



V8 XJ Series/XK

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SERVICE

TECHNICAL BULLETIN

Brake Disc Vibration – Diagnosis – General Information

MODEL

1997 MY-ON XK Range
1998 MY-ON V8 XJ Series

VIN

001001-ON
812256-ON

Issue:

This bulletin provides general background information to assist in resolving a customer complaint of brake vibration or judder.

The following points should be observed diagnosing a customer complaint.

GENERAL INFORMATION REGARDING BRAKE VIBRATION

- Brake vibration can be described as judder, shudder, pulsing etc., all are terms for the vibration of the vehicle and the vibration, transmitted as a pulsation of the hydraulic fluid in the brake line, which occur when the brakes are applied.
- The vibration of the vehicle is felt through the seat and the steering wheel; the pulsing of the fluid is felt through the brake pedal.
- Brake vibration occurs mainly on the front brakes.

PRINCIPAL CAUSES

1. **Partial corrosion of the disc surface** eventually causing variation in the brake disc thickness, or an alternating surface finish giving varying frictional values.
 - Variation in the brake disc thickness on an otherwise true running disc will cause a pumping of the fluid as the applied pads and pistons follow the disc, moving both pistons at the same time, alternately expanding and contracting the caliper fluid volume causing pressure pulses in the line to the brake pedal.
 - The variation of the brake disc thickness can be caused by corrosion of the area of the disc that is not covered by the pads when the vehicle is parked, causing a partial deterioration of the disc surface.
 - Corrosion of the disc is accelerated by the addition of salt to the road surface in winter, which is then sprayed onto the disc by splash, or by exposing the vehicle to salt laden air in a marine environment.

Note: Brake disc protective bags must be left in place during PDI and removed just prior to customer delivery. This will ensure that corrosion will not form on stored vehicles.

2. **A continuous variation in the position of the brake disc face relative to the brake pad.** i.e. the disc plane is not perpendicular to the hub center line.
This fault can be caused by, a distortion of the disc, or, the incorrect assembly of the disc to the hub, and is commonly known as 'run-out'.

- Brake disc run-out causes pumping of the fluid, by the inner and outer pad/piston assemblies following the disc in parallel, shifting from side to side, and so pumping fluid across the caliper causing pressure variations in the line.
 - The brake disc will normally run between the retracted pads and any wear that occurs through partial contact will be distributed evenly on the disc surface. Run-out on the other hand, will cause the disc to collide with the pads as it revolves, the two points of collision being 180° apart and on opposite sides of the disc: the result of this condition will be a pattern of wear causing variations in the disc thickness.
 - When the brakes are applied, this wear will cause pulsation of the pistons and the fluid; the severity of this wear will depend on the mileage.
 - Disc run-out can be caused by wear, as above, hub bearing adjustment, damage and also by foreign matter included between the hub and the disc when the wheel and disc assembly is disturbed.
 - Brake drag, which is the continued contact of the pad on the disc, caused by a piston or caliper not retracting after a brake application, will cause accelerated, and possibly uneven, wear.
- 3. Movement of the hub and disc assembly relative to the axle center line** caused by insecure or worn bearings.

WORKSHOP CHECKS

NOTE: The following workshop checks are intended as an aid to the understanding and diagnosis of brake disc concerns, but do **not** constitute an instruction to proceed with repair work.

General

- Check that the caliper and pistons move freely.
- If variations in the disc thickness are suspected, measure the thickness of the disc at regular radial intervals within the wear pattern.
- When the vehicle has been in service for some time, measure the thickness of the discs to ensure that they are above the minimum limits.
- If brake drag is suspected, remove the caliper and inspect and clean the guide pins and their housings.

Checking hub and brake disc run-out

1. With the wheel and brake disc removed, use a suitable dial indicator gauge to check the hub end float. If the end float exceeds the limit of 0.05 mm., (0.002 in.), check the hub bearing assembly for damage.
2. Use the dial indicator gauge to check the hub run-out by rotating the hub. If the hub run-out exceeds the limit (see table on next page), check the hub bearing assembly for damage.
3. Reinstall the disc on the hub and retain it in position with at least three lug nuts, after ensuring that the mating faces are clean.

4. Use the dial indicator gauge to check for disc run-out (Illustration 1). If excessive run-out is present, recheck the condition of the mating faces.

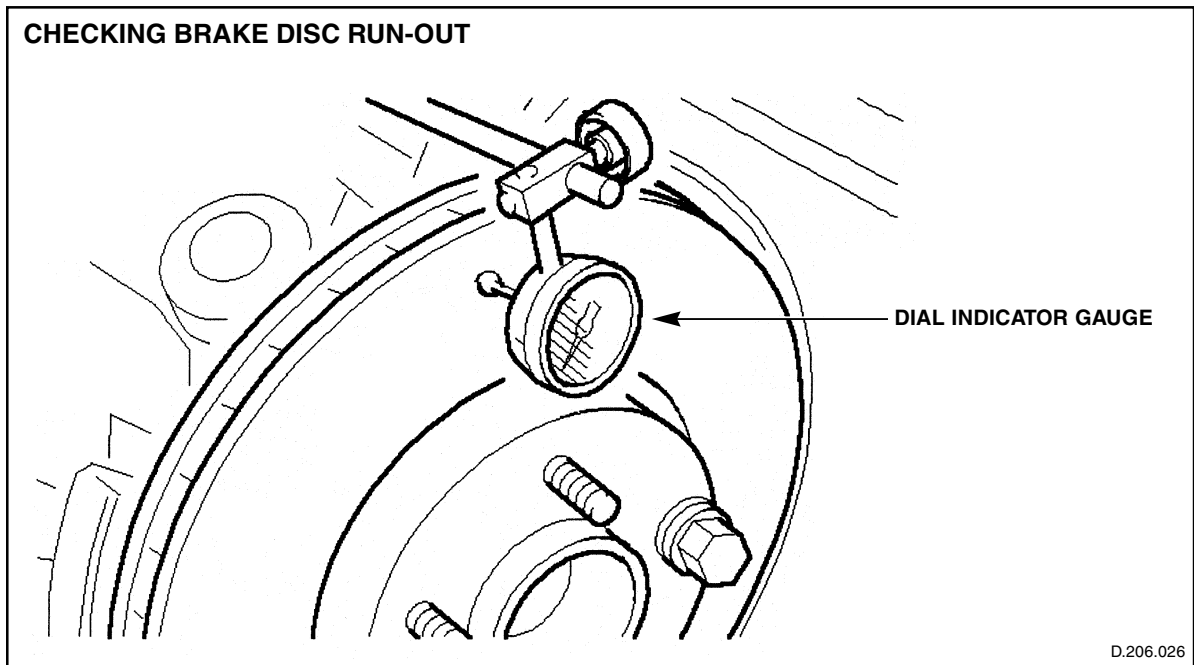


ILLUSTRATION 1

5. If run-out is still present, reinstall the disc in a new location, i.e. index the disc to a new position on the studs and recheck for run-out.
6. Continue to rotate the disc as before until all positions have been checked or the run-out has been reduced to below the minimum stated above.
7. If run-out is still present, install a new disc and recheck for run-out.

BRAKE DISC AND HUB SPECIFICATIONS

		XK		XJ		XK w/ Brembo
Min. thickness disc	F	26 mm	F	26 mm	F	30 mm
	R	18.5 mm	R	18.5 mm	R	18.5 mm
Max. run-out disc	F	0.1 mm	F	0.1 mm	F	0.05 mm
	R	0.15 mm	R	0.15 mm	R	0.03 mm
Max. run-out hub	F	0.038 mm	F	0.038 mm	F	0.038 mm
	R	0.057 mm	R	0.057 mm	R	0.057 mm
Max. end float hub		0.05 mm		0.05 mm		0.05 mm