TITLE

SKY-TEC STARTER INSTALLATION

EFFECTIVITY

<table>
<thead>
<tr>
<th>Model</th>
<th>Serial Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>172R</td>
<td>17280001 thru 17281560</td>
</tr>
<tr>
<td>172S</td>
<td>172S08001 thru 172S10978</td>
</tr>
</tbody>
</table>

DESCRIPTION

This modification kit provides instructions and parts to replace the Lamar PM2401 Starter and the Sky-Tec 149-NL Starter with a new Sky-Tec 149-NL/EC Starter. For airplanes that replace the Lamar PM2401 Starter, a new starter relay is also installed.

APPROVAL

FAA approval has been obtained on technical data in this publication that affects airplane type design.

REFERENCE

SB07-80-01R1

WEIGHT AND BALANCE INFORMATION

For airplanes that replace the Lamar PM2401 Starter with a new Sky-Tec 149-NL/EC Starter:

- MODEL: 172R/172S
- WEIGHT CHANGE: -1.9 pounds
- ARM: -25.26 inches
- RESULTANT MOMENT: +48 Inch-Pounds
- MOMENT/1000: +0.048 Inch-Pounds

For airplanes that replace the Sky-Tec 149-NL Starter with a new Sky-Tec 149-NL/EC Starter:

Negligible

Original Issue: April 2, 2007
NOTE: The parts below cover installation for one airplane when the Lamar PM2401 Starter is replaced with a new Sky-Tec 149-NL/EC Starter.

<table>
<thead>
<tr>
<th>NEW P/N</th>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>OLD P/N</th>
<th>DISPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK172-80-01A</td>
<td>1</td>
<td>Kit, consisting of the following parts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN525-8R10</td>
<td>1</td>
<td>Screw</td>
<td>Same</td>
<td>Discard</td>
</tr>
<tr>
<td>AN525-10R10</td>
<td>5</td>
<td>Screw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN525-10R12</td>
<td>1</td>
<td>Screw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN970-3</td>
<td>6</td>
<td>Washers</td>
<td>Same</td>
<td>Discard</td>
</tr>
<tr>
<td>LW31-1.16</td>
<td>1</td>
<td>Bolt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS20426AD3-3A</td>
<td>4</td>
<td>Rivet</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>MS21047L3</td>
<td>2</td>
<td>Nutplate</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>S1781-2</td>
<td>2</td>
<td>Connector (Standoff)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>S2209A5A</td>
<td>2</td>
<td>Tie Strap (Blue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2209-5</td>
<td>20</td>
<td>Tie Strap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2574-2</td>
<td>1</td>
<td>Nut, Nylon</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>STD1410</td>
<td>3</td>
<td>Nut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD475</td>
<td>4</td>
<td>Lock Washer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X61-0027</td>
<td>1</td>
<td>Starter Relay</td>
<td>X61-0012</td>
<td>Discard</td>
</tr>
<tr>
<td>0555324-22</td>
<td>1</td>
<td>Seal</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>0570512-8</td>
<td>1</td>
<td>Start Cable Assembly</td>
<td></td>
<td>Discard</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Instructions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For airplanes that will replace the Sky-Tec 149-NL Starter with a new Sky-Tec 149-NL/EC Starter, the parts that follow will be necessary:

<table>
<thead>
<tr>
<th>NEW P/N</th>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>OLD P/N</th>
<th>DISPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2209A5A</td>
<td>2</td>
<td>Tie Strap (Blue)</td>
<td>Same</td>
<td>Discard</td>
</tr>
<tr>
<td>S2209-5</td>
<td>20</td>
<td>Tie Strap</td>
<td>Same</td>
<td>Discard</td>
</tr>
<tr>
<td>S2574-2</td>
<td>1</td>
<td>Nut, Nylon</td>
<td>Same</td>
<td>Discard</td>
</tr>
</tbody>
</table>
For all airplanes, the part that follows will also be necessary:

<table>
<thead>
<tr>
<th>NEW P/N</th>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>OLD P/N</th>
<th>DISPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>149-NL/EC</td>
<td>1</td>
<td>Starter</td>
<td>Lamar PM2401 (Lycoming P/N 31B22207) or Sky-Tec 149-NL</td>
<td>Discard</td>
</tr>
</tbody>
</table>

The materials, or equivalent, listed in this table may be necessary.

<table>
<thead>
<tr>
<th>NAME</th>
<th>NUMBER</th>
<th>MANUFACTURER</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alodine 1132 Marker</td>
<td>U074093 (or equivalent)</td>
<td>Cessna Aircraft Company Cessna Parts Distribution 5800 East Pawnee PO Box 1521 Wichita, KS 67218 USA</td>
<td>To apply to bare metal.</td>
</tr>
</tbody>
</table>

ACCOMPLISHMENT INSTRUCTIONS

1. Prepare the airplane for maintenance.
   A. Make sure that all switches are in the OFF/NORM position.
   B. Disconnect electrical power from the airplane.
      (1) Disconnect external electrical power.
      (2) Disconnect the airplane battery.
   C. Attach maintenance warning tags to the battery and external power receptacle that have "DO NOT CONNECT ELECTRICAL POWER - MAINTENANCE IN PROGRESS" written on them.

2. Remove the upper and the lower engine cowl to get access to the starter. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 71, Cowl - Maintenance Practices.)

3. Remove the existing starter and do the modification necessary to install the new starter.
   A. To replace the Lamar PM2401 Starter with a Sky-Tec 149-NL/EC Starter, do the steps that follow:
      (1) Begin the modification to the engine baffle installation as follows:
          (a) (Refer to Figure 1, Detail A.) Remove the four screws from the air intake duct that goes through the hole in the 0509079-2 Seal. Keep the screws.
          (b) Remove and keep the 0509079-2 Seal.
          (c) Remove and keep the 0555324-19 Closeout.
      (2) Remove the accessory bracket from the starter as necessary. Keep the attaching hardware. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Alternator - Maintenance Practices.) (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)
      (3) (Refer to Figure 1, Detail A.) Remove and discard the 31B22207 (Lamar PM2401) Starter and attaching hardware. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)
      (4) Continue the modification to the engine baffle installation as follows:
          (a) (Refer to Figure 1, View B-B.) Do a modification to the 0555324-19 Closeout as follows:
              1. Trim the 0555324-19 Closeout to make a space for the 149-NL/EC Starter start cable to go through the engine baffle.
With a Number 3 drill, change the dimension of each of the two outboard holes from 0.194 inch in diameter to 0.213 inch in diameter as shown.

Drill a new Number 10 (0.193-inch diameter) hole in the 0555324-19 Closeout.

Drill two Number 40 (0.098 inch-diameter) holes with a countersink in the 0555324-19 Closeout for the MS20426AD3-3A Rivets that attach the MS21047L3 Nutplate.

Deburr the five holes and apply Alodine to bare metal.

Install the MS21047L3 Nutplate to the 0555324-19 Closeout with the two MS20426AD3-3A Rivets.

Drill a new Number 10 (0.193-inch diameter) hole in the 0555250 Right Forward Baffle Assembly.

Drill two Number 40 (0.098 inch-diameter) holes with a countersink on the forward side in the 0555250 Right Forward Baffle Assembly for the MS20426AD3-3A Rivets that attach the MS21047L3 Nutplate.

Deburr the three holes and apply Alodine to bare metal.

Install the MS21047L3 Nutplate to the 0555250 Right Forward Baffle Assembly with the two MS20426AD3-3A Rivets.

Replace the X61-0012 Starter Relay with the X61-0027 Starter Relay as follows:

Remove and discard the X61-0012 Starter Relay. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Power Junction Box - Maintenance Practices.)

Install the X61-0027 Starter Relay. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Power Junction Box - Maintenance Practices.)

Begin the installation of the new 0570512-8 Start Cable Assembly as follows:

Do the routing of the 0570512-8 Start Cable Assembly along the existing wire bundle and inside the black conduit to the 149-NL Starter. Attach the 0570512-8 Start Cable Assembly to the existing wire bundle as necessary with S2209-5 Tie Straps to the wire bundle.

Connect the ring terminal on the end of the 0570512-8 Start Cable Assembly to the stud on the X61-0027 Starter Relay.

Torque the stud nut on the X61-0027 Starter Relay to 40 inch-pounds, +5 or −5 inch-pounds.

Install the power junction box cover. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Power Junction Box - Maintenance Practices.)

To replace the Sky-Tec 149-NL Starter with a Sky-Tec 149-NL/EC Starter, do as follows:

Remove the screws that attach the left front baffle to the engine assembly. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)
(2) Remove the baffle from the engine. Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)  

(3) Disconnect the large electrical wire, which is the positive lead, at the starter. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)  

(4) Remove the bolt that attaches the accessory bracket to the starter. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Alternator - Maintenance Practices and Chapter 80, Starter - Maintenance Practices.)  

NOTE: It may be necessary to loosen the accessory bracket at the alternator.  

(5) Remove the one LW31-1.16 Bolt and the three STD1410 Nuts that attach the starter to the crankcase and remove the Sky-Tec 149-NL Starter from the engine. Keep the attachment hardware. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)  

4. (Refer to Figure 1, Detail C.) Install the 149-NL/EC Starter as follows:  

A. If not already installed, install the S2574-2 Nylon Nut on the S Terminal. Tighten the S2574-2 Nylon Nut until it touches the S Terminal stud nut.  

NOTE: The 149-NL/EC Starter comes with a jumper wire between the S Terminal stud and the power terminal stud. You will use this jumper because without the jumper wire the starter motor will not receive power to operate.  

B. (Refer to Figure 1, Detail C.) With the three STD1410 Nuts, one LW31-1.16 Bolt, and four STD475 Lock Washers, install the 149-NL/EC Starter. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)  

CAUTION: BEFORE YOU TORQUE THE ACCESSORY BRACKET, TORQUE THE NUTS AND THE BOLT THAT ATTACH THE 149-NL/EC STARTER TO THE ENGINE.  

C. Torque the mounting bolt and the nuts to 204 inch-pounds. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 20, Torque Data - Maintenance Practices.)  

D. Attach the accessory bracket to the starter as follows:  

(1) Attach the accessory bracket to the starter with the kept attaching hardware, and torque to 204 inch-pounds. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 80, Starter - Maintenance Practices.)  

(2) Attach the accessory bracket to the alternator with the kept attaching hardware, and torque to from 235 to 255 inch-pounds. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 24, Alternator - Maintenance Practices.)  

5. Connect the 0570512-8 Start Cable Assembly as follows:  

CAUTION: INSTALL ONLY THE METRIC NUT THAT IS SUPPLIED WITH THE 149-NL/EC STARTER. THE POWER TERMINAL IS A METRIC STUD.  

A. (Refer to Figure 1, Detail C.) Connect the ring terminal to the power terminal stud on the 149-NL/EC Starter.  

B. Torque the power terminal stud nut to 50 inch-pounds, +5 or −5 inch-pounds, and install the protective boot that is on the 0570512-8 Start Cable Assembly over the terminal.  

C. (Refer to Figure 1, Detail C.) Attach the 0570512-8 Start Cable Assembly to the 149-NL/EC Starter with the two S2209A5A Tie Straps, one S2209-5 Tie Strap, and two S1781-2 Connectors (Standoffs).  

6. (For airplanes that replace the Lamar PM2401 Starter with the new Sky-Tec 149-NL/EC Starter) Complete the installation of the engine baffles as follows:  

A. Put the new 0555324-22 Seal in position, and make marks for the three screw holes.  

B. Drill three Number 10 (0.193-inch diameter) holes in the 0555324-22 Seal.
C. (Refer to Figure 1, Detail A.) Put the 0555324-19 Closeout, 0555324-22 Seal, and 0509079-2 Seal in position on the engine baffle.

D. With three AN525-10R10 Screws and two AN970-3 Washers, begin the installation of the 0555324-19 Closeout and the 0555324-22 Seal on the engine baffle.

**NOTE:** No washer is required at the screw location on the 0555324-19 Closeout where the 0555324-22 Seal is not attached.

7. With the four AN970-3 Washers, one AN525-10R12 Screw, two AN525-10R10 Screws, and one AN525-8R10 Screw, install the 0555324-19 Closeout and the 0555324-22 Seal, and install the 0509079-2 Seal on the engine baffle.

8. Install the four kept screws in the air intake duct that goes through the hole in the 0509079-2 Seal.

9. Remove maintenance warning tags from the battery and the external power receptacle, and connect the battery.

10. Install the upper and the lower engine cowls. (Refer to the Model 172 Series 1996 and On Maintenance Manual, Chapter 71, Cowl - Maintenance Practices.)

11. Do an operational test of the starter system.

12. (For airplanes that replace the Lamar PM2401 Starter with the new Sky-Tec 149-NL/EC Starter) Do a revision of the weight and balance information for the airplane to incorporate the effect of this modification.

13. Make an entry in the airplane logbook stating that this Modification Kit has been installed.
**NOTE 1:** All dimensions are shown in inches.

**NOTE 2:** Make sure that these screws do not touch the exhaust heat shield when they are installed.

**NOTE 3:** No AN970–3 Washer is required at this location.

Figure 1. 172 Sky-Tec Starter Installation (Sheet 1)
NOTE 4: Change the dimension of each of the two holes from 0.194 inch in diameter to 0.213 inch in diameter.

NOTE 5: Trim here to make a space for the 149-NL/EC Starter start cable to go through the engine baffle.

NOTE 6: Install the MS21047L3 Nutplate on the aft side of the 0555324–19 Closeout.

Figure 1. 172 Sky-Tec Starter Installation (Sheet 2)
NOTE 7: Install the S1781–2 Cable Connector (Standoffs) in a position that does not let the start cable assembly move and that gives the maximum distance possible between the 149–NL/EC Starter and the start cable assembly.

NOTE 8: The jumper wire is supplied with the starter.
Figure 2. 0570512-8 Start Cable Assembly Installation (Sheet 1)