



**INIZIATIVE INDUSTRIALI ITALIANE S.p.A.  
(METEOR S.p.A.)**

**R O M A**

***Pilot's Operating Handbook and  
Airplane Flight Manual***



***SKY ARROW 600 SPORT***

Aircraft s/n:

Aircraft reg. number:

**APPROVED FOR U.S. REGISTERED AIRCRAFT  
IN ACCORDANCE WITH ASTM STANDARD F2245**

**APPROVAL PROCESS DATA**

The following pages include the material required by the airworthiness regulations which must be furnished to the pilot and also additional information provided by the manufacturer.

DOCUMENT REFERENCE N.: LS-14.01

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# **PILOT'S OPERATING HANDBOOK AND AIRPLANE FLIGHT MANUAL**

## ***SKY ARROW 600 SPORT***

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**Category of Airworthiness:** Special Certificate in the Light-Sport Aircraft Category

**Applicable Airworthiness Requirements:** See CERTIFICATION BASIS in Section 1

**This aircraft has to be operated in compliance with information and limitations contained herein.**

**This manual is part of a SKY ARROW 600 SPORT aircraft and must be carried on board at all times with other pertinent documents. Scope and revision status can be found in the List of Effective Pages and in the Record of Revisions contained in this section.**

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## **SECTION 1**

### **GENERAL**

#### **1.1. INTRODUCTION**

#### **1.2. CERTIFICATION**

##### **1.2.1. CERTIFICATION BASIS**

##### **1.2.2. AIRWORTHINESS CERTIFICATION**

##### **1.2.3. PERMITTED USE**

#### **1.3. WARNINGS, CAUTIONS AND NOTES**

#### **1.4. THREE-VIEWS**

#### **1.5. ABBREVIATIONS AND DEFINITIONS**

#### **1.6. CONVERSION FACTORS**

## 1.1 INTRODUCTION

This Flight Manual has been prepared to provide pilots and instructors with information for safe and efficient operation of the SKY ARROW 600 SPORT aircraft model.

The Manual includes the information required by the pertinent Airworthiness Regulations to be furnished to the pilot. It also contains supplemental data supplied by the aircraft manufacturer, Iniziative Industriali Italiane S.p.A. (3I), which may be useful to the pilot.

The Flight Manual covers the basic version of the aircraft. Any optional equipment has its own operator's manual. Copies of these manuals are attached to this Manual as enclosures, annexes or supplements. For the operation of optional equipment the proper Operation Manual must be studied and used by the pilot.

For approved and permissible optional equipment/accessories refer to the equipment list generated by the manufacturer, listed in Section 4 of this Manual.

According to ASTM standard F2295, it is the responsibility of the owner/operator of the aircraft to provide the manufacturer with current contact information, where the manufacturer may send the owner/operator information on continued airworthiness of the aircraft, such as revisions to aircraft flight and/or maintenance manuals, service literature, etc.

The contact information of the manufacturer is provided below:

Iniziative Industriali Italiane S.p.A.  
c/o Product Support Department  
Via Leonardo da Vinci 19/23  
I-00016 Monterotondo Scalo (Roma)

Ph: +39.06.90085545  
Fax: +39.06.90085530  
e-mail: [productsupport@skyarrow.com](mailto:productsupport@skyarrow.com)

Website:

General info: [www.skyarrow.com](http://www.skyarrow.com)  
Technical info: [www.skyarrow.it](http://www.skyarrow.it)

## 1.2 CERTIFICATION

### 1.2.1. CERTIFICATION BASIS

The SKY ARROW 600 SPORT meets the requirements of the following certification basis:

#### 1. AIRFRAME CERTIFICATION:

- ASTM designation: F2245.

#### NOISE CERTIFICATION:

- See Section 5, Performance, for noise certification of the SKY ARROW 600 SPORT

#### ENGINE CERTIFICATION:

- Rotax 912 ULS2: ASTM designation: F2339
- Rotax 912 S2: 14 CFR 33

### 1.2.2. AIRWORTHINESS CERTIFICATION

Each SKY ARROW 600 SPORT aircraft is issued by the FAA a Special Certificate of Airworthiness in the Light-Sport Category after a satisfactory inspection in the United States.

### 1.2.3. PERMITTED USE

Pilots holding a Sport Pilot certificate are authorized to fly the SKY ARROW 600 SPORT in accordance with the following rules:

DAY-VFR ONLY

If the aircraft is properly equipped (see section 3.13), as required by the applicable ASTM standards and sections of FAR 91, and the pilot in command has the appropriate rating and training, then the aircraft can be flown in accordance with the following rules:

DAY and NIGHT VFR

## 1.3 WARNINGS, CAUTIONS AND NOTES

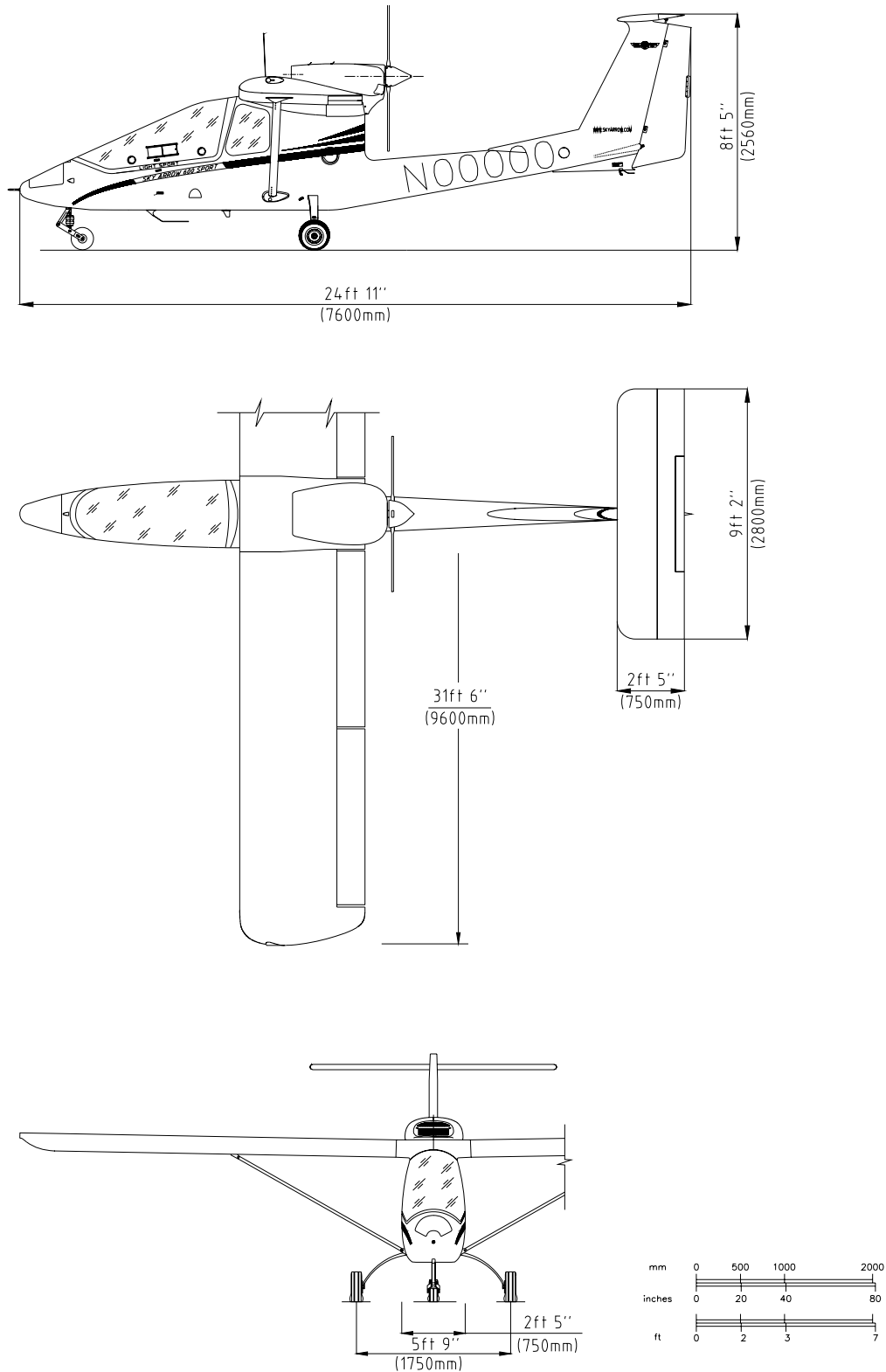
The following definitions apply to WARNINGS, CAUTIONS and NOTES used in the flight manual:

**WARNING:** means that failure to observe the corresponding procedure leads to an immediate or important degradation of flight safety.

**CAUTION:** means that failure to observe the corresponding procedure leads to a minor or to a more or less long term degradation of flight safety.

**NOTE:** draws the attention to any special item not directly related to safety but which is considered important or unusual.

### 1.4. THREE-VIEWS



## 1.5. LIST OF ABBREVIATIONS AND DEFINITIONS

### A. General Terms and Abbreviations

|                 |  |
|-----------------|--|
| AGL             | Above Ground Level   |
| MSL             | Mean Sea Level   |
| VS0             | The power off stall speed in landing configuration   |
| VS1             | The power off stall speed in current configuration   |
| VFE             | Max speed with flaps extended  |
| VX              | Best angle of climb speed  |
| VY              | Best rate-of-climb speed   |
| VA              | Maneuvering speed. Max speed for full deflection of control surfaces   |
| VN              | Maximum Structural Cruising Speed, which should only be exceeded in calm air, and then only with caution   |
| VH              | Max horizontal speed with max power  |
| V <sub>NE</sub> | Never exceed speed   |
| KIAS            | Indicated Air Speed expressed in Knots (it is the speed shown on the airspeed indicator)   |
| KCAS            | Calibrated Air Speed expressed in Knots (it is the indicated air speed corrected for position and instrument error; CAS is equal to TAS at standard atmospheric conditions at MSL) |
| KTAS            | True Air Speed expressed in Knots (it is the speed of the airplane relative to air. TAS is CAS corrected for altitude, temperature and compressibility errors).                    |

### B. Meteorological Terms and Abbreviations

|      |   |
|------|---|
| ISA  | International Standard Atmosphere at which air is identified as perfect dry gas. The temperature at mean sea level is 59 °F (15 °C), the air pressure at sea level is 1013.25 mbar (29.92 in/Hg). |
| OAT  | Outside Air Temperature   |
| IPA: | Indicated Pressure Altitude. Altitude reading with altimeter set to 1013.25 mbar (29.92 in/Hg) air pressure   |

Pressure Altitude: Altitude measured at standard pressure at MSL (1013.25 mbar / 29.92 in/Hg) using a barometric altimeter. Pressure altitude is the indicated altitude corrected for installation and instrument errors. Within this manual the instrument errors are assumed to be zero.

Aerodrome Pressure: Actual atmospheric pressure at the aerodrome altitude.

### C. Powerplant Terms and Abbreviations

|                                 |   |
|---------------------------------|---|
| Take-off Power (TOP):           | Maximum engine power for take-off.                                |
| Maximum Continuous Power (MCP): | Maximum permissible continuous engine output power during flight. |
| Throttle:                       | Lever used to control engine power                                |
| Choke:                          | Lever used to control air-fuel mixture enrichment                 |
| Carburetor Heater:              | Lever used to supply hot air to the carburetors                   |
| CHT:                            | Cylinder Heads Temperature indication                             |

### D. Flight Performance and Flight Planning Terms and Abbreviations

|                                   |   |
|-----------------------------------|---|
| Demonstrated crosswind component: | The max speed of the crosswind component at which the maneuverability of the aircraft during take-off and landing has been demonstrated during type certification test flights. |
| Service ceiling:                  | Altitude at which the max. rate of climb is 100 ft/min (0.5 m/s).   |
| Land as soon as practical:        | Land at the nearest airport   |
| Land as soon as possible:         | Land at the nearest suitable site with such characteristics as to cause the least possible damage to the airplane and passengers  |

### E. Weight and Center of Gravity Terms and Abbreviations

|                     |   |
|---------------------|---|
| RD:                 | Reference Datum (it is an imaginary vertical plane from which all horizontal distances for the center of gravity calculations are measured)   |
| CG:                 | Center of Gravity (it is the point of equilibrium for the airplane weight. Its distance from the RD can be calculated by dividing the total moment by the total weight of the airplane) |
| Station:            | A defined point along the longitudinal axis which is generally presented as a specific distance from the reference datum.   |
| Moment:             | The weight of a component multiplied by its lever arm.  |
| CG Limits:          | The CG range which the aircraft with a given weight must be operated within.  |
| MAC:                | Mean Aerodynamic Chord, used to define the C.G. limits, in percent  |
| Usable Fuel:        | The amount of fuel available for the flight plan calculation.   |
| Dry Empty Weight:   | Empty weight of the aircraft without unusable fuel and operating fluids.  |
| Basic Empty Weight: | Empty weight of the aircraft including unusable fuel, all operating fluids and maximum oil amount.  |
| Useful Load:        | The difference between take-off weight and empty weight.  |
| MTOW:               | Maximum Take-off Weight permissible to start the take-off run   |

### F. Equipment Terms and Abbreviations

|      |                      |
|------|----------------------|
| ACL: | Anti Collision Light |
|------|----------------------|

## 1.6. CONVERSION FACTORS

#### LENGTH OR ALTITUDE

1 ft = 0.3048 m

1 in = 25.4 mm

1 NM = 1.151 mi

1 NM = 1.852 km

1 mi = 1.609 km

#### SPEED

1 kt = 1.151 mph

1 kt = 1.852 km/h

1 mph = 1.609 km/h

#### PRESSURE

1 hPa = 100 N/m<sup>2</sup> = 1 mbar

1 inHg = 33.865 hPa

1 psi = 68.97 mbar

1 bar = 14.5 psi

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## **SECTION 2**

### **AIRCRAFT AND SYSTEMS DESCRIPTION**

#### **2.1. INTRODUCTION**

#### **2.2. POWERPLANT**

##### **2.2.1 ENGINE**

##### **2.2.2 PROPELLER**

#### **2.3. AIRFRAME**

#### **2.4. CONTROL LINES**

#### **2.5. LANDING GEAR AND BRAKE SYSTEM**

#### **2.6. COCKPIT**

#### **2.7. ELECTRICAL SYSTEM**

#### **2.8. AIRSPEED SYSTEM, STATIC AND DYNAMIC PORTS**

#### **2.9. PNEUMATIC STALL WARNING SYSTEM**

#### **2.10. AUXILIARY ENGINE COOLING SYSTEM**

## **2.1. INTRODUCTION**

This Section provides a description of the aircraft, its systems and their use. Refer to Section 9, Supplements, for details of optional systems and equipment.

## **2.2. POWERPLANT**

### **2.2.1 ENGINE**

Front and lateral views of the engine and engine performance graphs are shown in Figg. 2-1 and 2-2 on the following pages.

#### **A. Engine Controls**

Engine power is controlled by the throttle (higher L lever) mounted on the left side console near each seat. Pushing the lever forward increases power, while pulling it fully back sets the engine to idle. The choke (shorter L lever) mounted near the throttle should only be operated during the starting procedure, pulling it towards the tail of the aircraft. Once minimum operating temperatures of the engine are reached, push the lever fully forward to restore the normal AIR/FUEL ratio. The resistance of both levers can be increased by means of the friction wheel at the right of the front-seat controls.

#### **NOTE**

**Application of the choke is only necessary when the engine is cold.**

#### **B. Engine instruments**

See the figures relative to the instrument panel and cockpit.

#### **C. Ignition circuit**

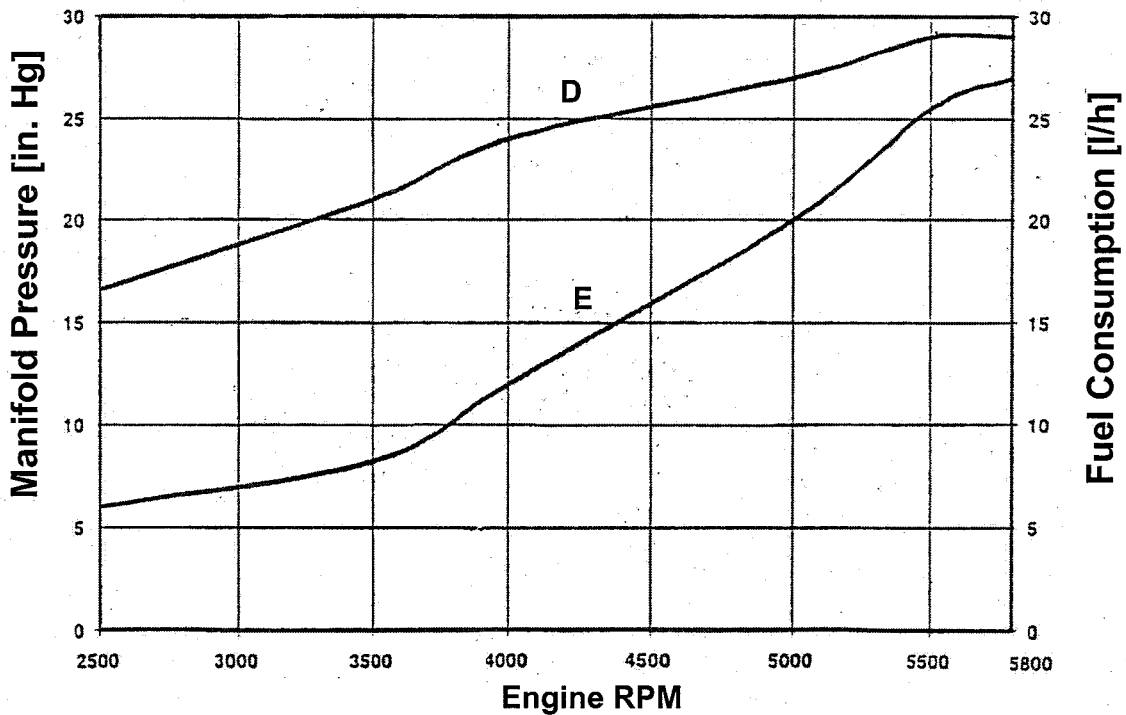
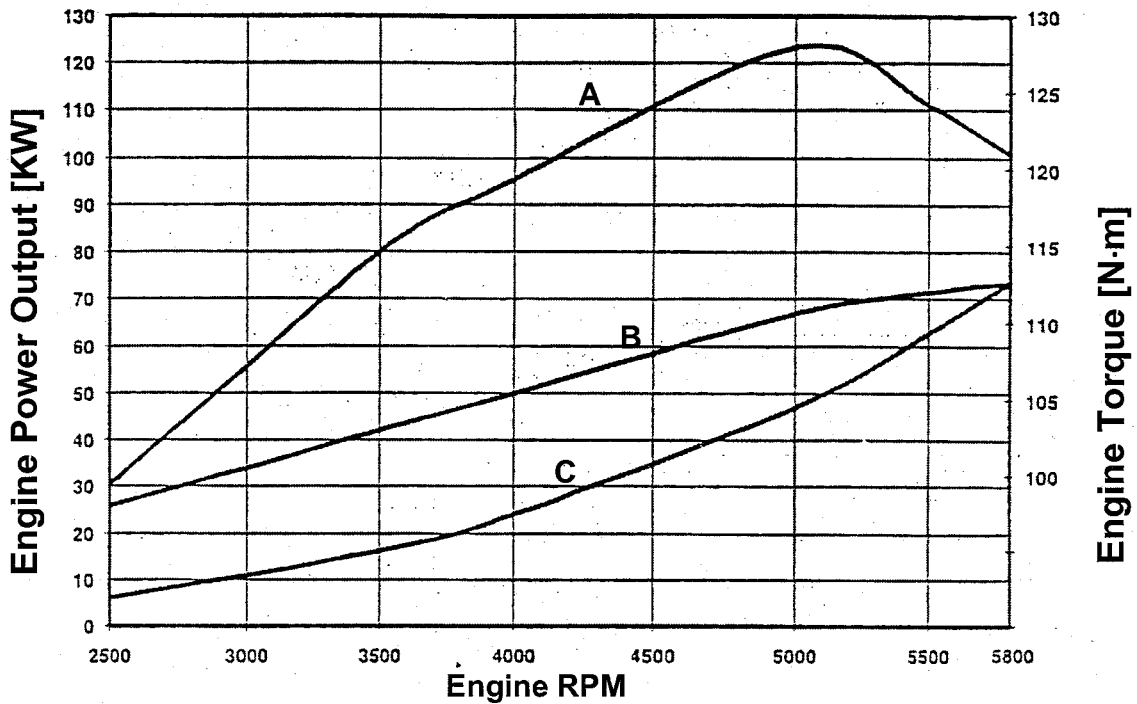
To connect the engine to its sources of electrical energy, switch the MASTER SWITCH and subsequently the two electronic ignition circuits ON. The actual engine start occurs by rotating one of the two ignition keys on the left side console forward of the throttles.

#### **NOTE**

**Read carefully the engine handbook for additional information and operating instructions.**



ROTAX 912 ULS2 –100Hp @5800 RPM



- A: Engine Torque
- B: Maximum Engine Output
- C: Power Requirement of Propeller
- D: Manifold Pressure
- E: Fuel Consumption

Fig. 2-2 - ENGINE PERFORMANCE GRAPHS

#### D. Engine lubricating system

Lubrication is guaranteed by a pump operated by the engine itself, that gives pressure to the oil contained in a detached cup. After flowing through the cartridge filter, the oil lubricates the internal parts of the engine and then is pushed to the radiator inside the air intake for necessary cooling. As for the characteristics of the lubricant and the temperatures and pressure values of usage, see Sections 3.4 and 3.5. A schematic of the system is shown in Fig. 2-3.

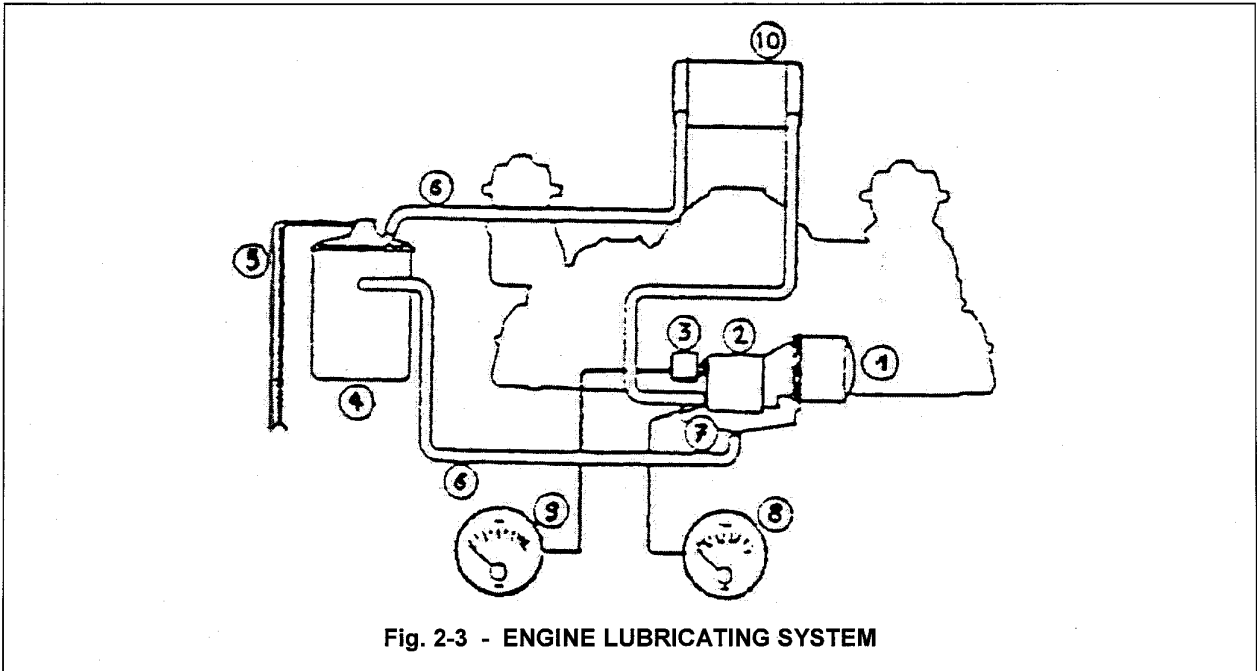


Fig. 2-3 - ENGINE LUBRICATING SYSTEM

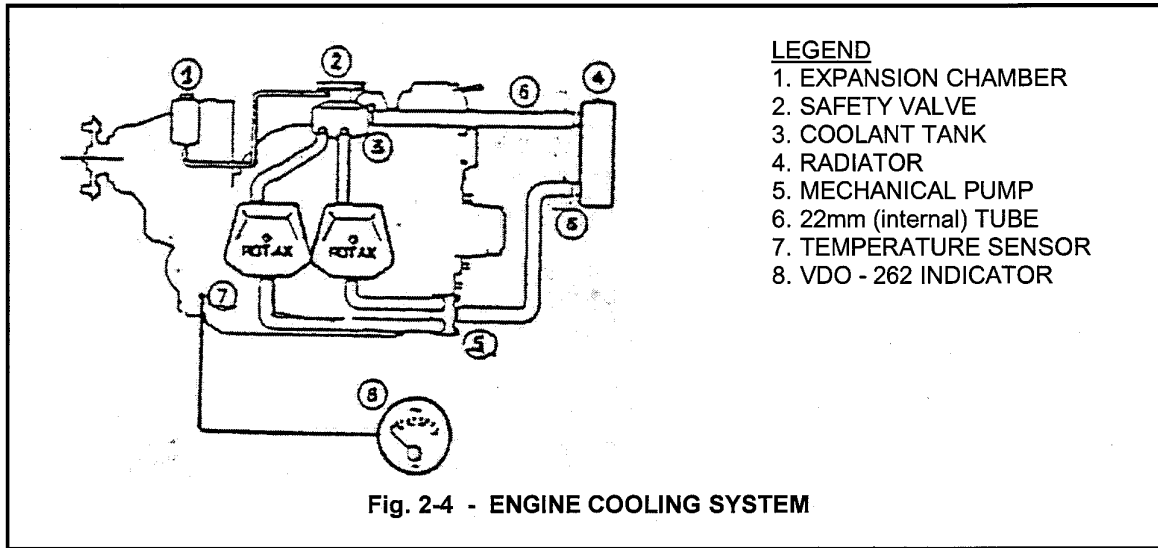
#### E. Engine cooling system

The front air intake on the engine cowling guarantees the necessary air to cool the oil and coolant radiators and to cool the cylinders and the feed through-filters of the two carburetors. On the lower side of the engine nacelle there are two dynamic air ports to cool the exhaust compartment. Hot air escapes through two vents on the lower back side of the nacelle and it is made easier by the suction created by the turning propeller. Cooling of the cylinder heads is accomplished by the circulation of the coolant caused by an engine operated pump. The coolant quantity can be checked by means of level notches on the reservoir. The cooling radiator is mounted in the lower side of the front air intake inside the engine cowling.

A schematic of the system is shown in Fig. 2-4.

Proper engine coolant is specified in Section 8.3.

The engine is also equipped with two auxiliary cooling fans installed before the radiator and operated by the pilot to avoid, during long periods on the ground with a running engine, high coolant temperatures.



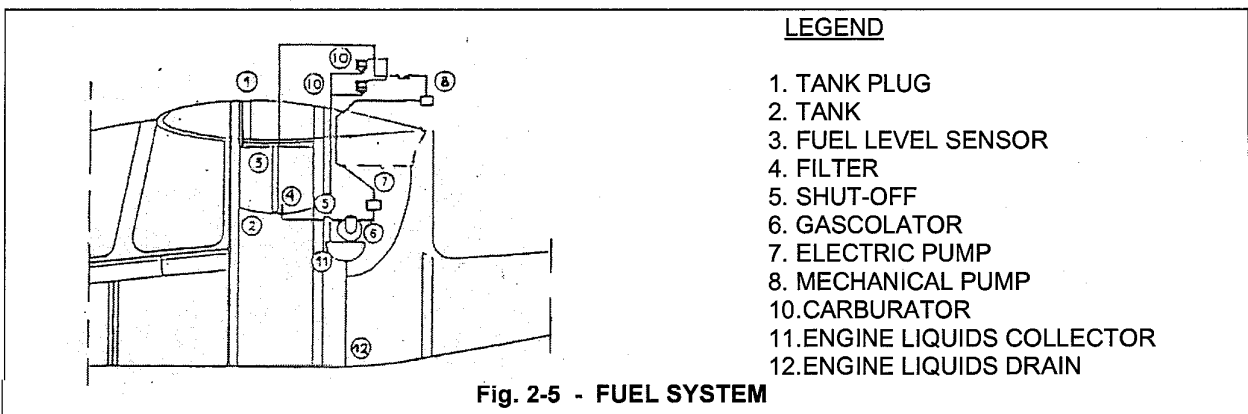
**F. Fuel system**

The fuel system includes an 18 gallon (68 l) tank mounted behind the bulkhead which is immediately behind the rear seat. The tank is separated from the engine by the firewall. The fuel leaves the tank through a strainer and then through a gascolator with a valve for draining of the condensation water. This valve can be accessed by a small spring shutter on the left side of the fuselage. The fuel is delivered to the carburetors by a diaphragm pump connected to the engine, and/or by an electrical pump controlled by a switch on the instrument panel. A schematic of the system is shown in Fig. 2-5.

Proper fuel grades are specified in Section 3.14.

A "FUEL LOW" light on the instrument panel warns the pilot when the fuel quantity reaches the trigger levels shown below:

| P/N of fuel level sensor or switch | "FUEL LOW" light trigger level |
|------------------------------------|--------------------------------|
| 12 STAE 508                        | no FUEL LOW light              |
| 12 STAE 506                        | 2.4 gals (9 l)                 |
| 12 STAE 510                        | 4.2 gals (16 l)                |



### G. Exhaust system

The exhaust system is constructed of welded stainless steel and is made of 4 collectors joined in one muffler. To protect the inside walls of the engine nacelle from the strong heat irradiation of the muffler, a metal heat shield surrounds the muffler. A schematic of the system is shown in Fig. 2-6

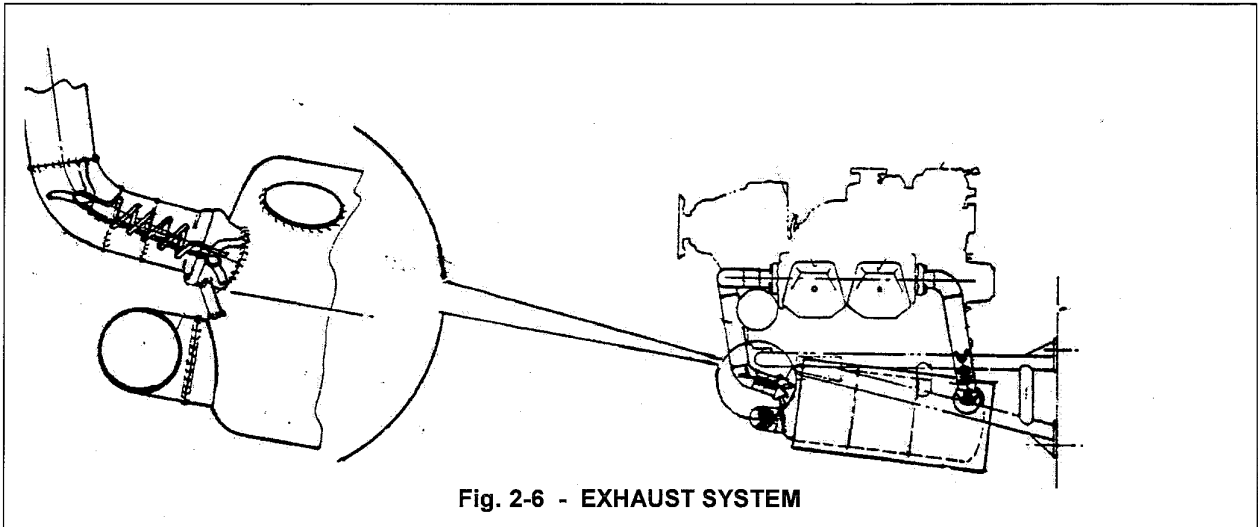


Fig. 2-6 - EXHAUST SYSTEM

### H. Carburetor hot air system

The carburetor heating is obtained by warming the external cold air forced out by a heat exchanger made by a steel box located around the engine exhaust manifold. The cold and warm air flow through a box in which a butterfly valve is operated by the pilot who controls a lever positioned on the left hand side of the console. The hot air system must be activated when the outside temperature is below 40 °F (+4 °C) with air humidity exceeding 60%.

### I. Cabin heating system (Optional equipment – applies only if installed in aircraft)

The cabin heating system is composed of two parts: the engine part and the fuselage part.

The engine part consists of the heat exchanger, assembled in two shells around the muffler, and of an air intake, placed into the left engine compartment fuselage opening.

The fuselage part is composed of heating hoses, placed on the inner left side of the cabin, with a TEE distributor in the middle, and of a mixer valve, placed on the front bulkhead. The TEE distributor is composed of a rotating valve, controlled by the first pilot, which leads the hot air to the 2<sup>nd</sup> pilot side. The mixer valve allows to change the hot air flow orientation towards the canopy or towards the cabin or it allows to mix the hot air with the cold one which comes from the front NACA air intake. The air flows from the air intake and passes through the heat exchanger; the heated air then flows through the firewall valve and goes into the fuselage hose. Then, if the TEE distributor valve is opened, part of the air flows towards the rear side of the cabin, near the 2<sup>nd</sup> pilot feet and, if the TEE valve is closed, all air flows towards the front mixer valve. When this valve is in the first position (control lever on the right console all forward, "defrost" position) the hot air flows towards the canopy, when the valve is in the second position (control lever in the middle), the hot air flows into cabin, near the first pilot legs. When the valve is in the third position (control lever all backwards), the air is mixed with the cold one coming from the front NACA air intake and it flows through both the mixer outlets, toward the canopy and the cabin. Using the left control lever, placed in the right console next to the mixer valve control lever, it's possible to close the firewall valve and to shut off the hot air flow.

#### L. Adjustable engine cooling system (Optional equipment – applies only if installed in aircraft)

The adjustment of the engine cooling is obtained by a baffle located behind the engine radiators and controlled by a lever placed on the right console. Moving this lever towards the nose of the aircraft (MAX) the baffle gets away from the radiators thus increasing the cooling effect of the system. Moving the lever towards the tail of the aircraft (MIN) the baffle gets close to the radiators in order to increase water temperature. The system in the MIN position is used also to prevent that the water temperature decreases to very low values (for example before a sudden descent from an high altitude).

### 2.2.2 PROPELLER

The propeller is connected to the engine reduction gear (ratio 1:2.4343) by a flange. The gear reduction allows the propeller to revolve at 2,383 RPM when the engine operates at 5,800 RPM. The propeller hub is covered by a spinner made of carbon fiber.

The thrust axis of the engine deviates 1° to the left, looking at the aircraft from the tail towards the nose. There is no vertical deviation. The deviation compensates the average gyroscopic effect of the propeller.

## 2.3. AIRFRAME

The fuselage is made from carbon fiber, Kevlar and epoxy resin. It is constructed of two half-shells with 9 bulkheads. The vertical fin is an integral part of the fuselage.

The wing is rectangular, double spar, and is entirely constructed of carbon sandwich with Kevlar reinforcement in epoxy resin. The wings are braced by two aluminum alloy struts with steel reinforcement. Wings have single-slot type flaps electrically controlled.

The empennage, «T» type, is made of carbon fiber sandwich and epoxy resin. The vertical empennage is comprised of a fin and a rudder. The horizontal empennage is rectangular, with an electrical trim and is mounted at a negative angle of 4°.

The standard fixed tricycle landing gear is made of two leaf-springs of fiberglass roving for the main gear and carbon sandwich in epoxy resin and steel parts with a rubber shock absorber for the nose wheel.

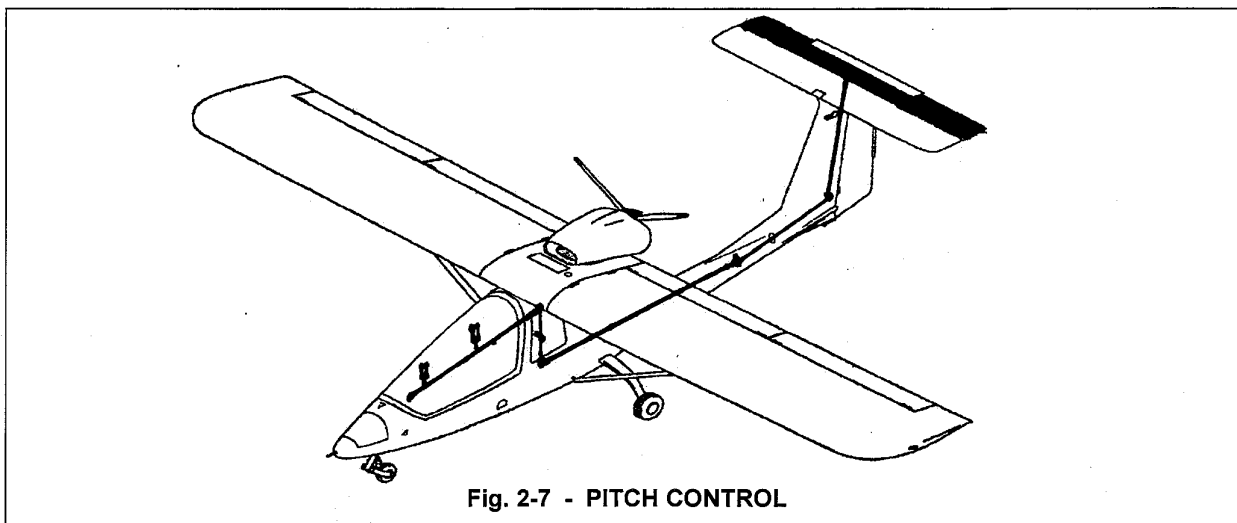
## 2.4. CONTROL LINES

The SKY ARROW aircraft has traditional controls in 3 axes operated through two sidesticks and two rudder pedal boards, one for the front and the other for the rear seat. The nose wheel is free castoring and therefore its direction is not controlled by the rudder pedals. Flaps are electrically operated by an actuator with a control switch located on the upper left side of the instrument panel. The control switch controls, besides the 0° position, 3 other positions: 10°, 20°, and 30° (full flaps).

It is possible to lock the flight controls when the aircraft is parked using the locking system placed inside the cabin.

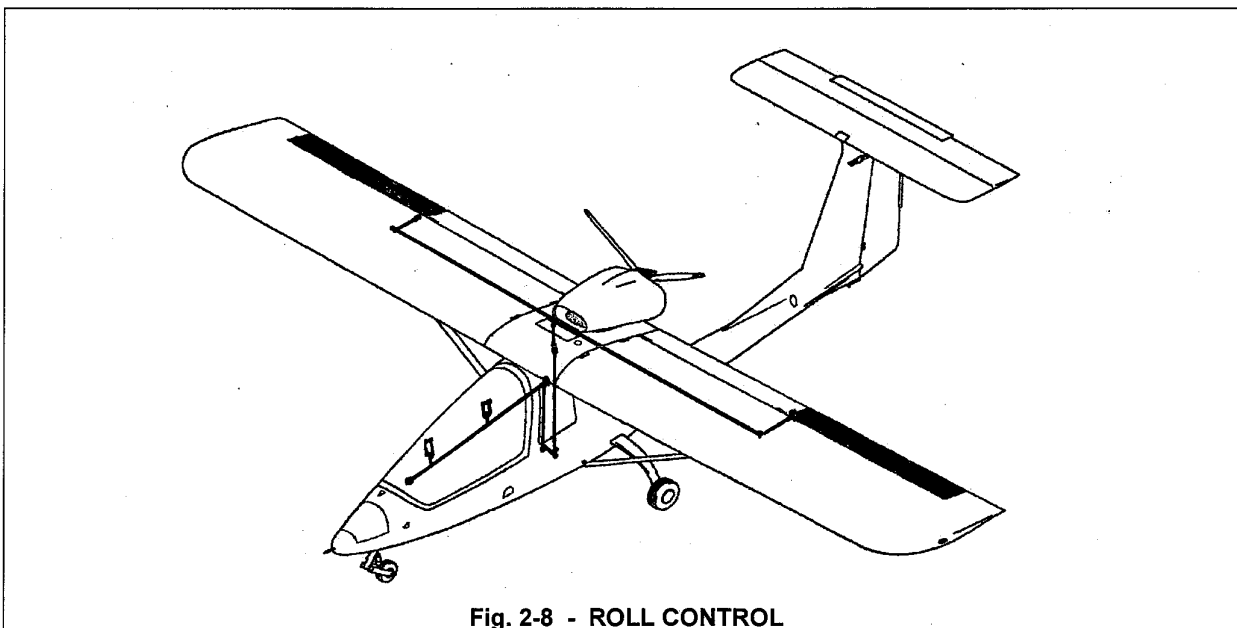
### A. Pitch Control

The tailplane is composed of a fixed and a variable surface. The latter is controlled by a push-pull rod with spherical «Uniball» type joints (see Fig. 2-7). Pitch trimming of the aircraft is accomplished by an electrically operated tab. The freedom of the elevator is  $22^{\circ}$  up and  $14^{\circ}$  down.



### B. Roll Control

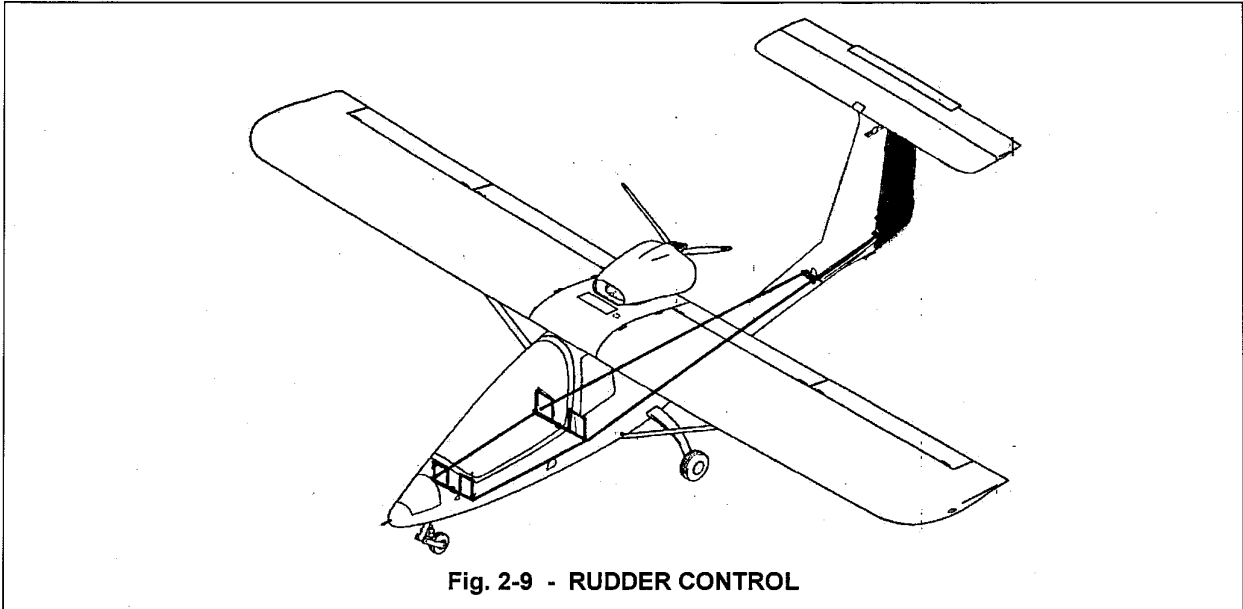
The roll control (Fig. 2-8) is obtained with a pair of Frise type ailerons operated by a push-pull rod with «Uniball» type spherical joints. The freedom of the ailerons is  $20^{\circ}$  upwards and  $14^{\circ}$  downwards. Fine trimming of the control can be accomplished on the threaded end of the rod.



### C. Rudder control

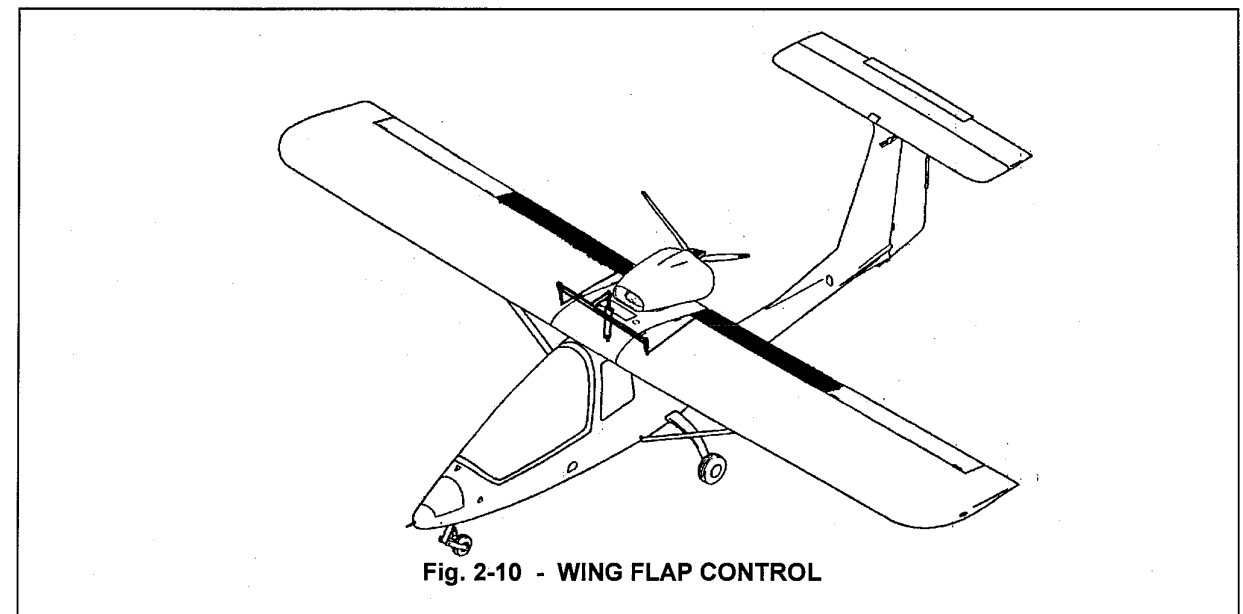
The rudder control (Fig. 2-9) is obtained by the 2 pedal sets (front and rear) connected to the rudder by steel cables with pulleys and a final push-pull rod. The rudder travel is 23° in both directions.

Fine trimming of the control is accomplished through a set up turnbuckles positioned in the compartment located behind the rear seat.



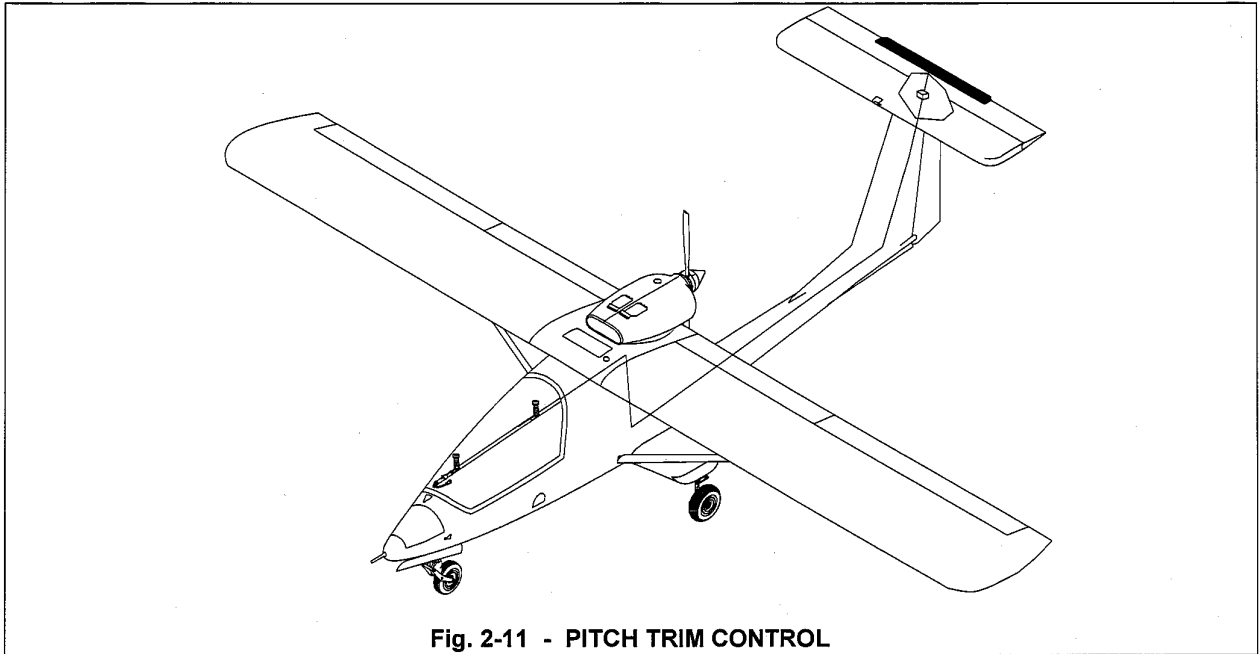
### D. Wing flap control

The flaps (Fig. 2-10) are plain type with a maximum deflection of 30° down. Their movement is controlled by a switch located on the instrument panel. The positions which the flaps will reach are indicated in degrees near the switch lever.



**E. Pitch trim control**

The aircraft is equipped with a pitch trim electrically controlled by a switch on both sidesticks (Fig. 2-11). These switches cause the aircraft to dive if pushed forward, and to climb if pushed backwards. An analog indicator located on the instrument panel shows trim tab position.



**Fig. 2-11 - PITCH TRIM CONTROL**

**F. Powerplant control**

The powerplant can be controlled in flight by both pilots (front and rear). The starting procedure is possible from the front seat only, as some controls (Master switch, dual ignition electronic system, and auxiliary electrical fuel pump on/off switch) are not available to the occupant of the rear seat. Powerplant controls and their availability to the pilots are listed in the following table:

| CONTROLS   | AVAILABILITY |          |
|--|--------------|----------|
|  | 1° Pilot     | 2° Pilot |
| 1. Throttle                                      | X            | X        |
| 2. Choke   | X            | X        |
| 3. Throttle and choke friction                   | X            |          |
| 4. Starter key                                   | X            | X        |
| 5. Fuel shut-off                                 | X            | X        |
| 6. Ignition shut off 1 & 2                       | X            | X        |
| 7. Brakes  | X            | X        |
| 8. Battery master switch                         | X            |          |
| 9. Generator master switch                       | X            |          |
| 10. Ignitions 1 & 2                              | X            |          |
| 11. Auxiliary fuel pump                          | X            |          |
| 12. Engine parameter indicators & warning lights | X            |          |
| 13. Carburetor heater control                    | X            |          |
| 14. Cabin heating control (if installed)         | X            |          |
| 15. Engine baffle control                        | X            |          |

#### **G. Carburetor heater control**

It is operated by a slider on the left console immediately behind the throttle.

#### **H. Cabin heating control (Optional equipment – applies only if cabin heating system is installed)**

It is operated by two sliders on the right console and by one on the left. The right slider on the right console controls the front mixer valve; when this lever is in the forward position, all the hot air flows towards the canopy ("Defrost" position) and when it is in the middle position, all the hot air flows into cabin, near the first pilot legs. In the backward position, the air flows through both the mixer outlets, canopy and cabin, and is mixed with the cold air that comes from the front NACA air intake. The left lever, close to the mixer valve lever, controls the firewall valve and closes the hot air flow from the engine heat exchanger. The lever on the left console opens the TEE distributor valve so that part of the air can flow toward the rear side of the cabin, near the second pilot feet.

#### **I. Engine baffle control**

It is operated by a slider on the right console. It controls the movement of the baffle behind the engine radiators.

## 2.5. LANDING GEAR AND BRAKE SYSTEM

The landing gear (Fig. 2-12), of the fixed tricycle type, is constructed, in the case of the nose wheel, of a self-centering wheel 4.10/3.50x4 (external diameter of nose wheel tire is 10.5 in) with a working pressure of 21.8 psi (1.5 bar), with a rubber shock absorber and, and in the case of the main gear, two leaf-springs fiberglass roving with two disc brakes. Shocks are absorbed by the leaf springs, the rubber shock absorber and the tires. Main wheel tires are of the type 5.00 x 5 (external diameter of the tire 13.5 in) with a working pressure of 29 psi (2.0 bar).

Braking action is obtained by disc brakes with hydraulic pinchers operating on the wheel discs of the main gear.

Depending on aircraft configuration, the brakes are controlled either by 2 levers on the right console, available to each pilot, or by toe pedals available for each pilot seat. Both the brake levers and the brake pedals act independently on the left and right wheels.

The parking brake consists of a mechanical lock placed on the right-hand side console and is available for the front seat only. To activate the parking brake, insert the locking device by lifting the knob and turning the handle 90 degrees clockwise. To release the parking brake, release the locking knob by lifting it and turning it 90 degrees counterclockwise.

### NOTE

Avoid keeping the parking brake on for long periods of time.

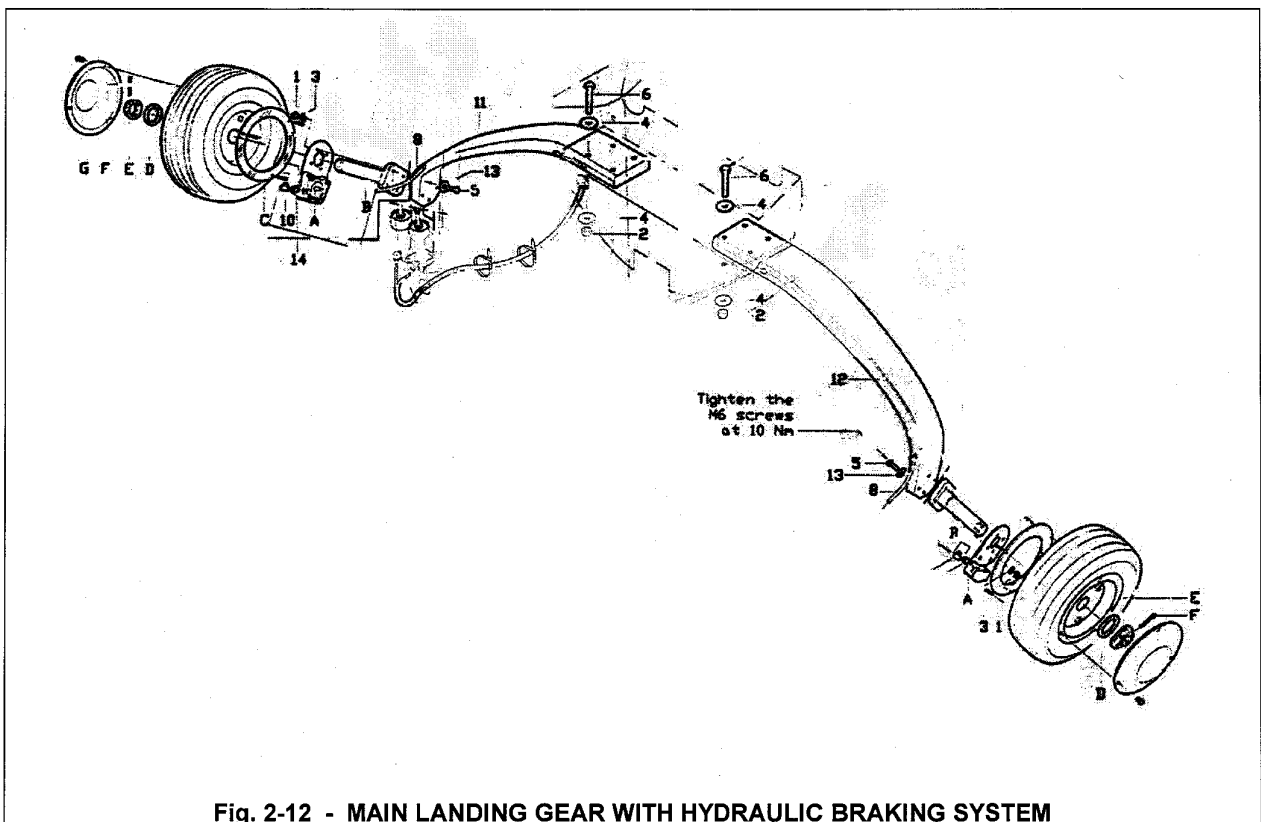


Fig. 2-12 - MAIN LANDING GEAR WITH HYDRAULIC BRAKING SYSTEM

## 2.6. COCKPIT

The cockpit is composed of:

- Canopy
- Standard instrument panel (or instrument panel with accessories)
- Left console
- Right console
- Rudder pedals
- Seats belts
- Baggage compartment
- Intercom, documents and map compartments

### A. Canopy

The canopy protects the crew and gives aerodynamic shape to the aircraft. It is constructed of one piece of transparent colorless Plexiglas molded on a supporting frame of fiberglass and carbon fiber. Inside the frame there is an air flow originated from a NACA scoop on the nose area of the aircraft. This air is distributed along the entire base of the canopy to supply fresh or alternatively hot air to the crew and avoid fogging of the canopy. To open, the canopy rotates on its hinges on the right side of the fuselage. On the left side of the canopy there is a sliding air scoop that contributes to the ventilation of the cockpit.

The canopy is locked to the fuselage by means of two studs mounted on the left side of the fuselage. A lever on the left console, available to both pilots, prevents the unintentional freeing of the studs.

#### **NOTE**

**Do not leave the aircraft parked with the canopy open.  
When the canopy is closed it must be as well locked, to prevent an  
unexpected gust of wind from opening and damaging it.**

### B. Instrument panel and accessory instrument panel

The panel (Fig. 2-13) is designed to be easily and fully removed. It is mounted to the aircraft by 2 hand operated bolts with rubber shock absorbers, and is connected to the aircraft systems by 2 electrical cables, 2 pneumatic connectors and 2 or more antenna connectors, depending on possible installation of optional avionics.

On the instrument panel is also installed the electrical flap control which indicates commanded position and the electric pitch trim position analog indicator. Suggested flap position for takeoff is 10°, on landing 20° or 30°.

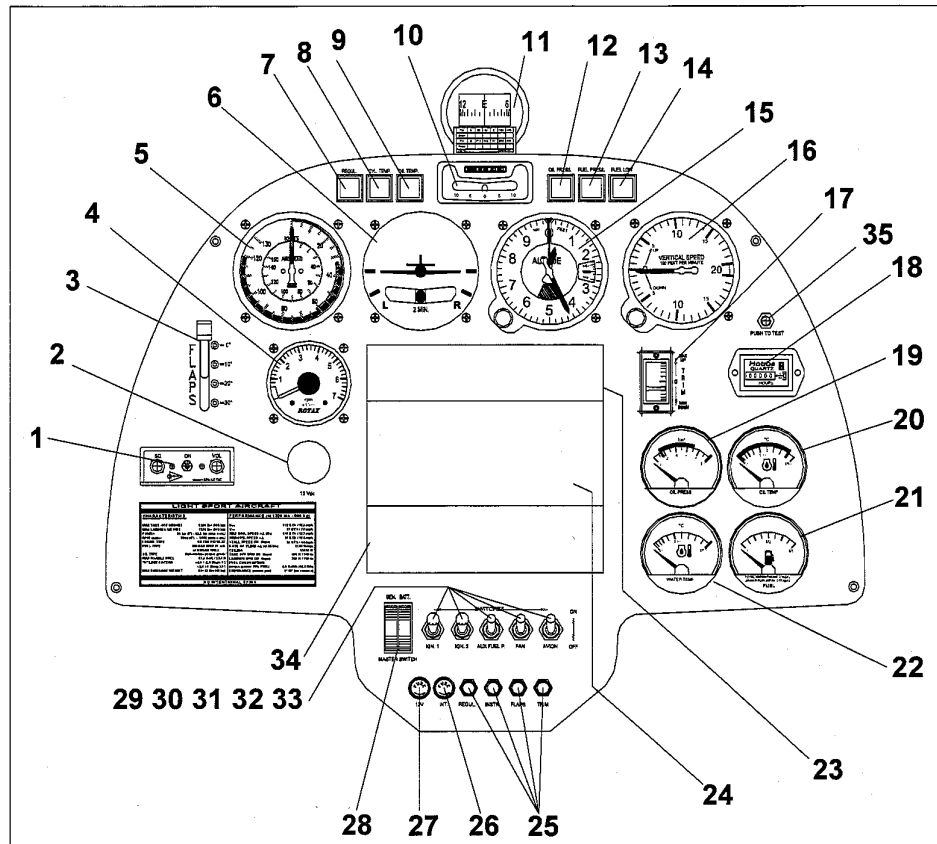
#### **NOTE**

**When entering and exiting the cockpit avoid leaning on the canopy and/or the instrument panel  
(compass). They are not strong enough to support you.**

For night operations, ASTM Standard F2245-06, Annex A2, requires the installation of an attitude indicator, attitude information can be presented to the pilot by the optional Dynon EFIS D-10A or Dynon FlightDEK-D180 units. In case of failure of the aircraft electric system, both units continue operating on an internal backup battery. To keep the backup battery fully charged, the EFIS D-10A and the FlightDEK-D180 must be connected to the aircraft master switch power for at least 1 hour per month.

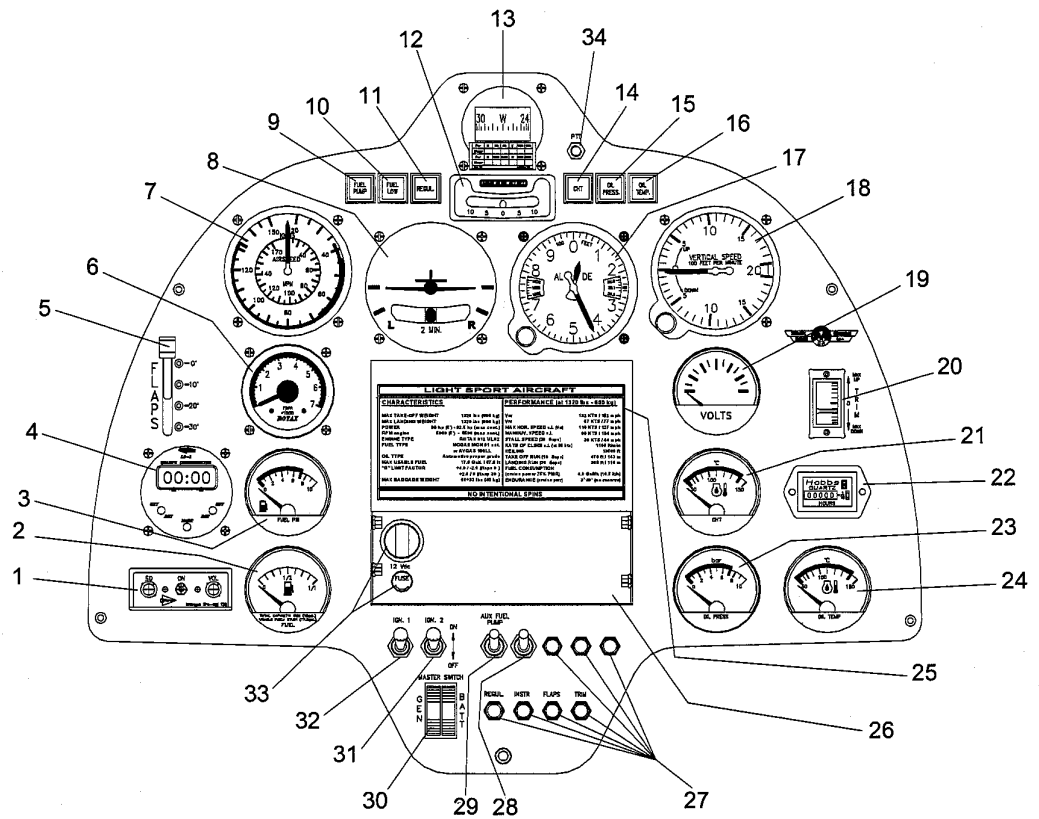
#### **NOTE**

**For detailed operating instructions of the Dynon EFIS D-10A and FlightDEK-D180,  
refer to the operating instructions provided by the manufacturer of the units.**



- |  |  |
|--|--|
| 1. Intercom                            | 19. CHT indicator                          |
| 2. 12 Vdc socket                       | 20. Fuel quantity indicator                |
| 3. Flap control lever                  | 21. Oil temperature indicator              |
| 4. Engine RPM indicator                | 22. Oil pressure indicator                 |
| 5. Airspeed indicator                  | 23. Available for avionics                 |
| 6. Turn coordinator                    | 24. Available for avionics                 |
| 7. Generator malfunction warning light | 25. Breakers                               |
| 8. CHT warning light                   | 26. Intercom line fuse                     |
| 9. Oil temperature warning light       | 27. 12 Vdc socket line fuse                |
| 10. Sideslip indicator                 | 28. Master switch (GEN and BATT)           |
| 11. Magnetic compass                   | 29. IGN. 1                                 |
| 12. Oil pressure warning light         | 30. IGN. 2                                 |
| 13. Fuel pressure warning light        | 31. Aux. Fuel pump switch                  |
| 14. Low fuel warning light             | 32. Aux. cooling fans switch               |
| 15. Altimeter                          | 33. Avionics switch                        |
| 16. Rate of climb indicator            | 34. Available for avionics                 |
| 17. Pitch trim position indicator      | 35. Push-to-test button for warning lights |
| 18. Hourmeter                          |  |

Fig. 2-13a - INSTRUMENTS PANEL, LAYOUT A – standard configuration



- |   |  |
|---|--|
| 1. Intercom                             | 19. Voltmeter                              |
| 2. Fuel quantity indicator              | 20. Pitch trim position indicator          |
| 3. Fuel pressure indicator              | 21. CHT indicator                          |
| 4. Digital chronometer                  | 22. Hourmeter                              |
| 5. Flap control lever                   | 23. Oil pressure indicator                 |
| 6. Engine RPM indicator                 | 24. Oil temperature indicator              |
| 7. Airspeed indicator                   | 25. Available for avionics                 |
| 8. Turn coordinator                     | 26. Available for avionics                 |
| 9. Fuel pressure warning light          | 27. Breakers (in use and available)        |
| 10. Low fuel warning light              | 28. Avionics switch (prearrangement)       |
| 11. Generator malfunction warning light | 29. Aux. Fuel pump switch                  |
| 12. Sideslip indicator                  | 30. Master switch (GEN and BATT)           |
| 13. Magnetic compass                    | 31. IGN. 2                                 |
| 14. CHT warning light                   | 32. IGN. 1                                 |
| 15. Oil pressure warning light          | 33. 12 Vdc socket and fuse                 |
| 16. Oil temperature warning light       | 34. Push-to-test button for warning lights |
| 17. Altimeter                           |  |
| 18. Rate of climb indicator             |  |

Fig. 2-13b - INSTRUMENTS PANEL, LAYOUT B – standard configuration

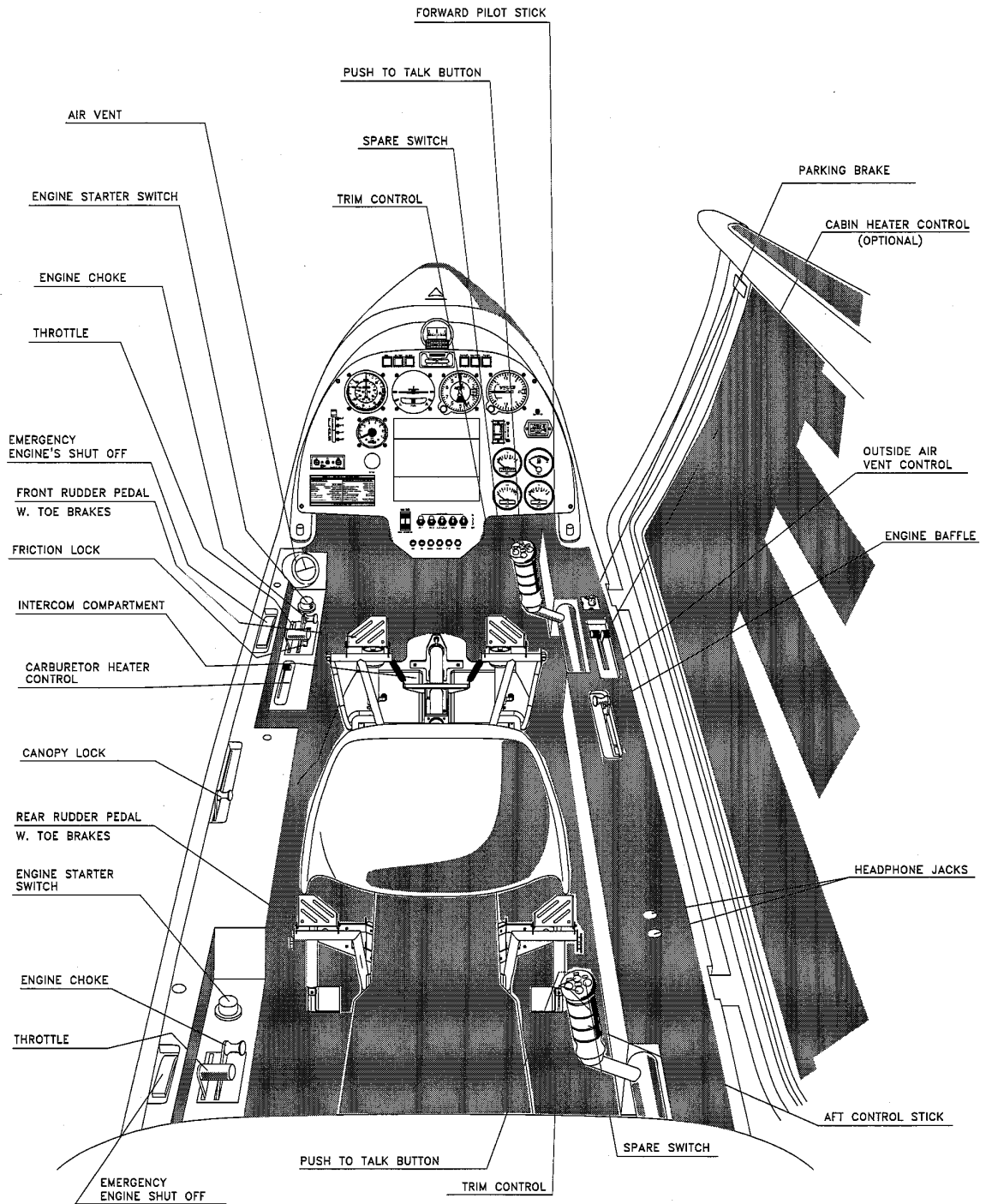


Fig. 2-14 - COCKPIT VIEW (configuration with pedal brakes shown)

### C. Left Console

On this console there are the following commands (starting forward and moving aft):

- adjustable air inlet plate
- engine starter key (front pilot)
- throttle friction (front pilot)
- choke (front pilot)
- throttle (front pilot)
- shut-off valve (front pilot)
- hot air carburetor lever
- lock/unlock, canopy lever
- engine starter key (rear pilot)
- choke (rear pilot)
- throttle (rear pilot)
- shut-off valve (rear pilot)

### D. Right Console

On this console there are the following commands (starting forward and moving aft):

- Brake levers, front and rear seat (depends on aircraft configuration)
- parking brake knob
- front pilot sidestick. Incorporates:
  - \*trim switch
  - \*microphone switch
- hot/cold cockpit air levers (if cabin heating system is installed)
- engine baffle control
- headphone microphone socket (front pilot)
- rear pilot sidestick. Incorporates:
  - \*trim switch
  - \*microphone switch.

### E. Rudder-pedals

The rudder-pedals (front and rear) are made of chrome-molybdenum tubing and steel cables. The rudder pedals are fastened to the cockpit floor with right angle brackets.

Depending on aircraft configuration, the pedals also accommodate the toe brakes and master cylinder assembly. To find the correct seating position, the distance between the front rudder pedals and the front seat is adjustable by an unlocking ball-grip, linked to a steel socket and recall spring, placed in the lower part of the instrument panel extension close to the floor.

The pedals may be moved by pulling the ball-grip until the click of the pedals hook can be heard, then pressing the pedals to place them farther away from the front seat or lightening the pressure on the pedals and continuing to pull the cable by the ball-grip to draw the pedals to the pilot, until the correct position is reached, then releasing the ball-grip and pressing the pedals until the click can be heard again. The rear rudder-pedals do not require regulation because the seat position and shape allows accommodation of pilots of any height.

#### **F. Seats and Harnesses**

The seats are not adjustable. Both seats have safety quick-release harnesses with 5 attachments. The harnesses can be adjusted by means of buckles.

#### **NOTE**

**When accessing the rear seat, use the proper retractable step on the side of the fuselage.**

#### **G. Baggage Compartment**

Baggage of no more than 66 and 33 lbs (30 and 15 kg) may be transported respectively in the compartments under the rear seat and the compartment behind the rear seat. However MTOW limit of 1,320 lbs (599 kg) must never be exceeded.

Rotate the rear seat forward to access the rear seat baggage compartment.

#### **H. Documents and maps compartments.**

On the floorboard ahead the front seat there is a hatch that provides access to a small compartment available to keep aircraft keys, pitot extension, special key for gasoline tank cup and other small useful items.

## **2.7. ELECTRICAL SYSTEM**

The electrical system (12 Vdc) is fed by two parallel power sources: the battery and the alternator. The standard alternator, internal to the engine and mechanically driven by the engine shaft, is the power source and supplies a power output of max. 250 W. The alternator supplies the recharging power for the battery (12V - 19 Ah) by a tension regulator safeguarded by a 25A circuit breaker mounted on the instrument panel. The tension regulator opens the circuit over  $16.5 \pm 0.3$  Volts. All circuits are safeguarded by fuses located in the nose compartment and in the instrument panel or by breakers or breaker switches on the instrument panel. The nose compartment also houses the battery with its vent and its relays. The main connections are by multipolar connectors with quick ring fittings to allow a fast removal. A schematic of the system is shown in Fig. 2-15.

#### **NOTE**

**Detailed wiring diagrams are available in the Maintenance Manual and/or at authorized maintenance facilities.**

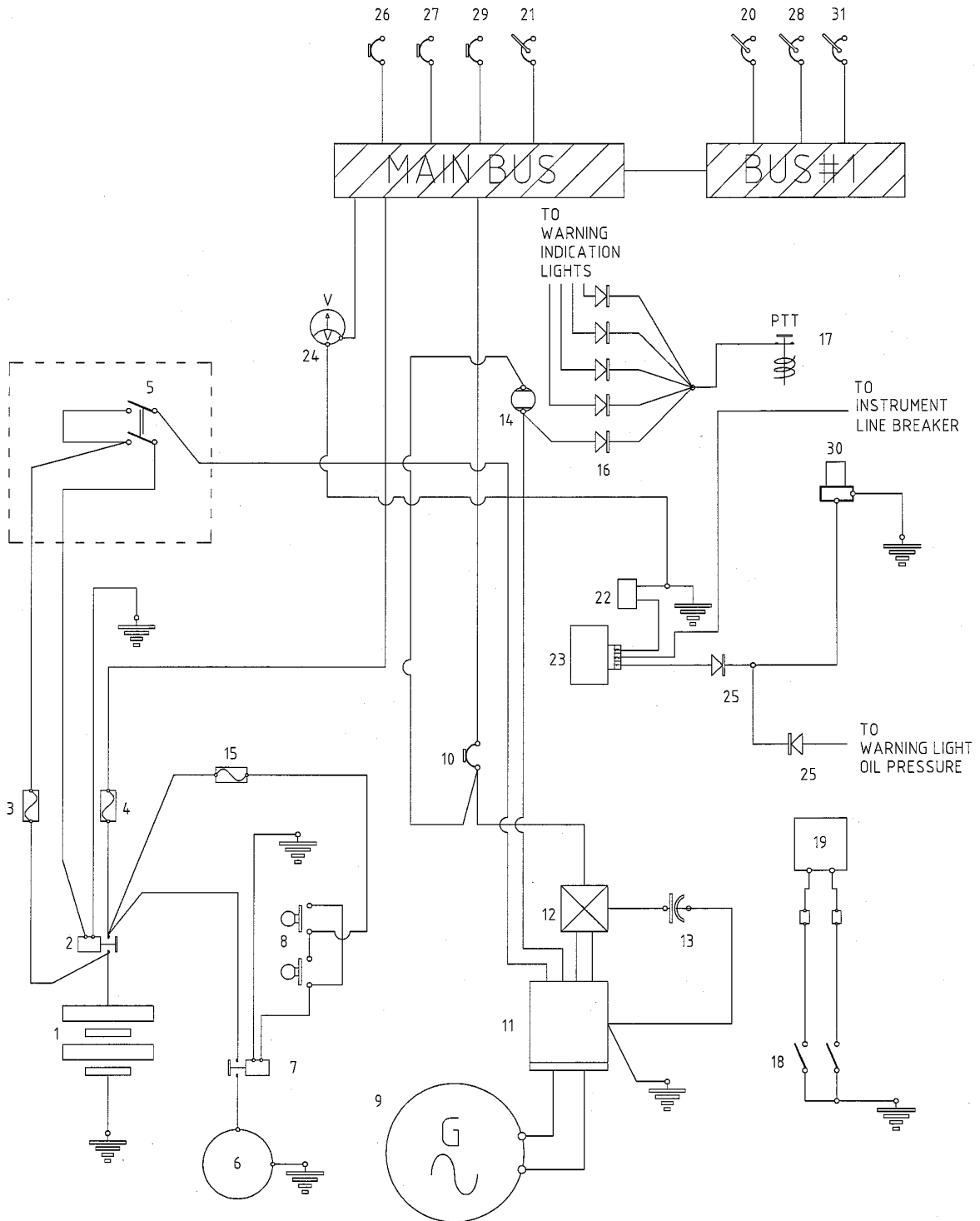


Fig. 2-15 - ELECTRICAL SYSTEM

**ELECTRICAL SYSTEM LEGEND**

| Item | Description                             | Item | Description  |
|------|---|------|--|
| 1    | Battery 12V                             | 26   | Instruments line breaker (5A):<br>- RPM indicator<br>- Oil temp. indicator<br>- Fuel level indicator<br>- Oil press. indicator<br>- Cyl. head temp. indicator<br>- 12 Vdc socket line fuse<br>- Hourmeter relay board<br>- Fuel pressure indicator |
| 2    | Battery relay                           |      |  |
| 3    | Master switch line fuse (5A)            |      |  |
| 4    | Main bus fuse (32A)                     |      |  |
| 5    | Master switch                           |      |  |
| 6    | Starter                                 |      |  |
| 7    | Starter relay                           |      |  |
| 8    | Starter key switches                    |      |  |
| 9    | Alternator (250W)                       |      |  |
| 10   | Alternator line breaker (25A)           | 27   | Trim line breaker (2A):<br>- Trim position indicator<br>- Flap/trim card   |
| 11   | Rectifier/Regulator                     |      |  |
| 12   | Equipotential positive                  |      |  |
| 13   | Capacitor (22000µF, 25V)                | 28   | Avionics line breaker (10 A) (optional)<br>- Intercom (1A)<br>- VHF  |
| 14   | Regulator warning light                 |      |  |
| 15   | Starter key switches line fuse (5A)     |      |  |
| 16   | Warning lights test line diodes         | 29   | Flap line breaker (7.5A)<br>- Flap position commuter<br>- Flap actuator  |
| 17   | Warning lights test button              |      |  |
| 18   | Ignition switches (1 and 2)             |      |  |
| 19   | Ignition box                            | 30   | Oil pressure sensor  |
| 20   | Auxiliary fuel pump breaker (5A)        | 31   | Transponder line breaker (3 A) (optional)<br>- Transponder<br>- Encoder  |
| 21   | Aux. cooling fans breaker (5A) (option) |      |  |
| 22   | Hourmeter                               |      |  |
| 23   | Hourmeter relay board                   |      |  |
| 24   | Voltmeter                               |      |  |
| 25   | Diodes                                  |      |  |

## 2.8. AIRSPEED SYSTEM, STATIC AND DYNAMIC PORTS

The system supplies static pressure to airspeed indicator, the altimeter and to the vertical speed indicator. The static ports are on the sides (right and left) of the fuselage. The system schematic is shown in Fig. 2-16.

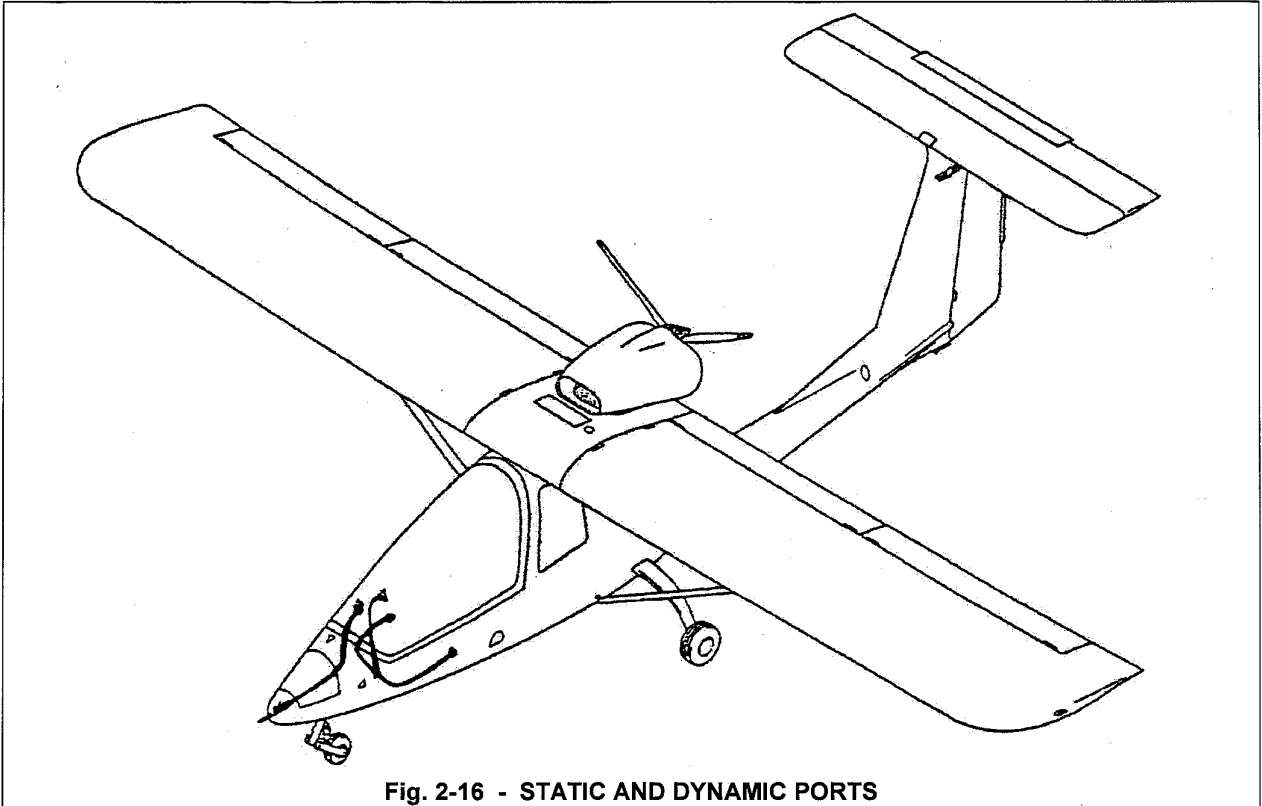


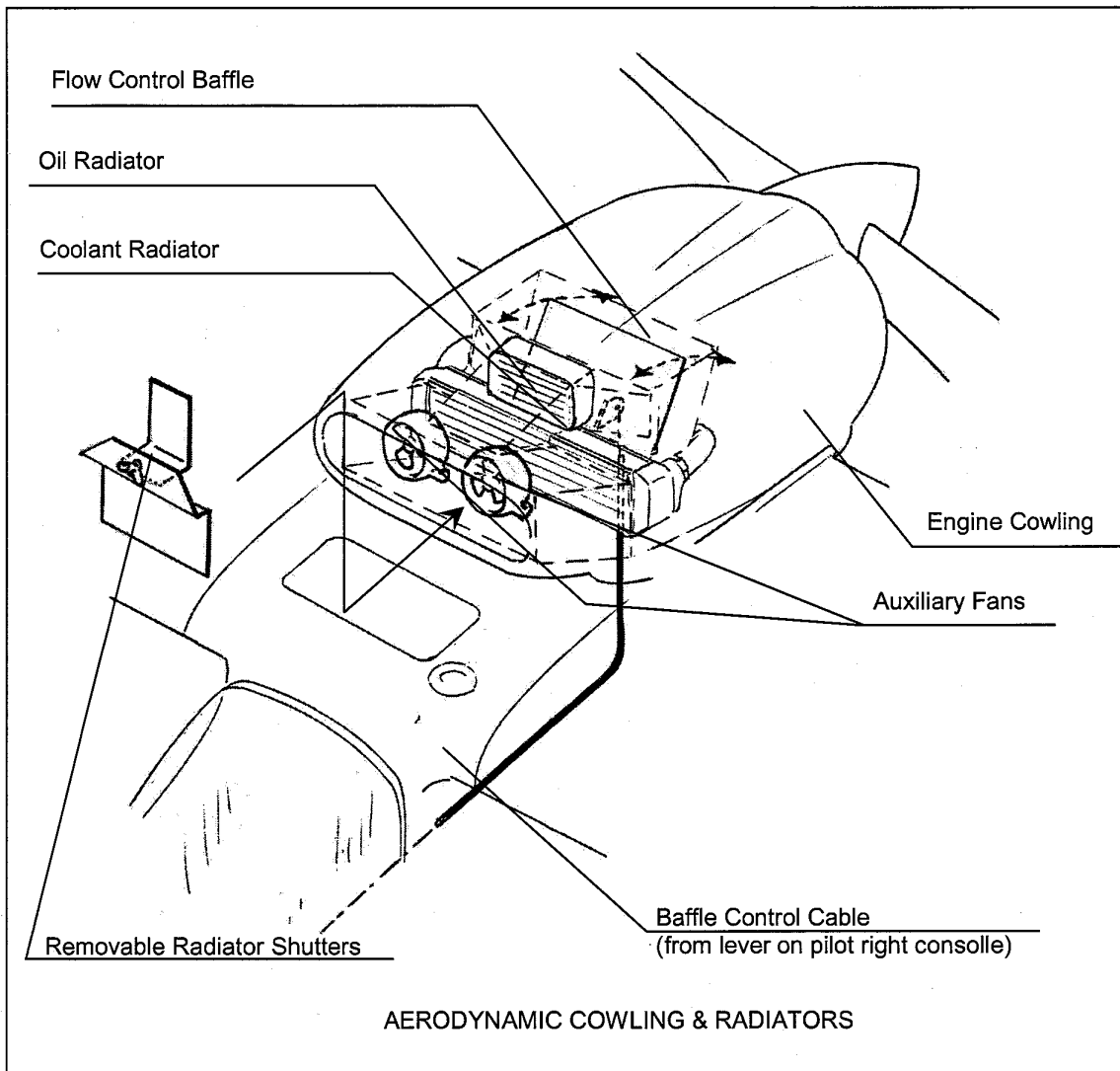
Fig. 2-16 - STATIC AND DYNAMIC PORTS

## 2.9. PNEUMATIC STALL WARNING SYSTEM

The system provides an acoustic stall warning at a speed between 5 and 10 kts before the stall. It is supplied by a dynamic suction port located near the leading edge of the left wing near the fuselage and by an acoustic indicator located near the rear seat.

## 2.10. AUXILIARY ENGINE COOLING SYSTEM (Optional equipment)

The engine can be equipped with an adjustable baffle system and two optional auxiliary cooling fans placed before the coolant and oil radiators. The baffles are adjusted by the pilot through a lever on the right-hand console. The fans are operated by the pilot by a button placed in the instrument panel. The system has to be used on ground during taxiing and long holdings with engine running, when the engine coolant temperature reaches 212 °F (100 °C). In flight, after takeoff, the fans have to be switched off.



## **SECTION 3**

### **OPERATING LIMITATIONS**

#### **3.1. INTRODUCTION**

#### **3.2 AIRSPEED LIMITATIONS**

#### **3.3 AIRSPEED INDICATOR MARKINGS**

#### **3.4. POWERPLANT LIMITATIONS**

#### **3.5. POWERPLANT INSTRUMENT MARKINGS**

##### **3.5.1 WARNING LIGHTS**

##### **3.5.2 LIMITATIONS SHOWN ON FLIGHT & ENGINE INSTRUMENTS**

#### **3.6. WEIGHT LIMITS**

#### **3.7. CENTER OF GRAVITY LIMITS**

#### **3.8. DEMONSTRATED CROSSWIND COMPONENT**

#### **3.9. SERVICE CEILING**

#### **3.10. MANEUVERING LOAD FACTORS**

#### **3.11. APPROVED MANEUVERS**

#### **3.12. FLIGHT CREW**

#### **3.13. KINDS OF OPERATION**

#### **3.14. FUEL LIMITATIONS**

#### **3.15. LIMITATION PLACARDS**

### 3.1. INTRODUCTION

Section 3 consists of the operating limitations, instrument markings, airspeed indicator markings and the limitations placards which are necessary for safe operation of the aircraft.

#### **WARNING**

**These limitations must be complied with for all operations.**

#### **NOTE**

**The external surfaces of this aircraft must be painted with shining white to avoid overheating of composite surface**

### 3.2. AIRSPEED LIMITATIONS

| SYMBOL   | DEFINITION                     | KCAS | KIAS | REMARKS  |
|----------|--------------------------------|------|------|--|
| $V_{NE}$ | Never exceed speed             | 132  | 132  | Never exceed this speed limit in any and all flight conditions   |
| $V_{NO}$ | Max. Structural cruising Speed | 104  | 104  | Do not exceed this speed limit in turbulent air                  |
| $V_A$    | Maneuvering Speed              | 90   | 93   | Do not use abrupt full control deflection at or above this speed |
| $V_{FE}$ | Maximum Flap Extended Speed    | 67   | 67   | Do not exceed this speed with flaps extended                     |

### 3.3. AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings are shown in Section 9.

## 3.4. POWER PLANT LIMITATIONS

### Engine

|  |  |
|--|--|
| Manufacturer   | BOMBARDIER ROTAX, Gunskirchen (Austria)                  |
| Type   | ROTAX 912 ULS2 or ROTAX 912 S2                           |
| Category   | Four stroke, 4 opposing cylinders, air and liquid cooled |
| Max. power at takeoff (5' minutes max)                                   | 98 hp (73.5 kW) @ 5,800 RPM                              |
| Max. continuous power  | 92.5 hp (69 kW) @ 5,500 RPM                              |
| Max. continuous engine RPM   | 5,500 RPM  |
| Max. cylinder heads temperature  | 266 °F (130 °C)  |
| Min & max. oil temperature   | 120 °F - 266 °F (50 °C – 130 °C)                         |
| Min oil pressure   | 12 psi (0.8 bar) (below 3,500 RPM)                       |
| Max oil press. (cold start - short term)                                 | 102 psi (7.0 bar)  |
| Normal operating oil pressure  | 29 ÷ 73 psi (2.0 ÷ 5.0 bar) (above 3,500 RPM)            |
| Min & Max. fuel pressure   | 2.2 ÷ 5.8 psi (4.5 ÷ 12.0 in/Hg)                         |
| Fuel specifications  | See section 3.14   |
| Limit of engine operation at zero gravity and in negative "g" conditions | 5 seconds at max – 0.5 g                                 |

### Propeller:

|                         |   |
|-------------------------|---|
| Manufacturer            | WARP-DRIVE, Inc. (U.S.A.)   |
| Type                    | 3 blades, composite, ground-adjustable pitch  |
| Pitch (typical setting) | 23° at 68% R  |
| Diameter                | 68.5 in (174 cm)  |
| Speed limitation        | Max (5 minutes): 2,383 RPM (5,800 RPM engine)<br>Max continuous: 2,260 RPM (5,500 RPM engine) |

#### NOTE

**The propeller is driven by a reduction gear with a ratio of 2.4343:1 (engine: prop.).  
The RPM indicator indicates engine speed. For this reason all RPM references  
within this manual are engine speeds.**

## 3.5. POWERPLANT INSTRUMENT MARKINGS

### 3.5.1. WARNING LIGHTS

The standard model is equipped with red warning lights that signal when the oil pressure, oil temperature and cylinder heads temperature (CHT) have reached dangerous levels or when the generator is not supplying enough energy. Location of the warning lights on the instrument panel is illustrated in Section 2, Aircraft and Systems Description.

The alarms operate at the following limits:

|                                  |                                   |
|----------------------------------|-----------------------------------|
| oil temperature                  | > 266 °F ± 9 °F (>130 °C ± 5 °C)  |
| oil pressure                     | < 22 psi (1.5 bar)                |
| cylinder heads temperature (CHT) | > 266 °F ± 9 °F (> 130 °C ± 5 °C) |
| generator output                 | < 12V                             |

In case of alarm, follow the procedures described in Section 6, Emergency Procedures.

### 3.5.2. LIMITATIONS SHOWN ON FLIGHT & ENGINE INSTRUMENTS

Engine instrument markings are shown in Section 9.

#### **CAUTION**

**Avoid, during cruise, allowing the oil temperature to drop below the normal operating range (194 ÷ 230 °F / 90 ÷ 110 °C), as possible formation of condensation water in the lubrication system badly influences the oil quality. To evaporate possibly accumulated condensation water, at least once a day 212 °F (100 °C) oil temperature must be reached.**

### 3.6. WEIGHT LIMITS

|  |                         |
|--|-------------------------|
| Maximum take off weight:                   | 1,320 lbs (599 kg)      |
| Maximum landing weight:                    | 1,320 lbs (599 kg)      |
| Maximum weight in the baggage compartments | 66 +33 lbs (30 + 15 kg) |

### 3.7. CENTER OF GRAVITY LIMITS

The aircraft nose is the reference datum for the following distances.

- Maximum forward CG limits:
  - At 1,320 lbs (599 kg) or less: 111.02 in (2.823 m)  
24.5% MAC
- Maximum aft CG limits:
  - At 1,212 lbs (550 kg) or less: 118.6 in (3.012 m)  
38.0% MAC
  - At 1,320 lbs (599 kg): 116.9 in (2.97 m)  
35.0% MAC

Linear variation for intermediate weights.

The procedure to determine the center of gravity is described in Section 4, Weight and Balance – Equipment List.

### 3.8. DEMONSTRATED CROSSWIND COMPONENT

See Section 5.4

### 3.9. SERVICE CEILING

See Section 5.3

### 3.10. MANEUVERING LOAD FACTORS

Structural maximum permissible load factors from  $V_A$  to  $V_{NE}$  are the following:

- Positive: + 4.0
- Negative: - 2.0

Structural maximum permissible load factors at  $V_{FE}$  (with extended flaps) are the following:

- Positive: + 2.0
- Negative: 0

### 3.11. APPROVED MANEUVERS

#### Permissible Maneuvers

1. All normal flight maneuvers
2. 60° angle of bank turn
3. Lazy eights
4. Chandelles
5. Stall (except whip stalls):

#### Entering speed

= = =  
77 KCAS (80 KIAS)  
97 KCAS (100 KIAS)  
97 KCAS (100 KIAS)  
Slow deceleration

#### NOTE

**Aerobatics as well as flight maneuvers with bank angles exceeding 60° are prohibited. Intentional spins are prohibited.**

### 3.12. FLIGHT CREW

Minimum flight crew

N° 1 Pilot operating from the front seat.

#### NOTE

**In single pilot operations, belt and shoulder harness of the vacant seat must be secured to avoid uncontrolled movement of seat and belt.**

### 3.13. KINDS OF OPERATION

Pilots holding a Sport Pilot certificated are permitted to fly under Visual Flight Rules as indicated in sub-section 1.2.3. Flights in known icing conditions are prohibited.

Minimum equipment required for operating the aircraft in compliance with applicable Light-Sport category and FAR regulations, and additional equipment installed by the manufacturer or available as an option is listed below:

#### NOTE

**Night operations are allowed only if the equipment required by ASTM Standard F2245-06 Annex A2 is installed. A complete list of installed and additional equipment is included in section 4 of the manual.**

|  | Required for: |           |        |
|--|---------------|-----------|--------|
|  | Day VFR       | Night VFR | Inst.  |
| <b>A. Flight and Navigation Instruments</b>  |               |           |        |
| Airspeed Indicator   | X             | X         | X      |
| Altimeter  | X             | X         | X      |
| Rate of Climb Indicator  |               |           | Option |
| Attitude indicator   |               | X         | Option |
| Sideslip indicator   |               |           | X      |
| Magnetic Compass   |               |           | X      |
| <b>B. Powerplant Instruments</b>   |               |           |        |
| Fuel Quantity Indicator  | X             | X         | X      |
| Fuel Pressure Indicator (s/n LSA002 and subs.)   |               |           | X      |
| Oil Pressure Indicator   | X             | X         | X      |
| Oil Temperature Indicator  | X             | X         | X      |
| Cylinder Heads Temperature Indicator   | X             | X         | X      |
| Engine RPM Indicator   | X             | X         | X      |
| Warning lights: oil press., oil temp., CHT, low fuel press, low fuel qty and generator failure |               |           | X      |
| <b>C. Other equipment</b>  |               |           |        |
| Seat Belts and Harness for each crew member  | X             | X         | X      |
| NAV/Anti collision lights system   |               | X         | Option |
| Cabin lights   |               | X         | Option |
| Landing light  |               |           | Option |
| ELT (see applicable regulations for ELT requirements)  |               |           | Option |

### 3.14. FUEL LIMITATIONS

|               |  |
|---------------|--|
| Fuel Quantity | 18 gal (68 lt)                                     |
| Usable Fuel   | 17.8 gal (67.5 lt)                                 |
| Approved Fuel | MOGAS MON 91 octane (U.S. standard)<br>AVGAS 100LL |

#### **NOTE**

**MOGAS RON 95/98 octane (or  $(RON+MON)/2 = 91$  octane) is approved fuel for continuous engine operation. AVGAS 100LL may be used only if other fuel types are not available. When mainly using AVGAS, residue formation leading to service difficulties can occur more frequently due to the higher lead contents (the engine is considered to be operated mainly on leaded AVGAS when used with AVGAS fuel for more than 30% of engine operating time). Therefore shorter maintenance intervals must be implemented immediately (see Maintenance Manual). In addition, when mainly using AVGAS compliance with the following operating conditions is required:**

- avoid extended or unnecessary use of carburetor air pre heating
- avoid prolonged periods of low speed idling

### 3.15. LIMITATION PLACARDS

All limitations expressed by the placards mounted on the instrument panel or in other visible locations in the cockpit, must be complied with. Placards are shown in section 9.

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## **SECTION 4**

### **WEIGHT AND BALANCE - EQUIPMENT LIST**

#### **4.1. INTRODUCTION**

#### **4.2. AIRCRAFT WEIGHING PROCEDURES**

#### **4.3. WEIGHT AND BALANCE**

#### **4.4. SAMPLE LOADING PROBLEM**

#### **4.5. LOADING GRAPH**

#### **4.6. CENTER OF GRAVITY MOMENT ENVELOPE**

#### **4.7. CENTER OF GRAVITY LIMITS TO REFERENCE DATUM**

#### **4.8. EQUIPMENT LIST**

## 4.1 INTRODUCTION

This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided. A comprehensive list of all Sky Arrow equipment available for this type of airplane, is included at the back of this section.

It should be noted that specific information regarding the weight, arm, moment and installed equipment list for this specific airplane can only be found in the appropriate weight and balance records. This information are part of the Equipment List (see Section 4.8), and carried in the airplane.

## 4.2. AIRCRAFT WEIGHING PROCEDURES

### 1. Preparation:

- a. Inflate tires to recommended operating pressures;
- b. Drain all fuel;
- c. Fill completely the oil system;
- d. Fill completely the cooling system;
- e. Fill completely the brake system;
- f. Be sure that the canopy is closed;
- g. Raise flaps to the fully retracted position;
- h. Place all control surfaces in neutral position.

### 2. Levelling:

- a. Place scales under each wheel. Minimum capacity: 440 lbs (200 kg) for scales under the main gears, and 220 lbs (100 kg) for scale under the nose gear
- b. Level the aircraft (lower or raise the nose strut to centre bubble on level)

### 3. Weighing:

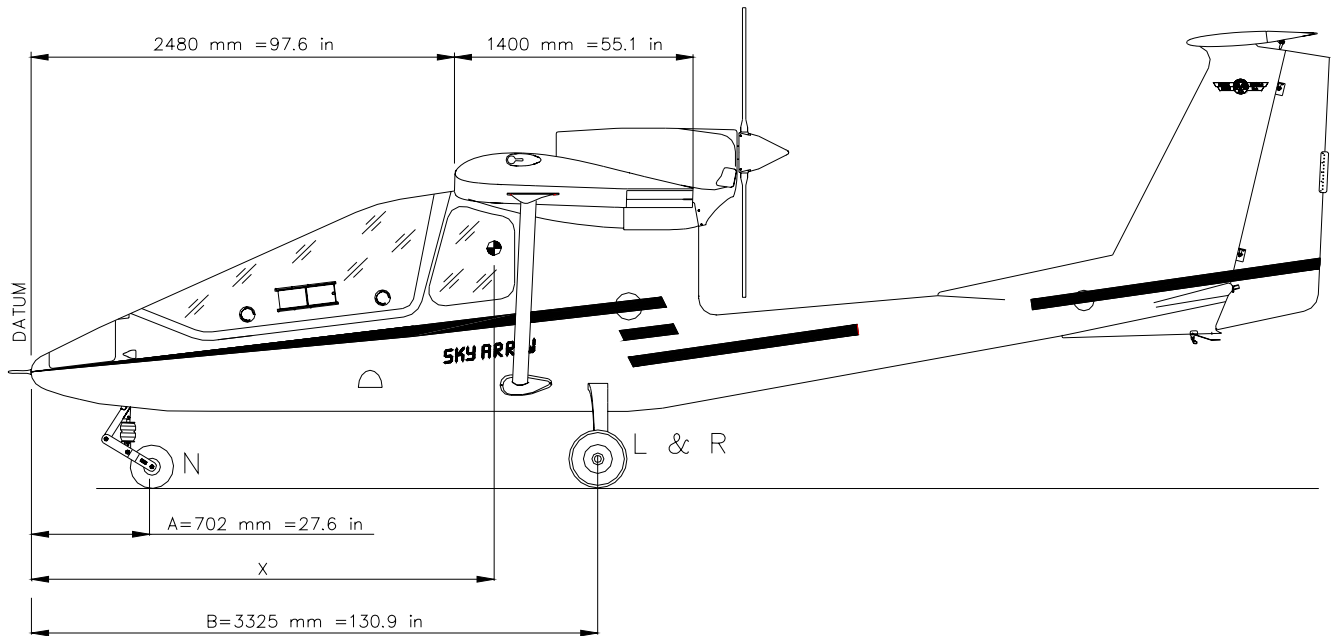
- a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

### 4. Using weights from item 3 and measurements from figure 4-1, the airplane empty weight and C.G. can be determined.

### 5. Basic Empty Weight may be determined by completing figure 4-1

### **NOTE**

**The scales must be correctly calibrated and certified**



**Figure 4-1. Sample Airplane Weighing**

| Scale Position                  | Scale Reading | Tare | Symbol | Net Weight |
|---------------------------------|---------------|------|--------|------------|
| Left Wheel                      |               |      | L      |            |
| Right Wheel                     |               |      | R      |            |
| Nose Wheel                      |               |      | N      |            |
| Sum of Net Weights (As Weighed) |               |      |        | W          |

$$X = \text{ARM} = \frac{N \times A + (L+R) \times B}{W}$$

$$X = \frac{(\quad) \times (\quad) + (\quad + \quad) \times (\quad)}{(\quad)}$$

### 4.3. WEIGHT AND BALANCE

The following information will enable you to operate your Sky Arrow within the prescribed weight and center of gravity limitations. To figure weight and balance, use the Sample Problem, Loading Graph, and Center of Gravity Moment Envelope as follows:

Take the basic empty weight and moment from appropriate weight and balance records (para. 4.8), and enter them in the column titled YOUR AIRPLANE on the Sample Loading Problem (para. 4.4).

#### **NOTE**

**In addition to the basic empty weight and moment noted on these records, the C.G. arm (fuselage station) is also shown, but need not be used on the Sample Loading Problem.**

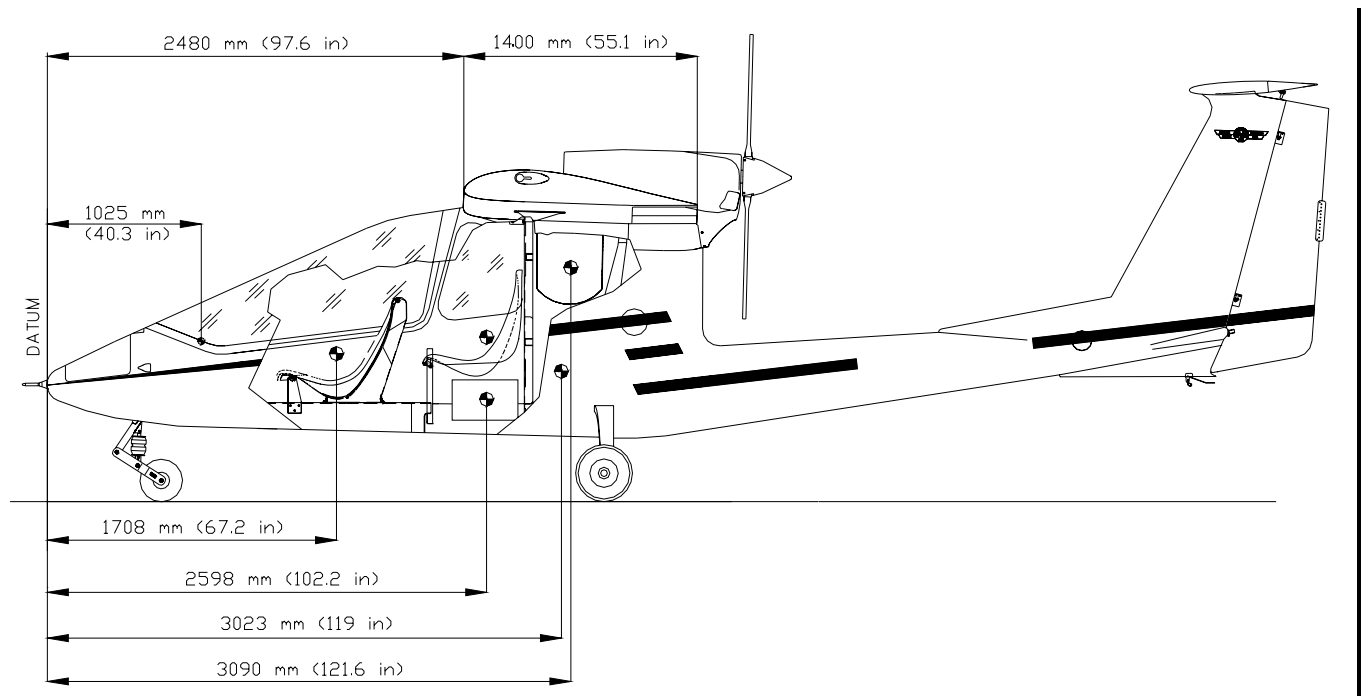
**The moment which is shown must be divided by 1000 and this value used as the moment/1000 on the loading problem**

Use the Loading Graph to determine the moment/1000 for each additional item to be carried; then list these on the loading problem.

#### **NOTE**

**Loading Graph information for the pilot, passengers and baggage is based on seats positions and baggage loaded in the center of the baggage areas as shown on the Loading Arrangements diagram (figure 4-2).**

Total the weights and moments/1000 and plot these values on the Center of Gravity Moment Envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

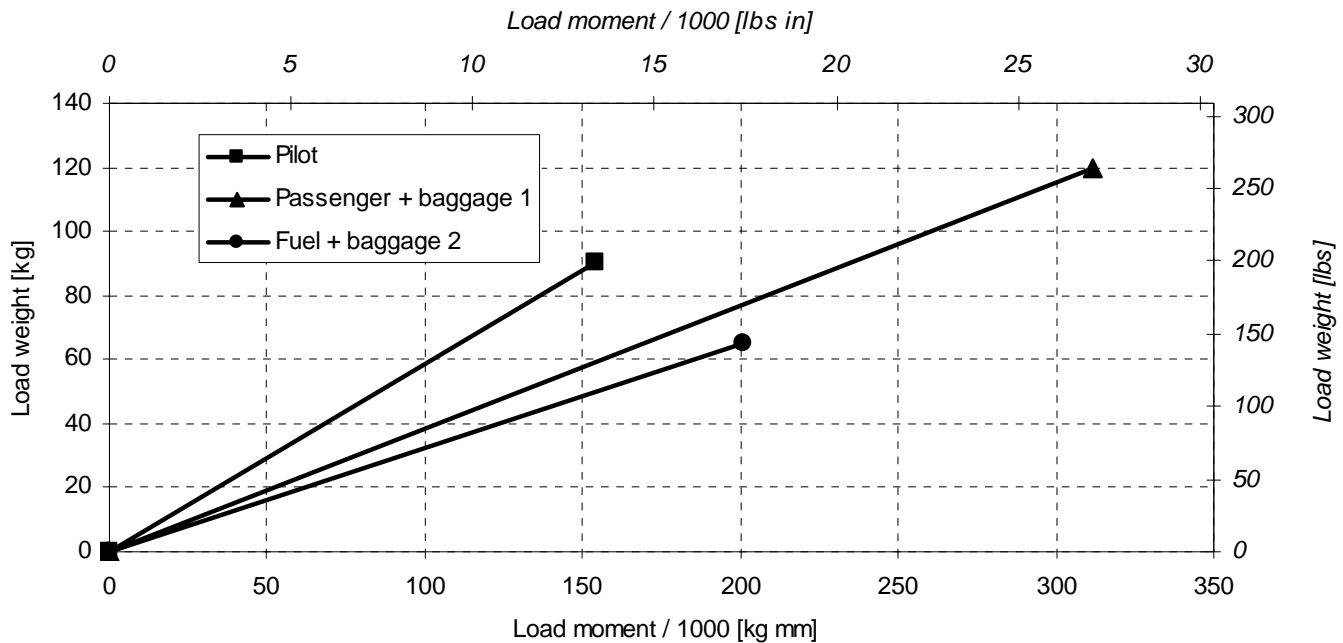


**Figure 4-2 Loading Arrangements**

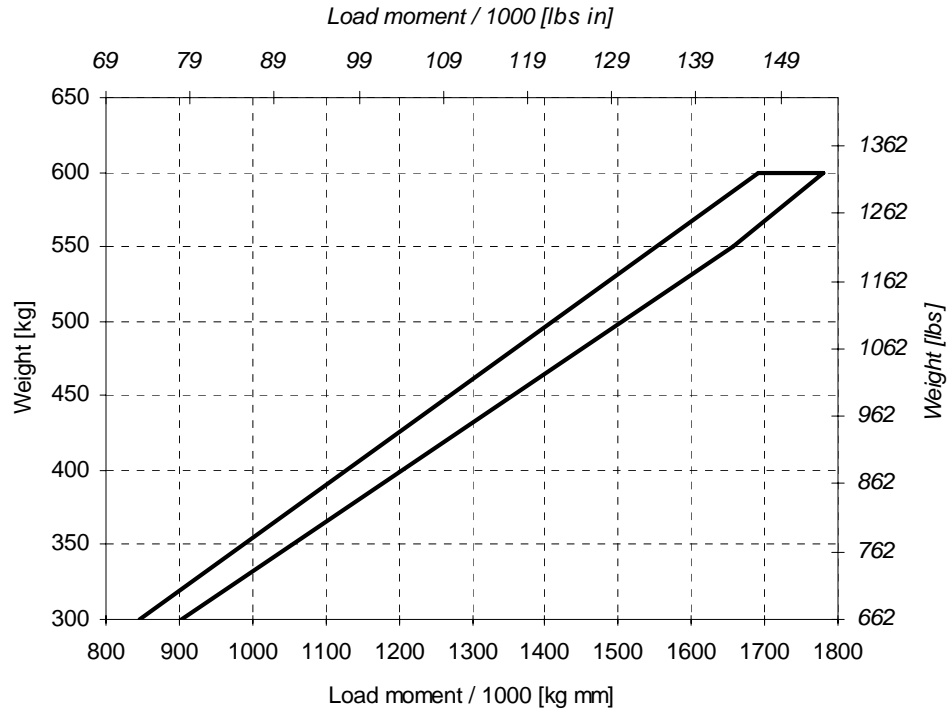
### 4.4. SAMPLE LOADING PROBLEM

|   | SAMPLE AIRPLANE |                       | YOUR AIRPLANE |                       |
|---|-----------------|-----------------------|---------------|-----------------------|
|   | Weight (lbs)    | Moment (lb.-in /1000) | Weight (lbs)  | Moment (lb.-in /1000) |
| 1. Basic Empty Weight (use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel, full oil and coolant)                              | 870             | 105                   |               |                       |
| 2. Usable Fuel (At 6 lbs/gal, 17.8 gal. max.)   | 100             | 12.2                  |               |                       |
| 3. Pilot  | 150             | 10.5                  |               |                       |
| 4. Passenger  | 150             | 15.5                  |               |                       |
| 5. Under rear seat baggage (Area 1, 66 lbs max.)  | 30              | 3.5                   |               |                       |
| 6. Behind rear seat baggage (Area 2, 33 lbs max.)   | 10              | 1.2                   |               |                       |
| <b>7. TOTAL WEIGHT AND MOMENT</b>   | <b>1,310</b>    | <b>147.9</b>          |               |                       |
| 8. Locate this point (Total Weight and Moment) on the Center of gravity Moment Envelope (para. 4.6).If this point falls within the envelope, the loading is acceptable. |                 |                       |               |                       |

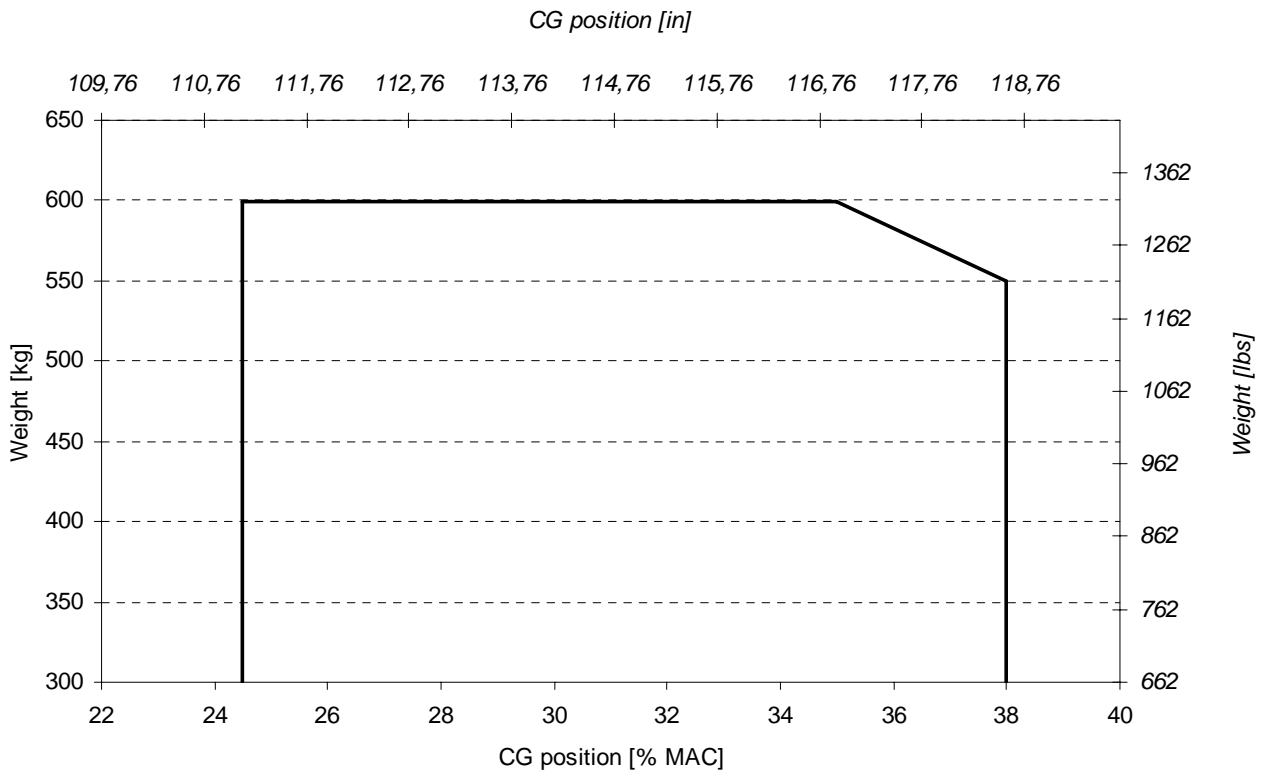
### 4.5. LOADING GRAPH



### 4.6. CENTER OF GRAVITY MOMENT ENVELOPE



### 4.7. CENTER OF GRAVITY LIMITS TO REFERENCE DATUM



## 4.8. EQUIPMENT LIST

The following equipment list is comprehensive of all Sky Arrow 600 Sport equipment available for this type of airplane.

The equipment list is composed by various items which are identified as follows:

An **item number** gives the identification number for each item. Each number is prefixed with a letter which identifies the **descriptive** grouping under which it is listed. This groupings are:

- A – Powerplant and accessories
- B – Landing gear and accessories
- C – Main electrical systems
- D – Cabin accommodation
- E – Instrument panel
- F – Additional equipment

A reference **drawing column** provides the Part Number or the Drawing Number for the item. Columns showing weight and arm provide the weight and center of gravity location for the equipment.

### NOTE

**The installation of additional equipment can be performed only with written consent and instructions provided by the manufacturer.**

### NOTE

**The values for weight and arm are shown. Positive arms are distances aft of the airplane datum.**

The equipment list contains the following additional information:

- specification of **aircraft model**, **serial number** and **registration number**;
- for each item, verification of installation (writing X in the corresponding square of column **INST.**)

The empty weight and balance record contained in this paragraph is provided for the recording of changes in the equipment affecting weight and balance.

In addition, the take-off weight and balance is also contained in this paragraph.

### NOTE

**A customized Empty Weight and Balance report and installed Equipment List are provided for each airplane as delivered from the factory and are attached at the end of this section.**

**EQUIPMENT LIST – Sky Arrow 600 Sport**

| A. POWERPLANT AND ACCESSORIES |  |                            |                                     | AIRCRAFT S/N: |    | REGISTRATION:  |                  |
|-------------------------------|--|----------------------------|-------------------------------------|---------------|----|----------------|------------------|
| N.                            | PART DESCRIPTION                             | Manufacturer               | Id-Code P/N                         | INSTALLED     |    | MASS lbs (kg)  | ARM in (mm)      |
|                               |  |                            |                                     | Yes           | No |                |                  |
| A1-a                          | Engine                                       | ROTAX                      | 912 ULS2                            |               |    | 173<br>(78.5)  | 151.6<br>(3,850) |
| A1-b                          | Engine                                       | ROTAX                      | 912 S2                              |               |    | 173<br>(78.5)  | 151.6<br>(3,850) |
| A2                            | Oil radiator                                 | ROTAX                      | 886.029                             |               |    | 1.1<br>(0.5)   | 124.0<br>(3,150) |
| A3                            | Coolant radiator                             | ROTAX                      | 995.697                             |               |    | 1.6<br>(0.75)  | 124.0<br>(3,150) |
| A4                            | Propeller                                    | Warp Drive                 | (641) 357 6000                      |               |    | 9.7<br>(4.4)   | 164.2<br>(4,170) |
| A5                            | Spinner                                      | Warp Drive                 | ---                                 |               |    | 0.9<br>(0.4)   | 164.6<br>(4,180) |
| A6                            | Aux fuel pump                                | Facet                      | 40106                               |               |    | 1.1<br>(0.5)   | 137.0<br>(3,480) |
| A7                            | Gascolator                                   | ACS                        | AGS-HBS-1                           |               |    | 0.66<br>(0.3)  | 133.8<br>(3,400) |
| A8-a                          | Fuel level sensor/switch                     | VDO                        | 226801015001C<br>(3i P/N 12STAE508) |               |    | 0.44<br>(0.2)  | 121.6<br>(3,090) |
| A8-b                          | Fuel level sensor/switch                     | VDO                        | 224817008004R<br>(3i P/N 12STAE506) |               |    | 0.44<br>(0.2)  | 121.6<br>(3,090) |
| A8-c                          | Fuel level sensor/switch                     | VDO                        | 395262001013G<br>(3i P/N 12STAE510) |               |    | 0.22<br>(0.1)  | 121.6<br>(3,090) |
| <b>B. LANDING GEAR</b>        |  |                            |                                     |               |    |                |                  |
| B1                            | Main gear wheel & brake assy                 | Marc-Ingegno               | 010102100                           |               |    | 10.49<br>(4.7) | 131<br>(3,325)   |
| B2                            | Main gear tire                               | Air-Trac<br>5.00-5", 6-ply | 040105001                           |               |    | 8.4<br>(3.8)   | 131<br>(3,325)   |
| B3                            | Master cylinder brake (front)                | Matco                      | MC-5                                |               |    | 4.4<br>(2.0)   | 131<br>(3,325)   |
| B4                            | Master cylinder brake (rear)                 | Matco                      | MC-4                                |               |    | 1.3<br>(0.6)   | 106.3<br>(2,700) |
| B5                            | Nose wheel                                   | Cheng-Shin                 | 7038<br>7131                        |               |    | 2.2<br>(1.00)  | 27.8<br>(706)    |
| B6                            | Shock absorber                               | Angst Pfister              | 150 1B                              |               |    | 0.55<br>(0.25) | 24.0<br>(610)    |
| B7                            | Master cylinder brake (finger brake config.) | Marc-Ingegno               | 010201100<br>010201117              |               |    | 0.8<br>(0.36)  | 32.5<br>(826)    |
|                               |  |                            |                                     |               |    |                |                  |

Date and location

Signature:

**EQUIPMENT LIST – Sky Arrow 600 Sport**

| <b>C. MAIN ELECTRICAL SYSTEM</b> |                          |                      |                        | <b>AIRCRAFT S/N:</b> |           | <b>REGISTRATION:</b>         |                            |
|----------------------------------|--------------------------|----------------------|------------------------|----------------------|-----------|------------------------------|----------------------------|
| <b>N.</b>                        | <b>PART DESCRIPTION</b>  | <b>Manufacturer</b>  | <b>Id-Code<br/>P/N</b> | <b>INSTALLED</b>     |           | <b>MASS<br/>lbs<br/>(kg)</b> | <b>ARM<br/>in<br/>(mm)</b> |
|                                  |                          |                      |                        | <b>Yes</b>           | <b>No</b> |                              |                            |
| C1                               | Battery 12V 18/19 Ah     | Fiamm                | 51814                  |                      |           | 10.8<br>(4.90)               | 11.8<br>(300)              |
| C2-a                             | Trim actuator            | Menzimer             | Mac servo S6A          |                      |           | 0.33<br>(0.15)               | 273.6<br>(6,950)           |
| C2-b                             | Trim actuator            | Ray Allen<br>Company | T2-10A                 |                      |           | 0.33<br>(0.15)               | 273.6<br>(6,950)           |
| C3                               | Flap actuator            | SKF                  | Cala 36x150/C          |                      |           | 2.8<br>(1.3)                 | 127.9<br>(3,250)           |
| C4                               | Voltage regulator        | Ducati               | 343620                 |                      |           | 0.9<br>(0.4)                 | 129.9<br>(3,300)           |
|                                  |                          |                      |                        |                      |           |                              |                            |
|                                  |                          |                      |                        |                      |           |                              |                            |
|                                  |                          |                      |                        |                      |           |                              |                            |
| <b>D. CABIN ACCOMODATION</b>     |                          |                      |                        |                      |           |                              |                            |
| D1-a                             | 3-point front seat belts | Scroth               | ---                    |                      |           | 2.3<br>(1.050)               | 67.2<br>(1,708)            |
| D1-b                             | 5-point front seat belts | Scroth               | 4-02-103201            |                      |           | 2.3<br>(1.050)               | 67.2<br>(1,708)            |
| D2-a                             | 3-point rear seat belts  | Scroth               | ---                    |                      |           | 2.3<br>(1.050)               | 102.3<br>(2,598)           |
| D2-b                             | 5-point rear seat belts  | Scroth               | 4-02-103201            |                      |           | 2.3<br>(1.050)               | 102.3<br>(2,598)           |
| D3                               | Stall warning system     | Cessna               | 0713348-1              |                      |           | 0.11<br>(0.05)               | 108.3<br>(2,750)           |
| D4                               | Parking tail support     | 3I                   | R17070/00              |                      |           | 0.66<br>(0.30)               | 110.2<br>(2,800)           |
| D5                               | Flight control locks     | 3I                   | L24229/00              |                      |           | 0.9<br>(0.40)                | 102.3<br>(2,598)           |
| D6                               | Fuel dip stick           | 3I                   | R09116/00              |                      |           | 0.11<br>(0.05)               | 112.2<br>(2,850)           |
| D7                               | Rudder pedals lock       | 3I                   | R02011/00              |                      |           | 0.88<br>(0.4)                | 102.3<br>(2,598)           |
|                                  |                          |                      |                        |                      |           |                              |                            |
|                                  |                          |                      |                        |                      |           |                              |                            |

Date and location

Signature:

**EQUIPMENT LIST – Sky Arrow 600 Sport**

| E. INSTRUMENT PANEL |                                       |                         |                | AIRCRAFT S/N: |    | REGISTRATION:       |                   |
|---------------------|---------------------------------------|-------------------------|----------------|---------------|----|---------------------|-------------------|
| N.                  | PART DESCRIPTION                      | Manufacturer            | Id-Code<br>P/N | INSTALLED     |    | MASS<br>lbs<br>(kg) | ARM<br>in<br>(mm) |
|                     |                                       |                         |                | Yes           | No |                     |                   |
| E1-a                | Airspeed indicator                    | United Instruments      | 8000           |               |    | 0.55<br>(0.25)      | 43.5<br>(1,105)   |
| E1-b                | Airspeed indicator                    | ---                     | BK-11B         |               |    | 0.55<br>(0.25)      | 43.5<br>(1,105)   |
| E2-a                | Rate of Climb indicator               | Aerogestor<br>(Winter)  | 5 ST VM 10-2   |               |    | 0.749<br>(0.34)     | 43.3<br>(1,100)   |
| E2-b                | Rate of Climb indicator               | United Instruments      | 7000           |               |    | 0.749<br>(0.34)     | 43.3<br>(1,100)   |
| E2-c                | Rate of Climb indicator               | Falcon Gauge            | VSI2 FM-3      |               |    | 0.749<br>(0.34)     | 43.3<br>(1,100)   |
| E3                  | Altimeter                             | United Instruments      | 5934D-3        |               |    | 0.55<br>(0.25)      | 43.3<br>(1,100)   |
| E4-a                | Magnetic compass                      | Airpath                 | C2400-L4P      |               |    | 0.66<br>(0.30)      | 47.2<br>(1,200)   |
| E4-b                | Magnetic compass                      | Airpath                 | C2300-L4B      |               |    | 0.66<br>(0.30)      | 47.2<br>(1,200)   |
| E4-c                | Magnetic compass                      | Spruce                  | 10-00421       |               |    | 0.6<br>(0.27)       | 43.3<br>(1,100)   |
| E5                  | Sideslip indicator                    | QM1                     | 10-00600       |               |    | 0.11<br>(0.05)      | 43.5<br>(1,105)   |
| E6-a                | Turn coordinator                      | United Instruments      | 9500B          |               |    | 2.2<br>(1.00)       | 42.1<br>(1,070)   |
| E6-b                | Turn coordinator                      | Continental Instruments | 5550-8340N3L   |               |    | 2.2<br>(1.00)       | 42.1<br>(1,070)   |
| E6-c                | Turn coordinator                      | Falcon Gauge            | TC02E-3-1      |               |    | 2.2<br>(1.00)       | 42.1<br>(1,070)   |
| E7                  | Hourmeter                             | Hobbs                   | 85000          |               |    | 0.154<br>(0.07)     | 44.1<br>(1,120)   |
| E8                  | RPM Indicator                         | Rotax                   | 966.403        |               |    | 0.44<br>(0.20)      | 43.7<br>(1,110)   |
| E9                  | Oil pressure indicator                | VDO                     | 350.030.004    |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |
| E10                 | Oil temp. indicator                   | VDO                     | 310.030.003    |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |
| E11                 | Fuel level indicator                  | VDO                     | 301.030.002    |               |    | 0.242<br>(0.11)     | 43.7<br>(1,110)   |
| E12                 | CHT indicator                         | VDO                     | 310.030.003    |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |
| E13                 | Master switch                         | Cessna                  | 11-15900       |               |    | 0.066<br>(0.03)     | 44.1<br>(1,120)   |
| E14                 | Trim indicator                        | Menzimer                | 6A-MAC         |               |    | 0.11<br>(0.05)      | 44.3<br>(1,125)   |
| E15-a               | Intercom                              | SIGTRONICS              | SPA-400        |               |    | 1.1<br>(0.5)        | 49.2<br>(1,250)   |
| E15-b               | intercom                              | SIGTRONICS Sport 200S   | SPA-200S       |               |    | 0.4<br>(0.17)       | 49.2<br>(1,250)   |
| E16-a               | Fuel pressure indicator<br>(0-15 psi) | UMA                     | 4-310-015      |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |
| E16-b               | Fuel pressure indicator<br>(0-8 psi)  | Rochester               | 5-90532        |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |
| E17                 | Voltmeter                             | VDO                     | 332-030-001    |               |    | 0.176<br>(0.08)     | 43.7<br>(1,110)   |

Date and location:

Signature:

**EQUIPMENT LIST – Sky Arrow 600 Sport**

| F. ADDITIONAL EQUIPMENT |                                     |                                 |                    | AIRCRAFT S/N: |    | REGISTRATION:       |                   |
|-------------------------|-------------------------------------|---------------------------------|--------------------|---------------|----|---------------------|-------------------|
| N.                      | PART DESCRIPTION                    | Manufacturer                    | Id-Code<br>P/N     | INSTALLED     |    | MASS<br>lbs<br>(kg) | ARM<br>in<br>(mm) |
|                         |                                     |                                 |                    | Yes           | No |                     |                   |
| F1-a                    | VHF                                 | Bendix King<br>KY-97A           | 064-1051-70        |               |    | 2.86<br>(1.3)       | 40.55<br>(1,030)  |
| F1-b                    | VHF                                 | ICOM<br>IC-A200                 | 202 B165           |               |    | 2.86<br>(1.3)       | 40.55<br>(1,030)  |
| F2                      | VHF Antenna                         | Comant                          | CI-122             |               |    | 0.11<br>(0.05)      | 55.9<br>(1,420)   |
| F3-a                    | Transponder                         | Bendix-King<br>KT76A            | 066-1062-0000      |               |    | 1.87<br>(0.85)      | 40.55<br>(1,030)  |
| F3-b                    | Transponder                         | Garmin<br>GTX 327               | 010-00188-01       |               |    | 3.1<br>(1.40)       | 40.55<br>(1,030)  |
| F3-c                    | Transponder                         | Garmin<br>GTX 330               | 010-00230-01       |               |    | 4.2<br>(1.9)        | 40.55<br>(1,030)  |
| F4-a                    | Transponder antenna                 | Allied Signal Avionics<br>KA-60 | 071-01591-<br>0001 |               |    | 0.11<br>(0.05)      | 68.5<br>(1,740)   |
| F4-b                    | Transponder antenna                 | Garmin<br>For GTX 327           | 010-10160-00       |               |    | 0.44<br>(0.2)       | 68.5<br>(1,740)   |
| F5                      | Encoding Altimeter                  | Ameri King<br>AK 350            | 11-12010           |               |    | 1.23<br>(0.56)      | 40.55<br>(1,030)  |
| F6                      | GPS w. moving map                   | Garmin<br>GPSMap 296            | 010-00356-00       |               |    | 1.1<br>(0.5)        | 40.55<br>(1,030)  |
| F7-a                    | GPS Antenna                         | Allied Signal Avionics<br>KA-92 | 071-01553-<br>0200 |               |    | 0.48<br>(0.22)      | 26.8<br>(680)     |
| F7-b                    | GPS Antenna                         | Garmin<br>GA56                  | 010-10040-01       |               |    | 0.48<br>(0.22)      | 26.8<br>(680)     |
| F8                      | Attitude indicator (electric)       | RC Allen                        | RCA 26AK-3         |               |    | 2.2<br>(1.00)       | 42.1<br>(1,070)   |
| F9                      | Cabin heating system                | 3I                              | L17171/00          |               |    | 7.7<br>(3.5)        | 157.9<br>(4,010)  |
| F10                     | Electric cooling fans               | 3I                              | R13378/00          |               |    | 0.44<br>(0.2)       | 120.1<br>(3,050)  |
| F11                     | Main gear aerodynamic covers        | 3I                              | R10047/00          |               |    | 2.2<br>(1.00)       | 131<br>(3,325)    |
| F12                     | Nose wheel mud guard                | 3I                              | R01018/00          |               |    | 0.48<br>(0.22)      | 27.8<br>(706)     |
| F13                     | OAT indicator                       | JPI                             | SL-OAT-“F”         |               |    | 0.11<br>(0.05)      | 44.1<br>(1,120)   |
| F14                     | Strobe/NAV lights assy              | Kuntzleman<br>Electronics, Inc. | DDM-SLC            |               |    | 4.4<br>(2.0)        | 113.4<br>(2,880)  |
| F15                     | Emergency Locator Transmitter (ELT) | Ameri-King                      | AK-450<br>450004   |               |    | 4.3<br>(1.95)       | 55.9<br>(1,420)   |
| F16                     | ELT Antenna                         | Ameri-King                      | 450018             |               |    | 0.11<br>(0.05)      | 55.9<br>(1,420)   |
| F17                     | Map reading light                   | Osram                           | 13.238.40          |               |    | 0.44<br>(0.2)       | 42.1<br>(1,070)   |
| F18                     | Under rear seat baggage container   | 3I                              | R67000/00          |               |    | 3.3<br>(1.5)        | 102.3<br>(2,600)  |
| F19                     | Behind rear seat baggage container  | 3I                              | R67100/00          |               |    | 7.00<br>(3.2)       | 119<br>(3,023)    |

Date and location

Signature:

**EQUIPMENT LIST – Sky Arrow 600 Sport**

| F. ADDITIONAL EQUIPMENT (cont'd) |   |                                  |                        | AIRCRAFT S/N: |    | REGISTRATION:       |                   |
|----------------------------------|---|----------------------------------|------------------------|---------------|----|---------------------|-------------------|
| N.                               | PART DESCRIPTION                        | Manufacturer                     | Id-Code<br>P/N         | INSTALLED     |    | MASS<br>lbs<br>(kg) | ARM<br>in<br>(mm) |
|                                  |   |                                  |                        | Yes           | No |                     |                   |
| F20                              | Fire extinguisher                       | ---                              | 12DOTV052              |               |    | 4.4<br>(2.0)        | 47.8<br>(1,215)   |
| F21                              | Headsets                                | ---                              | ---                    |               |    | ---                 | ---               |
| F22                              | GPS/COMM                                | Garmin<br>GNC 250XL              | 010-00122-00           |               |    | 2.63<br>(1.19)      | 40.55<br>(1,030)  |
| F23                              | Electronic Flight<br>Information System | Dynon Avionics<br>EFIS-D10A      | 100321                 |               |    | 1.54<br>(0.7)       | 40.55<br>(1,030)  |
| F24                              | Landing light                           | Whelen                           | A-715-1                |               |    | 1.1<br>(0.5)        | 11.8<br>(300)     |
| F25                              | Post lights                             | Whelen                           | A350CN-CL-<br>BK-SH-14 |               |    | 0.22<br>(0.1)       | 44.1<br>1,120     |
| F26                              | Electronic compass                      | Dynon Avionics<br>EDC-D10        | 100323                 |               |    | 0.22<br>(0.1)       | 67.2<br>(1,708)   |
| F27                              | EFIS/EMS                                | Dynon Avionics<br>FlightDEK-D180 | 100564                 |               |    | 3.5<br>(1.6)        | 40.55<br>(1,030)  |
|                                  |   |                                  |                        |               |    |                     |                   |
|                                  |   |                                  |                        |               |    |                     |                   |
|                                  |   |                                  |                        |               |    |                     |                   |

Date and location

Signature:

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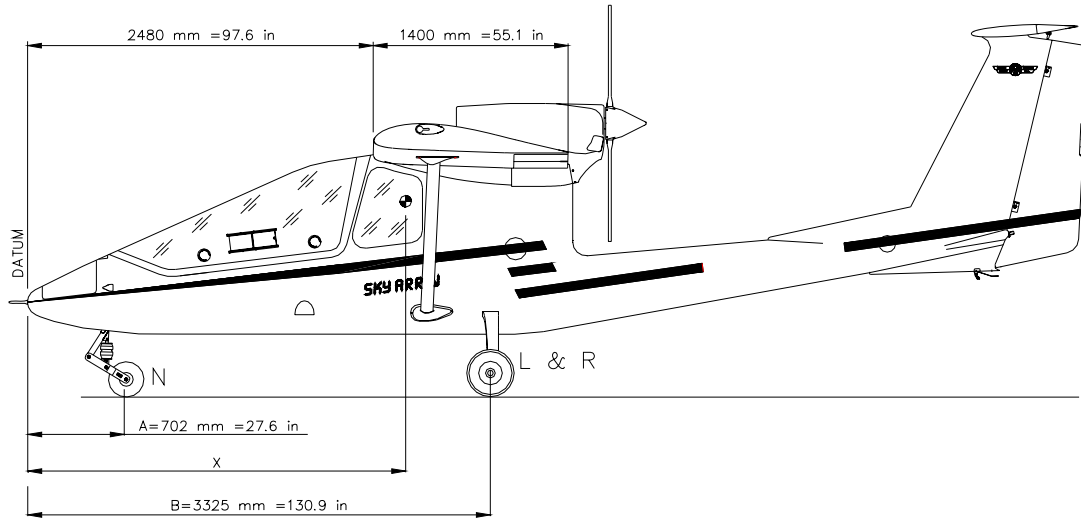
# EMPTY WEIGHT AND BALANCE

(see note at the beginning of the paragraph)

**AIRCRAFT MODEL: Sky Arrow 600 Sport**

**S/N:**

**REGISTRATION:**



| Scale Position                  | Scale Reading | Tare | Symbol   | Net Weight |
|---------------------------------|---------------|------|----------|------------|
| Left Wheel                      |               |      | L        |            |
| Right Wheel                     |               |      | R        |            |
| Nose Wheel                      |               |      | N        |            |
| Sum of Net Weights (As Weighed) |               |      | <b>W</b> |            |

$$X = \text{ARM} = \frac{N \times A + (L+R) \times B}{W}$$

$$X = \frac{(\quad) \times (\quad) + (\quad + \quad) \times (\quad)}{(\quad)} = \underline{\hspace{2cm}}$$

$$\% \text{ MAC} = \frac{X [\text{in}] - 97.6}{55.1} \times 100 = \underline{\hspace{2cm}}$$

Date and location

Signature:

\_\_\_\_\_

\_\_\_\_\_



## TAKE-OFF WEIGHT AND BALANCE

(see note at the beginning of the paragraph)

**AIRCRAFT MODEL: Sky Arrow 600 Sport**

**S/N:**

**REGISTRATION:**

|  | Weight<br>lbs<br>(kg) | Moment<br>lbs-in /1000<br>(kg-mm /1000) |
|--|-----------------------|---|
| 1. Basic Empty Weight (use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil and coolant)  |                       |   |
| 2. Usable Fuel (At 6 lbs/gal, 17.8 gal max.)   |                       |   |
| 3. Pilot   |                       |   |
| 4. Passenger   |                       |   |
| 5. Under rear seat baggage (Area 1, 66 lbs max.)   |                       |   |
| 6. Behind rear seat baggage (Area 2, 33 lbs max.)  |                       |   |
| 7. TOTAL WEIGHT AND MOMENT   |                       |   |
| <p><b>8. Locate this point (Total Weight and Moment) on the Center of gravity Moment Envelope (para. 4.6). If this point falls within the envelope, the loading is acceptable.</b></p> |                       |   |

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## **SECTION 5**

# **PERFORMANCE**

### **5.1. INTRODUCTION**

### **5.2. AIRSPEED CALIBRATION**

### **5.3. PERFORMANCES**

#### **5.3.1. TAKE-OFF DISTANCES**

#### **5.3.2. CLIMB AND DESCENT SPEEDS**

#### **5.3.3. STALL SPEEDS**

#### **5.3.4. CRUISING SPEEDS , BEST ECONOMY SPEED AND MAXIMUM RANGE SPEED**

#### **5.3.5. CEILING**

#### **5.3.6. MAIN PERFORMANCE GRAPH**

#### **5.3.7. LANDING DISTANCES**

### **5.4. CROSSWIND COMPONENT**

### **5.5. NOISE LEVEL**

## 5.1. INTRODUCTION

This Section includes information about the most important performance of the aircraft such as stall speeds for several configurations, take-off, landing and climb performance, hourly fuel consumption, turning radius, glide ratio, maximum crosswind allowed in takeoff and landing and noise level.

The Section also provides airspeed indicator calibration data.

### **NOTE**

**Performance change with variation in atmospheric conditions (temperature and humidity), engine and propeller condition, flight altitude and power setting.**

## 5.2. AIRSPEED CALIBRATION

### FLAPS 0°

| CIAS | KCAS  | Corr. | % Error |
|------|-------|-------|---------|
| 50   | 49.5  | -0.5  | 1.0     |
| 60   | 59.0  | -1.0  | 1.7     |
| 70   | 67.5  | -2.5  | 3.6     |
| 80   | 77.3  | -2.7  | 3.4     |
| 90   | 86.5  | -3.5  | 3.9     |
| 100  | 96.4  | -3.6  | 3.6     |
| 108  | 107.3 | -0.7  | 0.7     |

### FLAPS 10°/20°/30°

| CIAS | KCAS | Corr. | % Error |
|------|------|-------|---------|
| 40   | 42.0 | +2.0  | 5.0     |
| 45   | 46.5 | +1.5  | 3.3     |
| 50   | 51.0 | +1.0  | 2.0     |
| 60   | 60.7 | +0.7  | 1.2     |
| 70   | 70.0 | +0.0  | 0.0     |

## 5.3. PERFORMANCE

### 5.3.1. TAKE-OFF DISTANCES

Conditions: Weight: 599 kg (1,320 lbs) / Take-off 51 KCAS (50 KIAS) - Full Power  
Flaps 10° / 59 KCAS (58 KIAS) (1.3 V<sub>S1</sub>) over 15 m (50 ft) obstacle  
Wind calm / Clipped grass

| TEMPERATURE     | DISTANCE  | PRESSURE ALTITUDE (ft) |             |             |
|-----------------|-----------|------------------------|-------------|-------------|
|                 |           | 0                      | 2000        | 4000        |
| -4 °F (-20 °C)  | Sr ft (m) | 389 (118)              | 436 (133)   | 497 (151)   |
|                 | Sd ft (m) | 734 (222)              | 824 (251)   | 938 (284)   |
| 32 °F (0 °C)    | Sr ft (m) | 436 (132)              | 490 (149)   | 559 (169)   |
|                 | Sd ft (m) | 822 (249)              | 925 (282)   | 1,055 (320) |
| 59 °F (+15 °C)  | Sr ft (m) | 470 (143)              | 532 (162)   | 607 (184)   |
|                 | Sd ft (m) | 890 (270)              | 1,004 (306) | 1,146 (347) |
| 86 °F (+30 °C)  | Sr ft (m) | 509 (154)              | 574 (175)   | 656 (199)   |
|                 | Sd ft (m) | 961 (291)              | 1,084 (330) | 1,239 (375) |
| 104 °F (+40 °C) | Sr ft (m) | 535 (162)              | 603 (184)   | 690 (209)   |
|                 | Sd ft (m) | 1,009 (306)            | 1,139 (347) | 1,302 (395) |

**Sr** is the roll distance, **Sd** the takeoff distance on a 50 ft (15 m) obstacle.

The roll distances are to be increased by:

+ 17% on 12" (30 cm) grass and hard ground

+ 19% on clipped grass and soft ground

The roll distances are to be decreased by:

- 7% on asphalt runways

### 5.3.2. CLIMB AND DESCENT SPEEDS

#### CLIMB:

Conditions: Full Power

Weight 1,320 lb (599 kg)

Flaps 0°

Speeds: 63 KCAS (65 KIAS) from 0 to 5,000 ft

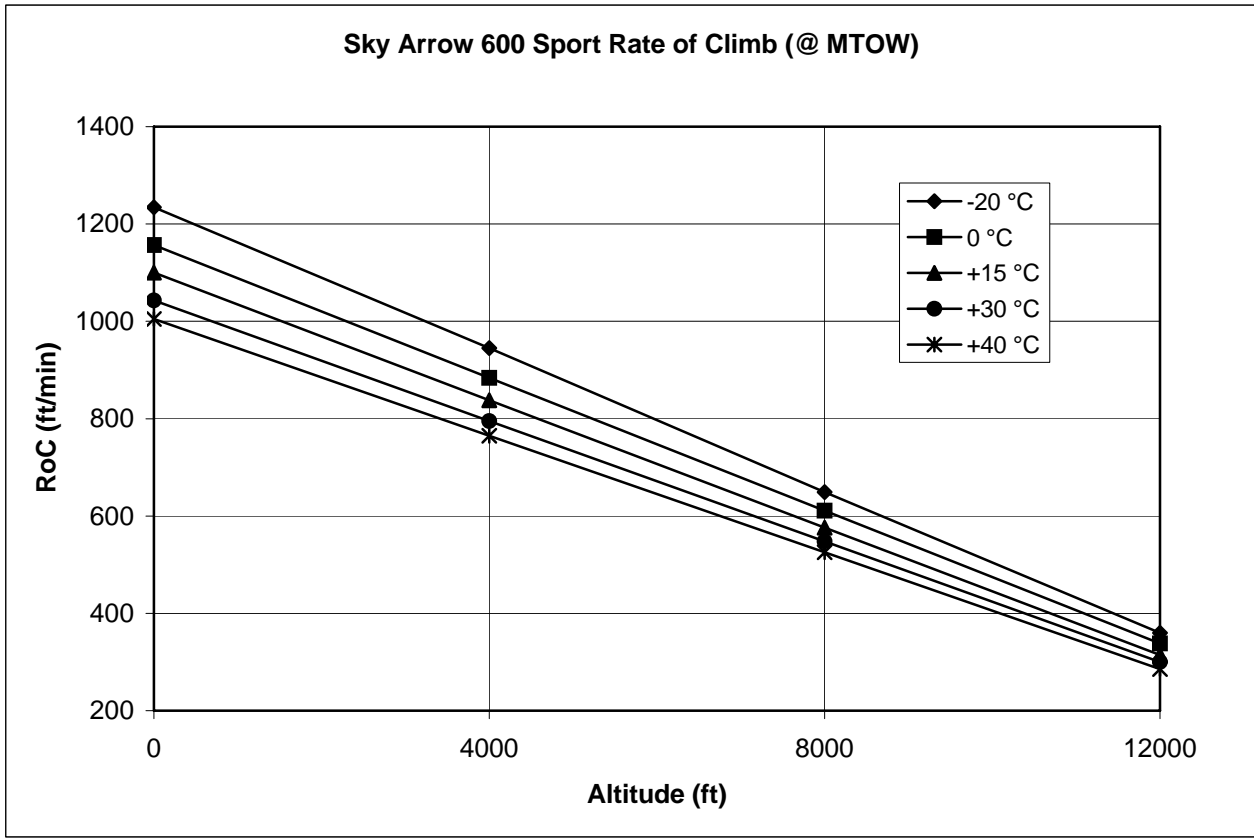
59 KCAS (60 KIAS) between 5,000 and 13,500 ft

| PRESSURE<br>ALTITUDE (ft) | TEMPERATURE °F (°C)   |           |             |            |             |
|---------------------------|-----------------------|-----------|-------------|------------|-------------|
|                           | CLIMB RATE (ft / min) |           |             |            |             |
|                           | -4° (-20°)            | +32° (0°) | +59° (+15°) | +86° (30°) | +104° (40°) |
| 0                         | 1,234                 | 1,157     | 1,100       | 1,043      | 1,005       |
| 2000                      | 1,086                 | 1,021     | 969         | 919        | 882         |
| 4000                      | 945                   | 884       | 838         | 795        | 765         |
| 8000                      | 649                   | 611       | 576         | 548        | 525         |
| 12000                     | 360                   | 338       | 314         | 300        | 285         |

**NOTE**

Climbing at  $V_Y$ , maintaining maximum continuous power with an atmospheric temperature of 100 °F (38 °C) (sea level), the temperatures of powerplant components and engine fluids remain within the limits established by the engine manufacturer, shown in Sect. 3.5, provided that the engine coolant indicated in sect. 1.5 is employed. The pilot must monitor constantly the cylinder heads temperature and if it approaches the temperature of 248 °F (120 °C) set the engine baffle in the MAX cooling position and either increase the speed for better cooling or reduce the temperature through a period of level flight.

In case of sea level temperature above 100 °F (38 °C), monitor oil temperature and be prepared to do the same procedure as above.



**DESCENT**

Condition: Weight 1,320 lb (599 kg) / Flaps 0°  
 3,000 RPM / Speed 59 KCAS (60 KIAS)  
 Glide ratio 1:12

**NOTE**

The aircraft with engine off (propeller stationary) at 59 KCAS (60 KIAS) has a glide ratio of 1:12. From an altitude of 3,300 ft the distance flown is 6.5 NM (7.5 mi) in no wind conditions.

**5.3.3. STALL SPEED**

Conditions: weight 1,320 lbs (599 kg), throttle at idle.

**BANK ANGLE**

| CONFIG.   | 0°   |      | 30°  |      | 45°  |      | 60°  |      |
|-----------|------|------|------|------|------|------|------|------|
|           | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS | KCAS | KIAS |
| Flaps 0°  | 44   | 44   | 47   | 47   | 52.5 | 53   | 60.5 | 62   |
| Flaps 10° | 43.5 | 42   | 46.5 | 45   | 51   | 50   | 60   | 60   |
| Flaps 20° | 41.5 | 40   | 45   | 43   | 49   | 48   | 57   | 57   |
| Flaps 30° | 40   | 38   | 43   | 41   | 47   | 46   | 55   | 55   |

### 5.3.4. CRUISE SPEEDS, BEST ECONOMY SPEED AND MAXIMUM RANGE SPEED

Conditions: weight 1,320 lbs (599 kg) / Flaps 0°

***Pressure altitude: 0 ft***

| Pwr. % | Eng. RPM | Speed |      |      | Fuel consumption |      | Endurance Hour/Min | Range NM |
|--------|----------|-------|------|------|------------------|------|--------------------|----------|
|        |          | KCAS  | KIAS | KTAS | gal/h            | lt/h |                    |          |
| 55     | 4,300    | 77.3  | 80   | 80   | 4.0              | 15.1 | 4 <sup>h</sup> 30' | 363      |
| 65     | 4,800    | 87.5  | 91   | 91   | 5.0              | 19.0 | 3 <sup>h</sup> 35' | 327      |
| 75     | 5,000    | 95.5  | 97   | 97   | 5.4              | 20.6 | 3 <sup>h</sup> 20' | 319      |

***Pressure altitude: 2,000 ft (610 m)***

| Pwr. % | Eng. RPM | Speed |      |      | Fuel consumption |      | Endurance Hour/Min | Range NM |
|--------|----------|-------|------|------|------------------|------|--------------------|----------|
|        |          | KCAS  | KIAS | KTAS | gal/h            | lt/h |                    |          |
| 55     | 4,500    | 75    | 78   | 81   | 4.5              | 16.9 | 4 <sup>h</sup> 00' | 325      |
| 65     | 4,900    | 86    | 89   | 92   | 5.2              | 19.8 | 3 <sup>h</sup> 25' | 316      |
| 75     | 5,150    | 91    | 94   | 97   | 5.8              | 21.8 | 3 <sup>h</sup> 05' | 304      |

***Pressure altitude: 4,000 ft (1,220 m)***

| Pwr. % | Eng. RPM | Speed |      |      | Fuel consumption |      | Endurance Hour/Min | Range NM |
|--------|----------|-------|------|------|------------------|------|--------------------|----------|
|        |          | KCAS  | KIAS | KTAS | gal/h            | lt/h |                    |          |
| 55     | 4,500    | 74    | 77   | 82   | 4.8              | 18.3 | 3 <sup>h</sup> 45' | 305      |
| 65     | 4,900    | 84    | 87   | 92   | 5.4              | 20.6 | 3 <sup>h</sup> 20' | 305      |
| 75     | 5,150    | 90    | 93   | 99   | 6.3              | 24.0 | 2 <sup>h</sup> 50' | 281      |

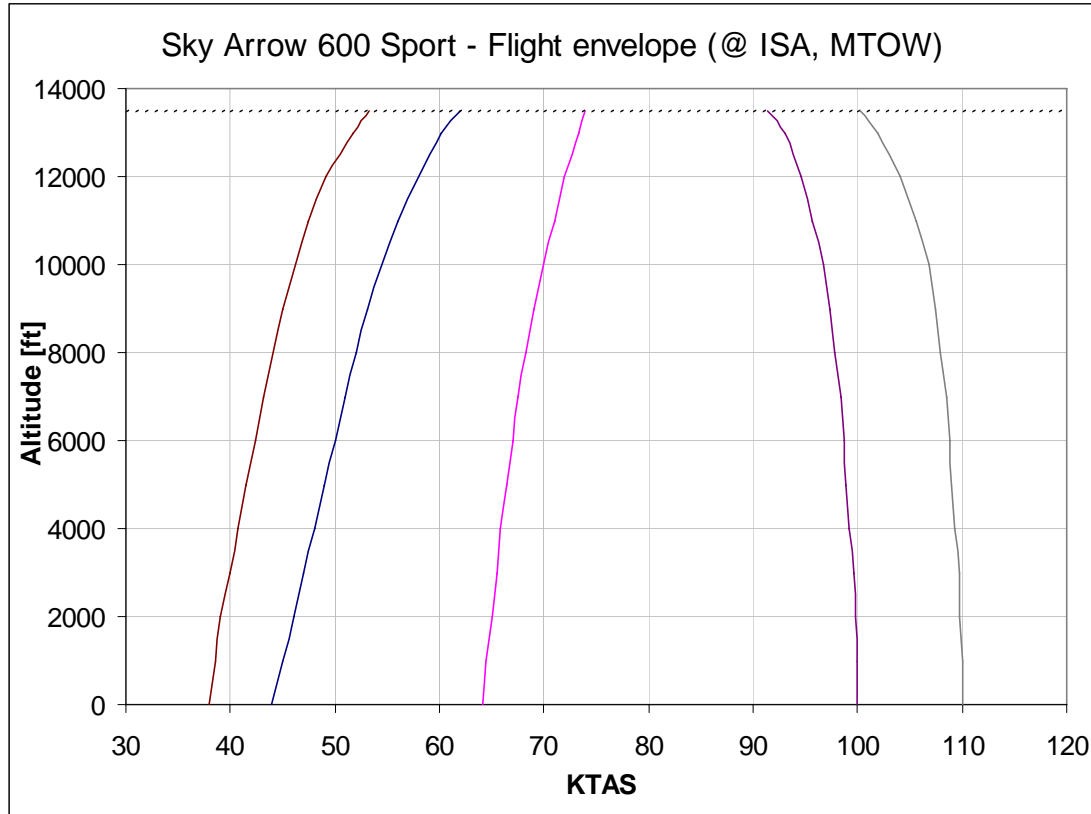
***Pressure altitude: 6,000 ft (1,830 m)***

| Pwr. % | Eng. RPM | Speed |      |      | Fuel consumption |      | Endurance Hour/Min | Range NM |
|--------|----------|-------|------|------|------------------|------|--------------------|----------|
|        |          | KCAS  | KIAS | KTAS | gal/h            | lt/h |                    |          |
| 55     | 4,500    | 72.5  | 75   | 82   | 5.1              | 19.4 | 3 <sup>h</sup> 30' | 289      |
| 65     | 4,900    | 83    | 86   | 94   | 5.9              | 22.3 | 3 <sup>h</sup> 05' | 287      |
| 75     | 5,150    | 89    | 92   | 101  | 6.8              | 25.6 | 2 <sup>h</sup> 40' | 268      |

### 5.3.5. CEILING

Aircraft service ceiling is 13,500 ft (4,100 m)

### 5.3.6. MAIN PERFORMANCE GRAPH



### 5.3.7. LANDING DISTANCES

- a) Conditions: **Flaps 30°**, approach speed: 51 KCAS (50 KIAS)  
Weight: 1,320 lb (599 kg)  
Wind calm / Clipped grass

| TEMPERATURE             | DISTANCE  | PRESSURE ALTITUDE (ft) |           |           |
|-------------------------|-----------|------------------------|-----------|-----------|
|                         |           | 0                      | 2000      | 4000      |
| <b>-4 °F (-20 °C)</b>   | Sf ft (m) | 319 (97)               | 338 (102) | 358 (108) |
|                         | Sa ft (m) | 580 (176)              | 614 (186) | 650 (197) |
| <b>+ 32 °F (0 °C)</b>   | Sf ft (m) | 344 (104)              | 365 (111) | 387 (117) |
|                         | Sa ft (m) | 626 (190)              | 663 (201) | 703 (213) |
| <b>+59 °F (+15 °C)</b>  | Sf ft (m) | 360 (110)              | 385 (117) | 409 (124) |
|                         | Sa ft (m) | 660 (200)              | 700 (212) | 743 (225) |
| <b>+86 °F (+30 °C)</b>  | Sf ft (m) | 382 (116)              | 405 (123) | 431 (130) |
|                         | Sa ft (m) | 694 (210)              | 737 (223) | 783 (237) |
| <b>+104 °F (+40 °C)</b> | Sf ft (m) | 394 (120)              | 419 (127) | 445 (135) |
|                         | Sa ft (m) | 717 (217)              | 762 (231) | 809 (245) |

**Sf** indicates braking distance, **Sa** the landing distance over a 50 ft obstacle.

- b) Conditions: **Flaps UP**, approach speed: 59 KCAS (60 KIAS)  
 Weight: 1,320 lb (599 kg)  
 Wind calm / Wet clipped grass

| TEMPERATURE             | DISTANCE  | PRESSURE ALTITUDE (ft) |             |             |
|-------------------------|-----------|------------------------|-------------|-------------|
|                         |           | 0                      | 2000        | 4000        |
| <b>-4 °F (-20 °C)</b>   | Sf ft (m) | 473 (143)              | 500 (152)   | 530 (161)   |
|                         | Sa ft (m) | 945 (286)              | 1,001 (303) | 1,060 (321) |
| <b>+ 32 °F (0 °C)</b>   | Sf ft (m) | 510 (155)              | 540 (164)   | 573 (174)   |
|                         | Sa ft (m) | 1,020 (309)            | 1,081 (328) | 1,147 (347) |
| <b>+59 °F (+15 °C)</b>  | Sf ft (m) | 534 (163)              | 571 (173)   | 606 (184)   |
|                         | Sa ft (m) | 1,070 (326)            | 1,141 (346) | 1,211 (367) |
| <b>+86 °F (+30 °C)</b>  | Sf ft (m) | 566 (171)              | 601 (182)   | 638 (193)   |
|                         | Sa ft (m) | 1,132 (343)            | 1,201 (364) | 1,276 (387) |
| <b>+104 °F (+40 °C)</b> | Sf ft (m) | 585 (177)              | 621 (188)   | 660 (200)   |
|                         | Sa ft (m) | 1,169 (354)            | 1,241 (376) | 1,319 (400) |

**Sf** indicates braking distance, **Sa** the landing distance over a 50 ft obstacle.

## 5.4 CROSSWIND COMPONENT

The maximum demonstrated crosswind speed is 15 kts.

## 5.5. NOISE LEVEL

*Not Applicable*

## **SECTION 6**

### **EMERGENCY PROCEDURES**

- 6.1. INTRODUCTION**
- 6.2. GROUND EMERGENCIES**
- 6.3. TAKE-OFF EMERGENCIES**
- 6.4. IN-FLIGHT EMERGENCIES**
- 6.5. LANDING EMERGENCIES**

## 6.1. INTRODUCTION

The following section contains a check-list as well as descriptions of the recommended procedures in case of an emergency.

Emergencies caused by aircraft or engine malfunction are extremely rare if proper pre-flight inspections and maintenance are practiced.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

## 6.2. GROUND EMERGENCIES

### A. Fire

1. Shut off PULL
2. Master switch OFF
3. Canopy OPEN
4. Abandon the aircraft
5. Use fire extinguishers approved for gasoline fire fighting.

#### **NOTE**

The **SHUT OFF** lever cuts off the fuel flow. The engine will continue to run for at least 15 seconds to burn carburetor fuel. The **MASTER SWITCH** cuts off the power to the instruments and to the electrical equipment, flaps included.

### B. Emergency canopy release

1. Left console lever PULL
2. Canopy PUSH OPEN

#### **WARNING**

Never open the canopy in flight.  
Before take-off be sure that canopy is properly closed and locked.

### C. Low voltage indication ( $\leq 12$ V) or GEN warning light ON

1. Engine RPM INCREASE (if practicable)
2. All unnecessary electrical equipment TURN OFF
3. If voltage remains low or light ON Interrupt planned flight

## 6.3. TAKE-OFF EMERGENCIES

### A. Loss of power

During takeoff run:

1. Throttle IDLE
2. Brakes APPLY AS NECESSARY
3. Shut off PULL
4. Ignition Switch OFF
5. Master Switch OFF

Immediately after takeoff (if there's no more space to land immediately on the runway):

- If enough power is available:

1. Take-off procedures COMPLETE
2. Aux fuel pump CHECK ON
3. Ignition switches CHECK BOTH ON
4. Land as soon as possible

- If enough power is not available:
  1. Search for a suitable place to perform a forced landing
  2. Power AS REQUIRED / AS AVAILABLE
  3. Flaps AS REQUIRED / FULL BEFORE LANDING
  4. Shut off PULL before landing
  5. Master switch OFF
  6. If risk of impact against obstacles exists, keep your legs near the body.

**WARNING**

**Do not execute turns with a bank angle more than 20°-30° unless airspeed exceeds the minimum maneuvering speed (59 KCAS (60 KIAS)).**

**NOTE**

**Keep in mind that pulling the shut-off lever cuts the fuel flow. Switching the master switch OFF does not allow operation of electrical instruments and flaps.**

**B. Engine Failure**

- Before rotation:
  1. Throttle IDLE
  2. Brakes APPLY AS NECESSARY
  3. Shut off PULL
  4. Ignition Switch OFF
  5. Master Switch OFF
- Immediately after takeoff:
  1. Search for a suitable place to perform a forced landing
  2. Flaps AS REQUIRED / FULL BEFORE LANDING
  3. Shut off PULL
  4. Master switch OFF immediately after touching ground
  5. If risk of impact against obstacles exists, keep your legs near the body.

**C. Rough control response**

Perform an emergency landing in the first field available.

**D. Fire**

- During take-off run
  1. Shut off PULL
  2. Brakes MAX POWER
  3. Master switch OFF
  4. Evacuate the aircraft immediately
- Immediately after take-off
  1. Search for a suitable place to perform a forced landing
  2. Flaps AS REQUIRED / FULL BEFORE LANDING
  3. Throttle Use only to avoid obstacles
  4. Shut off PULL when ready to land
  5. Master switch OFF immediately after touching ground
  6. If risk of impact against obstacles exists, keep your legs near the body.
  7. Evacuate the aircraft immediately

**E. Impact of birds or other objects on the propeller**

1. Throttle REDUCE as necessary to land ASAP  
or, in the worst cases:
2. Shut off PULL
3. Perform emergency landing with engine off according to point **B.** above.

## 6.4. IN-FLIGHT EMERGENCIES

**A. Lighting up of one of the warning lights**

- Oil pressure and/or temperature

1. Analog indicator CHECK
2. If pressure/temperature is normal (green range) warning light is malfunctioning
3. If pressure / temp. is out of green range REDUCE POWER to minimum required
4. Land ASAP
5. Be prepared for engine failure and emergency landing

- Cylinder heads temperature

1. Analog indicator CHECK
2. If temperature is normal (green range) warning light is malfunctioning
3. If temp. is out of green range (yellow or red range) CHECK that the engine baffle is open (MAX cooling), REDUCE POWER to minimum required and dive, if possible, to increase speed
4. If temp. does not return to green range Land ASAP and be prepared for engine failure and emergency landing

- Generator

1. BREAKER SWITCH OFF and ON
2. If the problem persists SWITCH OFF the generator switch
3. All unnecessary electrical equipment TURN OFF to save electrical energy
4. Land ASAP Keep in mind that the battery insures power to all necessary electrical equipment (ignition, flaps, fuel pump, trim and engine instruments) for about 30'.

**B. Engine running roughly**

1. Auxiliary fuel pump ON
2. Carburetor heater ON. If no advantage, carb. heater OFF
3. Ignition switches CHECK BOTH ON
4. Throttle REDUCE to minimum required power
5. Land as soon as possible

**C. Engine restart**

1. Speed 59 KCAS (60 KIAS)
2. Electric consumers OFF
3. Master switch ON
4. Auxiliary fuel pump ON
5. Throttle 1 in (2.5 cm) forward
6. Choke ON (only with cold engine)
7. Engine starter switch START
8. Oil pressure CHECK
9. Choke OFF (if activated)
10. Electric consumers ON if required
11. Oil temperature CHECK

**D. Emergency landing (with engine off)**

1. Speed. 60 KIAS (best glide)
2. Flaps UP
3. Search for a practicable place to land CHECK for wind direction and obstacles
4. Shut off PULL
5. Flaps FULL DOWN when required
6. Master switch OFF immediately after touching ground
7. If risk of impact against obstacles exists, keep your legs near the body.
8. Evacuate the aircraft immediately

**E. Rough control response**

Perform an emergency landing in the first field available.

**F. Fire**

1. Shut off PULL
2. Search for a suitable place to perform a forced landing
3. Flaps AS REQUIRED / FULL BEFORE LANDING
4. Master switch OFF immediately after touching ground
5. If risk of impact against obstacles exists, keep your legs near the body.
6. Evacuate the aircraft immediately

**G. Smoke in the cockpit or fogging of the canopy**

- Smoke in the cockpit

1. Non-essential electrical equipment OFF
2. Ventilation Increase (front air port and canopy air scoops)
3. Land in the first available airfield

- Fogging of the canopy

1. Cabin heater OPEN
2. Vents CLOSE (front air port and canopy air scoops)

**H. Impact of birds or other objects on the propeller**

1. Throttle REDUCE as necessary and land ASAP  
or, in the worst case:
2. Shut off PULL
3. Perform emergency landing with engine off according to point **D.** above.

**I. Spin**

1. Throttle IDLE
2. Rudder In opposition of the direction of rotation
3. Side stick Neutral and slightly forward
4. As rotation stops, neutralize rudder, return flaps to neutral (if extended) and make a smooth recovery.

**NOTE**

**To avoid inadvertent spins remember that at low speeds the sideslip indicator/turn coordinator must always be kept centered and controls must not be crossed.**

**In case of pre-stall or stall, the sidestick must always be centered.**

**WARNING**

**Intentional spins are prohibited**

**L. Carburetor icing**

1. Carburetor heater ON
2. Throttle FULL
3. Leave icing area (through change of altitude to reach area with higher temperature and lower humidity)
4. Cabin heat OPEN
5. If the condition persists land in the first available field or, if the malfunction is severe enough to justify it, in an emergency field.
6. In case of ice on the propeller with resulting vibrations, increase max. RPM and, if vibrations persist, reduce RPM to a minimum practicable.

**CAUTION**

**Use the carburetor heater when the outside temperature is lower than 50 °F (10 °C)  
and the relative humidity is higher than 60%**

**M. Pitch trim system failure**

- If the trim control switch should not respond:
  1. Trim control breaker CHECK ON
  2. If malfunction persists, adjust speed to control the aircraft without excessive force
  3. Land as soon as practical
- If the trim runs without pilot action on trim control:
  1. Trim control breaker PULL OUT
  2. Adjust speed to control the aircraft without excessive force
  3. Land as soon as practical.

**NOTE**

**It is possible to land safely with the pitch trim position full up or full down.**

## **6.5. LANDING EMERGENCIES**

**A. Engine running roughly**

1. Auxiliary fuel pump ON
2. Carburetor heater ON, if no advantage, carb. heater OFF
3. Ignition switches CHECK BOTH ON
4. Throttle REDUCE to minimum required power
5. Land as soon as possible

**B. Rough control response**

Perform an emergency landing ASAP

**C. Fire**

1. Search for a suitable place to perform a forced landing
2. Flaps AS REQUIRED / FULL BEFORE LANDING
3. Throttle Use only to avoid obstacles
4. Shut off PULL when ready to land
5. Master switch OFF immediately after touching ground
6. If risk of impact against obstacles exists, keep your legs near the body.
7. Evacuate the aircraft immediately

**D. Smoke in the cockpit or fogging of the canopy**

- Smoke in the cockpit
  1. Non-essential electrical equipment OFF
  2. Ventilation Increase (front air port and canopy air scoops)
  3. Land in the first available airfield
- Fogging of the canopy
  1. Cabin heater OPEN
  2. Vents CLOSE (front air port and canopy air scoops)

**E. Impact of birds or other objects on the propeller**

1. Throttle REDUCE as necessary and land ASAP  
or, in the worst case:
2. Shut off PULL
3. Perform emergency landing with engine off

**F. Emergency landing on water (ditching)**

1. Approach speed 51 KCAS (50 KIAS)
2. FLAPS FULL
3. Wind Fly towards (no waves)
4. In case of waves Approach parallel to wave front
5. Shut off lever PULL
6. Ditch at the minimum possible speed in a nose-up attitude
7. If aircraft capsizes unlock the canopy and strongly push on the canopy to open it.
8. Seat belts UNLOCK
9. Evacuate the aircraft

**WARNING**

**Never open the canopy in flight**

**G. Flaps actuator failure (no flaps landing)**

1. Approach speed: 59 KCAS (60 KIAS), maintaining low descent rate
2. Consider that for safe landing (ISA condition, 50 ft (15 m) obstacle and wet clipped grass), at least 1,150 ft (350 m) of runway are necessary for a full-stop landing

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## **SECTION 7**

### **NORMAL OPERATING PROCEDURES**

#### **7.1. INTRODUCTION**

#### **7.2. DAILY INSPECTION**

#### **7.3. PRE-FLIGHT INSPECTION**

#### **7.4. NORMAL OPERATION CHECKLIST**

## 7.1. INTRODUCTION

Section 7 provides checklist and procedures for normal operation of the airplane. Normal procedures associated with optional systems can be found in Section 9.

## 7.2. DAILY INSPECTION

Prior to the first flight of the day, the following checks are necessary:

1. Check the canopy for flaws or malfunctioning locks.
2. Check the hour-meter and check the conditions of all instruments without power.
3. Check the stroke of wheel brakes levers.
4. Check visually and by hand the pitch/roll lines mixer unit, located in the niche aft of the rear seat, for absence of loose play.
5. Switch the MASTER SWITCH ON to check electrical instruments functionally.
6. Check indicated fuel quantity and check the value with the real quantity in the tank.
7. Test operation and full range of flaps and pitch trim.
8. Switch the MASTER SWITCH OFF and key out.
9. Drain the fuel system by use of the gascolator (inside the shutter on the left side of the fuselage under the wing)
10. Check the engine oil level with the graduated bar

### **CAUTION**

**Do not use aviation oils and any other oil additives!**

11. Check the coolant level in the reservoir (check the level reference lines outside the reservoir) and refill, if necessary, using a proper funnel to avoid coolant overflow.

### **NOTE**

**In case of empty reservoir, the coolant level must be checked in the distribution tank on top of the engine.  
Excessive overfilling of the reservoir can cause an overflow during operation.**

### **CAUTION**

**Usage of lower quality coolant may result in sediments within the cooling system, degrading the efficiency of the system.  
Do not add water to the system or coolant that contains water.**

12. Check the tire pressure of the main landing gear (29 psi) and of the nose gear (21.8 psi).
13. Check visually the electrolyte level in the battery.
14. Check visually the locking bolts for wing and fuselage, tailplane and landing gear, verifying the related safety wires or the cotter pins.
15. Check that the roll, pitch and yaw controls deflect fully and freely.
16. Check that the left static port is clean.
17. Check the attachments of the wing to the fuselage, wing/strut and strut/fuselage.
18. Check the strobe/NAV lights on the left wing tip (if applicable)
19. Check that the left aileron is free.
20. Check the left flap connection and hinges.
21. Check tyres and the left main gear brake.
22. Check the left side of the fuselage for flaws.

23. Check the marking on the fin and on the stabilizer.
24. Check that the rudder is free and flawless.
25. Check that the elevator and trim tab are free and flawless.
26. Check the right side of the fuselage for flaws.
- 27a. Check stability and integrity of the propeller and spinner.
- 27b. Versions with overload clutch: turn the propeller by hand to and fro, feeling the free rotation of 15° or 30° before the crankshaft starts to rotate

**NOTE:** If the propeller can be turned between the dogs with practically no friction at all, further investigation is necessary before flight.

28. Remove engine cowlings and check for leaks, stability and security of the engine and integrity of engine mount, check coolant levels.
29. Check tyres and the right gear brake.
30. Check that the right aileron is free.
31. Check the right flap connection and hinges.
32. Check the strobe/NAV lights on the right wing tip (if applicable).
33. Check the attachments of the wing to the fuselage, wing/strut and strut/fuselage.
34. Check that the engine air intake is free.
35. Check that the right static port is clean.
36. Check the shock absorber and the nose wheel tire.
37. Check that the nose dynamic port and the pitot tube are clean.

### 7.3. PRE-FLIGHT INSPECTION

Before each flight the pilot must inspect the aircraft following the outline shown in figure 7-1. For each number in the figure the following checks must be done:

1. Check the general conditions of all instruments
2. Switch the MASTER SWITCH ON to check electrical instruments functionality.

#### **WARNING**

**Night operations are allowed only if the internal backup battery of the optional Dynon EFIS D-10A or FlightDEK-D180 (if installed) are fully charged.**

3. Test operation and full range of flaps and pitch trim.
4. Check indicated fuel quantity and check the value with the real quantity in the tank.
5. Switch the MASTER SWITCH OFF.
6. Check that the roll, pitch and yaw controls deflect fully and freely.
7. Check the canopy locking mechanism

#### **WARNING**

**In case of flight with only one pilot on board, fasten the safety harness of the rear seat**

8. Check that the left static port is clean.
9. Check the attachments of the wing to the fuselage, wing/strut and strut/fuselage.
10. Check the strobe/NAV lights on the left wing tip (if applicable).
11. Check that the left aileron is free
12. Check the left flap connection and hinges.
13. Check left tire and main gear brake.
14. Check the left side of the fuselage for flaws.
15. Check the marking on the fin and on the stabilizer.
16. Check that the rudder is free and flawless.
17. Check that the elevator and trim tab are free and flawless.
18. Check the right side of the fuselage for flaws.
- 19a. Check stability and integrity of the propeller and spinner.
- 19b. Versions with overload clutch: turn the propeller by hand to and fro, feeling the free rotation of 15° or 30° before the crankshaft starts to rotate

**NOTE:** If the propeller can be turned between the dogs with practically no friction at all, further investigation is necessary before flight.

20. Check for leaks, stability and security of the engine, check oil and coolant levels, check generator belt.

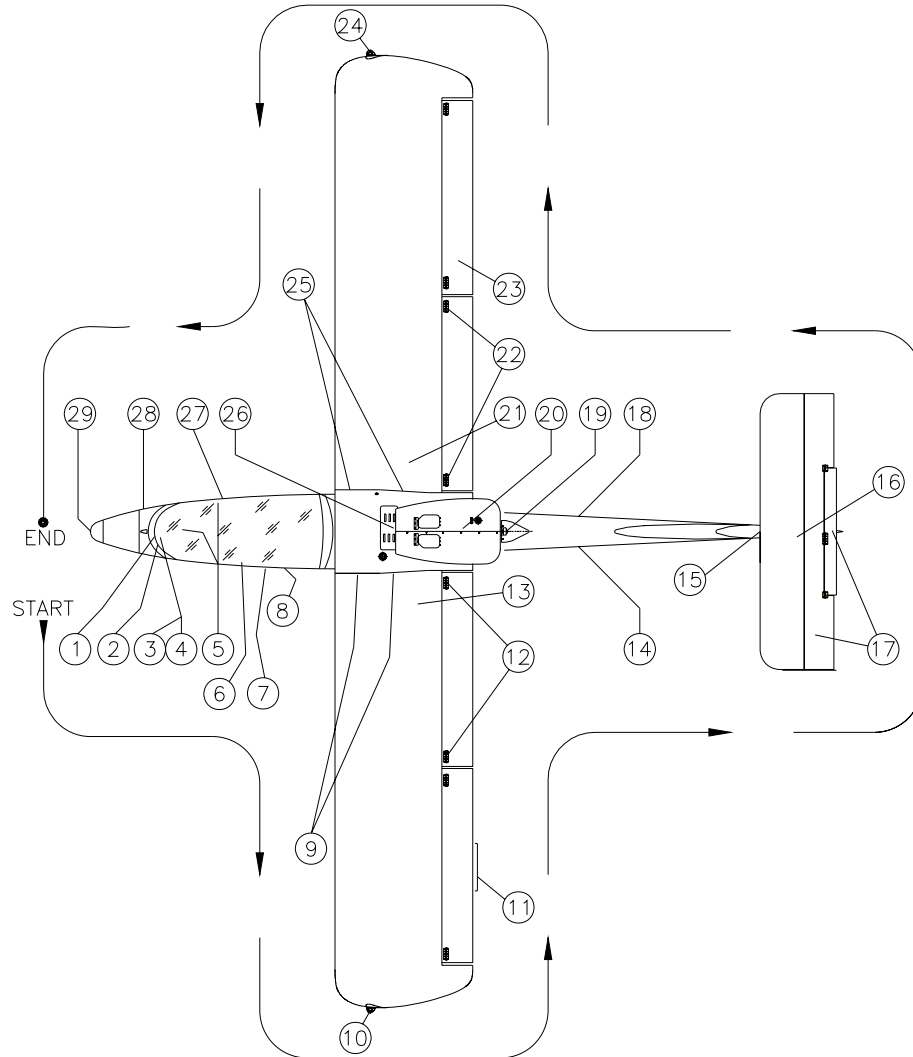
**NOTE**

**Notable consumption of oil or coolant does normally not occur. It is therefore neither necessary nor sensible to refill before these levels have dropped to the minimum marking.**

21. Check right tire and main gear brake.
22. Check the right flaps connection and hinges.
23. Check that the right aileron is free.
24. Check the strobe/NAV lights on the right wing tip (if applicable)
25. Check the attachments of the wing to the fuselage, wing/strut and strut/fuselage.
26. Check that the engine air intake is free.
27. Check that the right static port is clean.
28. Check the shock absorber and the nose wheel tire.
29. Check that the nose dynamic port and the pitot tube are clean.

**CAUTION**

**Visual Inspection is defined as check for: defects, cracks, delaminating, excessive play, insecure or improper mounting and general condition. Check also freedom of movement of control surfaces.**



**Fig. 7-1 – AIRCRAFT WALKAROUND**

## 7.4. NORMAL OPERATION CHECKLIST

### A. INTERNAL

- |                               |                        |
|-------------------------------|------------------------|
| 1. Documents, handbooks, maps | ON BOARD AS REQUIRED   |
| 2. Controls                   | FREE                   |
| 3. Switches                   | ALL OFF                |
| 4. Circuit breakers           | ALL IN                 |
| 5. Master                     | ON                     |
| 6. Fuel level                 | ENOUGH FOR THE MISSION |
| 7. Pitch trim                 | NEUTRAL (Central mark) |
| 8. Master                     | OFF                    |
| 9. Hour-meter                 | NOTE                   |
| 10. Canopy                    | FLAWLESS AND CLEAN     |
| 11. Canopy hinges             | CHECK                  |

### B. PRE-STARTING

- |                                      |                                    |
|--------------------------------------|------------------------------------|
| 1. BATT switch                       | ON                                 |
| 2. Cabin lights (if applicable)      | ON (night operations only)         |
| 3. Pedals and harness                | ADJUSTED AND FASTENED              |
| 4. Headsets                          | IN PLACE                           |
| 5. Canopy                            | CLOSED AND LOCKED                  |
| 6. Parking brake                     | ON                                 |
| 7. Ignitions and switches            | OFF                                |
| 8. Radio and avionics (if installed) | OFF                                |
| 9. Instruments                       | CHECK                              |
| 10. Starter keys                     | TIED BY A RIP CORD TO THE CONSOLES |

### C. ENGINE START

- |                                      |                         |
|--------------------------------------|-------------------------|
| 1. Carburetor heater                 | OFF                     |
| 2. Engine baffle                     | OPENED (MAX position)   |
| 3. Throttle friction                 | AS REQ'D                |
| 4. Choke                             | AS REQ'D                |
| 5. Throttle                          | IDLE                    |
| 6. Strobe/NAV lights (if applicable) | ON                      |
| 7. Ignition switches                 | ON                      |
| 8. Auxiliary fuel pump               | ON for 5 sec., then OFF |
| 9. Area                              | CLEAR                   |
| 10. Starter                          | ENGAGE                  |
| 11. Engine oil pressure              | CHECK                   |

### **CAUTION**

**If oil pressure is below 22 psi (1.5 bar) shut down engine immediately  
(10 seconds maximum delay)**

- |                                   |                  |
|-----------------------------------|------------------|
| 12. Choke                         | OFF              |
| 13. GEN switch                    | ON               |
| 14. Generator warning light       | CHECK OFF        |
| 15. Cylinder heads temperature    | CHECK            |
| 16. Warning lights                | CHECK OFF        |
| 17. Intercom                      | ON AND OPERATIVE |
| 18. Avionics/radio (if installed) | ON AND OPERATIVE |

**CAUTION**

**Warm-up the engine to a minimum oil temperature of 122 °F (50 °C)  
at 2,500/3,000 RPM (also possible during taxiing)**

**D. TAXIING**

- |                           |  |
|---------------------------|--|
| 1. Radios (if installed)  | CHECK                                  |
| 2. Parking brake          | RELEASE                                |
| 3. Left-right brakes      | CHECK                                  |
| 4. Rudder                 | CHECK FULL DEFLECTION                  |
| 5. Roll and pitch         | CHECK FULL DEFLECTION                  |
| 6. Auxiliary cooling fans | ON (after CHT reaches 212 °F / 100 °C) |

**E. RUN-UP**

- |                                  |   |
|----------------------------------|---|
| 1. Canopy                        | Properly CLOSED and LOCKED                              |
| 2. Harness                       | ADJUSTED AND FASTENED                                   |
| 3. Engine instruments            | GREEN BAND  |
| 4. Parking brake                 | ON  |
| 5. 4,100 RPM                     | CHECK IGN. 1 & 2 (max drop 300 RPM - max diff. 115 RPM) |
| 6. Carburetor heater             | CHECK   |
| 7. Flaps                         | 10° (1 <sup>ST</sup> NOTCH)                             |
| 8. Pitch trim                    | NEUTRAL   |
| 9. Landing light (if applicable) | ON (night operations only)                              |

**F. LINE-UP AND TAKEOFF**

- |                                   |                               |
|-----------------------------------|-------------------------------|
| 1. Runway and final leg           | CHECK CLEAR                   |
| 2. Parking brake                  | RELEASE                       |
| 3. Auxiliary fuel pump            | ON                            |
| 4. Throttle                       | FULL (engine RPM 5,100/5,400) |
| 5. 51 KCAS (50 KIAS)              | ROTATE                        |
| 6. 60.7 KCAS (60 KIAS) and 200 ft | FLAPS UP                      |
| 7. CLIMB SPEED                    | ATTAIN 63 KCAS (65 KIAS)      |
| 8. Auxiliary fuel pump            | OFF (500 FT)                  |
| 9. Auxiliary cooling fan          | OFF                           |
| 10. Landing light (if applicable) | OFF                           |

**NOTE**

**In crosswind conditions, directional control can be enhanced by using differential braking. Note that using the brakes for directional control increases the take-off roll distance.**

**WARNING**

**Never open the canopy in flight**

**G. CLIMB**

- |                           |                   |
|---------------------------|-------------------|
| 1. Throttle               | FULL              |
| 2. Powerplant instruments | GREEN RANGE       |
| 3. Flaps                  | UP                |
| 4. Airspeed               | 63 KCAS (65 KIAS) |

**NOTE**

**The best rate-of-climb speed decreases with increasing altitude**

| Pressure Altitude<br>(ft) | Speed  |        |
|---------------------------|--------|--------|
|                           | (KCAS) | (KIAS) |
| 0 - 5,000                 | 63     | 65     |
| 5,000 - 13,500            | 59     | 60     |

**H. CRUISE CHECKS**

- |                               |             |
|-------------------------------|-------------|
| 1. Oil pressure & temperature | GREEN RANGE |
| 2. Cylinder heads temperature | GREEN RANGE |
| 3. Fuel level                 | CHECK       |
| 4. Alarm lights               | OFF         |
| 5. Carburetor heat            | AS REQUIRED |

**WARNING**

**It is forbidden to deflect fully the flight controls beyond  $V_A$  (86.5 KCAS (90 KIAS))**

**I. LANDING APPROACH**

- |                                  |  |
|----------------------------------|--|
| 1. Speed                         | REDUCE TO 59 KCAS (60 KIAS)                |
| 2. Flaps                         | 10° (ONE NOTCH)                            |
| 3. Auxiliary fuel pump           | ON   |
| 4. Speed                         | 56 KCAS (55 KIAS)                          |
| 5. 45° to runway threshold       | FLAPS 20° (SECOND NOTCH)                   |
| 6. Carburetor heat               | OFF  |
| 7. Landing light (if applicable) | ON (night operations only)                 |
| 8. Final leg                     | FLAPS 30° (WHEN SURE<br>TO MAKE THE FIELD) |
| 9. Landing speed                 | 51 KCAS (50 KIAS)                          |

**CAUTION**

**Maximum operating time of landing light: 5 minutes**

**NOTE**

**Under conditions like strong headwind, danger of wind-shear or turbulence, a higher approach speed should be selected (normally add half of wind gust speed)**

**L. MISSED APPROACH (BALKED LANDING)**

- |   |                          |
|---|--------------------------|
| 1. Throttle                             | FULL POWER               |
| 2. Speed more than 56 KCAS (55 KIAS)    | START CLIMB              |
| 3. Flaps                                | 10°                      |
| 4. Speed 60.7 KCAS (60 KIAS) and 200 ft | FLAPS UP                 |
| 5. CLIMB SPEED                          | ATTAIN 63 KCAS (65 KIAS) |
| 6. Auxiliary fuel pump                  | OFF (500 FT)             |
| 7. Landing light (if applicable)        | OFF                      |

**M. TAXIING**

- |                        |                     |
|------------------------|---------------------|
| 1. After touchdown     | APPLY BRAKES AS RQD |
| 2. Direction           | RUDDER/BRAKES       |
| 3. Flaps               | UP                  |
| 4. Auxiliary fuel pump | OFF                 |

**N. PARKING**

- |                                      |         |
|--------------------------------------|---------|
| 1. Parking brake                     | ON      |
| 2. Avionics/Radio (if installed)     | OFF     |
| 3. Trim                              | NEUTRAL |
| 4. Landing light (if applicable)     | OFF     |
| 5. Ignition Switches                 | OFF     |
| 6. Strobe/NAV lights (if applicable) | OFF     |
| 7. Cabin lights (if applicable)      | OFF     |
| 8. Master Battery/Generator switches | OFF     |
| 9. Controls                          | LOCKED  |

**NOTE**

**The influence on flight characteristics caused by rain and the accumulation of insects is negligible.  
Flights through heavy rain should be avoided due to reduced visibility.**

## **SECTION 8**

# **HANDLING AND SERVICING**

### **8.1. INTRODUCTION**

### **8.2. PARKING, TIE-DOWN AND GROUND PROTECTION**

### **8.3. REFUELLING, LUBE, COOLANT AND BRAKE FLUID**

#### **8.3.1. REFUELLING**

#### **8.3.2. OIL FILLING, OIL & FILTER CHANGE**

#### **8.3.3. COOLANT**

#### **8.3.4. BRAKE FLUID**

### **8.4. CLEANING**

## 8.1. INTRODUCTION

This Section describes the procedures for:

- parking and tie-down
- refueling, changing oil, filling the aircraft with engine oil, coolant and brake fluid
- protecting on the ground
- cleaning

## 8.2. PARKING, TIE-DOWN AND GROUND PROTECTION

The aircraft must be parked facing into the wind using the following procedure:

- Lock the parking brake
- Lock the elevator by running the safety harness around the sidestick handgrip and buckling it.
- Close and lock the canopy
- Cover the canopy with the proper white protecting cloth
- Tie down the aircraft with stakes and ropes. Attach the ropes to the wing strut and to the nose gear
- Lock the ailerons with the proper aileron locks supplied with the aircraft in the position shown in Fig. 8-1

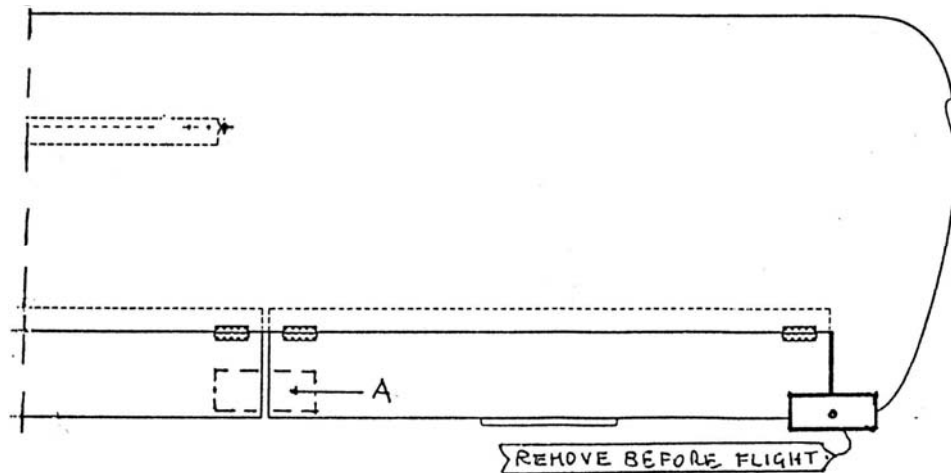
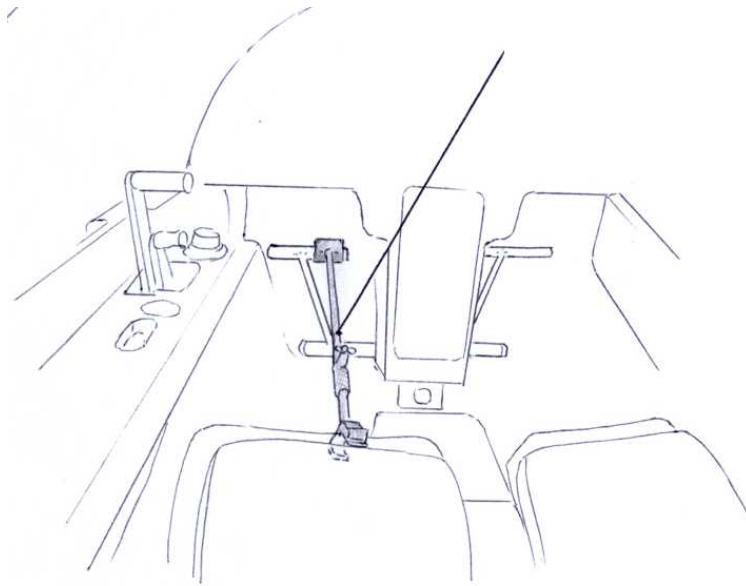


Fig. 8-1 - AILERON LOCK

### NOTE

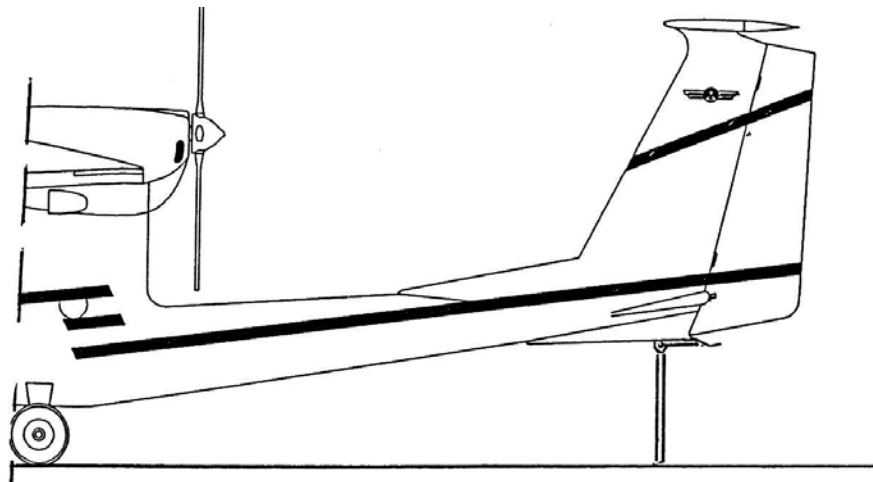
Never put the aileron lock in position A because, in case of flaps activation, the flaps and the ailerons will be damaged.

- Install the proper rudder gust-locks, supplied with the aircraft, in the rear rudder pedals as shown in Fig. 8-2.



**Fig. 8-2 - RUDDER LOCKS**

- Cover the engine air intake with the optional cover when anticipating a long stay on the ground
- Insert the tailskid stand as shown in Fig. 8-3



**Fig. 8-3 - TAILSKID STAND**

## 8.3. REFUELLING, LUBE, COOLANT AND BRAKE FLUID

### 8.3.1. REFUELLING

The engine mounted on this aircraft may be fed by unleaded automotive fuel (MOGAS MON 91 octane) and alternatively low lead aviation fuel (AVGAS 100LL). From the fuel tank the fuel goes to the carburetors after passing through the gascolator containing a filter. However only a properly filtered gasoline must be used. The control of purity of automotive gasoline by suppliers sometimes is not very accurate, therefore it is recommended to refuel the aircraft using a filtering funnel or other appropriate fuel filtering system.

Refuelling must be done as follows:

- connect the aircraft to the earth (ground) using a cable fastened to the specific point located on the rear side of the engine, where the ground symbol is displayed
- unscrew the fuel cap using the special tool supplied with the aircraft
- refill the aircraft using a filtering funnel
- replace the fuel cap properly.

#### **CAUTION**

**After refuelling, always store the key to the fuel cap in an adequate location (e.g.: the compartment for small items in the cockpit floor).**

**Inadvertently leaving the key on the upper surface of the wing may cause it to strike the propeller when the engine is turned on.**

#### **NOTE**

**IT IS COMPULSORY: During refuelling a fire extinguisher or a pail of sea-sand must be placed near the aircraft.**

**IT IS FORBIDDEN: To smoke or have a open flame in a radius of 66 ft (30 m) from the point at which fuelling is practised.**

**IT IS ADVISED: To use proper containers, rubber pipes and/or proper equipment for fuelling, to prevent the formation of static sparks.**

### 8.3.2. OIL SELECTION, OIL FILLING, OIL & FILTER change

The viscosity should be selected according to the oil temperature conditions. Some examples of oils suitable in every temperature condition are shown in the following table:

| Prg | Brand      | Description          | Specification | Viscosity   | Fuel type          |
|-----|------------|----------------------|---------------|-------------|--------------------|
| 01  | SHELL®     | Advance VSX 4        | API SG        | SAE 10 W-40 | Leaded or unleaded |
| 02  | MOBIL1®    | Full synthetic       | API SJ/CF     | SAE 15 W-50 | Unleaded only      |
| 03  | VALVOLINE® | Dura blend synthetic | API SH        | SAE 10 W-40 | Leaded or unleaded |

#### **NOTE**

**For more information about oil selection refer to ROTAX Service Instruction SI-18-1997 (latest revision)**

Capacity Max 3.2 US qt (3 lt)

Min 2.1 US qt (2 lt)

Oil and filter must be changed, after the first 25 engine operating hours; every 100 operating hours.

**CAUTION**

**Do not use aviation oil and oil additives.**

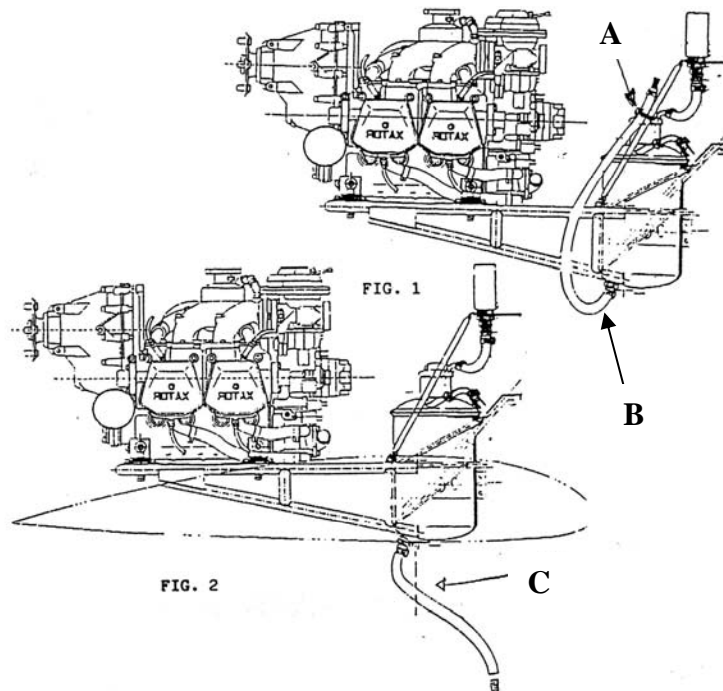
Filling

With reference to Fig. 8-4, unscrew the oil cap/dipstick **(A)** and restore the maximum level by filling the reservoir.

Change

With reference to Fig. 8-4 and using only appropriate grade of automotive oil, proceed as follows:

- Open the engine baffle completely by placing the control lever on MAX COOLING;
- cut the tie-wrap hose clamp **(A)** to release the drain hose **(B)**;
- pull out the hose through the air intake **(C)**;
- remove the hose clamp and the plug on the end of the hose;
- empty the oil by draining it in a container and dispose properly;
- change the oil filter;
- replace the plug, and the hose clamp that retains the plug;
- replace the drain hose in the original position and secure with a tie wrap;
- fill the reservoir with 3 liters of new oil;
- start the engine to IDLE;
- check that the oil pressure reaches the normal pressure within 10 seconds.



**Fig. 8-4 - ENGINE OIL CHANGE AND COOLANT RESEVOIR**

### 8.3.3. COOLANT

Use only EVANS NPG+ waterless coolant

#### **WARNING**

**Do not add water or water-containing coolant to the system**

|                         |  |
|-------------------------|--|
| Capacity                | Max 2.4 US qt (2.3 lt)<br>Min 2.3 US qt (2.2 lt)   |
| Overflow or filler tank | Max 0.21 US qt (0.2 lt)<br>Min 0.11 US qt (0.1 lt) |

#### **NOTE**

**For more information about coolant selection refer to ROTAX Service Bulletin SB-912-043 (latest revision)**

The coolant level may be checked in the transparent reservoir located at the aft end of the engine (Point D in Fig. 8-4). If additional coolant is required, use only the proper engine coolant.

#### **WARNING**

**Water or water-containing coolant must not be added in any case to the cooling system**

#### **NOTE**

**In case of an empty reservoir, the coolant level must be checked in the distribution tank on top of the engine.  
Excessive overfilling of the reservoir can cause an overflow during operation.**

### 8.3.4. BRAKE FLUID

Check every 100 hours/once a year the level of brake fluid and refill as required, using Esso Aviation Invaroil SJ13 AIR 3520 B H515 or equivalent, by unscrewing the Allen screw on top of the master brake cylinders.

## 8.4. CLEANING

It is very important to keep the aircraft clean as this reduces the chances of corrosion and simplifies inspection and maintenance.

### - **Canopy and side windows**

These are made of Plexiglas and must be carefully cleaned with soapy water and using a wet sponge to remove mud and encrusted dirt.

Do not rub the Plexiglas with a dry cloth because it may scratch the canopy.

After drying the canopy, lightly rub it with a cloth moistened with an antistatic fluid (DREWOQUASAR VIDEO or equivalent), then dry again.

Oil or grease spots can be cleaned by lightly rubbing them with a cloth wet with Plexiglas polish (MEGUIR'S Inc - MIRROR GLAZE or equivalent).

### **CAUTION**

**Do not use gasoline, benzene, acetone, paint solvents or sprays to clean the Plexiglas because they can cause serious damage.**

**If the aircraft is left under the sun, especially in the summer, remember to protect the canopy with its white covering.**

### - **Fuselage**

The fuselage must be cleaned with water and a neutral automotive detergent with a wet sponge. Dry with a soft cloth or chamois.

### - **Landing gear**

The main gear leaf springs, nose gear and tires must be cleaned with water and a neutral automotive detergent.

### - **Wings and tailplane**

The wing surfaces must be cleaned with water and a neutral detergent. The metal parts must be dried completely to prevent corrosion. To remove insects from the leading edge of wings use a wet sponge being very careful not to scratch the surface. Do the same for the struts.

The tailplane must be cleaned in the same manner as the wing.

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## **SECTION 9**

# **REQUIRED PLACARDS AND MARKINGS**

### **9.1. AIRSPEED INDICATOR RANGE MARKINGS**

### **9.2. OPERATING LIMITATIONS**

### **9.3. POWERPLANT INSTRUMENTS MARKINGS**

### **9.4. ADDITIONAL MARKINGS**

## 9.1. AIRSPEED INDICATOR RANGE MARKINGS

| MARKING    | SPEED RANGE (KCAS) | SPEED RANGE (KIAS) | MEANING  |
|------------|--------------------|--------------------|--|
| WHITE ARC  | 40 – 67            | 38 - 67            | Range of use of fully extended flaps                     |
| GREEN ARC  | 44 – 104           | 44 - 104           | Normal range of use                                      |
| YELLOW ARC | 104 – 132          | 104 - 132          | Speed range in smooth air                                |
| RED LINE   | at 132             | at 132             | Speed limit never to be exceeded in any flight condition |

## 9.2. OPERATING LIMITATIONS

Operating limitations are indicated by the following placard, displayed on the instrument panel or on the side console:

| <b>LIGHT SPORT AIRCRAFT</b>                     |   |
|---|---|
| <b>CHARACTERISTICS</b>                          | <b>PERFORMANCE (at 1,320 lbs – 599 kg)</b>              |
| MAX TAKE-OFF WEIGHT 1,320 lbs (599 kg)          | $V_{NE}$ 132 KTS / 152 mph                              |
| MAX LANDING WEIGHT 1,320 lbs (599 kg)           | $V_{FE}$ 67 KTS / 77 mph                                |
| POWER 98 hp (5') – 92.5 hp (max. cont.)         | MAX HOR. SPEED s.l. ( $V_H$ ) 110 KTS / 127 mph         |
| RPM engine 5,800 (5') – 5,500 (max cont.)       | MANOUV. Sp. s.l. 90 KTS / 104 mph                       |
| ENGINE TYPE ROTAX 912 ULS2                      | STALL SPEED (30° flaps) 38 KTS / 44 mph                 |
| FUEL TYPE - MOGAS MON 91 oct.<br>or Avgas 100LL | RATE OF CLIMB, s.l. (at 65 kts) 1,100 ft/min            |
| OIL TYPE Automotive proper grade                | CEILING 13,500 ft                                       |
| MAX. USABLE FUEL 17.8 Gall. / 67.5 lt           | TAKE OFF RUN (10° flaps) 470 ft / 143 m                 |
| "G" LIMIT FACTOR + 4.0 / - 2.0 (Flaps 0°)       | LANDING RUN (30° flaps) 360 ft / 110 m                  |
| + 2.0 / 0 (Flaps 30°)                           | FUEL CONSUMPTION  |
| MAX BAGGAGE WEIGHT 66+33 lbs (45) kg            | (cruise power 75% pwr) 4.9 gall/h (18.5 lt/h)           |
|   | ENDURANCE (cruise pwr.) 3 <sup>h</sup> 40' (no reserve) |
| <b>NO INTENTIONAL SPINS</b>                     |   |

### 9.3. POWERPLANT INSTRUMENTS MARKINGS

| INDICATORS       | RED LINE<br>Min. Limit | GREEN ARC<br>Normal usage     | YELLOW ARC<br>CAUTION                                   | RED LINE<br>Max. Limit |
|------------------|------------------------|-------------------------------|---|------------------------|
| RPM Indicator    | --                     | 1,400 – 5,500                 | 5,500 – 5,800   | 5,800                  |
| Oil temperature  | 120 °F<br>(50 °C)      | 120 - 230 °F<br>(50 – 110 °C) | 230 - 266 ° F<br>(110 – 130 °C)                         | 266 °F<br>(130 °C)     |
| Cyl. heads temp. | 140 °F<br>(60 °C)      | 140 - 248 °F<br>(60 – 120 °C) | 248 - 266 °F<br>(120 – 130 °C)                          | 266 °F<br>(130 °C)     |
| Oil pressure     | 12 psi<br>(0.8 bar)    | 29 – 72.5 psi<br>(2 – 5 bar)  | 12 - 29 psi (0.8 – 2 bar)<br>72.5 - 102 psi (5 – 7 bar) | 102 psi<br>(7 bar)     |

### 9.4 ADDITIONAL MARKINGS

The limitation expressed in the following placards, mounted on the bulkhead behind the rear seat and on the floorboard behind the rear seat, must be complied with

**NO BAGGAGE  
 BEHIND OR BELOW  
 THE SEAT  
 IF PROPER CONTAINERS  
 ARE NOT INSTALLED**

**ACCESS BEHIND  
 SEAT AND CONTAINER OR  
 FRAME  
 ONLY FOR MAINTENANCE**

The following additional placard must also be displayed in the cockpit

**This aircraft was manufactured in accordance with Light Sport Aircraft  
 airworthiness standards and does not conform to  
 standard category airworthiness requirements.**

**NOTE**

**For further placards refer to the Maintenance Manual.**

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## SECTION 10

# SUPPLEMENTS

This section of the handbook contains Supplements to safely and efficiently operate the Sky Arrow 600 Sport when optional equipment or equipment for special operations, not included in the basic Airplane Flight Manual, are installed. When such equipment is installed, the corresponding supplements must be in the airplane for flight operations.

Data in a supplement adds to, supersedes or replaces similar data in the basic Airplane Flight Manual.

A Log of Supplements is shown below. The Log of Supplements lists all Supplements available for the Sky Arrow 600 Sport at the page revision date (lower left-hand corner of this page). A mark in the column "Inst." Indicates that the supplement is installed in this Manual.

### LOG OF SUPPLEMENTS

| Inst. | Doc. number  | Title                               | Rev. no. | Rev. date      |
|-------|--------------|-------------------------------------|----------|----------------|
| X     | LS-14.03     | Aircraft Flight Training Supplement | 1        | Febr. 20, 2006 |
|       | LS-14.01/S01 | Kit for disabled pilots             | 1        | Jan 15, 2007   |
|       |              |                                     |          |                |
|       |              |                                     |          |                |
|       |              |                                     |          |                |
|       |              |                                     |          |                |
|       |              |                                     |          |                |
|       |              |                                     |          |                |
|       |              |                                     |          |                |



**INIZIATIVE INDUSTRIALI ITALIANE S.p.A.  
(METEOR S.p.A.)**

**R O M A**

***Pilot's Operating Handbook and  
Airplane Flight Manual***

***SKY ARROW 600 SPORT***

**SUPPLEMENT FOR  
KIT FOR DISABLED PILOTS**

**APPROVED FOR U.S. REGISTERED AIRCRAFT  
IN ACCORDANCE WITH ASTM STANDARD F2245**

When the kit for disabled pilots is installed in the Sky Arrow 600 Sport aircraft, this Supplement is applicable and must be inserted in Section 10 – Supplements of the Pilot's Operating Handbook and Airplane Flight Manual.

Information in this Supplement either adds to, supersedes or deletes information contained in the basic Pilot's Operating Handbook and Airplane Flight Manual.

**DOCUMENT REFERENCE N.: LS-14.01/S01**

**DATE OF INITIAL ISSUE: February 20, 2006**

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## LIST OF EFFECTIVE PAGES

| Page no. | Page rev. | Date                 |
|----------|-----------|----------------------|
| i        | 1         | Jan. 15, 2007        |
| ii       | 0         | Feb. 20, 2006        |
| iii      | 1         | Jan. 15, 2007        |
| iv       | 0         | Feb. 20, 2006        |
| 1        | 0         | Feb. 20, 2006        |
| 2        | 0         | Feb. 20, 2006        |
| 3        | 0         | Feb. 20, 2006        |
| 4        | 0         | Feb. 20, 2006        |
| <b>5</b> | <b>1</b>  | <b>Jan. 15, 2007</b> |
| 6        | 0         | Feb. 20, 2006        |

| Page no. | Page rev. | Date |
|----------|-----------|------|
|          |           |      |

## RECORD OF REVISIONS

| Rev. | Affected page  | Revision date |
|------|----------------|---------------|
| 0    | Original issue |               |
| 1    | i              | Jan. 15, 2007 |
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## 1. GENERAL

Iniziativa Industriali Italiane S.p.A. developed a special modification kit for the Sky Arrow line of aircraft, which allows disabled pilots to fly the airplane from the front seat, without relying on the rudder pedals for directional control. Installation of the modification kit does not modify the operational capabilities of the airplane.

This supplement to the Pilot's Operating Handbook and Airplane Flight Manual has been prepared to provide pilots and instructors with information for safe and efficient operation of the Sky Arrow 600 Sport aircraft, when the kit for disabled pilots is installed.

Each section of this Supplement is numbered as the corresponding section of the basic Flight Manual. It contains only those paragraphs and sub-paragraphs affected by the modification(s). The information contained in this Supplement either replaces, integrates or supersedes the corresponding information in the basic Flight Manual.

The applicability of this Supplement must be determined during the pre-flight inspection. Before each flight the pilot must inspect the aircraft and verify if the kit for disabled pilots is installed or not.

The major assembly which composes the kit is located in the cockpit, on the left-hand console. It can be easily and rapidly identified.

If the aircraft is fitted with the kit for disabled pilots, then it must be operated also in accordance with this Supplement to the Flight Manual.

### NOTE

**The kit for disabled pilots, if installed, can be removed. Refer to the proper Supplement to the airplane maintenance manual for removal/installation procedures.**

**If the kit for disabled pilots is removed (the proper configuration is ensured by aircraft pre-flight inspection), this Supplement to the Flight Manual is no longer applicable.**

### NOTE

**To allow sufficient training time to become fully confident with the system and its operation, the manufacturer strongly recommends pilots training on an aircraft fitted with the kit for disabled pilots to fly with a safety pilot in the rear seat before flying solo, for at least 5 (five) hours or more, if required.**

## 2. AIRCRAFT AND SYSTEMS DESCRIPTION

The kit for disabled pilots allows the pilot in the front seat to obtain directional control of the aircraft without using the rudder pedals. This is done by means of a T-shaped handle located on the left-hand console, that acts both as rudder and throttle control. An electric rudder trim system is also installed, and is operated by the right and left push-buttons on the top of the right-hand sidestick.

The modification kit consists of a permanent, factory-made prearrangement of the fuselage and of the electric system, and of a set of removable leverages that transfer rudder control from the pedals to the left-hand sidestick.

Operation of the rudder from the rear seat remains unchanged.

### MECHANICAL SYSTEM

The mechanical system allows the pilot in the front seat to operate the rudder and the throttle with the left hand. It is composed of an actuation handle terminating with a universal joint, a series of supports and links which terminate with ball joint ends. The longitudinal movements of the handle are transmitted to the rear rudder pedals. The entire system is fastened to the fuselage structure through the front seat support tube and a vertical plate on the left-hand side.

When the kit for disabled pilots is installed, both the front and the rear rudder pedals maintain their normal excursion. For this reason, two removable protection bars are fastened to the fuselage floor immediately behind the front rudder pedals, to prevent inadvertent rudder control by the pilot in the front seat. The protection bars are made of stainless steel and are painted red to be readily identified. The position of the protection bars does not limit the normal travel of the front rudder pedals.

### NOTE

**To install the protection bars and maintain normal travel of the rudder pedals, the front rudder pedals must be adjusted in the fully forward position.**

The upper part of the control handle can be removed from the aircraft without removing the entire kit for disabled pilots. A safety spring on the handle allows rapid disconnection.

Rudder and throttle control using the kit for disabled pilots is illustrated in fig. 1.

### RUDDER CONTROL

Rudder control is obtained with longitudinal movements of the control handle.

- For right rudder input, the pilot must push the handle towards the nose of the airplane;
- For left rudder input, the pilot must pull the handle towards the tail of the airplane.

### THROTTLE CONTROL

To operate the throttle, the pilot must rotate the handle clockwise, as shown in fig. 1.

- Throttle IDLE position is when the handle is perpendicular to the aircraft longitudinal axis;
- Throttle MAX position is when the handle is rotated clockwise approximately 70 degrees;

A locknut is placed underneath the front throttle lever to allow adjustment of the throttle travel.

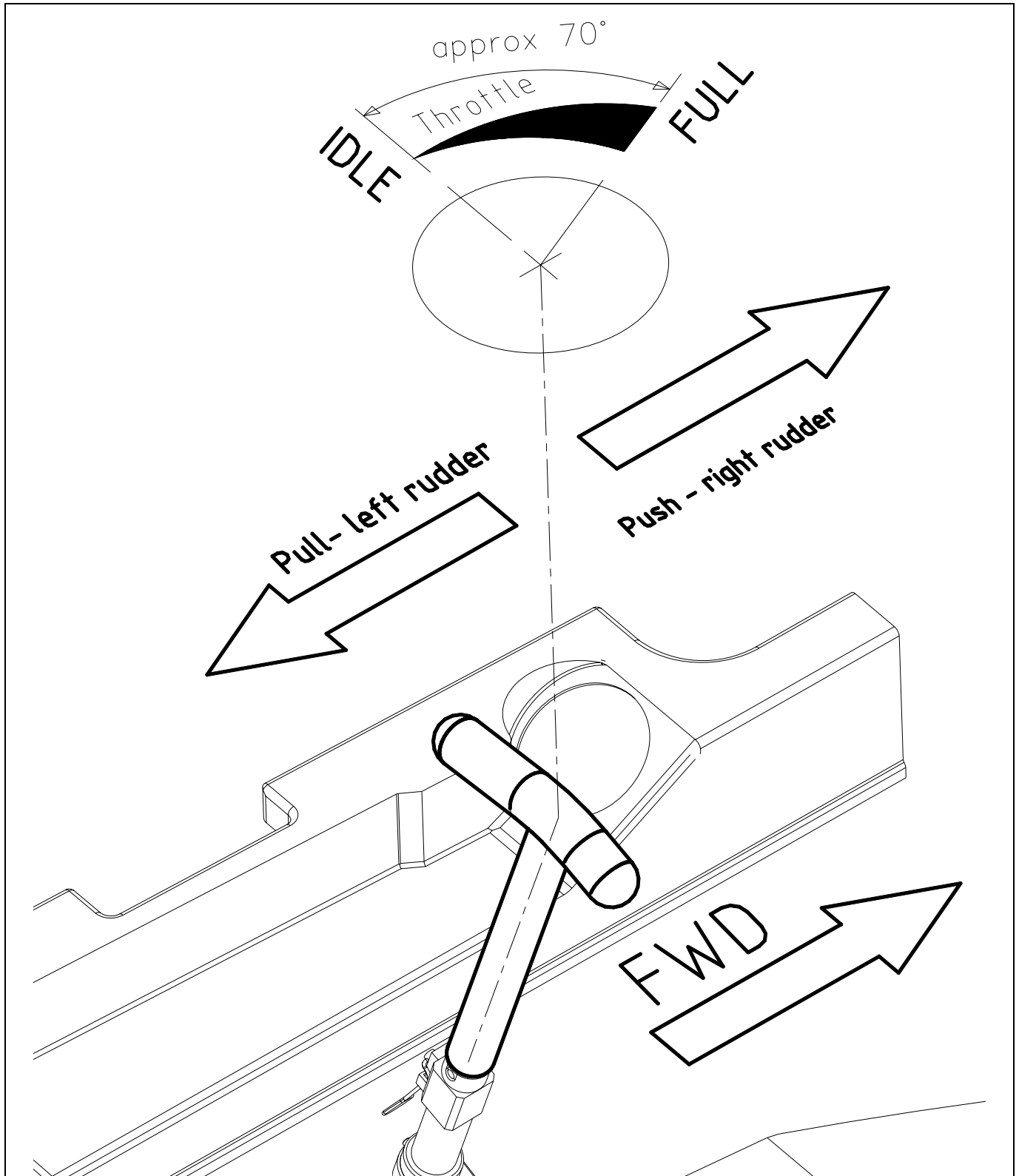


Fig. 1 – Rudder and throttle control

## ELECTRIC SYSTEM

The kit for disabled pilots also includes a rudder trim system, not included in the aircraft standard configuration. Installation of the trim system is permanent, and cannot be removed when other elements of the kit for disabled pilots are removed from the aircraft.

The rudder trim is actuated by a electric servo on the rudder. A rudder trim position indicator is installed on the instrument panel.

Trim command is available both to the front and the rear pilot, and is obtained with the left and right push-buttons on top of the right-hand sidestick.

Fig. 2 shows the rudder trim system.

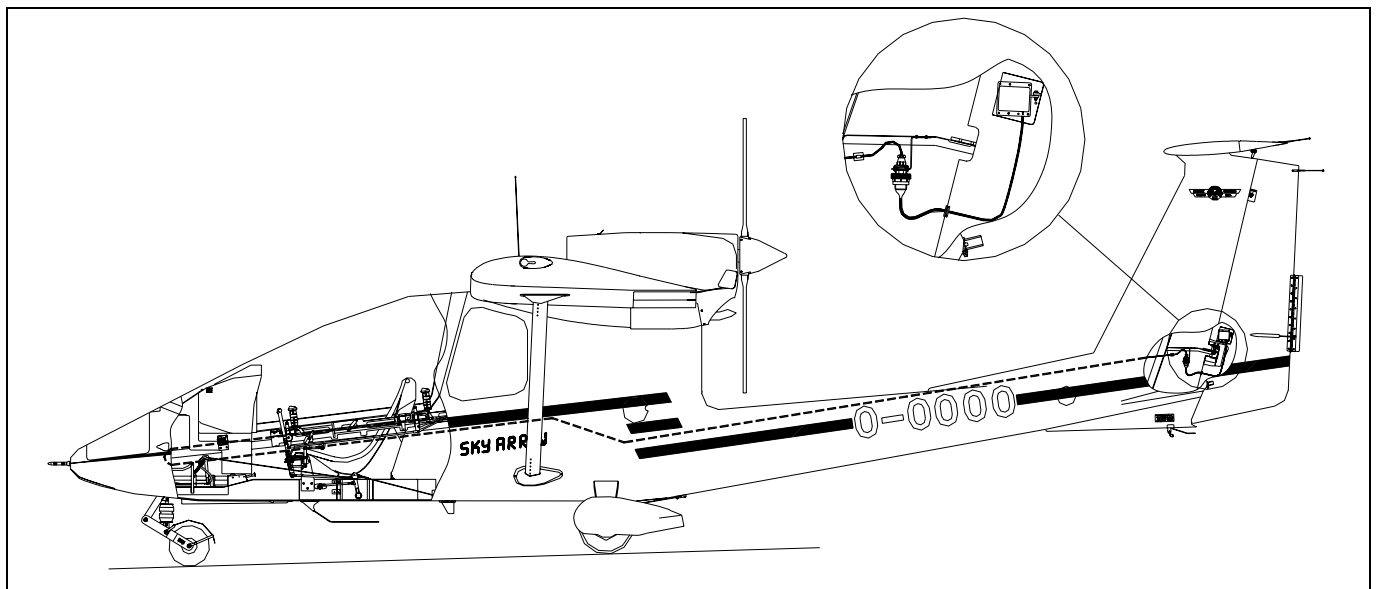


Fig. 2 – Rudder trim system

### 3. OPERATING LIMITATIONS

The operating limitations of the basic airplane remain unchanged.

## 4. WEIGHT AND BALANCE – EQUIPMENT LIST

### 4.8 EQUIPMENT LIST

The equipment list of the Sky Arrow 600 Sport aircraft, modified with the kit for disabled pilots, must be completed by an additional group of items. This paragraph displays only this additional group, and must be considered as an addition to the equipment list contained in the basic airplane flight manual.

| KIT FOR DISABLED PILOTS |                                  |              |               | AIRCRAFT S/N |    | REGISTRATION:  |                  |
|-------------------------|----------------------------------|--------------|---------------|--------------|----|----------------|------------------|
| N.                      | PART DESCRIPTION                 | Manufacturer | Id-Code P/N   | INSTALLED    |    | MASS lbs (kg)  | ARM in (mm)      |
|                         |                                  |              |               | Yes          | No |                |                  |
| 1                       | Complete kit for disabled pilots | 3i           | ---           |              |    | 20.0<br>(9.1)  | 118.1<br>(2,999) |
| 2                       | Mechanical links                 | 3i           | R14501/00     |              |    | 6.16<br>(2.8)  | 57.5<br>(1,461)  |
| 3a                      | Rudder trim actuator             | Menzimer     | MAC Servo S6A |              |    | 0.25<br>(0.11) | 281.6<br>(7,153) |
| 3b                      | Rudder trim actuator             | Ray Allen    | T2-10A        |              |    | 0.25<br>(0.11) | 281.6<br>(7,153) |
| 4a                      | Rudder trim indicator            | Menzimer     | MAC 6A        |              |    | 0.11<br>(0.05) | 44.3<br>(1,125)  |
| 4b                      | Rudder trim indicator            | Ray Allen    | MAC 6A        |              |    | 0.11<br>(0.05) | 44.3<br>(1,125)  |
|                         |                                  |              |               |              |    |                |                  |
|                         |                                  |              |               |              |    |                |                  |
|                         |                                  |              |               |              |    |                |                  |

## 5. PERFORMANCE

The performance of the basic airplane remains unchanged.

## **6. EMERGENCY PROCEDURES**

The emergency procedures of the basic airplane remain unchanged.

## **7. NORMAL OPERATING PROCEDURES**

### **7.2 DAILY INSPECTION**

If the kit for disabled pilots is installed, prior to the first flight of the day do the following additional checks:

1. Verify that the yaw and throttle control lever is positively engaged in its seat on the left-hand side console, and that the release spring is installed correctly.
2. Check visually and by hand that all mechanical links of the kit are properly and securely fastened. Verify absence of play;
3. Check proper installation of castle nuts and cotter pins at connections between rods;
4. Check that the rudder pedals protection bars are installed and properly secured;
5. Actuate the rudder control lever and check free and unrestricted rudder travel; the rudder pedals must move freely without interfering with the protection bars;
6. Test proper operation and unrestricted travel of the electric rudder trim;

### **7.3 PRE-FLIGHT INSPECTION**

If the kit for disabled pilots is installed, do the following additional pre-flight checks:

1. Test proper operation and unrestricted travel of the electric rudder trim;
2. Actuate the rudder control lever and check free and unrestricted rudder travel;
3. Verify that the electric wires to the rudder trim actuator do not restrict rudder travel.

## **8. HANDLING AND SERVICING**

### **8.4 CLEANING**

Normal care is required for the disabled pilots kit. This includes keeping all joints clean and free of dirt, and drying them thoroughly to prevent the onset of corrosion.

Periodic inspection and lubrication of the ball joints is required (refer to the proper supplement to the airplane maintenance manual).

## **9. REQUIRED PLACARDS AND MARKINGS**

The placards and markings of the basic airplane remain unchanged.