



Service Instruction

ENGINE COMPONENTS, INC.

S.I. No.: **03-4**

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Title: REPLACEMENT CRANKSHAFT GEARS FOR LYCOMING ENGINES

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Revision: **0**

Technical Portions are FAA DER Approved.

1.0 MODELS AFFECTED:

Installation eligibility for the Airmotive Engineering Corp. (ECi) replacement gears is provided in the following table:

PART NUMBER	INSTALLATION ELIGIBILITY
AEL19646 *AEL19646P005 *AEL19646P010	<p>O-235-C1, C1B, C1C, C2A, C2B, C2C, E1, E1B, E2A, E2B, F1, F1B, F2A, F2B, G1, G1B, G2A, G2B, H2C, J2A, J2B, K2A, K2B, K2C, L2A, L2C, M1, M2C, M3C, N2A, N2C, P1, P2A, P2C, P3C</p> <p>O-290-D, D2, D2A, D2B, D2C</p> <p>O-320-A1A, A1B, A2A, A2B, A2C, A2D, A3A, A3B, A3C, B1A, B1B, B2A, B2B, B2C, B2D, B2E, B3A, B3B, B3C, C1A, C1B, C2A, C2B, C2C, C3A, C3B, C3C, D1A, D1B, D1C, D1D, D1F, D2A, D2B, D2C, D2F, D2G, D2H, D2J, D3G, E1A, E1B, E1C, E1F, E1J, E2A, E2B, E2C, E2D, E2E, E2F, E2G, E2H, E3D, E3H</p> <p>IO-320-A1A, A2A, B1A, B1B, B1C, B1D, B1E, B2A, C1A, C1B, D1A, D1B, D1C, E1A, E1B, E2A, E2B, F1A</p> <p>AIO-320-A1A, A1B, A2A, A2B, B1B, C1B</p> <p>LIO-320-B1A, C1A</p> <p>AEIO-320-D1B, D2B, E1A, E1B, E2A, E2B</p> <p>O-340-A1A, A1B, A2A, B1A, B2A</p> <p>O-360-A1A, A1C, A1D, A1F, A1F6, A1G, A1G6, A1H, A1H6, A1P, A2A, A2D, A2E, A2F, A2G, A2H, A3A, A3D, A4A, A4D, A4G, A4J, A4K, A4M, A4N, A4P, B1A, B1B, B2A, B2B, B2C, C1A, C1C, C1E, C1F, C1G, C2A, C2B, C2C, C2D, C2E, C4F, C4P, D1A, D2A, D2B, F1A6, G1A6, J2A</p> <p>HO-360-A1A, B1A, B1B, C1A</p> <p>IO-360-A1A, A1B, A1B6, A1C, A1D, A1D6, A2A, A2B, A2C, A3B6, B1A, B1B, B1C, B1D, B1E, B1F, B1F6, B1G6, B2E, B2F, B2F6, B4A, C1A, C1B, C1C, C1C6, C1D6, C1E6, C1F, C1G6, D1A, E1A, F1A, K2A, L2A, M1A, M1B</p> <p>LO-360-A1H6</p> <p>AIO-360-A1A, A1B, A2A, A2B, B1B</p> <p>HIO-360-A1A, A1B, B1A, B1B, C1A, C1B, D1A, G1A</p> <p>LIO-360-C1E6</p> <p>TIO-360-A1A, A1B, A3B6</p> <p>AEIO-360-A1A, A1B, A1B6, A1C, A1D, A1E, A1E6, A2A, A2B, A2C, B1B, B1D, B1F, B1F6, B1G6, B1H, B2F, B2F6, B4A, H1A, H1B</p> <p>LHIO-360-C1A, C1B</p> <p>IO-720-A1A, A1B, B1A, B1B, C1B, D1B, D1C</p>



AEL19647	<p>O-540-A1A, A1A5, A1B5, A1C5, A1D, A1D5, A2B, A3D5, A4A5, A4B5, A4C5, A4D5, B1A5, B1B5, B1D5, B2A5, B2B5, B2C5, B4A5, B4B5, D1A5, E4A5, E4B5, E4C5, F1A5, F1B5, G1A5, G2A5, H1A5, H2A5, J3A5</p> <p>IO-540-A1A5, B1A5, B1B5, B1C5, C1B5, C1C5, C2C, C4B5, C4C5, C4D5, D4A5, D4B5, D4C5, E1A5, E1B5, E1C5, G1A5, G1B5, G1C5, G1D5, G1E5, G1F5, J4A5, K1A5, K1B5, K1C5, K1D5, K1E5, K1F5, K1G5, K1H5, K1J5, K1K5, K2A5, L1A5, L1C5, M1A5, M1C5, N1A5, R1A5, T4B5, V4A5, W1A5, AB1A5, AE1A5</p> <p>HIO-540-A1A</p> <p>AEIO-540-D4A5, D4B5, D4C5, D4D5, L1B5</p>
AEL19648	<p>IO-540-E1A5, E1B5, E1C5, K1B5, K1E5, K1H5, P1A5, S1A5, AA1A5, AA1B5, AC1A5</p> <p>TIO-540-A1A, A1B, A1C, A2A, A2B, A2C, C1A, E1A, G1A, H1A, J2B, U2A, W2A, AE2A, AF1A, AF1B, AG1A, AH1A, AJ1A, AK1A</p> <p>LTIO-540-J2B, U2A, W2A</p>
AEL19649	<p>O-360-A1AD, A1F6D, A1G6D, A1LD, A3AD, A4AD, A4JD, A5AD</p> <p>IO-360-A1B6D, A1D6D, A3B6D, A3D6D, C1E6D, J1AD, J1A6D</p> <p>LO-360-A1G6D</p> <p>TO-360-A1A6D, C1A6D, F1A6D</p> <p>HIO-360-E1AD, E1BD, F1AD</p> <p>LTO-360-A1A6D</p> <p>TIO-360-C1A6D</p> <p>LHIO-360-F1AD</p> <p>O-540-H1A5D, H1B5D, H2A5D, H2B5D, J1A5D, J1B5D, J1C5D, J1D5D, J2A5D, J2B5D, J2C5D, J2D5D, J3A5D, J3C5D, L3C5D</p> <p>IO-540-C4D5D, K1A5D, K1B5D, K1E5D, K1F5D, K1G5D, K1J5D, L1A5D, L1B5D, M1A5D, M1B5D, M2A5D, T4A5D, T4B5D, T4C5D, U1A5D, U1B5D, V4A5D, W1A5D, W3A5D</p> <p>TIO-540-F2BD, J2BD, K1AD, N2BD, R2AD, S1AD, T2AD, V2AD, AA1AD, AB1AD, AB1BD</p> <p>LTIO-540-F2BD, J2BD, K1AD, N2BD, R2AD, V2AD</p> <p>IO-720-A1BD, B1BD, C1BD, D1BD, D1CD</p>

* An Alternate Means of Compliance to Lycoming Service Bulletin 475B and Airworthiness Directive 91-14-22 has been approved by the FAA using crankshaft gears with oversize flanges. Details and installation instructions are available in ECi Service Instruction 98-5-2.

2.0 BACKGROUND: The Airmotive Engineering Corp., which is owned by Engine Components, Inc. has FAA Engineering Design Approval and PMA for a range of replacement parts for aircraft piston engines. Two crankshaft gears have been approved through extensive testing under FAA Project PM4401SC-E,



and two were approved through calculations and testing in PM7364SC-E. These crankshaft gears are approved as direct replacement parts for the engine models listed above. Because the mounting flanges of the gears can be tight in the crankshaft bore and the crankshaft dowel can be tight or otherwise bind in the hole in the gear mounting flange, Lycoming has issued Service Bulletin 475B to require scallops be cut in the mounting (pilot) flange of the gear so that a feeler gage can be inserted to verify the gear is tight against the bottom of the gear recess in the crankshaft. ECi gears are manufactured with these scallops already present, but anyone installing one of these gears should refer to Lycoming SB 475B.

Lycoming SB 475B details a repair to the gear recess at the rear end of the crankshaft. The FAA has also issued AD 91-14-22 that mandates the requirements of SB 475B be accomplished. The repair process detailed in SB 475B requires precision machining of the bore of the gear recess, chrome plating the bore and then grinding the bore back to standard size. The FAA has granted an Alternate Means of Compliance to this procedure that only requires the gear recess bore to be ground to an oversize, and a gear with oversize pilot flange be installed. Procedures for the use of the gears shown above with an asterisk are provided in ECi Service Instruction 98-5-2, which can be accessed on the ECi web site, <http://www.eci2fly.com>, or by contacting ECi Customer Service.

- 3.0 PROCEDURES:** The new crankshaft gear should fit within the pilot recess without apparent looseness. The .0010 inch loose to .0005 tight fit prescribed in the Lycoming overhaul data may seem somewhat tight, but the gear should be able to be seated with minor tapping with a brass or plastic face mallet. The inspections specified in Lycoming SB 475B should be followed to insure the gear is flat against the flat surface at the bottom of the recess. A new bolt must be used when this gear is replaced or reinstalled, and bolt torque specifications and additional assembly information are provided in Lycoming Overhaul Manual