



Motorcycle Owner's Manual



# **A** WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

## **Quick Reference Guide**

This Quick Reference Guide will assist you in finding the information you're looking for.

GENERAL INFORMATION

**MAINTENANCE AND ADJUSTMENT** 

TROUBLESHOOTING GUIDE

**ENGINE AND SUSPENSION TUNING** 

**STORAGE** 

A Table of Contents is included after the Foreword.

#### IMPORTANT INFORMATION

• This vehicle is designed for the operator only, no passengers.

Read owner's manual.

- This vehicle is a competition model only and was not manufactured for use on public streets, roads or highways.
- The use of this vehicle should be limited to participation in sanctioned competition events upon a closed course.
- This vehicle should not be used for general off-road recreation riding.

Whenever you see the symbols shown below, heed their instructions! Always follow safe operating and maintenance practices.

## **WARNING**

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in injury or death.

#### CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

#### NOTE

 This note symbol indicates points of particular interest for more efficient and convenient operation.

#### IMPORTANT NOTICE

THIS VEHICLE IS A COMPETITION MODEL ONLY AND WAS NOT MANUFACTURED FOR, NOR SHOULD IT BE USED ON, PUBLIC STREETS, ROADS, OR HIGHWAYS. THE USE OF THIS VEHICLE SHOULD BE LIMITED TO PARTICIPATION IN SANCTIONED COMPETITION EVENTS UPON A CLOSED COURSE. THIS VEHICLE SHOULD NOT BE USED FOR GENERAL OFF-ROAD RECREATIONAL RIDING. READ OWNER'S MANUAL.

## **A** WARNING

THIS VEHICLE SHOULD NOT BE USED FOR GENERAL OFF-ROAD RECREATIONAL RID-ING.

#### DISCLAIMER OF WARRANTY

This motorcycle is sold AS IS, with all faults, obvious or concealed and there are NO WAR-RANTIES, expressed or implied. Including warranties of MERCHANTABILITY or FITNESS FOR PURPOSE.

The purchaser accepts all responsibilities concerning quality, performance, cost of service and/or necessary repairs.

# Motorcycle Noise Emission Control Information

This motorcycle is designed for closed course competition use only. It does not conform to U.S. EPA motorcycle noise standards.

#### NOTICE

Off-road motorcycling is a wonderful sport, and we hope you will enjoy it to the fullest. However, if improperly conducted, this sport has the potential to cause environmental problems as well as conflicts with other people.

Responsible use of your off-road motorcycle will ensure that these problems and conflicts do not occur. TO PROTECT THE FUTURE OF YOUR

SPORT, MAKE SURE YOU USE YOUR MOTOR-CYCLE LEGALLY, SHOW CONCERN FOR THE ENVIRONMENT, AND RESPECT THE RIGHTS OF OTHER PEOPLE.

## **FOREWORD**

Congratulations on your choosing this Kawasaki motorcycle. Your new motorcycle is the product of Kawasaki's advanced engineering, exhaustive testing, and continuous striving for a superior lightweight, high-performance machine with superb handling and stability for racing and sporting use.

Your new KX is a highly tuned competition machine for participation in racing events. As with any mechanical device, proper care and maintenance are important for trouble-free operation and top performance. This manual is written to enable you to keep your KX properly tuned and adjusted.

Due to improvements in design and performance made during production, in some cases there may be minor discrepancies between the actual vehicle and the illustrations and text in this manual.

> KAWASAKI HEAVY INDUSTRIES, LTD. Consumer Products & Machinery Company

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## **SPECIFICATIONS**

#### **DIMENSIONS**

Overall length 2 160 mm (85 in.)

Overall width 820 mm (32.3 in.)
Overall height 1 270 mm (50 in.)

Wheelbase 1 469 mm (57.8 in.)

Road clearance 335 mm (13.2 in.)

Dry weight 92.5 kg (204 lb)

Dry weight 92.5 kg (204 lb)

Fuel tank capacity 7.2 L (1.9 US gal)

#### **ENGINE**

Type DOHC, 4-valve, single-cylinder, 4-stroke, liquid-cooled

Bore x stroke 77.0 × 53.6 mm (3.03 × 2.11 in.)

Displacement 249 cm<sup>3</sup> (15.25 cu in.)

Compression ratio 13.5 : 1

Carburetor KEIHIN FCR37

Starting system Primary kick
AC-CDI

Ignition system AC-C

Ignition timing 8° BTDC @2 000 r/min (rpm)

Lubrication system Forced Lubrication (semi dry sump)

Spark plug NGK CR8E

Spark plug terminal Solid-post

#### SPECIFICATIONS 9

#### TRANSMISSION

Transmission type 5-speed, constant-mesh, return shift

Clutch type Wet, multi disc

Drive system Chain drive

Gear ratios: 1st gear 2.142 (30/14)

2nd gear 1.785 (25/14)

3rd gear 1.444 (26/18) 4th gear 1.200 (24/20)

5th gear 1.045 (23/22)

Primary reduction ratio 3.350 (67/20)

Final reduction ratio 3.692 (48/13)

Overall ratio (top gear) 12.931

Engine oil: Capacity 1.5 L (91.5 cu in.)

Type API SG, SH, SJ or SL with JASO MA

SAE 10W-40, 10W-50

#### 10 SPECIFICATIONS

FRAME

Type Tubular, semi-double cradle

Steering angle 42° to either side

Castor 27.7°

Trail 119 mm (4.7 in.)

Tire size, type: Front 80/100-21 51M, BRIDGESTONE M403

Rear 100/90-19 57M, BRIDGESTONE M404

Rim size: Front 21 × 1.60

Rear 19 × 1.85

Suspension: Front Upside-down telescopic fork

Rear New Uni-trak® swingarm

Front suspension travel 315 mm (12.4 in.)

Rear wheel travel 310 mm (12.2 in.)

Front fork oil: Type SHOWA SS-05 or equivalent

Capacity 374 mL (12.6 US oz.)

Fork Cylinder Unit 193 mL (6.53 US oz.)

**BRAKES** 

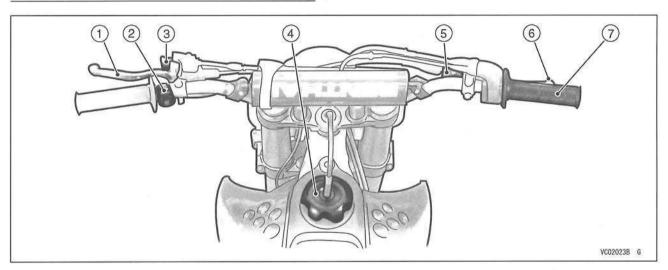
Type (Front & Rear) Disc

Effective Disc diameter: Front 225 mm (8.9 in.)

Rear 215 mm (8.4 in.)

Specifications are subject to change without notice.

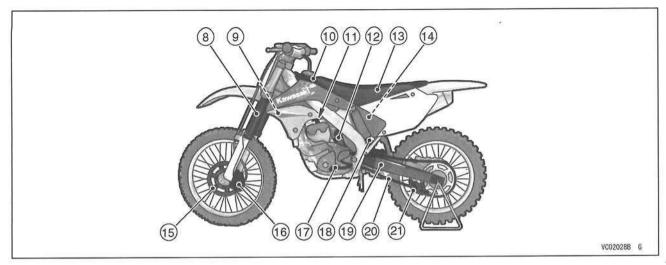
## **Location of Parts**



- 1. Clutch Lever
- 2. Engine Stop Button
- 3. Hot Starter Lever

- 4. Fuel Tank Cap
- 5. Front Brake Fluid Reservoir
- 6. Front Brake Lever

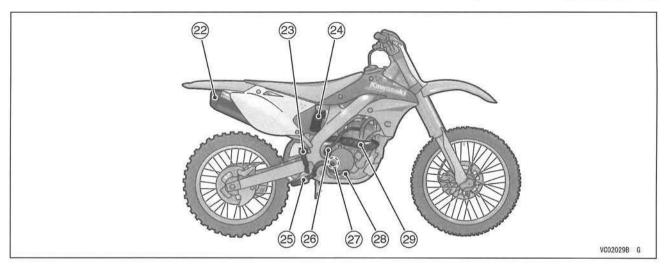
7. Throttle Grip



- 8. Front Fork
- 9. Radiator
- 10. Fuel Tank
- 11. Fuel Tap
- 12. Carburetor

- 13. Seat
- 14. Air Cleaner Element
- 15. Brake Disc
- 16. Brake Caliper
- 17. Shift Pedal

- 18. Rear Shock Absorber
- 19. Swingarm
- 20. Drive Chain
- 21. Chain Guide

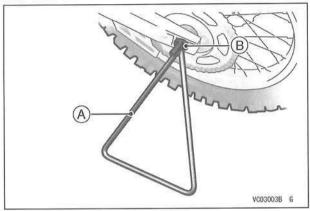


- 22. Silencer
- 23. Rear Brake Fluid Reservoir
- 24. Rear Shock Absorber Gas Reservoir
- 25. Uni-Trak® Tie Rod and Rocker Arm

- 26. Kick Pedal
- 27. Engine Oil Level Inspection Window
- 28. Rear Brake Pedal
- 29. Exhaust Pipe

## Side Stand

To install the side stand, insert its flat end into the rear axle shaft as shown.



A. Side Stand B. Rear Axle Shaft

## **A WARNING**

Do not start the engine or attempt to ride the motorcycle when the side stand is installed.

#### NOTE

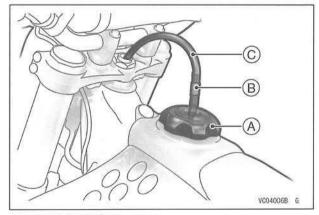
 Support the motorcycle with a suitable stand to perform maintenance or adjustment procedures.

#### Fuel

This Kawasaki KX has a 4-stroke engine that requires a gasoline.

The capacity of the fuel tank is 7.2 L (1.9 US gal). To open the fuel tank cap, pull out the breather hose from the hole in the steering shaft, and turn the tank cap counterclockwise.

The breather hose has the check valve. The check valve on the breather hose prevents fuel from flowing out. When installing the breather hose, make sure the arrow on the valve points toward the fuel tank cap.



- A. Fuel Tank Cap
- B. Check Valve
- C. Breather Hose

## **A** WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Always stop the engine and do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

#### Fuel Requirements:

Fuel Type

Use clean, fresh unleaded gasoline with a minimum Antiknock index of 90. The Antiknock Index is posted on service station pumps in the U.S.A. The octane rating of a gasoline is a measure of its resistance to detonation or "knocking". The Antiknock Index is an average of the Research Octane Number (RON) and the Motor Octane Number (MON) as shown in the table below.

Octane Ratio	ng Method	Minimum Rating
Antiknock Index	(RON + MON) 2	90

#### CAUTION

If engine "knocking" or "pinging" occurs, use a different brand of gasoline of a higher octane rating.

If this condition is allowed to continue it can lead to severe engine damage.

Gasoline quality is important. Fuels of low quality or not meeting standard industry specifications may result in unsatisfactory performance. Operating problems that result from the use of poor quality or nonrecommended fuel may not be covered under your warranty.

#### Fuels Containing Oxygenates

Gasoline frequently contains oxygenates (alcohols and ethers) especially in areas of the U.S. and Canada which are required to sell such reformulated fuels as part of a strategy to reduce exhaust emissions.

The types and volume of fuel oxygenates approved for use in unleaded gasoline by the U.S. Environmental Protection Agency include a broad range of alcohols and ethers, but only two components have seen any significant level of commercial use.

Gasoline/Alcohol Blends - Gasoline containing up to 10% ethanol (alcohol produced from agricultural

products such as corn), also known as "gasohol" is approved for use.

#### CAUTION

Avoid using blends of unleaded gasoline and methanol (wood alcohol) whenever possible, and never use "gasohol" containing more than 5% methanol. Fuel system damage and performance problems may result.

Gasoline/Ether Blends - The most common ether is methyl tertiary butyl ether (MTBE). You may use gasoline containing up to 15% MTBE.

#### NOTE

Other oxygenates approved for use in unleaded gasoline include TAME (up to 16.7%) and ETBE (up to 17.2%). Fuel containing these oxygenates can also be used in your Kawasaki.

#### CAUTION

Never use gasoline with an octane rating lower than the minimum specified by Kawasaki.

Never use "gasohol" with more than 10% ethanol, or more than 5% methanol. Gasoline containing methanol must also be blended with cosolvents and corrosion inhibitors.

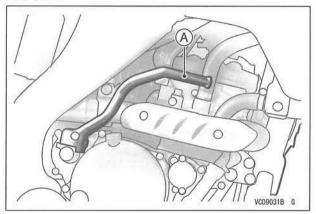
Certain ingredients of gasoline may cause paint fading or damage. Be extra careful not to spill gasoline or gasoline oxygenate blends during refueling.

When not operating your Kawasaki for 30 to 60 days, mix a fuel stabilizer (such as STA-BIL) with the gasoline in the fuel tank. Fuel stabilizer additives inhibit oxidation of the fuel which minimizes gummy deposits. Never store this product with "gasohol" in the fuel system. Before storage it is recommended that you drain all fuel from the fuel tank and carburetors. See the Storage sec-

tion in this manual.

#### Kick Pedal

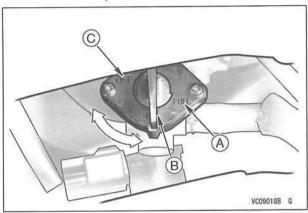
This motorcycle is equipped with a primary kick starting system. When the clutch lever is pulled, the motorcycle can be started with the transmission in any gear.



A. Kick Pedal

## Starting the Engine

- Shift the transmission into neutral.
- Turn the fuel tap lever to the ON position.



- A. Fuel Tap B. ON Position
- C. OFF Position

## **A** WARNING

Do not start the engine or attempt to ride the motorcycle when the side stand is installed.

#### CAUTION

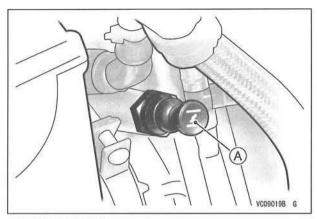
This motorcycle is designed for competition use only. Therefore, the radiator does not incorporate a coolant reserve tank or cooling fan. Prolonged idling of the engine with no airflow through the radiator can cause coolant loss and engine overheating resulting in possible engine damage. Any riding conditions that increase engine temperature will further reduce idling time before coolant loss occurs. These conditions include high ambient temperature, sandy or muddy terrain, or other conditions causing high engine loads at low speeds. Furthermore, warming the engine up excessively before operation, or leaving idling with the hot engine temperature after operation results in the engine overheating, too.

#### NOTE

- O Do not repeatedly operate the throttle with the engine starting, stopping and idling. The accelerator pump may foul the spark plugs with excess fuel.
- OA small amount of engine oil can collect in the crankcase breather hose passage and drip from the breather hose immediately after the engine is started. Excessive oil from the hose could be an indication the oil level is too high (see page 35).

## When engine is cold-

Pull out the choke knob.



A. Choke Knob

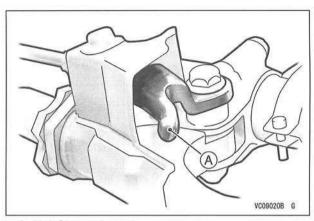
- Find the kick pedal position around the top so that the resistance to depress the kick pedal is fully felt by pushing down the kick pedal slowly.
- Kick the engine over, leaving the throttle closed.

#### NOTE

- O When the clutch lever is pulled, the motorcycle can be started with the transmission in any gear.
- Even after the engine has started, do not push back immediately the choke knob until the engine is thoroughly warmed up.

When engine is already warm or restarts-

• Pull the hot starter lever on the clutch lever.



A. Hot Starter Lever

- Kick the engine over, leaving the throttle closed without using the choke knob.
- Return the hot starter lever back immediately after the engine starts.

#### NOTE

Of the engine fails starting, open the throttle fully and depress the kick pedal slowly about  $4\sim 5$  times to clear too rich fuel mixtures in the engine. Then, kick the engine over, leaving the throttle closed with the hot starter lever pulled in.

 Hot starter lever or choke knob is used as following table

Engine Condition	Hot Starter Lever	Choke Knob
Already Warm	Pull in (ON)	Push back (OFF)
Restarting after falling	Pull in (ON)	Push back (OFF)
Cold	No use (OFF)	Use (ON)

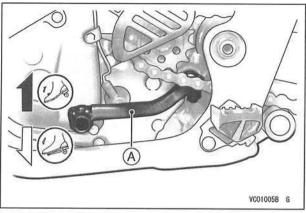
## **Shifting Gears**

This motorcycle is equipped with a 5-speed "return shift" transmission. The neutral is located halfway between 1st and 2nd gear. "Return shift" means that when shifting up or down, each gear must be engaged before the next higher or lower gear may be selected.

- To engage first gear from the neutral position, pull in the clutch lever and push down on the shift pedal, gently release the clutch lever, then release the shift pedal.
- To shift up to the next gear, pull in the clutch lever, lift the shift pedal with your toes, gently release the clutch lever, and then release the shift pedal.
- To shift down to the next gear, pull in the clutch lever, push the shift pedal down as far as it will go, gently release the clutch lever, then release the shift pedal.

#### CAUTION

When changing gears, press firmly on the shift pedal to ensure proper shifting. Careless, incomplete shifting can cause the transmission to jump out of gear and lead to engine damage.



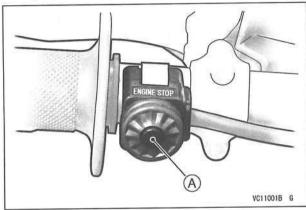
A. Shift Pedal

## **Stopping the Motorcycle**

For maximum deceleration, close the throttle and apply both front and rear brakes. Pull in the clutch lever as the motorcycle comes to a stop. Independent use of the front or rear brake may be advantageous in certain circumstances. Shift down progressively to ensure good engine response at all speeds.

## Stopping the Engine

- Shift the transmission into the neutral position.
- Close the throttle completely and push the engine stop button.



A. Engine Stop Button

Turn the fuel tap lever to the OFF position.

#### Break-In

A brief break-in procedure must be carried out to obtain the proper operating clearances in the engine and transmission, which are necessary for performance and reliability.

#### CAUTION

For the first hour or 20 km (12 mi) of operation, run the engine at low and moderate engine speeds. See details below.

Break in the engine as follows.

- Start the engine and let it idle until it is thoroughly warmed up.
- 2. Ride the motorcycle for about 20 minutes within 1/2 throttle opening.
- Stop and let the engine cool completely. Be sure to check the tightness of nuts and bolts, oil leakage, and any irregularities.
- Start the engine and ride the motorcycle for about 40 minutes within 3/4 throttle opening.
- Stop and let the engine cool completely. Be sure to fully check the tightness of nuts and bolts, oil leakage, and any irregularities, especially, each cable elongation, brake play, chain slack and spoke tightness.
- Change the engine oil, oil filter and front fork/rear shock absorber oil to the new one.
- After the break-in procedure has been properly carried out, the motorcycle is ready for regular

operation. Using the proper riding skills and techniques and avoiding recklessly high engine speeds will keep the engine trouble-free.

#### CAUTION

When any following parts have been replaced, the same break-in procedure as the new motorcycle must be carried out for one hour or 20 km (12 mi):

Cylinder, Piston, Piston pin, Piston ring, Valve, Valve lifter, Camshaft, Crankshaft, Mission gear, etc.

## Daily Pre-Ride Checks

Check the following items each day before you ride. The time required is minimal, and habitual performance of these checks will help ensure a safe, reliable ride.

If any irregularities are found during these checks, refer to the appropriate section and take the action required to return the motorcycle to a safe operating condition.

## **A WARNING**

Failure to perform these checks every day before you ride may result in serious damage or a severe accident.

Engine	
Engine Oil	No leakage
5	Level correct
Coolant	No leakage
	Level correct (engine cold)
Radiator Cap	Properly installed
Spark Plug	Correctly torqued
Cylinder Head Cover	Correctly torqued
Clutch	Functions properly
Carburetor	Properly tuned
Air Cleaner	Clean
All Oleaner	Apply oil to air cleaner element
	Properly installed
Muffler	No damage
Mullel	Properly installed
	No wear or damage
Engine Sprocket	No wear or damage

#### Frame Tires ..... Overall condition good No wear or damage Pressure correct Air valve cap installed Spokes ..... No looseness Drive Chain ..... Overall condition good Chain slack correct Oil if necessary Front and Rear Brakes ..... Function properly Lever and pedal play correct No fluid leakage Throttle Functions properly Throttle grip returns smoothly Steering ..... Smooth but not loose from lock to lock No binding due to control cables Front Fork ..... Functions properly No oil leakage Rear Shock Absorber ..... Functions properly No oil leakage Fuel Tank ..... Mounted securely No fuel leakage Rear Sprocket ..... No wear or damage Engine Stop Button ..... Functions properly

Nuts, Bolts, Fasteners .....

Properly tightened

## After-Race Checks

After racing, first clean the motorcycle (see p. 123), then inspect the entire motorcycle with special attention to the air cleaner, carburetor, brakes, etc.

Carry out the general lubrication (see p. 125) and make necessary adjustments.

## MAINTENANCE AND ADJUSTMENT

#### **Periodic Maintenance Chart**

The maintenance and adjustments outlined in this chapter are easily carried out and must be done in accordance with the Periodic Maintenance Chart to keep the motorcycle in good running condition.

1. Periodic Inspection (Engine Related Item)

FREQUENCY	After each race (or 2.5 hour)	Every 3 races (or 7.5 hour)	Every 6 races (or 15 hour)	Every 12 races (or 30 hour)	As required	See Page
Hot starter cable - adjust	• •	7.0 11001)	10 110417	oo noary		57
Throttle cable - adjust	•					45
Valve clearance - inspect			•			58
Clutch friction/steel plates - inspect †	•					53
Spark plug - clean, regap †						39
Clutch - adjust	0					51
Air cleaner element - clean †	•					43
Carburetor - inspect and adjust	•					46
Cylinder, cylinder head - inspect			•			2-0
*Crankshaft - inspect			•			34-11
Silencer - clean and inspect †	•					63
Kick pedal and shift pedal - clean	•					922

#### 28 MAINTENANCE AND ADJUSTMENT

FREQUENCY	After each race (or 2.5 hour)	Every 3 races (or 7.5 hour)	Every 6 races (or 15 hour)	Every 12 races (or 30 hour)	As required	See Page
Engine sprocket - inspect †	•					69
Coolant - inspect †	0					36
Breather hose - inspect	0					-
Radiator hoses and connection - inspect †	•					36

2. Periodic Inspection (Chassis Related Item)

FREQUENCY	After each race (or 2.5 hour)	Every 3 races (or 7.5 hour)	Every 6 races (or 15 hour)	Every 12 races (or 30 hour)	As required	See Page
Brake adjustment - inspect †	•					72
Brake pad wear - inspect †	•					75
Brake fluid level - inspect †	•					-
Spoke tightness and rim runout - inspect †	•					115, 116
Drive chain - adjust †	•					65
Drive chain - Lubricate †	•					69
Drive chain wear - inspect †	•					67
Front fork - inspect and clean	•					78
Nuts, bolts, fasteners - inspect †	•					118
*Fuel system - clean		0				100
Fuel hoses, connections - inspect †	•					2000
Brake hoses, connections - inspect †						1000
Steering play - inspect †	•					76
*Steering stem bearing - grease			•			(1272)
Rear sprocket - inspect †	•					69
General lubrication - perform	•					125
*Wheel bearing - inspect †	•					_

#### 30 MAINTENANCE AND ADJUSTMENT

FREQUENCY OPERATION	After each race (or 2.5 hour)	Every 3 races (or 7.5 hour)	Every 6 races (or 15 hour)	Every 12 races (or 30 hour)	As required	See Page
*Swingarm and UNI-TRAK linkage pivots - inspect		•				11-11
*Swingarm and UNI-TRAK linkage pivots - grease		•				:::
Frame - clean and check	•					5 <del>-2</del>
Wheel/tire (air pressure, excessive wear or damage) - inspect	•					)) <u>==</u> =
Rear shock absorber - inspect	•					11:-11
Cable - inspect						

3. Periodic Replacement (Engine and Chassis Related Item)

FREQUENCY OPERATION	After each race (or 2.5 hour)	Every 3 races (or 7.5 hour)	Every 6 races (or 15 hour)	Every 12 races (or 30 hour)	See Page	
Engine oil - replace			R		33	
Oil filter - replace			R		33	
*Piston and piston ring - replace †		Every	6 races		200	
*Piston pin - replace				R	<u>2620</u> 5	
Silencer packing - replace			R		<u> </u>	
*Brake fluid - replace †	Every 2 years				<u> </u>	
*Brake master cylinder cup and dust seal - replace †	Every 2 years					
*Brake caliper piston seal and dust seal - replace †	Every 2 years					
*Brake hoses and pipe - replace †	Every 4 years					
Front fork oil - replace			R			
*Fuel hose - replace †		Every	4 years		1000	
*Rear shock absorber oil - replace			R		=	

R: Replace

<sup>†:</sup> Replace, add, adjust, clean or torque if necessary.

\*: Should be serviced by referring to the Service Manual or an authorized Kawasaki dealer.

## **Engine Oil**

In order for the engine, transmission and clutch to function properly, maintain the engine oil at the proper level, and change the oil and oil filter periodically.

Not only do dirt and metal particles collect in the oil, but the oil itself loses its lubricative quality if used too long.

## **▲** WARNING

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

Because of the semi-dry sump lubrication system, the engine oil level indicated on the oil level inspection window will fluctuate depending on the motorcycle's position and engine speed when the engine's shut off. To ensure a proper reading of the engine oil level, follow the Oil Level Inspection procedures closely.

### CAUTION

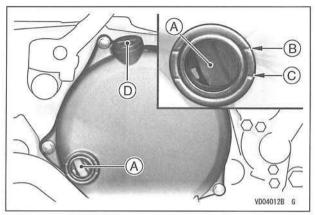
Racing the engine before the oil reaches every part can cause engine seizure.

### Oil Level Inspection

- If the oil has just been changed, let the motorcycle sit a few minutes allowing the oil to settle.
- Start the engine and run it for several minutes at idle speed. Do not run the engine at high engine speed.
- Stop the engine and wait several minutes for the oil to settle.
- Check the engine oil level with the motorcycle vertical through the oil level inspection window on the lower right side of the engine. The oil level should come up between the high and low level lines next to the window.
- If the oil level is too high, remove the excess oil using a syringe or other suitable device.
- If the oil level is too low, add the correct amount of oil through the oil filler opening. Use oil of the same type and brand as those of the one that is already in the engine.

#### NOTE

O If no oil appears in the oil level inspection window, tip the motorcycle slightly to the right until oil is visible then return to an upright position. If no oil appears even when tipped at an extreme angle, remove drain plugs to empty any oil that may be in the transmission and crankcase, reinstall the drain plugs and refill with the specified amount of oil.



- A. Oil Level Inspection Window
- B. High Level Line
- C. Low Level Line
- D. Oil Filler Cap

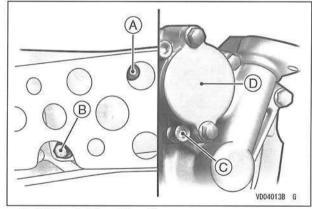
#### Oil and/or Oil Filter Change

The engine oil and/or oil filter should be changed periodically to ensure long engine life.

- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily.
- Stop the engine, and place a container beneath it.
- Remove the oil filler cap.
- Remove the oil drain plugs and position the vehicle perpendicular to the ground to allow all the oil to drain.

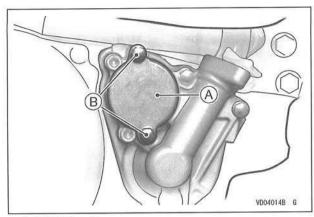
## **A WARNING**

Motor oil is a toxic substance. Dispose of used oil properly. Contact your local authorities for approved disposal methods or possible recycling.



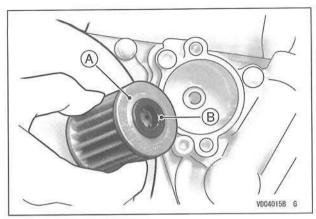
- A. Oil Drain Plug (Front)
- B. Oil Drain Plug (M10)
- C. Oil Drain Plug (Oil Filter Cover)
- D. Oil Filter Cover
- When the oil filter is replaced, remove the oil filter cover and take off the cover with O-ring.

#### 34 MAINTENANCE AND ADJUSTMENT



A. Oil Filter Cover B. Bolts

Replace the oil filter element with a new one.



A. Oil Filter Element

- B. Grommet
- Apply a little engine oil to the grommet.
- Install the oil filter element with the grommet toward the engine.

#### CAUTION

Inside-Out installation stop oil flow, causing engine seizure.

- Install the oil filter cover with a new O-ring and tighten its bolts to the specified torque.
- After the oil has completely drained out, install the drain plugs with their new gaskets. Proper torque for them is shown in the table.

**Engine Oil Drain Plugs Tightening Torque** 

Drain Plug (Front)	7.0 N·m (0.7 kgf·m, 5.2 ft·lb)
Drain Plug (M10)	20 N·m (2.0 kgf·m, 15 ft·lb)
Oil Filter Cover	9.8 N·m (1.0 kgf·m, 7.2 ft·lb)

### NOTE

- O Replace any gaskets or O-ring with their new ones.
- Fill the engine up to the high level line with good quality engine oil specified in the table.
- Install the oil filler cap.
- Start the engine.
- Check the oil level and oil leakage.

## Recommended Engine Oil

Castrol "Power 1 R4 Racing" SAE5W-40

**Engine Oil Capacity** 

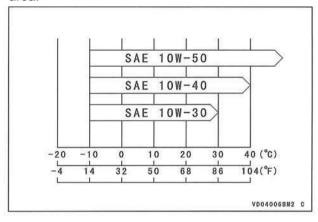
1.30 L (1.37 US qt)	[When filter is not removed]
1.35 L (1.43 US qt)	[When filter is removed]
1.50 L (1.59 US qt)	[When engine is completely dry]

### NOTE

O If unavailable, use equivalent engine oil in accordance with the following table.

Type: API SG, SH, SJ or SL with JASO MA Viscosity: SAE 10W-30, 10W-40, 10W-50

The oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.



# **Cooling System**

# Cooling Hoses

Check the cooling hoses for cracks or deterioration, and the connections for looseness in accordance with the Periodic Maintenance Chart.

### Radiator

Check the radiator fins for obstruction by insects or mud. Clean off any obstructions with a low-pressure stream of water.

# CAUTION

Using high-pressure water, as from a car wash facility, could damage the radiator fins and impair the radiator's effectiveness.

Do not obstruct or deflect airflow by installing unauthorized accessories in front of the radiator.

Interference with the cooling airflow can lead to overheating and consequent engine damage.

### Coolant

Coolant absorbs excessive heat from the engine and transfers it to the air through the radiator. If the coolant level becomes low, the engine overheats and may suffer severe damage. Check the coolant level each day before riding the motorcycle, and replenish coolant if the level is low.

# **A WARNING**

To avoid burns, do not remove the radiator cap or change the coolant when the engine is still hot.

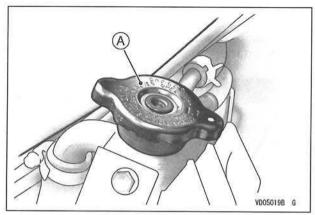
Wait until the engine cools down.

### NOTE

○ The coolant originally filled into the cooling system contains 50% of a permanent, ethylene-glycol-based antifreeze, has a freezing point of -35°C (-31°F) and a green appearance.

# Coolant Level Inspection

- Remove the right shroud.
- Situate the motorcycle perpendicular to the ground until the radiator cap is level to the ground, so that the radiator cap is located uppermost in order to exhaust the air accumulated in the radiator.
- Remove the radiator cap in two steps.
- First, turn the cap counterclockwise to the first stop and wait there for a few seconds.
- Then, push and turn the cap further in the same direction and remove it.

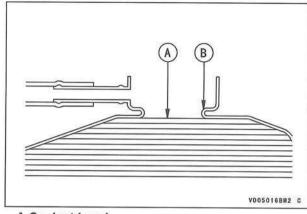


### A. Radiator Cap

 Check the coolant level in the radiator. The coolant should come up to the bottom of the radiator filler neck.

### NOTE

O Check the coolant level when the engine is cold (room or ambient temperature).



### A Coolant Level B. Filler Neck

 If the coolant level is low, add coolant through the radiator filler opening to the bottom of the filler neck.

## Water and Antifreeze Mixing Ratio

1:1 (water: antifreeze)

## Recommended Antifreeze

Permanent type of antifreeze (ethylene glycol base plus corrosion and rust inhibitors for aluminum engines and radiators)

### Coolant Total Amount

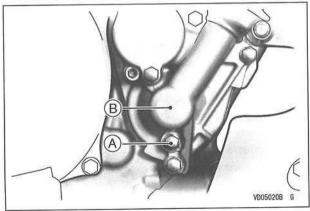
1.10 L (0.3 US qt)

Install the radiator cap.

# Coolant Change

The coolant should be changed to ensure long engine life, if necessary.

- Wait for the engine to cool completely.
- Situate the motorcycle perpendicular to the ground until the radiator cap is level to the ground.
- Remove the radiator cap in two steps (see the "Coolant level inspection" section).
- Drain the coolant from the engine and radiator in the following way.
- Place a container under the coolant drain plug on the water pump cover and remove the drain plug.



A. Coolant Drain Plug B. Water Pump Cover

# CAUTION

Immediately wash away any coolant that spills on the frame, engine, or wheel.

# **A WARNING**

Wash off any coolant that might have splashed on the tires, since the presence of coolant on them makes them slippery and could cause an accident and injury.

- Visually inspect the old coolant.
- If whitish cotton-like wafts are observed, aluminum parts in the cooling system are corroded and the system must be flushed.
- If the coolant is brown, iron or steel parts are rusting and the system must be flushed.
- Check the cooling system for damage, loose connections, and leaks.
- Install the coolant drain plug with its new gasket at the water pump cover and apply the specified torques.

#### NOTE

O Always replace any gasket with a new one.

# **Coolant Drain Plug Tightening Torque**

7.0 N·m (0.7 kgf·m, 5.2 in·lb)

 Fill the radiator up to the bottom of the radiator filler neck with coolant.  Lean the motorcycle slightly to the right until the radiator filler neck is level to the ground so that the filler neck is located uppermost in order to exhaust the air accumulated in the radiator.

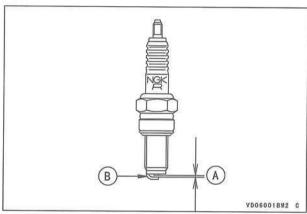
## CAUTION

Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instruction of the manufacture. Soft or distilled water must be used with the antifreeze in the cooling system. If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

### NOTE

- O Pour in the coolant slowly so that it can expel the air from the engine and radiator.
- Install the radiator cap.
- Check the cooling system for leaks.
- Start the engine and warm up thoroughly, then stop it.
- Check the coolant level after the engine has cooled down. The coolant should come up to the bottom of the radiator filler neck.
- If the coolant level is low, add coolant up to the bottom of the radiator filler neck.
- Install the radiator cap.
- Check the cooling system for leaks.

# Spark Plug



A. Gap

**B.** Outer Electrode

The spark plug should be taken out periodically for inspection and regapping. Measure the gap with a wire-type thickness gauge. If incorrect, adjust the gap to the specified value by bending the outer electrode.

Spark Plug Gap

CR8E	0.7 – 0.8 mm	
CR9E	(0.028 – 0.032 in.)	

If the plug is oily or has carbon built up on it, clean it (preferably with a sandblaster) and then clean off any abrasive particles. The plug may also be cleaned using a high-flash-point solvent and a wire brush or other suitable tool. If the spark plug electrodes are corroded, or damaged, or if the insulator is cracked, replace the plug. The standard spark plug is shown in the table below.

### Standard Spark Plug

NGK CR8E

To find out whether the plug's heat range is correct, remove the plug and examine the ceramic insulator around the center electrode. If the ceramic is light brown, the spark plug correctly matches the engine temperature.

If the ceramic is burned white, the plug should be replaced with a colder plug.

# **Optional Spark Plug**

Colder	NGK CR9E	

### NOTE

Of the engine performance drops, try replacing the spark plug to regain performance.

# Spark Plug Removal and Installation

 Pull the spark plug cap off the plug before removing the spark plug.

- Apply a suitable wrench to the spark plug.
- Loosen and remove the spark plug.
- When reinstalling the spark plug, torque it to specification.

# Spark Plug Tightening Torque

13 N·m (1.3 kgf·m, 9.6 ft·lb)

 Fit the plug cap securely onto the spark plug, and pull the cap lightly to make sure that it is properly installed.

## Air Cleaner

A clogged air cleaner restricts the air intake, increases fuel consumption, reduces engine power, and can cause spark plug fouling. Inspect the air intake system, which includes the air filter and air duct to the carburetor, and the duct clamps and carburetor, before each race or practice session.

# **A** WARNING

Any dirt entry into the engine can cause engine damage or engine failure. Engine failure could lead to an accident and injury. Regularly inspect the <u>air intake system</u> for dirt entry. If any dirt is found in the system, the entire system must be cleaned.

# CAUTION

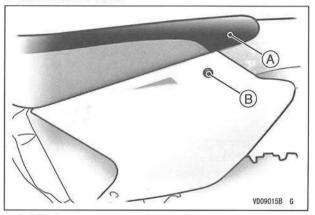
A clogged air cleaner will affect fuel mixture to the engine and reduce engine power and cause spark plug fouling.

## NOTE

 In dusty areas, the element should be cleaned more frequently than recommended interval.  After riding through rain or on muddy roads, the element should be cleaned immediately.

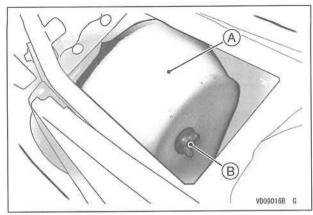
# Element Removal and Inspection

Remove the seat.



A. Seat B. Seat Bolt

 Remove the wing bolt, and take out the air cleaner element.



A. Air Cleaner Element B. Wing Bolt

- Check inside of the inlet tract and carburetor for dirt. If dirty, clean the intake tract and carburetor thoroughly.
- Stuff a clean, lint-free towel into the carburetor to keep dirt from entering the carburetor.
- Wipe out the inside of the air cleaner housing with a clean, damp towel.
- Take the element off its frame.

# CAUTION

Do not twist or wring the element, as it gets easily torn or damaged.

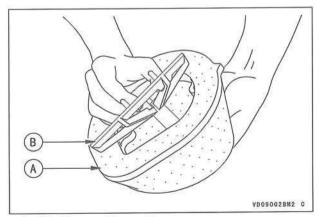
 Inspect the element. If it is dirty, clean it. Also check if the element is in good condition (no tears, hardening or shrinkage). If damaged, replace the element or it will allow dirt into the carburetor.

# **A WARNING**

A clogged air cleaner may allow dirt and dust to enter the carburetor and jam the throttle, which could cause an accident and injury.

# CAUTION

A clogged air cleaner may allow dirt and dust to enter the engine, causing it to wear excessively or to become damaged.



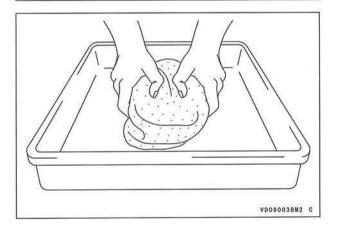
A. Air Cleaner Element B. Element Frame

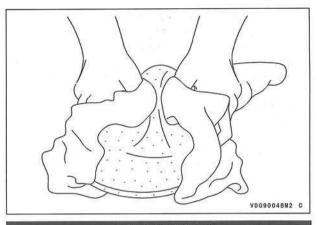
Element Cleaning and Installation

- Clean the element in a bath of a high flash point solvent or hot soapy water. Rinse the element with clear water to remove all traces of the cleaning solution.
- Squeeze the element dry in a clean towel.

## CAUTION

Do not twist, wring or blow the element dry to avoid damaging it.



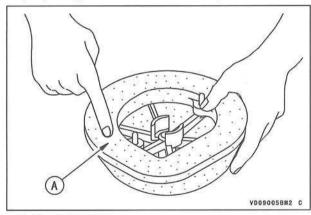


# **A WARNING**

Clean the element in a well-ventilated area, and make sure that there are no sparks or flames anywhere near the working area; this includes any appliance with a pilot light. To avoid a fire or explosion, do not use gasoline or a low-flash-point solvent to clean the element.

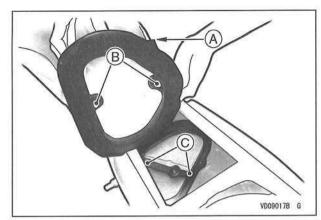
• After cleaning, let the filter dry completely. Saturate the element with a high-quality foam air filter oil and make sure that the oil is evenly applied throughout the element. Squeeze out the excess oil, but do not wring the element as this could cause tearing. In this case, too much oil is better than too little. Finally pat the inside of the element with a paper towel to remove any excess oil.

- Before installation, check the element for damage such as tears, hardening, or shrinkage. If damaged, replace the element.
- Apply grease to all mating surfaces and to the screw hole in the air cleaner housing and intake tract
- Remove the towel from the carburetor.
- Install the element onto its frame, and coat the element lip and lip seat with a thick layer of all -purpose grease to assure a complete seal.



A. Apply Grease.

 Install the air cleaner element so that its tab faces upward and its projections align with the holes in the housing.



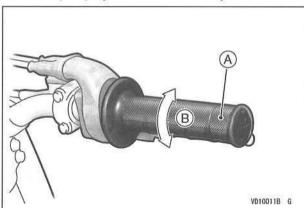
- A. Tab
- **B. Projections**
- C. Hole
- Install the seat.

## **Throttle Cable**

# Throttle Cable Adjustment

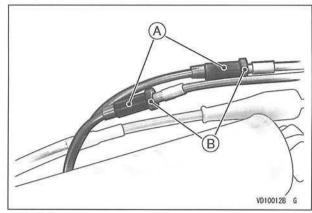
Inspect the throttle grip for smooth operation in all steering positions. Check and adjust the throttle cable in accordance with the Periodic Maintenance Chart.

Check that the throttle grip has 2 ~ 3 mm (0.08 ~ 0.12 in.) of play and turns smoothly.



A. Throttle Grip B. 2 ~ 3 mm (0.08 ~ 0.12 in.)

 If the play is incorrect, loosen the locknut on the upper end of the throttle cable and turn the adjuster to obtain the specified play. Then, tighten the locknut toward the adjuster.



A. Adjuster B. Locknut

 With the engine idling, turn the handlebar both ways and check if handlebar movement changes the idling speed. If so, the throttle cable may be improperly adjusted or incorrectly routed, or damaged. Be sure to correct any of these conditions before riding.

# **A** WARNING

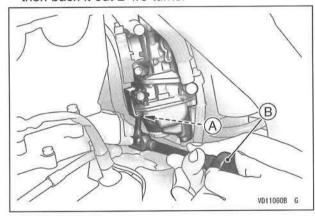
Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.

## Carburetor

Idling Adjustment

Idling adjustment is carried out using the pilot screw and the idling adjusting screw.

First turn the pilot screw with the pilot screw adjuster D (special tool) in until it is lightly seated, then back it out 2-1/8 turns.

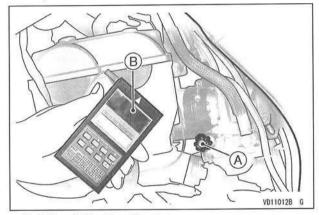


A. Pilot Screw B. Pilot Screw Adjuster D (57001–1588)

### NOTE

- When removing the pilot screw adjuster D from the carburetor, move the carburetor up lightly by using a suitable tool.
- Thoroughly warm up the engine.

 Turn the idling adjusting screw to adjust the idling speed 1 950 ~ 2 050 r/min (rpm) by using the engine revolution tester (The tester should be followed by the method described by the manufacture).



A. Idling Adjusting Screw B. Tester

- Open and close the throttle a few times to make sure the idling speed does not change, and readjust if necessary.
- With the engine idling, turn the handlebar both ways and check if handlebar movement changes the idling speed. If so, the throttle cable may be improperly adjusted, incorrectly routed, or damaged. Be sure to correct any of these conditions before riding.

# **A** WARNING

Operation with a damaged throttle cable could result in an unsafe riding condition.

## CAUTION

This motorcycle is designed for competition use only. Therefore, the radiator does not incorporate a coolant reserve tank or cooling fan. Prolonged idling of the engine with no airflow through the radiator can cause coolant loss and engine overheating resulting in possible engine damage. Any riding conditions that increase engine temperature will further reduce idling time before coolant loss occurs. These conditions include high ambient temperature, sandy or muddy terrain, or other conditions causing high engine loads at low speeds. Furthermore, warming the engine up excessively before operation, or leaving idling with the hot engine temperature after operation results in the engine overheating, too.

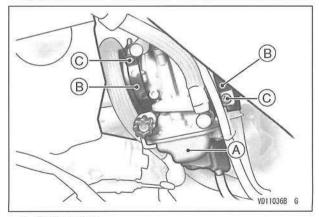
### Carburetor Removal

# **A WARNING**

Gasoline is extremely flammable and can be explosive under certain conditions.

Always stop the engine and do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Turn the fuel tap lever to the OFF position, and disconnect the fuel hose from the fuel tap.
- Remove the seat and left and right covers.
- Loosen the air cleaner duct clamp screw and the cylinder intake duct clamp screw at the carburetor.



- A. Carburetor
- B. Clamp
- C. Screw

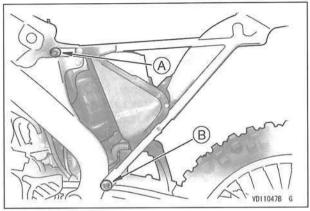
- Remove the silencer (see the "Exhaust System" section).
- Loosen the rear frame bolt (upper side).
- Remove the rear frame bolt (lower side).
- Pull the air cleaner duct clamp to the air cleaner housing side, and disconnect the carburetor from the air cleaner duct.
- Remove the air cleaner joint clamp by raising the rear portion of the frame a little.
- After removing the carburetor, push a clean, lint -free towel into the carburetor inlet and outlet to keep dirt or other foreign material from entering.

# **A** WARNING

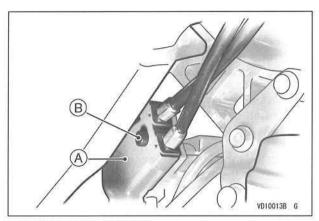
If dirt or dust is allowed to pass through into the carburetor, the throttle may become stuck, possibly causing an accident.

# CAUTION

If the clamp is not removed from the air cleaner housing, the rear shock absorber spring may be damaged. Raise the rear portion of the frame more.

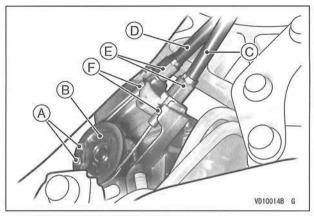


- A. Bolt (Loosen) B. Bolt (Remove)
- Remove the cable holder cover by removing the bolt.

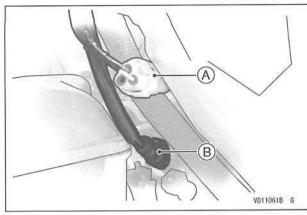


A. Cable Holder Cover B. Bolt

 Remove the lower ends of the throttle cables from the carburetor pulley by loosing the throttle cable mounting bolt.



- A. Throttle Cable Lower Ends
- B. Carburetor Pulley
- C. Accelerator Cable
- D. Decelerator Cable
- E. Mounting Bolt
- F. Locknut
- Disconnect the throttle sensor connector and hot starter cable.



A. Throttle Sensor Connector B. Hot Starter Cable

## CAUTION

If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

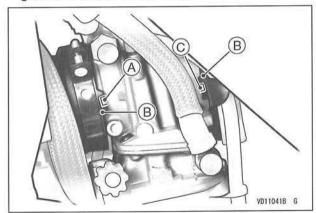
### Carburetor Installation

- Connect the throttle sensor connector and hot starter cable.
- Lubricate the lower ends of the throttle cables.
- Install the throttle cables and cover.

# **A** WARNING

Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.

- When installing the carburetor into the air cleaner duct and cylinder intake duct, align the projection of the carburetor with groove in the cylinder intake duct.
- Align the tab of the air cleaner duct clamp with the groove in the air intake duct.



- A. Carburetor Projection
- B. Duct Groove
- C. Tab
- Tighten the clamp screws securely.
- Route the carburetor air vent and overflow hoses properly.

- Connect the fuel hose to the fuel tap.
- Turn the fuel tap lever to the ON position, and check for fuel leakage from the carburetor.

# **A** WARNING

Gasoline is extremely flammable and can be explosive under certain conditions.

Always stop the engine and do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Open and close the throttle a few times to make sure the grip operates correctly.
- Adjust the throttle cable play and idling speed.

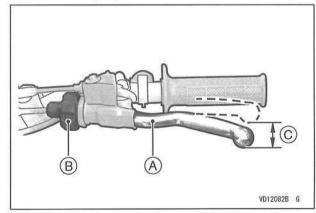
# Clutch

# Clutch Lever Adjustment

Proper clutch lever play is  $8 \sim 13$  mm ( $0.3 \sim 0.5$  in.). Lever play increases with cable stretch and friction plate wear, requiring periodic adjustment.

When the clutch lever play is out of specification, first try adjusting it at the clutch lever as follows.

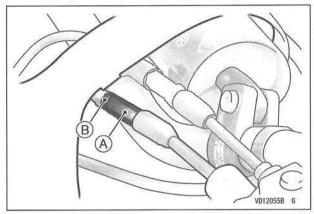
 Turn the adjuster to obtain the proper amount of clutch lever play.



- A. Clutch Lever
- B. Adjuster
- C. 8 ~ 13 mm (0.3 ~ 0.5 in.)

If the clutch lever play cannot be adjusted at the clutch lever, make the adjustment further down the cable as follows.

- Turn the adjuster in all the way.
- Loosen the locknut in the middle of the clutch cable, and turn the adjusting nut so that the clutch lever play is  $8 \sim 13$  mm ( $0.3 \sim 0.5$  in.).



- A. Adjusting Nut
- B. Locknut
- Tighten the locknut.

# **▲** WARNING

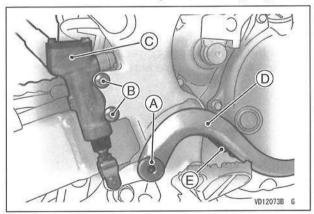
Be sure the upper end of the clutch outer cable is fully seated in its fitting, or it could slip into place later, creating enough cable play to prevent clutch disengagement, resulting in a hazardous riding condition.

### NOTE

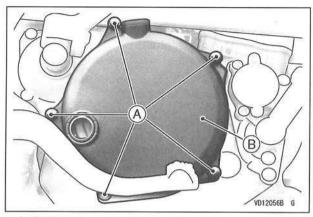
 After the adjustment is made, start the engine and check that the clutch does not slip and that it releases properly.

## Friction Plate Removal

- Drain the engine oil. (see the "Engine Oil" section).
- Remove the brake pedal pivot bolt and the rear brake master cylinder mounting bolts.
- Remove the rear brake pedal return spring.

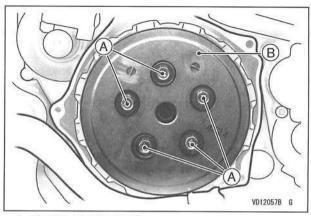


- A. Brake Pedal Pivot Bolt
- B. Rear Brake Master Cylinder Mounting Bolts
- C. Rear Brake Master Cylinder
- D. Brake Pedal
- E. Return Spring
- Remove the clutch cover mounting bolts.



A. Bolts B. Clutch Cover

- Remove the clutch cover and gasket.
- Remove the clutch spring bolts, clutch pressure plate and springs.



A. Clutch Spring Bolts
B. Clutch Pressure Plate

Remove the friction and steel plates.

# Friction and Steel Plate Wear/Damage Inspection

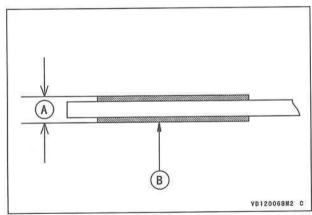
- Visually inspect the friction and steel plates to see if they show any signs of seizure, or uneven wear.
- ★ If any plates show signs of damage, replace all friction plates and steel plates as a set.
- Measure the thickness of the friction and steel plates with vernier calipers.
- ★ If they have worn past the service limit, replace them with new ones.

### **Friction Plate Thickness Measurement**

Standard	2.72 ~ 2.88 mm (0.1071 ~ 0.1134 in.)	
Service Limit	2.6 mm (0.102 in.)	

## Steel Plate Thickness Measurement

Standard	1.5 ~ 1.7 mm (0.0591 ~ 0.0669 in.)	
Service Limit	1.4 mm (0.055 in.)	



- A. Thickness
- **B. Friction Plate**

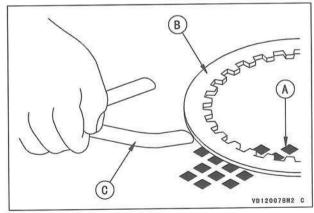
# Friction and Steel Plate Warp Inspection

 Place each friction plate and steel plate on a surface plate, and measure the amount of friction

- plate and steel plate warp with a thickness gauge (i.e., the gap between the surface plate and each friction plate or steel plate).
- If any plate is warped over the service limit, replace it with a new one.

Friction and Steel Plate Warp

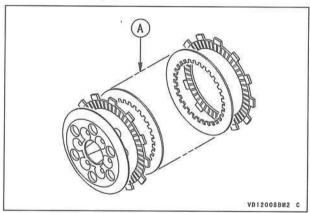
Friction	Standard	Maximum 0.15 mm (0.006 in.)
Plate Service Limit		0.3 mm (0.012 in.)
Steel Plate	Standard	Maximum 0.15 mm (0.006 in.)
	Service Limit	0.3 mm (0.012 in.)



- A. Surface Plate
- B. Friction or Steel Plate
- C. Thickness Gauge

## Friction and Steel Plate Installation

- Install all parts in the reverse order of removal.
- Install the friction plates and steel plates, alternating between the two; be sure to start and finish with a friction plate.

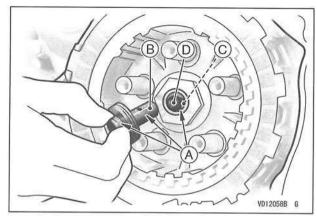


A. Friction and Steel Plates

## CAUTION

If dry steel plates and friction plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.

- Apply molybdenum disulfide grease to the contact area of the push rod holder.
- Install the push rod holder together with the steel ball into the push rod.

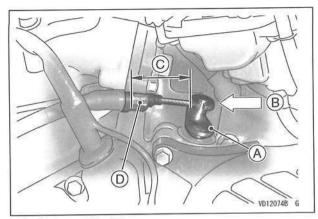


- A. Molybdenum Disulfide Grease
- B. Push Rod Holder
- C. Push Rod
- D. Steel Ball
- Install the clutch pressure plate and springs.
- Tighten the clutch spring bolts to the specified torque.

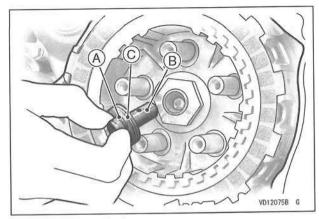
# **Clutch Spring Bolt Tightening Torque**

9.0 N·m (0.9 kgf·m, 80 in·lb)

 Check the release shaft lever position by measuring the position distance between the lever and the cable bracket while pushing the release shaft lever lightly forward.



- A. Release Shaft Lever
- B. Push forward
- C. Position Distance
- D. Cable Bracket
- If the lever position is not within the standard, select the correct thickness of adjusting washer according to the following table.
- Remove the push rod holder assembly as necessary and reinstall the clutch.



- A. Adjusting Washer
- B. Push Rod Holder Assembly
- C. Needle Bearing

**Adjusting Washer** 

Thickness	Part Number
1.5 mm (0.06 in.)	92200-1548
1.0 mm (0.04 in.)	92200-0045

# Release Shaft Lever Position and adjusting Washer Selection

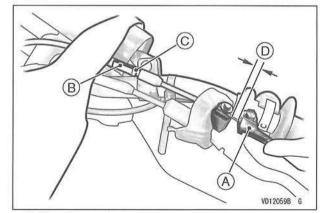
Position Distance	Judgment	Washers Thickness	Quantity
36.7 ~ 44.5 mm (1.44 ~ 1.75 in.)	Standard	1.5 mm (0.06 in.)	1
More than 44.5 mm (1.75 in.)	Too big	1.0 mm (0.04 in.)	1
Less than 36.7 mm (1.44 in.)	Too small	1.0 mm (0.04 in.)	2

- Place a new clutch cover gasket in position with a thin layer of grease and tighten the bolts.
- Install the parts removed.
- Check the engine oil level.

## **Hot Starter Cable**

Proper hot starter lever play between the hot starter lever and holder is  $0.5 \sim 1$  mm ( $0.02 \sim 0.04$  in.). Lever play increases with cable stretch, and requires periodic adjustment.

- Slide the clutch lever dust cover back.
- Check the hot starter lever play when pulling it lightly, and if it's play is out of specification, adjust the lever play.
- Loosen the locknut, turn the adjuster to obtain the proper hot starter lever play, then tighten the locknut.



- A. Hot Starter Lever
- B. Adjuster
- C. Locknut
- D. 0.5 ~ 1 mm (0.02 ~ 0.04 in.)

## Valve Clearance

Valve and valve seat wear decreases valve clearance, upsetting valve timing.

## CAUTION

If valve clearance is left unadjusted, wear will eventually cause the valves to remain partly open, which lowers performances, burns the valves and valve seats, and may cause serious engine damage.

Valve clearance for each valve should be checked and adjusted in accordance with the Periodic Maintenance Chart.

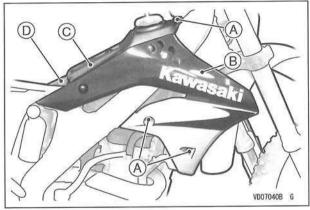
### NOTE

Olf the engine is hot, wait until the engine cools. Valve clearance must be checked when the engine is cold (room temperature).

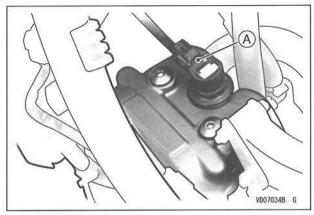
# Valve Clearance Inspection

- Turn the fuel tap lever to the OFF position.
- Remove the seat and left and right side covers.
- Remove the fuel tank mounting bolt and left and right radiator cover mounting bolts.

- Unhook the rubber band, and disconnect the fuel hose from the fuel tap.
- Remove the fuel tank together with left and right radiator covers.

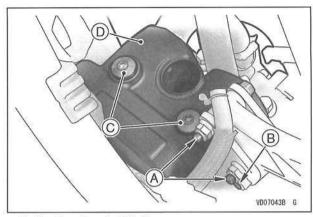


- A. Bolt
- **B. Radiator Cover**
- C. Fuel Tank
- D. Rubber Band
- Remove the spark plug cap.

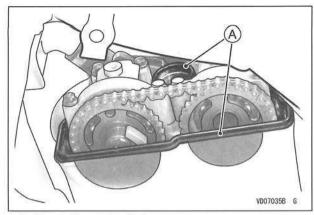


A. Spark Plug Cap

- Remove the engine bracket bolts and loosen the engine mounting bolt.
- Remove the cylinder head cover bolts and take off the cylinder head cover.

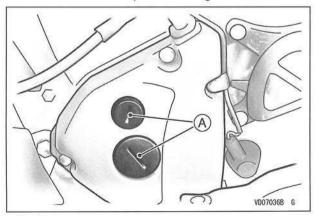


- A. Engine Bracket Bolts
- **B. Engine Mounting Bolts**
- C. Cylinder Head Cover Bolts D. Cylinder Head Cover
- Remove the head cover gasket.



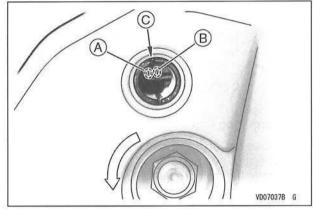
A. Head Cover Gasket

• Remove the two caps from the generator cover.



A. Caps

 Bring the piston to the Top Dead Center (TDC) of its compression stroke to inspect the valve clearance (the position at the end of the compression stroke) by aligning the top mark with the groove on the generator cover while turning the rotor bolt counterclockwise.

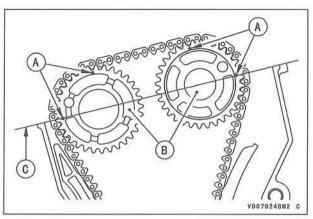


A. Ignition Timing Mark

- B. Top Mark
- C. Groove on Alternator Cover

### NOTE

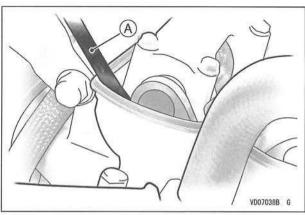
- Do not mistake the top mark for ignition timing mark.
- At this point, the timing marks on the camshaft sprockets must be almost aligned with the cylinder head upper surface as shown in the figure.



- A. Timing Mark
- B. Camshaft Sprockets
- C. Cylinder Head Upper Surface
- Using the thickness gauge, measuring the clearance between each cam lobe and valve lifter, for all four valves.

### NOTE

O Record the measured valves clearance.



A. Thickness Gauge

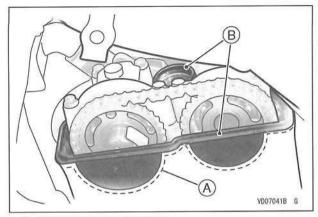
Standard Valve Clearance (Between cam and valve lifter)

Exhaust	0.17 ~ 0.22 mm (0.0067 ~ 0.0087 in.)
Inlet	0.10 ~ 0.15 mm (0.0039 ~ 0.0059 in.)

 If the valve clearance is not within the specified range, adjust by an authorized Kawasaki dealer or a competent mechanic following the instructions in the Service Manual.

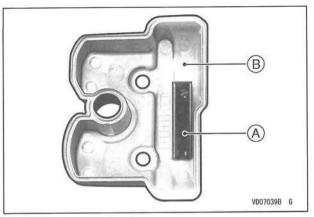
# Cylinder Head Cover Installation

 Apply the silicone sealant to the new cylinder head cover gasket as shown in the figure and install the new cylinder head cover gasket to the cylinder head.



A. Apply Silicone Sealant. B. Cylinder Head Cover Gasket

 Make sure that the upper chain guide is bottomed to the cylinder head cover.



A. Upper Chain Guide B. Cylinder Head Cover

## CAUTION

Unless the upper chain guide is bottomed, the camshaft chain could push the cylinder head cover upward, leading to an oil leak.

- Install the cylinder head cover.
- Install the washer with the metal side upwards to the cylinder head cover, and tighten the bolts to the specified torque.

## Cylinder Head Cover Bolt Tightening Torque

9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the two caps to the generator cover.
- Install the spark plug cap and the parts removed.

# **Exhaust System**

The exhaust system, in particular the silencer, is designed to reduce exhaust noise and conduct the exhaust gases away from the rider while minimizing power loss. If carbon has built up inside the silencer, exhaust efficiency is reduced, causing engine performance to drop.

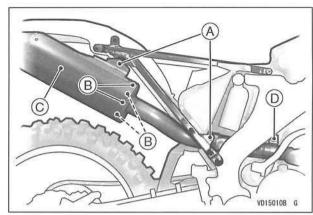
If the silencer is badly damaged, dented, cracked or rusted, replace it. Replace the silencer packing if the exhaust noise becomes too loud or engine performance drops.

# Silencer Packing Replacement

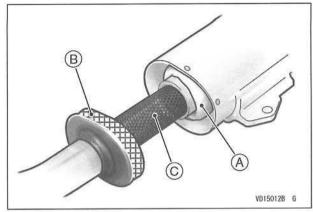
- Remove the right side cover.
- Remove the silencer bolts, and loosen the joint clamp bolt.
- Pull out the silencer pipe from the exhaust pipe.
- Remove the silencer cover bolts and pull the silencer pipe out.

## NOTE

OWhen replacing the silencer packing assembly, first insert the silencer packing assembly into the silencer cover, and align the exhaust hole of the silencer end cover with the silencer packing assembly hole while turning the packing assembly. Then, install the silencer pipe by pushing the silencer pipe into the silencer cover with aligning the silencer pipe with the exhaust hole.



- A. Silencer Bolts
- B. Silencer Cover Bolts
- C. Silencer
- D. Joint Clamp Bolt
- Pull off the old silencer packing, and install the new one inside the silencer cover.
- Apply silicone sealant around the inside of the silencer body.
- Install the silencer pipe into the silencer cover and tighten the silencer cover bolts to the specified torque.
- Apply a non-permanent locking agent to the Silencer Pipe movnting bolts.



- A. Silencer Packing
- B. Silicone Sealant
- C. Silencer Pipe

## Silencer Cover Bolt Tightening Torque

12 N·m (1.2 kgf·m, 8.9 ft·lb)

Tighten the silencer bolts to the specified torque.

# Silencer Bolts Tightening Torque

21 N·m (2.1 kgf·m, 15 ft·lb)

Install the right side cover.

# **Drive Chain**

For safety and to prevent excessive wear, the drive chain must be checked, adjusted, and lubricated before riding. If the chain becomes badly worn or maladjusted - either too loose or too tight - it could jump off the sprockets or break.

# **A WARNING**

A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.

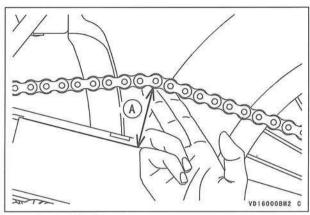
# Chain Slack Inspection

- Raise the rear wheel off the ground, then rotate the rear wheel to find the place where the chain is tightest (because it wears unevenly).
- Push up the drive chain in the middle of the upper chain run to measure the chain slack. The distance between the chain and the swingarm (at the end of the chain slipper) should be within the standard value.

### **Drive Chain Slack**

Standard	52 ~ 58 mm (2.0 ~ 2.3 in.)
Standard	02 - 00 mm (2.0 - 2.0 m.)

 Adjust the drive chain if its slack is out of specification.



#### A. Chain Slack

- In addition to checking the slack, rotate the rear wheel to inspect the drive chain for damaged rollers, loose pins and links and the sprockets for unevenly or excessively worn and damaged teeth.
- If there are any such defects, replace the drive chain and/or the sprockets.

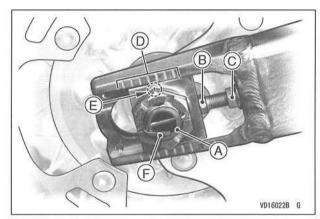
# Chain Slack Adjustment

- Remove the cotter pin from the rear axle nut.
- Loosen the rear axle nut and both chain adjuster locknuts.
- Turn both chain adjusting bolts evenly until the drive chain slack (measured between the chain and the swingarm) is within the standard value.
   For the rear wheel to be properly aligned, the

notch of the left chain adjuster should align with the same swingarm mark that the notch of the right chain adjuster aligns with.

### Drive Chain Slack

52 ~ 58 mm (2.0 ~ 2.3 in.)



- A. Axle Nut
- B. Adjusting Bolt
- C. Locknut
- D. Marks
- E. Notch
- F. Cotter pin

### NOTE

 Wheel alignment can also be checked using the straightedge or string method.

# **A** WARNING

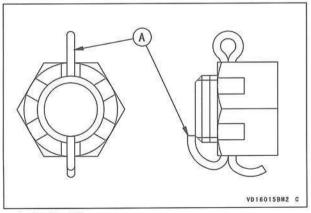
Misalignment of the wheel will result in abnormal wear and possibly in an unsafe riding condition.

- Tighten both chain adjuster locknuts.
- Torque the axle nut to the specified torque.

## Rear Axle Nut Tightening Torque

110 N·m (11.0 kgf·m, 80 ft·lb)

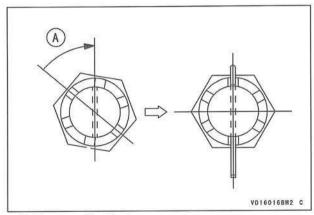
- Rotate the wheel, measure the chain slack again at the tightest position, and readjust it if necessary.
- Install a new cotter pin through the axle nut and axle, and spread its ends.



A. Cotter Pin

### NOTE

- O When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle shaft, tighten the nut clockwise up to the next alignment.
- OIt should be within 30 degree.
- O Loosen once and tighten again when the slot goes past the nearest hole.



A. Turning Clockwise

# WARNING

If the axle nut is not securely tightened or the cotter pin is not installed, an unsafe riding condition may result.

Check the rear brake effect.

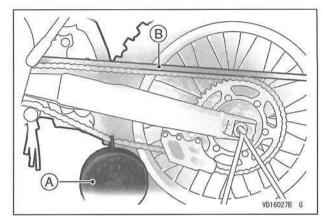
### NOTE

OWhen riding in wet and muddy conditions, mud sticks to the chain and sprockets, resulting in an overly tight chain, which can cause it to break. To prevent this, adjust the chain slack (measured between the chain and the swingarm) to 62 ~ 68 mm (2.4 ~ 2.7 in.).

# Chain Wear Inspection

When the chain has reached its wear limit (i.e., when it has stretched by 2% of its original length), it is no longer safe for use and should be replaced. Since it is impractical to measure the entire length of the chain, determine the degree of wear by measuring a 20-link section of the chain.

- Tighten the chain either by using the chain adjusters or by hanging a 10 kg (20 lb) weight on the chain.
- Measure the 20-link section on a straight part of the chain from the center of the 1st pin to the center of the 21st pin. If the length exceeds the service limit, the chain should be replaced. Since overworn sprockets will cause a new chain to wear faster, inspect both the engine and rear sprockets whenever the chain is replaced, and replace them if necessary.



A. Weight

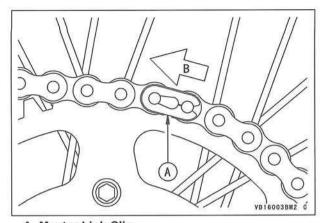
B. Tape Measure

### **Drive Chain 20-Link Section**

Standard length	317.5 mm (12.5 in.)
Wear limit	323 mm (12.7 in.)

### NOTE

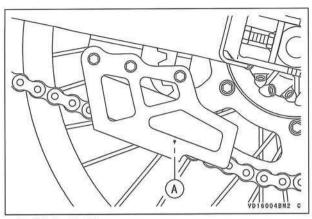
- O The drive system was designed for use with a DAIDO D.I.D 520DMA2 112-link chain. For maximum stretch resistance and safety, a genuine part must be used for replacement.
- O To minimize any chance of the Master Link coming apart, the master link clip must be installed with the closed end of the "U" pointing in the direction of chain rotation.



A. Master Link Clip
B. Direction of Rotation

# Chain Guide Wear Inspection

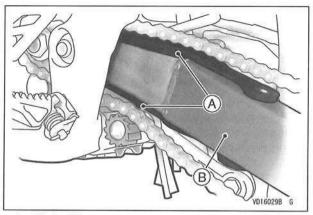
 Visually inspect the drive chain guide and replace it if excessively worn or damaged.



A. Chain Guide

# Chain Slipper Wear Inspection

 Visually inspect the upper and lower chain slippers on the swingarm and replace them if worn or damaged.



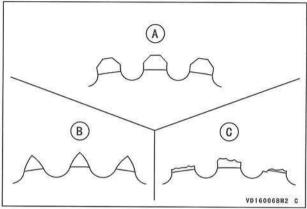
A. Chain Slippers

### B. Swingarm

# Sprocket Wear Inspection

 Visually inspect the sprocket teeth and replace the sprocket if its teeth are worn or damaged.

# Sprocket Tooth Wear



- A. Good Teeth
- B. Worn Teeth
  - C. Damaged Teeth

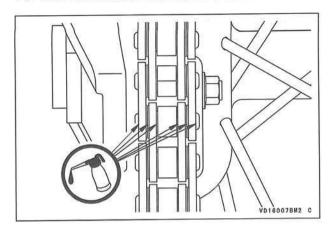
## NOTE

O Sprocket wear is exaggerated in the illustration.

### Chain Lubrication

Lubrication of the drive chain is necessary after riding in the rain or mud, or any time the chain appears dry. A heavy oil such as SAE90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.

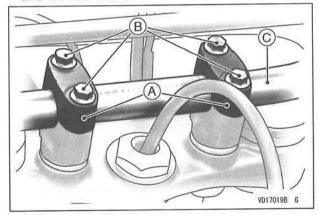
- Apply oil to the side of the rollers so that it will penetrate to the rollers and bushings.
- Wipe off any excess oil.



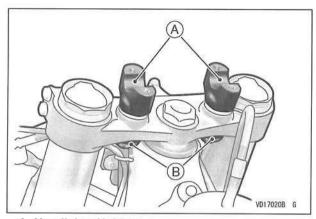
# Handlebar

To suit various riding positions, the handlebar can be adjusted by turning the handlebar holders around.

- Remove the handlebar pad.
- Check the handlebar for bent or crack.
- Remove the handlebar clamp bolts, the clamps and the handlebar.



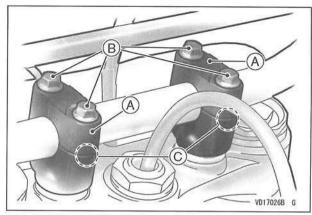
- A. Handlebar Clamp
- B. Bolts
- C. Handlebar
- Loosen the handlebar holder nuts, turn the handlebar holders 180°, and securely tighten the nuts.



A. Handlebar Holders

B. Handlebar Holder Nuts

- Put the handlebar on the handlebar holders.
- Mount the handlebar clamps.
- Check that the gauge of the handlebar is out of the left and right handlebar clamps equally.



- A. Handlebar Clamps
- B. Clamp Bolts
- C. Gap
- Torque the front and rear bolts of the handlebar clamps to 25 N·m (2.5 kgf·m, 18 ft·lb) equally. If the handlebar clamps are correctly installed, there will be even gap on the front and rear side of the clamp after the bolts torqued.
- Do not disassemble the supporting bar on the handlebar.

# Handlebar Clamp Bolts Tightening Torque

25 N·m (2.5 kgf·m, 18 ft·lb)

Check the front brake for proper brake effect or brake hose damage.

### NOTE

 Tighten the two clamp bolts alternately two times to ensure even tightening torque.

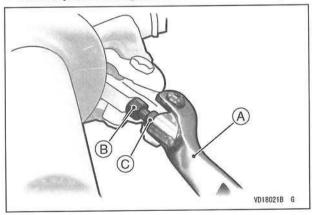
### Brakes

Disc and disc pad wear is automatically compensated for and has no effect on the brake lever or pedal action. There are no parts on the brakes that require adjustment except brake lever position.

# Brake Lever position

The brake lever position can be adjusted to suit the rider's preference.

- To adjust the brake lever position, loosen the locknut, and turn the adjuster to either side with a wrench.
- After adjustment, tighten the locknut securely.



- A. Brake Lever
- B. Adjuster
- C. Locknut

 Test the braking power and check that there is no brake drag.

# **A** WARNING

If the brake lever or pedal feels mushy, there might be air in the brake lines or the brake may be defective. Since it is dangerous to operate the motorcycle under such conditions, have the brake checked immediately.

#### Disc Brake Fluid

Inspect the brake fluid level in the front and rear reservoirs and change the brake fluid in accordance with the Periodic Maintenance Chart. The brake fluid should also be changed when contaminated with dirt or water.

Use only heavy-duty brake fluid as follows.

Front brake fluid: DOT 3 or DOT 4

Rear brake fluid: DOT 4

### NOTE

 The motorcycle is shipped with brake fluid DOT4 in the brake system.

# CAUTION

Do not spill brake fluid onto any painted surface.

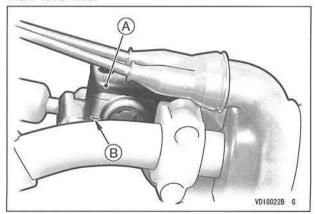
Do not use fluid from a container that has been left open or that has been unsealed for a long time.

Check for fluid leakage around the brake system fittings.

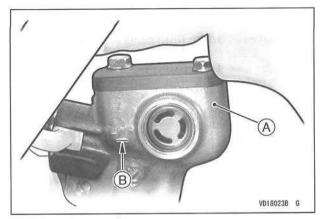
Check for brake hose damage.

# Brake Fluid Level Inspection (Front and Rear Reservoirs)

With the front or rear reservoir positioned horizontally, the brake fluid must always be above the minimum level line.

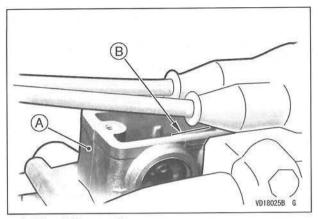


A. Front Reservoir B. Minimum Level Line

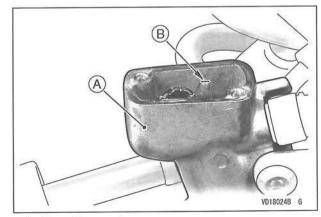


A. Rear Reservoir B. Minimum Level Line

 If the brake fluid in the front or rear reservoir is below the minimum level line, check for fluid leaks in the brake line and fill the reservoir to the maximum level line. (The step inside the front and rear reservoirs indicate the maximum level.)



A. Front Reservoir
B. Maximum Level Line



A. Rear Reservoir B. Maximum Level Line

# **A** WARNING

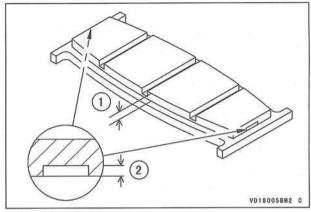
Do not mix two types or brands of brake fluid. If brake fluid is to be added but the fluid already in the brake system is not identifiable, the entire fluid must be changed.

# Brake Pad Wear Inspection

Inspect the brake pads for wear in accordance with the Periodic Maintenance chart. If the thickness of any pad in any (front or rear) brake caliper is less than 1 mm (0.04 in.), have both pads in the caliper replaced as a set. Pad replacement should be done by an authorized Kawasaki dealer.

#### MAINTENANCE AND ADJUSTMENT 75

### Usable Brake Pad Range



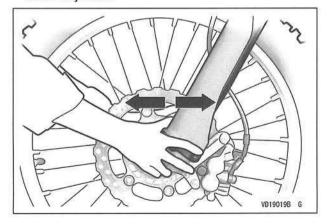
- 1. Lining Thickness
- 2. 1 mm (0.04 in.)

# Steering

The steering should always be kept adjusted so that the handlebar will turn freely but not have excessive play.

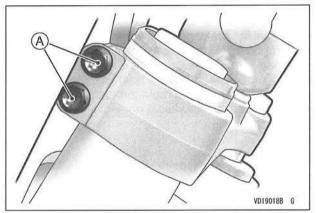
# Steering Inspection

- To check the steering adjustment, raise the front wheel off the ground using a jack (special tool).
- Push the handlebar lightly to either side. If the handlebar continues moving under its own momentum, the steering is not too tight.
- Squatting in front of the motorcycle, grasp the lower ends of the front fork at the axle, and push and rock the front fork back and forth as shown.
   If play is felt, the steering is too loose and needs to be adjusted.



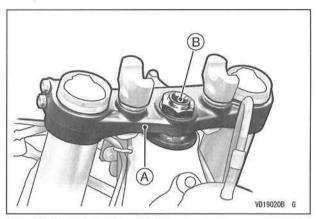
# Steering Adjustment

- Raise the front wheel off the ground using a jack (special tool).
- Remove the number plate.
- Remove the handlebar.
- Loosen the upper front fork clamp bolts.



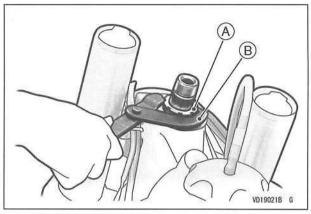
A. Upper Front Fork Clamp Bolts

 Remove the steering head nut, and raise the upper fork clamp.



A. Upper Front Fork Clamp B. Steering Head Nut

 Turn the steering stem locknut with a stem nut wrench (special tool) to obtain the proper adjustment.



A. Steering Stem Locknut B. Stem Nut Wrench (P/N. 57001-1100)

- Install the upper front fork clamp to the original position.
- Apply the specified torques to the steering head nut and upper front fork clamp bolts.

# Steering Head Nut Tightening Torque

98 N·m (10.0 kgf·m, 72 ft·lb)

### **Upper Fork Clamp Bolt Tightening Torque**

20 N·m (2.0 kgf·m, 15 ft·lb)

#### NOTE

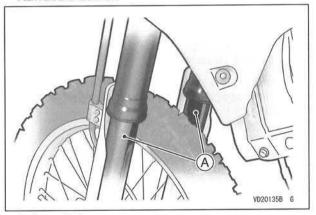
 Tighten the two clamp bolts alternately two times to ensure even tightening torque.

 Install the handlebar, check the steering again and readjust it if necessary.

# **Front Suspension**

# Front Fork Inspection

- Holding the brake lever, pump the front fork back and forth manually to check for smooth operation.
- Visually inspect the front fork for oil leakage, scoring or scratches on the outer surface of the inner tube.
- If necessary, repair or replace by an authorized Kawasaki dealer.



A. Inner Tube

# CAUTION

If the inner tube is badly bent or creased, replace it. Excessive bending, followed by subsequent straitening, can weaken the inner tube.

Any of the following front fork adjustments should be made to tune the front suspension to the rider's weight and the condition of the track.

Basically, there are six adjustments you can make to the front fork.

Air Pressure

Air pressure acts as a progressive spring over the entire fork travel range. Since the air pressure in the fork legs increases with normal use, the fork action on your KX will get stiffer as the race progresses. Therefore, it is not recommended to increase the air pressure for additional springing. The KX forks are designed to function without added air.

Rebound Damping Adjustment

This adjustment affects how quickly the fork rebounds. Depending on the model, the fork rebound damping adjuster has at least 20 positions. The fully seated position (adjuster turned fully clockwise) is the hardest setting. Turning the adjuster 9 clicks counterclockwise from the fully seated position is the standard setting, turning it counterclockwise 20 or more clicks (depending on the model) is the softest setting.

Compression Damping Adjustment

This adjustment affects how quickly the fork compresses. Depending on the model, the fork compression damping adjuster has at least 22 positions. The fully seated position (adjuster turned fully clockwise) is the hardest setting. Turning the adjuster 9 clicks counterclockwise from the fully seated position is the standard setting, turning it counterclockwise 22 or more clicks (depending on the model) is the softest setting.

Fork Oil Level Adjustment

The fork oil level affects only the final 100 mm (4 in.) of fork travel. A higher oil level will make the fork rebound more quickly. A lower oil level will make the fork rebound more slowly.

Fork Springs

Optional springs, softer and stiffer than standard, are available.

Fork Clamp Position

Steering is greatly affected by the fork clamp position (how much the outer fork tubes protrude above the upper fork clamp). The less the fork tube protrudes, the lighter the front end becomes and the greater the tendency for understeering and washout due to weight biasing. Increasing the amount of fork tube protrusion has opposite effects. Be sure that the front tire does not touch the fender when the fork is fully compressed. Make this adjustment in 10 mm (0.4 in.) steps.

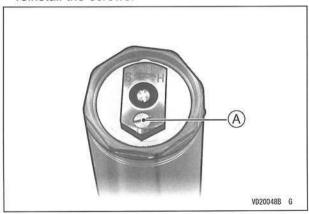
# CAUTION

The right and left fork tubes must be adjusted evenly.

### Air Pressure Adjustment

The standard air pressure in the front fork legs is atmospheric (0 kPa, 0 kgf/cm², 0 ft·lb). Air pressure in the fork legs increase with normal use, so the fork action stiffens during operation. Release air pressure from the fork legs prior to each race through the pressure relief screw located in each front fork base valve assembly. Make sure the front forks are fully extended with the front wheel off the ground when releasing the pressure.

- Raise the front wheel off the ground using a jack (special tool).
- Remove the screw on each front fork base valve assembly to let the air pressure equalize. Then, reinstall the screws.



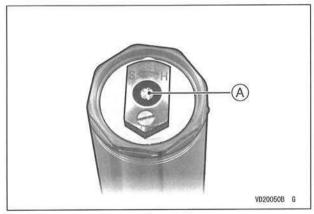
A. Air Pressure Relief Screw

# Compression Damping Adjustment

To adjust the compression damping, turn the adjuster on each front fork base valve assembly with a flat-head screwdriver. Adjust the compression damping to suit your preference under certain conditions.

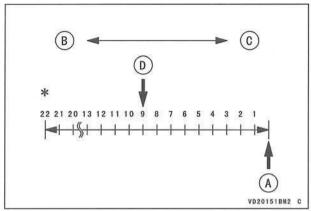
### CAUTION

Do not force the rebound and compression damping force adjusters beyond the fully seated position, or the adjusting mechanism may be damaged.



A. Compression Damping Adjuster

# **Compression Damping Adjuster Settings**



- A. Seated Position (Adjuster Turned Fully Clockwise)
- B. Softer (Counterclockwise)
- C. Harder (Clockwise)
- D. Standard Setting
- \*: Number of turns counterclockwise usable range -22 clicks or more.

# Standard Compression Damping Adjuster Setting

- 9 clicks\*
- \* Counterclockwise from the fully seated position

# CAUTION

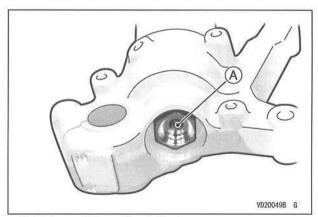
The right and left fork tubes must be adjusted evenly.

# Rebound Damping Adjustment

- Clean the bottom of the fork tubes.
- To adjust the rebound damping, turn the adjuster on the each front fork cylinder valve with a flat -head screwdriver. Adjust the rebound damping to suit your preference under certain conditions.

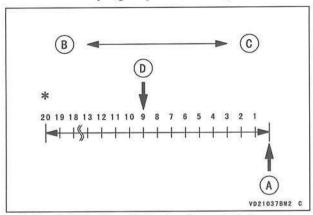
### CAUTION

Do not force the rebound and compression damping force adjusters beyond the fully seated position, or the adjusting mechanism may be damaged.



A. Rebound Damping Adjuster

# **Rebound Damping Adjuster Settings**



- A. Seated Position (Adjuster Turned Fully Clockwise)
- B. Softer (Counterclockwise)
- C. Harder (Clockwise)
- D. Standard Setting
- \*: Number of turns counterclockwise usable range -20 clicks or more.

# Standard Rebound Damping Adjuster Setting

9 clicks\*

\* Counterclockwise from the fully seated position

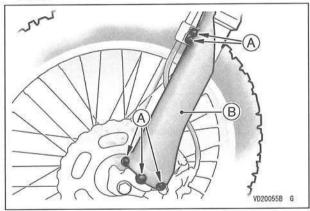
# CAUTION

The right and left fork tubes must be adjusted evenly.

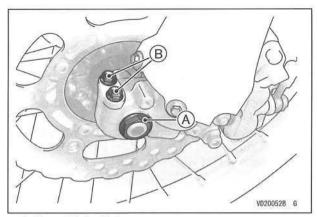
• Install the caps on the bottom of the fork tubes.

## Front Fork Removal

 Remove the front fork protector by removing the bolts.

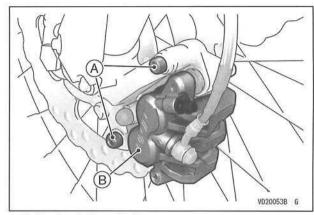


- A. Bolt
- **B. Front Fork Protector**
- Unscrew the front axle nut, and then loosen the left front axle clamp bolts.
- Loosen the right front axle clamp bolts.



A. Front Axle Nut B. Left Front Axle Clamp Bolts

 Remove the brake caliper from the fork leg to be removed, and rest the caliper on some kind of stand so that it does not dangle.

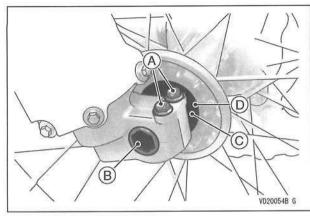


A. Brake Caliper Bolts

- B. Brake Caliper
- Support the motorcycle using a jack (special tool).
- Place a suitable stand under the engine to raise the front wheel off the ground.
- Remove the axle, and pull out the front wheel.

# CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so the disc does not touch the ground.



- A. Right Front Axle Clamp Bolts
- B. Axle
- C. Collar
- D. Cap
- Insert a wood wedge between the disc brake pads.
   This prevents them from being moved out of their proper position, if the brake lever is squeezed accidentally.
- Loosen the front fork upper clamp bolts.
- Loosen the front fork cylinder unit using the top plug wrench (special tool).

#### NOTE

- O Do not take off the base valve assembly.
- Set rebound damping and compression damping setting to the softest settings before disassembly

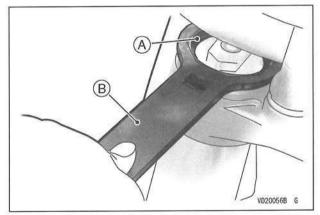
to prevent the needle of adjusters from damping. Record the setting before turning the adjuster.

Thoroughly clean the fork before disassembly.

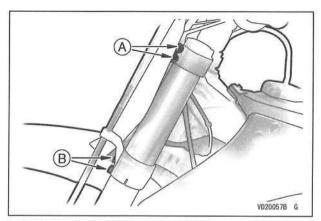
### CAUTION

Be careful not to scratch the inner tube and not to damage the dust seal.

Avoid scratching or damaging the inner tube or the dust seal. Use a mild detergent and sponge out dirt with plenty of water.

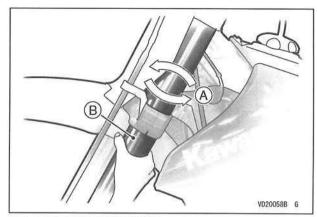


- A. Fork Cylinder Unit
- B. Top Plug Wrench (P.N. 57001-1645)
- Loosen the front fork lower clamp bolts.



A. Upper Front Fork Clamp Bolts B. Lower Front Fork Clamp Bolts

Remove the front fork by pulling down while twisting it.

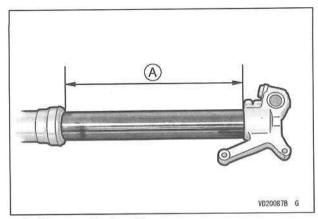


A. Pull down by twisting.

B. Front Fork

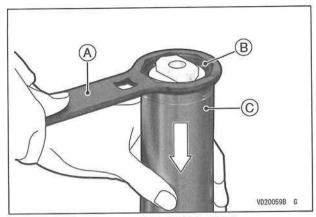
 Measure the length between the axle holder and outer tube and record it before disassembling the fork.

Standard Length 319 ±2 mm



A. Measure the length

 Using the top plug wrench (special tool), remove the fork cylinder unit from the outer tube and slowly slide down the outer tube.

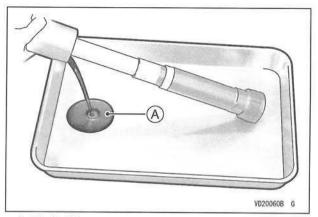


A. Top Plug Wrench (P.N. 57001-1645)

- B. Fork Cylinder Unit
- C. Outer Tube
- Place a drain pan under the front fork and drain fork oil.

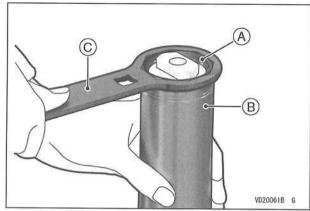
### NOTE

O Pump the outer tube several times to discharge the fork oil.



A. Fork Oil

 Raise the outer tube and temporarily install the fork cylinder unit to the outer tube using the top plug wrench (special tool).



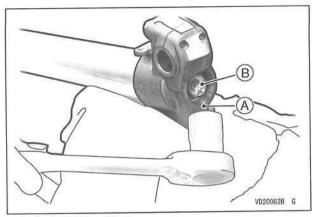
- A. Fork Cylinder Unit
- B. Outer Tube
- C. Top Plug Wrench (P.N. 57001-1645)
- Hold the axle holder with a vise.

### NOTE

- O Protect the axle holder with a soft jaw or heavy cloth when using a vise.
- Loosen the adjuster assembly completely.

#### NOTE

O When removing the adjuster assembly, do not force to loosen it at once using an impact wrench.

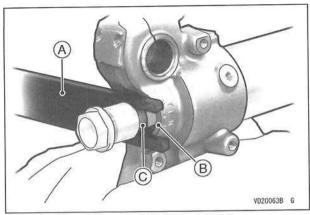


A. Axle Holder Part B. Adjuster Assembly

 Compress the outer tube by hands and install the top plug wrench (special tool) between the axle holder bottom and locknut.

# **A** WARNING

Be careful of reaction force in spring and fix surely so that the special tool should not come off. Do not place the finger etc. While servicing.

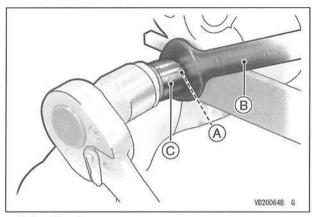


A. Top Plug Wrench (P.N. 57001-1645)

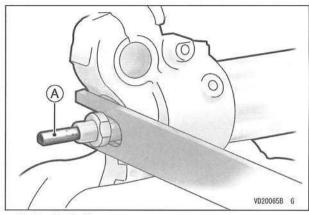
- B. Axle Holder Bottom
- C. Locknut
- Hold the locknut with a wrench and remove the adjuster assembly.

#### NOTE

O Do not remove the locknut from the piston rod. The piston rod may slide into the inner tube.



- A. Locknut
- B. Wrench
- C. Adjuster Assembly
- Remove the push rod.



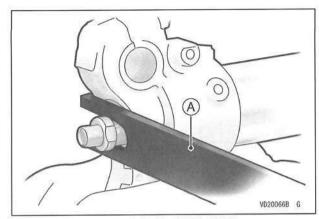
A. Push Rod

 With the outer tube compressed by hand, remove the top plug wrench (special tool).

### CAUTION

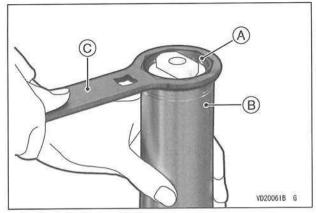
Removing the locknut and pushing the piston rod thread into the cylinder unit will damage the oil seal. Do not remove the locknut from the piston rod.

Be careful of reaction force from the fork spring when removing the top plug wrench. Hold the Piston rod tight enough so that the locknut does not damage the fork leg.



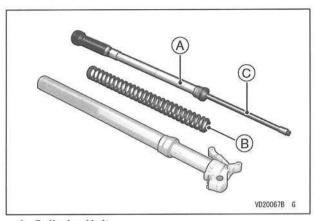
A. Top Plug Wrench (P.N. 57001-1645)

- Remove the fork leg from the vise.
- Loosen the fork cylinder unit with the top plug wrench (special tool).

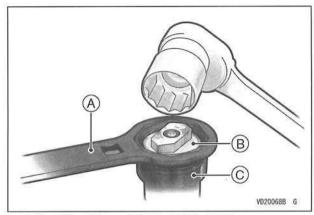


A. Fork Cylinder Unit

- B. Outer Tube
- C. Top Plug Wrench (P.N. 57001-1645)
- Remove the fork cylinder unit and fork spring from the outer tube.



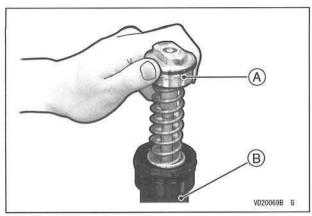
- A. Cylinder Unit
- B. Fork Spring
- C. Piston Rod
- Holding the top plug wrench (special tool) with a vise, loosen the base valve assembly on the fork cylinder unit.



- A. Top Plug Wrench (P.N. 57001-1645)
- B. Base Valve Assembly
- C. Fork Cylinder Unit
- Remove the base valve assembly from the fork cylinder unit.

# CAUTION

Be careful not to damage the bushing of the base valve.



A. Base Valve Assembly B. Fork Cylinder Unit

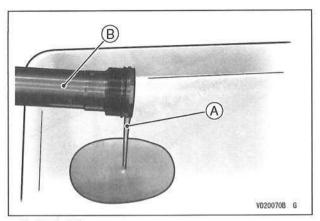
#### NOTE

 Slowly compress the piston rod until it stops so that the base valve assembly can be removed easily.

# CAUTION

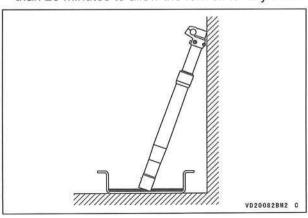
Disassembling the base valve assembly can lead to trouble. Do not disassemble the base valve assembly.

 Drain the fork oil from the fork cylinder unit by pumping the piston rod several times.

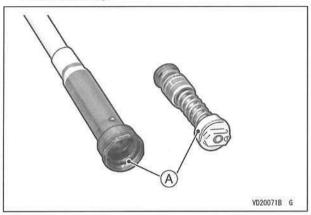


A. Fork Oil B. Fork Cylinder Unit

 Hold the front fork at the inverted position for more than 20 minutes to allow the fork oil to fully drain.



 Clean the threads of fork cylinder unit and base valve assembly.

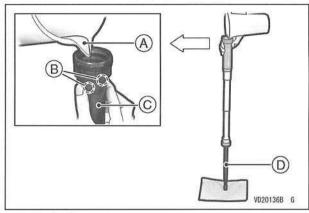


#### A. Threads

• With the piston rod fully stretched, pour 193 mL (6.53 US oz.) of fork oil.

### NOTE

O Plug the two oil holes on the cylinder unit with fingers.

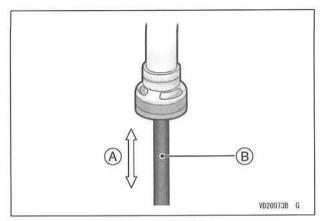


- A. Fork oil
- B. Oil Holes
- C. Fork Cylinder Unit
- D. Piston Rod

#### Recommended Fork Oil

SHOWA SS-05 or equivalent

 Pump the piston rod slowly several times to expel air.



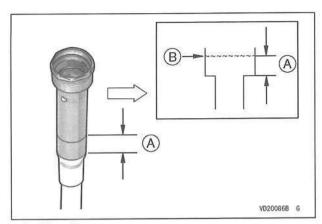
- A. Pump the Piston.
- **B. Piston Rod**
- With the piston rod fully stretched, check the oil level in the fork cylinder unit.

#### Oil Level

42 ~ 49 mm

#### NOTE

O Measure the oil level using a guage as shown in the figure.

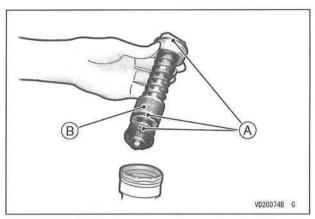


A. 42 ~ 49 mm B. Oil Level

- Replace the O-ring on the base valve assembly with new ones.
- Apply specified fork oil to the O-ring and bushings on the base valve assembly.

# CAUTION

Do not damage the bushings when assembling the base valve.

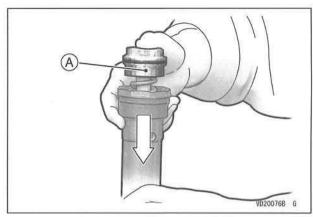


A. O-ring B. Bushings

 With the piston rod held immovable fully stretched, gently install the base valve assembly to the fork cylinder unit.

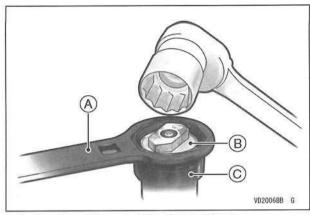
#### NOTE

O If there is difficulty in assembling the base valve, it may be because the oil level is too high. Check the oil level in the fork cylinder unit.



### A. Base Valve Assembly

- Hold the top plug wrench (special tool) with a vise.
- Holding the fork cylinder unit with the top plug wrench (special tool), torque the base valve assembly.



- A. Top Plug Wrench (P.N. 57001-1645)
- B. Base Valve Assembly
- C. Fork Cylinder Unit

# Base Valve Assembly Tightening Torque

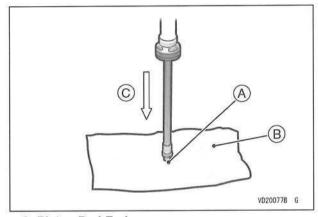
29.5 N·m (3.0 kgf·m, 21.8 ft·lb)

#### NOTE

- O Check if the locknut is completely screwed on to the piston rod.
- Protect the piston rod end with a heavy cloth to prevent piston rod thread damage.
- Hold the cylinder unit at the up right position and slowly pump the piston rod several times about 100 mm.
- Discharge the extra oil off the cylinder unit by pumping the piston rod to full stroke.

# CAUTION

Be careful not to bend or damage the piston rod when the piston rod is stroked. Service carefully because oil flies out from the oil hole of the cylinder unit.

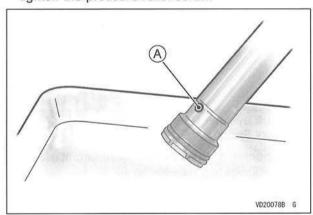


- A. Piston Rod End
- B. Heavy Cloth
- C. Pump the Piston

#### NOTE

- Set the compression damping force setting to the softest. Check the piston rod sliding surface for damage. Apply fork oil to the piston rod sliding surface.
- Drain the extra oil from the cylinder unit oil hole.

- Blow out the extra oil from the oil hole of the cylinder unit with the compressed air blow to the oil hole.
- Wipe the oil off completely from the fork cylinder unit.
- If you cannot use compressed air, remove the pressure relief screw on the fork cap.
   Up side down the fork damper for 10 minutes and drain the oil from the cylinder unit. Reinstall and tighten the pressure relief screw.



#### A. Oil Hole

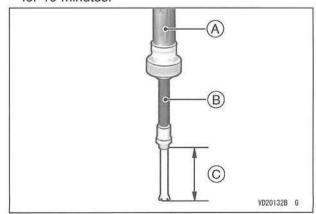
- Protect the piston rod end with a heavy cloth to prevent damage.
- Pump the piston rod to full stroke by pushing down the fork cylinder unit.
- Check the piston rod for smooth operation.
- If the piston rod operation is not smooth, check the piston rod for bend or damage.

- Hold the fork cylinder unit on level ground while piston rod is full stroked by your hand.
- Release the piston rod then check the piston rod extend to maximum.
- If the piston rod does not extend to maximum, bleed the cylinder unit again.

### CAUTION

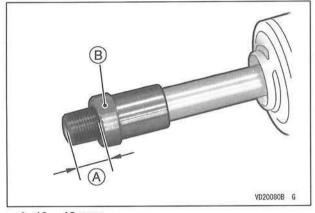
Be careful not to bend or damage the piston rod when the piston rod is stroked.

- Wipe the oil off completely from the cylinder unit.
- Compress the piston rod to 200 ~ 250 mm (7.9 ~ 9.8 in.) and hold the cylinder unit upright position for 10 minutes.



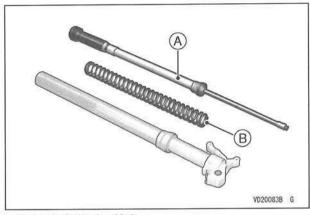
- A. Cylinder Unit
- B. Piston Rod
- C. 200 ~ 250 mm

- There should be no oil leak from the cylinder unit.
- If oil leaks from the cylinder unit, replace the cylinder unit assembly.
- Hold the cylinder unit on level ground and release the piston rod then check the piston rod extend to maximum.
- Tighten the locknut fully and measure 10 ~ 12 mm as shown.



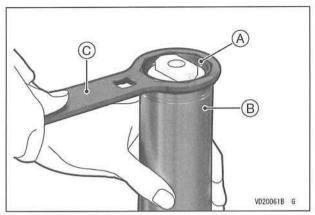
A. 10 ~ 12 mm B. Lock Nut

- Completely wipe off the fork oil from the spring and fork cylinder unit.
- Insert above-mentioned parts into the fork.



A. Fork Cylinder Unit B. Fork Spring

 Temporarily tighten the fork cylinder unit using the top plug wrench (special tool).



- A. Fork Cylinder Unit
- B. Outer Tube
- C. Top Plug Wrench (P.N. 57001-1645)
- Clamp the axle holder with a vise.

#### NOTE

O Protect the axle holder with a soft jaw or heavy cloth when using a vise.

# **A** WARNING

Clamping the axle holder too tight can damage it which will affect riding stability.

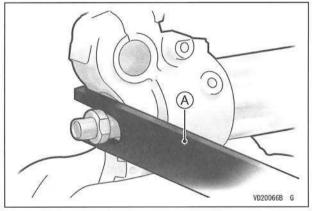
Do not clamp the axle holder too tight.

 Compress the outer tube by hands and install the top plug wrench (special tool) between the axle holder bottom and lock nut.

# **A WARNING**

Be careful of reaction force in spring and fix surely so that special tool should not come off.

Do not place the fingers etc. while serving.

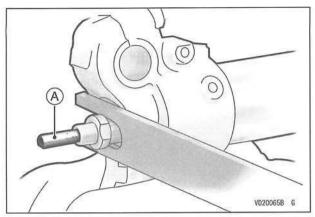


A. Top Plug Wrench (P.N. 57001-1645)

Insert the push rod into the piston rod.

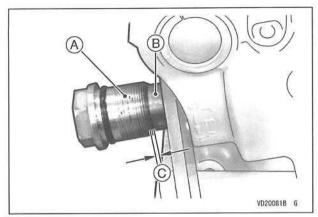
#### NOTE

O Check the push rod installation with its click by turning the push rod right and left.



A. Push Rod

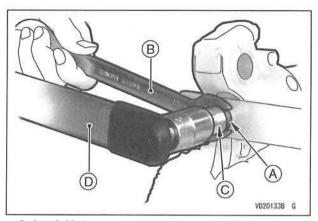
- Replace the O-ring on the adjuster assembly with new ones and apply specified fork oil to the O-ring.
- Slowly turn the adjuster assembly clockwise until resistance is felt and check the clearance between the lock nut and adjuster assembly for more than 1 mm (0.04 in)



- A. Adjuster Assembly
- B. Locknut
- C. More Than 1 mm
- Turn the locknut counterclockwise until it contacts with the adjuster assembly.
- With the locknut held immovable using a wrench, tighten the adjuster assembly to the specified torque.

# Locknut/Adjuster Assembly Tightening Torque

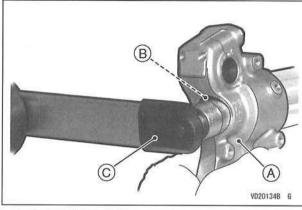
22 N·m (2.2 kgf·m, 16 ft·lb)



- A. Lock Nut
- B. Wrench
- C. Adjuster Assembly
- D. Torque Wrench
- With the outer tube compressed by hands, remove the top plug wrench (special tool).
- Apply a non-permanent locking agent and torque the adjuster assembly to the specified torque.

# **Adjuster Assembly Tightening Torque**

69 N·m (7.0 kgf·m, 50.9 ft·lb)

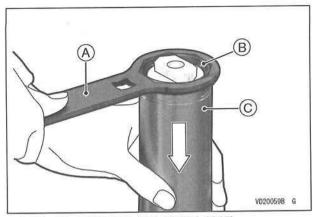


- A. Axle Holder Part
- B. Adjuster Assembly
- C. Torque Wrench
- Compare the length at assembly and at disassembly. There should be same length.
- If the length at assembly is longer than at disassembly, check the adjuster assembly and locknut installation.

#### Standard

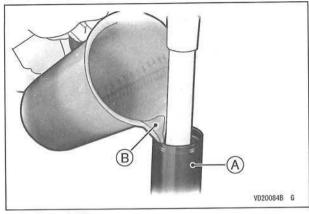
319 ±2 mm

 Using the top plug wrench (special tool), remove the fork cylinder unit from the outer tube and slowly slide down the outer tube.



A. Top Plug Wrench (P.N. 57001-1645)

- B. Fork Cylinder Unit
- C. Outer Tube
- Pour the specified amount of fork oil into the outer tube.



A. Outer Tube B. Fork Oil

# CAUTION

Be sure the oil capacity is the same in both fork legs.

### Recommended Fork Oil

SHOWA SS-05 or equivalent

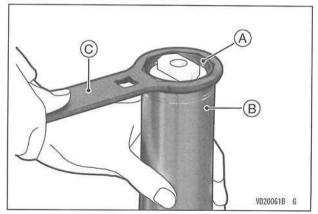
Standard Fork Oil Quantity

Fork Spring	4.5 N·mm (0.45 kgf·mm)	
Fork Oil Quantity	374 mL (12.6 US oz.)	
Adjustable Range	319 ~ 415 mL (10.8 ~ 14.0 US oz.)	

 When changing the fork spring, the oil quantity is as shown in the table.

SOFT (K = 4.3 N·mm)	Standard Oil Quantity	371 ml (12.5 US oz.)
	Adjustable Range	316 ~ 412 ml (10.7 ~ 13.9 US oz.)
HARD	Standard Oil Quantity	377 ml (12.7 US oz.)
	Adjustable Range	322 ~ 418 ml (10.8 ~ 14.1 US oz.)

 Raise the outer tube and temporarily install the fork cylinder unit to the outer tube using the top plug wrench (special tool).

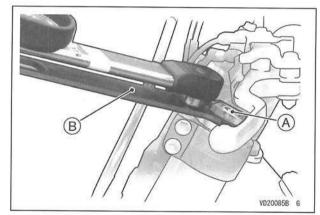


- A. Fork Cylinder Unit
- B. Outer Tube
- C. Top Plug Wrench (P.N. 57001-1645)

- Insert the front fork to the motorcycle.
- Tighten the front fork lower clamp bolts to the specified torque.

# Front Fork Lower Clamp Bolts Tightening Torque

22.5 N·m (2.29 kgf·m, 16.6 ft·lb)



- A. Fork Cylinder Unit
- B. Top Plug Wrench (P.N. 57001-1645)

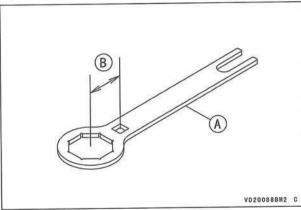
# Fork Cylinder Unit Tightening Torque

34 N·m (3.5 kgf·m, 25 ft·lb)

The torque of fork cylinder unit is specified to 34 N·m (3.5 kgf·m, 25 ft·lb) however, when you use the top plug wrench (special tool), reduce the torque to 90% of the specified value [31 N·m (3.1 kgf·m, 23 ft·lb)] due to the distance between the center of the

square hole, where the torque wrench is fitted, and that of the octagonal hole of the wrench.

This torque value [31 N·m (3.1 kgf·m, 23 ft·lb)] is applicable when you use a torque wrench whose length gives leverage of approximately 310 mm between the grip point to the center of the coupling square.



A. Top Plug Wrench (P.N. 57001-1645) B. Distance

- Remove the upper clamp bolts and apply non permanent locking agent.
- Tighten the front fork upper clamp bolts to the specified torque.

# Front Fork Upper Clamp Bolts Tightening Torque

20 N·m (2.0 kgf·m, 14 ft·lb)

- Take out wood wedge between the disc brake pads.
- Apply grease to the oil seals of the wheel.
- Fit the projection on the cap to the groove on the collar.
- Install the caps and collars on the left and right side of the hub.
- Put the front wheel assembly between the fork legs, and insert the front brake disc into the front brake pads.
- Insert the front axle from the right side of the motorcycle.
- Tighten the front axle nut to the specified torque.

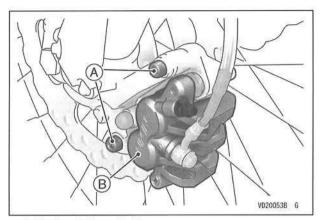
# Front Axle Nut Tightening Torque

79 N·m (8.0 kgf·m, 58 ft·lb)

 Install the brake caliper to the fork leg, and tighten the brake caliper bolts to the specified torque.

# **Brake Caliper Bolts Tightening Torque**

25 N·m (2.5 kgf·m, 18 ft·lb)

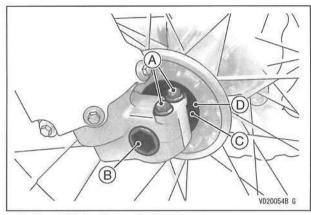


A. Brake Caliper Bolts B. Brake Caliper

 Tighten the left front axle clamp bolt to the specified torque.

## Left Front Axle Clamp Bolt Tightening Torque

20 N·m (2.0 kgf·m, 14.5 ft·lb)



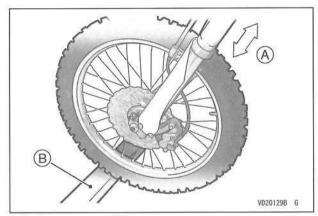
- A. Front Axle Clamp Bolts
- B. Front Axle
- C. Collars
- D. Caps

#### NOTE

- O Tighten the two clamp bolts alternately two times to ensure even tightening torque.
- Remove the jack and stand supporting the motorcycle.
- Install the parts removed.
- Before tightening the clamp bolts on the right fork leg, loosen the right front axle clamp bolts, and pump the forks up and down 4 or 5 times to allow the right fork leg to find a neutral position on the front axle.

#### NOTE

O Do not apply the front brake during this process to stop the motorcycle from rolling forward. Put a block in front of the wheel to stop it from moving.



- A. Pump up and Dwon
- B. Block
- Tighten the right axle clamp bolts to the specified torque.

### NOTE

 Tighten the two clamp bolts alternately two times to ensure even tightening torque.

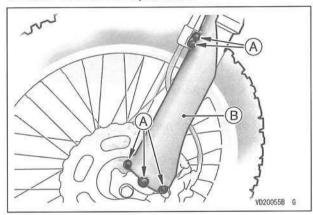
# Right Front Axle Clamp Bolt Tightening Torque

20 N·m (2.0 kgf·m, 14.5 ft·lb)

# **A** WARNING

Do not attempt to ride the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Install the front fork protector.



- A. Bolt
- **B. Front Fork Protector**
- Set the damping adjuster to the position recorded before removing the front fork.

# Optional Fork Springs

Various fork springs are available to achieve suitable front fork action in accordance with the rider's weight and track condition.

Harder springs stiffen the fork action and accelerate the rebound damping.

Softer springs soften the fork action and slow down the rebound damping.

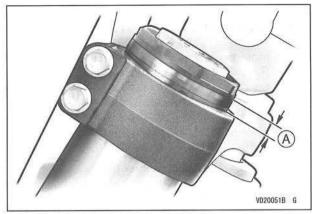
## Fork Clamp Position Adjustment

Steering is greatly affected by the fork clamp position (how much the outer fork tubes protrude above the upper fork clamp). The less the fork tube protrudes, the lighter the front end becomes and the greater the tendency for understeering and washout due to weight biasing. Increasing the amount of fork tube protrusion has opposite effects.

Be sure that the front tire does not touch the fender when the fork is fully compressed. Make this adjustment in 5 mm (0.2 in.) steps.

## CAUTION

The right and left fork tubes must be adjusted evenly.



A. Standard Fork Clamp Position

Standard Fork Clamp Position

7 mm (0.28 in.)\*

\* below the surface of the top plug

#### NOTE

O Tighten the two clamp bolts alternately two times to ensure even tightening torque.

## Rear Suspension (UNI-TRAK®)

This motorcycle's rear suspension system is called "UNI-TRAK®" and consists of a rear shock absorber unit, a swingarm, two lever rods and a lever.

The operating characteristics of the UNI-TRAK® suspension are similar to those of the front fork. However, a linkage system is used to achieve progressive springing characteristics.

## Rear Shock Absorber Inspection

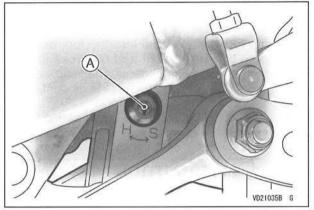
- Pump the seat down and up by 4 or 5 times, and inspect the smooth stroke.
- If it does not smoothly or noise is found, inspect the oil leak and rear shock absorber mounting.
- Visually inspect the rear shock absorber for oil leakage.
- If necessary, repair or replace by an authorized Kawasaki dealer.

## Rear Shock Absorber Adjustment

The spring preload of the shock absorber can be adjusted or the spring can be replaced with an optional one to suit various riding conditions. In addition, the damping force can be adjusted easily, making it unnecessary to change the oil viscosity.

## Rebound Damping Adjustment

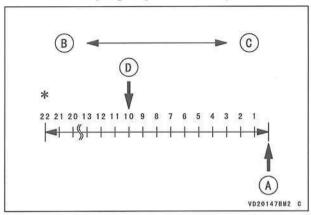
To adjust the rear shock absorber rebound damping, turn the rebound damping adjuster at the bottom of the rear shock absorber with a flat-head screwdriver.



A. Rebound Damping Adjuster

If the damping feels too soft or too stiff, adjust it in accordance with the following table.

## **Rebound Damping Adjuster Settings**



- A. Seated Position (Adjuster Turned Fully Clockwise)
- B. Softer (Counterclockwise)
- C. Harder (Clockwise)
- D. Standard Setting
- Number of turns counterclockwise usable range
   -22 clicks or more

## Standard Rebound Damping Adjuster Setting

10 th clicks

\* Counterclockwise from the fully seated position

## CAUTION

Do not force the rebound and compression damping force adjusters beyond the fully seated position, or the adjusting mechanism may be damaged.

#### NOTE

O Adjustment of the rebound damping adjuster for the rear suspension will slightly affect the compression damping force. Always make any damping adjustments in small steps and test their effects before using them in competition.

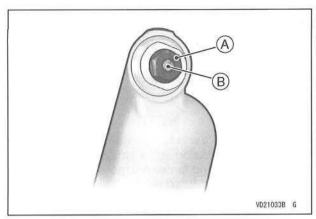
Compression Damping Adjustment (Gas Reservoir)

There are two adjustments you can make to the rear shock absorber gas reservoir.

To adjust the high speed compression damping, turn the high speed compression damping adjuster.

To adjust the low speed compression damping turn the low speed compression damping adjuster with a flat head screwdriver.

If the damping feels too soft or too stiff, adjust it in accordance with the following table.



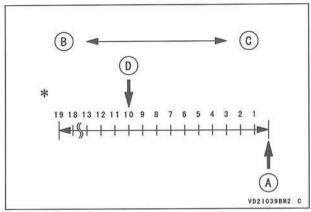
A. Compression Damping Adjuster for High Speed B. Compression Damping Adjuster for Low Speed

# High Speed Compression Damping Adjuster Settings.

0 ~ 4 turns out

If the damper setting feels too soft or too stiff, adjust it in accordance with the following table.

# Low Speed Compression Damping Adjuster Settings



- A. Seated Position (Adjuster Turned Fully Clockwise)
- B. Softer (Counterclockwise)
- C. Harder (Clockwise)
- D. Standard Setting
- Number of turns counterclockwise usable range
   -19 clicks or more

Standard Compression Damping Adjuster Setting

High speed	Low speed	
2 1/3 turns out*	10 clicks*	

## CAUTION

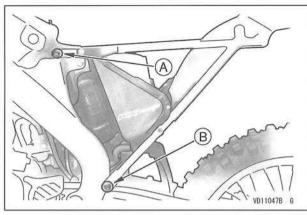
Do not force the rebound and compression damping force adjusters beyond the fully seated position, or the adjusting mechanism may be damaged.

#### NOTE

O Adjustment of the rebound damping adjuster for the rear suspension will slightly affect the compression damping force. Always make any damping adjustments in small steps and test their effects before using them in competition.

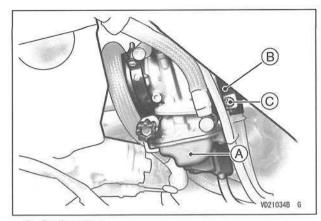
## Spring Preload Adjustment

- Remove the seat and both side covers.
- Remove the silencer (see the "Exhaust System" section).
- Loosen the rear frame bolt (upper side).
- Remove the rear frame bolt (lower side).



A. Bolt (Loosen) B. Bolt (Remove)

 Loosen the air cleaner duct clamp screw at the carburetor and remove the air cleaner duct clamp by raising the rear portion of the frame little.



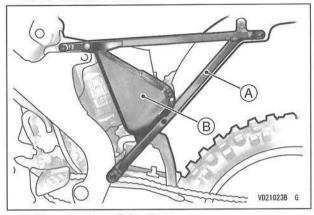
- A. Carburetor
- B. Clamp
- C. Screw

## CAUTION

If the clamp is not removed from the air cleaner housing, the rear shock absorber spring may be damaged.

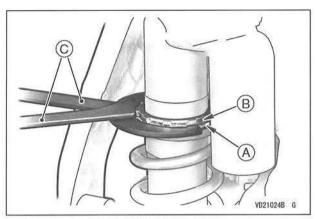
Remove the rear frame bolt (upper side).

 Remove the rear portion of the frame along with the air cleaner case.



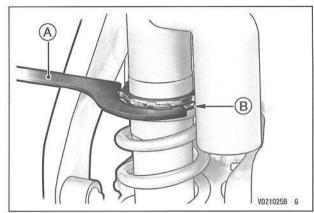
A. Rear Portion of the Frame B. Air Cleaner Case

- Raise the rear wheel off the ground using a jack (special tool).
- Using the hook wrenches (special tool), loosen the locknut on the rear shock absorber.



A. Spring Preload Adjusting Nut

- B. Locknut
- C. Hook Wrenches (P.N. 57001-1539)
- Using the hook wrench (special tool), turn the spring preload adjusting nut as required. Turning the adjusting nut down increases the spring preload.

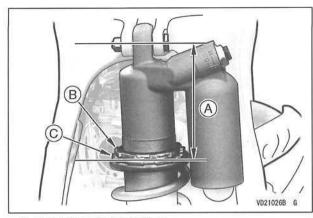


A. Hook Wrench (P.N. 57001-1102) B. Spring Preload Adjusting Nut

- The standard adjusting nut position from the center of the upper rear shock absorber pivot point is 129.1 mm (5.08 in.).
- The adjustable range is as shown in the table below.

Rear Shock Absorber Spring	Adjustable Range
K = 49 N·mm (5.0 kgf·m)	125.8 ~ 135.8 mm (5.0 ~ 5.3 in.)
K = 51 N·mm* (5.2 kgf·m)	125.8 ~ 133.8 mm (5.0 ~ 5.3 in.)
K = 53 N·mm (5.4 kgf·m)	125.8 ~ 139.5 mm (5.0 ~ 5.5 in.)

\*: Standard



- A. Adjusting Nut Position
- B. Locknut
- C. Spring Preload Adjusting Nut
- Tighten the locknut securely.

# Spring Preload Adjusting Nut Tightening Torque 45 N·m (4.6 kgf·m, 33 ft·lb)

- After making the adjustment, move the spring up and down to make sure that it is properly seated.
- Install the parts removed.

## Optional Rear Shock Absorber Springs

Various rear shock absorber springs are available to achieve suitable rear shock absorber action in accordance with the rider's weight and track condition.

A harder spring stiffens the shock absorber action and accelerates the rebound damping.

A softer spring softens the shock absorber action and slows down the rebound damping.

## **A WARNING**

Improper removal or installation of the rear shock absorber spring may cause the spring and/or related parts to be ejected at high velocity. Always wear eye and face protection when working on the rear shock absorber. Removal and installation of the rear shock absorber spring should be performed by an authorized Kawasaki dealer.

## Wheels

#### Tire Air Pressure

Tire air pressure affects traction, handling, and tire life. Adjust the tire air pressure to suit track conditions and rider preference, but keep it close within the recommended range.

- To check the tire air pressure, remove the air valve cap, and make sure to tighten the cap securely after checking the tire pressure.
- Reduce the tire air pressure to increase the tire tread surface on the ground when riding on a wet, muddy, sandy or slippery track.
- Increase the tire air pressure to prevent damage or punctures (though the tires will skid more easily) when riding on a pebbly or hard track.

## Tire Air Pressure Adjustable Range

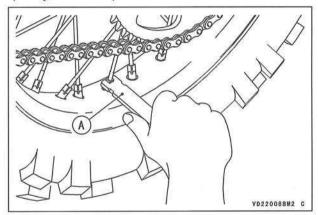
80 kPa (0.8 kgf/cm², 11 psi) ~ 100 kPa (1.0 kgf/cm², 14 psi)

#### NOTE

O Tire air pressure should be checked when the tires are cold, before you ride the motorcycle.

## Spokes and Rims

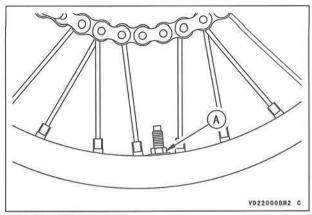
The spokes on both wheels must all be securely and evenly tightened and not be allowed to loosen. Unevenly tightened or loose spokes will cause the rim to warp, the nipples and spokes to fatigue more quickly, and the spokes to break.



A. Spoke and Spark Plug Wrench

#### Bead Protector

There is a bead protector on the both wheels. The bead protector prevents the tire and tube from slipping on the rim and damaging the valve stem. Valve stem damage may cause the tube to leak, necessitating tube replacement. In order to keep the tire and tube in position on the rim, inspect the bead protector before riding and tighten it if necessary. Tighten the valve stem nut finger tight only.



A. Bead Protector

#### Rim Runout

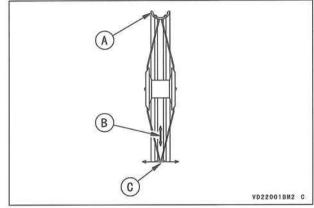
Set up a dial gauge on the side of the rim and rotate the wheel to measure its axial runout. The difference between the highest and lowest readings is the amount of runout.

- Set up the dial gauge on the inner circumference of the rim and rotate the wheel to measure its radial runout. The difference between the highest and lowest readings is the amount of runout.
- A certain amount of rim warpage (runout) can be corrected by recentering the rim, that is, by loosening some spokes and tightening other to change the position of certain portions of the rim. If the rim is badly bent, however, it should be replaced.

#### NOTE

O The welding spot of the rim may show excessive runout. Disregard this when measuring rim runout.

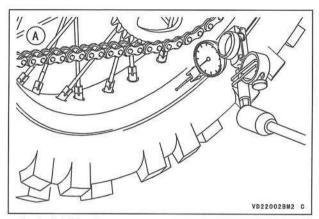
#### Rim Runout



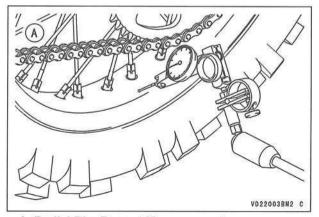
- A. Rim
- B. Radial Runout
- C. Axial Runout

#### **Rim Runout Maximum Limit**

Axial	1.0 mm (0.04 in.)
Radial	1.0 mm (0.04 in.)



A. Axial Rim Runout Measurement

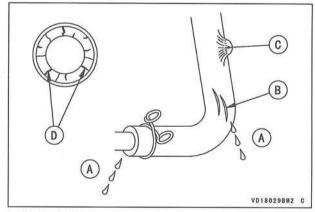


A. Radial Rim Runout Measurement

## **Hoses Inspection**

Check the brake and fuel hoses for cracks or deterioration, and the connections for looseness in accordance with the Periodic Maintenance Chart.

- Inspect the brake hose and fittings for deterioration, cracks and signs of leakage by bending or twisting the hoses.
- If damaged, replace the hoses.

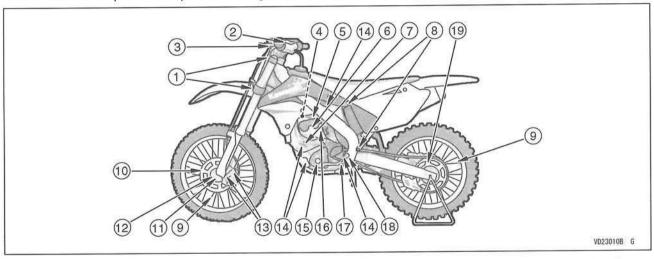


- A. Leakage
- B. Cracks
- C. Bulges
- D. Ozonic Cracks
- Check the hose are securely connected and clamps are tightened correctly.

## **Tightening Torques of Nuts and Bolts**

## Location of nuts and bolts

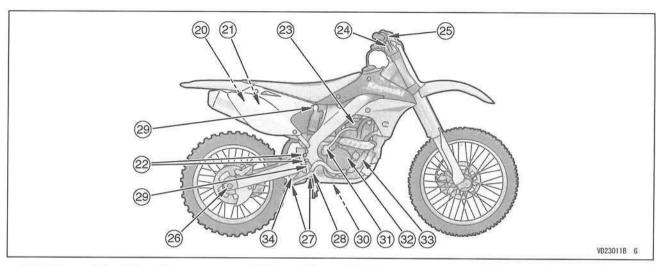
Before the first ride of each day of operation, check the tightness of the nuts and bolts shown below. Check also that all cotter pins are in place and in good condition.



- 1. Front Fork Clamp Bolts
- 2. Handlebar Clamp Bolts
- 3. Clutch Lever Holder Bolt
- 4. Spark Plug
- 5. Cylinder Head Cover Bolts
- 6. Cylinder Head Bolts
- 7. Cylinder Bolts
- 8. Rear Frame Bolts

- 9. Spokes
- 10. Brake Disc Mounting Bolts
- 11. Front Axle Nut
- 12. Front Axle Clamp Bolts
- 13. Brake Caliper Bolts
- 14. Engine Mounting Bolts and Nuts
- 15. Rotor Nut

- 16. Camshaft Chain Tensioner Bolts
- 17. Shift Pedal Bolts
- 18. Swingarm Pivot Shaft Nut
- 19. Rear Sprocket Nut



- 20. Silencer Pipe Mounting **Bolts**
- 21. Silencer Cover Mounting Bolts
- 22. Rear Master Cylinder **Mounting Bolts**
- 23. Cylinder Head Bracket Nut 24. Steering Head Nut

- 25. Front Master Cylinder Mounting Bolts
- 26. Rear Axle Nut
- 27. UNI-TRAK Lever Rod Bolt
- 28. Rear Brake Pedal Pivot Bolt
- 29. Rear Shock Absorber Bolt and Nut

- 30. Kick Pedal Pivot Bolt
- 31. Clutch Cover Bolts
- 32. Engine Oil Drain Plugs 33. Water Pump Cover Bolts 34. Uni-Trak Arm Bolt

## Torque table

Tighten all nuts and bolts to the proper torque using an accurate torque wrench. An insufficiently tightened nut or bolt may become damaged or fall out, possibly resulting in damage to the motorcycle and injury to the rider. An overtightened nut or bolt may become damaged, broken, or fall out.

Part Name		N·m	kgf⋅m	ft∙lb
Cylinder Head Cover Bolts		9.8	1.0	(87 in·lb)
Cylinder Head Bolts	(M10)	50	5.0	37
	(M6)	12	1.2	(106 in·lb)
Camshaft Chain Tensioner Bol	ts	9.8	1.0	(87 in·lb)
Cylinder Bolts	(M6)	12	1.2	(106 in·lb)
Camshaft Cap Bolts		9.8	1.0	(87 in·lb)
Engine Oil Drain Plug	(Front)	7.0	0.7	5.2
Engine Oil Drain Plug	(M10)	20	2.0	15
Engine Oil Drain Plug (Oil Filte Kick Pedal Pivot Bolt	r Cover)	9.8	1.0	(87 in·lb)
Kick Pedal Pivot Bolt		25	2.5	18
Rotor Nut		49	5.0	37
Shift Pedal Bolt		9.8	1.0	(87 in·lb)
Spark Plug		13	1.3	9.6
Coolant Drain Plug		7.0	0.7	(62 in·lb)
Clutch Cover Bolts		9.8	1.0	(87 in·lb)
Clutch Spring Bolts		9.0	0.9	(80 in·lb)
Generator Cover Bolts		9.8	1.0	(87 in·lb)

	Part Name		N·m	kgf⋅m	ft·lb
	Brake Caliper Bolts	(Front)	25	2.5	18
	Brake Disc Mounting Bolts	(Front)	9.8	1.0	(87 in·lb)
	****	(Rear)	23	2.3	17
	Cylinder Head Bracket Nut	M8	29	3.0	22
		M10	49	5.0	36
	Engine Mounting Bolts		49	5.0	36
	Front Axle Nut		79	8.0	58
	Front Axle Clamp Bolts		20	2.0	14
	Front Fork Clamp Bolts	(Uppet)	20	2.0	14
'A		(Lower)	22.5	2.29	16.6
CHASSIS	Silencer Bolts		21	2.1	15
AAS	Silencer Cover Bolts		12	1.2	(106 in·lb)
ប់	Fork Cylinder Unit		34	3.5	25
	Handlebar Clamp Bolts		25	2.5	18
	Swingarm Pivot Shaft Nut		98	10.0	72
	Rear Axle Nut		110	11.0	80
	Rear Brake Pedal Pivot Bolt		25	2.5	18
	Rear Frame Bolts		34	3.5	25
	Rear Shock Absorber Upper Bolt		39	4.0	29
	Rear Shock Absorber Lower Nut		34	3.5	25
	Spokes		2.2	0.2	(19 in·lb)
	Steering Head Nut		98	10.0	72

	Part Name	N·m	kgf⋅m	ft·lb
	Steering Stem Locknut	4.9	0.5	(43 in·lb)
	UNI-TRAK® Arm Bolt*	59	6.0	44
S	UNI-TRAK® Rod Bolts*	59	6.0	44
ASSIS	Rear Sprocket Nuts	34	3.5	25
CHA	Front Brake Master Cylinder Clamp Bolts	8.8	0.9	(78 in·lb)
O	Rear Brake Master Cylinder Mounting Bolts	10	1.0	(87 in·lb)

<sup>\*:</sup> Apply the oil to bolt thread or nut seat side.

## Cleaning Your Motorcycle

### General Precautions

Frequent and proper care of your Kawasaki motorcycle will enhance its appearance, optimize overall performance, and extend its useful life. Covering your motorcycle with a high quality, breathable motorcycle cover will help protect its finish from harmful UV rays, pollutants, and reduce the amount of dust reaching its surfaces.

- Be sure the engine and exhaust are cool before washing.
- Avoid applying degreaser to seals, brake pads, and tires.
- Always use non-abrasive wax and cleaner/polisher.
- Avoid all harsh chemicals, solvents, detergents, and household cleaning products such as ammonia-based window cleaners.
- Gasoline, brake fluid, and coolant will damage the finish of painted and plastic surfaces: wash them off immediately.
- Avoid wire brushes, steel wool, and all other abrasive pads or brushes.
- Use care when washing the plastic parts as they can easily be scratched.
- Avoid using pressure washers; water can penetrate seals and electrical components and damage your motorcycle.

#### **MAINTENANCE AND ADJUSTMENT 123**

 Avoid spraying water in delicate areas such as in air intakes, carburetors, brake components, electrical components, muffler outlets, and fuel tank openings.

## Washing Your Motorcycle

- Rinse your bike with cold water from a garden hose to remove any loose dirt.
- Mix a mild neutral detergent (designed for motorcycles or automobiles) and water in bucket. Use a soft cloth or sponge to wash your motorcycle. If needed, use a mild degreaser to remove any oil or grease build up.
- After washing, rinse your motorcycle thoroughly with clean water to remove any residue (residue from the detergent can damage parts of your motorcycle).
- Use a soft cloth to dry your motorcycle. As you dry, inspect your motorcycle for chips and scratches.
   Do not let the water air dry as this can damage the painted surfaces.
- Start the engine and let it idle for several minutes.
   The heat from the engine will help dry moist areas.
- Carefully ride your motorcycle at a slow speed and apply the brakes several times. This helps dry the brakes and restores them to normal operating performance.
- Lubricate the drive chain to prevent rusting.

#### NOTE

 After riding in an area where the roads are salted or near the ocean, immediately wash your motorcycle with <u>cold water</u>. Do not use warm water as it

accelerates the chemical reaction of the salt. After drying, apply a corrosion protection spray on all metal and chrome surfaces to prevent corrosion.

## Painted Surfaces

After washing your motorcycle, coat painted surfaces, both metal and plastic, with a commercially available motorcycle/automotive wax. Wax should be applied once every three months or as conditions require. Avoid surfaces with "satin" or "flat" finishes. Always use nonabrasive products and apply them according to the instructions on the container.

## Plastic Parts

After washing use a soft cloth to gently dry plastic parts. When dry, treat the non-painted plastic parts with an approved plastic cleaner/polisher product.

## CAUTION

Plastic parts may deteriorate and break if they come in contact with chemical substances or household cleaning products such as gasoline, brake fluid, window cleaners, thread-locking agents, or other harsh chemicals. If a plastic part comes in contact with any harsh chemical substance, wash it off immediately with water and a mild neutral detergent, and then inspect for damage. Avoid using abrasive pads or brushes to clean plastic parts, as they will damage the part's finish.

## Chrome and Aluminum

Chrome and uncoated aluminum parts can be treated with a chrome/aluminum polish. Coated aluminum should be washed with a mild neutral detergent and finished with a spray polish. Aluminum wheels, both painted and unpainted can be cleaned with special non-acid based wheel spray cleaners.

## Leather, Vinyl, and Rubber

If your motorcycle has leather accessories, special care must be taken. Use a leather cleaner/treatment to clean and care for leather accessories. Washing leather parts with detergent and water will damage them, shortening their life.

Vinyl parts should be washed with the rest of the motorcycle, then treated with a vinyl treatment.

The sidewalls of tires and other rubber components should be treated with a rubber protectant to help prolong their useful life.

## A WARNING

Special care must be taken not to get any rubber protectant on the tire's tread surface when treating tires. This may decrease the tire's ability to maintain contact with the road surface causing the rider to lose control.

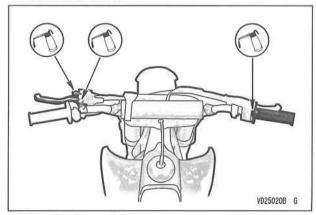
## Lubrication

Lubricate the areas shown in the illustrations of this section with either motor oil or regular grease, after each race and whenever the vehicle has been operated under wet or rainy conditions, especially after using a high-pressure spray washer. Before lubricating a part, clean off any rust with rust remover and wipe off any grease, oil, dirt, or grime.

## General Lubrication

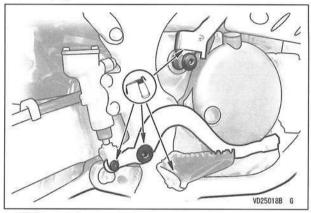
Apply motor oil to the following pivots:

- Clutch lever
- Front brake lever
- Hot Starter Lever

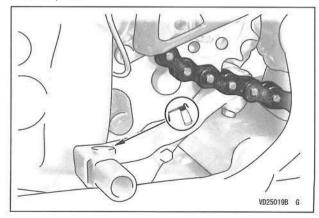


- · Rear brake pedal
- · Rear brake rod joints
- Kick pedal

## Foot peg



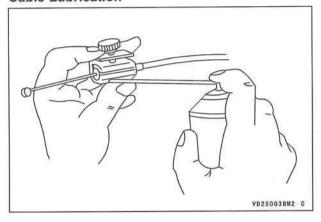
Shift pedal



Apply an aerosol cable lubricant with a pressure lubricator on all cables:

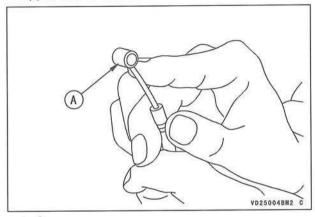
- Clutch cable
- Throttle cable
- Hot starter cable

#### **Cable Lubrication**



Apply grease to the following points:

- Upper end of clutch cable
- Upper end of throttle cable
- Upper end of hot starter cable



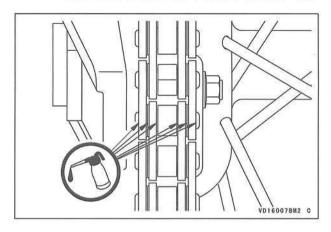
A. Grease.

### Drive Chain Lubrication

Lubricate the drive chain after riding through rain or on wet track, or any time that the chain appears dry. A heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.

- Apply oil to the sides of the rollers so that it will penetrate to the rollers and bushings.
- Wipe off any excess oil.

#### **MAINTENANCE AND ADJUSTMENT 127**



#### NOTE

O This troubleshooting guide is not exhaustive and does not give every possible cause for each problem listed. It is meant simply as a quick guide to assist you in troubleshooting for some of the more common difficulties.

## Starting failure or difficulties -

## Engine does not turn over

- Valve seized
- Valve lifter seized
- Cylinder or piston seized
- Crankshaft seized
- · Connecting rod small end seized
- Connecting rod big end seized
- Camshaft seized
- Transmission gear or bearing seized
- Kick shaft return spring broken
- Kick ratchet gear not engaging

#### Fuel does not flow

- No fuel in tank
- Fuel tap turned off
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

## **Engine flooded**

- Fuel level too high
- Float valve worn or stuck open
- Wrong starting technique (when the engine is flooded, kick with the throttle fully closed by pulling the hot starter lever in.)

## Spark missing or weak

- Spark plug dirty, broken, or gap improperly adjusted
- Spark plug cap or high-tension wiring defective
- Spark plug cap not contacting properly
- Spark plug type incorrect
- Crankshaft sensor defective
- CDI unit defective
- Ignition coil defective
- Engine stop switch wiring defective
- Ignition coil resistor defective/disconnected
- Flywheel magneto damaged
- Neutral switch defective
- · Wiring shorted or interrupted

#### Fuel-air mixture incorrect

- Idling adjusting/pilot screw improperly adjusted
- Slow jet or air passage clogged
- Air cleaner element clogged, poorly sealed, or not installed
- Starter jet clogged

## Compression low

- Spark plug loose
- Cylinder head insufficiently tightened
- Cylinder nut loose
- Cylinder or piston worn
- No valve clearance
- Crankshaft oil seal leak
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)
- · Piston ring worn, weak, broken, or sticking
- Piston ring side clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Cylinder gasket damaged

## Poor low-speed performance -

## Spark weak

- Spark plug dirty, broken, or gap improperly adjusted
- Spark plug cap or high-tension wiring defective
- Spark plug cap shorted or not contacting properly
- Spark plug type incorrect
- CDI unit defective
- Ignition coil defective
- Crankshaft sensor defective
- Flywheel magneto defective
- Wiring connector not in good contact

#### Fuel-air mixture incorrect

- · Idling adjusting/pilot screw improperly adjusted
- Slow jet, Needle jet or air passage clogged
- Air cleaner element clogged, poorly sealed, or not installed
- Starter plunger stuck open
- Carburetor fuel level too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air intake duct loose
- Hot starter stuck open
- Fuel tap clogged

## Compression low

- Spark plug loose
- Cylinder head insufficiently tightened
- Cylinder nut loose
- Cylinder or piston worn
- Piston ring worn, weak, broken, or sticking
- Piston ring side clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Cylinder gasket damaged
- No valve clearance
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface).
- Decompression trouble

#### Other

- Engine oil viscosity too high
- Brake dragging
- Ignition timing incorrect
- Engine oil level too high
- CDI unit defective
- Drive chain trouble
- Engine over heating
- Clutch slipping

## Poor or no high-speed performance -

## Firing incorrect

- Spark plug dirty, damaged, or gap improperly adjusted
- Spark plug cap or high-tension wiring defective
- Spark plug cap shorted or not contacting properly
- Spark plug type incorrect
- CDI unit defective
- Ignition coil defective
- Crankshaft sensor defective
- Flywheel magneto defective
- Wiring connector not in good contact

#### Fuel-air mixture incorrect

- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Carburetor fuel level too high or too low
- Air jet or air passage clogged
- Air cleaner element clogged, poorly sealed or not installed
- Starter plunger stuck open

- Fuel supply to carburetor insufficient
- Fuel contaminated with water or foreign matter
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air intake duct loose
- Fuel tap clogged
- Fuel line clogged
- Hot starter stuck open
- Needle Jet or air passage clogged

## Compression low

- Spark plug loose
- Cylinder head insufficiently tightened
- Cylinder nut loose
- Cylinder or piston worn
- · Piston ring worn, weak, broken, or sticking
- Piston ring side clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- No valve clearance
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on seating surface).
- Cylinder gasket damaged
- Decompression trouble

## Improper acceleration

- Starter plunger stuck open
- · Carburetor fuel level too high or too low
- Main jet clogged
- Throttle valve does not fully open
- Air cleaner element clogged
- Muffler clogged

- Fuel contaminated with water or foreign matter
- Brake dragging
- Clutch slipping
- Engine overheating
- Engine oil level too high
- · Engine oil viscosity too high
- Crankshaft bearing worn or damaged
- Ignition timing incorrect
- Crankshaft sensor defective
- Hot starter stuck open

#### Knocking

- Carbon built up in combustion chamber
- Fuel quality poor or type incorrect
- Spark plug type incorrect
- CDI unit defective

## Engine overheating -

## Firing incorrect

- Spark plug dirty, broken, or gap improperly adiusted
- Spark plug type incorrect
- CDI unit defective

#### Fuel-air mixture incorrect

- Main jet clogged or wrong size
- Carburetor fuel level too low
- Carburetor holder loose
- Air cleaner element clogged, poorly sealed, or not installed
- · Air intake duct poorly sealed
- Hot starter stuck open

## Compression high

Carbon built up in combustion chamber

## Engine overloaded

- Brake dragging
- Clutch slipping
- Engine oil level too high
- Engine oil viscosity too high
- Drive chain trouble

## Lubrication inadequate

- Engine oil level too low
- Engine oil quality poor or type incorrect

## Coolant inadequate

- Coolant level too low
- Coolant deteriorated

## Cooling system component defective

- Radiator clogged
- Radiator cap defective
- Water pump not rotating

## Clutch operation faulty -

## Clutch slipping

- No clutch lever play
- Clutch cable improperly adjusted
- Clutch cable defective
- Clutch plate worn or warped
- Clutch spring broken or weak
- Clutch release mechanism defective
- Clutch hub or housing unevenly worn

## Clutch not disengaging properly

- Clutch lever play excessive
- Clutch plate warped or too rough
- Clutch spring tension uneven
- Engine oil deteriorated
- Engine oil viscosity too high
- · Engine oil level too high
- Clutch housing frozen on drive shaft
- Clutch release mechanism defective
- Clutch hub nut loose
- Clutch plate warped or rough
- Clutch hub spline damaged

## Gear shifting faulty -

# Transmission does not go into gear; shift pedal does not return

- Clutch not disengaging
- Shift fork bent or seized
- · Gear stuck on the shaft
- Shift lever broken
- Pawl guide plate broken
- Shift return spring weak or broken
- Shift return spring pin loose
- Shift pawl broken
- Shift pawl spring tension lose
- Shift drum broken

## Transmission jumps out of gear

- Shift fork worn
- Gear groove worn

- · Gear dogs and/or dog grooves worn
- Shift drum groove worn
- Gear positioning lever spring weak or broken
- Shift fork pin worn
- Drive shaft, output shaft, and/or gear splines worn

## Transmission skips gears

- · Gear positioning lever spring weak or broken
- Pawl guide plate worn

## Engine noise abnormal -

## Knocking

- CDI unit defective
- Carbon built up in combustion chamber
- Fuel quality poor or type incorrect
- Spark plug type incorrect
- Engine overheating

#### Piston slap

- Piston clearance excessive
- Cylinder or piston worn
- Connecting rod bent
- Piston pin or piston pin bores worn

#### Valve noise

- Valve clearance incorrect
- Valve spring broken or weak
- Camshaft bearing or camface worn
- Valve lifter worn

#### Other noise

- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken or stuck
- Piston seized or damaged
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder head
- Crankshaft runout excessive
- Engine mounts loose
- Crankshaft bearing worn
- Primary gear worn or chipped
- Camshaft chain tensioner trouble
- · Camshaft chain, sprocket, chain guide worn
- Decompression spring broken
- Flywheel magneto loose

#### Abnormal drive train noise -

#### Clutch noise

- Clutch housing/friction plate clearance excessive
- Clutch housing gear excessive
- Metal chip jammed in clutch housing gear teeth

#### Transmission noise

- · Crankcase bearing worn or damaged
- Transmission gear worn or chipped
- Metal chip jammed in gear teeth
- Engine oil level or viscosity too low
- Kick ratchet gear not properly disengaging from kick gear

Output shaft idle gear worn or chipped

#### Drive chain noise

- Drive chain slack improperly adjusted
- Drive chain worn
- Rear and/or engine sprocket(s) worn
- Drive chain inefficiently lubrified
- Rear wheel misaligned

#### Frame noise abnormal -

#### Front fork noise

- Oil level or viscosity too low
- Spring weak or broken
- Front fork air pressure high

#### Rear shock absorber noise

Shock absorber damaged

#### Disc brake noise

- Pad installed incorrectly
- Pad surface glazed
- Brake disc warped
- Brake caliper defective
- Brake cylinder damaged

#### Other noise

Bracket, nut, bolt, etc. improperly mounted or tightened

#### Exhaust smoke -

## **Excessively white**

- Piston oil ring worn
- Cylinder worn
- Valve oil seal damaged
- Valve guide worn
- Engine oil level too high

#### Black smoke

- Air cleaner element clogged
- Main jet too large or fallen out
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high

#### Brownish

- Main jet too small
- Fuel level in carburetor float bowl too low
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Air cleaner poorly sealed or missing.

## Poor handling and/or stability -

## Handlebar hard to turn

- Control cable incorrectly routed
- Wiring incorrect routed
- Steering stem locknut too tight
- Roller bearing damaged
- Steering stem inadequately lubricated
- Steering stem bent

• Tire air pressure too low

## Handlebar shakes or vibrates excessively

- Tire worn
- Swingarm sleeve or needle bearing damaged
- Rim warped or out of balance
- Front and/or rear axle runout excessive
- Wheel bearing worn
- Handlebar clamp loose
- Steering head nut loose

## Handlebar pulls to one side

- Frame bent
- Wheel misaligned
- Swingarm bent or twisted
- Swingarm pivot shaft runout excessive
- Steering maladjusted
- Steering stem bent
- Front fork leg bent
- Right/left front fork oil level uneven

# Shock absorption unsatisfactory (suspension too hard)

- Front fork oil excessive
- Front fork oil viscosity too high
- Front fork leg bent
- Front fork air pressure high
- Tire air pressure too high
- Rear shock absorber improperly adjusted

# Shock absorption unsatisfactory (suspension too soft)

- Front fork oil level insufficient and/or front fork leaking oil
- Front fork oil viscosity too low
- Front fork and/or rear shock absorber spring weak
- Rear shock absorber leaking gas
- Rear shock absorber improperly adjusted

## Poor braking performance -

- · Air in the brake line
- · Brake pad or disc worn
- Brake fluid leaking
- Brake disc warped
- Brake pads contaminated
- Brake fluid deteriorated
- Primary and/or secondary master cylinder cup(s) damaged
- Master cylinder scratched
- Brake maladjusted (lever or pedal play excessive)

## **Carburetor Tuning**

Tuning a carburetor is not the mysterious science many racers believe it to be. One only needs to establish a basic knowledge of the identification and function of carburetor components as well as how they work together to do the job well.

Temperature-and altitude-related mixture adjustment

Condition*	Mixture will be	Adjustment
Cold air	leaner	richer
Warm air	richer	leaner
Dry air	leaner	richer
Low altitude	standard	none
High altitude (above 1 500 m or 4 000 ft)	richer	leaner

at constant atmospheric pressure and humidity

The main jet size should be increased or decreased by one to five sizes and the engine tested until its power is maximum.

Symptoms of Improper Mixture

If your machine exhibits one or several of the symptoms listed below, it may need carburetor tuning. Before attempting any changes, however, make sure that everything else is in good shape and properly tuned. Check the condition of the spark plug, make sure the ignition timing is correct, service the air cleaner element and decarbonize the muffler.

If your machine has run properly on a certain track in the past and then starts running poorly with the same carburetor settings, the problem is almost certain to be elsewhere; changing the carburetor settings in such a case would probably be a waste of time.

Symptoms when the mixture is too rich

Poor acceleration
Misfire at low engine speeds
Excessive smoke
Spark plug fouling
A "deep" exhaust noise

## Symptoms when the mixture is too lean

O Pinging or rattling
O Erratic acceleration
O Same as when running out of fuel
O High engine temperature

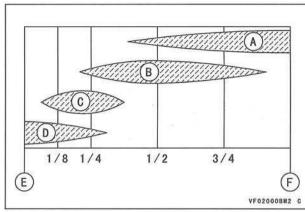
With pinging or rattling, make sure that the gasoline is fresh and the octane rating sufficient. You might also try a different brand of high-octane gasoline.

## Making Adjustments

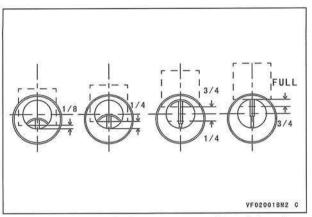
Carburetor tuning is made by replacing or adjusting the jet needle, main jet and slow jet, which regulate the fuel flow and pilot screw, which regulates the gasoline/air mixture.

The following chart shows the working range of each component. Note how the working ranges overlap as the throttle valve opens.

#### **ENGINE AND SUSPENSION TUNING 137**



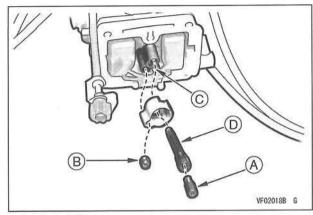
- A. Main Jet
- B. Jet Needle (Clip Position)
- C. Jet Needle (Straight Section)
- D. Slow Jet & Pilot Screw
- E. Closed
- F. Full Open



If you note a particular symptom of too rich or lean mixture in a specific operating range, use the chart to determine which components need adjusting. Use the following information to decide what changes to make.

#### Main Jet -

The main jet has its greatest effect in the ½-to-full-throttle range. The number stamped on the bottom or side of the main jet indicates the size of the hole in the jet which meters fuel. The larger the main jet number, the bigger the hole and the more fuel will flow; hence, larger numbers mean richer jetting; smaller numbers mean leaner jetting. Make main jet changes one size at a time.



- A. Main Jet
- B. Slow Jet
- C. Jet Needle
- D. Needle Jet

## **A** WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Never smoke while working on the carburetor. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

#### Jet Needle -

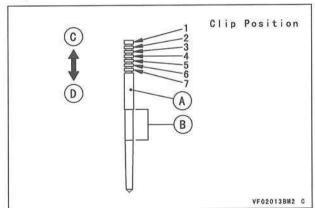
The jet needle has the greatest effect in the 1/4-to -3/4-throttle range. The needle moves in and out of the needle jet. Since the needle is tapered, its position in the needle jet determines the amount of fuel

allowed to pass through. There are seven grooves in the top of the jet needle in which a clip fits. This clip positions the jet needle in the throttle valve relative to the needle jet.

Moving the clip down has the effect of pulling the needle further out of the jet; the mixture is thereby enriched. Moving the clip up leans the mixture. Change the clip position one step at a time.

The straight section of the jet needle affects the throttle response at smaller throttle openings.

## Clip Position



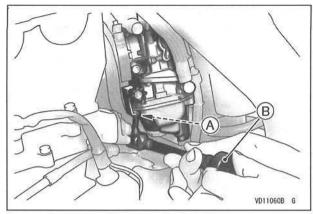
- A. Jet Needle Number
- **B. Straight Section**
- C. Leaner
- D. Richer

#### Slow Jet and Pilot Screw -

The slow jet and pilot screw control the mixture in the closed-to-1/8-throttle range, but have little effect between that and full throttle. To adjust the mixture in this range, the pilot screw can be turned to change the mixture, or the slow jet can be replaced to change the fuel flow. Start by turning the pilot screw while using the pilot screw adjuster D (special tool). Screwing the pilot screw in thins the mixture. Pilot screw specifications indicate the number of turns out from the lightly seated position. Make changes in 1/4-turn increments. If turning the screw between one and two-and-a-half turns does not provide the desired results, go over to adjusting the slow jet. The slow jet has a number stamped on it, which indicates its size: the larger the jet number is, the richer the mixture. Make one-step changes of the slow jet and fine-tune with the pilot screw.

#### NOTE

 When removing the pilot screw adjuster D from the carburetor, move the carburetor up lightly by using a suitable tool.



- A. Pilot Screw
- B. Pilot Screw Adjuster D (57001-1588)

#### Test Runs

 With all carburetor settings on standard, warm up the engine, run two or three laps of the course and examine the spark plug condition with varying throttle openings.

## Fuel-Air Mixture Adjustment

Spark Plug Insulator Condition	Mixture
Dry and a light tan color	correct
Whitish	too lean
Wet and sooty	too rich

- ★ If the spark plug insulator is whitish, the fuel-air mixture is too lean. Increase the main jet size by one step.
- ★ If the spark plug insulator is wet, the fuel-air mixture is too rich. Reduce the main jet size by one step.
- Tune the carburetor so that the engine delivers satisfactory power at all throttle openings.

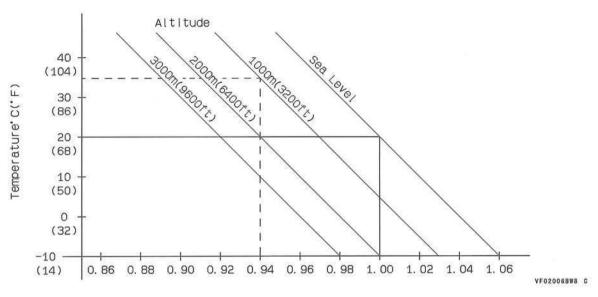
#### NOTE

O If the air-fuel mixture is too lean, the engine tends to overheat and may seize up. On the other hand, if the air-fuel mixture is too rich, the spark plug gets wet, which causes misfiring. The richness of the mixture varies depending on atmospheric conditions (pressure, humidity, and temperature). Adjust the carburetor taking these conditions into consideration.

## Altitude and Temperature Correction Factors

#### NOTE

O For the following recommendations to be applicable, you must use the standard settings as a base. Do not change any of the settings until you have determined which are necessary. All specifications are based on the use of the specified fuel and oil.



Correction Factor Applied to the Jet Needle and Pilot Screw

Correction factor	1.06 or above	1.06 - 1.02	1.02 - 0.98	0.98 - 0.94	0.94 or below
Jet needle setting	lower clip one position	same		i.	raise clip one position
Pilot screw opening	one turn out	½ turn out	same	1/2 turn in	one turn in

**Standard Carburetor Settings** 

Pilot screw opening	2 1/8	
Throttle valve diameter	1.5	
Slow jet	40	
Jet needle	NCYU	
Jet needle clip position	4	
Main jet	182	

Determine the altitude and temperature correction factor.

EXAMPLE: At 1 000 meters (3 200 ft) altitude and an air temperature of 35°C (95°F), the correction factor is 0.94 (see dotted line in the appropriate chart on the previous page).

Select the correct slow jet and main jet.
 EXAMPLE: For a correction factor of 0.94, multiply the jet size by that number.

Slow Jet Size Selection for a Correction factor of 0.94

Main Jet Size Selection for a Correction factor of 0.94

 Change the jet needle clip position and pilot screw opening according to the appropriate chart on the previous page.

EXAMPLE: For a correction factor of 0.94, raise the needle clip one position and turn in the pilot screw one turn.

Jet Needle Clip and Pilot Screw Setting for a Correction Factor of 0.94

Jet needle clip	4th groove from top-1 groove = 3rd groove
	2 1/8 turns out – 1 turn out = 1 1/8 turns out

### Suspension Tuning

#### Introduction

No area of machine adjustment is more critical than proper suspension tuning. An improperly tuned suspension will keep even the best rider from attaining the full benefit of his machine's ability. Match the suspension to the rider and the course conditions. WHILE TUNING THE SUSPENSION, KEEP THE FOLLOWING IMPORTANT POINTS IN MIND:

- If the machine is new, "break in" the suspension with at least one hour of riding before making any setting evaluations or changes.
- The three major factors which must be considered in suspension tuning are RIDER WEIGHT, RIDER ABILITY, and TRACK CONDITIONS. Additional influences include the RIDER'S STYLE and PO-SITIONING on the machine.
- Before changing the suspension settings, test changing your riding posture or position to check whether it is the cause of the problem or not.
- It is a wise practice to adjust the suspension to suit the rider's strong points. If you are fast in the corners, adjust the suspension to allow fast cornering.
- Make setting changes in small increments. A little bit goes a long way, and a setting is easily over adjusted.
- The front and rear suspension should always be balanced; when the one is changed, the other one might need to be changed similarly.

#### **ENGINE AND SUSPENSION TUNING 143**

- When evaluating suspension performance, the rider must make every effort to ride consistently and to recognize the effects of his input. Such things as changes in rider position and increasing fatigue may lead to incorrect judgments about necessary adjustments.
- When the proper settings have been determined for a particular track, they should be written down for reference when returning to the same track.
- Lubricate the bearings in the swingarm and UNI
  -TRAK® linkage after break-in and after every 5
  races to prevent friction from affecting suspension
  performance.

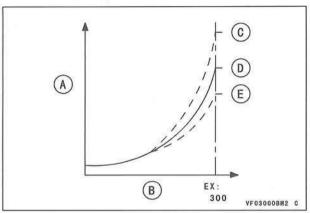
#### Front Fork

### Front Fork Oil Quantity -

The fork oil quantity in the fork tube is adjustable. A change in the fork oil level will not affect the spring force much at the top of fork travel, but it will have a great effect at the bottom of it.

- When the oil quantity is raised, the air spring becomes more progressive, and the front fork action feels "harder" in the later stage of fork travel, near the bottom.
- When the oil quantity is lowered, the air spring becomes less progressive, and the front fork action does not feel as "hard" in the later stage of fork travel.

### Fork Oil Quantity Effect on Fork Stroke



- A. Weight
- B. Fork Stroke
- C. Increase quantity
- D. Standard Oil quantity
- E. Decrease quantity

Changing the fork oil quantity works effectively at the end of fork travel. If fork bottoming is experienced, raise the fork oil I quantity. This will change the secondary spring rate.

### Front Fork Oil Quantity Adjustment -

 Adjust the front fork oil quantity (see Front Fork Oil Change under Front fork in the Maintenance and Adjustment chapter).

### Troubleshooting Improper Settings

Listed below are some symptoms of improper suspension settings and the most likely means of correcting them. The proper settings can be achieved by applying the information given in this chapter in a scientific, methodical manner. This does not mean, however, that you must be a scientist or trained technician to succeed. Simply take time to think about the changes you believe are necessary, check them against the symptoms and cures described here, make the changes in small increments, and take note of the changes and their effects.

## Front Fork Improper Adjustment Symptoms - Too Hard

### Spring too stiff

- Rebound or compression damping improperly adjusted.
- Spring too strong
- Oil quantity too high

### Suspension stiffens at the end of the fork stroke

- Fork oil quantity too high
- Fork air pressure high

### Spring OK, but suspension too hard

- Fork oil deteriorated
- Fork air pressure high

### Too Soft

### The front fork dives excessively during braking and deceleration

- Fork oil quantity too low
- Springs too soft

- Fork oil deteriorated
- Rebound and/or compression damping improperly adjusted.

## Rear shock absorber improper adjustment symptoms –

Too Hard

### Suspension too stiff

- Compression damping too high
- Spring too hard

### Spring OK but suspension too hard

- Unbalance between the spring and the rebound damping (rebound damping too low)
- Spring preload too high (hard)

#### Too Soft

### Bottoming occurs on landing after a high jump (otherwise OK)

- Spring preload too soft or compression damping too soft
- Spring too soft
- Shock absorber oil deteriorated

### Determining the Proper Settings

### Standard Settings

From the factory, the machine is set up for a medium-weight rider with intermediate riding ability.

Hence, if the actual rider weighs considerably more or less, or if his riding experience and ability are much above or below the intermediate level, it is likely that a few basic suspension adjustments will be necessary.

### Basic Readjustment of the Suspension

### Suspension Tuning According to Ground Surface

Smooth terrain	Softer spring	
Rough terrain	Harder spring	

## Suspension Tuning According to Riding Experience

Beginner	softer spring with greater rebound damping
Experienced rider	harder spring

### Suspension Tuning According to Rider Weight

Heavy rider	harder spring
Light rider	softer spring

### Suspension Tuning According the Type of Course

Many corners	Lower the front end slightly. [Increase the amount of fork tube protrusion above the upper fork clamp by 5 mm (0.2 in.)]. This accelerates steering and enhances turning ability.
Fast course	Raise the front end slightly. [Decrease the amount of fork tube protrusion above the upper fork clamp by 5 mm (0.2 in.)]. This slows down steering and enhances stability at high speed.
Deep dips or sandy ground	Raise the front end slightly to gain stability.

Begin the actual on-track testing and evaluation after making these preliminary adjustments.

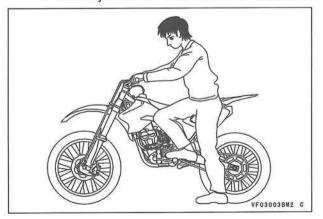
Bear in mind the following points when readjusting the suspension.

- Always make changes in small steps.
- The rider must be consistent in evaluating suspension performance.
- A change in the front suspension might require one in the rear suspension, and vise versa.

## Front and Rear Suspension Compatibility Inspection

Use this procedure to determine if the suspension is balanced reasonably well.

- Hold the motorcycle upright (remove the side stand).
- While standing next to the machine, lightly pull the brake lever, place one foot on the footpeg closest to you, and push down hard. If the motorcycle stays level as the suspension is compressed, the spring rates are well balanced.
- Sit astride the motorcycle, take a riding posture and check that the machine is in a horizontal position. If one end drops noticeably more than the other, the front and rear are not compatible and must be readjusted to achieve a better balance.



Although this is one of the most effective adjustment procedures, suspension settings may vary depending on the conditions at the track and the rider's preferences.

### Front and Rear Suspension Troubleshooting

### Front End Surges Downhill or During Acceleration Out of Corner –

The front suspension is too soft.

- Increase the compression damping.
- Increase the fork oil amount.
- Use an optional harder spring, or increase the spring preload.

## Front End "Knifes" or Oversteers in Turns (Tends to Turn Inward) –

The front suspension is too soft.

- Increase the compression damping or rebound damping.
- Increase the fork oil amount.

#### NOTE

O Heavier or expert riders may need a harder spring.

# Front End Pushes or "Washes Out" in Turns (Front Wheel Tends to Push Outward Rather than "Bite" in a Turn) –

The front suspension is too stiff.

- Decrease the compression damping or rebound damping.
- Release some air from the fork tubes.
- Decrease the fork oil amount.

Use a softer spring.

#### NOTE

O Lighter or less experienced riders may need a softer spring.

### Front End Does Not Respond to Small Bumps in Sweeping Turns –

The front suspension is too hard.

- Decrease the compression damping or rebound damping.
- Decrease the fork oil amount.
- Use a softer spring.

### Rear End "Kicks" When Braking on Bumps -

The rear shock absorber rebound damping may be too low.

Increase the rebound damping.

## Rear Tire Does Not "Hook Up" Out of Corners (Lack of Traction Coming Out of Turns) –

The rear shock absorber may be too stiff.

- Decrease the rear shock absorber spring preload.
- Decrease the high speed/low speed compression damping.
- Use a softer spring (Lightweight Rider Only).

### Fork Bottoms Off After a High-speed Jump (may be due to improper riding posture) –

The rebound damping is too soft or the spring is too hard.

- Increase the rebound damping.
- Decrease the rear shock absorber spring preload
- Decrease the compression damping.

Front and Rear Ends Bottom Off After a High-speed Jump (harsh bottoming occurs once or twice per lap) –

The front suspension is too soft.

- Increase the fork oil amount.
- Use a harder fork spring.

The rear suspension is too soft.

- Increase the rear shock absorber spring preload or use a harder spring.
- Increase the rear shock absorber high speed compression damping or use a harder spring.

#### NOTE

 Check the front and rear suspension compatibility after making any adjustment.

### Rear end feels soft at small jump -

- Increase the spring preload up to maximum.
- Increase the rear shock absorber low speed compression damping.

### Rear end feels soft at large jump -

- Increase the rear shock absorber high speed compression damping.
- Increase the spring preload up to maximum.

### Rear End Bottoms After 3 or 4 Successive Jumps –

Decrease the rebound damping.

#### NOTE

- O The rear shock absorber behavior on this machine may mislead some riders.
- O The rear shock absorber bottoms (due to full stroke) when the spring and damping are overcome by the total weight of the machine and rider.
- O A bottoming sensation (even though the machine is actually not bottoming) may be caused by machine weight and the inability of the rider to overcome an overly stiff spring or excessive damping.
- Observe the rear end jumps and try lowering the spring preload and damping if it does not approach bottoming.

### Gearing

Selection of the Secondary Reduction Ratio (Rear Sprocket)

### Rear Sprocket Selection According to Course Conditions

Fast course	small sprocket	
Many curves or hills	35 38	
Sandy or soft ground	large sprocket	

- If the course has long straight portions, the secondary reduction ratio should be reduced so that the machine speed can be increased.
- If then the course has many corners or uphills or is wet, the secondary reduction ratio should be increased so that gear shifting and acceleration are smooth.
- Since the speed must be changed depending on the ground condition on the day of the race, be sure to run through the circuit prior to a race and tune the machine accordingly.
- If there is a long straight portion of the course on which the machine can be run at maximum speed, the machine should be set so that the maximum speed is developed toward the end of the straight course, but care should be taken not to over-rev the engine.

#### **ENGINE AND SUSPENSION TUNING 149**

Since it is difficult to set the machine so it is best suited for all portions of the circuit, determine which circuit portions will have the greatest effect on lap time, and tune the machine to these portions. Confirm your settings by recording lap times after each change. In this way the machine will deliver best performance for the entire circuit.

## Special Care According to Track Conditions

- In dry, dusty conditions (such a volcanic ash or fine powdery dust), special care must be given to keeping the air cleaner element clean.
- When riding on wet, heavy clay, mud adheres to the tires and other parts of the vehicle. The mud can add significantly to the weight of the vehicle and therefore reduce performance. Take care to remove built-up mud from the tires and chassis after each ride, before drying occurs.
- The engine works hardest in muddy conditions and the radiator can become clogged with mud.

- Take care not to overheat the engine in these conditions. The engine also works very hard when riding in deep sand.
- In muddy or sandy conditions, increase chain slack as the chain and sprockets will be packed with mud or sand, which reduces chain slack.
- Check chain and sprocket wear frequently when riding in mud or sand, since wear is increased in these conditions.
- In very dusty conditions, as the air cleaner collects dust, the mixture becomes richer and it may be advisable to apply slightly leaner jetting (main jet).

### **OPTIONAL PARTS**

Carburetor	
Main Jet	#170
	#172
	#175
	#178
	#180
	#182 (Standard)
	#185
	#188
	#190
	#192
Slow jet	#35
	#38
	#40 (Standard)
	#42
	#45

Carburetor	
Jet needle	
Richer	NCYS
<b>↑</b>	NCYT
	NCYU (Standard)
<b>↓</b>	NCYV
Leaner	NCYW
Richer	NCVS
1	NCVT
	NCVU
<b>↓</b>	NCVV
Leaner	NCVW

### NOTE

ONCY\* is 0.5 clip position leaner than NCV\*.

### **152 OPTIONAL PARTS**

Engine Sprocket	
	12T
	13T (Standard)

Rear Sprocket	
	46T
	47T
	48T (Standard)
Aluminum	49T
	50T
	46T
Steel	47T
	48T
	49T
	50T

g (N·mm)
K = 4.2
K = 4.4 (Standard)
K = 4.6
K = 47
K = 49
K = 51 (Standard)
K = 53
no holes (for wet conditions)
no holes (for wet conditions)
wheel (without tire)
21×1.60
19×1.85
Steel

### 154 PRE-RACE CHECKS AND AFTER-RACE MAINTENANCE

### PRE-RACE CHECKS AND AFTER-RACE MAINTENANCE

#### Pre-race Checks -

- Front axle nut, or axle clamp nut tightness
- Front fork clamp bolt tightness
- Handlebar clamp bolt tightness
- Throttle grip screw tightness
- Throttle grip operation
- Front and rear brake hose installation
- Front and rear brake fluid level
- Front and rear brake disc and caliper installation
- Front and rear brake function
- Fuel tank installation
- All control cable routings
- Engine mounting bolt torque
- Engine sprocket installation
- Shift pedal bolt torque
- Engine oil level
- Carburetor clamp screw tightness
- Carburetor top cap tightness
- UNI-TRAK® lever rod bolt tightness
- UNI-TRAK® lever bolt torque
- Rear shock absorber bolt torque
- Swingarm pivot shaft nut torque
- Rear axle nut torque
- Rear sprocket bolt or nut torque
- Rear brake pedal operation
- Seat installation
- Front and rear wheel spoke tightness
- Front and rear tire air pressure
- Front fork air pressure
- Drive chain slack

- Coolant level
- Oil applied to air cleaner element.

#### Maintenance After the First Race -

- · Clean the air cleaner element.
- Adjust the drive chain slack.
- Torque the rear sprocket nuts.
- Tighten the spokes.
- Check the front and rear tire air pressure.
- Torque the front and rear axle nuts.
- Torque the pivot shaft nut.
- Torque the muffler and silencer bolts or nuts.
- Torque the front and rear fender bolts or nuts.
- Torque the fuel tank and seat bolts or nuts.
- Check the front and rear brake function.
- Check the steering play.
- Fill the fuel tank with fuel.
- Check the coolant level.

### Maintenance After Riding on a Dusty Course -

If dirt or dust gets into the engine, cylinder, piston and crankshaft bearings will be damaged. After riding, inspect the crankshaft big end. If the crankshaft big end is worn past the service limit, replace the crankshaft with a new one.

### Maintenance After Riding in the Rain or on a Muddy Course –

- Apply grease to swingarm and rear suspension pivots.
- Inspect the drive chain and rear sprocket for wear.

### PRE-RACE CHECKS AND AFTER-RACE MAINTENANCE 155

- Clean the air cleaner element.
- Check the cylinder and crankshaft big end.
- Grease the throttle grip and control cables.

### Suggested Spare Parts -

- Front and rear wheels
- Shift pedal and brake pedal
- Brake lever, clutch lever, and holders
- Throttle and clutch cables
- Handlebar
- Front and rear fenders, side covers, and number plate
- Radiator, radiator cover, and cooling hoses
- Throttle grip assembly
- Carburetor jets
- Air cleaner element
- Muffler, silencer, and related parts

- Chain case
- Front springs (for suspension adjustment)
- Rear shock absorber spring (for suspension adjustment)
- Rear sprockets with bolts/nuts and circlips
- Electrical parts
- Spark plugs
- Clutch assembly and friction plates
- Gaskets
- Front and rear tires (various compounds and tread patterns for different conditions)
- Front fork assembly
- Piston and piston rings
- Tire wraps, bolts, nuts, O-rings, washers, snap rings, wire, adhesive tape, vinyl tap (or duct tape), and #400 to #600 emery cloth

### **STORAGE**

### **Before Storage**

When the motorcycle is to be stored for any length of time, it should be prepared for storage as follows.

- Clean the entire vehicle thoroughly.
- Run the engine for about five minutes to warm the oil, then stop it and drain the engine oil.

### **A** WARNING

Motor oil is a toxic substance. Dispose of used oil properly. Contact your local authorities for approved disposal methods or possible recycling.

- Install the oil drain plugs and fill in fresh engine oil.
- Empty the fuel tank and the carburetor float bowl.
   (Fuel will deteriorate if left for a long time.)

### **A** WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Always stop the engine and never smoke while handling fuel. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

Gasoline is a toxic substance. Dispose of gasoline properly. Contact your local authorities for approved disposal methods.

- Remove the spark plug and spray fogging oil directly into the cylinder. Kick the engine over slowly a few times to coat the cylinder wall. Install the spark plug.
- Lubricate the drive chain and all the cables.
- Spray oil on all unpainted metal surfaces to prevent rusting. Avoid getting oil on rubber parts and on the brakes.
- Lift the motorcycle on a box or stand so that both wheels are raised off the ground. (If this cannot be done, put boards under the front and rear wheels to keep dampness away from the tire rubber.)
- Tie a plastic bag over the muffler to prevent moisture from entering.
- Cover the motorcycle to keep dust and dirt away from it.

### After Storage

- Remove the plastic bag from the muffler.
- Make sure the spark plug is tight.

### NOTE

- O Fit the plug cap securely onto the spark plug, and pull the cap lightly to make sure that it is properly installed.
- Fill the fuel tank with fuel.
- Check all the points listed in the Daily pre-ride checks section.
- Perform a General Lubrication Procedure.

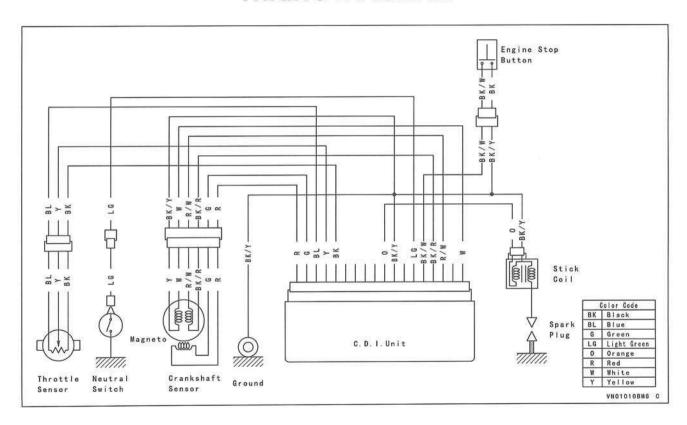
### **ENVIRONMENTAL PROTECTION**

To protect our environment, properly discard used tires, engine oil, or other vehicle components that you might dispose of in the future.

Consult your authorized Kawasaki dealer or local environmental waste agency for the proper disposal pro-

cedure.

### **WIRING DIAGRAM**



### MEMO



# **KX250T**





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