AERO Sp. z o.o.
WAŁ MIEDZESZYŃSKI 844
03-942 WARSAW, POLAND

AIRPLANE FLIGHT MANUAL

AT-4 LSA

LIGHT SPORT AIRPLANE

Airplane registration (Call sign): N703GB

Airplane Serial No.: AT4-003

Registered under No: .....

This airplane must be operated in accordance with information and limitations contained in this Manual.

This Manual must be carried in the airplane at all times

Doc. No. ATL4.02A

WARSAW
MAY, 2007

Editor:

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RECORDING OF REVISIONS

All revisions to this manual, with the exception of actual changes of weighing data must be recorded in the table below.

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LOG OF REVISIONS

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Section 1

GENERAL

1.1 Introduction

This Airplane Flight Manual is intended to provide pilots and instructors with information for safe and effective operation of this airplane which belongs in the Light Sport Airplane category. Some supplementary information is also introduced into the content by the airplane manufacturer. It is the pilot's responsibility to acquaint him/herself with the contents of this manual, as well as with any revisions to it.

CAUTION
THIS AIRPLANE FLIGHT MANUAL IS NOT A FLIGHT TRAINING MANUAL. SEPARATE FLIGHT TRAINING MANUALS EXIST FOR THAT PURPOSE

Should this manual be lost, the General Inspectorate of Civil Aviation – Civil Aircraft Inspection Board is to be notified immediately, and if outside Poland, the local civil aviation authority. Anybody who finds this manual is requested to deliver it promptly to the manufacturer: Aero Sp. z o. o. 03-942 Warszawa, Wał Miedzeszyński 844, Poland, email: aero@post.pl, tel 01148 22 616 20 87, fax 01148 22 617 85 28 and if outside Poland, to the local civil aviation authority.

All information contained in this manual and in other manuals delivered with the airplane is useful and necessary. However this information cannot be considered a substitute for theoretical and practical training in the range of aviation engineering and maintenance.

Although the mere reading of these instructions will not eliminate a hazard, the understanding and application of the information herein will promote the proper use of the aircraft.

The information and components-/system descriptions contained in this Manual are correct at the time of publication.

AERO however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on its products previously manufactured.

AERO reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

WARNING

Never fly the aircraft equipped with engine at locations, airspeeds, altitudes, or other circumstances from which a successful no- power landing cannot be made after sudden engine stoppage

Whether you are qualified pilot or a novice, complete knowledge of he aircraft its controls and operation is mandatory before any Flight. Flying any type of aircraft involves a certain amount of risk. Be informed and prepared for any situation or hazard associated with flying.

A recognized training program and continued education for piloting an aircraft is absolutely necessary for all aircraft pilots. Make sure you also obtain as much information as possible about your aircraft, its maintenance and operation.

Respect all government and local rules pertaining to flight operation in your flying area. Fly only when and where conditions topography, meteorological and airspace restrictions allow safe flight.

Before flight, ensure that all aircraft controls are operative. Make sure all controls can be easily reached in case of emergency.

Unless in a run up area, never run the engine with the propeller turning while on the ground. Do not operate engines if bystanders are close.

In the interest of safety, the aircraft must be not left unattended while the engine is running.

Keep an aircraft log and respect engine and aircraft maintenance schedules. Keep the engine in top operating condition at all times. Do not operate any aircraft which is not properly maintained or has any engine operating.

Since special tools and equipment may be required, engine servicing should only be preformed by a qualified trained mechanic approved by local airworthiness authority.

To eliminate possible injury or damage ensure any loose equipment or tools are properly secured before flight.

When in storage protect the aircraft and fuel system from contamination and exposure

Never operate the engine and gearbox without sufficient quantities of lubricating oil.

Drawings in this manual are for representation only and are supplied to aid understanding what is being described.

1.2 Warnings, cautions and remarks

The definitions below concern the following expressions:
warning, caution, note.

WARNING means that if the warnings concerned are not followed, this will lead to an immediate or significant reduction in flight safety

CAUTION means that if the precautions concerned are not followed this will lead to an immediate or significant reduction in flight safety

NOTE indicates all special issues, which do not directly affect flight safety, but are essential or unusual.

1.4 Descriptive data

This AT-4LSA is a two-seat, single engine, low wing, all metal airplane, with a three-wheel fixed landing gear with a nose wheel.

1.4.1. Airframe:

1. Dimensions:

-Span	27.4 ft
-Length	20.5 ft
- Height	7.34 ft
- Dihedral	3°
- Lifting area	122.7 ft^2
- Mean aerodynamic chord	4.3 ft
- Wing loading	10.8 lb/ft^2
- Wing profile	NACA 4415 mod.

2. Control surface displacements:

- Slab tail (angles related to the fuselage base)

Trailing edge down	10° ±1°
Trailing edge up	12° ±1°

- Trim & balancing tab (angles related to the fuselage base)

When the slab tail trailing edge is down, the tab is displaced downward, i.e. by maximum	26° ±3°
When the slab tail trailing edge is up, the tab is displaced upwards, i.e. by maximum	35° ±3°

- Ailerons (angles related to the wing chord)

- Up	15° ±2°
- Down	10° ±2°

- Rudder (angles related to the chord of the fin)
- Each side 30° ±2°
- Wing flaps (angles related to the wing chord)
- Retracted 0° ±2°
- For takeoff 15° ±2°
- For landing 40° +5/-2°

3. Landing gear

- Wheel track 7.42 ft
- Disc brakes
- Type of shock absorber elastic strut

	Main wheel		Nose wheel	
Tire type	380 x 150	5.00-5	5.00-4	5.00-5
Pressure	36 psi		36 psi	30 psi

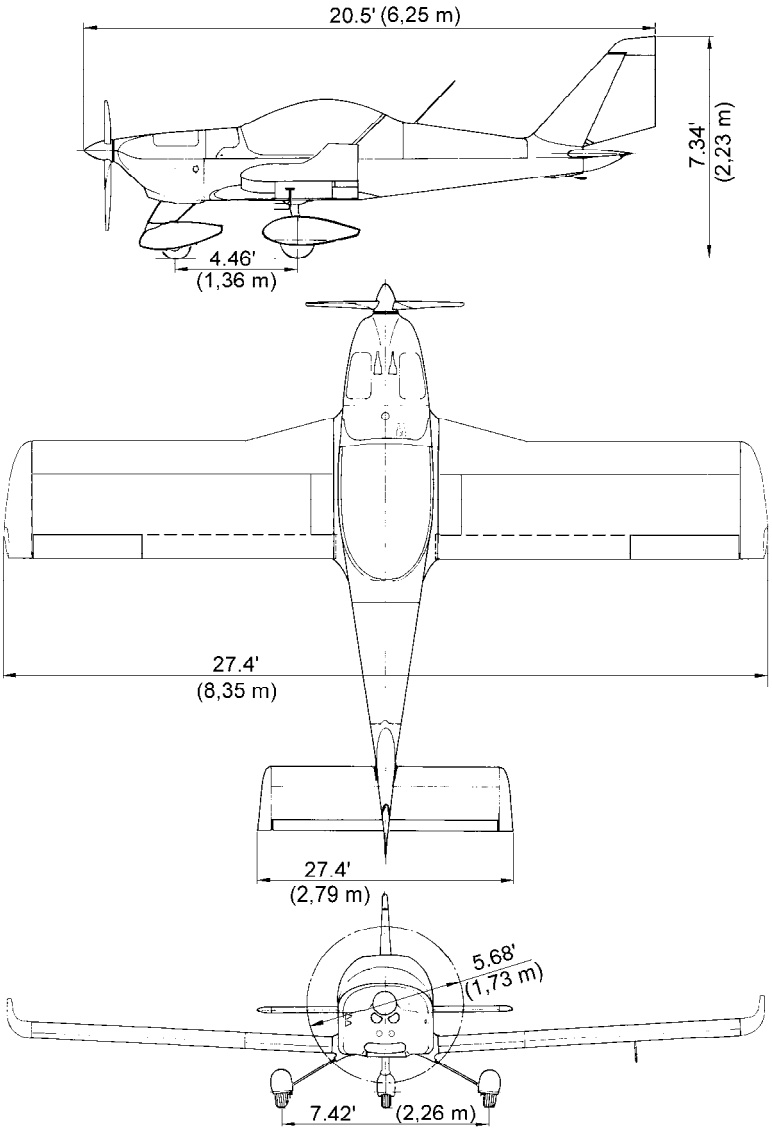
1.4.2. Engine

Four cylinder, horizontally opposed BOMBARDIER ROTAX, model 912ULS engine. The cylinders are air-cooled, the cylinder heads, by liquid cooled. Dual ignition. 98.5 HP take-off power, 92.5 HP continuous power.

1.4.3. Propeller

Ground adjustable 3-1-1P ELPROP three blade propeller prop with the outside diameter of 5.68 ft, with blades manufactured from carbon fiber and with an aluminum hub.

1.5 View of the airplane (three projections)



1.6 List of definitions and abbreviations

The following words or expressions have been used or may be helpful in particular Sections of this manual.

Basic speeds and their denotations:

IAS – **"INDICATED AIRSPEED"** means the speed of an air vessel indicated by its airspeed indicator co-operating with a Pitot tube, which is calibrated for the compressibility of an adiabatic airflow in the conditions of the standard atmosphere at sea level, without corrected errors of the airspeed measuring system. All IAS values in this manual presume the airspeed measuring system error to be zero.

CAS – **"CALIBRATED AIRSPEED"** means the speed of an air vessel after aerodynamic and instrument correction. The calibrated airspeed is equal to the true airspeed in the conditions of the standard atmosphere at sea level.

TAS – **"TRUE AIRSPEED"** means the airspeed of an air vessel, relative to the undisturbed airflow. It is CAS corrected by the change of air density depending on altitude and temperature.

$$TAS = CAS \sqrt{\rho_o / \rho}$$

ρ - air density at the particular altitude

V_{NE} – Maximum never exceed airspeed. This is a limit speed, which cannot be exceeded in any conditions.

V_{NO} – Maximum structural cruising speed. This is a limit speed which cannot be exceeded except in non-turbulent conditions, and then, only with care.

V_A – Maneuvering speed. Above this speed, rapid or full displacement of the control surfaces may in certain circumstances result in exceeding the maximum permissible loads of the structure.

V_{FE} – Maximum airspeed with wing flaps extended. This is the maximum permitted airspeed of the airplane with wing flaps extended.

V_{S1} – Stalling speed, or minimum airspeed of steady flight, at which the airplane is steer able in any other configuration than the landing configuration.

V_{S0} – Stalling speed, or minimum airspeed of steady flight, at which the airplane is steer able in the landing configuration.

V_X – Airspeed for the maximum angle of climb. This is the airspeed, at which the maximum increase of altitude over the shortest distance may be achieved.

V_Y – Airspeed for the maximum rate of climb. This is the airspeed at which the maximum increase of altitude in the shortest time may be achieved.

Meteorological denotations

ISA – International Standard Atmosphere.

ISA assumptions:
- The air is a dry perfect gas
- The temperature at sea level is 59°F,
- The pressure at sea level is 29.92”
- The drop in the temperature is 3.564°F for each 1000 ft of altitude in the range from sea level up to the altitude, at which the temperature is -70°F .

OAT – Outside Air Temperature. This is the temperature of the static air, read from the thermometer, or received from the ground meteorological service, with instrument error and air compressibility effect corrected.

Pressure altitude – This is the altitude read from the altimeter, preset to the standard pressure at the average sea level (29.92 inches).

Power Notation

Take-off power – Maximum power.

Maximum continuous power – Maximum power permitted for the whole flight.

Engine failure – any engine malfunction, engine stop included.

Terminology used for weights and definition of the center of gravity of the airplane.

Maximum takeoff weight – it is the maximum airplane weight at the moment of beginning the takeoff

Maximum landing weight – it is the maximum airplane weight in the moment of touch down.

Empty airplane weight – It is the weight of the equipped airplane, with unusable fuel and full amount of operational agents (oil, cooling agent and hydraulic fluid).

Center of Gravity – imaginary point on the airplane. The airplane suspended at this point is in equilibrium.

Limits of the CG – range of C.G positions, which must not be exceeded, when loading the airplane to a given total weight.

MAC – the Mean Aerodynamic Chord.

Consumable fuel – This is the amount of fuel which may be consumed, without symptoms of a rough engine running.

Unusable fuel – The amount of fuel, not less than that which gives the first symptoms of rough engine running, under the least favorable conditions for fuel feeding the fuel tank, which may occur during normal operation of the airplane.

Operational notations

Take-off run – the distance from the location where the airplane begins to move, to the location where the airplane lifts-off from the takeoff surface.

Take-off distance – the distance from the location where the airplane begins to move, to the location where the airplane reaches the altitude of 50 ft. This distance is to be measured parallel to the takeoff surface.

Landing distance – the distance from the location where the airplane has the altitude of 50 ft, to the location where the airplane stops. This distance is to be measured parallel to the takeoff surface.

Landing run – the distance from the location where the airplane touches down on the landing surface, to the location where the airplane stops.

Demonstrated crosswind capabilities – value of crosswind velocity for which it has been demonstrated that for take-off and landing no special pilot force, skill or concentration is required.

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Section 2

LIMITATIONS

Page

2.1. Introduction

This Section contains the limitations on the operation of this airplane, the marking of the instruments and the basic informative placards required for safe operation of the airplane, engine, the standard systems and the standard equipment.

2.2. Airspeed Limitations

Designation		IAS			REMARKS
Airspeed		**kts**	**mph**	**km/h**	
Maximum never exceed airspeed	V_{NE}	133	153	247	This airspeed must not be exceeded in any condition of operation.
Maximum structural cruising speed	V_{NO}	112	129	208	This airspeed cannot be exceeded, except in non-turbulent conditions, and then, only with care.
Maneuvering speed	V_A	90	103	166	Above this airspeed, no full or rapid displacement of the control surfaces is to be applied, because in certain operational conditions, at full control displacement, the loading limit of the airplane may be exceeded.
Maximum airspeed with flaps extended	V_{FE}	83	96	154	This airspeed is not to be exceeding when the wing flaps are extended to 15° or to 40°.

2.3. Marking of the airspeed indicator

The table below shows the markings of the airspeed indicator and the meaning of the color coding.

White sector		Range for safe deployment of wing flaps.
Green sector		Range of normal operation.
Yellow sector		Range of limited operation (maneuvers to be performed with care and in non-turbulent air only).
Red line		Maximum airspeed for any kind of operation.

Airspeed ranges IAS					
			kts	mph	km/h
White sector		from	34	40	64
		to	83	96	154
Green sector		from	41	47	76
		to	112	129	208
Yellow sector		from	112	129	208
		to	133	153	247
Red line			133	153	247

2.4. Power plant

ENGINE

Manufacturer	BOMBARDIER-ROTAX
Engine model	912ULS
Maximum takeoff power	98.5 HP
Maximum continuous power	92.5 HP
Engine maximum RPM	
- take-off (5 MIN.)	5 800 rpm
- continuous	5 500 rpm
- idle	~1 400 rpm
Maximum cylinder head temperature (CHT)	275°F / 135°C
Oil temperature	
-maximum	266°F / 130°C
-minimum	122°F / 50°C
-normal operational	194 to 230°F 90 to 110 °C
Oil pressure:	
-minimum	11.6 psi / 0.8 bar
-maximum	101.5 psi / 7 bar
-normal	29 -72.5 psi / 2 - 5 bar
Fuel pressure:	
-maximum	5.8 psi / 0.40 bar
-minimum	2.2 psi / 0.15 bar
Engine Starting Temperatures	
-maximum	122°F
-minimum	-13°F

Fuel:

Automotive gasoline, unleaded, minimum 91 Octane (Alcohol Free), AVGAS 100LL.

Refer to the Rotax 912S Series Engine Operating Manual for limitations and recommendations relating to fuel grades used

Oils:

The oils, to be marked "SF" or "SG" according to API classification

from 23°F to 104°F	SAE 20W-50; SAE 20W-40
from 5°F to 104°F	SAE 15W-40, 15W-50,
from -13°F to 104°F	SAE 10W-40
from -22°F to 104°F	SAE 5W-50; SAE 5W-40
- maximum amount of oil	3.6 US qts
- minimum amount of oil	2.6 US qts

Cooling agent

Waterless engine coolant	EVANS NPG+
Capacity of the system	2.1 US qts

Propeller:

Manufacturer	AERO Sp. z o.o.
Propeller model	ELPROP 3-1-1P Three blade, ground adjustable
Diameter of the propeller	5.68 ft
Direction of rotation	Clockwise

2.5. Marking of the engine monitoring instruments

Stated below, are the ways in which the engine monitoring instruments are marked, as well as the meanings of the colored markings.

Colored marking	Red line or sector	Green sector	Yellow sector	Red line or sector
The instrument, or the measured parameter	Minimum limit	Range of normal operation	Range of limited operation	Maximum limit
Tachometer	-	1,400 to 5,500 rpm	0 - 1400 rpm, 5500 - 5800 rpm	5800 – 7000 rpm
Fuel pressure	2.2 psi (0.15 bar)	2.2 to 5.8 psi (0.15 - 0.40 bar)	-	5.8 psi (0.40 bar)

Table bellow contains engine limitations indicated at engine controller.

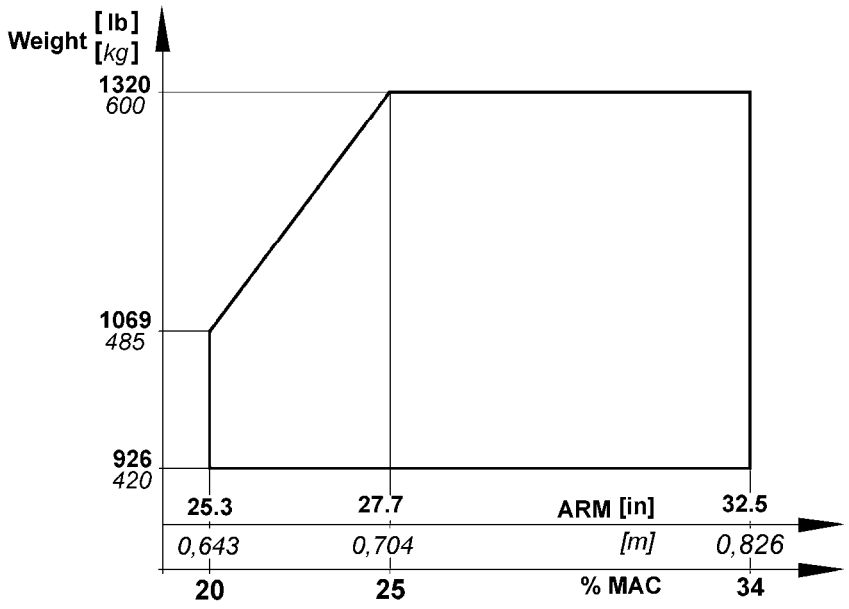
The measured parameter	Minimum limit	Range of normal operation	Range of limited operation	Maximum limit
Oil temperature "oil"	122ºF (50°C)	194 to 230ºF (90 - 110 °C)	122 - 194ºF (50 - 90ºC) 230 - 266ºF (110 - 130ºC)	266ºF (130 °C)
CHT	-	194 to 230ºF (90 - 110 °C)	167 - 194ºF (75 - 90ºC) 230 - 275ºF (110 - 135ºC)	275ºF (135 °C)
EGT	-	1112 to 1560ºF (600 - 850ºC)	1560 - 1616ºF (850 - 880ºC)	1616 - 1652ºF (880 - 900ºC)
Oil pressure "press"	11.6 psi (0.8 bar)	30 to 72.5 psi (2 - 5 bar)	11.6 – 30 psi (0.8 - 2 bar) 72 – 101.5 psi (5 - 7 bar)	101.5 psi (7 bar)

2.6. Weight

Maximum take-off weight	1320 lb
Maximum landing weight	1320 lb
Empty, equipped airplane weight	800 lb
Maximum load in the baggage compartment:	66 lb
- port baggage compartment (large)	44 lb
- starboard baggage compartment (small)	22 lb

2.7. Limitation of C.G position

Distance of the extreme C.G. positions from the leading edge of the Mean Aerodynamic Chord (MAC)



2.8. Approved maneuvers

The airplane is approved to perform the following maneuvers

- All normal flight maneuvers
- Stall (except tail slide)
- Lazy eight
- Chandelle
- Steep turn not exceeding 60° of bank

Entry airspeed:	IAS		
	kts	mph	km/h
Lazy eight	97	112	180
Chandelle	111	127	205
Steep turn with 60° of bank	86	99	160

WARNING
AEROBATICS AND INTENTIONAL SPINS ARE PROHIBITED

2.9. Controlled Load Factors

The limits of maximum permissible load factors:

With wing flaps retracted: **-1.5 to +4.0**

With wing flaps extended: **0 to +2**

2.10. Crew of the aircraft

The minimum crew of this airplane is 1 pilot

2.11. Types of operation

This airplane is approved for flights by day and Night in Visual Meteorological Conditions (VMC-DAY/NIGHT)

WARNING
FLIGHTS IN KNOWN ICING CONDITIONS ARE PROHIBITED.

LIST OF MINIMUM EQUIPMENT

SYSTEMS OR DEVICES,	VFR Day	VFR NIGHT
ELECTRIC POWER SYSTEM AND DEVICES		
1. Battery	1	1
2. Generator	1	1
3. Alternator	-	1
4. Generator warning light	1	1
5. Alternator warning light	-	1
6. Position Lights on each wing tip	-	1
7. Strobe	-	1
8. Instrument and cockpit lighting	-	1
FLIGHT AND NAVIGATION INSTRUMENTS		
1. Airspeed indicator	1	1
2. Altimeter	1	1
3. Magnetic compass	1	1
4. Vertical speed indicator	1	1
5. Artificial Horizon	-	1
ENGINE MONITORING INSTRUMENTS		
1. Tachometer	1	1
2. Fuel quantity indicator	1	1
3. Fuel pressure indicator	1	1
4. Engine monitor	1	1
- Cylinder head temperature		
- Exhaust gas temperature		
- Oil temperature		
- Oil pressure		
- Battery		
- OAT temperature		
Radio Equipment		
1. ELT	1	1
2. Radio transceiver	1	1

* – In the column “VFR DAY/NIGHT” the equipment is marked, which must be installed and correctly operating.

2.12. Fuel

Fuel tank: capacity:

- Total capacity	19.42 US gal
- Consumable fuel	18.5 US gal
- Unusable fuel	0.92 US gal

- Automotive unleaded gasoline of minimum 91 Octane (Alcohol free).
- Aviation gasoline AVGAS 100LL.

(Refer to the Rotax 912S Series Engine Operating Manual for limitations and recommendations relating to fuel grades used)

2.13. Number of seats

This airplane has two seats.

The dual control system enables the airplane to be controlled from both the port and starboard seats.

2.14. Limitation placards

Placards on the instrument panel:

THIS AIRCRAFT WAS MANUFACTURED IN ACCORDANCE WITH LIGHT SPORT AIRCRAFT AIRWORTHINESS STANDARDS AND DOES NOT CONFIRM TO STANDARD CATEGORY AIRWORTHINESS REQUIREMENTS.
FLIGHTS IN KNOWN ICING CONDITIONS PROHIBITED.
AEROBATIC MANEUVERS INCLUDING SPINS PROHIBITED.
OTHER LIMITATIONS ACC. TO AEROPLANE FLIGHT MANUAL

On the instrument panel below of the airspeed indicator

MAX MANEUVERING SPEED
V_A = 90 KTS IAS

or

MAX MANEUVERING SPEED
V_A = 103 MPH IAS

or

MAX MANEUVERING SPEED
V_A = 166 km/h IAS

On the starboard baggage compartment

BAGGAGE 22 lb

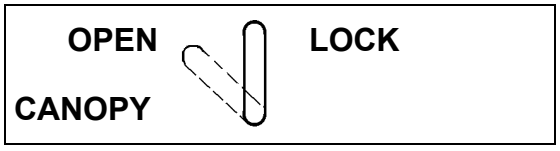
On the port baggage compartment

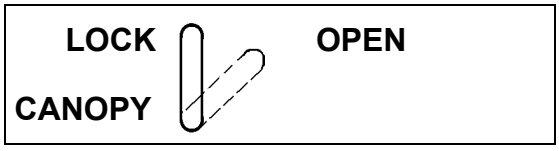
BAGGAGE 44 lb

On the jettisoning handle of the canopy

PULL TO JETTISON CANOPY

On the opening handle of the canopy





On the fuel tank filler

FUEL 18.5 US GAL
UNLEADED MIN 91 OCTANE
(Alcohol free)
AVGAS 100LL

On the oil filler

OIL 3.6 US QTS

Section 3

EMERGENCY PROCEDURES

Page

3.1. Introduction

Section 3 contains information concerning controlling and procedures, which are to be utilized in emergency situations, and which may occur during airplane operation.
To prevent danger in emergency situations, the basic indications contained in this section are to be considered and applied as required.

3.2. Engine failures

3.2.1. Engine failure during takeoff

- Maintain airspeed IAS = 44 kts/50 mph/81 km/h
- Fuel pump. OFF
- Fuel valve SHUT
- Throttle IDLE
- Ignition switch OFF
- Battery and generator OFF
- Landing: ahead avoiding obstacles, if any

3.2.2. Engine failures in flight

In case of:

- Exceeding the cylinder head temperature: check the temperature of the exhaust gases – for comparison. CHECK
- Fuel pressure drop below the permissible minimum: check the fuel quantity on board and opening of the fuel valve CHECK
- Excessive engine vibration: CARB HEAT ON

When icing, switch on the carburetor heating

- Over-speeding the engine
- Exceeding the maximum oil temperature
- The oil pressure drops below the permissible minimum

In all of the above cases, reduce the power to the minimum possible, fly to the nearest airfield, and – be prepared for precautionary landing

3.3. Engine re-starting in flight

• Maintain airspeed IAS =	58 kts/67mph/108km/h
• Fuel quantity in the tank	To be CHECKED
• Fuel valve	OPEN
• Emergency fuel pump	Switch ON
• Throttle to be set	IDLE (or 10 % opening)
• Choke – (when the engine is cool)	ON
• If the propeller does windmill – ignition	ON
• If the propeller has stopped – engine starter	ON

If the engine starts to run:

• Throttle, according to the required power	SET
• Operational parameters of the engine	To be CHECKED
• Emergency fuel pump	OFF

If the engine does not start to work	PERFORM EMERGENCY LANDING

NOTE
THE ENGINE CAN BE RE-STARTED IN THE ENTIRE RANGE OF OPERATIONAL AIRSPEEDS AND ALTITUDES. THE LOSS OF ALTITUDE AND AIRSPEED DURING ENGINE RE-STARTING IN FLIGHT IS NOT GREAT. NO OTHER SPECIAL PROCEDURES ARE REQUIRED FOR ENGINE RE-STARTING IN FLIGHT.

3.4. Smoke and fire

3.4.1. Engine fire on ground

In case of engine fire on ground take the following steps below:

• Fuel valve	SHUT
• Throttle	FULL OPEN
• Ignition switch	OFF
• Electrical equipment	OFF
• Battery generator and alternator	OFF
• Fire extinguisher	TO BE USED

3.4.2. Fire in flight

In case of <u>engine fire in flight</u>

• Maintain airspeed IAS =	58 kts/67 mph/108 km/h
• Fuel valve	PULL SHUT
• Throttle	FULL OPEN
• Ignition switch	OFF
• Battery generator and alternator	OFF
• Cabin canopy vents	SHUT
• A side-slip – opposite to the fire, to blow it out	TO BE PERFORMED
• When the engine stops	PERFORM EMERGENCY LANDING

CAUTION
AFTER AN ENGINE FIRE
DO NOT TRY TO RE-START THE ENGINE

In case of fire in the electrical system

- Maintain airspeed IAS = 58 kts/67 mph/108 km/h
- Electrical equipment OFF
- Fire extinguisher (if fire is in the cabin) TO BE USED
- Cabin canopy vents KEEP OPEN
- If the fire persists, decide upon a place for landing.

3.5. Gliding flight

- Recommended airplane configuration Wing flaps retracted
- Airspeed IAS = 58 kts/67 mph/108 km/h
- Throttle IDLE
- Gliding ratio (No power) 8

3.6. Emergency landing

3.6.1. Precautionary landing

- Landing place IDENTIFY
- Wing flaps to 40º EXTEND
- Maintain approach airspeed IAS = 48 kts/55 mph/89 km/h
- Safety belts FASTEN FIRMLY
- Electrical equipment OFF
- Locks of the canopy UNLOCK

Before touch-down:

- Fuel valve PULL SHUT
- Battery and generator OFF
- Ignition switch OFF
- Leveling out directly before touchdown.
  After touching-down, keep control stick fully pulled.

3.6.2. Landing after engine failure

- Wing flaps to 40º — EXTEND
- Maintain approach airspeed
  IAS = — 48 kts/55 mph/89 km/h
- Safety belts — FASTEN FIRMLY
- Locks of the canopy — UNLOCK
- Electrical equipment — OFF
- Fuel valve — PULL SHUT
- Battery and generator — OFF
- Ignition switch — OFF
- Throttle — IDLE

3.7. Recovering from unintentional spin

In case of an unintentional spin, the following recovering procedure is to be used.

- Throttle — IDLE
- Rudder – opposite to airplane rotation — APPLY
- Control stick — NEUTRAL
- Ailerons — NEUTRAL
- Wing flaps — RETRACT

When the airplane stops to rotate

- Rudder — NEUTRAL
- Control stick – gentle proceed to level flight
- Throttle – for level flight — TO BE SET

WARNING
INTENTIONAL SPINNING IS PROHIBITED

3.8. Other emergency procedures

3.8.1. Icing

- The airplane is not equipped with a de-icing system. DO NOT FLY IN ICING CONDITIONS
- Carburetor heating ON
- Heating of the cabin ON
- To a limited degree, some ice may be removed by hand, through the window of the cabin.

3.8.2. Abandoning the airplane with use of parachute

- Maintain airspeed IAS = 58 kts/67 mph/108 km/h
- Fuel Valve PULL SHUT
- Ignition switch OFF
- Battery and generator OFF
- Headset cables DISCONNECT
- Safety belts UNFASTEN
- Canopy (Pull both jettisoning levers and push out the canopy both hands) TO BE JETISONED
- The airplane TO BE ABANDONED
- The parachute, at a safe distance: DEPLOY

3.8.3. Failure of the electric system

- Check the condition of the system (Voltmeter, generator signaling light)
- Check the circuit breakers and fuses. Switch ON again, as required

In case of generator failure act as follows:

- Generator OFF
- Power receivers, not required to continue the flight OFF

3.8.4. Failure of the static and pitot pressure systems

The failure of the flight and navigation instruments might be caused by leakage or constriction of the static or pitot pressure systems.
In case of failure of the static or pitot pressure system, the landing approach is to be performed with flight parameters monitored by the tachometer and other correctly working flight and navigational instruments only. On ground, water sediment is to be removed from the systems, and the sensors of static and pitot pressure checked to be clean and not constricted. Have the systems checked for leakage.

3.8.5. Failure of balancing tab control system of slab tail

In case of failure of the balancing tab control system of the slab tail in flight, if the airplane becomes “tail heavy” (the nose rises), the airspeed is to be reduced to read about IAS = 44 kts / 50 mph / 81 km/h to reduce the force on the control stick

Section 4
NORMAL PROCEDURES

4.1. Introduction

Section 4 contains the list of inspection tasks and detailed procedures for normal airplane operation with standard equipment installed. Normal procedures concerning the optional equipment or systems are contained in Section 9.

4.2. Rigging and de-rigging the airplane

If de-rigging the airplane and preparation for transportation is necessary, refer to Airplane Maintenance Manual of AT-4 LSA Airplane, Section 2.6 – Transport of de-rigged Airplane

4.3. Daily pre-flight and post-flight inspection

Recommended daily pre-flight inspection:

- Check amount of fuel, oil and engine coolant
- Check for leaks of oil, fuel and coolant.
- Drain fuel sediment
- Check condition of exhaust pipes.
- Check condition of nose and main landing gear:
  - condition of the tires,
  - tire pressure, (visually)
  - condition of rubber shock absorber of the nose landing gear.
- Check condition of engine cowling, its locking and securing.
- Visually check propeller blades are clean and in good condition.
- Visually check the cockpit canopy is clean.
- Check the canopy for correct opening and locking.
- Check the inspection holes in the fuselage and wing are closed and locked.
- Check the sensor of pitot and static pressure is clean
- Check the sediment tanks of the pitot and static pressure systems in the following way:

- Unscrew the caps.
- Check the caps are dry (if not, evacuate the sediment)
- Screw on and tighten the caps onto the sediment tanks.

- Check condition and cleanliness of radio antennas.
- Visually check condition of the stabilizers and control surfaces.
- Visually check condition and secure fixing of the safety belts.
- Check free and smooth movement of the flight control system i.e. the elevator, rudder, ailerons and wing flaps, and check it for significant play or excessive friction.
- Check the levers controlling the engine move smoothly.
- Visually check condition of all board instruments.
- Check condition of battery and of the electric system.

- BATTERY switch	ON
- Indication of voltammeter	CHECK
- Turn indicator, artificial horizon	CHECK
- Radio equipment	CHECK

The battery is serviceable if the engine monitor reads not less than 12 V.

Recommended daily post-flight inspection

- Check the fuel, oil and cooling systems for leaks.
- Check fixing and general condition of the radio antennas
- Check the general condition of the airplane and its landing gear.

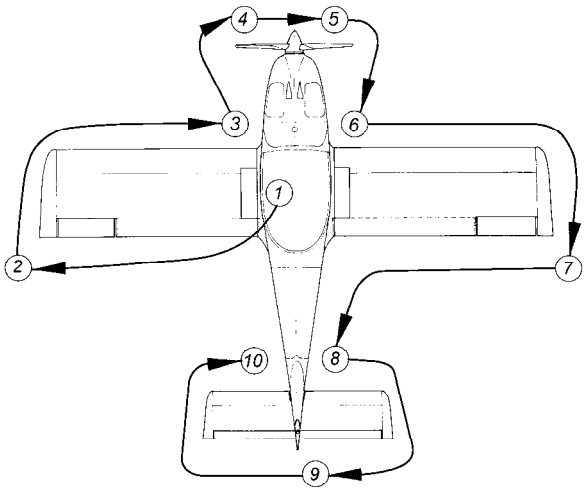
4.4. Preparation for flight

4.4.1. Determining weight and Center of Gravity

The pilot is responsible for the correct airplane loading. It is his duty to ensure that the C.G. position does not move outside the permissible limits defined in item 2.7 Center of Gravity. The method for calculating total weight and C of G position is given in Section 6 “Weight and Balance”

4.4.2. Pre-flight inspection of the airplane

It is the duty of the pilot to perform a pre-flight inspection prior to the flight or after a break in flights, when he has left the cabin. The inspection is to be made, starting with the cabin and walking clockwise around the airplane.



(1.) Cabin

- Canopy – Opening, closing and operation of locks — CHECK
- Inside cabin– All foreign items — REMOVE
- Condition of the seats — CHECK
- Seat belts — CHECK
- Flight controls – Free movement, lack of significant play and extensive friction — CHECK
- Balancing tab
  - Full travel — CHECK
  - Take-off setting — ESTABLISH
- Wing flap – Extension — CHECK

• Wing flap setting to 40º	ESTABLISH
• Carburetor heating – to be set OFF	CHECK
• Fuel valve – to be set OFF	CHECK
• Fuel pump – to be switched OFF	CHECK
• Ignition – to be set OFF	CHECK
• Fuel level – to be checked with the gauge	CHECK
• Battery and generator – to be switched OFF	CHECK
• All electrical equipment– to be switched OFF	CHECK

(2.) Port wing

• Structure – Condition and cleanliness	CHECK
• Wing flap – Condition of structure and play in control system and hinges	CHECK
• Ailerons – Condition of structure and play in control system and hinges	CHECK
• Pitot tube – Fixing and cleanliness	CHECK
• Inspection flap – to be closed and locked	CHECK

(3.) Port landing gear

• Tire – Check the tire pressure (visually)	CHECK
• Brake system	CHECK

(3.) (4.) Fuselage front part

• Canopy – Visually check cleanliness	CHECK
• Fuel tank – Fuel quantity and locking the filler-cap	CHECK
• Engine cowling – Locking and leaks	CHECK
• Propeller and spinner – Condition and cleanliness	CHECK
• Exhaust pipes – Condition	CHECK
• Antenna of transponder – Condition and fixing	CHECK
• Fuselage bottom surface –Condition and cleanliness	CHECK

(5.) Nose landing gear

- Tire – Check the tire pressure (visually) CHECK
- Shock absorber – Condition CHECK
- Towing bar – to be removed from the airplane CHECK

(6.). Starboard landing gear and front part of fuselage

- Tire – Check the tire pressure (visually) CHECK
- Brake system CHECK
- Oil level and presence of the dipstick CHECK

(turn the propeller several times first)

(7.) Starboard wing

- Structure – Condition and cleanliness CHECK
- Ailerons – Condition of structure and play in control system and hinges CHECK
- Wing flap – Condition of structure and play in control system and hinges CHECK
- Inspection flap – to be closed and locked CHECK

(8.) Fuselage rear part, starboard

- Structure – Condition and cleanliness CHECK
- Antennae – Condition and cleanliness CHECK

(9.) Empennage

- Fin – Condition and cleanliness CHECK
- Rudder – Hinges and their play CHECK
- Slab tail – Hinges and their play CHECK
- Trim & balancing tab – Hinges and their play CHECK

(10.) Fuselage rear part, port

- - Structure – Condition and cleanliness CHECK
- - Inspection flap – to be locked CHECK

4.5. Normal procedures and list of inspection tasks

4.5.1. Airspeeds for safe operation

Airspeed	Flaps	IAS		
		kts	mph	km/h
Take off: – lift-off – at altitude 15 m	15º	33 44	37 50	60 81
Maximum angle of climb (V_X)	0º	53	61	98
Maximum rate of climb (V_Y)	0º	58	67	108
Maximum angle of climb (V_X)	15º	48	55	89
Maximum rate of climb (V_Y)	15º	54	62	99
In rough air (recommended)	0º	86	99	160
Landing approach	40º	41	47	75
Maximum cross-wind component	0 to 40º	11.7	13.4	21.6

4.5.2. Before starting engine

- Wheel chocks — APPLY
- Seat in the cabin — TO BE OCCUPIED
- Canopy — SHUT AND LOCK
- Baggage – stow & secure — CHECK
- Seat belts — FASTEN
- Reading of the fuel quantity indicator — CHECK
- Ignition – to be switched off — CHECK
- Battery and generator – to be switched off — CHECK
- All electrical equipment – to be switched off — CHECK
- Trim and balancing tab – to be set to “TAKEOFF” — CHECK
- Flight controls – full and free movement of — CHECK
- Wing flaps — RETRACT

4.5.3. Using an electric ground power source

The airplane is equipped to use electric power from external sources. A typical power receptacle (of 11041 – type) is installed at the port side of the fuselage, in front of the wing. The polarity of the delivered connecting cable is marked on it. Special attention is to be given to the correct polarity, when connecting to the external source (Battery). The voltage of the external source must be 12 to 14 Volts.
The engine starting procedure, when using an external power source, is the same as when using the airplane's own battery.
After completing engine start, the external source is to be disconnected from the airplane.

NOTE

**INCORRECT POLARITY
MAY RESULT IN DAMAGE OF THE ELECTRICAL
SYSTEM OF THE AIRPLANE**

4.5.4. Engine starting

NOTE
**WHEN TURNING THE PROPELLER BY HAND,
SPECIAL CARE IS TO BE OBSERVED AND
THE FOLLOWING IS TO BE CHECKED:
- THE IGNITION IS SWITCHED OFF,
- THE CHOCKS ARE PUT UNDER THE WHEELS.
THE POSSIBILITY OF SPONTANEOUS
IGNITION ALWAYS EXISTS**

Cool engine procedure

- Fuel valve – set to OPEN
- Propeller – turn by hand several times EXECUTE
- Battery and generator ON
- Starting device (Choke) ON

- Emergency fuel pump — ON
- Throttle lever – to be set to — IDLE (or open by 10 %)
- The area next to propeller – to be clear — CHECK
- Brakes — APPLY
- Ignition switch — ON

(The starter may be switched on continuously for 10 sec., maximum. Subsequently, it needs to be allowed to cool for at least 2 min.)

NOTE
AFTER COMPLETING THE ENGINE START, CHECK WHETHER THE OIL PRESSURE STARTS TO RISE WITHIN 10 SEC. THE SPEED OF THE ENGINE MAY BE INCREASED, ONLY WHEN THE OIL PRESSURE IS STABILISED ABOVE 29 PSI (2 BAR).

CAUTION
TO AVOID DAMAGE TO BATTERY OR STARTER, NEVER KEEP THE STARTER SWITCHED ON FOR LONGER THAN 10 SEC. ALLOW AT LEAST 2 MIN. BEFORE SWITCHING ON AGAIN. NEVER SWITCH THE STARTER ON IF THE PROPELLER HAS NOT STOPPED ROTATING. DO NOT START THE ENGINE WHEN THE BATTERY IS WEAK – THIS MAY CAUSE DAMAGE TO THE ENGINE STARTING SYSTEM. PROPER PROPELLER ROTATION IS EVIDENCE OF GOOD CONDITION OF THE BATTERY.
OTHERWISE, SWITCH OFF THE ENGINE,
THE STARTER AND BATTERY SWITCHES
AND HAVE THE FAULT REPAIRED.

Hot engine procedure

The same as for cool engine start, but without turning the propeller and the starting device (choke) is to be set to OFF.

Procedure for low temperature

The procedure is the same as for cool engine, but the throttle lever may be set to idle only. The Carburetor heating is to be switched on. The oil pressure is to be observed carefully. It may be lower because of increased drag of the flow through the oil pump.
If necessary, have the engine warmed up using a hot air blower.

NOTE
AT LOW AMBIENT TEMPERATURE ENGINE STARTING MAY PROVE DIFFICULT, BECAUSE OF A DROP IN THE CAPACITY OF THE BATTERY. USING EXTERNAL ELECTRICAL POWER IS RECOMMENDED

After starting the engine

- Engine speed of 2500 RPM – until smooth engine operation is achieved — MAINTAIN
- Choke — OFF
- Electrical equipment — ON
- Indications of board instruments — CHECK
- Engine speed of 2000 to 2500 RPM – until oil temperature of 122ºF (50ºC) is achieved — MAINTAIN

Engine test run

- Brakes — APPLY
- Control stick — PULL
- Indications of board instruments – to be within the green sector of the scale — CHECK
- Engine speed to 4000 RPM — SET

- Ignition switch in position “1” SET
- Ignition switch in position “2” SET
- Ignition switch in position “1 +2” SET
- Throttle – full open SET
- Maximum engine speed CHECK

NOTE
MAXIMUM ENGINE SPEED ON GROUND IS 5300 RPM.
RPM DROP WHEN ONE IGNITION UNIT ONLY OPERATING IS 300 RPM.
MAXIMUM DIFFERENCE OF ENGINE SPEED BETWEEN POSITION “1” AND POSITION “2” MUST NOT EXCEED 120 RPM

4.5.5. Before taxing

- Wheel chocks REMOVE
- Artificial horizon ON
- Turn indicator ON
- Altimeter SET
- Radio SET ON AND CHECK
- Transponder (if required) – code and SBY SET

4.5.6. Taxing

- Brakes RELEASE
- Operation of the brakes CHECK
- Control stick – to be set according to wind condition EXECUTE

Taxiing is to be performed using brakes, and at higher speed, with use of the rudder

CAUTION
TO AVOID ENGINE OVERHEATING AND POLLUTION WITH DUST, OPERATION OF THE ENGINE ON GROUND AT RATINGS HIGHER THAN THE REQUIRED FOR TAXIING IS TO BE LIMITED TO A MINIMUM

4.5.7. Before take-off

- Fastening of the seat belts — CHECK
- Fuel valve – to be opened — CHECK
- Trim and balancing tab – to be set for take-off — CHECK
- Wing flaps – to be set for take-off (δ = 15º) — EXECUTE
- Ignition switch – to be set to “1+2” (BOTH) — CHECK
- Carburetor heating — OFF
- Temperature of the coolant –to be in green sector — CHECK
- Oil temperature–to be in green sector — CHECK
- Oil pressure – to be in green sector — CHECK
- Fuel pressure –to be in green sector — CHECK
- Altimeter – to be set properly — CHECK
- Turn indicator and artificial horizon – to operate correctly

4.5.8. Take-off

- Brakes — RELEASE
- Throttle – to be opened to full travel, gradually — EXECUTE
- Take-off direction – maintain using rudder pedals — EXECUTE
- Airspeed after lift-off to be maintained at
  IAS = 44 kts/50 mph/81 km/h
- Landing gear – rotating wheels — BRAKE
- When height 50’ reached – increase to speed to
  IAS = 58 kts/67 mph/108 km/h
- Wing flaps — RETRACT
- Emergency fuel pump — OFF

4.5.9. Climb

- Throttle – to be opened to full travel — EXECUTE
- Airspeed – for climb, to be maintained at — IAS = 58kts/ 67mph/108km/h

(The best climbing speed diminishes for each 3281'/1000 m by 1.6 kts / 1.9 mph / 3 km/h)

- Engine operational parameters – to be — MONITORED
- Transponder (if required) – to be set to — ON

4.5.10. Cruise

- Throttle – as required — SET
- Trim and balancing tab – as for cruise — SET
- Engine operational parameters – to be — MONITORED

4.5.11. Descent

- Throttle – as required — SET
- Coolant and oil temperature – to be — MONITORED

(If the engine becomes too cool, the throttle is to be opened and the carburetor heating to be switched ON)

4.5.12. Before landing

- Emergency fuel pump — ON
- Carburetor heating – as required — SET
- Throttle – as required — SET
- Wing flaps – as for landing (δ = 40 °) — SET
- Airspeed for final approach to be maintained:

IAS = 41 kts /47 mph/75 km/h

4.5.13. Landing

- Engine rating at altitude below 50ft (15 m), to be — DIMINISHED
- Touch-down with the main wheels at airspeed

IAS = 33 mph/ 37 kts/ 60 km/h

- Throttle — IDLE
- Braking — AS REQUIRED

4.5.14 Balked landing

• Carburetor heating	OFF
• Throttle – gradually	FULL OPEN
• Airspeed – to be	INCREASED
• Wing flaps – gradually	RETRACT
• Airspeed – to be maintained:	IAS= 58 kts/67 mph/108km/h
• Proceed to climb	EXECUTE

4.5.15. After the landing

• Emergency fuel pump	OFF
• Carburetor heating	OFF
• Wing flaps	RETRACT
• Artificial horizon	OFF and LOCK
• Turn indicator	OFF
• Transponder	OFF

4.5.16. Engine shutdown

• Radio transmitter	SWITCH OFF
• Electrical equipment	SWITCH OFF
• Throttle – to be set to	IDLE
(let the engine cool to normal operational level)	
• Ignition switch (Allow 2 to 3 min.)	SWITCH OFF
	When the engine stops:
• Battery and generator	SWITCH OFF
• Fuel valve	SHUT OFF

4.5.17. After the flight

- Control stick – to be pulled and fastened with the seat belts — EXECUTE
- Wheel chocks – to be put under the wheels — EXECUTE
- Propeller – to be set horizontally — EXECUTE
- Canopy – to be locked with the key — EXECUTE

4.6. Additional information

4.6.1. Stall

Stall is to be performed, by slowly pulling the control stick. The engine is to be idle. When the wing flaps are retracted, the airplane practically does not stall. Approaching the stalling speed is signaled by airplane buffeting, which appears at an airspeed 5 to 10 knots / 6 to 12 mph / 10 to 20 km/h higher than the stalling speed. The airplane oscillates longitudinally and laterally. The airplane recovers to fully immediately after pushing the control stick forward.

CAUTION!
NEVER TRY TO STALL AT LOW ALTITUDE

For stall speed – refer to Section 5.

NOTE
AT ENGINE RATINGS HIGHER THAN IDLE, THE STALLING SPEED IS LOWER THAN THAT GIVEN IN THE TABLE, BY 1 TO 8 KTS / 1.2 TO 9.3 MPH / 2 TO 15 KM/H DEPENDING ON WING FLAP POSITION AND AIRPLANE WEIGHT.

4.6.2. Flight maneuvers

The flight maneuvers are to be performed in accordance with the limits given in item 2.8. Approved maneuvers.

Steep turns are to be flown with the throttle fully opened.

4.6.3. Flight with a passenger

The pilot shall brief the passenger on operations and safety procedures prior to flight.

4.6.4. Crosswind take-off or landing

The correct airplane handling characteristics during takeoff and landing have been demonstrated at crosswind velocity up to 11.7 kts (/ 13.4 mph / 21.6 km/h).

Take-off

The control stick is to be displaced against the crosswind. The take-off direction is to be controlled by use of the rudder. The nose wheel is to be kept down until lift-off speed is achieved. After taking-off, try to avoid touching the ground again.

Landing

The wing flaps are to be extended as required for the conditions of the landing field. Have the airplane banked towards the crosswind. In a strong crosswind, also turn the airplane axis from the landing direction towards the crosswind.
Turn back to the landing direction immediately before touchdown.
Lowering the nose wheel earlier after touchdown helps to maintain direction. After touchdown keep the nose wheel down and control the direction with the rudder, and later with the brakes. At the end of the landing run keep the control stick against the crosswind.

4.6.5. Operational speed during takeoff and landing

Stated below in the table are the operational airspeeds for the approved wing flap positions.

Flaps	TAKE-OFF IAS								
	Lifting the nose wheel			Lifting off			After the takeoff		
	kts	mph	km/h	kts	mph	km/h	kts	mph	km/h
0º	30	34	55	37	42	68	58	67	108
15º	30	34	55	44	37	60	44	50	81
40º	-	-	-	-	-	-	-	-	-
Flaps	LANDING IAS								
	Approach			Touchdown			Lowering the nose wheel		
	kts	mph	km/h	kts	mph	km/h	kts	mph	km/h
0º	58	67	108	42	48	78	33	37	60
15º	44	50	81	38	43	70	31	36	58
40º	41	47	75	33	37	60	<27	<31	<50

Section 5

PERFORMANCE

TABLE OF CONTENTS Page

5.1. Introduction

This Section contains data concerning the following issues:

- Calibration of the airspeed indicator system,
- Stalling speeds,
- Take-off performance,
- Supplementary information from the manufacturer.

The diagrams have been computed on the basis of actual flight test data, for correct engine and aircraft operation and applying average piloting techniques.

5.2. Performance

5.2.1. Calibration of the Airspeed Indicator System

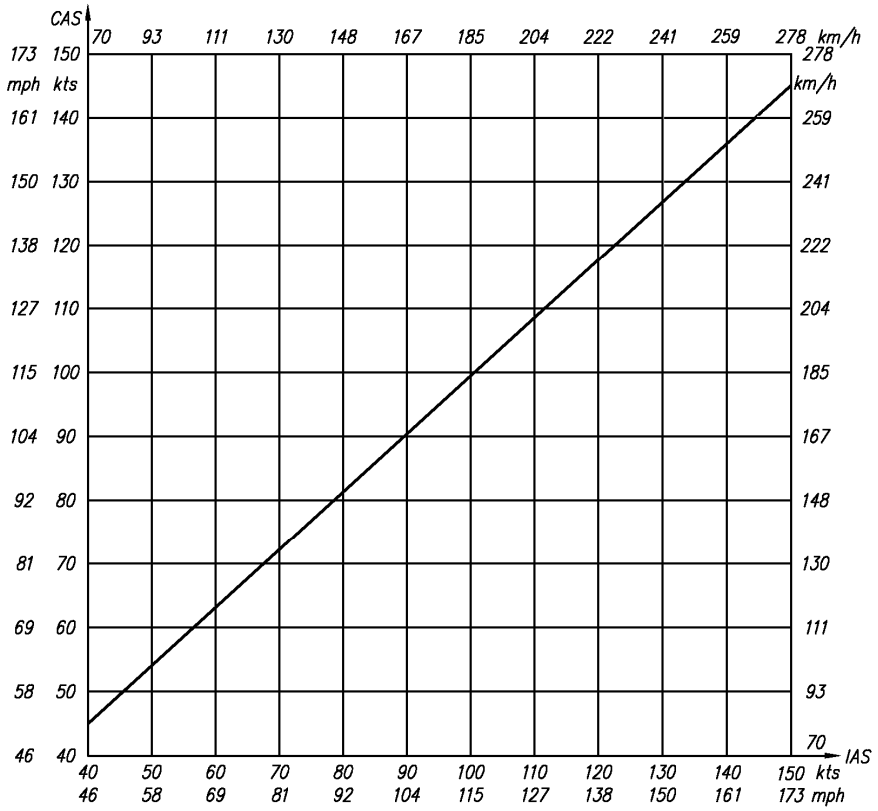
The diagram is based on test flight data.

$$CAS = IAS + \delta V$$

δV – aerodynamic correction

CLIMB, LEVEL FLIGHT, DESCENT

WING FLAPS: retracted, for take-off and for landing



5.2.2. Stalling Speed

Airplane maximum weight 1320 lb
Throttle idle

Flap Setting	Bank Angle		Stalling speed					
			IAS			CAS		
			kts	mph	km/h	kts	mph	km/h
0°	0°	V_{S1}	37	43	69	44	49	81
15°		V_{S1}	34	39	62	39	44	70
40°		V_{SO}	33	36	58	36	41	66
0°	30°	V_{S1}	41	47	75	48	55	88
15°		V_{S1}	37	43	69	42	48	77
40°		V_{SO}	35	40	65	39	35	73

5.2.3. Take-off Performance

Conditions:

- Maximum weight 1320 lb
- Airstrip surface Grass
- Rating Take-off power
- Wing flap position (for take-off) 15°
- Lift-off speed IAS= 33 kts/37 mph/60 km/h
- Airspeed at H = 50 ft IAS= 44 kts/50 mph/81 km/h

NOTE
FOR EACH 5 kts / 6 mph / 10 km/h OF HEAD WIND VELOCITY THE TAKE-OFF DISTANCE REDUCES BY 8 % AND INCREASES BY 25% FOR 5 kts / 6 mph / 10km/h TAIL WIND VELOCITY

To receive intermediate values of the data given in the table, interpolation is to be made between the increasing values.

TAKE-OFF RUN AND TAKE-OFF DISTANCES

Pressure altitude 0 ft (0 m) STD							
Ambient temperature	ºF	5	23	41	59	77	99
OAT	ºC	-15	-5	+5	+15	+25	+35
Take-off run	ft	531	550	573	593	635	677
	m	162	168	175	181	194	206
Take-off distance to H=50 ft (15m)	ft	1137	1182	1225	1269	1360	1453
	m	347	360	373	387	415	443
Pressure altitude 1460 ft (500 m) STD							
Ambient temperature	ºF	-0.4	17.6	35.6	53.6	71.6	89.6
OAT	ºC	-18	-8	+2	+12	+22	+32
Take-off run	ft	528	570	612	657	705	753
	m	169	174	187	200	215	230
Take-off distance to H=50 ft (15m)	ft	1128	1219	1315	1410	1513	1617
	m	344	372	401	430	461	493

TAKE-OFF RUN AND TAKE-OFF DISTANCES (continuation)

Pressure altitude 3281 ft (1000 m) STD							
Ambient temperature	ºF	-5.8	12.2	30.2	48.2	66.2	84.2
OAT	ºC	-21	-11	-1	+9	+19	+29
Take-off run	ft	581	624	680	731	783	838
	m	177	190	207	223	238	255
Take-off distance to	ft	1247	1337	1484	1563	1676	1795
H= 50 ft (15m)	m	380	408	452	476	511	547
Pressure altitude 4921 ft (1500 m) STD							
Ambient temperature	ºF	-13	5	23	41	59	77
OAT	ºC	-25	-15	-5	+5	+15	+25
Take-off run	ft	646	700	753	813	872	934
	m	197	213	230	248	266	285
Take-off distance to	ft	1385	1515	1617	1741	1868	1998
H= 50 ft (15m)	m	422	462	493	531	569	609
Pressure altitude 6562 ft (2000 m) STD							
Ambient temperature	ºF	-18.4	-0.4	17.6	35.6	53.6	71.6
OAT	ºC	-28	-18	-8	+2	+12	+22
Take-off run	ft	716	779	841	906	971	1163
	m	218	237	256	276	296	354
Take-off distance to	ft	1538	1668	1800	1938	2082	2494
H= 50 ft (15m)	m	469	508	549	591	635	760

5.2.4. Landing Distance

Conditions:

- Maximum weight 1320 lb
- Airstrip surface Grass
- Rating idle
- Wing flap position (for landing) 40°
- Braking maximum
- Approach speed at H=50 ft IAS= 41 kts/47 mph/75km/h

NOTE
FOR EACH 5 kts / 6 mph / 10 km/h OF HEAD WIND VELOCITY THE LANDING DISTANCE REDUCES BY 8 % AND INCREASES BY 24 % FOR EACH 5 kts / 6 mph / 10 km/h OF THE TAIL WIND VELOCITY.

LANDING DISTANCES

Pressure altitude 0 m STD							
Ambient temperature.	ºF	5	23	41	59	77	99
OAT	ºC	-15	-5	+5	+15	+25	+35
Landing distance from 50 ft (15m)	ft	1322	1375	1424	1476	1529	1578
	m	403	419	434	450	466	481
Landing run	ft	587	610	633	656	679	702
	m	179	186	193	200	207	214
Pressure altitude 1460 ft (500 m) STD							
Ambient temperature	ºF	-0.4	17.6	35.6	53.6	71.6	89.6
OAT	ºC	-18	-8	+2	+12	+22	+32
Landing distance from 50 ft (15m)	ft	1388	1440	1496	1549	1604	1657
	m	423	439	456	472	489	505
Landing run	ft	617	640	666	689	712	735
	m	188	195	203	210	217	224
Pressure altitude 3281 ft (1000 m) STD							
Ambient temperature	ºF	-5.8	12.2	30.2	48.2	66.2	84.2
OAT	ºC	-21	-11	-1	+9	+19	+29
Landing distance from 50 ft (15m)	ft	1457	1512	1572	1627	1683	1739
	m	444	461	479	496	513	530
Landing run	ft	646	673	699	722	748	774
	m	197	205	213	220	228	236
Pressure altitude 4921 ft (1500 m) STD							
Ambient temperature	ºF	-13	5	23	41	59	77
OAT	ºC	-25	-15	-5	+5	+15	+25
Landing distance from 50 ft (15m)	ft	1532	1591	1650	1709	1768	1827
	m	467	485	503	521	539	557
Landing run	ft	679	705	735	761	787	814
	m	207	215	224	232	240	248
Pressure altitude 6562 ft (2000 m) STD							
Ambient temperature	ºF	-18.4	-0.4	17.6	35.6	53.6	71.6
OAT	ºC	-28	-18	-8	+2	+12	+22
Landing distance from 50 ft (15m)	ft	1611	1673	1736	1798	1860	1923
	m	491	510	529	548	567	586
Landing run	ft	715	745	771	797	827	853
	m	218	227	235	243	252	260

5.2.5. Climb Performance

Wing flaps retracted (0º)

Conditions:

- Maximum weight 1320 lb
- Rating (Power setting) (full) nominal power
- Airspeed V_Y = 58 kts / 67 mph / 108 km/h IAS

This airspeed is to be reduced by 0.5 kts (0.57 mph) for each 1000 ft of altitude.

Wing flaps for take-off (15º)

Conditions:

- Maximum weight 1320 lb
- Rating nominal power
- Airspeed V_Y = 54 kts / 62 mph / 99 km/h IAS

This airspeed is to be reduced by 0.5 kts (0.57 mph) for each 1000 ft of altitude.

CLIMB PERFORMANCE (FLAPS 0°)

Pressure altitude 0 ft (0m) STD							
Ambient temperature OAT	ºF	5	23	41	59	77	99
	ºC	-15	-5	+5	+15	+25	+35
Rate of climb	ft/min	866	846	828	807	780	754
	m/s	4,40	4,30	4,20	4,10	3,96	3,83
Pressure altitude 1460 ft (500 m) STD							
Ambient temperature OAT	ºF	-0.4	17.6	35.6	53.6	71.6	89.6
	ºC	-18	-8	+2	+12	+22	+32
Rate of climb	ft/min	776	758	740	722	699	375
	m/s	3,94	3,85	3,76	3,67	3,55	3,43
Pressure altitude 3281 ft (1000 m) STD							
Ambient temperature OAT	ºF	-5.8	12.2	30.2	48.2	66.2	84.2
	ºC	-21	-11	-1	+9	+19	+29
Rate of climb	ft/min	687	671	665	640	618	598
	m/s	3,49	3,41	3,38	3,25	3,14	3,04
Pressure altitude 4921 ft (1500 m) STD							
Ambient temperature OAT	ºF	-13	5	23	41	59	77
	ºC	-25	-15	-5	+5	+15	+25
Rate of climb	ft/min	596	583	569	555	545	520
	m/s	3,03	2,96	2,89	2,82	2,77	2,64
Pressure altitude 6562 ft (2000 m) STD							
Ambient temperature OAT	ºF	-18.4	-0.4	17.6	35.6	53.6	71.6
	ºC	-28	-18	-8	+2	+12	+22
Rate of climb	ft/min	504	494	482	470	455	439
	m/s	2,56	2,51	2,45	2,39	2,31	2,23
Pressure altitude 8202 ft (2500 m) STD							
Ambient temperature OAT	ºF	-23.8	-5.8	12.2	30.2	48.2	66.2
	ºC	-31	-21	-11	-1	+9	+19
Rate of climb	ft/min	413	406	396	386	372	360
	m/s	2,10	2,06	2,01	1,96	1,89	1,83
Pressure altitude 9843 ft (3000 m) STD							
Ambient temperature OAT	ºF	-31	-13	5	23	41	59
	ºC	-35	-25	-15	-5	+5	+15
Rate of climb	ft/min	207	319	311	303	293	283
	m/s	1,05	1,62	1,58	1,54	1,49	1,44
Pressure altitude 3500 m (11483 ft) STD							
Ambient temperature OAT	ºF	-36.4	-18.4	-0.4	17.6	35.6	53.6
	ºC	-38	-28	-18	-8	+2	+12
Rate of climb	ft/min	234	228	224	218	211	205
	m/s	1,19	1,16	1,14	1,11	1,07	1,04

CLIMB PERFORMANCE (FLAPS 15°)

Pressure altitude 0 ft (0 m) STD								
Ambient temperature		ºF	5	23	41	59	77	99
OAT		ºC	-15	-5	+5	+15	+25	+35
Rate of climb		ft/min	760	744	726	707	685	663
		m/s	3,86	3,78	3,69	3,60	3,48	3,37
Pressure altitude 1460 ft (500 m) STD								
Ambient temperature		ºF	-0.4	17.6	35.6	53.6	71.6	89.6
OAT		ºC	-18	-8	+2	+12	+22	+32
Rate of climb		ft/min	673	659	644	630	606	587
		m/s	3,42	3,35	3,27	3,19	3,08	2,98
Pressure altitude 3281 ft (1000 m) STD								
Ambient temperature		ºF	-5.8	12.2	30.2	48.2	66.2	84.2
OAT		ºC	-21	-11	-1	+9	+19	+29
Rate of climb		ft/min	587	575	516	547	530	512
		m/s	2,98	2,92	2,85	2,78	2,69	2,60
Pressure altitude 4921 ft (1500 m) STD								
Ambient temperature		ºF	-13	5	23	41	59	77
OAT		ºC	-25	-15	-5	+5	+15	+25
Rate of climb		ft/min	500	490	478	467	451	437
		m/s	2,54	2,49	2,43	2,37	2,29	2,22
Pressure altitude 6562 ft (2000 m) STD								
Ambient temperature		ºF	-18.4	-0.4	17.6	35.6	53.6	71.6
OAT		ºC	-28	-18	-8	+2	+12	+22
Rate of climb		ft/min	413	406	356	386	372	360
		m/s	2,10	2,06	2,01	1,96	1,89	1,83
Pressure altitude 8202 ft (2500 m) STD								
Ambient temperature		ºF	-23.8	-5.8	12.2	30.2	48.2	66.2
OAT		ºC	-31	-21	-11	-1	+9	+19
Rate of climb		ft/min	327	321	313	305	295	285
		m/s	1,66	1,63	1,59	1,55	1,50	1,45
Pressure altitude 9843 ft (3000 m) STD								
Ambient temperature		ºF	-31	-13	5	23	41	59
OAT		ºC	-35	-25	-15	-5	+5	+15
Rate of climb		ft/min	242	238	232	226	219	213
		m/s	1,23	1,21	1,18	1,15	1,11	1,08

5.3. Supplementary Information

5.3.1. Cruise

Airspeed, range and endurance

Conditions:

- Maximum weight 1320 lb
- Wing flaps retracted
- Consumable fuel 18.5 US GAL
- Automotive gasoline, unleaded RON 95

NOTE
RANGE AND ENDURANCE DATA GIVEN IN THE TABLE RELATE TO USING OF ALL OF THE FUEL AT THE GIVEN ALTITUDE. TAXIING, TAKE-OFF AND CLIMB ARE NOT CONSIDERED IN THIS CALCULATION.

CRUISE PERFORMANCE

Pressure altitude H= 1600 ft (500 m) STD

Engine speed	IAS			CAS			TAS			Fuel consump.	Endur-ance	Range		
RPM	kts	mph	km/h	kts	mph	km/h	kts	mph	km/h	gal/h	h	naut. miles	stat. miles	km
4200	76	88	141	80	93	149	83	96	154	3.7	5.0	415	478	770
4400	86	99	159	87	100	161	90	104	167	3.97	4.66	420	483	778
4600	92	106	170	92	106	170	96	110	177	4.29	4.3	411	473	761
4800	97	111	179	96	111	178	100	116	186	4.62	4.0	402	462	744
5000	101	116	187	100	115	185	104	120	193	5.02	3.68	383	441	710
5200	105	121	195	104	119	192	107	124	199	5.44	3.4	366	421	677
5400	109	125	201	106	122	197	111	128	206	6.09	3.04	338	389	626

5.3.2. Climb After Balked Landing

It is possible to retract the flaps by hand in not more than 2 sec., without loss of altitude, or abrupt change in angle of attack, or special piloting skill. After retracting the wing flaps, the performance of the airplane is as given under 5.2.5. Climb Performance

5.3.3. Take-off and Landing on Grass Airstrips

It is possible to perform take-off or landing from grass strips with grass not longer than 6 in (a bit less than a half of the wheel diameter). On short cut grass, the takeoff run increases about 10 %.

5.3.4. Affect of Rain or Insect Remains on Airplane Performance and Handling

No observable affect of rain or sediment of insects on the airplane performance or handling has been noted.

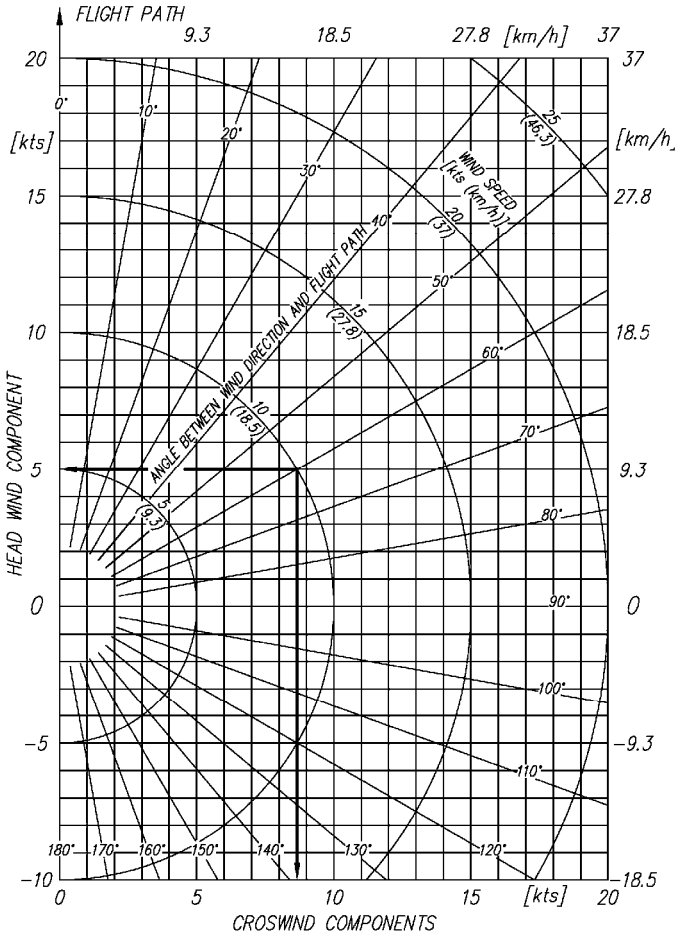
5.3.5. Demonstrated range of operational temperatures

During the test flights, which have been performed in ambient temperatures from 5°F(–15°C) to 86°F (+30°C), it has been proven that all systems operate correctly and the temperature of the components of the power plant, as well as the engine fluids, remain within the limits established by the manufacturer of the engine.

5.3.6. Demonstrated Range of Operational Temperatures

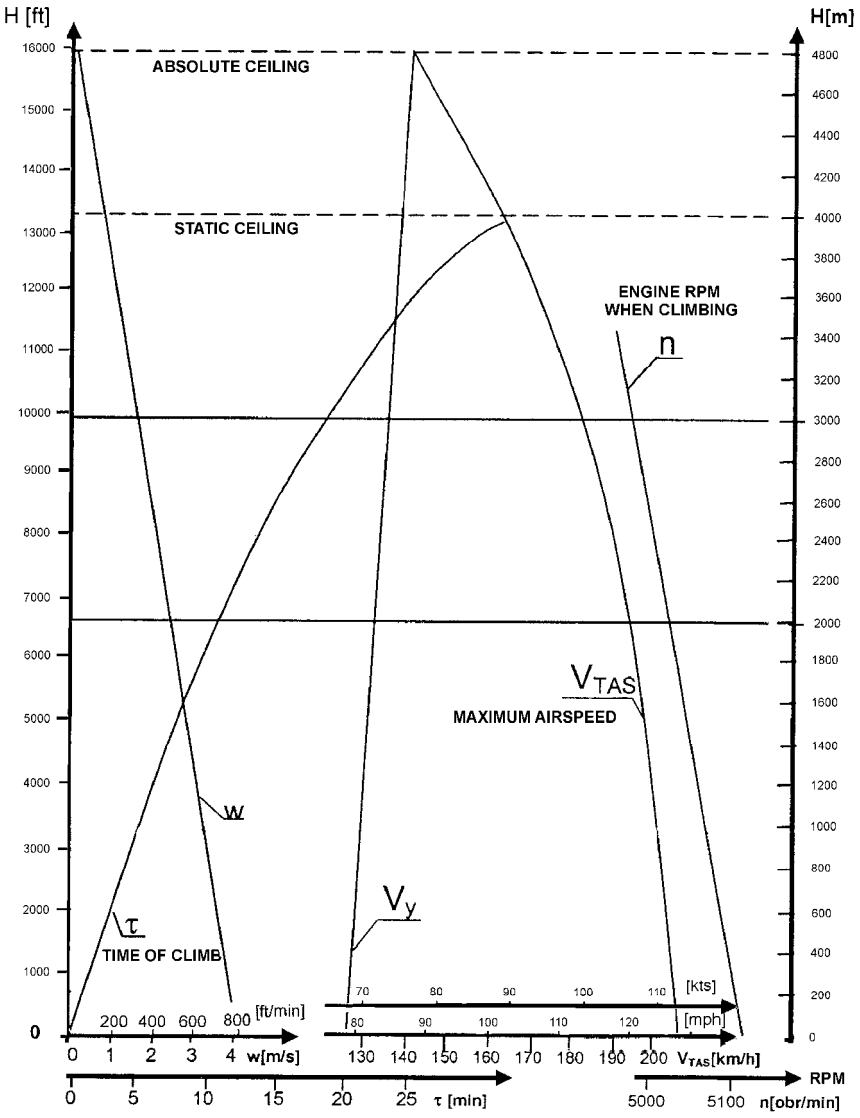
Correct airplane handling characteristics have been demonstrated during take-off and landing with the crosswind velocity up to 11.7 kts (21.6 km/h).

Diagram for determination of the crosswind component



5.3.7. Combined Diagram of Airplane Characteristics

ELPROP Propeller
Maximum airplane weight 1320 lb
Maximum power, wing flaps retracted



5.3.8. Noise

The outside noise level of the AT-3R100 airplane, determined in accordance with the procedure in Chapter 10 Annex 16 ICAO is: 66.6 ±0.35 dB (A), while the permissible level is 70.32 dB (A). The AT-4LSA has the same engine & propeller installation.

Section 6
WEIGHT AND BALANCE

6.1. Introduction

This Section contains the limitations of the useful load, within which the airplane may be operated safely.

The procedure for weighing airplane is contained in the Maintenance Manual of the AT-4LSA airplane. Any change in the weight of the empty airplane, e.g. after new equipment is fitted, repairs or re-painting, will necessitate re-calculation of the table 6.3 “Weight and Balance Schedule” of this manual. The equipment installed in this airplane is shown in the List of Equipment in Section 6-4.

6.2. Weight and Balance Calculation

In order to calculate the weight and center of gravity of the airplane, one of the following procedures should be followed.

WARNING
WHEN CALCULATING THE AIRCRAFT
WEIGHT AND BALANCE,
THE PLANNED FUEL CONSUMPTION SHOULD
BE TAKEN INTO CONSIDERATION.
A DECREASE IN FUEL LEVEL WILL RESULT IN THE
CENTER OF THE GRAVITY MOVING AFT.

Graphical method

From the table 6.3: ”Weight and Balance schedule” the actual weight and moment of the empty airplane should be read off.

WARNING
THE EMPTY WEIGHT OF THE AIRPLANE IS THE WEIGHT OF THE AIRPLANE WITH THE UNUSABLE AMOUNT OF FUEL, ENGINE OIL, COOLING LIQUID AND WITH THE OPTIONAL EQUIPMENT ACCORDING TO 6.4

For known weights of fuel, passenger, pilot and luggage read off the values of the moments from the chart 1 “values of the moments”. Weights and moments should be calculated according to the following table:

	Aircraft Loading Example		Your Aircraft loading	
	Weight [lb]	Moment [in lb]	Weight [lb]	Moment [in lb]
Empty airplane	827	22491		
Fuel (6 lb/US gal)	95	570		
Pilot + passenger	313	12457		
Baggage	31	1872		
Total weight and moment	1266	37390		

WARNING
THE TOTAL WEIGHT OF THE AIRPLANE
MUST NOT BE LESS THAN 926 lb
OR GREATER THAN 1320 lb

Using Chart: 2 -"Aircraft loading" it can be verified whether the Center of Gravity is inside the acceptable marked range (envelope) for the specific maximum weight and moment. If not, the aircraft loading should be changed. The Center of the Gravity should be inside the marked range during the whole flight.

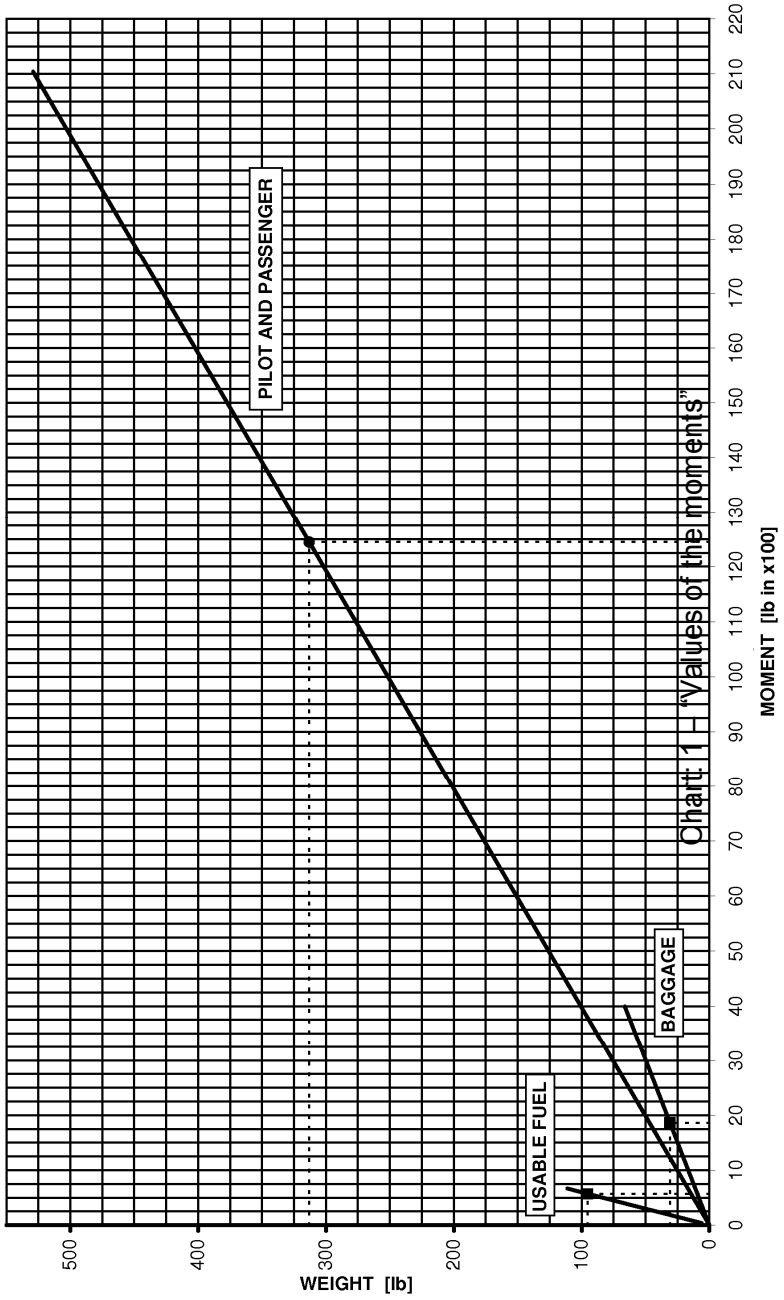
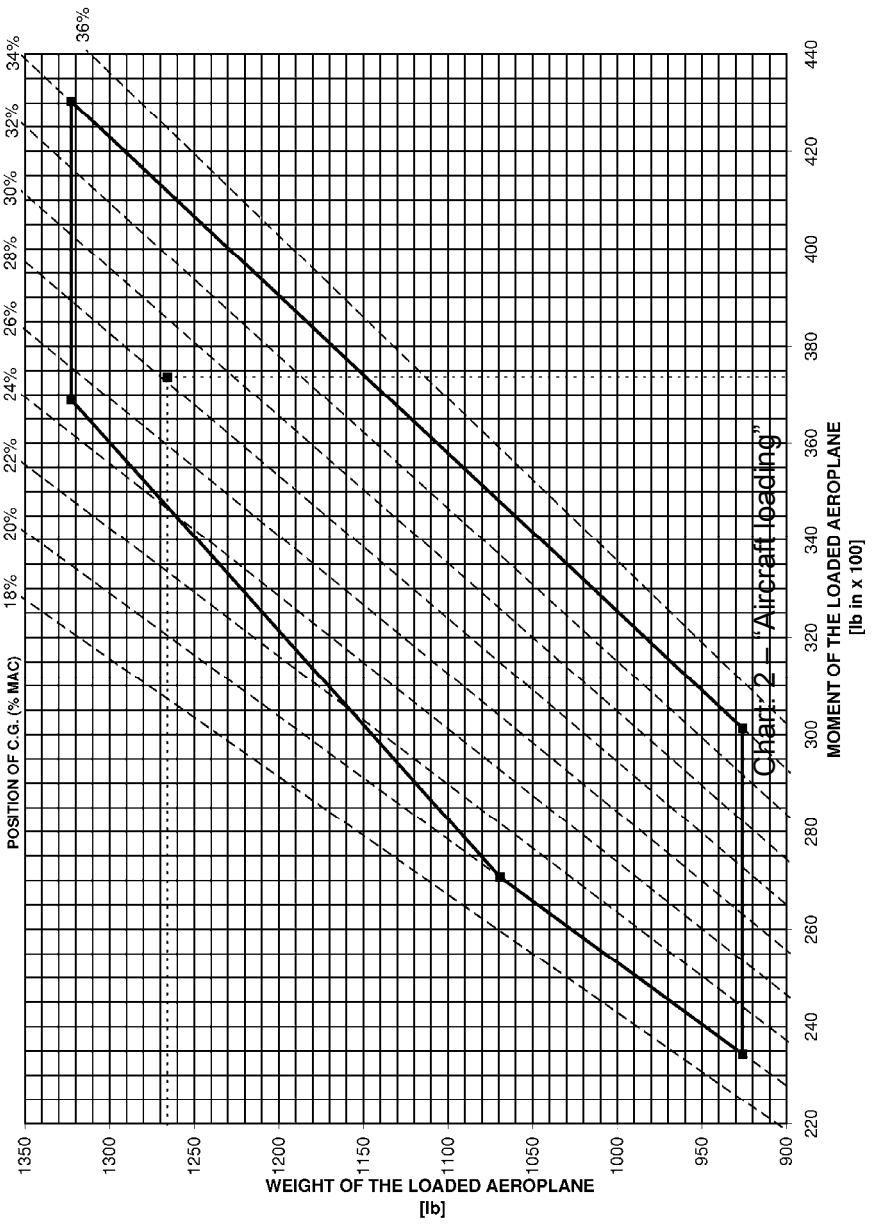


Chart: 1 – "Values of the moments"

Chart: 1 Values of the moments


POSITION OF C.G. (% MAC)
34%
36%
32%
30%
28%
26%
24%
22%
20%
18%
MOMENT OF THE LOADED AEROPLANE
[lb in x 100]
440
420
400
380
360
340
320
300
280
260
240
220
WEIGHT OF THE LOADED AEROPLANE
[lb]
1350
1300
1250
1200
1150
1100
1050
1000
950
900
Chart: 2 – "Aircraft loading"

Calculation Method

From the table 6.3: "Weight and Balance Schedule" the actual weight and moment of the empty airplane should be read off. Values of the moments should be calculated on the basis of the following formula, multiplying the weight by the appropriate arm:

Moment of the pilot and passenger: $\mathbf{M_{crew}}$[in lb] $\mathbf{= 39.8_{(arm)} \times Q_{crew}}$

Moment of the baggage: $\mathbf{M_{lugg}}$[in lb] $\mathbf{= 60.4_{(arm)} \times Q_{bagg}}$

Moment of the fuel $\mathbf{M_{fuel}}$[in lb] $\mathbf{= 6.0_{(arm)} \times Q_{fuel}}$

where: Q = weight [lb]

When calculating the Center of Gravity, the changes in the weight of oil and cooling liquid can be ignored since the difference of 0.132 US gal (0.99 lb) between their max and minimum levels is insignificant.

Weights and moments should be calculated according to the following table:

	Aircraft Loading Example			Your Aircraft Loading		
	Weight [lb]	Arm [in]	Moment [in lb]	Weight [lb]	Arm [in]	Moment [in lb]
Empty airplane	827	-	22491		-	
Fuel (6 lb/US gal)	95	6.0	570		6.0	
Pilot + Passenger	313	39.8	12457		39.8	
Baggage	31	60.4	1872		60.4	
Total weight, arm & moment	1266	29.5*	37390			

* total moment divided by total weight = total arm (see below)

Calculate the arm of the Center of Gravity of the airplane (X_{CG}):

$$X_{CG} = \frac{M}{Q}[in]$$

Where:

M – total moment of the airplane
Q – total weight of the airplane

WARNING
THE ARM OF THE CENTER OF GRAVITY (X_{CG}) IS MEASURED REARWARDS FROM THE SURFACE OF FIREWALL. THE VALUE X_{CG} MUST NOT BE LESS THAN 25.3 IN OR GREATER THAN 32.5 IN

Calculate the center of the gravity in % mean aerodynamic cord:

$$\overline{X}_{CG} = \frac{X_{CG} - 15}{51.57} \cdot 100\%$$

WARNING
THE VALUE X_{CG} MUST NOT BE LESS THAN 20% MAC OR GREATER THAN 34% MAC

6.3 Weight and Balance schedule

SERIAL NUMBER:			CALL SIGN.							
WEIGHT AND MOMENT OF THE EMPTY AIRPLANE (LAST TWO COLUMNS)										
			CHANGE OF WEIGHT							
DATE	SIGNATUE	DESCRIPTION OF THE MODIFICARTION	ADDED (+)			REMOVED (-)				
			Q [lb]	ARM [in]	MOM. [lb in]	Q [lb]	ARM. [in]	MOM. [lb in]	Qp [lb]	Mp [lb in]
		New factory built airplane with the equipment installed according to the equipment list								

Chronology of the construction and equipment modifications effecting changes of weight and moment of the airplane

6.4 AT-4LSA Equipment list

STANDARD EQUIPMENT	
No.	Name
1	Airspeed indicator
2	Altimeter
3	Vertical speed indicator
4	Compass
5	Engine monitoring instruments
6	Standard electric system

NOTE
WEIGHT OF THE INSTALLED EQUIPMENT IS INCLUDED IN THE EMPTY WEIGHT OF THE AIRPLANE
IN CAUSE OF MODIFICATION OF INSTALLED EQUIPMENT IT IS NECESSARY TO UPDATE ALL WEIGHT AND BALANCE DATA AS PER PROCEDURE GIVEN AT AT-4LSA AIRPLANE MAINTENANCE MANUAL.

OPTIONAL EQUIPMENT		
Type of equipment	Model	Installed
Clock		
Radio-transceiver		
VOR indicator		
Intercom		
Transponder		
Encoder		
GPS		
Engine run counter		
Stall warning System		
Fuel flow meter		
Extinguisher		
Wheel fairings	AT3.45.000.0	
Parking brake	AT3.47.100.0	
Alternator	AT3.61.390.0	
Strobe lights	AT3.61.400.0	
Cabin air intake	AT3.77.400.0	
Oil cooler flap control system	AT3.54.400.0	
Landing and taxing lights		
Anti-collision strobe		
Position lights	AT3.69.440.0	
Instruments lights	AT4.62.250.0	
Towing	AT3.79.000.0	
ELT	AK-450	

+ - Equipment installed
o - Equipment not installed

6.5 Usable weight

Baggage / Fuel	0 [lb]	11 [lb]	22 [lb]	33 [lb]	44 [lb]	55 [lb]	66 [lb]
3 US gal 18 lb							
6 US gal 36 lb							
9 US gal 54 lb							
12 US gal 72 lb							
15 US gal 90 lb							
18.5 US gal 111 lb							
Airplane Empty Weight ..... lb							
Completed by: Signature……..……... Date……..…..…							
Verified by: Signature……..……... Date……..…..…							

The table above contains total weight of pilot and passenger against fuel and baggage weights. Application of data contained in the table prohibits from exciding of allowed maximum weight and center of gravity limits.
Any change in airplane empty weight requires new creation of above table as per procedure given at AT-4LSA Airplane Maintenance Manual.

Section 7

DESCRIPTION OF THE AIRPLANE AND ITS EQUIPMENT

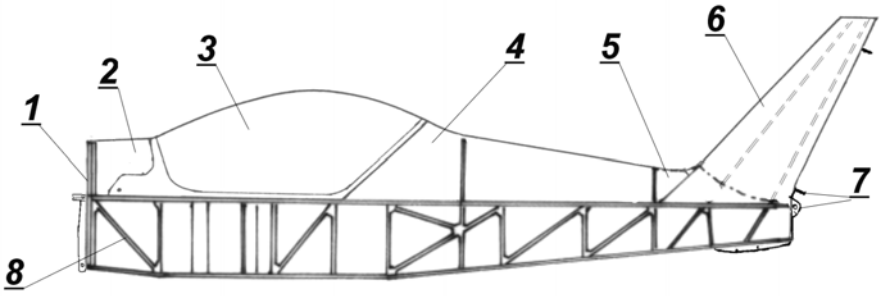
7.1. Introduction

This Section contains a description of the airplane and of its equipment.

7.2. Airframe

7.2.1. Fuselage

The fuselage, made of duralumin sheet, has a rectangular section, open in the area of the cabin. In the rear the fuselage passes fluently into the fin, being an integral part. The sections between canopy and fuselage, as well as those between fuselage and fin are made of epoxy-fibreglass composite.

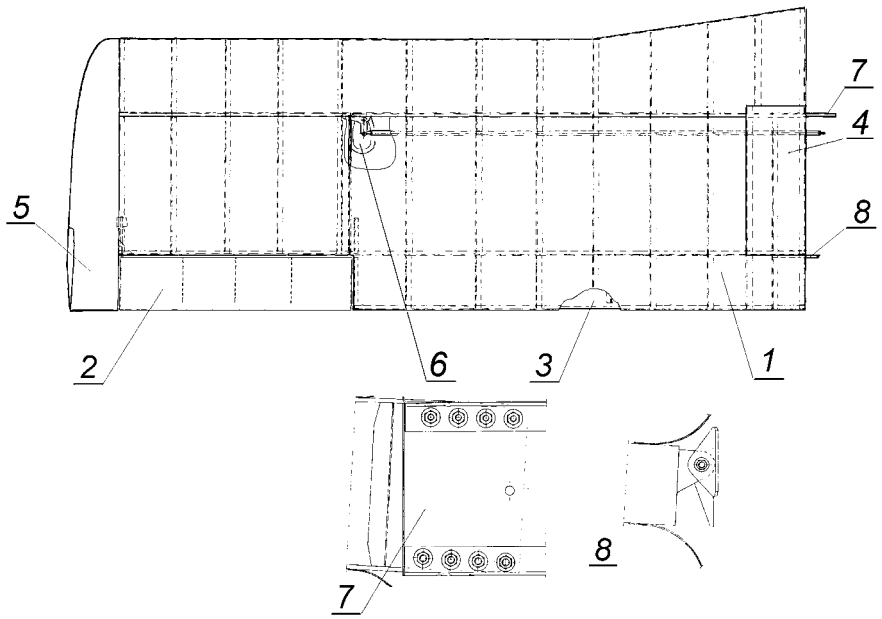


Fuselage

1. Fire wall
2. Upper fuel tank cover
3. Canopy
4. Canopy-fuselage fairing made of epoxy-fibreglass
5. Fuselage-fin fairing made of epoxy-fibreglass
6. Fin
7. Ferules of the rudder and the elevator
8. Fuselage frame

7.2.2. Wings

The wings are made of aluminium and are connected to the fuselage by means of the main and of the rear spars. The ailerons and the wing flaps are of similar design are connected to the wing by means of flat hinges. Wing tips made of epoxy-fibreglass.

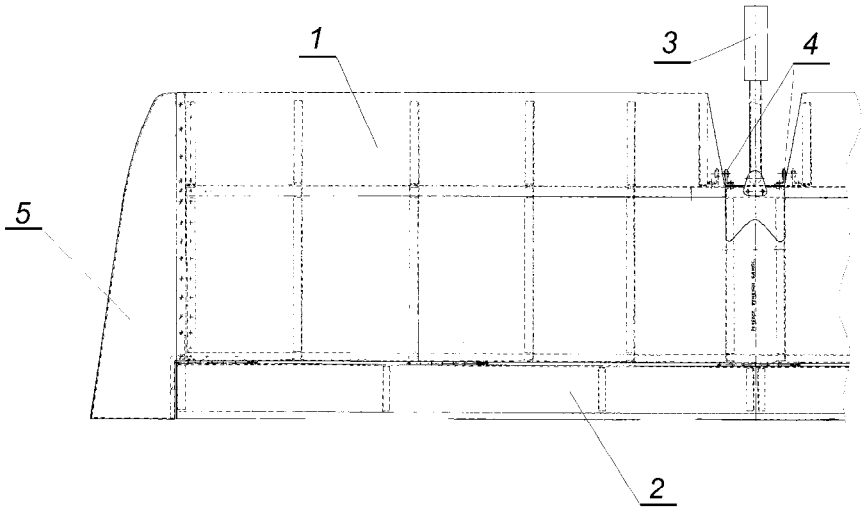


Wing

1. Wing frame
2. Aileron
3. Flap
4. Wing-walk surface
5. Wing tip
6. Inspection hatch
7. Main spar
8. Rear spar

7.2.3. Slab tail

The tail plane is a slab tail design with a structure similar to the wing, mass balanced, hinged at two points. The trim & balancing tab are contained within the contour of the tail plane.

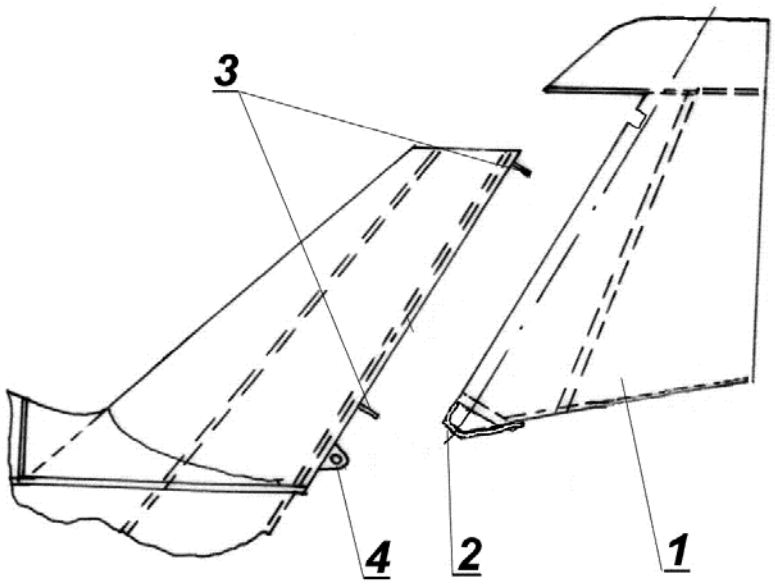


Slab tail

1. Structure of the slab tail
2. Trim and balancing tab
3. Balancing weight
4. Slab tail fittings
5. epoxy-fiberglass tips

7.2.4. Fin and rudder

The vertical tail unit consists of fin and rudder. The fin is an integral part of fuselage structure.



Fin and rudder

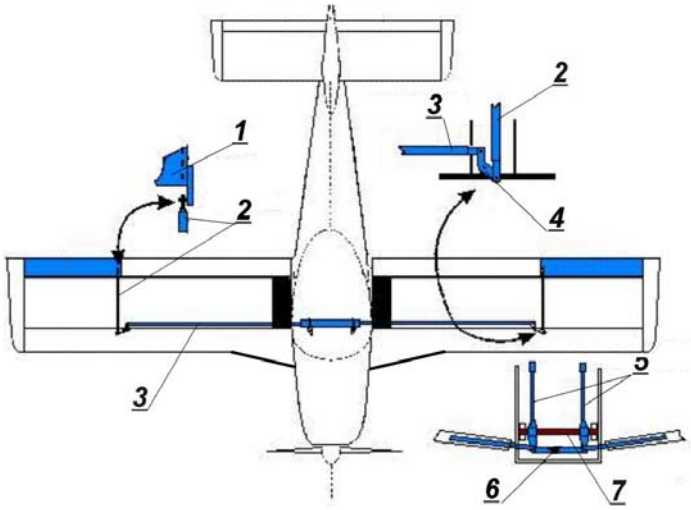
1. Rudder
2. Lower rudder fitting
3. Rudder mountings
4. Slab tail fittings

7.3. Flight control

This section contains a description of the control mechanisms of the wing flaps, the ailerons, the elevator, the trim & balancing tab and of the rudder.

7.3.1. Control of the ailerons

The ailerons are located at the trailing edge of the outboard wing part, between the wing flaps and the wingtips. The scheme of the control mechanism of the ailerons is shown below.



Control of the ailerons

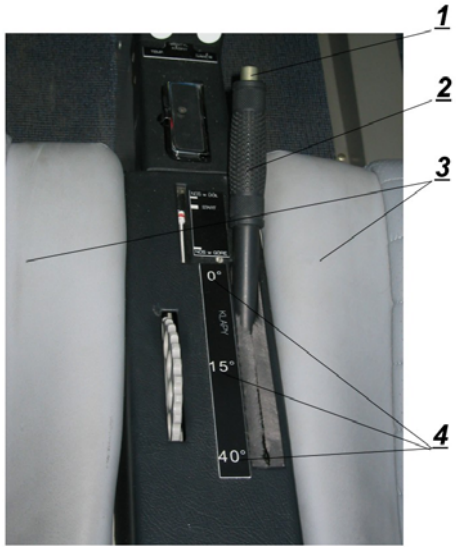
1. Aileron
2. Push rods
3. Push rods
4. Angle lever
5. Control sticks
6. Push rods
7. Torsion tube

7.3.2 Control of the wing flaps

The wing flaps which are of crocodile type (split flaps) are located below the trailing edge of the wing, between the fuselage and the ailerons. The wing flap control lever (see the illustration below) is located in the cabin, on the console, between the seats. This lever is fitted with a knob, which is to release the flap-retaining pin and enables the flap to be set in either of its three positions. In the extreme forward position of the lever the flap is set to $\delta_K = 0°$.

In the middle position of the lever the flap is set to $\delta_K = 15°$ and in the extreme rear, the setting is $\delta_K = 40°$.

The wing flap control lever transmits its movement to the flaps via push rod, torsion tube and the two pins.

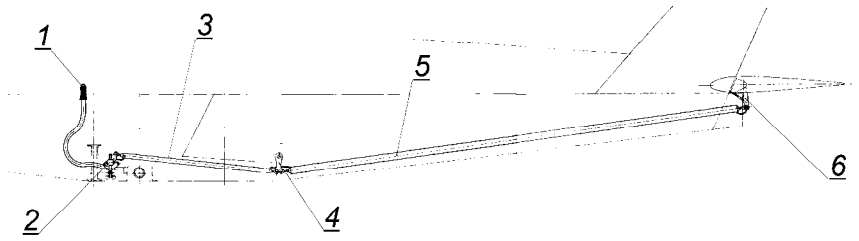


Control of the wing flaps

1. Releasing knob
2. Wing flap control lever
3. Seats
4. Marking of the flap setting

7.3.3. Control of the elevator

The slab tail elevator is fixed to the spar of the fin. The scheme of the elevator control is shown in the illustration below.

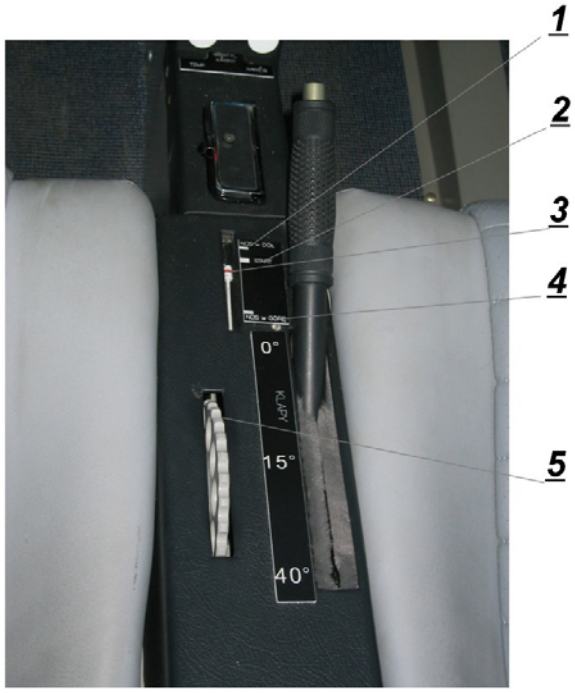


Control of the elevator

1. Control stick
2. Torsion tube
3. Short push rod
4. Connecting lever
5. Long push rod
6. Slab tail arm

7.3.4. Control of the trim/balancing tab

The trim & balancing tab is fixed to the trailing edge of the slab tail elevator is driven by torsion shaft, self locking screw gear and assembly of levers and pushrods .
The illustration below shows the control wheel of the tab and the tab setting indicator.

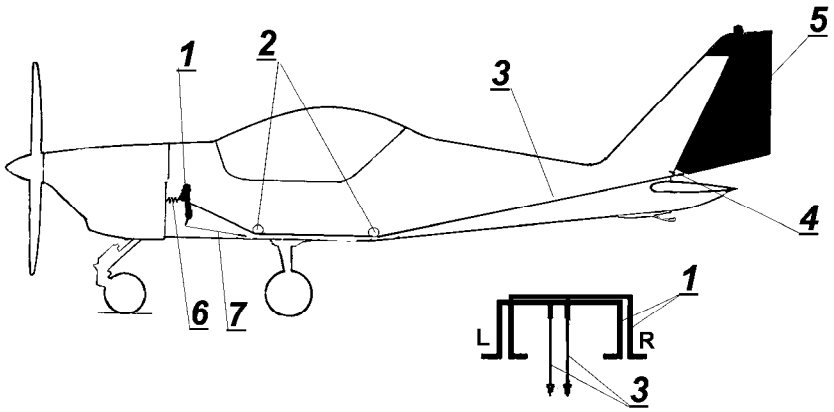


Control of the trim/balancing tab

1. “NOSE DOWN”
2. “TAKE-OFF SETTING”
3. Tab position indicator
4. “NOSE UP”
5. Trim & Balancing Tab Control Wheel

7.3.5. Rudder Control

The rudder is fixed to the fin. The illustration below shows the schematic of the rudder control.

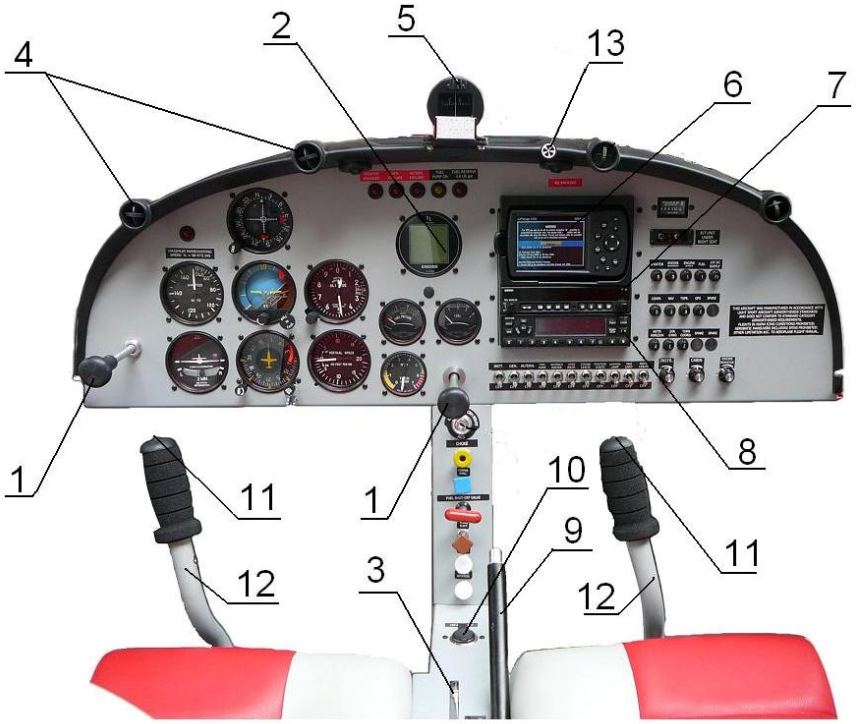


Schematic showing the set-up of the pedals controlling the rudder

1. Rudder pedals
2. Cable pulley
3. Cables
4. Rudder lever
5. Rudder
6. Tension springs
7. Discharge cables

7.4. Instrument panel

The equipment installed in this airplane is specified in the List of Equipment on page 6-4.

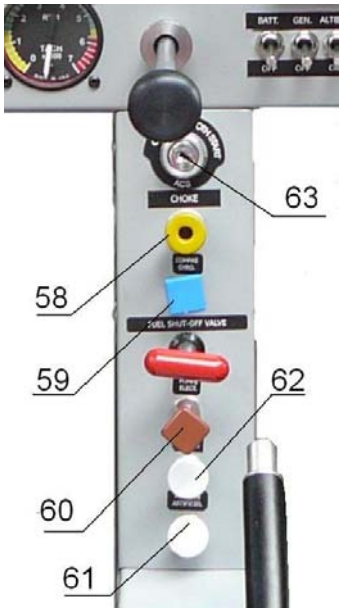


Instrument panel and central console

1. Left throttle lever	7. Radio transceiver
2. Engine monitor	8. Transponder
3. Trim tab setting indicator	9. Flaps control lever
4. Air inlets	10. 12 DC supply
5. Magnetic compass	11. Push-to-talk buttons
6. GPS	12. Control sticks
	13. Air inlet cable

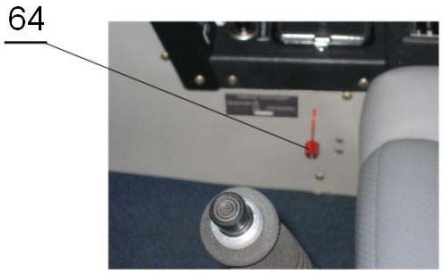
Right part of the instrument panel

14. Stall warning light
15. Artificial Horizon
16. Airspeed indicator
17. Turn coordinator
18. VOR indicator
19. Altimeter
20. Directional Gyro
21. Vertical speed indicator
22. RPM indicator
23. Fuel pressure indicator
24. Fuel level indicator
25. FUEL RESERVE light
26. FUEL PUMP ON light
27. ALTERN. FAILURE light
28. GEN. FAILURE light
29. STAR ENGAGGED light

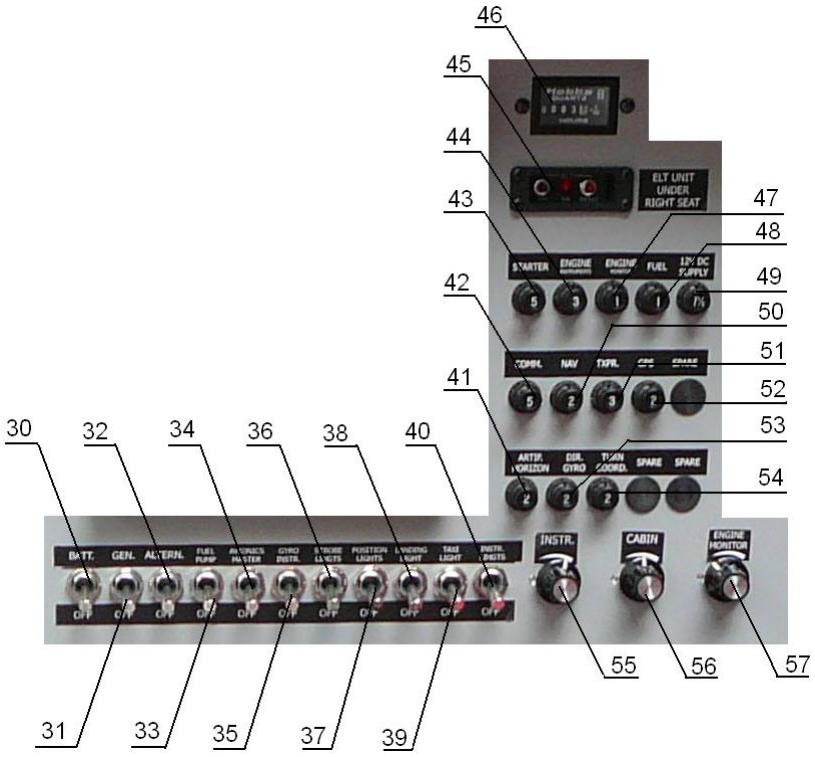


Central console

58. Choke
59. Carburetor preheating knobs
60. OIL HEATING leaver
61. CABIN HEAT leaver
62. CABIN VENT leaver
63. Ignition switch
64. Parking brake lever



LH side of the center console



Left part of the instrument panel

30. BTTERY automatic circuit breaker
31. GENERTAOR automatic circuit breaker
32. ALTERNATOR automatic circuit breaker
33. FUEL PUMP automatic circuit breaker
34. AVIONICS MASTER automatic circuit breaker
35. GYRO INSTR. automatic circuit breaker
36. STROBR LIGHTS automatic circuit breaker
37. POSITION LIGHTS automatic circuit breaker
38. TAXING LIGHTS automatic circuit breaker
39. LANDING LIGHTS automatic circuit breaker
40. INSTR. LIGHTS automatic circuit breaker
41. ARTIFICAL HORIZON circuit breaker
42. COMM circuit breaker
43. STARTER circuit breaker
44. ENGINE INSTRUMENTS circuit breaker
45. ELT control panel

45. ELT control panel
46. Hours meter
47. ENGINE MONITOR circuit breaker
48. FUEL circuit breaker
49. 12 DC SUPPLY circuit breaker
50. NAV. circuit breaker
51. TRANSP. circuit breaker
52. GPS circuit breaker
53. DIR. GYRO circuit breaker
54. TURN COORD. circuit breaker
55. INSTR. light dimmer
56. CABIN. light dimmer
57. ENGINE MONITOR light dimmer

Panel between seats

9. Flaps control lever
65. Trim wheel
66. Seats
67. Microphone sockets
68. Headphone sockets

7.5. Landing gear system

The aircraft has a three-wheel, fixed landing gear, with nose wheel. The main landing gear is of a flat spring design. The nose wheel is fitted with a rubber shock absorber

7.5.1. Braking system

The airplane is fitted with hydraulic disc brakes. The brake fluid container is located in the engine compartment, next to the firewall. The brake cylinders are located directly on the rudder pedals and are operated by foot pressure on the lever. The brake of each wheel operates independently. Optionally braking system could be equipped with additional set of main cylinders and clamps allowing independent operations of brakes from right seat.
The brake discs [7] are fixed to the wheel hubs and the brake callipers, to the struts. The system is fitted with bleeding valves, located at the lower part of each brake calliper.

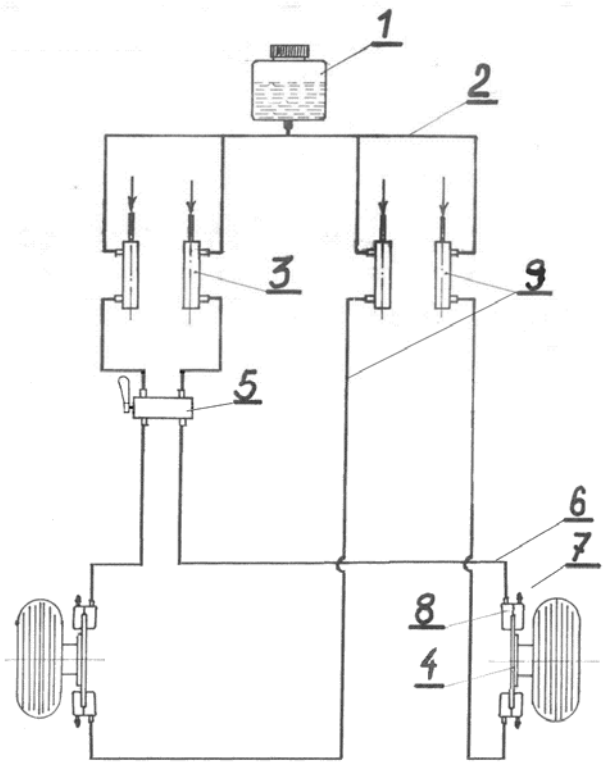


Diagram of the braking system

1. Brake fluid container
2. Feeding line
3. Brake cylinder
4. Brake disk
5. Parking brake valve (option)
6. Brake pressure line
7. Bleeding valve
8. Brake calliper
9. Right seat braking installation (option)

7.6. Seats, seat belts and harness

The seat position is permanently fixed (not adjustable). The illustration below shows the installation of the seats. Each seat is fitted with adjustable safety belts.

Seat belts and harness

1. Rear frame of fuselage
2. Harness
3. Safety belts

7.7. Baggage compartment

The baggage compartment is located behind the seats and consists of two containers (see illustration).

The containers are fitted with lids made of metal, locked by latches. Pressing the latch releases it and enables the lid to be opened. The baggage compartment allows for baggage of 66 lb total weight; 44 lb in the port container and 22 lb in the starboard one.

Baggage compartment

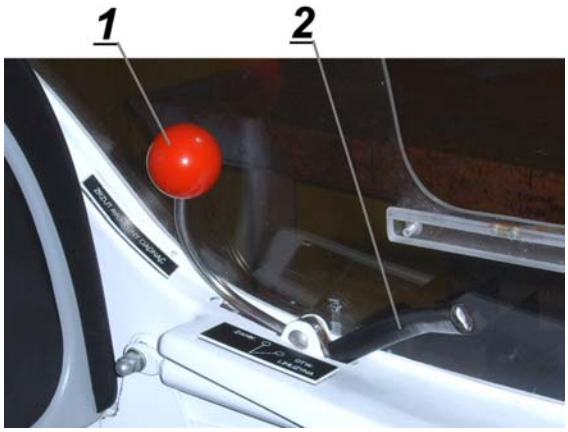
1. Lid of the baggage compartment
2. The port and the starboard baggage containers
3. Extinguisher

CAUTION

IT IS PROHIBITED TO CARRY INFLAMMABLE, CORROSIVE, EXPLOSIVE, RADIOACTIVE AND OTHER MATERIALS IN THE BAGGAGE COMPARTMENT, WHICH ARE HARMFUL FOR HUMAN HEALTH OR LIFE.

7.8. Canopy

The canopy consists of an epoxy fibreglass composite frame and of profiled acrylic sheet. The canopy can be moved forward, rotating around an axis located in front of the cabin. After entering the cabin the canopy should be pulled on the handle and lowered, until it rests on the fuselage sidewall edges, and then locked with the levers with orange knobs. Sliding venting tabs are installed on both sides of the canopy. Jettisoning of the canopy is achieved by pulling the lever with the red knob and pushing the canopy upwards. The locking and the jettisoning levers are arranged in the front part of the canopy on both sides, one of each, on each side.



Canopy

1. Canopy jettisoning lever
2. Lever locking and opening the canopy

7.9. Power unit

7.9.1. Engine

Rotax 912ULS engine
- Four-stroke, opposed, four cylinder engine
- Cylinder heads cooled with fluid, cylinders cooled with air
- Pressure lubrication
- Dual magneto ignition
- Propeller driven via reduction gear
- Electric starter
- Generator

Two interconnected throttle levers, located on the instrument panel, are used to control the engine.

7.9.2. Propeller

Ground adjustable 3-1-1P ELPROP three blade propeller prop with the outside diameter of 5.68 ft with blades manufactured from carbon fiber and with an aluminum hub.

7.10. Fuel system

The fuel is contained in the fuel tank, which is located between the instrument panel and the firewall. The fuel tank, made of composite, is contained in a sack, made of fabric resistant to smoke and to fuel.

There are drains installed in the sack, to drain any spilled fuel out of the airplane. The fuel tank is fitted with a filler which is drained. A measuring stick is attached to the filler cap. The fuel quantity is measured by the capacity type fuel level sensor. The signal from this sensor is transmitted to the fuel quantity indicator and to the reserve signal lamp. The reserve fuel signal lamp starts to light, when the fuel tank contains 2.6 US gal of consumable fuel.

The fuel is filtered by the coarse filter located on the fuel tank outlet, by the filter in the electric driven emergency fuel pump and by the fine filter, located behind the engine driven pump.

The fuel shut-off valve is located under the fuel tank, behind the firewall, and is operated from the cabin.

The engine driven pump feeds the fuel under pressure to the carburetors and to the fuel pressure sensor. Surplus fuel is drained back to the fuel tank.

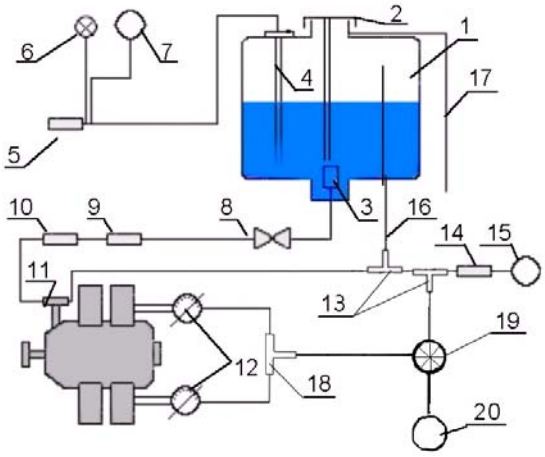
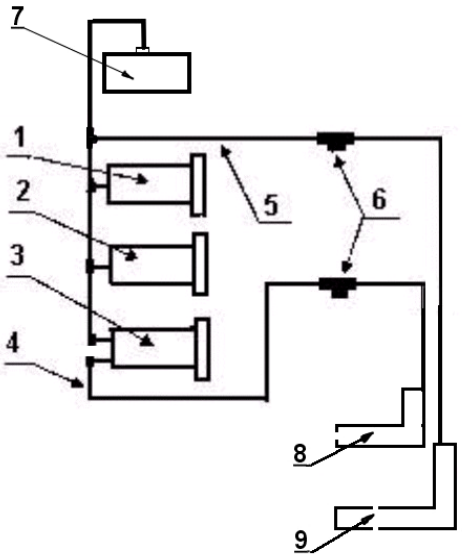


Diagram of the fuel system

1. Fuel tank
2. Filler cap with the measuring stick
3. Coarse fuel filter
4. Fuel level sensor
5. Reserve fuel sensor
6. Reserve fuel signalling lamp
7. Fuel quantity indicator
8. Shut-off valve
9. Electrically driven fuel pump
10. Fine fuel filter
11. Engine driven fuel pump
12. Carburetors
13. Three-way connectors
14. Fuel pressure sensor
15. Fuel pressure indicator
16. Fuel return line
17. Draining line of fuel filler
18. Three-way connectors
19. Fuel flow-meter sensor (optional)
20. Fuel flow-meter indicator (optional)

7.11. Pitot and static pressure systems

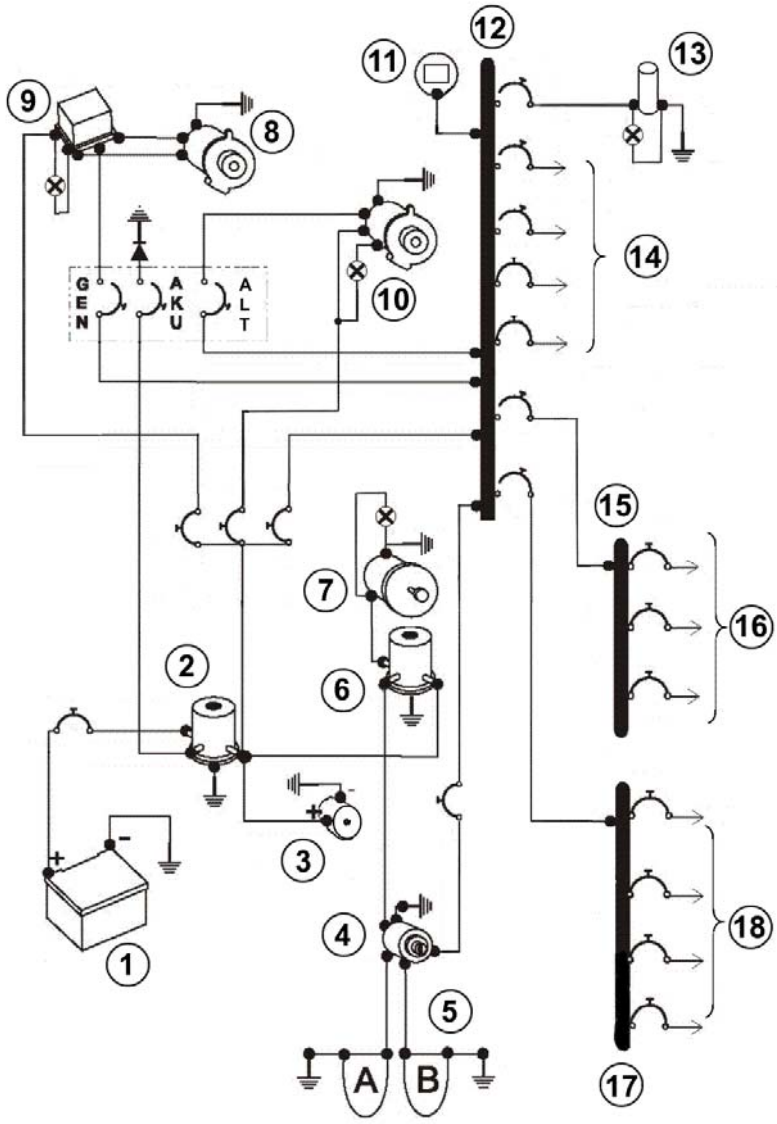
The sensors [9] and [8] receive air under pitot and static pressure and transmit it to the airspeed indicator [3], altimeter [2] , vertical speed indicator [1] and altitude encoder[7](option) -see the scheme on the illustration. The sensors of pitot and static pressure are fixed under the port wing. Water sediment containers [6] are installed to both the static pressure line [5] and to the pitot pressure line [4]. The sediment containers are located beneath the pilot's seat and are accessible from outside.



7.12. Electrical system

The source of on board electric power is the generator and the battery. It is a 12 Volt system. Automatic circuit breakers located on the instrument panel protect the system. The BATTERY switch switches on the system. The switches BATTERY and GENERATOR perform the task of the system master switch. In case of generator failure, the GENERATOR signalling lamp lights up. In such a case the system is fed from the on board battery. Additional alternator could become supplementary source of electric supply.

There is also an electrical ground power receptacle installed into the system, being located in front of the wing, on the port wall of the fuselage, in front of the firewall. An electric board socked is installed in the cabin, on the instrument panel. When using the ground power source, the on board battery is automatically switched off. Switching of the electric power receivers in this case is the same as when using the on board battery.



Electrical System

1. Battery
2. Battery contractor
3. Ground service plug receptacle*
4. Ignition switch
5. Engine ignition modules
6. Starter contractor
7. Starter
8. Alternator
9. Alternator control unit
10. Alternator*
11. Voltage indicator (engine controller)
12. Primary bus
13. Electric fuel pump
14. Electric equipment switches and circuit breakers
15. Avionic but
16. Gyro equipment circuit breakers
17. NAV-COM bus
18. NAV-COM circuit breakers

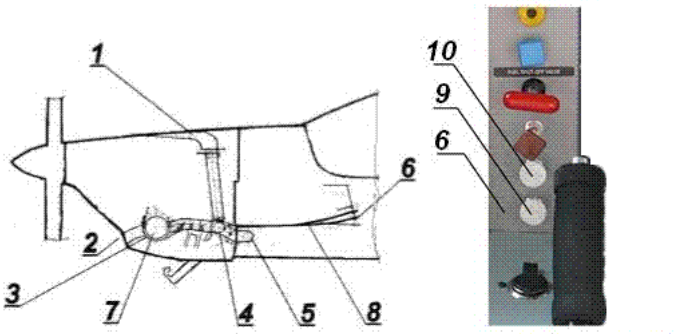
*- optional equipment

7.13. Airplane equipment

A detailed list of standard airplane equipment, as well as of the possible optional equipment is given in the Maintenance Manual of the AT-4LSA airplane. The operational instructions for the optional equipment are given in the section 9 – Supplements.

7.13.1. Cabin ventilation and heating

The cold air ventilation inlet in the lower part of the cabin shares the air intake with the carburetor air inlet connected to the air mixer. The air mixer enables adjustment of the volume and temperature of the cabin ventilating air. The fresh air is ducted from the intake to the heat exchanger located under the muffler and then further to the air mixer. From the mixer the air is ducted to the cabin outlet. The control cables and knobs are located on the middle console.

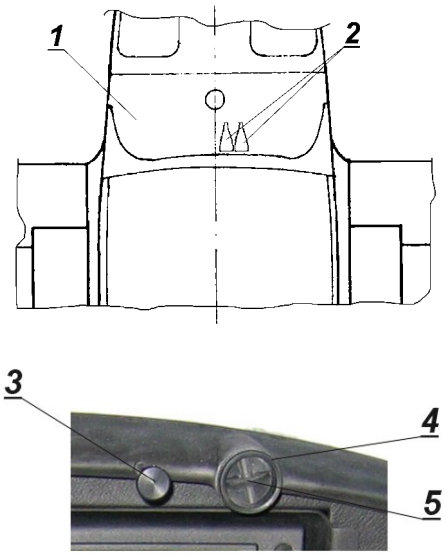


Cabin venting and heating

1. Cold air inlet
2. Heat exchanger inlet
3. Heat exchanger
4. Mixer
5. Cabin inlet
6. Middle console
7. Muffler
8. Control cables
9. Temperature control knob
10. Air volume control knob

Cabin Air Intake (optional)

The cabin air intake [2] for ventilation of the canopy and upper part of the cockpit is located in the tank cover [1]. Air flow can be adjusted with the pull knob [3]. The knob when pulled-out fully opens intake. The air is supplied to the cabin through four inlets located above the instrument panel [4]. The rate of flow can be adjusted by turning the diaphragm [5] and the direction of the air flow by turning the inlet.



6. 1. Tank cover
7. 2. Air intake
8. 3. Pull knob
4. Air inlet
5. Diaphragm

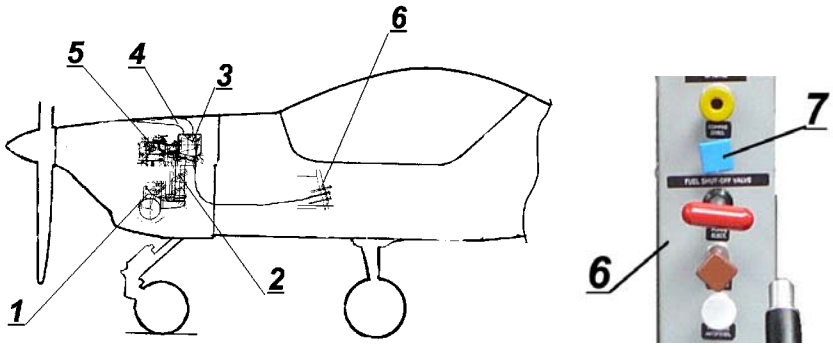
Cockpit air outlet

Adjustable cockpit air outlet is located in rear part of canopy.

7.13.2. Carburetor heating installation

Closing of the air flow from the cold air inlet causes suction of the hot air from the engine compartment through the heat exchanger located above the muffler. The heated air is channelled through the air duct to the filter box, where the air streams are mixed. The cold air stream can be adjusted by the flap controlled by the Bowden cable and knob located on the middle console. The temperature of the carburetor intake air can be read from the gauge on the instrument panel.

To increase of the temperature turn the knob to the left to unlock and pull to the selected position and turn right to lock.



1. Heat exchanger
2. Duct
3. Air filter box
4. Air intake
5. Carburetors
6. Middle console
7. Carburetor heating control knob

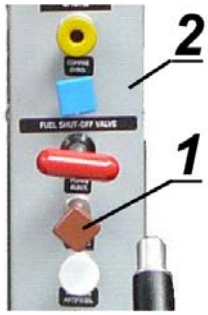
7.13.3. Oil cooler shutter

The standard oil cooler is equipped with manually adjusted on the ground shutter. Optionally aircraft could be equipped with system allowing adjustment of shutter from the cockpit.

The shutter closing is done by turning the knob counter-clockwise and pulling it out from the instrument panel. Locking in a selected position – turn clockwise. In case of operation flexible connector disconnection, the shutter will be automatically open using return springs.

CAUTION

POSITION OF OIL COOLER SHUTTER SHOULD BE SET IN SUCH A MANNER THAT ENGINE OIL TEMPERATURE DOES NOT EXCEED PERMISSIBLE LIMIT.



Operation of oil cooler shutter

1. “OIL HEAT” knob (optional)
2. Middle console

Section 8

HANDLING, SERVICING & MAINTENANCE

TABLE OF CONTENTS Page

8.1. Introduction

This Section contains procedures for the correct handling of the airplane and servicing, recommended by the airplane manufacturer. It also contains some requirements concerning inspections and basic maintenance, which are to be observed in order to maintain the performance and reliability of a new airplane. It is reasonable to proceed according to a prescheduled scheme of lubrication and maintenance, appropriate to the operating conditions and climate.

8.2. Scheduled Airplane Inspections

The scope and the intervals of the inspection schedule are defined in the Airplane Maintenance Manual. A separate inspection system may be required for the airplane by the appropriate Aviation Authority in order to renew the Annual Certificate. Tasks to be carried out in relation to scheduled inspections of engine, propeller and equipment, are defined in the respective applicable manuals or operating and maintenance instructions.

The owner and operator are responsible to insure that all handling, servicing and maintenance are only carried out by qualified personnel.

8.3 Airplane Repairs or Modifications

Any repair or modification of the airplane design may only be performed by authorized personnel.

NOTE
PRIOR TO ANY MODIFICATION OF THE AIRPLANE, CONSULT WITH THE CIVIL AVIATION AUTHORITY, THAT THE INTENDED MODIFICATION WILL NOT NEGATIVELY AFFECT THE AIRWORTHINESS OF THE AIRPLANE

After completing the modification, according to the instructions given in the Airplane Maintenance Manual, the aircraft should be re-weighed, and the respective weighing report sheet completed and the Weight and Balance schedule in para 6-3 of this manual must be revised. Also Section 9 of this manual is to be supplemented accordingly.

8.4. Ground servicing

The dimensions of the standard airplane are given in the airplane drawings (see Section 1). This allows the size of the area required for the airplane in a hangar or for parking to be defined.

NOTE
THE SIZE OF THE REQUIRED AREA IS TO BE INCREASED RESPECTIVELY, TO PROVIDE SPACE FOR SUPPLEMENTARY EQUIPMENT SUCH AS ANTENNAS OF RADIO EQUIPMENT (OR OTHER EQUIPMENT INSTALLED ACCORDING TO THE OPERATORS OPTIONS).

8.4.1. Relocating the Airplane on Ground

If using the towing bar on a level surface, one person is able to move the airplane. The tow bar is to be fixed to the nose wheel by means of two lugs.

If the ground is not even and there are difficulties in moving the airplane, two people may manage the relocation, balancing the plane on the main wheels. One person should guide the wingtip and the other should control the movement with the tow bar.

NOTE
DO NOT PUSH OR PULL THE AIRPLANE
BY HOLDING PROPELLER,
CONTROL SURFACES, WINGS OR FAIRINGS.

8.4.2. Parking

1. Position the airplane pointing into wind.
2. Apply chocks to the main wheels.
3. Secure the control sticks with the seat belts (or tow bar gust lock).
4. Lock the cockpit canopy and apply a canvas cover, if available.

8.4.3. Tying Down

There are lugs for the tie-down ropes on the airplane. They are located under the wingtips, at the rear of the airplane (tail skid) and at the front (nose landing gear ferrules).

When tying down, the following should be observed:

1. It is recommended to have the airplane pointed into wind.
2. Put chocks in front of the main wheels.
3. Apply locks to the ailerons, rudder and elevator, or fasten the control sticks with safety belts.
4. Put the ropes through the specified lugs and attach the rops to the ground anchors. There should only be slight tension on the tie-downs to prevent sagging.
5. Apply the cover to the pitot and static pressure sensors.
6. Lock the canopy and put on the cover.
7. Position the propeller horizontally.

8.4.4. Lifting

When jacking the airplane the following procedure should be followed:

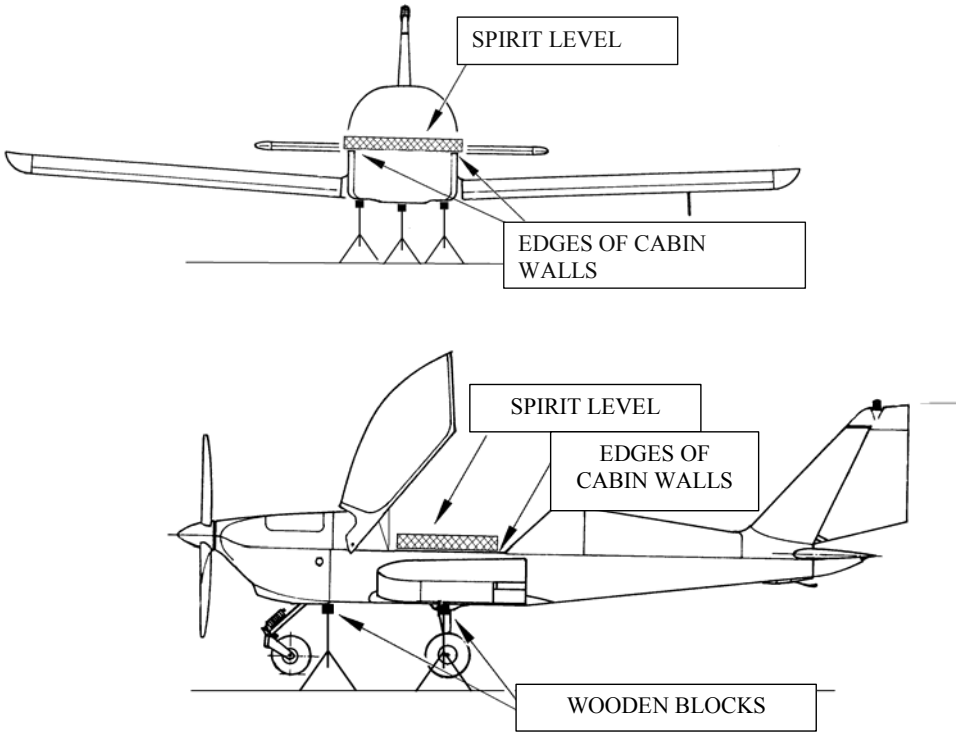
1. Put a stand (under a rib) under each wing to prevent the airplane from tilting.

NOTE
INSTEAD OF USING JACKS, THE AIRPLANE MAY ALSO BE LIFTED BY HAND, WHEN HOLDING THE LOWER FUSELAGE EDGES IN THE AREA BETWEEN THE FIREWALL AND THE WING AND IN FRONT OF THE HORIZONTAL STABILIZER.

2. Locate one of the jacks under the nose landing gear ferrule and the two other, each side next to the cabin walls, under the main landing gear box. Apply wooden blocks.
3. Lift the airplane gradually to the required height. Lift the airplane, raising each jack evenly at the same time and avoid swaying.

8.4.5. Leveling

After lifting, the airplane should be leveled, so that the cabin wall edges are horizontal (see the illustration).



8.5. Cleaning and Basic Maintenance

It is essential for the reliability of the airplane components to always keep them clean.

8.5.1. Painted External Surfaces

Prior to cleaning, take the following steps:

- Protect the wheels, especially the brake discs, covering them.

- Put the cover on the pitot and static pressure sensors.

- Mask off all holes and orifices.

Use clean water to remove all fine particles and then wash the surface with water adding mild soap. Do not use detergents or soaps which are acid, alkaline or abrasive.

To remove spots of grease or oil, use a piece of cloth with naphtha or aliphatic petrol.

After use of naphtha the surface should be re-waxed and polished.

To polish the painted surfaces, a soft cloth or chamois leather should be used. Aged painted surfaces may be treated with automotive waxes or good quality polishing compounds.

8.5.2. Glass Panels

The greatest care should be taken to avoid scratches when cleaning glass panels of plexiglas.
Never wipe the glass panels when dry. Rinse the panel with clean water or solution of mild soap and then wipe with soft clean cloth, sponge or chamois-leather.
To remove films of oil or grease, use tribasic sodium phosphate, well dissolved in water.
Sediments of grease or oil, if difficult to remove, should be cleaned with methanol, hexane, or naphtha. Finally rinse with clean water avoiding excessive rubbing of the glass panel surface.

CAUTION!
DO NOT USE PETROL, BENZENE, ACETONE, ANTI-ICING COMPOUNDS, OR PAINT SOLVENTS, BECAUSE THESE SUBSTANCES SOFTEN THE PLEXIGLASS,
OR MAY GIVE RISE TO A NETWORK OF FINE CRACKS

8.5.3. Propeller

The propeller is to be cleaned in the same way as the painted surfaces, but with great care.

8.5.4. Engine

The engine is to be cleaned as indicated in the Engine Maintenance Manual.

8.5.5. Cabin interior

The seats, carpets and upholstery are to be cleaned with a vacuum cleaner.
Do not use water to clean items of cloth or fabric.
Foam-based shampoos for general use on automotive upholstery may be applied, but the indications given on the packing should be strictly observed.

Section 9
SUPPLEMENTS

TABLE OF CONTENTS Page

9.1. Introduction

This section contains relevant supplements needed for safe operation of the airplane when equipped with supplementary systems, installed by the airplane manufacturer and specified below.

9.2. List of Introduced Supplements

Document No.	Title of the Supplement Introduced	Introduced. Date, Signature
Supplement No. 1	GARMIN SL30 Nav/Com System	
Supplement No. 2	Radio-transceiver GARMIN SL40	
Supplement No. 3	GARMIN GPSMAP	
Supplement No. 4	Stall Warner ACI T1	
Supplement No. 5	Transponder GARMIN GTX327	
Supplement No. 6	ELT AK-450	
Supplement No. 7	Landing and taxing lights	
Supplement No. 8	Strobe lights	

Document No.	Title of the Supplement Introduced	Introduced. Date, Signature
Supplement No. 9	Position lights	
Supplement No. 10	Instrument panel lighting	

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Section 9

SUPPLEMENT No. 1

GARMIN SL30 NAV/COM System

List of revisions

Revision No.	Revision description	Concerned pages	Date

List of effective pages

Page number	Issue date
9.1-1	MAY, 2007
9.1-2	MAY, 2007
9.1-3	MAY, 2007
9.1-4	MAY, 2007
9.1-5	MAY, 2007
9.1-6	MAY, 2007
9.1-7	MAY, 2007
9.1-8	MAY, 2007
9.1-9	MAY, 2007
9.1-10	MAY, 2007
9.1-11	MAY, 2007
9.1-12	MAY, 2007
9.1-13	MAY, 2007
9.1-14	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

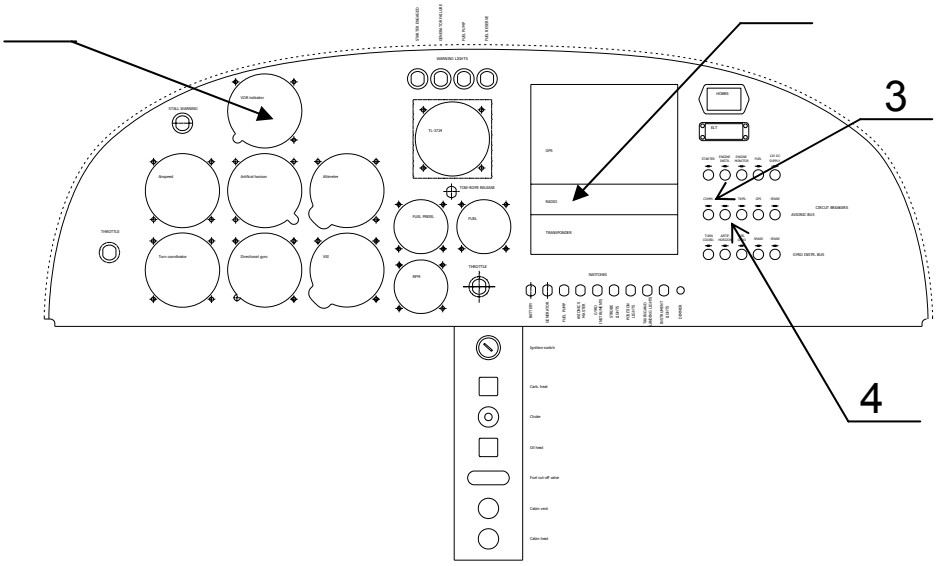
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

On the right side of the instrument panel is mounted SL30 type communication trasceiver. The trasceiver provides communication between the crew members and ground stations. Additionally, it cooperates with MD200-306 type VOR/LOC/GS indicator. Location of the equipment on the instrument panel is shown in drawing 1.1.



Drawing 1.1 Location of the equipment on instrument panel

1. COM/NAV SL30 transceiver
2. MD200-306 type VOR/LOC/GS indicator
3. „RADIO" circuit breaker
4. „NAVIGATION " circuit breaker

SL30 transceiver is used for radio communication with frequencies 118 MHz to 139,975 MHz and 760 channels having 25 kHz increments. The transceiver front panel is showed on drawing 2.1. Active frequency is displayed on left side of display. STBY frequency is preceded with "s" letter.

Additionally, the transceiver is fitted with VOR receiver working on 200 channels and LOC/GS Glideslope receiver. Active frequency of received frequencies is displayed on the display right side. Depending on the mode, navigation information are displayed on the display right side.

Basic technical specifications

Operating temperature range	from -20° to +55°
Input voltage range	10-40V

Com Radio Features

Communications channels	760
Frequency range	118- 136.975
Between channels increments	25kHz
Transmitter power	8W
Audio amplifier power	12W
Intercommunication function	

NAV Radio Performance Features

Frequency range:	VOR:	108	– 117.95MHz
	LOC	108	– 111.95MHz
	GS	328.60	– 335.40MHz
Between channels increments	50kHz (VOR/LOC)		

2. Unit Operation

2.1. Power On

For Power on the unit turn the battery switch on and rotate volume knob clockwise from OFF position. The transceiver will go through short initialization routine (about 15 sec.) and than briefly display last used active frequencies and COM or NAV standby frequencies, depending on used mode.

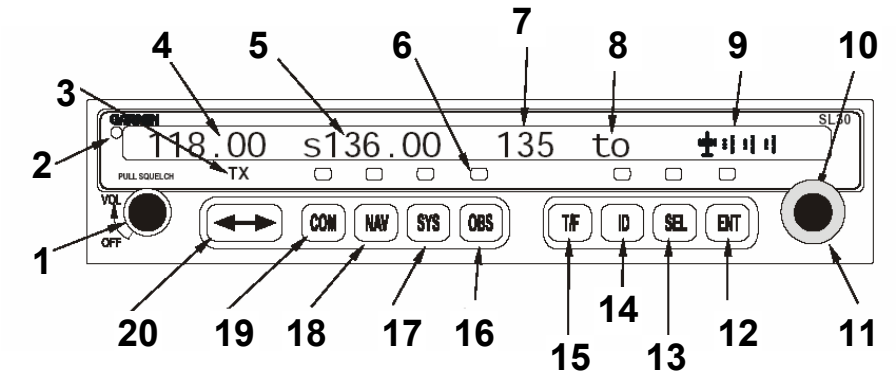
When the unit is switched on, pull the knob out to disable automatic squelch and rotating the knob to set proper volume. Push the knob in to activate automatic squelch again.

CAUTION

When transceiver is power on do not start the engine.

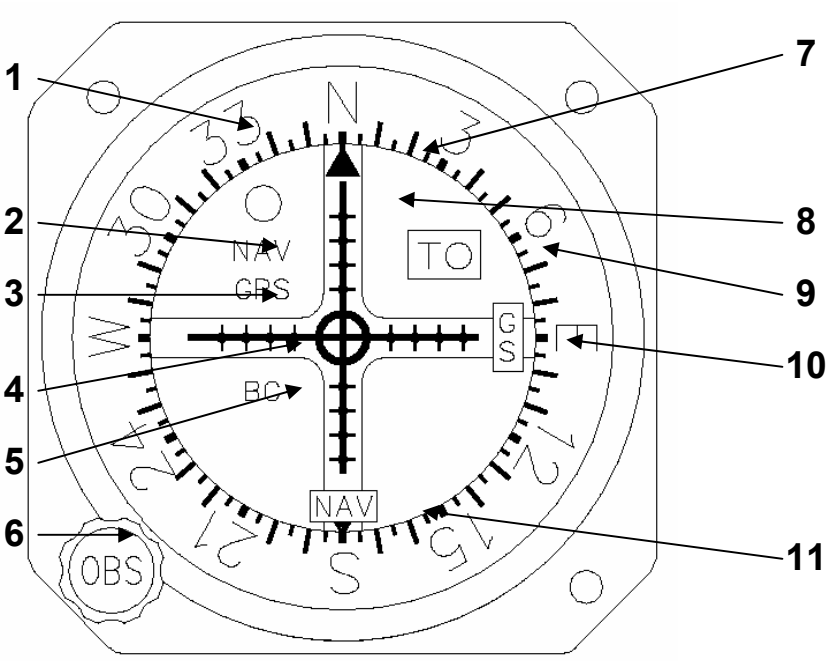
2.2. SL30 transceiver controls

SL30 transceiver front panel and controls are showed on drawing 2.1 when navigation display cooperating with the transceiver is shown on drawing 2.2.



Drawing 2.1 Transceiver front panel

1.) Power/Volume/Squelch Knob
2.) Photocell
3.) Transit Annunciator
4.) Active Frequency
5.) Standby Frequency
6.) Function Annunciators
7.) Bearing
8.) To/From Indication
9.) Graphic CDI
10.) Small Inner Knob
11.) Large Outer Knob
12.) Enter
13.) Select
14.) Ident
15.) To/From
16.) OBS Mode Select
17.) System Settings
18.) Nav Radio Mode Select
19.) Como Radio Mode Select
20.) Frequency Flip/Flop (Active/Standby)



Drawing 2.2 MD200-306 navigation indicator

1.) Azimuth Dial,
2.) NAV Mode Signaling
3.) GPS Mode Signaling,
4.) Glideslope Pointer
5.) Back Course Signaling Device
6.) Azimuth Knob
7.) Azimuth Index,
8.) VOR/LOC Heading Deviation Pointer
9.) To/From Signaling Device
10.) GS Warning Flag
11.) NAV Warning Flag

2.3. Transceiver controls

To control the transceiver the knobs and annunciators located on transceiver control panel are used.

Power On/Off – Volume - Squelch – the knob on the left side of the panel controls Power on/off, volume and squelch test. Pull the knob out disable automatic squelch. Push the knob in to activate automatic squelch again.

Large/Small knobs – located on the right side of the panel are used to select frequencies and to view the features available within a function or make changes.

FLIP/FLOP button– is used to switching between and active and standby frequency.

COM button is used to select the Com radio mode. When you are in Com mode communication frequencies are displayed and additionally the annunciator above the button will light.

NAV button is used to select Nav radio mode. When you are in Nav mode navigation frequencies are displayed and additionally the annunciator above the button will light.

SYS buton is used to reach System mode. When you are in System settings options are displayed and additionally the annunciator above the button will light.

OBS button – is used to see the current OBS setting and graphic CDI.

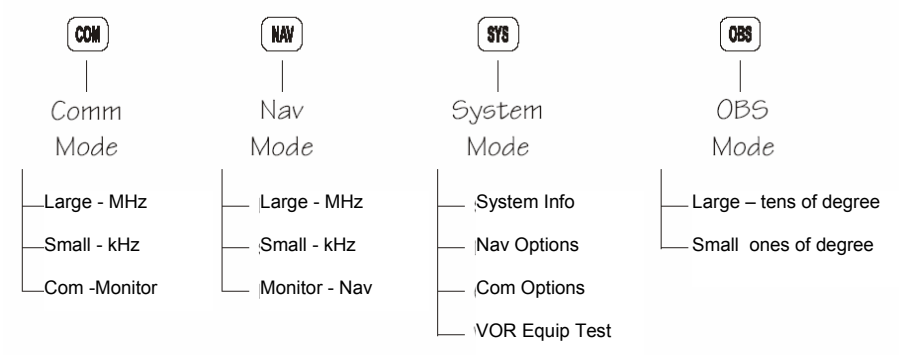
T/F button – is used to toggle between Bering TO or radial FROM the active VOR. **T**/F button does not operate for Localizer frequencies.

ID button – is used to select the Nav radio and toggle between VOICE or IDENT.

SEL button – is used to choose from a list channels types or to change value. The annunciator will light above the button when his function is active.

ENT button – is used to save selected values, to confirm a prompt, or to save the Standby frequency.

Below you have showed general scheme of the transceiver setting and relocation between its functions.



2.4. Selecting a Com Frequency

New frequencies are first selected as Standby frequency and than toggled to Active side when desired. While viewing the Standby frequency display, use the **LARGE** and **Small** knobs to select the desired frequency. To change communication frequency:

1.) Press **COM** to reach Com radio function. The annunciator above COM button will light.
2.) Turn the **Large** knob to change the values in one MHz increments. The MHz selection range is between 118 and 136 MHz in one MHz steps.
3.) Turn the **Small** knob to change the values in 25 kHz increments. The kHz selection range is between 000 and 975 kHz in 25 kHz steps.
4.) Turn the **Large** and **Small** knobs clockwise to increase and counter-clockwise to decrease the frequency values.
5.) Press the **FLIP/FLOP** button to toggle Standby frequency to the Active frequency.

Emergency Channel

The standard emergency channel 121.5 MHz is stored in the Com memory of the LS30. To fast select emergency frequency:

1.) Press **COM,** if you are not in Com mode already. Press **SEL**. Turn the **Large** knob to the Emergency channel, one position counter-clockwise will reach fastest.
2.) Press the **FLIP/FLOP** button to make Emergency channel the Active channel.
3.) Send your massage.

2.5. Selecting a Nav Frequency

New Nav frequencies are first selected as Standby frequency and than toggled to Active side when desired. While viewing the Standby frequency display, use the **LARGE** and **Small** knobs to select the desired frequency. To change navigation frequency:

1.) Press **NAV** to reach Nav radio function. The annunciator above NAV button will light.
2.) Turn the **Large** knob to change the values in one MHz increments. The MHz selection range is between 108 and 117 MHz in one MHz steps.
3.) Turn the **Small** knob to change the values in 50 kHz increments.
4.) Press the **FLIP/FLOP** button to toggle Standby frequency to the Active frequency.

When navigation receiver operates in LOC mode, Glide Slope (GS) frequency is given to it automatically. Set of those frequency pair is shown in the table below:

Localizer MHz	Glideslope MHz	Localizer MHz	Glideslope MHz
108.10	334.70	110.10	334.40
108.15	334.55	110.15	334.25
108.30	334.10	110.30	335.00
108.35	333.95	110.35	334.85
108.50	329.90	110.50	329.60
108.55	329.75	110.55	329.45
108.70	330.50	110.70	330.20
108.75	330.35	110.75	330.05
108.90	329.30	110.90	330.80
108.95	329.15	110.95	330.65
109.10	331.40	111.10	331.70
109.15	331.25	111.15	331.55
109.30	332.00	111.30	332.30
109.35	331.85	111.35	332.15
109.50	332.60	111.50	332.90
109.55	332.45	111.55	332.75
109.70	333.20	111.70	333.50
109.75	333.05	111.75	333.35
109.90	333.80	111.90	331.10
109.95	333.65	111.95	330.95

2.6. VOR mode and OBS operation

On the AT4 airplane the LS30 transceiver is configured as standard to operate with CDI outer indicator. Desired radial selection is done with OBS knob located on navigation indicator (Drawing 2.2) while on the right side of control panel appears radial value.

2.7. ILS Approach to Landing

When LOC/GS frequency is setting properly it's possible to perform ILS approach to landing. For this, observe pointers dislocation on CDI indicator and fly safely keeping both Localizer and Glide Slope yawing near zero.

3. Intercom function

SL30 transceiver may have connected to sets of headphones and microphones. Headsets can be used in conjunction with the internal voice-activated intercom. Additionally, it's possible to listen signals from identifying navigation transmitters.

For greater detail description of advanced the LS30 transceiver functions and configure settings, refer to „SL30 Nav Com Pilots Guide" No 506-0403-01.

Section 9

SUPPLEMENT No. 2

GARMIN SL40 Transceiver

List of revisions

Revision No.	Revision description	Concerned pages	Date

List of effective pages

Page number	Issue date
9.2-1	MAY, 2007
9.2-2	MAY, 2007
9.2-3	MAY, 2007
9.2-4	MAY, 2007
9.2-5	MAY, 2007
9.2-6	MAY, 2007
9.2-7	MAY, 2007
9.2-8	MAY, 2007
9.2-9	MAY, 2007
9.2-10	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

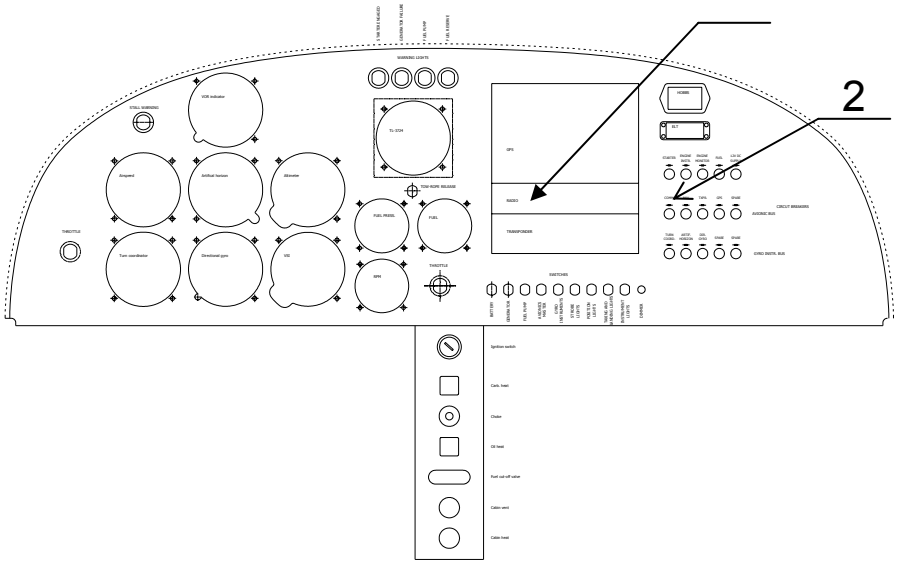
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

On the right side of the instrument panel is mounted SL40 type communication trasceiver. The trasceiver provides communication between the crew members and ground stations. Location of the equipment on the instrument panel is shown in drawing 1.1.



Drawing 1.1 Location of the equipment on instrument panel

1. “COM/NAV” SL40 transceiver
2. „RADIO” circuit breaker

SL40 transceiver is used for radio communication with frequencies 118 MHz to 139,975 MHz and 760 channels having 25 kHz increments. The transceiver front panel is showed on drawing 2.1. Active frequency is displayed on left side of display. STBY frequency is preceded with “s” letter.

Basic technical specifications

Operating temperature range	from -20° to +55°
Input voltage range	10-40V

Com Radio Features

Communications channels	760
Frequency range	118- 136.975
Between channels increments	25kHz
Transmitter power	8W
Audio amplifier power	12W
Intercommunication function	

2. Unit Operation

2.1. Power On

For Power on the unit turn the battery switch on and rotate volume knob clockwise from OFF position. The transceiver will go through short initialization routine (about 15 sec.) and than briefly display last used active frequencies and COM or NAV standby frequencies, depending on used mode.

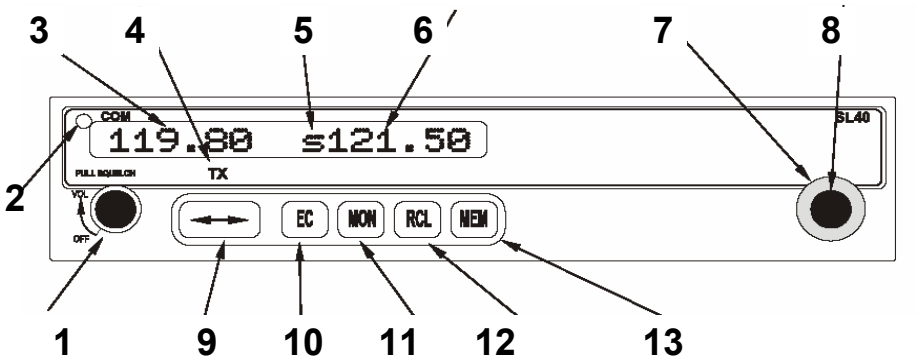
When the unit is switched on, pull the knob out to disable automatic squelch and rotating the knob to set proper volume. Push the knob in to activate automatic squelch again.

CAUTION

When transceiver is powered on do not start the engine.

2.2. SL40 transceiver controls

SL40 transceiver front panel and controls are shown on drawing 2.1.



Drawing 2.1 Transceiver front panel

1.) Power/Volume/Squelch Knob
2.) Photocell
3.) Active Frequency
4.) Transmit Annunciator
5.) Standby Symbol
6.) Standby Frequency
7.) Large Outer Knob
8.) Small Inner Knob
9.) Store Memory
10.) Recall Memory
11.) Frequency Monitor
12.) Frequency Channel
13.) Frequency Flip/Flop

2.3. Transceiver controls

To control the transceiver the knobs and annunciators located on transceiver control panel are used.

Power On/Off – Volume - Squelch – the knob on the left side of the panel controls Power on/off, volume and squelch test. Pull the knob out disable automatic squelch. Push the knob in to activate automatic squelch again.

Large/Small knobs – located on the right side of the panel are used to select frequencies and to view the features available within a function or make changes.

FLIP/FLOP button– is used to switching between and active and standby frequency.

EC (Emergency Chanel) button – is used to load the Emergency Channel (121,500 MHz) as the standby frequency. The Monitor function is automatically enabled.

MON (Monitor) button is used to listen to the standby frequency. When the active frequency receives a signal, the unit will switch automatically to the active frequency.

RCL (Recall) button – is used to retrieve stored frequencies.

MEM (Memory) button – is used to store the displayed Standby frequency in memory.

2.4. Selecting a Com Frequency

New frequencies are first selected as Standby frequency and than toggled to Active side when desired. While viewing the Standby frequency display, use the **LARGE** and **Small** knobs to select the desired frequency. To change communication frequency:

1.) Press **COM** to reach Com radio function. The annunciator above COM button will light.
2.) Turn the **Large** knob to change the values in one MHz increments. The MHz selection range is between 118 and 136 MHz in one MHz steps.
3.) Turn the **Small** knob to change the values in 25 kHz increments. The kHz selection range is between 000 and 975 kHz in 25 kHz steps.
4.) Press the **FLIP/FLOP** button to toggle Standby frequency to the Active frequency.

Emergency Channel

The standard emergency channel 121.5 MHz is stored in the Com memory of the LS40. To fast select emergency frequency press EC button and send your massage.

3. Intercom function

SL40 transceiver may have connected to sets of headphones and microphones. Headsets can be used in conjunction with the internal voice-activated intercom. Additionally, it's possible to listen signals from identifying navigation transmitters.

For greater detail description of advanced the LS40 transceiver functions and configure settings, refer to „SL40 Nav Com Pilots Guide" No 506-0594-02.

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Section 9

SUPPLEMENT No. 3

GPSMAP 296/396/496 receivers

List of revisions

Revision No.	Revision description	Concerned pages	Date

List of effective pages

Page number	Issue date
9.3-1	MAY, 2007
9.3-2	MAY, 2007
9.3-3	MAY, 2007
9.3-4	MAY, 2007
9.3-5	MAY, 2007
9.3-6	MAY, 2007
9.3-7	MAY, 2007
9.3-8	MAY, 2007
9.3-9	MAY, 2007
9.3-10	MAY, 2007
9.3-11	MAY, 2007
9.3-12	MAY, 2007
9.3-13	MAY, 2007
9.3-14	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

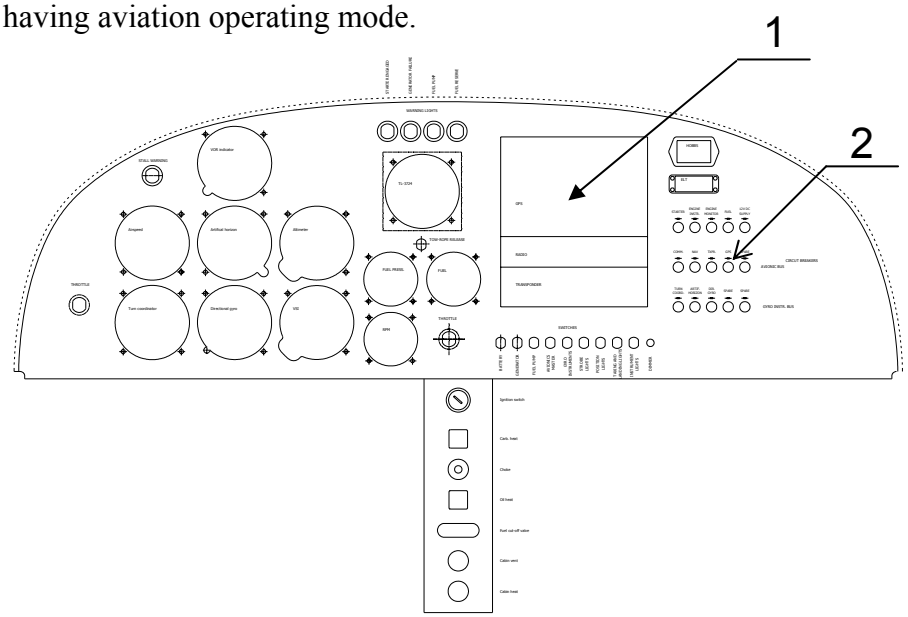
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

The GPS receiver is installed on the right side of the instrument panel. The location of the equipment on the instrument panel is shown on Drawing 1.1. GPSMAP 496 system is portable GPS receiver having aviation operating mode.



Drawing 1.1 Location of the equipment on the instrument panel

1. GPS MAP 496 receiver
2. “GPS” circuit breaker

When the antenna is connected and space is opened the unit will establish initial orientation during 5 minutes. If the unit has setting the UTC time and the date and position information, the process will be considerably accelerated (from 15 to 40 seconds).

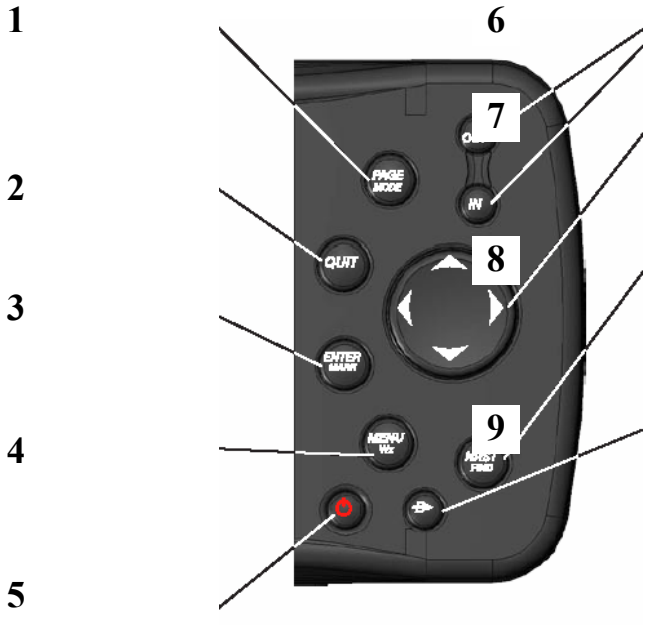
Basic Technical Specifications

Receiver:	12 parallel channels GPS transceiver Weather information (GPSMAP 396/496)
Acquisition times:	approx. 15s (warm) approx. 45s (cold) 5 min (initial starting/new location)
Update rate.	1/s
Accuracy	GPS 15 m (49 ft) 95% RMS DGPS (USCG) 3-5m (10-16ft) 95% typical DGPS (WAAS) <3m (10ft) 95% typical Velocity 0.1 kt
Power	- Rechargeable lithium battery Batter life 5-15hours (depending on backlight settings) - 11-35V (airplane network).

2. GTX-327 Transponder Control

The transponder front panel is show on Drawing 2.1

Drawing 2.1 GPSMAP 296/396/496 receiver front panel



Drawing 2.2 GPSMAP 296/396/496 receivers control keys

1.) PAGE key– is used to cycle through the main pages in sequence and return to the display from submenu page. Press and switch between Aviation Mode, Marine Mode and Automotive Mode.

2.) QUIT key – is used to cycle through the main pages in reverse sequence, revert to the previous value in a data entry field, or cancel a function.

3.) ENTER/MARK key – is used to select a highlighted option, initiate entry, and than confirm. Press and hold to mark a waypoint.

4) MENU key– is used to view the Option Menu for current page. Press twice to open the Main Manu.

5) POWER  **key** – press and hold to turn GPS receiver on or off. Press and release to adjust the backlighting and external speaker volume (if installed).

6) IN/OUT keys – are used to zoom in or zoom out on the Map Page.

7) Rocker  – press up, down, left, right to select menu options, enter data, or move pointer on the Map Page

8) NRST/FIND key – press to show the nearest airports, naiads, points of communication, and airspace boundaries in Aviation Mode. When pressed multiple times in Aviation Mode, the Find Menu appears.

9) DIRECT TO  **key** – press to start a Go To using airports, navaids, recently used waypoints. Press and hold to display additional information for current destination (such as communication frequencies and runway data).

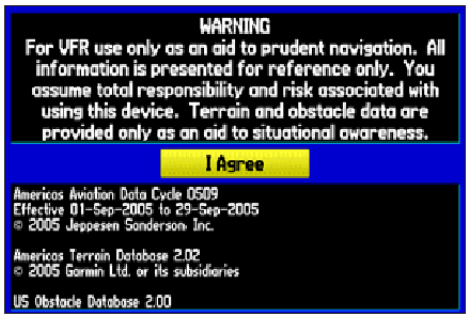
2.1. Starting the unit

Before first starting the unit, GPSMAP system has to find the satellites and to establish its initial position. To start GPS systems ensure that antenna is properly connected to GPS receiver and than:

1) Press and hold the Power key.

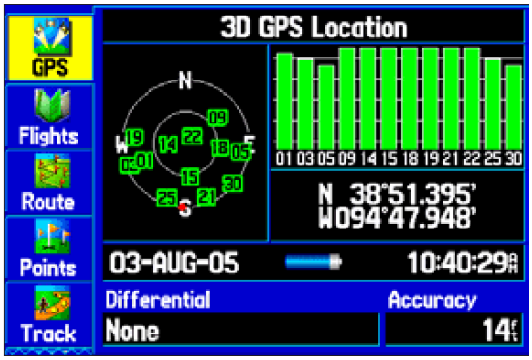
CAUTION
When GPS system is powered on do not start the engine.

2) Read the warning displayed on the screen.



Drawing 2.4 GPS warning

Status of the finding satellites may be observed on the page shown on Drawing 2.3.



Drawing 2.4 Status of GPS satellites

The satellites finding process is performed in three steps:

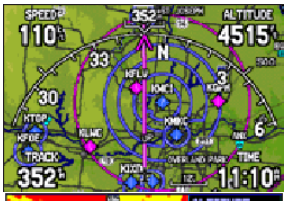
- **No signal bars from satellites** – any signal funded from satellites,
- **White signal bars from satellites** – means that a satellite is found but its dates are still collected,
- **Green signal bars from satellites** – means all needed dates about the satellite are collected.

Apart from graphic data appear appropriate text massages too (refer to GPSMAP Owner's Manual & Reference). After position location the receiver may be used as navigation aid.

To switch off system press and hold the Power button.

2.2. Basic Activity in Aviation Mode

GPSMAP receiver enables using of three basic operation modes: Aviation, Marine and Automotive. To switch over other mode press **PAGE** key or **QUIT** key. For every of those pages separate menu is available. The aviation mode has enabled six pages.



Map Page

Terrain Page

Panel page

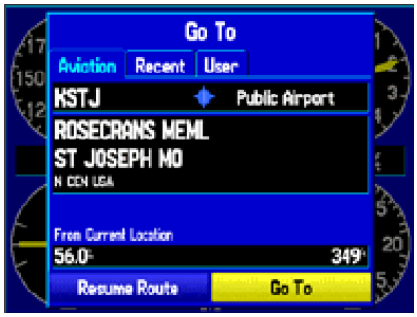
Active Route Page

Position Data Page

2.3. Direct To Function

Direct To function is started through pressing key. After pressing the key the Go To page will be shown. Than select an airport, navaid, recent point, or user-defined point to navigate to (Go To). To **Go To** an airport navaid:

1) Press the **Direct To** key to open the GoTo page. Use the **ROCKER** to select the **Aviation** tab.

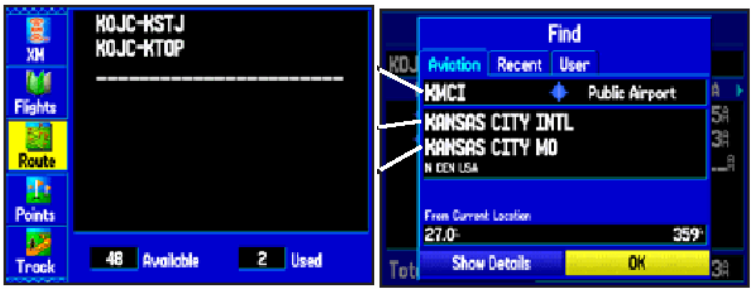


2) Select the identifier, facility name, or city field, and press **ENTER**.
3) Enter the identifier, facility name, or city.
4) Press **ENTER** when the waypoint is shown and highlighted.
5) With the on-screen **Go To** button highlighted, press **ENTER**. A course is plotted from your present location to the selected destination.

2.4. Creating a Flight Plan (Route)

To create a flight plan:

1) Press **MENU** key twice to open the Main Menu.
2) Highlight **Route** from vertical list of tabs.
3) Highlight the first available blank route slot, and press **ENTER**.
4) Press **ENTER** to find items to add to the route.



5) Select the identifier, facility name, or city field, and press **ENTER**. Enter the identifier, facility name, or city.
6) Press **ENTER** when the point is shown.
7) With the on-screen **OK** button highlighted, press **ENTER**. The point is added to the route.
8) When you are finished adding points to your route, press **QUIT** to view the **Route** tab again. You new route is highlighted.
9) Press **MENU**, select **Activate route**, and press **ENTER** to start navigation your route.

2.5. Additional Functions

Apart from basic functions such as creating a flight plan, GO TO function, and so on, GPSMAP 296/396/496 systems have a lot of additional functions which depend on the unit version and software. For example weather service massages (GPSMAP 396/496), alert functions and terrain awareness and warning system, and a lot of other navaids.

For detailed description of the GPS operation, for initial location establishing, flight plan entering or changing configuration settings refer to „Owner's Manual Portable Aviation Receiver GPSMAP 496" P/N 190-00693-00.

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Section 9
SUPPLEMENT No. 4

STALL WARNER ACI T1

List of revisions

Revision No.	Revision description	Concerned Pages	Date

List of effective pages

Page number	Issue date
9.4-1	MAY, 2007
9.4-2	MAY, 2007
9.4-3	MAY, 2007
9.4-4	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane.
Weight of the equipment included
in the weight of the empty airplane

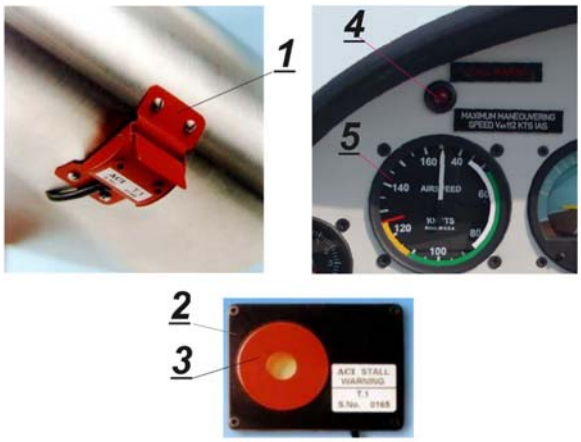
Section 7. Description of the airplane and of its equipment

The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

STALL WARNER ACI T1



1. Stall warning sensor
2. Warning unit
3. Alarm sounder
4. Warning light
5. Air Speed indicator

1. General Description

The stall warning unit informs pilot about the low speed of the airplane with a light and horn signal. At a speed of 5-10 kts (5.8 -11.5 mph = 9.3 -18.5 km/h) above the stall speed the red warning light and audible warning signal is activated.

The stall warning installation consists of: [1] stall warning sensor installed on the leading edge of the left wing, [2] audible warning unit installed behind the instrument panel and warning light [4] installed on instrument panel near the airspeed indicator [5].

The stall warning system is supplied from the electrical system of the airplane and protected by the “STARTER” fuse.

Additional protection is given by a 1.0A fuse inside the warning unit.

Section 9

SUPPLEMENT No. 5

GARMIN GTX 327 Transponder

List of revisions

Revision No.	Revision description	Concerned pages	Date

List of effective pages

Page number	Issue date
9.5-1	MAY, 2007
9.5-2	MAY, 2007
9.5-3	MAY, 2007
9.5-4	MAY, 2007
9.5-5	MAY, 2007
9.5-6	MAY, 2007
9.5-7	MAY, 2007
9.5-8	MAY, 2007
9.5-9	MAY, 2007
9.5-10	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

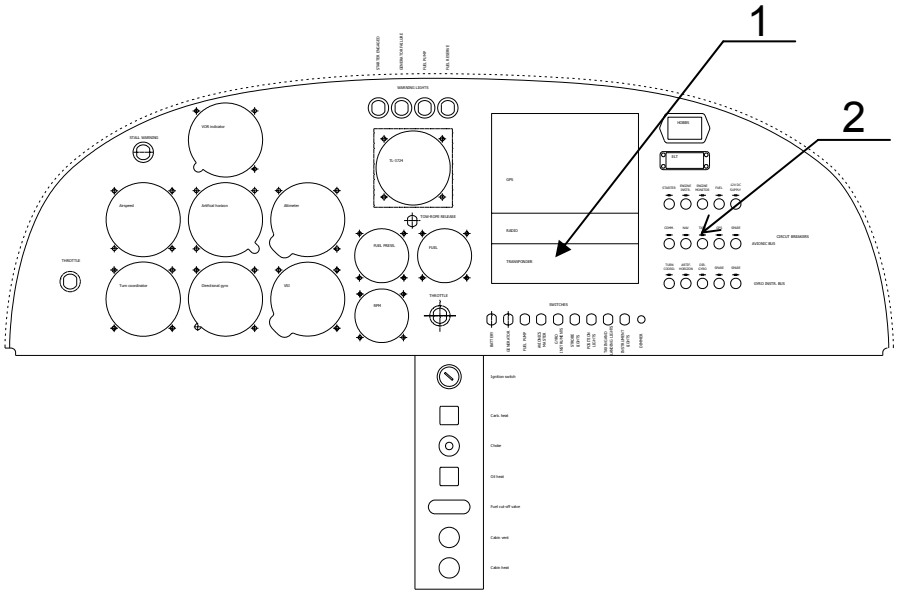
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

The GTX 327 transponder is installed on the right side of the instrument panel. The transponder system cooperates with AK-350 encoder. The location of the equipment on the instrument panel is shown in drawing 2.1. A transponder is used to identify the aircraft by the Air Traffic Control Radar Beacon System (ATCRBS). It may operates with mode A and C.



Drawing 1.1 Location of equipment on instrument panel

1. GTX-327 transponder
2. “Transponder” switch-breaker
3. AK-350 encoder (located behind instrument panel)

Basic technical specifications

Operating modes:	A (4096 modes) C (height from -1000 to 62700 feet)
Operating frequency	1090 MHz
Operating height	50000 feet
Rate power	min 125W (150W with 1,5dB cable)
Receiver sensitivity	rated 74dBm for 90% of reply
Humidity	95% @ 55° / 16 hours, 85% @ 38° / 32 hours
Operating temperature	from -20° too +55°

2. GTX-327 transponder operation

The transponder front panel show on drawing 2.1

Drawing 2.1 GTX 327 transponder front panel
and function buttons

2.1. The transponder power on and operating mode selection

The unit is powered on by pressing **STBY**, **ALT** or **ON** keys. For power off, press **OFF** key.

CAUTION
When transponder is power on
do not start the engine.

OFF – Powers off the GTX 327. Pressing **STBY**, **ON** or **ALT** key powers on the transponder displaying last active identificating code.
STBY – Selects the standby mode. When in standby mode, the transponder will not reply to any interrogations.
ON – Selects Mode A. In this mode, the transponder replies to interrogations, as indicated by the Reply Symbol (R.) Replies do not include altitude information.
ALT – Select Mode A and Mode C. In **ALT** mode, the transponder replies to identyfication and altitude interogations as indicated by Replay Symbol (R.). Replies to altitude interrogations include the standard pressure altitude received from an external altitude source, which is not adjusted for barometric pressure.

NOTE
Any time the function **ON** or **ALT** is selected the transponder becomes an active part of the Air Traffic Control Radar Beacon System (ATCRBS). The transponder also responds to interrogations from TCAS equipped aircraft.

2.2. Code selection

Code selection is done with eight keys (**0**-7) (Drawing 2.2) providing 4,096 active identification codes as below:

Drawing 2.2 Code selection

Pushing one of thise keys begins the code selection sequence. The new code is not activated until the fourth digit is entered. Pressing the **CLR** key moves the cursor back to previous digit. Pressing the **CLR** key when the cursor is on a first digit of code, or pressing the **CRSR** key during code entry, removes the cursor and cancels data entry, restoring the previous code. You may press the **CLR** key up to five seconds after code entry is complete to return the cursor to the fourth digit. The numbers 8 and 9 are not used for code entry, only for entering a Count Down time, contrast and display brightness, and data selection in the Configuration Mode.

Important codes:
1200 – The VFR code for any altitude in the US (Refer to ICAO standards elsewhere)
7000 – The VFR code commonly used in Europe (Refer to ICAO standards)
7500 – Hijack code (Aircraft is subject to unlawful interference)
7600 – Loss of communication
7700 – Emergency
7777 – Military interceptor operations (Never squawk this code)
0000 – Military use (Not enterable)

WARNING

DO NOT TURN ON THE TRANSPONDER IF SELECTED CODES ARE: 0000, 7700, 7777.
CODE 7700 IS RESERVED FOR EMERGENCY USE ONLY.

2.3. Keys functions

Poniżej podano funkcje przycisków sterujących transponderem:

IDENT – Pressing the **IDENT** key activates the Special Position Identification (SPI) Pulse for 18 seconds, identifying your transponder return from others on the air traffic controller's screen. The word "IDENT" will appear in upper left corner of the display while the IDENT mode is active.

VFR – Set the transponder code to the pre-programmed VFR code selected in Configuration Mode (this is set to 1200 at the factory). Pressing the **VFR** key again restores the previous identification code.

FUNC – Changes the page shown on the right side of the display. Display indicates Pressure Altitude, Flight Time, Count Up and Down timers. In Configuration Mode, steps through the configuration pages.

START/STOP – Starts and stops the Count Up and Down timers. In Configuration Mode, steps through the configuration pages in revere.

CRSR – Initiates starting time entry for Count Down timer and cancels transponder code entry. Selects changeable fields in Configuration Mode.

CLR – Resets all settings (Clearing).

8 – Reduces Contrast and Display Brightness when the respective fields are displayed and enters the number eight into the Count Down timer. Used in Configuration Mode.

9 – Increase Contrast and Display Brightness when the respective fields are displayed and enters the number nine into the Count Down timer. Used in Configuration Mode.

2.4. Functions displayed on control panel

PREASSURE ALT – Displays the altitude data supplied to the GTX 327 in feet, hundreds of feet (i.e. flight level), or meters, depending on configuration.

FLIGHT TIME – Displays the Flight Time, controlled by the **START/STOP** and **CLR** keys when Flight Timer is configured as manual. Under Automated Airborne Determination control, the timer begins when liftoff is sensed.

COUNT UP TIMER – Controlled by **START/STOP** and **CLR** keys.

COUNT UP TIMER – Controlled by **START/STOP**, **CLR** and **CLR** keys. The initial Mount Down time is entered with the **0-9** keys.

CONTRAST – This page is only displayed if manual contrast mode is selected in Configuration Mode. Contrast is controlled by the **8** and **9** keys.

DISPLAY – This page is only displayed if manual backlighting mode is selected in Configuration Mode. Backlighting is controlled by the **8** and **9** keys.

3. Additional Functions

3.1. Altitude Trend Indicator

When the "PRESSURE ALT" page is displayed, an arrow may be displayed to the right of the altitude, indicating that the altitude is increasing or decreasing. One of two sizes of arrows may be displayed depending on the rate of climb/descent. The sensitivity of those arrows is set using the GTX 327 Configuration Mode vertical speed rate.

3.2. Timer Operation

To activate Flight Timer press **FUNC** key antill "FLIGHT TIME" is displayed, than with the same key select one of two operation options, Count Up or Count Down.(COUNT UP i COUNT DOWN).
To maintain this function are used **START/STOP**, **CLR** and **0-9** keys.

3.3. Automatic ALT/STBY Mode Switching

If the GTX 327 can be configured with Automated Airborne Determination where ALT mode selection occurs when liftoff is sensed. The GTX can be configured manually when all modes are selected manually.

Section 9

SUPPLEMENT No. 6

ELT AK-450

List of revisions

Revision No.	Revision description	Concerned pages	Date

List of effective pages

Page number	Issue date
9.6-1	MAY, 2007
9.6-2	MAY, 2007
9.6-3	MAY, 2007
9.6-4	MAY, 2007
9.6-5	MAY, 2007
9.6-6	MAY, 2007

Section 1. General

The same as for the standard airplane

Section 2. Limitations

The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

The same as for the standard airplane

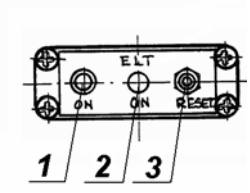
Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Device description

ELT is used for safety purposes only. The device is transmitting at the 121,5 MHz and 243 MHz frequencies. System is composed of mobile transmitter which is installed under right seat and telescopic antenna installed in front of communication antenna. ELT control is installed on instrument panel. Transmitter has it independent power supply unit. If removed from aircraft and installation of antenna unit can by used as a mobile device.

1.1. ELT remote unit



ELT remote unit

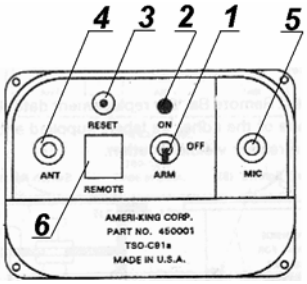
1. Switch "ON"
2. Control light
3. Switch "RESET"

1.2. ELT main unit

Main switch (1) can be placed in three positions:

switched ON; switched constantly ON and

automatically ON ("ARM")



ELT main unit

1. Main switch
2. Control light
3. Switch "RESET"
4. Antenna jack
5. Microphone jack
6. Control panel jack

2. Function test

NOTE
Functional test can be curried on within first five minutes after every hour only and transmission period cannot exceed 1.5 s.

1. Place main switch in "ON" position and check whether 121.5 MHz signals are received by communication COM transceiver and whether control lights are illuminating on control panel and main unit.
2. Place main switch in "OFF" position and check whether control lights are no illuminating and whether signals is not transmitted any more.
3. Place main switch in "ARM" position, press switch "ON" at the control panel. Check whether control lights are illuminating and are well visible at the instrument panel from pilot's seat. Check whether ELT signal is received by COM transceiver.
4. Press "RESET" switch on control panel and check whether transmission was interrupted and both control lights are not illuminating.

Section 9

SUPPLEMENT No. 7

LANDING AND TAXIING LIGHTS

List of revisions

Revision No.	Revision description	Concerned Pages	Date

List of effective pages

Page number	Issue date
9.7-1	MAY, 2007
9.7-2	MAY, 2007
9.7-3	MAY, 2007
9.7-4	MAY, 2007

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The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

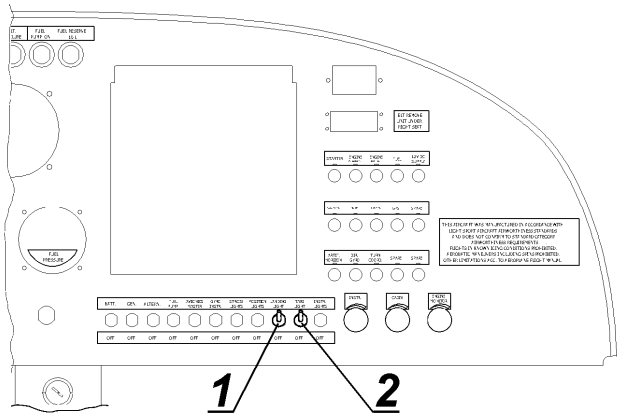
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

The light installation consists of a landing and taxing light. Lights are installed on lower engine cowling. The lights are activated by two switches placed on the instrument panel according to the drawing 1.1.



Drawing 1.1 Location of the equipment on the instrument panel

1. “LANDING LIGHT“ switch
2. “TAXING LIGHT” switch

Section 9
SUPPLEMENT No. 8

POSITION LIGHTS

List of revisions

Revision No.	Revision description	Concerned Pages	Date

List of effective pages

Page number	Issue date
9.8-1	MAY, 2007
9.8-2	MAY, 2007
9.8-3	MAY, 2007
9.8-4	MAY, 2007

Section 1. General

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The same as for the standard airplane

Section 3. Emergency procedures

The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

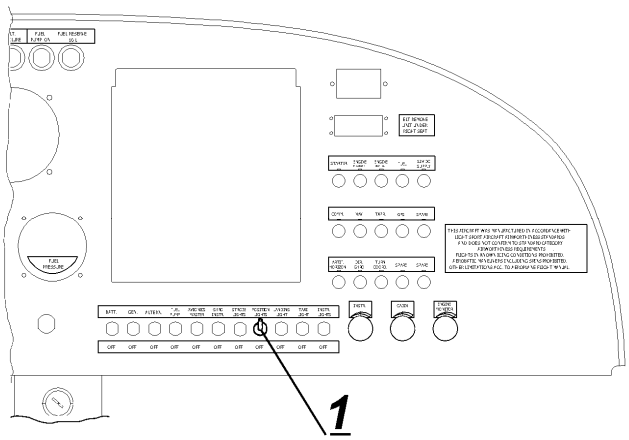
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

The position lights are mounted at the wing tips. The green light is mounted at the right tip while the red light at the left. Additionally, both lights are fitted with the white lights. Position lights are switched on by means of “POSITION LIGHTS” switch located on the right side of instrument panel.



Drawing 1.1 Location of the equipment on the instrument panel

1. “POSITION LIGHTS“ switch

Section 9
SUPPLEMENT No. 9

STROBE LIGHTS

List of revisions

Revision No.	Revision description	Concerned Pages	Date

List of effective pages

Page number	Issue date
9.9-1	MAY, 2007
9.9-2	MAY, 2007
9.9-3	MAY, 2007
9.9-4	MAY, 2007

Section 1. General

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Section 2. Limitations

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Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

The same as for the standard airplane

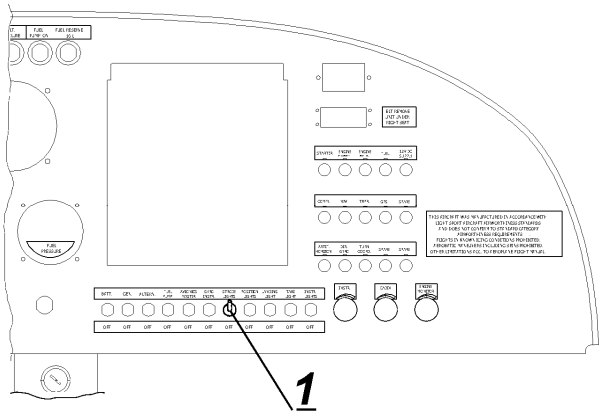
Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

Strobe lights are installed on the wingtips. The lights are activated by the switch “STROBE LIGHTS” installed on the instrument panel.

WARNING
THE STROBE LIGHTS SHOULD BE SWITCHED OFF
WHEN TAXIING NEAR TO OTHER AEROPLANES



Drawing 1.1 Location of the equipment on the instrument panel

1. “STROBE LIGHTS“ switch

Section 9
SUPPLEMENT No. 10

Instrument Panel Lighting

List of revisions

Revision No.	Revision description	Concerned Pages	Date

List of effective pages

Page number	Issue date
9.10-1	MAY, 2007
9.10-2	MAY, 2007
9.10-3	MAY, 2007
9.10-4	MAY, 2007
9.10-5	MAY, 2007
9.10-6	MAY, 2007

Section 1. General

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The same as for the standard airplane

Section 4. Normal procedures

The same as for the standard airplane

Section 5. Performance

The same as for the standard airplane

Section 6. Weight and balance

The same as for the standard airplane. Weight of the equipment included in the weight of the empty airplane

Section 7. Description of the airplane and of its equipment

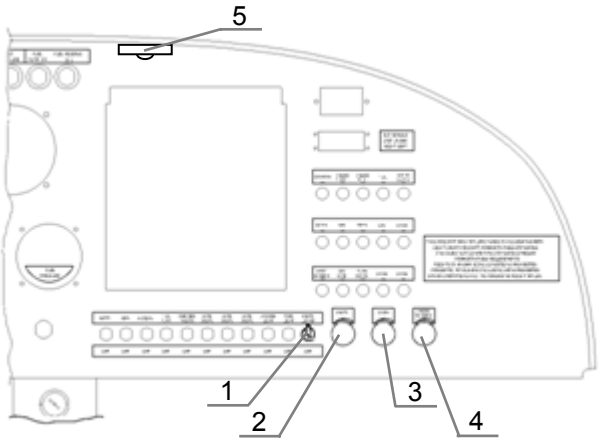
The same as for the standard airplane

Section 8. Handling, Servicing & Maintenance

The same as for the standard airplane

1. Description

The instrument panel lighting consists of flight and engine instrument lighting, radio function key lighting, compass lighting, cabin lighting, and engine monitoring unit dimmer.



Drawing 1.1 Location of the equipment on the instrument panel

1. “INSTR LIGHTS“ switch
2. Instrument dimmer
3. Cabin Dimmer
4. Engine monitoring unit dimmer
5. Cabin lighting lamp

Location of the equipment on the instrument panel is shown on Drawing 1.1. The instrument lighting is switched on with “INSTR LIGHTS” switch. For flight instruments, cabin and engine monitoring unit, separate lighting is possible. Adjustable engine monitoring unit lighting is switched on independently to position of the “INSTR LIGHTS” switch.

Cockpit lighting consists of two lamps installed over the instrument panel. The light stream is directed to any place by means of lamps fixed in spherical holder.

FLIGHT TRAINING SUPPLEMENT

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1. List of revisions

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2. List of effective pages

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18.1-2	May, 2007
18.1-3	May, 2007
18.1-4	May, 2007

Page number	Issue date
18.1-5	May, 2007
18.1-6	May, 2007

1. Introduction

This supplement contains information specific for AT-4LSA aircraft.

Read carefully all manuals delivered with this aircraft before first familiarization flight. You have to learn and remember all Limitations, Normal and Emergency procedures which are given in Pilot Operating Manual.

2. Before Flight

Flight characteristics of AT-4LSA are typical for LSA – light sport aircraft of for LVA – very light aircraft. However it is strongly recommended to note several of them:

- Nose wheel is steerable and directional control during taxing is maintained with brakes, which are controlled from both seats left and right. Hydraulic brakes installed on AT-4LSA are very effective so they must be used with care not to lock wheels.
- The AT-4LSA's engine & propeller are not offset. The propeller produces a high amount of P-Factor which requires more right rudder than typical, particularly during take-off. Amount of right rudder depends on wind speed & direction. In the case of full rudder deflection, and further control is required, use additional brake.
- This tendency decreases with speed and the rudder becomes more effective. Initially it is recommended to make few take-off runs to become more familiar with this behavior. Open throttle gradually during ground roll to reduce P-Factor swing. Keep adding throttle gently as speed increases..
- The aircraft is equipped with adjustable oil cooler inlet cover. This enables oil temperature to be kept at optimum value and significantly reduces warm up time after starting cold engine. Make sure that before take off the cover is fully open and its steering knob is fully pushed in.
- Carburetor heating is controlled with rods that can be locked in several positions. Pull out rod's knob to required position and rotate clockwise to lock it.
- Choke is used while starting cold engine. A substantial force is required to pull it as it is controlling two carburetors. When knob is pulled out rotate it clockwise to lock. When engine runs smoothly turn off suction by turning knob counterclockwise and than pushing it in.
- Cockpit cold and hot air control rods are friction type and do not need clocking.

- Aircraft has two throttle control levers (left and central). Pilot on left seat can use both, pilot on right seat can use central only. The central lever is equipped with friction lock and the lock should be trimmed this way to allow easy operations but, when left free levers should move themselves.
- The canopy is equipped with two (black) locking levers: left and right. Before take off make sure that canopy is properly closed and levers are in locked position. Both levers should be in vertical position.

  While turning locking levers into vertical position the over center locking mechanism locking position will noticeable. The canopy emergency drop knobs (red) are installed ahead of locking levers. If pulled out they will open all canopy locks and enable the emergency jettison of canopy. The in-flight emergency jettison is undertaken in emergency situation only when immediate evacuation from the aircraft is necessary and **ONLY IF** crew is equipped with parachutes.

  The emergency jettison knobs can be used to disassemble canopy on ground to allow access during maintenance.

3. FAMILIARIZATION FLIGHT

For familiarization flights it is recommended to use airfields with the airstrip of 2400 ft (800 m) long, with clean approaches.. Familiarization flights are to be conducted with instructor or person who is familiar with this type of aircraft

Initial flights (take offs) should be curried on in good weather conditions, suitable for DAY VFR Flight, and a wind below 8 kts

3.1. Training flight on traffic pattern

The training flight should include:

- landing in clean configuration

- landing in landing configuration with flaps at 15°

- landing in landing configuration with flaps at 40°

Use of flaps: Aircraft is significantly more speed stable on final approach with full flap. Use full flap in most normal conditions. Do not use full flap when there is excessive cross wind.

- go-around after balked landing

Be sure to retract flaps on a Balked landing (Go-Around).

3.2 Training flight in area

The training flight in area should contain following elements:

- stalls at all configurations (with or without power, at all flap settings, in turns.
- turning at 60° bank
- normal flight within full range of speeds (from min to max)