condition at approximately 85kts, momentarily shove the door outward slightly, and forcefully close and lock the door. This may also require manoeuvring to position the door out of the relative airflow.

The left cabin door is equipped with a window which can be opened. The window is closed by a latch on the lower edge of the window frame. The latch has a detent to keep it in the closed position which is normally released by a small push-button on the latch. The window is equipped with a spring-loaded retaining arm which will help rotate the window outward and hold it there. If required, the window may be opened at any speed up to 200kts. As an option the same type of window can be installed on the right door.

**Baggage Compartment**

The baggage compartment consists of the area from the back of the rear passenger seats to the aft cabin bulkhead. A baggage shelf, above the wheel well, extends aft from the aft cabin bulkhead. Access to the baggage compartment and the shelf is gained through a lockable baggage door on the left side of the aeroplane, or from within the cabin behind the aft passengers' seat.

When loading the airplane, children should not be allowed in the baggage compartment. Any material that may be hazardous to the aeroplane or occupants should never be carried anywhere in the aeroplane, especially not the baggage compartment. Care should be taken with loading the baggage compartment, as if not properly secured, baggage may slide forward into the passenger cabin during turbulence or manoeuvring. An optional baggage net with six tie-down straps may be provided for securing baggage, and is attached by tying the straps to tie-down rings provided in the airplane.

The baggage door has a push latch incorporating a key lock. Due to the low pressure around the aircraft, baggage doors sometimes open during flight and care should be taken to ensure the door is closed securely. For this reason it is recommended whenever possible that the lock is used.
Cabin and Door Dimensions

The following diagram illustrates the approximate dimensions of the cabin and positions of the cabin doors.

![Door Dimensions Diagram](image)

Figure 2h Door Dimensions

Flight Controls

The aeroplane’s flight control system consists of conventional aileron, rudder and elevator control surfaces. The control surfaces are manually operated through mechanical linkages to the control wheel for the ailerons and elevator, and rudder/brake pedals for the rudder. A manually-operated elevator trim tab is provided and installed on the right elevator.

The control surfaces are formed in a similar way to the wing and tail section with the inclusion of the balance weights, actuation system (control cables etc) and trim tabs. Control actuation is provided by a series of push-pull rods, bellcranks, pulleys and cables with their respective connections.

Elevator

The elevator is hinged to the rear part of the horizontal stabilizer on both sides. The main features are:

- an inset hinge with balance weights;
- an adjustable trim tab on right hand side of the elevator.
The elevator is operated by fore-and-aft movement of either the pilot or copilot’s control wheel.

The elevator control cables at their ends, are attached to a bell-crank mounted on a bulkhead in the tail cone. A push-pull tube connects this bell-crank to the elevator arm assembly, installed between the elevators. The leading edge of both left and right elevator tips incorporate extensions which contain the balance weights and act as hinge tabs. This aerodynamically and mechanically assists with control input by reducing the force required to move the elevator.

**Ailerons**

Conventional hinged ailerons are attached to the trailing edge of the wings. Main features of the aileron design include:

- a forward spar containing aerodynamic 'anti-flutter' balance weights;
- “V” type corrugated aluminium skin joined together at the trailing edge;
- differential and Frise design;
- fixed ground adjustable trim tabs.

**Differential and Frise Design**

The ailerons incorporate both Differential and Frise design. Differential refers to the larger angle of travel in the up position to the down position, increasing drag on the down-going wing. Frise-Type ailerons are constructed so that the forward part of the up-going aileron protrudes into the air stream below the wing to increase the drag on the down-going wing. Both features acting to reduce the effect of 'adverse aileron yaw', reducing the required rudder input during balanced turns. These features have the additional advantage of assisting with aerodynamic balancing of the ailerons, thus reducing the control force required.

The left aileron is equipped with a ground adjustable trim tab on the inboard end of the trailing edge, and balance weight in the leading edges.
Electrical System

Electrical energy for the aircraft is supplied by a 14 or 28-volt, direct-current, single wire, negative ground, electrical system. A 12 or 24 volt battery supplies power for starting and furnishes a reserve source of power in the event of alternator failure. An external power source receptacle may be installed to supplement the battery for starting and ground operation.

Alternator and Battery

Models produced from 1972, C210L and later had a 24 volt battery, with a 28 Volt alternator. The battery had either a standard 12.75 ampere-hour, or optional 15.6 ampere-hour capacity. Models produced before 1972 had a 12 volt battery, with a 14 Volt alternator, or for models C210D and earlier a 12 volt generator.

The amp/hour is the capacity of the battery to provide a current for a certain time. A 12.75 amp/hour battery is capable of steadily supplying a current of 1 amp for 12.75 hours and 6.3 amp for 2 hours and so on.

The battery is normally mounted on the left forward side of the firewall. Battery location in earlier models varies, from the engine compartment to aft of the cargo compartment, and even under the pilot seat in the C210A.

A standard 60 amp (or optional 95-amp) engine-driven alternator is the normal source of power during flight and maintains a battery charge, controlled by a voltage regulator/alternator control unit.

A 28-volt electrical system with 24-volt battery means that because the alternator provides 28-volt power, which is more than battery power, so the battery charge is maintained while in normal operation.

Electrical Equipment

On the Cessna-210, the following standard equipment requires electrical power for operation (there may be additional optional equipment which uses electrical power):
- Fuel quantity indicators;
- All internal and external lights and beacon, including warning lights;
- Pitot heat;
- Wing flaps;
- Gear retraction/extension operation (except older engine driven manual systems);
- Starter;
- All radio and radio-navigation equipment.
System Protection and Distribution

Electrical power for electrical equipment and electronic installations is supplied through the split bus bar. The bus bar is interconnected by a wire and attached to the circuit breakers on the lower, centre of the instrument panel.

The circuit breakers are provided to protect electrical equipment from current overload. If there is an electrical overload or short-circuit, a circuit breaker (CB) will pop out and break the circuit so that no current can flow through it.

It is normal procedure (provided there is no smell or other sign of burning or overheating) to reset a CB once only, after a cooling period, by pushing it back in.

Most of the electrical circuits in the aeroplane are protected by “push-to-reset” type circuit breakers. However, alternator output and some others are protected by a “pull-off” type circuit breaker to allow for voluntary isolation in case of a malfunction. Electrical circuits which are not protected by circuit breakers are the battery contactor closing (external power) circuit, clock circuit, and flight hour recorder circuit.

These circuits are protected by fuses mounted adjacent to the battery and are sometimes termed “hot wired or hot bus” connections because they are directly wired to the battery.

The master switch controls the operation of the battery and alternator system. The switch is an interlocking split rocker type, with the battery mode on the right hand side and the alternator mode on the left hand side. This arrangement allows the battery to be on line without the alternator, however, operation of the alternator without the battery on the line is not possible.

The switch is labelled BAT and ALT and is located on the left-hand side of the instrument panel. Continued operation with the alternator switch OFF will deplete the battery power. If the battery power becomes too low the battery contactor will open, removing power from the alternator field, and prevent the alternator from restarting. This is important to remember if you are starting an aeroplane by other means because of a flat battery.
The ammeter, normally located on the upper right side of the instrument panel, indicates the flow of current, in amperes, from the alternator to the battery (charge) or from the battery to the aircraft electrical system (discharge).

When the engine is operating and the master switch is ON, the ammeter indicates the charging rate applied to the battery. When the ammeter needle is deflected right of centre, the current flows into the battery and indicates the battery charge rate. When the ammeter needle is deflected left of centre, the current flows from the battery and the battery is therefore discharging.

With battery switch ON and no alternator output, the ammeter will indicate a discharge from the battery, because the battery is providing current for the electrical circuits that are switched on.

If the alternator is ON, but incapable of supplying sufficient power to the electrical circuits, the battery must make up the balance and there will be some flow of current from the battery. The ammeter will show a discharge. In this case, the load on the electrical system should be reduced by switching off unnecessary electrical equipment until the ammeter indicates a charge. A charge rate from the alternator to the battery will be shown due to fluctuations in the supply and demand and lags in the voltage regulation control. Indication of charge from the system to the battery more than temporarily, may indicate more serious problems and should be checked out immediately. Excessive charging may damage the battery, or essential electrical equipment and can cause an electrical fire.

An alternator failure may be detected by a red warning light near the ammeter labelled, HIGH-VOLTAGE on early models or LOW VOLTAGE on later models, or by a discharge on the ammeter where no light is installed. The switch was labelled HIGH VOLTAGE on early models as illumination would occur after the alternator was removed from the circuit due to an over-voltage condition, however the light will come on whenever the alternator is removed from the circuit. Although there is a slight difference in the components of the two systems, the basic function is the same, and is described more accurately by the later name.
In models with a generator, there is a light labelled GEN, which indicates when the generator is supplying insufficient power to the battery, which will illuminate steady if the generator is removed from the circuit, and will also often flicker on at idle or in situations requiring high electrical load.

Models without an over-volt sensor (1966-1969) do not have a warning light, although one may have been installed later as an optional modification. On these models, system protection is provided by means of a circuit breaker, and the only means of determining if the alternator is offline is by the ammeter discharge.

In the event an over-voltage condition occurs, the over-voltage sensor, if installed, automatically removes the alternator field current and shuts down the alternator. The red warning light will then turn on, indicating to the pilot that the battery is supplying all electrical power. This condition can be confirmed by a discharge on the ammeter.

The over-voltage sensor may be reset by turning both sides of the master switch OFF and back ON again. If the light extinguishes, the over-volt condition was transient, however if the light illuminates again, a malfunction has most likely occurred, and the remainder of the flight will be with an electrical supply from battery source alone.

If illumination of the warning light is due to a temporary under-volt situation need not be recycled since an over-voltage condition has not occurred to de-activate the alternator, the light will go out once the voltage returns to normal.

The warning light may be tested by momentarily turning OFF the ALT portion of the master switch.

In all aircraft it may be possible to have an over-voltage situation which does not trip the protection mechanisms. This will only be evident by an excessive rate of charge on the ammeter. In this case the alternator must be shut off as soon as possible to prevent damage to the battery or electrical system, including a possible electrical fire. Reducing the electrical load before attempting to reset may assist in rectifying the situation, however due to the large variations in systems and the non time-critical nature of electrical faults, for secondary actions the POH must be referred to.

For more information on electrical system malfunctions refer to Non-normal Flight Procedures section.

On the following page a schematic of the electrical system can be seen.