Cessna 310 R

Airplane & System Description

American Air Service
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### Performance and Specifications

<table>
<thead>
<tr>
<th>Weight:</th>
<th>Empty: 3752 lbs 1702 kg</th>
<th>max. Takeoff: 5500 lbs 2495 kg</th>
<th>SL Rate-of-Climb 2-Engines 1662 fpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>max. Landing</td>
<td>5400 lbs 2450 kg</td>
<td>SL Rate-of-Climb 1-Engine 370 fpm</td>
<td></td>
</tr>
<tr>
<td>Speed:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>max. Sea Level</td>
<td>207 KTAS 384 km/h</td>
<td>Service Ceiling 2-Engines 19750 ft</td>
<td></td>
</tr>
<tr>
<td>75% at 7500 Feet</td>
<td>195 KTAS 361 km/h</td>
<td>Service Ceiling 1-Engine 7400 ft</td>
<td></td>
</tr>
<tr>
<td>Maximum Range 10000 Feet</td>
<td>1152 NM 2133 km</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff: Ground Roll</td>
<td>1335 ft 407 m</td>
<td>over 50 ft Obstacle 1700 ft 518 m</td>
<td></td>
</tr>
<tr>
<td>Landing: Ground Roll</td>
<td>640 ft 195 m</td>
<td>over 50 ft Obstacle 1790 ft 546 m</td>
<td></td>
</tr>
<tr>
<td>Dimensions: Wing Span</td>
<td>36’11” 11,25 m</td>
<td>Length 31’11.5” 9.74 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>max. Height 10’11,8” 3.35 m</td>
<td></td>
</tr>
</tbody>
</table>

**Engines:** Teledyne Continental IO 520 M 285 HP at 2700 RPM
Fuel injected, direct drive, air-cooled, horizontally opposed, six cylinder, with 520 cubic-inch displacement

**Propellers:** McCauley, 3 Blade, Constant Speed, Full Feathering

### Airspeed Limitations

<table>
<thead>
<tr>
<th>Maneuvering Speed</th>
<th>148 KIAS</th>
<th>Air Minimum Control Speed</th>
<th>80 KIAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Flap extended 15°</td>
<td>158 KIAS</td>
<td>Maximum Gear Extended</td>
<td>138 KIAS</td>
</tr>
<tr>
<td>35°</td>
<td>138 KIAS</td>
<td>Never Exceed Speed</td>
<td>223 KIAS</td>
</tr>
<tr>
<td>Stall Speed clean</td>
<td>79 KIAS</td>
<td>Maximum Structural</td>
<td></td>
</tr>
<tr>
<td>Gear and Flaps down</td>
<td>72 KIAS</td>
<td>Cruising Speed</td>
<td>181 KIAS</td>
</tr>
</tbody>
</table>

### Maneuver Limits

This is a normal category airplane. Aerobatic maneuvers, including spins, are prohibited.

### Flight Load Factor Limits

The design load factors are 150% of the following, and in all cases the structure exceeds design loads.

At Design Takeoff Weight of 5500 Pounds:
- Gear and Flaps up: +3.8 G to -1.52 G
- Gear and full Flaps: +2.00 G

**For calculation of actual aircraft performance refer to section 5 of Pilots Operation Handbook!**
Multi-Engine Airspeeds:

<table>
<thead>
<tr>
<th>Description</th>
<th>Speed (KIAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Takeoff (no Flaps)</td>
<td>92</td>
</tr>
<tr>
<td>High Performance Takeoff (15 Deg. Flaps)</td>
<td>82</td>
</tr>
<tr>
<td>Best Angle-Of-Climb</td>
<td>85</td>
</tr>
<tr>
<td>Best Rate-Of-Climb</td>
<td>107</td>
</tr>
<tr>
<td>Maneuvering Speed</td>
<td>148</td>
</tr>
<tr>
<td>Maximum Flap Extended Speed Vfe 15 Deg</td>
<td>158</td>
</tr>
<tr>
<td>Max 35 Deg</td>
<td>138</td>
</tr>
<tr>
<td>Maximum Gear Operating Speed Vlo + Vle</td>
<td>138</td>
</tr>
<tr>
<td>Approach 35 Deg.</td>
<td>93</td>
</tr>
</tbody>
</table>

Single-Engine Airspeeds:

<table>
<thead>
<tr>
<th>Description</th>
<th>Speed (KIAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Control Speed Vmc</td>
<td>80</td>
</tr>
<tr>
<td>Safe Single Engine Speed</td>
<td>92</td>
</tr>
<tr>
<td>Best Angle-Of-Climb</td>
<td>95</td>
</tr>
<tr>
<td>Best Rate-Of-Climb</td>
<td>106</td>
</tr>
</tbody>
</table>

Preflight Inspection

**Pitot Cover**
- REMOVE

**1. Inside Cabin:**

- **Parking Brake**
  - SET

- **Alternate Static Source**
  - CLOSED

- **All Switches**
  - OFF

- **All Circuit Breakers**
  - IN

- **Landing Gear Switch**
  - DOWN

- **Fuel Selectors**
  - MAIN TANKS

- **Trim Tabs**
  - NEUTRAL

- **Oxygen**
  - ON

- **Quantity, Masks and Hoses**
  - CHECK

- **Oxygen**
  - OFF

- **Windows**
  - CHECK for cracks

- **Battery Switch**
  - ON

- **Fuel Gages**
  - CHECK

- **Tip Tank Transfer Pumps**
  - LISTEN

- **Wing Flaps**
  - DOWN

- **Pilot Heat**
  - ON for 20 seconds

- **All Navigation and Anti-Collision Lights**
  - CHECK

- **All Light Switches and Battery**
  - OFF

**2. Walk Around**

- **Baggage Door**
  - SECURE

- **Static Port**
  - CLEAR

- **Deice Boots**
  - CHECK

- **Control Surface Lock(s)**
  - REMOVE

- **Elevator**
  - CHECK

- **Tie Down**
  - REMOVE

- **Rudder**
  - CHECK

- **Deice Boots**
  - CHECK

- **Static Port**
  - CLEAR

- **Wing Locker Baggage Door**
  - SECURE

- **Battery Compartment Cover**
  - SECURE

- **Wing Flap**
  - CHECK

- **Wing Bottom**
  - CHECK

- **Control Surface Lock(s)**
  - REMOVE

- **Aileron**
  - CHECK

- **Main Tank Vents**
  - CLEAR

- **Navigation and anti-collision lights**
  - CHECK

- **Landing Light**
  - CHECK

- **Main Tank Fuel Sump**
  - DRAIN

- **Fuel Vent and Sniffin Valve**
  - CLEAR

- **Main Tank Fuel Quantity**
  - CHECK

- **Deice Boot(s)**
  - CHECK

- **Stall Warning Vane**
  - CHECK

- **Wing Tie Down**
  - REMOVE

- **Auxiliary Tank Fuel Quantity**
  - CHECK

- **Fuel Strainer**
  - DRAIN

- **Oil Level**
  - CHECK min. 9 Qts.

- **Engine Compartment**
  - CHECK

- **Propeller**
  - EXAMINE

- **Leading Edge Air Intake**
  - CLEAR

- **Main Gear, Tires, Wheel Well, Doors**
  - CHECK

- **Nose Gear, Tires, Wheel Well, Doors**
  - CHECK

- **Lower Fuselage**
  - CHECK

- **Pilot Tube**
  - CLEAR and WARM

- **Heater Inlet**
  - CLEAR

- **Leading Edge Air Intake**
  - CLEAR

- **Crossfeed Lines**
  - DRAIN

- **Main Gear, Tires, Wheel Well, Doors**
  - CHECK

- **Oil Level**
  - CHECK min. 9 Qts.

- **Engine Compartment**
  - CHECK

- **Propeller**
  - EXAMINE

- **Auxiliary Tank Fuel Quantity**
  - CHECK

- **Fuel Strainer**
  - DRAIN

- **Navigation and Anti-Collision Lights**
  - CHECK

- **Fuel Vent and Sniffin Valve**
  - CLEAR

- **Main Tank Fuel Sump**
  - DRAIN

- **Main Tank Vents**
  - CLEAR

- **Landing Light**
  - CHECK

- **Control Surface Lock(s)**
  - REMOVE

- **Aileron**
  - CHECK

- **Wing Bottom**
  - CHECK

- **Wing Flap**
  - CHECK

- **Wing Locker Baggage Door**
  - SECURE

**Before Starting Engines**

- **Preflight**
  - COMPLETE

- **Cabin Door**
  - LATCHED

- **Door Seal**
  - INFLATE

- **Control Locks**
  - REMOVED

- **Seat and Seat Belts**
  - ADJUST and SECURE

- **Intercom**
  - ON and SET

- **Fuel Selectors**
  - MAIN TANKS

- **Landing Gear Switch**
  - DOWN

- **Mixtures, Propellers and Throttles**
  - SET

- **All Switches and Circuit Breakers**
  - SET

- **Battery and Alternators**
  - ON

- **Landing Gear Position Lights**
  - 3 GREEN

- **All Warning Lights**
  - PRESS TO TEST

- **Lights**
  - AS REQUIRED
### Starting Engines

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propellers</td>
<td>CLEAR</td>
<td>Auxiliary Fuel Pumps</td>
<td>LOW</td>
</tr>
<tr>
<td>Magneto Switches</td>
<td>ON</td>
<td>Engine Instruments</td>
<td>CHECK</td>
</tr>
<tr>
<td>Engines</td>
<td>START</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Before Taxiing

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avionics</td>
<td>ON and SET</td>
<td>Wing Flaps</td>
</tr>
</tbody>
</table>

### Taxiing

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brakes</td>
<td>CHECK</td>
<td>Flight Instruments</td>
</tr>
</tbody>
</table>

### Before Takeoff

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Runup</td>
<td>COMPLETE</td>
<td>Lights</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td>Fuel Quantity</td>
<td>CHECK</td>
<td>All Cabin Doors and Windows</td>
<td>CLOSED</td>
</tr>
<tr>
<td>Fuel Selectors</td>
<td>MAIN TANKS</td>
<td>All Warning Lights</td>
<td>CLEAR</td>
</tr>
<tr>
<td>Cowl Flaps</td>
<td>LOCKED FULL OPEN</td>
<td>Flight Controls</td>
<td>CHECK</td>
</tr>
<tr>
<td>Trim Tabs</td>
<td>SET</td>
<td>Auxiliary Fuel Pumps</td>
<td>ON</td>
</tr>
<tr>
<td>Wing Flaps</td>
<td>UP</td>
<td>Ice Protection</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td>Flight Instruments and Avionics</td>
<td>SET</td>
<td>Synchrophaser</td>
<td>OFF</td>
</tr>
<tr>
<td>Auto Pilot Disconnect</td>
<td>CHECK</td>
<td>Seat Belts</td>
<td>Secure</td>
</tr>
</tbody>
</table>

### Takeoff

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>SET</td>
<td>Air Minimum Control Speed</td>
<td>80 KIAS</td>
</tr>
<tr>
<td>Engine Instruments</td>
<td>CHECK</td>
<td>Take Off and Climb to 50 Feet</td>
<td>92 KIAS at GW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refer to section 5 for speeds at reduced weights.</td>
<td></td>
</tr>
</tbody>
</table>

### After Takeoff

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brakes</td>
<td>APPLY</td>
<td>Best Angle-of-Climb Speed ME</td>
<td>85 KIAS at SL</td>
</tr>
<tr>
<td>Landing Gear</td>
<td>RETRACT</td>
<td>Best Rate-of-Climb Speed ME</td>
<td>107 KIAS at SL+GW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refer to section 5 for speeds at altitude and at reduced weight.</td>
<td></td>
</tr>
</tbody>
</table>

### Cruise Climb

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>SET (24.5°/2500 RPM)</td>
<td>Mixtures</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td>Auxiliary Fuel Pumps</td>
<td>OFF</td>
<td>Cowl Flaps</td>
<td>AS REQUIRED</td>
</tr>
</tbody>
</table>

### Descent

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>AS REQUIRED</td>
<td>Cowl Flaps</td>
<td>SET</td>
</tr>
<tr>
<td>Mixtures</td>
<td>ADJUST</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Before Landing

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat Belts</td>
<td>SECURE</td>
<td>Landing Gear</td>
<td>DOWN</td>
</tr>
<tr>
<td>Syncrohrapher</td>
<td>OFF</td>
<td>Mixtures</td>
<td>ADJUST</td>
</tr>
<tr>
<td>Fuel Selectors</td>
<td>MAIN TANKS</td>
<td>Propellers</td>
<td>FULL FORWARD</td>
</tr>
<tr>
<td>Auxiliary Pumps</td>
<td>ON</td>
<td>Approach Speed</td>
<td>93 KIAS</td>
</tr>
<tr>
<td>Wing Flaps</td>
<td>AS REQUIRED</td>
<td>Air Minimum Control Speed</td>
<td>80 KIAS</td>
</tr>
</tbody>
</table>

### After Landing

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Fuel Pumps</td>
<td>LOW</td>
<td>Wing Flaps</td>
<td>UP</td>
</tr>
<tr>
<td>Cowl Flaps</td>
<td>OPEN and LOCK</td>
<td>Cabin Heater (if used)</td>
<td>SWITCH to FAN</td>
</tr>
</tbody>
</table>

### Shut Down

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Brake</td>
<td>SET</td>
<td>Engines</td>
<td>SHUT DOWN</td>
</tr>
<tr>
<td>Accessory Switches</td>
<td>OFF</td>
<td>Batteries, Alternators, Magnetos</td>
<td>OFF</td>
</tr>
<tr>
<td>Auxiliary Fuel Pumps</td>
<td>OFF</td>
<td>Intercom</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Door Seal</td>
<td>DEFLATE</td>
</tr>
</tbody>
</table>
Emergency Procedures
(Bold Print Items should be committed to Memory)

Engine Securing Procedures

<table>
<thead>
<tr>
<th>Throttle</th>
<th>CLOSE</th>
<th>Fuel Selector</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixture</td>
<td>IDLE CUT OFF</td>
<td>Auxiliary Fuel Pump</td>
<td>OFF</td>
</tr>
<tr>
<td>Propeller</td>
<td>FEATHER</td>
<td>Magneto Switches</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Propeller Syncrophaser</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternator</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cowl Flap</td>
<td>CLOSE</td>
</tr>
</tbody>
</table>

Engine Failure during Takeoff (Speed below 92 KIAS)

| Throttles | CLOSE IMMEDIATELY | Brakes | AS REQUIRED |

Engine Failure after Takeoff (Speed Above 92 KIAS With Gear Up or in Transit)

<table>
<thead>
<tr>
<th>Mixtures</th>
<th>AS REQUIRED</th>
<th>Establish Bank</th>
<th>MAX. 5° TOWARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propellers</td>
<td>FULL FORWARD</td>
<td>Wing Flaps</td>
<td>GOOD ENGINE</td>
</tr>
<tr>
<td>Throttles</td>
<td>FULL FORWARD</td>
<td></td>
<td>UP in small</td>
</tr>
<tr>
<td>Landing Gear</td>
<td>CHECK UP</td>
<td></td>
<td>increments</td>
</tr>
<tr>
<td>Inoperative Engine</td>
<td>THROTTLE CLOSE</td>
<td>Climb to Clear Obstacle</td>
<td>92 KIAS</td>
</tr>
<tr>
<td></td>
<td>MIXTURE IDLE CUT OFF</td>
<td>Climb best SE-Rate-of-Climb-Speed</td>
<td>106 KIAS at SL</td>
</tr>
<tr>
<td></td>
<td>PROPELLER FEATHER</td>
<td>Trim Tabs</td>
<td>ADJUST</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inoperative Engine</td>
<td>SECURE</td>
</tr>
</tbody>
</table>

Engine Failure during Flight

<table>
<thead>
<tr>
<th>Inoperative Engine</th>
<th>DETERMINE</th>
<th>Operative Engine</th>
<th>ADJUST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADJUST as required</td>
<td>Power</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td></td>
<td>CHECK, if deficient</td>
<td>Mixture</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td>Fuel Selectors</td>
<td>AUX. FUEL PUMP ON</td>
<td>Fuel Selector</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td>Fuel Quantity</td>
<td>MAIN TANKS</td>
<td></td>
<td>Note: Auxiliary fuel on</td>
</tr>
<tr>
<td>Oil Pressure and Temperature</td>
<td>CHECK</td>
<td></td>
<td>side of dead engine is</td>
</tr>
<tr>
<td>Magneto Switches</td>
<td>CHECK</td>
<td></td>
<td>unusable</td>
</tr>
<tr>
<td>Mixture</td>
<td>CHECK ON</td>
<td>Auxiliary Fuel Pump</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>ADJUST TILL ENGINE IS FIRING, ADJUST FOR SMOOTH OPERATION</td>
<td>Cowl Flap</td>
<td>AS REQUIRED</td>
</tr>
<tr>
<td></td>
<td>SECURE</td>
<td>Trim Tabs</td>
<td>ADJUST</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical Load</td>
<td>DECREASE</td>
</tr>
<tr>
<td>If Engine does not start</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engine Inoperative Landing

<table>
<thead>
<tr>
<th>Fuel Selector</th>
<th>MAIN TANK</th>
<th>Landing Gear</th>
<th>DOWN within gliding distance of field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Fuel Pump</td>
<td>ON (operative engine)</td>
<td>Wing Flaps</td>
<td>DOWN when landing is assured</td>
</tr>
<tr>
<td>Alternate Air Control</td>
<td>IN</td>
<td>Speed</td>
<td>DECREASE below 93 KIAS only if landing is assured</td>
</tr>
<tr>
<td>Mixture</td>
<td>AS REQUIRED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propeller Syncrophaser</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propeller</td>
<td>FULL FORWARD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>106 KIAS with excessive altitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wing Flaps</td>
<td></td>
<td>Air Minimum Control Speed</td>
<td>80 KIAS</td>
</tr>
</tbody>
</table>

Engine Inoperative Go-Around

**WARNING:** Level flight may not be possible for certain combinations of weight, temperature and altitude.
In any event, do not attempt an engine inoperative go-around after wing flaps have been extended beyond 15°!

<table>
<thead>
<tr>
<th>Throttle</th>
<th>FULL FORWARD</th>
<th>Cowl Flap</th>
<th>OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixture</td>
<td>AS REQUIRED</td>
<td>Climb best SE Rate-of-Climb speed</td>
<td>106 KIAS at SL</td>
</tr>
<tr>
<td>Positive Rate-of-Climb</td>
<td>ESTABLISH</td>
<td></td>
<td>94 KIAS at 10000 ft</td>
</tr>
<tr>
<td>Landing Gear</td>
<td>UP</td>
<td>Trim Tabs</td>
<td>ADJUST max 5° bank</td>
</tr>
<tr>
<td>Wing Flaps</td>
<td>UP</td>
<td></td>
<td>toward good engine</td>
</tr>
</tbody>
</table>
Airstart

Auxiliary Fuel Pump
- CHECK OFF. If ON or LOW
- turn OFF, mixture to IDLE-
- CUT-OFF, Full Throttle,
magnetos OFF, rotate engine
- 15 revolutions with starter

Magnetos Switches
- ON

Fuel Selectors
- MAIN TANK

Throttle
- one inch FORWARD

Mixture
- AS REQUIRED

Propeller
- FORWARD of detent

Saver Button
- PRESS

Primer Switch
- ACTIVATE

Start and Primer Switch
- RELEASE when

Engine fires
- LOW

As Required
- AS REQUIRED

INCREASE after

cylinder head temp. reaches 200° F

Fuel in the auxiliary and opposite main tank is unusable!

Alternator Failure (Single)

Electrical Load
- REDUCE

If Circuit Breaker does not trip:
- Select affected alternator on VA-meter and monitor output. If output is normal + failure light remains on, disregard fail
indication and have indicator checked. If output is insufficient, turn off alternator and reduce load to one alternator capacity If complete loss of output occurs, check
field fuse and replace if necessary. If an intermittent light indication accompanied by voltmeter fluctuation is observed, turn off alternator and reduce load to on alternator capacity.

If Circuit Breaker is tripped:
- Turn off affected alternator
- Reset circuit breaker
- Turn on affected alternator
- If circuit breaker reopens, turn off alternator.

Alternator Failure (dual)

Electrical Load
- REDUCE

If Breakers have not tripped:
- Turn off alternators
- Check field fuses and replace as

required.

If Circuit Breakers are tripped:
- Turn off affected alternators
- Reset circuit breakers
- Turn on left alternator and
monitor output on voltmeter. If alternator is charging, leave
it on, disregard failure light.
- If still inoperative, turn off.
- Repeat above steps for
right alternator.
If circuit breakers reopen, prepare to terminate flight.

Landing Gear will not extend electrically

Landing Gear Motor Circuit Breaker
- CHECK IN with gear switch down
- If gear does not extend PULL breaker.

Landing Gear Switch
- NEUTRAL (Center)

Pilot's Seat
- ADJUST as required

Handcuff
- EXTEND AND LOCK
- ROTATE clockwise FOUR turns past
gear down lights are on (~ 52 turns)

Gear Down Lights ON
- Unlocked Light OFF

Gear Warning Horn
- CHECK (retard throttle)

Handcuff
- PUSH BUTTON and STOW

Landing Gear will not retract electrically - DO NOT TRY TO RETRACT MANUALLY

Landing Gear Switch
- DOWN

Gear Down Lights ON
- Unlocked Light OFF

Gear Warning Horn
- CHECK
**Airframe**

The Cessna 310 is a 6-place, all metal, low-wing airplane. The wing uses 2 main spars which attach to the carry-thru spars. The retractable landing gear is a tricycle design using air-over-oil shock struts.

**Flight Control System**

The flight controls consist of the ailerons, elevators and rudder and their respective trim systems. All of these surfaces are constructed of aluminum and are statically mass balanced. All control surfaces are actuated by cables attached to the pilot's control wheel respective rudder pedals. Also the trim tabs on the control surfaces are actuated by cables attached to trim wheels on the control pedestal.

**Nosewheel Steering System**

The nosewheel is controlled by the rudder pedals which are connected to the nose wheel steering system via cables and a bungee spring assembly. This system provides positive control up to 18° left or right, and free turning from 18° to 55° for sharp turns during taxiing.

**Wing Flaps System**

The wing flaps are of split flap design. Each wing flap (two on each side) is actuated by two push-pull rods attached to bell cranks in the wing. The bell cranks in each wing are ganged together with push-pull rods. Each inboard rod is attached to a cable which is actuated by an electric motor in the fuselage. The maximum extension is 35°.

**Landing Gear System**

The landing gear is a fully retractable tricycle landing gear consisting of a main gear located in each wing and a nose gear in the forward fuselage. Each landing gear is connected to a single gear box located aft of the pilot's seat. The gear box is driven by an electric motor attached to the box. During ground operation, accidental gear retraction is prevented by a safety switch located on the left gear strut preventing retraction as long as the strut is compressed by the weight of the aircraft. The gear doors are mechanically linked to their respective landing gears. Below the landing gear actuating knob are 4 position indicator lights. Three of them are green and will illuminate when the gear is down and locked. The other light is red and will illuminate when any or all of the gears are unlocked. When no light is illuminated the gear is in the UP and locked position. The landing gear warning horn is controlled by the throttles and the wing flap position. The horn will sound when the throttles are retarded below approximately 12" MAP or the flaps are lowered past the 15° position with gear retracted. The horn will also sound when the airplane is on ground with the gear switch in the UP position. The landing gear can be manually lowered by a handcrank located below the right front edge of the pilot's seat. To use the crank, tilt pilot's seat aft, pull the crank out of its storage clip and unfold it until it locks in the operating position. The procedure to lower the gear manually is given in the emergency checklist (section 3 Pilots operating handbook). To stow the crank, push the lock release button on the crank handle, fold the handle and insert it in the storage clip. When the handle is not stored, the gear will not operate electrically.

**Fuel System**

The fuel system consists of two main tanks, two auxiliary tanks, fuel selectors for selection of main, auxiliary or crossfeed fuel, two auxiliary fuel pumps and two engine driven pumps. The main tanks are aluminum tanks mounted on the wing tips. Each tank contains an auxiliary fuel pump and transfer pump. The auxiliary pump provides fuel pressure for starting the engines and supplies fuel in an emergency. The transfer pump transfers fuel from the nose section of the tank to the center sump, where it is picked up and routed to the engine. The transfer pump allows steep descents with low fuel quantity and are operating continuously when the battery switch is on. The auxiliary tanks are bladder type cells located in the outboard wings. These tanks provide fuel supply during cruise operation. The auxiliary tanks are vented to the main tanks. Two fuel selectors, one for each engine, are located on the floor between the pilot's and copilot's seat. The selectors allow selection of main fuel, auxiliary fuel, crossfeed and shut off. Quick drain valves are provided for each fuel tank, fuel selector and crossfeed line. Each engine is equipped with a mechanically driven fuel pump which provides fuel to the metering unit. Each pump also contains a bypass which returns excess fuel and vapor back to the main tanks all the times. Each auxiliary fuel pump on the main tank is operated by a 3-position switch. In the LOW position, the pump operates at low speed, providing adequate fuel flow for purging. The ON position runs the auxiliary pump at low.
speed as long as the engine driven pump is operating. With an engine driven pump failure the auxiliary pump will then automatically switch to high speed, providing sufficient fuel for all partial power operations. The dual indicating fuel quantity gage is calibrated in pounds and will accurately indicate the weight of fuel contained in the tanks, regardless of temperature. A gallons scale is provided in blue on the indicator allowing the pilot to determine the approximate volume of fuel on board. The fuel gage shows remaining fuel in the tank selected on the fuel selector. When one fuel selector is switched to the auxiliary tank, the gage will show remaining fuel in this tank and a yellow auxiliary tank indication light will illuminate. With a 3-position switch, adjacent to the auxiliary tank indicator lights the fuel gauge can be switched to each tank regardless of the position of the fuel selectors. Additionally to the fuel gages two low fuel indicator lights will provide a warning when the left/right main tank contains less then approximately 60 pounds of fuel. These lights are operating independently from the other fuel gages.

**Brake System**

The airplane is provided with an independent hydraulically actuated brake system for each main wheel. A hydraulic master cylinder is attached to each pilots rudder pedal. The brakes can be operated from each pilots seat. The parking brake is set with depressing the brake pedals and pulling the parking brake knob. To release the parking brake push the parking brake handle in.

**Electrical System**

Electrical Energy is supplied by a 28-volt, negative ground, direct current system powered by an 100 ampere alternator on each engine. The electrical system has independent circuits for each side with each alternator having its own regulator and overvoltage protection relay. The voltage regulators are connected to provide proper load sharing. A 24-volt battery is located in the left wing outboard of the engine nacelle. Separate battery and alternator switches are provided as a means of checking for a malfunctioning alternator circuit and to permit such a circuit to be turned off. An emergency alternator field switch is located on the right side of the switch and circuit breaker panel. The switch is used when the alternators will not self-excite. Placing the switch in the on position provides excitation from the battery even though the battery is considered to have failed. Two overvoltage relays constantly monitor their respective alternator output. Should an alternator exceed the normal operating voltage, the relay will trip, taking the alternator off the line. The overvoltage relay can be reset by cycling the applicable alternator switch. A voltmeter on the instrument panel is provided to monitor alternator current output, battery charge and bus voltage. A low voltage light will illuminate when the bus voltage decreases below 25 volts.

**Pitot Static System and associated Flight Instruments**

A heated pitot tube is located on the left side of fuselage nose cap. Static pressure ports are on both sides of the fuselage behind the cabin. An alternate static source, installed in the static system below the parking brake handle, supplies an alternate static source should the external static source malfunction. When open, this valve vents to the pressure in the cabin. Since this pressure is relatively low, the airspeed indicator and the altimeter will show slightly higher readings than normal. Refer to section 5 of the pilots operating handbook for airspeed and alitmeter corrections. The pitot static system is connected as in any other light airplane: Static pressure is connected to altimeter, vertical speed and airspeed indicator, the pitot tube is connected to the airspeed indicator.

**Vacuum System**

The vacuum system is powered by two engine driven vacuum pumps. The suction gage incorporates two red source indicator buttons, which during normal operation are retracted from view. Should a vacuum pump fail the respective indicator button will be visible. The malfunctioning vacuum pumps is automatically isolated from the system, the second pump will provide enough suction to operate the system. The vacuum powered flight instruments are the horizontal situation indicator and the attitude indicator.

**Stall Warning System**

A stall warning system is required equipment which consists of a stall warning transmitter vane located in the outboard wing leading edge, a cockpit warning horn and the necessary wiring to complete the system. The stall warning horn will sound about 4 to 9 KCAS above the actual stall in all flight configurations.

Engines

The airplane is equipped with two, 6-cylinder, fuel-injected engines. Each engine is rated at 285 horsepower at 2700 RPM. The control pedestal contains all engine controls. The three primary engine controls are in groups of two at the top of the pedestal, they are throttles, propeller controls and mixtures. A quadrant friction lock is provided to prevent the three primary engine controls from creeping once they have been set. The locking knob is located on the right side of the pedestal. Two cowl flap controls are located just below the rudder trim tab wheel; one for each engine. These controls are used to set the cowl flaps in any desired position. An alternate air control is provided for each engine. These mechanically actuated controls are located on the right side of the control pedestal. Normally the controls are pushed in, providing cold filtered ram air to the engines. When the controls are pulled out, warm unfiltered air from inside the cowling is provided to the engines. Each engine is equipped with a dual ignition system. Fuel is supplied to the engine using a low pressure injection system. The fuel is injected into the cylinder heads adjacent to the intake valve on all cylinders. Manual mixture controls, fuel flow gages and exhaust gas temperature gages are provided for precise leaning.

Propellers

The airplane is equipped with all-metal, three-bladed, constant speed, full feathering, single-acting, governor regulated propellers. Each propeller utilizes oil pressure which opposes the force of springs and counterweights to obtain correct pitch for engine load. Oil pressure from the governor drives the blade angle toward low pitch (increasing RPM) while the springs and counterweights drive blades toward high pitch (decreasing RPM) and the feather position. The propeller blades are continuously adjusted by the governor, which boosts the engine oil pressure by the governor gear pump to the level needed to control blade angle. The props are fail safe toward feather, and loss of oil pressure will cause them to feather. This would also cause them to feather on engine shut down on the ground, which would cause excessive stress and vibration during engine start. To prevent this, the propeller hubs incorporate centrifugal latch pins, which at an RPM below 700 engage the hub mechanism and prevent feathering. Above 700 RPM the latch pins are retracted by centrifugal force. The latches will not prevent feathering after an engine failure in flight, because airflow through the propeller will keep its RPM well above 700. To feather the propeller blades, the propeller control levers on the control pedestal must be placed in the feather position (full aft).

The synchrophaser system is designed to match propeller RPM and propeller phase angle of the two engines. The propeller RPM and phase angle of the slaved (left) engine will follow changes in RPM and phase angle of the master (right) engine over a limited range. This limited range will prevent the left engine from loosing more than 50 RPM should the right engine be feathered with the synchrophaser on. To set the synchrophaser system the propellers must first be synchronized manually. Then the synchrophaser is switched to SYNC, in this mode it is maintaining the RPM of both propellers the same. In the phase mode, the phase angle between the propeller blades of the left and right engine can be adjusted by using the rheostat. The phase position should only be used in level cruising flight in smooth air. The synchrophaser light is illuminated all the time when the propellers are synchronized. If the difference of both engines exceeds 50 RPM the light starts flashing.

Propeller Deice System

The propeller deice system consists of electrically heated boots on the propeller blades. Each boot consists of an inner and outer heating element, which receives its electrical power through a deice timer, to reduce the power drain and maintain propeller balance. A reading below the green arc on the propeller deice ammeter indicates that the blades are not being deiced uniformly. The system then has to be turned OFF, since uneven deicing results in propeller unbalance and can cause an engine failure. Energizing the propeller anti-ice before entering icing conditions will prevent ice build up which will be thrown off and can chip the fuselage.

Deice Boot System

This system is designed to remove ice after accumulation. The system consists of pneumatically operated boots, engine-driven pneumatic pumps, push switches with annunciator light and necessary hardware to complete system. The deice boots are attached to the leading edges of the wing and horizontal stabilizers. The boots expand and retract, using pressure and vacuum from the engine-driven vacuum pumps. Normally, vacuum is applied to all boots to hold them against the leading edge surfaces. When a deicing cycle is initiated, the vacuum is removed and a pressure is applied to "blow up" the boots. This change in contour will break the ice accumulation on the leading edges. Ice formation after this area will then be removed by normal air forces. At least 1/4 inch (6 mm) of ice accumulation is necessary for good deicing results. If used to early the ice is shaped to the contour of the inflated boots and deicing will become impossible. To activate the system just press the "PUSH ON" switch, the system will then execute one deice cycle. If the boots fail to deflate automatically press the deflate switch.

Despite the heated propellers and the deice boots this aircraft is not certified for flight into known icing.
**Oxygen System**

The oxygen system provides oxygen for each occupant individually up to an altitude of 30,000 feet. The oxygen is stored in a 76 cubic foot bottle located in the nose compartment. The system is activated by pulling the oxygen control knob to the ON position, allowing oxygen to flow from the regulator to all cabin outlets. The valve in the outlets is normally closed it is opened by inserting the connector of the mask. Permit no smoking when using oxygen. Oil grease, soap, lipstick, lip balm or any other fatty material constitute a serious fire hazard when in contact with oxygen. Be sure hands and clothing are oilfree before handling oxygen equipment. Be sure the oxygen control knob is not left in an intermediate position between ON and OFF, it may allow oxygen to bleed through the regulator into the nose compartment of the airplane.

**400B Integrated Flight Control System (Autopilot)**

The Cessna 400B Integrated Flight Control System (IFCS) provides a capability of automatic flight control or manual control with precision flight direction provided by computed command information. The complete presentation for the system is displayed on the flight director indicator (FDI), the mode selector and the horizontal situation indicator (HSI). Operation of the manual and automatic system is basically the same. the difference is whether the pilot follows the flight director commands or allows the autopilot to fly the airplane.

Precision flight direction information for manual control is provided on the FDI. The pilot flies the airplane to satisfy the two command bars, thus following the calculated flight path determined by the computer. The HSI displays a pictorial presentation of the airplane's position relative to VOR radials, localizer and glide slope beams. The HSI also gives heading reference with respect to magnetic north and provides selection of the desired heading, VOR radials and LOC runway heading.

The autopilot is activated with the ON/OFF switch on the autopilot control head. Pitch and roll manual command controls are also located on these control head. All other normal modes of flight are controlled from the mode selector on the left side in the instrument panel.

An automatic autopilot disengage function is provided to disengage the autopilot any time the airplane pitches up or down more than a normal amount from level flight attitude. The operational capability should be tested by pressing the autopilot disconnect test button before takeoff. Do not press this button in flight, the airplane will pitch up sharply and the autopilot will disconnect.

The autopilot off (A/P OFF) light located adjacent to the FDI, will illuminate when the autopilot is disengaged by any means other than the control wheel disengage switch. Whenever the autopilot disengages the autopilot warning horn will sound. The A/P OFF light will remain on until it is cancelled by pressing the control wheel autopilot disengage switch.