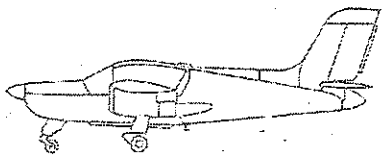
EADS SOCATA

FLIGHT MANUAL

MS 893E RALLYE



FLIGHT MANUAL

FOR AIRCRAFT

MS.893 E

Manufacturer : SOCATA Groupe AEROSPATIALE
Usine d'OSSUN
Boîte Postale n° 38
65001 - TARBES (FRANCE)
Telex : 520 828
Tel. : (62) 93.97.30

Type Certificate n° 22 dated 9.5.1972
Serial number Registration

Sections 2, 3 (Pages 2.01 to 2.07, 3.01 to 3.05, 5.01, 5.26) approved by DIRECTION GENERALE DE L'AVIATION CIVILE (D.G.A.C)

Approval D.G.A.C

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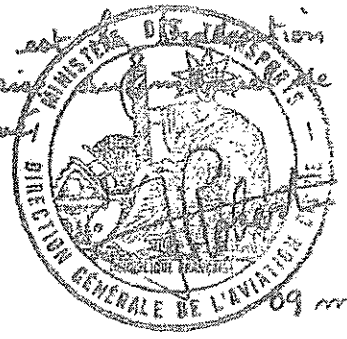


09 mars 1982

This aircraft must be operated in accordance with the limitations contained in Section 2 of this Flight Manual.

THIS DOCUMENT MUST BE KEPT PERMANENTLY ABOARD THE AIRCRAFT.

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 0

GENERAL

CONTENTS

SOCATA
MS. 893 E FLIGHT MANUAL

LIST OF AMENDMENTS

0.3 - List of symbols


Cigar lighter


Heated pitot tube


Battery


Starter


Instrument panel lighting


Emergency instrument panel lighting


Day-night damper

A.C.Excitation generator


Navigation lights


Anti-collision light


Turn and bank indicator


Fuel gauge


Landing light


Fuel pump


Fuel cock


Electric flaps


Starting injection


Pencil location

Oil temperature

Oil pressure

Fuel pressure

Ammeter

0.4 - LIST OF ABBREVIATIONS

A	: Ampere
°C	: Degre celsius (centigrade)
°F	: Degre FAHRENHEIT
ft	: Foot
Imp.gal	: Imperial gallon
US.gal	: U.S. gallon
HP	: Horse Power
in.Hg	: Inch of mercury
kg	: Kilogramme
km/h	: Kilometer per hour
kt	: Knot (1 nautical mile-1852 m per hour)
l	: litre
lb	: Pound
M	: Weight
MPH	: Mile per hour (statute mile 1609 m per hour)
m	: Metre
m.bar	: Millibar
m/s	: Metre per second
PA	: Manifold pressure
psi	: Pound per square inch (lb/in^2)
RPM	: Revolution per minute
U.S quart	1/4 of US gallon
V	: Volt
VA	: Maneuver speed
VC	: Calibrated Airspeed
Vc	: Design cruising speed
Vfe	: Flap extended speed
VI	: Indicated air speed (I.A.S)
Vne	: Never exceed speed
Vno	: Normal operating limit speed
Vp	: Ground speed
w	: Watt
Zp	: Pressure altitude

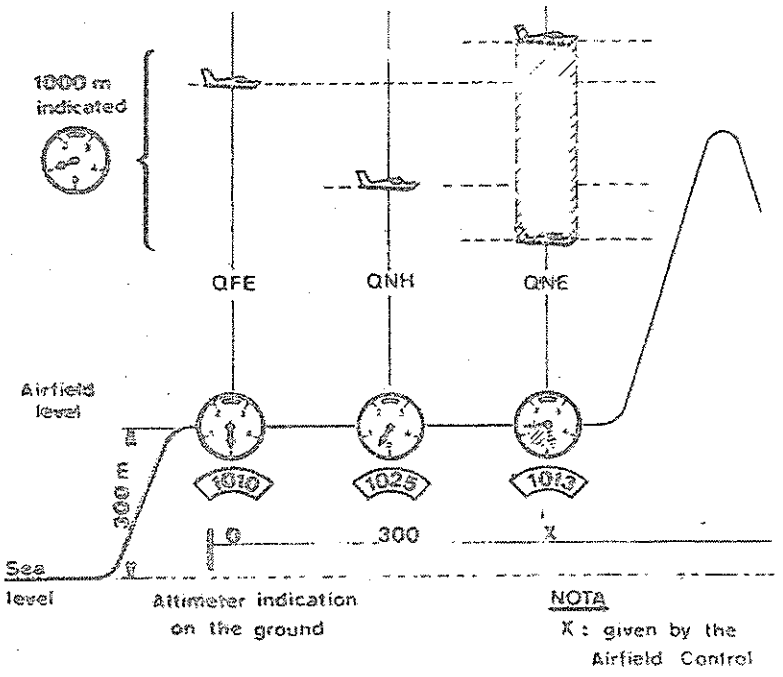
0.5 - USE OF THE ALTIMETER

The altimeter is an instrument which mesures the atmospheric pressure (absolute pressure). It is graduated in terms of altitude as compared to the pressure altitude of the typical atmosphere.

Since airfields are located at various altitudes and the atmospheric pressure varies in time for a same location, the altimeter is provided with an adjusting knob for resetting the pointers.

A window displays the pressure value corresponding to this setting.

Several altitude settings are used.



Q F E SETTING AT AIRFIELD LEVEL PRESSURE

The indicated height on ground is zero.
In local flight, the altimeter indicates continuously the pressure altitude relative to airfield.

Q N H SETTING AT THE PRESSURE CORRESPONDING TO THE READING OF ACTUAL AIRFIELD ALTITUDE - (temperature corrections excepted).

The indicated altitude on ground is close to the value given on the map.
In order to obtain the height above ground in flight, the altitude of the local area, given on the map. should be substracted from the altimeter reading.
Since the pressures vary in space, QNH is applicable within a certain area only.
The local Controlling Authorities give the local QNH.

Q N E LOCAL ALTITUDE CORRESPONDING TO THE STANDARD PRESSURE SETTING - 1013,2 mb (29,92 in.Hg).

This altitude value (given by the airfield controller may be quite different from the actual airfield altitude.
The setting to 1013,2 is used in airfield paths only in the case where the airfield altitude is such that the QFE or QNH setting is not possible. Then, the controller gives the altitude to be read on the altimeter at airfield level.
The setting to 1013,2 mb is used for flying at a level conforming to regulations or ATC instruction. It allows vertical separation to be provided, relative to other aircraft, set to the same reference.

0.6 - TYPICAL ATMOSPHERE

The mass of air surrounding the earth may be characterized in each point by three parameters : pressure, temperature and humidity Variation of these parameters as a function of the geometrical altitude (height above selected reference average sea level) defines the atmosphere.
The typical or standard atmosphere given in the table hereafter, is the reference atmosphere. It corresponds approximately to the average of the values measured in temperate zones.
The table hereafter gives the following data as a function of the altitude in m and ft :

- pressure in m.bar (p)
- temperature in CENTIGRADE (°C) and FAHRENHEIT (°F) degrees.
- coefficient by which calibrated airspeed VC should be multiplied to obtain true airspeed($\frac{1}{\sqrt{\sigma}}$).

Refer to section V. - LEVEL FLIGHT PERFORMANCES, for determining VC speed from indicated airspeed VI (I.A.S)

Z ft	p m.bar	°C	°F	$\frac{1}{\sqrt{\sigma}}$
0	1 013.25	+ 15.00	+ 59.00	1.0000
2.000	942.10	+ 11.00	+ 51.80	1.0294
4.000	875.03	+ 7.07	+ 44.86	1.0612
6.000	811.88	+ 3.11	+ 37.57	1.0938
8.000	752.47	- 0.86	+ 33.80	1.1280
10.000	696.65	- 4.80	+ 23.35	1.1638
12.000	644.21	- 8.80	+ 16.20	1.2012
14.000	595.00	- 12.70	+ 9.20	1.2405
16.000	549.16	- 16.68	+ 2.00	1.2815
18.000	505.98	- 20.66	- 5.20	1.3247
20.000	466.59	- 24.63	- 13.50	1.3700

0.7 - CORRESPONDENCE BETWEEN UNITS

Distance

The nautical mile is the average length of the sexagesimal minute of earth latitude.

1 NAUTICAL MILE = 1852 meters

Pressures

Units used :

Bar-pieze (pz) - inch of mercury (in.Hg) pound per square inch (lb/in^2-psi)

	bar	pz	in.hg	$\frac{lb}{psi}/in^2$	kg/cm^2
bar	1	100	29.5	14.5	1.0197
pz	0.01	1	0.295	0.145	0.010197
in.Hg	0.03386	3.386	1	0.49117	0.03453
$\frac{lb}{psi}/in^2$	0.06894	6.894	2.0359	1	0.0703
kg/cm^2	0.098067	98.067	28.958	14.2233	1

Exemple : psi : 6.894 pz

Power

Units used :

Watt (W) French horse power (CV) British horse power (HP)

	W	CV	HP
W	1	0.001359	0.001341
CV	735.49	1	0.9863
Hp	745.69	1.01387	1

Capacities

United used.

litre (l) - Imperial gallon (Imp.gal)
US gallon (US gal.)-

	l	Imp.gal	US.gal
l	1	0.219	0.264
Imp.gal	4.546	1	1.201
U.S. gal	3.785	0.833	1

Angular velocities

Units used

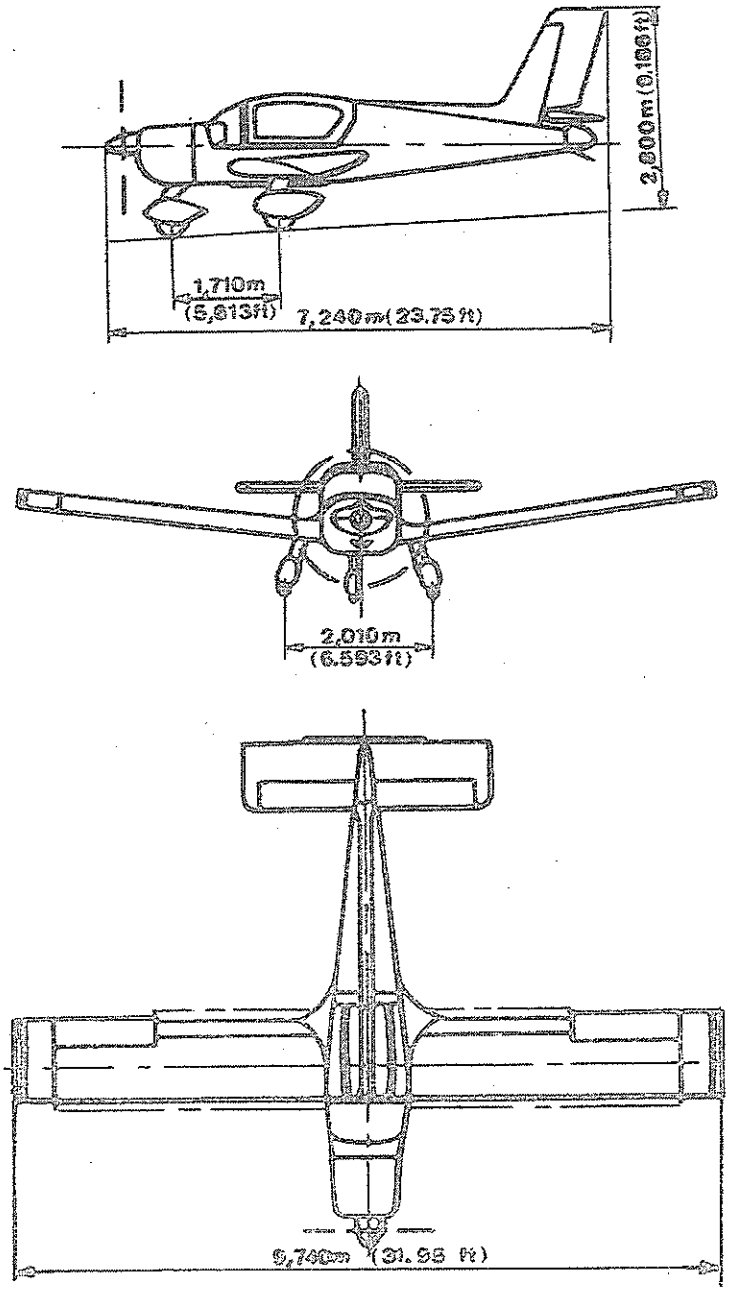
Revolution per minute (RPM) radian per second (rd.s)

1 RPM = 0.1047 rd./s

1 rd/s = 9.549 RPM

SECTION I

DESCRIPTION


2,800m (9.186ft)
1,710m
(5,613ft)
7,240m (23.75ft)
2,010m
(6.593ft)
9,740m (31.95 ft)

SECTION 1
DESCRIPTION

1.1 - General characteristics

Single engine, low cantilever wing aircraft, entirely made of metal

1.1.1 - Airframe (Theoretical dimensions)

Overall dimensions :
- Maximum span 9.740 m - 31.95 ft
- Total length 7.24 m - 23.75 ft
- Total height 2.80 m - 9.186 ft
- Propeller ground clearance, aircraft in line of flight, forward tire deflated, shock strut retracted.
  - SENSENICH propeller) 0.100 m - 4 in
  - HARTZELL propeller)

Wings :
- Aspect ratio 7,5
- Dihedral 7°
- Wing area 12,28 m^2 - 132.18 sq.ft
- Aerodynamic chord 1,3 m - 4.265 ft
- Slotted leading edge interconnected over the whole span

Ailerons :
- Slotted type
- Mean span 1.494 m - 4.901 ft
- Unit surface 0.78 m^2 - 8.36 sq.ft

Wing flaps :
- Recoil and slotted type
- Mean span 2.33 m - 7.64 ft
- Unit surface 1.2 m^2 - 12.91 sq.ft

Horizontal stabilizer
- Non adjustable stabilizer
  - Span 3.67 m - 12.04 ft
  - Surface 1.65 m^2 - 17.76 sq.ft

- Balance horn control surface
  - Surface 1.83 m2 - 19.70 sq.ft
- Automatic tab
  - Surface 0.072m2 - 0.77 sq.ft
  - Automaticity 100 %
- Controlled tab
  - Surface 0.072 m2- 0.77 sq.ft

Vertical stabilizer :
- Surface of fin 0.88 m2- 9,48 sq.ft
- Balance horn control surface
  - Surface 0.86 m2 - 9.26 sq.ft

Controlled tab (optional towing)
- Surface 0.072m2 - 0.77 sq.ft

Landing gear :
- Fixed tricycle type
- Track 2.01 m - 6.59 ft
- Wheel base 1.71 m - 5.60 ft
- Nose gear tire 5.00-4 - 6PR
- Inflating pressure 1.4 bar - 20.3 psi
- Main gear tires
  - Disc type brakes
    tire 6.00-6 - 6PR
    Inflating pressure 1.8 bar - 26.10 psi
- Shock struts

Oleopneumatic telescopic type
- Brakes

Hydraulic, differential type
Fluid : Aeroshell fluid 4 - Specif. AIR 3520
DTD 585

1.1.2 - Engine

- Make LYCOMING
- Type O360.A3A with SENSENICH propeller
  O360.A1A with HARTZELL propeller
- Number of cylinders 4
- Power 180 HP - 135 KW

1.1.3 - Propeller

76 EM8 054
SENSENICH 76 EM8 056
76 EM8 060

Diameter : Ø 1,93 m - 76 in.
Optional: HARTZELL HC.C2YK - 1BF/F 7666 A-2
(See chapter 7)
Diameter : Ø 1,88 m - 74 in.
Ø mini 1,83 m - 72 in.
Variable pitch "Constant speed" type

1.1.4 - Fuel
Aircraft gasoline 100/130 or AVGAS 100 LL
Total capacity (maximum)

235 l 62 US.Gal. 51.6 Imp. Gal.
Minimum usable capacity (warranted)

220 l 58 US.Gal. 48.4 Imp.Gal.
Unusable capacity
4,4 l 1.15 US.Gal. 0.96 Imp.Gal.

1.1.5 - Oil

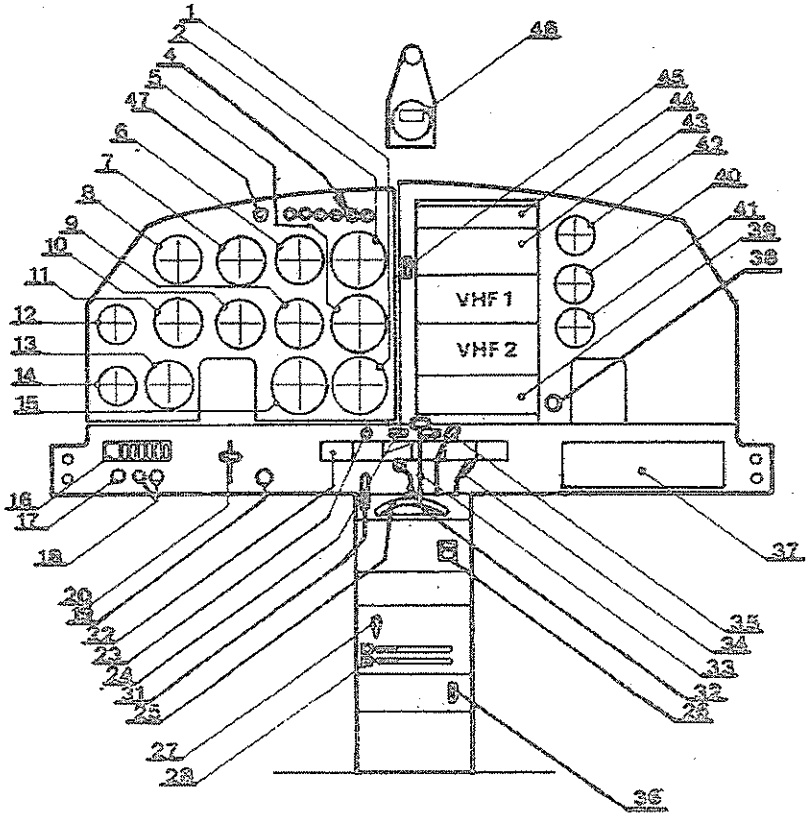
During the first 50 operating hours :
pure mineral oil
After the first 50 operating hours :
dispersing oil.

Grade :
Above +15°C (59°F) SAE 50
From -1°C to +32°C (30°F to 89°F) SAE 40
From -18°C to +21°C (1°F to 69°F) SAE 30
Under -12°C (14°F) SAE 20

Total engine capacity
7.51 l - 1.980 US.Gal. 1.642 Imp.Gal.

Usable capacity
6 l 1.584 US.Gal. 1.314 Imp.Gal.

Total system capacity
8 l - 2.112 US.Gal. 1.752 Imp.Gal.


VHF 1
VHF 2

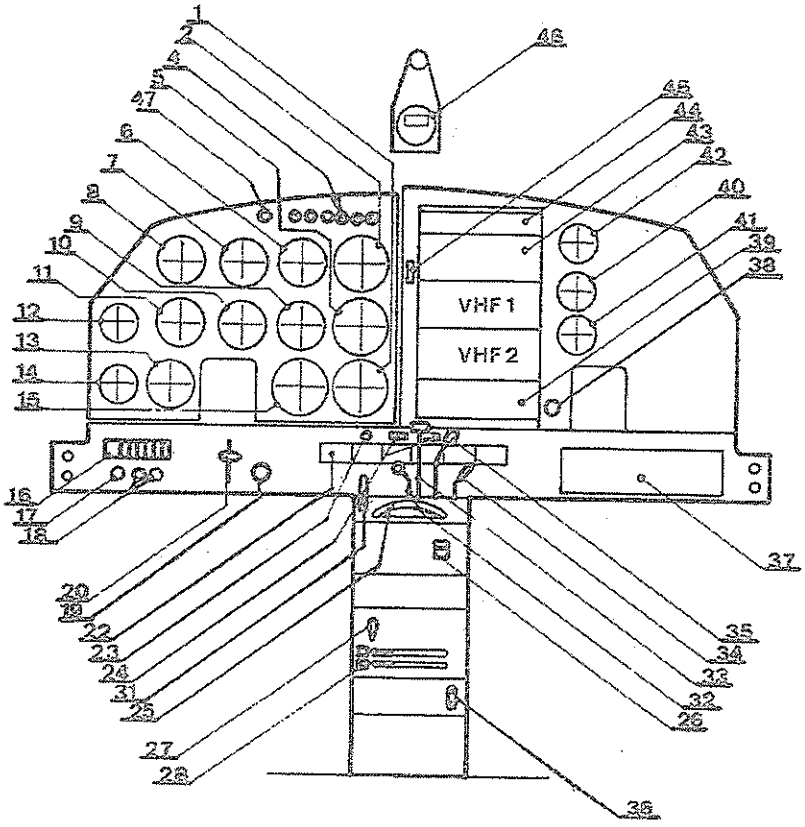
1.2 - Instrument panel

The instrument panel consists of a left hand shock mounted board, a right board, a strip and a center pedestal.
This panel accommodates the following standard or optional instruments.

ITEM-

1-Radio compass indicator (optional)
2-VOR.1 indicator (optional) - (VOR/ILS)
4-Warning lights
5VOR.2 indicator (optional) - (VOR/LOC)
6-Altimeter 1 - indicator
7-Artificial horizon indicator (optional)
8-Airspeed indicator
9-Rate of climb indicator
10-Directional indicator (optional)
11-Turn and bank indicator
12-Manifold pressure gauge (optional)
13-Tachometer indicator
14-Alternate static pressure
15-Altimeter 2 - indicator (optional)
16-Switches (from LH to RH)
- Battery
- Excitation
- Fuel pump
- Turn and bank indicator
- Pitot
- Anti-collision lights
- Navigation lights

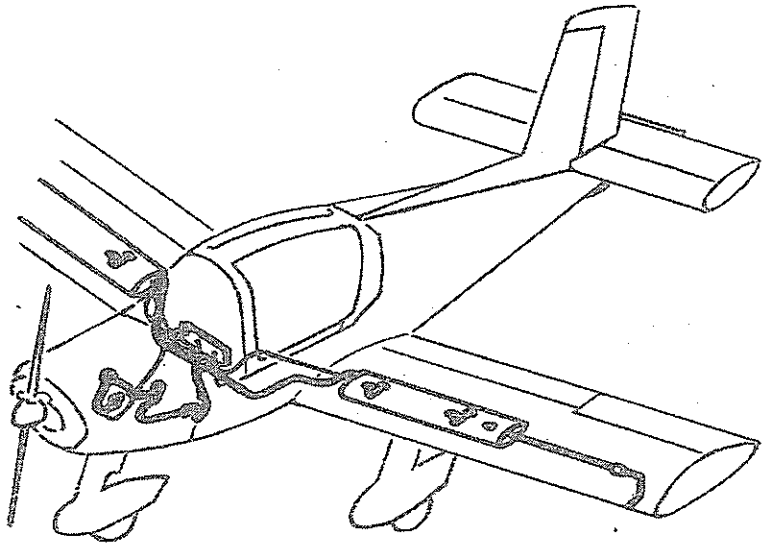
17-Conventional lighting rheostat (optional)
18-Emergency and radio lighting rheostat (option)
19-Magneto selector
20-Parking brake handle

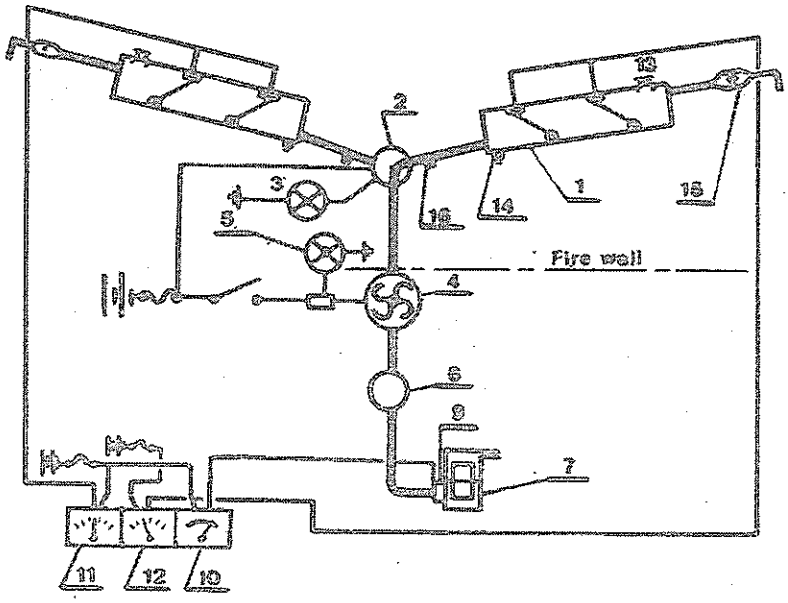

VHF 1
VHF 2

22. JAEGER compound panel (from LH to RH)
    - oil temperature
    - oil pressure
    - fuel pressure
    - LH fuel content indicator
    - RH fuel content indicator
    - Ammeter
23. Pencil-holder
24. Left and right landing lights switches
25. Rudder tab (optional)
26. Wing flaps electric control
27. Fuel shut-off cock
28. Air conditioning control

31. Elevator tab
32. Carburettor heating control
33. Throttle control
34. Mixture control
35. Propeller governor control (optional)
36. Indicator for wing flaps position
37. Circuit-breakers assembly (see on sheet 1.10.01)
38. Cigar-lighter
39. Transponder (optional)
40. ALCOR indicator (optional)
41. Cylinder head temperature indicator (option.)
42. Thermo carburettor indicator (optional)
43. Radio compass (optional)
44. Selector box (optional)
45. Glider release control (optional)
46. Compass.
47. Switch for manual starting up of the emergency marker (optional)

NOTE - The clock may be installed optionally on the control wheel.




2
13
3
1
15
5
16
14
Fire wall
4
6
9
7
11
12
10

1.3 - Fuel system

The fuel is contained within two metal tanks (1) each one located in a wing spar box.

Each tank is connected to a 3 way, 3 position (left, closed, right) cock (2) through a pipe.
This cock is actuated by means of a control on the pedestal.

The contact for the "Fuel cock" red warning light (3) is actuated by a cam integral with the cock control.

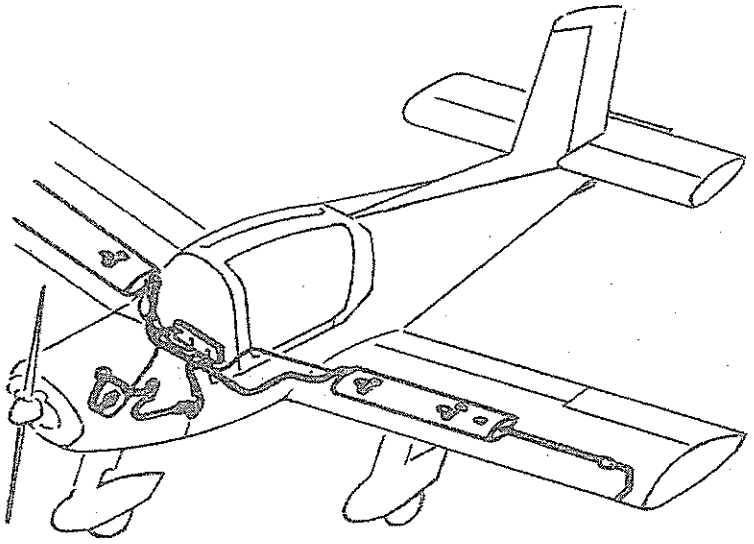
This light is energized as soon as the main electrical circuit is on and the cock is closed or in operation.

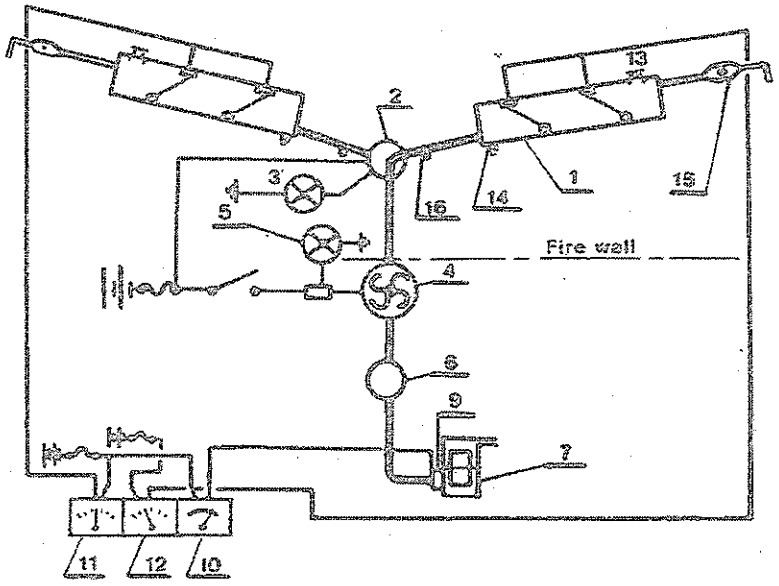
It goes out when the cock is open on left or "right" position.

A pipe, passing through the firewall, feeds the fuel from the cock to the electrical booster pump (4) fitted with a filter. A green flashing light (5) indicates that the booster pump is operating.

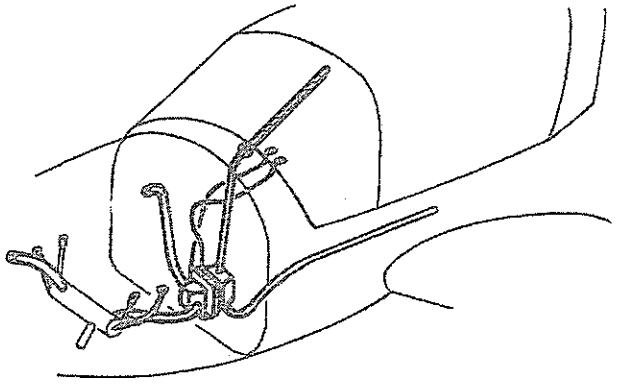
From the booster pump, the fuel is fed to the engine-driven pump (6)

An electrical sensor (9), located at carburettor inlet (7), transmits the fuel pressure data to an indicator (10) located on the center of the instrument panel strip.

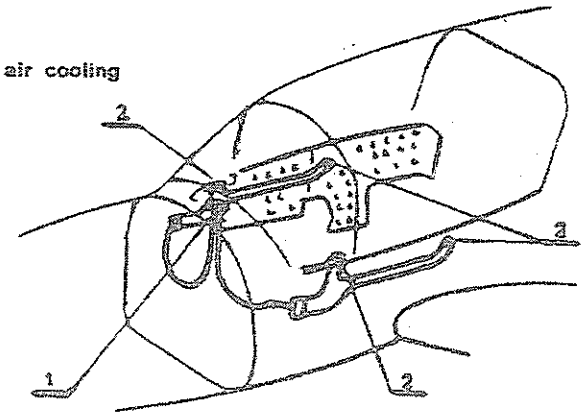



13
2
3
1
15
5
16
14
Fire wall
4
6
9
7
11
12
10

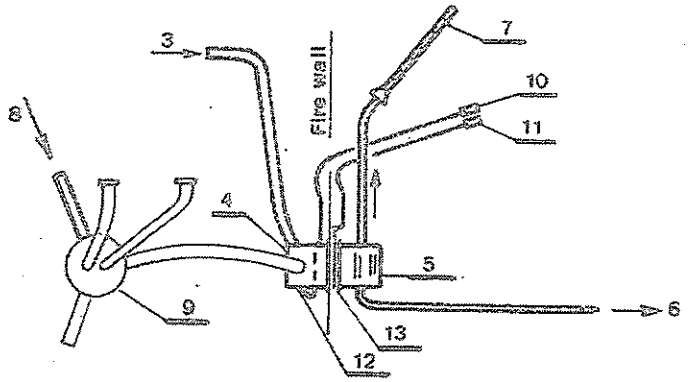
Each tank is fitted with 2 float-type transmitters which allow the available fuel quantity to be known at all times. Fuel content indicators (11-12) are located on the center of the instrument panel strip. Each tank is provided with a filling neck (13), a bleed and drain block (14) located on the wing lower surface, and a venting device consisting of a tube fitted with a check-valve (15) opening on the wing lower surface.
A cock (16) located between each tank and the fuel shut-off cock (2) is accessible from under the fuselage.



Lateral air cooling



Lower ventilation



1.4 - Air conditioning system

- Cool air

The ventilation of the cabin (side ventilation) is ensured by an air intake (1) located under the boss in front of the windshield.
Two flexible pipes convey fresh air to two ducts incorporated in side upholstery coverings.
Individual aerators (2) are at each passenger's disposal. Each one can on his own will adjust and guide the air flow.

The lower ventilation is ensured from an air intake (3), by means of a duct feeding cool air to mixter distributor (4). The latter allows distribution of air to be made at pilot and forward passenger's feet (5), at rear passenger's feet (6) (optionally) and at the windshield (7)

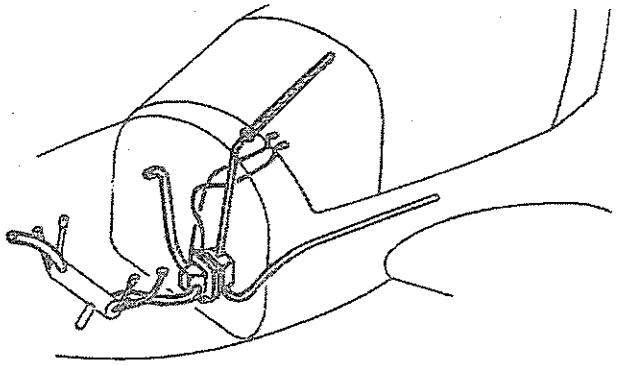
- Hot air

Air is picked off at point (8) and heated in the dual wall left exchanger manifold (9) and then fed to mixer distributor (4) from where it is distributed in the same way as cool air.

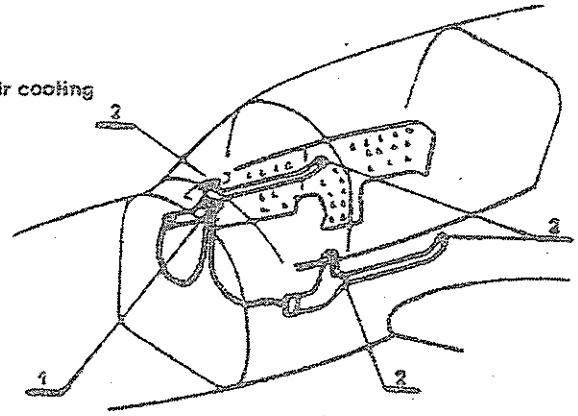
- Air conditioning controls

The control box installed on the instrument panel pedestal fitted with two levers (10 and 11) each one actuating a sheathed cable. One cable controls mixture flap (12) and the other controls the cabin air inlet flap (13), both flaps being installed in the mixer distributor. Upper lever (10) allows adjusting the hot air delivery to the cabin. Heating is maximum when control lever (10) is moved fully to the left (red marking).

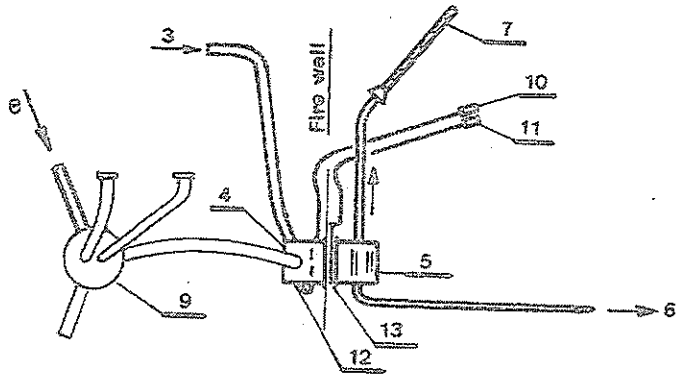
Heating is nil when control lever (10) is moved fully to the right (blue marking).



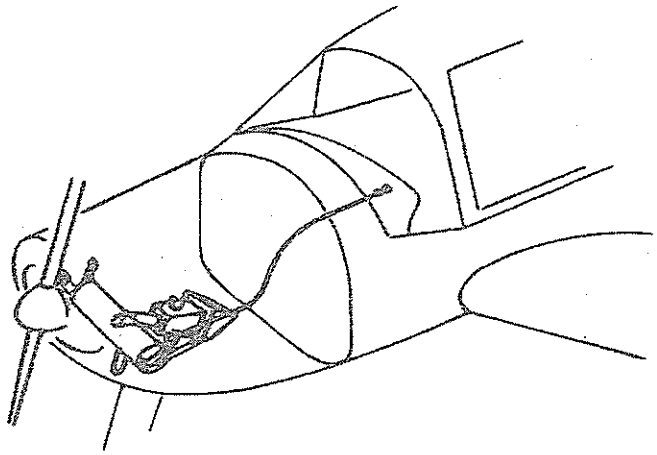
Lateral air cooling

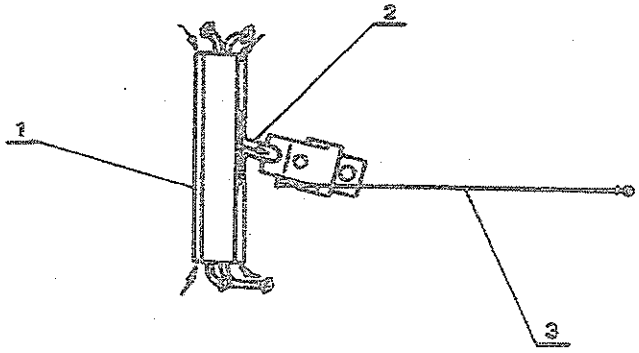


Lower ventilation



The flow is adjusted by ventilation lever (11) whatever the position of lever (10).
The lower lever (11) allows adjustment of the flow of the air mixture.
When moved fully to the right, the ventilation is maximum.
Moving the lever to the left gradually decreases the ventilation which is nil when "Shut-off" position is reached.
In case of fire in the engine compartment, the lever shall be moved fully to the left in order to avoid ingress of smoke inside the cabin.



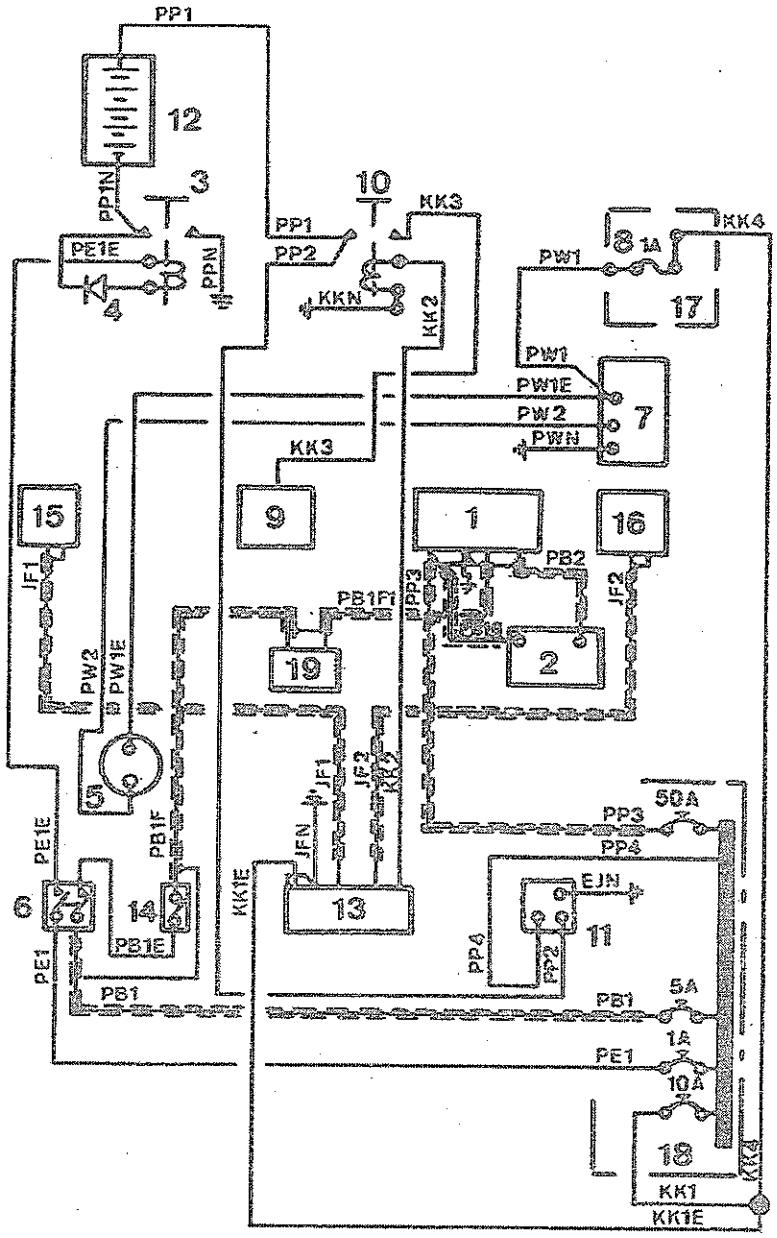

1
2
3

1.5 - Carburettor heating system and winter equipment.

Air admitted through an unfiltered aperture provided in the dual wall of the exchanger manifold (1) is fed to the carburettor through pipe (2).

Hot air flow is adjusted by means of "Carburettor Heating" pull lever (3).

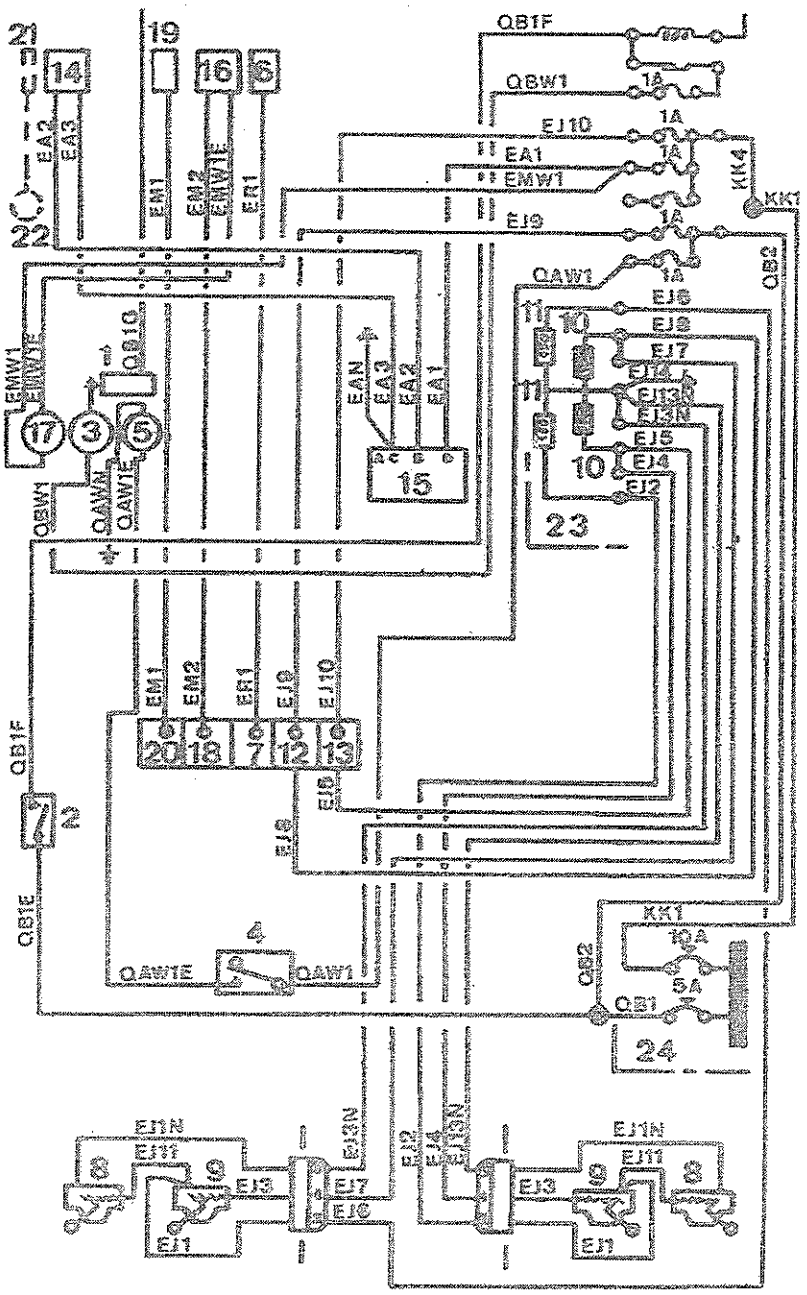
Winter equipment to be used when the temperature is below 0°C. 32°F consists of a plate which blanks off the oil cooler ventilation air inlet. This plate is fastened on the forward wall of the engine by means of two screws provided for that purpose.


PP1
12
PP1N
3
10
KK3
PE1E
PP1
PP2
PPN
4
KKN
KK2
8
1A
KK4
PW1
17
PW1
PW1E
PW2
PWN
7
KK3
15
9
1
16
JF1
PB2
PP3
JF2
PB1F1
19
2
PW2
PW1E
JF1
JF2
KK2
5
50A
PP3
PP4
PE1E
PB1F
JFN
KK1E
EJN
6
14
13
11
PB1E
PP4
PP2
PE1
PB1
PB1
5A
1A
PE1
10A
18
KK1
KK1E

1.6 - Génération, starting and ignition circuit

12 V dc, 55 A current is supplied by an a.c. generator and rectifier unit.

1 - a.c. generator
2 - Voltage regulator
3 - Battery relay
4 - Diode
5 - Generator warning light
6 - Battery switch
7 - A.c. generator flow voltage detector
8 - 1A fuse (junction box)
9 - Starter
10 - Starting relay
11 - Ammeter
12 - Battery
13 - Magneto selector
14 - "Generator field" control switch
15 - Left magneto
16 - Right magneto
17 - Junction box
18 - Circuit-breakers box
19 - Overvoltage relay


QB1F
QBW1
EJ10
EA1
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ER1
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EJ8
QB1E
QAW1E
QAW1
KK1
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QB1
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EJ11N
EJ11
EJ13
EJ7
EJ1
EJ12N
EJ14N
EJ12
EJ14
EJ3
EA3
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QB10
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QAW1N
QAW1E
EA2
EA3
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EM2
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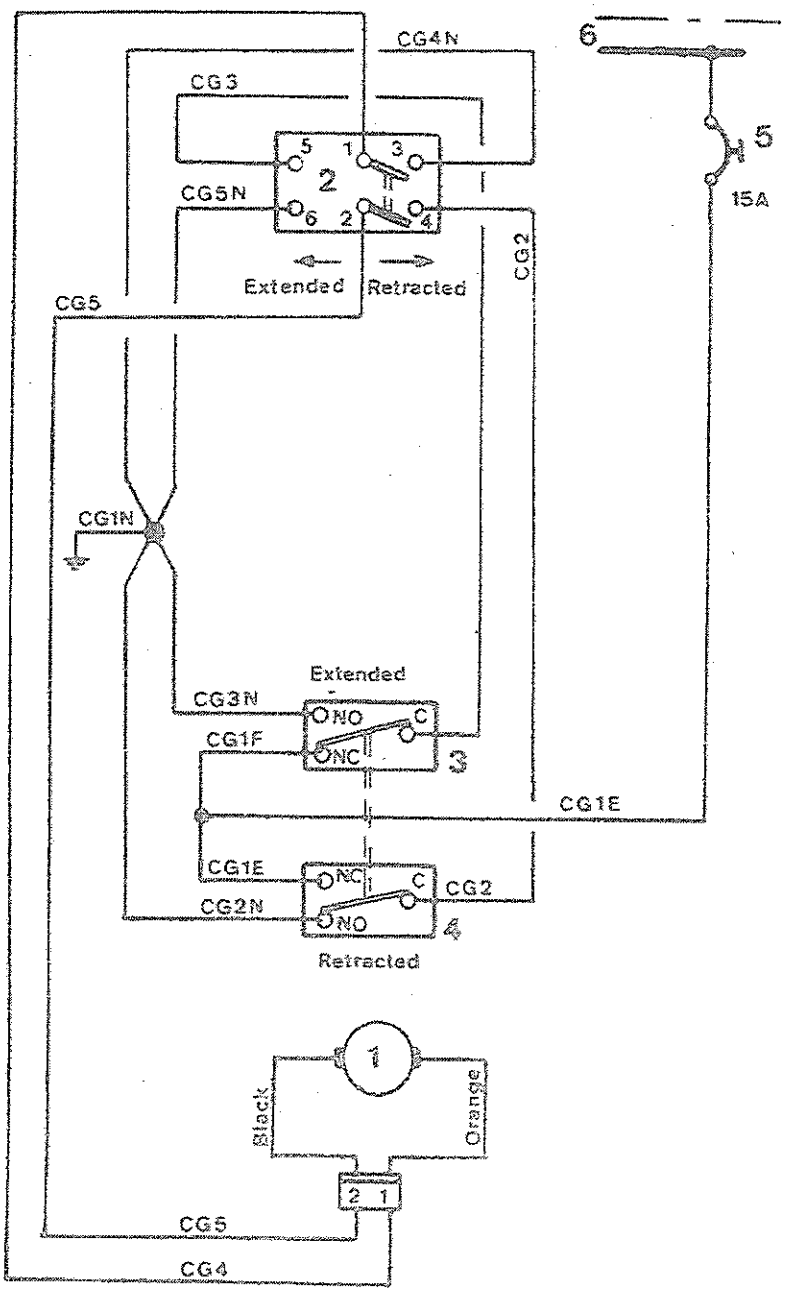
1.7 - Fuel and engine control electrical circuit

1 - Booster pump
2 - "Booster pump" switch
3 - Booster pump warning light
4 - Microswitch on fuel shut-off cock
5 - Fuel cock warning light
6 - Fuel pressure sensor
7 - Fuel pressure indicator
8 - Wing tip fuel level transmitter
9 - Wing root fuel level transmitter
10 - 1500 OHM resistor
11 - 150 OHM resistor
12 - Left level indicator
13 - Right level indicator
14 - Carburettor temperature sensor (optional)
15 - Carburettor temperature indicator (optional)
16 - Oil pressure sensor
17 - Oil pressure light
18 - Oil pressure indicator
19 - Oil temperature sensor
20 - Oil temperature indicator
21 - Cylinder temperature sensor (optional)
22 - Cylinder temperature indicator (optional)
23 - Junction box
24 - Circuit-breakers box.


CG4N
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CG3
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15A
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CG5N
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CG2
CG5
CG1N
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CG1E
CG1E
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C
CG2
CG2N
NO
4
Retracted
1
Black
Orange
2 1
CG5
CG4

1.8 - WING FLAPS ELECTRIC CONTROL CIRCUIT

1 - Wing flaps actuator

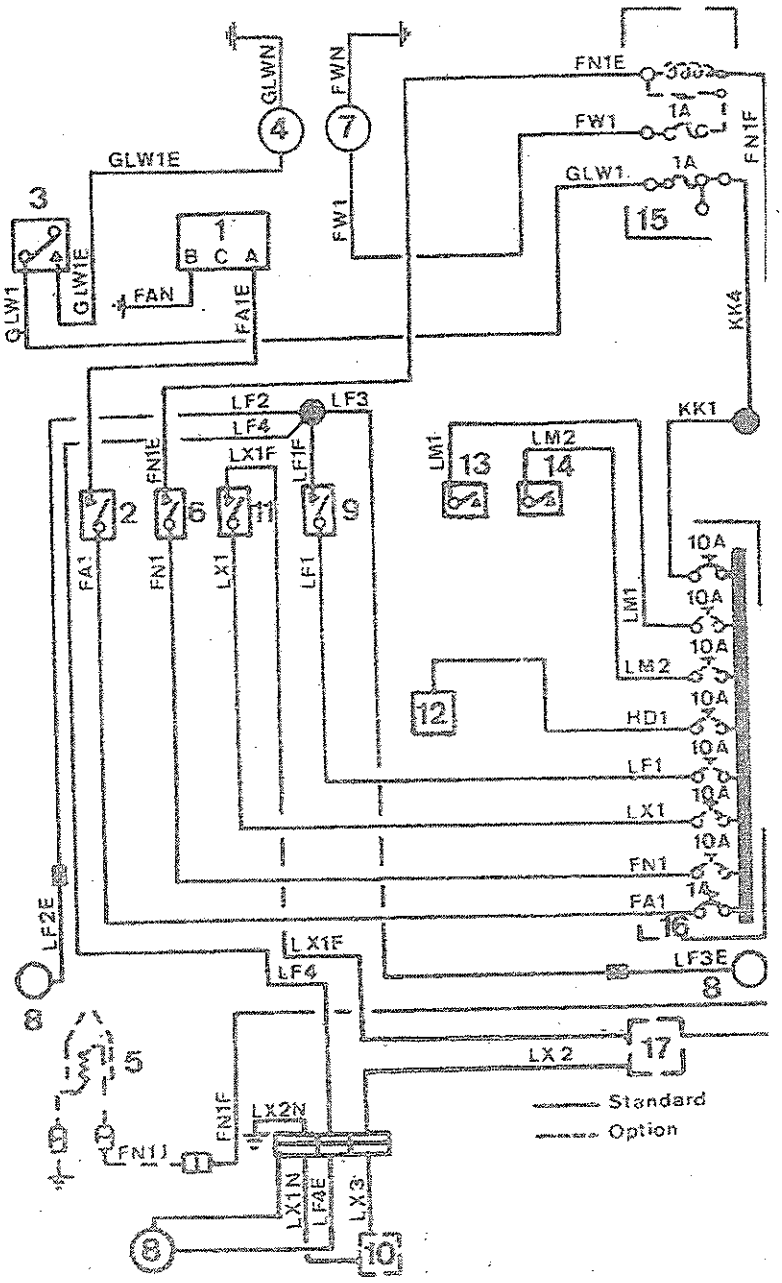
2 - Switch

3 - End of travel microswitch "extended"

4 - End of travel microswitch "retracted"

5 - 15.A circuit breaker

6 - Circuit breakers box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17
LX2
5
Standard
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LX1N
LF4E
LX3
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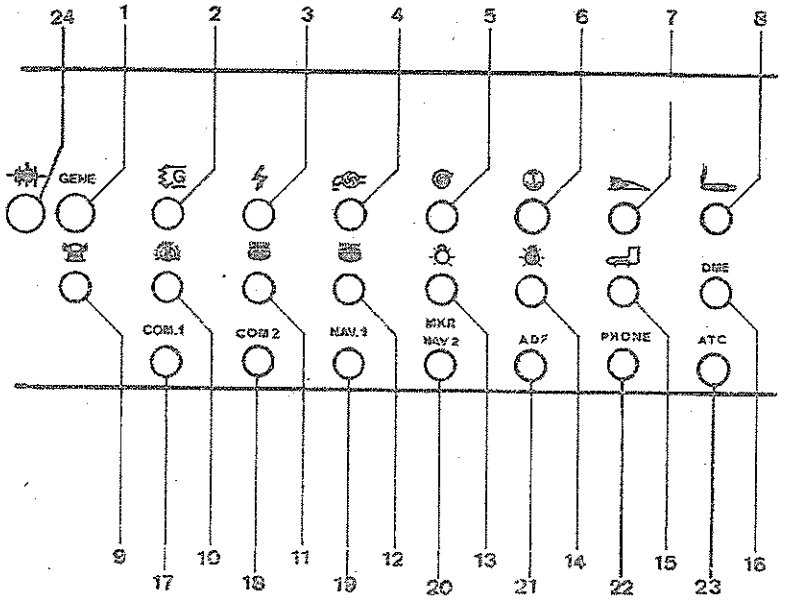
10

1.9 - Electrical circuit of various equipment

1 - Turn and bank indicator
2 - Turn and bank indicator switch
3 - Parking brake microswitch
4 - Parking brake light
5 - Heated ram air inlet (optional)
6 - Ram air inlet heating switch
7 - Ram air inlet warning light
8 - Navigation lights
9 - Navigation lights switch
10 - Anti-collision lights (optional)
11 - Anti-collision lights switch
12 - Cigar lighter
13 - Left landing light switch
14 - Right landing light switch
15 - Junction box
16 - Circuit breakers box
17 - Flashing light power supply (optional)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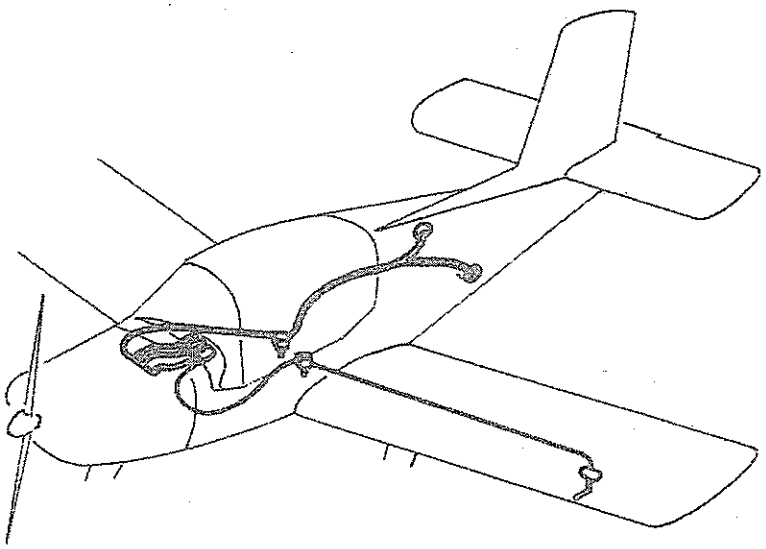
1.10 - Electrical protection system

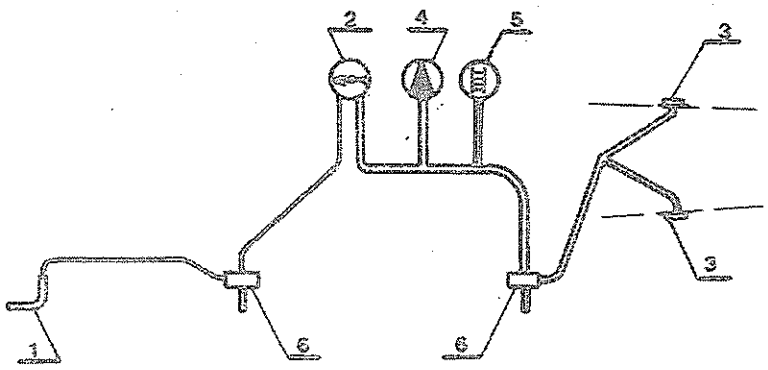
Electrical protection is ensured by circuit breakers located on the instrument panel, each one being provided for one or several systems.
The list hereunder gives the rating of the circuit-breaker together with the protected circuit (5).

1 -	40.A	circuit-breaker		-Ac generator
2 -	5.A	"	"	-Excitation
3 -	1.A	"	"	-Battery relay
4 -	5.A	"	"	-Fuel pump LH fuel content indicator Fuel pressure Oil pressure
5 -	10.A	"	"	-Starter RH fuel content indicator Oil temperature
6 -	1.A	"	"	-Turn and bank indicator
7 -	15.A	"	"	-Wing flaps
8 -	10.A	"	"	-Cigar lighter
9 -	10.A	"	"	-Anti-collision light
10 -	10.A	"	"	-Navigation lights
11 -	10.A	"	"	-LH landing light
12 -	10.A	"	"	-RH landing light
13 -	5.A	"	"	-Normal lighting
14 -	5.A	"	"	-Emergency lighting
15 -	10.A	"	"	-Pitot
16 -	5.A	"	"	-D.M.E.
17 -	5.A	"	"	-VHF.1 supply
18 -	5.A	"	"	-VHF.2 supply
19 -	5.A	"	"	-VOR.1 supply
20 -	5.A	"	"	-VOR.2 and Marker supply
21 -	5.A	"	"	-ADF supply
22 -	1.A	"	"	-Phone supply
23 -	5.A	"	"	-Transpondeur supply
24 -	50.A	"	"	-Battery (Opt. IFR)



Static system ——————

Dynamic system ——————



1.11 - Airspeed indicating system

A ram air inlet (1) installed on the lower surface of the left wing supplies ram air pressure to airspeed indicator (2).

Two static ports (3) located on each side of the rear fuselage section, feed airspeed indicator (2) altimeter (4) and rate of climb indicator (5) with static pressure.

Both systems are provided with bleeders (6) located at the lower part of the fuselage and accessible from outside.

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 2

LIMITATIONS

SECTION 2
LIMITATIONS

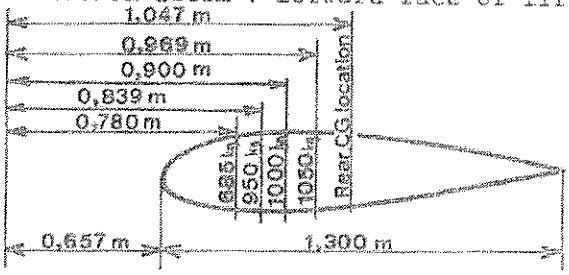
MS.893 E aircraft was certified for "Normal" and "Utility" category on 09.05.1972 in accordance with AIR 2052 Regulation, within the limits given hereafter.

2.1 -Limit speeds (IAS)

	CATEGORY					
	N			U		
	KM/h	kt	MPH	km/h	kt	MPH
Vne-Never exceed speed	290	156	180	290	156	180
Vno-Maximum cruise speed depending on structure strength	250	135	155	250	135	155
VA-Maximal control surface deflection up to	210	113	130	210	113	130
Vfe-Limit speed with flaps operating or extended	160	86	100	160	86	100
2.2-Maximum weight						
Permissible at take-off	1050kg-2314lb			1000kg-2205lb		
Permissible at landing	1000kg-2205lb			1000kg-2205lb		

2.3 -C.G.limits

C.G location datum : forward face of firewall



Rear C.G location is limited to 1.047 m -- 41.22 in.
Forward C.G location depends on the weight and on the category of use.It varies linearly between the following limits :

- 685 kg - 1510 lb - 0.780 m - 30.71 in.

- 950 kg - 2095 lb - 0.839 m - 33.1 in.
- 1000 kg - 2205 lb - 0.900 m - 35.4 in.
- 1050 kg - 2314 lb - 0.969 m - 38.15 in.

Leveling : Fuselage centerline horizontal (canopy slides horizontal)

2.4- Loading limits

Maximum number of occupants
-Forward station 2
-Rear station 2
Maximum load in luggage compartment: 45 kg-100 lb

It is however allowed to carry a third passenger on the rear seat, on condition that :
- The weight of each does not exceed 60 kg (132 lb)
- The aircraft is modified in compliance with SOCATA-SERVICE n° 117.

NOTA - The empty weight must include the non usable fuel staying in tanks and pipes (about 7 lb.) The empty weight is the one which appears in the last weight and balance sheet.

2.5-Engine limitations

Continuous duty of starter ..... 30 sec.
Maximum continuous rating ..... 2700 RPM
Maximum rating at take-off ..... 2700 RPM

OIL

Maximum temperature ..... 118°C-244°F
Normal pressure ..... 4,2 to 6,2bar
Minimum pressure at reduced RPM .... 1,7 bar
Red warning light rated at ..... 1 bar

FUEL

Normal pressure ..... 35 to 550mbar

2.6-Propeller limitations

SENSENICH propeller 76 EM 8.054
76 EM 8.056
76 EM 8.060

HARTZELL propeller HC.C2YK.IBF/F 7666 A-2
Maximum rating 2900 RPM
For HARTZELL propeller, avoid continuous working between 2000 and 2250 RPM. For SENSENICH propeller, avoid continuous working between 2150 and 2350 RPM.

2.7 - Limits of use in flight

2.7.1 - VFR and IFR flights

"The aircraft may be operated in VFR or IFR conditions, according to the installed equipment which is defined in the addendum corresponding to the night IFR or night VFR use".

2.7.2 - Icing conditions

Flight is prohibited in icing conditions.

2.7.3 - Demonstrated cross-wind

Maximum component at 90° : 20 kt

2.7.4 - Limit load design factors at maximum weight

Category	Flaps retracted		Flaps extended	
	N	U	N	U
n	+ 3,8 - 1.5	+ 4.4 - 1.8	+ 2 - 1	+ 2 - 1

2.7.5 - Spins and inverted flight

VOLUNTARY SPINS AND INVERTED FLIGHT ARE PROHIBITED

2.8 - Maneuvres permitted in "Utility" category

Maneuvres	Max. entry speed
Chandelle	VI ≥ 240 km/h - 130 kt - 149 MPH
Lazy eight	VI = 220 km/h - 119 kt - 137 MPH
Steep turns	VI = 175 km/h - 94 kt - 109 MPH

2.9 - Instruction plates and markings on instruments

2.9.1 - Instruction plate

FLIGHT CONDITIONS : DAY VFR
Icing conditions : Not allowed.

- INSTRUCTION PLATE -

- This airplane must be operated as a normal or utility category airplane in compliance with the operating limitations stated in the form of placards, markings and manuals.
- No aerobatic maneuvers, including spins, approved when operating in the normal category.
- Only the following aerobatic maneuvers are approved when operating in the utility category (maximum weight 2205 lb, or less).

Maneuver	Max.entry speed
Lazy eight	137 MPH - 119 kt
Chandelle	149 MPH - 130 kt
Steep turns	109 MPH - 94 kt
Stalls (except whip)	Slow deceleration
-Spins are prohibited	
Never exceed speed (IAS)	180 MPH - 156 kt
Maneuvering speed (IAS)	130 MPH - 113 kt
Maximum speed rough air (IAS)	155 MPH - 135 kt
Maximum speed flaps extended (IAS)	100 MPH - 86 kt

	Category N	Category U
-Maximum weights : take-off	2314 lb	2205 lb
landing	2205 lb	2205 lb
Flight maneuvering load factors (Flaps up)	+ 3.8 - 1.5	+ 4.4 - 1.8

INSTRUCTION PLATE

This aeroplane must be operated as a normal or utility category aeroplane in compliance with the markings and placards. All markings and placards on this aeroplane apply to its operation as a normal category aeroplane. For utility category operation refer to the aeroplane flight manual.

All aerobatic manoeuvres (including spins) are prohibited for normal category operation.

	CATEGORY N	CATEGORY U
Maximum weight	2314 Lb	2205 Lb
Never exceed speed Vne	156 kt	156 kt
Limit manœuvring load factor	3,8 g	4.4 g
Rough air max. speed	135 kt	135 kt
Max.speed flaps extended	86 kt	86 kt
Max.IAS with controls fully deflected	113 kt	113 kt

2.9.2 - Additional instruction plate in case of utilization of the rear seat in three-seater accommodation

" 3 passengers on the rear seat :
maxi. weight of each 60 kg (132 lb)"

2.9.3 - Markings on instruments

- Tachometer (SENSENICH propellers
(76 EM8.054
(76 EM8.056
  - . Green sector from 600 to 2150 RPM
  - . Red sector from 2150 to 2350 RPM
  - . Green sector from 2350 to 2700 RPM
  - . Red radial line at 2700 RPM

- Tachometer (SENSENICH propeller
(76 EM8.060
(Acoustic limitation
  - . Green sector from 600 to 2150 RPM
  - . Red sector from 2150 to 2350 RPM
  - . Green sector from 2350 to 2600 RPM
  - . Red radial line at 2700 RPM

  For HARTZELL constant speed propeller see Section 7.

- Oil thermometer
  - . Yellow sector under 40°C (104°F)
  - . Green sector from 40°C to 118°C (104°F to 244°F)
  - . Red sector above 118°C (244°F)

- Oil pressure gage
  - . Red sector under 1,7 bar
  - . Yellow sector from 1,7 to 4,2 bars
  - . Green sector from 4,2 to 6,2 bars
  - . Yellow sector from 6,2 to 7 bars
  - . Red sector above 7 bars

- Carburettor air thermometer

  . Yellow sector from - 15°C to + 5°C
  (5°F to 41°F) or
  . Yellow sector from - 10°C to +10°C
  (+14°F to +50°F)

- Fuel pressure gage

  . Red sector under 50 m.bar
  . Green sector above 50 m.bar

- Airspeed indicator

. White sector from	92 km/h	to 160 km/h
	50 kt	to 86 kt
. Green sector from	100 km/h	to 250 km/h
	54 kt	to 135 kt
. Yellow sector from	250 km/h	to 290 km/h
	135 kt	to 156 kt
. Red line at	290 km/h	
	156 kt	

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 3

EMERGENCY PROCEDURES

SECTION 3

EMERGENCY PROCEDURES

3.1 - Engine failure at take-off

Reduce RPM to minimum. Brake carefully while pulling the control handwheel fully rearward.

3.2 - Engine failure after take-off

Make use of available power to assist in reaching selected landing ground ahead. When sure that the selected ground can be reached, extend the flaps fully. Speed should not drop under. VI = 120 km/h - 65 kt - 75 MPH.

Before touch-down :

- cut-off magneto switch
- cut-off main switch
- close fuel cock

CAUTION : DO NOT ATTEMPT TO TURN

The altitude drop and the increase in stalling speed resulting from a turn may cause an untimely touch-down in a hazardous attitude.

3.3 - Engine failure in flight

CHECK

- Fuel pressure. Switch on the booster pump
- Fuel level indicators
- Fuel cock open on the tank with the highest level.
- Mixture on full rich (pushed)
- Carburettor heat on full

Fly the aircraft to the best lift-to-drag ratio speed 155 km/h-84kt-96 MPH with retracted flaps. The aircraft flies over 10 times approx its altitude (with no wind).

3.4 - Forced landing with an engine failure.

- Fuel cock closed
- Set to full RPM
- Magneto switch cut-off
- If radio installation is provided, send distress signals.

BEFORE LANDING
- Seat belts..... fastened
- Canopy..... unlocked(not open)
- Speed..... 120 km/h-65kt-75MPH
- Flaps in final approach..... Extended 30°
- Main switch..... off
- Flare out just before touch-down
- On ground, maintain control handwheel fully rearward.

3.5 - Precautionary landing
- Observe the landing area by flying over several times at low speed if necessary.
VI = 120 km/h-65kt-75 MPH.
- Proceed to a careful approach, with flaps extended 30° VI = 110 km/h-59kt-68 MPH, propeller pitch fully fine.
- Main switch..... off
- Flare out just before touch-down while setting throttle control to minimum RPM.

3.6 - Engine fire
- Fuel shut-off cock..... closed
- Booster pump..... off
- Throttle control to full RPM
- Ventilation control..... "shut-off"
- After engine stopping
- Magneto switch..... off
- Main switch..... off
- Generator field switch..... off

CAUTION
NO ATTEMPT SHOULD BE MADE TO RE-START THE ENGINE AFTER A FIRE WAS INITIATED.

3.7 - Electrical fire
- Switch off generator excitation
- Set main switch off
- Extinguish the fire using all means available (extinguisher supplied on option)
- In order to evacuate smoke, open fully the ventilation and if necessary open the canopy by 10 cm (4 in) at VI $\leqslant$ 180 km/h - 97 kt - 112 MPH.

3.8 - Vibrations
Vibrations can be initiated by the engine, or by carburettor icing.

or by too rich a mixture. Refer to section 4 for adjusting the mixture.
In all other cases, land at the earliest opportunity in order to check the cause. Check oil pressure and temperature.

3.9 - Fuel supply failure

Should a fuel pressure loss occur :
- Switch on booster pump
- Select the tank with the highest level

In case of RPM drop at full throttle, due to exhaustion of fuel in one tank, reduce throttle to half value approximately in order to ensure quick pick-up on the other tank. Switch to the other tank while booster pump is operating. Advance throttle as soon as the fuel pressure rises.

3.10 - Oil supply failure

In case of oil pressure drop , check the oil temperature. If excessively high (red sector)
- Decrease power.
- Proceed to the airfield while taking all measures for a possible landing in the country.

3.11 - Icing

3.11.1 - Airframe

Since the airframe is not provided with de-icing devices, the icing area should be left as quick as possible. Ice on the windshield can be removed more rapidly by setting the air conditioning system on fully hot position.

3.11.2 - Carburettor

In case of icing indication (RPM drop, manifold pressure drop, slight vibrations) pull out fully the carburettor heating control for a moment in order to remove the ice and then, push in the control progressively to the cold position. If the aircraft is fitted with a carburettor air thermometer (option 88) maintain the indicated temperature within sector located between + 5° C and + 20°C (41° F and 68°F).

NOTE :
Pulling the carburettor heating control may cause the RPM to drop by 100 RPM, the manifold pressure to drop by 30 to 50 m. bar, and may increase the vibration level. After the carburettor heating is adjusted it is mandatory to adjust the mixture to suppress the vibrations. The use of carburettor heating increases appreciably the hourly fuel consumption.

3.12 - Propeller governor failure
(see section 7)

3.13 - Electrical generation failure
Failure of the a.c generator energizes the red warning light. Check the discharge indication on the ammeter. Check the circuit breaker and engage it if required.
IF THE DISCHARGE STILL REMAINS
- Switch off generator field supply.
- Switch off all electrical equipment not essential for proceeding with the flight.

3.14 - Electrical circuit failure
Failure of electrical equipment : pressure, temperature and fuel level indicators..
- Check the circuit breakers panel. When a circuit breaker is released its knob appears in projection on the instrument panel.
- Reengage the circuit breaker after the checking of the circuit.

3.15 - Airspeed indicating system failure
In the case of erroneous indications in flight, carry out the approach at an airspeed at which the LE slats begin to open. On ground, bleed the systems and check pitot tubes and static ports for cleanliness. Check the systems for leaks prior to checking the instruments.

3.16 - Locking of L.E slats
Should the nose edges lock in closed slots position, do not fly under VI = 135 km/h-73 kt - 84 MPH. Proceed to a careful landing with the following approach configuration.
VI = 135 km/h-73kt-84 MPH, flaps retracted.
VI = 130 km/h-67kt-78 MPH, flaps extended 30°

3.17 - Involuntary spins

It is mandatory to apply the spin recovery procedure as soon as the pilot is noticing that the aircraft enters into spinning and this, at the latest, before the aircraft has carried out a complete turn.

RECOVERY SPIN PROCEDURE

Rapidly and simultaneously deflect :

-elevator control quite in nose-down pitch range (see note)-

-rudder control fully against.

-ailerons at neutral position -

Maintain the three controls in these positions until the spin has stopped.

As soon as the rotation has stopped : rudder control at neutral position and recovery carefully.

NOTE - The elevator is the most important control surface for the spin recovery.

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 4

NORMAL PROCEDURES

SECTION IV
NORMAL PROCEDURES

4.1 - Preparing for flight

4.1.1 - Determining the weight and C.G location (Use of the graph.)

1°) Preparation

On the graph, scribe a cross at point MO corresponding to the weight and C.G location of the aircraft, as mentioned on Inspection Register (weighing an C.G location report).

2°) Determining C.G location

When-plotting the vectors, make sure that the moment curve is correctly placed by checking the parallelism of weight reference lines. At the point corresponding to the weight and C.G location of the empty aircraft MO, set point 0 of "pilots" vector and draw a line which length corresponds to the added weight. From the new point obtained draw the "passengers" vector and then proceed in the same way for "luggage" and "fuel"vectors.
The end of this drawing allows reading the weight and C.G. location of the aircraft. In no case should the last "fuel" vector cross the shaded areas.

Sample drawn on the graph

Weight of empty aircraft (standard)	595kg- 1315 lb
C.G location	826mm -32.5 in
Pilots	154kg - 340 lb
Passengers	154kg - 340 lb
Luggage	21kg - 46.5lb
Fuel	126kg - 278 lb
This yields: total weight	1050kg -2314 lb
resulting C.G location	1043mm - 49 in

3°) - Additional fixed weights

When adding weights, the C.G location changes, and then it is advisable to determine its new value and to localize it on the graph by proceeding as follows :

- On the moment curve, localize on the reference axis point B corresponding to the position of the weight installed in the aircraft.
- From point A, draw a line which crosses point B.
- On this line, plot point C corresponding to the installed weight as read on rear passengers scale.
- Drawing vector BC on the graph from point MO, gives the new empty C.G location MI.

- Example drawn on the graph.

- Weight of 20 kg 44 lb installed within the area of the rear seat.

4°) - Limit weight and C.G (refer to section 2)

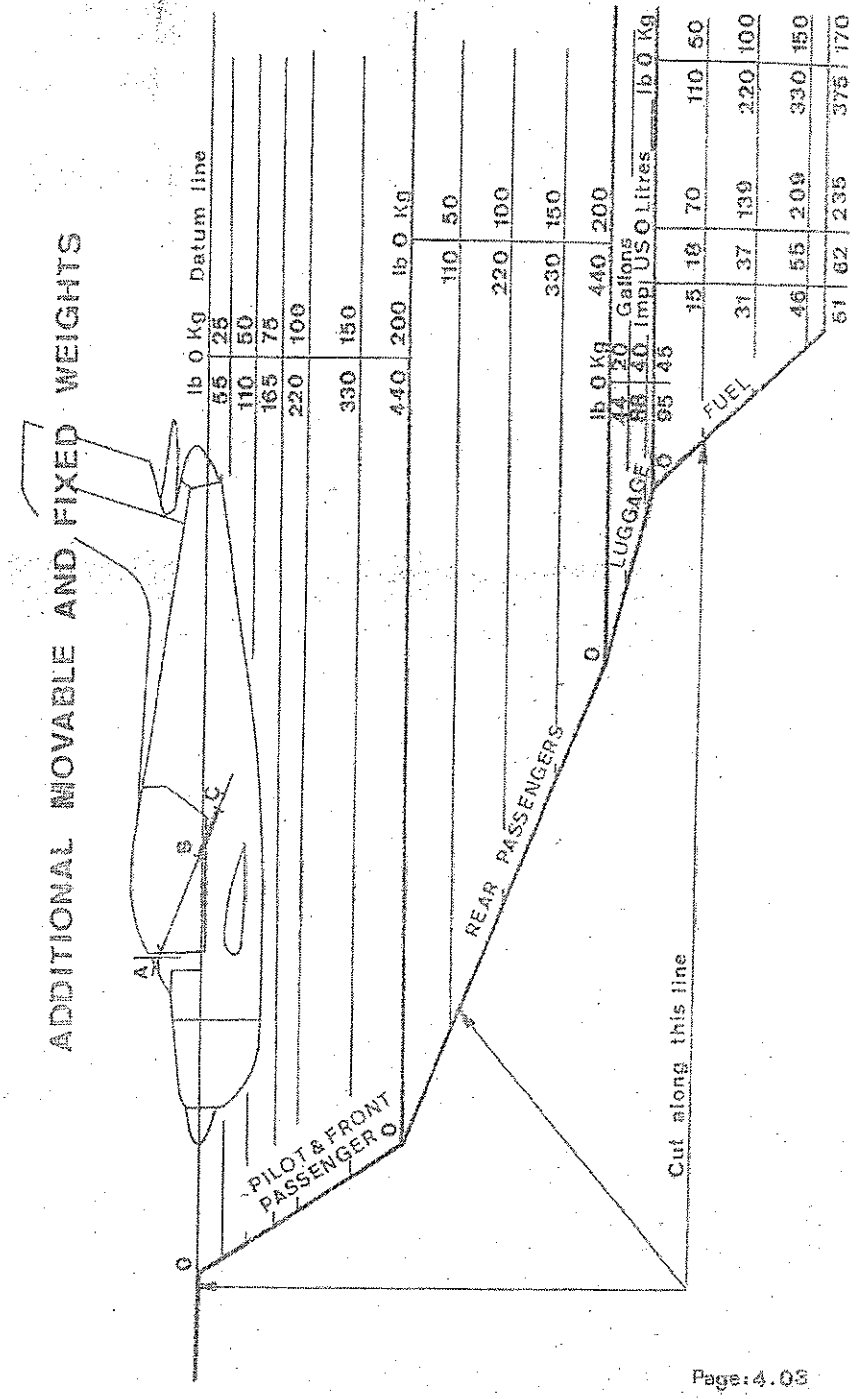
Loading is correct provided the resulting point giving the weight and C.G location is located within the non-shaded area.

NOTE

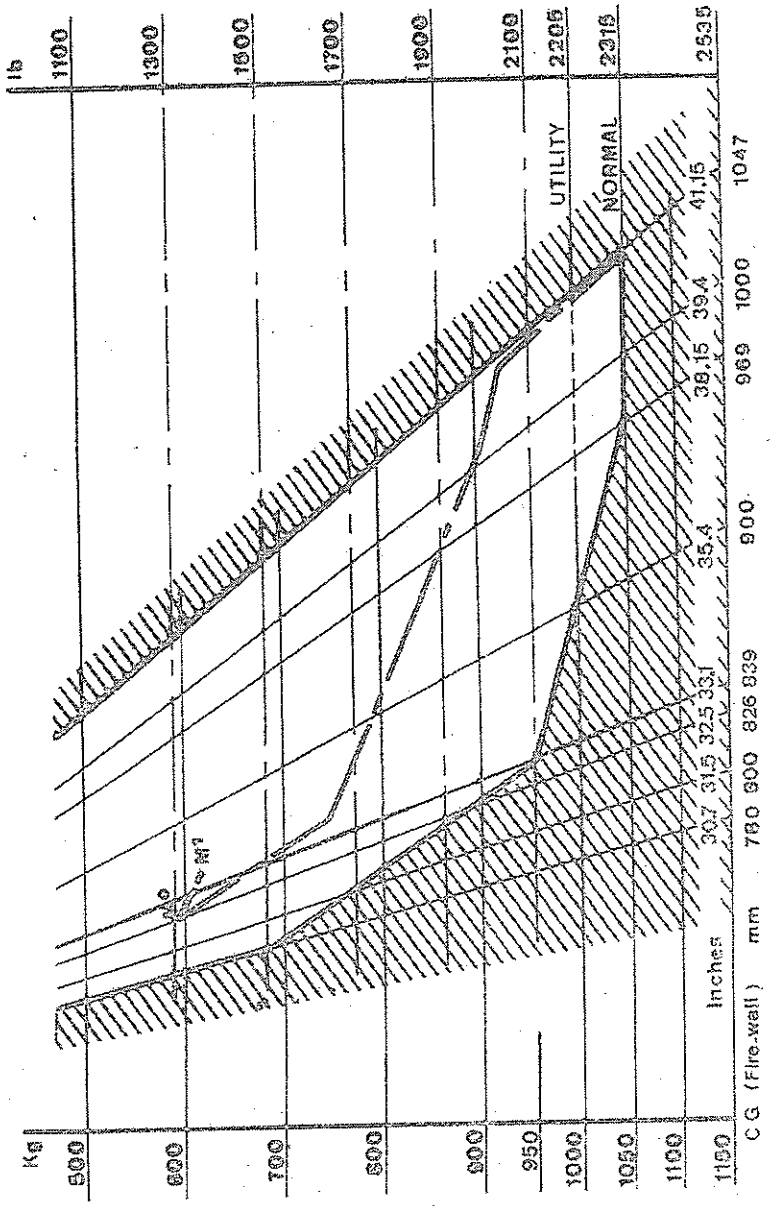
Correct loading of the aircraft is the responsibility of the pilot. The latter must check that C.G location does not move beyond the limits due to fuel consumption during flight.

MOMENT CURVE

Effective for all RALLYE aircrafts



4.1.2 – CG Location graph



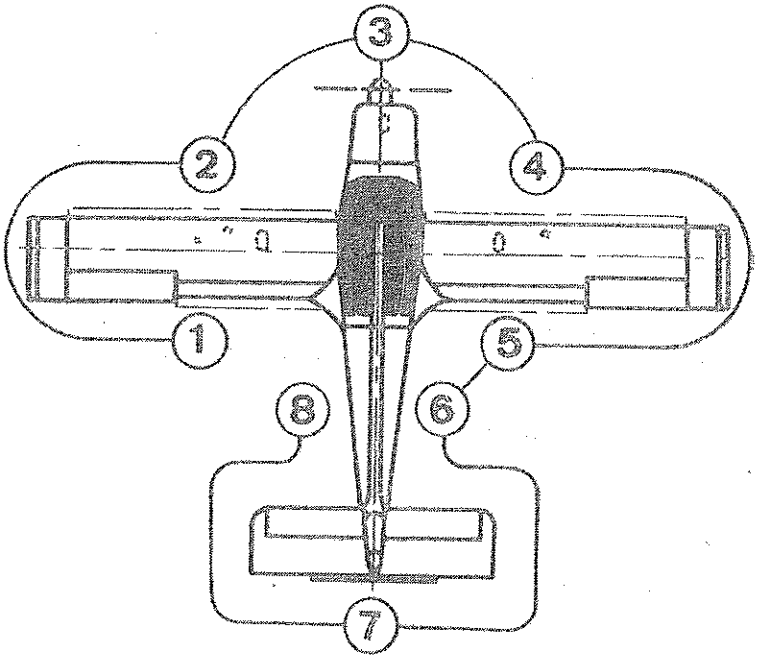
4.2 Handling on ground

A towing fork supplied in the aircraft kit fits onto the nose gear, and allows handling the aircraft on ground.

For ground operation it is forbidden to push on the movable surfaces : L.E slats, flaps, ailerons, empennage, propeller etc...

On flat ground one operator can move the aircraft using the towing fork.

4.3 - Checking before flight



4.3.1 - External check

Cabin

Canopy open	normal sliding
Flaps	extended
Magneto selector	set to off
Flight controls	unlocked
Main switch	stop
Tabs	neutral position

Carry-out the check by turning clockwise around the aircraft starting from the left side of the cabin.

(1) Left wing

Ailerons	controls)
Flaps	Hinges) checked
	Deflections)
	Plays)
Ram air inlet	clean, not clogged
Fuel tank	level checked
Fuel tank plug and door	installed, locked
Bleeding	carried out
L.E slats	clean internal surface rollers and arms installed, normal motion

(2) Main left landing gear

Tire	inflated
Fairing	good condition, normal position (shock absorber in good condition.)

(3) Forward fuselage section

Windshield	clean
Oil level	checked, door locked
Cowlings	closed and locked
	no trace of leak
Propeller	clean, good condition

	Propeller nose cone	no play
	Air intakes	clean not clogged
	Nose landing gear	
	Tire	inflated
	Fairing	good condition normal position (shock absorber correct)
	Towing fork	removed
	Exhaust pipes	secured
(4)	Right main landing gear	
	Tire	inflated
	Fairing	good condition normal position (shock absorber correct).
(5)	Right wing	
	L.E slats	clean internal surface, rollers and arms installed and locked, normal motion
	Bleeding	carried out
	Fuel tank	level checked
	Fuel tank plug and door	installed, locked
	Aileron Controls	
	Flaps Hinges)	
	Deflections)	checked
	Plays)	
(6)	Rear right fuselage section	
	Static port	clean, not clogged
(7)	Tail unit	
	Horizontal and vertical stabilizers	checked
	Elevators rudder and tabs	Hinges, deflections and plays : checked
	Controlled tabs	neutral position
(8)	Rear left fuselage section	
	Static port	clean, not clogged.

4.3.2 - Internal checking of the cabin

Canopy	locking checked, then close and lock
Parking brake	applied
Seats	adjusted
Seat belts	fastened
Flight controls	free on 3 axes, no play, no excessive friction
Tabs	checked at neutral position
Flaps	retracted

4.4 - Starting the engine

A.C. generator excitation	off
M agneto selector	Set to off
Booster pump	stop
Carburettor heating	set to cold

4.4.1 - Normal procedure

Mixture	full rich
Main switch	on
Alarm panel	lights energized : ground power unit, oil pressure, fuel cock
Propeller constant speed	Full low pitch
Fuel level indicators	checked
Fuel cock	open, light off.
Booster pump	on
Injection	2 to 3 times
Throttle control	pushed forwards by 2cm(~1in)
Surroundings	cleared
Starter	operated for 30sec. max.
Magneto selector	on 1+2 after starting
Oil pressure	slow rising

4.4.2 - Hot engine procedure

Same as under 4.4.1 except no injection needed.

4.4.3 - Cold weather procedure

Same as under 4.4.1 except, after starting, the engine rating is maintained by successive injection up to 900 to 1000 RPM.

If the engine is cranked by hand, check that :

- Chocks are installed
- Magnetos are off (selector set to off)

CAUTION : TO AVOID DAMAGING THE BATTERY, NEVER OPERATE THE STARTER MORE THAN 30 SECONDS. BEFORE PROCEEDING TO THE NEXT START, ALLOW ONE MINUTE AT LEAST TO ELAPSE. NEVER OPERATE THE STARTER UNTIL THE PROPELLER HAS REACHED A COMPLETE STOP.

NOTE : CHECK OIL PRESSURE AS SOON AS THE ENGINE OPERATES. IF PRESSURE IS NIL AFTER 15 OR 20 SECOND STOP THE ENGINE AND CHECK THE CAUSE.

4.4.4 - Starting failure

Proceed as follows :

Mixture control	Fully lean
Throttle control	Fully open
Starter	Operated during a few seconds

Then proceed normally without injections.

4.5-After the engine has started

Rating	between 800 ard 1000 RPM
A.C. generator excitation	On
Booster pump	Off
Fuel cock	Checked on both tanks
Turn and bank indicator	Operating
Ammeter	Green sector, light out.

4.6-Taxiing

Parking brake	released, light out
Elevator control	fully backward.

Taxi slowly while using the rudder.

If the rudder efficiency is not sufficient, use the brakes through short successive impulses since a prolonged action would result in slowing down the aircraft.

NOTE - Should a wheel run in a ground hole, avoid braking at the same time.

4.7 -Manœuvering point

4.7.1-Ground run

Parking brake	applied light energized.

Elevator control	rear sector
Fuel pressure	green sector
Oil pressure	green sector
Oil temperature	green sector
Mixture	full rich
Carburettor heating	set to cold

Propeller SENSENICH 76EM8	054	056	060
RPM ± 50	2450	2400	2350

Propeller constant speed full low pitch	
Propeller governor	2 cycles.Never decrease
N = 2000 RPM	the rating below 1500 RPM
Carburettor heating	checked
Magneto selection	175 RPM drop.Difference
N = 1800/2000 RPM	between magnetos 50 RPM

NOTE : When temperature is below 0°C 32°F, the carburettor air temperature should be maintained to 15°C 59°F approximately during magneto selection in order to avoid abnormal RPM drops. (Thermometer : optional)

4.7.2 - Before take-off

Seat belts	checked
Canopy	closed, locked
Flight controls	free
Tabs	neutral position
Flaps	retracted
Magneto selectors	set to 1 + 2
Carburettor heating	set to cold
Mixture	full rich
Propeller constant speed full low pitch	
Fuel cock	open, light off
Booster pump	operating,light energized
Fuel pressure	green sector
Oil pressure	green sector
Oil temperature	green sector
Altimeter	reset

4.8 - Take-off

Parking brake	released, light off

Align the aircraft
Set progressively to full throttle
Avoid braking during rolling.

lift-off nose wheel	50 à 70 km/h 27 to 38 kt 31 to 43 MPH
Take-off cleanly	VI = 105 km/h-57kt-65 MPH
Brake	VI = 130 km/h-70 kt
Climb to 300 ft	81 MPH approx.
Booster pump	Off, light off
	CORRECT PRESSURE

4.9 - Climb

4.9.1 - Normal climb with L.E slats retracted

Increase speed until slats close
Proceed with optimum climb speed.
VOM = 155 km/h - 84 kt - 96 MPH minus 7km/h -4kt 4 MPH every 5000 ft.
Carry out the climb with full throttle.Check the temperatures.

4.9.2 - Maximum gradient climb L.E slats extended

The best climb gradient is obtained for VI : 120/125 km/h - 64/67 kt - 75/78 MPH).-
NOTE : This climb speed should only be used when necessary for obstacle clearance, Monitor engine temperature carefully.

4.10 - Cruise

For RPM to be set and cruise performances refer to section 5.

USE OF FUEL

Maintain 1/4 of fuel content in one tank, as read on the indicator, before exhausting the second tank. Switch back to the first tank. (1/4 as read on the gauge corresponds to 28 litres i.e (6 Imp.gal. 7 US.gal) approximately 40 mm of cruise Flight)

NOTE :Before switching from one tank to the other, set the booster pump into operation.

Use of mixture control : Since satisfactory engine performance is closely related to mixture setting, adjustment must be carried out very carefully.Maintain mixture control on "full rich" position for take-off, rated, maximum continuous, climb and cruise powers above 75%. However, during take-off from high elevation airport or during climbs, roughness or loss of power may result from overrichness. In such a case, adjust mixture control only enough to obtain smooth operation not for economy. Rough operation due to over rich fuel/air mixture is most likely to be encountered in carbureted direct drive engines at altitude above 5000 ft.

Always enrich mixture before increasing power.

To lean the mixture, pull progressively the mixture control until a slight increase of RPM is observed, followed by a decrease. then, push slightly the contol for adjusting at an optimum RPM.

NOTE : Take care not to lean the mixture excessively to avoid resulting detonations and overheating of the engine.

4.11 - Descent

4.11.1 - Fast descent

Carburettor heating	set to hot
Mixture control	full rich
Propeller constant speed	full low pitch
Manifold pressure set as required	

Every 1500 ft, advance throttle momentarily

4.11.2 - Approach

Mixture control	- full rich
Propeller	- full low pitch
Booster pump	- on, light energized
Fuel cock	- open on the tank of highest level
Flaps extended	- as required

Carburettor heating-adjusted

Final turn - VI = 130km/h-70kt-81 MPH

Final approach

Flaps retracted - VI= 125km/h-67kt-78 MPH

Flaps extended 30°-VI=120km/h-65kt-75 MPH

4.12 - Landing

4.12.1 - Normal landing

Flare at maximum (L.E slats open automatically)

Touch-down	VI=100km/h-54kt-62 MPH approx.

Maintain elevator control backward until the nose wheel contacts the ground between 55 km/h-30 kt - 34 MPH and 75 km/h - 40 kt - 47 MPH, depending on C.G location eventually, apply the brakes.

4.12.2 - GO around

Throttle control	full RPM
Carburettor heating	full cold
Maintain	VI=125km/h-67kt-78MPH

Retract the flaps slowly while taking the normal climb slope at VI=155km/h-84kt-96MPH

4.13 - After landing

Booster pump	off, light off
Flaps	retracted
Tabs	neutral position
Carburettor heating	full cold

4.14 - Stopping

Parking brakes	applied
Electrical equipment	de-energized
Magneto cut-off test	at idle, cut-off then set to 1 + 2
Reduced RPM	N = 800/1000 RPM
Mixture control	Fully "leaned out"
After engine stopping :	
Magneto selector	set to off
A.C generator excitation	off
Main switch	off
Fuel cock	closed

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 5

ACOUSTIC LIMITATION

SECTION 5

ACOUSTIC LIMITATION

(SENSENICH 76.EM8 060 propeller)

In compliance with decree dated 15th April 1977, the maximum noise level permissible for SOCATA MS.893.E aircraft, corresponding to total maximum certification weight of 2315 lbs is of 74 dB (A).

The identification limitations and modifications of the aircraft which are necessary to get a variant complying with this requirement are as follows :

- Use of SENSENICH 76 EM8.060 fixed pitch propeller

- Engine limitation at normal utilisation maximum rating at 2600 RPM involving tachometer markings given in Section 2.

In this identification, the noise level which was determined in conditions stated by decree dated 3rd April 1980 and at normal utilisation maximum power is of 74 dB (A).

Within such a definition, SOCATA MS.893.E aircraft has received, in compliance with decree dated 30th July 1975, the noise limitation type certificate N° N22 dated 3rd February 1982.

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VOLUNTARY

PERFORMANCES

FOR HARTZELL PROPELLER SEE SECTION 7

Performances given in this section result from official tests carried out in accordance with AIR 2052 regulation.
Measurements were taken with zero wind condition, on dry and hard runway.
On grass runway, the rolling distances at take-off or landing shall be increased by :

7 % on hard
10 % on short grass
25 % on high grass

More than 25 % on saft, muddy or snowy field
The results are presented in function of the altitude (in feet) and the temperature at the considered altitude.

5.1 - Take-off performances

They are given at the weights of 1050 kg - 2314 lb and 750 kg - 1653 lb.

5.11 - Take-off at the weight of 1050kg-2314 lb WITH SENSENICH 76 EM.8 060 PROPELLER

Flaps retracted
Take-off speed : VI = 105km/h-57 kt - 65 MPH
Climb speed : VI = 125 km/h - 67 kt - 78 MPH

Rolling distances in meters					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	195	225	250	275	295
2000	235	270	300	335	355
4000	285	330	365	405	430
6000	345	400	440	475	525
8000	415	485	535	595	635

Rolling distances in feet					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	640	740	820	900	970
2000	770	890	980	1100	1160
4000	930	1080	1200	1330	1410
6000	1130	1310	1440	1560	1720
8000	1360	1590	1755	1950	2080

Distances in meters for crossing the 15 meters obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	350	400	445	490	525
2000	420	490	540	600	645
4000	515	600	670	750	805
6000	640	750	850	950	1050
8000	815	975	1130	1315	1465

Distances in feet for crossing the 50 feet ostacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	1150	1310	1460	1610	1730
2000	1380	1610	1770	1970	2110
4000	1690	1970	2200	2460	2640
6000	2070	2460	2790	3120	3440
8000	2670	3200	3700	4320	4800

5.1.2 - Take-off at the weight of 750 kg-1653 lb
WITH SENSENICH 76 EM8.060 PROPELLER
Flaps retracted
take-off speed : VI = 95 km/h-51kt-59 MPH
Climb speed : VI = 110km/h-59kt-68 MPH

Rolling distances in meters					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	110	125	140	155	165
2000	130	150	170	195	200
4000	160	185	205	225	240
6000	190	225	250	275	295
8000	235	270	300	335	355

Rolling distances in feet					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	360	410	460	510	540
2000	430	490	560	610	660
4000	530	610	670	740	790
6000	620	740	820	900	970
8000	770	890	980	1100	1160

Distances in meters for crossing the 15 meters obstacle.

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	215	245	275	305	330
2000	255	295	330	370	395
4000	305	355	395	445	480
6000	370	435	490	555	600
8000	455	540	615	705	770

Distance in feet for crossing the 50 feet obstacle

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	710	800	900	1000	1080
2000	840	970	1080	1210	1300
4000	1000	1160	1300	1460	1580
6000	1210	1430	1610	1820	1970
8000	1490	1770	2020	2310	2520

5.13 Take-off at the weight of 1050 kg-2314 lb

With SENSENICH 76 EM8.054 PROPELLER
Flaps retrated
Take-off speed : VI = 105km/h-57kt-65 MPH
Climb speed : VI = 125km/h-67kt-78MPH

Rolling distances in meters

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	185	215	240	265	285
2000	225	260	290	320	340
4000	270	315	345	385	410
6000	330	380	425	470	500
8000	400	460	515	570	605

Rolling distances in feet					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	610	710	790	870	940
2000	740	850	950	1050	1120
4000	890	1030	1130	1260	1340
6000	1080	1250	1400	1540	1640
8000	1310	1510	1690	1870	1980

Distances in meters for crossing the 15 meters obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	335	385	425	470	505
2000	400	465	515	570	610
4000	490	565	630	705	760
6000	605	710	795	900	980
8000	760	905	1040	1200	1330

Distances in feet for crossing the 50 feet obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	1100	1260	1350	1540	1660
2000	1310	1530	1690	1870	2000
4000	1610	1850	2070	2310	2490
6000	1980	2430	2610	2950	3210
8000	2490	2960	3410	3930	4360

5.1.4 - Take-off at the weight of 750 kg-1653 lb
WITH SENSENICH 76 EM8.054 PROPELLER
Flaps retracted
Take-off speed : VI =95km/h-51kt-59 MPH
Climb speed : VI = 110km/h-59kt-68 MPH

Rolling distances in meters

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	105	120	135	150	160
2000	125	145	160	180	190
4000	150	175	195	215	230
6000	185	215	240	265	280
8000	225	260	290	320	340

Rolling distances in feet

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	340	390	440	490	520
2000	410	480	520	590	620
4000	490	570	640	710	750
6000	610	710	790	870	920
8000	740	850	950	1050	1120

Distances in meters for crossing the 15 meters obstacle.

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	205	240	265	295	315
2000	245	285	315	355	380
4000	295	340	380	430	460
6000	355	415	465	525	570
8000	435	510	580	660	720

Distance in feet for crossing the 50 feet obstacle

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	670	790	870	970	1030
2000	800	930	1030	1160	1250
4000	970	1110	1250	1410	1510
6000	1160	1360	1530	1720	1870
8000	1430	1670	1900	2160	2360

5.1.5 - Take-off at the weight of 1050kg-2314 lb
WITH SENSENICH 76 EM8.056 PROPELLER
Flaps retracted
Take-off speed : VI=105km/h-57 kt-65 MPH
Climb speed : VI = 125 km/h-67 kt-78 MPH

Rolling distances in meters					
θ°C / Zp ft °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	190	220	245	270	290
2000	230	265	295	325	350
4000	275	320	355	395	420
6000	335	390	430	480	510
8000	405	470	525	580	615

Rolling distances in feet					
θ°C / Zp ft °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	620	720	800	890	950
2000	750	870	970	1070	1150
4000	900	1050	1170	1300	1380
6000	1100	1280	1410	1480	1680
8000	1330	1540	1720	1910	2020

Distances in meters for crossing the 15 meters obstacle					
θ°C / Zp ft °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	345	395	435	480	515
2000	410	475	525	585	630
4000	500	580	645	725	785
6000	620	725	820	925	1015
8000	785	940	1080	1250	1395

Distances in feet for crossing the 50 feet obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	1130	1300	1430	1580	1690
2000	1350	1560	1720	1920	2070
4000	1640	1900	2110	2380	2570
6000	2030	2380	2690	3030	3330
8000	2580	3080	3540	4100	4580

5.1.6 - Take-off at the weight of 750 kg-1653 lb
WITH SENSENICH 76 EM8.056 PROPELLER
Flaps retracted
Take-off speed : VI = 95km/h-51kt-59 MPH
Climb speed : VI = 110km/h-59kt-68 MPH

Rolling distances in meters					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	110	125	140	155	165
2000	130	150	170	185	200
4000	160	185	200	225	240
6000	190	220	245	275	290
8000	230	270	300	330	355

Rolling distances in feet					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	360	410	460	510	540
2000	430	490	560	610	660
4000	530	610	660	740	790
6000	620	720	800	900	950
8000	750	890	980	1080	1160

Distance in meters for crossing the 15 meters obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	215	245	275	305	330
2000	255	295	330	365	395
4000	305	355	395	445	480
6000	370	430	485	550	595
8000	450	535	605	695	760
Distance in feet for crossing the 50 feet obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	710	800	900	1000	1080
2000	840	970	1080	1200	1300
4000	1000	1160	1300	1460	1570
6000	1210	1410	1590	1800	1950
8000	1480	1750	1980	2280	2490

5.2 - Landing performances

They are given for the weights of 1000 kg - 2205 lb and 750 kg - 1653 lb

5.2.1 - Landing at the weight of 1000kg - 2205 lb

SENSENICH 76 EM8.054-056 and 060
Flaps : 30°
Final speed : VI = 120 km/h-65 kt - 75 MPH

Distances in meters from crossing the 15 meters obstacle to complete stop.

Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	330	345	360	375	380
2000	345	365	380	395	400
4000	365	385	400	415	425
6000	385	405	420	435	450
8000	405	430	445	460	475

Distances in feet from crossing the 50 feet obstacle to complete stop.

Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	1080	1130	1180	1230	1250
2000	1130	1200	1250	1300	1310
4000	1200	1260	1310	1360	1390
6000	1260	1330	1380	1430	1480
8000	1330	1410	1460	1510	1560

Landing in meters

Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	130	140	150	160	165
2000	140	155	160	170	175
4000	155	165	175	185	190
6000	165	175	185	195	205
8000	175	190	200	210	220

Landing in feet

Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	430	460	490	520	540
2000	460	510	520	560	570
4000	510	540	570	610	620
6000	540	570	610	640	670
8000	570	620	660	690	720

5.2.2 - Landing at the weight of 750 kg - 1653 lb
SENSENICH 76 EM8.054-056-060
Flaps : 30°
Final speed : VI = 100 km/h-54 kt-62 MPH

Distances in meters from crossing the 15 meters obstacle to complete stop					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	255	270	280	290	295
2000	270	285	295	305	315
4000	285	300	310	325	330
6000	300	315	330	340	350
8000	315	335	350	360	370

Distances in feet from crossing the 50 feet obstacle to complete stop.					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0		890	920	950	970
2000	890	940	970	1000	1030
4000	940	980	1020	1070	1080
6000	980	1030	1080	1110	1150
8000	1030	1100	1150	1180	1210

Landing runs in meters					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	105	115	120	125	130
2000	115	120	130	135	140
4000	120	130	140	145	150
6000	130	140	150	155	165
8000	140	155	160	170	175

Landing runs in feet					
θ°C / Zp ft / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	340	380	390	410	430
2000	380	390	430	440	460
4000	390	430	460	480	490
6000	430	460	490	510	540
8000	460	510	590	560	570

5.3 - Rates of climb

5.3.1 - At the weight of 1050 kg - 2314 lb
SENSENICH 76 EM8.060 PROPELLER
Flaps retracted
Optimum climb speed : VI=155km/h-84kt-96MPH

m/s					
θ°C / Zp ft / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	4.50	4.15	3.85	3.60	3.40
2000	3.90	3.50	3.25	3.00	2.85
4000	3.25	2.80	2.65	2.40	2.25
6000	2.65	2.30	2.05	1.80	1.65
8000	2.05	1.70	1.45	1.25	1.10

ft/min					
θ°C / Zp ft / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	886	817	758	709	670
2000	768	689	640	590	561
4000	640	551	522	472	443
6000	522	453	403	354	325
8000	403	335	285	246	217

5.3.2 - Rates of climb at the weight of 750 kg-1653 lb

SENSENICH 76 EM8.060 PROPELLER
Flaps retracted
Optimum climb speed : VI = 145 km/h-79 kt-90 MPH

M/s					
Zp ft \ 0°C / °F	- 20 - 4	0 + 32	+ 15 + 59	+ 30 + 86	+ 40 + 104
0	7.80	7.05	6.50	6.00	5.65
2000	6.90	6.15	5.65	5.15	4.85
4000	6.00	5.35	4.85	4.40	4.10
6000	5.10	4.50	4.05	3.60	3.30
8000	4.25	3.65	3.25	2.80	2.55

ft/min					
Zp ft \ 0°C / °F	- 20 - 4	0 + 32	+ 15 + 59	+ 30 + 86	+ 40 + 104
0	1535	1388	1280	1181	1112
2000	1358	1211	1112	1014	955
4000	1180	1053	955	866	807
6000	1004	886	797	709	650
8000	837	719	640	551	502

5.3.3 - Rates of climb at the weight of 1050 kg-2314 lb

SENSENICH 76 EM8.054 PROPELLER
Flaps retracted
Optimum climb speed : VI = 155 km/h-84 kt-96 MPH.

m/s					
Zp ft \ θ°C °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	4.70	4.30	4.00	3.70	3.55
2000	4.05	3.70	3.40	3.15	2.95
4000	3.45	3.10	2.80	2.55	2.40
6000	2.85	2.45	2.20	1.95	1.80
8000	2.20	1.90	1.65	1.40	1.25

ft/min					
Zp ft \ θ°C °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	925	847	788	728	700
2000	797	728	670	620	581
4000	680	610	550	500	472
6000	560	482	433	384	354
8000	433	374	325	275	246

5.3.4 - Rates of climb at the weight of 750kg-1653 lb

SENSENICH 76 EM8.054 PROPELLER
Flaps retracted
Optimum climb speed : VI=145km/h-79kt-90MPH

m/s					
Zp ft \ θ°C °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	8.15	7.35	6.80	6.25	5.90
2000	7.20	6.50	5.95	5.45	5.10
4000	6.30	5.65	5.15	4.65	4.35
6000	5.45	4.80	4.30	3.85	3.60
8000	4.60	3.95	3.50	3.10	2.80

ft/min					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	1605	1455	1340	1230	1160
2000	1415	1280	1170	1070	1005
4000	1240	1110	1015	915	855
6000	1070	945	845	760	710
8000	905	780	690	610	550

5.3.5 - Rates of climb at the weight of 1050 kg - 2314 lb

SENSENICH 76 EM8.056 PROPELLER

Flaps retracted

Optimum climb speed : VI = 155 km/h-84kt-96MPH

m/s					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	4.60	4.20	3.90	3.65	3.45
2000	3.95	3.60	3.30	3.05	2.90
4000	3.35	3.00	2.75	2.45	2.30
6000	2.75	2.40	2.15	1.90	1.75
8000	2.15	1.80	1.55	1.30	1.15

ft/min					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	905	830	770	720	680
2000	780	710	650	600	570
4000	660	590	540	480	450
6000	540	470	425	375	345
8000	425	355	305	255	225

5.3.6 - Rates of climb at the weight of 750 kg-1653 lb

SENSENICH 76 EM8.056 PROPELLER
Flaps retracted
Optimum climb speed : VI = 145 km/h-79 kt-90 MPH

m/sec

Zp ft \ 0°C °F	- 20 - 4	0 + 32	+ 15 + 59	+ 30 + 86	+ 40 + 104
0	7.80	7.05	6.50	6.00	5.65
2000	6.90	6.15	5.65	5.15	4.85
4000	6.00	5.35	4.85	4.40	4.10
6000	5.10	4.50	4.05	3.60	3.30
8000	4.25	3.65	3.25	2.80	2.55

ft/min

Zp ft \ 0°C °F	- 20 - 4	0 + 32	+ 15 + 59	+ 30 + 86	+ 40 + 104
0	1535	1390	1280	1180	1110
2000	1360	1210	1110	1015	955
4000	1080	1055	955	865	810
6000	1005	885	800	710	650
8000	840	720	640	550	500

5.4 - Cruise performances

At the weight of 1050 kg-2314 lb

Usable fuel capacity :
220 l.- 58 US.Gal - 48.4 Imp.Gal.

SENSENICH 76 EM8.054 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg	VI km/h	Vp km/h	Consom l/h	Range 220 l h.min	Range 220 l km
75 % 135 HP	0	2630	775	22.9	212	210	41	5.21	1120
	2000	2700	750	22.2	207	211	42	5.14	1100
70 % 126 HP	0	2560	745	22	206	204	37	5.56	1210
	2000	2620	725	21.4	203	207	38	5.47	1195
	4000	2680	700	20.7	201	211	39	5.38	1185
65 % 117 HP	0	2480	720	21.3	199	197	33.5	6.33	1290
	2000	2540	700	20.7	157	201	34	6.27	1290
	4000	2590	675	20	194	204	34.5	6.22	1290
	6000	2640	655	19.3	191	207	35.5	6.12	1280
	8000	2690	640	18.9	188	210	36.5	6.01	1260

SENSENICH 76 EM8.054 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg	VI MPH	Vp MPH	Cons. US.G/H	Range h.mn	220 L St.M
75 135 HP	0	2630	775	22.9	132	130	10.6	5.21	696
	2000	2700	750	22.2	129	131	11.1	5.14	684
70 126 HP	0	2560	745	22	128	127	9.75	5.56	752
	2000	2620	725	21.4	126	129	10	5.47	743
	4000	2680	700	20.7	125	131	10.3	5.38	736
65 117 HP	0	2480	720	21.3	124	122	8.85	6.33	802
	2000	2540	700	20.7	122	125	9	6.27	802
	4000	2590	675	20	121	127	9.1	6.22	802
	6000	2640	655	19.3	119	129	9.4	6.12	795
	8000	2690	640	18.4	117	131	9.65	6.01	783

SENSENICH 76 EM8.054 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg	VI kt	Vp kt	Cons. Imp.G	Range h.min	220 L N.m
75 % 135 HP	0	2630	775	22.9	115	113	9	5.21	605
	2000	2700	750	22.2	112	114	9.25	5.14	594
70 % 126 HP	0	2560	745	22	111	110	8.15	5.56	654
	2000	2620	725	21.4	110	112	8.35	5.47	645
	4000	2680	700	20.7	109	114	8.60	5.38	640
65 % 117 HP	0	2480	720	21.3	107	106	7.35	6.33	697
	2000	2540	700	20.7	106	108	7.50	6.27	697
	4000	2590	675	20	105	110	7.60	6.22	697
	6000	2640	655	19.3	103	112	7.80	6.12	691
	8000	2690	640	18.9	102	113	8.05	6.01	680

SENSENICH 76 EM8.056 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg.	VI km/h	Vp km/h	cons. l/h	Range 220L h.min	Range 220L km
75 % 135 HP	0	2590	785	23.2	212	210	40	5.30	1150
	2000	2640	760	22.5	209	213	41	5.22	1140
	4000	2690	740	21.9	206	216	42	5.14	1130
70 % 126 HP	0	2530	750	22.2	205	203	37	5.56	1200
	2000	2570	730	21.6	202	206	37,5	5.51	1200
	4000	2620	710	21	199	209	38	5.48	1205
	6000	2670	690	20.4	197	213	39	5.38	1200
70 % 117 HP	0	2470	720	21.3	198	196	33,5	6.34	1285
	2000	2510	705	20.9	195	199	34	6.28	1285
	4000	2550	685	20.2	192	202	34,5	6.22	1285
	6000	2600	660	19.5	190	206	35	6.17	1290
	8000	2650	645	19	187	208	35,5	6.12	1285

SENSENICH 76 EM8.056 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA In.Hg.	VI MPH	Vp MPH	Cons. US.G.	Range 220 L h.min	Range 220 L St.m
75 % 135 HP	0	2590	785	23.2	133	131	10.55	5.30	714
	2000	2640	760	22.5	131	133	10.85	5.22	708
	4000	2690	740	21.9	129	135	11.10	5.14	701
70 % 126 HP	0	2530	750	22.2	128	127	9.80	5.56	745
	2000	2570	730	21.6	126	129	9.90	5.51	745
	4000	2620	710	21	124	131	10	5.48	748
	6000	2670	690	20.4	123	133	10.30	5.38	745
65 % 117 HP	0	2470	720	21.3	124	123	8.85	6.34	798
	2000	2510	705	20.9	122	124	9.00	6.28	798
	4000	2550	685	20.2	120	126	9.10	6.22	798
	6000	2600	660	19.5	119	129	9.25	6.17	801
	8000	2650	645	19	117	130	9.40	6.12	798

SENSENICH 76 EM8.056 PROPELLER

W % - HP	Zp ft	N RPM	PA m.bar	PA In.Hg	VI kt	Vp kt	Cons. Imp.G	Range 220 L h.min	N.m
75 % 135 HP	0	2590	785	23.2	115	113	8.80	5.30	621
	2000	2640	760	22.5	113	115	9.00	5.22	616
	4000	2690	740	21.9	111	117	9.25	5.14	610
70 % 126 HP	0	2530	750	22.2	111	110	8.15	5.56	648
	2000	2570	730	21.6	109	111	8.25	5.51	648
	4000	2620	710	21	108	113	8.35	5.48	650
	6000	2670	630	20.4	106	115	8.60	5.38	648
65 % 117 HP	0	2470	720	21.3	107	106	7.35	6.34	694
	2000	2510	705	20.9	105	108	7.50	6.28	694
	4000	2350	685	20.2	104	109	7.60	6.22	694
	6000	2600	660	19.5	103	111	7.70	6.17	697
	8000	2650	645	19	101	112	7.80	6.12	694

SENSENICH 76 EM8.060

W % - HP	Zp ft	N RPM	PA m.bar	PA In.Hg	VI km/h	Vp km/h	Cons. l/h	Range 220 L h.min	km
75 % 135 HP	0	2540	785	23.2	216	214	39,5	5.34	1190
	2000	2590	765	22.6	213	217	40,5	5.26	1175
	4000								
	6000								
70 % 126 HP	0	2460	760	22.5	210	208	36	6.06	1270
	2000	2510	740	21.9	206	210	37	5.57	1250
	4000	2560	725	21.4	203	213	37	5.57	1260
	6000	2600	700	20.7	200	216	37,5	5.52	1265
	8000								
65 % 117 HP	0	2390	735	21.7	202	200	32.5	6.46	1350
	2000	2430	715	21.1	199	203	33.5	6.34	1330
	4000	2470	695	20.5	196	206	33.5	6.34	1350
	6000	2510	675	19.9	193	209	34	6.28	1350
	8000	2560	655	19.3	190	212	35	6.16	1330

SENSENICH 76 EM8.060

W % - HP	Zp ft	N RPM	PA m.bar	PA In. Hg.	VI MPH	Vp MPH	Cons. US.G	Range 220 L h.min	 St.m
	0	2540	785	23.2	134	133	10.45	5.34	739
75 %	2000	2590	765	22.6	132	135	10.70	5.26	730
	4000								
135 HP	6000								
	0	2460	760	22.5	131	129	9.50	6.06	789
70 %	2000	2510	740	21.9	128	131	9.80	5.57	776
	4000	2560	725	21.4	126	132	9.80	5.57	782
126 HP	6000	2600	700	20.7	124	134	9.90	5.52	785
	8000								
	0	2390	735	21.7	125	124	8.60	6.46	839
65 %	2000	2430	715	21.1	124	126	8.85	6.34	826
	4000	2470	695	20.5	122	128	8.85	6.34	839
117 HP	6000	2510	675	19.9	120	130	9	6.28	839
	8000	2560	655	19.3	118	132	9.25	6.16	826

SENSENICH 76 EM8.060

W	Zp	N	PA	PA	VI	Vp	Cons.	Range 220 L	
% - HP	ft	RPM	m.bar	in.Hg.	kt	kt	Imp.G	h.min	N.m
	0	2540	785	23.2	117	116	8.7	5.34	643
75 %	2000	2590	765	22.6	115	117	8.9	5.26	635
	4000								
135 HP	6000								
	0	2460	760	22.5	113	112	7.9	6.06	686
70 %	2000	2510	740	21.9	111	113	8.15	5.57	675
	4000	2560	725	21.4	110	115	8.15	5.57	681
126 HP	6000	2600	700	20.7	108	117	8.25	5.52	683
	8000								
	0	2390	735	21.7	109	108	7.15	6.46	730
65 %	2000	2430	715	21.1	107	110	7.4	6.34	718
	4000	2470	696	20.5	106	111	7.4	6.34	729
117 HP	6000	2510	675	19.9	104	113	7.5	6.28	729
	8000	2560	655	19.3	103	114	7.7	6.16	718

NOTE : The ranges and crossing distances shown on the previous tables agree with complete use of fuel at the indicated altitude, ignoring take-off, climb etc...

5.5 - Airspeed indicating system correction

Vp : True air speed with zero wind

Vc : (Calibrated airspeed) VI (indicated airspeed) corrected by the airspeed indicating system calibration.

$$VC = VI - 2 \text{ km/h}$$

Note : The above formula does not take into account the airspeed indicator tolerances.

STALLING SPEED

Stalling speeds (IAS) for a weight of 1050 kg-2314 lb - and at reduced RPM.

BANK									
Flaps	0°			30°			45°		
	km/h	kt	MPH	km/h	kt	MPH	km/h	kt	MPH
0°	100	54	62	110	59	68	121	65	75
30°	92	50	57	102	55	64	113	61	70

DEMONSTRATED CROSS-WIND

Maximum component at 90° : 20 kt

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 6

SPECIAL MANEUVERS AND OPERATIONS

SECTION 6

SPECIAL MANEUVERS AND OPERATIONS

6.1 - Stalling

CAUTION :

NEVER TRY STALLING NEAR THE GROUND

Stalling with reduced RPM is restricted by the elevator control stop, the aircraft falling flat.
Stalling with high RPM is characterized by a very nose high attitude.
With rear C.G position, a mild Wing drop may occur when the elevator control is close to its stop.
The aerodynamic warning is weak at reduced RPM but stronger at high power. Control may be regained immediately by easing the stick forward ; the altitude loss is small in all cases, and is minimum if RPM is immediately increased.

Stalling speeds (IAS) for a weight of 1050 kg - 2314 lb - at reduced RPM.

BANK									
Flaps	0°			30°			45°		
	km/h	kt	MPH	km/h	kt	MPH	km/h	kt	MPH
0°	100	54	62	110	59	68	121	65	75
30°	92	50	57	102	55	63	113	61	70

NOTE : Values obtained with high RPM are lower by 12 km/h-6kt- 7 MPH to 18 km/h - 10 kt 11 MPH than those given in the table hereabove.

6.2 - Flight with cross-wind

6.2.1 - Take-off

Aileron control actuated toward wind direction.
Maintain the aircraft along the axis using the rudder. Maintain nosewheel on ground up to VI = 120 km/h - 65 kt - 75 MPH.
Take-off cleanly in order to avoid touch-down with drift.

6.2.2 - Landing

Flaps extended to the minimum possible depending on the ground condition.
Make a crab angle approach or with the wing dropping in the wind direction.
Flare by placing the aircraft along the axis before touch-down.
When on ground keep the nose wheel down maintain the aircraft along the axis using rudder pedals and then the brakes.
Roll while actuating the control wheel toward wind direction.

6.3 - Flight in turbulent air

Maximum speed 250 km/h - 135 kt - 155 MPH
Recommended speed 220 km/h - 119 kt - 137 MPH
Check that pilot's and passenger's seat belts are sufficiently fastened.

6.4 - Use in cold weather

When outside temperature on ground is under 0° C - 32°F and since starting is more difficult due to the poor vaporization of fuel it is advisable, after starting, to help the engine running by marking successive injections until it reaches 900 to 1000 RPM.
(See oil grade under 1.1.5).

6.5 - Operation on short runways

6.5.1 - Take-off

Set progressively to full RPM while the brakes are applied. Extend the flaps at the beginning of take-off run.

As soon as the aircraft lifts off, set VI =155km/h 62 kt - 71 MPH : then retract the flaps progressively while reaching the climbing speed.

6.5.2 - Landing

Proceed to a flat approach with powered engine, VI = 110 km/h - 59 kt - 68 MPH flaps extended to 30°.

Just before touch down, fully reduce the RPM and flare at maximum. Maintain nose wheel as high as possible.

Use the brakes only when nose wheel is on ground.

6.6 - Take-off after a forced landing

For taking off after landing in the country (see Paragraph 3.5) only one pilot may be on board with a limited capacity of fuel.

With 1hr.30min. of range the MS.893E will have approximative weight of 740kg - 1631 lb-Then the take-off procedure is :

-Set progressively to full RPM while brakes are-applied.
-Extended full flaps after the beginning of the take-off run.
-Take off cleanly at VI = 85 km/h-53MPH-46kt
-Set VI =97km/h-60MPH-52kt to retract flaps
-Take the maximum gradient climb VI =120/125km/h 75/78 MPH - 65/67 kt -

6.7 - Flight with open canopy

Normal flight is possible with the canopy open by 10 cm-4 in. approximately.

For an opening of 0.50 m - 20 in. never exceed 180 Km/h - 97 kt - 112 MPH.

In no case should the speed exceed 150 km/h - 81 kt - 93 MPH, when the canopy is open by more than 0.50 m - 20 in.

NOTE - Never forget to lock the canopy in open position.

6.8 - Utilization of the anti-collision light

An instruction plate located on the left hand side of the instrument panel strip shows the utilization requirements of the anti-collision light (option nr. 267)

CAUTION

Turn off stobe light when taxiing near other aircraft or when flying in fog or clouds. Standard position lights must be used for all night operations.

SECTION 7

OPERATION WITH OPTIONAL EQUIPMENT

7.1 - Glider towing

7.1.1 - Requirements

The aircraft must be fitted with a towing hook installed on a pylon at the rear section of the fuselage (option n° 22), and with a SENSENICH propeller 76 EM8.054 or 056 or with HARTZELL propeller HC.C2YK.1BF.F 7666 A.2. The use of a cylinder head thermometer is recommended (bayonet type sensor on cylinder n° 3), option n° 66. Installation of a rear-view mirror is recommended. Option n° 119. The maximum weight of the towed glider (s) is 650 kg- 1433lb the maximum weight of the aircraft is 780 kg - 1720 lb.

7.1.2 - Towing procedure

In addition to normal procedure, carry-out a functional test of the towing hook on the aircraft and glider, before any towing flight. Hook up the cable on aircraft and glider. Move the aircraft slowly in order to stretch the cable.

Set to full manifold pressure. The rating on ground run, for the fixed pitch propellers must be at least :

Sensenich 054 propeller : 2400^{+0}_{-40} rpm

Sensenich 056 propeller : 2350^{+0}_{-40} rpm

For the HARTZELL-HC-C2YK-1BF/F.7666.A-2 constant speed propeller the rating, for full manifold pressure and full low pitch must be 2700^{+0}_{-40} rpm

Take off normally with flaps retracted or extended as necessary for towing slow gliders (VI < 110 km/h-59kt-68MPH). The extension of the flaps reduces the aircraft attitude but does no improve the rate of climb. Climb at VI =100km/h-54kt-62MPH to 120 km/h-65kt-75MPH depending on the types of gliders. The minimum towing speed is =100 km/h 54 kt - 62 MPH. The cylinder head temperature should never exceed 260°C - 500°F (if termometer is installed).

In sustained climb, keep watch on the oil temperature maintain it within the green sector by gradually reducing the power. In that case, set 2600 RPM by the pitch control and, eventually, adjust the manifold pressure by means of the throttle lever. After the glider has been released, set if possible such a descent rating as to avoid a sudden cooling of the engine i.e. for VI = 220km/h-119 kt - 137 MPH to 230 km/h - 124 kt - 143 MPH, N = 2400 RPM, with the propeller set to full low pitch while adjusting the throttle control.
In case of sustained descent, increase RPM every 1500 ft and avoid that cylinder head temperature be under 110°C-230°F.
Fly over the airfield to release the cable on ground by fully operating twice the release handle. Turn and proceed to normal landing.

7.1.3 - Long distance towing : Long distance towing can be carried out normally without special restrictions other than those resulting from the type of glider being towed. Preferably, the engine rating in cruise should be 2500 r.p.m. adjust the power with the throttle lever.

7.1.4 - Towing take-off on poor ground
Same procedure as under 7.1.2
To reduce the rolling lenght
Extend flaps 30°
Set to maximum manifold pressure, full low pitch, brakes applied, towing cable stretched.
Release the brakes.
Take-off cleanly at VI = 75km/h-40kt-46 MPH.
Retract the flaps slowly while reaching the minimum climbing speed VI for retracting the flaps 95 km/h-51 kt - 59 MPH.

7.2 - Streamer towing

7.2.1 - Requirements

For the aircraft, same conditions as under 7.1.1 i.e : installation of a SENSENICH propeller 76 EM8.054 or 56 or a HARTZELL propeller HC.C2YK.1BF/F 7666 A.2

- Installation of a towing hook.
- Installation of a cylinder head thermometer is recommended.
- Maximum weight of the aircraft: 780 kg-1720 lb

The 100 C x.S of the streamer must not exceed 180 m2-1938 Sq.ft i.e a maximum drag of 105 kg-231 lb at VI= 110 km/h- 59 kt - 68 MPH.

For instance, this drag corresponds to a streamer consisting of 34 characters 1.60 m-62.992 in high set on a lattice plus a trail 10 m - 32.808 ft.long.

7.2.2 - Towing procedure

In addition to current procedures, carry out a functional test of the aircraft hook.

Hook the cable to the aircraft and to the streamer.

Lay the folded streamer down on the ground ahead of the aircraft in order to allow the latter reaching a sufficient speed at the time the streamer is lifted from the ground.

In the case of "Pick-Up" hooking, the hook up speed must be VI = 100 km/h-54 kt-62 MPH.

Set full manifold pressure smoothly. The engine rating during ground run (full low pitch) must be 2700^{+0}_{-40} RPM.

And for fixed propeller 054.2400 $^{+0}_{-40}$ RPM

056.2350 $^{+0}_{-40}$ RPM

Proceed to normal take-off, flaps retracted or extended as necessary. The use of extended flaps changes the aircraft attitude but does not improve the rate of climb.

Climb : VI = 100 km/h-54 kt-62 MPH to 115 km/h-62 kt-71 MPH with full manifold pressure, full

low pitch, N = 2700 RPM.
The minimum towing speed is VI = 100 km/h-54 kt-62 MPH.
The cylinder head temperature must not exceed 260°C.500°F.
The oil temperature should be maintained within the green sector.
Level flight : For a towing speed in level flight of VI = 105 km/h-57 kt-65 MPH to 110 km/h-59 kt-68 MPH, set the engine rating to 2500 RPM in reference.

Use of flaps : The normal configuration during streamer stowage is "retracted flaps".

7.2.3 - Take-off with streamer on poor ground

Same procedure an in 7.2.2

To reduce the rolling lengh :

- reach the speed with retracted flaps.
- extended flaps to 30° at VI = 75 km/h-40 kt 47 MPH
- take-off cleanly
- retract slowly the flaps when reaching the minimum climbing VI allowed for retracting the flaps : i.e. 95 km/h-51 kt-59 MPH.

HARTZELL

VARIABLE PITCH PROPELLER

CONTENTS

7.3 - HARTZELL PROPELLER (Variable pitch)

This Section is valid for RALLYE MS.893.E equipped with HC.C2YK.1BF/F 7666 A-2 HARTZELL propeller (with variable pitch) and 0.360.A1A LYCOMING engine (Option 101).

The directives and characteristics appropriate to this version are only indicated.

7.3.1 - General characteristics

PROPELLER : HARTZELL
Ref : HC.C2YK.1BF/F 7666 A.2
Nominal diameter : 1.88 m - 74 in
Minimum diameter : 1.83 m - 72 in
Variable pitch with constant speed device.

7.3.2 - Engine limitations

The admissible engine rating with full throttle at ground run must be : 2700 $\pm$ 40 RPM

Markings on engine control instrument

Tachometer

Green sector from 750 to 2000 RPM
Red sector from 2000 to 2250 RPM
Green sector from 2250 to 2700 RPM
Radial red line at 2700 RPM
Rating prohibited in continual operation between 2000 and 2250 RPM.

7.3.3 - Emergency procedures

- In case of oil pressure drop in the governor system or a control breakdown, the propeller moves to low pitch.
- Control the engine in order not to exceed 2700 RPM. Full throttle is possible at low speeds only.
- Cheeck oil pressure and temperature

7.3.4 - Normal procedures

Ground run

Minimum oil temperature recommended : 40°C 104°F

Magneto selector 1, then 1 + 2	
N = 2000 RPM 2, then 1 + 2	
Permissible drop of rating	175
Checking of propeller regulation	
(tow operations maxi)	2000 RPM
Put on full throttle	
Check the maximum rating	2700 RPM
Reduce at	2200 RPM
Checking of carburettor heating	on then off
Loss of rating	100 RPM
Idle rating	750 $\pm$ 50 RPM

After take-off

Keep full throttle

Check the rating 2700 $^{+0}_{-20}$ RPM

If the rating goes beyond this value , reduce it by means of the propeller control.

Climb

Time of climb at the weight of 1050 kg-2314 lb

Z ft	2000	4000	6000	8000	10.000
Time to	2'50"	7'	11'30"	17'20"	25'15"
VI km/h	160	160	158	150	140
VI kt	86,5	86,5	85	81	76
VI MPH	100	100	98	93	87

Service ceiling 3900 m - 12 795 ft
Absolute ceiling 4600 m - 15 092 ft

Cruise

See performance diagram

Descent
Propeller low pitch
Throttle control on reduced

TO avoid a too important cooling of engine, keep rather a rating of 1800 to 2000 RPM.

Approach

Throttle control 1000 to 1200 RPM

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7.3.5 - ACOUSTIC LIMITATION - PERFORMANCE

Acoustic limitation

In compliance with decree dated 15th April 1977 the maximum noise level permissible for SOCATA MS.893 E aircraft, corresponding to total maximum certification weight of 2314 lbs is of 74 dB (A).

The identification limitations and modifications of the aircraft which are necessary to get a variant complying with this requirement are as follows :

- Use of HARTZELL HC.C2YK.1BF/F 7666 A-2 constant speed propeller
- Application of optional modification N° 278 consisting of the fitting of THIELMANN round exhaust system.

In this identification, the noise level which was determined in conditions stated by the above-mentioned decree dated 15th April 1977 and at maximum continuous power is of 71.2 dB (A).

Within such a definition, SOCATA MS.893.E aircraft has received, in compliance with decree dated 30th July 1975, the noise limitation type certificate N° N22 dated 24th August 1979.

Performance

Take-off at the weight of 1050 kg - 2314 lbs

Flaps retracted
Take-off speed : VI = 105 km/h - 57 kt - 65 MPH
Climb speed : VI = 125 km/h - 67 kt - 78 MPH

Rolling distance in meters					
Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	185	215	240	265	285
2000	225	260	290	315	340
4000	270	315	350	385	415
6000	330	380	420	465	500
8000	400	465	515	570	610

Rolling distances in feet					
Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	606	705	790	870	935
2000	740	850	950	1030	1115
4000	885	1030	1150	1260	1360
6000	1080	1245	1380	1525	1640
8000	1310	1525	1690	1870	2000

Distances in meters for crossing the 15 meters obstacle					
Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	335	385	425	470	505
2000	400	465	515	570	615
4000	490	570	635	710	765
6000	605	710	800	905	985
8000	770	920	1055	1225	1360

Distances in feet for crossing the 50 feet obstacle					
Zp ft \ θ°C / °F	−20 −4	0 +32	+15 +59	+30 +86	+40 +104
0	1100	1260	1380	1540	1660
2000	1310	1520	1690	1870	2020
4000	1610	1870	2070	2330	2510
6000	1980	2330	2620	2970	3230
8000	2520	3020	3460	4010	4460

Take-off at the weight of 750 kg - 1653 lb

Flaps retracted
Take-off speed : VI = 95 km/h-51 kt-59 MPH
Climb speed : VI = 110 km/h-59kt-68 MPH

Rolling distances in meters

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	105	120	135	150	160
2000	125	145	160	180	190
4000	155	175	195	220	230
6000	185	215	240	265	280
8000	225	260	290	320	345

Rolling distances in feet

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	344	395	445	490	525
2000	410	475	525	590	625
4000	510	575	640	720	755
6000	605	705	780	820	920
8000	740	850	950	1050	1130

Distances in meters for crossing the 15 meters obstacle.

Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	205	240	265	295	315
2000	245	285	315	355	380
4000	295	340	380	430	460
6000	355	415	465	525	570
8000	435	515	580	660	725

Distances in feet for crossing the 50 feet obstacle					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	670	780	870	970	1030
2000	800	900	1030	1165	1245
4000	970	1115	1245	1410	1510
6000	1165	1360	1525	1720	1870
8000	1425	1690	1900	2160	2380

Landing at the weight of 1000 kg-2205 lb
Flaps 30°
Final speed : VI = 120km/h-65 kt-75 MPH

Distances in meters from crossing the 15 meters obstacle to complete stop					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	330	345	360	375	380
2000	345	365	380	395	400
4000	365	385	400	415	425
6000	385	405	420	435	450
8000	405	430	445	460	475

Distances in feet from crossing the 50 feet obstacle to complete stop					
θ°C / Zp ft / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	1080	1130	1180	1230	1245
2000	1130	1195	1245	1295	1310
4000	1200	1260	1310	1360	1395
6000	1260	1330	1380	1425	1475
8000	1330	1410	1460	1510	1560

Landing runs in meters					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	130	140	150	160	165
2000	140	155	160	170	175
4000	155	165	175	185	190
6000	165	175	185	195	205
8000	175	190	200	210	220

Landing runs in feet					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	430	460	490	520	540
2000	460	510	520	560	570
4000	510	540	570	610	620
6000	540	570	610	640	670
8000	570	620	660	690	720

Landing at the weight of 750 kg-1653 lb
Flaps 30°
Final speed : VI = 100 km/h-54kt-62 MPH

Distances in meters from crossing the 15 meters obstacle to complete stop					
Zp ft \ θ°C / °F	-20 -4	0 +32	+15 +59	+30 +86	+40 +104
0	255	270	280	290	295
2000	270	285	295	305	315
4000	285	300	310	325	330
6000	300	315	330	340	350
8000	315	335	350	360	370

Distances in feet from crossing the 50 feet obstacle to complete stop

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	835	890	920	950	970
2000	890	940	970	1000	1030
4000	940	980	1020	1070	1080
6000	980	1030	1080	1110	1150
8000	1030	1100	1150	1180	1210

Landing runs in meters

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	105	115	120	125	130
2000	115	120	130	135	140
4000	120	130	140	145	150
6000	130	140	145	155	165
8000	140	155	160	170	175

Landing runs in feet

Zp ft \ θ°C / °F	-20 / -4	0 / +32	+15 / +59	+30 / +86	+40 / +104
0	340	380	390	410	430
2000	380	390	430	440	460
4000	390	430	460	480	490
6000	430	460	490	510	540
8000	460	510	530	560	570

Rates of climb at the weight of 1050 kg-2314 lb
Flaps retracted
Optimum climb speed : VI = 155km/h-84kt-96 MPH

m/s					
Zp ft \ 0°C / °F	- 20 / - 4	0 / + 32	+ 15 / + 59	+ 30 / + 86	+ 40 / + 104
0	4.70	4.30	4.00	3.70	3.55
2000	4.05	3.65	3.40	3.10	2.95
4000	3.40	3.05	2.80	2.50	2.35
6000	2.80	2.45	2.20	1.95	1.75
8000	2.15	1.85	1.60	1.35	1.20

ft/min					
Zp ft \ 0°C / °F	- 20 / - 4	0 / + 32	+ 15 / + 59	+ 30 / + 86	+ 40 / + 104
0	926	846	788	728	700
2000	800	720	670	610	581
4000	670	600	552	492	463
6000	550	482	433	384	345
8000	423	364	315	266	236

Rates of climb at the weight of 750 kg - 1653 lb

Flaps retracted

Optimum climb speed : VI = 145 km/h-79 kt-90 MPH

m/s					
Zp ft \ 0°C / °F	- 20 / - 4	0 / + 32	+ 15 / + 59	+ 30 / + 86	+ 40 / + 104
0	8.15	7.35	6.80	6.25	5.90
2000	7.25	6.50	6.00	5.45	5.10
4000	6.35	5.65	5.15	4.65	4.35
6000	5.45	4.80	4.30	3.85	3.55
8000	4.60	3.95	3.50	3.10	2.80

ft/min					
Zp ft \ °C / °F	- 20 - 4	0 + 32	+ 15 + 59	+ 30 + 86	+ 40 + 104
0	1605	1445	1340	1230	1160
2000	1430	1280	1180	1075	1005
4000	1250	1113	1015	916	856
6000	1075	946	847	758	700
8000	906	778	690	610	550

Cruise performances

- At the weight of 1050 kg - 2314 lb
- Usable fuel capacity

  - 220 l - 58 US.Gal - 48,4 Imp.G

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg.	VI km/h	Vp km/h	Cons. 1/h	Range 220 1 h.min	Range 220 1 km
	0	2450	800	23.6	216	214	38	5.47	1235
75 %	2000	2450	785	23.2	213	217	38	5.47	1255
	4000	2450	775	22.9	209	220	38	5.47	1270
135 HP	6000	2600	740	21.9	207	224	40	5.30	1230
	8000	2700	715	21.1	204	228	42,2	5.12	1185
	0	2400	770	22.7	209	207	35	6.17	1300
70 %	2000	2400	755	22.3	206	210	35	6.17	1320
	4000	2400	740	21.9	203	213	35	6.17	1340
136 HP	6000	2400	725	21.4	200	217	35	6.17	1360
	8000	2450	705	20.8	197	220	36	6.06	1340
	0	2350	740	21.9	202	200	32	6.52	1370
65 %	2000	2350	725	21.4	199	203	32	6.52	1390
	4000	2350	710	21	196	206	32	6.52	1410
117 HP	6000	2350	695	20.5	193	209	32	6.52	1430
	8000	2350	680	20	191	213	32	6.52	1460

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg.	VI MPH	Vp MPH	Cons. US.G/h	Range 220 l h.min	Range 220 l St.M
	0	2450	800	23.6	134	133	10	5.47	767
75 %	2000	2450	785	23.2	132	135	10	5.47	780
	4000	2450	775	22.9	130	137	10	5.47	789
135HP	6000	2450	740	21.9	129	139	10.55	5.30	764
	8000	2700	715	21.1	137	142	11.15	5.12	736
	0	2400	770	22.7	130	129	9.25	6.17	807
70 %	2000	2400	755	22.3	128	130	9.25	6.17	820
	4000	2400	740	21.9	126	132	9.25	6.17	832
126HP	6000	2400	725	21.4	124	135	9.25	6.17	845
	8000	2450	705	20.8	122	137	9.50	6.06	832
	0	2350	740	21.9	126	124	8.45	6.52	851
65 %	2000	2350	725	21.4	124	126	8.45	6.52	863
	4000	2350	710	21	122	128	8.45	6.52	876
117 HP	6000	2350	695	20.5	120	130	8.45	6.52	888
	8000	2350	680	20	119	132	8.45	6.52	907

W % - HP	Zp ft	N RPM	PA m.bar	PA in.Hg.	VI kt	Vp kt	Cons. Imp.G/h	Range 220 l h.min	N.m
75 % 135 HP	0	2450	800	23.6	117	116	8.35	5.47	667
	2000	2450	785	23.2	115	117	8.35	5.47	678
	4000	2450	775	22.9	113	119	8.35	5.47	686
	6000	2600	740	21.9	112	121	8.8	5.30	664
	8000	2700	715	21.1	110	123	9.3	5.12	640
70 % 126 HP	0	2400	770	22.7	113	112	7.7	6.17	702
	2000	2400	755	22.3	111	113	7.7	6.17	713
	4000	2400	740	21.9	110	115	7.7	6.17	724
	6000	2400	725	21.4	108	117	7.7	6.17	734
	8000	2450	705	20.8	106	119	7.9	6.06	724
65 % 117 HP	0	2350	740	21.9	109	108	7	6.52	740
	2000	2350	725	21.4	107	110	7	6.52	750
	4000	2350	710	21	106	111	7	6.52	761
	6000	2350	695	20.5	104	113	7	6.52	772
	8000	2350	680	20	103	115	7	6.52	788

NOTE : The ranges and crossing distances shown on the previous tables agree

with complete use of fuel at the indicated altitude, ignoring take-off, climb, etc...

SOCATA

MS. 893 E FLIGHT MANUAL

SECTION 8

NIGHT AND IFR FLIGHT EQUIPMENT

SECTION 8

[N]IGHT AND IFR FLIGHT EQUIPMENT

This section includes only the descriptions, limitations, normal and emergency procedures in addition to those of the MS.893E aircraft in its standard definition.

Sections 8.2 - 8.3 - 8.4 - 8.5 -
Pages 8.2.01 - 8.3.01 - to 8.3.04 - 8.4.01 to 8.4.04 - 8.5.01 to 8.5.03
approved by "SECRETARIAT GENERAL A L'AVIATION CIVILE (S.G.A.C.)".

Approval

This document must be embodied in section 8 of the MS.893E airplane flight manual.

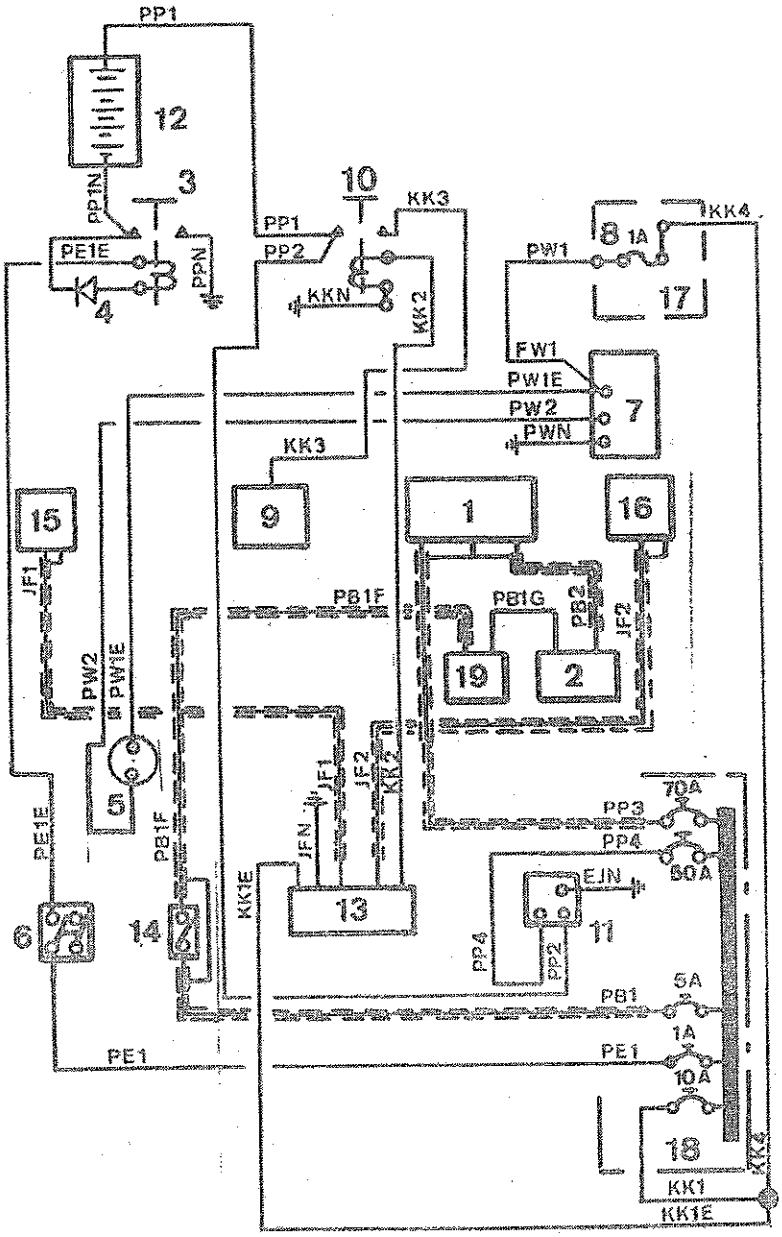
CONTENTS

8.1 - DESCRIPTION

8.1.1 - List of regular and mandatory equipment allowing the aircraft to be used in night or IFR flight.

The column "installation" indicates whether the equipment is mounted in standard version or on IFR option on the MS.893E aircraft.

Equipment	IFR	Night Flight	Instal-lation
Rate of climb indicator with stops	yes	yes	Std
Artificial horizon	yes	yes	Opt
Turn and bank indicator	yes	yes	Std
Course indicator	yes	yes	Opt
Negative pressure gauge	yes	yes	Opt
2nd sensitive altimeter	yes	yes	Opt
Heated pitot static tube	yes	yes	Opt
External temperature indicator	yes	yes	Opt
Stop watch	yes	yes	Opt
Emergency static system	yes	yes	Opt
Anti-collision light	yes	yes	Opt
VHF1	yes	yes	Opt
VHF2	yes	yes	Opt
VOR/LOC	yes	yes	Opt
VOR/ILS	yes	yes	Opt
MARKER	yes	yes	Opt
TRANSPONDER	yes	yes	Opt
Radio-compass	yes	yes	Opt
Selection box	yes	yes	Opt
Landing and taxiing lights	no	yes	Opt
Navigation lights	no	yes	Std
Instrument panel lighting	no	yes	Opt
Emergency lighting	no	yes	Opt
For reference			
2 Flash lights with flashing device	no	yes	for ref.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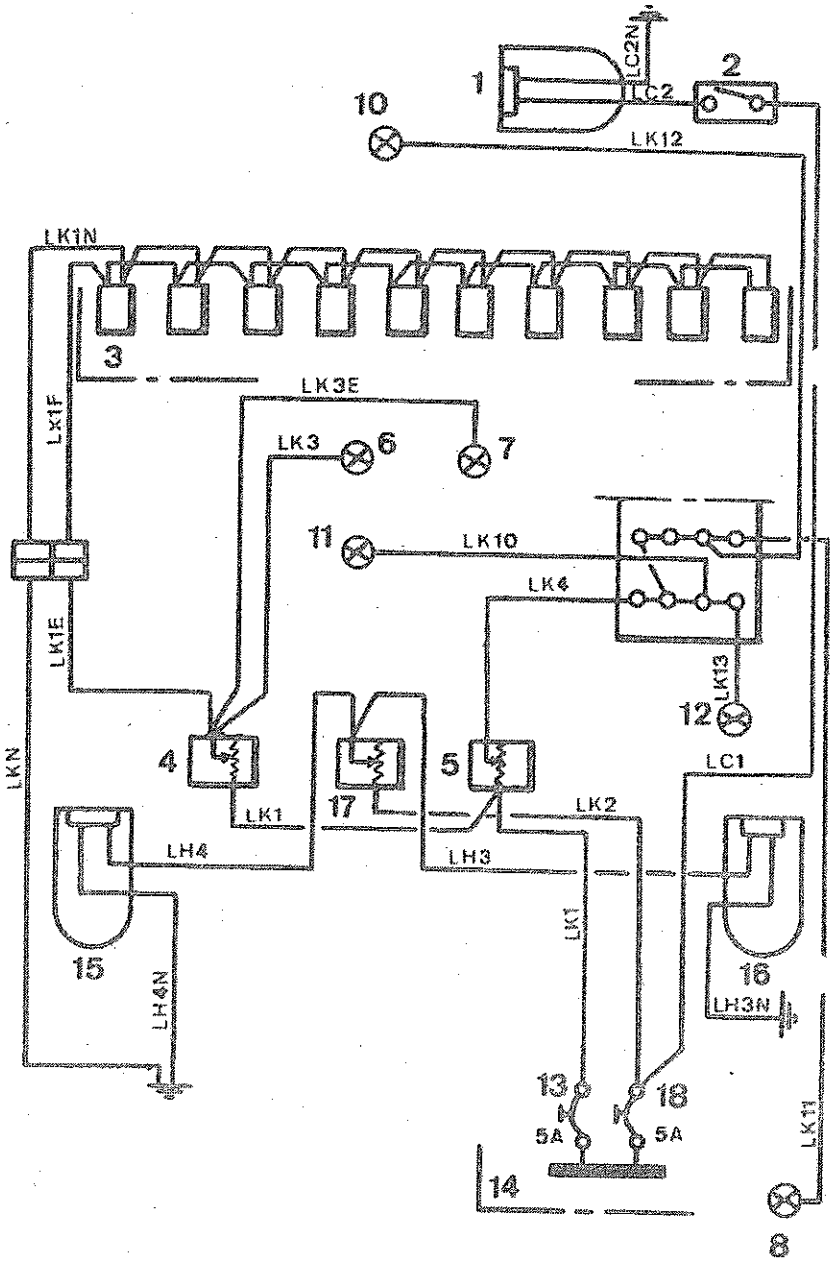
8.1.2 - Generation, starting and ignition circuit

The 14 V.70 Amp current is supplied by an a.c. generator and rectifier unit.

1 - A.C. generator
2 - Voltage regulator
3 - Battery relay
4 - Diode
5 - Generator warning light
6 - Battery switch
7 - A.C. generator flow voltage detector
8 - Fuse 1A (junction box)
9 - Starter
10 - Starting relay
11 - Ammeter
12 - Battery
13 - Magneto selector
14 - "Generator field" control switch
15 - L.H magneto
16 - R.H magneto
17 - Junction box
18 - Circuit breakers box
19 - Overvoltage relay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LH4N
LH3N
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5A
5A
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LK11
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8.1.3 - Lighting system

The optional lighting installation is broken down as follows

1 - Cabin lighting
2 - Instrument panel lighting
3 - Emergency lighting

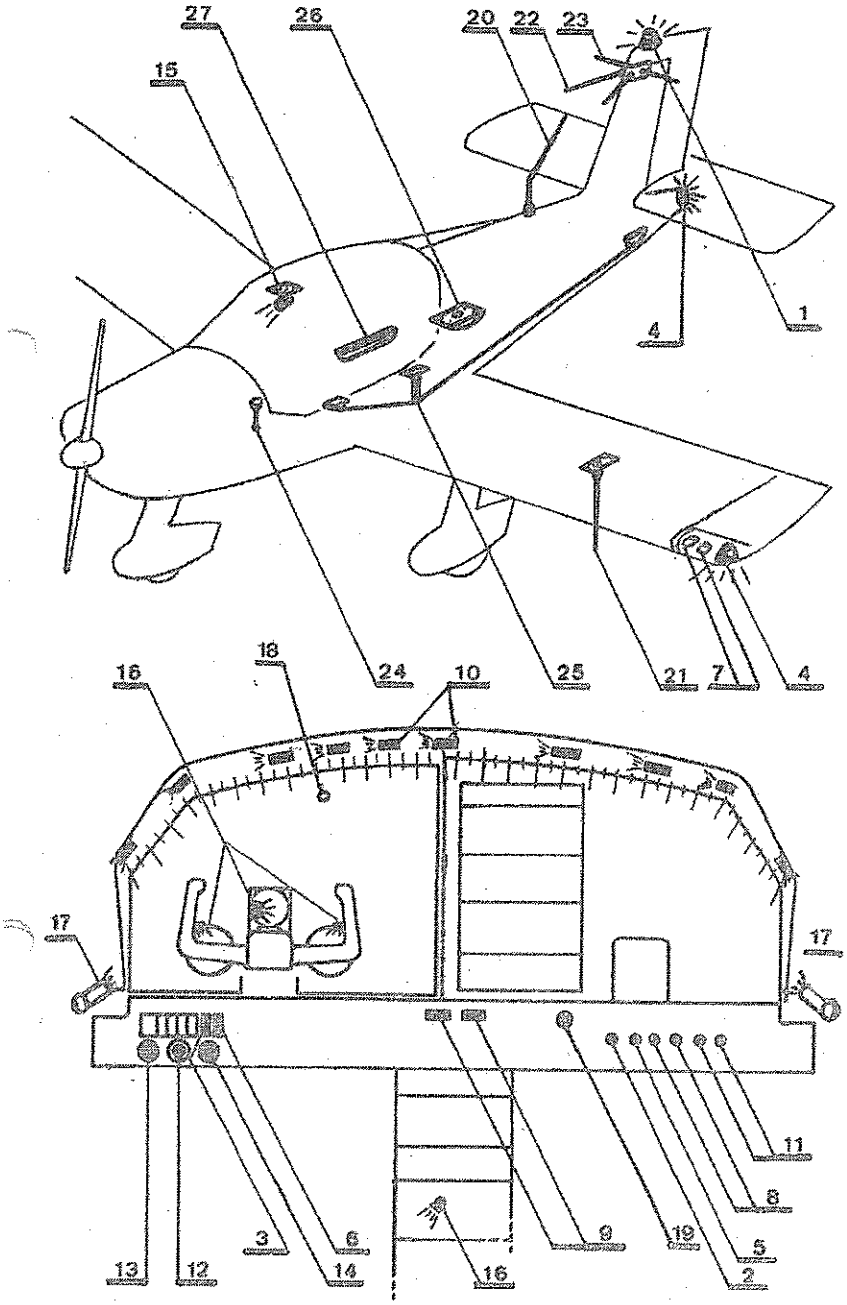
The installation comprises :

Cabin lighting
1 - Overhead light
2 - Switch on overhead light

Instrument panel
3 - Light ramp
4 - Normal lighting rheostat
5 - Radio lighting rheostat
6 - Tachometer lighting lamp
7 - 2nd altimeter lighting lamp
8 - Fuel cock lighting lamp

10 - Compass lighting
11 - Lighting lamp of the stop watch on LH control wheel
12 - Jaeger compound panel lighting
13 - 5A circuit-breaker
14 - Terminal strip

Emergency lighting
15 - LH Floodlight
16 - RH Floodlight
17 - Rheostat
18 - 5A circuit-breaker.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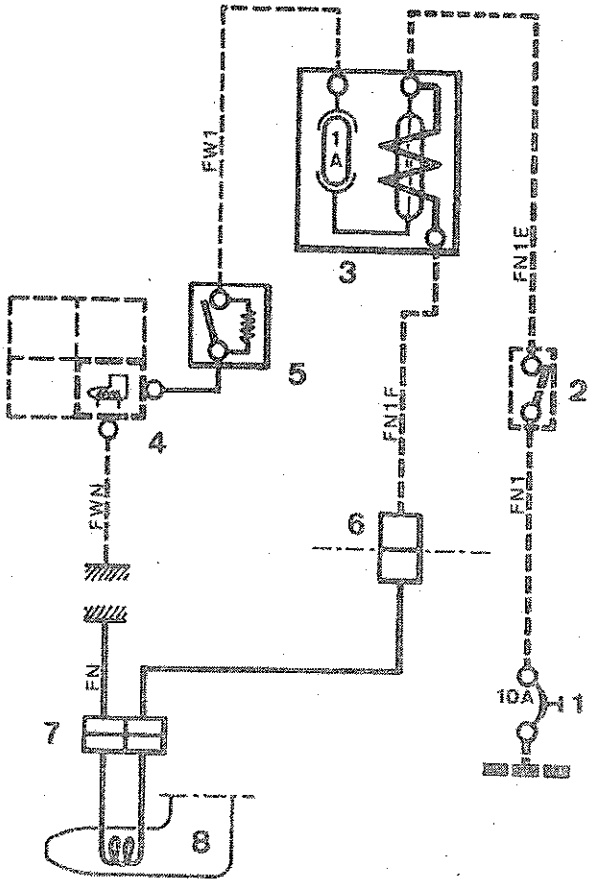
8.1.4 - Lighting devices

1 - Anti-collision light
2 - Anti-collision light circuit-breaker
3 - Anti-collision switch
4 - Navigation lights
5 - Navigation lights circuit-breaker
6 - Navigation lights switch
7 - Landing light and taxiing light
8 - Landing and taxiing lights circuit-breaker
9 - Landing and taxiing lights switch
10 - Instrument panel lighting ramp
11 - Lighting circuit-breaker
12 - Emergency lighting rheostat
13 - Normal lighting rheostat
14 - Radio instruments lighting rhéostat
15 - Overhead light (with its switch)
16 - Lighting lamps (fuel cock, watch, Alti-2, tachometer indicator, Jaeger compound panel)
17 - Emergency lighting floodlights
18 - Day-night dimmer
19 - Circuit-breaker battery

8.1.5 - Antenna

20 - VHF.1 antenna
21 - VHF 2
22 - VOR
23 - Glide ILS
24 - ATC Transponder
25 - Radio-compass - sense antenna
26 - Radio-compass - Loop antenna
27 - Marker antenna



System existing in standard version — — — —

8.1.6 - Heated pitot static tube

A heated pitot static tube is mounted under the L.H wing instead of the standard pitot tube. Wirings of control switch, protection circuit-breakers and the indicator light are included in the standard cable bundle of the aircraft. When ON, the green indicator light indicates that the heating resistor operates. Its brightness may be dimmed by means of a day-night selector switch. See paragraph 8.5.6.

The installation comprises

1 - Circuit breaker

2 - Control switch

3 - Magnetic switch system of the indicator

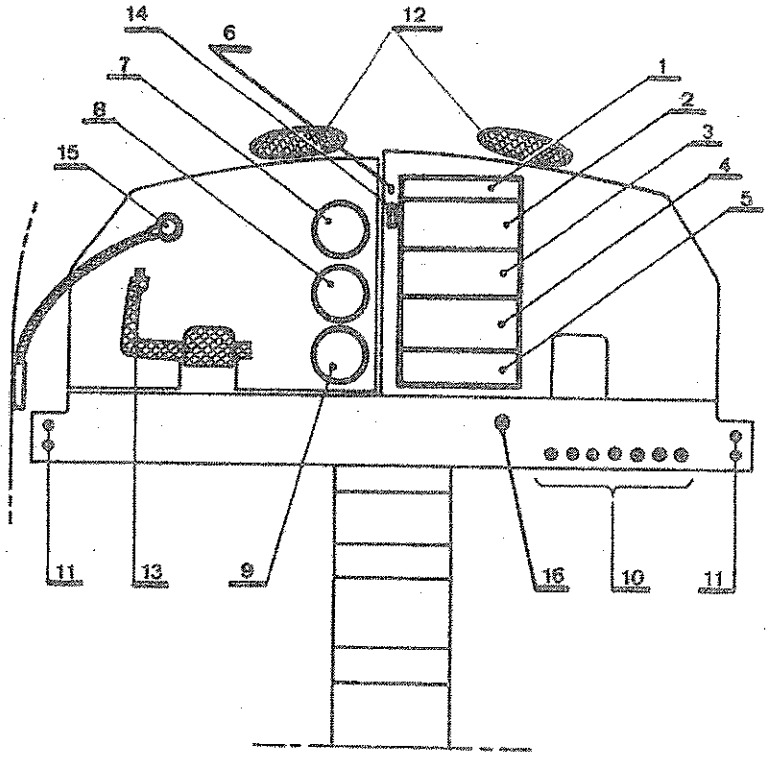
4 - Operation indicator light

5 - Day-night dimmer switch

6 - Disconnect plug in the wing

7 - Antenna disconnect plug

8 - Heated ram air inlet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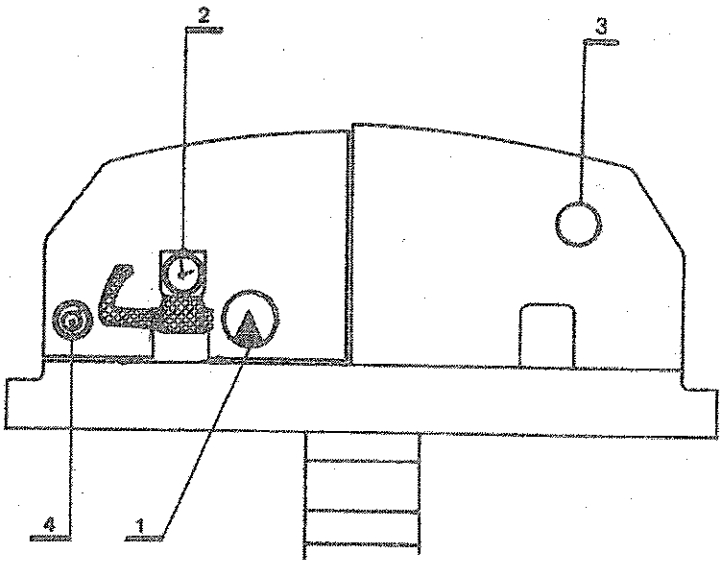
8.1.7 - Radio-navigation equipment

The central area of the instrument panel is provided to accomodate communication and navigation equipment the power supply of which is provided in standard installation on the terminal strip.The antenna feeders, are initially installed.
VHF installation includes the"noise suppression "installation optionally provided.

The installation comprises :

1 - Selection box
2 - Radio-compass
3 - VHF 1
4 - VHF 2
5 - Transponder
6 - Ils and marker on-off switch
7 - Receiver indicator : VOR - ILS
8 - Receiver indicator : VOR 2-LOC
9 - ADF indicator
10 - Radio circuit breakers assembly
11 - Microphones and headset jacks
12 - Loudspeaker
13 - Push-to-talk switch
14 - Marker
15 - Microboom (optional
16 - Circuit-breaker battery

NOTE - The radio-compass reception on the loudspeaker is obtained through VHF.1 or 2.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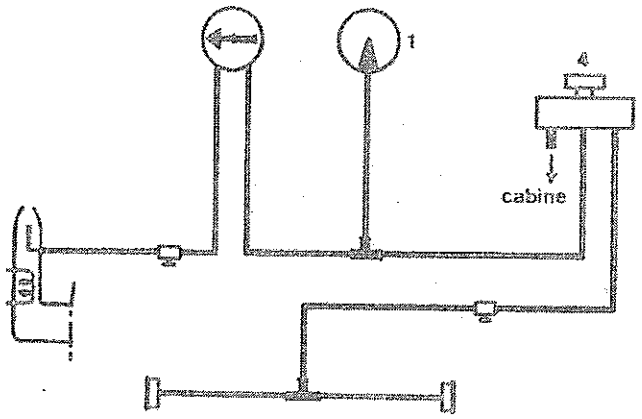
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8.1.8 - Instrument panel additional equipment

1 - Additional sensitive altimeter
In order to prevent icing effects on the external static ports, the 2nd sensitive altimeter is connected to the static pressure which exists in the cabin and is very next to the static pressure of the aircraft.

2 - Stop watch
The stop watch is installed, with its lighting device, on the control wheel of the LH pilot station.

3 - External temperature indicator
The indicator is connected to the transmitter which is installed in the LH wing, under the flap cover.
The instrument is provided with an integral lighting. A red warning light is installed on the dial.This warning light, permanently lit, becomes visible by the pointer rotation, when the external temperature is near the "zero" graduation.

4 - Emergency static system
A three-way cock allows the normal static system of the aircraft to be isolated in case of clogging or icing of static ports. This operation connects the static system of the first altimeter and that of the airspeed indicator to the cabin pressure.

8.2 - LIMITATIONS

The limitations of the aircraft equipped for IFR or night Flight are similar to those of the MS.893E standard aircraft set forth in section 2 of this flight manual.

INSTRUCTION PLATE

This plate is secured on the instrument panel strip skin.
IFR flight condition : Day and night.
Icing conditions : Not allowed.

8.3 - EMERGENCY PROCEDURES

These procedures complete those of standard aircraft described in section 3.

8.3.1 - Airspeed indicating system failure

- Wrong indications of airspeed indicator

Check the operation of pitot static tube heating with green indicator light "on"
If the switch is "on" and the indicator light is "off" reset the circuit breaker.

- Wrong indications of airspeed indicator and altimeter 1.

(no concordance with altimeter 2)

Connect the three-way cock to the emergency static system.
If the failure persists, carry-out a careful approach at a speed where the L.E slats just begin to open, while using the pre-setting described on paragraph 8.4.8.

8.3.2 - Normal lighting failure

Switch on emergency lights

Check engagement of normal lighting circuit-breaker. The overhead light may be used to complete emergency lighting.

8.3.3 - Landing light or taxi light failure

Although LH light is provided for taxiing and RH light for landing, it is easy to proceed with either light.
In case of landing with landing and taxi-lights failure, maintain the attitude given by I.L.S slope (see paragraph 8.4.8)

8.3.4 - ALTERNATOR FAILURE

The alternator failure is indicated by the lighting up of the red warning light.
Intermittent lighting up of the warning light in the landing phase with reduced throttle is not a case of failure.

- Check the charge indication of the ammeter

- Check and, should the occasion arise, re-engage the alternator circuit-breaker, the field excitation circuit-breaker and the field excitation switch.

If one of the circuit-breakers disengage again (overcharge) or if the discharge still remains :

- Switch off generator field supply

- Disengage the alternator circuit-breaker.

- Switch off all electrical equipment which are not essential for proceeding with the flight.

8.3.5 - Battery failure

If the ammeter gives an abnormal indication (alternator warning light -off).
- Check the battery circuit breaker. If it is engaged, disengage it, if it is disengaged, try to engage it again, once.
- The circuit breaker being finally disengaged, switch-off anti-collision light.
Switch off one after the other, electrical equipment which are not essential for proceeding with the flight.
- Avoid brutal variations of engine rating. At landing, light-up only one landing light.

8.3.6 - Total electrical failure

Check switches and circuit-breakers of battery and alternator.
- If only the battery circuit-breaker is disengaged :
- Switch-off electrical equipment which are not essential for proceeding with the flight.
- Re-engage the battery circuit-breaker.
If circuit breakers and switches are "ON"
- Disengage battery and alternator circuit-breakers.
- Switch off all electrical equipment if necessary.
- Utilize the emergency flash light.
- Carry out landing while maintaining the attitude given by I.L.S. slope pre-setting.
(see paragraph 8.4.8)

8.3.7 - Electrical fire

- Set main switch off
- Disengage battery and alternator circuit-breakers.

If there is no change for the better :

After checking of systems, it is possible to re-engage the battery system alone or the battery and alternator systems. The alternator system can only be effective again if the battery system is engaged.
Therefore, it is important to switch-off the generator field excitation in the last extremity.

8.4 - Normal procedures for IFR or night flight

These procedures complete those of the aircraft in standard equipment.

8.4.1 - FIRST STEPS

Study the meteorology in order to avoid flying in dangerous conditions(minima,icing...
Make sure that the fuel level is adequate for complying with regulations.

8.4.2 - Before flight

May be undertaken or continued by night.

- Check the operation of the anti-collision light.
- Check the operation of the navigation lights
- Check the operation of the cabin and instrument panel lighting.
- Check the operation of the landing and taxiing lights.
- Check the operation of the day-night selector switch.

An emergency electric flash-light must be present in the cabin.

8.4.3 - Taxiing

- Check the operation of gyroscopic instruments by making alternate turns.
- Horizon : set the miniature airplane figure horizontally
- Directional : correct rotation
- Turn and bank indicator : proper direction

During the night, preferably use only the LH landing light (Wide beam of rays).

8.4.4 - Before take-off

- Pitot heating
- Check instruments vacuum
- Test of VHF 1
- Test of VHF 2
- Test of VOR 1
- Test of VOR 2
- Test of radio-compass
- Test of marker lamps
- Put transponder on stand-by
- By night and in moist weather, set the air conditioning to "full hot".

8.4.5 - Path course

Directional and horizon bar setting.By night, lighting-up of RH landing light.
Start chronometer upon brakes release.

NOTE : Take-off by night may be carried out indifferently with RH light or with the two lights.

8.4.6 - TAKE-OFF
- Take-off clearly at VI=110 km/h-68MPH-59 kt.
- Always maintain the rate of climb indicator positive.
- By night, switch off landing lights at the end of the runway.

8.4.7 - CLIMB AND CRUISE
See section 5

8.4.8 - APPROACH (pre-setting)

Phase	PA mbar	PA in.Hg	VI	Pro-peller	L.E. slats	Wing flaps
Holding	.625	18.5	160/ 175	Full low pitch	retrac-ted	-
ILS approach	480/ 500	14.2/ 14.8	160/ 170	Full low pitch	retrac-ted	-
Final	480/ 500	14.2/ 14.8	120/ 130	Full low pitch	exten-ded	30°

These values are given for a weight of 1050 kg. 2315 lb.

FINAL ILS
A special switch allows glide slope and markers to be set in operation.
In order to accelerate the trafic flow, it is advisable to carry out final approach at VI=160/170km/h-99/106 MPH- 86/92 kt with flaps retracted.
In short final, extend the flaps at 30°.VI falls to 120/130 km/h- 75/81 MPH - 65/70 kt, and the LE. slats extend themselves.

It is not necessary to modify the power to maintain the angle of descent.

8.4.9 - LANDING

By night, it is better to use the RH landing, light (long range) or the two lights simultaneously.

Landing is easy with either light.

8.5 - UTILIZATION OF EQUIPMENT

8.5.1 - Radio selection box

It allows to select the transmission and the reception of VHF.1 or VHF.2 by means of the red buttons marked C1 -C2.The white buttons allow the reception to be selected on the loudspeaker.

BOTH of the 2nd VHF not selected on transmission N1 and N2 of VOR 1 and VOR 2.
ADF of radio-compass
MKR of markers

Radio-transmission

The emission may be carried out either by "Flexible boom microphone"(push-to-talk switch on the control wheel) or by hand microphone or by headset microphone.
Do not connect two headset microphones in parallele.

RECEPTION

The loudspeaker is the main equipment. The headset is considered as a stand-by equipment. The red button : SPKR, on the selection box acts only on the loudspeaker which operates only if one of the VHF is functioning.On headset, all the reception are simultaneous.

8.5.2 - VOR and ADF

Their operation is independant from the VHF but the reception on loudspeaker requires either VHF to be started.

8.5.3 - Glide and marker

They are controlled by a particular switch.

8.5.4 - Lighting

The lighting ramp under the visor and the lighting ramp of altimeter 2,tachometer are adjustable by means of the rheostat mounted, on the instrument panel L.H. strip skin.

The integrated lighting (Radio,instrument panel,engine control,compass),or instrument lighting(chrono,fuel cock) is controlled by an ON-OFF rheostat installed on the R.H side.The emergency lighting including L.H and R.H flood lights is controlled by an ON-OFF rheostat located in the center section.
The air temperature indicator is lit permanently.The overhead lights allow the maps to be installed and read.

8.5.5 - Landing and taxi-lights

The lights are controlled by switch located in front of the throttle block which comprises an indicator light.
The L.H light beam is wide and makes the taxiing easy.
The R.H light has a long range and will be preferably used at take-off and landing.
The simultaneous utilization is possible in every case.

8.5.6 - DAY NIGHT DIMMER SWITCH

A selector allows to set 2 different brightnesses on the fuel pump, heated pitot static tube, landing and taxi lights switch and marker indicator lights.

SECTION 9

NIGHT VFR EQUIPMENT

SECTION 9

NIGHT VFR EQUIPMENT

This section includes only the descriptions, limitations, normal and emergency procedures in addition to those of the MS 893 E aircraft in its standard definition

Sections 9.2 - 9.3 - 9.4 - 9.5
Pages 9.2.01 - 9.3.01 to 9.3.03 - 9.4.01 to 9.4.03 - 9.5.01 to 9.5.02
approved by "DIRECTION GENERALE DE L'AVIATION CIVILE" (D.G.A.C.)

Approval

cet additif est la traduction en langue anglaise de l'additif correspondant du manuel de vol français approuvé

p.o.

30.08.77

This document must be embodied in section 9 of the MS 893 E airplane flight manual

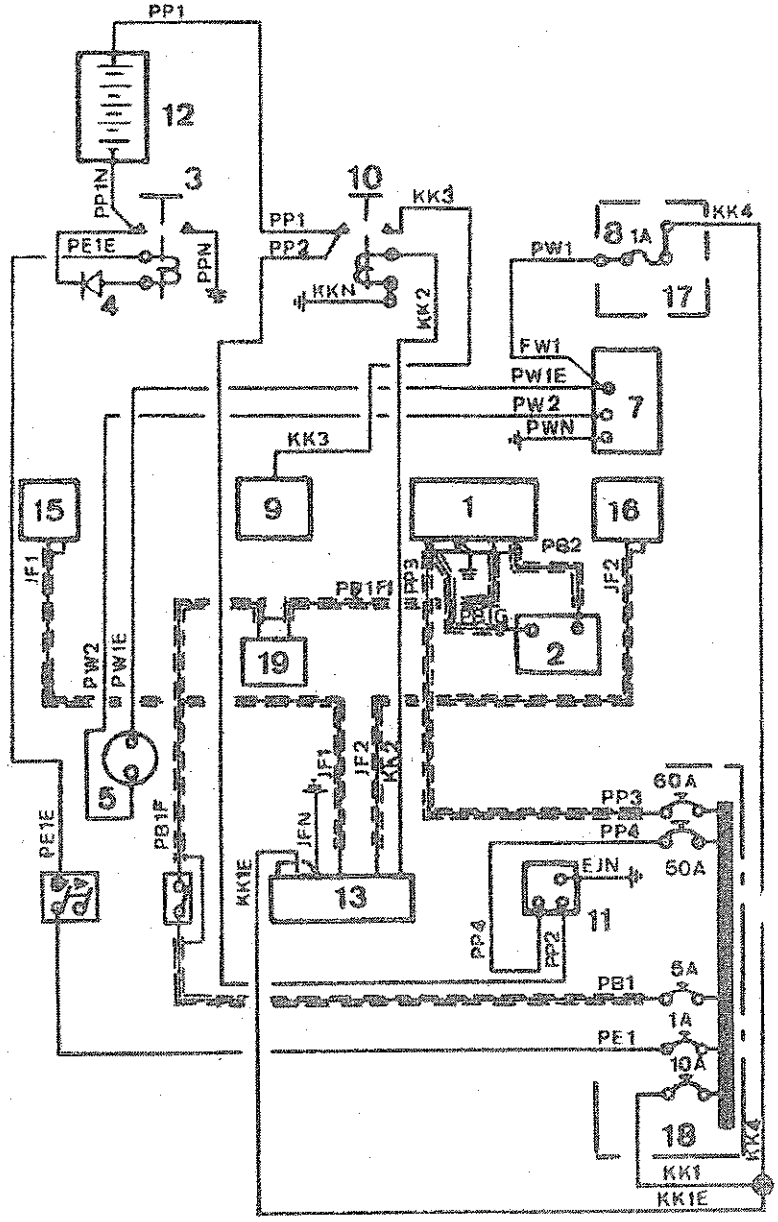
CONTENTS

9.1 - DESCRIPTION

9.1.1 - List of regular and mandatory equipment allowing the aircraft ot be used in night flight

The column "installation" indicates whether the equipment is mounted in standard version or in night flight option.

Equipment	Night Flight	Installation
RADIO-NAVIGATION		
VHF - category 2	yes	option
VOR/LOC - category 2	yes	option
Radio-compas - category 2	yes	option
NAVIGATION EQUIPMENT		
Artificial horizon(gyroscopic)	yes	opt.
Turn and bank indicator	yes	std.
Gyroscopic directional indicator	yes	opt.
Operating indicator of gyroscopic apparatuses	yes	opt.
Rate of climb indicator	yes	std
Anti-collision light	yes	opt.
Position lights	yes	std
Landing and taxiing lights	yes	opt.
Adjustable cabin lighting	yes	opt.
Flash light	personal equipment	
Night V.F.R. plate	yes	opt.

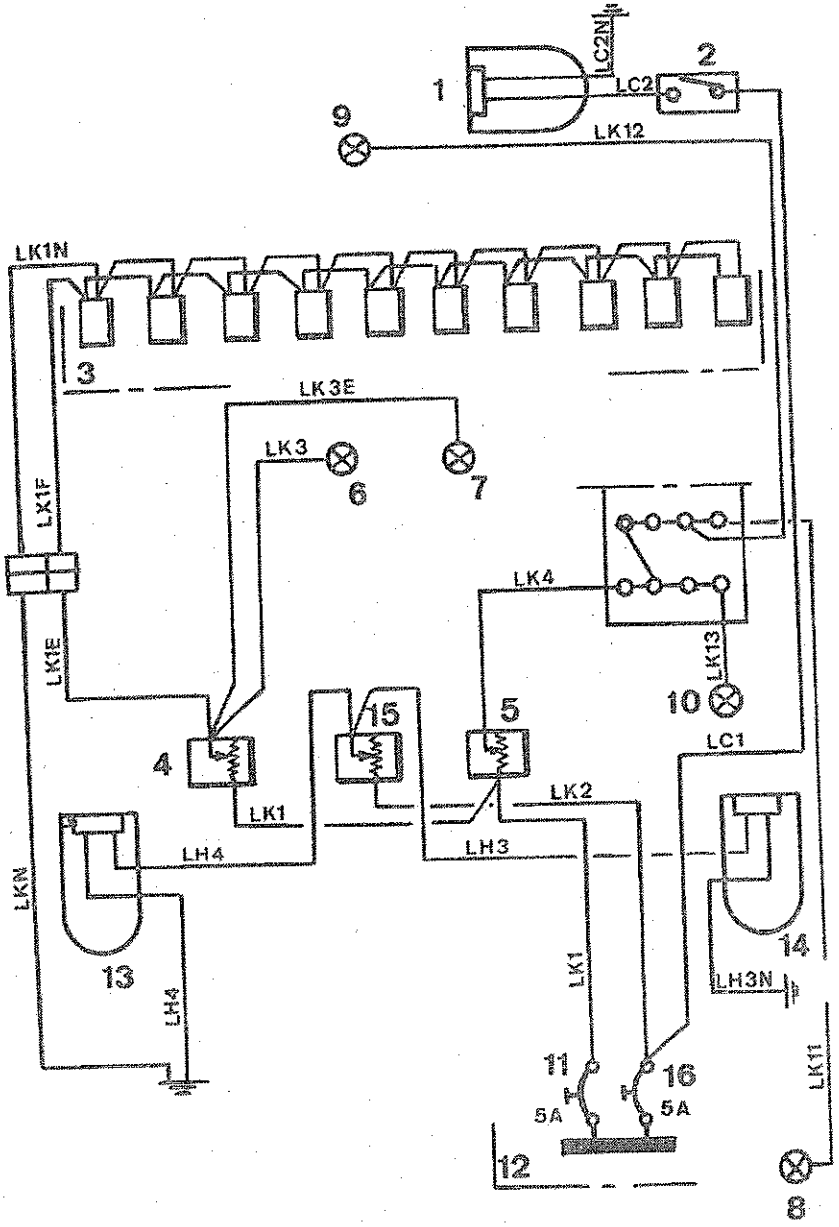


Edition : 10
05.1977

9.1.2 - Generation, starting and ignition circuit

The 14 V. 70 Amp. current is supplied by an a.c. generator and rectifier unit.

1 - A.C. generator
2 - Voltage regulator
3 - Battery relay
4 - Diode
5 - Generator warning light
6 - Battery switch
7 - A.C. generator flow voltage detector
8 - Fuse 1.A (junction box)
9 - Starter
10 - Starting relay
11 - Ammeter
12 - Battery
13 - Magneto selector
14 - "Generator field" control switch
15 - L.H. magneto
16 - R.H. magneto
17 - Junction box
18 - Circuit breakers box
19 - Overvoltage relay



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9.1.3 - Lighting system

The optional lighting installation is broken down as follows

1 - Cabin lighting
2 - Instrument panel lighting
3 - Emergency lighting

The installation comprises :

Cabin lighting

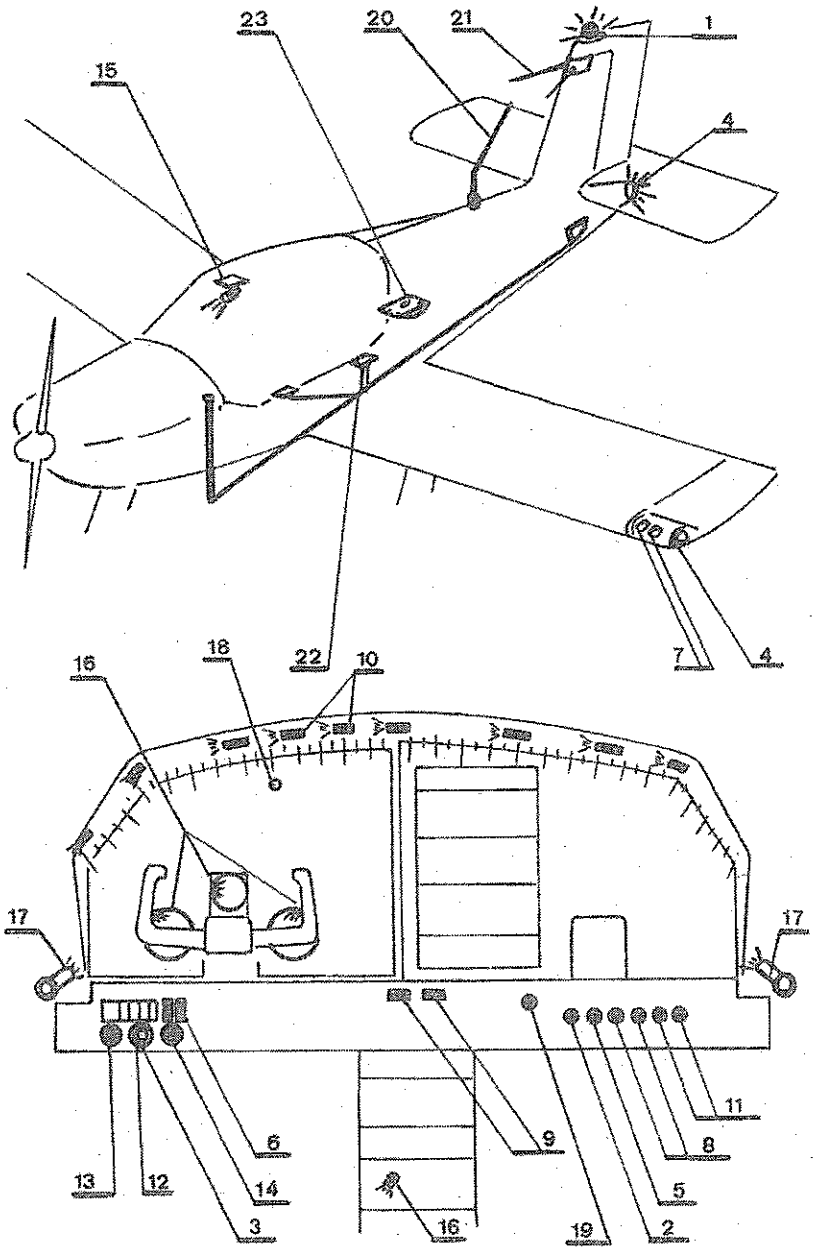
1 - Overhead light
2 - Switch on overhead light

Instrument panel

3 - Light ramp
4 - Normal lighting rheostat
5 - Radio lighting rheostat
6 - Tachometer lighting lamp
7 - 2nd altimeter lighting lamp
8 - Fuel cock lighting lamp
9 - Compass lighting
10 - Jaeger compound panel lighting
11 - 5 A. circuit-breaker
12 - Terminal strip

Emergency lighting

13 - LH Floodlight
14 - RH Floodlight
15 - Rheostat
16 - 5A circuit-breaker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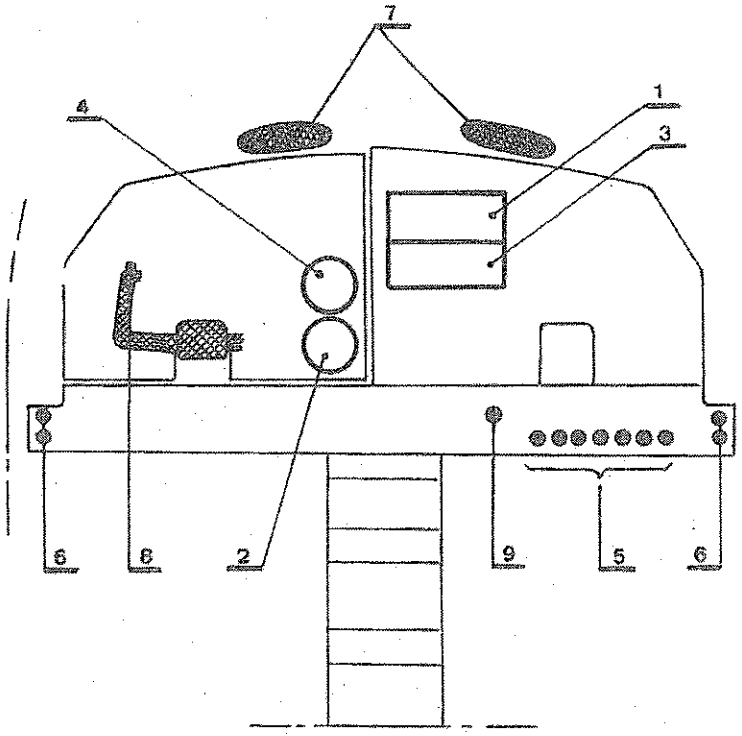
9.1.4 - Lighting devices

1 - Anti-collision light
2 - Anti-collision light circuit-breaker
3 - Anti-collision switch
4 - Navigation lights
5 - Navigation lights circuit-breaker
6 - Navigation lights switch
7 - Landing light and taxiing light
8 - Landing and taxiing lights circuit-breaker
9 - Landing and taxiing lights switch
10 - Instrument panel lighting ramp
11 - Lighting circuit-breaker
12 - Emergency lighting rheostat
13 - Normal lighting rheostat
14 - Radio instruments lighting rheostat
15 - Overhead light (with its switch)
16 - Lighting lamps (fuel cock, watch, altimeter 2, tachometer)
17 - Emergency lighting floodlights
18 - Day-night dimmer
19 - Battery circuit-breaker

9.1.5 - Antenna

20 - VHF 1 antenna
21 - V.O.R.
22 - Radio-compass - sense antenna
23 - Radio-compass - Loop antenna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9.1.6 - Radio-navigation equipment on instrument panel

The central area of the instrument panel is provided to accomodate communication and navigation equipment the power supply of which is provided in standard installation on the terminal strip. The antenna feeders are initially installed.

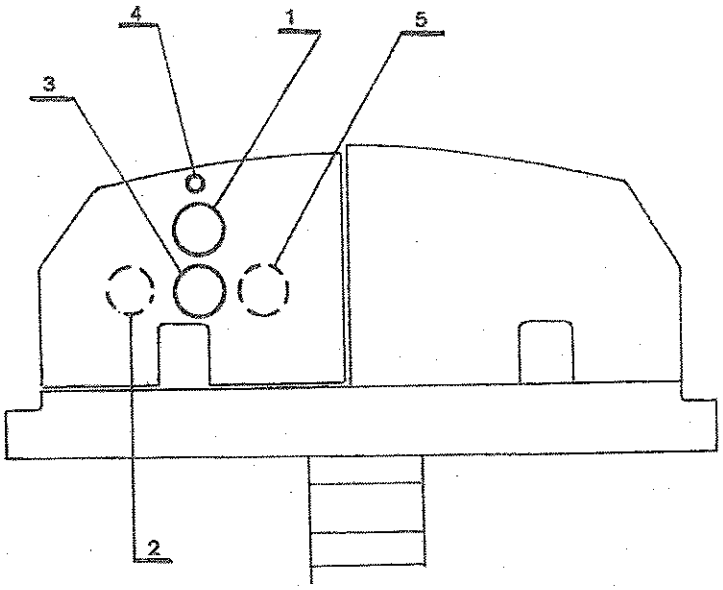
VHF installation includes the "noise suppression" installation optionally provided.

The installation comprises :

1 - Radio compass
2 - Radio-compass indicator
3 - V.H.F.
4 - Receiver indicator VOR/LOC
5 - Radio circuit-breakers assembly
6 - Microphones and headset jacks
7 - Londspeaker
8 - Push-to- talk switch
9 - Circuit breaker - Battery

NOTA : The radio-compass reception on the londspeaker is obtained through V.H.F.

In night VFR equipment definition, one installs either the radio-compass and the indicator or the VOR/LOC.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9.1.7 - Navigation equipment on the instrument panel

1 - Gyroscopic artificial horizon
2 - Turn and bank indicator
3 - Gyroscopic directional indicator
4 - Operating indicator of gyroscopic apparatuses
5 - Rate of climb indicator

NOTA - The apparatuses shown in broken lines are installed on the aircraft in production line.

9.2 - LIMITATIONS

The limitations of the aircraft equipped for night VFR flight are similar to those of the standard aircraft set forth in section 2 of this flight manual.

INSTRUCTION PLATE

This plate is secured on the central upper part of the instrument panel.

FLIGHT CONDITIONS : DAY AND NIGHT V.F.R.
Icing conditions : Not allowed.

9.3 - EMERGENCY PROCEDURES

These procedures complete those of standard aircraft described in section 3.

9.3.1 - Normal lighting failure

Switch on emergency lights

Check engagement of normal lighting circuit. breaker. The overhead light may be used to complete emergency lighting.

9.3.2 - Landing light or taxi light failure

Although LH light is provides for taxiing and RH light for landing, it is essay to proceded with either light.

9.3.3 - Alternator failure

The alternator failure is indicated by the lighting up to the red warning light. Intermittent lighting up of the warning light in the landing phase with reduced throttle is not a case of failure.

1 -Check the charge indication of the ammeter : If the discharge still remains, carry out operation "D".

2 -Check and, should the occasion arise, reengage the alternator circuit-breaker, the field excitation circuit-breaker :
If one of the circuit-breakers disengage again (overvoltage), carry out operation "D".

3 -The two above points being checked, switch off generator field supply by means of the excitation switch - Put again the switch in position "on". The actions "cut off excitation" and "switch on again" correspond to the starting again of the overvoltage relay. If the red warning light remains lighted up (possible failure of the voltage regulator) carry out operation "D".

-Operation "D"

-Switch off generator field supply

-Disengage the alternator circuit-breaker

-Switch off all electrical equipment which are not essential for proceeding with the flight.

9.3.4 - Battery failure

If the ammeter gives an abnormal indication (alternator warning light - off) :
Check the battery circuit breaker. If it is engaged, disengage it, and re-engage if it is disengaged.
Try to engage it again, once.
If the battery cannot be re-engaged switch off anti-collision light.
Switch off one after the other, electrical equipment which is not essential for the flight.
Avoid severe variations of engine power and electrical loading.
At landing, use one landing light only.

(NOTE : With the battery off-line the alternator tends to be unstable and can fail under load variations).

9.3.5 - Total electrical failure

Check switches and circuit breakers of battery and alternator.
Reset alternator as in 9.3.3 reset battery as in 9.3.4. If only the battery circuit breaker is disengaged : Switch-off electrical equipment which is not essential for the flight.
Re-engage the battery circuit breaker.
Reset the circuit breakers and switches to "ON".

Disengage battery and alternator circuit breakers.
Switch off all electrical equipment if no electrical power can be restored.
Use the emergency flash light for instrument lighting. Proceed to the landing.

9.3.6 - Electrical fire

Set main switch off.
Disengage battery and alternator circuit breakers.
After checking systems, it is possible to re-engage the battery system alone or the battery and alternator systems. The alternator system can only be effective again if the battery system is engaged.
Therefore, it is important to switch-off the generator field excitation only as a last extreme.

9.4 - Normal procedures for night flight

These procedures complete those of the aircraft in standard equipment.

9.4.1 - First steps

Study the meteorology in order to avoid flying in dangerous conditions (minima,icing.. Make sure that the fuel level is adequate for complying with regulations.

9.4.2 - Before flight

May be undertaken or continued by night.

- Check the operation of the anti-collision light.
- Check the operation of the navigation light
- Check the operation of the cabin and instrument panel lighting
- Check the operation of the landing and taxiing lights
- Check the operation of the day-night selector switch.

An emergency electric flash-light must be present in the cabin.

9.4.3 - Taxiing

-Check the operation of gyroscopic instruments by making alternate turns.
-Horizon : set the miniature airplane figure horizontally
-Directional : correct rotation
-Turn and bank indicator : proper direction
During the night, preferably use only the LH landing light (Wide beam of rays).

9.4.4 - Before take-off

-Check instruments wacuum
-Test of V.H.F.
-Test of VOR/LOC or radio-compass
-By night and in moist weather, set the air conditioning to "full hot".

9.4.5 - Path course

Directional and horizon bar setting. By night, lighting-up of RH landing light.

NOTE - Take-off by night may be carried out indifferently with RH light or with the two lights.

9.4.6 - Take-off

-Take-off cleanly at VI=110 km/h-68 MPH-59 kt.
-Always maintain the rate of climb indicator positive.
-By night, switch off landing lights at the end of the runway.

9.4.7 - Climb and cruise

The performances of the aircraft equipped for night VFR are similar to those of the standard aircraft shown in the section 5 of this flight manual.

9.4.8 - Landing

By night, it is better to use the RH landing light (long range) or the two lights simultaneously.

Landing is easy with either light.

9.5 - UTILIZATION OF EQUIPMENT

9.5.1 - Radio-transmission

The emission may be carried out either by "Flexible boom microphone" (push-to-talk switch on the control wheel) or by hand microphone or by headset microphone.
Do not connect two headset microphones in parallele.

9.5.2 - Reception

The loudspeaker is the main equipment. The headset is considered as a stand-by equipment. A reversing switch allows the reception to be selected on the loudspeaker or on the headset microphone. On headset, all the receptions are simultaneous.

9.5.3 - VOR/LOC or ADF

The reception is carried out on VHF auxiliary input.

9.5.4 - Lighting

The lighting ramp under the visor and the lighting ramp of altimeter 2, tachometer and fuel cock are adjustable by means of the rheostat mounted on the instrument panel L.H. strip skin.
The integrated lighting (radio, instrument panel, engine control, compass), or instrument lighting (fuel cock) is controlled by an ON-OFF rheostat installed on the R.H. side. The emergency lighting including L.H. and R.H. flood lights is controlled by an ON-OFF rheostat located in the center section.
The overhead lights allow the maps to be installed and read.

9.5.5 - Landing and taxi-lights

The lights are controlled by switch located in front of the throttle block which comprises an indicator light.
The L.H. light beam is wide and makes the taxiing easy.
The R.H. light has a long range and will be preferably used at take-off and landing.
The simultaneous utilization is possible in every case.

9.5.6 - Day night dimmer switch

A selector allows to set 2 different brightnesses on the fuel pump, landing and taxi lights switch indicator lights.