2007

American IronHorse®

Texas Chopper

SERVICE MANUAL

The information in the manual applies to the 2007 TX. Chopper model only.

P/N: A99001307

The American IronHorse® Technical Writing Department strives to give our customers a quality product and quality publications to maintain our product. To accomplish this goal, we need user feedback - your evaluation of this service and parts manual.

Please provide your comments on this manual. Is this manual complete, and easy to use? Is this manual accurate?_____

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Did you find errors in this manual?_____

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What can we do to improve this manual?_____

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Occupation:_____
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Dealership:_____
Street:_____
City:_____State:_____Zip Code_____

Clip out and mail to:
American IronHorse® Motorcycle Company
Technical Writing Department
4600 Blue Mound Rd.
Ft. Worth TX, 76106

FORWARD

The American IronHorse® 2007 Parts and Service Manual has been created for two reasons. First, it will familiarize the technician with construction of the American IronHorse motorcycles and second, guide them through approved maintenance and repair procedures. We at American IronHorse are certain that this service and repair manual will increase your shop turn around time and customer satisfaction.

SERVICE PREPARATION

It is imperative that the proper preparation for service be conducted before beginning a repair procedure. Ensure that all work areas are clean, this will aid in reducing repair time and will reduce the chance of misplacing tools and/or parts. Any required tools or materials should be gathered before beginning a repair procedure.

SERVICE/TECHNICAL BULLETINS

From time to time, service and/or technical bulletins may be issued from American IronHorse. These bulletins can be the result of an engineering change or serviceability change made at the factory. Please consult service/ technical bulletins before beginning a repair procedure in order to ensure the latest information is being used in the repair procedure.

REPLACEMENT PARTS

When performing any maintenance or repair procedure use only American IronHosre approved parts. Failure to use American IronHorse approved parts may result in product malfunction and possible serious injury or death.

PRODUCT REFERENCES

Loctite® Products listed are used to increase the effectiveness of fasteners.
For further questions regarding Loctite® products please contact the Henkel/Loctite Corporation.

Henkel Corp - Industrial
1001 Trout Brook Crossing
Rocky Hill, CT 06067
Phone: 860.571.5100

WARNINGS AND CAUTIONS

Statements preceded by the word **WARNING** or ***CAUTION*** printed in bold or italic face are extremely important.

WARNING means there is potential or personal injury to yourself or others.

CAUTION means there is potential for damage to vehicle or parts.

PLEASE TAKE SPECIAL NOTE OF THESE WARNINGS AND CAUTIONS.

MOTORCYCLE SPECIFICATIONS:

	Texas Chopper
DIMENSIONS (inches):	
Wheel Base:	84
Overall Length:	110.50
Overall Width:	35.50
Overall Height:	54.75
Ground Clearance:	4.25
Seat Height:	25.25
WEIGHT (pounds):	
Weight:	722
GVWR:	1200
GAWR - Front:	490
GAWR – Rear:	710
TIRES:	
Front:	90/90-21
Rear:	280/35VR-18
WHEELS:	
Front:	21” x 2.15”
Rear:	18” x 10.5”

TORQUE SPECIFICATIONS:

APPLICATION	THREAD TREATMENT	TORQUE
Fork Cap	DRY	50 ft. lbs.
Fork Neck Stem	Red Loctite® 262 (17 drops)	80 ft. lbs.
Triple Tree Pinch	Blue Loctite® 243 (2 drops)	25 ft. lbs.
Front Axle	Blue Loctite® 243 (4 drops)	55 ft. lbs.
Front Axle Pinch	Blue Loctite® 243 (2 drops)	25 ft. lbs
Ignition, Housing to Mount	Blue Loctite® 243 (1 drop)	140 in. lbs.
Riser to Triple Tree	Blue Loctite® 243 (1 drop)	50 ft. lbs.
Upper Bar/Lower Bar pinch	Blue Loctite® 243 (2 drops)	25 ft.lbs.
Motor Mounts	Blue Loctite® 243 (3 drops)	45 ft.lbs.

TORQUE SPECIFICATIONS (CONT):

APPLICATION	THREAD TREATMENT	TORQUE
Inner Primary to Eng/Trans	Mechanical Fold Tab Lock Blue Loctite® 243 (2 drops)	25 ft. lbs.
Outer Primary/Inner Primary	Blue Loctite® 243 (1 drop)	140 in. lbs.
Brake Caliper	Blue Loctite® 243 (3 drops)	40 ft. lbs.
Rear Axle	Blue Loctite® 243 (10 drops)	65 ft. lbs.
Compensator	Red Loctite® 262 (17 drops)	150 ft.lbs.
Clutch Hub Mainshaft	Red Loctite® 262 (17 drops)	75 ft. lbs.
Forward Controls	Blue Loctite® 243 (3 drops)	45 ft. lbs
Shocks	Red Loctite® 262 (5 drops)	70 ft. lbs.
Transmission Mount	Anti-seize Copper	55 ft. lbs.
Transmission Side Cover	Blue Loctite® 243 (1 drop)	10 ft. lbs.
Kick Stand	Blue Loctite® 243 (2 drops)	25 ft. lbs.
Oil Filter Housing	Blue Loctite® 243 (2 drops)	20 ft. lbs.
Starter	Blue Loctite® 243 (2 drops)	20 ft. lbs.
Horn	Blue Loctite® 243 (2 drops)	10 ft. lbs.
Brake Banjo	DRY	10 ft. lbs.
Caliper Bridge Bolts	Blue Loctite® 243 (2 drops)	28 ft. lbs.
Hub Bolts	Blue Loctite® 243 (2 drops)	50 ft. lbs.
Pulley Bolts	Blue Loctite® 243 (2 drops)	50 ft. lbs.
Rear Fender bolts	Blue Loctite® 243 (2 drops)	40 ft. lbs.

VEHICLE IDENTIFICATION NUMBER:

GENERAL:

The full 17 digit vehicle identification number is located on the right hand side of the neck tube (See Figure 1)

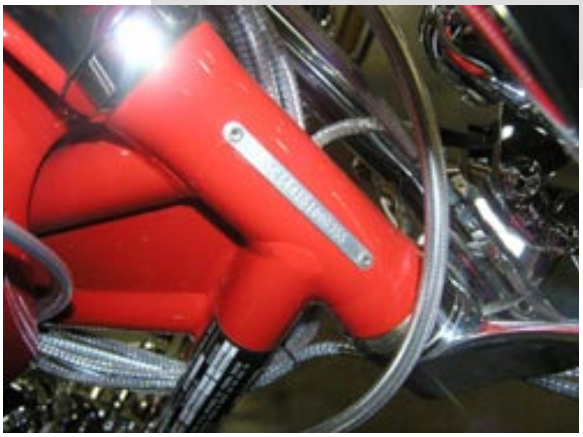

Figure 1

Using the example below (Figure 2) the short V.I.N. is abbreviated to **6** digits: **SZ6355.**

When ordering parts you may use a short V.I.N.

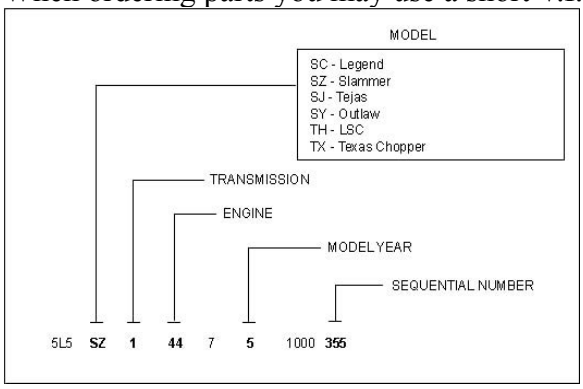

Figure 2

Transmission:
1= R/H Drive

Engine Size:
44= 111
55= 117
66= 124

Model Year:
7= 2007

Sequential Number:
355= 355th bike built in that model

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MAINTENANCE 1

REGULARLY SCHEDULED MAINTENANCE:

GENERAL

The following procedures are considered to be regularly scheduled maintenance. Refer to regularly scheduled maintenance table (Fig. 1) for actual mileages. Performing the following procedures at specified intervals greatly reduces excessive wear and tear on motorcycle. The regularly scheduled maintenance table is a reference tool only. If problems are identified before actual mileages, they should be addressed immediately. It is the owner's responsibility to keep current on regularly scheduled maintenance. In the event a malfunction occurs, regularly scheduled maintenance records may be used to determine if owner was at fault by not having motorcycle properly serviced.

Odometer Reading	500	2000	4000	6000	8000	10,000	12,000	14,000
Engine Oil	R	R	R	R	R	R	R	R
Oil Filter	R	R	R	R	R	R	R	R
Oil Screen	I	-	I	-	I	-	I	-
Rear Belt	I	I	I	I	I	I	I	I
Primary Chain	I	I	I	I	I	I	I	I
Primary Lubricant	R	-	R	-	R	-	R	-
Brake Pads and Disc	I	I	I	I	I	I	I	I
Brake Fluid Levels	I	I	I	I	I	I	I	I
Lights and Horn	I	I	I	I	I	I	I	I
Clutch Adjustment	I	I	I	I	I	I	I	I
Fuel Valve and Lines	I	I	I	I	I	I	I	I
Front Brake Lever	L	-	L	-	L	-	L	-
All Fasteners	T	-	T	-	T	-	T	-
Tire Pressure / Damage	I	I	I	I	I	I	I	I
Engine Idle	I	I	I	I	I	I	I	I
Throttle Operation	I	I	I	I	I	I	I	I
Electrical Switches	I	I	I	I	I	I	I	I
Ignition Timing	I	-	I	-	I	-	I	-
Spark Plugs	-	-	I	-	R	-	I	-
Transmission Lubricant	R	I	R	I	R	I	R	I
Engine Mounts	I	-	I	-	I	-	I	-
Rear Brake Caliper	I	-	I	-	I	-	I	-
Front Brake Caliper	I	-	I	-	I	-	I	-
Sealed Bearings	-	-	-	-	-	R	-	-
Front Fork Oil	-	-	-	-	-	R	-	-
Road Testing	X	X	X	X	X	X	X	X

Key:
I = Inspect if necessary
L = Lubricate
R = Replace
T = Tighten to proper torque
X = Perform

Figure 1

16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000
R	R	R	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R
I	-	I	-	I	-	I	-	I	-
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
R	-	R	-	R	-	R	-	R	-
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
L	-	L	-	L	-	L	-	L	-
T	-	T	-	T	-	T	-	T	-
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I
I	-	I	-	I	-	I	-	I	-
R	-	I	-	R	-	I	-	R	-
R	I	R	I	R	I	R	I	R	I
I	-	I	-	I	-	I	-	I	-
I	-	I	-	I	-	I	-	I	-
I	-	I	-	I	-	I	-	I	-
-	-	R	-	-	-	-	R	-	-
-	-	R	-	-	-	-	R	-	-
X	X	X	X	X	X	X	X	X	X

Key: I = Inspect if necessary
L = Lubricate
R = Replace
T = Tighten to proper torque
X = Perform

Figure 1 cont.

BATTERY MAINTENANCE:

NOTE: Yuasa batteries are permanently sealed, maintenance-free batteries. All batteries are shipped fully charged and ready for service. Inspection of battery at every regularly scheduled service interval for leaks, damage and corrosion needs to be performed.

<u>WARNING:</u> Batteries contain sulfuric acid. At all times, care must be taken to avoid contact of battery acid with eyes, skin, clothing or other items. Such contact can cause serious bodily injury.

INSPECTION

1. Top of battery must be clean at all times. Dirt and electrolyte on battery top can cause battery to self-discharge.

2. Clean battery top with a solution of baking soda and water (5 teaspoons baking soda per quart of water) after solution stops bubbling, rinse with clean water.

3. Check cable connectors and battery terminals for corrosion. Clean if necessary.

4. Inspect battery posts for damage due to over tightening.

CHARGING:

1. YTX20HL will charge at 1.8 amps for 10 hours.

2. YTX24HL will charge at 2.1 amps for 10 hours.

REMOVAL:

<u>WARNING:</u> Always disconnect negative battery cable first. Failure to do so can result in damage or serious injury.

1. Remove seat.

2. Unthread bolt and remove battery negative (-) cable from negative (-) terminal.

3. Unthread bolt and remove battery positive (+) cable from positive (+) terminal.

4. Remove battery strap and lift out battery.

INSTALLATION

1. Install bolt through battery positive (+) cable and into battery positive (+) terminal. Torque bolt to 60 to 96 in. lbs.

2. Install bolt through battery negative (-) cable and into battery negative (-) terminal.

3. Apply a thin coat of petroleum jelly or corrosion-retardant material to both battery terminals.

4. Secure battery strap and install seat.

<u>ENGINE OIL:</u>

CHANGING ENGINE OIL:

1. Run motorcycle until engine oil is warmed up to operating temperature (220 degrees F).
2. Remove engine oil drain plug. Drain oil into an approved container for proper disposal.

CAUTION: Always use oil filter wrench to remove oil filter, to ensure no damage to surrounding parts.

1. Remove oil filter with oil filter wrench. Clean any old gasket material from filter mount flange.

2. Apply a thin coat of oil to gasket on new filter and mounting plate. Screw new filter onto filter mounting plate. Tighten ½ to ¾ turn past gasket contact.

3. Clean drain plug to remove any old Teflon sealant.

4. Apply Teflon paste to drain plug and install. Torque drain plug to 14 to 21 ft. lbs.

5. Remove oil tank cap and fill tank with 2 quarts of 20w-50 rated oil. For temperatures below 40 degrees, F. 10w-40 may be used.

6. Start engine and watch for oil level to lower as the filter fills. Top off tank to within one (1) inch of the top of oil tank.

7. Reinstall oil tank cap.

PRIMARY CHAIN:

PRIMARY CHAIN INSPECTION

1. Place motorcycle in upright position, and then remove inspection cover and gasket. Properly dispose of old gasket.

CAUTION: Adjust primary chain at the tightest spot in the chain. Running primary chain too tight can result in premature wear.

1. Check tension on primary chain. Apply pressure to upper run of chain to verify free movement midway between engine compensating sprocket and the clutch sprocket.

2. When engine is cold, free play in upper run should be 5/8" to 7/8". When engine is hot, free play in upper run should be 3/8" to 5/8".

FREE PLAY ADJUSTMENT

1. Loosen adjuster nut a maximum of two (2) turns counterclockwise. Move the shoe assembly up or down to obtain proper free play.

2. Torque adjuster nut to 19 to 21 ft. lbs. If primary chain is worn beyond adjustment, replace chain.

3. Install new inspection cover gasket and inspection cover with bolts and blue Loctite® 243. Torque inspection cover bolts to 84 to 108 in. lbs.

CHAINCASE LUBRICANT:

LUBRICATION AND ADJUSTMENT

1. Remove chaincase drain plug from bottom of primary cover and drain all old chaincase lubricant into an approved container for disposal.

2. After cleaning drain plug, apply Teflon paste to threads and reinstall. Tighten until drain plug is 0.160 to 0.180 inches below chaincase.

3. Remove derby cover from primary chaincase by removing three (3) ¼ -20 x ¾ inch SHCS bolts.

4. Remove O-ring from groove in chaincase cover. Clean any excess oil from chaincase cover and surrounding areas.

5. With motorcycle in upright position, fill lubricant through derby cover until it reaches the bottom of the clutch diaphragm.

6. Inspect O-ring for tears or damage. Replace if needed.

7. Install O-ring in derby cover and reinstall derby cover. Apply blue Loctite® 243 and torque screws to 140 in. lbs.

CLUTCH ADJUSTMENT (HYDRAULIC):

CAUTION: Clutch adjustment should not be performed while motorcycle is hot, as clutch slippage may occur.

1. Motorcycle will need to be in the upright position and level.

2. Remove three (3) ¼ -20 x ¾ inch SHCS bolts to detach derby cover from primary chaincase cover (See Figure 1).

Figure 1

3. Loosen locknut on adjuster screw to allow adjuster screw to turn freely (See Figure2).

Figure 2

4. Tighten adjuster screw until it lightly seats.

5. Back adjuster screw out 1/8 turn.

6. Tighten locknut.

7. Check fluid level.

8. Using blue Loctite® 243 replace three (3) ¼ -20 x ¾ inch SHCS bolts to attach derby cover to primary chaincase cover.

TRANSMISSION LUBRICANT:

CHANGING LUBRICANT

1. Remove transmission check/fill plug.

2. Remove transmission drain plug and allow lubricant to drain into an approved container for disposal.

3. Clean drain plug and apply Teflon paste to threads and reinstall plug. Torque plug to 14 to 21 ft. lbs.

WARNING: Spilled lubricant that comes in contact with rear wheel, tire or brake components can affect how motorcycle performs, and could result in serious injury.

4. Fill AIH transmissions with 20 oz. transmission lubricant. Note this is a wet measurement.

5. To check fluid level, motorcycle must be in the upright position. Place dipstick in filler hole and rest on filler hole rim. Fluid level should be at the full mark when removed.

6. Check O-ring on dipstick for tears or damage. Replace if necessary. Install dipstick and tighten securely.

SEALED WHEEL BEARINGS:

FRONT BEARING REMOVAL

1. Remove wheel assembly. (See **FRONT WHEEL REMOVAL**).

2. Remove carrier with rotor by removing five (5) carrier bolts.

3. Remove dust covers from both hubs, and retaining ring from right hub.

4. Remove hubs by removing five (5) hub bolts from left hub.

5. Using a bearing press, press out old bearings from hubs.

FRONT BEARING

INSTALLATION

1. Apply anti-seize to bearing bores of both hubs. Press new sealed bearings into both hubs.

2. Install retaining ring in right hub followed by dust covers.

3. Align right hub holes with corresponding holes in rim. Slide bearing spacers in from left side, followed by left hub.

4. Apply red Loctite® 262 to hub bolts and install. Torque hub bolts, in star pattern, to 50 ft. lbs.

5. Install rotor ring with carrier onto left hub with blue Loctite® 243. Torque carrier bolts to 190 in. lbs.

6. Install front wheel assembly (See **FRONT WHEEL INSTALLATION**).

REAR BEARING REMOVAL:

1. Remove wheel assembly. (See **REAR WHEEL REMOVAL**).

2. Remove carrier with rotor by removing five (5) carrier bolts.

3. Remove pulley by removing five (5) pulley bolts.

4. Remove hubs by removing five (5) hub bolts from both hubs.

5. Remove retaining ring from right hub.

6. Remove old bearings using a bearing press. Press out two (2) old bearings from left hub and one (1) from right hub.

REAR BEARING INSTALLATION

1. Apply anti-seize to bearing bores of both hubs. Press two (2) new sealed bearings into left hub and one (1) into right hub (See Figure 1).

2. Replace retaining ring in right hub.

3. Align right hub holes with corresponding holes in rim. Slide bearing spacer in from left side, followed by left hub.

4. Apply red Loctite® 262 to hub bolts and install. Torque hub bolts in star pattern at 50 ft. lbs.
5. Insert plastic retaining plugs after hub bolts.

6. Check bearing spacer for looseness. There should be no loose motion. Bearing must be free to rotate with bearing inner races.

7. Install pulley onto right hub using pulley bolts and red Loctite® 262. Torque pulley bolts to 50 ft. lbs.

8. Install rotor ring with carrier on left hub using carrier bolts with blue Loctite® 243. Torque carrier bolts to 30 ft. lbs. in a star pattern.

9. Install rear wheel. (See **REAR WHEEL INSTALLATION**).

FRONT WHEEL:

REMOVAL

1. Elevate motorcycle front wheel.

2. Remove brake caliper(s) by removing caliper bolts. Note any shims placed between caliper and caliper mount. Shims will be used in same order in installation.

NOTE: DO NOT operate front brake lever with front wheel removed. Caliper piston may be forced out of bore. Reseating piston requires disassembly of caliper.

1. Remove axle bolt from left side.

2. Remove pinch bolts from right side.

3. Holding the wheel, slide axle out from right side. When removing axle, catch wheel spacers as they become free.

INSTALLATION

1. Apply light coat of anti-seize grease to axle.

2. From right side of wheel, insert axle through right slider, axle spacer, right side hub, bearing spacer, left side hub, axle spacer and left slider.

3. Secure axle in place with axle bolt and blue Loctite® 243. Torque axle bolt to 55 ft. lbs.

4. Install lower leg pinch bolts with blue Loctite® 243 and torque to 25 ft. lbs.

5. Install caliper assembly onto caliper mount, and secure in place with two (2) bolts and washers (See **BRAKE CALIPER**).

6. Place shims between caliper and caliper mount, if needed, to center caliper on rotor disc.

7. After centering caliper on rotor, apply blue Loctite® 243 on mounting bolts, then install and torque bolts to 40 ft. lbs.

REAR WHEEL:

REMOVAL (SY, SC, SJ)

1. Elevate motorcycle rear wheel.

2. Remove axle cover screws and cover.

3. Remove axle set screw and loosen axle adjuster screw.

4. Remove axle nut and slide axle out from right side. Catch wheel spacers as they become free.

5. Lay caliper with caliper mount on the side of swing arm.

NOTE: DO NOT operate rear brake lever with rear wheel removed. Caliper piston may be forced out of bore. Reseating piston requires disassembly of caliper.

6. Remove real wheel assembly.

INSTALLATION

See Figure 1 for full assembly procedures.

1. Remove lock screw from swing arm. Back out axle adjustment screw from swing arm.

2. Apply light coat of anti-seize grease to axle. From left side of wheel, insert axle through left side swing arm, left side wheel spacer, wheel assembly, right side wheel spacer, rear caliper mount, bushing and right side swing arm.

3. Install axle bolt with star washer and axle adjustment shoe. Tighten axle bolt. Install belt onto pulley. Adjust belt tension using adjustment screws.

4. Check belt tension and replace set screws, and torque axle bolt to 65 ft. lbs. Install axle cover using axle cover screws.

5. Install caliper assembly onto caliper mount, and secure in place with two (2) bolts and crush washers (See **BRAKE CALIPER**).

6. Place shims between caliper and caliper mount, if needed, to center caliper on rotor disc.

7. After centering caliper on rotor, apply blue Loctite® 243 on mounting bolts. Install shims and bolts and torque bolts to 40 ft. lbs.

REMOVAL (SZ, TX)

1. Elevate motorcycle rear wheel.

2. Remove axle cover screws and cover.

3. Remove belt guard.

4. Remove license plate light.

5. Loosen axle nut.

6. Loosen axle adjuster lock nuts and thread axle adjuster bolts in to release pressure from belt (See Figure 1).

Figure 1

7. Push tire toward the front of motorcycle to remove belt from pulley.

8. Remove axle nut and slide axle out.

9. Lay caliper with caliper mount off the side of the swing arm.

INSTALLATION

1. Apply light coat of anti-seize grease to axle and install axle spacer onto axle.

2. From left side of wheel insert axle through left side swing arm, left side wheel spacer, wheel assembly, right side wheel spacer, rear caliper mount, outer spacer and right side swing arm.

3. Install belt onto pulley. Adjust belt tension using axle adjuster bolts.

4. Apply blue Loctite® 243 to axle nut and install. Torque axle nut to 65 ft. lbs.

5. After belt tension is set, tighten axle adjuster lock nuts.

6. Install axle covers and screws with blue Loctite® 243.

7. Install caliper assembly onto caliper mount and secure in place with two (2) mounting bolts and crush washers. (See **BRAKE CALIPER**).

8. Shim between caliper and caliper mount if needed to center caliper on rotor disc.

9. After caliper is centered, apply blue Loctite® 243 to mounting bolts and torque to 40 ft. lbs.

TIRES:

REMOVAL

1. Remove wheel from motorcycle (See **WHEEL REMOVAL**).

2. Deflate tire.

3. Use bead breaker machine to loosen beads from rim flange.

4. Follow directions of the machine you are using to remove the tire from the rim.

INSTALLATION

1. Apply black RTV silicon over O-ring on valve stem and install into rim hole.

2. Install metal beveled washer over valve stem, beveled side up. Secure washer in place with 1/2" nut and tighten.

3. Place rim right side up on tire mounting machine.

4. Apply lubricant to rim flanges and both beads of tire.

5. Start tire on rim with right side up. If tire has colored dot on sidewall, it is a balancing mark and should be located next to valve stem.

6. Follow directions of the machine you are using to finish mounting the tire on the rim.

7. Ensure directional marker on tire corresponds with direction of rim and pulley.

8. Inflate tire to recommended pressure to seat bead. Install valve stem cap.

WHEEL BALANCING:

1. Wheels must be balanced to improve handling and reduce vibration.

2. Follow instructions on the wheel balancing machine you are using.

NOTE: The maximum weight permissible to accomplish balance is 3.5 oz.

3. Wheels should be balanced to within 0.5 oz. at 60 mph.

4. When applying weight to rim, install self-adhesive weights in .25 oz. increments on the flat surface of the rim.

5. When applying self adhesive weights, be sure surface is free of dirt, oil, or grease. Press firmly for 10 seconds.

NOTE: If 1.0 oz. or more is added to one location, split amount so that half is applied to each side of rim. Wheel should not be used for eight (8) hours to allow adhesive to cure completely.

FRONT FORK OIL:

CHANGING OIL

1. Remove the front wheel (See **FRONT WHEEL REMOVAL**).

2. Remove drain screws from bottom of each fork leg. Drain oil into an approved container for proper disposal.

3. Clean and replace drain screws and seal washers. Torque to 52 to 78 in. lbs.

4. Install front wheel (See **FRONT WHEEL INSTALLATION**).

5. Remove fork tube caps.

6. Fill fork legs with 12 oz. of Type E fork oil.

7. Torque fork tube caps to 50 ft. lbs.

BRAKES:

BRAKE FLUID INSPECTION

1. Check fluid level in rear brake master cylinder reservoir. Fluid level should be ¼ inch below top of reservoir.

2. Check fluid level in front brake master cylinder reservoir. Fluid level should be ¼ inch below top of reservoir.

3. Install reservoir covers with gaskets. Torque cover screws at 6 to 8 in. lbs.

4. Ensure front hand lever and rear foot pedal feel firm when applied. If not, bleeding the brake system is necessary. (See **BLEEDING BRAKES**).

BLEEDING BRAKES

1. Attach a length of tubing over bleeder valve and place the other end in an approved container for proper disposal. Motorcycle will need to be in upright position.

WARNING: Use only D.O.T 5 brake fluid. Failure to do so can cause damage to brake system or improper function of brake system which may lead to death or serious injury.

2. Fill master cylinder with D.O.T 5 brake fluid. Fluid level should be ¼ inch below top of reservoir. Apply and hold brake lever/pedal to gain hydraulic pressure.

3. Open bleeder valve 1 ½ turns counterclockwise. Fluid will start to flow through tubing and into container, allowing air pockets to be purged. After brake lever/pedal is fully depressed close bleeder valve.

4. Release brake lever/pedal and allow it to return to normal position.
5. Repeat steps 2 through 4 until all air pockets are purged.

6. Tighten front caliper bleeder valve to 60 in. lbs; tighten rear caliper bleeder valve to 80 in. lbs. Verify master cylinder fluid levels are ¼ inch below top of reservoir.

7. Fasten covers to master cylinder reservoirs. Torque screws at 6 to 8 in. lbs.

REPLACING REAR CALIPER PADS

WARNING: Always replace brake pads in sets. Never replace one side at a time. Failure to replace brake pads in sets could result in death or serious injury.

1. Remove caliper from caliper mount by removing two (2) mounting bolts and crush washers.

NOTE: Pay attention to the order of any shims, they will need to go back in the same order they came out.

2. Remove rear master cylinder reservoir cover. Pry brake pads back to seat pistons in bores; be aware the fluid level may raise more than 1/8 inch. Removing fluid to achieve this may be necessary.

3. Remove small retaining ring from the backside of caliper assembly. Slide clevis pin out from the back side of caliper assembly.

4. Remove old brake pads and inspect anti-rattle spring. If spring is damaged it will need to be replaced.

5. Install new brake pad set with friction material surfaces facing each other and mounting holes to the top between caliper housings.

6. While holding brake pads in place, slide clevis pin through inside caliper housing and one brake pad. Slide the other brake pad down to allow anti-rattle spring to slide onto clevis pin.

7. Once anti-rattle spring is on clevis pin, slide brake pad up and position anti-rattle spring around both brake pads. Slide clevis pin through last brake pad and into outside caliper housing.

8. Secure clevis pin in place with retaining ring.

9. Install caliper assembly over rotor and on rear caliper mount. Install two (2) mounting bolts and crush washers followed by any shims needed to center caliper on rotor. Apply blue Loctite® 243 to mounting bolts and torque to 40 ft. lbs.

<u>WARNING:</u> Always pump brake lever/pedal until fluid presses brake pads against brake rotor. Failure to do so could result in death or serous injury.

10. Pump brake pedal until pistons engage brake pads fully. Verify locations of pistons on brake pads.

<u>WARNING:</u> Use only D.O.T 5 brake fluid. Failure to do so can cause damage to brake system or improper function of brake system which may lead to death or serious injury.

11. Check fluid level in rear brake master cylinder reservoir. If needed, fill with D.O.T 5 brake fluid until level is ¼ inch below top of reservoir. Install rear brake master cylinder cover and torque at 6 to 8 in. lbs.

REPLACING FRONT CALIPER PADS

1. Remove caliper from caliper mount by removing two (2) mounting bolts and crush washers.

NOTE: Pay attention to the order of any shims, they will need to go back in the same order they came out.

2. Remove front master cylinder reservoir cover. Pry brake pads back to seat pistons in bores, be aware the fluid level may raise more than 1/8 inch. Removing fluid to achieve this may be necessary.

3. Remove small retaining ring from the backside of caliper assembly. Slide clevis pin out from the back side of caliper assembly.

4. Remove old brake pads and inspect anti-rattle spring. If spring is damaged it will need to be replaced.

5. Install new brake pad set with friction material surface facing each other and mounting holes to the top between caliper housings.

6. While holding brake pads in place slide clevis pin through inside caliper housing and one brake pad. Slide the other brake pad down to allow anti-rattle spring to slide onto clevis pin.

7. Once anti-rattle spring is on clevis pin, slide brake pad up and position anti-rattle spring around both brake pads. Slide clevis pin through last brake pad and into outside caliper housing.

8. Secure clevis pin in place with retaining ring.

9. Install caliper assembly over rotor and on rear caliper mount. Install two (2) mounting bolts and crush washers, followed by any shims needed to center caliper on rotor. Apply blue Loctite® 243 to mounting bolts and torque to 40 ft. lbs.

WARNING: Always pump brake lever/pedal until fluid presses brake pads against brake rotor. Failure to do so could result in death or serous injury.

10. Pump brake pedal until pistons engage brake pads fully. Verify locations of pistons on brake pads.

WARNING: Use only D.O.T 5 brake fluid. Failure to do so can cause damage to brake system or improper function of brake system which may lead to death or serious injury.

11. Check fluid level in rear brake master cylinder reservoir. If needed fill with D.O.T 5 brake fluid until level is ¼ inch below top of reservoir. Install rear brake master cylinder cover and torque at 6 to 8 in. lbs.

WARNING: Always test motorcycle brakes at low speeds. If brakes are not performing correctly, testing at high speeds could result in death or serious injury.

REAR BELT DEFLECTION:

LUBRICATION AND ADJUSTMENT:

NOTE: Setting tension with out using tension gauge usually results in loose belts.

1. Using tension gauge, check that the drive belt top run deflects 5/16 to 3/8 inch while applying 10 lbs. of upward force.

2. If belt adjustment is necessary, remove axle cover screws and axle covers. Loosen axle nut and jam nut.

3. Adjust belt tension by turning the axle adjusters an equal number of turns to keep wheel aligned until specifications in step two are met.

4. Check rear wheel for proper alignment. Tighten and torque jam nuts at 12 to 15 ft. lbs.

5. Torque axle nut to 65 ft. lbs. Reinstall axle covers.

AIR CLEANER FILTER:

REPLACING AIR FILTER

1. Remove three (3) air cleaner cover screws.

2. Inspect air filter and replace if necessary.

3. Apply blue Loctite® 243 to cover screws and install cover.

FUEL FILTER:

PETCOCK PRE FILTER SCREEN

WARNING: Gasoline is extremely flammable and explosive in certain conditions and toxic if inhaled. Do not smoke when working around gasoline. All work should be performed in a well-ventilated area away from open flame or spark.

1. Verify ignition switch is in the OFF position.

2. Turn fuel supply valve to the OFF position.

3. Using a vacuum pump, remove all fuel from fuel tank.

4. Remove fuel hose from petcock.

5. Remove hex nut that attaches the petcock to the fuel tank. Turn counterclockwise, removing valve, gasket and filter.

6. Inspect pre filter screen. Replace if necessary.

7. Attach petcock to fuel tank using hex nut. Thread right hand treads two (2) turns on fuel tank. Thread left hand threads to petcock two (2) turns. Tighten hex nuts.

8. Attach fuel hose to petcock using new hose clamp.

FUEL FILTER REPLACEMENT

1. Turn fuel supply off at petcock.

2. Disconnect fuel line at petcock and carburetor. Remove lines and filter as one assembly.

3. Replace filter.

4. Reinstall assembly on petcock and carburetor. When orientating fuel filter housing, be sure fuel low is going the same direction as the arrows on fuel filter housing.

THROTTLE CABLES:

LUBRICATION AND ADJUSTMENT

1. Loosen adjuster screw lock nuts on both cable adjusters. Turn cable adjusters clockwise to provide adequate slack in cables.

2. Remove throttle cable end from throttle spool first, then remove return cable.

3. Pull cables out of cable adjusters to expose slack.
4. Allowing cables to hang lubricate exposed portion of cables with light oil.

5. Reinstall return cable into throttle spool followed by throttle cable.

6. Thread cable adjusters equally counterclockwise to remove excess slack.

7. Turn handlebars to extreme right and adjust slack in throttle. Actuate throttle grip and ensure cable returns to idle.

8. Tighten adjuster screw lock nuts after final adjustments are made.

ENGINE MOUNTS:

INSPECTION

1. Remove top engine mounting bolts.
2. Inspect all mounting hardware for damage; replace if necessary.

3. Apply blue Loctite® 243 to bolts, install and torque to 45 ft. lbs.

SPARK PLUGS:

REPLACING SPARK PLUGS

1. Disconnect spark plug wires.

2. Remove old spark plugs using 5/8” spark plug socket.

3. On new spark plug, check gap using feeler gauge. Bend outside electrode to allow feeler gauge to pass through with a slight drag.

4. Proper gap measurement is 0.040 in.

5. Apply anti-seize to new spark plug threads and torque to 240 in. lbs.

6. Reconnect spark plug wires to correct spark plug.

HEADLAMP

INSPECTION

1. Place motorcycle on level ground. Ensure tires have proper amount of pressure.

2. Position motorcycle 25 ft. from a wall. Measure distance from front axle to the wall.

3. Draw a horizontal line 35 inches above the floor.

4. Load motorcycle with rider and any normal cargo (if applicable).

5. Position motorcycle and rider upright and steer straight ahead.

6. Turn ignition switch on, in order to turn on headlamp.

7. Correct alignment will place light equally spaced above and below the horizontal line, and centered between right and left.

8. Adjust headlamp if necessary.

ADJUSTMENT

1. For horizontal adjustment, remove headlamp mounting bolt from bottom of triple tree. Clean off old thread lock and reapply blue Loctite® 243 to bolt. Install bolt make adjustment to headlamp and tighten.

2. For vertical adjustment, remove both bolts on either side of headlamp mount. Clean off old thread lock and reapply blue Loctite® 243 to bolts. Install bolts, make adjustments and tighten.

CHASSIS 2

Chassis Section

The chassis section of this manual will address the components of the motorcycle that deal with handling, frame support and suspension. The following pages will give you detailed procedures for removal and replacement of chassis system components. Also included in this section are specifications on chassis system parts.

FRONT WHEEL:

REMOVAL

1. Elevate motorcycle front wheel.

2. Remove brake caliper(s) by removing caliper bolts. Note any shims placed between caliper and caliper mount. Shims will be used in same order in installation.

NOTE: DO NOT operate front brake lever with front wheel removed. Caliper piston may be forced out of bore. Reseating piston requires disassembly of caliper.

1. Remove axle bolt from left side.

2. Remove pinch bolts from right side.

3. Holding the wheel, slide axle out from right side. When removing axle, catch wheel spacers as they become free.

INSTALLATION

See Figure 1 for full assembly procedures.

1. Apply light coat of anti-seize grease to axle.

2. From right side of wheel, insert axle through right slider, axle spacer, right side hub, bearing spacer, left side hub, axle spacer and left slider.

3. Secure axle in place with axle bolt and blue Loctite® 243. Torque axle bolt to 55 ft. lbs.

4. Install lower leg pinch bolts with blue Loctite® 243 and torque to 25 ft. lbs.

5. Install caliper assembly onto caliper mount, and secure in place with two (2) bolts and washers (See **BRAKE CALIPER**).

6. Place shims between caliper and caliper mount, if needed, to center caliper on rotor disc.

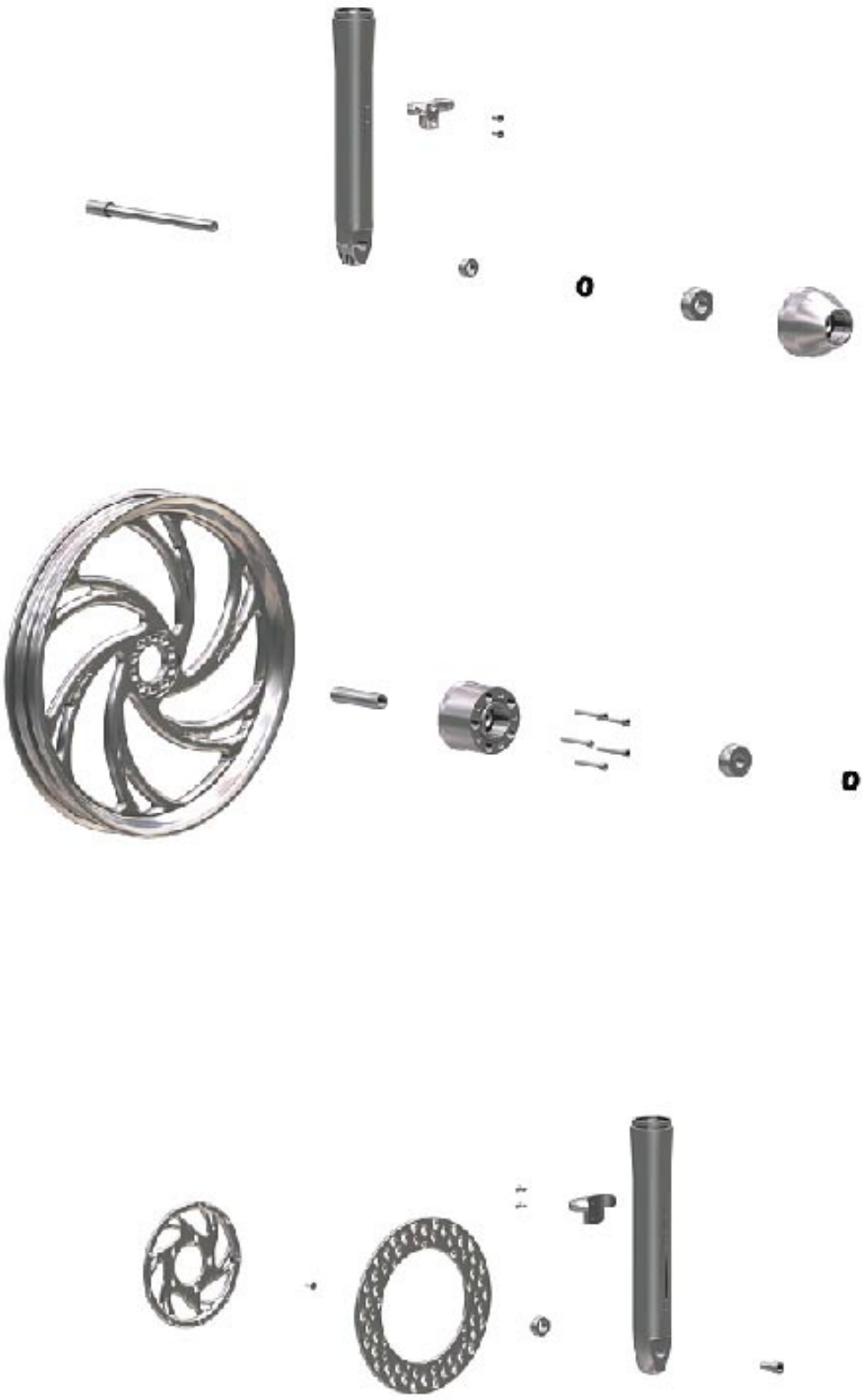


Figure 1

7. After centering caliper on rotor, apply blue Loctite® 243 on mounting bolts, then install and torque bolts to 40 ft. lbs.

REAR WHEEL:

REMOVAL (SY, SC, SJ)

1. Elevate motorcycle rear wheel.

2. Remove axle cover screws and cover.

3. Remove axle set screw and loosen axle adjuster screw.

4. Remove axle nut and slide axle out from right side. Catch wheel spacers as they become free.

5. Lay caliper with caliper mount on the side of swing arm.

NOTE: DO NOT operate rear brake lever with rear wheel removed. Caliper piston may be forced out of bore. Reseating piston requires disassembly of caliper.

6. Remove real wheel assembly.

INSTALLATION

See Figure 1 for full assembly procedures.

1. Remove lock screw from swing arm. Back out axle adjustment screw from swing arm.

2. Apply light coat of anti-seize grease to axle. From left side of wheel, insert axle through left side swing arm, left side wheel spacer, wheel assembly, right side wheel spacer, rear caliper mount, bushing and right side swing arm.

3. Install axle bolt with star washer and axle adjustment shoe. Tighten axle bolt. Install belt onto pulley. Adjust belt tension using adjustment screws.

4. Check belt tension and replace set screws, and torque axle bolt to 65 ft. lbs. Install axle cover using axle cover screws.

5. Install caliper assembly onto caliper mount, and secure in place with two (2) bolts and crush washers (See **BRAKE CALIPER**).

6. Place shims between caliper and caliper mount, if needed, to center caliper on rotor disc.

7. After centering caliper on rotor, apply blue Loctite® 243 on mounting bolts. Install shims and bolts and torque bolts to 40 ft. lbs.

REMOVAL (SZ, TX)

1. Elevate motorcycle rear wheel.

2. Remove axle cover screws and cover.

3. Remove belt guard.

4. Remove license plate light.

5. Loosen axle nut.

6. Loosen axle adjuster lock nuts and thread axle adjuster bolts in to release pressure from belt (See Figure 1).

Figure 1

7. Push tire toward the front of motorcycle to remove belt from pulley.

8. Remove axle nut and slide axle out.

9. Lay caliper with caliper mount off the side of the swing arm.

INSTALLATION

1. Apply light coat of anti-seize grease to axle and install axle spacer onto axle.

2. From left side of wheel insert axle through left side swing arm, left side wheel spacer, wheel assembly, right side wheel spacer, rear caliper mount, outer spacer and right side swing arm.

3. Install belt onto pulley. Adjust belt tension using axle adjuster bolts.

4. Apply blue Loctite® 243 to axle nut and install. Torque axle nut to 65 ft. lbs.

5. After belt tension is set, tighten axle adjuster lock nuts.

6. Install axle covers and screws with blue Loctite® 243.

7. Install caliper assembly onto caliper mount and secure in place with two (2) mounting bolts and crush washers. (See **BRAKE CALIPER**).

8. Shim between caliper and caliper mount if needed to center caliper on rotor disc.

9. After caliper is centered, apply blue Loctite® 243 to mounting bolts and torque to 40 ft. lbs.

TIRES:

REMOVAL

1. Remove wheel from motorcycle (See **WHEEL REMOVAL**).

2. Deflate tire.

3. Use bead breaker machine to loosen beads from rim flange.

4. Follow directions of the machine you are using to remove the tire from the rim.

INSTALLATION

1. Apply black RTV silicon over O-ring on valve stem and install into rim hole.

2. Install metal beveled washer over valve stem, beveled side up. Secure washer in place with 1/2" nut and tighten.

3. Place rim right side up on tire mounting machine.

4. Apply lubricant to rim flanges and both beads of tire.

5. Start tire on rim with right side up. If tire has colored dot on sidewall, it is a balancing mark and should be located next to valve stem.

6. Follow directions of the machine you are using to finish mounting the tire on the rim.

7. Ensure directional marker on tire corresponds with direction of rim and pulley.

8. Inflate tire to recommended pressure to seat bead. Install valve stem cap.

WHEEL BALANCING:

1. Wheels must be balanced to improve handling and reduce vibration.

2. Follow instructions on the wheel balancing machine you are using.

NOTE: The maximum weight permissible to accomplish balance is 3.5 oz.

3. Wheels should be balanced to within 0.5 oz. at 60 mph.

4. When applying weight to rim, install self-adhesive weights in .25 oz. increments on the flat surface of the rim.

5. When applying self adhesive weights, be sure surface is free of dirt, oil, or grease. Press firmly for 10 seconds.

FRONT BRAKE MASTER CYLINDER:

Required Tools:

1. **9/16” Wrench**
2. **3/8” Drive Ratchet**
3. **7/32” Hex Tip**
4. **Diagonal Wire Cutters**

Required Materials:

1. **Red Loctite® 262**
2. **D.O.T 5 Silicon Brake Fluid**
3. **Two (2) Copper Crush Washers**
4. **Black Zip Tie**

REMOVAL

1. Remove two (2) screws from reservoir cover and remove cover and gasket (See Figure 1).

Figure 1

2. Disconnect brake line from fitting on reservoir and drain into an approved container for proper disposal (See Figure 2).

Figure 2

3. Remove two (2) screws from the handlebar clamp to detach master cylinder reservoir from handlebar (See Figure 3).

Figure 3

DISASSEMBLY

1. Once master cylinder is free from handlebar, remove retaining ring from the bottom of pivot pin (See Figure 1).

Figure 1

2. Slide pivot pin out and remove hand lever. Remove bushing from hand lever.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

3. Remove wiper using compressed air.

4. Remove piston cap.

5. Remove piston with O-ring and primary cup followed by piston spring (See Figure 2).

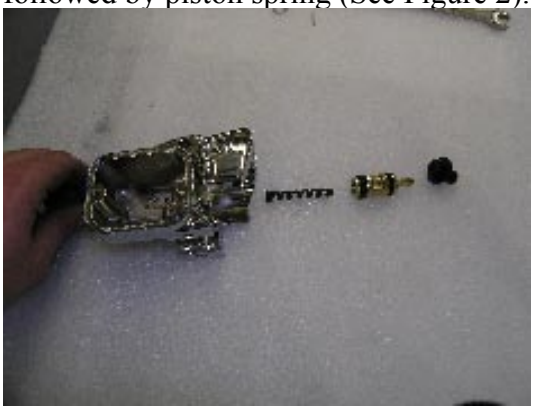


Figure 2

CLEANING AND INSPECTION

1. Using a clean rag and cleaning solvent, clean piston bore.

2. Inspect master cylinder for any damage or cracks.

ASSEMBLY

1. Install O-ring into groove on piston,

2. Install primary cup with smaller O.D. first onto the back of the piston.

3. Apply lubricant to inside piston bore, O-ring, and primary cup.

4. Install spring with the flared end first onto the piston bore.

5. Slide piston with primary cup end first over spring.

6. Install wiper onto piston cap, so that the flat side of wiper mates with the piston cap shoulder.

7. Install piston cap over piston pin.

8. Fit wiper into outlet side of piston bore. Wiper O.D. must be completely sealed in groove.

9. Install reservoir gasket and cover. Install two (2) screws and fasten cover to reservoir, but DO NOT TIGHTEN.

10. Install bushing in hand lever. Align hole in hand lever with hole in master cylinder bracket and install pivot pin.

11. Install retaining ring into pivot pin groove.

12. Attach master cylinder assembly to handlebar using two (2) screws, washers and handle bar clamp (See Figure 1).

Figure 1

13. Reattach brake line fitting to master cylinder reservoir (See Figure 2).

Figure 2

<u>WARNING:</u> Use only D.O.T 5 brake fluid. Failure to do so can cause damage to brake system or improper function of brake system which may lead to death or serious injury.

14. Remove reservoir cover and fill master cylinder with D.O.T 5 silicone brake fluid. Fluid lever should be ¼ inch from top. Do not reuse old brake fluid.

15. Bleed brake system (See **BLEEDING BRAKES**).

16. Verify proper operation by actuating brake hand lever with reservoir cover removed. A slight spurt of fluid will break the surface if all components are functioning properly.

17. Reinstall reservoir cover with gasket and securely fasten with screws (See Figure 3).

Figure 3

REAR BRAKE MASTER CYLINDER:

Required Tools:

1. **9/16” Wrench**
2. **3/8” Drive Ratchet**
3. **7/32” Hex Tip**
4. **Diagonal Wire Cutters**

Required Materials:

1. **Red Loctite® 262**
2. **D.O.T 5 Silicon Brake Fluid**
3. **Two (2) Copper Crush Washers**
4. **Black Zip Tie**

REMOVAL

1. Using Diagonal wire cutters, cut and remove the zip tie on the brake line cable harness.

2. Disconnect banjo bolt and fitting from brake reservoir and drain into an approved container for proper disposal.

3. Remove two (2) reservoir mounting bolts from the backside of mounting bracket to release the reservoir assembly.

DISASSEMBLY

1. Remove actuating rod, dust cover, actuating rod return spring and washer.

2. Compress piston while removing internal retaining ring.

3. Remove piston with O-ring followed by cup seal and cup stabilizer.

4. Slide piston return spring out last.

CLEANING AND INSPECTION:

1. Using a clean rag and cleaning solvent, wipe down all components.

2. Visually inspect all components for damage, excessive wear, or worn springs. If any components show signs or wear, replace them.

ASSEMBLY

1. Install piston return spring with tapered end up.

2. Install cup stabilizer followed by cup seal.

3. Install piston with O-ring in piston bore. Compress piston to install retaining ring.

4. Install washer and actuating rod return spring with tapered end up. Install dust cover and slide actuating rod into place.

INSTALLATION

1. Install reservoir assembly onto pivot shaft and secure to mounting bracket using two (2) 3/8” x 1” flat head bolts and red Loctite® 262.

2. Install brake line with banjo bolt and fitting and two (2) copper crush washers onto rear brake master cylinder.

3. Using black zip tie, secure brake light cable harness to rear brake master cylinder.

4. Remove rear brake master cylinder cover and fill with D.O.T 5 silicon brake fluid, and replace cover.

FRONT BRAKE CALIPER:

Required Tools:

1. **9/16" Wrench**
2. **3/8" Drive Ratchet**
3. **5/16" Hex Tip**
4. **Snap Ring Pliers**

Required Materials:

1. **Blue Loctite® 243**
2. **D.O.T 5 Silicon Brake Fluid**
3. **Four (4) Copper Crush Washers**
4. **Four (4) Cross-Over O-rings**
5. **Square Seals**

REMOVAL

1. Remove banjo fitting, bolt and both crush washers from caliper. Discard removed crush washers.

2. Remove both caliper mounting bolts and washers. Lift caliper upward to remove rotor from disc.

DISASSEMBLY

CAUTION: Never use metal objects to remove or install object from piston bores. Damaged pistons or bores will leak when reassembled.

1. Remove internal retaining ring from inside caliper halve. Remove clevis pin, anti-rattle spring, and brake pads.

2. Remove four (4) bridge bolts to separate caliper housing.

3. Remove brake pads.

4. Install 2 bridge bolts and fasten.

5. Remove bleeder valve.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

6. Using a gloved hand, cover bleeder valve hole. Blow compressed air through the hole where the banjo bolt was removed.

7. Remove bridge bolts, separate halves of caliper, and remove caliper pistons.

8. Remove and discard cross-over O-rings.

9. Remove seals from inside piston bores of caliper.

CLEANING AND INSPECTION

1. Using a clean rag and cleaning solvent, wipe down all components of the brake caliper.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

2. Blow compressed air through the brake fluid passageways in the caliper to dislodge any debris.

3. Inspect pistons for any scratches, gouges, or dents.

4. Inspect caliper halves for scratches, gouges, and dents.

5. If any problems are found with the caliper or caliper pistons, replace them.

6. Inspect bolts, banjo fitting if damaged replace.

ASSEMBLY

NOTE: When replacing brake pads both calipers must have pads replaced. Failure to do so may result in degraded braking performance and serious injury or death due to degraded braking performance.

CAUTION: Never use metal objects to remove or install object from piston bores. Damaged pistons or bores will leak when reassembled.

1. Lubricate square seals and outer diameter of pistons with a light coat of silicon grease.

2. Insert square seals into each piston bore. Install pistons into both caliper housings. Install cross-over O-rings on inside caliper halve.

3. Mate inside and outside caliper halves using four (4) bridge bolts and washers. Torque bridge bolts to 28 ft. lbs.

4. Slide brake pad set (friction surfaces facing each other) into the caliper with mounting hole to the top.

5. While holding brake pads slide clevis pin in through the side of caliper housing through one brake pad. Slide the other pad down to allow installation of the anti-rattle spring. Once spring is installed slide the second pad back into position and insert clevis pin through second pad, and into caliper housing.

6. Install internal retaining ring.

7. Install bleeder valve into top outside caliper housing.

INSTALLATION

1. Spread brake pads in caliper assembly to make sure pistons are properly seated.

2. Install caliper over rotor disc and secure to caliper mount, using two (2) mounting bolts and washers.

3. Verify caliper center line over rotor center line. If caliper is offset to the outside, mounting bolt shims will need to be installed.

4. To install shims remove caliper mounting bolts, place shim between caliper mount and caliper and reinstall mounting bolts.

5. After caliper is centered, rotate wheel slowly to ensure there is not interference between caliper and rotor disc.

6. Once centering is achieved, remove one bolt at a time and apply blue Loctite® 243 to mounting bolts and torque at 40 ft. lbs.

7. Install banjo fitting with two (2) new crush washers and banjo bolt. Torque banjo bolt to 20 ft. lbs, and connect brake line to banjo fitting.

8. Bleed brake system (See **BLEEDING BRAKES**).

REAR BRAKE CALIPER:

1. 9/16” Wrench
2. 3/8” Drive Ratchet
3. 5/16” Hex Tip
4. Snap Ring Pliers

Required Materials:

1. Blue Loctite® 243
2. D.O.T 5 Silicon Brake Fluid
3. Two (2) Copper Crush Washers
4. Two (2) Cross-Over O-rings
5. Square Seals

REMOVAL

1. Remove license plate holder.

2. Remove banjo fitting, bolt and both crush washers from caliper to remove rear brake line. Discard removed crush washers (See Figure 1).

Figure 1

3. Remove both caliper mounting bolts and washers. Lift caliper upward to remove from rotor disc (See Figure 2).

Figure 2

DISASSEMBLY

CAUTION: Never use metal objects to remove or install object from piston bores. Damaged pistons or bores will leak when reassembled.

1. Remove internal retaining ring from inside caliper halve. Remove clevis pin, anti-rattle spring, and brake pads.

2. Remove four (4) bridge bolts to separate caliper housing.

3. Remove brake pads.

4. Install 2 bridge bolts and fasten.

5. Remove bleeder valve.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

6. Using a gloved hand, cover bleeder valve hole. Blow compressed air through the hole where the banjo bolt was removed.

7. Remove bridge bolts, separate halves of caliper, and remove caliper pistons.

8. Remove and discard cross-over O-rings.

9. Remove seals from inside piston bores of caliper.

CLEANING AND INSPECTION

1. Using a clean rag and cleaning solvent, wipe down all components of the brake caliper.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

2. Blow compressed air through the brake fluid passageways in the caliper to dislodge any debris.

3. Inspect pistons for any scratches, gouges, or dents.

4. Inspect caliper halves for scratches, gouges, and dents.

5. If any problems are found with the caliper or caliper pistons, replace them.

6. Inspect bolts, banjo fitting if damaged replace.

ASSEMBLY

CAUTION: Never use metal objects to remove or install object from piston bores. Damaged pistons or bores will leak when reassembled.

1. Lubricate square seals and outer diameter of pistons with a light coat of silicon grease.

2. Insert square seals into each piston bore. Install pistons into both caliper housings. Install cross-over O-rings on inside caliper halve.

3. Mate inside and outside caliper halves using four (4) bridge bolts and washers. Torque bridge bolts to 28 ft. lbs.

4. Slide brake pad set (friction surfaces facing each other) into the caliper with mounting hole to the top.

5. While holding brake pads slide clevis pin in through the side of caliper housing through one brake pad. Slide the other pad down to allow installation of the anti-rattle spring. Once spring is installed slide the second pad back into position and insert clevis pin through second pad, and into caliper housing.

6. Install internal retaining ring.

7. Install bleeder valve into top outside caliper housing.

INSTALLATION:

1. Spread brake pads in caliper assembly to make sure pistons are properly seated.

2. Install caliper over rotor disc and secure to caliper mount, using two (2) mounting bolts and washers.

3. Verify caliper center line over rotor center line. If caliper is offset to the outside, mounting bolt shims will need to be installed.

4. To install shims remove caliper mounting bolts, place shim between caliper mount and caliper and reinstall mounting bolts.

5. After caliper is centered, rotate wheel slowly to ensure there is not interference between caliper and rotor disc.

6. Once centering is achieved, remove one bolt at a time and apply blue Loctite® 243 to mounting bolts and torque at 40 ft. lbs.

7. Install banjo fitting with two (2) new crush washers and banjo bolt. Torque banjo bolt to 20 ft. lbs, and connect brake lint to banjo fitting.
8. Bleed brake system (See **BLEEDING BRAKES**).

BLEEDING BRAKES:

1. Attach a length of tubing over bleeder valve and place the other end in an approved container for proper disposal. Motorcycle will need to be in upright position.

<u>WARNING:</u> Use only D.O.T 5 brake fluid. Failure to do so can cause damage to brake system or improper function of brake system which may lead to death or serious injury.

2. Fill master cylinder with D.O.T 5 brake fluid. Fluid level should be ¼ inch below top of reservoir. Apply and hold brake lever/pedal to gain hydraulic pressure.

3. Open bleeder valve 1 ½ turns counterclockwise. Fluid will start to flow through tubing and into container, allowing air pockets to be purged. After brake lever/pedal is fully depressed close bleeder valve.

4. Release brake lever/pedal and allow it to return to normal position.

5. Repeat steps 2 through 4 until all air pockets are purged.

6. Tighten front caliper bleeder valve to 60 in. lbs; tighten rear caliper bleeder valve to 80 in. lbs. Verify master cylinder fluid levels are ¼ inch below top of reservoir.

7. Fasten covers to master cylinder reservoirs. Torque screws at 6 to 8 in. lbs.

FRONT FORK LEGS:

Required Tools:

1. **3/8" Drive Ratchet**
2. **1/4" Hex Tip**
3. **1 3/8" Non-Marring Socket**
4. **1/2" Drive Ratchet**

REMOVAL:

1. Remove front brake caliper (See **FRONT BRAKE CALIPER REMOVAL**).

2. Remove front wheel (See **FRONT WHEEL REMOVAL**).

3. Remove front fender by removing two (2) mounting bolts from each fender mount.

4. Remove damper bolt from the bottom of each fork leg and drain fluid into an approved container for proper disposal.

5. Loosen two (2) pinch bolts on the lower triple tree (See Figure 1).

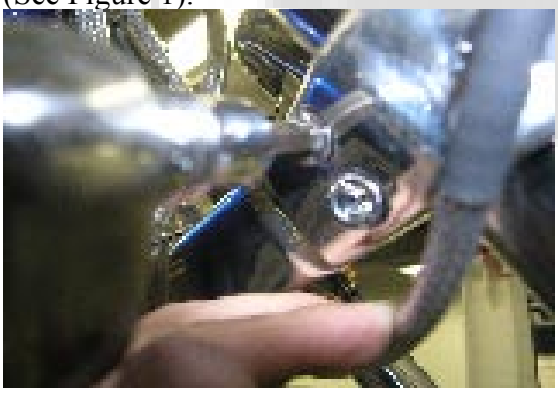


Figure 1

6. Remove fork leg assembly down and out of triple tree assembly (See Figure 2).

Figure 2

DISASSEMBLY

1. Remove lower leg cap and oil lock followed by the retaining ring (See Figure 1).

Figure 1

2. Remove fork tube from lower leg. Remove fork tube plug with O-ring (See Figure 2).

Figure 2

3. Remove tube spring, damper tube, and rebound spring from inside fork tube (See Figure 3).

Figure 3

4. Remove fork seal, fork seal spacer, and lower leg bushing from fork tube (See Figure 4).

Figure 4

5. Remove upper tube bushing.

UPPER LEG ASSEMBLY

1. Install upper tube bushing onto the fork leg tube. Slide the rebound spring, damper tube with split bushing and fork leg spring down the fork leg tube.

2. Install tube plug O-ring on leg tube plug. Install leg tube plug into leg tube. Tighten securely.

LOWER LEG ASSEMBLY

1. Apply thread paste to new damper bolt with crush washer. Install up through the bottom of lower leg slider holding the damper bolt in place turn lower leg slider up right and install oil lock beveled side down (See Figure 1).

Figure 1

2. Install leg tube damper end first into lower leg slider and tighten damper bolt.

3. Install lower leg bushing and seal spacer. Ensure flat side of seal spacer is facing upwards. Using a slide hammer lightly tap until seated (See Figure 2).

Figure 2

4. Apply a light coat of silicone to fork tube and fork seal install with letter side facing upwards. Using a slide hammer lightly tap until seated (See Figure 3).

Figure 3

5. Install the fork seal retaining clip into the groove in the lower leg slider (See Figure 4).

Figure 4

6. Install lower leg cap O-ring into leg cap. Apply a light coat of anti-seize to leg cap threads and tighten.

INSTALLATION:

1. Spread pinch joints on lower triple tree using a plastic wedge.

2. Fill fork leg with 12 oz. of Type E fork oil.

3. Lubricate top portion of fork leg with silicone spray and slide fork leg assembly through lower and upper triple trees and tighten securely.

4. Install tube seal on leg tube cap.

5. Slide chrome washer on fork leg tube plug and install fork leg tube cap. Torque to 50 ft. lbs.

6. Remove plastic wedges from pinch joints. Apply blue Loctite® 243 to the four (4) pinch bolts, install and torque to 30 ft. lbs (See Figure 1).

Figure 1

7. Install front wheel (See **FRONT WHEEL INSTALLATION**).

8. Install front brake caliper (See **FRONT BRAKE CALIPER INSTALLATION**).

TRIPLE TREE:

Required Tools:

1. **1/2” Wrench**
2. **7/16” Wrench**
3. **8 mm Wrench**
4. **3/8” Drive Ratchet**
5. **5/16” Hex Tip**
6. **3/8” Hex Tip**
7. **3/32” T Handle**
8. **Diagonal Wire Cutters**
9. **Snap Ring Pliers**

Required Materials:

1. **Blue Loctite® 243**

2. Red Loctite® 262

REMOVAL

1. Remove front wheel (See **FRONT WHEEL REMOVAL**).
2. Remove fender by removing two (2) mounting bolts from each fender mount (See Figure 1).

Figure 1

3. Remove brake line at lower triple tree (See Figure 2). Drain brake fluid into an approved container for proper disposal.

Figure 2

4. Remove brake caliper from lower leg (See Figure 3).

Figure 3

5. Remove four (4) pinch bolts on the lower triple tree (See Figure 4).

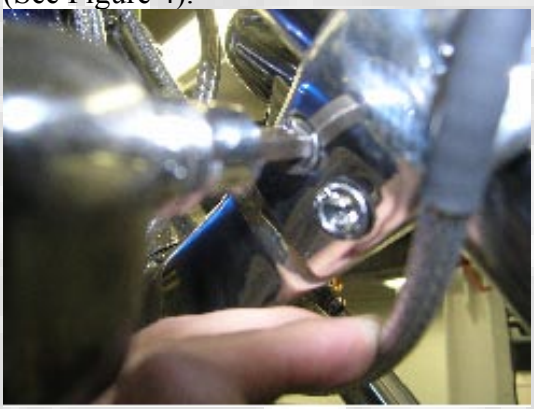


Figure 4

6. Loosen setscrews in the turn signal mounts and remove turn signals from lower triple tree (See Figure 5).

Figure 5

7. Remove headlight mounting bolt from underside of lower triple tree, detach Deutch® connector and remove headlight (See Figure 6).

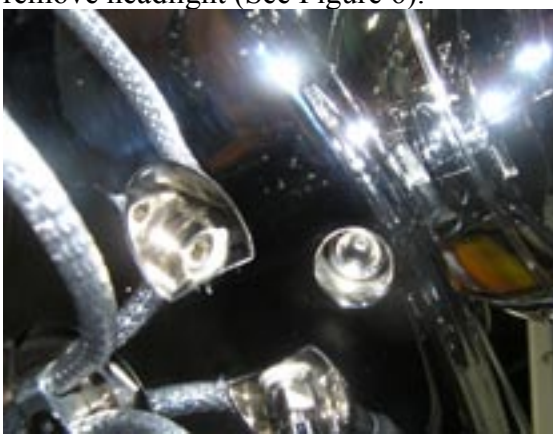


Figure 6

8. Remove upper brake line from handlebars, and upper triple tree.

9. Cut zip ties under fuel tank to expose front end wiring harness. You may need to remove the fuel tank to expose the harness.

10. Disconnect left and right hand control six pin connector sand speedometer six and four pin connector.

11. Slide connectors through hole in triple tree to remove.

12. Remove throttle cable and idle cable from carburetor.

13. Remove riser bolts from upper triple tree and remove handlebar assembly (See Figure 7).

Figure 7

14. Remove setscrews in the stem nut, and then remove stem nut (See Figure 8).

Figure 8

15. Slide lower triple tree along with lower bearing off of the neck stem (See Figure 9).

Figure 9

16. Slide upper triple tree with neck stem and upper bearing up and out of neck of frame (See Figure 10).

Figure 10

BEARING AND RACE REMOVAL

CAUTION: Always replace both bearing and races at the same time. Mismatched bearing components may lead to excessive wear and premature bearing replacement.

1. Remove race from both neck cups using a bearing race remover (See Figure 1).

Figure 1

ASSEMBLY

1. Install neck stem in upper triple tree. Use red Loctite® 262 and a 7/8" wrench. Strike wrench with rubber mallet to tighten.

2. Pack both bearings with suitable grease.

3. Press a new upper bearing on neck stem.

4. Press rubber bushings and a bushing sleeve into upper triple tree.

5. Install turn-stop plate on lower triple tree. Place the turn-stop plate to where the shorter slot is to the rear. Torque turn-stop bolts to 32 in. lbs.

6. Install head light mount onto lower triple tree with head light mounting bolt.

INSTALLATION

1. Lubricate inside neck with anti-seize or equivalent lubricant.

2. Install upper and lower neck cup in neck. When installing lower neck cup be sure fork stop is centered and to the rear.

3. Install roll pins into neck cup. Ensure roll pins are driven flush into cup surface.

4. Install both races in neck cups, using a race installer (See Figure 1).

Figure 1

5. Install upper triple tree assembly through the neck of frame (See Figure 2).

Figure 2

6. Install lower bearing.

7. Slide lower triple tree assembly up onto neck stem (See Figure 3).

Figure 3

8. Apply red Loctite® 262 to stem nut threads and loosely tighten.

9. Lubricate top portion of fork leg with silicone spray and slide fork leg assembly through lower and upper triple trees and tighten securely (See Figure 4).

Figure 4

Secure fork legs in place with fork leg caps (See Figure 5).

Figure 5

10. Torque stem nut to 80 ft. lbs.

11. Apply blue Loctite® 243 and install three (3) setscrews into stem.

12. Install pinch bolts into lower triple tree using blue Loctite® 243. Torque to 20 ft. lbs (See Figure 6).

Figure 6

13. Install head light assembly onto lower triple tree using mounting bolt with blue Loctite® 243 (See Figure 7).

Figure 7

14. Install beveled washers over rubber bushings in the upper triple tree. Secure handlebar assembly in place with riser mounting bolts (See Figure 8). Apply blue Loctite® 243 and torque bolts to 50 ft. lbs.

Figure 8

15. Zip Tie wiring harness back up under fuel tank.

16. Install turn signals onto mounts on lower triple tree. Once turn signal is properly adjusted apply blue Loctite® 243 to set screws and install.

17. Install upper brake line to upper controls and lower triple tree (See Figure 9).

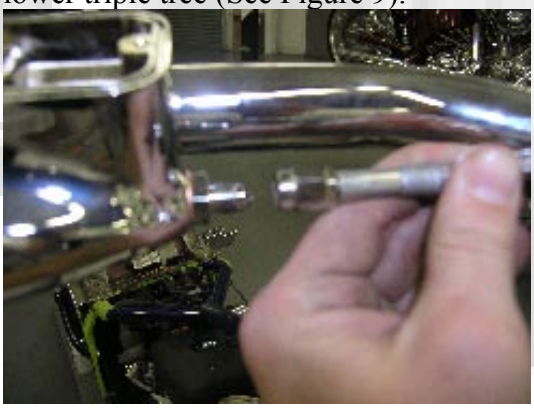


Figure 9

18. Install wheel assembly (See **FRONT WHEEL INSTALLATION**).

19. Connect lower brake line to the underside of lower triple tree. Bleed brake system (See **BLEEDING BRAKES**).

20. Install front fender using mounting bolts and blue Loctite® 243 lock washer, and flat washers (See Figure 10).

Figure 10

AIR RIDE SUSPENSION:

Required Tools:

1. **Two (2) Scissor Jacks**
2. **0-85 ft-lbs Torque Wrench**
3. **3/4" Wrench**
4. **3/4" Ratcheting Wrench**
5. **3/8" Drive Ratchet**
6. **12" 3/8" Drive Extension**
7. **3/8" to 1/2" Adapter**
8. **3/4" Torque Extension**
9. **10mm Wrench**
10. **5/32" Hex Tip Socket**
11. **3/8" Socket, 3/8" Drive**

Required Materials:

1. **Red Loctite® 262**
2. **Blue Loctite® 243**

REMOVAL:

1. Disconnect battery from motorcycle.

2. Using the bleed valves drain the air ride system of all air.

3. Place jack under motorcycle frame aft of the shocks (See Figure 1).

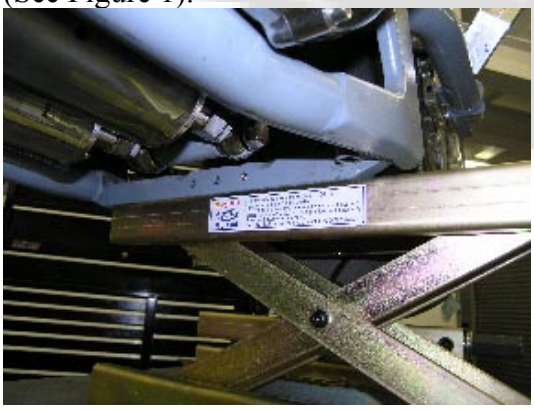


Figure 1

4. Place jack under rear tire to hold swingarm when shocks are removed (See Figure 2).

Figure 2

5. Remove shock cover plate attached to frame (See Figure 3).

Figure 3

6. Remove the air line from the air shock by pressing the fitting forward and pulling air line back.

7. Now that the air line is removed, remove both shocks from the swingarm (See Figure 4).

Figure 4

8. Remove front bolt on both shocks attaching them to the frame (See Figure 5).

Figure 5

9. Disconnect the air ride Deutch® connector (See Figure 6).

Figure 6

10. Disconnect the air ride compressor retaining band (See Figure 7).

Figure 7

11. Remove air solenoid and air lines.

INSTALLATION

1. Install air solenoid onto rear fender.

2. Install the air ride compressor and compressor retaining band (See Figure 1).

Figure 1

3. Apply red Loctite® 262 to shock mounting bolt and install shock to frame.

4. Apply red Loctite® 262 to shock mounting bolt and install shock to swingarm.

5. After shocks are installed, torque bolts to 70 ft.-lbs. (See Figure 2).

Figure 2

6. Install air line into the air shock.

7. Install shock cover plate using blue Loctite® 243.

8. Attach air ride system Deutch® connector (See Figure 3).

Figure 3

9. Install battery into motorcycle.

SEAT:

Required Tools:

1. NONE

Required Materials:

1. NONE

REMOVAL

1. Using your hand gently break loose the suction cup on the rear of the seat and lift up and out to remove seat (See Figure 1).

Figure 1

INSTALLATION

1. Slide metal tab under seat catch on frame. Press seat down until suction cup sticks.

KICKSTAND:

Required Tools:

1. 3/8” Drive Ratchet
2. 5/16” Hex Tip Socket
3. 0 - 150 lbs. Torque Wrench

Required Materials:

1. Four (4) 5/16” x 1” Chrome SHCS
2. Four (4) 5/16” Lock Washer
3. Blue Loctite® 243

REMOVAL

1. Using a 3/8” drive ratchet and 5/16” hex tip socket, remove the four (4) socket head cap screws mounting the kick stand to the left forward control (See Figure 1).

Figure 1

INSTALLATION

1. Using blue Loctite® 243, install the four (4) socket head cap screws through the kickstand mounting plate into the left forward control (See Figure 1).

Figure 1

2. Torque fasteners to 35 ft.lbs.

BELT GUARD:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1/2” Socket**
3. **1/2” Wrench**

Required Materials:

1. **Blue Loctite® 243**

REMOVAL

1. Using a 1/2” Wrench and a 1/2” socket and 3/8” drive ratchet, remove the three (3) fasteners holding the belt guard to the frame (See Figure 1).

Figure 1

INSTALLATION

1. Using a 1/2” Wrench and a 1/2” socket and 3/8” drive ratchet, and blue Loctite® 243, install the three (3) fasteners holding the belt guard to the frame

FORWARD CONTROLS:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/8” Hex Tip**
3. **3/16” Hex Tip**
4. **0-85 ft-lbs Torque Wrench**

Required Materials:

1. **Four (4) 3/8” x 1” SHCS**
2. **One (1)**
3. **Red Loctite® 262**
4. **Blue Loctite® 243**

REMOVAL

1. Place motorcycle in upright position.

2. Remove rear brake lever from right side forward control (See Figure 1).

Figure 1

3. On right side of motorcycle remove two (2) SHCS that bolt the right side forward control to frame (See Figure 2).

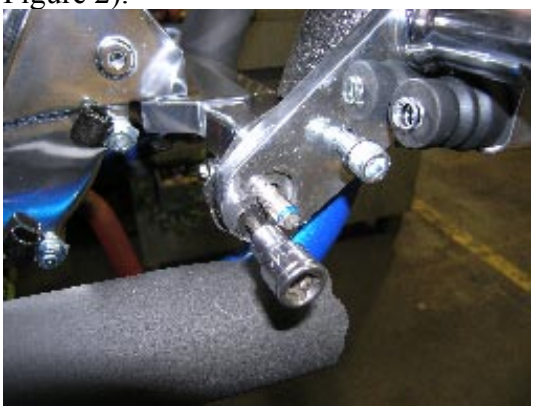


Figure 2

4. On left side of motorcycle remove kickstand (See **REMOVAL KICKSTAND**).

5. Remove three (3) 3/8” x 1” SHCS that bolt left side forward control to frame (See Figure 3).

Figure 3

INSTALLATION

1. Place motorcycle in upright position.

2. Install right side forward control onto frame using one (1) 3/8” x 1” SHCS and one (1) 3/8” x 3/4” bolt (See Figure 1). Torque 3/8” x 3/4” bolt at 20 ft.-lbs. and 3/8” x 1” SHCS at 40 ft.-lbs.

Figure 1

3. Install right side forward control rear brake lever assembly (See Figure 2).

Figure 2

4. Torque brake lever assembly bolt at 40 ft.-lbs (See Figure 3).

Figure 3

5. Install left side forward control to frame using three (3) 3/8” x 1” SHCS and torque at 40 ft.-lbs (See Figure 4).

Figure 4

6. Install foot peg onto right side forward control using spring washer, button head bolt and nylon locknut. When installing the spring washer ensure the arch is to the top (See Figure 5). Tighten button head bolt and nylon lock nut securely (See Figure 6).

Figure 5

Figure 6

7. Repeat step 6 for left side as procedures are identical.

8. Install toe peg on right side forward control using supplied bolt and red Loctite® 262 (See Figure 7).

Figure 7

9. Repeat step 8 for left side as procedures are identical.

HANDLE BAR ASSEMBLY:

Required Tools:

1. **3/8" Drive Ratchet**
2. **3/16" Hex Tip**
3. **5/32" Hex Tip**
4. **3/8" Hex Tip**
5. **Phillips Screwdriver**
6. **3/32" Allen Wrench**
7. **0-85 ft-lbs Torque Wrench**

Required Materials:

1. **Blue Loctite® 243**
2. **Black Zip Ties**

REMOVAL

1. Cut zip ties and disconnect Deutch® connectors for handle bar assembly. One connector at a time, slide connector through hole in upper triple tree to free handle bar assembly wiring harnesses.

2. Using 3/8" hex tip and ratchet, remove riser bolts from bottom of upper triple tree to remove the handle bar assembly (See Figure 1).

Figure 1

3. With handle bar assembly removed, remove speedometer assembly from handle bars using a 3/16" hex tip, and a 3/8" drive ratchet (See Figure 2).

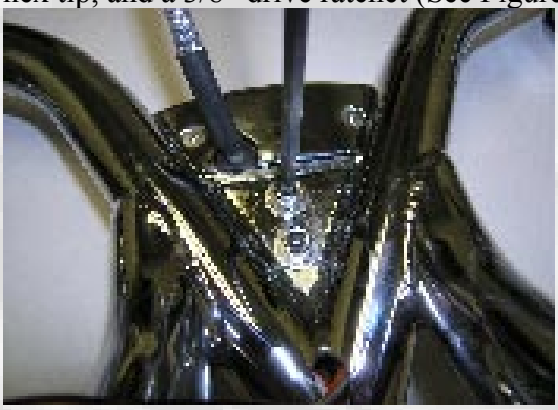


Figure 2

4. Using a 5/32" T-handle, remove the fasteners and bracket attaching the right hand grip to the handlebars (See Figure 3).

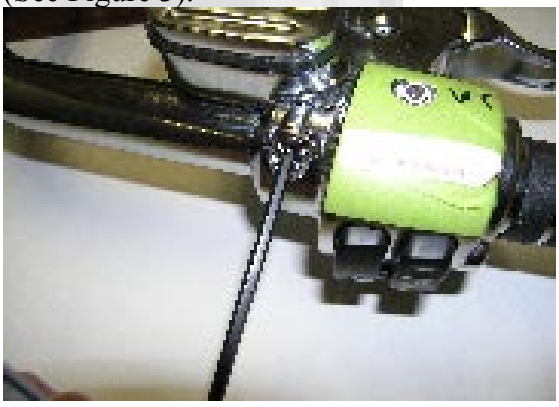


Figure 3

5. Remove the SHCS that holds the hand controls housing together.

6. Remove throttle and idle cables from throttle grip and remove throttle grip from handlebar assembly.

7. Remove the Phillips head screw inside the housing that holds the switches in place (See Figure 4).

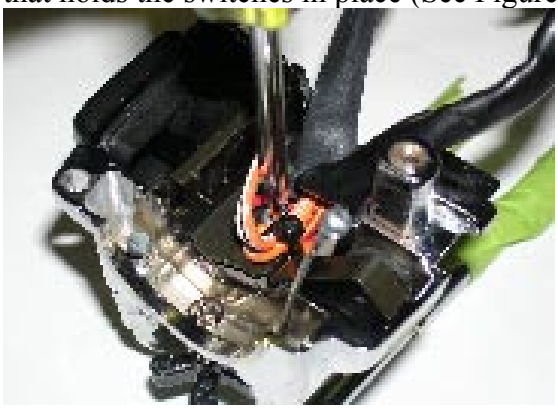


Figure 4

7. Remove switches from housing (See Figure 5).

Figure 5

8. Remove wiring from handlebars.

INSTALLATION

1. Install wiring into handlebars (See Figure 1). Repeat this step for both sides of the bars.

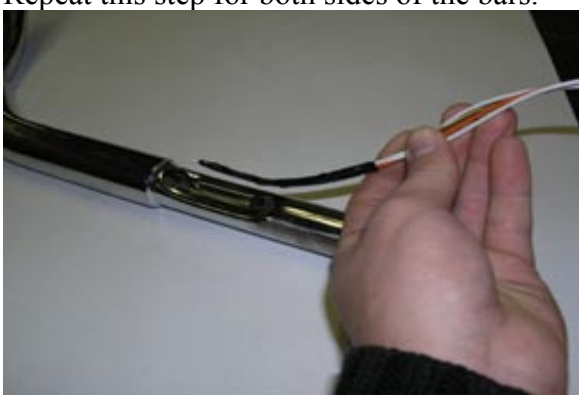


Figure 1

2. With wires inserted into the top of the bars, pull wires out of the bottom of the bars (See Figure 2).

Figure 2

3. Install the right side switch housing, throttle cables and right hand grip (See Figure 3).

Figure 3

4. Install left side switch housing and left side grip (See Figure 4).

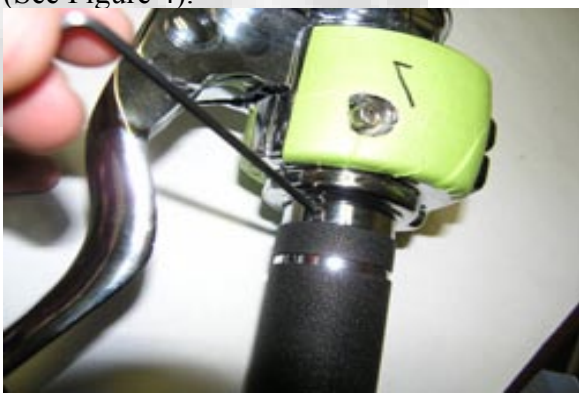


Figure 4

5. With handlebars wired and switch housings installed, install the speedometer using the two (2) SHCS fasteners and a 3/16" hex tip socket and ratchet (See Figure 5).

Figure 5

6. Using 3/8" hex tip and ratchet, install riser bolts from bottom of upper triple tree to attach the handle bar assembly (See Figure 6).

Figure 6

7. One connector at a time, slide connectors through hole in upper triple tree to attach handle bar assembly wiring harnesses'. With Deutch® connectors connected, use black zip ties to tie wiring harness up under the fuel tank.

HYDRAULIC CLUTCH:

Required Tools:

1. **3/8" Drive Ratchet**
2. **1/4" Drive Ratchet**
3. **1/2" Socket, 1/4" Drive**
4. **7/16" Wrench**
5. **1/2" Wrench**
6. **6" Extension, 1/4" Drive**
7. **5/32" Hex Tip Socket, 3/8" Drive**
8. **5/32" "T" Handle**
9. **0-50 ft. lb. Torque Wrench, 1/4" Drive**
10. **5/32" Allen Wrench**
11. **1/4" Hex Tip Socket, 3/8" Drive**

Required Materials:

1. **Blue Loctite® 243**
2. **D.O.T. 5 Silicone**
3. **Drain Pan**

REMOVAL

1. Place motorcycle in upright position, place approved drain pan container underneath motorcycle frame.

2. Remove transmission cover banjo bolt from bottom side of transmission cover (See Figure 1).

Figure 1

3. Drain D.O.T. 5 hydraulic fluid into an approved drain pan and dispose of properly.

4. Using a # 2 Phillips screw driver remove the reservoir cover from hydraulic clutch master cylinder (See Figure 2).

Figure 2

5. While draining hydraulic fluid, gently squeeze the clutch lever to force fluid to drain from hydraulic line.

6. With hydraulic fluid drained, remove hydraulic line from clamps on right side down tube (See Figure 3).

Figure 3

7. Using a 5/32" Allen wrench remove the hose clamp on the under side of the speedometer housing (See Figure 4).

Figure 4

8. Using a 7/16" wrench remove hydraulic line from hydraulic clutch master cylinder (See Figure 5).

Figure 5

9. Using a 5/32" "T" handle remove the fasteners holding the hydraulic master cylinder to the handlebar assembly (See Figure 6).

Figure 6

10. Using the 1/2” socket, 1/4” drive remove exhaust flange nuts (See Figure 7).

Figure 7

11. Remove exhaust mounting bracket nuts and remove exhaust pipe away from motorcycle.

12. Remove hydraulic transmission cover using 1/4” hex tip and 3/8” drive ratchet.

INSTALLATION

1. Inspect new transmission side cover.

2. Install hydraulic transmission cover; using a 1/4” hex tip socket and proper fasteners with blue Loctite® 243.

3. Install new hydraulic clutch master cylinder using a 5/32” “T” handle and blue Loctite® 243 (See Figure 1).

Figure 1

4. Install hydraulic line to master cylinder using a 7/16” wrench. Tighten securely.

5. Route hydraulic line underneath speedometer housing and install line clamp (See Figure 2).

Figure 2

6. Install hydraulic line clamps on right side down tube.

7. Install banjo bolt and new copper crush washers and tighten securely (See Figure 3).

Figure 3

8. Install exhaust pipe and tighten mounting bracket nuts and flange nuts securely.

9. Fill hydraulic clutch master cylinder with D.O.T. 5 silicone hydraulic fluid, and bleed system until no bubbles are seen.

OIL TANK:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1/4” Hex Tip**
3. **1/2” Ratchet Wrench**
4. **7/16” Ratchet Wrench**
5. **1/2” Deep Socket 3/8” Drive**
6. **5/8” Wrench**
7. **0-85 ft-lbs Torque Wrench**
8. **10 mm Wrench**

Required Materials:

1. **Blue Loctite® 243**
2. **Pipe Sealant**

REMOVAL

1. Using a 1/4” hex tip socket and 3/8” drive ratchet remove oil drain fitting and drain oil in motorcycle.

2. Using a 10 mm wrench remove battery terminal leads, and remove battery from motorcycle.

3. With battery removed, using a 1/2” socket and ratchet remove oil tank mounting bolts (See Figure 1).

Figure 1

4. Using a 1/2” ratcheting wrench, remove oil tank rear mounting fasteners (See Figure 2).

Figure 2

5. Using a 7/16” ratcheting wrench, remove oil tank mounting bracket fasteners (See Figure 3).

Figure 3

6. Remove oil return, oil supply, and engine oil vent lines from oil tank using a 5/8” wrench (See Figure 4).

Figure 4

7. With all lines removed, and all mounting hardware removed, remove oil tank from motorcycle frame (See Figure 5).

Figure 5

REAR FENDER:

Required Tools:

1. 3/8” Drive Ratchet
2. 5/16” Hex Tip Socket
3. 0-85 ft-lbs Torque Wrench

Required Materials:

1. Blue Loctite® 243
2. Shims

REMOVAL

NOTE:
The rear tail lamp Deutch® connector will need to be disconnected and the blue and black wire removed to facilitate the removal of the rear fender.

1. Remove seat from motorcycle (See SEAT REMOVAL).

2. Using a 3/8” drive ratchet and a 5/16” hex tip, remove the four (4) fasteners holding rear fender to the motorcycle frame.

3. Using a 5/16” hex tip socket a universal joint attachment and a 9” extension remove the two (2) fasteners from the underside of the fender.

4. When removing the rear fender, make note of shim placement, as shims must be reinstalled in the proper order.

INSTALLATION

1. Carefully install fender onto motorcycle frame.

2. Install one (1) 3/8” SHCS fastener to hold the fender in place.

3. Install shims if required, in the appropriate position.

4. Install the remaining 3/8” fasteners into the fender using blue Loctite® 243 and torque to 45 ft.-lbs.

5. Reinstall the blue and black wire into the connector, and reconnect the rear tail lamp Deutch® connector.

SWING ARM:

Required Tools:

1. 3/16” Hex Tip Socket
2. 1/8” Hex Tip Socket
3. 5/16” Hex Tip Socket
4. 3/8” Hex Tip Socket
5. 5/32” Hex Tip Socket
6. 5/32” T Handle
7. 3/8” Drive Ratchet
8. 1/2” Socket, 3/8” Drive
9. 1 1/16” Socket, 3/8” Drive
10. 1/4” Hex Tip Socket
11. 1/4” Drive Ratchet
12. 1/2” Socket, 1/4” Drive
13. 9/16” Wrench
14. 1/2” Wrench
15. 15/16” Socket, 3/8” Drive
16. 3/4” Wrench
17. 0-85 lbs. Torque Wrench
18. 7/32” Hex Tip Socket
19. 10mm Wrench

Required Materials:

1. **Black Zip ties**
2. **Blue Loctite® 243**
3. **Red Loctite® 262**
4. **Anti-Seize lubricant**
5. **Eight (8) Rubber Isolators**

REMOVAL

1. Remove battery from motorcycle.

2. Remove belt guard (See **BELT GUARD REMOVAL**).

3. Remove rear fender (See **REAR FENDER REMOVAL**).

4. Remove rear wheel assembly (See **REAR WHEEL REMOVAL**).

5. Remove shocks from the swing arm (See **SHOCK REMOVAL**).

6. Remove the pivot shaft covers using a 1/8" hex tip socket.

7. Remove pivot shaft bolts using a 15/16" socket.

INSTALLATION

1. Install the swing arm and torque pivot shaft bolts to 120 ft. lbs. Coat pivot shaft bolts with anti-seize before installation.

2. Install shocks onto swing arm (See **SHOCK INSTALLATION**).

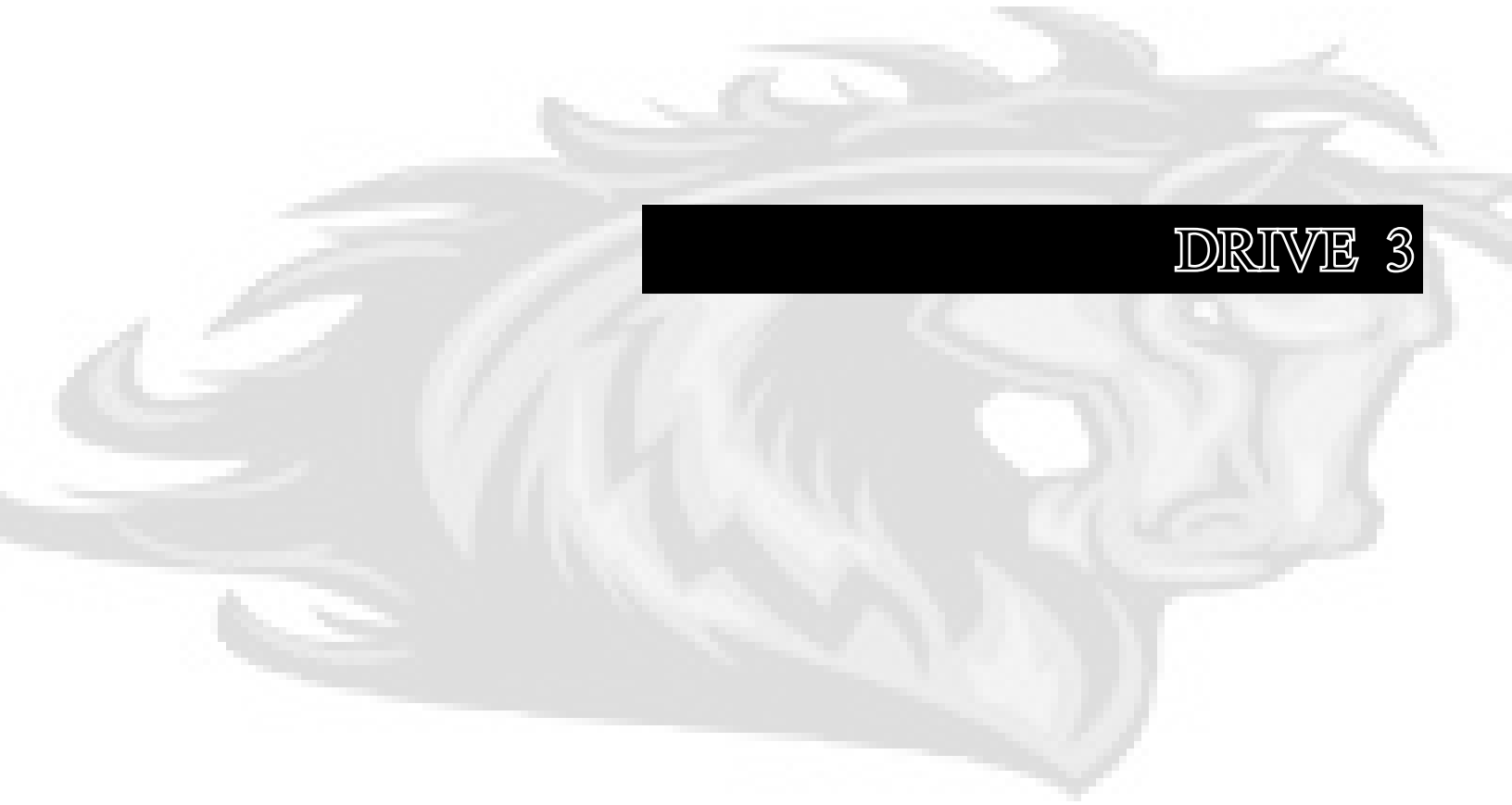
3. Install rear wheel assembly (See **REAR WHEEL INSTALLATION**).

4. Install rear fender (See **REAR FENDER INSTALLATION**).

5. Install the belt guard (See **BELT GUARD INSTALLATION**).

6. Install pivot shaft covers using blue Loctite® 243.

7. Install motorcycle battery.



DRIVE 3

Drive Section

The drive section of this manual will address the components of the motorcycle that transfer engine power to the rear wheel. The following pages will give you detailed procedures for removal and replacement of drive system components. Also included in this section are specifications on drive system parts.

SPECIFICATIONS:

Clutch: The 2007 American IronHorse motorcycles use a 32 tooth Rivera® clutch pack. This clutch pack consists of nine (9) friction plates and ten (10) steel plates. The clutch connects to the 25 tooth engine sprocket by a steel primary chain.

Rear Wheel Pulley: The rear wheel pulley is made of 4160 aluminum. The pulley is connected to the transmission pulley by a Kevlar® drive belt.

PRIMARY CHAINCASE:

Required Tools:

1. **1/2” Wrench**
2. **7/16” Wrench**
3. **11/16” Wrench**
4. **Standard Screwdriver**
5. **Rubber Mallet**
6. **1/4” Drive Ratchet**
7. **3/8” Drive Ratchet**
8. **1/2” Drive Ratchet**
9. **3/16” Hex Tip**
10. **7/32” Hex Tip**
11. **5/16” Socket 1/4” Drive**
12. **9/16” Socket 3/8” Drive**
13. **3/4” Socket 1/2” Drive**
14. **11/16” Socket 1/2” Drive**
15. **1 1/2” Socket 1/2” Drive**
16. **1 3/16” Socket 1/2” Drive**
17. **3” Extension 3/8” Drive**
18. **3” Extension 1/2” Drive**
19. **5/32” T Handle**
20. **7/32” T Handle**
21. **Metal Scribe**
22. **Pro Clutch Tool**
23. **Channel Locks**

Required Materials:

1. **Blue Loctite® 243**
2. **Red Loctite® 262**
3. **Outer Primary Cover Gasket**
4. **Inspection Cover Gasket**
5. **Derby Cover O-ring**
6. **Primary Fluid**
7. **Pipe Sealant**

REMOVAL OUTER PRIMARY CHAINCASE COVER

1. Remove primary chaincase drain plug and drain lubricant into an approved container for proper disposal.

2. Using 3/16” hex tip and ratchet remove chaincase cover fasteners.

3. Remove outer chaincase cover.

REMOVAL CLUTCH ASSEMBLY

1. Release tension on clutch cable by loosening jam nut and clutch cable adjuster (See **CLUTCH ADJUSTMENT (CABLE)**).

2. Remove clutch adjusting screw and locking nut (See Figure 1).

Figure 1

3. Using a standard screwdriver and rubber mallet bend locking tabs on clutch assembly nuts back (See Figure 2).

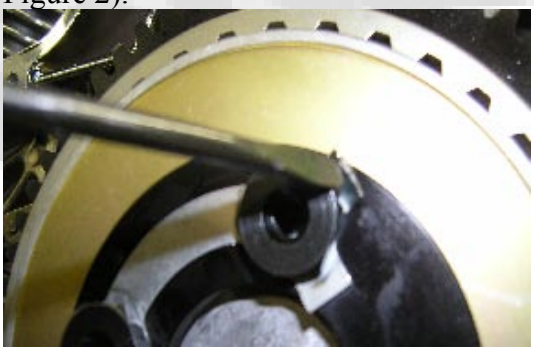


Figure 2

4. Remove nuts from clutch diaphragm plate, and locking tabs (See Figure 3).

Figure 3

5. Remove nut on chain tensioner (See Figure 4).

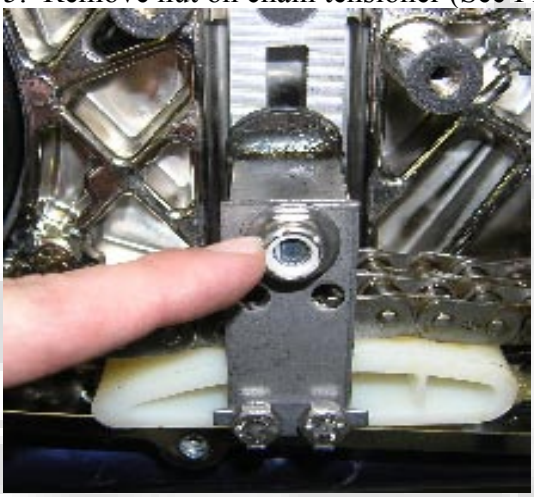


Figure 4

6. Remove diaphragm spring.

7. Remove clutch pack (See Figure 5).

Figure 5

8. Using pro clutch tool and pneumatic impact wrench and 1 3/16" socket remove main shaft nut (See Figure 6).

Figure 6

9. Using pneumatic impact wrench and 1 ½" socket remove engine compensating sprocket nut (See Figure 7).

Figure 7

10. Remove primary chain assembly (See Figure 8).

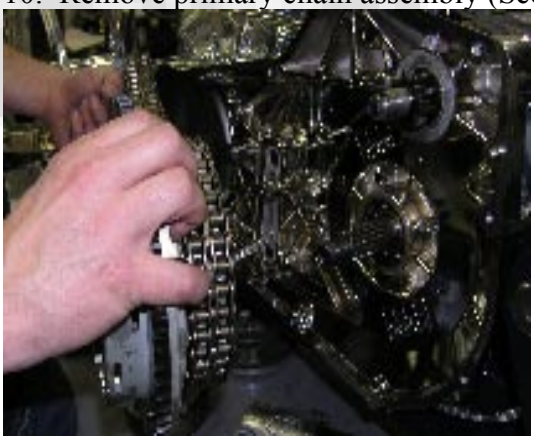


Figure 8

REMOVAL JACKSHAFT ASSEMBLY

1. Using a standard screwdriver and rubber mallet bend locking tab on jackshaft back (See Figure 1).

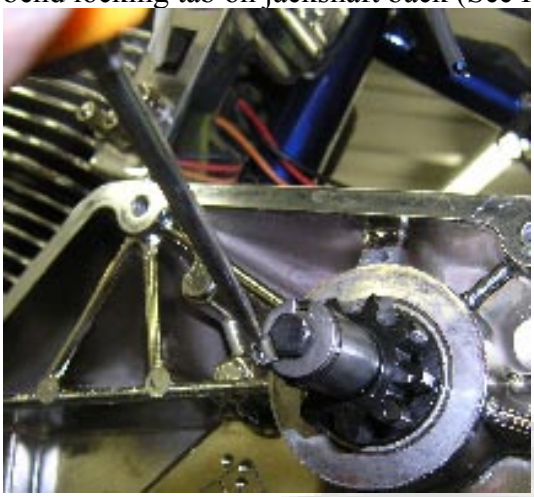


Figure 1

2. Using a 5/16” socket and 1/4” drive ratchet, remove jackshaft bolt (See Figure 2).

Figure 2

3. Slide jackshaft assembly out of inner primary chaincase (See Figure 3).

Figure 3

REMOVAL INNER PRIMARY CHAINCASE

1. Remove starter bolts (See Figure 1).

Figure 1

2. Using a standard screwdriver and rubber mallet, bend back locking tabs on inner primary bolts.

3. Using a 3/8” drive ratchet and 1/2” socket remove inner primary bolts (See Figure 2).

Figure 2

INSTALLATION INNER PRIMARY CHAINCASE

1. Using black silicone, encircle back side of inner primary bolt holes for proper sealing.

2. Replace O-ring.

3. Using a 3/8” drive ratchet and 1/2” socket install inner primary bolts (See Figure 1).

Figure 1

4. Using a standard screwdriver and rubber mallet, bend locking tabs on inner primary bolts.

5. Install starter bolts (See Figure 2).

Figure 2

INSTALLATION JACKSHAFT ASSEMBLY

1. Install jackshaft assembly into inner primary chaincase (See Figure 1).

Figure 1

2. Using a 5/16” socket and 1/4” drive ratchet, install jackshaft bolt (See Figure 2).

Figure 2

3. Using needle nose pliers bend locking tab on jackshaft to lock jackshaft bolt in place.

INSTALLATION PRIMARY CHAIN ASSEMBLY:

1. Install primary chain assembly (See Figure 1).

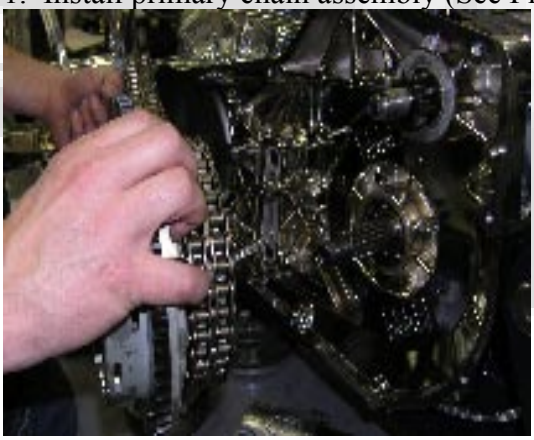


Figure 1

2. Using pneumatic impact wrench and 1 ½” socket install engine compensating sprocket nut (See Figure 2).

Figure 2

3. Using pro clutch tool and pneumatic impact wrench and 1 3/16” socket install main shaft nut (See Figure 3).

INSTALLATION CLUTCH ASSEMBLY:

1. Install clutch pack (See Figure 1).

Figure 1

2. Install diaphragm spring.

3. Install nuts and locking tabs on clutch diaphragm plate (See Figure 2).

Figure 2

4. Install nut on chain tensioner and set chain tension (See Figure 3).

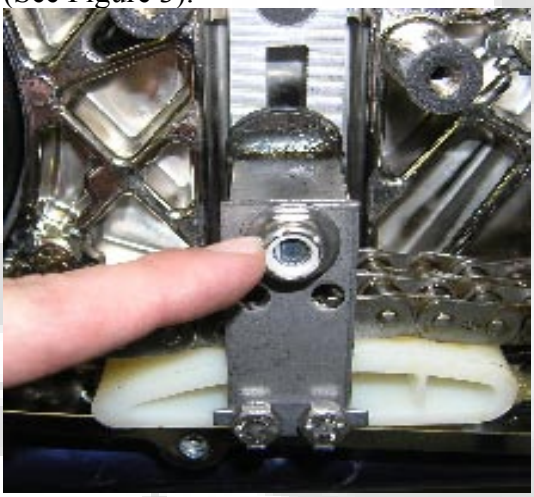


Figure 3

5. Install clutch adjusting screw and locking nut (See Figure 4).

Figure 4

6. Using needle nose pliers bend locking tabs on clutch assembly nuts to lock nuts in place.

INSTALLATION OUTER PRIMARY CHAINCASE

1. Install outer primary gasket, and outer primary chaincase cover.

2. Using 3/16” hex tip and ratchet install chaincase cover fasteners.

3. Install primary chaincase drain plug. Remove derby cover and fill primary chaincase with Castrol® MTX primary fluid to bottom of diaphragm spring.

4. Adjust tension on clutch cable by tightening jam nut and clutch cable adjuster.

TRANSMISSION BELT GUARD:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/16” Hex Tip Socket 3/8” Drive**
3. **3/8” Drive 0-85 lbs. Torque Wrench**
4. **3” 3/8” Drive Extension**

Required Materials:

1. **Blue Loctite® 243**

REMOVAL

1. Using a 3/16” hex tip socket and 3/8” drive ratchet remove the transmission belt guard from the transmission outer cover (See Figure 1).

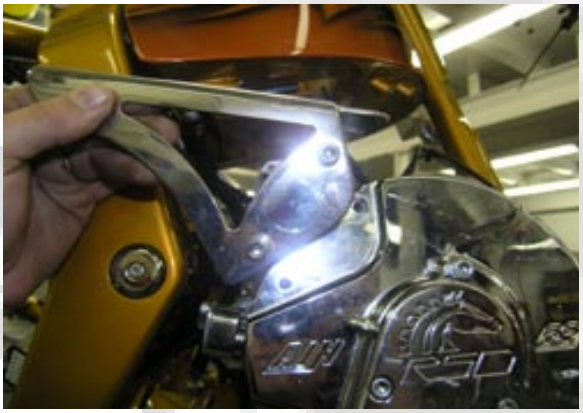


Figure 1

INSTALLATION

1. Using blue Loctite® 243 and a 3/16” hex tip socket install the two (2) fasteners that hold the belt guard to the transmission outer cover.

TRANSMISSION OUTER COVER:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/16” Hex Tip Socket 3/8” Drive**
3. **3/8” Drive 0-85 lbs. Torque Wrench**
4. **3” 3/8” Drive Extension**

Required Materials:

1. **Blue Loctite® 243**

REMOVAL

1. Using a 1/4” hex tip socket and 3/8: drive ratchet with a 3” extension remove the three (3) fasteners holding the transmission outer cover onto the transmission.

2. Using a 5/32” “T” handle remove the speed sensor from the transmission outer cover.

INSTALLATION

1. Using a 1/4” hex tip socket and 3/8: drive ratchet with a 3” extension install the three (3) fasteners holding the transmission outer cover onto the transmission with blue Loctite® 243.

2. Using a 5/32” “T” handle and blue Loctite® 243 install the speed sensor into the transmission outer cover.

TRANSMISSION PULLEY:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1 7/8” Socket 1/2” Drive**
3. **3/16” Hex Tip Socket 3/8” Drive**
4. **1/2” Drive Breaker Bar**
5. **1/2” Drive 0-150 lbs. Torque Wrench**
6. **3” 3/8” Drive Extension**
7. **1/2” Drive Impact Wrench**
8. **Lock-Up Tool**

Required Materials:

1. **Red Loctite® 262**

REMOVAL

1. Remove Transmission belt guard (See **TRANSMISSION BELT GUARD REMOVAL)**.

2. Remove Transmission outer cover (See **TRANSMISSION OUTER COVER REMOVAL)**.

3. Using a 3/16” hex tip socket and 3” extension, remove the two (2) fasteners holding the locking bracket on the transmission pulley (See Figure 1).

Figure 1

2. Using a 1 7/8” socket and a 1/2” drive impact wrench, remove the transmission pulley locking nut (See Figure 2). ***This is a reverse thread nut, so ensure you turn clockwise to remove.***

Figure 2

3. Carefully remove transmission pulley from the main shaft (See Figure 3).

Figure 3

INSTALLATION

1. Install transmission pulley onto transmission main shaft.

2. Using red Loctite® 262, install transmission pulley locking nut onto main shaft (See Figure 1).

Figure 1

3. Torque transmission pulley locking nut to 75 ft. lbs.

4. Install lock nut locking bracket using red Loctite® 262 and two (2) SHCS fasteners (See Figure 2).

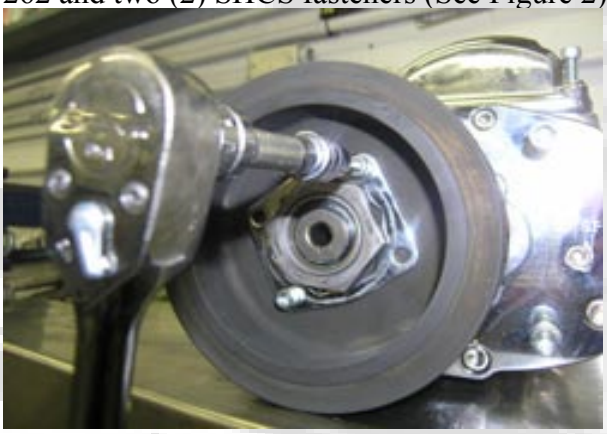


Figure 2

4. Install transmission outer cover (See **TRANSMISSION OUTER COVER INSTALLATION)**.

5. Install transmission belt guard (See **TRANSMISSION BELT GUARD INSTALLATION**).

DRIVE BELT:

Required Tools:

1. **3/16” Hex Tip Socket**
2. **1/8” Hex Tip Socket**
3. **5/16” Hex Tip Socket**
4. **3/8” Hex Tip Socket**
5. **5/32” Hex Tip Socket**
6. **3/16” T Handle**
7. **3/8” Drive Ratchet**
8. **1/2” Socket, 3/8” Drive**
9. **1 1/16” Socket, 3/8” Drive**
10. **1/4” Hex Tip Socket**
11. **1/4” Drive Ratchet**
12. **1/2” Socket, 1/4” Drive**
13. **9/16” Wrench**
14. **1/2” Wrench**
15. **15/16” Socket, 3/8” Drive**
16. **3/4” Wrench**
17. **0-85 lbs. Torque Wrench**

Required Materials:

1. **Black Zip ties**
2. **Blue Loctite® 243**
3. **Red Loctite® 262**
4. **Anti-Seize lubricant**
5. **Eight (8) Rubber Isolators**

REMOVAL

1. Place motorcycle in upright position.

2. Using a jack or lift, raise motorcycle off the ground.

3. Using a 3/16” “T” handle, remove axle block covers (See Figure 1).

Figure 1

4. Using a 1/2” wrench and a 1/2” socket and 3/8” drive ratchet, remove belt guard (See **BELT GUARD REMOVAL**).

5. Using a 3/8” hex tip socket and 3/8” drive ratchet remove license plate bracket from swingarm.

6. Remove rear brake caliper (See **REAR BRAKE CALIPER REMOVAL**). Take note of shim position and placement.

7. Using a 1/2” wrench loosen axle adjuster locking nuts and loosen axle adjuster bolts to allow for axle removal (See Figure 2).

Figure 2

8. Loosen and remove axle nut using a 15/16” socket and 1/2” drive ratchet.

9. Remove rear wheel assembly (See **REAR WHEEL ASSEMBLY REMOVAL**).

10. Remove seat and locate rear fender lights connector. Disconnect connector and remove the license plate light wires (Black and Blue wires).

11. Using a 3/16” hex tip socket remove splash shield bolt and rubber isolators, discard old rubber isolators (See Figure 3).

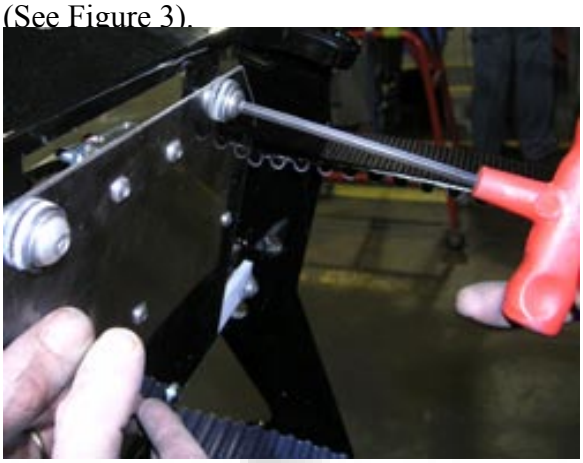


Figure 3

7. Using diagonal cutters, clip zip ties and separate wiring harnesses.

8. Remove lower splash shield (See Figure 4).

Figure 4

9. Remove license plate light harness from the harness bundle.

10. Remove swingarm pivot shaft covers (See Figure 5).

Figure 5

11. Remove pivot shaft bolts, while holding swing arm in place. This will require two persons. One to hold the swingarm and one to remove the pivotshaft bolts (See Figure 6).

Figure 6

12. Remove swingarm from frame.

13. Remove transmission belt guard (See **TRANSMISSION BELT GUARD REMOVAL**).

14. Remove transmission outer cover (See **TRANSMISSION OUTER COVER REMOVAL**).

15. Remove drive belt from transmission pulley (See Figure 7).

Figure 7

INSPECTION

1. Inspect belt for cracks, tears, and wear damage. Replace belt if needed.

INSTALLATION

1. Install drive belt onto transmission pulley (See Figure 1).

Figure 1

2. Install transmission outer cover (See **TRANSMISSION OUTER COVER INSTALLATION**).

3. Install transmission belt guard (See **TRANSMISSION BELT GUARD INSTALLATION**).

4. Install swingarm onto frame. This will take two persons, one to hold the swingarm and one to install the swing arm pivot shaft bolts (See Figure 2). Once the pivot shaft bolts are installed torque bolts to 120 ft. – lbs.

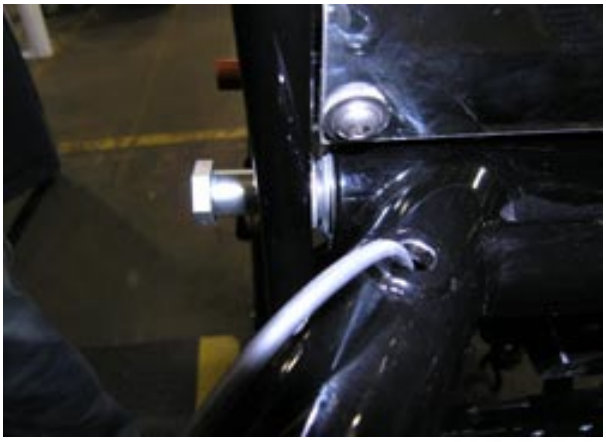


Figure 2

5. Using blue Loctite® 243, install swingarm pivot shaft covers (See Figure 3).

Figure 3

6. Route license plate light harness in the wiring harness bundle and secure with black zip ties.

7. Install lower splash shield using red Loctite® 262 (See Figure 4).

Figure 4

8. Using a 3/16" hex tip socket install splash shield bolts and rubber isolators with blue Loctite® 243 (See Figure 5).

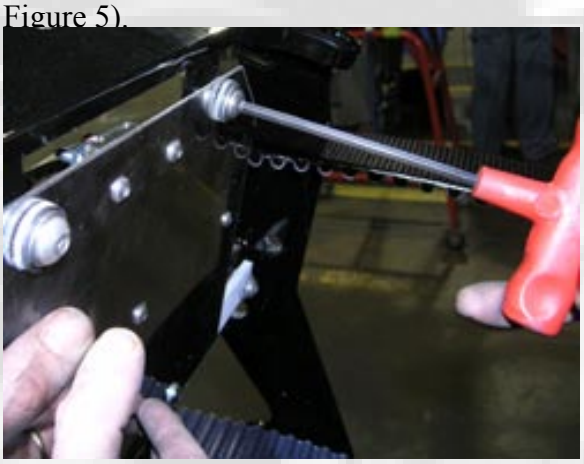


Figure 5

9. Locate rear fender lights connector. Connect connector and install the license plate light wires (Black and Blue wires).

10. Install rear wheel assembly (See **REAR WHEEL ASSEMBLY INSTALLATION**).

11. Using a 1/2” wrench tighten axle adjuster screws to apply tension to the drive belt. With the proper tension applied, check for belt tracking and free play. One belt is set correctly; lock axle adjuster locking nuts to prevent adjusters from moving (See Figure 6).

Figure 6

12. Install rear brake caliper (See **REAR BRAKE CALIPER INSTALLATION**). Ensure shims are installed in the same order that they were removed.

13. Using a 3/8” hex tip socket and 3/8” drive ratchet install license plate bracket onto swingarm.

14. Using a 1/2” wrench and a 1/2” socket and 3/8” drive ratchet, install belt guard (See **BELT GUARD INSTALLATION**).

15. Using a 3/16” “T” handle, install axle block covers with blue Loctite® 243 (See Figure 7).

Figure 7

16. Remove motorcycle from jack.

REAR WHEEL PULLEY:

Required Tools:

1. **3/8” Hex Tip Socket**
2. **3/8” Drive Torque Wrench 0-85 ft. lbs.**
3. **Impact Wrench**

Required Materials

1. **Red Loctite® 262**

REMOVAL

1. Remove rear wheel from motorcycle (See **REAR WHEEL REMOVAL**).

2. Using an impact wrench and a 3/8” hex tip socket, remove the fasteners holding the pulley to the rear wheel assembly (See Figure 1).

Figure 1

2. Remove pulley from rear wheel (See Figure 2).

Figure 2

INSPECTION

1. Inspect pulley for wear, cracks or sharp edges in grooves.

2. Clean pulley with a clean cloth and metal polish.

3. With pulley clean, re-inspect for any damage.

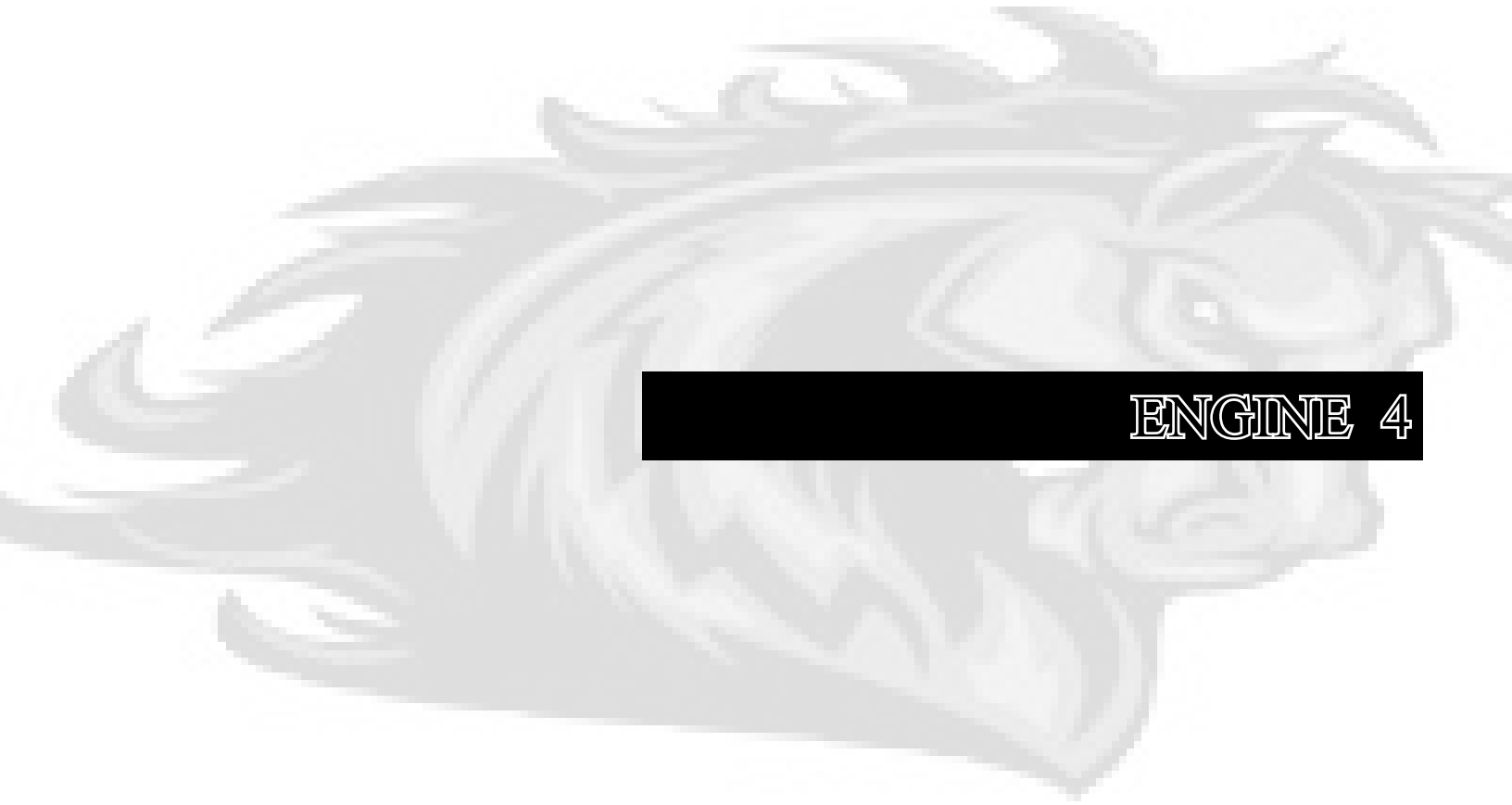
INSTALLATION

1. Install pulley onto rear wheel assembly ensuring the rotation of the pulley is in the proper direction (See Figure 1).

Figure 1

2. Using red Loctite® 262 install rear pulley fasteners.

3. Tighten these fasteners, and torque to 65 ft. – lbs.



ENGINE 4

Engine Section

The engine section of this manual will address the components of the motorcycle engine. The following pages will give you detailed procedures for removal and replacement of engine system components. Also included in this section are specifications on engine system parts.

ENGINE SPECS:

	111 cu in	117 cu in	124 cu in
Number of cylinders	2	2	2
Design	4 cycle, V-Twin	4 cycle, V-Twin	4 cycle, V-Twin
Compression Ratio	9.5 : 1	10.2 : 1	9.5 : 1
Bore	4 1/8”	4 1/8”	4 1/8”
Stroke	4 1/8”	4 3/8”	4 5/8”
Volume Displacement			
Cubic Inches	111	117	124
Cubic Centimeters	1819	1919	2034

Engine Torque Specifications

Item	Torque	Thread Treatment
Rocker Box ¼” Fasteners	100-120 in.-lbs	Loctite 243
Rocker Box 5/16” Fasteners	18 ft.-lbs	Loctite 243
Rocker Arm Support Plate	15-18 ft.-lbs	
Cylinder Head Bolts	8 ft.-lbs, 18 ft.-lbs 90°	Oil Threads
Cylinder Studs	10 ft.-lbs	Loctite 262
Crankcase Fasteners	12-15 ft.-lbs ¼”, 18-20 ft.-lbs 5/16”	
Piston Oilers	25 in.-lbs	Loctite 243
Pinion Nut	50 ft.-lbs	Loctite 262
Tappet Guide Fasteners	90-120 in.-lbs	Loctite 243
Pushrod Locknuts	90-120 in.-lbs	
Gear Cover Fasteners	120 in.-lbs	Loctite 243
Oil Pump Cover Mounting Fasteners	90-120 in.-lbs	
Oil Pump Top Mounting Fasteners	60 in.-lbs	
Intake Manifold to Head	16 ft.-lbs	Loctite 243
Intake Manifold to Carburetor	18 ft.-lbs	Loctite 243
Compression Releases	32-37 ft.-lbs	Anti-seize
Exhaust Flange to Head	18 ft.-lbs	Anti-seize
Head Temp Sensor	10-12 ft.-lbs	Anti-seize
Crank Position Sensor	90-120 in.-lbs	
Spark Plug	11-18 ft.-lbs	Anti-seize

Fly Wheel Specifications

Flywheel Diameter	8.25”
Rod Length	7.668”
Crankpin Diameter	1.500”
Wristpin Diameter	.927”
Sprocket and Pinion Shafts	1.250”

Valve Spring Pressure

Cam Lift	Closed Lbs.	Max. Lift Lbs.	Installed Spring Height
0.585	178	407	1.800”
0.6	178	413	1.800”
0.64	178	432	1.800”

Specifications and Wear Limits

Description		Specification	Wear Limit
ROCKER ARM	Shaft in bushing	.0007” - .0018”	.0035”
	Bushing fit in rocker are (tight)	.0012” - .0032”	< .0012”
	Rocker arm endplay	.001” - .012”	
CYLINDER HEAD	Valve to guide fit intake	.0012” - .0020”	.0035”
	Valve top guide fit exhaust	.0017” - .0025”	.0040”
	Valve guide in head (tight)	.0015” - .0030”	< .0015”
	Valve seat in head (tight)	.0050” - .0070”	< .0050”
	Seat width intake	.031”	.041”
	Seat width exhaust	.047”	.057”
	Valve stem protrusion	2.045” - 2.060”	2.080”
PISTONS	Fit in cylinder	.002” - .0026”	.0055”
	Compression ring gap	.017” - .026”	.030”
	Oil ring gap	.010” - .040”	.050”
CONNECTING RODS	Side play	.006” - .036”	.040”
	Wristpin in rod	.0005” - .001”	.002”
	Crankpin running clearance	.001” - .0012”	.002”
FLYWHEEL	Run out at bearing	.0005” - .001”	.006”
	Timken endplay	.001” - .005”	.005”
	Pinion bearing fit	.0004” - .001”	.002”

	Breather gear endplay	.005” - .015”	.016”
	Breather gear clearance	.0015” - .003”	.004”
	Camshaft in bushing	.0007” - .002”	.003”
	Camshaft endplay	.005” - .015”	.016”
	Pinion shaft in bushing	.001” - .0025”	.0035”
	Bushing fit in gear cover (tight)	.0007” - .0023”	< .0006”
CAM CHEST	Oil pump shaft	.0005” - .0025”	.0035”
LIFTERS	Lifter fit in guide	.0006” - .0017”	.0022”

Pinion Shaft Bearing and Race Specifications

BEARING RACE DIAMETER	PINION SHAFT BEARING DIAMETER	
	1.2498” - 1.2500”	1.2500” - 1.2502”
1.7511” to 1.7513”	RED	BLUE
1.7509” to 1.7511”	BLUE	WHITE
1.7507” to 1.7509”	WHITE	GREEN

BEARING RACE DIAMETER MINUS PINION SHAFT BEARING DIAMETER	BEARING CODE COLOR	ROLLER DIAMETER
.5005” - .5009”	GREEN	.2505”
.5007” - .5011”	WHITE	.2503”
.5009” - .5013”	BLUE	.2504”
.5011” - .5015”	RED	.2505”

ROCKER BOX:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1/4” Hex Tip Socket**
3. **0-85 ft-lbs Torque Wrench**
4. **Scissor Jack**
5. **3/16” Rocker Box Wrench**
6. **3/16” Hex Tip Socket**
7. **1/2” Socket 3/8” Drive**
8. **Breaker Bar (Optional)**
9. **Output Shaft Wrench (Optional)**

Required Materials:

1. **Blue Loctite® 243**
2. **Red Loctite® 262**
3. **Assembly Lube**
4. **Cleaning Solvent**
5. **Rocker Box Base Gasket**
6. **Rocker Box “O” Ring**

REMOVAL

1. Using a 3/16” rocker box wrench, remove the six (6) rocker box fasteners that hold the cover to the rocker box. These fasteners must be removed in a specific order to prevent the cover from warping (See Figure 1).

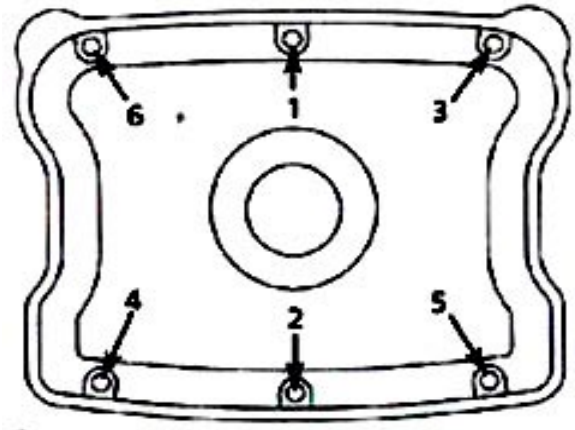


Figure 1

2. Remove the pushrod cover retainers so that the pushrods are visible.

3. With the engine in the motorcycle frame, place a scissor jack under the rear of the frame just aft of the transmission plate. Remove the spark plugs, and place the transmission in sixth gear. Rotate the rear tire until the front pushrods are at top dead center on the compression stroke. This is done to remove pressure from the valve springs, to facilitate the removal of the rocker box body. If the engine is out of the motorcycle use a bar and output shaft wrench to rotate the motor to achieve top dead center on the front pushrods.

4. With the pressure removed from the valves remove the rocker arm support fasteners (See Figure 2). These must be removed in a specific order (See Figure 3).

Figure 2

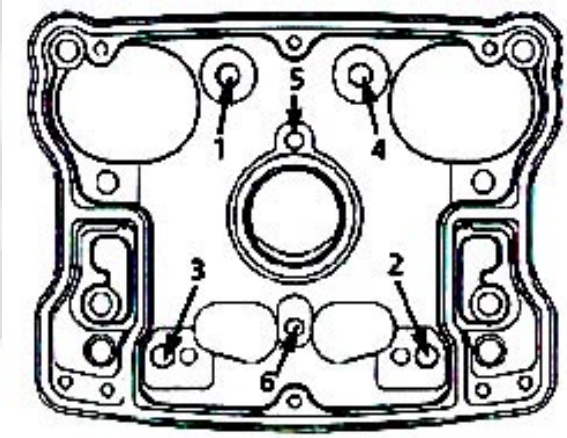


Figure 3

5. Remove the rocker base by removing the six (6) 5/16” fasteners.

INSTALLATION

1. Using cleaning solvent and a clean rag, wipe down all surfaces on the cylinder head and rocker box.

2. Install the rocker box base gasket onto the cylinder head and install the rocker box lower body. Install

fasteners using blue Loctite® 243 and torque fasteners to 15 – 18 ft.-lbs. Torque the fasteners in the order shown (See Figure 4).

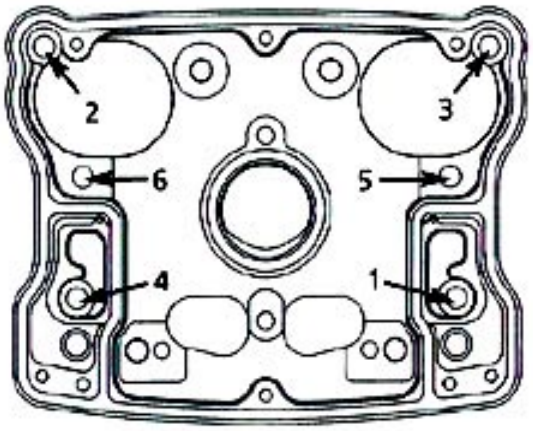


Figure 4

3. Using a feeler gauge, ensure that the rocker box and valve spring has a minimum gap of .025". If the minimum gap is not achieved, loosen the rocker box mounting fasteners and reposition the lower rocker box.

4. Install "O" ring into the lower rocker box around compression release ring.

5. Reassemble the rocker box and install rocker arms with the cut-out facing the center of the rocker box and aligned to the cam side fasteners. Install mounting fasteners in the rocker arm support using blue Loctite® 243 and torque to 15 – 18 ft- lbs (Fasteners 1,2,3 and 4 refer to Figure 5). Next install the two (2) 1/4" fasteners (5 and 6) and torque to 100 -120 in-lbs. Coat rocker arms liberally with assembly lube (See Figure 6).

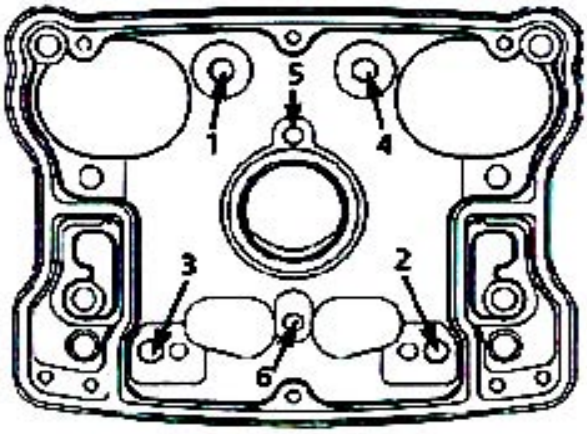


Figure 5

Figure 6

6. Check the endplay of the rocker arm. This can be done by sliding side to side as far as arm will allow. The gap measured is between the support plate and the opposite side of the arm. This measurement should fall between .001" and .012".

7. Install new rocker box cover gasket and O-ring and place cover on rocker box (See Figure 7). Using blue Loctite® 243 torque fasteners to 100-120 in –lbs, these fasteners must torque in a specific order (See Figure 8).

Figure 7

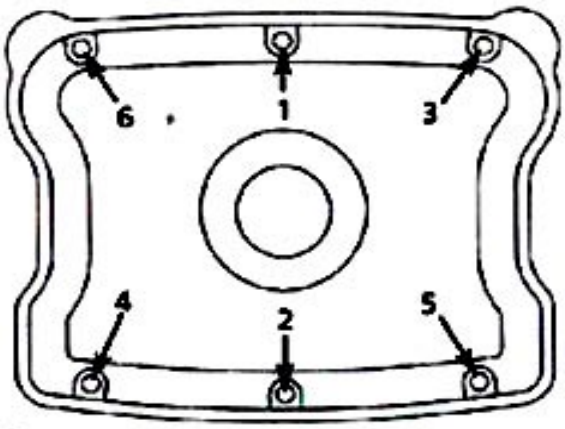


Figure 8

CYLINDER HEAD:

Required Tools:

1. **0 to 85 ft. lbs. Torque Wrench**
2. **1/2” 12-spline Socket**
3. **3/8” Drive Ratchet**
4. **Compression Release Valve Socket**

Required Materials:

1. **Two (2) Cylinder Heads**
2. **Two (2) Cylinder Head Gaskets**
3. **Eight (8) Cylinder Head Bolts**
4. **Eight (8) Cylinder Head Bolt Washers**
5. **Two (2) Compression Relief Valves**
6. **Red Loctite® 262**
7. **Engine Oil**

REMOVAL

1. Disconnect the compression release Deutch® connector.

2. Remove the green safety lock from the connector and remove the compression release wires.

3. Remove rocker box (See **ROCKER BOX REMOVAL**).

4. Remove engine push rods and label for reinstallation.

5. Remove intake manifold (See **INTAKE MANIFOLD REMOVAL**).

6. Using a compression release valve socket, remove the compression release from the cylinder head.

7. Remove the four (4) head bolts (See Figure 1). This should be done by loosening the bolts 90 degrees at a time in a cross pattern so that the head does not warp.

Figure 1

8. With cylinder head bolts removed, carefully remove cylinder head.

INSTALLATION

NOTE: Before beginning, read all assembly instructions thoroughly. All procedures must be understood before performing assembly. It is your responsibility to follow assembly instructions in order for your safety, and proper function of component.

CAUTION: Improper torque values, or torque sequence can cause damage to engine.

1. Using cleaning solvent, wipe down front cylinder and cylinder head surfaces.

2. Place cylinder head gasket over cylinder studs.

3. Install cylinder head on top of cylinder head gasket over cylinder studs.

4. Install cylinder head bolts, and hand tighten.

5. Install compression relief valve in cylinder head and hand tighten.

6. Using 0 to 85 ft. lb. torque wrench and ½" 12-spline socket, torque cylinder head bolts to 8 ft. lbs. Ensure proper torque sequence is followed (See Figure 1). These bolts must torque in a sequence (See Figure 2)

Figure 1

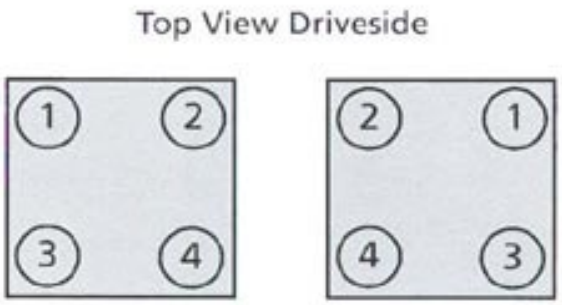


Figure 2

7. Using 0 to 85 ft. lb. torque wrench and ½" 12-spline socket, torque cylinder head bolts to 18 ft. lbs. Ensure proper torque sequence is followed (See Figure 2).

8. Using 0 to 85 ft. lb. torque wrench and ½" 12-spline socket, torque cylinder head bolts 90 degrees, starting at the 12 o'clock position. Ensure proper torque sequence is followed (See Figure 2).

9. Using 0 to 85 ft. lb. torque wrench and compression relief valve installation socket, torque compression relief valve to 18 ft. lbs.

Repeat these steps for rear cylinder head, as procedures are identical.

CYLINDER and PISTONS:

Required Tools:

1. **Impact wrench**
2. **3/16", 5/32", and 3/32" "T" Handles**
3. **Steel Pick**
4. **Piston Ring Compressor**
5. **Piston Ring Compressor Pliers**
6. **Piston Plate Tool**
7. **Feeler Gauge**
8. **Dowel Insertion Tool**
9. **Rubber Mallet**

Required Materials:

1. **Two (2) Cylinder Base Gaskets**
2. **Two (2) Pistons**
3. **Two (2) Piston Wrist Pins**
4. **Two (4) Wrist Pin Keepers**
5. **Two (2) Oil Scraper Rings**
6. **Four (4) Oil Rail Rings**
7. **Two (2) Support Rings**
8. **Two (2) Bottom Compression Rings**
9. **Two (2) Top Compression Rings**
10. **Eight (8) Cylinder Studs**
11. **Two (2) Cylinders**
12. **Four (4) Cylinder Dowels**
13. **Assembly Lube**
14. **Red Loctite® 262**
15. **Engine Oil**
16. **1/2" Plastic Tubing**

REMOVAL

NOTE: The piston <u>MUST</u> be at the top of its stroke in order to remove the cylinder.

1. Lift the cylinder off of the case so that you can see the connecting rods. In the event the cylinder does not lift off easily, use a sprocket shaft holding bracket to keep the piston still.

2. With the sprocket shaft bracket in place, gently strike the cylinder with a rubber mallet, on the support area of the fins, until the seal at the base gasket loosens. DO NOT strike the cylinder too hard, this can cause damage to the cylinder. Use a series of soft strikes to loosen the cylinder.

3. Lift the cylinder off of the case and place clean rags in the crankcase opening to prevent debris from entering the crankcase.

4. Continue lifting the cylinder off the cylinder studs. Use caution when approaching the top of the piston so that the piston does not fall against the cylinder studs.

5. With the cylinder removed, place 1/2" plastic tubing over cylinder studs, to protect the piston from damage.

PISTONS:

REMOVAL

1. Remove piston rings and discard.

2. Remove wrist pin keeper (See Figure 1).

Figure 1

3. Remove wrist pin and slide piston off of connecting rod.

INSTALLATION

1. Thoroughly clean crankcase, crank rod, wrist pin bushing, piston, and wrist pin with cleaning solvent, and dry with compressed air.

2. Carefully measure ring end gap, by pressing the top, then the bottom compression ring into the cylinder. Insert feeler gauge to measure gap in the compression rings. Gap should be .003 to .004 per inch of cylinder bore. An allowable measurement is no less than .017 and not more than .025. Optimal ring end gap is .020. Each ring should be inserted and measured separately to ensure proper fit.

3. Using cleaning solvent, clean the cylinder wall and gasket surfaces and dry with compressed air.

4. Using impact wrench with head bolt tool and 3/16" ball bearing, install cylinder studs with two drops of red Loctite® 262, shoulder down against crank case (See Figure 1).

Figure 1

5. Place cylinder base gasket over cylinder studs, against crankcase (See Figure 2).

Figure 2

6. On rear of piston install wrist pin keeper (See Figure 3).

Figure 3

7. Install piston on crank rod with arrow on top of piston, facing the cam side of the engine, by pressing wrist pin through piston and into crank rod until wrist pin seats (See Figure 4).

Figure 4

8. Using wrist pin keeper installation tool, install front wrist pin keeper (See Figure 5).

Figure 5

9. Using cleaning solvent, clean all piston rings and dry using compressed air.

10. Carefully install piston support ring in the bottom ring land of piston, ensuring ring divot is at the 4 o'clock position (See Figure 6).

Figure 6

11. Install oil scraper ring above piston support ring with gap at the 6 o'clock position (See Figure 7).

Figure 7

12. Install bottom oil rail ring between the piston support ring and oil scraper ring with gap at the 7 o'clock position (See Figure 8).

Figure 8

13. Install top oil rail ring above the oil scraper ring, with gap at the 5 o'clock position (See Figure 9).

Figure 9

14. Install bottom compression ring (ring with dot), with dot facing up, in second land above top oil rail ring, with gap at the 11 o'clock position (See Figure 10).

Figure 10

15. Install top compression ring with bevel facing up, in top ring land above second compression ring, with opening at the 1 o'clock position (See Figure 11).

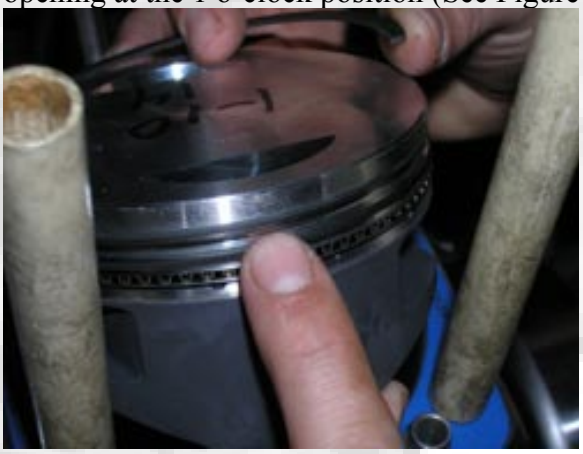


Figure 11

16. When all rings are installed in the piston, recheck piston ring gap locations, and coat piston and rings with assembly lube.

17. Place piston plate tool between crankcase and piston.

18. Using piston ring compression tool and pliers, compress piston rings. There should be a 1/8” gap between the top of the piston and the ring compression tool (See Figure 12).

Figure 12

19. Place cylinder on top of piston, with the cylinder studs lined up with their respective holes. Using equal pressure, press cylinder over rings while removing the ring compression tool (See Figure 13). When piston is pressed into cylinder, rotate rotor until piston is at top dead center position. Ensure piston approaches top dead center.

Figure 13

20. Insert cylinder dowels, using dowel insertion tool (See Figure 14).

Figure 14

Repeat these steps for the rear cylinder, as procedures are identical.

PUSHRODS:

Required Tools:

1. **Flathead Screwdriver**
2. **3/8” Drive Ratchet**
3. **1/4” Hex Tip Socket**
4. **0-85 ft-lbs Torque Wrench**
5. **3/16” Rocker Box Wrench**
6. **3/16” Hex Tip Socket**
7. **1/2” Socket 3/8” Drive**
8. **Breaker Bar (Optional)**
9. **Output Shaft Wrench (Optional)**
10. **Spark Plug Socket 5/8”, 3/8” Drive**

Required Materials:

1. **Blue Loctite® 243**
2. **Clean Rags**
3. **Assembly Lube**
4. **Cleaning Solvent**
5. **Rocker Box Base Gasket**
6. **Rocker Box “O” Ring**
7. **20W-50 Engine Oil**

REMOVAL

1. To facilitate the removal of the pushrods, the rocker box will need to be removed (See **ROCKER BOX REMOVAL**).

2. Remove the pushrod cover retainers using a flathead screwdriver so that the pushrods are visible (See Figure 1).

Figure 1

3. Remove the spark plugs using a 5/8" spark plug socket.

4. Rotate the output shaft until the front pushrods are at top dead center on the compression stroke. This is done to remove pressure from the valve springs, to facilitate the removal of the rocker box body.

5. With rocker box removed, slide pushrods out through the top of the cylinder head (See Figure 2). Ensure that you mark the pushrods in proper order for reinstallation.

Figure 2

INSTALLATION

1. Using a cleaning solvent, clean pushrods, and inspect for damage. If you notice any damage to a pushrod, replace all rods.

2. After rods and tubes have been cleaned, apply a light coat of engine oil to them.

3. Install the pushrods through the top of the cylinder head and into the pushrod tubes (See Figure 1).

Figure 1

4. Install rocker boxes (See **ROCKER BOX INSTALLATION**).

5. If your engine has adjustable pushrods, with the cylinder at top dead center on the compression stroke, adjust the push rod until contact with the tappet is made. Turn the pushrod four (4) more complete turns, until the valve begins to open.

6. Repeat step 5 for the remaining pushrod, and allow ten minutes for bleed down.

7. Loosen the pushrod so that it may be turned by hand with slight resistance. Loosen the pushrod one more full turn and tighten the locknut.

8. Repeat steps 5-7 for the remaining cylinder.

TAPPET BLOCKS AND TAPPETS:

Required Tools:

1. **Flathead Screwdriver**
2. **3/8” Drive Ratchet**
3. **1/4” Hex Tip Socket**
4. **0-85 ft-lbs Torque Wrench**
5. **3/16” Hex Tip Socket**
6. **1/4” 12 Point Socket**

Required Materials:

1. **Blue Loctite® 243**
2. **Clean Rags**
3. **Assembly Lube**
4. **Cleaning Solvent**
5. **20W-50 Engine Oil**
6. **Two (2) Tappet Block Gaskets**

REMOVAL

1. Remove pushrods (See **PUSHROD REMOVAL**).

2. Using a 3/16” hex tip socket, remove the fasteners holding the cam cover to the engine case (See Figure 1).

Figure 1

3. With screws removed, take the cam cover away from the engine case. Use a small container to catch any engine oil inside the cam chest.

4. Remove the tappet blocks using a 1/4”, 12 point socket and ratchet.

5. With the cam cover removed, press tappets up from inside cam chest, so that they may be removed with tappet blocks (See Figure 2).

Figure 2

6. Once tappets are removed, set to the side on a clean rag. Keep tappets in order they were removed in. It is important they are installed in the same location they were removed from.

INSTALLATION

1. Inspect tappets for wear or damage. If the tappet shows signs of wear and or damage, replace the tappet set. It is recommended that tappets be replaced every 20,000 to 25,000 miles.

2. Using light oil clean and lubricate the tappets and tappet blocks.

3. Starting with the rear tappet block, install a new tappet block gasket. Ensure this gasket is not covering the oil passage. Install the tappet block, and slide the tappets, in order, into the tappet block.

4. Ensure the tappet block is properly aligned, and tighten the four (4) 12 point fasteners down.

5. Torque tappet block fasteners to 10 ft-lbs.

6. Repeat steps 1 thru 6 for front tappet block.

CAM:

Required Tools:

1. **1/2” Socket, 12 Point**
2. **3/8” Drive Ratchet**
3. **1/4” Hex Tip Socket**
4. **0-85 ft-lbs Torque Wrench**
5. **3/16” Hex Tip Socket**
6. **Feeler Gauge**
7. **Micrometer**
8. **.105” Measurement Pins**

Required Materials:

1. **Blue Loctite® 243**
2. **Assembly Lube**
3. **Cleaning Solvent**
4. **20W-50 Engine Oil**
5. **Clean Rags**

REMOVAL

1. Using a 3/16” hex tip socket, remove the fasteners holding the cam cover to the engine case (See Figure 1).

Figure 1

2. Remove pushrods (See **PUSHROD REMOVAL**).

3. Remove the tappet blocks using a 1/4”, 12 point socket.

4. With screws removed, take the cam cover away from the engine case. Use a small container to catch any engine oil inside the cam chest.

5. Now that the cover and tappets are removed, slide the cam and breather gear out of the case and set aside for later installation.

CAM INSPECTION

1. Inspect the lobes of the cam for wear or gouges.

2. Inspect the cam bushing and bearing for excessive wear.

3. Verify the cam endplay. This will need to be check in four (4) places. This is done using a feeler gauge inserted through the lifer bore. There should be no more that .005” to .015” of endplay in the cam.

CAM GEAR MEASURING

1. Install .105” pins at 180 degrees apart on the cam gear, theses can be held in place by a rubber band.

2. Using a micrometer, measure the distance between the two pins. Write this measurement down.

3. Install the pins on the pinion gear and repeat the measurement.

4. Match the pinion gear to the size nearest to it, in **Figure 1**. The closer you are to the actual size the less noise created by the cam.

5. Install the cam and pinion gear dry. Install a new gasket and cover. Verify the cam slides easily across the pinion gear. This needs to be checked in four (4) spots. Rotate the flywheel to achieve the different spots for measurement. Also check for backlash at this time. If the cam does not spin easily move to the next size pinion gear.

6. With the proper gear selected, lubricate the cam and gear with assembly lube and continue to installation.

COLOR	Pinion Gear Dia. Over .105" Pins	Cam Gear Dia. Over .105" Pins
Orange	1.4751" - 1.4756"	2.7324" - 2.7334"
White	1.4745" - 1.4751"	2.7334" - 2.7344"
Yellow	1.4737" - 1.4745"	2.7344" - 2.7354"
Red	1.4729" - 1.4737"	2.7354" - 2.7364"
Blue	1.4721" - 1.4729"	2.7364" - 2.7374"
Green	1.4715" - 1.4721"	2.7374" - 2.7384"
Black	1.4710" - 1.4715"	2.7384" - 2.7394"

Figure 1

INSTALLATION

1. Using assembly lube coat cam bearing, bushing surfaces, and the four lobes.

2. Coat breather gear with assembly lube.

3. Install the camshaft lock washer into the engine case with the wings down and the flat edge facing the flywheel.

4. Install the thrust washer over the cam and install the cam in the case. Ensure the bottom timing mark is aligned with the pinion gear timing mark and that the second timing mark on the cam sits at the 8-o'clock position.

5. Install the breather gear. Ensure the breather gear timing mark aligns with the second timing mark on the cam.

6. Rotate the engine using the rods to ensure the cam and breather and pinion gears spin freely, with no bind.

7. Liberally apply assembly lube to the cam, breather gear, pinion gear, and cam bushing.

8. Install cam cover gasket, making sure not to cover the oil passages.

9. Install cam cover and torque fasteners to 120 ft-lbs.

OIL PUMP:

Required Tools:

1. **Flathead Screwdriver**
2. **3/8" Drive Ratchet**
3. **1/4" Hex Tip Socket**
4. **0-85 ft-lbs Torque Wrench**
5. **3/16" Hex Tip Socket**

Required Materials:

1. **Blue Loctite® 243**
2. **Assembly Lube**
3. **Cleaning Solvent**
4. **20W-50 Engine Oil**
5. **Clean Rags**
6. **Oil Pump Gaskets**

REMOVAL

1. Drain oil from motorcycle into an approved container for proper disposal.

2. Remove oil lines from oil pump.

3. Remove Pushrods, (See **PUSHROD REMOVAL**) cam, (See **CAM REMOVAL**) and tappets (See **TAPPET REMOVAL**).

4. Loosen the pressure relief and check ball screws.

5. Remove the four (4) fasteners holding the oil pump cover to the oil pump body and remove pump.

6. Using snap ring pliers, remove snap ring from the oil pump drive gear.

7. Remove the two (2) SHCS fasteners holding the oil pump body to the engine case.

8. Remove the oil pump body from the engine case.

INSTALLATION

1. Clean and inspect the oil pump, body, gears and cover. There should be no cracks, chips, scratches or gouges in these parts. If you find any of the above mentioned defects, replace the parts.

2. When the oil pump is removed from the engine you should replace the oil pump shaft seal. This seal will need to be installed with a shaft seal installation tool. Follow the instructions specified by the manufacturer of the tool.

3. With pump clean and shaft seal replaced, coat all the parts of the oil pump with assembly lube.

4. Install a new oil pump gasket and ensure the gasket does not contact the oil pump gears.

5. Place the pump and shaft into the crankcase, keep pressure on the oil pump shaft from the outside of the oil pump.

6. With the shaft through the bushing and even with the pinion gear, install the pump drive gear and press the shaft all the way through the gear.

7. Install the two SHCS fasteners but, **DO NOT** torque.

8. Spin the drive gear so that the woodruff key may be installed in the shaft groove.

9. Install the snap ring onto the pump shaft with the rounded edge facing the drive gear.

10. Install the oil pump body cover using four (4) fasteners hand tight. Rotate the oil pump drive gear and move the pump body, until the shaft spins smoothly.

11. Torque the cover fasteners in a cross pattern to 120 in-lbs.

12. Torque the two (2) SHCS oil pump fasteners to 120 in-lbs.

13. Pour engine oil into the pressure relief and check ball holes and install the components accordingly.

COMPRESSION RELEASES:

Required Tools:

1. **Compression Release Socket**
2. **3/8” Drive Ratchet**
3. **0-85 ft-lbs Torque Wrench**
4. **High Powered Vacuum**
5. **Small Flathead Screwdriver**
6. **1/2” Socket, 3/8”Drive**
7. **3”, 3/8” Drive Extension**

Required Materials:

1. **Blue Loctite® 243**
2. **Cleaning Solvent**
3. **Clean Rags**
4. **Silicone Lubricant**
5. **Anti-seize Lubricant**

REMOVAL (Engine in Frame)

1. Remove rocker box covers (See **ROCKER BOX REMOVAL**).

2. Carefully remove the rubber boot covering the compression release. Use only your fingers for this and be careful not to tear the boot.

3. Use a vacuum to remove any material around the compression release, so that it does not fall into the cylinder after the compression release has been removed.

4. Disconnect the compression release Deutch® connector and remove the wires from the connector.

5. Remove the compression release from the cylinder head using a compression release socket and ratchet. Be careful not to tear the wiring when removing the compression release with the socket.

REMOVAL (Engine out of Frame)

1. Same as above, except do not remove rocker box assembly.

INSTALLATION

1. Apply anti-seize lubricant to the threads of the compression release.

2. Install the compression release washer with the bevel facing up.

3. Thread the compression release into the cylinder by hand until it is tight (See Figure 1).

Figure 1

4. Feed compression release wiring through the compression release socket and place socket over the compression release. Torque compression release to 35 ft-lbs.

5. Remove socket and using silicone spray lubricant, coat rubber boot with silicone. Install rubber boot over compression release.

ELECTRICAL 5

Electrical Section

The electrical section of this manual will address the components of the motorcycle electrical system. The following pages will give you detailed procedures for removal and replacement of electrical system components. Also included in this section are specifications on electrical system parts.

Battery: All 2007 American IronHorse® motorcycles use a 12 volt DC, YTX20HL-BS battery. This is a sealed maintenance free lead acid battery.

Circuit Breaker: All 2007 American IronHorse® motorcycles are circuit protected by a 30 amp Short Stop circuit breaker.

Starter: American IronHorse® motorcycles use a 1.4kw rated Tech cycle starter.

Stator: As part of the charging system American IronHorse® motorcycles use a 32 amp single phase stator.

Regulator: All 2007 American IronHorse® motorcycles also use a 13.0 to 14.7 volt regulator as part of the charging system.

Igniter: American IronHorse® 2007 motorcycles use an electronic igniter controlled by the RHC.

RHC: The heart to the entire electrical system is the RHC or Relay Harness Controller. This serves as a power distribution station, relay station and overall brain of the motorcycle.

COIL:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/8” Hex Tip**
3. **0-85 ft-lbs Torque Wrench**

Required Materials:

1. **Three (3) 3/8” x 1” Chrome SHCS**
2. **Three (3) 3/8” Lock Washers**
3. **Two (2) 10 mm Flat Washers**
4. **One (1) 10 mm Fender Washer**
5. **Blue Loctite® 243**
6. **Red Loctite® 262**

REMOVAL

1. Remove coil cover (See Figure 1).

Figure 1

2. Remove spark plug wires from spark plugs.

3. Unplug coil connector (See Figure 2).

Figure 2

4. Remove top motor mount/coil mounting bolt and washers (See Figure 3).

Figure 3

5. Remove left and right coil mounting bolts and washers (See Figure 4).

Figure 4

6. Unplug MAP sensor and heat sensor (See Figure 5).

Figure 5

INSTALLATION

1. Install MAP sensor and heat sensor.

2. Place coil harness under motor mount/coil mounting bracket (See Figure 1).

Figure 1

3. Using blue Loctite® 243 and 3/8" x 1" chrome bolt and washers mount coil onto cylinder (See Figure 2).

Figure 2

4. Repeat step 3 for left side of motor/coil mount as procedures are identical.

5. Using red Loctite® 262 and 3/8" x 1" bolt, 10 mm fender washer, and 3/8" lock washer mount motor/coil mount to frame (See Figure 3).

Figure 3

6. Torque all three (3) coil mounting bolts to 35 ft-lbs (See Figure 4).

Figure 4

7. Connect coil connector to main harness (See Figure 5).

Figure 5

8. Install spark plug wires onto spark plugs (See Figure 6).

Figure 6

9. Install coil cover (See Figure 7).

Figure 7

CRANK SENSOR:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/16” Hex Tip 3/8” Drive**
3. **3/8” Hex Tip Socket 3/8” Drive**
4. **3/32” T Handle**
5. **5/16” Hex Tip Socket 3/8” Drive**
6. **15/16” Socket 3/8” Drive**
7. **1/2” Wrench**
8. **1/2” Socket 3/8” Drive**
9. **Diagonal Cutters**
10. **0-85 ft-lbs Torque Wrench**
11. **Small Standard Screwdriver**
12. **10mm Wrench**

Required Materials:

1. **Blue Loctite® 243**
2. **Red Loctite® #262**
3. **Zip Ties**
4. **Eight (8) Rubber Isolators**
5. **Anti-seize lubricant**

REMOVAL

1. Remove battery from motorcycle.

2. Using a 3/16” T Handle remove axle cover bolts and axle cover (See Figure 1)

Figure 1

3. Using a 1/2” wrench loosen axle adjustment locking nuts (See Figure 2).

Figure 2

4. With axle adjuster locking nuts removed, back out axle adjuster screw.

5. Remove rear wheel assembly (See **REAR WHEEL REMOVAL**).

6. Using a 3/16” hex tip socket remove splash shield bolt and rubber isolators, discard old rubber isolators (See Figure 3).

Figure 3

7. Slide splash shield out of the way and using diagonal cutters, clip zip ties and separate wiring harness’.

8. Locate crank sensor harness and unplug Deutch® connector (See Figure 4).

Figure 4

9. Using a small standard screwdriver remove green safety lock and de-pin Deutch® connector (See Figure 5).

Figure 5

10. Now that the connector is de-pinned, and the zip ties clipped, carefully pull harness back towards the engine assembly.

11. Using a 1/2” wrench remove the nuts and “P” clamps along the bottom of the engine case (See Figure 6). With the “P” clamps off, remove harness from the clamps.

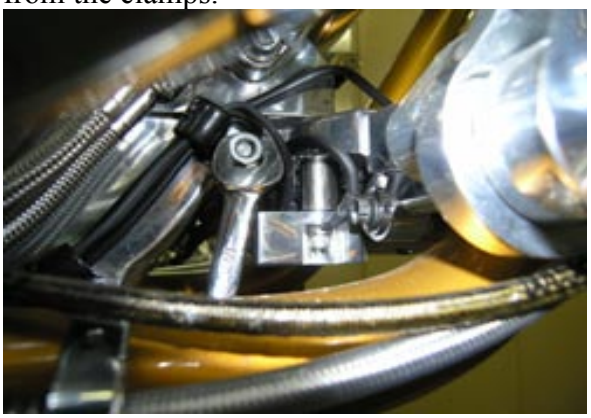


Figure 6

12. Repeat step 11, for all three (3) clamps.

13. Using a 3/16” hex tip socket and 3/8” drive ratchet remove the crank sensor mounting bolt (See Figure 7).

Figure 7

INSTALLATION

1. Using a 3/16” hex tip socket and 3/8” drive ratchet and blue Loctite®, install crank sensor and tighten mounting bolt (See Figure 1).

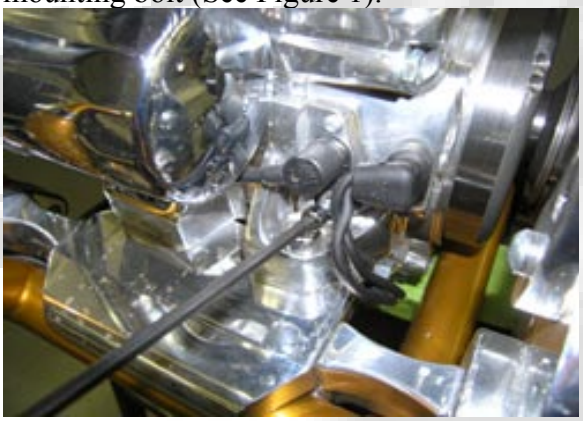


Figure 1

2. Carefully route crank sensor wiring harness through “P” clamps along bottom of engine case.

3. Run wiring harness up and through the back side of the battery compartment and zip tie.

4. Re-pin Deutch® connector and install green safety lock (See Figure 2).

Figure 2

5. Re-connect the crank sensor connector (See Figure 3).

Figure 3

6. Ensure all wiring harnesses are zip tied and positioned away from components that may cause chaffing.

7. Install splash shield and new rubber isolator grommets with red Loctite® 262. Torque bolts to 10 inch pounds.

8. Re-install rear wheel assembly (See **REAR WHEEL INSTALLATION**).

9. Using a 1/2” wrench tighten axle adjuster screws to achieve proper belt tension and wheel alignment.

10. Check belt for proper tracking and free play.

11. Tighten Axle adjuster locking screws using a 1/2” wrench (See Figure 4).

Figure 4

12. Using a 3/16” T Handle and blue Loctite® install axle covers (See Figure 5).

Figure 5

13. Install and re-connect battery.

IGNITER:

Required Tools:

1. 3/8” Drive Ratchet
2. Diagonal Cutters
3. 10mm Wrench
4. 3” Extension
5. 1/2” Socket, 3/8” Drive

Required Materials:

1. Zip Ties

REMOVAL

NOTE: Use caution when cutting zip ties, careless cuts may result in cut wires

1. Remove seat from motorcycle.

2. Disconnect battery from motorcycle**.**

3. Using diagonal cutters clip zipties holding igniter harness.

4. Remove the plug from the igniter (See Figure 4).

Figure 4

5. Using a 3/8” drive ratchet with 1/2” socket, remove igniter mounting nuts (See Figure 5).

Figure 5

INSTALLATION:

1. Install igniter and using 3/8” drive ratchet with 1/2” socket, tighten igniter mounting nuts (See Figure 1).

Figure 1

2. Connect igniter plug to igniter (See Figure 2).

Figure 2

3. Using zip ties carefully cinch harness’ back together.

10. Install and re-connect battery.

RHC:

Required Tools:

1. 3/8” Drive Ratchet
2. Diagonal Cutters
3. 10mm Wrench
4. 3” Extension
5. 1/2” Socket, 3/8” Drive

Required Materials:

1. Zip Ties

REMOVAL

NOTE: Use caution when cutting zip ties, careless cuts may result in cut wires

1. Remove seat from motorcycle.

2. Disconnect battery from motorcycle.

3. Using diagonal cutters clip zipties holding igniter harness.

4. Remove red snap lock on RHC plug (See Figure 4).

Figure 4

5. Remove RHC plug from RHC by depressing black tab on plug (See Figure 5).

Figure 5

10. Using a 1/2" socket and 3/8" drive ratchet remove the two (2) RHC mounting bolts and remove the RHC (See Figure 6).

Figure 6

INSTALLATION

1. Using a 1/2" socket and 3/8" drive ratchet install the two (2) RHC mounting bolts and RHC (See Figure 1).

Figure 1

2. Connect RHC plug to the RHC.

3. Install red snap lock onto RHC plug (See Figure 2).

Figure 2

4. Ziptie harness to secure wiring.

5. Re-connect battery.

6. Install seat on motorcycle.

CIRCUIT BREAKER:

Required Tools:

1. 3/8” Drive Ratchet
2 1/2” Wrench
3. 1/2” Socket 3/8” Drive
4. Diagonal Cutters
5. 0-85 ft-lbs Torque Wrench
6. Small Standard Screwdriver
7. 10mm Wrench

Required Materials:

1. Zip Ties

REMOVAL

1. Remove battery from motorcycle.

2. Remove circuit breaker from splash shield.

3. Remove and mark all wires connected to the circuit breaker, label wires positive (+) or negative (-).

INSTALLATION

1. Install positive wires to positive terminal of circuit breaker and negative wires to negative terminal of circuit breaker.

2. Install circuit breaker onto splash shield.

3. Install and re-connect battery.

IGNITION SWITCH:

Required Tools:

1. 3/8” Drive Ratchet
2. 3/16” Hex Tip 3/8” Drive
3. 5/16” Hex Tip Socket 3/8” Drive
4. Diagonal Cutters
5. 0-85 ft-lbs Torque Wrench
6. 10mm Wrench
7. Spanner Wrench

Required Materials:

1. Blue Loctite® 243
2. Zip Ties

REMOVAL

1. Remove battery from motorcycle.

2. Using a spanner wrench remove the ignition switch locking nut (See Figure 1).

Figure 1

3. Using a 5/16” hex tip socket remove the top mounting bolt from ignition switch mounting bracket (See Figure 2).

Figure 2

4. Using a 5/16” hex tip socket remove the bottom mounting bolt from ignition switch mounting bracket (See Figure 3).

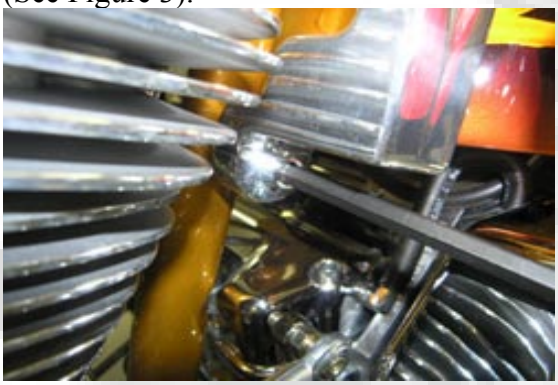


Figure 3

5. Remove ignition switch from housing (See Figure 4).

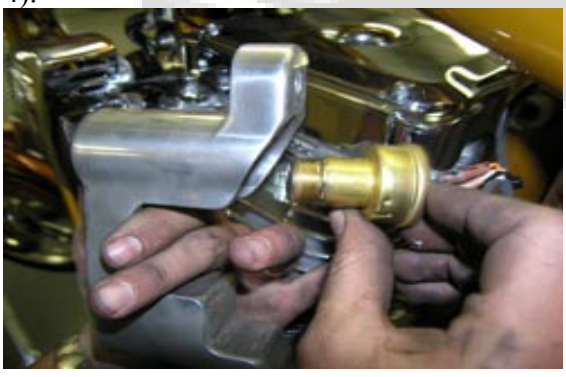


Figure 4

6. With ignition switch removed from mounting bracket unscrew ring terminals from ignition switch using a standard screwdriver (See Figure 5).

Figure 5

7. Inspect ignition switch wiring for damage.

INSTALLATION

1. Install ring terminals onto the ignition switch using a standard screwdriver (See Figure 1).

Figure 1

2. Install ignition switch into ignition switch mount housing (See Figure 2).

Figure 2

3. Using a spanner wrench install locking nut onto ignition switch (See Figure 3).

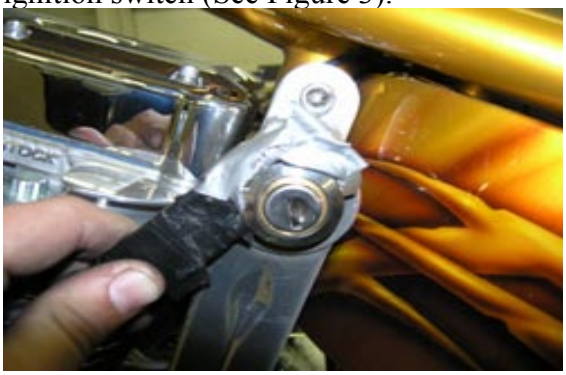


Figure 3

4. Install top ignition switch mounting bracket fastener into frame using blue Loctite® 243 and a 5/16" hex tip socket (See Figure 4).

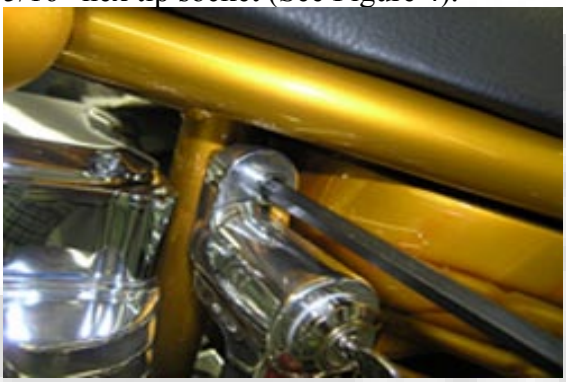


Figure 4

5. Install bottom ignition switch mounting bracket fastener into frame using blue Loctite® 243 and a 5/16" hex tip socket (See Figure 5).

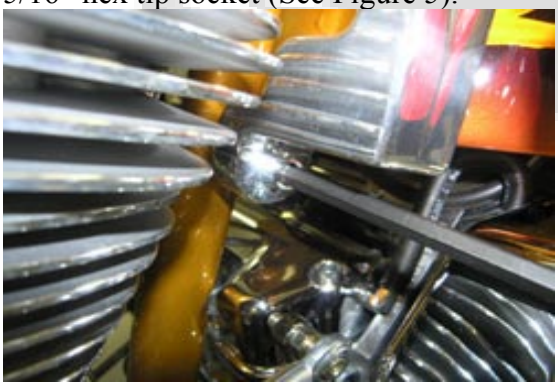


Figure 5

6. Hand tighten ignition switch mount fasteners.

VOLTAGE REGULATOR:

Required Tools:

1. **3/8" Drive Ratchet**
2. **3/16" Hex Tip 3/8" Drive**
3. **Rocker Box Wrench w/ 3/16" tip**
4. **Diagonal Cutters**
5. **0-85 ft-lbs Torque Wrench**
6. **10mm Wrench**
7. **3/8" Hex Tip Socket 3/8" Drive**
8. **3/32" T Handle**
9. **5/16" Hex Tip Socket 3/8" Drive**
10. **15/16" Socket 3/8" Drive**
11. **1/2" Wrench**
12. **1/2" Socket 3/8" Drive**
13. **Small Standard Screwdriver**
14. **Terminal Crimps**
15. **3/8" Wrench**

Required Materials:

1. **Blue Loctite® 243**
2. **Zip Ties**
3. **Eight (8) Rubber Isolators**
4. **One (1) Ring Terminal**

REMOVAL

1. Remove battery from motorcycle.

2. Using a 3/16" T Handle remove axle cover bolts and axle cover (See Figure 1)

Figure 1

3. Using a 1/2” wrench loosen axle adjustment locking nuts (See Figure 2).

Figure 2

4. With axle adjuster locking screws removed, back out axle adjuster.

5. Remove rear wheel assembly (See **REAR WHEEL REMOVAL**).

6. Using a 3/16” hex tip socket remove splash shield bolt and rubber isolators, discard old rubber isolators (See Figure 3).

Figure 3

7. Slide splash shield out of the way and using diagonal cutters, clip zip ties and separate wiring harness’.

8. Using a 3/8” wrench remove the nut, lock washer and the ring terminal from the copper post on the circuit breaker.

9. Using the diagonal cutters clip the old ring terminal from regulator harness and pull the harness carefully towards the front of the motorcycle. Make not of the routing of the harness, as the new harness will be routed the same way.

10. Using a 3/16” hex tip and a 3/8” drive socket remove old regulator from motorcycle (See Figure 4).

Figure 4

INSTALLATION

1. Using a 3/16” hex tip and a 3/8” ratchet install the regulator star washer, and spacers to the motorcycle frame.

2. Carefully route regulator harness through the “P” clamps and along the bottom of the engine and transmission. Now route the harness up the splash shield and over to the circuit breaker.

3. Using terminal crimpers, crimp a ring terminal onto the regulator harness.

4. Using a 3/8” wrench attach ring terminal and lock washer to circuit breaker.

5. Ensure all wiring harnesses are zip tied and positioned away from components that may cause chaffing.

7. Install splash shield and new rubber isolator grommets with red Loctite® 262. Torque bolts to 10 inch pounds.

8. Re-install rear wheel assembly (See **REAR WHEEL INSTALLATION**).

9. Using a 3/16” T Handle tighten axle adjuster screw to achieve proper belt tension and wheel alignment.

10. Check belt for proper tracking and free play.

11. Using a 1/2” wrench tighten axle adjustment locking nuts (See Figure 1).

Figure 1

12. Using a 3/16” T Handle and blue Loctite® install axle covers (See Figure 2).

Figure 2

13. Install and re-connect battery.

FUEL SYSTEM 6

FUEL SYSTEM

GENERAL

The S&S Super G is a butterfly type carburetor with a fully adjustable idle mixture, and the ability to change mid range and high speed jets. This carburetor also features an adjustable accelerator pump and a variable enrichment/fast idle device for increased throttle response, engine starting and engine warm ups. The Super G has a 2 1/16" (52.3mm) bore and a 1 ¾" (44.5mm) venturi. The Super G is the only carburetor used on 2007 American IronHorse motorcycles. The Super G carburetor comes set from the factory and has a 74 main jet and a 295 intermediate jet installed.

TROUBLESHOOTING

Use the following tables for troubleshooting of the carburetor.

OVERFLOW

Check for:	Solution:
Loose float bowl screws.	Tighten float bowl screws.
Damaged float bowl O-ring.	Replace float bowl O-ring.
Broken or leaking float assembly.	Replace Float assembly.
Bad needle.	Replace needle
Dirty needle.	Clean or Replace needle.
Misadjusted float.	Properly adjust float.

HARD STARTING

Check for:	Solution:
Misadjusted Carburetor.	Properly adjust carburetor.
Accelerator pump not working.	Repair/Replace accelerator pump
Enrichner not working properly	Repair/Replace enrichner
Intermediate jet clean and seated properly.	Clean/Replace and seat intermediate jet properly.

POOR IDLING

Check for:	Solution:
Misadjusted or damaged mixture screw.	Replace/adjust mixture screw.
Intake manifold leak.	Replace intake manifold.
Dirty carburetor or clogged internal passageways.	Clean carburetor and clear internal passageways.
Enrichner not shutting off.	Repair/replace enrichner.
Damaged butterfly.	Replace butterfly.

POOR FUEL ECONOMY

Check for:	Solution:
Jetting problems	Clean/Replace and seat jets properly.
Enrichner not shutting off.	Repair/replace enrichner
Misadjusted carburetor.	Properly adjust carburetor.
Misadjusted accelerator pump	Properly adjust accelerator pump.

POOR ACCELERATION

Check for:	Solution:
Jetting problems.	Clean/Replace and seat jets properly.
Damaged accelerator pump assembly.	Repair/Replace accelerator pump assembly.
Dirty Carburetor.	Clean carburetor.

POOR PERFORMANCE

Check for:	Solution:
Jetting problems.	Clean/Replace and seat jets properly.
Enrichner misadjusted.	Properly adjust enrichner.
Dirty Carburetor.	Clean carburetor.

POOR HIGH SPEED PERFORMANCE

Check for:	Solution:
Jetting problems.	Clean/Replace and seat jets properly.
Improper float adjustment.	Properly adjust float.
Accelerator pump misadjusted.	Properly adjust accelerator pump.
Worn or damaged needle.	Replace needle.
Restricted fuel supply.	Clear fuel restriction.

CARBURETOR:

WARNINGS:

- **Gasoline is extremely flammable and explosive in certain conditions and toxic in inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.**
- **If motorcycle has been running, wait until engine and exhaust pipes have had ample time to cool to avoid burns.**
- **Before performing any maintenance disconnect battery to eliminate the chance of sparks, or unintentional engagement of electric starter.**
- **To prevent engine flooding and possible overspill of gasoline which is a fire hazard, ensure float setting is correct and needle and seat assembly functions properly and shuts off fuel supply. Always shut off fuel petcock when engine is not running.**
- **Ensure all fuel lines, supply and overflow, are properly routed and fuel line clamps are tight. Contact of lines to exhaust pipes or other hot surfaces could cause lines to melt and present a significant fire hazard.**
- **Exhaust fumes are highly toxic and poisonous if breathed. Run motorcycle in well ventilated area so fumes are allowed to dissipate.**
- **Ensure all federal, state and local laws are followed when performing any maintenance.**

Required Tools:

1. **3/8" "T" Handle**
2. **Standard Screwdriver**
3. **10mm Wrench**
4. **Clean Rags**

REMOVAL

1. Shut off fuel petcock and disconnect battery (See Figure 1).

Figure 1

2. Remove breather hose and valve from air cleaner backing plate (See Figure 2).

Figure 2

3. Remove air cleaner cover, and air filter (See Figure 3).

Figure 3

4. Remove air cleaner backing plate, spacers and shims (See Figure 4). *Extra care should be taken during removal of these items, as shims must be reinstalled in proper order*.

Figure 4

5. Remove fuel line and drain existing fuel from carburetor.

6. Remove throttle cables from carburetor (See Figure 5).

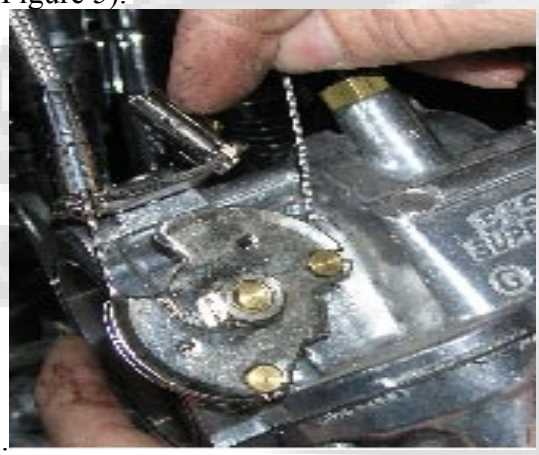


Figure 5

7. Remove carburetor, insulation block, and O-ring from intake manifold (See Figure 6).

Figure 6

8. Place clean rags inside intake manifold to prevent any foreign material from entering engine.

ASSEMBLY

NOTE: Before beginning, read all assembly instructions thoroughly. All procedures must be understood before performing assembly. It is your responsibility to follow assembly instructions in order for your safety, and proper function of component.

<u>WARNING:</u> The use of compressed air, and the debris dislodged by the use of compressed air can be harmful to eyes and body. Safety goggles must be worn when working around compressed air. To avoid bodily injury, never direct air stream toward hands, body, or eyes.

Required Materials:

1. **S&S Super G Carburetor**
2. **Blue Loctite® 243**
3. **74 Main Jet**
4. **295 Intermediate Jet**
5. **Cable Guide**
6. **Cable Guide Screw**
7. **Air/Fuel Mixture Screw**

Required Tools:

1. **3/8" "T" Handle**
2. **Standard Screwdriver**
3. **Clean Rags**
4. **Cleaning solvent**

1. Remove four (4) bowl screws and separate carburetor.

2. Install and seat 74 main jet (See Figure 7).

Figure 7

3. Install and seat 295 intermediate jet (See Figure 8).

Figure 8

4. Using cleaning solvent, clean rag and compressed air clean bowl assembly.

5. Reinstall bowl assembly and install 4 bowl screws.

6. Using cable guide screw, install cable guide (See Figure 9).

Figure 9

7. Taking special care not to over tighten, install the air/fuel mixture screw and spring (See Figure 10). Once installed, lightly seat and back off 1 ½ turns.

Figure 10

8. Set idle by turning ½ turn in (See Figure 11).

Figure 11

9. Set accelerator pump by tightening to coil bind, then backing off 2 ½ turns (See Figure 12). These adjustments are factory settings, final adjustments will need to be made during tuning .

Figure 12

INSTALLATION

NOTE: Before beginning, read all installation instructions thoroughly. All procedures must be understood before performing installation. It is your responsibility to follow installation instructions in order for your safety and proper function of the component.

Required Tools:

1. **3/8" "T" Handle**
2. **Standard Screwdriver**
3. **3/8" Hex Tip**
4. **10 mm Wrench**
5. **0 – 85 ft. lbs. Torque Wrench**
6. **Clean Rags**
7. **Cleaning Solvent**

Required Materials:

1. **S&S Super G Carburetor**
2. **Two (2) SHCS Black Oxide Bolts 3/8" x 1 ¼"**
3. **Backing Plate Gasket**
4. **Air Cleaner Backing Plate**
5. **Two (2) Backing Plate Bolts to Head Bolts**
6. **Three (3) Backing Plate Bolts**
7. **Two (2) 1.150" Spacers**
8. **Shims**
9. **Air Cleaner**
10. **Air Cleaner Cover**
11. **Blue Loctite® 243**

1. Using two (2) SHCS 3/8" x 1 ¼" black oxide bolts with blue Loctite® 243 attach carburetor to manifold (See Figure 13).

Figure 13

2. Torque bolts to 18 ft. lbs.

3. Install air cleaner backing plate and backing plate gasket using three (3) backing plate bolts and blue Loctite® 243 (See Figure 14).

Figure 14

4. While holding 1.150" spacers in place insert bolt with blue Loctite® 243, to attach backing plate to cylinder head (See Figure 15). Use shims provided to fill in any gaps between spacer and cylinder head.

Figure 15

5. Attach breather hose and valve from cylinder head to air cleaner backing plate (See Figure 16).

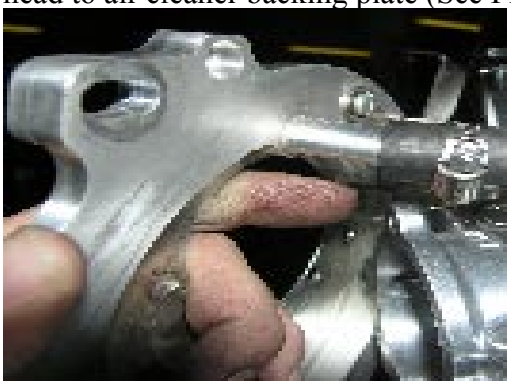


Figure 16

CARBURETOR TESTING AND TUNING

WARNINGS:

- **Gasoline is extremely flammable and explosive in certain conditions and toxic if inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.**
- **Ensure all fuel lines, supply and overflow, are properly routed and fuel line clamps are tight. Contact of lines to exhaust pipes or other hot surfaces could cause lines to melt and present a significant fire hazard.**
- **Exhaust fumes are highly toxic and poisonous if breathed. Run motorcycle in well ventilated area so fumes are allowed to dissipate.**

PRE-START CHECKS:

1. Once carburetor is installed and fuel line secured to fuel inlet, open fuel petcock and check for leaks around float bowl gasket and any inline fuel connections (fuel filter). Correct and clean up any leaks before starting engine.

2. Check operation of accelerator pump by looking down the venture of the carburetor while twisting the throttle rapidly. You should see a steady short stream of fuel squirting from the ejector nozzle.

ADJUSTING CARBURETOR:

1. During carburetor assembly, S&S adjusts both the throttle stop/engine rpm adjustment screw and the idle mixture screw to settings that should work for first start-up after installation.

2. Start engine and run until slightly warm (approximately 1-2 minutes), turn rpm adjustment screw to maintain approximately 1000 RPM during this warm up period.

3. Turn idle mixture screw clockwise, slowly leaning mixture until engine starts to die. Next turn screw counterclockwise, slowly richening mixture until engine RPM fall off. Mixture adjustment is correct when screw is positioned about halfway between these points, or approximately ¼ to ½ turn out from lean side of the adjustment range.

NOTE: Turning screw out (counterclockwise) makes idle mixture richer. Turning screw in (clockwise) makes mixture leaner. For most carburetors, a correctly adjusted screw will be between 1 ¼ and 1 ¾ turns out from bottom. If idle mixture screw is turned completely in, engine will not run at idle. Turning the idle mixture screw in past the bottom, will damage the carburetor body.

4. After initial idle mixture adjustment, reset engine idle to approximately 1000 RPM. Lower idle speed can cause hard starting; poor throttle response, erratic idle and unnecessary engine wear.

5. After engine has reached normal operating temperature, repeat steps 3 and 4 then adjust accelerator pump.

6. Turn accelerator pump travel screw inward or clockwise until pump contacts actuator arm (stops). Next turn screw outward or counterclockwise two (2) turns. Blip throttle and note engine response. Turn screw outward ¼ turn at a time and recheck throttle response until engine no longer hesitates.

MANIFOLD:

Required Tools:

1. **5/16” Hex Tip Socket 3/8” Drive**
2. **1/2” Wrench**
3. **3/8” Drive Ratchet**
4. **Flathead Screwdrver**
5. **3/16” Rocker Box Wrench**
6. **3/16” Hex Tip Socket 3/8” Drive**

Required Materials:

1. **Blue Loctite ® 243**

REMOVAL

1. Remove Air cleaner cover and Air cleaner (See Figure 1).

Figure 1

2. Using a flat heat screwdriver remove the three (3) air cleaner backing plate bolts (See Figure 2).

Figure 2

3. Using a hex tip and ratchet remove the two (2) SHCS that hold the backing plate to the heads (See Figure 3).

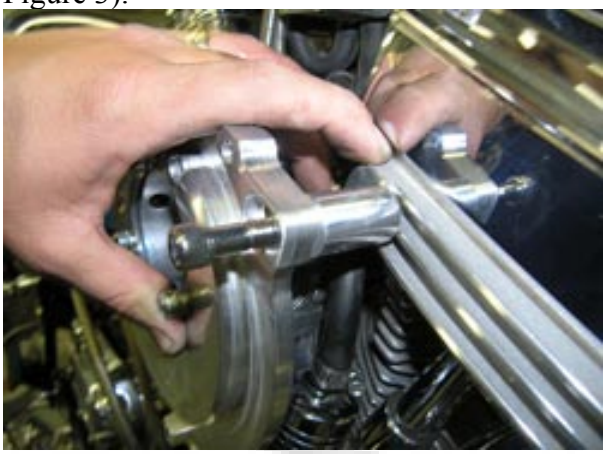


Figure 3

4. Remove the carburetor from the intake manifold (See Figure 4).

Figure 4

5. Remove the two (2) 5/16” SHCS that attach the intake manifold to the cylinder heads.

6. Loosen the two (2) 1/2” hex head bolts holding the intake manifold to the cylinder heads.

7. With hex head bolts loosened, carefully slide the intake manifold out from between the two cylinder heads. Replace intake manifold seals if needed.

INSTALLATION

1. Install intake manifold between the two cylinder heads.

2. Tighten the two (2) 1/2” hex head bolts holding the intake manifold to the cylinder heads.

3. Install the two (2) 5/16” SHCS that attach the intake manifold to the cylinder heads.

4. Remove the carburetor from the intake manifold (See Figure 1).

Figure 3

5. Using a hex tip and ratchet install the two (2) SHCS that hold the backing plate to the heads (See Figure 2).

Figure 2

6. Using a flat heat screwdriver remove the three (3) air cleaner backing plate bolts (See Figure 3).

Figure 3

7. Install Air cleaner cover and Air cleaner (See Figure 4).

Figure 46

CHOPPER STYLE TANK FUEL PETCOCK:

Required Tools:

1. **Oetiker® Pliers**
2. **Fuel Line Clamps**
3. **Diagonal Cutters**
4. **5/32" "T" Handle**

Required Materials:

1. **Oetiker® Clamps**
2. **Black Zipties**

REMOVAL

WARNING:

Gasoline is extremely flammable and explosive in certain conditions and toxic in inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.

1. Using a fuel line clamp, clamp top line feeding fuel filter to stop flow.

2. Remove fuel lines from petcock using diagonal cutters.

3. Using a 5/32" "T" handle remove petcock from motorcycle (See figure 1).

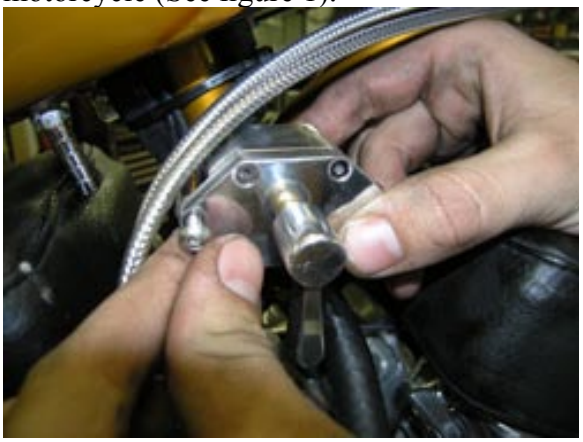


Figure 1

INSTALLATION

1. Install new fuel lines and Oetiker® clamps onto petcock (See Figure 1).

Figure 1

2. Using a 5/32" "T" handle install petcock onto motorcycle (See Figure 2).

Figure 2

3. Remove the fuel line clamp that was installed in the removal process.

4. Actuate fuel petcock lever to ensure movement is correct.

FUEL LINES:

Required Tools:

1. Oetiker® Pliers
2. Fuel Line Clamps
3. Flathead Screwdriver
4. Diagonal Cutters

Required Materials:

1. Oetiker® Clamps
2. Black Zipties

REMOVAL

<u>WARNING:</u>

Gasoline is extremely flammable and explosive in certain conditions and toxic in inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.

1. Using a fuel line clamp, clamp off main fuel line from fuel tank.

2. With main fuel line clamped, cut fuel line and place cut end into an approved container for disposal of fuel. Remove fuel line clamp and drain fuel tank.

3. Repeat step 2 for reserve fuel line.

4. Using diagonal cutters, remove old Oetiker® clamps and old fuel line.

INSTALLATION

1. Using new fuel line and new Oetiker® clamps install new fuel lines onto tank and petcock.

FUEL FILTER:

Required Tools:

1. Fuel Line Clamps
2. Flathead Screwdriver

Required Materials:

1. Black Zipties
2. Fuel Filter

REMOVAL

<u>WARNING:</u> Gasoline is extremely flammable and explosive in certain conditions and toxic in inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.

1. Using a fuel line clamp, clamp top line feeding fuel filter to stop flow.

2. Using a flathead screwdriver loosen hose clamp and remove fuel line from the top of the filter (See Figure 1).

Figure 1

3. Using a flathead screwdriver loosen hose clamp and remove fuel line from bottom of the filter.

INSTALLATION

1. Install new fuel filter with directional arrow pointing down.

2. Tighten hose clamps on hoses and ensure no fuel is leaking.

CHOPPER STYLE FUEL TANK:

Required Tools:

1. **3/8” Drive Ratchet**
2. **6”, 3/8” Drive Extension**
3. **1/2” Socket, 3/8” Drive**
4. **Flat Head Screw Driver**
5. **Diagonal Cutters**
6. **Fuel Line Clamp**
7. **Oetiker ® Pliers**

Required Materials:

1. **Rubber Fuel Line**
2. **Oetiker ® Clamps**

REMOVAL

WARNING:

Gasoline is extremely flammable and explosive in certain conditions and toxic in inhaled. Do not smoke when working around gasoline. All work should be performed in a well ventilated area away from open flame or spark.

1. Using a 1/2” socket and 3/8” drive ratchet with a six inch extension, remove the 4 nuts and washers holding the fuel tank to the motorcycle frame (See Figure 1). This may require you to move the wiring harness under the fuel tank.

Figure 1

2. With the nuts and washers removed, clamp fuel line from fuel tank with fuel line clamps and cut fuel line with diagonal cutters.

3. Carefully lift fuel tank off the backbone of the motorcycle frame.

4. With fuel tank removed from motorcycle, remove fuel line clamp and drain fuel from tank into and approved container for proper disposal.

INSTALLATION

1. Install new fuel line onto fuel tank (See **FUEL LINE INSTALLATION**).

2. Carefully install fuel tank onto the backbone of the motorcycle ensuring the tanks studs align with the fuel tanks mounts and grommets.

3. Install the four (4) washers and lock nuts onto the tank studs and tighten securely (See Figure 1).

Figure 1

4. Install Fuel line onto fuel petcock (See **FUEL LINE INSTALLATION**).

5. Carefully fill fuel tank with a minimal amount of gasoline and ensure tank does not leak around new fuel lines.

TRANSMISSION 7

TRANSMISSION SYSTEM

Transmission system specs:

Right side drive
Six speed
Constant mesh

Gear Ratios:

1st gear	2.94 : 1.00
2nd gear	2.21 : 1.00
3rd gear	1.60 : 1.00
4th gear	1.23 : 1.00
5th gear	1.00 : 1.00
6th gear	1.00 : 0.86

MAIN DRIVE GEAR (5th)

Bearing fit transmission case Tight Loose	 0.0005 in (0.0127 mm) 0.0007 in (0.018 mm)
Fit in bearing Tight Loose	 0.0006 in (0.015 mm) 0.0003 in (0.008 mm)
Fit on mainshaft	0.0001-0.0006 in (0.0025-0.015 mm)
Endplay	None

SHIFTER CAM ASSEMBLY

Shifter cam endplay	0.0060-0.0100 in (0.150-0.250 mm)
Right edge of middle cam Groove to right support block	1.877-1.887 in (47.67-47.93 mm)

SHIFTER FORKS

Shifter fork to cam groove endplay	0.0146-0.0200 in (0.371-0.500 mm)
Shifter fork to gear groove endplay	0.0055-0.0118 in (0.140-0.300 mm)

MAINSHAFT TOLERANCE

Mainshaft runout	0.000-0.002 in (0.00-0.05 mm)
Mainshaft endplay	None

COUNTERSHAFT TOLERANCE

Countershaft runout	0.000-0.002 in (0.00-0.05 mm)
Countershaft endplay	0.004-0.0157 in (0.1-0.4 mm)

1st gear clearance	0.0000-0.0080 in (0.000-0.203 mm)
2nd gear clearance	0.0000-0.0080 in (0.000-0.203 mm)
3rd gear endplay	0.0220-0.0600 in (0.559-1.524 mm)
3rd gear clearance	0.0000-0.0040 in (0.000-0.102 mm)
4th gear endplay	0.0220-0.0600 in (0.559-1.524 mm)
4th gear clearance	0.0000-0.0040 in (0.000-0.102 mm)
6th gear endplay	0.0080-0.0250 in (0.203-0.635 mm)
6th gear clearance	0.0000-0.0040 in (0.000-0.102 mm)

1st gear endplay	0.020-0.050 in (0.520-1.270 mm)
1st gear clearance	0.0000-0.0040 in (0.000-0.102 mm)
2nd gear endplay	0.0020-0.0400 in (0.051-1.016 mm)
2nd gear clearance	0.0000-0.0040 in (0.000-0.102 mm)
3rd&4th gear clearance	0.0000-0.0080 in (0.000-0.203 mm)
5th gear endplay	0.020-0.050 in (0.520-1.270 mm)
5th gear clearance	0.0000-0.0040 in (0.000-0.102 mm)

GENERAL

The American IronHorse® 2006 right side drive transmission is hydraulic actuated only.

TRANSMISSION BELT GUARD:

Required Tools:

1. **3/8” Drive Ratchet**
2. **3/16” Hex Tip Socket 3/8” Drive**
3. **3/8” Drive 0-85 lbs. Torque Wrench**
4. **3” 3/8” Drive Extension**

Required Materials:

1. **Blue Loctite® 243**

REMOVAL

1. Using a 3/16” hex tip socket and 3/8” drive ratchet remove the transmission belt guard from the transmission outer cover (See Figure 1).

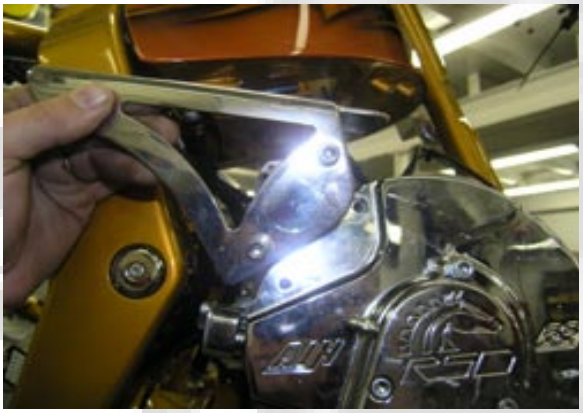


Figure 1

INSTALLATION

1. Using blue Loctite® 243 and a 3/16” hex tip socket install the two (2) fasteners that hold the belt guard to the transmission outer cover.

TRANSMISSION OUTER COVER:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1/4” Hex Tip Socket 3/8” Drive**
3. **3/8” Drive 0-85 lbs. Torque Wrench**
4. **3” 3/8” Drive Extension**
5. **5/32” “T” Handle**

Required Materials:

1. **Blue Loctite® 243**

REMOVAL

1. Using a 1/4” hex tip socket and 3/8: drive ratchet with a 3” extension remove the three (3) fasteners holding the transmission outer cover onto the transmission.

2. Using a 5/32” “T” handle remove the speed sensor from the transmission outer cover.

INSTALLATION

1. Using a 1/4” hex tip socket and 3/8: drive ratchet with a 3” extension install the three (3) fasteners holding the transmission outer cover onto the transmission with blue Loctite® 243.

2. Using a 5/32” “T” handle and blue Loctite® 243 install the speed sensor into the transmission outer cover.

TRANSMISSION PULLEY:

Required Tools:

1. **3/8” Drive Ratchet**
2. **1 7/8” Socket 1/2” Drive**
3. **3/16” Hex Tip Socket 3/8” Drive**
4. **1/2” Drive Breaker Bar**
5. **1/2” Drive 0-150 lbs. Torque Wrench**
6. **3” 3/8” Drive Extension**
7. **1/2” Drive Impact Wrench**
8. **Lock-Up Tool**

Required Materials:

1. **Red Loctite® 262**

REMOVAL

1. Remove Transmission belt guard (See **TRANSMISSION BELT GUARD REMOVAL)**.

2. Remove Transmission outer cover (See **TRANSMISSION OUTER COVER REMOVAL)**.

3. Using a 3/16” hex tip socket and 3” extension, remove the two (2) fasteners holding the locking bracket on the transmission pulley (See Figure 1).

Figure 1

2. Using a 1 7/8” socket and a 1/2” drive impact wrench, remove the transmission pulley locking nut (See Figure 2). ***This is a reverse thread nut, so ensure you turn clockwise to remove.***

Figure 2

3. Carefully remove transmission pulley from the main shaft (See Figure 3).

Figure 3

INSTALLATION

1. Install transmission pulley onto transmission main shaft.

2. Using red Loctite® 262, install transmission pulley locking nut onto main shaft (See Figure 1).

Figure 1

3. Torque transmission pulley locking nut to 75 ft. lbs.

4. Install lock nut locking bracket using red Loctite® 262 and two (2) SHCS fasteners (See Figure 2).

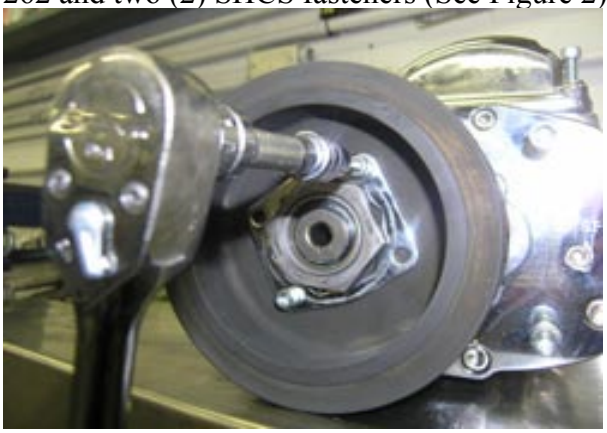


Figure 2

4. Install transmission outer cover (See **TRANSMISSION OUTER COVER INSTALLATION)**.

5. Install transmission belt guard (See **TRANSMISSION BELT GUARD INSTALLATION)**.

TRANSMISSION:

Required Tools:

1. 3/8" Drive Ratchet
2. 15/16" Socket 3/8" Drive
3. 3/16" Hex Tip Socket 3/8" Drive
4. 9/16" Socket 3/8" Drive
5. 1/2" Drive 0-150 lbs. Torque Wrench
6. 3" 3/8" Drive Extension
7. 1/2" Drive Impact Wrench
8. 1/2" Socket 3/8" Drive
9. 9/16" Wrench
10. 1/2" Socket 1/4" Drive
11. 1/4" Drive Ratchet
12. 1/4" Hex Tip Socket 3/8" Drive
13. Pliers
14. 5/16" Socket 1/4" Drive
15. Channel Locks
16. 7/16" Wrench
17. 1/2" Wrench
18. 10mm Wrench
19. 1 1/2" Socket 1/2" Drive
20. 1 3/16" Socket 1/2" Drive
21. 6 Inch Extension
22. 3/8" Drive Speed Handle
23. 40 Torx Tip Socket
24. 3/4" Socket 3/8: Drive
25. Standard Screwdriver
26. Rubber Mallet
27. 7/32" "T" Handle

Required Materials:

1. Red Loctite® 262
2. Blue Loctite® 243
3. Pipe Fitting Paste
4. Primary Fluid
5. Black Silicone RTV
6. Outer Primary Gasket
7. Inspection Cover Gasket
8. Derby Cover "O" Ring
9. Engine Case "O" Ring

REMOVAL

1. Remove battery from motorcycle.

2. Using a 9/16" wrench and 1/2" socket and 6 inch extension and 1/4" drive ratchet remove exhaust from motorcycle (See Figure 1).

Figure 1

3. Using a 3/16” T Handle remove axle cover bolts and axle cover (See Figure 2)

Figure 2

3. Using a 1/2” wrench loosen axle adjustment locking nuts (See Figure 3).

Figure 3

4. With axle adjuster locking nuts loose back out axle adjuster screw.

5. Using a 7/16” wrench and a 3/16” hex tip socket loosen the brake caliper mounting bracket.

6. Slide the rear wheel forward to allow for slack in the drive belt.

7. Using a 1/4”hex tip socket and ratchet, remove the transmission outer cover.

8. Using a 1/4” hex tip socket and ratchet remove the horn, and disconnect the electrical connectors

9. Remove drive belt from transmission pulley.

10. Using a 40 torx tip socket remove primary chaincase drain plug and drain lubricant into an approved container for proper disposal.

11. Remove the derby cover using a 3/16” hex tip socket and speed handle.

12. Remove the inspection cover using a 3/16” hex tip socket and speed handle.

13. Using a speed handle and 3/16” hex tip socket remove the fasteners holding the outer primary case to the inner primary case.

14. Remove clutch adjusting screw and locking nut (See Figure 4).

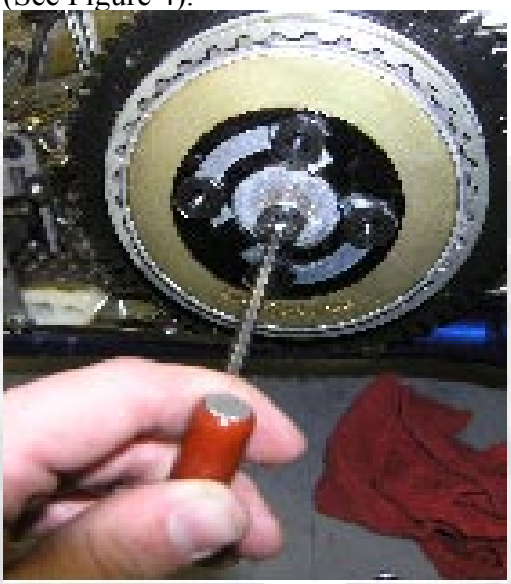


Figure 4

15. Using a standard screwdriver and rubber mallet bend locking tabs on clutch assembly nuts back (See Figure 5).

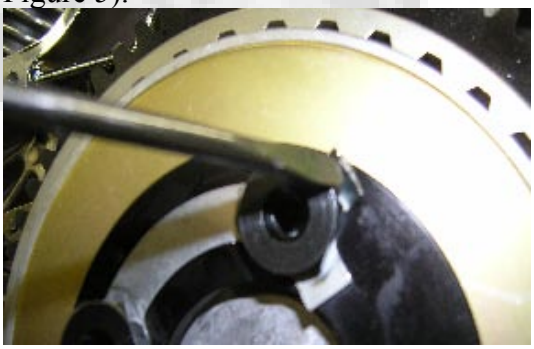


Figure 5

16. Remove nuts from clutch diaphragm plate, and locking tabs (See Figure 6).

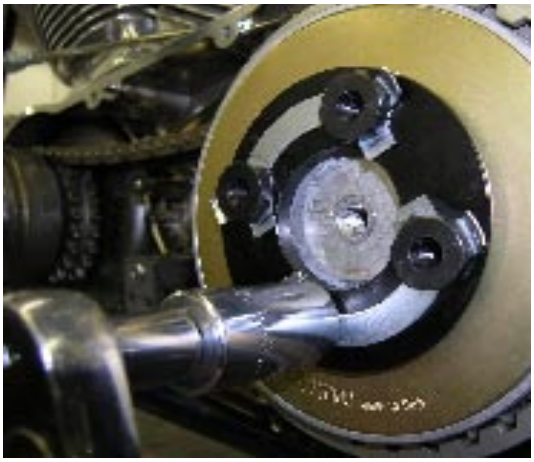


Figure 6

17. Remove diaphragm spring.

18. Remove nut on chain tensioner (See Figure 7).

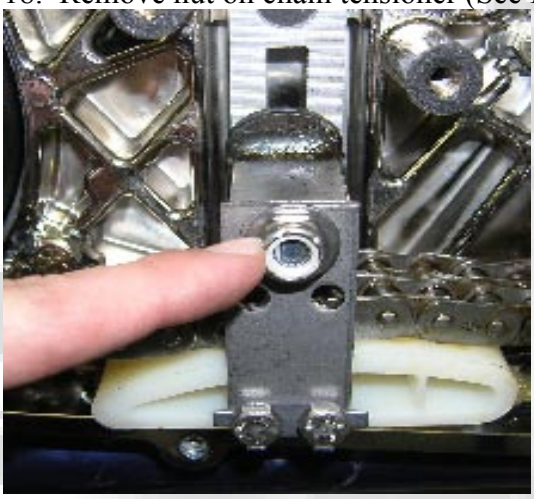


Figure 7

19. Using pro clutch tool and pneumatic impact wrench and 1 3/16" socket remove main shaft nut (See Figure 8).

Figure 8

20. Using pneumatic impact wrench and 1 ½" socket remove engine compensating sprocket nut (See Figure 9).

Figure 9

21. Remove primary chain assembly (See Figure 10).

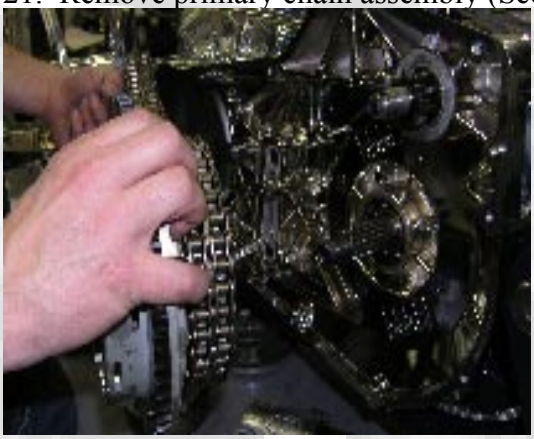


Figure 10

22. Using a standard screwdriver and rubber mallet bend locking tab on jackshaft back (See Figure 11).

Figure 11

23. Using a 5/16” socket and 1/4” drive ratchet, remove jackshaft bolt (See Figure 12).

Figure 12

24. Slide jackshaft assembly out of inner primary chaincase (See Figure 13).

Figure 13

25. Remove starter bolts (See Figure 14).

Figure 14

26. Using a 1/2” wrench remove the nut holding the battery lead onto the starter and the spade connector on the starter.

27. Remove starter from motorcycle (See Figure 15).

Figure 15

28. Using a standard screwdriver and rubber mallet, bend back locking tabs on inner primary bolts.

29. Using a 3/8” drive ratchet and 1/2” socket remove inner primary bolts (See Figure 16).

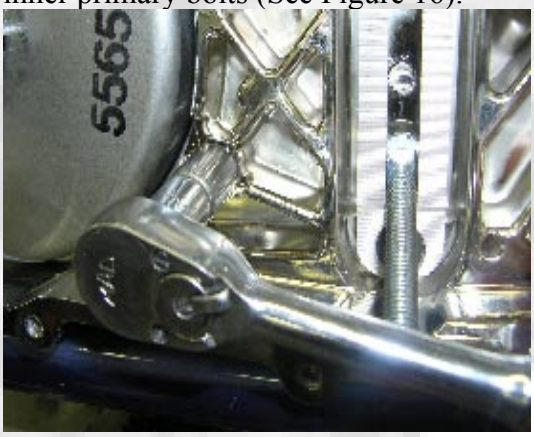


Figure 16

30. Using a 3/4” wrench remove the left shock from the frame (See Figure 17).

Figure 17

31. Using a 9/16” socket and 3/8” drive ratchet with a 3” extension, remove the nylon locking nuts from the transmission bolts (See Figure 18).

Figure 18

32. Remove transmission from motorcycle.

INSTALLATION

1. Ensure new transmission has been drained of all corrosion prevention fluid, and fill with 24 fluid ounces of 80/90 hypoid transmission fluid.

2. Install transmission into motorcycle carefully.

3. Install the four washers and nylon locking nuts onto the transmission studs hand tight (See Figure 1).

Figure 1

4. Replace engine case “O” ring and install inner primary chaincase.

5. Using a 9/16” socket and ratchet tighten the four (4) transmission nylon locking nuts. Using a feeler gage, measure any gap under the transmission. If shims are needed install the correct size shim to match the gap measured with the feeler gage.

6. Remove the inner primary chaincase, and using black silicone RTV, place a ring of silicone around all inner primary to engine case and transmission holes. This is done to prevent primary fluid from leaking one final assembly is complete.

7. Reinstall the inner primary chaincase, and replace locking tabs on inner primary fasteners. Using blue Loctite® 243 and a 1/2” socket and ratchet tighten inner primary fasteners. Torque fasteners to 25 ft.- lbs. (See Figure 2).

Figure 2

8. Using pliers bend locking tabs to prevent fasteners from backing out.

9. Install primary chain assembly and clutch basket onto motorcycle (See Figure 3).

Figure 3

10. Install chain tensioner washer and lock nut (See Figure 4).

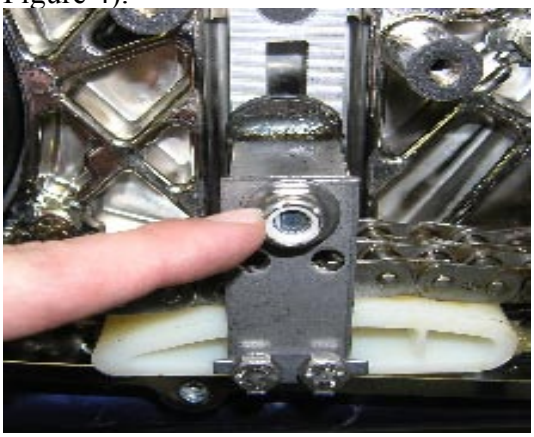


Figure 4

11. Using pneumatic impact wrench and 1 ½" socket and red Loctite® 262 install engine compensating sprocket nut (See Figure 5). Torque nut to 150 ft. – lbs.

Figure 5

12. Using pro clutch tool and pneumatic impact wrench and 1 3/16" socket install main shaft nut using red Loctite® 262. Torque to 65 ft. – lbs. (See Figure 6).

Figure 6

13. Install starter bolts (See Figure 7).

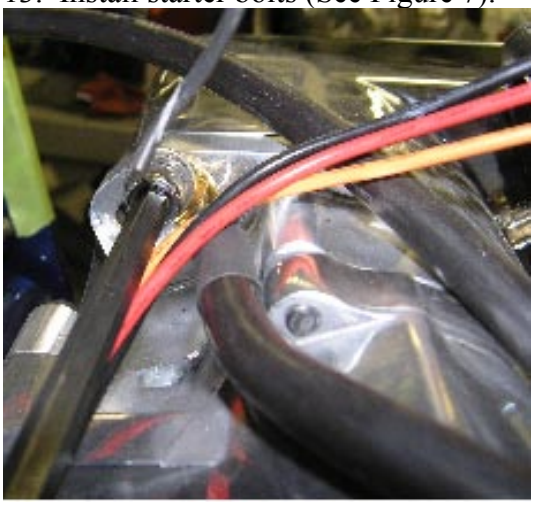


Figure 7

14. Install jackshaft assembly into inner primary chaincase (See Figure 8).

Figure 8

15. Using a 5/16" socket and 1/4" drive ratchet, install jackshaft bolt (See Figure 9).

Figure 9

16. Using needle nose pliers bend locking tab on jackshaft to lock jackshaft bolt in place.

17. . Install nuts and locking tabs on clutch diaphragm plate (See Figure 10).

Figure 10

18. Install clutch adjusting screw and locking nut (See Figure 11).

Figure 11

19. Using pliers bend locking tabs on clutch assembly nuts to lock nuts in place.

20. Install outer primary gasket, and outer primary chaincase cover.

21. Using 3/16” hex tip and ratchet install chaincase cover fasteners using blue Loctite® 243.

22. Install new Inspection cover gasket and inspection cover with blue Loctite® 243.

23. Install primary chaincase drain plug and fill primary chaincase with Castrol® MTX primary fluid to bottom of diaphragm spring.

24. Install new derby cover “O” ring and install derby cover with blue Loctite® 243.

25. Adjust tension on clutch cable by tightening jam nut and clutch cable adjuster.

26. Using a 1/2” wrench tighten axle adjuster screws to achieve proper belt tension and wheel alignment.

27. Check belt for proper tracking and free play.

28. Tighten Axle adjuster locking screws using a 1/2” wrench (See Figure 12).

Figure 12

12. Using a 3/16” T Handle and blue Loctite® install axle covers (See Figure 13).

Figure 13

13. Install and re-connect battery.

SHIFT LINKAGE:

Required Tools:

1. **7/16” Wrench**
2. **1/2” Wrench**
3. **5/32” “T” Handle**

REMOVAL

1. Using a 7/16” or 1/2” wrench remove the jam nut on the rear of the shift linkage rod connected to the transmission shift arm (See Figure 1).

Figure 1

2. Using a 1/2” wrench and a 5/32” “T” handle remove shift linkage from the left forward control shift lever (See Figure 2).

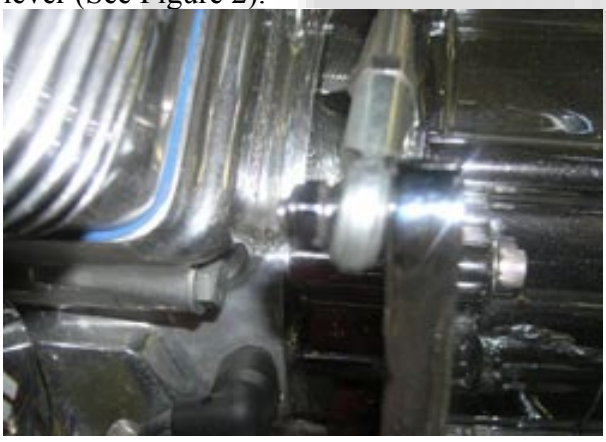


Figure 2

INSTALLATION

1. Using a 1/2” wrench and a 5/32” “T” handle install shift linkage onto the left forward control shift lever.

2. Using a 7/16” or 1/2” wrench install the jam nut on the rear of the shift linkage rod connected to the transmission shift arm.

SHIFT PAWL ADJUSTMENT:

Required Tools:

1. **11/16” Wrench**
2. **8 mm Wrench**
3. **7/32” Allen Wrench**
4. **5/16 Hex Tip Socket, 3/8” Drive**
5. **3/8” Drive Ratchet**
6. **0-85 ft. lb. Torque Wrench**

Required Materials:

1. **Blue Loctite® 243**
2. **Shop Towel**
3. **Zipties**

ADJUSTMENT

1. Place motorcycle in upright position and place jack underneath motorcycle frame.

2. Jack motorcycle to get rear wheel off of the ground.

3. Put transmission into third gear.

4. Holding toe shift peg, move shifter rod back and forth to feel the amount of play between gears. There should be equal movement forward and backward.

5. Using a 5/16” hex tip socket, remove the ignition switch housing from motorcycle frame (See Figure 1).

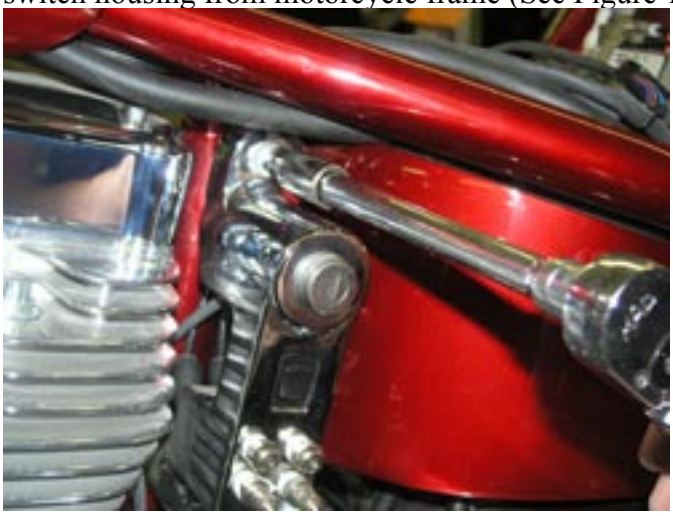


Figure 1

6. Place a shop towel over the frame rail and place ignition housing onto frame and ziptie in place to hold out of the way.

7. Using an 11/16” wrench loosen the transmission shift pawl adjustment lock nut (See Figure 2).

Figure 2

8. Using either an 8 mm wrench or 7/32” Allen wrench (depending on transmission style) adjust shift pawl clockwise or counterclockwise to even movement between gears (See Figure 3).

Figure 3

9. Tighten lock nut using an 11/16” wrench while maintaining position of adjuster with Allen wrench or 8 mm wrench (See Figure 4).

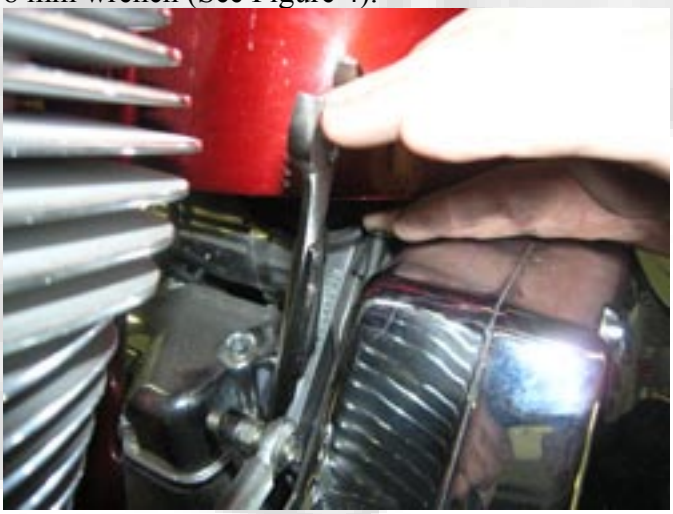


Figure 4

10. Cut ziptie and install ignition bracket onto frame using blue Loctite 243 (See Figure 5).

Figure 5

11. Torque fasteners to 30 ft. lbs.

APPENDIX 8