



VSP-105  
March 25, 1991 S/M

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**VENDOR SERVICE PUBLICATION**

**TO:** Piper International Distributors, Domestic Sales  
Dealers, Factory Direct Dealers, Parts Distributors  
and Piper Field Service Facilities

**MODELS AFFECTED:** All Aircraft Powered by Lycoming Direct Drive Engines

**SUBJECT:** Textron Lycoming Light Weight Starter Installation  
Instructions - Lycoming Service Instruction No. 1447A

**PURPOSE:** To distribute the attached Lycoming Service Instruction  
which provides installation information for the light  
weight starters now available from Textron Lycoming.

*We Are Flying*

**Williamsport Plant**

Textron Lycoming/Subsidiary of Textron Inc.  
652 Oliver Street  
Williamsport, PA 17701 U.S.A.

# SERVICE INSTRUCTION

DATE:

January 18, 1991

Service Instruction No. 1447A  
(Supersedes Service Instruction No. 1447)  
Engineering Aspects are  
FAA Approved

SUBJECT:

Textron Lycoming Light Weight Starter Installation Instructions

MODELS AFFECTED:

All Textron Lycoming **direct drive** piston engines except IO-720 and those engines with alternators or compressors mounted on left side.

TIME OF COMPLIANCE:

At owner's discretion.

Textron Lycoming is pleased to announce a new Light Weight Starter as a product improvement. The starters are available in kit form with applicable parts pertinent to your particular engine requirements. The Kits are P/N 05K21302-2 (12/14 pitch, 24V.), P/N 05K21302-1 (12/14 pitch, 12V.), P/N 05K21302-4 (10/12 pitch, 24V.), and P/N 05K21302-3 (10/12 pitch, 12V.). Items included in each kit are as follows:

**Starter Kit - P/N 05K21302-2 (12/14 pitch, 24V.)**

| Qty. | Part No.   | Description  |
|------|--|--|
| 1    | LW-16152   | Spacer, Starter/Crankcase  |
| 1    | 05K21194   | Kit, Shim (Contains 1 each<br>P/N 01L21158 & P/N 01L21159 Shims) |
| 1    | 31B21064   | Starter Assy., 12/14 pitch, 24V.                                 |
| 1    | Copy of latest edition of Service Instruction<br>No. 1447. |  |

**Starter Kit - P/N 05K21302-4 (10/12 pitch, 24V.)**

| Qty. | Part No.   | Description  |
|------|--|--|
| 1    | LW-16152   | Spacer, Starter/Crankcase  |
| 1    | 05K21194   | Kit, Shim (Contains 1 each<br>P/N 01L21158 & P/N 01L21159 Shims) |
| 1    | 31B21211   | Starter Assy., 10-12 pitch, 24V.                                 |
| 1    | Copy of latest edition of Service Instruction<br>No. 1447. |  |

**Starter Kit - P/N 05K21302-1 (12/14 pitch, 12V.)**

| Qty. | Part No.   | Description  |
|------|--|--|
| 1    | LW-16152   | Spacer, Starter/Crankcase  |
| 1    | 05K21194   | Kit, Shim (Contains 1 each<br>P/N 01L21158 & P/N 01L21159 Shims) |
| 1    | 31A21198   | Starter Assy., 12/14 pitch, 12V.                                 |
| 1    | Copy of latest edition of Service Instruction<br>No. 1447. |  |

**Starter Kit - P/N 05K21302-3 (10/12 pitch, 12V.)**

| Qty. | Part No.   | Description  |
|------|--|--|
| 1    | LW-16152   | Spacer, Starter/Crankcase  |
| 1    | 05K21194   | Kit, Shim (Contains 1 each<br>P/N 01L21158 & P/N 01L21159 Shims) |
| 1    | 31A21210   | Starter Assy., 10-12 pitch, 12V.                                 |
| 1    | Copy of latest edition of Service Instruction<br>No. 1447. |  |

After removing old starter and replacing with new Light Weight Starter, see Figure 4 for installation, check pinion to ring gear clearance at several locations on the ring gear. Gross variations indicate a bent or out of round starter ring gear. The starter ring gear must be replaced before proceeding with installation.

Pinion to ring gear clearance is shown in Figure 1. When the pinion is retracted (disengaged) the gap should be .055 or greater between the pinion and the ring gear. If clearance is less than .055, install Shim P/N 01L21158 and Shim P/N 01L21159. If the clearance is more than .055, no shims are required. Refer to Figure 2 for location if shims are being installed.

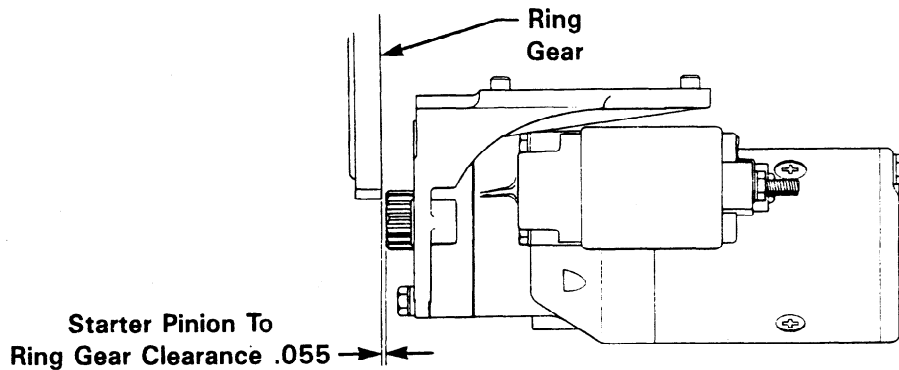


Figure 1. Pinion to Ring Gear Clearance

### DISASSEMBLY/ASSEMBLY

Shim Installation, P/N 01L21158\* and P/N 01L21159\*.

\* Not sold separately. Available as Kit P/N 05K21194.

- a. Remove (3) attaching bolts from nose section of starter.
- b. Remove the pinion/sprag clutch assembly from the nose.
- c. Place the round shim P/N 01L21159 into the pocket and then replace the pinion/sprag clutch assembly in the pocket.
- d. Place the housing shaped shim P/N 01L21158 between the mounting nose and the gear housing and reassemble components.
- e. Assemble in reverse order and torque bolts to 96 in./lbs.

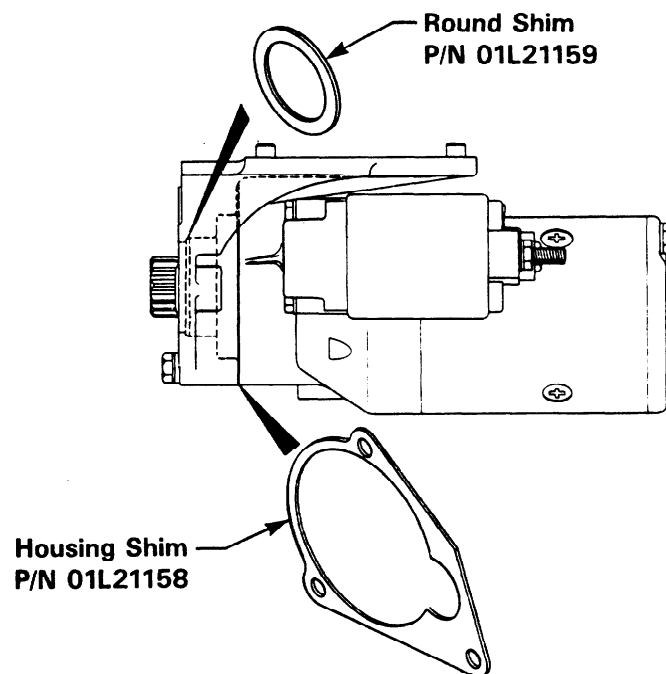


Figure 2. Shim Clearance Location

Back lash must be checked as follows. See Figure 3 for tolerance of pinion and ring gear.

After the pinion is engaged, there should be .010 back lash between the pinion and ring gear. If back lash is less than .010, install spacer P/N LW-16152 between starter and crankcase. Recheck to ascertain that tolerance is within limits. See Figure 4 for shim location.

#### NOTE

If back lash is greater than .010, do not install Spacer P/N LW-16152.

To check back lash, bend a 3/8" wide strip of metal in a "U" shape and place it behind the pinion after it has been pulled out by hand. This will hold the pinion in mesh with the ring gear to check back lash.

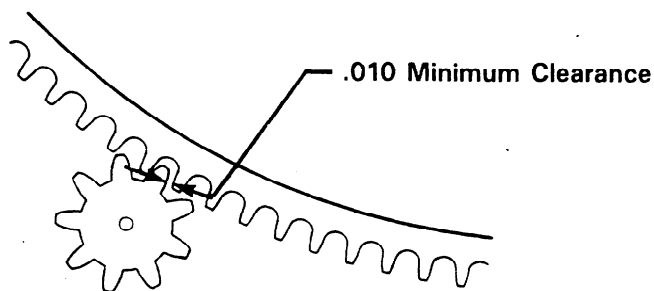


Figure 3. Ring Gear Back Lash

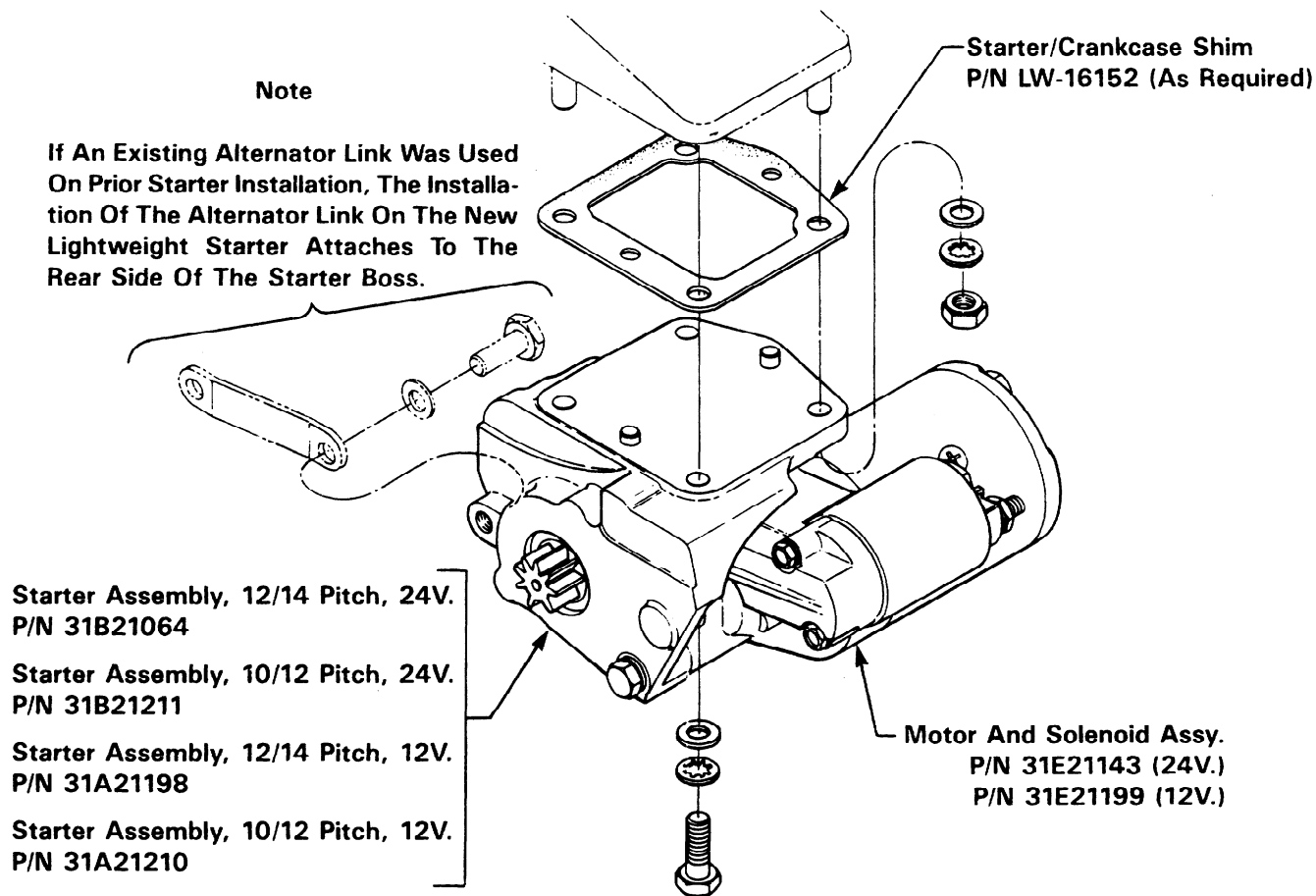
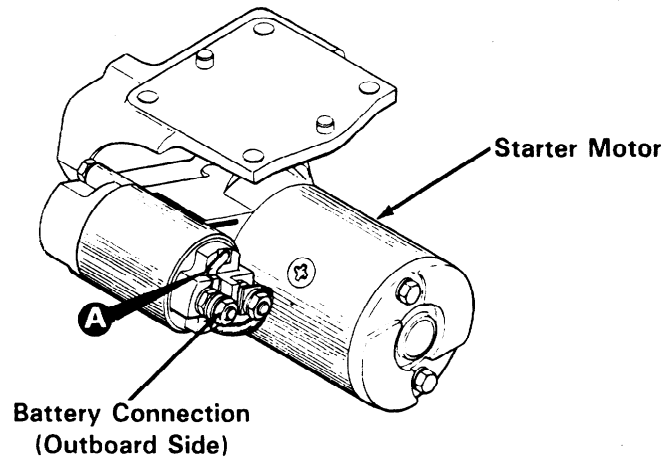
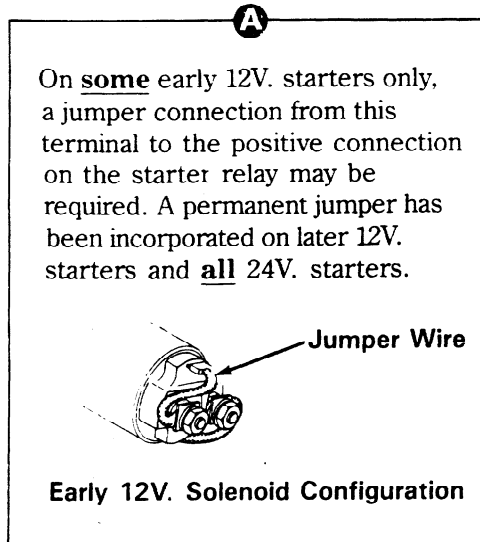


Figure 4. Starter Installation



Present Solenoid Configuration

Figure 5. Solenoid Wiring

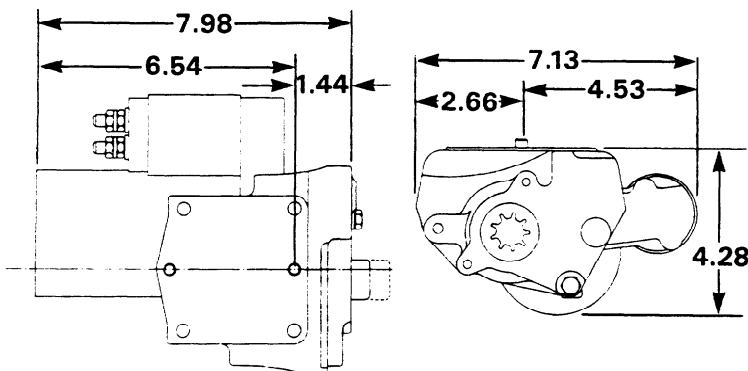


Figure 6. Textron Lycoming Light Weight Starter Dimensions

| STARTER                 | VOLTS              | WEIGHT    |
|-------------------------|--------------------|-----------|
| Textron Lycoming        | 12V.               | 11.3 lbs. |
|                         | 24V.               | 11.4 lbs. |
| Prestolite Geared       | 12V.<br>or<br>24V. | 18 lbs.   |
| Prestolite Direct Drive | 12V.<br>or<br>24V. | 17 lbs.   |

Figure 7. Starter Weight Chart

## NOTE

Ascertain that the appropriate weight difference has been recorded. (Reference Fig. 7 Weight Chart.) Some installations may require some trimming of Airframe Baffles. If this is required, an FAA Form 337 should be completed and made a permanent record of the airframe.

For troubleshooting and repair procedures refer to Textron Lycoming Light Weight Starter Component Maintenance Manual, SSP-490.

NOTE: Revision 'A' revises text, adds Kits, Figure 5 Solenoid Wiring, Starter Weights and Dimensions. 23237, 23598, 23156, 23407, 23393 — These numbers are for Textron Lycoming reference only.