



Service Instruction

ENGINE COMPONENTS, INC.

S.I. No.: 02-1

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Title: CONTINUING AIRWORTHINESS DATA AND INSTALLATION ELIGIBILITY OF ECI CRANKCASES FOR TCM FRONT DRIVE ENGINES

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Technical Portions are FAA DER Approved.

- 1.0 **SUBJECT:** ECI Crankcases for TCM Front Drive Engines.
- 2.0 **BACKGROUND:** ECI has completed design documentation and endurance testing according to FAR Part 33.49 and durability testing according to FAR Part 33.19 and Approved Test Plans for a range of engine parts including replacement crankcases for TCM front alternator drive engines. This Service Instruction details some features of the ECI crankcase and documents the installation eligibility.
- 3.0 **FEATURES AND OVERHAUL REQUIREMENTS:** The ECI replacement crankcase is cast using 357 Aluminum Alloy in permanent molds. This alloy upgrade is slightly different than the alloy used by TCM to cast their crankcases, but is selected to help resist the tendency for crankcases to crack in use. ECI strongly recommends that all crankcases be inspected and repaired (overhauled) by an Approved FAA Repair Station at engine overhaul. These crankcases may be weld repaired, but only FAA Repair Stations that have specific FAA Approval may accomplish these major repairs according to FAA Approved or Accepted data.

Particular attention must be paid to the crankshaft bores to insure proper crush of the half-shell sleeve bearings. The tolerance on most crankcase crankshaft bearing bores is ± 0.0005 inch. This very small tolerance is almost impossible to quantify using mechanical measuring equipment. ECI relies on air gages to verify these dimensions, and has found this technique to be reliable.

When crankcases are planed at the parting line during repair (prior to line-bore to re-establish bearing bore tolerances), the location of some gear centers are moved relative to the centerline of the rear main crankshaft and camshaft journals. These gear centers must be re-established to ensure proper gear backlash and operation. All of these repairs must be accomplished according to FAA Approved or Accepted data.

There are some ambiguities related to specific engine installations or due to changes after the original installation. Accordingly, ECI may not have all the information necessary to install all of the crankcase studs to meet the particular installation requirements. In some cases, ECI may elect to provide some studs not installed, so the installer may have to select the appropriate studs and install them to meet the requirements. Generally, the studs in question are either engine mount studs or accessory studs, and ECI will provide the correct studs whenever the stud configuration is determined to be improper for the installation.

The ECI crankcase has been endurance tested to show compliance with FAR Part 33.49 and was subsequently durability tested to show compliance with FAR Part 33.19. According to the protocol established by the FAA Engine and Propeller Directorate for durability requirements, the recommended overhaul period for this crankcase is the same as the TCM crankcase it replaces.

- 4.0 **ENGINE & SPEC DESIGNATION:** In the Eligibility column that follows, the engine and spec number are combined in the method currently employed by TCM. For example, the engine designation TSIO-520BB and the spec no. 5B is identified as "TSIO-520BB5B". The basic ECI front drive crankcase part number is AEC653923. The numbers shown in the first column of the installation eligibility listing are dash numbers of the basic part (drawing) number.



ECi Dash #	TCM part #	Eligibility (including spec. number)
1	654128-1	TSIO-520-BB5B, BB9B, BB10B, BB11B, BB12B, BB13B, BB14B, BB15B, BB16B, BB17B, BB18B, BB19B, BB20B, BB21B, BB22B, BB23B, BB24B, EB4B, EB5B, EB8B, EB9B, EB14B, EB15B, EB16B, EB17B, EB18B, EB19B, EB20B, EB21B, JB1B, JB2B, JB4B, JB13B, JB14B, KB1B, KB2B, NB1B, NB2B, NB4B, NB5B, NB6B, NB8B, NB17B, NB18B, NB19B, NB20B, NB21B, NB22B, NB23B, NB24B, NB31B, NB32B, NB34B, NB35B, VB1B, VB2B, VB4B, VB1F, VB2F, VB4F, VB5F, VB6F, VB7F.
2	654128-2	TSIO-520-B5B, B9B, B10B, B11B, B12B, B13B, B14B, B15B, E4B, E5B, E8B, E9B, E14B, E15B, E16B, E17B, E19B, E20B, E22B, E23B, J1B, J2B, J4B, J9B, J10B, J12B, J13B, J14B, K1B, K2B, K5B, N1B, N2B, N4B, N5B, N6B, N8B, N9B, N10B, N12B, N13B, N14B, N16B, N19B, N20B, N21B.
3	654128-3	TSIO-520-L1B, L4B, L7B.
4	654128-4	TSIO-520-LB1B, LB4B, LB6B, WB6B, WB3F, WB5F.
5	654128-5	IO-520-MB1B, MB2B.
6	654128-6	IO-520-M1B, M2B.
7	654128-7	TSIO-520-BE2F, BE2G. TSIO-550-A (all spec no's), B1B, B2B, C1B, C3B, C4B, E1B, E2B, E3B, E4B, E5B, E9B.
8	654128-8	TSIO-520-JB9B, JB10B, JB12B, KB3B, KB4B, NB9B, NB10B, NB12B, NB13B, NB14B, NB16B, NB25B, NB26B, NB27B, NB28B, NB29B, NB30B, NB33B.
9	654129-1	IO-520-CB3B, CB6B, CB34B, CB37B, CB38B.
10	654129-2	IO-520-CB7B, CB8B, CB9B, CB12B, CB13B, CB14B, CB15B, CB18B, CB19B, CB20B, CB21B, CB22B, CB23B, CB25B, CB26B, CB27B, CB28B, CB29B, CB30B, CB31B, CB33B, CB36B, CB39B, CB40B, CB41B, CB8F, CB9F, CB8W.
11	654129-3	IO-520-C3B, C6B, C9B, C12B, C14B, C15B.
12	654129-4	IO-520-C7B, C8B, C10B, C11B, C13B, C16B, C17B.
13	654130-1	IO-550-C8B, C9B, C11B, C12B, C13B, C15B, C16B, C17B, C18B, C19B, C21B, C22B, C25B, C26B, C27B, C33B, C34B, C35B, C37B, C41B, C1F, C2F, C3F, C6F, C2U.
14	654130-2 654130-3	IO-550-B11B, B12B, B13B, B14B, B15B, B16B, B17B, B18B, B19B, B20B, B21B, B22B, B23B, B24B, B25B, B26B, B27B, B28B, B31B, B32B, B34B, B36B, B38B, B40B, B41B, B42B, B43B, B45B, B46B, B48B, B49B, B51B, B52B, B53B, B54B, B61B, B63B, B66B, B68B, B1F, B2F, B3F, B4F, B5F, B6F, B9F, R4B, R5B.
15	654130-4	IO-550-A2B, A3B, A4B, A5B, A6B, A7B, A8B.
16 w/dowels	654130-5	IO-550-C31B, C36B, C40B, C43B.
17 w/dowels	654130-6	IO-550-B39B, B56B, B58B, B59B, B60B, B62B, B64B, B67B.
18	654130-7	IO-550-N6B, N8B, N14B.
19	654130-8	IO-550-G1B, G2B, G4B, G5B, G6B, N1B, N7B, P1B, P2B, P3B.
20	654130-9	IO-550-N2B, N13B.



ECi Dash #	TCM part #	Eligibility (including spec. number)
21 w/dowels	654130-10	IO-550-G7B.
22	654130-11	IO-550-R1B, R2B, R3B.
23	654130-14	IO-550-G8B.
24	654131-1	TSIOL-550-A3B, A5B, A6B, A8B, A9B, A1G.
25	654131-2	TSIOL-550-B1B.
26	654131-3	TSIOL-550-A7B.
27	654131-4	TSIOL-550-C1B.
28	654132-1	IO-520-B6B, BA2B, BA3B, BA6B, BA10B, BA11B, BA19B, BA22B, BA23B, BA26B, BA27B, BA30B, BA36B, BA37B.
29	654132-2	IO-520-BB3B, BB6B, BB10B, BB11B, BB22B, BB23B, BB30B, BB31B, BB38B, BB40B, BB43B, BB55B, BB56B, BB57B, BB58B, BB59B, BB64B. IO-550-B35B.
30	654132-3	TSIO-520-DB1B, DB3B.
31	654132-4	TSIO-520-D1B, D3B, D7B, D8B.
32	654132-5	IO-520-BA12B, BA14B, BA17B, BA20B, BA21B, BA24B, BA25B, BA28B, BA29B, BA31B, BA32B, BA33B, BA34B, BA35B, BA36B, BA39B, BA14M.
33	654132-6 654132-8	IO-520-BB12B, BB15B, BB18B, BB20B, BB21B, BB24B, BB25B, BB26B, BB27B, BB28B, BB29B, BB32B, BB33B, BB34B, BB35B, BB37B, BB41B, BB42B, BB44B, BB45B, BB46B, BB47B, BB48B, BB49B, BB50B, BB51B, BB52B, BB53B, BB60B, BB61B, BB65B, BB12M, BB16U, BB18U.
34	654132-7	TSIO-520-UB1B, UB5F, UB6B, UB7B, UB8B, UB9B, UB10B, UB12B, UB14B, UB15B, UB18B, UB20B, UB2F, UB3F, UB4F.
35 w/dowels	654132-9	TSIO-520-UB1B, UB5F, UB6B, UB7B, UB8B, UB9B, UB10B, UB12B, UB14B, UB15B, UB17B, UB18B, UB19B, UB20B, UB2F, UB3F, UB4F.
36 w/dowels	655792	IO-550-N10B, N11B, N12B, N15B.
37 w/dowels	655274	IO-550-B44B, B47B, B50B, B57B.
38 w/dowels	654989	IO-550-C29B, C32B, C38B, C42B.
39 w/dowels	655044	IO-550-B33B, B55B, B65B.
40	642509	TSIO-520-U (all spec no's).