TB20GT

from S/N 948

P/N : T00.DWEPIPYE

PILOT'S INFORMATION MANUAL

CAUTION

THIS INFORMATION MANUAL IS A NON–OFFICIAL COPY OF THE PILOT'S OPERATING HANDBOOK AND MAY BE USED FOR GENERAL INFORMATION PURPOSES ONLY.
IT IS NOT KEPT CURRENT AND THEREFORE CANNOT BE USED AS A SUBSTITUTE FOR AIRWORTHINESS AUTHORITIES APPROVED MANUAL WHICH IS THE ONLY ONE INTENDED FOR OPERATION OF THE AIRPLANE.

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TABLE OF CONTENTS

SECTION 1

GENERAL

TABLE OF CONTENTS

Page

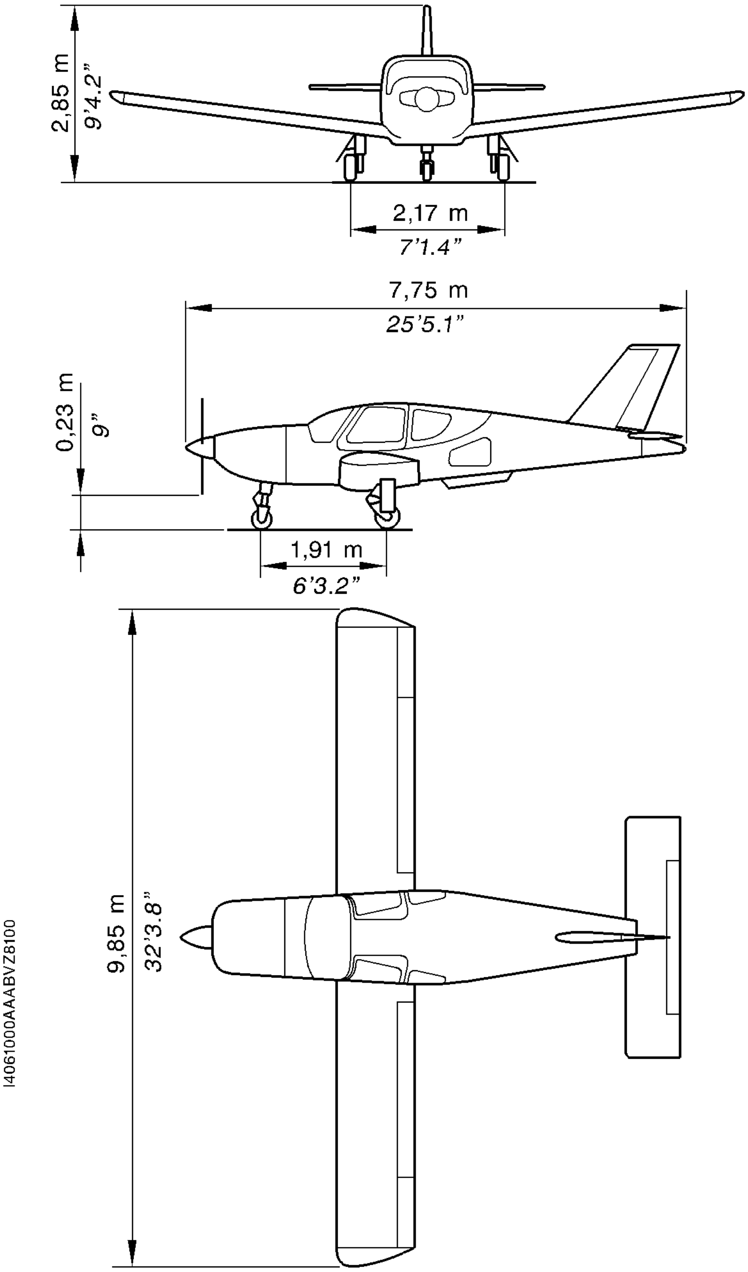

Figure 1.1 – THREE VIEW DRAWING

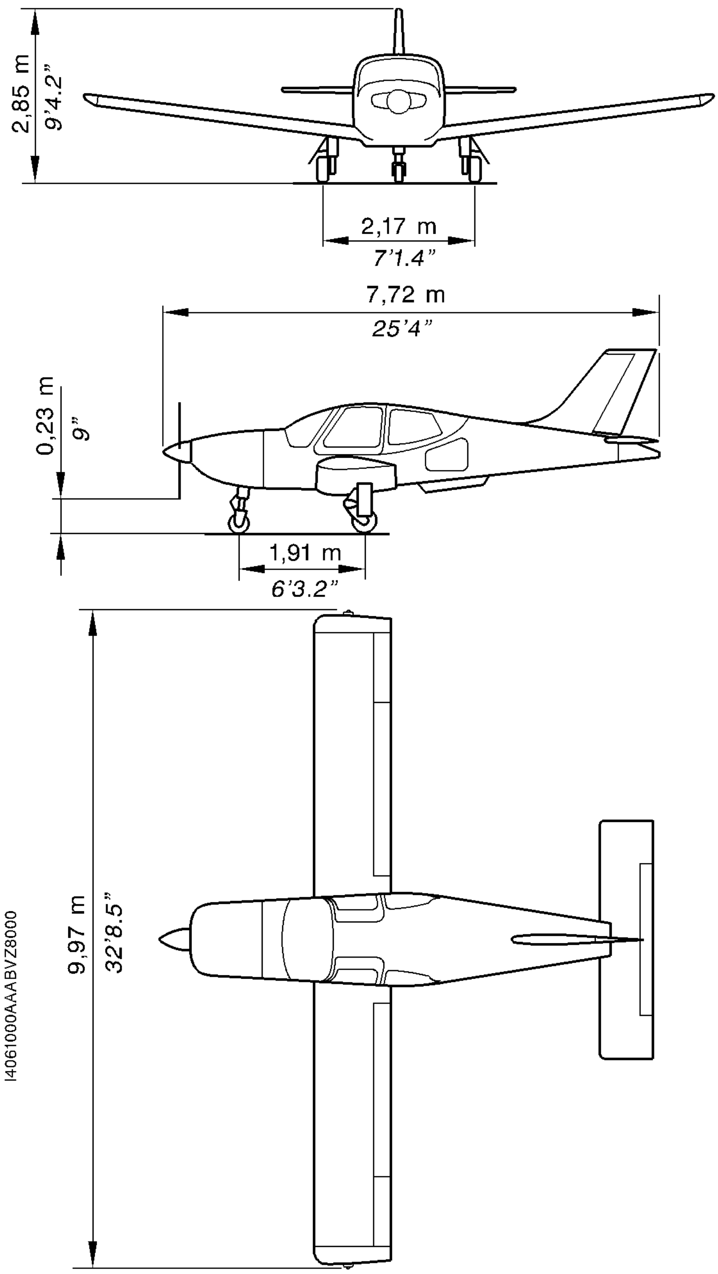

Figure 1.1A – THREE VIEW DRAWING

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GENERAL

This handbook contains 9 sections, and includes the material required by FAR Part 23 to be furnished to the pilot for operation of SOCATA Model TB 20 airplane. It also contains supplemental data supplied by SOCATA.

This section provides basic data and information of general interest. It also contains definitions or explanations of abbreviations and terminology commonly used.

The general for optional systems are given in Section ”Supplements” of this Manual.

DESCRIPTIVE DATA

ENGINE

Number of engines : 1
Engine Manufacturer : AVCO LYCOMING
Engine Model Number : IO–540–C4 D5D or IO–540–C4 B5D
Engine Type :
  Six–cylinder, horizontally opposed, direct drive, air–cooled
Engine rated at 250 BHP at 2575 RPM.

PROPELLER

Number of propellers : 1
Propeller Manufacturer : HARTZELL
Propeller Model Number : HC–C2YK–1BF/F8477–4
Number of blades : 2
Propeller Diameter :
  Maximum : 80 inches (2.03 m)
  Minimum : 78 inches (1.98 m)
Propeller Type :
  Constant–speed, hydraulically–actuated
Propeller Governor : WOODWARD M 210 681 or C210 761 or F210 761

FUEL

Approved Fuel Grades (and Colors) :
100 LL Grade Aviation Fuel (Blue)
100 (Formerly 100 / 130) Grade Aviation Fuel (Green)

Total capacity : 88.8 U.S Gallons (336 Litres)
Total capacity each tank : 44.4 U.S Gallons (168 Litres)
Total usable : 86.2 U.S Gallons (326 Litres)

NOTE :
Isopropyl alcohol or ethylene glycol monomethyl ether may be added to the fuel supply. Additive concentrations shall not exceed 1 % for isopropyl alcohol or 0.15 % for ethylene glycol monomethyl ether. Refer to Section 8 "Handling, servicing and maintenance" for additional information.

OIL

Oil grades (specifications) and Viscosity :

Outside Air Temperatures	**MIL–L–6082 Spec. Mineral Grades 50 first hours**	**MIL–L–22851 Spec. Dispersant Grades after 50 hours**
All temperatures	.....	SAE 15W50 or SAE 20W50
Above 80°F (27°C)	SAE 60	SAE 60
Above 60°F (15°C)	SAE 50	SAE 40 or SAE 50
30°F (–1°C) to 90°F (32°C)	SAE 40	SAE 40
0°F (–18°C) to 70°F (21°C)	SAE 30	SAE 30, SAE 40 or SAE 20W40
0°F (–18°C) to 90°F (32°C)	.....	SAE 20W50 or SAE 15W50
Below 10°F (–12°C)	SAE 20	SAE 30 or SAE 20W30

Oil Capacity :

Sump : 12 Quarts (11.3 Litres)
Total : 13.3 Quarts (12.6 Litres)
Maximum oil consumption : 0.004 qt/BHP/hr.

MAXIMUM CERTIFICATED WEIGHTS

Take–off : 3086 lbs (1400 kg)
Landing : 3086 lbs (1400 kg)
Weight in Baggage Compartment : 143 lbs (65 kg) ; refer to Section 6 for cargo loading instructions.

STANDARD AIRPLANE WEIGHTS

	Pre–MOD.151	Post–MOD.151
Standard Empty Weight :	1764 lbs (800 kg)	1814 lbs (823 kg)
Maximum Useful Load :	1323 lbs (600 kg)	1272 lbs (577 kg)

CABIN AND ENTRY DIMENSIONS

	Pre–MOD.151	Post–MOD.151
Maximum Cabin Width :	4.20 ft (1.28 m)	4.20 ft (1.28 m)
Maximum Cabin Length :	8.30 ft (2.53 m)	8.30 ft (2.53 m)
Maximum Cabin Height :	3.67 ft (1.12 m)	3.94 ft (1.20 m)
Number of Cabin Entries :	2	2
Maximum Entry Width :	3.45 ft (1.05 m)	3.48 ft (1.06 m)
Minimum Entry Width :	2.62 ft (0.80 m)	2.82 ft (0.86 m)
Maximum Entry Height :	2.30 ft (0.70 m)	2.46 ft (0.75 m)

BAGGAGE SPACE AND ENTRY DIMENSIONS

	Pre–MOD.151	Post–MOD.151
Maximum Compartment Width :	4.10 ft (1.25 m)	4.10 ft (1.25 m)
Minimum Compartment Width :	3.45 ft (1.05 m)	3.45 ft (1.05 m)
Maximum Compartment Length :	2.95 ft (0.90 m)	2.95 ft (0.90 m)
Minimum Compartment Length :	2.20 ft (0.67 m)	2.20 ft (0.67 m)
Maximum Compartment Height :	2.03 ft (0.62 m)	2.03 ft (0.62 m)
Minimum Compartment Height :	1.35 ft (0.41 m)	1.35 ft (0.41 m)
Entry Width :	2.10 ft (0.64 m)	2.10 ft (0.64 m)
Entry Height :	1.44 ft (0.44 m)	1.80 ft (0.55 m)

SPECIFIC LOADINGS

Wing loading : 24.1 lbs/sq.ft (117.6 kg/m^2)
Power loading : 12.3 lbs/BHP (5.6 kg/CV)

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS : ***Knots Calibrated Airspeed*** is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.

MPH CAS : ***Miles per Hour Calibrated Airspeed***

KIAS : ***Knots Indicated Airspeed*** is the speed shown on the airspeed indicator and expressed in knots.

MPH IAS : ***Miles per Hour Indicated Airspeed***

KTAS : ***Knots True Airspeed*** is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude, temperature and compressibility.

V_A : ***Maneuvering Speed*** is the maximum speed at which full or abrupt control movements may be used.

V_{FE} : ***Maximum Flap Extended Speed*** is the highest speed permissible with wing flaps in a prescribed extended position.

V_{LE} : ***Maximum Landing Gear Extended Speed*** is the maximum speed at which an airplane can be safely flown with the landing gear extended.

V_{LO} : ***Maximum Landing Gear Operating Speed*** is the maximum speed at which the landing gear can be safely extended or retracted.

V_{NE} : ***Never Exceed Speed*** is the speed limit that may not be exceeded at any time.

V_{NO} : ***Maximum Structural Cruising Speed*** is the speed that should not be exceeded except in smooth air, and then only with caution.

V_{SO} : ***Stalling Speed or the minimum steady flight speed*** at which the airplane is controllable in the landing configuration.

V_{S1} : ***Stalling Speed or the minimum steady flight speed***obtained in a specific configuration.

METEOROLOGICAL TERMINOLOGY

ISA : ***International Standard Atmosphere*** : Its temperature is 59°F (15°C) at sea level pressure altitude and decreases by 3.6°F (2°C) for each 1000 ft of altitude.

OAT : ***Outside Air Temperature*** is the free air static temperature. It is expressed in either degrees Celsius or degrees Fahrenheit.

QNH : Setting at the pressure corresponding to the reading of actual airplane altitude.

Pressure Altitude :
Is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inches of mercury (1013.2 hPa).

ENGINE POWER TERMINOLOGY

BHP : Brake Horsepower is the power developed by the engine.

MP : Manifold Pressure is a pressure measured in the engine's induction system and is expressed in inches of mercury (in.Hg).

RPM : Revolutions Per Minute is engine speed.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient :
Is the demonstrated ratio of the change in height during a portion of climb, to the horizontal distance traversed in the same time interval.

Demonstrated crosswind velocity :
Is the velocity of the crosswind component for which adequate control of the airplane during take–off and landing was actually demonstrated during certification tests. The value shown is not considered to be limiting.

g : Is acceleration due to gravity.

Usable Fuel :
Fuel available for flight planning.

Unusable Fuel :
Fuel remaining after a runout test has been completed in accordance with governmental regulations.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum :
Is an imaginary vertical plane from which all horizontal distances are measured for balance purpose.

Arm : Is the horizontal distance from the reference datum to the center of gravity (C.G.) of an item.

Moment : Is the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify balance calculations by reducing the number of digits).

Center of gravity (C.G.) :
Is the point at which an airplane, or equipment, 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. Limits: ***Center of Gravity Limits*** are the extreme center of gravity locations within which the airplane must be operated at a given weight.

Standard Empty Weight :
Weight of a standard airplane including unusable fuel and full operating fluids (oil and hydraulic fluids).

Basic Empty Weight :
Standard empty weight plus optional equipment.

Useful Load : Is the difference between take–off weight and the basic empty weight.

Maximum Take–off Weight :
Is the maximum weight approved for the start of the take–off run.

Maximum Weight at Landing :
Is the maximum weight approved for landing touch–down.

GENERAL ABBREVIATIONS

A	:	Ampere
A/C CTL	:	Air conditioning control
A/C CLUTCH	:	Air conditioning clutch
AIR COND	:	Air conditioning
ALT or ALTr	:	Alternator
A/P	:	Autopilot
BAT	:	Battery
CHT	:	Cylinder head temperature
°C	:	Degree Celsius (Centigrade)
°F	:	Degree Fahrenheit
EGT	:	Exhaust gas temperature
EVAP FAN	:	Evaporator fan
EXC	:	Energization
ft	:	Foot (Feet)
ft/min	:	Feet per minute
HI	:	High
HOR	:	Electric horizon
hPa	:	Hectopascal
hr	:	Hour
in	:	Inch
in.Hg	:	Inch of mercury
kg	:	Kilogram
kt	:	Knot (1 nautical mile/hr – 1852 m/hr)
l	:	Litre
lb	:	Pound
LDG	:	Landing gear
LO	:	Low
m	:	Metre
min	:	Minute
mm	:	Millimetre
P / N	:	Part Number
psi	:	Pounds per square inch

GENERAL ABBREVIATIONS (Cont'd)

qt	:	Quart
SM	:	Statute Mile
S / N	:	Serial Number
sq.ft	:	Square foot
Std	:	Standard
U.S Gal	:	U.S Gallon
V	:	Volt

RADIO ABBREVIATIONS

ADF	:	Automatic Direction Finder System
ADI	:	Attitude Director Indicator
ATC	:	ATC transponder
COM	:	Communications Transceivers
DME	:	Distance Measuring Equipment
ELT	:	Emergency Locator Transmitter
HF	:	High Frequency
HSI	:	Horizontal Situation Indicator
IFR	:	Instrument Flight Rules
ILS	:	Instrument Landing System
MKR	:	Marker Radio Beacon
NAV	:	Navigation Indicators and/or Receivers
RMI	:	Radio Magnetic Indicator
UHF	:	Ultra–High Frequency
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VOR	:	VHF Omnidirectional Range
VOR / LOC	:	VHF Omnidirectional Range Localizer
VSI	:	Vertical Speed Indicator
XPDR	:	Transponder

CONVERSION FACTORS

IMPERIAL AND U.S UNITS TO METRIC UNITS			METRIC UNITS TO IMPERIAL AND U.S UNITS		
MULTIPLY	BY	TO OBTAIN	MULTIPLY	BY	TO OBTAIN
FEET	0.3048	METRE	METRE	3.2808	FEET
INCH	25.4	mm	mm	0.03937	INCH
Imp.Gal	4.546	Litre	Litre	0.220	Imp.Gal
U.S Gal	3.785	Litre	Litre	0.264	U.S Gal
lb	0.45359	kg	kg	2.2046	lb

STANDARD ATMOSPHERE

Pressure altitude (ft)	Pressure (hPa)	°C	°F
0	1013.2	+ 15.0	+ 59.0
2000	942.1	+ 11.0	+ 51.8
4000	875.0	+ 7.0	+ 44.6
6000	811.9	+ 3.1	+ 37.6
8000	752.6	– 0.8	+ 30.5
10000	696.8	– 4.8	+ 23.4
12000	644.3	– 8.7	+ 16.2
14000	595.2	– 12.7	+ 9.2
16000	549.1	– 16.6	+ 2.2
18000	505.9	– 20.6	– 5.0
20000	465.6	– 24.6	– 12.4

CONVERSION TABLE

NOTE :
The standard pressure of 1013.2 hPa is equal to 29.92 inches of mercury.

950	951	952	953	954	955	956	957	958	959
28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.26	28.29	28.32
960	961	962	963	964	965	966	967	968	969
28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.58	28.61
970	971	972	973	974	975	976	977	978	979
28.64	28.67	28.70	28.73	28.76	28.79	28.82	28.85	28.88	28.91
980	981	982	983	984	985	986	987	988	989
28.94	28.97	29.00	29.03	29.06	29.09	29.12	29.15	29.18	29.20
990	991	992	993	994	995	996	997	998	999
29.23	29.26	29.29	29.32	29.35	29.38	29.41	29.44	29.47	29.50
1000	1001	1002	1003	1004	1005	1006	1007	1008	1009
29.53	29.56	29.59	29.62	29.65	29.68	29.71	29.74	29.77	29.80
1010	1011	1012	1013	1014	1015	1016	1017	1018	1019
29.83	29.85	29.88	29.91	29.94	29.97	30.00	30.03	30.06	30.09
1020	1021	1022	1023	1024	1025	1026	1027	1028	1029
30.12	30.15	30.18	30.21	30.24	30.27	30.30	30.33	30.36	30.39
1030	1031	1032	1033	1034	1035	1036	1037	1038	1039
30.42	30.45	30.47	30.50	30.53	30.56	30.59	30.62	30.65	30.68
1040	1041	1042	1043	1044	1045	1046	1047	1048	1049
30.71	30.74	30.77	30.80	30.83	30.86	30.89	30.92	30.95	30.98

SECTION 2

LIMITATIONS

TABLE OF CONTENTS

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GENERAL

The SOCATA Model TB 20 airplane is certified in Normal Category in accordance with following basis.

– Basic general technical conditions :
  FAR 23 Regulations, amendments 1 to 16.

– Complementary general technical conditions :
  Paragraph 23–1581, amendment 21.

– Special technical condition :
  The landing gear being held in high position by hydraulic pressure alone, the requirements of paragraphs 23–143 and 23–729 are modified as follows :

  (a) 1,6 V_{S1} speed is replaced by V_{NO} in 23–729 (a).

  (b) Condition 23–143, as for landing gear extension must be checked up to V_{NO}.

This airplane must be flown in compliance with the limits specified by placards or markings and with those given in this section and throughout this Manual.

This section of the airplane Flight Manual presents the various operating limitations, the significance of such limitations, instrument markings, color coding, and basic placards necessary for the safe operation of the airplane, its power plant and installed equipment.

The limitations for optional systems are given in Section ”Supplements” of this Manual.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2.1

	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	189	187	Do not exceed this speed in any operation
V_{NO}	Maximal Structural Cruising Speed	151	150	Do not exceed this speed except in smooth air, and then only with care
V_A	Maneuvering Speed	130	129	Do not make abrupt or full control movements above this speed
V_{FE}	Maximum Flap Extended Speed Take–off Landing	130 102	129 103	Do not exceed these speeds depending on flaps position
V_{LO}	Maximum Landing Gear Operating Speed	130	129	Do not extend or retract landing gear above this speed
V_{LE}	Maximum Landing Gear Extended Speed	140	139	Do not exceed this speed with landing gear extended

Figure 2.1 – AIRSPEED LIMITATIONS

AIRSPEED INDICATOR OR TRUE AIRSPEED INDICATOR MARKINGS

Airspeed indicator or true airspeed indicator markings and their color code significance are shown in Figure 2.2.

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	59 – 103	Full Flap Operating Range Lower limit is maximum weight V_{SO} in landing configuration. Upper limit is maximum speed permissible with flaps extended
Green Arc	70 – 150	Normal Operating Range Lower limit is maximum weight V_{S1} with flaps retracted. Upper limit is maximum struc–tural cruising speed
Yellow Arc	150 – 187	Operations must be conducted with caution and only in smooth air
Red line	187	Maximum speed for all ope–rations

Figure 2.2 – AIRSPEED INDICATOR OR TRUE AIRSPEED INDICATOR MARKINGS

POWER PLANT LIMITATIONS

Number of engines : 1

Engine Manufacturer : AVCO LYCOMING

Engine Model Number : IO–540–C4 D5D or IO–540–C4 B5D

Engine Operating Limits for Take–off and Continuous Operations :
Maximum Power : 250 BHP
Maximum Engine Speed : 2575 RPM
Maximum Cylinder Head Temperature : 500°F (260°C)
Maximum Oil Temperature : 244°F (118°C)

Oil Pressure :
Minimum : 25 psi (1.7 bar)
Maximum : 115 psi (7.9 bars)

Fuel Pressure :
Minimum : 0.1 psi (7 hPa)
Maximum : 8 psi (552 hPa)

Fuel Grades : See Fuel Limitations

Oil Grades (Specification) :
MIL–L–6082 Aviation Grade Mineral Oil or
MIL–L–22851 Aviation Grade Dispersant Oil

Number of propellers : 1

Propeller Manufacturer : HARTZELL

Propeller Model Number : HC–C2YK–1BF/F8477–4

Propeller Diameter :
Minimum : 78 inches (1.98 m)
Maximum : 80 inches (2.03 m)

POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code significance are shown in Figure 2.3.

INSTRUMENT	Red Line or arc --------- Minimum Limit	Yellow Arc ------------ Caution Range	Green Arc ----------- Normal Operating	Red Line -------- Maximum Limit
Tachometer	—	—	750 to 2575 RPM	2575 RPM
Oil Temperature	—	below 104°F (40°C)	104 to 244°F (40 to 118°C)	244°F (118°C)
Fuel Pressure Fuel flow	0.1 psi 2 Gal / hr	—	0.1 to 8 psi 2 to 25 Gal / hr	8 psi 25 Gal / hr
Oil Pressure (1)	25 psi	25 to 60 psi and 90 to 100 psi	60 to 90 psi	100 psi
Oil Pressure (2)	25 psi	25 to 55 psi and 95 to 115 psi	55 to 95 psi	115 psi
Cylinder Head Temperature (3)	—	435 to 500°F (224 to 260°C) (4)	200 to 435°F (93 to 224°C) (4)	500°F (260°C)

(1) Alternative No. 1
(2) Alternative No. 2
(3) If installed on airplane
(4) Optional marking (according to instrument model)

Figure 2.3 – POWER PLANT INSTRUMENT MARKINGS

WEIGHT LIMITS

Maximum Take–off Weight : 3086 lbs (1400 kg)
Maximum Landing Weight : 3086 lbs (1400 kg)
Maximum Weight in Baggage Compartment : 143 lbs (65 kg) ; refer to Section 6 for cargo loading.

CENTER OF GRAVITY LIMITS

Center of gravity range with landing gear extended :

Forward :
42.2 inches (1.071 m) aft of datum at 3086 lbs (1400 kg)
37.4 inches (0.949 m) aft of datum at 2756 lbs (1250 kg)
35.9 inches (0.913 m) aft of datum at 2205 lbs (1000 kg) or less.

Aft :
47.4 inches (1.205 m) aft of datum at all weights.

Reference datum : Front face of firewall.
Straight line variation between points.
Leveling point : Upper fuselage spar

NOTE :
It is the responsibility of the pilot to insure that the airplane is properly loaded. See Section 6 ”Weight and Balance” for proper loading instructions.

MANEUVER LIMITS

This airplane is certificated in the normal category.
The normal category is applicable to airplane intended for non–aerobatic operations.
These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and steep turns in which the angle of bank is no more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flaps up : + 3.8 g
Flaps down : + 2.0 g

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR operations and may be equipped for night VFR and day & night IFR operations. See Supplements Section of this Manual.
Flight into known icing conditions is prohibited.

FUEL LIMITATIONS

2 Tanks :	44.4 U.S Gallons (168 Litres) each
Total Fuel :	88.8 U.S Gallons (336 Litres)
Usable Fuel :	86.2 U.S Gallons (326 Litres)
Unusable Fuel :	2.6 U.S Gallons (10 Litres)

NOTE :
Usable fuel (up to unusable fuel) can be safely used during all normal airplane maneuvers.
FOR STEEP NOSE DOWN ATTITUDE (rapid descent) select a fuel tank with at least 10 U.S Gallons (a quarter of tank capacity).
FOR PRONOUNCED OR LONG SIDE SLIPPING select the fuel tank (with usable fuel) at the opposite side of the low wing.

CREW LIMITATIONS

Minimum crew : 1 Pilot
(1 pilot required at L.H. station)

SEATING LIMITS

Front seats : 2

Rear seats : 2 when accommodated with 2 seat belts or
3 when accommodated with 3 seat belts
[maximum total weight on rear seats :
509 lbs (231 kg)]

USE OF DOORS

Flight with doors open or ajar is prohibited.

VACUUM GAGE MARKINGS (if installed)

MARKING	CORRESPONDING VALUE
Green	Normal operating from 4.4 to 5.2 in.Hg
Red lines	at 4.4 and 5.2 in.Hg

PLACARDS

NOTE :
The placards described in the Section 9 "Supplements" replace or supplement those described in this paragraph.

(1) In full view of the pilot, forward of overhead lights

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN FORM OF PLACARDS, MARKINGS AND FLIGHT MANUAL.

INVERTED FLIGHT	PROHIBITED
AEROBATIC MANEUVERS	PROHIBITED
INTENTIONAL SPINS	PROHIBITED
ICING CONDITIONS	PROHIBITED
MAXIMUM TAKE–OFF AND LANDING WEIGHT	3086 lbs
DESIGN MANEUVERING SPEED V_A	129 KIAS
LIMIT SPEED V_{NE}	187 KIAS
FLAPS EXTENDED MAXIMUM SPEED V_{FE}	
FLAPS "TAKE–OFF"	129 KIAS
FLAPS "LANDING"	103 KIAS
LANDING GEAR EXTENDED MAXIMUM SPEED V_{LE}	139 KIAS
LANDING GEAR OPERATING MAXIMUM SPEED V_{LO}	129 KIAS
POSITIVE FLIGHT LOAD FACTOR (MAXIMUM)	
FLAPS UP	+ 3.8
FLAPS DOWN	+ 2

FLIGHT CONDITIONS : DAY VFR
ICING CONDITIONS NOT ALLOWED

(2) Calibration chart on compass

For	N	30	60	E	120	150
Steer						
For	S	210	240	W	300	330
Steer						

DATE : RADIO ON

(3) On Baggage door

65 kg – 143 lbs MAXIMUM

**FOR LOADING INSTRUCTIONS
SEE "WEIGHT AND BALANCE
DATA" IN FLIGHT MANUAL**

(4) Near fuel tank caps

**CARBURANT
FUEL – KRAFTSTOFF**

AVGAS 100 LL

**43.1 US – 35.9 UK.GAL
163 L**

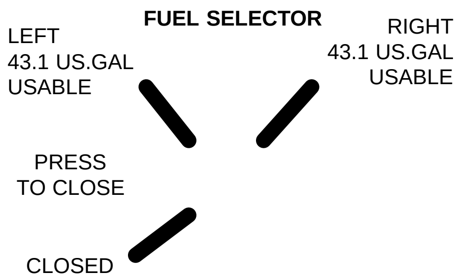
(5) On the back side of access door to oil filler cap

**Oil system
capacity**

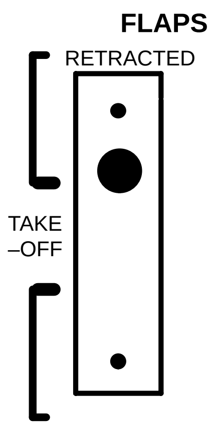
**12.6 l
13.3 qt**

(6) Near the pilot's air outlet

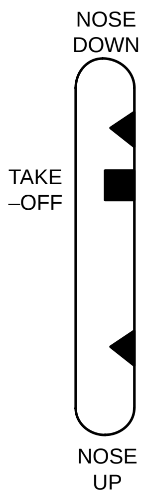
(7) On the fuel selector



(8) Near the wing flap control

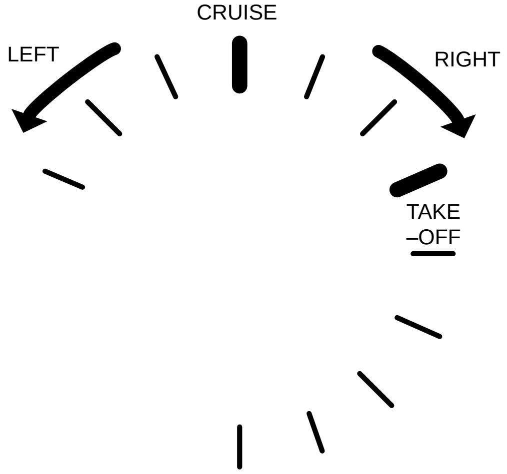


(9) Near the stabilator tab position indicator

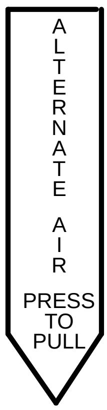


(10) Near the rudder trim

RUDDER TAB



(11) Near landing gear configuration and control



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SECTION 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

Page

GENERAL

This section provides the pilot with procedures that enable him to cope with emergencies that may be encountered in operating the SOCATA Model TB 20 airplane. If proper preflight inspections, operating procedures, and maintenance practices are used, emergencies due to airplane or engine malfunction should be rare. Likewise, careful flight planning and good pilot judgment can minimize enroute weather emergencies. However, should any emergency develop, the guidelines in this section should be considered and applied as necessary to correct the problem.

AIRSPEEDS FOR SAFE OPERATIONS (IAS)

Engine failure after take–off	70/76 KIAS
Maneuvering speed	129 KIAS
Best glide speed	92 KIAS
Precautionary landing with engine power	70/76 KIAS

ENGINE FAILURES

ENGINE FAILURE DURING TAKE–OFF RUN

Throttle	IDLE
Brakes	APPLY
Mixture	IDLE CUT–OFF
Magneto selector	OFF
Main switch	OFF
Fuel selector	OFF

ENGINE FAILURE IMMEDIATELY AFTER TAKE–OFF

Airspeed	70/76 KIAS
Mixture	FULL RICH
Fuel selector	SWITCH TANKS
Fuel pump	ON

If engine does not start :

Mixture	IDLE CUT–OFF
Fuel selector	OFF

Fuel pump	OFF
Landing gear lever	AS REQUIRED
Land	STRAIGHT AHEAD
Magneto selector	OFF
Main switch	OFF

WARNING

LANDING STRAIGHT AHEAD IS USUALLY ADVISABLE

ENGINE FAILURE IN FLIGHT

Glide speed	92 KIAS
Main switch	ON
Mixture	FULL RICH
Fuel gages	CHECK
Fuel tanks	SWITCH
Magneto selector	BOTH
Fuel pump	ON

If icing conditions are unintentionally encountered :

”Alternate Air”	FULLY PULLED

If the engine does not start :

Mixture	IDLE CUT–OFF
Throttle	1/2 OPEN
Starter	ENGAGE (if propeller stopped)
When the engine runs windmilling)	SLOWLY ENRICH UNTIL RE–START

NOTE :
Engine re–starting can be performed without particular limitations in all airplane flight envelope.

If the engine does not start, get ready for an emergency landing without engine power.

NOTE :
Gliding distance – see Figure 3.4

LOW OIL PRESSURE

Oil warning light	ON
Pressure indicator	IN RED LOW SECTOR
Throttle	REDUCE AS FAR AS POSSIBLE
Oil temperature	CHECKED
If oil temperature in red sector	REDUCE THROTTLE

Prepare for a forced landing and land as soon as possible.

LOW FUEL FLOW

Fuel pump	OPERATING
Fuel gages	CHECKED
Fuel selector	SWITCH TANKS

ENGINE VIBRATION

Engine vibration is generally due to defective spark plugs or too rich a mixture.

Mixture	RESET
If vibration persists :	
RPM	SET FOR MINIMUM VIBRATION RANGE

Land as soon as possible.

PROPELLER GOVERNOR FAILURE

In case of oil pressure drop in the governor system or pitch control failure, the propeller moves to low pitch.

Oil pressure	CHECKED
Oil temperature	CHECKED
Throttle	AS REQUIRED
Airspeed	REDUCED

Avoid rapid application of power.

CAUTION : MAXIMUM RPM : 2575

FORCED LANDINGS

NOTE :
It is recommended that the wheels be up if landing on an unprepared surface.

EMERGENCY LANDING WITHOUT ENGINE POWER

Glide speed	92 KIAS
Radio	TRANSMIT MAYDAY on 121.5 MHz or on the appropriate frequency giving location and intentions
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Landing gear lever	AS REQUIRED
Mixture	IDLE CUT–OFF
Fuel selector	OFF
Magneto selector	OFF
Flaps	AS REQUIRED

When the landing is secured :

Flaps	LANDING
Approach speed	70 / 76 KIAS
Main switch	OFF

PRECAUTIONARY LANDING WITH ENGINE POWER

Flaps	LANDING
Approach speed	70/76 KIAS
Radio	ADVISE ATC OF INTENTIONS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Field	FLY OVER selected field
Landing gear lever	AS REQUIRED
Main switch	OFF
Touch–down	FLARE OUT and keep nose high
Mixture	IDLE CUT–OFF
Fuel selector	OFF
Magneto selector	OFF
Brakes	AS REQUIRED

DITCHING

Radio	TRANSMIT MAYDAY on 121.5 MHz or on the appropriate frequency giving location and intentions
Landing gear lever	UP
Flaps	LANDING
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Airspeed	70/76 KIAS
Flight path	Parallel to swells

Before touch–down :

Main switch	OFF
Mixture	IDLE CUT–OFF
Fuel selector	OFF
Touch–down	FLARE OUT and keep nose high

EMERGENCY DESCENT

Throttle	IDLE AS REQUIRED
Airspeed	129 KIAS
Landing gear lever	DOWN
Descent at V_{LE}	139 KIAS

After a prolonged descent with reduced power, apply power with caution due to low cylinder head temperature.

FIRES

ENGINE FIRE DURING START

Mixture	IDLE CUT–OFF
Starter	GO ON STARTING
Throttle	FULL THROTTLE
Fuel selector	OFF

If fire goes on :

Main switch	OFF
Magneto selector	OFF

Evacuate passengers and extinguish fire using all available means (fire extinguisher if installed)

ENGINE FIRE IN FLIGHT

Visual detection	SMOKE – FLAMES
Fuel selector	OFF
Mixture	IDLE CUT–OFF
Fuel pump	OFF
Throttle	FULL THROTTLE
Cabin air cooling & demisting	FIRE CUT–OFF (–)

After engine has stopped :

Magneto selector	OFF
”ALTr FLD” switch–breaker	OFF
Forced landing	EXECUTE (as described in ”Emergency Landing Without Engine Power”)

<u>WARNING</u>

NO ATTEMPT SHOULD BE MADE TO RESTART THE ENGINE AFTER A FIRE

ELECTRICAL FIRE IN FLIGHT

* *If FIRE is in ENGINE COMPARTMENT :*

Main switch	OFF
Cabin air cooling & demisting	FIRE CUT–OFF

Land as soon as possible.

* *If FIRE is in CABIN :*

Main switch	OFF
"ALTr FLD" switch–breaker	OFF
All electrical switches (except magnetos)	OFF
Cabin air cooling & demisting	FIRE CUT–OFF
Fire extinguisher (if installed)	ACTIVATE

* *If FIRE APPEARS TO BE OUT and electrical power is necessary to continue flight :*

Main switch	ON
Circuit breakers	CHECK for faulty circuit, do not close
Radio/electrical switches	ON, one at a time
Cabin air cooling	OPEN when fire is out

CABIN FIRE

Main switch	OFF
Cabin air cooling & demisting	FIRE CUT–OFF
Fire extinguisher (if installed)	ACTIVATE

<u>WARNING</u>

AFTER DISCHARGING A FIRE EXTINGUISHER WITHIN A CLOSED CABIN, WHEN FIRE IS EXTINGUISHED, PARTIALLY OPEN CABIN AIR COOLING TO VENTILATE THE CABIN AND PREVENT SUFFOCATION

Land as soon as possible.

WING FIRE

Navigation and landing lights	OFF
Anticollision lights (if installed)	OFF
Pitot heating (if installed)	OFF

Land as soon as possible.

ICING

**FLIGHT INTO KNOWN ICING CONDITIONS
IS PROHIBITED**

Cabin temperature	FULL HOT
Pitot heating (if installed)	ON
Demisting	OPEN
"Alternate Air"	FULLY PULLED
Engine	INCREASE POWER without exceeding red line and periodically change RPM to minimize ice buildup on propeller

Turn back or change altitude to obtain best outside air conditions.
If icing continues plan a landing at the nearest airport. With an extremely rapid ice build–up, select a suitable "off airport" landing site.

NOTE :
With an ice accumulation on or near the wing leading edges, a higher stalling speed may be expected. Plan all maneuvers accordingly.

LANDING GEAR MALFUNCTIONS

LANDING GEAR FAILS TO RETRACT

THE THREE GREEN LIGHTS REMAIN "ON"

Landing gear lever	CHECK UP
"LDG GEAR" circuit breaker	CHECK CLOSED
Emergency landing gear control	CHECK PUSHED

If landing gear fails to retract :

Landing gear lever	DOWN
Landing gear lights	CHECK GREEN ON

Continue flight with landing gear down, up to destination or toward an appropriate alternate airfield.

Maximum airspeed	139 KIAS

THE RED LIGHT REMAINS "ON" (WITH OR WITHOUT GREEN LIGHT "ON")

"LDG GEAR" circuit breaker	PULL OFF
Landing gear lever	DOWN
"LDG GEAR" circuit breaker	PUSH
Landing gear lights	CHECK GREEN ON RED OFF

Continue flight with landing gear down, up to destination or toward an appropriate alternate airfield.

Maximum airspeed	139 KIAS

A GREEN LIGHT REMAINS "ON", RED LIGHT "OFF"

Flaps	TAKEOFF
Airspeed	97 KIAS
"LDG GEAR" circuit breaker	PULL OFF
Landing gear lever	DOWN
Emergency landing gear control	PULL
Landing gear lights	CHECK GREEN ON

Continue flight with landing gear down, up to destination or toward an appropriate alternate airfield.

Maximum airspeed	139 KIAS

As a precaution, proceed as described in procedure LANDING WITH A LANDING GEAR NOT LOCKED.

INTENTIONALLY LEFT BLANK

LANDING GEAR FAILS TO EXTEND (ONE OR SEVERAL GREEN GEAR DOWN LIGHTS FAIL TO ILLUMINATE)

Main switch	ON
Landing gear lever	DOWN
"LDG GEAR" circuit breaker	CHECK CLOSED
Landing gear lights	ILLUMINATE DURING TEST
Flaps	TAKE–OFF
Airspeed	97 KIAS

The landing gear should extend and lock normally.

If this does not happen :

Landing gear lever	UP
"LDG GEAR" circuit breaker	OPEN
Landing gear lever	DOWN
Emergency landing gear control	PULLED
Gear down (green) lights	ON
Gear in transit (red) light	OFF

If all electrical power has been lost, the landing gear must be extended using the above procedures. The gear position indicator lights will not illuminate.

Normal landing.

ONE OR SEVERAL LANDING GEAR (GREEN) LIGHTS FAIL TO ILLUMINATE DURING TEST CARRIED OUT IN THE PREVIOUS PROCEDURE

Yaw/slip airplane to help lock gear down	
Gear in transit (red) light	OFF
Gear in transit (red) light	ILLUMINATES DURING TEST

The affected indicator green light bulb should be burnt out :

Landing gear position	CHECK DOWN POSITION WITH THE TOWER

Precautionary landing

LANDING WITH A LANDING GEAR NOT LOCKED

Landing gear position	CHECK POSITION WITH THE TOWER

LANDING GEAR APPEARS DOWN AND LOCKED

"LDG GEAR" circuit breaker	CLOSED
Landing gear lever	DOWN
Emergency landing gear control	PUSHED

Precautionary landing

LANDING GEAR UP OR PARTIALLY EXTENDED

Nose gear not locked

– *Landing :*

Flaps	LANDING
Airspeed	65/70 KIAS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

– *In final, cut–off the engine*

Main switch	OFF
Mixture	IDLE CUT–OFF
Fuel selector	OFF
Magneto selector	OFF

– *After touch–down of main landing gears :*

Keep nose high without braking.
Brake smoothly as soon as nose wheel contacts ground.

Main gear not locked

NOTE :
In case only one main gear extends, minimum airplane damage will result if a gear–up landing is made.

– *Retract the landing gear :*

Emergency landing gear control	PUSHED
”LDG GEAR” circuit breaker	CLOSED
Landing gear lever	UP

– *Landing on grass if possible :*

Flaps	LANDING
Airspeed	65/70 KIAS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

– *Before touch–down :*

Main switch	OFF
Mixture	IDLE CUT–OFF
Fuel selector	OFF
Magneto selector	OFF

LANDING WITHOUT STABILATOR CONTROL

Fly the airplane using pitch trim and throttle.

– *Long final :*

Airspeed	80 KIAS
Flaps	LANDING
Landing gear lever	DOWN
Fuel pump	ON
Mixture	FULL RICH
Propeller	HIGH RPM
Throttle and pitch trim	ADJUST SO AS TO MAINTAIN A RATE OF DESCENT LOWER THAN 500 ft/min

– *Final :*

FLARE OUT near the ground with the pitch trim.

CAUTION

**REDUCE THROTTLE ONLY
AFTER TOUCH–DOWN**

RADIO MASTER SWITCH FAILURE (if installed)

When radio navigation equipment cannot be set under voltage due to RADIO MASTER switch malfunction.

”R.M. SWITCH” circuit breaker OPEN

Radio navigation are supplied again and flight can go on normally.

ELECTRICAL FAILURE : IMMEDIATE ACTION

ELECTRICAL EQUIPMENT FAILURE

Check the circuit breakers panel.
If the circuit breaker is open, close it once only.
If it opens again, do not try to close the circuit breaker, the equipment has failed.

ALTERNATOR FAILURE (Simplified procedure)

"ALTr" warning light	ON
Voltmeter :	
– Green sector	CONTINUE FLYING
– Red / yellow sector :	
"ALTr FLD" switch–breaker	OFF then ON
"ALTr" warning light	REMAINS ON
"ALTr FLD" switch–breaker	OFF
Air conditioning switch (if installed)	OFF
Non essential electrical load items	OFF

CAUTION

SEE HEREAFTER CHECK–OUT PROCEDURE TO BE USED FOR NIGHT VFR OR IFR (See Figure 3.1)

CAUTION

CHECK BATTERY DISCHARGE. IN THIS CASE, ENDURANCE IS REDUCED AS ELECTRICAL POWER IS ONLY SUPPLIED BY BATTERY

Battery approximate duration : 40 min (Night IFR emergency conditions).

NOTE :
The use of the normal landing gear extension may induce a total electrical failure. For landing gear extension, first use the emergency system.

ELECTRICAL FAILURE : CHECK–OUT PROCEDURE FOR NIGHT VFR AND IFR

ALTERNATOR FAILURE (See Figure 3.1)

NOTE :
The use of the normal landing gear extension may induce a total electrical failure. For landing gear extension, first use the emergency system.

BATTERY FAILURE (See Figure 3.2)

NOTE :
The use of the normal landing gear extension may induce a total electrical failure. For landing gear extension, first use the emergency system.

TOTAL ELECTRICAL FAILURE (See Figure 3.3)

NOTE: WHEN BUS 3 "PULL–OFF" TYPE CIRCUIT BREAKER IS OPEN, LANDING GEAR ELECTRICAL CONTROL BECOMES INOPERATIVE AND THE LANDING GEAR MUST BE EXTENDED USING EMERGENCY SYSTEM

KEY : *CB : Circuit breaker*
PCB : Pull–off type circuit breaker
SB : Switch–breaker

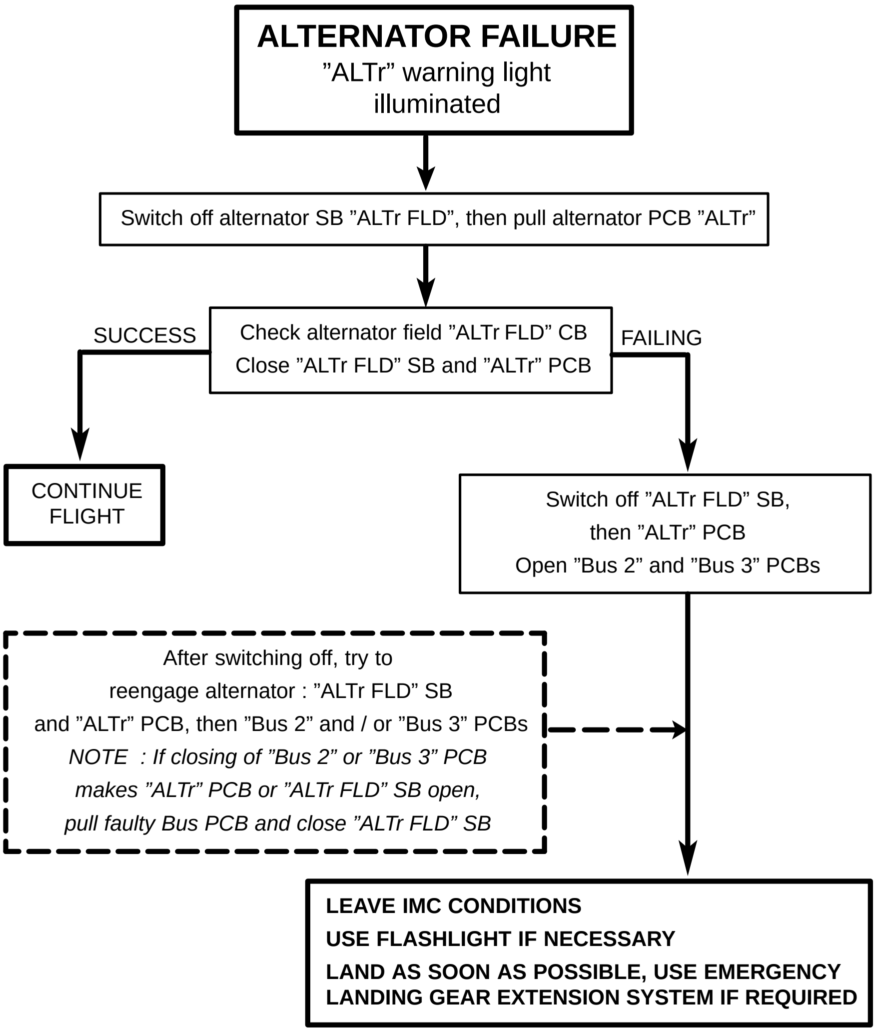

Figure 3.1 – ALTERNATOR FAILURE DIAGRAM

KEY : PCB : Pull–off type circuit breaker
SB : Switch–breaker

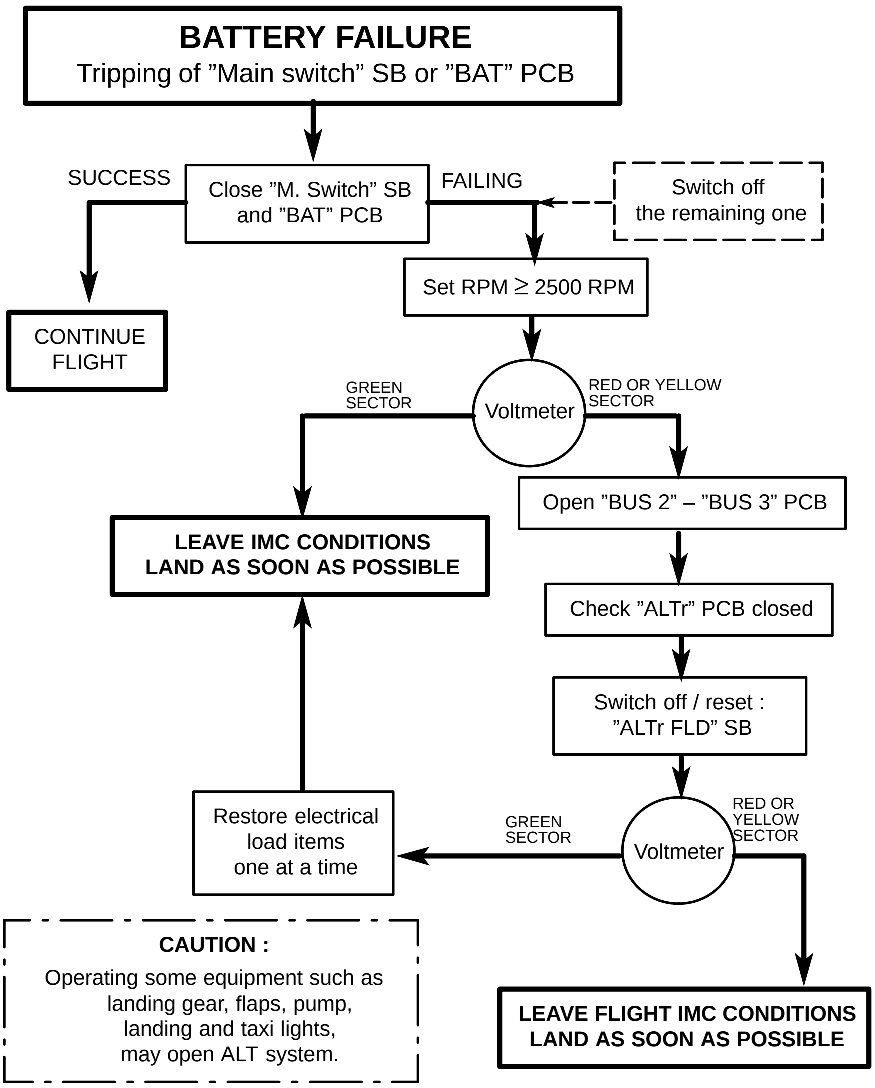

Figure 3.2 – BATTERY FAILURE DIAGRAM

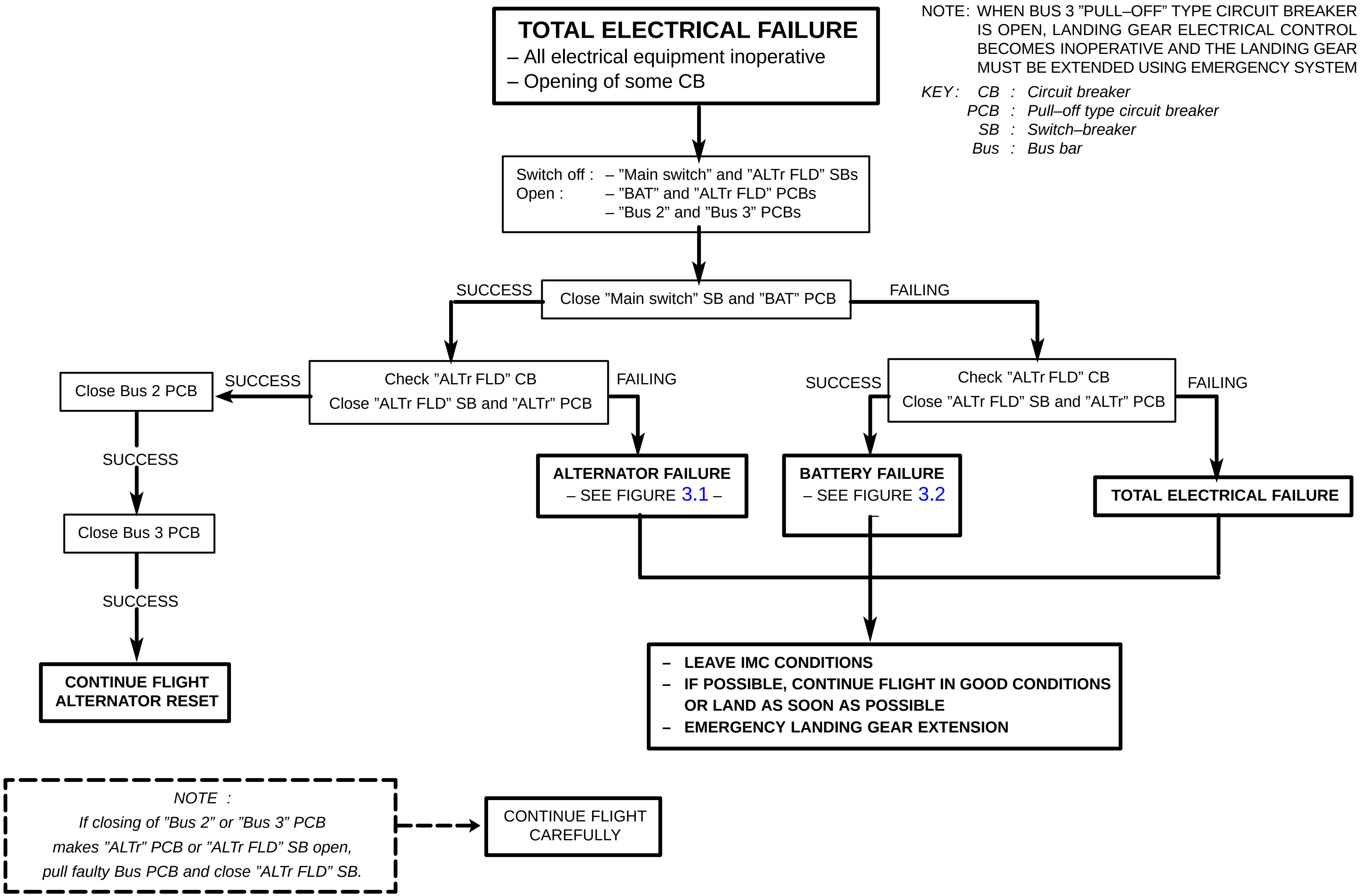

Figure 3.3 – TOTAL ELECTRICAL FAILURE DIAGRAM

AIRSPEED INDICATING SYSTEM FAILURE

In case of erroneous indications in flight :

Pitot heating (if installed)	ON
Alternate static source (if installed)	PULL
	For IAS and pressure altitude, see altimeter and airspeed indicator correction tables in "Performance" Section

If erroneous indications persist, carry out a precautionary approach maintaining an adequate airspeed margin above stall warning activation speed.

Recommended parameters :

Propeller	FULL FORWARD
Manifold pressure	AS REQUIRED (Approach : 17 in.Hg)

LANDING WITHOUT FLAPS (Flaps locked, retracted)

"FLAPS" circuit breaker	OPEN
Flaps control	ACTUATED

If the procedure is not successfull, perform the same operations as for a normal landing and maintain a 90 KIAS approach speed.

Plan a landing distance increased by approximately 60 %.

INVOLUNTARY SPIN

INTENTIONAL SPINS ARE PROHIBITED

However, should inadvertent spin occur, the following recovery procedure is recommended :

Rapid and simultaneous action :

Throttle	IDLE
Rudder control	HOLD OPPOSITE DIRECTION OF ROTATION
Stabilator control	FULL FORWARD
Ailerons	NEUTRAL

Spin with flaps :

Same procedure, except retract flaps as soon as possible.

When spinning stops, centralize rudders, level the wings and ease out of the ensuing dive.

JAMMED DOORS

<u>Pre–MOD.151</u>

In case of jammed doors and in case of emergency : JETTISON REAR WINDOWS, kicking with foot on the upper part.

OPTIMUM GLIDE WITHOUT ENGINE RUNNING

– MAXIMUM AERODYNAMIC EFFICIENCY ”8”

Landing gear up – Flaps up
Speed 92 KIAS at maximum weight
Propeller wind milling
Zero wind

– MAXIMUM AERODYNAMIC EFFICIENCY ”5”

Landing gear up – Flaps in landing position
Speed 70 KIAS at maximum weight
Propeller wind milling
Zero wind

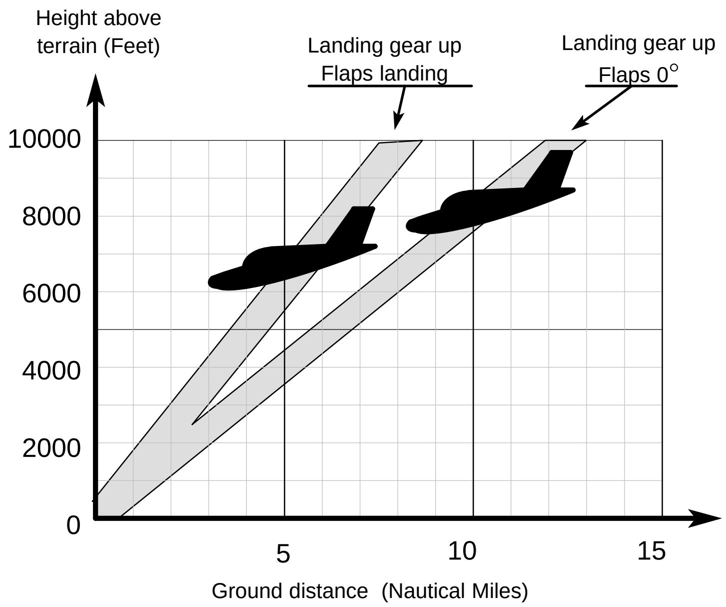

Figure 3.4 – OPTIMUM GLIDE WITHOUT ENGINE RUNNING

SECTION 4

NORMAL PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

GENERAL

This section provides procedures for the conduct of normal operation of the SOCATA Model TB 20 airplane.
The normal procedures for optional systems are given in Section ”Supplements” of this Manual.

AIRSPEEDS FOR SAFE OPERATIONS (IAS)

Following speeds are those important for safe operation of airplane.
These data are valid for standard airplane used at maximum weight in normal conditions.

– Best rate of climb
  . Landing gear up, flaps retracted 95 KIAS
  . Landing gear down, flaps in landing position 73 KIAS
– Best angle of climb
  . Landing gear up, flaps retracted 81 KIAS
  . Landing gear down, flaps in landing position 67 KIAS
– Operating speed in turbulent air127 KIAS
– Maximum speed with flaps in take–off position 129 KIAS
– Maximum speed with flaps in landing position 103 KIAS
– Final approach speed (flaps in landing position) 73 KIAS
– Maximum demonstrated crosswind 25 KNOTS

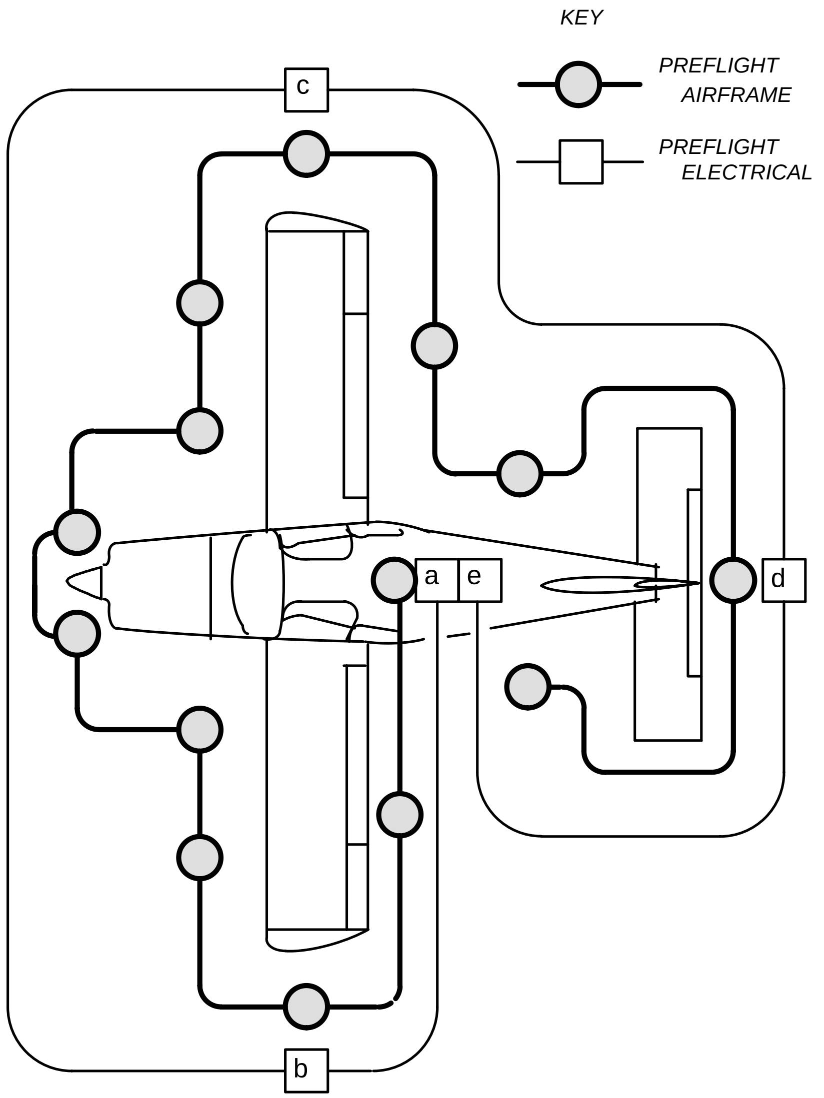

Figure 4.1 – PREFLIGHT INSPECTIONS

PREFLIGHT INSPECTIONS (See Figure 4.1)

AIRFRAME

1 – Cabin

Pilot door	OPEN
Control lock	REMOVED
Magneto selector	OFF
Landing gear lever	DOWN
Mixture	IDLE CUT–OFF
Main switch	ON
Flaps	LANDING
Pitch trim	TAKE–OFF
Rudder trim	TAKE–OFF
Oxygen (if installed)	Check pressure
Fire extinguisher (if installed)	Check pressure
Main switch	OFF
Fuel selector	OPEN on ”Left”

Proceed with the external preflight inspection moving clockwise around the airplane.

2 – L.H. wing trailing edge

Flap and aileron	Check controls, hinges, plays, deflections

3 – L.H. wing

Wing tip, lights and landing lights	Undamaged

4 – L.H. wing leading edge

Wing	Free from frost, snow, ice
Pitot	Cover removed, clean, unobstructed
Tie–down	REMOVED
Stall warning device	Clean, check deflection
Fuel tank	Check level
Fuel tank cap	SECURED
Fuel tank draining	Fuel free from water and sediment

Fuel tank drain	Check CLOSED

5 – *L.H. main landing gear*

Chocks	REMOVE
Tire	Check condition
Shock absorber	Normal position
Door	Check play and cleanliness
Microswitches	Clean
Landing gear well	No foreign body

6 – *Forward fuselage*

Windshield and window panels	Clean
Engine cowling attachment	Check
Oil	Check level and absence of leak
Propeller	Clean, good condition
Propeller cone	Check (no slack)
Air intakes	Clean
Oil pump breather	Unobstructed
Exhaust pipe	Check
Fuel filter draining	Fuel free from water and sediment
Fuel filter drain	Check CLOSED

7 – *Nose landing gear*

Towing fork	REMOVE
Tire	Check
Shock absorber	Normal position
Door	Check attachments and cleanliness
Microswitches	Clean
Landing gear well	No foreign body

8 – *R.H. main landing gear*

Chocks	REMOVE
Tire	Check condition
Shock absorber	Normal position
Door	Check play and cleanliness
Microswitches	Clean
Landing gear well	No foreign body

9 – R.H. wing leading edge

Fuel tank draining	Fuel free from water and sediment
Fuel tank drain	Check CLOSED
Fuel tank	Check level
Fuel tank cap	SECURED
Tie–down	REMOVED
Wing	Free from frost, snow and ice

10 – R.H. wing

Wing tip and lights	Undamaged

11 – R.H. wing trailing edge

Flap and aileron	Check controls, hinges, plays, deflections

12 – R.H. rear fuselage

R.H. door lock	UNLOCKED
Static port	Cover removed, clean
Window panels	Clean

13 – Stabilizers

Fin	Check
Rudder and rudder tab	Check controls, hinges, plays, frictions
Stabilator and stabilator tab	Check controls, hinges, deflections, plays, frictions
Tail cone and navigation light (<u>Pre–MOD.151</u>)	Good condition

14 – L.H. rear fuselage

Static port	Cover removed, clean
Baggage compartment door	SECURED
Window panels	Clean

ELECTRICAL SYSTEMS

a – Cabin

"ALTr FLD" switch–breaker	OFF
Fuel pump	OFF
Main switch	ON
Advisory panel	Tested
Landing gear indicator lights	Tested
Fuel gages	Check
Flaps	RETRACT
Instrument lights	ON
Navigation lights	ON
Anticollision lights (if installed)	ON
Strobe lights (if installed)	ON
Recognition lights (if installed) (<u>Post–MOD.151</u>)	ON
Pitot heating (if installed)	ON
Landing and taxi lights	ON

b – L.H. wing

Navigation light	Illuminated
Anticollision light (if installed)	Flashing
Recognition lights (if installed) (<u>Post–MOD.151</u>)	Illuminated
Landing and taxi lights	Illuminated

<u>WARNING</u>

**DO NOT TOUCH PITOT DIRECTLY.
IT CAN BE HOT ENOUGH TO BURN SKIN**

Heated pitot (if installed)	Check heat
Stall warning device	Aural warning

NOTE :
Landing and taxi lights and Pitot heating "OFF" before carrying on inspection will prevent battery from being run down.

c – R.H. wing

Navigation light	Illuminated
Anticollision light (if installed)	Flashing
Recognition lights (if installed) (<u>Post–MOD.151</u>)	Illuminated

d – Airplane rear part

Navigation light (Pre–MOD.151)	Illuminated
Strobe light (if installed)	Flashing
Anticollision light (if installed)	Flashing

e – Cabin

Navigation lights	OFF
Strobe lights (if installed)	OFF
Anticollision lights (if installed)	OFF
Recognition lights (if installed) (Post–MOD.151)	OFF
Pitot heating (if installed)	OFF
Landing and taxi lights	OFF
Instrument lights	OFF
Main switch	OFF

BEFORE STARTING ENGINE

Preflight inspection	Carried out
Doors	CLOSED, check catches in place
Main switch	OFF
Parking brake	Set
Parking brake light ”PARK”	Illuminated
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Flight controls	Check for proper operation
Pitch trim	Check deflection
Rudder trim	Check deflection
Fuel selector	OPEN (L.H. or R.H.)
Circuit breakers (side panel)	Closed
Magneto selector	OFF
Emergency landing gear control	PUSHED
”Radio master” (if installed)	OFF
Landing gear lever	DOWN
”Alternate Air”	PUSHED
Alternate static source (if installed)	PUSHED
Air conditioning (if installed)	OFF

ENGINE STARTING

Anticollision lights (if installed)	ON

COLD ENGINE :

Main switch	ON
Propeller	FULL FORWARD
Throttle	1/4 OPEN
Mixture	IDLE CUT–OFF
Fuel pump	ON
Mixture	FULL RICH until fuel flow is displayed (3 to 5 sec.) then IDLE CUT–OFF
Fuel pump	OFF
Area	Clear
Magneto/start selector	START (30 sec. maxi)

When the engine starts :

Magneto selector	BOTH
Mixture	FULL RICH
Oil pressure	Check, if no pressure within 30 sec., shut down engine

HOT ENGINE RE–STARTING PROCEDURE :

Main switch	ON
Propeller	FULL FORWARD
Throttle	FULL POWER
Mixture	IDLE CUT–OFF
Fuel pump	ON
Mixture	FULL RICH for 1 sec. then IDLE CUT–OFF
Fuel pump	OFF
Area	Clear
Magneto/start selector	START (30 sec. maxi)

When the engine starts :

Magneto selector	BOTH
Mixture	FULL RICH
Throttle	Reduced

AFTER STARTING ENGINE

ELECTRICAL POWER CHECK :

"ALTr FLD" switch–breaker OFF	
– "ALTr" warning light	ON
– Voltmeter	Yellow sector
"ALTr FLD" switch–breaker ON	
– "ALTr" warning light	OFF
– Voltmeter	Green sector
Turn and bank indicator (if installed)	ON
Vacuum gage (if installed)	Checked
Advisory panel test	Positive
Landing gear indicator lights test	Positive
"Radio master" (if installed)	ON
All radios and navaids	ON
Fuel selector	Check engine operation (minimum 1 minute) on each tank
Fuel selector	Set to fullest tank
Flaps	Checked and RETRACTED

DAY OPERATION :

Air conditioning switch (if installed)	"AIR COND" if air conditioning required

NIGHT OPERATION :

Air conditioning switch (if installed)	"OFF"

TAXIING

Parking brake	Release
Brakes	Checked
Flight instruments	Checked
Taxi light	As required

Avoid exceeding 1200 RPM as long as the oil temperature indicator pointer is within yellow sector.

Steering the airplane with the rudder pedals only is generally sufficient. The combined use of the rudder pedals and the brakes permits if necessary tight turns.

Check operation of gyroscopic instruments (horizontal attitude, heading and turn and bank indicators) by means of alternate turns.

ENGINE RUN–UP

Parking brake	Set
Engine control friction	Adjusted
Oil temperature	Green sector
Oil pressure	Green sector
Mixture	FULL RICH
Fuel selector	Set to fullest tank

PROPELLER CHECK :

Propeller	FULL FORWARD
Throttle	2000 RPM
Propeller	Cycle twice (maxi. 500 RPM drop) Return to high RPM (FULL FORWARD)

MAGNETO CHECK :

Throttle	2000 RPM
Magneto selector	L. then BOTH R. then BOTH
Maximum RPM drop on each magneto	175 RPM
Maximum difference between magnetos	50 RPM

”ALTERNATE AIR” CHECK :

”Alternate Air”	Pulled
Manifold pressure	Maintained
”Alternate Air”	Pushed

MAXIMUM POWER CHECK (or when releasing brakes before take–off) :

Full throttle	2575 RPM

BEFORE TAKE–OFF

Seats, seat belts, shoulder harnesses	Check
Doors	LOCKED
Controls	Free
Pitch trim	TAKE–OFF
Rudder trim	TAKE–OFF
Flaps	TAKE–OFF
Magneto selector	BOTH
”Alternate Air”	Pushed
Propeller	FULL FORWARD
Mixture	FULL RICH
Fuel selector	Check set to fullest tank
Fuel pump	ON
Oil temperature	Green sector
Oil pressure	Green sector
Voltmeter	Green sector
Altimeter	Set
Heading indicator (if installed)	Set
Horizontal attitude gyro (if installed)	Set
Parking brake	RELEASE – Light OFF
Cabin blower (if installed)	OFF
Landing lights	As required
Navigation lights	As required
Pitot heating (if installed)	As required
Transponder (if installed)	As required
Air conditioning switch (if installed)	”OFF”

TAKE–OFF

Lined up on runway	Check heading indicator Check emergency compass
Smoothly apply full power	
Airspeeds	See Section 5 ”Take–off performance”

STANDARD AIRSPEEDS :

Rotation	68 KIAS
Initial climb	75 KIAS

WHEN SAFELY AIRBORNE :

Brakes	Apply
Landing gear	RETRACT

AT 300 ft :

Flaps	RETRACT

AT 1000 ft :

Fuel pump	OFF
External lights	As required
Air conditioning switch (if installed)	"AIR COND" if air conditioning required

CLIMB

Mixture	FULL RICH
Throttle	FULL POWER
Propeller	FULL FORWARD (2575 RPM)
Optimum climb speed	95 KIAS

NOTE :
Climb can also be carried out at higher speeds and lower power ratings (better visibility towards front, better engine cooling, lower noise level)

CRUISE

Cruise 75 % and holding, see engine data in "Performance" section.

In practice, it is recommended to change tank every half–hour and not to exceed a fuel imbalance of 20 U.S Gallons (75 Litres)

Flight into known icing conditions is PROHIBITED

Unintentional icing conditions : see Section 3 "Emergency procedures", Paragraph "Icing".

Leave icing conditions as soon as possible.

Remember to push in the ”Alternate Air” control after leaving the icing area and when you are sure there is no ice on the airframe.

DESCENT

Power setting as required for descent.

Every 1500 ft, apply engine power to prevent excess engine cooling and spark plugs fouling. Avoid too long descents with manifold pressure lower than 14 in.Hg.

Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

APPROACH – LANDING

FINAL :

Airspeed	86/92 KIAS
Flaps	TAKE–OFF below 129 KIAS
Landing gear lever	DOWN
Fuel pump	ON
Mixture	FULL RICH
Propeller	FULL FORWARD
Brakes	Checked
Seats, seat belts, shoulder harnesses	Checked
Landing lights	ON

SHORT FINAL :

Flaps	LANDING below 103 KIAS
Airspeed	See Section 5 ”Landing Performance”
Standard airspeed	73 KIAS
Air conditioning switch (if installed)	”OFF”

GO–AROUND

Smoothly apply full power

Airspeed	76/81 KIAS

When climb rate is positive :

Landing gear lever	UP
Flaps	”TAKE–OFF”
Airspeed	90 KIAS
Flaps	”RETRACTED”
Climb at	95 KIAS

AFTER LANDING

Fuel pump	OFF
Flaps	RETRACTED
Landing light	OFF
Taxi light	As required
Trims	TAKE–OFF
Radio equipment	As required
Pitot heating (if installed)	OFF
Air conditioning (if installed)	As required

SHUT–DOWN / SECURING AIRPLANE

Parking brake	Set
Turn and bank indicator (if installed)	OFF
Anticollision lights (if installed)	OFF
Taxi light	OFF
Lights	OFF
”Radio master” (if installed)	OFF
Air conditioning switch (if installed)	”OFF”
Throttle	Reduce

<u>WARNING</u>

THE TEST HEREAFTER MUST BE IMPERATIVELY CARRIED OUT WITH ENGINE POWER LOWER THAN 1000 RPM ; THE FAILURE TO OBSERVE THIS RULE MAY LEAD TO EXHAUST SYSTEM DAMAGE

Magnetos cut–off test (*)	OFF, then BOTH
Throttle	1200 RPM
Mixture	IDLE CUT–OFF

AFTER ENGINE STOPS :

Magneto selector	OFF
"ALTr FLD" switch–breaker	OFF
Main switch	OFF
Fuel selector	OFF
Control lock	Installed
Chocks/Tie–downs	Installed

(*) Depending on the kind of operation, it is not necessary to perform this test more than once a day, but just before securing the airplane.

STALLS

CAUTION

ATTEMPT PRACTICE STALLS ONLY WITH SUFFICIENT ALTITUDE FOR RECOVERY

Power–on stalls require an extremely steep pitch attitude. If the center of gravity is at or near its aft limit, a slight tendency toward wing rocking or a wing drop may occur when the stabilator is deflected near its stop.

Aerodynamic warning (pre–stall buffet) is low with power idle and more pronounced at higher power settings. Stall recovery can be effected immediately by easing the stick forward. Altitude loss is minor in all cases and is minimized by prompt application of power at the onset of the stall.

The stall warning horn will sound from 5 to 10 knots before stall speed.

FLIGHT WITH CROSSWIND

TAKE–OFF :

Apply full power before brake release.

Aileron control moved into wind.

Keep the airplane on runway centerline using the rudder.

Maintain nose–wheel on ground up to 65 KIAS.

Lift–off cleanly in order to avoid subsequent touch–down.

LANDING :

When landing in a strong crosswind, use the landing flap setting.

Although the crab or combination method of drift correction may be used, the wing low method gives the best control. Maximum bank angle close to the ground is 15°.

After touch–down, keep the nose–wheel on the ground, hold a straight course using rudder pedals.

FLIGHT IN TURBULENT AIR

Maximum airspeed	140 KIAS
Recommended airspeed	129 KIAS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

USE OF DOORS

In windy or gusty conditions, the doors should be firmly held during opening and closing and should be closed and locked immediately after entering or leaving the airplane.

The doors must be closed and locked for all taxiing and flight operations.

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SECTION 5

PERFORMANCE

TABLE OF CONTENTS

ACOUSTIC LIMITATION

In compliance with decree dated 3rd April 1980, the maximum noise level permissible for SOCATA Model TB 20 airplane corresponding to total maximum certification weight of 3086 lbs is 78.7 d B (A).

The noise level which was determined in conditions stated by above–mentioned decree at maximum continuous power is 74 d B (A).

In compliance with decree dated 12th November 1980 SOCATA Model TB 20 airplane has received the noise limitation type certificate Nr N165 dated 18th December 1981.

AIRSPEED CALIBRATION

NOTE :
The indicated airspeeds (IAS) suppose instrument error to be null.

NORMAL STATIC SOURCE

Figure 5.1

FLAPS RETRACTED L/Gear UP		FLAPS TAKE–OFF L/Gear UP OR DOWN		FLAPS LANDING L/Gear DOWN	
KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
65	62	60	56	55	52
75	74	70	69.5	60	58
85	85	75	75	65	64.5
120	120.5	85	85.5	80	79.5
150	151	100	101	100	99.5
MPH IAS	MPH CAS	MPH IAS	MPH CAS	MPH IAS	MPH CAS
75	71	70	66	65	61
85	84	80	79	70	68
100	100	90	90	80	79
135	135	100	101	95	95
175	176	115	116	115	114

ALTERNATE STATIC SOURCE

CONDITIONS :
Air outlets and/or cabin air selector flow lever to open position

Figure 5.2

FLAPS RETRACTED L/Gear UP		FLAPS LANDING L/Gear DOWN	
KIAS	KCAS	KIAS	KCAS
65	63	55	51
75	72	60	56
100	95	65	61
120	114	80	74
150	142	100	93
MPH IAS	MPH CAS	MPH IAS	MPH CAS
75	73	65	60
85	82	70	65
100	96	80	74
135	128	95	88
175	166	115	106

ALTITUDE COMPENSATION

ALTERNATE STATIC SOURCE

NOTE 1 :
Subtract corrections from the read altitude.

NOTE 2 :
In case of alternate static source utilization, open air outlets and/or actuate cabin air selector flow lever to open position.

AIRSPEED / ALTITUDE	80 KIAS 92 MPH IAS	110 KIAS 127 MPH IAS	140 KIAS 160 MPH IAS	170 KIAS 195 MPH IAS
0 ft	25	50	80	125
5000 ft	25	55	95	145
9000 ft	30	60	105	160
13000 ft	35	70	120	190
17000 ft	40	80	135	220

Figure 5.3 – ALTITUDE COMPENSATION

STALLING SPEEDS

CONDITIONS : Weight 3086 lbs (1400 kg)
Power OFF

CONFIGURATION	BANK					
	0°		30°		45°	
	KIAS	MPH IAS	KIAS	MPH IAS	KIAS	MPH IAS
FLAPS RETRACTED L. GEAR RETRACTED	70	80	75	86	83	95
FLAPS TAKE–OFF L. GEAR UP OR DOWN	65	75	70	80	77	89
FLAPS LANDING L. GEAR DOWN	59	68	63	73	70	81

NOTE :
The indicated airspeeds (IAS) suppose instrument error to be null.

Figure 5.4 – STALLING SPEEDS

WIND COMPONENTS

EXAMPLE :

Wind speed	:	20 kt
Angle between wind direction and flight path	:	50°
Headwind	:	13 kt
Crosswind	:	15 kt

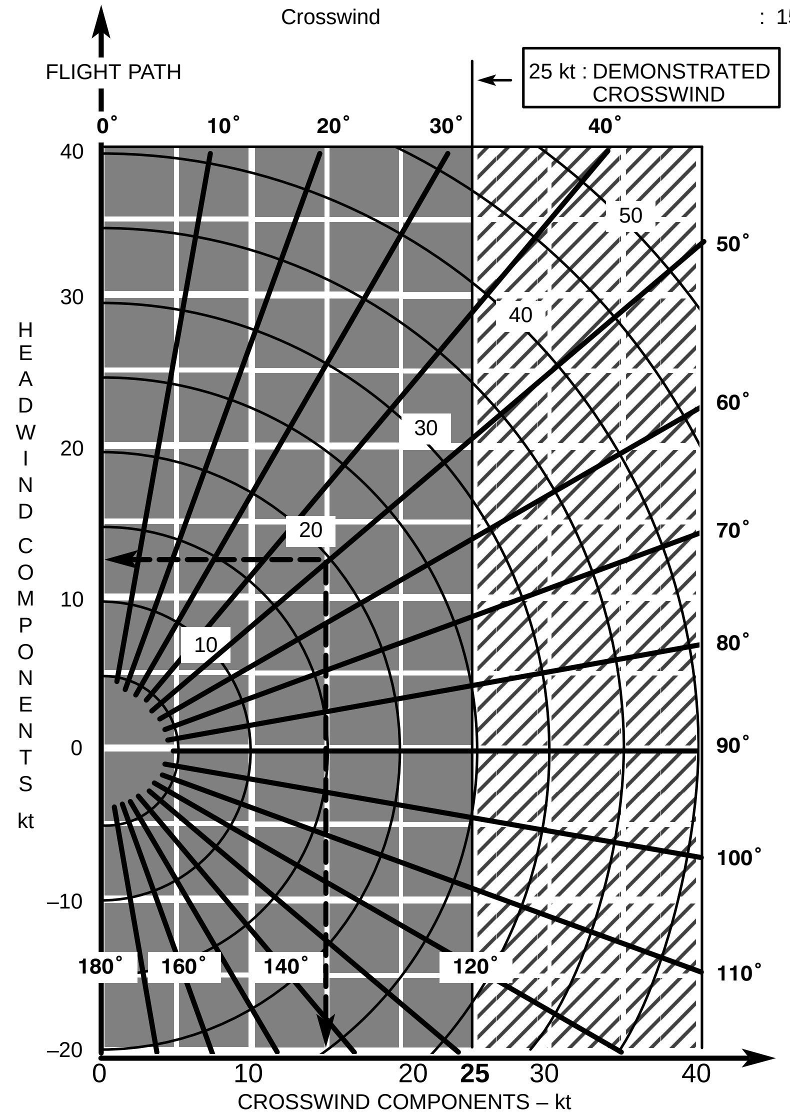

Figure 5.5 – WIND COMPONENTS

NOTICE

Performance given in this section are based on tests and interpolated to standard conditions (ICAO) and extrapolated from parameters : weight, altitude, temperature...

Performance values given do not take into account factors such as pilot technique or degraded airplane condition.

Take–off and landing performance figures are based on a dry hard surface runway.

The total take–off and landing distances (taxiing and clear 50 ft) will be corrected as follows :

– Influence of runway condition :

  Increase by : 7 % on hard sod

  10 % on short grass

  25 % on high grass

– Influence of wind :

  . Increase by 30 % for each 10 kt rear wind

  . Reduce by 10 % for each 10 kt headwind.

ALTERNATE AIR INFLUENCE

If flight conditions may cause icing, it is recommended to operate the lower pull control actuating Alternate Air flap. This operation has an influence on the engine developped power due to the appreciable elevation of air intake temperature and alters the take–off distance by approximately 10 %. During climb at maximum power, climb speed drop is 150 ft / min. During climb at lower power and during cruise flight, rated performance could be established by increasing manifold pressure of 1 in.Hg at the same power.

TAKE–OFF PERFORMANCE

CONDITIONS :

IAS : Lift off : 63 KIAS – 73 MPH IAS
Clear 50 ft : 69 KIAS – 79 MPH IAS
Weight : 2370 lbs (1075 kg)
Flaps : Take–off position (10°)
Power : Full low pitch – Full throttle
Runway : Tar, dry
N : 2575 RPM

NOTE :
See Paragraph "NOTICE" for corrections due to wind and runway condition.

Tempe–rature	**Distance**	**Pressure altitude (ft)**					
		0	**2000**	**4000**	**6000**	**8000**	**10000**
ISA – 20°C (– 36°F)	Roll (ft)	647	757	886	1042	1230	1448
	Clear 50 ft (ft)	1008	1170	1365	1605	1906	2282
ISA	Roll (ft)	771	905	1063	1254	1487	1758
	Clear 50 ft (ft)	1197	1399	1642	1948	2341	2851
ISA + 20°C (+ 36°F)	Roll (ft)	909	1070	1261	1492	1775	2106
	Clear 50 ft (ft)	1409	1655	1959	2346	2859	3564

Figure 5.6 – TAKE–OFF PERFORMANCE

TAKE–OFF PERFORMANCE

CONDITIONS :

IAS : Lift off : 71 KIAS – 82 MPH IAS
Clear 50 ft : 78 KIAS – 90 MPH IAS
Weight : 3086 lbs (1400 kg)
Flaps : Take–off position (10°)
Power : Full low pitch – Full throttle
Runway : Tar, dry
N : 2575 RPM

NOTE :
See Paragraph "NOTICE" for corrections due to wind and runway condition.

Tempe–rature	Distance	Pressure altitude (ft)					
		0	2000	4000	6000	8000	10000
ISA – 20°C (– 36°F)	Roll (ft)	1115	1305	1527	1795	2119	2496
	Clear 50 ft (ft)	1735	2036	2409	2889	3537	4457
ISA	Roll (ft)	1329	1560	1833	2162	2562	3029
	Clear 50 ft (ft)	2083	2469	2959	3618	4578	6190
ISA + 20°C (+ 36°F)	Roll (ft)	1566	1845	2173	2572	3059	3630
	Clear 50 ft (ft)	2483	2976	3626	4562	6116	9854

Figure 5.7 – TAKE–OFF PERFORMANCE

CLIMB PERFORMANCE

CONDITIONS :

Landing gear UP
Weight : 2370 lbs (1075 kg)
Indicated speed : 86 KIAS – 99 MPH IAS
Mixture : FULL RICH
Flaps retracted
Power : 2575 RPM – full throttle

PRESSURE ALTITUDE Feet	CLIMB SPEED					
	ISA – 20°C (– 36°F)		ISA		ISA+20°C (+ 36°F)	
	m/s	ft/min	m/s	ft/min	m/s	ft/min
500	8.94	1760	8.01	1576	7.22	1422
2500	8.13	1601	7.24	1425	6.48	1276
4500	7.33	1443	6.47	1273	5.74	1130
6500	6.54	1287	5.70	1122	4.99	982
8500	5.74	1129	4.93	970	4.25	836
10500	4.95	973	4.16	818	3.49	688
12500	4.15	817	3.39	667	2.74	540

Figure 5.8 – CLIMB PERFORMANCE

CLIMB PERFORMANCE

CONDITIONS :

Landing gear UP
Weight : 3086 lbs (1400 kg)
Indicated speed : 95 KIAS – 109 MPH IAS
Mixture : FULL RICH
Flaps retracted
Power : 2575 RPM – full throttle

PRESSURE ALTITUDE Feet	CLIMB SPEED					
	ISA – 20°C (– 36°F)		ISA		ISA+20°C (+ 36°F)	
	m/s	ft/min	m/s	ft/min	m/s	ft/min
500	6.32	1244	5.59	1100	4.96	977
2500	5.65	1112	4.94	972	4.34	853
4500	4.98	979	4.29	844	3.70	729
6500	4.31	848	3.64	716	3.07	604
8500	3.64	716	2.99	588	2.43	479
10500	2.97	585	2.34	460	1.80	353
12500	2.31	455	1.69	332	1.16	228

Figure 5.9 – CLIMB PERFORMANCE

CLIMB PERFORMANCE

CONDITIONS :

Landing gear UP
Weight : 2370 lbs (1075 kg)
Indicated speed : 86 KIAS – 99 MPH IAS
Mixture : FULL RICH
Flaps 0°
Power : 2575 RPM – full throttle

PRESS. ALT. Feet	CLIMB FROM SEA LEVEL								
	ISA –20°C (– 36°F)			ISA			ISA +20°C (+ 36°F)		
	TIME min's"	FUEL US Gal	DIST. NM	TIME min's"	FUEL US Gal	DIST. NM	TIME min's"	FUEL US Gal	DIST. NM
500	0'17"	0.1	0.4	0'19"	0.1	0.5	0'21"	0.1	0.5
2500	1'29"	0.6	2.1	1'39"	0.6	2.4	1'49"	0.6	2.8
4500	2'48"	1.0	4.0	3'8"	1.1	4.7	3'28"	1.1	5.3
6500	4'17"	1.5	6.3	4'48"	1.6	7.3	5'20"	1.6	8.4
8500	5'58"	2.0	8.9	6'43"	2.1	10.4	7'31"	2.2	12.0
10500	7'53"	2.5	11.9	8'57"	2.7	14.1	10'6"	2.8	16.4
12500	10'9"	3.1	15.7	11'39"	3.3	18.7	13'18"	3.5	22.1

Figure 5.10 – CLIMB PERFORMANCE

CLIMB PERFORMANCE

CONDITIONS :

Landing gear UP
Weight : 3086 lbs (1400 kg)
Indicated speed : 95 KIAS – 109 MPH IAS
Mixture : FULL RICH
Flaps 0°
Power : 2575 RPM – full throttle

PRESS. ALT. Feet	CLIMB FROM SEA LEVEL								
	ISA –20°C (– 36°F)			ISA			ISA +20°C (+ 36°F)		
	TIME min's"	FUEL US Gal	DIST. NM	TIME min's"	FUEL US Gal	DIST. NM	TIME min's"	FUEL US Gal	DIST. NM
500	0'24"	0.2	0.6	0'27"	0.2	0.7	0'30"	0.2	0.8
2500	2'6"	0.8	3.3	2'23"	0.9	3.8	2'41"	0.9	4.5
4500	4'2"	1.5	6.4	4'35"	1.6	7.5	5'10"	1.7	8.8
6500	6'15"	2.2	10.0	7'9"	2.3	11.9	8'8"	2.5	14.0
8500	8'51"	3.0	14.5	10'13"	3.2	17.3	11'46"	3.4	20.7
10500	11'58"	3.8	20.0	14'2"	4.2	24.3	16'28"	4.5	29.6
12500	15'53"	4.8	27.1	19'5"	5.3	33.8	23'9"	6.0	42.7

Figure 5.11 – CLIMB PERFORMANCE

MAXIMUM PERFORMANCE ALTITUDE

Maximum performance altitude in standard temperature condition (ISA), corresponding to a vertical speed of 100 ft/min, is 18000 ft at take–off maximum weight.

ANTENNAS INFLUENCE ON PERFORMANCE

Installation of radio antennas reduces cruise performance as follows :

AERIAL	CRUISE SPEED		RANGE
	KIAS	MPH IAS	
VHF	– 0.48	– 0.56	– 0.30 %
VOR	– 0.59	– 0.68	– 0.37 %
Glide	– 0.32	– 0.37	– 0.20 %
ADF Loop antenna	– 0.75	– 0.87	– 0.47 %
ELT	– 0.16	– 0.19	– 0.10 %
Anticollision lights	– 0.16	– 0.19	– 0.10 %
Strobe lights	– 0.43	– 0.50	– 0.27 %
Example : IFR	– 3.23	– 3.73	– 2 %

Figure 5.12 – ANTENNAS INFLUENCE ON PERFORMANCE

FOOTSTEPS INFLUENCE ON PERFORMANCE

Installation of the retractable footsteps increases cruise performance as follows :

CRUISE SPEED		RANGE
KIAS	MPH IAS	
+ 2.5	+ 2.9	+ 0.8 %

Figure 5.12A – FOOTSTEPS INFLUENCE ON PERFORMANCE

NOTE :
The retractable footsteps are only installed when modification No. MOD.151 is applied. Thereby, the 2.5 KIAS speed gain counterbalances the standard installation of the VHF, VOR, Glide, ADF, ELT antennas and of the anticollision lights.

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LEVEL FLIGHT PERFORMANCE

Level flight performance are given for a weight of 2943 lbs (1335 kg) and for setting ”Best Power” or ”Best Economy” obtained with an EGT.

Fuel : 86.2 U.S Gal (326 litres) usable

Various parameters such as the mixture setting, engine and propeller condition and the atmospheric conditions (wind, moisture, temperature and so on...) may noticeably vary the endurance and range.

Settings with EGT indicator :

– Best economy mixture : from full rich, weaken slowly mixture until peak EGT.

– Best power mixture : From peak EGT, re–enrich until EGT temperature decreases by 75°F (3 divisions).

Settings without EGT indicator :

– Best economy mixture : from full rich, weaken slowly until first engine malfunctioning signs (vibration) appear and then re–enrich slowly.

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 500 ft

ISA : 57.2°F (14°C)

CONDITIONS :
- Mixture adjusted to the BEST POWER
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	23.6	173	150	174	151	61.3	16.2	40.6	10.7
	2400	24.3					60.4	15.9	40.0	10.6
	2300	25.1					59.4	15.7	39.3	10.4
	2200	26.0					58.5	15.4	38.7	10.2
70 %	2500	22.4	168	146	169	147	58.4	15.4	39.7	10.5
	2400	23.1					57.4	15.2	39.1	10.3
	2300	23.8					56.5	14.9	38.4	10.1
	2200	24.7					55.5	14.7	37.8	10.0
65 %	2500	21.2	163	142	165	143	55.5	14.7	38.8	10.2
	2400	21.9					54.5	14.4	38.1	10.1
	2300	22.6					53.6	14.2	37.5	9.9
	2000	23.4					52.6	13.9	36.8	9.7
60 %	2500	20.1	158	137	159	138	52.5	13.9	38.0	10.0
	2400	20.7					51.6	13.6	37.3	9.9
	2300	21.3					50.6	13.4	36.6	9.7
	2200	22.1					49.7	13.1	35.9	9.5
55 %	2500	18.9	152	132	153	133	49.6	13.1	37.2	9.8
	2400	19.5					48.6	12.8	36.5	9.6
	2300	20.1					47.7	12.6	35.8	9.5
	2200	20.8					46.7	12.3	35.0	9.2
50 %	2500	17.7	146	127	147	128	46.7	12.3	36.5	9.6
	2400	18.3					45.7	12.1	35.8	9.5
	2300	18.8					44.8	11.8	35.0	9.2
	2200	19.5					43.8	11.6	34.3	9.1

Figure 5.13 – LEVEL FLIGHT PERFORMANCE (500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 2500 ft

ISA : 50°F (10°C)

CONDITIONS :
– Mixture adjusted to the BEST POWER
– Speed without antennas nor external lights
– Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	23.0	171	148	177	154	61.3	16.2	39.9	10.5
	2400	23.8					60.4	15.9	39.2	10.4
	2300	24.5					59.4	15.7	38.6	10.2
	2200	25.4					58.5	15.4	38.0	10.0
70 %	2500	21.9	166	144	172	150	58.4	15.4	39.0	10.3
	2400	22.6					57.4	15.2	38.4	10.1
	2300	23.3					56.5	14.9	37.7	10.0
	2200	24.2					55.5	14.7	37.1	9.8
65 %	2500	20.7	161	140	167	145	55.4	14.6	38.1	10.1
	2400	21.4					54.5	14.4	37.5	9.9
	2300	22.1					53.6	14.2	36.8	9.7
	2000	22.9					52.6	13.9	36.2	9.6
60 %	2500	19.6	156	136	162	141	52.5	13.9	37.3	9.9
	2400	20.2					51.6	13.6	36.6	9.7
	2300	20.9					50.6	13.4	36.0	9.5
	2200	21.6					49.7	13.1	35.3	9.3
55 %	2500	18.5	150	131	156	136	49.6	13.1	36.6	9.7
	2400	19.0					48.6	12.8	35.9	9.5
	2300	19.6					47.7	12.6	35.2	9.3
	2200	20.3					46.7	12.4	34.5	9.1
50 %	2500	17.3	144	125	150	130	46.7	12.3	35.9	9.5
	2400	17.8					45.7	12.1	35.2	9.3
	2300	18.4					44.8	11.8	34.4	9.1
	2200	19.0					43.8	11.6	33.7	8.9

Figure 5.14 – LEVEL FLIGHT PERFORMANCE (2500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 4500 ft

ISA : 42.8°F (6°C)

CONDITIONS :
– Mixture adjusted to the BEST POWER
– Speed without antennas nor external lights
– Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	22.5	168	147	180	157	61.3	16.2	39.1	10.3
	2400	23.2					60.4	16.0	38.5	10.2
	2300	24.0					59.4	15.7	37.9	10.0
70 %	2500	21.4	164	143	176	153	58.4	15.4	38.3	10.1
	2400	22.1					57.4	15.2	37.7	10.0
	2300	22.8					56.5	14.9	37.0	9.8
	2200	23.6					55.5	14.7	36.4	9.6
65 %	2500	20.3	160	139	170	148	55.5	14.7	37.4	9.9
	2400	20.9					54.5	14.4	36.8	9.7
	2300	21.6					53.6	14.1	36.2	9.6
	2000	22.4					52.6	13.9	35.5	9.4
60 %	2500	19.2	154	134	165	143	52.5	13.9	36.6	9.7
	2400	19.7					51.6	13.6	36.0	9.5
	2300	20.4					50.6	13.4	35.3	9.3
	2200	21.1					49.7	13.1	34.7	9.2
55 %	2500	18.0	149	129	158	138	49.6	13.1	36.0	9.5
	2400	18.6					48.6	12.9	35.3	9.3
	2300	19.2					47.7	12.6	34.6	9.1
	2200	19.8					46.7	12.4	33.9	9.0
50 %	2500	16.9	141	123	151	131	46.7	12.3	35.5	9.4
	2400	17.4					45.7	12.1	34.8	9.2
	2300	18.0					44.8	11.8	34.1	9.0
	2200	18.6					43.8	11.6	33.4	8.8

Figure 5.15 – LEVEL FLIGHT PERFORMANCE (4500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 6500 ft

ISA : 35.6°F (2°C)

CONDITIONS :
- Mixture adjusted to the BEST POWER
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	22.1	167	145	184	160	61.3	16.2	38.4	10.1
70 %	2500	20.9	162	141	178	155	58.4	15.4	37.6	9.9
	2400	21.6					57.4	15.2	37.0	9.8
	2300	22.3					56.5	14.9	36.3	9.6
65 %	2500	19.8	157	137	173	151	55.4	14.6	36.8	9.7
	2400	20.5					54.5	14.4	36.1	9.5
	2300	21.1					53.6	14.1	35.5	9.4
	2000	21.9					52.6	13.9	34.9	9.2
60 %	2500	18.7	152	132	168	146	52.5	13.9	36.0	9.5
	2400	19.3					51.6	13.6	35.4	9.4
	2300	19.9					50.6	13.4	34.7	9.2
	2200	20.6					49.7	13.1	34.1	9.0
55 %	2500	17.6	146	127	161	140	49.6	13.1	35.4	9.4
	2400	18.2					48.6	12.9	34.7	9.2
	2300	18.8					47.7	12.6	34.0	9.0
	2200	19.4					46.7	12.3	33.3	8.8
50 %	2500	16.5	138	120	152	132	46.7	12.3	35.2	9.3
	2400	17.0					45.7	12.1	34.5	9.1
	2300	17.6					44.8	11.8	33.8	8.9
	2200	18.2					43.8	11.6	33.1	8.7

Figure 5.16 – LEVEL FLIGHT PERFORMANCE (6500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 8500 ft

ISA : 28.4°F (– 2°C)

CONDITIONS :
- Mixture adjusted to the BEST POWER
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
70 %	2500	20.5	160	139	182	158	58.4	15.4	36.9	9.7
65 %	2500	19.4	155	135	176	154	55.5	14.7	36.1	9.5
	2400	20.0					54.5	14.4	35.5	9.4
	2300	20.7					53.6	14.2	34.9	9.2
60 %	2500	18.3	150	130	170	148	52.5	13.9	35.4	9.4
	2400	18.9					51.6	13.6	34.8	9.2
	2300	19.5					50.6	13.4	34.1	9.0
	2200	20.2					49.7	13.1	33.5	8.8
55 %	2500	17.2	144	125	164	143	49.6	13.1	34.8	9.2
	2400	17.8					48.6	12.9	34.1	9.0
	2300	18.3					47.7	12.6	33.4	8.8
	2200	19.0					46.7	12.4	32.8	8.7

Figure 5.17 – LEVEL FLIGHT PERFORMANCE (8500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 10500 ft

ISA : 49.6°F (– 6°C)

CONDITIONS :
- Mixture adjusted to the BEST POWER
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
65 %	2500	19.0	153	133	180	156	55.5	14.7	35.5	9.4
60 %	2500	17.9	148	129	173	151	52.5	13.9	34.8	9.2
	2400	18.5					51.6	13.6	34.2	9.0
	2300	19.1					50.6	13.4	33.6	8.9
55 %	2500	16.8	142	123	166	144	49.6	13.1	34.4	9.1
	2400	17.4					48.6	12.8	33.7	8.9
	2300	17.9					47.7	12.6	33.1	8.7
	2200	18.6					46.7	12.3	32.4	8.6

Figure 5.18 – LEVEL FLIGHT PERFORMANCE (10500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 12500 ft

ISA : 14°F (– 10°C)

CONDITIONS :
- Mixture adjusted to the BEST POWER
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

% BHP	N RPM	PA in.Hg	CAS MPH	CAS kt	TAS MPH	TAS kt	MIXTURE ADJUSTING l / h	MIXTURE ADJUSTING U.S. Gal / hr	SPECIFIC CONSUMPTION l / 100 NM	SPECIFIC CONSUMPTION U.S. Gal / 100 NM
60 %	2500	17.5	146	127	176	154	52.5	13.9	34.2	9.0
	2400	18.1					51.6	13.6	33.6	8.9
55 %	2500	16.5	138	120	168	146	49.6	13.1	34.0	9.0
	2400	17.0					48.6	12.9	33.4	8.8
	2300	17.5					47.7	12.6	32.7	8.6

Figure 5.19 – LEVEL FLIGHT PERFORMANCE (12500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 500 ft

ISA : 57.2°F (14°C)

CONDITIONS : – Mixture adjusted to the BEST ECONOMY
– Speed without antennas nor external lights
– Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	23.6	169	147	170	148	52.8	14.0	35.6	9.4
	2400	24.3					51.8	13.7	35.0	9.2
	2300	25.1					50.9	13.5	34.4	9.1
	2200	26.0					50.0	13.2	33.7	8.9
70 %	2500	22.4	165	143	166	144	50.3	13.3	34.9	9.2
	2400	23.1					49.4	13.1	34.2	9.0
	2300	23.9					48.5	12.8	33.6	8.9
	2200	24.7					47.5	12.6	32.9	8.7
65 %	2500	21.2	160	139	161	140	47.9	12.7	34.2	9.0
	2400	21.9					46.9	12.4	33.5	8.8
	2300	22.6					46.0	12.1	32.8	8.7
	2000	23.4					45.0	11.9	32.2	8.5
60 %	2500	20.1	155	135	156	136	45.4	12.0	33.5	8.8
	2400	20.7					44.5	11.8	32.8	8.7
	2300	21.3					43.5	11.5	32.1	8.5
	2200	22.1					42.6	11.3	31.4	8.3
55 %	2500	18.9	149	129	150	130	43.0	11.4	33.0	8.7
	2400	19.5					42.0	11.1	32.2	8.5
	2300	20.1					41.1	10.8	31.5	8.3
	2200	20.8					40.1	10.6	30.8	8.1
50 %	2500	17.7	142	123	143	124	40.5	10.7	32.6	8.6
	2400	18.3					39.6	10.4	31.8	8.4
	2300	18.8					38.6	10.2	31.1	8.2
	2200	19.5					37.7	9.9	30.3	8.0

Figure 5.20 – LEVEL FLIGHT PERFORMANCE (500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 2500 ft

ISA : 50°F (10°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

% BHP	N RPM	PA in.Hg	CAS MPH	CAS kt	TAS MPH	TAS kt	MIXTURE ADJUSTING l / h	MIXTURE ADJUSTING U.S. Gal / hr	SPECIFIC CONSUMPTION l / 100 NM	SPECIFIC CONSUMPTION U.S. Gal / 100 NM
75 %	2500	23.0	167	145	174	151	52.8	13.9	35.0	9.2
	2400	23.8					51.9	13.7	34.4	9.1
	2300	24.6					50.9	13.5	33.7	8.9
	2200	25.4					50.0	13.2	33.1	8.7
70 %	2500	21.9	163	142	169	147	50.4	13.3	34.3	9.1
	2400	22.6					49.4	13.1	33.6	8.9
	2300	23.3					48.5	12.8	33.0	8.7
	2200	24.2					47.5	12.6	32.3	8.5
65 %	2500	20.8	158	137	164	143	47.9	12.7	33.6	8.9
	2400	21.4					46.9	12.4	32.9	8.7
	2300	22.1					46.0	12.2	32.3	8.5
	2000	22.9					45.1	11.9	31.6	8.3
60 %	2500	19.6	153	133	158	138	45.4	12.0	33.0	8.7
	2400	20.2					44.5	11.8	32.3	8.5
	2300	20.9					43.5	11.5	31.6	8.3
	2200	21.6					42.6	11.2	30.9	8.2
55 %	2500	18.5	147	128	152	133	43.0	11.4	32.4	8.6
	2400	19.0					42.0	11.1	31.7	8.4
	2300	19.6					41.1	10.9	31.0	8.2
	2200	20.3					40.1	10.6	30.3	8.0
50 %	2500	17.3	139	121	145	126	40.5	10.7	32.1	8.5
	2400	17.8					39.5	10.4	31.4	8.3
	2300	18.4					38.6	10.2	30.6	8.1
	2200	19.0					37.7	10.0	29.9	7.9

Figure 5.21 – LEVEL FLIGHT PERFORMANCE (2500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 4500 ft

ISA : 42.8°F (6°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	22.5	165	144	177	154	52.8	13.9	34.4	9.1
	2400	23.2					51.9	13.7	33.7	8.9
	2300	24.0					50.9	13.4	33.1	8.7
70 %	2500	21.4	161	140	172	150	50.3	13.3	33.7	8.9
	2400	22.1					49.4	13.0	33.0	8.7
	2300	22.8					48.5	12.8	32.4	8.6
	2200	23.6					47.5	12.6	31.8	8.4
65 %	2500	20.3	156	136	167	145	47.9	12.7	33.0	8.7
	2400	20.9					46.9	12.4	32.3	8.5
	2300	21.6					46.0	12.2	31.7	8.4
	2000	22.4					45.0	11.9	31.0	8.2
60 %	2500	19.2	151	131	161	140	45.4	12.0	32.4	8.6
	2400	19.8					44.5	11.8	31.7	8.4
	2300	20.4					43.5	11.5	31.1	8.2
	2200	21.1					42.6	11.3	30.4	8.0
55 %	2500	18.0	145	126	155	135	43.0	11.4	31.9	8.4
	2400	18.6					42.0	11.1	31.2	8.2
	2300	19.2					41.1	10.8	30.5	8.1
	2200	19.9					40.1	10.6	29.8	7.9
50 %	2500	16.9	137	119	146	127	40.5	10.7	31.9	8.4
	2400	17.4					39.6	10.5	31.1	8.2
	2300	18.0					38.6	10.2	30.4	8.0
	2200	18.6					37.7	10.0	29.6	7.8

Figure 5.22 – LEVEL FLIGHT PERFORMANCE (4500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 6500 ft

ISA : 35.6°F (2°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
75 %	2500	22.1	163	142	180	157	52.8	14.0	33.7	8.9
70 %	2500	21.0	159	138	175	152	50.3	13.3	33.1	8.7
	2400	21.6					49.4	13.1	32.4	8.6
	2300	22.3					48.4	12.8	31.8	8.4
65 %	2500	19.8	154	134	170	148	47.9	12.7	32.4	8.6
	2400	20.5					46.9	12.4	31.8	8.4
	2300	21.1					46.0	12.2	31.2	8.2
	2000	21.9					45.0	11.9	30.5	8.1
60 %	2500	18.7	149	129	164	142	45.4	12.0	31.9	8.4
	2400	19.3					44.5	11.8	31.2	8.2
	2300	19.9					43.5	11.5	30.6	8.1
	2200	20.6					42.6	11.2	29.9	7.9
55 %	2500	17.6	142	124	157	136	43.0	11.4	31.5	8.3
	2400	18.2					42.0	11.1	30.8	8.1
	2300	18.8					41.1	10.8	30.1	7.9
	2200	19.4					40.1	10.6	29.4	7.8
50 %	2500	16.5	134	116	147	128	40.5	10.7	31.7	8.4
	2400	17.0					39.6	10.5	30.9	8.2
	2300	17.6					38.6	10.2	30.2	8.0
	2200	18.2					37.7	10.0	29.4	7.8

Figure 5.23 – LEVEL FLIGHT PERFORMANCE (6500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 8500 ft

ISA : 28.4°F (– 2°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
70 %	2500	20.5	157	136	178	155	50.3	13.3	32.5	8.6
65 %	2500	19.4					47.9	12.6	31.9	8.4
	2400	20.0	152	132	173	150	46.9	12.4	31.2	8.2
	2300	20.7					46.0	12.1	30.6	8.1
60 %	2500	18.3					45.4	12.0	31.3	8.3
	2400	18.9	146	127	167	145	44.5	11.7	30.7	8.1
	2300	19.5					43.5	11.5	30.0	7.9
	2200	20.2					42.6	11.3	29.4	7.8
55 %	2500	17.2					43.0	11.4	31.0	8.2
	2400	17.8	140	122	159	138	42.0	11.1	30.4	8.0
	2300	18.3					41.1	10.9	29.7	7.8
	2200	19.0					40.1	10.6	29.0	7.7

Figure 5.24 – LEVEL FLIGHT PERFORMANCE (8500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 10500 ft

ISA : 49.6°F (– 6°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

% BHP	N RPM	PA in.Hg	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
			MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
65 %	2500	19.0	150	130	176	153	47.9	12.6	31.3	8.3
60 %	2500	17.9	144	125	169	147	45.4	12.0	30.9	8.2
	2400	18.5					44.5	11.7	30.2	8.0
	2300	19.1					43.5	11.5	29.6	7.8
55 %	2500	16.8	137	119	161	140	43.0	11.3	30.8	8.1
	2400	17.4					42.0	11.1	30.1	7.9
	2300	17.9					41.1	10.9	29.4	7.8
	2200	18.6					40.1	10.6	28.7	7.6

Figure 5.25 – LEVEL FLIGHT PERFORMANCE (10500 ft)

LEVEL FLIGHT PERFORMANCE

PRESSURE ALTITUDE : 12500 ft

ISA : 14°F (– 10°C)

CONDITIONS :
- Mixture adjusted to the BEST ECONOMY
- Speed without antennas nor external lights
- Weight : 2943 lbs (1335 kg)

NOTE :
Bold–faced types represent recommended power.

%	N	PA	CAS		TAS		MIXTURE ADJUSTING		SPECIFIC CONSUMPTION	
BHP	RPM	in.Hg	MPH	kt	MPH	kt	l / h	U.S. Gal / hr	l / 100 NM	U.S. Gal / 100 NM
60 %	2500	17.5	142	123	171	149	45.4	12.0	30.4	8.0
	2400	18.1					44.5	11.7	29.8	7.9
	2500	16.5					43.0	11.4	30.5	8.1
55 %	2400	17.0	134	116	162	141	42.0	11.1	29.9	7.9
	2300	17.6					41.1	10.9	29.2	7.7

Figure 5.26 – LEVEL FLIGHT PERFORMANCE (12500 ft)

HOLDING CONDITIONS IN FLIGHT

45 % BHP
1800 RPM
MP = 21.5 in.Hg
Substract 0.3 per 1000 ft
Consumption : 8.5 U.S Gal/h

LANDING PERFORMANCE

WEIGHT : 2370 lbs (1075kg)

CONDITIONS :

Clear 50 ft : 67.5 KIAS – 78 MPH IAS
Flaps : Landing position
Runway : Tar, dry

NOTE :
See Paragraph "NOTICE" for corrections due to wind and runway condition.

Tempe–rature	**Distance**	**Pressure altitude (ft)**					
		0	**2000**	**4000**	**6000**	**8000**	**8000**
ISA – 20°C (– 36°F)	Roll (ft)	675	710	755	800	855	905
	Clear 50 ft (ft)	1420	1495	1570	1650	1740	1905
ISA	Roll (ft)	720	765	810	865	920	980
	Clear 50 ft (ft)	1515	1590	1675	1760	1855	1975
ISA + 20°C (+ 36°F)	Roll (ft)	770	820	870	930	985	1055
	Clear 50 ft (ft)	1610	1690	1780	1875	1980	2095

Figure 5.1 – LANDING PERFORMANCE (2370 lbs)

LANDING PERFORMANCE

WEIGHT : 3086 lbs (1400kg)

CONDITIONS :
Clear 50 ft : 76 KIAS – 88 MPH IAS
Flaps : Landing position
Runway : Tar, dry

NOTE :
See Paragraph "NOTICE" for corrections due to wind and runway condition.

Tempe–rature	**Distance**	**Pressure altitude (ft)**					
		0	**2000**	**4000**	**6000**	**8000**	**8000**
ISA – 20°C (– 36°F)	Roll (ft)	770	815	865	915	980	1040
	Clear 50 ft (ft)	1713	1800	1895	1995	2110	2235
ISA	Roll (ft)	825	875	930	985	1050	1115
	Clear 50 ft (ft)	1820	1920	2015	2120	2245	2380
ISA + 20°C (+ 36°F)	Roll (ft)	885	940	995	1055	1130	1200
	Clear 50 ft (ft)	1945	2045	2145	2255	2390	2535

Figure 5.2 – LANDING PERFORMANCE (3086 lbs)

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SECTION 6

WEIGHT AND BALANCE

TABLE OF CONTENTS

GENERAL

This section contains the procedure for determining the basic empty weight and moment of SOCATA Model TB 20 airplane. Procedures for calculating the weight and moment for various operations are also provided. A list of equipment available for this airplane is included at the back of this section.

It should be noted that the list of specific optional equipment installed on your airplane as delivered from the factory can be found in the records carried in the airplane.

IT IS THE RESPONSIBILITY OF THE PILOT TO ENSURE THAT THE AIRPLANE IS LOADED PROPERLY.

AIRPLANE WEIGHING PROCEDURES

Refer to Maintenance Manual for the procedures to use.

NOTE :
Weighing carried out at the factory takes into account all equipment installed on the airplane. The list of these equipment and the weighing result are noted in the Individual Inspection Record.

BAGGAGE / CARGO LOADING

BAGGAGE

The baggage compartment is located at the back of rear passengers bench or, Post–MOD.151, seats. Loading can either be carried out through baggage compartment access door provided with a locking device, located on L.H. side of the airplane, or from the inside of the cabin, on upper part of the back of the bench or, Post–MOD.151, of the rear seats. In this case, a zip fastener allows folding the sound–proofing cloth.

Tie–down straps are provided for securing baggage on compartment floor.

CARGO

To facilitate the carrying of equipment, large or bulky items, the rear bench or, Post–MOD.151, the rear seats may be removed from the airplane.

To remove rear bench or seats : See Figure 6.1 (A, B, C)

– Lift up seating (Item 6) of rear bench or, Post–MOD.151, of rear seats and remove arm rest (kept in position with "Velcro" straps)

– If you want to free the back from its support plate, lift it up about 1.5 inch (3 cm) at both ends and pull it forward so that both attaching pins free from apertures.

– To remove the support plate (Item 5) and back (Item 1) :

  . Unfasten attachments of sound–proofing cloth on cross–beam (Item 2)
  . Pushing, unscrew ¼ turn both attaching pins of air regulation duct on rear floor (Item 4)
  . Pull both latches inwards (Item 3)
  . Lift up support plate (Item 5) to disengage it forward.

NOTE :
To reinstall rear bench or, Post–MOD.151, rear seats – see Figure 6.1 (a, b, c) reverse removal instructions.

IMPERATIVELY RESPECT WEIGHT AND BALANCE LIMITS

THE PILOT IS RESPONSIBLE FOR CORRECT BAGGAGE AND / OR CARGO LOADING. PRIOR TO ANY FLIGHT HE MUST MAKE SURE THAT WEIGHT, BALANCE AND TIE–DOWN ARE CORRECT.

– **Baggage weight :**

  Maximum 143 lbs (65 kg) at 102.36 in. (2.600 m)

– **Cargo weight (without baggage) :**

  Maximum 573 lbs (260 kg) at 74.80 in. (1.900 m)

CAUTION

WHEN IN CARGO CONFIGURATION, NO PASSENGERS ARE ALLOWED IN THE CARGO AREA.

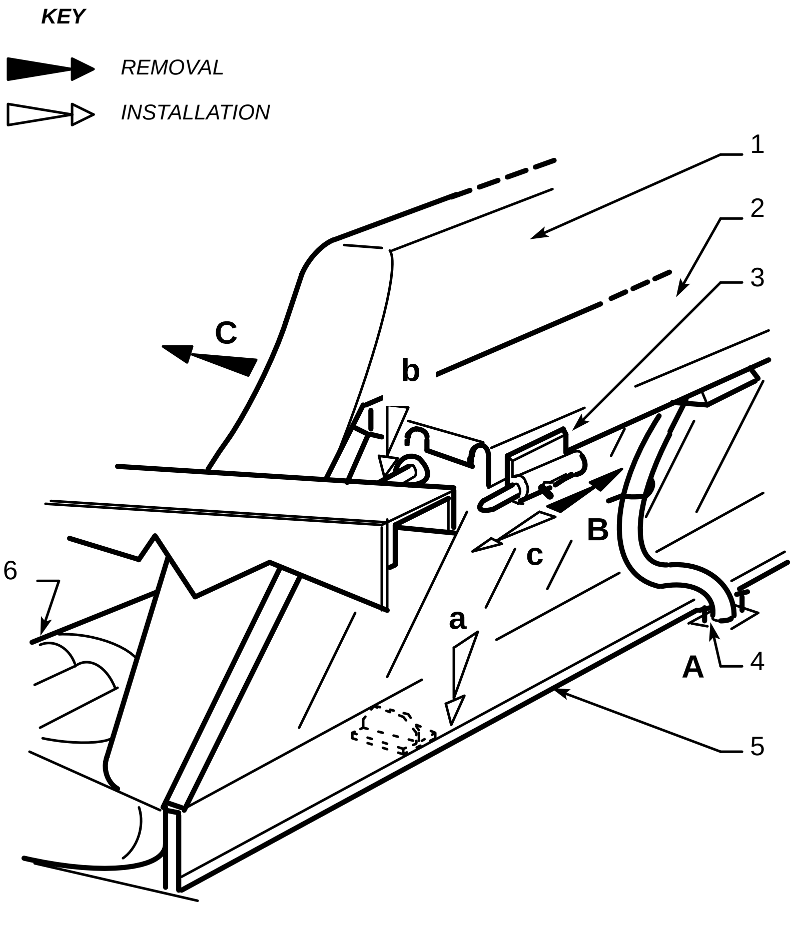

Figure 6.1 – REMOVAL AND INSTALLATION OF REAR BENCH OR, Post–MOD.151, REAR SEATS

DETERMINING WEIGHT AND BALANCE

GENERAL

This paragraph is intended to provide the pilot with a simple means of determining weight and balance of his airplane with regard to its empty characteristics and loading. The empty weight to be considered is the one noted on the last weighing form.

The data concerning loading are given on following graphs :

– Loading graph : see Figure 6.4
– Weight / Moment envelope : see Figure 6.5

To determine airplane loading within a given flight configuration, you only have to add up weights and moments of the various loads recorded and to add them to empty airplane data.

These values carried forward on weight / moment envelope must give a point within the limits drawn with continuous line.

If that is the case, loading is acceptable.

NOTE :
If moment is not directly known (optional equipment for example), determine it multiplying weight [lbs (kg)] by arm [in. (m)].

UTILIZATION OF WEIGHT / MOMENT GRAPH

Extract translucent Figure 6.5 from the manual and take a pencil.

– On Figure 6.5, place point A (1) corresponding to your empty airplane
[Our sample loading : 1866 lbs (846.5 kg) – 70.64 lb.in / 1000 (813.7 m.kg)]

– Superpose point A (1) and point A of graph 1 Figure 6.4.

– Draw on weight / moment envelope the straight line pilot + front passenger to get point A (2) corresponding to front seats loading.
[Our sample loading : 2 persons 340 lbs (154 kg)].

- Superpose point A (2) and point A of graph 1, draw the rear passengers straight line to get point B (1) related to rear seat loading.
  [Our sample loading : 2 persons 340 lb (154 kg)]

- Superpose point B (1) and point B of graph 2, draw the fuel straight line to get point B (2).
  [Our sample loading : 397 lbs (180 kg) – 66 U.S Gal (250 l) fuel]

- Superpose point B (2) and point B of graph 2, draw the baggage straight line to get point M.
  [Our sample loading : 110 lbs (50 kg) baggage]

Since point M falls within weight / moment envelope, the loading is acceptable.

NOTE :
Option No. 0800.00M ”L.H. or R.H. front seat back–off installation”, option No. 0800.10M ”L.H. front seat back–off installation” and/or option No. 0800.20M ”R.H. front seat back–off installation” are marked on your airplane by a color ring (yellow / green) located on the 2 front supports (tubes) of each seat.
For C.G. location calculation, take 2–inch (50 mm) L.H. front seat or L.H. and R.H. front seats back–off installation into account.

SAMPLE WEIGHT AND BALANCE RECORD

CONTINUOUS HISTORY OF CHANGES IN STRUCTURE OR EQUIPMENT AFFECTING WEIGHT AND BALANCE

AIRPLANE MODEL :	SERIAL NUMBER :	PAGE NUMBER :

DATE	ITEM No		DESCRIPTION OF EQUIPEMENT OR MODIFICATION	WEIGHT CHANGE						RUNNING BASIC EMPTYWEIGHT	
				ADDED (+)			REMOVED (–)				
	IN	OUT		WEIGHT lb	ARM in.	MOMENT lb.in/1000	WEIGHT lb	ARM in.	MOMENT lb.in/1000	WEIGHT lb	MOMENT lb.in/1000
			As delivered								

Figure 6.2 – SAMPLE WEIGHT AND BALANCE RECORD

	SAMPLE AIRPLANE			YOUR AIRPLANE			Ref. on chart Figure 6.6
	Weight lb	Lever arm in.	Moment lb.in / 1000	Weight lb	Lever arm in.	Moment lb.in / 1000	
Standard empty weight	1764	37.06	65.37				
Optional equipment	102	51.66	5.27				
Basic empty weight	1866		70.64				A(1)
Pilot (without Opt. 0800)	170	45.38	7.71				A(2)
Pilot (with Opt. 0800)	/	47.44	/				A(2)
Front passenger (without Opt. 0800)	170	45.38	7.71				A(2)
Front passenger (with Opt. 0800)	/	47.44	/				A(2)
Rear seat passengers	340	80.00	27.20				B(1)
Fuel (66 U.S Gal.)	397	42.70	16.95				B(2)
Baggage	110	102.54	11.20				
TOTAL WEIGHT AND MOMENT	3053		141.50				M

Figure 6.3 – SAMPLE LOADING

CAUTION

OPTION(S) No. 0800.00M (Qty 1 or 2)
OR 0800.10M AND 0800.20M (See NOTE on page 6.6) :
2–in. (50 mm) back–off installation for L.H. and/or R.H. front seat(s)

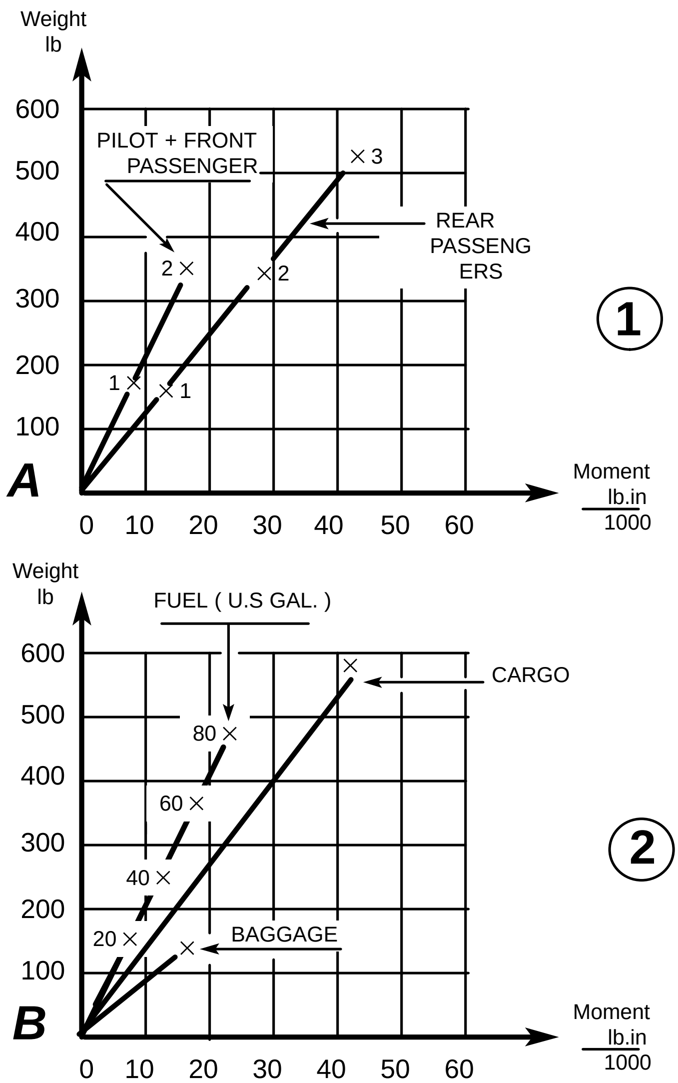

Figure 6.4 – LOADING GRAPHS

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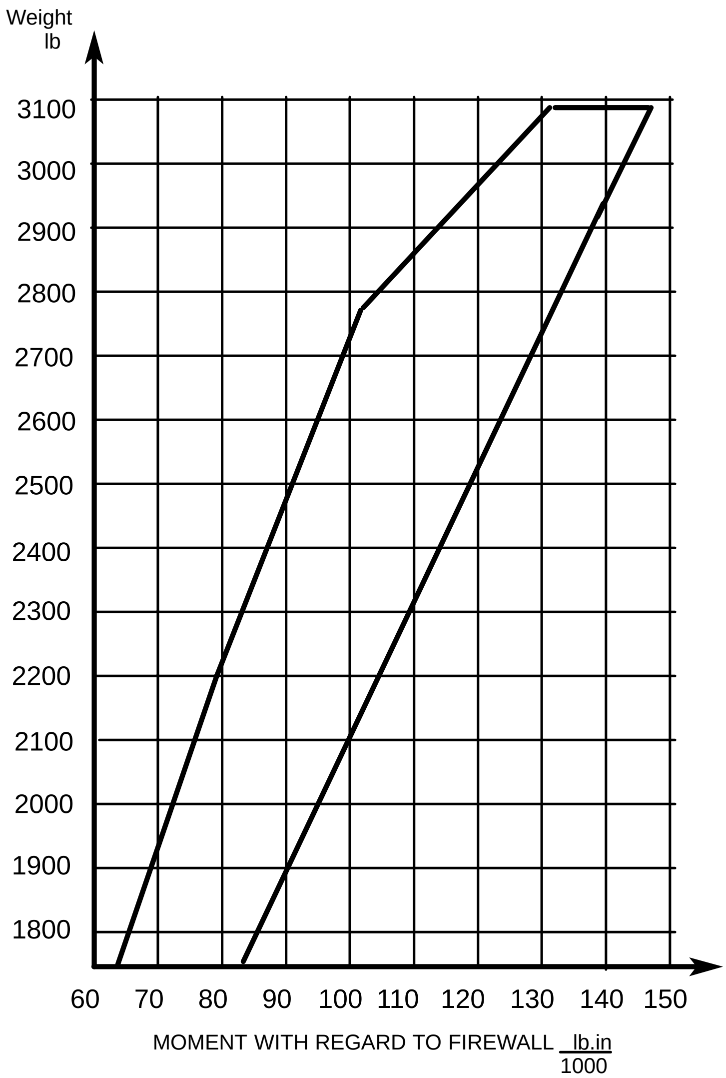


Figure 6.5 – LIMITS WEIGHT / MOMENT

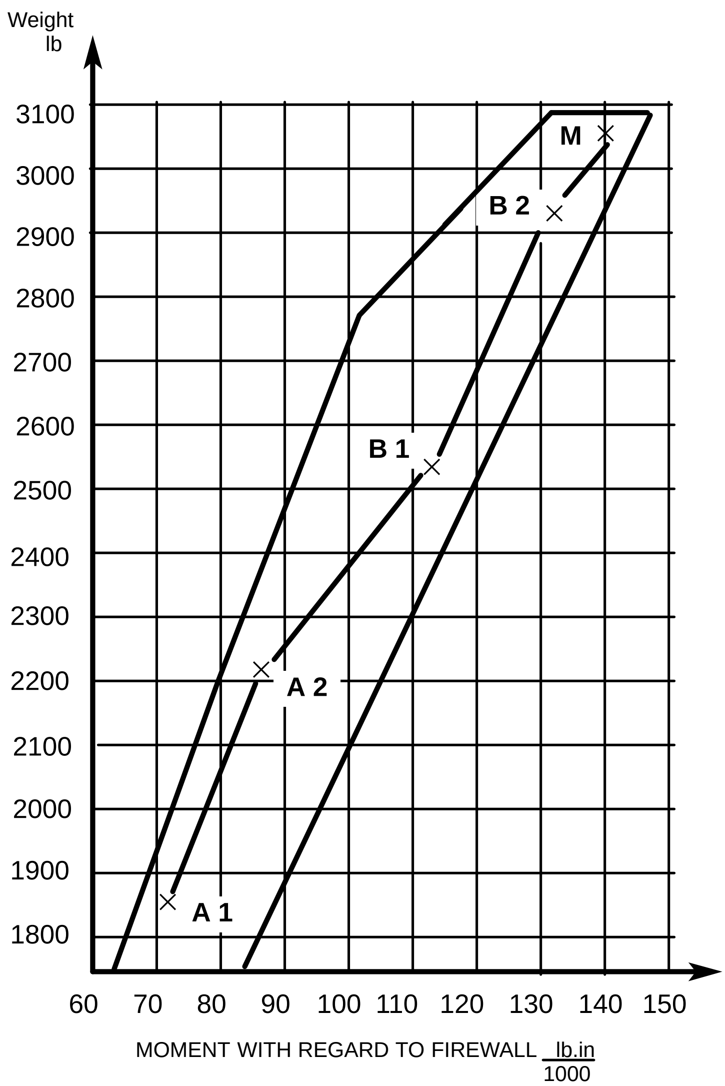


Figure 6.6 – LOADING SAMPLE

EQUIPMENT LIST

The following equipment list contains standard equipment installed on each airplane and available optional equipment.

A separate equipment list of items installed at the factory in your specific airplane is provided in your airplane file.

Columns showing weight (in pounds) and arm (in inches) provide the weight and center of gravity location for the equipment.

The equipment list provides the following information :

(a) Required or Standard items
- A letter ”R” or ”S” allows classifying of the equipment :
  ”R” : equipment items required for certification
  ”S” : standard equipment items

(b) Optional equipment (not restrictive)
- A letter ”O” or ”A” allows classifying of the equipment :
  ”O” : optional equipment items replacing required or standard items
  ”A” : optional equipment items which are in addition to required or standard items
- In the following column, an item number allows identification of the optional equipment.
- The column marked ”*” will be used to tick off the optional equipment installed on your airplane.

NOTE 1 :
Unless otherwise indicated (–), arms are positive values.
Positive arms are distances aft of the airplane datum ; negative arms are distances forward of the datum.

NOTE 2 :
Equipment list, which validity is “Pre–MOD. 151” :
S/N 948 to 1999, except S/N 1900
Equipment list, which validity is “Post–MOD. 151” :
S/N 2000 to 9999, plus S/N 1900

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		01 – SPECIFIC OPTIONAL EQUIPMENT			
A	H615 20M	Additional equipment for IFR France "Grey" – Up to S/N 1269 – From S/N 1270		 0.441 /	 25.59 /
A	H616 20M	Additional equipment for night VFR France "Grey"		0.441	25.59

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		21 – ENVIRONMENTAL SYSTEM			
		21–40 – Heating			
A	C598 00M	Radio console ventilation		1.543	6.30
A	C869 00M	Radio console forced ventilation (blower KING KA 33)		1.543	4.33
A	C869 10M	Radio console forced ventilation (blower KING KA 33) (With option C872 00M ”Battery (at the front)” installed – refer to ATA 24)		1.543	7.87
A	C869 20M	Radio console forced ventilation (blower KING KA 33) (on radio console)		1.543	12.99
A	F822 00M	Forced ventilation, rear passengers VETUS		2.756	136.61
A	F822 10M	Forced ventilation, rear passengers VETUS		2.756	136.61
A	F822 20M	Forced ventilation, rear passengers VETUS		2.756	136.61
		21–50 – Air conditioning			
A O	F874 00M	Air conditioning system KEITH with alternator 70A LW 14363 LYCOMING		67.000 13.000	72.83 – 37.80
A O	F874 10M	Reinforced air conditioning system KEITH with alternator 70A LW 14363 LYCOMING		68.210 13.000	72.83 – 37.80

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		22 – AUTO FLIGHT			
		22–12 – Autopilot			
A	D675 00M	Altitude and vertical speed preselector KAS 297B KING		1.764	21.65
A	D675 10M	Altitude and vertical speed preselector KAS 297B KING (on R.H. instrument panel)		1.764	21.65
A	D675 20M	Altitude and vertical speed preselector KAS 297B KING (on radio console)		1.764	21.65
A	D675 30M	Altitude and vertical speed preselector KAS 297B KING (EHSI version) (on radio console)		1.764	21.65
A	G668 00M	A/P KAP 100 KING		11.442	35.43
A	G668 10M	A/P KAP 100 KING with electrical pitch trim		17.659	67.72
A	G669 00M	A/P KAP 150 KING		21.363	76.38
A	G670 00M	A/P KFC 150 KING		21.561	75.59
A	G810 00M	Remote A/P modes annunciator KA 185–03 for KAP 150		0.661	23.62
A	G810 10M	Remote A/P modes annunciator KA 185–01 for KFC 150		0.661	23.62
A	G892 00M	A/P KAP 150 KING with EFIS included in K891 00M option (refer to ATA 34)		21.958	77.95
A	G892 10M	A/P KFC 150 KING with EFIS included in K923 00M option (refer to ATA 34)		21.958	77.95
A	G892 20M	A/P KAP 150 KING with EFIS included in K923 00M option (refer to ATA 34)		21.958	77.95

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		23 – COMMUNICATIONS			
		23–10 – Speech communications			
		23–11 – VHF capability			
A	23–001A	Audio selector/Intercom system PMA 7000MS PS ENGINEERING		3.814	26.77
A	J524 30M	Interphone		0.441	11.81
A	J539 00M	VHF/COM capability (Loud–speaker "SONAVOX")		3.395	47.24
A	J539 20M	VHF/COM capability (Loud–speaker "AUDAX")		2.998	45.28
A	J688 00M	Boom microphone headset PELTOR		0.992	55.12
A	J827 00M	Intercommunication system SPA 400 ICS SIGTRONICS (Front and rear seats)		0.750	32.28
A	J827 10M	Intercommunication system SPA 400 AV SIGTRONICS (Front seats)		0.750	32.28
A	J893 00M	Headset (noise reducer) HDCII BOSE (pilot and front passenger)		4.189	55.12
A	J893 10M	Headset (noise reducer) HDCII BOSE (pilot)		2.094	55.12
A	J894 00M	VHF/COM capability		3.219	45.27
A	J894 20M	VHF/COM capability		3.219	45.27
A	J912 00M	Boom microphone headset H10–13–4 DAVID CLARK		0.838	55.12
A	J928 00M	Boom microphone headset HMEC 25–KA SENNHEISER : Pilot and front passenger Rear passengers		 0.661 0.661	 55.12 94.49

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	J928 10M	Boom microphone headset HMEC 25–KAS SENNHEISER : Pilot and front passenger Rear passengers		 0.661 0.661	 55.12 94.49
A	K807 00M	Audio control box KMA 24H52 KING with interphone		2.205	27.56
A	K809 00M	Audio control box KMA 24H70 KING with audio selector threshold (4 transmitters/receivers)		2.381	31.50
A	K809 10M	Audio control box KMA 24H71 KING with audio selector threshold (5 transmitters/receivers)		2.381	31.50
A	K815 00M	Audio selection box KMA 24–02 KING		2.910	22.44
A	K815 10M	Audio selection box KMA 24–02 KING		2.910	22.44
A	0523 00M	Boom microphone headset H10–30 DAVID CLARK		1.190	55.12
		23–12 – COM 1 installation			
A	0549 10M	Rigid antenna VHF 1 D & M		0.661	127.17
A	K805 20M	VHF 1 KY 196 A 30 KING + KMA 24–02 (with VHF capability)		7.231	32.28
A	K805 30M	VHF 1 KY 196 A 30 KING (without VHF capability)		3.858	18.11
		23–13 – COM 2 installation			
A	0549 20M	Rigid antenna VHF 2 D & M		0.661	57.87
A	K805 00M	VHF 2 KY 196 A 30 KING		3.825	22.83
A	K805 10M	VHF 2 KY 196 A 30 + KMA 24–02 KING		6.768	22.44
		23–14 – COM 3 installation			
A	K880 00M	UHF KTR909 KING		9.590	83.46

S/R/A/O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		23–60 – Static dischargers			
A	J884 00M	ESD protection		/	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		24 – ELECTRICAL POWER			
A	C875 00M	Firewall disconnects		1.367	0.00
		24–30 – DC generation			
R		Alternator 70A ALU 8421 PRESTOLITE/ELECTROSYSTEMS or LW 14324 LYCOMING (when air conditioning system installed, refer to ATA 21)		12.985	– 37.80
R		Battery G242–10AH GILL		26.962	93.70
R		Battery relay 70 117 221.5 ESSEX		0.772	87.40
R		Voltage regulator TB20 61215 P/N BOO 368.5 LAMAR		0.375	3.94
R		Pedestal electrical equipment TB20 61216		0.728	29.53
A	C839 00M	Converter 28 V – 14 V LT– 71A KGS		1.653	39.37
O	C861 00M	Battery G246–19AH GILL		41.446	94.09
O	C872 00M	Battery (at the front)		△1.653	1779.49
A	D689 00M	Ammeter 28 V		0.551	28.74
A	D907 00M	Voltmeter–ammeter indicator ELECTRONICS INTERNATIONAL		0.805	26.77
		24–40 – External power supply			
A	C519 30M	Ground power receptacle		2.271	90.55
A	C836 00M	Ground power receptacle		2.579	91.73
A	C836 10M	Ground power receptacle (With option C872 00M ”Battery (at the front)”)		3.682	49.61
A	C841 00M	Ground power extension (With options C835 00M or C836 00M)		4.740	91.73

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		24–50 – Distribution			
R		Standard circuit breakers panel TB20 61212		1.962	29.92
R		Printed circuits assembly on firewall TB20 61210 including fuses printed circuit, lights warning printed circuit, pitot and alternator output printed circuit		0.948	0.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		25 – EQUIPMENT AND FURNISHINGS			
		25–10 – Cockpit			
O	F778 00M	Leather seats assembly ”Grey 95” PMV with head–rests (F778 15M) : – Front seats (Qty 2) PMV – Rear seat PMV		 58.598 17.064	 49.21 84.65
O	F778 10M	Leather seats assembly ”Chanel 95” PMV with head–rests (F778 25M) : – Front seats (Qty 2) PMV – Rear seat PMV		 58.598 17.064	 49.21 84.65
A	F779 15M	Front head–rests ”Blue 90” (Qty 2)		3.417	51.18
A	F879 15M	Front head–rests ”Blue 95” (Qty 2) PMV		3.461	55.12
A	F879 25M	Front head–rests ”Ficelle 95” (Qty 2) PMV		3.461	55.12
A	F879 35M	Rear head–rests ”Blue 95” (Qty 2) PMV		3.461	90.55
A	F879 45M	Rear head–rests ”Ficelle 95” (Qty 2) PMV		3.461	90.55
O	067800 M	Leather seats assembly ”Grey” PMV with head–rests (067815 M) : – Front seats (Qty 2) PMV – Rear seat PMV		 48.060 19.555	 49.21 84.65
O	067810 M	Leather seats assembly ”Chanel” PMV with head–rests (067825 M) – Front seats (Qty 2) PMV – Rear seat PMV		 48.060 19.555	 49.21 84.65
A	067815 M	Leather head–rests ”Grey” (Qty 2)		3.086	55.12 or 90.55
O	067820 M	Leather seats assembly ”Grey” PMV with head–rests (067815 M) (Extended version) : – Front seats (Qty 2) PMV – Rear seat PMV		 48.060 19.555	 49.21 84.65

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	067825 M	Leather head–rests "Chanel" (Qty 2)		3.086	55.12 or 90.55
O	067830 M	Leather seats assembly "Chanel" PMV with head–rests (067825M) (Extended version) : – Front seats (Qty 2) PMV – Rear seat PMV		 48.060 19.555	 49.21 84.65
A	067915 M	Head–rests "Cendre" (Qty 2)		2.161	55.12 or 90.55
A	067925 M	Head–rests "Sable" (Qty 2)		2.161	55.12 or 90.55
A	067935 M	Head–rests "Blue 95" (Qty 2) PMV		2.161	55.12 or 90.55
A	067945 M	Head–rests "Ficelle 95" (Qty 2) PMV		2.161	55.12 or 90.55
A	067955 M	Rear head–rests "Blue 95" (Qty 2) PMV		3.461	90.55
A	067965 M	Rear head–rests "Ficelle 95" (Qty 2) PMV		3.461	90.55
		25–11 – Front seats			
R		Front seats TB10 74030		18.298	51.18
R		Front seats TB10 74095		23.622	51.18
R		Front seats TB10 74106x00/01		24.625	49.21
R		Front seats TB10 74106x02/03		25.055	49.21
O	F779 00M	Front seats "Blue 90" (Qty 2)		52.117	49.21
O	F879 00M	Front seats "Blue 95" (Qty 2) PMV		52.976	49.21
O	F879 10M	Front seats "Ficelle 95" (Qty 2) PMV		52.976	49.21

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
O	067900 M	Front seats ”Cendre” (Qty 2) with head–rests (067915 M)		45.194	49.21
O	067910 M	Front seats ”Sable” (Qty 2) with head–rests (067925M)		45.194	49.21
O	067940 M	Front seats ”Blue 95” (Qty 2) PMV with head–rests (067935 M)		45.194	49.21
O	067950 M	Front seats ”Ficelle 95” (Qty 2) PMV with head–rests (067945 M)		45.194	49.21
O	067980 M	Front seats ”Blue 95” (Qty 2) PMV with head–rests (067935 M)		52.271	49.21
O	067990 M	Front seats ”Ficelle 95” (Qty 2) PMV with head–rests (067945 M)		52.271	49.21
O	080000 M	L.H. or R.H. front seat back–off installation (Pre–MOD.89)		0.331	37.80
O	080010 M	L.H. front seat back–off installation (Post–MOD.89)		0.882	37.80
O	080020 M	R.H. front seat back–off installation (Post–MOD.89)		0.882	37.80
O	100140 M	Tilting front seat ”Blue 95”		18.300	49.21
O	100440 M	Tilting front seat ”Ficelle 95”		18.300	49.21
		25–12 – Rear bench			
R		Rear seat : Back + seating TB10 74027		13.448	84.65
R		Rear seat : Back + seating TB10 74107		14.616	84.65
O	F879 20M	Rear seat ”Blue 95” PMV		18.144	84.65
O	F879 30M	Rear seat ”Ficelle 95” PMV		18.144	84.65
O	F899 00M	Rear bench ”Blue 95” with arm–rest ”LUXE” (Post–MOD.90)		15.939	84.65
O	F899 10M	Rear bench ”Ficelle 95” with arm–rest ”LUXE” (Post–MOD.90)		15.939	84.65

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
O	067920 M	Rear seat ”Cendre” with head–rests (067915 M)		17.064	84.65
O	067930 M	Rear seat ”Sable” with head–rests (067925 M)		17.064	84.65
O	067960 M	Rear seat ”Blue 95” PMV with head–rests (067935 M)		17.064	84.65
O	067970 M	Rear seat ”Ficelle 95” PMV with head–rests (067945 M)		17.064	84.65
O	079900 M	Rear seat ”Cendre” with central arm–rest		13.338	84.65
O	079910 M	Rear seat ”Sable” with central arm–rest		13.338	84.65
O	079920 M	Rear seat ”Blue 95” PMV with central arm–rest		13.338	84.65
O	079930 M	Rear seat ”Ficelle 95” PMV with central arm–rest		13.338	84.65
		25–13 – Safety and harnesses belts			
R		Front seat belt TB10 79013 SECURAIGLON		2.646	47.24
R		Front seat belt TB10 79013 TRW REPA		2.646	47.24
R		Front seat belt TB10 79013 P/N 10.4022.000.002 ANJOU AERO		2.646	47.24
R		Rear seat belt TB10 79014 P/N 344.22.070.04.300 AIGLON		1.124	94.49
A	050210 M	3rd rear safety belt ”Black”		0.882	84.65
O	056320 M	Rear reel safety belt		2.646	106.30
A	063700 M	Rear seat shoulder harness (Qty 2)		2.249	94.49
A	064000 M	3rd rear reel safety belt		1.918	106.30
A	064100 M	3rd rear seat shoulder harness		1.124	94.49

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		25–14 – Central pedestal			
S		Lighter R.V.I : – Plug 5000 361 037 R.V.I – Fixed part 5000 361 635 R.V.I – Light 5000 462 170 R.V.I		0.154	37.80
S		Front ash–tray		0.882	43.31
S		Rear ash–tray		0.353	65.35
		25–15 – Upper duct			
S		Sun visor PLEXIGLAS		0.683	41.34
		25–60 – Emergency equipment			
A	F902 00M	Axe		2.535	37.40
A	F903 00M	Life jackets (Qty 4)		8.818	124.80
A	H881 00M	First aid case		4.409	90.95
		25–61 – Emergency locator transmitter			
A	25–001A	Emergency locator transmitter ELT 91 SOCATA P/N ELT 91A 2560 000 000 (TSO)		3.351	103.15
A	J871 00M	Emergency locator transmitter POINTER		2.756	103.54
A	J908 00M	Three–frequency emergency locator transmitter ELT 96 SOCATA (EUROCAE)		3.638	106.30
A	J924 00M	Emergency locator transmitter ELT 90 SOCATA (EUROCAE)		3.351	103.15
A	J931 00M	Emergency locator transmitter ELT 200 ARTEX (For export only)		2.866	103.15
A	J933 00M	Three–frequency emergency locator transmitter ELT 97 SOCATA (TSO)		3.638	106.30
A	051700 M	Emergency locator transmitter ELT 10 NARCO		3.307	119.29

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	051710 M	Emergency locator transmitter JOLLIET (aft baggage compartment)		3.086	119.29
A	051730 M	Emergency locator transmitter JOLLIET (forward baggage compartment)		3.086	109.45

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		26 – FIRE PROTECTION			
A	F823 00M	Cabin halon extinguisher FH 15N AREOFEU		4.409	37.80
A	F823 10M	Cabin halon extinguisher H1–10 AIR MAIP		4.850	37.80
A	F823 20M	Cabin halon extinguisher H1–10 AIR MAIP (with special support)		5.313	37.80
A	F883 00M	Cabin powder extinguisher AFT 15N AREOFEU		4.608	37.80
A	052800 M	Cabin fire extinguisher		2.822	36.22

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		27 – FLIGHT CONTROLS			
		27–20 – Yaw control			
		27–50 – Wing flaps (control)			
R		Flaps actuator TB20 61235 P/N 8308 AVIAC		5.534	80.71
R		Flaps actuator TB20 61201 P/N 700–238 LPMI		5.203	85.04
R		Flaps control selector TB20 61234		0.320	31.50
R		Flaps position indicator TB20 61232		0.132	31.50
R		Flaps relay + support TB20 61260 : – 2 relays HG2–24 VDC MATSUSHITA – 2 supports HG2 SS MATSUSHITA		 0.551 0.110	 78.35 78.35

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		28 – FUEL SYSTEM			
		28–10 – Fuel tanks			
A	058030 M	Ferry fuel tank (TB20 52925)		63.933	78.35
A	058040 M	Ferry fuel tank (TB20 52925)		63.933	78.35
		28–20 – Fuel supply			
R		Fuel electric pump TB20 61218 P/N 8120–H WELDON		2.425	24.80
R		Fuel electric pump TB20 61218 P/N B8120–H WELDON		2.425	24.80
R		Fuel selector/filter TB20 52026		1.301	44.49
		28–40 – Fuel indication			
O	C866 00M	Fuel low level warning		0.728	33.46

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		30 – ICE AND RAIN PROTECTION			
		30–09 – T.K.S. airframe deicing			
A	C687 00M	TKS ice protection systems (empty tank) (Not valid for U.S. aircraft)		40.565	74.80
A	C687 10M	TKS system (Specific for U.S. aircraft)		40.565	74.80
		30–60 – Propeller deicing			
A	C522 20M	Propeller deicing		9.545	–11.42
A	C522 30M	Propeller deicing		9.545	–11.42

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		31 – INDICATING/RECORDING SYSTEMS			
		31–10 – Control and indicating panels			
R		Engine and fuel controls TB20 76201		1.102	24.80
O	F634 00M	Raised radio console		3.131	23.62
		31–20 – Independent instruments			
A	D516 00M	Stop watch DODANE		0.441	35.43
A	D571 00M	Hourmeter DATCON		0.551	23.62
A	D638 00M	Digital chronometer (L.H. station) ASTROTECH		0.507	35.43
A	D638 20M	Digital chronometer (R.H. station) ASTROTECH		0.507	35.43
A	D680 00M	Quartz chronometer THOMMEN P/N Q18.945.22.28.1KB		0.485	35.43
A	D680 10M	Quartz chronometer THOMMEN P/N Q18.945.22.28.1KB (R.H. station)		0.485	35.43
A	D806 00M	Three–axis accelerometer		0.992	23.62
A	D829 00M	Mechanical chronometer THOMMEN P/N B18.945.22.28.1K		0.485	35.43
A	D829 10M	Mechanical chronometer THOMMEN P/N B18.945.22.28.1K (R.H. station)		0.485	35.43
A	D833 00M	Digital clock/chronometer LC2 ASTROTECH		0.331	23.62
A	D844 00M	Mechanical chronometer Type 11.1 BREGUET		0.441	35.43
O	D911 00M	Hourmeter "Flight duration" DATCON NOTE : Tachometer–Hourmeter, refer to ATA 77		0.661	31.50
		31–50 – Central warning systems			
R		Advisory panel TB20 61222 (if GPS installed, refer to ATA 34)		0.397	22.83

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
R		LDG / stall warning unit TB30 69030		0.529	86.61
A	C561 00M	Starter warning light		0.132	39.37
A	C850 00M	LDG GR hydraulic generator operation light		0.176	47.24
O	C900 00M	Advisory panel (extended) (Not valid for U.K. aircraft)		0.529	23.62
O	C900 10M	Advisory panel (extended) (Specific for U.K. aircraft)		0.529	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		32 – LANDING GEARS			
		32–30 – Extension and retraction			
R		LDG relay TB20 61261 P/N 03395–24 V–50 A CARTIER		0.573	70.87
R		LDG relay TB20 61279 P/N MS 24197–D1		1.499	70.87
		32–35 – Hydraulic generation			
R		LDG hydraulic generator TB20 61213 P/N HYH 5001 PRESTOLITE		8.818	73.23
R		LDG hydraulic generator TB20 61213 P/N HYH 5003 PRESTOLITE		8.818	73.23
R		LDG hydraulic generator TB20 61263 P/N 1117–04 LHC		10.582	73.23
R		LDG hydraulic generator TB20 61263 P/N 1117–05 LHC		10.582	73.23
R		LDG hydraulic generator TB20 61267 P/N 3939637177 COMMERCIAL HYDRAULICS		11.640	73.23
R		LDG hydraulic generator TB20 61267 P/N MC108 BI 19 AL4VT (637177) OILDYNE		11.640	73.23
R		LDG hydraulic generator TB20 61267 P/N 108 BI 19 SP AL4VT (641634) OILDYNE		11.640	73.23
		32–40 – Wheels and brakes			
R		Main LDG wheel assy (2) 40–84 CLEVELAND		5.688	57.48
R		Main LDG wheel assy (2) 40–84B CLEVELAND		5.820	61.42
R		Main LDG brake assy (2) 30–41B CLEVELAND		2.535	57.48
R		Main LDG tire (2) 15.6.00–6 6 PRTT DUNLOP		6.107	57.48
R		Main LDG tire (2) 15.6.00–6 6 PR GOODYEAR		6.107	57.48

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
R		Main LDG tire (2) 15.6.00–6 6 160TT MICHELIN		6.107	57.48
R		Main LDG tube (2) 15.6.00–6 DUNLOP		2.425	57.48
R		Main LDG tube (2) 6.00–6 DUNLOP		1.653	57.48
R		Main LDG tube (2) 15.6.00–6–6.00.6 GOODYEAR		1.653	57.48
R		Main LDG tube (2) TR20 P/N 092–500–0 MICHELIN		1.653	57.48
R		Main LDG tube (2) 15.6.00–6 TR GOODYEAR		1.653	57.48
R		Nose LDG wheel assy 40–77 B CLEVELAND		2.822	– 17.72
R		Nose LDG tire 5.00–5 6 PRTT DUNLOP		5.798	– 17.72
R		Nose LDG tire 5.00–5 6 120TT MICHELIN		5.798	– 17.72
R		Nose LDG tire 5.00–5 6 PR P/N 505C61.8 GOODYEAR		5.798	– 17.72
R		Nose LDG tube 5.00–5 DUNLOP		1.455	– 17.72
R		Nose LDG tube TR67A P/N 092–308–0 MICHELIN		1.455	– 17.72
R		Nose LDG tube 5.00–5 TR67 GOODYEAR		1.455	– 17.72
A	052100 M	Braking control (R.H. post)		3.307	11.81
		32–60 – Position indicating system and alarms			
R		LDG configuration and control panel TB20 61202		0.309	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		33 – LIGHTS			
		33–10 – Cockpit			
S		Rear cabin lighting TB20 64200		0.507	65.35
S		Instrument panel lighting TB20 64201		0.485	23.62
S		Front cabin lighting (emerg.) TB20 64200		0.220	44.09
A	E588 00M	Maps reading light		0.176	25.59
A	E873 00M	Emergency lighting system		4.079	104.72
		33–40 – External lighting			
S		Landing light G.E. 4591		0.353	35.43
S		Taxi light G.E. 4626		0.353	35.43
S		L.H. navigation light 3131 LABINAL		0.419	34.65
S		R.H. navigation light 3133 LABINAL		0.419	34.65
S		L.H. navigation light W1250 PR WHELEN		0.441	34.65
S		R.H. navigation light W1250 PG WHELEN		0.441	34.65
S		Rear navigation light 3175 LABINAL		0.198	239.76
S		Rear navigation light A555A–V–28V WHELEN		0.132	239.76
A	E537 00M	Strobe light JPC on vertical stabilizer		1.874	145.67
A	E537 10M	Strobe lights JPC on vertical stabilizer and under fuselage		3.197	140.55
A	E537 20M	Strobe light JPC on vertical stabilizer (red glass)		1.874	145.67
A	E824 00M	Anticollision lights WHELEN (wing tips) A490A TS DF 14–28 – Light A625		5.423	107.48

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	E824 10M	Anticollision lights WHELEN (wing tips) A490A TS CF 14–28 – Light A625		5.423	107.48
A	E824 20M	Anticollision lights WHELEN (wing tips) A490A TS DF 14–28 – Light A625D		5.423	107.48
A	E824 30M	Anticollision lights WHELEN (wing tips) A490A TS CF 14–28 – Light A625D		5.423	107.48
A	E824 40M	Anticollision lights WHELEN (wing tips) A490A TS CF 14–28 – Light A625 P/N 01–077058–15		5.423	107.48
O	E826 00M	Strobe light WHELEN (tail) A490A TS DF 14–28 – Light A500 ASP		2.094	145.67
O	E826 10M	Strobe light WHELEN (tail) A490A TS CF 14–28 – Light A500 SP		2.094	145.67
O	E826 20M	Strobe light WHELEN (tail) A490A TS CF 14–28 – Light A500A		2.094	145.67
O	E848 00M	Light control box JX 128 FLASHELEK		0.551	55.31

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34 – NAVIGATION			
		34–10 – Flight environment data			
		34–11 – Air data systems			
R		Altimeter TB20 76222 P/N 5934 PD1 or PD3 Code A253 UNITED INSTRUMENTS		0.816	25.59
R		Altimeter TB20 76222 P/N 5934 PD1 or PD3 Code A187 (with light tray 28 VDC) UNITED INSTRUMENTS		0.816	25.59
R		True airspeed indicator with integrated lighting TB20 76223 P/N 8125 Code B588 (with light tray 28 VDC) UNITED INSTRUMENTS		0.728	24.80
R		True airspeed indicator with integrated lighting TB20 76223 P/N 8125 Code B605 UNITED INSTRUMENTS		0.728	24.80
R		Vertical speed indicator TB20 76224 P/N 7000 Code C85 (with light tray 28 VDC) UNITED INSTRUMENTS		1.014	23.62
R		Vertical speed indicator TB20 76224 P/N 7000 Code C83 UNITED INSTRUMENTS		1.014	23.62
O	C515 10M	Heated pitot (Not valid for Russian & Ukrainian aircraft)		1.190	53.15
A	C635 00M	2nd heated pitot (R.H. wing)		1.190	47.24
A	D681 00M	2nd altimeter 20000 ft		1.433	19.69
A	D803 00M	Installation of 2nd airspeed indicator		1.213	23.62
A	D811 00M	Alti–coder KE 127 KING		1.433	17.72
A	D830 00M	Alti–coder 20000 ft TRANSCALL		1.433	17.72
A	D831 00M	Alti–coder 30000 ft TRANSCALL		1.433	17.72
A	D832 00M	2nd altimeter 35000 ft		1.433	19.69

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	D897 00M	2nd vertical speed indicator (R.H. station) P/N 7000 C83 UNITED INSTRUMENTS		1.521	23.62
A	D915 00M	Metric altimeter # 3 P/N 5940 UNITED INSTRUMENTS		0.926	23.62
O	K608 20M	Alti–coder KEA 130A (35000 ft) KING		1.764	21.65
O	K608 30M	Alti–coder 20000 ft UNITED INSTRUMENTS		1.764	21.65
A	N846 00M	Altitude encoder AR850 NARCO		1.323	19.69
A	051100 M	Alternate static source (in cabin)		0.331	23.62
		34–13 – Outside temperature			
A	D804 00M	Outside air temperature indicator (standard connector on sensor)		0.551	23.62
A	D804 10M	Outside air temperature indicator (water–tight connector on sensor)		0.551	23.62
A	D910 00M	Outside air temperature indicator (standard connector on sensor) DAVTRON		0.551	23.62
A	D910 10M	Outside air temperature indicator (water–tight connector on sensor) DAVTRON		0.551	23.62
A	D910 20M	Outside air temperature indicator (water–tight connector on sensor) DAVTRON		0.551	23.62
		34–20 – Attitude and direction			
		34–21 – Heading reference system			
A	D683 40M	Air–driven heading indicator AID		2.888	21.65
A	D914 00M	Heading gyro indicator SIGMA–TEK (on L.H. instrument panel)		2.668	23.62
A	D914 10M	Heading gyro indicator SIGMA–TEK (on R.H. instrument panel)		2.976	19.69
A	D922 00M	Electric heading gyro indicator 205–1BL		3.219	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K660 00M	HSI assy KING without heading recopy		12.720	67.32
A	K660 10M	HSI assy KING with heading recopy capability		12.720	67.32
A	K660 20M	HSI assy KING with heading recopy capability (30/400 Hz) with vertical KA 51B		12.720	67.32
A	K660 30M	HSI assy KING with heading recopy capability (30/400 Hz) with horizontal KA 51B		12.720	67.32
A	K660 40M	HSI assy KING with heading recopy capability (30/400 Hz) (lighting control at R.H. station)		12.720	67.32
A	K660 50M	HSI assy KING with horizontal KA 51B (if GPS KLN 90B installed)		12.720	67.32
A	K660 60M	HSI assy KING with vertical KA 51B (if GPS KLN 90B installed)		12.720	67.32
A	067140 M	Heading indicator KG 107		2.690	20.47
		34–22 – Turn and bank indication			
R		Slip indicator Type 57 AIR PRECISION		0.110	23.62
R		Slip indicator P/N 35216 WINTER		0.110	23.62
O	D691 00M	Turn–and–bank indicator UNITED INSTRUMENTS		1.675	23.62
O	D697 00M	Electrical turn coordinator CASTLEBERRY		1.698	23.62
A	D818 10M	Slip indicator (R.H. station) UNITED INSTRUMENTS		1.675	23.62
		34–23 – Magnetic compass			
R		Compass TB20 76229 P/N C2400 L 4P (28 V) AIRPATH		0.595	20.47
		34–24 – ADI and standby horizon			
A	34–001A	Electrical attitude gyro indicator 1100–28L(5F) BFG (Not valid for U.K. aircraft)		2.866	24.41

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	34–001B	Electrical attitude gyro indicator 1100–28LK(5F) BFG (Specific for U.K. aircraft)		2.866	24.41
A	34–001C	Electrical attitude gyro indicator 1100–28LS(5F) BFG (on L.H. instrument panel) (Not valid for U.K. aircraft)		2.866	24.41
A	D683 00M	Attitude gyro and heading gyro indicators AID (Not valid for U.K. aircraft)		5.093	21.65
A	D683 10M	Attitude gyro and heading gyro indicators AID (Specific for U.K. aircraft)		5.093	21.65
A	D683 20M	Attitude gyro indicator AID (Not valid for U.K. aircraft)		2.205	21.65
A	D802 00M	Electrical attitude gyro indicator 305–2BL (on L.H. instrument panel) (Not valid for U.K. aircraft)		2.690	23.62
A	D802 10M	Electrical attitude gyro indicator 305–2BL–S (Not valid for U.K. aircraft)		2.690	23.62
A	D802 20M	Electrical attitude gyro indicator 305–2BL–S (Not valid for U.K. aircraft)		2.690	23.62
A	D802 30M	Electrical attitude gyro indicator 305–2BL–SK AID (Specific for U.K. aircraft)		2.690	23.62
A	D802 40M	Electrical attitude gyro indicator 305–2BL (on R.H. instrument panel) (Not valid for U.K. aircraft)		2.690	23.62
A	D802 50M	Electrical attitude gyro indicator 305–2BL–K BFG (Specific for U.K. aircraft)		2.690	23.62
A	D802 60M	Electrical attitude gyro indicator B305–2BL (on R.H. instrument panel) (Not valid for U.K. aircraft)		2.690	23.62
A	D867 00M	Electric attitude gyro indicator RCA26 BK–12 (R.H. seat) RC ALLEN (Not valid for U.K. aircraft)		2.315	21.65
A	D913 00M	Attitude gyro indicator SIGMA–TEK (Not valid for U.K. aircraft)		2.161	23.62
A	D913 10M	Attitude gyro indicator SIGMA–TEK (Specific for U.K. aircraft)		2.161	23.62

S/R/A/O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	067130 M	Attitude gyro indicator KG 258 for KAP 100 (Not valid for U.K. aircraft)		3.086	20.47
A	067131 M	Attitude gyro indicator KG 258 for KAP 100 (Specific for U.K. aircraft)		3.086	20.47
A	067230 M	Attitude gyro indicator KG 258 for KAP 150 (Not valid for U.K. aircraft)		3.086	20.47
A	067231 M	Attitude gyro indicator KG 258 for KAP 150 (Specific for U.K. aircraft)		3.086	20.47
A	067330 M	Attitude gyro indicator with Flight Director KI 256 for KFC 150		3.285	20.47
		34–25 – Radio magnetic indication			
A	K584 00M	RMI KI 22900 (without switching) KING		3.086	21.65
A	K584 10M	RMI KI 22900 (with switching) KING		3.307	21.65
A	K819 00M	RMI KNI 582 KING		3.417	21.65
		34–28 – Electronic flight instrumentation system			
A	K891 00M	Radio/navigation assy KING with EHI 40 EFIS system KING (EHSI only) : – KMA 24H70 audio control box – VHF1 VOR/ILS KX 165–25 – VHF2 VOR/ILS KX 165–25 with KI 206 indicator – DME KN 63 – ADF KR 87 – ATC KT 76A – MARKER KR 21 – RMI KI 229 – GPS KLN 90A – KCS 305 gyro unit The EHI 40 part components are as follows : – SG 465 symbol generator – ED 461 EHSI indicator – KN 40 adapter		98.325	65.75

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K923 00M	Radio/navigation assy KING with EHI 40 EFIS system KING (EHSI only) : – KMA 24H70 audio control box – VHF1 VOR/ILS KX 165–25 – VHF2 VOR/ILS KX 165–25 with KI 206 indicator – DME KN 63 – ADF KR 87 – MARKER KR 21 – RMI KI 229 – GPS KLN 90B – KCS 305 gyro unit The EHI 40 part components are as follows : – SG 465 symbol generator – ED 461 EHSI indicator – KN 40 adapter		94.577	68.11
		34–30 – Landing and taxiing aids			
		34–31 – Marker			
A	K676 00M	Marker receiver indicator KR 21 KING		1.257	21.65
		34–40 – Independent position determining			
		34–41 – Stormscope			
A	J820 00M	Stormscope WX 1000 BFG (on panel strip)		15.432	83.07
A	J820 10M	Stormscope WX 1000 BFG (on R.H. instrument panel)		15.432	83.07
A	J828 00M	Stormscope WX 1000 + BFG		15.432	83.07
A	J828 10M	Stormscope WX 1000 + BFG (with converter assy)		15.432	83.07
A	J918 00M	Stormscope WX–900 BFG		4.806	85.43

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34–50 – Dependent position determining			
		34–51 – NAV 1 installation			
A	K654 00M	Receiver VOR KN 53 NAV 1 VOR/ILS KING		5.026	68.11
A	K654 10M	Receiver VOR KN 53 NAV 1 VOR/LOC KING		6.790	55.12
A	K662 00M	NAV system KNS 81–10 KING		7.496	52.76
A	K662 20M	NAV system KNS 81–12 KING		7.496	52.76
A	K663 00M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 with audio amplifier (with VHF capability) KING		11.486	35.43
A	K663 10M	VHF assy COM1/NAV1 (VOR/ILS) KX 155 (with VHF capability) KING		11.596	48.82
A	K663 40M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 (with VHF capability) KING		11.486	35.43
A	K663 50M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 (without VHF capability) KING		8.091	30.71
A	K663 60M	VHF assy COM1/NAV1 (VOR/ILS) KX 155 (without VHF capability) KING		8.201	49.21
A	K663 70M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 with audio amplifier (without VHF capability) KING		8.091	30.71
A	K666 00M	VHF 1 VOR/LOC KX165–25 KING		12.566	39.37
A	K666 10M	VHF 1 VOR/ILS KX165–25 KING		14.087	35.43
A	K667 00M	NAV system KNS 80 KING		8.598	54.33
A	K812 00M	VHF assy COM1/NAV1 (VOR/ILS) KX 165 (with VHF capability) KING		11.118	49.61
A	K812 20M	VHF assy COM1/NAV1 (VOR/LOC) KX 165 (with VHF capability) KING		11.552	35.43
A	K812 50M	VHF assy COM1/NAV1 (VOR/LOC) KX 165 (without VHF capability) KING		8.157	30.71

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K812 60M	VHF assy COM1/NAV1 (VOR/ILS) KX 165 (without VHF capability) KING		7.782	50.39
A	K813 00M	VOR/ILS indicator KI 206–04 KING		1.631	21.65
A	K813 10M	VOR/ILS indicator KI 206–05 KING		1.764	21.65
A	K814 00M	VOR/ILS indicator KI 204 KING		1.918	21.65
A	K847 00M	Converter VOR/LOC KN 72 KING		1.653	43.31
		34–52 – NAV 2 installation			
A	K654 20M	Receiver VOR KN 53 NAV 2 VOR/ILS KING		5.379	63.78
A	K654 30M	Receiver VOR KN 53 NAV 2 VOR/LOC KING		6.967	59.05
A	K663 20M	VHF assy COM2/NAV2 (VOR/LOC) KX 155 KING		7.760	24.80
A	K663 30M	VHF assy COM2/NAV2 (VOR/ILS) KX 155 KING		6.900	24.80
A	K666 20M	VHF 2 VOR/LOC KX165–25 KING		5.335	39.37
A	K666 30M	VHF 2 VOR/ILS KX165–25 KING		8.818	48.82
A	K812 10M	VHF assy COM2/NAV2 (VOR/ILS) KX 165 KING		6.482	24.80
A	K812 30M	VHF assy COM2/NAV2 (VOR/LOC) KX 165 KING		7.716	24.80
A	K813 00M	VOR/ILS indicator KI 206–04 KING		1.631	21.65
A	K813 10M	VOR/ILS indicator KI 206–05 KING		1.764	21.65
A	K814 00M	VOR/ILS indicator KI 204 KING		1.918	21.65
		34–53 – Transponder			
A	K656 00M	ATC KT 76 A KING on radio console		3.682	20.08

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K656 10M	ATC KT 76 A KING on R.H. panel strip (with support) (when option C872 00M "Battery at the front" installed, refer to ATA 24)		3.836	21.65
A	K656 20M	ATC KT 76 A KING on R.H. panel strip (with support)		3.836	21.65
A	K656 30M	ATC KT 76 A KING on R.H. panel strip (with support) (EHSI version)		3.836	21.65
A	K876 00M	Transponder ATC KT 71 KING		4.630	22.44
A	K876 10M	Transponder ATC KT 71 KING (on R.H. panel strip)		4.630	22.44
A	K929 00M	Transponder ATC KT 76C KING (on R.H. panel strip)		3.527	23.62
		34–54 – Automatic Direction Finder (ADF)			
A	K655 00M	ADF KR 87.01/04 (Indicator KI 227.00) KING (on radio console)		8.730	90.16
A	K655 10M	ADF KR 87.01/04 (Indicator KI 227.01) KING (on radio console)		8.730	90.16
A	K655 20M	ADF KR 87 KING		8.025	96.06
A	K655 40M	ADF KR 87 (Indicator KI 227.01) KING (on R.H. panel strip)		8.730	90.16
A	K917 00M	ADF2 KR 87 KING		9.436	94.49
		34–55 – DME installation			
A	K657 00M	DME KN 62A KING		3.682	21.26
A	K657 10M	DME KN 64 KING		3.682	21.26
A	K664 00M	DME KN 63 KING		5.489	40.94

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34–57 – Global Positioning System (GPS)			
A	34–500A	Color Skymap capability CM 2000 SKYFORCE		0.970	30.51
A	J870 00M	GPS 100 AVD–140 GARMIN interfaced with HSI and A/P (VFR use only), including advisory panel TB20 61760 (For export only)		4.145	22.44
A	J870 10M	GPS 100 AVD–140 GARMIN "Stand alone"		3.593	22.44
A	J870 20M	GPS 100 AVD–140 GARMIN "Stand alone", with audio attenuation, including extended advisory panel		3.593	22.44
A	J870 30M	GPS 100 AVD–140 GARMIN interfaced with HSI and A/P, with audio attenuation (VFR use only), including advisory panel (For export only)		4.145	22.44
A	J870 40M	GPS 100 AVD–140 GARMIN interfaced with HSI, with audio attenuation (VFR use only), including advisory panel (For export only)		4.145	22.44
A	J925 00M	GPS 150 GARMIN "Stand alone"		4.696	25.60
A	K860 00M	GPS KLN 90A KING "Stand alone"		8.466	22.44
A	K860 10M	GPS KLN 90A KING interfaced with HSI and A/P, with RMI		9.171	21.65
A	K860 20M	GPS KLN 90A KING "Stand alone" with extended advisory panel		8.466	22.44
A	K860 30M	GPS KLN 90A KING interfaced with HSI, with RMI		9.171	21.65
A	K860 40M	GPS KLN 90A KING interfaced with HSI and A/P, without RMI (For export only)		9.171	21.65

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K899 00M	GPS KLN 90B KING interfaced with HSI and A/P, without RMI (KA91 antenna) (For export only)		9.943	21.26
A	K899 10M	GPS KLN 90B KING interfaced with HSI and A/P, without RMI (KA92 antenna) (For export only)		9.943	21.26
A	K899 30M	GPS KLN 90B KING interfaced with HSI and A/P, with RMI (KA92 antenna) (English–speaking countries)		9.943	21.26
A	K920 00M	GPS KLN 89B KING "Stand alone"		4.519	25.20
A	K926 00M	GPS KLN 89B KING interfaced with HSI KI 525A (KCS 55A compass system)		5.578	22.83
A	K927 00M	GPS KLN 90B KING interfaced with HSI and A/P, without RMI (KA92 antenna)		9.943	21.26

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		35 – OXYGEN			
A	F921 00M	Oxygen constant–flow masks with radio (crew) (Qty 2) PURITAN BENNETT		0.705	55.12
A	061710 M	Oxygen system equipment EROS		31.085	115.35
A	061800 M	Oxygen mask with radio (pilot) EROS		2.205	55.12
A	061900 M	Oxygen mask without radio (passenger) EROS		1.323	90.55
A	062100 M	Oxygen system equipment (pressure–demand type) PURITAN BENNETT		32.187	115.35
A	062101 M	Oxygen front head–rests "Blue 90" (Qty 2) PMV		3.968	55.12
A	062102 M	Oxygen front head–rests "Blue 95" (Qty 2) PMV		3.968	55.12
A	062110 M	Oxygen system equipment PURITAN BENNETT		32.187	115.35
A	062112 M	Oxygen front head–rests "Ficelle 95" (Qty 2) PMV		3.968	55.12
A	062115 M	Oxygen system equipment (constant–flow type) PURITAN BENNETT		32.187	115.35
A	062121 M	Oxygen rear head–rests "Blue 90" (Qty 2) PMV		3.968	90.55
A	062122 M	Oxygen rear head–rests "Blue 95" (Qty 2) PMV		3.968	90.55
A	062125 M	Oxygen front head–rest "Blue 95" PMV		2.469	55.12
A	062132 M	Oxygen rear head–rests "Ficelle 95" (Qty 2) PMV		3.968	90.55
A	062135 M	Oxygen front head–rest "Ficelle 95" PMV		2.469	55.12
A	062142 M	Oxygen leather head–rests "Grey 95" (Qty 2)		4.189	55.12 or 90.55
A	062145 M	Oxygen rear head–rest "Blue 95" PMV		2.469	90.55

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	062152 M	Oxygen leather head–rests ”Chanel 95” (Qty 2)		4.189	55.12 or 90.55
A	062155 M	Oxygen rear head–rest ”Ficelle 95” PMV		2.469	90.55
A	062160 M	Oxygen head–rest ”Cendre” PMV		2.469	55.12 or 90.55
A	062170 M	Oxygen head–rest ”Sable” PMV		2.469	55.12 or 90.55
A	062180 M	Oxygen leather head–rest ”Grey” PMV		3.527	55.12 or 90.55
A	062190 M	Oxygen leather head–rest ”Chanel” PMV		3.527	55.12 or 90.55
A	062200 M	Oxygen pressure–demand type mask with radio (crew) PURITAN BENNETT		1.764	55.12
A	062300 M	Oxygen constant–flow mask without radio (rear passenger) PURITAN BENNETT		0.529	90.55

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		37 – VACUUM			
		37–11 – Distribution (normal)			
A	A816 00M	Vacuum system (Pump AIRBORNE 211CC or 215CC)		4.784	0
A	A904 00M	Vacuum pump SIGMA–TEK with filter		5.291	0.79
A	A904 10M	Vacuum pump SIGMA–TEK with filter (when stormscope installed, refer to ATA 34)		5.291	0.79
A	067150 M	Vacuum system (without attitude gyro indicator, nor heading, nor HSI)		2.579	10.24
		37–12 – Distribution (emergency)			
A	C632 00M	Auxiliary dry air pump		12.456	30.31
		37–20 – Indicating			
A	063100 M	Vacuum system warning light		0.198	0.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		52 – DOORS			
		52–10 – Access doors			
A	H889 00M	Door stop system (metallic doors)		1.653	49.21
		52–40 – Inspection doors			
A	H882 00M	Doors (Qty 2) on lower engine cowl		0.441	– 26.30

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		53 – FUSELAGE			
A	B896 00M	Tail cone protection		0.661	215.67
A	H885 00M	Centering cup jack rest (convex contact area)		/	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		56 – WINDOWS			
S		Colourless windows assy : – Windshield TB21 24001 – Door windows TB10 25030 – Rear side windows TB10 22030		27.558 11.023 8.598 7.937	53.15 27.56 55.12 86.61
O	058520 M	Tinted windows assy : – Windshield TB21 24001 – Door windows TB10 25030 – Rear side windows TB10 22030		27.558 11.023 8.598 7.937	53.15 27.56 55.12 86.61
A	056200 M	L.H. little window		0.750	39.37
A	056210 M	R.H. little window		0.750	39.37
A	056220 M	L.H. tinted little window		0.750	39.37
A	056230 M	R.H. tinted little window		0.750	39.37
A	F868 00M	Ventilation scoops		0.220	79.53

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		61 – PROPELLER			
R		Propeller HC–C2YK–1BF/F 8477–4 HARTZELL		55.115	– 47.64
		61–20 – Controls			
R		Propeller governor M210 681 WOODWARD		2.645	– 39.37
R		Propeller governor C210 761 WOODWARD		2.645	– 39.37
R		Propeller governor F210 761 WOODWARD		2.645	– 39.37

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		71 – POWER PLANT			
		71–60 – Air inlet			
A	059120 M	2nd Air filter		0	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		72 – PISTON ENGINE			
R		Engine IO–540–C4D5D LYCOMING with starter and magneto		438.715	– 25.59
O	A865 00M	Engine IO–540–C4B5D LYCOMING with starter, magneto and vibrator :		439.377	– 25.59
		– Magneto selector P/N 10.357210–1 TCM		/	/
		– Starting vibrator P/N 10.382808–24 TCM		0.661	4.72
		– Dual magneto P/N 10.785146–106 TCM		11.508	– 9.06

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		73 – FUEL SYSTEM AND CONTROLS			
		73–30 – Indicating system			
A	D821 00M	Flowmeter FT 10 or FC 10 (litres) ARNAV		1.720	29.53
A	D821 10M	Flowmeter FT 10 or FC 10 (gallons) ARNAV		1.720	29.53
A	D838 00M	Fuel flow totalizer (l/h) FT 101A HOSKINS		1.720	29.53
A	D838 10M	Fuel flow totalizer (Gal/h) FT 101A HOSKINS		1.720	29.53
A	D905 00M	Digital fuel management system SHADIN		1.157	33.46
A	D905 30M	Digital fuel management system SHADIN (EHSI coupled)		1.157	33.46

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		74 – IGNITION			
		74–10 – Electric generation system			
R		Dual magneto D6LN 3000 BENDIX		11.508	– 9.06
R		Dual magneto D6LN 2031 BENDIX		11.508	– 9.06

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		77 – ENGINE INDICATING			
		77–10 – Power			
R		Tachometer TB20 76820 LMI NORIS R80 VVS P/N LM 81		1.014	25.59
R		Manifold pressure – fuel flow/pressure TB20 76220 P/N 6331 Code H132 (with light tray 28 VDC) UNITED INSTRUMENTS		0.948	25.59
R		Manifold pressure – fuel flow/pressure TB20 76220 P/N 6331 Code H139 UNITED INSTRUMENTS		0.948	25.59
O	D862 00M	Tachometer–Hourmeter NRF 80 P/N LM 02 LMI		0.860	23.62
		77–20 – Temperature			
A	D536 00M	Exhaust gas temperature (EGT) ALCOR		0.882	21.65
A	D685	EGT/CHT – Probe on all cylinders		3.307	3.94
A	D685 00M	EGT/CHT – Probe on cylinder No. 1		1.323	19.69
A	D906 00M	EGT/CHT multiple indicator EDM 700 6C JP INSTRUMENT		3.593	– 1.18

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		78 – EXHAUST			
A	A888 00M	Low noise exhaust		19.841	15.75

S/R/A/O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		79 – LUBRICATION			
		79–10 – Storage			
A	065820 M	Oil drain door		0.220	– 25.59
		79–20 – Distribution			
R		Oil cooler 20006A NDM		3.086	– 14.17
A	A886 00M	2nd oil cooler		4.079	– 13.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		80 – STARTING			
R		Starter MHB 4016 PRESTOLITE/ELECTROSYSTEMS or LW 15572 LYCOMING		17.990	– 39.37
R		Starter 31B 21064 LYCOMING		11.376	– 39.37
R		Starter relay CE 1971 060 F PARIS RHONE		1.499	87.40

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		01 – SPECIFIC OPTIONAL EQUIPMENT			
A	H615 20M	Additional equipment for IFR France "Grey"		/	/
A	H616 20M	Additional equipment for night VFR France "Grey"		0.441	25.59

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		21 – ENVIRONMENTAL SYSTEM			
		21–40 – Heating			
S		Radio console forced ventilation TB20 73805		1.543	12.99
A	F822 20M	Forced ventilation, rear passengers VETUS		2.756	136.61
		21–50 – Air conditioning			
A O	F874 00M	Air conditioning system KEITH with alternator 70A LW 14363 LYCOMING		67.000 13.000	72.83 – 37.80
A O	F874 10M	Reinforced air conditioning system KEITH with alternator 70A LW 14363 LYCOMING		68.210 13.000	72.83 – 37.80

S/R/A/O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		22 – AUTO FLIGHT			
		22–12 – Autopilot			
A	D675 00M	Altitude and vertical speed preselector KAS 297B KING		1.764	21.65
A	D675 10M	Altitude and vertical speed preselector KAS 297B KING (on R.H. instrument panel)		1.764	21.65
A	D675 20M	Altitude and vertical speed preselector KAS 297B KING (on radio console)		1.764	21.65
A	D675 30M	Altitude and vertical speed preselector KAS 297B KING (EHSI version) (on radio console)		1.764	21.65
A	G668 00M	A/P KAP 100 KING		11.442	35.43
A	G668 10M	A/P KAP 100 KING with electrical pitch trim		17.659	67.72
A	G669 00M	A/P KAP 150 KING		21.363	76.38
A	G670 00M	A/P KFC 150 KING		21.561	75.59
A	G810 00M	Remote A/P modes annunciator KA 185–03 for KAP 150		0.661	23.62
A	G810 10M	Remote A/P modes annunciator KA 185–01 for KFC 150		0.661	23.62
A	G892 10M	A/P KFC 150 KING with EFIS included in K923 00M option (refer to ATA 34)		21.958	77.95
A	G892 20M	A/P KAP 150 KING with EFIS included in K923 00M option (refer to ATA 34)		21.958	77.95

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		23 – COMMUNICATIONS			
		23–10 – Speech communications			
		23–11 – VHF capability			
s		VHF/COM capability TB20 65216 : – Loud–speaker – Hand microphone – Radio master switch		3.219	45.27
A	23–001A	Audio selector/Intercom system PMA 7000MS PS ENGINEERING		3.814	26.77
A	J912 00M	Boom microphone headset H10–13–4 DAVID CLARK		0.838	55.12
A	J928 00M	Boom microphone headset HMEC 25–KA SENNHEISER : Pilot and front passenger Rear passengers		 0.661 0.661	 55.12 94.49
A	J928 10M	Boom microphone headset HMEC 25–KAS SENNHEISER : Pilot and front passenger Rear passengers		 0.661 0.661	 55.12 94.49
A	K807 00M	Audio control box KMA 24H52 KING with interphone		2.205	27.56
A	K809 00M	Audio control box KMA 24H70 KING with audio selector threshold (4 transmitters/receivers)		2.381	31.50
A	K809 10M	Audio control box KMA 24H71 KING with audio selector threshold (5 transmitters/receivers)		2.381	31.50
A	K815 10M	Audio selection box KMA 24–02 KING		2.910	22.44
A	0523 00M	Boom microphone headset H10–30 DAVID CLARK		1.190	55.12

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		23–12 – COM 1 installation			
S		Faired rigid antenna VHF 1 D & M		0.661	127.17
A	K805	VHF 1 KY 196 A 30 KING		3.858	18.11
		23–13 – COM 2 installation			
S		Faired rigid antenna VHF 2 D & M		0.661	57.87
A	K805	VHF 2 KY 196 A 30 KING		3.825	22.83
		23–14 – COM 3 installation			
A	K880 00M	UHF KTR909 KING		9.590	83.46
		23–60 – Static dischargers			
A	J884 00M	ESD protection		/	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		24 – ELECTRICAL POWER			
A	C875 00M	Firewall disconnects		1.367	0.00
		24–30 – DC generation			
R		Alternator 70A ALU 8421 PRESTOLITE/ELECTROSYSTEMS or LW 14324 LYCOMING (when air conditioning system installed, refer to ATA 21)		12.985	– 37.80
R		Battery G242–10AH GILL		26.962	93.70
R		Battery relay 70 117 221.5 ESSEX		0.772	87.40
R		Voltage regulator TB20 61215 P/N BOO 368.5 LAMAR		0.375	3.94
R		Pedestal electrical equipment TB20 61216		0.728	29.53
A	C839 00M	Converter 28 V – 14 V LT– 71A KGS		1.653	39.37
O	C861 00M	Battery G246–19AH GILL		41.446	94.09
A	D689 00M	Ammeter 28 V		0.551	28.74
A	D907 00M	Voltmeter–ammeter indicator ELECTRONICS INTERNATIONAL		0.805	26.77
		24–40 – External power supply			
S		Ground power receptacle TB20 61840		2.579	91.73
A	C841 00M	Ground power extension		4.740	91.73

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		24–50 – Distribution			
R		Standard circuit breakers panel TB20 61212		1.962	29.92
R		Printed circuits assembly on firewall TB20 61210 including fuses printed circuit, lights warning printed circuit, pitot and alternator output printed circuit		0.948	0.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		25 – EQUIPMENT AND FURNISHINGS			
		25–10 – Cockpit			
O	25–003A	Leather seats assembly with head–rests : – Front seats (Qty 2) PMV – Rear seat PMV		 55.115 19.621	 50.20 84.65
		25–11 – Front seats			
R		Front seats with head–rests TB10 74203		52.029	50.20
		25–12 – Rear bench			
R		Rear seats with head–rests TB10 74204		18.298	84.62
		25–13 – Safety and harnesses belts			
R		Front seat belt TB10 79013 P/N 10.4022.000.002 ANJOU AERO		2.646	47.24
S		Rear reel safety belt TB10 79000		2.646	106.30
A	064000 M	3rd rear reel safety belt		1.918	106.30
		25–14 – Central pedestal			
S		Lighter R.V.I : – Plug 5000 361 037 R.V.I – Fixed part 5000 361 635 R.V.I – Light 5000 462 170 R.V.I		0.154	37.80
S		Front ash–tray		0.882	43.31
S		Rear ash–tray		0.353	65.35
		25–15 – Upper duct			
S		Sun visor PLEXIGLAS		0.683	41.34

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		25–60 – Emergency equipment			
A	F902 00M	Axe		2.535	37.40
A	F903 00M	Life jackets (Qty 4)		8.818	124.80
A	H881 00M	First aid case		4.409	90.95
		25–61 – Emergency locator transmitter			
A	25–001A	Emergency locator transmitter ELT 91 SOCATA P/N ELT 91A 2560 000 000 (TSO)		3.351	103.15
A	J871 00M	Emergency locator transmitter POINTER		2.756	103.54
A	J908 00M	Three–frequency emergency locator transmitter ELT 96 SOCATA (EUROCAE)		3.638	106.30
A	J924 00M	Emergency locator transmitter ELT 90 SOCATA (EUROCAE)		3.351	103.15
A	J931 00M	Emergency locator transmitter ELT 200 ARTEX (For export only)		2.866	103.15
A	J933 00M	Three–frequency emergency locator transmitter ELT 97 SOCATA (TSO)		3.638	106.30
A	051730 M	Emergency locator transmitter JOLLIET (forward baggage compartment)		3.086	109.45

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		26 – FIRE PROTECTION			
A	F823 00M	Cabin halon extinguisher FH 15N AREOFEU		4.409	37.80
A	F823 10M	Cabin halon extinguisher H1–10 AIR MAIP		4.850	37.80
A	F823 20M	Cabin halon extinguisher H1–10 AIR MAIP (with special support)		5.313	37.80
A	F883 00M	Cabin powder extinguisher AFT 15N AREOFEU		4.608	37.80

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		27 – FLIGHT CONTROLS			
		27–50 – Wing flaps (control)			
R		Flaps actuator TB20 61203 P/N 700–238 LPMI		5.203	85.04
R		Flaps control selector TB20 61234		0.320	31.50
R		Flaps position indicator TB20 61232		0.132	31.50
R		Flaps relay + support TB20 61260 : – 2 relays HG2–24 VDC MATSUSHITA – 2 supports HG2 SS MATSUSHITA		 0.551 0.110	 78.35 78.35

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		28 – FUEL SYSTEM			
		28–10 – Fuel tanks			
A	058040 M	Ferry fuel tank (TB20 52925)		63.933	78.35
		28–20 – Fuel supply			
R		Fuel electric pump TB20 61218 P/N B8120–H WELDON		2.425	24.80
R		Fuel selector/filter TB20 52026		1.301	44.49
		28–40 – Fuel indication			
S		Fuel low level warning		0.728	33.46

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		30 – ICE AND RAIN PROTECTION			
		30–09 – T.K.S. airframe deicing			
A	C687 00M	TKS ice protection systems (empty tank) (Not valid for U.S. aircraft)		40.565	74.80
A	C687 10M	TKS system (Specific for U.S. aircraft)		40.565	74.80
		30–60 – Propeller deicing			
A	C522 30M	Propeller deicing		9.545	–11.42

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		31 – INDICATING/RECORDING SYSTEMS			
		31–10 – Control and indicating panels			
R		Engine and fuel controls TB20 76201		1.102	24.80
S		Raised radio console TB10 76050		3.131	23.62
		31–20 – Independent instruments			
A	D571 00M	Hourmeter DATCON		0.551	23.62
A	D638 00M	Digital chronometer (L.H. station) ASTROTECH		0.507	35.43
A	D638 20M	Digital chronometer (R.H. station) ASTROTECH		0.507	35.43
A	D680 00M	Quartz chronometer THOMMEN P/N Q18.945.22.28.1KB		0.485	35.43
A	D680 10M	Quartz chronometer THOMMEN P/N Q18.945.22.28.1KB (R.H. station)		0.485	35.43
A	D806 00M	Three–axis accelerometer		0.992	23.62
A	D829 00M	Mechanical chronometer THOMMEN P/N B18.945.22.28.1K		0.485	35.43
A	D829 10M	Mechanical chronometer THOMMEN P/N B18.945.22.28.1K (R.H. station)		0.485	35.43
A	D833 00M	Digital clock/chronometer LC2 ASTROTECH		0.331	23.62
O	D911 00M	Hourmeter "Flight duration" DATCON NOTE : Tachometer–Hourmeter, refer to ATA 77		0.661	31.50
		31–50 – Central warning systems			
R		Advisory panel TB20 61285		0.529	23.62
R		LDG/stall warning unit TB30 69030		0.529	86.61

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
S		LDG GR hydraulic generator operation light TB20 72032		0.176	47.24
A	C561 00M	Starter warning light		0.132	39.37

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		32 – LANDING GEARS			
		32–30 – Extension and retraction			
R		LDG relay TB20 61279 P/N MS 24197–D1		1.499	70.87
		32–35 – Hydraulic generation			
R		LDG hydraulic generator TB20 61267 P/N MC108 BI 19 AL4VT (637177) OILDYNE		11.640	73.23
R		LDG hydraulic generator TB20 61267 P/N 108 BI 19 SP AL4VT (641634) OILDYNE		11.640	73.23
		32–40 – Wheels and brakes			
R		Main LDG wheel assy (2) 40–84B CLEVELAND		5.820	61.42
R		Main LDG brake assy (2) 30–41B CLEVELAND		2.535	57.48
R		Main LDG tire (2) 15.6.00–6 6 PRTT DUNLOP		6.107	57.48
R		Main LDG tire (2) 15.6.00–6 6 PR GOODYEAR		6.107	57.48
R		Main LDG tire (2) 15.6.00–6 6 160TT MICHELIN		6.107	57.48
R		Main LDG tube (2) 15.6.00–6 DUNLOP		2.425	57.48
R		Main LDG tube (2) 6.00–6 DUNLOP		1.653	57.48
R		Main LDG tube (2) 15.6.00–6–6.00.6 GOODYEAR		1.653	57.48
R		Main LDG tube (2) TR20 P/N 092–500–0 MICHELIN		1.653	57.48
R		Main LDG tube (2) 15.6.00–6 TR GOODYEAR		1.653	57.48
R		Nose LDG wheel assy 40–77 B CLEVELAND		2.822	– 17.72
R		Nose LDG tire 5.00–5 6 PRTT DUNLOP		5.798	– 17.72

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
R		Nose LDG tire 5.00–5 6 120TT MICHELIN		5.798	– 17.72
R		Nose LDG tire 5.00–5 6 PR P/N 505C61.8 GOODYEAR		5.798	– 17.72
R		Nose LDG tube 5.00–5 DUNLOP		1.455	– 17.72
R		Nose LDG tube TR67A P/N 092–308–0 MICHELIN		1.455	– 17.72
R		Nose LDG tube 5.00–5 TR67 GOODYEAR		1.455	– 17.72
S		Braking control (R.H. post) TB20 45030		3.307	11.81
		32–60 – Position indicating system and alarms			
R		LDG configuration and control panel TB20 61202		0.309	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		33 – LIGHTS			
		33–10 – Cockpit			
S		Rear cabin lighting TB20 64202		0.220	65.35
S		Instrument panel lighting TB20 64201		0.485	23.62
S		Front cabin lighting (emerg.) TB20 64202		0.507	44.09
S		Maps reading light		0.176	25.59
A	E873 00M	Emergency lighting system		4.079	104.72
		33–40 – External lighting			
S		Landing light G.E. 4591		0.353	35.43
S		Taxi light G.E. 4626		0.353	35.43
S		Navigation and anticollision lights assy WHELEN TB20 63212		4.431	64.96
A	33–001A	Recognition lights WHELEN		0.463	33.46
A	E537 00M	Strobe light JPC on vertical stabilizer		1.874	145.67
A	E537 10M	Strobe lights JPC on vertical stabilizer and under fuselage		3.197	140.55
A	E537 20M	Strobe light JPC on vertical stabilizer (red glass)		1.874	145.67
O	E826	Strobe light WHELEN (tail)		2.094	145.67
O	E848 00M	Light control box JX 128 FLASHELEK		0.551	55.31

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34 – NAVIGATION			
		34–10 – Flight environment data			
		34–11 – Air data systems			
R		Altimeter TB20 76222 P/N 5934 PD1 or PD3 Code A253 UNITED INSTRUMENTS		0.816	25.59
R		True airspeed indicator with integrated lighting TB20 76223 P/N 8125 Code B605 UNITED INSTRUMENTS		0.728	24.80
R		Vertical speed indicator TB20 76224 P/N 7000 Code C83 UNITED INSTRUMENTS		1.014	23.62
S		Air data systems TB10 77200 : – Heated pitot – Alternate static source (in cabin)		 1.190 0.331	 53.15 23.62
A	C635 00M	2nd heated pitot (R.H. wing)		1.190	47.24
A	D681 00M	2nd altimeter 20000 ft		1.433	19.69
A	D803 00M	Installation of 2nd airspeed indicator		1.213	23.62
A	D811 00M	Alti–coder KE 127 KING		1.433	17.72
A	D830 00M	Alti–coder 20000 ft TRANSCALL		1.433	17.72
A	D831 00M	Alti–coder 30000 ft TRANSCALL		1.433	17.72
A	D832 00M	2nd altimeter 35000 ft		1.433	19.69
A	D897 00M	2nd vertical speed indicator (R.H. station) P/N 7000 C83 UNITED INSTRUMENTS		1.521	23.62
A	D915 00M	Metric altimeter # 3 P/N 5940 UNITED INSTRUMENTS		0.926	23.62
O	K608 20M	Alti–coder KEA 130A (35000 ft) KING		1.764	21.65
O	K608 30M	Alti–coder 20000 ft UNITED INSTRUMENTS		1.764	21.65

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	N846 00M	Altitude encoder AR850 NARCO		1.323	19.69
		34–13 – Outside temperature			
S		Outside air temperature indicator (water–tight connector on sensor) TB20 76202		0.551	23.62
A	D910 20M	Outside air temperature indicator (water–tight connector on sensor) DAVTRON		0.551	23.62
		34–20 – Attitude and direction			
		34–21 – Heading reference system			
A	D914 00M	Heading gyro indicator SIGMA–TEK (on L.H. instrument panel)		2.668	23.62
A	D914 10M	Heading gyro indicator SIGMA–TEK (on R.H. instrument panel)		2.976	19.69
A	D922 00M	Electric heading gyro indicator 205–1BL		3.219	23.62
A	K660 20M	HSI assy KING with heading recopy capability (30/400 Hz) with vertical KA 51B		12.720	67.32
A	K660 30M	HSI assy KING with heading recopy capability (30/400 Hz) with horizontal KA 51B		12.720	67.32
A	K660 50M	HSI assy KING with horizontal KA 51B (if GPS KLN 90B installed)		12.720	67.32
A	K660 60M	HSI assy KING with vertical KA 51B (if GPS KLN 90B installed)		12.720	67.32
A	067140 M	Heading indicator KG 107		2.690	20.47
		34–22 – Turn and bank indication			
S		Turn–and–bank indicator TB20 76825 UNITED INSTRUMENTS		1.675	23.62
O	D697 00M	Electrical turn coordinator CASTLEBERRY		1.698	23.62
A	D818 10M	Slip indicator (R.H. station) UNITED INSTRUMENTS		1.675	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34–23 – Magnetic compass			
R		Compass TB20 76229 P/N C2400 L 4P (28 V) AIRPATH		0.595	20.47
		34–24 – ADI and standby horizon			
A	34–001A	Electrical attitude gyro indicator 1100–28L(5F) BFG (Not valid for U.K. aircraft)		2.866	24.41
A	34–001B	Electrical attitude gyro indicator 1100–28LK(5F) BFG (Specific for U.K. aircraft)		2.866	24.41
A	34–001C	Electrical attitude gyro indicator 1100–28LS(5F) BFG (on L.H. instrument panel) (Not valid for U.K. aircraft)		2.866	24.41
A	067330 M	Attitude gyro indicator with Flight Director KI 256 for KFC 150		3.285	20.47
		34–25 – Radio magnetic indication			
A	K584 00M	RMI KI 22900 (without switching) KING		3.086	21.65
A	K584 10M	RMI KI 22900 (with switching) KING		3.307	21.65
A	K819 00M	RMI KNI 582 KING		3.417	21.65
		34–28 – Electronic flight instrumentation system			
A	K923 00M	Radio/navigation assy KING with EHI 40 EFIS system KING (EHSI only) : – KMA 24H70 audio control box – VHF1 VOR/ILS KX 165–25 – VHF2 VOR/ILS KX 165–25 with KI 206 indicator – DME KN 63 – ADF KR 87 – MARKER KR 21 – RMI KI 229 – GPS KLN 90B – KCS 305 gyro unit		94.577	68.11

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
	K923 00M (Cont'd)	The EHI 40 part components are as follows : – SG 465 symbol generator – ED 461 EHSI indicator – KN 40 adapter			
		34–30 – Landing and taxiing aids			
		34–31 – Marker			
A	K676 00M	Marker receiver indicator KR 21 KING		1.257	21.65
		34–40 – Independent position determining			
		34–41 – Stormscope			
A	J820 00M	Stormscope WX 1000 BFG (on panel strip)		15.432	83.07
A	J820 10M	Stormscope WX 1000 BFG (on R.H. instrument panel)		15.432	83.07
A	J828 10M	Stormscope WX 1000 + BFG		15.432	83.07
A	J918 00M	Stormscope WX–900 BFG		4.806	85.43
		34–50 – Dependent position determining			
		34–51 – NAV 1 installation			
A	K663 51M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 KING		7.100	23.23
A	K663 61M	VHF assy COM1/NAV1 (VOR/ILS) KX 155 KING		6.173	23.23
A	K663 71M	VHF assy COM1/NAV1 (VOR/LOC) KX 155 with audio amplifier KING		7.870	24.80
A	K812 51M	VHF assy COM1/NAV1 (VOR/LOC) KX 165 KING		7.165	23.23
A	K812 61M	VHF assy COM1/NAV1 (VOR/ILS) KX 165 KING		5.644	23.23
A	K813 00M	VOR/ILS indicator KI 206–04 KING		1.631	21.65

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
A	K813 10M	VOR/ILS indicator KI 206–05 KING		1.764	21.65
A	K814 00M	VOR/ILS indicator KI 204 KING		1.918	21.65
A	K847 00M	Converter VOR/LOC KN 72 KING		1.653	43.31
		34–52 – NAV 2 installation			
A	K663 21M	VHF assy COM2/NAV2 (VOR/LOC) KX 155 KING		7.275	20.08
A	K663 31M	VHF assy COM2/NAV2 (VOR/ILS) KX 155 KING		6.415	23.23
A	K812 11M	VHF assy COM2/NAV2 (VOR/ILS) KX 165 KING		5.997	22.83
A	K812 31M	VHF assy COM2/NAV2 (VOR/LOC) KX 165 KING		7.341	23.23
A	K813 00M	VOR/ILS indicator KI 206–04 KING		1.631	21.65
A	K813 10M	VOR/ILS indicator KI 206–05 KING		1.764	21.65
A	K814 00M	VOR/ILS indicator KI 204 KING		1.918	21.65
		34–53 – Transponder			
A	K656 00M	ATC KT 76 A KING on radio console		3.682	20.08
A	K656 20M	ATC KT 76 A KING on R.H. panel strip (with support)		3.836	21.65
A	K656 30M	ATC KT 76 A KING on R.H. panel strip (with support) (EHSI version)		3.836	21.65
A	K876 00M	Transponder ATC KT 71 KING		4.630	22.44
A	K876 10M	Transponder ATC KT 71 KING (on R.H. panel strip)		4.630	22.44
A	K929 00M	Transponder ATC KT 76C KING (on R.H. panel strip)		3.527	23.62

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		34–54 – Automatic Direction Finder (ADF)			
A	K655 00M	ADF KR 87.01/04 (Indicator KI 227.00) KING (on radio console)		8.730	90.16
A	K655 10M	ADF KR 87.01/04 (Indicator KI 227.01) KING (on radio console)		8.730	90.16
A	K655 20M	ADF KR 87 KING		8.025	96.06
A	K655 40M	ADF KR 87 (Indicator KI 227.01) KING (on R.H. panel strip)		8.730	90.16
A	K917 00M	ADF2 KR 87 KING		9.436	94.49
		34–55 – DME installation			
A	K657 00M	DME KN 62A KING		3.682	21.26
A	K657 10M	DME KN 64 KING		3.682	21.26
A	K664 00M	DME KN 63 KING		5.489	40.94
		34–57 – Global Positioning System (GPS)			
A	34–500A	Color Skymap capability CM 2000 SKYFORCE		0.970	30.51
A	K920 00M	GPS KLN 89B KING ”Stand alone”		4.519	25.20
A	K926 00M	GPS KLN 89B KING interfaced with HSI KI 525A (KCS 55A compass system)		5.578	22.83
A	K927 10M	GPS KLN 90B KING interfaced with HSI and A/P, without RMI (KA92 antenna)		9.943	21.26

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		35 – OXYGEN			
A	F921 00M	Oxygen constant–flow masks with radio (crew) (Qty 2) PURITAN BENNETT		0.705	55.12
A	062105 M	Oxygen system equipment (constant–flow type) PURITAN BENNETT		32.187	115.35
A	062300 M	Oxygen constant–flow mask without radio (rear passenger) PURITAN BENNETT		0.529	90.55

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		37 – VACUUM			
		37–11 – Distribution (normal)			
S		Vacuum pump SIGMA–TEK with filter TB20 78817		5.291	0.79
A	A904 10M	Vacuum pump SIGMA–TEK with filter (when stormscope installed, refer to ATA 34)		5.291	0.79
		37–12 – Distribution (emergency)			
A	C632 00M	Auxiliary dry air pump		12.456	30.31
		37–20 – Indicating			
S		Vacuum system warning light TB20 78817		0.198	0.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		52 – DOORS			
		52–40 – Inspection doors			
A	H882 00M	Doors (Qty 2) on lower engine cowl		0.441	– 26.30

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		53 – FUSELAGE			
A	B896 00M	Tail cone protection		0.661	215.67
A	H885 00M	Centering cup jack rest (convex contact area)		/	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		56 – WINDOWS			
S		Colourless windows assy TB10 24000 :			
		– Windshield		11.640	27.56
		– Door window		4.056	55.12
		– Rear side window		2.535	86.61

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		61 – PROPELLER			
R		Propeller HC–C2YK–1BF/F 8477–4 HARTZELL		55.115	– 47.64
		61–20 – Controls			
R		Propeller governor F210 761 WOODWARD		2.645	– 39.37

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		71 – POWER PLANT			
		71–60 – Air inlet			
A	059120 M	2nd Air filter		0	/

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		72 – PISTON ENGINE			
R		Engine IO–540–C4D5D LYCOMING with starter and magneto		438.715	– 25.59
O	A865 00M	Engine IO–540–C4B5D LYCOMING with starter, magneto and vibrator : – Magneto selector P/N 10.357210–1 TCM – Starting vibrator P/N 10.382808–24 TCM – Dual magneto P/N 10.785146–106 TCM		439.377 / 0.661 11.508	– 25.59 / 4.72 – 9.06

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		73 – FUEL SYSTEM AND CONTROLS			
		73–30 – Indicating system			
A	D905 00M	Digital fuel management system SHADIN		1.157	33.46
A	D905 30M	Digital fuel management system SHADIN (EHSI coupled)		1.157	33.46

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		74 – IGNITION			
		74–10 – Electric generation system			
R		Dual magneto D6LN 3000 BENDIX		11.508	– 9.06
R		Dual magneto D6LN 2031 BENDIX		11.508	– 9.06

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		77 – ENGINE INDICATING			
		77–10 – Power			
R		Manifold pressure – fuel flow/pressure TB20 76220 P/N 6331 Code H139 UNITED INSTRUMENTS		0.948	25.59
S		Tachometer–Hourmeter NRF 80 P/N LM 02 or LM 021 LMI		0.860	23.62
		77–20 – Temperature			
S		EGT/CHT TB20 76202		1.323	19.69
A	D906 00M	EGT/CHT multiple indicator EDM 700 6C JP INSTRUMENT		3.593	– 1.18

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		78 – EXHAUST			
A	A888 00M	Low noise exhaust		19.841	15.75

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		79 – LUBRICATION			
		79–10 – Storage			
A	065820 M	Oil drain door		0.220	– 25.59
		79–20 – Distribution			
R		Oil cooler 20006A NDM		3.086	– 14.17
A	A886 00M	2nd oil cooler		4.079	– 13.39

S/ R/ A/ O	ITEM OPT10	REQUIRED (R) OR STANDARD (S) OR OPTIONAL (A or O) EQUIPMENT	*	WEIGHT per unit lb (kg)	ARM in. (m)
		80 – STARTING			
R		Starter MHB 4016 PRESTOLITE/ELECTROSYSTEMS or LW 15572 LYCOMING		17.990	– 39.37
R		Starter 31B 21064 LYCOMING		11.376	– 39.37
R		Starter relay CE 1971 060 F PARIS RHONE		1.499	87.40

SECTION 7

DESCRIPTION

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

GENERAL

This section provides description and operation of the SOCATA Model TB 20 airplane and its systems. Some of the equipment described herein is optional and may not be installed in the airplane. Details of other optional systems and equipment are presented in Section 9 ”Supplements” of this Manual.

AIRFRAME

The TB 20 is an all–metal, five–place, cantilever low wing, single–engine airplane equipped with retractable tricycle landing gear and is designed to be used in normal category .

The fuselage consists of an all–metal aluminium alloy structure of semimonocoque design. It includes 10 frames. The main frames are as follows :

– Frame No. 0 on which firewall, engine mount and nose gear mount are fixed.

– Frame No. 1 on which wing front attachments are fixed.

– Frame No. 2 double frame which allows crossing and attachment of the wing spar.

– Frame No. 3 on which wing rear attachments are fixed.

– Frame No. 7 on which vertical stabilizer front attachment is fixed.

– Frame No. 8 on which vertical stabilizer rear attachment is fixed.

– Frame No. 9 on which horizontal stabilator hinge fittings are fixed.

The cabin section, from frame No. 0 to frame No. 6, is reinforced by horizontal spars made of extruded aluminium sections.

The streamlined fairing is ensured by a composite material upper duct which includes the two access ”gull–wing” doors.

Access to the baggage compartment (behind the bench seat) is provided through a door located on the L.H. side of the fuselage.

WINGS

The wings contain integral fuel tanks. They consist of stamped metal ribs riveted to the wing skin and to monobloc spar.

Wings characteristics :

Profile	RA16-3C3
Aspect ratio	8
Dihedral	6°3
Aerodynamic chord	4.002 ft – 1.220 m
True chord	4.085 ft – 1.245 m
Wing area	128.091 sq.ft – 11.90 m^2
Wing setting	+ 3°

Ailerons :

Unit area	4.897 sq.ft – 0.46 m^2
Mean span	4.081 ft – 1.244 m

Recoil and slotted type wing flaps :

Area	20.021 sq.ft – 1.86 m^2
Mean span	8.366 ft – 2.550 m

EMPENNAGE

The vertical stabilizer consists of a fin, a rudder and a controlled tab.
The horizontal stabilizer is of stabilator type with an automatic anti–tab controlled in its stabilator tab function.
Both are of conventional metal structure type (spar, ribs and skin).

Empennage characteristics :

Conventional type vertical stabilizer :

Fin area Pre–MOD.151	9.472 sq.ft – 0.88 m^2
Fin area Post–MOD.151	11.194 sq.ft – 1.04 m^2
Rudder area	6.781 sq.ft – 0.63 m^2
Controlled rudder tab	0.474 sq.ft – 0.04 m^2

Stabilator type horizontal stabilizer :

Span	12.07 ft – 3.680 m
Stabilator area, anti–tab included	32.938 sq.ft – 3.06 m^2
Tab area	5.328 sq.ft – 0.50 m^2
Tab automaticity	104 %

FLIGHT CONTROLS

SURFACES

The airplane is equipped with a conventional three–axis surface system, consisting of aileron, stabilator and rudder surfaces.

Each front seat is provided with a control wheel which actuates ailerons and stabilator through rods and bellcranks.

The control wheel being actuated fully, ailerons deflection must be :

–	upwards	15° ± 1.5°
–	downwards	15° ± 1.5°

Stabilator deflection must be :

–	nose–up	- 16° ± 1°
–	nose–down	+ 3° ± 1°

The stabilator consists of an automatic anti–tab, which automaticity is 104 %. This anti–tab can also be controlled through the pitch trim.

Each front seat is provided with a rudder pedal which controls the rudder through rods and bellcranks.

Rudder deflection to the left and to the right is 25° ± 2°.

Rudder has a controlled tab.

TRIM SYSTEMS

Manually–operated pitch and rudder trims are provided.

Stabilator trimming is accomplished by actuating on stabilator anti–tab through a control wheel vertically mounted on L.H. side of the control panel.

This control wheel actuates stabilator anti–tab through cables and an irreversibility system.

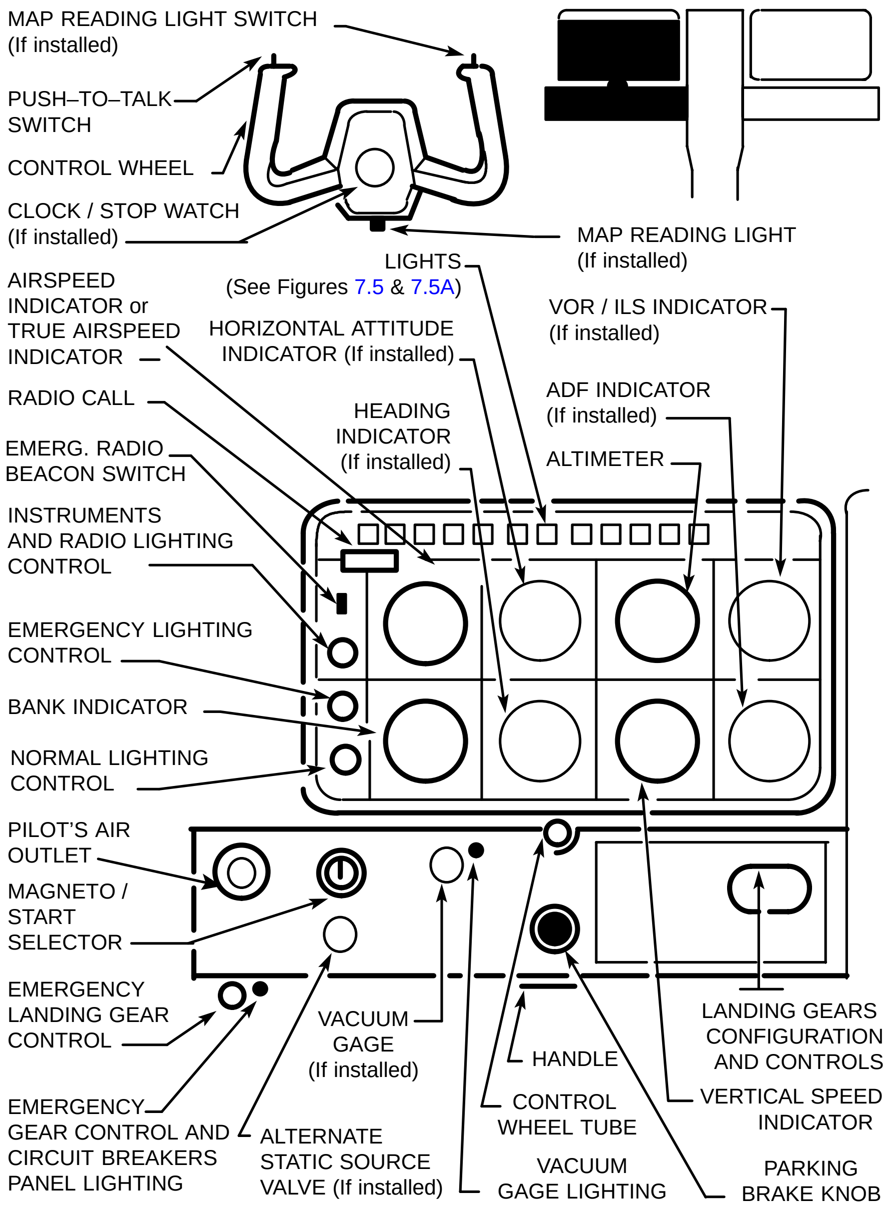


Figure 7.1 – EXAMPLE OF INSTRUMENT PANEL AND L.H. SUBPANEL

A pointer indicator located on the right of the trim control wheel gives the anti–tab position. Forward rotation of the control wheel will trim nose–down, conversely, rearward rotation will trim nose–up.

Stabilator tab deflection with stabilator in maximum nose–up attitude must be :

- nose–up 0° ± 0.5°
- nose–down 15° ± 1.5°

Rudder trimming is accomplished by rotating a control knob (rudder trim) deflecting horizontally, located on the control pedestal. This trim actuates the rudder tab through a sheathed control. Rotating the trim to the right will trim nose–right ; conversely, rotating it to the left will trim nose–left.

Rudder tab deflection must be :

- to the right 10° ± 2°
- to the left 25° ± 2°

INSTRUMENT PANEL

L.H. instrument panel (see Figure 7.1) is designed around the basic "T" configuration.
The gyros (if installed) are located in front of the pilot and arranged vertically.
The airspeed indicator or the true airspeed indicator and the altimeter are to the left and right of the gyros, respectively.
The upper edge of the instrument panel contains the advisory panel (see Figures 7.5 and 7.5A).
The left side of the panel contains lighting controls, emergency beacon switch (if installed) and registration (enabling airplane radio call).

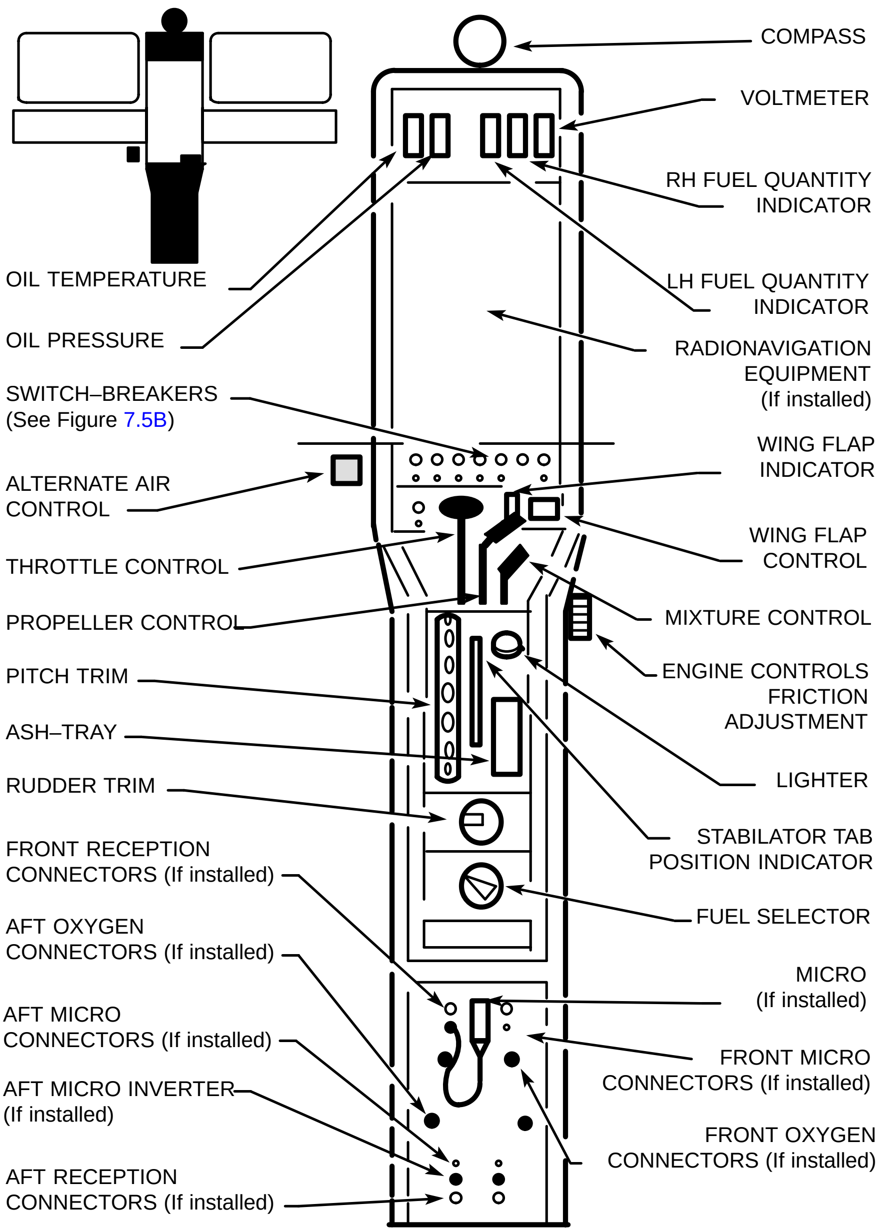


Figure 7.2 – EXAMPLE OF CONSOLE AND PEDESTAL

The L.H. panel strip (see Figure 7.1) contains from left to right : L.H. air outlet, magneto/start selector, parking brake knob, landing gears configuration and controls ; under the panel strip, on L.H. side, emergency landing gear control, on R.H. side, the ”Alternate Air” control ; alternate static source valve and vacuum gage (if installed) complete the L.H. panel strip.

The central console (see Figure 7.2) contains in the upper edge, the engine monitoring cluster, then radio–navigation equipment vertically mounted to console lower edge.

The central pedestal (see Figure 7.2) contains fore to aft :

- the switch–breakers panel, flap control and indicator
- the engine controls (from left to right : throttle, propeller, mixture)
- the pitch trim and its indicator
- the lighter and the ash–tray
- the rudder trim
- the fuel selector
- the micro (if installed)
- the reception and micro jacks (if installed)
- the oxygen masks connector (if installed)
- on pedestal R.H. side, engine controls friction device.

The R.H. instrument panel (see Figure 7.3) contains the tachometer or tachometer–hourmeter and the manifold pressure – fuel flow/pressure dual indicator and spare locations for additional equipment (2nd altimeter, VOR/LOC indicator, outside air temperature, cylinder head temperature, exhaust gas temperature...).

The R.H. panel strip (see Figure 7.3) contains a location for radio equipment or any other one, cabin air selector, R.H. air outlet.

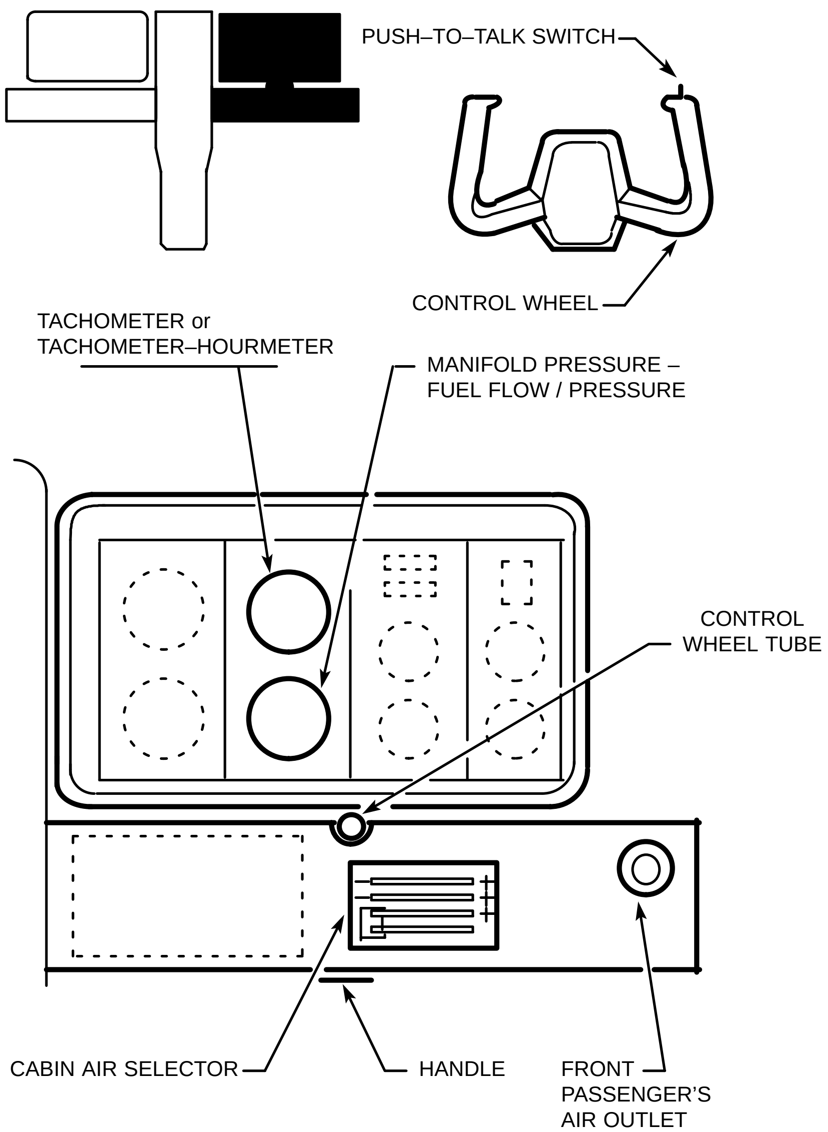


Figure 7.3 – EXAMPLE OF INSTRUMENT PANEL AND R.H. SUBPANEL

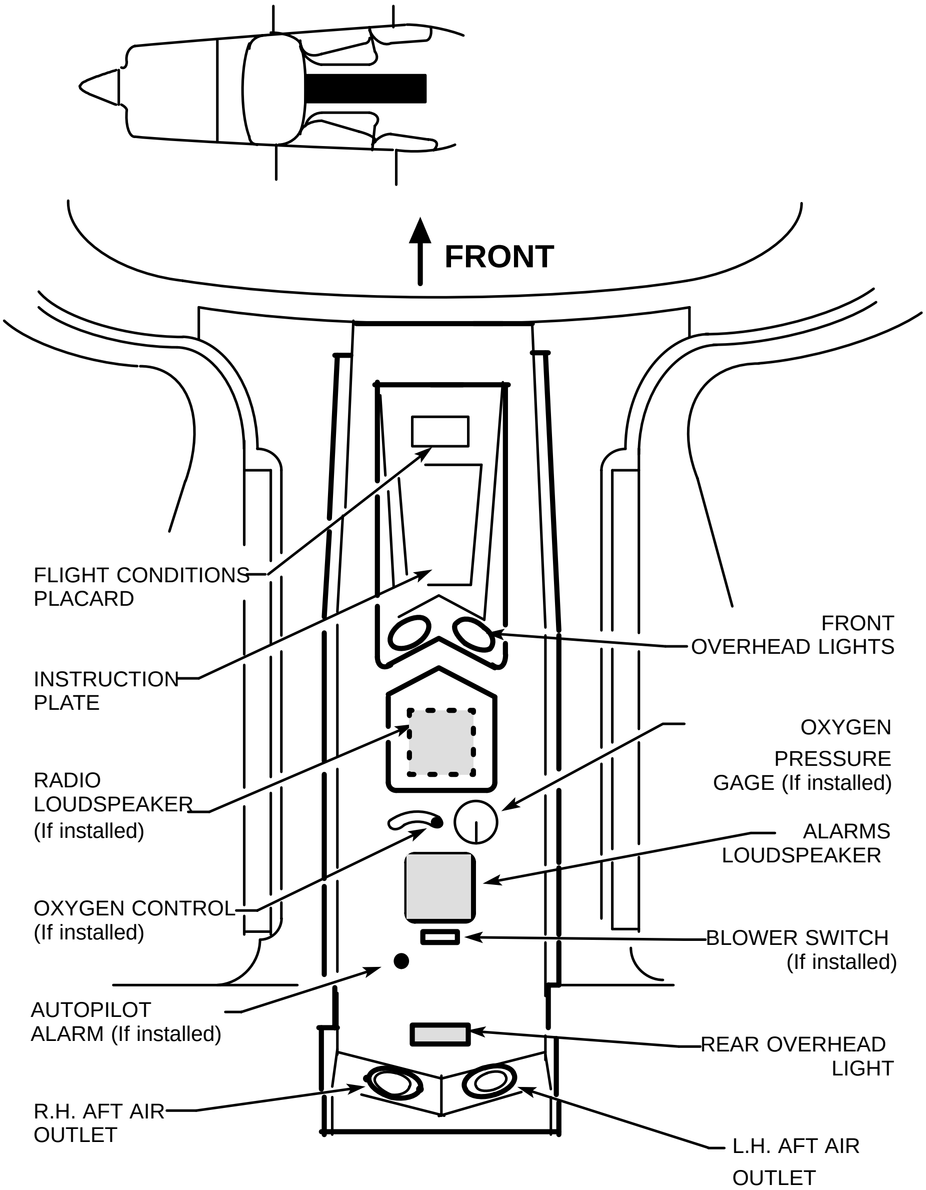


Figure 7.4 – UPPER DUCT CENTRAL PART

Upper duct central part (see Figure 7.4) contains fore to aft :

– ”Flight conditions” placard
– ”Instruction” plate
– Front overhead lights
– Radio loud–speaker (if installed)
– Oxygen control and pressure gage (if installed)
– Alarms loud–speaker
– Blower switch (if installed)
– Autopilot alarm (if installed)
– Rear overhead light
– Rear air outlets.

ADVISORY PANEL

The advisory panel (see Figures 7.5 and 7.5A) is located at the top edge of the L.H. instrument panel, directly in front of the pilot. The panel contains separate indicator lights which illuminate green, amber or red when a specific condition occurs in the associated airplane system. A green colored light is illuminated to indicate a normal or safe condition in the system. However, an illuminated amber lamp indicates that a cautionary condition exists, but which may not require immediate corrective action. When a hazardous condition exists requiring immediate corrective action, a red light illuminates.

A day / night switch is installed in the centre of the advisory panel to control the intensity of the green indicator lights and of the GPS annunciators (if GPS installed).

Additional annunciators, associated to the GPS (if installed) are installed in the centre of the advisory panel.

SWITCH–BREAKERS PANEL

The general electrical equipment switch–breakers are located on the front part of the central pedestal.

The switch–breakers located on this panel are illustrated in Figure 7.5B.

CIRCUIT–BREAKERS PANEL

The electrical equipment circuit–breakers are located on a separate panel mounted on the L.H. cabin sidewall adjacent to the pilot.

Circuit–breakers located on this panel are illustrated in Figure 7.6.

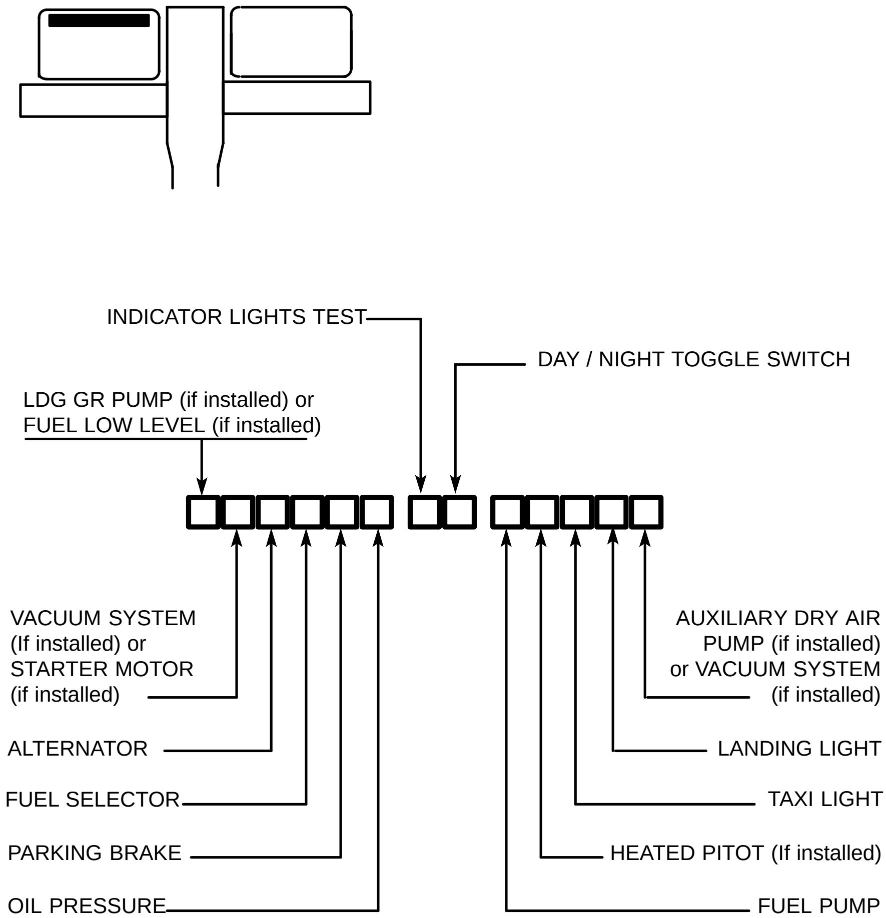
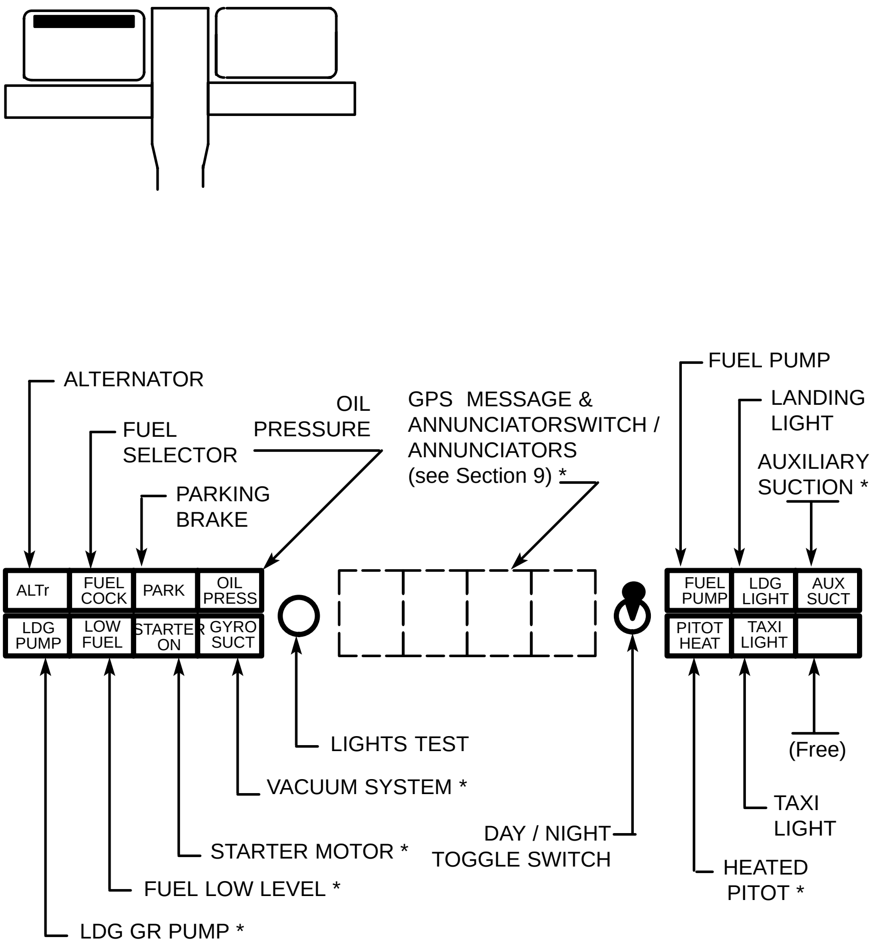


Figure 7.5 – ADVISORY PANEL (BASIC)



(*) If installed

Figure 7.5A – ADVISORY PANEL (EXTENDED)

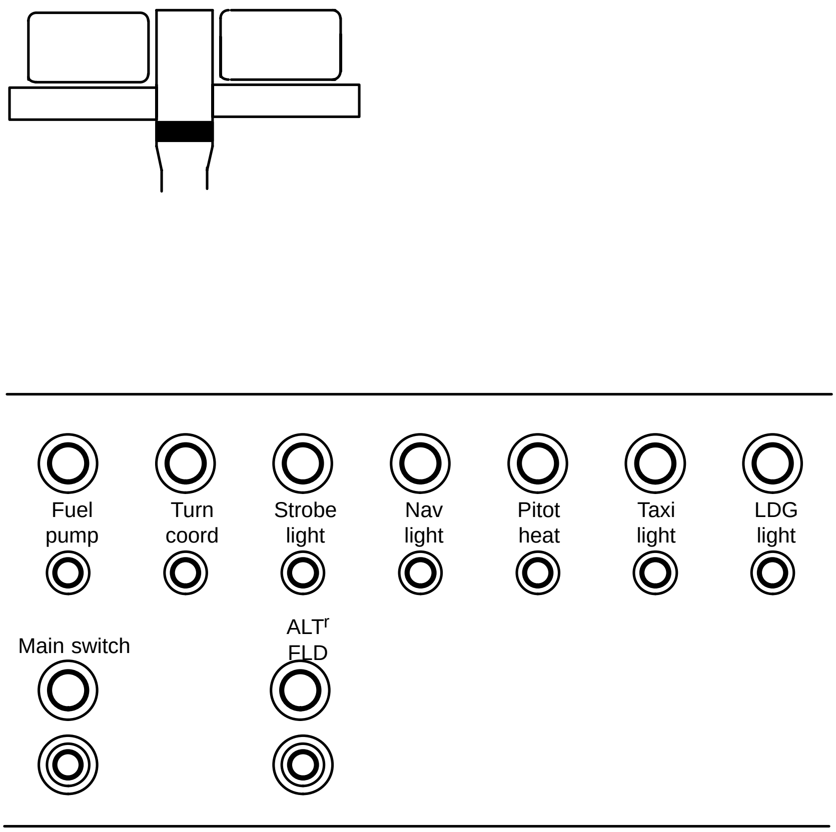


Figure 7.5B – SWITCH–BREAKERS (SB)

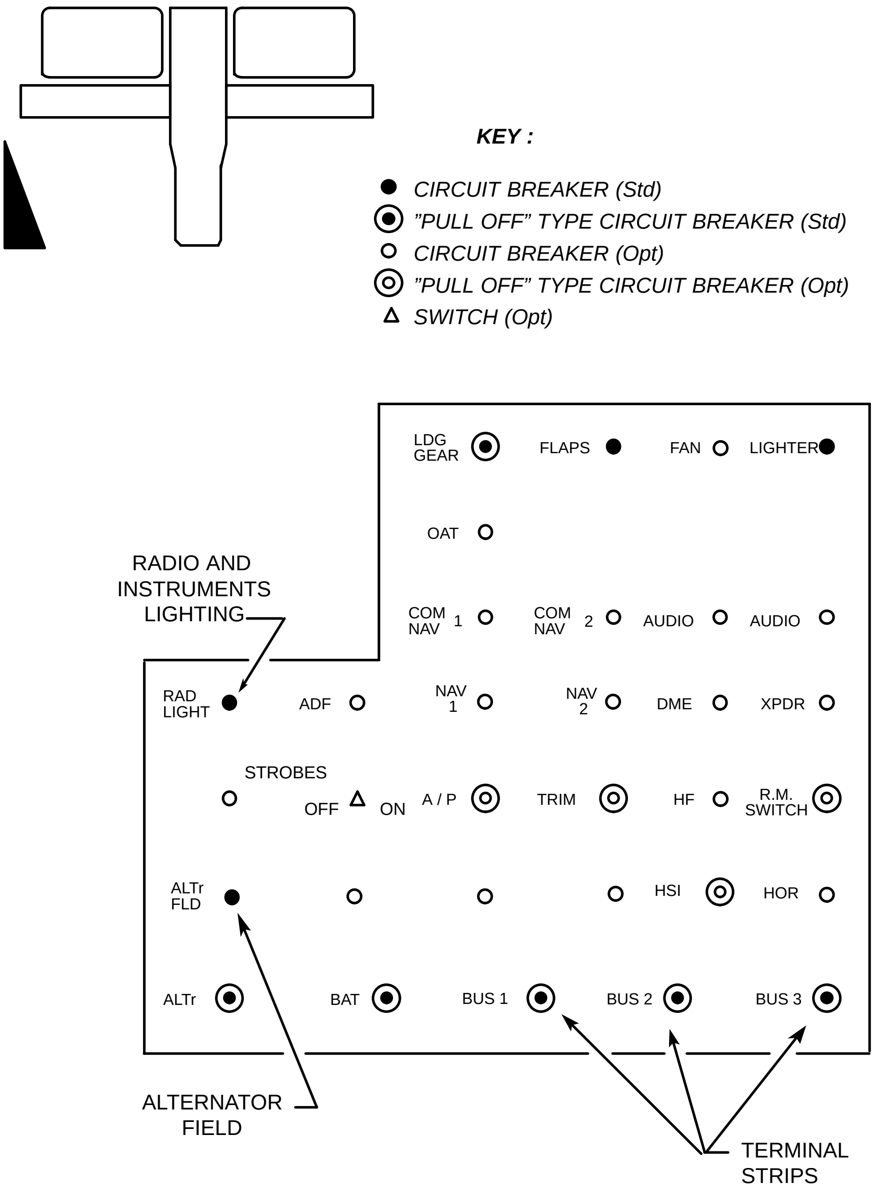
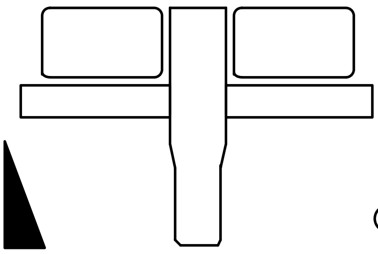


Figure 7.6 – CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)



KEY :

- ● *CIRCUIT BREAKER (Std)*
- ◉ *"PULL OFF" TYPE CIRCUIT BREAKER (Std)*
- ○ *CIRCUIT BREAKER (Opt)*
- ◎ *"PULL OFF" TYPE CIRCUIT BREAKER (Opt)*
- Δ *SWITCH (Opt)*

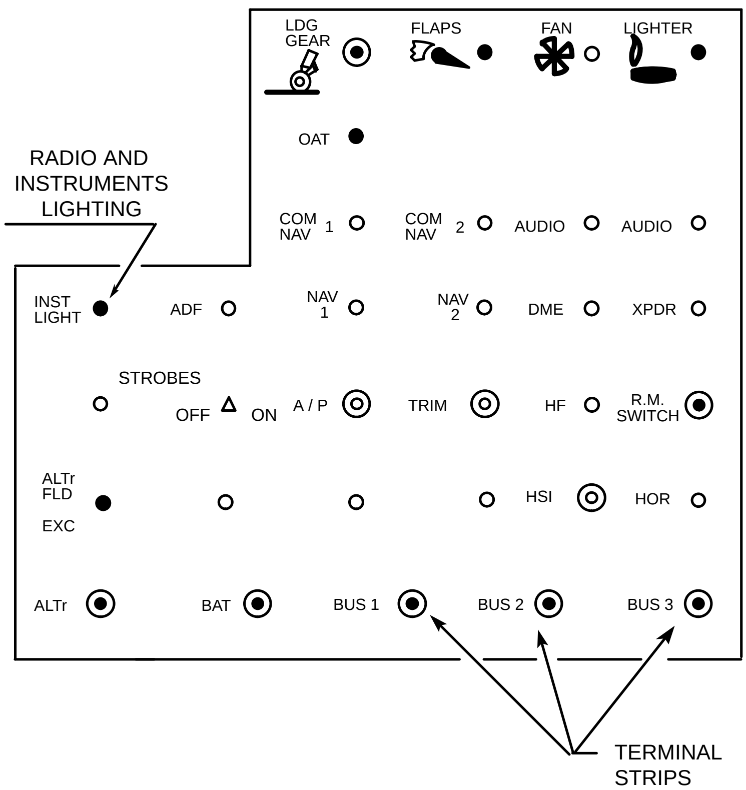


Figure 7.6A – CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

INTENTIONALLY LEFT BLANK

GROUND CONTROL

Effective ground control while taxiing is accomplished through nose– wheel steering by using the rudder pedals connected to nose–wheel through rods.

When a rudder pedal is fully pushed, the nose–wheel rotates through an arc of approximately 18°30' each side of the center. By applying either left or right brake, the degree of turn may be increased.

The minimum turning radius of the airplane is obtained by using differential braking and nose gear steering (see Figure 7.7).

Moving the airplane by hand is most easily accomplished by attaching a tow bar (stowed in the baggage compartment) to the nose gear leg.

If the airplane is to be towed by vehicle, never turn the nose gear more than 18°30' either side of center or structural damage to the nose gear could result.

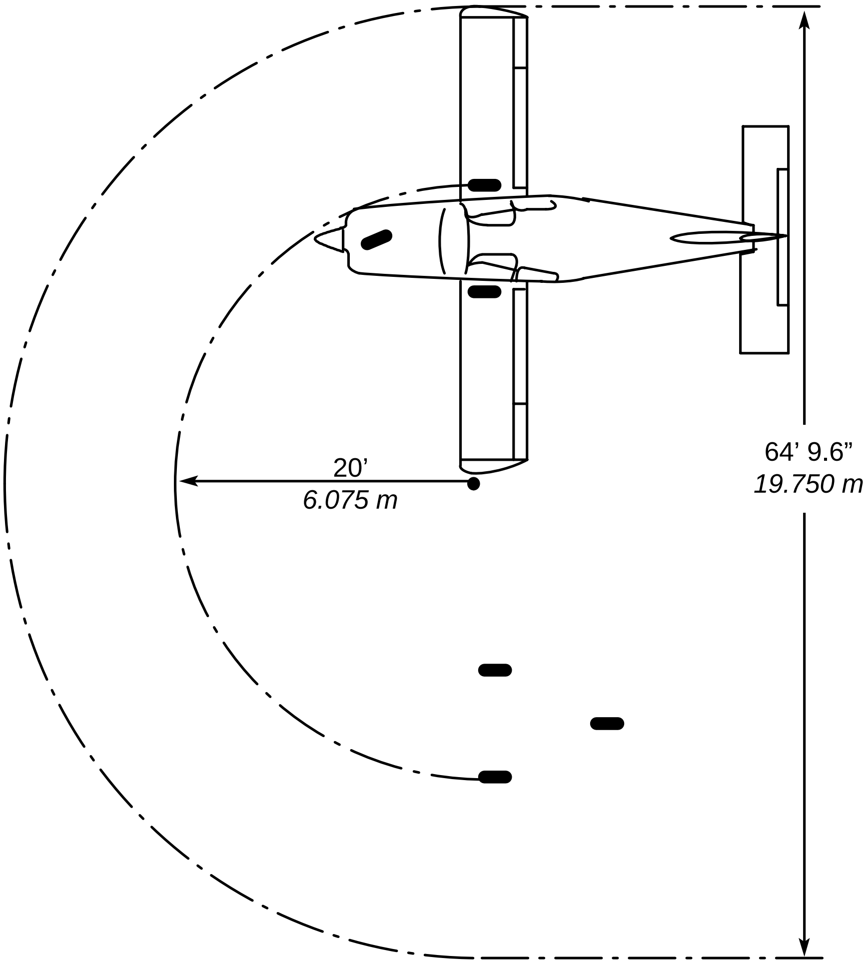


Figure 7.7 – MINIMUM TURNING RADIUS

WING FLAPS

The wing flaps are of the large span, single–slot type. They are retracted or extended by positioning to the desired flap deflection position the flaps control located on the pedestal, on R.H. side of the switch–breakers.

The switch lever is moved up or down in a slotted panel with mechanical stops at "retracted" (0°) ; "take–off" (10°) and "landing" (40°) positions (see Figure 7.2). An indicator located near the control provides various flaps positions.

The wing flaps system is protected by a 10–amp circuit breaker, labeled "FLAPS" located on L.H. circuit breakers side panel (see Figure 7.6).

LANDING GEAR

The landing gear system is a retractable tricycle type utilizing a conventional steerable nose gear and a trailing beam type main landing gear. Nose gear and main gears are provided with oil / air shock absorbers. Each main gear wheel is equipped with a hydraulically–actuated, single–disc brake on the inboard side of the wheel.

Landing gear extension or retraction is accomplished by actuators powered by an electrically–driven hydraulic power pack : the hydraulic generator. The latter is located under the rear seat.

The hydraulic system fluid level may be checked by utilizing the dipstick / filler cap located on the rear R.H. side of the pump. The dipstick / filler cap is accessible through a door located under the rear seat. The level should be checked at 100–hour intervals. When the fluid level it at or below the slot on the dipstick, hydraulic fluid (MIL–H–5606 D) should be added to bring the level to the top of the dipstick / filler cap opening.

A normal operating pressure is automatically maintained in the landing gear system ; this pressure is sufficient to provide a positive up pressure on the landing gear.

A hinge strut provides the mechanical downlock of the nose and main gears. Mechanically–actuated wheel well doors connected to landing gear are provided for the nose and main gears.

Hydraulic generator operation is started and stopped by a pressure switch when landing gear control is on ”up” position.

<u>Post–MOD.151</u>

The footsteps extension/retraction is combined with that of main landing gears.

LANDING GEAR CONTROL

The landing gear lever is located on the R.H. side of the L.H. panel strip. The lever has two positions, up and down, which give a mechanical indication of the gear position selected. From either position, the lever must be pulled out to clear a detent before it can be repositioned ; operation of the landing gear system will not begin until the lever has been repositioned. After the lever has been repositioned, it directs hydraulic pressure within the system to actuate the gear to the selected position.

LANDING GEAR POSITION INDICATOR LIGHTS

Position indicator lights located adjacent to the landing gear lever indicate the gear is either down and locked or unlocked.

Separate green gear ”down” indicator lights are provided for each gear and a red single gear unlocked light illuminates anytime one gear at least is not locked down or fully up.

The landing gear system is also equipped with gear safety (squat) microswitches, an emergency extension control and a gear–up warning system.

The gear unlocked red light and the green gear down lights (one for each gear) are tested using a push–knob labeled ”TEST” on the annunciator panel. The green lights are dimmed with the toggle switch labeled ”D/N” located on the annunciator panel.

LANDING GEAR OPERATION

To retract or extend the landing gear, pull out on the gear lever and move it to the desired position. During a normal cycle, the gear retracts fully or extends and locks, limit microswitches close and green indicator lights illuminate (down cycle only), indicating completion of the cycle.

While the gear is in transit , or whenever any gear is not fully retracted or locked down, the red gear unlocked light will illuminate.

The electric pump will continue to run :

– during landing gear extension, until the green indicator lights illuminate and the red indicator light goes out ;

– during landing gear retraction, until the green and red indicator lights go out.

If pressure in the system drops, the pressure switch starts operation of the hydraulic generator which increases pressure.

During cruising flight with the landing gear retracted, automatic cycling on the hydraulic pump motor to restore system pressure bleed down may normally occur a few times per hour. Frequent cycling is an indication of an abnormal pressure loss and the cause of such condition should be investigated.

The safety (squat) microswitches, actuated by the main gears, electrically prevent inadvertant retraction whenever the gear shock–absorber is compressed by the weight of the airplane. A pull–off type circuit breaker is also provided in the system as a maintenance safety feature. With the circuit breaker pulled out, landing gear operation by the gear pump is prevented. After maintenance is completed, and prior to flight, the circuit breaker should be pushed back in.

EMERGENCY LANDING GEAR EXTENSION

In the event the landing gear fails to extend normally, slowling the airplane below 97 kt (180 km/h) and placing the landing gear lever in the down position should allow the landing gear to "free fall" to the down and locked position, as evidenced by the green gear down lights illuminating. Following this procedure, should the gear lights indicate that the gear is still not down and locked, utilize the emergency landing gear control under the L.H. panel strip to extend the gear.

For this, push on central knob before pulling the lever rearward. For complete procedures, refer to Section 3 "Emergency procedures".

The emergency landing gear control cannot be used to retract the gear, however, it is necessary to push back this control to retract the landing gear in a normal way.

LANDING GEAR WARNING SYSTEM

The airplane is equipped with a landing gear warning system designed to help prevent the pilot from inadvertently making a wheels–up landing. The system consists of a throttle–actuated microswitch which is electrically connected to an aural warning unit.

In gear up configuration, when throttle is retarded at approximately ½ inch (12 mm) of the aft stop (battery switch–breaker ON), the throttle linkage will actuate on a microswitch which is electrically connected to the gear aural warning unit.

If the landing gear is retracted (or not down and locked), a continuous tone will be heard on the alarm loud–speaker. In addition, a microswitch connected to the wing flap system also sounds a tone when the flaps are extended beyond 10° with the landing gear retracted.

A "LDG PUMP" amber warning light (if installed) located at advisory panel L.H. side, illuminates to indicate operation of the hydraulic generator.

BAGGAGE COMPARTMENT

The baggage compartment extends from the rear seat to the rear bulkhead of the cabin (former n° 6). The access is possible either through a lockable door located on the left side of the airplane, or from the inside of the cabin.

Prior to any flight, check that this door is locked.

To open the access door, proceed as follows :

POUSSER POUR TOURNER
PUSH TO TURN – DRÜCKEN UM ZU DREHEN

Figure 7.8

WARNING

ANY PARCEL OR BAGGAGE MUST BE FIXED WITH STRAPS. IT IS FORBIDDEN TO TRANSPORT PEOPLE IN THE BAGGAGE COMPARTMENT.

ANY MATERIAL THAT MIGHT BE DANGEROUS FOR THE AIRPLANE OR THE OCCUPANTS SHOULD NOT BE PLACED IN THE AIRPLANE.

CARGO CONFIGURATION

The rear seat may be taken off for easy loading in cargo configuration.
For further information, refer to Section 6 "Weight and Balance".

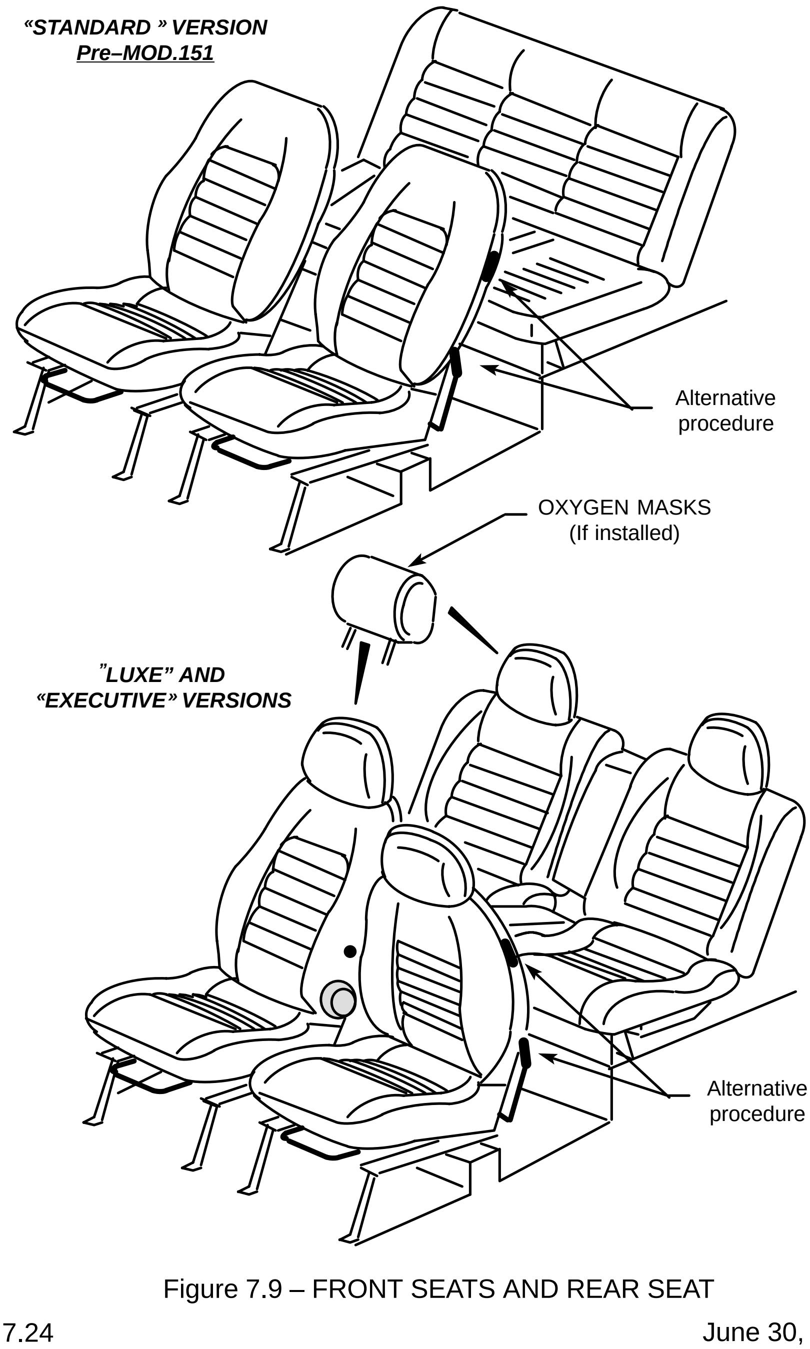


Figure 7.9 – FRONT SEATS AND REAR SEAT

SEATS, SEAT BELTS AND SHOULDER HARNESSES

FRONT SEATS

The various possibilities of seats adjustment depend on the version chosen.

- To move the seat forward and rearward (*) :
  Use the adjustment bar located on the front part of the seat, under the seating and grasp handle under instrument panel strip.
- To tilt the seat (*) :
  Use the lever located on the outboard side of the seat.
- To change the seat back angle (if installed) :
  Use the knurled knob located at the bottom part on the inboard side of the seat back.
- To adjust the back, at lumbar level (if installed) :
  Use the knob located over the knurled knob on the inboard side of the seat back.
  Press on the knob and moderately lean back to the desired position, release the button, the seat back should fit perfectly with your back.

  (*) Lift up adjustment bar or lever to unlock ; when in desired position, release it and make sure it is locked.

REAR BENCH OR, Post–MOD.151, REAR SEATS

- To remove rear bench or rear seats, refer to Section 6 "Weight and Balance".
  Rear bench or rear seats is/are not adjustable.

HEAD–RESTS (if installed)

- Before Model "95" :
  . To adjust and remove the head–rest :
  Simply make it slide vertically.
  . To fit the head–rest into the seat back :
  Turn the centering bush (bearing an arrow) of ¼ turn clockwise (in the arrow direction) and maintain it to fit the head–rest in the seat back.
  . If oxygen equipment is installed, the masks are stored inside the head–rests.
- Model "95" :
  . To install, adjust and remove the head–rest, simply make it slide vertically.

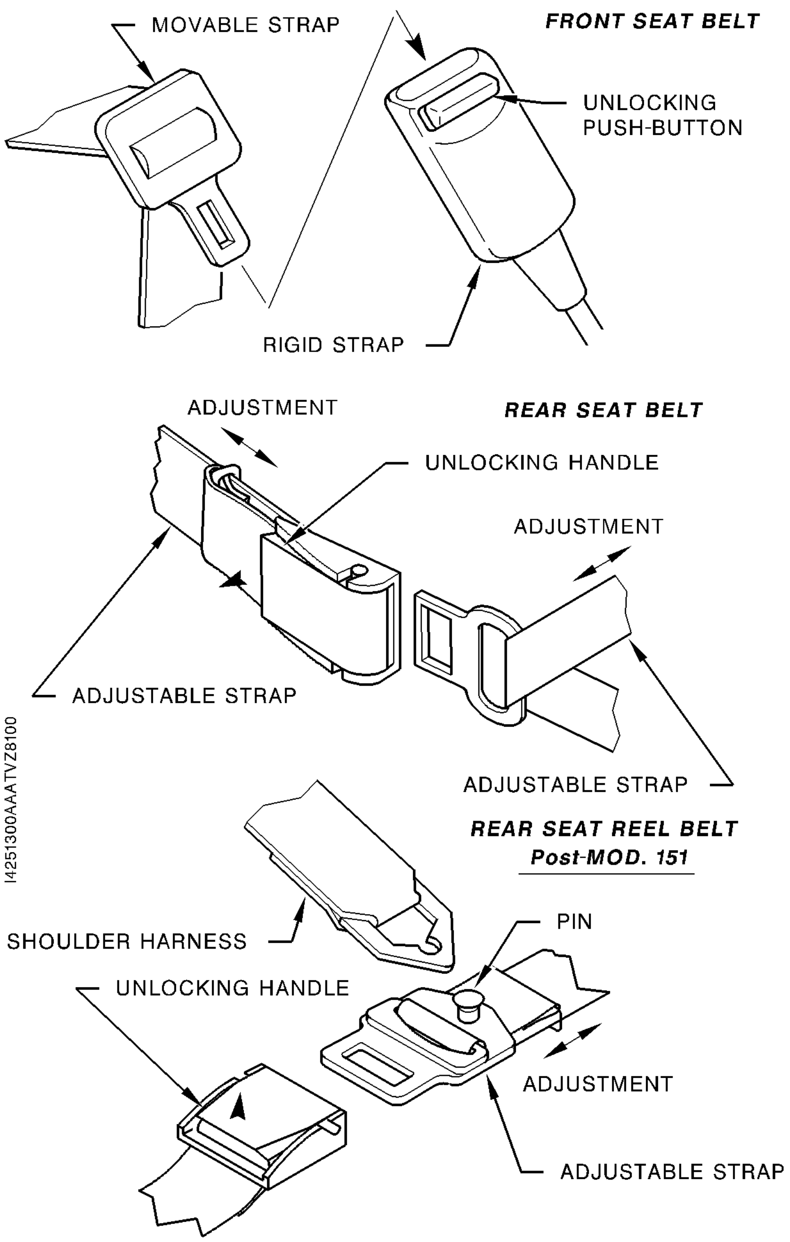


Figure 7.10 – SEAT BELTS

SEAT BELTS (see Figure 7.10)

RECOMMENDATIONS

Misuse of the safety belt may introduce a risk.
Be sure the belt is tightened when it is fastened.
To be effective, the seat belt shall not be twisted.
In any case and for all types of belts, check that they are not impeded in their operation.
Further to a severe accident, replace the belts which were installed when the accident happened.

Front seat belts

– To lock them :
Engage movable strap into rigid strap up to clipping.
Should a blocking occur during operation, slightly ease back [5 in. (10 cm) approximately], then unwind strap again.

– To unlock them :
Depress red unlocking push–button to free movable strap.

Rear seat belts

– To lock them :
Engage both straps up to clipping.
Be sure the belt is properly tightened (adjustement is possible on both straps).

– To unlock them :
Pull on unlocking handle to release straps.

<u>Post–MOD.151</u>

Rear seat reel belts

– To lock them :
Engage reel shoulder harness rigid part on adjustable strap pin. Then engage straps so attached in the locking handle up to clipping.
Be sure the belt is properly tightened.

– To unlock them :
Pull on unlocking handle to release straps.
Disengage shoulder harness rigid part from the pin.

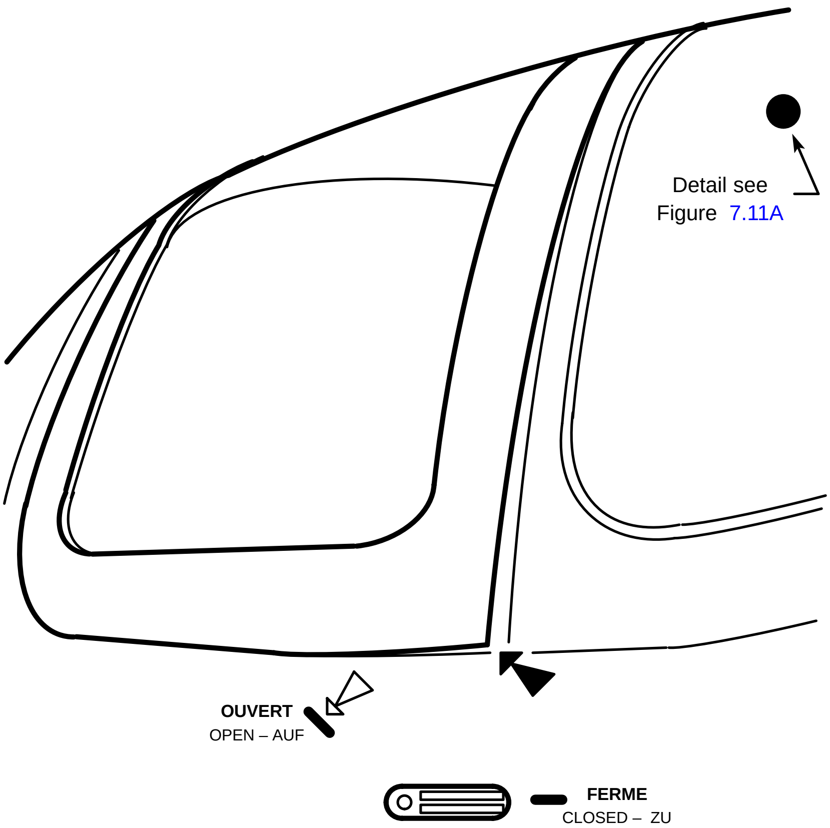


Figure 7.11 – DOORS OPENING AND CLOSING

Figure 7.11A – EMERGENCY EXIT – Pre–MOD.151

DOORS AND EXITS (see Figure 7.11)

DOORS

– To open them :
  Push handle forward.
  Lift the door at the location marked with a shaded arrow.
  Follow door up to maximum position.

– To close them :
  Close the door and set handle to "Closed" position .

WARNING

PRIOR TO EACH FLIGHT, CHECK THAT BOTH CABIN ACCESS DOORS ARE NOT KEY–LOCKED

CHECK THAT BOTH LOCKING HOOKS ARE PROPERLY NOTCHED

EXITS

Pre–MOD.151

In case of L.H. and R.H. doors locking, and if it is necessary to leave the airplane in a hurry (risks of fire, drowning...) jettisson one or both rear windows, kicking out at the location of the placard.

The placard (see Figure 7.11A) is located on both rear windows and is legible from the inside of the airplane.

CONTROLS LOCK

A locking pin located in lateral case on pilot's side is provided to block the control wheel.

To insert the blocking pin into the control wheel tube pull the control wheel backwards to approximately half–way and line up the tube hole with that of the fixed part on the panel. The blocking pin will be inserted vertically from top to bottom.

A safety device preventing the introduction of the magneto/start selector key forbids operation of the engine with blocked control wheel.

Pull the blocking pin upwards to free the control wheel and the magneto/start selector.

ENGINE

The TB 20 airplane is powered by a six–cylinder, horizontally opposed, direct drive LYCOMING IO–540–C4–D5D (or IO–540–C4–B5D, if the starting vibrator, optional equipment A86500M is installed) engine rated at 250 BHP at 2575 RPM. It is provided with a starter, a 24–volt / 70–amp alternator, an all–weather shielded ignition harness, a dual magneto, a vacuum pump drive, a fuel pump and a manifold air filter.

The engine cowl is a laminate cantilever structure, fixed on the firewall and made of two elements. The upper cowl is fitted with an inspection door provided to check oil level ; it can also be fitted with an access door to the propeller deicing fluid tank. The lower cowl is fitted with incorporated air intakes and may be fitted with an inspection door to easy quick drain. Both cowls are completely removable without requiring removal of the propeller.

The engine mount is made of steel tube, rigidly attached on firewall. Engine attachment is provided by dynafocal mounting brackets to attenuate vibrations.

Engine and accessories cooling is provided by a downwards airflow. Air penetrates through holes located on each side of the propeller cone, is guided around the engine by airproof deflectors, then conducted to two air outlets located on the lower cowl.

Engine inlet air penetrates through an air intake located at the front of the lower cowl and goes directly through a filter, before being admitted in the air duct under the injection unit.

The air duct can also be air–feeded by an alternative air supply source ”Alternate air” which is mechanically actuated by pushing the control lever located on the R.H. side under the L.H. instrument panel. From S / N 948 push central knob before pulling control lever rearward or pushing it back forward. This air source provides the injection unit with heated air when the airplane is involuntarily into icing conditions.

The stainless steel exhaust system comprises a silencer with a heat exchanger in order to provide cabin hot air supply. Exhaust gases are evacuated through the exhaust duct at the basis of engine lower cowl, on R.H. side.

In order to obtain the maximum engine performance and T.B.O, the pilot should apply the procedures recommended by Lycoming Operator's Manual concerning the engine.

ENGINE CONTROLS

- Engine manifold pressure is controlled by the throttle (large black knob) located on the control pedestal on the L.H. side. In the forward position, the throttle is open (full power) ; in the aft position, it is closed (engine idling).

  At approximately ½ in. (12 mm) of its rear stop, the throttle actuates on landing gear alarm microswitch.

- The propeller governor is controlled by the propeller control (blue or black notched knob) located at the centre of the central pedestal. In the forward position, the propeller moves to "low pitch" position (high RPM), in the aft position, it moves to "high pitch" position (low RPM).

- The mixture is controlled by the mixture control (red notched knob) located on R.H. side of the central pedestal. In the forward position, the mixture is open (full rich) ; in the aft position, the mixture is closed (idle cut–off).

- Engine controls friction is controlled by a knurled knob located in the alignment of the controls on the R.H. side of the pedestal.

ENGINE INSTRUMENTS

Indicators enable the pilot to assure a permanent check of oil pressure, oil temperature, tachometer, manifold pressure, flowmeter and (if installed) EGT and CHT.

IGNITION – STARTER SYSTEM

Engine ignition is provided by a dual magneto on two spark plugs per cylinder.

The R.H. part of the magneto fires the R.H. lower and L.H. upper spark plugs ; the L.H. part of the magneto fires the L.H. lower and R.H. upper spark plugs.

Ignition is controlled by a key–operated rotating selector, located on L.H. side of the L.H. panel strip.

The selector operates clockwise :

– if the airplane is not equipped with the starting vibrator :

  OFF ; L.H. magneto ; R.H. magneto ; L.H. + R.H. magnetos ; STARTER by pushing.

– if the airplane is equipped with the starting vibrator (OPT A865) :

  OFF ; R.H. magneto ; L.H. magneto ; L.H. + R.H. magnetos ; STARTER by pushing.

CAUTION

**RELEASE THE PRESSURE ON THE KEY
AFTER ENGINE START**

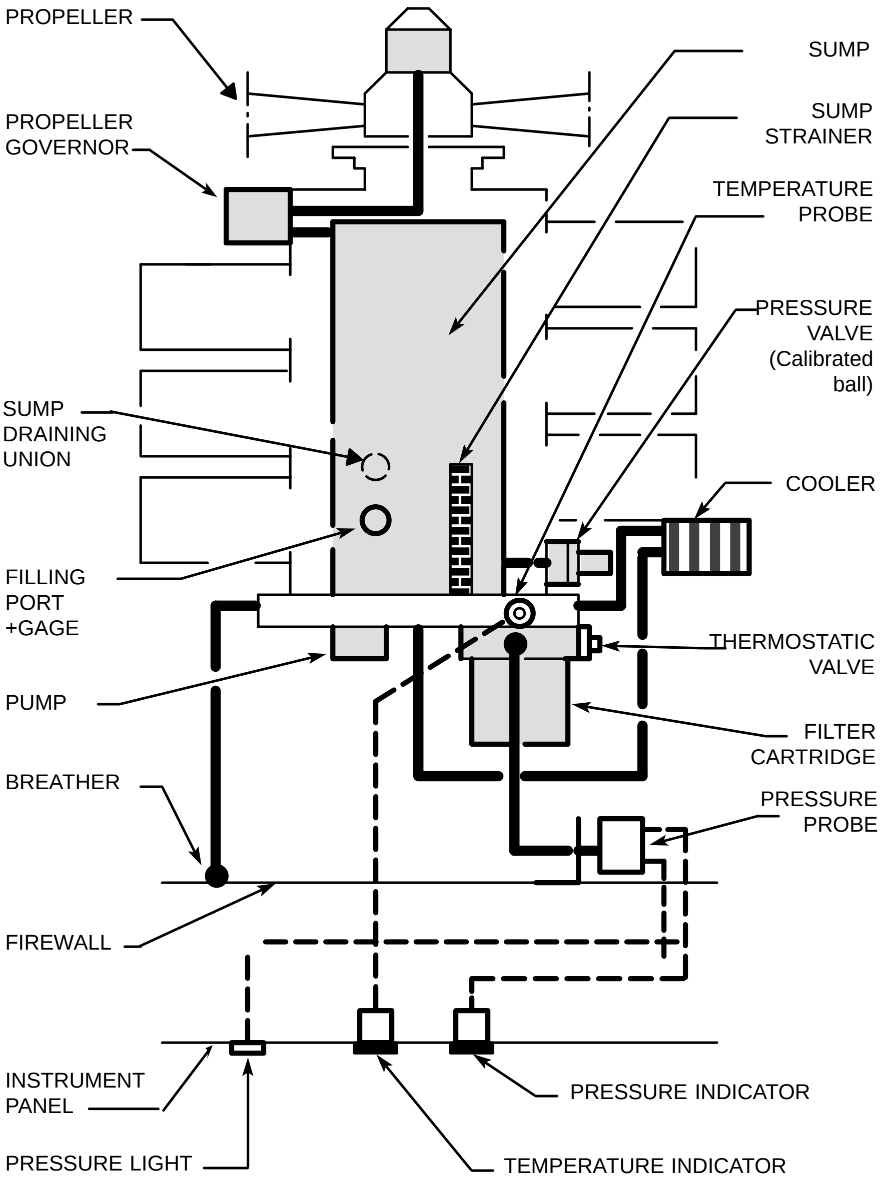


Figure 7.12 – OIL SYSTEM

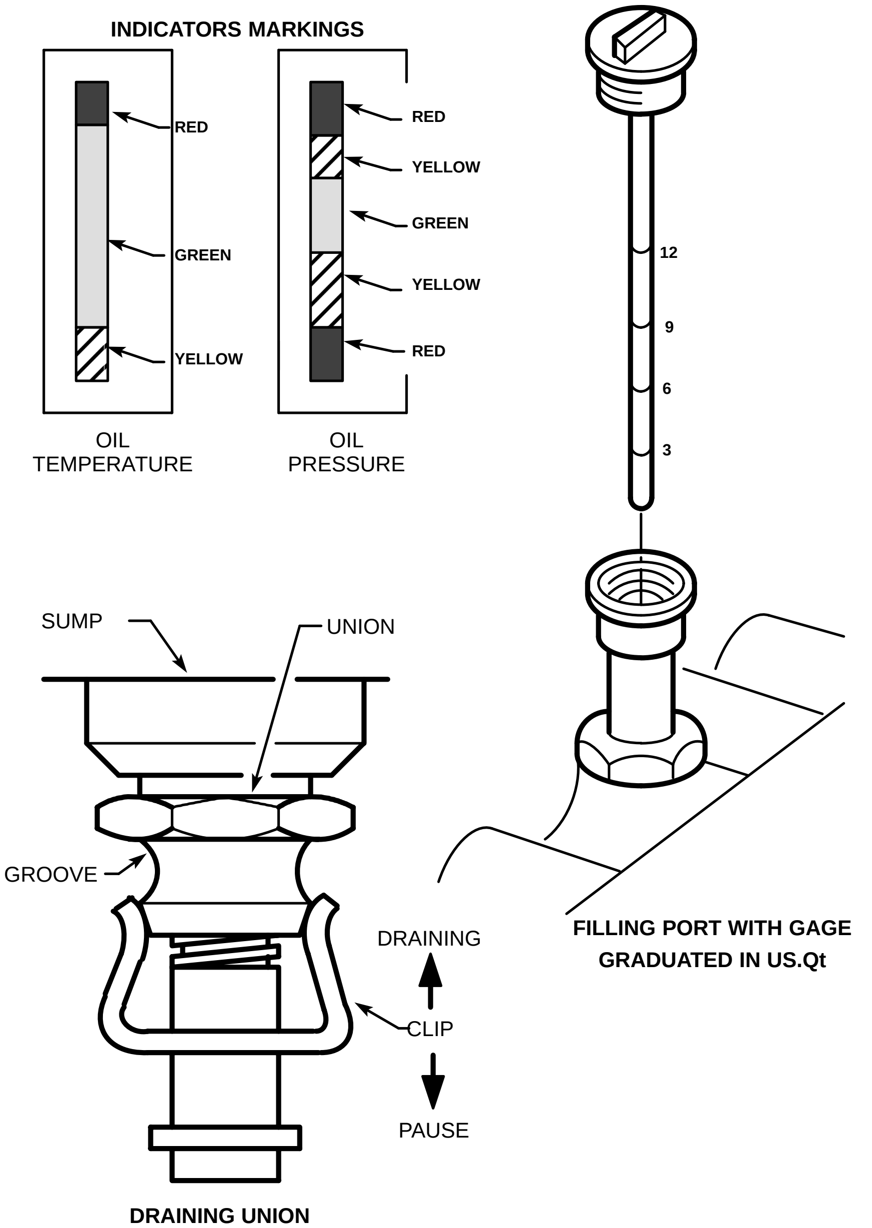


Figure 7.12A – OIL SYSTEM

NEW ENGINE BREAK–IN AND OPERATION

The engine has undergone a break–in at the factory and is ready for the full range of use. It is, however, recommended that cruising flights be accomplished at 65 to 75 % until a total of 50 hours has accumulated or oil consumption has stabilized.

The airplane is delivered from the factory with corrosion preventive engine oil. If, during the first 50 hours, oil must be added, use only aviation grade straight mineral oil in compliance with Specification MIL–L–6082.
Use dispersant oil in compliance with Specification MIL–L–22851 only after the first 50 hours.

ENGINE LUBRICATION SYSTEM (See Figures 7.12 and 7.12A)

The engine is lubricated by an oil system powered by a pump located on engine rear accessory housing. A sump located at the bottom of the engine allowing oil recovery, a cartridge throw–away type filter located on engine rear accessory housing and a strainer type filter located in the sump complete the system.
A pressure probe and a temperature probe transmitting the values to two indicators located on upper edge of the console enable the pilot to check the oil system.
An inspection door located on engine upper cowl provides access to oil system filling port.
A dipstick attached on the port blanking cap enables to check oil level in the sump. A union located under the engine case enables a quick drain of the latter.

AIR INDUCTION SYSTEM

The engine is supplied with an air intake located under the propeller cone. This air intake is fitted with a filter which removes dust and other foreign matters from the induction air so that they do not penetrate into the air duct. However, in the event the air filter becomes blocked, pull on "Alternate Air" control to open an alternate air door allowing air to enter the engine.
For flights in sandy or dusty atmosphere, install a second specific filter.

EXHAUST SYSTEM

Exhaust gas from each cylinder is collected by pipes to be conducted, in order to reduce its noise level to an exhaust duct which vents it outboard on R.H. side of lower engine cowl.

PROPELLER

The airplane is fitted with all–metal, two–bladed, constant–speed, governor–regulated propeller. The propeller control actuates on the governor. According to the control position, the governor determines propeller rotation speed, and thus the engine speed to be maintained. The governor controls flow of engine oil, boosted to high pressure by the governing pump, on a piston located in propeller hub. Oil pressure twists the blades toward high pitch (low RPM). When oil pressure to the piston is relieved, the blades twist to low pitch (high RPM).

FUEL SYSTEM

The fuel system (see Figures 7.13 and 7.14) consists of two vented integral fuel tanks (one in each wing), a selector valve, a filter, an auxiliary fuel pump as well as an engine–driven fuel pump, a fuel distributor and six fuel–injection nozzles.

Engine–driven fuel pump suction draws fuel from L.H. or R.H. tank through the three–position selector valve and a filter.
The selector valve is controlled through a knob labeled ”FUEL SELECTOR”
The selector valve knob has following positions labeled : ”CLOSED”, ”LEFT”, ”RIGHT”.

Then, the fuel goes through the auxiliary fuel pump (electric) and supplies the engine fuel pump. The engine pump supplies fuel under pressure to injection unit. The fuel is then conducted to the divider, to the injectors in the cylinders.

A dual indicator gives the manifold pressure as well as the fuel flow and pressure (the fuel pressure is a nozzle pressure picked up on the flow divider).

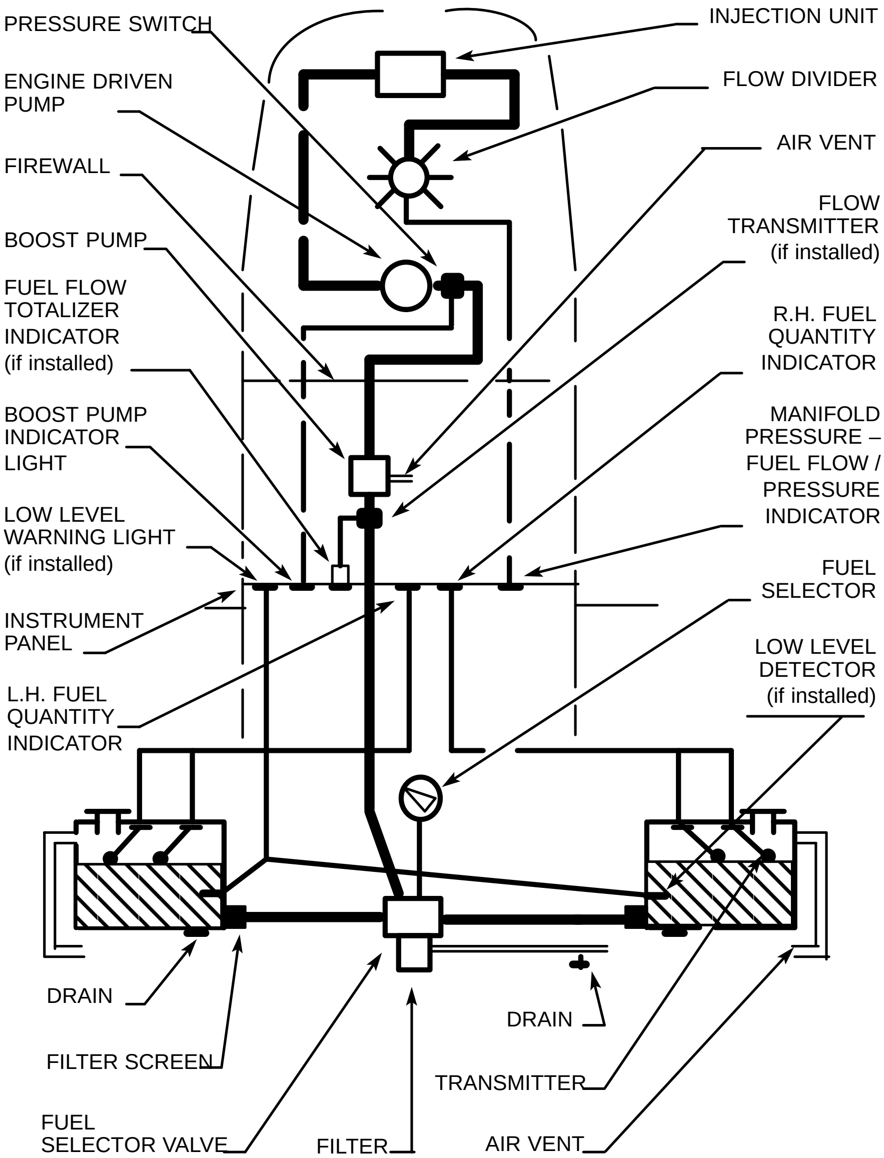


Figure 7.13 – FUEL SYSTEM

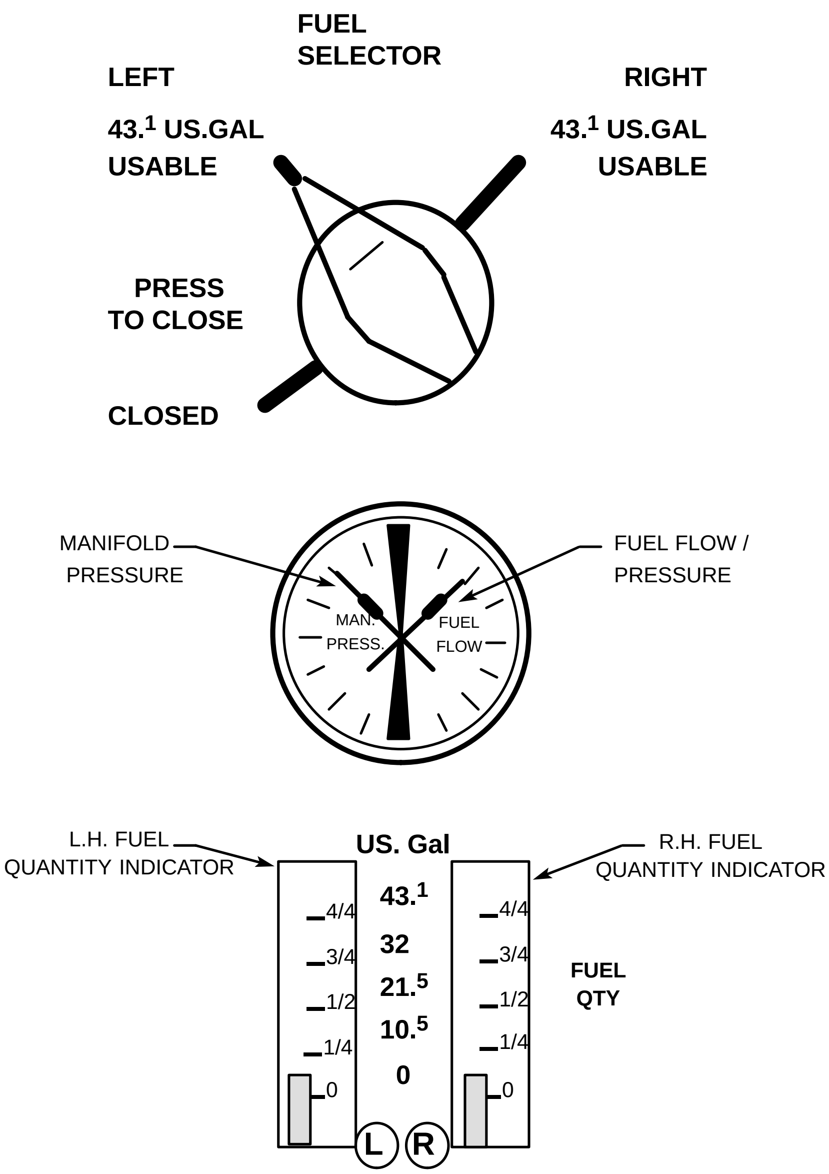


Figure 7.14 – FUEL SYSTEM MARKINGS

Fuel quantities :

- Total maximum : 88.8 U.S Gal (336 l)
- Total usable : 86.2 U.S Gal (326 l)
- Unusable : 2.6 U.S Gal (10 l)

In cruise flight, a continuation of fuel flow must be assured as the new tank is being selected. When switching from one tank to the other, place the auxiliary fuel pump switch momentarily in the "ON" position until normal fuel flow has been restored.

Each fuel tank is equipped with its own ventilation system, an essential element in the operation of the fuel system. Should a vent become blocked, the fuel flow from the tank concerned is reduced and the engine may cut out. The ventilation is ensured by ducts which run to the lower surface of each wing.

The quantity of fuel is measured by four electric gage transmitters (two in each wing) and is displayed by two level indicators located at the top of the central console.
The indicators are graduated in 1/4, 1/2, 3/4 and 4/4, with the zero indicating an empty tank. When the pointer of the indicator is at zero, approximately 1.3 U.S. Gal (5 litres) of unusable fuel remains in the tank.
The indicators cannot be relied upon for accurate readings during skids, slips or unusual attitudes. If both indicator pointers should rapidly move to a zero, check voltmeter and oil temperature indicators. If they are not indicating, an electrical malfunction has occurred.

A low level warning light (if installed), located on the advisory panel, comes on whenever fuel quantity, remaining in one of both tanks, (airplane in line of flight) reaches approximately 7.9 U.S. Gal (30 litres). In this configuration, the warning light illumination is controlled by a low level detector, located in each tank.

The auxiliary fuel pump is controlled by a switch–breaker located on front part of pedestal.
An indicator light located on the advisory panel shows operation of the auxiliary pump.

The fuel system is equipped with drain valves to provide a means for the examination of the fuel in the system for contamination and grade. The system should be drained every day before the first flight and after each refueling by using the fuel sampler provided to drain fuel from the wing tank sump drain and the fuel strainers drains. The fuel tank sump drains are located just outboard of each main landing gear well and the fuel strainer drain is located under the R.H. front fuselage, near its intersection with R.H. wing.

The fuel tanks should be filled after each flight to minimize condensation, respecting the weight and balance limits.
The tanks are provided with a gage visible from the filling port.
Fuel tanks are full (fuel level not marked on the gage) when fuel is at the level of the filling port.

RETRACTABLE LANDING GEAR HYDRAULIC SYSTEM

The only function of the hydraulic generator located under rear seat is to supply hydraulic power necessary for operation of the retractable landing gear.

BRAKE SYSTEM

BRAKING

Braking is provided by disc brakes hydraulically actuated by brake pedals located on the L.H. station rudder pedals.

The R.H. station may also be equipped with brake pedals.

Differential braking helps to maneuver during taxiing :
– L.H. pedal actuates the L.H. wheel brake,
– R.H. pedal actuates the R.H. wheel brake.

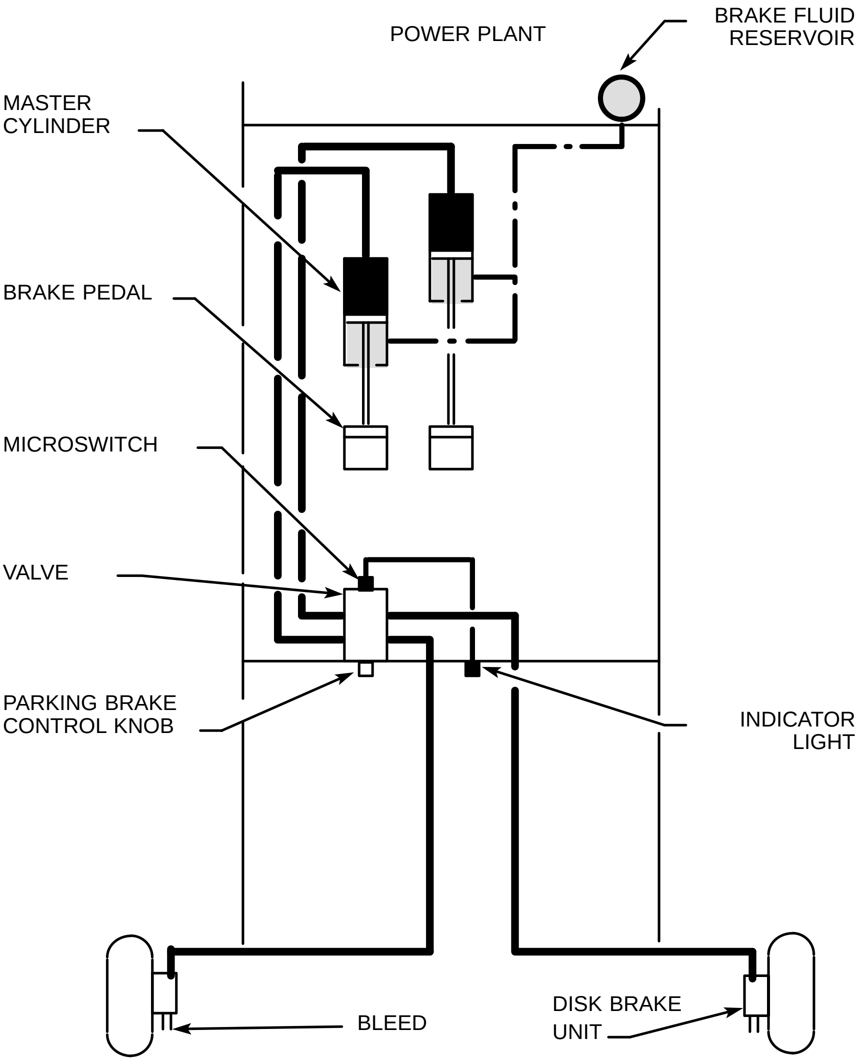


Figure 7.15 – BRAKE SYSTEM (L.H. station only)

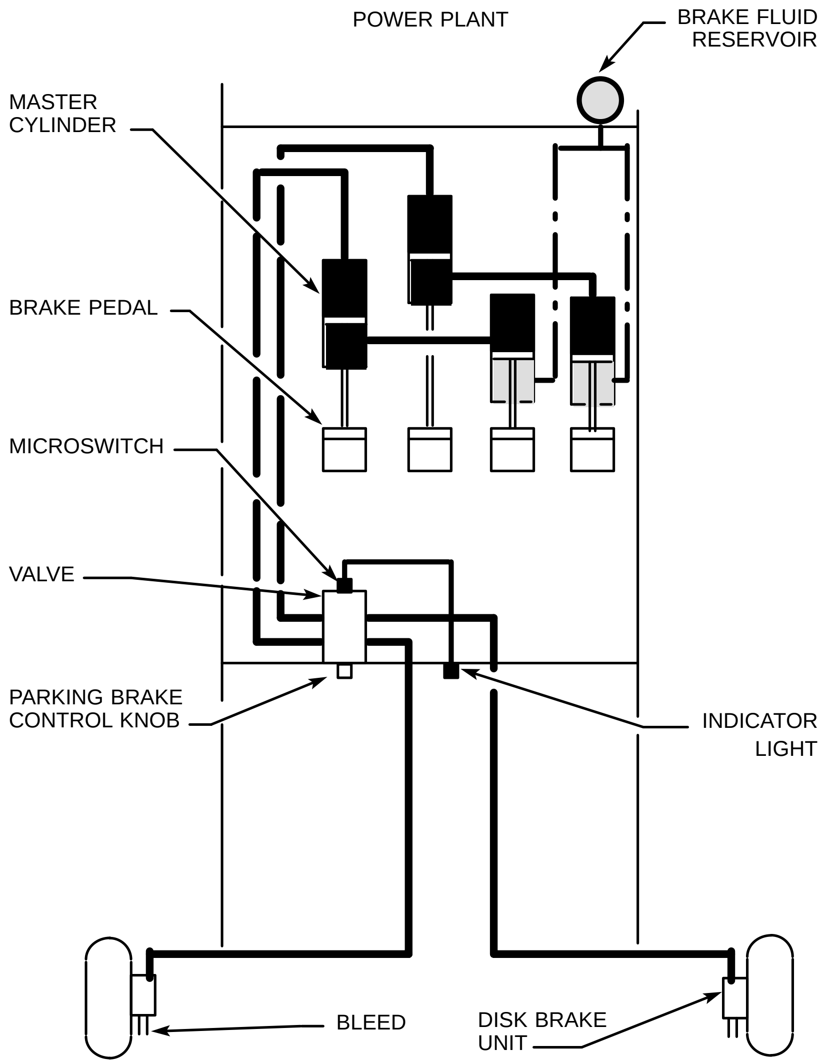


Figure 7.15A – BRAKE SYSTEM (L.H. + R.H. stations) (if installed)

PARKING BRAKE

- Parking brake is constituted with a knob located on the lower section of the L.H. strip, actuating a valve.
- To apply the parking brake, depress the pedals and turn the parking brake knob rightward.
- To release the parking brake, depress the pedals and set knob again in its vertical position (turn it leftward).
- An indicator light located on the advisory panel shows the position of the parking brake knob.

NOTE :
Operating the brake knob does not cause the parking brake to operate.

STANDARD ELECTRICAL SYSTEM

The airplane is equipped with a 28–volt, direct–current electrical system (see Figures 7.16 and 7.16A). A belt–driven 70–amp alternator installed on the engine and, in standard version, a battery located in a compartment under the baggage compartment floor, supply the system. In optional version, the battery is located in a compartment over the front table, forward the R.H. instrument panel.

The alternator is controlled by an alternator control unit providing voltage regulation, plus overvoltage sensing.

A ”pull–off” type circuit breaker calibrated at 60 amps limits the alternator electrical load to the battery and the networks.

ALTERNATOR CONTROL UNIT

The alternator control unit located on the firewall, on cabin side provides the alternator voltage regulation and overvoltage protection.

In the event of overvoltage, the alternator control unit cuts off the alternator field and the amber (red on UK airplanes) warning light labeled ”ALTr” illuminates. In this case only the battery powers the airplane mains.

The reset of the alternator control unit is operated by disconnecting and closing the switch–breaker labelled ”ALT^{r} FLD”.

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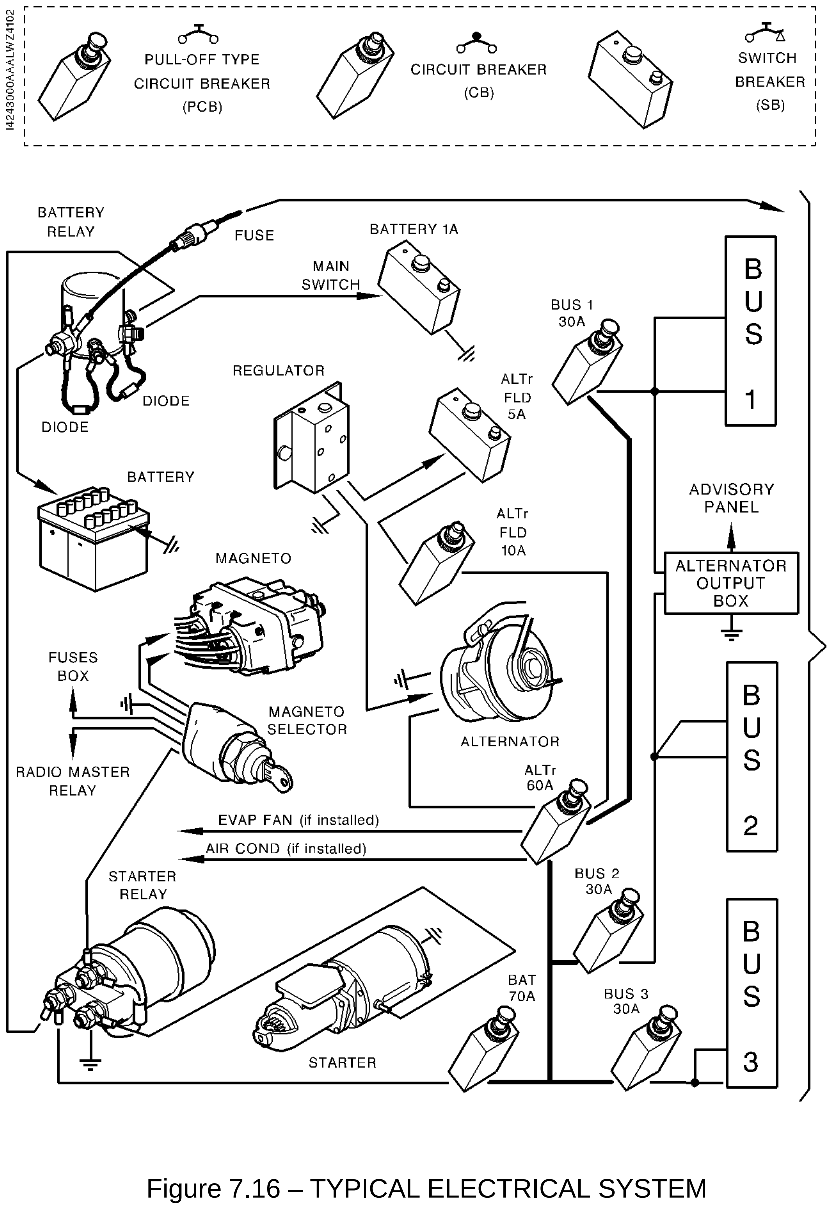

Figure 7.16 – TYPICAL ELECTRICAL SYSTEM

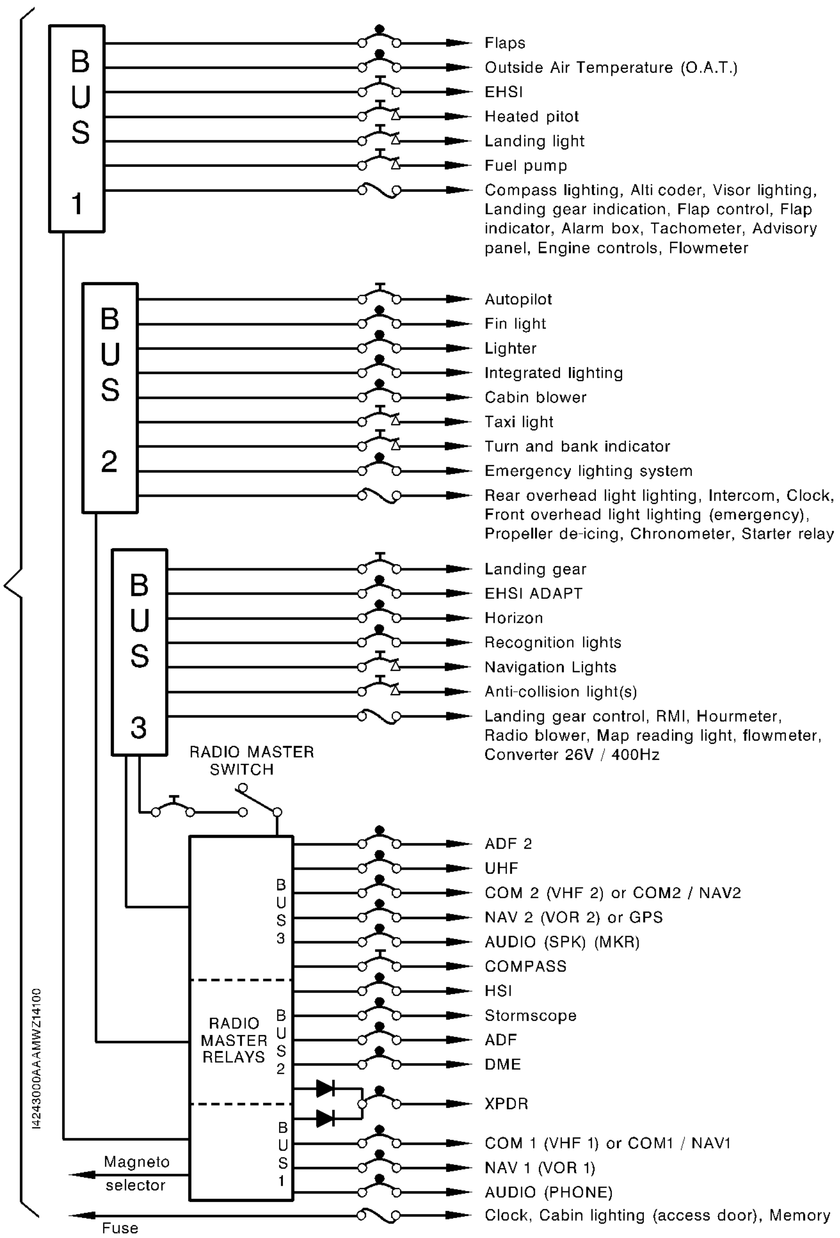

Figure 7.16A – TYPICAL ELECTRICAL SYSTEM

MAIN SWITCH

Battery connection to the electrical network is made through the switch–breaker labeled ”MAIN SWITCH”.

Before connecting ground power receptacle (if installed) on external power unit, check that main switch is OFF.

ALTERNATOR CONTROL

Located on the R.H. side of the main switch, the alternator switch–breaker labeled ”ALT^{r} FLD” controls the operation of the alternator through the regulator.

In the event of an alternator disconnection, should the flight be continued, only the necessary electrical equipment will be used.

The opening of ”BAT” and ”ALTr FLD” pull–off type circuit breakers in flight cuts off simultaneously all electrical power supplies.

AVIONICS POWER SWITCH (if installed)

A switch labeled ”RADIO MASTER” is installed on R.H. side of the L.H. strip to control power supply to avionics and enables automatic disconnection of avionics systems when the engine starts, or manual disconnection during abnormal conditions.

When the switch is in OFF position, no electrical power will be applied to the avionics equipment. The avionics power switch ”RADIO MASTER” should be placed in the OFF position prior to turning main switch ON or OFF, or applying an external power source and may be utilized in place of the individual avionics equipment switches.

Pulling off the ”R.M. SWITCH” circuit breaker enables to inhibit the ”RADIO MASTER” switch operation, and so to recover the power supply of the radio set in case of faulty operation of the ”RADIO MASTER” switch.

”RADIO MASTER” function does not concern some optional equipment such as electric trim, autopilot, HF transceiver...

VOLTMETER

A voltmeter is incorporated to the engine control instruments module, located on the upper part of the console, to monitor electric generation system efficiency.

With the alternator operating, the indication must stabilize in the green sector.

With the alternator off, indication may go down to the yellow sector.

If indication is within lower red sector, remove and charge the battery.

If indication is within the upper red sector with the alternator operating, the regulator has to be adjusted.

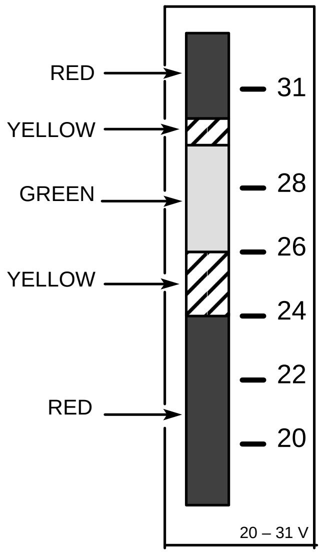

Figure 7.17 – VOLTMETER MARKING

AMMETER (if installed – standard equipment for ”BRAZIL”)

The ammeter indicates current flow, in amperes, from the alternator to the battery, or from the battery to the electrical system. With the engine operating and master switch ”ON”, the ammeter indicates the rate of charge being applied to the battery.

CIRCUIT BREAKERS AND FUSES

Most of electrical circuits are protected by circuit breakers installed on the L.H. side panel, adjacent to the pilot. Should an overload occur on a circuit, the circuit breaker opens and will switch off the circuit. Allow it to cool for three minutes approximately, then the circuit breaker may be closed again (pressed down).

Avionics equipment are protected by circuit breakers grouped in the lower part of the L.H. side circuit breakers panel.

In addition to protection of the alternator supply with a 60–amp pull–off type circuit breaker labeled ”ALTr”, the following pull–off type circuit breakers have been installed :

– 70 A labeled ”BAT” between battery and network
– 30 A labeled ”BUS 1” on bus bar 1 supply
– 30 A labeled ”BUS 2” on bus bar 2 supply
– 30 A labeled ”BUS 3” on bus bar 3 supply

These five pull–off type circuit breakers are manually–operated and can isolate the various sources or bus bars.

Fuses located on L.H. firewall door protect following circuits (from left to right) :

Upper row :	advisory panel, landing gears warning lights, advisory panel, compass lighting, rear cabin light, starter relay, electric tachometer, emergency lighting,
and if installed :	propeller de–icing, RMI, converter 26 V / 400 Hz, radio fan, spare.
Lower row :	engine monitoring cluster, engine monitoring cluster, landing gears control, flaps indicator, flaps control, alarms box (landing gear + stall), visor lighting,
and if installed :	chronometer, intercom, clock, alti–coder, maps light, spare, hourmeter, fuel flowmeter.

"ALTr" WARNING LIGHT (LOW VOLTAGE)

Anytime electrical system voltage falls below approximately 26 volts, as directly sensed by the distribution systems, an amber (red on UK airplanes) warning light labeled "ALTr" illuminates on advisory panel to warn the pilot.

GROUND POWER RECEPTACLE (if installed)

A ground power receptacle permits the use of an external power source for cold weather starting and during maintenance work on the airplane electrical system. Details of the ground power receptacle are presented in Section 9 "Supplements".

IFR AND NIGHT VFR ELECTRICAL SYSTEMS (if installed)

See Section 9 "Supplements".

LIGHTING SYSTEMS

EXTERIOR LIGHTING

<u>Pre–MOD.151</u>

Basic exterior lighting consists of conventional navigation lights located on the wing tips and tail cone, a landing light and a taxi light mounted on the L.H. wing leading edge.

The airplane may be equipped with an anticollision assembly, including a light on each wing tip and, as a replacement for the navigation light at the tail cone end, if required, with a double–function light (navigation light/strobe light).

<u>Post–MOD.151</u>

Basic exterior lighting consists of :

– a unit located on each wing tip including side and rear navigation lights, as well as an anticollision light,

– a landing light and a taxi light installed in the L.H. wing leading edge.

The airplane may be equipped, on each wing tip, with a recognition light.

All

In addition to the navigation lights, the exterior lighting may include a strobe light installed on the vertical stabilizer and under the fuselage.

Lighting controls :

The switch–breakers, located on the central pedestal front part (see Figure 7.5B), control the lighting of the landing and taxi lights, the navigation lights and anticollision lights.

NOTE :
The amperage of the wing tip anticollision light switch–breaker is increased when the airplane is equipped with the tail cone strobe light.

A switch, located on the circuit breaker panel (see Figure 7.6), controls the strobe light illumination. This circuit is protected by a circuit breaker located on the left of the switch.

Anticollision lights and strobe lights should not be used when flying through clouds or overcast, the flashing light reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation.

INTERIOR LIGHTING

Instrument panel and control panels lighting is provided by integral, flood, post lights and electroluminescent lighting. Three lighting control knobs are grouped together on the L.H. part of the L.H. instrument panel.

These three controls vary the intensity of all instrument panel and L.H. sidewall circuit breakers panel lightings, except for the rear overhead light. The following paragraphs describe the function of these controls.

Lighting controls :

They allow the operating from down to up of :

– ”Normal” control which controls and modulates L.H. and R.H. instrument panels visors lighting.

– ”Emergency” control Pre–MOD.151 :

  which modulates lighting of overhead lights controlled by rotating them.

– ”Emergency” control Post–MOD.151 :

  which controls and modulates lighting of front overhead lights.

– ”Radio and instruments” control which controls and modulates console visor lighting, instruments and equipment on instrument panel, emergency landing gear control and circuit breakers panel.

NOTE :

– *Both ”normal” and ”radio and instruments” controls and, Post–MOD.151, the emergency control operate and modulate lighting ; from high position ”OFF”, turn clockwise for ”FULL INTENSITY OPERATION” then still clockwise, modulate towards ”MINIMUM INTENSITY”, turn back to ”OFF” position turning counterclockwise.*

– *”Emergency” control, Pre–MOD.151, modulates lighting ; from high position ”FULL INTENSITY” turn clockwise to modulate towards ”MINIMUM INTENSITY” ; turn back to high position ”FULL INTENSITY” turning counterclockwise .*

A courtesy light is installed in the cabin headliner, in front of the air outlets, to facilitate boarding or deplaning the airplane during night operations. The light circuit does not require power to be applied to the main electrical system bus bars for operation (Main switch may remain OFF) .

This light is controlled by a toggle switch integrated to the light. Throwing this overhead light provides its extinguishing, a continuous or an intermittent lighting controlled by the opening of the L.H. front door.

A maps reading light may be installed on the bottom of the control’s wheel. This light illuminates the lower portion of the cabin in front of the pilot and is used for reading maps and other flight data during night operation. It is controlled by a switch located on the right horn of the pilot’s control wheel.

DEMISTING, AIR REGULATION, VENTILATION, FIRE CUT–OFF

The temperature and air flow to the cabin are regulated by the cabin air regulation system and the air outlets (see Figure 7.18).

DEMISTING

The air intake located on the L.H. side of the propeller cone provides air supply to the exchanger located around the exhaust duct, the heated air supplies a box located on the upper portion of the aft face of the firewall. This box may be shut off by a fire cut–off shutter and allows hot air distribution on both sides of the windshield.

Hot airflow is regulated from the control panel located on R.H. side of instrument panel strip.

AIR REGULATION

Hot air

Comes from the exchanger (located around exhaust duct).

This heated air supplies a cabin air mixer located aft of the firewall (in front of front passenger's feet).

The hot airflow supplying this mixer is regulated by a fire cut–off shutter from the control panel located on R.H. portion of the instrument panel strip.

Cool air

Comes from R.H. NACA air intake which may be shut off by means of two flaps with simultaneous opening. This cool air supplies cabin air mixer.

NOTE :
Shutting off NACA air intakes reduces appreciably the cabin noise level.

Hot / cool air mixing in cabin air mixer

Hot and cool airflows in cabin air mixer are actuated through a single control. Regulation is obtained by moving the control ; rightwards air becomes warmer, leftwards air becomes cooler, fully moved to the left in fire cut–off position for the cabin air mixer.

Distribution of regulated air

The mixed airflow in the cabin air mixer is regulated by a shutter before being distributed in the cabin towards pilot's feet, front and rear passengers' feet and in upper part of rear seat back–rest.

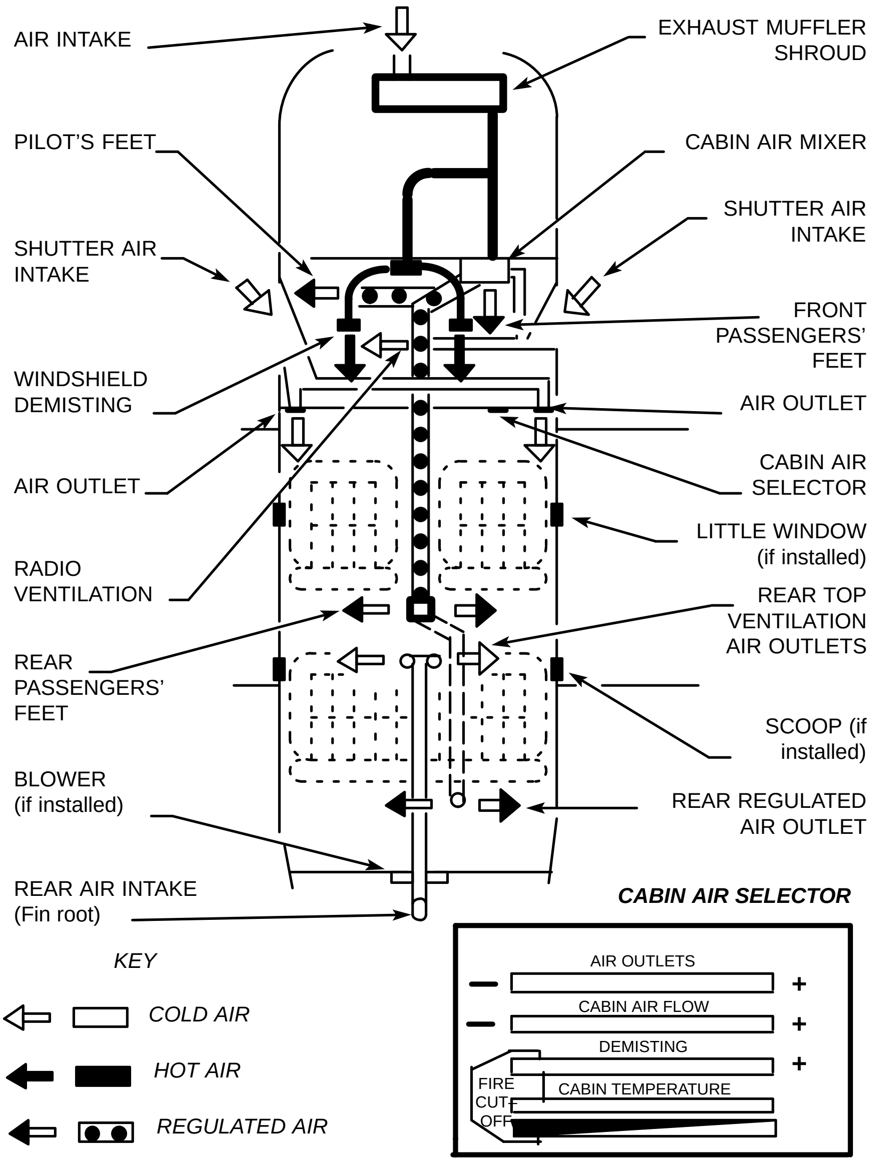

Figure 7.18 – DEMISTING, AIR REGULATION, VENTILATION, CUT–OFF SYSTEM

VENTILATION

Low ventilation

See ”Cool air” and ”Distribution of regulated air” of the previous ”AIR REGULATION” paragraph.

High ventilation

– Pilot + front passenger

  Air (at outside temperature) coming from NACA L.H. shutter air intake supplies two swivelling air outlets which airflow may be regulated, located on both parts of the instrument panel strip. The upper control of cabin air selector allows adjustment of NACA opening.

  NOTE :
  To get air from the air outlets, combine their opening with opening of NACA air intake.
  Shutting off NACA air intakes reduces appreciably the cabin noise level.

  A little window may be installed on the access doors to facilitate high ventilation for pilot and front passenger.

– Rear passengers

  An air intake (at outside temperature), located at the bottom part of the fin, supplies two air outlets (swivelling and with adjustable airflow) installed on the upper duct.

  A swivelling scoop may be installed on rear windows to facilitate high ventilation for rear passengers.

A blower (if installed) attached on aft face of the baggage compartment (former 6) and picking up outside air in aft fuselage permits to accelerate the cool airflow at rear seats. The blower switch is located on the upper duct, in front of air outlets (see Figure 7.4).

FIRE CUT–OFF

CAUTION

TO PROVIDE THE CUT–OFF OPERATION, BOTH ”DEMISTING” AND ”CABIN TEMPERATURE” CONTROLS MUST BE POSITIONED FULLY TO THE LEFT

AIR CONDITIONING (if installed)

See Section 9 ”Supplements”.

OXYGEN SYSTEM (if installed)

See Section 9 ”Supplements”.

AIRSPEED INDICATING SYSTEM AND INSTRUMENTS

The airspeed indicating system (see Figure 7.19) supplies pitot air pressure to the airspeed indicator or to the true airspeed indicator and a static air pressure to the airspeed indicator or to the true airspeed indicator, the vertical speed indicator and the altimeter.

The system consists of a pitot, which can be heated, located on the lower surface of the L.H. wing, two static ports located on L.H. and R.H. side of aft fuselage, a static system drain located on the wings splicing.

The pitot heating system (if installed) is controlled by a switch–breaker located on the central pedestal.

The alternate static source (if installed) is controlled by a knob located on the L.H. strip, this knob controls a valve which supplies static pressure from inside the cabin.

Refer to Sections 3 ”Emergency procedures” and 5 ”Performance” of this manual for the pressure variations influence on instruments indication.

When stopped, protect the static ports and pitot with covers.

TRUE AIRSPEED INDICATOR (if installed)

The true airspeed indicator is fitted with a rotable ring which works in conjunction with its dial in a manner similar to a flight computer.

To set the indicator, first rotate the ring until pressure altitude is aligned with outside air temperature.

To obtain pressure altitude, set the barometric scale of the altimeter to 29.92 in.Hg (1013.2 hPa) and read pressure altitude. Pressure altitude should not be confused with QNH altitude.

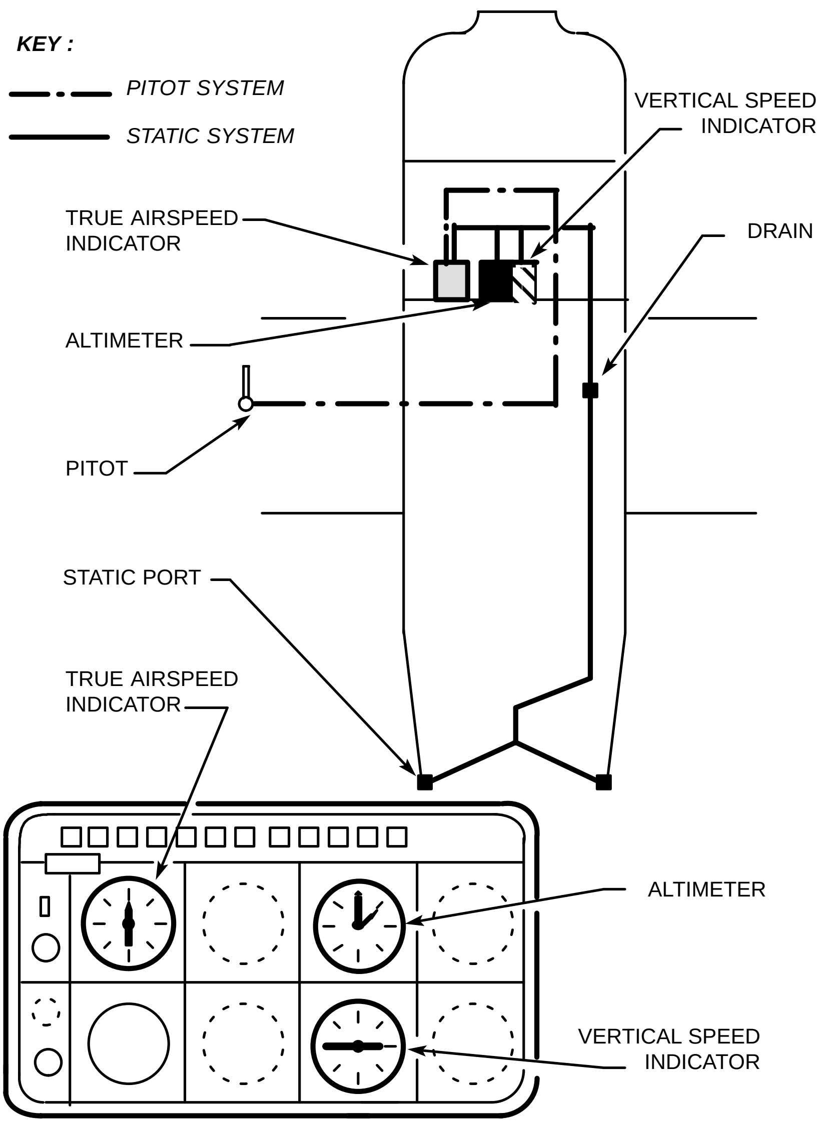

Figure 7.19 – AIRSPEED INDICATING SYSTEM

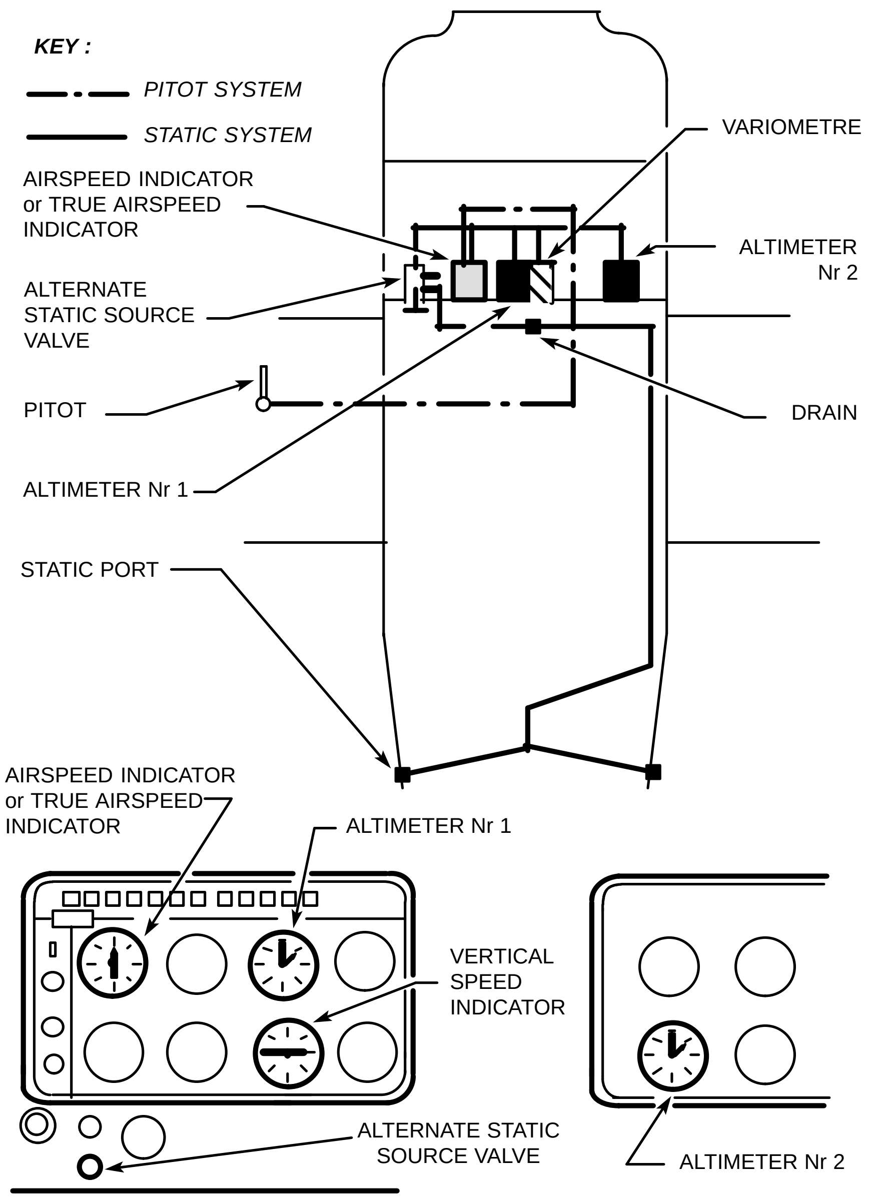

Figure 7.19A – AIRSPEED INDICATING SYSTEM WITH ALTERNATE STATIC SOURCE

Having set the ring to correct for altitude and temperature, read the true airspeed shown on the rotable ring by the indicator pointer.

For best accuracy, the indicated airspeed should be corrected to corrected airspeed by referring to the Airspeed calibration chart in Section 5 "Performance". Knowing the calibrated airspeed, read true airspeed on the ring opposite the calibrated airspeed.

VERTICAL SPEED INDICATOR

The vertical speed indicator depicts airplane rate of climb or descent in feet per minute. The pointer is actuated by atmospheric pressure changes resulting from changes of altitude as supplied by the static source.

ALTIMETER

Airplane altitude is depicted by a barometric type altimeter. A knob near the lower left portion of the indicator provides adjustment of the instrument barometric scale to the current altimeter setting.

ALTERNATE STATIC SOURCE (if installed)

A two position selector allows the normal static source system of the airplane to be isolated in case of clogging or icing of static ports.

The ON position ("PULL") of the alternate static source valve admits cabin static pressure to the static system (see Figure 7.19A).

VACUUM SYSTEM AND INSTRUMENTS

The airplane may be fitted with a vacuum system (see Figures 7.20 and 7.20A) providing the suction necessary to operate an attitude gyro indicator and heading indicator.

The system consists of an engine–driven vacuum system, a vacuum relief valve and an air filter installed between the firewall and instrument panel, vacuum–operated instruments installed on L.H. instrument panel and a vacuum gage installed on L.H. panel strip, near the pilot's control wheel.

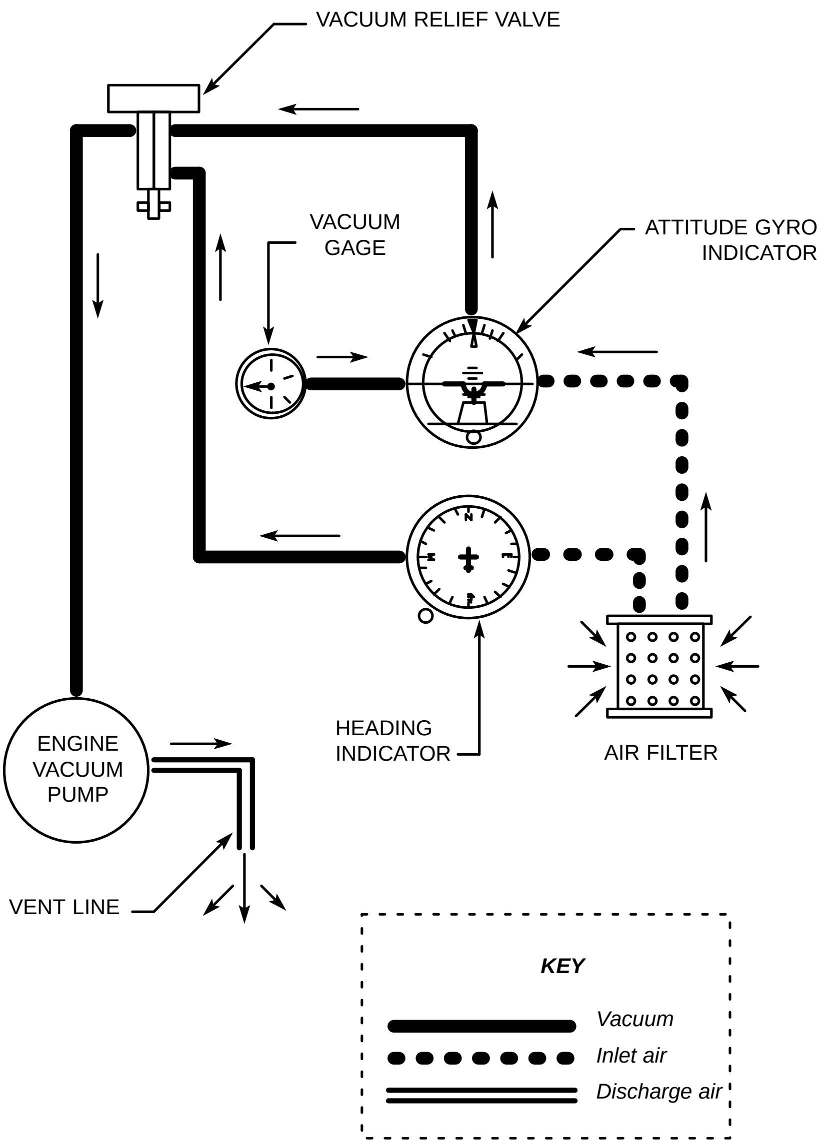

Figure 7.20 – VACUUM SYSTEM (With heading indicator)

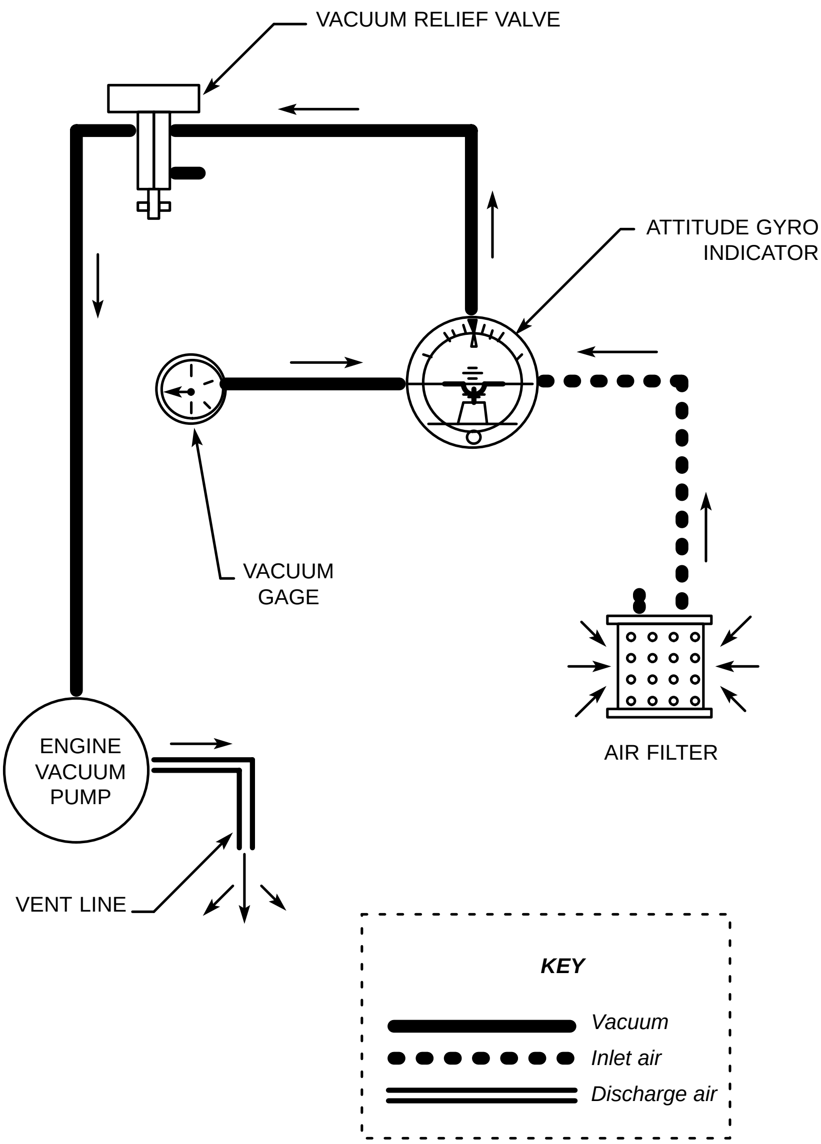

Figure 7.20A – VACUUM SYSTEM (Without heading indicator)

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The system may be provided with an alarm, red warning light labelled ”GYRO SUCT” on the advisory panel ; this warning light indicating an insufficient suction illuminates between 3 and 3.5 in.Hg.

ATTITUDE GYRO INDICATOR (if installed)

The attitude gyro indicator gives a visual indication of flight attitude. Bank attitude is presented by an index at the top of the indicator relative to the bank scale which has index marks at 10°, 20°, 30°, 60° and 90° either side of the center mark.

Pitch and roll attitudes are presented by a miniature airplane superimposed over a symbolic horizon area divided into two sections by a white horizon bar. The upper ”sky blue” area and the lower ”ground” area have arbitrary pitch reference lines useful for pitch attitude control.

A knob at the bottom of the instrument is provided for inflight adjustment of the miniature airplane to the horizon bar for a more accurate flight attitude indication.

HEADING INDICATOR (if installed)

The heading indicator displays airplane heading on a compass card in relation to a fixed simulated airplane image and index. The heading indicator will precess slightly over a period of time. Therefore, the compass card should be set in accordance with the magnetic compass just prior to take–off and regularly re–adjusted on extended flights. A knob on the lower left edge of the instrument is used to adjust the compass card to correct for any precession.

VACUUM GAGE (if installed)

The vacuum gage is calibrated in inches of mercury and indicates the suction available for operation of the attitude and heading indicators. The desired suction range is 4.4 to 5.2 in.Hg.

A suction reading out of this range may indicate a system malfunction or improper adjustment, and in this case, the indicators should not be considered reliable.

AUXILIARY DRY AIR PUMP (if installed)

Refer to Section 9 ”Supplements”.

AUTOPILOT (if installed)

Refer to Section 9 ”Supplements”.

STALL WARNING SYSTEM

The airplane is equipped with a vane–type stall warning unit in the leading edge of the left wing. The unit is electrically connected to an aural warning. The vane in the wing senses the change in airflow over the wing and operates the warning unit, which produces a tone over the alarms speaker. This warning tone begins between 5 and 10 knots above the stall in all configurations.

The stall warning system should be checked during the preflight inspection by momentarily turning on the battery switch and actuating the vane in the wing.The system is operational if a continuous tone is heard on the alarms speaker.

STATIC DISCHARGERS (if installed)

As an aid in IFR flights, wick–type static dischargers are installed to improve radio communications during flight through dust or various forms of precipitation (rain, snow or ice crystals).

Under these conditions, the build–up and discharge of static electricity from the trailing edges of the wings (flaps and ailerons), rudder, stabilator, propeller tips and radio antennas can result in loss of usable radio signals on all communications and navigation radio equipment. Usually, the ADF is first to be affected and VHF communication equipment is the last to be affected.

Installation of static dischargers reduces interference from precipitation static, but it is possible to encounter severe precipitation static conditions which might cause the loss of radio signals, even with static dischargers installed. Whenever possible, avoid known severe precipitation areas to prevent loss of dependable radio signals. If avoidance is impractical, minimize airspeed and anticipate temporary loss of radio signals while in these areas.

DE–ICING SYSTEM

Refer to Section 9 ”Supplements”.

RADIO EQUIPMENT

Refer to Section 9 ”Supplements”.

TURN AND BANK INDICATOR (if installed)

The bank indicator located under the airspeed indicator or the true airspeed indicator may be replaced by a turn and bank indicator ; it is controlled by a switch–breaker located in front of the pedestal and labeled ”TURN COORD.”.

CLEAR–VISION WINDOW (if installed)

In case a lot of mist appears on the windshield, turn both clear–vision window attachment knobs upwards and tilt window downwards.

NOTE :
Close the clear–vision window and lock it with both knobs prior to opening ”gull–wing” access door.

SUN VISOR

To remove sun–visor, firmly pull downwards the foamed attachment pin.

Up to S / N 1115, the attachment pin is equipped (in its upper part) with an adjusting screw which provides friction on arm swivelling. After adjustment, lock the screw using varnish.

From S / N 1116, an adjusting knurled knob located under the attachment pin stiffens sun–visor arm rotation without removing the pin.

To reinstall the sun–visor, hit it firmly upwards, at the base of the foamed attachment pin.

FIRE EXTINGUISHER (if installed)

The fire extinguisher is located under L.H. front seat. It is accessible by moving the seat full backwards. It is attached on the floor by means of a quick–disconnect clamp. A pressure gage allows checking the fire extinguisher condition, follow the recommendations indicated on the extinguisher.

EMERGENCY LOCATOR TRANSMITTER (if installed)

The airplane may be equipped with an emergency locator transmitter, which enables to locate it in case of distress. It is located in the baggage compartment.

The emergency locator transmitter assembly is constituted of a transmitter supplied by a battery, of a retractable antenna integrated in the locator transmitter and allowing use of the latter outside the airplane and of a remote control located on the instrument panel.

Operation of the emergency locator transmitter is obtained as follows :

- from the instrument panel by setting ”ELT” remote control switch to ON or MAN position (locator transmitter ”MANU–OFF–AUTO” or ”MAN/RESET–OFF–AUTO” control switch in stand–by on AUTO position),
- from the locator transmitter by setting its ”MANU–OFF–AUTO” or ”MAN/RESET–OFF–AUTO” control switch to MANU or MAN/RESET position,
- automatically in case of shock, when both switches are set to AUTO.

When locator transmitter ”MANU–OFF–AUTO” or ”MAN/RESET–OFF–AUTO” switch is set to OFF, transmission is impossible.

”XMIT ALERT” indicator light (if installed) located above ”ELT” remote control switch indicates to the pilot the emergency locator transmitter is transmitting.

Reset after an inadvertent activation

ELT 90 (EUROCAE) – ELT 91 (TSO)

1) Set ELT switch to "MAN/RESET" or remote control switch to "MAN".	a) The ELT keeps on transmitting emergency signal. b) On remote control, the "XMIT ALERT" red warning light remains on. c) On ELT, the red warning light remains on.
2) Set again ELT switch or remote control switch to "AUTO".	a) The ELT does not transmit emergency signal any longer. b) On remote control, the "XMIT ALERT" red warning light goes off. c) On ELT, the red warning light goes off.

ELT 96 (EUROCAE) – ELT 97 (TSO)

1) Set ELT switch to "MAN/RESET", then to "AUTO" or press push button "AUTO TEST/RESET" on the remote control.	a) The ELT does not transmit emergency signal any longer. b) On remote control and on ELT switch, the "XMIT ALERT" red warning light illuminates during 2 seconds, then goes off.

JE2, ELT 10 ET POINTER 3000

On ELT, press on button "RESET".

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

GENERAL

This section contains the procedures recommended by SOCATA for the proper ground handling and routine care and servicing of your SOCATA Model TB 20 airplane. Also included in this section are the inspection and maintenance requirements which must be followed if your airplane is to retain its performance and dependability.

It is recommended that a planned schedule of lubrication and preventive maintenance be followed, and that this schedule be tailored to the climatic or flying conditions to which the airplane is subjected.

For this, see Manufacturer's Maintenance Manual.

IDENTIFICATION PLATE

All correspondence regarding your airplane should include its serial number. This number together with the model number, type certificate number and production certificate number are stamped on the identification plate attached at the rear of the fuselage beneath the horizontal stabilizer.

PUBLICATIONS

When the airplane is delivered from the factory, it is supplied with a Pilot's Operating Handbook and supplemental data covering optional equipment installed in the airplane.

In addition, the owner may purchase the following :

- Maintenance Manual
- Illustrated Parts Catalog
- Price Catalog
- Labor Allowance Guide

CAUTION

PILOT'S OPERATING HANDBOOK MUST ALWAYS BE IN THE AIRPLANE

INSPECTION PERIODS

Refer to regulations in force in the certification country for information concerning preventive maintenance which is to be carried out by pilots.

A maintenance Manual should be obtained prior to performing any preventive maintenance to ensure that proper procedures are followed. Maintenance must be accomplished by licensed personnel.

ALTERATIONS OR REPAIRS

It is essential that the Airworthiness authorities be contacted prior to any alterations or repairs on the airplane to ensure that airworthiness of the airplane is not violated. Alterations or repairs must be accomplished by licensed personnel.

GROUND HANDLING

TOWING

CAUTION

USING THE PROPELLER FOR GROUND HANDLING COULD RESULT IN SERIOUS DAMAGE, ESPECIALLY IF PRESSURE OR PULL IS EXERTED ON BLADE TIPS

The airplane should be moved on the ground with the aid of nose gear strut fork tow bar which is stowed in the baggage compartment or with a vehicle which will not damage the nose gear steering device or exert excessive loads on the latter.

CAUTION

WHEN TOWING WITH A VEHICLE, DO NOT EXCEED THE NOSE GEAR TURNING ANGLE, OR DAMAGE TO THE GEAR AND STEERING DEVICE WILL RESULT

(see Figure 8.1)

PARKING

When parking the airplane, head into the wind. Do not set the parking brake when brakes are overheated or during cold weather when accumulated moisture may freeze the brakes. Care should be taken when using the parking brake for an extended period of time during which an air temperature rise or drop could cause difficulty in releasing the parking brake or damage the brake system.

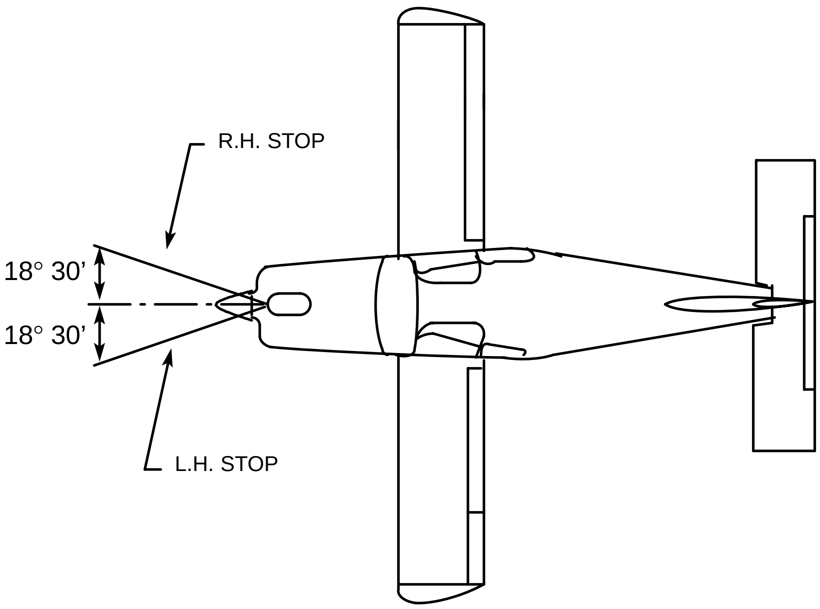

Figure 8.1 – TURNING ANGLE LIMITS

For long term parking, blanking covers (static ports, pitot), cockpit cover, tie–downs, wheel chocks and control wheel lock are recommended. In severe weather and high wind conditions, tie the airplane down as outlined in the following paragraph.

TIE–DOWN

Proper tie–down procedure is the best protection against damage to the parked airplane by gusty or strong winds. To tie–down the airplane securely, proceed as follows :

– Install control wheel lock.
– Chock all wheels.
– Tie sufficiently strong ropes or chains to hold airplane back ; insert a rope in each tie–down hole located on flaps hinge arms and in rear tie–down fitting, located under horizontal stabilizer ; secure each rope to a ramp tie–down.
– Check that doors are closed and locked.

JACKING

When it is necessary to jack the airplane off the ground or when jacking points are used, refer to Maintenance Manual for specific procedures and equipment required.

LEVELING

Level the airplane as described in Maintenance Manual.

FLYABLE STORAGE

Airplanes placed in storage for a maximum of 30 days or those which receive only intermittent use for the first 25 hours are considered in flyable storage.

Every seventh day during these periods, the propeller should be rotated by hand through several revolutions. This action ”limbers” the oil and prevents any accumulation of corrosion on engine cylinder walls.

CAUTION

CHECK THAT THE MAGNETO SELECTOR IS OFF, THE THROTTLE IS CLOSED, THE MIXTURE CONTROL IS IN THE IDLE CUT–OFF POSITION, AND THE AIRPLANE IS SECURED BEFORE ROTATING THE PROPELLER BY HAND. DO NOT STAND WITHIN THE ARC OF THE PROPELLER BLADES WHILE TURNING THE PROPELLER

After 30 days in storage, the airplane should be flown for at least 30 minutes, or a ground runup should be made just long enough to produce an oil temperature within the lower green arc range. Avoid prolonged runups.

Engine runup helps to eliminate excessive accumulations of water in the fuel system and other air spaces in the engine. Keep fuel tanks full to minimize condensation in the tanks. Keep the battery fully charged to prevent the electrolyte from freezing in cold weather.

LONG TERM STORAGE WITHOUT FLYING POSSIBILITY

Refer to Maintenance Manual for the procedures to follow.

SERVICING

MAINTENANCE

In addition to the preflight inspection in Section 4, servicing, inspection, and test requirements for your airplane are detailed in the Maintenance Manual.

Maintenance Manual outlines all items which require attention at 50, 100, 400, 500 and 1000 hours intervals plus those items which require servicing, inspection or testing at special intervals, first 25 flight hours, yearly inspection, major inspection.

ENGINE OIL

Grade and Viscosity for temperature range

Outside Air Temperature	**MIL–L–6082 Spec. Mineral Grades 50 first hours**	**MIL–L–22851 Spec. Dispersant Grades after 50 hours**
All temperatures	.....	SAE 15W50 or 20W50
Above 80°F (27°C)	SAE 60	SAE 60
Above 60°F (15°C)	SAE 50	SAE 40 or SAE 50
30°F (–1°C) to 90°F (32°C)	SAE 40	SAE 40
0°F (–18°C) to 70°F (21°C)	SAE 30	SAE 30, SAE 40 or SAE 20W40
0°F (–18°C) to 90°F (32°C)	.....	SAE 20W50 or 15W50
Under 10°F (–12°C)	SAE 20	SAE 30 or SAE 20W30

NOTE :
This airplane was delivered from the factory with a corrosion–preventive aircraft engine oil. If oil must be added during the first 50 hours, use only aviation grade straight mineral oil conforming to specification MIL–L–6082.

Capacity of engine sump : 12 U.S. qt (11.3 litres)

Do not operate on less than 6 U.S. qt (5.7 litres). To minimize loss of oil through breather, fill to 9 U.S. qt (8.5 litres) for normal flights of less than 3 hours. For extended flights, fill to 12 U.S. qt (11.3 litres). These quantities refer to oil dipstick level readings. During oil and filter changes 1.3 additional U.S. qt (1.2 litres) is required for the filter.

Oil and oil filter change :

After the first 25 hours of operation, drain engine oil sump and replace filter. Refill sump with straight mineral oil and use this kind of oil until a total of 50 hours has accumulated or oil consumption has stabilized ; then change to dispersant oil and replace filter. It is recommended that the oil filter element be changed every 50 hours or sooner under unfavourable conditions. Engine oil is changed with the filter. Drain the engine oil sump and replace the filter at least every 4 months even though less than the recommended hours have accumulated. Reduce intervals for prolonged operation in dusty areas, cold climates, or even when short flights and long idle periods result in sludging conditions.

NOTE :
During the first 25–hour oil and filter change, a general inspection of engine compartment is required. Items which are not normally checked during a preflight inspection should be given a particular attention. Hoses, metal lines and fittings should be inspected for signs of oil and fuel leaks, and checked for abrasions, chafing, security, proper routing and support and evidence of deterioration.

Inspect the intake and exhaust systems for cracks, evidence of leakage and security of attachment. Engine controls and linkages should be checked for freedom of movement through their full range, security of attachment and evidence of wear. Inspect wirings for security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals. Check the alternator belt and retighten if necessary. A periodic check of these items during subsequent servicing operations is recommended.

FUEL

Approved fuel grades (and colors)

100 LL Grade Aviation Fuel (Blue)
100 Grade Aviation Fuel (Formerly 100 / 130) (Green).

CAUTION

NEVER FLY THE AIRPLANE WITH CONTAMINATED (WATER, SAND, RUST, DUST...) OR UNAPPROVED FUEL

NOTE :
Isopropyl alcohol or ethylene glycol monomethyl ether may be added to the fuel supply in quantities not to exceed 1 % or 0.15 % by volume, respectively, of the total. Refer to "Fuel Additives" paragraph hereafter for additional information.

Capacity each tank : 44.4 U.S Gal (168 l)

NOTE :
Service the fuel system after each flight and keep fuel tanks full to minimize condensation in the tanks, respecting weight and balance limits.

WARNING

DO NOT OPERATE ANY AVIONICS OR ELECTRICAL EQUIPMENT ON THE AIRPLANE DURING FUELING. DO NOT ALLOW OPEN FLAME OR SMOKING IN THE VICINITY OF THE AIRPLANE WHILE FUELING

DURING ALL FUELING OPERATIONS, FIRE FIGHTING EQUIPMENT MUST BE AVAILABLE ; ATTACH GROUNDING WIRE TO ANGLE (IF INSTALLED) ON UPPER SURFACE OF WING NEAR THE CAP ; IN CASE THERE IS NO ANGLE, ATTACH CABLE TO A METALLIC PART OF THE AIRPLANE WHICH IS NOT PAINTED

Fuel additives

Strict adherence to recommended preflight draining instructions as called for in Section 4 will eliminate any free water accumulations from the tank sumps. While small amounts of water may still remain in solution in the gasoline, it will normally be consumed and go unnoticed in the operation of the engine.

One exception to this can be encountered when operating under the combined effect of use of certain fuels, with high humidity conditions on the ground followed by flight at high altitude and low temperature. Under these unusual conditions, small amounts of water in solution can precipitate from the fuel stream and freeze in sufficient quantities to induce partial icing of the engine fuel system.

While these conditions are quite rare and will not normally pose a problem to owners and operators, they do exist in certain areas of the world and consequently must be dealt with, when encountered.

Therefore, to alleviate the possibility of fuel icing occurring under these unusual conditions, it is permissible to add ispropyl alcohol or ethylene glycol monomethyl ether (EGME) compound to the fuel supply.

The introduction of alcohol or EGME compound into the fuel provides two distinct effects :

– it absorbs the dissolved water from the fuel
– alcohol has a freezing temperature lowering effect.

Alcohol, if used, is to be mixed with the fuel in a concentration of 1 % by volume. Concentrations greater than 1 % are not recommended since they can be detrimental to fuel tank materials.

The manner in which the alcohol is added to the fuel is significant because alcohol is most effective when it is completely dissolved in the fuel.

To ensure proper mixing, the following is recommended :

- For best results, the alcohol should be added during the fueling operation by pouring the alcohol directly on the fuel stream issuing from the fueling nozzle.
- An alternate method that may be used is to premix the complete alcohol dosage with some fuel in a separate clean container (approximately 2 to 3 U.S. Gal – 7 to 11 litres) and then transferring this mixture to the tank prior to the fueling operation.

Any high quality isopropyl alcohol may be used, such as anti–icing fluid or isopropyl alcohol (Federal Specification TT–I–735a). Figure 8.2 provides alcohol – fuel mixing ratio information.

Ethylene glycol monomethyl ether (EGME) compounds, in compliance with MIL–I–27686, if used, must be carefully mixed with the fuel in concentration not to exceed 0.15 % by volume. Figure 8.2 provides EGME – fuel mixing ratio information.

CAUTION

MIXING OF THE EGME COMPOUND WITH THE FUEL IS EXTREMELY IMPORTANT. A CONCENTRATION IN EXCESS OF THAT RECOMMENDED (0.15 % BY VOLUME MAXIMUM) WILL RESULT IN DETRIMENTAL EFFECTS TO THE FUEL TANKS (DETERIORATION OF PROTECTIVE PRIMER AND SEALANTS) TO FUEL SYSTEM AND ENGINE COMPONENTS (DAMAGE TO SEALS). USE ONLY BLENDING EQUIPMENT RECOMMENDED BY THE MANUFACTURER TO OBTAIN PROPER PROPORTIONING

DO NOT ALLOW CONCENTRATED EGME COMPOUND TO COME IN CONTACT WITH THE AIRPLANE FINISH AS DAMAGE CAN RESULT

Prolonged storage of the airplane will result in a water buildup in the fuel which ”leeches out” the additive. An indication of this is when an excessive amount of water accumulates in the fuel tank sumps. The concentration can be checked using a differential refractometer. It is imperative that the technical manual for the differential refractometer be followed explicitely when checking the additive concentration.

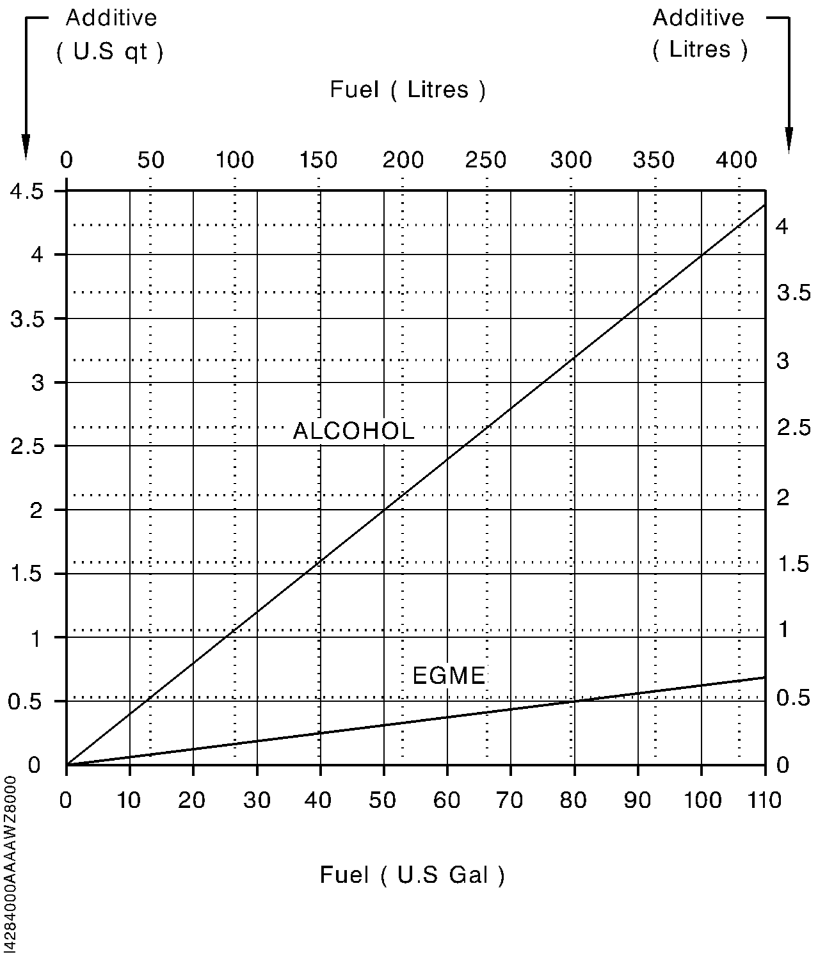

Figure 8.2 – ADDITIVE MIXING RATIO

LANDING GEAR

Nose gear tire :

5.00–5 6 PRTT – Inflating pressure : 56.5 psi (3.9 bars)

Main gear tires :

15 6.00–6 6 PRTT – Inflating pressure : 63.9 psi (4.4 bars)

Nose gear shock absorber :

Filling with hydraulic fluid MIL–H–5606 ; inflate with pressurized dry air or nitrogen to 108.7 psi (± 4) that is 7.5 bars (± 0.3) .

Main gears shock absorbers :

Filling with hydraulic fluid MIL–H–5606 ; inflate with pressurized dry air or nitrogen to 666 psi (+15 ; – 0) that is 45.9 bars (+1 ; – 0).

Check every 100 hours and service with MIL–H–5606 hydraulic fluid.

Brakes :

Service as required with MIL–H–5606 hydraulic fluid.

OXYGEN (if installed)

Aviator's breathing oxygen : Specification MIL–O–27210.

Maximum pressure (cylinder temperature stabilized after filling) : 1850 psi (128 bars) to 70°F (21°C). Refer to Maintenance Manual for inflating pressures.

AIRPLANE CLEANING AND CARE

WINDOWS AND WINDSHIELD

The plastic windshield and windows should be cleaned with an airplane windshield cleaner. Apply the cleaner sparingly with soft cloths and rub with moderate pressure until all dirt, oil scum and bug stains are removed. Allow the cleaner to dry, then wipe it off with soft flannel cloths.

CAUTION

NEVER USE GASOLINE, BENZINE ALCOHOL, ACETONE, FIRE EXTINGUISHER OR ANTI–ICE FLUID, LACQUER THINNER OR GLASS CLEANER TO CLEAN THE PLASTIC. THESE MATERIALS WILL ATTACK THE PLASTIC AND MAY CAUSE IT TO CRAZE

Follow by carefully washing with a mild detergent and plenty of water. Rinse thoroughly, then dry with a clean moist chamois. Do not rub the plastic with a dry cloth since this builds up an electrostatic charge which attracts dust. Waxing with a good commercial wax will finish the cleaning job. A thin, even coat of wax polished out by hand with clean soft flannel cloths will fill in minor scratches and help prevent further scratching.

Do not use a canvas cover on the windshield unless freezing rain or sleet is anticipated since the cover may scratch the plastic surface.

PAINTED SURFACES

Refer to Maintenance Manual for the procedures to follow.

PROPELLER CARE

Preflight inspection of propeller blades for nicks and wiping them occasionally with an oily cloth to clean off grass and bug stains will assure long blade life. Small nicks on the propeller, particularly near the tips and on the leading edges, should be dressed out as soon as possible since these nicks produce stress concentrations, and if ignored, may result in cracks. Never use an alkaline cleaner on the blades ; remove grease and dirt.

ENGINE CARE

Refer to Maintenance Manual for the procedures to follow.

INTERIOR CARE

To remove dust and loose dirt from the upholstery and carpet, clean the interior regularly with a vacuum cleaner.

For additional information, refer to Maintenance Manual.

FRONT ASH–TRAY

To empty front ash–tray, remove it while holding it on its edges (if necessary, lift it up with a screwdriver wrapped up in a cloth).

REAR ASH–TRAYS

To empty a rear ash–tray, open it tilting its movable part to its stop, then push moderately on central part to disengage the ash–box.

To install again the ash–box, insert upper part then push on lower part.