

KIRK ENGINES, INC.

Instructions for Installation of Crankshaft Counter Weight Plate on Kohler K-Series Models K301, K321, and K341 Single Cylinder Engines

A 50% RBF (Reciprocating Balance Factor) is a good compromise in reducing transmitted vibrations from a single-cylinder engine. For reasons unknown, Kohler engineers under-balanced these engines (only 27% RBF on the K301) such that they transmit unnecessarily high reciprocating forces about the vertical axis, contributing to discomfort felt by the operator. Some engines were fitted with balance gears bringing the RBF up to 50%, but these balancers are usually removed during rebuilds as they have a reputation of failing catastrophically. Addition of this Crankshaft Counter Weight Plate (hereafter referred to as the Plate) restores the 50% reciprocating balance factor to engines that were originally equipped with balance gears and have subsequently had them removed. It also greatly improves those engines that never had balance gears installed. An improvement in crankshaft balance yields lower main bearing loads contributing to longer engine life, reduced transmitted vibrations and thus greater operator comfort.

This modification requires use of machine tools; a milling machine with rotary table and a drill press is necessary, along with the skill in operating such machinery. It is highly recommended that a professional machinist with both the machinery and experience be allowed to perform the following operations.

All machining operations are made on the outer face of the PTO-side counterweight of the stock Kohler crankshaft. This is the counterweight adjacent to the camshaft gear and is the narrower of the two counterweights.

Procedure

1. Chuck crankshaft such that full access is available to the PTO counterweight. Machine the outer face of the counterweight to the dimensions shown in Figure 1, striving for approximately 80% cleanup of the surface. Usually a cut of .050 to .070 inches deep will result in acceptable cleanup. A flat, smooth surface is desired. At this point your crankshaft should appear as that shown in Figure 2 (less the two holes at this stage).

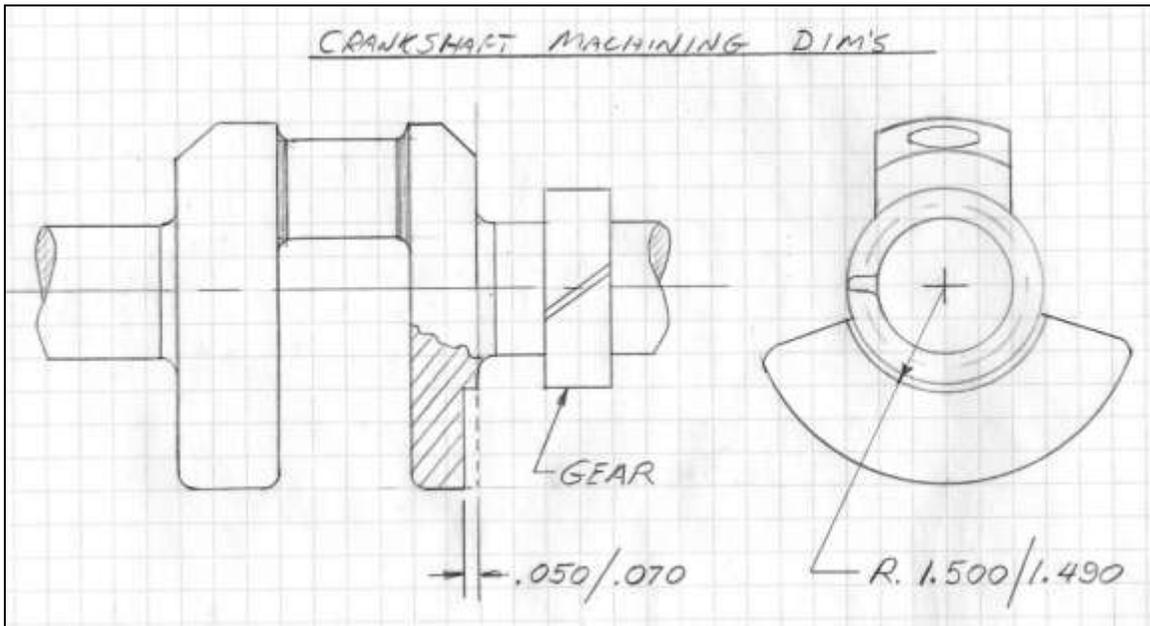


Figure 1

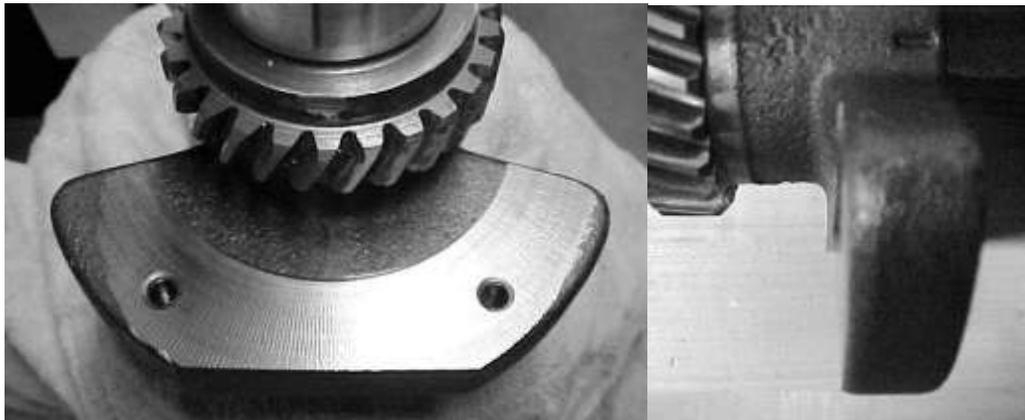


Figure 2

2. Place the Plate on the machined surface tight against the 1.5 radius. Center by aligning the end overlap of Plate with the ends of the crankshaft counterweight as shown in Figure 3. Clamp Plate in this position. The Plate now forms a drill guide for the next operation.



Figure 3

3. In the drill press (or milling machine), drill 2 each, .2010 dia. (#7 drill) holes through the crankshaft counterweight using the Plate as a drill guide. With Plate removed, tap both drilled holes 1/4 – 20 threads through. BE CAREFUL! – the nodular iron crankshaft material is hard and taps can be readily broken. Proceed slowly with a sharp tap and use plenty of oil.
4. Clamp the Plate to drill press table and using a countersink tool, machine the two holes (one side of Plate only) such that the supplied grade 8 screw heads protrude .040 inches maximum from the Plate surface. The finished Plate should appear as shown in Figure 4.

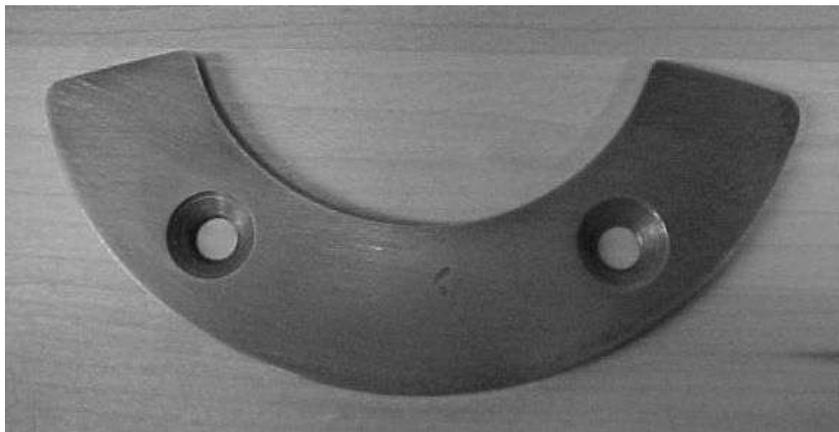


Figure 4

5. Clean the crankshaft surface and threaded holes of chips and oil. Clean the Plate and supplied screws, being certain no oil remains on screws. Place the Plate on counterweight surface and align the holes.

6. **VERY IMPORTANT!** Apply Loctite #271 high strength thread locking compound (the red stuff) liberally to full length of threaded holes. Insert and tighten both screws to approximately 80-100 inch-pounds torque. Failure to properly execute this step can lead to potential engine destruction! Your finished crankshaft should appear as shown in Figure 5. Allow several hours for Loctite to cure before installing crankshaft.

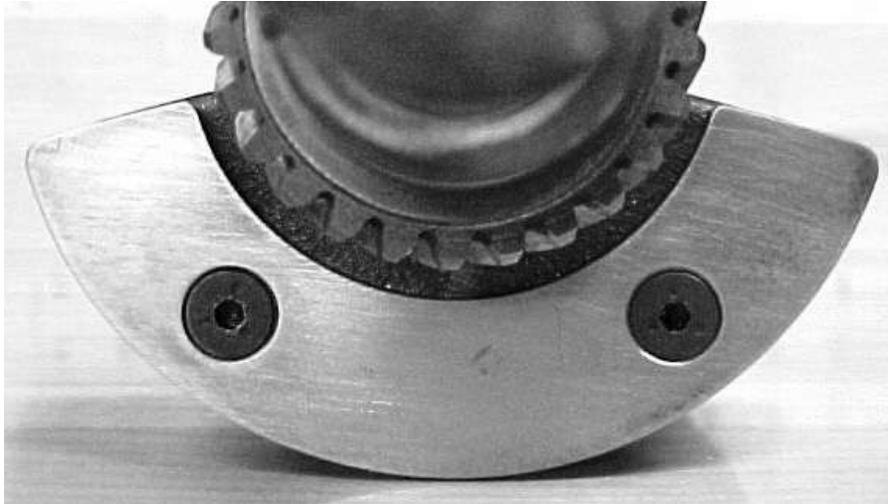


Figure 5

If Plate has been properly centered on counterweight (Step 2, Figure 3) it is not necessary to re-balance crankshaft. The Kohler production specifications accurately aligned the counterweight center of mass 180 degrees from the crankpin centerline. Accurate installation of the Plate will not affect this relationship.

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