

# *"The Straight Word"*

## **Cessna 208 Caravan**

*208 Caravan I & 208B Grand Caravan Series*

### **I. FLIGHT PROCEDURES:**

#### ***COCKPIT PREPARATION***

Fuel Tank Selectors	Both On
Ignition Switch	Norm
Heading Bug	Set QFU
HSI Course Indicator	Set Course
Altimeters	Set QNH
Emergency Power Lever	Normal
Power Lever	Idle
Propeller Lever	High RPM
Condition Lever	Cutoff
Trims	Set for Takeoff
Bleed Air Switch	Off

#### ***BEFORE START***

Parking Brake	Apply
Battery	On, Check Voltage
Beacon	On

#### ***ENGINE START***

Fuel Boost Switch	Norm, then On
Starter Switch	Start

Once N1 has stabilised at a minimum of 12%, fuel may be opened. Engine light-off should occur about 3 seconds thereafter – abort after 10 seconds if no light-off. Maximum ITT during engine start is 1090°C:

Condition Lever	Low Idle, Check ITT
At 52% N1, Starter Switch	Off
Engines Instruments	Check
Generator	Check Online
Fuel Boost Switch	Norm

## **AFTER START**

Avionic 1 & 2 Switches	On
Standby Power	On
Cabin Signs	Set
Flaps	Set 0° to 20°
Inertial Separator	As Required

## **TAXIING**

Taxi Light	On
Parking Brake	Release
Brakes	Test
Flight Instruments	Check
Flight Controls	Check

## **RUN-UP**

The run-up shall be made before the first flight of the day.

Overspeed Governor	Check Stable @ 1750 RPM
Standby Power	Check by Generator Trip

## **BEFORE TAKE-OFF**

Annunciator Panel	Check
Landing Lights	On
Taxi Light	Off
Condition Lever	High Idle

## **AFTER TAKE-OFF**

The normal takeoff torque is 1658 lb-ft (208) or 1865 lb-ft (208B), with an ITT limitation of 805°C. Rotation occurs at 75 KIAS with flaps up and at 70 KIAS with flaps 20°.

A speed of 90 KIAS should be maintained for the initial climb, unless obstacles are a threat; in that case, 83 KIAS should be maintained for best angle of climb with flaps 20° until obstacles are cleared. Then, upon reaching the takeoff safety altitude (ASD):

Flaps	Up
Climb Power (ITT 740°C)	(208) Set 1658 lb-ft & 1750 RPM (208B) Set 1865 lb-ft & 1750 RPM
Altimeters	Set Standard
Landing Lights	Off

A climb speed of 120 KIAS shall then be taken for a normal climb.

## **DESCENT**

Fuel Tank Selectors  
Altimeters

Both On  
Set QNH

### ***BEFORE LANDING***

The normal arrival technique calls for the following steps:

- Flaps 10°.
- Flaps 20°.
- Flaps 30°.
- Propellers Max RPM.
- Inertial Separator as Required.

A speed of 120 KIAS shall be maintained in the approach environment. The required torque to maintain a Vref of 80 KIAS (flaps 30°) normally stands around 350 lb-ft.

### ***AFTER LANDING***

Flaps	Up
Ice Protection	Off
Landing Lights	Off
Taxi Light	On
Condition Levels	Low Idle

### ***ENGINE SHUTDOWN***

Avionics 1 & 2 Switches	Off
Standby Power Switch	Off
Fuel Boost Switch	Off
Propeller	Feather
Condition Lever	Cut Off
All Electrical Switches	Off
Battery	Off
Fuel Tank Selectors	Off to Avoid Crossfeeding

## **II. SYSTEMS DESCRIPTION:**

### ***FLIGHT CONTROLS***

Conventional surfaces, operated mechanically. The ailerons are aided by a pair of spoilers at high deflections.

Mechanical trims.

### ***ENGINES & PROPELLERS***

One Pratt & Whitney PT6A-114, 600 shp (208).

One Pratt & Whitney PT6A-114A, 675 shp (208B).

Engine limitations:

- Torque : 1658 lb-ft (-114), 1865 lb-ft (-114A).
- Propeller : 1600 - 1900 RPM.
- ITT : 740°C (cruise), 765°C (cont), 805°C (t/o), 1090°C (stt).

(Torque values in the stripped green arc may be used as long as the RPM prevents the horsepower from exceeding rated limit – see performance charts)

An Emergency Power Lever is installed to manually override the FCU in case of a malfunction. If the FCU fails, the engine will decrease to idle; move the Emergency Power Lever away from the Normal position and use it instead of the regular power level. Caution should be used with respect to ITT, because engine response will be more rapid than when using the regular power lever.

The ignition switch must be turned on when flying into heavy precipitations or attempting an engine relight.

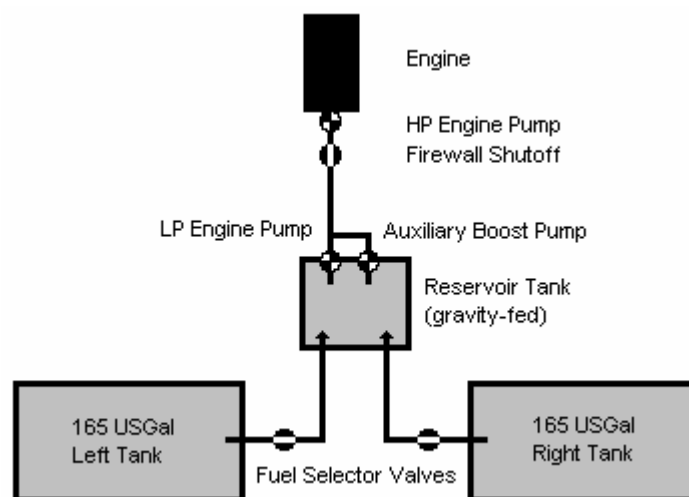
An inertial separator, mechanically actuated, prevents ingestion of ice or debris by the engines and must be On when operating in heavy precipitation or on unimproved runways. It causes a slight torque loss.

The propeller is controlled by three governors: one primary (standard type) and two secondary (standard overspeed and FCU restrictor). It can be feathered and reversed.

## **FUEL SYSTEM**

Two fuel tanks in the following configuration:

- Mains : 2 x 166 USGal (2 x 1110 lbs)
- Total : 332 USGal ( 2220 lbs )  
= 1261 litres.



Fuel falls by gravity from the Main Tanks into a small Reservoir Tank. The engine feeds from that Reservoir Tank via an engine-driven LP pump. The engine-driven LP pump is backed up by an electrical Auxiliary Boost Pump. The Auxiliary Boost Pump has three positions: Off,

Norm (armed with a low fuel pressure sensor) and On (continuously on). The amber Auxiliary Fuel Pump On Annunciator will blink when the pump is armed but not operating, and will be lit continuously when the pump is operating.

The Fuel Tank Selector Valve is provided with a warning horn and a red Fuel Select Off Annunciator to prevent inadvertent mishandling. The horn will sound in these three cases:

- Both Fuel Tank Selectors Off.
- Starter engaged with one Fuel Tank Selector Off.
- One Fuel Tank Selector Off with fuel tank in use containing less than 25 USGal.

This warning system is tied to the START CONT and the FUEL SEL WARN circuit breakers, and these should be checked if a malfunction occurs.

Fuel transfer from one side to the other is possible by gravity or asymmetrical flight.

Two amber Fuel Low Annunciators will light up if the respective tank contains less than 25 USGal. A red Reservoir Fuel Low Annunciator is also provided if the reservoir is less than half-full.

The engine shutdown system provides an EPA can which receives the residual fuel in the lines, blown by P3 air after cutoff. The EPA can shall be drained everyday.

Maximum fuel imbalance is 200 lbs.

## ***HYDRAULIC SYSTEM***

Standard small-aeroplane brakes system using MIL-H-5606 fluid.

## ***ELECTRICAL SYSTEM***

28 VDC system:

- One 40-amp-hour battery on the front right side of the firewall.
- One 200-amps starter-generator.
- One standby 75-amps alternator.

The standby alternator may be used in case of generator failure. The Stby Pwr Switch should be set On and the amber Stby Elect Pwr On and Stby Elect Pwr Inop lights monitored. For the avionics to be used, the regular Avionics 1 and 2 Switches should be turned Off, while the Avionics Stby Pwr and Avionics Bus Tie Switches should be turned On. The normal power supply circuit can be completely isolated by pulling the six 30-amp breakers labelled BUS 1 PWR and BUS 2 PWR. The standby alternator will work with the battery off. Standby Power is normally on at all times in flight, but must be turned off before engine shutdown to avoid draining the battery (exciting current).

The External Power Switch has three positions: Off, Starter (GPU to starter only) and Bus (GPU to bus only).

Some aeroplanes are equipped with dual inverters to provide 26 VAC and 115 VAC to the autopilot exclusively.

## ***ENVIRONMENTAL SYSTEMS***

The airplane is not pressurized, and air conditioning is an option. Heating and windshield defrosting are achieved by placing the Bleed Air Heat Switch in the On position and using the three adjacent levers. The hot air will be depressed and mixed P3 air.

## ***LANDING GEAR & WING FLAPS***

Fixed landing gear.

The electrical single-slot wing flaps have four positions: Up, 10°, 20° and 30°.

There is a standby electrical motor to actuate the flaps if the main motor fails. First, move the Standby Flap Motor Switch from Norm to Stby to disable the main motor, then move the Standby Flap Motor Up/Down Switch as desired. The limit switches are disabled as well when using the standby motor, hence actuation should be terminated before the flaps reach full up or down travel.

## ***FIRE PROTECTION***

A red Engine Fire Annunciator and a Firewall Shutoff Valves. No fire extinguisher.

## ***ICE PROTECTION***

The following ice protection devices are switch activated and must be turned on at all times during flight:

- Pitot Heat: electrical.
- Stall Heat: electrical.

The following ice protection devices must only be turned on when flying into icing conditions:

- Windshield Anti-Ice Panel: electrical.
- Propeller Deice: electrical, two 90-second cycles (on and off).
- Surface Deice Boots: pneumatic, when ice grows over 1 in. thick.

## **III. PERFORMANCE:**

These figures are valid respectively for a 600-shp 208 and a 675-shp 208B with the cargo pod installed. They are computed with the bleed air off.

### ***TAKEOFF (208)***

Normal takeoff:                    1658 lb-ft torque, 1900 RPM, flaps up.

Use a Vr of 75 KIAS. For a paved field at 2000 ft elevation, ISA, no wind, MTOW and inertial separator off, expect a TODR of 1000 metres.

Short-field takeoff: 1658 lb-ft torque, 1900 RPM, flaps 20°.

Use a Vr of 70 KIAS. For a clean dirt field at 2000 ft elevation, ISA + 20°C, no wind, MTOW and inertial separator on, expect a TODR of 900 metres.

### ***TAKEOFF (208B)***

Flex takeoff: Torque to achieve 740°C ITT, 1900 RPM, flaps 10°.

Use a soft-field takeoff technique. For a paved field at 2000 ft elevation, ISA, no wind, MTOW and inertial separator off, expect a TODR of 1800 metres.

Normal takeoff: 1865 lb-ft torque, 1900 RPM, flaps up.

Use a Vr of 75 KIAS. For a paved field at 2000 ft elevation, ISA, no wind, MTOW and inertial separator off, expect a TODR of 1400 metres.

Short-field takeoff: 1865 lb-ft torque, 1900 RPM, flaps 20°.

Use a Vr of 70 KIAS. For a clean dirt field at 2000 ft elevation, ISA + 20°C, no wind, MTOW and inertial separator on, expect a TODR of 1000 metres.

### ***CLIMB (208)***

Normal climb: 1658 lb-ft torque, 1900 RPM, 765°C max ITT.

Use a 120 KIAS cruise climb speed, and expect a MTOW rate of climb of 850 fpm at MSL.

### ***CLIMB (208B)***

Flex climb: Torque to achieve 740°C ITT, 1900 RPM.

Use a 115 KIAS cruise climb speed, and expect a MTOW rate of climb of 650 fpm at MSL & ISA.

Normal climb: 1865 lb-ft torque, 1900 RPM, 765°C max ITT.

Use a 115 KIAS cruise climb speed, and expect a MTOW rate of climb of 850 fpm at MSL & ISA.

### ***CRUISE (208)***

“Coco” cruise: 1300 lb-ft torque, 1750 RPM, 740°C max ITT.

Expect to cruise at 160 KTAS, with a fuel consumption of 300 PPH at FL100. For flight planning purposes, a speed of 150 knots and an overall consumption of 350 PPH for the first hour and 300 PPH for the next ones may be used.

### ***CRUISE (208B)***

Normal cruise: Torque to achieve 720°C ITT, 1750 RPM.

Expect to cruise at 160 KTAS, with a fuel consumption of 330 PPH at FL100 & ISA. For flight planning purposes, a speed of 150 knots and an overall consumption of 350 PPH may be used.

### ***LANDING (208)***

Short-field landing: flaps 30°, full brakes and reverse on impact.

Use a Vref of 78 KIAS. For a paved field at 2000 ft elevation, ISA + 20°C, no wind and MLW, expect an LDR of 475 metres.

### ***LANDING (208B)***

Short-field landing: flaps 30°, full brakes and reverse on impact.

Use a Vref of 78 KIAS. For a paved field at 2000 ft elevation, ISA + 20°C, no wind and MLW, expect an LDR of 600 metres.

## **IV. WEIGHT & BALANCE:**

### ***LIMITATIONS***

(208)		(208B)	
MRW	8,035 lbs	MRW	8,785 lbs
MTOW	8,000 lbs	MTOW	8,750 lbs
MLW	7,800 lbs	MLW	8,500 lbs
MZFW	none		
Max Passengers	9		

### ***USEFUL LOADS***

(208)	
APS Weight (Standard 3 pax seats, 2 crew)	5,200 lbs
Maximum Fuel Load (332 USGal)	2,220 lbs
Maximum Useful Load	2,835 lbs
Full Fuel Useful Load	615 lbs

(208B)	
APS Weight (Standard 5 pax seats, 2 crew)	5,545 lbs
Maximum Fuel Load (332 USGal)	2,220 lbs
Maximum Useful Load	3,240 lbs
Full Fuel Useful Load	1,015 lbs



## **V. SPEEDS:**

V<sub>so</sub> = 50 KIAS  
V<sub>si</sub> = 63 KIAS

V<sub>x</sub> = 86 KIAS (208)  
72 KIAS (208B)  
V<sub>y</sub> = 106 KIAS (208)  
104 KIAS (208B)

V<sub>fe/10°</sub> = V<sub>mo</sub>  
V<sub>fe/20°</sub> = 150 KIAS  
V<sub>fe/30°</sub> = 125 KIAS

V<sub>a</sub> = 150 KIAS @MTOW (208)  
148 KIAS @MTOW (208B)  
V<sub>mo</sub> = 175 KIAS

V<sub>bg</sub> = 96 KIAS @ MTOW (208)  
95 KIAS @ MTOW (208B)