PILOT'S INFORMATION MANUAL

TB 9

TB9 "SPRINT"

from S/N 948
with MOD.139

P/N : T00. 18430309E4

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.

For any information concerning this document, please contact :

SOCATA
SUPPORT CLIENT / CUSTOMER SUPPORT
AEROPORT TARBES-OSSUN-LOURDES
B.P. 930 – 65009 TARBES CEDEX
FRANCE

TELEPHONE : 33 (0)5 62.41.73.00
TELEFAX : 33 (0)5 62.41.76.54
TELEX : 532 835 F

December 31, 1997 – E4R1

Printed in FRANCE

TABLE OF CONTENTS

SECTION 1

GENERAL

TABLE OF CONTENTS

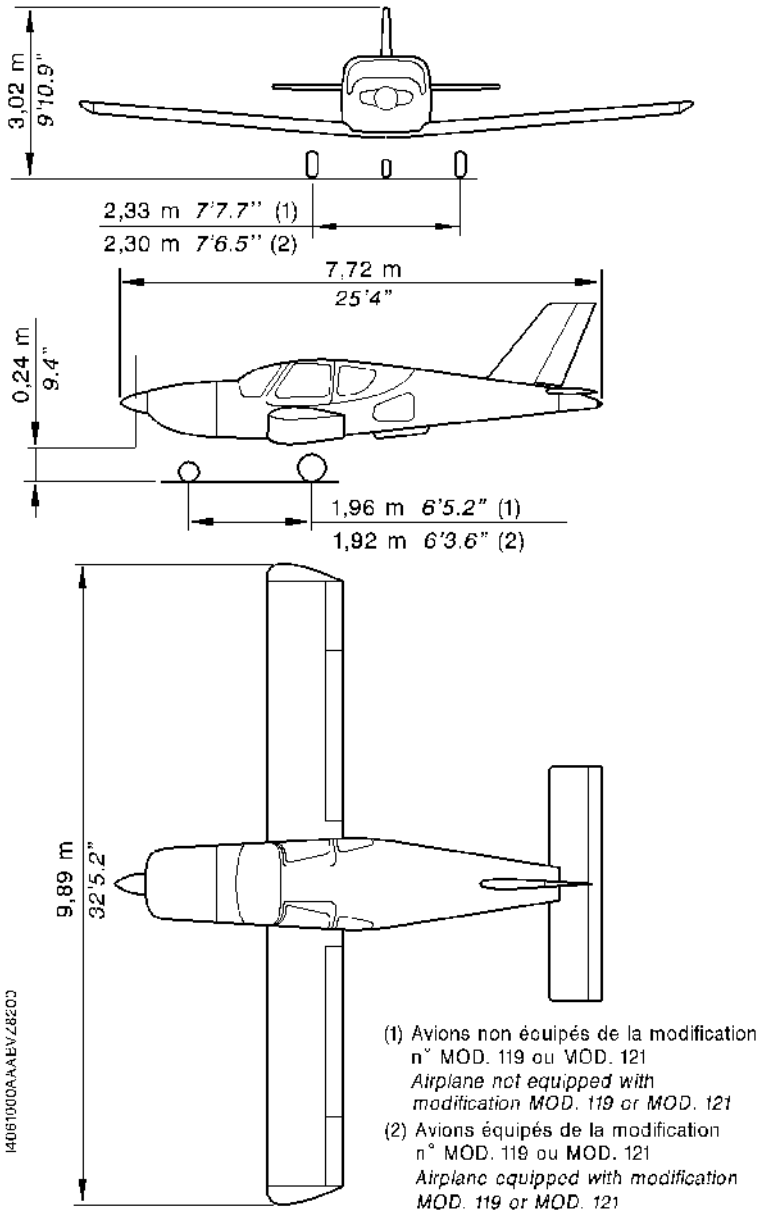


Figure 1.1 - THREE VIEW DRAWING

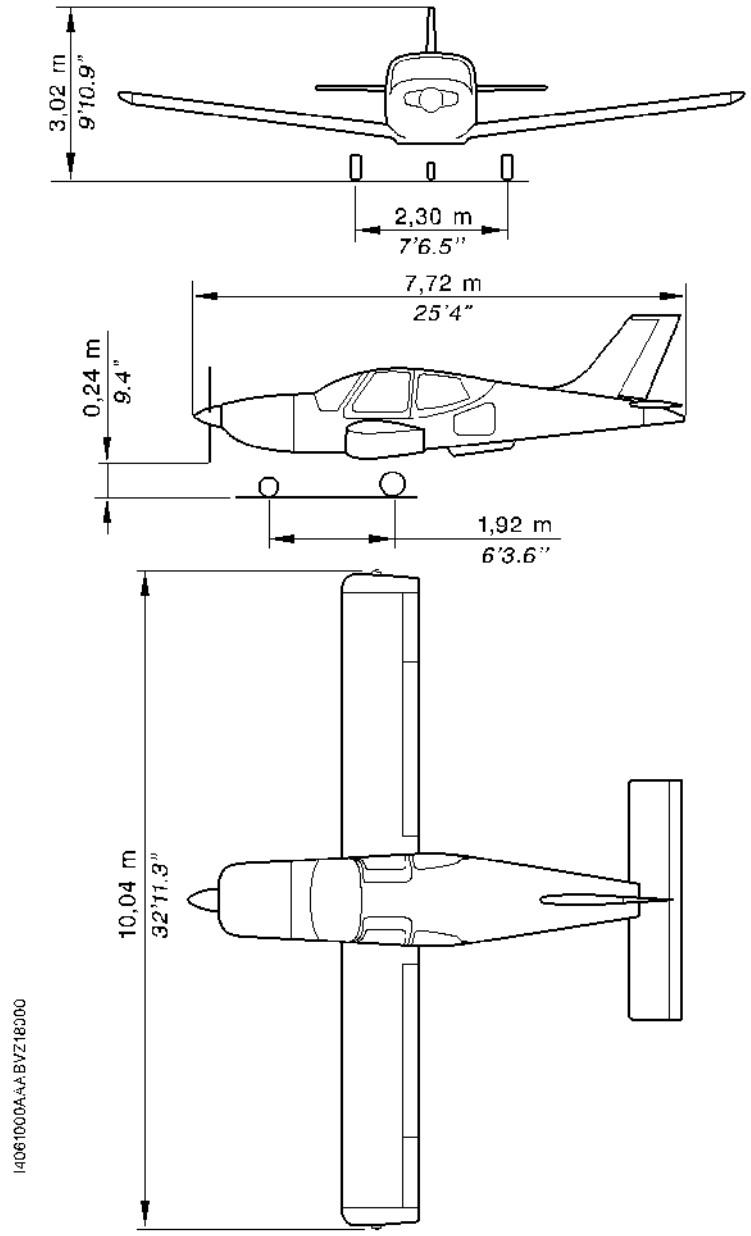


Figure 1.1A – THREE VIEW DRAWING

INTENTIONALLY LEFT BLANK

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 9 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 9 "Supplements" of this Manual.

DESCRIPTIVE DATA

ENGINE

Number of engines : 1
Engine Manufacturer : AVCO LYCOMING
Engine Model Number : O-320-D2A
Engine Type :
Four-cylinder, horizontally opposed, direct drive, air-cooled
Engine rated at 160 BHP at 2700 RPM.

PROPELLER

Number of propellers : 1
Propeller Manufacturer : SENSENICH
Propeller Model Number : 74.DM6.S8.058
Number of blades : 2
Propeller Diameter :
Maximum : 74 inches (1.88 m)
Minimum : 72 inches (1.83 m)
Propeller Type :
Fixed pitch

FUEL

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

Total capacity :	41.7 U.S Gal	(158 l)
Total capacity each tank :	20.8 U.S Gal	(79 l)
Total usable :	40.2 U.S Gal	(152 l)

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

CAUTION

DO NOT MIX DIFFERENT BRANDS OR TYPES OF OIL

Oil grades (specifications) and Viscosity (Reference : TEXTRON LYCOMING Service Bulletin No. 480 at last revision) :

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 : 8 Quarts (7.6 Litres)
Total : 8.45 Quarts (8 Litres)
Maximum oil consumption : 0.8 qt/hr.

Do not operate on less than 4 U.S. qt (3.8 litres). To minimize loss of oil through breather, fill to 6 U.S. qt (5.7 litres) for normal flights of less than 3 hours. For extended flights, fill to 8 U.S. qt (7.6 litres). These quantities refer to oil dipstick level readings.

For engine equipped with the cartridge filter option, during filter drainage or replacement, add 0.45 U.S. qt (0.4 litres) of oil for the filter.

MAXIMUM CERTIFICATED WEIGHTS

Normal and Utility categories

Take-off : 2337 lbs (1060 kg)
Landing : 2337 lbs (1060 kg)

Weight in Baggage Compartment : 143 lbs (65 kg) ; Refer to Section 6 for loading instructions.

STANDARD AIRPLANE WEIGHTS

Normal and Utility categories

Airplane not equipped with modification MOD. 119 or MOD. 121 :

	Pre-MOD.151
Standard Empty Weight :	1446 lbs (656 kg)
Maximum Useful Load :	891 lbs (404 kg)

Airplane equipped with modification MOD. 119 or MOD. 121 :

	Pre-MOD.151	Post-MOD.151
Standard Empty Weight :	1457 lbs (661 kg)	1499 lbs (680 kg)
Maximum Useful Load :	880 lbs (399 kg)	838 lbs (380 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

Normal and Utility categories

Wing loading : 18.2 lbs/sq.ft (89.1 kg/m^2)
Power loading : 14.6 lbs/BHP (6.63 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_{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.

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).

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

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, full operating fluids and full oil.

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
ALT or ALTr	:	Alternator
A / P	:	Autopilot
BAT	:	Battery
C	:	Consumption
CHT	:	Cylinder Head Temperature
°C	:	Degree Celsius (Centigrade)
°F	:	Degree Fahrenheit
EGT	:	Exhaust Gas Temperature
EXC	:	Energization
ft	:	Foot (Feet)
ft/min	:	Feet per minute
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
m	:	Metre
min	:	Minute
mm	:	Millimetre
P / N	:	Part Number
psi	:	Pounds per square inch
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
US.Gal	3.785	Litre	Litre	0.264	US.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 28.05	951 28.08	952 28.11	953 28.14	954 28.17	955 28.20	956 28.23	957 28.26	958 28.29	959 28.32
960 28.35	961 28.38	962 28.41	963 28.44	964 28.47	965 28.50	966 28.53	967 28.56	968 28.58	969 28.61
970 28.64	971 28.67	972 28.70	973 28.73	974 28.76	975 28.79	976 28.82	977 28.85	978 28.88	979 28.91
980 28.94	981 28.97	982 29.00	983 29.03	984 29.06	985 29.09	986 29.12	987 29.15	988 29.18	989 29.20
990 29.23	991 29.26	992 29.29	993 29.32	994 29.35	995 29.38	996 29.41	997 29.44	998 29.47	999 29.50
1000 29.53	1001 29.56	1002 29.59	1003 29.62	1004 29.65	1005 29.68	1006 29.71	1007 29.74	1008 29.77	1009 29.80
1010 29.83	1011 29.85	1012 29.88	1013 29.91	1014 29.94	1015 29.97	1016 30.00	1017 30.03	1018 30.06	1019 30.09
1020 30.12	1021 30.15	1022 30.18	1023 30.21	1024 30.24	1025 30.27	1026 30.30	1027 30.33	1028 30.36	1029 30.39
1030 30.42	1031 30.45	1032 30.47	1033 30.50	1034 30.53	1035 30.56	1036 30.59	1037 30.62	1038 30.65	1039 30.68
1040 30.71	1041 30.74	1042 30.77	1043 30.80	1044 30.83	1045 30.86	1046 30.89	1047 30.92	1048 30.95	1049 30.98

INTENTIONALLY LEFT BLANK

SECTION 2

LIMITATIONS

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

GENERAL

SOCATA Model TB 9 is certificated in the Normal and Utility Categories.

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

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 Pilot's Operating Handbook 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 9 "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	165	165	Do not exceed this speed in any operation
V_{NO}	Maximal Structural Cruising Speed	128.5	128.5	Do not exceed this speed except in smooth air, and then only with care
V_A	Maneuvering Speed	122	122	Do not make abrupt or full control movements above this speed
V_{FE}	Maximum Flap Extended Speed	95	95	Do not exceed this speed with flaps 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	50 - 95	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	58 - 128.5	Normal Operating Range Lower limit is maximum weight V_{S1} with flaps retracted. Upper limit is maximum structural cruising speed
Yellow Arc	128.5 - 165	Operations must be conducted with caution and only in smooth air
Red line	165	Maximum speed for all operations

Figure 2.2 - AIRSPEED INDICATOR OR TRUE AIRSPEED INDICATOR MARKINGS

POWER PLANT LIMITATIONS

Number of engines : 1

Engine Manufacturer : AVCO LYCOMING

Engine Model Number : O-320-D2A

Engine Operating Limits for Take-off and Continuous Operations :
Maximum Power : 160 BHP
Maximum Engine Speed : 2700 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 : 0.5 psi (34 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 : SENSENICH

Propeller Model Number : 74.DM6.S8.058

Propeller Diameter :
Minimum : 72 inches (1.83 m)
Maximum : 74 inches (1.88 m)

Static RPM at maximum permissible throttle setting, sea level :
Minimum : 2400 RPM
Maximum : 2600 RPM

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	---	---	600 to 2700 RPM	2700 RPM
Oil Temperature	---	Below 104°F (40°C)	104 to 244°F (40 to 118°C)	244°F (118°C)
Fuel Pressure (1)	Below 0.5 psi	---	Above 0.5 psi	---
Fuel Pressure (2)	Below 0.5 psi	---	0.5 to 8 psi	Above 8 psi
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 (224to260°C) (4)	200 to 435°F (93 to 224°C) (4)	500°F (260°C)
Carburated air temperature	---	14 to 41°F (-10 to +5°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

Normal and utility categories

Maximum Take-off Weight : 2337 lbs (1060 kg)
Maximum Landing Weight : 2337 lbs (1060 kg)

Maximum Weight in Baggage Compartment : Maximum 143 lbs (65 kg) refer to Section 6 for loading instructions.

CENTER OF GRAVITY LIMITS

Normal and utility categories

Forward :
41.3 inches (1.050 m) aft of datum at 2337 lbs (1060 kg)
38.3 inches (0.974 m) aft of datum at 2138 lbs (970 kg) or less.

Aft :
47.4 inches (1.205 m) aft of datum at all weights and for both categories.

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 both normal and utility categories.

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) and turns in which the angle of bank is no more than 60°.

Maximum Design Weight	2337 lbs (1060 kg)
Design Maneuvering Speed	122 KIAS (141 MPH IAS)

The TB 9 airplane is approved for the following normal category maneuvers : Lazy eights, chandelles, and steep turns in which the angle of bank is not more than 60°.

Utility category

This airplane is not designed for aerobatic flight. However, the utility category is applicable to airplane intended for limited aerobatic operations.

Maximum Design Weight	2337 lbs (1060 kg)
Design Maneuvering Speed	122 KIAS (141 MPH IAS)

No aerobatic maneuvers are approved except those listed below :

Maneuver	Recommended Entry Speed
Chandelles	130 KIAS (149 MPH IAS)
Lazy eights	124 KIAS (143 MPH IAS)
Steep turns	108 KIAS (124 MPH IAS)
Stalls (except whip stalls)	Slow Deceleration

Spins Prohibited

FLIGHT LOAD FACTOR LIMITS

	Normal category n between	**Utility category** n between
Flaps up :	+ 3.8 g and - 1.5	+ 4.4 g and - 1.8
Flaps down :	+ 2.0 g and - 0	+ 2.0 g and - 0

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 :	20.8 U.S Gal	(79 l)	each
Total Fuel :	41.7 U.S Gal	(158 l)	
Usable Fuel :	40.2 U.S Gal	(152 l)	
Unusable Fuel :	1.6 U.S Gal	(6 l)	

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 5 U.S Gal (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 :
386 lbs (175 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

Placard in lbs :

THIS AIRCRAFT MUST BE FLOWN IN NORMAL OR UTILITY CATEGORY IN ACCORDANCE WITH THE PLACARDS, MARKINGS AND FLIGHT MANUAL

NORMAL AND UTILITY CATEGORY

MAXIMUM WEIGHT	2337 lbs
MANEUVERING SPEED V_A	122 KIAS
NEVER EXCEED SPEED V_{NE}	165 KIAS
FLAPS EXTENDED SPEED V_{FE}	95 KIAS

DESIGN LIMIT LOAD FACTOR :

"N" CATEGORY	FLAPS RETRACTED	$-1.5 \leq n \leq +3.8$
	FLAPS EXTENDED	$-0 \leq n \leq +2$
"U" CATEGORY	FLAPS RETRACTED	$-1.8 \leq n \leq +4.4$
	FLAPS EXTENDED	$-0 \leq n \leq +2$

ANY ACROBATIC MANEUVER IS PROHIBITED IN NORMAL CATEGORY

N UTILITY CATEGORY ONLY THE FOLLOWING ACROBATIC MANEUVERS ARE PERMITTED :

	ENTRY SPEED
CHANDELLES	130 KIAS
LAZY EIGHT	124 KIAS
STEEP TURNS	108 KIAS

STALLS

VOLUNTARY SPINS ARE PROHIBITED IN BOTH NORMAL AND UTILITY CATEGORIES..

MARKINGS, PLACARDS AND INSTRUCTION PLATES APPLY TO CATEGORIES "N" AND "U".

Placard in kg :

THIS AIRCRAFT MUST BE FLOWN IN NORMAL OR UTILITY CATEGORY IN ACCORDANCE WITH THE PLACARDS, MARKINGS AND FLIGHT MANUAL

NORMAL AND UTILITY CATEGORY

MAXIMUM WEIGHT . . . . . 1060 kg
MANEUVERING SPEED V_A . . . . . 227 km/h - 122 kt
NEVER EXCEED SPEED V_{NE} . . . . . 306 km/h - 165 kt
FLAPS EXTENDED SPEED V_{FE} . . . . . 176 km/h - 95 kt

DESIGN LIMIT LOAD FACTOR :

"N" CATEGORY	FLAPS RETRACTED	$-1.5 \leq n \leq +3.8$
	FLAPS EXTENDED	$-0 \leq n \leq +2$
"U" CATEGORY	FLAPS RETRACTED	$-1.8 \leq n \leq +4.4$
	FLAPS EXTENDED	$-0 \leq n \leq +2$

ANY ACROBATIC MANEUVER IS PROHIBITED IN NORMAL CATEGORY

N UTILITY CATEGORY ONLY THE FOLLOWING ACROBATIC MANEUVERS ARE PERMITTED :

ENTRY SPEED

CHANDELLES . . . . . 240 km/h - 130 kt
LAZY EIGHT . . . . . 230 km/h - 124 kt
STEEP TURNS . . . . . 200 km/h - 108 kt
STALLS

VOLUNTARY SPINS ARE PROHIBITED IN BOTH NORMAL AND UTILITY CATEGORIES..

MARKINGS, PLACARDS AND INSTRUCTION PLATES APPLY TO CATEGORIES "N" AND "U".

FLIGHT CONDITIONS : DAY VFR
ICING CONDITIONS NOT ALLOWED

(2) Calibration chart on compass

I4113003AAADVZ8000A

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

DATE: RADIO ON

(3) On Baggage door

I4113006AAADVZ8000A

65 kg - 143 lbs MAXIMUM
FOR LOADING INSTRUCTIONS
SEE "WEIGHT AND BALANCE
DATA" IN FLIGHT MANUAL

(4) Near fuel tank caps

I4112500AAAAWZ8100

CARBURANT
FUEL - KRAFTSTOFF
AVGAS 100 LL
20.1 US _16.7 UK. GAL
76 L

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

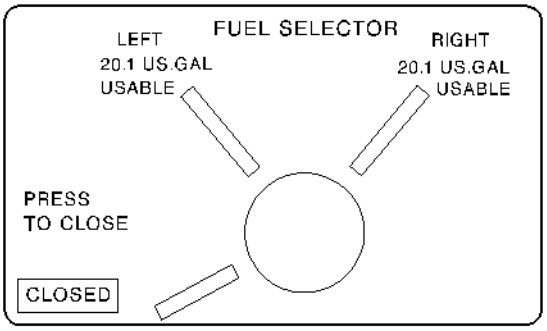
I4112102AAABVZ8100

Oil system
capacity
8 l
8.4 qt

(6) On the fuel selector

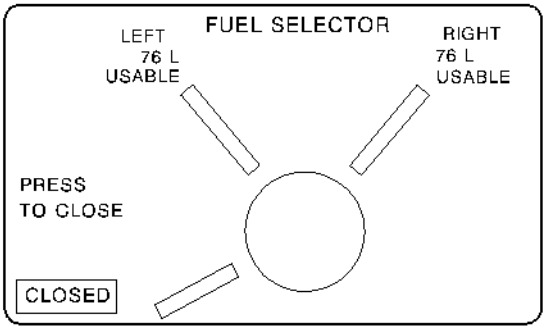
Markings in U.S. Gallons :

I4113004AAATVZ8300



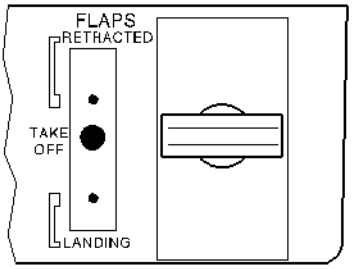
Markings in Litres :

I4113004AAATVZ8100



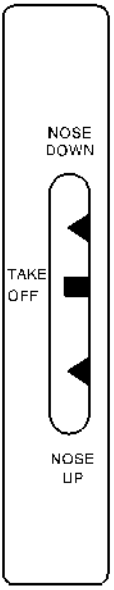
(7) Near the wing flap control

I4113004AAAEVZ8000A



(8) Near the stabilator tab position indicator

I4113004AAAFVZ8201



(9) If three belts are installed at the rear seats :

I4113002AAAAYZ8101

MASSE MAXI POUR 3 PASSAGERS AUX PLACES AR.
MAX GEWICHT FÜR 3 PASSAGIERE AUF DEM RÜCKSITZ } 175 kg
MAX WEIGHT FOR 3 PASSENGERS ON REAR SEATS } 386 lbs

SECTION 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

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 9 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.
The emergency procedures for optional systems are given in Section 9 "Supplements" of this manual.

AIRSPEEDS FOR SAFE OPERATIONS (IAS)

Engine failure after take-off	70 KIAS
Maneuvering speed	122 KIAS
Best glide speed	86 KIAS
Precautionary landing with engine power	65 / 70 KIAS

ENGINE FAILURES

ENGINE FAILURE DURING TAKE-OFF RUN

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

ENGINE FAILURE IMMEDIATELY AFTER TAKE-OFF

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

If the engine does not start :

Mixture	IDLE CUT-OFF
Fuel selector	OFF
Fuel pump	OFF

Land	STRAIGHT AHEAD
Magneto selector	OFF
Main switch	OFF

WARNING

LANDING STRAIGHT AHEAD IS USUALLY ADVISABLE

ENGINE FAILURE IN FLIGHT

Glide speed	86 KIAS
Main switch	ON
Fuel pump	ON

If the engine does not start :

Mixture	IDLE CUT-OFF
Throttle	1/2 OPEN
Fuel gages	CHECK
Fuel selector	SWITCH TANKS
Magneto selector	BOTH
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 carburetor icing (see § "Icing"), defective spark plugs or too rich a mixture.

Mixture RESET

If vibration persists :

RPM SET FOR MINIMUM VIBRATION RANGE

Land as soon as possible.

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

Glide speed	86 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
Mixture	IDLE CUT-OFF
Fuel selector	OFF
Magneto selector	OFF
Flaps	AS REQUIRED

When the landing is secured :

Flaps	LANDING
Approach speed	65 / 70 KIAS
Main switch	OFF

PRECAUTIONARY LANDING WITH ENGINE POWER

Flaps	LANDING
Approach speed	65 / 70 KIAS

Radio	ADVISE ATC OF INTENTIONS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Field	FLY OVER selected field
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
Flaps	LANDING
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Airspeed	70 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

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	FIRECUT-OFF (-)

After engine has stopped :

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

WARNING

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	OFF
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

WARNING

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 (if installed)	OFF
Anticollision lights (if installed)	OFF
Pitot heat switch (if installed)	OFF

Land as soon as possible.

ICING

FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED

Carburetor icing leads to a power rating drop, a manifold pressure drop and slight vibration :

Carburetor heating	ON

NOTE:
Pulling the carburetor heating control may cause the power rating to drop and increase the vibration level. After having fully pulled the carburetor heating control, it is mandatory to adjust the mixture to suppress vibration. The use of carburetor heating increases appreciably the hourly fuel consumption.

Cabin temperature	FULL HOT
Pitot heating (if installed)	ON
Demisting	OPEN
Engine	INCREASE POWER and periodically change RPM to minimize ice build-up on propeller
Carburated air thermometer (if installed)	+ 41 to +68°F (+5 to + 20°C)

Turn back or change altitude to obtain best outside air conditions.

After disappearing of icing conditions :

Carburetor heating	OFF

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 WITHOUT STABILATOR CONTROL

Fly the airplane using pitch trim and throttle.

- *Long final* :

Airspeed	80 KIAS
Flaps	LANDING
Fuel pump	ON
Mixture	FULL RICH
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

AILERON CONTROL FAILURE

Should an aileron control efficiency loss occur (accidental disconnection), fly the airplane using rudder for lateral control.

If flaps are extended, set rapidly sufficient speed (70 KIAS at least) and retract flaps.

Land with retracted flaps at 80 KIAS.

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 trips 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
Undervoltage warning light	REMAINS ON
"ALTr FLD" switch-breaker	OFF
Non essential electrical load items	OFF

CAUTION

SEE HEREAFTER THE CHECK-OUT PROCEDURE 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).

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

ALTERNATOR FAILURE (See Figure 3.1)

BATTERY FAILURE (See Figure 3.2)

TOTAL ELECTRICAL FAILURE (See Figure 3.3)

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

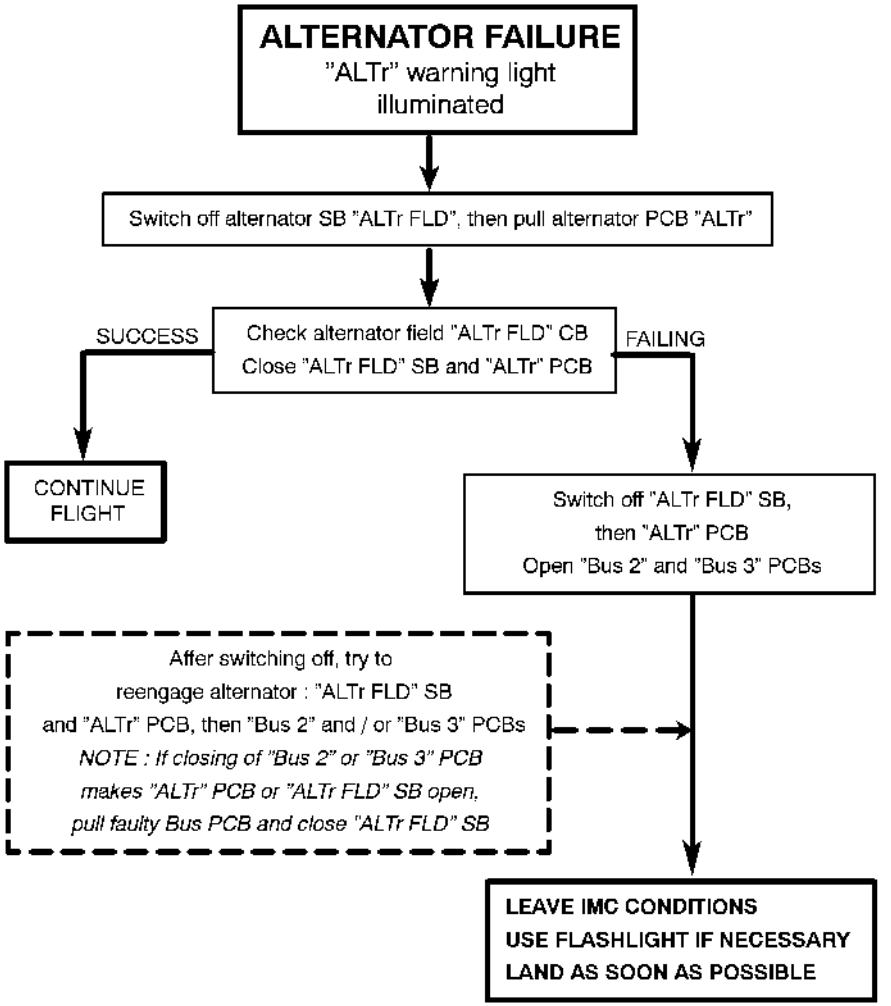


Figure 3.1 – ALTERNATOR FAILURE DIAGRAM

AIRSPEED INDICATING SYSTEM FAILURE

In case of erroneous indications in flight :

Pitot heating (if installed)	ON
Alternate static source (if installed)	PULL
	In case of alternate static source utilization, open air outlets and / or actuate cabin air selector flow lever to open position. Then, airspeed indicator and altimeter errors are not significant.

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

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 80 KIAS approach speed.

Plan a landing distance increased by approximately 60 %.

For landing performance, see Section 5 "Performance".

INVOLUNTARY SPIN

INTENTIONAL SPINS ARE PROHIBITED

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

Rapid and simultaneous action :

Throttle	REDUCED
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

Pre-MOD.151

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

- Speed 85 KIAS at maximum weight
- Propeller wind milling
- Flaps up
- Zero wind

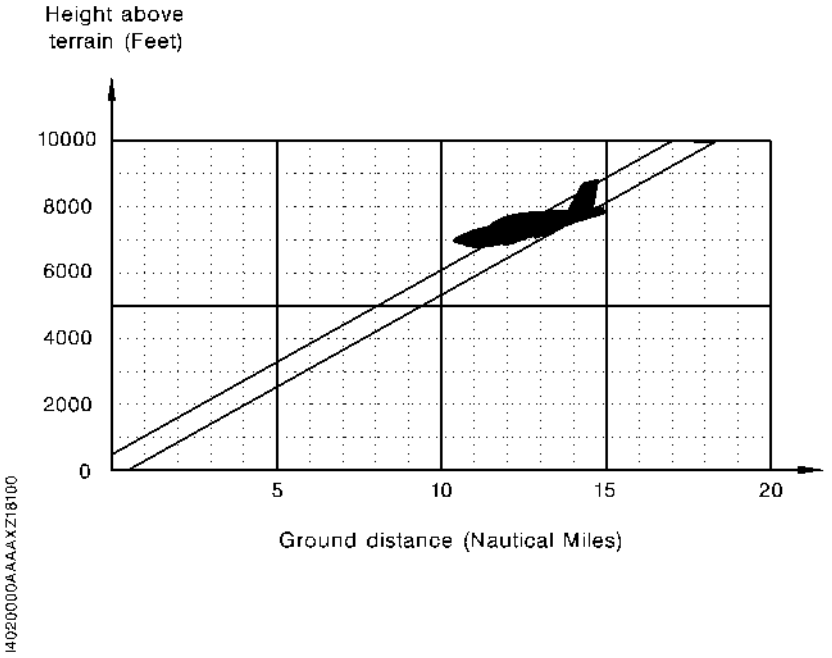


Figure 3.4 - OPTIMUM GLIDE WITHOUT ENGINE RUNNING

INTENTIONALLY LEFT BLANK

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 9 airplane.

The normal procedures for optional systems are given in Section 9 "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	
. Flaps retracted	78 KIAS
. Flaps in landing position	62 KIAS
- Best angle of climb	
. Flaps retracted	67 KIAS
. Flaps in landing position	59 KIAS
- Operating speed in turbulent air	122 KIAS
- Maximum speed with flaps in take-off position	95 KIAS
- Maximum speed with flaps in landing position	95 KIAS
- Final approach speed (flaps in landing position)	65 KIAS
- Maximum demonstrated crosswind	25 kt

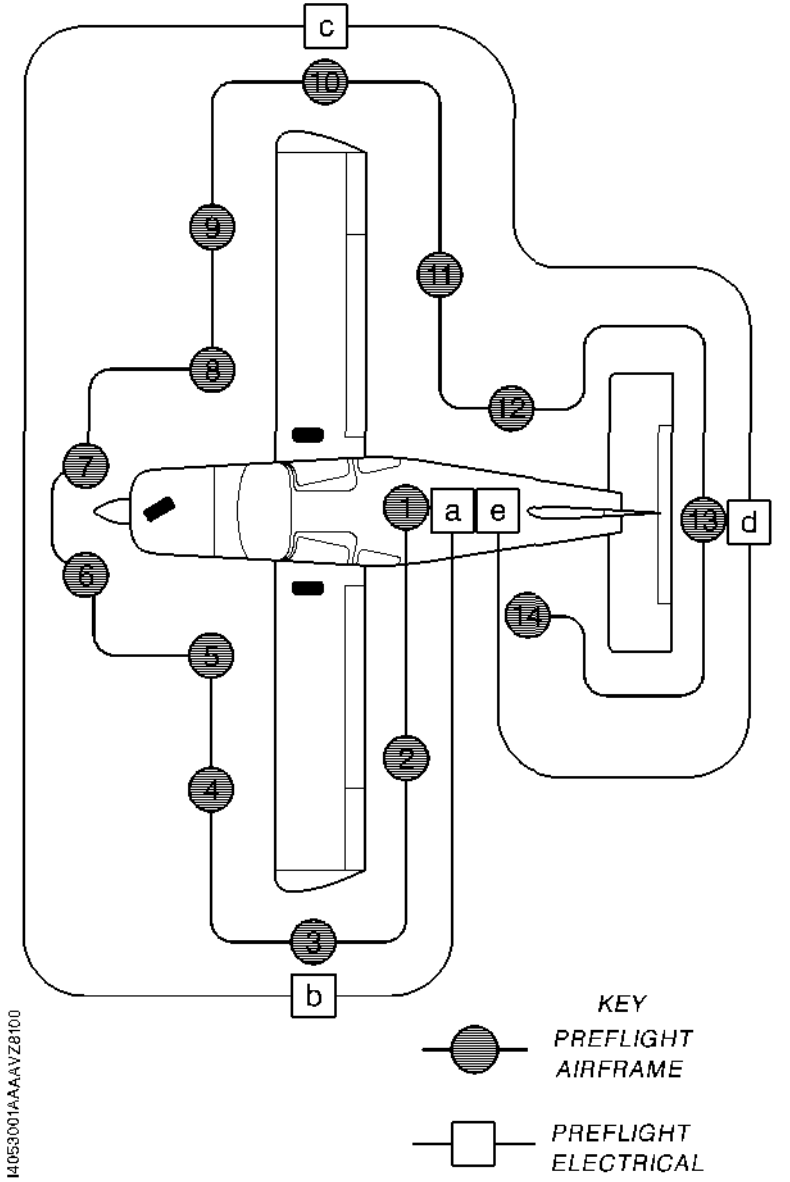


Figure 4.1 - PREFLIGHT INSPECTIONS

PREFLIGHT INSPECTIONS (See Figure 4.1)

AIRFRAME

1 - Cabin

Pilot door	OPEN
Controls lock	REMOVED
Magneto selector	OFF
Mixture	IDLE CUT-OFF
Main switch	ON
Flaps	LANDING
Pitch trim	TAKE-OFF
Fire extinguisher (if installed)	Check pressure
Main switch	OFF
Fuel selector	OPEN (L.H.)

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

2 - L.H. wing trailing edge

Flap and aileron	Check controls, hinges, plays, deflections

3 - L.H. wing

Wing tip (lights and landing lights if installed)	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
Fairing	Check condition, cleanliness and normal position

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
Fairing	Check condition, cleanliness and normal position

8 - R.H. main landing gear

Chocks	REMOVE
Tire	Check for condition
Shock absorber	Normal position
Fairing	Check condition, cleanliness and normal position

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 if installed)	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	Check controls, hinges, plays, frictions
Stabilator and stabilator tab	Check controls, hinges, deflections, plays, frictions
Tail cone [and light if installed (Pre-MOD.151)]	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
Fuel gages	Check
Flaps	RETRACT
Instrument lights (if installed)	ON
Navigation lights (if installed)	ON
Anticollision lights (if installed)	ON
Strobe lights (if installed)	ON
Recognition lights (if installed) (Post-MOD.151)	ON
Pitot heating (if installed)	ON
Landing and taxi lights (if installed)	ON

b - L.H. wing

Navigation light (if installed)	Illuminated
Anticollision light (if installed)	Flashing
Recognition light (if installed) (Post-MOD.151)	Illuminated
Landing and taxi lights (if installed)	Illuminated

WARNING

**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 (if installed)	Illuminated
Recognition light (if installed) (Post-MOD.151)	Illuminated
Anticollision light (if installed)	Flashing

d - Airplane rear part

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

e - Cabin

Navigation lights (if installed)	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 (if installed)	OFF
Instrument lights (if installed)	OFF
Main switch	OFF

BEFORE STARTING ENGINE

Preflight inspection	Carried out
Doors	CLOSED, check catches in place
Main switch	OFF
Parking brake	Set
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Flight controls	Check operation
Pitch trim	Check deflection
Fuel selector	OPEN (L.H. or R.H.)
Circuit breakers (side panel)	Closed
Magneto selector	OFF
"Radio master" (if installed)	OFF
Alternate static source (if installed)	PUSHED

ENGINE STARTING

Anticollision lights (if installed)	ON

NORMAL PROCEDURE :

Carburetor heating	OFF
Mixture	FULL RICH
Main switch	ON
Fuel pump	ON
Pump warning light	ON
Fuel pressure	Green sector
Injection	Throttle operated a few times
Throttle	1/4 OPEN
Area	Clear
Magneto / start selector	START (30 sec. maxi)

When the engine starts :

Magneto selector	BOTH
Oil pressure	Green sector

> If no oil pressure indication after 30 sec., shutdown engine.

Fuel pump	OFF
Engine	1000 to 1200 RPM during heating

HOT ENGINE :

Same procedure as normal procedure, but without injection.

COLD WEATHER PROCEDURE :

Carburetor heating	OFF
Mixture	FULL RICH
Main switch	ON
Fuel pump	ON
Pump warning light	ON
Fuel pressure	Green sector

Injection	Throttle operated 10 to 15 times
Throttle	1/4 OPEN
Area	Clear
Magneto / start selector	START (30 sec. maxi)

When the engine starts :

Magneto selector	BOTH
Oil pressure	Green sector

> If no oil pressure indication after 30 sec., shutdown engine.

Fuel pump OFF

Engine

- 1200 RPM until oil temperature pointer moves
- 1500 RPM until oil temperature pointer reaches 50 % of yellow sector
- 2000 RPM until oil temperature pointer reaches the green sector

FAILED STARTING :

Failed starting may be due to excess fuel resulting from repeated injection producing black smoke and back fire.

Proceed as follows :

Mixture	IDLE CUT-OFF
Throttle	FULL POWER
Magneto / start selector	START (30 sec. maxi)

Then, resume normal procedure without injection.

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
"Radio master" (if installed)	ON
All radios and navaids	ON
Fuel selector	Set to fullest tank
Flaps	Checked and RETRACTED

TAXIING

Parking brake	Release
Brakes	Checked
Flight instruments	Checked
Taxi light (if installed)	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
Fuel pressure	Green sector
Mixture	FULL RICH
Carburetor heating	OFF
Fuel selector	Set to fullest tank

MAGNETO CHECK :

Throttle	1800 RPM
Magneto selector	L. then BOTH R. then BOTH
Maximum RPM drop on each magneto	175 RPM
Maximum difference between magnetos	50 RPM

CARBURETOR HEATING CHECK :

Carburetor heating	ON
Carburetor temperature indicator (if installed)	Increase
Carburetor heating	OFF

BEFORE TAKE-OFF

Seats, seat belts, shoulder harnesses	Check
Doors	LOCKED
Controls	Free
Pitch trim	TAKE-OFF
Flaps	TAKE-OFF
Magneto selector	BOTH
Carburetor heating	OFF
Mixture	FULL RICH
Fuel selector	Check set to fullest tank

Fuel pump	ON
Oil temperature	Green sector
Oil pressure	Green sector
Fuel 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 (if installed)	As required
Navigation lights (if installed)	As required
Pitot heating (if installed)	As required
Transponder (if installed)	As required

TAKE-OFF

Lined up on runway	Check heading indicator Check stand-by compass
Smoothly apply full power	
Airspeeds	See Section 5 "Take-off performance"
STANDARD AIRSPEEDS :	
Rotation	65 KIAS
Initial climb	65 KIAS
WHEN SAFELY AIRBORNE :	
Brakes	Apply
AT 300 ft :	
Climb speed	73 KIAS
Flaps	RETRACT
AT 1000 ft :	
Fuel pump	OFF
External lights (if installed)	As required

CLIMB

Mixture	FULL RICH
Throttle	FULL POWER
Optimum climb speed	80 KIAS

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

CAUTION

CLIMB AT BEST ANGLE OF CLIMB SHOULD BE USED ONLY IN EXCEPTIONAL CASES SINCE THE ENGINE IS LESS COOLED

CRUISE

Power	Adjusted
Pitch trim	Adjusted
Mixture	Adjusted

Normal cruise between 60 % and 75 %, see Section 5 "Performance".

Adjust mixture on "FULL RICH" for power higher than 75 %.

RECOMMENDATIONS :

In practice, it is recommended to change tank every half-hour when observing fuel pressure and not to exceed a fuel imbalance of 12.4 U.S Gallons (47 litres).

During take-off from high elevation airport or during prolonged climbs, roughness or loss of power may result from overrichness.

In such a case, adjust mixture control only enough to obtain smooth operation and not for economy.

Rough operation due to overrich fuel / air mixture is most likely to be encountered at altitudes above 5000 ft.

CAUTION

ALWAYS ENRICH MIXTURE BEFORE INCREASING POWER

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 replace the carburetor heating control in OFF position after leaving the icing area.

DESCENT

Power setting as required for descent.

Every 1500 ft, apply engine power to prevent excess engine cooling and spark plugs fouling.

If descent with reduced throttle :

Carburetor heating	ON
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

APPROACH - LANDING

FINAL :

Airspeed	76 KIAS
Flaps	TAKE-OFF
Fuel pump	ON
Mixture	FULL RICH
Carburetor heating	ON or OFF as required

Brakes	Checked
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Landing lights (if installed)	ON
SHORT FINAL :	
Flaps	LANDING
Airspeed	See Section 5 "Landing Performance"
Standard airspeed	67 KIAS

GO-AROUND

Carburetor heating	OFF
Smoothly apply full power	
Airspeed	73 / 80 KIAS
When climb rate is positive :	
Flaps	TAKE-OFF
Airspeed	73 KIAS
Flaps	RETRACTED
Climb	78 KIAS

AFTER LANDING

Fuel pump	OFF
Flaps	RETRACTED
Landing light (if installed)	OFF
Taxi light (if installed)	As required
Trim	TAKE-OFF
Radio equipment	As required
Pitot heating (if installed)	OFF
Carburetor heating	OFF

SHUT-DOWN / SECURING AIRPLANE

Parking brake	Set
Turn and bank indicator (if installed)	OFF
Anticollision lights (if installed)	OFF
Taxi light (if installed)	OFF
Navigation lights (if installed)	OFF
"Radio master" (if installed)	OFF
Throttle	REDUCED

WARNING

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	900 to 1000 RPM
Mixture	IDLE CUT-OFF

(*) 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.

AFTER ENGINE STOPS :

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

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 buftet) 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	128 KIAS
Recommended airspeed	108 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.

SECTION 5

PERFORMANCE

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

ACOUSTIC LIMITATION

The TB 9 aircraft complies, with noise levels lower than the limit noise levels by :

- 5.1 dB (A), with Chapter 10, appendix 6, annex 16 of the agreement relative to International Civil Aviation Organization (ICAO),
- 3.3 dB (A), with FAR PART 36 appendix G.

The noise limits authorized in above-mentioned conditions are :

- 84.0 dB (A) for the ICAO,
- 79.1 dB (A) for the FAR.

The noise levels which were determined in above-mentioned conditions at maximum continuous power and at 2490 RPM are :

- 78.9 dB (A) for the ICAO,
- 75.8 dB (A) for the FAR.

Consequently, according to above-mentioned conditions, the noise limitation type certificate No. N165 is extended to SOCATA Model TB 9 aircraft equipped with the SENSENICH propeller 58" (TB 9 "SPRINT").

AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

Figure 5.1 - NORMAL STATIC SOURCE

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

ALTERNATE STATIC SOURCE

In case of alternate static source utilization, open air outlets and / or actuate cabin air selector flow lever to open position. Then, instrument error is slight.

ALTITUDE COMPENSATION

ALTERNATE STATIC SOURCE

In case of alternate static source utilization, open air outlets and / or actuate cabin air selector flow lever to open position. Then, instrument error is not significant.

STALLING SPEEDS

CONDITIONS : Weight : 2337 lbs (1060 kg)
Power OFF

CONFIGURATION	BANK					
	0°		30°		45°	
	KIAS	MPH IAS	KIAS	MPH IAS	KIAS	MPH IAS
FLAPS RETRACTED	58	66	62	71	69	79
FLAPS TAKE-OFF	54	63	59	68	65	75
FLAPS LANDING	50	58	54	62	59	68

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

Figure 5.2 - STALLING SPEEDS

WIND COMPONENTS

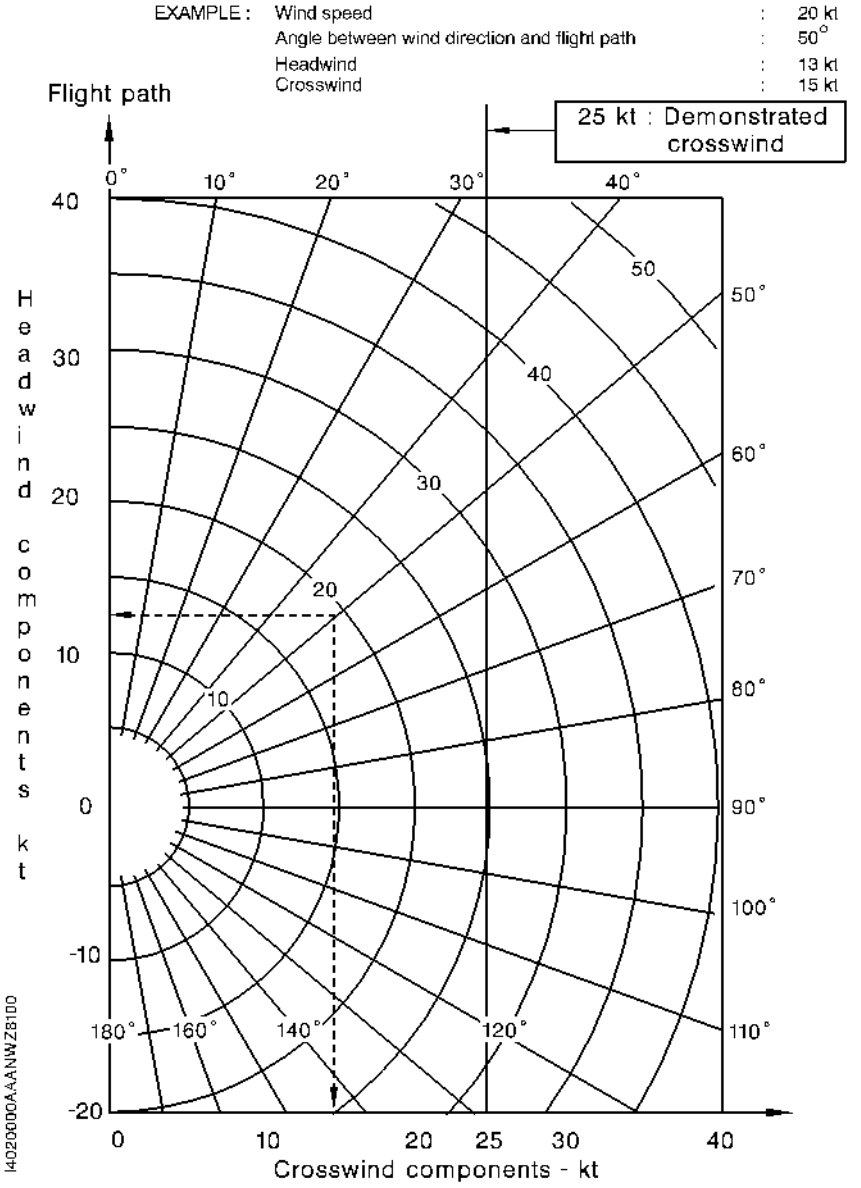


Figure 5.3 - WIND COMPONENTS

NOTICE

Measurements were taken with zero wind condition on dry tarred runway.

The performance are presented as a function of the altitude in feet and the temperature at the considered altitude.

Take-off and landing pertormance 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.

TAKE-OFF PERFORMANCE

Flaps extended

The take-off runs correspond to tests conducted (in TARBES-OSSUN), on tarred runway.

TAKE-OFF PERFORMANCE

CONDITIONS : IAS : Lift off : 65 KIAS - 75 MPH IAS
Clear 50 ft : 65 KIAS - 75 MPH IAS
Weight : 2337 lbs (1060 kg)

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	886	1099	1312	1591	1886
	Clear 50 ft (ft)	1411	1755	2100	2575	3232
+ 32°F (0°C)	Roll (ft)	1099	1263	1526	1837	2231
	Clear 50 ft (ft)	1690	1903	2411	3018	3871
+ 59°F (+ 15°C)	Roll (ft)	1230	1427	1690	2051	2493
	Clear 50 ft (ft)	1870	2198	2707	3412	4478
+ 86°F (+ 30°C)	Roll (ft)	1378	1575	1870	2247	2756
	Clear 50 ft (ft)	2067	2461	3035	3855	5184
+ 104°F (+ 40°C)	Roll (ft)	1444	1755	2018	2428	2772
	Clear 50 ft (ft)	2215	2707	3264	4167	6168

Figure 5.4 - TAKE-OFF PERFORMANCE (2337 lbs)

TAKE-OFF PERFORMANCE

CONDITIONS : IAS : Lift off : 60 KIAS - 69 MPH IAS
Clear 50 ft : 62 KIAS - 71 MPH IAS
Weight : 1874 lbs (850 kg)

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	623	771	935	1148	1345
	Clear 50 ft (ft)	984	1214	1476	1837	2313
+ 32°F (0°C)	Roll (ft)	755	886	1099	1296	1558
	Clear 50 ft (ft)	1165	1378	1706	2133	2772
+ 59°F (+ 15°C)	Roll (ft)	886	1050	1181	1411	1706
	Clear 50 ft (ft)	1312	1575	1886	2395	3232
+ 86°F (+ 30°C)	Roll (ft)	951	1099	1312	1558	1870
	Clear 50 ft (ft)	1444	1690	2133	2739	3757
+ 104°F (+ 40°C)	Roll (ft)	1050	1230	1411	1657	2067
	Clear 50 ft (ft)	1575	1854	2297	2953	4675

Figure 5.5 - TAKE-OFF PERFORMANCE (1874 lbs)

CLIMB PERFORMANCE

CONDITIONS : Climb speed : 80 KIAS - 92 MPH IAS
Weight : 2337 lbs (1060 kg)
Flaps retracted

Pressure altitude (ft)	VERTICAL SPEED									
	- 4°F (- 20°C)		+ 32°F (0°C)		+ 59°F (+ 15°C)		+ 86°F (+ 30°C)		+ 104°F (+ 40°C)	
	m/s	ft/min	m/s	ft/min	m/s	ft/min	m/s	ft/min	m/s	ft/min
0	3.90	770	3.60	710	3.40	665	3.10	610	3.00	595
2000	3.40	670	3.10	610	2.90	575	2.65	520	2.50	495
4000	2.90	570	2.55	505	2.35	460	2.10	415	2.00	390
6000	2.35	460	2.05	405	1.80	355	1.60	320	1.50	290
8000	1.80	355	1.60	310	1.30	255	1.10	220	0.95	185

Figure 5.6 - CLIMB PERFORMANCE (2337 lbs)

CLIMB PERFORMANCE

CONDITIONS : Climb speed : 73 KIAS - 84 MPH IAS
Weight : 1874 lbs (850 kg)
Flaps retracted

Pressure altitude (ft)	VERTICAL SPEED									
	- 4°F (- 20°C)		+ 32°F (0°C)		+ 59°F (+ 15°C)		+ 86°F (+ 30°C)		+ 104°F (+ 40°C)	
	m/s	ft/min	m/s	ft/min	m/s	ft/min	m/s	ft/min	m/s	ft/min
0	5.20	1020	4.80	950	4.60	905	4.35	860	4.30	850
2000	4.60	905	4.30	840	4.05	800	3.85	760	3.75	735
4000	4.05	800	3.75	735	3.50	690	3.35	655	3.25	640
6000	3.45	680	3.15	620	3.00	590	2.80	550	2.70	530
8000	2.90	575	2.65	525	2.50	490	2.30	450	2.20	435

Figure 5.7 - CLIMB PERFORMANCE (1874 lbs)

MAXIMUM PERFORMANCE ALTITUDE

Maximum performance altitude in standard temperature condition (ISA), corresponding to a vertical speed of 100 ft/min, is 12000 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 light	- 0.16	- 0.19	- 0.10 %
Strobe lights	- 0.43	- 0.50	- 0.27 %
Example : IFR	- 3.23	- 3.73	- 2.00 %

Figure 5.8 - ANTENNAS INFLUENCE ON PERFORMANCE

LEVEL FLIGHT PERFORMANCE

Level flight performance are given for a take-off weight of 2337 lbs (1060 kg) and for setting "Best Power" obtained with an EGT indicator.

Fuel : 40.2 U.S Gal (152 litres) usable

Endurance without reserve

The endurance and ranges specified correspond to complete use of the fuel at the indicated altitude without allowing for take-off, climb, and so on...

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.

To obtain as precisely as possible the best economy consumption results given thereaffer, we recommend the use of a rich mixture indicator (exhaust gas temperature indicator = EGT).

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.

PRESSURE ALTITUDE : 2000 FT

ISA : 52°F (11°C)

Total usable capacity : 40.2 U.S. Gal

PERFORMANCE WITH BEST ECONOMY CONSUMPTION

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2550	74	109	126	112	129	8.2	4h55'	634	550
2500	70	106	122	109	126	7.8	5h10'	646	560
2450	67	103	119	106	122	7.6	5h20'	649	565
2400	64	100	115	103	119	7.1	5h37'	668	580
2350	61	97	112	100	115	6.9	5h50'	674	585
2300	59	94	108	97	112	6.6	6h05'	677	590

BEST POWER PERFORMANCE

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2550	74	111	128	114	131	9.9	4h02'	531	460
2500	70	108	124	111	128	9.4	4h16'	547	475
2450	67	105	121	108	124	8.9	4h28'	556	485
2400	64	102	117	105	121	8.6	4h40'	565	490
2350	61	99	114	102	117	8.2	4h52'	572	495
2300	59	96	111	99	114	8	5h02'	575	500

(*) Rounded values

Figure 5.9 - LEVEL FLIGHT PERFORMANCE (2000 ft)

PRESSURE ALTITUDE : 4000 FT

ISA : 45°F (7°C)

Total usable capacity : 40.2 U.S. Gal

PERFORMANCE WITH BEST ECONOMY CONSUMPTION

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2600	73	106	122	113	130	8.1	4h59'	648	563
2550	69	103	119	110	127	7.7	5h15'	663	576
2500	66	100	115	107	123	7.4	5h25'	669	581
2450	63	97	112	103.5	119	7.1	5h38'	671	583
2400	61	94	108	100	115	6.9	5h51'	673	585
2350	58	91	105	97	112	6.5	6h10'	687	597

BEST POWER PERFORMANCE

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2600	73	108	124	115	132	9.9	4h04'	538	467
2550	69	105	121	112	129	9.3	4h17'	554	481
2500	66	102	117	109	126	8.9	4h29'	562	489
2450	63	99	114	105.5	121	8.6	4h41'	570	495
2400	61	96	111	102	117	8.3	4h50'	569	494
2350	58	93	107	99	114	7.9	5h04'	577	501

(*) Rounded values

Figure 5.10 - LEVEL FLIGHT PERFORMANCE (4000 ft)

PRESSURE ALTITUDE : 6000 FT

ISA : 37°F (3°C)

Total usable capacity : 40.2 U.S. Gal

PERFORMANCE WITH BEST ECONOMY CONSUMPTION

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2650	71	103	119	113	130	7.9	5h04'	658	572
2600	68	100	115	110	127	7.7	5h15'	664	577
2550	65	96.5	111	106	122	7.3	5h32'	673	585
2500	62	93	107	102	117	7.0	5h44'	673	585
2450	59	90	104	98	113	6.7	6h00'	677	588
2400	57	87	100	95	109	6.5	6h12'	678	589

BEST POWER PERFORMANCE

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2650	71	105	121	115	132	9.8	4h06'	542	471
2600	68	102	117	112	129	9.3	4h18'	555	482
2550	65	98.5	113	108	124	8.9	4h31'	561	487
2500	62	95	109	104	120	8.5	4h24'	562	489
2450	59	92	106	100	115	8.2	4h54'	564	490
2400	57	89	102	97	112	7.9	5h04'	565	491

(*) Rounded values

Figure 5.11 - LEVEL FLIGHT PERFORMANCE (6000 ft)

PRESSURE ALTITUDE : 8000 FT

ISA : 30°F (-1°C)

Total usable capacity : 40.2 U.S. Gal

PERFORMANCE WITH BEST ECONOMY CONSUMPTION

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2700	70	100	115	113	130	7.9	5h04'	658	572
2650	66	97	112	109	126	7.4	5h26'	680	591
2600	64	94	108	105	121	7.1	5h38'	680	591
2550	61	90	104	101	116	6.9	5h50'	679	590
2500	58	86	99	97	112	6.6	6h05'	678	589

BEST POWER PERFORMANCE

N RPM	% BHP *	IAS		TAS		C U.S. Gal	ENDURANCE (Without reserve)		
		KIAS	MPH	KTAS	MPH		h.min	SM	NM
2700	70	102	117	115	132	9.8	4h05'	539	468
2650	66	99	114	111	128	9.2	4h21'	556	483
2600	64	96	111	107	123	8.9	4h31'	557	484
2550	61	92	106	103	119	8.5	4h43'	559	486
2500	58	88	101	99	114	8.2	4h55'	561	487

(*) Rounded values

Figure 5.12 - LEVEL FLIGHT PERFORMANCE (8000 ft)

LANDING PERFORMANCE

WEIGHT : 2337 lbs (1060 kg)

CONDITIONS : VI : Touch-down: 59 KIAS - 68 MPH IAS
Clear 50 ft : 67 KIAS - 77 MPH IAS

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	558	607	640	705	771
	Clear 50 ft (ft)	1198	1296	1394	1509	1641
+ 32°F (0°C)	Roll (ft)	607	640	705	771	820
	Clear 50 ft (ft)	1312	1394	1509	1624	1755
+ 59°F (+ 15°C)	Roll (ft)	640	689	755	804	869
	Clear 50 ft (ft)	1378	1476	1591	1723	1854
+ 86°F (+ 30°C)	Roll (ft)	673	722	787	853	919
	Clear 50 ft (ft)	1444	1558	1657	1805	1952
+ 104°F (+ 40°C)	Roll (ft)	689	755	820	886	951
	Clear 50 ft (ft)	1493	1591	1739	1870	2018

Figure 5.13 - LANDING PERFORMANCE [2337 lbs (1060 kg)]
(Flaps extended)

LANDING PERFORMANCE

WEIGHT : 2337 lbs (1060 kg)

CONDITIONS : VI : Touch-down: 66 KIAS - 76 MPH IAS
Clear 50 ft : 75 KIAS - 87 MPH IAS

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	730	798	841	930	996
	Clear 50 ft (ft)	1573	1683	1812	1971	2126
+ 32°F (0°C)	Roll (ft)	798	841	930	996	1062
	Clear 50 ft (ft)	1262	1816	1971	2122	2282
+ 59°F (+ 15°C)	Roll (ft)	841	908	945	1041	1130
	Clear 50 ft (ft)	1794	1926	2082	2237	2414
+ 86°F (+ 30°C)	Roll (ft)	886	952	1019	1107	1196
	Clear 50 ft (ft)	1882	2037	2171	2348	2546
+ 104°F (+ 40°C)	Roll (ft)	908	975	1062	1151	1240
	Clear 50 ft (ft)	1949	2082	2259	2435	2635

Figure 5.13A - LANDING PERFORMANCE [2337 lbs (1060 kg)]
(Flaps retracted)

LANDING PERFORMANCE

WEIGHT : 1764 lbs (800 kg)

CONDITIONS : VI : Touch-down: 56 KIAS - 64 MPH IAS
Clear 50 ft : 59 KIAS - 68 MPH IAS

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	345	377	394	427	459
	Clear 50 ft (ft)	869	951	1017	1083	1181
+ 32°F (0°C)	Roll (ft)	377	394	427	459	492
	Clear 50 ft (ft)	951	1017	1083	1181	1263
+ 59°F (+ 15°C)	Roll (ft)	394	427	459	492	525
	Clear 50 ft (ft)	1001	1083	1132	1263	1345
+ 86°F (+ 30°C)	Roll (ft)	410	443	476	509	558
	Clear 50 ft (ft)	1050	1132	1214	1312	1427
+ 104°F (+ 40°C)	Roll (ft)	427	459	492	525	574
	Clear 50 ft (ft)	1099	1181	1280	1362	1476

Figure 5.14 - LANDING PERFORMANCE [1764 lbs (800 kg)]
(Flaps extended)

LANDING PERFORMANCE

WEIGHT : 1764 lbs (800 kg)

CONDITIONS : VI : Touch-down: 63 KIAS - 72 MPH IAS
Clear 50 ft : 66 KIAS - 76 MPH IAS

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

Tempe-rature	Distance	Pressure altitude (ft)				
		0	2000	4000	6000	8000
- 4°F (- 20°C)	Roll (ft)	443	487	509	553	598
	Clear 50 ft (ft)	1130	1241	1328	1417	1550
+ 32°F (0°C)	Roll (ft)	487	509	553	598	642
	Clear 50 ft (ft)	1241	1328	1417	1550	1639
+ 59°F (+ 15°C)	Roll (ft)	509	553	598	642	687
	Clear 50 ft (ft)	1307	1417	1484	1639	1746
+ 86°F (+ 30°C)	Roll (ft)	532	576	620	664	730
	Clear 50 ft (ft)	1373	1484	1594	1705	1860
+ 104°F (+ 40°C)	Roll (ft)	553	598	642	687	753
	Clear 50 ft (ft)	1439	1528	1660	1771	1926

Figure 5.14A - LANDING PERFORMANCE [1764 lbs (800 kg)]
(Flaps retracted)

CLIMB - CONSUMPTION - TIME - DISTANCE COVERED

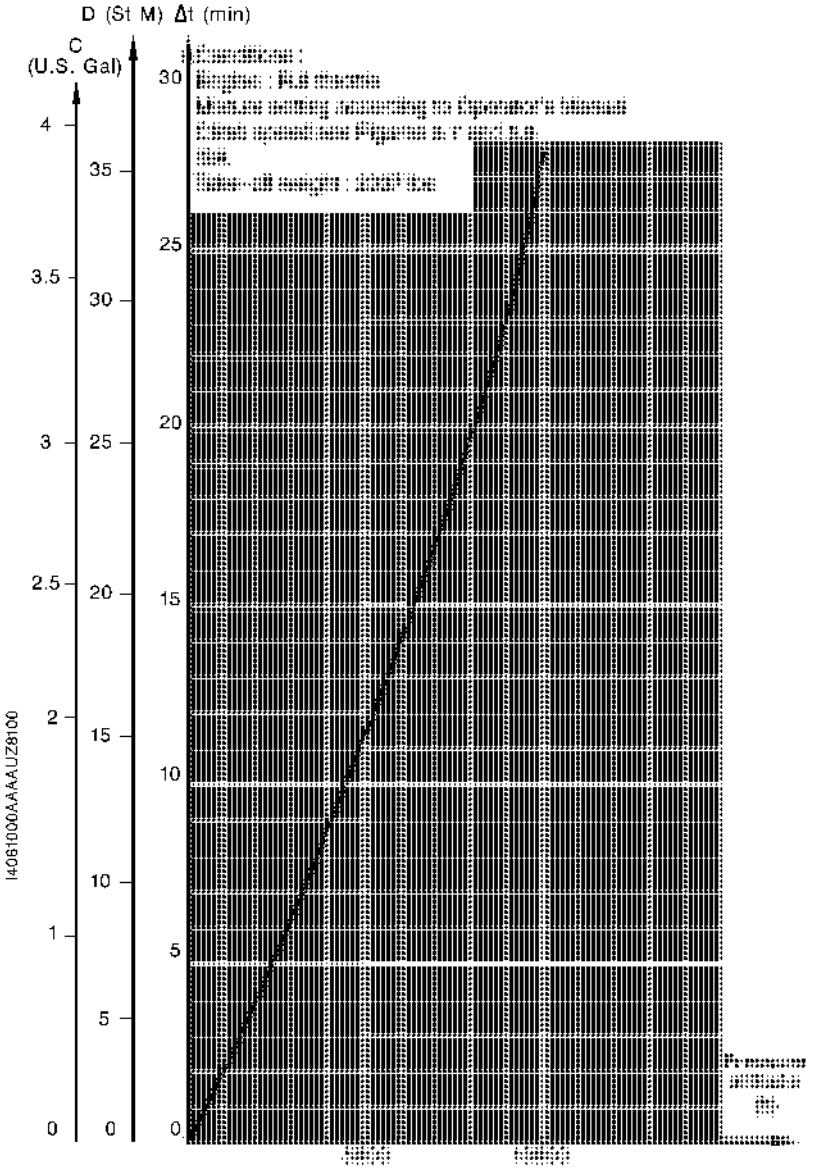


Figure 5.15 - CLIMB - CONSUMPTION - TIME - DISTANCE COVERED

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 9 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 be used.

NOTE:
Weighing carried out at the factory takes into account all the items of equipment installed on the airplane. The list of these items of 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) (kept in position with "Velcro" straps) of rear bench or, Post-MOD.151, of rear seats and, in this case, remove arm rest.
- 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 1/4 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 102.3 in. (2.600 m)

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

  Maximum 441 lbs (200 kg) at 78.7 in. (2.000 m)

CAUTION

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

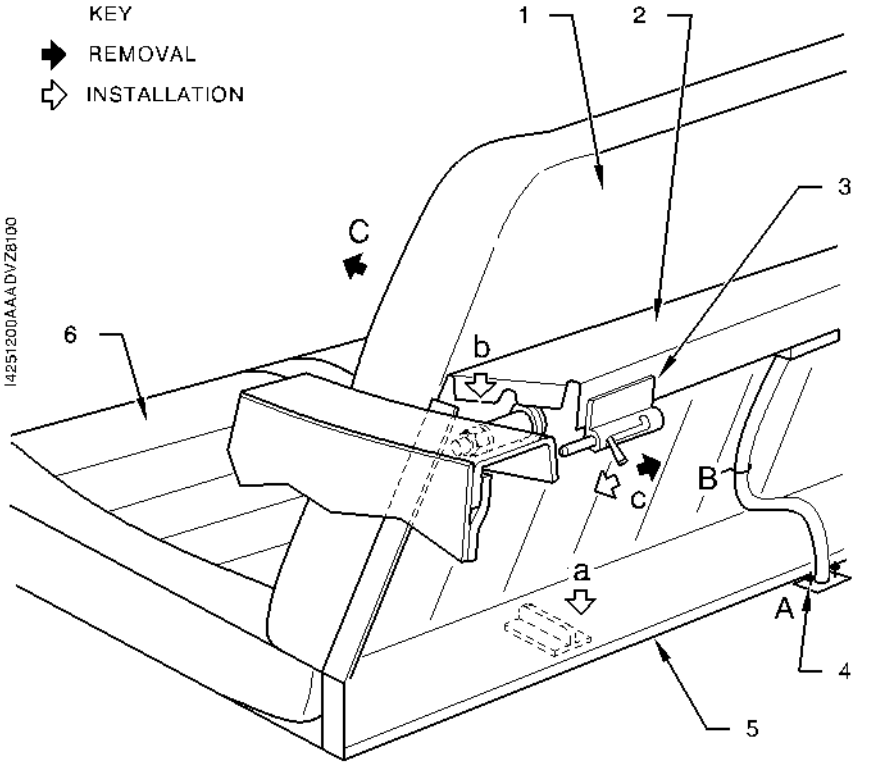


Figure 6.1 - REMOVAL AND INSTALLATION OF REAR BENCH OR, Post-MOD.151, REAR SEATS

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 : 1457 lbs (661 kg) - 52.56 lb.in / 1000 (631 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 284 lbs (129 kg)]

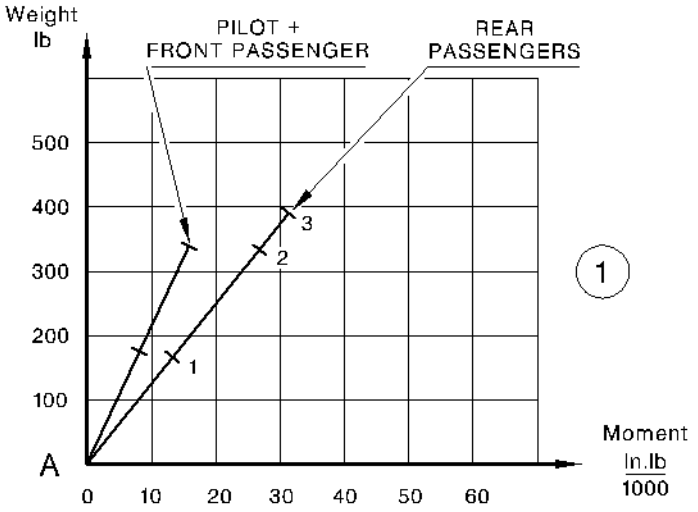
- Superpose point B (1) and point B of graph ②, draw the fuel straight line to get point B (2).
  [Our sample loading : 192 lbs (87 kg) - 31.9 U.S Gal (121 l) fuel]

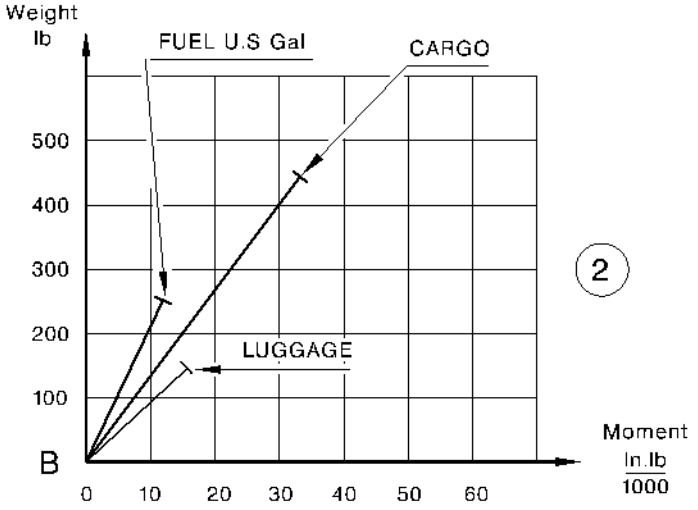
- Superpose point B (2) and point B of graph ②, draw the baggage straight line to get point M.
  [Our sample loading : 18 lbs (8 kg) baggage]

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

NOTE:
[Pre-MOD.151 : not valid for TB 9 standard front seat - Post-MOD.151 : not valid with option 25-002A (bucket front seats)] :
Option No. 080000 M "L.H. or R.H. front seat back-off installation", option No. 080010 M "L.H. front seat back-off installation" and/or option No. 080020 M "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.

CAUTION
OPTION(S) No. 080000 M (Qty 1 or 2)
OR 080010 M AND 080020 M (See NOTE on page 6.6) :
2-in. (50 mm) back-off installation for L.H. and/or R.H. front seat(s)





I40B100DAAACVZ8100

Figure 6.4 - LOADING GRAPHS

INTENTIONALLY LEFT BLANK

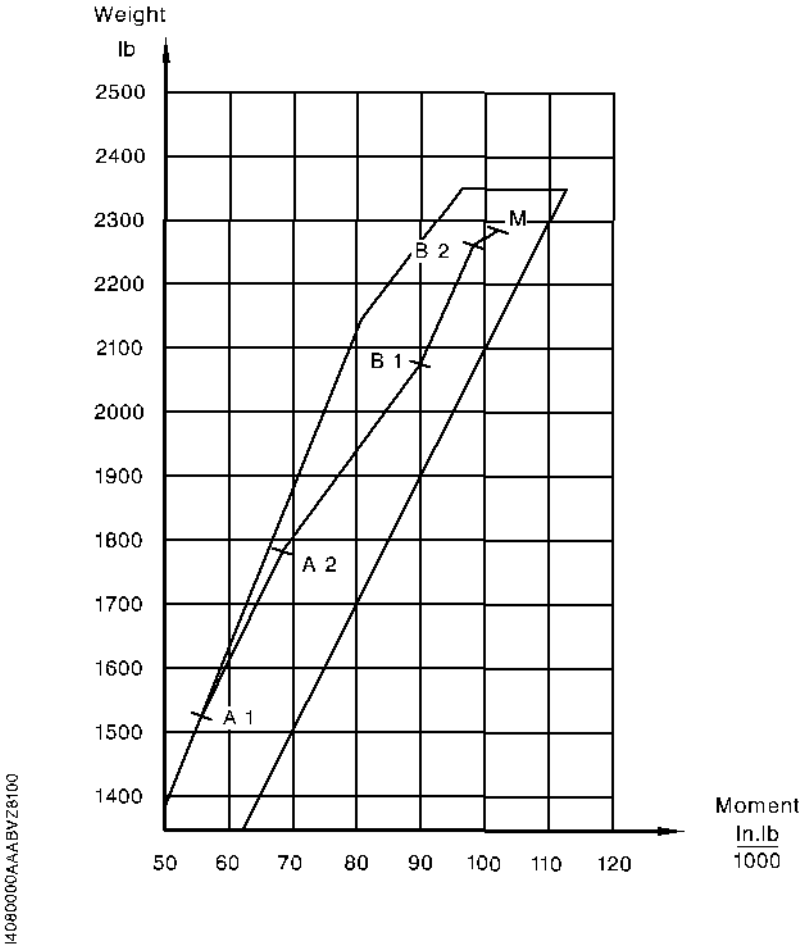


Figure 6.6 - LOADING SAMPLE

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 (Non restrictive list)

- 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 with "**Pre-MOD. 151**" validity :*
S/N 948 to 1999, except S/N 1900
*Equipment list with "**Post-MOD. 151**" validity :*
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 20M	Radio console forced ventilation (blower KING KA 33) (on radio console)		1.543	12.99

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 10M	VHF/COM capability (Loud-speaker "SONAVOX")		3.395	47.24
A	J539 30M	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 10M	VHF/COM capability		3.219	49.21
A	J894 30M	VHF/COM capability		3.219	49.21
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	052300 M	Boom microphone headset H10-30 DAVID CLARK		1.190	55.12
		23-12 - COM 1 installation			
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
A	054910 M	Rigid antenna VHF 1 D & M		0.661	127.17
		23-13 - COM 2 installation			
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
A	054920 M	Rigid antenna VHF 2 D & M		0.661	57.87
		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			
		24-30 - DC generation			
R		Alternator 70A ALU 8421 PRESTOLITE/ELECTROSYSTEMS or LW 14324 LYCOMING		12.985	– 37.80
R		Battery G242-10AH GILL		26.962	- 2.76
R		Battery relay 70 117 221.5 ESSEX		0.772	- 1.18
R		Voltage regulator TB20 61215 P/N BOO 368.5 LAMAR		0.375	3.94
A	C839 00M	Converter 28 V - 14 V LT- 71A KGS		1.653	39.37
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	C825 00M	Ground power receptacle		3.527	47.24
A	C835 00M	Ground power receptacle		3.682	49.61
A	C841 00M	Ground power extension (With option C835 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)
		25 - EQUIPMENT AND FURNISHINGS			
		25-10 - Cockpit			
A	F779 15M	Front head-rests "Blue 90" (Qty 2)		3.417	51.18
A	F837 00M	Cabin upholstering "Blue 90"		12.456	59.06
A	F837 10M	Cabin upholstering "Ficelle 90"		12.456	59.06
A	F837 20M	Cabin upholstering "Blue 95"		12.456	59.06
A	F837 30M	Cabin upholstering "Ficelle 95"		12.456	59.06
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
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 TB09 74011x07		12.743	51.18
R		Front seats TB09 74011x09		13.294	50.00
R		Front seats TB09 74011x12/13		13.382	50.00
R		Front seats TB09 74011x10/11		13.801	50.00

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	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
O	F901 00M	Front seats "Blue 95" (Qty 2) (Post-MOD.89 and 90)		50.111	50.00
O	F901 10M	Front seats "Ficelle 95" (Qty 2) (Post-MOD.89 and 90)		50.111	50.00
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" (Oty 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" (Oty 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	080120 M	Tilting front seat "Blue 95" PMV		18.298	49.21
O	080130 M	Tilting front seat "Ficelle 95" PMV		18.298	49.21
O	080140 M	Tilting lowered front seat "Blue 95" PMV		23.622	49.21
O	080150 M	Tilting lowered front seat "Ficelle 95" PMV		23.622	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

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	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
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	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)
		25-15 - Upper duct			
A	052630 M	Sun visor PLEXIGLAS - Model 86		0.683	41.34
A	052640 M	Sun visor PLEXIGLAS - Model 91		0.683	41.34
		25-17 - Instrument panel			
O	057730 M	R.H. large instrument panel		4.740	23.62
O	057740 M	R.H. large instrument panel		4.740	23.62
O	069500 M	R.H. small instrument panel		1.984	23.62
O	069510 M	R.H. small instrument panel		1.984	23.62
		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	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			
A	059700 M	Rudder / aileron control interconnection		2.138	16.14
		27-50 - Wing flaps (control)			
R		Flaps actuator TB10 61235 P/N 8375 AVIAC		5.071	61.81
R		Flaps actuator TB10 61235 P/N 700-239 LPMI		4.365	61.81
R		Flaps actuator TB10 61237 P/N 8308 AVIAC		5.534	61.81
O	C569 00M	Flaps preselection		0.220	39.37
O	C569 10M	Flaps preselection (with new switch)		0.220	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)
		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 TB10 61218000 P/N 476284 FACET/BENDIX		1.653	1.18
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)
		31 - INDICATING/RECORDING SYSTEMS			
		31-10 - Control and indicating panels			
R		Engine and fuel controls TB09 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)
A	C561 00M	Starter warning light		0.132	39.37
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			
		32-40 - Wheels and brakes			
R		Main LDG wheel assy (2) 40-97E Type III CLEVELAND		5.842	59.84
R		Main LDG wheel assy (2) 40-97F CLEVELAND		6.482	59.84
R		Main LDG brake assy (2) 91.50 CLEVELAND		1.918	59.84
R		Main LDG tire (2) 15.6.00-6 4 PRTT DUNLOP (Pre-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 4 PLYS GOODYEAR (Pre-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 PR GOODYEAR (Pre-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 PRTT DUNLOP (Post-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 160TT MICHELIN (Post-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 6PR P/N 156E61.3 GOODYEAR (Post-MOD.119 or MOD.121)		8.818	59.84
R		Main LDG tube (2) 15.6.00-6 DUNLOP (Pre-MOD.119 or MOD.121)		2.425	59.84
R		Main LDG tube (2) 6.00-6 DUNLOP (Pre-MOD.119 or MOD.121)		1.653	59.84
R		Main LDG tube (2) TR20 P/N 092-500-0 MICHELIN (Post-MOD.119 or MOD.121)		2.425	59.84
R		Main LDG tube (2) 15.6.00-6 TR GOODYEAR (Post-MOD.119 or MOD.121)		1.653	59.84
R		Nose LDG wheel assy 40-77 B CLEVELAND		2.822	– 16.93
R		Nose LDG wheel assy 040-7702 CLEVELAND		2.822	– 16.93
R		Nose LDG tire 5.00-5 6 PRTT DUNLOP		5.798	– 16.93

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	– 16.93
R		Nose LDG tire 5.00-5 6 PR P/N 505C61.8 GOODYEAR		5.798	– 16.93
R		Nose LDG tube 5.00-5 DUNLOP		1.455	– 16.93
R		Nose LDG tube TR67A P/N 092-308-0 MICHELIN		1.455	– 16.93
R		Nose LDG tube 5.00-5 TR67 GOODYEAR		1.455	– 16.93
A	052100 M	Braking control (R.H. post)		3.307	11.81
		32-60 - Position indicating system and alarms			
A	B877 00M	LDG simulator assy		0.595	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			
A	E588 00M	Maps reading light		0.176	25.59
A	E696 00M	Lighting assembly (instrument panels, cabin, landing, taxi and LABINAL navigation lights)		3.483 or 3.351	31.50
A	E696 20M	Lighting assembly (instrument panels, cabin, landing, taxi and WHELEN navigation lights)		3.483 or 3.351	31.50
A	E873 00M	Emergency lighting system		4.079	104.72
		33-40 - External lighting			
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
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

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	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		Airspeed indicator TB09 76223 P/N 8100 Code B615 UNITED INSTRUMENTS		0.728	24.80
O	C515 10M	Heated pitot		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	D682 00M	Vertical speed indicator with integrated lighting P/N 7000 Code C83 UNITED INSTRUMENTS		1.014	23.62
A	D803 20M	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
A	N846 00M	Altitude encoder AR850 NARCO		1.323	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	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
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

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)
		34-22 - 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
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

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	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
		34-25 - Radio magnetic indication			
A	K584 00M	RMI KI 22900 (without switching) KING		3.086	21.65
A	K819 00M	RMI KNI 582 KING		3.417	21.65
		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

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	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
		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

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	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
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

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	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	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	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
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

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	- 3.54
A	A904 10M	Vacuum pump SIGMA-TEK with filter (when stormscope installed, refer to ATA 34)		5.291	- 3.54
A	067150 M	Vacuum system (without attitude gyro indicator, nor heading, nor HSI)		2.579	10.24
		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

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

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 :		27.558	53.15
		- Windshield TB21 24001		11.023	27.56
		- Door windows TB10 25030		8.598	55.12
		- Rear side windows TB10 22030		7.937	86.61
O	058520 M	Tinted windows assy :		27.558	53.15
		- Windshield TB21 24001		11.023	27.56
		- Door windows TB10 25030		8.598	55.12
		- Rear side windows TB10 22030		7.937	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 74DM6S8-0-58 SENSENICH		36.817	– 47.64

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	059110 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 0-320-D2A LYCOMING		245.592	– 26.77

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		L.H. magneto (without harness) S4LN 21 BENDIX		4.740	– 17.72
R		R.H. magneto (without harness) S4LN 20 BENDIX		5.247	– 17.72
R		L.H. magneto (without harness) LW 51360.37 LYCOMING		4.740	– 17.72
R		R.H. magneto (without harness) LW 51360.29 LYCOMING		5.247	– 17.72
R		L.H. magneto (without harness) 4373 SLICK		4.740	– 17.72
R		L.H. magneto (without harness) 4273 SLICK		4.740	– 17.72
R		L.H. magneto (without harness) 66 HC 25 SFNN SLICK		4.740	– 17.72
R		R.H. magneto (without harness) 66 HP OSANN SLICK		5.247	– 17.72
R		R.H. magneto (without harness) 4370 SLICK		5.247	– 17.72
R		R.H. magneto (without harness) 4270 SLICK		5.247	– 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)
		77 - ENGINE INDICATING			
		77-10 - Power			
R		Tachometer TB09 76206 LMI P/N LM 83		1.235	23.62
O	D864 00M	Tachometer-Hourmeter NRF 80 P/N LM 04 LMI		0.860	23.62
		77-20 - Temperature			
A	D536 00M	Exhaust gas temperature (EGT) ALCOR		0.882	21.65
A	D684 00M	Carburetor temperature		0.331	23.62
A	D684 10M	Carburetor temperature (without cover on R.H. instrument panel)		0.331	23.62
A	D685	EGT/CHT - Probe on all cylinders		3.307	3.94
A	D685 00M	EGT/CHT - Probe on cylinder No. 2		1.323	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)
		79 - LUBRICATION			
		79-10 - Storage			
A	065810 M	Oil drain door		0.220	– 25.59
		79-20 - Distribution			
R		Oil cooler 20002A NDM		1.742	– 20.47

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	- 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)
		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			
A	C869 20M	Radio console forced ventilation (blower KING KA 33) (on radio console)		1.543	12.99
A	F822 20M	Forced ventilation, rear passengers VETUS		2.756	136.61

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)
		23 - COMMUNICATIONS			
		23-10 - Speech communications			
		23-11 - VHF capability			
S		VHF/COM capability TB10 65216 : - Loud-speaker - Hand microphone - Radio master switch		3.219	49.21
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	052300 M	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			
A	K805	VHF 2 KY 196 A 30 KING		3.825	22.83
A	054920 M	Rigid antenna VHF 2 D & M		0.661	57.87
		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			
		24-30 - DC generation			
R		Alternator 70A ALU 8421 PRESTOLITE/ELECTROSYSTEMS or LW 14324 LYCOMING		12.985	– 37.80
R		Battery G242-10AH GILL		26.962	- 2.76
R		Battery relay 70 117 221.5 ESSEX		0.772	- 1.18
R		Voltage regulator TB20 61215 P/N BOO 368.5 LAMAR		0.375	3.94
R		Pedestal electrical equipment TB10 61216		0.728	29.53
A	C839 00M	Converter 28 V - 14 V LT- 71A KGS		1.653	39.37
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 TB10 61830		3.682	49.61
A	C841 00M	Ground power extension		4.740	91.73
		24-50 - Distribution			
R		Standard circuit breakers panel TB10 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	25-002A	Bucket front seats (Qty 2) : - Rear head-rests (Qty 2)		26.587 3.616	50.20 84.65
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
		25-15 - Upper duct			
S		Sun visor PLEXIGLAS		0.683	41.34
		25-17 - Instrument panel			
S		Small R.H. instrument panel		1.984	23.62
O	057730 M	R.H. large instrument panel		4.740	23.62
O	057740 M	R.H. large instrument panel		4.740	23.62
		25-60 - Emergency equipment			
A	F902 00M	Axe		2.535	37.40

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)
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	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			
		27-20 - Yaw control			
A	059700 M	Rudder / aileron control interconnection		2.138	16.14
		27-50 - Wing flaps (control)			
R		Flaps actuator TB09 61207 P/N 700-239 LPMI		5.203	85.04
R		Flaps control selector TB10 61227		0.320	31.50
R		Flaps position indicator TB20 61232		0.132	31.50
R		Flaps relay + support TB10 61236 : - 2 relays HG2-24 VDC MATSUSHITA - 2 supports HG2 SS MATSUSHITA		 0.551 0.110	 78.35 78.35
O	C569 10M	Flaps preselection (with new switch)		0.220	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)
		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 TB10 61218000 P/N 476284 FACET/BENDIX		1.653	1.18
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)
		31 - INDICATING/RECORDING SYSTEMS			
		31-10 - Control and indicating panels			
R		Engine and fuel controls TB09 76201		1.102	24.80
A	F634 00M	Raised radio console		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 O18.945.22.28.1KB		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
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			
		32-40 - Wheels and brakes			
R		Main LDG wheel assy (2) 40-97E Type III CLEVELAND		5.842	59.84
R		Main LDG wheel assy (2) 40-97F CLEVELAND		6.482	59.84
R		Main LDG brake assy (2) 91.50 CLEVELAND		1.918	59.84
R		Main LDG tire (2) 15.6.00-6 6 PRTT DUNLOP		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 160TT MICHELIN		8.818	59.84
R		Main LDG tire (2) 15.6.00-6 6 6PR P/N 156E61.3 GOODYEAR		8.818	59.84
R		Main LDG tube (2) TR20 P/N 092-500-0 MICHELIN		2.425	59.84
R		Main LDG tube (2) 15.6.00-6 TR GOODYEAR		1.653	59.84
R		Nose LDG wheel assy 40-77 B CLEVELAND		2.822	– 16.93
R		Nose LDG wheel assy 040-7702 CLEVELAND		2.822	– 16.93
R		Nose LDG tire 5.00-5 6 PRTT DUNLOP		5.798	– 16.93
R		Nose LDG tire 5.00-5 6 120TT MICHELIN		5.798	– 16.93
R		Nose LDG tire 5.00-5 6 PR P/N 505C61.8 GOODYEAR		5.798	– 16.93
R		Nose LDG tube 5.00-5 DUNLOP		1.455	– 16.93
R		Nose LDG tube TR67A P/N 092-308-0 MICHELIN		1.455	– 16.93
R		Nose LDG tube 5.00-5 TR67 GOODYEAR		1.455	– 16.93
S		Braking control (R.H. post) TB10 45030		3.307	11.81

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)
		32-60 - Position indicating system and alarms			
A	B877 00M	LDG simulator assy		0.595	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		Airspeed indicator TB09 76223 P/N 8100 Code B615 UNITED INSTRUMENTS		0.728	24.80
S		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 20M	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) TB09 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
		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
		34-23 - Magnetic compass			
R		Compass TB20 76229 P/N C2400 L 4P (28 V) AIRPATH		0.595	20.47

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)
		34-24 - 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
		34-25 - Radio magnetic indication			
A	K584 00M	RMI KI 22900 (without switching) KING		3.086	21.65
A	K819 00M	RMI KNI 582 KING		3.417	21.65
		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

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	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
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	K876 00M	Transponder ATC KT 71 KING		4.630	22.44

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	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
		34-57 - Global Positioning System (GPS)			
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

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	- 3.54
A	A904 10M	Vacuum pump SIGMA-TEK with filter (when stormscope installed, refer to ATA 34)		5.291	- 3.54
		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)
		53 - FUSELAGE			
A	B896 00M	Tail cone protection		0.661	215.67

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 74DM6S8-0-58 SENSENICH		36.817	– 47.64

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	059110 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 0-320-D2A LYCOMING		245.592	– 26.77

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		L.H. magneto (without harness) 4373 SLICK		4.740	– 17.72
R		R.H. magneto (without harness) 4370 SLICK		5.247	– 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)
		77 - ENGINE INDICATING			
		77-10 - Power			
S		Tachometer-Hourmeter NRF 80 P/N LM 04 or LM 041 LMI		0.860	23.62
		77-20 - Temperature			
S		EGT/CHT TB20 76802		1.323	19.69
A	D684 10M	Carburetor temperature (without cover on R.H. instrument panel)		0.331	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)
		79 - LUBRICATION			
		79-10 - Storage			
A	065810 M	Oil drain door		0.220	– 25.59
		79-20 - Distribution			
R		Oil cooler 20002A NDM		1.742	– 20.47

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 relay CE 1971 060 F PARIS RHONE		1.499	87.40

INTENTIONALLY LEFT BLANK

SECTION 7

DESCRIPTION

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

INTENTIONALLY LEFT BLANK

GENERAL

This section provides description and operation of the SOCATA Model TB 9 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 9 is an all-metal, four / five-place, cantilever low wing, single-engine airplane equipped with fixed tricycle landing gear and is designed to be used in normal and utility categories.

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. 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 rear seat) is provided by a baggage door on the left side of the fuselage.

WINGS

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

Wings characteristics :

Profile	RA16-3C3
Aspect ratio	8
Dihedral	4°5
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 and a rudder.
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 (fixed part) Pre-MOD.151	9.472 sq.ft - 0.88 m^2
Fin area (fixed part) Post-MOD.151	11.194 sq.ft - 1.04 m^2
Rudder area	6.781 sq.ft - 0.63 m^2

Stabilator type horizontal stabilizer :

Span	10.499 ft - 3.200 m
Stabilator area, anti-tab included	26.694 sq.ft - 2.48 m^2
Tab area	5.813 sq.ft - 0.54 m^2
Tab automaticity	85 %

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 (angle reference : wing chord) must be :

- upwards 15° ± 1.5°
- downwards 15° ± 1.5°

Stabilator deflection (angle reference : fuselage upper spar) must be :

- nose-up - 17° ± 1°
- nose-down + 2° ± 1°

The stabilator consists of an automatic anti-tab, which automaticity is 85 %. 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 (angle reference : fin chord) to the left and to the right is 25° ± 2°.

TRIM

A manually-operated pitch trim is 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.

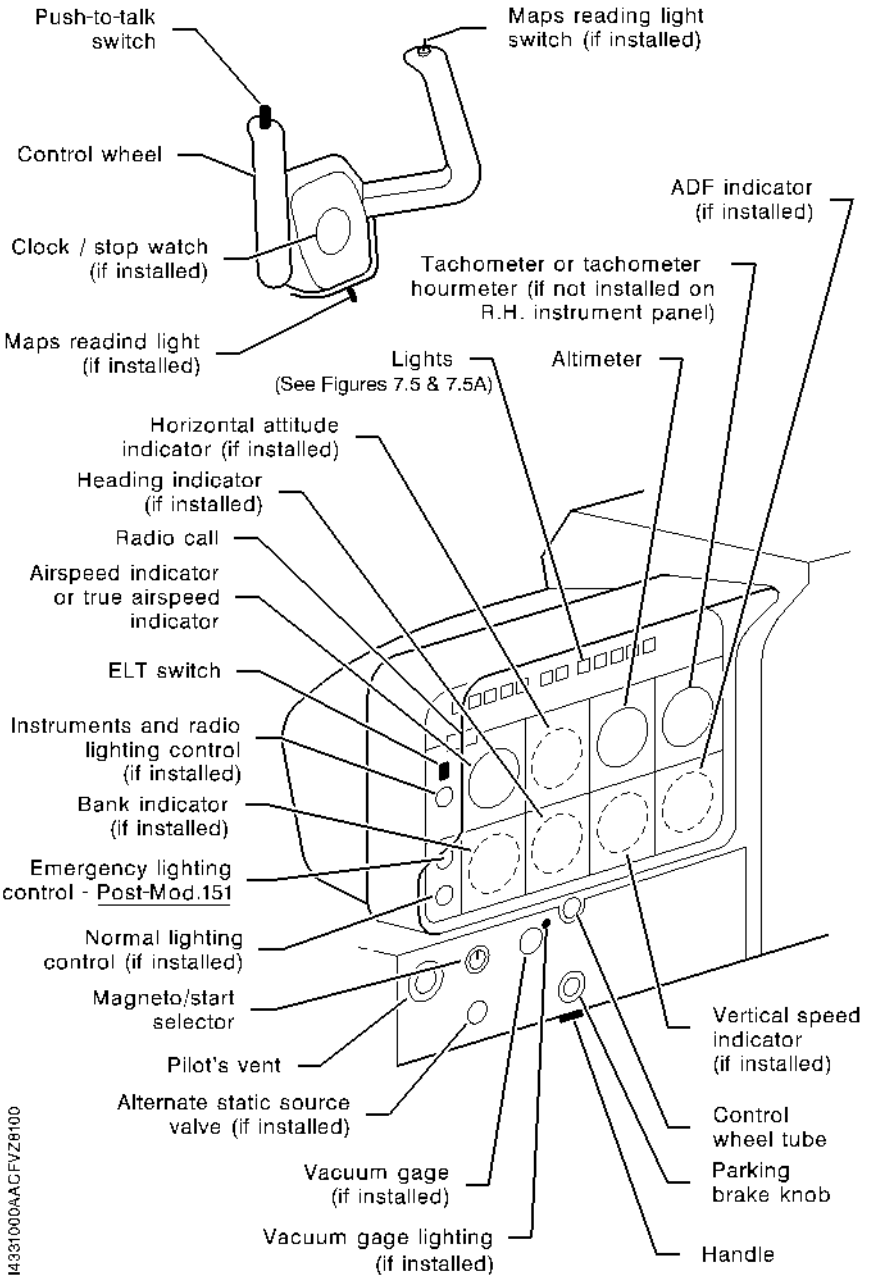


Figure 7.1 - EXAMPLE OF INSTRUMENT PANEL AND L.H. SUBPANEL

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 2.5° ± 0.5°
- nose-down 17° ± 1.5°

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).

The L.H. panel strip (see Figure 7.1) contains from left to right : L.H. air outlet, magneto / start selector, parking brake knob ; 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.

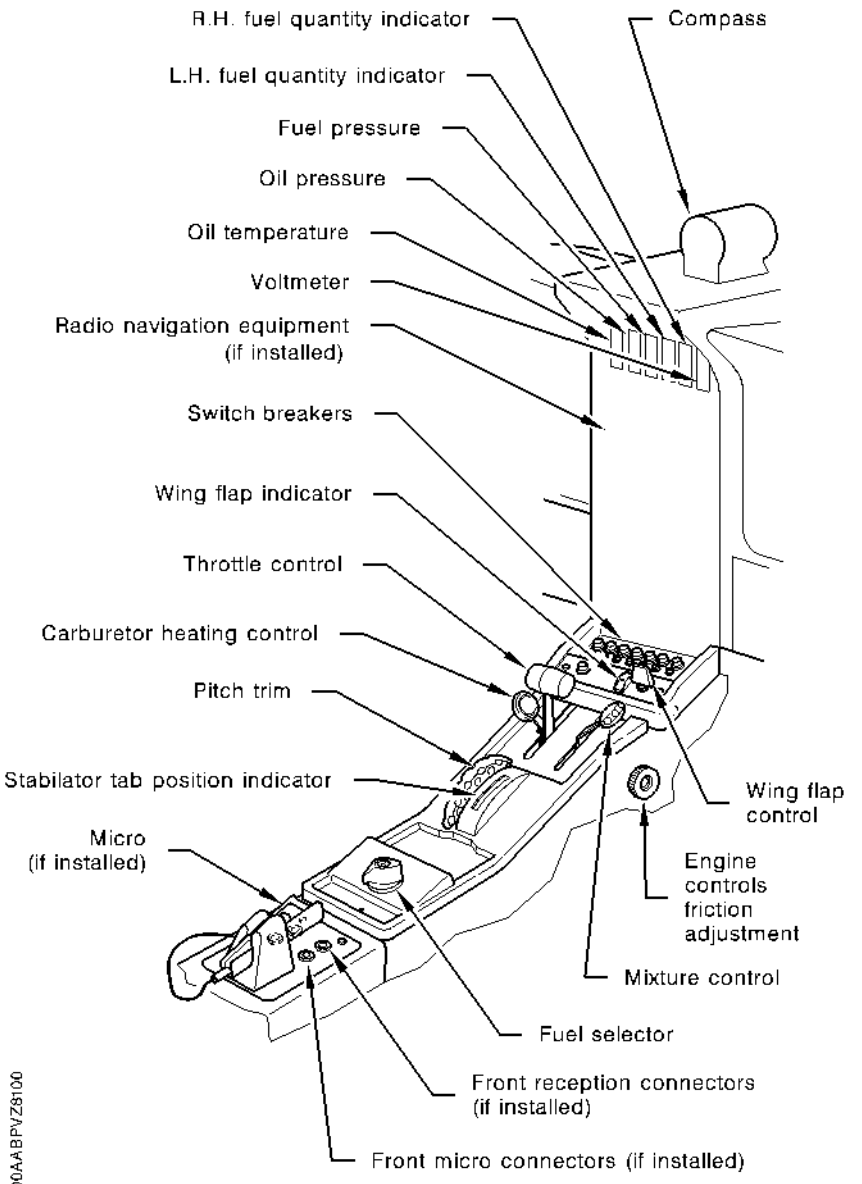


Figure 7.2 - EXAMPLE OF CONSOLE AND PEDESTAL

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 : carburetor heating, throttle, mixture)
- the pitch trim and its indicator
- the fuel selector
- the micro (if installed)
- the reception and micro jacks (if installed)
- on pedestal R.H. side, engine controls friction device.

Pre-MOD.151

The R.H. instrument panel (if installed) (see Figure 7.3) contains locations for additional equipment (manifold pressure indicator, 2nd altimeter, VOR/LOC indicator, outside air temperature, cylinder head temperature, exhaust gas temperature...).

Post-MOD.151

The R.H. instrument panel (see Figure 7.3A) contains the tachometer-hourmeter, the outside air temperature indicator (OAT), the EGT/CHT indicator and locations for additional equipment (manifold pressure indicator, 2nd altimeter, VOR/LOC indicator, ...).

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

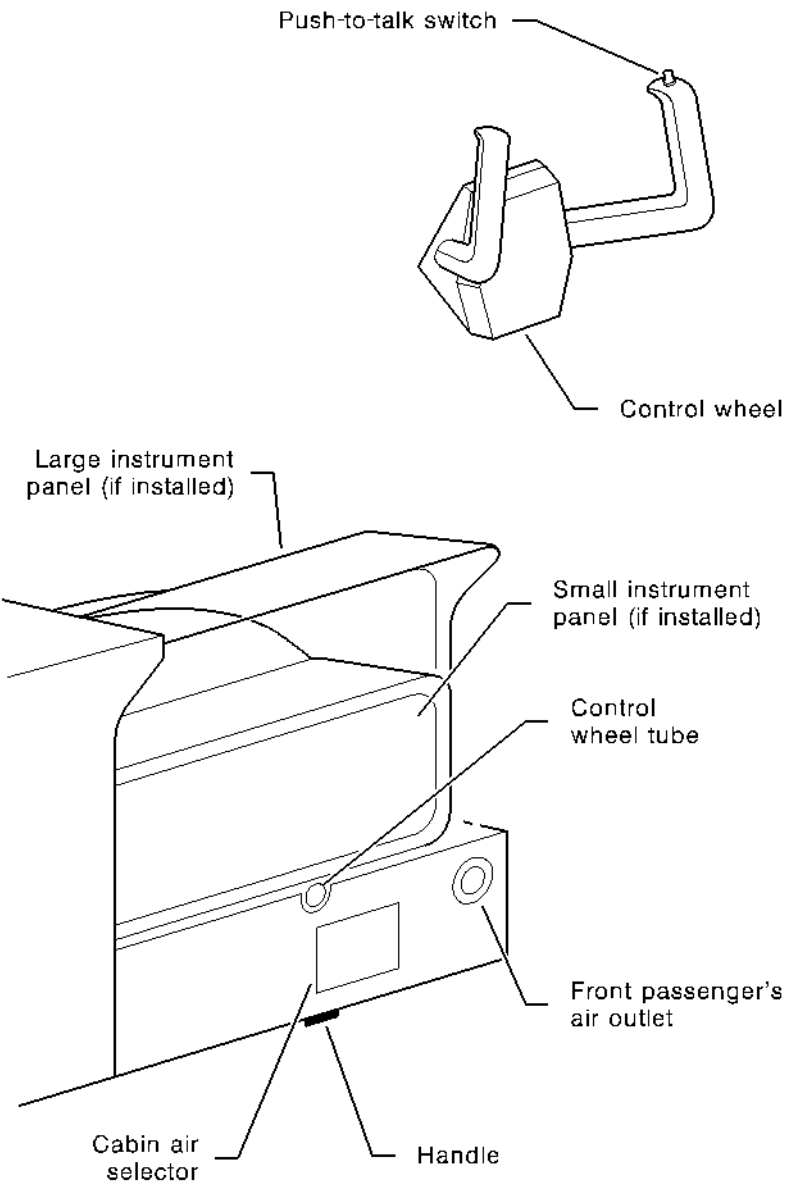


Figure 7.3 - EXAMPLE OF INSTRUMENT PANEL AND R.H.

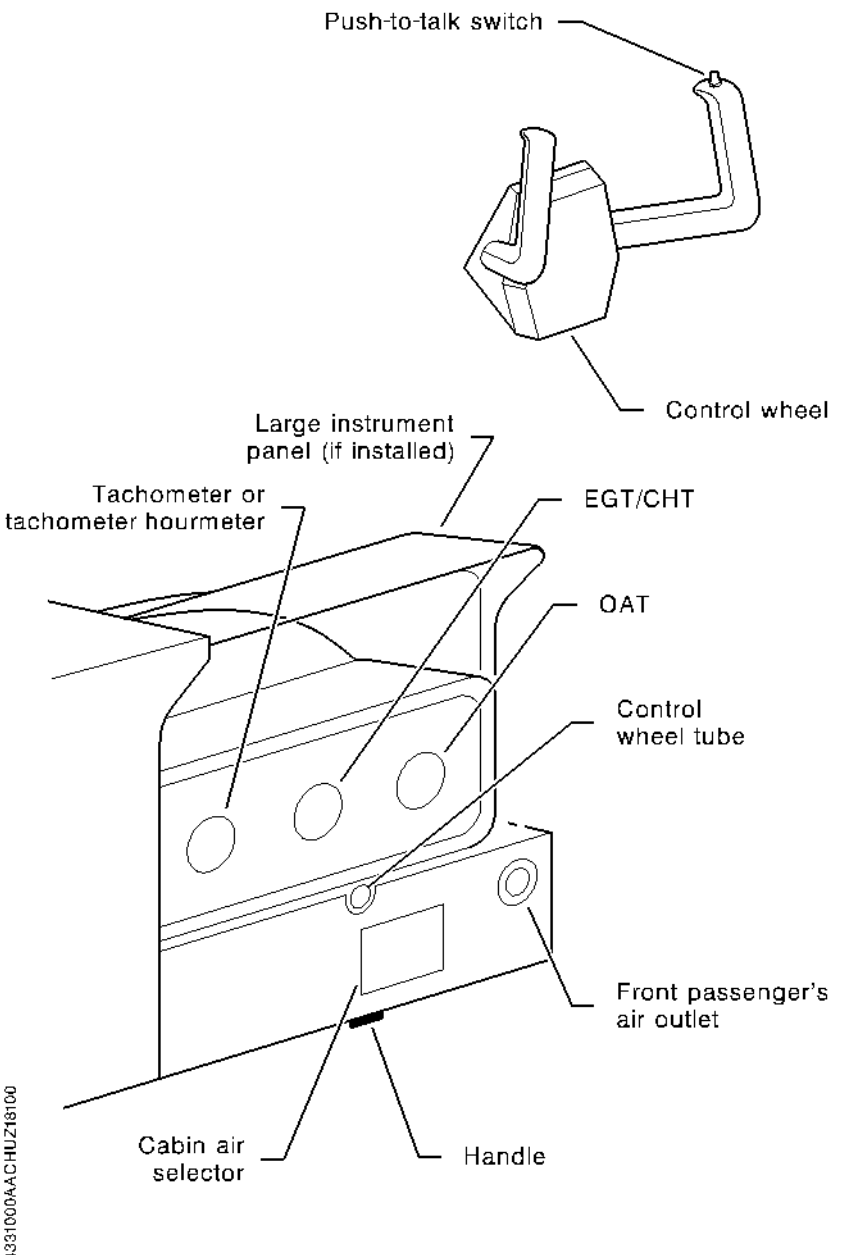


Figure 7.3A - EXAMPLE OF INSTRUMENT PANEL AND R.H.

INTENTIONALLY LEFT BLANK

Pre-MOD.151

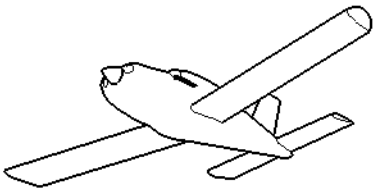
Upper duct central part (see Figure 7.4) contains fore to aft :

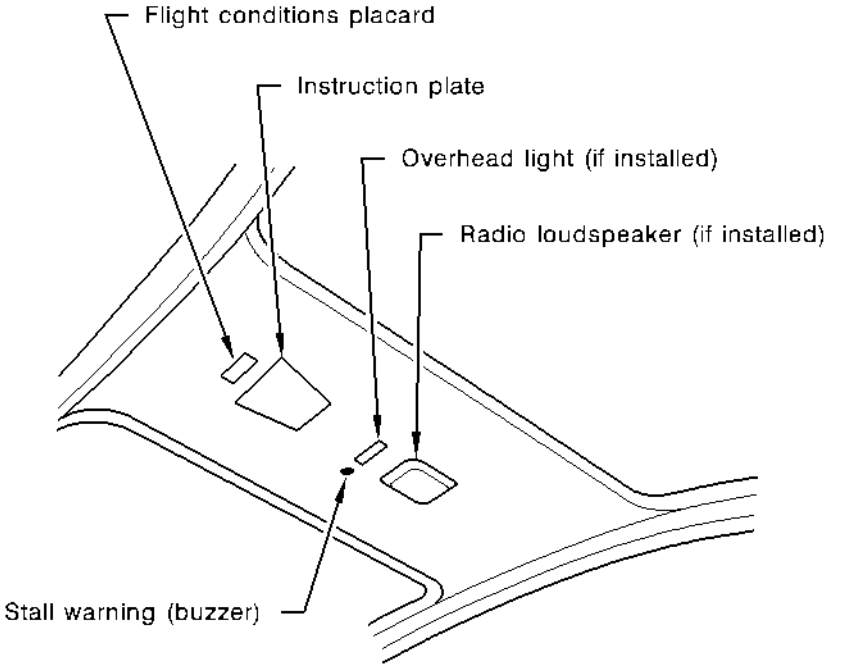
- Flight conditions placard
- Instruction plate
- Overhead light (if installed)
- Radio loudspeaker (if installed)
- Stall warning (buzzer).

Post-MOD.151

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

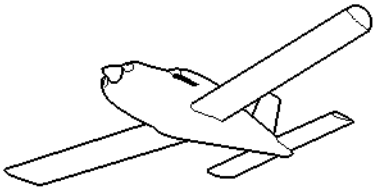
- Flight conditions placard
- Instruction plate
- Front overhead lights
- Radio loudspeaker (if installed)
- Blower switch (if installed)
- Stall warning (buzzer)
- Rear overhead light
- Rear air outlets.





I4251600AAAXUZ8100

Figure 7.4 - EXAMPLE OF UPPER DUCT CENTRAL PART



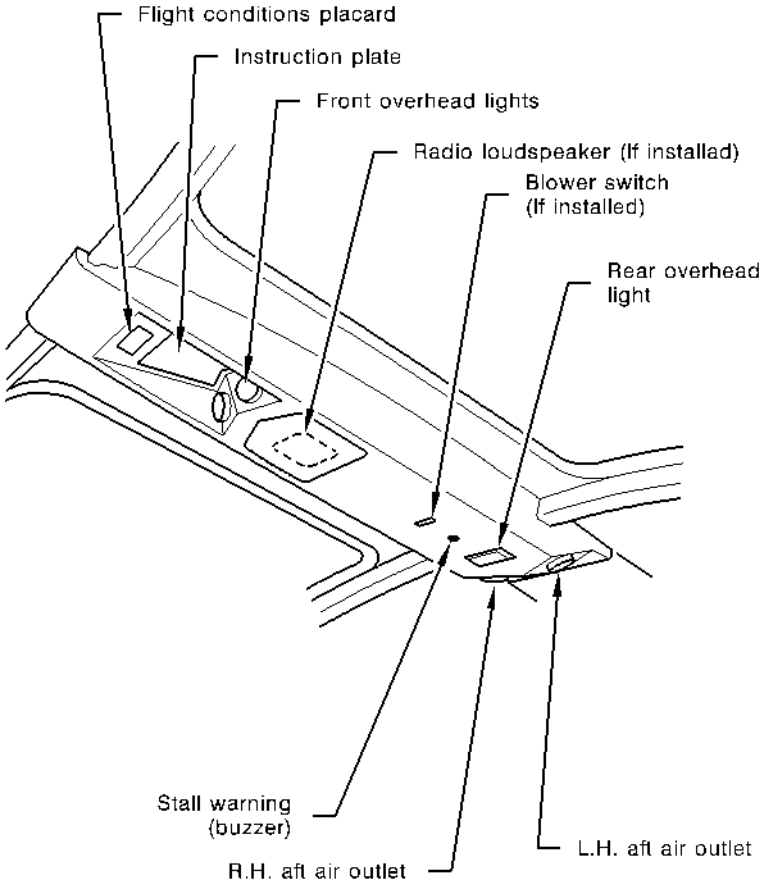


Figure 7.4A - UPPER DUCT CENTRAL PART

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 ten 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

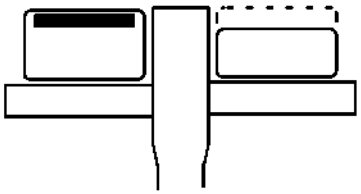
The general electrical equipment switch-breakers are located on the front part of the central pedestal.

The switch-breakers located on this panel are illustrated in Figure 7.5A.

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.



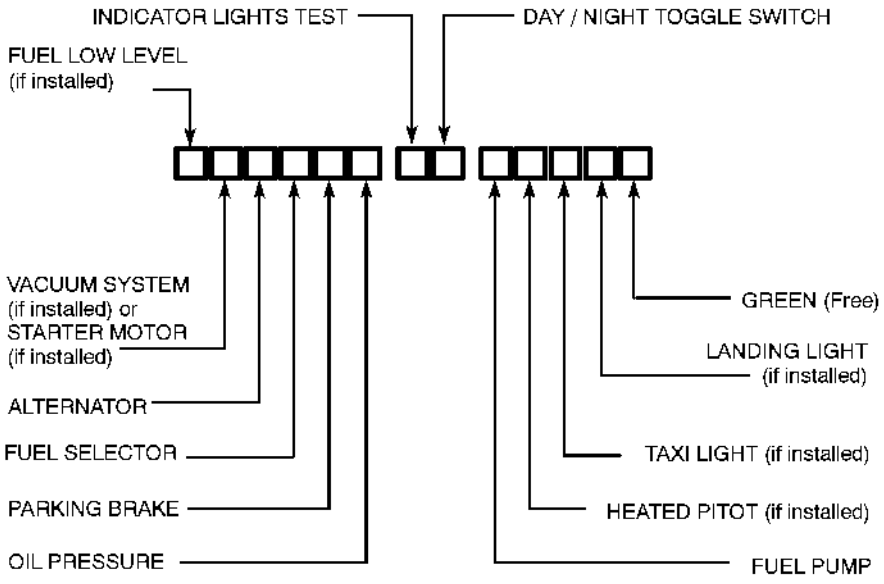
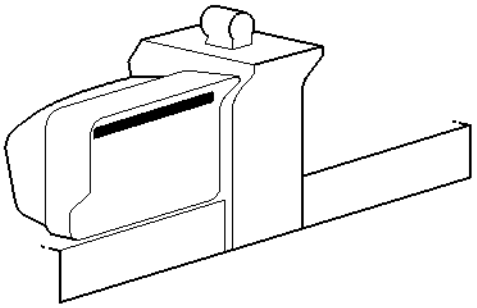


Figure 7.5 - ADVISORY PANEL (BASIC)



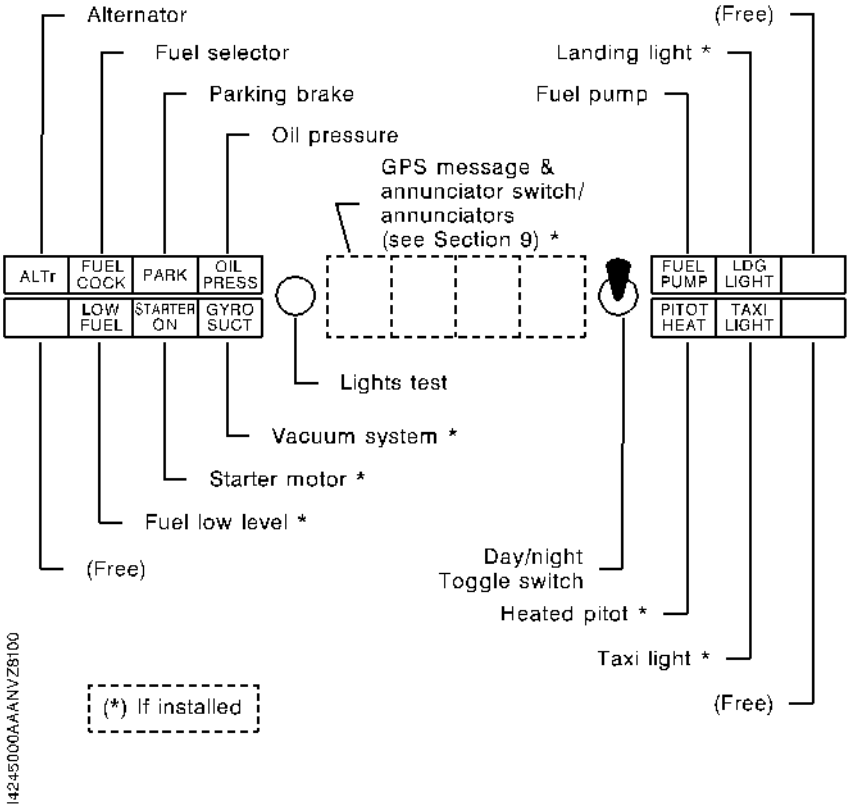
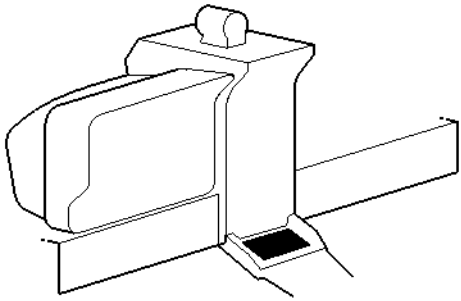
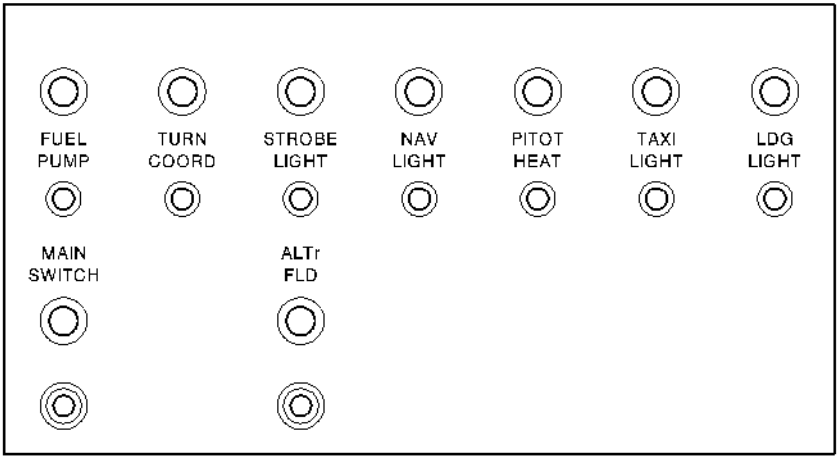


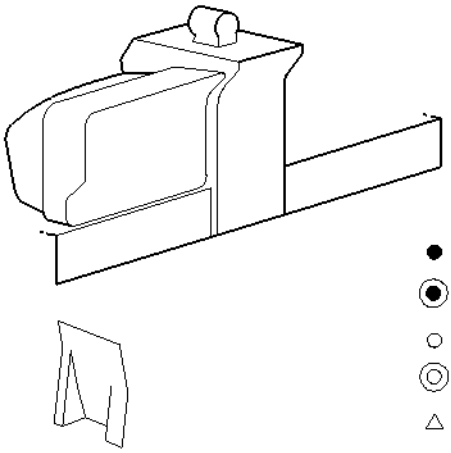
Figure 7.5A - ADVISORY PANEL (EXTENDED)





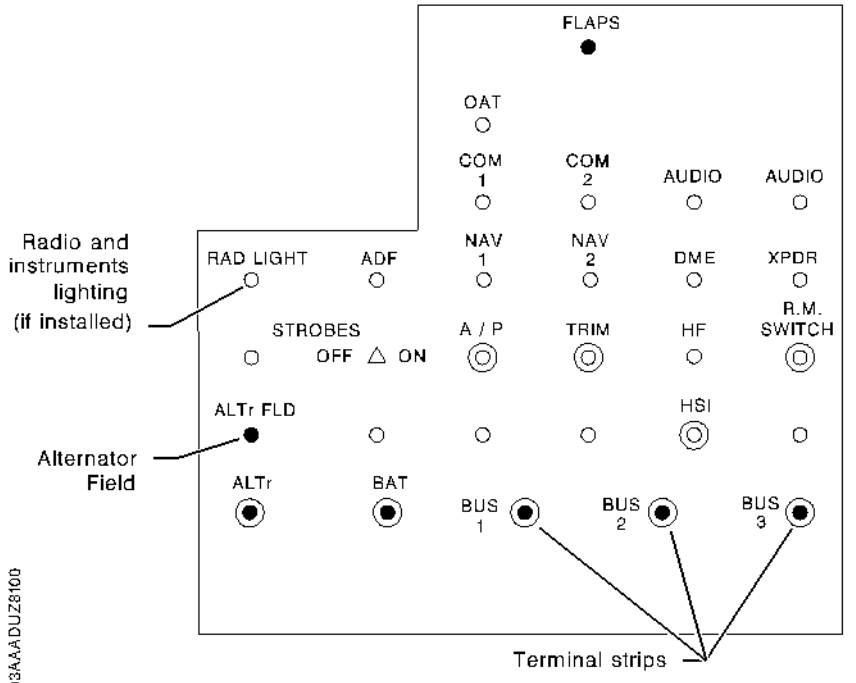
I4245000AACDVZ8100

Figure 7.5B - SWITCH-BREAKERS (SB)



Key :

- ● Circuit breaker (Std)
- ◉ "Pull off" type circuit breaker (Std)
- ○ Circuit breaker (Opt)
- ◎ "Pull off" type circuit breaker (Opt)
- △ Switch (Opt)



I4245003AAADUZ8100

Figure 7.6 - CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

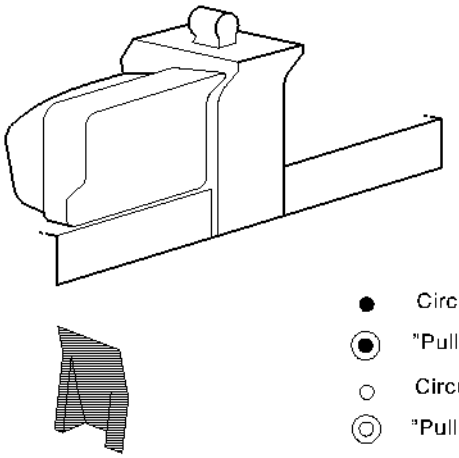


Figure 7.6A - CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

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 22° to the left and 18°30' to the right. 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 22° to the left and 18°30' to the right or structural damage to the nose gear could result.

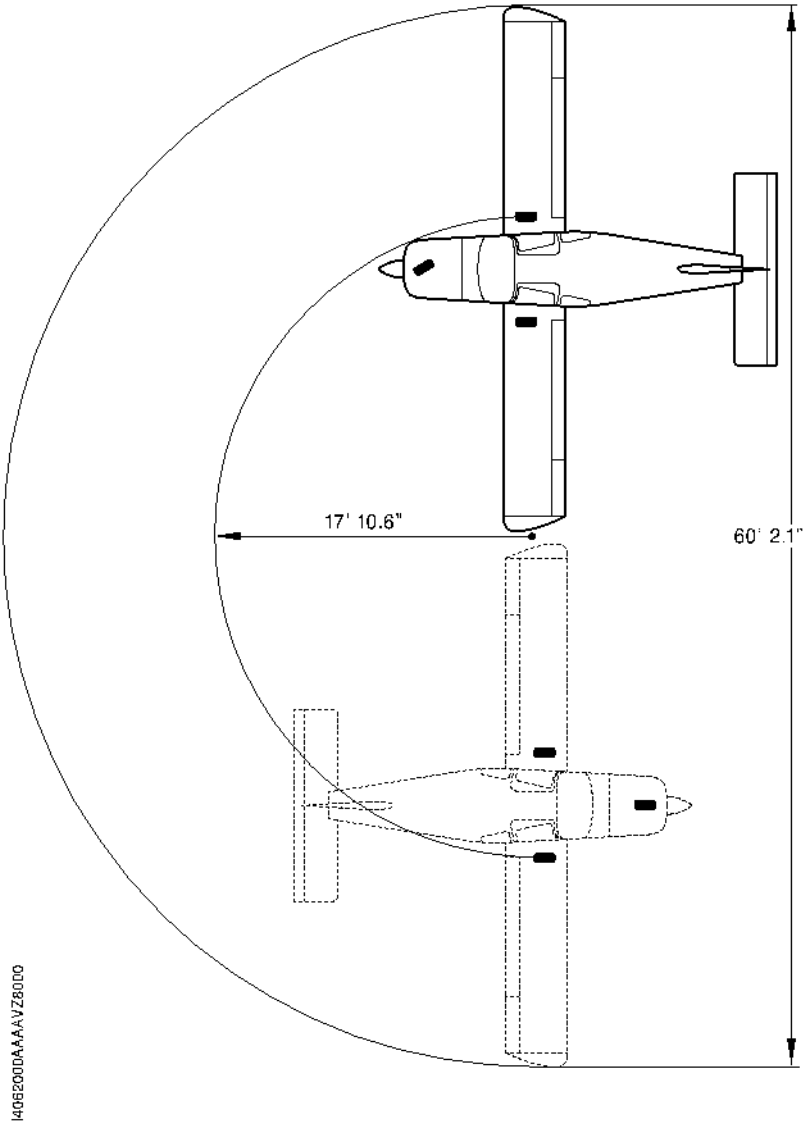


Figure 7.7 - MINIMUM TURNING RADIUS

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 tilts up or down with stops at 0° and 25°30'. If your aircraft is equipped with pre-setting flaps, the switch lever is moved up or down in a slotted panel with mechanical stops at "retracted" (0°) ; "take-off" (10°) and "landing" (25°30') positions (see Figure 7.2). An indicator located near the control provides various flaps positions.

The wing flaps system is protected by a 8-amp circuit breaker, labelled "FLAPS", located on L.H. circuit breakers side panel (see Figure 7.6).

LANDING GEAR

Aircraft <u>not equipped</u> with modification MOD. 119 or MOD. 121 :

The landing gear system is of stationary tricycle type with conventional steerable nose gear. Nose gear and main gears are equipped with telescopic and oil / air shock absorbers incorporated in landing gear leg. Each main gear wheel is equipped with a hydraulically-actuated, single-disc brake on the inboard side of the wheel.

Aircraft <u>equipped</u> with modification MOD. 119 or MOD. 121 or MOD. 151 :

The landing gear system is of stationary tricycle type with conventional steerable nose gear. The nose gear is equipped with a telescopic and oil / air shock absorber incorporated in the landing gear leg. Each main gear includes a rear shock compensating rocker beam connected to the landing gear leg by means of an oil / air shock absorber. Each main gear wheel is equipped with a hydraulically-actuated, single-disc brake on the inboard side of the wheel.

BAGGAGE COMPARTMENT

The baggage compartment extends from the rear bench or, Post-MOD.151, rear seats to the rear bulkhead of the cabin (former No. 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 bench or, Post-MOD.151, rear seats may be taken off for easy loading in cargo configuration. For further information, refer to Section 6 "Weight and balance".

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.

"Standard" version

- To gain access to rear bench, move the front seat forward to maximum position.

"Optional" version

- 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

- To remove rear bench, refer to Section 6 "Weight and Balance".
  Rear bench is 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 1/4 turn clockwise (in the arrow direction) and maintain it to fit the head-rest in the seat back.
- Model "95" :
  . To install, adjust and remove the head-rest, simply make it slide vertically.

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.

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

REAR SEATS

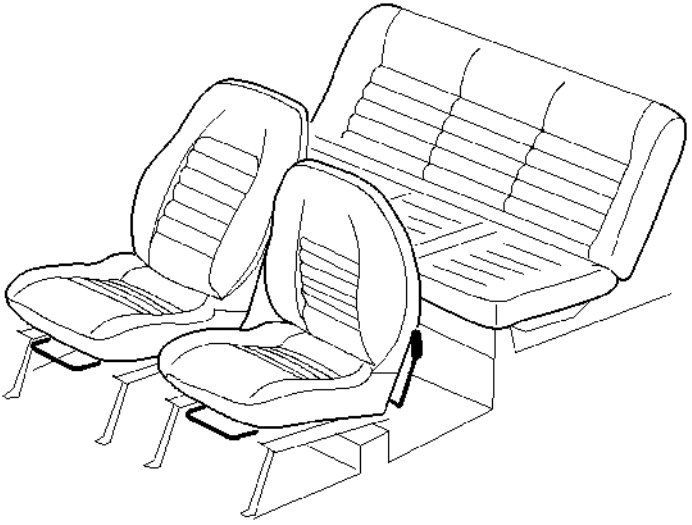
- To remove rear seats, refer to Section 14 "Weight and Balance".
  Rear seats are not adjustable.

HEAD-RESTS (if installed)

- To install, adjust and remove the head-rest, simply make it slide vertically.

INTENTIONALLY LEFT BLANK

"STANDARD" VERSION : Fixed FWD back-rest - Pre-MOD.151
"OPTIONAL" VERSION : Adjustable FWD back-rest - Pre-MOD.151



"LUXE" AND
"EXECUTIVE" VERSIONS

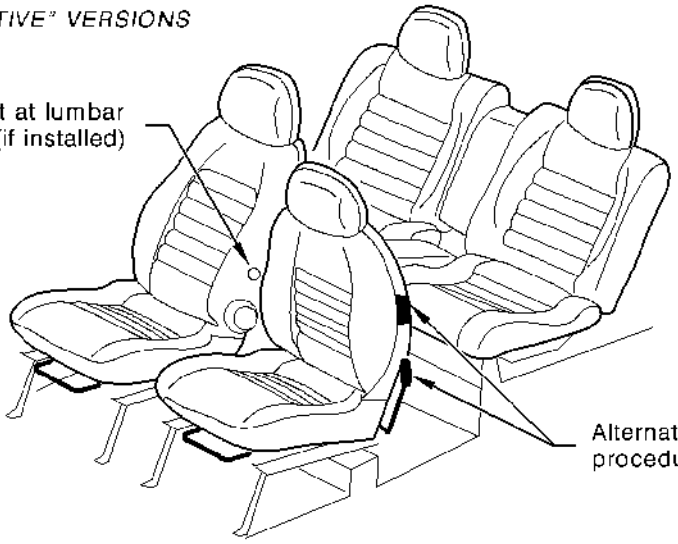


Figure 7.9 - FRONT SEATS AND REAR SEAT

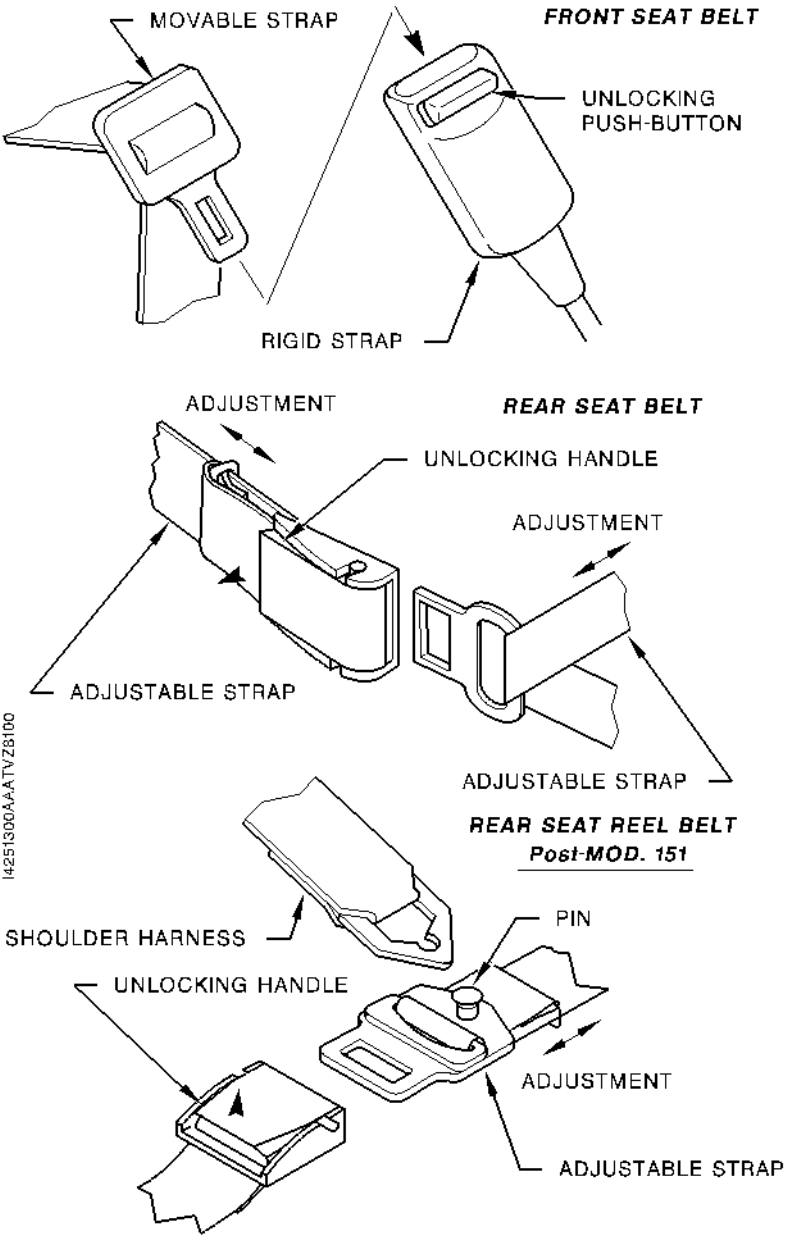


Figure 7.10 - SEAT BELTS

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 (adjustment is possible on both straps).
- To unlock them :
  Pull on unlocking handle to release straps.

Post-MOD.151

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.

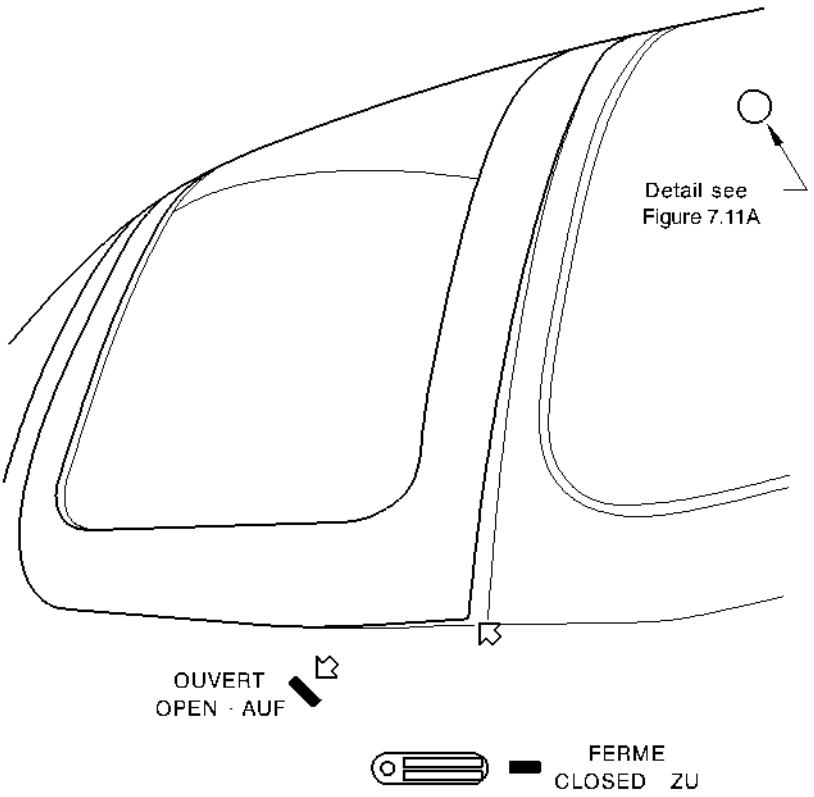


Figure 7.11 - DOORS OPENING AND CLOSING

I45210000AACCTY8100

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 9 airplane is powered by a four-cylinder, horizontally opposed, direct drive LYCOMING O-320-D2A engine rated at 160 BHP at 2700 RPM. It is provided with a starter, a 24-volt / 70-amp alternator, an all-weather shielded ignition harness, two magnetos, 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 on the left side of the lower cowl and goes directly through a filter, before being admitted in the air duct under the carburetor. The air duct comprises an alternate air intake with mechanical closing, the purpose of which is to supply the carburetor with heated air when the airplane is involuntary in 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 power is controlled by the throttle (large black knob) located on the control pedestal. In the forward position, the throttle is open (full power) ; in the aft position, it is closed (engine idling).
- 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).
- The carburated air temperature is controlled by the carburetor heating control (grey round knob) located on the control pedestal on the L.H. side. If control lever is in forward position, the outside temperature air is carried through the air filter to the carburetor, if in the aft position, exchanger heated air, mixed with outside temperature air, is directly carried to the carburetor.
- 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 fuel pressure, oil pressure, oil temperature, tachometer and (if installed) EGT and CHT.

IGNITION - STARTER SYSTEM

Engine ignition is provided by two magnetos on two spark plugs per cylinder.

The R.H. magneto fires the R.H. lower and L.H. upper spark plugs ; the L.H. 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 : "OFF" ; "L.H." magneto ; "R.H." magneto ; "L.H. + R.H." magnetos ; "STARTER" by pushing.

CAUTION

RELEASE THE PRESSURE ON THE KEY AFTER ENGINE STARTING

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.

However for new, remanufactured or recently overhauled engines, as well as engines on which cylinders have been recently installed, it is required to perform according to TEXTRON LYCOMING Service Bulletin No. 480 at last revision the following inspections :

- an inspection within the 10 first flight hours,
- an inspection within the 25 following flight hours.

Use dispersant oil in compliance with Specification MIL-L-22851 only after the first 50 hours.

ENGINE LUBRICATION SYSTEM

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 and two strainer type filters, one located in sump, the other one located on engine rear accessory housing, complete the system. As an option, the latter may be replaced by a cartridge type filter.

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 on the L.H. side of the lower cowling. 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, place carburator heating control in the ON position to open an alternate air door allowing air to enter the engine.

For flights in sandy or dusty atmosphere, install a second specific filter.

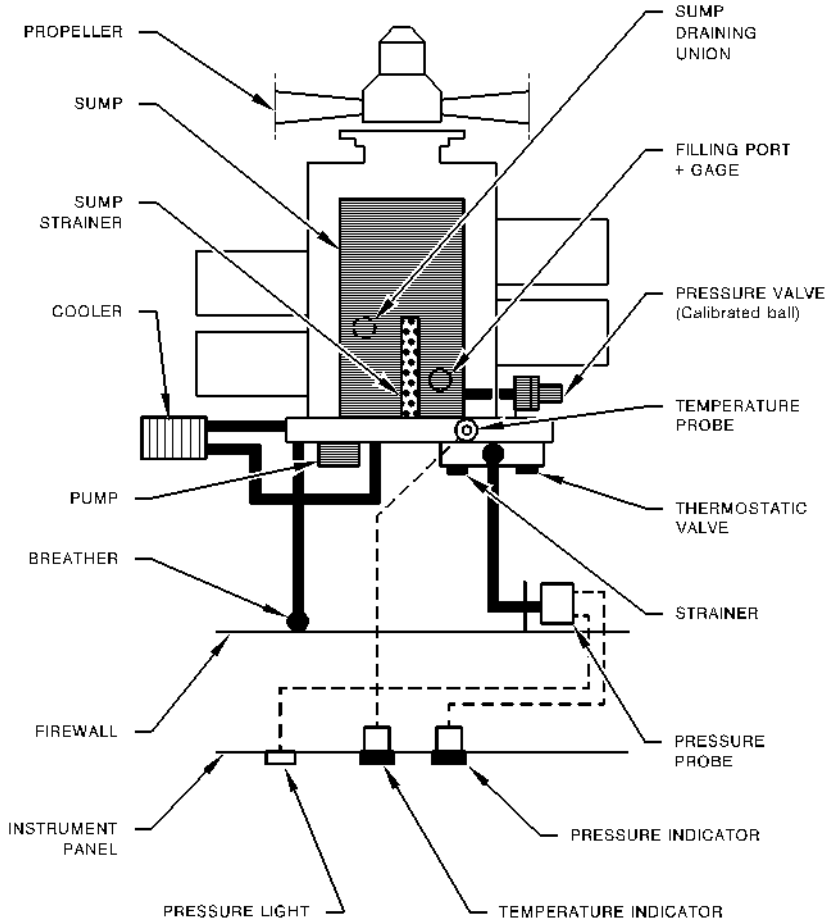


Figure 7.12 - OIL SYSTEM WITH STRAINER

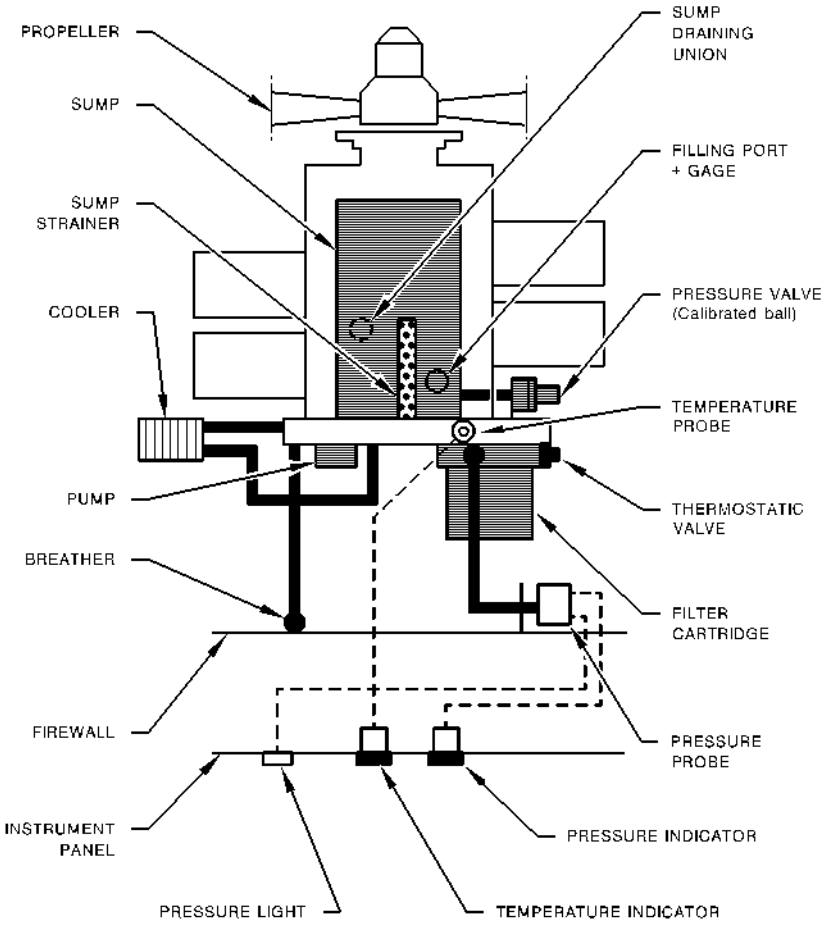


Figure 7.12A - OIL SYSTEM WITH FILTER CARTRIDGE

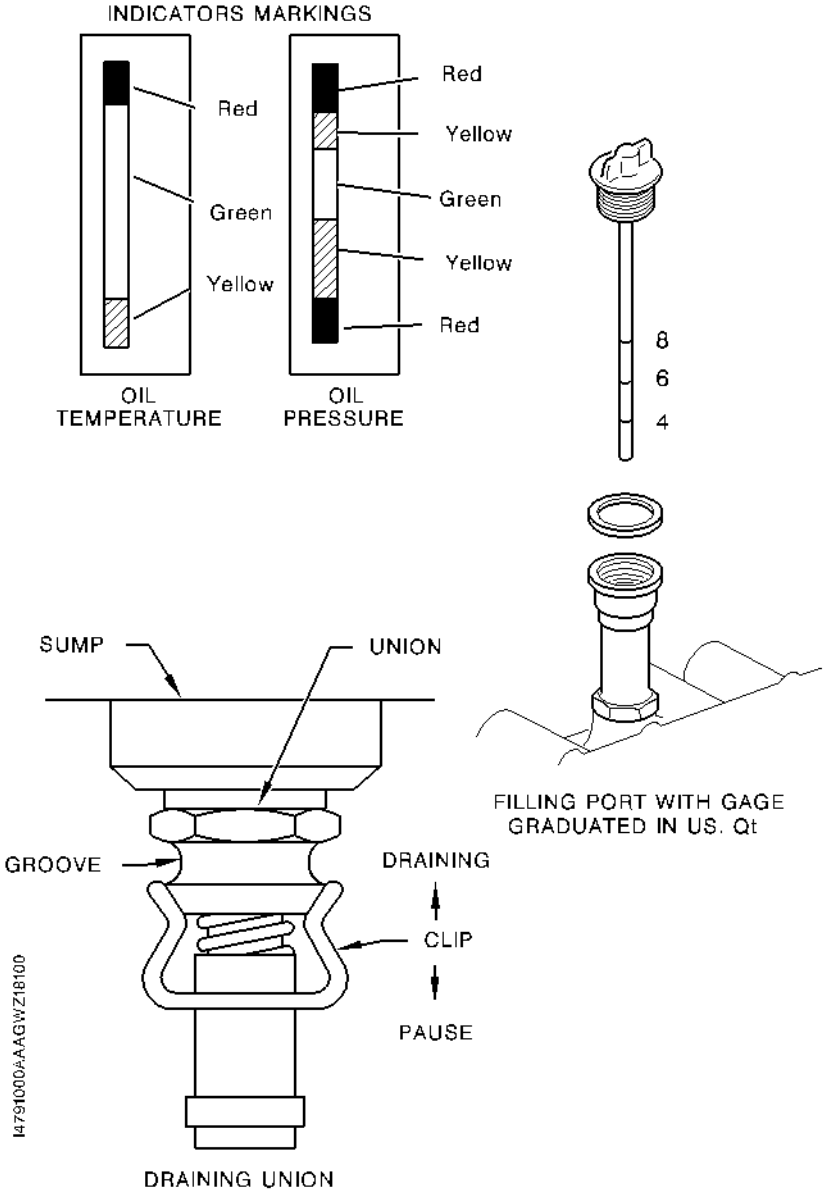


Figure 7.12B - OIL SYSTEM

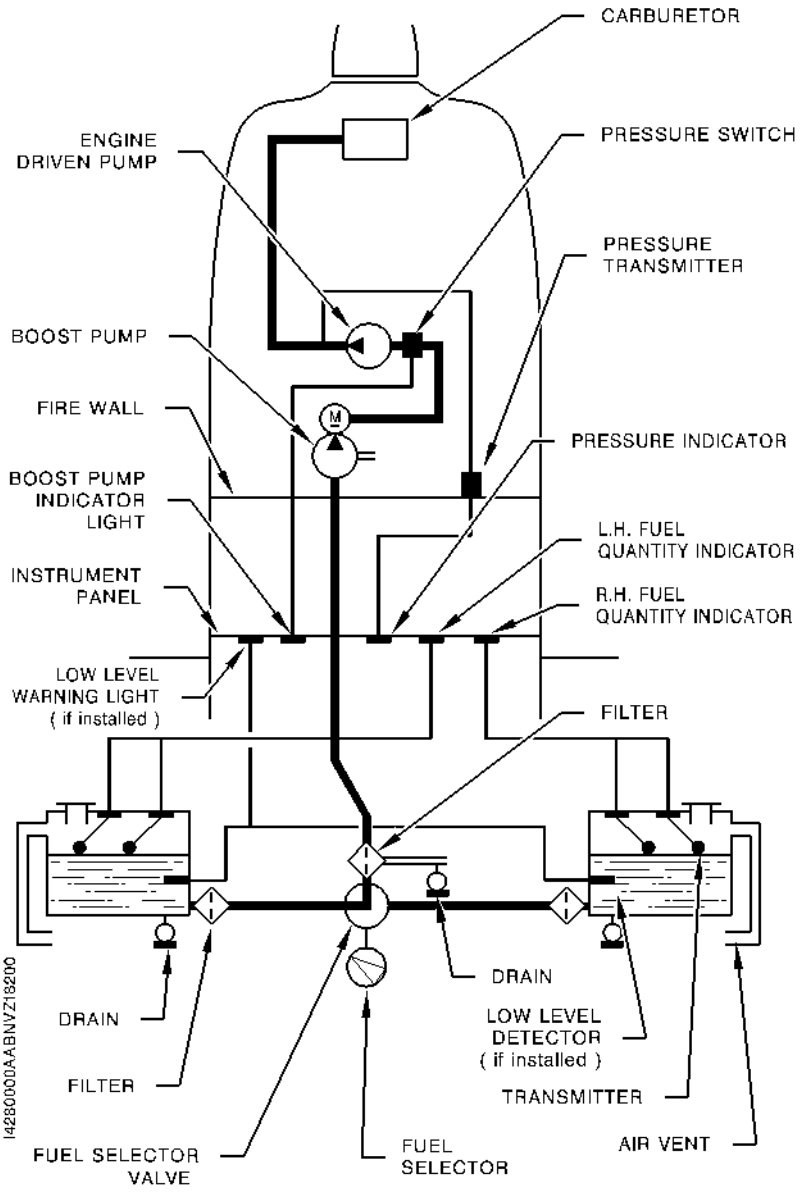


Figure 7.13 - FUEL SYSTEM

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 an all-metal, two-bladed fixed pitch propeller.

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 and a carburetor.

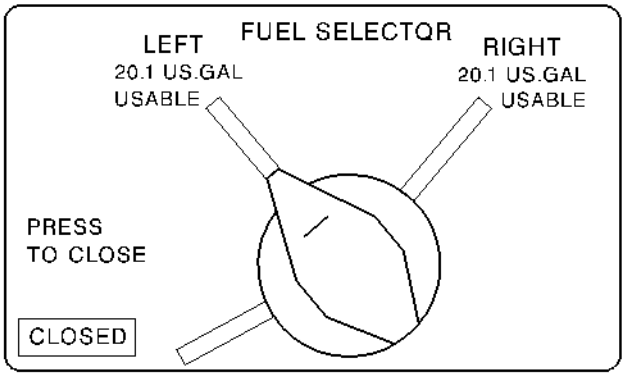
Engine-driven fuel pump suction draws fuel from L.H. or R.H. tank through the three-position selector valve and a filter.
The selector valve is controlled through a knob labeled "FUEL SELECTOR". The selector valve knob has following positions labeled : "CLOSED", "LEFT", "RIGHT".

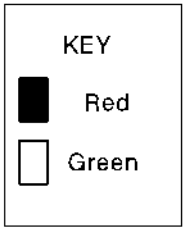
Then, the fuel goes through the auxiliary fuel pump (electric) and supplies the engine fuel pump. The engine pump supplies fuel under pressure to the carburetor.

Fuel quantities :

- Total maximum : 41.7 U.S Gal (158 l)
- Total usable : 40.2 U.S Gal (152 l)
- Unusable : 1.6 U.S Gal (6 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.





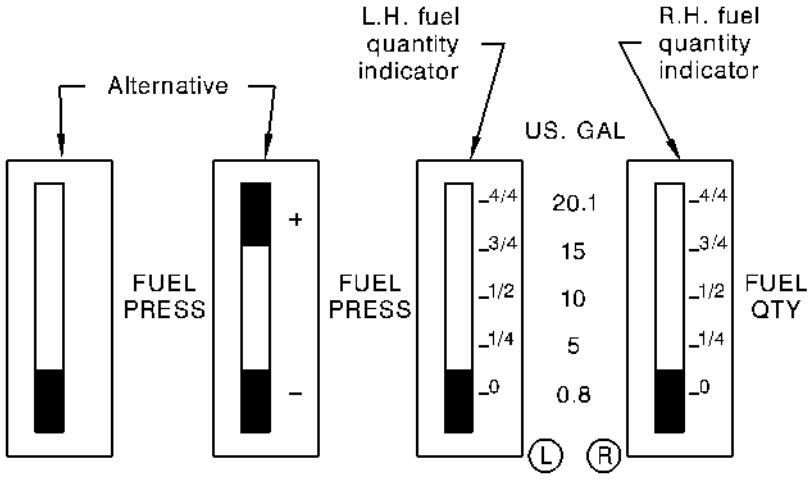


Figure 7.14 – FUEL SYSTEM MARKINGS

Each fuel tank is equipped with its own venting system, which is essential to fuel system operation. A plugged venting system will result in a decreasing fuel flow from the respective fuel tank and eventual stoppage of the engine. Venting is accomplished by a vent line which terminates at each wing lower surface.

Fuel quantity is measured by four fuel quantity gages and is shown by two fuel quantity indicators located on the upper portion of the central console.

Airplanes equipped with resistor/float gages

The float type gages, two on each wing, are attached to the rear of the tanks.

Airplanes equipped with capacity gages

The capacity type gages, two on each wing, are attached to the rear of the tanks, on the wing spar.

Fuel quantity measured by the gages is transmitted to the fuel quantity indicators by a gaging conditioner located under the seating of the rear bench or, Post-MOD.151, the rear seats.

All

Indicators are calibrated at 1/4, 1/2, 3/4 and 4/4, zero indicating an empty tank. When the indicator pointer is set to zero, approximately 0.8 U.S. Gal (3 litres) remains in the tank as unusable fuel.
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 4.22 U.S. Gal (16 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.

BRAKE SYSTEM

BRAKING

Braking is provided by hydraulic disk brakes 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.

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 alarms panel shows the position of the parking brake knob.

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

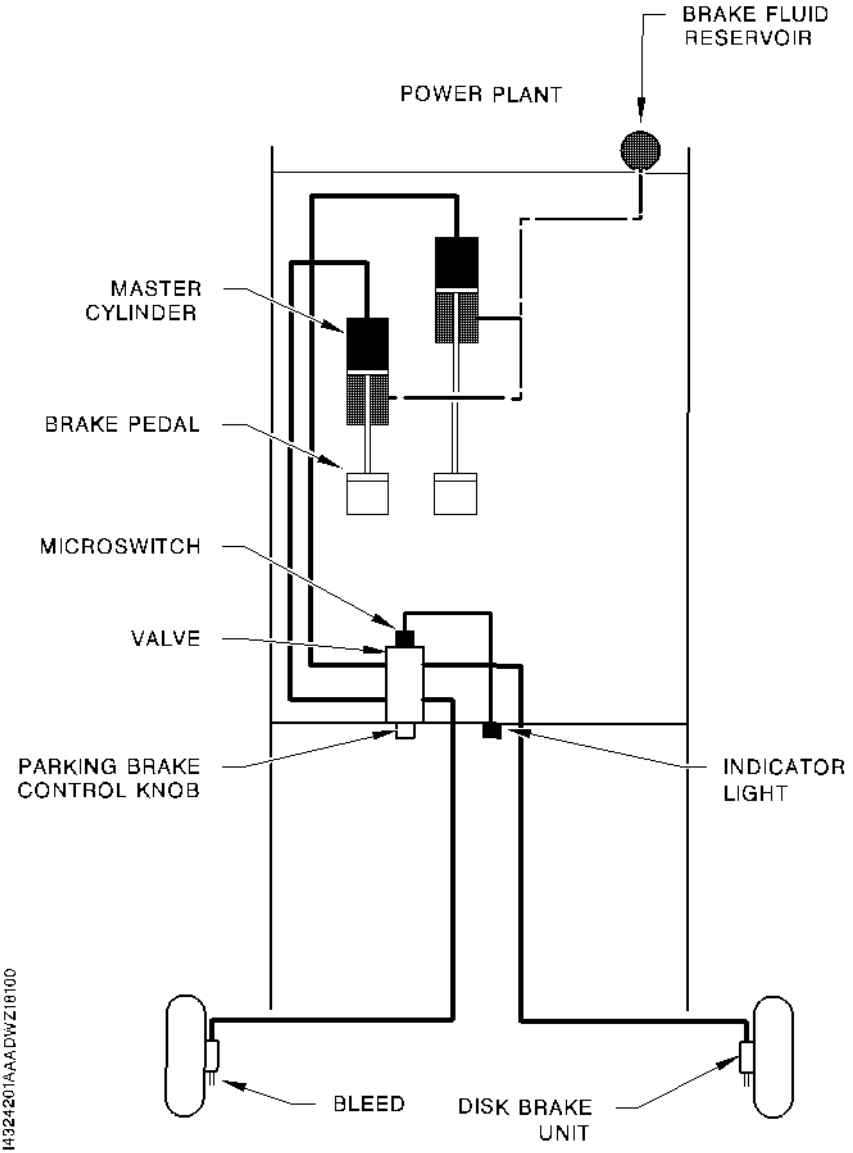


Figure 7.15 - BRAKE SYSTEM (L.H. station only)

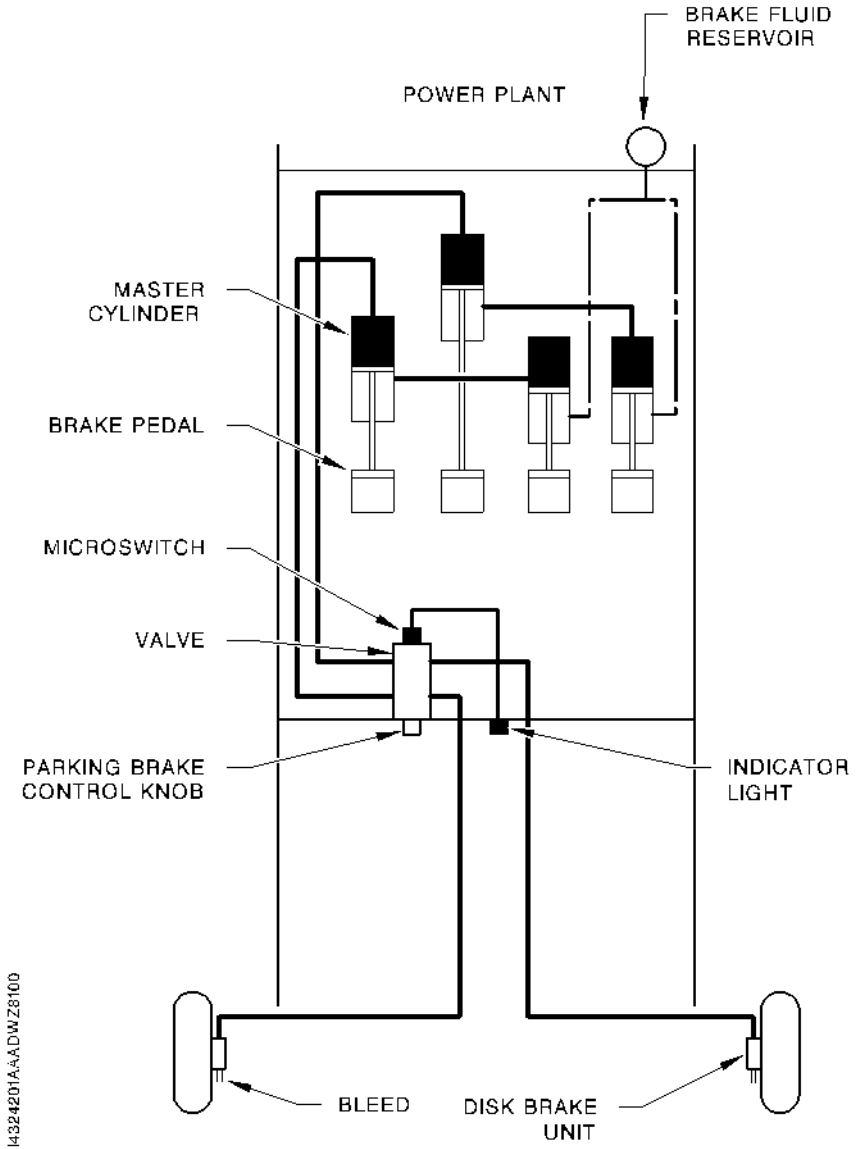


Figure 7.15A - BRAKE SYSTEM (L.H. + R.H. stations) (if installed)

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 a battery located in the engine compartment on firewall R.H. side supply the system.

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 labelled "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 "ALTr FLD".

MAIN SWITCH

Battery connection to the electrical network is made through the switch-breaker labelled "MAIN SWITCH".

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

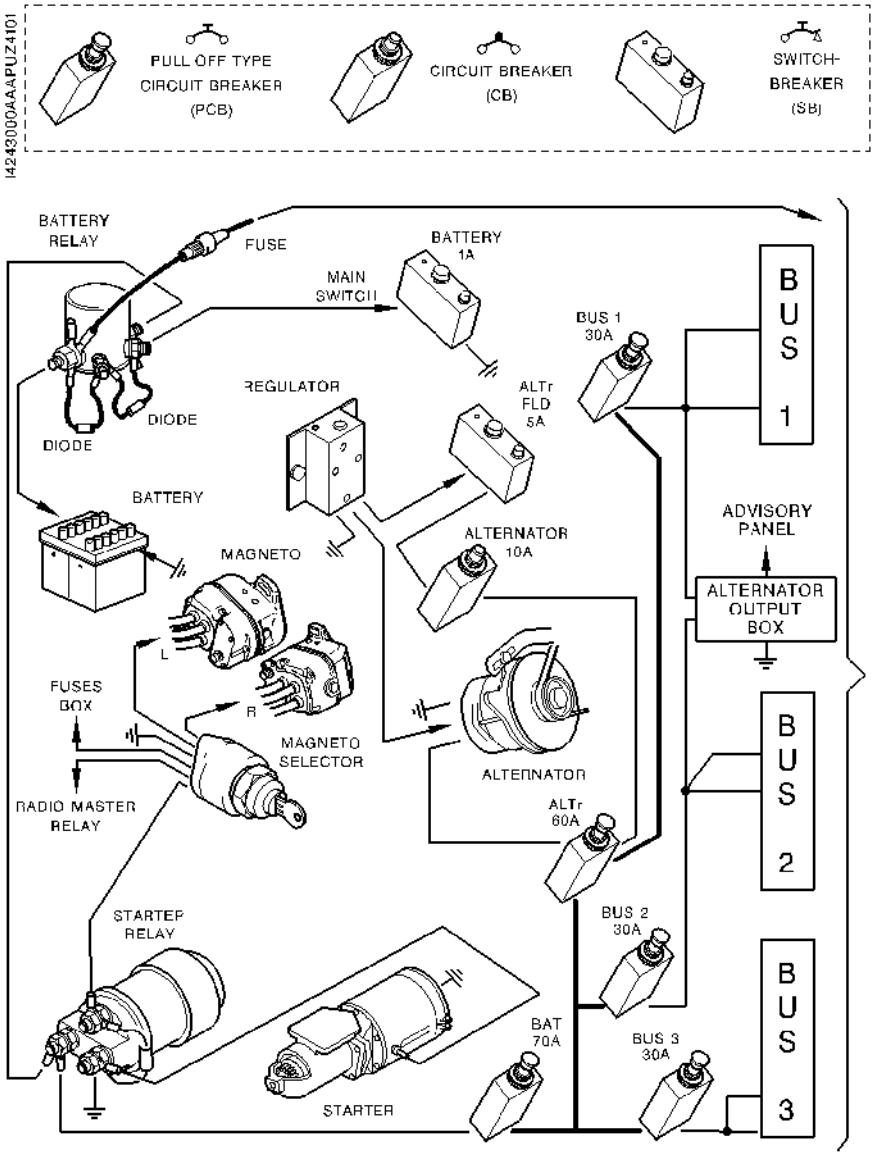


Figure 7.16 - TYPICAL ELECTRICAL SYSTEM

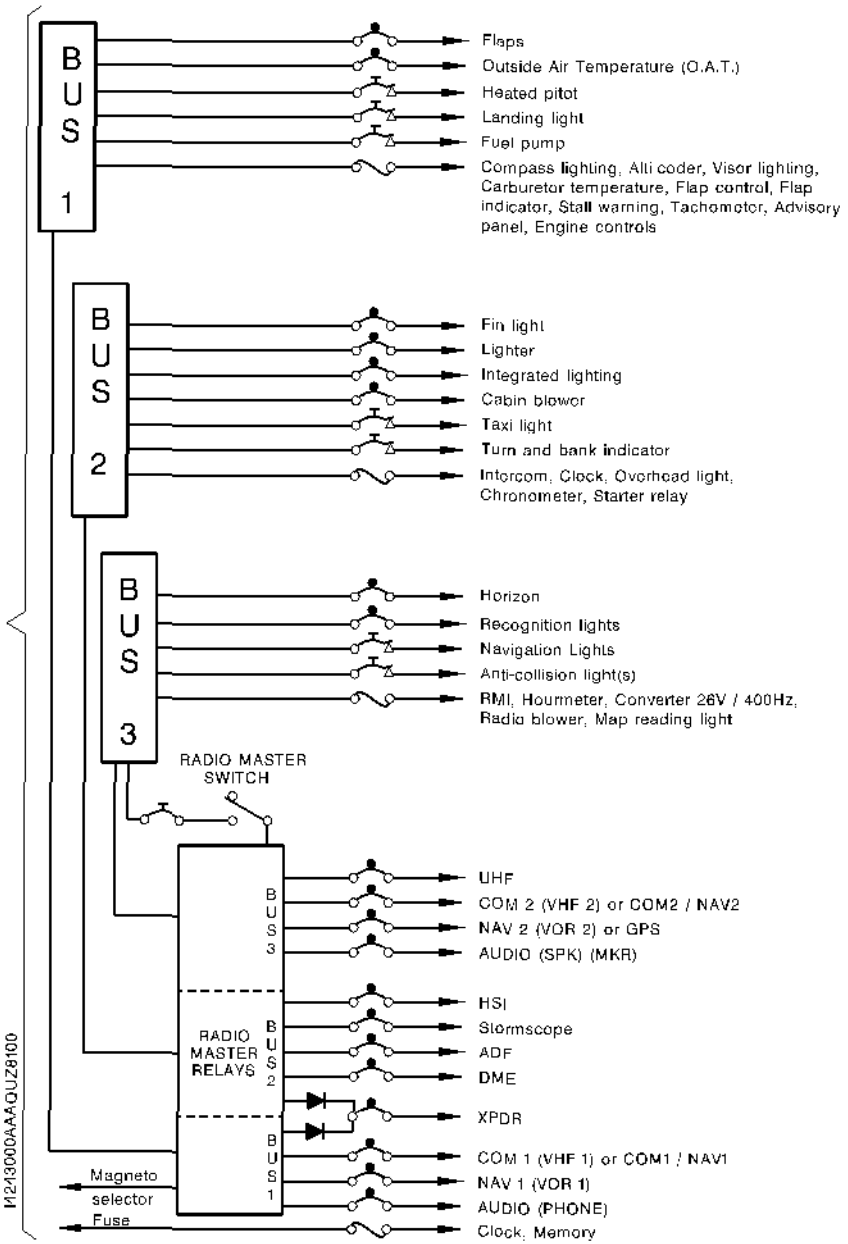


Figure 7.16A - TYPICAL ELECTRICAL SYSTEM

ALTERNATOR CONTROL

Located on the R.H. side of the main switch, the alternator switch-breaker labelled "ALTr 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 labelled "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.

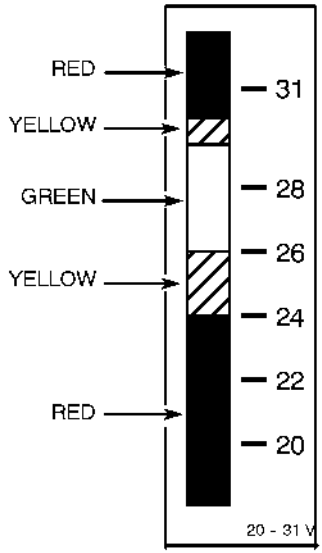


Figure 7.17 - VOLTMETER MARKING

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 trips and will switch oft 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 labelled "ALTr", the following pull-off type circuit breakers have been installed :

- 70 A labelled "BAT" between battery and network
- 30 A labelled "BUS 1" on bus bar 1 supply
- 30 A labelled "BUS 2" on bus bar 2 supply
- 30 A labelled "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, spare, advisory panel, compass lighting (if installed), overhead light (if installed), starter relay, electric tachometer,
and if installed :	carburetor temperature, RMI, converter 26 V / 400 Hz, radio fan, spare.
Lower row :	engine monitoring cluster, engine monitoring cluster, spare, flaps indicator, flaps control, stall warning, visor lighting (if installed),
and if installed :	chronometer, intercom, clock, alti-coder, map light, spare, hourmeter, spare.

"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 labelled "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 17 "Supplements".

IFR AND NIGHT VFR ELECTRICAL SYSTEMS (if installed)

See Section 17 "Supplements".

LIGHTING SYSTEMS (if installed)

EXTERIOR LIGHTING

Pre-MOD.151

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).

Post-MOD.151

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. Two lighting control knobs are grouped together on the L.H. part of the L.H. instrument panel.

These two controls vary the intensity of all instrument panel and L.H. sidewall circuit breakers panel lightings, except for the 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.
- "Radio and instruments" control (if installed) which controls and modulates console visor lighting, instruments and equipment on instrument panel and circuit-breakers panel.

Post-MOD.151

- "Emergency" control which modulates lighting of overhead lights controlled by rotating them.

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.*

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 requires power to be applied to the main electrical system bus bars for operation (Main switch ON).
This light is controlled by a toggle switch integrated to the light.

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 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 aft of the firewall (in front of front passenger's feet). This box may be shut off by a fire cut-off shutter and allows air distribution on both sides of the windshield.

Hot air flow 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.

Cold air

Comes from R.H. NACA. This cold air supplies cabin air mixer through the central knob of the control panel.

Hot / cold air mixing in cabin air mixer

Hot and cold 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 colder, fully moved to the left in fire cut-off position for the cabin.

Distribution of regulated air

The mixed airtlow 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.

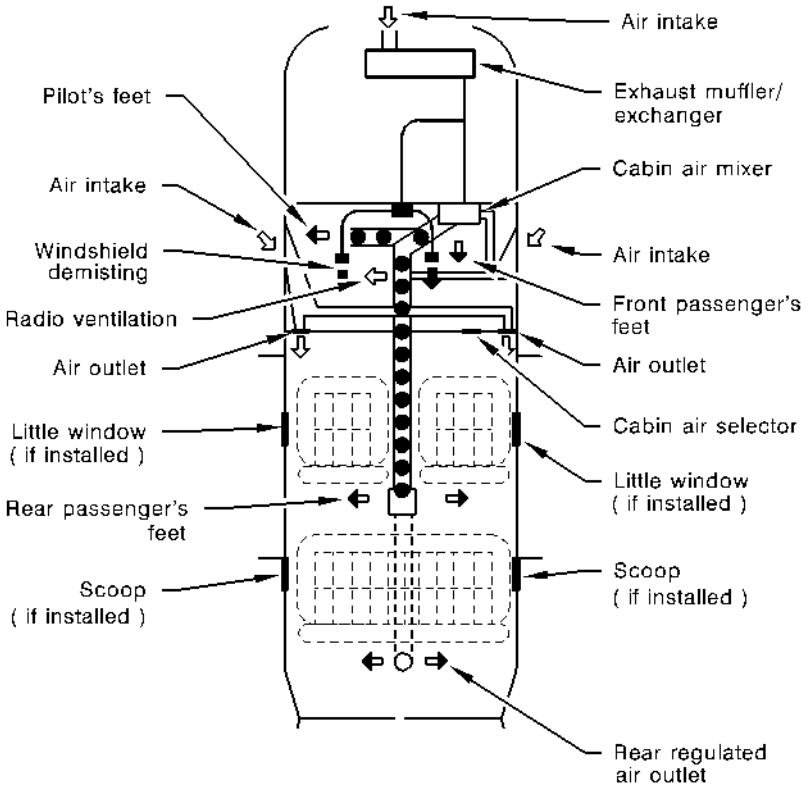


Figure 7.18 - DEMISTING, AIR REGULATION, VENTILATION, CUT-OFF SYSTEM

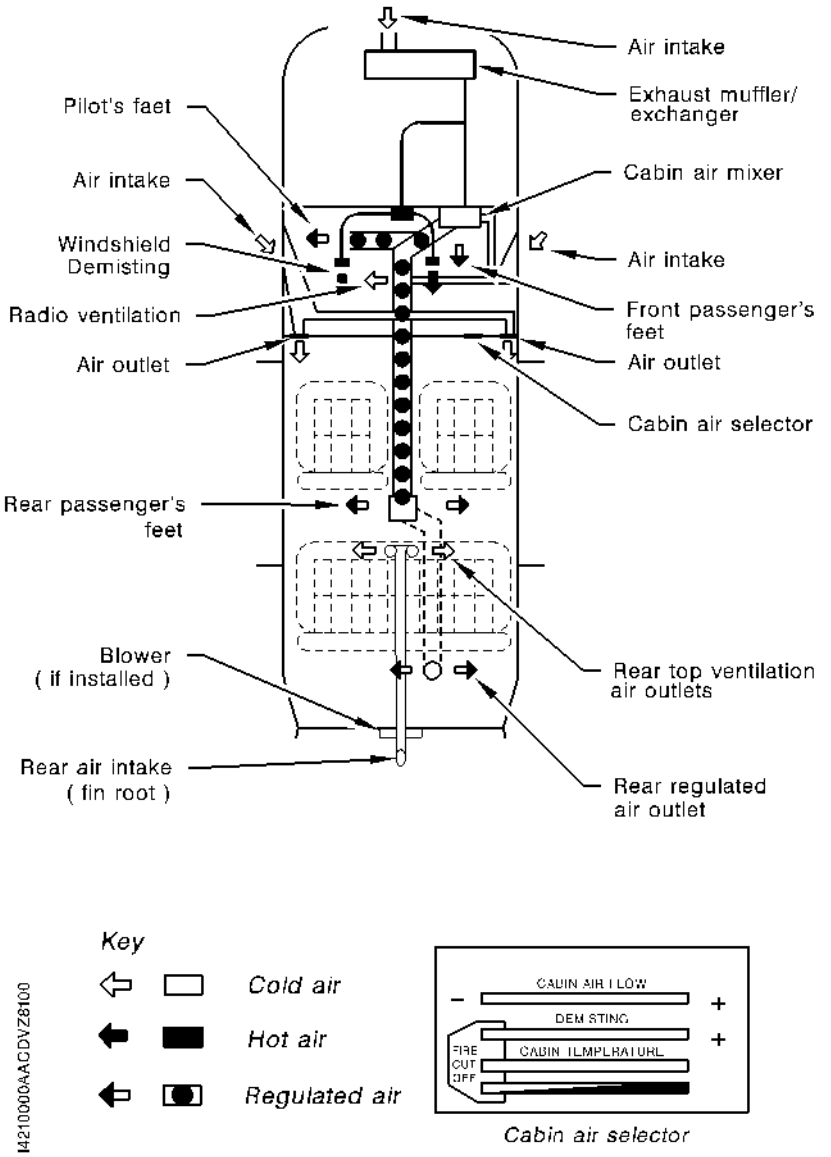


Figure 7.18A - DEMISTING, AIR REGULATION, VENTILATION, CUT-OFF SYSTEM

INTENTIONALLY LEFT BLANK

VENTILATION

Low ventilation

See "Cold 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. and R.H. air intakes supplies two swivelling air outlets which airflow may be regulated, located on both parts of the instrument panel strip.

Pre-MOD.151

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

- Rear passengers

Pre-MOD.151

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

Post-MOD.151

  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 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 7.4A).

FIRE CUT-OFF

CAUTION

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

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 (if installed) 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.

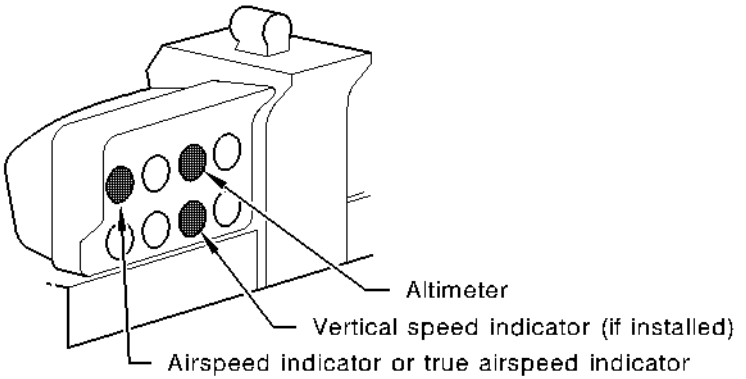
TRUE AIRSPEED INDICATOR (if installed)

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.

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



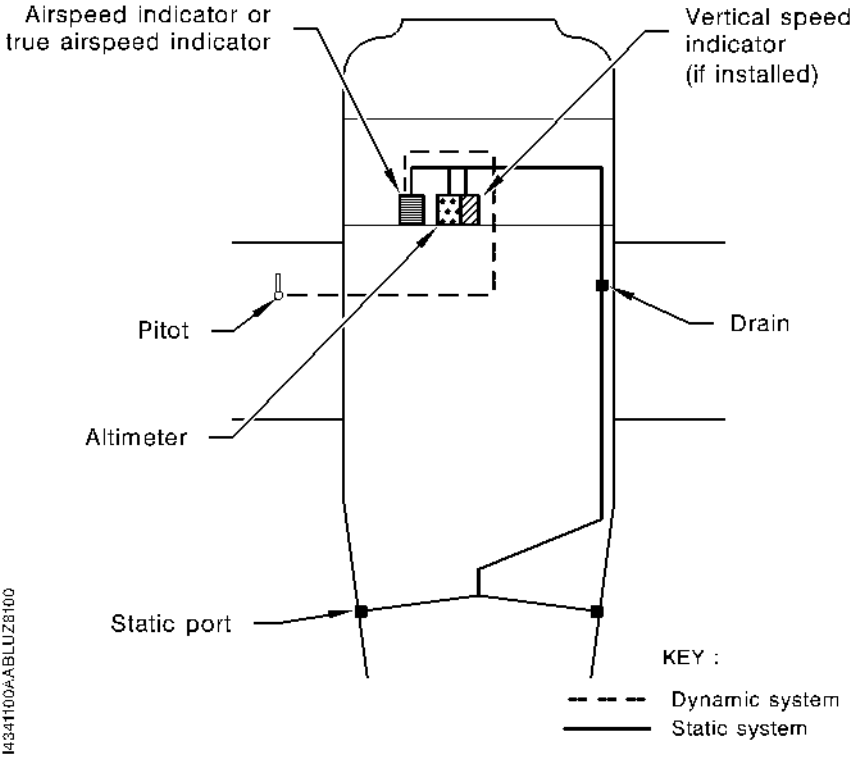


Figure 7.19 - AIRSPEED INDICATING STANDARD SYSTEM

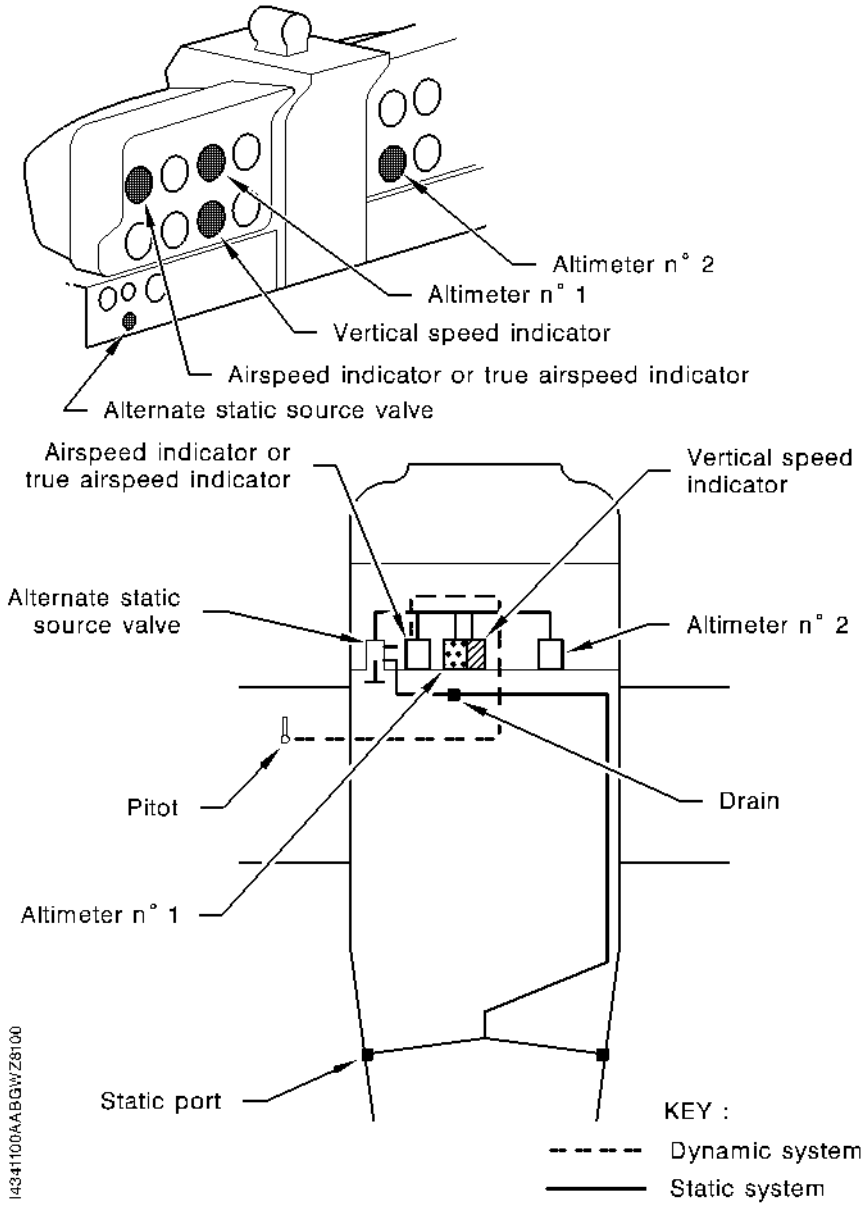


Figure 7.19A - AIRSPEED INDICATING SYSTEM WITH ALTERNATE STATIC SOURCE

VERTICAL SPEED INDICATOR (if installed)

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.

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.

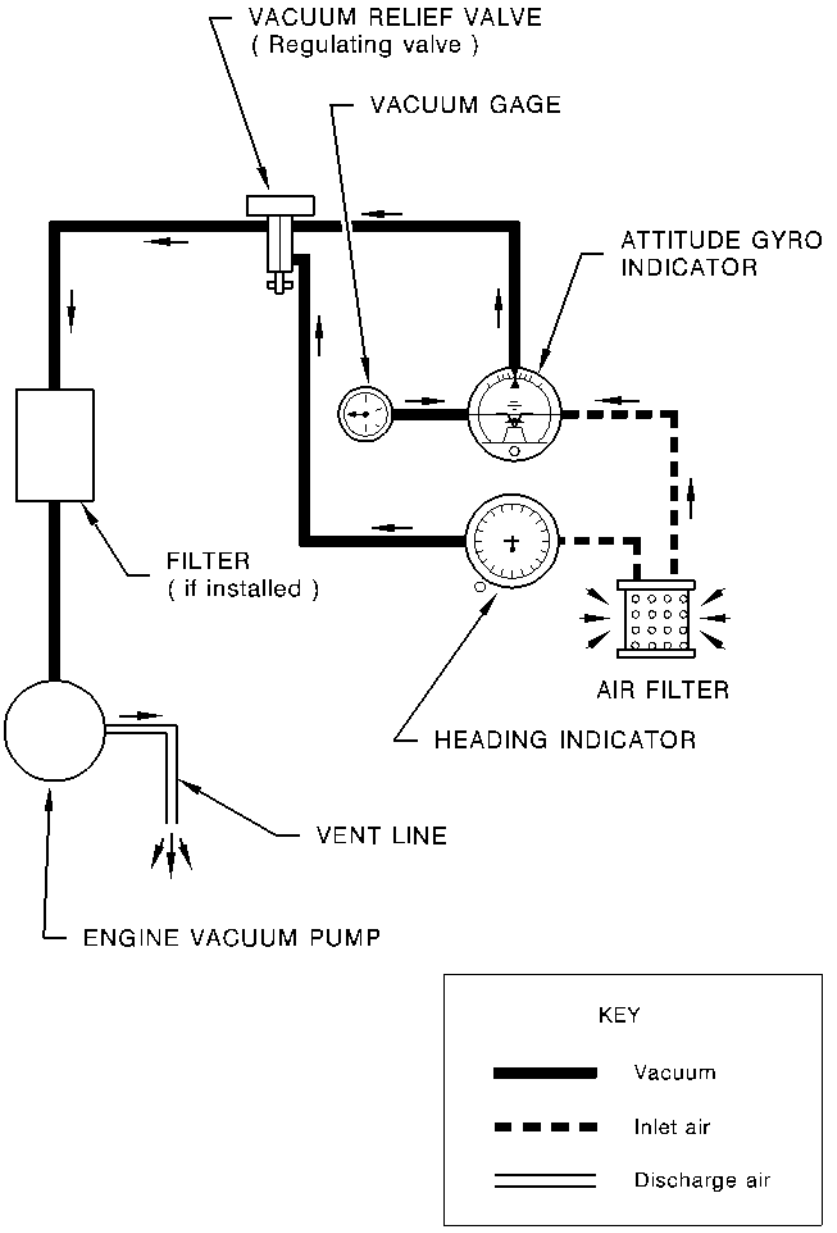


Figure 7.20 - VACUUM SYSTEM (With heading indicator)

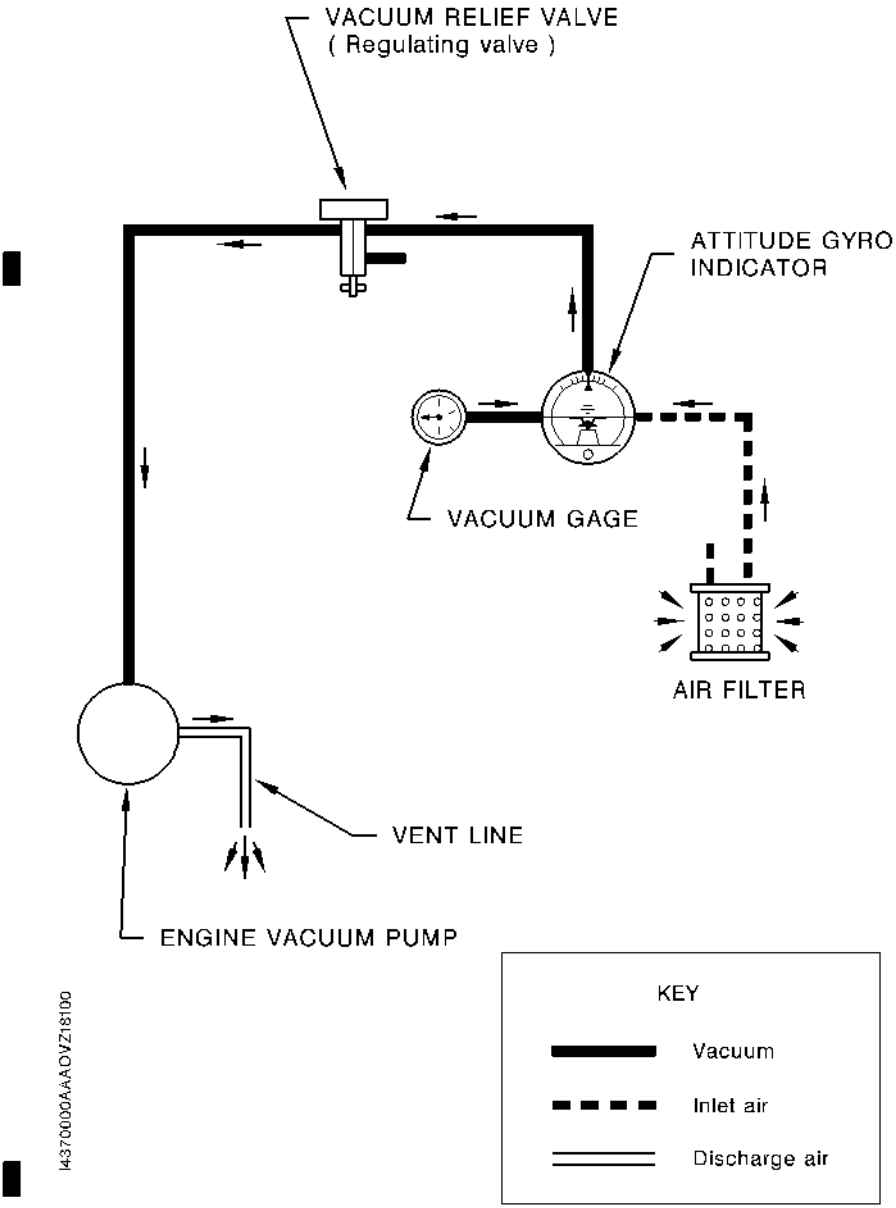


Figure 7.20A - VACUUM SYSTEM (Without heading indicator)

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 leff 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.

AUTOPILOTS

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 discontinuous tone on the buzzer located on the upper duct. 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 discontinuous bell of the buzzer is heard.

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.

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 labelled "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 (if installed)

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 AND POINTER 3000

On ELT, press on button "RESET".

INTENTIONALLY LEFT BLANK

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 9 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 to the rear part 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

DO NOT TOW THE AIRPLANE WHEN CONTROLS ARE LOCKED

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 8.2)

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.

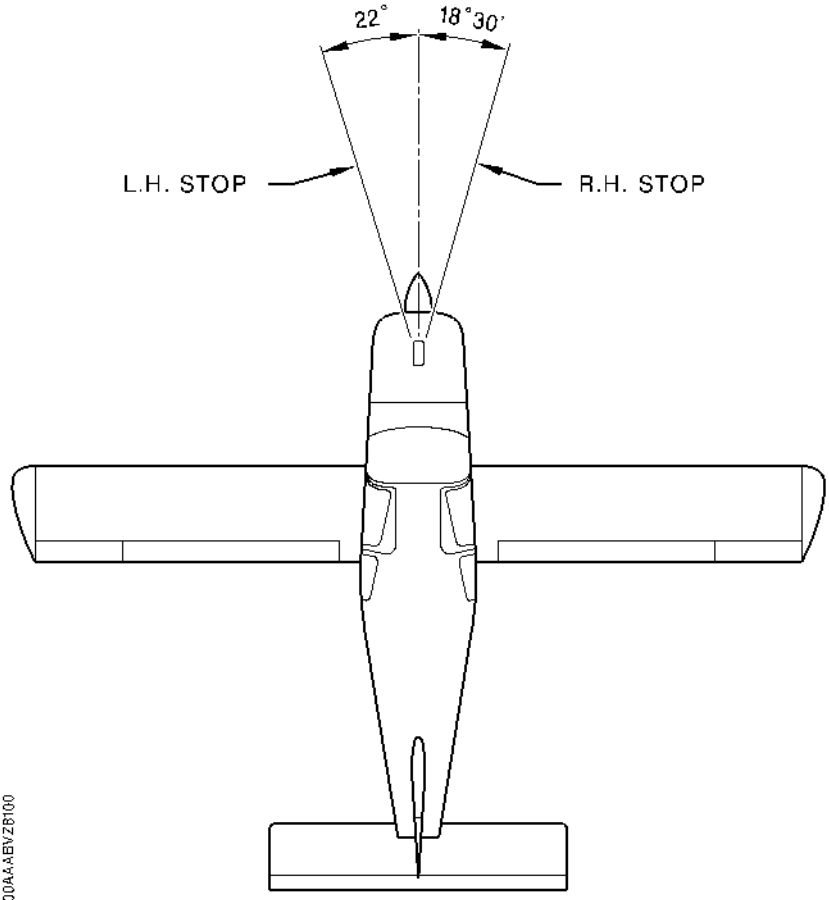


Figure 8.2 - TURNING ANGLE LIMITS

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

CAUTION

DO NOT MIX DIFFERENT BRANDS OR TYPES OF OIL

Grade and Viscosity for temperature range (Reference : TEXTRON LYCOMING Service Bulletin No. 480 at last revision) :

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

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 : 8 U.S. qt (7.6 litres)

Do not operate on less than 4 U.S. qt (3.8 litres). To minimize loss of oil through breather, fill to 6 U.S. qt (5.7 litres) for normal flights of less than 3 hours. For extended flights, fill to 8 U.S. qt (7.6 litres). These quantities refer to oil dipstick level readings.

For engines equipped with the cartridge filter option, during filter drainage or replacement, add 0.45 U.S. qt (0.4 litres) of oil for the filter.

NOTE:
Total capacity of the system : 8.45 U.S. qt (8 litres).

Oil and oil filter change :

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

Change engine oil 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.

The TB 9 airplane is equipped with a strainer. To have a 50-hour drain cycle, instead of a 25-hour one, the oil system can be fitted with a cartridge type filter - see SOCATA Service Letter No. SL 10-031-79.

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 : 20.9 U.S Gal (79 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 isopropyl 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 8.3 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 8.3 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.

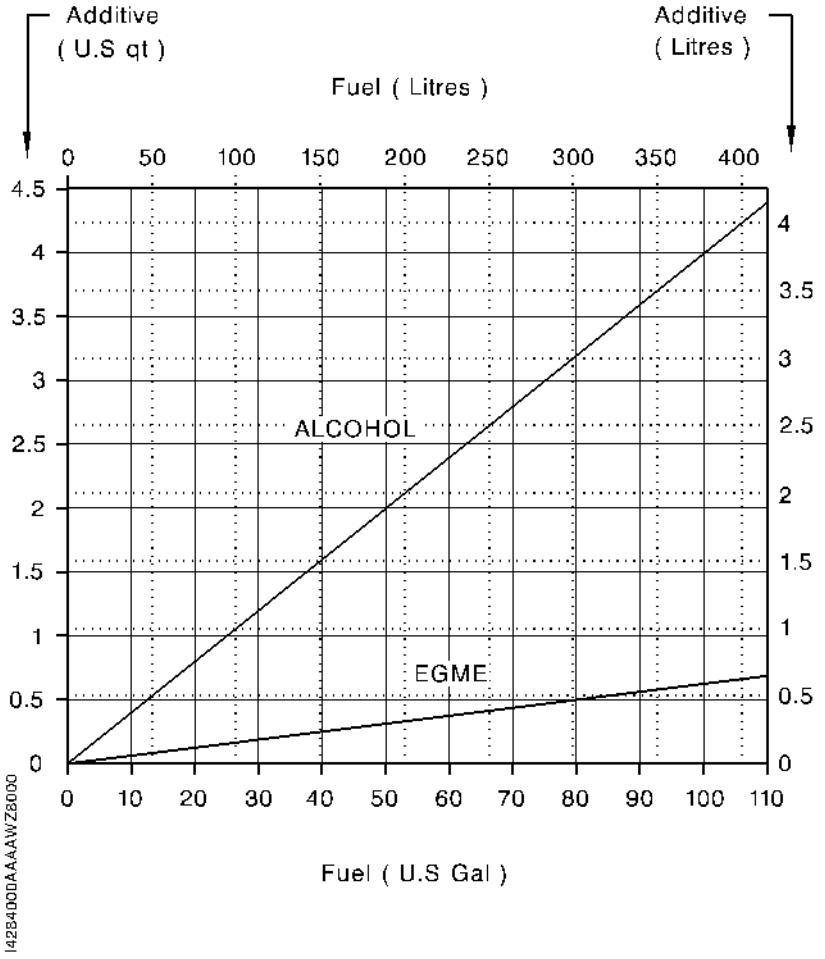


Figure 8.3 - ADDITIVE MIXING RATIO

LANDING GEAR

Tires :

- ***Nose gear***

  5.00-5 6 PRTT - Inflating pressure : 44.9 psi (3.1 bars)

- ***Main gears***

  Aircraft <u>not equipped</u> with modification MOD. 119 or MOD. 121 :

  . Standard :15.6.00-6 4 PRTT - Inflating pressure : 33.3 psi (2.3 bars)

  . Variant : 15.6.00-6 6 PRTT - Inflating pressure : 33.3 psi (2.3 bars)

  Aircraft <u>equipped</u> with modification MOD. 119 or MOD. 121 or MOD. 151 :

  15.6.00-6 6 PRTT - Inflating pressure : 40.6 psi (2.8 bars)

Shock absorbers :

- ***Nose gear***

  . Filling with hydraulic fluid MIL-H-5606 ; inflate with pressurized dry air or nitrogen.

  . Inflating pressure :
  P/N TB10 42000 : 94.2 psi (± 4) that is 6.5 bars (± 0.3)
  P/N TB10 42001 : 98.6 psi (± 4) that is 6.8 bars (± 0.3)

- ***Main gears***

  Aircraft <u>not equipped</u> with modification MOD. 119 or MOD. 121 :

  Filling with hydraulic fluid MIL-H-5606 ; inflate with pressurized dry air or nitrogen to 130.5 psi (± 4) that is 9 bars (± 0.3)

  Aircraft <u>equipped</u> with modification MOD. 119 or MOD. 121 or MOD. 151 :

  Filling with hydraulic fluid MIL-H-5606 ; inflate with pressurized dry air or nitrogen to 479 psi (+ 15 ; - 0), that is 33 bars (+ 1 ; - 0).

Brakes :

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

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.

LIST OF SUPPLEMENTS AND VALIDITIES

Supp. No.		Edition No. - Date
A -	General	
	TB 9 / 10 / 200 / 20 / 21 - From S / N 1	0 - 31.01.93
1 -	Day and night IFR equipment	
	TB 9 / 10 - From S / N 1 to 947	1 - 31.01.88
	TB 9 / 10 / 200 - From S / N 948	2 - 30.09.89
1A -	Day and night IFR equipment	
	TB 20 - From S / N 1 to 947, except S / N 823 to 849+888	1 - 31.01.88
	TB 20 - From S / N 948, and S / N 823 to 849+888	2 - 30.06.88
1B -	Day and night IFR equipment	
	TB 21 - From S / N 1 to 947	1 - 31.01.88
	TB 21 - From S / N 948	2 - 31.05.89
2 -	Night VFR equipment	
	TB 9 - From S / N 1 to 878, except S / N 765	1 - 31.01.88
	TB 10 - From S / N 1 to 947	1 - 31.01.88
2A -	Night VFR equipment	
	TB 20 - From S / N 1 to 947, except S / N 823 to 849+888	1 - 31.01.88
	TB 20 - From S / N 948, and S / N 823 to 849+888	2 - 30.06.88
2B -	Night VFR equipment	
	TB 21 - From S / N 1 to 947	1 - 31.01.88
	TB 21 - From S / N 948	2 - 31.05.89
2C -	Night VFR equipment	
	TB 9 - From S / N 879 to 947, plus S / N 765	0 - 30.09.88
	TB 9 - From S / N 948	1 - 30.09.89
2D -	Night VFR equipment	
	TB 10 / 200 - From S / N 948	0 - 30.09.89

14 - Auxiliary dry air pump
TB 10 / 200 / 20 / 21 - From S / N 1 ..... 1 - 31.01.88

15 - "TKS" ice protection systems
TB 20 / 21 - From S / N 1 ..... 0 - 29.02.88

16 - "MITCHELL" autopilot type CENTURY I
TB 9 / 10 - From S / N 1 ..... 1 - 31.01.88

17 - "MITCHELL" autopilot type CENTURY II B
TB 9 / 10 - From S / N 1 ..... 1 - 31.01.88

18 - Oxygen equipment "EROS"
TB 20 / 21 - From S / N 1 ..... 1 - 31.01.88

19 - Intentionally left blank

20 - Fuel flow totalizer FC / FT 10 "ARNAV"
TB 20 / 21 - From S / N 731 ..... 0 - 31.01.91

21 - Fuel flow totalizer FT 101 A "HOSKINS"
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.01.91

22 - "BFG" WX-1000 / 1000+ or WX-900 or WX-500 stormscope
TB 9 / 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.01.91

23 - Air conditioning system
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.01.91

24 - "KEITH" air conditioning system
TB 20
From S / N 948 and S / N 823 to 849+888
TB 21
From S / N 2081 ..... 0 - 30.09.94

25 - "GARMIN" 100 AVD GPS navigation system interfaced with HSI KI 206
TB 20 (Valid for aircraft under FAA regulations)
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.09.94

26 - "BENDIX / KING" KLN90A GPS navigation system interfaced with HSI KI 525A
TB 9 / 10 / 200 / 20 / 21 - From S / N 1 ..... 0 - 15.01.95

27 - Low noise exhaust
TB 9 - From S / N 1 ..... 0 - 31.10.95

28 - Low noise exhaust
TB 10 - From S / N 1 ..... 0 - 31.10.95

29 - Low noise exhaust
TB 20 - From S / N 1 ..... 0 - 31.10.95

30 - "BENDIX / KING" vertical speed and altitude selector type KAS 297B
TB 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.12.95

31 - "BENDIX / KING" EHI 40
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.04.96

32 - "BENDIX / KING" KLN90A GPS navigation system interfaced with EHI 40 EHSI
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.04.96

33 - "BENDIX / KING" KLN90B GPS navigation system interfaced with the HSI KI 525A
TB 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.04.96

34 - EDM 700
TB 20
From S / N 948 and S / N 823 to 849+888 ..... 0 - 15.11.96

35 - "SHADIN" digital fuel management system
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 15.11.96

36 - Intentionally left free

37 - "BENDIX / KING" KLN89B GPS navigation system – "Stand Alone"
TB 9 / 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.06.97

38 - "BENDIX / KING" KLN90B GPS navigation system interfaced with EHI 40 EHSI
TB 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.06.97

39 - "GARMIN" 150 GPS navigation system -"Stand Alone"
TB 9 / 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.08.97

40 - "BENDIX / KING" KLN89B GPS navigation system interfaced with the HSI KI 525A
TB 9 / 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 30.09.97

41 - "TKS" system
TB 20 / TB 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 15.11.98

42 - Intentionally left free

43 - "GARMIN" GNS 430 GPS navigation system interfaced with GI 106A CDI
TB 9 / 10 / 200 / 20 / 21
From S / N 2000, plus S / N 1633 + 1900 ..... 0 - 31.08.00

44 - "KEITH" air conditioning system
TB 200
From S / N 2013 ..... 0 - 31.08.00

45 - Three-blade propeller
TB 20 / TB 21
From S / N 1 ..... 0 - 28.10.00

46 - Intentionally left free

47 - "HONEYWELL" KFC 225 automatic flight control system
TB 20 / TB 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.01.01

48 - "HONEYWELL" KLN 94 GPS (B-RNAV) navigation system interfaced with electromechanical instruments
TB 9 / 10 / 200 / 20 / 21
From S / N 2000, plus S / N 1633 and 1900 ..... 0 - 31.01.01

49 - "HONEYWELL" KMD 550 Multi-function display
TB 9 / 10 / 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 31.01.01

50 - "SHADIN" MICROFLO-L™ digital fuel management system
TB 200 / 20 / 21
From S / N 948 and S / N 823 to 849+888 ..... 0 - 15.05.01

51 - "GARMIN" GNS 430 GPS (B-RNAV) navigation system interfaced with electromechanical instruments
(GPS # 1 : B-RNAV / GPS # 2 : IFR)
TB 9 / 10 / 200 / 20 / 21
From S / N 2000, plus S / N 1633 + 1900..... 0 - 15.05.01

52 - "HONEYWELL" KLN 94 GPS navigation system -"Stand Alone"
TB 9 / 10 / 200 / 20 / 21
From S / N 2000, plus S / N 1633 and 1900 ..... 0 - 30.05.01

53 - "GARMIN" GNS 530 GPS (B-RNAV) navigation system interfaced with electromechanical instruments
(GPS # 1 : B-RNAV)
TB 9 / 10 / 200 / 20 / 21
From S / N 2000, plus S / N 1633 + 1900..... 0 - 15.01.02

D.G.A.C.Approval :

DGAC/SFACT/N.AG
Chargé de Certification
Grégory POMMERA

30 MAI 2002

Date : .....

DIRECTION GÉNÉRALE DE L'AVIATION CIVILE

SUPPLEMENT

DAY AND NIGHT IFR EQUIPMENT

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1

GENERAL

EQUIPMENT REQUIRED FOR IFR OPERATION

The airplane is approved for day & night IFR operations when the appropriate equipment is installed and operating correctly.

The type certification requires following equipment in addition to the basic flight instruments. These equipment must be installed and operate perfectly according to the indicated type of use.

CAUTION

IT IS THE PILOT'S RESPONSIBILITY TO CHECK THAT THE FOLLOWING EQUIPMENT LIST IS IN ACCORDANCE WITH THE SPECIFIC NATIONAL OPERATING RULES OF THE AIRPLANE REGISTRATION COUNTRY DEPENDING ON THE TYPE OF OPERATION

NOTE :
Systems and equipment mentioned hereafter do not include specific flight and radio-navigation instruments required by decree concerning the civil airplanes operating general conditions or other foreign regulations (for example FAR PART 91 and 135).

EQUIPMENT	Day IFR	Night IFR
Vertical speed indicator	yes	yes
Attitude gyro indicator	yes	yes
Turn-and-bank indicator	yes	yes
Heading indicator	yes	yes
Vacuum gage	yes	yes
Vacuum warning light	**	**
Heated pitot	yes	yes
Carburetor temperature indicator	yes	yes
OAT indicator	yes	yes
Stop watch	yes	yes
Alternate static source	yes	yes
Anticollision light	yes	yes
Landing and taxi lights	no	yes
Navigation lights	no	yes
Adjustable interior lighting	no	yes
Adjustable emergency lighting	no	yes
1 microphone and headset assy	yes	yes
1 hand microphone and cabin loud-speaker	yes	yes
For reference :		
Flashlight with flashing device	no	yes
Day and Night IFR placard	yes	yes

** Optional equipment ; mandatory for BRAZIL

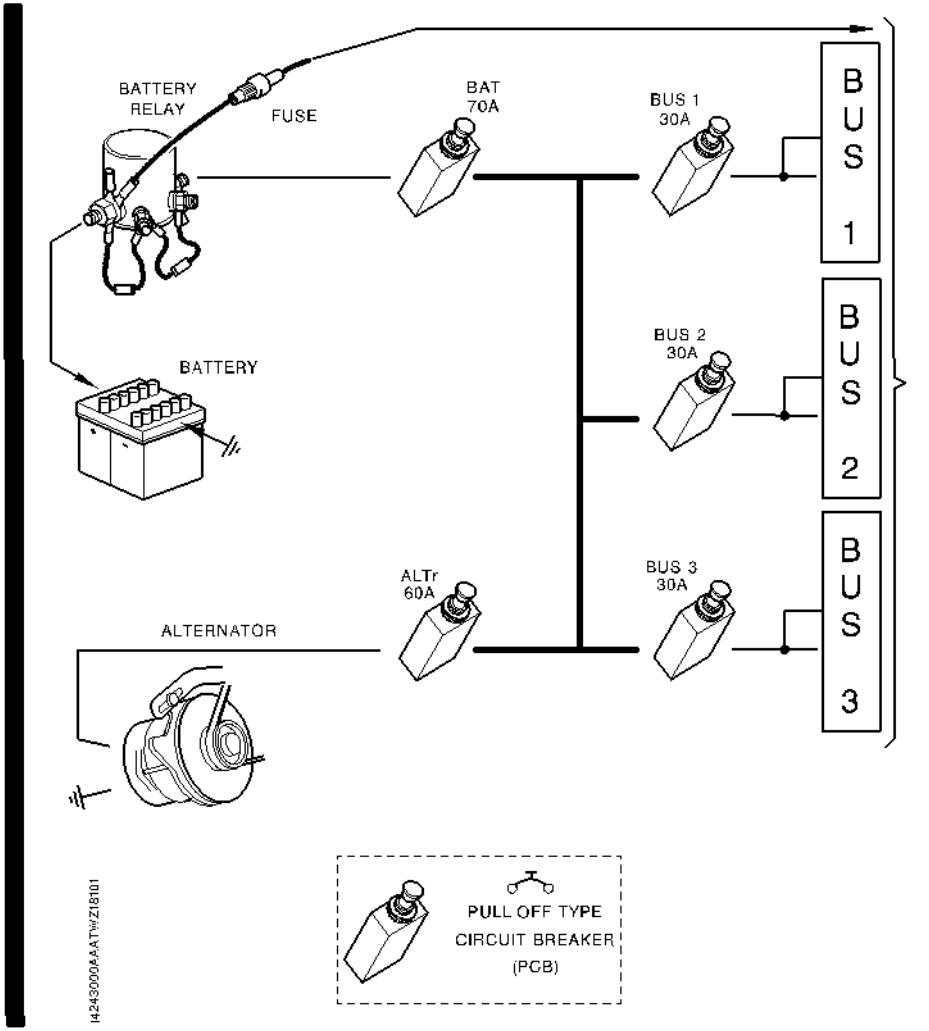


Figure 9.1.1 - BUS BARS POWER SUPPLY

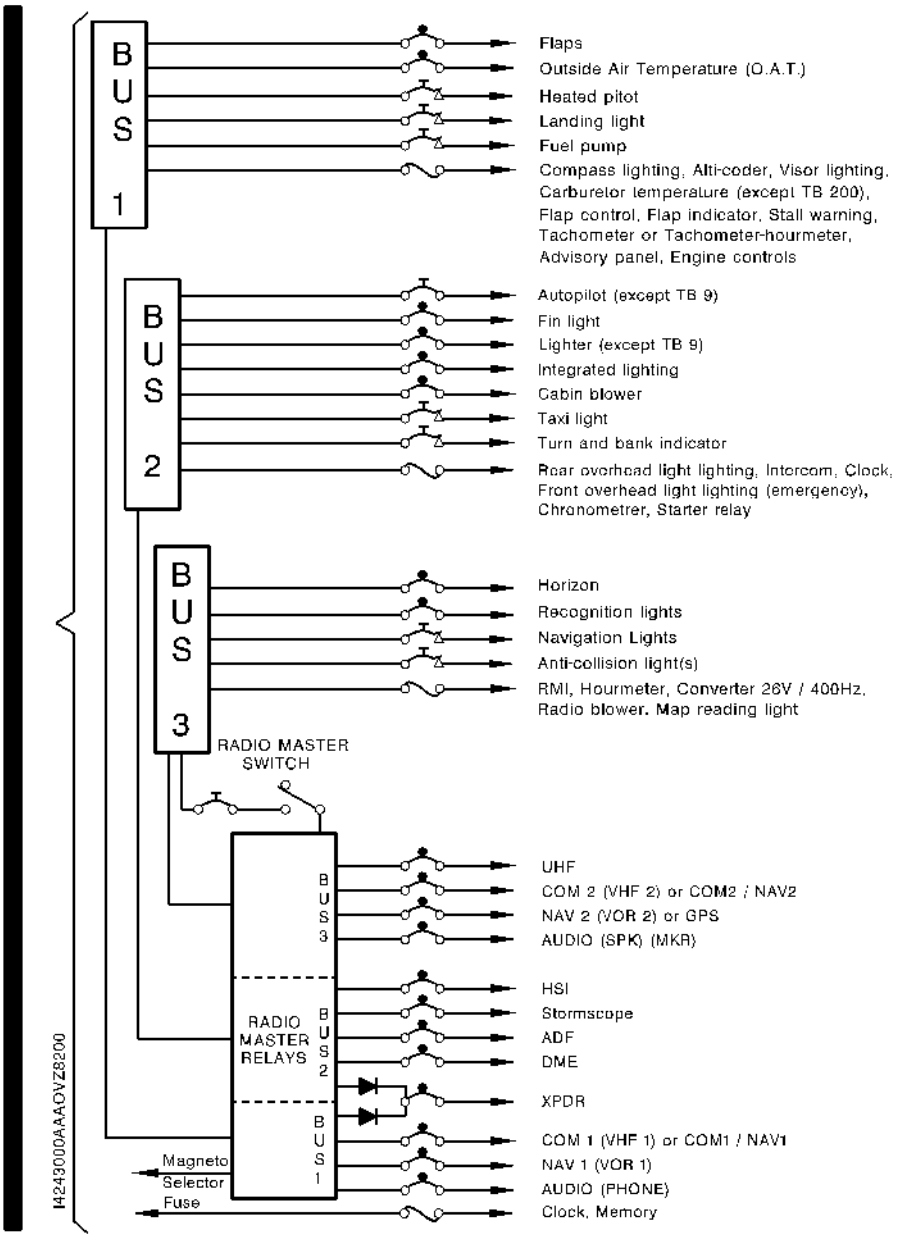


Figure 9.1.2 - POWER DISTRIBUTION IN IFR

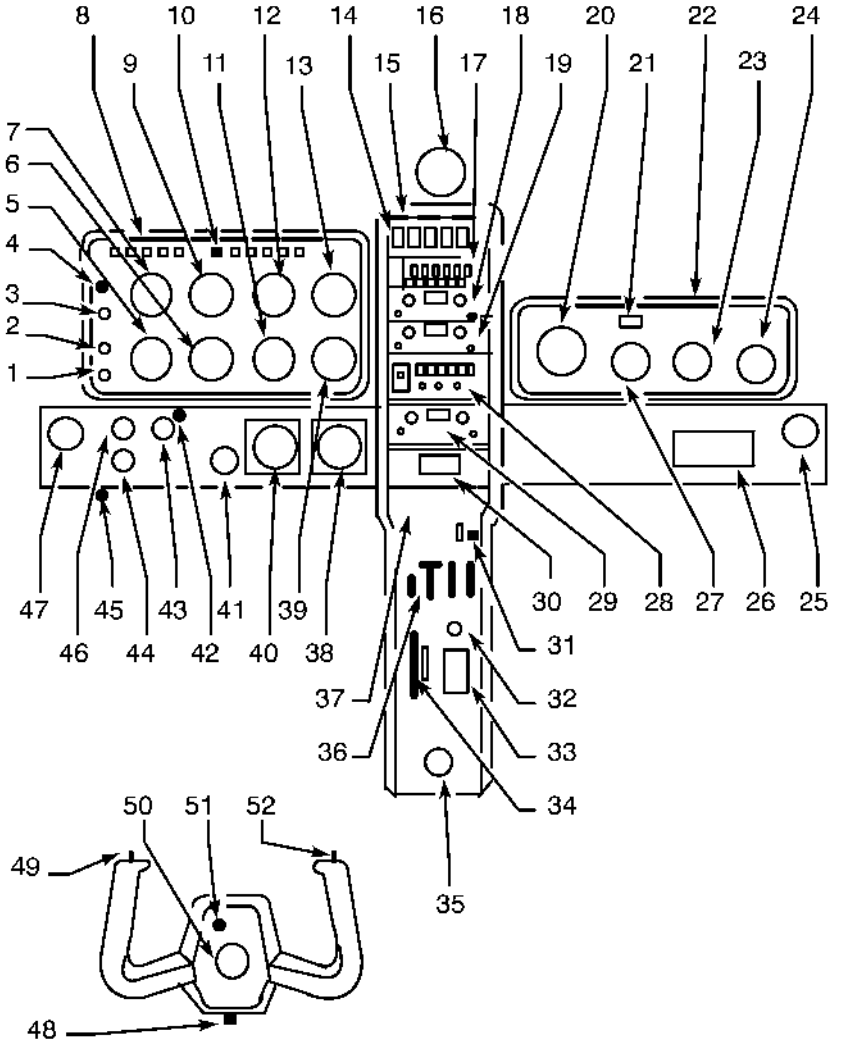


Figure 9.1.3 - EXAMPLE OF NARCO VERSION INSTRUMENT PANEL " IFR "

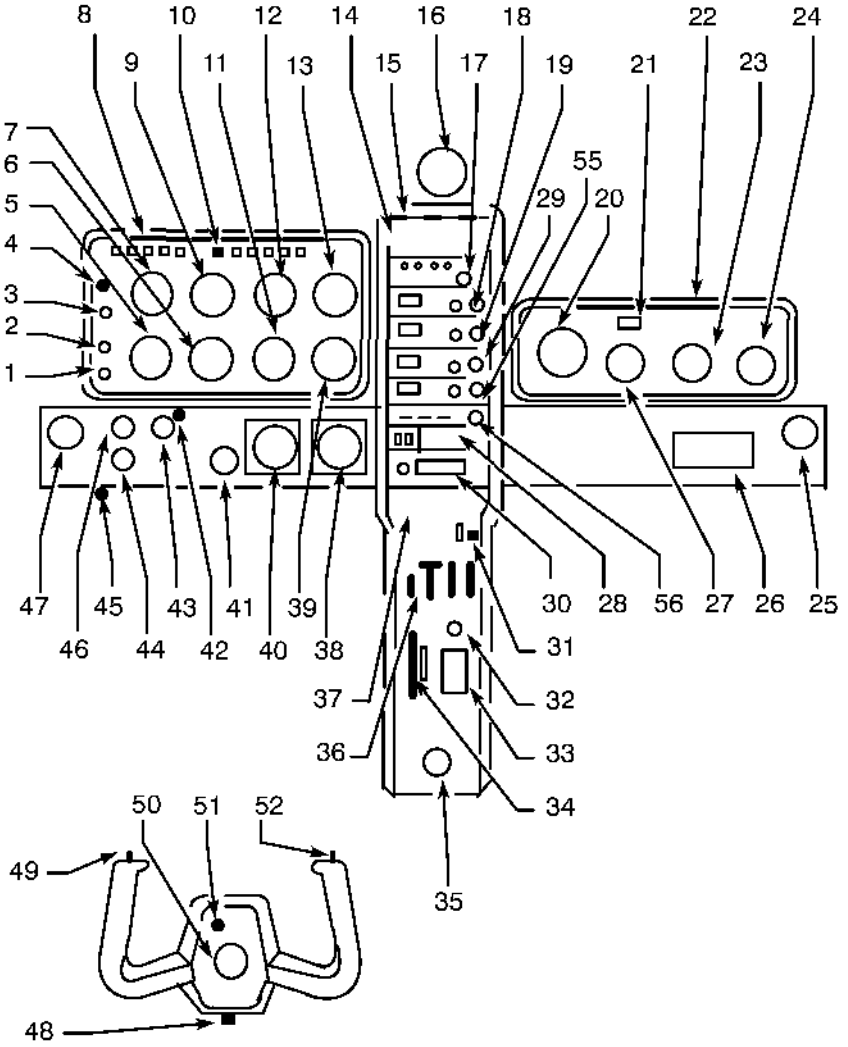


Figure 9.1.3A - EXAMPLE OF KING VERSION INSTRUMENT PANEL " IFR "

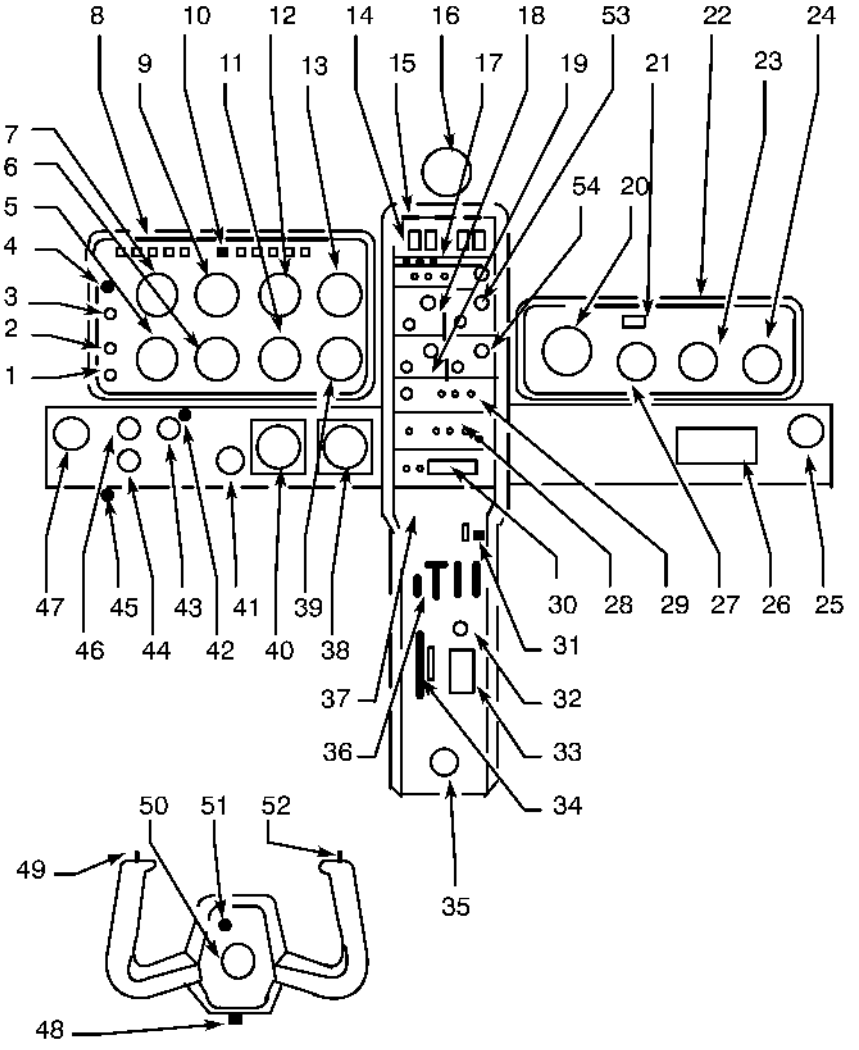


Figure 9.1.3B - EXAMPLE OF COLLINS VERSION
INSTRUMENT PANEL « IFR »

INSTRUMENT PANEL EXAMPLE (NARCO, COLLINS OR KING)

1 - Normal lighting control (Std)
2 - Emergency lighting control (Std)
3 - Instruments and radio lighting control (Std)
4 - Emergency locator transmitter switch (if installed)
5 - Illuminated turn-and-bank indicator
6 - Illuminated heading indicator
7 - Illuminated true airspeed indicator (Std)
8 - L.H. instrument panel visor lighting
9 - Illuminated attitude gyro indicator
10 - Pitot heat indicator light
11 - Illuminated vertical speed indicator (Std)
12 - Illuminated altimeter (Std)
13 - VOR 1 receiver-indicator (NARCO)
13 - VOR 1 indicator (COLLINS - KING)
14 - Engine monitoring cluster (Std)
15 - Radio support visor lighting
16 - Illuminated compass (Std)
17 - Audio control panel
18 - VHF 1
19 - VHF 2
20 - Manifold pressure gage (TB 9 - TB 10)
20 - Manifold pressure - fuel flow / pressure dual indicator (TB 200)
21 - Carburetor temperature indicator (TB 9 - TB 10)
22 - R.H. instrument panel visor lighting
23 - Illuminated CHT / EGT combination
24 - Illuminated OAT indicator
25 - R.H. air outlet (Std)
26 - Cabin air selector (Std)
27 - Illuminated tachometer (Std) or, Post-MOD.151 (All) and MOD.139 (TB 9), illuminated tachometer-hourmeter (Std)
28 - Transponder
29 - Radio compass
30 - DME indicator
31 - Wing flaps control and illuminated indicator (Std)
32 - Lighter (Std) (TB 10 - TB 200)
33 - Ash-tray (Std) (TB 10 - TB 200)
34 - Pitch trim control wheel and illuminated indicator (Std)
35 - Fuel selector (Std)

INSTRUMENT PANEL EXAMPLE (Cont.)

36 - Engine controls (Std)
37 - Switch-breakers for turn-and-bank indicator, anti-collision light(s), navigation lights, heated pitot and landing lights
38 - Illuminated altimeter Nr 2
39 - VOR 2 receiver-indicator (NARCO)
39 - VOR 2 indicator (COLLINS - KING)
40 - Illuminated ADF indicator
41 - Parking brake knob (Std)
42 - L.H. subpanel post light (Std)
43 - Vacuum gage
44 - Alternate static source valve
45 - Circuit breakers panel post light
46 - Magneto / start selector (Std)
47 - L.H. air outlet (Std)
48 - Maps reading light (if installed)
49 - Push-to-talk switch
50 - Clock / stop watch
51 - Clock / stop watch post light (if installed)
52 - Maps reading light switch
53 - NAV 1 receiver (COLLINS)
54 - NAV 2 receiver (COLLINS)
55 - VOR / ILS receiver (KING)
56 - VOR / LOC receiver (KING)

LIGHTING DEVICES

INSTRUMENT PANELS LIGHTING

- See Figure 9.1.3.
- Controlled and regulated by "Normal" and "Radio" controls.

EMERGENCY LIGHTING

Pre-MOD.151

- Front overhead lights controlled by turning post lights and regulated by the "Emergency" control. See Figure 9.1.3.

Post-MOD.151 (All) and MOD.139 (TB 9)

- Front overhead lights controlled and regulated by the "Emergency" control. See Figure 9.1.3.

CABIN LIGHTING

Pre-MOD.151

- Front overhead lights controlled by turning post lights and regulated by the "Emergency" control. See Figure 9.1.3.

Post-MOD.151 (All) and MOD.139 (TB 9)

- Front overhead lights controlled and regulated by the "Emergency" control. See Figure 9.1.3.

All

- Rear overhead light (manual).

INSTRUMENT PANEL ADDITIONAL EQUIPMENT

ADDITIONAL SENSITIVE ALTIMETER (if installed)

The second sensitive altimeter is connected to the airplane static pressure. It may be switched over to cabin static pressure by means of the alternate static source valve.

When the alternate static source valve is pulled, altitude compensation should be performed as per Section 5 "Performance".

CLOCK / STOP WATCH

The clock / stop watch and its post light are installed in the center of the pilot's control wheel.

OAT INDICATOR

The indicator is connected to the transmitter which is installed under L.H. wing. The instrument is provided with integral lighting.

A red warning light is provided on the dial. This warning light, permanently lit, becomes visible by the pointer rotation when the outside atmosphere is close to 32° F.

ALTERNATE STATIC SOURCE

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.

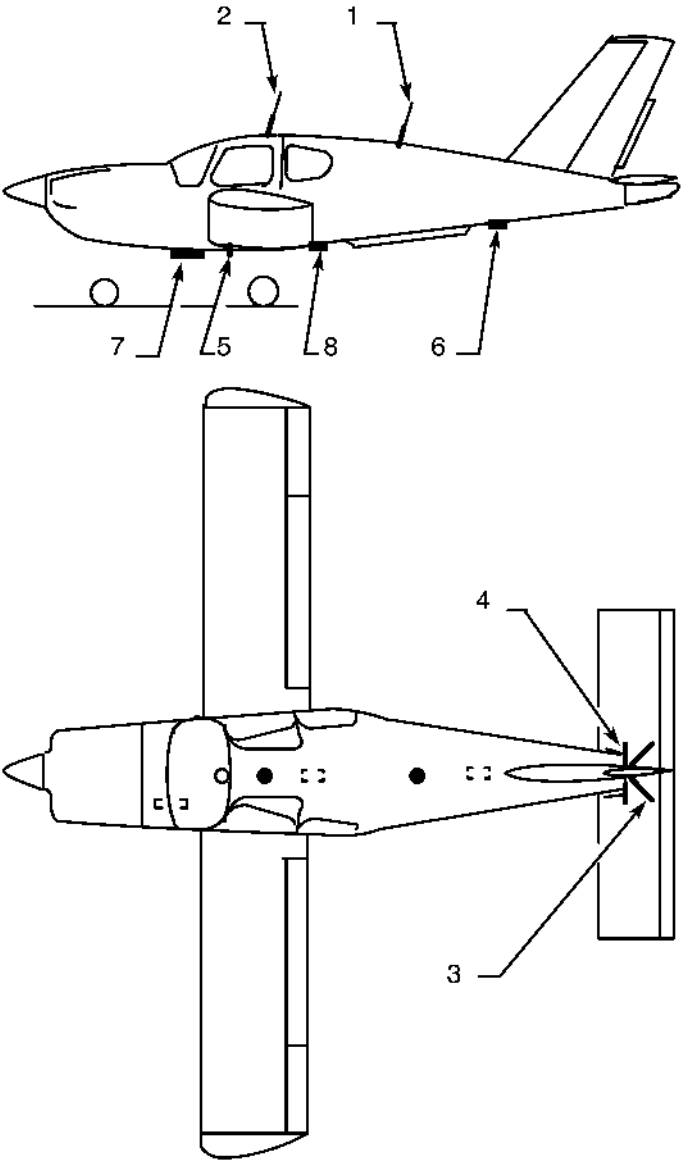


Figure 9.1.4 – ANTENNAS

ANTENNAS

1 - VHF 1 antenna

2 - VHF 2 antenna

3 - VOR antenna

4 - Glide ILS antenna

5 - ATC transponder antenna

6 - Radio compass - loop and sense antenna

7 - Marker antenna

8 - DME antenna

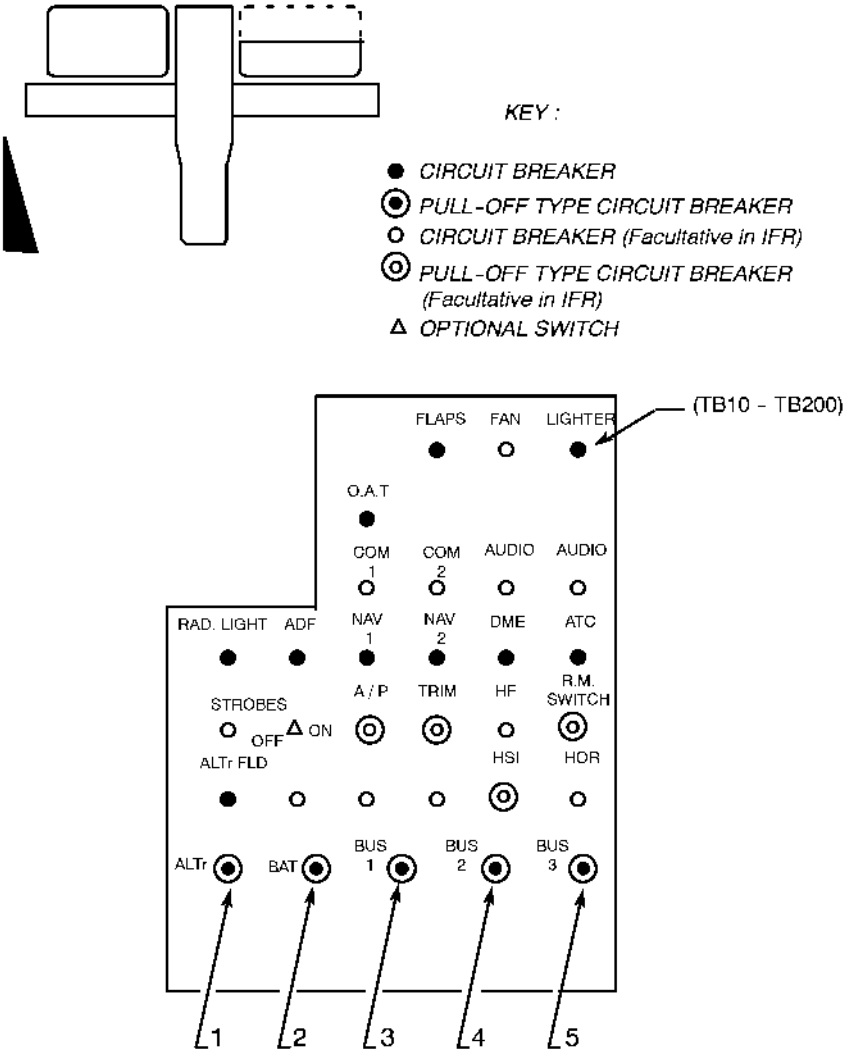


Figure 9.1.5 - CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

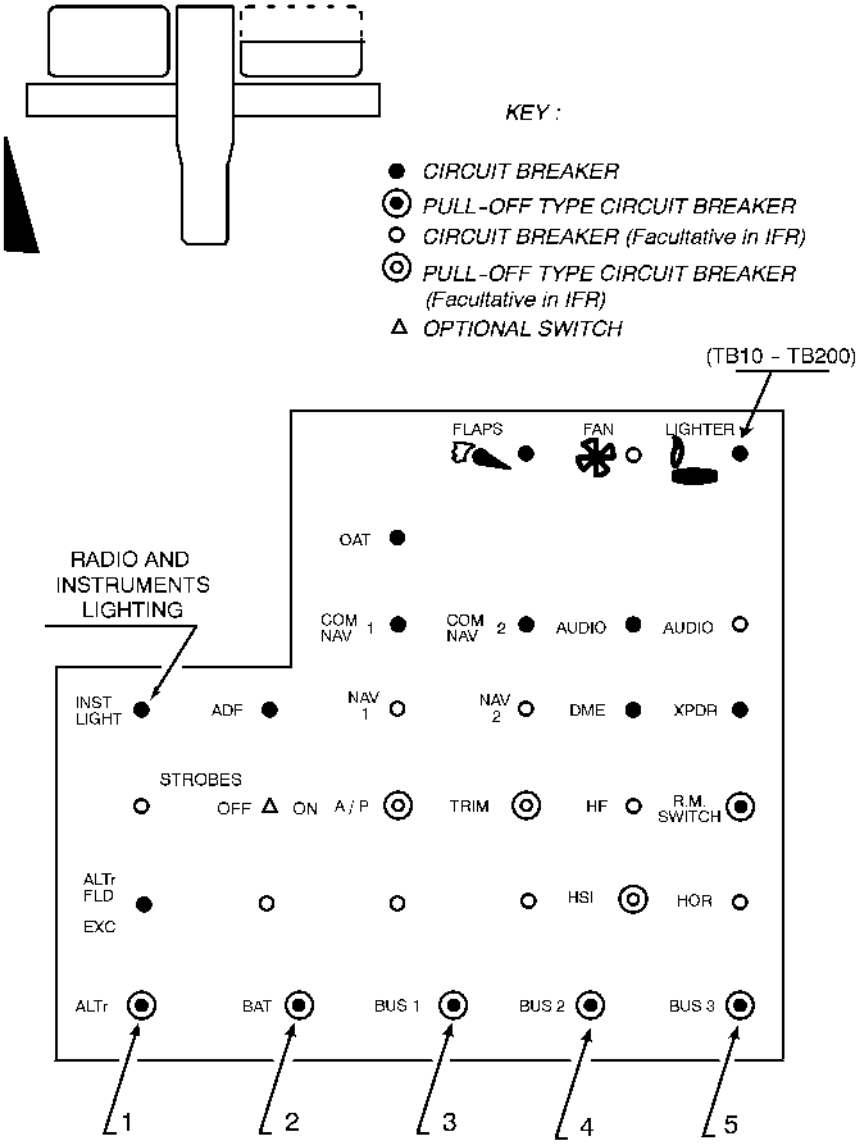


Figure 9.1.5A - CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

INTENTIONALLY LEFT BLANK

CIRCUIT BREAKERS ASSEMBLY

1 - Alternator "pull-off' type circuit breaker (60 A)

2 - Battery "pull-off' type circuit breaker (70 A)

3 - BUS bar 1 "pull-off" type circuit breaker (30 A)

4 - BUS bar 2 "pull-off" type circuit breaker (30 A)

5 - BUS bar 3 "pull-off" type circuit breaker (30 A)

SECTION 2
LIMITATIONS

These limitations supplement or replace those of the standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook.

PLACARDS

This placard is located near the instruction plate :

FLIGHT CONDITIONS : DAY AND NIGHT IFR AND VFR
ICING CONDITIONS NOT ALLOWED

This placard is located on L.H. instrument panel :

CAUTION : DURING ILS APPROACH
AVOID ENGINE RPM HIGHER THAN 2600

SECTION 3

EMERGENCY PROCEDURES

These procedures supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

AIRSPEED INDICATING SYSTEM FAILURE

- Check the operation of the heated pitot, green indicator light "ON". If the switch-breaker is "ON" and the indicator light "OFF", check that BUS 1 "pull-off" type circuit breaker is "ON".
- Erroneous indications of true airspeed indicator and altimeters :

  Alternate static source "PULL"

Open air outlets and / or actuate cabin air regulation flow lever to open position. Then, airspeed indicator and altimeter errors are slight.

If the failure persists, perform a precautionary approach, maintaining an adequate airspeed margin above the stall warning activation speed using the pre-setting (see Figure 9.1.6).

NORMAL LIGHTING FAILURE

- Switch on emergency lighting system (front overhead lights)
- Check that radio and instruments lighting circuit breaker is "ON".

LANDING LIGHT FAILURE

The left light has a wide beam and is considered as a taxi light, and the right one has a narrow beam and is considered as a landing light, but either or both can be used as desired.

When landing without lights, it is suggested to use the same pitch attitude as that required to maintain the ILS Glide Slope.

FIRE OR SMOKE OF ELECTRIC ORIGIN

- Disengage "pull-off" type circuit breakers of BUS bars 1, 2, 3.
- After a few moments reset "pull-off" type circuit breakers in the numerical order with a delay between each operation for observation. Disengage the faulty BUS bar and disconnect all the equipment supplied by the latter. See Figure 9.1.2.
- Reset "pull-off" type circuit breaker and reconnect one after the other all the disconnected equipment to isolate the failed item. Let the "pull-off" type circuit breaker tripped for this item.

VACUUM SYSTEM FAILURE

If the vacuum gage is below green arc or shows zero :

- the pneumatically operated attitude gyro indicator and / or heading indicator / HSI are inoperative.
- electric turn-and-bank indicator and magnetic compass continue to function normally.

Leave IMC conditions, fly airplane carefully in partial panel mode, and proceed with landing as soon as possible.

SECTION 4
NORMAL PROCEDURES

These procedures supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

4.1 - PROCEDURES FOR IFR FLIGHT OR NIGHT FLIGHT

PRELIMINARY STEPS

Study the meteorology in order to avoid flying in hazardous conditions (minima, icing...).

Check that fuel level is sufficient to comply with regulations.

BEFORE FLIGHT (may be undertaken or continued at night)

Check the operation :

. of anti-collision light(s)
. of navigation lights
. of cabin and instrument panel lighting
. of landing lights
. of day / night selector switch.

A flashlight must be provided on board the airplane.

TAXIING

Check the operation of gyroscopic instruments by performing alternate turns :

- Attitude gyro indicator - set miniature airplane as required
- Heading indicator - correct rotation
- Turn-and-bank indicator - proper direction.

At night, preferably use only the taxi light (left landing light).

BEFORE TAKE-OFF

- Heated pitot
- Check vacuum gage in green arc
- Check installed radio-navigation equipment
- Set transponder to "stand-by"
- At night or in damp weather, set the cabin air selector to maximum demisting.

LINED UP ON RUNWAY

Check heading indicator and attitude gyro indicator bar.

At night, turn on landing lights as required.

TAKE-OFF

See Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

Always maintain a positive rate of climb.

At night, switch off the landing lights when safely airborne.

CLIMB, CRUISE AND DESCENT

See Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

Beware of the risk of eye-sight problems above 8000 feet (without oxygen).

ILS APPROACH (pre-setting)

These values are given for a weight of 2535 lbs (1150 kg - TB 10 - TB 200) - 2337 lbs (1060 kg - TB 9).

In order to facilitate air traffic, it is advisable to proceed with final approach at VIAS = 86 / 92 KIAS - 99 / 106 MPH IAS with flaps retracted.

In short final run, fully extend the flaps, VIAS will then drop to 70 / 76 KIAS - 81 / 87 MPH IAS. It is not necessary to modify the power to maintain the angle of descent.

	Wing flaps	KIAS	MPH IAS	MP in.Hg (TB10-TB200)	Propeller RPM	Vert. Speed indic. ft/min
Holding	0°	86 / 92	99 / 106	20.7	2500 (TB10-TB200) 2350 (TB 9)	0
ILS Approach	0°	86 / 92	99 / 106	14.8	2500 (TB10-TB200) 2000 (TB 9)	- 450
Final	25°30'	70 / 76	81 / 87	*	Full low pitch (TB10-TB200) (TB 9) *	- 450

(*) As required

Figure 9.1.6 - PRE-SETTINGS, ILS APPROACH

ILS approach with KING ILS

"Erratic deviations have been observed with airplane flown down an ILS path with KING RADIO-NAV installations. Analysis of the phenomenon indicates that the fluctuations are due to an interference between propeller rotation frequency and one of LOC frequencies. The more sensitive conditions are met when the localizer beacon is right ahead and the engine speed is adjusted toward 2650 RPM.

The localizer use is not significantly impaired by the phenomenon when :

- engine speed is reduced to lower than 2600 RPM
- localizer beacon lies right or left by more than 30 degrees from airplane heading.

Autopilot APR mode operation should be discontinued whenever high engine power settings are anticipated. This can be done by switching to HDG mode or CWS mode or by switching off the autopilot. Of course from above one understands that REV mode or BCK COURSE mode are not concerned by this limitation after take-off (loc. beacon lies 180° from airplane heading in this case)."

LANDING

At night, preferably use the R.H. landing light (long range) or both lights simultaneously.

4.2 - USE OF AVIONICS

AUDIO CONTROL PANEL

These knobs permit the selection of transmission and reception of VHF 1 or VHF 2, double VHF reception, reception of VOR 1, VOR 2, ADF, Marker and DME.

TRANSMISSION

Transmission may be made either through the hand microphone, or through the headset boom microphone with its push-to-talk-switches located on the control wheels. Headsets that will not be used should be unplugged.

RECEPTION

Select the loud-speaker or headset reception by means of the corresponding button on audio control panel (SPKR or PHONE).

In I.M.C. or at night, it is recommended to use the headset.

VOR, ADF, MKR AND DME (if installed)

They operate independently of VHF comm transceivers, but at least one VHF comm transceiver must be turned on to provide an audio amplifier for loud-speaker operation, unless the audio control panel contains an integral amplifier. Headphone operation is normal regardless of VHF operation on loud-speakers.

LIGHTING

Three controls are located on the left side of the L.H. instrument panel. See Figure 9.1.3 :

- Lower control (normal)

  Controls and regulates lighting of L.H. and R.H. instrument panels' visors.

- Central control (emergency) Pre-MOD.151

  Regulates lighting of both forward overhead lights. Rotating the overhead lights turns them on and off.

- Central control (emergency) Post-MOD.151 (All) and MOD.139 (TB 9)

  Controls and regulates lighting of both forward overhead lights.

- Upper control (radio-equipment) operates and regulates :
  - Radio equipment lighting
  - Instruments and indicators lighting on instrument panel
  - Circuit breakers panel lighting

NOTE :
Both "normal" and "radio-equipment" controls and, Post-MOD.151 (All) and MOD.139 (TB 9), the "emergency" position control operate and regulate lighting ; from high position "OFF" turn clockwise for "FULL INTENSITY OPERATION", then, still clockwise, rotate towards "MINIMUM INTENSITY" ; turn back to "OFF" turning counterclockwise.
The "Emergency" position control, Pre-MOD.151, regulates lighting ; from high position "FULL INTENSITY" turn clockwise to regulate to "MINIMUM INTENSITY" ; turn back to high position "FULL INTENSITY" turning counterclockwise.

LANDING LIGHTS

The lights are controlled by two switch-breakers. See Figure 7.5B of the basic Pilot's Operating Handbook.

The L.H. light has a wide beam which facilitates taxiing.

The R.H. light has a long range beam and should be used for take-off and landing.

Simultaneous operation is possible.

DAY / NIGHT DIMMER

A day / night switch allows the indicator lights for the fuel pump, pitot heater and landing lights to be dimmed during night operations.

SECTION 5
PERFORMANCE

The installation and the operation of the day and night IFR equipment do not change the basic performance of the airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.
However, the installation of the externally mounted antennas will result in a minor reduction in cruise performance. See Section 5 "Performance" of the basic Pilot's Operating Handbook.

SUPPLEMENT

NIGHT VFR EQUIPMENT

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

LIST OF APPROVED AND MANDATORY EQUIPMENT
ALLOWING FLIGHT OF THE AIRPLANE
IN NIGHT FLIGHT
(in addition to the basic flight instruments)

EQUIPMENT
- RADIO-NAVIGATION VHF - Category 2 VOR / LOC - Category 2 (NAV) or Radio compass - Category 2 (ADF) - NAVIGATION EQUIPMENT Horizontal attitude gyro indicator Turn and bank indicator Directional gyro indicator Gyro "ON" indicator Vertical speed indicator Anti-collision light Navigation lights Landing and taxi lights Interior panel lighting Flashlight (Personal equipment) Night VFR placard

NOTE :

Refer to the prevailing regulation, which can evolve anytime.

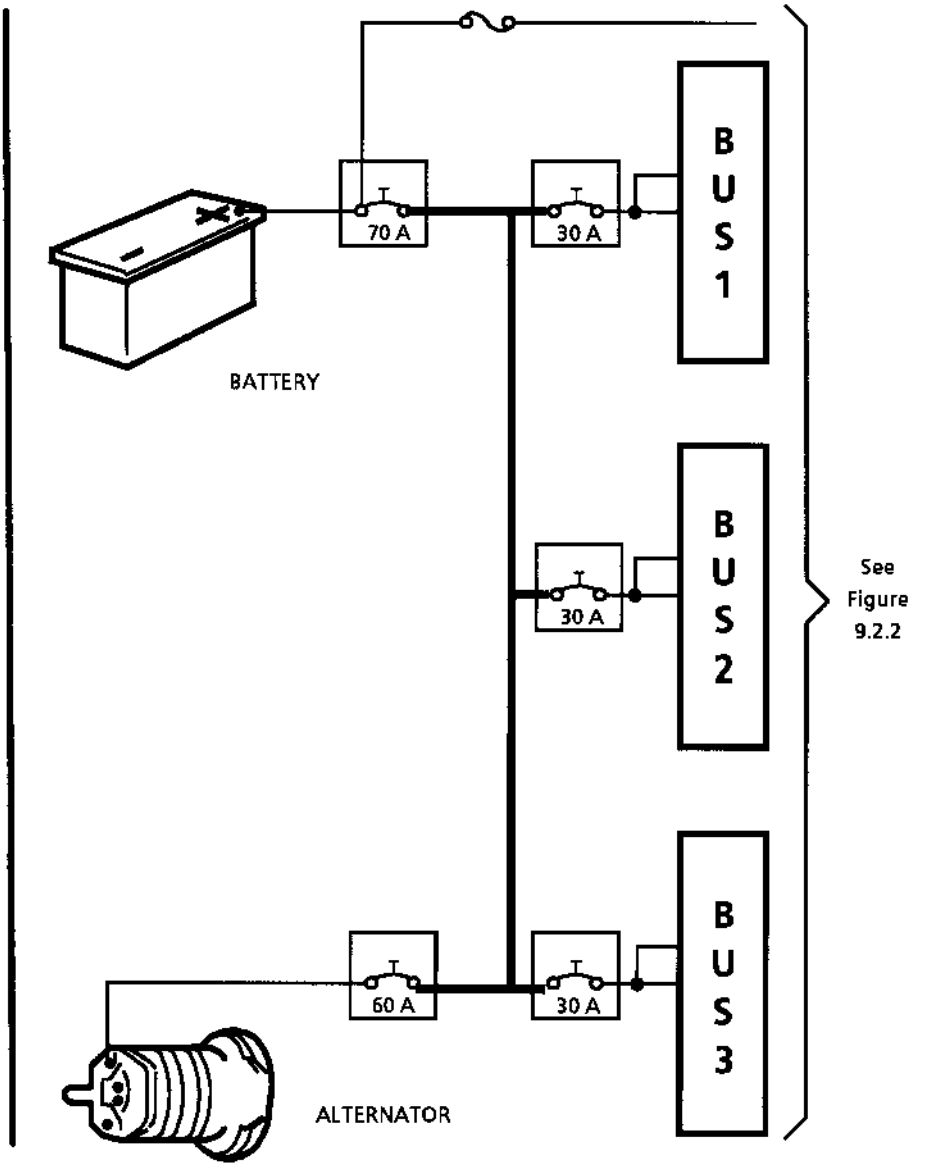


Figure 9.2.1 - BUS BARS POWER SUPPLY

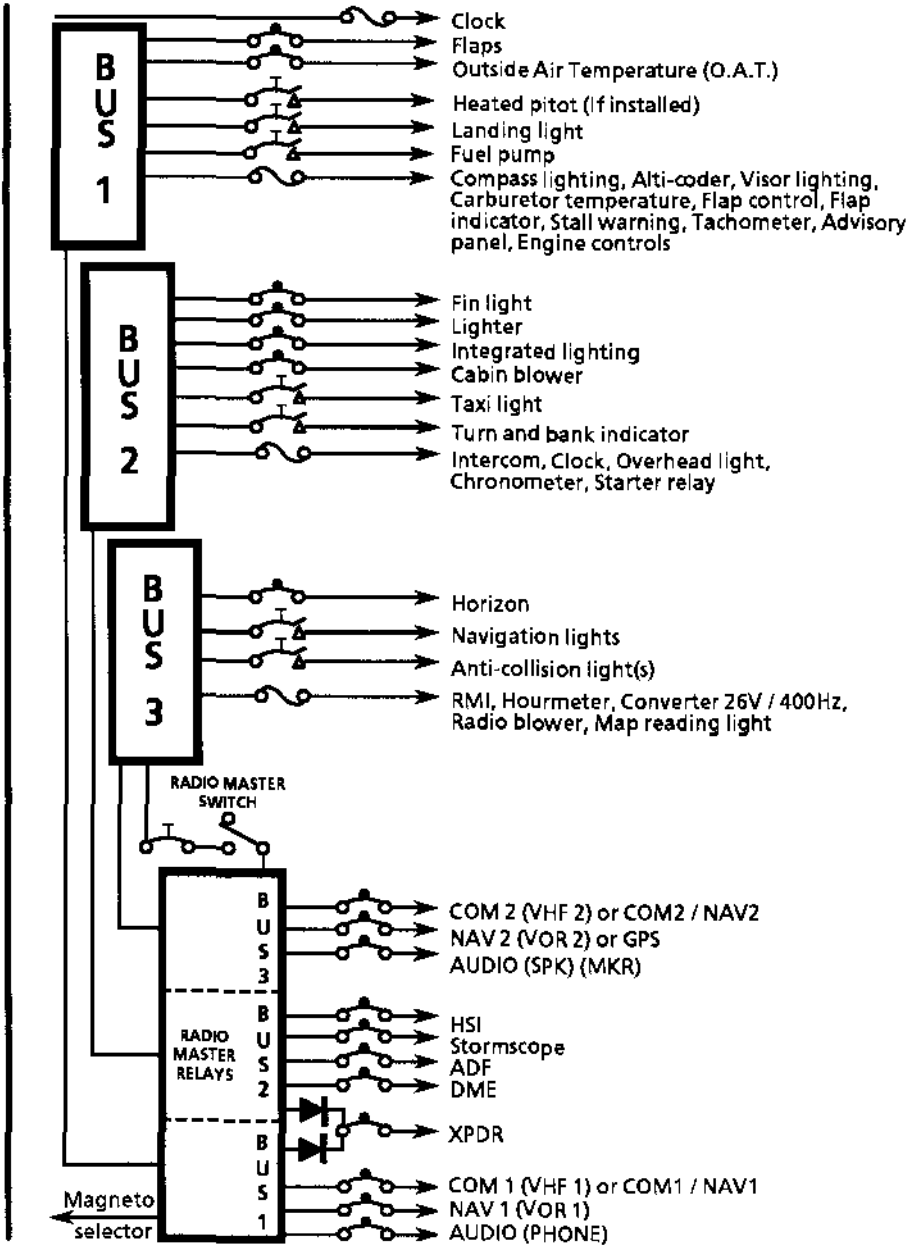


Figure 9.2.2 - POWER DISTRIBUTION IN VFR

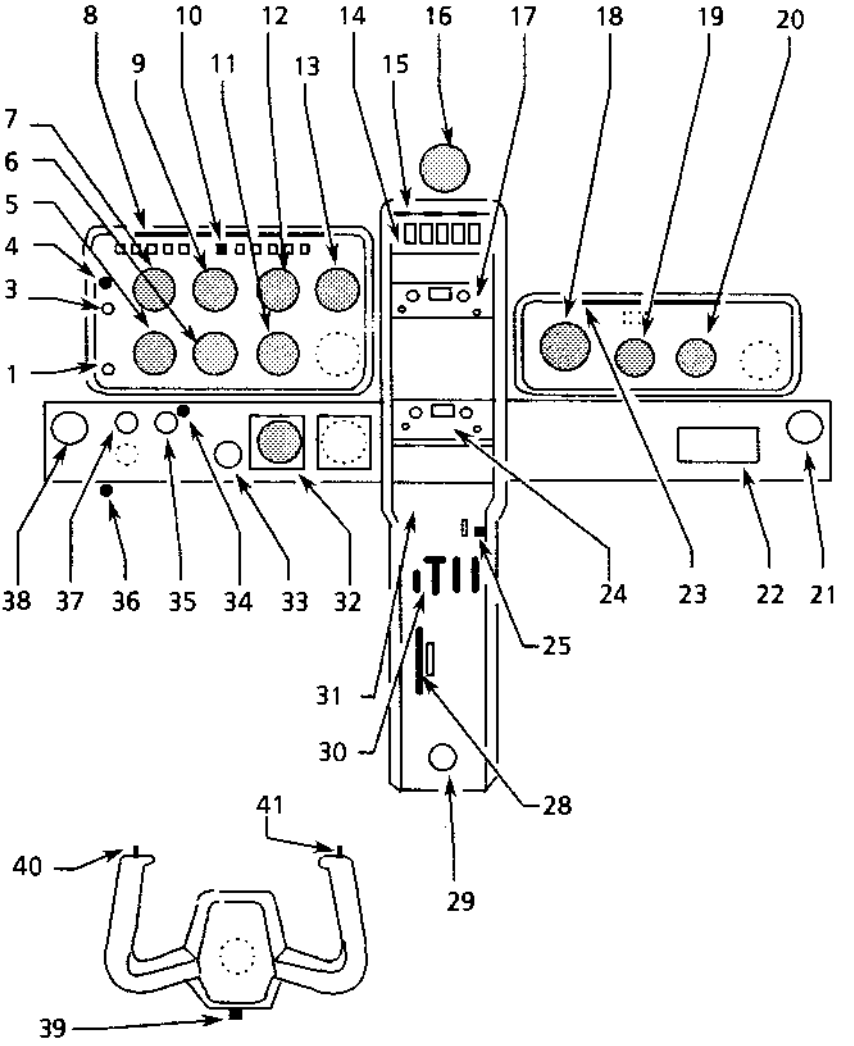


Figure 9.2.3 - EXAMPLE OF NARCO VERSION INSTRUMENT PANEL « VFR »

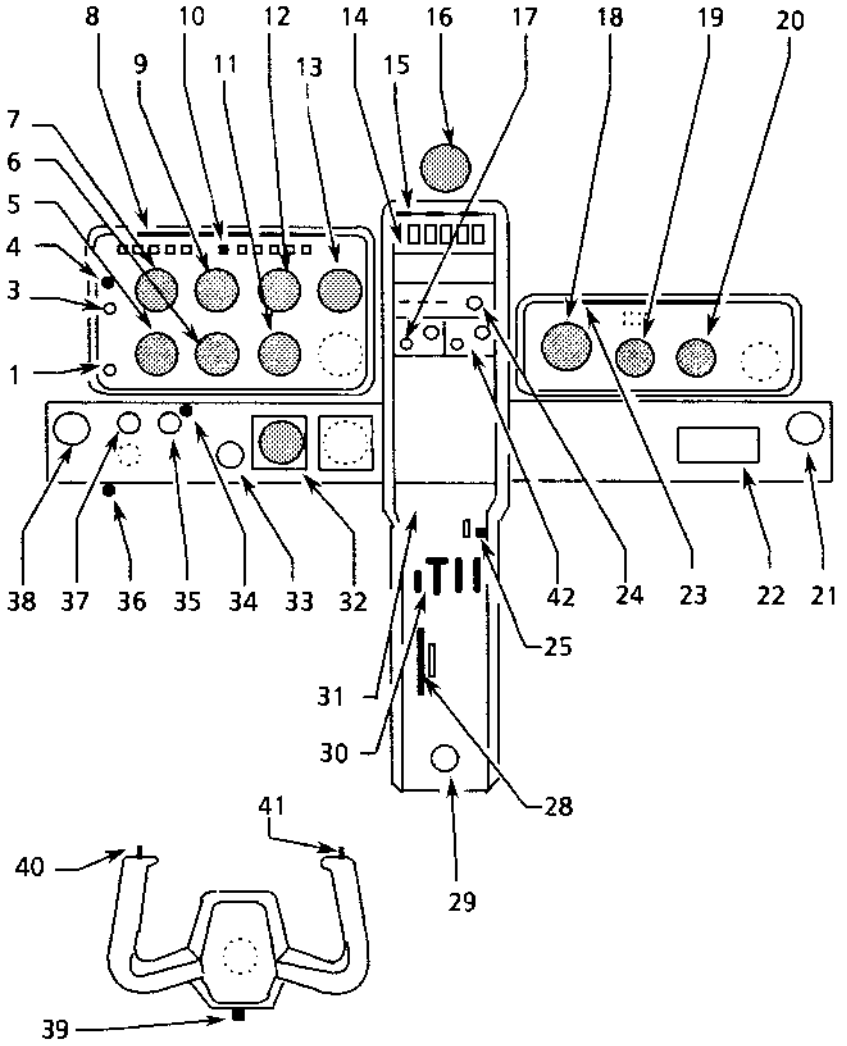


Figure 9.2.3A - EXAMPLE OF KING VERSION INSTRUMENT PANEL « VFR »

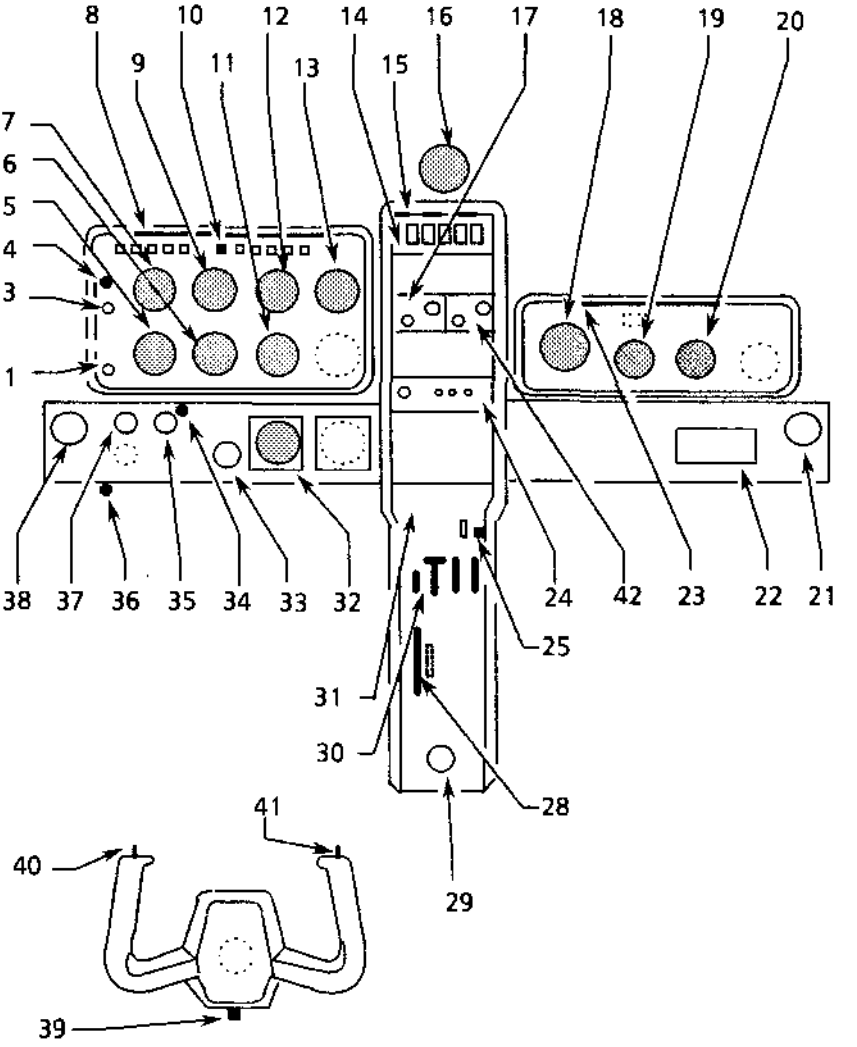


Figure 9.2.38 - EXAMPLE OF COLLINS VERSION INSTRUMENT PANEL « VFR »

INSTRUMENT PANEL EXAMPLE (NARCO, COLLINS or KING)

1 - Normal lighting control
3 - Instruments and radio lighting control
4 - Emergency radio beacon switch (if installed)
5 - Illuminated turn and bank indicator
6 - Illuminated directional indicator
7 - Illuminated true airspeed indicator
8 - L.H. instrument panel visor lighting
9 - Illuminated horizontal attitude indicator
10 - Pitot heat indicator light
11 - Illuminated vertical speed indicator
12 - Illuminated altimeter (Std)
13 - VOR indicator (COLLINS - KING)
13 - VOR receiver-indicator (NARCO)
14 - Engine controls panel (Std)
15 - Radio support visor lighting
16 - Illuminated compass
17 - VHF 1
18 - Illuminated tachometer
19 - Manifold pressure gage
20 - Illuminated combination CHT / EGT
21 - R.H. vent (Std)
22 - Cabin air selector (Std)
23 - R.H. instrument panel visor lighting
24 - Radio compass
25 - Wing flaps control and indicator
28 - Pitch trim illuminated control wheel and indicator
29 - Fuel selector (Std)
30 - Engine controls (Std)
31 - Switch-breakers for turn and bank indicator, anti-collision, navigation lights, heated pitot and landing lights
32 - Illuminated ADF indicator
33 - Parking brake knob (Std)
34 - L.H. subpanel post light
35 - Vacuum system suction gage

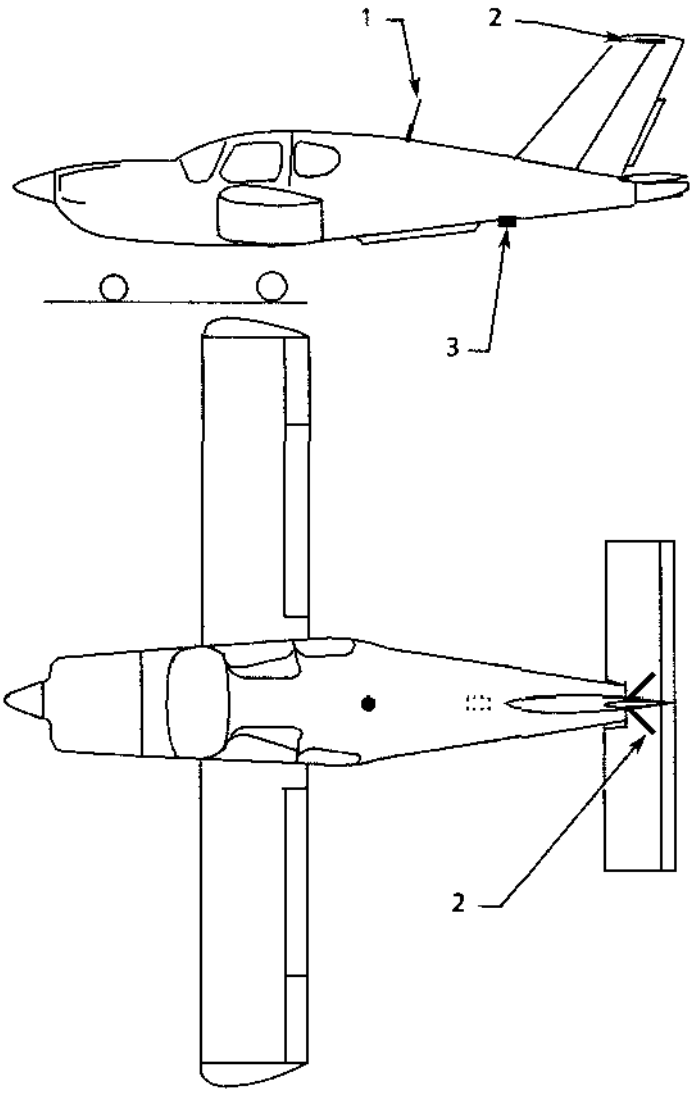


Figure 9.2.4 - ANTENNAS

INSTRUMENT PANEL EXAMPLE (Cont.)

36 - Circuit-breakers panel post light
37 - Magneto / start switch (Std)
38 - L.H. vent (Std)
39 - Maps reading light (if installed)
40 - Push-to-talk switch
41 - Maps reading light switch
42 - VOR / LOC receiver (KING - COLLINS)

LIGHTING DEVICES

INSTRUMENT PANELS LIGHTING

- See Figure 9.2.3.
- Controlled and modulated by "Normal" and "Radio" controls.

CABIN LIGHTING

- Overhead light (Manual).

ANTENNAS

1 - VHF antenna

2 - VOR antenna

3 - Radio compass - loop and sense antenna.

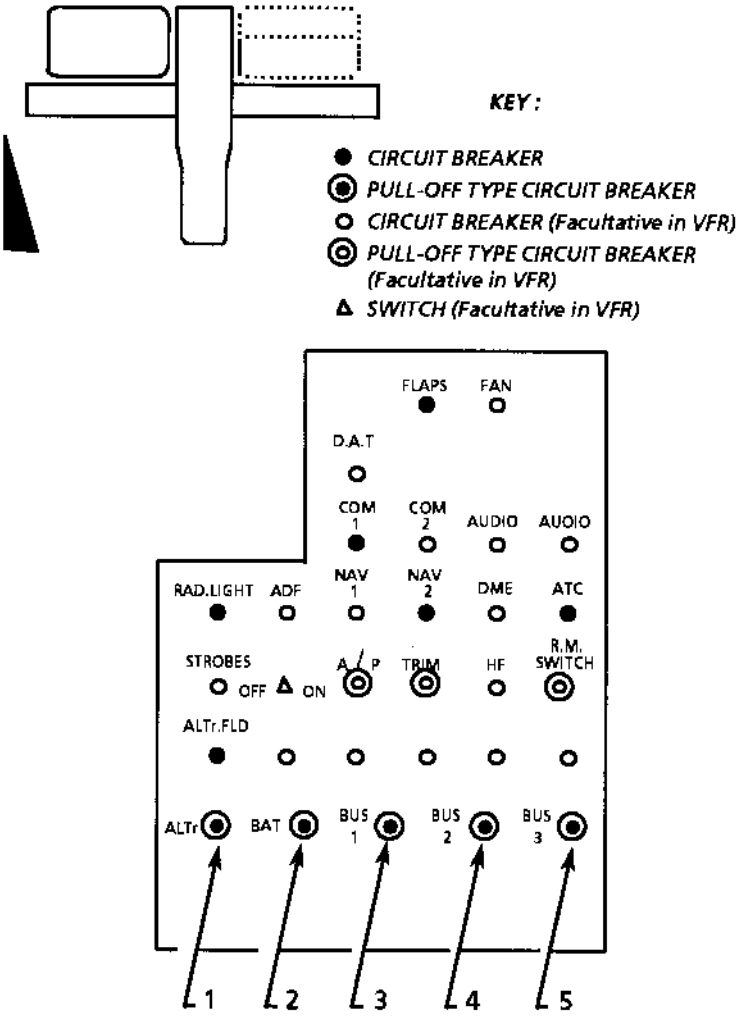


Figure 9.2.5 - CIRCUIT BREAKERS ASSEMBLY
(Typical arrangement)

CIRCUIT-BREAKERS ASSEMBLY

1 - Alternator "Pull-off" type circuit-breaker (60 A)

2 - Battery "Pull-off" type circuit-breaker (70 A)

3 - Bus bar 1 "Pull-off" type circuit-breaker (30 A)

4 - Bus bar 2 "Pull-off" type circuit-breaker (30 A)

5 - Bus bar 3 "Pull-off" type circuit-breaker (30 A)

INTENTIONALLY LEFT BLANK

SECTION 2
LIMITATIONS

The installation and the operation of the night VFR equipment do not change the basic limitations of the airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook.

PLACARDS

This placard is located near the instruction plate :

FLIGHT CONDITIONS : DAY AND NIGHT VFR
ICING CONDITIONS NOT ALLOWED

This placard is located on L.H. instrument panel :

CAUTION : DURING ILS APPROACH
AVOID ENGINE RPM HIGHER THAN 2600

SECTION 3
EMERGENCY PROCEDURES

These procedures complete those of standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

LIGHTING FAILURE

- Check that radio and instrument lighting circuit breaker is "ON".
- Use the flashlight and the overhead light if necessary.

NOTE :
The panel lighting (underneath the instrument panels' visors) and the radio / instruments lighting have separated circuits. Then a simultaneous failure of both lightings is unlikely except in case of a total electrical failure.

LANDING LIGHT FAILURE

The left light has a wide beam and is considered a taxi light, and the right has a narrow beam and is considered a landing light, but either or both can be used as desired.

When landing without lights, it is suggested to use the same pitch attitude as that required to maintain the ILS Glide Slope.

FIRE OR SMOKE OF ELECTRIC ORIGIN

- Disengage "pull-off" type circuit-breaker of bus bars 1, 2, 3.
- After a few moments reset "pull-off" type circuit-breakers in the numerical order with a delay between each operation for observation. Disengage the faulty bus bar and disconnect all the equipment supplied by the latter. See Figure 9.2.2.
- Reset "pull-off" type circuit-breaker and reconnect one after the other all the disconnected equipment until the faulty equipment is found and isolated. Leave the "pull-off" type circuit-breaker for this item tripped.

VACUUM SYSTEM FAILURE

Vacuum below green arc or zero : Pneumatically operated horizontal attitude and / or directional gyro / HSI inoperative. Electric turn and bank indicator and magnetic compass continue normal operation.

Fly the airplane carefully in partial panel mode, and proceed with landing as soon as possible.

SECTION 4
NORMAL PROCEDURES

These procedures complete those of standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

4-1 - PROCEDURES FOR VFR NIGHT FLIGHT

FIRST STEPS

Study the meteorology in order to avoid flying in hazardous conditions (minima, icing...).

Check that fuel level is sufficient to comply with regulations.

BEFORE FLIGHT (may be undertaken or continued at night)

Check operation :

. of anti-collision light
. of navigation lights
. of cabin lighting (instrument panels and instruments)
. of landing lights
. of day / night selector switch.

A flashlight must be provided on board the airplane.

TAXIING

Check operation of gyroscopic instruments by performing alternate turns :

- Horizontal attitude indicator - set miniature airplane as required
- Directional indicator - correct rotation
- Turn and bank indicator - proper direction.

At night, preferably use only the taxi light (left landing light).

BEFORE TAKE-OFF

- Check suction gage in green arc
- Check VHF
- VOR or radiocompass
- At night or in damp weather, set the air conditioning system to maximum demisting.

LINED UP ON RUNWAY

Check directional gyro heading and horizontal attitude gyro bar.

At night, turn on landing lights as required.

TAKE-OFF

See Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

Always maintain a positive rate of climb.

At night, switch off landing lights when safely airborne.

CLIMB, CRUISE AND DESCENT

See Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

Beware of the risk of eye-sight problems above 8000 feet (without oxygen).

ILS APPROACH (pre-setting)

These values are given for a weight of 2337 lbs (1060 kg).

In order to facilitate air traffic, it is advisable to proceed with final approach at VIAS = 86 / 92 KIAS - 99 / 106 MPH IAS with flaps retracted.

In short final run, fully extend the flaps, VIAS will then drop to 70 / 76 KIAS - 81 / 87 MPH IAS. It is not necessary to modify the power to maintain the angle of descent.

	Wing flaps	KIAS	MPH IAS	Propeller RPM	Vert. Sp. indicator ft/min
Holding	0°	86 / 92	99 / 106	2350	0
ILS Approach	0°	86 / 92	99 / 106	2000	- 450
Final	25°30'	70 / 76	81 / 87	As required	- 450

Figure 9.2.6 - PRE-SETTINGS, ILS APPROACH

ILS approach with KING ILS

"Erratic deviations have been observed with airplane flown down an ILS path with KING RADIO-NAV installations. Analysis of the phenomenon indicates that the fluctuations are due to an interference between propeller rotation frequency and one of LOC frequencies. The more sensitive conditions are met when the localizer beacon is right ahead and the engine speed is adjusted toward 2650 RPM.

The localizer use is not significantly impaired by the phenomenon when :

- engine speed is reduced to lower than 2600 RPM
- localizer beacon lies right or left by more than 30 degrees from airplane heading.

Autopilot APR mode operation should be discontinued whenever high engine power settings are anticipated. This can be done by switching to HDG mode or CWS mode or by switching off the autopilot. Of course from above one understands that REV mode or BCK COURSE mode are not concerned by this limitation after take-off (loc. beacon lies 180° from airplane heading in this case)."

LANDING

At night, preferably use the R.H. landing light (long range) or both lights simultaneously.

4-2- USE OF AVIONICS

TRANSMISSION

Transmission may be made either through the hand microphone, or through the headset boom microphone with its push-to-talk-switches located on the control wheels. Headsets that will not be used should be unplugged.

RECEPTION

The loud-speaker is the main equipment, the headset being considered as a stand-by equipment.

A selector switch selects reception on the loud-speaker or headset.

On headset operation, all receptions are simultaneous.

LIGHTING

Two controls are located on the left side of the L.H. instrument panel. See Figure 9.2.3 :

- Lower control (normal)

  Controls and modulates lighting of L.H. and R.H. instrument panels' visors.

- Upper control (radio-equipment) operates and modulates :

  . Radio equipment lighting

  . Instruments and indicators lighting on instrument panel

  . Circuit-breakers panel lighting

NOTE :

Both "normal" and "radio-equipment" controls 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" turning counterclockwise.

LANDING LIGHTS

The lights are controlled by two switch-breakers. See Figure 7.5 of the basic Pilot's Operating Handbook.

The L.H. light has a wide beam which facilitates taxiing.

The R.H. light has a long range beam and should be used for take-off and landing.

Simultaneous operation is possible.

DAY / NIGHT DIMMER

A day / night switch allows the indicator lights for the fuel pump, pitot heater and landing lights to be dimmed during night operations.

SECTION 5

PERFORMANCE

The installation and the operation of the night VFR equipment do not change the basic performance of the airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.
However, the installation of the externally mounted antennas will result in a minor reduction in cruise performance. See Section 5 "Performance" of the basic Pilot's Operating Handbook.

SUPPLEMENT

GROUND POWER RECEPTACLE

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

The ground power receptacle permits the use of an external power source for cold weather starting and during lenghty maintenance work on the electrical and avionics equipment. The receptacle is located under the baggage compartment access door, near the anti-twist edge.

NOTE :
If no avionics equipment is to be used or worked on, the avionics power switches should be turned off or the circuit breakers should be released or, if installed, set "Radio Master" switch to OFF.
If maintenance is required on the avionics equipment, it is advisable to utilize a battery cart external power source to prevent damage to the avionics equipment by transient voltage.

NOTE :
The auxiliary power source relay disconnects battery automatically, when the ground power receptacle is powered. Therefore it is impossible to service battery without having removed it from the airplane.

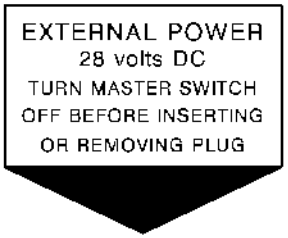
SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook.

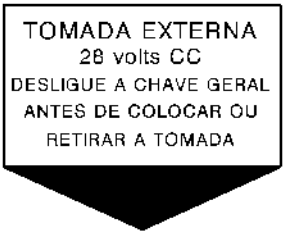
PLACARDS

The following placards are located above the ground power receptacle access door :

I411200DAAAIWZ8101



Valid for English speaking countries



Valid for Brazil

SECTION 3

EMERGENCY PROCEDURES

The installation and the operation of the ground power receptacle do not change the basic emergency procedures of the airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereaffer supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook.

Engine starting using auxiliary power does not change the basic procedures, however :

WARNING

IF THE BATTERY HAS BEEN REMOVED, BEFORE CONNECTING THE AUXILIARY POWER SOURCE, ISOLATE ELECTRICAL HARNESS TERMINAL LUGS USING RUBBER OR PLASTIC OR CHECK THEIR ISOLATION

CAUTION

IT IS RECOMMENDED TO LET THE ENGINE RUN WITH THE AUXILIARY POWER ONLY IF THE "RADIO MASTER" IS OFF.

Airplanes not equipped with the "Radio Master" switch

The avionics power switches should be turned off.

Airplanes equipped with the "Radio Master" switch

Electrical power supply of radio communication and radio navigation systems is automatically cut off during engine starting sequence.

All

WARNING

WHEN TURNING ON THE MAIN SWITCH, USING AN EXTERNAL POWER SOURCE, OR PULLING THE PROPELLER THROUGH BY HAND, TREAT THE PROPELLER AS IF THE MAGNETO SWITCHES WERE ON : DO NOT STAND, NOR ALLOW ANYONE ELSE TO STAND, WITHIN THE ARC OF THE PROPELLER, SINCE A LOOSE OR BROKEN WIRE, OR A COMPONENT MALFUNCTION, COULD CAUSE THE ENGINE TO START

The ground power receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground power receptacle is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the electrical system, thereby preventing any damage to electrical equipment.

The following check should be made after starting engine and removing the external power source, if there is any question as to the condition of the battery.

(1) Main switch - OFF.

(2) Taxi and landing lights switch-breakers - ON.

(3) Engine RPM - REDUCE to idle.

(4) Main switch - ON (with taxi and landing lights ON).

(5) ALTr FLD switch-breaker - ON.

(6) Engine RPM - INCREASE to approximately 1500 RPM.

(7) Voltmeter - CHECK.
If the voltmeter is in red sector or, Post-MOD.182, if V < 24 Volts (VDC lamp illuminated) : remove the battery for servicing.

(8) Lights switch-breakers - OFF.

SECTION 5
PERFORMANCE

The installation and the operation of the ground power receptacle do not change the basic performance of the airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SUPPLEMENT

"BFG" WX-1000 / 1000+ OR WX-900 OR WX-500 STORMSCOPE

TABLE OF CONTENTS

"BFG" WX-1000 / WX-1000+ OR WX-900 OR WX-500
STORMSCOPE

SECTION 1

GENERAL

This supplement supplies information to the pilot about limitations, normal and emergency procedures when the optional "BFG" WX-1000/1000+ or WX-900 or WX-500 stormscope is installed on the SOCATA TB airplanes. The stormscope must be used within limits of this supplement.

SECTION 2

LIMITATIONS

These limitations supplement those of standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook.

The "BFG" WX-1000/1000+ or WX-900 or WX-500 stormscope systems signal displays are not intended for the purpose of penetrating thunderstorm areas or areas of severe turbulence ; such intentional use is prohibited.

NOTE :
Range selector determines receiver sensitivity and therefore relative range. Displayed range is based on signal strength and is not to be used for accurate determination of thunderstorm location.

The "BFG" WX-1000/1000+ stormscope systems check-list functions are for reference only.

CAUTION

THE STORMSCOPE MUST NOT BE USED FOR THUNDERSTORM PENETRATION

- The "BFG" Stormscope Pilot's Handbook, Range II, No. 75-0299-7690-1 (WX-1000/1000+)

or

- The WX-900 Pilot's guide, No. 78-8060-6027-9

or

- The WX-500 Pilot's guide, No. 009-11501-001 with :
  - the KMD 550/850 Multi-function Display Pilot's Guide No. 006-18222-0000

  or

  - the "GARMIN" GNS 530 Pilot's Guide, No. 190-00181-00,

at their last revision, shall be readily available to the pilot, each time the "BFG" stormscope operation is foreseen.

SECTION 3

EMERGENCY PROCEDURES

Installation and operation of "BFG" WX-1000/1000+ or WX-900 or WX-500 stormscope systems do not change the basic emergency procedures of the airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

SECTION 4

NORMAL PROCEDURES

Normal operating procedures are outlined in the "BFG" WX-1000/1000+ stormscope Pilot's Handbook, Range II, No. 75-0299-7690-1 at last revision.

Normal operating procedures are outlined in the "BFG" WX-900 stormscope Pilot's Guide, Range II, No. 78-8060-6027-9 at last revision.

Normal operating procedures are outlined in the "BFG" WX-500 stormscope Pilot's Guide, Range II, No. 009-11501-001 at last revision.

SECTION 5

PERFORMANCE

Installation and operation of "BFG" WX-1000/1000+ or WX-900 or WX-500 stormscope systems do not change the basic emergency procedures of the airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT		EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	34 - NAVIGATION				
A	Stormscope (on panel strip) (J820 00M)	WX-1000	BFG	15.432 (7.000)	83.07 (2.11)
A	Stormscope (on R.H. instrument panel) (J820 10M)	WX-1000	BFG	15.432 (7.000)	83.07 (2.11)
A	Stormscope (J828 00M)	WX-1000+	BFG	15.432 (7.000)	83.07 (2.11)
A	Stormscope (with converter assy) (J828 10M)	WX-1000+	BFG	15.432 (7.000)	83.07 (2.11)
A	Stormscope (J918 00M)	WX-900	BFG	4.806 (2.180)	85.43 (2.17)
A	Stormscope (OPT10 34502A)	WX-500	BFG	4.960 (2.250)	117.32 (2.98)

SECTION 7

DESCRIPTION

The "BFG" (Series II) WX-1000/1000+ or WX-900 or WX-500 stormscope weather mapping systems provide a visual screen readout of the electrical discharges associated with thunderstorms. This information with proper interpretation, will allow the pilot to detect severe thunderstorm activity. Stormscope information (dots or strike points according to stormscope type) will be displayed on the screen to indicate the electrical discharge areas.

Stormscope information may be displayed on two selectable views : 360° view of surrounding airspace and 120° view of forward airspace only (WX-1000/1000+ or WX-500).

The display scope provides full scale selectable ranges of :

- 200, 100, 50 and 25 nautical miles (WX-1000/1000+ or WX-500)
- 100, 50 and 25 nautical miles (WX-900).

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A

"OPTIONAL EQUIPMENT No. J870 00 - J870 30 - J870 40"

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the aircraft is equipped with the option "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A.

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB 20 aircraft is equipped with the option "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A.

Using information provided by satellites ("GARMIN" 100 AVD is able to track up to 8 satellites at a time), GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base (two different data bases are available : North American base or international base). The data base has to be updated every 28 days.

Each data base contains information about airports, communication frequencies, VORs, NDBs, intersections, flight service stations ...

There is also room for up to 100 user defined waypoints and 10 different flight plans.

SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A.

GPS "GARMIN" 100 AVD is installed in accordance with FAA notice 8110.47 dated 23 April 93.

This equipment is approved for use as a VFR navigation system for en route and terminal area only. Therefore, GPS navigation must be crosschecked with usual means.

Data base updating must be verified before each flight.

GPS "GARMIN" 100 AVD is not approved for navigation as a primary source.

Figure 9.25.1 - GPS limitation placard

"GARMIN" 100 AVD Owner's Manual at its latest revision shall be readily available to the pilot whenever the operation of the GPS navigation system is predicted.

SECTION 3
EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard aircraft described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A.

If "GARMIN" 100 AVD GPS information is flagged (Flag "NAV" on HSI), revert to remaining operational navigation equipment. Press the 

button-switch to select the NAV 1 navigation source.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A.

Normal operating procedures of the "GARMIN" 100 AVD GPS are outlined in the "GARMIN" 100 AVD Owner's Manual at the latest revision.

However, it is essential to precise the following points :

SET UP CONDITIONS

- Verify if the data base is current.
- Check that CDI settings are as follows :
  . CDI scale > ± 5.00 (Section II.3 of the Owner's Manual).
  . STEER TO > D - BAR (Section II.3 of the Owner's Manual).
- Check tone setting : MSG and key or MSG only (Section II.5 of the Owner's Manual).
- Check that MAP DATUM is WGS 84 or as indicated on the navigation charts used (Section II.7 of the Owner's Manual).
- Check that OUTPUT parameter is set to AVIATION (Section II.7 of the Owner's Manual).

SYSTEM ANNUNCIATOR

The system annunciator is located above the ADI.

MESSAGE (MSG) - Will flash to alert the pilot of a situation that requires attention. It also generates an audible tone to alert the pilot of the message. Messages that require immediate attention such as an arrival alarm or a loss of GPS data generate a quick tone that will not stop until MSG key is pressed. All other messages generate a slow tone that will cease after 15 seconds.

SYSTEM SWITCHES

NAV 1 / GPS - This button-switch is used for selecting data to be presented on the pilot's HSI, either NAV data from the number one navigation receiver or GPS data from the "GARMIN" 100 AVD GPS.

The NAV 1 / GPS button-switch is located above the ADI.

PILOT'S DISPLAY

Left / right steering information is provided via the course deviation indicator on the pilot's HSI as a function of the source selected with the NAV 1 / GPS button-switch position.

GPS navigation parameters are presented on the HSI as :

- desired track (DTK) information,
- cross track error (XTK).

About one minute prior to reaching a waypoint, MSG alarm lights on, audio warning is on for 15 seconds. The message "Approaching waypoint" can be displayed.

As HSI is not slaved to DTK GPS output, it is necessary to adjust manually the selected course of the HSI to the present DTK of the navigation leg. This has to be made when crossing a waypoint.

FLIGHT DIRECTOR / AUTOPILOT COUPLED OPERATION

Whether the NAV 1 / GPS button-switch is selected on GPS data or NAV data engaging the NAV mode on the autopilot mode controller will make the FD appear, using selected course and left / right steering information presented on the HSI.

The autopilot is coupled to the HSI when AP is engaged on the mode controller.

WARNING

WHEN CROSSING A WAYPOINT, WITH THE AUTOPILOT ENGAGED ON NAV MODE AND USING GPS DATA, IF THE COURSE POINTER IS NOT ADJUSTED AT THE VALUE OF THE NEW DESIRED TRACK AND IF THE COURSE CHANGE IS MORE THAN 5°, THE FLIGHT DIRECTOR AND AUTOPILOT WILL STEER A DIVERGENT ROUTE AFTER THE WAYPOINT.

NOTE :
When the HSI is selected on GPS navigation source, the RMI remains selected on NAV 1 or NAV 2 source.

CAUTION

"GARMIN" 100 TURN OFF

THE "GARMIN" 100 AVD GPS HAS AN INTEGRATED BATTERY PACK. WHEN SELECTING RADIO MASTER SWITCH OFF AT ENGINE SHUT DOWN, GPS STAYS ON, USING THE BATTERY PACK.
PRESS AND HOLD THE OFF / DIM SIDE OF THE ON / OFF KEY FOR 3 SECONDS UNTIL THE DISPLAY IS BLANK.

SECTION 5
PERFORMANCE

Installation and operation of the "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A do not change the performance of the aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6
WEIGHT AND BALANCE

Weight and balance corresponding to the "GARMIN" 100 AVD GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A are given in the optional equipment list attached to Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

SECTION 7
DESCRIPTION

Normal operating procedures are described in the "GARMIN" 100 AVD Owner's Manual at the latest revision.

CONTROLS - see Figure 9.25.2

The front panel consists of a 3-line, 22-character LCD display and 21 keys. Information displayed on the LCD is commonly referred to as a page.

Access to the pages is made by the keys on the left and bottom of the LCD. Alphanumeric keys on the right of the LCD are used to enter data.

The rocker key (← →) activates a cursor that can be moved on the page to locations called fields. This function is visible by an area of inverse video on the screen.

The CLR key erases information in the cursor field or toggles through several available options on a cyclic field.

ENT key completes the process of data entry and indicates approval.

ANNUNCIATORS - see Figure 9.25.3

The annunciators include :

- 1 amber warning light marked "MSG",
- 1 button-switch composed of :
  - . a green indicator light marked "NAV 1",
  - . a blue indicator light marked "GPS".

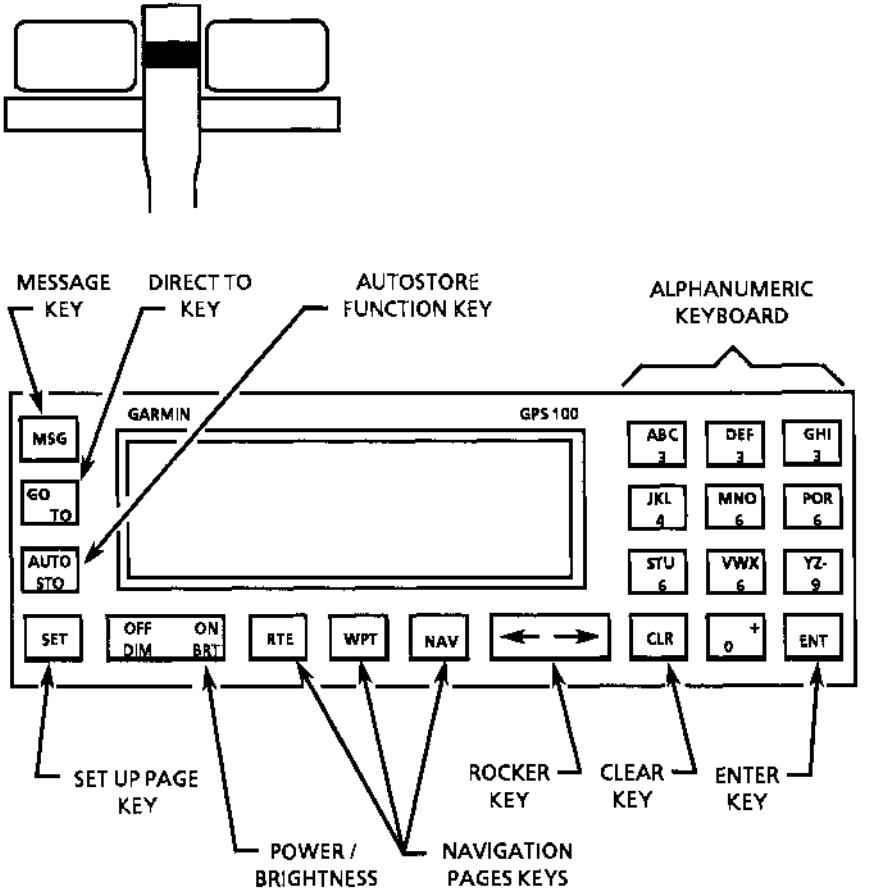
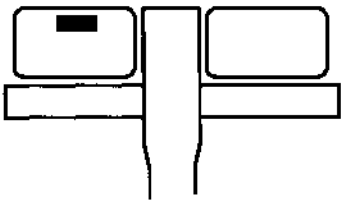


Figure 9.25.2 - Controls



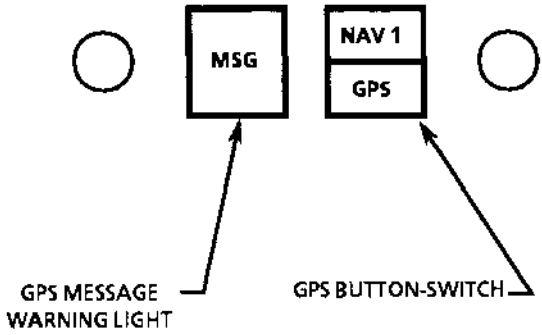


Figure 9.25.3 - GPS annunciators

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A

"OPTIONAL EQUIPMENT No. K860 10M - K860 30M - K860 40M"

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the aircraft is equipped with the option ""BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option ""BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 52SA".

Using information provided by satellites ("BENDIX / KING" KLN90A is able to track up to 8 satellites at a time), GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base (two different data bases are available : North American one or International one). The data base is housed in a cartridge plugged into the back of the KLN90A and is updated every 28 days by means of diskettes and a computer (a jack located on left lower panel provides a means of interfacing the KLN90A with the computer via an interface cable).

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, flight service stations ...

There is also room for up to 250 user defined waypoints and 26 different flight plans.

The KLN90A0 receives altitude code from the encoding altimeter.

SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option ""BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A".

Data base updating must be verified before each flight.

NOTE :
The KLN90A genuine data base is referenced to WGS 84 geodetic datum.

If the data base or chart are not referenced to WGS 84 or to NAD 83 geodetic datum, in the absence of agreed operating procedure, the GPS navigation must be disabled for terminal area.

GPS "BENDIX / KING" KLN90A is not approved for navigation as a primary source.

Figure 9.26.1 - GPS limitation placard

The navigation must be performed with the primary navigation means. In any case, GPS use is limited to "en route" and terminal areas.

"BENDIX / KING" KLN90A Pilot's Guide at its latest revision shall be readily available to the pilot whenever the operation of the GPS navigation system is predicted.

D.G.A.C. Approved

SECTION 3
EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard aircraft described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option ""BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A".

If KLN90A GPS information is flagged (Flag "NAV" on HSI) or GPS integrity (RAIM) capability is lost, revert to remaining operational navigation equipment. Press the NAV 1 / GPS button-switch to select the NAV 1 navigation source.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option ""BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A".

Normal operating procedures of the KLN90A GPS are outlined in the "BENDIX / KING" KLN90A Pilot's Guide at the latest revision.

However, it is important to precise the following points :

SET UP CONDITIONS

- Verify if the data base is current.

- Verify the baro setting.

- Set turn anticipation mode (SET / 6) to :
  . ENABLE (turn anticipation ENABLED) : recommended mode,
  . DISABLE (turn anticipation DISABLED) : not recommended mode.

- Check that the proper criteria are used for nearest airport selection.

COURSE DEVIATION INDICATOR

In any mode, the course deviation indicator sensitivity is plus or minus 5 Nm full scale.

NOTE :
Transmission on VHF 1 or 2 communication frequencies 121.15, 121.175, 121.20, 131.25, 131.275 and 131.30 MHz may adversely affect reception of the GPS signal. Transmissions in excess of 10 seconds may result in loss of GPS signal reception and WRN annunciator activation. Navigation will be restored within 5 seconds after the completion of the transmission. If UHF communication system is installed, the same behaviour can be observed on the first harmonic of the VHF frequencies, 242.30, 242.35, 242.40, 262.50, 262.55 and 262.60 MHz.

D.G.A.C. Approved

SYSTEM ANNUNCIATORS

The system annunciators are located above the main horizon :

1) WAYPOINT (WPT) - Prior to reaching a waypoint in the active flight plan, the KLN90A GPS will provide navigation along a curved path segment to ensure a smooth transition between two adjacent legs in the flight plan. This feature is called turn anticipation. Approximately 20 seconds prior to the beginning of turn anticipation the WPT annunciator will flash, going solid upon initialization of the turn, and extinguishing upon turn completion.

WARNING

TURN ANTICIPATION IS AUTOMATICALLY DISABLED FOR WAYPOINTS USED EXCLUSIVELY IN SID / STARS WHERE OVERFLIGHT IS REQUIRED. FOR WAYPOINTS SHARED BETWEEN SID / STARS AND PUBLISHED EN ROUTE SEGMENTS (REQUIRING OVERFLIGHT IN THE SID / STARS) PROPER SELECTION ON THE PRESENTED WAYPOINT PAGE IS NECESSARY TO PROVIDE ADEQUATE ROUTE PROTECTION ON THE SID / STARS.

2) MESSAGE (MSG) - Will flash to alert the pilot of a situation that requires attention. Press the MSG button on the KLN90A GPS to view the message (Appendix B of the KLN90A Pilot's Guide contains a list of all of the message page messages and their meanings).

3) WARN (WRN) - Annunciates that GPS integrity (RAIM) capability is lost.

NOTE :
The warning annunciator may be tested by pressing on "TEST" knob of the alarm panel.

SYSTEM SWITCHES

NAV 1
GPS - This button-switch is used for selecting data to be presented on the pilot's HSI, either NAV data from the number one navigation receiver or GPS data from the KLN90A GPS.

The NAV 1 GPS button-switch is located below the HSI.

D.G.A.C. Approved

PILOT'S DISPLAY

Left / right steering information is provided via the course deviation indicator on the pilot's HSI as a function of the source selected with the NAV 1 / GPS button-switch position.

EN ROUTE-LEG mode

When using the en route-leg mode, it is necessary to adjust manually the course indicator at the value of the desired track between two waypoints.

When the KLN90A is used with the TURN ANTICIPATION ENABLED, at the beginning of turn anticipation, WPT alert annunciator goes on steady, MSG annunciator begins flashing. At this time, the KLN90A will notify the pilot with a message on the Message Page of the new desired track to select on the HSI. This message will not be given if the course change is less than 5°.

CAUTION

IT IS RECOMMENDED TO USE KLN90A WITH TURN ANTICIPATION ENABLED

WHEN TURN ANTICIPATION IS DISABLED, waypoint alerting occurs approximately 35 seconds prior to actually reaching the waypoint. MSG annunciator remains OFF. There is no course change message displayed by the KLN90A.

When the KLN90A is used WITH TURN ANTICIPATION DISABLED, the "Super NAV 5" page allows a rapid visualisation of the aircraft position in horizontal navigation with regards to the route and the waypoints. It is strongly recommended to use this page.

EN ROUTE-OBS mode

When using the en route-OBS mode, it is also necessary to adjust manually the course indicator at the value of the OBS selected on the KLN90A. The desired track selection is made only from the KLN90A control box.

FLIGHT DIRECTOR / AUTOPILOT COUPLED OPERATION

The HSI can be coupled to KAP 100, KAP 150 or KFC 150 autopilots.

The NAV mode engagement on the autopilot mode controller arms the autopilot in navigation mode, using selected course and left / right steering information presented on the HSI. It makes the FD appear in the case of the KFC 150 autopilot.

When AP is engaged on the mode controller, the autopilot is coupled to the HSI.

WARNING

WHEN CROSSING A WAYPOINT, WITH THE AUTOPILOT ENGAGED ON NAV MODE AND USING GPS DATA, IF THE COURSE POINTER IS NOT ADJUSTED AT THE VALUE OF THE NEW DESIRED TRACK AND IF THE COURSE CHANGE IS MORE THAN 5°, THE FLIGHT DIRECTOR AND AUTOPILOT WILL STEER A DIVERGENT ROUTE AFTER THE WAYPOINT (EN ROUTE-LEG MODE SELECTED ON THE KLN90A).

NOTE :
When the HSI is selected on GPS navigation source, the RMI (if installed) remains selected on NAV 1 source (VOR or RNAV).

SECTION 5
PERFORMANCE

Installation and operation of the "BENDIX / KING" KLN90A GPS NAVIGATION SYSTEM INTERFACED WITH HSI KI 525A do not change the performance of the aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6
WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	ITEM No.	OPTIONAL EQUIPMENT	WEIGHT lb	ARM in.
A	K860 10M	GPS KLN 90A "KING" interfaced with HSI and A/P, with RMI	9.17	21.65
A	K860 30M	GPS KLN 90A "KING" interfaced with HSI, with RMI	9.17	21.65
A	K860 40M	GPS KLN 90A "KING" interfaced with HSI and A/P, without RMI (For export only)	9.17	21.65

SECTION 7
DESCRIPTION

Normal operating procedures are described in the "BENDIX / KING" KLN90A Pilot's Guide at the latest revision.

CONTROLS - see Figure 9.26.2

Controlled by two sets of concentric knobs and two cursor buttons, the KLN90A can present a variety of information in a number of different page formats.

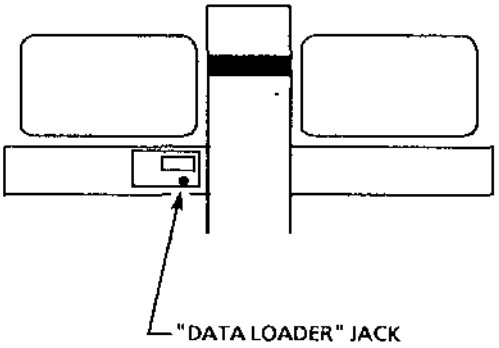
The various display types can be considered as chapters in a book, each chapter having as many as 26 numbered pages at once. With a few exceptions, each of these pages can be changed independently.

Generally the 2 concentric knobs and the cursor button to the left of the screen are used to select data on L.H. page, just as the right knobs and cursor on the right control the R.H. page.

The large outer knobs control the chapters and the small inner knobs turn the pages.

To change data in a page use the cursor function. This function is an area of inverse video on the screen brought up by depressing the cursor buttons.

Then rotate the outer knob to position the cursor and the inner knob to select the desired characters. Repeat this operation as many times as necessary and valid (ENT button).



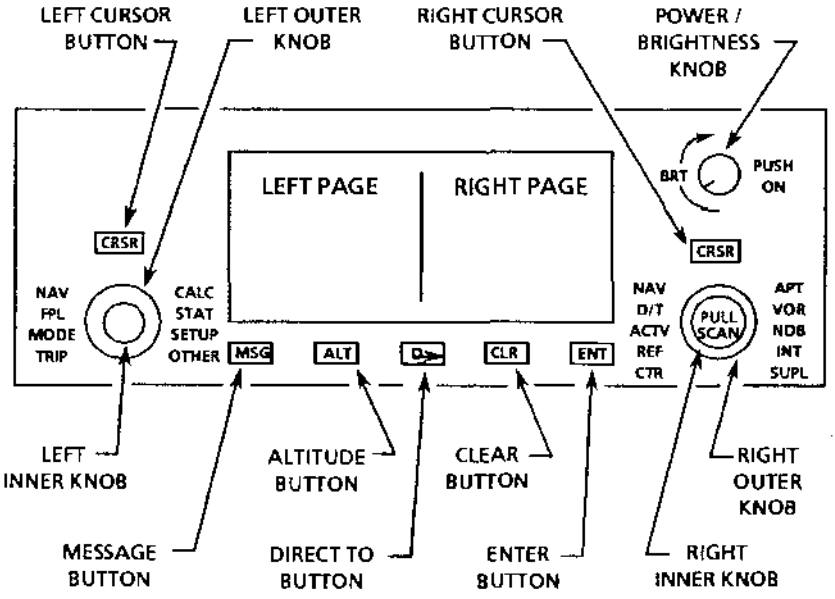
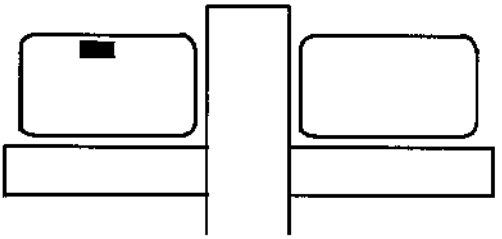


Figure 9.26.2 - Controls



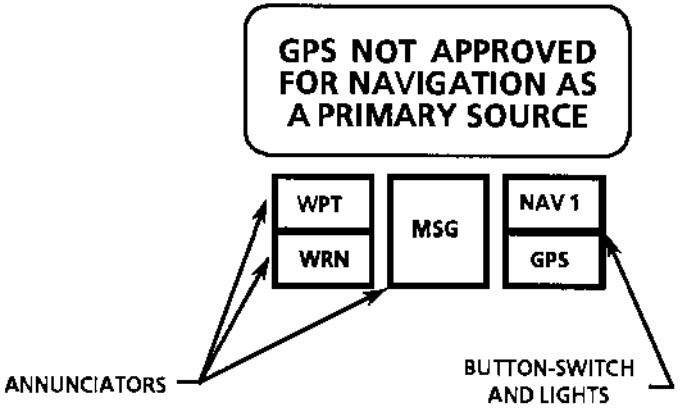


Figure 9.26.3 - GPS placard and annunciators

SUPPLEMENT

LOW NOISE EXHAUST

"OPTIONAL EQUIPMENT N° A890"

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the aircraft is equipped with the option "LOW NOISE EXHAUST".

SECTION 2
LIMITATIONS

The installation and the operation of the option "LOW NOISE EXHAUST" do not change the basic limitations of the aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook.

SECTION 3
EMERGENCY PROCEDURES

The installation and the operation of the option "LOW NOISE EXHAUST" do not change the emergency procedures of the aircraft described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter partially replace those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the aircraft is equipped with the option "LOW NOISE EXHAUST".

PREFLIGHT INSPECTIONS

AIRFRAME

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 play)
Air intakes	Clean
Oil pump breather	Unobstructed
Exhaust pipe	Check
Exhaust muffler	Check condition and attachment
Fuel filter draining	Fuel free of water and sediment
Fuel filter drain	Check CLOSED

SECTION 5

PERFORMANCE

The performance hereafter partially replace those of the standard aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

ACOUSTIC LIMITATION

With a noise level lower than the limit noise level by 5.5 dB (A) the TB 9 aircraft complies with Chapter 10, appendix 6, annex 16 of the agreement relative to International Civil Aviation Organization (ICAO).

The noise limit authorized in above-mentioned ICAO conditions is 84.0 dB (A).

The noise level which was determined in above-mentioned ICAO conditions at maximum continuous power and at 2645 RPM is 78.5 dB (A).

Consequently, according to above-mentioned ICAO conditions, the noise limitation type certificate is extended to SOCATA TB 9 aircraft equipped with the option Nr A890.

SECTION 6

WEIGHT AND BALANCE

The weight and balance hereafter complete those of the standard aircraft described in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb (kg)	ARM in (m)
		A - ENGINE & ACCESSORIES			
A	A89000M	LOW NOISE EXHAUST		14.33 (6,50)	15.75 (0,40)

SECTION 7
DESCRIPTION

The description hereafter partially replaces those of the standard aircraft described in Section 7 "Description" of the basic Pilot's Operating Handbook.

EXHAUST SYSTEM - see Figure 9.27.1

Exhaust gases from each cylinder are collected by pipes to be conducted, in order to reduce their noise level to an exhaust duct which is located at the front, crosswise under the power plant.

Then, exhaust gases route through a pipe under engine compartment R.H. side up to an additional muffler located longitudinally under the fuselage, in aircraft centerline. Then they are discarged in the atmosphere.

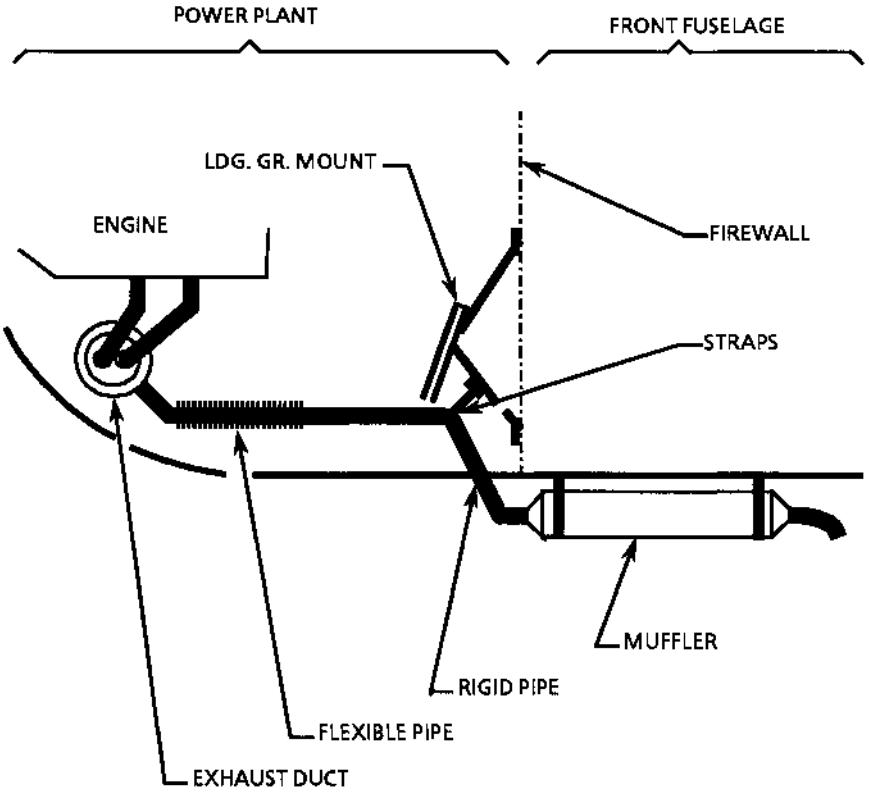


Figure 9.27.1 - EXHAUST SYSTEM (PRINCIPLE)

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"

OPTIONAL EQUIPMENT No. K920 00M

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"".

Using information provided by satellites ("BENDIX / KING" KLN89B is able to track up to 8 satellites at a time), GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base (three different data bases are available : Americas, Atlantic, Pacific). The data base is housed in a cartridge plugged into the front face of the KLN89B and is updated every 28 days by means of diskettes.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, SIDs, STARs, instrument approaches, flight service stations ...

There is also room for 500 user defined waypoints and 26 different flight plans.

CAUTION

IT IS STRONGLY ADVISED NOT TO LOAD USER WAYPOINTS IN DATA BASE IN TERMINAL AREA NAVIGATION DUE TO THE INCREASE OF WORK LOAD FOR THE PILOT

The KLN89B can receive altitude code from the encoding altimeter.

SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"".

Data base updating must be verified before each flight.

NOTE :
The original KLN89B data base is in accordance with the WGS84 geodetic model.

If the data base or the cartridge are not in accordance with WGS84 or NAD 83 geodetic model, and as there is no means of operation published, GPS navigation system must be disengaged in terminal area.

GPS "BENDIX / KING" KLN89B can only be used as a supplemental source for navigation in VFR (the instruments required for navigation in VFR must be available onboard).

GPS USED FOR NAVIGATION IN VFR ONLY

Figure 9.37.1 - GPS limitation placard

"BENDIX / KING" KLN89B Pilot's Guide at its latest revision shall be readily available to the pilot.

SECTION 3
EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"".

"MSG" ANNUNCIATOR ILLUMINATION

1 - "MSG" push-knob of KLN89B ..... **PRESS**

Check the message.

If the message mentions the loss of GPS system integrity (RAIM NOT AVAILABLE) :

2 - Continue the VFR flight with the primary sources of navigation (VOR, ADF...) if they exist.

When the system integrity is restored, the return to GPS mode must be accompanied by the validation of the followed and desired track concordance by using the other sources of navigation, if they exist.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"".

Normal operating procedures of the KLN89B GPS recommended by "BENDIX / KING" manufacturer are outlined in the "BENDIX / KING" KLN89B Pilot's Guide at the latest revision and KLN89B Memory Jogger at the latest revision.

However, it is important to precise the following points for the use of KLN89B on TB :

SET UP CONDITIONS

- The system must utilize ORS level 20 or later in compliance with the Pilot's Guide.
- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the KLN89B prior to flight.
- Set turn anticipation mode (SET / 4) to :
  - . ENABLE (turn anticipation ENABLED) : recommended mode,
  - . DISABLE (turn anticipation DISABLED) : not recommended mode.
- Check that the proper criteria are used for nearest airport selection (SET / 6).

COURSE DEVIATION INDICATOR

The course deviation indicator sensitivity is adjustable with a maximum value which is the default value selected by the KLN89B. It is recommended not to change the default value which is ± 5 NM full scale.

NOTE :
Transmission on VHF 1 or 2 communication frequencies 121.15, 121.175, 121.20, 131.25, 131.275 and 131.30 MHz may adversely affect reception of the GPS signal. Transmissions in excess of 10 seconds may result in loss of GPS signal reception. Navigation will be restored within 5 seconds after the completion of the transmission. If UHF communication system is installed, the same behaviour can be observed on the first harmonic of the VHF frequencies, 242.30, 242.35, 242.40, 262.50, 262.55 and 262.60 MHz.

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"MSG" message annunciator

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR ONLY FLASHES.

It will flash to alert the pilot of a situation that requires his attention. Press the "MSG" button on the KLN 90B GPS to view the message. (Appendix B of the KLN89B Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).
"MSG" annunciator is amber.

"WPT" Waypoint annunciator

Prior to reaching a waypoint in the active flight plan, the KLN89B GPS will provide navigation along a curved path segment to ensure a smooth transition between two adjacent legs in the flight plan. This feature is called turn anticipation. Approximately 20 seconds prior to the beginning of the turn anticipation, the "WPT" annunciator will flash, going solid upon initiation of the turn, and extinguishing upon turn completion.
"WPT" annunciator is amber.

"LEG" mode

The use of "LEG" mode is selected by the "OBS" button.

When the KLN89B is used with the TURN ANTICIPATION ENABLED, at the beginning of turn anticipation, WPT alert annunciator goes on steady, MSG annunciator begins flashing. At this time, the KLN89B will notify the pilot with a message on the Message Page of the new desired track . This message will not be given if the course change is less than 5°.

CAUTION

IT IS RECOMMENDED TO USE KLN89B WITH TURN ANTICIPATION ENABLED

WHEN TURN ANTICIPATION IS DISABLED, WAYPOINT ALERTING OCCURS APPROXIMATELY 35 SECONDS PRIOR TO ACTUALLY REACHING THE WAYPOINT. MSG ANNUNCIATOR REMAINS OFF. THERE IS NO COURSE CHANGE MESSAGE DISPLAYED BY THE KLN89B.

When the KLN89B is used WITH TURN ANTICIPATION DISABLED, the "Super NAV 5" page allows a rapid visualisation of the airplane position in horizontal navigation with regards to the route and the waypoints. It is strongly recommended to use this page.

"OBS" mode (selected by the "OBS" button)

The "OBS" mode has to be selected as follow :

- press the "OBS" button to select the "LEG" mode, then the "OBS" mode,
- when selecting the "OBS" mode, the active "WPT" of the "LEG" mode is chosen as reference "WPT" for the "OBS" mode.

SECTION 5
PERFORMANCE

Installation and operation of the ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"" do not change the performance of the aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6
WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	ITEM No.	OPTIONAL EQUIPMENT	WEIGHT lb	ARM in.
A	K920 00M	"BENDIX / KING" KLN89B GPS navigation system - "Stand Alone"	4.519	25.20

SECTION 7
DESCRIPTION

Normal operating procedures of the ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM - "STAND ALONE"" are described in the "BENDIX / KING" KLN89B Pilot's Guide at the latest revision.

CONTROLS - see Figure 9.37.2

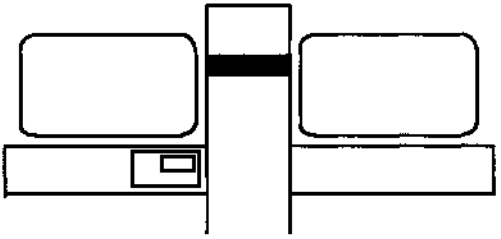
Controlled by one set including concentric knobs and one cursor button, the KLN89B can present a variety of information in a number of different page formats.

The various display types can be considered as chapters in a book, each chapter having some number of pages. With a few exceptions, each of these pages can be changed independently.

The large outer knob controls the chapters and the small inner knob turns the pages.

To change data in a page, use the cursor function. This function is an area that flashes on the screen brought up by depressing the cursor button.

Then rotate the outer knob to position the cursor and the inner knob to select the desired characters. Repeat this operation as many times as necessary and valid (ENT button).



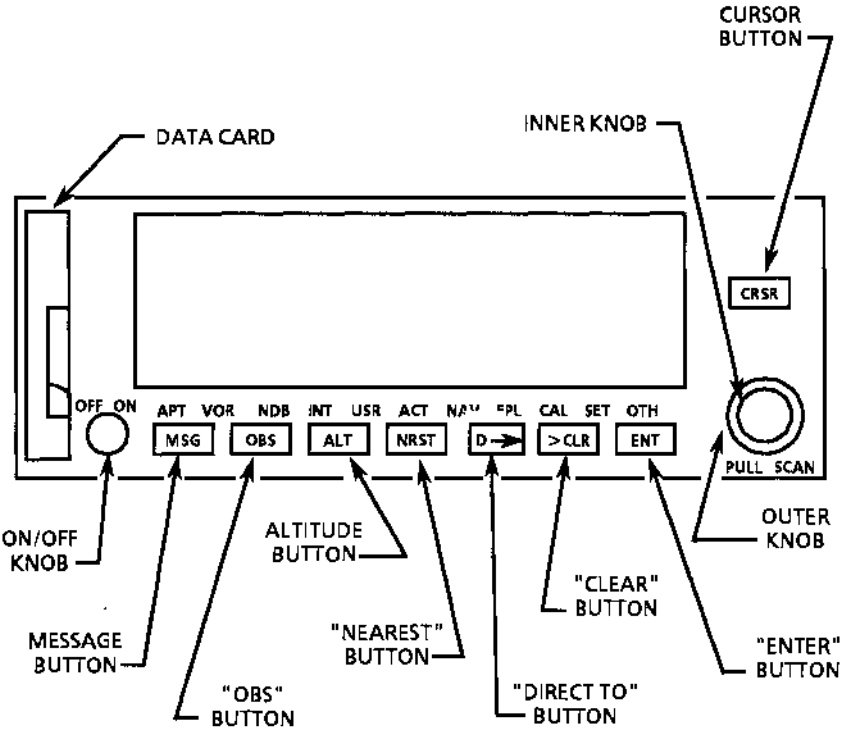
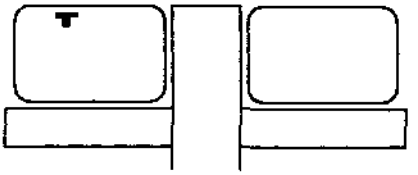
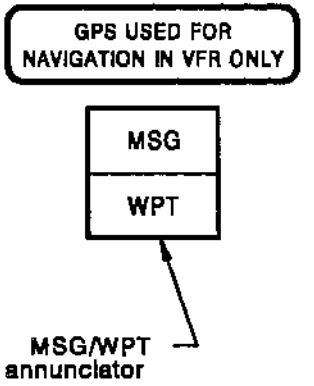


Figure 9.37.2 - Controls





H113006AAAPWZ9100

Figure 9.37.3 - GPS placard and annunciators

SUPPLEMENT

"GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"

OPTIONAL EQUIPMENT No. J925 00M

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"".

Using information provided by satellites ("GARMIN" 150 GPS is able to track up to 8 satellites at a time), GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base (three different data bases are available : Americas, International and Worldwide). The data base is contained in a NavData card plugged into the front face of the "GARMIN" 150 GPS and is updated every 28 days by means of new cards.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections ...

There is also room for 1000 user defined waypoints and 20 reversible flight plans.

The "GARMIN" 150 GPS can be connected to a "SHADIN" or "ARNAV" fuel flowmeter.

SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"".

Data base updating must be verified before each flight.

"GARMIN" 150 GPS can only be used as a navigation source in day VFR in sight of ground or water (the instruments required for navigation in VFR must be available onboard).

GPS USED ONLY FOR NAVIGATION IN DAY VFR IN SIGHT OF GROUND OR WATER

Figure 9.39.1 - GPS limitation placard

The GPS integrity is not ensured.

It is therefore the responsibility of the pilot to verify that its position is correct using the other available navigation sources.

"GARMIN" 150 GPS Pilot's Guide at its latest revision shall be readily available to the pilot.

SECTION 3
EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"".

"MSG" ANNUNCIATOR ILLUMINATION

1 - "STAT" button ..... **PRESS**

Check the message.

If the message mentions the loss of GPS system or part of the system :

2 - Continue the VFR flight with the primary sources of navigation (VOR, ADF...) if they exist.

When the system is restored, the return to GPS mode must be accompanied by the validation of the followed and desired track concordance by using the other sources of navigation, if they exist.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"".

Normal operating procedures of the "GARMIN" 150 GPS are outlined in the "GARMIN" 150 GPS Pilot's Guide at the latest revision.

However, it is important to precise the following points for the use of "GARMIN" 150 GPS on TB :

SET UP CONDITIONS

- Verify if the data base is current.
- Check that the proper criteria are used for nearest airport selection.
- Check that the CDI sensitivity scale is set to ± 5 NM.
- Check that MAP DATUM is set to WGS 84 or as indicated on the used navigation charts.

COURSE DEVIATION INDICATOR

The course deviation indicator sensitivity is adjustable with a maximum value which is the default value selected by the "GARMIN" 150 GPS. It is recommended not to change the default value which is ± 5 NM full scale.

NOTE :
Transmission on VHF 1 or 2 communication frequencies 121.15, 121.175, 121.20, 131.25, 131.275 and 131.30 MHz may adversely affect reception of the GPS signal. Transmissions in excess of 10 seconds may result in loss of GPS signal reception. Navigation will be restored within 5 seconds after the completion of the transmission. If UHF communication system is installed, the same behaviour can be observed on the first harmonic of the VHF frequencies, 242.30, 242.35, 242.40, 262.50, 262.55 and 262.60 MHz.

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"MSG" message annunciator

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR ONLY FLASHES.

It will flash to alert the pilot of a situation that requires his attention. Press the "STAT" button on the "GARMIN" 150 GPS to view the message. (Appendix C of the "GARMIN" 150 GPS Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).
"**MSG**" annunciator is amber.

"WPT" Waypoint annunciator

About 1 minute before reaching a waypoint, "**MSG**" and "**WPT**" warning lights come on and audio warning is ON for 15 seconds. The message "Approaching waypoint" can be displayed by pressing the "STAT" button.
"**WPT**" and "**MSG**" annunciators are amber.

SECTION 5
PERFORMANCE

Installation and operation of the ""GARMIN" 150 GPS NAVIGATION SYSTEM - "STAND ALONE"" do not change the performance of the aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

5ECTION 6
WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	ITEM No.	OPTIONAL EQUIPMENT	WEIGHT lb	ARM in.
A	J925 00M	"GARMIN" 150 GPS - "Stand Alone"	4.696	25.59

SECTION 7
DESCRIPTION

Normal operating procedures are described in the "GARMIN" 150 GPS Pilot's Guide at the latest revision.

CONTROLS - see Figure 9.39.2

The front panel consists of 3-line, 20-character LCD display and 10 keys. Information displayed on the LCD is commonly referred to as a page.

Access to the pages is made by the keys on the right and bottom of the LCD.

Item 1 - POWER / BRIGHTNESS KNOB - This knob controls unit power and screen brightness.

Item 2 - "DIRECT TO" KEY - The direct-to key performs an instant direct-to, allows to enter a waypoint and sets a direct course to the destination.

Item 3 - "NRST" KEY - The nearest key is used to obtain information on the 9 nearest airports, VORs, NDBs, intersections, user waypoints and 2 nearest FSSs. This key also accesses any active SUA information.

Item 4 - "SET" KEY - The set key allows to customize the settings on the "GARMIN" 150 GPS to pilot's preference.

Item 5 - "RTE" KEY - The route key enables to create, edit, activate and invert routes. Search-and-rescue, parallel offset and closest point of approach are also performed using the route key.

Item 6 - "WPT" KEY - The waypoint key is used to view information such as runways, frequencies, position and comments on airports, VORs, NDBs, intersections and user waypoints.

Item 7 - "NAV" KEY - The navigation key is used to view navigation and position information. Planning operations are also performed using the "NAV" key.

Item 8 - DOUBLE CONCENTRIC KNOB (INNER / OUTER) - The **outer** knob is used to advance through pages, advance the cursor or move through data fields. The **inner** knob is used to change data or scroll through information that cannot fit on the screen all at once.

Item 9 - "ENT" KEY - The enter key is used to approve an operation or complete data entry. It is also used to confirm information, such as during power on.

Item 10 - "STAT" KEY - The status key is used to view receiver and satellite status, as well as system messages.

Item 11 - "CRSR" KEY - The cursor key is used to activate / deactivate the cursor. An active cursor is indicated by flashing characters on the screen. It is used to highlight fields for data entry, changing information or cycling through available options.

Item 12 - "CLR" KEY - The clear key is used to erase information or cancel an entry.

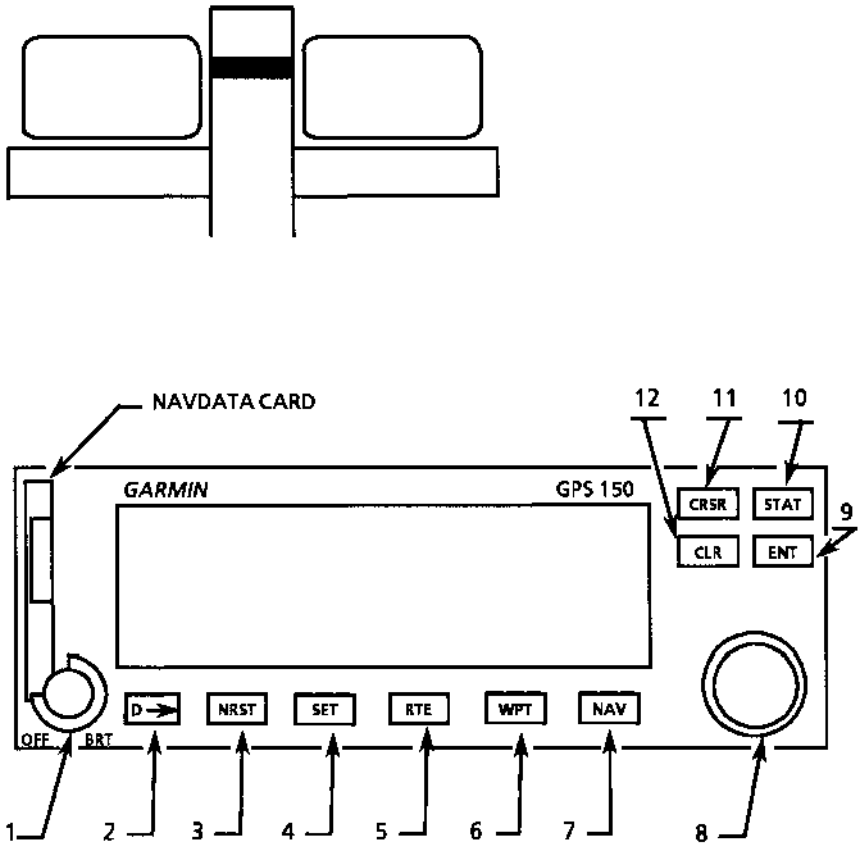


Figure 9.39.2 - Controls

ANNUNCIATORS - See Figure 9.39.3

The annunciators include 2 amber warning lights marked "MSG" and "WPT".

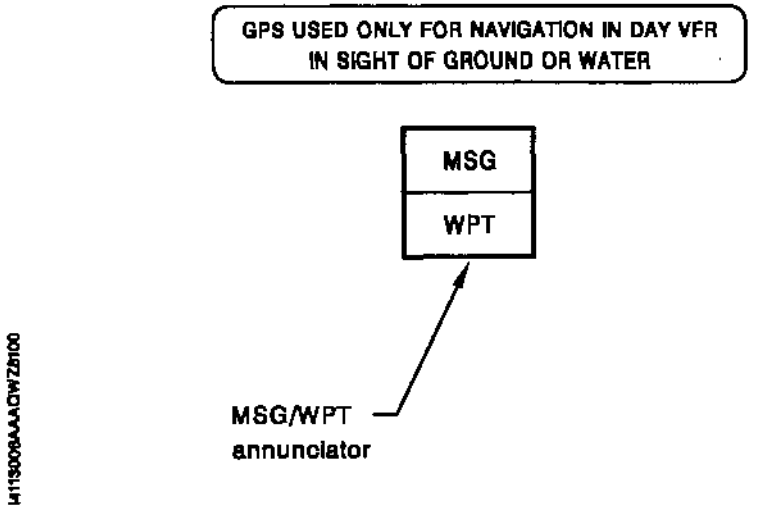


Figure 9.39.3 - GPS placard and annunciators

SUPPLEMENT

"BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A

OPTIONAL EQUIPMENT No. K926 00M

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1
GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A".

Using information provided by satellites ("BENDIX / KING" KLN89B is able to track up to 8 satellites at a time), GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base (three different data bases are available : Americas, Atlantic, Pacific). The data base is housed in a card plugged into the front face of the KLN89B and is updated every 28 days by means of diskettes or by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, SIDs, STARs, instrument approaches, flight service stations ...

There is also room for 500 user defined waypoints and 25 different flight plans.

CAUTION

IT IS STRONGLY ADVISED NOT TO LOAD USER WAYPOINTS IN DATA BASE IN TERMINAL AREA NAVIGATION DUE TO THE INCREASE OF WORK LOAD FOR THE PILOT

The KLN89B can receive altitude code from the encoding altimeter and be interfaced with a fuel flowmeter.

SECTION 2
LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A".

Data base updating must be verified before each flight.

NOTE :
The original KLN89B data base is in accordance with the WGS84 geodetic model.

If the data base or the card are not in accordance with WGS84 or NAD 83 geodetic model, and as there is no means of operation published, GPS navigation system must be disengaged in terminal area.

Navigation must be controlled using primary sources. In any case, GPS use is limited to the En route or terminal area of the flight.

"BENDIX / KING" KLN89B Pilot's Guide at its latest revision shall be readily available to the pilot.

The use of GPS KLN89B approach mode is prohibited.

USE OF GPS APPROACH MODE IS PROHIBITED

Figure 9.40.1 - GPS limitation placard

IFR navigation is restricted as follows :

- IFR en route and terminal area navigation is prohibited unless the pilot verifies the currency of the data base and verifies each selected waypoint for accuracy by reference to the aeronautical documentation.

SECTION 3
EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A".

NAV FLAG

If the NAV flag appears on the HSI when it is interfaced with GPS KLN89B, this means that the GPS signal integrity has been lost.

1 - "NAV 1 / GPS" inverter ..... **PRESS**

Return to the NAV1 navigation source and to remaining operational navigation equipment.

"MSG" ANNUNCIATOR ILLUMINATION

1 - "MSG" push-knob of KLN89B ..... **PRESS**

Check the message.

If the message mentions the loss of GPS system integrity (RAIM NOT AVAILABLE) or detects a too important position error (RAIM POSITION ERROR) :

2 - "NAV 1 / GPS" inverter ..... **PRESS**

Return to the NAV1 navigation source and to remaining operational navigation equipment.

When the system integrity is restored, the return to GPS mode must be accompanied by the validation of the followed and desired track concordance by using primary sources of navigation.

SECTION 4
NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A".

Normal operating procedures of the KLN89B GPS recommended by "BENDIX / KING" manufacturer are outlined in the "BENDIX / KING" KLN89B Pilot's Guide at the latest revision and KLN89B Memory Jogger at the latest revision.

However, it is important to precise the following points for the use of KLN89B on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the KLN89B prior to flight.
- Set turn anticipation mode (SET / 4) to :
  - . ENABLE (turn anticipation ENABLED) : recommended mode,
  - . DISABLE (turn anticipation DISABLED) : not recommended mode.
- Check that the proper criteria are used for nearest airport selection (SET / 6).

COURSE DEVIATION INDICATOR

The course deviation indicator sensitivity is adjustable with a maximum value which is the default value selected by the KLN89B. It is recommended not to change the default value which is ± 5 NM full scale.

NOTE :
Transmission on VHF 1 or 2 communication frequencies 121.15, 121.175, 121.20, 131.25, 131.275 and 131.30 MHz may adversely affect reception of the GPS signal. Transmissions in excess of 10 seconds may result in loss of GPS signal reception and WRN annunciator activation. Navigation will be restored within 5 seconds after the completion of the transmission. If UHF communication system is installed, the same behaviour can be observed on the first harmonic of the VHF frequencies, 242.30, 242.35, 242.40, 262.50, 262.55 and 262.60 MHz.

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"NAV 1/GPS" inverter

It may be used to select data for presentation on the pilot's HSI (L.H. instrument panel) ; either NAV data from NAV 1 navigation receiver or GPS data from the KLN89B GPS. The presentation on the HSI is also required for the autopilot connection.

"MSG" message annunciator

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR ONLY FLASHES. IN THIS CASE, RETURN TO NAVIGATION PRIMARY MEANS BY PRESSING ON "NAV 1/GPS" INVERTER

It will flash to alert the pilot of a situation that requires his attention. Press the "MSG" button on the KLN89B GPS to view the message. (Appendix B of the KLN89B Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings). **"MSG"** annunciator is amber.

"WPT" Waypoint annunciator

WARNING

TURN ANTICIPATION IS AUTOMATICALLY DISABLED FOR WAYPOINTS WHERE OVERFLIGHT IS MANDATORY ("SID/STARS" FOR EXAMPLE). FOR WAYPOINTS SHARED BETWEEN "SID/STARS" AND PUBLISHED ENROUTE SEGMENTS (REQUIRING OVERFLIGHT IN THE "SID/STARS"), PROPER SELECTION ON THE PRESENTED "WAYPOINT" PAGE IS NECESSARY TO PROVIDE ADEQUATE ROUTE PROTECTION ON THE "SID/STARS".

Prior to reaching a waypoint in the active flight plan, the KLN89B GPS will provide navigation along a curved path segment to ensure a smooth transition between two adjacent legs in the flight plan. This feature is called turn anticipation. Approximately 20 seconds prior to the beginning of the turn anticipation, the "WPT" annunciator will flash, going solid upon initiation of the turn, and extinguishing upon turn completion.
"WPT" annunciator is amber.

GPS approach "GPS APR ARM / GPS APR ACTV" switch / annunciator

CAUTION

THE USE OF GPS KLN89B APPROACH MODE IS PROHIBITED

This switch / annunciator is used to select or deselect approach mode of the KLN89B. This operation mode is not certified and is, furthermore, inhibited by programming the maintenance pages.

"LEG" mode

The use of "LEG" mode is selected by the "OBS" button.

When the KLN89B is used with the TURN ANTICIPATION ENABLED, at the beginning of turn anticipation, WPT alert annunciator goes on steady, MSG annunciator begins flashing. At this time, the KLN89B will notify the pilot with a message on the Message Page of the new desired track . This message will not be given if the course change is less than 5°.

CAUTION

WHEN TURN ANTICIPATION IS DISABLED, WAYPOINT ALERTING OCCURS APPROXIMATELY 35 SECONDS PRIOR TO ACTUALLY REACHING THE WAYPOINT. "MSG" ANNUNCIATOR REMAINS OFF. THERE IS NO COURSE CHANGE MESSAGE DISPLAYED BY THE KLN89B

IT IS RECOMMENDED TO USE KLN89B WITH TURN ANTICIPATION ENABLED

When the KLN89B is used WITH TURN ANTICIPATION DISABLED, the "Super NAV 5" page allows a rapid visualisation of the airplane position in horizontal navigation with regards to the route and the waypoints. It is strongly recommended to use this page.

"OBS" mode (selected by the "OBS" button)

The "OBS" mode has to be selected as follows :

- press the "OBS" button to select the "LEG" mode, then the "OBS" mode,
- when selecting the "OBS" mode, the active "WPT" of the "LEG" mode is chosen as reference "WPT" for the "OBS" mode.

FLIGHT DIRECTOR / AUTOPILOT COUPLED OPERATION

The HSI may be coupled with KAP 150 or KFC 150 autopilot.

Engaging the "NAV" mode on the autopilot mode controller engages the autopilot in navigation mode by using the selected course and left / right steering information presented on the HSI. It makes FD appear.

When AP is engaged on the mode controller, the autopilot is coupled to the HSI.

WARNING

WHEN CROSSING A WAYPOINT :

- **IF THE AUTOPILOT IS ENGAGED ON NAV MODE USING GPS DATA, THE COURSE POINTER MUST BE ADJUSTED TO THE VALUE OF THE NEW DESIRED TRACK (FOR A COURSE CHANGE UPPER THAN 5°).**
- **IF NOT, THE FLIGHT DIRECTOR AND AUTOPILOT WILL STEER A DIVERGENT ROUTE AFTER THE WAYPOINT CROSSING (EN ROUTE-LEG MODE SELECTED).**

NOTE :
When the HSI is selected on GPS navigation source, the RMI (if installed) remains selected on NAV 1 source (VOR or RNAV).

"SID" PROCEDURE

NOTE :
"SID" procedure can only be loaded in the Active Flight Plan (FPL 0).

Prior to take-off - Select an appropriate "SID" from the **ACT 7** page. If necessary, select runway and transition point.

NOTE 1 :
*Using right hand outer knob, select the ACT (Active Flight Plan waypoints) pages. Pull right hand inner knob out and scroll to the departure airport then push the inner knob in and select the **ACT 7** page.*
*To delete or replace a "SID", select **FPL 0** page. Place the cursor over the name of the procedure, press **ENT** to change it, or **CLR** then **ENT** to delete it.*

NOTE 2 :
*After "SID" loading in the Active Flight Plan, using right hand outer knob, select the **ACT** (Active Flight Plan waypoints) pages. To check position of the "SID" waypoints, pull this knob and scroll each waypoint of the departure procedure.*

"STAR" PROCEDURE

NOTE :
"STAR" procedure can only be loaded in the Active Flight Plan (FPL 0).

Prior to arrival - Select an appropriate "STAR" from the **ACT 7** page.

NOTE 1 :
*Using right hand outer knob, select the **ACT** (Active Flight Plan waypoints) pages. Pull right hand inner knob out and scroll to the destination airport, then push the inner knob in and select the **ACT 7** page.*
*To delete or replace a STAR, select **FPL 0** page. Place the cursor over the name of the procedure, press **ENT** to change it, or **CLR** then **ENT** to delete it.*

NOTE 2 :
*After "STAR" loading in the Active Flight Plan, using right hand outer knob, select the **ACT** (Active Flight Plan waypoints) page. To check position of the "STAR" waypoints, pull this knob and scroll each waypoint of the arrival procedure.*

SECTION 5
PERFORMANCE

Installation and operation of the ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A" do not change the performance of the aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6
WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	ITEM No.	OPTIONAL EQUIPMENT	WEIGHT lb	ARM in.
A	K926 00M	"BENDIX / KING" KLN89B GPS interfaced with the HSI KI525A	5.578	22.83

SECTION 7
DESCRIPTION

Normal operating procedures of the ""BENDIX / KING" KLN89B GPS NAVIGATION SYSTEM INTERFACED WITH THE HSI KI525A" are described in the "BENDIX / KING" KLN89B Pilot's Guide at the latest revision.

CONTROLS - see Figure 9.40.2

Controlled by one set including concentric knobs and one cursor button, the KLN89B can present a variety of information in a number of different page formats.

The various display types can be considered as chapters in a book, each chapter having some number of pages. With a few exceptions, each of these pages can be changed independently.

The large outer knob controls the chapters and the small inner knob turns the pages.

To change data in a page, use the cursor function. This function is an area that flashes on the screen brought up by depressing the cursor button.

Then rotate the outer knob to position the cursor and the inner knob to select the desired characters. Repeat this operation as many times as necessary and valid (ENT button).

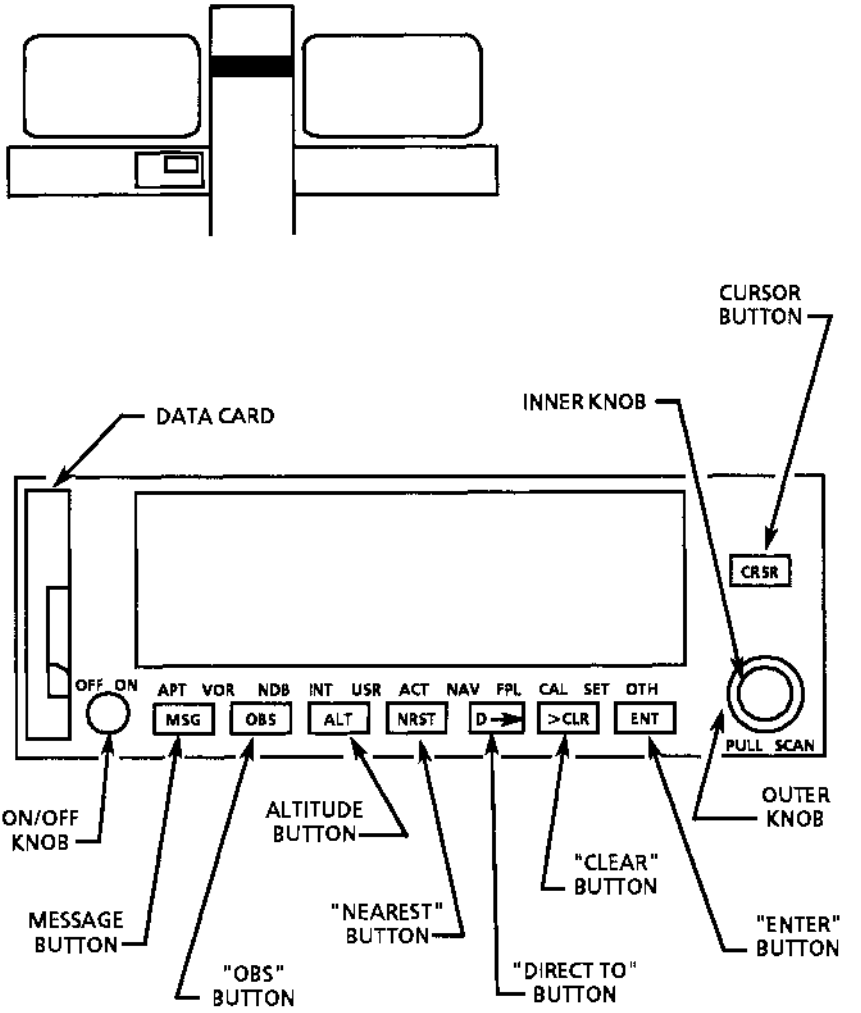
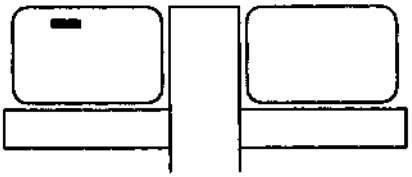


Figure 9.40.2 - Controls



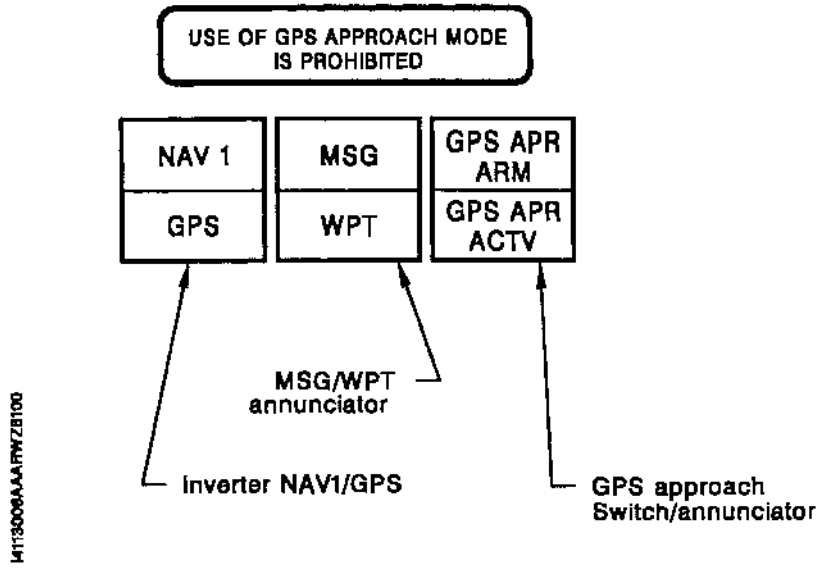


Figure 9.40.3 - GPS placard and annunciators

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1

GENERAL

Approved utilization type :

- Day/Night VFR

Certification rule :

- AC 20-138

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI" for a day/night VFR operation.

The generalities hereaffer supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI".

The GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means using information provided by satellites ("GARMIN" GNS 430 is able to track up to 12 satellites at a time). It also uses data recorded in a data base (two different data bases are available : North American one or International one). The data base is housed in a Nav data card plugged into the GNS 430 front face and is updated every 28 days by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, flight service stations ...

There is also room for up to 1000 user defined waypoints and 20 different flight plans.

The GNS 430 GPS receives altitude code from the encoding altimeter.

The GI 106A CDI may be coupled with the KAP 150 autopilot (if installed).

SECTION 2

LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI".

Data base updating must be verified before each flight.

NOTE :
The GNS 430 genuine data base is referenced to WGS 84 geodetic datum.

GPS USED FOR NAVIGATION IN VFR ONLY

Figure 9.43.1 - GPS limitation placard

"GARMIN" GNS 430 Pilot's Guide, P/N 190-00140-00 Revision A or any applicable following edition, shall be readily available to the pilot whenever the operation of the GPS navigation system is predicted.

The GNS 430 GPS may replace the VOR or the ADF.

2.1 - CDI not coupled with KAP 150 autopilot

The system must utilize the following software versions or more recent ones :

Subsystem	Software
MAIN	2.16
GPS	2.03
COM	3.00
VOR/LOC	2.05
G/S	2.02

2.2 - CDI coupled with KAP 150 autopilot

The system must utilize the following software versions or more recent ones :

Subsystem	Software
MAIN	2.22
GPS	2.10
COM	4.01
VOR/LOC	3.01
G/S	2.03

SECTION 3

EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard aircraft described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI".

CDI NAV FLAG OR "INTEG" WARNING

Return to the VOR ou ADF navigation source and to remaining operational navigation equipment.

"CDI" push-button ..... **VLOC**

"MSG" ANNUNCIATOR ILLUMINATION

1 - "MSG" push-button of GPS ..... **PRESS**

Check the message.

"RAIM is not available", "Poor GPS Coverage", "Searching the sky" or "RAIM position warning" :

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

2 - "CDI" push-button ..... **VLOC**

"MSG" ANNUNCIATOR ILLUMINATION (Cont'd)

If the message mentions an error of course deviation :

- OBS set to DTK value
  Return to VOR or ADF navigation source and to remaining operational navigation equipment.
  "CDI" push-button ..... **VLOC**
- OBS not set to DTK value
  Set the CDI to the value of DTK.
  . CDI coupled with autopilot : Check the correct interception of the segment, if the AP interface is used.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI".

Normal operating procedures of the GPS recommended by the manufacturer are outlined in the "GARMIN" GNS 430 Pilot's Guide at the latest revision and Memory Jogger at the latest revision.

However, it is important to precise the following points for the GPS use on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the GPS prior to flight.

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"CDI" push-button

This push-button may be used to select data to be displayed on the CDI ; the NAV data come either from NAV 1 navigation receiver or from the GPS.

When pressed once, the push-button illuminates **"VLOC"** (white), pressed one more time illuminates **"GPS"** (green).

"MSG" message annunciator (amber)

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR JUST FLASHES.

"MSG" message annunciator will flash to alert the pilot of a situation that requires his attention. Press the **"MSG" push-button** located on the GPS to view the message (Chapter 10 of "GARMIN" GNS 430 Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).

"WPT" Waypoint annunciator (amber)

This annunciator illuminates 10 seconds before warning "TURN TO XXX".

"APR" annunciator is not used.

"GPS" mode

When using the "GPS" mode, GPS navigation data (course deviation, TO/FROM) are presented on the CDI.

When crossing a waypoint, the track resetting on the following navigation leg must be hand-performed on the CDI.

Autopilot (if installed) coupled operation

The CDI may be coupled with KAP 150 autopilot.

The autopilot "NAV" mode uses left/right course deviation information and the CDI heading.

This information is related to the navigation source (VLOC or GPS) selected by the "CDI" push-button of the GPS.

When AP is engaged on the mode controller, the autopilot is then coupled with the CDI and uses displayed information (track and course deviation).

REMARK :
The change of steering source for the autopilot, when the latter is set to "NAV" side mode, implies a sequence of checks, some of which may be omitted or require a particular attention. Therefore it is strongly recommended to temporarily disengage the autopilot "NAV" mode before changing source.

SECTION 5

PERFORMANCE

Installation and operation of the "GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI do not change the performance of the TB aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	23 - COMMUNICATIONS			
A	COM-NAV-GPS#1 GNS 430 interfaced with GI 106A CDI (OPT10 23003A)	GARMIN	9.700 (4.400)	24.80 (0.630)

SECTION 7

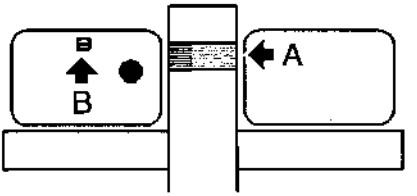
DESCRIPTION

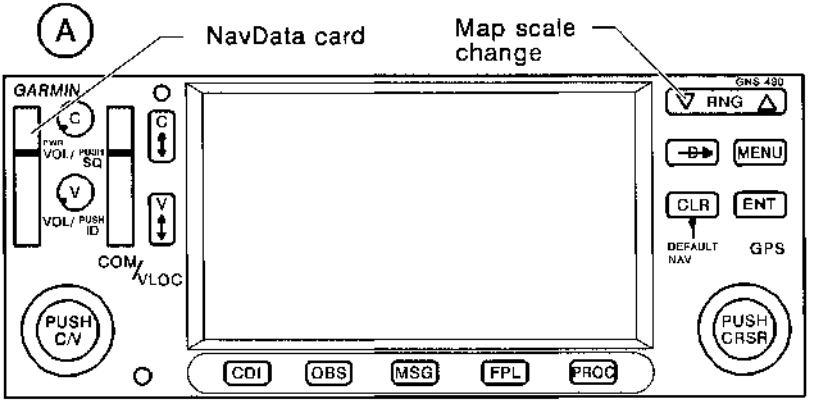
Normal operating procedures of the "GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH GI 106A CDI are described in the "GARMIN" GNS 430 Pilot's Guide at the latest revision.

The option includes :

- one GNS 430 GPS installed in radio rack - see Figure 9.43.2,
- one GI 106A CDI on pilot's instrument panel,
- one "MSG/WPT" repeater on advisory panel.

"GARMIN" GNS 430 GPS NAVIGATION SYSTEM INTERFACED WITH *GI 106A CDI*





I4345100AAATTY8100

- C - COM volume
- V - VOR volume
- PUSH C/V - Selection of VOR/VHF frequencies
- PUSH CRSR - Selection of group pages; Group selection:
  - NAV
  - WPT
  - AUX
  - NRST
- CDI - Navigation source (VLOC/GPS)selection
- OBS - OBS/Leg mode selection
- MSG - Message viewing
- FPL - Create / Edit / Activate
- PROC - Procedures :
  - Arrival
  - Departure
  - Approach
- "Direct TO"

Figure 9.43.2 - "GARMIN" GNS 430 GPS SYSTEM

SUPPLEMENT

"HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS

TABLE OF CONTENTS

"HONEYWELL" KLN 94 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SECTION 1

GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB airplane is equipped with the option ""HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS".

Approved utilization types :

- IFR in continental and Terminal Enroute areas as additional source,
- B-RNAV.

Certification rules :

- AMJ 20X2 Section 4,
- AC 20-138.

The generalities hereafter supplement those of the standard airplane described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS".

This supplement does not constitute an operational utilization authorization.

The GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means using information provided by satellites (the KLN 94 system is able to track up to 8 satellites at a time). It also uses data recorded in a data base. The data base is housed in a Navdata card to be inserted in the front face and is updated every 28 days by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, SIDs, STARs, instrument approaches, flight service stations ...

There is also room for up to 500 user defined waypoints and 25 different flight plans.

SECTION 2

LIMITATIONS

2.1 - General

The limitations hereafter supplement those of the standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS".

"HONEYWELL" KLN 94 Pilot's Guide, P/N 006-18207-000 Revision 0 dated 09/00 or any applicable following edition, shall be readily available to the pilot, each time the GPS navigation system is used.

The system must utilize the ORS 01 software version or a more recent one.

Data base updating must be verified before each flight.

The navigation sources required for the anticipated flight shall be serviceable and allow an immediate crossed check on available ground aids or shall allow to return to primary navigation sources in case of GPS navigation loss.

Use of GPS as a navigation source is **PROHIBITED**, unless the pilot verifies the currency of the data base and the coordinates of each selected waypoint.

For every navigation into areas reserved for B-RNAV, the pilot must be provided with a predicted availability of RAIM on the route, if the constellation disposes of less than 23 satellites.

The check of navigation system information consistency must be regularly performed during the flight :

- when reaching each waypoint or before reaching the position report point of the ATC,
- before leaving a published route and then every 15 minutes during this type of operation (function "Direct To").

The check of position information consistency may be performed by comparing this position with the one determined by the primary radionavigation sources.

2.2 - SID/STAR

The use of SIDs and STARs stored in GPS data base is **PROHIBITED.**

The use of user waypoints on SID/STAR is **PROHIBITED.**

2.3 - Instrument approach (Non precision approach)

Use of the GPS is **PROHIBITED.**

GPS 1
APPROVED FOR B-RNAV
SID/STAR AND APPROACH MODE PROHIBITED

Figure 9.48.1 - GPS limitation placard

SECTION 3

EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS".

HSI NAV FLAG

Return to remaining operational navigation equipment.

"NAV1/GPS1" push-button **NAV1**

"MSG" ANNUNCIATOR ILLUMINATION

1 - "MSG" push-button of GPS ..... **PRESS**

Check the message.

"Bad Satellite Geometry", Nav Super Flag Failure", "RAIM position error", "RAIM not available", "Searching the sky" or "No GPS Receiver Data" :

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

"NAV1/GPS1" push-button **NAV1**

"MSG" ANNUNCIATOR ILLUMINATION (Cont'd)

*If the message mentions an error of course deviation (**"Adj Nav CRS to XXX"** or **"GPS course is xxx°"**) :*

- OBS set to DTK value
  Return to VOR or ADF navigation source and to remaining operational navigation equipment.
  "NAV1/GPS1" push-button **NAV1**
- OBS not set to DTK value
  Set the OBS to the value of DTK. Check the correct interception of the segment, if the AP interface is used.

WHEN IN B-RNAV VERIFY THE IFR PROCEDURE APPLICABLE TO EACH ONE OF THESE NEW SITUATIONS WITH THE AIR TRAFFIC CONTROL :

- **OUT OF B-RNAV AREA : IT IS PROHIBITED TO ENTER THE B-RNAV AREA.**
- **IN B-RNAV AREA : INFORM THE AIR TRAFFIC CONTROL TO INDICATE THE LOSS OF B-RNAV CAPABILITY.**

When the system integrity is restored, the return to GPS mode must be accompanied by the validation of the followed and desired track concordance by using primary sources of navigation.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS".

Normal operating procedures of the GPS recommended by the manufacturer are outlined in the "HONEYWELL" KLN 94 Pilot's Guide at the latest revision and Memory Jogger at the latest revision.

However, it is important to precise the following points for the GPS use on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the GPS prior to flight.
- In case of B-RNAV use :

  During the preflight planning phase, the availability of GPS integrity (RAIM) shall be confirmed for the intended flight (route and time).

  B-RNAV flight dispatch shall not be made in the event of a continuous loss of RAIM for more than 5 minutes predicted in any part of the intended flight.

  With 23 or more satellites available, the predicted availability of RAIM is valid for 7 days.

  When less than 23 satellites are available, the predicted availability of RAIM shall be confirmed short before each flight.

"HONEYWELL" KLN 94 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"NAV1/GPS1" push-button

This push-button may be used to select data to be displayed on the pilot's HSI ; the NAV data come either from NAV1 navigation receiver or from the GPS1.

When pressed once, the push-button illuminates **"NAV1"** (green), pressed one more time illuminates **"GPS1"** (blue).

"MSG" message annunciator (amber)

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR JUST FLASHES

"MSG" message annunciator will flash to alert the pilot of a situation that requires his attention. Press the **"MSG" push-button** located on the GPS to view the message (Appendix B of "HONEYWELL" KLN 94 Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).

"WPT" Waypoint annunciator (amber)

This annunciator flashes approximately 20 seconds before warning "NEXT DTK".

"APR" annunciator is not used.

"TERM" annunciator is not used.

"GPS" mode

When using the "GPS" mode, GPS navigation data (course deviation, TO/FROM) are presented on the HSI.

When crossing a waypoint, the track resetting on the following navigation leg must be hand-performed on the HSI.

Autopilot coupled operation

The GPS may be coupled with the autopilot via the HSI, which receives the information relative to the navigation source (VOR1 or GPS) selected by the "NAV1/GPS1" push-button.

When AP is engaged on the mode controller, the autopilot is then coupled with the HSI and uses displayed information (track and course deviation).

Autopilot with flight director

Engaging the "NAV" mode on the autopilot mode controller will activate the FD on the ADI. The FD uses selected course and left/right steering information displayed on the HSI.

GPS use in Terminal area

The CDI full scale must be set by hand to ± 1 Nm.

"HONEYWELL" KLN 94 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SECTION 5

PERFORMANCE

The installation and the operation of the "HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS do not change the basic performance of the airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement the one given for the standard airplane in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	34 - NAVIGATION			
A	GPS (B-RNAV) KLN 94 interfaced with electromechanical instruments (OPT10 34301A)	HONEYWELL	5.952 (2.700)	25.98 (0.66)

SECTION 7

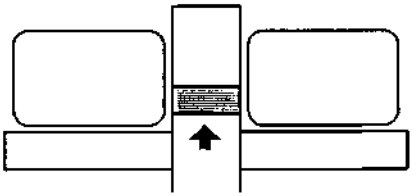
DESCRIPTION

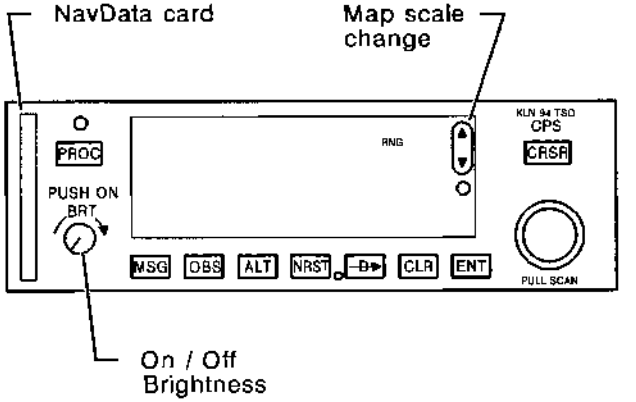
Normal operating procedures of the "HONEYWELL" KLN 94 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS are described in the "HONEYWELL" KLN 94 Pilot's Guide at the latest revision.

GPS system consists of :

- one KLN 94 GPS - see Figure 9.48.2 :
  This GPS may be a navigation source for the autopilot. Course deviation information is then displayed on the HSI.
- one repeater/control unit integrated to the advisory panel - see Figure 9.48.3 :
  This instrument allows to select the navigation source for the autopilot (NAV1 or GPS1). It is used also to duplicate the MSG, WPT warnings and to recopy GPS TERM and APR data.

"HONEYWELL" KLN 94 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS





MSG - Message viewing

OBS - OBS/Leg mode selection

ALT - Altitude functions

NRST - Nearest VOR, NDB, Airports, interceptions, User defined waypoints

"Direct TO"

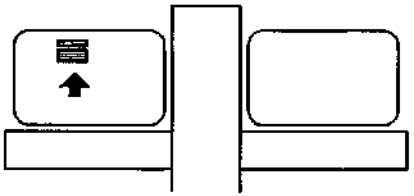
PROC - Procedure

CLR - Clear

ENT - Enter

I4345100AAAUTY8200

Figure 9.48.2 - "HONEYWELL" KLN 94 GPS SYSTEM



GPS 1
APPROVED FOR B-RNAV
SID/STAR AND APPROACH MODE PROHIBITED

NAV1	MSG	TERM
GPS1	WPT	APR

NAV1
GPS1

- NAV1/GPS1 push-button

Annunciators :

- NAV1 : NAV1 navigation source
- GPS1 : GPS1 navigation source
- MSG, WPT : Repeater of GPS, MSG, WPT warnings
- TERM, APR : Repeater of TERM, APR data (not used)

I4345100AAAUTY8001

Figure 9.48.3 - Repeater/control unit and GPS placard

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"HONEYWELL" KMD 550 MULTI-FUNCTION DISPLAY

TABLE OF CONTENTS

SECTION 1

GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""HONEYWELL" KMD 550 MULTI-FUNCTION DISPLAY".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KMD 550 MULTI-FUNCTION DISPLAY".

The KMD 550 is a multi-function display screen which allows to display topographical type information (rivers, roads, ...), aeronautical type information (VOR, Airport, NDB, ...), as well as information issued from a WX 500 stormscope and/or the active flight plan issued from a GPS.

Aeronautical items of information are stored in a data card. This data base is updated every 28 days by replacing the data card.

SECTION 2

LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KMD 550 MULTI-FUNCTION DISPLAY".

KMD 550/850 Multi-function Display Pilot's Guide, P/N 006-18222-0000, Revision 0 dated Oct/2000 or any applicable following edition, shall be readily available to the pilot.

The KMD 550 may be used only as an aid to navigation, if :

- navigation is based on other approved instruments,
- the KMD 550 data base is current and compatible with the flight,
- KMD 550 and associated GPS data bases cover the same geographical areas.

CAUTION

KMD 550 TOPOGRAPHICAL DATA MUST NOT BE USED FOR TERRAIN AND/OR OBSTACLES AVOIDANCE

SECTION 3

EMERGENCY PROCEDURES

Installation and operation of the "HONEYWELL" KMD 550 multi-function display do not change the emergency procedures described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KMD 550 MULTI-FUNCTION DISPLAY".

KMD normal operating procedures recommended by the manufacturer are outlined in the KMD 550/850 Multi-function Display Pilot's Guide, P/N 006-18222-0000, Revision 0 dated Oct/2000 or any applicable following edition.

CAUTION

DISPLAY ON STORMSCOPE PAGE IS ALWAYS SET IN "TRACK UP".

DISPLAY ON "MAP" PAGE IS SET EITHER IN "NORTH UP" OR IN "TRACK UP".

WHEN DISPLAY ON "MAP" PAGE IS SET IN "NORTH UP", THE PILOT MUST BEWARE OF THE INTERPRETATION OF DISPLAYED DATA DURING THE SWITCHING FROM A "MAP" DISPLAY TO A "WX" DISPLAY

SECTION 5

PERFORMANCE

Installation and operation of the "HONEYWELL" KMD 550 multi-function display do not change the performance of the TB aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	34 - NAVIGATION			
A	Multi-function display KMD 550 (OPT10 34304A)	HONEYWELL	6.614 (3.00)	21.65 (0.55)

SECTION 7

DESCRIPTION

1 - Brightness control
2 - Data card
3 - LCD display
4 - Available function
5 - ON/OFF control
6 - Selected function indicators
7 - Function select keys
8 - Control knobs (inner and outer)
9 - Power key labels
10 - Soft labels
11 - Joystick
12 - Power keys
13 - Fault indicator

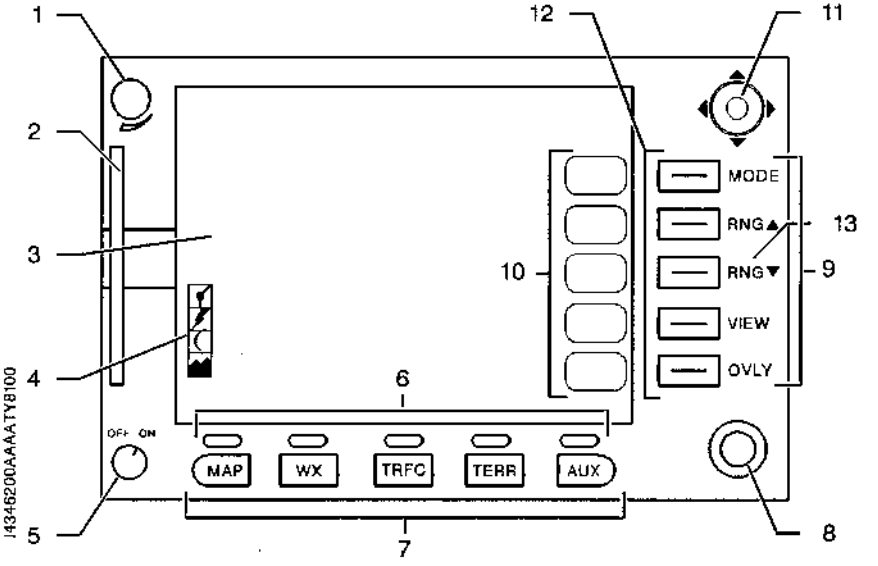


Figure 9.49.1 - KMD 550 Multi-function display (front view)

SUPPLEMENT

"GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)

TABLE OF CONTENTS

"GARMIN" GNS 430 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SECTION 1

GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB airplane is equipped with the option ""GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)".

Approved utilization types :

(a) GPS # 1, interfaced with HSI (Option OPT10 23-006A)

- IFR in continental and Terminal Enroute areas as additional source,
- B-RNAV,
- Non precision approaches (GPS, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV).

(b) GPS # 2, interfaced with CDI (Option OPT10 23-004A) (if installed)

- IFR in continental and Terminal Enroute areas as additional source.

Conformity means :

- ACJ 20X4 and ACJ 20X5
- AC 20-138.

The generalities hereafter supplement those of the standard airplane described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)".

This supplement does not constitute an operational utilization authorization.

The GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means using information provided by satellites (the GNS 430 system is able to track up to 12 satellites at a time). It also uses data recorded in a data base. The data base is housed in a Navdata card to be inserted in the front face and is updated every 28 days by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, SIDs, STARs, instrument approaches, flight service stations ...

There is also room for up to 1000 user defined waypoints and 20 different flight plans.

SECTION 2

LIMITATIONS

2.1 - General

The limitations hereafter supplement those of the standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)".

"GARMIN" GNS 430 Pilot's Guide, P/N 190-00140-00 Revision A dated 12/98 or any applicable following edition, shall be readily available to the pilot, each time the GPS navigation system is used.

The system must utilize the following software versions or more recent ones :

Subsystem	Software
MAIN	2.22
GPS	2.10

Data base updating must be verified before each flight.

The navigation sources required for the anticipated flight shall be serviceable and allow an immediate crossed check on available ground aids or shall allow to return to primary navigation sources in case of GPS navigation loss.

Use of GPS as a navigation source is **PROHIBITED**, unless the pilot verifies the currency of the data base and the coordinates of each selected waypoint.

Procedures during flight preparation

During flight preparation, the pilot must get information about GPS constellation, via aeronautical data (consultation of GPS NOTAM).

When less than 24 satellites are available (or less than 23 if equipment uses pressure altitude information), the pilot must make sure that RAIM function is available on the projected route and for the flight period in B-RNAV areas.

RAIM function prediction can be done using prediction software integrated into GNS 430 or any other approved software such as the one provided for the users by EUROCONTROL on INTERNET.

If a loss of RAIM function is predicted on the chosen route for a period of more than 5 minutes, the flight cannot be done. In that case, the flight will either be postponed or another route will be chosen. The prediction software must then be used again.

Preflight procedures

During preflight checks, it is necessary to verify data base validity (updating of the last AIRAC cycle).

The onboard equipment must be initialized in compliance with manufacturer procedures (refer to "GARMIN GNS 430 Pilot's Guide").

In case a pre-programmed or an already stored flight plan is used, an accurate check of the waypoints is also required.

General in-flight procedures

Before entering a B-RNAV area, the pilot must make sure that RAIM function is available.

Flight plan activation, WPT and LEG changes as well as any modification of initialization data must be done in compliance with equipment User's Manual.

For every navigation into areas reserved for B-RNAV, the pilot must be provided with a predicted availability of RAIM on the route, if the constellation disposes of less than 23 satellites.

The check of navigation system information consistency must be regularly performed during the flight :

- when reaching each waypoint or before reaching the position report point of the ATC,
- before leaving a published route and then every 15 minutes during this type of operation (function "Direct To").

The check of position information consistency may be performed by comparing this position with the one determined by the primary radionavigation sources.

2.2 - SID/STAR

The use of SIDs and STARs stored in GPS data base is only authorized, if the pilot has checked that GPS procedure corresponds to the one given in the official documentation (coordinates of various points and paths between points).

2.3 - Instrument approach (Non precision approach)

2.3.1 - GPS # 1

CAUTION

KAP 150 AUTOPILOT (if installed) COUPLED OPERATION IS PROHIBITED

Use of the GPS to perform an instrument approach is possible, as long as this use is approved by the air navigation local authority for the approach in question.

Instrument approaches performed with the GPS must be achieved according to approved approach procedures given in the GPS data base. The data base must be kept up to date and base data accuracy checked with regard to the official documentation, preferably before the flight.

(a) Instrument approaches must be performed in GPS approach mode and the RAIM must be available at the final approach fix (FAF).

(b) Precision approaches (ILS, LOC, LOC-BC, MLS ...) must not be performed with the GPS.

(c) If a landing is required on a diversion field, an other means than GPS must be available to perform approach to this field. Required on board equipment must be serviceable and ground aids must be operational.

Instrument approaches can only be performed, as long as used point coordinates are referenced with regard to WGS 84 system or an equivalent system.

2.3.2 - GPS # 2

Use of the GPS approach mode is **PROHIBITED**.

Figure 9.51.1 - GPS # 2 (if installed) limitation placard

SECTION 3

EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)".

3.1 - GPS # 1, interfaced with HSI (Option OPT10 23-006A)

HSI NAV FLAG OR "INTEG" WARNING
Return to VOR or ADF navigation source and to remaining operational navigation equipment. "NAV1/GPS1" push-button **NAV1**

"MSG" ANNUNCIATOR ILLUMINATION
In navigation with GPS associated to the warning : "MSG" push-button of associated GPS ..... **PRESS** Check the message. *NOTE :* *A single "stand-alone" GPS certified as B-RNAV navigation means is required to fly in B-RNAV areas.*

"MSG" ANNUNCIATOR ILLUMINATION (Cont'd)

In case of loss of RAIM function, the navigation information remains available but its integrity is no longer controlled.

- If RAIM loss occurs out of B-RNAV area, the aircraft must not enter B-RNAV area.
- If RAIM loss occurs in B-RNAV area, GPS navigation can be continued as long as cross-checkings done with conventional means (VOR, DME, NDB and dead reckoning elements) enable making sure that B-RNAV accuracy criteria are observed. When this condition is not met, the Air Traffic Control must be contacted to return to conventional navigation.

If GPS navigation information is lost or declared not valid, use the other available navigation means. If this occurs during instrument approach final phase, a go-around must be made, except if the other approved radio means to perform approach are displayed and available.

3.2 - GPS # 2, interfaced with CDI (Option OPT1023-004A) (if installed)

CDI NAV FLAG OR "INTEG" WARNING

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

"CDI" push-button ..... **VLOC**

"MSG" ANNUNCIATOR ILLUMINATION

1 - "MSG" push-button of GPS ..... **PRESS**

Check the message.

"RAIM is not available", "Poor GPS Coverage", "Searching the sky" or "RAIM position warning" :

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

"CDI" push-button ..... **VLOC**

If the message mentions an error of course deviation :

- OBS set to DTK value
  Return to VOR or ADF navigation source and to remaining operational navigation equipment.
  "CDI" push-button ..... **VLOC**
- OBS not set to DTK value
  Set the OBS to the value of DTK.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR)".

Normal operating procedures of the GPS recommended by the manufacturer are outlined in the "GARMIN" GNS 430 Pilot's Guide at the latest revision and Memory Jogger at the latest revision.

However, it is important to precise the following points for the GPS use on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the GPS prior to flight.
- In case of B-RNAV use :

  During the preflight planning phase, the availability of GPS integrity (RAIM) shall be confirmed for the intended flight (route and time).

  B-RNAV flight dispatch shall not be made in the event of a continuous loss of RAIM for more than 5 minutes predicted in any part of the intended flight.

  When less than 24 satellites are available (or less than 23 if equipment uses pressure altitude information), the pilot must make sure that RAIM function is available on the projected route and for the flight period in B-RNAV areas.

  When 23 or more satellites are available, the prediction of satellite position is valid for 7 days. Their predicted availability is ensured for 48 hours by EUROCONTROL.

  When less than 23 satellites are available, the predicted availability of RAIM shall be confirmed short before each flight.

"GARMIN" GNS 430 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"NAV1/GPS1" push-button

This push-button may be used to select data to be displayed on the pilot's HSI ; the NAV data come either from NAV1 navigation receiver or from the GPS # 1.

When pressed once, the push-button illuminates **NAV1** (white or green), pressed one more time illuminates **GPS1** (green or blue).

"GPS CRS OBS/GPS CRS LEG" push-button

This push-button may be used to select GPS # 1 navigation mode (LEG or OBS mode).

When pressed once, the push-button illuminates **GPS CRS OBS** (amber), pressed one more time illuminates **GPS CRS LEG** (green).

"MSG" message annunciator (amber)

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR JUST FLASHES

This annunciator is associated with the **GPS # 1**.

"MSG" message annunciator will flash to alert the pilot of a situation that requires his attention. Press the **"MSG" push-button** located on the GPS # 1 to view the message (Chapter 10 of "GARMIN" GNS 430 Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).

"WPT" Waypoint annunciator (amber)

This annunciator is associated with the **GPS # 1**.

This annunciator illuminates approximately 10 seconds before "TURN TO XXX" warning.

"APR" annunciator is a duplicate of the GPS # 1 "APR" information.

"TERM" annunciator is a duplicate of the GPS # 1 "TERM" information.

"GPS" mode of the GPS # 1

When using the "GPS" mode, GPS # 1 navigation data (course deviation, TO/FROM) are presented on the HSI.

"CDI" push-button of GPS # 2 (if installed)

This push-button may be used to select data to be displayed on the CDI ; the NAV data come either from NAV2 navigation receiver or from the GPS # 2.

When pressed once, the push-button illuminates **"VLOC"** (white) on the CDI, pressed one more time illuminates **"GPS"** (green) on the CDI.

"GPS" mode of the GPS # 2 (if installed)

When using the "GPS" mode, GPS # 2 navigation data (course deviation, TO/FROM) are presented on the CDI.

When crossing a waypoint, the track resetting on the following navigation leg must be hand-performed on the CDI.

GPS flight plan

In the active flight plan, addition of a STAR or an approach is always made at the end of the flight plan. In the scope of these additions, the pilot must pay attention not to duplicate points.

Coupled operation with KFC 225 autopilot (option OPT10 22-001) (if installed)

GPS # 1 may be coupled with the autopilot via the HSI, which receives the information relative to the navigation source (VOR1 or GPS # 1) selected by the "NAV1/GPS1" push-button.

When crossing a waypoint, the airplane turns automatically, while a "TURN TO" warning appears. This warning disappears during the turn. The pilot must then manually adjust the course indicator on the HSI. Approximately 1 minute later, after the warning disappearing, if the pilot has not adjusted manually the course indicator to the correct heading, a warning remenbers him that.

When the AP "NAV" mode is engaged on the mode controller, the autopilot is then coupled with the HSI and uses displayed information (track and course deviation).

Engaging the "NAV" mode on the autopilot mode controller will activate the FD on the ADI. The FD uses selected course and left/right steering information displayed on the HSI.

Coupling with autopilot during a non precision approach must be made in "NAV" mode, except in the following cases :
- holding pattern,
- landing pattern turn,
- interrupted approach,

which have to be made in "HDG" mode.

For memory, the approach particular point name in the GARMIN system is as follows :

- IA = IAF
- FA = FAF ou FAP
- MA = MAP
- MH = MAHP

When the GPS suspends the linked navigation (GPS "SUSP" annunciator), the autopilot continues using heading and "GPS CRS OBS" annunciator (amber) illuminates.

NOTE :
The KFC 225 autopilot has a "Lateral clearance" function : refer to Section 4 "Normal procedures" of the Supplement "HONEYWELL KFC 225 automatic flight control system" located in Section 9 "Supplements" of this Manual.

Coupled operation with KAP 150 autopilot (option OPT10 G669) (if installed)

CAUTION

KAP 150 AUTOPILOT COUPLED OPERATION IN APPROACH MODE IS PROHIBITED

Only GPS # 1 may be coupled with the autopilot via the HSI, which receives the information relative to the navigation source (VOR1 or GPS # 1) selected by the "NAV1/GPS1" push-button.

When crossing a waypoint, the track resetting on the following navigation leg must be hand-performed on the HSI.

When the AP "NAV" mode is engaged on the mode controller, the autopilot is then coupled with the HSI and uses displayed information (track and course deviation).

REMARK :
The change of steering source for the autopilot, when the latter is set to "NAV" side mode, implies a sequence of checks, some of which may be omitted or require a particular attention. Therefore it is strongly recommended to temporarily disengage the autopilot "NAV" mode before changing source.

"GARMIN" GNS 430 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

SECTION 5

PERFORMANCE

The installation and the operation of the "GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR) do not change the basic performance of the TB airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement the one given for the standard airplane in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	23 - COMMUNICATIONS			
A	COM-NAV-GPS # 1 GNS 430 (B-RNAV) interfaced with electromechanical instruments (OPT10 23006A)	GARMIN	8.157 (3.700)	25.59 (0.65)
A	COM-NAV-GPS # 2 GNS 430 interfaced with electromechanical instruments (OPT10 23004A)	GARMIN	9.700 (4.400)	25.20 (0.64)

SECTION 7

DESCRIPTION

Normal operating procedures of the "GARMIN" GNS 430 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV / GPS # 2 : IFR) are described in the "GARMIN" GNS 430 Pilot's Guide at the latest revision.

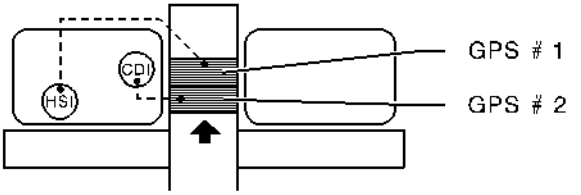
GPS # 1 system consists of :

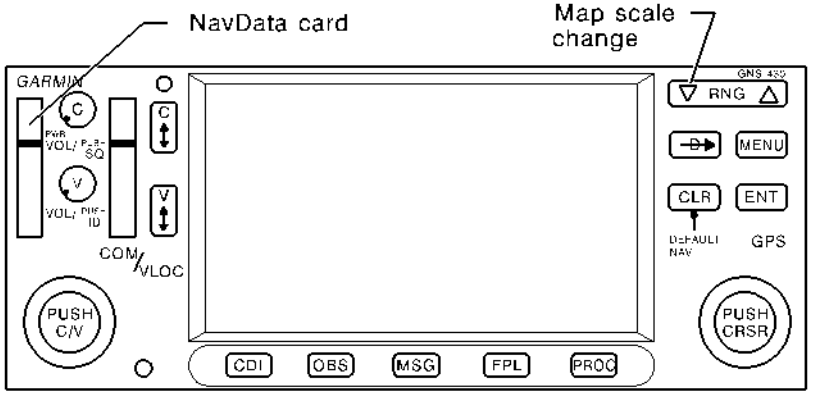
- one "GNS 430" GPS - see Figure 9.51.2 :
  This GPS may be a navigation source for the autopilot. Course deviation information is then displayed on the HSI.
- one repeater/control unit - see Figure 9.51.3 :
  This instrument allows to select the navigation source for the autopilot (NAV1 or GPS1). It is also used to duplicate the MSG, WPT warnings and to recopy GPS TERM, APR information.

GPS # 2 system (if installed) consists of :

- one "GNS 430" GPS - see Figure 9.51.2 :
  This GPS may be a navigation source for the GI 106A CDI.
- one GI 106A CDI.

"GARMIN" GNS 430 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED WITH
ELECTROMECHANICAL INSTRUMENTS

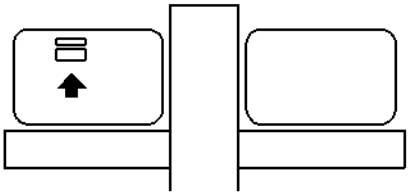


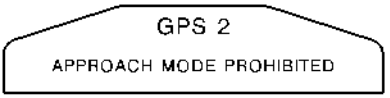


I4345100AAATTY18300

- C - COM volume
- V - VOR volume
- PUSH C/V - Selection of VOR/VHF frequencies
- PUSH CRSR - Selection of group pages
  Group selection :
  - NAV
    WPT
    AUX
  - NRST
- CDI - Navigation source (VLOC/GPS) selection
- OBS - OBS/Leg mode selection
- MSG - Message viewing
- FPL - Create
  - Edit
    Activate
- PROC - Procedures :
  Arrival
  Departure
  - Approach
- D▶ - "Direct TO"

Figure 9.51.2 - "GARMIN" GNS 430 GPS SYSTEM





NAV1	MSG	TERM	GPS CRS OBS
GPS1	WPT	APR	GPS CRS LEG

NAV1
GPS1

- NAV1/GPS1 push-button

GPS CRS OBS
GPS CRS LEG

- GPS CRS OBS/GPS CRS LEG push-button

Annunciators :

- NAV1 : NAV1 navigation source
- GPS1 : GPS1 navigation source

MSG, WPT : Repeater of GPS, MSG, WPT warnings

- TERM, APR : Repeater of TERM, APR data

I4345100AAAVVZ8100

Figure 9.51.3 - Repeater/control unit and GPS placard

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SECTION 1

GENERAL

Approved utilization type :

- Day VFR in sight of ground or water

Certification rule :

- AC 20-138

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB aircraft is equipped with the option ""HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE".

The generalities hereafter supplement those of the standard aircraft described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE".

The GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means using information provided by satellites (the KLN 94 system is able to track up to 8 satellites at a time). It also uses data recorded in a data base. The data base is housed in a Navdata card to be inserted in the front face and is updated every 28 days by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, flight service stations ...

There is also room for up to 500 user defined waypoints and 25 different flight plans.

The KLN 94 GPS receives altitude code from the encoding altimeter.

SECTION 2

LIMITATIONS

The limitations hereafter supplement those of the standard aircraft described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE".

Data base updating must be verified before each flight.

NOTE :
The KLN 94 genuine data base is referenced to WGS 84 geodetic datum.

GPS USED ONLY FOR NAVIGATION IN DAY VFR IN SIGHT OF GROUND OR WATER

Figure 9.52.1 - GPS limitation placard

"HONEYWELL" KLN 94 Pilot's Guide, P/N 006-18207-000 Revision 0 dated 09/00 or any applicable following edition, shall be readily available to the pilot whenever the operation of the GPS navigation system is predicted.

The system must utilize the ORS 02 software version or a more recent one.

SECTION 3

EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard aircraft described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE".

"MSG" ANNUNCIATOR ILLUMINATION

"MSG" push-button of GPS ..... **PRESS**

Check the message.

"Bad Satellite Geometry", Nav Super Flag Failure", "RAIM position error", "RAIM not available", "Searching the sky" or "No GPS Receiver Data" :

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

When the system integrity is restored, the return to GPS mode must be accompanied by the validation of the followed and desired track concordance by using primary sources of navigation.

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard aircraft described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB aircraft is equipped with the option ""HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE".

Normal operating procedures of the GPS recommended by the manufacturer are outlined in the "HONEYWELL" KLN 94 Pilot's Guide at the latest revision and Memory Jogger at the latest revision.

However, it is important to precise the following points for the GPS use on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the GPS prior to flight.

SYSTEM ANNUNCIATORS

"MSG" message annunciator (amber)

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR JUST FLASHES.

"MSG" message annunciator will flash to alert the pilot of a situation that requires his attention. Press the **"MSG" push-button** located on the GPS to view the message (Appendix B of "HONEYWELL" KLN 94 Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).

"WPT" Waypoint annunciator (amber)

This annunciator flashes approximately 20 seconds before warning "NEXT DTK".

SECTION 5

PERFORMANCE

Installation and operation of the "HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE do not change the performance of the TB aircraft described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement those given for the standard aircraft in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	34 - NAVIGATION			
A	GPS KLN 94 Stand alone (OPT10 34306A)	HONEYWELL	4.850 (2.200)	28.74 (0.73)

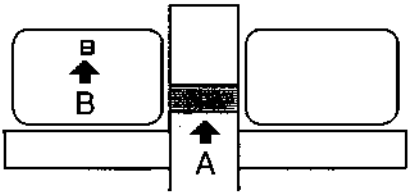
SECTION 7

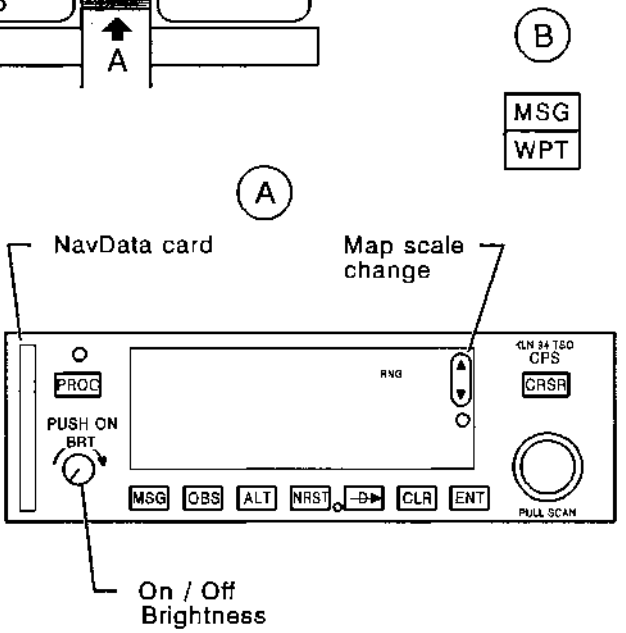
DESCRIPTION

Normal operating procedures of the "HONEYWELL" KLN 94 GPS NAVIGATION SYSTEM - STAND ALONE are described in the "HONEYWELL" KLN 94 Pilot's Guide at the latest revision.

The option includes :

- one KLN 94 GPS installed in radio rack - see Figure 9.52.2,
- one "MSG/WPT" repeater on advisory panel.





MSG - Message viewing

OBS - OBS/Leg mode selection

ALT - Altitude functions

NRST - Nearest VOR, NDB, Airports, interceptions, User defined waypoints

"Direct TO"

PROC - Procedure

CLR - Clear

ENT - Enter

I4345100AAAUTY8300

Figure 9.52.2 - "HONEYWELL" KLN 94 GPS SYSTEM

INTENTIONALLY LEFT BLANK

SUPPLEMENT

"GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL INSTRUMENTS (GPS # 1 : B-RNAV)

TABLE OF CONTENTS

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH ***ELECTROMECHANICAL HSI***

SECTION 1

GENERAL

This supplement is intended to inform the pilot about the equipment limitations, description and operations necessary to the operation when the TB airplane is equipped with the option ""GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV)".

Approved utilization types :

- IFR in continental and Terminal Enroute areas as additional source,
- B-RNAV,
- Non precision approaches (GPS, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV).

Conformity means :

- ACJ 20X4 and ACJ 20X5
- AC 20-138.

The generalities hereafter supplement those of the standard airplane described in Section 1 "General" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV)".

This supplement does not constitute an operational utilization authorization.

The GPS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means using information provided by satellites (the GNS 530 system is able to track up to 12 satellites at a time). It also uses data recorded in a data base. The data base is housed in a Navdata card to be inserted in the front face and is updated every 28 days by replacing the card.

Each data base contains information about airports, communication frequencies, VORs, NDBs, Intersections, SIDs, STARs, instrument approaches, flight service stations ...

There is also room for up to 1000 user defined waypoints and 20 different flight plans.

SECTION 2

LIMITATIONS

2.1 - General

The limitations hereafter supplement those of the standard airplane described in Section 2 "Limitations" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV)".

"GARMIN" GNS 530 Pilot's Guide, P/N 190-00181-00 Revision A dated 04/00 or any applicable following edition, shall be readily available to the pilot, each time the GPS navigation system is used.

The system must utilize the following software versions or more recent ones :

Subsystem	Software
MAIN	2.08
GPS	2.10

Data base updating must be verified before each flight.

The navigation sources required for the anticipated flight shall be serviceable and allow an immediate crossed check on available ground aids or shall allow to return to primary navigation sources in case of GPS navigation loss.

Use of GPS as a navigation source is **PROHIBITED**, unless the pilot verifies the currency of the data base and the coordinates of each selected waypoint.

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH ***ELECTROMECHANICAL HSI***

Procedures during flight preparation

During flight preparation, the pilot must get information about GPS constellation, via aeronautical data (consultation of GPS NOTAM).

When less than 24 satellites are available (or less than 23 if equipment uses pressure altitude information), the pilot must make sure that RAIM function is available on the projected route and for the flight period in B-RNAV areas.

RAIM function prediction can be done using prediction software integrated into GNS 530 or any other approved software such as the one provided for the users by EUROCONTROL on INTERNET.

If a loss of RAIM function is predicted on the chosen route for a period of more than 5 minutes, the flight cannot be done. In that case, the flight will either be postponed or another route will be chosen. The prediction software must then be used again.

Preflight procedures

During preflight checks, it is necessary to verify data base validity (updating of the last AIRAC cycle).

The onboard equipment must be initialized in compliance with manufacturer procedures (refer to "GARMIN GNS 530 Pilot's Guide").

In case a pre-programmed or an already stored flight plan is used, an accurate check of the waypoints is also required.

General in-flight procedures

Before entering a B-RNAV area, the pilot must make sure that RAIM function is available.

Flight plan activation, WPT and LEG changes as well as any modification of initialization data must be done in compliance with equipment User's Manual.

For every navigation into areas reserved for B-RNAV, the pilot must be provided with a predicted availability of RAIM on the route, if the constellation disposes of less than 23 satellites.

The check of navigation system information consistency must be regularly performed during the flight :

- when reaching each waypoint or before reaching the position report point of the ATC,
- before leaving a published route and then every 15 minutes during this type of operation (function "Direct To").

The check of position information consistency may be performed by comparing this position with the one determined by the primary radionavigation sources.

2.2 - SID/STAR

The use of SIDs and STARs stored in GPS data base is only authorized, if the pilot has checked that GPS procedure corresponds to the one given in the official documentation (coordinates of various points and paths between points).

2.3 - Instrument approach (Non precision approach)

CAUTION

KAP 150 AUTOPILOT (if installed) COUPLED OPERATION IS PROHIBITED

Use of the GPS to perform an instrument approach is possible, as long as this use is approved by the air navigation local authority for the approach in question.

Instrument approaches performed with the GPS must be achieved according to approved approach procedures given in the GPS data base. The data base must be kept up to date and base data accuracy checked with regard to the official documentation, preferably before the flight.

(a) Instrument approaches must be performed in GPS approach mode and the RAIM must be available at the final approach fix (FAF).

(b) Precision approaches (ILS, LOC, LOC-BC, MLS ...) must not be performed with the GPS.

(c) If a landing is required on a diversion field, an other means than GPS must be available to perform approach to this field. Required on board equipment must be serviceable and ground aids must be operational.

Instrument approaches can only be performed, as long as used point coordinates are referenced with regard to WGS 84 system or an equivalent system.

SECTION 3

EMERGENCY PROCEDURES

The emergency procedures hereafter supplement those of the standard airplane described in Section 3 "Emergency procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV)".

HSI NAV FLAG OR "INTEG" WARNING

Return to VOR or ADF navigation source and to remaining operational navigation equipment.

"NAV1/GPS1" push-button **NAV1**

"MSG" ANNUNCIATOR ILLUMINATION

In navigation with GPS associated to the warning :

"MSG" push-button of associated GPS ..... **PRESS**

Check the message.

NOTE :
A single "stand-alone" GPS certified as B-RNAV navigation means is required to fly in B-RNAV areas.

"MSG" ANNUNCIATOR ILLUMINATION (Cont'd)

In case of loss of RAIM function, the navigation information remains available but its integrity is no longer controlled.

- If RAIM loss occurs out of B-RNAV area, the aircraft must not enter B-RNAV area.
- If RAIM loss occurs in B-RNAV area, GPS navigation can be continued as long as cross-checkings done with conventional means (VOR, DME, NDB and dead reckoning elements) enable making sure that B-RNAV accuracy criteria are observed. When this condition is not met, the Air Traffic Control must be contacted to return to conventional navigation.

If GPS navigation information is lost or declared not valid, use the other available navigation means. If this occurs during instrument approach final phase, a go-around must be made, except if the other approved radio means to perform approach are displayed and available.

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH *ELECTROMECHANICAL HSI*

SECTION 4

NORMAL PROCEDURES

The normal procedures hereafter supplement those of the standard airplane described in Section 4 "Normal procedures" of the basic Pilot's Operating Handbook, when the TB airplane is equipped with the option ""GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV)".

Normal operating procedures of the GPS recommended by the manufacturer are outlined in the "GARMIN" GNS 530 Pilot's Guide at the latest revision and Memory Jogger at the latest revision.

However, it is important to precise the following points for the GPS use on TB :

SET UP CONDITIONS

- Verify if the data base is current. Verify data on the self test page.
- Verify that altitude data is valid for the GPS prior to flight.
- In case of B-RNAV use :

  During the preflight planning phase, the availability of GPS integrity (RAIM) shall be confirmed for the intended flight (route and time).

  B-RNAV flight dispatch shall not be made in the event of a continuous loss of RAIM for more than 5 minutes predicted in any part of the intended flight.

  When less than 24 satellites are available (or less than 23 if equipment uses pressure altitude information), the pilot must make sure that RAIM function is available on the projected route and for the flight period in B-RNAV areas.

  When 23 or more satellites are available, the prediction of satellite position is valid for 7 days. Their predicted availability is ensured for 48 hours by EUROCONTROL.

  When less than 23 satellites are available, the predicted availability of RAIM shall be confirmed short before each flight.

SYSTEM ANNUNCIATORS / SWITCHES / CONTROLS

"NAV1/GPS1" push-button

This push-button may be used to select data to be displayed on the pilot's HSI ; the NAV data come either from NAV1 navigation receiver or from the GPS # 1.

When pressed once, the push-button illuminates **NAV1** (white), pressed one more time illuminates **GPS1** (green).

"GPS CRS OBS/GPS CRS LEG" push-button

This push-button may be used to select GPS navigation mode (LEG or OBS mode).

When pressed once, the push-button illuminates **GPS CRS OBS** (amber), pressed one more time illuminates **GPS CRS LEG** (green).

"MSG" message annunciator (amber)

CAUTION

"MSG" ANNUNCIATOR MAY BE PERMANENTLY ILLUMINATED IF THERE EXISTS A PERMANENT MESSAGE. WHEN A NEW MESSAGE APPEARS, "MSG" ANNUNCIATOR JUST FLASHES

This annunciator is associated with the **GPS # 1**.

"MSG" message annunciator will flash to alert the pilot of a situation that requires his attention. Press the **"MSG" push-button** located on the GPS # 1 to view the message (Chapter 12 of "GARMIN" GNS 530 Pilot's Guide contains a list of all the messages likely to appear on the "Message" page and their meanings).

"WPT" Waypoint annunciator (amber)

This annunciator is associated with the **GPS # 1**.

This annunciator illuminates approximately 10 seconds before "TURN TO XXX" warning.

"APR" annunciator is a duplicate of the GPS # 1 "APR" information.

"TERM" annunciator is a duplicate of the GPS # 1 "TERM" information.

"GPS" mode of the GPS # 1

When using the "GPS" mode, GPS # 1 navigation data (course deviation, TO/FROM) are presented on the HSI.

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH ***ELECTROMECHANICAL HSI***

GPS flight plan

In the active flight plan, addition of a STAR or an approach is always made at the end of the flight plan. In the scope of these additions, the pilot must pay attention not to duplicate points.

KFC 225 autopilot (if installed) coupled operation (option OPT10 22-001)

GPS # 1 may be coupled with the autopilot via the HSI, which receives the information relative to the navigation source (VOR1 or GPS # 1) selected by the "NAV1/GPS1" push-button.

When crossing a waypoint, the airplane turns automatically, while a "TURN TO" warning appears. This warning disappears during the turn. The pilot must then manually adjust the course indicator on the HSI. Approximately 1 minute later, after the warning disappearing, if the pilot has not adjusted manually the course indicator to the correct heading, a warning remenbers him that.

When the AP "NAV" mode is engaged on the mode controller, the autopilot is then coupled with the HSI and uses displayed information (track and course deviation).

Engaging the "NAV" mode on the autopilot mode controller will activate the FD on the ADI. The FD uses selected course and left/right steering information displayed on the HSI.

Coupling with autopilot during a non precision approach must be made in "NAV" mode, except in the following cases :
- holding pattern,
- landing pattern turn,
- interrupted approach,

which have to be made in "HDG" mode.

For memory, the approach particular point name in the GARMIN system is as follows :

- IA = IAF
- FA = FAF ou FAP
- MA = MAP
- MH = MAHP

When the GPS suspends the linked navigation (GPS "SUSP" annunciator), the autopilot continues using heading and "GPS CRS OBS" annunciator (amber) illuminates.

NOTE :
The KFC 225 autopilot has a "Lateral clearance" function : refer to Section 4 "Normal procedures" of the Supplement "HONEYWELL KFC 225 automatic flight control system" located in Section 9 "Supplements" of this Manual.

Coupled operation with KAP 150 autopilot (option OPT10 G669) (if installed)

CAUTION

KAP 150 AUTOPILOT COUPLED OPERATION IN APPROACH MODE IS PROHIBITED

Only GPS # 1 may be coupled with the autopilot via the HSI, which receives the information relative to the navigation source (VOR1 or GPS # 1) selected by the "NAV1/GPS1" push-button.

When crossing a waypoint, the track resetting on the following navigation leg must be hand-performed on the HSI.

When the AP "NAV" mode is engaged on the mode controller, the autopilot is then coupled with the HSI and uses displayed information (track and course deviation).

REMARK :
The change of steering source for the autopilot, when the latter is set to "NAV" side mode, implies a sequence of checks, some of which may be omitted or require a particular attention. Therefore it is strongly recommended to temporarily disengage the autopilot "NAV" mode before changing source.

SECTION 5

PERFORMANCE

The installation and the operation of the "GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV) do not change the basic performance of the TB airplane described in Section 5 "Performance" of the basic Pilot's Operating Handbook.

SECTION 6

WEIGHT AND BALANCE

Information hereafter supplement the one given for the standard airplane in Section 6 "Weight and balance" of the basic Pilot's Operating Handbook.

A or O	OPTIONAL EQUIPMENT	EQUIPMENT SUPPLIER	WEIGHT per unit lb (kg)	ARM in. (m)
	23 - COMMUNICATIONS			
A	COM-NAV-GPS # 1 GNS 530 (B-RNAV) interfaced with electromechanical HSI (OPT10 23007A)	GARMIN	10.141 (4.600)	23.23 (0.59)

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH ***ELECTROMECHANICAL HSI***

SECTION 7

DESCRIPTION

Normal operating procedures of the "GARMIN" GNS 530 GPS (B-RNAV) NAVIGATION SYSTEM INTERFACED WITH ELECTROMECHANICAL HSI (GPS # 1 : B-RNAV) are described in the "GARMIN" GNS 530 Pilot's Guide at the latest revision.

GPS # 1 system consists of :

- one "GNS 530" GPS - see Figure 9.53.1 :
  This GPS may be a navigation source for the autopilot. Course deviation information is then displayed on the HSI.
- one repeater/control unit - see Figure 9.53.2 :
  This instrument allows to select the navigation source for the autopilot (NAV1 or GPS1) and GPS navigation mode (OBS or LEG). It is also used to duplicate the MSG, WPT warnings and to recopy GPS TERM, APR information.

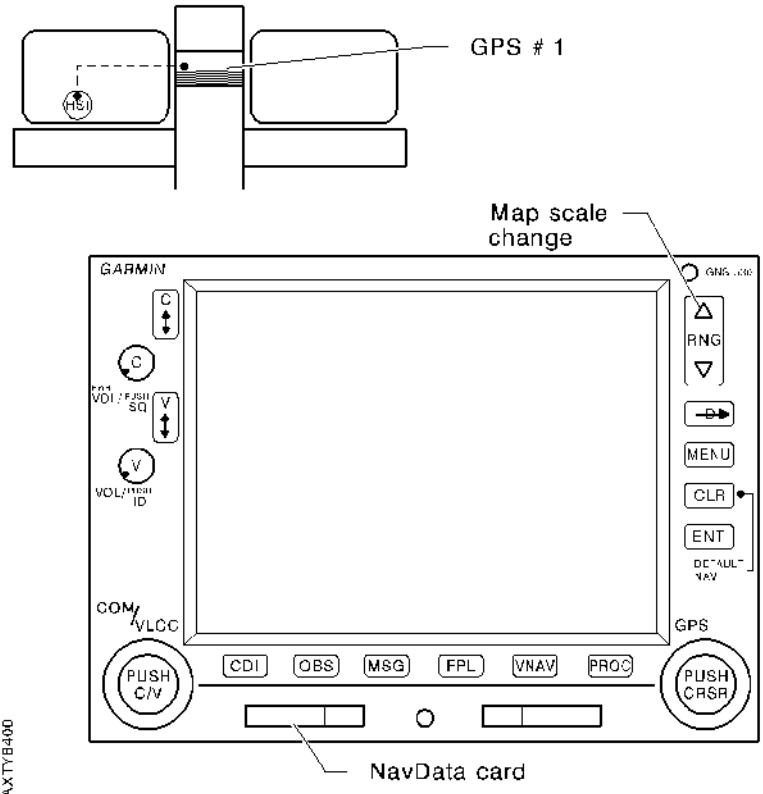
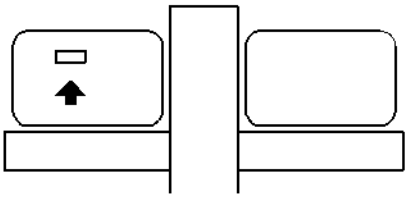


Figure 9.53.1 - "GARMIN" GNS 530 GPS SYSTEM

"GARMIN" GNS 530 GPS (B-RNAV)
NAVIGATION SYSTEM INTERFACED
WITH ***ELECTROMECHANICAL HSI***



NAV1	MSG	TERM	GPS CRS OBS
GPS1	WPT	APR	GPS CRS LEG

NAV1
GPS1

NAV1/GPS1 push button

GPS CRS OBS
GPS CRS LEG

GPS CRS OBS/GPS CRS LEG push button

Annunciators :

- NAV1 : NAV1 navigation source
- GPS1 : GPS1 navigation source
- MSG, WPT : Repeater of GPS, MSG, WPT warnings
- TERM, APR : Repeater of TERM, APR data

I4345100AAAXTY18200

Figure 9.53.2 - Repeater/control unit and GPS placard

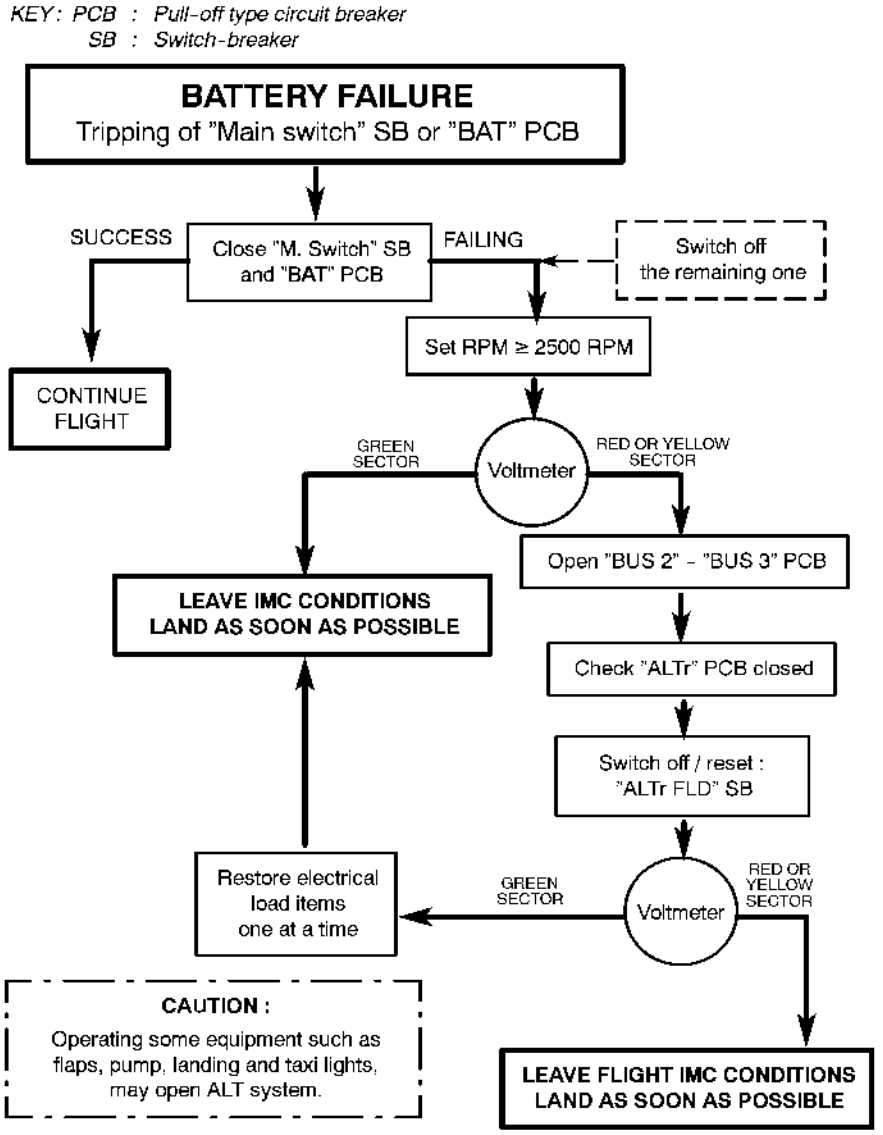


Figure 3.2 - BATTERY FAILURE DIAGRAM

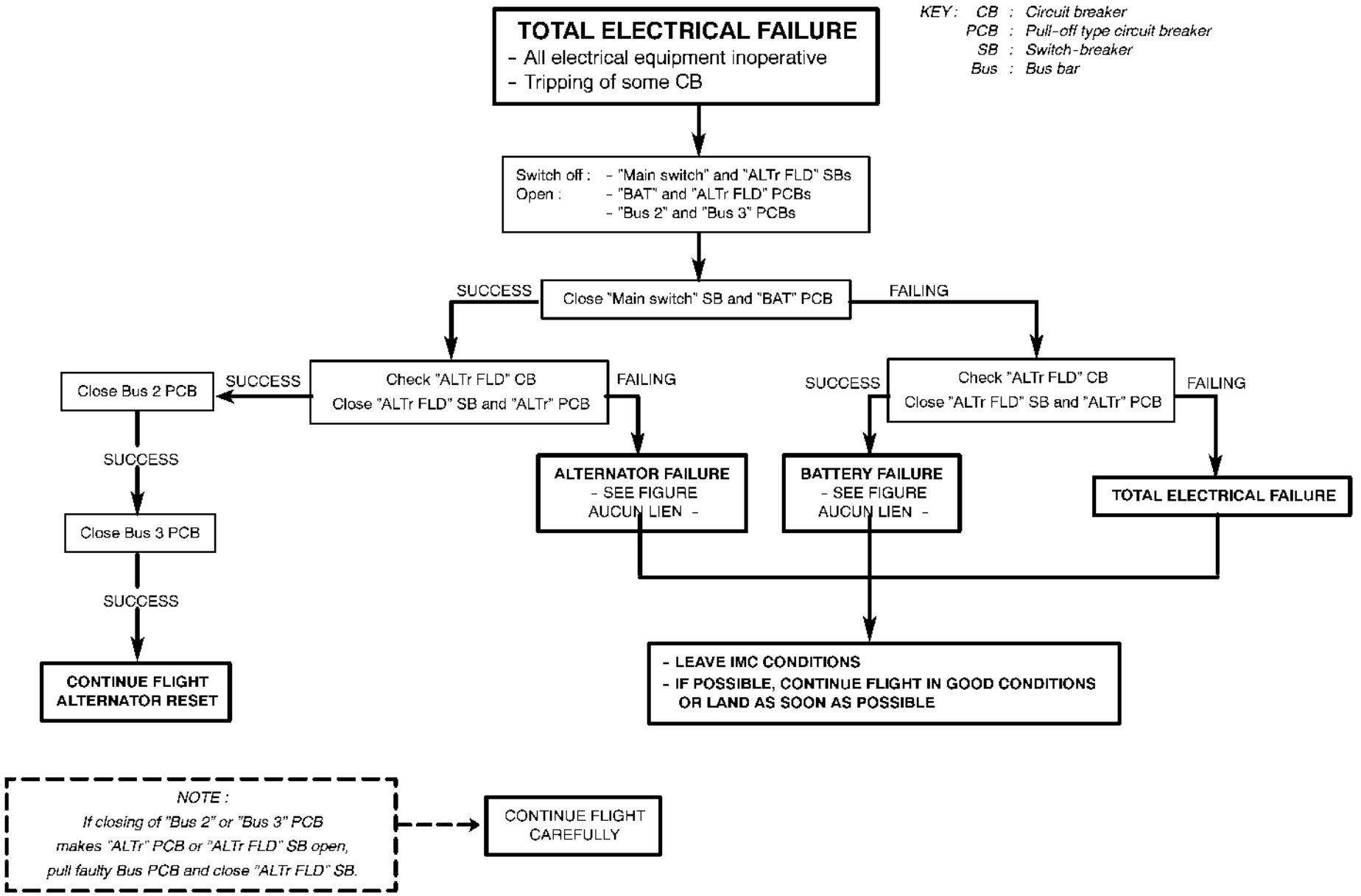


Figure 3.3 - TOTAL ELECTRICAL FAILURE DIAGRAM

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	1446	36.2	52.34				
Optional equipment	11	19.7	0.22				
Basic empty weight	1457		52.56				A(1)
Pilot (without Opt. 0800)	170	45.4	7.71				A(2)
Pilot (with Opt. 0800)	/	47.4	/				
Front passenger (without Opt. 0800)	170	45.4	7.71				
Front passenger (with Opt. 0800)	/	47.4	/				
Rear seat passengers	284	80.1	22.75				
Fuel (31.9 U.S Gal.)	192	42.3	8.12				B(1)
Baggage	18	102.3	1.84				B(2)
TOTAL WEIGHT AND MOMENT	2291		100.69				M

Figure 6.3 - SAMPLE LOADING