

## SERVICING A NEW MOTORCYCLE

### WARNING

**Perform the service and maintenance operations as indicated in the regular service interval table. Lack of regular maintenance at the recommended intervals can affect the safe operation of your motorcycle, which could result in death or serious injury. (00010a)**

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 [1.3 MAINTENANCE SCHEDULE](#) for details.

## SAFE OPERATING MAINTENANCE

### NOTES

- *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

**Be sure to check capacity rating and condition of hoists, slings, chains and cables before use. Exceeding capacity ratings or using lifting devices that are in poor condition can lead to an accident, which could result in death or serious injury. (00466b)**

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

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### 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.

### 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

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### 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

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### 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

**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). Pump octane is the octane number usually shown on the gas pump.

## GASOLINE BLENDS

### CAUTION

**Do not use gasoline that contains methanol. Doing so can result in fuel system component failure, engine damage and/or equipment malfunction. (00148a)**

Buell motorcycles are 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.
- DO NOT USE RACE GAS OR OCTANE BOOSTERS. Use of these fuels will damage the fuel system.
- 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 and CI4. 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 [1.6 ENGINE LUBRICATION SYSTEM](#) 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 reservoir. 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.



**Table 1-1. Regular Service Intervals For Buell Firebolt Models**

ITEM SERVICED	PROCEDURE	1000 mi	5000 mi	10,000 mi	15,000 mi	20,000 mi	25,000 mi	NOTES
		1600 km	8000 km	16,000 km	24,000 km	32,000 km	40,000 km	
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	
	Replace					X		
Tires	Check pressure, inspect tread	X	X	X	X	X	X	
Transmission lubricant	Replace	X		X		X		
Clutch	Check adjustment	X	X	X	X	X	X	1
Primary chain	Check adjustment	X	X	X	X	X	X	1
Rear belt, idler and sprockets	Inspect	X	X	X	X	X	X	1
Throttle, brake, and clutch controls, sidestand, active muffler cable and active intake cable adjustment (if equipped)	Check, adjust and lubricate	X	X	X	X	X	X	1
Brake fluid	Check levels and condition	X	X	X	X	X	X	1,2
Brake pads and discs	Inspect for wear	X	X	X	X	X	X	
Spark plugs	Replace			X		X		1
Electrical equipment and switches	Check operation	X	X	X	X	X	X	
Engine idle speed	Check adjustment	X	X	X	X	X	X	1
Ignition timing	Check			X		X		1
Throttle position sensor (TPS)	Zero	X		X		X		1
Front fork oil	Replace			X		X		1
Steering head bearings	Perform resistance test		X	X	X	X	X	1
Oil cooler fins	Clean	X	X	X	X	X	X	
Brake system, oil lines, front forks, rear shock, exhaust system, exhaust system mounting, evaporative emission system (if applicable)	Inspect	X	X	X	X	X	X	1
Critical fasteners	Check tightness			X		X		1
Engine mounts and stabilizer links	Inspect			X		X		1
Road test	Verify component and system functions	X	X	X	X	X	X	

**NOTES:**

- Should be performed by an authorized Harley-Davidson/Buell dealer, unless you have the proper tools, service data and are mechanically qualified.
- Every two years.



**Table 1-2. Quick Reference Maintenance Chart**

ITEM SERVICED	SPECIFICATION	DATA
Engine oil and filter	Drain plug torque	Apply Loctite 565 Thread Sealant and reinstall plug and tighten to 26-29 ft-lbs (35-39 Nm)
	Oil capacity	2.5 quarts (2.4 liters) and includes the 4.0 ounces (0.12 liter) poured into the filter
	Filter	Hand tighten 1/2-3/4 turn after gasket contact
	Black filter part number	63806-00Y
Primary chain tension	Deflection with hot engine	1/4-3/8 in. (6.4-9.5 mm)
	Deflection with cold engine	3/8-1/2 in. (9.5-12.7 mm)
	Chain tensioner nut torque	20-25 ft-lbs (27-34 Nm)
	Primary chain inspection cover torque	84-108 <b>in-lbs</b> (10-12 Nm)
Primary chain lubricant	Lubricant capacity	GENUINE HARLEY-DAVIDSON FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT (Part No. 99851-05 quart size) as required until fluid level is even with bottom of clutch diaphragm spring
	Primary chaincase drain plug torque	Apply Loctite 565 Thread Sealant and reinstall plug and tighten to 14-30 ft-lbs (19-41 Nm)
Clutch adjustment	Free play at adjuster screw	clockwise 1/4-1/2 turn
	Free play at hand lever	1/16-1/8 in. (1.6-3.2 mm)
	Clutch inspection cover torque	84-108 <b>in-lbs</b> (10-12 Nm)
Transmission lubricant	Lubricant level	GENUINE HARLEY-DAVIDSON FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT (Part No. 99851-05 quart size) as required until fluid level is even with bottom of clutch diaphragm spring
Tire condition and pressure	Pressure for solo rider	Front: 34 psi (234 kPa) Rear: 36 psi (248 kPa)
	Pressure for rider and passenger	Same as Solo
	Wear	Replace tire if 1/32 in. (0.8 mm) or less of tread pattern remains
Brake fluid reservoir level	D.O.T. 4 hydraulic brake fluid part numbers	99953-99A (12 oz.) 99973-05 (gal.).
	Proper fluid level	1/8 in. (3.2 mm) from the top
	Master cylinder reservoir cover torque	9-13 <b>in-lbs</b> (1.0-1.5 Nm)
Brake pad linings and discs	Minimum brake pad thickness	0.040 in. (1.0 mm) or less
	Minimum brake disc thickness	0.18 in. (4.5 mm) or less



**Table 1-2. Quick Reference Maintenance Chart**

ITEM SERVICED	SPECIFICATION	DATA
Intake cover assembly	Intake cover screw torque	12-36 <b>in-lbs</b> (1.3-4 Nm)
Clutch and throttle cables	Lubricant	LUBIT-8 TUFOIL® CHAIN AND CABLE LUBE (Part No. HD-94968-85TV)
	Handlebar switch housing screw torque	25-33 <b>in-lbs</b> (2.8-3.7 Nm)
Spark plugs	Type	10R12A
	Gap	0.035 in. (0.9 mm)
	Torque	12-18 ft-lbs (16-24 Nm)
Engine idle speed	Idle speed	1050-1150 RPM
Front fork oil	Type	HYDRAULIC FORK OIL (TYPE E) Part No. 99884-80 4.21 in. (107 mm) from the top of the fork tube
Battery	Lubricant	ELECTRICAL CONTACT LUBRICANT Part No. 99861-02 (1 oz.)
	Battery terminal torque	72-96 <b>in-lbs</b> (8-11 Nm)



### GENERAL

Buell recommends using Harley Softcloths with the following products to clean your windshield. To minimize swirl marks, cleaning should be done when motorcycle is cool and parked in the shade.

- HARLEY-DAVIDSON BUG REMOVER (Part No. 94657-98).

- HARLEY-DAVIDSON SUNWASH (PART No. 94659-98).
- NOVUS 1 CLEANER/PROTECTANT (Part No. 99837-94T).
- NOVUS 2 SCRATCH REMOVER (Part No. 99836-94T).
- HARLEY GLAZE (Part No. 99701-84) to polish and seal after cleaning.

b1220x1x

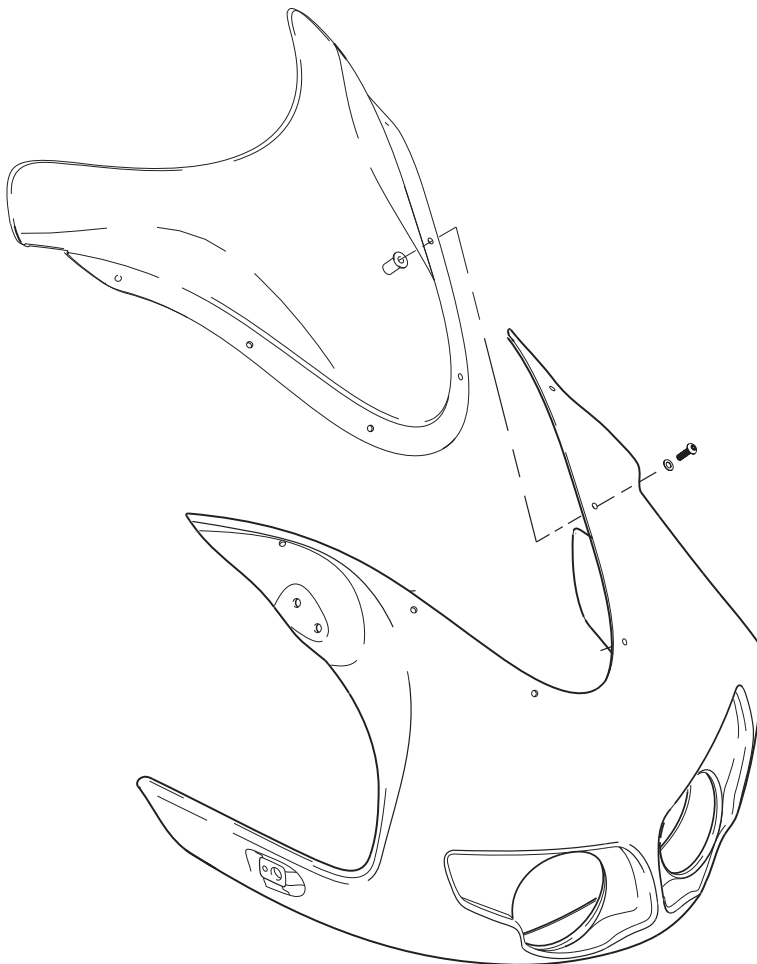


Figure 1-1. Firebolt Windshield



GENERAL

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

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

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

**⚠ WARNING**

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**

A warning label is attached to the top of the battery. See [Figure 1-2](#). 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)

**⚠ WARNING**

Battery posts, terminals and related accessories contain lead and lead components, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling. (00019a)

Table 1-3. Battery Electrolyte Antidotes

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

BATTERY TESTING

Voltmeter Test

See [Table 1-4](#). The voltmeter test provides a general indicator of battery condition. Check the voltage of the battery to verify that it is in a 100% fully charged condition. If the open circuit (disconnected) voltage reading is below 12.6V, charge the battery and then recheck the voltage after the battery has set for one to two hours. If the voltage reading is 12.8V or above, perform the load test described under [7.11 BATTERY](#).

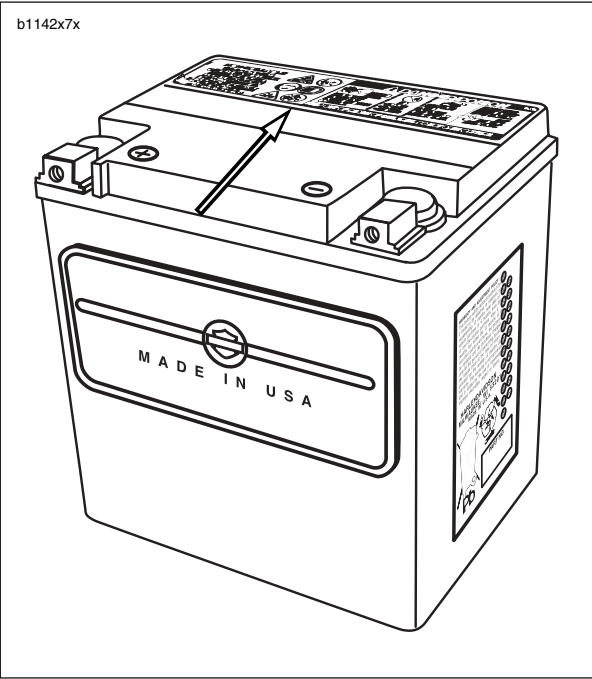


Figure 1-2. Battery Warning Label

Table 1-4. Voltmeter Test

BATTERY CHARGE CONDITIONS	
12.7	100%
12.6	75%
12.3	50%
12.0	25%
11.8	0%



## BATTERY DISCONNECTION AND REMOVAL

1. Remove seat. See 2.38 SEAT.

### ⚠ WARNING

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

## CLEANING AND INSPECTION

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

## STORAGE

### ⚠ WARNING

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)

### CAUTION

Do not allow battery to completely discharge. The electrolyte in a discharged battery will freeze. The more discharged a battery is, the more easily it can freeze and crack the battery case. (00218a)

If the motorcycle will not be operated for several months, such as during the winter season, remove the battery from the motorcycle and fully charge. See 7.11 BATTERY.

See Figure 1-3. Self-discharge is a normal condition and occurs continuously at a rate that depends on the ambient temperature and the battery's state of charge. Batteries discharge at a faster rate at higher ambient temperatures. To reduce the self-discharge rate, store battery in a cool (not freezing), dry place.

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

### NOTE

The H-D Battery Tender Automatic Battery Charger (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, fully charge the battery. See 7.11 BATTERY.

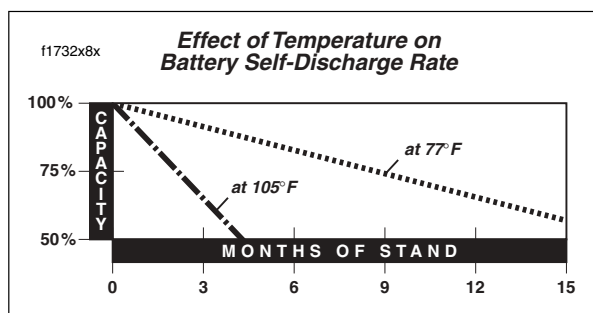


Figure 1-3. Battery Self-Discharge Rate



## BATTERY INSTALLATION AND CONNECTION

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

### CAUTION

Connect the cables to the correct battery terminals. Failure to do so could result in damage to the motorcycle electrical system. (00215a)

### 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)

### CAUTION

Do not over-tighten bolts on battery terminals. Use recommended torque values. Over-tightening battery terminal bolts could result in damage to battery terminals. (00216a)

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

### WARNING

After installing seat, pull upward on front of seat to be sure it is in locked position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070a)

7. Install seat. See [2.38 SEAT](#).



## GENERAL

The engine oil level can be checked with the oil and engine at ambient temperatures (cold check).

However, an accurate reading of the engine oil level can only be taken with the engine at normal operating temperature (hot check). Ride motorcycle for approximately 10 minutes to warm the oil and the engine to normal operating temperature.

### NOTE

*The engine will require a longer warm up period in colder temperatures.*

Whether a cold or a hot check, the procedure is the same.

During the pre-ride inspection:

- Check for oil leaks from the oil filter and oil lines.
- Check the engine oil level (cold check).
- Check engine oil level (hot check).

At every fueling stop:

- At scheduled maintenance intervals.
- When storing the motorcycle.

### NOTE

- *Engine oil and filter should be changed when fluids are hot.*
- *The colder the weather, the shorter the recommended oil change interval. A vehicle used only for short runs in cold weather must have the engine oil drained more frequently.*

## ENGINE OIL LEVEL CHECK

### CAUTION

**Do NOT operate the engine when the oil level is below the add mark on the dipstick at operating temperature. Engine damage will result. (00187a)**

### CAUTION

**Do not overfill oil tank. Doing so can result in oil carry-over to the air cleaner leading to equipment damage and or equipment malfunction. (00190a)**

### CAUTION

**Do not switch lubricant brands indiscriminately because some lubricants interact chemically when mixed. Use of inferior lubricants can damage the engine. (00184a)**

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

### NOTE

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

4. See Figure 1-4. Unscrew and remove dipstick and read oil level.
5. If the level is below the lower registration mark, add only enough oil to bring oil level between lower and upper registration marks.

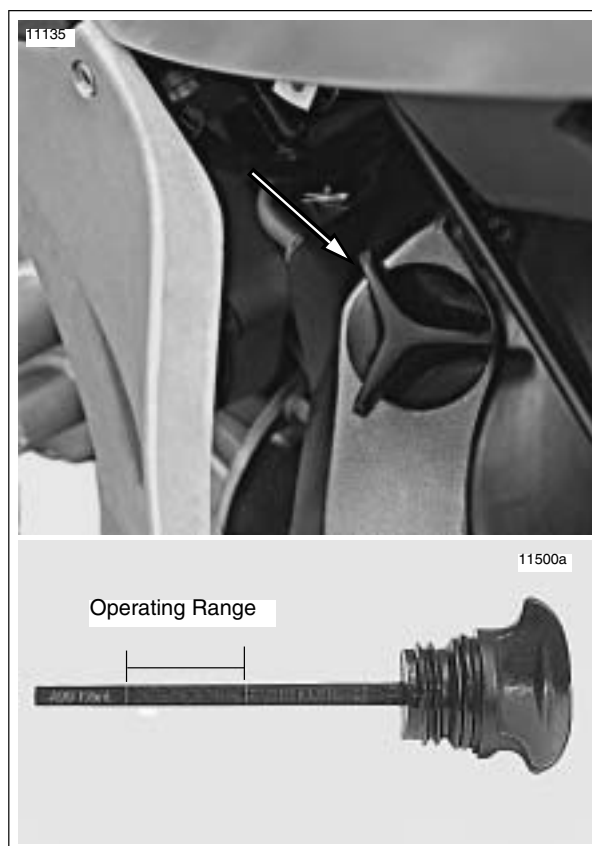


Figure 1-4. Dipstick Location/Engine Oil Level



## ENGINE OIL AND FILTER CHANGE

### Drain Oil

1. Ride motorcycle for 10 minutes to warm oil to operating temperature. Turn engine off.
2. See [Figure 1-5](#). Place a container under the drain plug on the bottom left side of the oil tank/swingarm.
3. Using a 5/8 in. wrench, remove drain plug from under oil tank/swingarm.
4. Wipe debris from magnetic tip on drain plug.
5. See [Figure 1-6](#). Unscrew and remove dipstick from oil fill hole on top of oil tank/swingarm.

### Change Filter

1. Remove chin fairing See [2.33 CHIN FAIRING](#).
2. See [Figure 1-7](#). Remove oil filter using pliers or belt type OIL FILTER WRENCH.
3. Clean filter gasket contact surface on crankcase. Surface must be smooth and free of debris or old gasket material.
4. Apply a thin film of clean engine oil to filter gasket.
5. Pour 4.0 ounces (0.12 liter) of clean engine oil into **new** filter (until filter is approximately 1/2 full).
6. Screw filter onto adapter until filter gasket touches crankcase surface.
7. By hand, turn filter an additional 1/2 to 3/4 turn.

#### WARNING

Check that no lubricant gets on tires, wheels or brakes when changing fluid. Traction can be adversely affected, which could result in loss of control of the motorcycle and death or serious injury. (00047b)

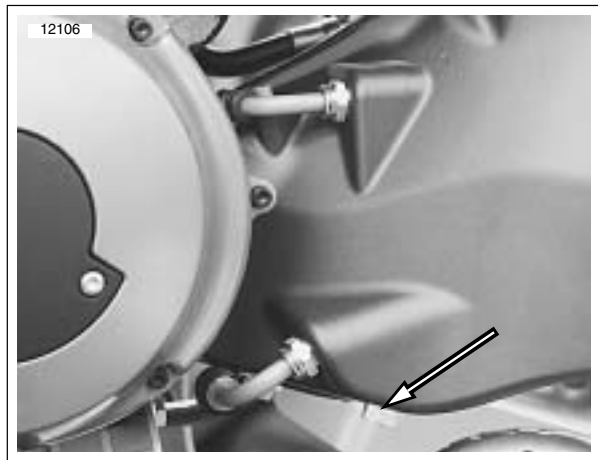


Figure 1-5. Oil Tank Drain Plug



Figure 1-6. Dipstick Location

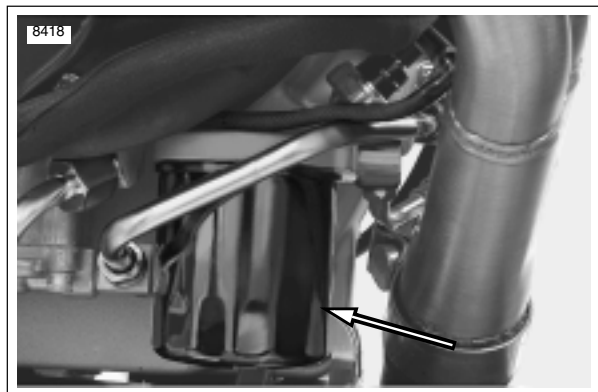


Figure 1-7. Oil Filter



## Replacing Oil

1. Inspect drain plug o-ring for tears or damage. Replace if required. Wipe any foreign material from drain plug.
2. Apply Loctite 565 Thread Sealant, reinstall plug and tighten to 26-29 ft-lbs (35-39 Nm).
3. Fill oil tank through filler (dipstick) hole with recommended oil from [Table 1-5](#).

### NOTE

*Oil tank capacity with filter change is approximately 2.5 quarts (2.4 liters) and includes the 4.0 ounces (0.12 liter) poured into the filter. Always verify proper hot oil level on dipstick. Do not overfill.*

4. Inspect o-ring on dipstick for rips or tears. Replace as required.

### NOTE

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

5. Install dipstick into oil tank/swingarm fill hole. Make sure dipstick is installed completely. DO NOT OVER TIGHTEN.

6. Remove left side oil cooler scoop. See [2.35 AIR SCOOPS](#).

### WARNING

**Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)**

7. Blow out any debris from fins with compressed air from the inside of the oil cooler outward. Inspect cooler fins for debris or damage.
8. Wipe up any spilled oil on muffler.
9. Start engine. Verify that oil pressure signal light on instrument support turns off after a few seconds when engine speed is 1000 RPM or above.
10. Check for oil leaks at oil filter, drain plug, hoses and oil cooler.
11. Install chin fairing. See [2.33 CHIN FAIRING](#).
12. Install air scoop. See [2.35 AIR SCOOPS](#).
13. Check (hot) oil level. See [ENGINE OIL LEVEL Check](#).

**Table 1-5. Recommended Oil Grades**

HARLEY-DAVIDSON TYPE	VISCOSITY	HARLEY-DAVIDSON RATING	LOWEST AMBIENT TEMP °F	COLD WEATHER STARTS BELOW 50° F
H.D. Multi-Grade	SAE 10W40	HD 360	Below 40° (4°C)	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



## GENERAL

Check brake fluid level and condition:

- When storing or removing the motorcycle for the season.

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

- Every 2 years.

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

Inspect front and rear brake lines and replace as required:

- Every 4 years.

Inspect caliper and master cylinder seals and replace as required:

- Every 2 years.

If determining probable causes of poor brake operation, refer to [Table 1-6](#).

## BLEEDING BRAKES

### WARNING

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. 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. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. **KEEP OUT OF REACH OF CHILDREN.** (00240a)

### WARNING

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

### WARNING

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

### WARNING

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

### WARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

### WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

### CAUTION

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239a)



**Table 1-6. Brake Troubleshooting**

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



## Bleeding Front Brake

### NOTE

Hydraulic brake fluid bladder-type pressure equipment can be used to fill the brake master cylinder through the bleeder valve if master cylinder reservoir cover is removed to prevent pressurization.

1. See [Figure 1-8](#). With motorcycle in upright position, install end of plastic tubing over front caliper bleeder valve; place other end in a clean container.

### CAUTION

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239a)

2. Cover body surfaces, right handlebar switches and instrument panel to protect from spillage.
3. See [Figure 1-9](#). Remove two fasteners from front master cylinder cover.
4. Add **D.O.T. 4 BRAKE FLUID** to master cylinder reservoir. Bring fluid level to within 1/8 in. (3.2 mm) of molded boss inside front master cylinder.

### NOTE

*Do not reuse brake fluid.*

5. Slowly depress and release hand lever several times to build up hydraulic pressure, then hold brake hand lever in the depressed position.
6. While holding brake hand lever in the depressed position, open bleeder valve about 1/2-turn counterclockwise. Brake fluid will flow from bleeder valve and through tubing into clean container. When brake lever has moved 1/2 to 3/4 of its full range of travel, close bleeder valve (clockwise). Allow brake lever to return slowly to its released position.
7. Repeat steps 5-6 until all air bubbles are purged.
8. Tighten front caliper bleeder valve (metric) to 36-60 **in-lbs** (4-7 Nm).
9. Verify master cylinder fluid level as described in step 4.
10. Attach cover to front master cylinder reservoir and tighten fasteners to 9-13 **in-lbs** (1.0-1.5 Nm).
11. Remove cover from molded-in-color surfaces, right handlebar switches and instrument panel.



Figure 1-8. Front Caliper Bleeder Valve

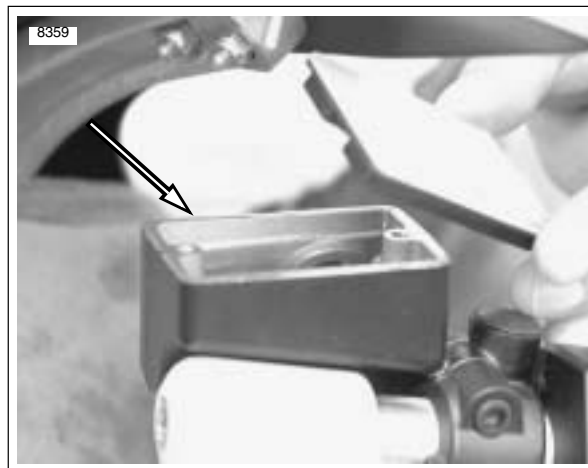


Figure 1-9. Front Master Cylinder Reservoir



## Bleeding Rear Brake

### NOTE

Hydraulic brake fluid bladder-type pressure equipment can be used to fill the brake master cylinder through the bleeder valve if master cylinder reservoir cover is removed to prevent pressurization.

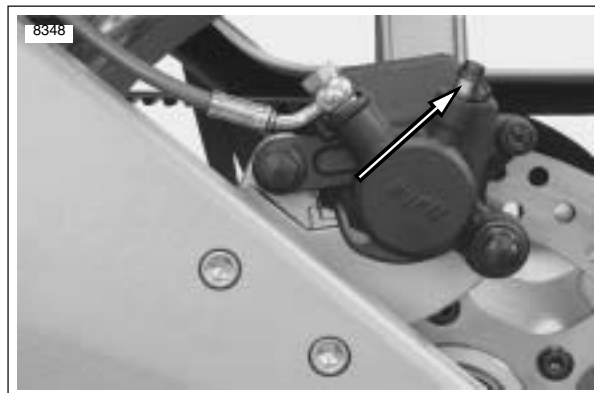


Figure 1-10. Rear Caliper Bleeder Valve

1. See [Figure 1-10](#). Install end of plastic tubing over rear caliper bleeder valve; place other end in a clean container. Stand motorcycle upright.

### CAUTION

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239a)

2. Remove seat. See [2.38 SEAT](#).

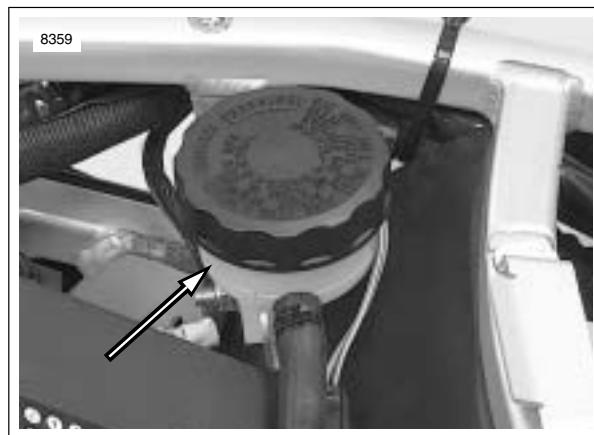


Figure 1-11. Rear Master Cylinder Reservoir

3. See [Figure 1-11](#). Remove cap and gasket from rear master cylinder reservoir.
4. Add **D.O.T. 4 BRAKE FLUID** to master cylinder reservoir with motorcycle upright (not on sidestand). Bring fluid level between upper and lower marks on reservoir.

### NOTE

Do not reuse brake fluid.

5. Slowly depress and release brake pedal several times to build up hydraulic pressure, then hold brake pedal in the depressed position.
6. While holding brake pedal in the depressed position, open bleeder valve about 1/2-turn counterclockwise. Brake fluid will flow from bleeder valve and through tubing into clean container. When brake pedal has moved 1/2 to 3/4 of its full range of travel, close bleeder valve (clockwise). Allow brake pedal to return slowly to its released position.
7. Repeat steps 5-6 until all air bubbles are purged.
8. Tighten rear caliper bleeder valves (metric) to 36-60 **in-lbs** (4-7 Nm).
9. Verify master cylinder fluid level as described in step 4.
10. Attach covers to master cylinder reservoirs and tighten cap on rear master cylinder reservoir securely.

### 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)

11. Install seat. See [2.38 SEAT](#).



## BRAKE PEDAL ADJUSTMENT

### ⚠ WARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

Check rear brake pedal operation:

- Before every ride.

### NOTES

- See [Figure 1-12](#). On the very end of the threaded brake rod, are two flat sides (2). To ensure proper thread engagement with the clevis (3), the flat sides must extend below the extruded nut (1) in the clevis by at least one full thread. This is the minimum rod engagement.
- Also, there should be a minimum of 0.030 in. (0.8 mm) between brake rod end and brake pedal.

### ⚠ WARNING

Threaded rod should not be adjusted to the point of contacting brake pedal. Improper adjustment could result in death or serious injury.

1. See [Figure 1-13](#). Inspect for minimum and maximum brake rod engagement in brake clevis (4). Adjust as required.
2. Adjust brake pedal.
  - a. See [Figure 1-13](#). Loosen locknut (3) while holding rod adjuster (2). Move locknut away from top surface of clevis (4).
  - b. Turn rod adjuster to set pedal height.
  - c. Return locknut (3) to fit flush against top surface of clevis and tighten to 130-173.5 in-lbs (14.7-19.6 Nm).

### NOTE

Brake pedal has no free play adjustment.

b0615x1x

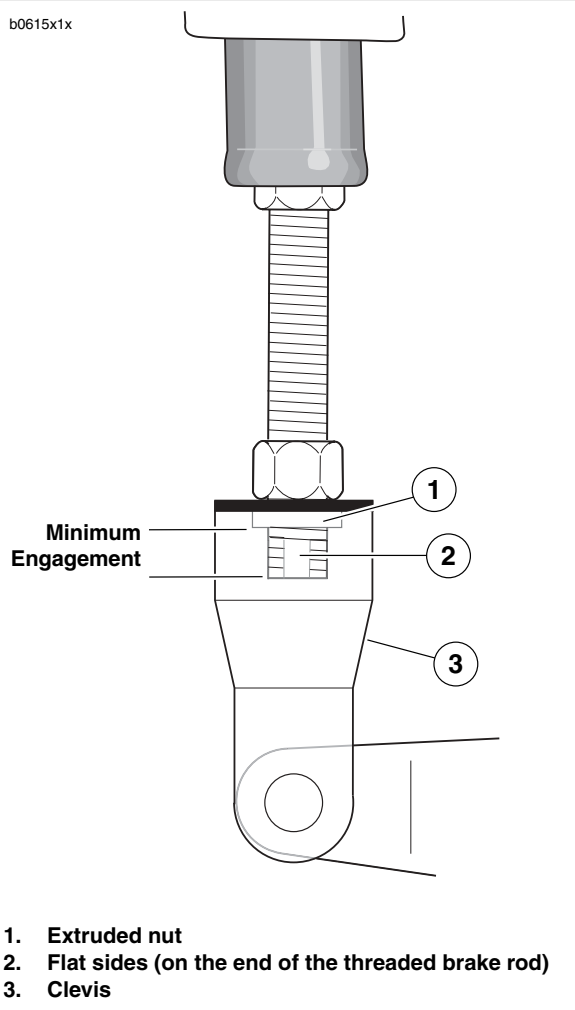
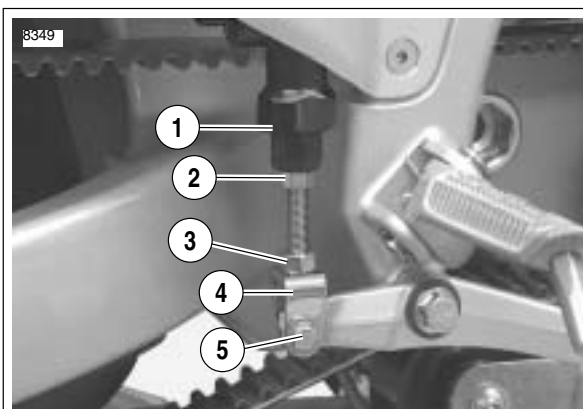


Figure 1-12. Critical Measurements with Typical Brake Pedal



1. Bottom of master cylinder
2. Rod adjuster
3. Locknut
4. Clevis
5. Clevis pin

Figure 1-13. Pushrod Adjustment



## BRAKE PAD THICKNESS

### WARNING

**Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)**

See [Figure 1-14](#). Inspect brake pads for damage or excessive wear. Replace both pads as a set if friction material of either pad is worn to 0.040 in. (1.0 mm) or less. If this amount of wear occurs, wear grooves will disappear from friction material surface.

## BRAKE ROTOR THICKNESS

### WARNING

**Check that no lubricant gets on tires, wheels or brakes when changing fluid. Traction can be adversely affected, which could result in loss of control of the motorcycle and death or serious injury. (00047b)**

See [Figure 1-15](#). Check brake rotors for minimum thickness:

- At every scheduled service interval:
- 1. Inspect rotor. Replace rotor if warped or badly scored.
- 2. Measure rotor thickness. Replace rotor if minimum thickness is less than 0.18 in. (4.5 mm).

#### NOTE

- See [2.12 FRONT BRAKE CALIPER](#) or [2.15 REAR BRAKE CALIPER](#) for rotor replacement procedure.
- Whenever rotor is replaced, replace rotor drive bushings, fasteners, washers and springs.

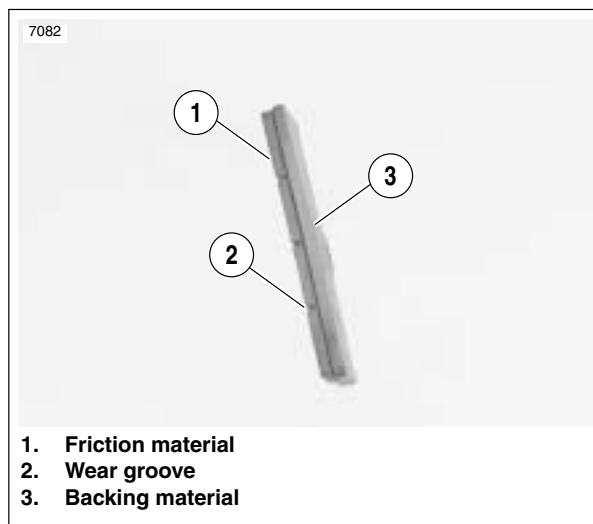


Figure 1-14. Brake Pad Thickness



Figure 1-15. Front Brake Rotor



## BRAKE PAD REPLACEMENT

### Front Pad Removal

1. See [Figure 1-16](#). Loosen pin hanger (2) but do not remove.
2. Rotate wheel so that caliper is centered between rotor mounting fasteners (1).
3. Remove lower caliper mounting fastener (4) that secures caliper to fork lower.
4. Loosen but do not remove upper caliper mounting fastener (3) that secures caliper to fork lower.
5. Remove pin hanger (2).
6. Rotate caliper counterclockwise to allow access to outer pad.
7. Remove outer pad from right side.
8. Remove inner pad from left side by pulling rearward, rotating pad 90 degrees and pulling through wheel opening.

### Front Pad Installation

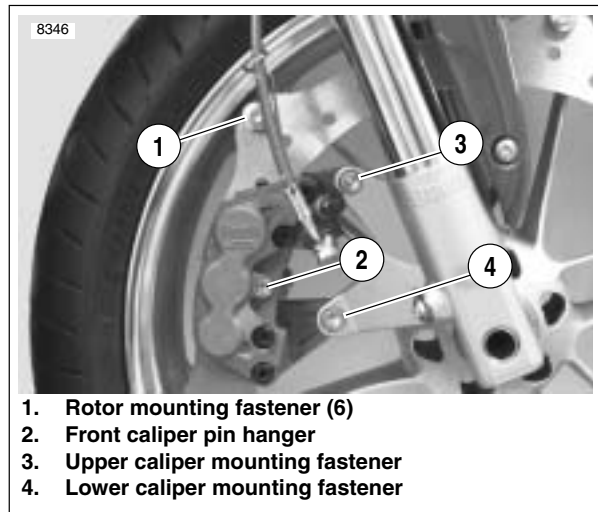
#### NOTE

*Before beginning this procedure it will be necessary to 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.*

1. Push pistons in with suitable tool such as a clean paint scraper until fully seated in bores. Be careful not to damage rotor.
2. Install **new** inner pad from left side of motorcycle.
3. Install **new** outer pad from right side of motorcycle.
4. See [Figure 1-16](#). Install pin hanger (2) making sure it engages hole on both pads and spring clip.
5. Rotate caliper clockwise to align mounting fastener hole.
6. See [Figure 1-16](#). Install lower caliper mounting fastener (4).
7. Apply LOCTITE 271 and tighten both caliper mounting fasteners (3, 4) to 35-37 ft-lbs (48-50 Nm).
8. Tighten pin (2) to 11-14 ft-lbs (15-19 Nm).
9. Check brake fluid level and install front master cylinder reservoir cap and tighten screws to 9-13 **in-lbs** (1.0-1.5 Nm).

#### NOTE

*Avoid making hard stops for the first 100 miles (160 km) to allow **new** brake pads to “wear in” properly with the rotor.*



**Figure 1-16. Front Brake Caliper**



## Rear Pad Removal

1. See [Figure 1-17](#). Remove rear caliper pin plug (3) and loosen pin (4).
2. Remove fastener securing brake line assembly to swing-arm.
3. Remove two mounting fasteners (1) securing brake caliper and carrier assembly to swingarm.
4. Lift caliper and carrier assembly up and off of rotor.
5. Remove pin hanger (4).
6. Remove inner and outer pads, being careful not to dislodge pad spring.

## Rear Pad Installation

1. See [Figure 1-17](#). Check that retainer (2) is present.
2. See [Figure 1-18](#). Check that pad spring is present. Should pad spring become dislodged, install with widest area of spring towards piston side of caliper.

### NOTE

*Before beginning this procedure it will be necessary to 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.*

3. Push piston in with suitable tool such as a clean paint scraper until fully seated in bore.
4. Install **new** inner and outer brake pads
5. See [Figure 1-17](#). Install hanger pin (4) making sure pin engages hole on both pads.
6. Install brake caliper and carrier assembly over rotor.
7. Apply 271 Loctite to two mounting fasteners (1) and install through swingarm into carrier and tighten to 24-26 ft-lbs (32.5-35 Nm).
8. Install hanger pin and tighten to 11-14 ft-lbs (14.9-18.9 Nm).
9. Install pin plug (3). Tighten plug to 24 **in-lbs** (3 Nm).
10. Install fastener securing p-clamp and brake line assembly to swingarm and tighten to 36-60 **in-lbs** (4.1-6.8 Nm).
11. Check brake fluid level and install master cylinder reservoir cap and tighten cap securely.

### NOTE

*Avoid making hard stops for the first 100 miles (160 km) to allow **new** brake pads to "wear in" properly with the rotor.*

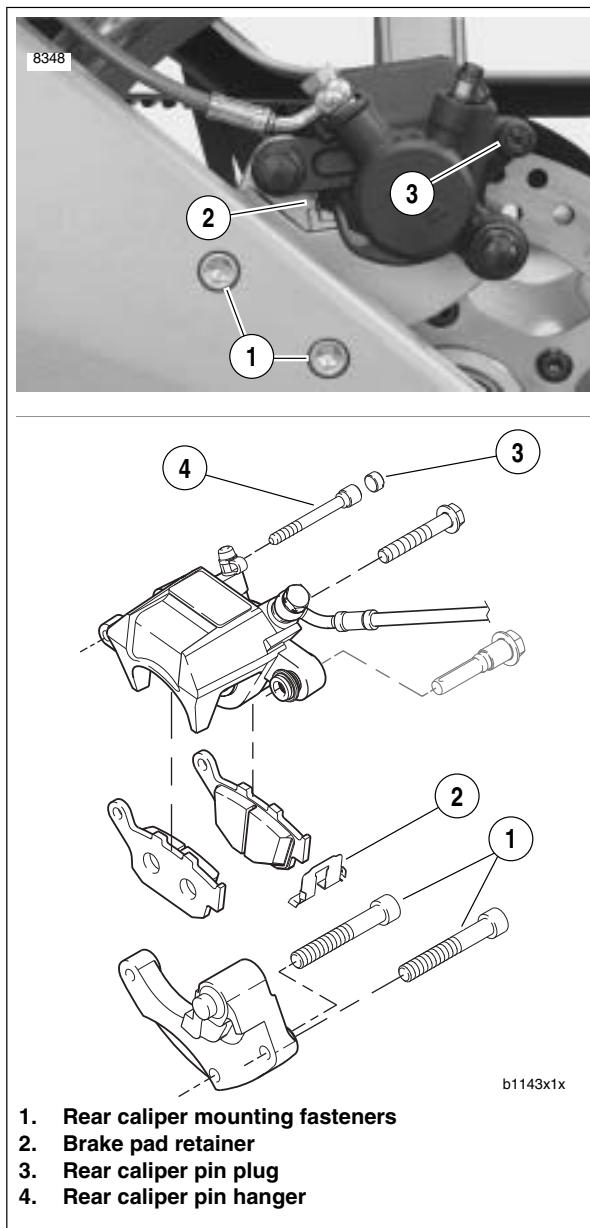


Figure 1-17. Rear Brake Caliper

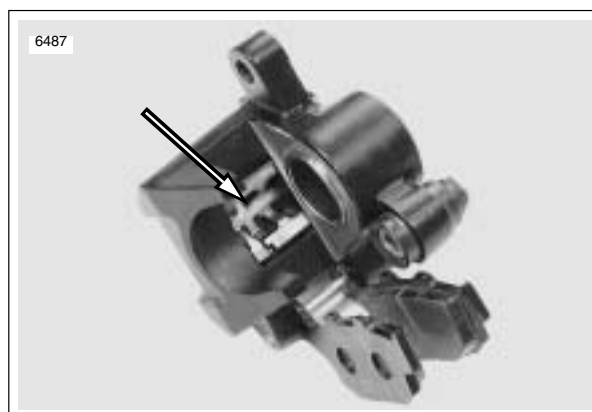


Figure 1-18. Rear Brake Pad Spring



TIRE INFLATION

**⚠ WARNING**

- Use only Buell approved tires. See a Buell dealer. Using non-approved tires can adversely affect stability, which could result in death or serious injury. (00133a)
- Do not inflate tire beyond maximum pressure as specified on sidewall. Over inflated tires can blow out, which could result in death or serious injury. (00027a)

Check tire pressure and tread:

- Before every ride.

Check for proper front and rear tire pressures when tires are cold. Compare pressure against [Table 1-7](#).

Table 1-7. Tire Pressures

TIRE		PRESSURE FOR SOLO RIDING		PRES-SURE AT GVWR
Pirelli Diablo T	Front	34 PSI	234 kPa	Same as solo riding
	Rear	36 PSI	248 kPa	

TIRE REPLACEMENT

See [Figure 1-19](#). Treadwear indicator bars will appear on tire tread surfaces when 1/32 in. (0.8 mm) or less of tire tread remains. Letters that say **TWI** on tire sidewalls pinpoint location of wear indicator bars. Always remove tires from service before they reach the treadwear indicator bars (1/32 in. [0.8 mm] tread pattern depth remaining).

Replace the tires when the tire wear indicator bars appear.

New tires are needed if any of the following conditions exist.

1. Tire wear indicator bars become visible on the tread surfaces.
2. Tire cords or fabric become visible through cracked sidewalls, snags or deep cuts.
3. A bump, bulge or split in the tire.
4. Puncture, cut or other damage to the tire that cannot be repaired.

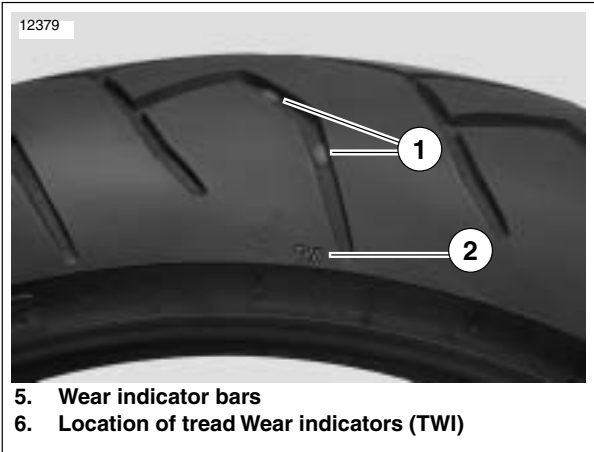


Figure 1-19. Tire Wear Indicator Bars (TWI)  
Pirelli Diablo T

WHEEL BEARINGS

**⚠ WARNING**

Never use compressed air to “spin-dry” bearings. Very high bearing speeds can damage unlubricated bearings. Spinning bearings with compressed air can also cause a bearing to fly apart, which could result in death or serious injury.

Check front and rear wheel bearings for wear:

- Every time a wheel is removed.
- When storing or removing the motorcycle for the season.

Check wheel bearings for wear and corrosion. Excessive play or roughness indicates worn bearings. Replace bearings in sets only.



## GENERAL

Transmission fluid capacity is approximately 1.0 quart (0.95 liter). For best results, drain fluid while hot.

## TRANSMISSION FLUID

1. When the engine reaches normal operating temperature, turn the engine off and position motorcycle on sidestand. this will allow the chaincase lubricant to drain out of the transmission.

### CAUTION

**When draining or adding lubricant, do not allow dirt, debris or other contaminants to enter the engine. (00198a)**

2. See Figure 1-21. Position a suitable container under drain plug. Remove plug and drain fluid.
3. Position the motorcycle straight up and LEVEL. This allows additional fluid to be drained from clutch compartment and will prevent chaincase lubricant from draining out of clutch cover opening when refilled.
4. Wipe any foreign material from the magnetic drain plug, inspect/replace oring and apply Loctite 565 Thread Sealant. Reinstall plug and tighten to 14-30 ft-lbs (19-40.6 Nm).
5. Remove three fasteners and washers from clutch inspection cover. Remove clutch inspection cover with gasket from primary cover.

### CAUTION

**Do not overfill the primary chaincase/transmission with lubricant. Overfilling can cause rough clutch engagement, incomplete disengagement, clutch drag and/or difficulty in finding neutral at engine idle. (00199b)**

### NOTE

*Make certain primary chaincase is filled with proper amount of lubricant with motorcycle upright. If under filled, transmission can be damaged during vehicle operation.*

6. See Figure 1-22. Add GENUINE HARLEY-DAVIDSON - FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT (Part No. 99851-05 quart size) as required until fluid level (4) is even with bottom of clutch diaphragm spring (1).

### NOTE

*Each time the clutch inspection cover is removed the gasket must be replaced.*

7. Install **new** clutch cover gasket.
8. See Figure 1-20. Install clutch inspection cover tightening three fasteners and washers to 84-108 **in-lbs** (10-12 Nm).
9. Clean up any fluid that may have spilled on muffler.

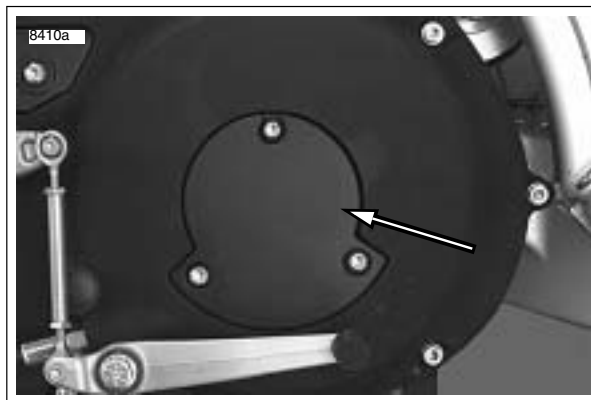


Figure 1-20. Clutch Inspection Cover

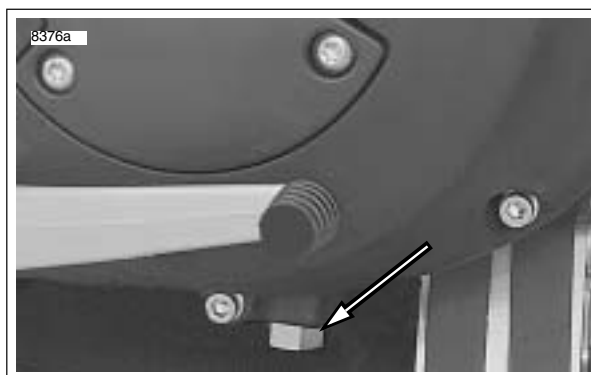


Figure 1-21. Primary Drain Plug

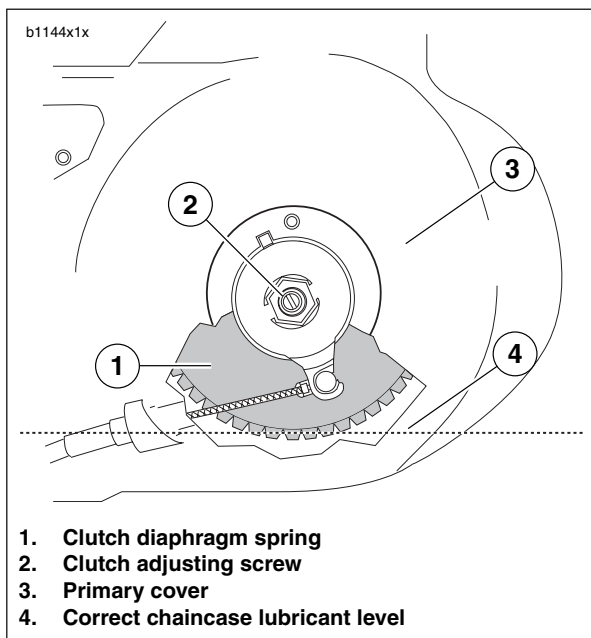


Figure 1-22. Fluid Level



## ADJUSTMENT

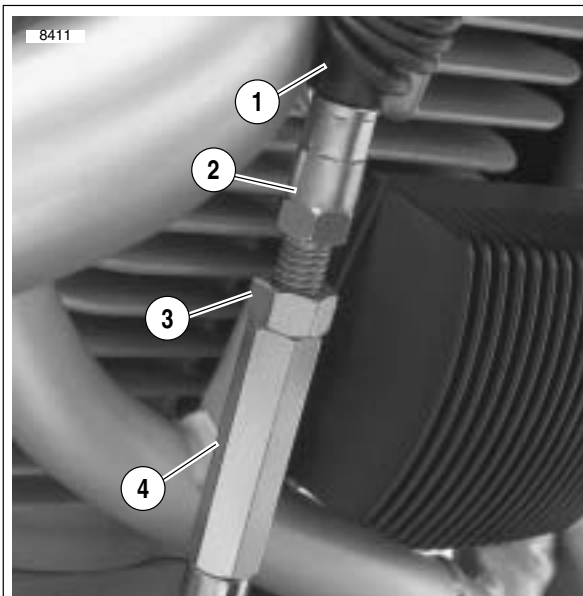
If clutch slips under load or drags when released, first check control cable adjustment. If cable adjustment is within specifications, adjust clutch mechanism as described below.

When necessary, lubricate cable with LUBIT-8 TUFOIL® CHAIN AND CABLE LUBE (Part No. HD-94968-85TV).

1. Position the vehicle upright and level. This will prevent lubricate from draining out when clutch inspection cover is removed.
2. See [Figure 1-23](#). Slide rubber boot (1) upward to expose adjuster mechanism. Loosen jam nut (3) from adjuster (4). Turn adjuster to shorten cable housing until there is a large amount of free play at clutch hand lever.
3. See [Figure 1-20](#). Remove three fasteners and washers from clutch inspection cover. Remove clutch inspection cover and gasket from primary cover.
4. See [Figure 1-24](#). Remove spring (1) and lockplate (2). Using a flat tip screwdriver, turn adjusting screw (3) counterclockwise until it lightly bottoms.
5. Turn adjusting screw clockwise 1/4-1/2 turn. Install lockplate and spring on adjusting screw flats. If hex on lockplate does not align with recess in outer ramp, rotate adjusting screw clockwise until it aligns.

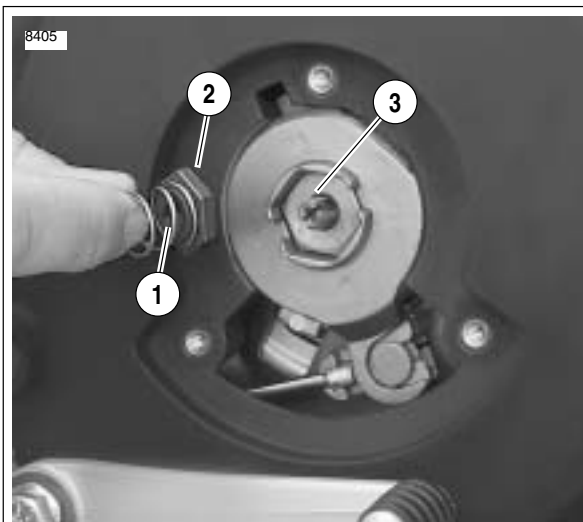
### NOTE

*Spring installs on outboard side of hex lockplate.*



1. Rubber boot
2. Cable end
3. Jam nut
4. Adjuster

**Figure 1-23. Clutch Cable Adjuster Mechanism**

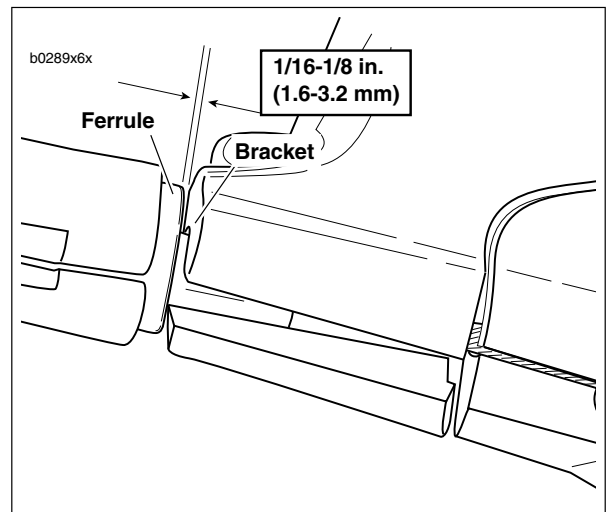


1. Diaphragm spring
2. Lockplate
3. Adjusting screw

**Figure 1-24. Clutch Adjustment**



6. Squeeze clutch hand lever to maximum limit three times. This sets the ball and ramp mechanism. Pull outer cable conduit and at the same time adjust cable adjuster to provide 1/16-1/8 in. (1.6-3.2 mm) free play at clutch hand lever. Adjust as follows:
  - a. See [Figure 1-25](#). Pull ferrule (end of cable housing) away from bracket. Gap between ferrule and bracket should be 1/16-1/8 in. (1.6-3.2 mm).
  - b. See [Figure 1-23](#). Set free play by turning adjuster (4).
  - c. Tighten jam nut (3) against adjuster (4).
  - d. Slide boot (1) over cable adjuster mechanism.
7. Change or add transmission fluid if necessary.
8. See [Figure 1-20](#). Install clutch inspection cover and **new** gasket using three fasteners and washers and tighten to 84-108 **in-lbs** (10-12 Nm).



**Figure 1-25. Adjusting Clutch Free Play**



## GENERAL

The drive belt tension on a new belt will loosen after approximately 1000 miles (1600 km). The drive belt tension is automatically determined by the idler pulley. Axle alignment is not adjustable.

## INSPECTION

### Rear Sprocket

#### NOTE

*If gouges to rear sprocket are large enough to be harmful, they will leave a pattern on the belt face.*

1. Inspect each tooth of rear sprocket for:
  - a. Major tooth damage.
  - b. Large coating chips (larger than 0.25 in.) (6.35 mm) missing/removed.
  - c. Gouges caused by hard objects.
2. Replace rear sprocket if major tooth damage or loss of coating in an area 0.25 in. (6.35 mm) or larger occurs.

### Drive Belt

See [Table 1-8](#). Inspect drive belt for:

- Cuts or unusual wear patterns on both sides of belt.
- Outside edge bevelling. Some bevelling is common, but it indicates that sprockets are misaligned.
- Outside surface for signs of stone puncture. If cracks/damage exists near edge of belt, replace belt immediately. Damage to center of belt will require belt replacement eventually, but when cracks extend to edge of belt, belt failure is imminent.
- Inside (toothed portion) of belt for exposed tensile cords (normally covered by facing fabric). This condition will result in belt failure and indicates worn transmission sprocket teeth. Replace belt and transmission sprocket.
- Signs of puncture or cracking at the base of the belt teeth. Replace belt if either condition exists.

### Idler Pulley

Inspect idler pulley for signs of uneven wear. Excessive lateral side play of 0.020 in. (0.5 mm) or roughness indicates worn bearings. Replace idler pulley as an assembly. See [6.6 DRIVE BELT SYSTEM](#).



**Figure 1-26. Checking Lateral Sideplay on Idler Pulley with a Dial Indicator**

## CLEANING

Keep dirt, grease, oil, and debris off the belt, idler pulley and sprockets. Clean the drive belt with a mild soap and water spray solution as required. Dry thoroughly. Do not immerse belt in solution. Do not direct pressurized water on belt.



**Table 1-8. Potential Limits to Belt Drive Service Life**

CONDITION	ROOT CAUSE	REQUIRED ACTION
Excessive Edge Wear (mistracking)	Misalignment or bent drive structure	Check structure (bad bearing, bent members, etc.)
	Bent or rough flange	Repair flange/replace sprocket
	Damage due to handling (pry on, etc.)	Follow proper handling/installation procedure
	Debris damage to edge of belt	Inspect/replace belt
		Inspect for damaged or missing guards
	Belt hitting obstruction	Check structure (bad bearing, bent members, etc.)
		Inspect for loose/missing fasteners
		Inspect for damaged or missing guards
	Bent or loose idler bracket	Replace idler assembly
		Inspect for loose/missing fasteners
	Broken or loose guards	Check structure (bad bearing, bent members, etc.)
		Inspect for loose/missing fasteners
		Inspect for damaged or missing guards
Excessive tooth wear	Rough or damaged sprocket	Inspect/replace sprocket
	Worn sprocket	Inspect/replace sprocket
	Debris in sprocket	Clean and protect drive
		Inspect for damaged or missing guards
	Abrasive environment	Eliminate or control exposure
		Inspect for damaged or missing guards
Apparent belt stretch <i>NOTE</i> <i>The drive belt tension on a new belt will loosen after approximately 1000 mi (1600 km)</i>	Worn sprocket	Inspect/replace sprocket
	Debris in sprocket	Clean and protect drive
		Inspect for damaged or missing guards
	Idler bearing failure	Replace idler assembly
	Aggressive riding/hard use	Riding practice/operator choice
	Exposure to oils, solvents, harsh chemicals	Eliminate or control exposure
		Clean and protect drive
Cracks in back of belt	Idler/bearing binding	Replace idler assembly
	Exposure to oils, solvents, harsh chemicals	Eliminate or control exposure
		Clean and protect drive
	Cut by sharp debris (not at belt edge)	Inspect/replace sprocket
		Continue to run but monitor condition frequently
	Cut by sharp debris at belt edge	Inspect/replace sprocket
		Inspect/replace belt



**Table 1-8. Potential Limits to Belt Drive Service Life**

CONDITION	ROOT CAUSE	REQUIRED ACTION
Tooth shear/cracks	Excessive load/shock load	Inspect/replace belt
		Riding practice/operator choice
	Worn sprocket	Inspect/replace sprocket
	Debris damage	Inspect/replace sprocket
		Clean and protect drive
		Inspect/replace belt
		Continue to run but monitor condition frequently
		Inspect for damaged or missing guards
Belt breakage	Excessive load/Shock load	Inspect/replace belt
		Riding practice/operator choice
	Damage due to handling (pry-on, etc.)	Follow proper handling/installation procedure
	Debris in sprocket or belt	Inspect/replace sprocket
		Clean and protect drive
		Inspect/replace belt
Excessive drive noise	Worn/damaged sprocket	Inspect/replace sprocket
		Missing/damaged belt guards
	Damaged flange	Repair flange/replace sprocket
	Damaged idler	Check structure (bad bearing, bent members, etc.)
		Replace idler assembly
	Damaged belt	Follow proper handling/installation procedure
		Inspect/replace belt
	Debris stuck in belt	Inspect/replace sprocket
		Clean and protect drive
		Inspect/replace belt
		Missing/damaged belt guards
	Debris stuck in sprocket	Inspect/replace sprocket
		Follow proper handling/installation procedure
		Inspect/replace belt
		Missing/damaged belt guards