AIRPLANE FLIGHT MANUAL

CAPRONI VIZZOLA
C22J

Serial NO MSFS-V1.2.7

Registration NO I-CAVT

Type Certificate NO MND-2021

THIS HANDBOOK INCLUDES THE MATERIAL, REQUIRED TO BE FURNISHED TO THE PILOT BY REGRISTRO AERONAUTICO ITALIANO REGULATIONS AND ADDITIONAL INFORMATION PROVIDED BY THE MANUFACTURER.

Manufacturer Name: CAPRONI VIZZOLA

Address: https://www.mariosplanes.com/

TABLE OF CONTENTS

SECTION 1
GENERAL

1.1. NOTES TO USERS

General

It is the pilot's responsibility to be familiar, at all times, with the content matter of this Flight Manual, Information is contained in seven sections, viz:

Section 1 General

Section 2 Limitations

Section 3 Emergency Procedures

Section 4 Normal Operating Procedures

Section 5 Performance

Section 6 Weight and Balance

Section 7 Systems Manual

Information in this flight manual relates to an aeroplane typically equipped with acrobatic certification standards.

Each section contains a detailed list of contents. Whenever the certification of airworthiness is required to be carried, this flight manual must also be aboard the aeroplane as it is an essential part of the above-mentioned certificate.

Applicability

Application of this flight manual is limited to the specific Caproni Vizzola C22J Flight Simulator model designated by serial number on the face of the title page.

This manual is not to be used for real world operations.

Page Identification

The page numbers in each section include se section number and a dash (i.e. "3" for all pages in the "Emergency Procedures" section) followed by serial number of the page beginning with "1" for each section, such as 3-1. 3-3, etc.

Each page bears a page number at the bottom.

1.2. DIMENSIONS AND AREAS

A three-view illustration showing the pertinent details of the aeroplane appears in Fig.1 and 2.

1.3. ENGINES

(a)	Number of Engines	2
(b)	Engine Manufacturers	Microturbo
(c)	Engine Model Number	TRS 18-1-202
(d)	Take-Off Thrust	145 daN
(e)	Engine RPM at Take-Off	48750
(f)	Maximum Continuous Thrust	130 daN
(g)	Engine RPM	47000
(h)	Engine type	
	Compressor stages and Type	1-centrifugal
	Turbine stages and Type	1-axial
	Combustion chamber Type	annular reverse flow

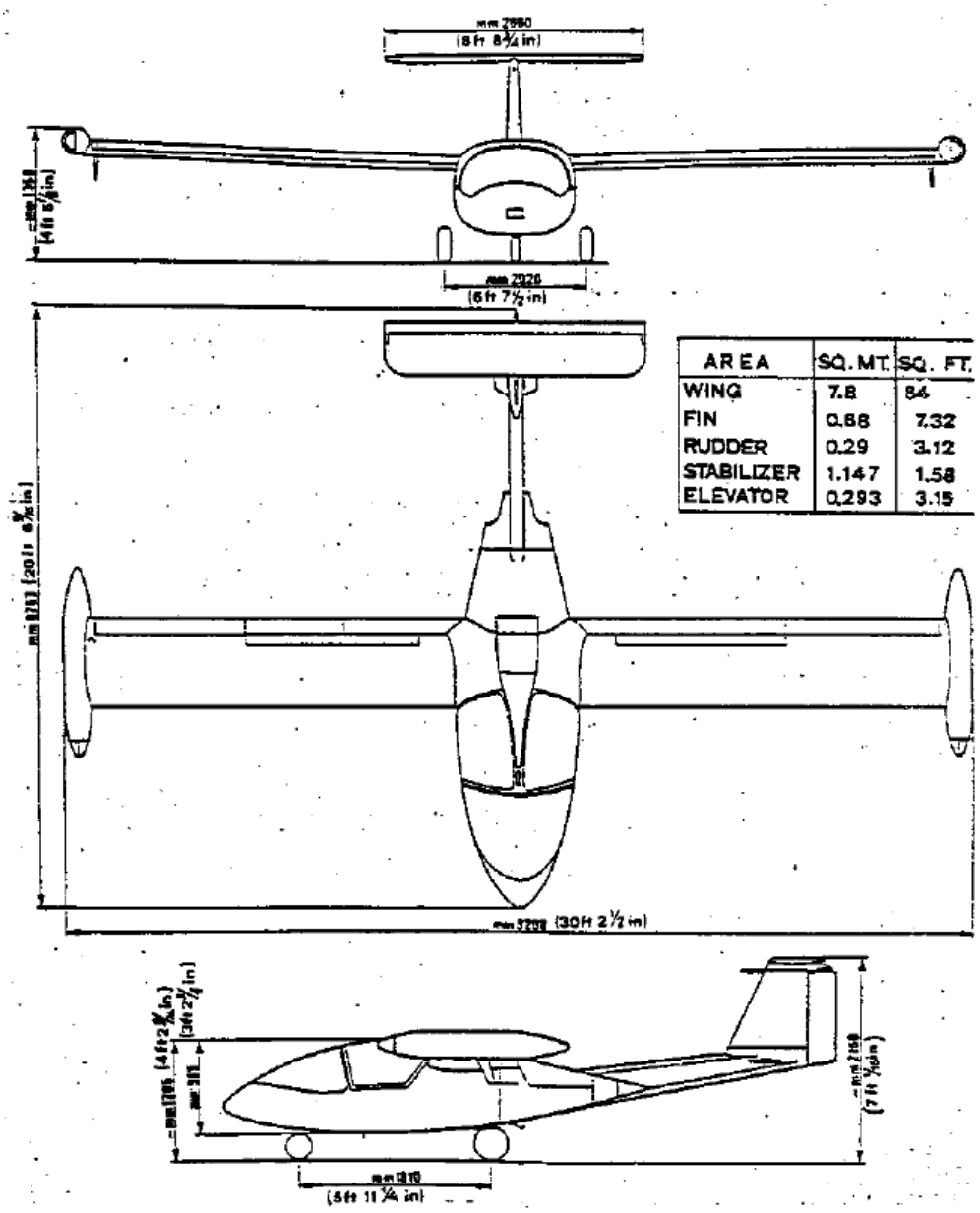


Figure 1-1

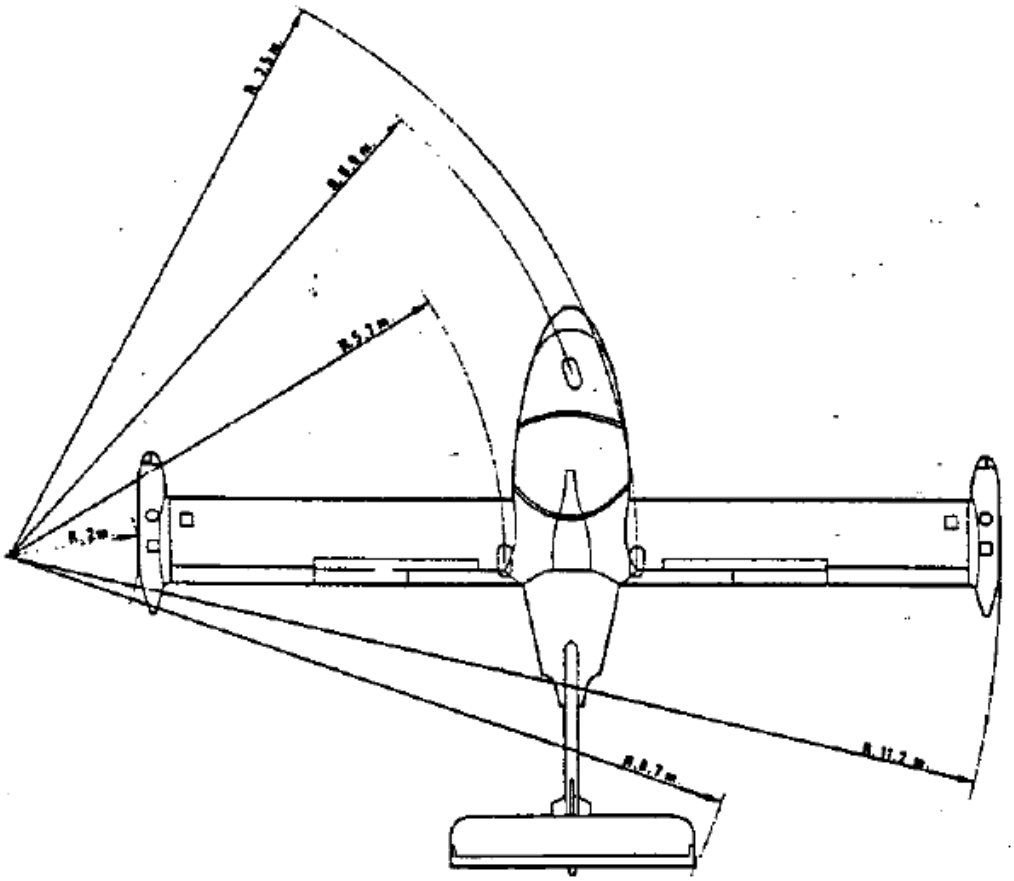


Figure 1-2

Turning Radius

1.4. FUEL

a) Fuel Capacity (total)
(US Gal / lit) 113.6 / 430

b) Usable Fuel (total)
(US Gal / lit) 110.6 / 418.5

c) Fuel Specification

FUEL TYPE	NATO CODE	SPECIFICATIONS		COMMERICAL DENOMINATION
		FRANCE	U.K.	
Kerosene + 50°C (+ S 7.48)	F 34	AIR 3405/ C/F-34	D. Eng. RD 2453	Fuel TRO Kerosene JP 5 AVTUR/ FS II (with antifreeze additive) MIL T 83133
Kerosene + 50°C (without inhibitor)	F 35	AIR 3405/ C/F-35	D. Eng. RD 2494	Fuel TRO Kerosene JP 5 AVTUR ASTM-D-1655 JET A1 or JET A (without antifreeze additive)

For operations into forecast temperature below +5 °C the use of fuel anti-icing additive Phillips PFS-55MB is required. The additive concentration by volume shall be a minimum of 0.08 and maximum of o.15 percent.

1.5. OIL

a)	Oil Capacity (each engine) (US Gal / lit)	0.211 / 0.8
b)	Usable Oil (US Gal / lit)	0.132 / 0.5
c)	Oil Specification	MIL-L-23699 or MIL-L-7808

1.6. WEIGHTS

		Lb	Kg
a)	Maximum Take-Off Weight	2764	1255
b)	Maximum Landing Weight	2582	1172
c)	Maximum Zero-Fuel Weight	2037	925
	Maximum Weight in the baggage compartment	24	11
d)	Standard Empty Weight	1628	739

1.7. SPECIFIC LOADING

a)	Wing loading (lb/ sq ft – Kg / sq mt)	33 / 161
b)	Thrust Loading (Max Thrust / T.O.W.)	0.235

1.8. BAGGAGE COMPARTMENT

		Lb	Kg
a)	Maximum Load Allowed	24	11

1.9. DEFINITIONS AND ABBREVIATIONS

(a) General Airspeed terminology and symbols

CAS	Calibrated Airspeed means the indicated speed of an aircraft, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
KCAS	Calibrated Airspeed expressed in “knots”.
GS	Ground speed is the speed of an airplane relative to the ground.
IAS	Indicated airspeed is the speed of an aircraft as shown in the airspeed indicator when corrected for instrument error. IAS values published in this manual assume zero instrument error.
KIAS	Indicated Airspeed expressed in “Knots”.
M	Mach number is the ratio of true airspeed to the speed of sound.
TAS	True Airspeed is the speed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature and compressibility.
KTAS	True Airspeed expressed in “Knots”.
V_A	Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
V_{FE}	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.
V_{LO}	Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.
V_{LE}	Maximum Landing Gear Extended Speed is the maximum speed at which the aircraft can be safely flown with the landing gear extended.
V_{BE}	Maximum Airbrakes Extended Speed is the maximum speed permissible with airbrakes in extended position.
V_{BO}	Maximum Airbrakes Operating Speed is the maximum speed at which the airbrakes can be safely operated.
V_{MC}	Air Minimum Control Speed is the minimum flight speed at which the airplane is directionally and laterally controllable, determined in accordance with Certification Regulations. Airplane Certification conditions include one engine becoming inoperative, not more than a 5° bank towards the operative engine, takeoff power on operative engine, landing gear up, flaps in takeoff position and most critical C.G. NOTE: for this airplane it is not an operating limitation.

V_{MO}/M_{MO}	Maximum Operating Limit Speed is the speed limit that may not be deliberately exceeded in normal flight operations. V is expressed in Knots and M in Mach number.
V_S	Stalling Speed or the minimum steady flight speed at which the airplane is controllable.
V_{SI}	Stalling Speed or the minimum steady flight speed obtained in a specific configuration.
V_{S0}	Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.
V_X	Best Angle-of-Climb speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.
V_Y	Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

(b) Meteorological terminology

ISA	International Standard Atmosphere in which: The air is a perfect dry gas; The temperature at sea level is 15°C (59°F); The pressure at sea level is 29.92 In Hg (1013.2 mb); The temperature gradient from sea level to the altiutude at which temperature is -56.5°C (-69.7°F) is -0.00198°C (-0.003564°F) per foot and zero above that altitude.
OAT	Outside Air Temperature is the free air static temperature obtained either from inflight temperature indications or ground meteorological sources, corrected for instrument error and compressibility effects.
INDICATED PRESSURE ALTITUDE	The number actually read from an altimeter when the barometric subscale has been set to 29.92 In Hg (1013.2 mb).
PRESSURE ALTITUDE	Altitude measured from standard sea level pressure (29.92 In Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this manual altimeter instrument errors are assumed to be zero.
STATION PRESSURE	Actual atmospheric pressure at field elevation.
WIND	The Wind Velocities recorded as variables on the chart of this manual are to be understood as the headwind or tailwind components of the reported wind.
HEIGHT	The vertical distance between the lower part of the aeroplane and the relevant datum.

(c) Thrust Terminology

TAKEOFF THRUST	Maximum thrust possible during takeoff.
MAXIMUM CONTINUOUS THRUST	Maximum thrust permissible for unrestricted periods of use.

(d) Engine Controls and Instruments

EGT GAUGE	Exhaust Gas Temperature Gauge indicates temperature of the gases at the outlet of the gas producer turbine rotor.

(e) Airplane Performance and Flight Planning Terminology

CLIMB GRADIENT	The ratio, in the same units, and expressed as percentage of: $\frac{\text{Change in height}}{\text{Horizontal distance travelled in the same time interval}}$
DEMONSTRATED CROSSWIND VELOCITY	The demonstrated crosswind velocity is the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. Is not considered a limitation.

(f) Weight and Balance

REFERENCE DATUM	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
ARM	The horizontal distance from the reference datum to the center of gravity (C.G.) of the item.
MOMENT	the product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits).
CENTER OF GRAVITY (C.G.)	The pint at which the airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. ARM	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. LIMITS	The extreme center of gravity locations within which the airplane must be operated at a given weight.
USABLE FUEL	Fuel available for flight planning.

UNUSABLE FUEL	Fuel remaining after a runout test has been completed in accordance with certification regulations.
STANDARD EMPTY WEIGHT	Weight of a standard airplane including unusable fuel, as defined by the Equipment List.
BASIC EMPTY WEIGHT	Standard Empty Weight plus optional equipment actually installed.
PAYLOAD	Weight of occupants, Cargo and baggage.
USEFUL LOAD	Difference between takeoff weight and basic empty weight. It includes payload and usable fuel.
MAXIMUM TAKEOFF WEIGHT	Maximum weight approved.
MAXIMUM LANDING WEIGHT	Maximum weight approved for the landing touchdown.
MAXIMUM ZERO FUEL WEIGHT	Maximum weight with no usable fuel.

SECTION 2
LIMITATIONS

2.1. GENERAL

Section 2 of this manual presents the operating limitations, the significance of such limitations, instrument marking, colour coding and basic placards necessary for the safe operation or the airplane, its powerplant, standard systems and standard equipment.

NOTE:

The limitations included in this section are approved by the Registro Aeronautico Italiano.

2.2. AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2.1.

Variation of airspeed limit with height is shown in Figure 2.2.

SPEED	CAS	IAS	REMARKS
Maneuvering Speed V_A (Knots)	228	231	Do not make full or abrupt control movements above this speed.
Maximum Flap Extended Speed V_{FE} (Knots)	150	152	Do not exceed this speed with a given flap setting.
Maximum Landing Gear Operating Speed V_{LO} (Knots)	140	142	Do not extend or retract landing gear above this speed.
Maximum Landing Gear Extended Speed V_{LE} (Knots)	140	142	Do not exceed this speed with landing gear extended.
Maximum Airbrakes Extended / Operating Speed V_{BE} (Knots) / V_{BO}	150	152	Do not exceed this speed with airbrakes extended or for airbrakes operation.
Maximum Operating Speed Limit V_{MO} (Knots) M_{MO} (Mach #)	257 0.473	260 0.48	Do not exceed this airspeed or Mach in any operation (V_{MO} is limiting speed up to 10700 ft)

Note: V_{MC} is not a limitation for this airplane.

Figure 2-1

Airspeed Limitations

Figure 2-2

Airspeed Limitation with Altitude

2.3. AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color significance are given in Fig. 2.3

MARKING	IAS VALUE OR RANGE	SIGNIFICANCE
White Arc	70 - 152 KTS	Full Flap Operating Range. Lower limit is the maximum weight stalling speed in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Blue Sector	114 – 124 KTS	One Engine Inoperative Best Rate of Climb at 1255 Kg (2767 lb) between S.L. and 14000 ft.
Red Lines	260 / 0.48	Maximum Speed for all operations (V_{MO} / M_{MO})

Figure 2-3

Airspeed Indicator Markings

NOTE: The Flight Simulator model depicts the Airspeed indicator as mounted in the prototype airframes. The markings are not present.

2.4. POWER PLANT LIMITATIONS

d) Number of Engines 2
e) Engine Manufacturer MICROTURBO
f) Engine Model Number TRS 18-1-202
g) Engine Operating Limits
See Fig. 2.4 and 2.5
h) Maximum starting altitude 20000ft
See Fig. 2.5

OPERATING CONDITION	OPERATING LIMITS				
	N%	EGT (°C) max	OIL PRESS. (bar) max	OIL TEMP. (°C) max	FUEL PRESSURE (bar)
TAKEOFF (1)	104	820 - 860	0.7 - 3	140	1.2 - 3
MAX CONTINUOUS	100	820	0.7 - 3	140	1.2 - 3

(1) Max time for take-off thrust: 2 minutes.

Figure 2-4

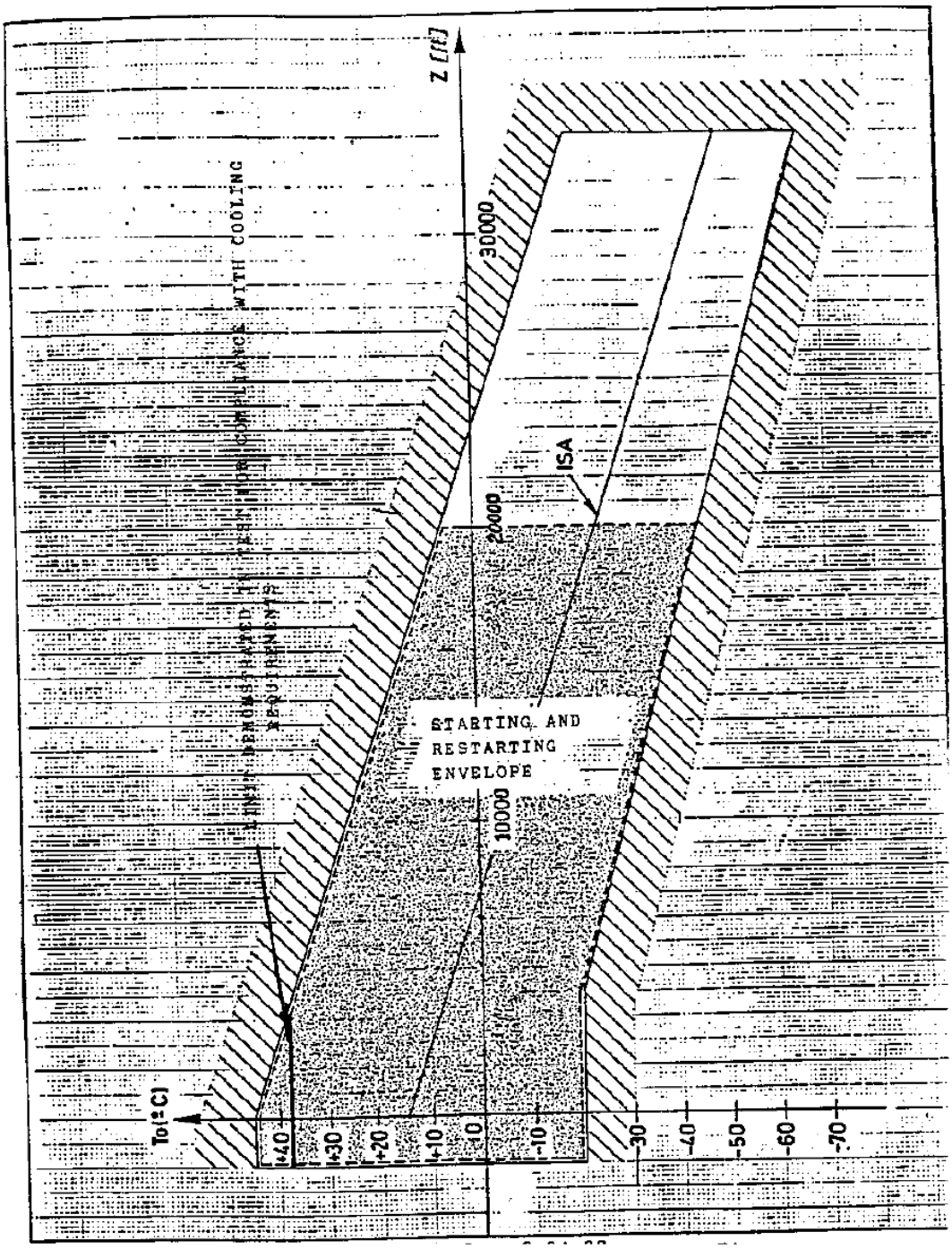


Figure 2-5

Operating Envelope

i) Fuel Specification

FUEL TYPE	NATO CODE	SPECIFICATIONS		COMMERICAL DENOMINATION
		FRANCE	U.K.	
Kerosene – 50°C (+ S 748)	F34	AIR 3405 / C/F-34	D. Eng. RD 2453	Fuel TRO Kerosene JP8 AVTUR/ FS II (with antifreeze additive) MIL T 83133
Kerosene – 50°C (without inhibitor)	F35	AIR 3405 / C/F-35	D. Eng. RD 2494	Fuel TRO Kerosene JP8 ASTM-D-1655 JET A1 or JET A (without antifreeze additive)

For operations into forecast temperatures below +5°C the use of fuel anti-icing additive Phillips PFS-S5MB is required.

The additive concentration by volume shall be a minimum of 0.08% and a maximum of 0.15%.

(g) Oil Specification
Oil conforming to MIL-L-23699B or MIL-L-7808

(h) Ambient Temperature Limitations:
Maximum atmospheric Temperature at which compliance with cooling requirements is shown: 37.8°C (100°F).

2.5. POWERPLANT INSTRUMENT MARKINGS

Meaning of instrument markings and the value of limits are in Figure 2.6.

INSTRUMENT	Red Line	Yellow Arc	Green Arc	Yellow Arc	Red Line
	MINIMUM LIMIT	CAUTION RANGE	NORMAL OPERATING	CAUTION OR TAKEOFF	MAXIMUM LIMIT
Engine Rotational Speed (N%) Indicator			53 - 100	100 – 104	102
EGT Temperature (°C)			Up to 820	820 – 860	860
Oil Pressure	0.7		0.7 – 3		
Oil Temperature			0 – 140		140
Fuel Pressure	0.55	0.55 – 1.2	1.2 – 3		

Figure 2-6

Powerplant Limits

2.6. WEIGHT LIMITS

It is the responsibility of the airplane owner and pilot to assure that the airplane is properly loaded. Maximum allowable weights are listed below. Refer to Section 5 “Weight and Balance” for loading instructions.

		Lb	Kg
a)	Maximum Takeoff Weight	2767	1255
b)	Maximum Landing Weight	2583	1172
c)	Maximum Zerofuel Weight	2037	925

2.7. CENTER OF GRAVITY LIMITS

(Refer to Fig. 2-7)

(a) Forward Limit
92.95 in (2361 mm) aft of Datum at all weights

(b) Rearward limits
94.58 in (2402 mm) aft of Datum at maximum takeoff weight
97.02 in (2464 mm) aft of Datum at 2588 pounds (1172 Kg) or less
(The chord is 35.433 in (900 mm) long)

NOTES

Straight line variation between points indicated. The Datum is located 82.677 inches (2100 mm) in front of wing leading edge.

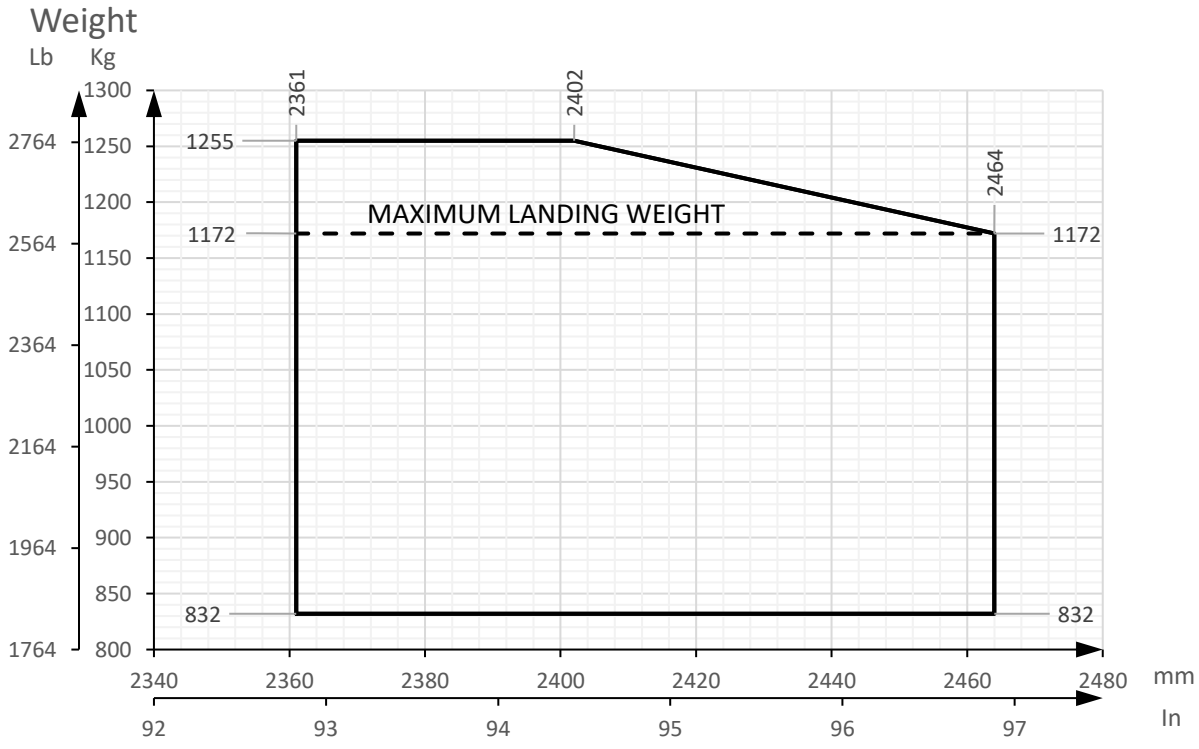


Figure 2-7

Center of Gravity Limits

2.8. MANEUVERS LIMITS

This is an acrobatic category aircraft. For the following maneuvers the corresponding entry speeds are recommended:

Barrel Roll	Entry Speed: 180 KIAS
Aileron Roll	: 180 KIAS
Wing Over	: 180 KIAS
Looping	: 200 KIAS
Half roll at top of the loop	: 220 KIAS
Half Cuban Eight	: 200 KIAS
Chandelle	: 200 KIAS
Spin (cruise configuration only)	: Stall + 5 KIAS

Spin with flaps down and inverted spins are prohibited.

Negative g flight is limited to 30 seconds.

When above maneuvering speed (Refer to Figure 2-1) the controls must not be fully abruptly deflected.

2.9. FLIGHT MANEUVERING LOAD FACTOR LIMITS

d)	Positive Load Factor (Flaps Up	7.0 g
e)	Negative Load Factor (Flaps Up)	-3.5 g
f)	Positive Load Factor (Flaps Down and / or Airbrakes Open)	3.5 g

2.10. FLIGHT CREW

Minimum Crew	One Pilot

2.11. KINDS OF OPERATION

The standard airplane is approved for day and night operations under VFR conditions provided the minimum equipment required for the applicable operational rules is installed.

NOTE

Whenever oxygen is required, mask type MBU-5/P or similar must be used to be interfaced with aircraft provisions.
Oxygen masks are not part of the aircraft, they are part of the crew equipment.
The airplane has not been approved for flight in known icing conditions.

2.12. FUEL LIMITATION

g)	Unusable Fuel Quantity (for the complete system)	3 US Gal (11.5 lt)
h)	Usable Fuel Quantity (for the complete system)	110.6 US Gal (418 lt)

Fill the internal tanks before fueling the tip tanks.

Close the wing fueling points before fueling the tip tanks.

Before fueling Connect the earth cable of the fueling vehicle to the nose landing gear.

2.13. MAXIMUM OPERATING ALTITUDE LIMIT

Flight up to 25'000 ft is approved if the aircraft is equipped with oxygen in accordance with the applicable operational rules.

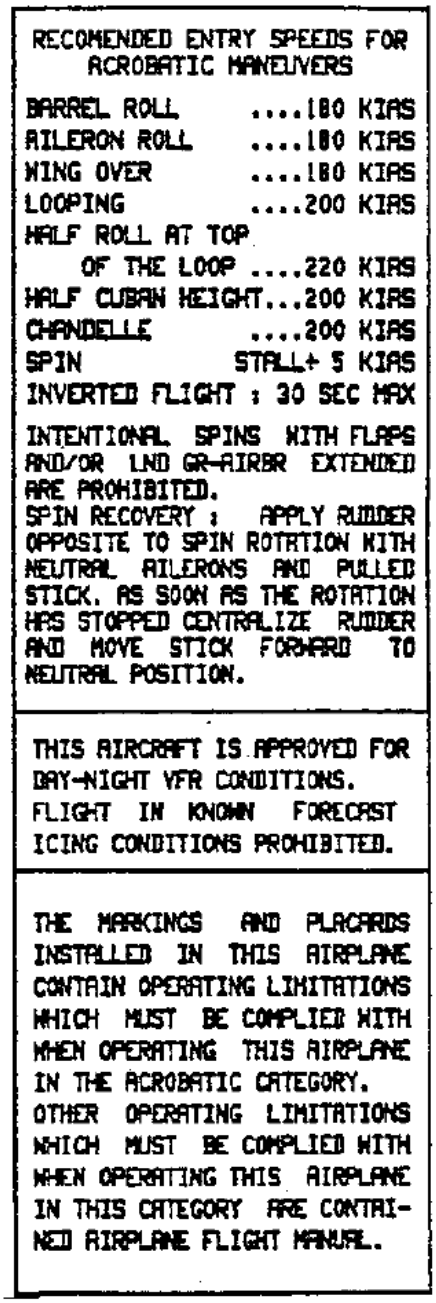
2.14. SEATING LIMITATION

The maximum number of occupants is two (including the pilot).

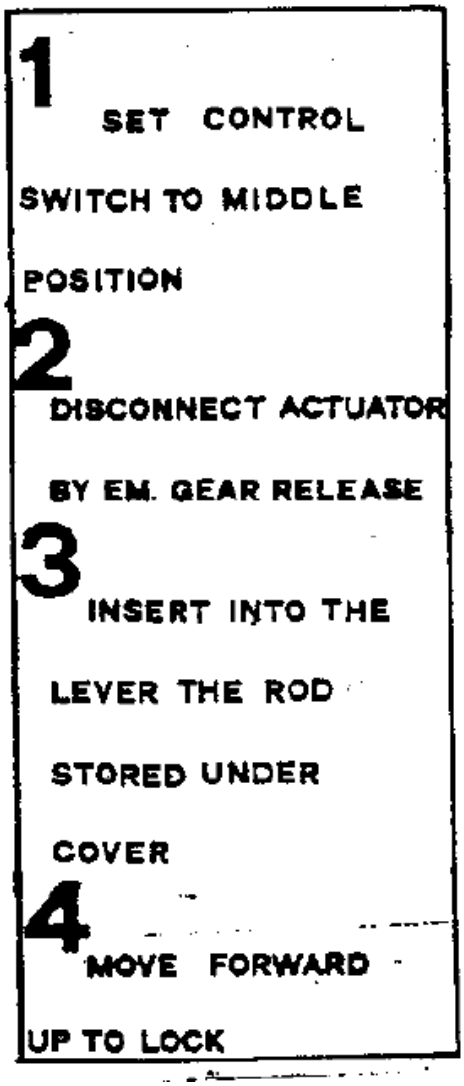
Pilot must seat in the side of flight instruments.

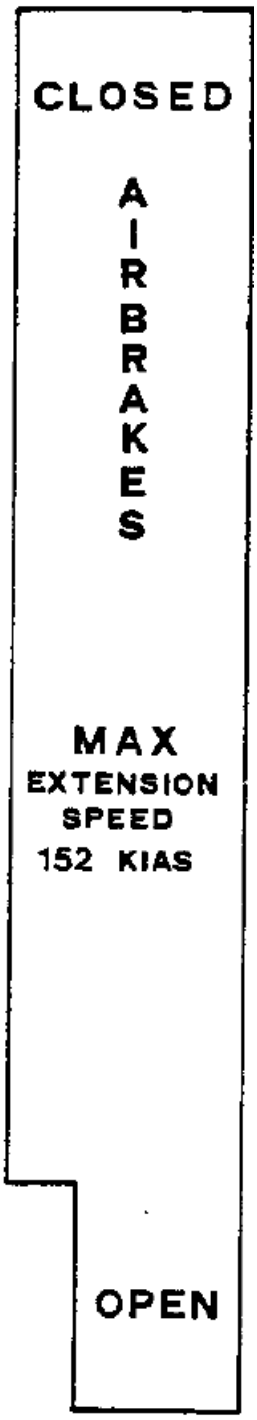
2.15. PLACARDS

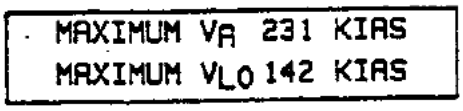
In Full view of the pilot:




PULL TO REMOVE
EMERGENCY
GEAR
EXTENSION


1
SET CONTROL
SWITCH TO MIDDLE
POSITION
2
DISCONNECT ACTUATOR
BY EM. GEAR RELEASE
3
INSERT INTO THE
LEVER THE ROD
STORED UNDER
COVER
4
MOVE FORWARD
UP TO LOCK


CLOSED
AIRBRAKES
MAX
EXTENSION
SPEED
152 KIAS
OPEN



On Baggage Compartment

On canopy Ceiling:

- Calibration placard for magnetic compass

SECTION 3
EMERGENCY PROCEDURES

3.1. INTRODUCTION

This section is divided into Ground Operation Emergencies, Takeoff Emergencies, In-Flight Emergencies and Landing Emergencies.

Three basic rules, which apply to all emergencies, are established:

1. Maintain aircraft Control.
2. Analyze the situation and take proper action.
3. Land as the situation dictates or abandon the aircraft.

NOTE

The emergency conditions combined with the pilot's analysis of the situation, type of emergency, and proficiency are of prime importance in determining the urgency of the landing. The following information provides general guidance

Land As Soon As Possible:

An emergency will be declared.

A landing should be accomplished at the nearest suitable airfield considering the severity of the emergency, weather conditions, field facility, lighting, A/C gross weight.

Land As Soon As Practical:

Emergency conditions are less urgent and, although the mission is to be terminated, the degree of emergency is such that an immediate landing at the nearest suitable airfield may not be necessary.

3.2. GROUND OPERATION EMERGENCIES

3.2.1. Engine Fire or overtemperature during start

An engine fire during start may be caused by an excess of fuel inside the combustion chamber. The fire is indicated by flames from the exhaust stacks and rapid increase of EGT and/or FIRE warning light ON.

1. Engine MAST .....OFF
2. Motor engine or abandon A/C

3.2.2. Ground Abandonment

1. Canopy latch .....OPEN
2. Shoulder Harness..... Release
3. Headphone/microphone
   and oxygen mask (If applicable) ..... Disconnect

3.3. TAKEOFF EMERGENCIES

General

When a take-off emergency occurs, the pilot is faced with the decision between aborting or continuing the takeoff.

The decision will be influenced by the nature of the take-off where the emergency is recognized, the ability to accomplish a safe abort or to continue take-off to a safe altitude for subsequent emergency landing or bail-out.

The decision for aborting a take-off will be influenced by two factors:

- Aircraft factor – nature of the failure, gross weight, configuration, and speed
- Runway factor – remaining runway length, existence of obstacles, condition of surface.

NOTE:

It is not possible to retract the landing gear when the aircraft is on the ground.

3.3.1. Engine Fire Before rotation

1. Throttles.....IDLE
2. Engine MAST (both).....OFF
3. Brakes .....APPLY
4. BATT switch.....OFF

3.3.2. Engine Failure before rotation (speed below 78 Knots)

1. Throttles.....IDLE
2. Brakes .....APPLY
3. Maintain direction with nosewheel steering

IF INSUFFICIENT RUNWAY REMAINS FOR A SAFE STOP

4. Engine MAST (both).....OFF
5. BATT switch.....OFF

3.3.3. Engine control box failure after lift-off

This situation is indicated by:

- Engine RPM: Idle
- P NORM warning light: lighted

1. Airspeed..... CHECK
2. Direction ..... Maintain
3. Identify inoperative engine
4. Corresponding emergency throttle……Turn clockwise carefully

CAUTION

Emergency control system is provided with neither overspeed nor external temperature automatic limiting circuits. It is pilot's responsibility not to exceed the engine limitations (in these operating conditions).

5. Landing gear..... UP
6. Continue climb straight ahead and reach 95 KIAS

WHEN SAFE ALTITUDE IS REACHED

7. Primary engine throttle 100%
8. Emergency Throttle (inoperative primary control) . 100%
9. Accelerate to 115 KIAS
10. Flaps ..... UP

Land as soon as practical

3.3.4. One engine flame-out after lift-off (speed above 78 Knots)

1. Airspeed ..... Check
2. Direction ..... Maintain
   - 1 - 2 degrees bank towards the operative engine
   - Rudder as required for heading control
3. Throttle (operating engine) ..... FULL
4. Landing Gear ..... UP
5. Continue climb straight ahead and reach 95 KIAS

WHEN SAFE ALTITUDE IS REACHED

6. Inoperative engine MASTER .....OFF
7. Operative engine throttle 100%
8. Flaps ..... UP
9. Accelerate to 115 KIAS

Land as soon as practical

3.3.5. Tire blowout at takeoff

IF IT IS POSSIBLE TO STOP ON THE GROUND:

1. Throttles.....IDLE
2. Direction ..... Maintain
3. Reduce load on the blown tire by lateral deflection of control stick to the side opposite the blown tire

IF IT IS ENVISAGED TO ROLL OFF THE RUNWAY

1. Engine MAST .....OFF
2. BATT switch.....OFF

IF IMPOSSIBLE TO STOP ON THE RUNWAY

1. Continue Takeoff
2. Landing gear..... Leave DOWN
3. Airspeed ..... below 140 KIAS
4. Consume as much fuel as possible
5. Land on the side opposite the blown tire
6. After touchdown proceed as specified for tire blowout on the ground.

3.4. IN-FLIGHT EMERGENCIES

3.4.1. Engine Failure

General

The engine failure mis defined as a loss of power.

Due to the nature of the control of the TRS-18-1-202 engine each electrical failure of the control drives the engine to idle.

Full authority on the engine may be restored by the emergency control system.

A complete engine failure, which is rarely encountered, may be caused by engine internal damage or loss of fuel supply.

The engine instruments often offer indication of impending engine failure.

Reduction of thrust and minimizing load factors will generally prolong the engine operating time prior to complete engine failure. Engine stoppage is generally due to improper or defective fuel supply system operation; this condition should be indicated by the FUEL PRESS indicator.

The engine failure does not cause sudden directional variation of this airplane.

The pilot must decide on the action to be undertaken:

To restart the engine or to continue the flight to the nearest practical field.

AFTER DETECTION OF A DEAD ENGTINE

1. Rudder.....Apply towards operating engine to keep direction
2. Operating Engine throttle..... Adjust as required
3. To Climb.....Adjust airspeed towards the best single engine climb speed

3.4.1.1. Engine Restart

1. Altitude ..... Below 20’000 ft
2. NOR BUS breaker..... PULL (not simulated)
3. Other unnecessary electrical loads.....OFF

INOPERATIVE ENGINE

4. Engine MAST.....OFF
5. Throttle .....IDLE
6. Fuel BOOST pump.....OFF
7. Fuel shut-off light.....check “SHUT”
8. Engine MAST.....ON
9. RPM.....Monitor
10. EGT.....Monitor

When idling RPM is obtained

11. Generator Lights ..... Check
    Amber “GEN”..... “OFF”
    Green “GEN”..... “ON”
12. Fuel pump lights ..... check “OFF”
13. Fuel BOOST pump.....ON

If unable to restart the engine:

14. Engine MAST.....OFF

Land as soon as practical

3.4.1.2. Compressor Stall

A compressor stall is advised by a noisy stroke and fluctuations of engine parameters.

1. Throttle .....Retard to IDLE

If stall has not been cleared

2. Engine MAST.....OFF
3. BOOST pump.....OFF
4. Proceed for engine restart

3.4.1.3. Engine fire

Engine fire is generally indicated by a red FIRE Warning on the central warning panel.

1. Throttle ..... Reduce
2. Cockpit hot Air ..... Close
3. Defroster..... Close

WARNING

In these conditions never exceed the following limits:

Speed: 160 KIAS

n_z: +3.8 / -15 g

If light switches out:

4. RPM.....to maintain flight condition
5. Land as soon as possible

If light remains ON, on the corresponding engine:

4. Engine MAST.....OFF
5. BOOST pump.....OFF
6. Fuel shut-off light.....check “SHUT”

If fuel shut-off light OPEN is “ON”:

7. Shut-off switch..... Depress

Land as soon as possible.

3.4.1.4. Oil System Failure

An oil system failure is generally indicated by oil temperature increase and/or oil pressure decrease with subsequent re OIL P warning light “ON” (rated at .9 bar).

(a) Low Pressure

1. Throttle ..... Advance to obtain 0.7 bar
2. Land as soon as practical

If minimum oil pressure cannot be obtained:

1. Throttle .....IDLE
2. Engine MAS.....OFF
3. BOOST pump.....OFF
4. Land as soon as practical

(b) High Temperature

1. Throttle ..... Reduce to obtain normal value
2. Resume normal throttle setting, monitor temp.

If normal value cannot be obtained

2. Throttle ..... Maintain Low RPM

3. Land as soon as practical

3.4.2. Electrical Fire

Circuit breakers isolate all electrical circuits in the aircraft and automatically interrupt power when a short circuit occurs.

However, if a circuit breaker fails to operate, the wire will overheat causing the insulator to ignite; this will be evident by smoke and/or fumes in the cockpit.

For smoke or fumes elimination refer to the following paragraph.

3.4.2.1. Smoke or fumes in the cockpit

1. Ventilation inlets.....OPEN
2. Cabin Heater and Defrost ..... CLOSED
3. NOR BUS Breaker..... PULL (not simulated)
4. Other unnecessary electrical breakers ..... PULL (not simulated)

If Smoke or fumes persist:

5. Oxygen Mask..... Wear
6. Diluter ..... 100% (not simulated)

If no reduction of smoke is observed:

7. Land as soon as possible

3.4.3. Electrical System Failure

3.4.3.1. Single Generator Failure

The Failure of a generator is indicated by:

- Amber GEN Warning light: “ON”
- Green GEN Light: “OFF” (on control panel)
- Ammeter: 0

1. GEN switch.....OFF
2. NOR BUS breaker..... OUT (not simulated)
3. GEN switch.....ON
4. GEN Arm ..... PRESS

If green light keeps “OFF” or GEN switch trips out again:

5. GEN switch.....OFF
6. Land as soon as practical

The electronic control of the involved engine is still fed by the other generator and by the battery.

If Amber and Green GEN lights are both “ON”, the generator is feeding its own engine but is disconnected from the Main Busbar.

In this case it is advisable to keep the NOR BUS breaker OUT to avoid overcharge for the connected generator.

3.4.3.2. Dual Generator Failure

1. GEN switches .....OFF
2. NOR BUS breaker.....OFF (not simulated)
3. Descend below 10000 ft and Fuel BOOST pumps ... OFF
4. Unnecessary electrical equipment .....OFF

In Night Flight:

5. Instrument lights.....OFF
6. Internal Flood Light.....ON

(NOTE: In this simulation, these two lights are tied together. They are both ON or OFF)

7. Proceed as for single generator failure to reset at least one generator.

If unable to reset one generator:

8. Land as soon as possible

3.4.4. Fuel System Failure

3.4.4.1. Hight Fuel Pressure warning light lighted

1. Throttle .....Reduce

If light is still on

2. Descend as low as practical

If light is still on

3. Land as soon as practical.

3.4.4.2. Low fuel pressure warning light lighted

1. Descent below 10000 ft as soon as practical
2. Land as soon as practical.

3.4.4.3. Low fuel pressure (lower than 1.2 bar)

1. BOOST pump switch .....check ON
2. Throttle .....Reduce
3. Descend below 10000 ft as soon as practical
4. If pressure still low.....Land as soon as practical.

3.4.4.4. Leak of oxygen supply

1. Diluter .....Set to emergency (not simulated)
2. Bottle pressure ..... Check
3. Blinker ..... Check
4. Mask connection..... Check

If leak persists

5. Descent below 10000 ft

3.4.5. Static Source Malfunction

1. Alternate Source Valve knob ..... PULL
2. Altitude and airspeed correction.....Apply
   (use correction card)

3.4.6. Trim Runaway

In case of trim runaway speeds can be maintained by applying a proper control force.

1. Trim breaker ..... PULL (not simulated)

NOTE:
Do not reinsert the breaker.

2. Land as soon as possible

3.4.7. Trim spring failure

The trim spring failure causes the tendency of the airplane to pitch up.

The airplane is easily controllable by applying a pitch-down control force.

The force depends on the speed, the higher the speed the higher the force, being very low below 140 KIAS.

Land as soon as practical.

3.5. LANDING EMERGENCIES

WARNING

Make sure the harnesses are locked and tightened before an emergency landing.

3.5.1. Forced Landing

1. Airspeed.....Best Glide
2. Landing site..... Select
3. Emergency radio call.....Transmit
4. Shoulder Harness.....Lock
5. Landing gear..... DOWN if suitable
6. Flaps.....as required
7. Airbrakes.....as required

Prior to touchdown:

8. Engine MAST (both).....OFF
9. BATT switch.....OFF

3.5.2. Single engine approach and landing

1. Engine shutdown procedure ..... Completed
2. Normal landing procedure.....perform

3.5.3. Single engine Go-around

1. Throttle ..... FULL
2. Airbrake ..... CLOSED
3. Attitude.....with positive rate of climb
4. Landing gear..... UP
5. Airspeed..... increase
6. RPM.....100%
7. Flaps..... UP
8. Airspeed.....blue sector (To climb)

3.5.4. No flaps approach and landing

1. Perform a normal approach
2. Landing gear.....DOWN
3. Airspeed.....105 KIAS
4. Airbrakes.....as required

After touchdown:

5. Throttles.....IDLE
6. Airbrakes.....OPEN
7. Brakes .....Apply as required

3.5.5. Emergency Landing Gear Extension

1. Airspeed.....below 120 KIAS
2. Flaps.....as required
3. LND Gear circuit breaker ..... OUT (not simulated)
4. LND GEAR Lever.....DOWN
5. L.G. disconnect lever..... release and pull
6. Emergency Gear Extension Cover.....Remove
7. Rod connected to emergency gear extension coverInsert in lever
8. Emergency Lever....move forward up to be hooked
9. 3 Green lights.....ON

NOTE:

In this simulation, steps 5 to 8 are accomplished together by clicking on the Emergency Gear Extension cover.

3.5.6. Belly landing or L.G. partially extended

1. Shoulder harness ..... LOCK
2. Fuel ..... consume to the minimum (1/8)
3. Flaps .....DOWN
4. Airbrakes.....OPEN
5. Make anormal approach

Before touchdown:

6. Engine MAST (both) .....OFF
7. BATT switch.....OFF
8. Contact runway at speed as slow as possible
9. After a complete stop ..... Abandon A/C

In case of unsafe nose gear

1. Land in nose-up attitude
2. Control stick aft, to hold nose up as long as possible
3. After a complete stop, abandon A/C.

3.5.7. Landing with asymmetric fuel load

Increase approach speed by 5 KTS with a dissymmetry of 6 filaments of fuel-level instrument.

Over 6 filaments increase the speed of 1 knot for each filament.

SECTION 4
NORMAL PROCEDURES

4.1. GENERAL

This section describes the recommended procedures for the conduction of normal operations for C22J airplanes. All the Required procedures and those necessary for operation of the airplane as determined by the operating and design features of the airplane are presented.

Pilots should familiarize themselves with the procedures given in this section in order to become proficient in the normal operations of the airplane.

4.2. PREPARATION FOR FLIGHT

4.2.1. Airspeed for safe operations

The airspeed limitations are contained in Section 2.

The following airspeeds are those which are significant to the operations of the airplane.

The figures are for standard airplanes flown at maximum gross weight under normal conditions at sea level.

	KIAS
Best Rate of Climb Speed (Flaps Up)	157
Best Rate of Climb Speed with one engine inoperative	124
Final Approach Speed	95
Maximum demonstrated crosswind velocity	18 Kts

4.2.2. Weight and Balance

Refer to Section 2 for the weight and balance limitations, and Section 6 for correct Loading and C.G. computation.

4.3. PRE-FLIGHT CHECK

4.3.1. Before Exterior Inspection

1. Airplane status or airworthiness, paper on board... CHECK
2. Canopy .....OPEN
3. Fire Extinguisher .....NEARBY
4. Landing Gear Lever .....DOWN
5. Avionic Switches .....OFF
6. Circuit Brakers..... Check IN (not simulated)
7. BATT .....ON; check voltage
8. Elevator Trim..... "NOSE UP"
9. Flaps .....Check UP
10. Airbrakes Lever .....Check CLOSED
11. Fuel Quantity ..... Check

NOTE:

If Dissymmetry is above 3 filaments FILL the tanks UP to equalize the levels.

12. Landing Gear ..... 3 Green lights “ON”
13. BATT ..... OFF
14. Oxygen ..... Check Pressure

4.3.2. Exterior Inspection

During the exterior inspection (Fig. 4-1) the aircraft shall be checked for general condition, security of access doors and panels and filler caps for hydraulic fluid, oil and fuel leaks, as well as for the following:

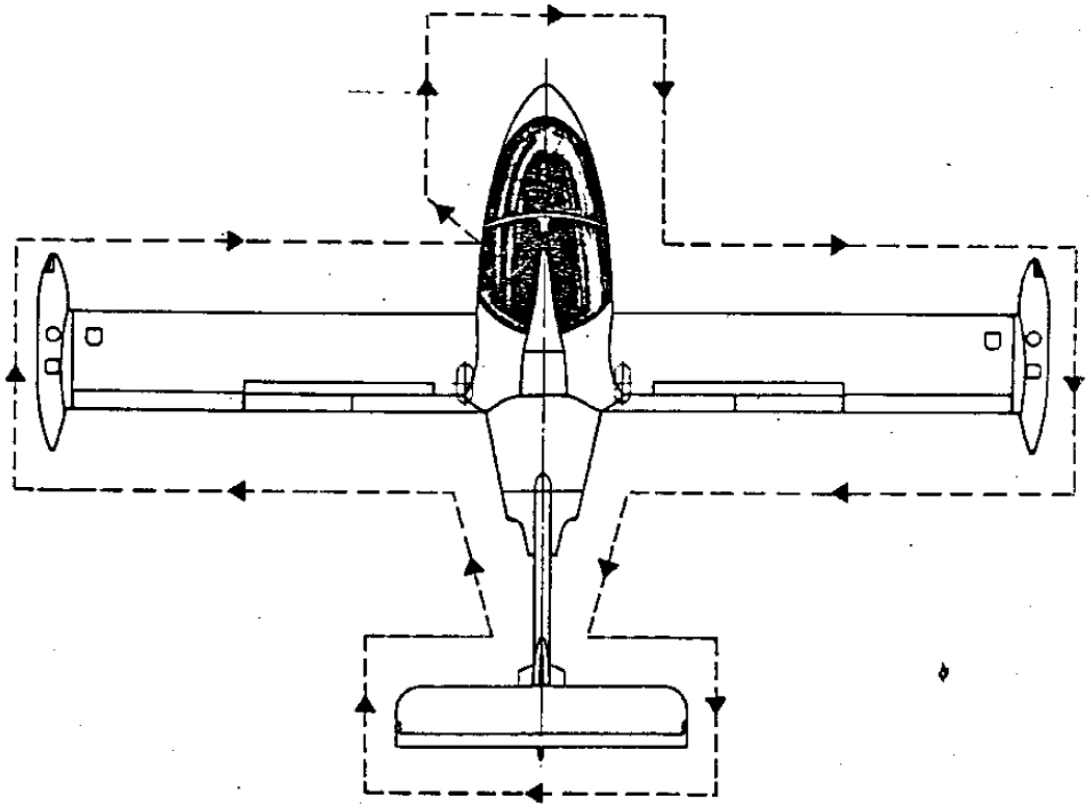


Figure 4-1

Walk Around

A. NOSE

1. Canopy ..... CLOSED
2. External Canopy Handle..... LOCKED
3. Left Static Port ... Clean and free from obstructions
4. Windshield ..... Clean
5. Ventilation Air Intake..... free from obstructions
6. Wheel and Tire.....Condition, inflation and alignment of slippage marks
7. Right Static Port . Clean and free from obstructions
8. OAT Probe..... Clean and free from obstructions
9. Antennas (Lower Side).....Condition and security

B. RIGHT WING

1. Leading Edge ..... Condition
2. Upper Surface ..... Condition
3. Lower Surface ..... Condition
4. Stall Warning Vane ..... Condition and Movement
5. Mooring Rope ..... Remove (If applicable)
6. Wing Tank Cap ..... Closed and Locked
7. Navigation and anti-collision light ..... Condition
8. Tip Tank..... Condition and Security
9. Tip Tank Cap..... Closed and Locked
10. Tip Tank Cocks ..... Closed. Check for fuel drips
11. Antenna (Lower side).....Condition and security
12. Aileron..... Condition
13. Airbrake ..... Condition
14. Wing Flap ..... Condition and free play

C. RIGHT MAIN LANDING GEAR

1. Wheel Chock ..... In place
2. Wheel and tire.....Condition inflation and alignment of slippage marks.
3. Landing Gear Leg ..... Condition
4. Fuse Bolts..... Condition
5. Brake and line ..... Condition
6. Landing Gear Bottom Door... Condition and Locked
7. Landing Gear Lateral Door ..... Condition

D. FUSELAGE – RIGHT SIDE

1. Engine Air Intake (NACA Inlet) .....Condition and clear of obstruction
2. Engine Cowling.....Condition and security
3. Right Exhaust Pipe ..... Free and conditions

E. TAIL

1. Pitot Tube.....cover removed and clear of obstruction
2. Fixed and movable surfaces.Condition and security
3. Anticollision light ..... Condition
4. VOR antennas ..... Condition and Security
5. Elevator Springs .....Condition and security

F. FUSELAGE – LEFT SIDE

1. Left Exhaust Pipe..... Free and conditions
2. Engine Cowling.....Condition and security
3. Engine Air Intake (NACA Inlet) .....Condition and clear of obstruction

G. LEFT MAIN LANDING GEAR

1. Wheel Chock ..... In place
2. Wheel and tire.....Condition inflation and alignment of slippage marks.
3. Landing Gear Leg ..... Condition
4. Fuse Bolts..... Condition
5. Brake and line ..... Condition
6. Landing Gear Bottom Door ... Condition and Locked
7. Landing Gear Lateral Door ..... Condition

H. LEFT WING

1. Wing Flap ..... Condition and free play
2. Airbrake ..... Condition
3. Aileron..... Condition
4. Antenna (Lower side).....Condition and security
5. Tip Tank Cocks ..... Closed. Check for fuel drips
6. Tip Tank Cap..... Closed and Locked
7. Tip Tank..... Condition and Security
8. Navigation and anti-collision light ..... Condition
9. Wing Tank Cap ..... Closed and Locked
10. Mooring Rope ..... Remove (If applicable)
11. Lower Surface ..... Condition
12. Upper Surface ..... Condition
13. Leading Edge..... Condition

4.3.3. Interior Inspection

1. Parachute..... As required
2. Pilot's seat.....Adjust
3. Pedals.....Adjust
4. Safety Harness.....Condition and security of the locking device
5. Headphone and microphone.....Connect
6. Oxygen hose ..... Connect (if required)
7. Parking Brake .....Set
8. Flight Controls.....Free
9. Pitot Heat.....OFF
10. DME .....OFF
11. Altitude Alerter .....OFF
12. Radio 1 & 2.....OFF
13. VOR 1 & 2.....OFF
14. Transponder.....OFF
15. ADF.....OFF
16. Turn and Slip .....OFF
17. Attitude Indicator .....OFF
18. Lights (Landing, Nav, Anticol, internal).....OFF
19. Airbrakes..... CLOSED
20. Hot Air control ..... CLOSED
21. Defogger ..... CLOSED
22. Throttle Friction .....Adjust
23. Throttle .....IDLE
24. Emergency Throttle ..... Fully counter-clockwise

CAUTION

If the throttle is not in the idle position, after the startup the engine will immediately at RPMs higher than idle. This could damage the engine

25. External power.....Connected (not simulated)

NOTE

In order to preserve the life of the battery, the engine startup is only to be done by aircraft battery when an external power source 28 VDC/20A is not available.

26. BATT switch.....ON

Warning Panel Lights

27. GEN lights (amber)..... "ON"
28. OIL lights ..... "ON"
29. LOW PRES light ..... "ON"
30. PUMP lights..... "ON"
31. Lights
    - FIRE
    - HIGH PRESS
    - And engine instrument filamentsPRESS to TEST

Engine Control Panel

32. Fuel Shut-Off flights ..... "SHUT"

33. Engine MAST switches .....OFF
34. Fuel BOOST switches .....OFF
35. Engine TEST switches.....OFF
36. Landing Gear lights .....Press to TEST

INTERIOR INSPECTION FOR NIGHT FLIGHT

1. Instrument Lights..... Check
2. Position Lights..... Check
3. Strobe lights..... Check
4. Flood light ..... Check
5. Landing Light..... Check

NOTE

Continuous use of the landing light for more than 5 minutes should be avoided.

4.3.4. Dry Crank Motoring

NOTE

Dry crank motoring is necessary each time unburnt fuel is supposed to be present in the combustion chamber, such as after an aborted starting.

1. Engine MAST switches ..... Check OFF
2. VENT button.....keep depressed as long as necessary (max 10 Sec.)

4.3.5. Starting the Left Engine

1. Left engine MAST switch .....ON
   (engine will start automatically)
2. EGT.....Check within limits (860°C max then below 500°C)
3. RPM..... Check
4. Oil Pressure.....Check increasing
5. Fuel PUMP lights.....Check “OFF”
6. Oil light.....Check “OFF”

After startup

7. GEN switch.....Check “ON”
8. Generator lights..... Check:
   - Amber GEN L ..... “OFF”
   - Green L GEN ..... “ON”

NOTE

The amber light “ON” indicates the generator not connected to the MAIN busbar.
The green light “ON” indicates the generator is properly operating.

9. Voltage.....Check (27 – 29 V)

4.3.6. Starting the Right Engine

1. Right engine MAST switch .....ON
   (engine will start automatically)

NOTE

During the starting of the second engine the generator of the running engine is automatically disconnected from the MAIN busbar and the amber GEN L light is "ON" for about 10 seconds.

2. EGT.....Check within limits (860°C max then below 500°C)
3. RPM..... Check
4. Oil Pressure.....Check increasing
5. Fuel PUMP lights.....Check "OFF"
6. Oil light.....Check "OFF"

After startup

7. GEN switch.....Check "ON"
8. Generator lights..... Check:
   - Amber GEN R..... "OFF"
   - Green R GEN..... "ON"
9. Voltage.....Check (27 – 29 V)
10. RPM and EGT ..... Stabilized
11. External power (if used).....Disconnect
12. Ammeters ..... Check
13. Engine instruments..... Check within limits

4.3.7. Emergency engine control box check

This check must be performed at the first flight of the day

1. Left Throttle .....IDLE
2. L TEST switch.....ON
3. PUMP NORM L light.....Check "ON"
4. Left Emergency Throttle ..... Clockwise to increase

NOTE

Emergency control box gives no correction for external temperature. Limitation for max RPM as shown in fig 4-2 must be monitored by the pilot.

5. Engine instruments..... Check within limits
6. Left Emergency throttle..... Fully counterclockwise
7. L TEST switch.....OFF
8. Right Throttle.....IDLE
9. R TEST switch .....ON
10. PUMP NORM R light .....Check "ON"
11. Right emergency throttle..... Clockwise to increase

NOTE

Emergency control box gives no correction for external temperature. Limitation for max RPM as shown in fig 4-2 must be monitored by the pilot.

12. Engine Instruments..... Check within limits
13. Right emergency Throttle ... Fully counterclockwise
14. R TEST switch .....OFF

4.3.8. Fuel Filter Check

15. LOW PRESS light.....Check “OFF” (max 5´after engine starting)
16. L BOOST pump .....Check “OFF”
17. Left throttle..... Advance for 100% RPM
18. Fuel Pressure.....Check within limits (0.95 bar min)
19. Left Throttle .....IDLE
20. L BOOST PUMP .....ON
21. R BOOST pump.....Check “OFF”
22. Right throttle ..... Advance for 100% RPM
23. Fuel Pressure.....Check within limits (0.95 bar min)
24. Right Throttle.....IDLE
25. R BOOST PUMP .....ON

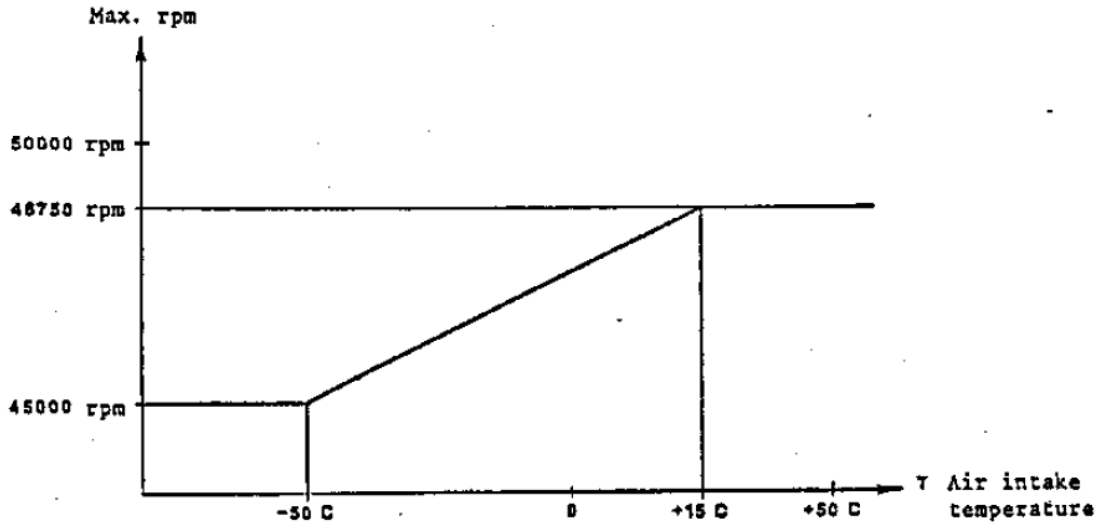


Figure 4-2

Speed Limitation in function of Air Intake temperature

4.3.9. Before Taxiing

1. Avionic Equipment.....ON
2. Communication Equipment.....ON
3. NAV equipment .....as required
4. Audio panel.....as required
5. Lights.....as required
6. Flap control and instrument operation ..... Check
7. Airbrake operation, check ..... Set Closed
8. Trim control and instrument operation..... Check
9. Radio call.....as required

4.3.10. Taxiing

1. Wheel chocks.....Remove
2. Parking Brake..... Release
3. Brakes ..... Check
4. Oxygen diluter.....as required (not simulated)

CAUTION

The nose wheel is mechanically linked to the rudder pedals through the steering system. Do not use differential braking to turn. Such an action could damage the nose wheel steering mechanism. Brakes must be used evenly for slowing down and stopping aircraft only. Steering must be accomplished by use of rudder pedals only.

NOTE

See figure 1-2 for the minimum turning radius and clearance required.

4.3.11. Before Takeoff Checks

1. Flight Controls..... Check Free
2. Trim.....Set for takeoff position
3. Airbrakes..... Check closed
4. Flaps.....Set DOWN
5. Engine instruments..... Check within green sectors
6. Flight Instruments..... Check
7. Fuel quantity..... Check
8. Safety Harness ..... LOCKED
9. Canopy .....Closed and Locked

4.4. TAKE OFF CHECKS

4.4.1. Take-off

1. Aircraft .....Aligned with runway
2. Attitude and heading indicators .. Check and Adjust
3. Brakes .....Apply
4. Throttle ..... Full (max. 2 min.)
5. Engine Parameters.....Monitor within limits
   (EGT: 860°C max – Oil Temp. 140°C max)
6. Brakes ..... Release
7. Direction .....Maintain with nose wheel steering
8. At v78 KIAS.....Rotate A/C to takeoff attitude
9. Maintain attitude (A/C lift off at 80 – 85 KIAS)

After Take-off:

10. Brakes .....Apply
11. Landing Gear.....UP and Check

NOTE

Landing gear retraction time is 7 seconds.

12. 120 KIAS..... Flaps UP and position check
13. RPM.....Reduce (100%)
14. Trim..... As required

4.5. IN FLIGHT CHECKS

4.5.1. Climb

On Climb-out after take-off, it is recommended that the best angle of climb speed be maintained only if obstacle clearance is a consideration.

1. Start climb at selected speed, RPM 100%
   Best Rate of Climb speed ..... 157 KIAS
   Best Angle of Climb speed ..... 141 KIAS
2. Oxygen (Pressure and blinker)..... Check
   (if applicable)
3. EGTs (within limits: 820°C max)..... Check
4. Oil Pressure (within limits: 1.5 bar min) ..... Check
5. Oil Temperature (within limits: 140°C max) .. Check
6. Altimeter .....Set as required
7. Windshield defroster ..... As required
8. Throttle ..... As required

4.5.2. Before Landing

NOTE

Airbrake must be deployed after flaps lowering to avoid lift drop in case of airbrake retraction. Airbrakes down and flaps up is not a normal approach configuration.

1. Speed .....Reduce to 140 KIAS
2. Flaps ..... Down
3. Airbrakes ..... Open
4. Approach Speed (flaps and airbrakes).....95 KIAS
5. Throttle .....As required for 95 KIAS
6. Landing Light..... As required

4.5.3. Balked Landing

1. Throttle ..... Full forward
2. Airbrakes ..... Close
3. Continue normal approach until engines are at max thrust and speed increases
4. Establish take-off attitude with positive rate of climb
5. Landing Gear ..... UP
6. 120 KIAS ..... Flaps UP
7. RPM..... Reduce to max. continuous
8. Trim ..... As required

4.5.4. Landing

1. Start a gradual flare out
2. Touchdown on main wheels
3. Use brakes only to reduce speed
4. Maintain direction with nose wheel steering

4.5.5. Crosswind Approach and Landing

If a crosswind landing is necessary approach with increased speed (about 5 KIAS).

1. Lower the wing into the wind to maintain the runway direction

Before Touchdown

2. Align the wheels with the runway

4.6. POST-FLIGHT CHECKS

4.6.1. After Landing

1. Landing Light.....OFF
2. Airbrakes.....CLOSE
3. Flaps..... UP
4. Pitot Heating.....OFF
5. Windshield Defroster.....CLOSE
6. Trim.....NEUTRAL
7. Transponder and NAV systems.....OFF

4.6.2. Engines Shut Down

1. Parking Brake..... APPLIED
2. Throttle.....IDLE
3. Radios.....OFF
4. Attitude Indicator .....OFF
5. Turn & Slip Indicator.....OFF
6. Internal & External Lights .....OFF
7. L & R BOOST pumps.....OFF
8. Stabilize EGT ..... Check
9. Engine MAST..... OFF (2)
10. Engine turn to stop (52 – 20") ..... CHECK
11. Battery .....OFF

4.7. OXYGEN SYSTEM

4.7.1. Generals

The pilots receive oxygen from the diluter demand oxygen supply system, which mixes the proper ratio of oxygen and cockpit air at a given altitude. A diluter demand oxygen regulator on each side3 of the cockpit provides the pilots with individually regulated control of the oxygen system.

The control lever has three positions (not simulated):

- NORMAL — For delivery of automatically diluted oxygen at pilot demand
- 100 % — For delivery of 100% oxygen
- EMERGENCY — For delivery of 100% oxygen at positive pressure

WARNING

If any symptoms occur suggestive of the onset of hypoxia, immediately set the control lever to the EMERGENCY position and descend below 1000 ft.

Whenever carbon monoxide or other noxious gas is present or suspected set the diluter control lever to 100% and continue breathing undiluted oxygen until the danger is no longer present.

4.7.2. Oxygen Duration

The oxygen supply is provided by a 6.7 liters pressure cylinder.

With the cylinder charged to 2150 PSI the oxygen duration at 25000 ft for a crew of two is: 1h 45 min. The duration time is doubled when only one pilot is using oxygen.

4.7.3. Oxygen Masks

Mask type MBU-5/P or similar can be used interfaced with aircraft provisions.

Oxygen masks are not part of the aircraft, they are part of the crew equipment.

4.8. SPIN CHARACTERISTICS

4.8.1. Spin

The aircraft has been approved for intentional spin with gear and flaps up only.

Spins in any other configuration or inverted spins are prohibited.

4.8.2. Spin Entry

A spin may be entered at a speed 5 KIAS above stall and rapidly applying full back stick and full rudder in the desired direction of the spin and maintaining full back stick.

4.8.3. Spin Behavior

After rudder application the aircraft yaws for about 30°, then the nose moves down and the wings begin to rotate.

After ¼ turn, the nose is 45° down and the wings are 90° rotated.

A tendency to nose up to 15° may be manifested during the first turn.

The time for the first tur is 4 seconds.

After the first 1 ¼ turn the spin is stabilized with the nose down (45° - 60°)

The rotation is rapid (3 secs) per turn wide and sudden oscillation.

The altitude loss for each turn is 450 – 550 ft.

4.8.4. Spin Recovery

To effect the spin recovery, Apply positive rudder opposite to spin rotation, maintain neutral aileron and full back stick.

After this phase the yaw rotation is reduced and the nose moves down.

Release the stick forward to neutral position and centralize the rudder control.

The aircraft will recover from the spin within ½ turn after neutral stick is applied.

CAUTION

The stick should be released for the necessary amount only, to avoid too steep attitude and to reduce the altitude loss during the dive pull up phase.

Inverted attitude recovery may be obtained by excessive forward stick application.

SECTION 5
PERFORMANCE

5.1. GENERAL

This section provides performance information applicable to the C22J required by certification regulations.

The performance information, provided by the performance charts in this section, is based on measured Flight Test Data corrected to I.S.A. Standard Day conditions and analytically expanded for various parameters of weight, altitude temperature.

5.2. SUMMARY OF REQUIRED PERFORMANCE

The following Performance figures are based on measured Flight Test Data corrected to I.S.A. Standard Day conditions and to the Maximum Takeoff Weight, for takeoff data, and to the maximum landing weight for landing data.

1. Takeoff distance over 50 ft obstacle (95 KIAS, 18° Flaps, Sea Level)	950 m (3117 ft)
2. Takeoff Rate of Climb (141 KIAS, 18° Flaps, Sea Level	1600 ft/min
3. Landing Distance from 50 ft Obstacle (95 KIAS, 18° Flaps, Airbrakes Open, Sea Level)	825 m (2707 ft)

5.3. WIND COMPONENT

Maximum Demonstrated crosswind velocity for takeoff and landing is 18 Knots.

Refer to Figure 5-1 to compute crosswind component.

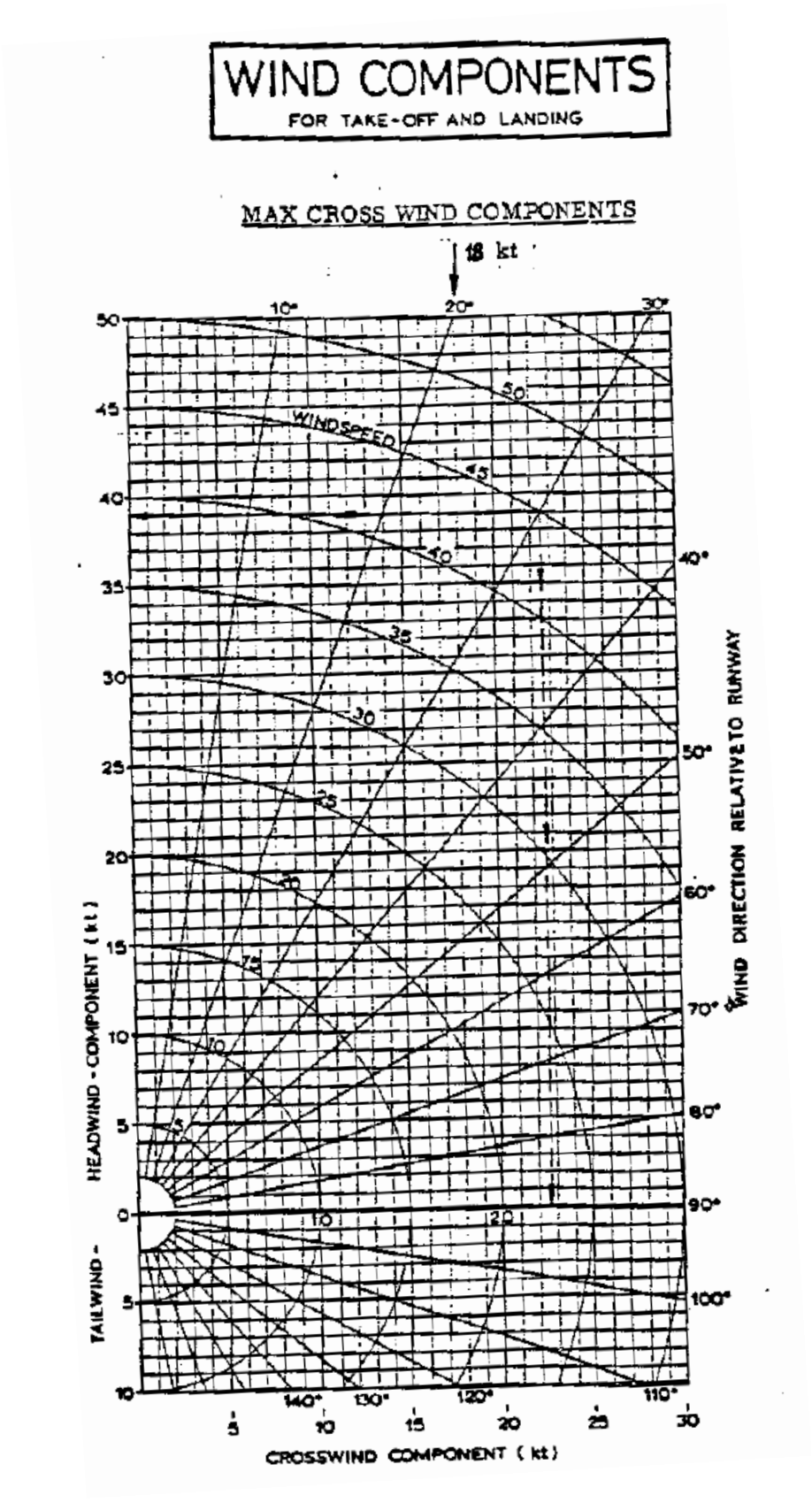

WIND COMPONENTS
FOR TAKE-OFF AND LANDING
MAX CROSS WIND COMPONENTS
18 kt
WINDSPEED
HEADWIND - COMPONENT (kt)
TAILWIND -
CROSSWIND COMPONENT (kt)
WIND DIRECTION RELATIVE TO RUNWAY

Figure 5-1

5.4. STALL SPEEDS

Associated Conditions	
Power	Idle
Landing Gear	Up or Down
Center of Gravity	Most Forward
Weight	1255 Kg

Example	
Landing Gear	Down
Flaps	Down
Airbrakes	Open
Angle of Bank	15°
Stall Speed in Level Flight	70 KIAS
$V_{S\phi}/V_{SL}$	1.02
Stall Speed in Turning Flight	71.4 KIAS

NOTES:

1. Maximum Altitude loss during stall recovery is approximately 400 ft.
2. Maximum nose down pitch attitude and altitude loss recover from single engine stalls are approximately 20° and 400 feet respectively.
3. Effect of bank angle on stall speed: see Figure 5-2

FLAP	LANDING GEAR	AIRBRAKES	KIAS	KCAS
UP	RETRACTED	CLOSED	79	83
DOWN	EXTENDED	CLOSED	73	78
DOWN	RETRACTED	CLOSED	75	78
DOWN	EXTENDED	OPEN	70	73.5

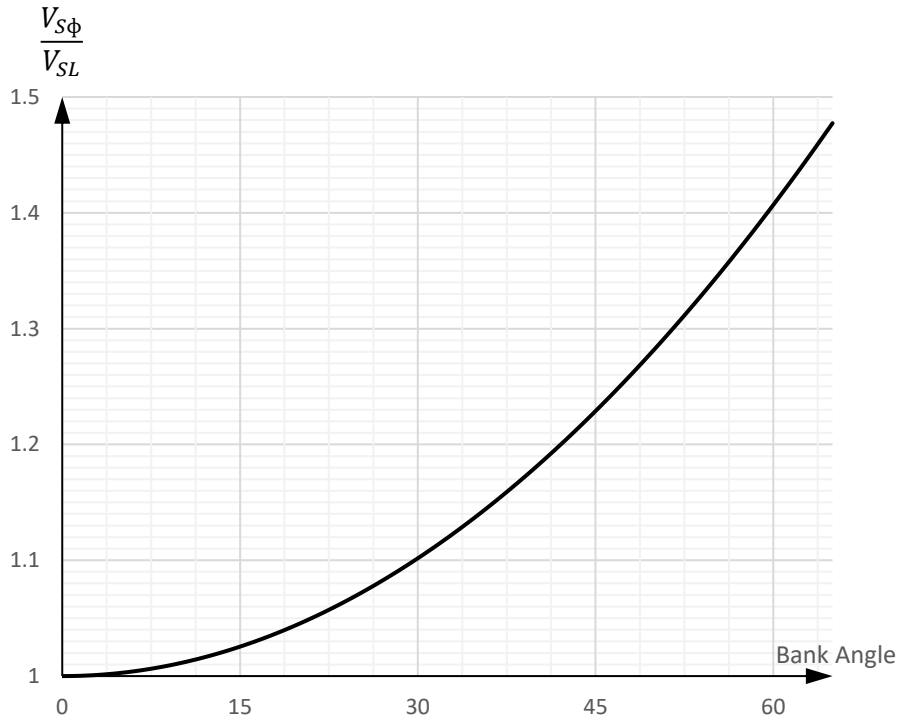


Figure 5-2

$V_{S\phi}$ = STALL SPEED IN TURNING FLIGHT

VSL = STALL SPEED IN LEVEL FLIGHT

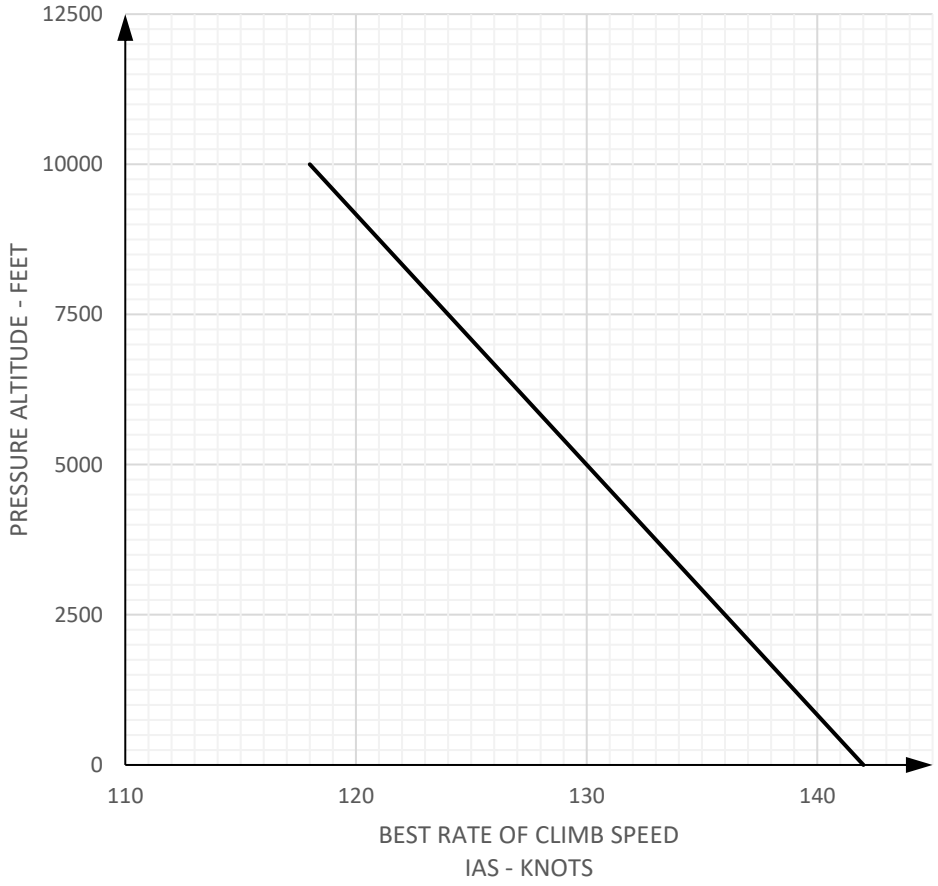
5.5. TAKE-OFF DISTANCE OVER 50 FT OBSTACLE

Air Temperature	20°C
Altitude	2000 ft
Takeoff Weight	1175 Kg
Wind	5 Kt Head
Takeoff Distance	920 m

5.6. CLIMB PERFORMANCE

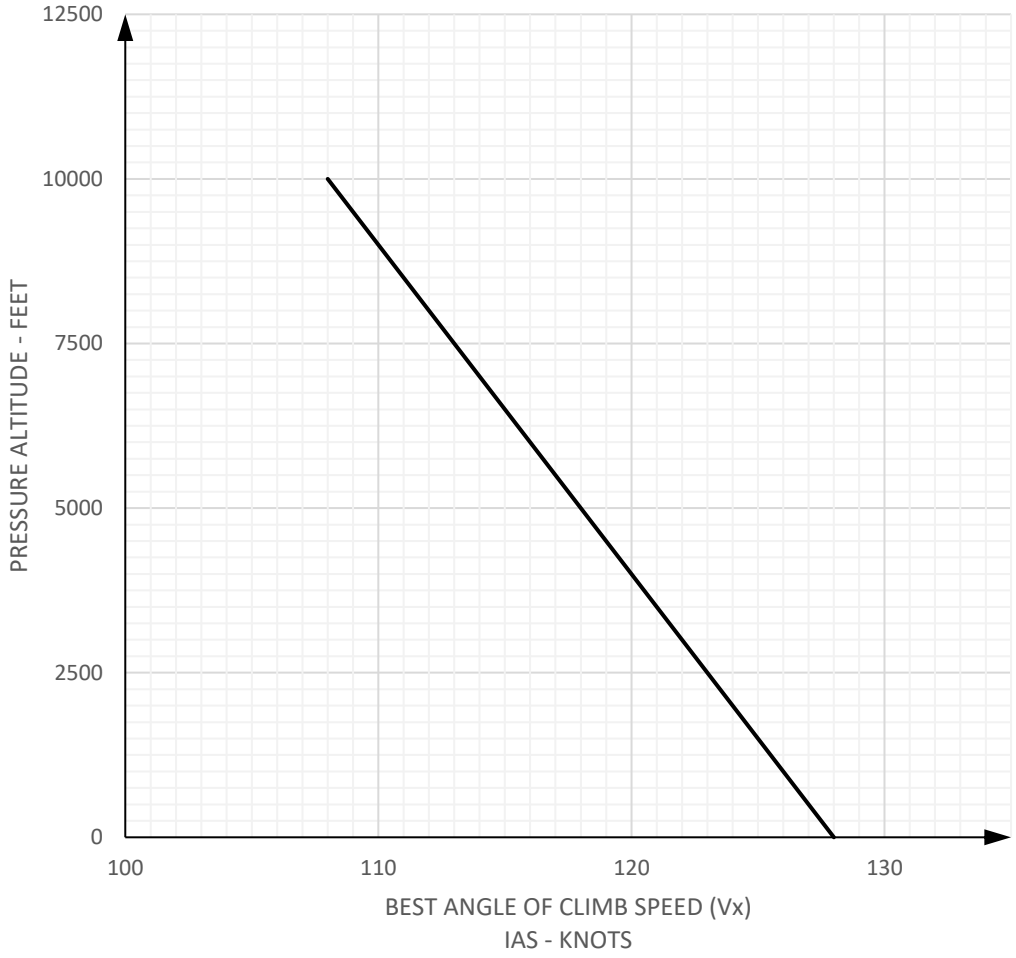
5.6.1. Best Rate of Climb Speed – Flaps Down

Thrust	Continuous (100%) 2 engines
Flaps	Down
Airbrakes	Closed
Landing Gear	Retracted
Weight	Maximum Takeoff
Atmosphere	ISA Standard Day



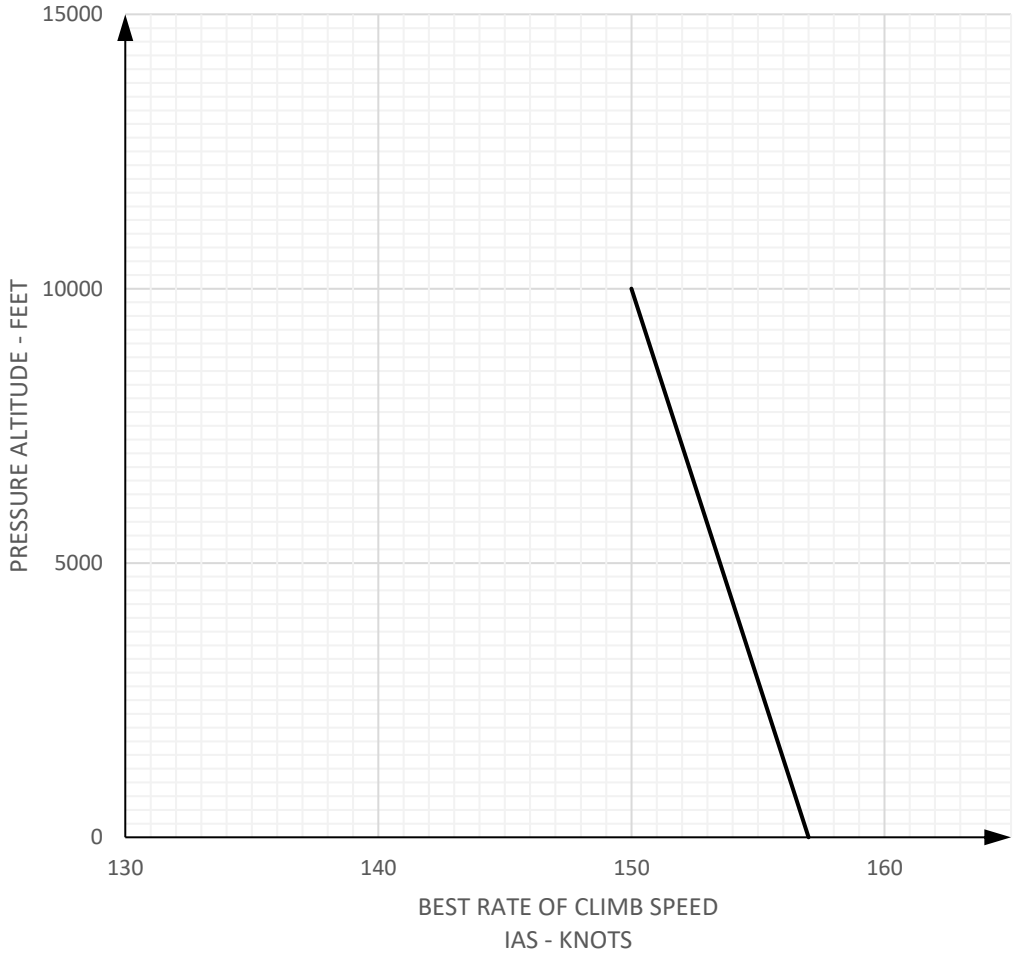
5.6.2. Best angle of Climb Speed – Flaps Down

Thrust	Continuous (100%) 2 engines
Flaps	Down
Airbrakes	Closed
Landing Gear	Retracted
Weight	Maximum Takeoff
Atmosphere	ISA Standard Day



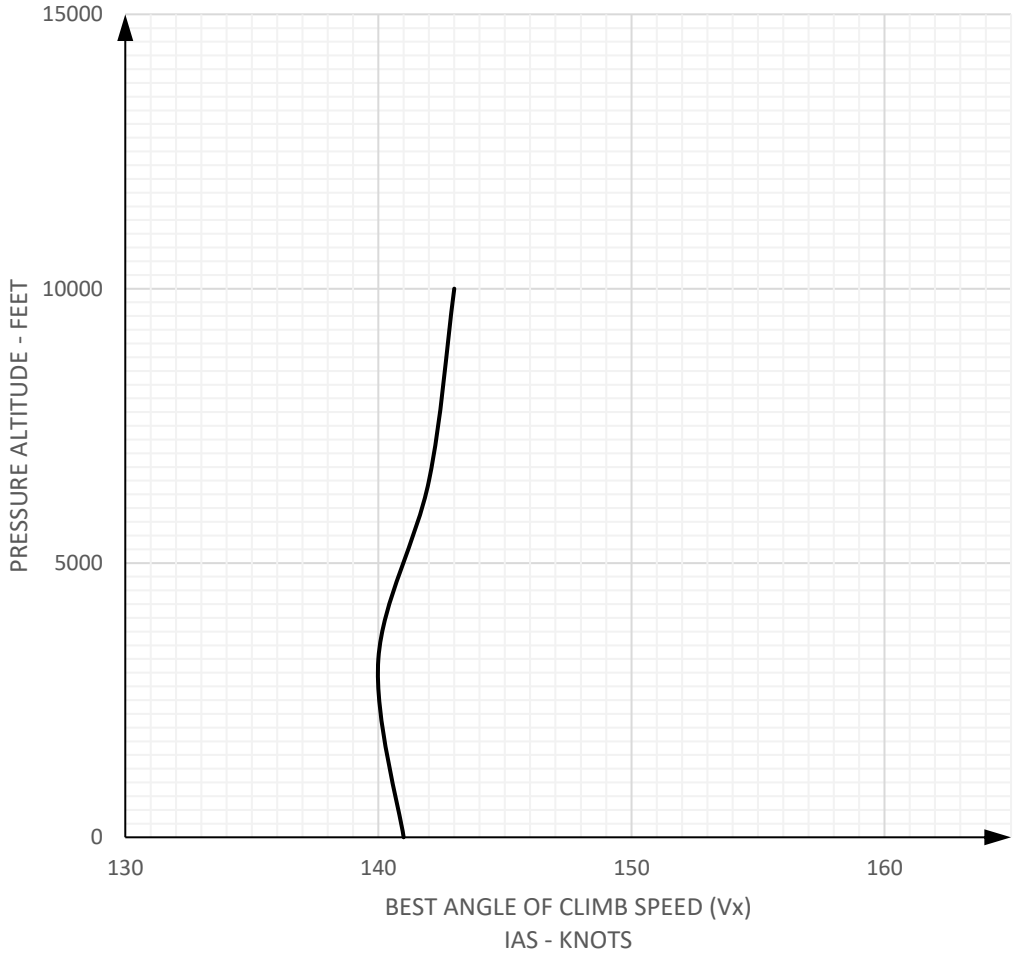
5.6.3. Best Rate of Climb Speed – Flaps Up

Thrust	Continuous (100%) 2 engines
Flaps	Up
Airbrakes	Closed
Landing Gear	Retracted
Weight	Maximum Takeoff
Atmosphere	ISA Standard Day



5.6.4. Best Angle of Climb Speed – Flaps Up

Thrust	Continuous (100%) 2 engines
Flaps	Up
Airbrakes	Closed
Landing Gear	Retracted
Weight	Maximum Takeoff
Atmosphere	ISA Standard Day



5.6.5. One Engine Inoperative Climb

See Fig. 5-3.

Associated Conditions:

Thrust	Continuous (100%)
Flaps	Up
Best Rate of Climb Speed	124 KIAS at Sea Level 114 KIAS at 14000 ft Linear variation between S.L. and 14000 ft

Example:

Outside Air Temperature	20°C
Altitude	2000 ft
Weight	1100 Kg
Rate of Climb	360 ft / min.

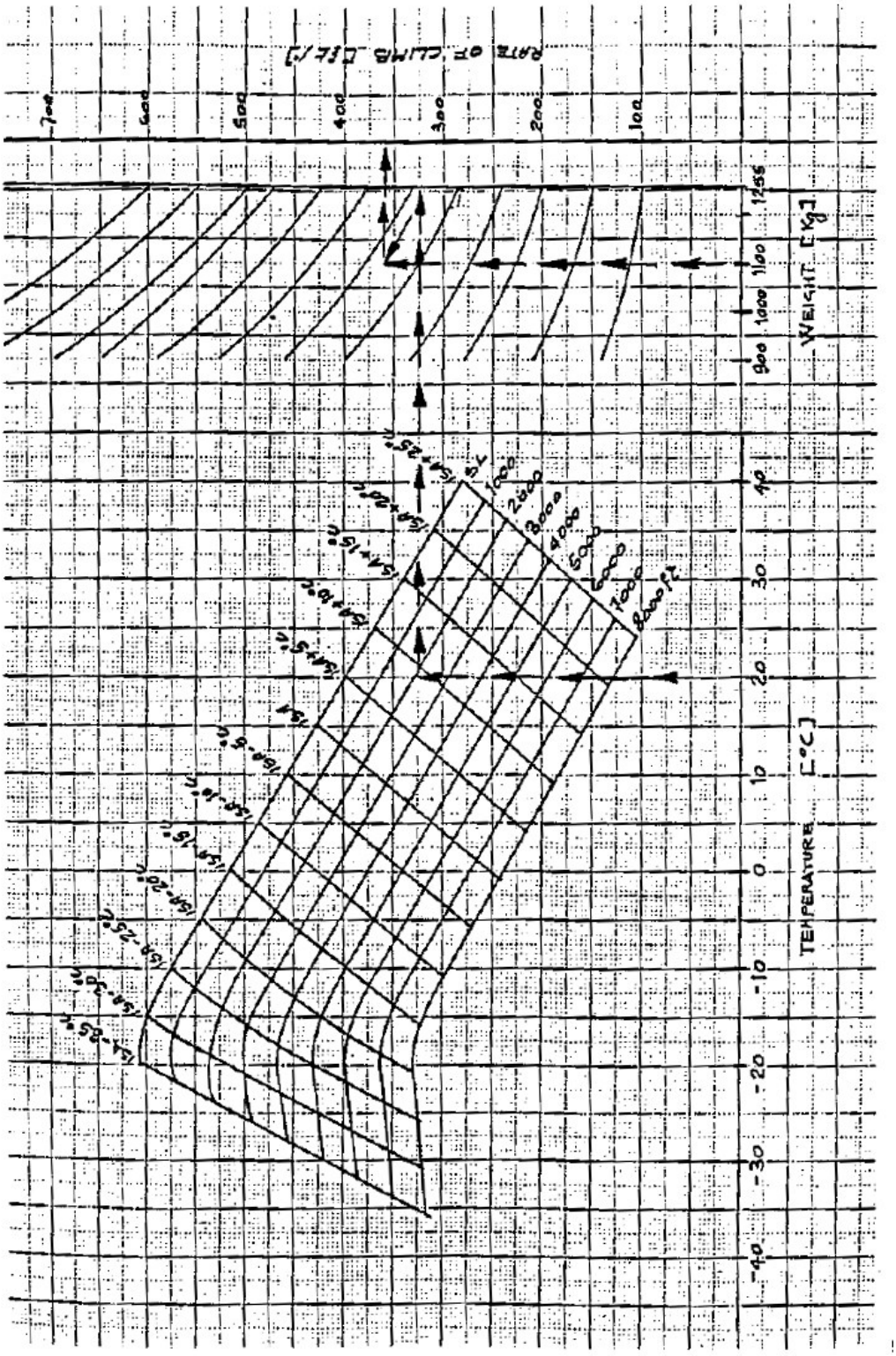

RATE OF CLIMB [ft/']
700
600
500
400
300
200
100
WEIGHT [Kg]
1255
900
1000
1100
TEMPERATURE [°C]
40
30
20
10
0
-10
-20
-30
-40
1000
2000
3000
4000
5000
6000
7000
8000 ft
ISA+35°C
ISA+30°C
ISA+25°C
ISA+20°C
ISA+15°C
ISA+10°C
ISA+5°C
ISA
ISA-5°C
ISA-10°C
ISA-15°C
ISA-20°C
ISA-25°C
ISA-30°C
ISA-35°C

Figure 5-3

5.6.6. Best Angle of Climb Speed – Flaps and Landing Gear Down

Thrust	Continuous (100%) 2 engines
Flaps	Down
Airbrakes	Closed
Landing Gear	Extended
Weight	Maximum Takeoff
Atmosphere	ISA Standard Day – 5000 ft Altitude
Speed	105 KIAS
Rate of Climb	863 ft / min.

SECTION 6
WEIGHT AND BALANCE

6.1. INTRODUCTION

This section contains the necessary information and procedures for correct loading and center of gravity calculation of the airplane

This section also contains procedures to establish the weight and balance for flight and describes the arms and weights of all equipment installed on the airplane. Weight and Balance limitations specified in Section 2 must never be exceeded and it is the pilot's responsibility to ensure that the airplane is loaded within the limits before each flight.

Center of gravity is a determining factor for handling characteristics for take-off and longitudinal static stability.

A properly loaded airplane will provide good performance within the flight envelope.

Using then running empty weight and C.G. location, the pilot can easily determine the weight and C.G. position for the loaded airplane by computing the total weight and moment and then determining whether they are within the approved envelope.

6.2. WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

NOTE:

It is the responsibility of the pilot and aircraft owner to ensure that the airplane is loaded properly.

The weight and balance at take-off are to be computed as follows:

a) Using the value of Fig. 6-1 add the weight and moment of all items to be loaded to the Running empty Weight on the Weight and Balance form (Figure 6-2).
b) Compute the total weight and moment and determine the C.G. location.
c) Locate on Figure 6-3 – Center of Gravity Envelope the load condition. If the point falls within the envelope, the loading meets the weight and balance requirements.

OCCUPANTS		FUEL			
Weight (Kg)	Moment (Kg * m)	Liters	Weight (Kg) 0.8 Kg/l	MOMENT (Kg * m) Main Tanks	Tip Tanks
55	82.5	20	16	38	40
60	90	40	32	76	80
65	97.5	60	48	113	119
70	105	80	64	151	159
75	112.5	100	80	189	199
80	120	120	96	227	238
85	127.5	137.5	110	260	273
90	135	140	112	264	
		160	128	302	
		180	144	340	
		200	160	378	
		220	176	415	
		240	192	453	
		260	208	491	
		275	220	519	

Figure 6-1

WEIGHT AND BALANCE LOADING FORM

	WEIGHT	MOMENT (Kg * m)
Running empty Weight	738	1882
Pilot's Seat		
Copilot's Seat		
Baggage		(1)
Main Wings Tank Fuel		
Tip Tanks Fuel		
Other		
Totals		

C.G. Station (Moment/Weight)	

Totals must be within approved weight and C.G. limits (Fig 6-3)
It is the responsibility of the pilot to ensure that the airplane is loaded properly
Note (1): The influence on C.G. is negligible.

Figure 6-2

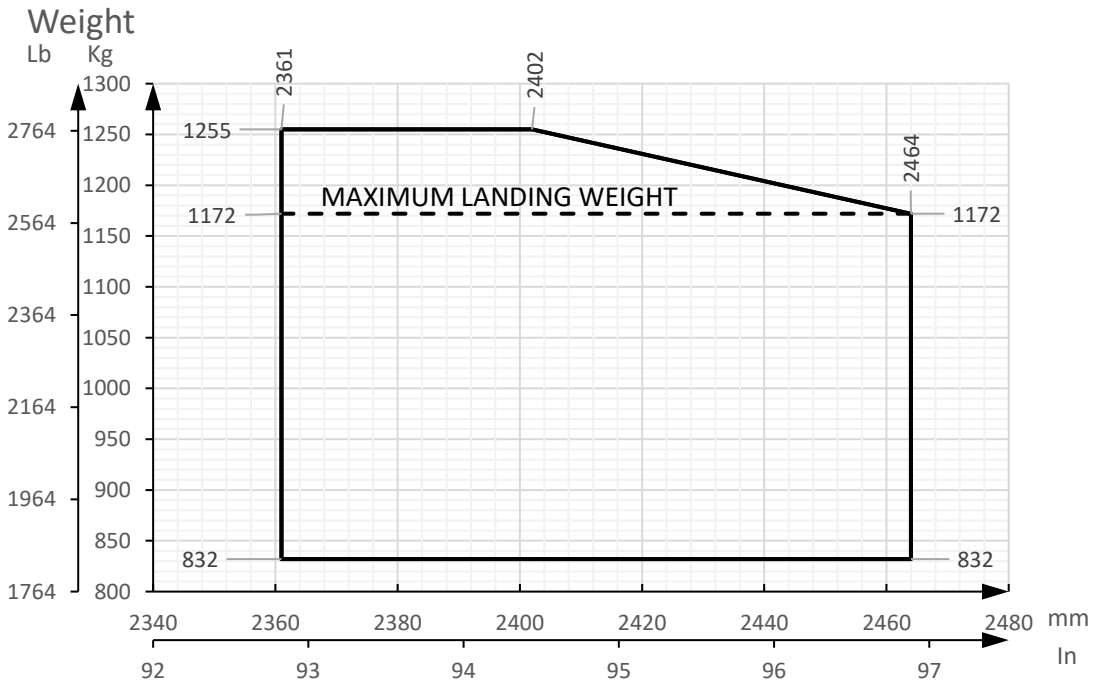


Figure 6-3

Center of Gravity Envelope

NOTE:

This Flight Simulator Model provides an automated version of the Load Form in the documents folder. Moments are automatically calculated, and the C.G. location is automatically plotted on the Center of Gravity envelope.

SECTION 7
PANEL & SYSTEMS MANUAL

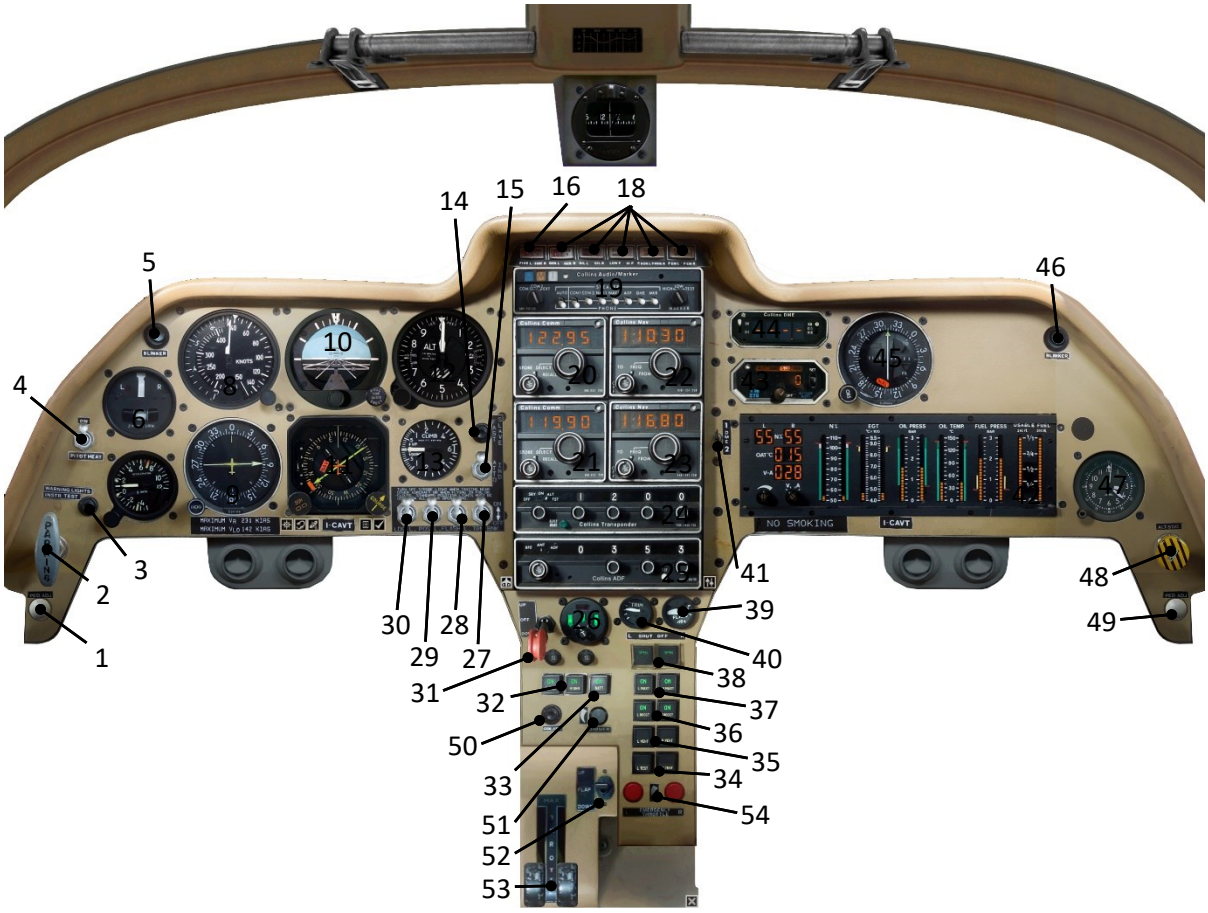
7.1. MAIN INSTRUMENT PANEL

This section gives a pictorial view of all the instrument panels in the aircraft.

- Figure 7-1 depicts the main instrument panel
- Figure 7-2 depicts the panel located between the two seats

In this Flight Simulator model, some controls may require additional explanation:

Toggle Switches	Left Click
Multi Position switches & Knobs	Left Click Mouse Wheel
Knobs & Levers	Left Drag Mouse Wheel
Rotary knobs	Left Click Mousewheel
Safety Covered Switches	Left Click to toggle Cover
Altitude Alerter Setting switch	Mouse wheel: Increment/Decrement by 1 step. Drag Up/Down: Keep Incrementing / Decrementing
Clock Knob	Pull Out: Start Chronometer Center: Stop Chronometer Push In: Reset timer



1. Pedal Adjust Handle, LH
2. Parking Brakes Handle
3. Warning Lights Test Button
4. Pitot Heat Switch
5. Oxygen Blinker, LH
6. Turn & Bank Indicator
7. Accelerometer
8. Airspeed Indicator
9. ADF Indicator
10. Attitude Indicator
11. Course Indicator (HSI)
12. Altimeter
13. Rate of Climb Indicator
14. Fast Slave Switch
15. Attitude Indicator Switch
16. Engine Fire Warning Lights
17. Standby Compass
18. Warning Lamps
19. Audio Marker Panel
20. COMM 1 Equipment
21. COMM 2 equipment
22. NAV 1 equipment
23. NAV 2 equipment
24. Transponder equipment
25. ADF equipment
26. Landing Gear Indicator
27. Turn & Bank Switch
28. Anticollision Lights Switch
29. Position Light Switch
30. Landing Light Switch
31. Landing Gear Lever
32. LH & RH Gen Switches
33. Battery Switch
34. Eng. Control Test Buttons
35. Eng. Dry Crank Buttons
36. Eng. Boost Pump Buttons
37. Eng. Master Switches
38. Eng. Shut-Off Switches
39. Flaps Position Indicator
40. Longitudinal Trim Indicator
41. DME Selector Switch
42. Integrated Multi Display
43. Altitude Alerter
44. DME indicator
45. NAV 2 Indicator
46. Oxygen Blinker, RH
47. Clock
48. Alternate Static Source
49. Pedal Adjust Handle, RH
50. GEN Arm Button
51. Instrument Lights Potentiometer
52. Flaps Switch
53. LH & RH Throttles
54. Emergency Throttles
55. Close Pedestal Panel

Figure 7-1

7.1.1. Pedal Adjust Handle, LH

This function is not simulated.

7.1.2. Parking Brakes Handle

Actuates a mechanical cable linkage to lock the brakes for parking.

7.1.3. Warning Lights Test Button

Momentary push-button. Illuminates the Central warning lights (7.1.16, 7.1.18) and the Integrated Multi Display (7.1.42).

7.1.4. Pitot Heat Switch

Circuit Breaker and Control Switch that feeds the Pitot Heating via the main electrical bus.

7.1.5. Oxygen Blinker, LH

Whenever the pilot is using oxygen, the card inside the blinker rotates. In this simulation, donning of oxygen masks is simulated when reaching 120000 ft.

7.1.6. Turn & Bank Indicator

A standard, electrically driven turn coordinator instrument.

7.1.7. Accelerometer

A conventional type accelerometer. It displays the load factor to which the aircraft is subjected. It also gives an indication of maximum positive and negative g-units reached by the aircraft during flight. The dial scale ranges from 0 to 12 positive g-units and from 0 to 4 negative g-units. A “PUSH TO SET” knob, on the lower left side of the instrument, allows zero-setting of the maximum positive and negative g-units displayed.

7.1.8. Airspeed Indicator

Combine Airspeed / Mach indicator. An airspeed bug can be adjusted through the knob on its lower right.

7.1.9. ADF Indicator

The IND 650 Indicator is a single pointer indicator. The following controls and indications are available:

- HEADING SELECTOR: it is a knob labelled HDG which is used to rotate the compass card to the aircraft magnetic heading.
- LUBBER LINE: It is the reference line for setting the desired headings.
- BEARING POINTER: It is served to the ADF receiver and indicated the relative bearing between the aircraft center line and the selected ground station.

7.1.10. Attitude Indicator

A self-contained, independent instrument which displays roll and pitch attitude. Pitch and roll attitude are displayed by the position of a spheroid relative to a fixed aircraft symbol. A knob, on the lower right of the instrument, marked PULL FOR QUICK ERECT, when pulled allows for quick gyroscope erection. The attitude indicator is supplied through a circuit breaker switch (7.1.15).

7.1.11. Course Indicator (HSI)

The Collins 331A-3G type course indicator (also referred as Horizontal Situation Indicator – HIS) provides a pictorial display of the navigation situation; in addition, it also provides controls for course and heading selection. The course indicator incorporates the following:

- Lubber line: indicates the magnetic heading of the aircraft
- HDG flag: comes into view to indicate a failure in the power supply or the compass section of the system or when the system is de-energized.
- NAV flag: appears when the VOR/ILS receiver is not receiving an appropriate signal. Deviation bar indications of the heading indicating arrow are invalid.
- Compass Card: the compass card can rotate and is served to the Flux Detector signals. It displays magnetic north, read against the lubber line.
- Miniature aircraft: represents the actual aircraft (stationary symbolic aircraft). It remains stationary, always pointing to the lubber line.
- COURSE KNOB: is used to select either the desired radial of a VOR station or the localizer course of an ILS station, as displayed by the Course Arrow, on the compass card.
- COURSE ARROW: is positioned by the Course Knob and is used to track the VOR radial or the inbound course of an ILS station on the Compass Card.
    - RECIPROCAL COURSE POINTER: is the rear end of the course arrow, pointing to the reciprocal of the selected course.
    - LATERALDEVIATION BAR: is a portion of the Selected Course Arrow. It indicates the selected VOR radial or ILS localizer course. Aircraft position in relation to a VOR radial or the localizer beam is represented by the relative position of the miniature aircraft and the lateral deviation bar. To maintain a radial, as selected by the Course Arrow, the lateral deviation bar should be kept aligned with the arrow.
    - LATERAL DEVIATION SCALE: each mark in the lateral deviation scale indicates a deviation of approximately 2 degrees from the selected VOR radial or ½ degree from the localizer course.
    - HDG KNOB: allows setting the selected heading marker on the outer rim of the compass card, against the heading to be flown.
    - SELECTED HEADING MARKER: is positioned by the HDG Knob, it provides the pilots with a reference to the selected heading to be held.
    - TO-FROM POINTER: indicates which end of the indicator arrow is turned to the selected VOR station.

7.1.12. Altimeter

It is a conventional barometric altimeter which uses aneroid capsule to convert static pressure information from the Pitot system to aircraft altitude. The pointers on the face of the instrument present aircraft altitude in feet. A long pointer indicates the hundreds of feet; the short dagger-shaped pointer indicates thousands of feet; finally, a wedge-shaped marker moving along the dial indicates the ten thousands of feet. To compensate for variations from standard atmosphere, to which the altimeter has been designed, a setting nob on the lower left corner sets the barometric pressure as received from the weather station. Barometric pressure setting, ion InHg, appears on a window on the right side of the dial.

7.1.13. Rate of Climb Indicator

It displays the vertical speed component of the aircraft in flight. The dial range is from 0 to 6000 feet per minute (f.p.m.) climb or descent vertical speed.

7.1.14. Fast Slave Switch

The slaving accessory combines flux detector and gyro information. The FAST SLAVE switch permits the pilot to fast slave the Slaving accessory if necessary.

7.1.15. Attitude Indicator Switch

A circuit breaker switch providing power to the Attitude Indicator (7.1.10).

7.1.16. Engine Fire Warning Lights

FIRE L	FIRE R

The fire detection system consists of a sensing element around each engine, two FIRE lamps and a fire warning test Circuit. The test circuit is activated by either the Warning Lights Test button (7.1.3) or by pressing the FIRE lights.

7.1.17. Standby Compass

A conventional magnetic compass.

7.1.18. Warning Lamps

GEN L	GEN R	OIL L	OIL R	LOW P.	HI P.	P.NOR. L.	P.NOR. R.	P.EM. L.	P.EM. L.

The Centralized Warning system comprises the following lamps:

- GEN L: No.1, or Left Hand Generator, offline
- GEN R: No.1, or Right Hand Generator, offline
- OIL L: Left engine oil pressure (Refer to 7.1.42)
- OIL R: Right engine oil pressure (Refer to 7.1.42)
- LOW P: Pressure in the collector tank is below 0.1 bar.
- HI P: Pressurization in the fuel tanks exceeds 0.3 bar.
- P.NOR.L: Left Engine Main Control Box Failure/Inoperative
- P.NOR.R: Right Engine Main Control Box Failure/Inoperative
- P.EM.L: Left Engine Emergency Control Box Failure/Inoperative
- P.EM.L: Right Engine Emergency Control Box Failure/Inoperative

NOTE: In this prototype aircraft, the labels below the lights are to be followed. Text on the indicators themselves is to be disregarded.

7.1.19. Audio Marker Panel

The AMR-530 Audio Marker Panel is equipped with the following displays and controls: A Communication Master Selector, an Auto Switch (not simulated), seven Audio Control Switches, a Marker witch and three Marker Lights. The above controls and lights are located on the front panel and have the following functions:

- The COMMUNICATIONS MASTER SELECTOR is a two-position switch labelled COMM1, COMM 2. IN the COMM 1 or COMM 2 position, either the VHF COMM 1 or the VHF COMM 2 transceiver is selected for use by the pilots.
- The AUTO switch is not simulated, and always activated.

- The seven AUDIO CONTROL SWITCHES are labelled respectively COM 1, COM 2, NAV 1, NAV 2, ADF, DME, and MKR. They are two position toggle switches with the positions center-OFF, and down-PHONE. The PHONE position routes the corresponding audio signal to the pilot's headphones.
- The MARKER switch allows to select sensitivity between LOW and HIGH position. Setting the switch to the spring-loaded TEST position the three MARKER LIGHTS are lit at full intensity and the audio channel is tested (if the relevant MKR switch is set to PHONE). This position is used for a preflight test of the MARKER LIGTHTS operation.
- The Marker lights are labelled O, M, and I respectively. They provide the pilots with a visual indication of marker beacon passage.

7.1.20. COMM 1 Equipment

The VHF-251E communications transceiver is designed to provide maximum ease of operation; it is equipped with the following displays and controls located on its control panel: Frequency Selector, Mode Selector, Volume/Test Knob, Frequency Display and Transmit indicator.

- The FREQUENCY SELECTORS consist of two concentric knobs used to select communications frequencies. The inner knob selects kHz and the outer knob selects MHz frequencies. There are no end stops, therefore frequencies may be selected turning the knobs in either direction.
- The MODE SELECTOR knob is located, on the lower left side of the control panel and is labelled: STORE-SELECT-RECALL. It is used to control the single channel memory. When in SELECT position, a desired frequency may be may be selected by the FREQUENCY SELECTORS. Turning the knob momentarily to the STORE position, the selected frequency is stored in in the memory replacing the previously stored frequency. The knob is spring loaded. The RECALL position allows operation of the transceiver on the previously stored frequency. When the knob is in the SELECT position, any of the 720 channels within frequency range, can be selected for operation via the FRQUENCY SELECTOR.
- The VOLUME/TEST Knob is a rotary control concentric to the MODE SELCRTOR Knob. In The fully counter-clockwise position the transceiver is switched OFF. Rotating clockwise increases the radio volume.
- The FREQUENCY DISPLAY is a five-digit electronic indicator that displays the frequency to which the transceiver is tuned, regardless or the position of the MODE SELCTOR.
- The TRANSMIT INDICATOR is a lamp labelled XMIT which monitors the radio frequency output during transmission.

7.1.21. COMM 2 equipment

See 7.1.20.

7.1.22. NAV 1 equipment

The Collins VIR 351 has a capability of 200 channels on the VHF frequency range, from 108.00 thru 117.95 MHz in 50 kHz steps, 160 channels being VOR channels and the remaining 40 being LOC channels. The NAV 1 receiver is also capable of tuning the COLLING GLS 350 E glideslope receiver. Both the NAV 1 and NAV 2 are capable of tuning the OLLINS TCR 451

DME receiver. The front panel of each receiver is equipped with the following controls and indications:

- VOL/ID Knob: when rotated fully contraclockwise the receiver is swathed OFF. Rotating clockwise increases the radio volume.
- DISPLAY SELECTED CONTROL: it is a three-position rotary switch, labelled TO, FREQ and FROM. In the TO position the display shows the bearing to the station. In the FREQ position, the frequency of the selected ground station is presented on the display. In the FROM position the display shows the VOR bearing "from" the station, followed by the letter F.
- ELECTRONIC DISPLAY: it is a five-digit seven bar indicator which display either the selected frequency or the VOR bearing.

7.1.23. NAV 2 equipment

See 7.1.22.

7.1.24. Transponder equipment

The TDR 950L Transponder has the following controls and indicators:

- FUNCTION SELECTOR: Selects transponder modes OFF, STBY, ALT, ON.
- REPLY LAMP: this lamp flashes whenever a response is transmitted to a valid interrogation.
- CODE SELECTOR SWITCHES: they are four rotating knobs used to select the reply code. The selected code appears on four windows located each, above the corresponding knob.

7.1.25. ADF equipment

The RCR 650 A ADF receiver is fitted with the following controls and indications:

- VOL/ID CONTROL KNOB: when rotated fully contraclockwise the receiver is swathed OFF. Rotating clockwise increases the radio volume.
- FREQUENCY SELECTORS: they are three rotary knobs which allow to select the operating frequency. Selected frequency is displayed on four windows over the frequency selectors.

7.1.26. Landing Gear Indicator

The landing gear position indication is given by three green lamps and a red lamp. When the landing gear is selected down, if one legs is not down the corresponding green light is not lit and the red light remains lit.

Landing Gear Position Warning: when the aircraft is likely to be in a landing configuration and anyone of the three legs is not down, an audio signal is given to the pilots. When either engine throttle lever is set at minimum and the airbrakes are deployed, the audio signal is generated.

7.1.27. Turn & Bank Switch

A circuit breaker switch supplying power to the turn & bank indicator.

7.1.28. Anticollision Lights Switch

Anticollision lights consist of three high-intensity white lamps having the same location as the position lights, at both wing tip tanks nose sections and at the top of the vertical fin trailing edge.

7.1.29. Position Light Switch

- A red lamp on the nose of the left wing tank
- A green lamp on the nose of the right wing tank
- A white lamp on the top side of the vertical fin trailing edge

7.1.30. Landing Light Switch

The landing light is a white lamp located on the nose of the fuselage. Operation for more than 5 consecutive minutes is to be avoided.

7.1.31. Landing Gear Lever

Features 3 positions:

- UP: powers the gear motor to retract the landing gear
- OFF: disconnects power to the landing gear motor
- DOWN: powers the gear motor to extend the landing gear.

7.1.32. LH & RH Gen Switches

ON L GEN	ON R GEN

Generator Control Pushbuttons.

When electrical power is available to the main bus, the amber “L GEN” and “R GEN” labels are lighted.

When the respective generator is online, the green “GEN” label illuminates.

Pressing the button attempts to bring the respective generator online, or disconnects it if online.

The GEN ARM pushbutton needs to be pressed if a generator has been manually disconnected (by pressing the respective GEN button).

7.1.33. Battery Switch

ON BATT

Battery ON/OFF pushbutton.

When electrical power is available to the main bus, the amber “BATT” label is lighted. The “BATT” label will flash sporadically if the battery is disconnected, and no power is available in the main bus (provided enough voltage is present in the battery).

When the battery is online, the green “ON” label is illuminated.

7.1.34. Eng. Control Test Buttons

ON L TEST	ON R TEST

Engine emergency control box test toggle buttons

When electrical power is available to the main bus, the amber “L TEST” and “R TEST” labels are lighted.

When the respective engine is running (MAST on), this function can be activated. With Test ON, the normal control box of the respective engine is disconnected, and the respective “P

NOR" is illuminated. Acting on the respective emergency throttle knob shall now control the engine. Pressing the TEST switch button again will reactivate the normal engine control box.

7.1.35. Eng. Dry Crank Buttons

Engine Dry Crank Buttons

When electrical power is available to the main bus, the amber "L VENT" and "R VENT" labels are lighted.

When the respective engine is stopped (MAST off), pressing this momentary pushbutton will power the respective starter motor and close the fuel supply to the engine. Dry motoring shall be limited to 10 sec. per engine maximum.

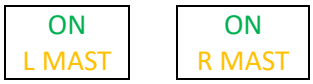
7.1.36. Eng. Boost Pump Buttons

Engine Boost Pump Toggle buttons

When electrical power is available to the main bus, the amber "L BOOST" and "R BOOST" labels are lighted.

If electrical power is available, pressing these switches toggles ON/OFF the respective engine electric fuel boost pump.

7.1.37. Eng. Master Switches



Engine Master Switches

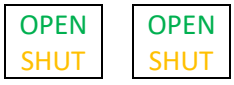
When electrical power is available to the main bus, the amber "L MAST" and "R MAST" labels are lighted.

When the respective engine MAST is OFF, pressing this button initiates the automated engine start sequence.

When the respective engine MAST is ON, pressing this button initiates the automated engine shutdown sequence.

When an engine shuts down for any reason, the respective MAST switch toggles to OFF.

7.1.38. Eng. Shut-Off Switches



Engine fuel shut-off toggle buttons.

The engine fuel shut-off switches are covered by a spring-loaded safety guard to prevent accidental operation. In this simulation, the guard is lifted by right-clicking.

When the respective fuel shut-off valve is closed, the "SHUT" label is illuminated. When the valve is open, the "SHUT" label is off and the "OPEN" label illuminates.

Normally, the valves are automatically controlled by the engine control box.

7.1.39. Flaps Position Indicator

Flaps can extend from 0° to 18°. Any intermediate position can also be selected.

7.1.40. Longitudinal Trim Indicator

Trim actuator position indicator. In this simulation, clicking on the instruments shows/hides a warning card displaying instructions for longitudinal trim settings for take-off and approach.

7.1.41. DME Selector Switch

In the up position, labelled “1”, the DME transmitter receiver is tuned to the NAV 1 equipment, in the down position, labelled “2”, the DME is transmitter receiver is tuned to the NAV2 equipment.

7.1.42. Integrated Multi Display

The integrated multi display panel (IMDP) displays operating parameters of the engines and the electrical system:

- Fuel Quantity, labelled FUEL LEVEL
- Fuel supply pressure, labelled FUEL PRESS
- Engine lubricating oil temperature, labelled OIL TEMP
- Engine lubricating oil pressure, labelled OIL PRESS
- Engine exhaust gas temperature, labelled EGT
- An analogue display of engine speed, labelled N%
- Two digital displays of engine speed, labelled N%
- Outside air temperature, labelled OAT
- Voltage current output of the two electrical systems on a single digital display labelled V-A
- A selector knob labelled V-A controls the V-A display. The selector has 4 positions, from left to right:
    1. LH system Volts
    2. RH System Volts
    3. LH System Amperes
    4. RH system Amperes
- A light potentiometer regulates the backlighting of the IMDP.

7.1.43. Altitude Alerter

It is a panel mounted unit with a display and control switches, It allows the pilot to select a flying altitude and altitude range, and gives pilots flying commands reach the selected altitude. It also warns the pilot when the aircraft deviates from the selected altitude range. The front panel carries the following controls and indicators:

- MODE SWITCHES: four pushbuttons labelled ALT, BARO, SEL and RNG respectively. Pressing ALT (Altitude Mode) aircraft altitude in 100 ft increments is displayed on the digital display. The BARO switch selects the Barometric pressure mode of operation and is used to enter the barometric setting. This simulation ties this instrument to the Altimeter BARO setting. When the BARO switch is pressed, the altimeter setting appears on the display. The barometric setting can be entered acting on the SET switch. The SEL switch is used to select flying altitude. Acting on the SET switch, the pilot selects a pre-determined altitude where he wants the alert to activate. The setting may be continually adjusted during flight. The RNG button

selects the Range mode of operation. When first pressed, a range of ±250 ft appears on the display. Range is adjustable from ±50 to ±750 ft. The range can be adjusted acting on the SET switch.

- SET SWITCH: it is labelled SET and can be moved vertically. The switch is spring-loaded to centre and acts like a lever, increasing or decreasing the selected value with a speed proportional to the switch deflection. The mouse wheel produces single increments/decrements. This switch is used to adjust the setting in the Barometric Pressure, Select and Range models of operation.
- POWER SWITCH: It is a rotary knob used to turn ON or OFF the equipment.
- DISPLAY UNIT: It is a six digit seven-bar indicator. The first Digit, to the left, is the visual alert and can display either a Descent Command Bar (N), a Climb Command Bar (U), or a Level Command Bar (-). The remaining five digits can either display the selected altitude, the altitude range, or the barometric setting depending on the mode of operation selected.

7.1.44. DME indicator

Che Collins IND 450 indicator consists of a power switch, a mode selector, and digital display.

- POWER SWITCH: a two position toggle labelled ON-OFF.
- MODE SLECTOR: It is a three position toggle switch labelled NM, KTS and MIN. In the NM position, distance from the station in nautical miles is displayed to a maximum of 199.9 nautical miles. The KTS position displays ground speed of the aircraft in knots with respect to the selected station up to a maximum of 399 knots, minimum detectable speed is 30 knots. The MIN position displays the remaining flight time to the station in minutes.

7.1.45. NAV 2 Indicator

The IND 350 indicator is a single pointer VOR/LOC indicator, equipped with a manual Omnibearing Selector (OBS), and a NAV flag. Rectilinear deviation bars provide presentation of deviation when intercepting courses. The indicator is also equipped with a 360-degree visibility of course selector card with reciprocal and 45-degree reference marks. The OBS knob allows the pilot to select the desired radial from the VOR station.

7.1.46. Oxygen Blinker, RH

Whenever the pilot is using oxygen, the card inside the blinker rotates. In this simulation, donning of oxygen masks is simulated when reaching 120000 ft.

7.1.47. Clock

The clock is equipped with a timer function, operated with the push-pull knob on the lower left of the instrument:

- PULL: Start Chronometer
- CENTRE: Stop Chronometer
- Push: Reset Chronometer (Spring Loaded position)

7.1.48. Alternate Static Source

The lever deviates the static source to the alternate port.

7.1.49. Pedal Adjust Handle, RH

This function is not simulated.

7.1.50. GEN Arm Button

The GEN ARM pushbutton needs to be pressed if a generator has been manually disconnected (by pressing the respective GEN button).

7.1.51. Internal Lights Switch

This knob controls the electrical power to the instrument backlighting and ceiling mounted floodlight.

7.1.52. Flaps Switch

Any intermediate flap position may be selected.

In this simulation, the switch is operated by clicking UP or DOWN. The mouse wheel may also be used. Standard Flight simulator Flap commands are also usable.

7.1.53. LH & RH Throttles

In this simulation, throttles can be dragged, or operated with the mouse wheel.

7.1.54. Emergency Throttles

When the Respective engine control box has failed, the emergency throttle may restore control of the engines to the pilots. In this simulation, it only responds when the TEST function is activated for the respective engine.

7.2. LOWER PANEL (BETWEEN SEATS)

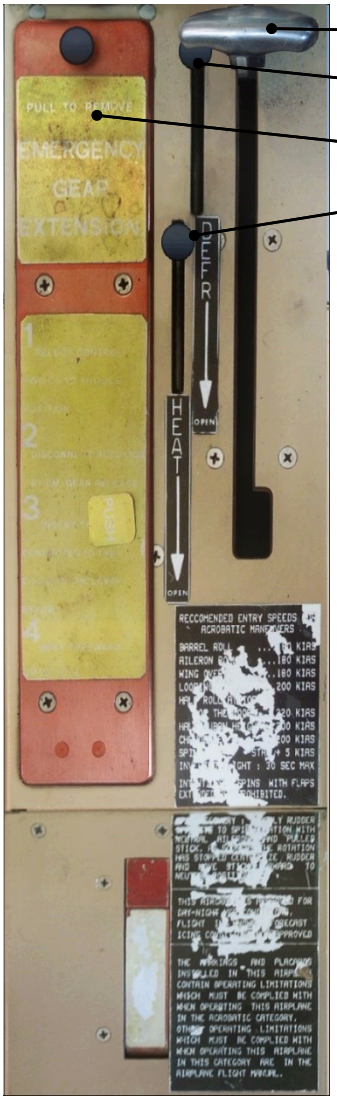


Figure 7-2

1. Airbrakes Lever
2. Windshield Defrost Lever
3. Emergency Gear Extension Mechanism
4. Cabin Heating air Lever

7.2.1. Airbrakes Lever

One panel located above each wing, extending from the wing root until the end of the flaps, and hinging together with the flaps. When open, the leading edge of the panel is rotated upwards by a maximum of 48°. The flaps are also rotated downward by the same amount. The lever operates the airbrakes and flaps through a series of mechanical linkages. Flap deflection can still operate through its full range of 18° plus the commanded airbrake deflection.

7.2.2. Windshield Defrost Lever

External air from an intake on the belly of the aircraft is fed through a heat exchanger around the right engine. The hot air is routed to a nozzle located on the forward end of the dashboard to be ejected on the internal side of the front windshield. This system only operates with engines running and aircraft flying. In this simulation, windshield ice may form under rainy conditions if external temperature is low enough. Operating this control will reverse the icing process.

7.2.3. Emergency Gear Extension Mechanism

This panel can be removed by lifting the black knob on its forward end. It releases a gear release lever to be inserted in the red slot below this panel. In this simulation the complete process is accomplished by a single click on this panel. The Gear lever must be set to the DOWN position.

7.2.4. Cabin Heating Air Lever

External air from an intake on the belly of the aircraft is fed through a heat exchanger around the left engine. The hot air is routed to the nozzles located in front of the pilots. This system only operates with engines running and aircraft flying.

7.3. CHECKLIST

This simulation includes a checklist function, through the standard Flight Simulator Checklist functionality.

7.4. GENERAL SYSTEM NOTES

This section details notes and warnings that apply to the systems of the aircraft as simulated. Care shall be taken to avoid unsafe operation.

7.4.1. Fuel system

The fuel system includes:

- Two Wing Tip Tanks (capacity: 72 litres each)
- Two Main Wing Tanks (capacity: 137 litres each)
- One Fuselage Collector Tank (capacity: ~ 1 litre)

Fuel is gravity fed to the collector tank, from the main wing tanks. The tip tanks are interconnected with the main wing tanks

- **Engines feed ONLY from the collector tank**
- Always refuel the main tanks first. If more fuel is needed, fuel the tip tanks.
- The collector tank is equipped with valves for inverted flight. **Inverted flight is limited to 30s to avoid collector tank exhaustion and engine fuel starvation.**

7.4.2. Heating system

Windshield frosting is simulated. Operate the Windshield Defrost lever as required.

7.4.3. Flight Controls

In this aircraft, airbrakes provide positive lift. They shall be deployed for landing.

- **Airbrakes down and flaps up is not a normal approach configuration.**

Elevator Trim requires setting before take-off:

- **Set elevator trim 25% UP with 2 occupants**
- **Set elevator trim 12% UP with 1 occupant**

7.4.4. Weight and Balance

Pilot and Co-pilot models will display in accordance to the weight and balance as entered in Flight Simulator:

Weight (lbs)	Model Displayed
0 to 80	Empty seat
80 to 137	Female
137 upwards	Male

Setting unrealistic values will result in inability to trim the aircraft, and possible pitch instability / elevator authority saturation.

7.4.5. Conditions at Simulation start-up.

When starting a flight from the gate/parking, the aircraft will be “Cold & Dark”, fully shut down.

When starting inflight, the aircraft is set-up for safe continuation of flight.