

INDIAN CHIEF SERVICE MANUAL

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P.D.I. REFERENCE

(PRE-DELIVERY INSPECTION)

The P.D.I. checklist contained within the Sales & Warranty Registration form must be completed prior to delivery of the motorcycle to the customer. The items on the checklist must be tested and/or reviewed in accordance with the Indian Motorcycle-approved methods and procedures using specialized equipment. After each item has been inspected and found to be in proper order, place a check mark next to the item. After the motorcycle has been thoroughly checked and road-tested, the delivering dealer and test rider must sign and date the form. Upon delivery of the motorcycle, the customer should sign and date the form.

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Delivery – Explain operation of all controls and break-in procedure.

Owner's Manual – Explain contents and provide information on rider safety training.

Indian Chief Specifications

Fluid Requirements

Engine Oil:
20w-50
3.0 quarts with new filter / 2.8 liters with new filter

Fork Fluid:
30 weight
Wet – 11.5 U.S. ounces / 340cc
Dry – 12.5 U.S. ounces / 370cc

Transmission:
80-90 weight
20-24 U.S. ounces / 670-720cc

Fuel: Unleaded gasoline, 91 octane or higher

Brake Fluid: D.O.T. 5

Battery: Distilled water

Tires & Wheels

Tires:
Front, Firestone VT-01F 130-90-16 67H
Rear, Firestone VT-01R 130-90-16 73H

Tire pressure:
Front: 36 p.s.i. 2.5 kg/cm²
Rear: 40 p.s.i. 2.8 kg/cm²

Never exceed the pressure stated on the tire sidewall which is 41 P.S.I.

Pressures are for original equipment tires. See your dealer or tire manufacture for non-O.E.M. tires.

Inner tube: 5.00/5.10"-16

Wheels: 3.5" x 16", 60 spoke

Wheel bearing free play: .003"-.008", .076-.203mm

Brakes

Pad: EBC, FA 216PM, DMX-GG
Pad thickness, new – .205-.215", 5.21-5.46mm
Minimum Pad thickness – .062", 1.575mm

Rotor: Diameter – 11.5"
Front, new thickness – .205-.210", 5.21-5.46mm
Front minimum thickness – .180", 4.57mm
Rear, new thickness – (not available at time of printing)
Rear min. thickness – (not available at time of printing)

Engine Tune-Up Specifications

Spark plugs:
Type: Bosch Platinum WR7DP
Gap: .040", 1.01mm
Torque: 18-22 foot pounds

Ignition timing:
34° B.T.D.C. @ 2200-3300 R.P.M.
Maximum advance 35° @ 3850 R.P.M
Falling to 34° B.T.D.C. @ 4400 R.P.M

Carburetor jetting, at sea level

California Models:
Idle RPM: 800-1000
Idle Mixture Screw: 1¼-1¾ turns
Accelerator Pump Screw: 2-2½ turns
Intermediate Jet: .0295"
Main Jet: .074"
Exhaust Discs: 6

49 State Models with Carb. Restrictor:
Idle RPM: 800-1000
Idle Mixture Screw: 1¼-1¾ turns
Accelerator Pump Screw: 2-2½ turns
Intermediate Jet: .0280"
Main Jet: .066"
Exhaust Discs: 6

Electrical

Battery:
1999 model: 12 volt, 20 amp, lead/acid
2000 model: 12 volt, 20 amp, maintenance free

Rectifier/Regulator: Output, 14 volt, 32 amp

Fuel Tank Capacity

4.75 gallons U.S.
1.75 quarts of reserve

Dimensions and Weight

Bike Weight, Dry: 650 pounds, 295.5 kg

GVWR: 1080 pounds, 490 kg

Seat Height: 24" / 610mm

Ground Clearance: 6" / 152mm

Wheelbase: 69" / 1752mm

Overall Length: 100" / 2540mm

Overall Width: 47" / 1194mm

Overall Height: 49" / 1245mm

Rake: 36 Degrees

Primary Service (500 mile)

Perform the following operations for the Primary service.

Periodic maintenance of the motorcycle is important to its longevity, this is especially true for the first 500 miles. Below is a check list to be performed at the 500 mile mark.

1. Change engine oil, replace oil filter and clean tappet screen ..... *page 3*
2. Change transmission oil and clean magnetic drain plug ..... *page 5*
3. Inspect air filter and clean/replace if necessary ..... *page 6*
4. Inspect the primary belt ..... *page 7*
5. Check and adjust rear drive belt ..... *page 10*
6. Lubrication of shift rod pivot points ..... *page 11*
7. Inspect brake pads lining for wear and discs for warpage ..... *page 13*
8. Brake fluid level and condition ..... *page 15*
9. Inspect oil lines and brake lines for leaks ..... *page 16*
10. Throttle cables, Clutch cable inspection and lubrication ..... *page 18*
11. Clutch and brake lever pivot points lubrication ..... *page 20*
12. Check clutch adjustment ..... *page 21*
13. Check and adjust carburetor & enrichener operation ..... *page 22*
14. Clean the petcock screen and inspect the fuel line joints for leaks ..... *page 23*
15. Check tire pressure and inspect tread ..... *page 25*
16. Check battery electrolyte level and clean battery terminals ..... *page 26*
17. Check operation of all electrical equipment and switches ..... *page 27*
18. Check rear shock absorbers ..... *page 28*
19. Check front and rear wheel spoke tightness ..... *page 29*
20. Check front steering stem adjustment ..... *page 30*
21. Check rear pivot bolts for proper tightness ..... *page 32*
22. Perform a bolt torque audit ..... *page 32*
23. Check ignition timing ..... *page 34*
24. Conduct road test ..... *page 35*

Change engine oil, replace oil filter and clean tappet screen

It is essential to keep clean, fresh oil in the engine at all times. More frequent oil changes are necessary when:

- the motorcycle is ridden hard,
- the air temperature is very hot or very cold,
- idling for extended periods of time,
- two up riding,
- mountain riding,
- dusty conditions.

Indian Motorcycles are supplied with 20W-50 V-Twin Motorcycle oil in their engine. This oil is formulated for the rigors of air cooled motorcycle engines and will provide maximum protection. **Indian Motorcycle does not recommend the addition of mystery oils to the basic 20W-50 Motorcycle product.**

Each oil manufacturer produces products chemically designed which contain detergents, polymers and anti-wear agents to name a few. All these chemicals are balanced to not assault the other. Addition of such oil additives may create an imbalance and the outcome is unknown.

Tools required:

Drain pan

Flat blade screwdriver

Oil filter wrench

Warm the oil to operating temperature.

On the lower right hand side of the oil bag is the oil drain hose. The lower end of the drain hose is attached to a plug welded to the frame cross-over. With a flat blade screwdriver loosen the worm clamp at the bottom of the hose.

Place the drain pan under the hose. Remove the hose from the plug.

When all the oil has drained from the oil bag, slip the hose onto the frame plug and tighten the worm clamp.

Remove the oil bag filler cap.

Pour 3 quarts of 20W-50 V-Twin motorcycle oil into the oil bag.

Return the oil bag filler cap.

Oil filter

The oil filter is located on the front of the engine crankcases.

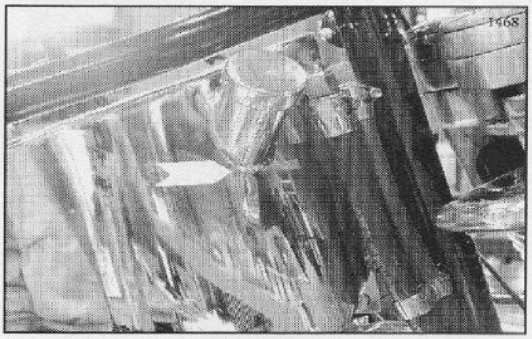
From the left side of the bike remove the oil filter using a proper sized oil filter wrench.

Inspect the filter seating surface of the engine. Make sure the old filter gasket is not attached to the engine. Clean any dirt or debris from the seating surface and surrounding area.

Replace the filter with an Indian approved part (#96-022). Apply a thin film of oil to the filter threads and to the gasket of the new filter.

Screw the filter into the filter mount until the gasket contacts the seating surface. Torque another 1/2-3/4 of a revolution.

Engine oil should be checked when warm and the motorcycle is vertical. The oil should touch the bottom of the oil filler neck. Add oil if necessary.



Bring the oil level up to the bottom of the filler neck.

Tappet screen

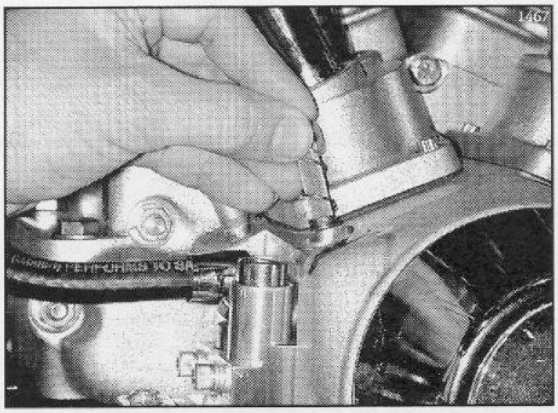
Tools required:

Large flat blade screwdriver

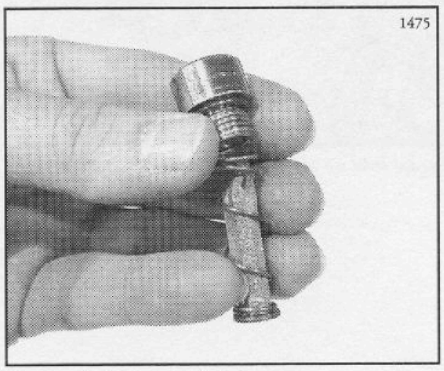
Drag link flat blade bit socket

Torque wrench

The tappet screen provides coarse filtering of engine oil before reaching the hydraulic tappets.



The tappet screen cap is located on the engine crankcase slightly forward of the oil pump housing. Remove the cap using a large flat blade screwdriver.



Open end of screen to the bottom

Remove the spring and screen with a magnet.

Clean the screen with a suitable oil removal product. Inspect the screen for any metal chips. Chips may be removed with brake clean, carb clean, etc. If the chips can not be removed replace the screen with a new part. (#03-614)

Sequence of assembly is as follows:

a. Screen, opening to the bottom

b. Spring

c. Cap, inspect the o-ring before assembly.

Torque the cap to 96 inch pounds (8 foot pounds) using the drag link flat blade bit screwdriver.

Transmission oil change

Changing the transmission oil regularly will enhance the service life of the transmission. The oil should be changed after the first 500 miles (800km) of service and at each 2500 miles there after. Transmission oils are specifically design for high shear loads. Use a transmission oil designed specifically for V-twin motorcycles.

Tools required:

3/16" ball hex key, 6" long

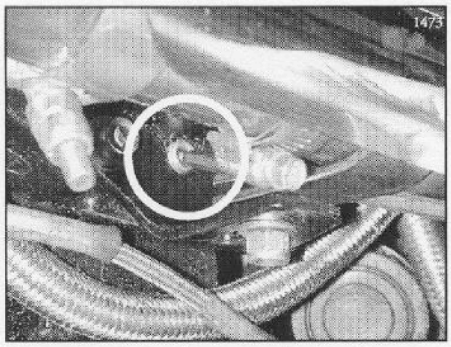
ratchet

3/8" hex key

Bring the motorcycle transmission oil to operating temperature by riding it.

Place a drain pan below the right side of the transmission housing.

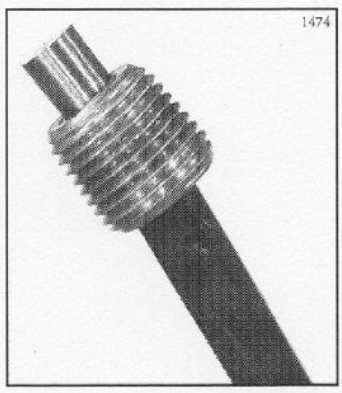
Using a 3/16" ball drive hex key remove the magnetic drain plug. Be careful not to burn yourself on the hot exhaust.



Transmission drain plug access under the exhaust using a ball end hex key.

Lean the bike over to the right to allow complete draining. Clean the magnet on the drain plug removing all the metal chips.

Clean the threads of the plug removing the sealant. Reapply a fresh quantity of Teflon thread sealant to the drain plug threads.

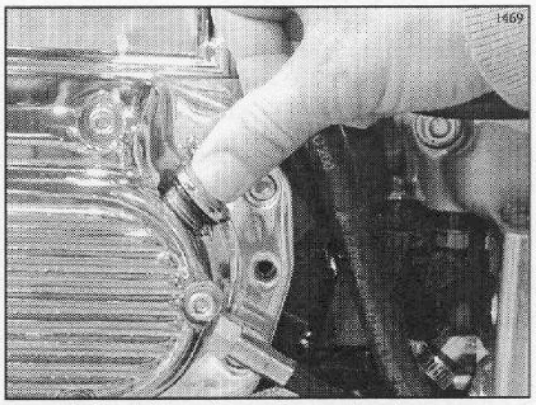


Return the drain plug to the transmission housing and tighten using a 3/16" ball hex key and ratchet.

Remove the fill plug dipstick located on the front side of the chrome cover using a 3/8" hex key.

Pour 20oz (600ml) of 80-90 gear oil into the transmission.

Move the bike to a vertical position on level ground. Check the fluid level by returning the dip stick to the housing. Do not screw the dipstick into the case to check the oil level, let it sit on the threads. The oil level should be between the two marks.



Insert the dip stick into the case. Do not thread.

Thoroughly wipe the bottom of the frame rail and surrounding parts to remove any oil.

Warm the transmission oil by riding the bike and check the level again. Add oil if required.

Check for any leaks after riding.

Air cleaner servicing

Frequent servicing of the air cleaner element will provide the engine with clean air increasing engine longevity. At the 500 mile service inspect the element for nominal dirt build up. Typical cleaning interval is 5000 miles in normal conditions, greater frequency in dusty conditions.

Tools required:

#2 phillips screwdriver

The air cleaner element is located inside the chrome cover on the right hand side of the bike approximately where your knee is located while riding.

Remove the three Phillips screws from the chrome air cleaner cover using a #2 phillips screwdriver.

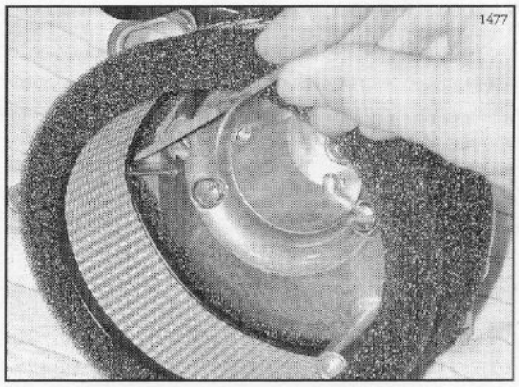
Remove the foam element from the chrome housing.

Carefully remove the screen from the inside of the foam.

Wash the foam element in a non-flammable solvent and let dry.

Use a foam air cleaner oil to saturate the foam. Work the oil into all surfaces with your fingers. Squeeze the excess oil from the element, but, do not wring.

Insert the screen back into the foam being careful not to tear it. Make sure the lips of the foam are completely over the edge of the screen.



Filter must fit over the web

Place the foam element onto the backing plate. Press inward with enough pressure to force the filter over the web on the left hand side of the backing plate. Once seated, the filter will remain on the backing plate without being held.

Apply blue Loctite to the first 1/4" of threads of the three 1/4"- 20 x 1" oval head Phillips screws.

Tighten using a #2 phillips screwdriver and torque to 84-108 inch pounds (7-9 foot pounds).

Primary belt inspection

The inner primary belt should be checked at the 500 mile check and at every 2500 miles there after. If the belt becomes damaged in any way it may cause the motorcycle to run roughly or vibrate in an uncharacteristic manner. Under normal riding conditions the belt should last 40,000-50,000 miles before replacement is needed.

Belt tension check

Tools required:

3/16″ hex bit socket

ratchet

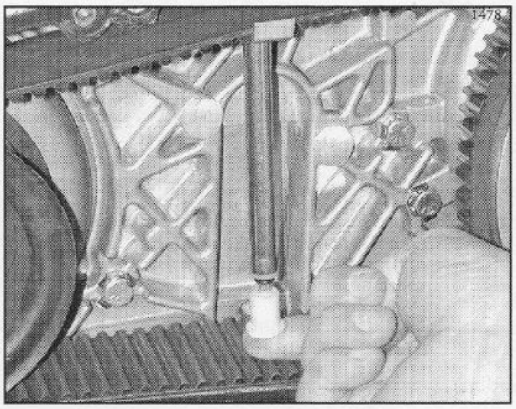
torque wrench

belt tension gauge

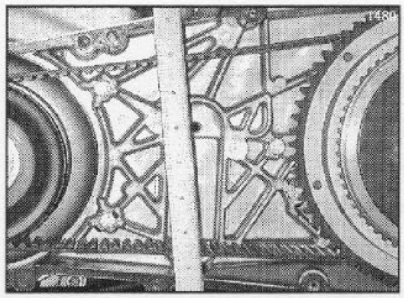
Remove the twelve 1/4″-20 SHCS along the perimeter of the outer primary cover using a 3/16″ hex bit socket. Remove the outer primary cover from the inner.

Inspect the inside of the primary case for belt debris. Thoroughly inspect the belt for excessive wear marks. Inspect the sprockets for excessive wear marks. Replace the belt if excessive wear is found. Diagnose the reason for wear.

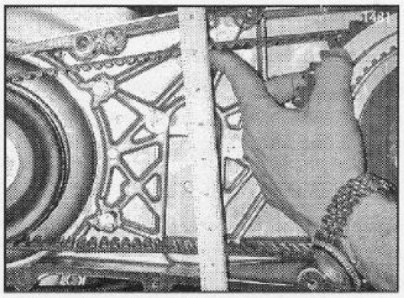
Inspect the tension of the belt when cold. Set the belt tension gauge to 10 pounds. Place the gage at the mid point of the upper belt and deflect upward. Maximum deflection upward is 1/2″. With 10 pounds of deflection force the belt should not contact the inner primary housing.



Belt tension tool

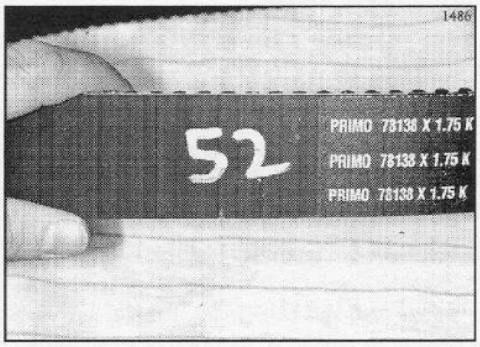


Neutral position of belt



Deflected position of belt

Different belt lengths are available. There is a hand written two digit number on the belt that varies from 38-60, the larger the number the longer the belt. The difference between a 38 belt and a 60 is .030″ in total length – a very small amount. Overall, the belts are very tension tolerant and durable.



Belt removal

Tools required:

12" machinist scale

5/8" hex socket

1⅛" hex socket

1½" hex socket

3/16" hex key

pneumatic impact

torque wrench

If excessive debris and or abnormal wear are found remove the belt. To remove the belt, remove the front sprocket nut. You will need a pneumatic impact wrench and 1½" hex socket.

Once the nut has been removed slip the outer belt guide off the shaft. Inspect the guide for burrs or a bent edge. This may have caused the belt wear. Replace if bent.

Replace the nut finger tight.

Remove the four 5/16" clutch pressure plate nuts using a 5/8" hex socket.

Remove the diaphragm spring, pressure plate and all the clutch plates from the clutch shell.

Remove the 3/4"-18 clutch hub nut using a 1⅛" hex socket and pneumatic wrench.

NOTE: THE NUT IS A LEFT HAND THREAD - TO REMOVE, TURN IN A CLOCKWISE DIRECTION.

Grasp the clutch shell and pull outward. Grasp the belt at the front of the engine sprocket and pull outward. Continue to work the clutch shell and belt until the belt can be removed.

Once the belt has been removed, look for excessive wear marks. Inspect the area of belt contact upon the engine sprocket, clutch shell and belt guides. Replace any parts found to be bent or damaged. Removal of small burrs can be performed without replacing parts.

Sprocket alignment

Check the engine sprocket alignment to the clutch. Return the clutch to the transmission shaft and thread the clutch nut back on. Remember this is a left hand thread nut. To tighten turn the nut to the left. Torque to 70-80 foot pounds using a 1⅛" hex socket.

Tighten the engine sprocket to 100-110 foot pounds using a 1½" hex socket.

Lay a 12" scale or straight edge between the front sprocket and clutch shell. At the two o'clock position on the front sprocket place the place a 12" scale or straight edge. Move the straight edge to be flush with the sprocket edge. The edge of the scale at the clutch shell should be touching the shell for proper alignment.

If adjustment is necessary a shim can be inserted between the front sprocket and rotor.

Shims are available from Primo or Indian.

Install the belt

Remove the engine sprocket nut using a 1½" hex socket and impact wrench.

Remove the clutch nut using a 1⅛" hex socket. **Remember it is left hand threads**. Slip the clutch assembly from the transmission shaft.

Slip the belt onto the clutch shell sprocket. Slip the assembly onto the transmission shaft about 1/2". Lever the belt over the front sprocket. Alternate pushing the drive belt onto the front sprocket whole working the clutch shell all the way until it seats.

Place the outer pulley guide on the front sprocket. Place blue Loctite on the first 1/4" of crankshaft threads. Thread the nut on to the crankshaft. Place a "lockboard" between the front and rear sprockets to keep them from rotating. Torque the front sprocket nut using a 1½" hex socket to 100-110 foot pounds.

Slip the inner hub onto the transmission shaft splines. Apply blue locktite to first 1/4" of transmission shaft threads and thread the left hand nut on. Tighten the nut using a 1⅛" hex socket to 70-80 foot pounds.

Slip a steel clutch plate into the clutch. Align the plate fingers to the shell fingers. Follow this with a fiber plate and alternate between steel and fiber plates until all are installed.

Install the pressure plate, diaphragm spring (cupped surface towards the inside of clutch), new locking tabs and the shoulder nuts.

Finger start the four shoulder nuts. Tighten the shoulder nuts equally until they bottom. Using a cross pattern and 5/8" hex socket, torque to 24-36 inch pounds (2-3 foot pounds).

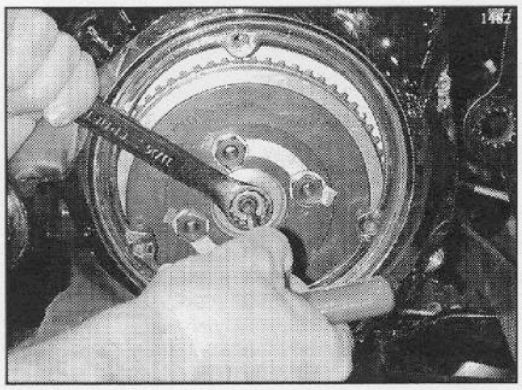
Bend the locking tabs around the shoulder nuts.

Before installing the clutch adjustment screw, apply grease to the dished end of the screw where it contacts the pushrod. Continue applying grease along the non-threaded section.

Apply blue loctite to the first 1/4" of threads.

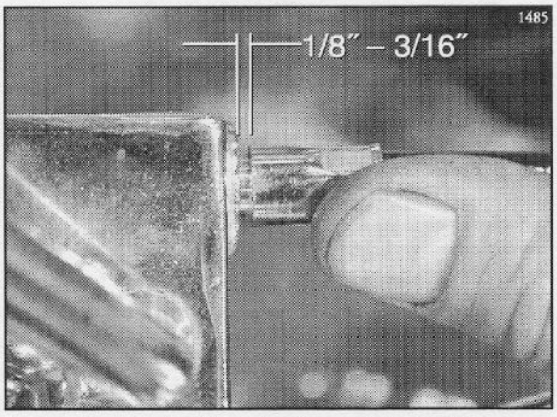
Using a 3/16″ hex key thread the adjusting screw inward (clockwise) until it touches the push rod inside the transmission. Continue threading inward until the diaphragm spring can be turned by hand. Back the screw out (counterclockwise) until it is free turning. Slowly turn the screw inward again (clockwise) until resistance is felt. The adjustment screw should be just touching the clutch push rod. Back the screw out (counterclockwise) 1/2-3/4 turn.

Finger tighten the jam nut. Slip the boxed end of an 11/16″ combination wrench over the jam nut. The key to preserving the correct adjustment is to prevent the adjustment screw from moving while tightening the jam nut. Tighten the jam nut while holding the screw with the hex key. Torque the jam nut to 6-10 foot pounds using a 11/16″ hex socket and torque wrench



Hold the adjusting screw while tightening the jam nut

Pull the clutch lever on the handlebar a few times. Check the gap between the clutch cable ferrule and bracket by pulling the clutch cable away from the housing. The air gap should be approximately 1/8-3/16″. Adjust the clutch again to achieve the correct air gap.



Air gap between clutch lever housing and clutch cable

Excessive air gap may not let the clutch fully disengage and cause rough shifting and the bike to creep forward when in gear while the engine is idling. A small air gap or none at all may cause the clutch to slip under acceleration.

Install the outer primary cover.

Apply blue Loctite to the first 1/4″ of threads on all 12 primary cover bolts. Make sure all the bolts have 1/4″ A.N. washers before installation into the outer primary cover.

Around the perimeter of the inner primary case are 2 dowel pins. These are used to align the outer primary cover to the inner. Approximately 3/4″ from the left pin is a threaded hole. Starting here place a 1/4″-20 x 2″ length bolt in the outer primary cover. Continuing clockwise place the remaining four 2″ long bolts in the outer cover.

In the other 7 holes thread the 1/4″-20 x 1¼″ bolts in. Torque the bolts in a "w" pattern to 8-10 foot pounds using a 3/16″ hex bit socket.

Adjust rear drive belt

Tools required:

Belt tension tool

15/16" hex socket

15/16" box end wrench

1/2" hex socket

3mm hex key

1⅛" centering socket

15/16" centering socket

Alignment gauge

Torque wrench

Place a jack under the bike at the transmission cross member. Lift the bike to where the rear tire is off the ground 1" or so.

On the lower rung of the rear drive belt find a distance halfway between the transmission shaft and the rear wheel axle. This point will be approximately 1" aft of the lower swing arm rocker.

Using the belt tension tool placed at the halfway point apply 10 foot pounds of force upon the belt deflecting it upward. Measure this distance. The correct deflection value is 3/8"-1/2".

Rotate the tire 1/2" a revolution and check the belt tension again. Do this a few more times. You may find some tight and loose spots, yet, the measurements should fall within the 3/8"-1/2" range.

If adjustment is required loosen the rear axle using a 15/16" hex socket, ratchet and 15/16" combination wrench.

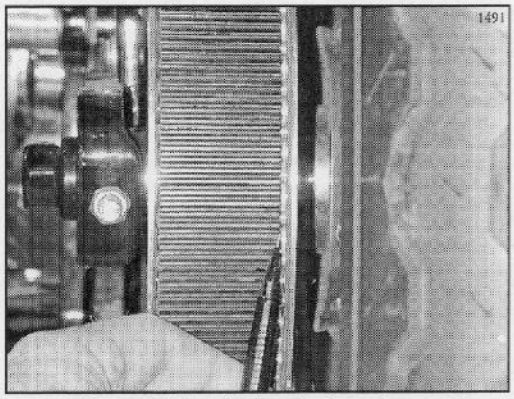
Loosen or tighten the axle adjuster nuts according to the required need. Remember loosen or tighten the nuts in equal increments. Use a 1/2" hex wrench for the axle adjusters.

If the belt requires loosing make sure that after backing off the adjusters the axle has slid forward on both the left and right side.

Tighten the axle nut using the 15/16" tools. Torque to 60-65 foot pounds. Check the tension again in 3 or 4 places along the belt.

Belt tracking

Spin the tire in a forward rotation and check for tracking of the drive belt to the rear sprocket. The belt should slowly track to left side of the sprocket with approximately 15 rotations of the rear tire. Spinning the tire backward will cause the belt to track to the right.

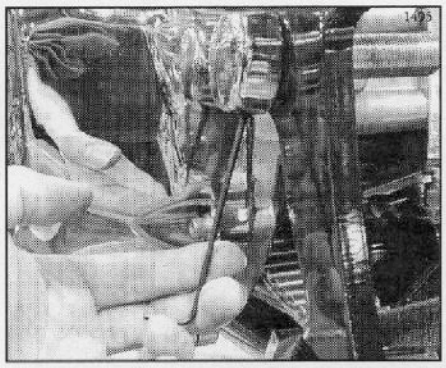


Note gap between belt and right side of sprocket

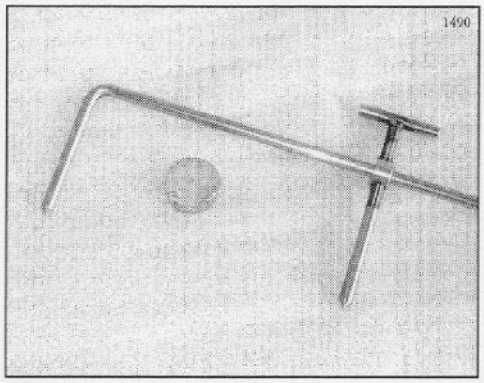
If adjustment is required tighten or loosen the axle adjuster nuts to achieve the correct belt tracking. The belt tension will require a recheck also.

Rear wheel alignment

Remove the two swingarm pivot bolt covers using a 3mm hex key.

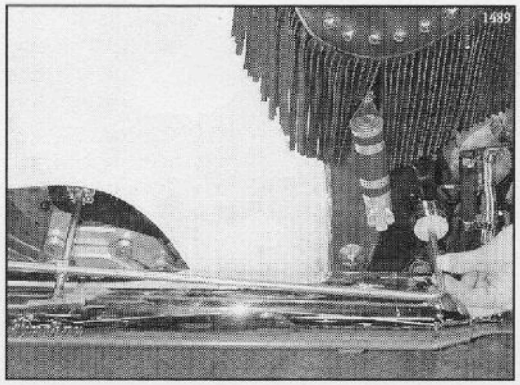


Slip the 1⅛" centering socket on the left pivot bolt and the 15/16" centering socket on the left rear axle bolt.



Centering socket and alignment gauge

Using the alignment gauge check the center-to-center distance of the swingarm pivot bolt to the axle.



Remove the two centering sockets and transfer them to the right side pivot bolt and axle nut. Check the center-to-center distance. Compare the left side distance to the right side distance. Maximum difference should be 1/8″. If greater than 1/8″ reduce the offset by adjusting the axle nuts with a 1/2″ hex wrench.

After adjustment check the belt tracking as performed in the previous section.

Lubrication of shift rod pivot points

Frequent lubrication of the shift rod pivot points decreases wear and reduces the effort required to shift the transmission. Many transmissions are blamed for rough shifting when the real reason lies in the bushings being dry or worn out.

Tools required:

1/2″ box end wrench

3/16″ hex key

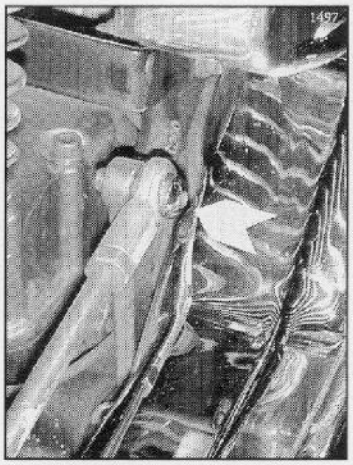
1/4″ hex key

1/2″ box end wrench

ratchet

torque wrench

Before removal of the shift rod pivot bolts check for clearance between the primary case and the rear button head bolt. Rock the heal shifter down and hold. The button head should not be touching the inner primary case. Interference between the two can cause hard or missed up shifts.



Check for clearance between the inner primary and bolt head.

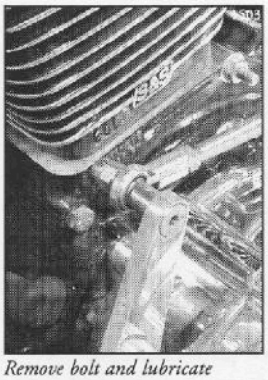
If interference is detected the transmission shift lever may not be seated deeply enough or the lever inclination may not be correct.

Loosen the shift lever pinch bolt using a 1/4″ hex key. Push the shift lever inward creating clearance between the inner primary cover and button head pivot bolt. If this does not provide clearance remove the shift lever and index it 1 spline counterclockwise.

Tighten the pinch bolt using a 1/4″ hex key. Torque to 18-20 foot pounds.

Shift rod pivot points lubrication

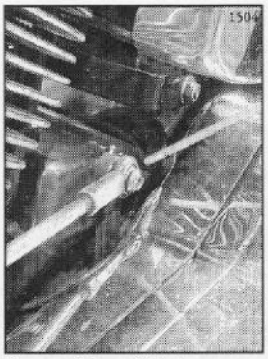
Remove the front flat head pivot bolt from the shift shaft using a 3/16″ hex key and 1/2″ box end wrench. Place grease on the pivot points being careful not to get any on the end of the threads. Place a drop of blue Loctite in the acorn nut threads.



Remove bolt and lubricate

Tighten using a 3/16″ hex key and 1/2″ box end wrench. Torque to 13-19 foot pounds.

Remove the rear button head pivot bolt using a 3/16″ hex key. Place grease on the pivot point. Again be careful to not get any grease on the end of the bolt threads. Place a drop of blue Loctite on the end of the threads. Tighten using a 3/16″ hex key. Torque to 13-19 foot pounds.

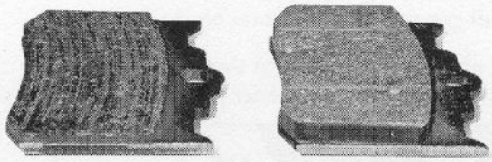


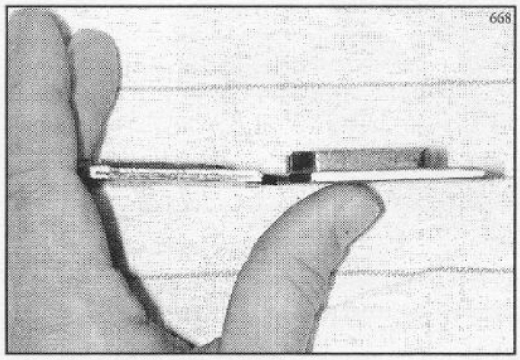
Remove bolt and lubricate

Inspect brake pads, discs and rear master cylinder rod free play

With different riding conditions and habits brake pad wear can be quite different for each rider. Indian motorcycle has no minimum mileage specification for brake pad wear. If the customer is having trouble with rapid wear different pad compositions are available through the aftermarket.

Initial inspection of the pads should be performed at 500 miles and subsequent inspection at every 2500 miles. Pads should be replaced when the lining thickness becomes 1/16" or less. Never change just one pad in a caliper, they must be replaced in sets.

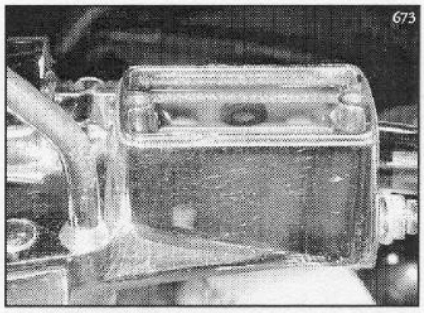

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If a pad change is required an initial "bedding in" is necessary. The bedding in should be performed in the dealer's motorcycle parking lot by the mechanic. If the rear pads are being bedded in, pull the clutch in while braking. This prevents wheel hop.

Bring the motorcycle to 20-30 MPH and apply the brakes moderately – do not lock the brakes. Do this 20-30 times and let the brakes cool for 10 minutes. Perform another 5-10 stops. Again, do not lock the brakes. This process should remove any old pad material from the rotor and seat them to the disc. Rotors with deep groves will require more miles on the bike to fully seat the pads.

Check the fluid level in the reservoir. Add D.O.T. 5 hydraulic brake fluid if low. Fill to 1/4" below the top of the reservoir.


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Fill to 1/4" below top edge of reservoir

WARNING – USE ONLY DOT 5 BRAKE FLUID. D.O.T 5 fluid is silicone based and not compatible with D.O.T 3, 4 or 5.1. Damage to the brake system will occur if you install any other fluid.

Rear pad removal and replacement

Tools required:

1/8" hex bit socket

1/4" hex bit socket

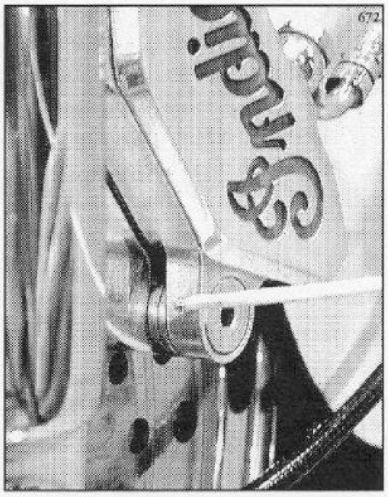
7/32" hex bit socket

Large flat blade screwdriver

Ratchet

Torque wrench

Remove the two 3/8" flat heads bolts using a 7/32" hex bit socket. Each bolt contains shims which center the caliper to the disc. Carefully remove only one bolt at a time and collect the shims. Do not mix the shims, they must remain in their respective positions relative to the caliper.


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Shim between hanger and caliper (front caliper)

Slip the caliper from the disc.

Remove the brake pad retaining pin from the caliper using a 1/4" hex bit socket. Remove the pads from the caliper.

Before retracting the caliper pistons into the caliper be sure to thoroughly wipe the brake dust, dirt and grime from the pistons. Cleaning greatly reduces the chance of foreign particles being ingested into the piston seals. Foreign matter may cause the seals to leak or seize the pistons.

Return the old pads to the caliper.

Place a brake spreader between the old pads. Retract the pistons into the caliper. If the pistons will not retract completely the master cylinder may be full of fluid. Remove some of the brake fluid from the master cylinder.

Install the new pads in the caliper. Make sure the pad friction material is facing each other.

Align the retaining pin to the pad through hole. Tighten the retaining pin using a 1/4" hex bit socket. Torque to 180 inch pounds (15 foot pounds).

Slip the caliper on to the disc and align with the hanger mounting holes. Slide the shims between the caliper and hanger. Be sure the shims removed from the rear mounting position are returned to the rear. The same applies to the front shims.

Slip the flat head bolts through the caliper holes than the shims and thread into the hanger. Tighten using a 1/4" hex bit socket. Torque to 25-30 foot pounds.

Remove the two reservoir cap flat heads using a 1/8" hex key. Check the fluid level in the reservoir. Add D.O.T. 5 hydraulic brake fluid if low to 1/4" below the top of the reservoir.

WARNING – USE ONLY DOT 5 BRAKE FLUID. D.O.T 5 fluid is silicone based and not compatible with D.O.T 3, 4 or 5.1. Damage to the brake system will occur if you install any other fluid.

Front pad removal and installation

Tools required:

1/4" hex bit socket

7/32" hex bit socket

#2 phillips screwdriver

Large flat blade screwdriver

Ratchet

Torque wrench

Assembly and disassembly for the front is the same as the rear. Again, **do not mix the shims**. Make sure the upper set of shims is returned to the upper mount hole and the lower shims remain with the lower mount.

Remove the two reservoir cap screws using a #2 phillips screwdriver. Check the fluid level in the reservoir. Add D.O.T. 5 hydraulic brake fluid if low fill to 1/4" below the top of the reservoir.

Rear master cylinder push rod free play

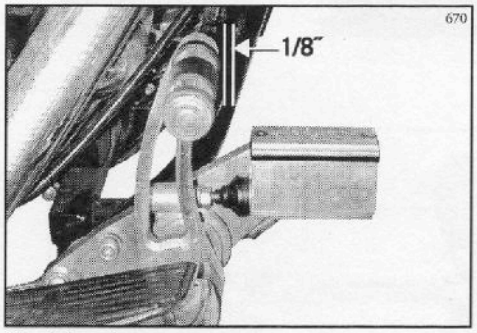
Tools required:

1/2" open end wrench

pliers

Grasp the brake pedal with your thumb and index finger. Gently move the pedal forward and backward. You should feel a small amount of free play between the push rod and master cylinder piston. You will not be able to see the air gap since the dust cover blocks the view.

Free play should be a 1/8" at the pedal. Free play is adjusted at the master cylinder push rod.



Check free play

Excessive play will allow the pedal to vibrate excessively. No play and the pedal may be actuating the brakes.

Adjust the rod by loosening the hex nut using a 1/2" open end wrench. Grasp the rod with you finger and turn in a clockwise direction to decrease the play or counterclockwise to increase the play.

Tighten the hex nut using a 1/2" open end wrench. You may need a pair of pliers to keep the rod from turning while tightening.

Brake fluid level and condition

Brake fluid level and condition must be checked at the 500 mile mark and at each 2500 mile interval.

Indian motorcycles use a DOT 5 silicone based fluid, which is purple in color. **Never use a DOT 3 or 4 glycol based fluid in the system.** The fluids are not compatible and clots will form in the brake system if mixed. If mixed, the brake system will require flushing and the rubber seals in the caliper and master cylinder will require replacing.

Front master cylinder

Tools required:

#2 phillips screwdriver

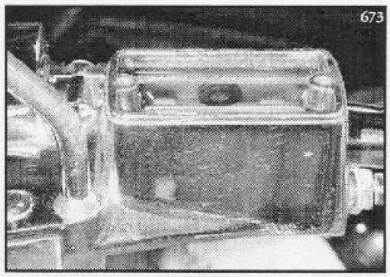
Clean the top of the master cylinder removing any debris.

Remove the cap from the front brake master cylinder located on the right handlebar using a #2 phillips screwdriver.

View the bottom of the reservoir for any debris. Remove and flush the system if found.

The fluid level should be within a 1/4" from the top of the reservoir. Add fluid if needed.

Remember, only purple colored DOT 5 fluid can be added.



Fill to 1/4" below the top edge of the reservoir

Return the cap and seal to the top of the reservoir. Tighten using a #2 phillips screwdriver. Torque to 10-15 inch pounds.

Rear master cylinder

Tools required:

1/8" tee handle hex bit

Clean the top of the master cylinder removing any debris.

Remove the cap from the rear brake master cylinder located on the right foot control using a 1/8" hex key.

View the bottom of the reservoir for any debris. Remove and flush the system if found.

The fluid level should be within a 1/4" from the top of the reservoir. Add fluid if needed.

Remember, only purple colored DOT 5 fluid can be added.

Return the cap and seal to the top of the reservoir. Tighten using a 1/8" hex key.

Torque to 30-40 inch pounds.

WARNING – USE ONLY DOT 5 BRAKE FLUID. D.O.T 5 fluid is silicone based and not compatible with D.O.T 3, 4 or 5.1. Damage to the brake system will occur if you install any other fluid.

Inspect oil & brake lines for leaks

Check all oil lines for leakage at the attachment points. There are 11 check points.

Oil bag – 4 points

Oil pump – 2 points

Oil filter – 2 points

Engine block – 2 points

Frame – 1 point

Oil bag

Tools required:

1/4" flat blade screwdriver

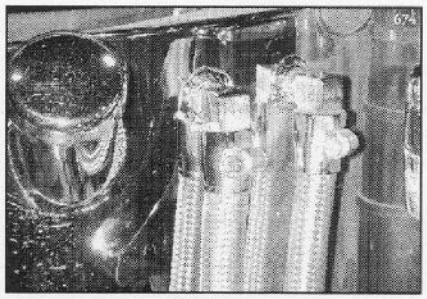
1/2" open end wrench

9/16" open end wrench

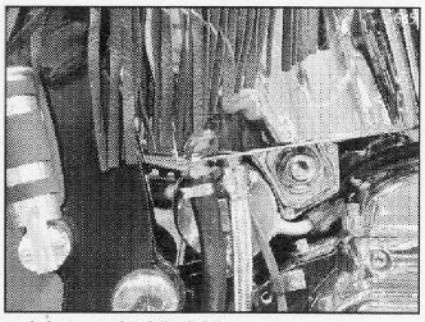
Torque wrench

The oil bag has 4 points of inspection. The straight and 90° fittings can be tightened with a either a 1/2" or 9/16" box end wrench. Tighten to 10-12 foot pounds. If torquing to spec does not stop the leak remove the fitting and reapply a thread sealant with Teflon to the threads.

The rubber hoses attached to the fitting may leak also. Tighten the worm clamps to 15 inch pounds using a flat blade screwdriver.



Oil return and vent fittings.



Oil drain and oil feed fittings.

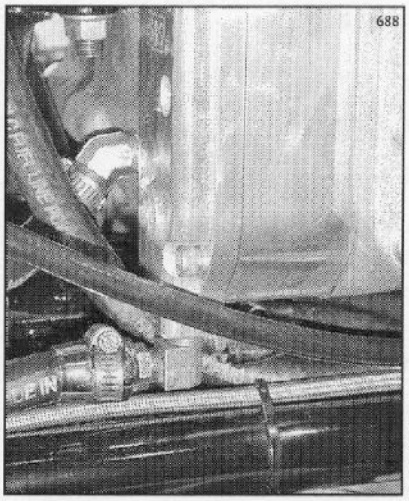
Oil pump

Tools required:

1/4" flat blade screwdriver

1/2" open end wrench

The oil pump has 2 points of inspection. Tighten the fitting using a 1/2" tappet wrench. Tighten the worm clamp using a 1/4" flat blade screwdriver. If torquing to spec does not stop the leak remove the fitting and reapply a thread sealant with Teflon to the threads.



Lower return fitting on oil pump & engine crankcase breather fitting.

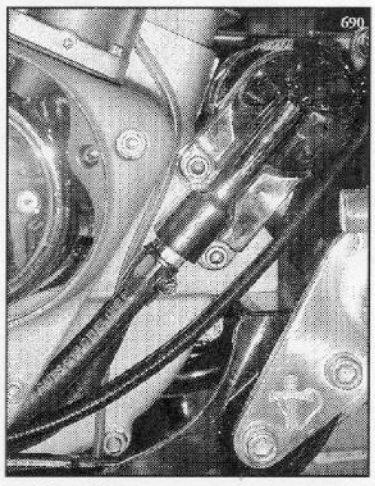
Oil filter

Tools required:

1/4" flat blade screwdriver

9/16" open end wrench

The oil filter has 2 points of inspection. Tighten the fitting using a 9/16" open end wrench. Tighten the worm clamp using a 1/4" flat blade screwdriver. If torquing to spec does not stop the leak remove the fitting and reapply a thread sealant with Teflon to the threads.



Oil filter fittings

Engine block

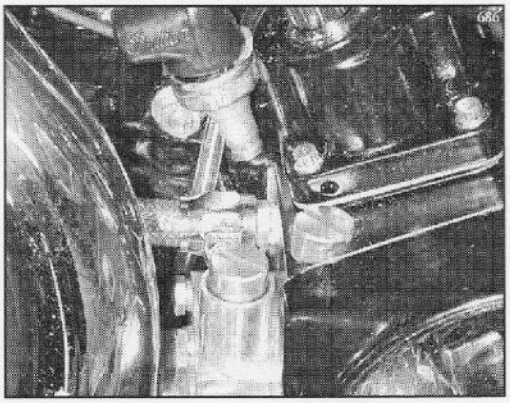
Tools required:

1/4" flat blade screwdriver

1/2" open end wrench

14mm open end wrench

The engine block has 2 points of inspection. Tighten the fitting above the oil pump using a 1/2" open end wrench. If torquing to spec does not stop the leak remove the fitting and reapply a thread sealant with Teflon to the threads.



The lower fitting can be tightened using a 14mm open end wrench. This wrench and a 9/16" are not a tight fit. The 14mm is slightly tighter than a 9/16". Use care when tightening. If torquing to spec does not stop the leak remove the fitting and reapply a thread sealant with Teflon to the threads.

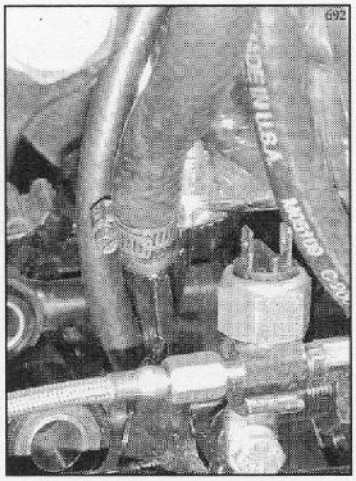
Tighten the worm clamp using a 1/4" flat blade screwdriver.

Frame

Tools required:

1/4" flat blade screwdriver

The frame has 1 point of inspection. Located below the right rear of the oil tank on the lower frame tube cross member is oil tank drain line. Tighten the worm clamp using a 1/4" flat screwdriver.



Oil bag drain line attached to frame.

Brake line inspection

View all the of the front and rear brake lines joints looking for leakage. Tighten the joint if leakage is found.

Front brake master cylinder adaptor – 20 foot pounds

Front brake line connectors – 12-15 foot pounds

Front caliper adaptor – 18-20 foot pounds

Rear brake line fittings – 18-22 foot pounds

Rear brake line connectors – 12-15 foot pounds

If leakage is still detected replace the crush washers and apply hydraulic line sealant to the threads of the joint.

Throttle cable, Clutch cable Inspection and Lubrication

The Indian Chief uses a push/pull throttle arrangement. Inspection should be at the 500 mile mark Lubrication of the cables should be performed yearly or sooner if extra effect is detected in operating.

View the throttle cables throughout their entire length. Make sure they are not kinked or chafed. For safety sake replace the cables if any defects are found.

Throttle cable lubrication

Tools required:

5/32" Tee handled hex key

3/8" open end wrench

Cable luber, "Champion's Choice" brand



Spray lubricant and cable lube tool

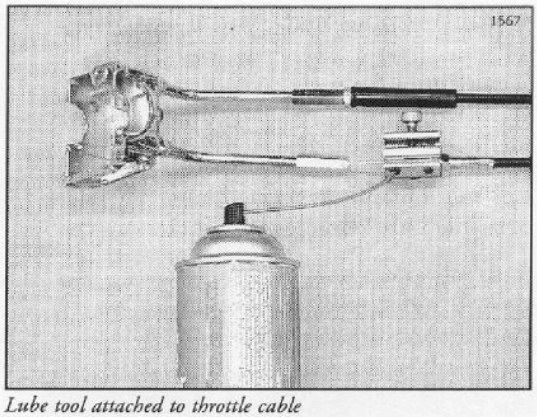
Loosen the button heads holding the cap to the brake lever bracket using a 5/32" (or 4mm) tee handled hex key. Slide the lever away from the throttle/switch housing.

Remove the throttle/switch housing bolts using a 5/32" (or 4mm) tee handle hex bit. Slowly remove the top housing – be careful the throttle cable ends have small ferrules slipped on.

Remove the ferrules from the cables.

At the throttle cable adjustment nut pull the spring sheath exposing the cable. Install the lube tool on to the cable and sheath. Lubricate the cable with *"Champions Choice"* brand or equivalent spray product.

Lube the second throttle cable.



Lube tool attached to throttle cable

Apply a small amount of blue Loctite to the two throttle housing cap screws.

Apply a small amount of grease to the cable ferrules. Slip the ferrules onto the cable balls.

Slip the balls into the throttle pipe and make sure the throttle pipe is seated correctly in the lower housing.

Gently place the top throttle housing on to the bottom. Thread the 2 socket head cap screws in to the housing and tighten very lightly. Rotate the throttle checking for proper rotation.

Align the throttle/switch housing to have the parting line be parallel with the ground.

Tighten the two throttle housing bolts using a 5/32" (or 4mm) tee handle hex bit.

Again check for proper throttle rotation.

Remove the two brake lever brake lever bracket screws one at a time and apply blue loctite to the threads.

Replace the screws.

Pull the brake lever to the handle bar and slide the brake assembly into the throttle/switch housing. Failure to pull the lever before sliding will damage the brake light switch.

Release the brake lever. Tighten the two brake bracket screws using a 5/32" (or 4mm) tee handle hex bit.

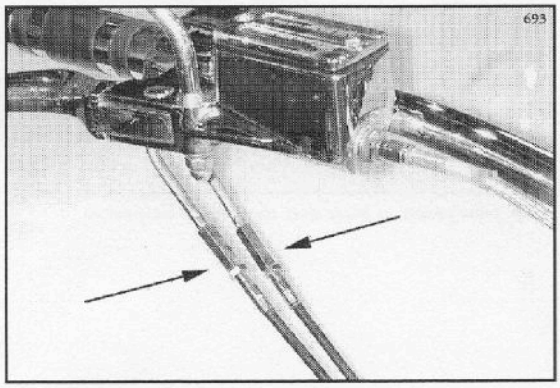
Check the operation of the brake lever and throttle again.

Throttle cable adjustment

Tools required:

5/16" or 8mm open end wrench

Adjustment of throttle cable free play is accomplished using the threaded adjusters located under the throttle/switch housing.



Throttle cable adjustment

Before adjustment move the handlebars all the way to the left fork stop and access the free play. Rotate the handlebars to the right fork stop and access free play. Determine in which position the throttle has the least free play and leave the handlebars there.

The front cable opens the throttle plate. Loosen the jam nut on the front cable adjuster using a 5/16" or 8mm open end wrench. If less free play is needed in the cable rotate the adjuster to advance toward the cable. Tighten the jam nut. Rotate the throttle and check the free play. Rotate the handlebars back and forth a few times and check free play again at the fork stops. Adjust again if necessary. There should be a minimal amount of free play in the throttle.

Start the engine and let it idle. Move the handlebars left and right to the fork stops. The RPM of the engine should not increase. If it does, loosen the forward throttle cable adjuster until the engine RPM does not rise when the handlebars are turned.

Once the front (carb opening) cable has been adjusted check the free play of the rear (carb closing) cable. View the carburetor. The cables are retained by two chrome upright tubes. The long tube houses the closing cable and has a spring. The spring is there to take up free play and act as a cushion.

Adjust the cable to compress the spring slightly when the handlebars are aimed straight ahead. The spring will take up any tightening of the cable when the handlebars are turned to the fork stops.

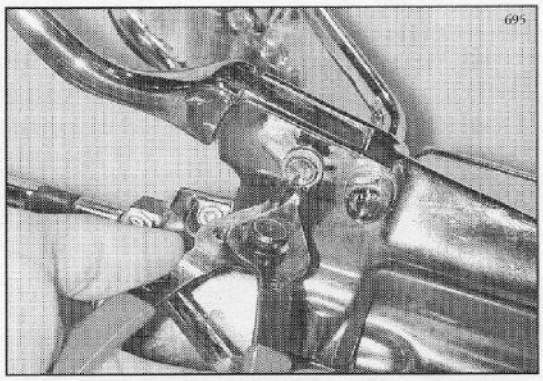
Clutch cable inspection and lubrication

Inspect the clutch cable through out the entire length. Make sure it is not kinked or chafed. Replace cable if found defective.

Tools required:

External snap ring pliers with .050" tips

Remove the retaining ring from the bottom of the clutch lever pivot pin using external snap ring pliers with .050" tips.



Push the pivot out of the bracket.

Slowly pull the lever away from the handlebars. Hold the plastic bushings from falling out of the lever. Extract the cable from the bushings and return the lever and plastic bushings to the bracket.

Place the *"Champions Choice"* brand cable luber on the cable. Lubricate the cable with *"Champions Choice"* cable lubricant or equal product.

Slowly pull the lever out of the bracket and slip the cable between the plastic bushings.

Align the lever pivot hole to the bracket hole and slip the pivot pin through.

Place the snap ring onto the bottom of the pivot pin using the external snap ring pliers.

Clutch and brake lever pivot point lubrication

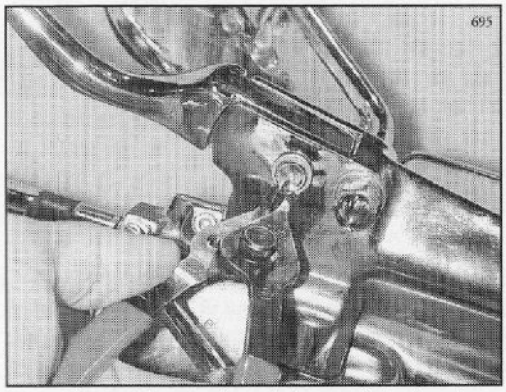
Tools required:

snap ring pliers with .050" dia. tips

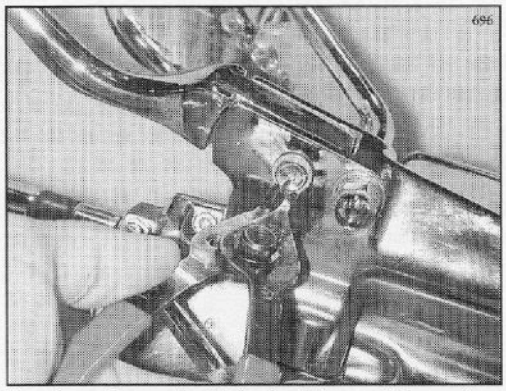
Clutch lever pivot

Remove the snap ring from the bottom of the clutch lever pivot pin using snap ring pliers with .050" dia. tips. Remove the pivot pin from the bracket. Slowly pull the clutch lever from bracket. Remove the cable from the pivot and lube with grease. Replace the pivot in the lever.

Place a small amount of grease on the pivot pin. Return the pivot pin to the clutch lever and replace the snap ring.



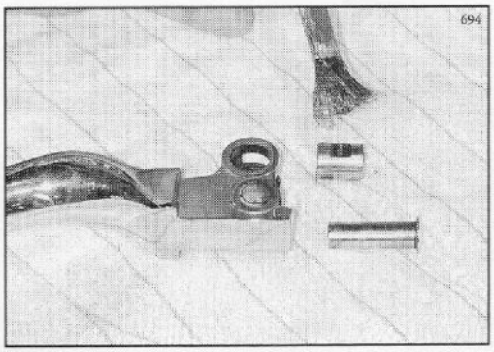
Remove the retaining ring from the bottom of the pivot pin



Two pivot points require lubrication. The second pivot point is attached to the clutch cable.

Brake lever pivot

Use the above instructions for the Clutch Lever Pivot.



Two pivot points on brake lever that require lubrication.

Clutch Adjustment

Proper clutch adjustment is required to insure proper disengagement and engagement of the clutch. Excessive air gap may not fully disengage the clutch causing rough shifting and may cause the bike to creep forward while at a stop light. A small air gap or none at all may cause the clutch to slip under acceleration.

Tools required:

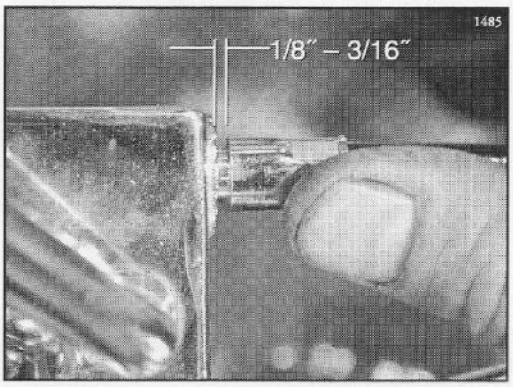
3/16" tee handled hex bit

11/16" box end hex wrench

11/16" hex socket

torque wrench

Pull the lever on the handlebar a few times. Grasp the cable and pull it away from the clutch bracket. Measure the air gap. Specification is 1/8"-3/16".

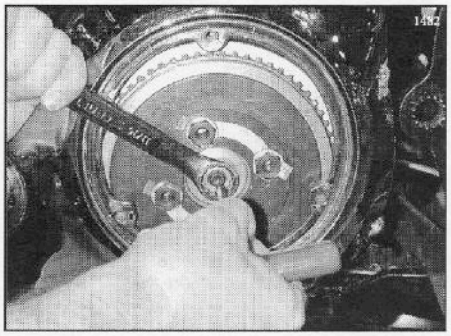


If adjustment is required remove the derby cover from the outer primary cover. Use a 3/16" tee handled hex bit to remove the three 1/4" socket head screws.

Loosen the adjusting screw jam nut using a 11/16" hex socket.

Using a 3/16" tee handled hex key turn the rod to achieve the correct 1/8-3/16" air gap at the clutch cable. Turning the screw inward (clockwise) reduces the air gap while turning it out (counterclockwise) increases the air gap. Typically the adjusting screw is run inward until it gently contacts the transmission push rod. Turn the screw outward (counterclockwise) 1/2-3/4 of a turn. This procedure typically produces the desired air gap.

Place a 11/16" box end hex wrench on the jam nut. Insert the 3/16" tee handled hex bit into the adjusting screw. The key to preserving the correct adjustment is to prevent the adjusting screw from moving while tightening the jam nut. Tighten the jam nut while holding the tee. Torque the jam nut to 6-10 foot pounds using a 11/16" hex socket.



Pull the clutch lever a few times and recheck the air gap. Adjust the clutch again if the correct air gap has not been achieved.

Place blue Loctite on the first 1/4" of threads of the three 1/4" socket head bolts.

Align the derby cover to the outer primary. Thread the three bolts into the holes and tighten using a 3/16" hex bit socket. Torque to 8-10 foot pounds.

Inspect and adjust carburetor idle mixture, idle RPM and accelerator pump

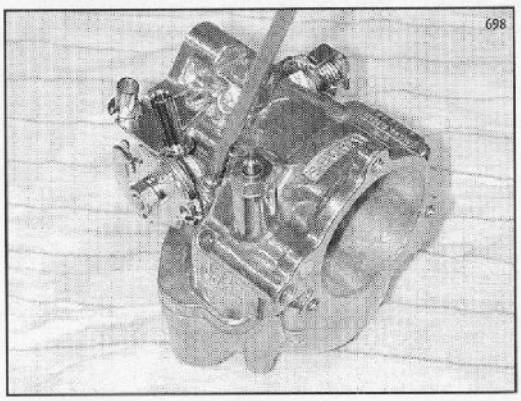
Tools required:

12" long x 1/4" wide flat blade screwdriver

The S&S Super E carburetor (1⅞" bore) is supplied on all Indian 88 c.i. engines. An enrichment/fast idle circuit is used for starting and warm up. The enrichment device utilizes separate air and fuel pickup passageways and is engaged by pushing down the fast idle lever for 49 state bikes or by pulling up the brass washer on California models.

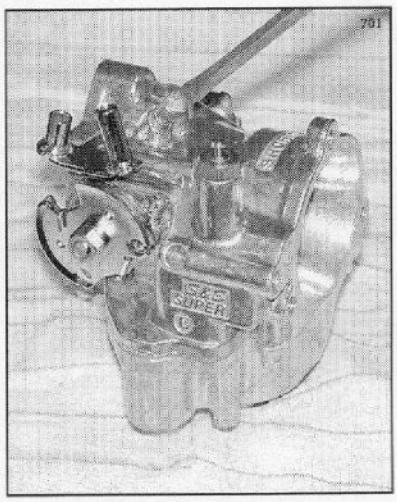
Warm the engine to operating temperature. Make sure the enrichment lever is fully closed.

The engine should idle between 800-1000 RPM. If adjustment is needed turn the RPM adjustment screw located beside the throttle spool using the 12" long x 1/4" wide flat blade screwdriver.



Idle adjustment screw

Identify the low speed mixture screw. It is brass with a cross cut (+). Turn the screw clockwise, slowly leaning the mixture until the engine starts to die. Mentally note the position. Turn the screw counterclockwise, slowly enriching the mixture until engine RPM starts to decrease. The engine RPM should increase then decrease. Mentally note the position. Turn the screw half way between the two points.



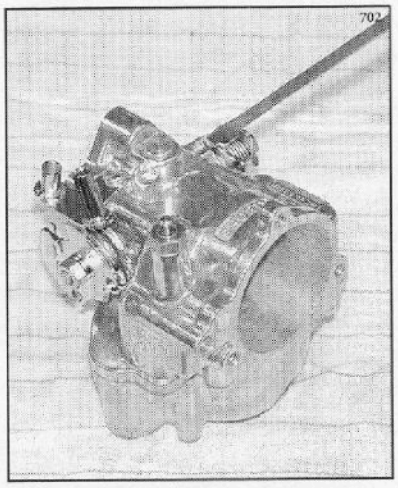
Low speed mixture adjustment screw

Typically this neutral position is approximately 1/4 to 1/2 turn out from the lean side of the adjustment range or 1¼-1¾ turns out from the fully seated position.

Idle circuit notes. If the idle adjustments are made before the engine is fully warmed the idle mixture will be rich when the engine reaches operating temperature.

Accelerator pump adjustment

The function of the accelerator pump is to improve throttle response when rapidly opening the throttle at low RPM. The adjuster screw regulates the volume of fuel delivered by the accelerator pump. Turning the adjusting screw inward or clockwise decreases the volume of fuel. Turning the screw outward or counterclockwise increases the volume of fuel.



Accelerator pump adjustment screw

Turn the pump adjusting screw, located on the right side of the carburetor, inward (clockwise) slowly until it gently contacts the pump actuator arm. In this condition the pump is shut off. Do not use excessive force to seat the screw. Rotate the screw outward (counter clockwise) 2-2½ turns.

With the engine warm and idling, blip the throttle and note the response. If the engine hesitates turn the screw outward 1/4 of a turn and check the throttle response. Adjust until no hesitation occurs. Road test the bike noting the throttle response at 500 RPM increments from idle to 3000-3500 RPM.

Minimum pump stroke is recommended to conserve fuel, prevent spark plug fouling and reduce black smoke emitting from the exhaust pipes.

Clean the petcock screen and Inspect the fuel line joints for leaks

Just like the engine the fuel tank will contain small amounts of debris that need removal.

Removal of the petcock to clean the screen is required at the 500 mile mark and at each 5000 miles there after. The inline paper filter requires changing at the 500 mark and at each 5000 miles or sooner if needed.

Proper fuel flow to the carburetor is needed to maintain the correct float bowl fuel height. The fuel flow of the stock petcock with no filter is approximately 61 ounces per minute. Flow with the filter is approximately cut in half to 32 ounces (1 quart) per minute. At 32 ounces per minute this is approximately 3-4 times what the engine will consume while accelerating hard in first gear and 10 times what is need to cruise at 60 MPH. This is an adequate reserve, yet, if the petcock or filter become restricted, engine acceleration may become soft or the engine may cough. At highway speeds the engine may not receive enough fuel and act like it is running out gas. Flipping to reserve may correct the problem by allowing more fuel to reach the carburetor, but, the problem will reappear when the fuel in the tanks gets to the reserve level.

Tools required:

side cutters

1" open end wrench

straight jaw pincer

Petcock cleaning

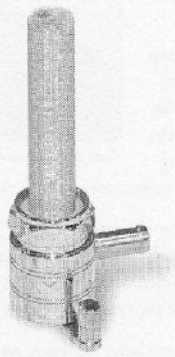
Turn the petcock to the off position. Place a clamp on the fuel crossover tube located between the left and right fuel tanks.

Cut the ear clamp (crimp clamp) from the fuel line at the petcock using the side cutters.

Attach a 3' length of fuel line to the petcock. Drain the fuel from the left tank into a gasoline can. Remove the drain line from the petcock.

Loosen the petcock nut using a 1" open end wrench. Hold the petcock while turning the nut. Pull the petcock from the gas tank.

Clean the screen using a tank solvent. Stubborn material can sometimes be removed with carburetor cleaner.



Petcock screen

Note: The petcock nut is both left and right hand thread. The gas tank has right hand threads and the petcock left hand threads.

Before returning the clean petcock to the gas tank remove the nut using a clockwise rotation (left hand threads). Rethread the nut back on to the petcock only 1/2 a revolution using a counterclockwise rotation.

Insert the petcock into the tank. Turn the nut clockwise while applying slight upward pressure. This technique should engage an equal amount of threads in both the gas tank and the petcock.

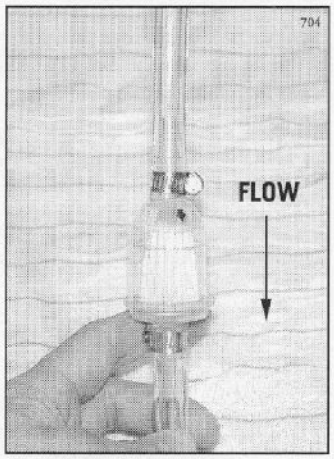
Rotate the petcock lever to the on position. Align the petcock lever to point toward the gas tank. Tighten the nut using a 1" open end wrench to 72 inch pounds.

Filter changing

Cut the ear clamp (crimp clamp) from the fuel line at the base of the carburetor using the side cutters. Remove the fuel line from the carburetor.

Pull the fuel line upward through the cylinders.

Cut the two ear clamps used to retain the fuel filter and remove the fuel lines.



Fuel flow direction through filter

Observe the fuel filter for a directional arrow. The arrow indicates the direction of fuel flow.

Slip a 14mm (9/16″) ear clamp on the 9″ length fuel line. Slip the fuel filter into the fuel line making sure the arrow points away from the line.

Slip a 14mm ear clamp on the 11″ fuel line. Slip the fuel line onto the fuel filter. Slide the ear clamps to within 1/8″ of the bottom of the fuel line and crimp both using the straight jaw pincers.

Slip a 14mm ear clamp on each end of the fuel line. Feed the 11″ line between the cylinders and through the circular chrome fuel line guide. Attach it to the carburetor fitting.

Slip the 9″ section upon the petcock. Slide the two ear clamps to approximately 1/8″ from the end of the fuel line. Crimp both clamps using the straight jaw pinchers.

Remove the clamp from the cross over tube.

Fuel line leak inspection

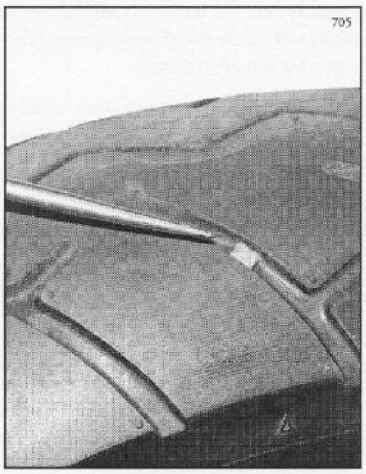
Turn the petcock to the on position and view all joints for leakage. Tighten any joint found leaking.

Inspect the petcock for leakage. If the petcock mechanism is leaking replace the unit.

Tire inspection and pressure check

Tires are critical to the handling performance of the motorcycle. Tire pressures should be checked weekly and the visually inspected at the first 500 mile check.

Tire wear indicators are required by law. These indicators are located in a minimum of six places on the tread circumference and become visible at a tread depth of approximately 1/16″ at which point the tire is considered worn out and should be replaced. The tread wear indicators are located in the tire sips and appear as a solid band.



Wear indicator painted for clarity.

Please remember, just because a tire has not reached the tread wear indicators do not mean the tire's handling characteristics are not affected. A rear tire used primary for touring typically wears in the center creating squared edges. This square edge wear pattern my cause an odd feeling when the bike is asked to lean over. The tire should be replaced if any odd handling is encountered.

Front tire wear typically occurs off center and produces steps at the water drain sips. When leaned over these steps can cause the handlebars to oscillate producing a weave of the motorcycle. Again, the tire does not have to be worn down to the wear bar indicators for this to occur. Prompt replacement of the tire typically restores handing back to as new condition.

Proper inflation pressure is critical to tire longevity. Low inflation pressure will cause the tire to built up heat and break down the sidewall and tread. In extreme cases the tire will form a bubble between the cords and rubber. When this occurs a tread section may tear away from the tire, inducing a vibration, progressively get worse leading to a flat tire at speed – a dangerous situation.

Always adhere to the tire manufacturer's suggested pressures taking into consideration the weight of motorcycle, weight of passengers and conditions.

As the tire heats up the air inside the tire will expand. This heated air raises the tire pressure. Typically this rise is on the order of 2-6 psi with the bike fully loaded and traveling at high speeds on a 90 degree day.

Based on Firestone Tires recommendations the Indian Chief should run:

Front tire	130-90 16 67H at 42 psi
Rear tire	130-90 16 73H at 42 psi

Tire pressures should be checked when the tires are COLD.

Again, hot tires will show a pressure increase. Do not let air out of a hot tire to bring it down to the cold pressure setting. Releasing air will allow the tire to heat even further and possibly lead to failure.

Tire inspection

Visually inspect the tire for any cuts, cracks and bubbles on the tread surface and sidewall. Replace the tire if any defects are found.

Check battery electrolyte level and clean terminals

To keep the battery in peak operating condition the solution level should be checked weekly and the battery connections should be cleaned and checked for tightness every 2500 miles.

On model year 2000 Indian Chiefs the battery is a maintenance free unit – no water needs to be added. Battery terminals still need to be cleaned and check for tightness every 2500 miles.

Caution should be taken when working with electrolyte and the gases the battery produces. Battery electrolyte (sulfuric acid) is extremely caustic. If the acid is splashed on clothing or skin immediately neutralize with a solution of baking soda and water.

Always use safety glasses or a face shield when filling a new battery with acid. If acid does come in contact with your eyes immediately flood the eyes with cold water for 15 minutes, call a physician and go to the hospital emergency room.

Terminal cleaning and battery filling

Tools required:

10mm combination wrench

Small wire brush

3/16" hex bit socket

5/16" hex bit socket

6" extension

ratchet

1/2" flat blade screwdriver

Remove the two side seat bolts using a 5/16" hex bit socket. Bikes with a rear seat must remove the single bolt using a 3/16" hex bit socket and 6" extension.

Remove the bolt from the negative terminal of the battery using a 10mm combination wrench. Pull the bolt from the ground cable. Pull the ground cable away from the negative terminal of the battery.

Remove the bolt from the positive terminal of the battery using the 10mm combination wrench. Pull the bolt from the battery cable. Pull the cable away from the battery terminal.

Remove the battery strap. Lift the battery from the bike.

Clean the battery terminals using a wire brush removing any oxidation. The same can be done to the cables.

Clean the top of the battery removing any dirt. If the top of the battery is sulfated clean with a solution of baking soda and water. Clean the terminals and top with the solution. Rinse well with water.

Check the electrolyte level. View the front of the battery noting the minimum and maximum level lines. Remove the caps from the battery. Using distilled water bring the electrolyte level in all 6 cells to the maximum line. Never add electrolyte to a used battery.

Inspect the battery cushion located in the bottom of the oil bag/battery box. Clean or replace if necessary.

Return the battery to the oil bag/battery box. Attach the battery strap.

Before assembly coat the terminals and battery cable copper terminals with dielectric thermal grease. This grease will help prevent future corrosion.

Slip the bolt through the positive battery cable and the 2 other terminals. Thread the bolt into the positive post of the battery and tighten to 60 inch pounds.

Slip the bolt through the negative terminal of the ground cable. Thread the bolt into the negative battery post. Tighten to 60 inch pounds.

Return the seat to the bike. Be sure you slip the front seat lip into the frame bracket.

Apply blue Loctite to the first 1/4" of threads to all seat bolts.

Thread the two chrome 1/2" button head bolts into the side of the frame.

Seats with a passenger seat thread the 1/4" chrome button head bolt into the rear fender.

Tighten the 2 side bolts using a 5/16" hex bit socket. Torque to 25 foot pounds.

Tighten the rear 5/16" button head using a 3/16" hex bit socket. Torque to 96 inch pounds.

Electrical equipment check

The ignition key controls the ignition and lights of the motorcycle.

On model year 1999 Indian Chiefs the ignition switch resides on the left hand side under the horn. Rotate your left hand backward to turn the ignition on.

On model year 2000 Indian Chiefs the ignition switch resides on the right hand side by the seat. Rotate your right hand forward to turn the ignition on.

Switch the ignition key to the on position. Confirm that the rear red running light is on and the front fender light is on.

Red dash light

The red dash light should be on and will only go off when the engine is running and attains sufficient oil pressure. It will remain on through out the test.

Green dash light

The green dash light indicates the transmission is in neutral. Place the transmission in gear. The green dash light will go out. Return the transmission to neutral.

Left handlebar switches

Toggle the high/low selector. When in the high beam position the headlight should produce a bright light and the blue dash light should illuminate. Toggled to the low position the headlight should produce less light and the blue dash light should be off.

Push the horn button confirming the horn emits the proper tone.

Push the turn signal button and confirm that both front and rear, left turn signal lights function. The left yellow dash light should blink in unison with the turn signal.

Right handlebar switches

Push the turn signal button and confirm that both front and rear, right turn signal lights function. The right yellow dash light should blink in unison with the turn signal.

Toggle the engine run/off switch to the off position. Make sure the green transmission neutral light is on. Pull in the clutch and depress the start button. The engine should not turn over.

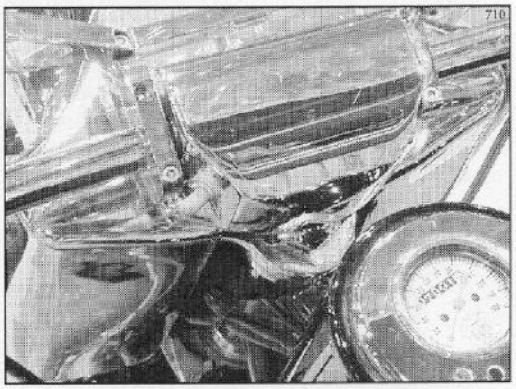
Toggle the engine run/off switch to the run position. Make sure the green transmission neutral light is on. Pull in the clutch and quickly depress the start button. The engine should turn over.

Brake light checks

Pull the front brake lever. The rear brake light should activate followed by three simultaneous blinks of the left and right orange lenses. Press the rear brake pedal, the rear brake light should be on.

Spot lights

Locate the spot light toggle switch. There may be two locations. Early Indian Chiefs have the switch on the left side of the handlebar clamp cover. Later model switches are located on the left rear of the headlight housing.



Early model Chief with spotlight switch mounted on handlebar clamp cover

Toggle the spotlight switch to the on position. Toggle the headlight Hi/Lo switch to the Lo position. Both left and right spot lights should be on.

Turn the ignition key to the off position.

Rear shock absorber check

The shock absorbers and rubber bushings should be inspected at the 500 mile mark and every 5000 miles there after.

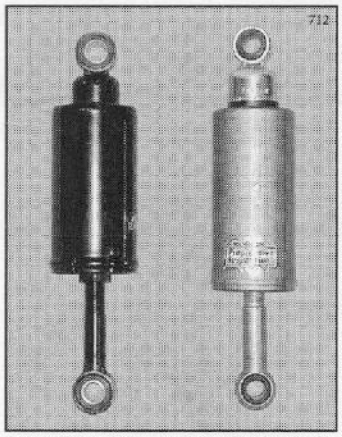
Look for oil leaks, spring can damage and rubber bushing deterioration.

Large dents in the spring cans will cause the internal spring to can contact the outer can and wear a hole through the Teflon liner.

Inspect the rubber bushing on each end of the shocks for deterioration. The rubber acts as a cushion between steel eye and shock bolt. Replace if needed.

The Progressive brand shock absorber (gold in color) is not rebuildable. The KT/Sway-A-Way brand shock (black in color) can not be rebuilt at the dealer level. They can be returned to the original manufacture for an oil change or spring rate increase/decrease.

Typically it will be cheaper for the customer to purchase O.E.M. shocks unless an upgrade is desired.

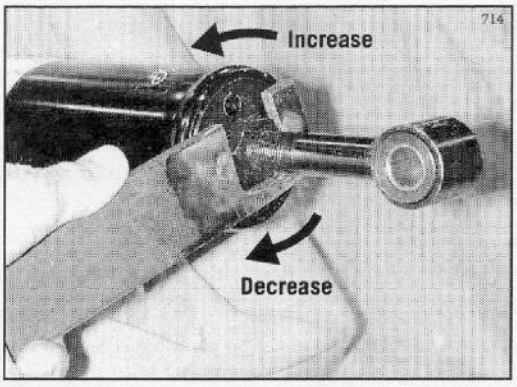


KT shock vs. Progressive Suspension shock

Shock absorber spring preload can be set using a spanner wrench with 1.7″ pin centers.

The customer may wish to experiment with the spring preload if they are bottoming the suspension or carrying heavy loads.

Loosen the shock rod jam nut using a 1⅛″ open end hex wrench. Rotating the spanner clockwise decreases spring preload while counterclockwise increases spring preload.



Pin spanner used to adjust spring preload

Front and rear wheel spoke tightness

Loose spokes can lead to handling problems, spoke breakage and wheel failure. Below describes minor spoke adjustment. If there are many spokes loose retruing may be required.

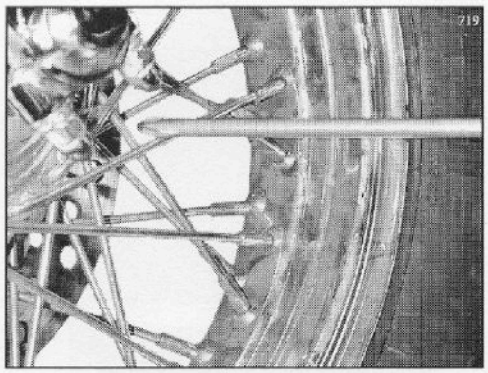
Tools required:

6mm spoke wrench

long screwdriver or metal rod

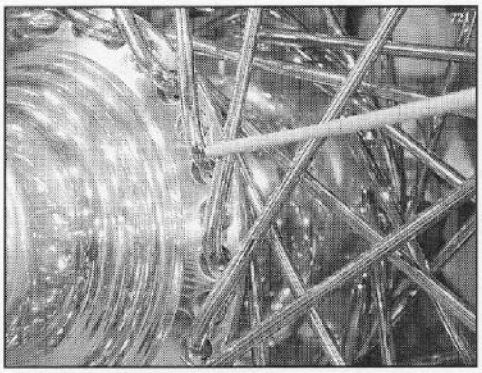
Raise the front tire of the motorcycle off the ground.

Tap each spoke in the center with a long screwdriver noting each spoke's tone. Spokes producing a dull or flat tone require tightening. A tightened spoke will produce a clear tone. Spokes producing a very high note are too tight. Spokes are rarely too tight from the factory. Rear wheel spokes typically require more maintenance than the fronts.

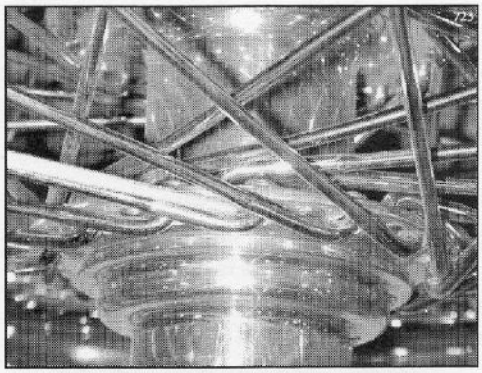


Tap the center of the spoke noting the tone.

When you find a loose spoke closely inspect the entire length for damage. Be especially vigilant viewing the head area.

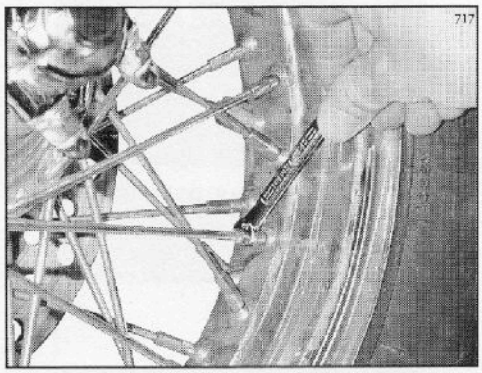


View the outside radius of the spoke for any fractures.



View the inside radius of the spoke for fractures.

Tighten the spokes using a 6mm open end wrench and tap, noting the tone.



Once the spokes are tight visually inspect the rim and hub for dents, cracks and out of roundness. Replace any parts found bad.

While spinning the wheel note any excessive drag or looseness in the bearings.

Repeat this procedure for the rear wheel.

Check steering stem adjustment

Steering stem bearings adjustment should be checked at the 500 mile mark and at each 5000 mile interval. The bearings should be lubricated every 10,000 miles.

Tools required:

Pointer

Masking tape

Scale

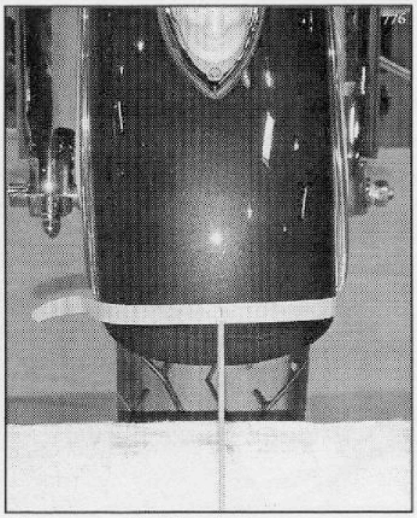
Raise the front of the motorcycle bringing the front wheel is off the ground. Remove the windshield or any other accessory that may affect the weight of the fork assembly.

Swing the wheel slowly back and forth feeling for any rough spots, tightness or flat spots. Race flat spotting occurs from a heavy blow, typically from wheelies, collisions with cars, the bike being dropped off a truck, etc. Replace the races and bearings if flat spots are found.

Point the front wheel straight ahead.

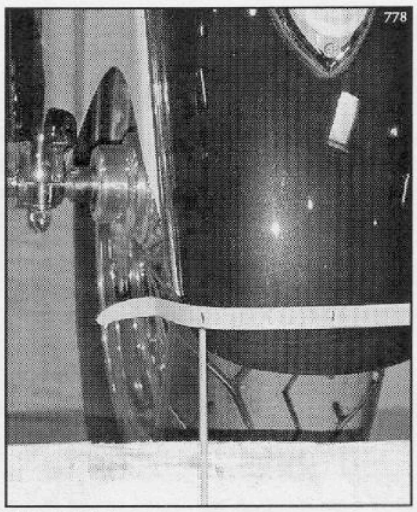
Cut a piece of masking tape to approximately 8″ in length. Place the tape on the front edge of the fender.

Place the pointer tip at the center of the fender. Lightly mark the center on the tape.



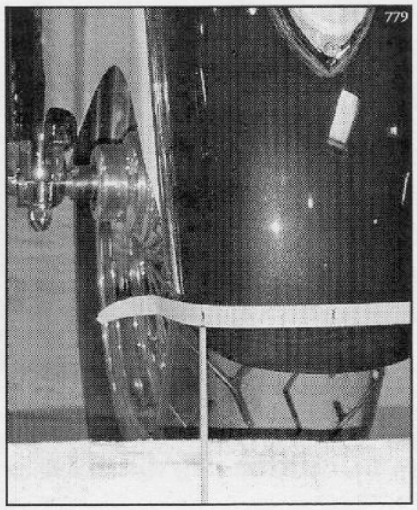
Pointer centered and marked

Gently tap the wheel to the right in approximately 1/4″ increments. Place a mark on the masking tape where the wheel starts to fall away by itself.



Right side fall away

Bring the wheel back to center and perform the same test to the left. Fall away to the left will have a greater value than the right because of the brake caliper.



Left side fall away

Measure the distance between the two outer marks on the masking tape. Taking into consideration the heavy skirted fender the fall away distance should be between 4-6″.

Steering stem bearing adjustment

Tools required:

5/32″ hex bit socket or 3/16″ hex bit socket (depending on model year)

5/8" combination wrench

1½″ hex socket

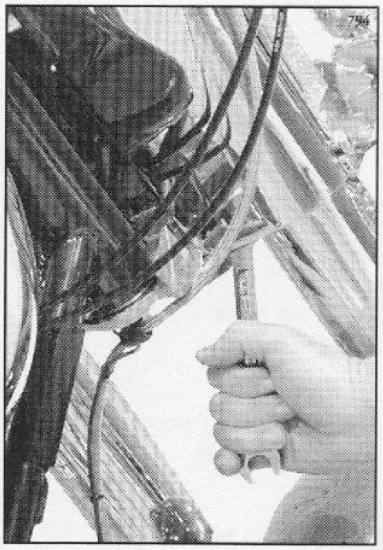
ratchet

spanner

Aluminum rod (use as a punch)

Ball peen hammer

Torque wrench

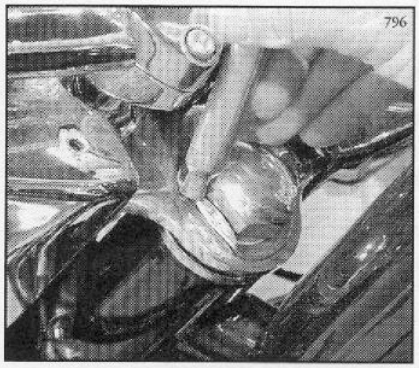


Place the motorcycle on a jack and lift the front wheel off the ground.

Loosen the two lower triple tree hex bolts using a 5/8″ combination wrench. They are accessible from the lower backside of the triple tree.

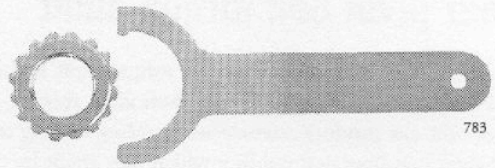
Loosen the two lower triple tree bolts using a 5/8″ box end wrench.

Remove the two handlebar cover button head bolts using a 5/32″ hex tee. For models with chrome tapered head socket bolts use a 3/16″ hex bit socket.

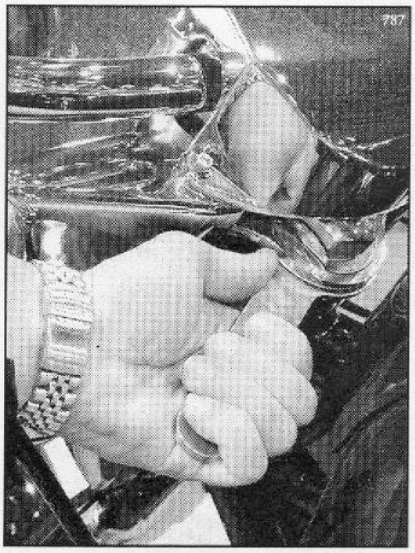


Flatten the tab washer using the aluminum rod and hammer. Loosen the fork crown nut using a 1½″ hex socket.

Depending upon your fall away results from the previous inspection tighten or loosen the spanner nut located under the top triple tree using a spanner wrench.



Spanner nut and spanner wrench



Spanner wrench inserted under top triple tree and indexed into spanner nut.

Conduct another fall away test to bring the front end into the proper specification. Again check for smooth operation.

Remove the fork crown nut and replace the tab washer. Thread the crown nut back onto the stem and tighten using a 1½″ hex socket. Torque to 40-45 foot pounds.

Tighten the lower triple tree fork tube bolts using the 5/8″ combination wrench. Torque to 42 foot pounds.

Bend the washer tab against the nut face.

While the handlebar cover is off check the torque of the four handlebar bolts using a 1/4″ hex bit socket. Torque to 30 foot pounds.

Return the handlebar clamp cover to the top triple tree.

Apply blue Loctite to the two 1/4″-20 x 3/4″ chrome button head bolts. Slip the bolts through the cover and thread into the top triple tree. Torque to 96 inch pounds.

Return any accessories to the front forks, windshield, horn, etc.

Rear pivot bolt torque audit

The swingarm pivot bolts require a torque audit at the 500 mile mark and at 5000 miles there after. A loose pivot bolt can produce a weave while riding leading to impaired handling and stability which may result in personal injury and damage to the motorcycle.

Tools required:

1⅛" hex socket

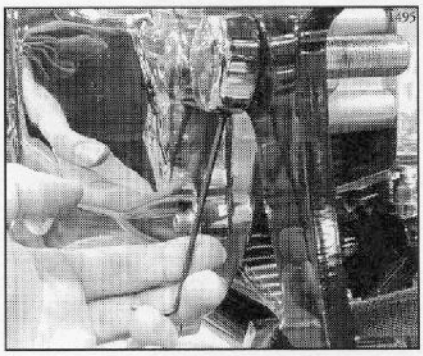
3mm hex key

1/4" flat blade screwdriver

torque wrench

Loosen the two chrome pivot bolt covers using a 3mm hex key. The covers are also attached with silicone adhesive and typically can not be removed with your bare hands.

Leave the hex key inserted in the set screw. Gently pull outward on the hex key removing the cover. If the cover is difficult to remove insert a 1/4" flat blade screwdriver between the cover and frame. Place the screwdriver at the bottom of the cover and begin gently prying from the pivot bolt head. Use caution while prying – avoid chipping the frame paint.



Pry the cover off with the hex key

Set the torque wrench to 150 foot pounds checking both pivot bolts for tightness.

Remove the old silicone seal from the pivot bolt covers. Apply new silicon seal to a depth of 1/8".

Slip the covers back on the pivot bolts and align the set screws with a bolt face.

The set screw should be rotated to the bottom hiding it from view.

Bolt torque audit

Below is a list of fasteners with torque valves that need auditing at the 500 mile check. An example is given below.

Derby cover ◀ Part

8-10 foot pounds (Torque Value) using a 3/16" hex bit socket (Tool Required)

3, (Qty.) socket head, (Bold Description) 1/4"-20 x 3/4" (Bolt Size)

(Bolt Size = Diameter-Threads per inch x Bolt length)

Handlebars clamps
30 foot pounds using a 1/4" hex bit socket
4, socket heads, 1/4"-20 x 3/4"

Handlebar clamp cover
96 inch pounds using a 3/16" hex bit socket
2, tapered socket head or button head, 1/4"-20 x 3/4"

Fork crown nut
40-45 foot pounds using a 1½" hex socket
1, hex head, 1"-24

Fork tube pinch bolts
42 foot pounds using a 5/8" hex socket
2, hex bolts, 7/16"-20 x 1¼"

Front brake rotor
16-24 foot pounds using a 3/16" hex bit socket
4, hex bolts, 5/16"-18 x 3/4" button head

Front axle nut
50-55 foot pounds using a 7/8" hex socket
1, hex nut,

Front axle cap
9-13 foot pounds using a 1/2" hex socket
2, acorn nuts, 5/16"- 24

Front brake caliper
25-30 foot pounds using a 7/32" hex bit socket
2, flat head sockets, 3/8"-16 x 1"

Front brake hanger
25-30 foot pounds using a 7/32" hex bit socket
2, flat head sockets, 3/8"-16 x 1"

Front fender mount bolts
22-25 foot pounds using a 1/4" hex bit socket 4, socket heads, 5/16"-18 x 1¾"

Rear axle nut
60-65 foot pounds using a 15/16 hex socket
1, 5/8"-18 castle nut

Rear brake rotor
23-27 foot pounds using a 7/32" hex bit socket
5, button heads, 3/8"-16 x 1"

Rear brake caliper
25-30 foot pounds using a 7/32" hex bit socket
2, flat head sockets, 3/8"-16 x 1"

Rear caliper torque arm
25-30 foot pounds using a 5/16" hex bit socket
1, socket head, 3/8"-24 x 1½"
1, socket head, 3/8"-24 x 1¾"

Rear caliper torque arm jam nuts
15-20 foot pounds using a 6 point flare nut crowfoot
2, hex jam nuts, 3/8"-24

Rear sprocket
65 foot pounds using a 3/8" hex bit socket
5, socket heads, 7/16"-14 x 1/14"

Swingarm pivot bolts
135-150 foot pounds using a 1⅛" hex socket
2, hex bolts, 3/4"-16 x 3"

Swingarm pivot bolt covers
60-84 inch pounds using a 3mm hex bit socket
2, set screws, 6-1.0 x 6mm

Shock mounting bolts
115-130 foot pounds using a 3/4" offset torque adaptor
4, hex head shoulder bolts, 1/2"-13

Engine mounting bolts
35-38 foot pounds using a 9/16" hex socket
Front: 2, hex head, 3/8"-24 x 2"
Rear: 2, hex head, 3/8"-24 x 3½"

Transmission to plate
35-38 foot pounds using a 9/16" hex socket
4, flanged nuts, 3/8"-24

Transmission plate to frame
35-38 foot pounds using a 9/16" hex socket
4, hex heads, 3/8"-24 x 1¼"

Outer primary cover
8-10 foot pounds using a 3/16" hex bit socket
7, socket heads, 1/4"-20 x 1½"
5, socket heads, 1/4"-20 x 2"

Exhaust shield clamps
65-75 inch pounds using a 1/4" hex socket
6, size 24 worm drive hose clamps

Exhaust flange nuts
15-18 foot pounds using a 1/2" hex socket
4, top lock nuts, 5/16"-24

Header bracket to transmission
13-19 foot pounds using a 1/4" hex bit socket
2, socket heads, 5/16-18 x 1¼"

Header clamp to header bracket
13-19 foot pounds using a 1/2" hex socket
1, hex head, 5/16"-18 x 1"

Muffler to mount
13-19 foot pounds using a 1/2" hex socket
2, hex heads, 5/16"-18 x 1¼"

Muffler mount to frame
33 foot pounds using a 9/16" hex socket
2, hex heads, 3/8"-16 x 2½"

Muffler T-bolt clamp
10-12 foot pounds using a 7/16" hex socket
1, hex head, 1/4"-28 nut

Rear fender, upper
60 foot pounds using a 3/4" hex socket
2, hex heads, 1/2"-13 x 1½"

Rear fender, sides
20-25 foot pounds using 1⅜" hex bit socket
4, button heads socket, 5/16"-18 x 3/4"

Seat, side
25 foot pounds using a 5/16" hex bit socket
2, button head sockets, 1/2"-13 x 3/4"

Seat, rear
96 inch pounds using a 3/16" hex bit socket
1, button head socket, 1/4"-20 x 3/4"

Air cleaner cover
84-108 inch pounds using a #3 phillips bit
3, oval head phillips, 1/4"-20 x 1¼"

Derby cover
8-10 foot pounds using a 3/16" hex bit socket
3, socket heads, 1/4"-20 x 3/4"

Primary drive belt inspection cover
8-10 foot pounds using a 3/16" hex bit socket
4, socket heads, 1/4"-20 x 1/2"

Ignition timing check

Checking the ignition timing of the engine at 500 miles. Timing that is advanced or retarded can damage the engine. Timing that is a few degrees retarded can make the engine run sluggish and cause excessive engine heat that may discolor the exhaust pipes.

Tools required:

13/16" spark plug wrench

3/32" tee handled hex bit

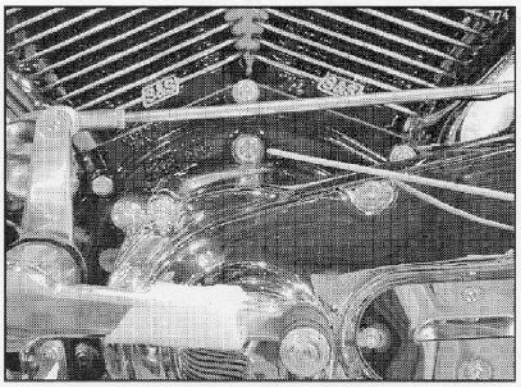
1/4" flat blade screwdriver

Torque wrench

Static timing check

Place a jack under the frame cross member and lift the rear wheel off the ground.

Remove the timing mark inspection plug from the left side of the engine using a 3/8" hex bit socket.

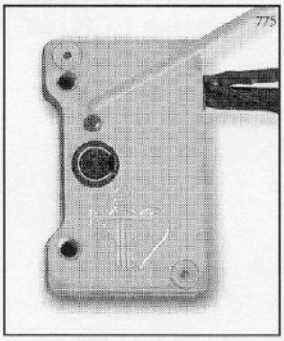


Timing mark inspection plug

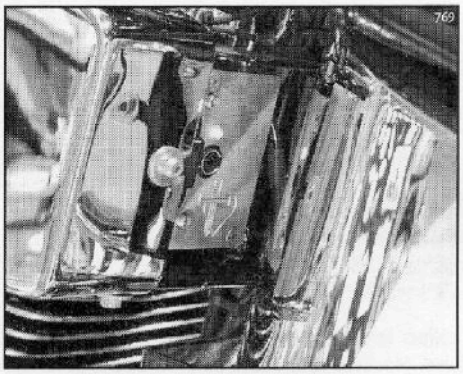
Remove both spark plugs using a 13/16" spark plug socket.

Remove the sensor plate cover from the right side of the cam box using a 3/32" tee handled hex bit.

Turn the ignition switch to the on position. View the aluminum ignition module located behind the coil. The red module light should be on.



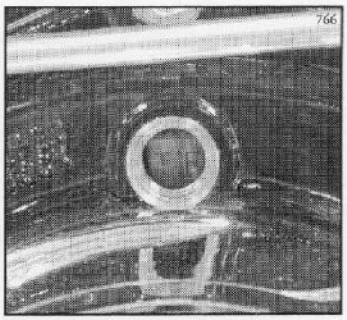
Ignition module off bike showing red LED



Ignition module with red LED glowing

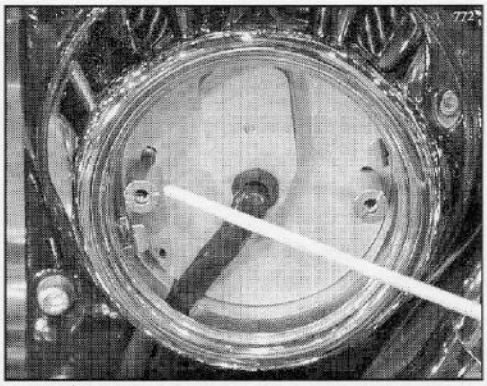
Place the transmission in 5th gear. Rotate the rear wheel while watching for the T:F mark to appear in the inspection hole. "T" stands for top dead center, "F" for front cylinder. Align the T:F mark to be centered within the hole. The red module light should now be off. If the light is still on rotate the rear wheel until it goes off and compare the T:F to the center of the inspection hole.

If adjustment is required, again, place the T:F mark in the center of the inspection hole.



Loosen the sensor plate located on the right side of the engine using a 1/4" flat blade screwdriver.

Rotate the plate until the red ignition module light goes out.



Loosen the two sensor plate screws and rotate the plate to adjust static timing.

Tighten the sensor plate screws using a 1/4″ flat blade screwdriver to 14 inch pounds.

Place blue Loctite on the threads of the sensor cover screws. Replace the sensor cover and thread button head bolts in. Tighten using a 3/32″ hex bit socket to 14 inch pounds.

Thread the original spark plugs back in to the cylinder heads and tighten using a 13/16″ spark plug socket to 11-18 foot pounds. Place a drop of blue Loctite on the inspection hole plug and tighten to 25-30 foot pounds. Remove the jack from the bike.

Dynamic timing

Tools required:

Inductive timing light

1/4″ flat blade screwdriver

3/32″ tee handled hex bit

3/8″ hex bit socket

Connect an inductive timing light to the front cylinder ignition wire.

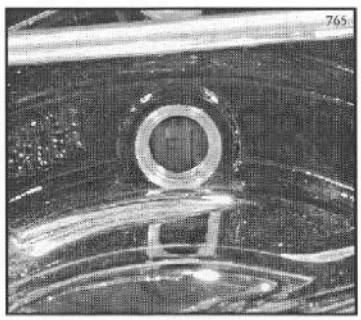
Remove the timing mark sight plug from the left side of the engine using a 3/8″ hex bit socket.

Remove the sensor plate cover from the right side of the cam box using a 3/32″ tee handled hex bit

Turn the ignition switch to the on position. Start the engine and let idle for 1 minute.

The Chief is programmed to be at 34° advance between 2200-3300 RPM, ramp upward to 35° at 3800 RPM and ramp downward to 34° at 3800-4400 RPM.

Bring the engine RPM to 2200-3300. Shine the timing light at the inspection hole. A "F|" should be visible and is at 35° advance. Slowly bring the RPM up to where maximum advance is achieved (3800) and observe the F| mark.



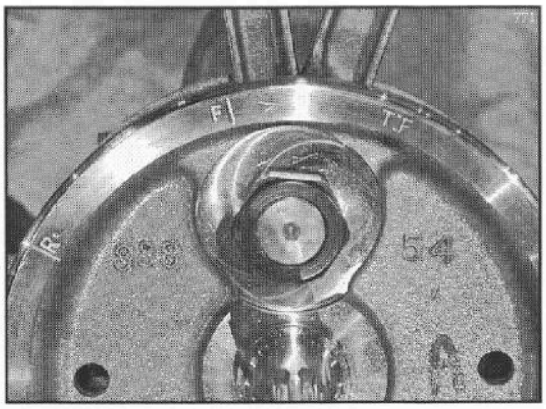
Front cylinder advance mark

If adjustment is required loosen the sensor plate located on the right side of the engine using a 1/4″ flat blade screwdriver. Rotate the plate slightly, tighten the screws and again check the dynamic advance.

Once the correct timing is achieved tighten the sensor plate screws using a 1/4″ flat blade screwdriver to 14 inch pounds.

Place blue Loctite on the threads of the sensor cover screws. Replace the sensor cover and threads the bolts in. Tighten using a 3/32″ hex bit socket to 14 inch pounds.

Place a drop of blue Loctite on the inspection hole plug and tighten to 25-30 foot pounds.



Flywheel showing the timing marks.

°R (rear cylinder)

F° (front cylinder)

T:F (top dead center, front cylinder) marks

Conduct road test

Before you start the motorcycle and perform a road test clean the header pipes and muffler of any finger prints and oil. Starting the bike with a finger print soiled exhaust may permanently scare it.

Perform a road test checking the handling and operation of the speedometer, brake, clutch, engine and transmission. Note any defects, rough operation, unusual noises, inconsistencies and odd handling. Correct any problem found.

After the road test check the engine oil. Inspect for fuel, oil and brake leaks.

Perform the following operations for the Interval Service:

Periodic maintenance of the motorcycle is important to its longevity and safe operation.

Below is a check list to be performed at the 2500 mile mark and every 5000 miles there after.

1. Check and inspect engine oil ..... *page 3*
2. Check and inspect transmission fluid ..... *page 5*
3. Check battery solution level and clean battery connections ..... *page 26*
4. Inspect fuel petcock. Fuel lines and fittings for leaks. ..... *page 23*
5. Check enrichener and throttle operation ..... *page 22*
6. Check operation of all electrical equipment and switches. ..... *page 27*
7. Check rear drive belt. ..... *page 10*
8. Check and inspect brake fluid level. ..... *page 15*
9. Inspect brake pads and discs for wear ..... *page 13*
10. Check tires for pressure and signs of wear. ..... *page 25*
11. Conduct road test. ..... *page 35*

The items listed above have all been performed in the Primary Service (500 mile check). Refer to the Primary Service procedures for text.

Perform the following operations for the Renewal Service:

Periodic maintenance of the motorcycle is important to its longevity and safe operation. Below is a check list to be performed at the 10,000 mile mark and every 10,000 miles there after.

1. Change engine oil, replace oil filter and clean tappet screen . . . . . *page 3*
2. Change transmission oil and clean magnetic drain plug . . . . . *page 5*
3. Inspect air filter and clean/replace if necessary . . . . . *page 6*
4. Inspect the primary belt . . . . . *page 7*
5. Check and adjust rear drive belt . . . . . *page 10*
6. Lubrication of shift rod pivot points . . . . . *page 11*
7. Inspect brake pads lining for wear and discs for warpage . . . . . *page 13*
8. Brake fluid level and condition . . . . . *page 15*
9. Inspect oil lines and brake lines for leaks . . . . . *page 16*
10. Throttle cables, Clutch cable inspection and lubrication . . . . . *page 18*
11. Clutch and brake lever pivot points lubrication . . . . . *page 20*
12. Check clutch adjustment . . . . . *page 21*
13. Check and adjust carburetor & enrichener operation . . . . . *page 22*
14. Clean the petcock screen and inspect the fuel line joints for leaks . . . . . *page 23*
15. Check tire pressure and inspect tread . . . . . *page 25*
16. Check battery electrolyte level and clean battery terminals . . . . . *page 26*
17. Check operation of all electrical equipment and switches . . . . . *page 27*
18. Check rear shock absorbers . . . . . *page 28*
19. Check front and rear wheel spoke tightness . . . . . *page 29*
20. Check front steering stem adjustment . . . . . *page 30*
21. Check rear pivot bolts for proper tightness . . . . . *page 32*
22. Perform a bolt torque audit . . . . . *page 32*
23. Check ignition timing . . . . . *page 34*
24. Conduct road test . . . . . *page 35*
25. Replace spark plugs . . . . . *page 41*
26. Replace brake fluid . . . . . *page 41*
27. Replace fork oil . . . . . *page 43*
28. Lubricate steering head bearings and check bearing adjustment . . . . . *page 43*
29. Repack wheel bearings . . . . . *page 48*

The first 24 operations are performed in the Primary Service. Refer to the Primary Service procedures for text.

Spark plug replacement

Tools required:

13/16" hex socket

pliers

torque wrench

Gently pull the spark plug caps away from the spark plugs. Be very careful to not separate the caps from the wires while pulling.

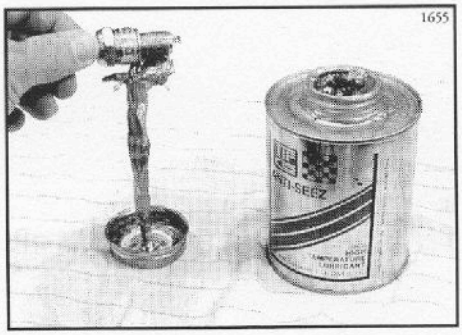
Clean the cylinder head/spark plug area with compressed air.

Remove the old spark plugs using a 13/16" hex socket.

Install new Bosch Platinum spark plugs, # WR7DP.

Gap the new plugs at .038-.043" (.097-1.09mm).

Apply a small quantity of anti-seize to the spark plug threads.



Insert the plugs into the threads and tighten using a 13/16" hex socket.

Torque to 11-18 foot pounds.

Tighten the threaded caps located on the spark plugs with a pair of pliers.

Return the spark plug wires to the spark plugs.

Replace brake fluid

During motorcycle operation the efficiency of the hydraulic brake system is continuously reduced through the absorption of moisture from the atmosphere. This occurs through the normal heating and cooling cycles of the fluid during brake application. Our D.O.T 5 fluid does not absorb moisture, yet, the heating and cooling cycles are still present, thus, the moisture still invades the system.

The brake fluid must be replaced every year, preferably in the spring or after removing the motorcycle from storage.

Replace the fluid with D.O.T. 5 (purple color) fluid only. Adding D.O.T. 3 or 4 fluid to the D.O.T 5 system will cause coagulation to occur and braking performance to diminish or cease to function.

WARNING – USE ONLY DOT 5 BRAKE FLUID. D.O.T. 5 fluid is silicone based and not compatible with D.O.T. 3, 4 or 5.1. Damage to the brake system will occur if you install any other fluid.

Tools required:

Clean turkey baster

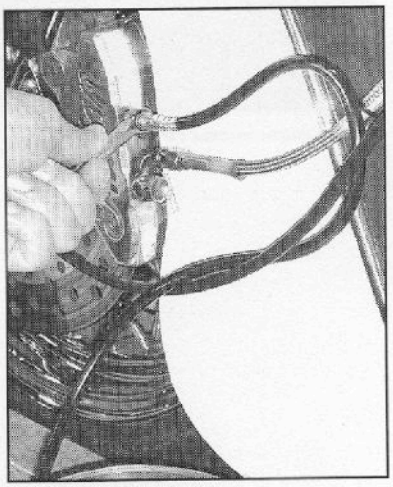
3/8" flair nut wrench

clear tubing, 1/4" diameter, approximately 30" length

catch can

Clean both the front and rear master cylinders before removing the covers.

Remove the reservoir cover from the front brake master cylinder using a #2 phillips screwdriver.



Insert the turkey baster into the master cylinder and remove the old fluid.

Place new D.O.T. 5 fluid in the front master cylinder.

Place a 1/4" diameter clear tube on the front caliper bleed nipple.

Place the tube into a catch can.

Slip a 3/8" flair nut wrench on the nipple.

Pump the hand brake and hold. Break loose the nipple 1/4 turn, tighten once the brake lever reaches the handlebar.

Pump the hand lever a few times. Again break loose the nipple 1/4 turn, tighten once the brake lever reaches the handlebar.

Check the fluid level of the reservoir. Do not let the lever become to low or you will pump air into the brake line requiring further bleeding.

Continue this method until fresh fluid is viewed exiting the bleed tube.

Add fresh fluid to within a 1/4" of the top edge.

Replace the master cylinder cap and tighten the screw using a #2 phillips screwdriver.

Torque to 10-15 inch pounds.

Rear brake fluid replacement

Perform the same procedures to the rear brake system as you did the front.



Muffler system removed for clarity

Replace fork oil, Lubricate wheel bearings & Lubricate steering head bearings

Tools required:

Small diagonal cutters
9/64" tee handled hex bit
5/32" tee handled hex bit
7/32" hex bit socket
3/16" hex bit socket
1/4" hex bit socket
8mm open end hex wrench
3/8" hex socket
1/2" hex socket
5/8" hex socket
1⅜" hex socket
1½" hex socket
#2 phillips
#3 phillips
hammer
punch
spanner
torque wrench

Cut the zip ties along the length of the front hydraulic brake line.

Remove the speedometer cable from the speedo drive using a 8mm open end hex wrench.

Remove the screws holding the dash to the gas tanks using a 5/32" tee handed hex bit.

Place a clean shop rag on the left gas tank and lay the dash upon it.

Trace the front fender light wire up through the bottom triple tree, and into the lighting module. Unplug the connector. Cut the female connector from the wire and gently pull the wire through the bottom triple tree.

Remove the front brake cable from the chrome fender retainer.

Place bubble wrap or any soft item around the fork legs to protect the fender paint and forks legs from damage.

Loosen the 4 front fender bolts from the fork legs using a 1/4" hex bit socket. Note the nylon washers placed between the fork and fenders to prevent paint damage. Carefully remove one bolt from each fork leg.

Carefully remove the remaining two bolts from the fork legs and gently remove the fender.

Remove the brake line clamp located under the bottom triple tree using a 1/2" hex socket.

Loosen the brake hanger bolts from the left fork slider using a 7/32" hex bit socket. Gently remove the bottom bolt and look for any shims. Do the same for the top bolt.

Place a bungee cord on the frame and hang the brake caliper from it.

Remove the spotlight stabilizer bar using a 3/16" hex bit socket.

Remove the handlebar clamp cover using a 3/16" hex bit socket.

Remove the headlight trim ring using a #2 phillips screwdriver.

Remove the 10 bolts holding the headlight to the split housing using a 5/32" hex bit socket. Gently pull the headlight away from the housing and unplug the electrical connection.

Unbolt the headlight ground wire from the bottom triple clamp using a 9/64" tee handled hex bit.

Remove the trim piece from the top of the headlight housing. Remove the three K-lock nuts and #10 washers from inside the headlight housing using a 3/8" hex socket.

View inside the headlight housing and cut any spotlight wire zip ties. Unplug the spotlight switch wires.

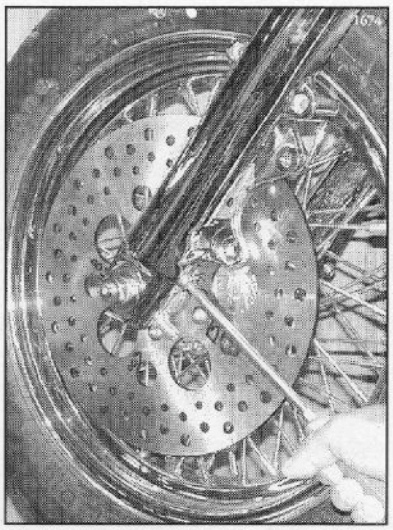
Loosen the four button head bolts holding the spotlight brackets to the headlight housing using a 5/16" hex bit socket. Remove the left side housing first noting the washer position.

The upper right side housing bolt captures the brake line clamp and has different spacer hardware.

Place a drain pan under the left fork leg and remove the drain plug from the lower rear of the fork using a #3 phillips screwdriver.

Gently push down on the handlebars to remove oil from the leg. Continue to pump the leg removing all the oil. Inspect the copper crush washer for damage and replace if necessary. Return the plug with crush washer to the fork leg and torque to 6-8 foot pounds.

Perform the same procedure for the right fork.



Fork oil drain plug

Remove all fork oil from the brake rotor and tire with a brake clean solution.

Place a jack under the motorcycle and lift the front wheel off of the ground.

Loosen the axle cap located on the bottom of the right fork leg using a ½" hex socket.

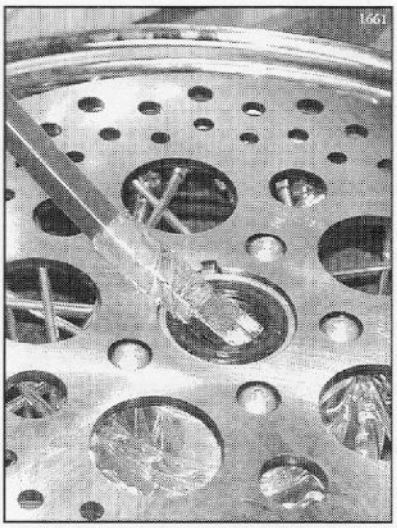
Remove the axle nut from the left side of the axle using a 7/8" hex socket.

View the axle spacers and note their position before removing the axle.

Gently pull the axle from the wheel. Once removed place all spacers back in their original position on the axle and slip the axle back into the fork.

Front wheel bearing lubrication

The bearing and mating race are matched set. Do not mix bearing and races. Remove only 1 bearing at a time, lube and return to its' original position.



Seal removal

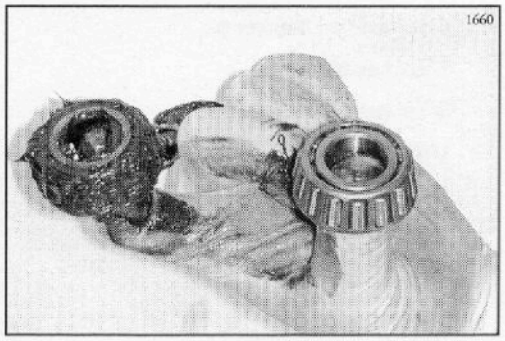
Remove the seal from the left side of the hub using a seal removal tool. Clean the seal and inspect for wear. Replace if needed. Place a small quantity of grease upon the seal lip cavity.

Pull the bearing from the race. Wash the bearing in solvent to remove the old grease.

Wipe the race located in the hub with a rag dipped in solvent. Wipe the race again with a lint free cloth.

Inspect the race and bearing for wear, if replacement is needed restore in matched sets only.

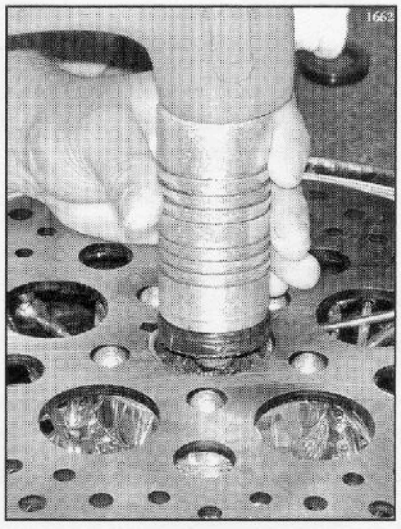
If you are reusing the original bearing repack it with a high quality waterproof bearing grease.



Packed vs. raw bearing

Wipe a film of grease upon the bearing race. Return the bearing to the race.

Place a light film of grease upon the outer edge of the seal and place upon the hub. Align the seal and gently drive into the hub using a seal driver or hex socket. The diameter of the socket should be slightly smaller than the O.D. of the seal. Continue to tap the seal inward until it seats against the bearing.



Seal being driven into hub

Perform the same operation on the right side bearing and race.

Front fork removal

Remove the axle and spacers from the forks.

Loosen the two fork tube pinch bolts located in the lower triple clamp using a 5/8″ hex socket.

Remove the fork tube cap using a 1⅜″ hex socket from each fork tube.

Slide the fork legs from the triple trees.

Turn the forks upside down in a pan to drain the remaining oil.

Handlebar removal

Place clean, thick rags upon the gas tank.

Loosen the handlebar clamp bolts slowly using a 1/4″ hex bit socket. Gently let the bars move downward while loosening the bolts. Remove the bolts and move the handlebars to the well padded gas tank.

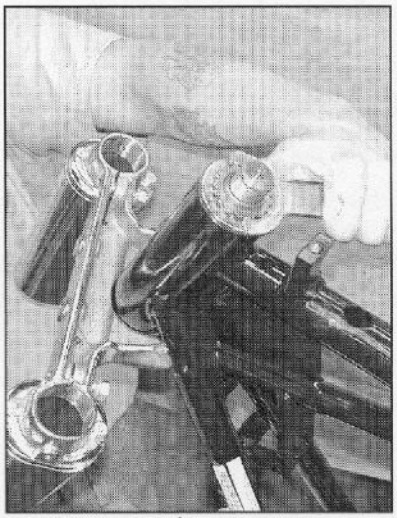
Triple clamp removal

Flatten the tab washer located upon the top triple clamp using a punch and hammer.

Remove the fork crown nut using a 1½″ hex socket.

Remove the top triple clamp from the stem.

Loosen the spanner nut from the stem using a spanner wrench. Tap the top of the stem with a soft face hammer to loosen the stem from the bearings.



Spanner nut removal

Remove the spanner nut while preventing the lower triple clamp from falling onto the ground.

Place the lower triple clamp in a solvent tank and remove the old grease from the bearing.

Inspect the bearing for wear.

Repack the bearing using a high quality waterproof bearing grease.

Wipe the lower bearing race located in the bottom of the frame head tube with a rag dipped in solvent. Clean the race surface with a lint free cloth.

Inspect the race for damage and wear.

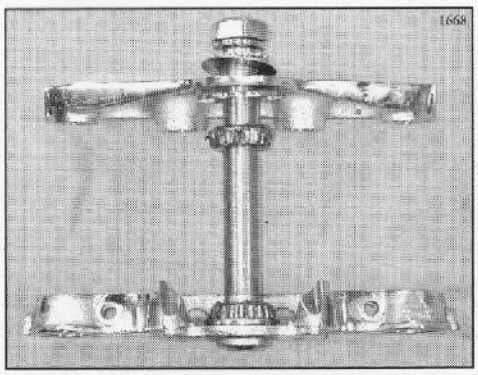
Place a film of grease on the race.

Clean the top bearing dust cover.

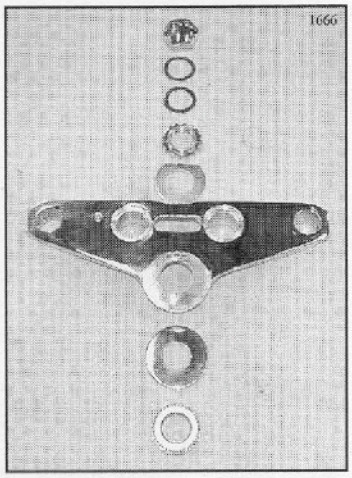
Perform the same cleaning, inspection and lubrication to the top bearing and race.

Triple clamp installation

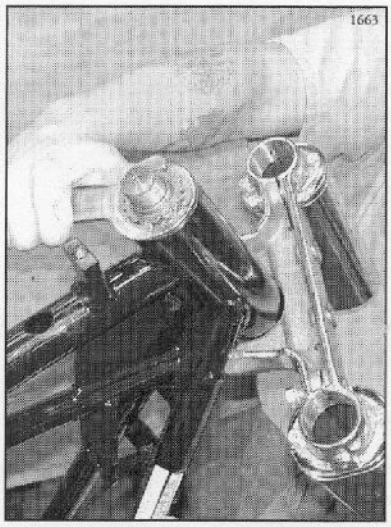
Place the upper bearing back into the steering head followed by the dust cover.



Top clamp & hardware



Slip the fresh lubed lower triple clamp assembly back into the steering head. Thread the spanner nut back onto the stem. The spanner section of the nut should be on the top. Torque to 20 foot pounds. A "front wheel fall away" test will be performed after the front end is completely installed.



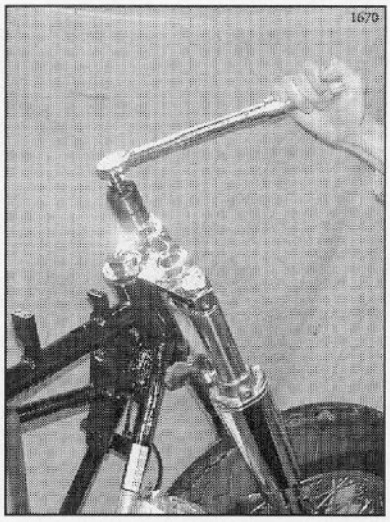
Tighten and torque the spanner nut

Slip the top triple clamp onto the stem and thread the crown nut onto the stem. Do not tighten.

Identify the left fork leg, it has the mounting bosses for the brake hanger.

Slip the left fork leg through both the bottom and top triple clamps.

Make sure the oil drain plugs have been returned to the fork legs. Pour into each fork leg 11 ounces of 30 weight fork oil.



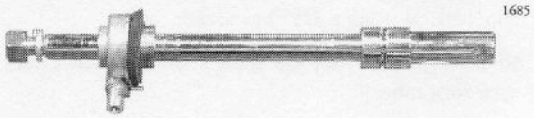
Torquing the fork caps

Thread the left fork cap into the tube. Torque to 50 foot pounds using a 1⅜" hex socket.

Slip the right fork leg into the triple clamps and thread the cap on. Torque to 50 foot pounds using a 1⅜" hex socket.

Front wheel installation

Clean the spacers and speedo drive unit before assembly. Replace the speedo drive foam seal if torn or worm out.



Front axle with hardware

Check the rotor side hub seal to make sure it has been greased. Place the speedo drive unit into the rotor side of the hub. Make sure the speedo drive tabs indexes into the brake rotor.

Check the right seal for grease. Place the 1/2" width chrome spacer into the right side seal.

Clean the axle and apply fresh grease to it before installation.

Slip the axle through the right fork leg axle cap approximately 1/2". Slip the .650" width chrome spacer on the axle.

Slip the wheel between the fork legs being careful not to damage anything. The brake rotor is oriented to the left side of the bike.

Lift the wheel upward and align with the axle. Slip the axle inward through the wheel and into the right fork leg.

On to threaded side of the axle slip a 1/2" flat washer followed by the 1/2" lock washer and the 1/2" hex nut.

Lightly tighten the axle cap nuts located on the bottom right work leg using a 1/2" hex socket. The cap must be loose enough to allow the axle to slid while tightening in a future step.

Handlebar installation

Apply blue Loctite to the 4 handlebar clamp bolts.

Place the handlebars back into the lower clamp. Place the upper clamp on the bars and thread the bolts inward using a 1/4" hex bit socket.

Lightly tighten the clamp and position the handlebar grips to be parallel with the ground. Adjust the clamp to have an equal air gap in both the front and rear.

Torque the clamp bolts to 30 foot pounds.

Fork seating

Lower the jack and remove from under the bike.

Press downward on the handlebars a few times compressing the forks. This allows the fork tubes, axle and triple clamps to relax and mate together reducing binding.

Tighten the two fork tube pinch bolts located in the rear of the lower triple clamp using a 5/8" hex socket. Torque to 40 foot pounds.

Press the handlebars downward a few more times to seat the axle into the fork legs.

Tighten the axle nut using a 7/8" hex socket to 50-55 foot pounds.

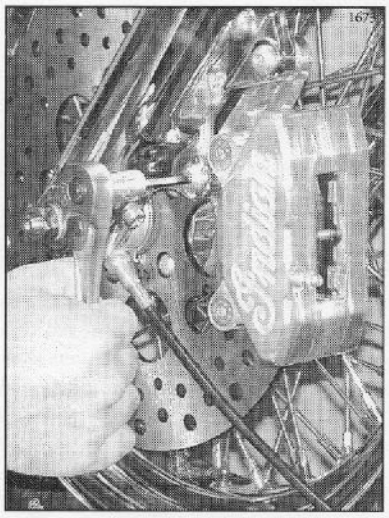
Compress the forks a few more times to seat the axle in the cap. Torque the axle cap to 9-11 foot pounds using a 1/2" hex socket.

Torque the chrome stem nut to 40 foot pounds using a 1 1/2" hex socket.

Brake caliper and hanger installation

Apply blue Loctite to the 2 caliper hanger bolts.

Slip the caliper over the rotor. Align the hanger to the fork leg bosses. Return any shims between the hanger and fork boss to their original position. Slip the bolts through the bosses and thread into the hanger.



Hanger installation onto left fork slider

Tighten the bolts using a 7/32" hex bit socket. Torque to 25-30 foot pounds.

Front fender installation

Make sure the fork legs are still covered with a layer of bubble wrap or equivalent.

Apply blue Loctite on the first 1/4" of threads to the four mounting bolts.

Slip the four bolts into the fender mount bosses located on the fork sliders. Make sure the bolts do not protrude through the bosses.

Gently guide the fender between the forks.

Align the fender to the bolts and thread 1 bolt into each side. Place a nylon washer between the fork bosses and fender on the remaining two bolts and thread into the fender.

Unthread the two bolts that do not have nylon washers and slip washers in.

Torque the bolts to 22-25 foot pounds using a 1/4" hex bit socket.

Route the fender light wire along the hydraulic brake line and place zip ties approximately every 6". Continue to route the wire through the pinch bolt air gap located in the lower triple clamp.

Route the wire along the others wire coming from the headlight etc. Once you reach the lighting module (harness connector) strip the wire 1/4" from the end and attach a female pin connector.

Plug the wire back into the male connector. Check the lights function by turning on the key switch.

Dash installation

Align the dash to the mounting holes. Apply blue Loctite to the mounting bolts.

Thread the bolts into the holes and gently tighten. Apply only light tension to the dash. Over tightening will dish the dash and possibly crack it.

Headlight/Spotlight installation

Apply blue Loctite to the four chrome button head bolts.

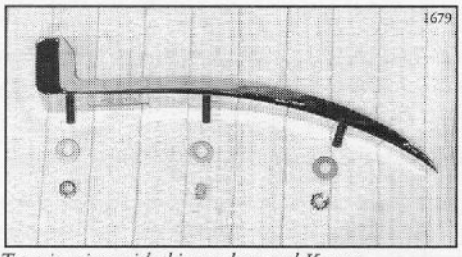
Slip the bolts into left spotlight. Slip chrome washers on each bolt.

Align the left headlight shell and spotlight to the mounting holes in the triple clamps. Thread the bolts inward.

Do the same for the right headlight shell. The top right hardware contains the brake line clamp.

Lightly tighten the four bolts using a 3/16" hex bit socket.

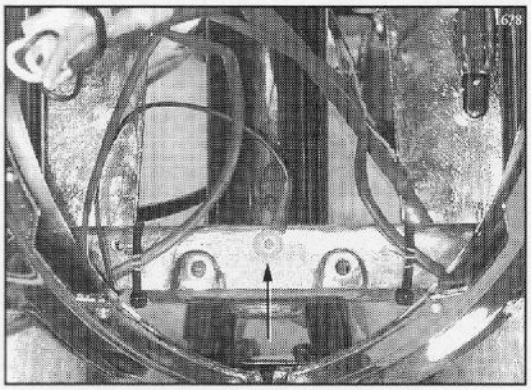
Apply blue Loctite to the trim piece that hides the top seam. Slip the trim on to the headlight shell. Slip a thin washer onto the center stud and thread a K-nut on. Do the same with the remaining two studs. Align the two housing halves and tighten the center.



Top trim piece with thin washers and K-nuts

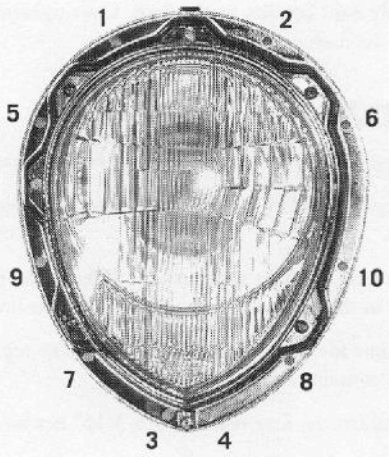
K-nut using a 3/8″ hex socket. Check the alignment of the housings and tighten the remaining two K-nuts. Torque to 20 inch pounds.

Attach the ground wire to the triple clamp using a 9/64″ hex bit.



Arrow points to ground wire

1681



Apply blue Loctite to the 10 socket head bolts used to attach the headlight to the housing.

Align the headlight to the housing and thread the bolts in. Use the numbered sequence shown in photo 1681 for bolt installation and torquing.

Check alignment of the housing halves while tightening the bolts. Torque to 22 inch pounds using a 5/32″ hex bit socket.

Torque the spotlight bolts using a 3/16″ hex bit socket to 10-12 foot pounds.

Snap the headlight trim ring on and thread the #8 self taping screw into the bottom of the ring. Torque to 10-20 inch pounds using a #2 phillips bit.

Attach the spot light stabilizer bar to the spot light brackets. 3/16″ hex bit socket. Torque to 10-12 foot pounds.

Steering stem adjustment

Raise the front of the motorcycle off the ground. Swing the wheel slowly back and forth feeling for rough spots, tightness of flat spots.

Refer to the primary service section for steering stem adjustment using the fall away method.

Rear wheel bearing lubrication

Tools required:

5/16″ hex bit socket

3/16″ hex bit socket

1/2″ hex socket

7/16″ hex socket

15/16″ hex socket

ratchet

Source a jack that is capable of securely raising the frame rails 11-12″ or higher. Raising the frame rail 11″-12″ off the ground will allow the rear tire to be removed with out removing the rear fender. Proceed to the section titled "Rear wheel removal" if you are able to raise the bike the 11″-12″.

Rear fender removal (if required)

Remove the seat from the frame by removing the two chrome button head bolts using a 5/16" hex bit socket. For models with a buddy seat remove the single rear chrome button head bolt using a 3/16" hex bit socket.

Cut the zip tie holding the 4 pin connector to the connector anchor. Disconnect the 4 pin connector.

Remove the muffler. Loosen the muffler-to-header T-bolt clamp using a 7/16" hex socket. Remove the 2 hex bolts holding the muffler to the muffler bracket using a 1/2" hex socket. Pull the muffler from the header.

Remove the fender. Remove the four chrome button head bolts holding the sides of the fender to the frame using a 3/16" hex bit socket.

Removal of the fender requires two people. Loosen the two top fender bolts a few turns using a 3/4" hex socket. Have the second person grasp the rear of the fender holding it from falling. Remove the bolts and lift the fender off the bike.

Rear wheel removal

Place a jack under the motorcycle at the crossmember. Raise the bike to have the rear wheel slightly off the ground.

Remove the cotter key from the axle nut. Loosen the axle nut using a 15/16" hex socket.

Remove the nut from the axle.

Loosen the two axle adjuster nuts using a deep 1/2" hex socket. Loosen them in equal amounts and enough to remove the drive belt from the sprocket. Count the revolutions and write the amount on a piece of paper.

Adjust the jack under the motorcycle to have the rear wheel just touching the ground. Remove the axle from the rear wheel.

Gently remove the wheel from the swingarm noting where each spacer is located. Place the spacers off to their respective sides of the motorcycle.

Bearing removal and lubrication

The bearing and mating race are a matched set. Do not mix bearing and races. Remove only 1 bearing at a time, lube and return to its' original position.

Remove the left side (sprocket side) seal using a seal puller or screwdriver. Be very careful not to damage the seal.

Clean the seal and inspect for wear. Replace if needed. Place a small quantity of grease upon the seal lip cavity.

Pull the bearing from the race. Wash the bearing in solvent to remove the old grease.

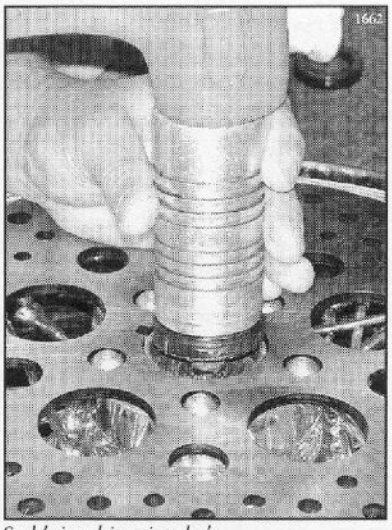
Wipe the race located in the hub with a rag dipped in solvent. Wipe the race again with a lint free cloth.

Inspect the race and bearing for wear, if replacement is needed restore in matched sets only.

If your are reusing the original bearing repack it with a high quality waterproof bearing grease.

Wipe a film of grease upon the bearing race. Return the bearing to the race.

Place a light film of grease upon the outer edge of the seal and place upon the hub. Align the seal and gently drive into the hub using a seal driver or hex socket. The diameter of the socket should be slightly smaller than the O.D. of the seal. Continue to tap the seal inward until it seats against the bearing.



Seal being driven into hub

Perform the same operation on the right side bearing and race.

Rear wheel installation

Insert the 1/2″ length black powder coated spacer into the sprocket side seal.

Insert the 3/4″ chrome spacer into the brake rotor side of the wheel

Place the wheel into the swingarm, sprocket to the left side of the bike. Loop the drive belt over the sprocket. Slip the 1½″ length black powder coated spacer between the between the left swingarm and 1/2″ black spacer. Lightly grease the axle and slip through the swingarm from left to right. Do not insert the axle fully.

Slip the stepped aluminum spacer between the right swingarm and brake hanger. The hanger is counter bored for the step in the spacer.

Fully insert the axle. Slip the axle washer on to the axle. Thread the castle nut onto the axle and finger tighten.

Adjust the drive belt tension. Tighten the adjuster nuts the exact amount they were loosened and tighten the axle.

Lift the rear of the motorcycle off the ground approximately 1/2″. Rotate the rear wheel checking for belt tracking. The belt should track to the left side of the sprocket in approximately 15 revolutions. Loosen the axle and adjust if required.

Check the belt tension. On the lower rung of the belt find a distance halfway between the transmission shaft and the rear wheel axle. This point will be approximately 1″ aft of the lower swingarm rocker.

Place the belt tension tool at the halfway point. Apply 10 pounds of force deflecting the belt upward. Measure the deflection distance. The correct deflection value is 3/8″–1/2″.

Rotate the tire 1/2″ a revolution and check the belt tension again. Do this a few more times. You may find tight and loose spots, yet, the measurements should fall within the 3/8″–1/2″ range. Adjust if necessary.

Torque the axle nut to 60-65 foot pounds. Insert a new cotter key and bend.

LEVEL II MAINTENANCE PROCEDURES

Carburetor Rebuild ..... *page 53*

Clutch Disk Inspection and Replacement ..... *page 58*

Electrical Troubleshooting ..... *page 61*

Evaporative Emissions System ..... *page 64*

Rear Wheel Removal & Installation ..... *page 66*

Rocker Box Gasket Replacement ..... *page 67*

Starter Removal & Installation ..... *page 70*

Wheel Bearing End Play Check & Adjustment ..... *page 73*

Carburetor Rebuilding

The Indian Chief is equipped with an S&S "E" series carburetor which has a 1⅞" (47.6mm) bore and a 1⅝" (39.6mm) venturi. This instruction is based on the standard rebuild kit available from Indian.

Standard jetting at sea level is listed below.

California Models

Idle RPM: 800-1000
Idle Mixture Screw: 1¼-1¾
Accelerator Pump Screw: 2-2½
Intermediate Jet: .0295"
Main Jet: .074"
Exhaust Discs: 6

49 State Models with Carb Restrictor

Idle RPM: 800-1000
Idle Mixture Screw: 1¼-1¾
Accelerator Pump Screw: 2-2½
Intermediate Jet: .0280"
Main Jet: .066"
Exhaust Discs: 6

Tools required:

Flat blade screwdriver
7/16" hex socket
1/2" open end wrench
5/8" box end wrench

Drain the fuel from the carburetor by removing the bowl plug.

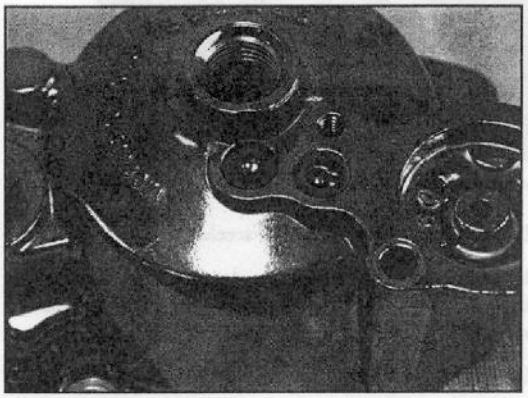
Remove the fuel line from the float bowl.

Remove the carburetor from the motorcycle.

Remove the 4 float bowl screws. Three screws are close to the float bowl/body parting line. The fourth screw serves a dual purpose holding the float bowl and the accelerator pump cap.

Accelerator Pump

Turn the float bowl upside down. Remove the 2 screws holding the accelerator pump cap. Be careful when removing the cap there are 2 steel balls, a spring and 2 O-rings under it.

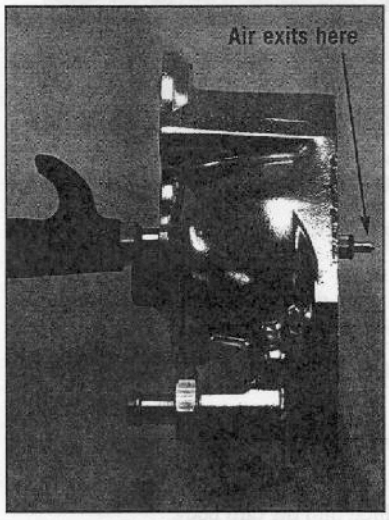


Accelerator pump cap removed showing the 2 steel balls and 0-rings

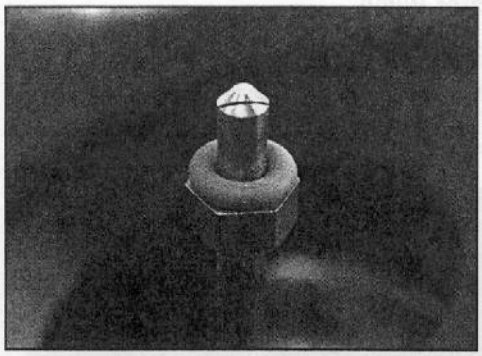
Remove the steel balls, O-rings and spring.

Using an air hose direct compressed air though the port closest to the bowl drain plug. On the inside of the float bowl is a brass tube with an O-ring. This is the accelerator pump ejector nozzle. Air should be exiting from the cut in the tip of the ejector nozzle.

Clean the nozzle if necessary.



Air being directed through the accelerator pump discharge tube



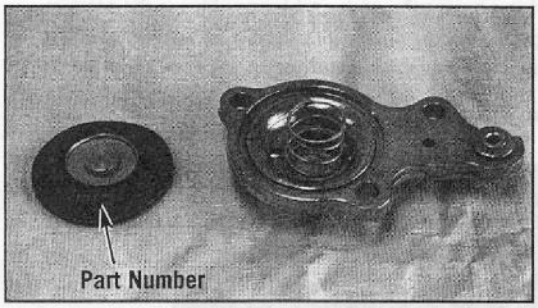
Accelerator pump discharge tube with O-ring

Place two new O-rings into the accelerator pump cavity.

Place a new spring into the port closest to the bowl drain plug. This is the port that has the ejector nozzle attached to it.

Place 2 new steel balls into the O-ringed ports.

Remove the diaphragm from the pump cap. There is a spring under the diaphragm, remove and replace. Place a new diaphragm into the pump cap. The shiny side goes toward the spring. The printed part number should be facing you if the diaphragm is installed correctly.



Diaphragm removed from accelerator pump cap. Note part number on diaphragm orientated up.

Return the pump cap with new diaphragm to the float bowl.

Remove the O-ring on the accelerator pump nozzle and replace with a new one. See photo above

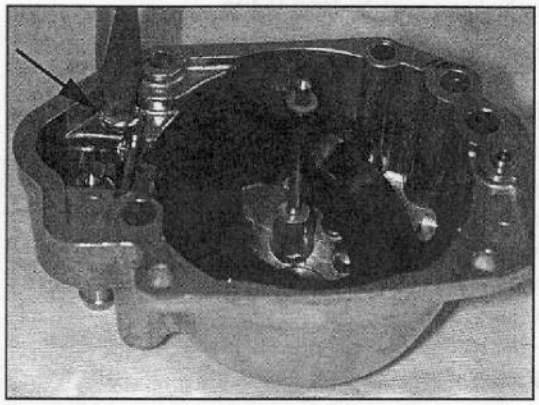
Remove the accelerator pump pushrod from the upper carb body.

Remove the pushrod bellows dust seal and replace with a new part.

Insert a new pushrod into the carb body.

Float Assembly

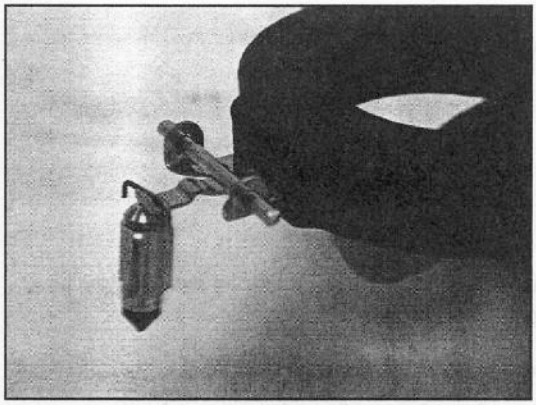
Turn the float bowl over. Using a flat blade screwdriver remove the screw holding the float pin. Lift the float and attached needle from the float bowl.



Float pin retaining screw.

Remove the float pin from the float and replace with a new one.

Remove the needle hanging from the float and replace with a new one.



Brass needle hanging from the float.

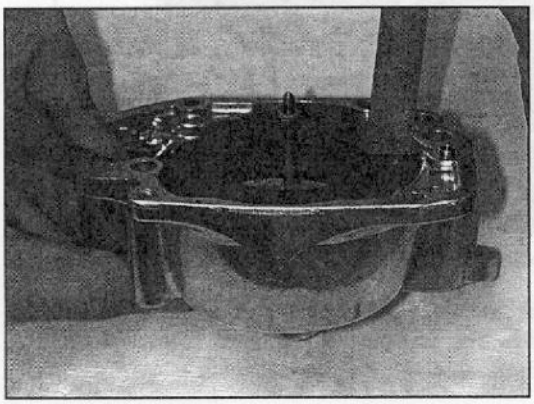
Remove the brass needle using a 5/8" box end wrench. Place a new O-ring on the new seat and install using a 5/8" box end wrench.

Insert the float assembly back into the float bowl while carefully slipping the needle into the brass seat. The float pin should fit into the slot of the float bowl. Thread a new screw securing the float pin to the float bowl.

Check the function of the float. Make sure the float and needle move freely.

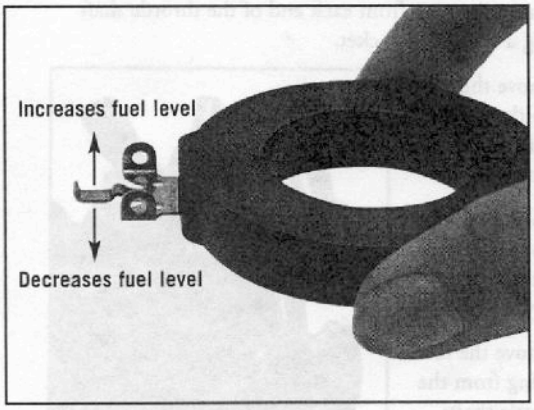
Setting Float Height

Depress the needle and float making sure the needle is seated. Measure the float height from the top of the bowl to the edge of the float. The measurement is taken from the opposite side of the seat. See picture.



Float height measurement

The measurement should fall within 1/8-3/16." Adjust if necessary. Bend the tab that the float needle attaches to. Bending the tab downward lowers float (fuel) height. Raising the tab raises float (fuel) height.



Fuel height adjustment tab

Bleed Hole, and Port Check

With compressed air, check the drilled and cast ports of the body to make sure they are not plugged.

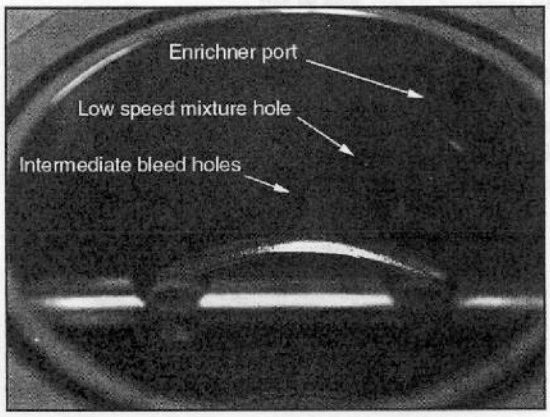
Intermediate Bleed Hole Check

Remove the old float bowl gasket.

Remove the throttle plate from the throttle shaft using a flat blade screwdriver.

Place the carb body on the bench with the inlet facing down and the O-ring facing you.

Remove the brass intermediate jet from the carb body. Place an air gun into the intermediate jet port and shoot a low volume of air through the port. The air should be exiting in the roof of the carb body from the 3 small holes.



The three vertical holes are the intermediate jet bleed holes. The small single hole to the upper right is the low speed mixture. The large hole to the upper right is the enrichner port.

Low Speed Port

Remove the idle mixture screw from the carb body.

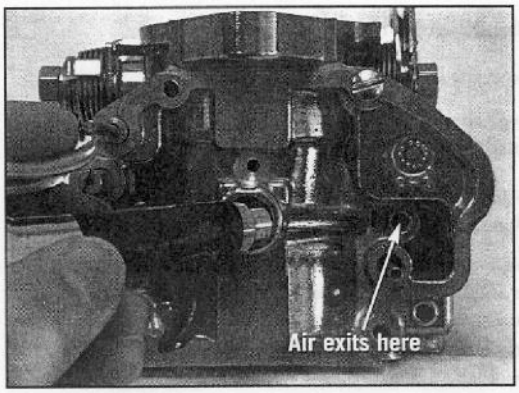
Place an air gun into the idle mixture port and shoot air through it. Air should be escaping through the single hole in the roof of the carb body. The single hole is approximately 1/4" from the 3 intermediate bleed holes.

Main Jet Port

Remove the main jet discharge tube from the carb body using a 1/2" box end wrench.

Place a piece of masking tape over the main jet discharge hole in the venturi area.

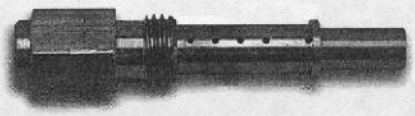
Place an air gun into the main jet port and shoot compressed air through it. Air should exit from a hole in the float bowl area, approximately 1½" to the right of the main jet port.



Place compressed air into main jet port.

Main Jet Discharge Tube

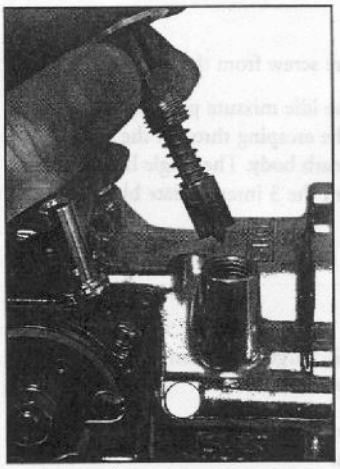
Make sure the main jet discharge tube holes are free of debris. Return the brass main jet discharge tube to the carb body using a 1/2" box end wrench.



Main jet discharge tube with 5 bleed holes.

Enrichner/Fast idle Port

Remove the enrichner/fast idle plunger nut from the carb body using a 1/2" open end wrench.

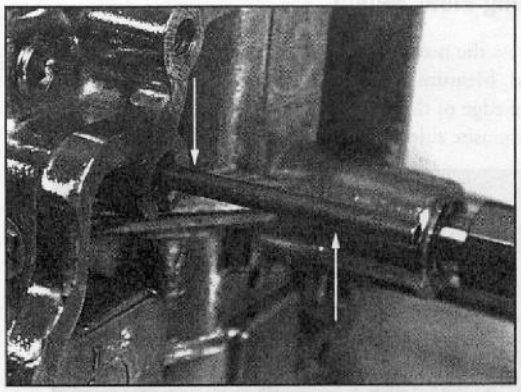


Enrichener plunger assembly.

Lift the plunger assembly from the carb body.

Lift the carb body up to view through the fast idle port. It should be free of debris.

There are 4 holes in the side of the brass tube that feeds the fast idle port. Make sure these are not plugged.



Enrichner fuel pickup tube with holes.

Slip the enrichner/fast idle plunger into the carb body, shoulder first. Slip a new spring on the plunger. On California models this spring can not be removed.

Slip the brass plunger nut onto the plunger and tighten using a 1/2" open end wrench.

Check the operation. It should operate smoothly.

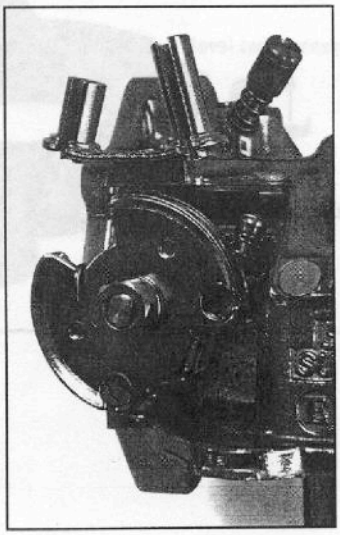
Throttle Shaft

Remove the nuts from each end of the throttle shaft using a 7/16" hex socket.

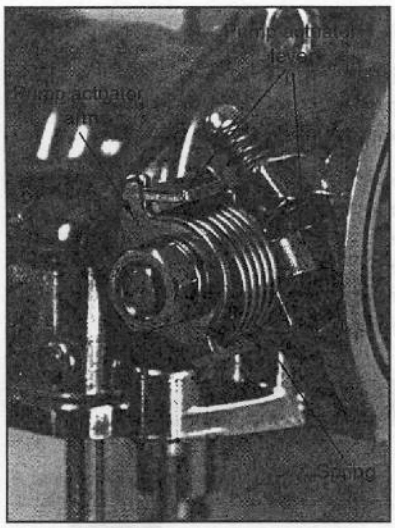
Remove the throttle spool and return spring from the shaft.

Gently pull the throttle shaft from the carb body.

Remove the following from the throttle shaft; accelerator pump actuator arm, actuator spring and the pump actuator.



Throttle Spool



Accelerator Pump Actuator Assembly

Slip a new nylon washer onto the throttle shaft.

Assemble the pump actuator first, followed by the actuator spring and finally by the accelerator pump actuator.

Slip the shaft assembly into the carb body. Make sure the shaft is slipped into the body from the side that is stamped with the carb serial number.

On the other end of the shaft, slip the throttle spool spring. Loop the end of the spring over the idle screw boss.

Slip the throttle spool onto the shaft. The throttle stop tab is oriented toward the carburetor. Make sure the throttle stop screw and the tab align.

Loop the spring end onto the throttle spool.

Slip new lock washers onto each end of the shaft. Thread new nuts onto each end of the shaft and tighten.

Check to make sure that the shaft rotates freely.

After rotating the throttle shaft, slip the new throttle plate into the throttle shaft. Check to make sure the throttle closes fully. Back out the idle stop screw so it is not touching the throttle spool tab.

If the throttle does not close completely, remove the throttle plate and rotate. Slip the throttle plate back into the shaft and again check to make sure it closes fully.

Apply blue Loctite to the 2 new throttle plate screws. Thread them into the shaft and do not tighten.

Rotate the shaft checking for binding of the plate to the body. Again check making sure the throttle closes fully.

Tighten the screws. Again check for binding and full throttle plate closure.

Idle Mix Screw, Idle Stop Screw & Accelerator Pump Adjustment Screw

Remove the idle mixture screw and spring. Replace with new parts. Thread the screw inward (clockwise) until it gently bottoms out. Turn the screw outward (counter-clockwise) 1½ turns. This is an approximate mixture setting.

Remove the idle stop screw and spring. Replace with new parts. Bring the screw to where it just touches the throttle spool tab. Thread the screw inward 1/2 a turn.

This is a general idle setting.

Remove the accelerator pump adjustment screw. Replace with new parts. Thread the screw inward until it gently contacts the pump actuator arm. Back the screw outward 2¼ turns. This is a general pump setting.

Replace the cable guide screw with a new one.

Bowl gasket, Drain Plug O-ring & Body O-ring

Before assembling the carb bowl to the body, place a new gasket between them.

Use the new float bowl screws to secure the bowl to the body. Tighten using a flat blade screwdriver.

Place a new O-ring upon the float bowl drain plug. Tighten the brass drain plug using a 5/8" box end wrench.

Remove the carburetor/manifold O-ring and replace with a new one.

Return the carburetor to the bike. After hooking up the throttle cables, make sure the throttle plate opens freely.

Start the bike and warm to operating temperature. Adjust the low speed mixture screw, the idle screw and accelerator pump according to the instructions outlined in the Primary Service Procedures titled, Check and Adjust Carburetor & Enrichener Operation.

Clutch Disc Inspection and Replacement

The clutch assembly installed in the Indian Chief is a very durable unit. If after removing the fiber clutch plates and determining there is still sufficient fiber material the clutch may just require shimming to bring it back to proper working condition.

Tools required:

3/16" hex bit socket

1/2" box end wrench

11/16" box end wrench

5/8" hex socket

ratchet

torque wrench

Remove the forward shift linkage pivot bolt using a 3/16" hex bit socket and 1/2" box end wrench.

Remove the outer primary cover bolts using a 3/16" hex bit socket. The cap screw located under the floorboard can be removed using a ball end hex key.

Move the shift lever forward and place a rag over the toe lever to prevent scratching the primary cover during removal.

Remove the primary cover.

Loosen the pressure plate adjuster jam nut. The rod will require adjustment after replacing the clutch plates.

Use a hammer and punch to flatten the locking tabs securing the 4 clutch pressure plate shoulder nuts.

Loosen the 4 clutch pressure plate shoulder nuts using a 5/8" hex socket.

Remove the shoulder nuts and spring retainer as a unit. Note any washers between the lock tab and shoulder nuts or between the shoulder bolts and hub standoffs. They will need to be reinstalled in their original position.

Remove the diaphragm spring and pressure plate.

You now have access to the clutch plates. The first and last plates are steel.

Remove all the plates from the clutch.

Plate & Hub Inspection

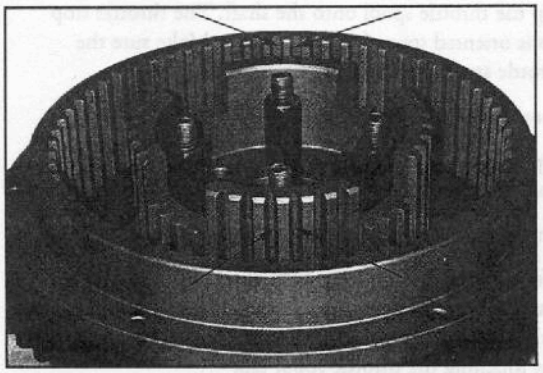
Inspect the steel friction plates for coning warpage. Place each steel friction plate on a granite block or glass plate and check the flatness using a dial indicator.

Another way to check flatness is to stack a pair of used plates together. Hold them between thumb and forefinger at 1 point. Look for light between the plates. If light is not visible between them, take the top plate and turn it over. If light is seen between the plates, they are coned and need replacement.



Inspect the fiber plates. Is there still red friction material remaining on both sides of all the friction discs?

Inspect the inner and outer clutch hubs for wear in the spline areas. Notches in the spline areas can cause rough engagement and disengagement. Replace the hubs if they are worn.



Wear areas of hubs

Replacement of Clutch Plates

Insert the .047" steel plate into the clutch first, than a friction plate. Follow this with a .080" thick steel plate and another friction plate. Alternate the .080" steel plates with the friction plates. The last plate will be steel.

Apply a small quantity of anti-seize to the four clutch studs protruding from the clutch hub.

First, install the pressure plate followed by the diaphragm spring and finally the spring retainer.

Install new lock clips on the shoulder nuts. If the shoulder nuts had washers installed on them, make sure they are returned to their original position.

Thread the shoulder nuts onto the four hub standoffs. If there were washers between the hub standoffs and the shoulder nuts they must be reinstalled.

Torque the shoulder nuts to 24-36 inch pounds (2-3 foot pounds) using a 5/8″ hex socket.

Clutch Rod Adjustment

Turn the clutch rod adjusting screw inward using a 3/16″ tee handled hex until there is resistence. The adjusting screw should now be touching the push rod. Back the adjusting screw in and out several more times to make sure the rod is fully seated. Back the screw out for the final time 1/2-3/4 turn and tighten the jam nut using a 11/16″ box end wrench. Torque to 6-10 foot pounds. Pull the handlebar mounted clutch lever checking for proper adjustment. There should be approximately 1/16-1/8″ free play between the clutch lever bracket and clutch cable.

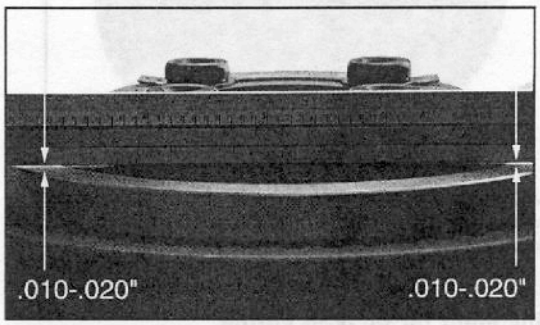
Diaphragm Spring Adjustment

The diaphragm spring is designed to function correctly only when it is installed and operated with the spring compressed to within .010-.020″ of being perfectly flat (clutch engaged). This critical adjustment ensures correct and maximum spring pressure is being applied to the pressure plate. Operating the motorcycle with the diaphragm spring incorrectly adjusted will result in excessive clutch wear, clutch slipping or premature clutch failure. Maintaining the correct diaphragm spring adjustment to compensate for clutch wear is as easily as installing special washers to each of the four shoulder nuts (causing a small INCREASE in diaphragm spring compression).

Typically after installing the new clutch plates no shim adjustment is required.

Measurement

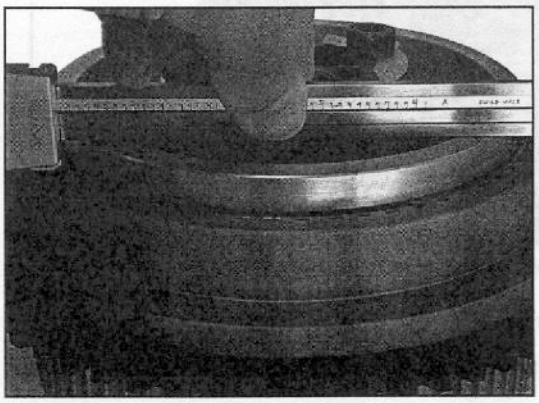
Have a second person pull the clutch lever to the handlebars and hold. The optimum clutch adjustment is to have the diaphragm spring almost completely flat. Place a straight edge across the diaphragm spring. There should be an air gap at the outer edges of .010-.020″.



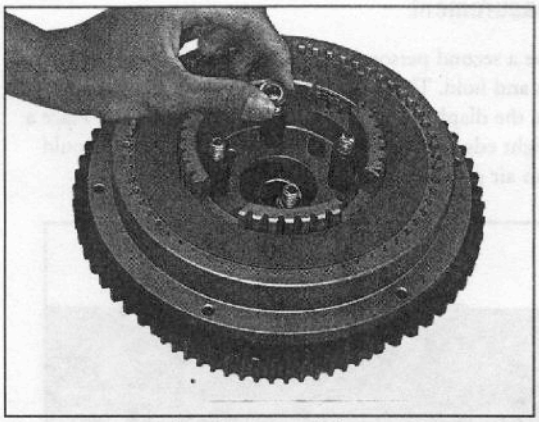
Correct adjustment

Adjustment for flat or concave spring

If the diaphragm spring is flat or concave (#1881) and not within .010-.020″ of being flat, optimum spring function will not be available. The lever may also be excessively hard to pull at the end of the stroke. To correct this install a .022″ washer on each of the clutch hub standoffs as shown. Always check the spring curvature with a high quality straight edge.



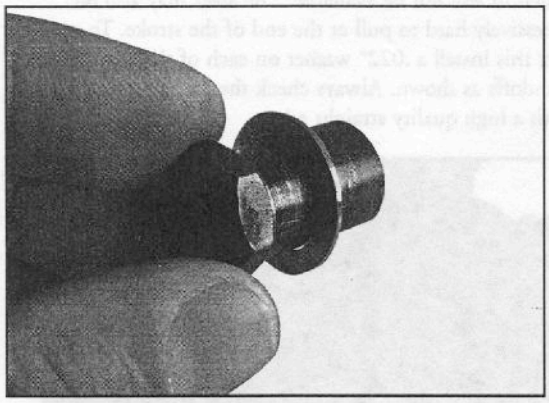
Spring over compressed or flat



Placing a .022" thick washer on standoff corrects for over compression of diaphragm spring. Increases spring height.

Adjustment for peaked spring

After the diaphragm spring is installed and not compressed to with .010-.020" of being flat, optimum clutch function will not be available. To increase spring compression, a special .028" thick washer may be installed on each shoulder nut as shown.



With .028" washer installed on shoulder nut ***Reduces*** *spring height.*

Apply blue loctite to the 12 primary case cap screws.

Replace the outer primary cover gasket if torn.

Upon the perimeter of the inner primary case are 2 dowel pins. These are used to align the inner primary case to the outer primary case. Approximately 3/4" from the left pin is a threaded hole, starting here, place a 1/4"-20 x 2" length cap screw into the outer primary cover. Continuing clockwise, slip the remaining four 2" long cap screws into the outer primary cover. For the remaining 7 holes slip the 1/4"-20 x 1¼" cap screws in.

Being careful not to scratch the outer primary cover, align to the dowel pins and tap with your hand to seat.

Torque the bolts in a "W" pattern to 8-10 foot pounds using a 3/16" hex bit socket.

Return the shift lever rod to the shift lever. Apply grease to the pivot bolt where the spherical joint rides being careful not to get any on the end of the bolt. Place a drop of blue Loctite in the acorn nut threads.

Tighten using a 3/16" hex bit socket and 1/2" box end wrench. Torque to 13-19 foot pounds.

Electrical Troubleshooting

Battery Maintenance and Care

Proper maintenance and care of the battery prolongs its' life. The 1999 Chief was equipped with a lead acid battery while the 2000 model is supplied with a maintenance free battery. The 1999 lead acid battery must have distilled water added to it while the 2000 Chief battery requires no water be added.

New battery preparation

When a new battery is required, the first 12-24 hours are the most critical to long life. Start by filling the battery with the electrolyte (acid) supplied by the manufacturer to the maximum fill line. Let the battery stand for 1-2 hours. Check the electrolyte level and add electrolyte if needed. If you were to put the battery into the motorcycle at this time it would only have 80% of it rated capacity and never more. This is why it is critical to place the battery on a slow rate charger for "initialization" before installation.

A safe beginning to charging is carefully reading the battery manufacturers instructions. Typically it is stated for a lead/acid battery to charge at no more than 1/10 the stated battery amperage. For example a lead /acid battery listed at 10 amps should be charged at 1 amp per hour. The 10 amp battery should be left on the charger for 15 hours for a 100% charge. A 12 volt, 1 amp trickle charger will meet most needs at the consumer level. There are many exceptions to this rule depending on battery type, thus, consult the manufacturers instructions.

After charging add distilled water to the lead acid battery to the maximum fill line and return to the charger for 1 hour. For the maintenance free battery no additional water or electrolyte is needed.

The best chargers for initialization and maintenance are the "Battery Tender" brand. These "smart" chargers identify the type of battery and apply either constant current or constant voltage as is needed. Constant current charging is optimal for deeply discharged batteries and constant voltage is good for maintaining a battery at tip-top voltage. These chargers can be left attached to the battery at all times when not being ridden and only require a monthly check of electrolyte level.

Charging Yuasa Maintenance Free Batteries

Yuasa recommends that their maintenance free battery be charged with a constant-current charger that can push as much as 16.9 volts. The battery needs to be monitored during initialization to not exceed full charge. Maintenance free batteries are 100% charged at 13.0 volts. Also, remember that when a battery comes directly off the charger it will have a surface charge and give a false voltage reading. The battery must sit 1-2 hours to dissipate the surface charge. Another way to quickly dissipate the surface charge is to place a load on the battery. Leave the headlight on for 3 minutes to dissipate the surface charge.

All this leads to purchasing a high quality charger that determines the battery condition and type and applies the correct voltage, current and time.

Battery voltage using a multimeter

State of Charge	Maintenance Free	Conventional Lead/ Acid
100%	13.0v	12.6
75%	12.8v	12.4
50%	12.5v	12.1
25%	12.2v	11.9
0%	12.0v or less	11.8v or less

Voltage Regulator Performance Test

Connect a multimeter to the battery terminals. Set the meter to dc volts, scale of 20 or less. Start the bike and observe the meter.

Increase the R.P.M. until the voltage reaches 14-15 volts. At this point the voltage regulator/rectifier should prevent any further increase in voltage.

If the voltage continues to increase with more R.P.M. than the regulator/rectifier needs replaced. Overcharging of the battery occurs with this condition.

Voltage Drop Testing For a Low Cranking Starter

Tools required:

Digital multimeter

Voltage drop testing compares the voltage loss between 2 points in an operating circuit and displays the difference. The advantage to voltage drop testing is that none of the connections have to be disassembled to conduct the test. More information on batteries is available in the Electrical Trouble Shooting Section, Battery Maintenance and Care.

First measure the battery voltage. Set the meter to read DC voltage. Connect the red multimeter lead to the positive (+) post of the battery and the black lead to the negative (-) post of the battery. A maintenance free battery with 100% charge will read 13.0 volts dc, a lead antimony will read 12.7vdc and a lead calcium will read 12.6vdc.

Press the starter button and read the battery cranking voltage displayed on the multimeter.

Power Side Voltage Drop Test

There are 2 ways to measure voltage drop across the battery cable. The first method involves taking the battery voltage you measured in the prior instructions minus the voltage measured at the starter. To measure the starter voltage, place the red multimeter lead on the starter post and the black lead to ground. Press the starter button and read the multimeter. As an example, if the battery voltage is 12.5vdc and the starter voltage is 10vdc subtracting the 2 yields a voltage drop of 2.5vdc. This should be considered a very high amount.

Battery cranking 12.5vdc
- Starter cranking 11.0vdc

Voltage drop 2.5vdc

This method is very good for understanding how the voltage drop is derived.

The second method is easier to perform. Place the red multimeter lead on the positive post of the battery. Place the black multimeter lead on the power post of the starter. Press the starter button and read the multimeter.

If greater than 0.5vdc than insufficient voltage is reaching the starter. Clean the following: battery terminals, the battery cable terminals, the starter cable terminals; and the starter post. Again, check the voltage drop across the circuit. If the voltage is still 0.5vdc or higher, the battery power cable is not carrying sufficient voltage to the starter and needs replaced.

Replace the battery/starter power cable and perform another voltage drop test.

If the voltage drop is 0.5vdc or less then the cable is operating satisfactory. If not, a ground side voltage drop test needs to be performed.

Ground Side Voltage Drop Test

To perform a ground side voltage drop test, place the black lead of the multimeter to the negative battery post. Place the red multimeter lead on the starter case. Press the red multimeter lead onto the starter case.

Press the starter button and read the multimeter. The ground voltage drop should be .4vdc or less because the load device (starter in this case) should use up all the available voltage if the ground is ground (return) is adequate. A voltage drop close to 0.0 is desirable. If a high voltage drop is measured, then there is a bad ground. Clean the ground circuit and test again.

If after replacing the defective parts and there have been no detected problems in the test parts, the starter needs to be replaced.

Other Voltage Drop Tests

Voltage drop tests can be performed on starter solenoids, switches, headlights, taillights, brake lights, etc.

Maximum voltage drop for motorcycle circuits are:

Starter circuit: maximum voltage drop

Positive side 0.5vdc
Negative side 0.4vdc
Starter solenoid 0.2vdc

Charging circuit: maximum voltage drop

Positive side 0.3v charging at 20 A
Negative side 0.1v

Other circuits:

Headlights, brake lights taillights: maximum voltage drop

Positive side 0.2vdc
Negative side 0.2vdc

Current Draw Test

This test is performed to determine if there is a current draw on the battery causing the battery to be drained. Presently the Indian Chief has no accessories (clock, radio etc.) that places a drain on the battery while the motorcycle is not running.

Disconnect the ground cable from the negative post of the battery.

Set the meter to register amperage (current flow). Place the positive lead of the multimeter on the negative post of the battery. Place the negative lead of the multimeter on the ground cable terminal.

Make sure the ignition key is turned to the off position.

Read the meter. There may be some leakage through the regulator. A perfect condition would be 0 amps.

Stator AC Output Test

Disconnect the regulator/rectifier from the stator at the engine case. Set your multimeter to read ac voltage. Place the multimeter leads into the stator sockets. Start the bike and read the meter. The alternator should produce 16-20 vac per thousand R.P.M.

Alternator output

16-20 volts ac per thousand R.P.M.

Stator check

Grounded stator

With the ignition off, disconnect the regulator/rectifier from the stator at the engine case. Set your multimeter to read continuity (RX1 scale). Place the multimeter leads into one of the stator sockets and ground the other.

There should be infinite resistance (no continuity). If the meter displays any other resistance figure, this indicates the stator is grounded and must be replaced.

Do the same for the other stator socket. Again, there should be infinite resistance (no continuity). If the meter displays any other resistance figure this indicates the stator is grounded and must be replaced.

Correct stator resistance

(infinity)

Shorted Stator

With the ignition off, disconnect the regulator/rectifier from the stator at the engine case. Set your multimeter to read continuity (RX1 scale). Place the multimeter leads into the stator sockets.

The stator resistance should be 0.1-0.2 ohms. Should the meter measure no resistance, or higher than 0.2 ohms, then the stator needs to be replaced.

Correct stator resistance

0.1-0.2 ohms

Evaporative Emissions System

The evaporative emission system installed on the Indian Chief limits the amount of fuel vapor being placed into the atmosphere as required by the State of California. Forty-nine state bikes at this time do not require this system be installed.

The Vacuum spring diaphragm attaches to the carburetor. With the engine running, engine vacuum keeps the valve open. When the engine is shut off the valve closes which prevents fuel vapors from exiting the carburetor mouth, thus, not polluting the atmosphere.

The fuel vapors from the carburetor and gas tank are routed to the charcoal canister and stored until the engine is started. The vapors in the canister are then routed to the carburetor and burned during normal combustion.

The solenoid valve operates by an electrical signal supplied by the ignition switch.

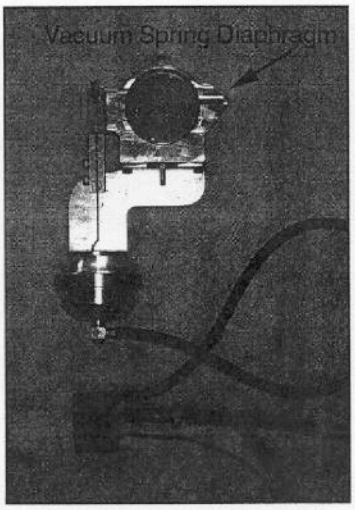
Once the ignition key is turned on, the solenoid valve is opened allowing vacuum from the carburetor to open the vacuum spring diaphragm.

The one-way valve located between the solenoid valve and the "y" tubing connector allows vacuum flow in one direction – toward the solenoid valve.

The pressure relief valve has 2 straight tubing connectors and a 90° bend to it. The valve is designed to hold "X" amount of fuel vapor pressure in the charcoal canister before it "pops off" and bleeds to the remainder of the system.

Troubleshooting the system

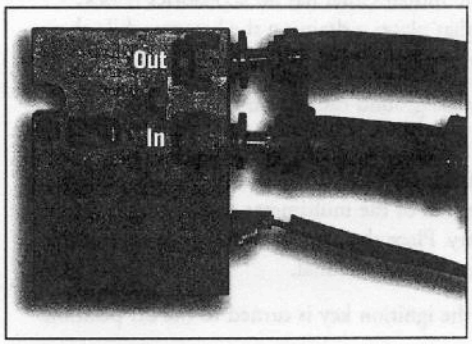
Vacuum Spring Diaphragm



Make sure the butterfly operated by the vacuum spring diaphragm (attached to the carburetor) opens fully when the starter is engaged.

Solenoid Valve

With the ignition key on and pressure applied to the "IN" port, flow should be felt through the "OUT" port.



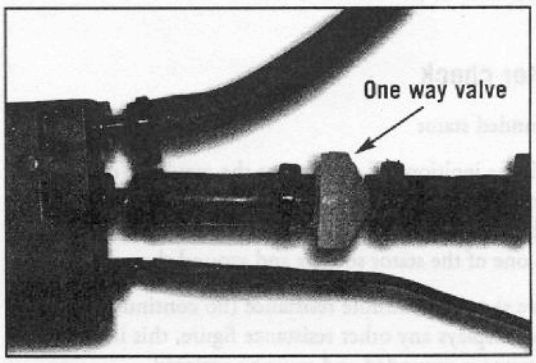
Solenoid controlled check valve

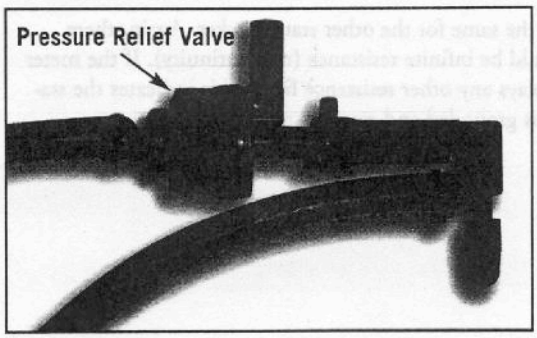
With the ignition key in the off position apply a small amount of pressure to the "IN" port of the solenoid valve. No flow should be felt from the "OUT" port.

Replace the solenoid valve if both conditions are not met.

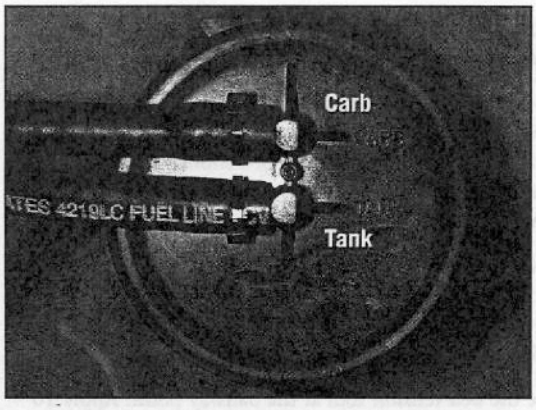
One-Way Valve

Apply low pressure to the one-way valve. In one direction flow should be felt. When flow direction is reversed no flow should be felt. If both conditions are no met then the valve should be replaced.



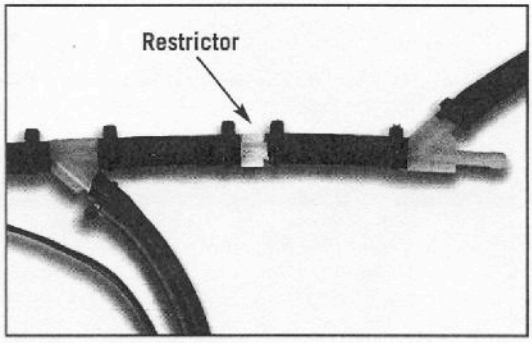


Pressure Relief Valve



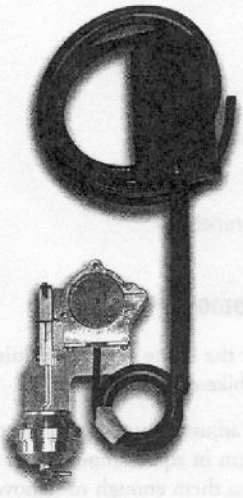
Carbon Canister





Restrictor

Hook Up of Hoses



Carbon canister to vacuum spring diaphragm.

Rear Wheel Removal and Installation

Tools required:

1/2" hex socket

15/16" hex socket

ratchet

torque wrench

Rear Wheel Removal

Place a jack under the frame at the transmission crossmember. Lift the bike off the ground.

Loosen the 2 axle adjuster nuts using a deep 1/2" hex socket. Loosen them in equal amounts and count the revolutions. Loosen them enough to remove the drive belt from the sprocket. Note the amount on a piece of paper.

Remove the cotter key from the axle nut. Loosen the axle nut using a 15/16" hex socket.

Remove the nut from the axle. Adjust the jack under the motorcycle to have the rear wheel just touching the ground. Remove the axle from the rear wheel.

Lift the tire at least 6" off the ground, higher is better. This allows the tire to be wiggled from under fender.

Gently remove the wheel from the swingarm noting where each spacer is located. Place the spacers off to their respective sides of the motorcycle.

Rear Wheel Installation

Insert the 1/2" length black powder coated spacer into the sprocket side seal.

Insert the 1/2" chrome spacer into the brake rotor side of the wheel

Place the wheel into the swingarm, sprocket to the left side of the bike. Loop the drive belt over the sprocket. Slip the 1½" length black powder coated spacer between the left swingarm and 1/2" black spacer. Lightly grease the axle. Slip the axle through the swingarm and wheel from left to right. Do not fully insert the axle.

Slip the stepped aluminum spacer between the right swingarm and brake hanger. The hanger is counter bored for the step in the spacer.

Fully insert the axle. Slip the axle washer onto the axle. Thread the castle nut onto the axle and finger tighten.

Adjust the drive belt tension. Bring the adjuster nuts to the original position and tighten the axle.

Lift the rear of the motorcycle off of the ground approximately 1/2". Rotate the rear wheel in a forward direction checking for belt tracking. The belt should track to the left side of the sprocket in approximately 15 revolutions. Loosen the axle and adjust if necessary.

Check the belt tension. On the lower rung of the belt, find a distance halfway between the transmission shaft and the rear wheel axle. This point will be approximately 1" aft of the lower swingarm rocker.

Place the belt tension tool at the halfway point. Apply 10 pounds of force deflecting the belt upward. Measure the deflection distance. The correct deflection value is 3/8"-1/2".

Rotate the tire 1/2 a revolution and recheck the belt tension again. Do this a few more times. You may find tight and loose spots, yet the measurements should fall within the 3/8"-1/2" range. Adjust if necessary.

Torque the axle nut to 60-65 foot pounds. Insert a new cotter key and bend.

Rocker Box Gasket Replacement

This procedure is written to change the top, center and lower rocker box gaskets. If only the top and center gaskets are the only ones that need to be changed, then only the top and center covers require removal – you do not need to remove the bottom rocker box.

When all the gaskets need changed on both the front and rear bottom rocker boxes, remove the front cylinder first. Removing the front rocker box first allows the rear tappets to bleed down eliminating the push rods being loosened.

The front cylinder pushrods do not require removal to change front rocker gaskets.

Tools required:

3/16" hex bit socket

1/4" 12 point hex socket

5/16" 12 point hex socket

7/16" hex socket

1/2" hex socket

brass punch

soft faced mallet

Remove dash / Remove fuel tanks

Loosen the four screws on top of the rocker box. Depending upon the rocker box manufacturer, use either a 3/16" hex key, 1/4" 12 point hex socket or 5/16" 12 point hex socket.

Remove the 4 bolts from the rocker box.

Tap the top cover with a soft faced hammer to loosen if needed. Do the same for the rocker box center ("D" ring).

Remove the top cover followed by the center "D" ring.

When Only The Top or Center Gaskets are Leaking

Clean and inspect all gasket surfaces.

Replace the umbrella valve.

Place a new outer center gasket and new inner center gasket on the lower rocker box.

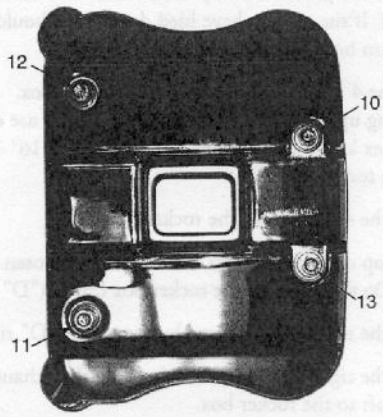
Slip the cleaned center rocker box cover ("D" ring) on the lower rocker box.

Install a new top rocker cover gasket onto the center cover ("D" ring).

Slip the top cover on.

10/1/00

Insert the 4 rocker cover bolts into the top rocker cover. Torque to 8 foot pounds following the sequence below.



Torque sequence

When All Gaskets For Both Front And Rear Cylinders Are Being Replaced

Front Rocker Box

Bring the rear cylinder to top dead center (both valves closed).

Loosen the four screws on top of the front rocker box. Depending upon the rocker box manufacture, use either a 3/16" hex key, 1/4" 12 point hex socket or 5/16" 12 point hex socket.

Remove the 4 bolts from the rocker box.

Tap the top cover with a soft faced mallet to loosen if needed. Do the same for the rocker box center ("D" ring).

Remove the top cover followed by the center "D" ring.

Loosen the two 1/4" socket head bolts using a 3/16" hex bit socket. Loosen the three 1/4" hex bolts using a 7/16" hex socket. Loosen the four 5/16" tower bolts using a 1/2" hex socket. Loosen each screw only 1-2 turns each. Alternate until all pressure has been released by the valve springs.

Lift the front rocker box from the cylinder head.

Clean all gasket surfaces.

Rear Rocker Box

Make sure the piston is at top dead center and the valves are closed. If the tappets have bled down you should be able to turn both push rods.

Loosen the 4 screws on top of the rear rocker box. Depending upon the rocker box manufacturer, use either a 3/16" hex key, 1/4" 12 point hex socket or 5/16" 12 point hex socket.

Remove the 4 bolts from the rocker box.

Tap the top cover with a soft faced mallet to loosen if needed. Do the same for the rocker box center ("D" ring).

Remove the top cover followed by the center "D" ring.

Remove the right rear 5/16" bolt holding the exhaust rocker shaft to the rocker box.

Use a 1/2" hex socket.

Using a brass punch and mallet, tap both rocker arm shafts from the rocker box. Mark each shaft upon removal, "Intake" or "Exhaust."

Remove the rocker arms. Mark each rocker arm "Intake" or "Exhaust".

Pull the intake push rod (front) from the rocker box and mark with masking tape "Intake."

Pull the rear push rod (rear) from the rocker box and mark with masking tape "Exhaust."

Remove the two 1/4" socket head bolts holding the rocker box to the cylinder head using a 3/16" hex bit socket.

Remove the three 1/4" hex head bolts using a 7/16" hex socket.

Remove the rocker box from the head.

Inspect the rocker arm pads and ball sockets for pitting and excessive wear. Replace the rocker arms if necessary.

Clean all gasket surfaces.

Assembly

Return the push rods to their original position.

Place new gaskets on top of the cylinder head.

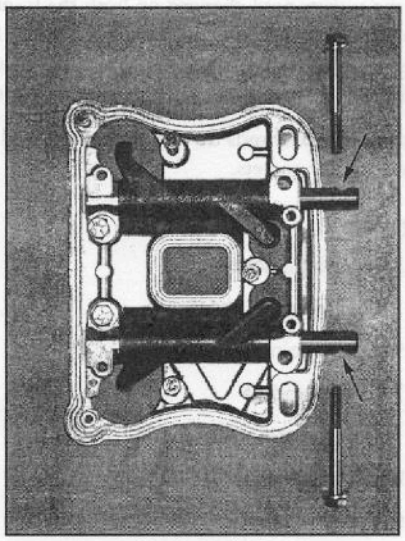
Place the rocker box on the head and align.

Insert the two 1/4"-20 x 1¾" socket heads and thread inward. Insert the three 1/4"-20 x 1¼" hex bolts.

Return the rocker arms to their correct position.

View the rocker shafts and notice that the notch on each goes toward the pushrod side.

Align the intake rocker arm to the rocker box. Insert the intake rocker shaft into the rocker box shaft tower from the right side of the bike. Do not insert the shaft fully. Allow the notches to be visible. Rotate the shaft to have the notch vertical. Continue tapping the shaft inward until the notch aligns with the bolt hole in the shaft tower. The bolt engages the notches locking the shaft. Insert the 5/16"-18 x 2¾" long bolt into the rocker box locking the shaft.

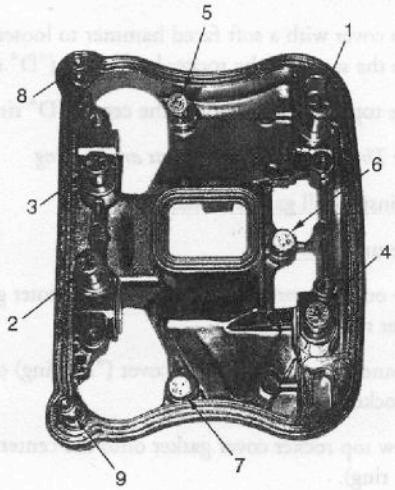


Notches in shafts

Do the same for the exhaust rocker.

Slip the two 5/16"-18 x 2½" long bolts into the valve side of the shaft tower.

Use the torque sequence photo below for all the bottom rocker bolts.



Torque sequence

Numbers 1, 2, 3 & 4 are 5/16″-18 bolts. Torque to 18 foot pounds using a 1/2″ hex socket.

Numbers 5, 6 & 7 are 1/4″-20 hex bolts. Torque to 12 foot pounds using a 7/16″ hex socket.

Numbers 8 & 9 are 1/4″-20 socket heads. Torque to 10-12 foot pounds using a 3/16″ hex bit socket.

Replace the umbrella valve before.

Place a new outer center gasket and new inner center gasket on the lower rocker box.

Slip the cleaned center rocker box cover ("D" ring) on the lower rocker box.

Install a new top rocker cover gasket onto the center cover ("D" ring).

Slip the top cover on.

Insert the four rocker cover bolts into the top rocker cover. Torque to 8 foot pounds.

Refer to photo #41 for the correct torque sequence.

Starter Removal and Installation

Tools required:

3/16" hex bit socket

1/4" hex bit socket

5/16" hex bit socket

7/16" hex socket

1/2" hex socket

1/2" box end wrench

10mm box end wrench

13 or 14mm hex socket

#3 phillips screw driver

punch

hammer

15" zip ties

Remove the seat.

Remove the negative battery ground strap first followed by the positive side. Remove the battery.

Unplug the brake light wires attached to the pressure sensor. The pressure sensor is located on the frame rail and forward of the oil bag drain tube.

Pull the positive battery cable from the oil bag.

Pull the negative battery cable form the oil bag.

Pull the brake light wires from the pressure sensor up through the oil bag.

Pull the wire going to the starter solenoid. The wire has a 90° female crimp fitting.

Remove the rear shift rod linkage bolt.

Remove the outer primary cover.

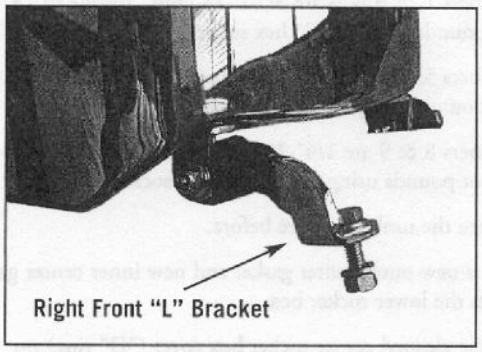
Remove the air cleaner cover.

Remove the lower left nylock hex nut from the rubber oil bag mount using a 7/16" hex socket and extension.

Remove the lower right "L" bracket nut and bolt from the oil bag using a 1/2" hex socket and box end wrench. The bolt goes through the "L" bracket and frame.

Remove the 2 rear oil bag bolts using a 1/2" hex socket. The right bolt has the ground strap attached to it.

The oil bag can now be slid to the right and almost all the way out of the frame. Place a 15" zip tie through the small opening of the left rear oil bag and around the right frame rail. This suspends the oil bag from the frame rail.



Starter Removal

Tap the lock tab away from the jackshaft bolt using a punch and hammer.

Place a set of channel locks on the pinion gear to keep it from rotating while loosing the jackshaft bolt. Remove the jackshaft bolt using a 7/16" hex socket. Access to the bolt is from the left side of the bike. Inspect the jackshaft drive gear for excessive wear or chipped teeth.

Remove the 2 bolts holding the starter to the transmission using a 1/4" hex bit socket. Gently pull the starter form the transmission being careful not to scratch the chrome pieces.

The starter/jackshaft coupling may be attached to the starter or the jackshaft. Remove the coupling and clean the old grease from the inner splines. Inspect the splines for wear.

Apply new grease to the coupling splines and slip onto the new starter.

Starter Installation

Apply blue Loctite to the 2 socket head starter bolts.

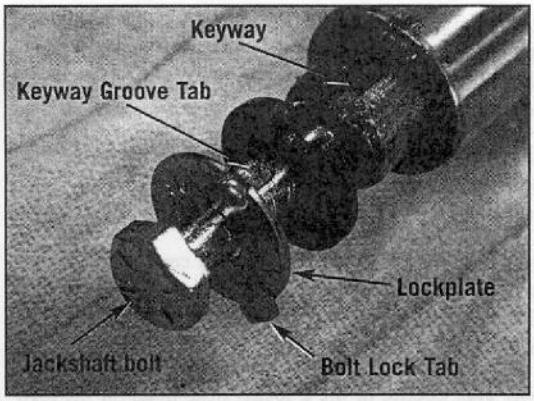
Align the coupling splines to the jackshaft splines and push the starter inward. Make sure the transmission vent tube is routed under the starter.

Align the starter bolt holes to the transmission bolt holes.

Thread the bolts into the holes and leave loose.

Upon the jackshaft bolt is a lockplate. Align the lockplate groove tab to the jackshaft keyway groove, and thread the bolt into the starter. Do not tighten the bolt.

Tighten the 2 starter bolts using a 1/4" hex bit socket. Torque to 15-20 foot pounds.



Tighten the starter jackshaft bolt using a 7/16″ hex socket. Torque to 7-9 foot pounds.

Pull the pinion gear toward the clutch. Release the gear checking for proper retraction.

Binding can occur between the keyway groove tab and the pinion gear if the tab is not fully seated. Use a punch and hammer to fully seat the tab. Pull and release the pinion gear again checking for binding.

Bend the lockplate tab over the jackshaft bolt to secure it.

Apply di-electric grease to the positive (power) battery cable ring terminal and the solenoid post.

Slip the positive cable onto the solenoid stud.

Place the star washer onto the solenoid post followed by the nut. Align the cable to be pointing toward the left side of the motorcycle.

Depending upon the nut size use either a 13 or 14mm wrench to tighten. Torque to 65-80 inch pounds (5.4-6.6 foot pounds).

Slip the rubber boot over the stud and cable.

Oil Tank Installation

Clip the zip tie used to secure the tank to the frame.

Slip the tank back into the frame being careful not to scratch any components. The rear tank mount (black in color) slips behind the frame cross member while the left front rubber mounted stud slips through the frame mount.

Feed the battery cable through the left rear of the oil bag.

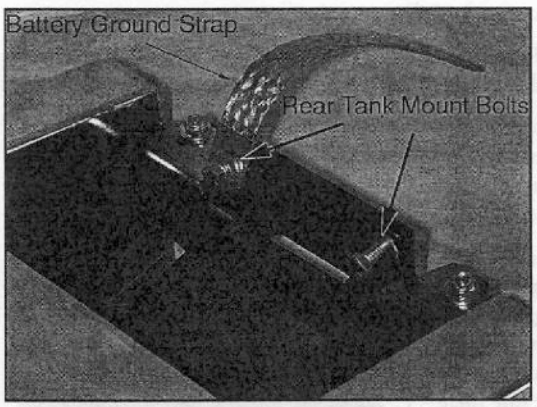
Feed the brake light wires and the solenoid wire through the right rear of the oil bag.

The solenoid wire has a 90° female crimp connector. Attach this to the male connector on the solenoid.

Apply blue Loctite to the 2 rear oil tank bolts. Align the rear oil tank mount (black in color) to the frame through holes. Slip the left bolt through the frame and thread into the oil tank mount. Do not tighten.



Slip the remaining bolt through the battery ground strap. Slip the bolt with ground strap through the frame and thread into the oil tank bracket.



Align the right front "L" bracket to the frame. The "L" bracket sits on top of the frame bracket. Apply blue Loctite to the bolt and slip through the "L" bracket and frame. Slip the lock washer onto the bolt and thread the nut on. Do not tighten.

Thread the nylock nut onto the left front rubber stud.

Lightly snug the hardware in the following sequence:

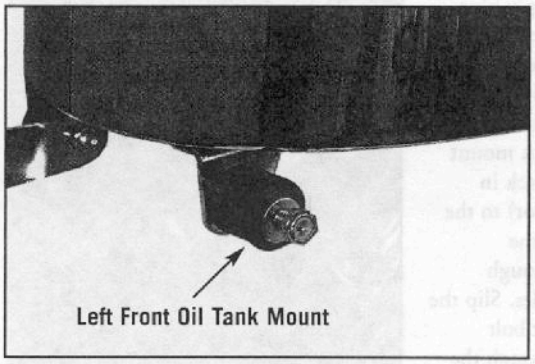
a. Left rear bolt using a 1/2″ hex socket.

b. Right rear bolt with ground strap using a 1/2″ hex socket. Align the strap to be vertical.

c. Left rubber mount nylock nut using a 7/16″ hex socket.

d. Right front nut and bolt using a 1/2″ box end wrench and 1/2″ hex socket.

Check alignment of the oil bag to the frame rails and oil



bag to the frame mounts. Adjust if necessary.

Torque the hardware to the following specifications:

a. Left rear bolt using a 1/2" hex socket, torque to 17-19 foot pounds.

b. Right rear bolt with ground strap using a 1/2" hex socket, torque to 17-19 foot pounds.

c. Left rubber mount nylock nut using a 7/16" hex socket, torque to 8-10 foot pounds.

d. Right front nut and bolt using a 1/2" box end wrench and 1/2" hex socket, torque to 17-19 foot pounds.

Attach the 2 brake light connectors to the brake line pressure sensor. The brake light wire has 2 straight female connectors attached. There is no polarity for the pressure sensor.



After oil tank installation, inspect the battery cable routing making sure there is not direct contact between the metal battery box pan and the cable. A foam battery tray liner is installed to prevent cable chaffing. If direct contact does occur, chaffing of the wire can take place leading to shorting of the battery.

Apply di-electric grease to the posts of the battery. Install the battery with the positive post located to the left. Attach the positive cable to the battery first followed by the negative ground strap. Use a 10mm hex wrench. Torque to 96 inch pounds (8 foot pounds).

Apply blue Loctite to the outer primary cover socket head bolts. Install the outer primary cover. Tighten the bolts using a 3/16" hex bit socket. Torque to 8-10 foot pounds.

Lubricate the rear shift rod linkage bolt using grease. Apply blue Loctite to the first 1/8" of bolt threads. Torque to 13-19 foot pounds using a 3/16" hex bit socket.

Apply blue Loctite to the 3 air cleaner cover screws. Install the air cleaner cover. Tighten the screws using a #3 phillips screw driver. Torque to 84-108 inch pounds (7-9 foot pounds).

Apply blue Loctite to the 2 socket head bolts for the seat. Tighten using a 5/16" hex bit socket. Torque to 25 foot pounds.

Bikes with a passenger seat, tighten the rear socket head bolt using a 3/16" hex bit socket. Torque to 96 inch pounds (8 foot pounds).

Wheel Bearing End Play Check and Adjustment

Wheel bearing end play is critical to the handing and safe operation of the motorcycle. Incorrect end play will result in decreased bearing life. Insufficient bearing end play may cause the bearing to seize while excessive end play may result in unstable handling.

Wheel bearing end play specification .003-.008″

Tools required:

Dial indicator, .001″ resolution

Magnetic base

1/2″ hex bit socket

7/8″ hex bit socket

Front wheel

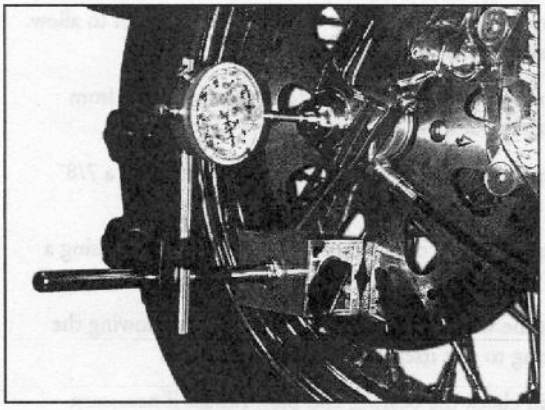
Raise the front wheel off the ground.

Loosen the 2 acorn nuts 1/2 turn on the bottom of the right fork leg cap holding the axle.

Use a 1/2″ hex socket.

Torque the axle nut located on the left side of the axle to 50-55 foot pounds using a 7/8″ hex socket.

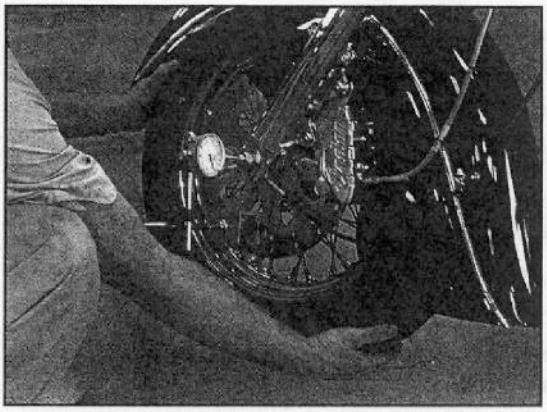
Torque the 2 acorn nuts using a 1/2″ hex socket to 9-13 foot pounds.



Indicator Mounting

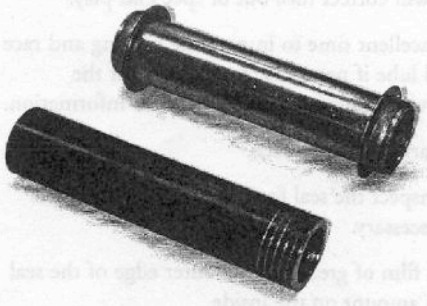
Place the magnetic indicator base on the disc brake caliper. Adjust the indicator to contact the center of the axle. Make sure the indicator plunger moves parallel to the axle to avoid indicator trigonometry error.

Grasp the tire at the perimeter. With both hands push the wheel away from you. Zero the indicator. With both hands pull the wheel toward you while reading the indicator. Correct end play is .003-.008″.



Checking end play. Both hands are pulling in this photo.

To adjust end play change the center hub spacer. Installing a longer spacer increases end play while a shorter spacer decreases end play.



Two varieties of center hub spacers used on the Chief

Below is a list of Center Hub Spacers lengths with corresponding part numbers.

Length	P/N
4.400	23-056
4.405	23-047
4.410	23-048
4.415	23-049
4.420	23-057
4.425	23-050
4.430	23-051
4.435	23-052
4.440	23-058
4.445	23-059
4.450	23-060
4.555	23-061
4.065	23-062

To remove the center hub spacer the front wheel will require removal.

Loosen and remove the left side axle nut using a 7/8" hex socket.

Loosen the right fork leg axle cap using a 1/2" hex socket.

Remove the speedometer cable from the drive unit.

Gently pull the axle from the wheel allowing the front wheel to fall to the ground.

Round up any spacers that have fallen and place on the axle.

Remove the seal from the left disc brake rotor side of the wheel using a seal removal tool.

Lift the bearing from the race and sit it on a clean, lint free cloth.

Remove the center hub spacer and measure it's length.

Replace the original hub spacer with one that you have determined will correct thee out of spec end play.

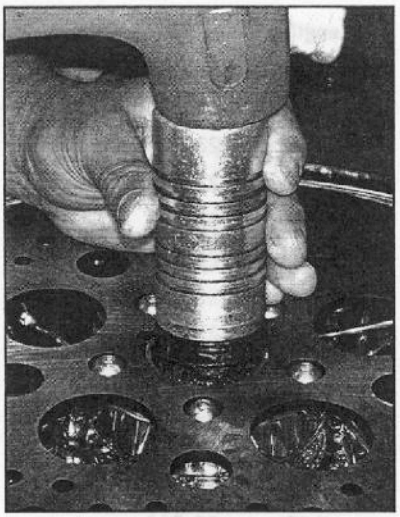
Now is an excellent time to inspect the bearing and race for wear and lube if necessary. See page 44 of the Renewal Service Procedures for lubrication information.

Place the bearing into the race.

Clean and inspect the seal for any cuts or worn areas. Replace if necessary.

Place a light film of grease on the outer edge of the seal and a liberal amount on the inside.

Align the seal to the hub. Gently seat the seal using a seal driver or socket of comparable size. The diameter of the socket should be slightly smaller than the O.D. of the seal.



Seal being driven into hub

Before inserting the wheel into forks check the brake pads. Replace the pads if necessary.

Insert a very large screw driver or pad spreader tool between the brake pads and force them open.

Make sure the 1/2" thick spacer is inserted in the right side wheel bearing seal.

Place the speedometer drive unit into the rotor side of the bearing seal.

Make sure the speedo drive tabs index into the rotor.



Front axle with hardware

Clean the axle and apply fresh grease.

Slip the axle through the right fork leg axle cap approximately 1/2". Slip the .650" width chrome spacer on the axle.

Orient the rotor to the left side of the bike. Slip the wheel between the fork legs being careful not to damage anything.

Lift the wheel upward and align with the axle. Slip the axle inward through the wheel and into the left fork leg.

On the threaded side of the axle slip a 1/2" flat washer followed by the 1/2" lock washer and the 1/2" hex nut.

Lightly tighten the axle cap nut located on the bottom of the right fork leg. The cap must be loose enough to allow the axle to slide while tightening the axle nut.

Align the speedometer drive to angle downward from horizontal at a 30° angle.

Torque the axle nut to 50-55 foot pounds using a 7/8" hex socket.

Torque the axle clamp nuts to 9-13 foot pounds using a 1/2" hex socket.

Spin the wheel a couple dozen revolutions allowing the bearing to seat itself into the race.

Again check the bearing end play. Adjust if necessary. Specification is .003-.008"

Install the speedometer cable to the speedo drive unit.

Rear Wheel End Play

Repeat the same process described in the front wheel end play. The same center hub spacers are used in the rear wheel as the front.

Torque values for the rear wheel axle are 60-65 foot pounds using a 15/16" hex socket.

After removal of the rear wheel check the drive belt tension and tracking, see page 10 of the Primary Service Procedures for more information.