Harley-Davidson Motor Co., Inc., 3700 W. Juneau Ave., P.O. Box 653, Milwaukee, WI 53201 414/342-4680

ML-271 July 31, 1985

Dear Dealer, Service Manager, and Mechanic:

The Service Department, in an effort to provide an informational recap of both past and present repair procedures, has assembled the attached pages of Technical Tips.

The Technical Tips presented are a combination of service techniques previously discussed and some newly updated information. Some procedures may have been covered during Service School, a topic discussed in a Service Seminar, or from a previously issued Service Bulletin.

This information is presented to you in a Question-and-Answer format that is ideal for group discussion. Group discussion will help increase retention through participation.

We're confident that the attached Technical Tips will be valuable now and in the seasons to come. This type of information is typically covered in our Service School courses, which are beginning soon. Sign up for Service School early and take advantage of the delayed payment program.

Sincerely,

Technical Services Department
Harley-Davidson Motor Co.,Inc.

ROUTING:	SERVICE MANAGER	SALES MANAGER	PARTS MANAGER	CHIEF MECHANIC	MECHANIC NO. 1	MECHANIC NO. 2	MECHANIC NO. 3	MECHANIC NO. 4	RETURN THIS TO:
INITIAL HERE									

August, 1985

Service Letter ML-271

Dear Dealer:

1. Have your customers been experiencing premature wheel bearing problems?

POSSIBLE CAUSES:

(1) Customer pressure-washes wheels in seal area.
(2) Extreme environmental conditions (heat, humidity, dirt).
(3) Vehicle inactivity.

All of these conditions require more frequent than normal bearing inspection and lubrication. Repack bearings annually, or more frequently than 10,000 miles. This recommendation should be made to the customer well in advance of the recommended inspection period.

2. 1982 to 1985 FLT, FLHT, and FLH customers who have rear discs equipped with an anti-ring spring on rear disc, may have complained of a screeching noise while coming to a stop.

Remove anti-ring spring and apply a bead of silicone sealant in the entire groove. Reinstall spring.

3. Has your 1985 1340 Evolution customer complained of unidentifiable "ticking" noise?

You listen to it and it sounds like a hot muffler cooling after a hard run, but seems to increase with RPM's in an erratic manner. Sometimes oil usage or smoking from one exhaust pipe will accompany this situation. This noise will favor the exhaust or intake ports. Using a stethoscope, or similar tool, identify which head the noise is coming from, remove the appropriate rocker cover. Carefully inspect the **inner** valve spring, it may be broken. Compare the inner and outer springs for even coil uniformity.

4. Has your 1340 Evolution customer complained of a lifter-like noise; usually after a long trip and after the vehicle has cooled down?

INSPECTION:

With engine cold, increase RPM to 2000-3000. Listen for lifter-like noise.

NOTE

In severe cases the noise may be present at an idle.

Allow vehicle to reach operating temperatures. Return RPM's to 2000-3000. Noise will be reduced or absent. Increase RPM to 3000-4000. Noise recurs.

NOTE

This noise is caused by contact between the carbon build-up on the piston and the carbon build-up in the "squish" area of the combustion chamber.

This build-up will only occur with certain types of riding, such as, steady highway speeds for prolonged periods of time.

REPAIR:

Remove cylinder heads and decarbonize combustion chamber. Replace head gaskets with new service head gasket, Part No. 16773-85.

Vehicles which **may be** affected: Crankcase number is between 1584-013-041 and 1585-036-019.

5. Has your XL customer complained of ABNORMAL cam noise (1984 and early 1985 vehicles)?

While investigating this noise look for discolored cam gears. A small precentage of crankcases may have loose bearing inserts in the case. Please contact Technical Service for further diagnostic procedures.

6. Has your 1984 and early 1985 XL customer complained of a valve train clatter, power loss and backfiring through exhaust system after a short trip?

This could be a sign that an exhaust valve is beginning to stick. See Figure 1. If this is the case hold the head at the approximate angle it sits on the cylinder. You may observe that the oil drain hole is almost even with the top of the valve guide. This drain hole should be lowered to keep oil level well below the top of the guide. Lower hole with grinding tool.

CAUTION

Do not drill; you could break into exhaust port.

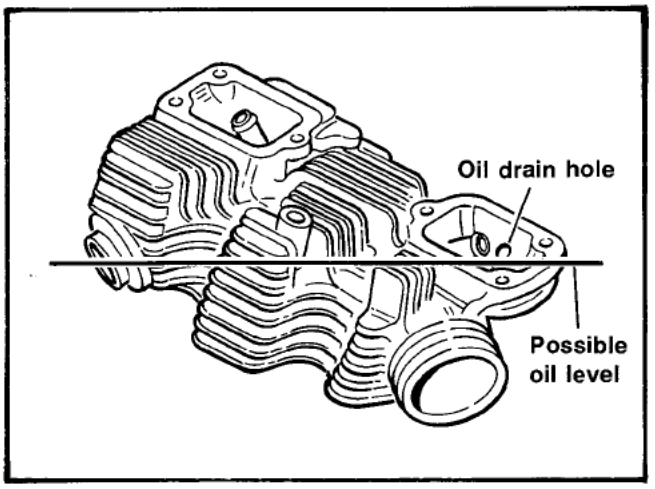


Figure 1. Oil Drain Hole

7. Has your customer complained of starter run-on?

See Service Bulletin M-893 for parts comparison. Verify whether vehicle has the new style retainer cap and dowel pin, including a nickel-plated solenoid contact washer. A kit is available to make this change. Use the following:

4-speed rear belt: Kit #31300-80A
5-speed rear chain or belt
and 4-speed rear chain: Kit #31447-65.

Replacement solenoids will have nickel plated washers. The new overrun spring retainer will allow an additional 0.120 in. of pull-in before coil bind.

8. Has your customer, with a dual belt or belt conversion complained of primary belt failures?

POSSIBLE CAUSES:

(1) Misalignment.
(2) Improper tensioning.
(3) Lack of proper compensating sprocket servicing.
(4) Improper installation and handling.

MISALIGNMENT

Misalignment is identified by a straight or slightly angular clean break.

Prior to belt failure misalignment can be identified by polishing marks on clutch basket. These are signs of the belt climbing up the side of the clutch basket. Symptoms include a "pulsing" clutch and an excessive collection of polyurethane fiber in the primary housing.

Measure belt alignment as per service manual with the following suggestions in mind:

"A" Measurement

In taking this measurement, remember to push the rotor in board because magnetizism will tend to center the rotor over the stator.

"B" Measurement

Check tightness of friction disc on clutch hub. A loose friction disc can contribute to a pulsing clutch.

Now take the "B" measurement in three places using a dial caliper: 12:00 o'clock, 4:00 o'clock and 8:00 o'clock. Add your figure and divide by three. This is your average measurement. Subtract the "B" measurement from "A". This will give you "C", or the difference between "A" and "B". Subtract 0.270 in. from "C". This gives you thickness of the required spacer. In certain cases you will arrive at a minus or negative number. This amount must be machined off of the rotor spline insert where you took your "A" measurement.

IMPROPER TENSIONING

Lack of tensioning is indicated by a loss of belt teeth, exposing the KEVLAR cords. This could lead to a frayed break of primary belt. Over tensioning will cause a severe pulsing clutch and/or poor clutch performance as vehicle reaches operating temperature. Preventive maintenance will stop this situation.

When replacing belt, establish proper tension, as found in the Service Manual, and instruct your customer to return for a re-adjustment within 500 miles.

LACK OF PROPER COMPENSATING SPROCKET SERVICING

At belt replacement, remember to polylube the compensating sprocket with POLYOIL #99860-81 and remind your customer of its recommended service intervals. This could offset future service problems.

IMPROPER INSTALLATION AND HANDLING

Take care handling the belt. Twisting, bending backwards, banging a belt on the counter, all can lead to early failure or reduced service life.

The question has been raised by customer to the dealer or his representative; "Why does Harley-Davidson no longer build a vehicle with the primary belt system?" The reason is Harley-Davidson decided to go to an improved diaphragm clutch, which required an oil bath environment. We could not adapt the belt to this application.

9. Does your customer with a late 1984 vehicle have chronic oil leaks at the rear of the primary case?

This leak may seem to be coming from the O.D. or I.D. of the inner primary bearing or on 4-speed vehicles, from the starter motor housing or around the head of the starter drive actuator arm mounting screw on top of the primary housing.

The inner primary vents through the mainshaft and out the transmission vent hole or hose by means of a flat which is ground the length of the clutch pushrods. A small percentage of late 1984 vehicles did not have a flat on the pushrod closet to the adjuster.

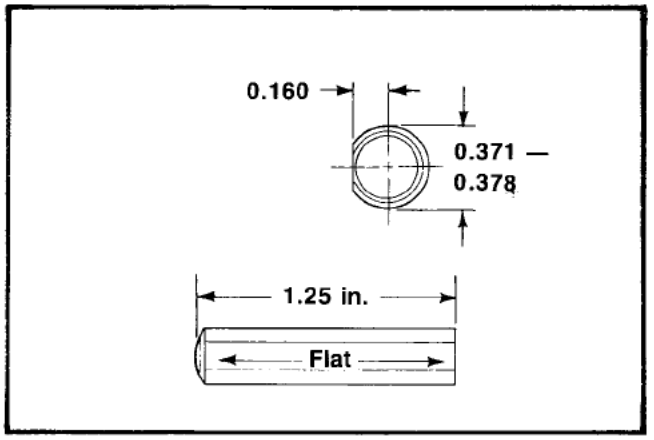


Figure 2. Clutch Pushrod

INSPECTION

Remove the clutch cover. Release any tension on the adjuster screw. Remove the snap ring and adjuster mounting block and remove the clutch pushrod.

See Figure 2. If there is no flat on the clutch pushrod, grind one the length of the pushrod.

10. Is your customer experiencing a slipping clutch?

During pre-delivery and set-up the clutch lever free play should be set at 1/4 in. This will allow the clutch plates to take a set. You will notice as the plates take their set, the free play will diminish and will require a readjustment at 500 miles. This readjustment should include verification of proper diaphragm spring attitude, pushrod adjustment and finally, clutch cable freeplay.

Remind your customer that at least a 1/16 in. free play must be present at all times to ensure optimal clutch performance. Simply increading the free play by cable adjustment is incorrect and could lead to a slipping problem.

11. Has your customer experienced chronic false neutrals with his 4-speed? Have you ridden his 4-speed and confirmed this?

See Figure 3. Inspect shifter shaft in transmission top cover. Part No. 34652-80. Check for twist or improper indexing of shifter shaft finger ball to cam end.

Using a straight-edge, as shown in Figure "B", the ball end should be split in half. If it is not split in half the shaft is twisted or improperly indexed. Replace shifter shaft.

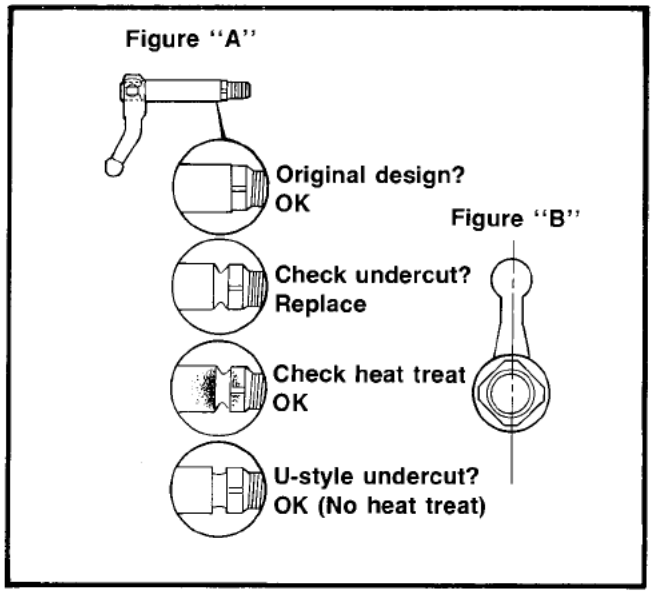


Figure 3. Four Speed Shifter Shaft

12. Does your 1985 FXR or FXRT customer complain of shifter difficulties after vehicle has reached operating temperatures?

Primary case expansion reduces end play of shifter shaft, if lever is too close to primary cover. This growth could cause drag and reduce shifting performance. Relocate lever, increasing end play of the primary shifter shaft. Check end play while vehicle is at operating temperature.

13. Have your new customers of rear belt drive vehicles complained of a "chirping" noise under normal driving conditions?

Apply a small amount of POLYOIL, Part No. 99860-81 to sides of belt.

14. Have you experienced recurring main drive gear oil leaks on 1982 and later 4-speed vehicles?

POSSIBLE CAUSE:

Oil passing between the main drive gear spacer and the main drive gear (spline leaks).

REPAIR:

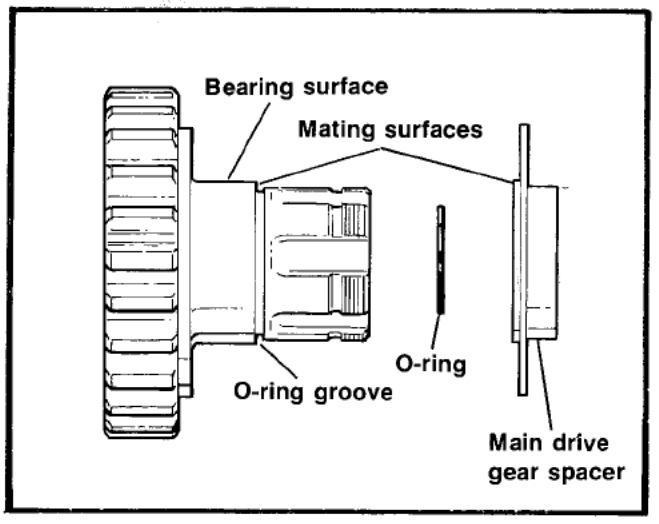


Figure 4. Main Drive Gear and Spacer

(1) Remove inner primary. See DRIVE section in Service Manual.
(2) Drain lubricant from transmission.
(3) Remove main drive gear spacer and seal.
(4) Clean main drive gear to spacer mating surfaces so they are oil free.
(5) The main drive gear spacer you removed should be replaced with the appropriate new spacer:
Rear Belt Drive – P.N. 35070-84
Rear Chain Drive – P.N. 35079-84
(6) See Figure 4. Apply a light coat of machinist's blue to the main drive gear spacer's mating surface.
(7) Install spacer on the main drive gear and rotate spacer to establish the location of the contact patch. Remove spacer and verify this contact area. There should be 360° of even contact. If a good

mating surface cannot be established try another spacer, because the chamfer may be too large. If you have any questions contact the Technical Service Department.

Install O-ring part no. 1114. **Do not use a substitute.** Take care to protect the O-ring from the splined threads of the main drive gear. Use masking tape on the splines. Install the O-ring in groove directly against shoulder. Coat O-ring with a light grease such as vaseline.

(9) Install seal and new main drive gear spacer.

(10) Follow assembly instructions as found in Service Manual. Do not use an impact wrench to install the main drive gear sprocket nut because proper torque is essential. This torque is 80-90-ft-lbs. Apply a small amount of Loctite #242 to the threads of the main drive gear sprocket nut. Do not apply any Loctite to main drive gear threads.

(11) Complete vehicle assembly and refill transmission and primary with appropriate lubricants, as required.

15. Does your customer with an early 1984 Evolution vehicle complain of excessive compression rattle above 2000 RPM while operating properly in the correct RPM range for the gear selected (not lugging the motor)?

If you have verified proper ignition timing and V.O.E.S. setting, check the part number on the ignition module. If this number is a −84, replace with −84A module. This does not pertain to the FXRP models, nor the vehicles equipped with Screamin' Eagle modules. The −84A module will substantially reduce noise and improve vehicle driveability.

16. Does your customer experience problems with regulators and batteries? Could it be more than just a bad regulator?

POSSIBLE CAUSE:

(1) Poor battery preparation
(2) Damaged cell(s)

RECOMMENDATIONS FOR PREPARING A BATTERY FOR SERVICE:

(1) Fill with acid (1.280) and allow to stand for 45 minutes to 1 hour. Calcium plates are dry and will absorb the acid. Recheck acid level; fill if needed.
(2) Charge at 1/10th the amp. hour rate, so temperature does not exceed 110°F, until full charge is achieved. This will require approximately 18 hours of charging.

NOTE

An insufficiently charged or damaged battery will send a discharged signal to the regulator/rectifier. This causes the regulator/rectifier to pass maximum charging current, effectively reducing the service life of the regulator/rectifier.

MECHANICS NOTES

In 1984 and early 1985 a small percentage of sprocket shaft tapers were contaminated, and spun in left flywheel half. It is Harley-Davidson's recommendation that: Under **no** circumstances are these assemblies to be re-used, they could fail again at a later date. Replace flywheel set if vehicle is under Warranty. Contact the Service Department if the vehicle is out of Warranty.

What is deflection versus total deflection? Deflection is movement in one direction. **Total** deflection is movement in **two** directions added together. See Service Manual for proper deflection settings on belts and chains.

When assembling and installing the clutch hub mainshaft nut, do not use an impact wrench. Use Loctite #242 on nut threads. Tighten nut to 50 ft-lbs torque. If you cannot locate Loctite #242, Loctite's information telephone number is 1-800-323-5106.

NOTE

Just a reminder; make all mechanical electrical and oil pressure checks at 2,000 RPM, unless otherwise specified in Service Manual.

September 18, 1985

Dear Dealer, Service Manager and Mechanic:

The attached Service information will be of interest to your Service staff. We plan to send this kind of information on a regular basis and suggest you file it with your other Service letters for future reference.

It is our intention that you use this letter as an informational update to keep your staff better informed. Some dealers have indicated that regularly scheduled meetings where information of this sort is discussed does two things. It helps everyone involved become more knowledgeable and increases profitability through efficiency. This is a way to build that team spirit.

Sincerely,

Technical Service Department
Harley-Davidson Motor Company, Inc.

sp

attachment

"ave you noticed a change in the alternator rotor assembly on 1340 engines?

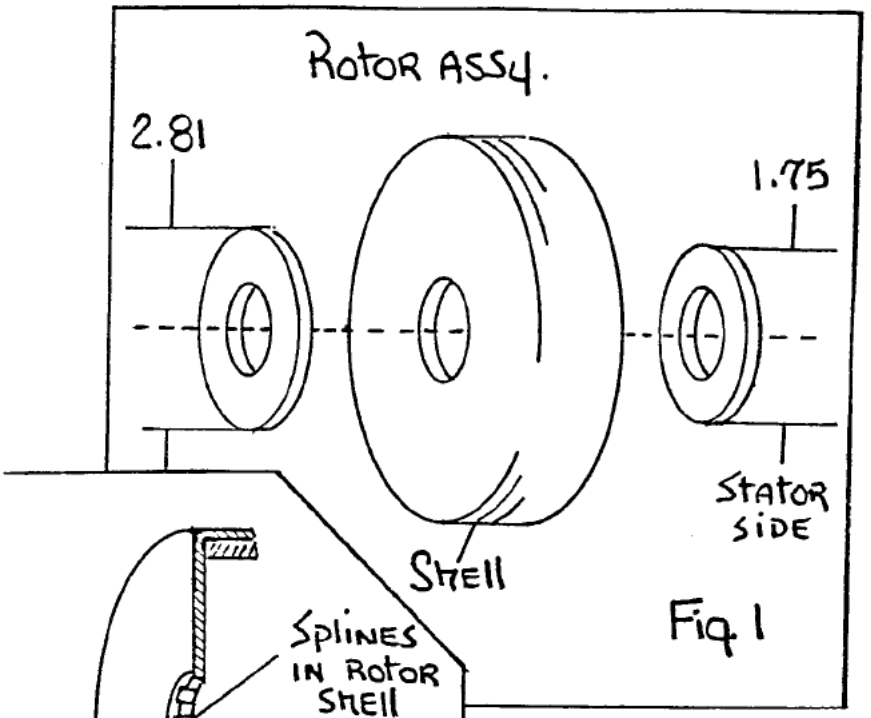


Fig 1

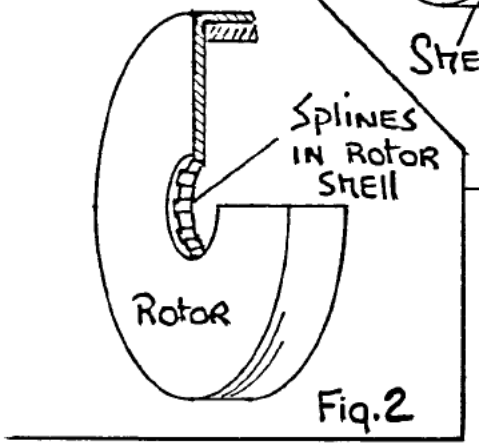


Fig.2

The brazed splined insert was removed, starting Crankcase #1585-314-067. Flatwashers were then used in place of the brazed insert. Since splines were removed, proper torque is essential in maintaining adequate clamp load to the rotor assembly. Use #242 Loctite on the threads of the compensator nut. See Figure 1 for proper assembly.

In Jan. of 1986, the rotor shell will be machined with splines. The same flat washers will still be utilized. See Figure 2. This should be considered a product improvement as both splined and nonsplined rotors perform satisfactorally.

You will also find that we no longer coat the stator windings on XL Evolution and 1340 Evolution. This change went into effect starting with crackcase numbers:

XL Evolution	#1786-212-015
1340 Evolution	#1586-232-003

2. Is fitting pistons boring?

1340 Evolution

Bulletin #903 refers to a new torquing procedure for Evolution head bolts. When using torque plates don't forget to use that same new torquing procedure. Remember to use the gaskets.

Shovelhead

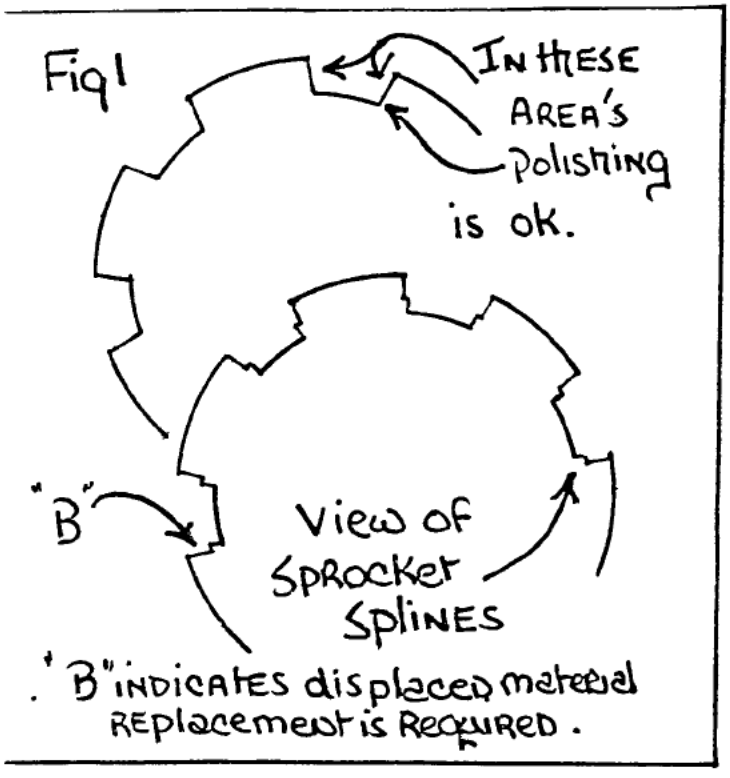
These cylinders require different torque values when properly using torque plates.

Head bolts	65 ft lbs
Cylinder Base	35 ft lbs

NOTE

Keep in mind the idea of torque plates is to reproduce the clamping pressures normally achieved in an engine assembly.

3. Have you had a transmission sprocket nut set screw back out or the head of the screw break off?



Possible causes:

1. No Loctite on the threads of the screw.

2. Improperly located set screw.

3. Sprocket splines extremely loose on main drive gear.

4. Improper sprocket nut torque and lack of Loctite on nut threads.

Recommended repair:

A. Did the main drive gear nut come off?

   If so, carefully inspect both the splines of the main drive gear and drive sprocket for signs of displaced material. See Figure 1. This will call for replacement of the sprocket and/or main drive gear.

NOTE

Light polishing is to be expected.

It is the recommendation of the Service Department that the large transmission seal and small main drive gear to mainshaft seal be replaced as their ability to seal is now questionable.

B. Refer to the service manual for proper locating of the set screw. When reinstalling set screw, use Loctite #242 on the threads of the screw and on the threads of the sprocket nut. Remember Loctite's information phone number was in our last letter.

4. Has your customer claimed his motorcycle just shut off while running down the road? He pulled over sat there for a while and it fired right back up as if nothing had happened?

This kind of problem can drive any mechanic nuts. It's just plain difficult to diagnose. Service Writers, can you imagine--what goes through the mechanic's mind when the description of the problem simply reads, vehicle quits intermittently.

Let's ask the customer some questions.

1. Has the vehicle ever done this before? If so, how often and when? (The customer may say, yep! When I'm low on gas. Could this be a gas cap venting problem.)

2. Did you check for spark? (The customer might say, sure did! No spark until I played with the ignition switch.)

3. Did the lights go out at the same time? (Customer, yea and then I'd hear this click noise. Could it be a circuit breaker or a short or a ground.)

4. Did your tach (if so equipped) act erratic? (Try disconnecting the tach.)

5. Was the power loss associated with back firing and a clattering noise. (Could this be a sticking valve.)

These are not all the questions and answers. The point is get as much back ground information as possible and write it on the work order. It can only help your mechanic and service department become more profitable.

Tip:

If you can reproduce the failure in the shop or on a road test, but are puzzled as to whether it's in the wiring or the module or sensor. Try hot wiring in this format:

At the coil:

Disconnect the white wire that comes from the kill button, leave the other white wire on, as it goes to the module. Run a jumper lead from the positive side of the battery to the positive or white wire side of the coil. Run vehicle, if the problem clears up the problem is in the wiring. If it does not clear up, remove the tach wire on the other side of the coil. Run vehicle, if it clears up, the problem is in the tach. If not consider the module or sensor. At this time refer to manual for recommended checks.

Remember:

The first things to do are make sure that the battery is up, there's spark at the plugs and you've got gas to the carburetor with good cylinder compression.

6. Has your 1986 FLTC, FLHTC, FXRD radio acted in a bizarre manner?

You're entering a new dimension of both sight and sound. You're next stop the road sign up ahead. Your radio has entered the Twilight Zone.

Save yourself some time. Don't start looking for bad connections right away.

Try disconnecting the battery ground and reconnecting it again. This will reset the radio. You may have to reprogram the stations as the memory circuit could just plain forget. In case further diagnostics are required, please refer to the 1984 to 1986 FLT/FXR Service Manual page 2-87.

Part #'s you may be interested in:

1. Starter motor replacement kits Prestolite to Hitachi

FLT & FRX	31470-84
FLH:	31459-84
67 to 80 XLH	31454-84

2. Front brake caliper anti-vibration kit fits 1973 to early 1984 FLH/FLHS: 44070-72.

3. Stator plug wire retaining clip all 1340 and 1200: 45095-85

4. FLT and FLHT rubber battery holder: 66106-86.

5. Diaphragm clutch "Performance" fiber plates. These are for those demanding customers involved in severe activities such as parade duty. Part #37931-84.

6. What is a 9045? Maybe it's something new! Please correct your parts books 1984 and 85. A 9045 is 1/2 of a 9028 Timken Bearing assembly. If you are replacing sprocket shaft Timkens order the 9028 assembly.

IMPORTANT NOTE

2. Please make corrections to last service letter ML-271, see next page.

mating surface cannot be established try another spacer, because the chamfer may be too large. If you have any questions contact the Technical Service Department.

Install O-ring part ~~no. 1114.~~ **Do not use a substitute.** Take care to protect the O-ring from the splined threads of the main drive gear. Use masking tape on the splines. Install the O-ring in groove directly against shoulder. ~~Coat O-ring with a light grease such as vaseline.~~

(9) Install seal and new main drive gear spacer.

(10) Follow assembly instructions as found in Service Manual. Do not use an impact wrench to install the main drive gear sprocket nut because proper torque is essential. This torque is 80-90-ft-lbs. Apply a small amount of Loctite #242 to the threads of the main drive gear sprocket nut. Do not apply any Loctite to main drive gear threads.

(11) Complete vehicle assembly and refill transmission and primary with appropriate lubricants, as required.

PART# 11114

Should READ:

Apply a light coat of petroleum jelly to the I.D. of the main DR. GEAR spacer. This will serve as a lead-in lubericant for the O-Ring.

15. Does your customer with an early 1984 Evolution vehicle complain of excessive compression rattle above 2000 RPM while operating properly in the correct RPM range for the gear selected (not lugging the motor)?

If you have verified proper ignition timing and V.O.E.S. setting, check the part number on the ignition module. If this number is a –84, replace with –84A module. This does not pertain to the FXRP models, nor the vehicles equipped with Screamin' Eagle modules. The –84A module will substantially reduce noise and improve vehicle driveability.

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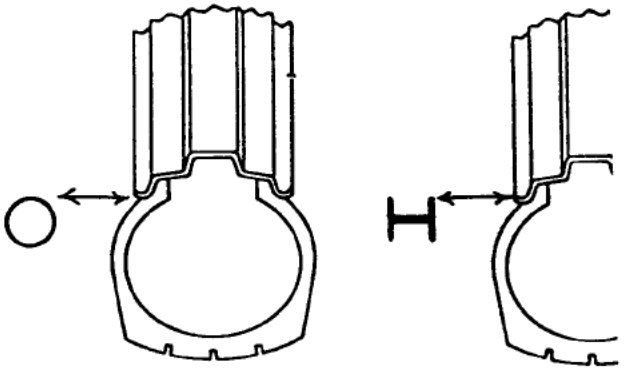
NOTE

Just a reminder; make all mechanical electrical and oil pressure checks at 2,000 RPM, unless otherwise specified in Service Manual.

DATE: NOVEMBER 8, 1985

TECHNICAL TIPS

1. Is it in alignment?



Obviously it's difficult, if not impossible to measure from a round object

To those who have the proper wheel alignment bars, you deserve a round of applause. To them that don't, let's discuss what makes 'em wrong.

It's just one thing, accuracy of measurement.

Let's get rid of those florescent tubes and replace them with aluminum channel.

Why you say? See Figure "A" and then Figure "B". Also the manufacturer of those florescent bulbs doesn't guarantee straightness, only that they supply light. You can get the channel from a metal supply shop. You'll want (2) two of them and each should be eight feet long.

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2. Do your customers complain of oil coming out the air cleaner?

CAUSES

A. Overfilling the oil tank.

B. A restriction on the return side of the pump.

C. A leaking check ball in the oil pump.

Recommended questions to ask customer.

When does it start carrying oil over?

After the vehicle has set for a few days at start up? (See Section A or C).

While running down the road at highway speeds? (See Section B).

Does it ever clear up?

Was it ever acceptable?

Does this problem correspond with the addition of an oil cooler or a recent oil change? (See Section B).

A. Over filling the oil tank.

If the oil tank is overfilled, the excess oil will return to the gearcase cover by the oil tank vent hose. The oil tank can be over filled in a number of sneaky ways other than four quarts in a three quart system.

2. Do your customers complain of oil coming out the air cleaner? (Continued).

A1. For example, not running the vehicle before changing the oil. This may leave excessive oil in the gearcase and flywheel compartment.

A2. How about that oil sucking gremlin that steals half a quart every evening. The customers feel compelled to bring that oil level up to spec. the next morning.

A3. Vehicles with oil tanks that have all the fittings on the bottom of the tank, use a stand tube inside the tank for the vent line. The top of the stand tube should be above the oil level at all times. If the stand tube is damaged below the oil level or the level of oil is above the top of the stand tube, oil carry over will continue until the level of oil is below the damaged portion or the top of the stand tube.

B. A restriction on the return side of the pump.

Carry over will occur while driving the vehicle at highway speeds. The amount of carry over is directly related to the amount of restriction. More restriction, more carryover. In most cases the restriction is minor and translates to a small amount of carry over, which if left alone creates a bothersome mess.

Start looking for pinched hoses or a restrictive oil filter. Do not simply disconnect the breather hose and run it to the ground.

This raises an interesting question.

Could oil carry over of the minor variety contribute to oil comsumption?

You bet your boots it can!

SEE Question #3, Page 4.

2. Do your customers complain of oil coming out the air cleaner? (Continued).

C. A leaking check ball in the oil pump.

This is that gremlin referred to in Section A2. The customer's complaint is; after the vehicle sits for a day or two, oil comes out the air cleaner on start up.

How did the oil get around that check ball?

C1. Debris may be trapped between the ball and seat.

Before you tap on the check ball, try removing the spring and the check ball and run the vehicle for say 10 to 15 miles. This will allow maximum oil flow and perhaps flush the debris into the tappet screen.

C2. Poor check ball seat.

If the above suggestion does not resolve the problem, pinch off the oil feed hose. Remove the spring and check ball and evacuate oil out of the tower. Inspect the seat. Do not simply tap the ball, there may be an aluminum chip on the seat. Tapping on the ball could only compound the problem.

C3. Porosity in Seat.

If it is minor porosity, you may be able to lap the seat. Some creative dealers have brazed a check ball on to a tee handle, using a small amount of lapping compound, have improved the seat. The pump must be removed for this repair as lapping compound could prove devastating to the motor.

3. Customer complains, I'm using a quart of oil every 583 miles.

SUGGESTION

Before you roll up your sleeves and tear it apart, try this.

Have your customer perform this oil consumption test for one week.

A. Verify correct oil level.

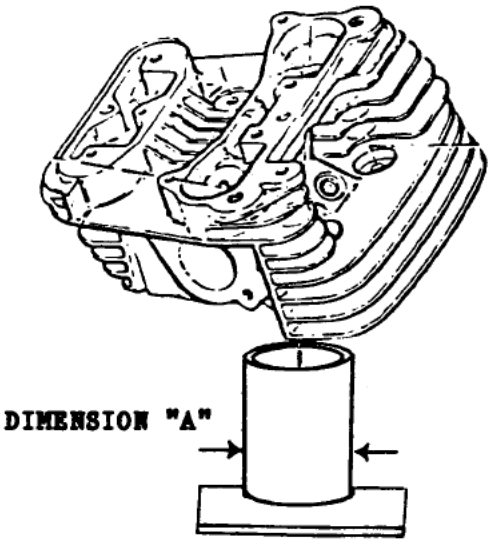
B. Tape the filler plug closed. Note on that tape the mileage and the date.

C. Remove the breather hose from the carb backing plate and stick it into a catch bottle. The catch bottle should be non-breakable, such as a plastic baby bottle. Remember to cover the fitting in the carb backing plate. Secure both the bottle and the hose firmly to the vehicle. Don't seal the top of the catch bottle as this could pressurize the system.

D. Instruct your customer to check the catch bottle every day. If the catch bottle begins to fill with oil, the vehicle should be returned to your dealership. Start looking for that restriction on the return side of the pump. Refer to Question 2, Section B, Page 2.

4. 1986 model electrical problems, no spark, charging, poor driveability?

Don't stand there scratching your head. Silly as it might sound, the new powdered paint on the frame may be the problem. It is so tough and covers so well, you may not have a good ground. Scrape some paint away between all frame ground connectors and install a star washer between the connector and frame. We are presently making changes to insure good grounds in the future.



INSTRUCTIONS

Place the valve seat squarely on the tool as shown above. Utilizing the Kent-Moore driver handle, H-D 34740 and your hydraulic press.

Push the guide out. Heat is not necessary for removal or installation.

Install the guides with the appropriate tool as recommended by the service manual for that model.

Good news. Put those hammers away.

Installation and removal of guides no longer has to be a tribute to the anvil chorus. You can now make a tool that will render the hammer obsolete.

If you choose to make the tool yourself, materials are available from a steel supplier or it can be made by your local steel fabricator.

The common dimensions are:

Base: 4" x 4" by 3/8" thick.
Length of the pipe: 6".
Pipe minimum wall thickness: 0.1875.

Dimension "A" is the O.D. of the pipe. This must be controlled as the pipe must squarely mate with the seat.

DIMENSION "A"

1100 and 1340 Evolution
Intake - 1.94
Exhaust - 1.71

883
Intake - 1.81
Exhaust - 1.57

Shovelheads

NOTE

Shovelheads require one tool for removal of both guides and a separate tool for installation. When removing guides, the head must be up side down (spring side on the tool). Remember, clean that carbon off.

Shovelheads - Removal
Intake and Exhaust- Use Evolution Exh. tool 1.71 for both

Shovelheads - Installation
Intake - 2.13
Exhaust - Use Evolution Intake tool 1.94

POLICE BULLETIN BOARD

1. Please make the following correction to the parts book, 1984 to 1985 FXRP, Page 95, Item 27. Part number should be 65377-84, not 65573-82.

2. Some '84 and '85 FLHTP and FXRP's have had sirens activate due to water contamination. If your officers experience this, please contact Dave Pader, Extension 4327, for repair information.

3. FXRP tires should not be used on anything other than on FXRP's. The fenders are hand picked for extra clearance.

MECHANIC'S NOTES

1. Hylomar? Wipe surface clean and dry. The solvent in Hylomar will displace fine oil films, allowing Hylomar to get maximum adhesion, but it's always best to start with a clean, dry surface.

   Apply only enough Hylomar to fill the space between the components when assembled. Any more than this is waste and can add to the cost of assembly.

   Allow Hylomar to dry to the touch - This insures all the solvent has evaporated. Most components will be sealed successfully when assembled wet - but we prefer dry.

   Keep in mind our gaskets are to be installed dry. Hylomar may be used to hold the gasket in place by applying a small amount in key locations.

   Applications:
   For sealing threaded parts such as '86 XL clutch cable adjuster threads, timing plugs, O-ring retention.

2. If you are looking for a FLHTC, FXSTC or FXRC cylinder and piston assembly, look no more. The part number is: 16512-86. Black wrinkle with finished fins.

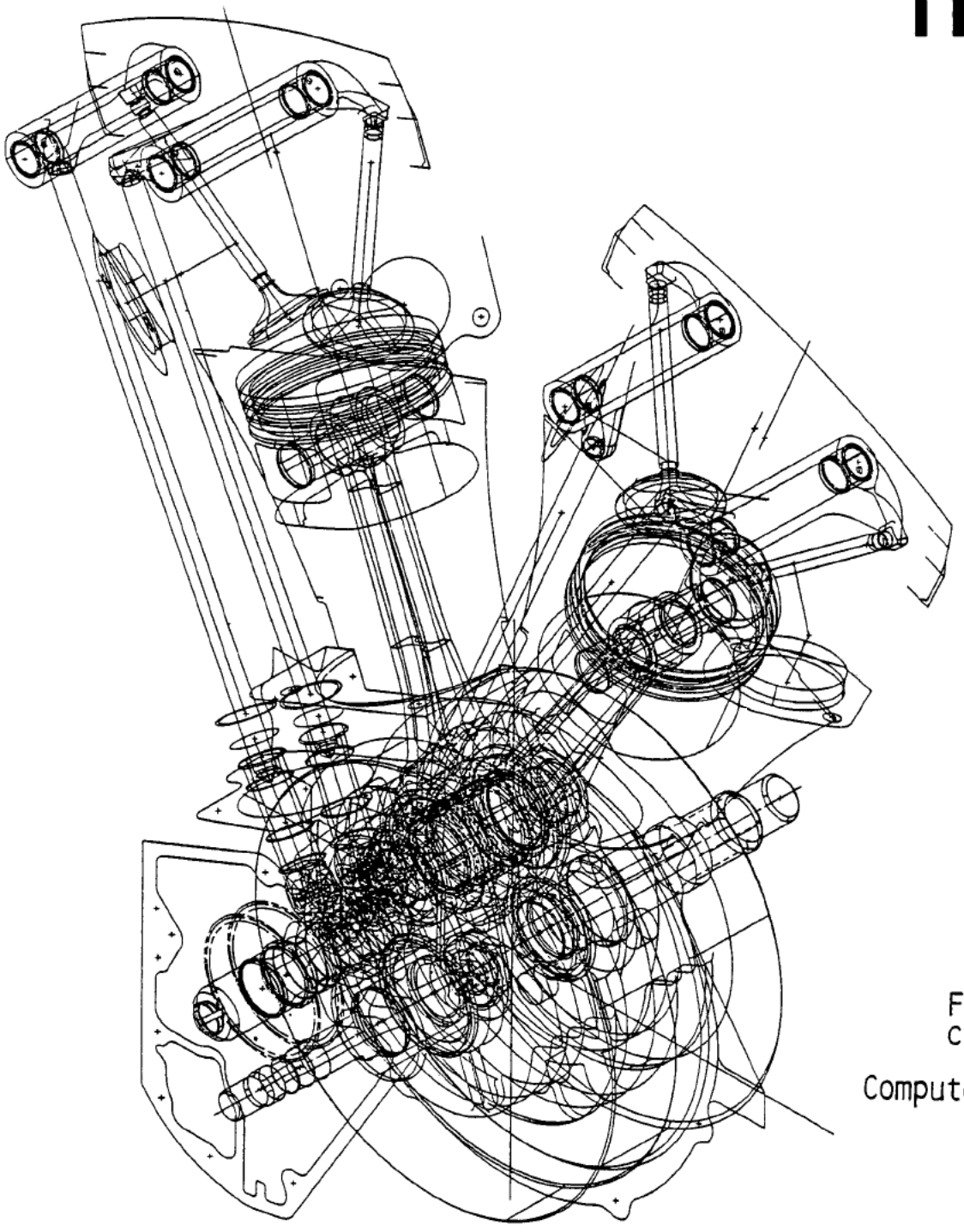
3. Sensor plate part number 32400-80A is a product improvement. The sensor plate leads will be protected from contamination by a rubberized potting, similar to the module. If the sensor plate is removed, you will notice that the sensor pickups have also been changed. This brings us to the meat of the story. A SMALL percentage of these sensor pickups will have a screw in the large pickup. **This screw is preset, it retains a magnet. DO NOT attempt to adjust and/or remove this screw.**

4. WEEPING OIL? We have a few reports of weeping cylinder base gaskets on Evolution motors. Please do not jump the gun. Clean the area and allow the customer to drive the vehicle. If it persists, the oil may be originating from the crankcase cylinder stud threads. Remove the suspect stud and discard, apply 242 Loctite to the threads of the new replacement studs. Reinstall stud to proper height.

   IMPORTANT: DO NOT try to simply tighten the head bolts. **Cylinder head fasteners should never be retorqued on any Evolution engine.**

TECHNICAL

TIPS



Front page
courtesy of:

Computer Aided Design
(C.A.D.)

DATE: April 1986

1.) Why is this guy still breaking speedo cables on his bike? (FXRD & FXRT vehicle)

You did everything to make sure the wiring wasn't the cause. Did you?

(Refer to Tech. Tips Jan.86)
Question # 2

Along with relocating the wiring harness you may have to relocate the radio's choke. The choke is a black box similar to the P.I.S. circuit you were to have removed per Service Bulletin # M-913A. Call Milwaukee if breakage continues.

2.) Your customer complains: There's a noise in my motor it's driving me crazy fix it will ya...

Noise???

How many noises can you hear in an external pushrod, air cooled, aluminum motor? You're right alot.

It may sound like a lifter and turn out to be contact between the piston and the squish area of the head. A loose pinion may sound like a bottom end knock. That's only the tip of the iceberg. Sometimes you have to drive the vehicle doing your rendition of a Joey Chitwood thrill show only to find it's the speedo cable banging against the front fender.

I think the only thing harder to find is an electrical problem or your car keys when you're in a rush.

REMEMBER: Interrogate your customer, he may be withholding valuable information.

Look at the simple things first.

1.) The loose front exhaust pipe mounting bracket. (Cam cover area)
On FLT's and HT's we've found the muffler support bracket loose. (Saddlebag area)
The muffler to exhaust pipe clamp may be loose. You may not be able to put your finger on the noise, so try your foot.

Note: The rubber mount vehicles have been on the scene for a while now and the miles have taken their toll.
Check those motor mounts in particular the front motor mount. (Refer to Service Bulletin # M-888)

2.) Noise???(Continued).

2.) If you find that it is an internal engine noise. Do not go to your tool box and put your blinders on. It' hard to check oil pressure, cylinder compression, timing or locate the noise if the motor is in little pieces parts.

If you call us, and we'd like you to, we're going to ask those questions. It sounds kind of iffie when you answer: The oil pressure was ok or the compression was good. What hurts is when you say to your self, I didn't check it, I don't know what it was. Pin that noise down with a stethoscope or similar tool. Make some notes, like the noise is R.P.M. related, I hear it in the front cylinder, it's loudest under load. You are a Mechanical Detective and a good detective solves the case with some deductive reasoning but mainly facts.

Just keep this in mind. Noise don't mean broken part

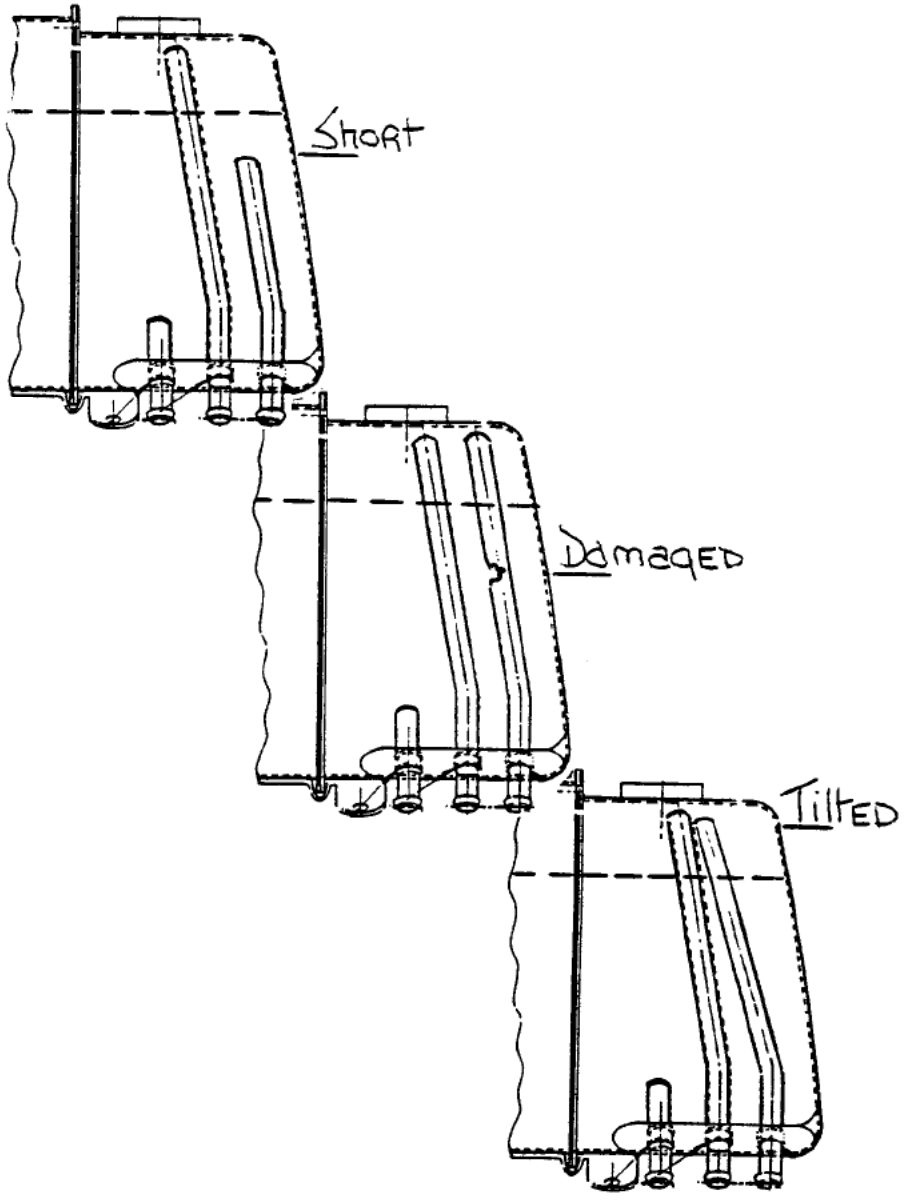
3.) Oil/ Air cleaner, Air cleaner/ Oil we know now why it happens per Nov. 85 Tech. Tips question # 2 but why is only half the answer. What about a quick way to diagnose where the problem is.

Note: Provided on page (7) will be an abbreviated diagnostic chart for quick reference.

Carry-over, where do you start? What are you looking for? First you've got to Qualify the complaint. Ask the customer the right questions.

1.) When does it carry-over? Driving at steady highway speeds? After the bike's been sitting for a couple of days and you start it up?

3.) Oil/ Air cleaner(Continued).

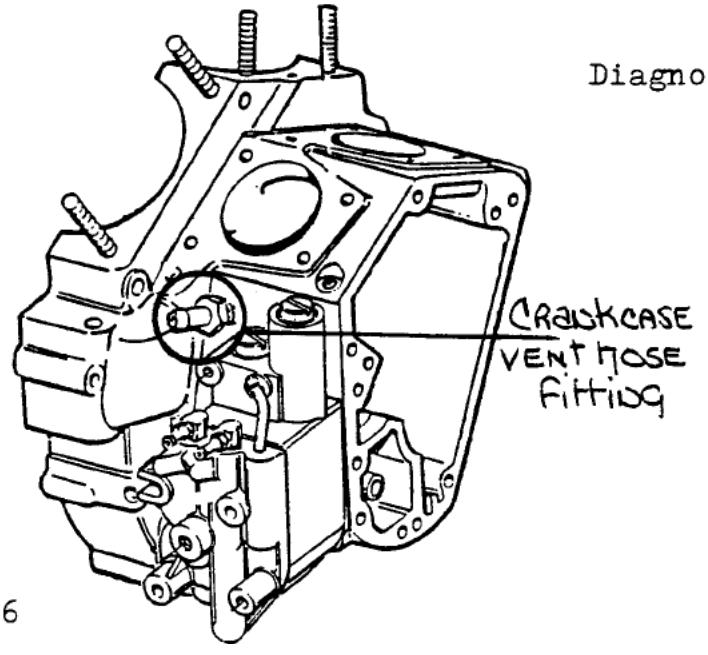


2.) Drive or run the vehicle and reproduce the problem with the breather hose in a baby bottle test described in Nov. 85 Tech. Tips page 4. This will help you better understand the amount of carry over you're dealing with. Now lets start the diagnostics.

We're going to separate the systems. We'll discuss the oil tank first, then the return lines and finally the motor, qualifying each one as we go.

3.) Overfilled, short or damaged stand tube or tilted return stand tube: Carry-over will continue until the level of oil is below the top of the vent tube or the damaged portion of the tube with one exception, the tilted stand tube. It may continue as long as the oil supply exists.

Note: We know you can't always start on a vehicl as soon as it arrives at the shop. So if the vehicles been sitting for a few days, warm it up with the breather hose directed to a catch pan. Then make sure the oil level is correct.



Diagnostic's 1

With the oil tank oil level correct and the ignition off, pinch off the oil tank vent hose and remove the hose at the crankcase vent hose fitting. Direct the hose into a catch pan and unpinch the hose. (Vehicle should be upright) If oil begins to trickle out of the vent hose, allow it to run until it stops. Recheck oil level. Down a quart, hey? Must be a short or damaged stand tube. Replace the oil tank.

3.) Oil/ Air cleaner(Continued)

Diagnostic's 1 Part 2

No oil ran out the vent hose! Don't give up. Leave the vent hose unconnected and cap off t! crankcase vent fitting.

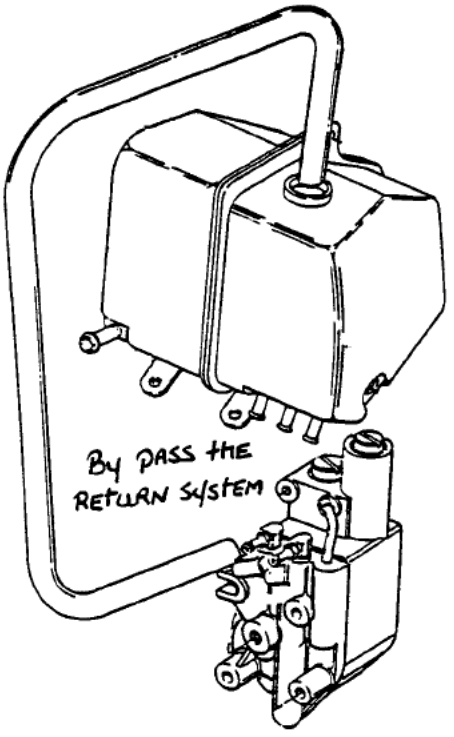
Note: If you do not cap off the vent fitting you're going to have a real live mess.

Now start the vehicle, remember keep that hose pointed into the catch pan. If oil begins to trickle out you have a tilted stand pipe. Try switching the return oil hose with the oil tank vent hose at the oil tank before you replace it.

This simple act may save both time and money by not replacing the tank.

No trickle from the vent hose.

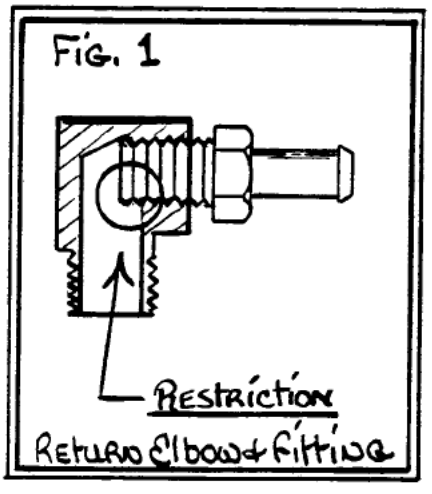
So the problem's not in the oil tank. Lets reconnect the crankcase vent hose and move on to the next step.

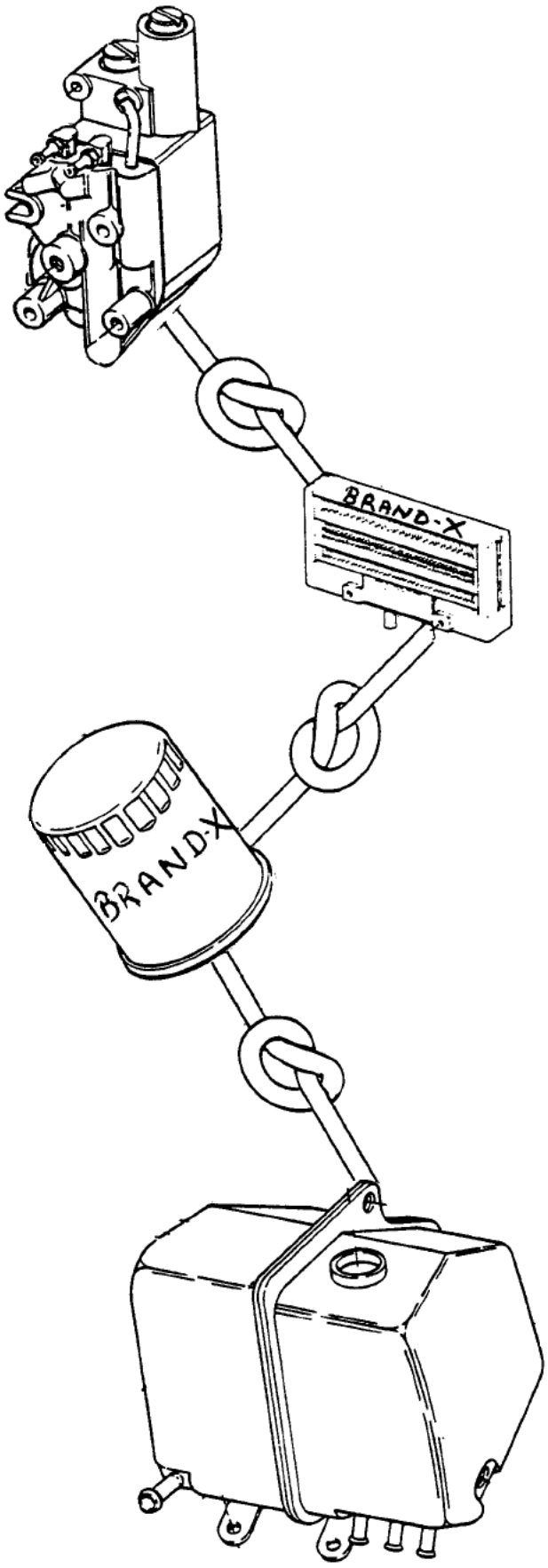


Diagnostic's 2

Return system vs motor: Remove the return hose at the oil pump return fitting and plug the hose, so oil doesn't run everywhere. Select a length of oil hose long enough to reach the oil tank filler neck when connected to the oil pumps return fitting.

Note: Before connecting the test hose note the number of threads exposed on the return fitting to return elbow connection. Remove the fitting and elbow and inspect how far the fitting is screwed into the elbow. The fitting may be restricting the return oil flow. See fig. (1). Modify fitting as required and reinstall.





Diagnostic's 2 (Continued)

Now connect the test hose to the return fitting and direct the open end of the hose into the oil tank.

Run the engine and note if the carry-over is much improved or stops. If it stops or improves the problem is between the oil pump return fitting and the oil tank.

Note: In rare instances you may have to drive the vehicle to reproduce the same set of circumstances to be sure you've corrected the problem. Remember, put the breather hose in a non-breakable container, secure both the bottle and hose to the frame. A plug must be fabricated to hold the test return hose in the oil tank filler neck and control spillage of oil from the oil tank. A modified oil dip stick plug may fill the bill.

-Important-
No restrictions in the test return hose.
Please!

The carry-over cleared up. Start looking for that restriction. Pinched return hose, after market oil filter, oil cooler, plugged fitting or hose.

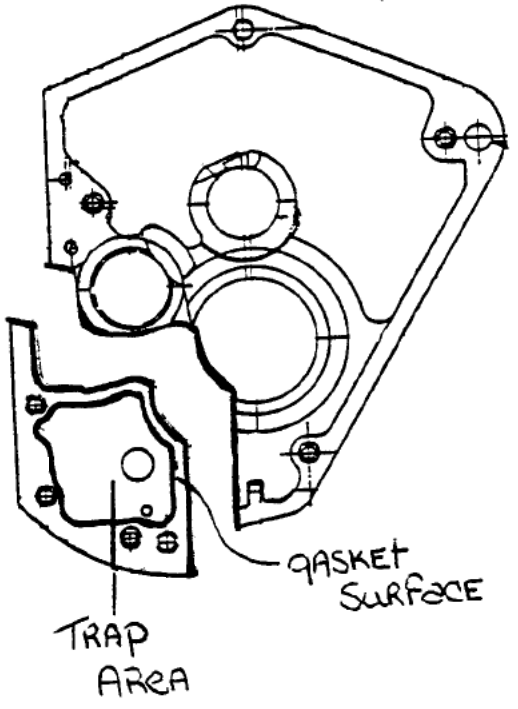
Friends lets bow our heads and repeat after me.

I will never willingly install any fittings, probes or adapters which reduce the oil pump's ability to return oil to the oil tank as this will lead to carry over big time. Amen!

Diagnostic's 3

So it's still carrying over and you've performed every test including checking that return fitting. What? You say you forgot to check it? Go on go check it, I'll wait.....

Fig. 2 Cam Compartment



.....Back so soon? You say the fitting's not run in too far. Ok.

Oil can be getting into the engine in a number of ways. Read Nov. 85 Tech. Tips question # 2, section C, page # 3. This carry over will occur upon start up after the vehicle has sat for a couple of days. If no improvement the problem may be deeper than this. Continue with the following section.

Now that your anticipation has built to a fevers pitch. Go ahead, pull off the pump, take off that cam cover. But know what you're looking for.

Examine the following

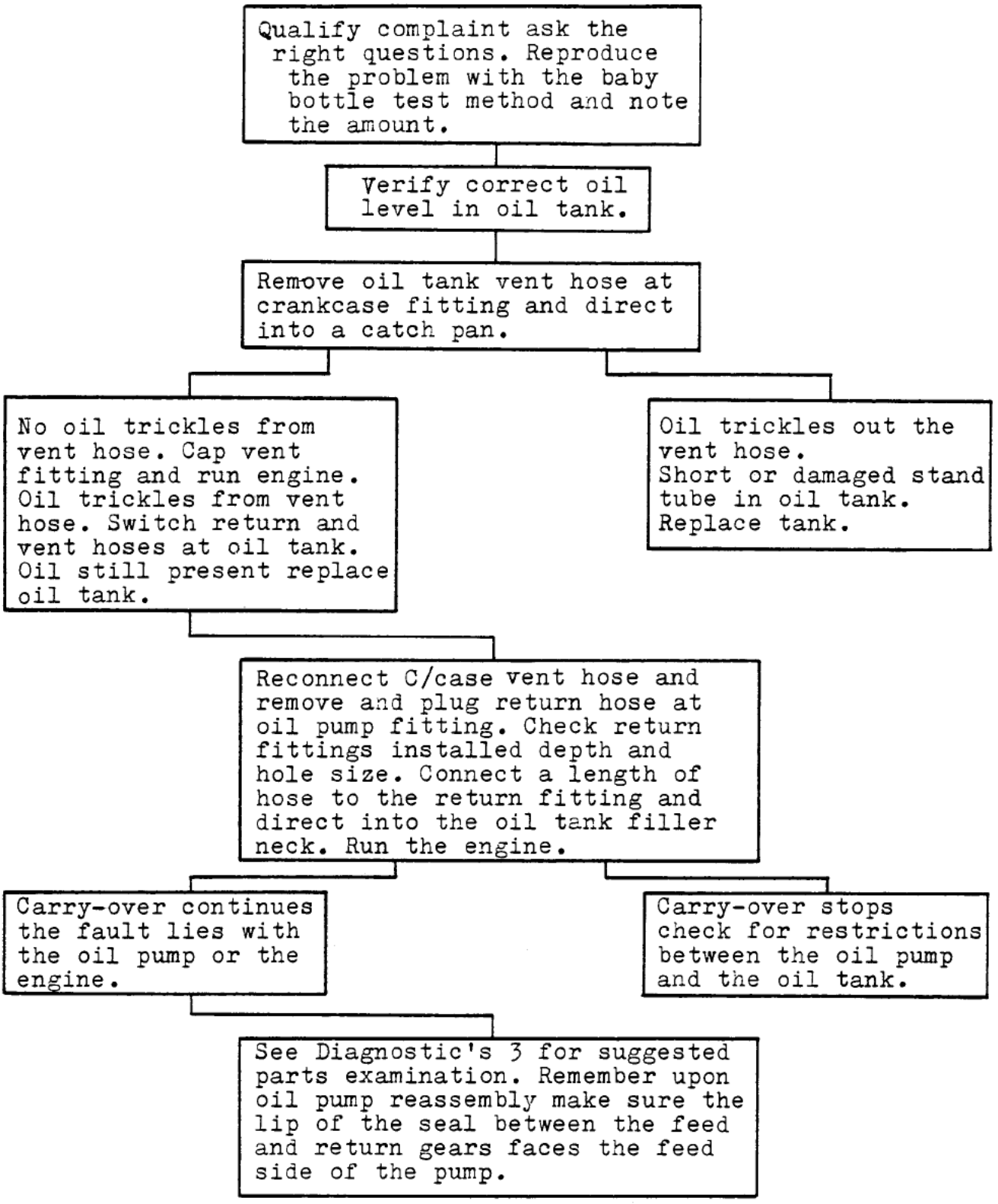
1.) Oil pump return pockets for damage, grooves, a sheared drive gear key.
2.) A damaged breather gear or pocket or out of time. Don't just look at it, pull it out.
3.) A damaged gasket surface between the trap area and th cam compartment. See figure (2).
4.) A cracked or porous cam cover.
5.) A plugged evacuator hole in the trap compartment.
6.) A plugged return passage to the return gears.

If you haven't found it by now, don't put it back together, call us first. Maybe we have some new revelation that might solve the problem.

If you do find it, remember during oil pump reassembly turn the seal around between the feed and return gears. The I.D. lip should face the feed gears.

Thanks splat

Abbreviated Diagnostic Chart



MECHANIC'S NOTES

"S" vs "H" Cams - The "H" cam profile is no longer with us, instead all P & A replacement cams will utilize the "S" profile. The gear will still reflect the size difference (O.D.) Pre-77 vs 78 to 84.

When installing the "S" cam in a: early 82 and earlier vehicle, remember to update the valve springs with the orange or red springs. The additional cam lift will cause inner and outer spring contact if springs are not replaced.

XL V^2 Models - The rear cylinder left rear rocker box Allen screw, P/N 852, may not clear the frame during disassembly. Should this situation arise during disassembly, cut the screw in half and remove, substitute Allen screw P/N 884. The torque will remain the same - 10 to 13 ft./lbs.

I'm sure we all know by now that the clutch cables are made of a new heat resistant material (1986 models). If you didn't, you do now.

1340cc Evolution intake compliance fitting mounting bolt torque is: 35 to 50 inch lbs.

5-Speed Transmission Note: Harley-Davidson Service Department recommends that if you remove any retaining ring from either the main or countershaft, you must replace that retainer with a new retainer ring. Do not reuse old retaining rings.

TUNE INTO RADIO FACTS!!

Motorola radio problem? Mr. Steve McShane of Midtronic's may be able to help. Call Phone # 312/388-9002 - this is your number - not the customer's. Let's not ruin a good thing.

1986 Radios - The volume control knob on the face plate is thicker than all the rest. This thicker knob could interfere with the face plate's protective cover. The knobs pull off - switch the volume with the Bass knob. This may offset a future problem.

When installing the radio's umbrella, I guarantee you'll have to move some wires. On the FLHT you may have to clip the ty/raps that hold the choke and AVC (automatic volume control). If you run into more than the normal pain the ___ with the installation of the umbrella on the FLHT, try this. Loosen the radio's chassis rear support screw through the headlight. The chassis should drop down slightly to provide some additional clearance. If more clearance is required, remove the radio's face plate and loosen the chassis mounting nuts.

HEY - PARTS COUNTER!!

"E" Cams - XR-1000 Performance:

Front exhaust - 25496-83	Rear exhaust - 25617-83
Front intake - 25502-83	Rear intake - 25616-83

WHERE'S THAT PART?

Remember the splined alternator rotor we talked about in the September 1985 Tech Tips, question #1, Page 1? Well, I do. To bring you up to date we won't be seeing it much before 87 so it's important to use 242 Loctite on that compensator nut. In fact, don't forget to use 242 Loctite on the trans. sprocket nut and the clutch hub nut.

The 1986 Fashions and Accessories guide, Page 35, Item 14-C - Transmission Top Cover, P/N 34466-82, fits all 5-speed 1340cc engines with the exception of the 5-speed FXST vehicles. If you want a chrome cover for your FXST, please order the FXSTC P/N 34468-86.

The stock part number for the FXST transmission top cover is P/N 34464-86. Please correct your parts book as it is in error.