PILOT'S OPERATING HANDBOOK

SOCATA Groupe Aérospatiale

MODEL TB 20

SERIAL N° 479

REGISTRATION N° N84AV

This Pilot's Operating Handbook is FAA approved for U.S. registered airplane in accordance with the provisions of 14 CFR Section 21.29, and is required by FAA Type Certificate Data Sheet N° A51EU.

Sections 2 (Pages 2.1 to 2.16), 3 (Pages 3.1 to 3.16), 5 (Pages 5.2 and S.5) approved by DIRECTION GENERALE DE L'AVIATION CIVILE.

D.G.A.C. Approval

DIRECTION GENERALE DE L'AVIATION CIVILE ET DE LA METEOROLOGIE

L'Ingénieur en Chef de l'Armement
Adjoint au Chef de la Division Aéronefs

Date : 18 FEV. 1991 Alain RICHARD

"Ce Manuel est une traduction en langue anglaise, comme répondant aux exigences de la FAA, du Manuel Français correspondant approuvé par la D.G.A.C."

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

THIS DOCUMENT MUST BE KEPT PERMANENTLY ABOARD THE AIRPLANE.

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

GENERAL

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

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

For this, see Manufacturer's Maintenance Manual.

IDENTIFICATION PLATE (see Figure 8.1)

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

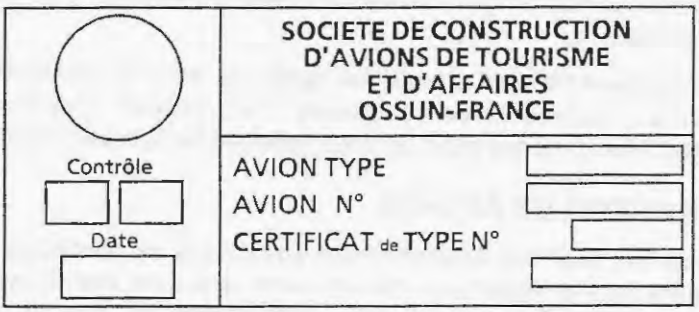


Figure 8.1 - IDENTIFICATION PLATE

PUBLICATIONS

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

In addition, the owner may purchase the following :

- Maintenance Manual
- Illustrated Parts Catalog
- Price Catalog
- Removal and Installation Labor Allowances

NOTE :
At the beginning of the Manual, you will find a sheet which enables you to order various Manuals available from SOCATA.

CAUTION

PILOT'S OPERATING HANDBOOK MUST ALWAYS BE IN THE AIRPLANE

INSPECTION PERIODS

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

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

ALTERATIONS OR REPAIRS

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

GROUND HANDLING

TOWING

CAUTION

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

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

CAUTION

DO NOT TOW THE AIRPLANE WHEN CONTROLS ARE LOCKED

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

(see Figure 8.2)

PARKING

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

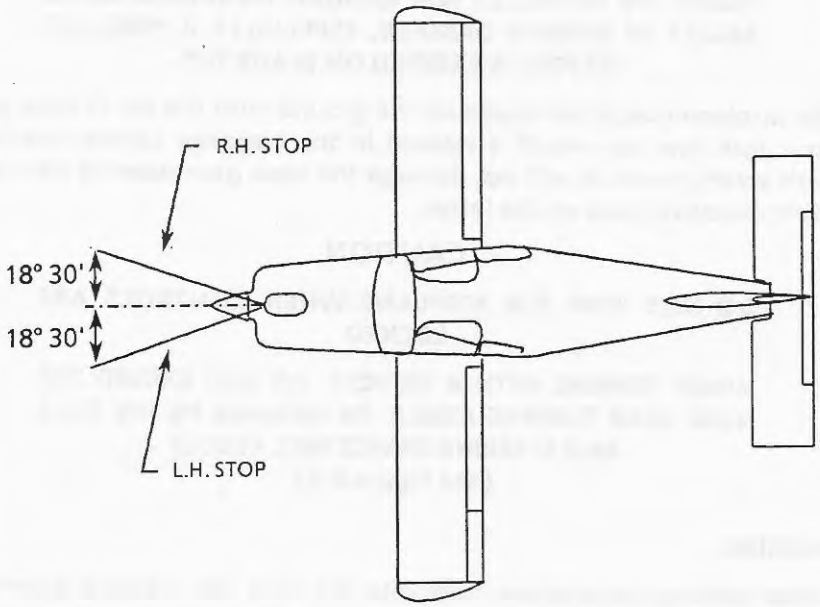


Figure 8.2 - TURNING ANGLE LIMITS

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

TIE-DOWN

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

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

JACKING

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

LEVELING

Level the airplane as described in Maintenance Manual.

FLYABLE STORAGE

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

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

CAUTION

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

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

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

LONG TERM STORAGE WITHOUT FLYING POSSIBILITY

Refer to Maintenance Manual for the procedures to follow.

SERVICING

MAINTENANCE

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

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

ENGINE OIL

Grade and Viscosity for temperature range

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

NOTE :

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

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

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

Oil and oil filter change :

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

NOTE :
During the first 25-hour oil and filter change, a general inspection of engine compartment is required. Items which are normally checked during a preflight inspection should be given a particular attention. Hoses, metal lines and fittings should be inspected for signs of oil and fuel leaks, and checked for abrasions, chafing, security, proper routing and support and evidence of deterioration.

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

FUEL

Approved fuel grades (and colors)

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

CAUTION

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

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

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

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

WARNING

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

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

Fuel additives

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

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

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

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

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

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

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

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

To ensure proper mixing, the following is recommended :

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

Any high quality isopropyl alcohol may be used, such as anti-icing fluid or isopropyl alcohol (Federal Specification TT-I-735a). Figure 8.3 provides alcohol - fuel mixing ratio information.

Ethylene glycol monomethyl ether (EGME) compounds, in compliance with MIL-I-27686, if used, must be carefully mixed with the fuel in concentration not to exceed 0.15 % by volume. Figure 8.3 provides EGME - fuel mixing ratio information.

CAUTION

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

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

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

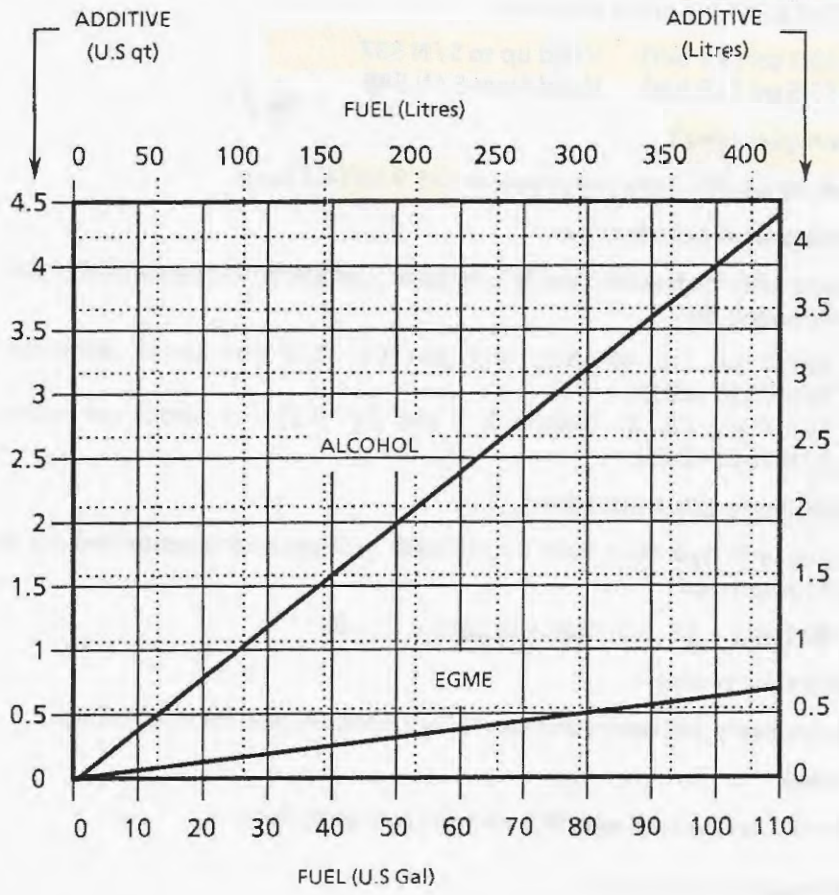


Figure 8.3 - ADDITIVE MIXING RATIO

LANDING GEAR

Nose gear tire :

5.00-5 6 PR - Inflating pressure :

. 49.3 psi (3.4 bar) Valid up to S / N 587
. 56.5 psi (3.9 bar) Valid from S / N 588

479

Main gear tires :

15 6.00-6 6 PR - Inflating pressure : 63.9 psi (4.4 bar)

Nose gear shock absorber :

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

. 101.6 psi (± 4) that is 7 bar (± 0.3) for shock absorber P / N TB20 42011.
. 108.7 psi (± 4) that is 7.5 bar (± 0.3) for shock absorber P / N TB21 42001.

Main gears shock absorbers :

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

. 624 psi (+ 15 ; - 0) that is 43 bar (+ 1 ; - 0) .

Hydraulic system :

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

Brakes :

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

OXYGEN (if installed)

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

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

AIRPLANE CLEANING AND CARE

WINDOWS AND WINDSHIELD

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

CAUTION

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

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

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

PAINTED SURFACES

Refer to Maintenance Manual for the procedures to follow.

PROPELLER CARE

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

ENGINE CARE

Refer to Maintenance Manual for the procedures to follow.

INTERIOR CARE

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

For additional information, refer to Maintenance Manual.

FRONT (all validities) **and REAR** (up to S/N 609, except 588) **ASH-TRAYS**

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

REAR ASH-TRAYS (from S / N 610, plus 588)

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

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

SECTION 7

DESCRIPTION

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

GENERAL

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

AIRFRAME

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

The cabin portion is constructed with metal panels assembled to form a rigid structure. Metal floor panels extend the length of the cabin area and baggage compartment. The aft fuselage is constructed of sheet aluminium alloy panels which form a monocoque structure.

Passengers and pilot entrance into the cabin area is provided by two "gull-wing" doors.

Access to the baggage compartment (behind the rear seat) is provided by a baggage door on the left side of the fuselage.

WINGS

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

Wings characteristics :

Profile	RA16–3C3
Aspect ratio	8
Dihedral	6°30'
Aerodynamic chord	4.002 ft - 1.220 m
True chord	4.085 ft - 1.245 m
Wing area	128.091 sq.ft - 11.90 m^2
Wing setting	+ 3°

Ailerons :

Unit area	4.897 sq.ft - 0.46 m^2
Mean span	4.081 ft - 1.44 m

Recoil and slotted type wing flaps :

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

EMPENNAGE

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

Empennage characteristics :

Conventional type vertical stabilizer :

Fin area	9.472 sq.ft - 0.88 m^2
Rudder area	6.781 sq.ft - 0.63 m^2
Controlled rudder tab	0.474 sq.ft - 0.04 m^2

Stabilator type horizontal stabilizer :

Span	11.943 ft - 3.640 m
Stabilator area, anti-tab included	32.938 sq.ft - 3.06 m^2
Tab area	5.328 sq.ft - 0.50 m^2
Tab automaticity	104 %

FLIGHT CONTROLS

SURFACES

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

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

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

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

Stabilator deflection must be :

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

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

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

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

Rudder has a controlled tab.

TRIM SYSTEMS

Manually-operated pitch and rudder trims are provided.

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

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

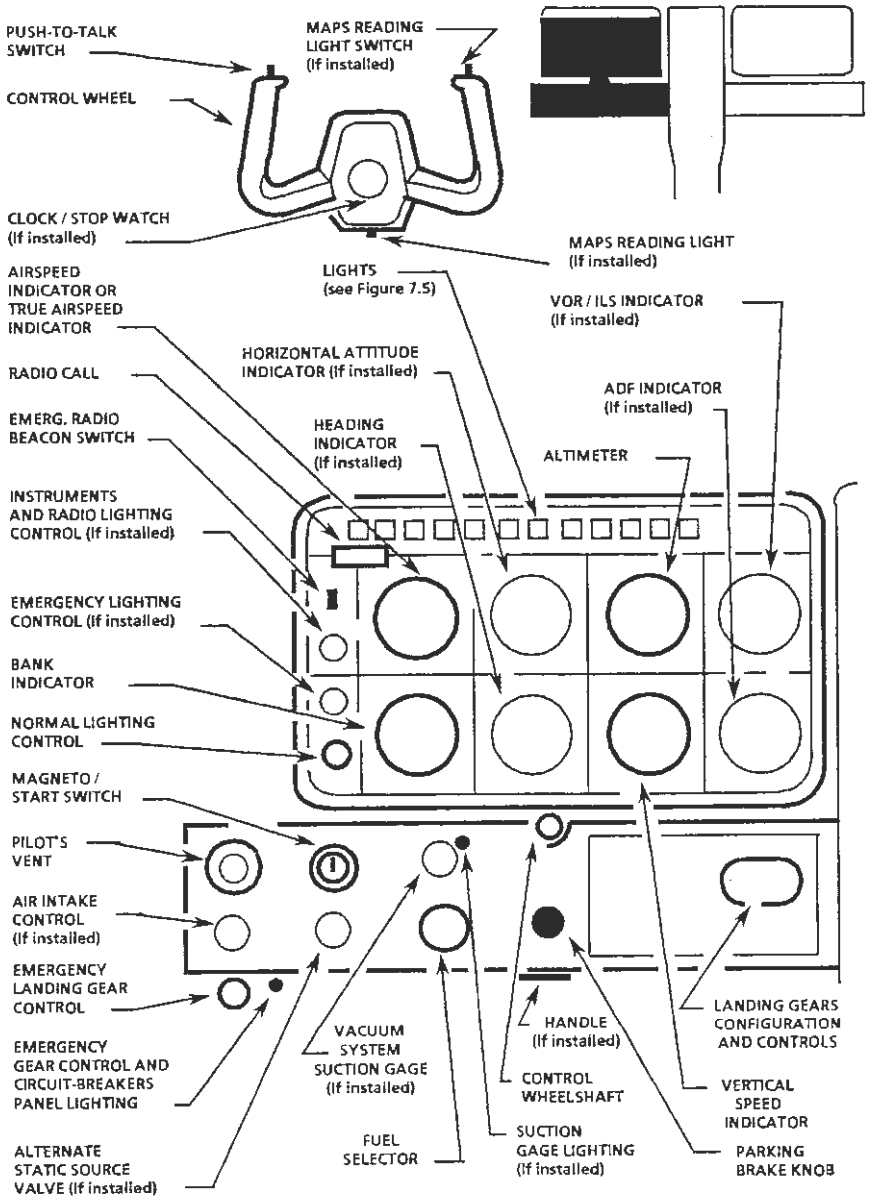


Figure 7.1 - EXAMPLE OF INSTRUMENT PANEL AND L.H. SUBPANEL

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

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

- nose-up 0° ± 0,5°
- nose-down 15° ± 1,5°

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

Rudder tab deflection must be :

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

INSTRUMENT PANEL

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

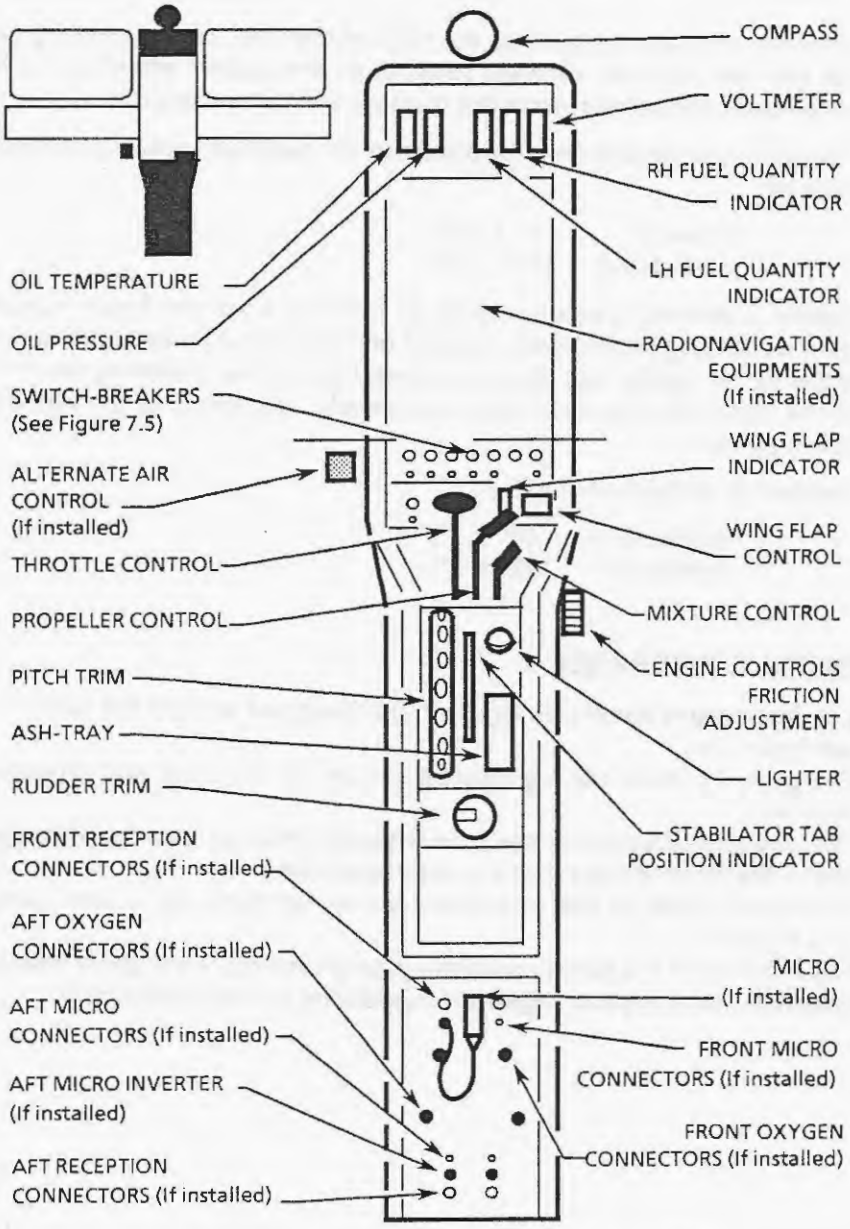


Figure 7.2 - EXAMPLE OF CONSOLE AND PEDESTAL

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

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

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

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

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

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

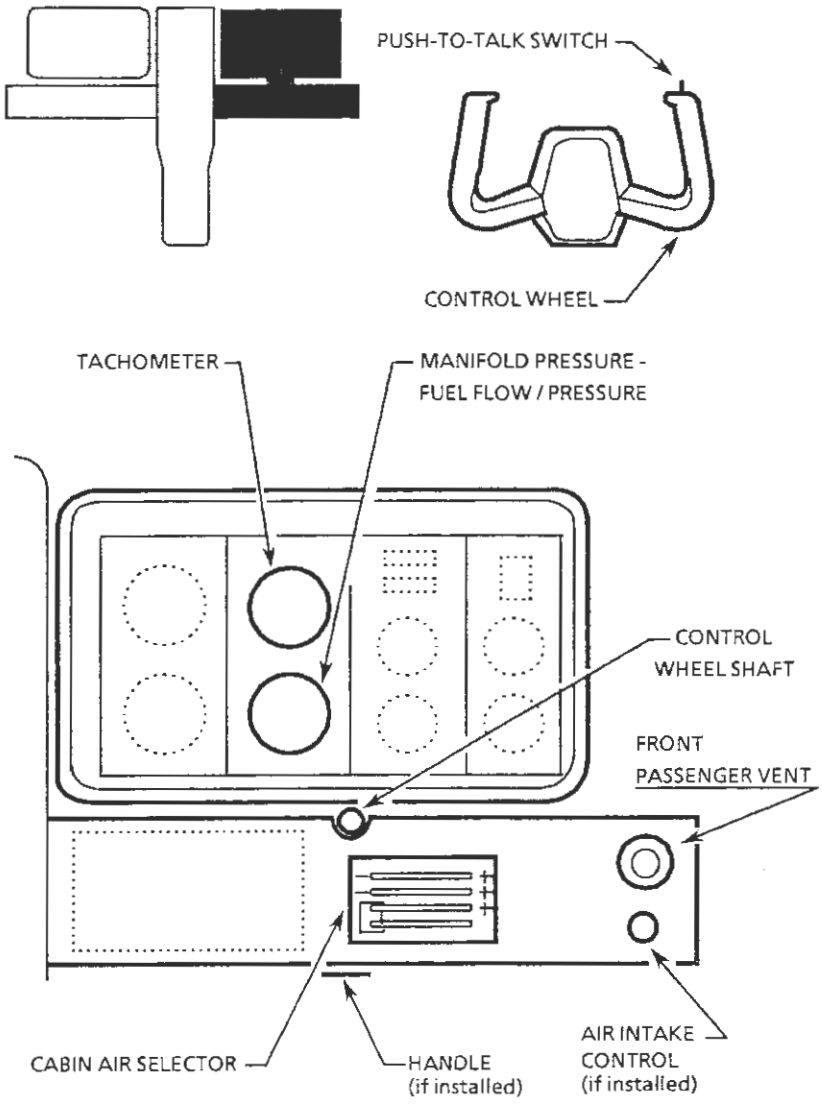


Figure 7.3 - EXAMPLE OF INSTRUMENT PANEL AND R.H. SUBPANEL

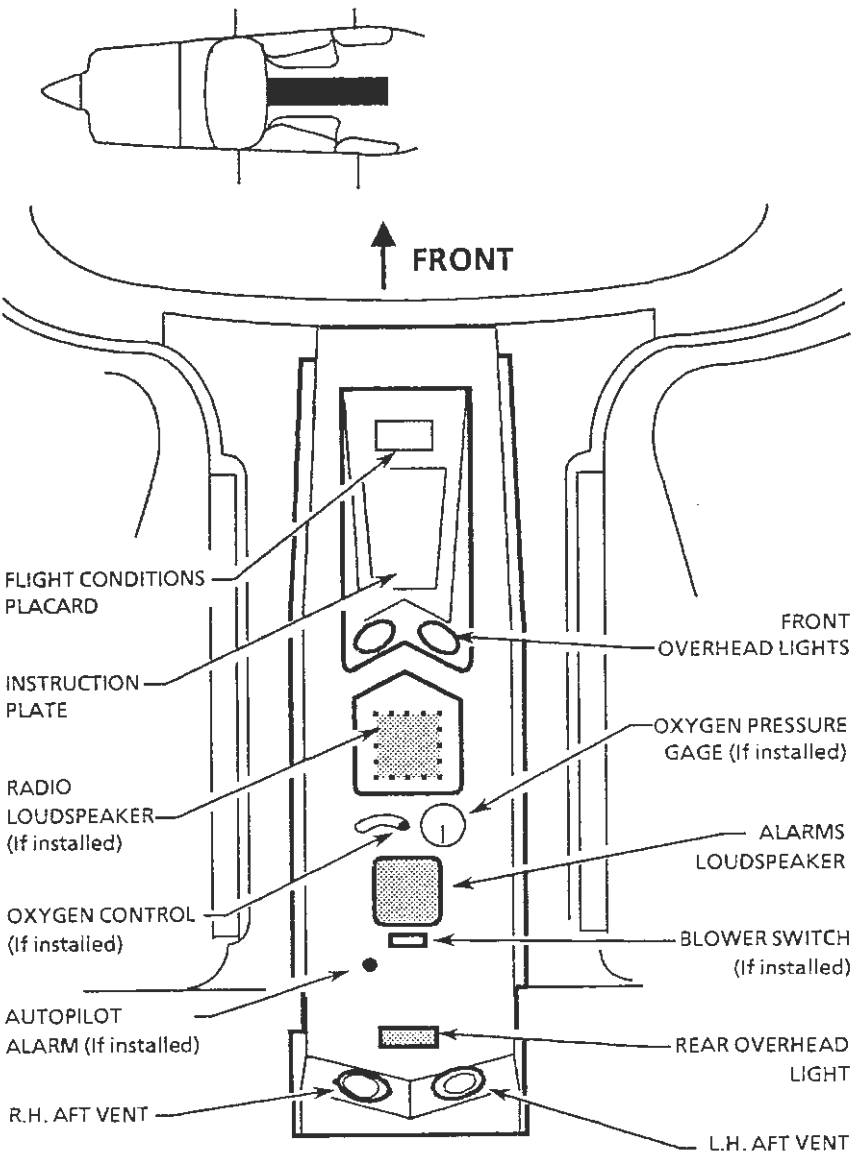


Figure 7.4 - EXAMPLE OF UPPER DUCT CENTRAL PART ARRANGEMENT

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

- "Flight conditions" placard
- "Instruction" plate
- Front overhead lights
- Radio loud-speaker (if installed)
- Oxygen control and pressure gage (if installed)
- Alarms loud-speaker
- Blower switch (if installed)
- Autopilot alarm (if installed)
- Rear overhead light(s)
- Rear vents.

ALARMS PANEL

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

SWITCH-BREAKERS PANEL

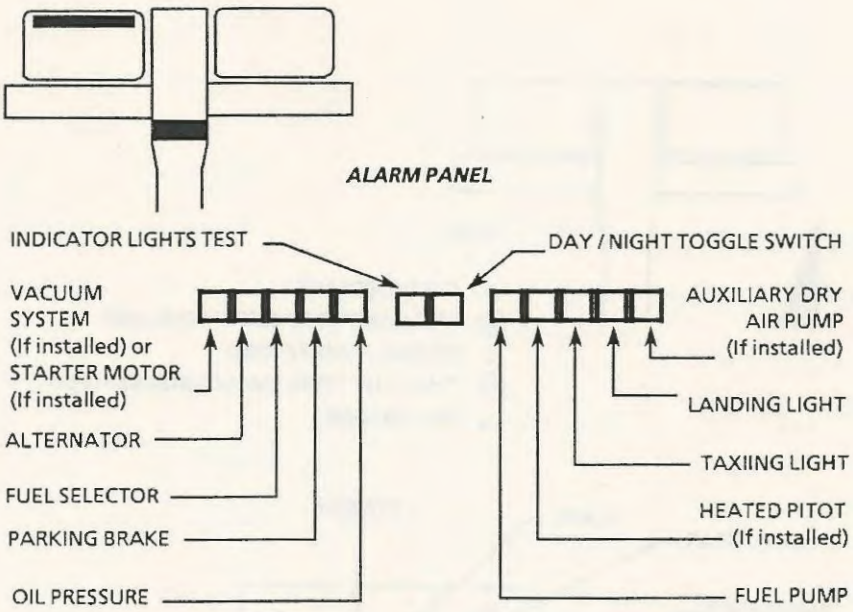
The general electrical equipment switch-breakers are located on the front part of the central pedestal.

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

CIRCUIT-BREAKERS PANEL

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

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



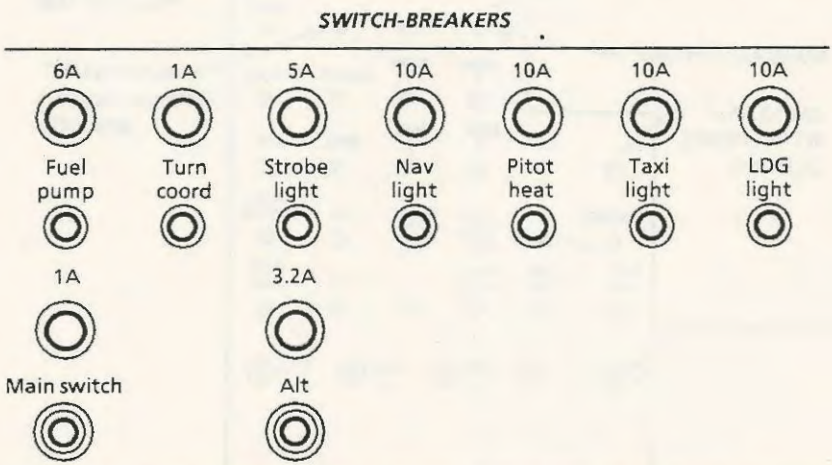


Figure 7.5 - INDICATOR LIGHTS AND SWITCH-BREAKERS

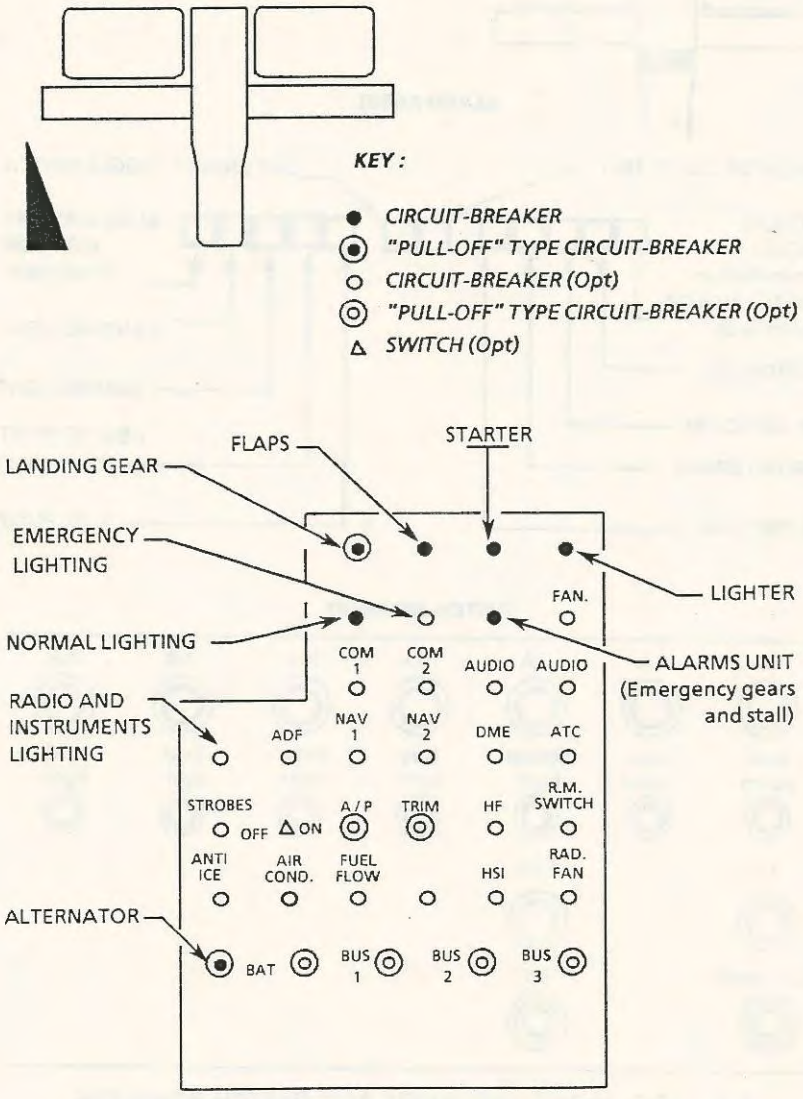


Figure 7.6 - CIRCUIT-BREAKERS ASSEMBLY
(Typical arrangement)

GROUND CONTROL

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

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

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

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

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

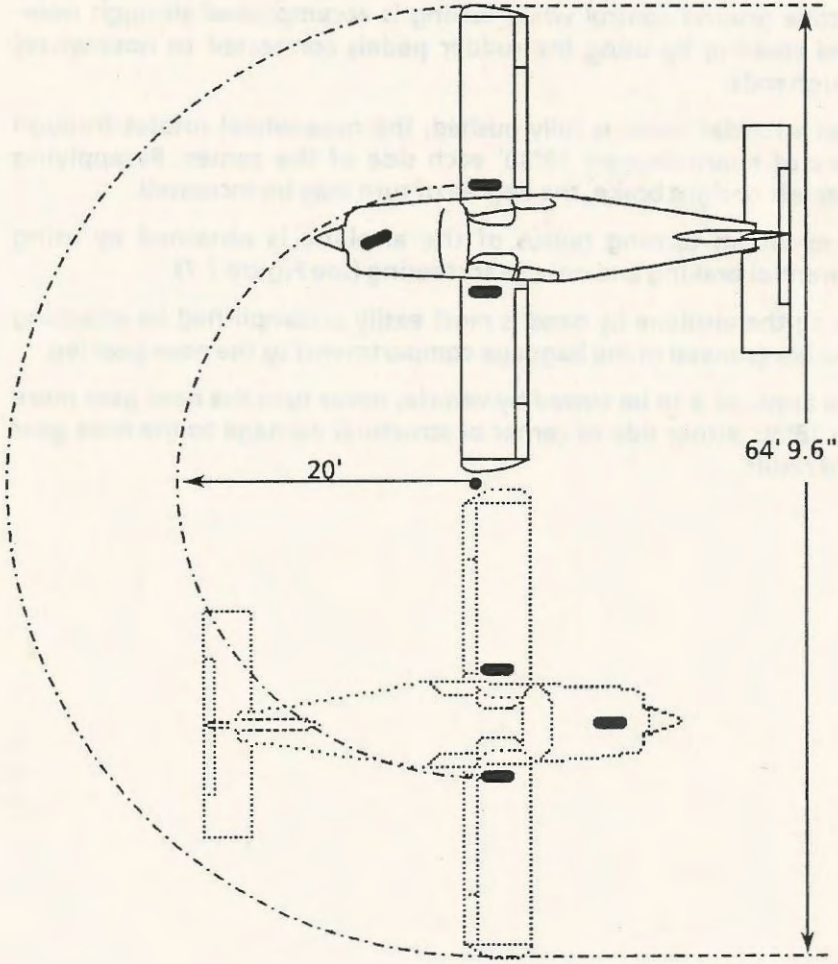


Figure 7.7 - MINIMUM TURNING RADIUS

WING FLAPS

The wing flaps are of the large span, single-slot type. They are retracted or extended by positioning to the desired flap deflection position the flaps control located on the pedestal, on R.H. side of the switch-breakers. The switch lever is moved up or down in a slotted panel with mechanical stops at "retracted" (0°) ; "take-off (10°) and "landing" (40°) positions (see Figure 7.2). An indicator located near the control provides various flaps positions. The wing flaps system is protected by a 10-amp. circuit-breaker, labeled "FLAPS" located on L.H. circuit-breakers side panel (see Figure 7.6).

LANDING GEAR

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

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

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

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

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

Electro-hydraulic pump operation is started and stopped by a pressure switch when landing gear control is on "up" position.

LANDING GEAR CONTROL

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

LANDING GEAR POSITION INDICATOR LIGHTS

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

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

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

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

LANDING GEAR OPERATION

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

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

The electric pump will continue to run :

- during landing gear extension, until the green indicator lights illuminate and the red indicator light goes out ;
- during landing gear retraction, until the green and red indicator lights go out.

If pressure in the system falls below 1392 psi (96 bars), the microswitch starts operation of the electro-hydraulic pump which brings pressure up to 1392 psi (96 bars).

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

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

EMERGENCY LANDING GEAR EXTENSION

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

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

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

LANDING GEAR WARNING SYSTEM

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

In gear up configuration, when throttle is retarded below approximately $\frac{1}{2}$ inch of the aft stop (battery switch-breaker ON), the throttle linkage will actuate on a microswitch which is electrically connected to the gear aural warning unit.

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

BAGGAGE COMPARTMENT

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

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

To open the access door, proceed as follows :

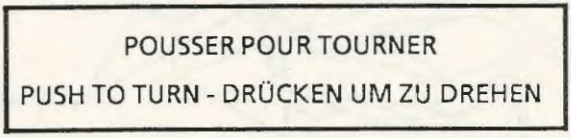


Figure 7.8

WARNING

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

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

CARGO CONFIGURATION

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

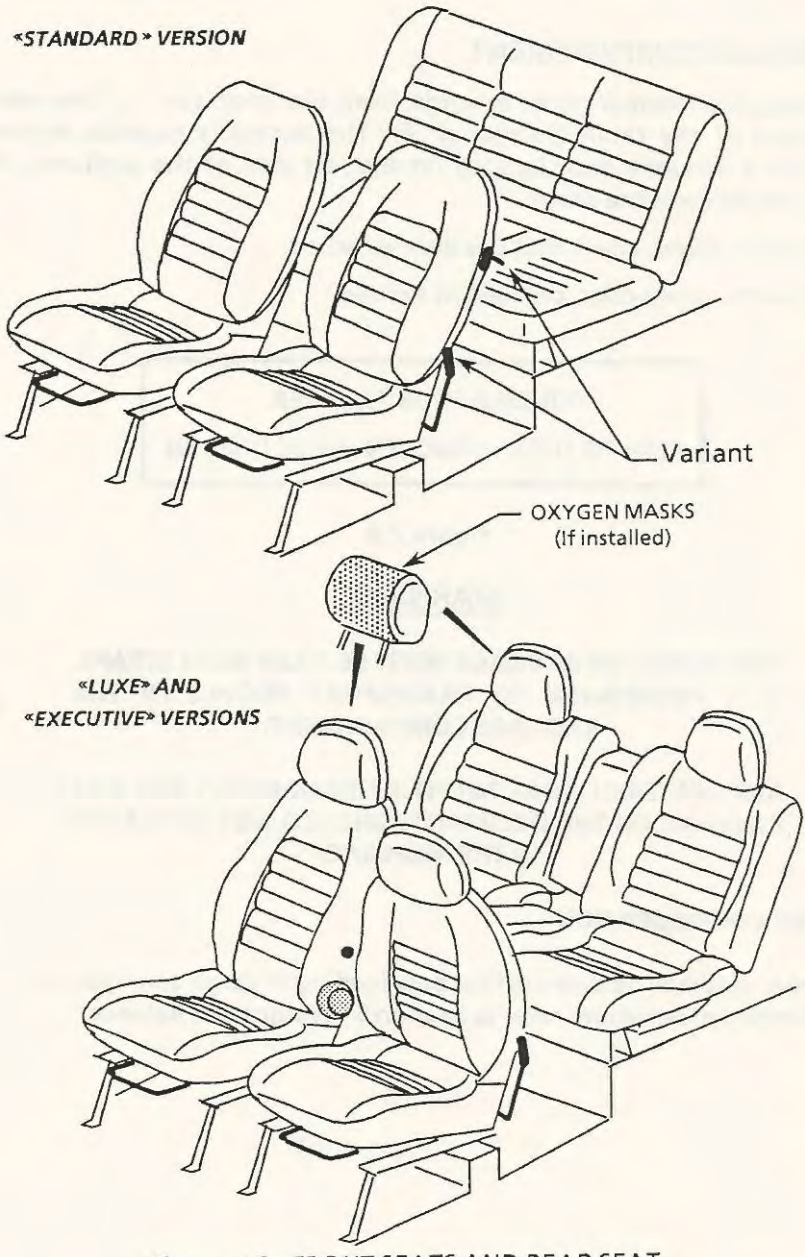


Figure 7.9 - FRONT SEATS AND REAR SEAT

SEATS, SEAT BELTS AND SHOULDER HARNESSES

FRONT SEATS

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

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

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

REAR SEAT

- To remove rear seat, refer to Section 6 "Weight and Balance".
  Rear seat is not adjustable.

HEADRESTS (if installed)

- To adjust and remove the headrest :
  Simply make it slide vertically.
- To fit the headrest into the seat back :
  Turn the centering bush (bearing an arrow) of $\frac{1}{4}$ turn clockwise (in the arrow direction) and maintain it to fit the headrest in the seat back.
- If oxygen equipment is installed, the masks are stored inside the headrests.

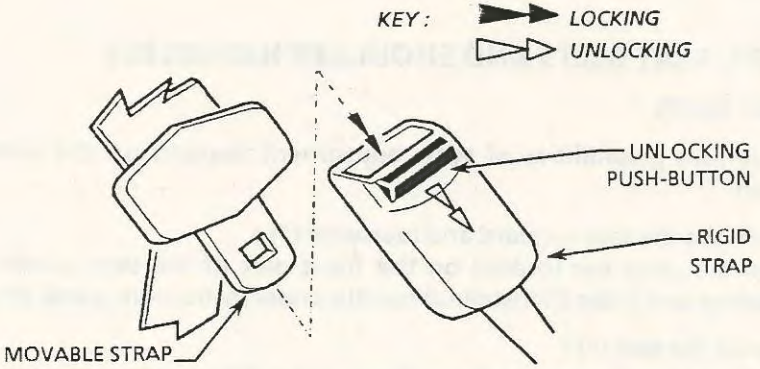


Figure 7.10 - FRONT SEAT BELT (with rigid strap)

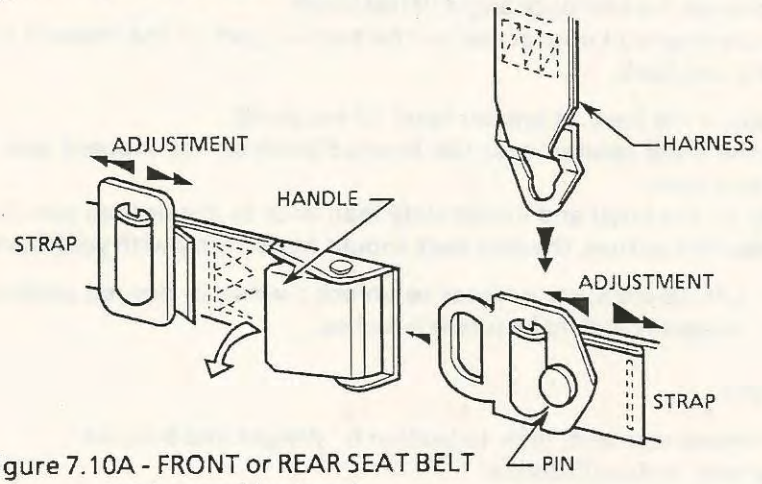


Figure 7.10A - FRONT or REAR SEAT BELT (with movable straps)

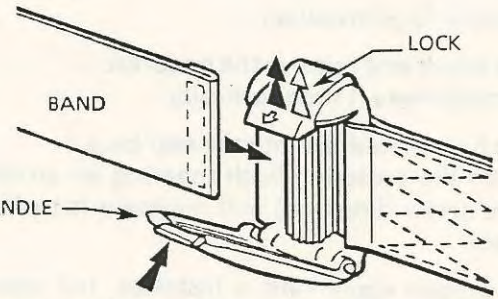


Figure 7.10B - REAR SEAT BELT (with band)

SEAT BELTS (see Figure 7.10)

RECOMMENDATIONS

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

Front seat belts (with rigid straps) (see Figure 7.10)

- To lock them :
  Engage movable strap into rigid strap up to clipping.
  Should a blocking occur during operation, slightly ease back (5 in. approximately), then unwind strap again.
- To unlock them :
  Depress red unlocking push-button to free movable strap.

Front and rear seat belts (with movable straps) (see Figure 7.10A)

- To lock them :
  Engage both straps up to clipping.
  Be sure the belt is properly tightened (adjustement is possible on both straps).
- To unlock them :
  Pull on unlocking handle to release straps.

Rear seat belts (with band) (see Figure 7.10B)

- To lock them :
  Lift the lock in order to insert the band until sufficient tightening.
  Fold down the handle up to clipping on the lock.
- To unlock them :
  Lift the lock to free the band.

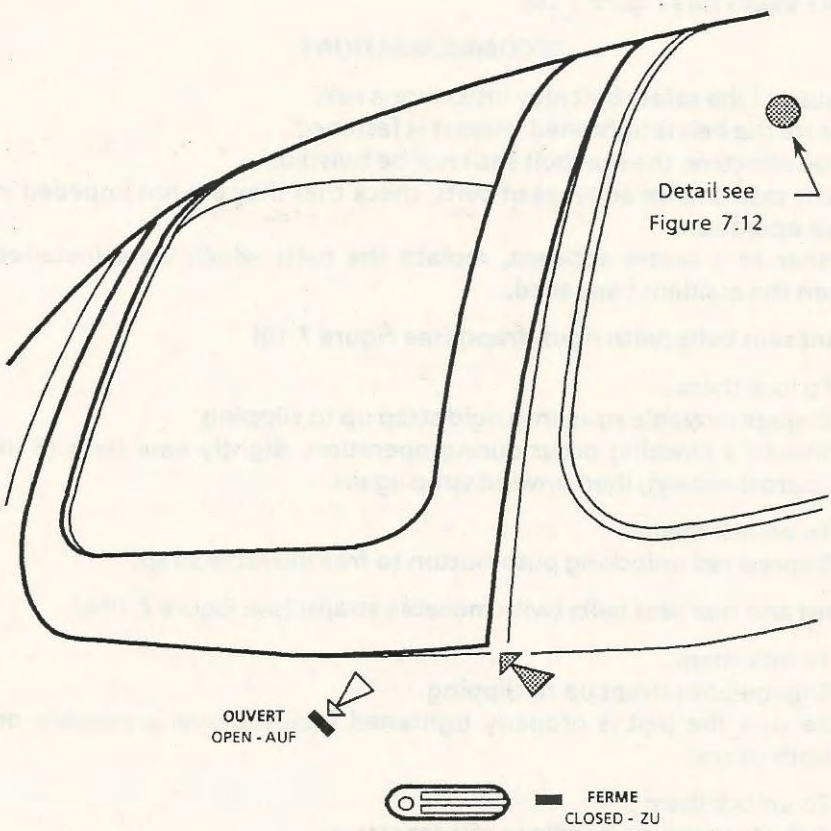


Figure 7.11 - DOORS OPENING AND CLOSING

Figure 7.12 - EMERGENCY EXIT

DOORS AND EXITS (see Figure 7.11)

DOORS

- To open them :
  Push handle forward (and hold it if mecanism is not supplied with a return spring).
  Lift the door at the location marked with a shaded arrow.
  Follow door up to maximum position.
- To close them :
  Close the door and set handle to "Closed" position .

WARNING

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

CHECK THAT BOTH LOCKING HOOKS ARE PROPERLY NOTCHED

EXITS

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

The placard (see Figure 7.12) is located on both rear windows and is legible from the inside of the airplane.

CONTROLS LOCK (Valid up to S / N 587)

The towing bar (stored in the baggage compartment) is provided to block the control wheel and the L.H. rudder pedal.

Align rudder pedals. Capture L.H. rudder pedal with the lower part of the towing bar, on the other part of the towing bar, insert the blocking pin into the control wheel tube, pull the control wheel backwards to approximately half-way and line up the tube hole with that of both bar tabs.

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

CONTROLS LOCK (Valid from S / N 588)

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

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

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

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

ENGINE

The TB 20 airplane is powered by a six-cylinder, horizontally opposed, direct drive LYCOMING IO-540-C4-D5D engine rated at 250 BHP at 2575 RPM. It is provided with a starter, a 14-volt / 70-amp alternator, an all-weather shielded ignition harness, a dual magneto, a vacuum pump drive, a fuel pump and a manifold air filter.

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

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

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

Engine inlet air penetrates through an air intake located at the front of the lower cowl and goes directly through a filter, before being admitted in the air duct under the injection unit. The air duct can also be supplied by an alternative air supply source "Alternate air" which is actuated either mechanically by the control (if installed) located under the L.H. panel near the pedestal, or automatically by suction. This air source provides the injection unit with heated air when the airplane is involuntarily into icing conditions.

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

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

ENGINE CONTROLS

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

  At approximately $\frac{1}{2}$ in. of its rear stop, the throttle actuates on landing gear alarm microswitch.

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

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

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

ENGINE INSTRUMENTS

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

IGNITION - STARTER SYSTEM

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

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

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

The switch operates clockwise : "OFF" ; "L.H." magneto ; "R.H." magneto ; "L.H. + R.H." magnetos ; "STARTER" by pushing.

CAUTION

RELEASE THE PRESSURE ON THE KEY AFTER ENGINE START

NEW ENGINE BREAK-IN AND OPERATION

The engine has undergone a break-in at the factory and is ready for the full range of use. It is, however, recommended that cruising flights be accomplished at 65 to 72 % until a total of 50 hours has accumulated or oil consumption has stabilized.

The airplane is delivered from the factory with corrosion preventive engine oil. If, during the first 25 hours, oil must be added, use only aviation grade straight mineral oil in compliance with Specification MIL-L-6082.
Use dispersant oil in compliance with Specification MIL-L-22851 only after the first 50 hours.

ENGINE LUBRICATION SYSTEM

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

AIR INDUCTION SYSTEM

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

EXHAUST SYSTEM

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

PROPELLER

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

FUEL SYSTEM

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

Engine-driven fuel pump suction draws fuel from L.H. or R.H. tank through the three-position selector valve.
The selector valve is controlled through a knob located on the L.H. instrument panel strip
The selector valve knob has following positions labeled : "LEFT", "CLOSED", "RIGHT".

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

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

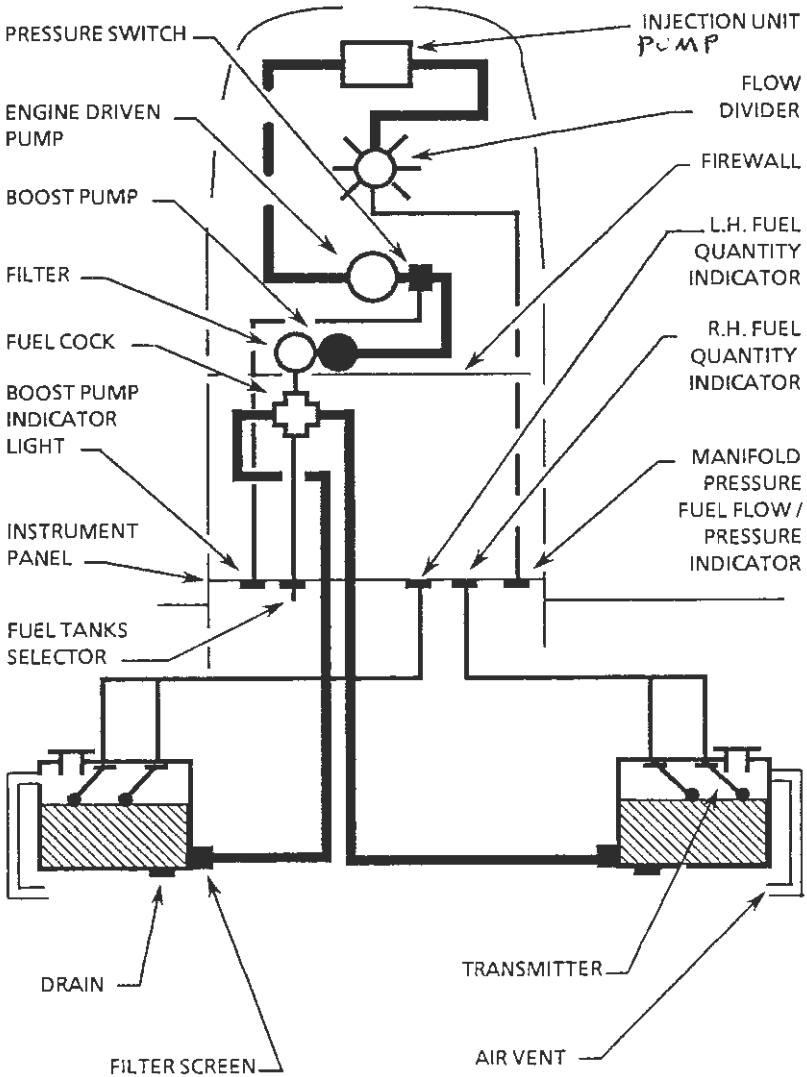


Figure 7.13 - FUEL SYSTEM

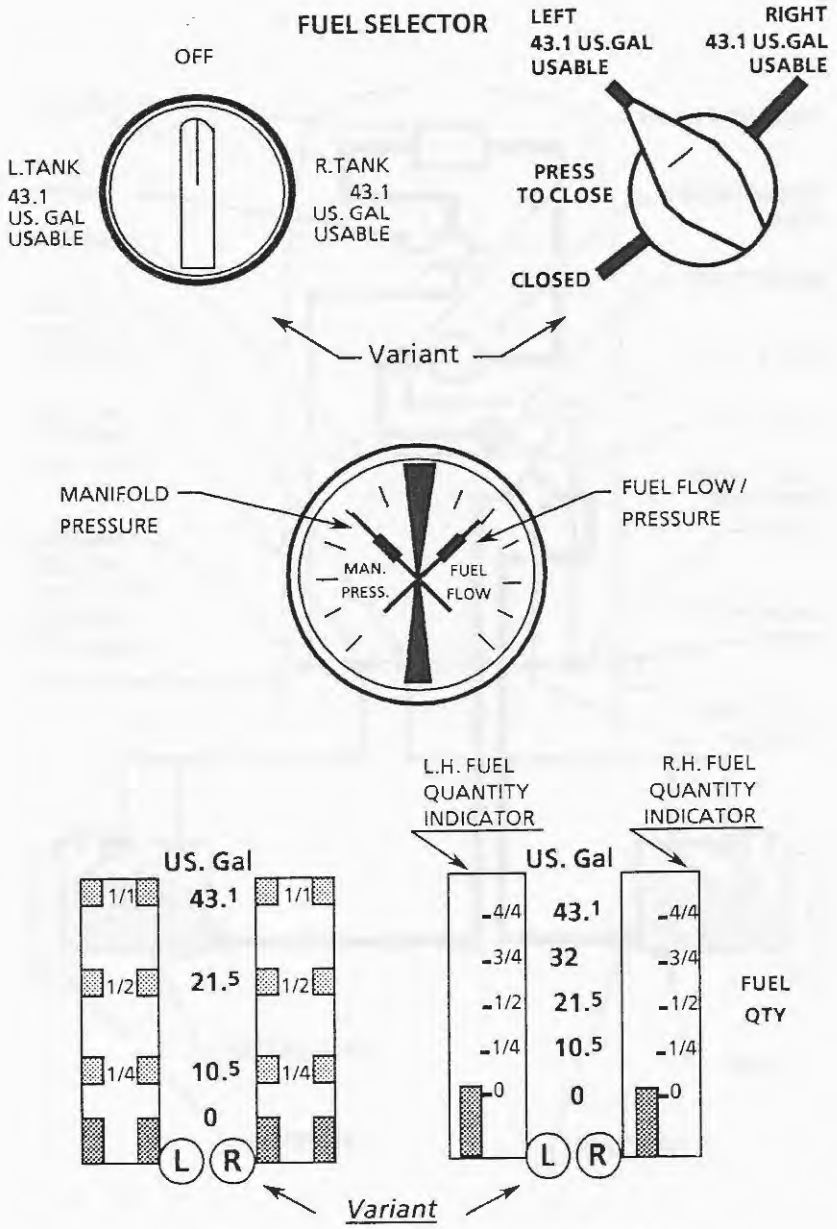


Figure 7.14 - FUEL SYSTEM MARKINGS

Fuel quantities :

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

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

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

Fuel quantity is measured by four electrically-operated fuel quantity transmitters (two in each wing tank) and is shown by two fuel quantity indicators located on the upper portion of the central console.
Indicators are calibrated at 1/4, 1/2 and on some versions 3/4 and 4/4, a red line indicating an empty tank. When an indicator shows an empty tank, approximately 1.3 gallon remains in the tank as unusable fuel.
The indicators cannot be relied upon for accurate readings during skids, slips or unusual attitudes. If both indicator pointers should rapidly move to a zero, check voltmeter and oil temperature indicators. If they are not indicating, an electrical malfunction has occurred.

The auxiliary fuel pump is controlled by a switch-breaker located on front part of pedestal.
An indicator light located on the alarms panel show operation of the auxiliary pump.

The fuel system is equipped with drain valves to provide a means for the examination of the fuel in the system for contamination and grade. The system should be drained every day before the first flight and after each refueling by using the fuel sampler provided to drain fuel from the wing tank sump drain. The fuel tank sump drains are located just outboard of each main landing gear well.
The fuel filter of the electrical booster pump is located near the latter on the firewall.

NOTE :
This filter draining is a maintenance function and is performed at the 50 hour interval as per the maintenance manual. This filter is not to be drained during preflight inspection.

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

RETRACTABLE LANDING GEAR HYDRAULIC SYSTEM

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

BRAKE SYSTEM

BRAKING

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

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

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

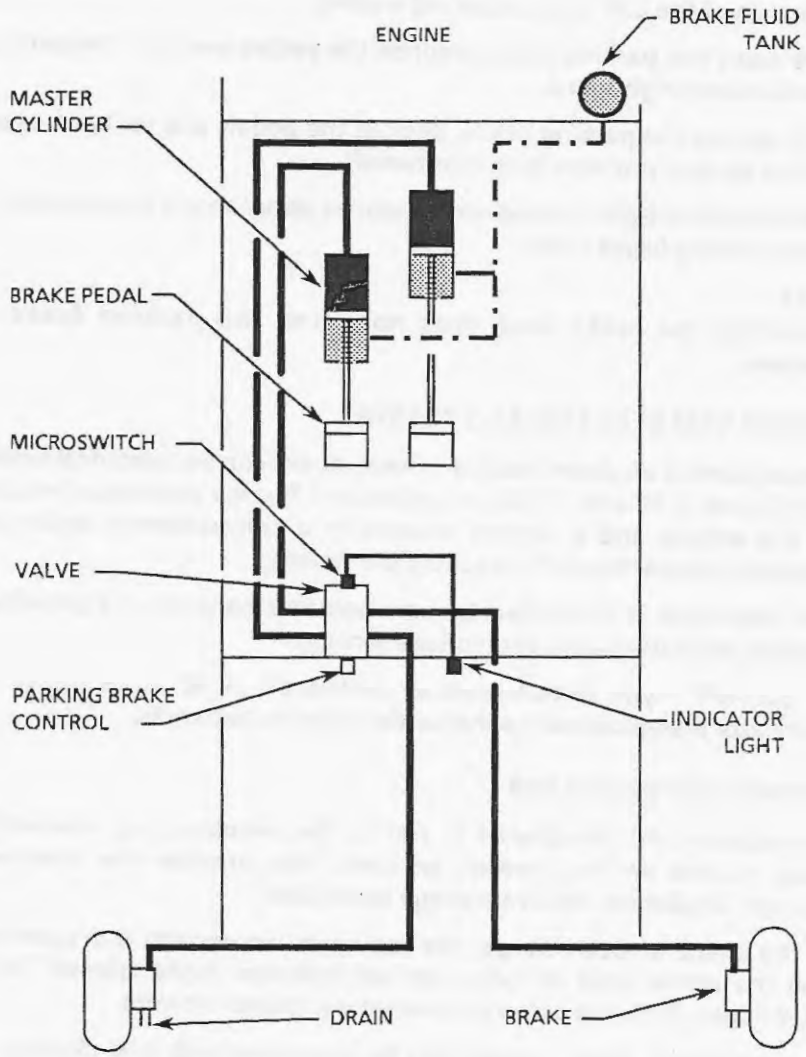


Figure 7.15 - BRAKE SYSTEM

PARKING BRAKE

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

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

STANDARD ELECTRICAL SYSTEM

The airplane is equipped with a 14-volt, direct-current electrical system (see Figures 7.16 and 7.16A). A belt-driven 70-amp alternator installed on the engine and a battery located in a compartment under the baggage compartment floor supply the system.

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

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

ALTERNATOR REGULATOR

A regulator and (integrated or not to this regulator) an overvoltge relay located on the firewall, on cabin side provide the alternator voltage regulation and overvoltage protection.

In the event of overvoltage, the regulator disconnects the alternator and the amber (red on UK airplanes) indicator light labeled "ALT" illuminates. Only the battery powers the airplane network.

The regulator reset is operated by disconnecting and closing the switch-breaker labeled "ALT".

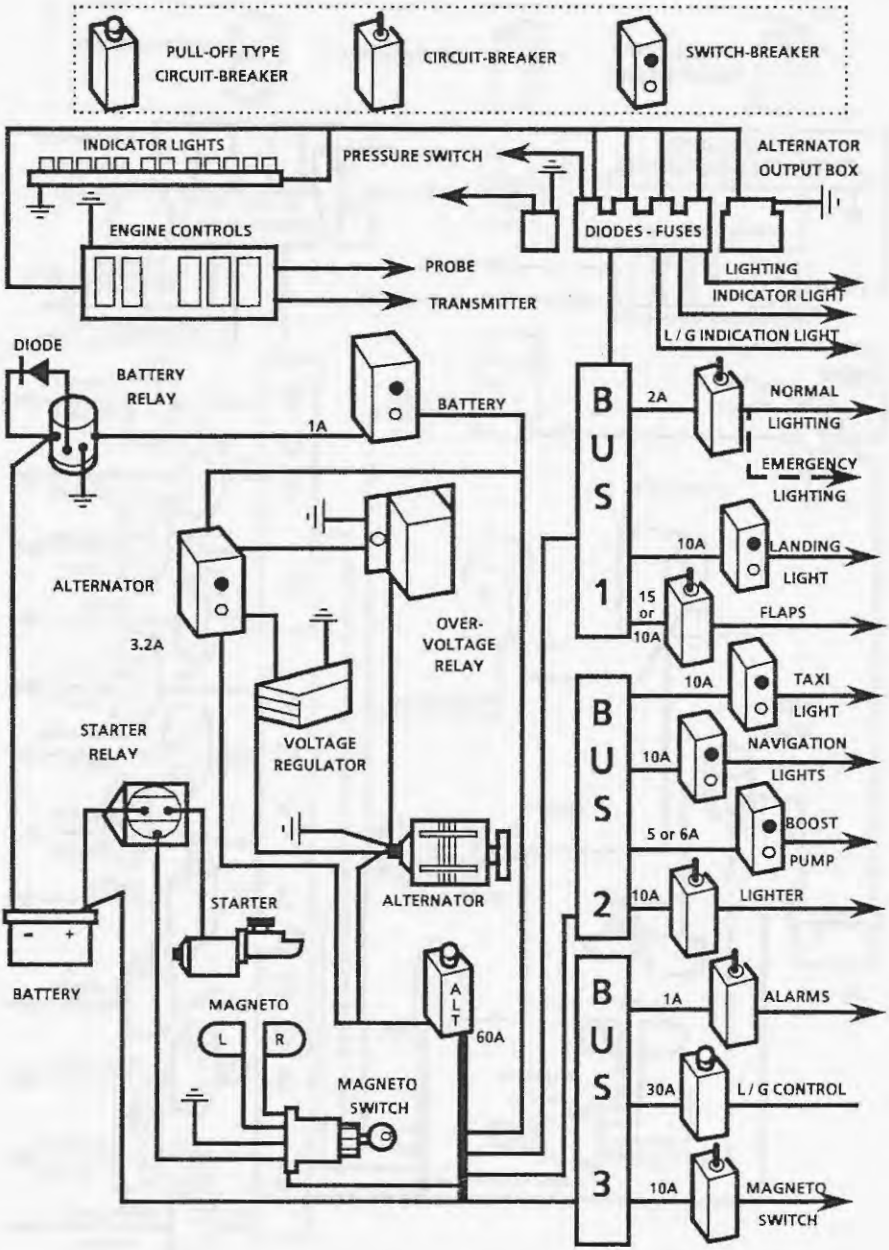


Figure 7.16 - STANDARD ELECTRICAL SYSTEM
(Valid up to S / N 369)

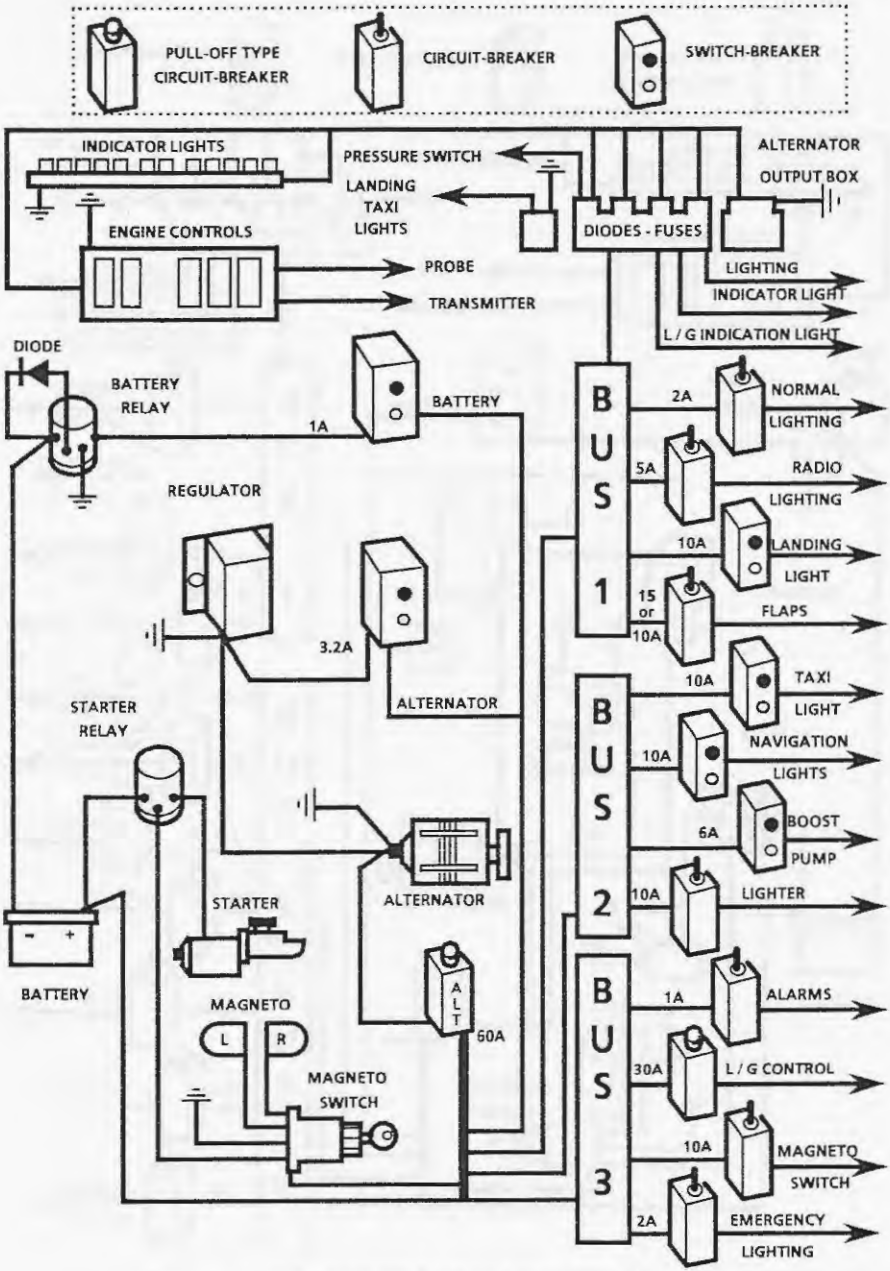


Figure 7.16A - STANDARD ELECTRICAL SYSTEM
(Valid from S / N 370)

MAIN SWITCH

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

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

ALTERNATOR CONTROL

Located on the R.H. side of the main switch, the alternator switch-breaker labeled "ALT" controls the operation of the alternator through the regulator.

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

Disconnecting "MAIN SWITCH" and "ALT" in flight disconnects simultaneously all electrical power supplies.

AVIONICS POWER SWITCH (if installed)

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

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

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

VOLTMETER

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

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

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

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

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

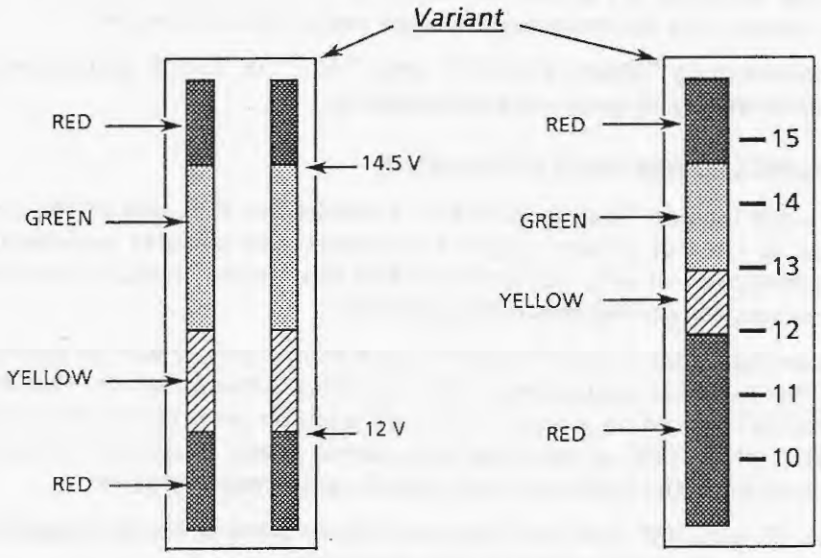


Figure 7.17 - VOLTMETER MARKING

CIRCUIT-BREAKERS AND FUSES

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

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

Fuses located on L.H. firewall door protect the engine control instruments, the regulation units, cabin entrance courtesy light and (if installed) the watch.

UNDERVOLTAGE WARNING LIGHT

Anytime electrical system voltage falls below approximately 12.7 volts, as directly sensed by the distribution systems, an amber (red on UK airplanes) indicator light labeled "ALT" illuminates on alarms panel to warn the pilot.

GROUND POWER RECEPTACLE (if installed)

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

IFR AND NIGHT VFR ELECTRICAL SYSTEMS (if installed)

For IFR and night VFR operation, a stricter network protection segregation has been done.

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

- 70 A labeled "BAT" between battery and network
- 40 A labeled "BUS 1" on bus bar 1 supply
- 40 A labeled "BUS 2" on bus bar 2 supply
- 40 A labeled "BUS 3" on bus bar 3 supply

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

For further information, refer to Section 9 "IFR" Supplement 1 and "VFR" Supplement 2.

LIGHTING SYSTEMS

EXTERIOR LIGHTING

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

The airplane may be equipped with an anticollision light on vertical stabilizer. In addition to navigation lights the exterior lighting may include a strobe light installed on tail cone and on each wing tip.

All exterior lights are controlled by switch-breakers located on central pedestal. The switch-breakers are on pushing forward and off pushing rearward.

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

INTERIOR LIGHTING

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

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

Lighting controls :

They allow the operating from down to up of :

- "Normal" control which controls and modulates L.H. and R.H. instrument panels visors lighting.
- "Emergency"control (if installed) which modulates lighting of overhead lights controlled by rotating them.
- "Radio and instruments" control (if installed) which controls and modulates console visor lighting, instruments and equipment on instrument panel, emergency landing gear control and circuit-breakers panel.

NOTE :

- *Both "normal" and "radio and instruments" controls operate and modulate lighting ; from high position "OFF", turn clockwise for "FULL INTENSITY OPERATION" then still clockwise, modulate towards "MINIMUM INTENSITY", turn back to "OFF" position turning counterclockwise.*
- *"Emergency" control modulates lighting ; from high position "FULL INTENSITY" turn clockwise to modulate towards "MINIMUM INTENSITY" ; turn back to high position "FULL INTENSITY" turning counterclockwise .*

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

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

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

DEMISTING, AIR CONDITIONING, VENTILATION, FIRE CUT-OFF (Valid up to S / N 584)

The temperature and volume of airflow to the cabin are regulated by the cabin air selector sytem and the vents (see Figure 7.18).

DEMISTING (Valid up to S / N 584)

The air intake located on the L.H. side of the propeller cone provides air supply to the exchanger located around the exhaust duct, the heated air supplies a box located aft of the firewall (in front of front passenger's feet). This box may be shut off by a fire cut-off shutter and allows air distribution on both sides of the windshield.

The airflow (hot or cold depending on the position of the other two controls) is regulated from the lower knob on control panel located on R.H. part of the instrument panel strip.

AIR CONDITIONING (Valid up to S / N 584)

Hot air

Comes from the exchanger (located around exhaust duct).

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

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

Cold air

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

Hot / cold air mixing in cabin air mixer

Regulation is obtained by moving the above-mentioned controls :

. to the left, full flow
. to the right, no flow

Distribution of conditioned air

The cabin air mixer is distributed in the cabin through the lower knob on the control panel.

This knob allows :

- L.H. position :
  Windshield deicing and demisting
- Intermediate position :
  General air conditioning
- R.H. position :
  Front and rear passengers air conditioning.

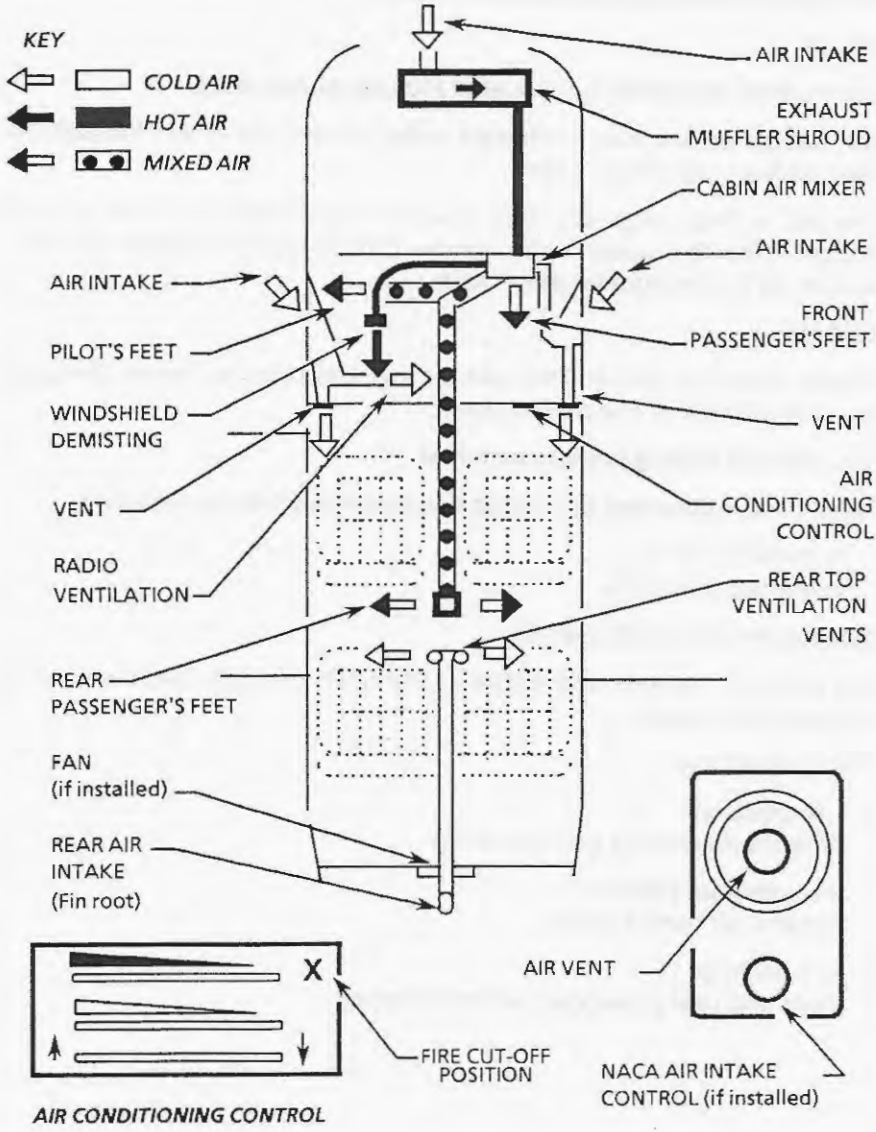


Figure 7.18 - DEMISTING, AIR CONDITIONING, VENTILATION, CUT-OFF SYSTEM (Valid up to S / N 584)

VENTILATION (Valid up to S / N 584)

Low ventilation

See "Cold air" and "air distribution" of the previous "Air conditioning" paragraph.

High ventilation

- Pilot + front passenger

  Air (at outside temperature) coming from NACA L.H. and R.H. air intakes supplies two swivelling vents which airflow may be regulated, located on both parts of the instrument panel strip.

  On some versions, fresh air coming to each vent depends on NACA air intake control (located under the vent) position :

  . pulled control, vent is supplied

  . pushed control, vent is not supplied

NOTE :
In that case, vent aperture or closure must be followed by a similar action on NACA air intake control.

- Rear passengers

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

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

FIRE CUT-OFF (Valid up to S / N 584)

CAUTION

TO PROVIDE THE CUT-OFF OPERATION, HOT AIR CONTROL (UPPER CONTROL) MUST BE FULLY POSITIONED TO THE RIGHT.

DEMISTING, AIR CONDITIONING, VENTILATION, FIRE CUT-OFF (Valid from S / N 585)

The temperature and volume of airflow to the cabin are regulated by the cabin air selector sytem and the vents (see Figure 7.18A).

DEMISTING (Valid from S / N 585)

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

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

AIR CONDITIONING (Valid from S / N 585)

Hot air

Comes from the exchanger (located around exhaust duct).

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

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

Cool air

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

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

Hot / cool air mixing in cabin air mixer

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

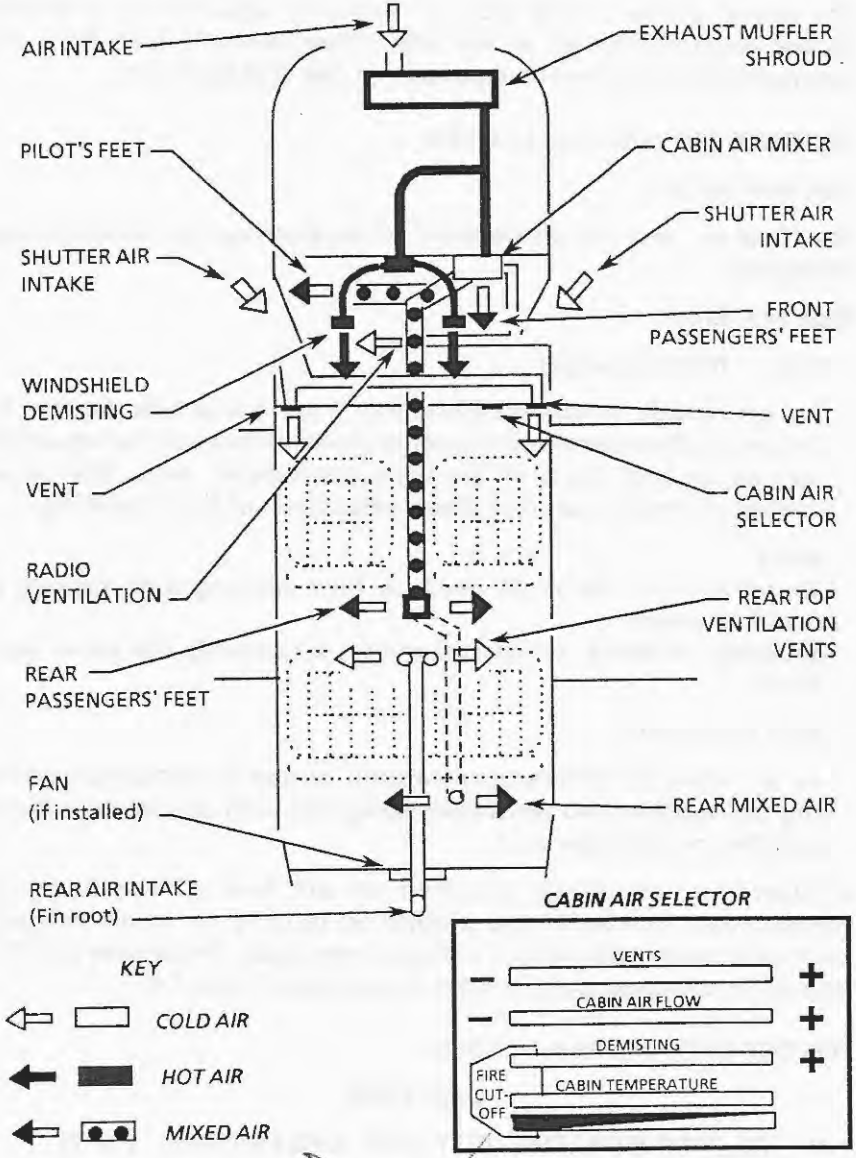


Figure 7.18A - DEMISTING, AIR CONDITIONING, VENTILATION, CUT-OFF SYSTEM (Valid from S / N 585)

Distribution of conditioned air

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

VENTILATION (Valid from S / N 585)

Low ventilation

See "Cool air" and "air distribution" of the previous "Air conditioning" paragraph.

High ventilation

- Pilot + front passenger

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

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

- Rear passengers

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

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

FIRE CUT-OFF (Valid from S / N 585)

CAUTION

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

OXYGEN SYSTEM (if installed)

See Section 9 "Supplements".

AIRSPEED INDICATING SYSTEM AND INSTRUMENTS

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

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

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

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

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

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

TRUE AIRSPEED INDICATOR (if installed)

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

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

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

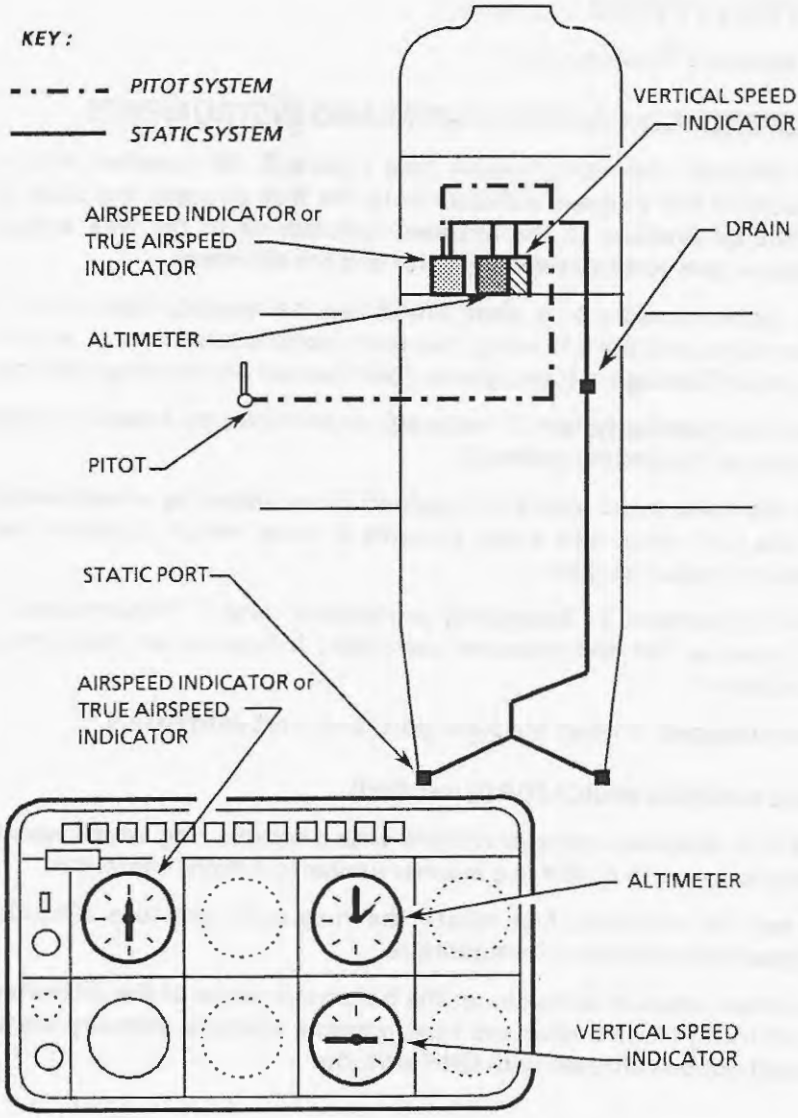


Figure 7.19 - AIRSPEED INDICATING SYSTEM

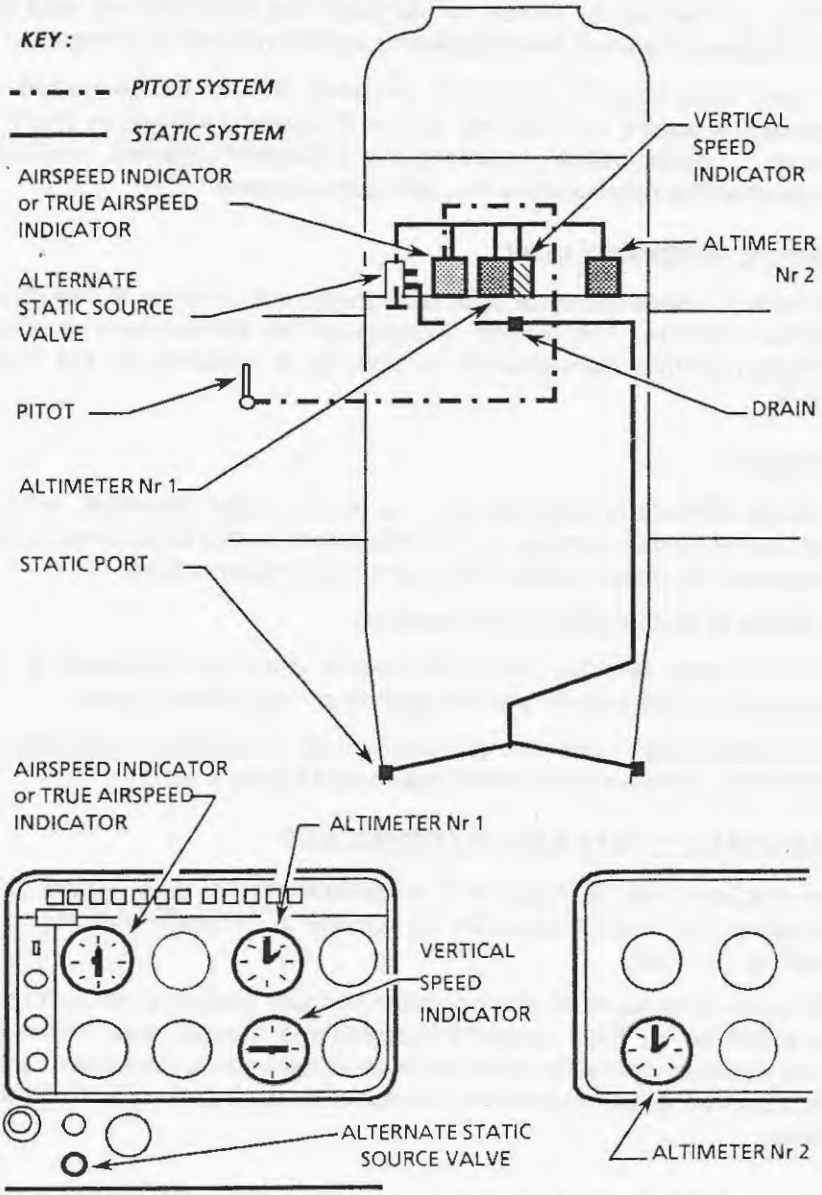


Figure 7.19A - AIRSPEED INDICATING SYSTEM WITH ALTERNATE STATIC SOURCE

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

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

VERTICAL SPEED INDICATOR

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

ALTIMETER

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

ALTERNATE STATIC SOURCE (if installed)

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

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

VACUUM SYSTEM AND INSTRUMENTS

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

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

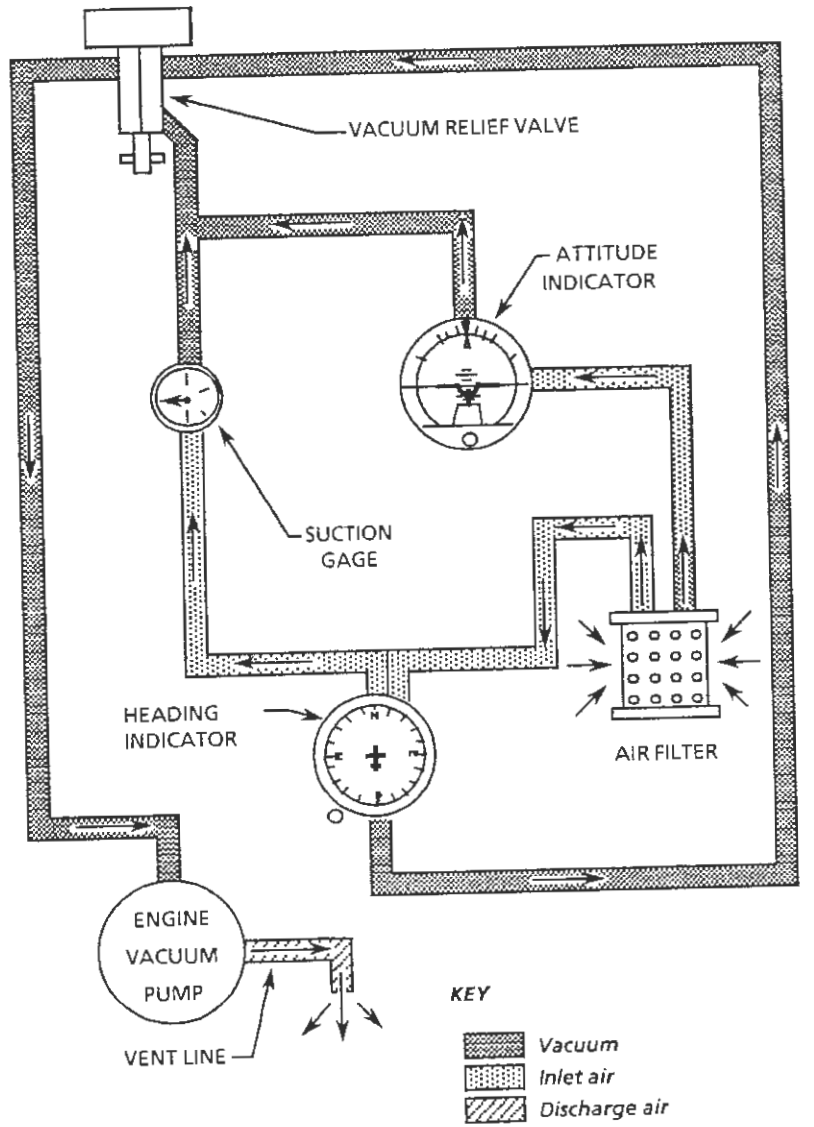


Figure 7.20 - VACUUM SYSTEM

The system may be provided with an alarm, red warning light labeled "GYROS" on the alarms panel ; this warning light indicating an insufficient suction illuminates between 3 and 3.5 in.Hg.

ATTITUDE INDICATOR (if installed)

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

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

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

HEADING INDICATOR (if installed)

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

SUCTION GAGE (if installed)

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

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

AUXILIARY DRY AIR PUMP (if installed)

Refer to Section 9 "Supplements".

AUTOPILOTS

Refer to Section 9 "Supplements".

STALL WARNING SYSTEM

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

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

STATIC DISCHARGERS (if installed)

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

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

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

DE-ICING SYSTEM

Refer to Section 9 "Supplements".

RADIO EQUIPMENT

Refer to Section 9 "Supplements".

TURN AND BANK INDICATOR (if installed)

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

CLEAR-VISION WINDOW (if installed)

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

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

GLARE SHIELD

To remove "plexiglas" glare shield, firmly pull downwards the foamed attachment pin, it is equipped (in its upper part) with an adjusting screw which provides friction on arm swivelling. After adjustment, lock the screw using varnish.

To reinstall the "plexiglas" glare shield, hit it firmly upwards, at the base of the foamed attachment pin.

FIRE EXTINGUISHER (if installed)

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

SECTION 4

NORMAL PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

GENERAL

This section provides procedures for the conduct of normal operation of the SOCATA Model TB 20 airplane.

The normal procedures for optional systems are given in Section "Supplements" of the Flight Manual.

AIRSPEEDS FOR SAFE OPERATIONS (IAS)

Following speeds are those important for safe operation of airplane.

These data are valid for standard airplane used at maximum weight in normal conditions.

- Best rate of climb V_Y	
. Landing gear up, flaps retracted	95 KIAS
. Landing gear down, flaps in landing position	73 KIAS
- Best angle of climb V_X	
. Landing gear up, flaps retracted	81 KIAS
. Landing gear down, flaps in landing position	67 KIAS
- Operating speed in turbulent air V_A	127 KIAS
- Maximum speed with flaps in take-off position	
. If SB Nr 39 * is not applied	103 KIAS
. If SB Nr 39 * is applied	129 KIAS
- Maximum speed with flaps in landing position	103 KIAS
- Final approach speed (flaps in landing position)	73 KIAS
- Maximum demonstrated crosswind	25 KNOTS

(*) Including all its revisions

V_{S1} 70 Stall speed pg 5.5

V_{S0} 60 Stall speed pg 5.5

V_{LO} 130 pg 2.4

V_{LE} 140 pg 2.4

V_r 70

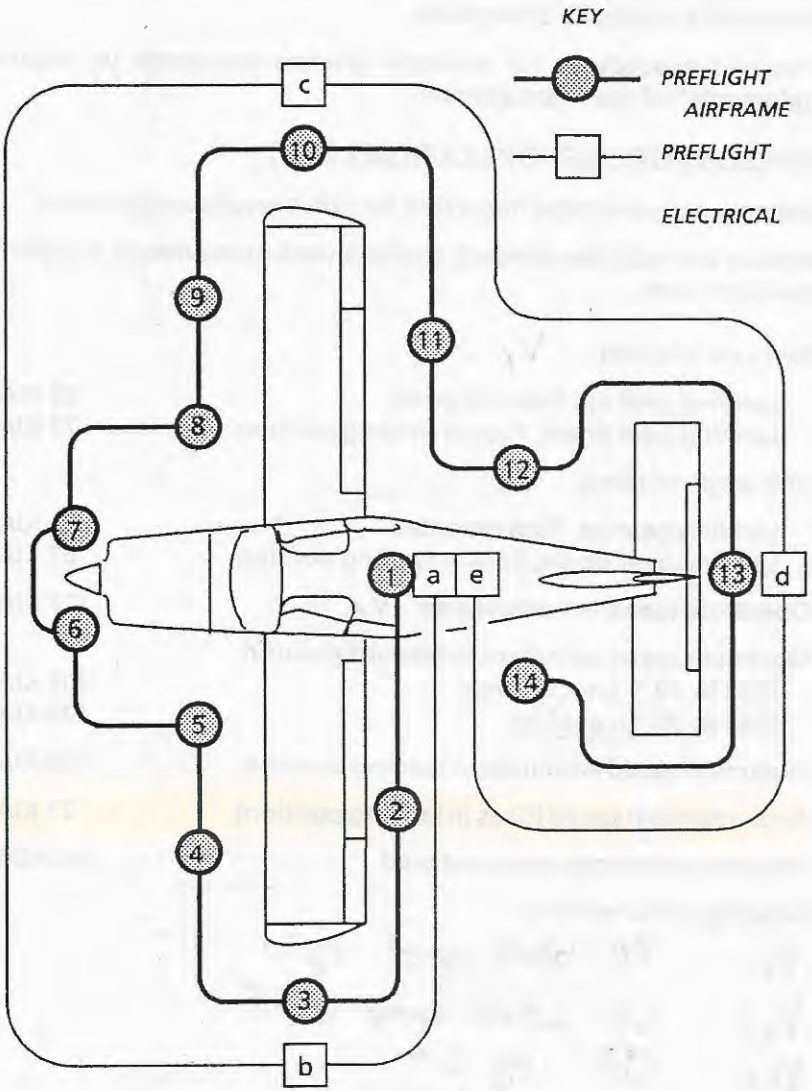


Figure 4.1 - PREFLIGHT INSPECTIONS

PREFLIGHT INSPECTIONS (See Figure 4.1)

AIRFRAME

1 - Cabin

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

Proceed with the external preflight inspection moving clockwise around.

2 - L.H. wing trailing edge

Flap and aileron	Check controls, hinges, plays, deflections

3 - L.H. wing

Wing tip, lights and landing lights	Undamaged

4 - L.H. wing leading edge

Wing	Free of frost, snow, ice
Pitot	Cover removed, clean, unobstructed
Tie-down	REMOVE
Stall warning device	Clean, check deflection
Fuel tank	Check level
Fuel tank cap	SECURE
Fuel tank draining	Fuel free of water and sediment
Fuel tank drain	Check CLOSED

5 - L.H. main landing gear

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

6 - Forward fuselage

Windshield and window panels	Clean
Engine cowling attachment	Check
Oil	Check level and absence of leak
Propeller	Clean, good condition
Propeller cone	Check (no play)
Air intakes	Clean
Oil pump breather	Unobstructed
Exhaust pipe	Check

NOTE :
The draining of the fuel filter on the electrical boost pump is a maintenance function and is performed at the 50 hour interval as per the maintenance manual. This filter is not to be drained during preflight inspection.

7 - Nose landing gear

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

8 - R.H. main landing gear

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

9 - R.H. wing leading edge

Fuel tank draining	Fuel free of water and sediment
Fuel tank drain	Check CLOSED
Fuel tank	Check level
Fuel tank cap	SECURE
Tie-down	REMOVE
Wing	Free of frost, snow and ice

10 - R.H. wing

Wing tip and lights	Undamaged

11 - R.H. wing trailing edge

Flap and aileron	Check controls, hinges, plays, deflections

12 - R.H. rear fuselage

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

13 - Empennages

Fin	Check
Rudder and rudder tab	Check controls, hinges, deflections, plays, frictions
Stabilator and stabilator tab	Check controls, hinges, deflections, plays, frictions
Tail cone and navigation light	Good condition

14 - L.H. rear fuselage

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

ELECTRICAL SYSTEMS

a - Cabin

Alternator switch	OFF
Fuel pump	OFF
Main switch	ON
Alarm panel	Tested
Landing gear indicator lights	Tested
Fuel gages (CAUTION) if Voltage is Lower Than 13 Volts Delay Check RANGE Fuel Quantity is Estimated. OVER	
Flaps	RETRACT
Instrument lights	ON
Navigation lights	ON
Anti-collision light (if installed)	ON
Strobe lights (if installed)	ON
Pitot heating (if installed)	ON
Landing lights	ON

b - L.H. wing

Navigation light	Illuminated
Strobe light (if installed)	Flashing
Landing lights	Illuminated

WARNING

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

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

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

c - R.H. wing

Navigation light	Illuminated
Strobe light (if installed)	Flashing

d - Airplane rear part

Navigation light	Illuminated
Strobe light (if installed)	Flashing
Anti-collision light (if installed)	Flashing

e - Cabin

Navigation light	OFF
Strobe lights (if installed)	OFF
Anti-collision light (if installed)	OFF
Pitot heating (if installed)	OFF
Landing lights	OFF
Instrument lights	OFF
Main switch	OFF

BEFORE STARTING ENGINE

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

ENGINE STARTING

COLD ENGINE :

Main switch	ON
Propeller	FULL FORWARD
Throttle	1/4 OPEN
Fuel pump	ON
Mixture	FULL RICH until fuel flow appears (3 to 5 sec.) then idle cut-off
Fuel pump	OFF
Area	Clear
Magneto / start switch	START (30 sec. maxi)

When the engine starts :

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

HOT ENGINE RE-STARTING PROCEDURE :

Main switch	ON
Propeller	FULL FORWARD
Throttle	FULL POWER
Fuel pump	ON
Mixture	FULL RICH for 1 sec. then idle cut-off
Fuel pump	OFF
Area	Clear
Magneto / start switch	START (30 sec. maxi)

When the engine starts :

Magneto switch	BOTH
Mixture	FULL RICH
Throttle	Reduced

AFTER STARTING ENGINE

ELECTRICAL GENERATION CHECK :

Alternator switch OFF
- Generation warning light — ON
- Voltmeter — Yellow sector

Alternator switch ON
- Generation warning light — OFF
- Voltmeter — Green sector

Turn and bank indicator (if installed)	ON
Suction gage (if installed)	Checked
Anti-collision light (if installed)	ON
Alarm panel test	Positive
Landing gear indicator lights test	Positive
"Radio master" (if installed)	ON
All radios and navaids	ON
Fuel selector (fuel gages) Check	Set to fullest tank
Flaps	Checked and RETRACTED

TAXIING

Parking brake	Release
Brakes	Checked
Flight instruments	Checked

Avoid exceeding 2000 RPM as long as the oil temperature indicator pointer is within yellow sector.

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

Check operation of gyroscopic instruments by means of alternate turns : horizontal attitude, directional and turn and bank indicators.

ENGINE RUN-UP

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

PROPELLER CHECK :

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

MAXIMUM POWER CHECK :

Full throttle	2575 RPM

MAGNETO CHECK :

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

BEFORE TAKE-OFF

Seats, seat belts, shoulder harnesses	Check
Doors	LOCKED
Controls	Free
Pitch trim	TAKE-OFF
Rudder trim	TAKE-OFF
Flaps	TAKE-OFF
Magneto switch	BOTH
Propeller	FULL FORWARD

Mixture	FULL RICH
Fuel selector	Check set to fullest tank
Fuel pump	ON
Oil temperature	Green sector
Oil pressure	Green sector
Voltmeter	Green sector
Altimeter	Set
Directional gyro (if installed)	Set
Horizontal attitude gyro (if installed)	Set
Parking brake	RELEASE - Light OFF
Cabin blower (if installed)	OFF
Landing lights	As required
Navigation lights	As required
Pitot heating (if installed)	As required
Transponder (if installed)	As required

TAKE-OFF

Lined up on runway	Check directional gyro
Smoothly apply full power	
Airspeeds	See Section 5 "Take-off performance"

STANDARD AIRSPEEDS :

Rotation	68 KIAS
Initial climb	75 KIAS

WHEN SAFELY AIRBORNE :

Brakes	Apply
Landing gear	RETRACT

AT 300 ft :

Flaps	RETRACT
Landing lights	As required
Navigation lights	As required

AT 1000 ft :

Fuel pump	OFF

CLIMB

Mixture	FULL RICH
Throttle	FULL POWER
Propeller	FULL FORWARD (2575 RPM)
Optimum climb speed	95 KIAS 100

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

CRUISE

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

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

Flight into known icing conditions is PROHIBITED

In case of unintentional icing encounter (precipitation or clouds with outside air temperature at or below 32°F (0°C)) apply FULL alternate air by pulling "Alternate Air" (if installed) control (located below instrument panel on left side of center console) FULLY OUT.

Leave icing conditions as soon as possible.

Remember to push in the "Alternate Air" (if installed) control after leaving the icing area.

DESCENT

Power setting as required for descent.

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

APPROACH - LANDING

FINAL :

Airspeed	86/92 KIAS
Flaps	
. If SB Nr 39 * is not applied	TAKE-OFF
. If SB Nr 39 * is applied	TAKE-OFF below 129 KIAS
Landing gear lever	DOWN
Fuel pump	ON
Mixture	FULL RICH
Propeller	FULL FORWARD
Brakes	Checked
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Landing lights	ON as required

SHORT FINAL :

Flaps	LANDING
Airspeed	See Section 5 "Landing Performance"
Standard airspeed	73 KIAS
Landing lights	ON

(*) Including all its revisions

GO-AROUND

Smoothly apply full power

Airspeed	76/81 KIAS
Landing gear lever	UP

Retract flaps to take-off position then fully.

Climb at 95 KIAS.

AFTER LANDING

Fuel pump	OFF
Flaps	RETRACTED
Landing lights	OFF
Trims	TAKE-OFF
Radio equipment	As required
Pitot heating (if installed)	OFF

SHUT-DOWN / SECURING AIRPLANE

Parking brake	Set
Turn and bank indicator (if installed)	OFF
Anti-collision light (if installed)	OFF
Lights	OFF
"Radio master" (if installed)	OFF
Throttle	Reduce

WARNING

THE TEST HEREAFTER MUST BE IMPERATIVELY CARRIED OUT WITH REDUCED THROTTLE ; THE FAILURE TO OBSERVE THIS RULE MAY LEAD TO THE EXHAUST SYSTEM DAMAGE

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

AFTER ENGINE STOPS :

Magneto switch	OFF
Alternator switch	OFF
Main switch	OFF
Fuel selector	OFF
Controls lock	Installed
Chocks / Tie-downs	Installed

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

STALLS

CAUTION

ATTEMPT PRACTICE STALLS ONLY WITH SUFFICIENT ALTITUDE FOR RECOVERY

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

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

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

FLIGHT WITH CROSSWIND

TAKE-OFF :

Apply full power before brake release.

Aileron control moved into wind.

Keep the airplane on runway centerline using the rudder.

Maintain nose-wheel on ground up to 65 KIAS.

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

LANDING :

When landing in a strong crosswind, use the minimum flap setting required for the landing distance available.

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

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

OPERATION ON SHORT RUNWAYS

TAKE-OFF :

Flaps	TAKE-OFF
Pitch trim	TAKE-OFF
Rudder trim	TAKE-OFF

Apply full power before brake release.

Take-off	Airspeed : See Section 5 "Take-off performance"

When safely airborne :

Landing gear lever	UP
Initial climb	Airspeed : See Section 5 "Take-off performance"
Airspeed	92 KIAS
Flaps	RETRACTED

LANDING :

Make a power approach with a reduced rate of descent.

Flaps	LANDING
Landing gear lever	DOWN
Approach with power	Airspeed : See Section 5 "Landing performance"

Just before touch-down, reduce throttle to idle.
Airplane, then nose-wheel on ground.
Firmly apply the brakes.

FLIGHT IN TURBULENT AIR

Maximum airspeed	140 KIAS
Recommended airspeed	130 KIAS
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE

USE OF DOORS

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

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

INTENTIONALLY LEFT BLANK

Takeoff distance, ground roll		1250'
" " over 50ft obstacle		2100'
Max demonstrated crosswind component		25kt
ROC sea level		1250 fpm
Max level speed sea level		167kts
Service ceiling		25,000'
Landing distance over 50' obstacle		1740'
" " ground roll		820'
Baggage capacity		143 lb
oil capacity		13.3 qt
Fuel Capacity	88.8 gal	532.8 lbs
usable	86.2 gal	517.2 lbs

SECTION 5

PERFORMANCE

TABLE OF CONTENTS

FLYOVER NOISE LEVEL

Flyover noise level measured in accordance with 14 CFR Part 36 Appendix F : 74 dB (A).

NOTE :
No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into or out of any airport.

AIRSPEED CALIBRATION

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

NORMAL STATIC SOURCE

Figure 5.1

FLAPS RETRACTED L/Gear UP		FLAPS TAKE-OFF L/Gear UP OR DOWN		FLAPS LANDING L/Gear DOWN	
KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
65	62	60	56	55	52
75	74	70	69.5	60	58
85	85	75	75	65	64.5
120	120.5	85	85.5	80	79.5
150	151	100	101	100	99.5
MPH IAS	MPH CAS	MPH IAS	MPH CAS	MPH IAS	MPH CAS
75	71	68	64	62	58
87	86	81	80	68	66
99	99	87	87	75	74
137	137	99	100	93	93
174	175	118	119	118	117

ALTERNATE STATIC SOURCE

CONDITIONS :
Vents and / or cabin air conditioning flow lever to open position

Figure 5.2

FLAPS RETRACTED L/Gear UP		FLAPS LANDING L/Gear DOWN	
KIAS	KCAS	KIAS	KCAS
65	64.5	55	51
75	73	70	65
100	95	85	79
120	114	100	93
140	133	110	102
MPH IAS	MPH CAS	MPH IAS	MPH CAS
75	73	62	58
87	84	87	81
124	118	112	104
149	142	124	116
174	165	/	/

ALTITUDE COMPENSATION

ALTERNATE STATIC SOURCE

NOTE 1:
Subtract corrections from the read altitude

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

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

Figure 5.3 - ALTITUDE COMPENSATION

STALLING SPEEDS

CONDITIONS : Weight 3086 lbs (1400 kg)

Power OFF

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

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

Figure 5.4 - STALLING SPEEDS

WIND COMPONENTS

EXAMPLE:

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

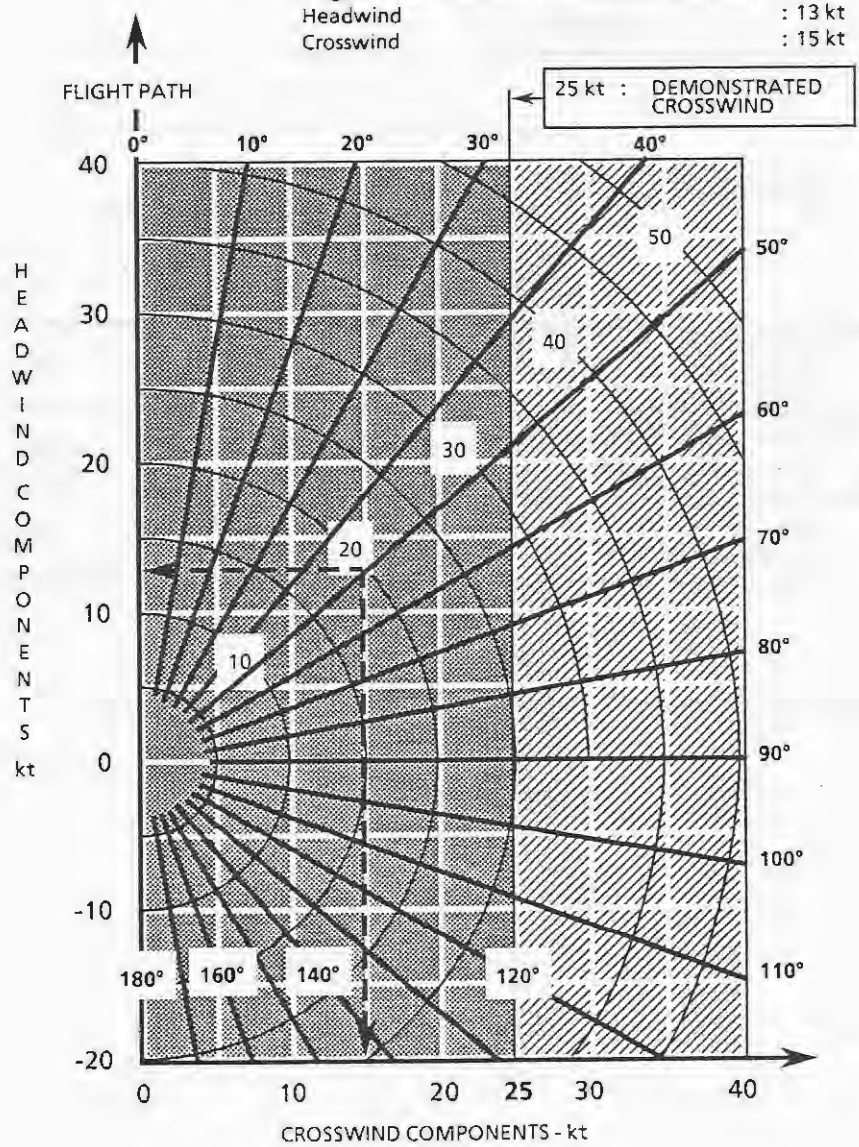


Figure 5.5 - WIND COMPONENTS

NOTICE

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

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

Take-off performance figures are based on a dry hard surface runway.

Other runway surfaces require the following correction factors :

Increase by : 7 % on hard grass (dry sod)

10 % on short grass

25 % on high grass

For operation on short, wet grass on a firm subsoil, increase take-off (clear 50 ft) distance by 25 % and landing distance by 30 %. The effect on the ground roll is evaluated above.

Wind influence : Headwind :
Reduce distance of 20 % with 5 kt headwind.

Rear wind :
Increase distance of 15 % with 2.5 kt rear wind.

Add 20% to the result to be safe.

TAKE-OFF PERFORMANCE

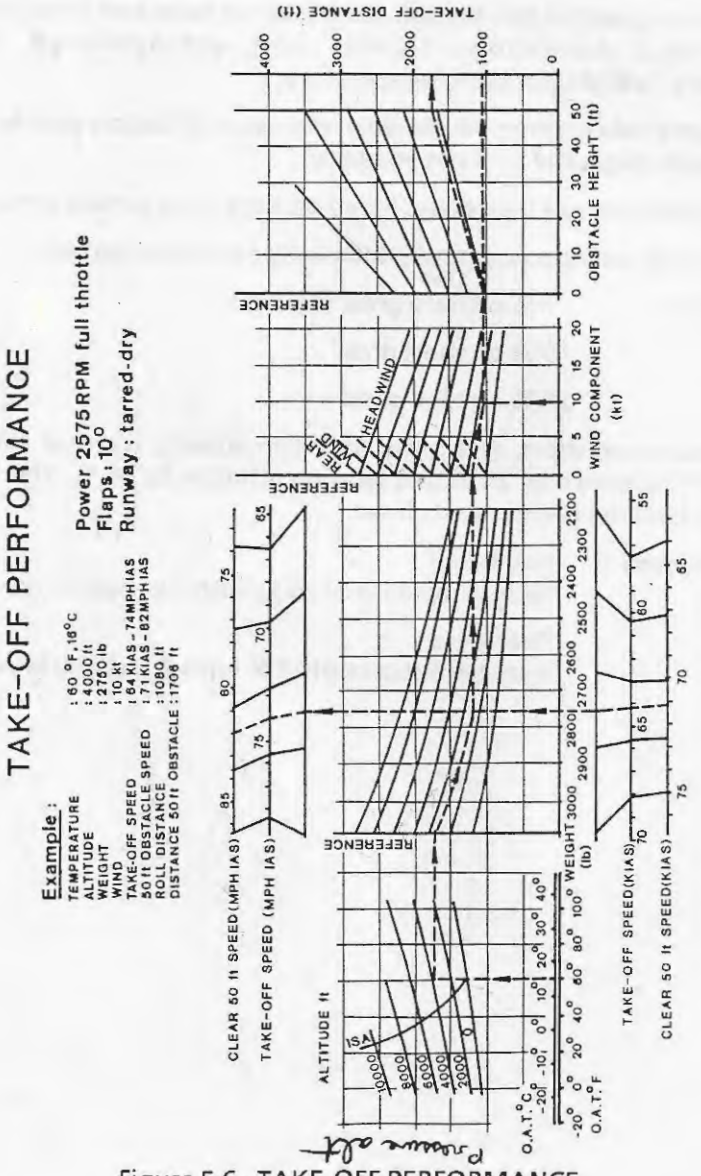


Figure 5.6 - TAKE-OFF PERFORMANCE

CLIMB PERFORMANCE

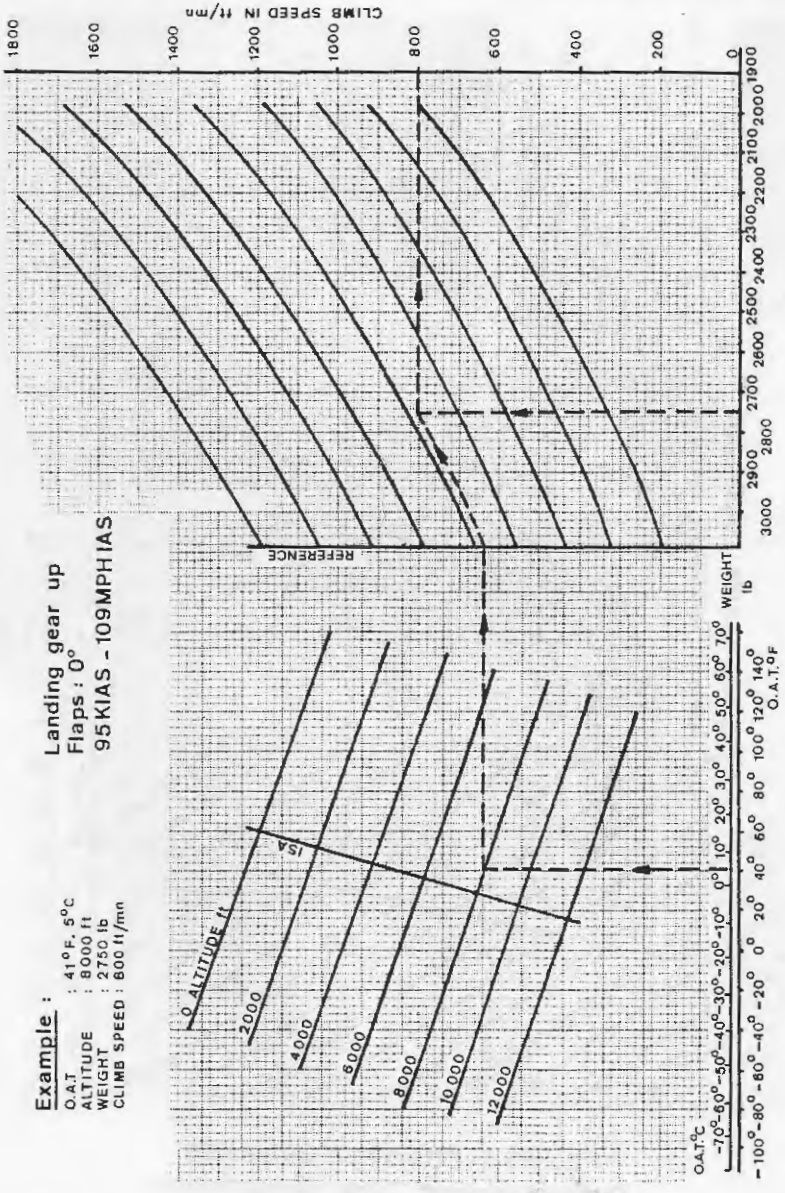


Figure 5.7 - CLIMB PERFORMANCE

CLIMB PERFORMANCE - Distance covered - Time - Consumption

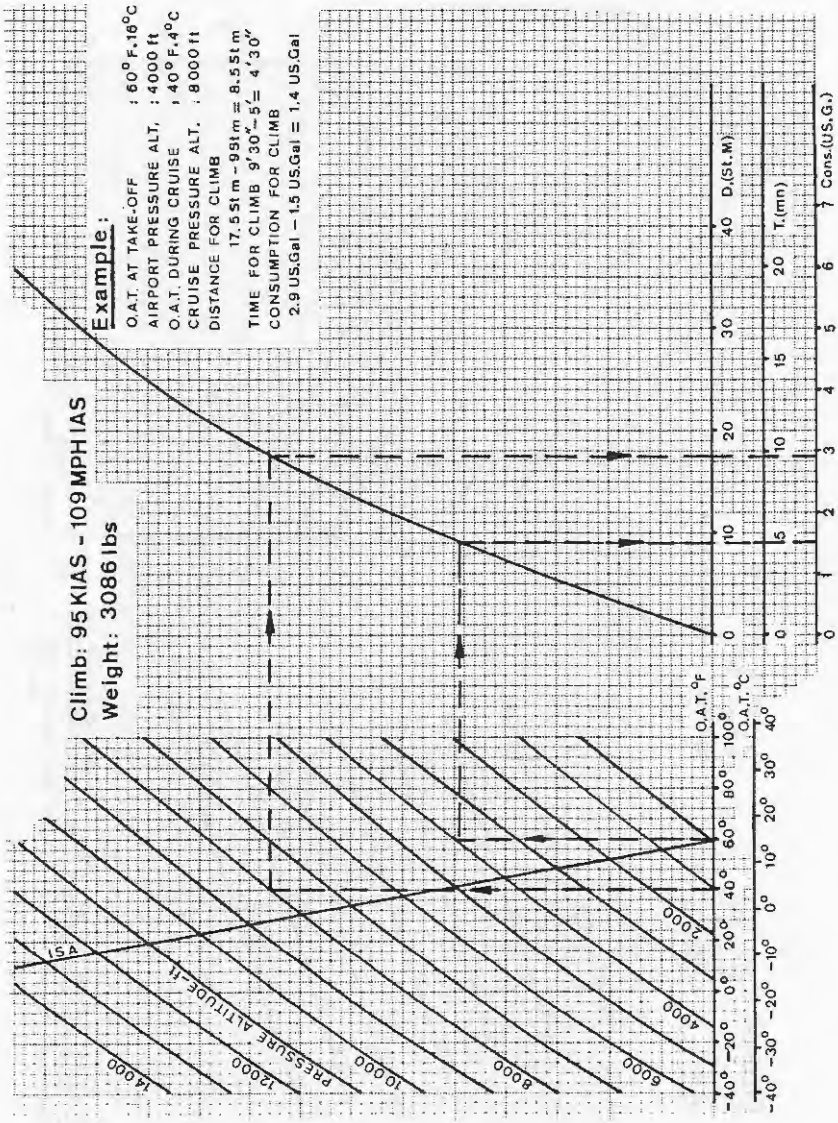


Figure 5.8 - CLIMB PERFORMANCE
Distance covered - Time - Consumption

ANTENNAS INFLUENCE ON PERFORMANCE

Installation of radio antennas reduces cruise performance as follows :

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

Figure 5.9 - ANTENNAS INFLUENCE ON PERFORMANCE

RATINGS TABLE - ENGINE LYCOMING IO-540-C4 D5D

% BHP	PRESSURE ALTITUDE ft	MANIFOLD PRESSURE in.Hg				
		2200 RPM	2300 RPM	2400 RPM	2500 RPM	2575 RPM
75	0	***26.1***	***25.2***	***24.3***	23.7	23.2
	2000	***25.6***	***24.7***	***23.8***	23.2	22.7
	4000		***24.2***	***23.3***	22.6	22.2
	6000			***22.9***	22.1	21.7
	8000					21.2
65	0	***23.5***	***22.6***	21.9	21.2	20.8
	2000	***22.9***	***22.1***	21.4	20.7	20.3
	4000	***22.4***	***21.6***	20.9	20.3	19.9
	6000	***21.9***	***21.2***	20.5	19.9	19.5
	8000		***20.7***	20.1	19.5	19.1
	10000				19.1	18.6
55	0	***21.0***	20.2	19.5	18.9	18.5
	2000	***20.4***	19.7	19.0	18.4	18.1
	4000	***19.9***	19.2	18.5	17.9	17.6
	6000	***19.4***	18.7	18.0	17.5	17.2
	8000	***19.0***	18.3	17.6	17.1	16.8
	10000	***18.6***	17.9	17.3	16.8	16.4
	12000	***18.0***	17.5	16.9	16.4	16.1
	14000				16.1	15.7

Recommended values : ***Italic numbers***

Add 0.5 in.Hg to manifold pressure per fraction of 18°F (10°C) above standard temperature.

Decrease manifold pressure by 0.5 in.Hg per fraction of 18°F (10°C) under standard temperature.

Figure 5.10 - RATINGS TABLE

Ratings Table - Engine : LYCOMING IO-540-C4 D5D

Pressure altitude	Standard temperature			75 % power					65 % power					55 % power				
			RPM	2200	2300	2400	2500	2575	2200	2300	2400	2500	2575	2200	2300	2400	2500	2575
ft	°F	°C		Manifold pressure - in.Hg														
0	59	15		26.1	25.2	24.3	23.7	23.2	23.5	22.6	21.9	21.2	20.8	21	20.2	19.5	18.9	18.5
2000	52	11		25.6	24.7	23.8	23.2	22.7	22.9	22.1	21.4	20.7	20.3	20.4	19.7	19	18.4	18.1
4000	45	7			24.2	23.3	22.6	22.2	22.4	21.6	20.9	20.3	19.9	19.9	19.2	18.5	17.9	17.6
6000	38	3				22.9	22.1	21.7	21.9	21.2	20.5	19.9	19.5	19.4	18.7	18	17.5	17.2
8000	31	- 1						21.2		20.7	20.1	19.5	19.1	19	18.3	17.6	17.1	16.8
10000	23	- 5										19.1	18.6	18.6	17.9	17.3	16.8	16.4
12000	16	- 9												18	17.5	16.9	16.4	16.1
14000	9	-13															16.1	15.7

Add 0.5 in.Hg to Manifold pressure per fraction of 50°F (10°C) above standard temperature.

Decrease Manifold pressure by 0.5 in.Hg per fraction of 50°F (10°C) under standard temp.

	APPROXIMATE FUEL FLOW	
	BEST ECONOMY MIXTURE	BEST POWER MIXTURE
% Power/Rating	US.Gal/h	US.Gal/h
55/2200	10.6	12.3
65/2300	12.1	14.0
75/2400	13.7	15.9

NOTE : This approximate fuel flow varies with altitude.
If the aircraft is equipped with and EGT indicator, setting will be carried out as follows :
- From full rich, reduce slowly richness until EGT needle comes to the maximum : this is Best Economy mixture setting.
- To get Best Power setting, re-enrich until EGT temperature decreases by 100°F (4 divisions).

ENDURANCE

		Cruise	Best Power			Minimum consumption		
		Power	75%	65%	55%	75%	65%	55%
		Rating	2400	2300	2200	2400	2300	2200
	Consumption US.Gal/h		15.9	14	12.3	13.7	12.1	10.6
With reserves 45 mn at 45 % power (N=1800 RPM)	Usable fuel US.Gal		77.5			77.5		
	Endurance h.min		4h52'	5h32'	6h18'	5h39'	6h24'	7h19'
Without reserves	Fuel US.Gal		84			84		
	Endurance h.min		5h16'	6h	6h49'	6h07'	6h56'	7h55'

Holding conditions in flight at 45 % power N = 1800 RPM
MaP = 21.5 in.Hg - 0.3 per 1000 ft

APPROXIMATE FUEL FLOW

% BHP	RPM	BEST ECONOMY MIXTURE		BEST POWER MIXTURE	
		U.S Gal/hr	l/hr	U.S Gal/hr	l/hr
55	2200	10.6	40.1	12.3	46.6
65	2300	12.1	45.8	14.0	53.0
75	2400	13.7	51.9	15.9	60.2

NOTE :
This approximate fuel flow varies very slightly with altitude.

If the airplane is equipped with an EGT indicator, setting will be carried out as follows :

- *Best Economy Mixture setting : From full rich, reduce slowly mixture until peak EGT.*
- *Best Power Mixture setting : From peak EGT, re-enrich until EGT temperature decreases by 100°F (4 divisions).*

Figure 5.11 - APPROXIMATE FUEL FLOW

ENDURANCE

CRUISE	BEST POWER			MIN. CONSUMPTION		
POWER	75 %	65 %	55 %	75 %	65 %	55 %
RATING	2400	2300	2200	2400	2300	2200
CONSUMPTION U.S Gal /hr (Litres/hr)	15.9 (60.2)	14 (53)	12.3 (46.5)	13.7 (51.9)	12.1 (45.8)	10.6 (40.1)
Endurance (hr min) With reserves 45 min at 45 % BHP 1800 RPM Fuel 77.5 U.S Gal. (293.5 l)	4hr52'	5hr32'	6hr18'	5hr39'	6hr24'	7hr19'
Endurance (hr min) Without reserves Fuel 84 U.S Gal. (318 l)	5hr16'	6hr00'	6hr49'	6hr07'	6hr56'	7hr55'

Holding conditions in flight : 45 % BHP
1800 RPM
MP = 21.5 in.Hg
Subtract 0.3 per 1000 ft

NOTE :
Endurance take taxiing into account.

Figure 5.12 - ENDURANCE

CRUISE PERFORMANCE - Minimum Consumption

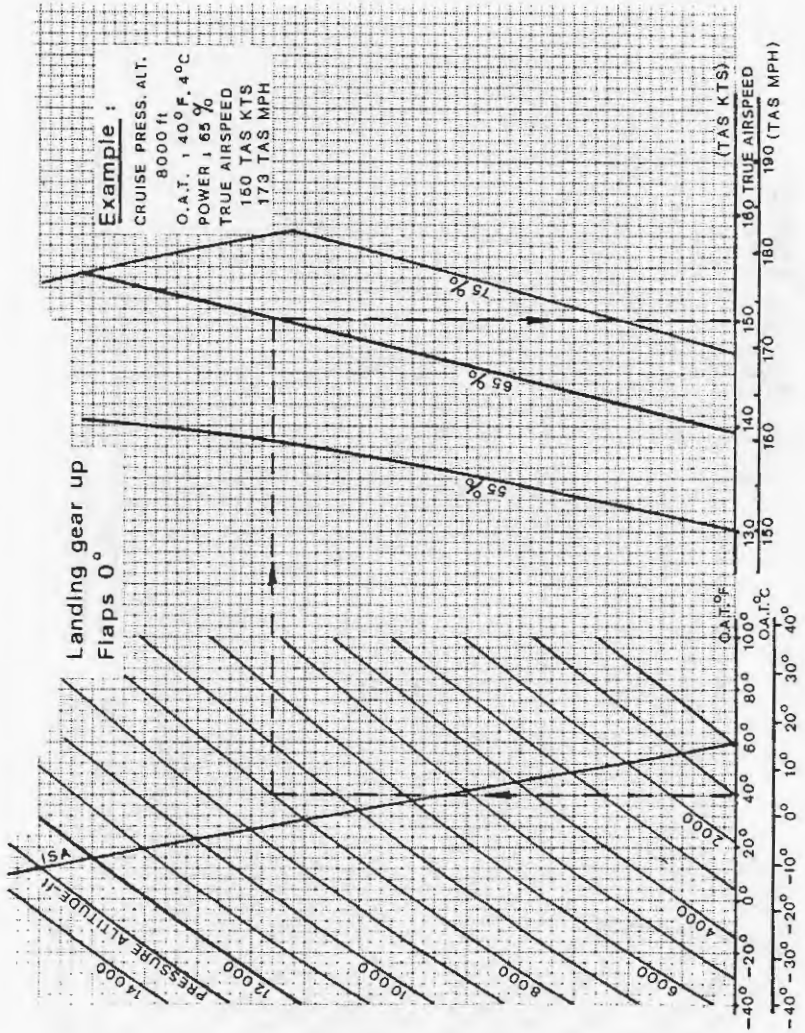


Figure 5.13 - CRUISE PERFORMANCE - Minimum Consumption

CRUISE PERFORMANCE - Best Power

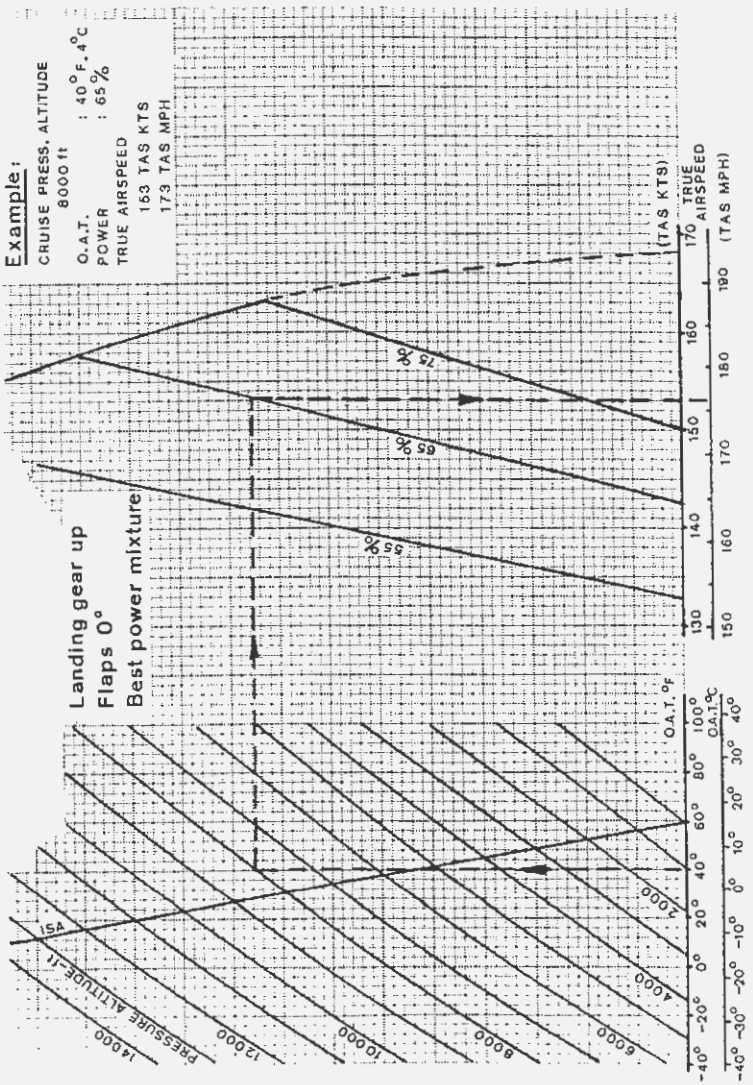


Figure 5.14 - CRUISE PERFORMANCE - Best Power

RANGES - Minimum Consumption

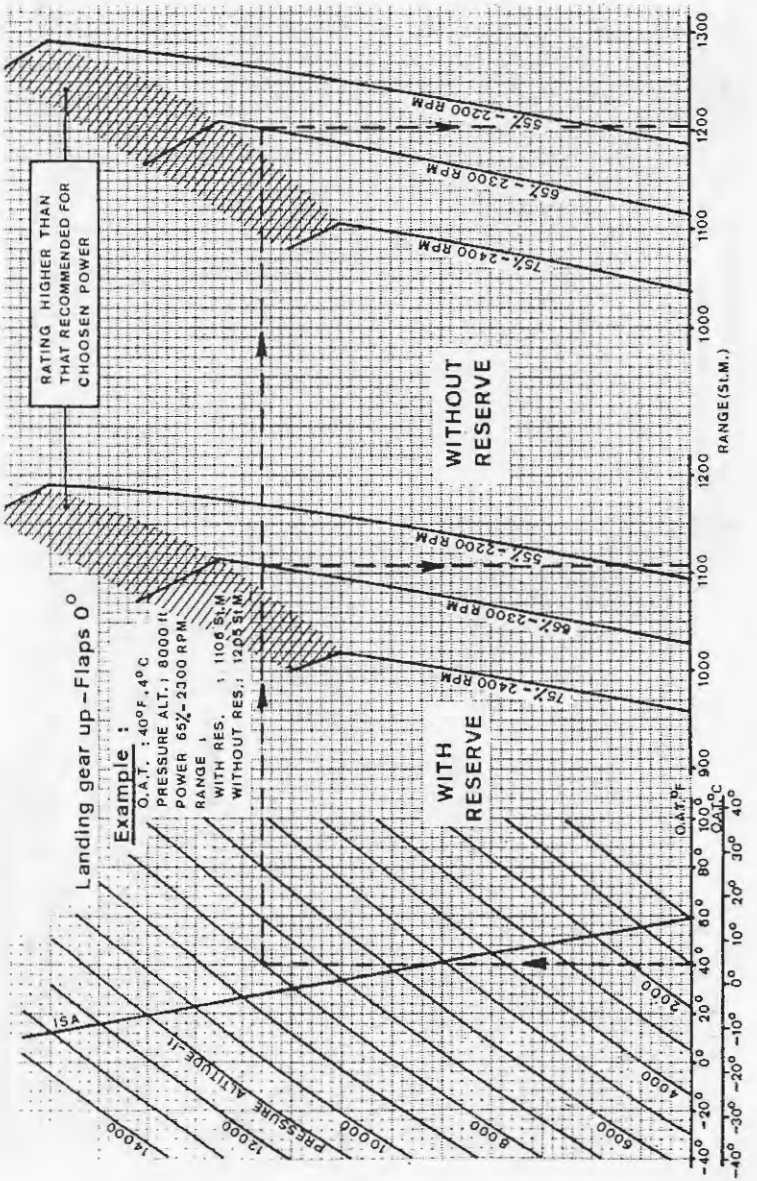


Figure 5.15 - RANGES - Minimum Consumption

RANGES - Best Power

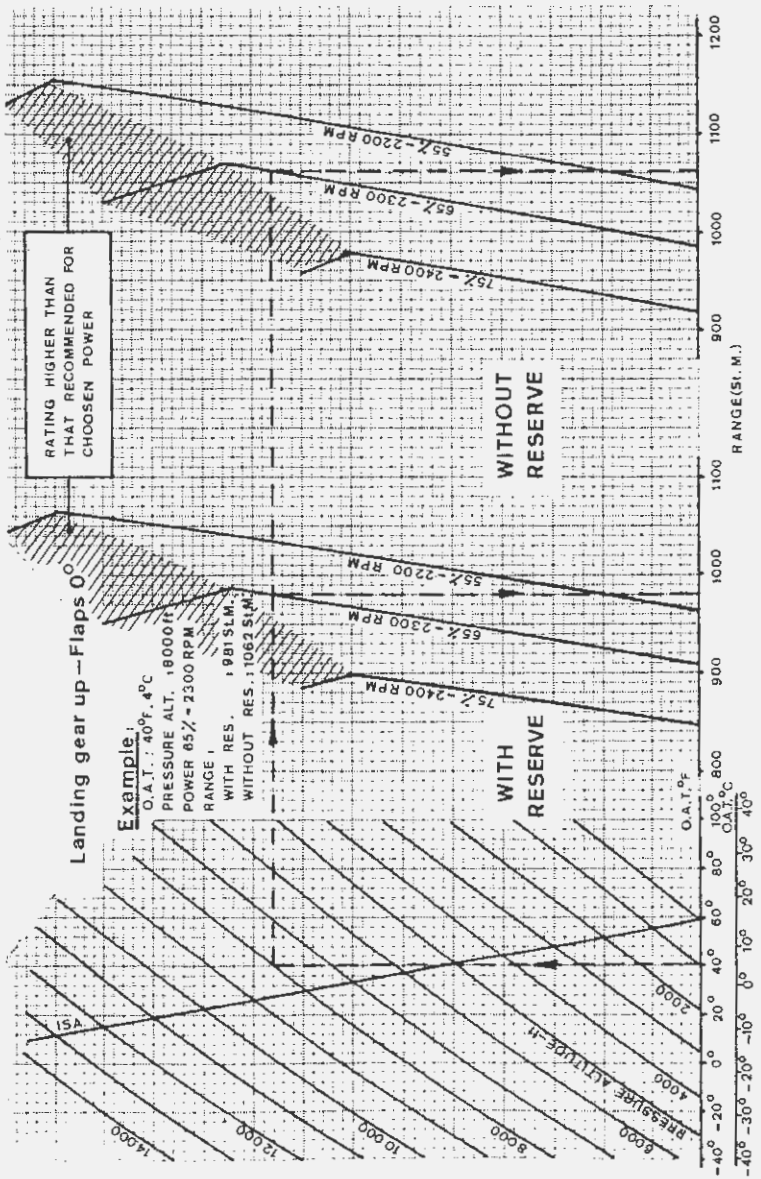


Figure 5.16 - RANGES - Best Power

LANDING PERFORMANCE

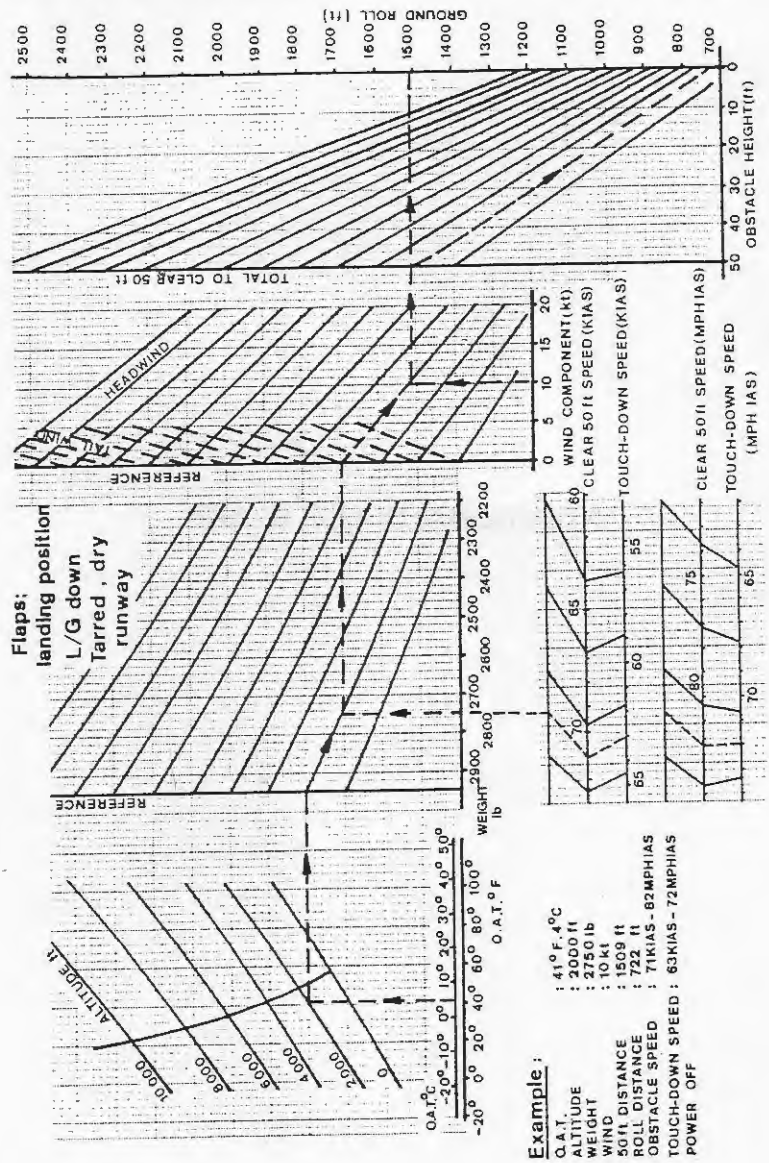


Figure 5.17 - LANDING PERFORMANCE

INTENTIONALLY LEFT BLANK

SECTION 6

WEIGHT AND BALANCE

TABLE OF CONTENTS

Fuel = G lbs / GAL

GENERAL

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

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

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

AIRPLANE WEIGHING PROCEDURES

Refer to Maintenance Manual for the procedures to use.

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

BAGGAGE / CARGO LOADING

BAGGAGE

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

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

CARGO

To facilitate the carrying of equipment, large or bulky items, the rear seat may be removed from the airplane.

To remove rear seat : See Figure 6.1 (A, B, C, D)

- Lift up rear seat seating (Item 6) (kept in position with "Velcro" straps)
- If you want to free the back from its support plate, lift it up about 1.5 inch at both ends and pull it forward so that both attaching pins free from apertures.
- To remove the support plate (Item 5) and back (Item 1) :
  - . Unfasten attachments of sound-proofing cloth on cross-beam (Item 2)
  - . Pushing, unscrew $\frac{1}{4}$ turn both attaching pins of air conditioning duct on rear floor (Item 4) (if installed)
  - . Pull both latches inwards (Item 3)
  - . Lift up support plate (Item 5) to disengage it forward.

NOTE :
To reinstall rear seat - see Figure 6.1 (a, b, c, d) reverse removal instructions.

IMPERATIVELY RESPECT WEIGHT AND BALANCE LIMITS

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

- Baggage weight :

  ~~Maximum 110 lbs (50 kg) at 102.36 in. (2.600 m) (up to S / N 399)~~
  Maximum 143 lbs (65 kg) at 102.36 in. (2.600 m) (from S / N 400)
  S/N 479

- Cargo weight (without baggage) :

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

CAUTION

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

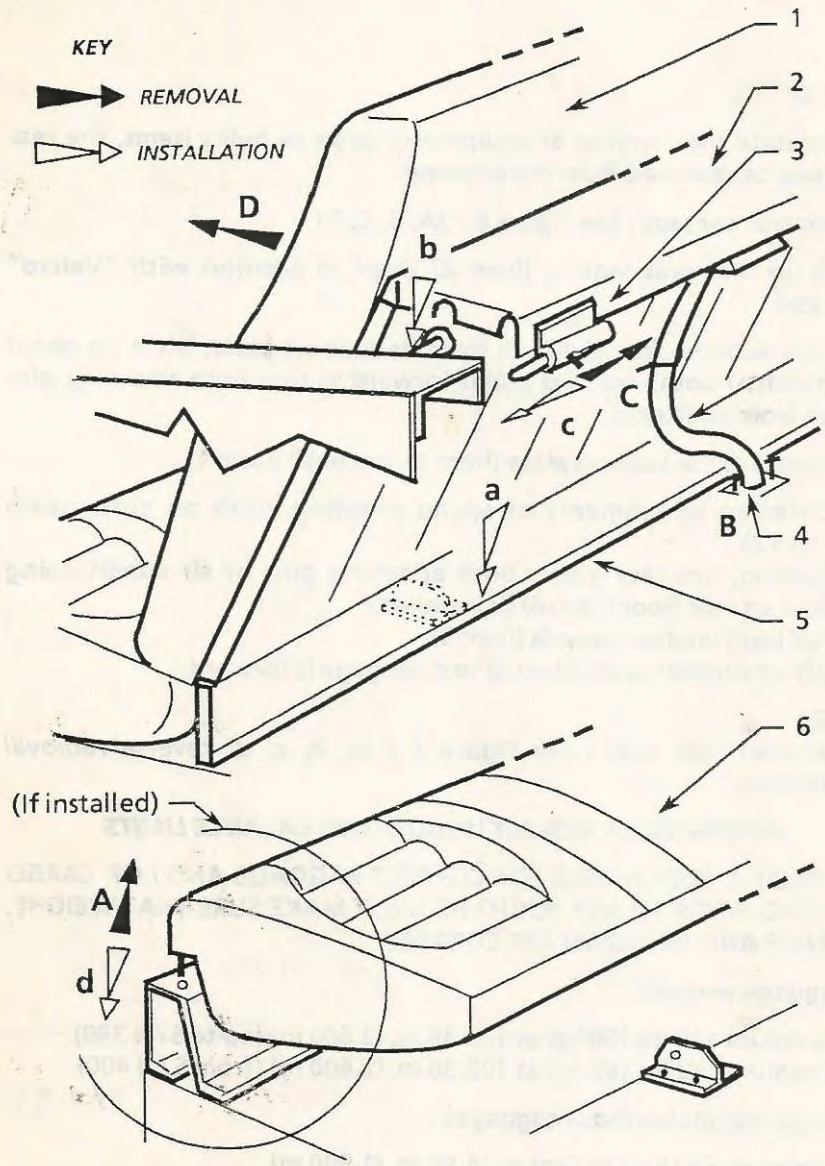


Figure 6.1 - REMOVAL AND INSTALLATION OF REAR SEAT

DETERMINING WEIGHT AND BALANCE

GENERAL

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

The data concerning loading are given on following graphs :

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

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

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

If that is the case, loading is acceptable.

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

UTILIZATION OF WEIGHT / MOMENT GRAPH

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

- On Figure 6.5, place point A (1) corresponding to your empty airplane
  (Our sample loading : 1866 lbs - 70.64 lb.in / 1000)
- Superpose point A (1) and point A of graph ① Figure 6.4.
- Draw on weight / moment envelope the straight line pilot + front passenger to get point A (2) corresponding to front seats loading.
  (Our sample loading : 2 persons 340 lbs).

- Superpose point A (2) and point A of graph ①, draw the rear passengers straight line to get point B (1) related to rear seat loading.
  (Our sample loading : 2 persons 340 lbs)
- Superpose point B (1) and point B of graph ②, draw the fuel straight line to get point B (2).
  (Our sample loading : 397 lbs - 66 U.S Gal fuel)
- Superpose point B (2) and point B of graph ②, draw the baggage straight line to get point M.
  (Our sample loading : 110 lbs baggage)

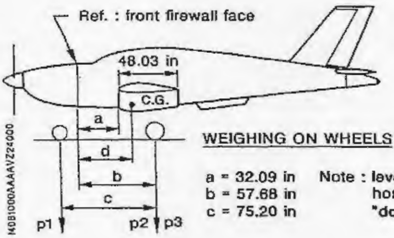
Since point M falls within weight / moment envelope, the loading is acceptable.

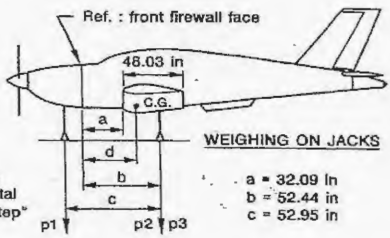
NOTE :

The option Nr 800.00 "Moving back of L.H. pilot's seat" is marked on your airplane by a color ring (yellow / green) located on the 2 front supports (tubes) of the seat.

For C.G. location calculation, take into account moving back of L.H. pilot's seat of 2 inches.

WEIGHING REPORT	Aircraft, type : TB Registration : N84AV	Date : 1-15-2010 Place : El Paso Aero Signature : Ed B





WEIGHING CARRIED OUT ON JACKING POINTS			
	Read weight (lbs)	Tare (lbs)	Net weight (lbs)
L.H. jacking point	750	–	p^2 750
R.H. jacking point	700	–	p^3 700
FWD jacking point	500	–	p^1 500
Empty weight P(lbs) = 1950			

DISTANCE FROM C.G. LOCATION TO REFERENCE
(before corrections)

$$d(in.) = b - \frac{(c \times p1)}{P}$$

$$57.68 - \frac{(75.20 \times 500)}{1950}$$

CORRECTIONS			
	Weight (lbs)	Lever arm (in.)	Moment (lbs.in)
Empty aircraft	P 1950	d 38.398	74876.1
Non usable fuel	15.8	42.32	669.2
Results	M 1965.8	D 38.429	75545.3

LEGEND

Empty weight must include unusable fuel quantity and oil full load

C.G. LIMITS	LOADING EXAMPLE			
W e i g h t (lbs)		Weight (lbs)	Lever arm (in.)	Moment (lbs.in)
	Empty aircraft	1965.8	38.429	75545.3
	Pilot			
	Passengers			
	Luggage			
	Fuel			
	Total			
Distance from C.G. location to reference (in.)	Previous weighing	(Empty weight : lbs) (Date :)		

Weighing report
Figure 201

EL PASO AERO, INC.
AVIONICS ASSOCIATES
7305 Boeing Drive
El Paso, Texas 79925

(915) 779-3481
El Paso International Airport

INSTALLED EQUIPMENT DATA

NAME: El Paso Aero, Inc.
ADDRESS: 7305 Boeing Drive
El Paso, Texas 79925
DATE: 03/033/2014
AIRCRAFT: Socata TB-20 Trinidad s/n 479 N84AV
WORK ACCOMPLISHED: Removed #1 COM KY197, #1 NAV KNS-80 and GPS. Installed Garmin GTN650 #1 NAV/COM/GPS.

ITEM:	PART NUMBER	SERIAL NUMBER	WEIGHT	ARM	MOMENT
A/C as shown on previous W&B dated 01/15/10			1965.80	38.43	75545.30
REMOVED:					
COM1	KY197	79403	- 3.20	21.00	- 67.20
NAV1	KNS80	13452	- 6.00	20.00	- 120.00
GPS	GX55	6004518	- 2.60	21.00	- 54.60
GPS Antenna	AT575	5792	EXCHANGE		
INSTALLLED:					
#1 N/C/GPS	GTN650	1Z8013022	7.00	20.00	140.00
GPS Antenna	GA35	98594	EXCHANGE		
TOTALS			1961.00	38.47	75443.50

GROSS WEIGHT	3086.00 (Take Off)
EMPTY WEIGHT	1961.00
USEFUL LOAD	1125.00
C.G. (ARM)	38.47

SIGNATURE OF AUTHORIZED INDIVIDUAL
A. Chenausky #2436697

SAMPLE WEIGHT AND BALANCE RECORD

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

AIRPLANE MODEL :	SERIAL NUMBER :	PAGE NUMBER :

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

Figure 6.2 - SAMPLE WEIGHT AND BALANCE RECORD

	SAMPLE AIRPLANE			YOUR AIRPLANE			Ref. on chart Figure 6.6
	Weight lb	Lever arm in.	Moment lb.in / 1000	Weight lb	Lever arm in.	Moment lb.in / 1000	
Standard empty weight	1764	37.06	65.37				
Optional equipment	102	51.66	5.27				
Basic empty weight	1866		70.64	1885.7	39.25	74.01	A(1)
Pilot (with Opt. 800.00)	170	45.38	7.71	220.0	45.38	9.00	
Pilot (without Opt. 800.00)	/	47.44	/				
Front passenger	170	45.38	7.71				A(2)
Rear seat passengers	340	80.00	27.20				B(1)
Fuel (66 U.S Gal.)	397	42.70	16.95	(86 gal) 517.2		67	B(2) 86.2 gal
Baggage	110	102.54	11.28				
TOTAL WEIGHT AND MOMENT	3053		141.49				M

Figure 6.3 - SAMPLE LOADING

	SAMPLE AIRPLANE			YOUR AIRPLANE			Ref. on chart Figure 6.6
	Weight lb	Lever arm in.	Moment lb.in / 1000	Weight lb	Lever arm in.	Moment lb.in / 1000	
Standard empty weight	1764	37.06	65.37				
Optional equipment	102	51.66	5.27				
Basic empty weight	1866		70.64				A(1)
Pilot (with Opt. 800.00)	170	45.38	7.71				
Pilot (without Opt. 800.00)	/	47.44	/				
Front passenger	170	45.38	7.71				A(2)
Rear seat passengers	340	80.00	27.20				B(1)
Fuel (66 U.S Gal.)	397	42.70	16.95				B(2)
Baggage	110	102.54	11.28				
TOTAL WEIGHT AND MOMENT	3053		141.49				M

Figure 6.3 - SAMPLE LOADING

CAUTION

Option Nr 800.00 (See NOTE on page 6.6) : 2 in. (50 mm) moving back for pilot's seat

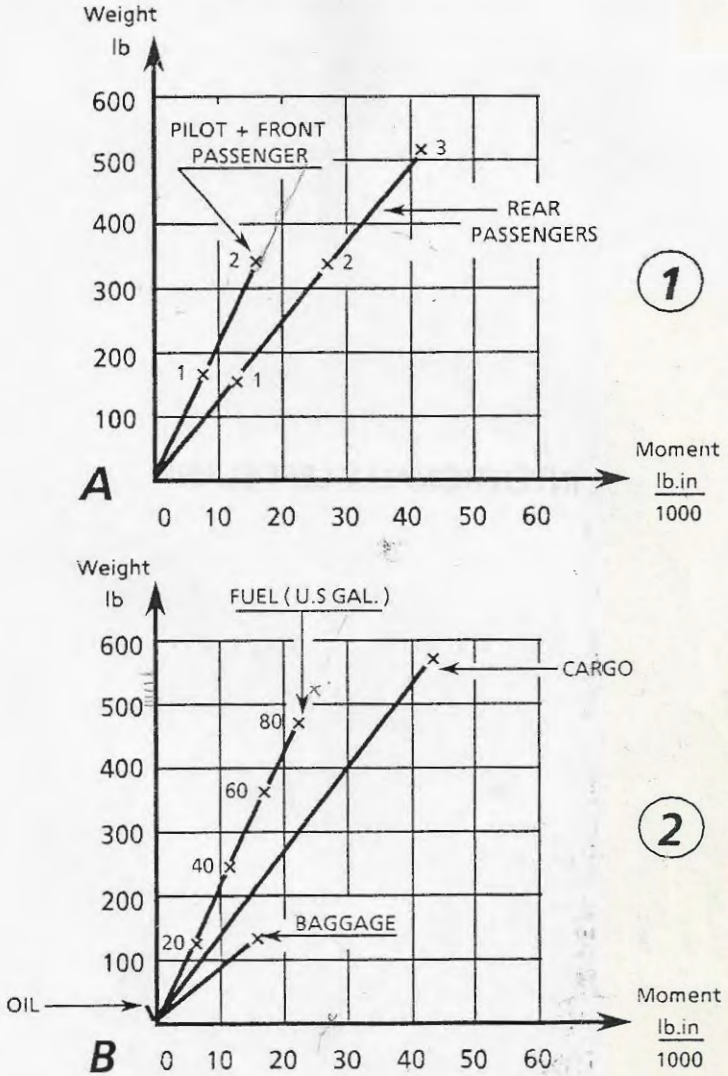


Figure 6.4 - LOADING GRAPHS

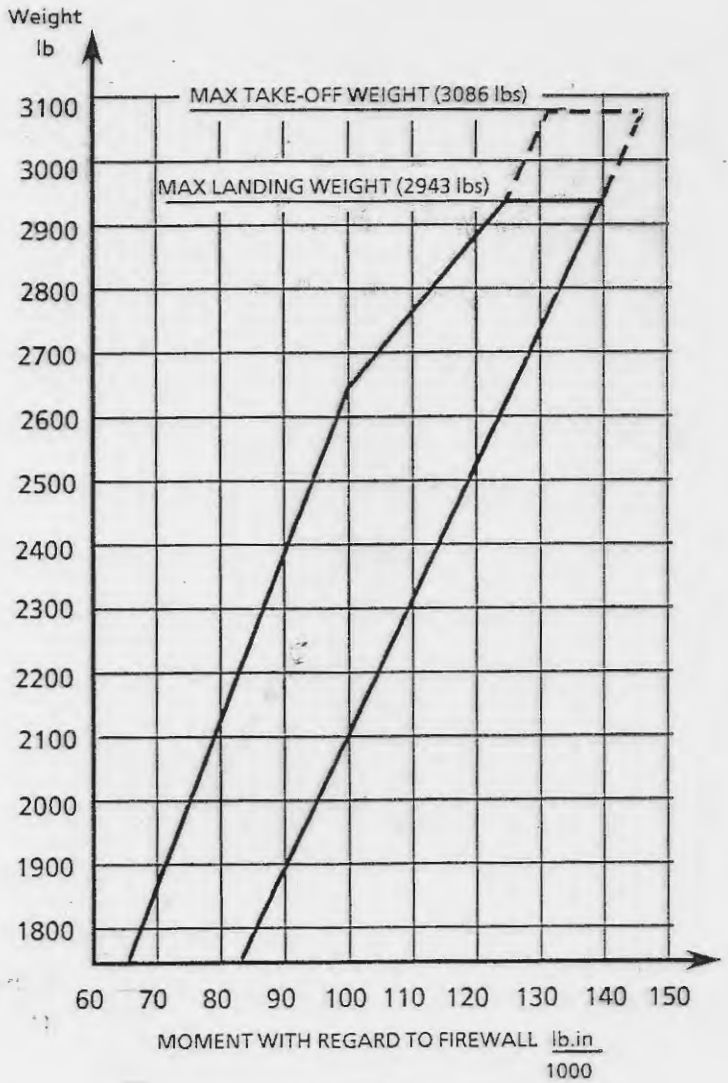


Figure 6.5 - LIMITS WEIGHT / MOMENT
(Valid up to S / N 587)

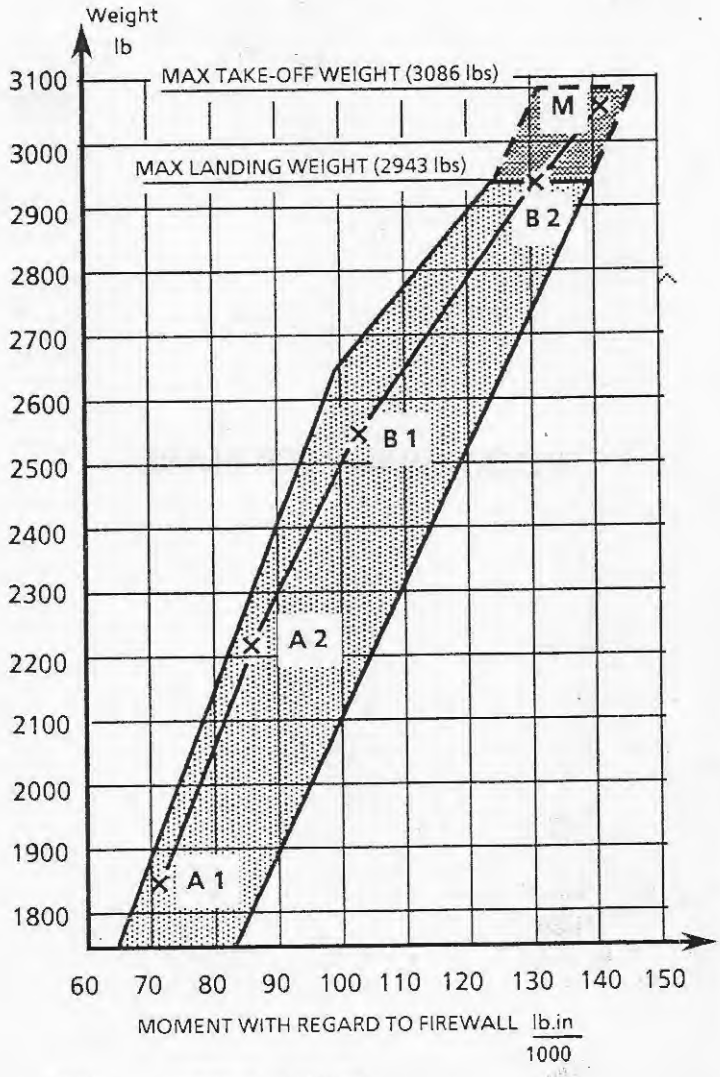


Figure 6.6 - LOADING SAMPLE
(Valid up to S / N 587)

Serial number 479

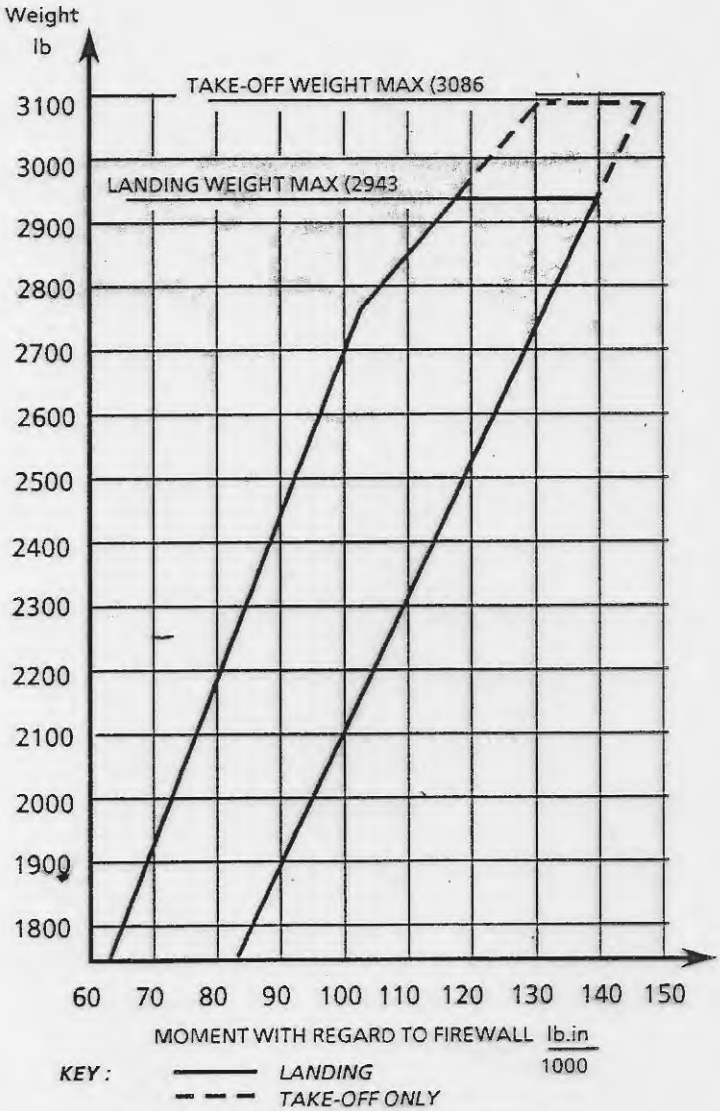


Figure 6.5 - LIMITS WEIGHT / MOMENT
(Valid from S / N 588)

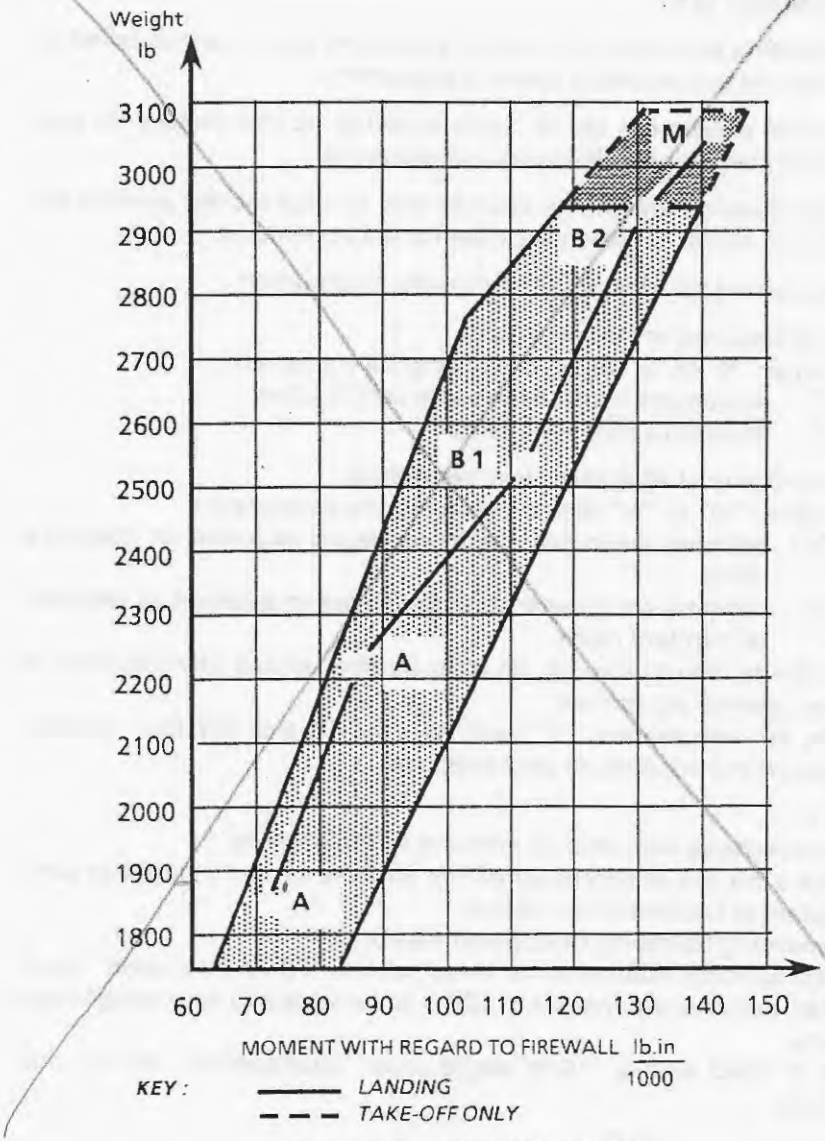


Figure 6.6 - LOADING SAMPLE
(Valid from S / N 588)

EQUIPMENT LIST

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

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

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

The equipment list provides the following information :

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

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

NOTE :
Unless otherwise indicated (-), arms are positive values.
Positive arms are distances aft of the airplane datum ; negative arms are distances forward of the datum.
The symbol ☒ following description means that :
- If this optional equipment is fitted with a "20 W dual cone" loud-speaker, optional equipment n° 539 is to be added to your weight and balance.
- If it is fitted with a "10 W single cone" loud-speaker, do not add anything.

R or S	REQUIRED OR STANDARD EQUIPMENT	WEIGHT lb	ARM in.
	POWER PLANT AND ACCESSORIES		
R	Engine : LYCOMING IO-540-C4 D5D with starter and magneto	438.715	– 25.59
R	Alternator : PRESTOLITE 70A ALX 8421	12.632	– 37.80
R	Propeller : HARTZELL HC-C2YK-1BF/F 8477-4	55.115	– 47.64
R	Oil cooler : AP13- AU06-03	3.968	– 14.17
	or AOC-13HG-06-01		
	or NDM 20006 A	3.086	– 14.17
R	Propeller governor : WOODWARD C 210 761		
	or WOODWARD E 210 681	2.645	– 39.37
	or WOODWARD M 210 681		
R	Fuel filter : SOFRANCE 00240000000 NOA	0.639	– 1.18
	LANDING GEAR AND ACCESSORIES		
	Wheels, tires and brakes - Main LDG (2) :		
R	- Wheel assy : CLEVELAND 40-84	5.688	57.48
R	- Brake assy : CLEVELAND 30-41 B	2.535	57.48
R	- Tire : 15 6.00-6 6 PR	6.107	57.48
R	- Tube : 6.00-6	1.653	57.48
	Wheel and tire - Nose LDG :		
R	- Wheel assy : CLEVELAND 40-77 B	2.822	– 17.72
R	- Tire: 5.00-5 6 PR	5.798	– 17.72
R	- Tube: 5.00-5	1.455	– 17.72
	ELECTRICAL EQUIPEMENT		
R	Battery : REBAT R35 12 V - 35 AH	27.117	93.70
R	Dual magneto : D6LN 3000	11.508	– 9.06
	or D6LN 2031		

R or S	REQUIRED OR STANDARD EQUIPMENT	WEIGHT lb	ARM in.
R	Starter : PRESTOLITE MZ 4222	17.990	- 39.37
R	LDG electric pump : TB20 61031	8.818	73.23
R	LDG / stall warning unit : TB30 69030	0.661	86.61
R	Battery relay : RBM 70906	0.816	87.40
R	Starter relay : RBM 70 112 225-5	0.573	- 1.18
	SAW 4217 or 4204 or SAZ 4201E	0.816	- 1.18
S	Lighter : 910.1704	0.287	37.80
R	Alarms panel : TB10 61042	0.463	22.83
R	Voltage regulator : TB20 61030000 (LW 15895)	0.683	1.97
	or TB20 61033000 (LAMAR B00371.5)	1.345	3.94
R	Overvoltage relay : PRESTOLITE 78059 or 17621	0.551	3.15
R	Fuel electric pump :		
	DUKES 4634.00 (14140-00-17)		
	see SB Nr 47 at the last revision	1.984	- 1.18
	or TB20 61015000 (Kit Nr 9132) WELDON 8120 G	2.403	- 1.18
R	Flaps actuator : AVIAC 8076-1	5.071	83.86
	or AVIAC 8304	6.173	80.71
S	Cabin lighting (Front and Rear) : TB10 61001	0.639	65.35
S	Landing light : G.E. 4509	0.441	35.43
S	Taxi light : G.E. 4519	0.441	35.43
S	Navigation lights :		
	- L.H. : LABINAL 47007 903 30G	0.220	33.86
	- R.H. : LABINAL 47007 903 50D	0.220	33.86
	- Rear : LABINAL 47007 907 70AR	0.198	239.76

R or S	REQUIRED OR STANDARD EQUIPMENT	WEIGHT lb	ARM in.
	INSTRUMENTS		
R	Tachometer : TB10 72015 AC RT 11	0.794	23.62
R	Manifold pressure / fuel flow pressure : TB20 72017000	1.257	23.62
R	Engine and fuel controls : TB20 76030	0.551	27.17
	or TB20 76061	0.882	24.80
R	Airspeed indicator : UI 8125		
	or EDO AIRE 5172 1Z		
	or BADIN 38399.040	0.595	24.80
R	Altimeter : AEROSONIC 101720-01545	1.036	24.02
	or BADIN 37500.000	0.728	24.02
	or EDO AIRE 12003 M	1.036	24.02
	or UI 5934 PM 1	1.036	24.02
R	Vertical speed indicator : UI 7000		
	or EDO AIRE 1403 IZ	0.992	24.80
	or BADIN 38210	0.992	24.80
		0.661	22.83
R	Compass : AIRPATH C2400 L 4P	0.595	20.47
R	Turn-and-bank indicator : AIR PRECISION Type 57	0.110	23.62

R or S	REQUIRED OR STANDARD EQUIPMENT	WEIGHT lb	ARM in.
	CABIN EQUIPEMENT		
	Seat belts :		
R	- Front seat belt (2) :		
	PACIFIC 0107153	1.631	47.24
	or SECURAIGLON 10.4022.000.002	2.623	47.24
	or TRW REPA 10.4022.000.002	2.623	47.24
	or ANJOU AERO 10.4022.000.002	2.623	47.24
R	- Rear seat belt (2) : AIGLON Type 343-1 or 341 or ANJOU AERO Type 343-1 or 341	0.728	85.04
	Seats :		
R	- Front seat (2) : TB10 74012	18.960	51.18
R	TB10 74028	21.164	51.18
	TB10 74030	18.298	49.21
	- Rear seat :		
	Back TB10 74014	16.755	88.19
	Seating TB10 74013		
	Back + seating TB10 74016	17.637	88.19
	Back + seating TB10 74027	12.566	84.65
S	Glare shield : Blue, brown or black	1.102	45.28
	PLEXIGLAS	0.683	41.34
S	Colourless windows :	27.558	53.15
	- Windshield TB10 24030 or TB21 24001	11.023	27.56
	- Doors windows TB10 25030	8.598	55.12
	- Rear side windows TB10 22030	7.937	86.61

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
		AIRFRAME, ENGINE AND ELECTRICAL EQUIPMENT			
A	050800M	Outside air thermometer		0.331	23.62
A	051100M	Alternate static source			
		- in cabin		0.331	23.62
		- in hull		0.705	76.77
O	051500M	Heated pitot		1.102	53.15
A	051700M	Fixed emergency beacon "NARCO ELT 10"		3.307	119.29
A	051710M	Fixed emergency beacon "JOLLIET"		3.086	119.29
A	051720M	Fixed emergency beacon "SHARK"		3.527	119.29
A	051910M	Ground power receptacle		5.291	94.49
A	051930M	Ground power receptacle		6.173	94.49
A	052200M	Propeller de-icing		8.157	- 15.75
	053000M	Flashing navigation lights			
A		- 2 lights (wing tips)		5.864	67.72
A		- 3 lights		7.187	92.13
A	053300M	Anti-collision light "LABINAL"		0.882	190.16
A	053400M	Anti-collision light "GRIMES"		3.748	149.61
A	053500M	Cylinder head thermometer		0.661	23.62
A	053600M	Exhaust gas temperature "ALCOR"		0.661	23.62

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	053700M	Anti-collision light on vertical stabilizer "JPC 1000"		1.984	161.42
A	058020M	Ferry fuel tank		63.933	75.20
A	058700M	Outside air thermometer for the tropics		0.772	23.62
A	058910M	Flowmeter FT 101 (litres)		1.675	25.98
A	058920M	Flowmeter FT 101 (pounds)		1.675	25.98
A	058930M	Flowmeter FT 101 (gallons)		1.675	25.98
A	060900M	Dual CHT - EGT indicator - probe on cylinder Nr 1 - probes on all cylinders		 1.323 3.307	 19.69 3.94
A	061000M	Emergency lighting		0.220	23.62
A	063500M	2nd heated pitot (R.H. wing) "AERO INSTRUMENT" (Pitot + 2nd true airspeed indicator)		 1.323 1.984	 55.12 44.88
A	065820M	Oil drain door		0.220	- 25.59
A	068500M	Illuminated EGT – CHT dual indicator - probe on cylinder n° 1 - probes on all cylinders		 1.323 3.307	 19.69 3.94
A	068700M	"TKS" ice protection systems (empty tank)		40.565	74.80
A	069000M	Outside air thermometer "AID"		0.948	30.71

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
		COCKPIT EQUIPMENT			
A	050200M	3rd rear seat belt		0.882	84.65
A	050300M	Glare shield curtains		2.645	88.18
A	050400M	Blower		2.866	125.98
O	050500M	Front seat with tilting back-rest		7.937	51.18
O	050600M	Rear seat with central arm-rest		5.974	88.19
A	052100M	Braking control (R.H. post)		3.307	11.81
A	052800M	Cabin fire extinguisher		2.822	36.22
A	056200M	Little window		0.750	39.37
O	056300M	Rear reel safety belt		2.116	106.30
O	057800M	Seats assembly "Executive" leather		34.291	62.99
O	057900M	Seats assembly "Executive" fabric		23.589	62.99
O	058510M	Tinted windows		0	0
A	058800M	Maps reading light		0.176	25.59
A	061710M	Oxygen system equipment "EROS"		31.085	115.35
A	061800M	Oxygen mask with radio "EROS"		2.205	55.12
A	061900M	Oxygen mask without radio "EROS"		1.323	90.55
A	0621	Oxygen head-rest "cendre" (621.20) or "sable" (621.30)		2.271	78.74

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	0621	Oxygen leather head-rest "grey" (621.40) or "chanel" (621.50)		2.579	78.74
A	062110M	Oxygen system equipment "PURITAN-BENNETT"		32.187	115.35
A	062200M	Oxygen mask "PURITAN-BENNETT" with radio		1.764	55.12
A	062300M	Oxygen mask "PURITAN-BENNETT" without radio		0.529	90.55
A	063700M	Rear seat shoulder harness (Quantity 2)		2.249	94.49
A	064000M	3rd rear reel safety belt		1.918	106.30
A	064100M	3rd rear seat shoulder harness		1.124	94.49
O	0079900 M	Rear seat with central arm-rest "cendre" "PMV"		13.34	84.65
O	079910M	Rear seat with central arm-rest "sable" "PMV"		13.34	84.65
O	080000M	Moving back system of L.H. pilot's seat		0.331	37.80
		INSTRUMENT PANEL EQUIPMENT			
O	051300M	Turn-and-bank indicator "EDO AIRE"		1.323	23.62
O	051310M	Turn-and-bank indicator capable A / P 1		1.323	23.62
O	051320M	Turn-and-bank indicator "BADIN"		1.323	23.62
A	051600M	Stop watch		0.441	35.43

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	051800M	Altimeter N° 2			
		- EDO AIRE		1.764	25.59
		- UNITED INSTRUMENT		1.764	25.59
		- BADIN CROUZET		1.433	25.59
A	052710M	Electric clock		0.441	27.56
O	052920M	True airspeed indicator (km / h)		0.661	24.80
O	052950M	True airspeed indicator (kt)		0.661	24.80
A	053200M	Gyroscopic assy (with vacuum system)			
		- EDO AIRE		8.929	10.43
		- BADIN CROUZET		8.378	10.43
A	054800M	Electric hour meter		0.331	27.56
A	056100M	Starter warning light		/	/
A	057000M	Electrical hour meter (aircraft using time)		0.661	31.50
A	057100M	Electric hour meter (Engine using time)		0.551	23.62
A	059000M	Electrical pitch trim		4.586	117.00
A	059300M	Ammeter		1.102	29.13
A	061400M	Additional adjustable and emergency lighting		0.882	25.59
A	063100M	Warning light for gyros supply failure		0.198	0.39
A	063800M	Digital chronometer "ASTROTECH LC2"		0.551	35.43
A	068000M	Chronometer Q18 "THOMMEN"		0.661	35.43

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	068100M	Altimeter n° 2 "UNITED INSTRUMENT"		1.786	24.80
A	068900M	Ammeter "AID"		0.529	28.74
O	069100M	Turn and bank indicator "UNITED INSTRUMENT" or "AID"		2.028	22.83
		RADIO AND NAVIGATION EQUIPMENT			
A	052300M	Boom microphone headset "SOCAPEX" "DAVID CLARK"		1.036 1.190	55.12 55.12
A	0524	Interphone VHF		0.441	11.81
A	053900M	VHF capability - loudspeaker 10 W single ☒ - loudspeaker 20 W dual		/ 0.860	/ 62.20
A	054100M	VHF 1 COLLINS 251 E ☒		6.239	31.50
A	054200M	VHF 2 COLLINS 251 E + AMR 350		7.209	19.29
A	054300M	VOR LOC COLLINS VIR 351 + IND 350 A		4.850	39.76
A	054400M	VOR ILS COLLINS VIR 351 + IND 351 A + GLS 350 E - used without HSI - used with HSI		9.149 7.848	43.31 46.06
A	054500M	ADF 650 A COLLINS		7.496	83.46
A	054600M	Transponder COLLINS TRD 950		2.205	20.47

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	054700M	DME COLLINS 451			
		- without switching box		6.900	41.34
		- with switching box		7.385	41.34
A	054715M	DME COLLINS additional equipment		0.485	41.34
A	054910M	Rigid antenna VHF 1 D & M		0.661	127.17
A	054920M	Rigid antenna VHF 2 D & M		0.661	57.87
A	055000M	IFR COLLINS		63.382	39.37
A	055100M	VHF 1 BECKER AR 2009 / 25 ☒		5.071	29.53
A	055200M	VHF 2 BECKER AR 2009 / 25 + AL 3B		5.952	22.44
A	055300M	VOR LOC BECKER NR 2029 + IN 2041		5.732	38.19
A	055400M	VOR ILS BECKER			
		NR 2029 + IN 2040 + GM 2020		9.480	44.88
A	056000M	HF KING : KHF 950-05		35.053	100.39
A	057200M	ADF BECKER 2079 + VR 2070		8.818	78.74
A	057300M	Transponder BECKER ATC 2000		2.205	20.47
A	058303M	HSI without heading recopy		4.850	23.62
A	058304M	HSI with heading recopy		6.173	23.62
A	058400M	RMI KING KI 229		3.417	23.62
A	059400M	Radio master switch		0.992	29.53
A	059600M	Stormscope 3M-WX-10 A		11.905	96.06

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	059800M	Radio console ventilation		2.028	6.30
O	0599	Alti-coder NARCO AR 500 or AR 850		1.323	17.72
A	060000M	IFR NARCO with DME IFR NARCO without DME		51.367 61.729	35.04 35.83
A	060100M	VHF 1 COM 120 NARCO ☒		5.952	31.50
A	060200M	VOR LOC NAV 121 NARCO		3.748	39.37
A	060300M	VHF 2 and box CP 136		6.614	20.47
A	060400M	ADF 141 NARCO		7.275	53.15
A	060500M	Transponder AT 150 NARCO		2.866	20.87
A	060600M	Radio adjustable lighting		0.331	0.79
O	060800M	Alti-coder "BADIN CROUZET" 39.600.000		1.764	21.65
O	060810M	Alti-coder (not illuminated) KING KEA 129		1.764	21.65
O	060820M	Alti-coder "KING" KEA 130		1.764	21.65
A	061100M	Additional lighting for IFR		/	/
A	061300M	VOR ILS NAV 122 NARCO		5.732	47.24
A	061500M	Additional equipment for IFR France		1.543	24.80
A	061510M	Additional equipment for IFR France		1.543	24.80
A	061600M	Additional equipment for night VFR France		1.543	24.80
A	061610M	Additional equipment for night VFR France		1.543	24.80

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	062400M	DME 195 NARCO (airplane fitted with VOR LOC)		10.362	40.55
A	062510M	DME KING KN 65 A KI 266 1 VOR		10.362	39.76
A	062515M	Additional equipment for installation of 2nd VOR		4.189	40.16
A	062700M	VOL / LOC BECKER NR 2030 + NI 2031		5.622	33.07
A	064800M	Transceiver VHF 1 KY 0196-05 with 28 V converter		7.496	33.07
A	064810M	Transceiver VHF 2 KY 0196-05 with 28 V converter		7.496	33.07
A	065100M	VHF 1 KING KY 019700 ☒		7.055	37.01
A	065200M	VHF 2 KING KY 019700		5.512	23.62
A	065210M	VHF 2 KING KY 197 / VHF - VOR KX		3.748	23.62
A	065300M	VOR LOC KING KN 53.01 + KI 203		5.291	51.18
A	065400M	VOR ILS KING KN 53.01 + KI 204		7.055	62.99
A	065500M	ADF KING KR 87 + KI 227.00		6.393	59.06
A	065600M	Transponder KING KT 76 A 00		3.307	20.08
A	065700M	DME KING KN 62 A 01 or KN 64		3.968	21.26
	066000M	Course indicator KING KCS 55 A			
A		- without converter		12.456	65.75
A		- with converter		13.779	59.84

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	066100M	VHF / VOR ILS KING KX 155.01		13.889	39.37
	066200M	NAV System KNS 81.10 KING with glide			
A		- with KI 206		8.598	43.70
A		- with KI 525 A or NSD 360 A		7.275	47.24
A	066210M	- indicator KI 206.04		1.301	23.62
A	066220M	- chanellisation warning		/	/
A	066300M	VHF / VOR LOC KING KX 155.08 ☒		9.656	33.86
A	066400M	DME KING KN 63.04		4.189	40.16
A	066500M	2nd ADF KING KR 87 + KI 228			
		+ Audio control box		6.393	35.43
A	066600M	VHF / VOR LOC KING KX 165.00 ☒		12.566	35.43
A	066610M	VHF / VOR ILS KING KX 165.01 ☒ + KMA 2402		13.889	39.37
	066700M	NAV System KNS 80 :			
A		- without Glide connected with KI 202		7.937	31.50
A		- with Glide connected with KI 206		9.700	43.31
A		- with Glide connected with KI 525 A		12.787	37.80
A		- with Glide connected with NSD 360 A		13.228	37.80
A	067600M	Marker receiver KING KR 21		1.543	21.26
A	067700M	NAV 1 - NAV 2 commutation for A / P KING			
		- with demodulator		1.036	15.75
		- without demodulator		0.705	15.75

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
		AUTOPILOT AND BLIND FLIGHT ASSEMBLY			
A	058100M	Gyroscopic assy (with vacuum system) for A / P 21		9.811	11.22
A	058110M	Gyroscopic assy (with vacuum system) for A / P 21 with course indicator, without heading card		13.558	14.96
A	058120M	Gyroscopic assy (with vacuum system) for A / P 21 with course indicator, with heading card		15.102	15.94
A	058200M	A / P "MITCHELL CENTURY 31"		17.967	72.83
A	058300M	Gyroscopic assy (with vacuum system) for A / P 31			
		- with directional		9.811	11.22
		- with course indicator, without heading card			
		- with course indicator, with heading card		13.558 15.102	14.96 15.94
A	063200M	Auxiliary dry air pump		16.204	48.82
A	063600M	2nd air-driven attitude gyro indicator KG 258 KING		3.527	23.62
A	064200M	Radio beacon KR 10A KING		4.740	112.99
A	064300M	2nd electrical attitude gyro indicator RCA 26AK 1 AID		2.976	21.65
A	065900M	A / P "MITCHELL CENTURY 21"		7.716	35.43

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	066800M	A / P "KING KAP 100" without electric pitch trim		11.442	35.43
A	066810M	A / P "KING KAP 100" with electric pitch trim		17.659	67.72
A	066900M	A / P "KING KAP 150"		21.363	76.38
A	067000M	A / P "KING KFC 150"		21.561	75.59
A	067100M	Blind flight for A / P KAP 100			
		without directional		5.666	6.30
		with directional		8.355	11.02
A	067110M	Blind flight for A / P KAP 100 without heading recopy without directional		18.122	47.24
		Blind flight for A / P KAP 100 without heading recopy with directional		20.811	43.70
A	067120M	Blind flight for A / P KAP 100 with heading recopy without directional		19.445	44.09
		Blind flight for A / P KAP 100 with heading recopy with directional		22.134	41.34
A	067200M	Blind flight for A / P KAP 150			
		without directional		5.666	6.30
		with directional		8.355	11.02

A or O	ITEM N°	OPTIONAL EQUIPMENT	*	WEIGHT lb	ARM in.
A	067210M	Blind flight for A / P KAP 150 without heading recopy without directional		18.122	47.24
		Blind flight for A / P KAP 150 without heading recopy with directional		20.811	43.70
A	067220M	Blind flight for A / P KAP 150 with heading recopy without directional		19.445	44.09
		Blind flight for A / P KAP 150 with heading recopy with directional		22.134	41.34
A	067300M	Blind flight for A / P KFC 150 without heading		18.320	46.85
A	067310M	Blind flight for A / P KFC 150 with heading recopy		19.643	44.09
A	067500M	Altitude and vertical speed preselector KING KAS 297 B		1.764	20.87
A	068300M	Blind flight "AID"		8.929	11.42
A	A81600M	Vacuum system (AIRBORNE 211 CC pump)		4.784	3.15

APPLICABILITY OF YOUR MANUAL

The Pilot's Operating Handbook in the airplane at the time of delivery from SOCATA contains information applicable to SOCATA Model TB 20 airplane designated by the serial number and registration number shown on approval page of this handbook.

This information is based on data available at the time of publication.

For any Pilot's Operating handbook and / or Supplement order, it is necessary to mention their part number.

PILOT'S OPERATING HANDBOOK AND SUPPLEMENTS PART NUMBERS

A Pilot's Operating Handbook consists of a basic part which has its own part number (Sections 0 to 8) and of Supplements, each one bearing a particular part number.

Each Supplement looks like a small Pilot's Operating Handbook.

The part number in the form of "Z00. 18xxxxxxxx" is the number noted on the first page of the "List of effective pages and validities", either of the basic Pilot's Operating Handbook or of each Supplement.

To a part number corresponds an airplane model, a version and an edition of the handbook or of a Supplement.

REVISIONS AND EDITIONS

Changes and / or additions to this handbook and its supplements will be covered by revisions and editions published by SOCATA.

REVISIONS

Revisions allow updating of part of the handbook or the Supplement (s) (mistakes, omissions, airworthiness repercussions...).

Revised pages cancel and replace the respective pages in the handbook.

For each revision of a manual or supplement, part number (Z00. 18xxxxxxxx) is followed by R1 for revision 1, R2 for revision 2, and so on...

Revised pages take systematically the more recent edition of the concerned handbook.

NOTE:

Modifications and additions are noted in the margin with a black vertical line facing the modified part ; if the text has not been modified, but if it has been moved to another page, the black line will be drawn opposite paging or revision.

CAUTION

IT IS THE RESPONSIBILITY OF THE OWNER TO MAINTAIN THIS HANDBOOK IN A CURRENT STATUS AND THEREFORE TO INCORPORATE SUCCESSIVE REVISIONS.

EDITIONS

Editions enable to validate the whole handbook or Supplement (s) further to modifications and / or important technical improvements on the concerned model (example : new fuel system, increase of landing weight...)

To a new edition corresponds a new airplane validity and a new part number (Z00. ...). Except in exceptional cases, your handbook is not concerned with new editions.

TABLE OF CONTENTS

ORIGINAL ... 4 ... January 31, 1990

D.G.A.C. APPROVAL

Approved on 18 FEV. 1991

LIST OF AMENDMENTS

NOTE : Bold-faced and italic types are used for "U.S." specific pages.

Edition 4 of January 31, 1990

Revision .... of .....

Pages	Description

LIST OF EFFECTIVE PAGES AND VALIDITIES

NOTE : Bold-faced and italic types are used for "U.S." specific pages.

EDITION ... 4 ... January 31, 1990

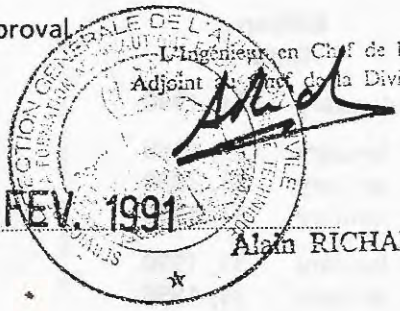
From S / N 588 to 730 and
From S / N 1 to S / N 587
if airplanes EQUIPPED with kit Nr 9118
(modification Nr 50)

(P / N Z00. 1800042085)

Page Nr	Edition Date		Revision Nr
Title	January	31, 1990	–
0.1	January	31, 1990	–
0.2 thru 0.4	January	31, 1990	–
0.5 thru 0.8	January	31, 1990	–
1.1	January	31, 1990	–
1.2 thru 1.5	January	31, 1990	–
1.6 thru 1.12	January	31, 1990	–
2.1 and 2.2	January	31, 1990	–
2.3	January	31, 1990	–
2.4 thru 2.14	January	31, 1990	–
2.15 and 2.16	January	31, 1990	–
3.1 thru 3.16	January	31, 1990	–
4.1 thru 4.20	January	31, 1990	–
5.1 and 5.2	January	31, 1990	–
5.3 thru 5.20	January	31, 1990	–
6.1 thru 6.10	January	31, 1990	–
6.10A thru 6.10C	January	31, 1990	–
6.11	January	31, 1990	–
6.11A	January	31, 1990	–
6.12 thru 6.30	January	31, 1990	–

7.1 thru 7.35	January	31, 1990	–
7.36	January	31, 1990	–
7.37 thru 7.62	January	31, 1990	–
8.1 thru 8.18	January	31, 1990	–
9.0.1	January	31, 1990	–
9.0.2	January	31, 1990	–
9.0.3 and 9.0.4	January	31, 1990	–
Section 9	See Log of Supplements		

D.G.A.C. Approval



Date : 18 FEV. 1991

Alain RICHARD

SECTION 1

GENERAL

TABLE OF CONTENTS

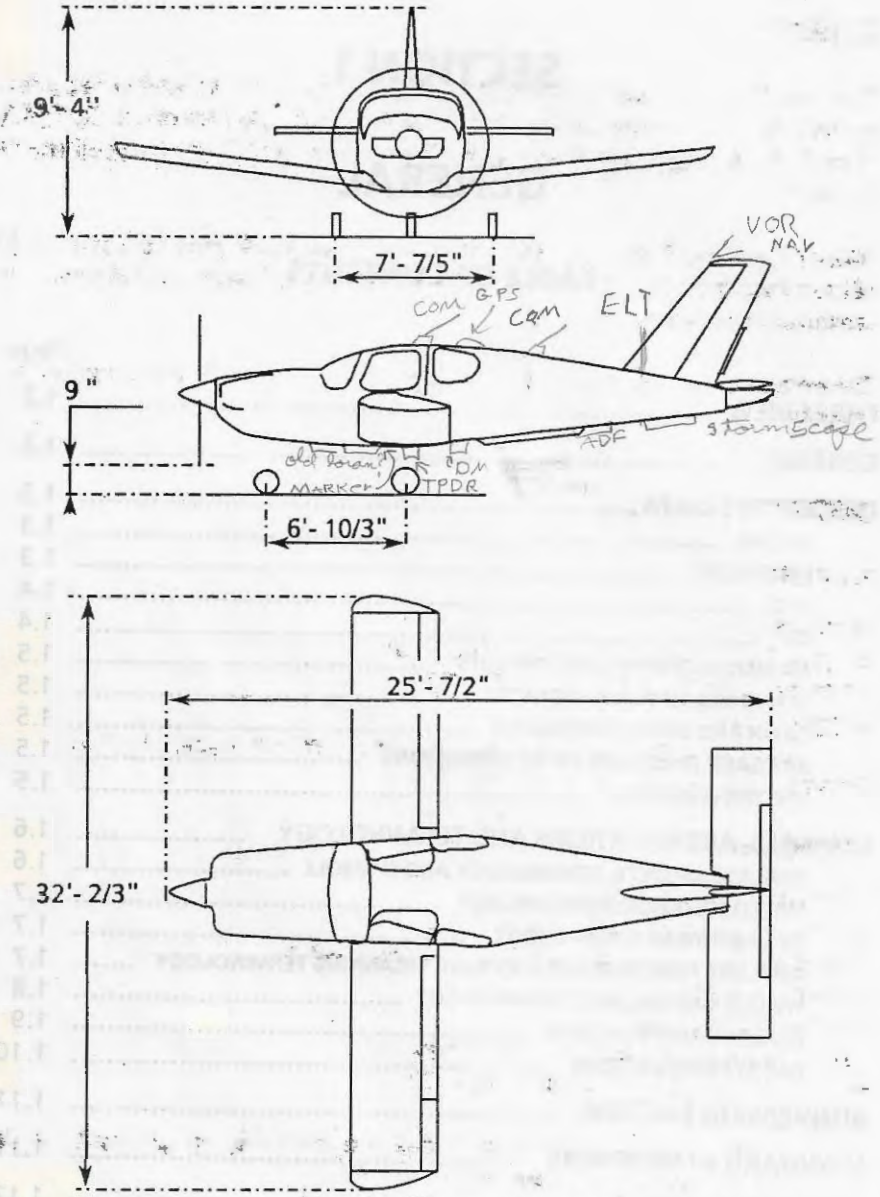


Figure 1.1 - THREE VIEW DRAWING

GENERAL

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

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

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

DESCRIPTIVE DATA

ENGINE

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

PROPELLER

Number of propellers : 1
Propeller Manufacturer : HARTZELL
Propeller Model Number : HC-C2YK-1BF/F8477-4
Number of blades : 2
Propeller Diameter :
Maximum : 80 inches (2.03 m)
Minimum : 78 inches (1.98 m)
Propeller Type :
Constant-speed, hydraulically-actuated, pitch setting at 30 inches station : low 14°, high 31°
Propeller Governor : WOODWARD C 210 761
or E 210 681
or M 210 681

Hartzell Propeller Inc
One Propeller Place
Piqua, Ohio 45356

HP-TB20-AFMS

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

TO

SOCATA TB 20

AIRPLANE FLIGHT MANUAL

STC SA01192CH

Aircraft Serial Number: 479

Registration Number: N84AV

GENERAL

This supplement must be attached to the FAA Approved Airplane Flight Manual when the airplane is modified by the installation of a Hartzell HC-C3YR-1RF/F7693F propeller, A-2295-3(P) spinner and optional C-4686 anti-ice kit in accordance with STC SA01192CH The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the Airplane Flight Manual.

FAA Approved _____
Charles L. Smalley, Manager
Systems and Flight Test Branch
Chicago Aircraft Certification Office
FAA Central Region

Date MAR 2 3 2000

HP-TB20-AFMS

AFM SUPPLEMENT
SOCATA TB 20
STC SA 01192CH

LOG OF REVISIONS

Revision Number	Revised Pages	Description of Revision	Date

NOTE: All changes are indicated by a black vertical line along the left margin.

FAA Approved _____

Date MAR 2 3 2000

HP-TB20-AFMS
AFM SUPPLEMENT
SOCATA TB 20
STC SA01192CH

2. LIMITATIONS

POWERPLANT LIMITATIONS:

Propeller: Hartzell HC-C3YR-1RF/F7693F(B)

Pitch: High 31.0 ± 1.0 degrees,
Low 13.0 ± 0.2 degrees,

Measured at 30-inch station

Maximum Diameter: 78 inches
Minimum Diameter: 76 inches

Spinner: Hartzell A-2295-3(P)

Prop Anti-ice: Kit C-4686 (Optional)

KINDS OF OPERATION LIMITS:

Flight into icing conditions is prohibited. Operation in FAR 25 Appendix C icing conditions has not been demonstrated.

3. EMERGENCY PROCEDURES

ENGINE FAILURE; MAXIMUM GLIDE:

Gliding distance is reduced approximately 7% with the 3-blade propeller installed.

4. NORMAL PROCEDURES

No change

FAA Approved MAR 2 3 2000 Date_____

HP-TB20-AFMS
AFM SUPPLEMENT
SOCATA TB 20
STC SA01192CH

5. PERFORMANCE

The performance of the 3-blade propeller meets or exceeds the performance of the original 2-blade propeller.

NOISE LEVEL: This modification did not increase the noise level and was not considered an acoustical change as defined in paragraph 21.93(b) of the Federal Aviation Regulations.

6. WEIGHT AND BALANCE

The three-blade propeller weighs approximately 15 pounds more than the two-blade propeller. See revised aircraft weight and balance records.

7. DESCRIPTION

The propeller is a 78-inch-diameter model which features three aluminum blades. The general description, construction and function of the propeller are otherwise unchanged.

8. AIRPLANE HANDLING, SERVICE & MAINTENANCE

Refer to Hartzell Manual 115 (Owner's Manual) for general propeller service information.

FAA Approved MAR 2 3 2000 Date_____

FUEL

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

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

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

OIL

Oil grades (specifications) and Viscosity :

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

Oil Capacity :

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

MAXIMUM CERTIFICATED WEIGHTS

Take-off : 3086 lbs (1400 kg)
Landing : 2943 lbs (1335 kg)
Weight in Baggage Compartment (refer to Section 6 for cargo loading instructions) : 110 lbs (50 kg) (Valid up to S / N 399)
143 lbs (65 kg) (Valid from S / N 400)

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight : 1764 lbs (800 kg)
Maximum Useful Load : 1322 lbs (600 kg)

CABIN AND ENTRY DIMENSIONS

Maximum Cabin Width : 4.20 ft (1.28 m)
Maximum Cabin Length : 8.30 ft (2.53 m)
Maximum Cabin Height : 3.67 ft (1.12 m)
Number of Cabin Entries : 2
Maximum Entry Width : 3.45 ft (1.05 m)
Minimum Entry Width : 2.62 ft (0.80 m)
Maximum Entry Height : 2.30 ft (0.70 m)

BAGGAGE SPACE AND ENTRY DIMENSIONS

Maximum Compartment Width : 4.10 ft (1.25 m)
Minimum Compartment Width : 3.45 ft (1.05 m)
Maximum Compartment Length : 2.95 ft (0.90 m)
Minimum Compartment Length : 2.20 ft (0.67 m)
Maximum Compartment Height : 2.03 ft (0.62 m)
Minimum Compartment Height : 1.35 ft (0.41 m)
Entry Width : 2.10 ft (0.64 m)
Entry Height : 1.44 ft (0.44 m)

SPECIFIC LOADINGS

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

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

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

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

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

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

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

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

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

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

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

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

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

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

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

METEOROLOGICAL TERMINOLOGY

ISA : ***International Standard Atmosphere***

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

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

Pressure Altitude :

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

Standard Temperature :

Is 59°F (15°C) at sea level pressure altitude and decreases by 3.6°F (2°C) for each 1000 ft of altitude.

ENGINE POWER TERMINOLOGY

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

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

RPM : Revolutions Per Minute is engine speed.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient :

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

Demonstrated crosswind velocity :

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

g : Is acceleration due to gravity.

Usable Fuel : Fuel available for flight planning.

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

WEIGHT AND BALANCE TERMINOLOGY

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

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

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

Center of gravity (C.G.) :
Is the point at which an airplane, or equipment, would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.

C.G. Limits : ***Center of Gravity Limits*** are the extreme center of gravity locations within which the airplane must be operated at a given weight.

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

Basic Empty Weight :
Standard empty weight plus optional equipment.

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

Maximum Take-off Weight :

Is the maximum weight approved for the start of the take-off run.

Maximum Computation Weight at Landing :

Is the maximum weight approved for landing touch-down.

GENERAL ABBREVIATIONS

A	:	Ampere
ALT	:	Alternator
A / P	:	Autopilot
CHT	:	Cylinder head temperature
°C	:	Degree Celsius (Centigrade)
°F	:	Degree Fahrenheit
EGT	:	Exhaust gas temperature
ft	:	Foot (Feet)
ft/min	:	Feet per minute
hPa	:	Hectopascal
hr	:	Hour
in	:	Inch
in.Hg	:	Inch of mercury
kg	:	Kilogram
kt	:	Knot (1 nautical mile/hr - 1852 m/hr)
l	:	Litre
lb	:	Pound
LDG	:	Landing gear
m	:	Metre
min	:	Minute
mm	:	Millimetre
psi	:	Pounds per square inch
qt	:	Quart
s	:	Second
sq.ft	:	Square foot
Std	:	Standard
U.S Gal	:	U.S Gallon
V	:	Volt

RADIO ABBREVIATIONS

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

CONVERSION FACTORS

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

STANDARD ATMOSPHERE

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

CONVERSION TABLE

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

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

SECTION 2

LIMITATIONS

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

GENERAL

SOCATA Model TB 20 is certificated in the Normal Category.

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

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

The limitations included in this section have been approved by the Federal Aviation Administration in accordance with 14 CFR Section 21.29.

The limitations for optional systems are given in Section "Supplements" of the Flight Manual.

SOCATA Model TB 20 is certificated under FAA Type Certificate N° A51EU.

AIRSPEED LIMITATIONS

VALID IF SB Nr 39 * IS NOT APPLIED

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

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

(*) Including all its revisions

Figure 2.1 - AIRSPEED LIMITATIONS

AIRSPEED LIMITATIONS

VALID IF SB Nr 39 * IS APPLIED

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

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

(*) Including all its revisions

Figure 2.1A - AIRSPEED LIMITATIONS

AIRSPEED INDICATOR OR TRUE AIRSPEED INDICATOR MARKINGS

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

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

Figure 2.2 - AIRSPEED INDICATOR OR TRUE AIRSPEED INDICATOR MARKINGS

POWER PLANT LIMITATIONS

Number of engines : 1

Engine Manufacturer : AVCO LYCOMING

Engine Model Number : IO-540-C4 D5D

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

Oil Pressure :
- Minimum : 25 psi (1.7 bar)
- Maximum : 100 psi (6.9 bar)

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

Fuel Grades : See Fuel Limitations

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

Number of propellers : 1

Propeller Manufacturer : HARTZELL

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

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

Propeller Blade Angle at 30 inches station :
- Low : 14°
- High : 31°

WEIGHT LIMITS

Maximum Take-off Weight : 3086 lbs (1400 kg)
Maximum Computation Landing Weight : 2943 lbs (1335 kg)
Maximum Weight in Baggage Compartment (refer to Section 6 for cargo loading) : 110 lbs (50 kg) (Valid up to S / N 399)
143 lbs (65 kg) (Valid from S / N 400)

CENTER OF GRAVITY LIMITS

Center of gravity range with landing gear extended (up to S / N 587) :

Forward :
42.5 inches (1.080 m) aft of datum from 2943 lbs (1335 kg) to 3086 lbs (1400 kg)
37.8 inches (0.961 m) aft of datum at 2646 lbs (1200 kg)
36.9 inches (0.937 m) aft of datum at 1984 lbs (900 kg) or less.

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

Center of gravity range with landing gear extended (from S / N 588) :

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

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

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

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

MANEUVER LIMITS

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

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flaps up : + 3.8 g and – 1.5 g
Flaps down : + 2.0 g

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR operations and may be equipped for night VFR and day & night IFR operations. See Supplements Section of this Manual.

Flight into known icing conditions is prohibited.

FUEL LIMITATIONS

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

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

SEATING LIMITS

Front seats : 2

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

USE OF DOORS

Flight with doors open or ajar is prohibited.

SUCTION GAGE MARKINGS (If installed)

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

PLACARDS

VALID IF SB Nr 39 * IS NOT APPLIED

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

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

INVERTED FLIGHT	PROHIBITED
AEROBATIC MANEUVERS	PROHIBITED
INTENTIONAL SPINS	PROHIBITED
ICING CONDITIONS	PROHIBITED
MAXIMUM TAKE-OFF WEIGHT	3086 lbs
MAXIMUM LANDING WEIGHT	2943 lbs
DESIGN MANEUVERING SPEED V_A	129 KIAS
LIMIT SPEED V_{NE}	187 KIAS
FLAPS EXTENDED MAXIMUM SPEED V_{FE}	103 KIAS
LANDING GEAR EXTENDED MAXIMUM SPEED V_{LE}	139 KIAS
LANDING GEAR OPERATING MAXIMUM SPEED V_{LO}	129 KIAS
POSITIVE FLIGHT LOAD FACTOR (MAXIMUM)	
FLAPS UP	+ 3.8
FLAPS DOWN	+ 2

FLIGHT CONDITIONS : DAY VFR
ICING CONDITIONS NOT ALLOWED

(*) Including all its revisions

VALID IF SB Nr 39 * IS APPLIED

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

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

INVERTED FLIGHT	PROHIBITED
ACROBATIC MANEUVERS	PROHIBITED
INTENTIONAL SPINS	PROHIBITED
ICING CONDITIONS	PROHIBITED
MAXIMUM TAKE-OFF WEIGHT	3086 lbs
MAXIMUM COMPUTATION WEIGHT AT LANDING	2943 lbs
DESIGN MANEUVERING SPEED V_A	129 KIAS
LIMIT SPEED V_{NE}	187 KIAS
FLAPS EXTENDED MAXIMUM SPEED V_{FE}	
IN TAKE OFF POSITION	129 KIAS
IN LANDING POSITION	103 KIAS
LANDING GEAR EXTENDED MAXIMUM SPEED V_{LE}	139 KIAS
LANDING GEAR OPERATING MAXIMUM SPEED V_{LO}	129 KIAS
POSITIVE FLIGHT LOAD FACTOR (MAXIMUM)	
FLAPS UP	+ 3.8
FLAPS DOWN	+ 2

FLIGHT CONDITIONS : DAY VFR
ICING CONDITIONS NOT ALLOWED

(*) Including all its revisions

(2) Calibration chart on compass

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

DATE: RADIO ON

(3) On Baggage door

~~50 kg - 110 lbs MAXIMUM~~

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

~~Valid up to S / N 399~~

65 kg - 143 lbs MAXIMUM

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

Valid from S / N 400
84AV S/N 479

(4) Near fuel tank caps

CARBURANT
FUEL - KRAFTSTOFF

AVGAS 100 LL

43.1 US - 35.9 UK.GAL
163 L

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

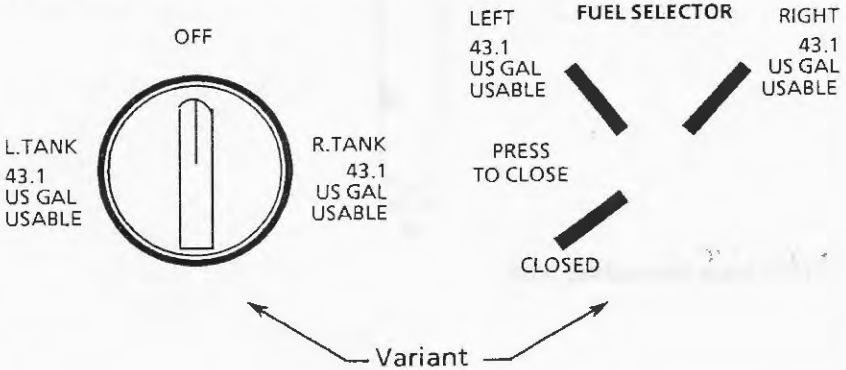
Oil system capacity
12.6 l
13.3 qt

and / or Markings on oil cap

OIL
12 Qts

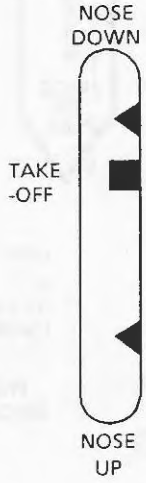
(6) Near the pilot's vent

(7) On the fuel selector

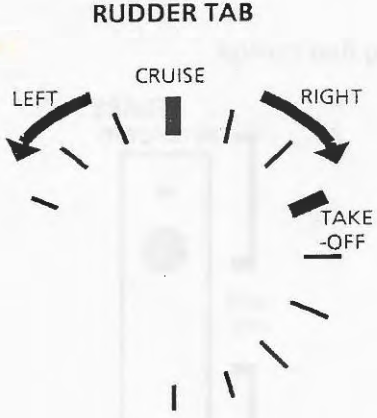


(8) Near the wing flap control

(9) Near the pitch trim position indicator



(10) Near the rudder trim



SECTION 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

GENERAL

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

The emergency procedures for optional systems are given in Section "Supplements" of the Flight Manual.

AIRSPEEDS FOR SAFE OPERATIONS (IAS)

Engine failure after take-off	70/76 KIAS
Maneuvering speed	127 KIAS
Best glide speed	92 KIAS
Precautionary landing with engine power	70/76 KIAS

ENGINE FAILURES

ENGINE FAILURE DURING TAKE-OFF RUN

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

ENGINE FAILURE IMMEDIATELY AFTER TAKE-OFF

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

If engine does not start :

Mixture	IDLE CUT-OFF
Fuel selector	OFF

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

WARNING

LANDING STRAIGHT AHEAD IS USUALLY ADVISABLE

ENGINE FAILURE IN FLIGHT

Glide speed	92 KIAS
Main switch	ON
Fuel pump	ON
Mixture	IDLE CUT-OFF
Fuel gages	CHECK
Fuel selector	SWITCH TANKS
Magneto switch	BOTH
Starter	ENGAGE (if propeller stopped)
When the engine runs (windmilling)	SLOWLY ENRICH UNTIL RE-START

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

NOTE :
Gliding distance is approximately 1.62 nautical miles (1.86 statute miles) for each 1000 feet of altitude above terrain.

LOW OIL PRESSURE

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

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

LOW FUEL FLOW

Fuel pump	OPERATING
Fuel gages	CHECKED
Fuel selector	SWITCH TANKS

ENGINE VIBRATION

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

Mixture	RESET

If vibration persist :

RPM SET FOR MINIMUM VIBRATION RANGE

Land as soon as possible.

PROPELLER GOVERNOR FAILURE

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

Oil pressure	CHECKED
Oil temperature	CHECKED
Throttle	AS REQUIRED
Airspeed	REDUCED

Avoid rapid application of power.

CAUTION : MAXIMUM RPM : 2575

FORCED LANDINGS

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

EMERGENCY LANDING WITHOUT ENGINE POWER

Glide speed	92 KIAS
Radio	TRANSMIT MAYDAY on 121.5 MHz or on the appropriate frequency giving location and intentions
Landing gear lever	AS REQUIRED
Mixture	IDLE CUT-OFF

Fuel selector	OFF
Magneto switch	OFF
Flaps	LANDING
Seats, seat belts, shoulder harnesses	ADJUSTED and SECURE
Main switch	OFF

PRECAUTIONARY LANDING WITH ENGINE POWER

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

DITCHING

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

Before touch-down :

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

EMERGENCY DESCENT

Throttle	IDLE AS REQUIRED
Airspeed	130 KIAS
Landing gear lever	DOWN
Descent at V_{LE}	139 KIAS

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

FIRES

ENGINE FIRE DURING START

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

If fire goes on :

Main switch	OFF
Magneto switch	OFF

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

ENGINE FIRE IN FLIGHT

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

After engine has stopped :

Magneto switch	OFF
Alternator switch	OFF
Main switch	OFF
Forced landing	EXECUTE (as described in "Emergency Landing Without Engine Power")

WARNING

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

ELECTRICAL FIRE IN FLIGHT

*If *FIRE* is in *ENGINE COMPARTMENT* :

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

Land as soon as possible.

*If *FIRE* is in *CABIN* :

Main switch	OFF
Alternator switch	OFF
All electrical switches (except magnetos)	OFF
Cabin air cooling & demisting	FIRE CUT-OFF
Fire extinguisher (if installed)	ACTIVATE

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

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

CABIN FIRE

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

WARNING

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

Land as soon as possible.

WING FIRE

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

Land as soon as possible.

ICING

FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED

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

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

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

LANDING GEAR MALFUNCTION PROCEDURES

LANDING GEAR FAILS TO RETRACT (ONE OR SEVERAL GREEN GEAR DOWN AND/OR RED GEAR IN TRANSIT LIGHTS REMAIN "ON")

Main switch	ON
Landing gear lever	UP
Circuit-breakers	CHECK "LDG GEAR" and "LG WARNING" BREAKERS IN
Emergency landing gear control	PUSHED
Landing gear lever	DOWN
Landing gear lights	CHECK GREEN ON RED OFF
Airspeed	130 KIAS
Landing gear lever	RECYCLE TO UP POSITION

If landing gear still fails to retract, reposition the landing gear lever to the down position.

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

Main switch	ON
Landing gear lever	DOWN
Circuit-breakers	CHECK "LDG GEAR" and "LG WARNING" BREAKERS IN
Landing gear lights	ILLUMINATE DURING TEST

LANDING GEAR MALFUNCTIONS

LANDING GEAR FAILS TO RETRACT

THE THREE GREEN LIGHTS REMAIN "ON"

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

If landing gear fails to retract :

Landing gear lever	DOWN
Landing gear lights	CHECK GREEN ON

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

Maximum airspeed	139 KIAS

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

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

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

Maximum airspeed	139 KIAS

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

Flaps	TAKEOFF
Airspeed	97 KIAS
"LDG GEAR" circuit breaker	PULL OFF
Landing gear lever	DOWN

Emergency landing gear control	PULL
Landing gear lights	CHECK GREEN ON

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

Maximum airspeed	139 KIAS

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

Flaps	TAKE-OFF
Airspeed	97 KIAS

The landing gear should extend and lock normally.
If this does not happen :

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

Normal landing.

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

Yaw / slip airplane to help lock gear down

Gear in transit (red) light	OFF
Gear in transit (red) light	ILLUMINATES DURING TEST

The affected indicator green light bulb should be burnt out :

Landing gear position	CHECK DOWN POSITION WITH THE TOWER

Precautionary landing

LANDING WITH A LANDING GEAR NOT LOCKED

Landing gear position	CHECK POSITION WITH THE TOWER

LANDING GEAR APPEARS DOWN AND LOCKED

Landing gear circuit-breaker	IN
Landing gear lever	DOWN
Emergency landing gear control	PUSHED

Precautionary landing

LANDING GEAR UP OR PARTIALLY EXTENDED

Nose gear not locked

- *Landing :*

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

- *In final, cut-off the engine*

Main switch	OFF
Mixture	IDLE CUT-OFF

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

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

Main gear not locked

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

- *Retract the landing gear :*

Emergency landing gear control	PUSHED
Landing gear circuit-breaker	IN
Landing gear lever	UP

- *Landing on grass if possible :*

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

- *Before touch-down :*

Main switch	OFF
Mixture	IDLE CUT-OFF

LANDING GEAR MALFUNCTIONS

LANDING GEAR FAILS TO RETRACT

THE THREE GREEN LIGHTS REMAIN "ON"

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

If landing gear fails to retract :

Landing gear lever	DOWN
Landing gear lights	CHECK GREEN ON

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

Maximum airspeed	139 KIAS

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

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

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

Maximum airspeed	139 KIAS

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

Flaps	TAKEOFF
Airspeed	97 KIAS
"LDG GEAR" circuit breaker	PULL OFF
Landing gear lever	DOWN

Emergency landing gear control	PULL
Landing gear lights	CHECK GREEN ON

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

Maximum airspeed	139 KIAS

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

LANDING WITHOUT STABILATOR CONTROL

Fly the airplane using pitch trim and throttle.

- *Long final :*

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

- *Final :*

FLARE OUT near the ground with the pitch trim.

CAUTION

REDUCE THROTTLE ONLY AFTER TOUCH-DOWN

ELECTRICAL FAILURE

ALTERNATOR FAILURE

Undervoltage warning light	ON
Voltmeter :	
- Green sector	CONTINUE FLYING
- Red / yellow sector	ALT. Switch OFF then ON
Undervoltage warning light	REMAINS ON
ALT. switch	OFF
Nonessential electrical load items	OFF

Fuel gages: If voltage is lower than 13 volts (below green range) fuel quantity is over-estimated

CAUTION

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

Battery approximate duration : 50 min (Night IFR emergency conditions).

ELECTRICAL EQUIPMENT FAILURE

Check the circuit-breakers panel.
If the circuit-breaker is tripped, reset it once only.
If it trips again, do not try to reset the circuit-breaker, the equipment has failed.

AIRSPEED INDICATING SYSTEM FAILURE

In case of erroneous indications in flight :

Pitot heating (if installed)	ON
Alternate static source (if installed)	EMERGENCY (Pulled)

For IAS and pressure altitude, see altimeter and airspeed indicator correction tables in "Performance" Section

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

Recommended parameters :

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

INVOLUNTARY SPIN

INTENTIONAL SPINS ARE PROHIBITED

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

Rapid and simultaneous action :

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

Spin with flaps :

Same procedure, except retract flaps as soon as possible.

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

JAMMED DOORS

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

MAXIMUM GLIDE

- MAXIMUM AERODYNAMIC EFFICIENCY "8"

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

- MAXIMUM AERODYNAMIC EFFICIENCY "5"

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

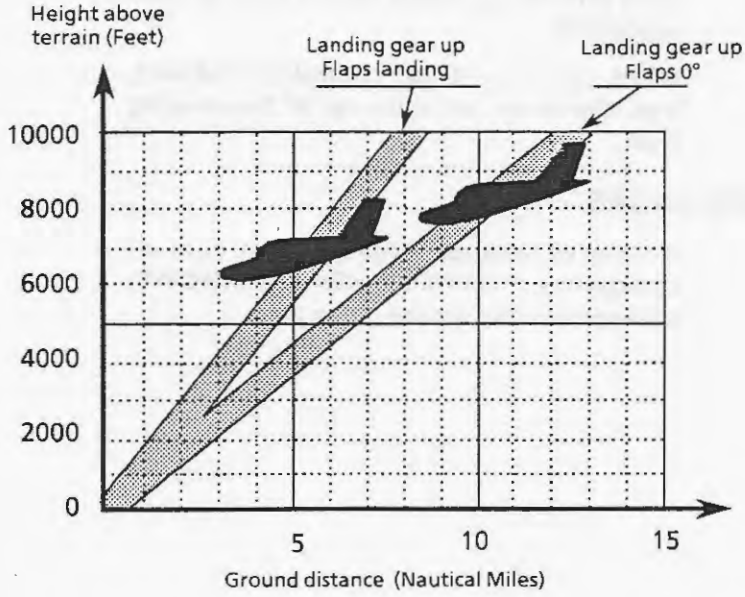


Figure 3.1 - MAXIMUM GLIDE