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.

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.

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.
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**

![Diagram of plug reach](image)

**Standard Spark Plug Threads**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>14 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch</td>
<td>1.25 mm</td>
</tr>
<tr>
<td>Reach</td>
<td>19.0 mm</td>
</tr>
</tbody>
</table>

**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

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
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 level 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

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

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
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

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

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
Nut, Bolt, and Fastener Tightness

Tightness Inspection
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*

*Cure the lower part of the inner cable sparingly.

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

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:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Symbol</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>mega</td>
<td>M</td>
<td>x 1,000,000</td>
</tr>
<tr>
<td>kilo</td>
<td>k</td>
<td>x 1,000</td>
</tr>
<tr>
<td>centi</td>
<td>c</td>
<td>x 0.01</td>
</tr>
<tr>
<td>milli</td>
<td>m</td>
<td>x 0.001</td>
</tr>
<tr>
<td>micro</td>
<td>μ</td>
<td>x 0.000001</td>
</tr>
</tbody>
</table>

#### Units of Length:

- \( \text{km} \times 0.6214 = \text{mile} \)
- \( \text{m} \times 3.281 = \text{ft} \)
- \( \text{mm} \times 0.03937 = \text{in} \)

#### Units of Torque:

- \( \text{N-m} \times 0.1020 = \text{kg-m} \)
- \( \text{N-m} \times 0.7376 = \text{ft-lb} \)
- \( \text{N-m} \times 8.851 = \text{in-lb} \)
- \( \text{kg-m} \times 9.807 = \text{N-m} \)
- \( \text{kg-m} \times 7.233 = \text{ft-lb} \)
- \( \text{kg-m} \times 86.80 = \text{in-lb} \)

#### Units of Pressure:

- \( \text{kPa} \times 0.01020 = \text{kg/cm}^2 \)
- \( \text{kPa} \times 0.1450 = \text{psi} \)
- \( \text{kPa} \times 0.7501 = \text{cm Hg} \)
- \( \text{kg/cm}^2 \times 98.07 = \text{kPa} \)
- \( \text{kg/cm}^2 \times 14.22 = \text{psi} \)
- \( \text{cm Hg} \times 1.333 = \text{kPa} \)

#### Units of Speed:

- \( \text{km/h} \times 0.6214 = \text{mph} \)

#### Units of Force:

- \( \text{N} \times 0.1020 = \text{kg} \)
- \( \text{N} \times 0.2248 = \text{lb} \)
- \( \text{kg} \times 9.807 = \text{N} \)
- \( \text{kg} \times 2.205 = \text{lb} \)

#### Units of Power:

- \( \text{kW} \times 1.360 = \text{PS} \)
- \( \text{kW} \times 1.341 = \text{HP} \)
- \( \text{PS} \times 0.7355 = \text{kW} \)
- \( \text{PS} \times 0.9863 = \text{HP} \)

#### Units of Temperature:

\[
\frac{9 (\text{°C} + 40) - 40}{5} = \text{°F}
\]

\[
\frac{5 (\text{°F} + 40) - 40}{9} = \text{°C}
\]