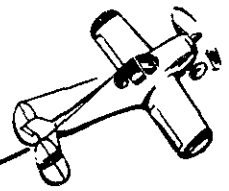
Ercoupe MEMORANDUM

ERCOUPE SERVICE MEMORANDUM No. 54

SUBJECT: Installation of the Trim-O-Matic



The following instructions will deal with the installation of the Trim-O-Matic, hereafter referred to as "T-O-M." So that the T-O-M will operate as desired, the complete control system must be checked for looseness and all worn bolts and bushings must be replaced. Our memo's 35, 35A, 55, 55A, and 57 deal with this subject. A free operating control system, not a loose one, will allow the T-O-M to perform most effectively. Notice the manner of assembly when unpacking the T-O-M, so that when this unit is installed the parts will be assembled in the proper sequence. The unit will be obtainable through our distributor dealer organization as SK-20 with blueprint 415-52175. (Change "A".)

A. Installation:

1. Remove rug, toe board, control column plate, floor board, and seat cushion. Take out the bucket seat by removing three pins at the rear of the seat. Save all hardware, because most of it must be replaced.

2. Remove fiber guide 415-52056, (which surrounds pushrod 415-52036), located on rear of main spar adjacent to elevator bell crank. Drill out rivet just above guide and leave hole blank.

3. Place the template (dimensions same as 415-52184 Plate) with lettered side aft, in the bay where guide was removed. Refer to B P for proper position of this template before attempting to drill. One edge should be against lower edge of upper cap strip, the inner edge against gusset 415-52184. With template firmly in place, drill #30 hole through web at template pilot hole. Remove template and enlarge this hole in the web with a 3/8" drill. CAUTION: DO THIS IN STEPS USING 3 16", 1/4", and 3/8" DRILLS. Install plate assembly 415-52184. Check that the plate assembly bears flat against web. It may be necessary to use a round file and elongate the 3/8" hole slightly to obtain the desired fit. If so, file web carefully and remove burrs. Do *not* leave sharp notches in sides of hole.

4. After plate is fitted, drill two holes with a No. 30 drill (.1281), and insert buttons or bolts and nuts to hold plate assembly 415-52184. Using a No. 11 drill (.191), pierce the hole in the lower inboard corner. This is the only 3/16" hole in the plate assembly. Insert bolt AN 3-5A from the front of the spar using the additional hardware called out on the blueprint. Drill the remaining #30 holes. Drive the AN 426-AD 4-5 rivets in the six (6) countersunk holes and the AN 470-AD 4-5 rivets in the balance. Note one hole (3/8" dia.) in plate is not used for T-O-M.

5. Replace guide 415-52056 using two 1 16" washers between guide and web, and longer screws, AN 526-10-10. In some installations it may be necessary to trim washers under guide so as to allow them to fit flat on the web.

6. Disassemble parts from 415-52185 yoke assembly, and reassemble through plate assembly 415-52184 as shown in blueprint 415-52175. Screw knob all the way on, to compress spring completely. (Acorn nut and position indicator adjustment will be described later.) Leave 3/16" dia. bolt out of yoke until later.

7. Attach bracket assembly 415-52176 with arms 415-52177 and 415-52180 bolted to it on the lower cap strip with two small "C" clamps. Place bracket assembly 415-52176 so forward end is flush with the cap strip. Swing the arms upward and check clearance with the pushrod; allow a ¼", minus .1 16", plus ⅛", clearance between the arms and pushrod. Locate the attaching hole on the forward end of bracket (5/16") from forward edge and ⅜" from inboard edge of bracket, and drill #9 hole (.1960) through cap strip lip. Bolt forward end of bracket with prescribed hardware (as shown on blueprint), and using same edge distance drill #9 (.1960) hole through the rear lip of the lower cap strip and bracket. RECHECK ¼" CLEARANCE EXISTS BETWEEN ARMS AND PUSHROD WHEN THEY ARE IN POSITION SHOWN IN PRINT, BEFORE DRILLING SECOND HOLE.

8. Slide arms back and forth in yoke assembly to check free movement. Bend fork of yoke with pliers, if necessary, to obtain clearance, exercising care not to damage the threaded end of rod or weld.

9. Mark the top of 415-52188 adjustment knob with pencil and back off exactly four turns, this neutralizes T-O-M adjustment. Neutralize airplane control systems (See Memo 35) and install 415-52182 stop assembly on pushrod, leaving nuts loose. Remove spring 415-52181 from arms, swing forward arm (415-52180) into yoke, and install 3/16" bolt and spacer in yoke.

10. With both systems still neutral, pull forward arm rearward until it touches the bolt in the yoke assembly. Move the stop assembly forward until it touches this arm. Bolt stop assembly in place with the provided hardware being sure stop pin is horizontal. Rotate wheel completely to the right, and install guard plate 415-52192 and clamp around pushrod, with guard plate vertical. Rotation of pushrod permitted by ball type rod ends should be "average out" when positioning stop and guard plate.

11. With control wheels again in neutral, install spring 415-52181. Rotate wheels to the right and back off six more turns on the T-O-M adjusting knob, or 10 complete turns from the full compress position. Put flat nut on adjusting shaft and tighten until it just touches the knob. Install indicator 415-52191, and acorn nut, tightening acorn so it holds indicator horizontal.

12. Check for control system freedom, being sure nothing in the T-O-M interferes with full control motion. Check tightness of nuts. Do not expect T-O-M to neutralize system on the ground, as controls have too much friction for the spring except when vibration and air loads of flight assist it. Lubricate T-O-M per maintenance instructions.

13. Replace floor and other parts of airplane removed. Install seat bucket, but leave screws loose until after flight tests.

14. Install plate 415-52190 on floor mat.

B. Flight Tests:

1. After all parts have been installed, fly airplane with T-O-M installed. It should be possible to trim airplane for straight flight with any power setting and at airspeeds from 60 M.P.H. to over 120 M.P.H. Wheel should return to neutral in less than a second when rotated and released. DO NOT expect to fly in and out of turns by rotating the control. This is a trim device (like the trim tab), not a maneuvering control.

2. If airplane is wing heavy with T-O-M, remove spring 415-52181 and flight test for excessive wing heaviness per Service Memo 35. If T-O-M still will not trim airplane when it is trimmed without spring, loosen nuts on stop and guard plates, move stop and re-tighten. Moving stop backward makes airplane left wing heavy. A motion of 1 16" of the stop equals about two turns on the adjusting knob.

3. If the T-O-M spring is not strong enough to overcome the system friction, the source of the excess friction should be located and corrected.

C. Maintenance:

1. The spacer in the yoke and the stop pin should be lubricated with light grease at 100 hour inspections, and the system checked for excessive wear at the same time. The screw on which the adjusting knob travels should have a drop of light oil every 100 hours.

2. The action of the T-O-M depends upon good fits at three points on the arms and a true surface at the flanges, where the arms ride on the pins. The bushings, 415-52178 at the pivot of the arms are self-lubricating and replaceable. The spacer in the yoke should be replaced if worn; do *not* use an oversize bolt here. If the working surfaces on the arms become badly worn, the arms must be replaced to eliminate the slop. The same is true of the hardened pin on the stop assembly.