

MANUAL 320

SUPPLEMENT TO LYCOMING OVERHAUL AND PARTS MANUALS

LYCOMING IO-320-E2A ENGINE MODIFIED UNDER CHAMPION STC# SE7CE

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CHAMPION AIRCRAFT CORPORATION

Osceola, Wisconsin

1. APPLICABILITY. This supplement applies to all Lycoming IO-320-E2A engines which have been modified according to Champion Aircraft Corporation STC# SE73E (Inverted oil system). Installation of the inverted oil system is noted in the front of the engine logbook. Normal recommendations as per the Lycoming Overhaul Manual should be followed except for the inverted oil system, the procedure for which is given below.
2. OVERHAUL PERIOD. Due to the limited available service experience with the Champion inverted oil system, it is recommended that the overhaul procedure as described in Section .3 be accomplished when engine total time equals 400 hours and every 400 hours thereafter. The accompanying Champion Form # 360 (Owner's Overhaul Report - Inverted Oil System - Lycoming IO-320-E2A Engine Modified as per STC# SE73E) should be completed and sent to Champion Aircraft Corporation when overhaul is accomplished. It is expected that Champion Aircraft will, upon receipt of sufficient service data, extend the recommended overhaul period accordingly.
3. OVERHAUL PROCEDURE. It is recommended that the following procedure be accomplished at the times specified in Section .2 of this manual. Refer to Figure .4-1 for nomenclature and part numbers.

#### DISASSEMBLY AND INSPECTION

- 1) Remove lower cowl.
- 2) Drain engine oil.
- 3) Loosen intake pipe hose clamps and slide hoses clear of oil sump.
- 4) Remove fuel injector from mounting pad on oil sump.
- 5) Remove large hex plug and attached line from bottom of sump.
- 6) Remove peripheral oil sump bolts and oil sump. Discard gasket.
- 7) Check 2-1936 swinging pickup for freedom of swing through 180°.
- 8) Check trap door in 4-1460 baffle for freedom of movement.
- 9) Remove four bolts holding 1-9835 covers to 4-1460 baffle; Remove 1-9835 covers.
- 10) Through baffle opening around pickup tube remove cotter keys and nuts holding 2-1932 tube to crankcase. Remove tube. Discard cotter keys and gasket.
- 11) Unsafety and remove 1-9836 oil return tube nut and washer.
- 12) Remove 4-1460 baffle assembly. Discard gasket.

- 13) Inspect baffle assembly visually for indications of loose rivets, excessive wear at pickup tube screen contact surface, or other items.
- 14) Inspect oil baffle trap door hinge. Hinge should not be excessively sloppy. Door movement along hinge should not exceed 1/16 in. and door should close against baffle. The hinge pin should not be worn into hinge more than 1/32 in.
- 15) Separate 2-1932 tube and 2-1936 swinging pickup by removing cotter key and pin. Discard cotter key.
- 16) Inspect 2-1932 tube and 2-1936 swinging pickup for cracks using dye penetrant method. Check for wear due to contact with 1-9835 covers. Maximum allowable groove depth on pickup tube is 0.010 in.
- 17) Measure diameter of 2-1932 tube barrel and 2-1936 swinging pickup socket (mating surfaces). Allowable dimensions are:
  - Min. barrel outside diameter: 0.497
  - Max. socket inside diameter: 0.510
- 18) Reject any parts which do not meet above conditions.
- 19) For parts information see Section .4.
- 20) Clean parts and remove all gasket material.

ASSEMBLY

NOTE: Use all new gaskets and cotter keys. See Table .3-1 for torque limits.

- 1) Apply film of No. 3 Permatex Seal to mating surfaces of 4-1460 baffle and crankcase. Install Lycoming 62972 sump gasket.
- 2) With 1-9835 covers removed, install baffle onto crankcase.
- 3) Install 4 temporary guide bolts in oil sump bolt holes and position baffle accordingly.
- 4) Install 1-9836 nut and AN960-916 washer on 2-1930 oil return tube. Torque and safety. MAXIMUM TORQUE = 130 - 160 IN. LB.
- 5) Attach 2-1932 tube to crankcase through access hole in baffle. Use Lycoming gasket 60820. Torque and cotter key mounting nuts.
- 6) Install 2-1936 swinging pickup, lubricating with engine oil before assembly. Insure that swinging pickup can swing freely 180° without interference. Minimum clearance between swinging pickup screen and

baffle surface is 1/16 in. At full travel, swinging pickup tube should rest on trap door edge, not on baffle surface. If necessary, distort screen to obtain above clearance.

- 7) Install 1-9835 covers to seal as much as possible around pickup tube, removing material from sealing edges of covers if necessary. Maximum clearance = 0.020 in.
- 8) Check operation of baffle trap door.
- 9) Inspect.
- 10) Remove 4 temporary guide bolts.
- 11) Apply film of No. 3 Permatex Seal to mating surfaces of baffle and oil sump. Install oil sump using Lycoming 68972 sump gasket. Check full travel of swinging pickup through hex plug opening in bottom of sump before installing oil sump bolts.
- 12) Install and tighten sump bolts. Recheck full travel of swinging pickup.
- 13) Reinstall large hex plug and attached line in bottom of sump.
- 14) Install intake hoses and fuel injector.
- 15) Inspect.
- 16) Add required engine oil and check for leaks around sump.
- 17) Replace lower cowling.

TABLE 3-1

TORQUE LIMITS

| Item                    | Torque, in. lb. |
|-------------------------|-----------------|
| 10-32 Cap Screws        | 40              |
| 1/4 Nuts and Cap Screws | 75              |
| 1-9836 Nut              | 130 - 160       |

4 PARTS INFORMATION

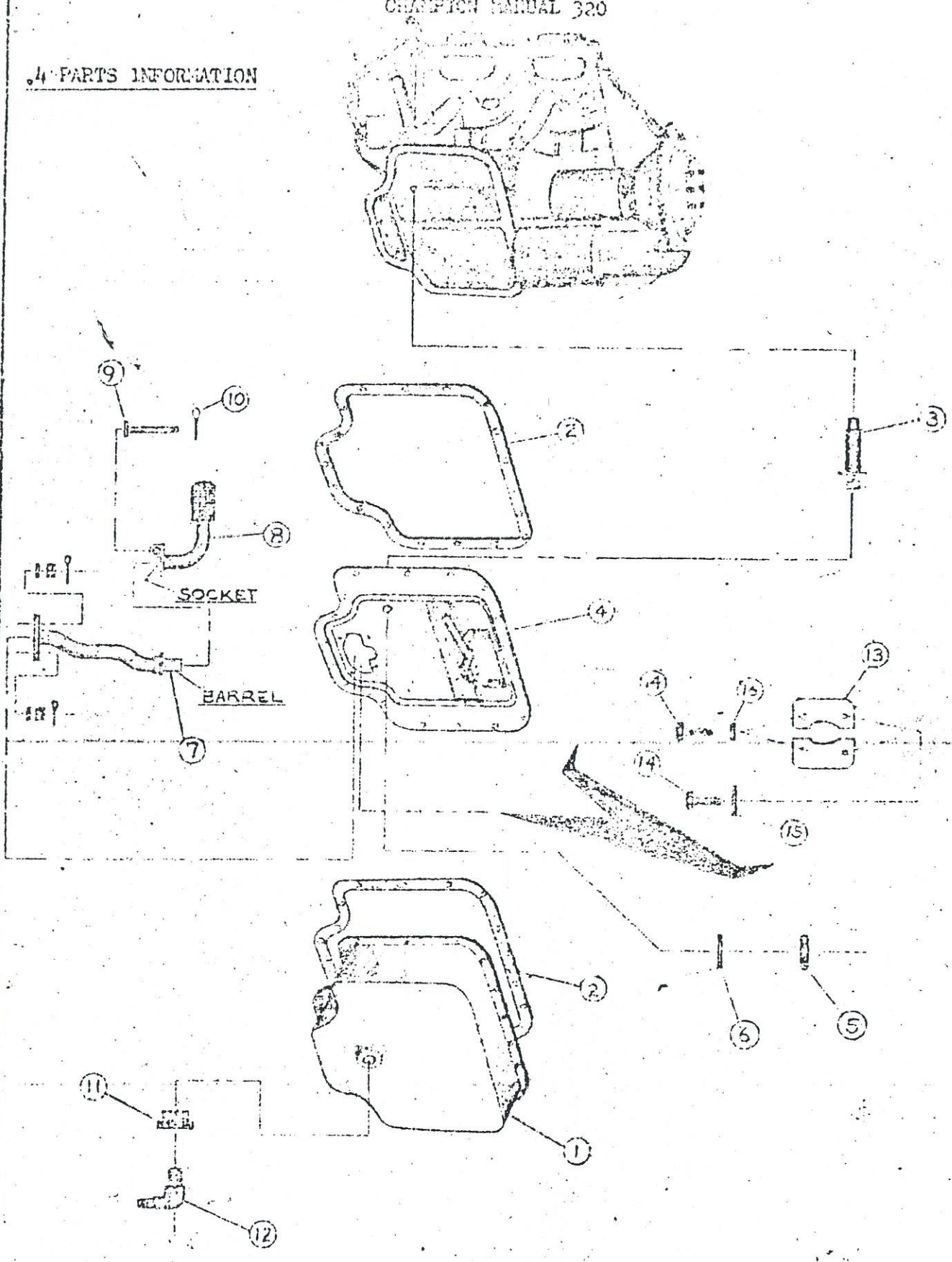


FIGURE 4-1

INVERTED OIL SYSTEM

TABLE 4-1

## PARTS LIST - INVERTED OIL SYSTEM

| Ref. | Nomenclature                | Part No.  | No. Req'd. |
|------|-----------------------------|-----------|------------|
| 1    | Sump, oil                   | 72352 *   | 1          |
| 2    | Basket, sump                | 68972 *   | 2          |
| 3    | Tube, oil return            | 1-1930    | 1          |
| 4    | Baffle assembly             | 4-1460    | 1          |
| 5    | Gut, oil return tube        | 1-9836    | 1          |
| 6    | Washer, oil return tube     | AN760-615 | 1          |
| 7    | Pickup tube                 | 2-1932    | 1          |
| 8    | Swinging pickup             | 2-1936    | 1          |
| 9    | Pin, swinging pickup        | AN392-31  | 1          |
| 10   | Socket key, swinging pickup | AN330-2-2 | 1          |
| 11   | Hex plug, sump bottom       | 1-9843    | 1          |
| 12   | Elbow, sump bottom          | AN322-6D  | 1          |
| 13   | Cover, baffle opening       | 1-9835    | 2          |
| 14   | Bolt, baffle cover          | AN3-4A    | 4          |
| 15   | Washer, baffle cover        | AN970-3   | 2          |
| 16   | Washer, baffle cover        | AN760-10  | 2          |

\* Lycoming Part Number

CHAMPION AIRCRAFT CORPORATION  
Osceola, Wisconsin

OWNER'S OVERHAUL REPORT - INVERTED OIL SYSTEM - LYCOMING IO-320-E2A

ENGINE MODIFIED AS PER STC# SE70E

Note: This form is to be completed by aircraft owner or mechanic at time of inverted oil system overhaul.

1. Name of Owner \_\_\_\_\_
2. Address of Owner \_\_\_\_\_  
\_\_\_\_\_
3. Aircraft Registration No. \_\_\_\_\_
4. Date of Aircraft Manufacture \_\_\_\_\_
5. Aircraft Serial No. \_\_\_\_\_
6. Engine Serial No. \_\_\_\_\_
7. Engine Total Time \_\_\_\_\_
8. Engine Time since last oil system overhaul \_\_\_\_\_
9. Estimated percentage of time spent in aerobatic flight (pitch over 30°, roll over 60°) \_\_\_\_\_
10. If overhaul was not done at recommended overhaul time, please explain.  
\_\_\_\_\_  
\_\_\_\_\_
11. If replacement or repair of any part of the oil system was necessary, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
12. Please list any comments on Champion's inverted oil system.  
\_\_\_\_\_  
\_\_\_\_\_

Signature of Owner (or Mechanic)

Date

\_\_\_\_\_

\_\_\_\_\_