

Service-Information Motorcycle



BMW NA
Service Department

Group: 11
Engine

October 1988
11 037 88
(2289)
REVISION

For USA Only

K100 Lash Gear Noise

REVISION - January, 1989

Please destroy S.I. #11 037 88 (2289) and replace with this Revision.

This Service Information is an amendment to S.I. 11 033 86 (#2209), dated May, 1986, regarding Location of Lash Gear on K100 Engine Output Shaft.

Identification: The motorcycle has developed a distinct increase in the noise between the crankshaft and output shaft gears. Depending upon severity, noise may range from loud whining to knocking or rattling, particularly during transitions in throttle at low rpms.

Consult your T.S.M. for authorization prior to performing this repair.

Remove crankshaft cover and examine crankshaft gear for free play between the output shaft gear.

Causes: The potential causes may include one or more of the following:

- The tensioning gear annular spring has weakend, applying insufficient tension.
- The diaphragm spring has weakend, no longer holding the tensioning gear firmly against the output gear.
- The location pins for the tensioning gear and annular spring have worn.

Action:

- Inspection of the output shaft and tensioning gear assembly.
- Replacement of the output bearing, tensioning gear, annular spring.
- Removal of the diaphragm spring and shimming will be the minimum action authorized by the Technical Services Managers.
- If the annular spring location pin has worn, it too must be replaced.

Procedure: This repair procedure should be performed using the recommendations enclosed. Specific details are provided for actions not normally done in the dealership. Additional assistance is found in the form of checklists for special tools, additional tools, parts and torque values.

Repair Video: A VHS video of this repair procedure is included with this S.I. for your viewing. A charge of \$15.00 will be billed to your Parts Account.

Parts Ordering: Parts referred to in this S.I. should be ordered through normal parts-ordering channels (see attached Parts List).

You will also find enclosed a parts order form for your convenience. Copy this list for parts ordering and warranty filing.

Warranty: Parts and labor are reimbursable under the BMW Limited Motorcycle Warranty of three (3) years/unlimited Miles.

Warranty Claiming:

- Authorization is required from Technical Services Manager.
- Use normal Warranty Claim form.
- Use Defect Code 11 21 02 39 00.
- Use the attached parts list. Complete the blanks and staple the forms to claim.
- The repair has no specific flat rate. Reimbursement is available by claiming the following work time (WT):

K100	93 FR	WT	11 99 000
K100RS	100 FR	WT	11 99 000
K100RT	106 FR	WT	11 99 000

The work times listed above include all operations related to this repair and all additional operations related to parts removed.

Repair Details:

- Remove gear box.
- Remove intermediate flange; attach engine holder 110 620. Install frame support dolly - part number 88 88 6 465 620, then remove engine hydraulic jack stand.
- Remove hall access cover and rotate engine to "V" mark.

**Repair
Details:
(Cont'd.)**

- Drain engine oil, engine coolant and remove the lower sump cover and the water/oil pump assembly.
- Secure the output shaft into the upper engine case using crate straps at each end. An extension should be made using a center punch or alignment bar at the front.
- Confirm the "V" mark location at the front of the crankshaft and confirm that the straps are secure.
- Remove the allens from the sump perimeter as well as the two hex from the rear inside and two allens from the front inside which secure the output shaft.
- Heat the area around the rear output bearing to soften the Loctite, then remove the lower sump housing.
- Now clean the gear teeth contact surface to prepare for painting a timing mark.
- Confirm one last time the "V" mark position and paint a reference mark on the gear tooth which aligns with the case surface.
- Have one person hold and remove the output shaft area and loosen the "crate" straps.
- Before cleaning the output gear, scribe an additional timing mark onto the aluminum gear carrier just in case your mark is washed off.

Due to the 1:1 ratio between the crankshaft and output shaft, it is very important that the existing wear pattern be maintained.

**Extremely
Important:**

Always use care when handling gears and work on a wooden or padded surface to avoid any nicks or scratches to the gear teeth which would cause additional noise.

- Remove the output bearing retaining circlip and use puller 008 400 against support 331 307 to remove bearing.
- Remove the annular spring and inspect the location pin for wear. The annular spring and the tension gear will be replaced. The diaphragm spring will be replaced with a suitable shim.
- If the location pin is worn, it must be replaced.

**Repair
Details:
(contd)**

- To remove the pin from the gear, first transfer a mark to the inside of the gear carrier. This can be done by viewing location and scribing a line along the outside of the gear carrier and following it parallel to the inside.
- Make a punch mark directly at the base at the radius of the inner carrier.
- Support the gear carefully and use a 1/8" drill bit long enough to reach this inside area. Drill only through the aluminium carrier.

Drill another 1/8" hole 180° around the gear carrier for balancing purposes. Drill this hole in the same location as the pin hole on the opposite side.

- Use a Snap-On tapered 1/8" punch.
- Use this tapered punch when preparing to press out the location pin from the back side. A length of 3/4" should be all that is needed to remove the pin.
- Clean the pin hole thoroughly and prepare to install a new location pin.
- Use Loctite #272 liberally on the new pin and in the hole.
- Use a 5mm nut to act as both a guide for pressing in the new pin as well as a depth stop. The pin should be no more than 5.5mm above the gear surface. **Do not pound the pin in; press it in.**
- Without installing the new annular spring, place the new tension gear into position and prepare to measure for shim selection.
- Measure from the shoulder, where the output bearing rests, to the surface of the tensioning gear ring.
- After taking your measurement, select the shim which will provide a clearance of 0.07 to 0.09mm.

Shim Size	Part Number
1.60mm	11 21 1 461 742
1.75mm	11 21 1 461 743
1.90mm	11 21 1 461 744
2.05mm	11 21 1 461 745

**Repair
Details:
(contd)**

- If the shim you need is not available, please downsize a larger shim using a surface plate and some fine emery paper.
- Spray all surfaces of the output gear, annular spring and tension gear with Uni-Molly C220 prior to assembly.
- Assemble the output gear using the new annular spring, new tension gear, appropriately selected shim, new output bearing and new retaining circlip.
- The new circlip is dished and the dished side goes against the bearing. Be certain it is positively engaged in the groove.
- Complete the assembly of the output shaft using 5 new absorber biscuits and spray the splines on the output shaft and clutch carrier with Uni-Molly C220.

Uni-Molly C220 should be given a 30-minute air-dry time prior to assembly.

- Completely clean all Loctite from the location grooves in the engine and sump cases.
- Pre-load the tensioning gear by prying against one of the stationery rivets. Clamp into position using a vise-grip with several rounds of duct tape to pad the clamping jaws.

Very Important: Do not pry against gear teeth.

- Apply a coating of Loctite 1110B to the rear output bearing location ring.
- Install the output shaft into the upper case, making certain your timing is properly aligned with the case surface.
- Please be certain that the bearing location ring-end gaps meet at the case surfaces.
- Once the output shaft is firmly in place, secure once again with crate straps.
- Confirm timing marks and prepare to install the lower sump housing. If the crate straps are secure, remove the vise grip from the output gear.

**Repair
Details:
(contd)**

The lower sump should be prepared in advance with the 3-Bond 1207B prior to installation.

A 10 minute air-cure should always be given to 3-Bond 1207B before installation.

- Install new oil and water passageway O-rings, align the lower sump housing with the bearing location ring and install up into position.
- Install the two hex bolts at the rear inside and two allens at the front inside of the lower sump to secure into position.
- Torque the allen front internal bolts to 18 Nm, the hex rear internal bolts to 40 Nm and the perimeter allens to 7 Nm.

You are now ready to finish the assembly of the motorcycle.

- Paint a timing mark on the clutch pieces just in case there are no paint marks. Clutch pieces should be placed 120° apart.
- Soak the rear main and alternator seals for 2 hours in engine oil prior to assembly.
- Lubricate the clutch and gearbox input splines with Staburags.
- Lubricate the driveshaft splines with Staburags.
- Use the new clutch-centering bridge for more accurate placement of the friction plate - **part no. 88 88 6 212 672.**
- Make two alignment dowels 8 x 90mm to aid in the installation of the gearbox.
- Always replace the alternator drive flange bolt and use Loctite #242 upon installation.
- Always replace the thrust washer behind the clutch carrier with a new one of like size.

Very truly yours,

BMW of North America, Inc.



Frank Stevens
National Service Manager
jel/062.4



Richard Dampf
National Technical Manager

BMW Special Tools

88 88 6 001 510	Jack Stand
88 88 6 005 010	Seal Puller - Alternator
88 88 6 114 650	Oil Filter Socket
88 88 6 212 670	Clutch Center (including 88 88 6 212 672 bridge)
88 88 6 331 307	Thrust Center - Output Bearing Removal
88 88 6 008 400	Puller for Output Bearing
88 88 6 007 500	Kukko 17 K Puller
88 88 6 002 600	TX 30 Torx
88 88 6 110 620	Engine Holder
88 88 6 111 620	Alternator Seal Driver
88 88 6 111 630	Output Seal Driver
88 88 6 261 660	Pivot Pin Removal
88 88 6 465 620	Support Legs "Dolly Grasshopper"
88 88 6 002 550	Depth Gauge

Shop Supplies

<u>Part Number</u>	<u>Description</u>
07 58 9 056 998	1110B Adhesive
11 21 9 056 999	Uni-Molly C220
07 58 9 056 979	Three Bond 1207B
07 55 9 056 992	Staburags
07 58 9 056 030	Loctite 272
07 58 9 056 031	Loctite 242
95 00 9 000 140	BMW Engine Oil
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Additional Workshop Tools

Depth Gauge
Micrometer (0-25mm)
Alignment Dowels (2) 8 x 1.25 90mm long
Crate Straps (2)
27mm $\frac{1}{2}$ " Drive Socket
30mm $\frac{1}{2}$ " Drive Socket
 $\frac{1}{2}$ " Drive Breaker Bar
0 - 50 ft./lb. Torque Wrench
75 - 150 ft./lb. Torque Wrench
Drift Assortment
Center Punch
Electric Drill - Drill Press Preferred
Hydraulic Press
1/8" Drill Bit* (4" minimum length) - Part No. 140-008 1/8" x 5 3/4"
Vise Grip
Duct Tape

*Drill Bit available from: Quad Machinery & Supply Co. - 1-800-342-8665,
or in New Jersey - 201-288-4070

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Torque Values

	Nm	Ft/lb.
Shock Bolt/Nut**	51	37
Footpeg Mounts	15	11
Exhaust Flange Nuts*	21	15
Swing Arm - Right	9	6.5
- Left - pin	10 loose 7.5	7 loose 5.5
- Left Locknut	41	30
Centerstand**	41	30
Gearbox to Intermediate Flange	16	12
Clutch Carrier Nut*	140 loose 100	101 loose 72
Starter Motor	7	5
Alternator	22	16
Torx Bolts	9.5	7
Alternator Drive Flange Bolt* & **	22	16
Sump Allens	7	5
Output Shaft Allen - Front	18	13
Output Shaft Hex - Rear	40	29
Oil-Water Pump Allen	7	5
Coolant Drain	9	6.5
Clutch Cover	19	14
Rear Wheel	105	77
Frame to Gearbox	45	32
Frame to Intermediate Flange	45	32
Sprag Clutch Bolts**	9	6.5

* Requires new part

** Requires use of Loctite 242 (Blue)