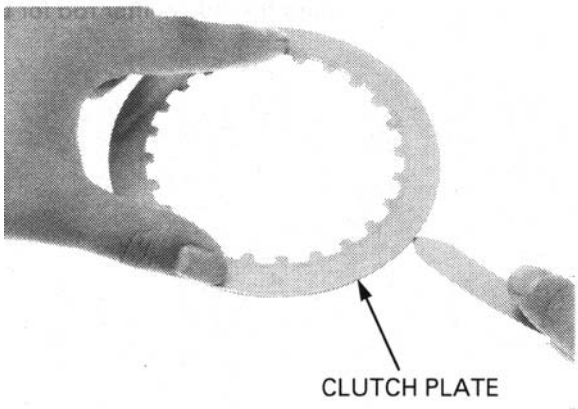


CLUTCH PLATES

Check the plates for excessive warpage or discoloration.
Check the plate warpage on a surface plate using a feeler gauge.

Clutch plates should be replace as a set if one or more exceed the service limit.

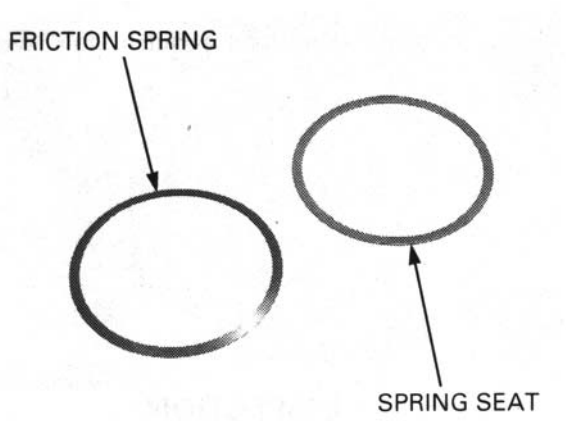
SERVICE L MIT: 0.10 mm (0.004 in)



FRICTION SPRING/SPRING SEAT

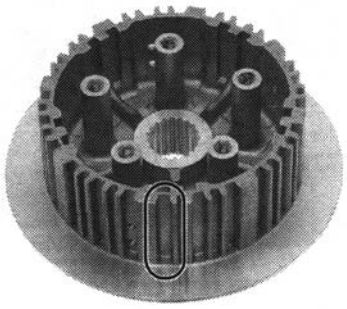
Check the friction spring and spring seat for deformation, warpage or damage, and replace if necessary.

- A damaged or warped spring seat will cause the friction spring to be pressed unevenly.
- A damaged friction spring also causes the weak contact between the discs and plates or uneven disc/plate contact.



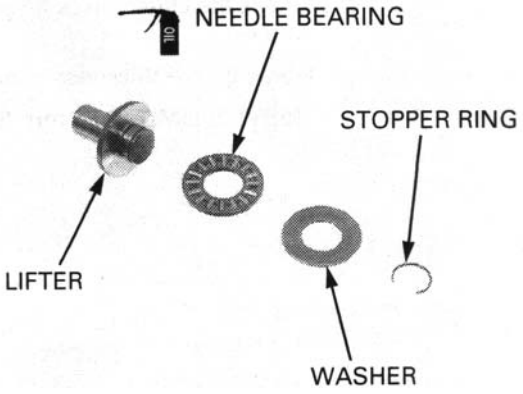
CLUTCH CENTER

Check the clutch center for nicks, indentations or abnormal wear made by the clutch plates.



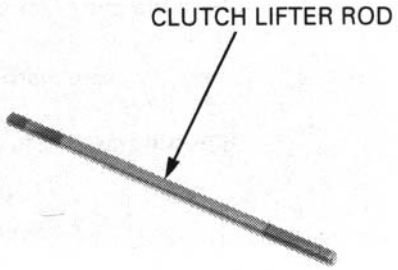
CLUTCH LIFTER/NEEDLE BEARING

Remove the stopper ring, washer and needle bearing from the clutch lifter.
Check the lifter for wear or damage.
Check the needle bearing for wear or damage.
Replace the needle bearing and washer as a set if necessary.
Apply transmission oil to the needle bearing.
Install the needle bearing, washer and stopper ring.



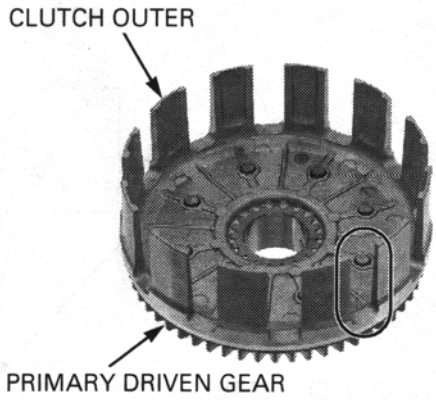
CLUTCH LIFTER ROD

Check the clutch lifter rod for bend or damage.



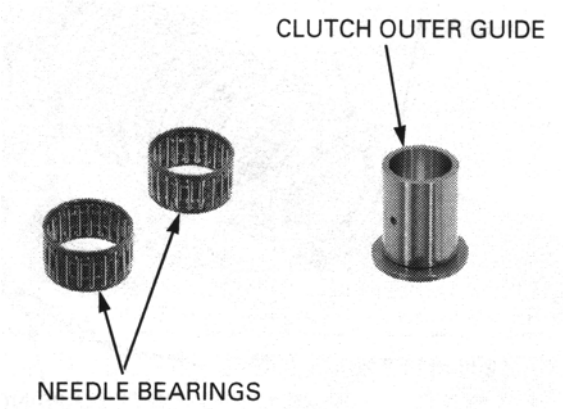
CLUTCH

Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.
Check the serrated teeth of the primary driven gear for wear or damage.



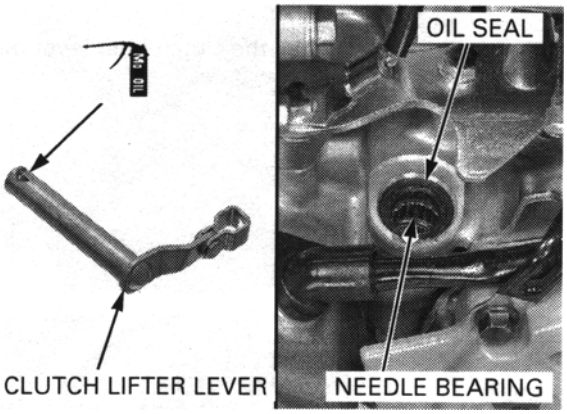
NEEDLE BEARING/CLUTCH

Check the needle bearing for wear or damage.
Check the mainshaft for wear or damage at the sliding surface of the clutch outer guide.
Check the clutch outer guide for abnormal wear or damage.

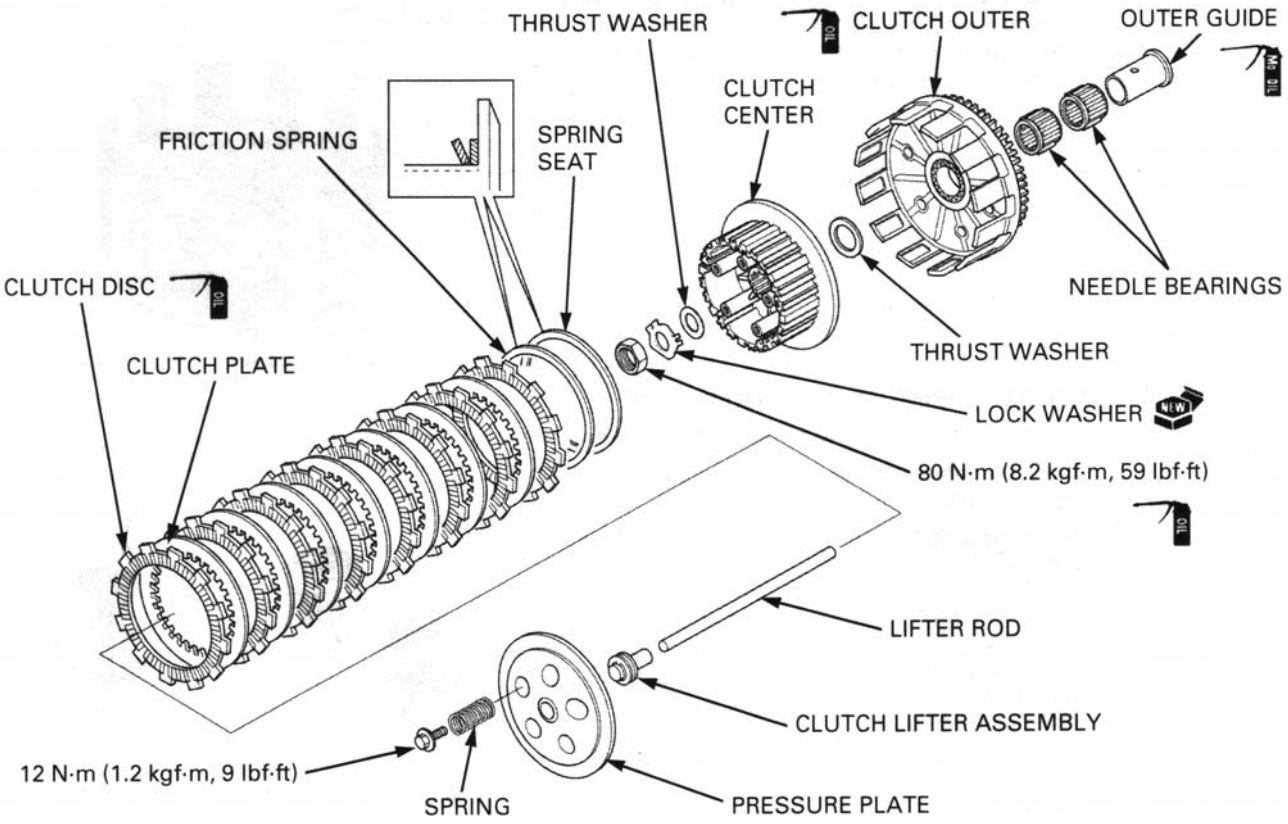


CLUTCH LIFTER

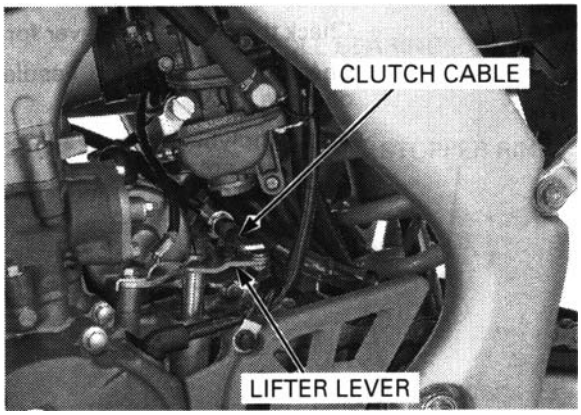
Check the clutch lifter lever for damage.
Check the oil seal and needle bearing for wear or damage.
Apply molybdenum oil solution to the clutch lifter lever cam area.



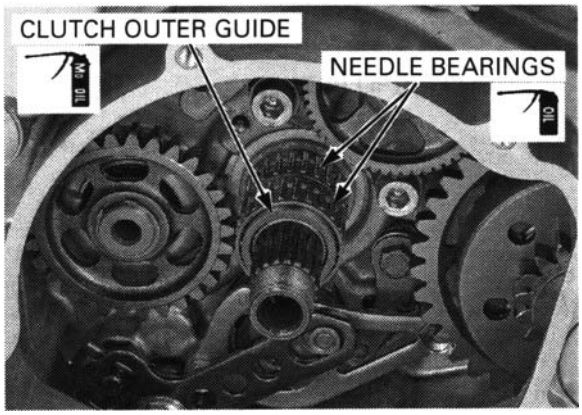
INSTALLATION



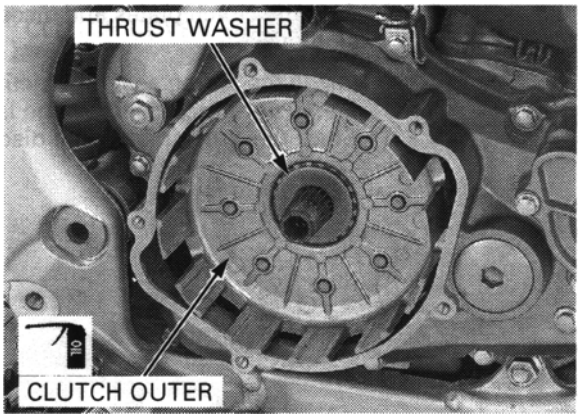
Connect the clutch cable end to the clutch lifter lever.
Install the clutch lifter lever into the left crankcase.



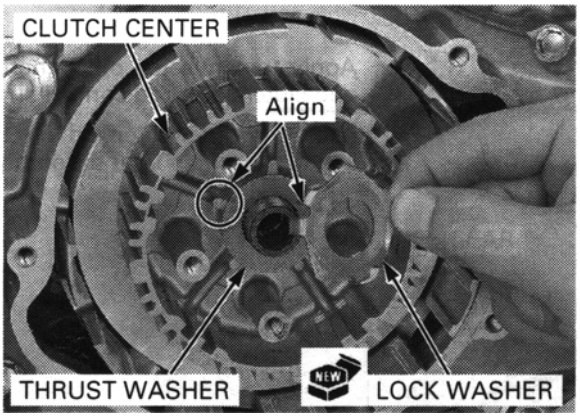
Apply molybdenum oil solution to the clutch outer guide sliding surface.
Apply transmission oil to the needle bearings.
Install the clutch outer guide and needle bearings onto the mainshaft.



Apply transmission oil to the clutch outer sliding surface.
Install the clutch outer and thrust washer.



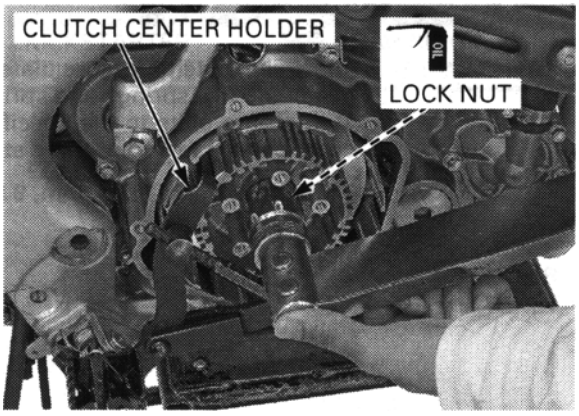
Install the clutch center onto the mainshaft.
Install the thrust washer.
Install a new lock washer by aligning its groove with the clutch center rib.



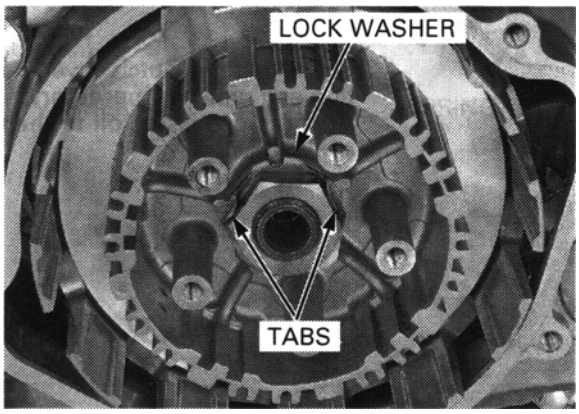
Apply transmission oil to the threads and seating surface of the clutch center lock nut, then install it onto the main shaft.
Tighten the lock nut to the specified torque using the special tool.

TOOL:
Clutch center holder **07724-0050001 or 07724-0050002**

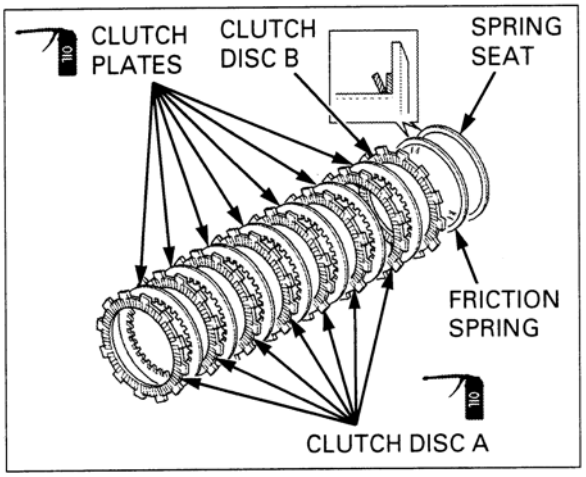
TORQUE: 80 N·m (8.2 kgf·m, 59 lbf·ft)



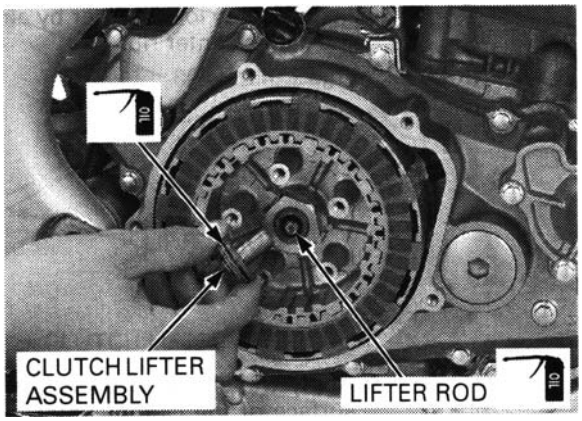
Bend the tabs of the lock washer up against the clutch center lock nut.



Coat the clutch plates and discs with clean transmission oil.
Install the spring seat and friction spring as shown.
Install the clutch disc B (large I.D. disc).
Stack the clutch plates and disc A alternately.

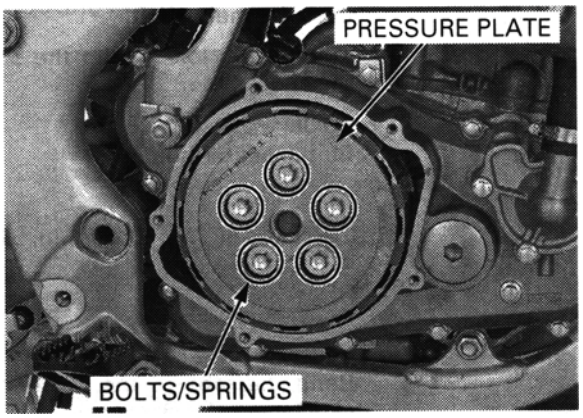


Apply transmission oil to the clutch lifter assembly and clutch lifter rod contact surface.
Insert the clutch lifter rod into the mainshaft.
Install the clutch lifter assembly.

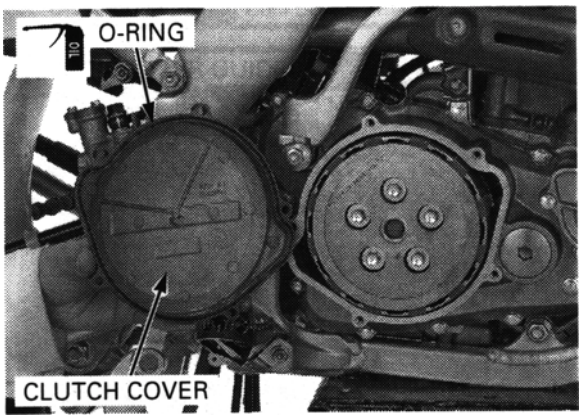


Install the clutch pressure plate.
Install the five springs and spring bolts.
Tighten the bolts to the specified torque in a crisscross pattern in two or three steps.

TORQUE: 12 N·m (1.2 kgf·m, 9lbf·ft)



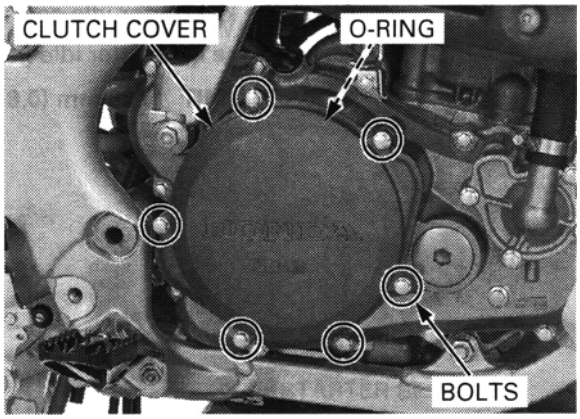
Check that the clutch cover O-ring is in good condition and replace if necessary.
Apply transmission oil to the O-ring and install the clutch cover.



Install and tighten the cover bolts in a crisscross pattern in two or three steps.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the brake pedal.
Adjust the clutch lever free play .
Fill the engine with the recommended transmission oil
Start the engine and check for oil leaks.

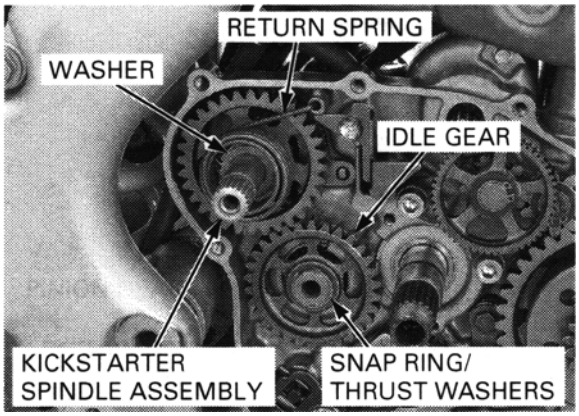


KICKSTARTFR

REMOVAL

Remove the following:
- Right crankcase cover
- Clutch

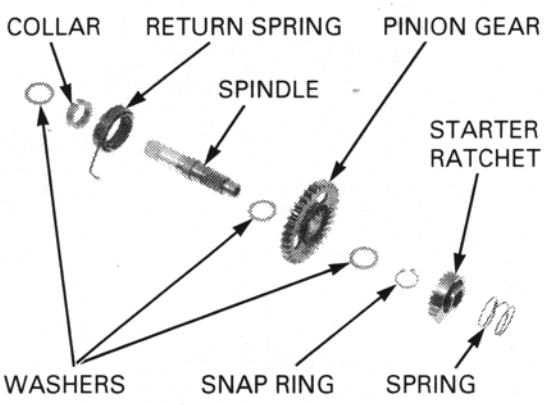
Remove the snap ring, thrust washers and starter idle gear.
Unhook the kickstarter return spring from the crankcase.
Remove the washer, kickstarter spindle assembly and ratchet spring.



DISASSEMBLY/INSPECTION

Disassemble the kickstarter spindle by removing the following:
- Return spring and collar
- Ratchet spring and starter ratchet
- Snap ring, thrust washers and pinion gear

Check the return spring and ratchet spring for fatigue or damage.
Check the starter ratchet for wear or damage.



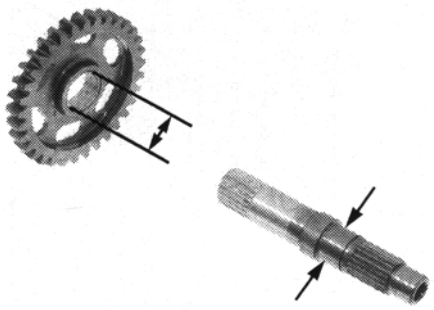
Check the kickstarter pinion for wear or damage.
Check the kickstarter spindle for bend, wear or damage.

Measure the kickstarter pinion gear I.D.

SERVICE LIMIT: 16.55 mm (0.652 in)

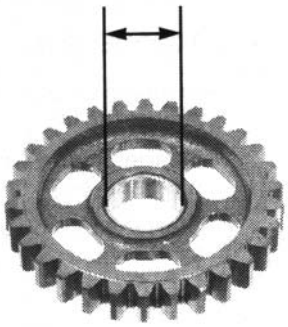
Measure the kickstarter spindle O.D.

SERVICE LIMIT: 16.46 mm (0.648 in)



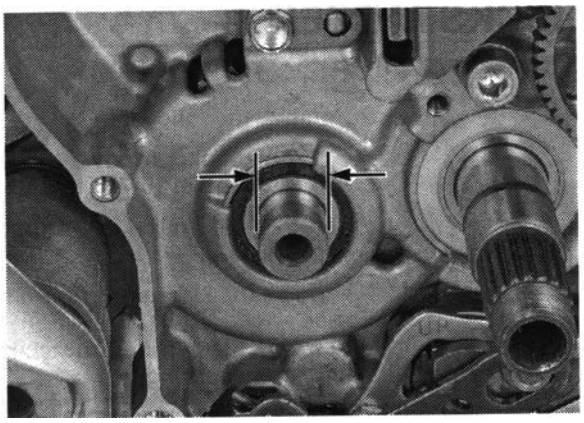
Check the kickstarter idle gear for wear or damage.
Measure the kickstarter idle gear I.D.

SERVICE LIMIT: 17.06 mm (0.672 in)

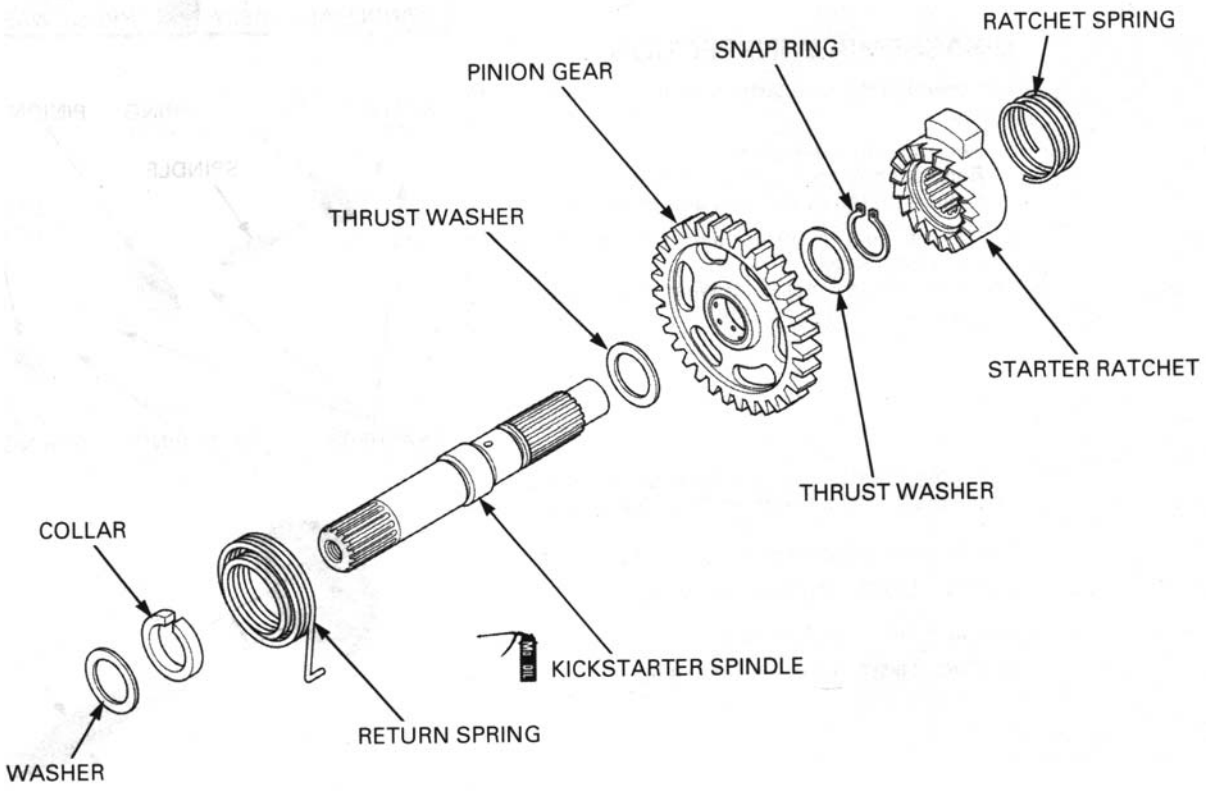


Measure the countershaft O.D. at the idle gear sliding surface.

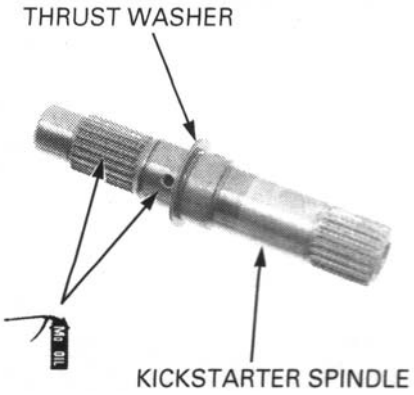
SERVICE LIMIT: 16.97 mm (0.668 in)



ASSEMBLY

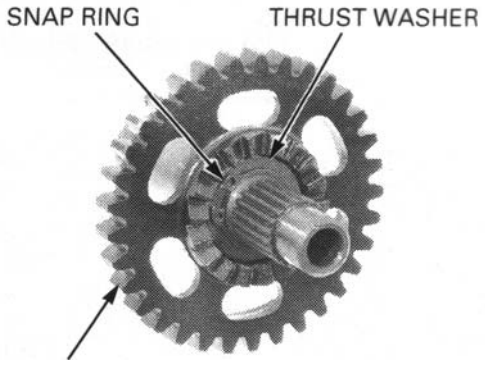


Apply molybdenum oil solution to the kickstarter spindle spline and gear rolling area.
Install the thrust washer into the kickstarter spindle.

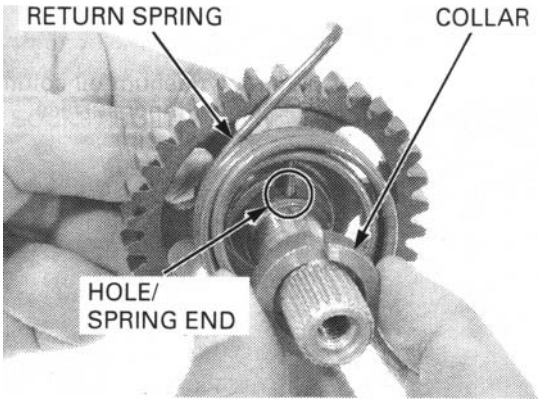


Set the sharp edge of the snap ring facing out.

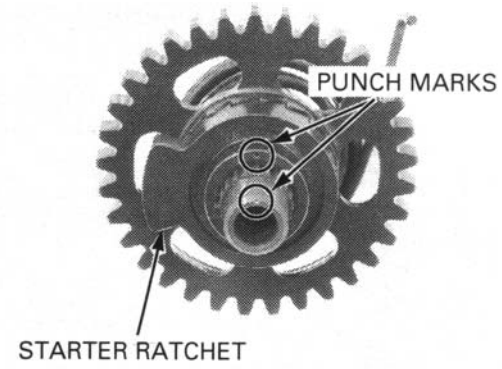
Install the pinion *gear and* thrust *washer.*
Install the snap ring in the groove of the spindle



Insert the return spring end into the hole on the kickstarter spindle.
Install the collar by aligning its gap with the spring.



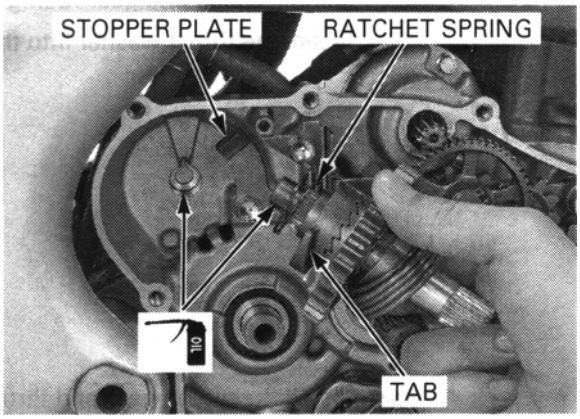
Align the punch marks and install the starter ratchet.



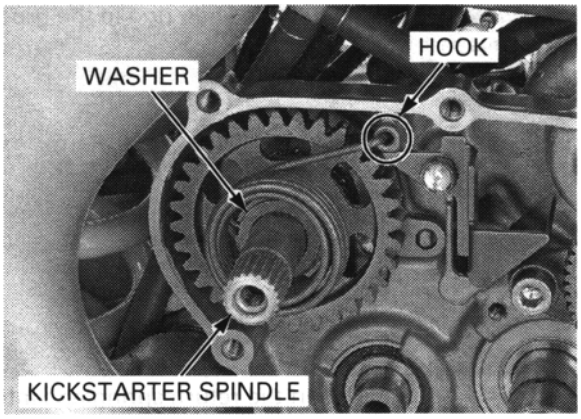
INSTALLATION

Install the ratchet spring.
Apply transmission oil to the kickstarter spindle journal.
Install the kickstarter assembly to the crankcase and rotate the spindle counterclockwise until the ratchet tab is clear of the stopper plate.

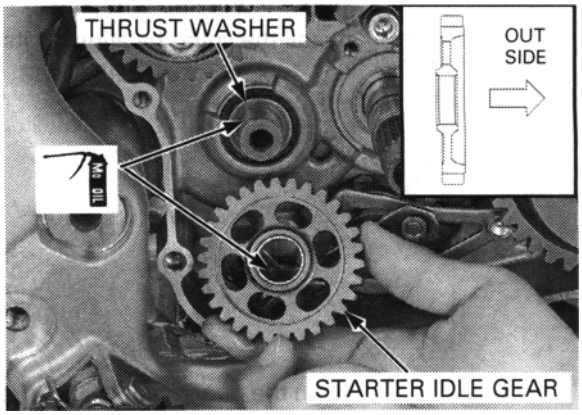
Be sure the ratchet spring does not fall off the spindle during installation.



Hook the return spring end into the hole in the crankcase.
Install the washer.

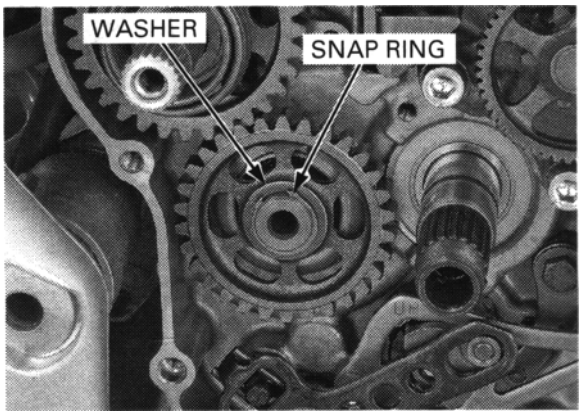


Install the thrust washer onto the countershaft.
Apply molybdenum oil solution to the countershaft and idle gear inner surface.



Install the thrust washer and snap ring
Install the following:

- Clutch
- Right crankcase cover



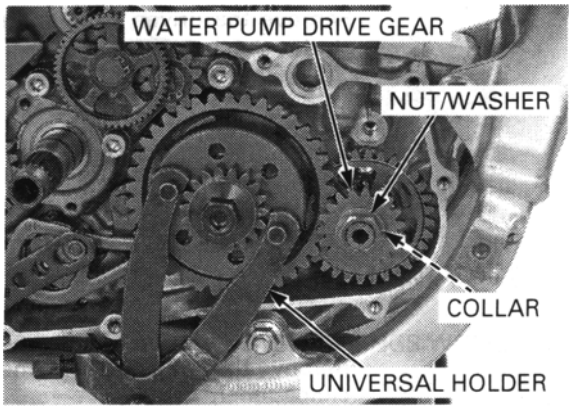
STARTER CLUTCH

REMOVAL

Remove the following:
- Right crankcase cover (page 4-54)
- Clutch (page 4-56)

Hold the starter clutch using the special tool and loosen the water pump drive gear nut.

TOOL:
Universal holder **07725-0030000**

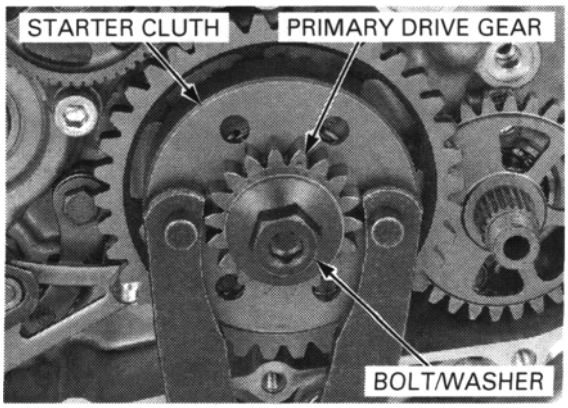


Remove the nut, washer, water pump drive gear and collar.

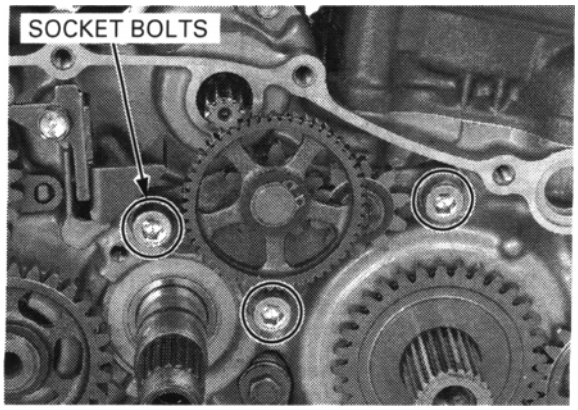
Loosen the primary drive gear bolt using the special tool.

TOOL:
Universal holder **07725-0030000**

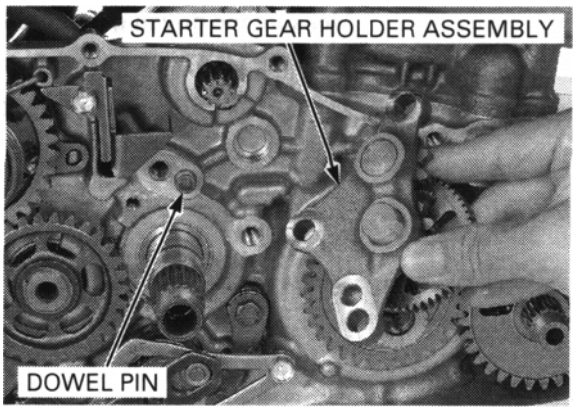
Remove the bolt, washer, primary drive gear and starter clutch.



Remove the socket bolts and starter gear holder assembly.

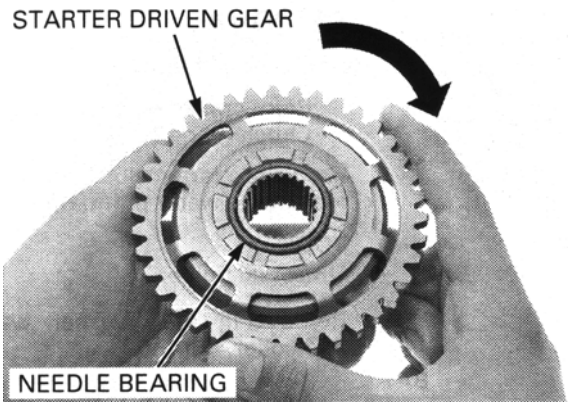


Remove the dowel pin from the crankcase.

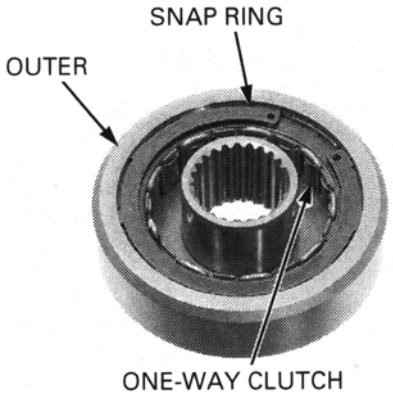


DISASSEMBLY/INSPECTION

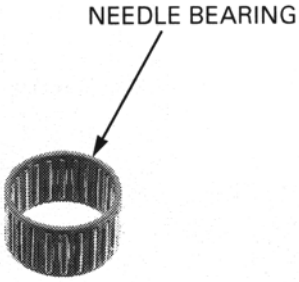
Check that the starter driven gear turns clockwise smoothly and does not turn counterclockwise. Remove the driven gear and needle bearing from starter clutch outer.



Remove the snap ring and one-way clutch from the clutch outer.



Check the needle bearing for abnormal wear or damage.



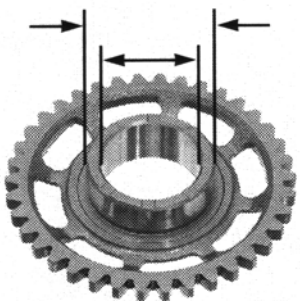
Check the starter driven gear for abnormal wear or damage.

Measure the driven gear boss I.D.

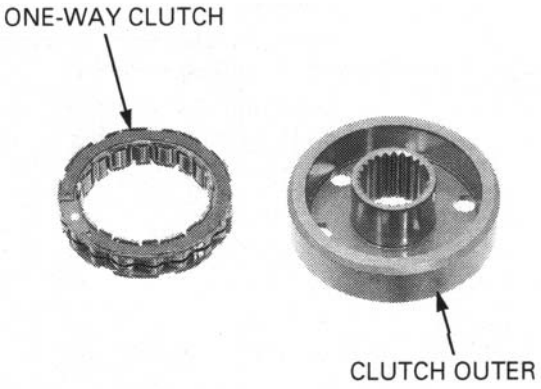
SERVICE LIMIT: 35.07 mm (1.381 in)

Measure the driven gear boss O.D.

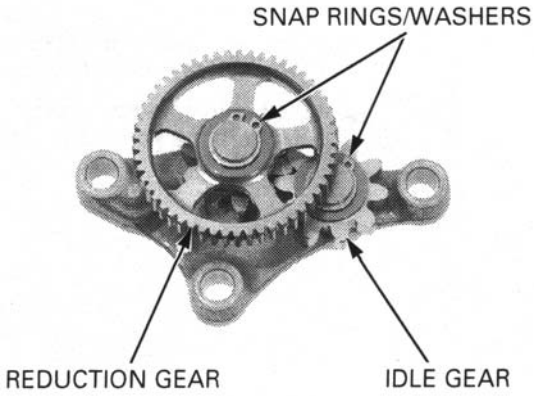
SERVICE LIMIT: 45.64 mm (1.797 in)



Check the one-way clutch sprag for abnormal wear or damage.
Check the starter clutch outer inner surface for wear or damage.



Remove the snap rings, washers, starter reduction gear and idle gear.

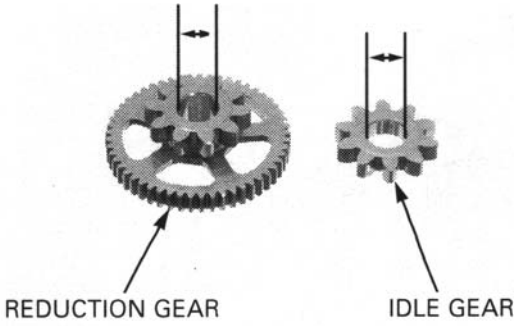


Check the starter reduction gear and idle gear for wear or damage.
Measure the reduction gear I.D.

SERVICE LIMIT: 12.05 mm (0.474 in)

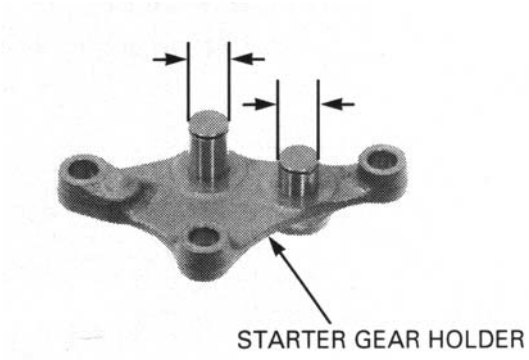
Measure the idle gear I.D.

SERVICE LIMIT: 12.05 mm (0.474 in)



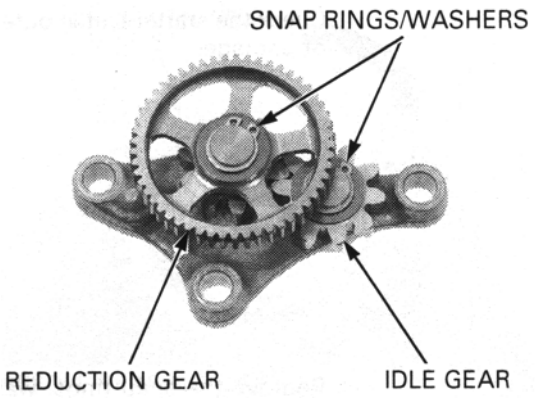
Check the starter gear holder sliding surface for wear or damage.
Measure the starter qear holder shaft O.D.

SERVICE LIMIT: 11.98 mm (0.472 in)

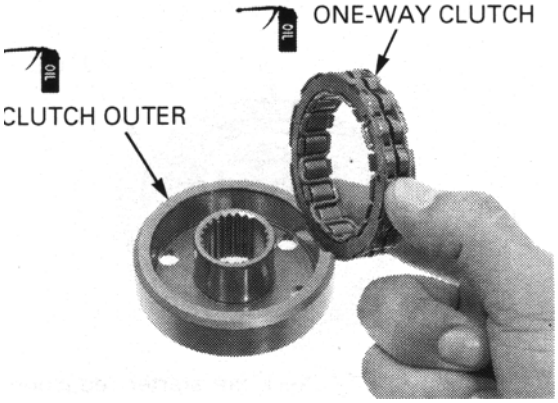


ASSEMBLY

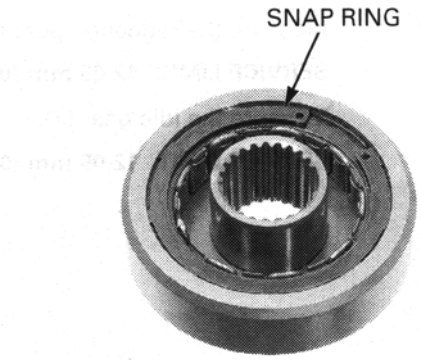
Apply molybdenum oil solution to the starter gear holder sliding surfaces.
Install the starter reduction gear, idle gear, washers and snap rings.



Apply transmission oil to the one-way clutch and starter clutch outer sliding surface.
Install the one-way clutch into the starter clutch outer with the white paint facing out.

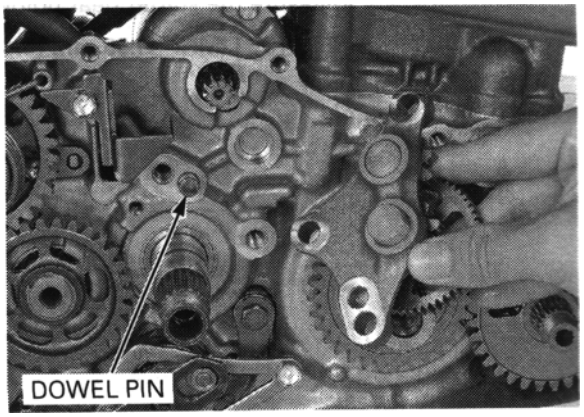


Install the snap ring securely.



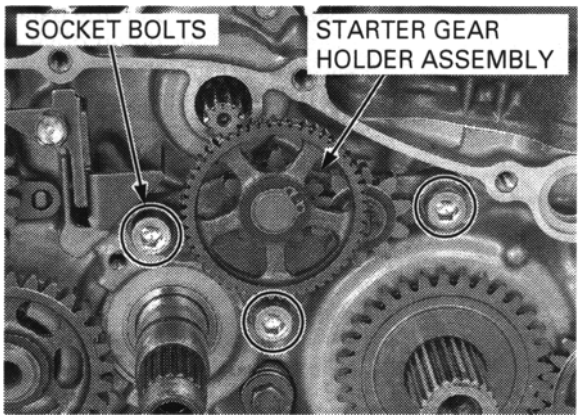
INSTALLATION

Install the dowel pin into the crankcase.

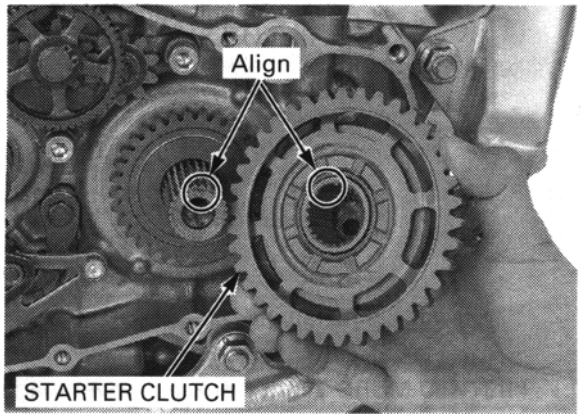


Install the starter gear holder assembly and socket bolt.
Tighten the bolts to the specified torque.

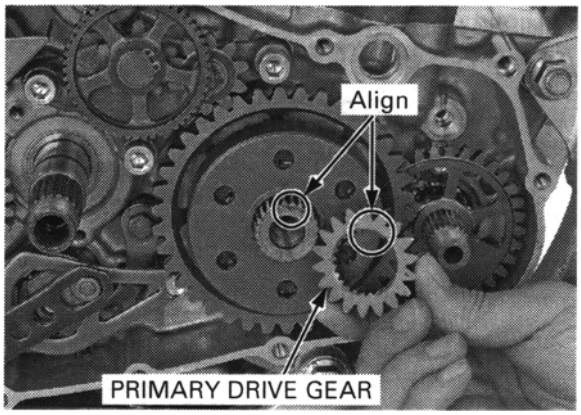
TORQUE: 22 N·m (2.2 kgf·m, 16 Ibf·ft)



Install the starter clutch while aligning its wide cutout in the splines with the punch mark on the mainshaft.



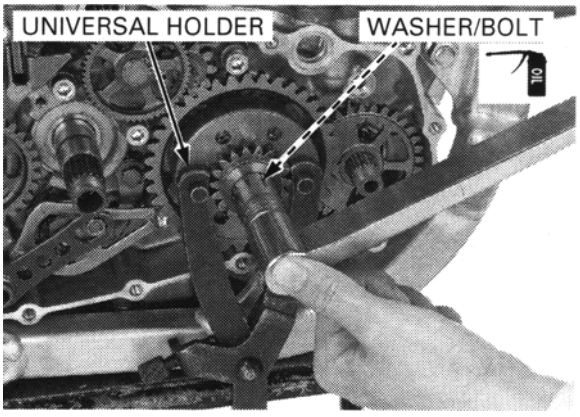
Install the primary drive gear while aligning its wide cut-out in the splines with the punch mark on the mainshaft.



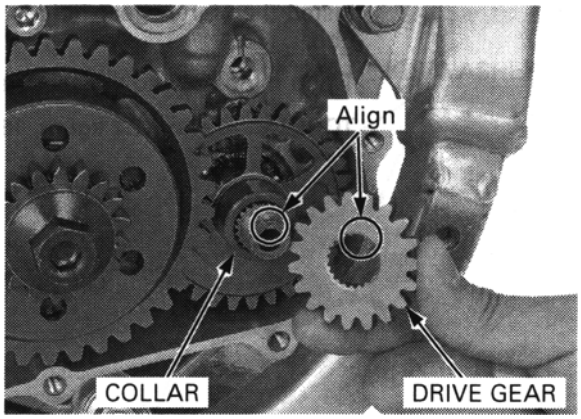
Apply transmission oil to the primary drive gear bolt threads and seating surface.
Install the washer and bolt.
Tighten the primary drive gear bolt to the specified torque while holding the starter clutch with the special tool.

TOOL:
Universal holder 07725-0030000

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)



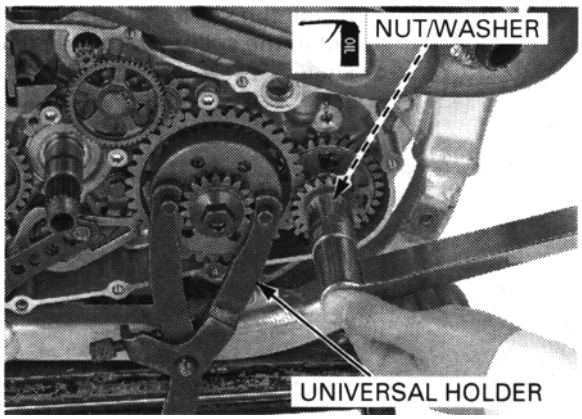
Install the collar onto the balancer shaft.
Install the water pump drive gear while aligning its wide cut-out in the splines with the punch mark on the balancer shaft.



Apply transmission oil to the water pump drive gear nut threads and seating surface.
Install the washer and nut.
Tighten the water pump drive gear nut to the specified torque while holding the starter clutch with the special tool.

TOOL:
Universal holder **07725-0030000**

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)



Install the following:

- Clutch
- Right crankcase cover

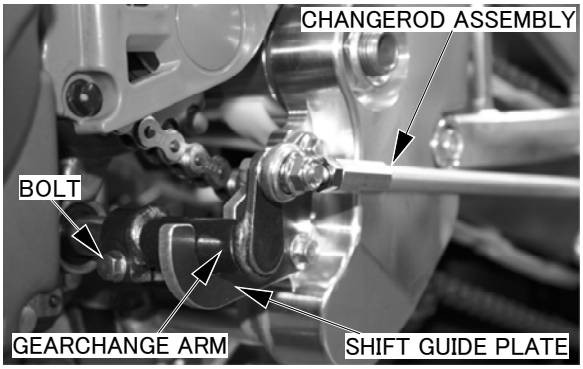
GEARSHIFT LINKAGE

REMOVAL

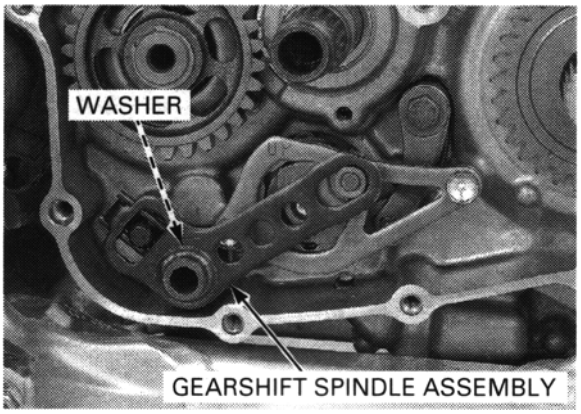
Remove the following:
- Right crankcase cover
- Clutch
- Starter clutch
- Changeod assembly
- Shift guide plate

When removing the gearshift pedal, mark the pedal position to ensure correct installation in its original

Remove the bolt and gearchange arm.



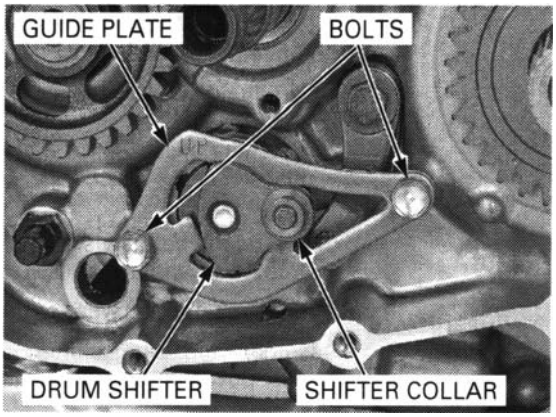
Remove the gearshift spindle assembly and washer from the crankcase.



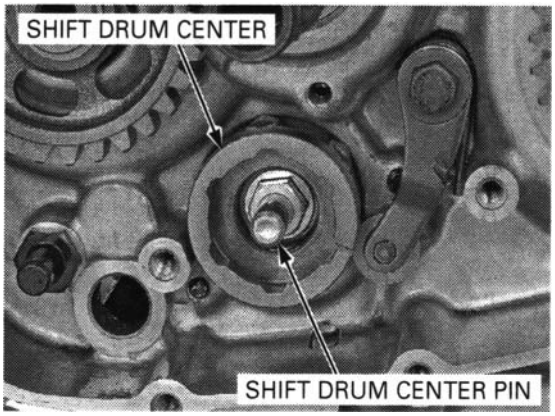
Remove the shifter collar.

Do not let the ratchet pawls fall when removing the guide plate and drum shifter.

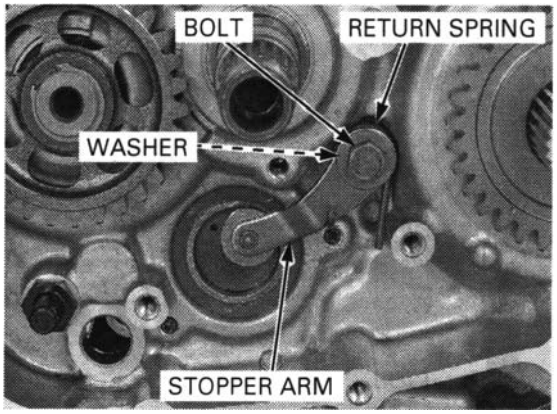
Remove the bolts, guide plate and drum shifter as an assembly.



Remove the shift drum center pin and shift drum center.



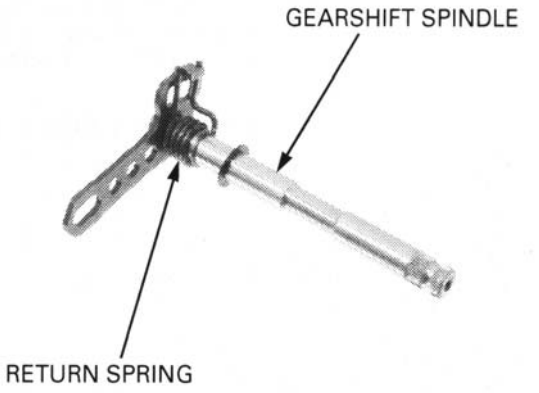
Remove the bolt, stopper arm, washer and return spring.
Remove the drum pin from the shift drum.



INSPECTION

GEARSHIFT

Check the gearshift spindle for bend, wear or damage.
Check the return spring for fatigue or damage.

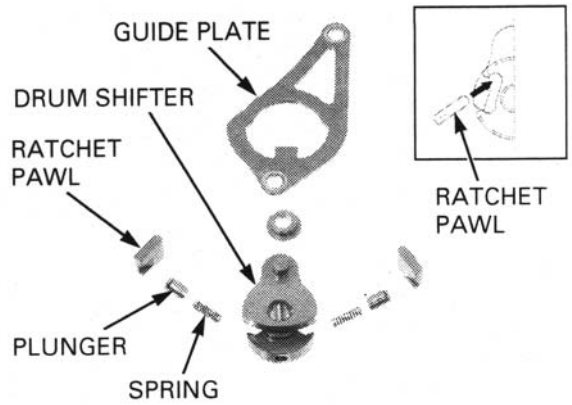


RATCHET PAWL

Remove the following:

- Guide plate
- Drum shifter
- Ratchet pawls
- Plungers
- Springs

Clean the ratchet pawls, plungers, springs and drum shifter with clean transmission oil.
Check each part for wear or damage.
Assemble the drum shifter, springs, plungers and ratchet pawls in the guide plate as shown.

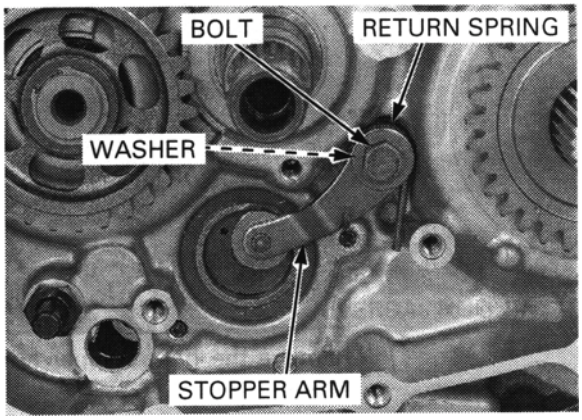


INSTALLATION

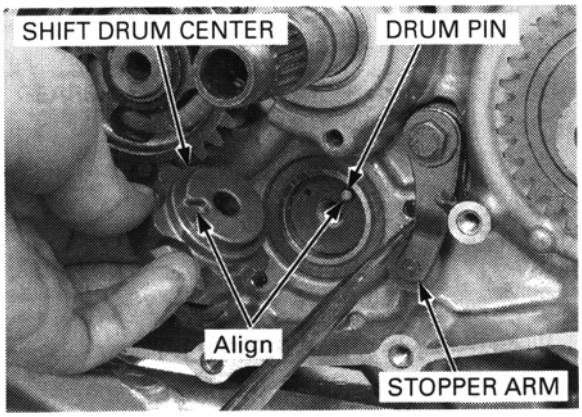
Install the return spring, washer and stopper arm and tighten the stopper arm bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Check the stopper arm for proper operation.

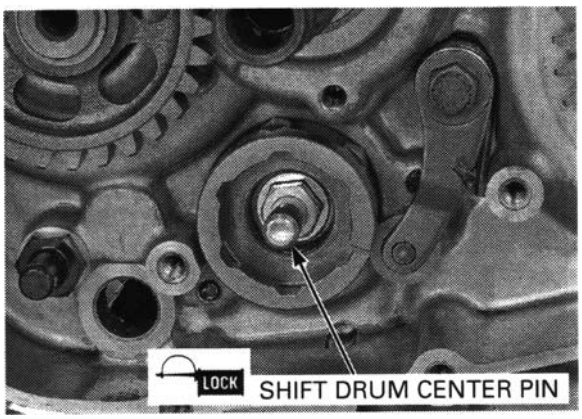


Install the shift drum pin into the hole on the shift drum.
Move the stopper arm out of the way using a screwdriver.
Install the shift drum center while aligning its groove with the shift drum pin.



Apply a locking agent to the shift drum center pin threads and then install the center pin.
Tighten the shift drum center pin to the specified torque.

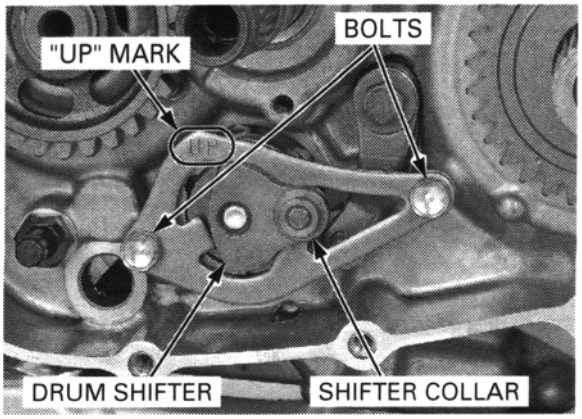
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Set the drum center in a position other than neutral. While holding the ratchet pawls in place in the guide plate and drum shifter, install the drum shifter assembly by aligning the hole of the drum shifter with the shift drum center pin, and guide plate "UP" mark facing up.

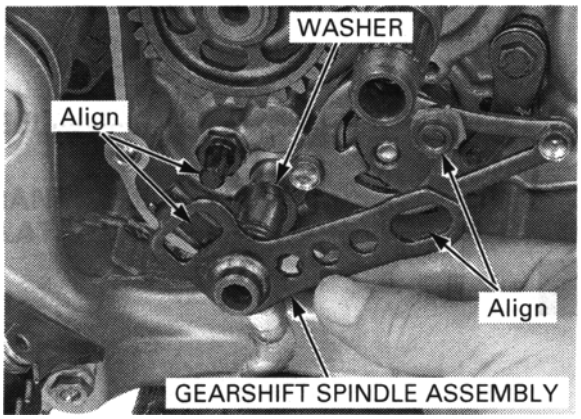
Install and tighten the guide plate bolt.

Install the shifter collar onto the drum shifter.



Do not forget to install the washer onto the

Install the washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin, and also the gearshift spindle hole with the shifter collar.



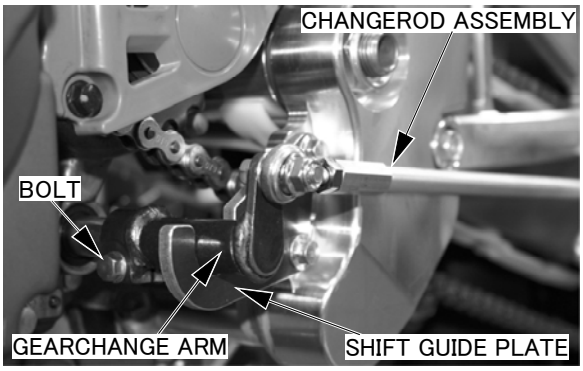
Install the gearchange arm on its original position as marked during removal.
Tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 Ibf·ft)

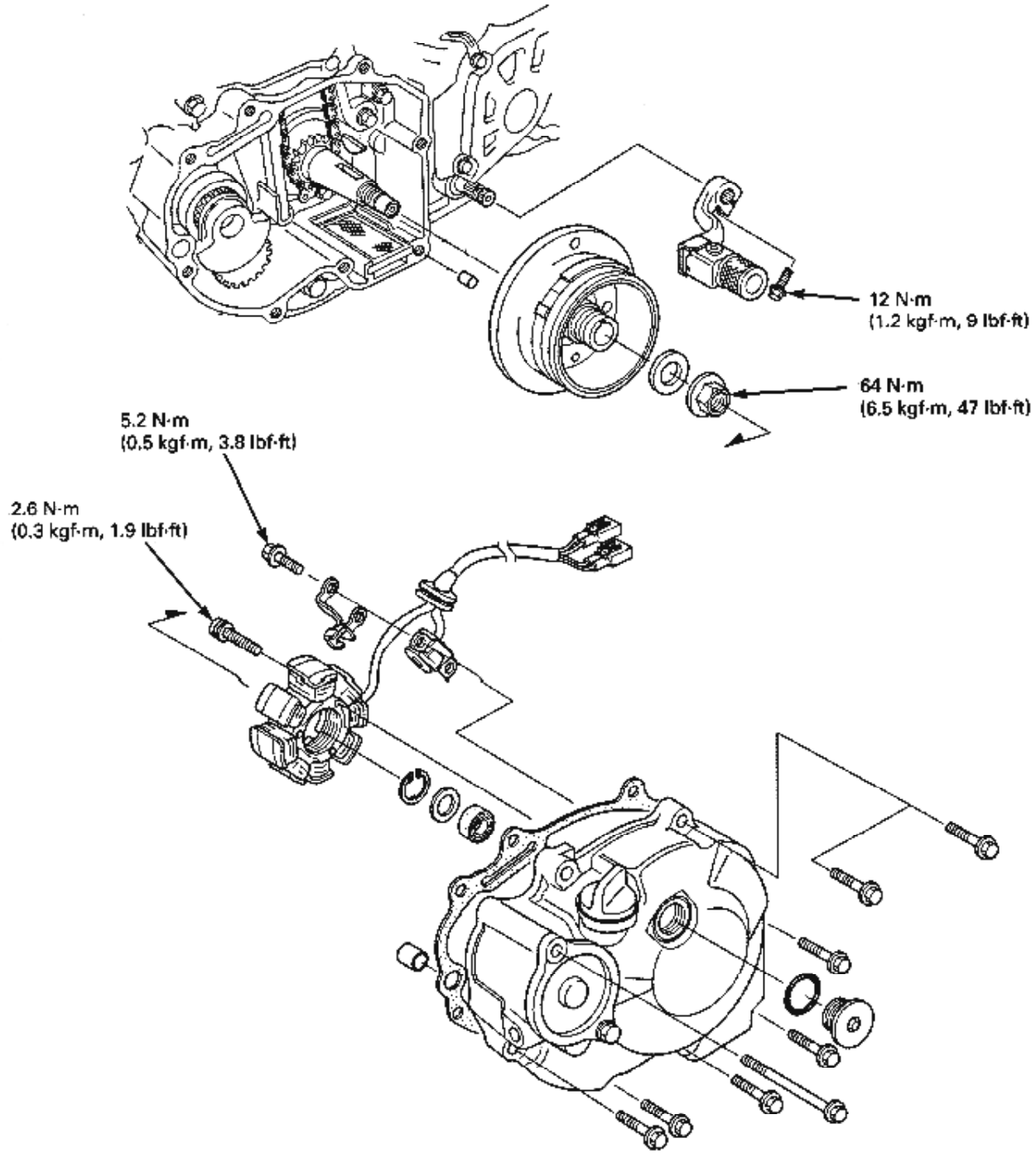
Move the gearchange arm and check the shift mechanism for smooth operation.

Install the following:

- Starter clutch
- Clutch
- Right crankcase cover
- Changerod assembly
- Shift guide plate



COMPONENT LOCATION



SERVICE INFORMATION

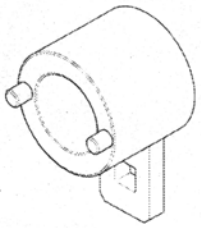
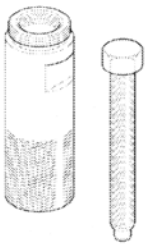
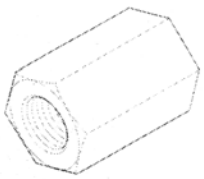
GENERAL

· This section covers the removal and installation of the alternator stator and flywheel. These services can be done with the engine installed in the frame.
· Refer to inspection for the alternator stator

TORQUE VALUES

Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply engine oil to the threads and seating surface.
Ignition pulse generator mounting bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	Apply a locking agent to the threads.
Stator mounting screw	2.6 N·m (0.3 kgf·m, 1.9 lbf·ft)	Apply a locking agent to the threads.

TOOLS

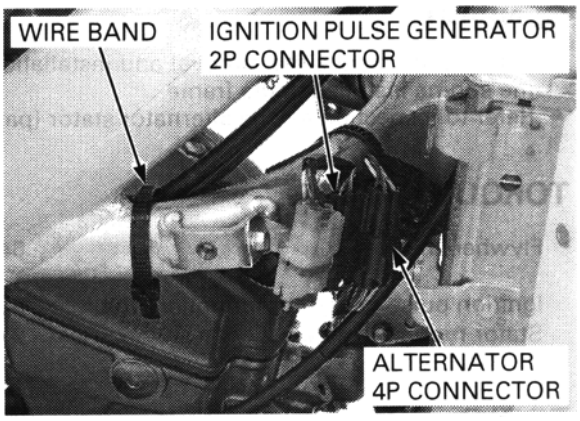
Flywheel holder *070MB-KRN0100*	Flywheel puller *07933-1480000*	Flywheel puller adaptor *070MG-KSE0100*
		

LEFT CRANKCASE COVER REMOVAL

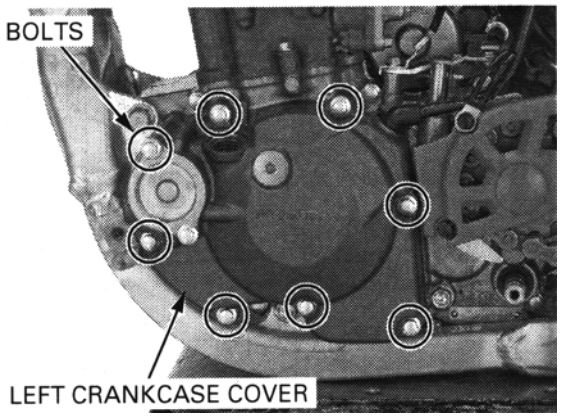
Remove the following:

- Fuel tank
- Left engine guard
- Gearshift pedal

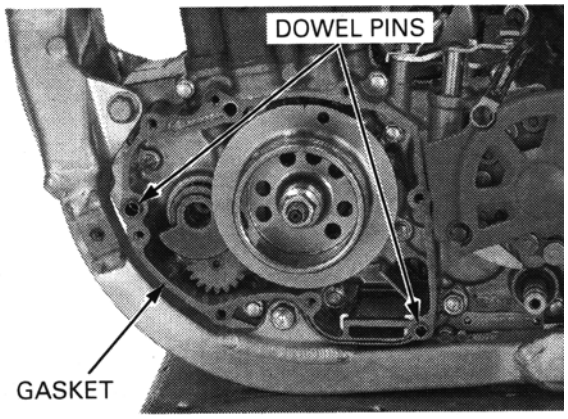
Drain the engine oil.
Remove the wire band.
Disconnect the alternator 4P (Black) connector and ignition pulse generator 2P (Black) connector.



Loosen the bolts in a crisscross pattern in two or three steps.
Remove the bolts and left crankcase cover.



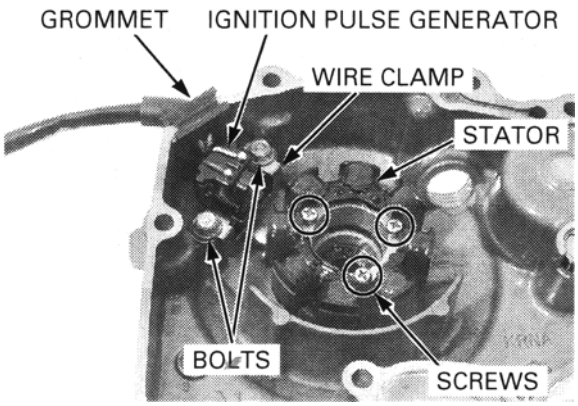
Remove the gasket and dowel pins.



STATOR

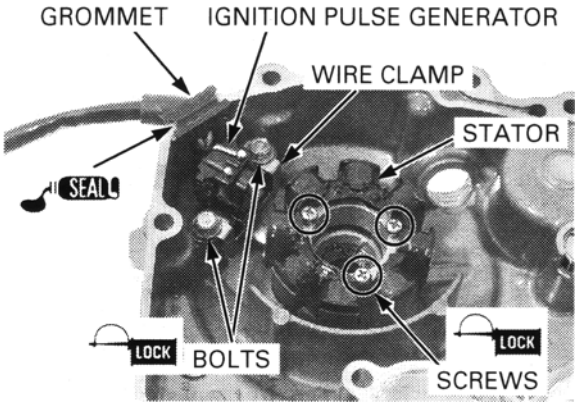
REMOVAL

Remove the left crankcase cover.
Remove the bolts and wire clamp.
Remove the ignition pulse generator and grommet from the left crankcase cover.
Remove the screws and stator.



INSTALLATION

Place the stator/ignition pulse generator into the left crankcase cover.
Apply liquid sealant to the wire grommet seating surface and install the grommet into the groove in the left crankcase cover.
Apply locking agent to the ignition pulse generator mounting bolt and stator mounting screw threads.
Install the ignition pulse generator mounting bolts with the wire clamp.
Tighten the ignition pulse generator mounting bolts and stator mounting screws to the specified torque.



TORQUE:
Ignition pulse generator mounting bolt:
5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)
Stator mounting screw:
2.6 Nvm (0.3 kgf·m, 1.9 lbf·ft)

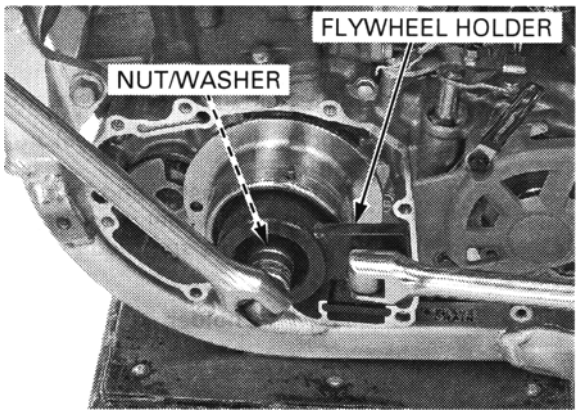
Install the left crankcase cover.

FLYWHEEL

REMOVA

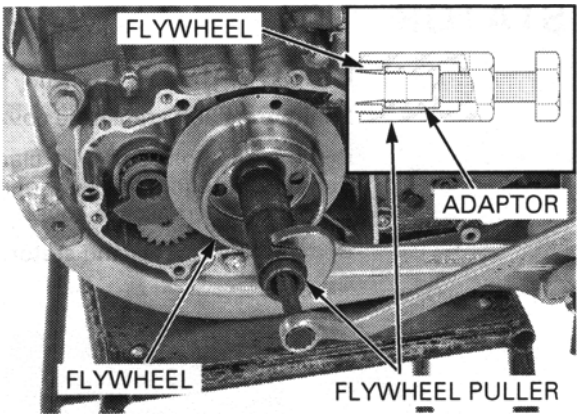
Remove the left crankcase cover .
Hold the flywheel with the special tool and remove the nut and washer.

TOOL:
Flywheel holder **070MB-KRN0100**

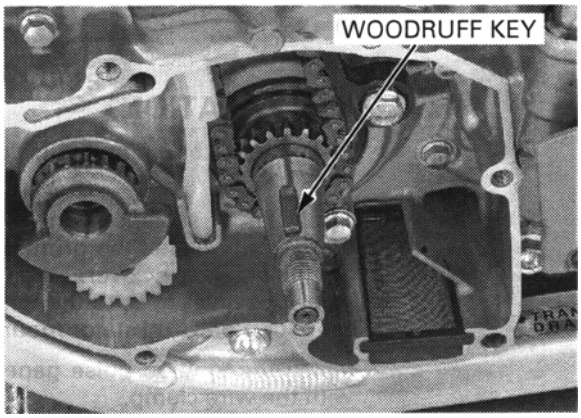


Remove the flywheel using the special tools.

TOOLS:
Flywheel puller **07933-1480000**
Flywheel puller adaptor **070MG-KSE0100**

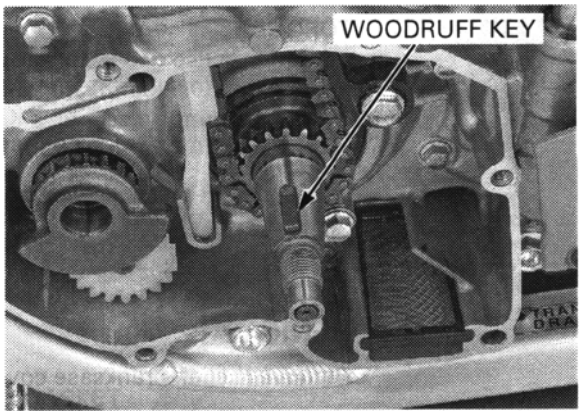


Remove the woodruff key.



INSTALLATION

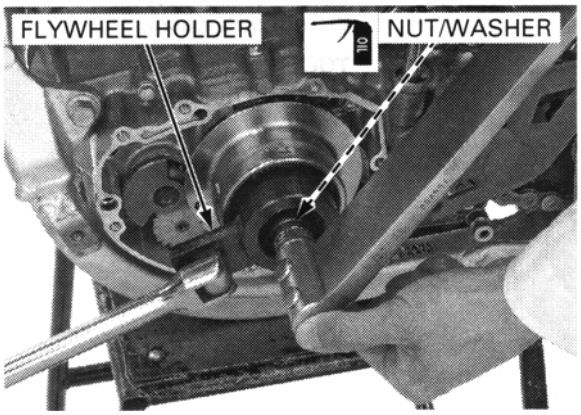
Install the woodruff key into the groove in the crank shaft.
Clean the crankshaft and flywheel tapered areas.



Install the flywheel to the crankshaft by aligning the groove in the flywheel with the woodruff key.
Apply oil to the flywheel nut threads and seating surface.
Install the washer and flywheel nut.
Hold the flywheel with the special tool and tighten the nut to the specified torque.

TOOL:
Flywheel holder **070MB-KRN0100**

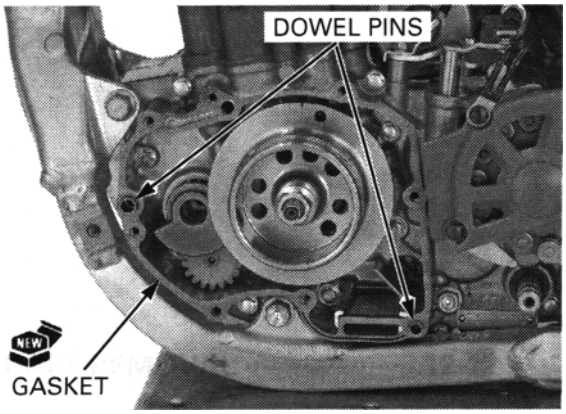
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



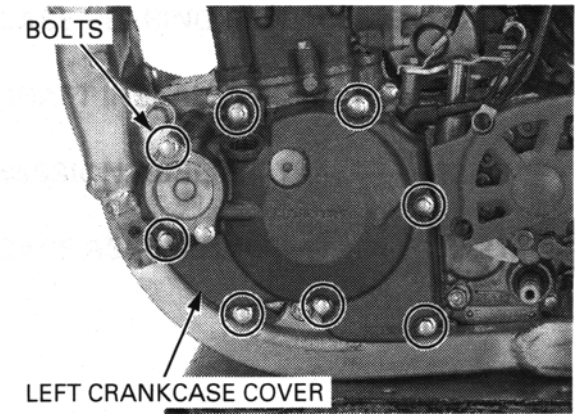
Install the left crankcase cover

LEFT CRANKCASE COVER INSTALLATION

Install the dowel pins and a new gasket



Install the left crankcase cover and bolts.
Tighten the left crankcase cover bolts in a crisscross pattern in two or three steps.



Connect the ignition pulse generator 2P (Black) connector and alternator 4P (Black) connector.

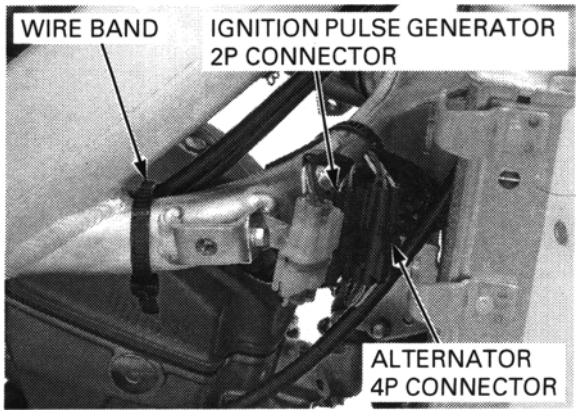
Route the cables and wires properly

Clamp the wire with the band.

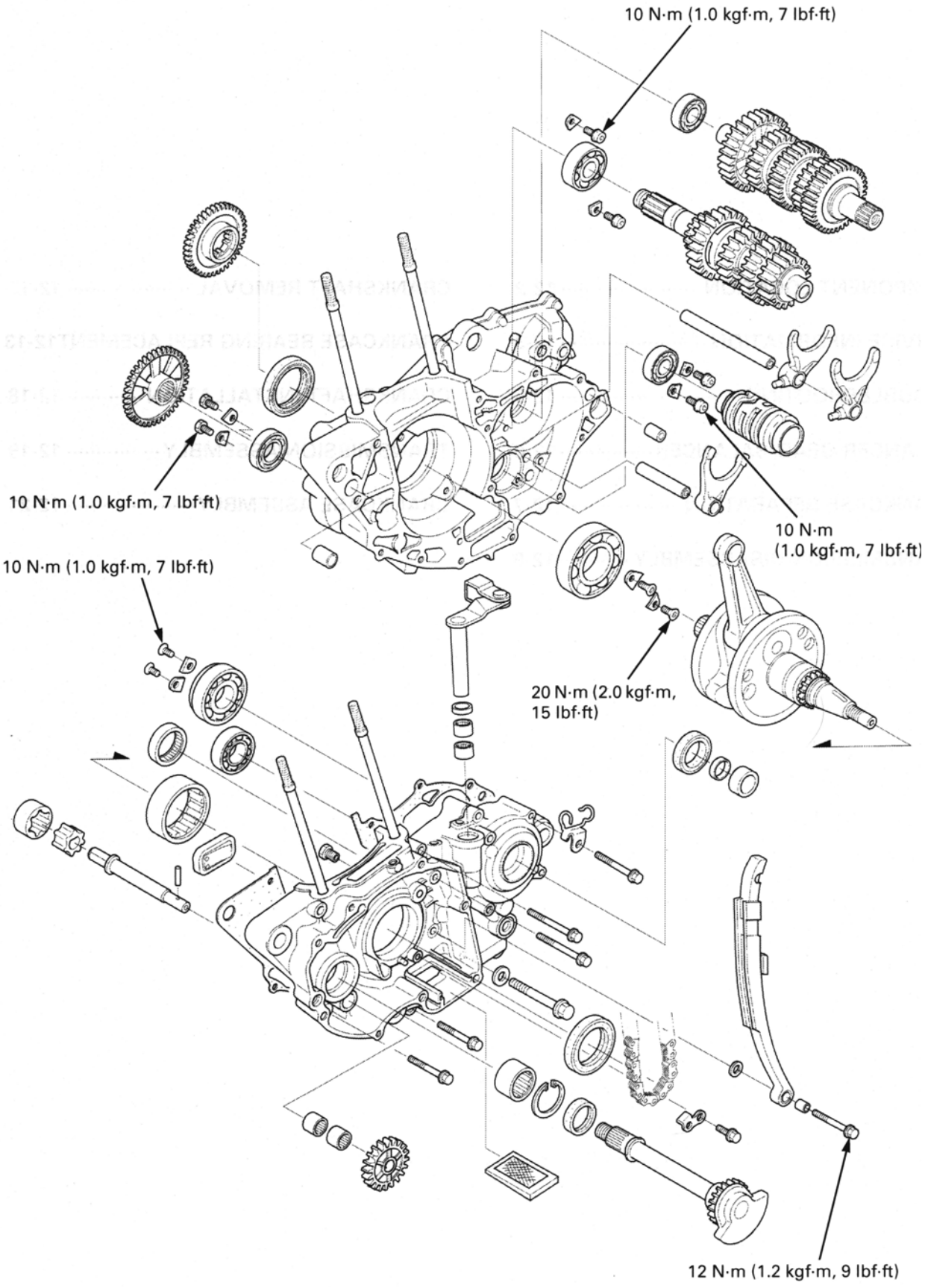
Install the following:

- Gearshift pedal
- Left engine guard
- Fuel tank

Fill the engine with the recommended engine oil .



COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the crankcase, crankshaft, transmission and balancer.
- The crankcase halves must be separated to service the crankshaft and transmission. To service these parts, the engine must be removed from the frame.

  The following parts must be removed before separating the crankcase,
  - Engine
  - Starter motor
  - Cylinder head
  - Cylinder
  - Piston
  - Clutch
  - Stater clutch
  - Kickstarter
  - Gearshift linkage
  - Flywheel
  - Balancer
  - Oil pump drive gear/drive pin

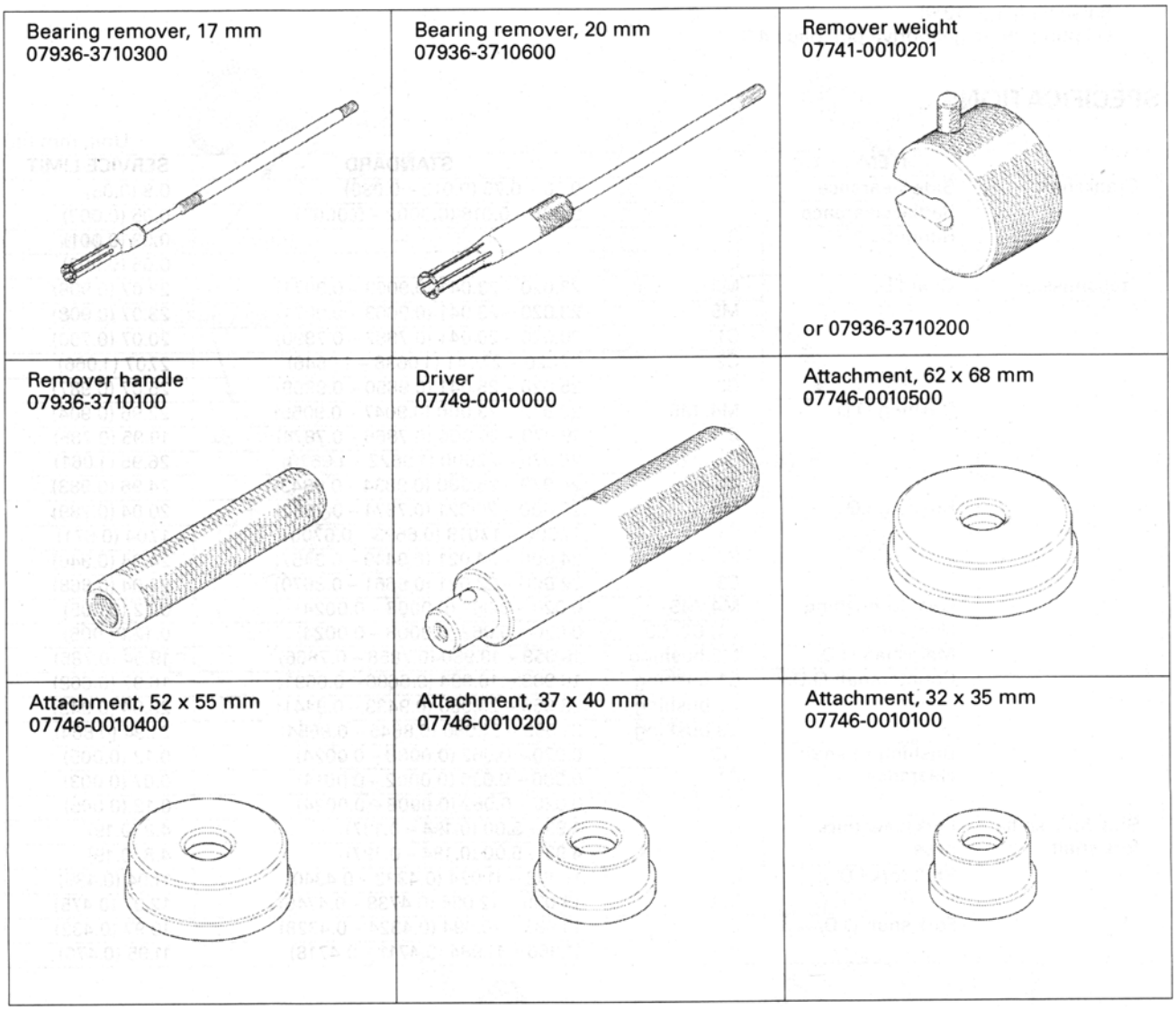
SPECIFICATIONS

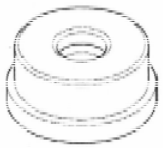
ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.30-0.75(0.012-0.030)	0.8 (0.03)
	Radial clearance		0.006 - 0.018 (0.0002 - 0.0007)	0.05 (0.002)
	Runout	R		0.03(0.001)
		L		0.05 (0.002)
Transmission	Gear I.D.	M4	23.020 - 23.041 (0.9063 - 0.9071)	23.07(0.908)
		M5	23.020 - 23.041 (0.9063 - 0.9071)	23.07 (0.908)
		C1	20.020 - 20.041 (0.7882 - 0.7890)	20.07 (0.790)
		C2	27.020 - 27.041 (1.0638 - 1.0646)	27.07 (1.066)
		C3	25.020 - 25.041 (0.9850 - 0.9859)	25.07 (0.987)
	Bushing O.D.	M4, M5	22.979 - 23.000 (0.9047 - 0.9055)	22.96 (0.904)
		C1	19.979 - 20.000 (0.7866 - 0.7874)	19.95 (0.785)
		C2	26.979 - 27.000 (1.0622 - 1.0630)	26.95(1.061)
		C3	24.979 - 25.000 (0.9834 - 0.9843)	24.96 (0.983)
	Bushing I.D.	M5	20.000 - 20.021 (0.7874 - 0.7882)	20.04 (0.789)
		C1	17.000 - 17.018 (0.6693 - 0.6700)	17.04(0.671)
		C2	24.000 - 24.021 (0.9449 - 0.9457)	24.04 (0.946)
		C3	22.000 - 22.021 (0.8661 - 0.8670)	22.04 (0.868)
	Gear-to-bushing clearance	M4, M5	0.020 - 0.062 (0.0008 - 0.0024)	0.12(0.005)
		C1, C2, C3	0.020 - 0.062 (0.0008 - 0.0024)	0.12(0.005)
	Mainshaft O.D.	M5 bushing	19.959 - 19.980 (0.7858 - 0.7866)	19.94 (0.785)
	Countershaft O.D.	C1 bushing	16.983 - 16.994 (0.6686 - 0.6691)	16.97(0.668)
		C2 bushing	23.959 - 23.980 (0.9433 - 0.9441)	23.94 (0.943)
		C3 bushing	21.959 - 21.980 (0.8645 - 0.8654)	21.94 (0.864)
	Bushing-to-shaft clearance	M5	0.020 - 0.062 (0.0008 - 0.0024)	0.12(0.005)
		C1	0.006 - 0.035 (0.0002 - 0.0014)	0.07 (0.003)
		02,03	0.020 - 0.062 (0.0008 - 0.0024)	0.12 (0.005)
Shift fork, shift fork shaft	Fork claw thickness	C	4.93-5.00(0.194-0.197)	4.8 (0.19)
		R, L	4.93-5.00(0.194-0.197)	4.8 (0.19)
	Shift fork I.D.	C	11.003 - 11.024 (0.4332 - 0.4340)	11.04 (0.435)
		R, L	12.035-12.056 (0.4738 - 0.4746)	12.07(0.475)
	Fork shaft O.D.	C	10.983 - 10.994 (0.4324 - 0.4328)	10.97 (0.432)
		R, L	11.966 - 11.984 (0.4711 - 0.4718)	11.95 (0.470)

TOROUE VALUES

Right crankshaft bearing set plate torx screw	20N·m(2.0kgf·m, 15lbf·ft)	Apply locking agent to the threads (ThreeBond2430, 1373N or equivalent high strength locking agent).
Countershaft bearing set plate screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Shift drum bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Mainshaft bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Balancer shaft bearing set plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Cam chain tensioner pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Transmission oil drain bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply transmission oil to the threads and seating surface.
Crankcase orifice	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	ALOC; replace with new one.

TOOLS



Attachment, 42 x 47 mm 07746-0010300 	Pilot, 20 mm 07746-0040500 	Pilot, 30 mm 07746-0040700 
Pilot, 17 mm 07746-0040400 	Pilot, 22 mm 07746-0041000 	Pilot, 25 mm 07746-0040600 

TROUBLESHOOTING

Excessive noise

- Worn crankshaft main journal bearings
- Worn or damaged connecting rod bearings
- Worn connecting rod small end
- Worn balancer bearings
- Improper balancer installation
- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing

Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Broken shift drum stopper arm spring
- Worn or bent shift forks
- Broken gearshift spindle return spring

Hard to shift

- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum guide grooves
- Bent shift spindle

Engine vibration

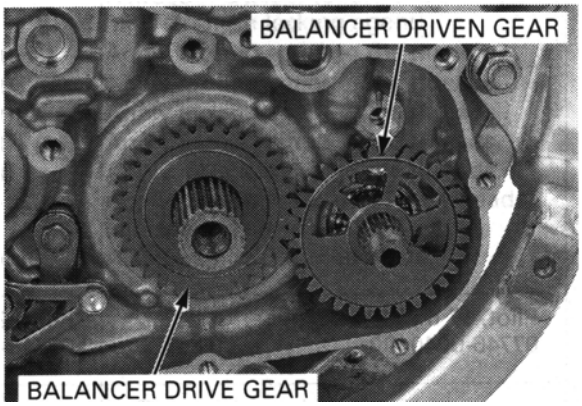
- Excessive crankshaft runout
- Improper balancer timing

BALANCER GEAR/BALANCER

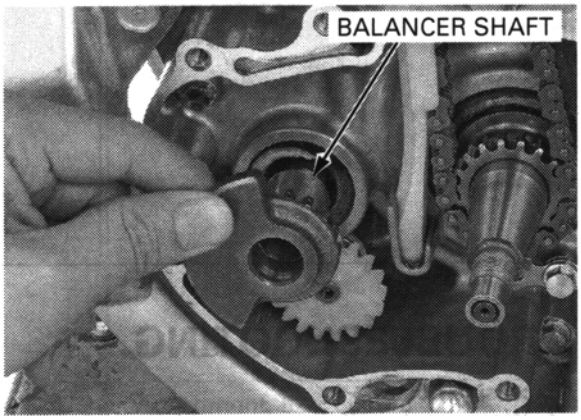
REMOVAL

Remove the following:
- Right crankcase cover
- Clutch
- Starter clutch
- Flywheel

Remove the balancer drive and driven gears.



Remove the balancer shaft from the crankcase.



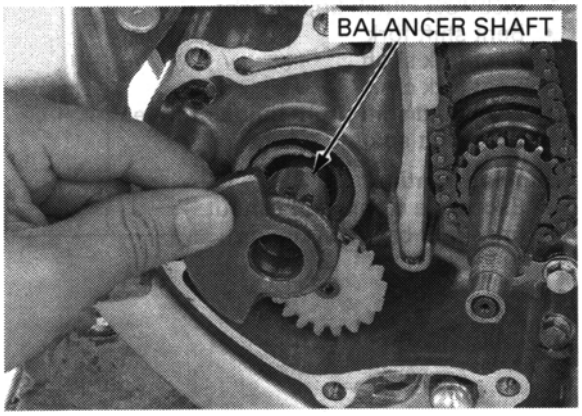
INSPECTION

Check the balancer shaft for wear, damage or excessive scratches.
Check the balancer shaft gear for wear or damage.
Check the balancer drive/driven gear for wear or damage.

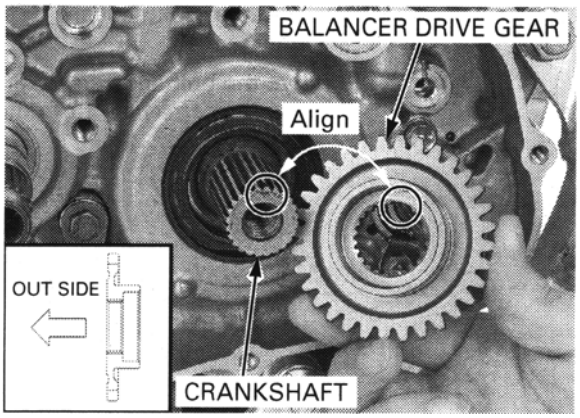
INSTALLATION

Engage the balancer shaft gear portion with the oil pump driven gear

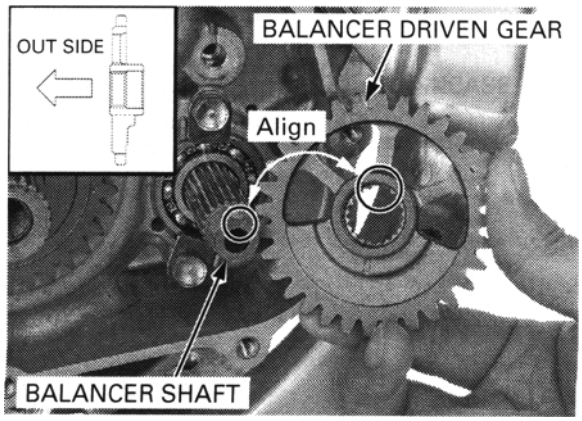
Install the balancer shaft into the crankcase as shown.



Install the balancer drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.



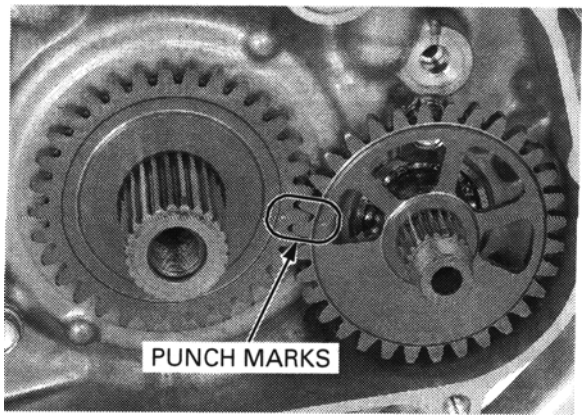
Install the balancer driven gear while aligning its wide cut-out in the splines with the punch mark on the balancer shaft.



Align the punch mark of the driven gear with the punch mark of the drive gear by turning the balancer shaft.

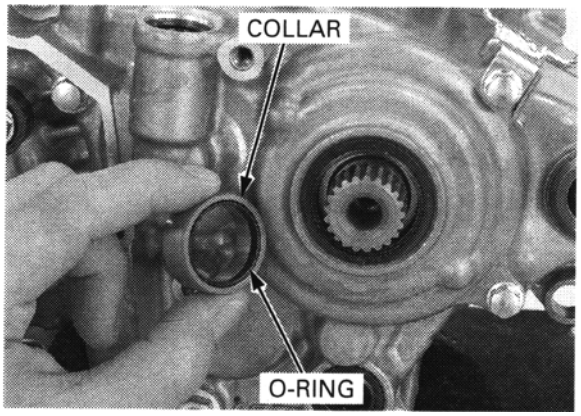
Install the following:

- Flywheel
- Starter clutch
- Clutch
- Right crankcase cover

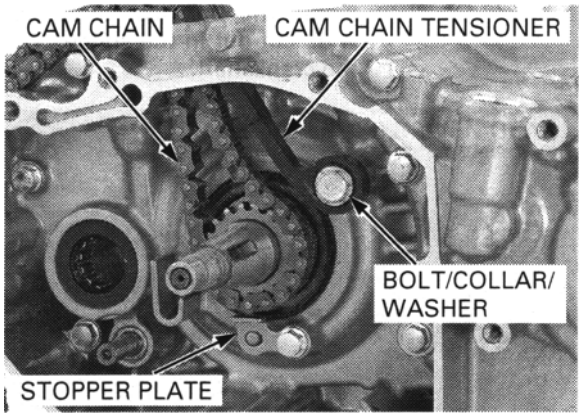


CRANKCASE SEPARATION

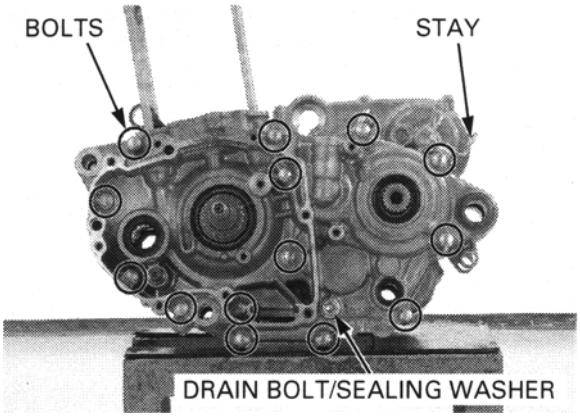
Refer to service information for removal of necessary parts before separating the crankcase . Remove the collar and O-ring.



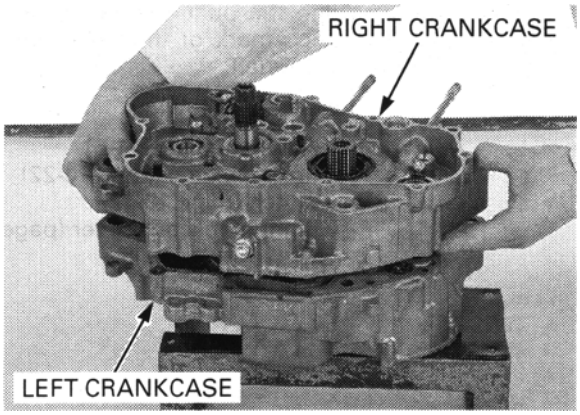
Remove the bolt, collar, washer and cam chain tensioner.
Remove the bolt and cam chain stopper plate.
Remove the cam chain from the timing sprocket.



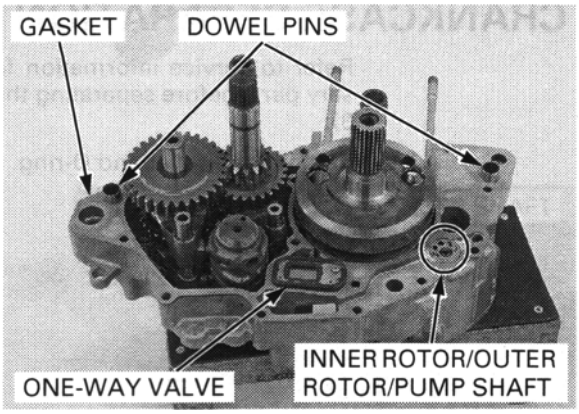
Remove the transmission oil drain bolt and sealing washer.
Loosen the crankcase bolts in a crisscross pattern in two or three steps.
Remove the crankcase bolts and breather hose stay.



Place the left crankcase facing down and separate the left and right crankcase halves.

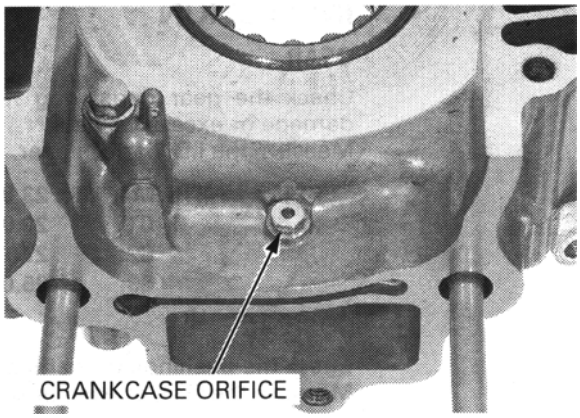


Remove the oil pump inner/outer rotors and shaft.
Remove the one-way valve.
Remove the dowel pins and gasket.



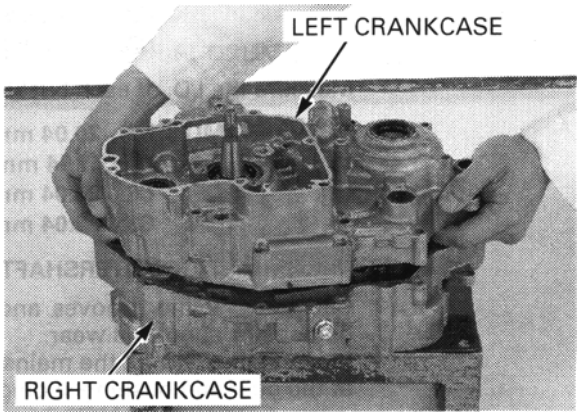
Do not remove the crankcase orifice unless it is necessary to replace with a new one.

Check the orifice for damage or clogging.
Blow open passage in the orifice with compressed air.

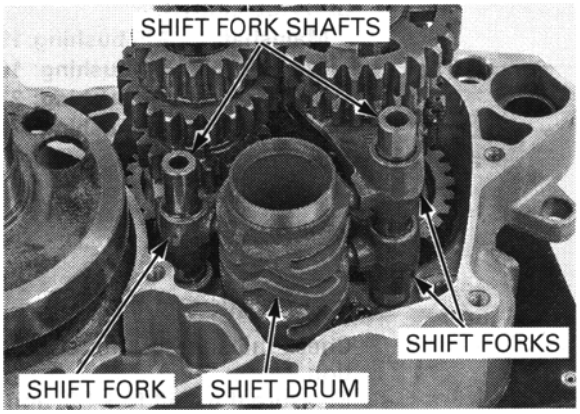


TRANSMISSION DISASSEMBLY

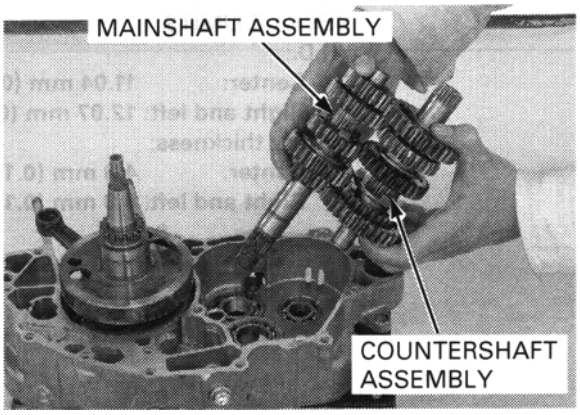
Separate the crankcase halves.
Temporarily install the right crankcase.
Place the right crankcase facing down and separate the right and left crankcase halves.



Remove the shift fork shafts.
Remove the shift fork guide pins from shift drum grooves and remove the shift drum.
Remove the shift forks.



Remove the mainshaft and countershaft as an assembly from the right crankcase.

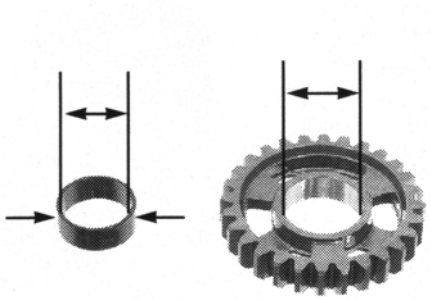


Disassemble the transmission:

- Keep track of the disassembled parts (gears, bushings, washers, and snap rings) by sliding them onto a tool or a piece of wire.
- Do not remove the snap rings over the shafts. Expand the snap ring ends and slide the snap ring off the shaft, along with the gear behind it.

INSPECTION

Check the gear dogs, dog holders and teeth for damage or excessive wear.
Measure the I.D. of each gear.



SERVICE LIMITS: M4, M5: 23.07 mm (0.908 in)
C1: 20.07 mm (0.790 in)
C2: 27.07 mm (1.066 in)
C3: 25.07 mm (0.987 in)

BUSHING

Check the bushings for damage or excessive wear.
Measure the O.D. of each bushing.

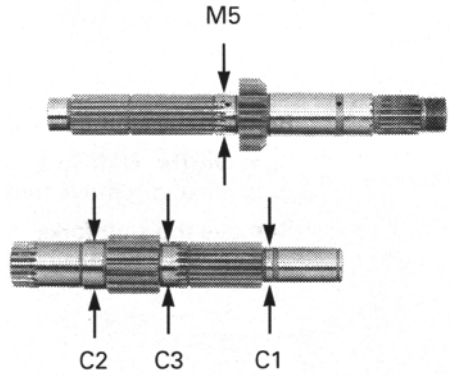
SERVICE LIMITS: M4, M5: 22.96 mm (0.904 in)
C1: 19.95 mm (0.785 in)
C2: 26.95 mm (1.061 in)
C3: 24.96 mm (0.983 in)

Measure the I.D. of each bushing.

SERVICE LIMITS: M5: 20.04 mm (0.789 in)
C1: 17.04 mm (0.671 in)
C2: 24.04 mm (0.946 in)
C3: 22.04 mm (0.868 in)

MAINSHAFT/COUNTERSHAFT

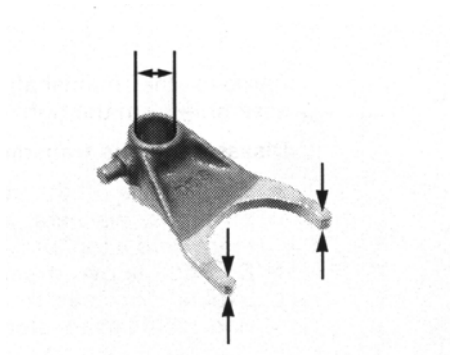
Check the spline grooves and sliding surfaces for damage or abnormal wear.
Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.



SERVICE LIMITS:
Mainshaft: M5 bushing: 19.94 mm (0.785 in)
Countershaft: C1 bushing: 16.97 mm (0.668 in)
C2 bushing: 23.94 mm (0.943 in)
C3 bushing: 21.94 mm (0.864 in)

SHIFT FORK

Check the shift fork for abnormal wear or deformation.
Measure the shift fork I.D. and claw thickness.

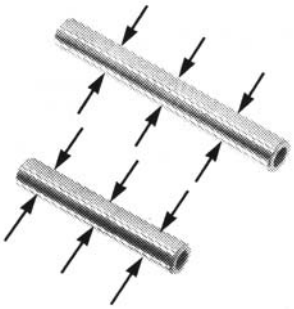


SERVICE LIMITS:
I.D.:
Center: 11.04 mm (0.435 in)
Right and left: 12.07 mm (0.475 in)
Claw thickness:
Center: 4.8 mm (0.19 in)
Right and left: 4.8 mm (0.19 in)

SHIFT FORK

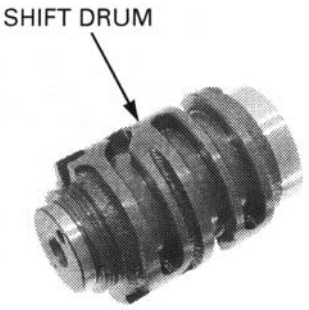
Check the shift fork shaft for abnormal wear or deformation.
Measure the shift fork shaft O.D.

SERVICE LIMITS:
Center: 10.97 mm (0.432 in)
Right and left: 11.95 mm (0.470 in)



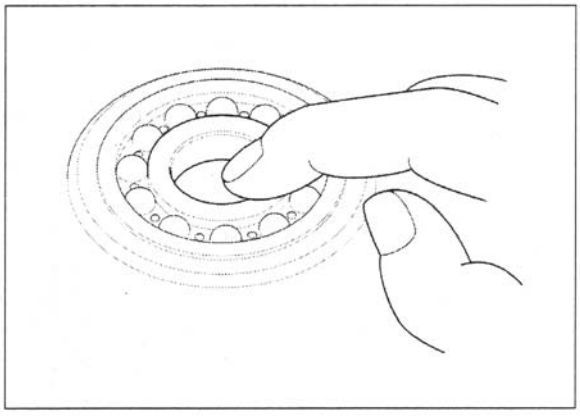
SHIFT DRUM

Inspect the shift drum for scoring, scratches or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.



TRANSMISSION BEARING

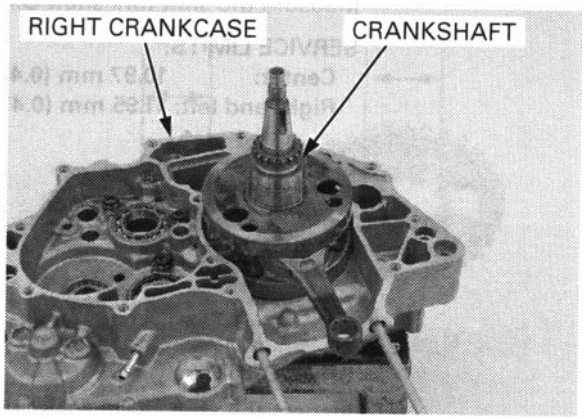
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the crankcase.
Replace any bearing if the inner race does not turn smoothly and quietly, or if the bearing fits loosely in the crankcase.



CRANKSHAFT REMOVAL

REMOVAL

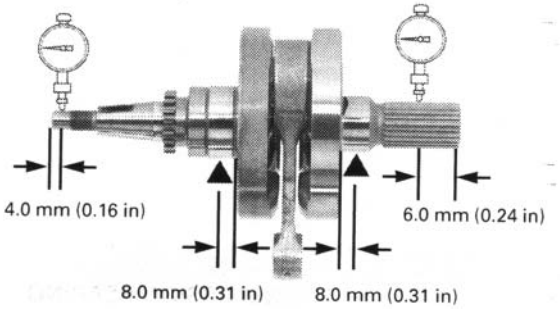
Separate the crankcase.
Remove the transmission.
Remove the crankshaft from the right crankcase.



INSPECTION

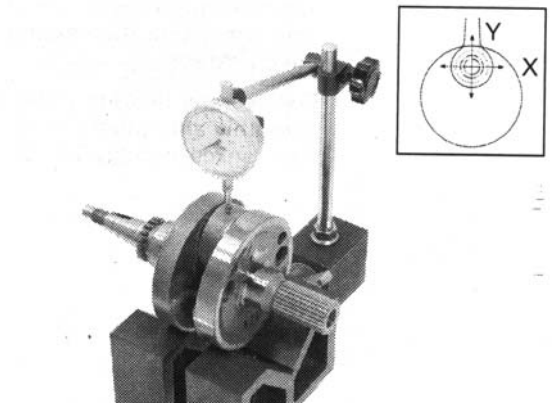
Place the crankshaft on a stand or V-blocks.
Set the dial indicator on the crankshaft journals.
Rotate the crankshaft two revolutions (720°) and read the runout.

SERVICE LIMITS: L: 0.05 mm (0.002 in)
R: 0.03 mm (0.001 in)



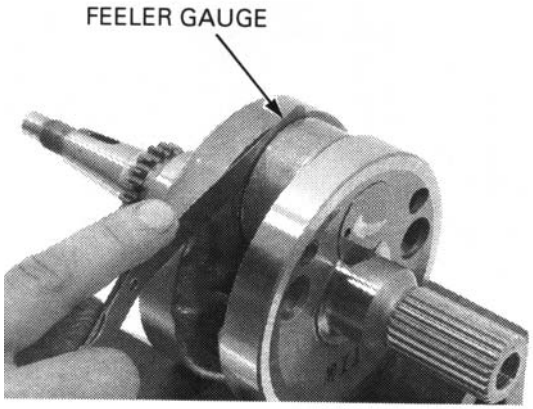
Measure the connecting rod big end radial clearance in both X and Y directions.

SERVICE LIMIT: 0.05 mm (0.002 in)



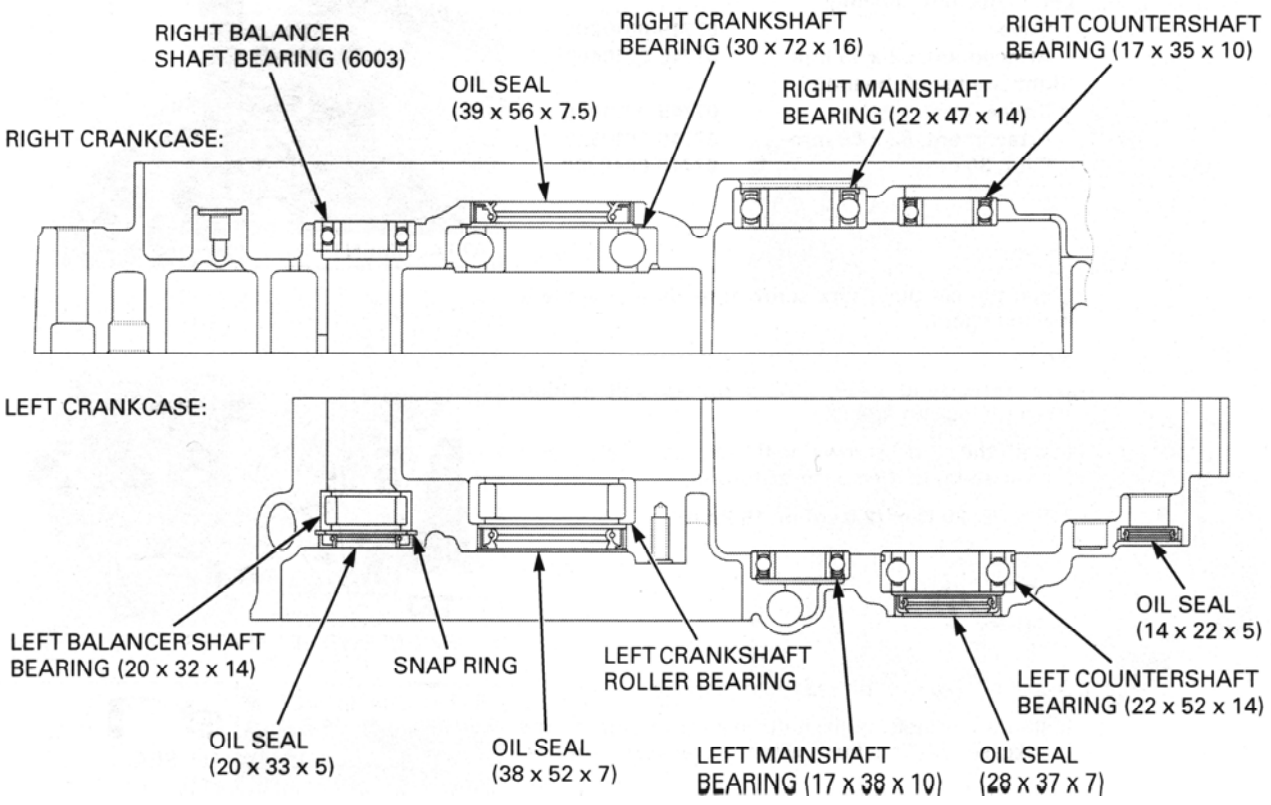
Measure the connecting rod big end side clearance.

SERVICE LIMIT: 0.8 mm (0.03 in)



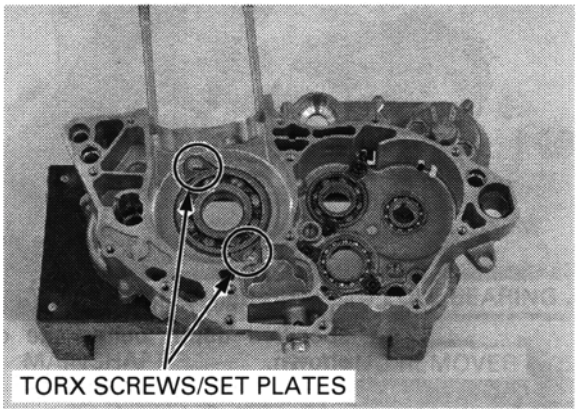
CRANKCASE BEARING REPLACEMENT

CRANKCASE BEARING/OIL SEAL LOCATION

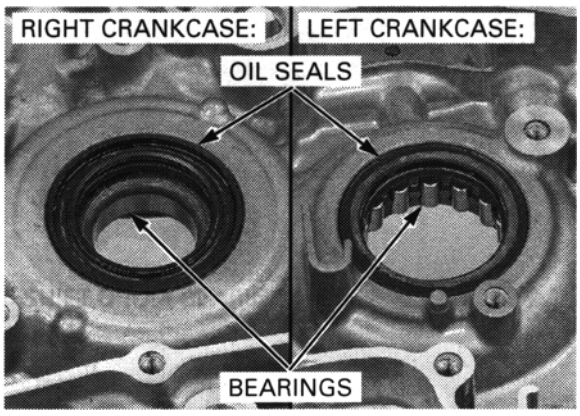


CRANKSHAFT BEARING

Remove the torx screws and right crankcase bearing set plates.



Remove the crankshaft oil seals and bearings from both crankcase halves.

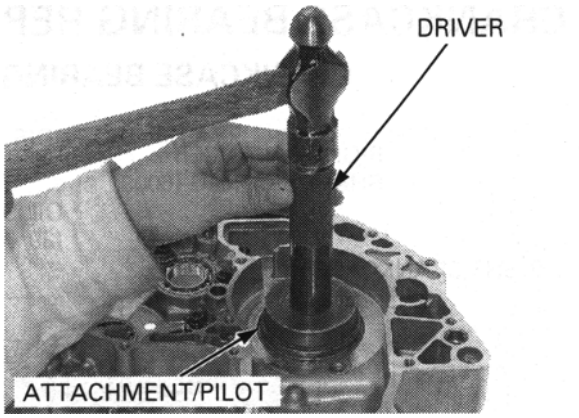


Drive in the new bearing squarely with the marking side facing toward the inside of the crankcase.

Drive new crankshaft bearings into both crankcase halves using the special tools.

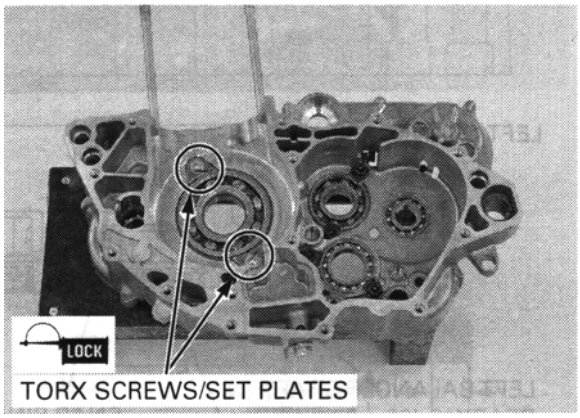
TOOLS:

Left crankshaft bearing:	
Driver	**07749-0010000**
Attachment 52 × 55 mm	**07746-0010400**
Right crankshaft bearing:	
Driver	**07749-0010000**
Attachment 62 × 68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**

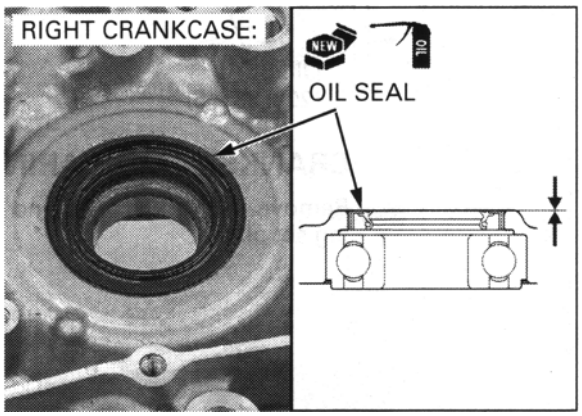


Clean the set plate torx screw threads and apply a locking agent.
NOTE:
Use ThreeBond 2430, 1373N or equivalent high strength locking agent.
Install the torx screws with the set plates and tighten them to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

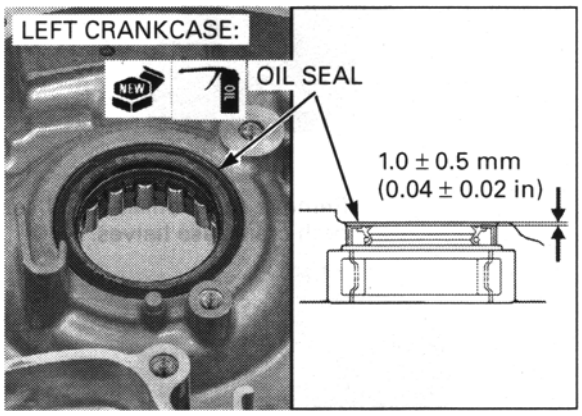


Apply oil to a new oil seal outer surface.
Install a new left crankshaft bearing oil seal to the crankcase until it is flush with the crankcase surface.



Apply transmission oil to a new oil seal outer surface.

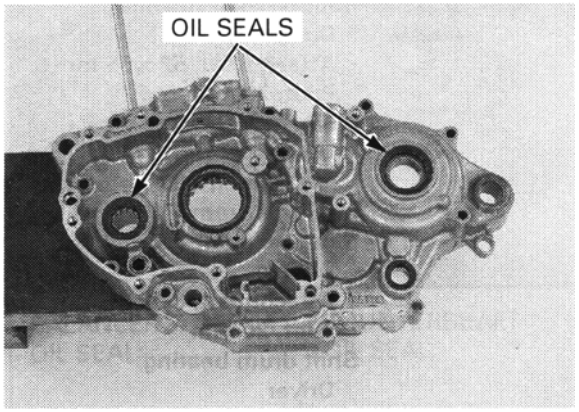
Install a new right crankshaft bearing oil seal to the specified depth below the crankcase surface as shown.



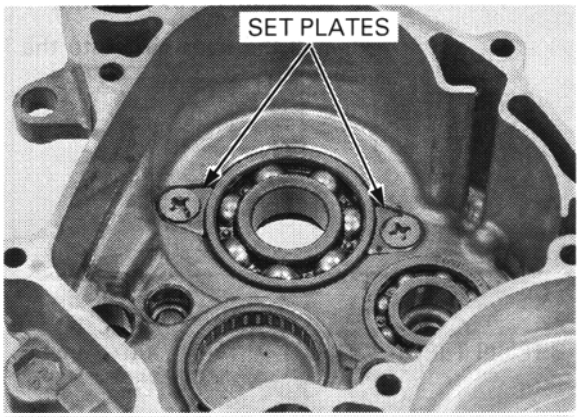
TRANSMISSION/BALANCER/SHIFT DRUM BEARINGS

LEFT CRANKCASE

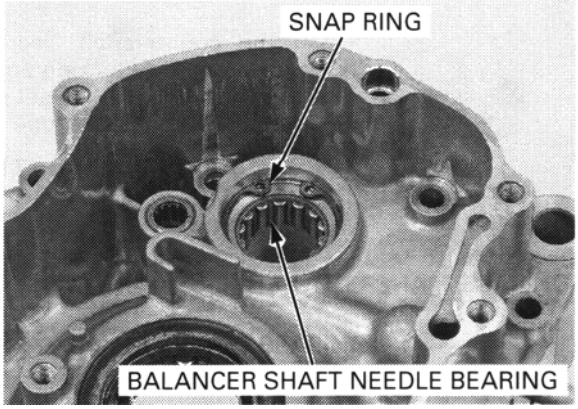
Remove the countershaft oil seal and balancer shaft oil seal.



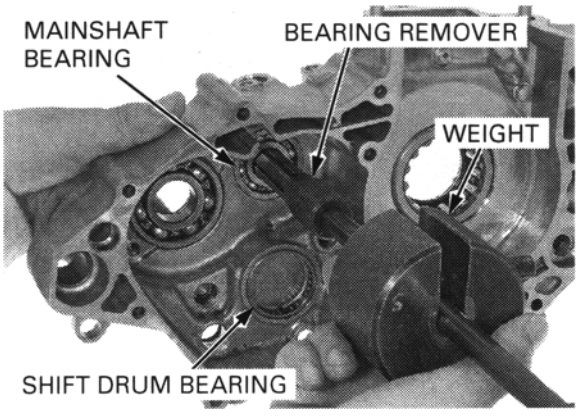
Remove the screws and countershaft bearing set plates.



Remove the snap ring from the left crankcase.



Remove the countershaft bearing out of the crankcase.
Remove the mainshaft bearing, balancer shaft bearing using the special tools as shown.



TOOLS:

Mainshaft bearing:

Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-3710200**

Balancer shaft bearing:

Remover handle	**07936-3710100**
Bearing remover, 20 mm	**07936-3710600**
Remover *weight*	**07741-0010201 or 07936-3710200**

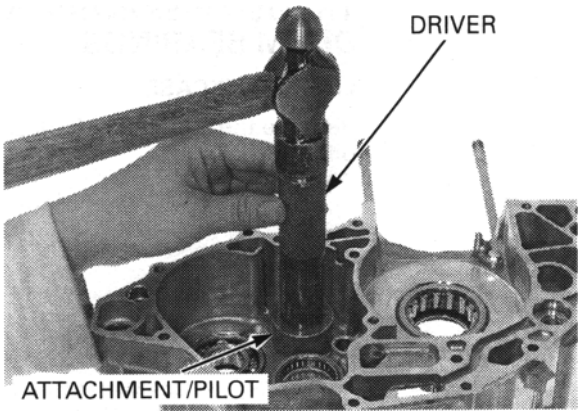
Remove the shift drum bearing.

Drive in the new bearings squarely with the marking side facing toward the inside of the crankcase.

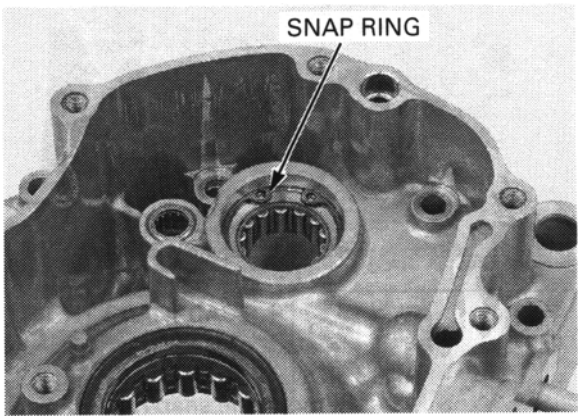
Drive new bearings into the left crankcase using the special tools.

TOOLS:

Countershaft bearing:	
Driver	**07749-0010000**
Attachment 52 × 55 mm	**07746-0010400**
Pilot 22 mm	**07746-0041000**
Mainshaft bearing:	
Driver	**07749-0010000**
Attachment 37 × 40 mm	**07746-0010200**
Pilot, 17 mm	**07746-0040400**
Balancer shaft bearing:	
Driver	**07749-0010000**
Attachment 32 × 35 mm	**07746-0010100**
Pilot, 20 mm	**07746-0040500**
Shift drum bearing:	
Driver	**07749-0010000**
Attachment 37 × 40 mm	**07746-0010200**

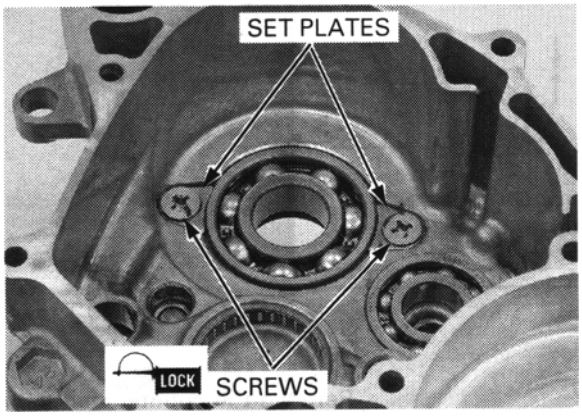


Install the snap ring into the left crankcase groove securely.

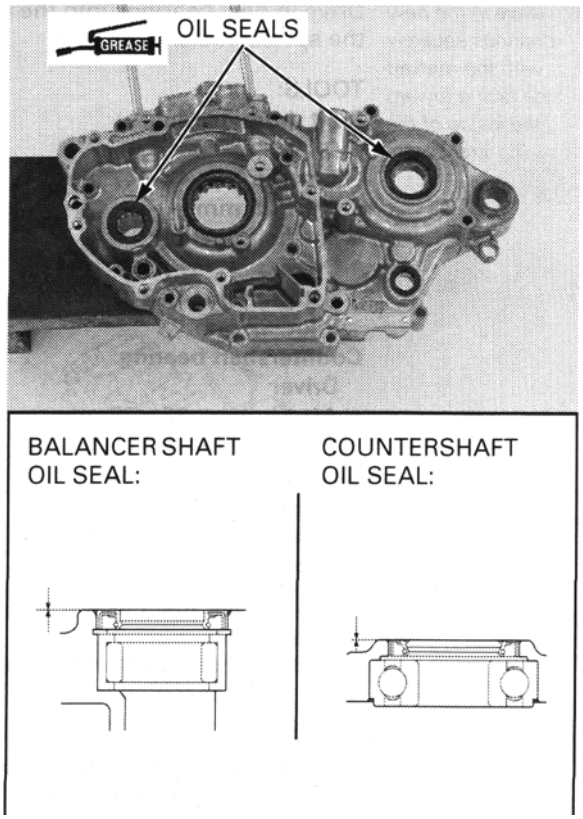


Clean the countershaft bearing set plate screw threads and apply a locking agent.
Install the screws with the set plates and tighten the screws to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

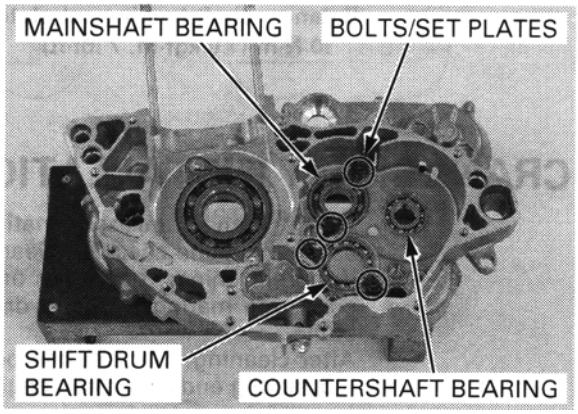


Apply grease to the countershaft and balancer shaft oil seal lips.
Install the oil seals to the crankcase until it is flush with the crankcase surface.



RIGHT

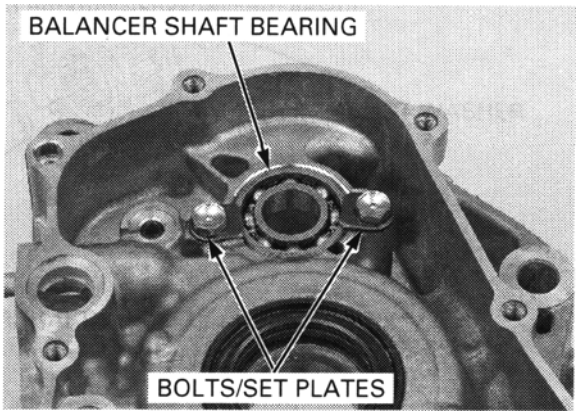
Remove the socket bolts and set plates.
Remove the countershaft bearing, mainshaft bearing and shift drum bearing.



Remove the bolts and set plates.
Remove the balancer shaft bearing using the special tools.

TOOLS:

Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201 or 07936-3710200**

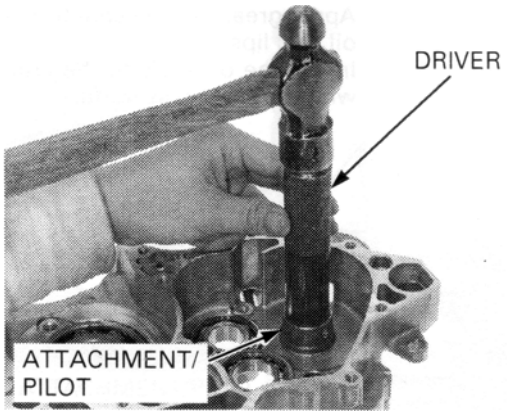


Drive in the new bearings squarely with the marked side facing toward the inside of the crankcase.

Drive in new bearings into the right crankcase using the special tools.

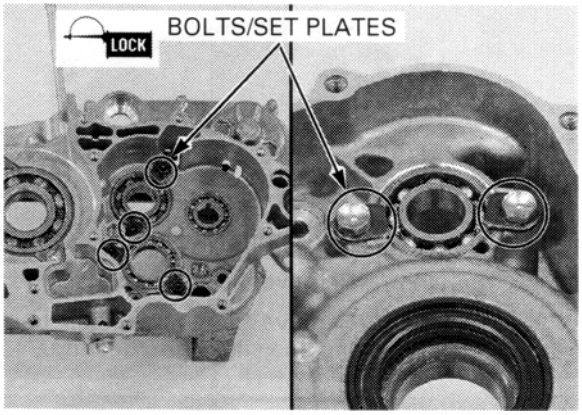
TOOLS:

Shift drum bearing:	
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot 25 mm	**07746-0040600**
Mainshaft bearing:	
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 22 mm	**07746-0041000**
Countershaft bearing:	
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 17 mm	**07746-0040400**
Balancer shaft bearing:	
Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 17 mm	**07746-0040400**



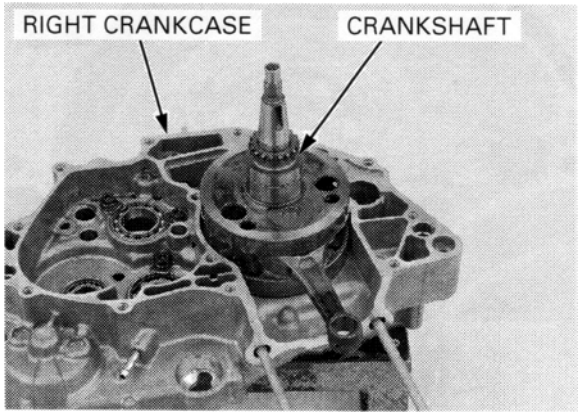
Clean the set plate socket bolt threads and apply a locking agent.
Install the bolts with the set plates and tighten the bolts to the specified torque.

TORQUE:
Shift drum bearing set plate bolts:
10 N·m (1.0kgf·m,7lbf·ft)
Mainshaft bearing set plate bolts:
10 N·m (1.0 kgf·m, 7 lbf·ft)
Balancer shaft bearing set plate bolts:
10 N·m (1.0 kgf·m, 7 lbf·ft)



CRANKSHAFT INSTALLATION

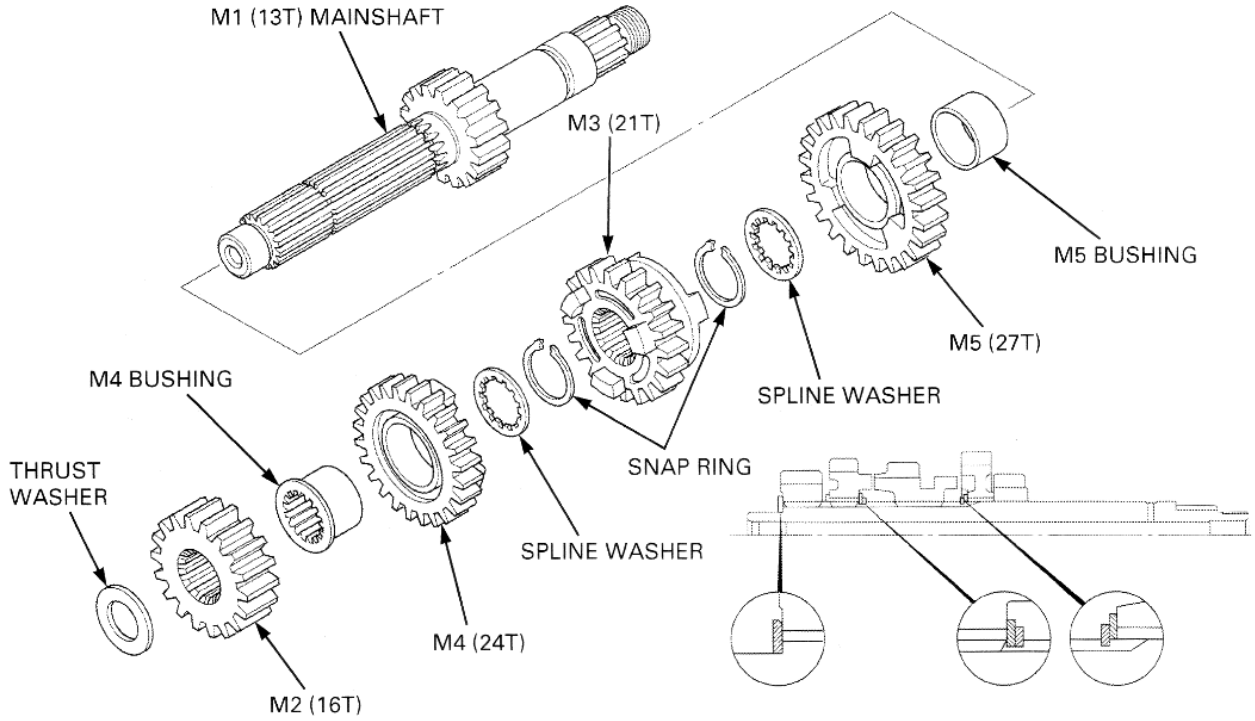
Clean both crankcase mating surfaces before assembling and check for wear or damage.
If there is minor roughness or irregularities on the crankcase mating surfaces, dress them with an oil stone.
After cleaning, lubricate the bearings and connecting rod big end with clean engine oil.
Install the crankshaft into the right crankcase.

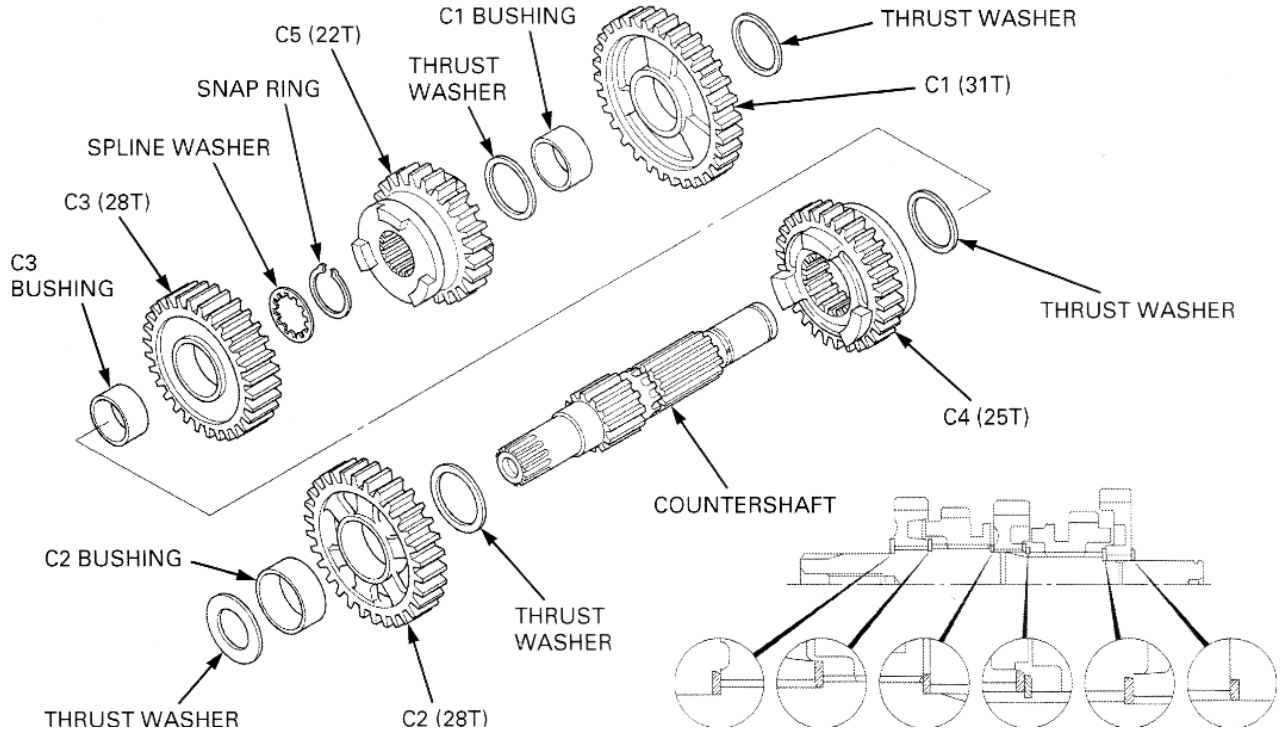


TRANSMISSION ASSEMBLY

Coat the spline area, rolling and sliding area of each gear with molybdenum oil solution.
Apply transmission oil to the teeth of each gear.
Assemble the mainshaft and countershaft.

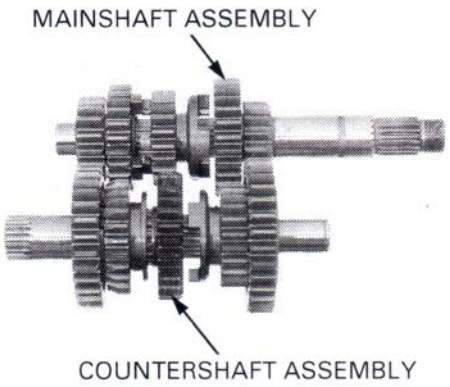
MAINSHAFT:





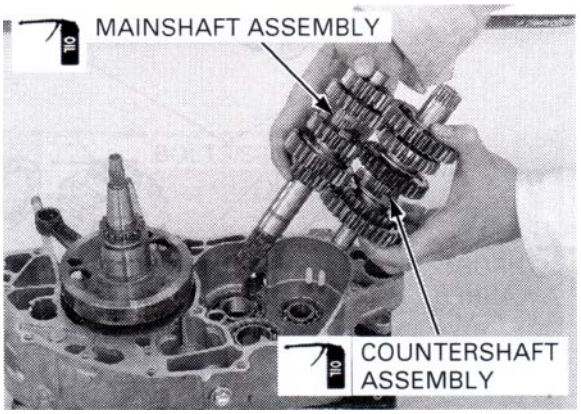
INSTALLATION

・ Check the gear movement and rotation on the shaft.
・ Install the washers and snap rings with the chamfered edge facing the thrust load side.
・ Do not reuse worn snap rings which could easily spin in the grooves.
・ Check that the snap rings are seated in the grooves. Align their end gaps with the grooves in the spline.

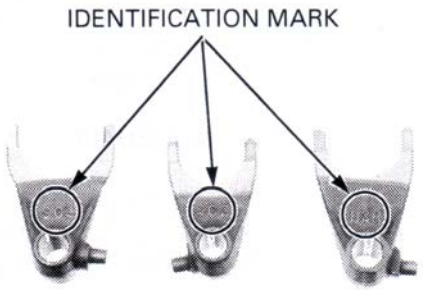


Apply transmission oil to the following parts:
- Each gear
- Mainshaft bearings
- Countershaft bearings
- Shift drum bearings

Engage the mainshaft and countershaft gears and place the transmission assembly into the right crankcase.



・ Each shift fork has an identification mark, "R" is for the right shift fork, "L" is the left shift fork and "C" is for the center shift fork.
・ When installing, face each identification mark to the right crankcase.

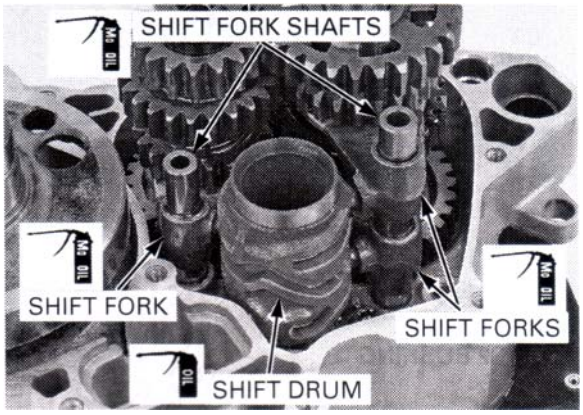


Apply transmission oil to the shift drum guide grooves.

Apply molybdenum oil solution to the following parts:
- Shift fork claws and guide pins
- Shift fork sliding surfaces
- Shift fork shafts

Install the shift forks to the shifter grooves in the sliding gears.
Install the shift drum by aligning the guide pins on the shift forks with the guide grooves in the shift drum.

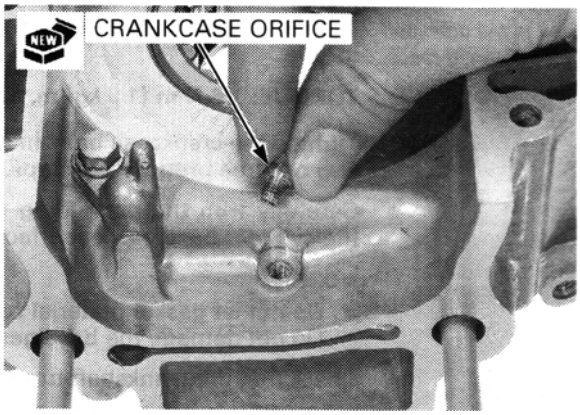
Slide the shift fork shafts through the shift forks, and into the crankcase.



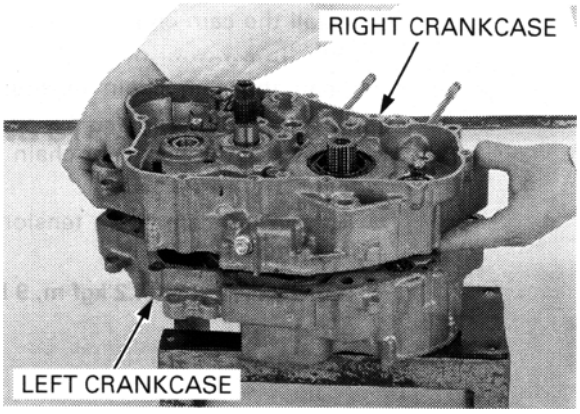
CRANKCASE ASSEMBLY

If the crankcase orifice was removed, install a new crankcase orifice to the left crankcase and tighten it to the specified torque.

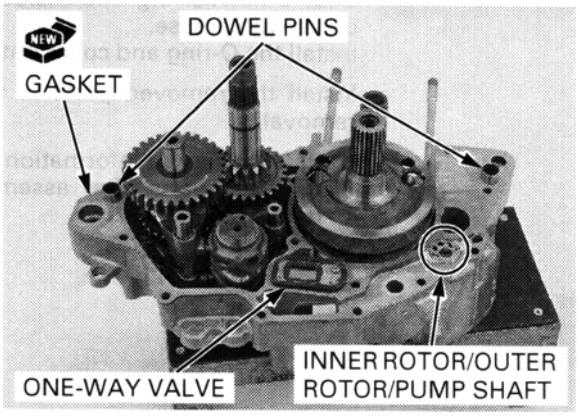
TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)



Temporarily install the left crankcase.
Place the left crankcase facing down and separate the left and right crankcase halves.

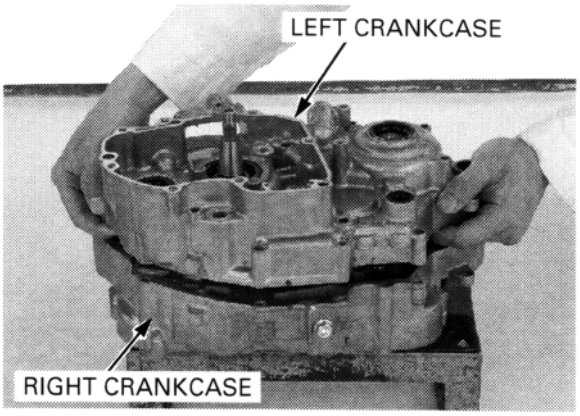


Install the oil pump inner/outer rotor and shaft in the left crankcase.
Install the one-way valve.
Install the dowel pins and a new gasket.



Before assembly, lubricate the transmission bearings with clean transmission

Place the right crankcase onto the left crankcase.



Apply transmission oil to the drain bolt threads.

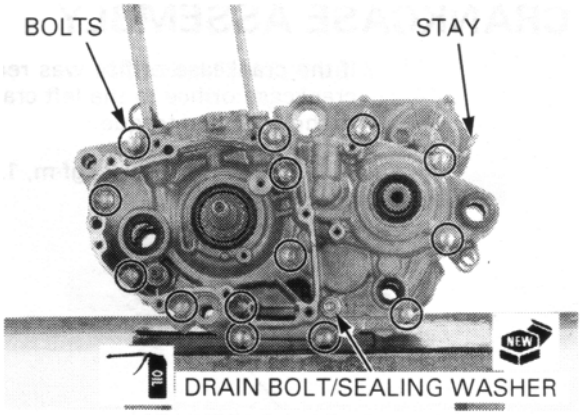
Install the crankcase bolts and breather hose stay.
Install the transmission oil drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)
Tighten the crankcase bolts in a crisscross pattern in two or three progressive steps.

Carefully trim the protruding gasket material from the cylinder base gasket surface.

NOTE:
- Do not let gasket material fall into the crankcase.
- Do not damage the base gasket surface.

Check that the crankshaft turns smoothly.

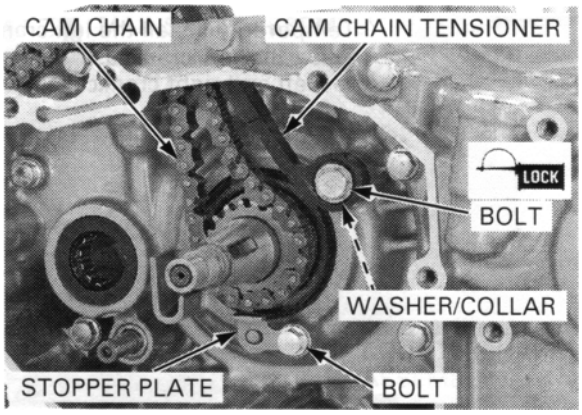


Install the cam chain onto the timing sprocket.
Install the cam chain stopper plate and tighten the bolt.

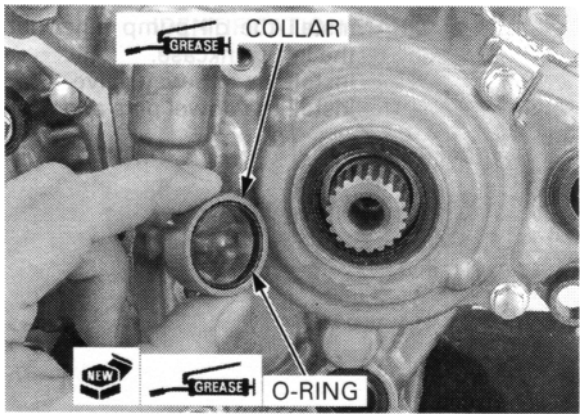
Clean the cam chain tensioner bolt threads and apply a locking agent.

Install the washer, cam chain tensioner, collar and bolt.

Tighten the cam chain tensioner bolt to the specified torque.
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Coat a new O-ring and inside of the countershaft collar with grease.
Install the O-ring and collar onto the countershaft.
Install the removed parts in the reverse order of removal.
- Refer to service information for installation of the removed parts after assembling the crankcase .



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NOTE:
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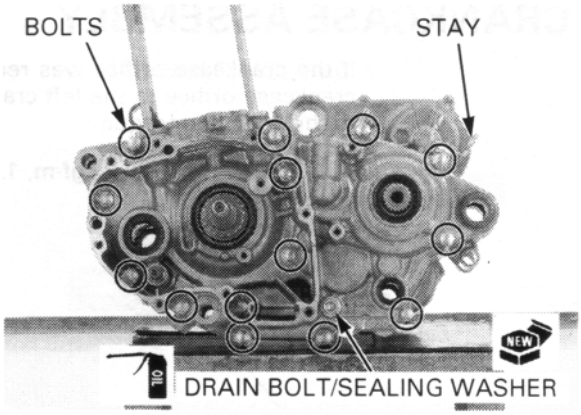

Install the cam chain onto the timing sprocket.
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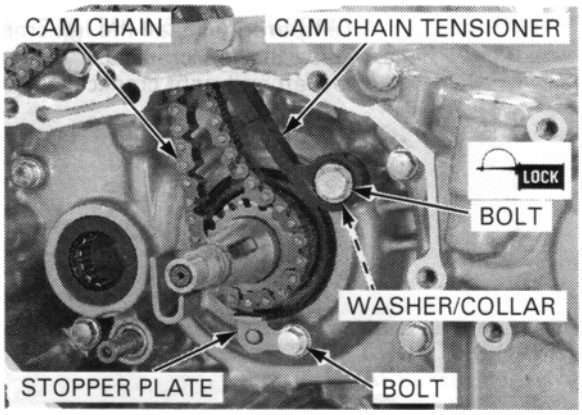
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



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Install the O-ring and collar onto the countershaft.
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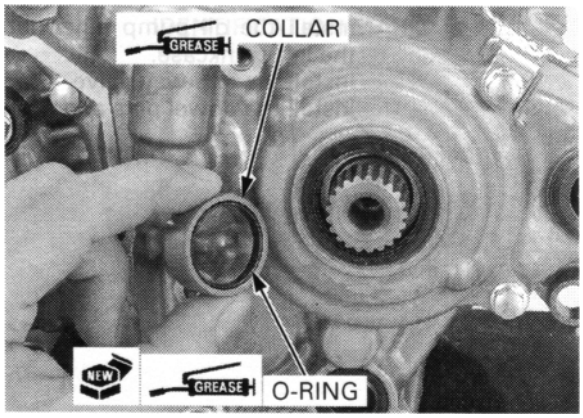


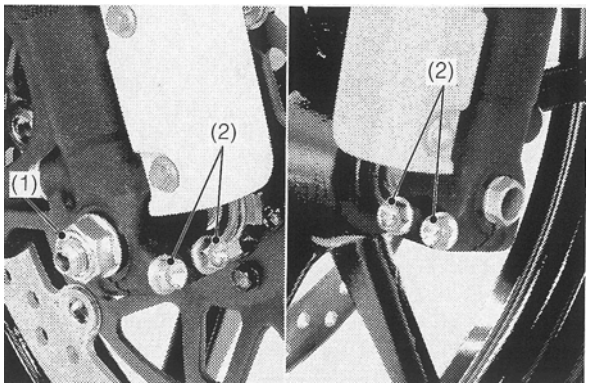
Front wheel

Removal

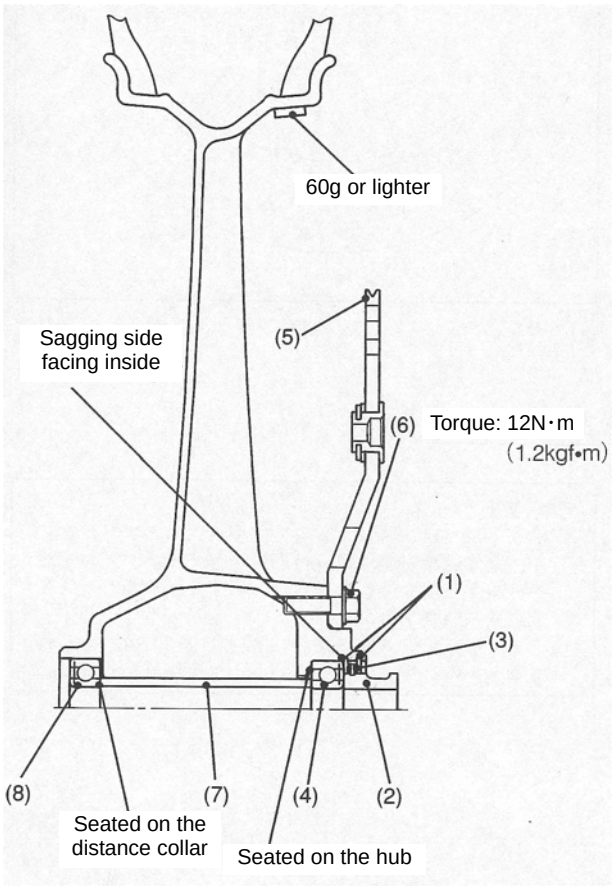
Remove the axle nut.
Loosen the axle holder bolts.

Hold the motorcycle upright and raise the front wheel off the ground by placing the work stand or equivalent
Remove the axle and front wheel.

Note
Do not operate the brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the pads.



(1) Axle nut (2) Axle holder bolts



(1) Circlip (IN/35mm) (2pc)
(2) Side collar
(3) Circlip (EX/26mm)
(4) R. Wheel bearing (6202U)
(5) Brake disc
(6) Flange bolt, 6×20mm
(7) Distance collar
(8) L. Wheel bearing (6202U)

Front wheel bearing replacement

Turn the inner race of R/L bearing with your finger. The bearings should turn smoothly and quietly.
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the bearings in pairs.
Remove the wheel bearings and distance collar using following tools.

Tool	
Bearing remover head	**07746-0050400**
Bearing remover shaft	**07746-0050100**

Assembly

Apply oil to the outer surface of the bearings.
Drive the bearings in the wheel hub using special tools.

Tool	
Driver A	**07749-0010000**
Attachment, 32×35mm	**07746-0010100**
Pilot, 15mm	**07746-0040300**

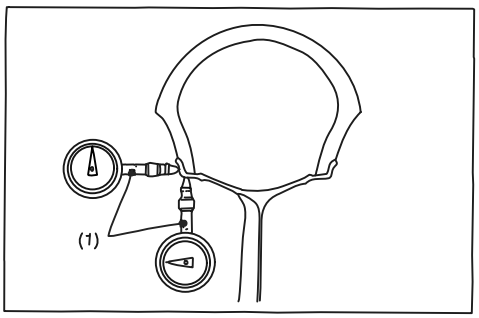
Advice
- Install the wheel bearings with the sealed ends toward the outside.
- L Wheel bearing should be fully seated against the distance collar.
- Do not degrease the bearings

Inspection

Wheel rim
Check the rim runout by placing the wheel on a truing stand.
Spin the wheel slowly by hand, and read the runout using a dial indicator.

Advice
Casted wheels are not repairable. Replace the wheel with new one in case of damage or excessive runout.

Service limit: 0.3mm

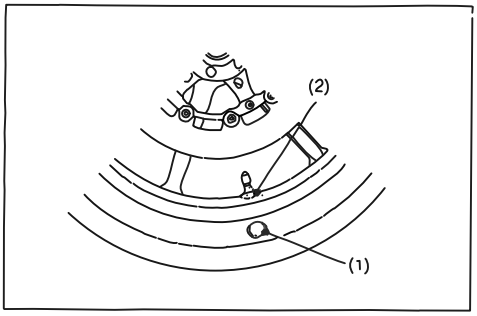


(1) Dial indicator

Inspect the wheel balance.

Wheel balance

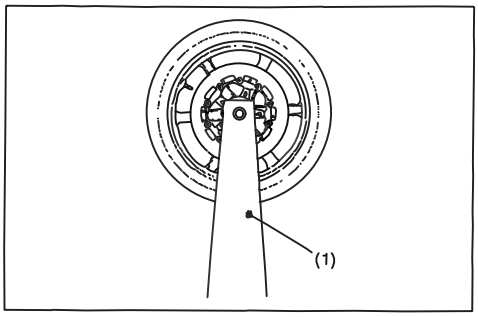
Advice
- Wheel balance directly influences the motorcycle safety and controllability. Make sure to perform wheel balance check and adjustment when remove tires from the wheels.
- Make sure the balance mark on tires (paint) is aligning with the wheel valve stem



(1) Balance mark (2) Valve stem

Placing the wheel assembly (including the brake disc) to the truing stand.
Let the wheel turn until it stops itself. Mark the lowest point of the wheel.
Repeat the operation 2 to 3 times and confirm the heaviest point of the wheel.
Well-balanced wheel will not stop at same location.

Attach a balance weight to a point directly opposite from the heaviest point (highest point).
Clean the wheel rim before you stick the balance weight.
Try to obtain optimum weight of the balance weight until the wheel doesn't stop at same location.
Do not use more than 60g balance weight at one location.



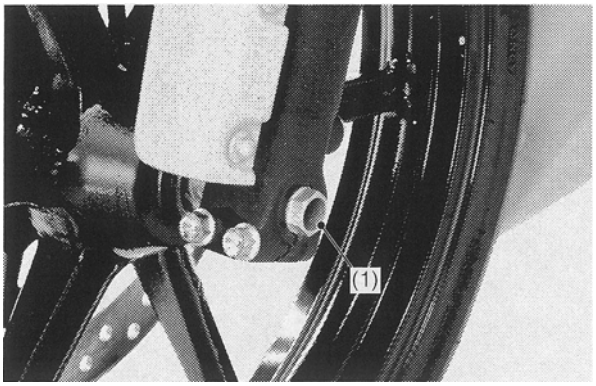
(1) Truing stand

Installation

Clean the clamping surface of the axle and axle holders.
Install the front wheel between the fork legs.

Be careful not to damage the brake pads with the disc.

Apply a thin layer of grease to the front axle and insert the axle from the left side.



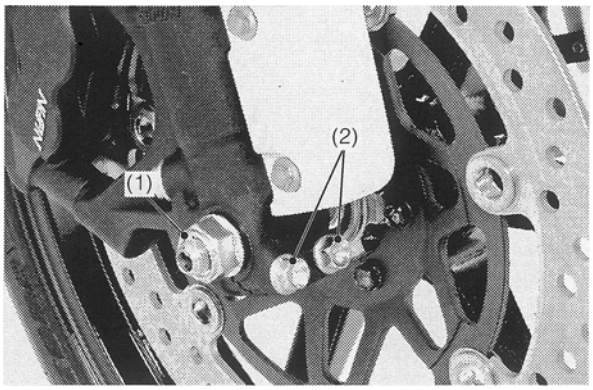
(1) Axle

Hold the axle and tighten the axle nut to the specified torque.

Torque: 69N・m(7.0kgf・m)

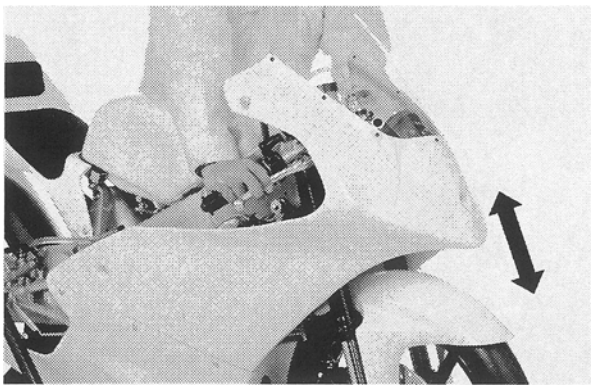
Tighten the right axle holder bolts to the specified torque.

Torque: 22N・m(2.2kgf・m)



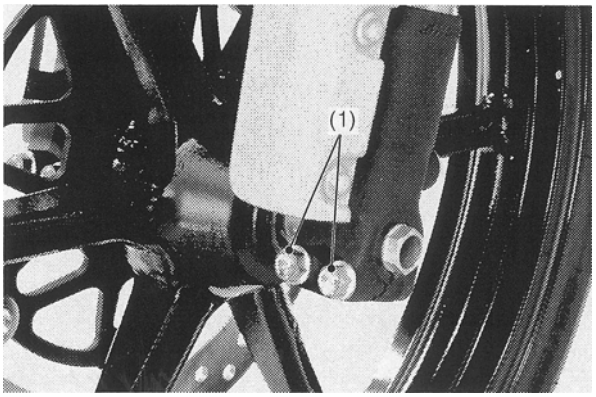
(1) Axle nut (2) Axle holder bolts

With the front brake applied, pump the front suspension up and down several times to seat the axle and check the front brake operation.
Be sure the fork legs are parallel.



Tighten the left axle holder bolts to the specified torque.

Torque: 22N・m(2.2kgf・m)



(1) Axle holder bolts

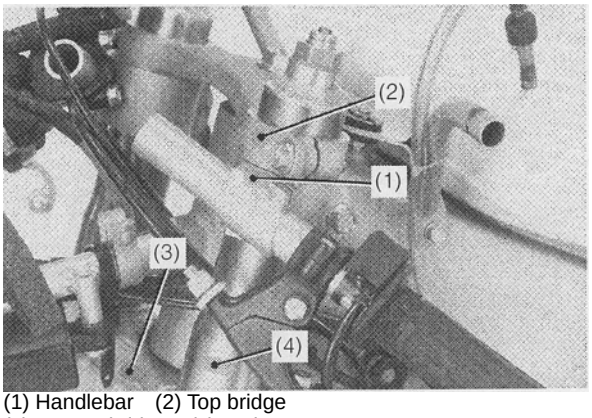
Fork

Removal

Remove the front wheel
Remove the bolts and front fender.
Remove the front brake caliper.

Loosen the handlebar holder bolts.
Loosen the top bridge pinch bolts.

When disassembling the fork, make sure to loosen the top bridge pinch bolts before loosen the fork bolts.
Do not use a crescent or adjustable wrench to loosen the fork bolt; it could be damaged.



(1) Handlebar (2) Top bridge
(3) Bottom bridge (4) Fork

Loosen the bottom bridge pinch bolts, and pull the fork legs down and out of the fork bridges.

Disassembly

Clean the fork assembly (sliding surface of the slider, around the socket bolt) before disassembling the fork.

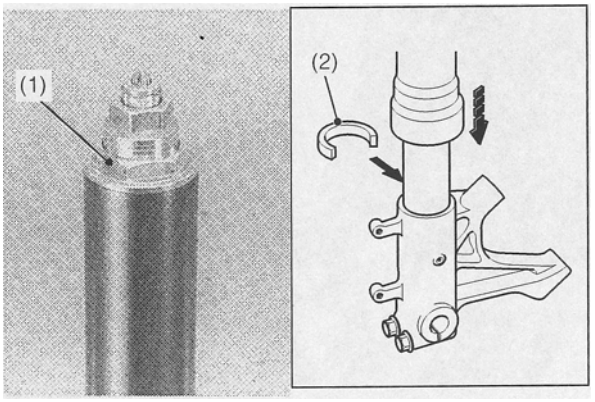
Be careful not to scratch the sliding surface of the fork slider. Damaging the fork slider will cause oil leaks.

Attach the fork set collar above the axle holder.

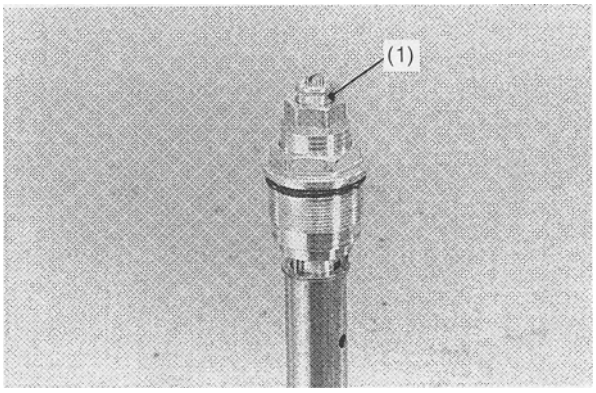
Tool
Fork set collar **51481-NX4-610**

Hold the outer tube and remove the fork bolt.
Gently bring down the outer tube until it sits on the fork set collar.

Always hold both outer tube and axle holder (slider) together after removing the fork bolt from the outer tube. If you hold only the outer tube, the slider goes down due to gravity and damages bushing and oil seals, or cause oil leaks from the slider hole.



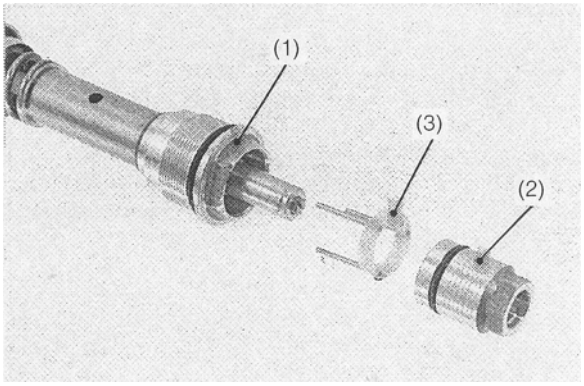
(1) Fork bolt (2) Fork set collar



(1) Stop ring

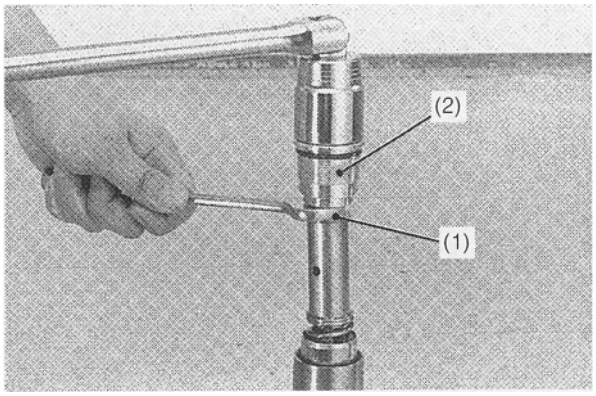
Remove the stop ring.

Hold the fork bolt and remove the pre-load adjuster by turning it counterclockwise.
Remove the spring adjusting plate



(1) Fork bolt (2) Pre-load adjuster
(3) Spring adjusting plate

Push the fork spring seat stopper down and put a 17mm wrench into the slit of the rebound adjuster.
Hold the rebound adjuster and remove the fork bolt from damper rod.



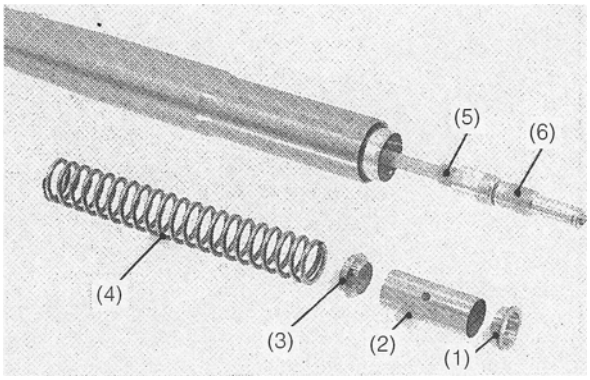
(1) Spring seat stopper (2) Fork bolt

Remove the following parts;
- Fork damper
- Centering plate

Advice
Check the slider if it moves smoothly in the outer tube. In case the slider doesn't move smoothly, check the slider for bend or damage, or bushing for wear or damage.

Remove the fork set collar.

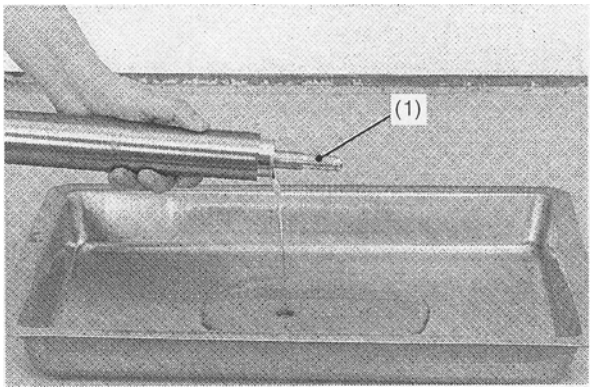
Remove the following parts;
- Spring seat stopper
- Spring collar
- Joint plate
- Fork spring



(1) Spring seat stopper (2)Spring collar
(3) Joint plate (4) Fork spring
(5) Lock nut (6) Rebound adjuster

Drain the fork oil.
Empty the fork oil from the fork damper by pumping the damper rod several times.

・Do not loosen or remove the lock nut and rebound adjuster.

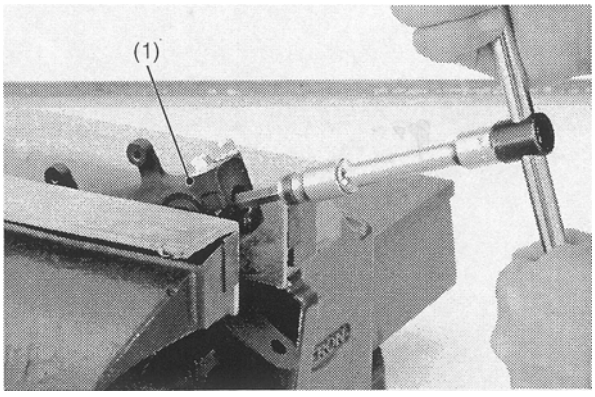


(1) Damper rod

Set the axle holder of the slider in a vise with a piece of wood or soft jaws to avoid damage.
Do not over-tighten the vise on the axle holder.

Loosen the socket bolt and remove it.

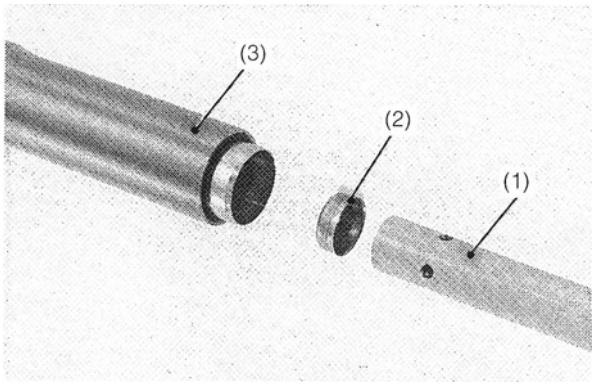
In case the fork damper moves with the socket bolt, install the fork spring and fork bolt temporary to hold the fork damper.



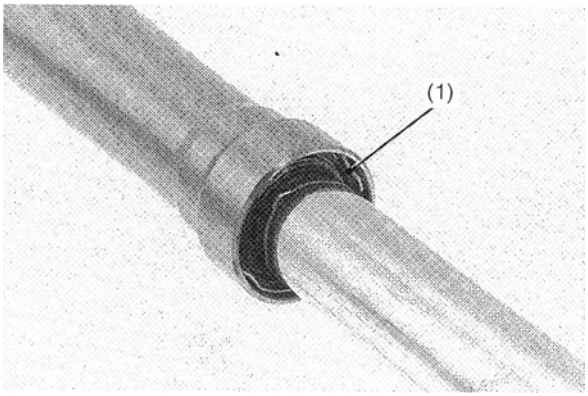
(1) Axle holder

Inspection

Advice
- Do not disassemble the fork damper. Do not loosen or remove the rebound adjuster nut or adjuster from the damper rod.
- Always check the slider sliding surface for score marks and scratches when replacing the oil seal due to oil leaks.



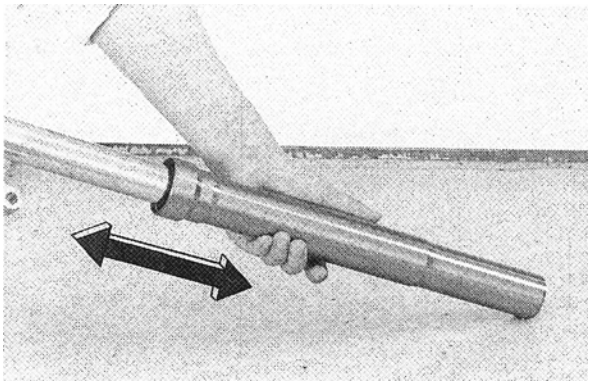
(1) Fork damper (2) Centering plate
(3) Slider



(1) Stopper ring

Remove the oil seal stopper ring. Be careful not to scratch the slider sliding surface.

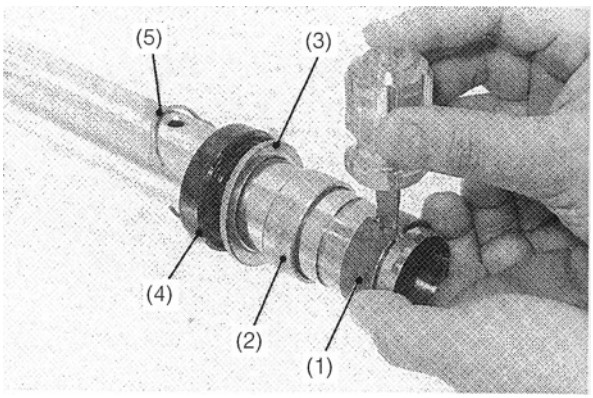
Using quick successive motions, pull the slider out of the outer tube.



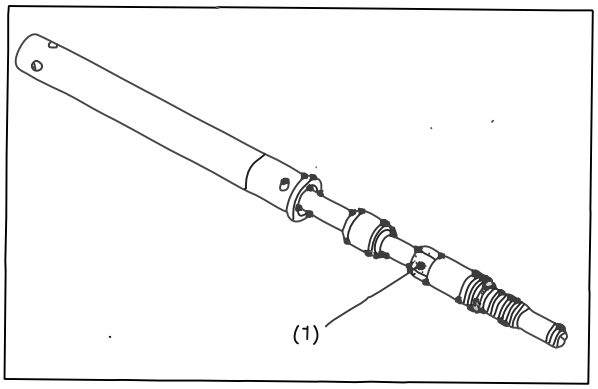
(1) Outer tube (2) Fork damper

Carefully remove the slider bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand. Remove the guide bushing. Be careful not to damage the Teflon coated area.

Remove the following parts;
- Backup ring
- Oil seal
- Stop ring



(1) Slide bush (2)Guide bush
(3) Backup spring (4) Oil seal
(5) Stop ring

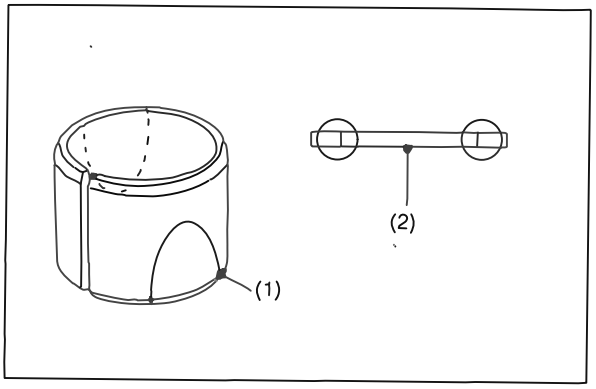


(1) Rebound adjuster lock nut

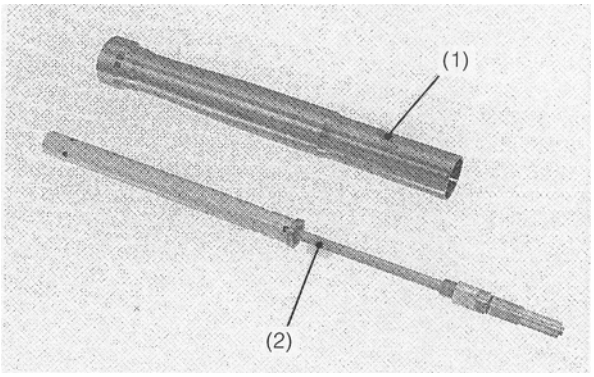
Bush / Backup ring

Check the sliding surface of the bushing for wear or scratches.
Remove any metal powder from the slider and guide bushings with a nylon brush and fork oil.
If copper appears on the surface or excessive scratch is found, replace the bushing.

Replace the backup ring if there is distortion at the points as shown (in the picture).



(1) Bush (2) Backup ring

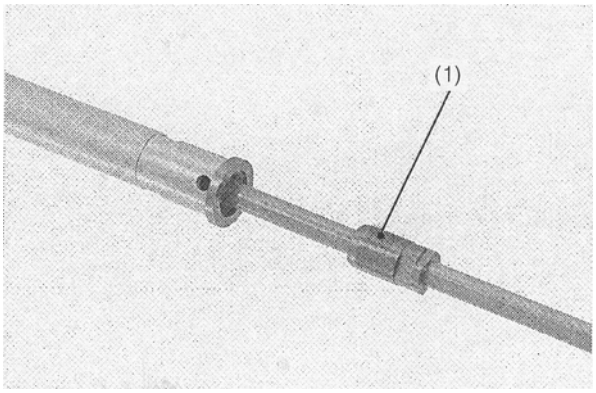


(1) Outer tube (2) Fork damper

Outer tube / Fork damper

Check the outer tube for damage or deformation.
Check the damper rod for bend, wear or damage.

Check the oil lock valve for wear or damage.



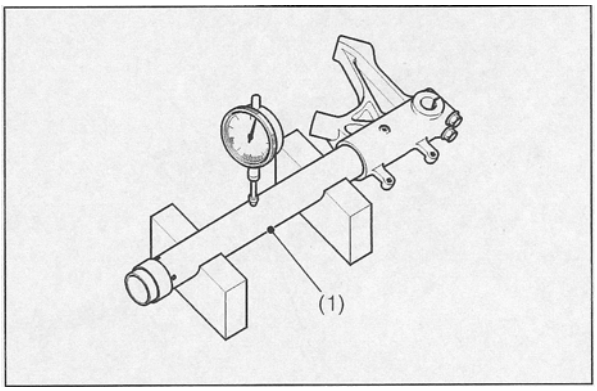
(1) Oil lock valve

Fork slider

Check the slider for score marks, scratches and excessive or abnormal wear

Set the slider on V-blocks and measure the runout.
Actual runout is 1/2 of the total indicator reading.

Service limit: 0.2mm
Replace if the measurement exceeds the service limit.



(1) Fork slider

Assembly

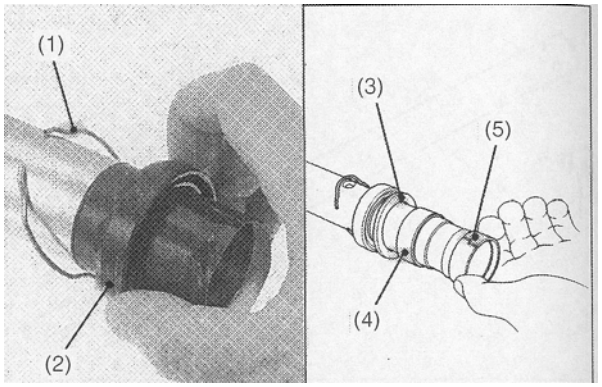
- Before assembly, wash all parts with a high flash point or non-flammable solvent and remove all dirt.
- Perform break-in ride for the front fork in case bushings, fork slider or outer tube are replaced with new ones.
- Perform the break-in rider with standard suspension settings.
- Honda Ultra Cushion Oil Special (SAE5W), SHOWA SS05 or equivalent fork oil is recommended to obtain performance of the fork.
- Do not use vegetable oil. It will damage the function of oil seals and cause oil leaks.

Wrap the end of the slider with tape to protect oil seal lips.
Install the stopper ring onto the slider.
Apply recommended fork oil to the oil seal and install it onto the slider with its marked side facing the stopping ring.
Remove the tape from the end of the slider.

Apply recommended fork oil to the guide bushing, and install the backup ring and guide bushing onto the slider.

Apply recommended fork oil to a new slide bushing and install it onto the slider.

Advice
Always use new slide bushing at assembly. Install the slide bushing with your fingers. Do not use screwdriver or other tools to install the slide bushing.



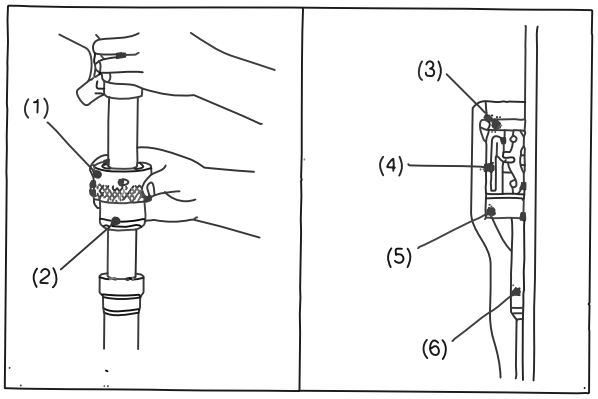
(1) Stopping ring (2) New oil seal
(3) Backup ring (4) Guide bushing
(5) New slide bushing

Coat the slider and guide bushings with the recommended fork oil and install the slider into the out tube.

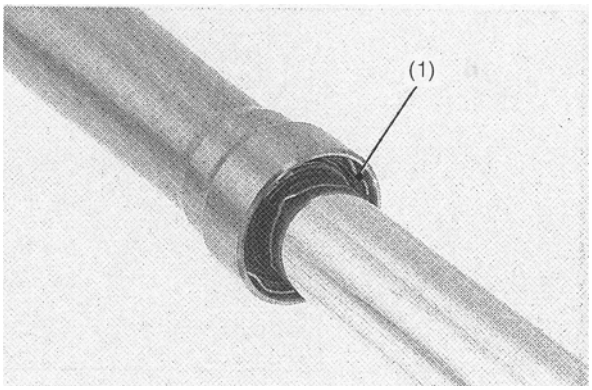
Drive in the guide bushing together with the backup ring into the outer tube.
Drive the oil seal into the outer tube until the stopping ring groove appears.

Tool
Fork seal driver 07KMD-KZ30100
Fork seal driver attachment 07916-NX4-700

Install the stopper ring into the groove in the outer tube.



(1) Fork seal driver (2) Attachment
(3) Stopping ring (4) Oil seal
(5) Backup ring (6) Guide bushing

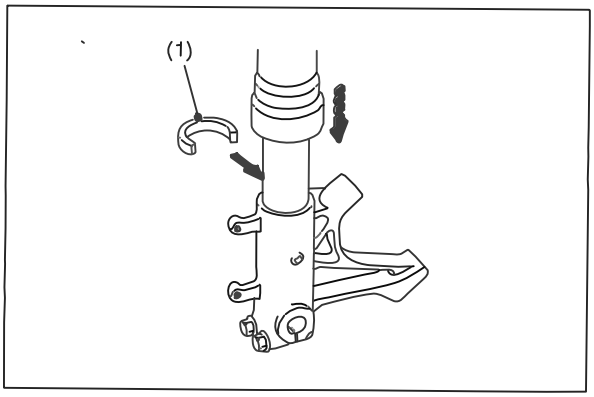


(1) Stopping ring

Always hold both outer tube and axle holder (slider) together. If you hold only the outer tube, the slider goes down due to gravity and damages bushing and oil seals, or cause oil leaks.

Attach the fork set collar above the axle holder.
Gently bring down the outer tube until it sits on the fork set collar.

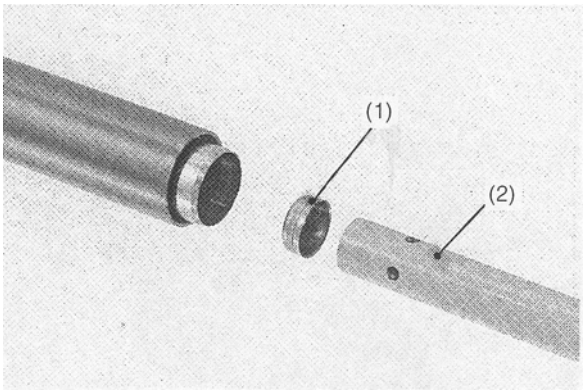
Tool
Fork set collar **51481-NX4-610**



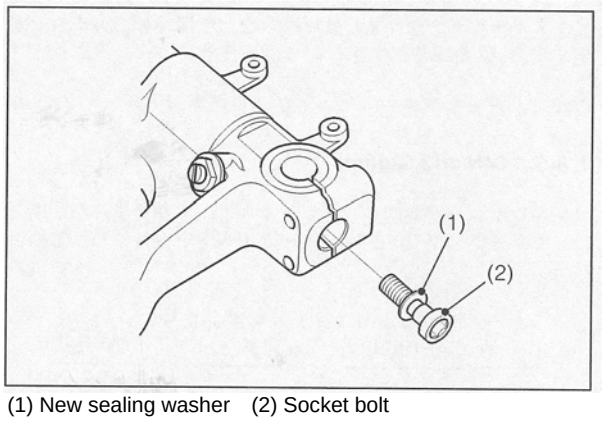
(1) Fork set collar

Install the centering plate to the fork damper.
Install the fork damper into the slider.

Install a new sealing washer and socket bolt.



(1) Centering plate (2) Fork damper



(1) New sealing washer (2) Socket bolt

Set the axle holder in a vise with a piece of wood or soft jaws to avoid damage. (Do not over-tighten the vise.)

Tighten the socket bolt to the specified torque.

Torque: 34N・m(3.5kgf・m)

In case the fork damper moves with the socket bolt, install the fork spring and fork bolt temporary to hold the fork damper.

SHOWA cushion oil:

	Oil	SAE(W)	Liter	Part No.
Front	SS05	5	1	88885-050-000
	SS05	5	4	88885-050-004
	SR6	5	-	SHOWA No.
	SS08	15	1	88885-080-000
	SS08	15	4	88885-080-004
Rear	SS25	5 or less	1	88885-250-000
	SS25	5 or less	4	88885-250-004

Note
Install the fork set collar and fully compress the fork to measure the oil level.

Pour the recommended fork oil into the fork until half full.

Recommended fork oil:
Honda Ultra Cushion Oil Special (SAE 5W),
SHOWA SS05 or equivalent

Perform the following procedure to bleed remaining air from the fork

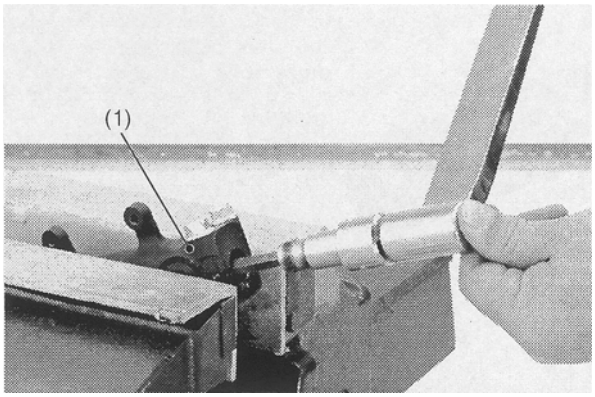
1. Extend the fork. Close the outer tube end with a palm and compress it gently. Remove the palm and extend the fork. Repeat the operation 2 to 3 times. (This will push oil into the fork damper.)

Advice
Do not pull the outer tube more than 225mm from the axle holder to avoid oil leaks when you extending the fork.

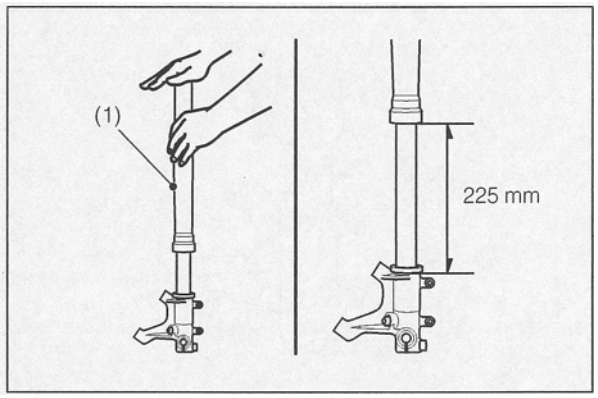
2. Gently pump the fork damper rod 8 to 9 times and bleed any air from the fork.
3. Pour the rest of the fork oil into the fork and perform 2 again. Leave the fork for 5min to settle the oil level between the outer tube and slider.

Measure the oil level from the top of the fork slider.

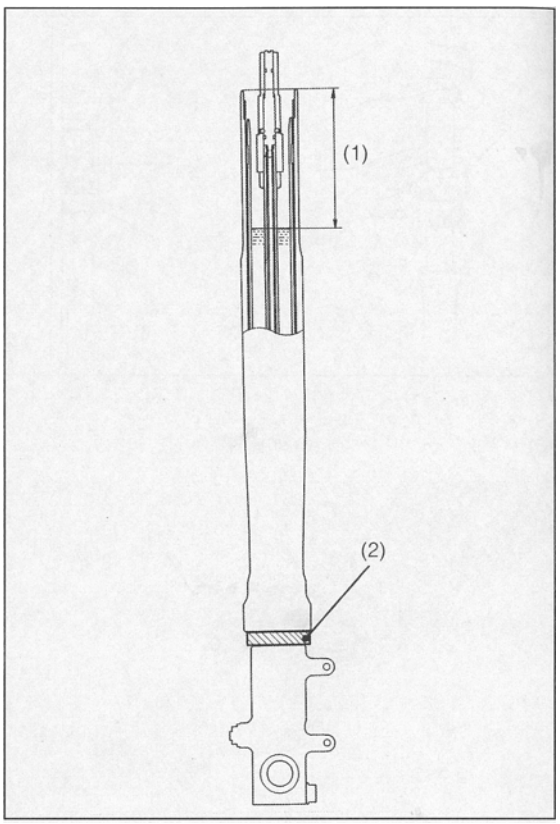
Standard oil level: Right fork・111mm Left fork・106mm
Standard oil capacity: 233 cm³



(1) Axle holder



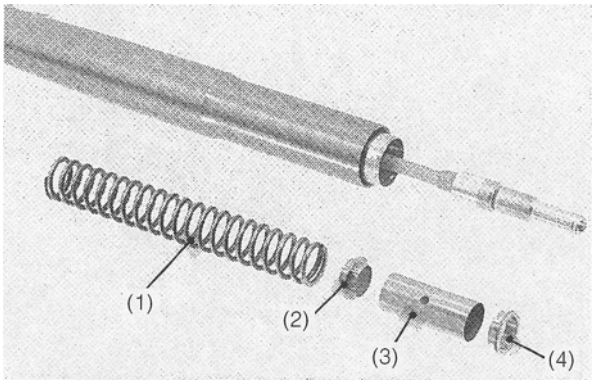
(1) Outer tube



(1) Oil level (2) Fork set collar

Install the fork spring with its identification mark facing upward.

Install the following parts;
- Joint plate
- Spring collar
- Spring seat stopper

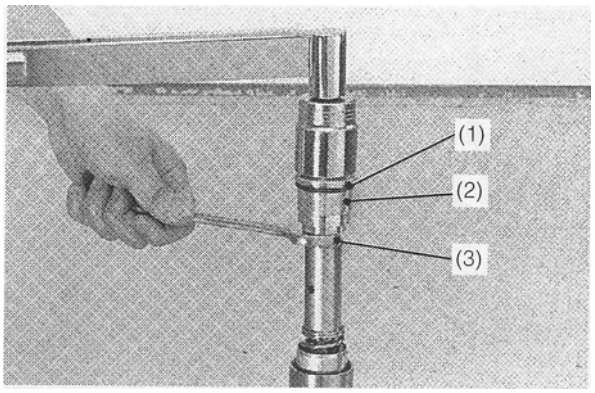


(1) Fork spring (2) Joint plate
(3) Spring collar (4) Spring seat stopper

Install a new O-ring into the fork bolt.
Push down the spring seat stopper while holding the damper rod, and install the fork bolt onto the damper rod.
Push the fork spring seat stopper down and put a 17mm wrench into the slit of the damper rod.

Hold the damper rod and tighten the fork bolt

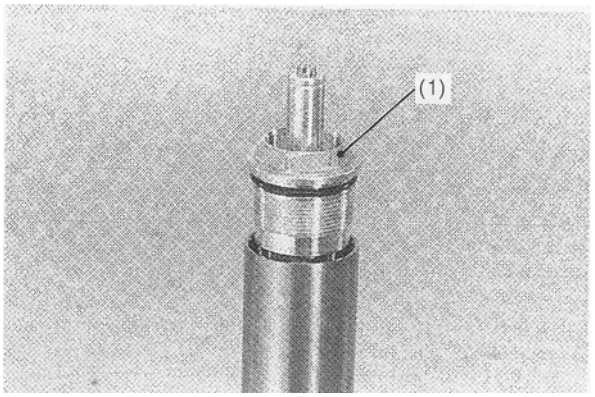
Torque: 34N・m(3.5kgf・m)



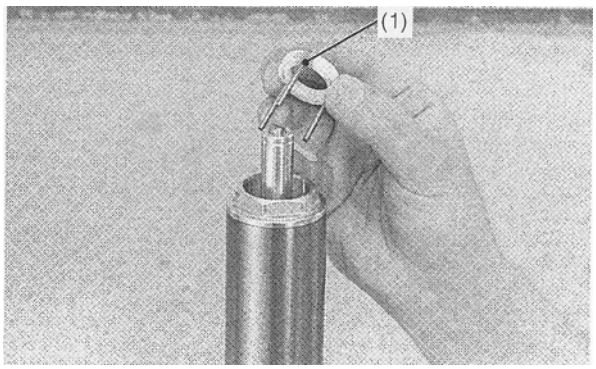
(1) New O-ring (2) Fork bolt
(3) Slit

Coat a new O-ring with the recommended fork oil.
Install the fork bolt into the outer tube.

Install the spring adjusting plate by aligning the hole location.



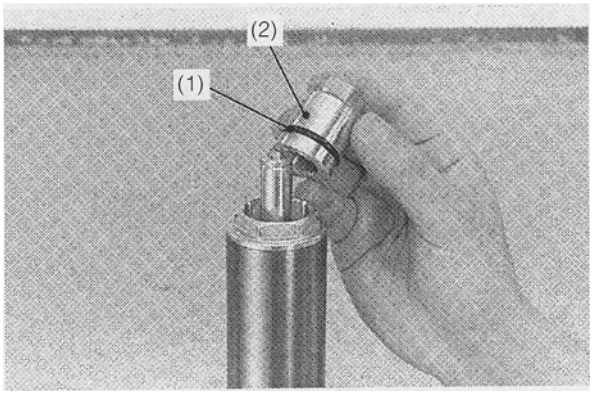
(1) Fork bolt



(1) Spring adjusting plate

Coat a new O-ring with the recommended fork oil and install the pre-load adjuster into the fork bolt.
Hold the fork bolt and tighten the pre-load adjuster.

Install the stopping ring.



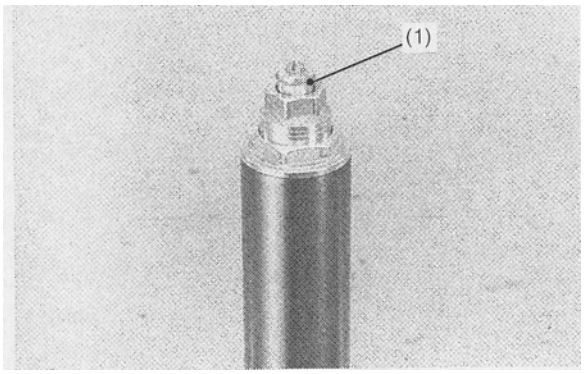
(1) New O-ring (2) Pre-load adjuster

Installation

Insert the fork leg into the bottom bridge, handlebar and top bridge.

The top of the outer tube must be 12mm above the top bridge upper surface.
Tighten the bottom bridge pinch bolts to the specified torque.

Torque: 23N・m(2.3kgf・m)



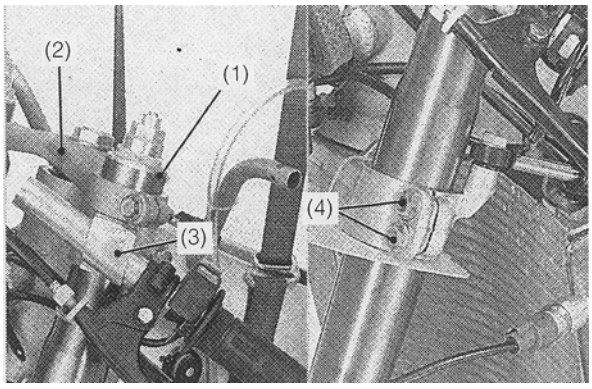
(1) Stopping ring

Over-tightening the bottom bridge pinch bolt can deform the outer tube. They must be tightened to the specified torque.
A deformed outer tube must be replaced.

Tighten the fork bolt to the specified torque.
Torque: 34N・m(3.5kgf・m)

Tighten the top bridge pinch bolt to the specified torque.
Torque: 23N・m(2.3kgf・m)

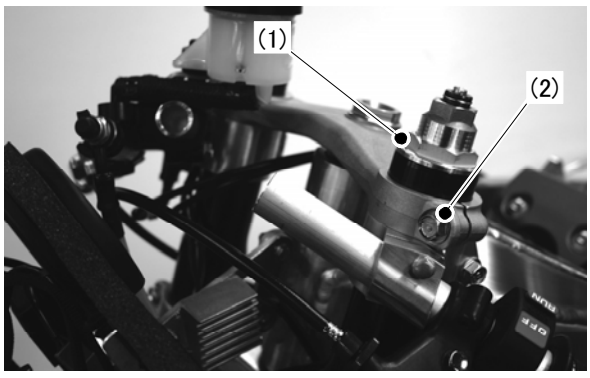
Adjust the handlebar position and tighten its pinch bolt to the specified torque.
Torque: 23N・m(2.3kgf・m)



(1) Outer tube (2) Top bridge
(3) Handlebar (4) Bottom bridge

Over-tightening the pinch bolts can deform the outer tube.
They must be tightened to the specified torque.
A deformed outer tube must be replaced.

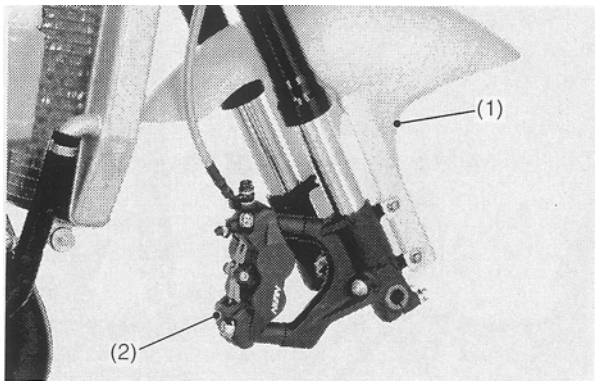
Adjust the spring pre-load adjuster and compression rebound adjuster to obtain their original position marked at disassembly.



(1) Fork bolt (2) Top bridge pinch bolt

Install the front fender and tighten the bolts.
Install the brake caliper and tighten the bolts.

Install the front wheel.



(1) Front fender (2) Brake caliper

Handlebar

Removal

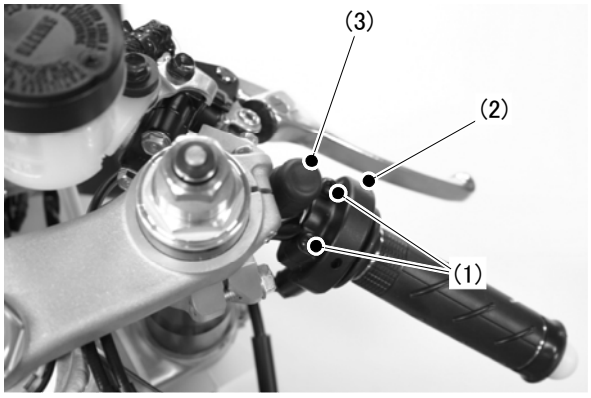
Remove the screws and throttle housing cover.

Remove the throttle housing.
Disconnect the throttle cables from the throttle pipe.
Remove the screws and engine stop switch.

Remove the brake master cylinder.

Reverse the operation when installing the handlebar.

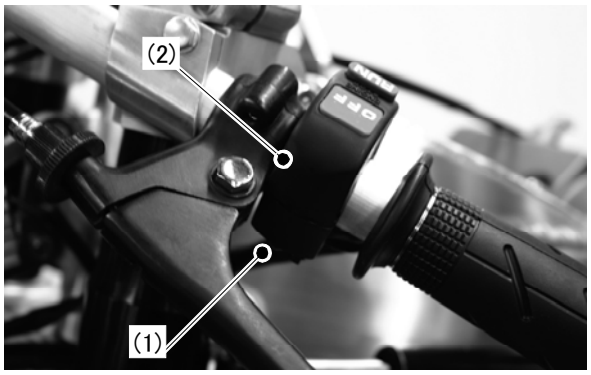
Standard position: Touching the top bridge



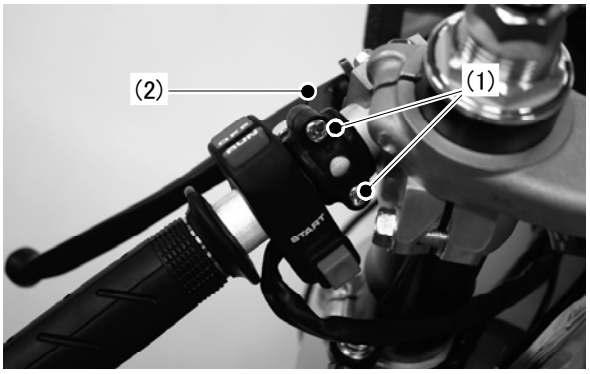
(1) Screws (2) Cover (3) Engine stop switch

Remove the screw and power switch.

Remove the screws and clutch lever bracket.



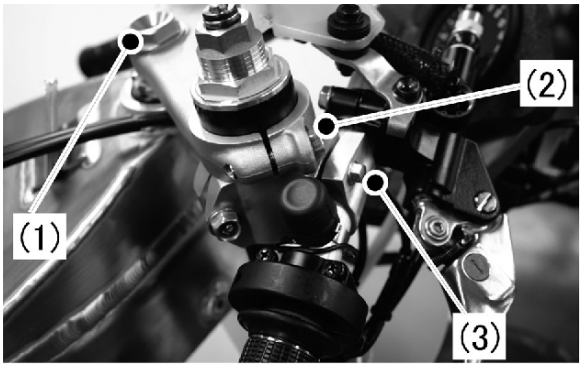
(1) Screw (2) Power switch



(1) Screws (2) Clutch lever bracket

Remove the steering stem bolt.
Loosen the top bridge pinch bolts and remove the top bridge.
Loosen the handlebar pinch bolt and remove the handlebar.

Torque: Handlebar pinch bolt: 23N · m(2.3kgf · m)
Top bridge pinch bolt: 23N · m(2.3kgf · m)
Steering stem bolt: 59N · m(6.0kgf · m)

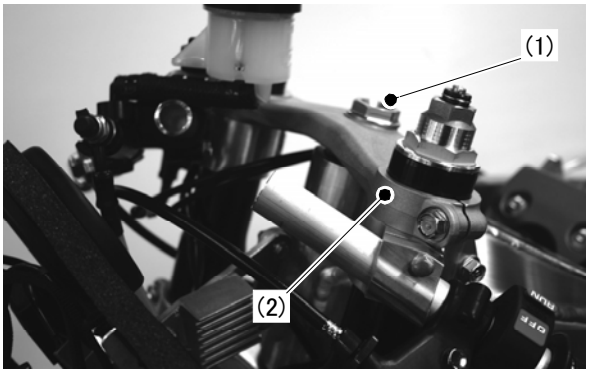


(1) Steering stem bolt
(2) Top bridge pinch bolt
(3) Handlebar pinch bolt

Steering stem

Removal

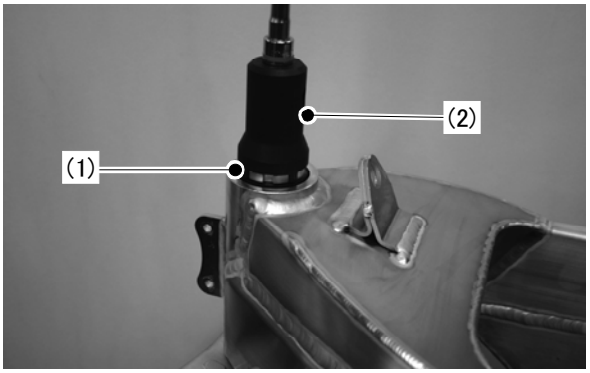
Remove the following parts;
- Upper front cowling
- Front wheel
- Front fender
- Front brake caliper
- Steering stem bolt
- Fork
- Top bridge



(1) Steering stem bolt (2) Top bridge

Remove the lock washer.
Remove the steering stem adjusting nut.

Tool
Steering stem socket 07916-KA50100



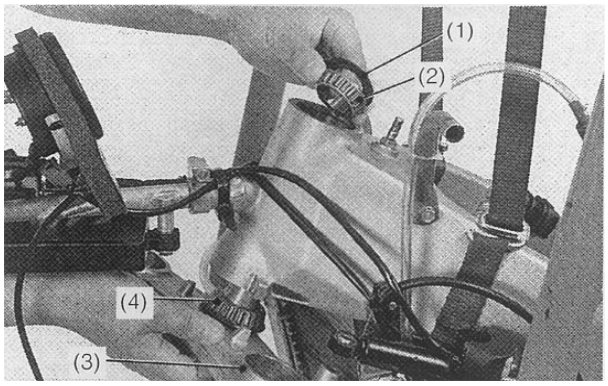
(1) Adjusting nut
(2) Steering stem socket

Remove the following parts;

(1) Dust seal
(2) Upper bearing
(3) Steering stem
(4) Lower bearing

Remove the following parts;

(1) Dust seal
(2) Upper bearing
(3) Steering stem
(4) Lower bearing



(1) Dust seal (2) Upper bearing
(3) Steering stem
(4) Lower bearing

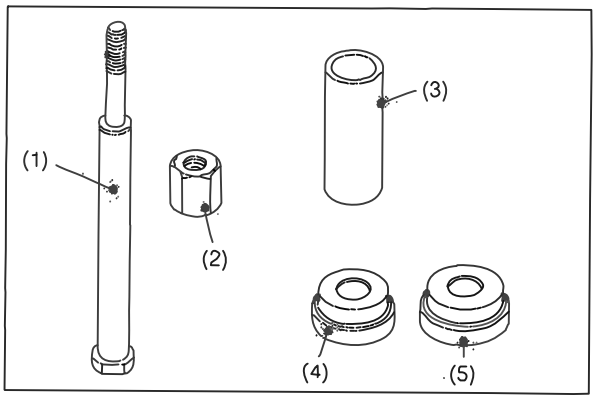
Bearing outer race replacement

- Always replace the bearings and races as a set.
- Check around the steering head pipe for damages from crashing.

Remove the stem outer race.

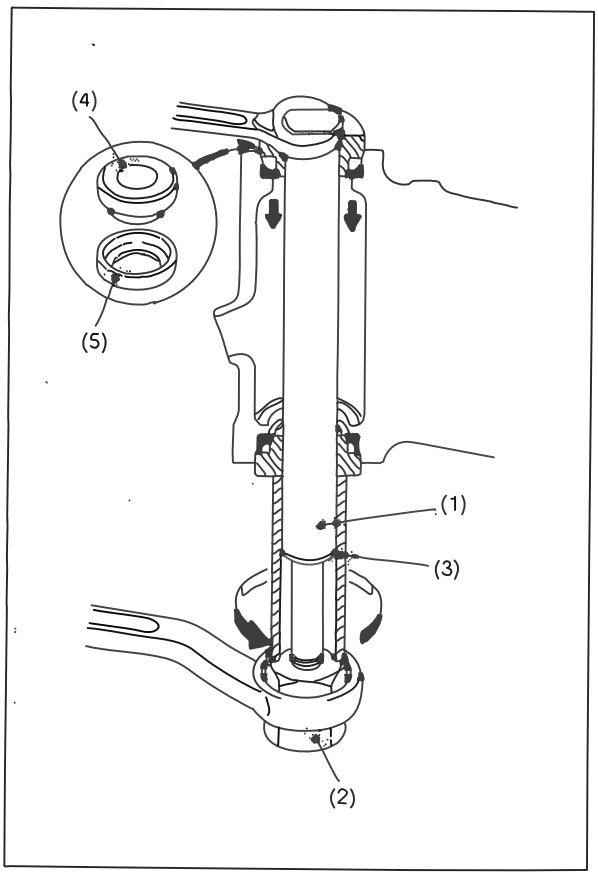
Install the outer races using the special tools.

Tool	
Ball race installer set	07910-NX4-003
— Installer nut	07911-NX4-003
— Assembly collar	07912-NX4-003
— Installer attachment, 47mm	07913-NX4-003
— Installer attachment, 51mm	07914-NX4-003
— Installer shaft	07915-NX4-003



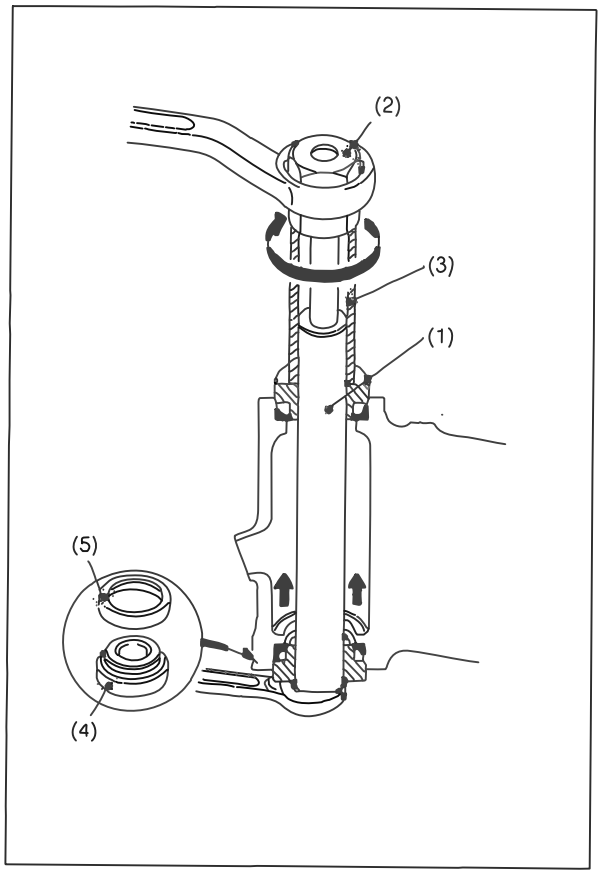
(1) Installer shaft (2) Installer nut
(3) Collar (4) Attachment, 47mm
(5) Attachment, 51mm

Install a new upper outer race and special tools as shown. Hold the installer shaft (1) with a wrench and turn the installer nut (2) slowly until the groove of installer attachment (4) aligns with the steering head pipe upper surface.



(1) Installer shaft (2) Nut (3) Collar
(4) Installer attachment, 47mm
(5) Upper outer race

Install a new lower outer race and special tools as shown. Hold the installer shaft (1) with a wrench and turn the installer nut (2) slowly until the groove of installer attachment (4) aligns with the steering head pipe lower surface.

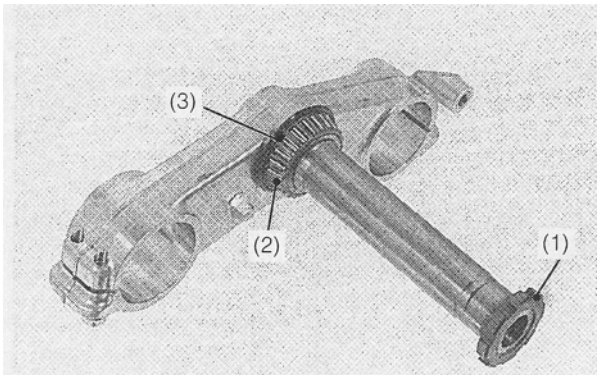


(1) Installer shaft (2) Nut (3) Collar
(4) Installer attachment, 51mm
(5) Lower outer race

Lower bearing replacement

Temporarily install the stem nut to avoid damaging the steering stem threads.

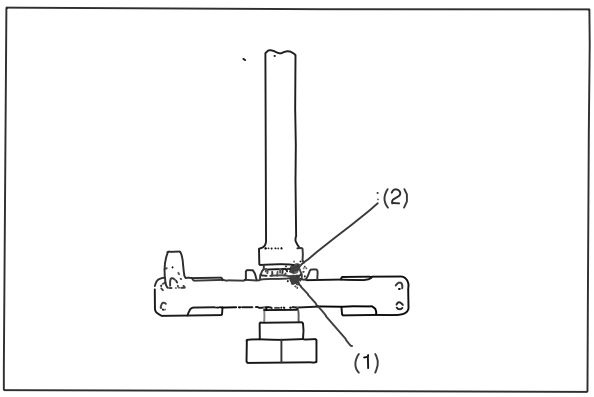
Remove the lower bearing and lower dust seal.



(1) Stem nut (2) Lower bearing
(3) Lower dust seal

Install a new dust seal and lower bearing using a hydraulic press and the special tool.

Tool
Steering stem driver **07946-MBOOOOO**

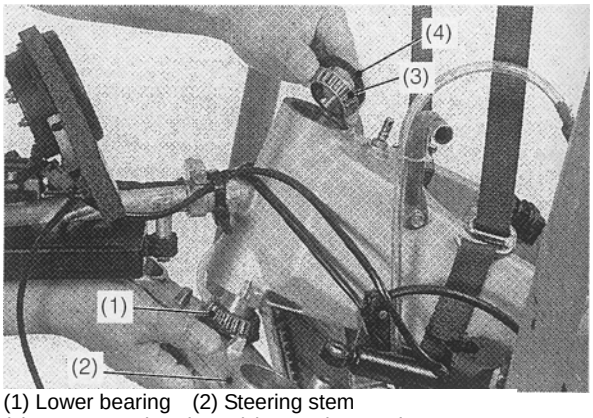


(1) New dust seal
(2) New lower bearing

Installation

Pack the upper and lower bearings, outer races and dust seals with grease.

Install the steering stem into the head pipe.
Install the upper bearing and dust seal.

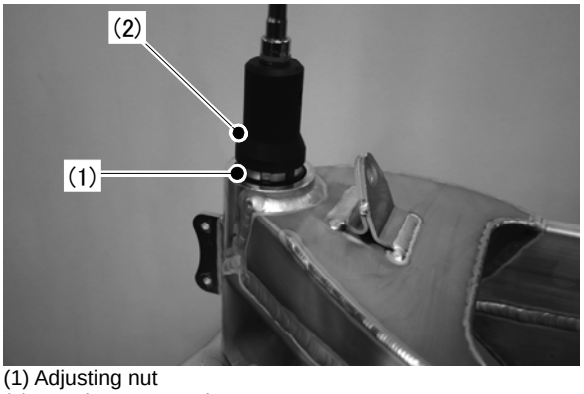


(1) Lower bearing (2) Steering stem
(3) New upper bearing (4) New dust seal

Install the steering stem as follows;
1. Apply oil to the threads of the steering stem adjusting nut and install it.
   Tighten the adjusting nut to the specified torque.

Tool
Steering stem socket 07916-KA50100

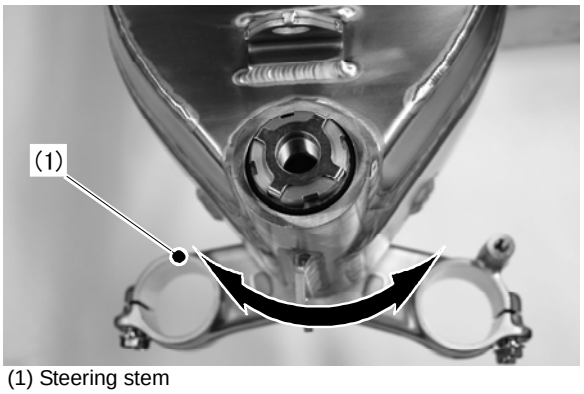
Torque: 15N · m(1.5kgf · m)



(1) Adjusting nut
(2) Steering stem socket

2. Move the steering stem 15 degrees to left and right several times (about 5 times) to seat the bearings.
   Confirm that the steering stem moves smoothly without play

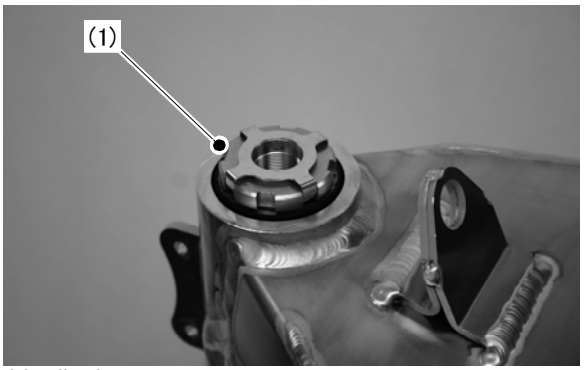
Some pictures used in this manual may show wirings, cable handlings and clampings differently from the actual motorcycle.



(1) Steering stem

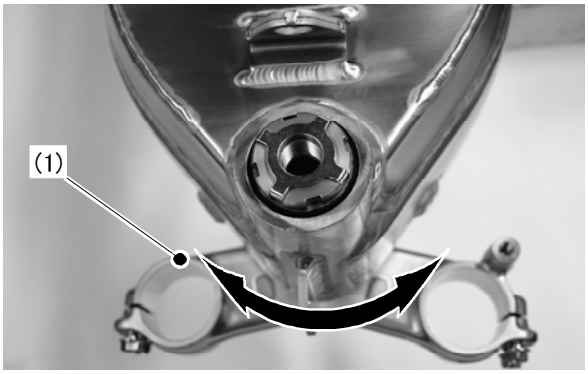
3. Loosen the adjusting nut until it tunes by fingers. Do not loosen it too loose.

4. Retighten the adjusting nut by fingers.



(1) Adjusting nut

5. Move the steering stem 15 degrees to left and right several times (about 5 times) to seat the bearings.
6. Retighten the adjusting nut by fingers.
7. Repeat 4～6 operation a few times until the adjusting nut doesn't move by fingers. (Thoroughly centering the bearings.)



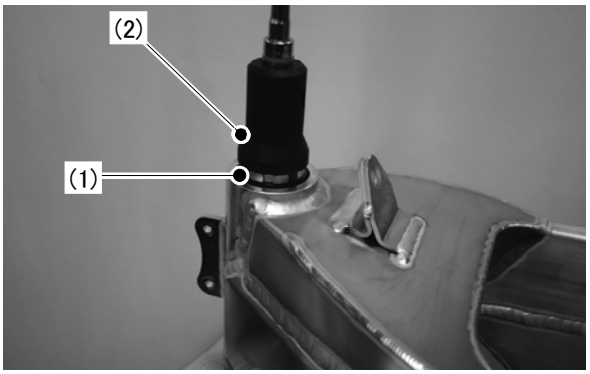
(1) Steering stem

8. Tighten the adjusting nut to the specified torque using special tool. In case a torque wrench is not available, tighten the adjusting nut 5mm peripherally (one block of the nut key is 6.2mm)

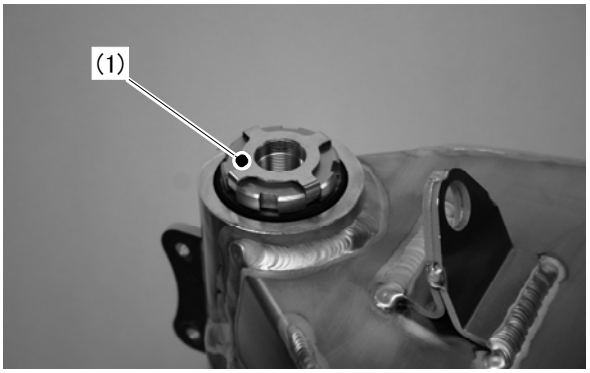
Tool
Steering stem socket 07916-KA50100

Torque: 5N・m(0.5kgf・m)

9. Install the lock washer onto the adjusting nut.



(1) Adjusting nut (2) Steering stem socket



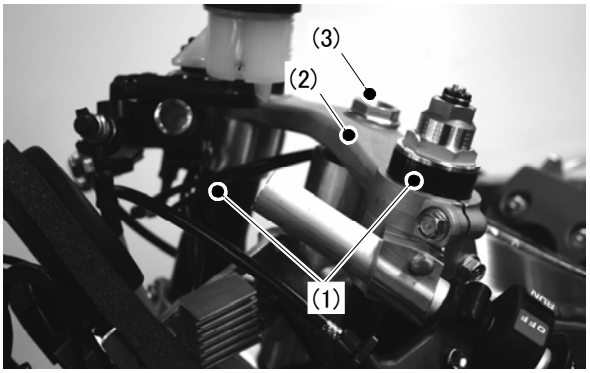
(1) Lock washer

Install the following parts;
- Fork
- Handlebar
- Top bridge
- Stem bolt

Apply grease to the threads of the stem bolt and install it.
Tighten the stem bolt to the specified torque.

Torque: 59N・m(6.0kgf・m)

Install the front wheel.
Install the upper front cowling.
Install the front fender.
Install the front brake caliper.



Rear Wheel

Removal

Raise the rear wheel off the ground by lacing the maintenance stand.

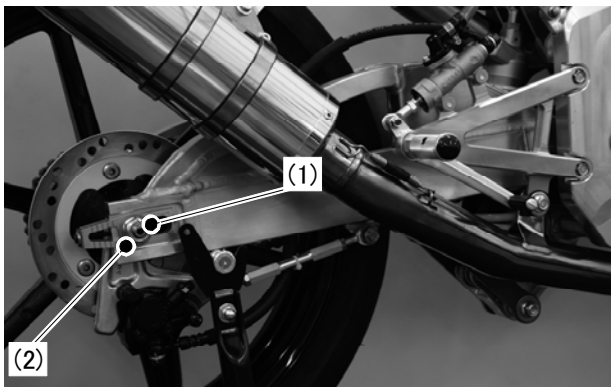
Loosen the axle nut.

Hold the axle and remove the axle nut.
Remove the axle and washer.

Remove the drive chain from the driven sprocket and remove the rear wheel.

Note
Do not operate the brake pedal after removing the rear wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

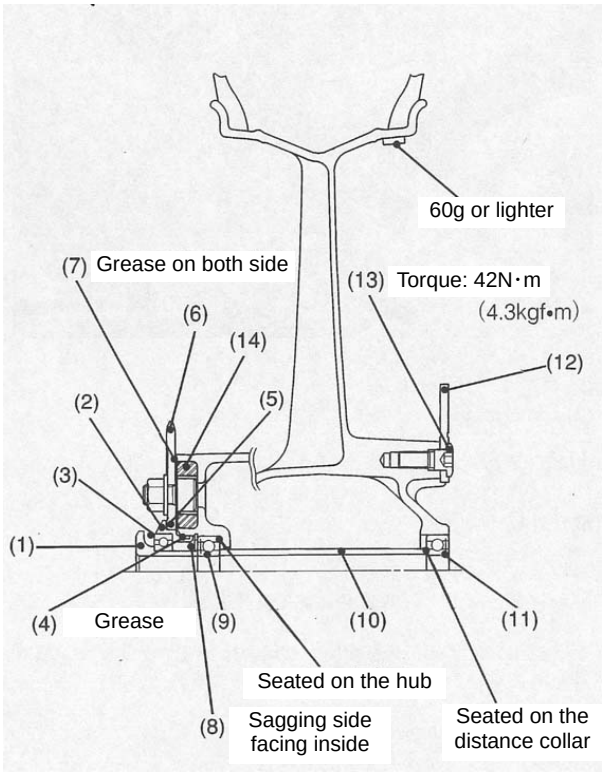
See 5-2 for Wheel inspection.



(1) Axle nut (2) Axle

Disassembly / Assembly

(1) Side collar
(2) Sprocket collar
(3) Sprocket collar bearing (6904UU)
(4) O-ring
(5) Sprocket collar washer
(6) Driven sprocket
(7) Sprocket washer
(8) Circlip
(9) L. Wheel bearing (6202U)
(10) Distance collar
(11) R. Wheel bearing (6202U)
(12) Brake disc
(13) Brake disc bolt
(14) Damper rubber



Rear wheel bearing replacement

Turn the inner race of R/L bearing with your finger. The bearings should turn smoothly and quietly.
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the bearings in pairs.
Remove the wheel bearings and distance collar using following tools.

Tool
Bearing remover head **07746-0050400**
Bearing remover shaft **07746-0050100**

Assembly

Apply oil to the outer surface of the bearings.
Drive the bearings in the wheel hub using special tools.

Tool
Driver A **07749-0010000**
Attachment, 32×35mm **07746-0010100**
Pilot, 15mm **07746-0040300**

Advice
・Install the wheel bearings with the sealed ends toward the outside.
・Press the R wheel bearing in while holding the L wheel bearing inner race.
・Do not degrease the bearings

Installation

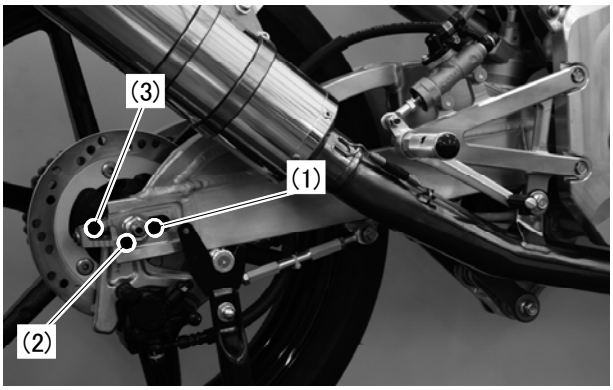
Place the rear wheel into the swing arm.

Be careful not to damage the brake pads with the disc.

Apply a thin coat of grease to the axle.
Install the washer and axle from the left side.
Install the washer and axle nut.

Hold the axle and tighten the axle nut to the specified torque.
Adjust the drive chain slack

Torque: 69N・m(7.0kgf・m)



(1) Axle (2) Axle nut
(3) Drive chain adjuster

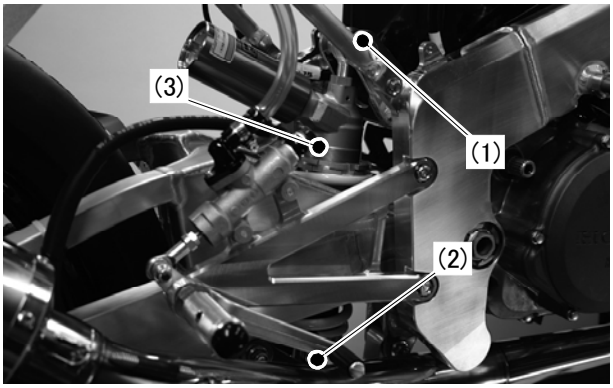
Rear cushion

Removal

Remove the seat cowling.
Hold the frame securely with the work stand or equivalent.

The lock nut and adjuster of the cushion must be loosened before removing the cushion from the motorcycle for cushion spring replacement.

Remove the following parts;
- Upper mount bolt / nut
- Cushion arm plate / Cushion link
- Lower mount bolt / nut
- Rear cushion

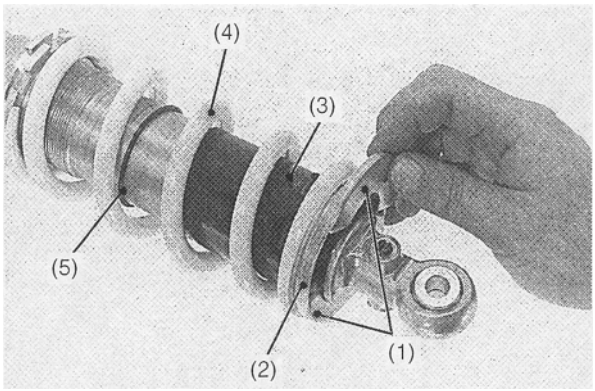


(1) Upper mount bolt / nut
(2) Lower mount bolt / nut
(3) Rear cushion

Disassembly

Loosen the spring lock nut and adjuster.

Remove the following parts;
- Spring seat stopper
- Spring seat
- Spring guide
- Spring
- O-ring



(1) Spring seat stopper (2) Spring seat
(3) Spring guide (4) Spring (5) O-ring

Inspection

Spring

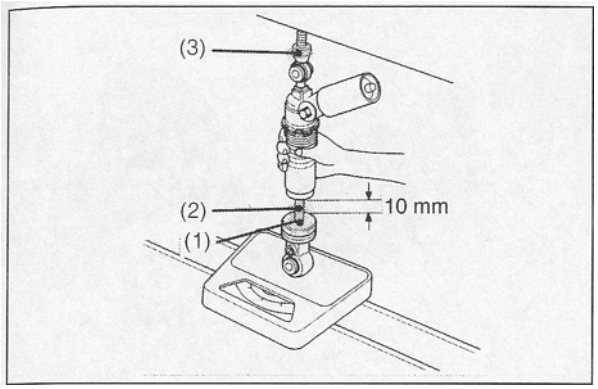
Check the spherical bearing for movement and damage.
If any abnormalities are found, replace it with new one.

Spherical bearing (5-21)

Check the spherical bearing for its operation and damage.
Replace with new one in case any abnormality is found.

Damper
Check the damper for oil leaks.
If any oil leaks are found, replace the damper.

Expand the damper fully and mark at 10mm below the damper bottom.
Place the damper on the scale and read the weight. Compress the damper with hydraulic press until the bottom of the damper reaches the marking. Read the weight increase.



(1) Damper rod (2) Marking (3) Hydraulic press

Damper compressive force: 15.4-20.0kgf

In case the damper compression force is below 15.4kgf, pump the nitrogen to the specified pressure

Pressure: 10.0-13.0kgf/cm²

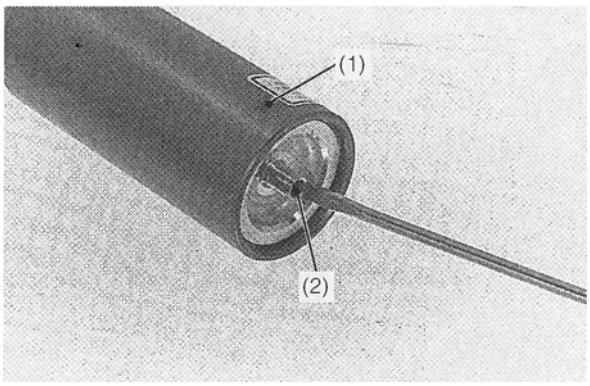
Damper unit gas release

⚠WARNING

The damper unit contains nitrogen under high pressure. Mishandling it could cause serious injury.

- Wear adequate eye protection.
- Do not allow heat or disassembly the damper. It can cause an explosion or oil blow.

Release nitrogen and remove the valve core when you discard the damper.



(1) Reservoir (2) Valve core

Remove the reservoir valve cap.
Depress the valve core to release the nitrogen from the reservoir, and remove discard the valve core after nitrogen is completely released.

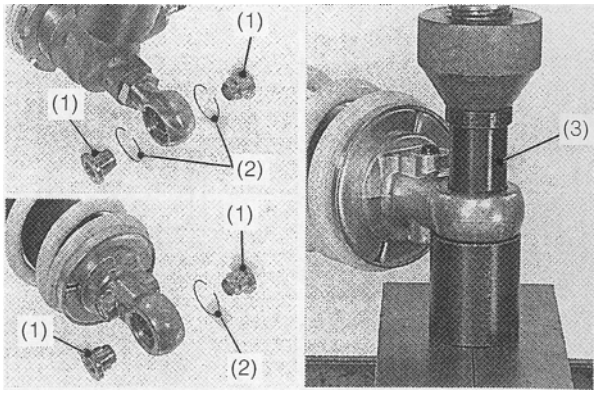
Spherical bearing replacement

Remove collars using 2 flatblade screwdrivers.

Set the rear cushion in a vise with piece of wood or soft jaws to avoid damage when you remove the collars.

Remove the stopping rings from the upper joint.
Remove the stopping ring from the lower joint.

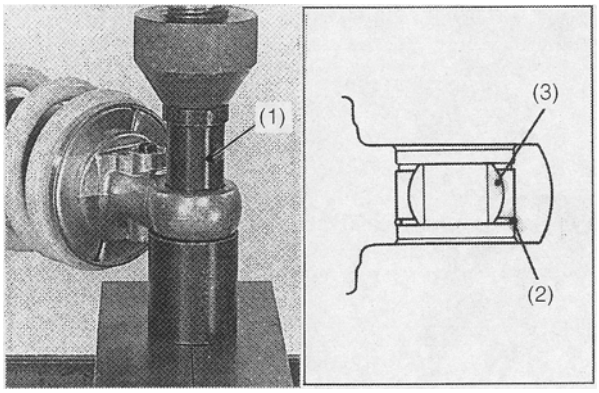
Remove the spherical bearing using the special tools



(1) Collars (2) Stopping rings
(3) Bearing driver

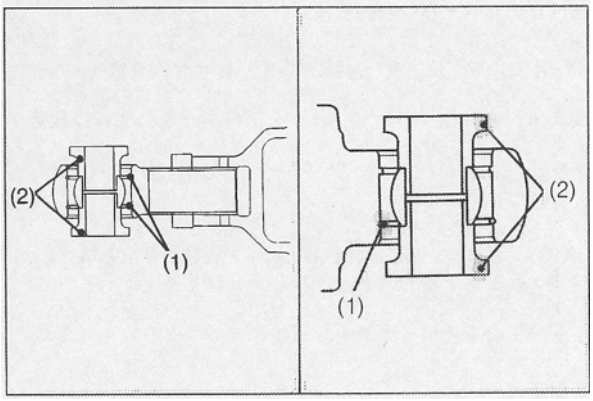
Install one of the stopping rings.
Push-in the spherical bearing until its hits the stopping ring using the special tool.

Tool
Spherical bearing driver 07946-KA30200



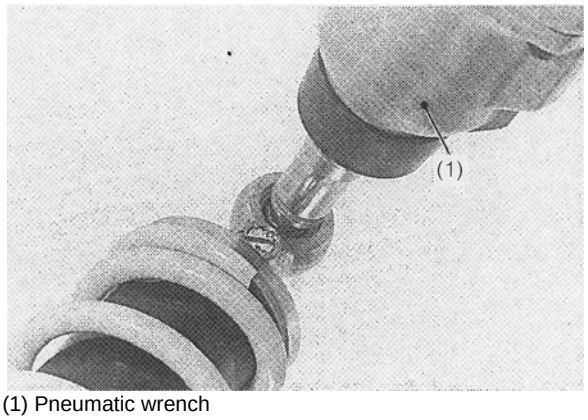
(1) Spherical bearing driver
(2) Stopping ring (3) Spherical bearing

Install the other stopping ring to the upper joint.
Install the collars.



(1) Stopping ring (2) Collar

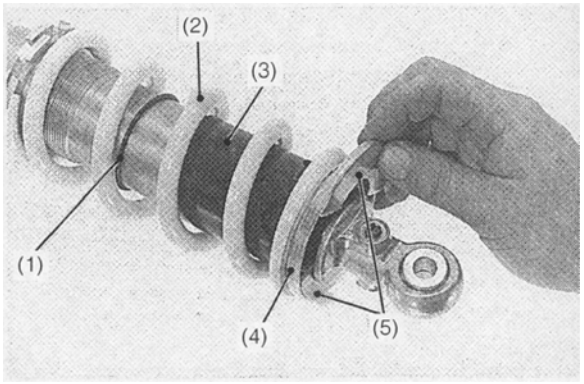
Note
- Always inspect the spherical bearing before a full-scale riding. If the bearing doesn't move smoothly, spin the bearing with tools as a break-in operation until it turns easily by fingers.
- To perform the break-in operation, temporarily install bearing bolt and nut and spin the spherical bearing with a pneumatic wrench as shown. Apply oil to the bearing to avoid bearing seize.



(1) Pneumatic wrench

Assembly

Install the O-ring to the damper case.
Install the cushion spring tapered side facing down.

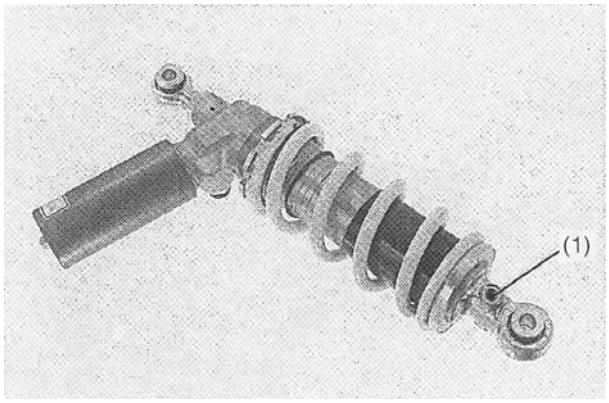


(1) O-ring (2) Spring (3) Spring guide (4) Spring seat
(5) Spring seat stopper

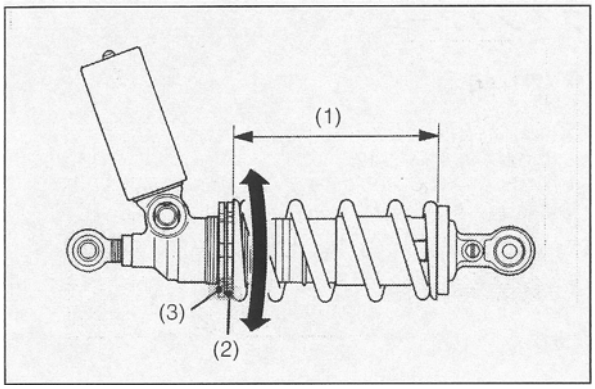
Install the following parts;
- Spring guide
- Spring seat
- Spring seat stopper

Turn the adjuster to adjust the spring pre-load.
Hold the adjuster and tighten the lock nut.

Torque: 49N・m(5.0kgf・m)



(1) Rebound adjuster



(1) Pre-load (2) Adjuster
(3) Lock nut

Installation

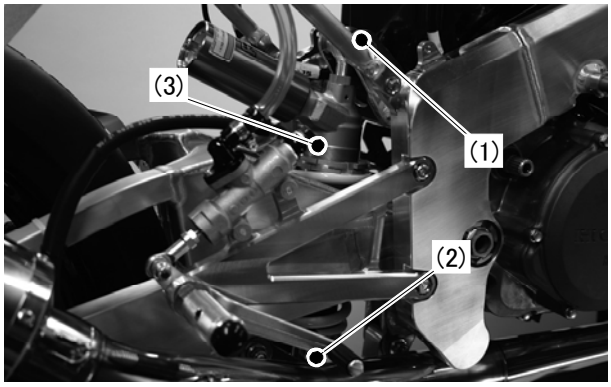
Set the rear cushion into the frame.
Insert the lower mounting bolt from the left hand side of the motorcycle.

Tighten the bolt securely.

Pre-assembly the cushion arm plate.

Move the swingarm vertical and insert the upper mounting bolt from the left hand side of the motorcycle.

Install and tighten the mounting nuts while applying a load (1G).

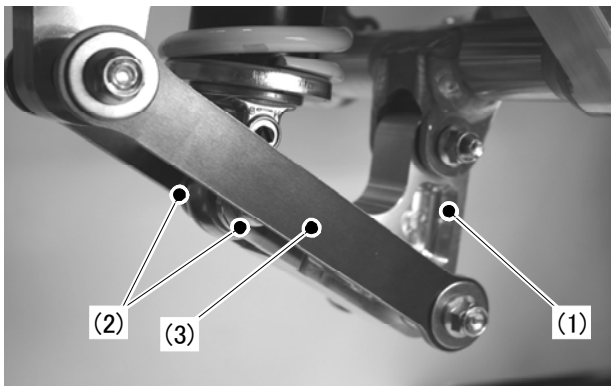


(1) Upper mounting bolt / nut
(2) Lower mounting bolt / nut
(3) Rear cushion

Cushion linkage

Removal

Hold the frame securely with the work stand or equivalent.
Remove the following parts;
- Cushion link / Cushion arm plate bolt / nut
- Cushion link / Frame bolt / nut
- Cushion link
- Rear cushion lower bolt / nut
- Cushion arm plate / bolt / nut/ washer
- Cushion arm plate



(1) Cushion link
(2) Rear cushion lower bolt / nut
(3) Cushion arm plate

Bearing replacement

Remove the pivot collar and dust seals
Remove the needle bearings using special tools and a hydraulic press.

Tool:

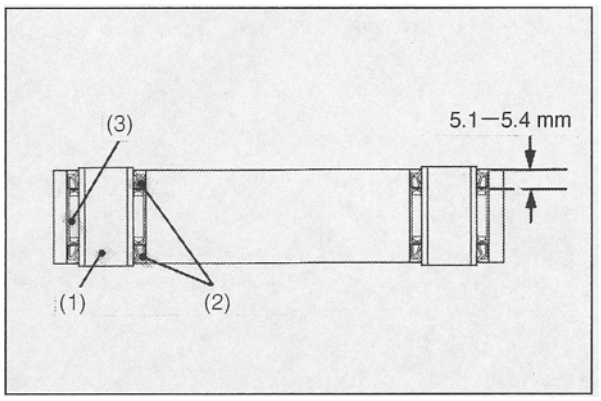
Needle bearing driver	**07946-MJ00000**
— Driver shaft	**07946-MJ00100**
— Driver head	**07946-MJ00200**

Pack new needle bearings with grease.

Press the new needle bearings with the special tools.

- Press the needle bearing with the marked side facing out.
- Press the needle bearing until its surface is 5.1 – 5.4mm below the cushion link surface

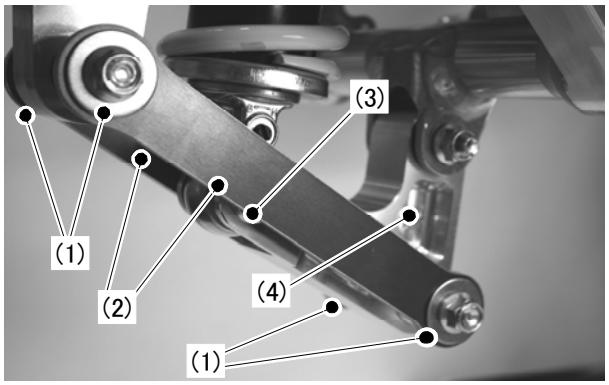
Apply grease to the dust seal lips and install it.
Install the pivot collars.



(1) Pivot collar (2) Dust seal
(3) Needle bearings

Installation

Install the following parts;
— Washer
— Cushion arm plate
— Cushion arm plate / Swing arm bolt / nut
— Rear cushion lower bolt / nut
— Washer
— Cushion link
— Cushion link / Cushion arm plate bolt / nut
— Cushion link / Frame bolt / nut

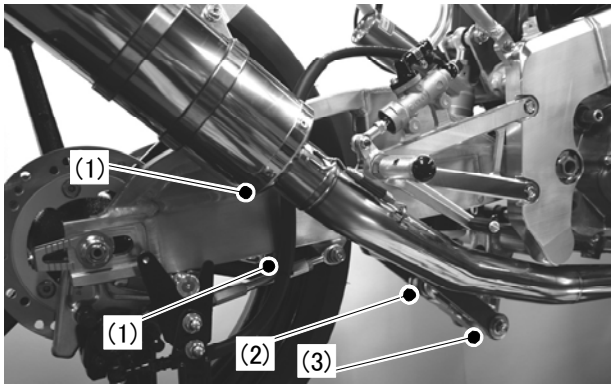


(1) Washers (2) Cushion arm plates
(3) Rear cushion lower mounting bolt / nut
(4) Cushion link

Tighten the cushion nut and rear cushion lower mounting bolt.

Tighten the linkage components while applying a load (1G).

Torque: 44N・m(4.5kgf・m)



(1) Tie-wraps (2) Rear cushion lower mounting bolt
(3) Cushion arm bolt

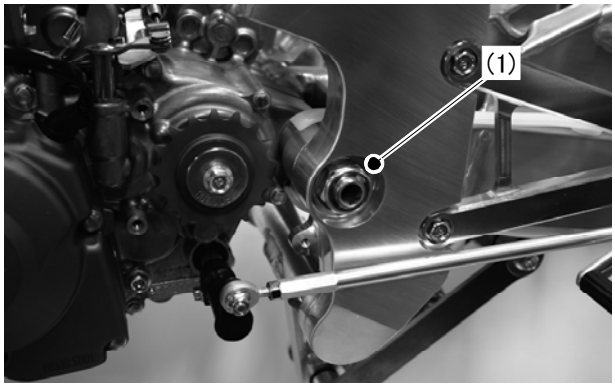
Swing arm

Hold the frame securely with the work stand or equivalent.
Remove the following parts;
— Rear wheel
— Rear brake caliper bracket
— Rear brake hose tie-wraps
— Rear cushion lower mounting bolt
— Cushion arm plates / Swing arm bolt / nut

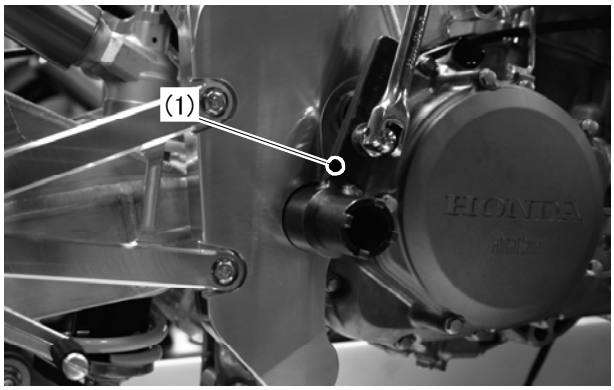
Remove the swing arm pivot nut.
Loosen the swing arm pivot lock nut.

Tool

Lock nut wrench	**07HMA-MR70200**

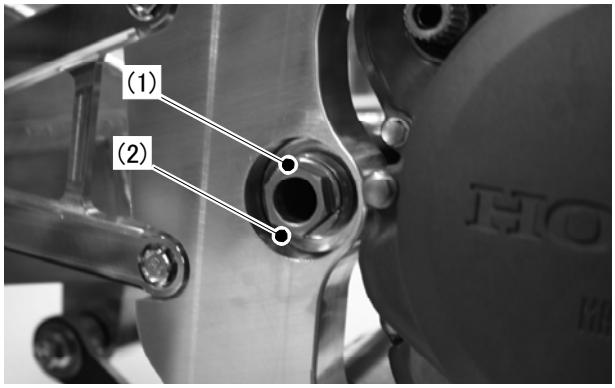


(1) Pivot nut



(1) Lock nut wrench

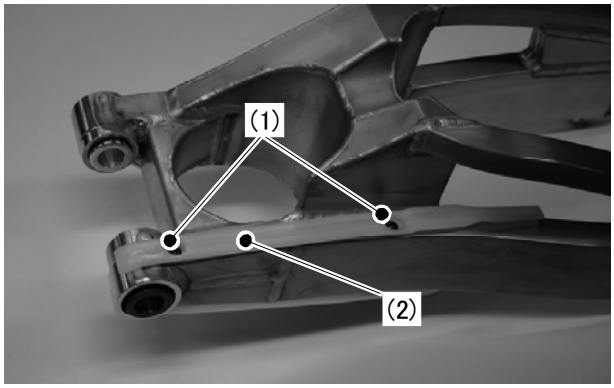
Turn the swing arm pivot bolt and loosen the adjusting bolt.
Remove the pivot bolt and swing arm.
※Make sure to hold the engine at it position by placing a jack underneath.



(1) Pivot bolt (2) Adjusting bolt

Disassembly

Remove the screws and drive chain slider.



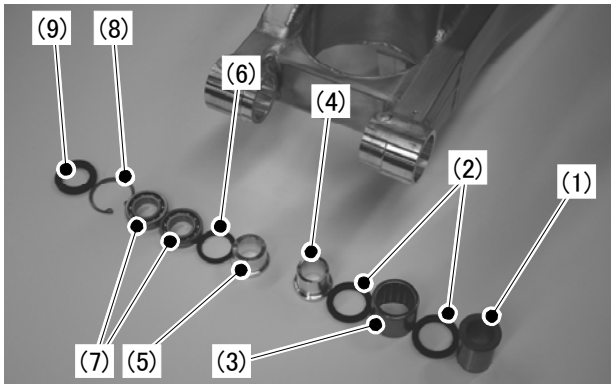
(1) Screws (2) Drive chain slider

Remove the pivot collar “B”.
Remove the dust seal and distance collar.

Remove the circlip.

Swing arm pivot bearing replacement

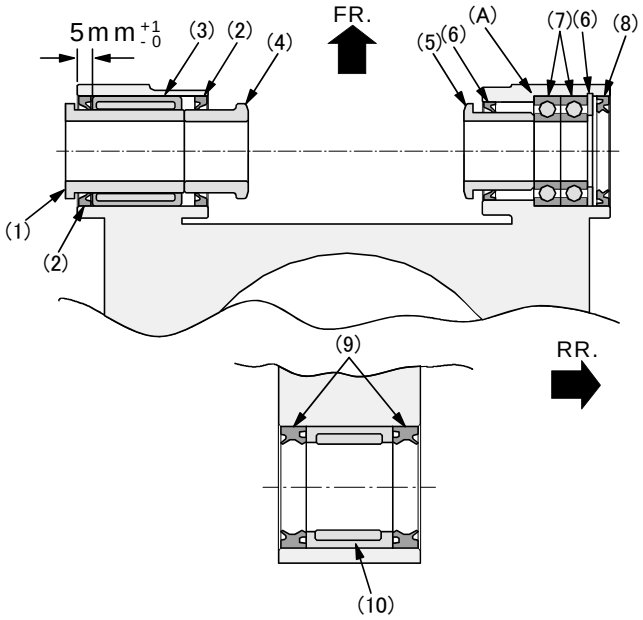
Always replace the pivot bearings as a set.



(1) Pivot collar “B” (2) L. Dust seals
(3) Needle bearing (4) L. Distance collar
(5) R, Distance collar (6) R. Dust seal
(7) Ball bearings (8) Circlip (9) Dust seal

(1) Pivot collar “B”
(2) L. Dust seals
(3) Needle bearing
(4) L.Distance collar
(5) R.Distance collar
(6) Snapring
(7) L.Pivot bearing(20x37x9mm)
(8) R. Dust seal
(9) Dust seal(17x24x5mm)
(10) Needle bearing(17x24x17mm)

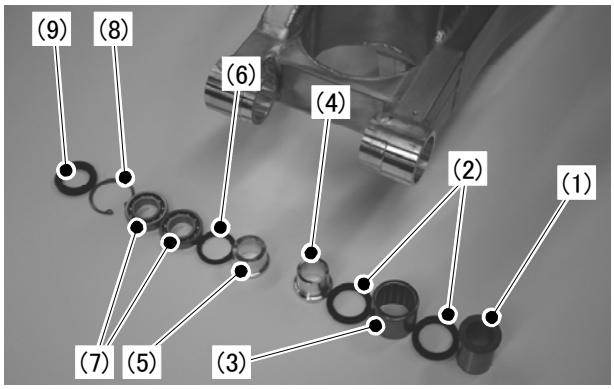
(A) A bearing put in to a bottom.



Assembly

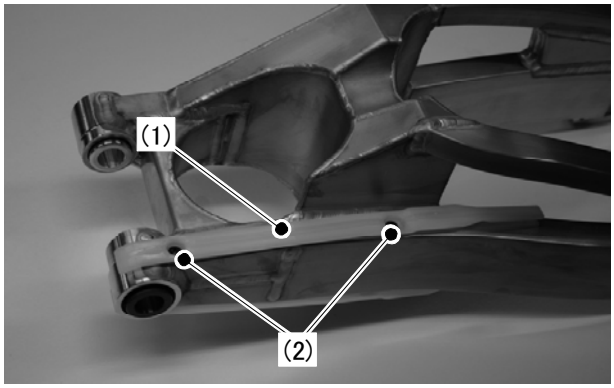
Securely install the circlip into the groove of the swing arm.
Pack the R. pivot bearing with grease.
Apply grease to a new R. dust seal lips and install it.

Install the distance collar.
Pack the needle bearing with grease.
Apply grease to a new L. pivot dust seal lips and install them.
Install the pivot collar “B”.



(1) Pivot collar “B” (2)L. Dust seals
(3) Needle bearing (4) L. Distance collar
(5) R, Distance collar (6) R, Dust seal
(7) Ball bearings (8) Circlip (9) Dust seal

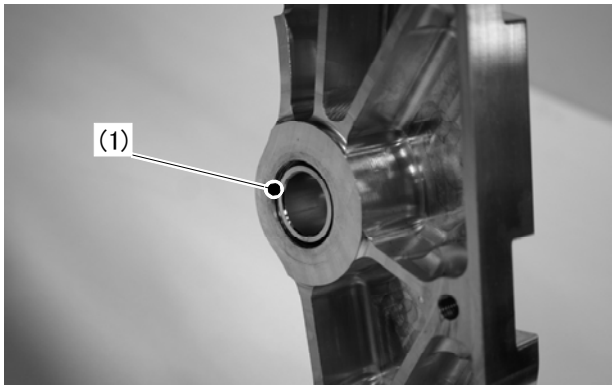
Install the drive chain slider onto the swing arm.
Apply locking agent to the threads of the screws.
Install and tighten the screws.



(1) Drive chain slider (2) Screws

Installation

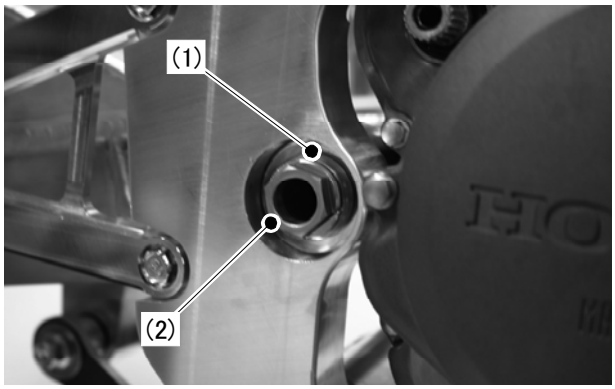
Apply grease to the threads of swing arm adjusting bolt.
Install the swing arm adjusting bolt to the frame.
The tip of the swing arm adjust bolt should not come out from inner side of the frame to avoid having it interfering with the swing arm



(1) Adjusting bolt

Install the swing arm onto the frame.
Apply thin coat of grease to the swing arm pivot bolt sliding surface and install the swing arm pivot bolt.
Align the slit of pivot bolt and adjusting bolt and tighten the adjusting bolt to the specified torque.

Torque: 15N・m(1.5kgf・m)

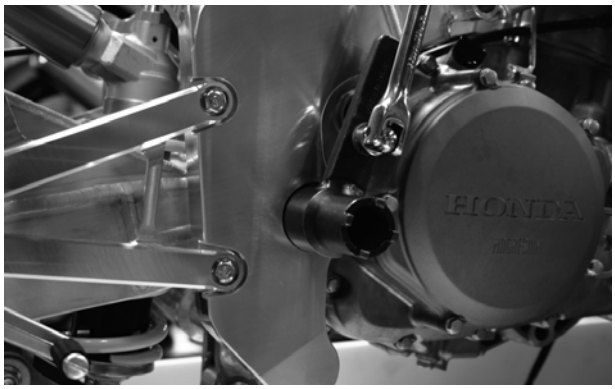


(1) Adjusting bolt (2) Pivot bolt

Install the swing arm adjusting bolt lock nut and tighten it to the specified torque.

Tool
Lock nut wrench 07HMA-MR7-0200

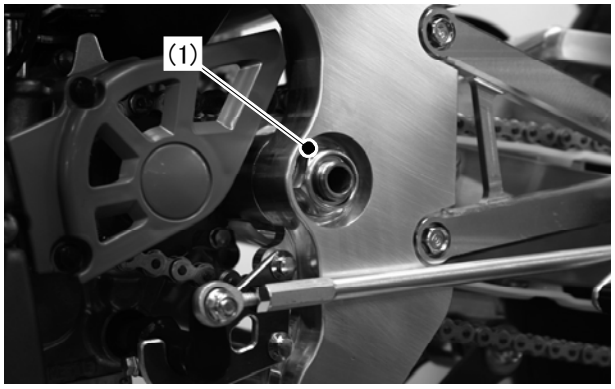
Torque: 44N・m(4.5kgf・m)



(1) Lock nut wrench

Hold the swing arm pivot bolt and tighten the pivot nut to the specified torque.

Torque: 95N・m(9.7kgf・m)



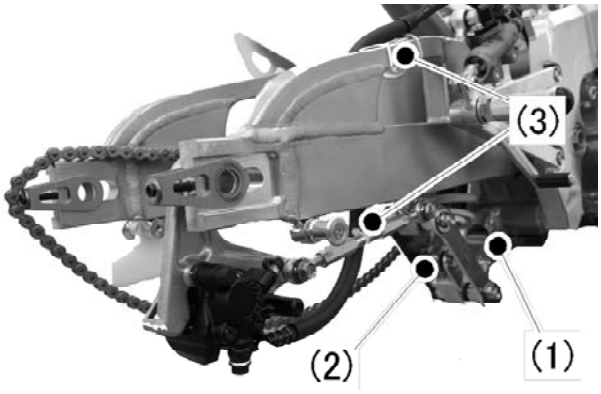
(1) Pivot nut

Install the following parts;
- Rear cushion lower mounting bolt / nut
- Cushion arm plates / bolt / nut

Tighten the rear cushion lower mounting nut.
Tighten the cushion arm nut.

Put the brake hose through correctly and install the caliper bracket.
Fix the brake hose with tie-wraps.

Install the rear wheel.



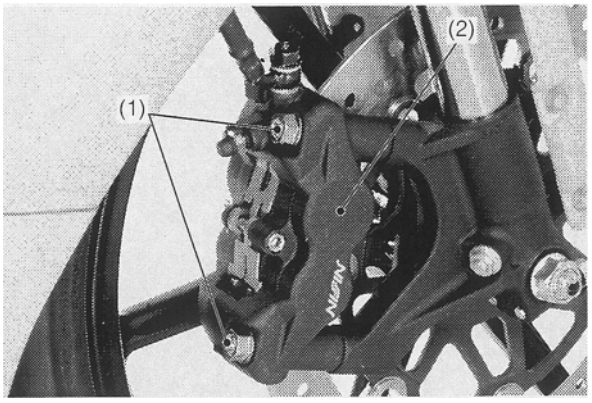
(1) Cushion arm bolt
(2) Rear cushion lower mounting bolt
(3) Tie wraps

Brake pad replacement

Front brake pad replacement

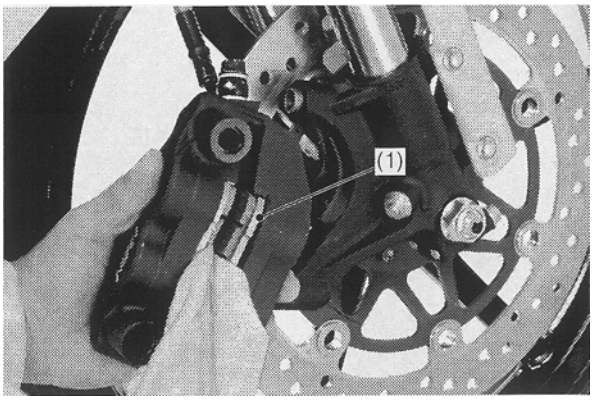
Advice
- Do not get oils on the brake disc or pads. A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a brake degreasing agent.
- Always replace the brake pads in pairs.

Use genuine HRC brake pads (refer to the parts list in this manual).
Remove the brake caliper bolts and brake caliper.



(1) Bolts (2) Caliper

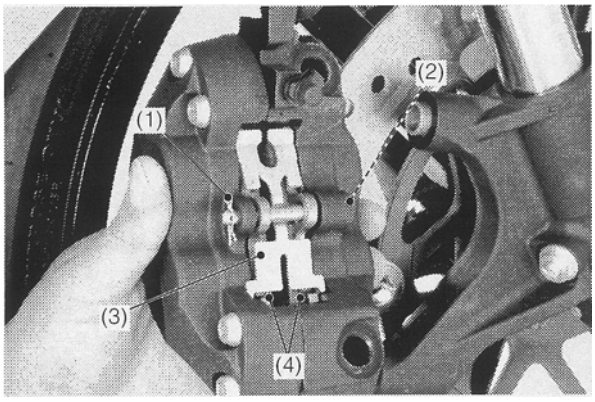
⚠WARNING
- Check the brake fluid level in the master cylinder reservoir as this operation causes the fluid level to rise. Excessive fluid level will constantly push brake pads and could lock the wheel and lead to a crash. (⇒3-13)
- HONDA RS125R brake system is used in MD250H, however, never use the cast iron disc (45120-NX4-004, '96model) in combination with the stainless steel disc pads (45105-NX4-770, '97-98model). It will create cracks on the brake disc.



(1) Brake pad

Push the caliper pistons all the way in with old pads to allow installation of new brake pads.

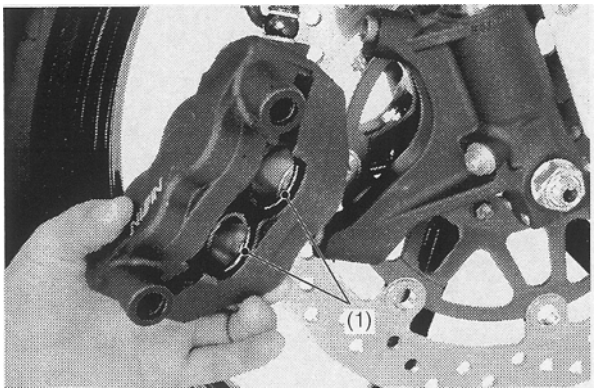
Remove the B clip.
Remove the pad pin and brake pads.



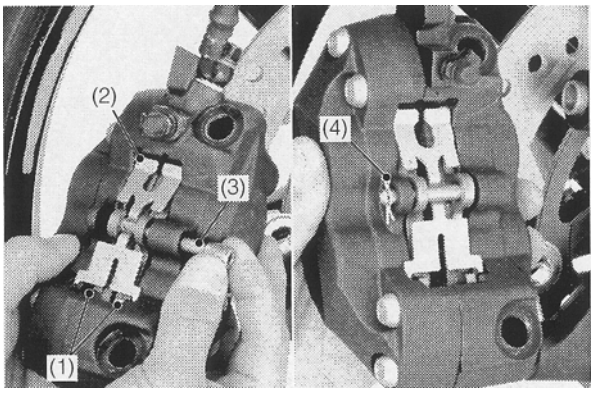
(1) B clip (2) Pad pin (3) Pad spring
(4) Brake pads

Use neutral or less aggressive cleaning solution to protect piston seal when cleaning the inside of the caliper.

Advice
Do not allow cleaning fluid or gasoline to get on the piston seal. It will lose the brake performance. Always use neutral cleaning solution to clean the caliper pistons.



(1) Caliper pistons



(1) New brake pads (2) Pad spring
(3) Pad pin (4) B clip

Install new brake pads.
Install the pad spring and pad pin, and then tighten the pad pin to the specified torque.

Torque: 18 N・m (1.8 kgf・m)

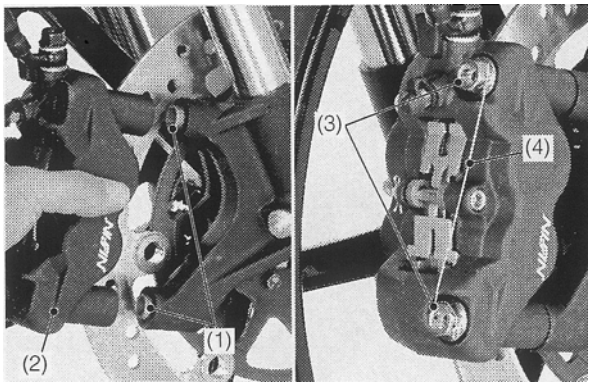
Install the B clip.

Make sure the knock pins are installed to the fork slider bracket.
Be careful not to damage pads when installing the brake caliper onto the brake disc.
Install the brake caliper bolts and tighten them to the specified torque.

Torque: 49 N・m (5.0kgf・m)

Lock the brake caliper bolts with wire.

Operate the brake lever to seat the caliper pistons against the pads.

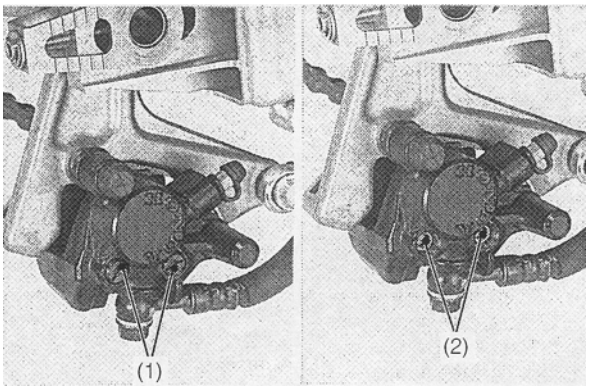


(1) Knock pins (2) Brake caliper
(3) Bolts (4) Wire lock

Rear brake pads replacement

Advice
- Do not get oils on the brake disc or pads. A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a brake degreasing agent.
- Always replace the brake pads in pairs.

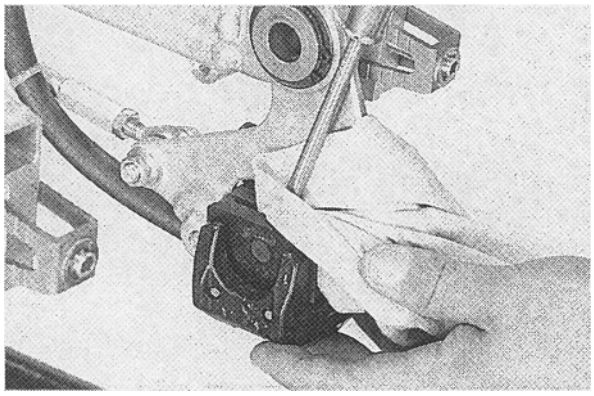
Remove the rear wheel.
Remove the pad pin plugs and loosen the pad pins.



(1) Pad pin plugs (2) Pad pin

Push the caliper pistons all the way in with old pads to allow installation of new brake pads.

Check the brake fluid level in the V-tube.
Remove the pad pin, brake pads and pad spring.

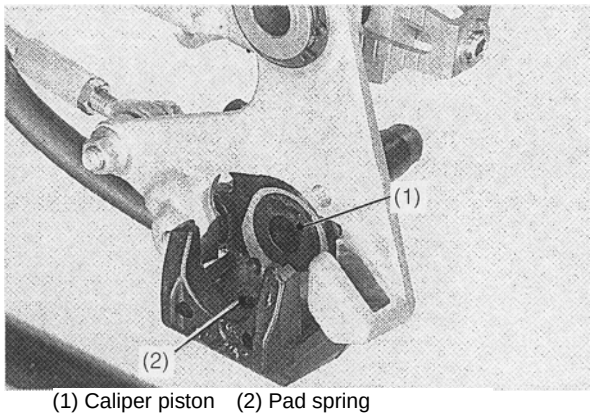


⚠WARNING

Check the brake fluid level in the V-tube as this operation causes the fluid level to rise. Excessive fluid level will constantly push brake pads and could lock the wheel and lead to a crash.

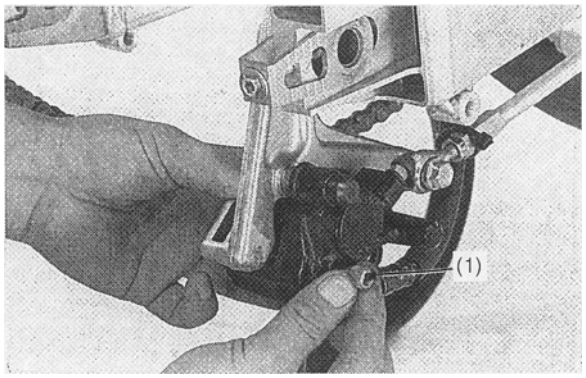
Make sure that fluid level in the V-tube is appropriate after replacing rear brake pads. (⇒3-13)

Clean the caliper, especially around the caliper piston.
Install the pad spring into the caliper.



(1) Caliper piston (2) Pad spring

Install new brake pads. Push the pad spring with pads and install the pad pin.



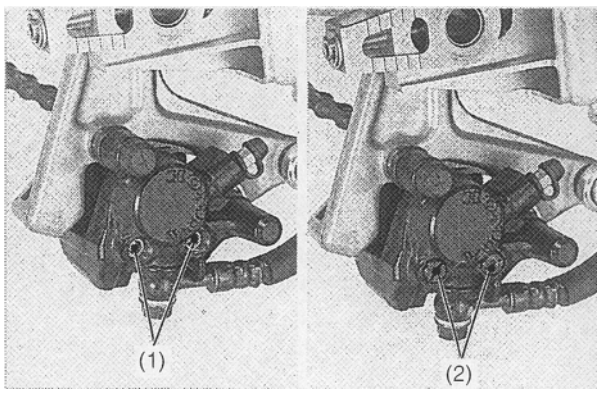
(1) Pad pin

Tighten the pad pins.

Torque: 18N・m(1.8kgf・m)

Install and tighten the pad pin plugs.
Torque: 1 N・m (0.15kgf・m)

Install the rear wheel.



(1) Pad pins (2) Pad pin plugs

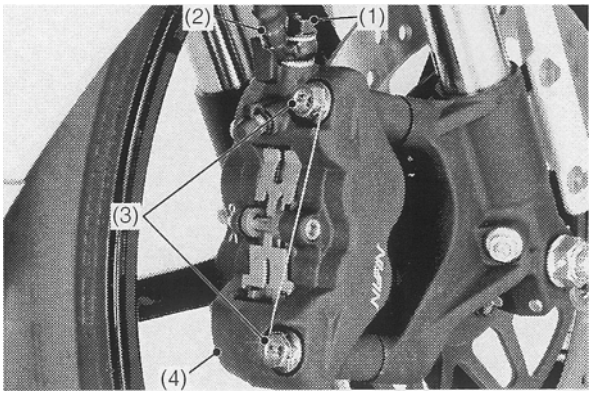
Front brake caliper

Removal

Drain the front brake hydraulic system.
Place a clean tray under the caliper.

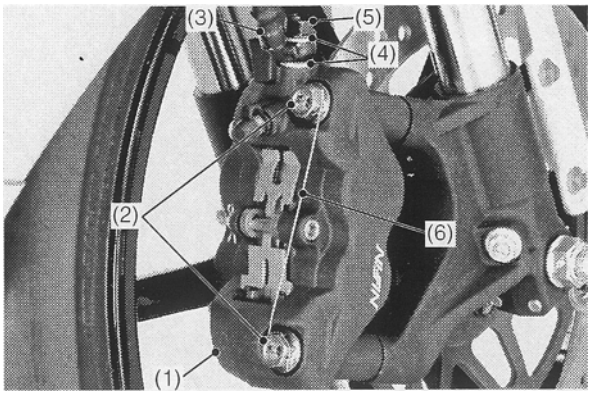
Spilled brake fluid will damage painted surface, plastic and rubber parts. Be careful not to spill the fluid on those parts.

Remove the following parts;
- Brake hose oil bolt
- Sealing washer
- Brake hose
- Caliper bolts
- Brake caliper
- Brake pads



(1) Oil bolt (2) Brake hose
(3) Caliper bolts (4) Brake caliper

Advice
- Never disassemble the brake caliper. It will deteriorate its performance.
- In case the brake caliper is damaged, replace it as an assembly.



(1) Brake caliper (2) Caliper bolts
(3) Brake hose (4) New sealing washers
(5) Oil bolt (6) Wire lock

Installation

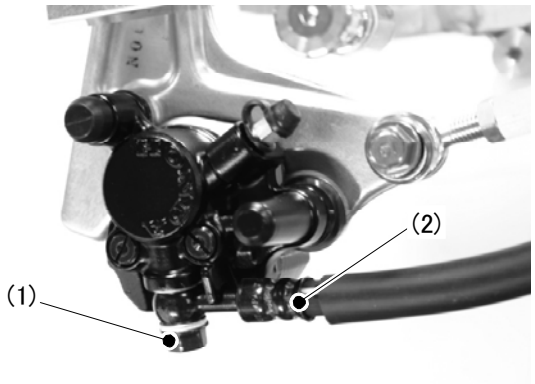
Make sure the knock pins are installed to the fork slider bracket.
Be careful not to damage pads when installing the brake caliper onto the brake disc.
Install the brake caliper bolts and tighten them to the specified torque.

Torque: 49 N・m (5.0 kgf・m)
Lock the brake caliper bolts with wire. (⇒3-18,19)

Install the brake hose eyelet and new sealing washers.
Install the brake hose oil bolt and tighten it to the specified torque.

Torque: 24 N・m(2.4 kgf・m)

Fill and bleed the front brake hydraulic system.



(1) Oil bolt (2) Brake hose

Rear brake caliper assembly

Removal

Drain the rear brake hydraulic system.
Remove the rear wheel

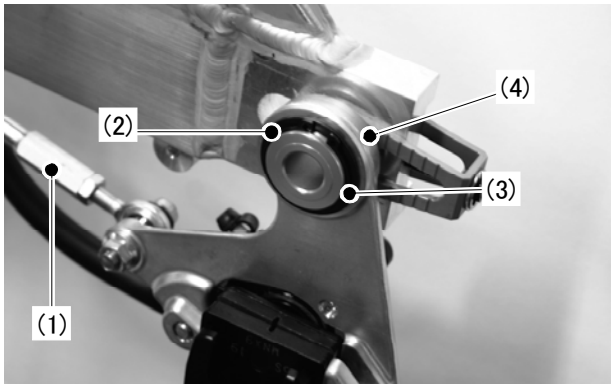
Place a clean tray under the caliper.

Spilled brake fluid will damage painted surface, plastic and rubber parts. Be careful not to spill the fluid on those parts.

Remove the following parts;
- Brake hose oil bolt
- Sealing washer
- Brake hose

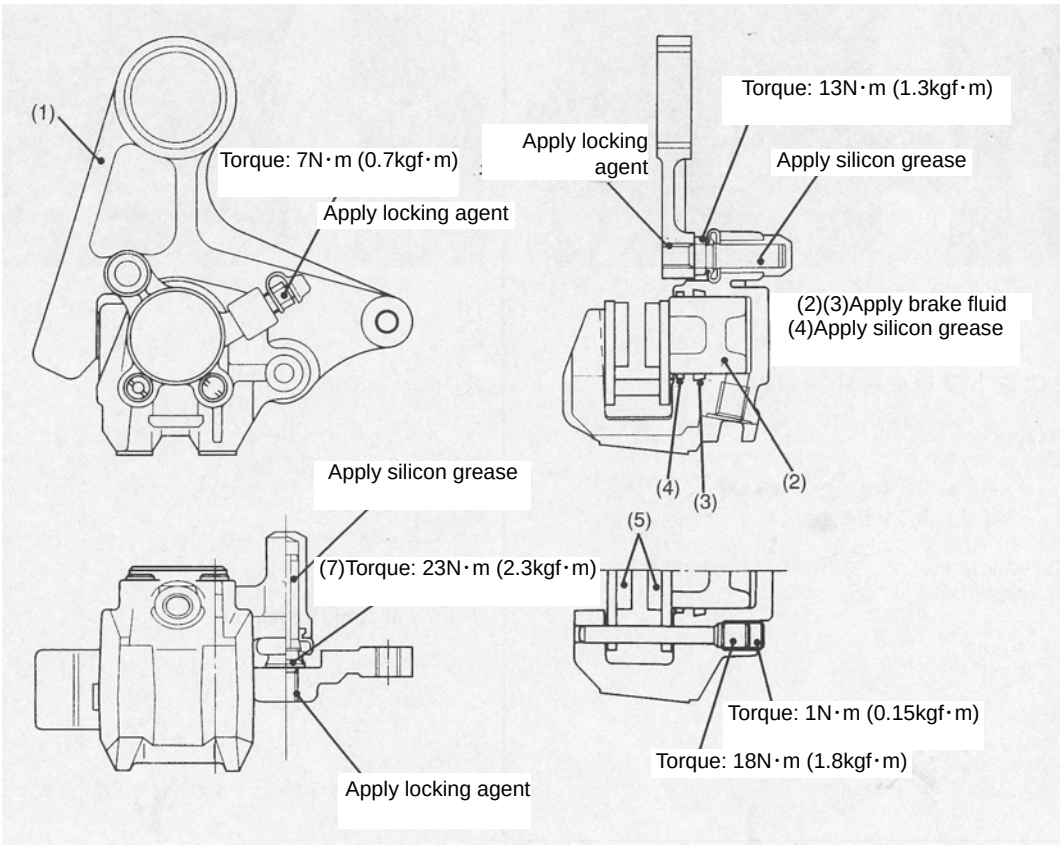
Remove the brake torque rod bolt and nut.
Remove the circlip and washer, and then remove the brake caliper / bracket as an assembly.

Remove the brake pads.



(1) Torque rod (2) Circlip (3) Washer
(4) Bracket

Disassembly / Assembly

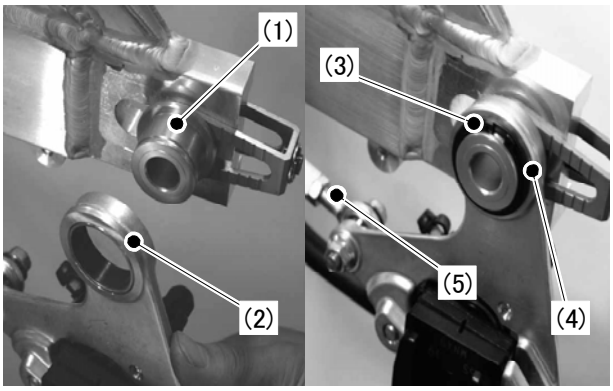


(1) Caliper bracket
(2) Caliper piston
(3) Piston seal
(4) Dust seal
(5) Brake pads
(6) Pin bolt A
(7) Pin bolt

Installation

Install the caliper/bracket assembly onto the caliper bracket collar.
Install the washer with its sagging side facing inside.
Securely install the circlinp into the groove of the bracket collar.

Install the torque rod to the bracket and tighten the bolt/nut.

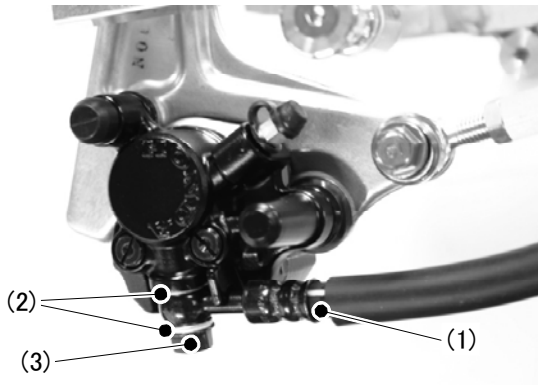


(1) Bracket collar (2) Caliper bracket assembly
(3) Washer (4) Circlip (5) Torque rod

Install the brake hose eyelet and new sealing washers.
Install the brake oil bolt and tighten it to the specified torque.

Torque: 24N・m(2.4kgf・m)

Fill and bleed the rear brake hydraulic system.



(1) Brake hose (2) New sealing washers
(3) Oil bolt

Front master cylinder

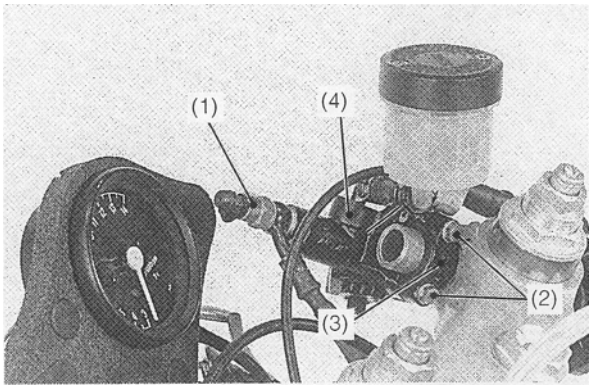
Removal

Spilled brake fluid will damage painted surface, plastic and rubber parts. Be careful not to spill the fluid on those parts.
Cover the hose joint to avoid having the brake fluid leaks.

Drain the front brake hydraulic system.

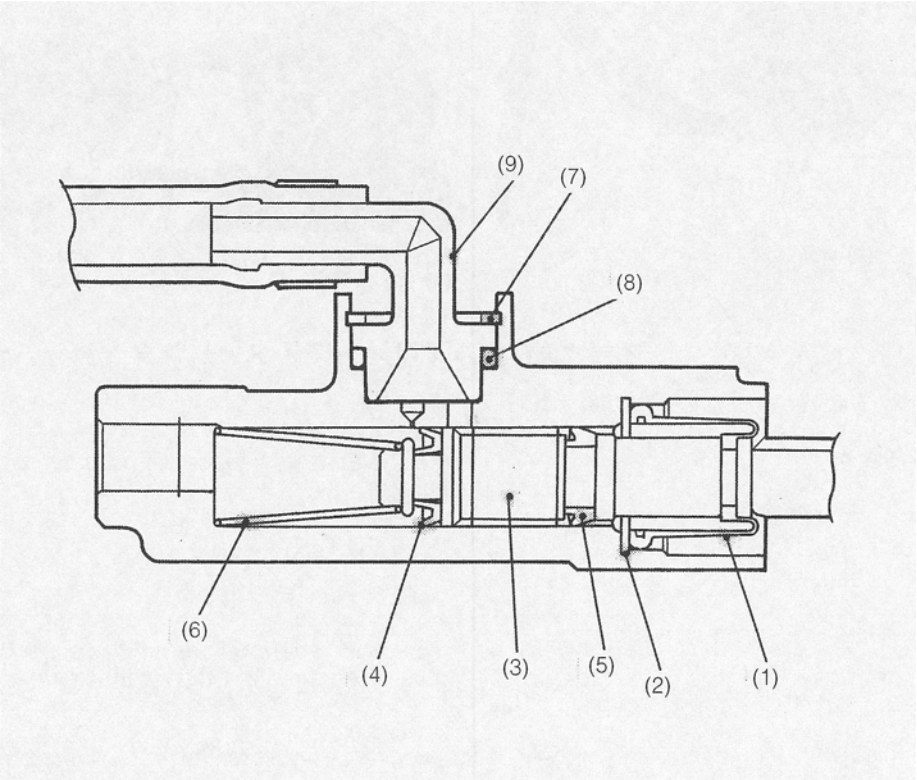
Remove the brake lever from the master cylinder.
Remove the brake oil bolt and brake hose.

Remove the following parts;
- Brake hose oil bolt / Sealing washers
- Brake hose
- Reservoir / Hose
- Master cylinder holder bolts / Holder
- Master cylinder



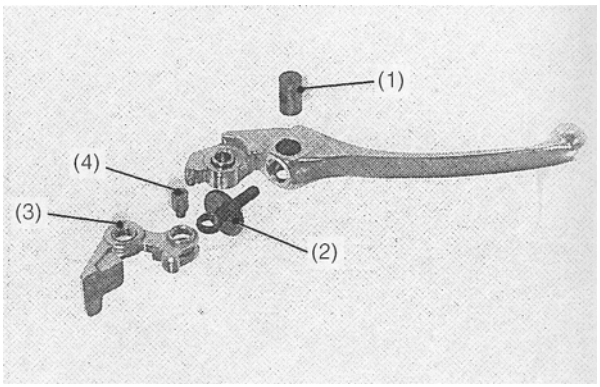
(1) Oil bolt (2) Holder bolts (3) Holder
(4) Master cylinder

Disassembly / Assembly



(1) Boot
(2) Circlip
(3) Master piston
(4) Primary cup
(5) Secondary cup
(6) Spring
(7) Circlip
(8) O-ring
(9) Reservoir joint

Brake lever assembly procedure.
1. Install the joint pin with arrow mark pointing at the lever.
2. Apply silicon grease to the threads of the adjuster.
3. Apply locking agent to the threads of the pivot screw.
Assemble the adjuster arm and brake lever and tighten the pivot screw.



(1) Joint pin (2) Adjuster
(3) Adjuster arm (4) Pivot screw

Installation

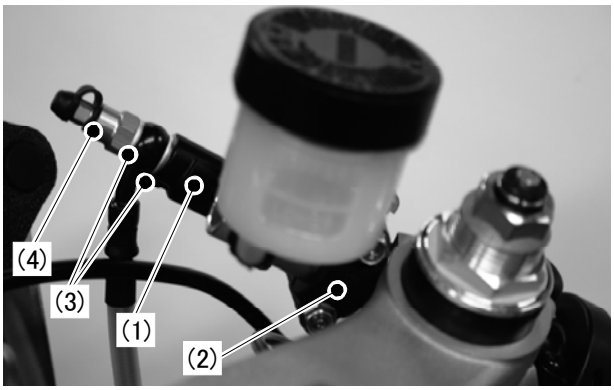
Assembly the master cylinder to the handlebar and install them with "UP" mark on the master cylinder holder facing up.
Install the holder bolts.

Install the brake lever and adjust its angle.
Tighten the upper holder bolt first, then the lower bolt.

Install the brake hose eyelet with new sealing washers.
Install the brake hose oil bolt.

Adjust the brake hose angle and tighten the brake hose oil bolt.

Torque: 24N・m{2.4kgf・m)



(1) Master cylinder (2) "UP" mark
(3) New sealing washers (4) Oil bolt

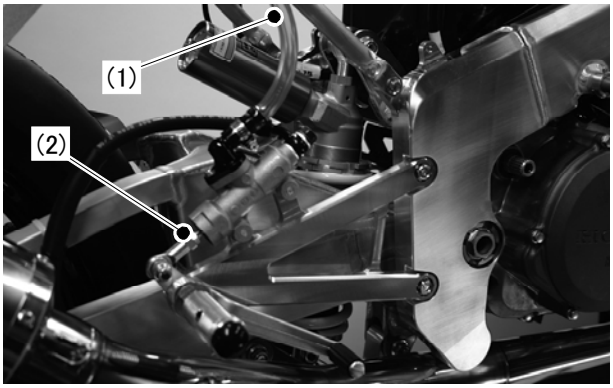
Rear master cylinder

Removal

Spilled brake fluid will damage painted surface, plastic and rubber parts. Be careful not to spill the fluid on those parts.

Drain the front brake hydraulic system.
Remove the tie wrap from the V-tube.

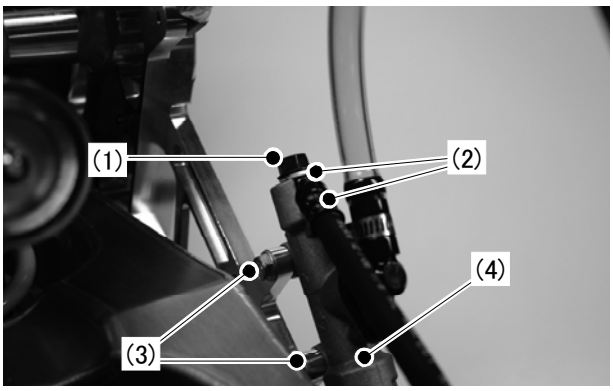
Remove the joint bolt/nut and then remove the push rod joint from the brake pedal.



(1) V-tube (2) Joint bolt / nut

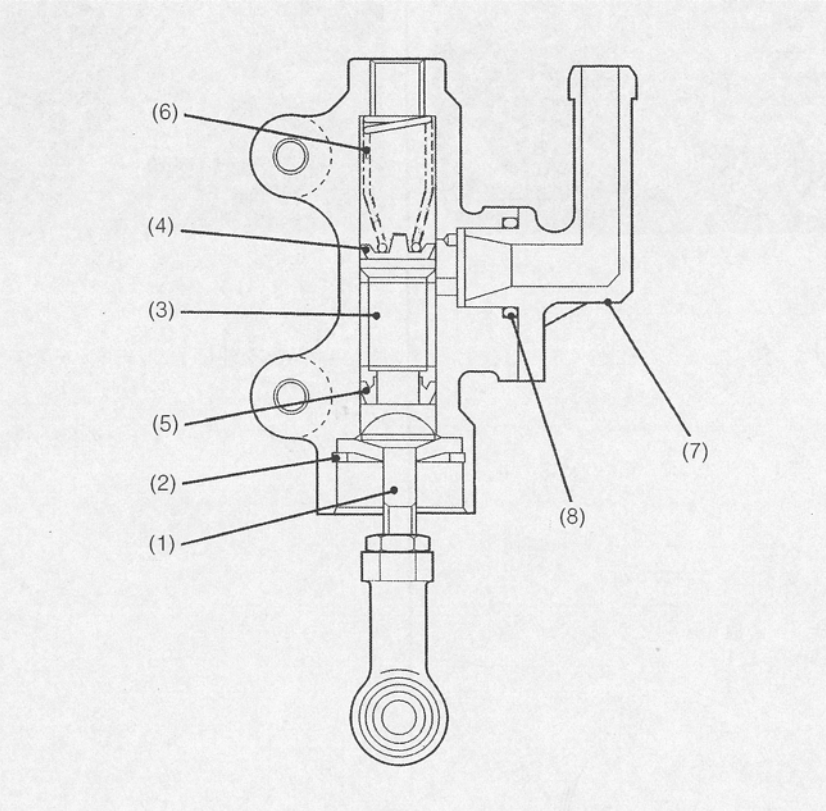
Remove the oil bolt, brake hose eyelet and sealing washers.

Remove the bolts and master cylinder.



(1) Oil bolt (2) Sealing washer
(3) Bolts (4) Master cylinder

Disassembly / Assembly



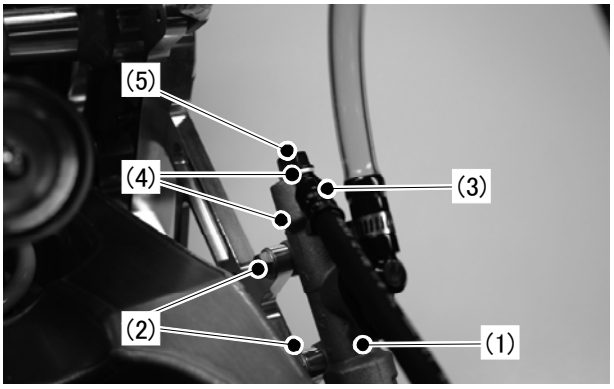
(1) Push rod joint assembly
(2) Circlip
(3) Master piston
(4) Primary cup
(5) Secondary cup
(6) Spring
(7) Reservoir joint
(8) O-ring

Installation

Install the master cylinder to the bracket and tighten the bolts.

Install the brake hose eyelet and new sealing washers.
Install the brake hose oil bolt and tighten it to the specified torque.

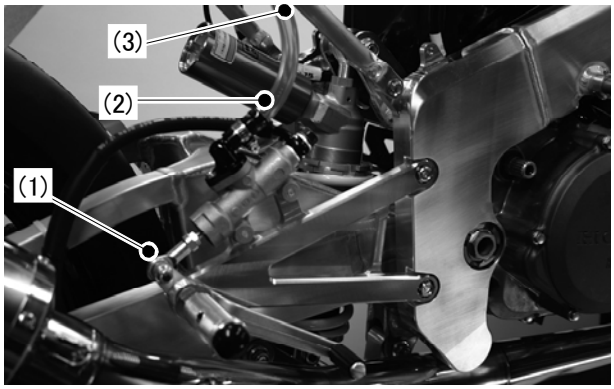
Torque: 24N · m(2.4kgf · m)



(1) Master cylinder (2) Bolts
(3) Eyelet joint (4) New sealing washers
(5) Oil bolt

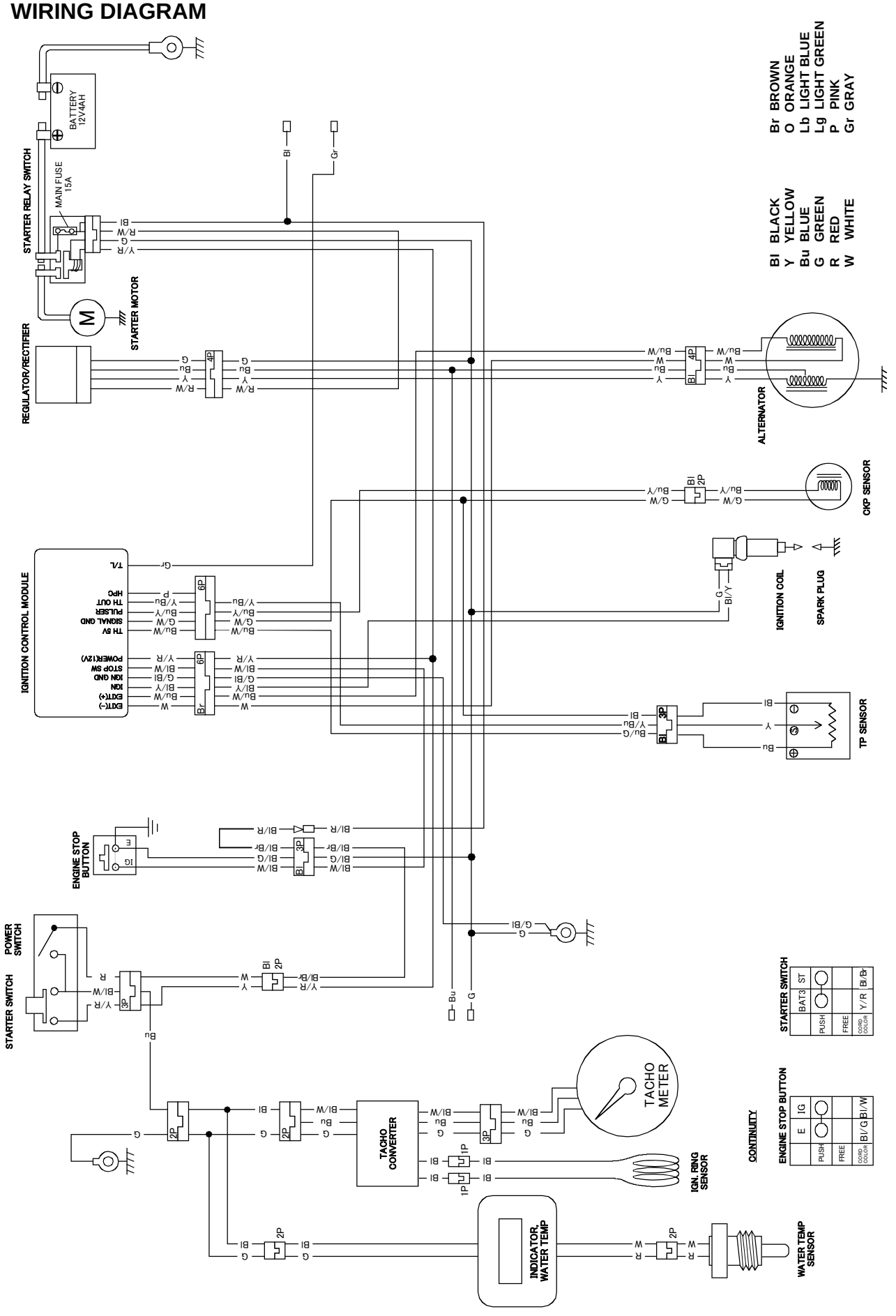
Install the brake pedal joint to the brake pedal.
Install the joint bolt and nut, and tighten them.

Fix the V-tube to the frame with a tie wrap.
Fill and bleed the rear brake hydraulic system.



(1) Joint bolt / nut (2) V-tube
(3) Tie wrap

WIRING DIAGRAM



Carburetor setting table

Reference setting for various temperature range.

M/J: Main jet
S/J: Slow jet
J/N: Jet needle
P/S: Pilot screw initial opening
N/C: Jet needle clip position

Carburetor setting (Standard)	
Main Jet	#160
Slow jet	#42
Jet needle	NCYR
Jet needle clip position	4th groove from top
Pilot screw initial opening	2-1/2

Altitude 0～300m	0～10℃	11～20℃	21～30℃	31～35℃
M/J	165	162	160	160
S/J	45	42	42	40
J/N	NCYR	NCYR	NCYR	NCYR
P/S	2-1/2	2-1/2	2-1/2	2
N/C	4/7	4/7	4/7	3/7

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