

YAMAHA

XZ550RJ

SERVICE MANUAL

11H-28197-10

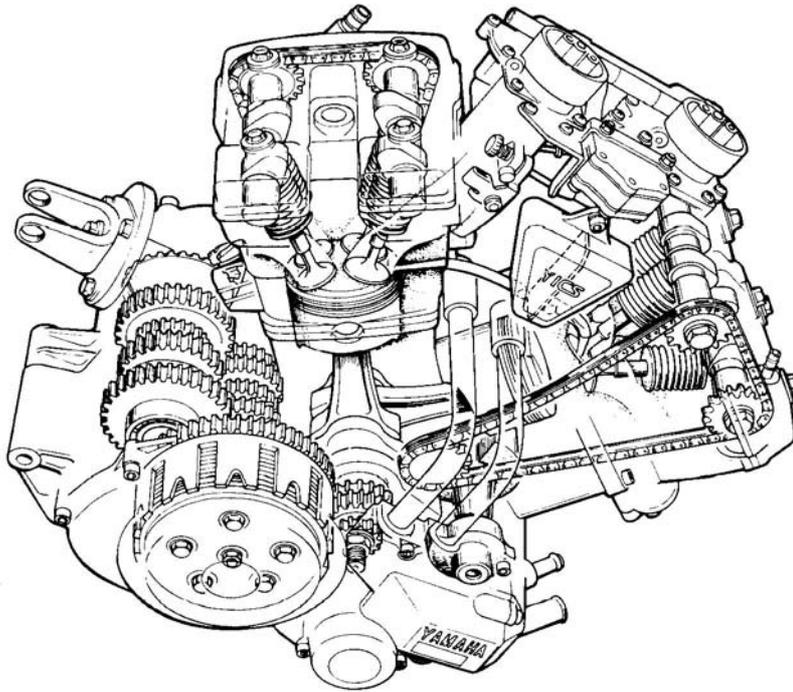
FEATURES

XZ550RJ



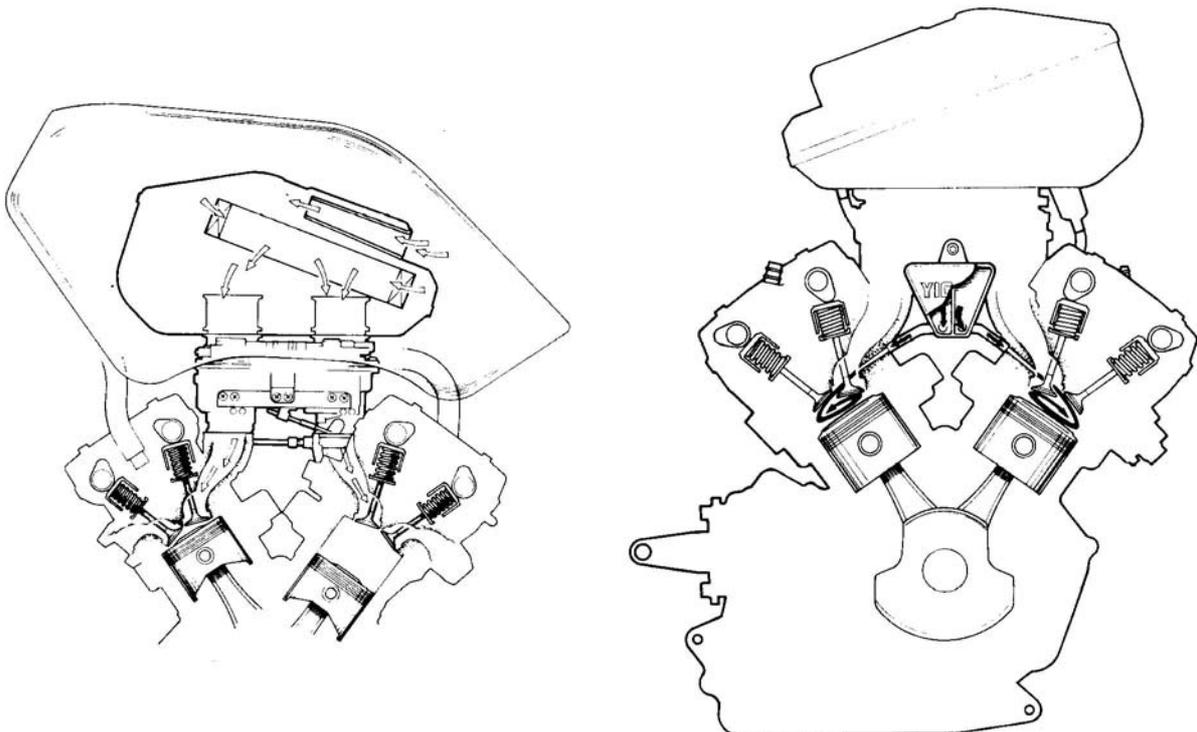
Liquid-cooled V-Twin

The 70° V-Twin engine is liquid-cooled to maintain the best operating temperature range. The cooling system features an aluminum-corrugate radiator which is extremely light and exhibits excellent heat-dissipating characteristics. An automatically activated electric fan pulls air through the radiator in heavy-traffic situations. The system has an automotive-type expansion and recovery tank which makes airspace in the radiator unnecessary and virtually eliminates coolant loss on even the hottest days. A thermostatic valve mounted in the engine block provides quick warmups and stable coolant temperature.

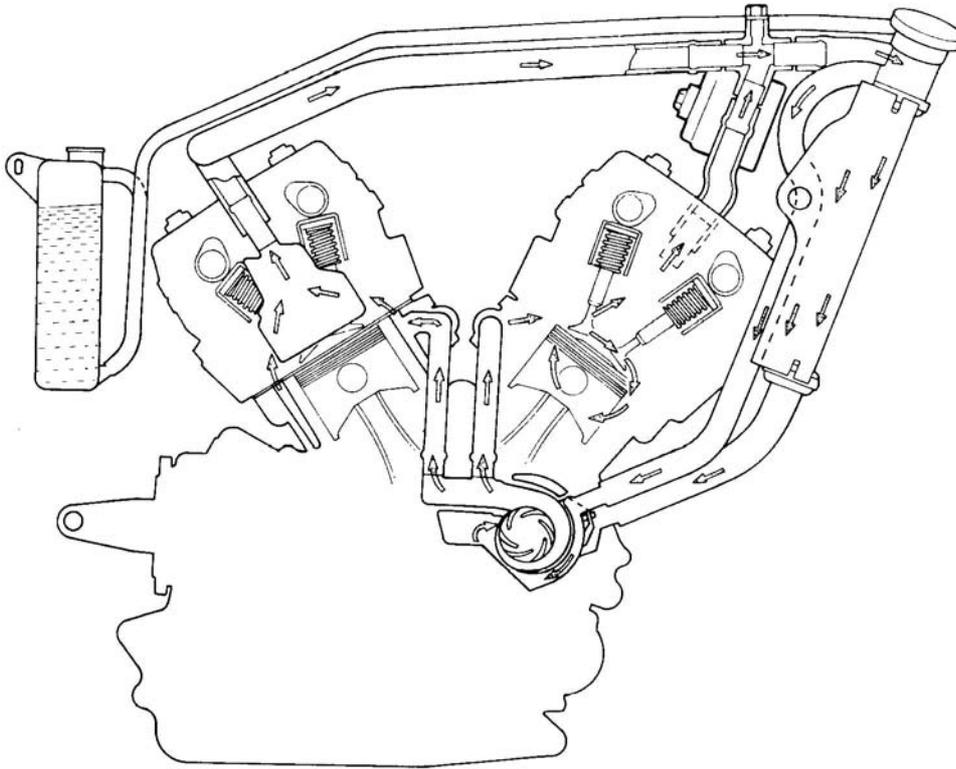


YICS
To increase fuel economy through more efficient combustion, the engine is equipped with the patented Yamaha Induction Control System (YICS). In this configuration, the YICS consists of a chamber linked to the intake manifold by a tube. Upon intake, the vacuum in the manifold creates a vacuum in the chamber; when the intake valve closes, the chamber draws in some air-fuel mixture. When the intake valve reopens, the mixture in the chamber shoots back out through the angled tube and into the cylinder, mixing with and swirling the main intake charge. The swirling charge is then compressed and ignited, burning more completely and producing more power than that of a conventional engine.

INTAKE SYSTEM AND YICS



LIQUID COOLING SYSTEM



Downdraft carb

The induction system on this motorcycle features downdraft carburetion. The 34 mm (1.34 in) Venturis are positioned so that the incoming air takes a virtually straight path through the carbs and the intake manifolds to the combustion chambers; intake efficiency is remarkably high. An accelerator pump is installed in the carburetor assembly to eliminate hesitation when the throttle is opened at low engine speeds. A fuel pump delivers gas from the tank to the float bowls, and a regulator sends excess fuel through a circuit back to the fuel pump inlet.

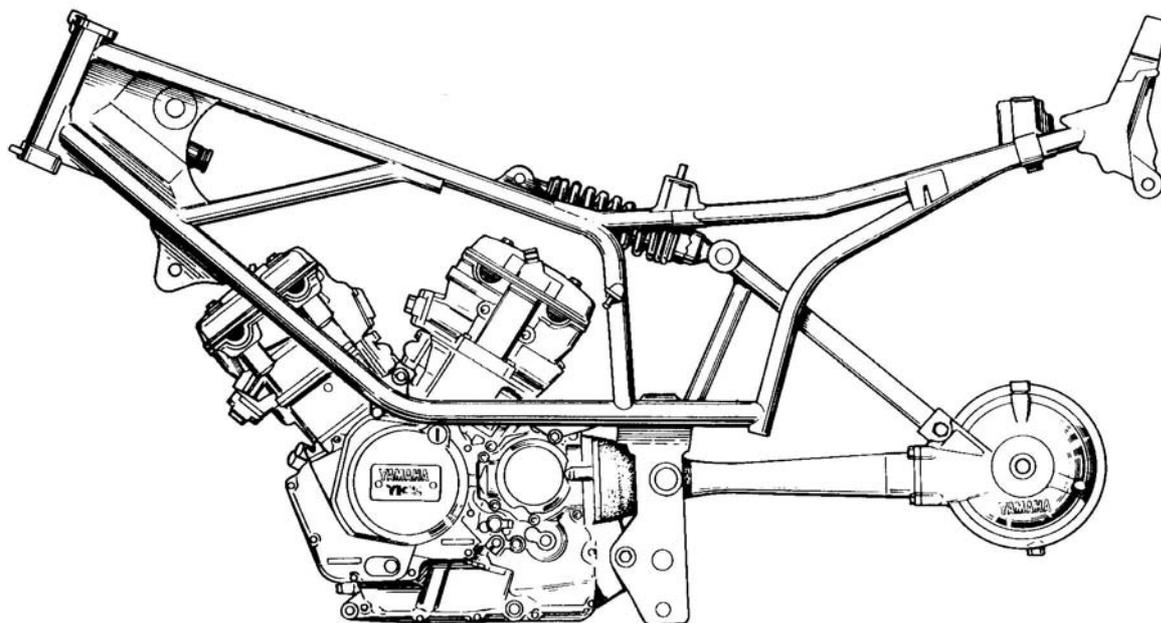
DOHC 4-valve heads

Each cylinder head has dual overhead camshafts, and each camshaft acts directly on top of the valves; there are no pushrods or rocker arms. Both heads have four valves, two intake and two exhaust, instead of one intake and one exhaust valve. By using two slightly smaller valves in place of each large valve, port area is significantly increased. This provides a much greater volume of mixture and exhaust flow. In addition, the smaller, lighter valves are easier to control at high engine speeds; the valves can follow the cam profiles more closely to resist "floating" and allow a 9,500 r/min red line.

Chassis bits

The "hang-support" frame on this motorcycle allows a lower engine placement and center of gravity while providing excellent rigidity for precise handling. Cornering clearance is also enhanced. The trailing-axle front suspension performs superbly. The axle placement helps to maintain a short wheelbase, allowing quick, sporty handling. Yamaha's proven Monoshock rear suspension provides the excellent handling and comfort characteristics for which it is famous. The spring preload is adjustable to five settings.

FRAME AND MONOCROSS SUSPENSION SYSTEM



NOTICE

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha motorcycles have a basic understanding of the mechanical concepts and procedures inherent to motorcycle repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the motorcycle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his motorcycle and to conform with federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system for the XZ550RJ. Please read this material carefully.

Particularly important information is distinguished in this manual by the following notations:

NOTE: A NOTE provides key information to make procedures easier or clearer.

CAUTION: A CAUTION indicates special procedures that must be followed to avoid damage to the motorcycle.

WARNING: A WARNING indicates special procedures that must be followed to avoid injury to a motorcycle operator or person inspecting or repairing the motorcycle.

**SERVICE DEPT.
INTERNATIONAL DIVISION
YAMAHA MOTOR CO., LTD.**

CHAPTER 1. GENERAL INFORMATION

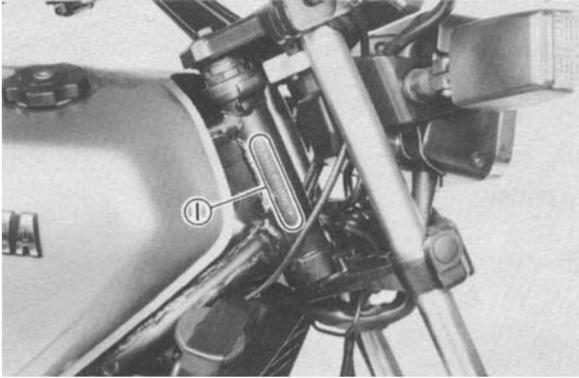
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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

Frame serial number

The frame serial number is stamped into the right side of the steering head pipe.



1. Frame serial number

Engine serial number

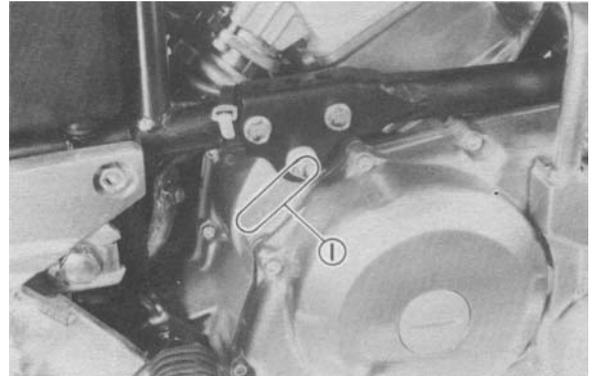
The engine serial number is stamped into the elevated part of the right rear section of the engine.

Starting serial number:

XZ550RJ	11H-000101
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NOTE

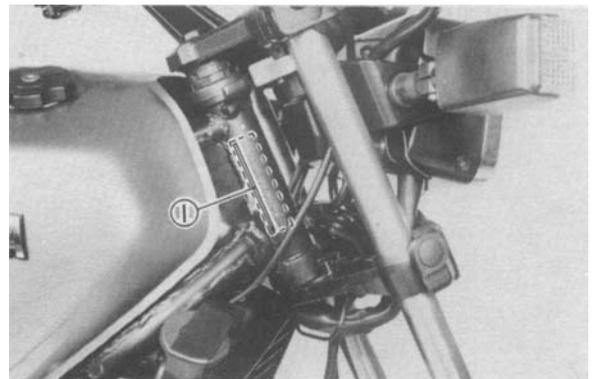
The first three digits of these numbers are for model identification; the remaining digits are the unit production number.



1. Engine serial number

Vehicle identification number

The vehicle identification number is on the left side of the steering head pipe.



1. Vehicle identification number



SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.

For tune-up

Inductive tachometer (P/N YU-08036)

Inductive timing light (P/N YU-08037)

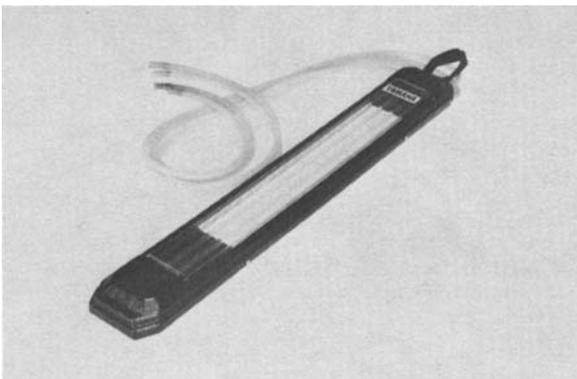
Fuel level gauge (P/N YM-01312)

Cooling system tester (P/N YU-24460)

Compression gauge (P/N YU-33223)

Compression gauge
12 mm (0.47 in) adapter (P/N YU-33223-3)

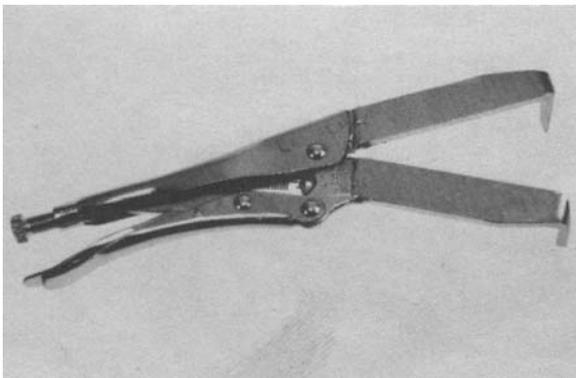
Vacuum gauge (P/N YU-08030)



This gauge is needed for carburetor synchronization

For engine service

Universal clutch holder
(P/N YM-91042)



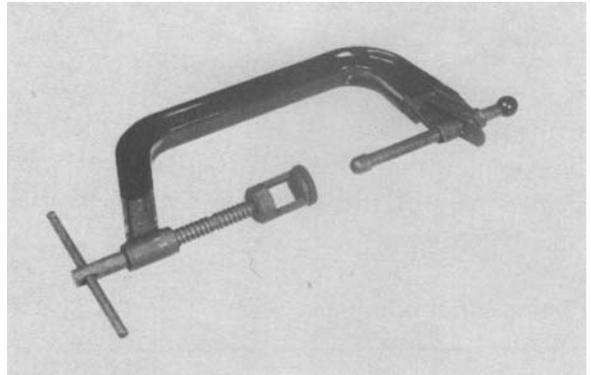
This tool is used to hold the clutch when removing or installing the clutch boss locknut

Tappet adjusting tool (P/N YM-28899)



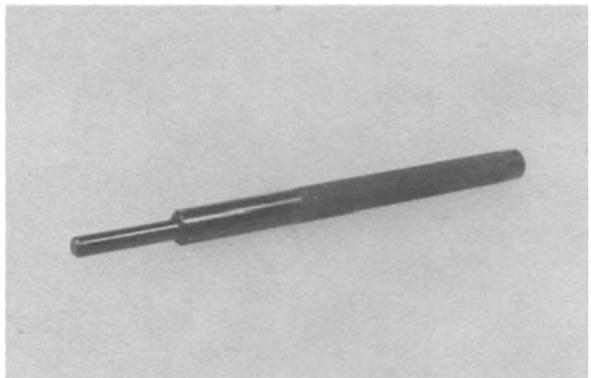
This tool is necessary to replace valve adjusting pads.

Valve spring compressor
(P/N YM-04019)



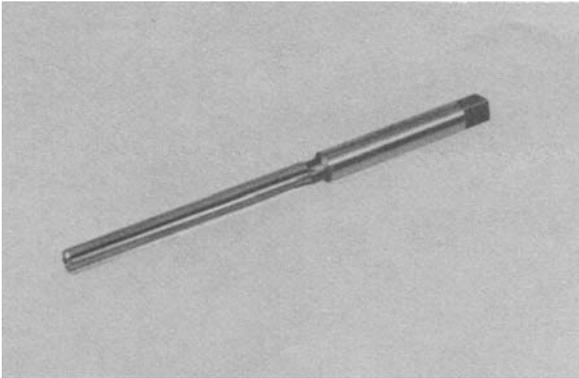
This tool must be used for removing and installing the valve assemblies

Valve guide remover
(P/N YM-04064)



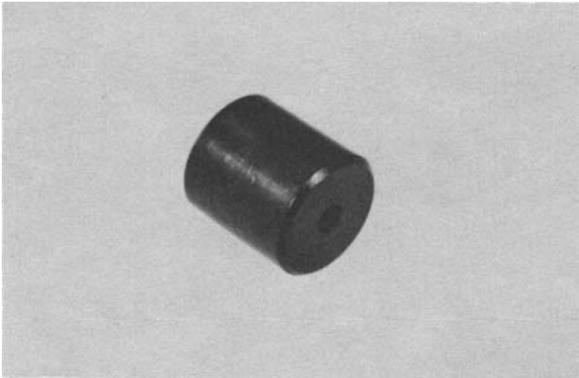
This must be used to remove the valve guides

Valve guide reamer
(P/N YM-04066)



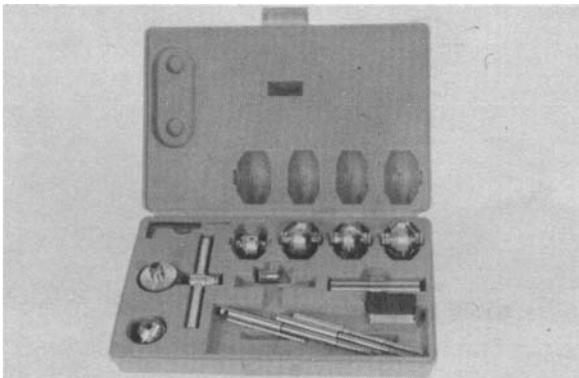
This must be used when replacing the valve guide.

Valve guide installer
(P/N YM-04065)



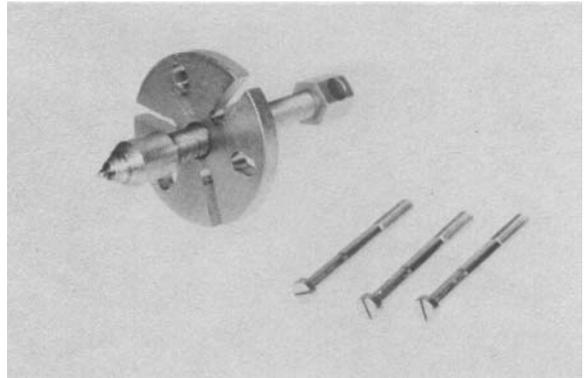
This tool is needed for proper installation of the valve guides.

Valve seat cutter set
(P/N YM-91043)



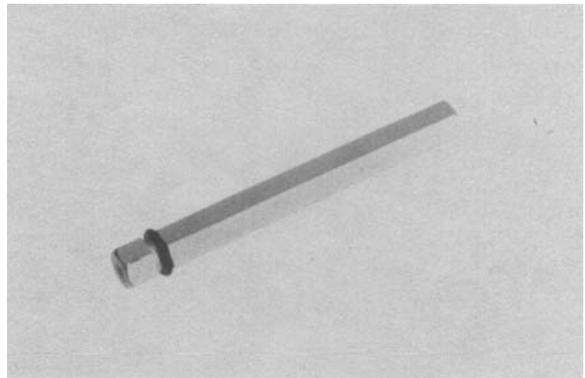
This tool is needed to resurface the valve seat.

Flywheel puller
(P/N YU-33270)



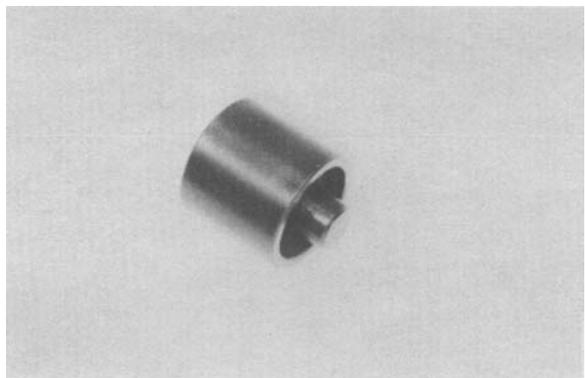
This tool is used for removing the flywheel

8mm (0,3 in) wrench adapter
(P/N YM-28897)



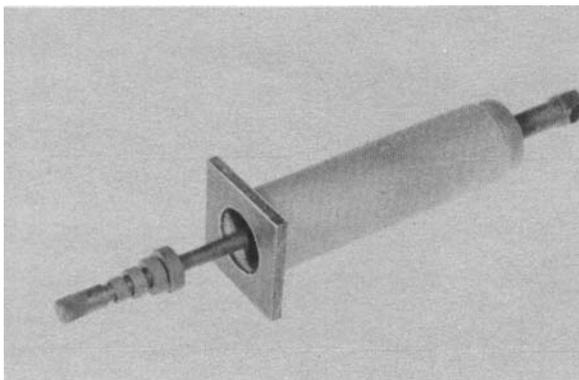
This tool is used to loosen or tighten the cylinder head securing nut.

Water pump seal installer
(P/N YM-33221)



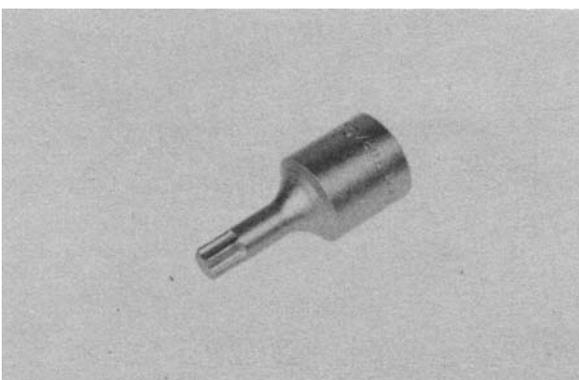
This tool is needed for proper installation of the water pump seal.

Piston pin puller
(P/N YU-01304)



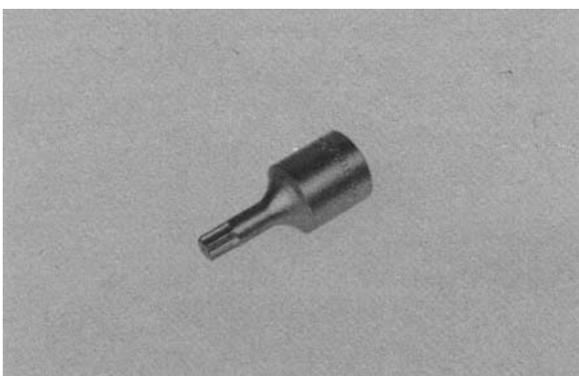
This tool is used to remove the piston pin.

#30 Torx driver
(P/N YU-29843-6)



This tool is used to loosen or tighten the drive axle bearing stopper bolt

#25 Torx driver
(P/N YU-29843-4)



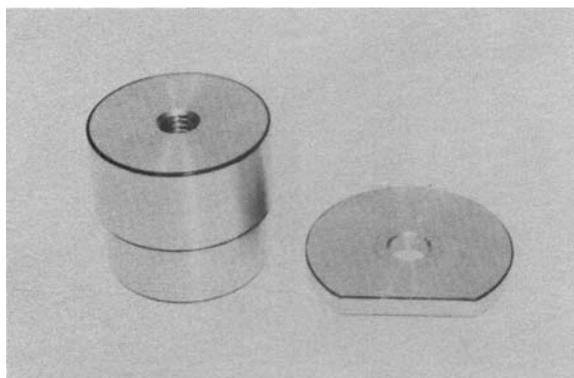
This tool is used to loosen or tighten the shift cam segment securing bolt

46 mm (1.8 in) offset wrench
(P/N YM-04045A)

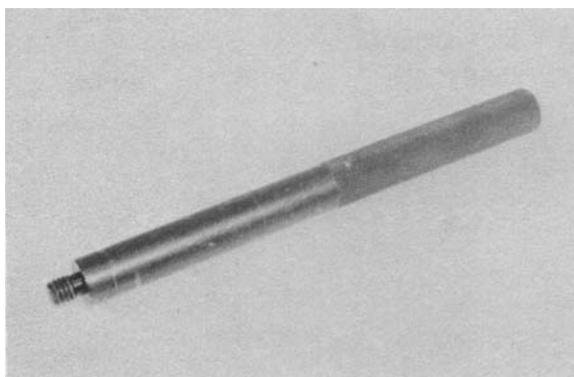


This tool is used to loosen and tighten the primary drive gear/balancer drive gear securing nut.

Plain bearing driver/installer
(P/N YM-28898)

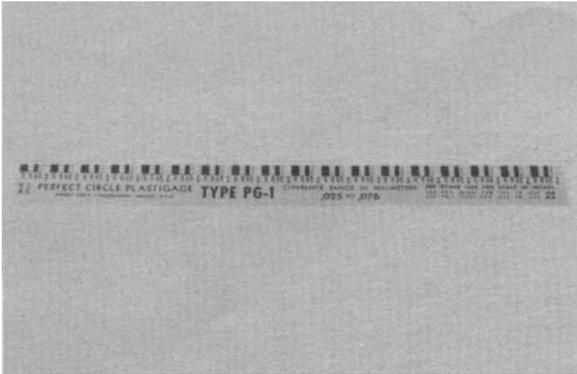


Handle (P/N YM-04058-1)



These tools are used for removing and installing the crankshaft plain bearing.

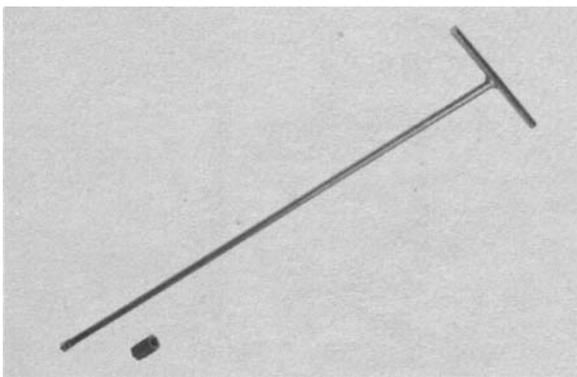
Plastigauge set "Green"
(P/N YU-33210)



This gauge is needed when measuring clearance for connecting rod bearing.

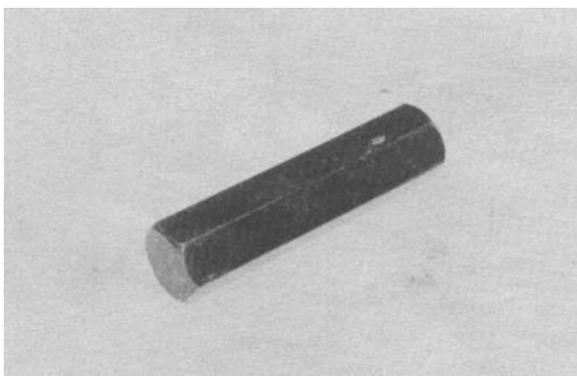
For chassis service

T-handle (P/N YU-01268) and damper rod holder (P/N YM-33256)



This tool is used to loosen and tighten the front fork cylinder holding bolt

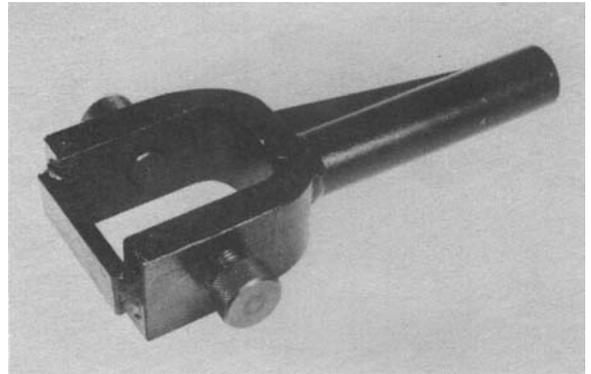
Front fork cap socket (19mm) (0.75 in))
(P/N YM-01298)



This tool is needed when loosening and tightening the front fork cap bolt

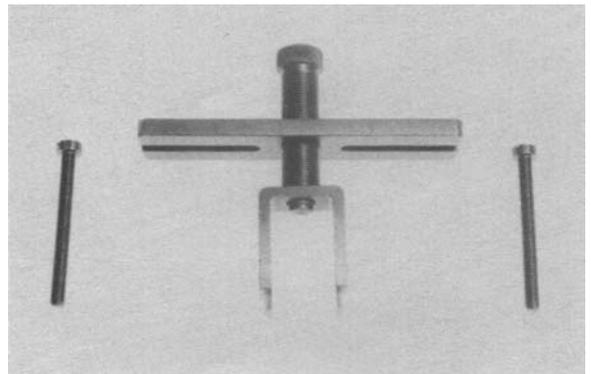
For middle gear service

Universal joint holder
(P/N YM-04062)



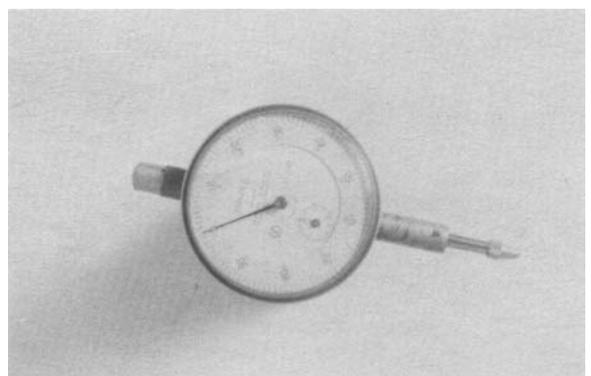
This tool is used when adjusting gear lash, in the middle gear.

Middle drive gear holder
(P/N YM-33222)



This tool is needed when measuring gear back lash.

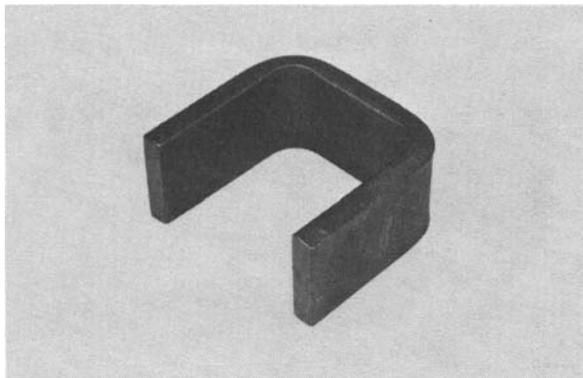
Dial indicator
(P/N YU-03097)



These tools are used when measuring gear lash for middle gear.

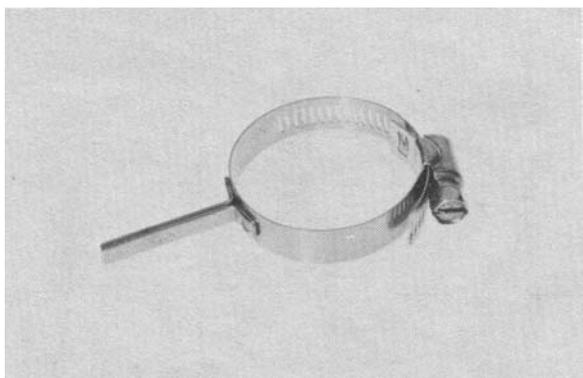
For shaft drive service

Damper spring compressor
(P/N YM-04011)



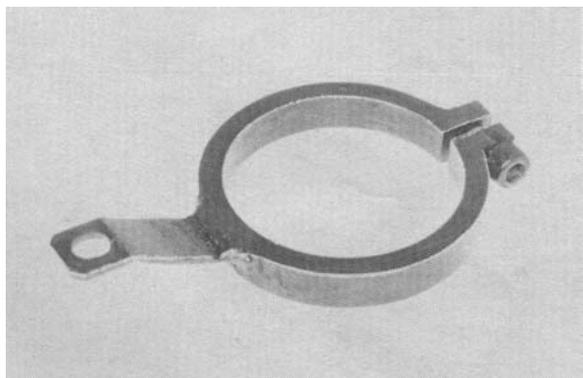
This tool is needed to disassemble and reassemble the middle gear damper.

Final drive gear lash tool
(P/N YM-01230)



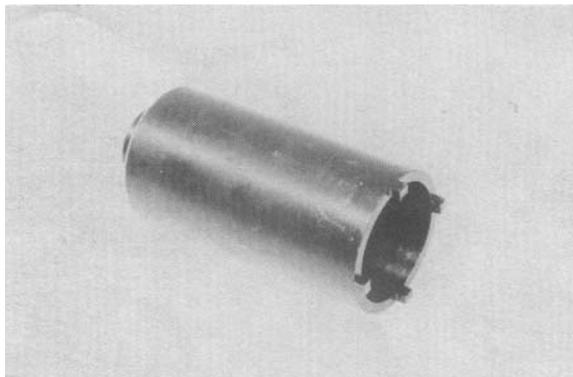
This tool is needed when measuring gear lash for final gear.

Ring gear holder
(P/N YM-01254)



This tool is needed when measuring gear lash.

Bearing retainer wrench
(P/N YM-33214)

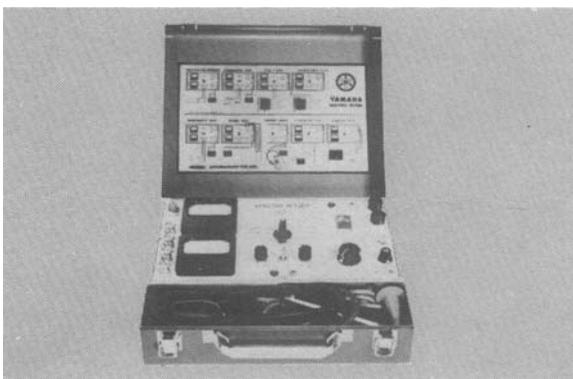


This tool is used to loosen or tighten the bearing retainer.

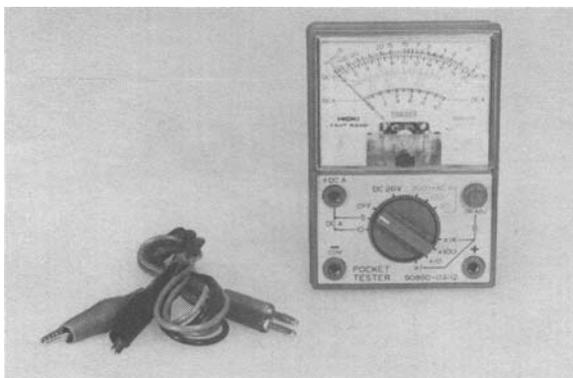
For electrical components

The uses of these tools are described in Chapter 6.

Electro tester
(P/N YU-03021)



Pocket tester
(P/N YU-03112)



CHAPTER 2. PERIODIC INSPECTIONS AND ADJUSTMENTS

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PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service and to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

MAINTENANCE INTERVALS CHARTS

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emissions control are grouped separately.

PERIODIC MAINTENANCE EMISSION CONTROL SYSTEM

No.	Item	Remarks	Initial break-in		Thereafter every	
			1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months
1*	Valve clearance	Check and adjust valve clearance when engine is cold.		○		○
2	Spark Plugs	Check condition. Adjust gap/ Clean. Replace after initial 13,000 km (8,000 mi) or 18 months and thereafter every 12,000 km (7,500 mi) or 18 months.		○	○	Replace every 12,000 km (7,500 mi) or 18 months
3*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		○		○
4*	Fuel line	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○		○
5*	Exhaust system	Check for leakage. Retighten as necessary. Replace gasket(s) if necessary.		○	○	
6*	Carburetor synchronization	Adjust synchronization of carburetors.		○	○	
7*	Idle speed	Check and adjust engine idle speed. Adjust cable free play if necessary.		○	○	

*It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.

GENERAL MAINTENANCE/LUBRICATION

No.	Item	Remarks	Type	Initial break-in		Thereafter every		
				1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months	16,000 km (10,000 mi) or 24 months
1	Engine oil	Warm up engine before draining.	Refer to page 2-10	○	○	○		
2	Oil filter	Replace	—	○	○		○	
3	Air filter	Clean with compressed air.	—	○	○		○	
4	Cooling system	Check hoses for cracks or damage, replace if necessary. Replace coolant every 24 months.	Ethylene glycol anti-freeze coolant					○
5*	Brake system	Adjust free play. Replace pads if necessary (front). Replace shoes if necessary (rear).	—	○	○	○		
6*	Clutch	Adjust free play.	—	○	○	○		
7	Final gear oil	Replace	SAE80 API GL—4 Hypoid gear oil	○			○	
8*	Control and meter cable	Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W 30 motor oil	○	○	○		
9	Change/ Brake pedal shaft pivot	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W 30 motor oil		○	○		
10	Center and sidestand pivots	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W 30 motor oil		○	○		
11*	Steering bearing and races	Check bearings assembly for looseness. Moderately repack every 16,000 km (10,000 mi).	Medium weight wheel bearing grease		○	○		Repack
12*	Front fork oil	Drain completely. Refill to specification.	Yamaha fork oil 15wt or equivalent					○
13*	Wheel bearings	Check bearings for smooth rotation. Replace if necessary.	—		○	○		
14	Battery	Check specific gravity. Check breather pipe for proper operation.	—		○	○		
15	Brake/ Clutch lever pivot shaft	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W 30 motor oil		○	○		

*It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.

ENGINE

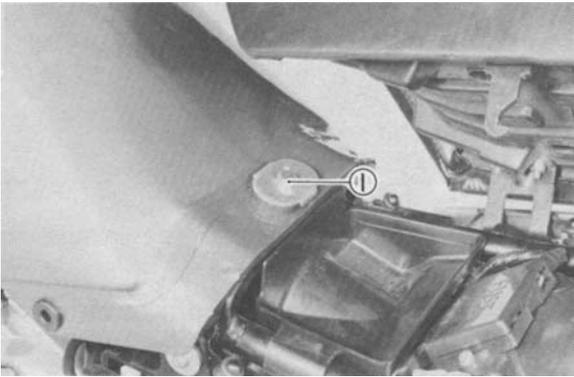
Valve clearance adjustment

Adjust the valve clearance as follows:

NOTE:

Valve clearance must be measured when the engine is cool to the touch.

1. Remove the seat, and remove the side covers, fuel tank, air filter assembly, and crankcase ventilation pipes.



1. Fuel tank holding bolt

CAUTION:

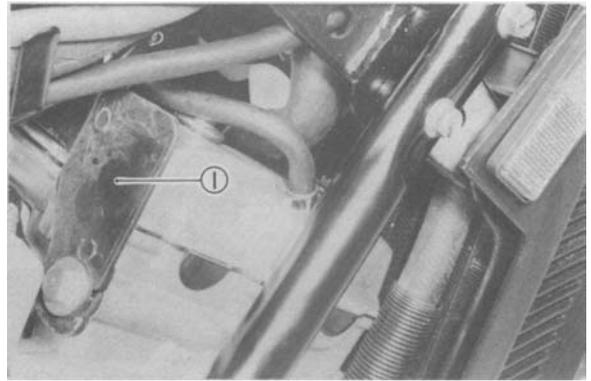
After removing the air filter assembly, cover the carburetors with a clean rag to prevent dust or any foreign materials from entering.

2. Remove the radiator cover and the radiator securing bolts. Gently and firmly push the left side of the radiator assembly towards the front wheel. The right side of the radiator and connected pipes should remain in place.

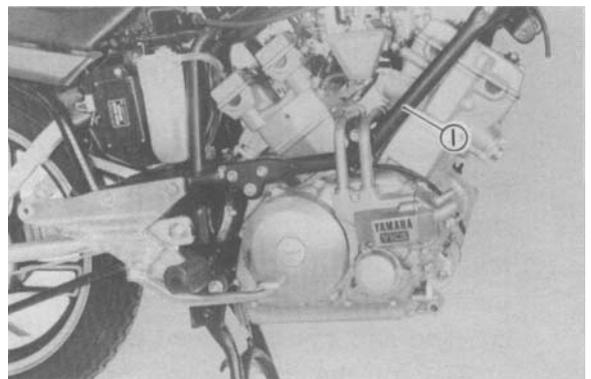
NOTE:

It is not necessary to completely remove the radiator from the motorcycle.

3. Remove the air baffle plate from behind the front cylinder and remove the right side frame tube.



1. Air baffle plate

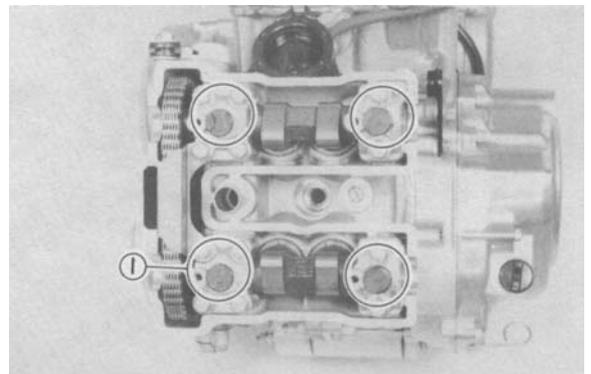


1. Down tube frame

4. Disconnect the spark plug cap from each cylinder head.
5. Remove the cylinder head covers.

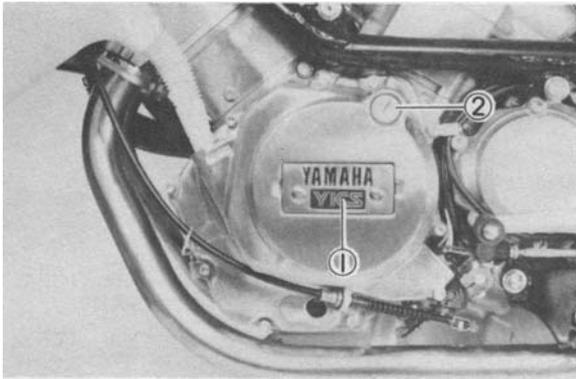
NOTE:

Be careful so that the oil plugs on the camshaft caps are not lost.



1. Oil plug

6. Remove the emblem plate and timing plug from the left-side crankcase.

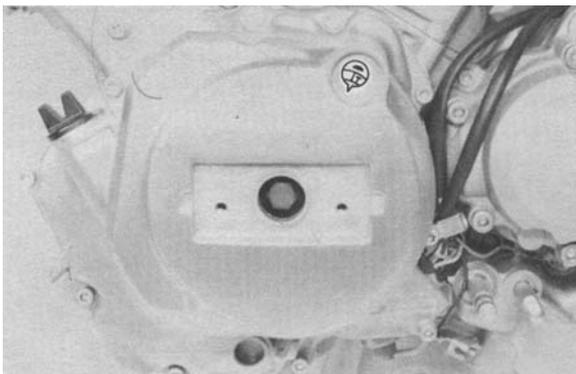


1. Emblem plate 2. Timing plug

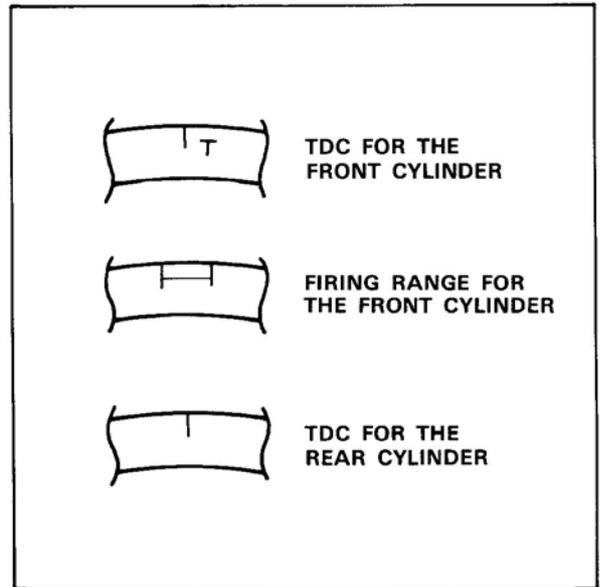
7. Align the "T" mark (for the front cylinder) on the flywheel with the stationary pointer on the crankcase cover. The pointer can be viewed through the timing window in the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC). Valve clearance should be checked and adjusted when the piston is at TDC on the compression stroke. The piston is at TDC on compression when there is free play in both valve adjusters.

NOTE:

The crankshaft should be turned counterclockwise, as viewed from the left side of the motorcycle.



The flywheel is marked as follows:



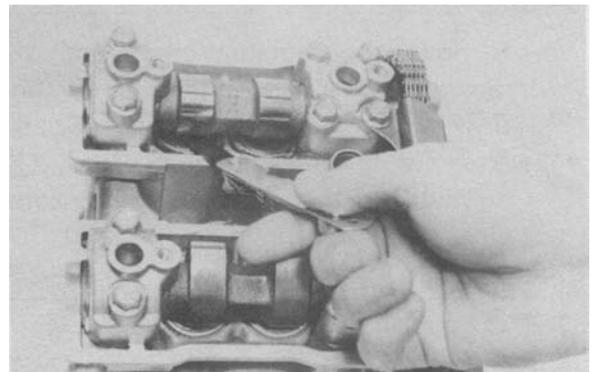
8. Use a feeler gauge to determine the clearance. If clearance is incorrect, record the measured amount of clearance. This must be measured carefully.

Intake valve (cold):

0.11 ~ 0.15mm (0.0043 - 0.0059 in)

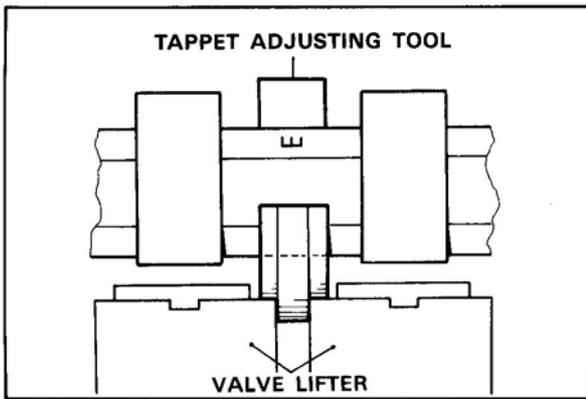
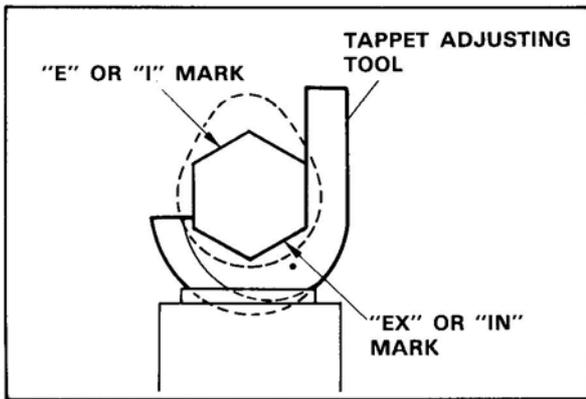
Exhaust valve (cold):

0.16 ~ 0.20mm (0.0063 ~ 0.0079 in)



9. Valve clearance is adjusted by replacing the adjusting pad on the top of the valve lifter. Adjusting pads are available in 25 thicknesses, ranging from No. 200 (2.00 mm (0.079 in)) to No. 320 (3.20 mm (0.130 in)) in steps of 0.05 mm (0.002 in). The thickness of each pad is marked on the pad face that contacts the valve lifter (not the cam). Adjustment of the valve clearance is accomplished as follows:

- a. There is a slot in each valve lifter. The slots must be positioned opposite of each other on the exhaust and intake side before the tappet adjusting tool is installed.
- b. Turn the crankshaft until the camshaft identification mark (IN or EX) faces upward. Place the tappet adjusting tool under the camshaft with the tool match mark (•) and camshaft I.D. mark aligned.
- c. Turn the crankshaft until the lobe of the tool depresses the valve lifters.



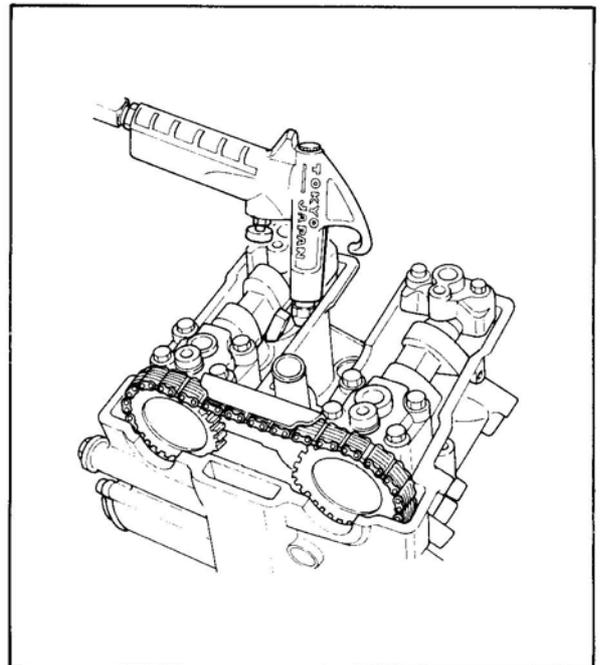
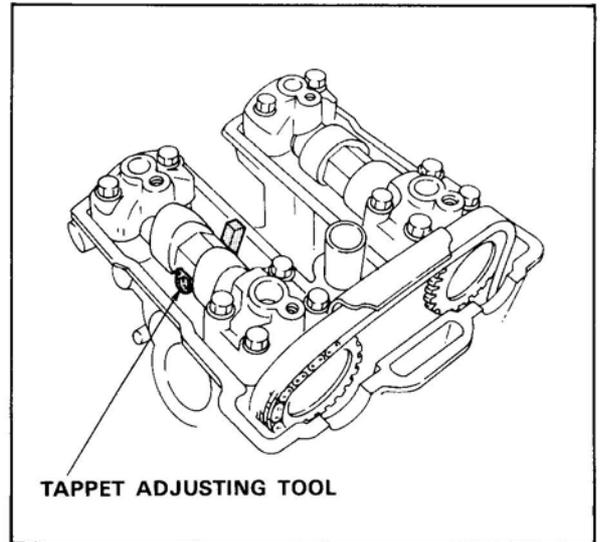
WARNING:

When turning the crankshaft, exercise care so that the tappet adjusting tool does not contact the mating surface of the cylinder head and the cylinder head cover.

NOTE:

When installing the tappet adjusting tool onto the camshaft, be careful so that the lobe of the tool does not ride on the pad.

- d. Remove the pads from the lifters. There is a slot in each lifter. Use an air gun or a small screwdriver and a magnetic rod to remove the pads. Note the numbers on the pads.



- e. Proper pad selection is made as follows: (Use appropriate chart for exhaust or intake valves.)
 - 1) Find number of original (installed) pad number on chart. Read down on chart.
 - 2) Find measured valve clearance (from step 1) on chart. Read across.

NOTE:

The new pad number is to be used as a guide only. Verify the correctness of this choice in the following step(s).

- At the intersection of installed pad number (down) and measured clearance (across) is a new pad number.

EXAMPLE:

Intake valve, installed pad:

No.250 (read down)

Measured clearance:

0.32mm (0.013 in) (read across)

New pad number: No.270

(intersection of down & across)

		Intake																								
		INSTALLED PAD NUMBER																								
MEASURED CLEARANCE		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00	0.05																									
0.06	0.10																									
0.11	0.15																									
0.21	0.25	209	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.26	0.30	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.31	0.35	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.36	0.40	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.41	0.45	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.46	0.50	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.51	0.55	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.56	0.60	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.61	0.65	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.66	0.70	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.71	0.75	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.76	0.80	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.81	0.85	265	270	275	280	285	290	295	300	305	310	315	320													
0.86	0.90	270	275	280	285	290	295	300	305	310	315	320														
0.91	0.95	275	280	285	290	295	300	305	310	315	320															
0.96	1.00	280	285	290	295	300	305	310	315	320																
1.01	1.05	285	290	295	300	305	310	315	320																	
1.06	1.10	290	295	300	305	310	315	320																		
1.11	1.15	295	300	305	310	315	320																			
1.16	1.20	300	305	310	315	320																				
1.21	1.25	305	310	315	320																					
1.26	1.30	310	315	320																						
1.31	1.35	315	320																							
1.36	1.40	320																								

VALVE CLEARANCE(engine cold) 0.16 - 0.20mm (0.0062 - 0.0079in)

Example Installed is 250
Measured clearance is 0.32mm (0.013in)
Replace 250 pad with 270

* Pad number : (example) Pad No.250 = 2.50mm (0.098in)
Pad No.255 = 2.55mm (0.100in)

Always install pad with number down

Intake

MEASURED CLEARANCE	INSTALLED PAD NUMBER																								
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00~0.05				200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305
0.06~0.10			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.11~0.15		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.16~0.20																									
0.21~0.25	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.26~0.30	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.31~0.35	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.36~0.40	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.41~0.45	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.46~0.50	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.51~0.55	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.56~0.60	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.61~0.65	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.66~0.70	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.71~0.75	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.76~0.80	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.81~0.85	265	270	275	280	285	290	295	300	305	310	315	320													
0.86~0.90	270	275	280	285	290	295	300	305	310	315	320														
0.91~0.95	275	280	285	290	295	300	305	310	315	320															
0.96~1.00	280	285	290	295	300	305	310	315	320																
1.10~1.05	285	290	295	300	305	310	315	320																	
1.06~1.10	290	295	300	305	310	315	320																		
1.11~1.15	295	300	305	310	315	320																			
1.16~1.20	300	305	310	315	320																				
1.21~1.25	305	310	315	320																					
1.26~1.30	310	315	320																						
1.31~1.35	315	320																							
1.36~1.40	320																								

VALVE CLEARANCE(engine cold)0.16~0.20mm (0.0062 ~ 0.0079 in)

Example Installed is 250
Measured clearance is 0.32mm (0.013 in)
Replace 250 pad with 265

* Pad number : (example) Pad No.250 = 2.50mm (0.098 in)
Pad No.255 = 2.55mm (0.100 in)

Always install pad with number down.

Exhaust

MEASURED CLEARANCE	INSTALLED PAD NUMBER																								
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00~0.05					200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300
0.06~0.10				200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305
0.11~0.15			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.16~0.20		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.21~0.25																									
0.26~0.30	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.31~0.35	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.36~0.40	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.41~0.45	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.46~0.50	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.51~0.55	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.56~0.60	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.61~0.65	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.66~0.70	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.71~0.75	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.76~0.80	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.81~0.85	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.86~0.90	265	270	275	280	285	290	295	300	305	310	315	320													
0.91~0.95	270	275	280	285	290	295	300	305	310	315	320														
0.96~1.00	275	280	285	290	295	300	305	310	315	320															
1.10~1.05	280	285	290	295	300	305	310	315	320																
1.06~1.10	285	290	295	300	305	310	315	320																	
1.11~1.15	290	295	300	305	310	315	320																		
1.16~1.20	295	300	305	310	315	320																			
1.21~1.25	300	305	310	315	320																				
1.26~1.30	305	310	315	320																					
1.31~1.35	310	315	320																						
1.36~1.40	315	320																							
1.41~1.45	320																								

VALVE CLEARANCE (engine cold) 0.21~0.25 mm (0.0083 ~ 0.0098 in)

Example Installed is 250
Measured clearance is 0.32 mm (0.013 in)
Replace 250 pad with 260

* Pad number : (example) Pad No.250 = 2.50 mm (0.098 in)
Pad No.255 = 2.55 mm (0.100 in)

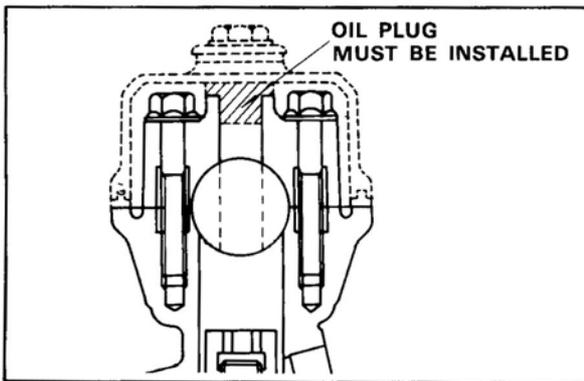
Always install pad with number down.

10. Install the new pad in the lifter. Install the pad with the number down.
11. Turn the crankshaft to remove the adjusting tool from the camshaft.
12. Turn the crankshaft to rotate cam several rotations. This will set the pad in the lifter.
13. Recheck the valve clearance. If the clearance is incorrect, repeat the proceeding steps until the proper clearance is obtained.
14. To assemble the motorcycle, reverse the disassembly procedures. Pay close attention to installation of the cylinder head cover.
15. Rotate the crankshaft approximately 290 degrees counterclockwise to TDC for the rear cylinder. Repeat the steps above, and check/adjust the valve clearance. Inspect the head cover gasket. If damaged, replace the gasket.
16. Install the head covers, and torque the bolts to specification.

Tightening torque:
10 Nm (1.0 m-kg, 7.2ft-lb)

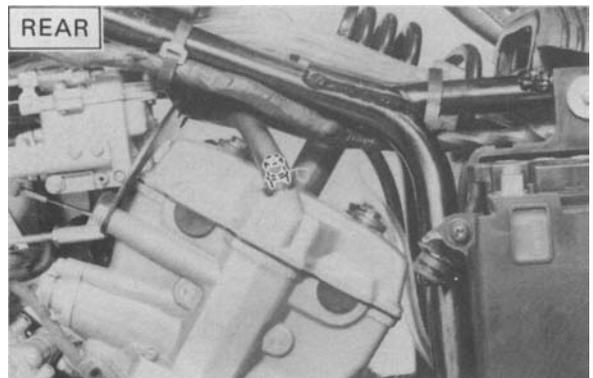
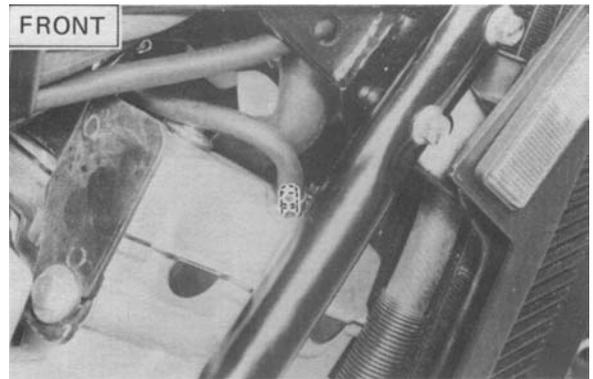
WARNING:

When installing the cylinder head cover, make sure all cam caps are covered with oil plugs.



NOTE:

The cylinder head cover should be so installed that the smaller crankcase ventilation pipe fitting hole is toward the front cylinder, and the larger one is toward the rear side.



17. Install the air baffle plate and radiator. Tighten the radiator securing bolts to specification.

Tightening torque:
7 Nm (0.7m-kg, 5.1 ft-lb)

18. Install the radiator cover and air filter assembly. Connect the crankcase ventilation pipes.
19. Install the fuel tank and connect the fuel and vacuum pipe lines. Tighten the fuel tank holding bolt to specification.

Tightening torque:
15 Nm (1.5m-kg, 11 ft-lb)

Spark plug

1. Check electrode condition and wear, insulator color, and electrode gap.
2. Clean the spark plug with spark plug cleaner if necessary. Use a wire gauge to adjust the plug gap to specification.
3. If the electrode becomes too worn, replace the spark plug.
4. When installing the plug, always clean the gasket surface, wipe off any grime that might be present on the surface of the spark plug, and torque the spark plug properly.

Standard spark plug:

D8EA (NGK) or
X24ES-U(NIPPON DENSO)

Spark plug gap:

0.6-0.7 mm (0.024-0.028 in)

Spark plug tightening torque:

20 Nm (2.0 m-kg, 14 ft-lb)

Crankcase ventilation system

Check the ventilation pipe from the cylinder head cover on the each cylinder to the air filter assembly for cracks or damage; replace if necessary.

Fuel line

Check the fuel hoses and vacuum lines for cracks or damage; replace if necessary.

Exhaust system

1. Retighten the exhaust pipe flange bolts and muffler clamp bolts.

Tightening torque:

Exhaust pipe flange bolt

10 Nm (1.0 m-kg, 7.2 ft-lb)

Muffler clamp bolt

20 Nm (2.0 m-kg, 14 ft-lb)

2. Replace the exhaust pipe gasket(s) and/ or muffler gasket(s) if necessary.

Carburetor synchronization

Carburetors must be adjusted to open and close simultaneously. Adjust as follows:

NOTE:

Valve clearance must be set properly before synchronizing the carburetors.

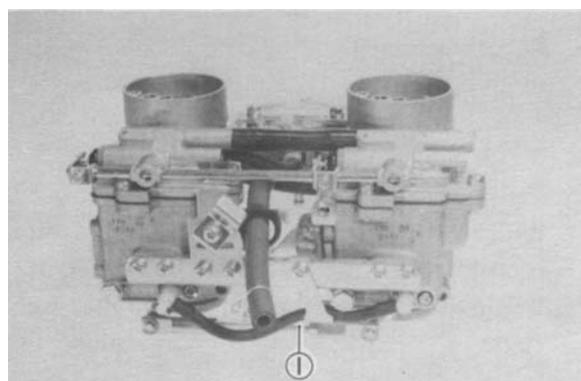
1. Remove the vacuum lines from each carburetor joint, and install the vacuum gauge lines to each carburetor joint.

NOTE:

The front cylinder carburetor joint has two vacuum lines coming out of it. Disconnect the smaller diameter line, and leave the larger line in place on the carburetor joint.



2. Turn the fuel cock to the "PRI" position.
3. Start the engine, and let it warm up.
4. Read the vacuum gauge. The readings for each carburetor should be the same. If not, adjust the synchronizing rod until the readings are the same.



1. Synchronizing rod

5. Reconnect the vacuum lines.

Idle speed

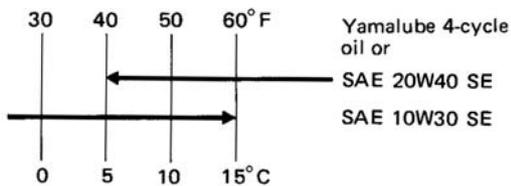
1. Start the engine, and warm it up for a few minutes.
2. Set the engine idle speed to the specified level by adjusting the throttle stop screw on the rear cylinder carburetor. Turning the throttle stop screw in (clockwise) increases the engine speed; turning it out (counter-clockwise) decreases the engine speed. Use a tachometer for checking and adjusting the engine speed.

Engine idle: 1,300 ± 50 r/min

Engine oil

Recommended oil

Use Yamalube 4-cycle oil or SAE 20W40 SE motor oil if the temperature does not go below 5°C (40°F). Use SAE 10W30SE motor oil if the temperature does not go above 15°C (60°F).



Oil level measurement

1. Place the motorcycle on its center-stand. Warm up the engine for several minutes.

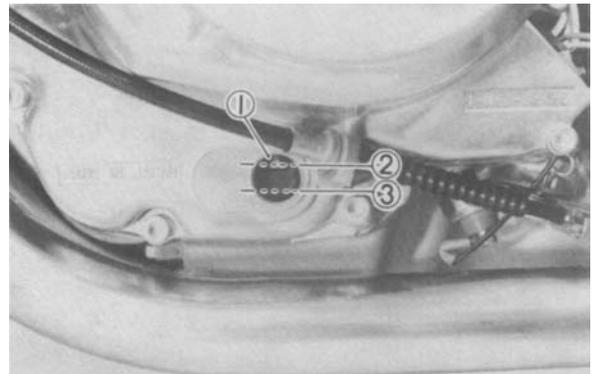
NOTE:

Be sure the motorcycle is positioned straight up when checking the oil level; a slight tilt toward the side can produce false readings.

2. With the engine stopped, check the oil level through the level window located at the lower part of the left side crankcase cover.

NOTE:

Wait a few minutes until the oil level settles before checking.

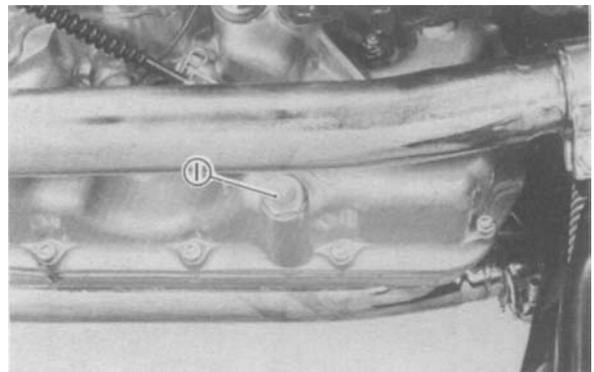


1. Level window 2. Maximum mark 3. Minimum mark

3. The oil level should be between the maximum and minimum marks. If the level is lower, add sufficient oil to raise it to the proper level.

Oil change (without changing the filter)

1. Start the engine and stop after a few minutes of warm-up.
2. Place an oil pan under the engine and remove the oil filler cap.
3. Remove the drain plug and drain the oil.



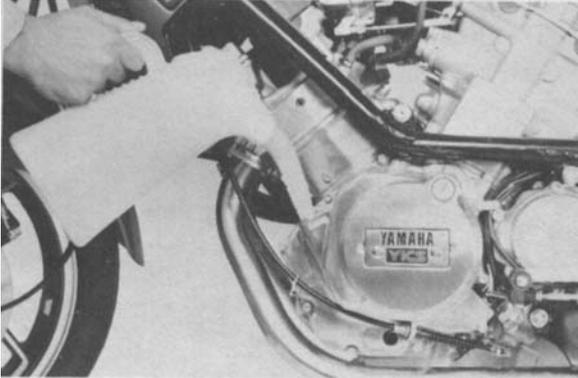
1. Engine drain plug

4. Reinstall the drain plug (make sure it is tight).

Drain plug torque:

43 Nm (4.3 m·kg, 31.0 ft·lb)

5. Add 2.4 L (2.1 Imp qt, 2.5 US qt) of engine oil through the oil filler hole. Reinstall the oil filler cap.



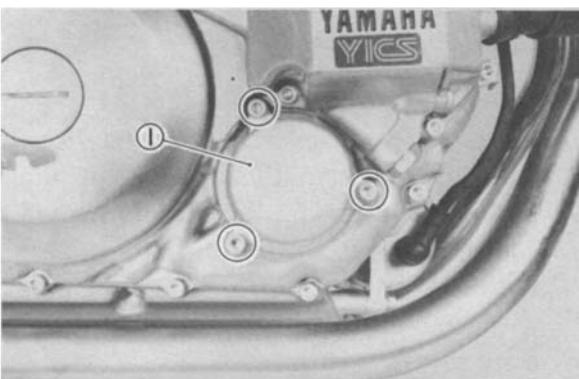
CAUTION:

Take care not to allow foreign material to enter the crankcase.

6. Start the engine, and let it warm up. During warm-up, check for oil leakage. If oil leaks, stop the engine immediately, and check for the cause.
7. Stop the engine and check the oil level.

Oil and filter change

1. Remove the drain plug and drain the oil.
2. Remove the oil filter bolt and filter element



1. Oil filter cover

3. Reinstall the drain plug (make sure it is tight).

Drain plug torque:

43 Nm (4.3 m-kg, 31.0 ft-lb)

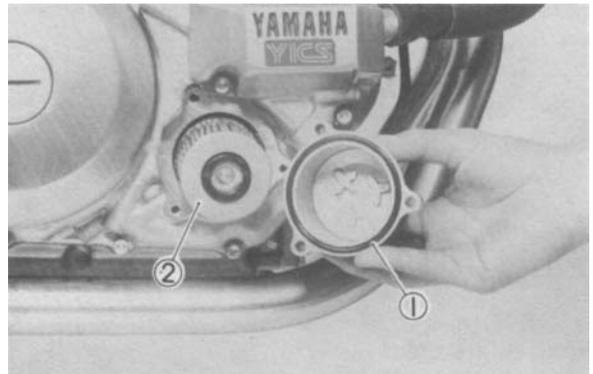
4. Install the new oil filter element, new O-ring, and filter cover; tighten the oil filter bolt.

Oil filter bolt:

10 Nm 1.0 m-kg, 7.2ft-lb)

NOTE:

Make sure the O-ring is positioned properly.

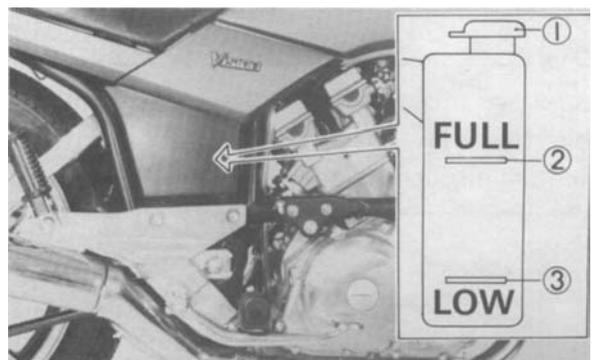


1. Proper O-ring position 2. Oil filter element

5. Add 2.7 L (2.4 Imp qt, 2.9 US qt) of engine oil through the oil filler. Reinstall the oil filler cap.
6. After the replacement of engine oil and/or oil filter, be sure to check for the oil level and any oil leakage. The oil level indicator light should go off after the oil is filled.

Coolant

Check the coolant level in the reservoir tank when the engine is cold. The coolant level is satisfactory if it is between the FULL and LOW level on the tank. The coolant level will vary with engine temperature. However, if the level is on or below the LOW level, add tap water (soft water) until the "FULL" level is reached. Change the coolant every two years. (See "COOLING SYSTEM" for more detail.)



1. Coolant reservoir tank cap 2. Full level 3. Low level

WARNING:

Do not remove the radiator cap when the engine is hot.

CAUTION:

Hard water or salt water is harmful to the engine parts.

You may use boiled water or distilled water if you can't get soft water.

Reservoir tank capacity:

Total:

0.35 L(0.3 Impqt, 0.4 US qt)

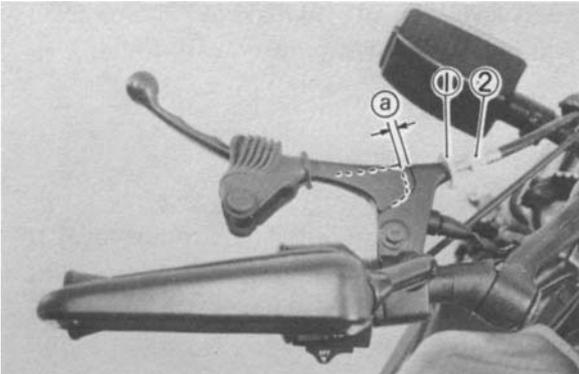
From LOW to FULL level:

0.25 L(0.2 Impqt, 0.3 US qt)

Clutch adjustment

Free play adjustment

1. Loosen the clutch lever adjuster lock-nut.
2. Turn the cable adjuster either in or out until proper lever free play is attained. Tighten the locknut.



1. Locknut 2. Adjuster a. 2~3 mm (0.08-0.12 in)

Clutch lever free play:

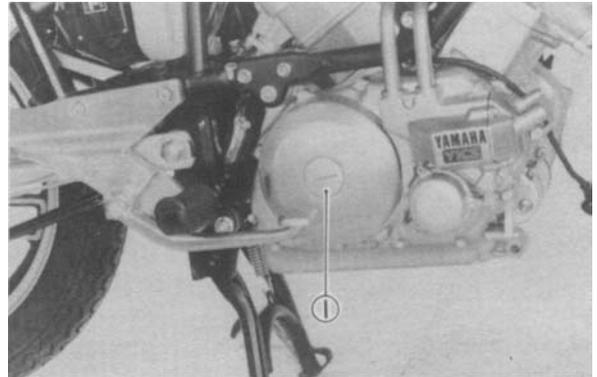
2 ~3 mm (0.08 ~0.12 in)

NOTE:

The above procedure provides for maximum cable free play to allow for proper clutch actuating mechanism adjustment.

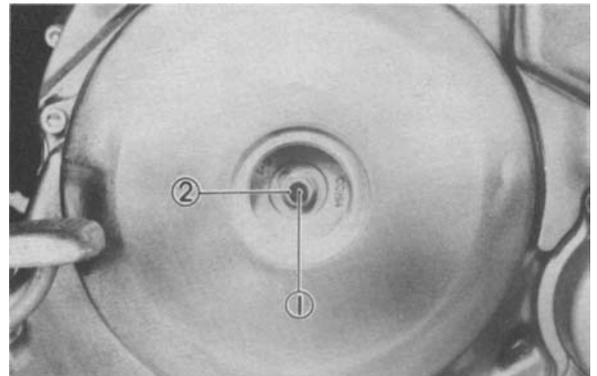
Mechanism adjustment

1. Fully loosen the cable inner wire length-adjuster locknut and screw in the adjuster until tight.
2. Turn the handle lever adjuster in.
3. Remove the clutch adjuster plug from the right side crankcase cover.



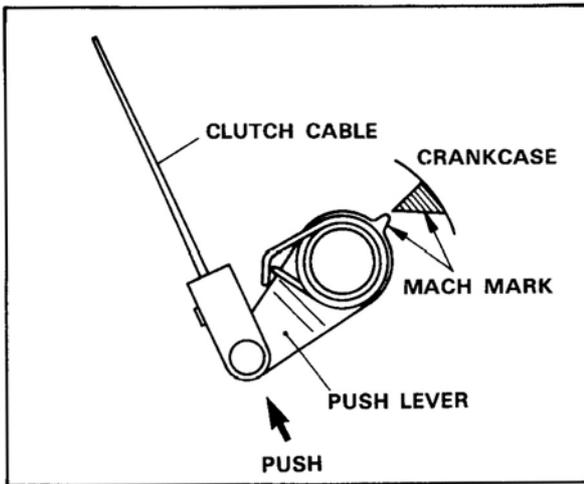
1. Clutch adjuster plug

4. Loosen the adjuster lock nut on the pressure plate.



1. Adjuster 2. Locknut

5. Move the push lever toward the front with your finger until it stops. With the push lever in this position, back out the adjusting screw, and as illustrated, align the mark on the end of the push lever with the mark (protuberance) on the crankcase.



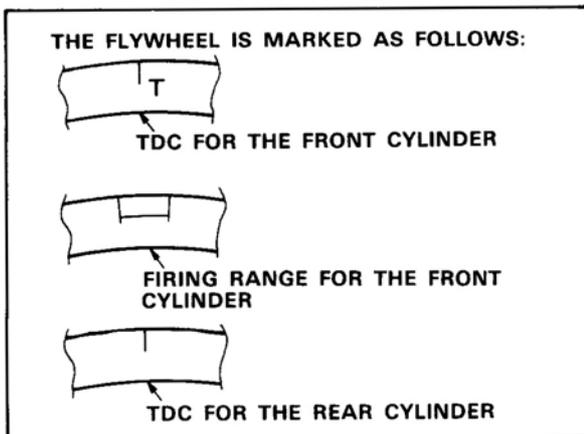
6. Tighten the adjuster lockout.

Tightening torque:
8 Nm (0.8 m·kg, 5.8ft·lb)

7. Adjust the clutch lever free play.

Checking ignition timing

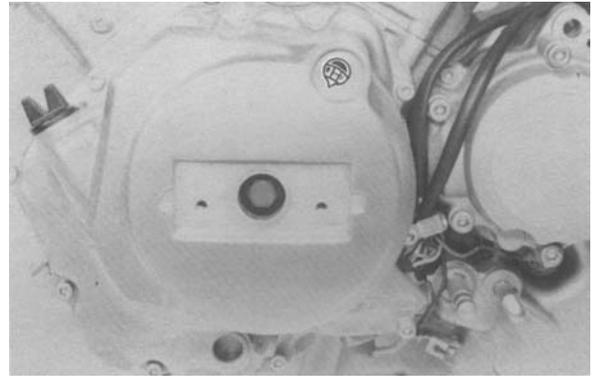
Check the ignition timing with a timing light by observing the stationary pointer and the marks stamped on the flywheel.



1. Remove the emblem plate and timing plug from the left side crankcase cover.
2. Connect the timing light to the front (#1) cylinder spark plug wire.
3. Start the engine, and keep the engine running at the specified speed. Use a tachometer to check the engine speed.

Engine Speed: 1,300 ± 50 r/min

4. The stationary pointer (in the timing window) should be within the firing range shown on the flywheel. If the pointer is not within the range or if it is not steady, check the flywheel and/or pickup assembly for tightness and/or damage. (See Chapter 7, "ELECTRICAL" for further information.)



5. Reinstall the generator cover.

Compression pressure measurement

Insufficient compression pressure will result in performance loss and may indicate leaking valves or worn or damaged piston rings.

1. Make sure the valve clearance is correct.
2. Warm up the engine for 2 ~ 3 minutes; stop the engine.
3. Remove both spark plugs.
4. Install a compression gauge.
5. Turn over the engine with the electric starter (make sure the battery is fully charged) with the throttle wide open until the pressure indicated on the gauge does not increase further. The compression should be within the specified levels.

Compression pressure (at seal level):

Standard:	980 kPa (10 kg/cm ² , 142 psi)
Minimum:	882 kPa (9 kg/cm ² , 128 psi)
Maximum:	1,079 kPa (11 kg/cm ² , 156 psi)

WARNING:

When cranking the engine, ground the spark plug wires to prevent sparking.



6. If the pressure is too low, squirt a few drops of oil into the cylinder being measured. Measure compression again. If there is a higher reading than before (without oil), the piston rings may be worn or damaged. If the pressure remains the same after measuring with the oil, one or both rings and valves may be the source of the problem.
7. Check both cylinders. Compression pressure should not vary more than the specified value from one cylinder to the other.

Difference between each cylinder:
Less than 98 kPa (1.0 kg/cm², 14 psi)

CHASSIS

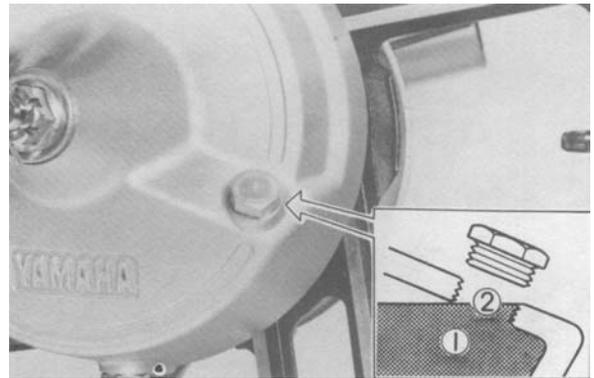
Final gear oil

Oil level measurement

1. Place the motorcycle on a level place, and place it on its centerstand. The engine should be cool (at atmospheric temperature).
2. Remove the oil filler cap and check the oil level. If it is not up to the brim of the filler hole, add oil.

CAUTION:

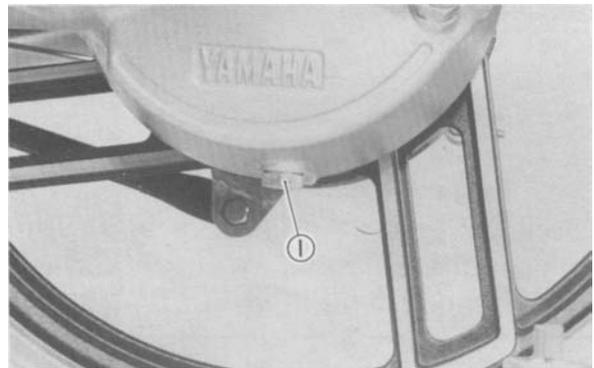
Take care not to allow foreign material to enter the final gear case.



1. Final gear oil 2. Correct oil level

Gear oil replacement

1. Place an oil pan under the final gear case.
2. Remove the final gear oil filler cap and the drain plug; drain the oil.



1. Final gear drain plug

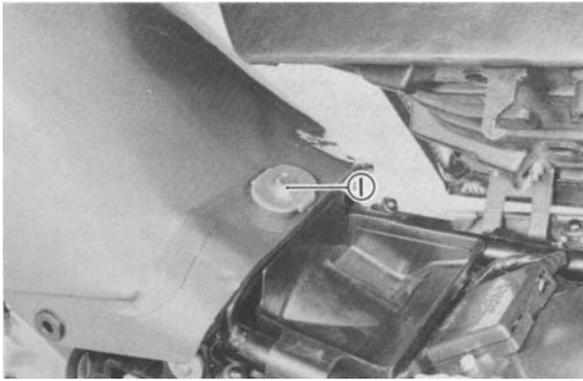
3. Reinstall and tighten the final gear drain plug.
4. Fill the gear case to the specified level.

Oil capacity: 0.20 L (0.18 Imp qt, 0.21 US qt)
Recommended oil: SAE 80 API "GL-4"
Hypoid gear oil
If desired, an SAE 80W90 Hypoid gear oil may be used for all conditions.

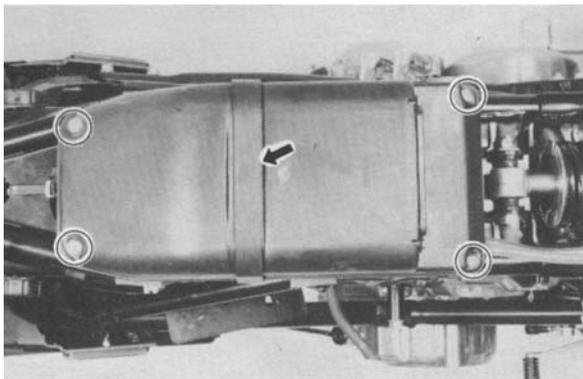
5. Reinstall the filler cap securely.

Air filter

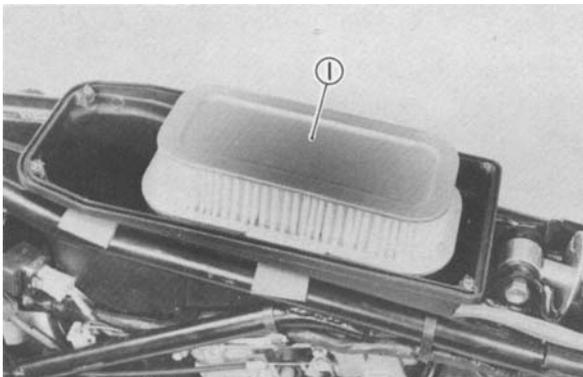
1. Turn the fuel cock lever to "RES". Remove the fuel pipes from the fuel cock.
2. Remove the sidecovers.
3. Open the seat and remove the fuel tank holding bolt.



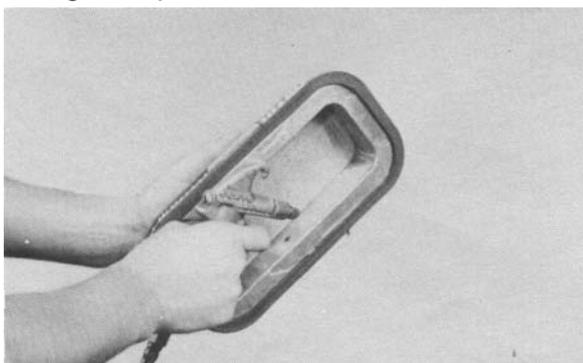
1. Fuel tank holding bolt
4. Remove the band and air filter case cover by removing the four screws.



5. Pull out the element.



1. Air filter element
6. Tap the element lightly to remove most of the dust and dirt; then blow out the remaining dirt with compressed air from the inner surface of the element. If element is damaged, replace it.



7. Reassemble by reversing the removal procedure. Check whether the element is seated completely against the case.
8. The air filter element should be cleaned at the specified intervals.

CAUTION:

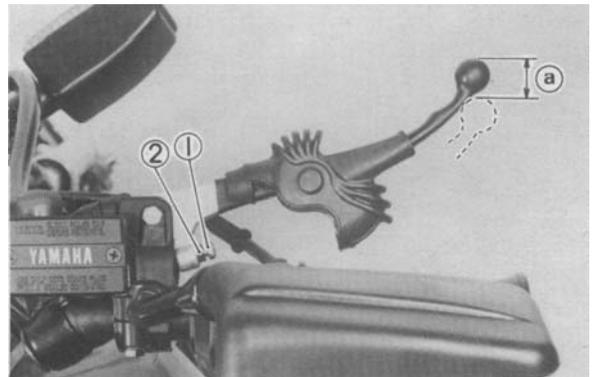
The engine should never be run without the air cleaner element installed; excessive piston and/or cylinder wear may result.

Front and rear brake

Front brake lever free play adjustment. The brake can be adjusted by simply adjusting the free play of the brake lever. The piston in the caliper moves forward as a brake pad wears out, automatically adjusting the clearance between the brake pads and brake disc.

CAUTION:

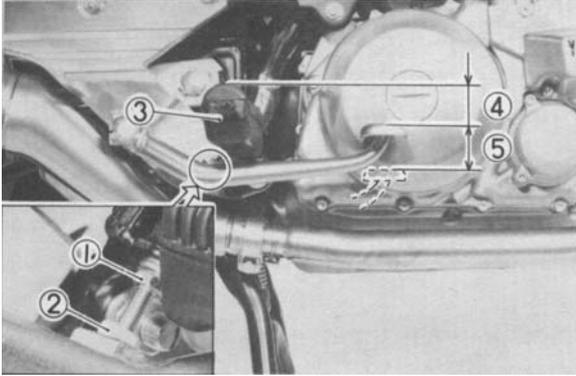
Proper lever free play is essential to avoid excessive brake drag.



1. Adjuster 2. Locknut @ 5~8mm (0.2~0.3 in)

1. Loosen the adjuster locknut on the brake lever.
2. Turn the adjuster so that the brake lever movement at the lever end is 5 ~ 8mm (0.2 ~ 0.3 in) before the adjuster contacts the master cylinder piston.
3. After adjusting, tighten the locknut.

1. Loosen the adjuster locknut (for pedal height).
2. By turning the adjuster bolt clockwise or counterclockwise, adjust the brake pedal position so that its top end is flush with the top of the footrest.
3. Secure the adjuster locknut.



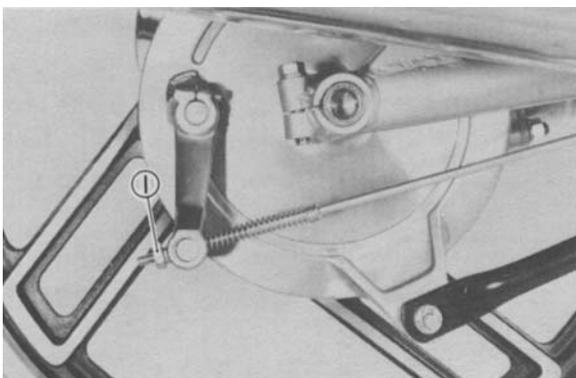
- | | |
|--|--------------------------------------|
| 1. Adjuster bolt
(for pedal height) | 3. Footrest |
| 2. Locknut | 4. Pedal height 20mm (0.8 in) |
| | 5. Free play 15 ~25 mm (0.6 ~1.0 in) |

WARNING:

After adjusting the pedal height, the brake-pedal free play should be adjusted.

Free play

1. The rear brake should be adjusted to suit the rider's preference, but free play at the end of the brake pedal should be 15 ~25mm (0.6 ~ 1.0 in). To adjust, turn the adjuster on the brake rod clockwise to reduce play; turn the adjuster counterclockwise to increase play.

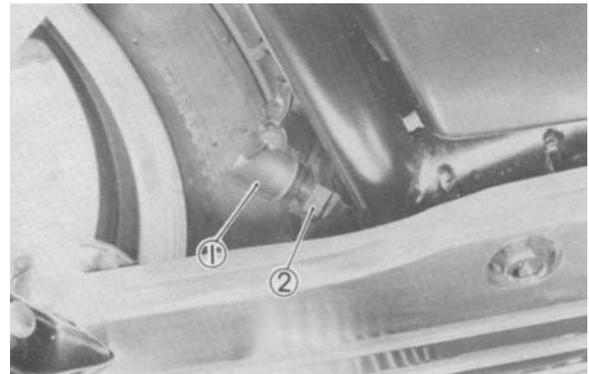


1. Adjuster

Check the operation of the brake light after adjusting the rear brake.

Brake light switch adjustment

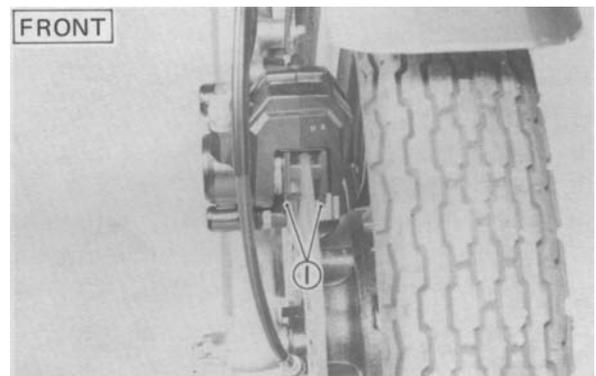
The brake light switch is operated by the movement of the brake pedal. To adjust, hold the switch body with your hand so it does not rotate and turn the adjusting nut. Proper adjustment is achieved when the brake light comes on slightly before the brake begins to take effect.



1. Main body
2. Adjusting nut

Front brake pad

To check, examine the pads in the front brake. If any pad is worn to the wear limit, replace both pads in the caliper.



1. Wear indicator