2007 SOFTAIL SERVICE MANUAL

The information in this Service Manual applies to all 2007 Softail® models.

FOREWORD

GENERAL

This Service Manual has been prepared with two purposes in mind. First, it will acquaint the user with the construction of the Harley-Davidson product and assist in the performance of basic maintenance and repair. Secondly, it will introduce to the professional Harley-Davidson Technician the latest field-tested and factory-approved major repair methods. We sincerely believe that this Service Manual will make your association with Harley-Davidson 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
- Section 7–Transmission
- Section 8–Electrical
- Appendix A–Tools
- Appendix B–Wiring
- Appendix C–Metric Conversions
- Appendix D–Glossary

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 contains sequentially numbered topics. The numbering system allows quick cross references throughout the document.

For example, the sixth topic (BRAKES) in section one (MAINTENANCE) could be referred to as:

1.6 BRAKES

This cross reference directs the reader to section **1** (MAINTENANCE) and topic **6** (BRAKES).

PREPARATION FOR SERVICE

⚠WARNING

Stop the engine when refueling or servicing the fuel system. Do not smoke or allow open flame or sparks near gasoline. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00002a)

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, Harley-Davidson Motor Company will periodically issue Service Bulletins to Harley dealers. Service Bulletins cover interim engineering changes and supplementary information.

USE GENUINE REPLACEMENT PARTS

⚠WARNING

When replacement parts are required, use only genuine Harley-Davidson parts or parts with equivalent characteristics (which include type, strength and material). Failure to do so may result in product malfunction. This could result in death or serious injury.

To ensure satisfactory and lasting repairs, carefully follow the Service Manual instructions and use only genuine Harley-Davidson replacement parts. Behind the emblem bearing the words GENUINE HARLEY-DAVIDSON stand more than 100 years of design, research, manufacturing, testing and inspecting experience. This is your assurance that the parts you are using will fit right, operate properly and last longer

WARNINGS AND CAUTIONS

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

⚠DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. (00119a)

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. (00139a)

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage (00140a)

⚠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. Inadequate safety precautions could result in death or serious injury.**
- **Since Harley-Davidson 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 Harley-Davidson must first thoroughly satisfy himself that neither his nor the operator's safety will be jeopardized as a result. This could result in death or serious injury.**
- **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 death or serious injury.**

PRODUCT REFERENCES

⚠WARNING

Follow the directions listed on all products. Carefully read all labels, warnings and cautions before use. Inadequate safety precautions could result in death or serious 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 USA 48092-3499

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 contact Loctite Corp. at www.loctite.com.

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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, Harley-Davidson reserves the right to change specifications, equipment or designs at any time without notice and without incurring obligation.

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MAINTENANCE 1

SERVICING A NEW MOTORCYCLE

⚠WARNING

Always follow the listed service and maintenance recommendations, since 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. See FIRST SCHEDULED MAINTENANCE under 1.3 MAINTENANCE SCHEDULE for details.

SAFE OPERATING MAINTENANCE

CAUTION

- **Do not attempt to retighten engine head bolts. Retightening can cause engine damage.**
- **During the initial 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. Secondary 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, auxiliary lamp, tail lamp, brake lamp, horn and turn signal operation.

SHOP PRACTICES

Repair Notes

NOTE

- *General maintenance practices are given in this section.*
- *Repair = Disassembly/Assembly.*
- *Replace = Removal/Installation.*

All special tools and torque values are noted at the point of use.

All required parts or materials can be found in the appropriate PARTS CATALOG.

Safety

Safety is always the most important consideration when performing any job. Be sure you have a complete understanding of the task to be performed. Use common sense. Use the proper tools. Protect yourself and bystanders with approved eye protection. Don't just do the job – do the job safely.

Removing Parts

Always consider the weight of a part when lifting. Use a hoist whenever necessary. Do not lift heavy parts by hand. A hoist and adjustable lifting beam or sling are needed to remove some parts. The lengths of chains or cables from the hoist to the part should be equal and parallel and should be positioned directly over the center of the part. Be sure that no obstructions will interfere with the lifting operation. Never leave a part suspended in mid-air.

⚠WARNING

Always check the capacity rating and condition of hoists, slings, chains or cables before use. Failure to do so can lead to an accident which could result in death or serious injury.

Always use blocking or proper stands to support the part that has been hoisted. If a part cannot be removed, verify that all bolts and attaching hardware have been removed. Check to see if any parts are in the way of the part being removed.

When removing hoses, wiring or tubes, always tag each part to ensure proper installation.

Cleaning

If you intend to reuse parts, follow good shop practice and thoroughly clean the parts before assembly. Keep all dirt out of parts; the unit will perform better and last longer. Seals, filters and covers are used in this vehicle to keep out environmental dirt and dust. These items must be kept in good condition to ensure satisfactory operation.

Clean and inspect all parts as they are removed. Be sure all holes and passages are clean and open. After cleaning, cover all parts with clean lint-free cloth, paper or other material. Be sure the part is clean when it is installed.

Always clean around lines or covers before they are removed. Plug, tape or cap holes and openings to keep out dirt, dust and debris.

Disassembly and Assembly

Always assemble or disassemble one part at a time. Do not work on two assemblies simultaneously. Be sure to make all necessary adjustments. Recheck your work when finished. Be sure that everything is done.

Operate the vehicle to perform any final check or adjustments. If all is correct, the vehicle is ready to go back to the customer.

REPAIR AND REPLACEMENT PROCEDURES

Hardware and Threaded Parts

Install helical thread inserts when inside threads in castings are stripped, damaged or not capable of withstanding specified torque.

Replace bolts, nuts, studs, washers, spacers and small common hardware if missing or in any way damaged. Clean up or repair minor thread damage with a suitable thread chaser.

Replace all damaged or missing lubrication fittings.

Use Teflon pipe sealant on pipe fitting threads.

Threadlocking Agents

Always follow specific service manual procedures when working with fasteners containing preapplied threadlocking agents when fastener replacement is recommended. When re-using fasteners containing threadlocking agents, be sure to completely remove all existing threadlocking agent from fastener threads with a wire brush or wire wheel. Also, be sure to remove residual threadlocking agent from fastener hole using an appropriate thread chasing device and compressed air when using new or existing fasteners. Always use the recommended threadlocking agent for your specific procedure.

Wiring, Hoses and Lines

Replace hoses, clamps, electrical wiring, electrical switches or fuel lines if they do not meet specifications.

Instruments and Gauges

Replace broken or defective instruments and gauges. Replace dials and glass that are so scratched or discolored that reading is difficult.

Bearings

Anti-friction bearings must be handled in a special way. To keep out dirt and abrasives, cover the bearings as soon as they are removed from the package.

Wash bearings in a non-flammable cleaning solution. Knock out packed lubricant inside by tapping the bearing against a wooden block. Wash bearings again. Cover bearings with clean material after setting them down to dry. Never use compressed air to dry bearings.

Coat bearings with clean oil. Wrap bearings in clean paper.

Be sure that the chamfered side of the bearing always faces the shoulder (when bearings installed against shoulders). Lubricate bearings and all metal contact surfaces before pressing into place. Only apply pressure on the part of the bearing that makes direct contact with the mating part. Install bearings with numbered side facing out.

Always use the proper tools and fixtures for removing and installing bearings.

Bearings do not usually need to be removed. Only remove bearings if necessary.

Bushings

Do not remove a bushing unless damaged, excessively worn or loose in its bore. Press out bushings that must be replaced.

When pressing or driving bushings, be sure to apply pressure in line with the bushing bore. Use a bearing/bushing driver or a bar with a smooth, flat end. Never use a hammer to drive bushings.

Inspect the bushing and the mated part for oil holes. Be sure all oil holes are properly aligned.

Exhaust System Leakage

In the event of an exhaust system leak at a muffler or header pipe connection location, disassemble and clean all mating surfaces. Replace any damaged components. If leak still exists, disassemble and repair the leak by applying a bead of Harley-Davidson High-Performance Sealant, part number 99650-02. Reassemble components, wipe off any excess sealant and allow adequate curing time following sealant product instructions before running vehicle.

Gaskets

Always discard gaskets after removal. Replace with **new** gaskets. Never use the same gasket twice. Be sure that gasket holes match up with holes in the mating part.

Lip Type Seals

Lip seals are used to seal oil or grease and are usually installed with the sealing lip facing the contained lubricant. Seal orientation, however, may vary under different applications.

Seals should not be removed unless necessary. Only remove seals if required to gain access to other parts or if seal damage or wear dictates replacement.

Leaking oil or grease usually means that a seal is damaged. Replace leaking seals to prevent overheated bearings.

Always discard seals after removal. Do not use the same seal twice.

O-Rings (Preformed Packings)

Always discard O-rings after removal. Replace with **new** O-rings. To prevent leaks, lubricate the O-rings before installation. Apply the same type of lubricant as that being sealed. Be sure that all gasket, O-ring and seal mating surfaces are thoroughly clean before installation.

Gears

Always check gears for damaged or worn teeth.

Lubricate mating surfaces before pressing gears on shafts.

Shafts

If a shaft does not come out easily, check that all nuts, bolts or retaining rings have been removed. Check to see if other parts are in the way before using force.

Shafts fitted to tapered splines should be very tight. If shafts are not tight, disassemble and inspect tapered splines. Discard parts that are worn. Be sure tapered splines are clean, dry and free of burrs before putting them in place. Press mating parts together tightly.

Clean all rust from the machined surfaces of new parts.

Part Replacement

Always replace worn or damaged parts with **new** parts.

CLEANING

Part Protection

Before cleaning, protect rubber parts (such as hoses, boots and electrical insulation) from cleaning solutions. Use a grease-proof barrier material. Remove the rubber part if it cannot be properly protected.

Cleaning Process

Any cleaning method may be used as long as it does not result in parts damage. Thorough cleaning is necessary for proper parts inspection. Strip rusted paint areas to bare metal before repainting.

Rust or Corrosion Removal

Remove rust and corrosion with a wire brush, abrasive cloth, sand blasting, vapor blasting or rust remover. Use buffing crocus cloth on highly polished parts that are rusted.

TOOL SAFETY

Air Tools

- Always use approved eye protection equipment when performing any task using air-operated tools.
- On all power tools, use only recommended accessories with proper capacity ratings.
- Do not exceed air pressure ratings of any power tools.
- Bits should be placed against work surface before air hammers are operated.
- Disconnect the air supply line to an air hammer before attaching a bit.
- Never point an air tool at yourself or another person.
- Protect bystanders with approved eye protection.

Wrenches

- Never use an extension on a wrench handle.
- If possible, always pull on a wrench handle and adjust your stance to prevent a fall if something lets go.
- Never cock a wrench.
- Never use a hammer on any wrench other than a STRIKING FACE wrench.
- Discard any wrench with broken or battered points.
- Never use a pipe wrench to bend, raise or lift a pipe.

Pliers/cutters/prybars

- Plastic- or vinyl-covered pliers handles are not intended to act as insulation; don't use on live electrical circuits.
- Don't use pliers or cutters for cutting hardened wire unless they were designed for that purpose.
- Always cut at right angles.
- Don't use any prybar as a chisel, punch or hammer.

Hammers

- Never strike one hammer against a hardened object, such as another hammer.
- Always grasp a hammer handle firmly, close to the end.
- Strike the object with the full face of the hammer.
- Never work with a hammer which has a loose head.
- Discard hammer if face is chipped or mushroomed.
- Wear approved eye protection when using striking tools.
- Protect bystanders with approved eye protection.

Punches/chisels

- Never use a punch or chisel with a chipped or mushroomed end; dress mushroomed chisels and punches with a file.
- Hold a chisel or a punch with a tool holder if possible.
- When using a chisel on a small piece, clamp the piece firmly in a vise and chip toward the stationary jaw.
- Wear approved eye protection when using these tools.
- Protect bystanders with approved eye protection.

Screwdrivers

- Don't use a screwdriver for prying, punching, chiseling, scoring or scraping.
- Use the right type of screwdriver for the job; match the tip to the fastener.
- Don't interchange POZIDRIV®, PHILLIPS® or REED AND PRINCE screwdrivers.
- Screwdriver handles are not intended to act as insulation; don't use on live electrical circuits.
- Don't use a screwdriver with rounded edges because it will slip – redress with a file.

Ratchets and Handles

- Periodically clean and lubricate ratchet mechanisms with a light grade oil. Do not replace parts individually; ratchets should be rebuilt with the entire contents of service kit.
- Never hammer or put a pipe extension on a ratchet or handle for added leverage.
- Always support the ratchet head when using socket extensions, but do not put your hand on the head or you may interfere with the action of its reversing mechanism.
- When breaking loose a fastener, apply a small amount of pressure as a test to be sure the ratchet's gear wheel is engaged with the pawl.

Sockets

- Never use hand sockets on power or impact wrenches.
- Select the right size socket for the job.
- Never cock any wrench or socket.
- Select only impact sockets for use with air or electric impact wrenches.
- Replace sockets showing cracks or wear.
- Keep sockets clean.
- Always use approved eye protection when using power or impact sockets.

Storage Units

- Don't open more than one loaded drawer at a time. Close each drawer before opening up another.
- Close lids and lock drawers and doors before moving storage units.
- Don't pull on a tool cabinet; push it in front of you.
- Set the brakes on the locking casters after the cabinet has been rolled to your work.

FUEL

⚠WARNING

Use care when refueling. Pressurized air in fuel tank can force gasoline to escape through filler tube. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00029a)

⚠WARNING

Avoid spills. Slowly remove filler cap. Do not fill above bottom of filler neck insert, leaving air space for fuel expansion. Secure filler cap after refueling. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00028a)

Use a good quality unleaded gasoline (91 pump octane or higher). Octane ratings are usually shown on the gas pump.

GASOLINE BLENDS

CAUTION

Using gasoline that has an alcohol additive, such as methanol, may cause fuel system rubber components' failure and/or engine damage.

Harley-Davidson motorcycles were designed to give the best performance using unleaded gasoline. Some fuel suppliers sell gasoline/alcohol blends as a fuel. The type and amount of alcohol added to the fuel is important.

- DO NOT USE GASOLINES CONTAINING METHANOL. Using gasoline/methanol blends will result in starting and driveability deterioration and damage to critical fuel system components.
- ETHANOL is a mixture of 10% ethanol (Grain alcohol) and 90% unleaded gasoline. Gasoline/ethanol blends can be used in your motorcycle if the ethanol content does not exceed 10%.
- REFORMULATED OR OXYGENATED GASOLINES (RFG): "Reformulated gasoline" is a term used to describe gasoline blends that are specifically designed to burn cleaner than other types of gasoline. Your motorcycle will run normally using this type of gas.

You may find that some gasoline blends adversely affect the starting, driveability or fuel efficiency of your bike. If you experience one or more of these problems, we recommend you try a different brand of gasoline or gasoline with a higher octane rating.

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-4
- CG-4
- CH-4
- CI-4

The preferred viscosities for the diesel engine oils, in descending order, are:

- 20W-50
- 15W-40
- 10W-40

At the first opportunity, see a Harley-Davidson dealer to change back to 100 percent Harley-Davidson oil.

See 1.4 ENGINE OIL AND FILTER for all service information.

WINTER LUBRICATION

Combustion in an engine produces water vapor. During starting and warm-up in cold weather, especially in freezing temperatures, the vapor condenses to water before the crankcase is hot enough to exhaust it through the breather system. If the engine is run long enough for the crankcase to become thoroughly heated, the water returns to vapor and is then exhausted.

An engine used for only short trips, and seldom allowed to thoroughly warm up, accumulates increasing amounts of water in the oil tank. Water mixed with oil forms a sludge that causes accelerated engine wear. In freezing temperatures, the water becomes slush or ice, which may clog oil lines and result in engine failure.

Always change the engine oil more often in winter. If the engine is used for short runs, change the oil even more frequently. The farther below freezing the temperature drops the more often the oil should be changed.

FIRST SCHEDULED MAINTENANCE

- On models with springer forks (FLSTSC), after 500 miles (800 km) a Harley-Davidson dealer should perform the first scheduled service listed in the Owner's Manual. See the Maintenance and Lubrication section in your Owner's Manual for more information.
- On models with hydraulic forks (FXST, FLSTC, FLSTF, FXSTB, FXSTD, FLSTN, FXSTC), after 1000 miles (1600 km) a Harley-Davidson dealer should perform the first scheduled service listed in the Owner's Manual. See the Maintenance and Lubrication section in your Owner's Manual for more information.

Table 1-1. Regular Service Intervals For Softail Models

ITEM SERVICED	PROCEDURE	FIRST SERVICE	5000 mi 8000 km	10,000 mi 16,000 km	15,000 mi 24,000 km	20,000 mi 32,000 km	25,000 mi 40,000 km	NOTES
Engine oil and filter	Replace	X	X	X	X	X	X	
Oil lines and brake system	Inspect for leaks	X	X	X	X	X	X	1
Air cleaner	Inspect, service as required	X	X	X	X	X	X	
Tires	Check pressure, inspect tread	X	X	X	X	X	X	
Wheel spokes	Check tightness	X	X			X		1, 4
Primary chaincase lubricant	Replace	X		X		X		
Transmission lubricant	Replace	X				X		
Clutch	Check adjustment	X	X	X	X	X	X	1
Rear belt and sprockets	Inspect, adjust belt	X	X	X	X	X	X	1
Throttle, brake and clutch controls	Check, adjust and lubricate	X	X	X	X	X	X	1
Jiffy stand	Inspect and lubricate	X		X		X		1
Fuel lines and fittings	Inspect for leaks	X	X	X	X	X	X	1
Fuel tank filter	Replace						X	1
Brake fluid	Check levels and condition	X	X	X	X	X	X	6
Brake pads and discs	Inspect for wear	X	X	X	X	X	X	
Spark plugs	Inspect	X	X	X	X		X	
	Replace					X		
Electrical equipment and switches	Check operation	X	X	X	X	X	X	
Engine idle speed	Check adjustment	X	X	X	X	X	X	1
Front fork oil	Replace	Replace at 50,000 miles (80,000 kilometers)						1

NOTES:

1. Should be performed by an authorized Harley-Davidson dealer, unless you have the proper tools, service data and are mechanically qualified.
2. Disassemble, lubricate and inspect every 30,000 miles (48,000 km).
3. Perform annually.
4. Not all vehicles are equipped with spoke wheels. Consult appropriate topic in service manual.
5. Disassemble, lubricate and inspect every 20,000 miles (32,000 km).
6. Change DOT 4 brake fluid and flush every two years.
7. Adjust at 500 miles (800 kilometers).

Table 1-1. Regular Service Intervals For Softail Models

ITEM SERVICED	PROCEDURE	FIRST SERVICE	5000 mi 8000 km	10,000 mi 16,000 km	15,000 mi 24,000 km	20,000 mi 32,000 km	25,000 mi 40,000 km	NOTES
Steering head bearings (Softail models)	Adjust	X		X		X		1
	Lubricate			X		X		2
Steering head bearings (Springer models)		Adjust and lubricate every 2500 miles (4000 kilometers)						1, 5
Rear fork bearings (if applicable)	Repack					X		1
Windshield bushings	Inspect			X		X		1
Springer rocker bearings	Adjust	X		X		X		1, 7
Fuel door, tour-pak, saddle-bags	Lubricate hinges and latches	X	X	X	X	X		
Critical fasteners	Check tightness	X		X		X		1
Battery	Check battery and clean connections							3
Road test	Verify component and system functions	X	X	X	X	X	X	

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Table 1-2. Quick Reference Maintenance Chart

ITEM SERVICED	SPECIFICATION	DATA
Engine oil and filter	Drain plug torque	14-21 ft-lbs (19-28 Nm)
	Oil capacity	3.0 qt. (2.85 L)
	Filter	Hand tighten 1/2-3/4 turn after gasket contact
	Chrome filter part number	63798-99
	Black filter part number	63731-99
Primary chain lubricant	Lubricant capacity	32 oz. (0.95 mL)
	Primary chaincase drain plug torque	14-21 ft-lbs (19-28 Nm)
Clutch adjustment	Free play at adjuster screw	1/2-1 turn
	Adjuster screw locknut torque	72-120 **in-lbs** (8-14 Nm)
	Free play at hand lever	1/16-1/8 (1.6-3.2 mm)
	Clutch inspection cover torque	84-108 **in-lbs** (10-12 Nm)
Transmission lubricant	Lubricant level	Dipstick at FULL with motorcycle on jiffy stand and filler plug resting on threads
	Lubricant capacity	32 oz. (0.95 mL)
	Transmission drain plug torque	14-21 ft-lbs (19-28 Nm)
	Filler plug torque	25-75 **in-lbs** (3-9 Nm)
Spark plugs	Type	HD-6R12
	Gap	0.038-0.043 in. (0.97-1.09 mm)
	Torque	12-18 ft-lbs (16-24 Nm)
Engine idle speed	Idle speed	950-1050 RPM
Front fork oil	Type	HYDRAULIC FORK OIL (TYPE E) Part No. 99884-80 (16 oz.)
Battery	Lubricant	ELECTRICAL CONTACT LUBRICANT Part No. 99861-02 (1 oz.)
	Battery terminal torque	60-96 **in-lbs** (6.8-10.9 Nm)

Table 1-2. Quick Reference Maintenance Chart

ITEM SERVICED	SPECIFICATION	DATA
Tire condition and pressure	Pressure for solo rider	FLSTC, FLSTSC, FLSTN Models: Front: 36 psi (248 kPa) Rear: 36 psi (248 kPa)
		FXST, FXSTC, FXSTB Models: Front: 30 psi (207 kPa) Rear: 38 psi (262 kPa)
		FLSTF Models: Front: 36 psi (248 kPa) Rear: 38 psi (262 kPa)
		FXSTD Model: Front: 30 psi (207 kPa) Rear: 36 psi (248 kPa)
	Pressure for rider and passenger	FLSTC, FLSTSC, FLSTN Models: Front: 36 psi (248 kPa) Rear: 40 psi (276 kPa)
		FXST, FXSTC, FXSTB Models: Front: 30 psi (207 kPa) Rear: 42 psi (290 kPa)
		FLSTF Models: Front: 36 psi (248 kPa) Rear: 42 psi (290 kPa)
		FXSTD Model: Front: 30 psi (207 kPa) Rear: 40 psi (276 kPa)
	Wear	Replace tire if 1/32 in. (0.8 mm) or less of tread pattern remains
Wheel spokes	Spoke nipple torque	Steel laced rim: 40-50 **in-lbs** (4.5-5.6 Nm)
		Chrome aluminum rim: 55 **in-lbs** (6.2 Nm)
Steering head bearings	Lubricant for neck fitting	SPECIAL PURPOSE GREASE Part No. 99857-97 (14 oz. cartridge)
Brake fluid reservoir level	D.O.T. 4 hydraulic brake fluid part number	99953-99A (12 oz.)
	Proper fluid level	1/8 in. (3.2 mm) from the top
	Master cylinder reservoir cover torque	6-8 **in-lbs** (0.7-0.9 Nm)
Brake pad linings and discs	Minimum brake pad thickness	0.04 in. (1.02 mm)
	Minimum brake disc thickness	See stamp on side of disc
Drive belt	Upward measurement force applied at midpoint of bottom of belt strand	10 lb. (4.5 kg)
	With motorcycle On jiffy stand without rider or luggage	FLSTN, FXSTD–1/4-5/16 in. (6.4-7.9 mm) FXST, FLSTC, FLSTF, FXSTB, FLSTSC, FXSTC–9/16-5/8 in. (14.3-15.9 mm)
	Vehicle upright with rear wheel in air	FLSTN, FXSTD–5/16-3/8 in. (7.9-9.5 mm) FXST, FLSTC, FLSTF, FXSTB, FLSTSC, FXSTC–11/16-3/4 in. (17.5-19.0 mm)

Table 1-2. Quick Reference Maintenance Chart

ITEM SERVICED	SPECIFICATION	DATA
Air cleaner	Air cleaner cover bracket screw torque	40-60 **in-lbs** (4.5-6.8 Nm)
	Air cleaner cover screw torquew	30-60 **in-lbs** (4.1-6.8 Nm)
	Adhesive for air cleaner cover screw	LOCTITE THREADLOCKER 243 Part No. 99642-97 (6 ml)
Clutch and throttle cables	Lubricant	SUPER OIL Part No. 94968-85TV (1/4 fl. oz.)
	Handlebar clamp screw torque	12-15 ft-lbs (16.3-20.3 Nm)
	Handlebar switch housing screw torque	35-45 **in-lbs** (4-5 Nm)

CHECKING AND ADDING OIL

See Figure 1-1. Check engine oil level:

- As part of the pre-ride inspection.
- At every scheduled service interval.

Type of Oil

Refer to Table 1-3. Use the proper grade of oil for the lowest temperature expected before the next oil change. See 1.2 FUEL AND OIL for specific information regarding winter needs.

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 Harley-Davidson dealer to change back to 100 percent Harley-Davidson oil.

Checking Oil Level

Ride motorcycle until engine is warmed up to operating temperature, then do the following.

1. Idle motorcycle on jiffy stand for 1-2 minutes.
2. Shut motorcycle off and leave motorcycle **resting on jiffy stand**.
3. See Figure 1-2. Check oil level on dipstick. If necessary, add oil until oil registers at upper groove on dipstick. Do not overfill oil tank.

Table 1-3. 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

Figure 1-1. Checking Oil Tank Level

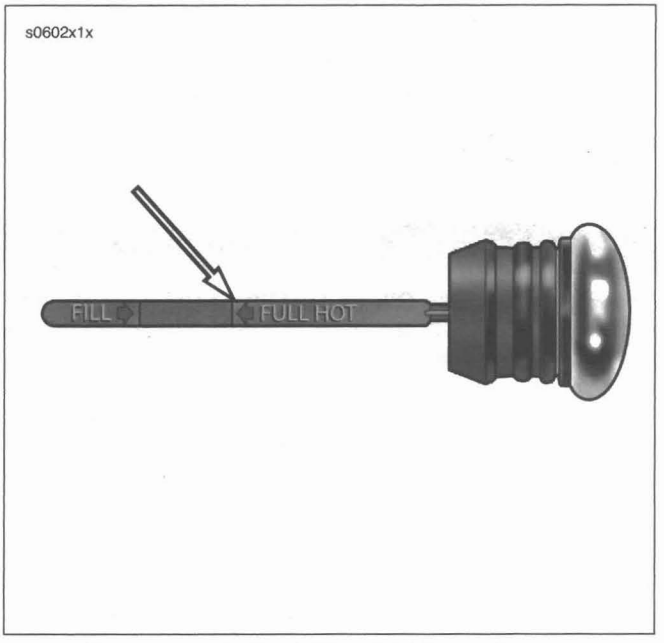


Figure 1-2. Oil Tank Dipstick Upper Groove

CHANGING OIL AND FILTER

PART NO.	SPECIALTY TOOL
HD-42311 or HD-44067	Oil filter wrench

NOTES

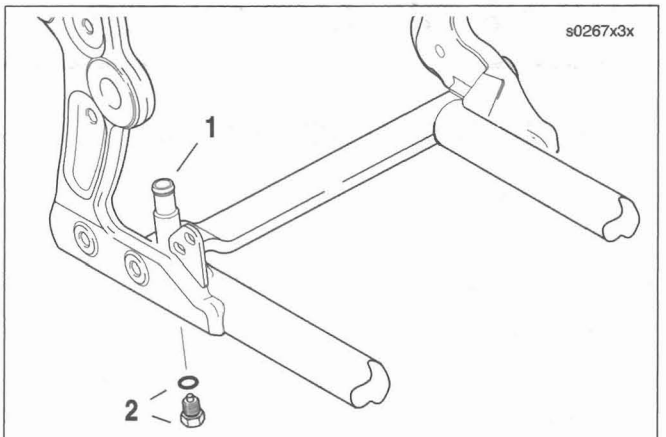
- *If the motorcycle is ridden hard, under dusty conditions, or in cold weather, the oil and filter should be changed more often.*
- *All Softails are shipped from the factory with SAE 20W50 Harley-Davidson 360 Motor Oil.*
- *All Softails come equipped from the factory with a premium 5 micron synthetic media oil filter, Part No. 63798-99 (Chrome) or 63731-99 (Black). These are the only recommended replacement filters.*

1. Ride motorcycle until engine is warmed up to normal operating temperature.
2. See Figure 1-1. Remove the oil filler plug/dipstick by pulling steadily while moving plug back and forth.
3. See Figure 1-3. Remove the engine oil drain plug with O-ring (2). Allow oil to drain into a suitable container.

CAUTION

See Figure 1-4. Use OIL FILTER WRENCH (Part No. HD-42311 or HD-44067) for filter removal. These tools can prevent damage to crankshaft position sensor and/or sensor cable.

4. Remove the oil filter using the OIL FILTER WRENCH. Clean the oil filter mount flange of any old gasket material.
5. See Figure 1-5. Lube the gasket on **new** oil filter with engine oil and install **new** filter. Hand tighten oil filter 1/2 to 3/4 turn after gasket contacts filter mounting surface.
6. See Figure 1-3. Install oil tank drain plug.
   a. Inspect O-ring for tears or damage. Replace if required. Wipe any foreign material from plug.
   b. Install O-ring and drain plug. Tighten to 14-21 ft-lbs (19.0-28.5 Nm).
7. See Figure 1-1. Fill oil tank with 3.0 quarts (2.85 liters) of oil. Use the proper grade of oil for the lowest temperature expected before next oil change. See Table 1-3.
8. Start engine and carefully check for oil leaks around drain plug and oil filter.
9. Check engine oil level.



1. Frame connection for oil tank drain hose
2. Oil tank drain plug and O-ring

Figure 1-3. Oil Tank Drain Plug

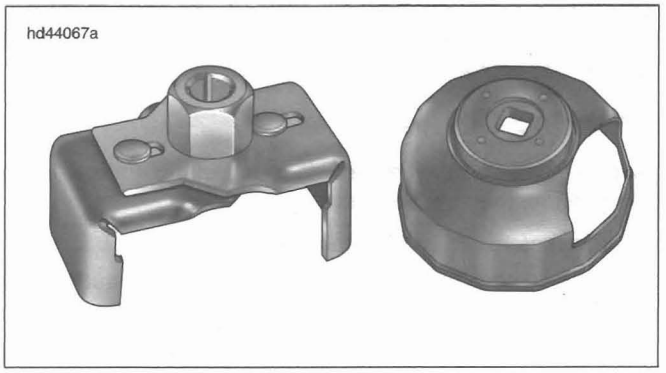


Figure 1-4. Oil Filter Wrench
Part No. HD-42311 (left), Part No. HD-44067 (right)

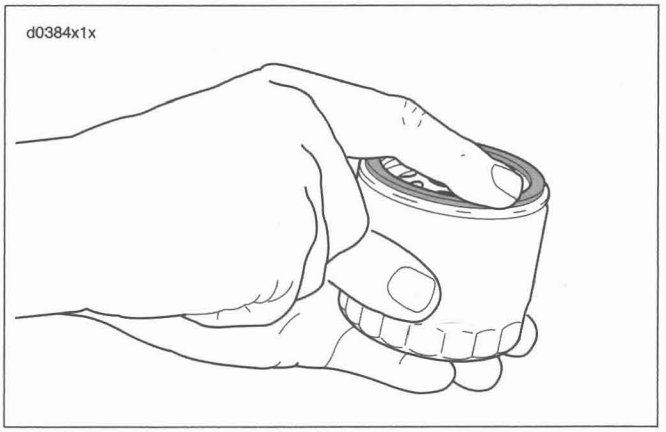


Figure 1-5. Lubing New Oil Filter

GENERAL

⚠WARNING

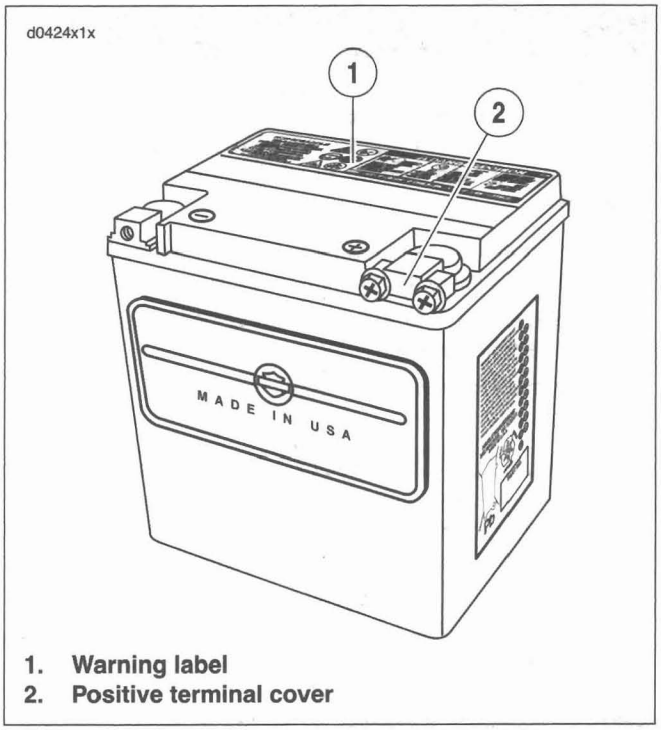
Batteries contain sulfuric acid, which could cause severe burns to eyes and skin. Wear a protective face shield, rubberized gloves and protective clothing when working with batteries. KEEP BATTERIES AWAY FROM CHILDREN. (00063a)

⚠WARNING

Never remove warning label attached to top of battery. Failure to read and understand all precautions contained in warning, could result in death or serious injury. (00064a)

Table 1-4. 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.



1. **Warning label**
2. **Positive terminal cover**

Figure 1-6. Battery

NOTE

See 8.15 BATTERY for charging and testing information.

Figure 1-7. Battery Warning Label

DISCONNECTION AND REMOVAL

1. Remove seat.

⚠WARNING

Disconnect negative (-) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00049a)

2. See Figure 1-8. Unthread bolt and remove battery negative cable (black) from battery negative (-) terminal (2).
3. Unthread bolt and remove battery positive cable (red) from battery positive (+) terminal (3).
4. Lift battery from within oil tank.

INSTALLATION AND CONNECTION

1. See Figure 1-9. Place the fully charged battery into the battery pad, terminal side facing front wheel.

NOTE

Battery must sit flat on bottom of tray pad. Verify that battery does not sit on front edge of tray pad.

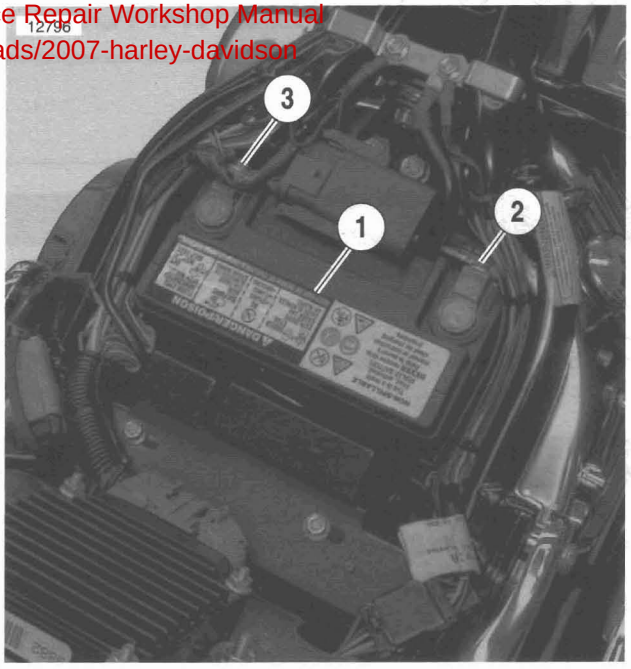
CAUTION

Attach the cables to the correct battery terminals using the proper torque. Overtightening bolts can damage battery terminals and incorrect connections may damage the motorcycle's electrical system.

⚠WARNING

Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

2. See Figure 1-9. Verify that the positive battery cable (1) from the starter is routed at the angle shown. Verify positive battery cable and rear oxygen sensor wire (2) are parallel and do not cross.
3. See Figure 1-8. Insert bolt through battery positive cable (red) into threaded hole of battery positive (+) terminal (3). Tighten bolt to 60-96 **in-lbs** (6.8-10.9 Nm).



1. **Battery**
2. **Negative battery terminal**
3. **Positive battery terminal**

Figure 1-8. Battery Assembly

4. Insert bolt through battery negative cable (black) into threaded hole of battery negative (-) terminal (2). Tighten bolt to 60-96 **in-lbs** (6.8-10.9 Nm).
5. 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 in locked position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070a)

6. Install seat.