Compiled by

HOOSIER BRITISH 4x4 & GUNS N' ROVERS

AJ133 5.0L V8

Overhaul manual — lower end assembly

Use with the AJ133 overhaul specs sheet.

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Preliminary

Download and view the AJ133 Overhaul Specs listed on our Resources page at www.hoosierbritish4x4.com and ensure all of your components are within spec.

Bearings are available in −0.25, −0.50, and −0.75 mm undersize diameters if the crankshaft needs ground. Pistons are available in +0.25, +0.50, and +0.75 mm if they need bored. Connecting rods must be replaced if damaged, as there are no currently available oversized bearings as of 2026.

You also need to be certain your block, crank, and other components are entirely clean of any metal shavings, debris, or burrs from the machine shop. Once everything is within spec, we can get started assembling.

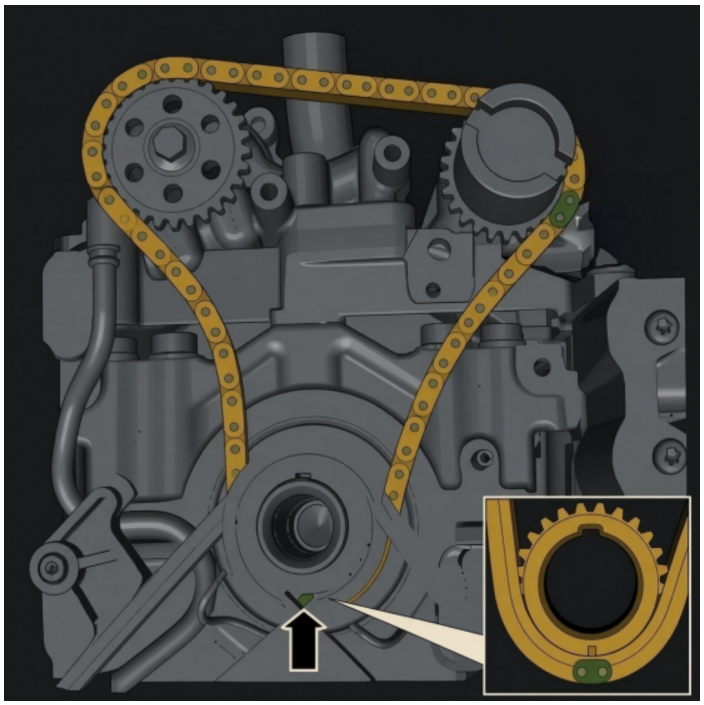
Main bearing clearance check

To check your main bearing clearance, ensure your main bolt holes are clean and dry. Install your studs (we're using Xotic Performance studs for this guide — more on that later). Walk the studs all the way into the hole, then install your bearings and crankshaft with WD-40 or similar light oil only on the bottom bearing. Gently place the crankshaft into place and place Plastigage on the top of the journals. Install the main caps dry. Install the nuts to the studs using their stud lube, then back the studs out at least ½ turn. Torque them down to spec, then remove them and observe Plastigage to ensure your bearing clearances match the spec. Shuffle the bearings around to match, or send it to the machine shop for correction. If they are correct, gently pull the crankshaft and bearings and clean everything to prepare for final assembly.

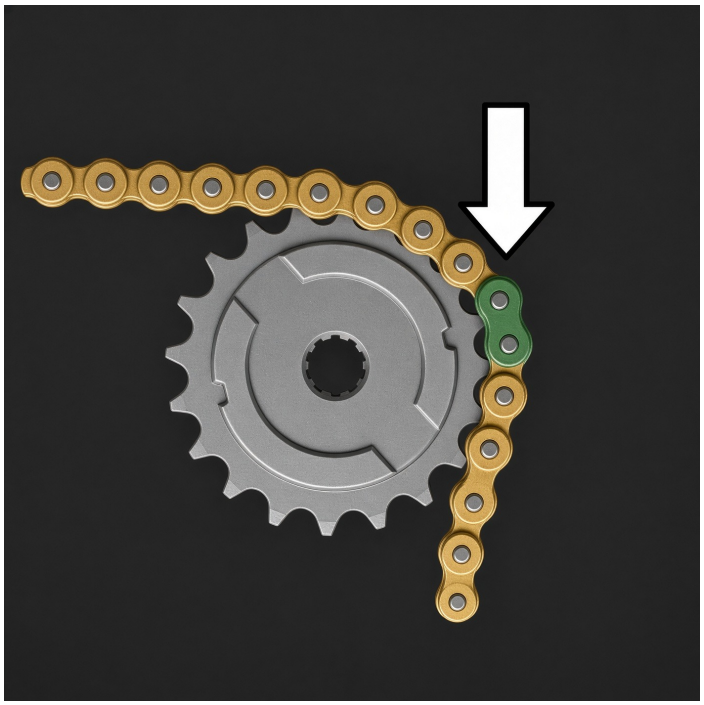
Assembly

1	Install your spring dowels into the block. Next install your upper main bearings. Clean the bore, clean the backside of your bearing, and place with the oil port lined up in the block. Apply a liberal amount of assembly lube to the bearing surface.
2	Install your thrust washers with the oil channels out. A second set of hands to hold these in place will help keep them in place. Apply a liberal amount of assembly lube to the outer faces of these as well.
3	Slowly lower the crankshaft into place, ensuring it doesn't bind or pinch any of the bearings or thrust washers.
4	Install the lower main bearings into the main caps. Clean the cap and the back of the bearing shells and ensure they are dry. Apply a liberal amount of assembly lube to the bearing surface.
5	Place the main caps on their respective journals. With a dead-blow hammer, gently tap them onto the spring dowels until they are fitted into place. The caps are labeled 1–5 with 1 being at the front of the block and 5 at the back, and with arrows pointing to the front of the block.
6	Install your main studs to the bottom of the holes, reapply thread lube, and then install the washers and nuts until hand tight. Install the side bolts until 2–3 turns from tight. Now back your studs out at least ½ turn or until the thread is just sticking out of the top of the nut. Apply a high-torque and oil-safe RTV to the crossbolts and tighten them until hand tight. Wait the listed amount of time for your RTV to begin your torque sequence.
7	Torque down your main studs. We are using Xotic Performance studs for our builds: the M10s get 23.5, 46.5, and 70 ft-lbs; the M8 studs and cross bolts get 10, 20, and 30 ft-lbs. VAP may have different torque specs for their studs. If you are using the OE-style TTY bolts, those specs for the M10s are 25 Nm, 57 Nm, and then 70°, and the M8s are 15 Nm, 33 Nm, and 75°. Test the crankshaft by turning it every torque sequence to be sure it isn't binding up. After assembly, ensure your windage tray will fit (there will likely be one stud at the back that will touch. Clearance the windage tray with a Dremel or die grinder here).
8	Take a screwdriver or small pry bar and set up a dial indicator on the crankshaft nose. Place the pry bar between the crankshaft and Number 3 cap and gently pry it forward, then gently pry it rearward to take your crankshaft end play measurement.
9	Assemble your pistons and rods. Using assembly lube, lightly oil the wrist pins and insert the C-clips, install your piston rings and lightly oil them with standard motor oil, then clean your big ends and install your bearing.

10	Using a piston ring compressor and a wooden mallet, tap the pistons into their bore with the arrows pointing to the front of the block. Install the big end on the crankshaft using Plastigage and confirm your oil clearance, then clean them up and apply a liberal amount of assembly lube to the bearings and install. Torque down one rod at a time and then rotate the engine a revolution to ensure nothing is binding. After you have installed the first two pistons, set them so their journal is at 6:00 and use feeler gauges to check your side clearance on your connecting rods. Do this for the other 6 pistons with the same sequence.
11	Install your windage tray, oil pump, oil pump outlet pipe, and oil pump pickup tube.
12	Install your high pressure fuel pump camshaft.
13	Install your static lower timing chain guide and lower timing chain tensioner.
14	Install your lower timing chain with the oil pump drive sprocket, ensuring to align the colored link with the crankshaft and the lines (not the grooves) on the high pressure fuel pump camshaft.



Step 14 — Colored link to the crankshaft. On the high pressure fuel pump camshaft, the lines — not the grooves.



Proper HPFP Camshaft Alignment

Note: There is a lot of fighting over the orientation of the FoMoCo logo on the camshaft. This does not have any bearing on how the camshaft is timed, either line will work. However, if it helps your sanity, many keyboard warriors will tell you the logo should be right side up.

There may be an additional colored link on your lower timing chain that is unused on the 5.0L. This is only used on the 3.0L, which shares these parts.

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