Appendix

Table of Contents

Additional Considerations for Racing 16-2
Carburetor 16-2
Spark Plug 16-2
Spark Plug Inspection 16-3
Troubleshooting Guide 16-4
General Lubrication 16-8
Lubrication 16-8
Nut, Bolt, and Fastener Tightness 16-8
Tightness Inspection 16-8
Unit Conversion Table 16-9

Additional Considerations for Racing

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing conditions. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important points.

- You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competitive or related uses. Please read the warranty carefully.
- Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- When the motorcycle is operated on public roads, it **must** be in its original state in order to ensure safety and compliance with applicable regulations.

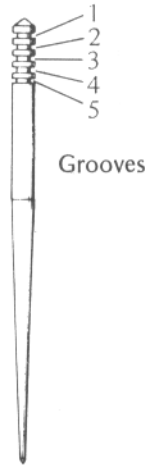
Carburetors:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetors have been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture.

For the models other than the US model, a certain amount of adjustment can be made by changing the position of the needle. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the bottom raises the needle, which makes the mixture richer at a given position of the throttle valve.

Jet Needle



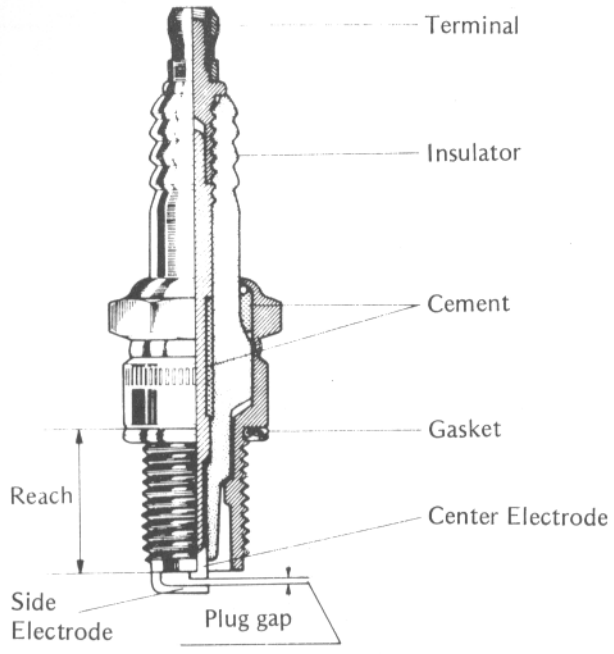
Spark Plug:

The spark plug ignites the fuel/air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and adjusted.

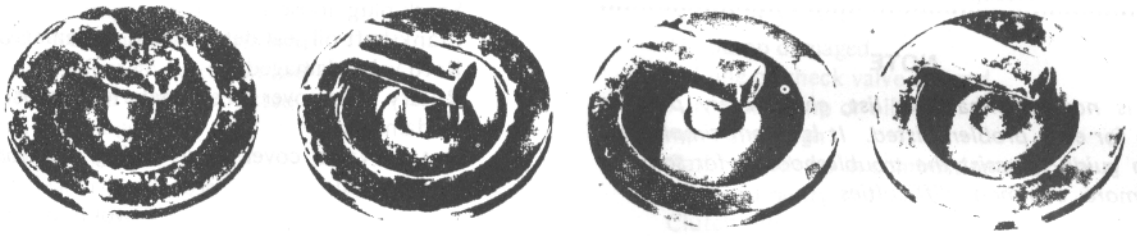
Test have shown the plug listed in the "General Specifications" section in the "General Information" chapter to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

Spark Plug



Spark Plug Condition



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 – 800°C (750 – 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too high a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

Spark Plug Inspection

●Remove the spark plug and inspect the ceramic insulator.

★Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used. If the ceramic is black, it indicates that the plug is firing at too low a temperature, so the next hotter type (NGK B8ES) should be used instead. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

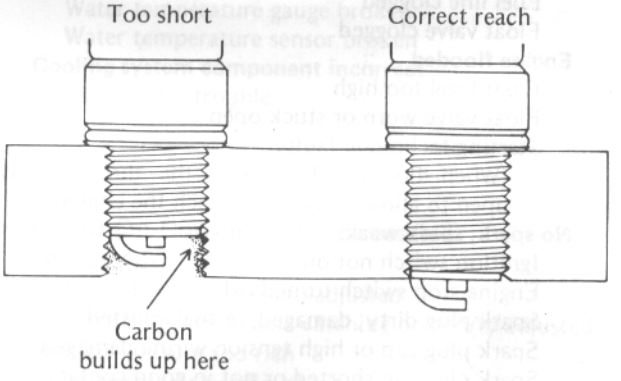
CAUTION

○**If the spark plug is replaced with a type other than the standard plug listed in the "SPECIFICATIONS" section, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same insulator type (regular type or projected type) as the standard plug.**

○**If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.**

○**If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preignition, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.**

Plug Reach



Standard Spark Plug Threads

Diameter	:	**14 mm**
Pitch	:	**1.25 mm**
Reach	:	**19.0 mm**

NOTE

○*The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling). The standard plug has been selected to match the normal usage of this motorcycle in combined street and highway riding. Unusual riding conditions may require a different spark plug heat range. For racing, install the colder plug.*

Troubleshooting Guide

NOTE

This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start; Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or crankcase bearing seizure
- Balancer gear or bearing seizure
- Kickstarter return spring broken
- Kick ratchet gear not engaging

No fuel flow
- No fuel in tank
- Sticking of the valve in valve in the fuel tap
- Fuel tap vacuum hose clogged
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded
- Float level too high
- Float valve worn or stuck open
- Starting technique faulty
  (When flooded, kick with the throttle fully open to allow more air to reach the engine)

No spark, spark weak
- Ignition switch not on
- Engine stop switch turned off
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Exciter coil damaged
- CDI unit broken
- Pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged
- Ignition or engine stop switch shorted
- Wiring shorted or open

Fuel/air mixture incorrect
- Idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter jet clogged

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running at Low Speed

Spark weak
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- CDI unit broken pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Carburetors not synchronizing
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged

Poor Running No Power at High Speed

Firing incorrect
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition timing malfunction
- Exciter coil damaged
- CDI unit broken
- Pickup coil broken or maladjusted

Fuel/air mixture incorrect
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Float level too high or too low

Air jet or air passage clogged
Air cleaner clogged, poorly sealed, or missing
Starter plunger stuck open
Fuel to carburetor insufficient
Water or foreign matter in fuel
Fuel tank air vent obstructed
Fuel line clogged
Fuel tap clogged
Air cleaner duct loose

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Sprak plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged

Oil and fuel/air mixture incorrect
Oil pump cable maladjusted
Throttle control cable maladjusted
Crankshaft oil seal deteriorated or damaged
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Engine rpm will not rise properly
Starter plunger stuck open
Float level too high or too low
Main jet clogged
Throttle valve does not fully open
Air cleaner clogged
Muffler clogged
Water or foreign matter in fuel
Cylinder exhaust port clogged
Brake dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damged

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or inccorect
Spark plug incorrect

Overheating

Firing incorrect
Spark plug dirty, damaged, or maladjusted
Ignition timing malfunction

Fuel/air mixture incorrect
Main jet clogged or wrong size
Float level too low
Air cleaner clogged
Air cleaner duct loose

Oil and fuel/air mixture incorrect
Throttle control cable maladjusted
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Compression high
Carbon built up in combustion chamber

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect
Coolant leve too low
Coolant deteriorated

Cooling system component incorrect
Radiator clogged
Thermostat trouble
Radiator cap trouble
Water pump not rotating
Water pump impeller damaged

Overcooling

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Cooling system component incorrect
Thermostat trouble

Fuel and Oil Consumption Excessive

Idle too fast
Throttle stop screw maladjusted
Throttle control cable catching or poorly adjusted

Fuel/air mixture too rich
Jet needle or needle jet worn
Starter plunger stuck open
Float level too high
Air cleaner clogged

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Spark plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary vlave cover large O-ring deteriorated or damaged

Exhaust obstructed
Muffler clogged
Cylinder exhaust port clogged

Engine load faulty
- Clutch slipping
- Transmission oil level too high
- Brake dragging

Clutch Operation Faulty

Clutch slipping
- No clutch lever play
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch spring weak
- Clutch cable maladjusted
- Clutch inner cable catching
- Clutch release mechanism trouble
- Clutch hub or housing unevenly worn

Clutch not disengaging properly
- Clutch lever play excessive
- Clutch plate warped or too rough
- Clutch spring tension uneven
- Transmission oil deteriorated
- Transmission oil viscosity too high
- Clutch housing gear frozen on drive shaft
- Clutch release mechanism trouble

Gear Shift Faulty

Doesn't into gear; shift pedal doesn't return
- Clutch not disengaging
- Shift fork bent or seized
- Shift return spring weak or broken
- Shift lever broken
- Set levers binding
- External shift mechanism arm worn

Jumps out of gear
- Shift fork worn
- Gear groove worn
- Gear dogs, holes, and/or recesses worn
- Shift drum groove worn
- Shift drum set lever spring weak or broken
- Shift fork guide pin or collar worn
- Drive shaft, output shaft, and/or gear splines worn

Overshifts
- Shift drum set lever spring weak or broken

Abnormal Engine Noise

Knocking
- Ignition timing malfunction
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Overheating
- Spark plug incorrect

Piston slap
- Cylinder/piston clearance excessive
- Cylinder, piston worn
- Connecting rod bent
- Piston pin, piston pin hole worn

Other noise
- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken, or stuck
- Piston seizure or damaged
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder connection
- Crankshaft runout excessive
- Engine mount loose
- Crankshaft bearing worn

Abnormal Drive Train Noise

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

Transmission noise
- Crankcase bearing worn
- Transmission gear worn or chipped
- Metal chip jammed in gear teeth
- Transmission oil insufficient or too thin
- Kick ratchet gear not properly disengaging from kick gear
- Kick idle gear worn or chipped

Drive chain noise
- Chain worn
- Rear and/or engine sprocket(s) worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise

Front fork noise
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise
- Shock absorber damaged

Disc brake noise
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper damaged
- Cylinder damaged

Other noise
- Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smoke

Excessive white smoke
- Oil pump cable maladjusted
- Throttle control cable maladjusted
- Engine oil poor quality or incorrect
- Crankshaft oil seal damaged

Brownish smoke
- Air cleaner clogged
- Main jet too large or fallen off
- Starter plunger stuck open
- Float level too high

Handling and/or Stability Unsatisfactory

Handlebar hard to turn
- Control cable routing incorrect
- Wiring routing incorrect
- Steering stem locknut too tight
- Bearing roller damaged
- Bearing race dented or worn
- Steering stem lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates
- Tire worn
- Swing arm bushing or needle bearing damaged
- Rim warped
- Front, rear axle runout excessive
- Wheel bearing worn
- Handlebar clamp loose

Handlebar pulls to one side
- Frame bent
- Wheel misalignment
- Swing arm bent or twisted
- Swing arm pivot shaft runout excessive
- Steering stem bent
- Front fork leg bent
- Right/left front fork oil level uneven

Shock absorption unsatisfactory
- (Too hard)
- Front fork oil excessive
- Front fork oil viscosity too high
- Tire air pressure too high
- Rear suspension maladjusted
- (Too soft)
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Front fork, rear shock absorber spring(s) weak
- Rear shock absorber oil leaking
- Rear shock absorber gas leaking

Brake Doesn't Hold

Disc brake
- Air in the brake line
- Pad or disc worn
- Brake fluid leak
- Disc warped
- Contaminated pad
- Brake fluid deteriorated
- Primary cup or secondary cup damaged
- Master cylinder scratched inside

Battery Discharged

- Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
- Battery lead making poor contact
- Regulator/rectifier damaged
- Ignition switch damaged
- Load excessive (e.g., bulb of excessive wattage)
- Flywheel magneto damaged
- Stator coil open or short
- Wiring faulty

Battery Overcharged

- Battery damaged
- Regulator/rectifier trouble

General Lubrication

Lubrication

- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.
- Side Stand
- Clutch Lever
- Brake Lever
- Brake Pedal Shaft
- Kick Pedal

Points: Lubricate with Grease.
- Clutch Inner Cable Ends
- Speedometer Inner Cable*

*Grease the lower part of the inner cable sparingly.

Cables: Lubricate with Motor Oil.
- Choke Cable
- Throttle Cable
- Oil Pump Cable
- Clutch Cable

Nut, Bolt, and Fastener Tightness

Tighteness Inspeciton

- Check the tighteness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*Check engine fastener tightness when the engine is cold (at room temperature).*

○If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. First loosen each fastener by ½ turn, then tighten it.

★If cotter pins are damaged, replace them with new ones.

Nut, Bolt, and Fastener to be checked

Wheels:
- Front Axle Nut
- Front Axle Clamp Bolts
- Rear Axle Nut
- Rear Axle Nut Clip

Brakes:
- Front Master Cylinder Clamp Bolts
- Front Caliper Mounting Bolts
- Rear Master Cylinder Mounting Bolts
- Torque Link Nuts
- Torque Link Nut Clip
- Brake Lever Pivot Nut
- Brake Pedal Bolt

Suspension:
- Front Fork Clamp Bolts
- Front Fork Top Plug
- Rear Shock Absorber Mounting Bolts
- Swing Arm Pivot Shaft Nut
- Uni-trak Link Nuts

Steering:
- Stem Head Nut
- Handlebar Holder Bolts
- Handlebar Clamp Bolts

Engine:
- Engine Mounting Bolts
- Cylinder Head Bolts
- Muffler Mounting Nuts
- Muffler Mounting Bolts
- Cylinder Nuts

Others:
- Side Stand Bolts
- Front Footpeg Mounting Bolts
- Rear Footpeg Mounting Bolts
- Front Footpeg Clip
- Rear Footpeg Clip

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1,000,000
kilo	k	x 1,000
centi	c	x 0.01
milli	m	x 0.001
micro	μ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb
kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb
kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm^2
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm^2	x	98.07	=	kPa
kg/cm^2	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

km/h	x	0.6214	=	mph

Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

$$\frac{9\,(°C + 40)}{5} - 40 = °F$$

$$\frac{5\,(°F + 40)}{9} - 40 = °C$$

