

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

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 wall 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

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 leaded or 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)

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.
- **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 | 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 | | 1 |
| | Replace belt and idler | | | | | | X | 1 |
| Throttle, brake, and clutch controls, jiffy stand, active muffler cable and active intake cable adj. (if equipped) | Check, adjust and lubricate | X | X | X | X | X | X | 1 |
| Ignition/gas cap locks | lubricate | X | X | X | X | X | X | |
| 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 | |
| Brake calipers and master cylinders | Inspect for leaks | | | X | X | X | X | 1, 2 |
| 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 lines, 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.
- Or 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 29-31 ft-lbs (40-42 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 | 40-60 in-lbs (5-7 Nm) |
| Primary chain lubricant | Lubricant capacity | SPORT-TRANS FLUID (Part No. 98854-96 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 11-15 ft-lbs (14.9-20.3 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 in-lbs (10-12 Nm) |
| Transmission lubricant | Lubricant level | SPORT-TRANS FLUID (Part No. 98854-96 as required until fluid level is even with bottom of clutch diaphragm spring) |
| Tire condition and pressure | Pressure for solo rider | Front: 36 psi (248 kPa) Rear: 38 psi (262 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. 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 in-lbs (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 |
| Drive belt | Replace drive belt and idler pulley assembly: | At every 25,000 mi (40,000 km) service interval. |
| Intake cover assembly | Intake cover screw torque | 12-36 in-lbs (4-4 Nm) |

Table 1-2. Quick Reference Maintenance Chart

| ITEM SERVICED | SPECIFICATION | DATA |
|----------------------------|---------------------------------------|--|
| Clutch and throttle cables | Lubricant | LUBIT-8 TUFOIL® CHAIN AND CABLE LUBE (Part No. HD-94968-85TV) |
| | Handlebar clamp screw torque | 36-60 in-lbs (4-7 Nm) |
| | Handlebar switch housing screw torque | 25-33 in-lbs (3-4 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 4.6 in. (118 mm) from the top of the fork tube |
| Battery | Lubricant | ELECTRICAL CONTACT LUBRICANT Part No. 99861-02 (1 oz.) |
| | Battery terminal torque | 72-96 in-lbs (8-11 Nm) |

GENERAL

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

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

CAUTION

Use of abrasive products or powered buffing equipment will cause permanent cosmetic damage to molded-in-color body panels. Use only recommended products and techniques outlined in this manual to avoid damaging molded-in-color body panels. (00245a)

CAUTION

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

RECOMMENDED PRODUCTS

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

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

CARE AND MAINTENANCE

Washing

To wash molded-in-color panels:

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

Cleaning Between Washings

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

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

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

NOTE

Rain or water will remove Harley Gloss from body panels.

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

Polishing

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

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

Minor Scratch Removal

To remove minor scratches from body panels:

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

Major Scratches

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

GENERAL

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

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

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

⚠ WARNING

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 1-1](#). 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](#).

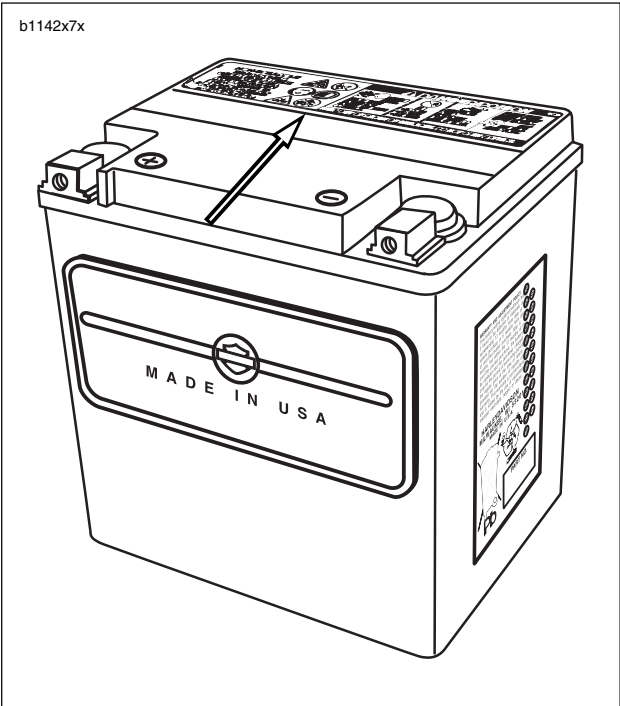


Figure 1-1. Battery Warning Label

Table 1-4. Voltmeter Test

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

BATTERY DISCONNECTION AND REMOVAL

1. Remove seat. See 2.38 SEAT.

⚠ WARNING

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

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

NOTE

The H-D Battery Tender Automatic Battery Charger (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.

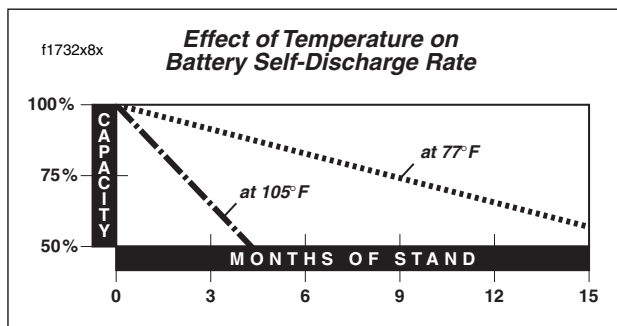


Figure 1-2. Battery Self-Discharge Rate

BATTERY INSTALLATION AND CONNECTION

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

CAUTION

Connect the cables to the correct battery terminals. 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

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

Change engine oil and filter when storing or removing the motorcycle for the season.

NOTE

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

CHECKING ENGINE OIL LEVEL

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

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

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

CAUTION

Do NOT 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)

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

1. The motorcycle must be on level ground, on the side-stand, with the engine off.

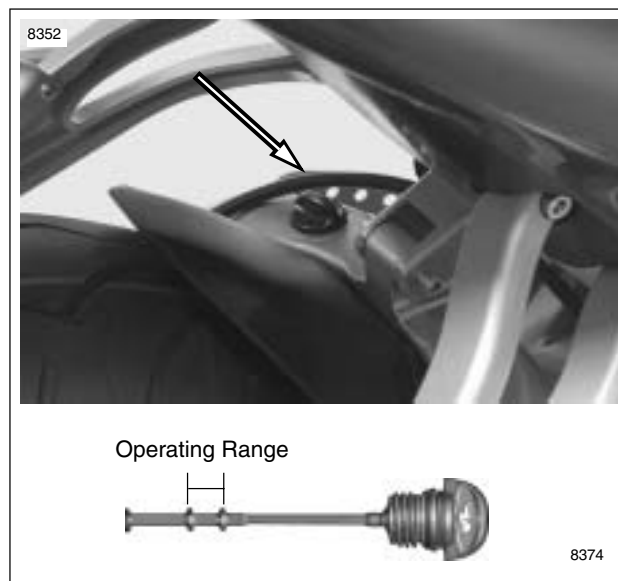


Figure 1-3. Dipstick Location/Engine Oil Level

2. See [Figure 1-3](#). 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 1-5](#). Unscrew and remove dipstick and note oil level.
 - a. Oil level should be within the operating range (between upper and lower registration marks) on dipstick.
 - b. If oil level is below lower registration mark, add only enough oil to bring oil level between lower and upper registration marks.

CHANGING ENGINE OIL AND FILTER

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

NOTE

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

Draining Oil

1. See [Figure 1-4](#). Place a suitable container under the drain plug.



Figure 1-4. Oil Tank Drain Plug

2. Using a 5/8 in. wrench, remove drain plug from under oil tank/swingarm. Wipe any accumulated debris from magnetic tip on drain plug.



Figure 1-5. Dipstick Location

3. See [Figure 1-5](#). Unscrew and remove dipstick from oil fill hole on top of oil tank/swingarm.

Changing Filter

1. Remove chin fairing. See [2.33 CHIN FAIRING](#).

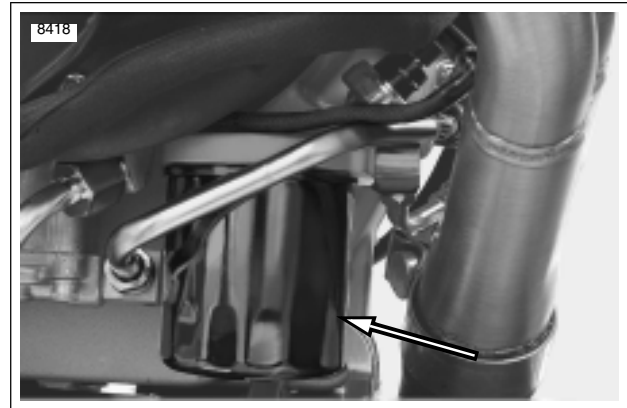


Figure 1-6. Oil Filter

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

⚠ WARNING

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)

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 29-31 ft-lbs (40-42 Nm).
3. Fill oil tank through filler (dipstick) hole with recommended oil from [Table 1-5](#). Oil tank capacity with filter change is approximately 2.5 quarts (2.4 liters) and includes the 4.0 ounces (0.12 liter) poured into the filter. Always verify proper hot oil level on dipstick. Do not over-fill.
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](#).
7. Inspect oil cooler fins for debris or damage. Blow out any debris from fins with compressed air from the inside of the cooler outward.
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 [2.35 AIR SCOOPS](#).
13. Check (hot) oil level. See [CHECKING ENGINE OIL LEVEL](#).

Table 1-5. Recommended Oil Grades

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

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

Table 1-6. Brake Troubleshooting

| CONDITION | CHECK FOR | REMEDY |
|---|---|---|
| Excessive lever/pedal travel or spongy feel. | Air in system. Master cylinder low on fluid. | Bleed brake(s). Fill master cylinder with approved brake fluid. |
| Brake fade | Moisture in system. | Bleed brake(s). 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 1-7](#). 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 molded-in color 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 1-8](#). 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 1-7. Front Caliper Bleeder Valve

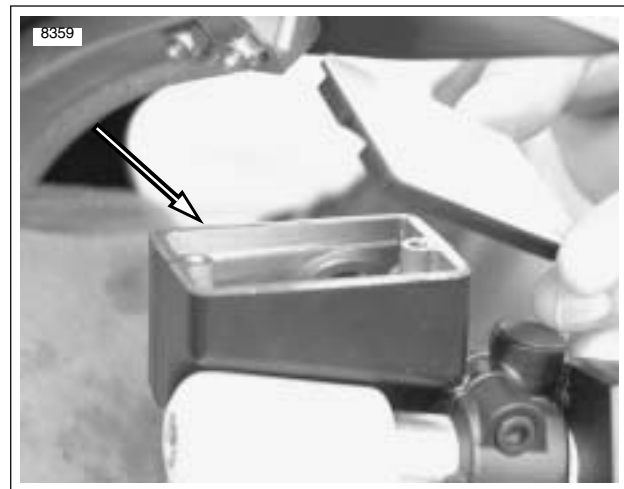


Figure 1-8. Front Master Cylinder Reservoir

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.

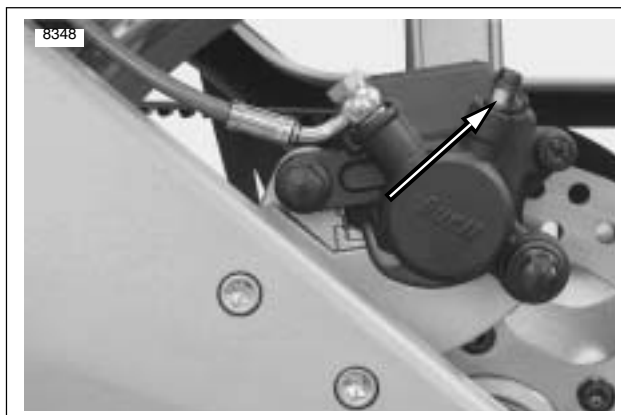


Figure 1-9. Rear Caliper Bleeder Valve

1. See [Figure 1-9](#). 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 molded-in color 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](#).

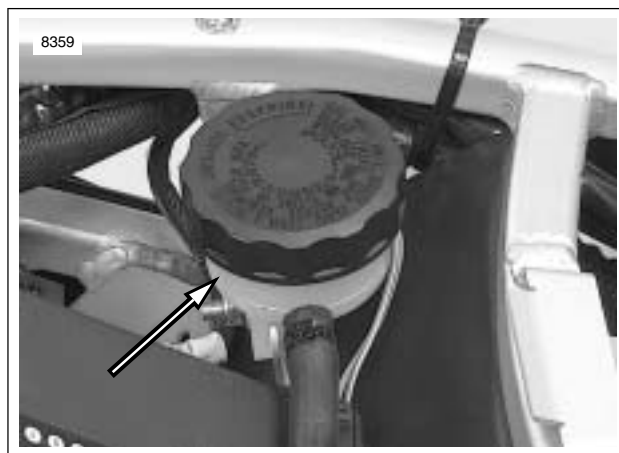


Figure 1-10. Rear Master Cylinder Reservoir

3. See [Figure 1-10](#). 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 1-11](#). 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 1-12](#). Inspect for minimum and maximum brake rod engagement in brake clevis (4). Adjust as required.
2. Adjust brake pedal.
 - a. See [Figure 1-12](#). 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

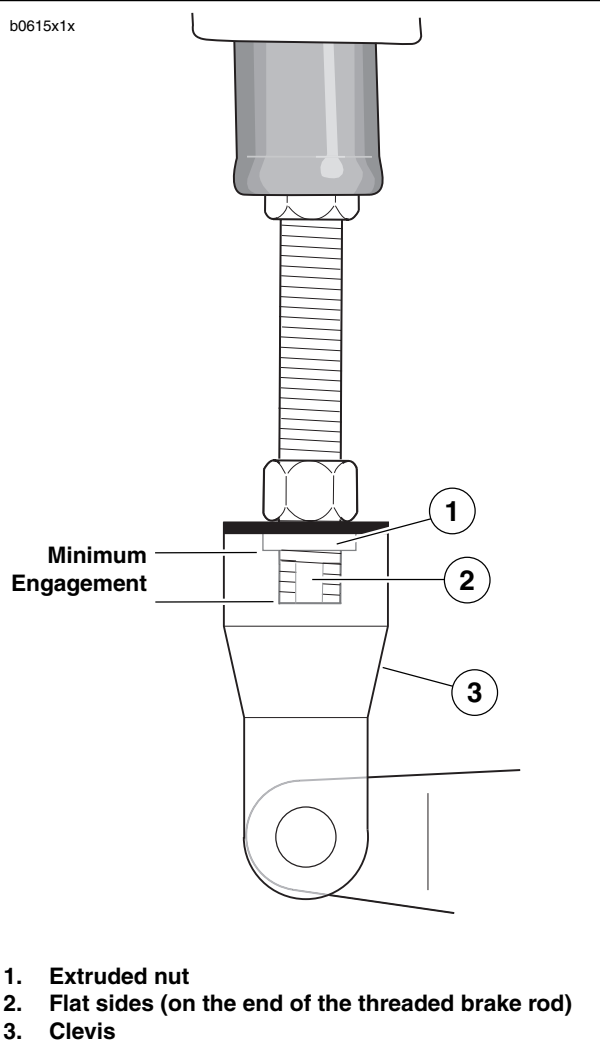
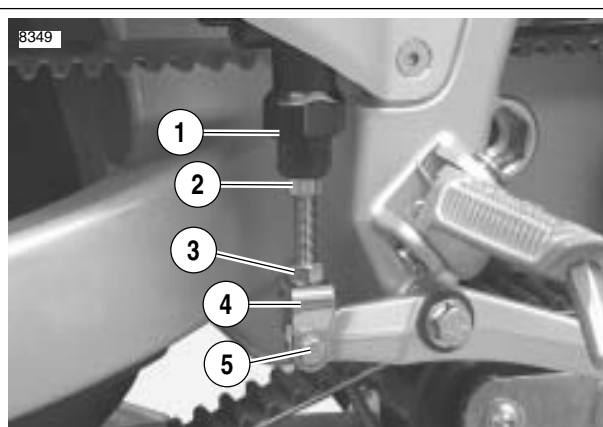


Figure 1-11. Critical Measurements with Typical Brake Pedal



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

Figure 1-12. 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 1-13](#). 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 1-14](#). Check brake rotors for minimum thickness:

- At the 1000 mile (1600 km) service interval.
 - At every 5000 mi (8000 km) service interval thereafter.
 - At every scheduled service interval:
1. Measure rotor thickness. Replace rotor if minimum thickness is less than 0.18 in. (4.5 mm). Replace drive bushings, fasteners, washers and springs whenever rotor is replaced.
 2. Check rotor surface. Replace if warped or badly scored. See [2.5 FRONT WHEEL](#) or [2.6 REAR WHEEL](#) for procedure.

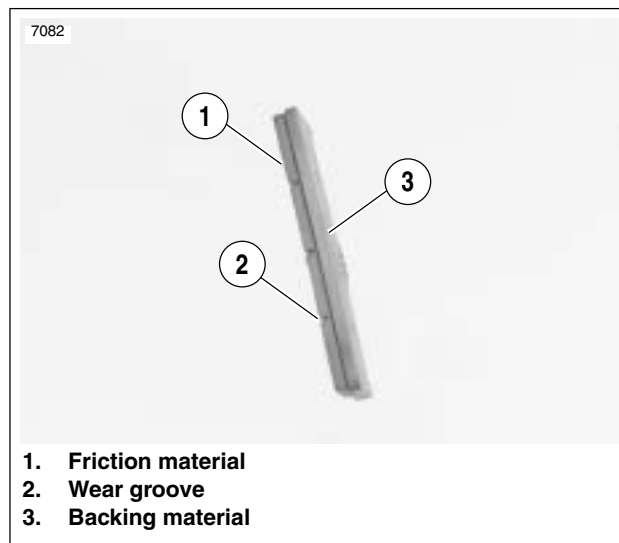


Figure 1-13. Brake Pad Thickness



Figure 1-14. Front Brake Rotor

BRAKE PAD REPLACEMENT

Front Pad Removal

1. See [Figure 1-15](#). Loosen pin (2) but do not remove.
2. Rotate wheels 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 (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

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 side pad from left side of motorcycle.
3. Install **new** outer pad from right side of motorcycle.
4. See [Figure 1-15](#). Install pin (2) making sure it engages hole on both pads and spring clip.
5. Rotate caliper clockwise to align mounting fastener hole.
6. See [Figure 1-15](#). Install lower caliper mounting fastener (4).
7. 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).

NOTE

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

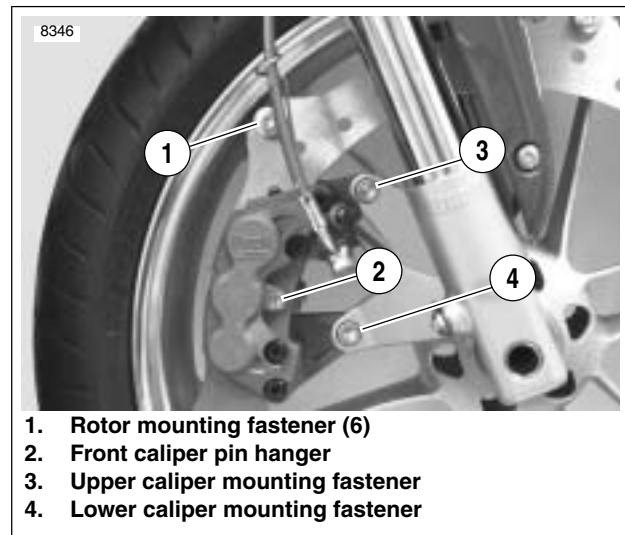


Figure 1-15. Front Brake Caliper

Rear Pad Removal

1. See [Figure 1-16](#). Remove rear caliper pin plug (3) and loosen pin (4).
2. Remove fastener securing p-clamp, wire form and brake line assembly to swingarm.
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 hanger pin (4).
6. Remove inner and outer pads, being careful not to dislodge pad spring.

Rear Pad Installation

1. See [Figure 1-16](#). Check that retainer (2) is present.
2. See [Figure 1-17](#). Check that pad spring is present. Should pad spring become dislodged, install with widest area of spring towards piston side of caliper.
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 1-16](#). Install hanger pin (4) making sure pin engages hole on both pads.
6. Install brake caliper and carrier assembly over rotor.
7. Install two mounting fasteners (1) through swingarm into carrier and tighten to 35-37 ft-lbs (48-50 Nm).
8. Apply LOCTITE 272 and tighten hanger pin to 11-14 ft-lbs (14.9-18.9 Nm).
9. Install pin plug (3). Tighten plug to 18-25 **in-lbs** (2-3 Nm).
10. Install fastener securing p-clamp, wire form and brake line assembly to swingarm and tighten to 36-60 **in-lbs** (4.1-6.8 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.

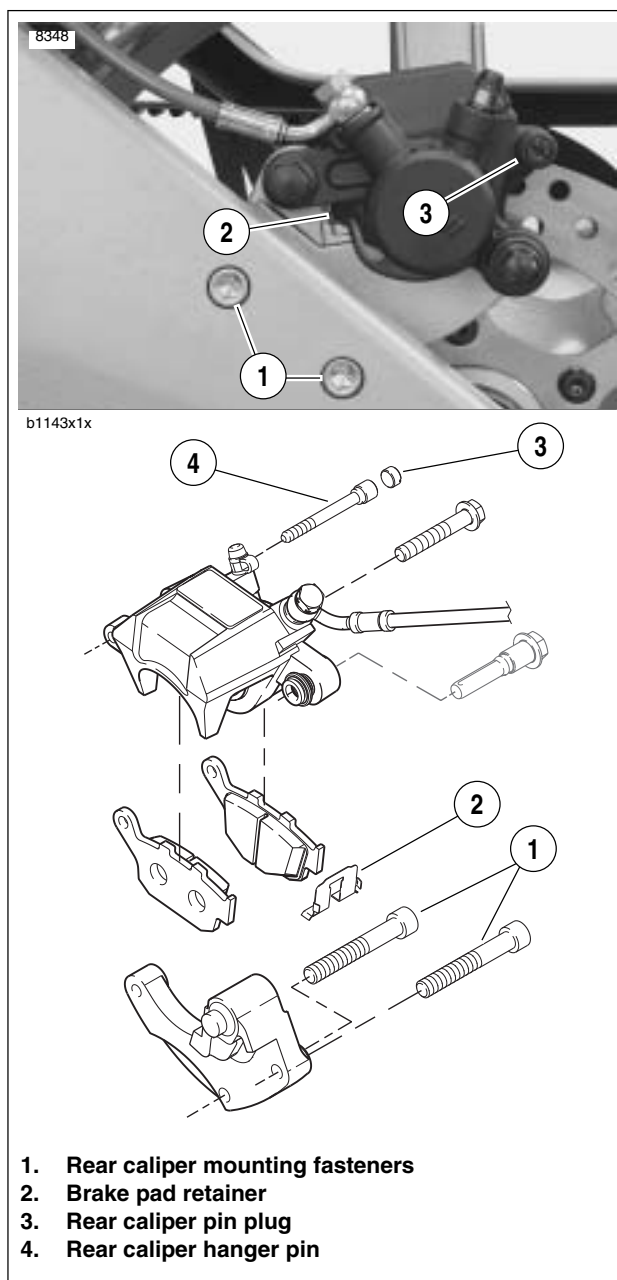


Figure 1-16. Rear Brake Caliper

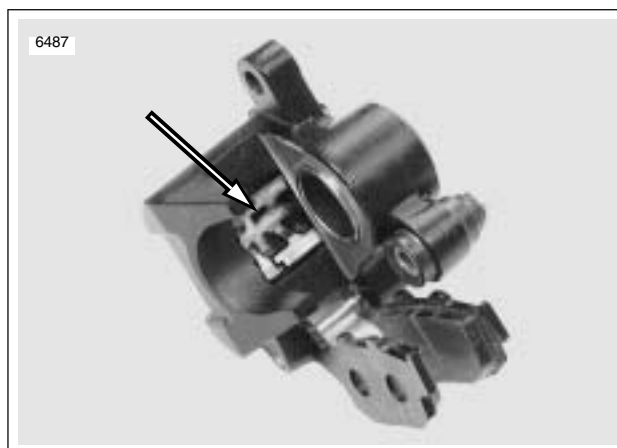


Figure 1-17. Rear Brake Pad Spring

TIRE INFLATION

⚠ WARNING

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 | | PRESSURE AT GVWR |
|-------|--------------------------|---------|---------------------|
| Front | 36 PSI | 248 kPa | Same as solo riding |
| Rear | 38 PSI | 262 kPa | |

TIRE REPLACEMENT

See [Figure 1-18](#). Arrows on tire sidewall pinpoint location of wear bar indicators on the tire tread. Tire wear indicator bars will appear on tire tread surfaces when 1/32 in. (0.8 mm) or less of tire tread remains.

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.

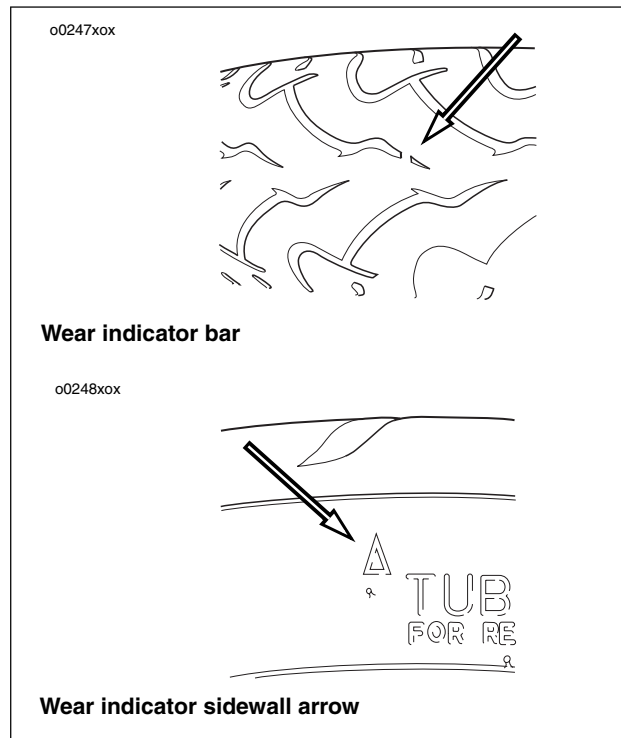


Figure 1-18. Tire Wear Indicator Bars

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 jiffy stand. 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 1-20. 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 and apply Loctite 565 Thread Sealant. Reinstall plug and tighten to 11-15 ft-lbs (14.9-20.3 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)

CAUTION

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 1-21. Add SPORT-TRANS FLUID (Part No. 99896-88 quart size; Part No. 99895-88 gallon size) as required until fluid level (3) is even with bottom of clutch diaphragm spring (2).

NOTE

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

7. Install **new** clutch cover gasket.
8. See Figure 1-19. 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.

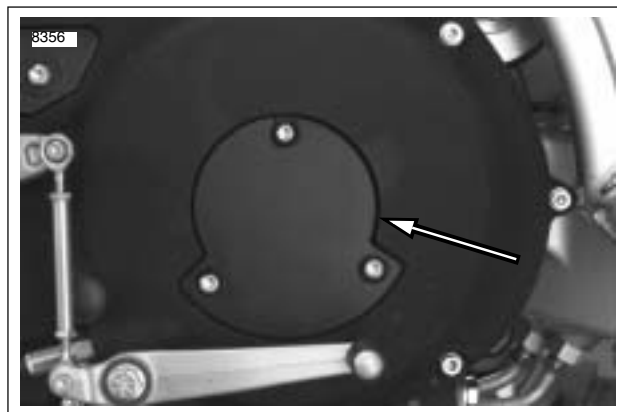


Figure 1-19. Clutch Inspection Cover

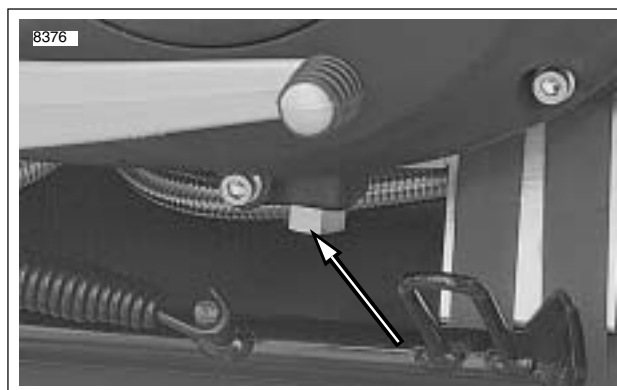


Figure 1-20. Primary Drain Plug

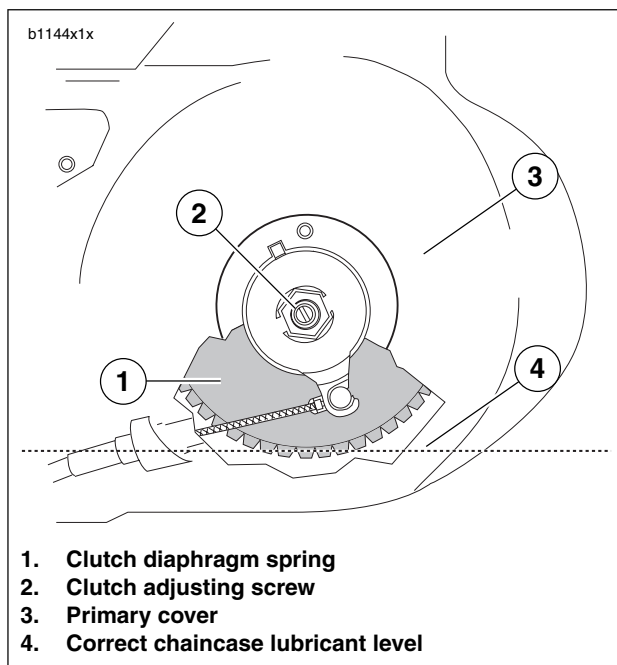


Figure 1-21. Fluid Level

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. Raise rear wheel off floor using REAR WHEEL SUPPORT STAND (Part No. B-41174).
2. See [Figure 1-22](#). 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 1-19](#). Remove three fasteners and washers from clutch inspection cover. Remove clutch inspection cover and gasket from primary cover.
4. See [Figure 1-23](#). 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.

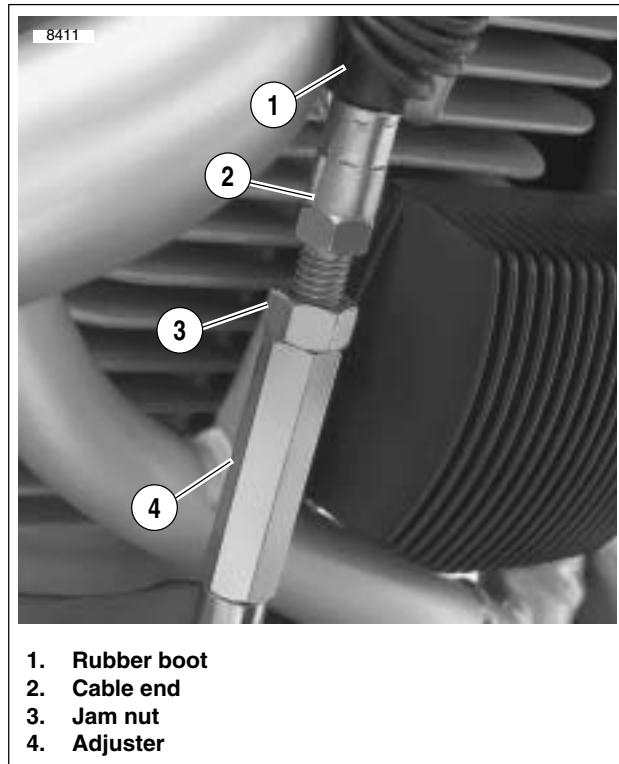


Figure 1-22. Clutch Cable Adjuster Mechanism

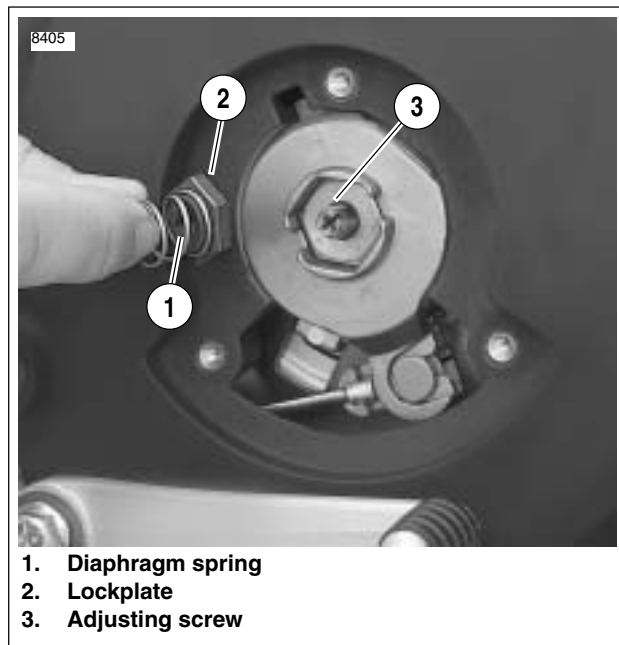


Figure 1-23. Clutch Adjustment

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 1-24](#). 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 1-22](#). 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 1-19](#). Install clutch inspection cover and **new** gasket using three fasteners and washers and tighten to 84-108 **in-lbs** (10-12 Nm).
9. Check clutch cable free play. See Step 6 above.

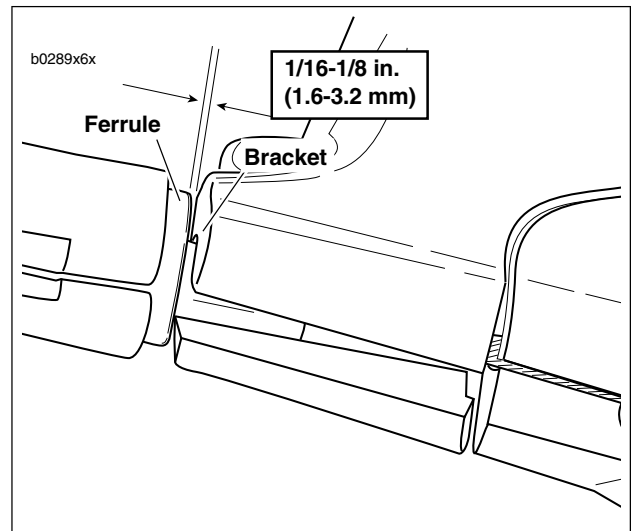


Figure 1-24. Adjusting Clutch Free Play

GENERAL

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

Replace drive belt and idler pulley assembly:

- At every 25,000 mi (40,000 km) service interval.

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 1/4") missing/removed.
 - c. Gouges caused by hard objects.
2. Replace rear sprocket if major tooth damage or loss of coating in an area 1/4" 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 1-25. 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 |