

# service bulletin

M93-4 Supersedes M90-7 Technical Portions Are FAA Approved
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12 February 1993

**SUBJECT: CRANKSHAFT COUNTERWEIGHTS****MODELS****AFFECTED:** IO-360, L/TSIO-360, E-185, E-225, O-470, IO-470, TSIO-470, IO-520, IO-550, L/TSIO-520, TSIO-550 AND TSIOL-550.

The purpose of this service bulletin is to stress the importance of thorough inspection and proper assembly of crankshaft counterweights and their associated parts.

**COMPLIANCE:** At overhaul or when the crankshaft is removed from the engine.

Remove the counterweights from the crankshaft, clean, and press the old bushings from the counterweight bores and the crankshaft hanger flange. Removing and replacing bushings with makeshift tools can result in damage to the crankshaft and counterweights. A special tool for removing and replacing the bushings is supplied by Borroughs Tool and Equipment Corp., 2429 North Burdick, Kalamazoo, Michigan, 49007.

**WARNING...Improper installation of the bushings, retaining plates or retaining rings will cause engine failure.**

Carefully inspect the counterweight bores for signs of wear. Special attention should be given to the wear area shown in Figure 1. Measure the counterweight bores. Counterweight bores which exceed the dimension shown in Figure 1 must be discarded. Oversize counterweight bushings are NOT permitted. Opposing pairs of counterweights must match in weight within two grams. If either counterweight is worn or damaged, it will be necessary to discard both on that cheek and procure a matched pair for replacement.

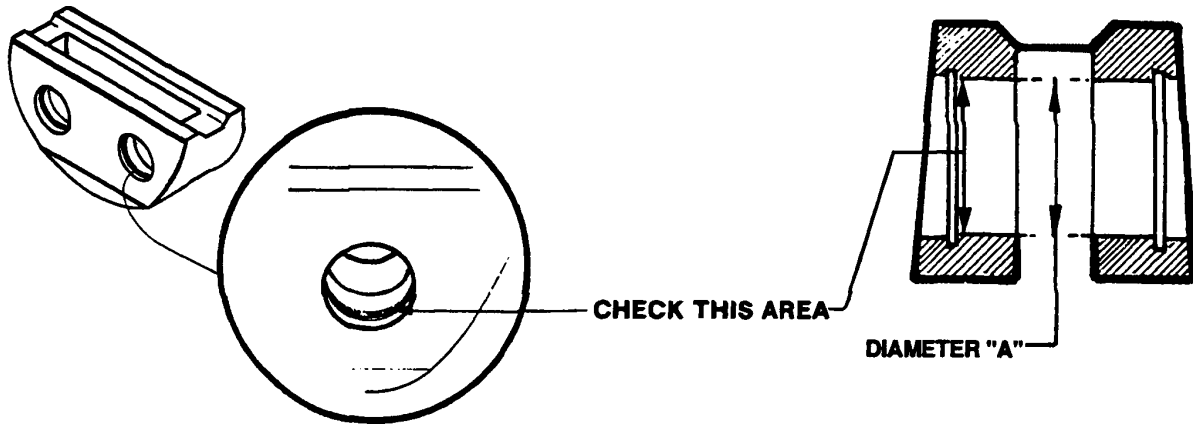
Check the retaining ring groove in each counterweight for wear, damage, distortion or other improper conditions. Any of these conditions would require replacement of the counterweight.

All counterweight and crankshaft blade bushings, pins, retaining rings and plates must be replaced 100% at overhaul.

The counterweight plates have a small protruded point, (.001-.007) which provides an interference fit, (see Figure 2). Upon installation, check the counterweight plates for an actual interference fit in the bushing bore. **DO NOT USE PLATES WHICH HAVE A LOOSE FIT.** Proper installation of the retaining rings is very important. Make sure the rings are seated fully in the bushing bore grooves with the sharp edge side of the retaining ring facing outboard.

Assure that the proper pins and plates are installed. Reference TCM Service Bulletin M89-24 or current revision as applicable.

*(continued)*



ENGINE MODEL	DIAMETER "A"
All "E" Series, 470, 520 and 550	.8745 - .8755
All 360	1.000 - 1.001

FIGURE 1

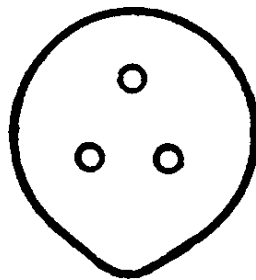


FIGURE 2