

2003 SOFTAIL MODELS

SERVICE MANUAL

Part Number 99482-03

Section 1: Maintenance

Section 2: Chassis

Section 3: Engine

Section 4: Fuel System

Section 5: Starter

Section 6: Drive

Section 7: Transmission

Section 8: Electrical

Section 9: Fuel Injection

Appendix

ELECTRICAL DIAGNOSTICS

Part Number 99498-03

Section 1: Starting & Charging

Section 2: Instruments

Section 3: TSM & TSSM

Section 4: Engine Management (Carbureted)

Section 5: Engine Management (EFI)

Section 6: Wiring

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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, passing lamp, tail lamp, brake lamp 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.

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.

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

Remove filler cap slowly and fill fuel tank slowly to prevent spillage; do not overfill or fill above the bottom of the filler neck insert. In addition, leave air space to allow for fuel expansion. Expansion can cause an overfilled tank to overflow gasoline through the filler cap onto surrounding areas. After refueling, be sure filler cap is securely tightened. Failure to comply may cause an explosion or fire which could result in death or serious injury.

Use a good quality leaded or unleaded gasoline (91 pump octane or higher). Pump octane is the octane number 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, 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.

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 pan. 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.

MAINTENANCE TASK AND SERVICE DATA	P R E R I D E	F I R S T	2	5	7	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5
			5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
			MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Engine oil (*) <i>Oil level:</i> Fill to upper groove on dipstick with warm engine. (1.4 ENGINE OIL AND FILTER)	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R
Engine filter (*) <i>Filter tightening:</i> Hand tighten oil filter 1/2 to 3/4 turn after gasket surface contacts filter mounting surface. (1.4 ENGINE OIL AND FILTER)		R		R		R		R		R		R		R		R		R		R		R
Battery (*) (1.5 BATTERY MAINTENANCE)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Brake fluid level and condition <i>Brake fluid type:</i> D.O.T. 5 SILICONE BRAKE FLUID (1.6 BRAKES)		I		I		I		I		I		I		I		I		I		I		I
Brake pads and discs for wear <i>Minimum pad thickness:</i> varies upon application <i>Maximum brake disc lateral runout:</i> 0.008 in. (0.2 mm) (1.8 BRAKE PADS AND DISCS)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

FIRST SCHEDULED MAINTENANCE

- On models with springer forks (FLSTS, FXSTS), 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 (FXSTD, FLSTC, FLSTF, FXST, FXSTB), 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 Code:
A - Adjust.
I - Inspect, and if necessary, correct, adjust, clean or replace.
L - Lubricate with specified lubricant.
R - Replace or change.
T - Tighten to proper torque.
X - Perform.
D - Disassemble (Lube & Inspect).
(*) - Also perform prior to storage or annually.

MAINTENANCE TASK AND SERVICE DATA	P R E R I D E	F I R S T	2	5	7	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5			
			5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	
			MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI			
			4	8	2	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	
			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
Tire pressure and inspect tire for wear/damage (*) (1.9 TIRES AND WHEELS)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Wheel spoke tightness <i>Wheel spoke nipple torque:</i> 40-50 in-lbs (4.5-5.6 Nm) (1.9 TIRES AND WHEELS)				I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Primary chain adjustment (*) <i>Deflection:</i> Deflection depends upon vehicle temperature. (1.10 PRIMARY CHAIN)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Primary chain lubricant <i>Lubricant level:</i> Bottom edge of diaphragm spring with vehicle upright. <i>Lubricant type:</i> Part No. 99887-84 (quart) or 99886-84 (gallon) (1.11 PRIMARY CHAINCASE LUBRICANT)		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
Clutch adjustment <i>Hand lever free play:</i> 1/16-1/8 in. (1.6-3.2 mm) (1.12 CLUTCH)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

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MAINTENANCE TASK AND SERVICE DATA	P	R	E	F	I	R	I	2	2	2	2	3	3	3	3	4	4	4	4	5
	E	R	D	S	M	M	M	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
	4	8	2	6	0	4	8	2	6	0	4	8	2	6	0	4	8	2	6	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Transmission lubricant (*) <i>Lubricant level:</i> Bottom edge of FULL mark on dipstick with vehicle upright. <i>Lubricant type:</i> Part No. 99892-84 (quart) <i>Drain plug:</i> 14-21 ft-lbs (19.0-28.5 Nm) (1.13 TRANSMISSION LUBRICANT)				R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R
Rear belt deflection inspection (*) <i>Deflection:</i> 5/16-3/8 in. (7.9-9.5 mm) <i>Specialty tool:</i> Part No. HD-35381 (1.14 REAR BELT DEFLECTION)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Rear belt and sprocket (*) (1.15 REAR BELT AND SPROCKETS)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Steering head bearings (1.17 STEERING HEAD BEARINGS: ALL BUT FLSTS/FXSTS or 1.18 STEERING HEAD BEARINGS: FLSTS/FXSTS)	A	L	AL	L	AL	L	AL	L	D	L	AL	L	AL	L	AL	L	AL	L	AL	L
Springer rocker bearings (1.19 ROCKER BEARINGS: FLSTS/FXSTS)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	I
Front fork oil (1.20 FRONT FORK OIL)								R								R				

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MAINTENANCE TASK AND SERVICE DATA	P R E R I D E	F I R S T	2	5	7	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5		
			5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0	5
			MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI		
			4	8	2	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	
			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
Spark plugs (*) <i>Plug type:</i> No. 6R12 <i>Plug gap:</i> 0.038-0.043 (0.97-1.09 mm) <i>Plug torque:</i> 12-18 ft-lbs (16.3-24.4 Nm) (1.21 SPARK PLUGS)			I	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	
Air cleaner filter (*) <i>Cover screw torque:</i> 36-60 in-lbs (4.1-6.8 Nm) (1.22 AIR CLEANER FILTER)			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Lubricate controls (*) Front brake hand lever, clutch hand lever, throttle control cables and clutch control cable (1.23 CABLE AND CHASSIS LUBRICATION)			IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	
Operation of throttle (1.24 THROTTLE CABLES)			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Enrichener operation (carbureted only) (1.25 ENRICHENER: CARBURETED)			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Engine idle speed: 950-1050 RPM (1.26 IDLE SPEED AND IGNITION TIMING: CARBURETED) or 9.3 IDLE SPEED: EFI			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	

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MAINTENANCE TASK AND SERVICE DATA	P R E R I O D E	F I R S T	2	5	7	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	
			5	0	5	0	2	5	7	0	5	0	5	7	0	5	0	5	7	0	5	0	5
			MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	
			4	8	2	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	
			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
Fuel supply valve filter screen (1.27 FUEL SUPPLY VALVE FILTER: CARBURETED)											I								I				
Fuel supply valve, hoses and fittings for leaks (*) (1.27 FUEL SUPPLY VALVE FILTER: CARBURETED)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Check oil and brake lines for leaks		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
Engine mounts (1.28 ENGINE MOUNTS)							I				I								I			I	
Operation of all electrical equipment and switches (*)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
All critical fasteners except engine head bolts (1.30 CRITICAL FASTENERS)		T				T					T								T			T	
Jiffy stand 2.36 JIFFY STAND		L				L					L								L			L	
EFI fuel filter												R										R	
Road test		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Table Code:

A - Adjust.
I - Inspect, and if necessary, correct, adjust, clean or replace.
L - Lubricate with specified lubricant.

R - Replace or change.
T - Tighten to proper torque.
X - Perform.

D - Disassemble (Lube & Inspect).
(*) - Also perform prior to storage or annually.

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

See [Table 1-1](#). 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 stand vehicle upright.
3. See [Figure 1-2](#). Check level on dipstick. If necessary, add oil until oil registers at upper groove on dipstick. Do not overfill oil tank.

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



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

Change engine oil and filter:

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

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 10 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 no more than 3.5 quarts (3.3 liters) of oil. Use the proper grade of oil for the lowest temperature expected before next oil change. See [Table 1-1](#).
8. Start engine and carefully check for oil leaks around drain plug and oil filter.
9. Check engine oil level.

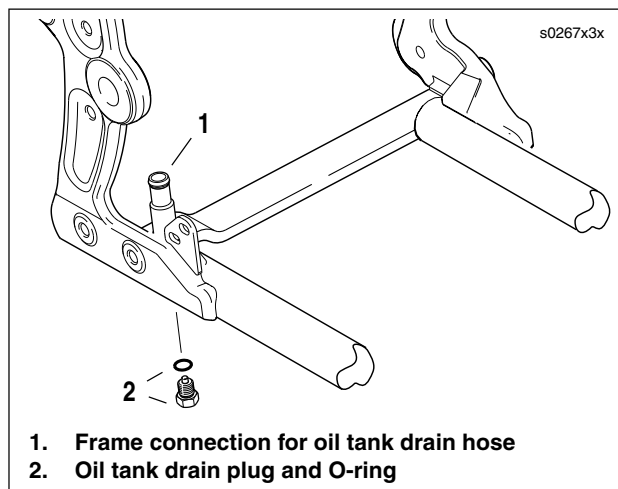


Figure 1-3. Oil Tank Drain Plug

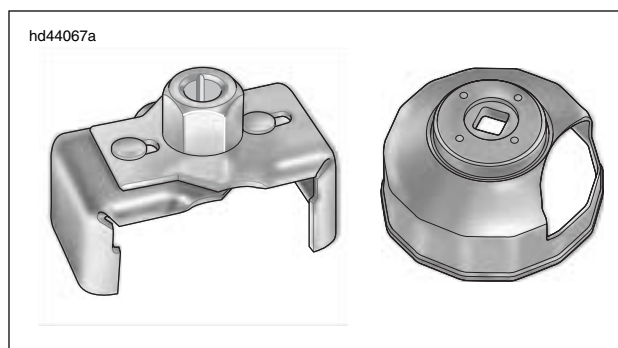


Figure 1-4. Oil Filter Wrench
Part No. HD-42311 (left), Part No. HD-44067 (right)

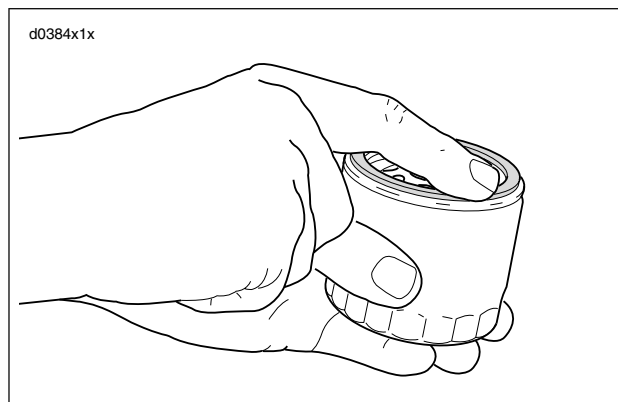


Figure 1-5. Lubing New Oil Filter

GENERAL

⚠ WARNING

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. See [Figure 1-6](#). A warning label is attached to the top of the battery. 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. See [Figure 1-7](#).

All AGM 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.

Table 1-2. 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.

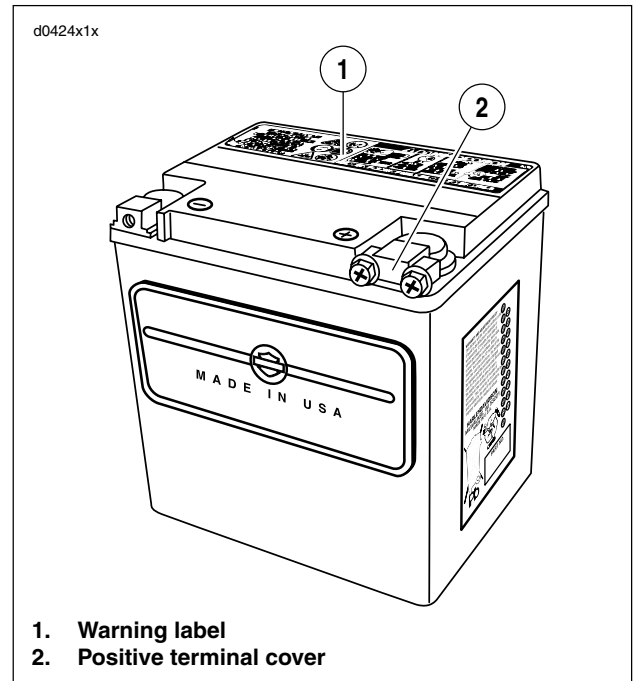


Figure 1-6. Battery

NOTE

See [8.17 BATTERY](#) for charging and testing information.

d0425x1x



Contents are Corrosive.



Wear Safety Glasses.



Contents are Explosive.



Keep Flames Away.



Read Instructions.



Keep Away From Children.

NON-SPILLABLE

This is a ready filled, activated, SEALED BATTERY. NEVER remove strip. Refer to owner's manual for charging instructions.

If battery is put into service after date shown, charge for minimum of 1 hour at 6-10 amps. (See side of battery for date.)








⚠ DANGER/POISON 3-4425

 <p>SHIELD EYES.</p> <p>EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.</p>	 <p>NO SPARKS, FLAMES OR SMOKING</p>	 <p>SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.</p>
<p>FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.</p>		

KEEP OUT OF REACH OF CHILDREN. DO NOT OPEN BATTERY.

Figure 1-7. Battery Warning Label

DISCONNECTION AND REMOVAL

1. Remove seat.

⚠ WARNING

To protect against shock and accidental start-up of vehicle, disconnect the negative battery cable before proceeding. Inadequate safety precautions could result in death or serious injury.

⚠ WARNING

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

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. Verify that the positive battery cable from the starter (4) is routed next to tab (3) on the battery tray pad (2). 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.

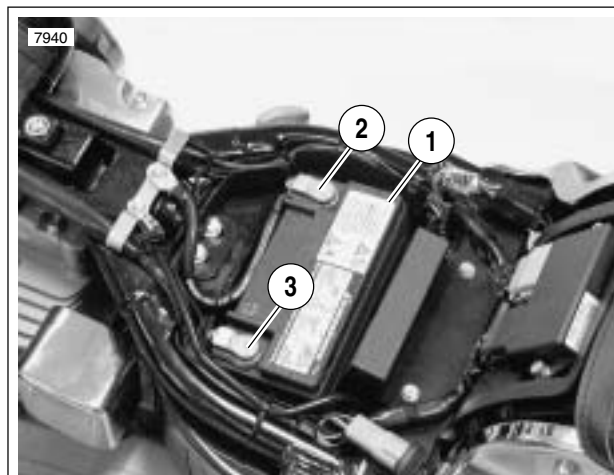
CAUTION

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

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 that could result in death or serious injury.

2. 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

3. 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).
4. 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 position during vehicle operation causing loss of control of the vehicle which could result in death or serious injury.

5. Install seat.

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

Store the battery out of the reach of children. Inadequate safety precautions 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 8.17 BATTERY.

See Figure 1-10. 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 BATTERY TENDER PLUS AUTOMATIC BATTERY CHARGER (Part No. 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, refer to the instructions under 8.17 BATTERY.

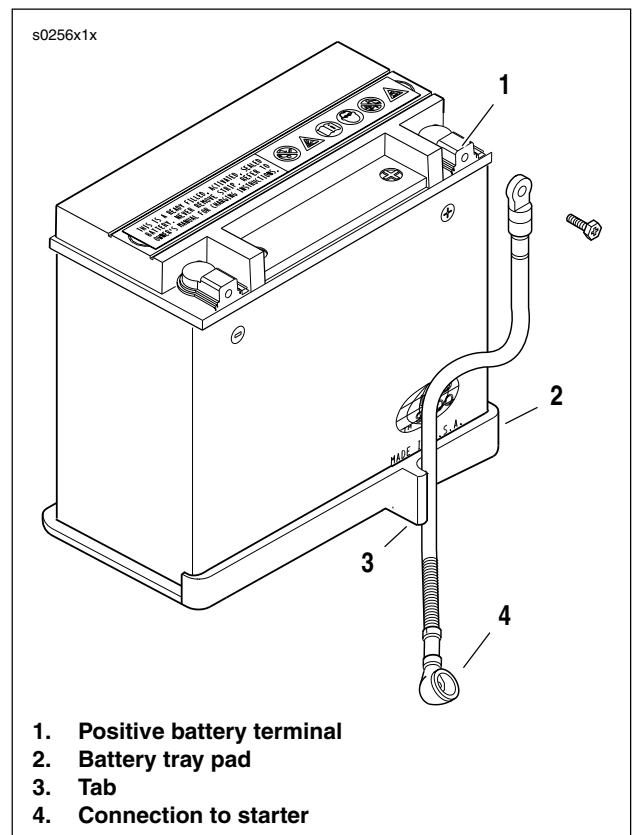


Figure 1-9. Positive Battery Cable Routing

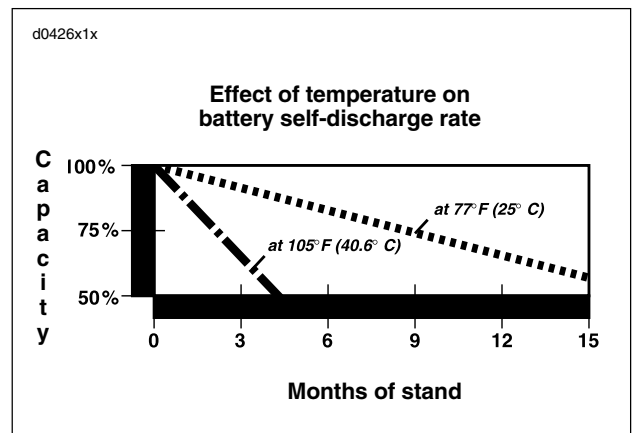


Figure 1-10. Battery Self-Discharge Rate

FLUID INSPECTION

Check brake fluid reservoir level and condition:

- At the first scheduled service interval.
- At every 5000 mile (8000 km) service interval thereafter.
- When storing or removing the motorcycle for the season.
- Also, check for fluid leaks at every service interval.

CAUTION

Direct contact of D.O.T. 5 brake fluid with eyes may cause eye irritation, swelling, and redness. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 5 brake fluid may cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN.

1. See [Figure 1-11](#). Check level in rear brake master cylinder reservoir. Level should be 1/8 in. (3.2 mm) below the gasket surface.

CAUTION

To prevent dirt from entering the master cylinder reservoir, thoroughly clean the cover before removal.

2. See [Figure 1-12](#). Check level in front brake master cylinder reservoir. Level should be 1/8 in. (3.2 mm) below the gasket surface.
3. Install gaskets and covers. Tighten reservoir cover screws to 6-8 in-lbs (0.7-0.9 Nm).

WARNING

After completing repairs or bleeding the system, always test motorcycle brakes at low speed. If brakes are not operating properly or braking efficiency is poor, testing at high speeds could result in death or serious injury.

4. Front brake hand lever and rear brake foot pedal must have a firm feel when applied. If not, bleed system using only D.O.T. 5 SILICONE BRAKE FLUID. See [1.7 BLEEDING BRAKES](#).

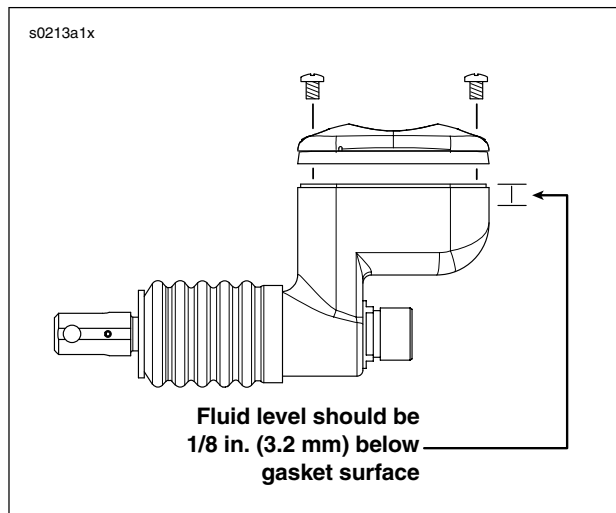


Figure 1-11. Rear Brake Master Cylinder Reservoir

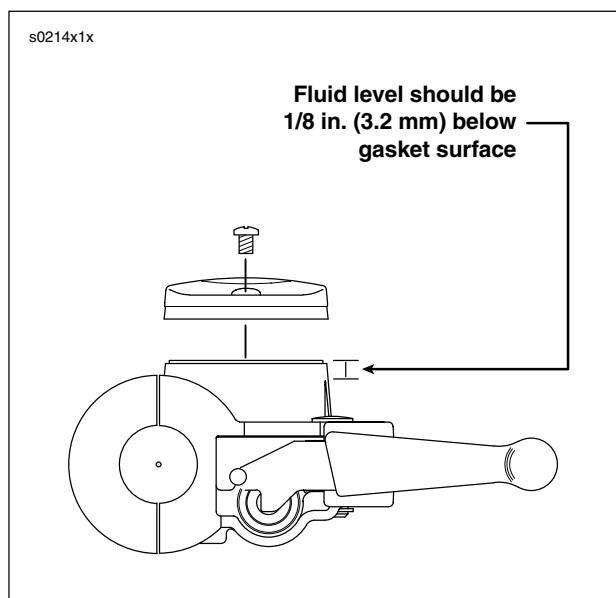


Figure 1-12. Front Brake Master Cylinder Reservoir

REAR BRAKE PEDAL

Pedal Height

The rear brake pedal is nonadjustable. When brake system components are properly assembled, brake pedal is correctly adjusted.

Pedal Lubrication

See [Figure 1-13](#). Rear brake pedal contains greaseless bushings. Replace bushings if worn.

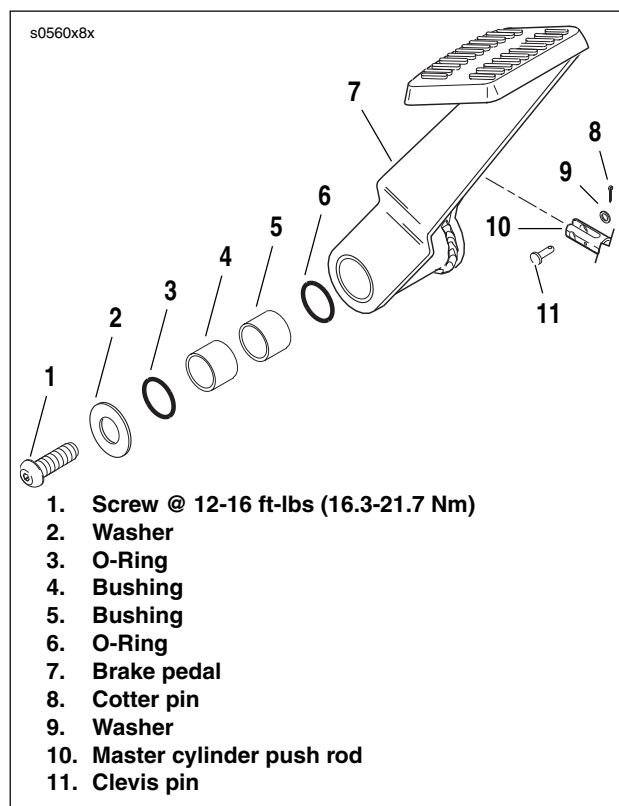


Figure 1-13. Rear Brake Pedal

GENERAL

CAUTION

Direct contact of D.O.T. 5 brake fluid with eyes may cause eye irritation, swelling, and redness. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 5 brake fluid may cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. **KEEP OUT OF REACH OF CHILDREN.**

Check brake fluid level and condition:

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

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

PROCEDURE

NOTE

Hydraulic brake fluid bladder-type pressure equipment can be used to fill brake master cylinder through the bleeder valve. Remove master cylinder reservoir cover so that system cannot pressurize. Do not use pressure bleeding equipment when the hydraulic system is sealed with master cylinder reservoir cover and gasket in place.

1. Remove bleeder valve cap. Install end of a length of clear plastic tubing over caliper bleeder valve; place other end in a clean container. Stand motorcycle upright.
 - a. Front brake bleeder valve-see [Figure 1-14](#).
 - b. Rear brake bleeder valve-see [Figure 1-15](#).
2. Add D.O.T. 5 SILICONE BRAKE FLUID to master cylinder reservoir. Fluid level should be 1/8 in. (3.2 mm) below the gasket surface. Depress and hold brake lever/pedal to build up hydraulic pressure.
3. Open bleeder valve slowly about 1/2-turn counterclockwise; brake fluid will flow from bleeder valve and through tubing. When brake lever/pedal has moved its full range of travel, close bleeder valve (clockwise). Allow brake lever/pedal to return slowly to its released position.

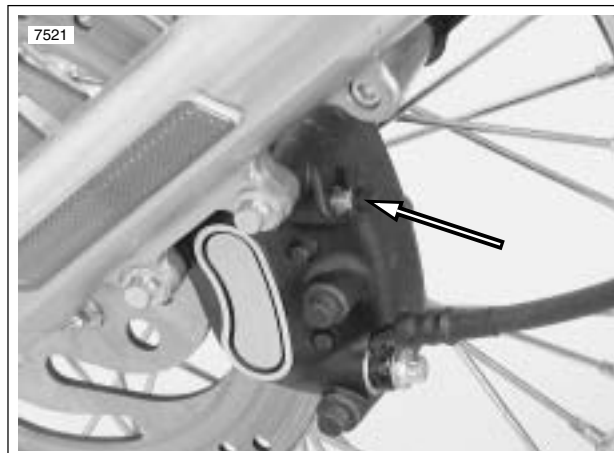


Figure 1-14. Front Brake Bleeder Valve



Figure 1-15. Rear Brake Bleeder Valve

4. Repeat Steps 2-3 until all air bubbles are purged.
5. Tighten bleeder valve to 80-100 in-lbs (9.0-11.3 Nm). Install bleeder valve cap.
6. Verify master cylinder fluid level as described in Step 2.

WARNING

After completing repairs or bleeding the system, always test motorcycle brakes at low speed. If brakes are not operating properly or braking efficiency is poor, testing at high speeds could result in death or serious injury.

7. Attach covers to master cylinder reservoirs. Tighten screws on covers to 6-8 in-lbs (0.7-0.9 Nm).

INSPECTION

Check brake pads and discs:

- At every scheduled service interval.
- Whenever the components are removed during service procedures.

Brake Pads

CAUTION

Direct contact of D.O.T. 5 brake fluid with eyes may cause eye irritation, swelling, and redness. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 5 brake fluid may cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN.

WARNING

Always replace brake pads in complete sets for correct brake operation. Never replace just one brake pad. Failure to install brake pads as a set could result in death or serious injury.

See Figure 1-16. Replace brake pads (3) if brake pad friction material on either the front or rear caliper is worn to service limit. Always replace both pads in a caliper as a set.

- FLSTS/FXSTS front brake pads: 0.06 in. (1.6 mm) or less above the backing plate (4).
- All other brake pads: 0.04 in. (1.02 mm) or less above the backing plate (4).
- When checking the brake pads and discs, inspect the brake hoses for correct routing and any signs of damage. Inspect pad pins for grooving and wear. Measure the pad pin diameter in an unworn area, and then in the area of any grooving or wear. If wear is more than 0.015 in. (0.38 mm), replace both pins.

Brake Disc Thickness

The minimum brake disc (2) thickness is stamped on the side of the disc. Replace disc if badly scored.

Brake Disc Lateral Runout and Warpage

Maximum brake disc lateral runout and warpage is 0.008 in. (0.2 mm).

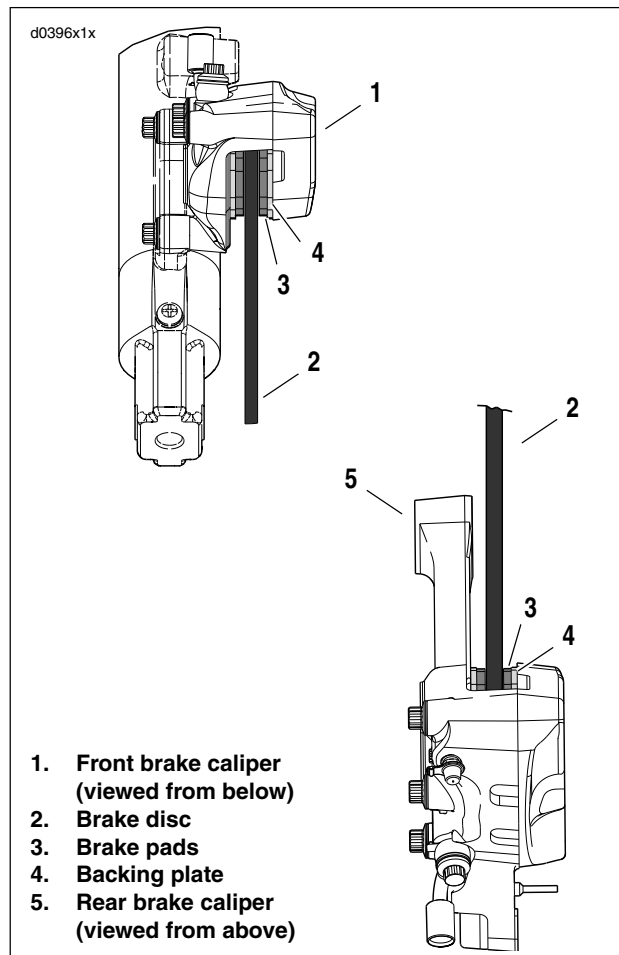


Figure 1-16. Brake Pad Inspection

BRAKE PAD REPLACEMENT

Rear Brake Caliper

1. If present, remove right saddlebag.

Remove the rear master cylinder reservoir cap. As the pistons are pushed back into the caliper, fluid level may rise more than 1/8 in. (3.2 mm). You may have to remove fluid to allow for this.

2. See [Figure 1-17](#). Loosen, but do not remove, both pad pins (12 pt/0.25 in.).
3. Pry the inside pad back. Use steady pressure to prevent scoring the brake disc. Pry between the pad and the brake disc in order to push the caliper pistons back into their bores.

CAUTION

Do not completely pull pad pins from caliper during the next step. Completely removing pad pins at this time will cause difficulty during assembly.

4. Once the pistons have been fully retracted into their bores, pull pad pins part way until the inside pads drop free. Note the pad's original orientation for replacement purposes.

NOTE

See [Figure 1-18](#). The front and rear brake calipers except FXSTD models, use the same exact brake pad set.

- FXSTD rear brake pads have a vertical slot cut into pad. Consult the latest Parts Catalog for specific replacement parts.
 - Do not substitute front and rear brake pads on FXSTD models.
 - Install pad with two tabs (1) on the inboard side of the rear caliper.
5. Install **new** inside brake pad using the same orientation as the pad previously removed. Curved portion of pad must face upward.
 6. Install pad pins until the pins snap into place with an audible click. Do not fully tighten at this time.

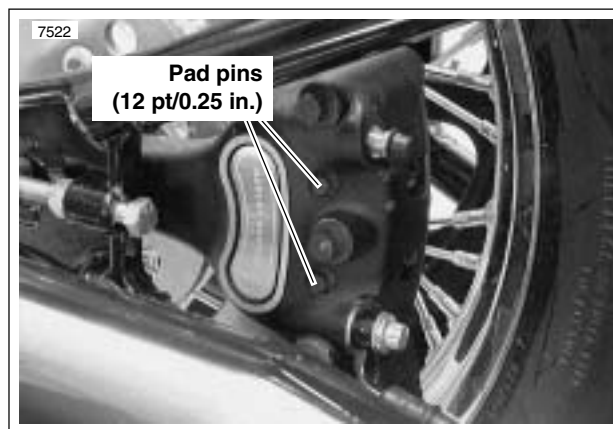


Figure 1-17. Pad Retaining Bolts (Rear Caliper Shown)

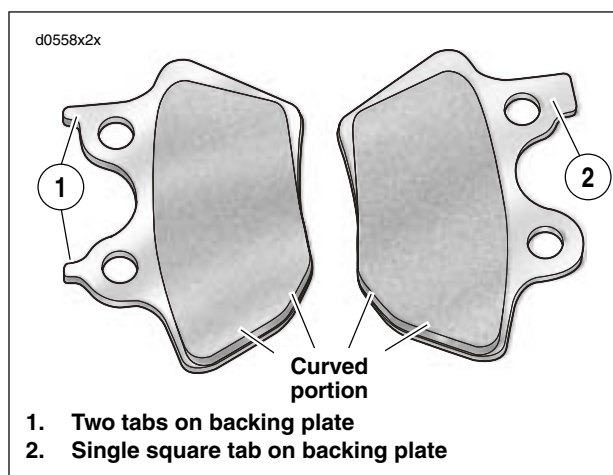


Figure 1-18. Brake Pad Orientation

7. Pump brake pedal lever to move inside pistons out until they contact inside brake pads.
8. Pry the outside pad back. Pry between the pad and the brake disc in order to push the caliper pistons back into their bores.
9. Verify that inside pads are captured between brake disc and pistons. Completely remove pad pins to free outside brake pad. Note the pad's original orientation for replacement purposes.
10. Inspect pad pins for grooving and wear. Measure the pad pin diameter in an unworn area, and then in the area of any grooving or wear. If wear is more than 0.015 in. (0.38 mm), replace both pins.
11. Install **new** outside brake pad using the same orientation as the pad previously removed. If the inside pad moved during the previous step, reinstall. Curved portion of pad must face upward.
12. Install both pad pins through holes in inner and outer brake pads. Tighten to 180-200 **in-lbs** (20.3-22.6 Nm).

⚠ WARNING

Whenever new pads are installed, **BEFORE** moving motorcycle, you must pump brake fluid until the pistons push the pads against the brake disc. If you don't pump fluid pressure up again, the brakes will not be available to stop the motorcycle which could result in death or serious injury.

13. Pump brake pedal to move pistons out until they contact both brake pads. Verify piston location against pads.
14. Check brake fluid level in master cylinder. Fill to proper level if necessary using D.O.T. 5 SILICONE BRAKE FLUID. Install master cylinder reservoir cap. Tighten reservoir cap screws to 6-8 **in-lbs** (0.7-0.9 Nm).
15. Install right saddlebag if necessary.

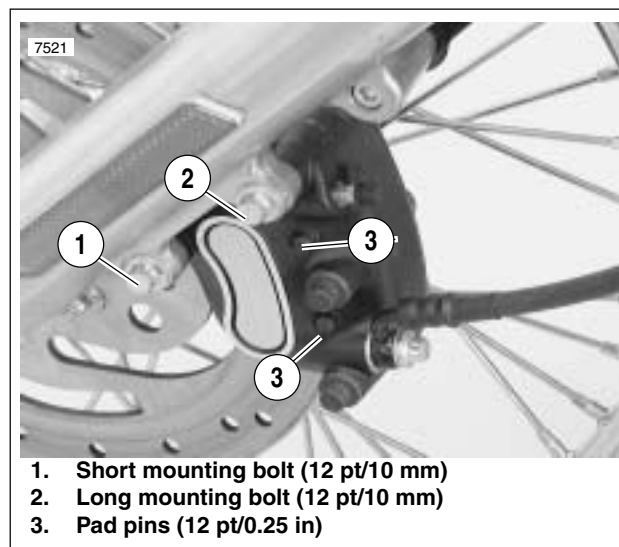
⚠ WARNING

After completing repairs or bleeding the system, always test motorcycle brakes at low speed. If brakes are not operating properly or braking efficiency is poor, testing at high speeds could result in death or serious injury.

16. Test brake system.
 - a. Turn ignition switch ON. Pump brake pedal to verify operation of the brake lamp.
 - b. Test ride the motorcycle. If the brakes feel spongy, bleed the system. See [1.7 BLEEDING BRAKES](#).

NOTE

Avoid making hard stops for the first 100 miles (160 km). This allows the **new** pads to become conditioned to the brake discs.



1. Short mounting bolt (12 pt/10 mm)
2. Long mounting bolt (12 pt/10 mm)
3. Pad pins (12 pt/0.25 in)

Figure 1-19. Front Brake Caliper (Left Side Shown)

Front Brake Caliper: All But FLSTS/FXSTS

NOTE

See 2.19 FRONT BRAKE CALIPER: FLSTS or 2.20 FRONT BRAKE CALIPER: FXSTS to change front brake pads on those models.

1. Remove the front master cylinder reservoir cap. As the pistons are pushed back into the caliper, fluid level may rise more than 1/8 in. (3.2 mm). You may have to remove fluid to allow for this.
2. See Figure 1-19. Loosen, but do not remove, both pad pins (3) (12 pt/0.25 in.).
3. Remove both caliper mounting bolts (1, 2) (metric). Detach caliper from front forks and brake disc.
4. Pry the pads back to force all four caliper pistons into their bores.
5. With the pistons retracted, remove the pad pins and brake pads.
6. Inspect pad pins for grooving and wear. Measure the pad pin diameter in an unworn area, and then in the area of any grooving or wear. If wear is more than 0.015 in. (0.38 mm), replace both pins.

NOTE

See Figure 1-18. The front and rear brake calipers except FXSTD models, use the same exact brake pad set.

- The FXSTD rear brake pads have a vertical slot cut into pad. Consult the latest Parts Catalog for specific replacement parts
 - Do not substitute front and rear brake pads on FXSTD models.
 - On the right side of the vehicle, the pad with two tabs (1) installs on the inboard side of the caliper.
 - On the left side of the vehicle, the pad with two tabs (1), installs on the outboard side of the caliper.
7. Install **new** pads into caliper. Curved portion of pad must face rear of motorcycle.
 8. Loosely install the pad pins until you hear an audible click.

9. Attach caliper to front fork.
 - a. See Figure 1-19. Place caliper over brake disc with bleeder valve facing upwards.
 - b. Loosely install long mounting bolt (2) (12 pt/10 mm) into top hole on fork leg.
 - c. Install short mounting bolt (1) (12 pt/10 mm) into bottom hole on fork leg. Tighten bottom mounting bolt to 28-38 ft-lbs (38.51.5 Nm).
 - d. Final tighten the top mounting bolt to 28-38 ft-lbs (38.51.5 Nm).
 - e. Final tighten both pad pins to 180-200 **in-lbs** (20.3-22.6 Nm).

WARNING

Whenever new pads are installed, BEFORE moving motorcycle, you must pump brake fluid until the pistons push the pads against the brake disc. If you don't pump fluid pressure up again, the brakes will not be available to stop the motorcycle which could result in death or serious injury.

10. Pump brake hand lever to move pistons out until they contact both brake pads. Verify piston location against pads. If the front wheel is off the ground, rotate wheel to check for excessive brake pad drag.
11. Check brake fluid level in master cylinder. Fill to proper level if necessary using D.O.T. 5 SILICONE BRAKE FLUID. Install master cylinder reservoir cap. Tighten reservoir cap screws to 6-8 **in-lbs** (0.7-0.9 Nm).

WARNING

After completing repairs or bleeding the system, always test motorcycle brakes at low speed. If brakes are not operating properly or braking efficiency is poor, testing at high speeds could result in death or serious injury.

12. Test brake system.
 - a. Turn ignition switch ON. Pump brake hand lever to verify operation of the brake lamp.
 - b. Test ride the motorcycle. If the brakes feel spongy, bleed the system. See 1.7 BLEEDING BRAKES.

NOTE

Avoid making hard stops for the first 100 miles (160 km). This allows the **new** pads to become conditioned to the brake discs.

TIRES

⚠ WARNING

For your own personal safety, tires, rims and air valves must be correctly matched to wheel rims. See your Harley-Davidson dealer. Mismatching tires, tubes, rims and air valves may result in damage to the tire bead during mounting or may allow the tire to slip on the rim, possibly causing tire failure which could result in death or serious injury.

- In addition, using tires other than those specified may adversely affect motorcycle handling.
- Tubeless tires fitted with the correct size inner tubes may be used on all Harley-Davidson laced (wire spoked) wheels. Protective rubber rim strips must be used with tubeless tires (fitted with correct size inner tubes) when mounted on laced (wire spoked) wheels.
- Inner tubes must not be used in radial tires and radial tires must not be used on laced (wire spoked) wheels.
- Tubeless tires are used on all Harley-Davidson cast and disc wheels.
- Tire sizes are molded on the tire sidewall. Inner tube sizes are printed on the tube.

Check tire pressure and tread:

- As part of the pre-ride inspection.
 - At every scheduled service interval.
1. Inspect each tire for punctures, cuts, and breaks.
 2. Inspect each tire for wear. Replace tires before they reach the tread wear indicator bars.

NOTE

Missing indicator wear bars represent less than 1/32 in. (0.8 mm) tread pattern depth remaining.

⚠ WARNING

Do not exceed the maximum inflation pressure listed on tire sidewall. Overinflating could lead to tire failure which could result in death or serious injury.

3. Check for proper front and rear tire pressures when tires are cold. Compare results against [Table 1-3](#).

Table 1-3. Tire Pressures

DUNLOP TIRES ONLY		SOLO RIDER		RIDER & ONE PASSENGER	
MODEL	TIRE	PSI	kPA	PSI	kPA
FLSTC, FLSTF, FLSTS	Front	36	248	36	248
	Rear	36	248	40	276
FXST, FXSTB, FXSTS, FXSTD	Front	30	207	30	207
	Rear	36	248	40	276

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