# REVISION LIST

## CHAPTER 3: WING SYSTEMS

The following list of revisions will allow you to update the Legacy construction manual chapter listed above.

Under the “Action” column, “R&R” directs you to remove and replace the pages affected by the revision. “Add” directs you to insert the pages shown and “R” to remove the pages.

<table>
<thead>
<tr>
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<td>Moved fuel pump behind co-pilot seat and adjusted all hydraulic lines accordingly. Added photo.</td>
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<td>3-13b</td>
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<td>3-23</td>
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<td>Added photo showing hydraulic lines crossing main spar.</td>
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<td>Added photo and updated dimensions for hydraulic support.</td>
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<td>Updated measurement and carbon layup requirements.</td>
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<td>Updated fuel line openings through bulkhead.</td>
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<td>3-35 through 3-37</td>
<td>3/12-15-04</td>
<td>ADD</td>
<td>Add pages.</td>
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<td>3-3, 3-14, 3-16, 3-18, 3-23</td>
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<td>Added optional landing lights, part number changes to sequence valve, updated main gear hydraulic cylinder.</td>
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<td>Added and revised part numbers for Grove wheels and brakes.</td>
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Chapter 3: Wing Systems

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Note:
Optional Parts available through:
(*) Lancair Avionics
(**) Kit Components, Inc.

1. INTRODUCTION

In this chapter various systems are installed in the center wing section. A couple of sturdy padded sawhorses should be used to support the center wing section. Note that after installing some items, such as the gear doors, pitot tube, fuel pump, etc, etc you will remove and store for final assembly.

WARNING: Fuel and Hydraulic lines must be kept clean and free from dust. Cover ends.

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MARKER BEACON ANTENNA

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COMMUNICATION ANTENNA

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<td>16)</td>
<td>AN960-416</td>
<td>8</td>
<td>Washers, Flat</td>
<td></td>
</tr>
</tbody>
</table>

### Over Center Link Attachment (for both sides)

<table>
<thead>
<tr>
<th>#</th>
<th>PART NO. (P/N)</th>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>OPTIONAL ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>4705</td>
<td>4</td>
<td>Over Centerlink Attachment</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>4706</td>
<td>2</td>
<td>Over Centerlink Reinforcement Plate</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>4513</td>
<td>4</td>
<td>Over Centerlink Backing Plate</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>AN4-15A++</td>
<td>8</td>
<td>Bolts, Undrilled</td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>AN365-428A</td>
<td>8</td>
<td>Nut, Nylock</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>AN960-416L</td>
<td>8</td>
<td>Washer, Flat</td>
<td></td>
</tr>
</tbody>
</table>

### Over Center Link (for both sides)

<table>
<thead>
<tr>
<th>#</th>
<th>PART NO. (P/N)</th>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>OPTIONAL ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>4709-01</td>
<td>4</td>
<td>Shim 0.032”</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
Optional Parts available through:

(*) Lancair Avionics

(**) Kit Components, Inc.
### PART NO. (P/N) QTY DESCRIPTION OPTIONAL ITEM  
Over Center Link continued (for both sides)  
1) AN4-23A 6 Bolt, Undrilled  
2) TU-5.00-5 2 Inner Tube 5"  
3) 57-1M 2 Main Wheel Assembly  
4) AN365-428A 6 Nut, Nylock  
5) TR-GY 5.00-5 2 Tire, Main Gear  
6) AN960-416 12 Washers, Flat  

CENTER WING SECTION HYDRAULICS  
1) AN3-13A 6 Bolt, Undrilled  
2) AN3-10A 6 Bolt, Undrilled  
3) MS219-DG4 6 Clamp  
4) MS219-DG7 6 Clamp  
5) AN804-4D 2 Fittings, Tee  
6) AN818-4D 38 Fittings, Nut  
7) AN819-4D 38 Fittings, Sleeve  
8) AN822-4D 6 Fittings, Elbow  
9) AN825-4D 2 Fittings, Tee  
10) AN827-4D 2 Fitting, Cross  
11) AN832-4D 6 Fittings, Union  
12) AN833-4D 6 Fittings, Elbow  
13) AN837-4D 7 Fittings, Elbow  
14) AN924-4D 15 Fittings, Nut  
15) BG03-4NJ 20 Hose Fittings  
16) R703 130 in. Flexible Hydraulic Line  
17) AN365-1032A 12 Nut, Nylock  
18) PH-250 1 (1/4" x 3.5" x 1.5") Phenolic Block  
19) PH-250 2 (1/4" x 3" x 3") Phenolic Block  
20) 5052 240 in. 1/4" Tubing, Aluminum  
21) AN960-10 12 Washer, Flat  

LANDING/TAXI LIGHTS  
1) 4228 1 Landing/Taxi Light Mount **Yes  
2) 4531 1 Landing/Taxi Light Lens **Yes  
3) 4532 1 Gasket **Yes  
4) MS35649-262 6 Nut, Check **Yes  
5) MS24694-S52 8 Screw, Machine **Yes  
6) 101-0127 4 0770346-02 1 Landing Light **Yes  
7) MS21069-06 6 Nut Plate  
8) K1000-08 8 Nut Plate  
9) 01-0770346-02 1 Landing Light **Yes  
10) 3614 6 Spring **Yes  
11) AN960-6 6 Washer **Yes  
12) 800-0001 1 (pair) Main gear landing lights (12 volt)  
13) 800-0002 1 (pair) Main gear landing lights (24 volt)  

SPEED BRAKES  
1) 4530 2 Cover Plates (only used when **Yes  
2) 4934-12 2 Precise Flight Speed Brakes, 12 Volt **Yes  
3) 4934-24 2 Precise Flight Speed Brakes, 24 Volt **Yes  
4) MS24694-S5 28 Screws, Machine (Structural)  

---

**Notes:**  
- **(not included with kit)**
- **Optional Item**
3. CONSTRUCTION PROCEDURES

A. Pitot Tube (Optional)

The pitot tube installs in the forward left access panel of the center wing section.

A 1. Install in left forward access panel as shown:

Note: Optional Parts available through Kit Components Inc.
B. Installing the Marker Beacon Antenna (Optional)
The marker beacon mounts in a joggle in the front center of the center wing section.

B 1. Drill holes to size as shown. Mount the marker beacon antenna with hardware as shown.

C. Communications Antenna (Optional)
The communications antenna installs in a joggle in the aft center of the center wing section.

C 1. Drill the 5/8” hole for the antenna connector.

Using the antenna as a template, drill the four mounting holes using a #20 drill.
Install the nutplates as shown using a #40 Drill bit and a 100° countersink for the MSC-34 pop rivets.

Note:
If you do not wish to install the marker beacon antenna (or the other antennas of the center wing section) apply three (3) BID to the joggled area and body work with micro.

Optional Parts (Antenna) available through Lancair Avionics.
D. Spar Closeout

D 1. Drill the holes for fuel supply (lower two holes) and fuel return lines (upper) in the Center main spar as shown.

D 2. Drill two holes (center two holes) for the brake lines. These two holes should be 0.375" diameter. The placement is approximately 2" from the bottom and 0.5" from the centerline.

**Note:** If you are using a Lycoming engine it is not necessary to install fuel return lines.

D 3. Trim the fuel line transition hole of spar closeout to the scribe line.

Fuel Line Transition Hole Spar Closeout
Fig. 3:D:2

Prior to bonding in the center spar closeout we suggest creating the passage for the fuel lines.

D 4. Install spar closeout using epoxy & flox using proper bonding procedures. Center the spar closeout ± 1/8".
E. Main Gear Doors

The main gear of the Legacy has two gear doors per side. The outboard gear door is mechanically actuated and the inboard gear door is actuated by a hydraulic cylinder.

Note: Prior to installing the BJ-02 into gear leg, check for paint overspray in the threads. Tap if required.

Parts shown & labeled are for left side only except as noted.

metal lock nut AN365-832A (7 pcs)

Note: some of the screws may be too short. Use MS24694-S7 where required.
Fitting the Gear Doors

**E 1.** Lightly sand all edges of the gear doors with a sanding block. Be careful not to sand through the structural plies.

**E 2.** Fit the inboard gear door by removing material off the inboard edge of the door to give 0.06 in. clearance all around.

**E 3.** Fit the outboard gear door. With the inboard gear door still in place, drop the outboard gear door in place as shown. From the inside, mark the trim line. Note that the bevelled edge of the gear door is outboard.

---

**Trimming Outboard Gear Door**

Insert tongue depressors as shown on the inboard & outboard edges.

Remove material off inboard end of gear door as required.

The door has two embedded hardpoints.

Note: The outboard edge of the gear door is bevelled. This bevel is for identification purposes only.

---

Mark and trim the outboard edge of the gear door. (You will trim approx. 2 1/8 in. for reference).
E 4. Remove 3/16 of the exposed foam core from the inboard end of inboard gear door and the outboard end of outboard gear door. We suggest using a dremel. Fill with Epoxy/Micro mix.

Micro Filling Gear Doors
Fig. 3:E:4

Inboard to close out the end of the gear door.

Gear Doors - Release Tape (Optional)

To get a perfect fit of the gear doors some body work may be required. The end result we are looking for is an even gap around the gear doors and that the gear doors transition nicely to the lower wing skin. This section describes one method for body working the gear doors.

To get an even gear door gap we suggest using electrical tape (referred to as the release tape in this section) as a “spacer”. The release applying epoxy/micro with the electrical tape in place will form an even gap between the gear doors and the lower wing skin. Because of the shape of the gear door the doors tend to back lock during the release. Some force is required to remove the gear doors following the release. The correct shape is sanded by hand using the beveled sanding block shown in this section.

Another method is to apply just one layer of a release tape and while the micro is curing, run a knife blade around the perimeter to create the even gap. Also some body work may be required to blend the gear doors to the lower wing skin.

Inboard Gear Door Release Preparation
Fig. 3:E:5
Outboard Gear Door

**Release Preparation**

Fig. 3:E:6

- **Aircraft Up**
- **Outboard Gear Door**

Apply 4 layers of electrical tape to the edge wrapping onto the lower surface.

Apply 1 layer of electrical tape to the upper surface.

Close out with 1 layer of electrical tape from the edge wrapping onto the upper surface.

After cure, clean edges up using a small sanding block as shown.

Gear Door Release

**Fig. 3:E:7**

- **A/C Up**
- **Outboard**

Mound up micro as shown

Apply weights as required

Use shot bags as necessary to weigh the gear doors down.

Wood blocks superglued to the gear door. This sets the proper height.

Apply weights as required

Cut-out a 1/2" x 3" wood piece for a handle

Bevel (3°) one side of a 1" x 1" x 3" block of wood

3-10
Gear Doors - Outboard Hardware Mounting

Outboard Gear Door Hardware Mounting

Fig. 3:E:8

E 5. Install the outboard gear attachments as shown.
Countersink the outside of the gear door for the screws.

E 6. Install the outboard gear door bracket.
Countersink the outside of the gear door for the screws.

Note: For outboard gear doors that don’t have the hard-points for the outboard gear door attachment bracket screws, it is necessary to install hard-points. Drill the holes as explained above and visually determine if the hard-points are installed. They are identified as follows:

No hard-point - There is foam between the holes.
Hard-point - There is solid e-glass in the holes.

Hard-points are installed as follows:

1. Mark screw locations on the inside of the gear door.
2. Draw a 5/8” dia. circle centered on the screw locations.
3. Remove the INSIDE LAMINATE ONLY of the circle you drew.
4. Remove 1/4” of the core around the hole and fill it with flox.

Gear Doors - Installing the Outboard Attachment Receptacles

E 7. Align the outboard gear door in the joggle. Temporarily secure in place using wood blocks and instant glue.

Gear Door Alignment

Fig. 3:E:9

E 8. From a 1/8 in. piece of phenolic, cut out four (4) pieces as shown below.

Receptacle Support

Fig. 3:E:10

\[ \frac{3}{16} \text{ Hole} \]

\[ 45^\circ \]

\[ \frac{3}{16} \]

\[ \frac{1}{16} \]

\[ 2 \]
E 9. Prepare all bonding surfaces by sanding the inside of the stub wing, receptacle and phenolic.

E 10. Install the receptacle and the phenolic with epoxy/flox.

Receptacle Support Bonding
Fig. 3:E:11

IMPORTANT: The receptacle must make contact with the attachment.

Outboard  A/C Up  Fwd

form fillets

form fillets

Receptacle, 4727-02 (2 pcs)

E 11. Secure with 3 BID using proper bonding procedures.

Receptacle Support Reinforcement
Fig. 3:E:12

Outboard  A/C Up  Fwd

Pattern for Glassing

3/4"  3/4"  3/4"

1 1/2"

3"

3/4"

cut here as shown

Final trim the BID tape after cure for a “clean look.”

Installing the Inboard Gear Door
To complete this section the aft loads pad must be installed. Refer to chapter 10 for the aft load pad installation. (The hinges for the inboard gear doors mount to the aft load pads).

Prior to mounting the hinges the inboard gear door must be final trimmed. The inboard edge of the gear door becomes the reference for installing the hinge. Note the 3/16" notch in the inboard edge of the gear door. The notch is to accept the hinge. The 0.05" sets the gap between the inboard gear door and the joggle. While these dimensions may seem confusing at first we suggest that you study the parts and try to understand the installation process before getting started.

Inboard Gear Door Hardware Mounting
Fig. 3:E:13

Metal Lock Nut, AN365-832A (6 pcs)

Flat Washer, AN960-8L (12 pcs)

Nut Plates, K1000-3 (7 pcs)

Bolt, AN3-5A (7 pcs)

Pop Rivet, MSC-34 (14 pcs)

Flat Washer, AN960-8L (7 pcs)

Bolt, AN3-5A (7 pcs)

Metal Lock Nut, AN365-832A (6 pcs)

Bracket, Inboard Gear Door

Piano Hinge, 4728 (1 pc)

Pop Rivet, MSC-34 (14 pcs)

Nut Plates, K1000-3, (7 pcs)

Machine Screw MS24694-S5 (6 pcs)

(Countersink gear doors to accept screws)

Flat Washer, AN960-8L (7 pcs)

Flat Washer, AN960-8L (7 pcs)

Flat Washer, AN960-8L (7 pcs)

Metal Lock Nut, AN365-832A (6 pcs)

Machine Screw MS24694-S5 (6 pcs)

Left Inboard Gear Shown

Outboard  A/C Up  Fwd

Align hinge 0.06" inboard of gear door.

FWD

Note: some of the screws may be too short. Use MS24694-S7 where required.

The notch for the hinge is 3/16" deep.

E 12. Install hardware in inboard gear door.
**E 13.** Identify the left indoor gear bracket (4714-01) using the figure below. The outboard edge of the bracket is a 90 deg. side, meaning the face of the bracket and the three bracket arms make a 90 deg. angle on the outboard side. Position the bracket with the two outboard holes over the two existing holes in the fuselage that are approx. 10” from the cockpit closeout rib. Hold the bracket over the holes and mark the two inboard holes. Drill the inboard holes.

**E 14.** Slide a flat washer AN960-10, onto bolt AN3-22 then through the inboard gear door bracket, 4714-01, attaching the following in this order: cylinder actuator (4787), spacer (4768), hydraulic cylinder tube assembly (4765), and finish with another flat washer (AN960-10), a castle nut (AN310-3) and secure with cotter pin MS24665-132.

**E 15.** Attach the Left Inboard Gear Door Bracket (4714-02) by aligning its holes with the outboard holes. Countersink the holes in the center wing section for the four screws and install using machine screws, MS24694-S54, with washers, AN960-10L, and nuts AN365-1032A.

**E 16.** Slide the cylinder spring (13373) onto the hydraulic cylinder tube assembly.

**E 17.** Slide a retainer (4769) onto the tube assembly (4765). Then install and tighten a female rod end (F35-14) onto the assembly.

**E 18.** Install and tighten check nut (AN316-4) followed by a female rod end (F34-14) onto the cylinder actuator.

**E 19.** Now assemble the parts for the other end of the cylinder actuator by sliding an AN3-20 bolt through the bracket doubler (4732) and the remaining parts in the following order: rod end of the cylinder actuator, through the inboard side of the left inboard gear door bracket (4726-01B), spacer (4767) rod end on the retainer spring, a flat washer (AN960-10), a castle nut (AN310-3) and secure with cotter pin MS24665-132.

**E 20.** Finish bolting the two brackets together, 4732 to 4726-01B, using each of bolts AN3-5A, AN3-7A and AN3-9A and three each of washers AN960-10 and nuts AN365-1032A.

---

### Inboard Gear Door Hydraulic Cylinder Mounting (part 1)

**Fig. 3:E:14**

- Cylinder Actuator 4787 (1 pc)
- Cylinder Spring 13373 (1 pc)
- Hydraulic Cylinder Tube Assembly, 4765 (1 pc)
- Left Inboard Gear Door Bracket 4714-01 (1 pc) - outboard side
- Cotter Pin MS24665-132 (1 pc)
- Castle Nut AN310-3 (1 pc)
- Flat Washer AN960-10 (1 pc)
- Inboard side of the left inboard gear door bracket
- Spacer, 4768 (1 pc)
- Flat Washer AN960-10 (1 pc)
- Bolt AN3-22 (1 pc)

### Inboard Gear Door Hydraulic Cylinder Mounting (part 2)

**Fig. 3:E:15**

- Bolt AN3-10A (1 pc)
- Bolt AN3-7A (1 pc)
- Bolt AN3-5A (1 pc)
- Bolt AN3-20 (1 pc)
- Female Rod End F35-14 (1 pc)
- Female Rod End F34-14 (1 pc)
- Washer, AN960-10 (3 pcs)
- Nut, AN965-1032A (3 pcs)
- Flat Washer AN960-10 (1 pc)
- Retainer Spring 4769 (1 pc)
- Rod for Hydraulic Cyl. 4786 (1 pc)
- Cylinder Actuator 4787 (1 pc)
- Cylinder Spring 13373 (1 pc)
- Bracket Left Inboard Gear Door 4726-01B (1 pc)
- Washer, AN960-10 (3 pcs)
- Nut, AN965-1032A (3 pcs)
- Castle Nut AN310-3 (1 pc)
- Flat Washer AN960-10 (1 pc)
- Bracket Doubler Inboard Gear Door 4732 (Typ)

*Note: The hydraulic cylinder operation is covered in chapter 16.*
Inboard Gear Door Hinge Mounting to Inboard Rib
Fig. 3:E:16

Note: This step must be completed after the rib is aligned. Refer to Chapter 10, Figure 10:B:2.

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F.  Main Gear Installation

The Legacy landing gear is oleo pneumatic. The landing gear is pre-aligned at the factory however the angle of the gear leg itself must be set as shown later in this section. The first 50 Legacy kits were supplied with a style 1 landing gear and from then on a style 2 landing gear. To identify, style 1 is a one piece type fork as shown and style II has a collar that bolts to the fork as shown on the left. If you have a style 1 type of fork you must comply with service bulletin SB058.

F 1.  Assemble the main gear legs as shown.

Main Landing Gear Style II
Fig. 3:F:1:b

Main Landing Gear (Exploded View)
Fig. 3:F:1

Optional Landing Lights
12 volt 800-0001
24 volt 800-0002
(Sold by the pair)

Shims are installed between forward bearing block and spar at the factory. When installing the gear remove only the aft bearing block. Check that gear fits tight - there should be no play. If necessary add or remove shims. The shims are available through KCI at no charge.

0.03" shim P/N: 4707-01
0.06" shim P/N: 4707-02

Note: Tire not shown for clarity. Parts shown & labeled are for left side of the airplane only. Right hand is symmetrically opposite.
F 2. Install the hardware at the center link rib as shown.

Over Center Link Support Assembly

Fig. 3:F:3

Note: The over-center link backing plates do not come with the holes drilled. When aligning the plates install as high as possible to leave room for hydraulics fittings. It is acceptable to notch the plates to allow room for hydraulic fittings as required.

The shims installed between over-center link attachment and reinforcing plate are not shown. Refer to Fig. 3:F:4.

Note: It may be necessary to remove material off this corner if part extends above the rib.

Note: 4705 installed with long side down

Note: Holes in 4706 are oversized

Bolt AN4-15A (4 pcs)
(Bolt length varies depending on the number of shims needed)

Nylock Nut, AN365-428A (4 pcs)

Flat Washer, AN960-416 (4 pcs)

Over-center Link Backing Plate
4513 (2 pcs)

Over-center Link Reinforcement Plate
4706 (1 pc)

Over-center Link Attachment
4705 (2 pcs)

Main Landing Gear, 4702-01 (1 pc)

Torque Plate, 075-00800 (1 pc)

Nylock Nut, AN365-428A (4 pcs)

Over-center Link Ribs

Note: Parts shown & labeled are for one side of the airplane only.

Note: It may be necessary to remove material off this corner if part extends above the rib.

Main Landing Gear, 4702-01 (1 pc)

Nylock Nut, AN365-428A (4 pcs)
Note: The hydraulic cylinder should be installed such that the ports face forward. Install all bolts from forward to aft.

Over Center Link Assembly
Fig. 3-F:4

Note: Install the ball stud, part number 198-0006 9512K73 with Loctite 242.
Main Gear Down Switch

Fig. 3-F:5

This switch installs on the bottom. It can be installed on either side.

Switch arm JM-1

Micro switch and switch arm are secured to the 4720 over center linkage with screws provided in the JM-1 packet.

This photograph is taken from beneath the main gear, looking up at the switch.
Final adjustment of up stop is explained in chapter 16.
Over Center Link Reinforcing Plate Shim Installation
Looking Forward
Fig. 3:F:8

SMART TOOL

Install shims as required to set gear to 90° (or vertical).

Install within 0.375" of top of box and drill 0.25" holes.

Over center link reinforcement plate 4706 (1 pc)

Over center link backing plate 4513 (1 pc)

Over center link rib

Shims:
P/N 4709-01, 0.032" thick
P/N 4709-02, 0.063" thick

Typical amount required is between 2 and 3 thick shims.

Notes:
The aircraft must be level for this step. If the center wing section is bonded refer to Figure 10:A:5. If not, level the center wing section tip to tip.

The number of shims are not necessarily the same on the front and the back (but should be very close). With the complete mechanism assembled visually inspect the Z02E973 bushing in the gear leg (Fig. 3:F:1) The bushing should be close to centered. Excessive friction (from binding) may be caused by such a misalignment.
G Main Gear Wheels and Tires

The main gear of the Legacy uses 5.00 x 5 wheels & tires. Cleveland wheels and brakes are standard in the kit. Installation of the brakes are in Chapter 18.

Main Gear Wheels & Tires
(Exploded View)
Fig. 3:G:1

Note:
Parts shown & labeled are for one side of the airplane only.

Main Wheel Assembly (1 set) 40-151 (Parker)57-1M (Grove)

5.00 x 5 Tire, TR-GY-5.00-5

5.00 x 5 tube, TU-5.00-5

Bolt, AN4-23A (3 pcs)

Flat Washer, AN960-416 (3 pcs)

Nylock Nut, AN365-428A (3 pcs)

Cup Bearing and Cone, 214-00300 (Parker) Cup 028-004 and Cone 027-004 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Seal Ring, 154-00600 (Parker)010-001 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Cup Bearing and Cone, 214-00300 (Parker) Cup 028-004 and Cone 027-004 (Grove)

Cup Bearing and Cone, 028-004 and Cone 027-004 (Grove)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Flat Washer, AN960-416 (3 pcs)

Bolt, AN4-23A, (3 pcs)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Cup Bearing and Cone, 214-00300 (Parker) Cup 028-004 and Cone 027-004 (Grove)

Cup Bearing and Cone, 028-004 and Cone 027-004 (Grove)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Snap Ring, 155-00200 (Parker) VH-237-S02 (Grove)

Snep Ring, 155-00200 (Parker)011-001 (Grove)

Felt Grease Seal, 154-00600 (Parker)010-001 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Cup Bearing and Cone, 214-00300 (Parker) Cup 028-004 and Cone 027-004 (Grove)

Cup Bearing and Cone, 028-004 and Cone 027-004 (Grove)

Seal Ring, 153-00800 (Parker)011-001 (Grove)

Grease Seal Ring, 153-00800 (Parker)011-001 (Grove)

Snap Ring, 155-00200 (Parker) VH-237-S02 (Grove)

WARNING:
Bearings must be packed prior to flight.
G 1. Insert the 5.00 x 5 tube into the tire. Then inflate the tube with a very small amount of air (just enough to unfold it). This will make the assembly easier and prevent kinks.

G 2. Place the tire and tube into the rim you have set on your bench. Push the tire down onto the rim, always avoid pinching the tube. You’ll not be able to push the tire all the way onto the rim, the tire will be fully seated with air pressure.

G 3. Place the other half of the rim onto the tire, aligning the valve stem hole & the three (3) bolt holes. Pull the valve stem through the rim as you work the rim down. Here is where most people damage the tube. If you’re not careful when pushing the rims together, you can easily pinch the tube or stem between the rims. Instant leak! This problem can be avoided by just being careful & aware of the danger.

G 4. Before the two halves of a Cleveland rim can be secured together, the brake disc assembly must be placed onto the inboard face of the wheel (the side opposite the valve stem). The two rim halves & the brake disc are secured together with the manufacturer supplied bolts and nuts.

G 5. Inflate the Goodyear tires 45 to 50 psi. It is a good idea to do this a few times before full inflation. This will help loosen any folds in the tube.
G 6. Grease the two wheel bearings with quality grease, making sure the grease penetrates the entire bearing.

G 7. Place the bearings into the races of the wheel. On the Cleveland wheel, after the bearings are placed into the race, a seal consisting of two thin steel washers and a felt washer is secured with a retainer ring. The seals and the rings retain the bearings in the wheel.

G 8. Now the wheels are ready to be mounted on the axles. Carefully slide the wheel onto the axle until the inboard bearing has been seated. Secure the wheel with an MS21025-20 axle nut. Tighten the nut until there is no slop in the wheel bearings. The axle nut should be tightened so when you spin the wheel it rotates approximately one turn. Then lock the axle nut into position with a MS24665-292 cotter pin.

Note: Parts shown & labeled are for one side of the airplane only.
H. Center Wing Section Hydraulics

To view the schematics of all line layouts, see pages 3-35 through 3-37.

Refer to Figure 3:H:2 for fitting at aft spar.

Elbow fitting (90°), AN822-4D

Bulkhead fitting, AN833-4D (2 pc) with checknut, AN924-4D

Tee Fitting, AN825-4D

Elbow Fitting (90°), AN837-4D

Sequence Valve, HC-05-A (1 pc) w/ AN816-4D (Nipple) Fitting on both ends.

Tee Fitting, AN825-4D

Elbow Fitting (90°), AN822-4D

Straight Bulkhead Fitting, AN832-4D

Refer to Figure 3:H:2 for fitting at aft spar.

Note:
Installations aft of the aft spar and forward of the main spar installed in chapter 16. This is a schematic only. Refer to following pages for exact routing.

Ref: FUSELAGE/CENTER WING SECTION JOINT

7/09-05-08
Center Wing Section Hydraulic Lines Routing

Fig. 3/H:2

Location of fuel return line
45° Bulkhead Fitting, AN837-4D with Check Nut, AN924-4D

Straight Bulkhead Fittings, AN832-4D with AN824-4D Check Nut

Tee Fitting, AN825-4D

Support

Cross Fitting, AN 827-4D (2 pcs)

Phenolic Support

Secure the line running from the cross fitting to the cylinder such that there is no movement of the aluminum lines when the cylinder is actuated.

LP

All flexible lines (shown in black) are R703 hose with BG03-04NJ fittings on both ends.

All 1/4" Lines with AN818-4D Nuts & AN818-4D Sleeves.

Elbow Fitting, AN822-4D

45° Bulkhead Fitting, AN837-4D with AN924-4D Check Nut

Straight Bulkhead Fitting, AN832-4D with AN824-4D Check Nut

Tee Fitting, AN825-4D

Support

Cross Fitting, AN 827-4D (2 pcs)

Phenolic Support

Secure the line running from the cross fitting to the cylinder such that there is no movement of the aluminum lines when the cylinder is actuated.

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Elbow Fitting, AN822-4D

45° Bulkhead Fitting, AN837-4D with Check Nut, AN924-4D

45° Bulkhead Fitting, AN837-4D with Check Nut, AN924-4D

Location of fuel return line

Support

Cross Fitting, AN 827-4D (2 pcs)
Positioning of Hydraulic lines

Top View (Looking Down)

Fig. 3:H:3

The first hole needs to be located 0" from the center line.

Return
10 3/4"

Low Pressure
12 3/4"

High Pressure
15 3/4"

For hole dimensions see Fig. 3:H:5

AFT SPAR

For hydraulic line support (phenolic) see Fig. 3:H:4

Suggested Hydraulic Line Support (New layout)

Fig. 3:H:4

Secure with 2 BID per side.

Radius .13

Radius .28

Radius 28

Radius 13

A/C Up

Forward

Z

WING SYSTEMS
Chapter 3

WING SYSTEMS

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A/C Center Line

Flap Motor Transition Hole

A/C Up

Fwd

AFT SPAR

AFT SPAR

A/C Up

Outboard

Note: Parts shown & labeled are for one side of the airplane only.

Drill three holes equal distance from each other. If the carbon layup was not completed by the factory, then you need to complete a 4-BID carbon layup as shown in the photo below.

The decored area starts at 5.5" from the center line. The first hole needs to be located at 6" from the center line.

Forward side of AFT Spar

The decored area starts at 5.5" from the center line. The first hole needs to be located at 6" from the center line.

Console

Hose, R703
AN822-4D (2 per hose)

1/4" Aluminum Line, 5052 w/ Sleeves, AN819-4D w/ Nuts, AN818-4D

45° Elbow Bulkhead Fitting, AN837-4D

Tee Bulkhead Fitting AN804-4D

Apply 4 BID reinforcement at the clamp location. Clamp should be approx. 5" outboard of rib.

Sequence valve installed in section 3:F. See Fig. 3:F:6

Sequence Valve Installation

Fig. 3:H:6

1/4" aluminum line, 5052 w/ Sleeves, AN819-4D w/ Nuts, AN818-4D

Drill three holes equal distance from each other. If the carbon layup was not completed by the factory, then you need to complete a 4-BID carbon layup as shown in the photo below.

Forward side of AFT Spar

Apply 4 BID reinforcement at the clamp location. Clamp should be approx. 5" outboard of rib.

Sequence Valve Installation

Fig. 3:H:6

Apply 4 BID reinforcement at the clamp location. Clamp should be approx. 5" outboard of rib.

The decored area starts at 5.5" from the center line. The first hole needs to be located at 6" from the center line.

Forward side of AFT Spar

Note: Parts shown & labeled are for one side of the airplane only.
Prior to drilling each hole check the inboard side to ensure that the fitting is installed in a suitable location. It must clear the backing plate (p/n 4513) and mount on the flat surface. It is acceptable to trim a small amount of the backing plate to make room to install the fitting.

Note: It is easier to install the AN816-4D fitting prior to mounting the sequence valve.

Screw & check nut supplied with sequence valve.

7/16" dia. holes (4 locations)

Prior to drilling each hole check the inboard side to ensure that the fitting is installed in a suitable location. It must clear the backing plate (p/n 4513) and mount on the flat surface. It is acceptable to trim a small amount of the backing plate to make room to install the fitting.
Transition Holes for Aft Load Pad 19 Rib

Fig. 3-H:8

Transition hole for push pull tube

3/4" dia. - fuel supply lines

Transition hole for inboard gear door hydraulic cylinder. Locate and size as required.

7/16" dia. holes - hydraulic lines
Flap torque tube access hole. Locate and size as required.

3/8" dia. hole - brake line
7/16" dia. hole for fuel return line
7/16" dia. hole for hydraulic line
3/8" dia. hole for seat belt attachment

7/8" (from center of hole to outside edge.)
Hydraulic Line Routing through Gear Well

The fuel and hydraulic lines on the aft side of the gear well must be kept clear of the flap torque tube. We suggest that you temporarily install the flap tube support brackets for reference. Refer to figure 21-A.1.

All lines must be kept clear of opening for the tire clearance. Secure the lines using one of the methods described in Chapter 1.
I. Aft Spar Transition Holes

While you have easy access to the aft spar flap actuating mechanism, it is the best time to cut the holes. We suggest using a dremel and final trimming with perma grit tools.

WARNING: DO NOT CUT INTO THE SPAR CAPS.
J. Landing and Taxi Lights (Optional)

The landing/taxi light kits are available through KCI. They are available for both the left and the right side.

J 1. Trim the landing/taxi light mount to the scribe lines. There are two sets of scribe lines:
   1) Trim the mount flange to scribe line (flange width should be 1”).
   2) Trim mount to scribe lines to accept the lights.

J 2. Install the landing and taxi lights as shown in the light mount.

Note: it isn’t necessary to install the adjustment system at this time. The adjustment mechanism consists of the longer screws, washers & springs. This can be set anytime after closing the wing. The aircraft must be leveled for this step. See Chapter 7.

Taxi Light: initially set to -4°
Landing Light: initially set to -6°
(Final adjust to preference)

Note: Optional Parts available through Kit Components Inc.
J 3. Install light mount. Alignment:
   (1) Tight up against the leading edge
   (2) Align inbd/outbd as shown in Fig. 3:J:3.

J 4. After the wing is closed, trim the skin up to the edge of joggle as shown.

J 5. Adjust joggle thickness to 0.2". At 0.2" the lens will be flush with wing skin.

J 6. Trim the plexiglass to fit the opening. We suggest temporarily installing small pieces of gasket material to simulate gasket thickness.

J 7. Using a plexiglass drill bit install the lens.
J 8. Install the lights. Install the gasket, lights and lens with the adjustment mechanism and set. Note: One of the four screws of the light remains. The adjustment mechanism consists of three (3) screws. The fourth screw is the original screw holding the light together.

Note: Beauty ring not shown for clarity
Optional Parts available through Kit Components Inc.
K. Speed Brakes (Optional)

K 1. After closing, install the drain tube. Lightly sand the aluminum tube and install such that both ends are flush.

Note: If you are not installing speed brakes, install cover plates (P/N: 4530) available through Kit Components Incorporated.

Note: Optional Parts available through Kit Components Inc.
L. Fuel and Hydraulic Lines Schematics

Line Schematics for Wings

Fig. 3:

![Diagram of Fuel and Hydraulic Lines for Wings](image-url)
Line Schematics aft of Main Spar
Fig. 3-1:2
Fuel Lines with Gascolator and Pump

Fig. 3:1.;3