Indian MOTORCYCLE

INDIAN MOTORCYCLE SERVICE MANUAL

1999-2001 MODELS

CONTENTS

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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1999-2000 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 primary oil
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/cm^2
Rear: 40 p.s.i. 2.8 kg/cm^2

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 – .205"-.210"
Rear min. thickness – .180"

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: 24¼" / 692mm

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, 5000 mile mark and every 10,000 miles thereafter.

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.

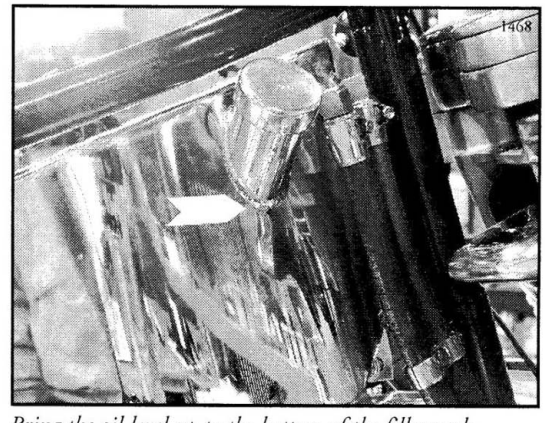
From the left side of the bike remove the oil filter using a proper sized oil filter wrench.

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

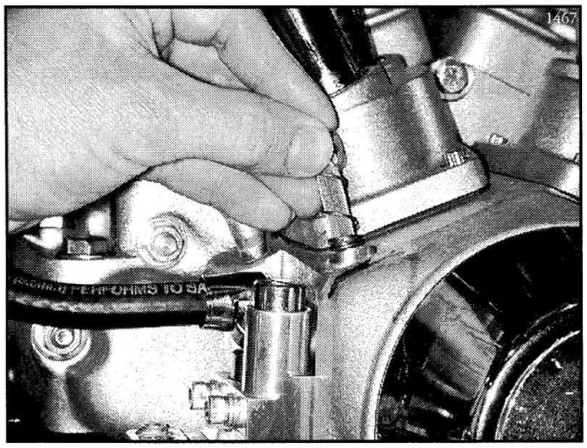
Tools required:

Large flat blade screwdriver

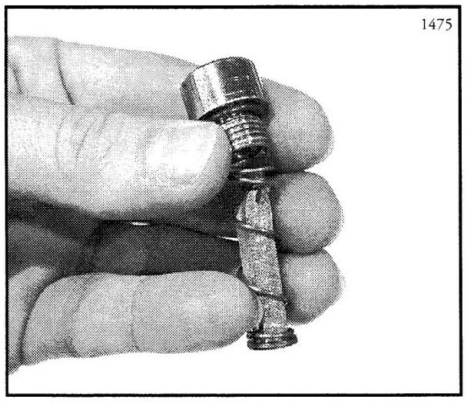
Drag link flat blade bit socket

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

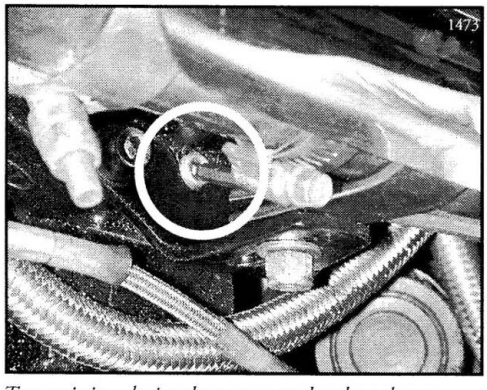
ratchet

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.

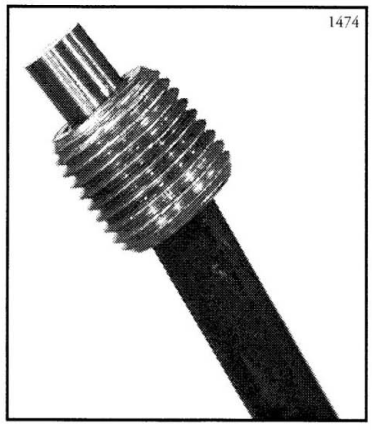
Using a 3/16″ ball drive hex key remove the magnetic drain plug. Be careful not to burn yourself on the hot exhaust.



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.

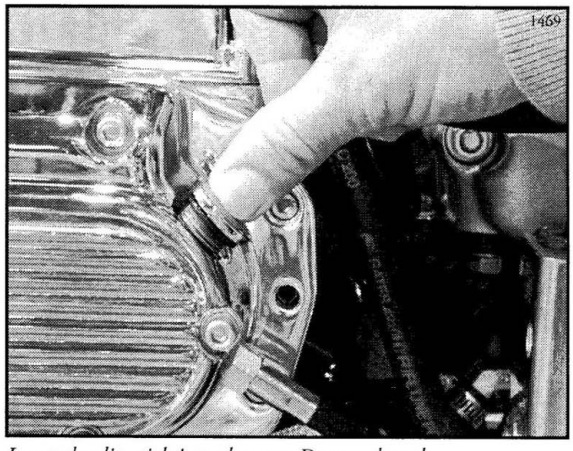


Return the drain plug to the transmission housing and tighten using a 3/16″ ball hex key and ratchet.

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.

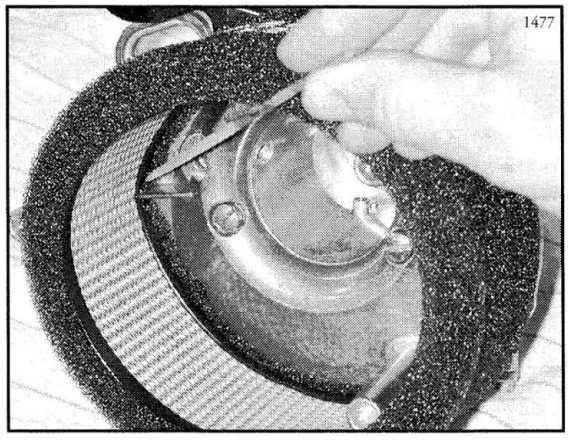
Remove the foam element from the chrome housing.

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.

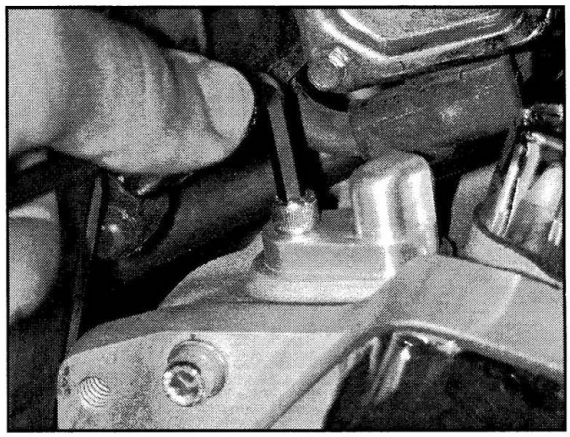
Tighten using a #2 phillips screwdriver and torque to 84-108 inch pounds (7-9 foot pounds).

Speedometer sensor cleaning

The speedometer may display erratic needle behavior or not function. Cleaning the sensor may restore proper function to the speedometer. The speedometer sensor is located on the top right side of the transmission.

Remove the socket head cap screw using a 3/16" hex key.

Remove the sensor & clean the tip with WD-40 or similar product. Check the o-ring for cuts and replace if necessary. Lubricate the o-ring before inserting the sensor into the transmission case. Clean and place blue thread lock on the threads of the cap screw. Torque the cap screw to 9 foot pounds.



Remove the socket head cap screw to gain access to the sensor

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

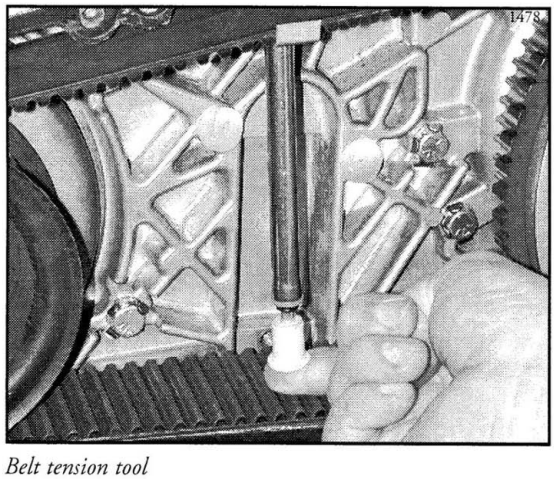
torque wrench

belt tension gauge

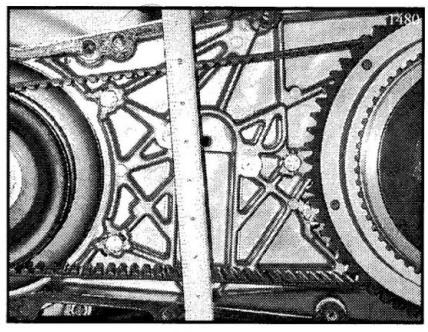
Remove the twelve 1/4″-20 SHCS along the perimeter of the outer primary cover using a 3/16″ hex bit socket. Remove the outer primary cover from the inner.

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.

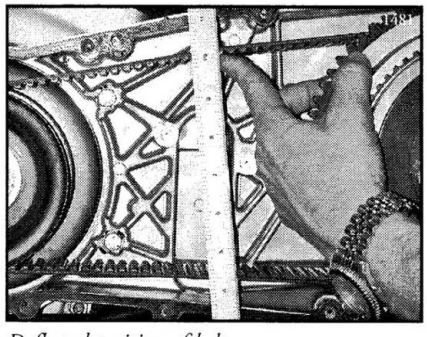
Inspect the tension of the belt when cold. Set the belt tension gauge to 30 pounds. Place the gage at the mid point of the upper belt and deflect upward. Deflection upward is 3/8″-1/2″. With 30 pounds of deflection force the belt should not contact the inner primary housing.



Belt tension tool

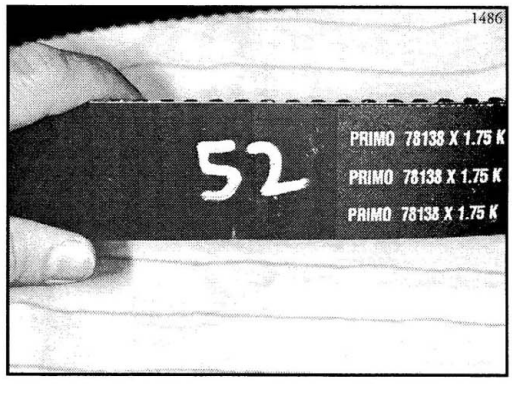


Neutral position of belt



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. 5 increment increase adds approximately 1/16″ of looseness. Initial break-in of 8-25 hrs per gates.



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).

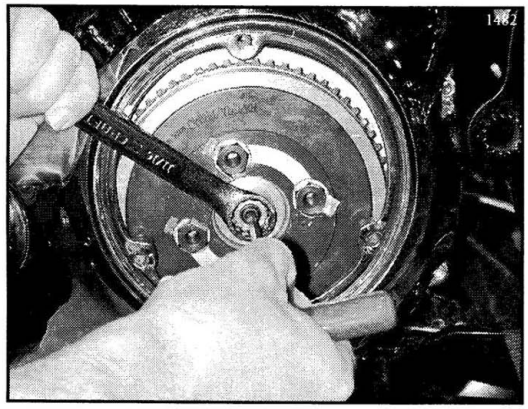
Bend the locking tabs around the shoulder nuts.

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.

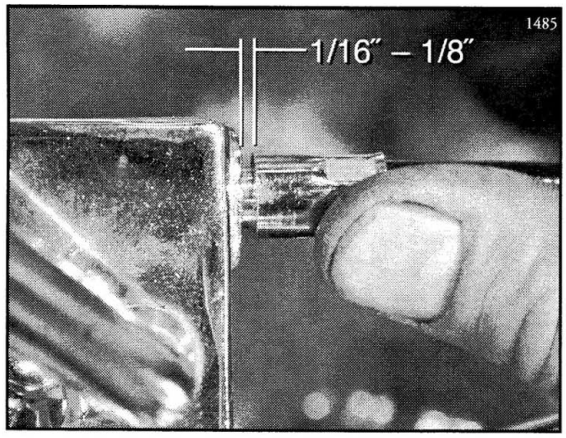
Using a 3/16″ hex key thread the adjusting screw inward (clockwise) until it touches the push rod inside the transmission. Continue threading inward until the diaphragm spring can be turned by hand. Back the screw out (counterclockwise) until it is free turning. Slowly turn the screw inward again (clockwise) 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. Cable also has adjustment that can be used.



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.

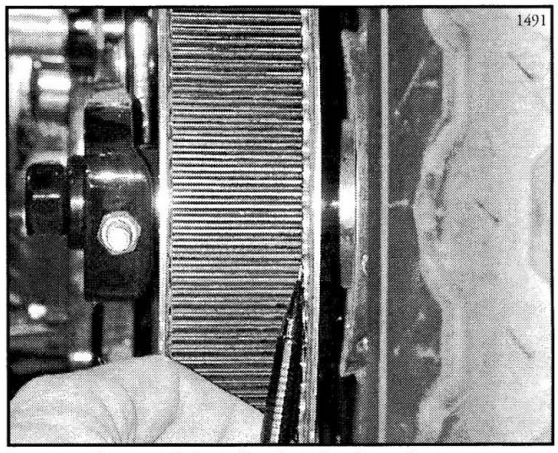
Loosen or tighten the axle adjuster nuts according to the required need. Remember loosen or tighten the nuts in equal increments. Use a 1/2″ hex wrench for the axle adjusters.

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.

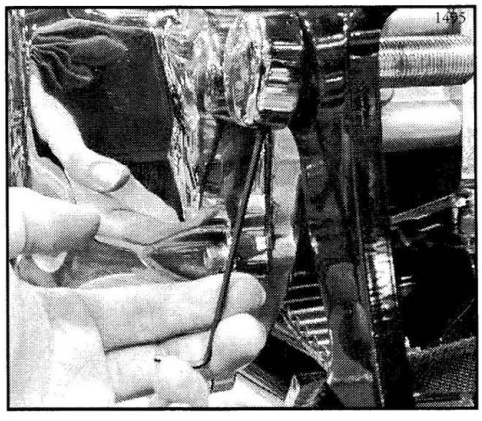


Note gap between belt and right side of sprocket

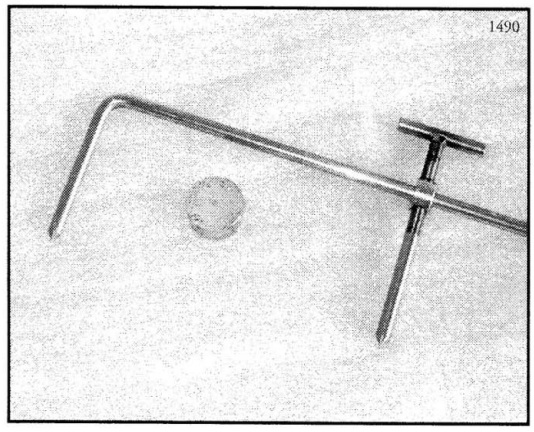
If adjustment is required tighten or loosen the axle adjuster nuts to achieve the correct belt tracking. The belt tension will require a recheck also.

Rear wheel alignment

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

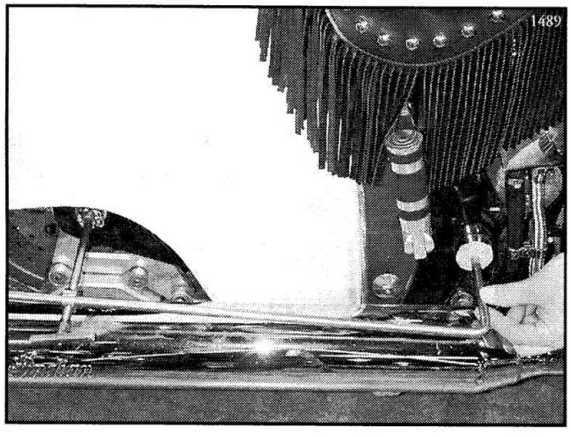


Slip the 1⅛″ centering socket on the left pivot bolt and the 15/16″ centering socket on the left rear axle bolt.



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

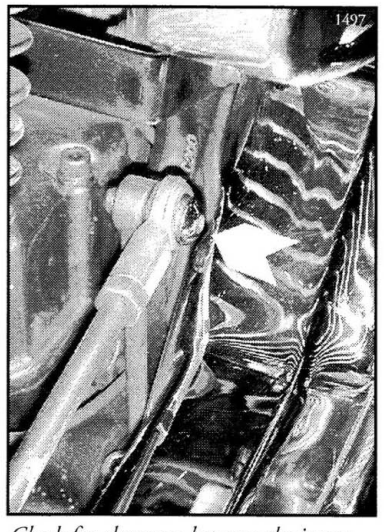
1/4" hex key

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.

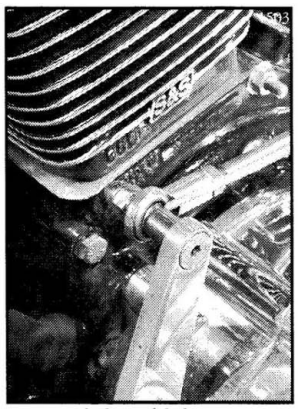
If interference is detected the transmission shift lever may not be seated deeply enough or the lever inclination may not be correct.

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.

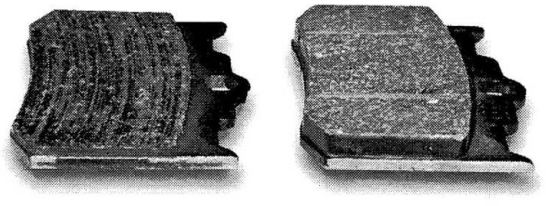
Remove the rear button head pivot bolt using a 3/16″ hex key. Place grease on the pivot point. Again be careful to not get any grease on the end of the bolt threads. Place a drop of blue Loctite on the end of the threads. Tighten using a 3/16″ hex key. Torque to 13-19 foot pounds.

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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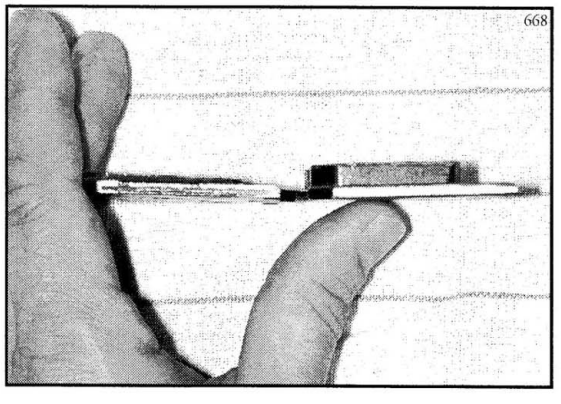

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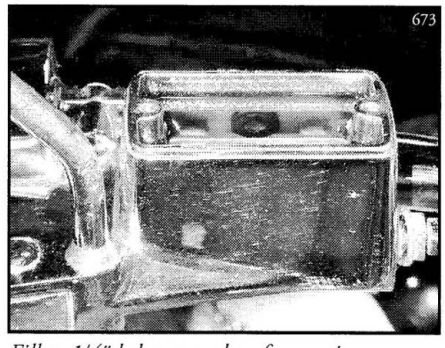
If a pad change is required an initial "bedding in" is necessary. The bedding in should be performed in the dealer's motorcycle parking lot by the mechanic. If the rear pads are being bedded in, pull the clutch in while braking. This prevents wheel hop.

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

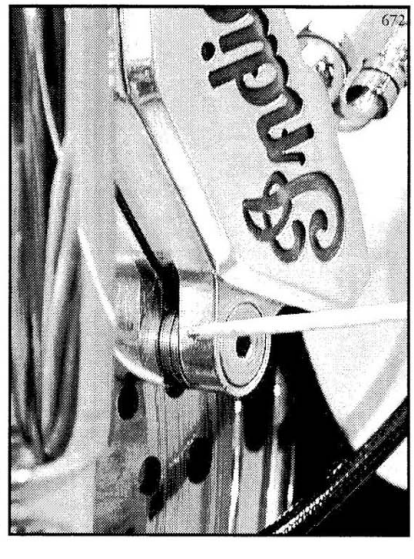
7/32″ hex bit socket

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

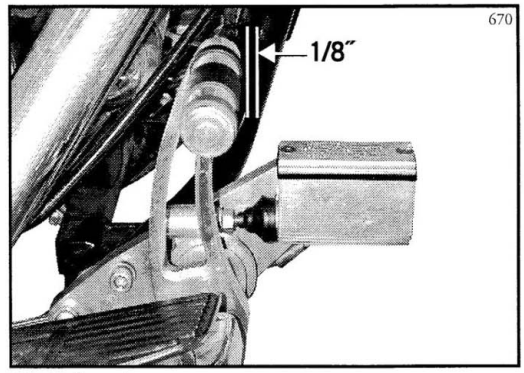
Tools required:

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

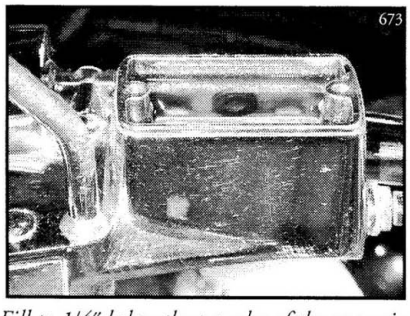
Clean the top of the master cylinder removing any debris.

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

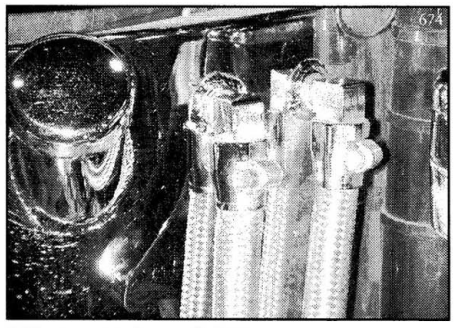
1/2" open end wrench

9/16" open end wrench

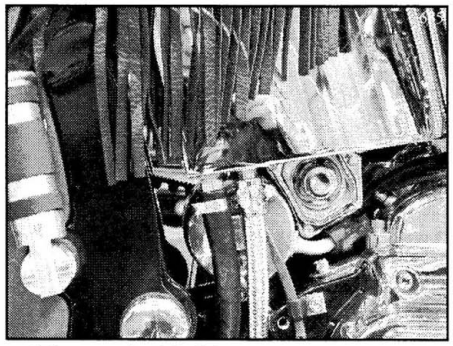
Torque wrench

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.

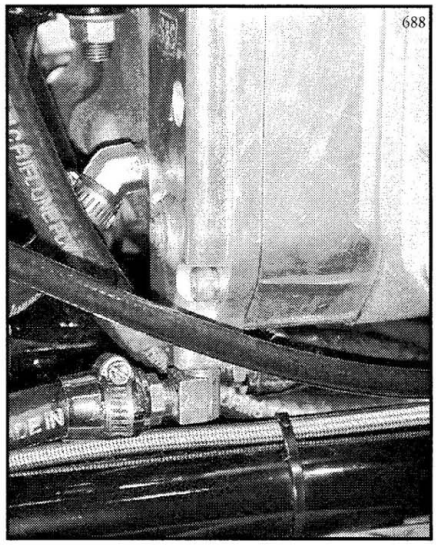
Oil pump

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.

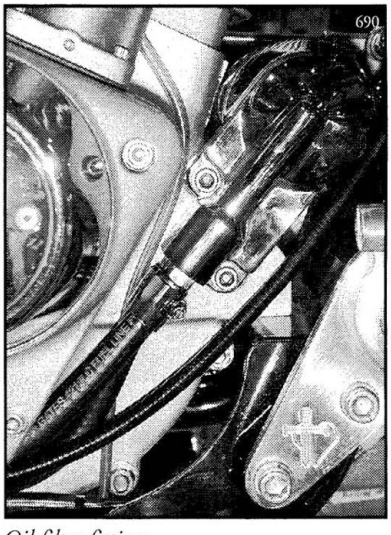
Oil filter

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

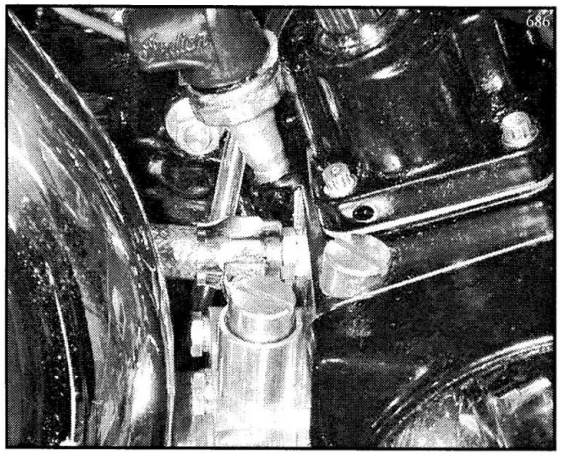
Tools required:

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.

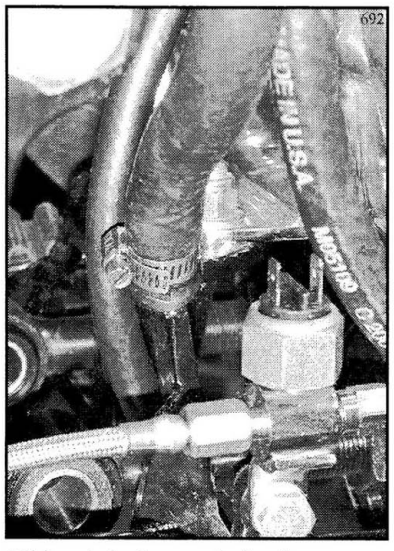
Tighten the worm clamp using a 1/4" flat blade screwdriver.

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

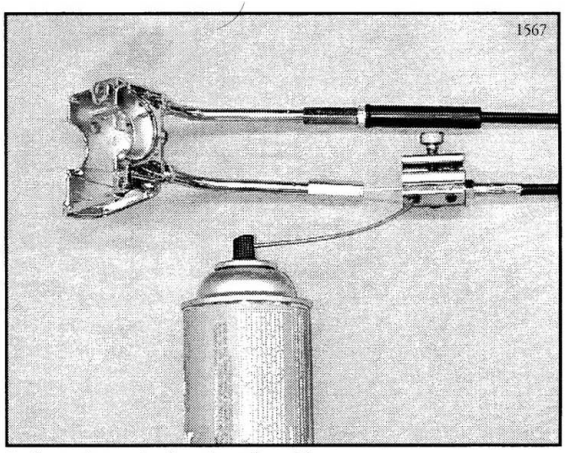
Loosen the button heads holding the cap to the brake lever bracket using a 5/32″ (or 4mm) tee handled hex key. Slide the lever away from the throttle/switch housing.

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.

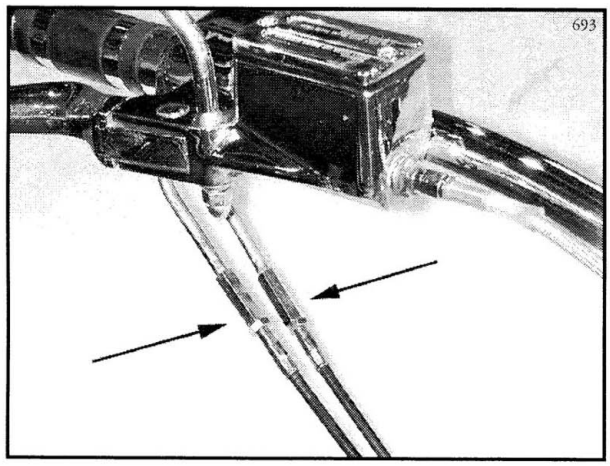
Check the operation of the brake lever and throttle again.

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.

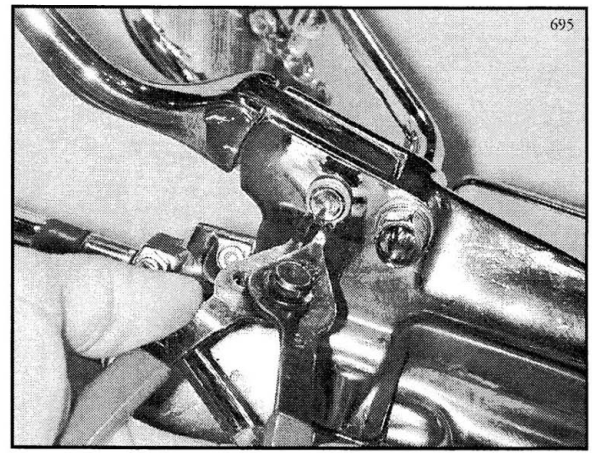
Clutch cable inspection and lubrication

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

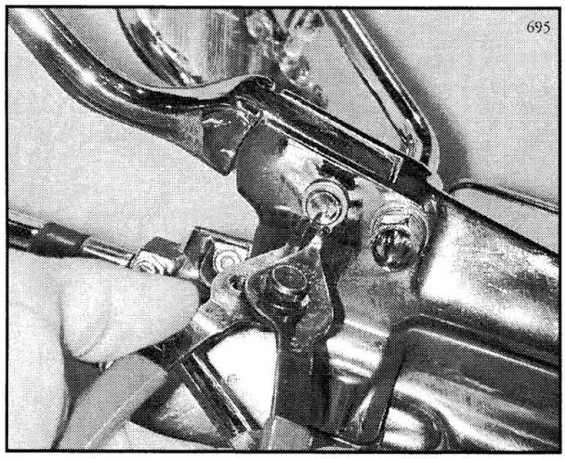
Tools required:

snap ring pliers with .050″ dia. tips

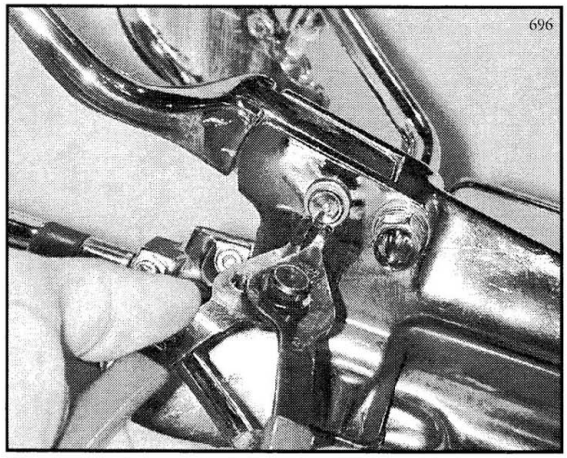
Clutch lever pivot

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.



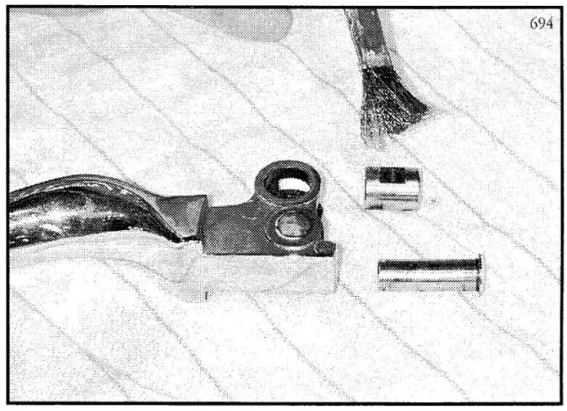
Remove the retaining ring from the bottom of the pivot pin



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:

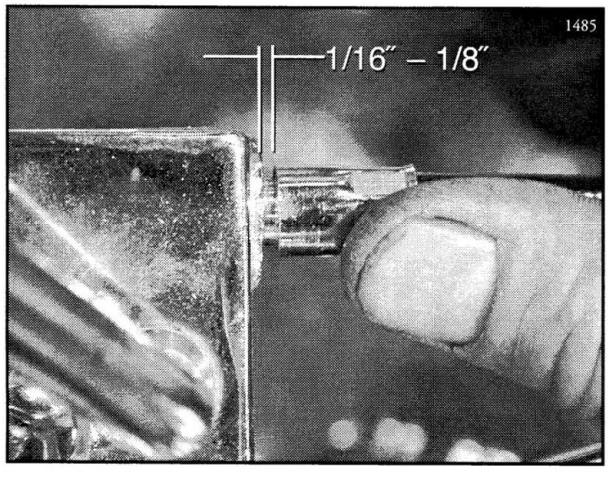
3/16″ tee handled hex bit

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″.

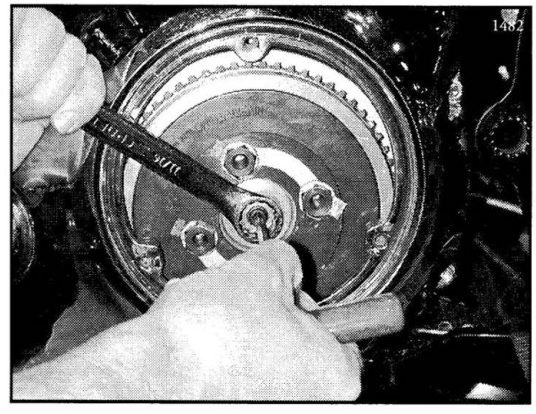


If adjustment is required remove the derby cover from the outer primary cover. Use a 3/16″ tee handled hex bit to remove the three 1/4″ socket head screws.

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:

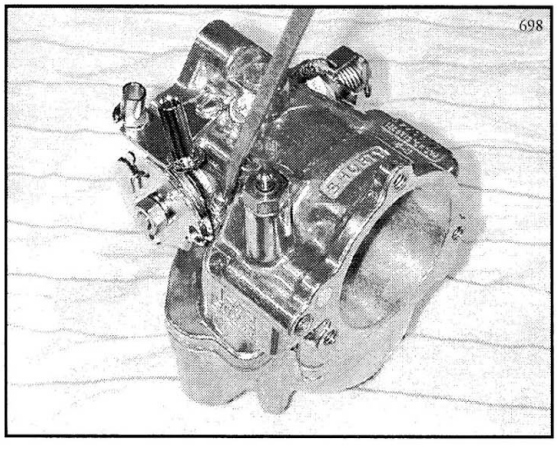
12" long x 1/4" wide flat blade screwdriver

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.

Idle RPM	Idle Mix Screw	Acc. Pump
800-1000	1¼-1¾	2-2½

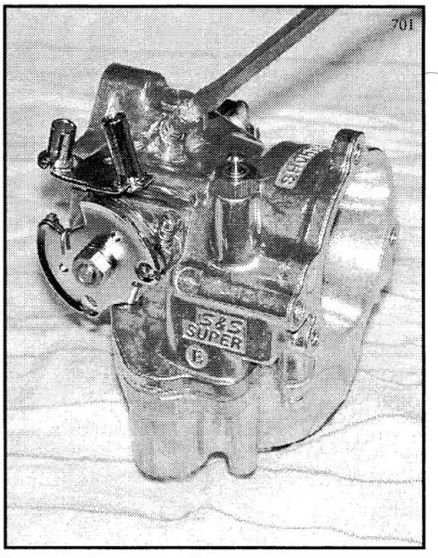
Warm the engine to operating temperature. Make sure the enrichment lever is fully closed.

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.



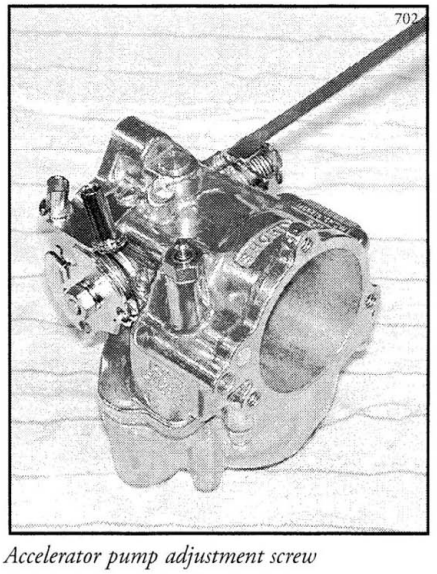
Low speed mixture adjustment screw

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

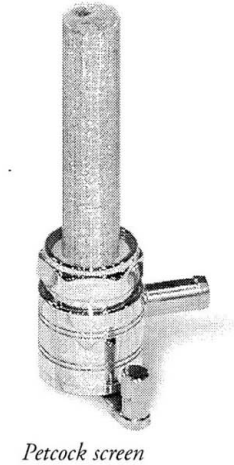
Turn the petcock to the off position. Place a clamp on the fuel crossover tube located between the left and right fuel tanks.

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.

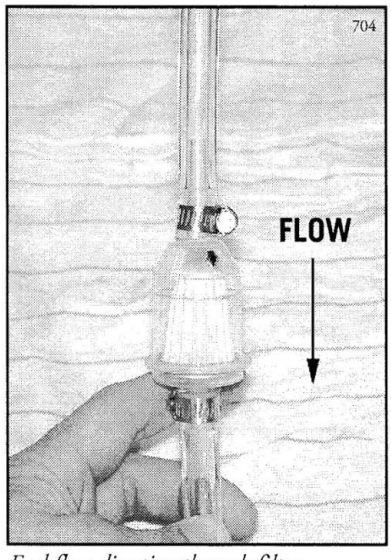
Rotate the petcock lever to the on position. Align the petcock lever to point toward the gas tank. Tighten the nut using a 1″ open end wrench to 72 inch pounds.

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.