Johnson Engineering

v–twin drivetrain performance

TECH

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Four-Point Ball Bearing

Johnson Engineering
100 Blake Road
Denver, IA 50622

(319)984-9298 voice
(319)984-9299 fax
"twistgear@juno.com"

Product: Four-Point Ball Bearings for the Harley-Davidson™ Transmission Trapdoor
Part no.:   700003, 700005
Description: replacement transmission bearing set
Application: Harley-Davidson™ type transmissions

1987-1998 big twins (6204 bearings) use 4-point P/N 700003.

1999-up big twins (6304 bearings: 35251-93C trapdoor) use 4-point P/N 700005.

1991 and later Sportsters™ with 6204 bearings use 4-point P/N 700003.

Features: Radial capacity nearly twice 2-point bearing load.
                  Axial rating exceeds stock (deep-groove) bearing.
                  Can carry any combination of radial or axial load.
                  Significantly improves the reliability of both OE and
                  aftermarket trapdoors.

Bearing	Radial Rating(lb)	balls
6204	2900	8
JE700003	4520	10
6304	3900	7
JE700005	6650	10

Comparison of JE 4-Point Bearing Radial Capacity/Pounds to OEM
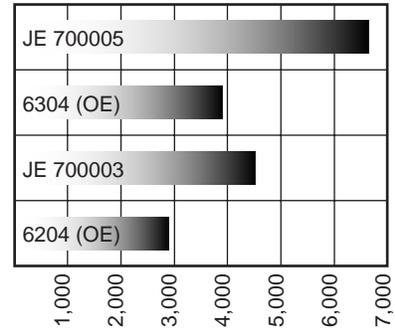
Product Benefits   Four-Point Bearings
Four-point ball bearings are designed for both
radial and axial loads without the risk of failure due
to ball override and are specialized for use in high performance products requiring
maximum load distribution over both x and y axes. The radial capacity is approximately
double that of a deep groove ball bearing, and, because deep groove bearings aren't
rated for lateral loading, the axial capacity is many times greater.

The balls in a 4-point bearing contact the races in four locations, not two as in a deep
groove design. The resulting radial load capacity is 1.5 – 1.7 times that of a 2-point
design. Caution is recommended when applying axial loads on deep groove ball
bearings. The balls should not override the shoulder, which could result in fatigue and
premature failure due to edge contact.

The trapdoor bearing reliability of all Harley-Davidson. motorcycles can be significantly
improved by replacing the existing deep groove design with Johnson Engineering's

four-point ball bearings. The cage material is glass fiber reinforced polymide 66, which resists vibration fatigue. (Welded or riveted cages are prone to failure when subjected to high vibration.) Polymide materials is also tolerant of oil temperatures up to 250º F.

Johnson Engineering's TwistGear features helical gears that apply modest axial loads on the counter shaft trapdoor bearing. Below are recommended and required configurations when installing TwistGear in conjunction with the engine type noted.

High Horsepower Engines
Mandatory on both main and countershaft locations when TwistGear's installed. Suggested for all gear set applications.

Moderate Horsepower Engines
Recommended when TwistGear is installed on either the new HD 35251-93C trapdoor or the HD 35251-93B trapdoor.

Stock Engines
Standard bearings are adequate with either spur or helical TwistGear since the helical gear axial loads are within the capacity of the stock bearings. However, four-point bearings are recommended.
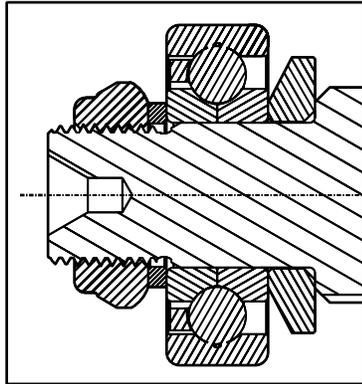
IMPORTANT: Four-point bearing requires use of lock nut (countershaft shown) for retention of race.

Installation and Service Instructions
The four-point ball bearing inner ring is divided into two annular pieces. A nylon cage retains the balls in the outer race.

Press the stock bearing out of the counter shaft position in the trapdoor. Press the outer race assembly into the trapdoor, contacting the bearing around the perimeter of the outer race.

Never use a hammer when installing the outer race! Trapdoor damage could result!

Press one inner ring half onto the counter shaft with the races facing out. Repeat the above for the main shaft if a second optional bearing was purchased.

Assemble the main shaft and counter shaft assemblies into the trapdoor bearings, and press the remaining inner ring(s) onto the shaft ends.

It's critical that the mainshaft and countershaft trapdoor locknuts are properly torqued. The assembly order should look like the shaft end illustration. (Inner rings aren't matched — mixing is allowed.)