2003 BUELL® SERVICE MANUAL

Buell AMERICAN MOTORCYCLES

FIREBOLT XB9R MODEL

OFFICIAL FACTORY MANUAL – Part No. 99493-03Y

IMPORTANT NOTICE

Buell motorcycles conform to all applicable U.S.A. Federal Motor Vehicle Safety Standards and U.S.A. Environmental Protection Agency regulations effective on the date of manufacture.

To maintain the safety, dependability, and emission and noise control performance, it is essential that the procedures, specifications and service instructions in this manual are followed.

Any substitution, alteration or adjustment of emission system and noise control components outside of factory specifications may be prohibited by law.

Buell Distribution Corporation

2003 BUELL® XB9R FIREBOLT™ MODEL

SERVICE MANUAL

The information in this Service Manual applies to 2003 Buell® Firebolt™ XB9R model motorcycles.

PART NO. 99493-03Y

CMI - 3.m -06/02

Printed in U.S.A.
on Recycled Paper

FOREWORD

GENERAL

This Service Manual has been prepared with two purposes in mind. First, it will acquaint the user with the construction of the Buell product and assist in the performance of basic maintenance and repair. Secondly, it will introduce to the professional Buell Technician the latest field-tested and factory-approved major repair methods. We sincerely believe that this Service Manual will make your association with Buell products more pleasant and profitable.

HOW TO USE YOUR SERVICE MANUAL

Information is arranged as follows:

- Section 1–Maintenance
- Section 2–Chassis
- Section 3–Engine
- Section 4–Fuel System
- Section 5–Electric Starter
- Section 6–Drive/Transmission
- Section 7–Electrical
- Appendix A–Tools
- Appendix B–Electrical Connectors
- Appendix C–Metric Conversions
- Appendix D–Hose and Wire Routings

Use the TABLE OF CONTENTS following this FOREWORD or the INDEX at the back of the book to find the desired subject.

Note that each manual section topic is sequentially numbered in the upper left or right hand corner of the page. The numbering system allows the user to quickly find cross referenced topics by flipping through the pages.

For example, the ninth topic (CLUTCH) in section one (MAINTENANCE) is listed as:

1.9 CLUTCH

The **1.9** will appear in the upper left or right hand corner of the page.

PREPARATION FOR SERVICE

⚠WARNING

Gasoline is extremely flammable and highly explosive. Always stop the engine when refueling or servicing the fuel system. Do not smoke or allow open flame or sparks near the work site. Inadequate safety precautions may result in personal injury.

Good preparation is very important for efficient service work. A clean work area at the start of each job will allow you to perform the repair as easily and quickly as possible, and will reduce the incidence of misplaced tools and parts. A motorcycle that is excessively dirty should be cleaned before work starts. Cleaning will occasionally uncover sources of trouble. Tools, instruments and any parts needed for the job should be gathered before work is started. Interrupting a job to locate tools or parts is a distraction and causes needless delay. See APPENDIX A–TOOLS for equipment required for special service work.

NOTE

- *To avoid unnecessary disassembly, carefully read all relative service information before repair work is started.*
- *In figure legends, the number which follows the name of a part indicates the quantity necessary for one complete assembly.*

SERVICE BULLETINS

In addition to the information presented in this Service Manual, Buell Distribution Corporation will periodically issue Service Bulletins to Buell dealers. Service Bulletins cover interim engineering changes and supplementary information.

USE GENUINE REPLACEMENT PARTS

⚠WARNING

When replacement parts are required, use only genuine Buell parts or parts with equivalent characteristics (which include type, strength and material). Failure to do so may result in product malfunction and possible personal injury.

To ensure satisfactory and lasting repairs, carefully follow the Service Manual instructions and use only genuine Buell replacement parts. This is your assurance that the parts you are using will fit right, operate properly and last longer.

SAFETY DEFINITIONS

Statements in this service manual preceded by the following words are of special significance:

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in serious property damage.

⚠WARNING

- **Proper service and repair is important for the safe, reliable operation of all mechanical products. The service procedures recommended and described in this Service Manual are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. These special tools should be used when and as recommended. It is important to note that some warnings against the use of specific service methods, which could damage the motorcycle or render it unsafe, are stated in this Service Manual. However, please remember that these warnings are not all-inclusive.**

- **Since Buell could not possibly know, evaluate or advise the service trade of all possible ways in which service might be performed, or of the possible hazardous consequences of each method, we have not undertaken any such broad evaluation. Accordingly, anyone who uses a service procedure or tool which is not recommended by Buell must first thoroughly satisfy himself that neither his nor the operator's safety will be jeopardized as a result.**

- **Wear eye protection when using hammers, arbor or hydraulic presses, gear pullers, spring compressors, slide hammers and similar tools. Be especially cautious when using pulling, pressing or compressing equipment. The forces involved can cause parts to fly outward with considerable force, possibly resulting in personal injury.**

PRODUCT REFERENCES

⚠WARNING

Follow the directions listed on all products. Carefully read all labels, warnings and cautions before use. Inadequate safety precautions may result in personal injury.

When reference is made in this Service Manual to a specific brand name product, tool or instrument, an equivalent product, tool or instrument may be substituted.

Kent-Moore Products

All tools mentioned in this manual with an "HD", "J" or "B" preface must be ordered through:

Kent-Moore
SPX Corporation
28635 Mound Road
Warren, Michigan 48092-3499
Telephone: 1-800-345-2233

Direct all product returns, warranty or otherwise, to the following address:

Kent-Moore
Attn: Returned Goods
655 Eisenhower Drive
Owatonna, Minnesota 55060-0995

Sealing and Threadlocking Products

LOCTITE PRODUCTS

Some procedures in this Service Manual call for the use of Loctite® products. If you have any questions regarding Loctite product usage or retailer/wholesaler locations, please call Loctite Corp. at 1-800-323-5106.

CONTENTS

All photographs, illustrations and procedures may not necessarily depict the most current model or component, but are based on the latest production information available at the time of publication.

Since product improvement is our continual goal, Buell Distribution Corporation reserves the right to change specifications, equipment or designs at any time without notice and without incurring obligation.

Buell products are manufactured under one or more of the following U.S. patents – 5295702, 5435584, 5332246, 4989696, 4951774, 4964484, 5209319, 5303795, 4776423, 6213238, 6105701, 6267193, D440190, 6213240.

TABLE OF CONTENTS

SECTION 2-CHASSIS

SECTION 5-ELECTRIC STARTER

Page No.

SECTION 6-DRIVE/TRANSMISSION

Page No.

SECTION 7-ELECTRICAL

APPENDICES

NOTES

SERVICING A NEW MOTORCYCLE

⚠WARNING

Always follow the listed service and maintenance recommendations, because they affect the safe operation of the motorcycle and the personal welfare of the rider. Failure to follow recommendations could result in death or serious injury.

Service operations to be performed before customer delivery are specified in the applicable model year PREDELIVERY AND SETUP MANUAL.

The performance of new motorcycle initial service is required to keep warranty in force and to ensure proper emissions systems operation.

After a new motorcycle has been driven its first 1000 miles (1600 km), and at every 2500 mile (4000 km) interval thereafter, have a Buell dealer perform the service operations listed in Table 1-2.

SAFE OPERATING MAINTENANCE

CAUTION

- **Do not attempt to re-tighten engine head bolts. Re-tightening can cause engine damage.**
- **During the initial 1000 mile (1600 km) break-in period, use only Harley-Davidson 20W50 engine oil. Failure to use the recommended oil will result in improper break-in of the engine cylinders and piston rings.**

A careful check of certain equipment is necessary after periods of storage, and frequently between regular service intervals, to determine if additional maintenance is required.

Check:

1. Tires for abrasions, cuts and correct pressure.
2. Drive belt for proper tension and condition.
3. Brakes, steering and throttle for responsiveness.
4. Brake fluid level and condition. Hydraulic lines and fittings for leaks. Also, check brake pads and rotors for wear.
5. Cables for fraying, crimping and free operation.
6. Engine oil and transmission fluid levels.
7. Headlamp, passing lamp, tail lamp, brake lamp and turn signal operation.

XB9R TOOL SET

The Buell XB9R comes with a standard tool set (stored in the trunk) that consists of the following:

- Shock Spanner Wrench
- T27 TORX Wrench
- 7/8" Axle Wrench (Hex)
- Tool Kit Pouch
- Screw Driver

INSPECTING

Leak Dye

When using leak dye with the black light leak detector, add 1/4 oz. (7.4 ml) of dye for each 1 quart (0.9 liter) of fluid in the system being checked.

GENERAL

United States System

Unless otherwise specified, **all fluid volume measurements in this Service Manual are expressed in United States (U.S.) units-of-measure.** See below:

- 1 pint (U.S.) = 16 fluid ounces (U.S.)
- 1 quart (U.S.) = 2 pints (U.S.) = 32 fl. oz. (U.S.)
- 1 gallon (U.S.) = 4 quarts (U.S.) = 128 fl. oz. (U.S.)

Metric System

Fluid volume measurements in this Service Manual include the metric system equivalents. In the metric system, 1 liter (L) = 1,000 milliliters (mL). Should you need to convert from U.S. units-of-measure to metric units-of-measure (or vice versa), refer to the following:

- fluid ounces (U.S.) x 29.574 = milliliters
- pints (U.S.) x 0.473 = liters
- quarts (U.S.) x 0.946 = liters
- gallons (U.S.) x 3.785 = liters
- milliliters x 0.0338 = fluid ounces (U.S.)
- liters x 2.114 = pints (U.S.)
- liters x 1.057 = quarts (U.S.)
- liters x 0.264 = gallons (U.S.)

PRIMARY DRIVE/ TRANSMISSION FLUID

Use only SPORT-TRANS FLUID (Part No. 98854-96 quart size or Part No. 98855-96 gallon size).

FRONT FORK OIL

Use only TYPE E FORK OIL (Part No. 99884-80).

BRAKE FLUID

⚠WARNING

D.O.T. 4 brake fluid can cause irritation of eyes and skin, and may be harmful if swallowed. If large amount of fluid is swallowed, induce vomiting by administering two tablespoons of salt in a glass of warm water. Call a doctor. In case of contact with skin or eyes, flush with plenty of water. Get medical attention for eyes. KEEP BRAKE FLUID OUT OF THE REACH OF CHILDREN. Failure to comply could result in death or serious injury.

Use only **D.O.T. 4 BRAKE FLUID** (Part No. 99953-99Y).

FUEL

Use a good quality unleaded gasoline (**91 pump octane** or higher). Pump octane is the octane number usually shown on the gas pump. See 3.2 ENGINE for a detailed explanation of alternative fuels.

ENGINE OIL

Use the proper grade of oil for the lowest temperature expected before the next oil change.

If it is necessary to add oil and Harley-Davidson oil is not available, use an oil certified for diesel engines. Acceptable diesel engine oil designations include CF, CF-4, CG-4 and CH-4. The preferred viscosities for the diesel engine oils, in descending order, are 20W-50, 15W-40 and 10W-40. At the first opportunity, see a Buell dealer to change back to 100 percent Harley-Davidson oil.

Table 1-1. Recommended Oil Grades

HARLEY-DAVIDSON TYPE	VISCOSITY	HARLEY-DAVIDSON RATING	LOWEST AMBIENT TEMP °F	COLD WEATHER STARTS BELOW 50° F
H.D. Multi-Grade	SAE 10W40	HD 360	Below 40° (4°C)	Excellent
H.D. Multi-Grade	SAE 20W50	HD 360	Above 40° (4°C)	Good
H.D. Regular Heavy	SAE 50	HD 360	Above 60° (16°C)	Poor
H.D. Extra Heavy	SAE 60	HD 360	Above 80° (27°C)	Poor

Table 1-2. Regular Service Intervals

ODOMETER READING SERVICE OPERATIONS (see chart code below)	1000 mi 1600 km	2500 mi 4000 km	5000 mi 8000 km	7500 mi 12000 km	10000 mi 16000 km	12500 mi 20000 km	15000 mi 24000 km	17500 mi 28000 km	20000 mi 32000 km	22500 mi 36000 km	25000 mi 40000 km	27500 mi 44000 km	30000 mi 48000 km	32500 mi 52000 km	35000 mi 56000 km	37500 mi 60000 km	40000 mi 64000 km	42500 mi 68000 km	45000 mi 72000 km	47500 mi 76000 km	50000 mi 80000 km
Change engine oil and filter.	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R
Inspect air cleaner, service as required.	I		I		I		I		R		I		I		I		R		I		I
Inspect brake pads and discs for wear.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Adjust primary chain.	A		A		A		A		A		A		A		A		A		A		A
Inspect primary shoe.					I				I				I				I				I
Change transmission/primary chaincase lube and clean drain plug.	RI		RI		RI		RI		RI		RI		RI		RI		RI		RI		RI
Check ignition timing.					I				I				I				I				I
Spark plugs.					R				R				R				R				R
Zero throttle position sensor (TPS).	A				A				A				A				A				A
Check engine idle speed.	I		I		I		I		I		I		I		I		I		I		I
Steering head bearing resistance test.			X		X		X		X		X		X		X		X		X		X
Adjust throttle cables.	A		A		A		A		A		A		A		A		A		A		A
Adjust clutch and clutch cable.	A		A		A		A		A		A		A		A		A		A		A
Check rear belt and idler pulley. **Replace belt and idler pulley every 15,000 mi. (24,000 km).**	I		I		I		R		I		I		R		I		I		R		I
Check front and rear tire pressure and inspect tread.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Clean oil cooler fins.	X		X		X		X		X		X		X		X		X		X		X
Change front fork oil.					X				X				X				X				X
Check brake fluid reservoir levels and condition.	I		I		I		I		I		I		I		I		I		I		I
Inspect front and rear brake caliper and master cylinder for leaks every 2500 miles (4000 km) or two years.					I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Check operation of all electrical equipment & switches.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Inspect oil lines and brake system for leaks.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Lubricate front brake hand lever, throttle control cables, clutch control cables (and hand lever), sidestand pivot, and rear brake pedal bushing (if applicable).	IL		IL		IL		IL		IL		IL		IL		IL		IL		IL		IL
Check tightness of all critical fasteners: hand controls, brake system, front and rear axles, upper and lower triple clamps, front fork components, engine mounts, stabilizers, rear shock.					T				T				T				T				T
Inspect motorcycle: Check front and rear brake lines, oil lines, front forks, rear shock, exhaust system, exhaust system mounting.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Road test.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Chart Codes:

I - Inspect, & if necessary correct, clean or replace.

R- Replace or change.

A- Adjust.

D- Disassemble (lube & inspect).

L- Lubricate with specified lubricant.

T- Tighten to proper torque.

X- Perform.

GENERAL

Special care and maintenance are required for the molded-in-color body panels that are standard on your Buell XB9R motorcycle.

Molded-in-color surfaces look like painted surfaces, but are not. The color pigment is mixed in with the material when the part is made, not applied over the surface. Molded-in-color panels require different maintenance than painted surfaces to maintain their original shine. Using methods that work on painted surfaces may ruin the finish of molded-in-color parts.

CAUTION

Use of abrasive products or powered buffing equipment will cause permanent cosmetic damage to molded-in-color body panels. Use only the recommended products and techniques outlined in this section to avoid damaging molded-in-color body panels.

CAUTION

Do not use touch-up paint on molded-in-color panels.

RECOMMENDED PRODUCTS

Products recommended for the proper care and maintenance of molded-in-color body panels are available at your Buell dealer and are listed below:

- Harley Wash (Part No. 99715-90) or Harley Sun Wash (Part No. 94659-98)
- Harley Gloss (Part No. 94627-98)
- Harley Glaze Polish and Sealant (Part No. 99701-84)
- Harley Swirl and Scratch Treatment (Part No. 94655-98)
- Harley Softcloth (Part No. 94656-98)

CARE AND MAINTENANCE

Washing

To wash molded-in-color panels:

1. Rinse surface with water.
2. Wash with Harley Wash or Harley Sun Wash.
3. Rinse surface thoroughly with water.
4. Dry with a clean chamois or soft dry natural fiber cloth.

Cleaning Between Washings

Untreated molded-in-color body panels sometimes have a static charge that attracts dust. Applying Harley Gloss or Harley Glaze Polish and Sealant to molded-in-color surfaces will eliminate this condition.

To keep a high gloss finish on molded-in-color panels between washings:

1. Spray Harley Gloss onto surface and wipe with a clean soft natural fiber cloth or Harley Softcloth.

NOTE

Rain or water will remove Harley Gloss from body panels.

2. Reapply Harley Gloss as described above to keep surfaces looking their best.

Polishing

Polishing molded-in-color body panels results in greater surface gloss and a protective coating.

1. Apply Harley Glaze Polish and Sealant every six months or as required to keep molded-in-color panels protected and looking their best.
2. Clean and dry surfaces to be polished (see *Washing*).
3. Apply Harley Glaze Polish and Sealant to clean, slightly dampened cloth or sponge and apply to surface with a light overlapping motion. Make sure to cover all areas.
4. Let Harley Glaze Polish and Sealant dry to a haze and buff off residue with a clean soft cloth or Harley Softcloth.

Minor Scratch Removal

To remove minor scratches from body panels:

1. To remove light surface scratches and rubs, use Harley Swirl and Scratch Treatment as recommended.
2. Make sure Swirl and Scratch Treatment is applied with a moist cloth and by hand (not by machine).
3. After scratch or rub has been repaired, polish surface lightly with Harley Glaze.

Major Scratches

There is no repair procedure for severely scratched surfaces. Severely scratched body panels must be replaced.

GENERAL

Buell motorcycle batteries are permanently sealed, maintenance-free, valve-regulated, lead/calcium and sulfuric acid batteries. The batteries are shipped pre-charged and ready to be put into service. Do not attempt to open these batteries for any reason.

Inspect the battery for damage or leaks and for clean, non-corroded connections:

- At the 1000 mile (1600 km) service interval.
- At every scheduled service interval thereafter.

⚠WARNING

All batteries contain electrolyte. Electrolyte is a sulfuric acid solution that is highly corrosive and can cause severe chemical burns. Avoid contact with skin, eyes, and clothing. Avoid spillage. Always wear protective face shield, rubberized gloves and protective clothing when working with batteries. A warning label is attached to the top of the battery. See Figure 1-1. Never remove warning label from battery. Failure to read and understand all precautions contained in warning label before performing any service on batteries could result in death or serious injury.

⚠WARNING

Battery posts, terminals and related accessories contain lead and lead components, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

Table 1-3. Battery Electrolyte Antidotes

CONTACT	SOLUTION
External	Flush with water.
Internal	Drink large quantities of milk or water, followed by milk of magnesia, vegetable oil or beaten eggs. Call doctor immediately.
Eyes	Flush with water, get immediate medical attention.

BATTERY TESTING

Voltmeter Test

See Table 1-4. The voltmeter test provides a general indicator of battery condition. Check the voltage of the battery to verify that it is in a 100% fully charged condition. If the open circuit (disconnected) voltage reading is below 12.6V, charge the battery and then recheck the voltage after the battery has set for one to two hours. If the voltage reading is 12.8V or above, perform the load test described under 7.10 BATTERY.

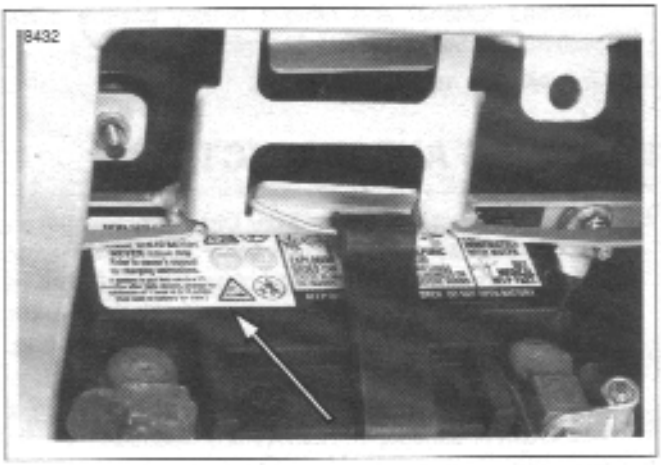

Figure 1-1. Battery Warning Label

Table 1-4. Voltmeter Test

BATTERY CHARGE CONDITIONS	
12.8	100%
12.6	75%
12.3	50%
12.0	25%
11.8	0%

BATTERY DISCONNECTION AND REMOVAL

1. Remove seat. See 2.38 SEAT.

⚠WARNING

Always disconnect the negative battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

2. Unthread fastener and remove battery negative cable (black) from battery negative (-) terminal.
3. Pull back terminal cover boot.
4. Unthread fastener and remove battery positive cable (red) from battery positive (+) terminal.
5. Unhook strap and remove battery.

CLEANING AND INSPECTION

1. Battery top must be clean and dry. Dirt and electrolyte on top of the battery can cause battery to self-discharge. Clean battery top with a solution of baking soda (sodium bicarbonate) and water (5 teaspoons baking soda per quart or liter of water). When the solution stops bubbling, rinse off the battery with clean water.
2. Clean cable connectors and battery terminals using a wire brush or sandpaper. Remove any oxidation.
3. Inspect the battery screws, clamps and cables for breakage, loose connections and corrosion. Clean clamps.
4. Check the battery posts for melting or damage caused by overtightening.
5. Inspect the battery for discoloration, raised top or a warped or distorted case, which might indicate that the battery has been frozen, overheated or overcharged.
6. Inspect the battery case for cracks or leaks.

STORAGE

⚠WARNING

Always store batteries where they cannot be reached by children. Contact with the battery's sulfuric acid could result in death or serious injury.

CAUTION

The electrolyte in a discharged battery will freeze if exposed to freezing temperatures. Freezing may crack the battery case and buckle battery plates.

If the motorcycle will not be operated for several months, such as during the winter season, remove the battery from the motorcycle and fully charge. See 7.10 BATTERY.

See Figure 1-2. Self-discharge is a normal condition and occurs continuously at a rate that depends on the ambient temperature and the battery's state of charge. Batteries discharge at a faster rate at higher ambient temperatures. To reduce the self-discharge rate, store battery in a cool (not freezing), dry place.

Charge the battery every month if stored at temperatures below 60° F. (16° C). Charge the battery more frequently if stored in a warm area above 60° F. (16° C).

NOTE

The H-D Battery Tender Automatic Battery Charger (P/N 99863-93TA) may be used to maintain battery charge for extended periods of time without risk of overcharging or boiling.

When returning a battery to service after storage, fully charge the battery. See 7.10 BATTERY.

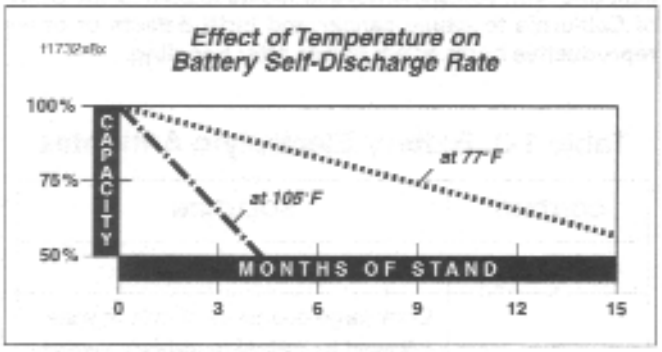

Figure 1-2. Battery Self-Discharge Rate

BATTERY INSTALLATION AND CONNECTION

1. Place the fully charged battery in the mounting position, terminal side to the rear of motorcycle.
2. Hook rubber strap around body of battery.

CAUTION

Connect the cables to the correct battery terminals or damage to the motorcycle electrical system will occur.

⚠WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

CAUTION

Overtightening fasteners can damage battery terminals.

3. Insert fastener through battery positive cable (red) into threaded hole of battery positive (+) terminal and tighten fastener to 72-96 **in-lbs** (8-11 Nm).
4. Install terminal cover boot.
5. Insert fastener through battery negative cable (black) into threaded hole of battery negative (-) terminal and tighten fastener to 72-96 **in-lbs** (8-11 Nm).
6. Apply a light coat of petroleum jelly or corrosion retardant material to both battery terminals.

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control which could result in death or serious injury.

7. Install seat. See 2.38 SEAT.

GENERAL

Check engine oil level (hot check) at every refueling stop.

Inspect oil lines and filter for leaks:

- At 1500 mi (2400 km) initial service and every 2500 mi (4000 km) service interval.

Change engine oil and filter under **normal service** conditions in warm or moderate temperatures:

- At 1000 mi (1600 km) initial service and every 5000 mi (8000 km) service interval thereafter.
- When storing or removing the motorcycle for the season.

Change engine oil and filter under **severe service** conditions in warm or moderate temperatures (severe dust, temperatures above 80°F/27°C, extensive idling or speeds in excess of 65 mph/105 km/h):

- At 1000 mi (1600 km) initial service and every 2500 mi (4000 km) service interval thereafter.
- When storing or removing the motorcycle for the season.

NOTE

The colder the weather, the shorter the recommended oil change interval. A vehicle used only for short runs in cold weather must have the engine oil drained more frequently.

CHECKING ENGINE OIL LEVEL

An accurate engine oil level reading can only be obtained with the engine at normal operating temperature (hot check). The engine will require a longer warm up period in colder temperatures.

For pre-ride inspection, simply verify that there are no oil leaks from the oil filter and oil lines prior to operating the motorcycle.

- Perform a hot check of the engine oil level at each fuel stop.

CAUTION

Do not allow hot oil level to fall below lower mark on dipstick. To do so may result in equipment damage and/or malfunction.

CAUTION

Do not overfill oil tank. Overfilling oil tank may result in oil carryover to the air cleaner, equipment damage and/or equipment malfunction.

CAUTION

Do not switch oil brands indiscriminately because some oils interact chemically when mixed. Use of inferior oils or non-detergent oils can damage the engine.

Ride motorcycle for approximately 10 minutes to ensure the oil is hot and the engine is at normal operating temperature.

1. The motorcycle must be on level ground, on the sidestand, with the engine off.
2. See Figure 1-4. Unscrew and remove dipstick from oil tank/swingarm filler hole. Wipe dipstick clean.
3. Insert dipstick into oil tank filler hole, screwing dipstick in completely. DO NOT OVER TIGHTEN.

NOTE

The area between the upper and lower registration marks is the operating range.

4. See Figure 1-4. Unscrew and remove dipstick and note oil level.
   a. Oil level should be within the operating range (between upper and lower registration marks) on dipstick.
   b. If oil level is below lower registration mark, add only enough oil to bring oil level between lower and upper registration marks.

CHANGING ENGINE OIL AND FILTER

Ride motorcycle for approximately 10 minutes to ensure the oil is hot and the engine is at normal operating temperature. Turn engine off.

NOTE

Secure rear wheel on lift or place scissor jack under jacking point.

Draining Oil

1. See Figure 1-3. Place a suitable container under the drain plug.
2. Using a 5/8 in. wrench, remove drain plug from under oil tank/swingarm. Wipe any accumulated debris from magnetic tip on drain plug.
3. See Figure 1-4. Unscrew and remove dipstick from oil fill hole on top of oil tank/swingarm.

Changing Filter

1. Remove chin fairing See 2.33 CHIN FAIRING.
2. See Figure 1-5. Remove oil filter using pliers or belt type OIL FILTER WRENCH.
3. Clean filter gasket contact surface on crankcase. Surface should be smooth and free of any debris or old gasket material.
4. Apply a thin film of clean engine oil to filter gasket.
5. Pour 4.0 ounces (0.12 liter) of clean engine oil into **new** filter when changing oil (until filter is approximately 1/2 full).
6. Screw filter onto adapter until filter gasket touches crankcase surface. Rotate filter another 1/2-3/4 turn by hand.

⚠WARNING

Be sure no oil gets on tires when changing oil and filter. Traction will be adversely affected which may lead to loss of control which could result in death or serious injury.

Replacing Oil

1. Install drain plug.
2. Fill oil tank through filler (dipstick) hole with recommended oil from Table 1-5. Oil tank capacity with filter change is approximately 2.5 quarts (2.4 liters) and includes the 4.0 ounces (0.12 liter) poured into the filter. Always verify proper hot oil level on dipstick. Do not overfill.
3. Inspect o-ring on dipstick for rips or tears. Replace as required.

NOTE

For ease of installation, apply a light film of clean engine oil to the dipstick o-ring.

4. Install dipstick into oil tank/swingarm fill hole. Make sure dipstick is installed completely. DO NOT OVER TIGHTEN.
5. Remove left side oil cooler scoop. See 2.35 AIR SCOOPS.
6. Inspect oil cooler fins for debris or damage. Blow out any debris from fins with compressed air from the inside of the cooler outward.
7. Wipe up any spilled oil on muffler.
8. Start engine. Verify that oil pressure signal light on instrument support turns off after a few seconds when engine speed is 1000 RPM or above.
9. Check for oil leaks at oil filter, drain plug, hoses and oil cooler.
10. Install chin spoiler. See 2.33 CHIN FAIRING.
11. Install air scoop 2.35 AIR SCOOPS.
12. Check (hot) oil level. See CHECKING ENGINE OIL LEVEL.

Table 1-5. Recommended Oil Grades

HARLEY-DAVIDSON TYPE	VISCOSITY	HARLEY-DAVIDSON RATING	LOWEST AMBIENT TEMP °F	COLD WEATHER STARTS BELOW 50° F
H.D. Multi-Grade	SAE 10W40	HD 360	Below 40° (4°C)	Excel-lent
H.D. Multi-Grade	SAE 20W50	HD 360	Above 40° (4°C)	Good
H.D. Regular Heavy	SAE 50	HD 360	Above 60° (16°C)	Poor
H.D. Extra Heavy	SAE 60	HD 360	Above 80° (27°C)	Poor

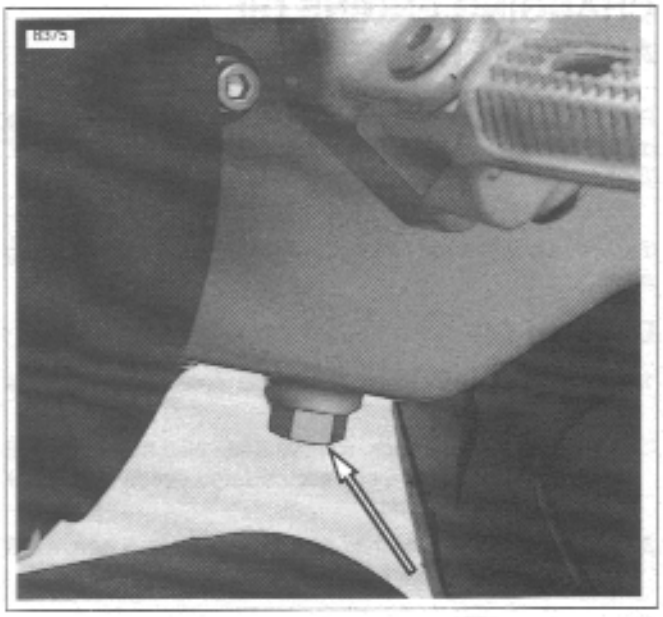

Figure 1-3. Oil Tank Drain Plug

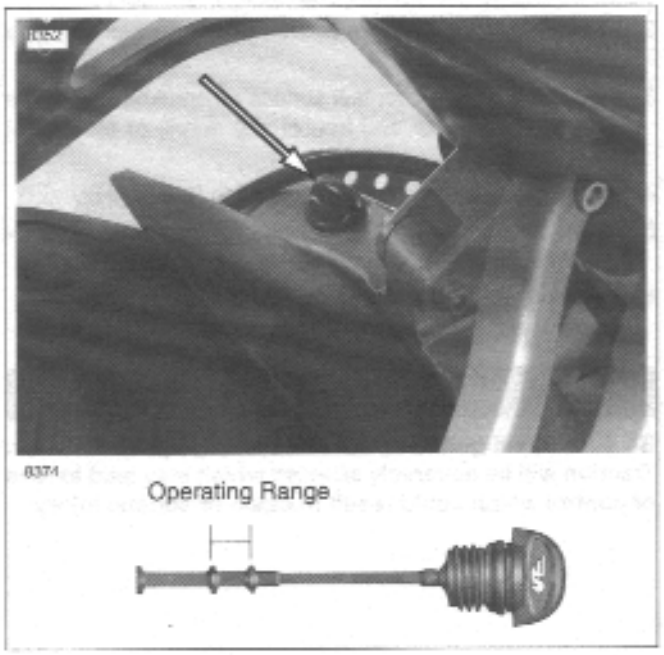

Figure 1-4. Dipstick Location/Engine Oil Level

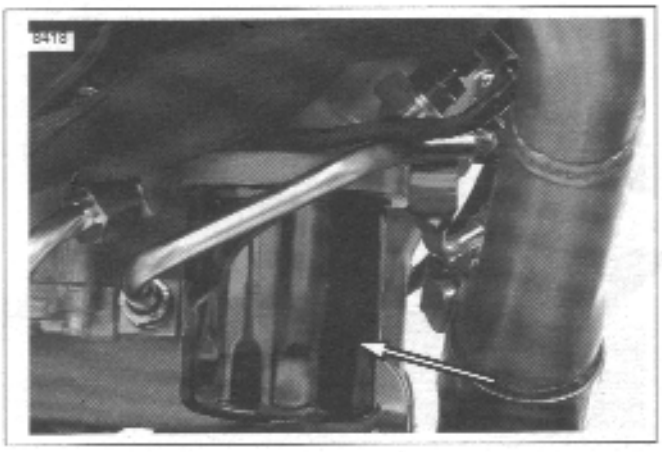

Figure 1-5. Oil Filter

GENERAL

Check brake fluid level and condition:

- At the 1000 mile (1600 km) service interval.
- At every 5000 mile (8000 km) service interval thereafter.
- When storing or removing the motorcycle for the season.

Replace **D.O.T. 4 BRAKE FLUID**:

- Every 2 years.

Front brake hand lever and rear brake foot pedal must have a firm feel when brakes are applied. If not, bleed system as described.

Inspect front and rear brake lines and replace as required:

- At the 1000 mile (1600 km) service interval.
- At every 2500 miles (4000 km) service interval thereafter.
- Every 4 years.

Inspect caliper and master cylinder seals and replace as required:

- At the 1000 mile (1600 km) service interval.
- At every 2500 miles (4000 km) service interval thereafter.
- Every 2 years.

If determining probable causes of poor brake operation, see Table 1-6.

BLEEDING BRAKES

⚠WARNING

D.O.T. 4 brake fluid can cause irritation of eyes and skin, and may be harmful if swallowed. If large amount of fluid is swallowed, induce vomiting by administering two tablespoons of salt in a glass of warm water. Call a doctor. In case of contact with skin or eyes, flush with plenty of water. Get medical attention for eyes. KEEP BRAKE FLUID OUT OF THE REACH OF CHILDREN. Failure to comply could result in death or serious injury.

⚠WARNING

Never mix D.O.T. 4 with other brake fluids (such as D.O.T. 5). Use only D.O.T. 4 brake fluid in motorcycles that specify D.O.T. 4 fluid on the reservoir cap. Mixing different types of fluid may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

⚠WARNING

Use only fresh, uncontaminated D.O.T. 4 fluid. Cans of fluid that have been opened may have been contaminated by moisture in the air or dirt. Use of contaminated brake fluid may adversely affect braking ability and lead to brake failure which could result in death or serious injury

⚠WARNING

Use only copper crush banjo washers (See Parts Catalog for Part No.) with D.O.T. 4 brake fluid. Earlier silver banjo washers are not compatible with D.O.T. 4 fluid and will not seal properly over time. Failure to comply may adversely affect braking ability and lead to brake failure which could result in death or serious injury.

⚠WARNING

Clean brake system components using denatured alcohol. Do not use mineral-base cleaning solvents, such as gasoline or paint thinner. Use of mineral-base solvents causes deterioration of rubber parts that continues after assembly. This may result in improper brake operation which could result in death or serious injury.

⚠WARNING

Always test motorcycle brakes at low speed after servicing or bleeding system. To prevent death or serious injury, Buell recommends that all brake repairs be performed by a Buell dealer or other qualified technician.

CAUTION

Cover molded-in-color surfaces and right handlebar switches and use care when removing brake reservoir cover and adding D.O.T. 4 brake fluid. Spilling D.O.T. 4 brake fluid on molded-in-color surfaces will result in cosmetic damage. Spilling brake fluid on switches may render them inoperative.

Table 1-6. Brake Troubleshooting

CONDITION	CHECK FOR	REMEDY
Excessive lever/pedal travel or spongy feel.	Air in system. Master cylinder low on fluid.	Bleed brake(s). Fill master cylinder with approved brake fluid.
Brake fade	Moisture in system.	Bleed brake(s). Fill master cylinder with approved brake fluid.
Chattering sound when brake is applied.	Worn pads. Worn D shape bushings Loose mounting bolts. Warped rotor.	Replace brake pads. Replace rotor and bushings as set. Tighten bolts. Replace rotor.
Ineffective brake – lever/pedal travels to limit.	Low fluid level. Piston cup not functioning.	Fill master cylinder with approved brake fluid, and bleed system. Rebuild cylinder.
Ineffective brake – lever/pedal travel normal.	Distorted or glazed rotor. Distorted, glazed or contaminated brake pads.	Replace rotor. Replace pads.
Brake pads drag on rotor – will not retract.	Cup in master cylinder not uncovering relief port. Rear brake pedal linkage out of adjustment.	Inspect master cylinder. Adjust linkage.