PILOT´S OPERATING HANDBOOK AND FLIGHT MANUAL AIRPLANE

MAGIC GS-700

MODEL: MAGIC GS-700

SERIAL NUMBER_____

REGISTRATION NUMBER_____

ORIGINAL ISSUE: 14 January 2009

REVISION No 2: 20 OCTOBER 2011

IBIS AIRCRAFT S.A.
COLOMBIA SOUTH AMERICA
www.ibis-aircraft.com

PILOT´S OPERATING HANDBOOK
AND
FLIGHT MANUAL AIRPLANE

RECORD OF MANUAL REVISIONS

Any revisions to the present manual must be recorded in the following table.

Revision No.	Date released	Chapter	Approved by
1.0	08-18-2010	All	Ibis Aircraft
2.0	10-20-2011	All	Ibis Aircraft

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THIS HAND BOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT AND CONSTITUTES THE APPROVED AIRPLANE FLIGHT MANUAL.

OWNERS ARE ENCOURAGED TO EVALUATE. THEIR OWN CHECKLISTS AND OWNER DEVELOPED MANUAL DATA FOR COMPLETENESS BASED ON THIS HANDBOOK.

PILOT´S OPERATING HANDBOOK AND FLIGHT MANUAL AIRPLANE IBIS MAGIC GS-700

REV. 2

(20 October - 2011)

Original Flight Manual Airplane IBIS MAGIC GS-700

WARNING!

This manual MUST be present inside the cockpit at all times!

Should you be selling the aircraft make sure this manual is handed over to the new owner

Brand: _____

Model: _____

Serial number: _____

Date of manufacture: _____

Aircraft empty weight (kg): _____

Fuel weight: _____

Available cargo weight: _____

Equipment included in aircraft empty weight:

_____
_____
_____
_____
_____
_____
_____
_____

Office Address: Calle 13A # 100-35 Cali (Valle del Cauca)
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www.ibis-aircraft.com

PILOT´S OPERATING HANDBOOK AND FLIGHT MANUAL AIRPLANE IBIS MAGIC GS-700

Model: _____

Data Sheet number: _____

Factory serial number: _____

Registration number: _____

Date of Issue: _____

Pages signed under “Approval” in section Index of revisions and List of valid pages are approved by:

Authority: _____

Signature: _____

Stamp: _____

Original date of Approval: _____

This aircraft is to be operated in compliance with information and limitations contained herein. The original English Language edition of this manual has been approved as operating instruction according the legislations applicable and in-force by the above authority.
Approval of translation has been done by best knowledge and judgment.

This Data Sheet provides basic information about the **IBIS Magic GS-700** airplane. A Data Sheet must be completed for these aircraft and then return a copy to the company. The Data Sheet stays with the aircraft and must be amended each time major changes are made to the configuration, performance or characteristics of the aircraft.

WARNING!

This aircraft is not required to comply with the safety regulations for standard aircraft

PERSONS FLY IN THIS AIRCRAFT AT THEIR OWN RISK

AIRCRAFT TYPE:

AIRCRAFT TYPE: _____

MODEL: _____

SERIAL No: _____

AIRCRAFT BUILDER:

NAME: _____

CONTACT PHONE: _____

FAX: _____

ADDRESS: _____

AIRCRAFT DETAILS:

DATE OF CONSTRUCTION: _____

DATE OF FIRST FLIGHT: _____

WING SPAN: _____

WING AREA: _____

A/C LENGTH: _____

WING CHORD: _____

ROOT CHORD: _____ TIP CHORD: _____

SERVICE CEILING: _____ RANGE:_____ AUTONOMY:_____

EMPTY WEIGHT:

MAXIMUM TAKE OFF WEIGHT: _____

Date of last Weighing: _____

Specify how weight was measured:

_____

_____

_____

_____

List equipment fitted to aircraft and included in empty weight:_____

_____

_____

FORWARD AND AFT CENTRE OF GRAVITY LIMITS:

FWD: _____ AFT: _____

Specify in inches/mm from datum and position of datum. State how or from where CG limits are obtained.

_____

_____

_____

COLOR:

AIRPLANE COLOR: _____

FUSELAGE: _____ WINGS:_____ TAIL:_____

MAXIMUM AND MINIMUM AIRSPEEDS:

MAXIMUM [NEVER EXCEED] AIRSPEED: _____

STALL SPEED [LANDING CONFIGURATION]:_____

MAX CRUISE: _____

FUEL SYSTEM:

TYPE OF FUEL: _____

NUMBER OF FUEL TANKS: _____

TOTAL FUEL CAPACITY: _____ CAPACITY OF EACH TANK:_____

SEAT BELTS AND EQUIPMENT:

[List equipment fitted to aircraft including seat belts, showing type & manufacturer, radio, transponder, etc.]:

_____

_____

_____

ENGINE DETAILS:

ENGINE MANUFACTURER: _____

MODEL: _____

ENGINE SERIAL NUMBER: _____

TWO OR FOUR STROKE: _____

CAPACITY IN CC:_____

RATED HORSEPOWER: _____

OIL SYSTEM: _____

PROPELLER DETAILS:

TYPE: _____ MODEL: _____

PITCH AND DIAMETER: _____x_____

NUMBER OF BLADES: _____

REDUCTION DRIVE TYPE: _____

REDUCTION RATIO: _____

PROPELLER MANUFACTURER:

NAME: _____

AIRCRAFT CONSTRUCTION DETAILS:

WHERE AIRCRAFT WAS BUILT [State/Territory/City]:

_____

MATERIALS USED IN CONSTRUCTION:

(1) Fuselage Frame and Covering:

_____

_____

_____

_____

(2) Wing Frame and Covering:

_____

_____

_____

_____

(3) Other parts, unless similar to the above:

_____

_____

_____

_____

PICTURES:

Please attach the following RECENT PICTURES showing:

Aircraft from FRONT and SIDE

AIRCRAFT REGISTRATION NUMBERS ON WING AND FUSELAGE/TAIL COCKPIT SHOWING INSTRUMENT PANEL including MTOW WEIGHT AND WARNING PLACARDS.

Please annotate pictures with the aircraft registration number and the date on which they were taken.

NAME AND ADDRESS OF THE PERSON COMPLETING THIS FORM

Name: _____

Address: _____

Contact Numbers: Phone:_____ Fax:_____

Signature: _____

Date: _____

PERFORMANCE - SPECIFICATIONS

SPEED:		
Máximum at Sea Level		104 Kts
CRUISE, 75%Power at 8,000 ft		93 Kts
4800 RPM		4.6 GLH
72% Power at 8,000 ft	Range……	333 MILES
16.5 Gallons usable fuel	Time……	3.3HRS
72% Power at 8,000 ft	Range……..	697 MILES
34.5 Gallons usable fuel	Time……	6.9 HRS
Speed		88 Kts
Maximum Range at 10,000 ft	Range……	342 MILES
16.5 Gallons usable fuel	Time……	3.3 HRS
Maximum Range at 10,000 ft	Range……	717MILES
34.5 Gallons usable fuel	Time……	6.9 HOURS
Speed		90Kts
5000 RPM		5.3GLH
75% Power at 8,000 ft	Range……	333 MILES
16.5 Gallons usable fuel	Time……	3.1 HRS
75% Power at 8,000 ft	Range……	696 MILES
34.5 Gallons usable fuel	Time……	6.5 HRS
Speed		103Kts
Maximum Range at 10,000 ft	Range……	345 MILES
16.5 Gallons usable fuel	Time……	3.1 HRS
Maximum Range at 10,000 ft	Range……	722 MILES
34.5 Gallons usable fuel	Time……	6.5 HRS
5500 RPM		6.6 GLH
Speed		96 Kts
82% Power at 8,000 ft	Range… ……	288 MILES
16.5 Gallons usable fuel	Time……..	2.5 HRS
82% Power at 8,000 ft	Range……..	601 MILES
34.5 Gallons usable fuel	Time……..	5.2 HRS
Speed		97Kts
Maximum Range at 10,000 ft	Range……...	300 MILES
16.5 Gallons usable fuel	Time……	2.5 HRS
Maximum Range at 10,000 ft	Range……..	627 MILES
34.5 Gallons usable fuel	Time……	5.22 HRS
Speed		101Kts
RATE OF CLIMB AT SEA LEVEL		865 fpm
SERVICE CEILING		12,000 ft
TAKEOFF PERFORMANCE		
Ground Roll		509 ft
Total Distance over 50ft obstacle		845 ft
LANDING PERFORMANCE		
Ground roll		542 ft

Total Distance over 50 ft obstacle	921 ft
STALL SPEED (CAS)	
Flaps up, power off	42 Kts
Flaps down, power off	30 Kts
Flaps with Robertson Stol System	24 Kts
Ramp	1320 LBS
STANDARD EMPTY WEIGHT	
MAGIC GS_700	704 LBS
MAXIMUM USEFUL LOAD	
MAGIC GS_700	616LBS
BAGGAGE ALLOWANCE	50 LBS
WING LOADING (Pounds / Sq Ft)	10.85
POWER LOADING (Pounds / HP)	13.2
FUEL CAPACITY	
Standard Tanks	18GAL
Auxiliary Tanks	18GAL
OIL CAPACITY	3QTS
ENGINE: Rotax	912 S-914S
100 bhp at 5800 rpm	
PROPELLER: Controllable electric pitch propellers diameter	72 IN-70 IN

THANK YOU…

You have purchased a state of the art, high performance general aviation aircraft, your **IBIS MAGIC GS700**. It´s performance is spectacular and it´s life almost beyond measure when given reasonable care. Your **IBIS** has been designed and instructed to give you the most in performance, economy, and comfort. It is our desire that will find flying it, either for business or pleasure, a pleasant and profitable experience.

This Pilot's Operating Handbook has been prepared as a guide to help you get the most assure and utility from your airplane. It contains information about your **IBIS'S** equipment, operating procedures, and performance; and suggestions for its servicing and care. We urge you to read it from cover to cover, and to refer to it frequently.

Our interest in your flying pleasure has not ceased with your purchase of an **IBIS**, worldwide, the **IBIS** Dealer Organization backed by the IBIS Customer Services Department stands ready to serve you. The following services are offered by most **IBIS** Dealers:

- **THE IBIS WARRANTY** which provides coverage for parts and labor, is available at IBIS Dealers worldwide. Specific benefits and provisions of warranty, plus other important benefits for you, are contained in your Customer Care Program book, supplied with your airplane. Warranty service is available to you at authorized **IBIS** Dealers throughout the world upon presentation of your Customer Care Card which establishes your eligibility under the warranty.
- **FACTORY TRAINED PERSONNEL** to provide you with courteous expert or service.
- **FACTORY APPROVED SERVICE EQUIPMENT** to provide you efficient and accurate workmanship.
- **A STOCK OF GENUINE IBIS SERVICE PARTS** on hand when you need them.
- **THE LATEST AUTHORITATIVE INFORMATION FOR** SERVICING **IBIS** AIRPLANES, since **IBIS** Dealers have all of the Service Manuals and Parts Catalogs, kept current by Service Letters and Service News Letters, published by **IBIS Aircraft S.A.**

We urge all IBIS aircraft owners to use the **IBIS** Dealer Organization to the fullest.

A current IBIS aircraft Dealer Directory accompanies your new airplane. The Directory is revised frequently, and a current copy can be obtained from your IBIS

aircraft Dealer. Make your directory one of your cross-country flight planning aids; a warm welcome awaits you at every IBIS aircraft Dealer.

IMPORTANT NOTICE

This handbook must be read carefully by the owner or operator (s) of your **IBIS** in order to be become familiar with its operation and to obtain all it has to offer in terms of both speed and reliability. Herein are suggestions and recommendation to help you obtain safe performance without sacrificing economy. You are encouraged to operate your machine in accordance with and within the limits identified in this Pilots Operating Handbook as well as any placards located in the airplane.

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This handbook will be kept current by Service letters published by **IBIS Aircraft S.A.** These are distributed to **IBIS** aircraft Dealers and to those who subscribe through the Owner Follow Up System, if you are not receiving subscription service. You will want to keep in touch with your **IBIS Aircraft Dealer** for information concerning the change status of the handbook. Subsequent changes will be made in the form of stickers. These should examine and attached to the appropriate page in the handbook immediately after receipt: the handbook should not be used for operational purposes until it has been updated to a current status.

SECTION 1

GENERAL

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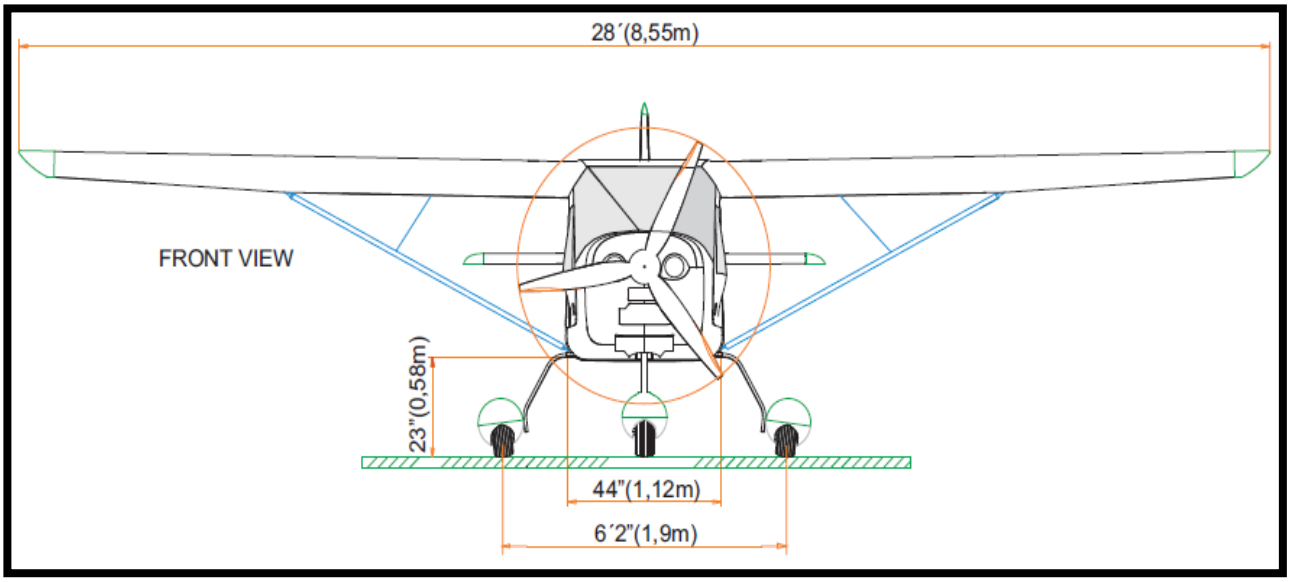
INTRODUCTION

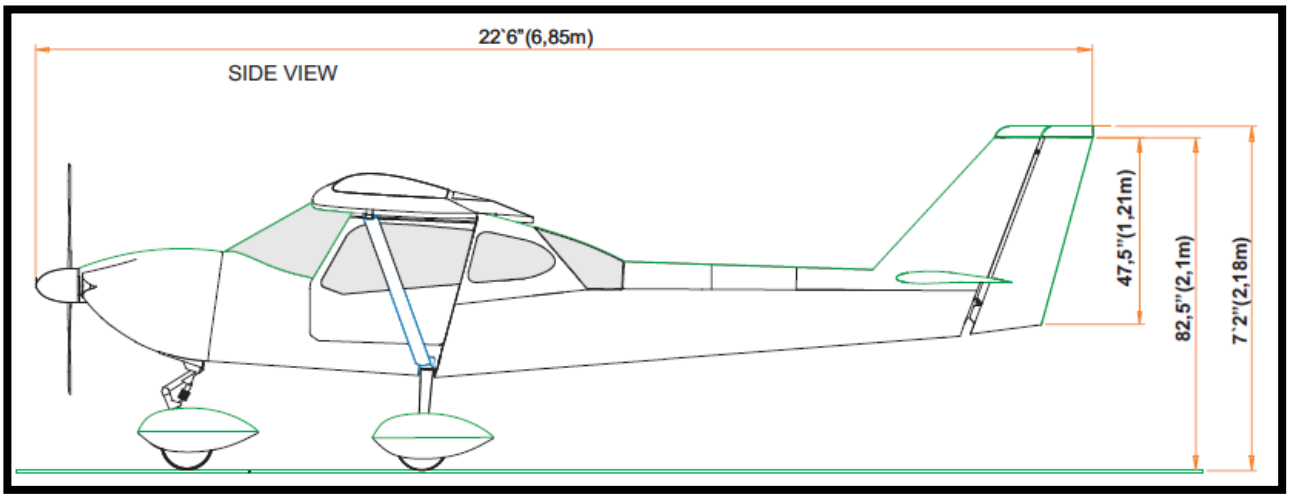
The Magic GS-700 is a two-seater high-performance aircraft with tapered planform, a tricycle gear with controllable nose wheel. It presents essential features such as: high wing, built mainly in metal using aircraft aeronautical aluminum, chromium-molybdenum alloy and composites, designed and developed by IBIS AIRCRAFT.

This handbook contains 9 sections, and includes the material required to be furnished to the pilot. It also contains supplemental data supplied **IBIS Aircraft S.A.**

Section 1 provides basic data and information of general interest. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used.

THREE VIEW DRAWING





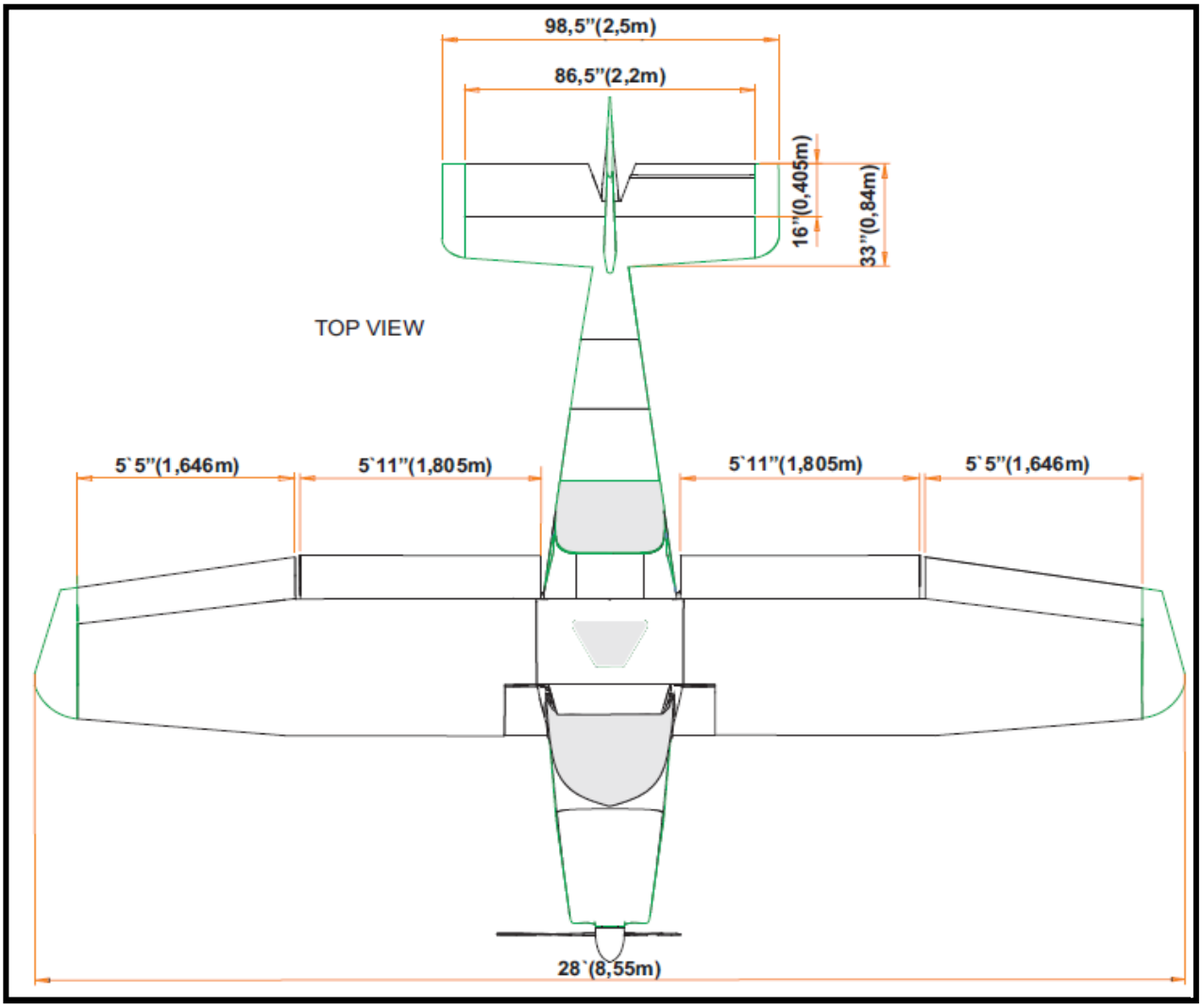


Figure 1-1. Three View

DESCRIPTIVE DATA

WING

Wing span:	8.55m (28')
Wing chord:	1.346m (53")
Wing surface:	11.34m^2(122ft^2)
Aspect ratio:	6.446
Taper ratio:	0.718
Wing loading:	10.82lb/ft^2

FUSELAGE

0verall length:	6.850m (22' 6")
0verall width:	1.051m (41.3")
0verall height:	2.180m (7' 2")

EMPENNAGE

Stabilator span:	2.500m (8' 2")
Vertical tail span:	1.279m (50.3")

LANDING GEAR

Wheel track:	1.900m (6' 2")
Main gear train:	5.00-5

CONTROL SURFACES TRAVEL LIMITS

Ailerons	Up 20^0 down 15^0
Flaps	0^0 - 42^0
Rudder	RH 25^0 LH 25^0
Elevator	Up 30^0 down 25^0

ENGINE

Number of engines: 1.
Engine Manufacturer: ROTAX
Engine Model Number: 912 UL – 912ULS
Engine Type: Normally-aspirated, direct-drive, air-cooled, water-cooled, horizontally-opposed, carburetor equipped, four-cylinder engine with 912 UL/A/F 1211 cm^3 (73, 9 in^3) 12 UL/S, 1352 cm^3 (82.5 in^3).
Horsepower Rating and Engine Speed: 80 - 100 rated BHP at 5800 RPM

PROPELLER

Propeller Manufacturer: **IVO PROP**
Number of Blades: **3**.
Propeller Diameter, Maximum: 72 inches. (100 BHP)
Minimum: 70 inches. (80 BHP)
Propeller Type: Electric controllable pitch propeller

FUEL
Approved Fuel: 94 Octane.

Fuel Capacity:

Standard Tanks:

Total Capacity Each Tank: 9 us Gallons.

Reserve tank: 2 us Gallons.

Total Capacity: 20 us Gallons.

Total Usable: 18.5 us Gallons.

Long Range (Auxiliary Tanks):

Total Capacity: 18 us Gallons

Total Capacity Each Tank: 9 us Gallons.

Total Usable: 18 us Gallons

NOTE:

Due to Cross-feeding between fuel tanks, the tanks should be re-topped after each refueling to assure maximum capacity.

OIL

Oil Grade (Specification):

Aviation Grade Straight Mineral Oil: Use to replenish supply during first 5 hours and at the first 25 hours oil change. Continue to use until a total of 50 hours has accumulated or oil consumption has stabilized.

NOTE:

The airplane was delivered from the factory with corrosion preventive aircraft engine oil. This oil should be drained after the first 5 hours of operation.
The next oil change is at 25 hours of operation

Recommended Viscosity:

Sport Campion 4T
Castrol GTX APIFL
Synthetic - 10 W 60
SAE 20 W 50
ELF Synthetic - 10 W 60
SHELL ELI PLUS 10 W 40

Oil Capacity:

Sump: 3.0 Quarts.
Total: 3.2 Quarts (if oil filter installed)

Oil Temp:

Max 130°C (266°F)
Min 50°C (122°F)
Norm 90°C - 110°c (194°F - 230°F)

MAXIMUM CERTIFICATED WEIGHTS

Takeoff: 1320 Lb.
Landing: 1320 Lb.

Weight in Baggage Compartment:
Baggage Area 1– 50 Lb.
The maximum weight capacity for baggage areas is 50 Lb.

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight, IBIS:704 Lb.
Maximum Useful Load, IBIS: 616 Lb.

CABIN ENTRY DIMENSIONS

Detailed dimensions of the cabin interior and entry door openings are illustrate in Section 6.

BAGGAGE SPACE DIMENSIONS

Baggage area dimensions are illustrated in detail in Section 6.

SPECIFIC LOADINGS

Wing Loading: 10.82 Lb / ft^2.
Power Loading: 13.2Lb/ hp.

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS	**Knots Calibrated Airspeed** is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.
KIAS	**Knots Indicated Airspeed** is the speed shown on the airspeed indicator and expressed in knots.
KTAS	**Knots True Airspeed** is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.
VA	**Maneuvering Speed** is the maximum speed at which you may Use abrupt control travel.
V FE	**Maximum Flap Extended Speed** is the highest speed Permissible with wing flaps in a prescribed extended position.

VNO	**Maximum Structural Cruising Speed** is speed that should Not be exceeded except in smooth air, then only with caution.
VNE	**Never Exceed Speed** is the speed limit that not be exceeded at any time.
VS	**Stalling Speed or the minimum steady flight speed** at which the airplane is controllable.
VS0	**Stalling Speed or the minimum steady flight speed at** which the airplane is controllable in the landing configuration at the most forward center of gravity.
VX	**Best Angel-of-Climb Speed** is the speed which results in the greatest gain, of altitude in a given horizontal distance.
VY	**Best Rate-of-Climb Speed** is the speed which results in the greatest gain in altitude in a given time.

METEOROLOGICAL TERMINOLOGY

OAT	**Outside Air Temperature** is the free air static temperature. It is expressed in either degrees Celsius (formerly centigrade) or degrees Fahrenheit.
Standard Temperature	**Standard Temperature** is 59°F (15°C) at sea level pressure altitude and decreases by 35.6°F (2°C) for each 1000 feet of altitude
Pressure	**Pressure Altitude** is the altitude read from an altimeter when Altitude the altimeter's barometric scale has been set to 29.92 Inches of mercury (760 mm).

ENGINE POWER TERMINOLOGY

BHP	**Brake Horsepower** is the power developed by the engine.
RPM	**Revolutions per Minute** is engine speed.
Static RPM	**Static RPM** is engine speed attained during a full-throttle engine run-up when the airplane is on the ground and

stationary.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Demon-Started Crosswind Velocity	**Demonstrated Crosswind Velocity** is the velocity of the crosswind component for witch adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. The value shown is not considered to be limiting
Useable Fuel	**Usable Fuel** is the fuel available for flight planning.
Unusable Fuel	**Unusable Fuel** is the quantity of fuel that cannot be safely used in flight.
LTH	**Liters per Hour** is the amount of fuel (in gallons) consumed per hour.
KPL	**Kilometers per Liter** is the distance (in kilometers) which can be expected per liter of fuel consumed at a specific engine power setting and/or flight configuration.
G	**G.** is acceleration due to gravity.

WEIGHT AND BALANCE TERMINOLOGY

Reference datum	**Reference Datum** is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	**Station** is a location along the airplane fuselage given in terms of the distance from the reference datum.
Arm	**Arm** is the horizontal distance from the reference datum to the center of gravity (C.G) of an item.
Moment	M**oment is** the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify balance calculation by reducing the number of digits.)
Center of would Gravity by (C.G.)	**Center of Gravity** is the point at which an airplane, or equipment, balance if suspended. Its distance from the reference datum is found dividing,the total moment by the total weight of the airplane.
C.G. Arm	**Center of Gravity Arm** is the arm obtained by adding the airplane´s

Individual moments and dividing the sum by the total weight.

C.G Limits	**Center of Gravity Limits** are the extreme center of gravity locations Within which the airplane must be operated at a given weight.
Standard Weight	**Standard Empty Weight** is the weight of a standard airplane, Empty including unusable, fuel operating fluids and full engine oil.
Basic Empty Weight	**Basic Empty Weight is the standard** empty weight plus the weight of Optional equipment.
Useful Load	**Useful load** is the difference between takeoff weight and the basic empty weight.
Gross	**Gross (loaded) Weight** is the loaded weight of the airplane. (Loaded) weight.
Maximum Takeoff Weight	**Maximum Takeoff** Weight is maximum the weight approved for the start of the takeoff runs.
Maximum Landing Weight	**Maximum Landing Weight** is the maximum weight approved for landing touchdown.
Tare	**Tare** is the weight of chocks, blocks, stands, etc. Used when weighing an airplane, and is included in the scale readings . Tare is deducted from the scale Reading to obtain the actual (Net) airplane weight.

SECTION 2

LIMITATIONS

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INTRODUCTION

Section 2 includes Limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment. The limitations included in this section have been approved by the manufacturer.

AIRSPEED LIMITATION

	SPEEED	Kts (IAS)	Kts (CAS)	REMARKS
VNE	Never Exceed Speed	113	108	Do not exceed this speed in any operation
VNO	Maximum Structural Cruising Speed	100	95	Do not exceed this speed except in smooth air, and then only with caution.
VH	Maximum speed	104	99	Maximum speed in level flight at max continuous power (MSL)
V A	Maneuvering speed **1320Lb** S-LSA	74	70	Do not make full or abrupt control movements above this speed.
VFE	Maximum Flap Extended speed.	57	52	Do not exceed this speed with flaps down.
VS0	Stall speed with flaps	30	26	Minimum speed
VS	Stall speed No flaps	42	36	Minimum speed

Figure 2-1 Airspeed Limitations

AIRSPEED INDICATOR MARKINGS

MARKING	Kts VALUE OR RANGE	SIGNIFICANCE
White Arc	30-57	Full Flap Operating Range. Lower limit is the maximum weight Vso in landing configuration. Upper limit is maximum sed permisible with flaps extended.
Green Arc	57-87	Normal Operating Range. Lower limit is maximum weight Vs at most forward C.G. with flaps retracted. Upper limit is maximum structural crusing sed.
Yellow Arc	87-104	Operation must be conducted with caution and only in smooth air.
Red Line	113	Maximum speed for all operations.

Figure 2-2 Airspeed Indicator Markings

POWER PLANT LIMITATIONS

Engine Manufacturer: **ROTAX**
Engine Model Type**: 912** UL (80HP) / 912 ULS (100HP)
Engine Operating Limits for Takeoff and continuous Operations:
Maximum Power: 100 BHP
Maximum Engine RPM: 5800 RPM.
Maximum Oil Temperature: 130°C (266°F).
Oil Pressure
Minimum: 1.5bar.
Maximum: 7bar.
Propeller Manufacturer: IVO PROP
Model: Patriotic+0 3 blade.
Propeller Diameter, Maximum: 72 inch - Minimum: 70 inches

POWER PLANT INSTRUMENT MARKINGS

INSTRUMENT	RED LINE	GREEN ARC	RED LINE
	MINIMUM LIMIT	NORMAL OPERATING	MAXIMUM LIMIT
Tachometer	-------	5200 RPM	5500 RPM
Oil Temperature	-------	90C° -110°C(194°F - 230°F)	130C° -(266°F)
Oil Pressure	1.5 bar	2 – 5 bar	7bar
Water Temperature		80°C -100°C(176°F - 212°F)	110°C -(230°F)
CHT			135°C - (275°F)
EGT		880C° - (1616°F)	880°C - (1616°F)

Figure 2-3 Power Plant Instrument Markings

SEE ROTAX MANUAL

WEIGHT LIMITS

Maximum Takeoff Weight: 1320 Lb.
Maximum Landing Weight: 1320 Lb.
Maximum Weight in Compartment : 50 Lb

CENTER OF GRAVITY LIMITS

Center of Gravity Limits range:
Forward: 10.59 inches aft of datum (269mm).
Aft: 18.54 inches aft of datum (471 mm).
Reference Datum: wing leading edge.

SERVICE CEILING ……12000 Feet (3657 m)

MANEUVER LIMITS

This airplane is certificated in the utility category and is designed limited aerobatic flight. In the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required. All of these maneuvers are permitted in this airplane.

No aerobatic maneuvers are approved except listed below:

MANEUVER
MAXIMUM ENTRY SPEED

Chandelles……74 Kts
Lazy Eights……..74 Kts
Steep Turns……..74 Kts
Spins……..Use Slow Deceleration
Stalls (Except Whip Stalls)……..……Use Slow Deceleration

- Higher speeds can be used if abrupt use of the controls is avoided.

Aerobatics that may impose high loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the airplane is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors: with maximum take-off weight **1320 LB.**

- Flaps Up: +4.0 / -2.0 G
- Flaps Down: +2.0 / 0 G
- The design load factors are 150% of above, and in all cases, the structure meets exceeds loads.

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR. The reference to types of flight operations on the operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance. **Flight into known icing conditions is prohibited.**

FUEL LIMITATIONS

Fuel Capacity:

Standard Tanks:

Total Capacity Each Tank: 9 us gallons.

Reserve tank: 2 us gallons.

Total Capacity: 20 us gallons.

Total Usable: 18.5 us gallons.

Long Range (Auxiliary Tanks):

Total Capacity: 18 us gallons.

Total Capacity Each Tank: 9 us gallons.

Total Usable: 18 us gallons.

NOTE:

Due to cross-feeding between fuel thanks, the tanks should be re-topped after each refueling to assure maximum capacity.

NOTE:

Takeoffs have not been demonstrated with less than 2 gallons total fuel (1 gallon per tank).

Approved Fuel 94 Octane

PLACARDS

The following information is displayed in the individual placards.

1. In full view of the pilot: (The “DAY” entry shown on the example below will vary as the airplane equipped.)

This airplane is approved in the utility category and must be operated in compliance with the operating limitations as stated in the form of placards, markings and manuals.

MAXIMUMS

MANEUVERING SPEED (IAS)……74 Kts
GROSS WEIGHT ……..……1320Lb.

FLIGHT LOAD FACTOR Flaps Up……..+4.0 / -2.0 G
Flaps Down……+2.0 / 0 G

NO ACROBATIC MANEUVERS,INCLUDING SPINGS,ARE APPROVED LISTED
FLIGHT INTO KNOW ICING CONDITIONS PROHIBITED

2. In the central rear compartment of the Baggage:

BAGGAGE ALLOWANCE
50 POUNDS MAXIMUM
FOR ADDITIONAL LOADING INSTRUCTIONS
SEE WEIGHT AND BALANCE DATA

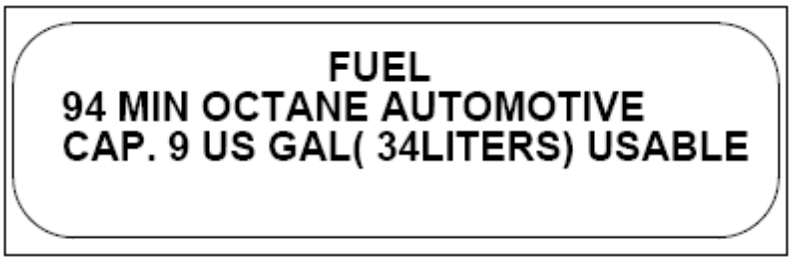
3. Near fuel shutoff valve (standard tanks)

FUEL- 18 GAL - ON-OFF

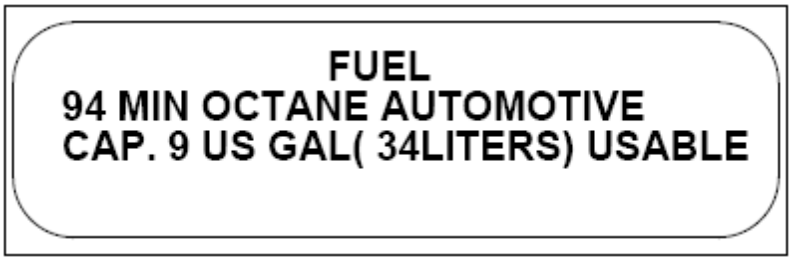
Near fuel shutoff valve (Long Range - Extra tanks)

FUEL - 36 GAL - ON-OFF

4. Near both fuel tanks filler cap (standard tanks)



Near both fuel tank filler cap (Long Range -Auxiliary tanks)



5. On the upper left instrument panel

6.On the upper right instrument panel

7. In the top center of the battery box

SECTION 3
EMERGENCY PROCEDURES

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INTRODUCTION

Section 3 provides checklist and amplified Procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enrooted weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure after Takeoff ..... 52 Kts
Maneuvering Speed:
1320 Lb..... 74 Kts
Maximum Glide ..... 56 Kts
Precautionary Lading with Engine Power ..... 48 Kts
Lading Without Engine Power:
Wing Flaps Up ..... 52 Kts
Wing Flaps Down ..... 48 Kts

OPERATIONAL CHECKLIST

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle.....IDLE
2. Brakes..... APPLY
3. Wing Flaps..... RETRACT
4. Ignition Switch..... OFF
5. Master Switch..... OFF

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed..... 52 Kts
2. Fuel Shutoff Valve..... OFF
3. Ignition Switch..... OFF
4. Master Switch..... OFF
5. Wing Flaps..... As Required

ENGINE FAILURE DURING FLIGHT

1. Airspeed…… 52 Kts
2. Fuel Shutoff Valve….. ON
3. Ignition Switch……. BOTH (or START if propeller is stopped)

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

1. Airspeed…… 57 Kts (flaps up); 52 Kts (flaps down)
2. Fuel Shutoff Valve…... OFF.
3. Ignition Switch……..… OFF.
4. Wing Flaps…….. AS REQUIRED (30^{o} recommended).
5. Master Switch…….. OFF.
6. Doors…… UNLATCH PRIOR TO TOUCHDOWN.
7. Touchdown…….. SLIGHTLY TAIL LOW.
8. Brakes…….. APPLY HEAVILY.

PRECAUTIONARY LANDING WITH ENGINE POWER

1. Airspeed……52 Kts.
2. Wing Flaps……..…20°.
3. Selected Field……. FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed.
4. Radio and Electrical Switches…OFF.
5. Wing Flaps……30° (on final approach).
6. Airspeed……48 Kts.
7. Master Switch……OFF.
8. Doors…….. UNLATCH PRIOR TO TOUCHDOWN.
9. Touchdown……SLIGHTLY TAIL LOW.
10. Ignition Switches……. OFF.
11. Brakes……APPLY HEAVILY.

DITCHING

1. Radios……TRANSMIT MAY DAY o 21.5 Mhz. Giving location and intentions.
2. Heavy Objects (in baggage area). SECURE OR JETTISON.

3. Approach……..High Winds. Heavy seas…INTO THE WIND.
4. Light Winds, Heavy Swells…PARALLEL TO SWELLS.
5. Wing flaps……30°.
6. Power…….. ESTABLISH 300 FT/MIN DESCENT AT 48 Kts.
7. Cabin Doors…….. UNLATCH.
8. Touchdown……LEVEL ATTITUDE AT 300 FT/MIN DESCENT.
9. Face……CUSHION at touchdown with folded coat.
10. Airplane……..… EVACUATE through cabin doors. If necessary open windows and flood cabin to equalize pressure so doors can be opened.
11. Life vests and raft……INFLATE.

FIRES

DURING START ON GROUND

Cranking…….…… CONTINUE, to get a start which would suck the flames and accumulated fuel through the carburetor and into the engines.

If engine starts:

1. Power…… 1700 RPM for a few minutes
2. Engine…….. SHUTDOWN and inspect for damage

If engine fail to start:

1. Cranking…… CONTINUE in an effort to obtain a start.
2. Fire Extinguisher……..OBTAIN (have ground attendants obtain in not. installed)
3. Engine…….. SECURE.
   a. Master Switch……OFF.
   b. Ignition Switch…… OFF.
   c. Fuel Shutoff Valve……OFF.
4. Fire……..EXTINGUISH using fire extinguisher, wool Intentionally in blanket, or dirt.
5. Fire Damage……..INSPECT, repair damage or replace damaged components or wiring before conducting another flight.

ENGINE FIRE EN FLIGHT

1. Throttle……..CUT_OFF
2. Fuel Shutoff Salve……...OFF
3. Magnetos…… OFF
4. Master Switch…….. OFF

5. Airspeed……....78 Kts (if fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture)
6. Forced Landing…….. EXECUTE (as described on emergency landing without engine power).

ELECTRICAL FIRE IN FLIGHT

1. Master Switch……..…OFF
2. All Other Switches (except ignition switch)... OFF
3. Vents/Cabin Air…… …..... CLOSED
4. Fire Extinguisher…….. ACTIVATE (if available)

WARNING!

After discharging an extinguisher within a closed cabin, ventilate the cabin If fire appears out and electrical power is necessary for continuance of flight:

5. Master Switch……..……ON
6. Circuit Breakers…….. ..CHECK for faulty circuit, do not reset.
7. Radio/Electrical Switches…ON one at a time, with delay after each until short circuit is localized.
8. Vents/Cabin Air……..……OPEN when it is ascertained that fire is completely extinguished.

CABIN FIRE

1. Master Switch……..…OFF
2. Vents/Cabin Air……..……CLOSED (to avoid drafts)
3. Fire Extinguisher…… ACTIVATE (if available)
4. Land the airplane as soon as possible to inspect for damage

WING FIRE

1. Navigation Light Switch (if installed)…OFF
2. Strobe Light Switch (if installed)……OFF
3. Pilot Heat Switch (if installed)……..…OFF

NOTE:

Perform a side slip to keep the flames away from the fuel tank and cabin, and land as soon as possible, with flaps retracted.

ICING

INADVERTENT ICING ENCOUNTER

1. Turn pitot heat switch ON (if installed).
2. Turn back or change altitude to obtain an outside air temperature that is less conducive to icing.
3. Open the throttle to increase engine speed and minimize ice buildup on propeller blades.
4. Watch for signs of carburetor air filter ice. An unexpected loss in engine speed could be caused by carburetor ice or air intake filter ice.
5. Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable "off airport" landing site.
6. With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for significantly higher stall speed.
7. Leave wing flaps retracted. With a severe ice build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in a loss of elevator effectiveness.
8. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach.
9. Perform a landing approach using a forward slip, if necessary, for improved visibility.
10. Approach at 57 to 65 Knots PH depending upon the amount of ice accumulation.
11. Perform a landing in level attitude.

LANDING WITH A FLAT MAIN TIRE

1. Wing Flaps……AS DESIRED.
2. Approach …… .NORMAL.
3. Touchdown……GOOD TIRE FIRST hold airplane off flat tire as long as Possible with aileron control.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

OVER – VOLTAGE LIGHT ILLUMINATES (IF INSTALLED)

1. Master Switch……OFF (both sides).
2. Master Switch……..ON
3. Over – Voltage Light……. …OFF.

If over – voltage light illuminates again:

4. Flight…….. TERMINATE as soon as practical.

AMMETER SHOWS DISCHARGE

1. Master……..……..OFF.
2. Nonessential Electrical Equipment….. OFF.
3. Flight ……TERMINATE as soon as practical.

AMPLIFIED PROCEDURES

ENGINE FAILURE

If an engine failure occurs during the takeoff run, the most important thing to do is stop the airplane on the remaining runway. Those extra items on the checklist will provide added safety after a failure of this type.

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takeoff. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions. Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway. The checklist procedures assume that adequate time exists to secure the fuel and ignition systems prior to touchdown.

After an engine failure in flight, the best glide speed as shown in fig: 3-1 should be established as quickly as possible. While gliding toward suitable landing area, an effort should be made to identify the cause of it failure. If time permits, an engine restart should be attempted as shown: the checklist. If the engine cannot be restarted, a forced landing without power must be completed.

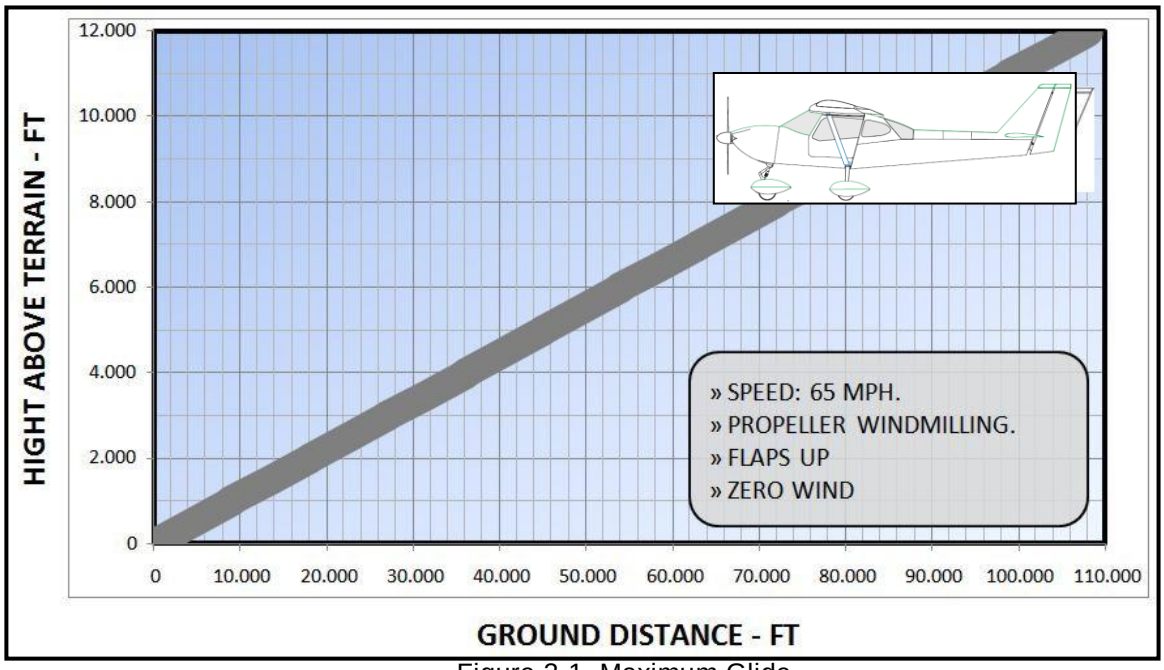

Figure 3-1. Maximum Glide

FORCED LANDINGS

If all attempts to restart the engine fail and a forced landing is imminent select a suitable field and prepare for the landing as discussed under the Emergency Landing without Engine Power checklist.

Before attempting an "off airport" landing with engine power available, one should fly over the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed under the Precautionary Landing with Engine Power checklist.

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area and collect folded coats for protection of occupants' face at touchdown. Transmit Mayday message on 121.5 MHz giving location and intentions.

LANDING WITH OUT ELEVATOR CONTROL

Trim for horizontal flight (with airspeed of approximately 52 Kts and flaps lowered to 20°) by using throttle and elevator trim controls. Then **do not change the elevator trim control setting**; control the glide angle by adjusting power exclusively.
At flare out, the nose-down moment resulting from power reduction is an adverse factor and the airplane may hit on the nose wheel. Consequently, at flare out, the trim control should be set at the full nose-up position and the power adjusted so that the

airplane will rotate to the horizontal attitude for touchdown. Close the throttle at touchdown.

FIRES

Although engine fires are extremely rare in flight; the steps of the appropriate checklist should be followed if one is encountered. After completion of this procedure, execute a forced landing. Do not attempt to restart engine.
The initial indication of an electrical fire is usually the odor of burning insulation. The checklist for this problem should result in elimination of the fire.

EMERGENCY OPERATION IN CLOUDS (Vacuum System Failure) if installed

In the event of a vacuum system failure during flight in marginal weather the directional indicator and attitude indicator will be disabled, and the pilot will have to rely on the turn coordinator if he inadvertently flies into clouds. The following instructions assume that only the electrically powered turn coordinator is operative (if installed), and that the pilot is not completely proficient in instrument flying.

EXECUTING A 180° TURN IN CLOUDS

Upon inadvertently entering the clouds, an immediate plan should be made to turn back as follows:

1. Note the time of the minute hand and observe the position of the sweep second hand on the clock.
2. When the sweep second hand indicates the nearest half-minute, initiate a standard rate left turn, holding the turn coordinator symbolic airplane wing opposite the lower left index mark for 60 seconds. Then roll back to level flight by leveling the miniature airplane.
3. Check accuracy of the turn by observing the compass heading which should be the reciprocal of the original heading.
4. If necessary, adjust heading primarily with skidding motions rather than rolling motions so that the compass will read more accurately.
5. Maintain altitude and airspeed by cautious application of elevator control. Avoid over controlling by keeping the hands off the control wheel as much as possible and steering only with rudder.

EMERGENCY DESCENT THROUGH CLOUDS

If conditions preclude reestablishment of VFR flight by a 180° turn, a descent through a cloud deck to VFR conditions may be appropriate. If possible, obtain radio clearance for an emergency descent through clouds. To guard against a spiral dive, choose an easterly or westerly heading to minimize compass card swings due to changing bank angles. In addition, keep hands off the control wheel and steer a straight course with rudder control by monitoring the turn coordinator. Occasionally check the compass heading and make minor corrections to hold an approximate course. Before descending into the clouds, set up a stabilized let-down condition as follows:

1. Reduce power to set up a 500 to 800 ft/min rate of descent.
2. Adjust the elevator trim for a stabilized descent at 52 Kts.
3. Keep hands off control wheel.
4. Monitor turn coordinator and make corrections by rudder alone.
5. Check trend of compass card movement and make cautious corrections with rudder to stop turn.
6. Upon breaking out of clouds, resume normal cruising flight.

RECOVERY FROM A SPIRAL DIVE

If a spiral is encountered, proceed as follows:
1. Close the throttle.
2. Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator (if installed) with the horizon reference line.
3. Cautiously apply elevator back pressure to slowly reduce the airspeed to 60Kts.
4. Adjust the elevator trim control to maintain at 60 Kts glide.
5. Keep hands off the control wheel, using rudder control to hold a straight heading.
6. Clear engine occasionally, but avoid using enough power to disturb the trimmed glide.
7. Upon breaking out of clouds, resume normal cruising flight.

FLIGHT IN ICING CONDITIONS

Flight into icing conditions is prohibited. An inadvertent encounter with these conditions can best be handled using the checklist procedures. The best procedure, of course, is to turn back or change altitude to escape icing conditions.

SPINS

Should an inadvertent spin occur, the following recovery procedure should be used:

1. PLACE AILERONS IN NEUTRAL POSITION.
2. RETARD THROTTLE TO IDLE POSITION.
3. APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.
4. JUST **AFTER** THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL **BRISKLY** FORWARD FAR ENOUGH TO BREAK THE STALL.
5. Full down elevator may be required at aft center of gravity loadings to assure optimum recoveries.
6**. HOLD THESE CONTROL INPUTS UNTIL ROTATION STOPS.** Premature relaxation of the control inputs may extend the recovery.
7. AS ROTATION STOPS, NEUTRALIZE RUDDER, AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

NOTE:

If disorientation precludes a visual determination of the direction of rotation, the symbolic airplane in the turn coordinator (if installed) may be referred to for this information. For additional information on spins and spin recovery, see the discussion under SPINS in Normal Procedures (Section 4).

ROUGH ENGINE OPERATION OR LOSS OF POWER CARBURETOR ICING

A gradual loss of RPM and eventual engine roughness may result from the formation of carburetor ice. The best procedure, of course, is to turn back or change altitude to escape icing conditions.

SPARK PLUG FOULING

A slight engine roughness in flight may be caused by one or more spark plugs becoming fouled by carbon or lead deposits. This may be verified by turning the ignition switch momentarily from BOTH to either L or R position. An obvious power loss in single ignition operation is evidence of spark plug or magneto trouble; proceed to the nearest airport for repairs using the BOTH position of the ignition switch unless extreme roughness dictates the use of a single ignition position.

MAGNETO MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of magneto problems. Switching from BOTH to either L or R ignition switch position will identify which magneto is malfunctioning. Select different power settings to determine if continued operation on BOTH magnetos is practicable, if not, switch to the good magneto and proceed to the nearest airport for repairs.

LOW OIL PRESSURE

If low oil pressure is accompanied by normal oil temperature, there is a possibility the oil pressure gage or relief valve is malfunctioning. A leak in the line to the gage is not necessarily cause for an immediate precautionary landing because an orifice in this line will prevent a sudden loss of oil from the engine sump. However, a landing at the nearest airport would be advisable to inspect the source of trouble.

If a total loss of oil pressure is accompanied by a rise in oil temperature, there is good reason to suspect an engine failure is imminent. Reduce engine power immediately and select a suitable forced landing field. Use only the minimum power required to reach the desired touchdown spot.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS (IF ALTERNATOR INSTALLED)

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and low-voltage warning light; however, the cause of these malfunctions is usually difficult to determine. A broken alternator drive belt or wiring is most likely the cause of alternator failures, although other factors could cause the problem. A damaged or improperly adjusted alternator control unit can also cause malfunctions. Problems of this nature constitute an electrical emergency and should be dealt with immediately. Electrical power malfunctions usually fall into two categories: excessive rate of charge and insufficient rate of charge. The paragraphs below describe the recommended remedy for each situation.

EXCESSIVE RATE OF CHARGE

After engine starting and heavy electrical usage at low engine speeds (such as extended taxiing) the battery condition will be low enough to accept above normal charging during the initial part of a flight. However, after thirty minutes of cruising

flight, the ammeter (if installed) should be indicating less than two needle widths of charging current. If the charging rate were to remain above this value on a long flight, the battery would overheat and evaporate the electrolyte at an excessive rate. Electronic components in the electrical system could be adversely affected by higher than normal voltage. If a faulty voltage regulator setting is causing the overcharging. To preclude these possibilities, and over _ voltage sensor will automatically shut down the alternator and the over voltage warning light illuminate, if de charge voltage reaches approximately 16 volts. Assuming that the malfunction was only momentary, an attempt should be made to reactivate the alternator system. To do this turn both sides of the master switch off and then on again. If the problem no longer exists, normal alternator charging will resume and the warning light will go off. If the light illuminates again, a malfunction is confirmed. In this event, the flight should be terminated and / or the current drain on the battery Minimized because the battery can supply the electrical system for only a limited period of time. Power must be conserved for later use of the landing light and flaps during landing.

INSUFFICIENT RATE OF CHARGE (IF ALTERNATOR INSTALLED)

If the ammeter indicates a continuous discharge rate in flight, the alternator is not supplying power to the system and should be shut down since the alternator field circuit may be placing an unnecessary load on the system. All nonessential equipment should be turned off and the flight terminated as soon as practical.

Section 4 provides checklist and amplified procedures for the conduct of normal operation.

SECTION 4

CHECKLIST PROCEDURES

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INTRODUCTION

Section 4 provides noted checklist and amplified procedures for the conduct of normal operation.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 1320 Lb and may be used for any lesser weight.

Takeoff:

Normal Climb Out	57-52Kts
Short Field Takeoff. Flaps 10°, Speed at 50 Feet	47-52Kts
Climb, Flaps Up:	
Normal.....	57-60Kts
Best Rate of Climb, Sea Level.....	57Kts
Best Rate of Climb, 10,000 Feet.....	53Kts
Best Angle of Climb, Sea Level thru 10,000 Feet	48Kts
Landing Approach:	
Normal Approach, Flaps Up.....	52-57Kts
Normal Approach, Flaps 30°.....	48-57Kts
Short Field Approach, Flaps 30°	47Kts
Balked Landing:	
Maximum Power, Flaps 20°.....	48Kts
Maximum Recommended Turbulent Air Penetration Speed:	
1320 Lb... …....	90Kts
1120 Lb……	82Kts
450 Kg……..	78Kts
Maximum Demonstrated Crosswind Velocity.....	12Kts

NOTE:

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice, or snow from wing, tail, and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch with 30 seconds with battery and pitot heat switches on.

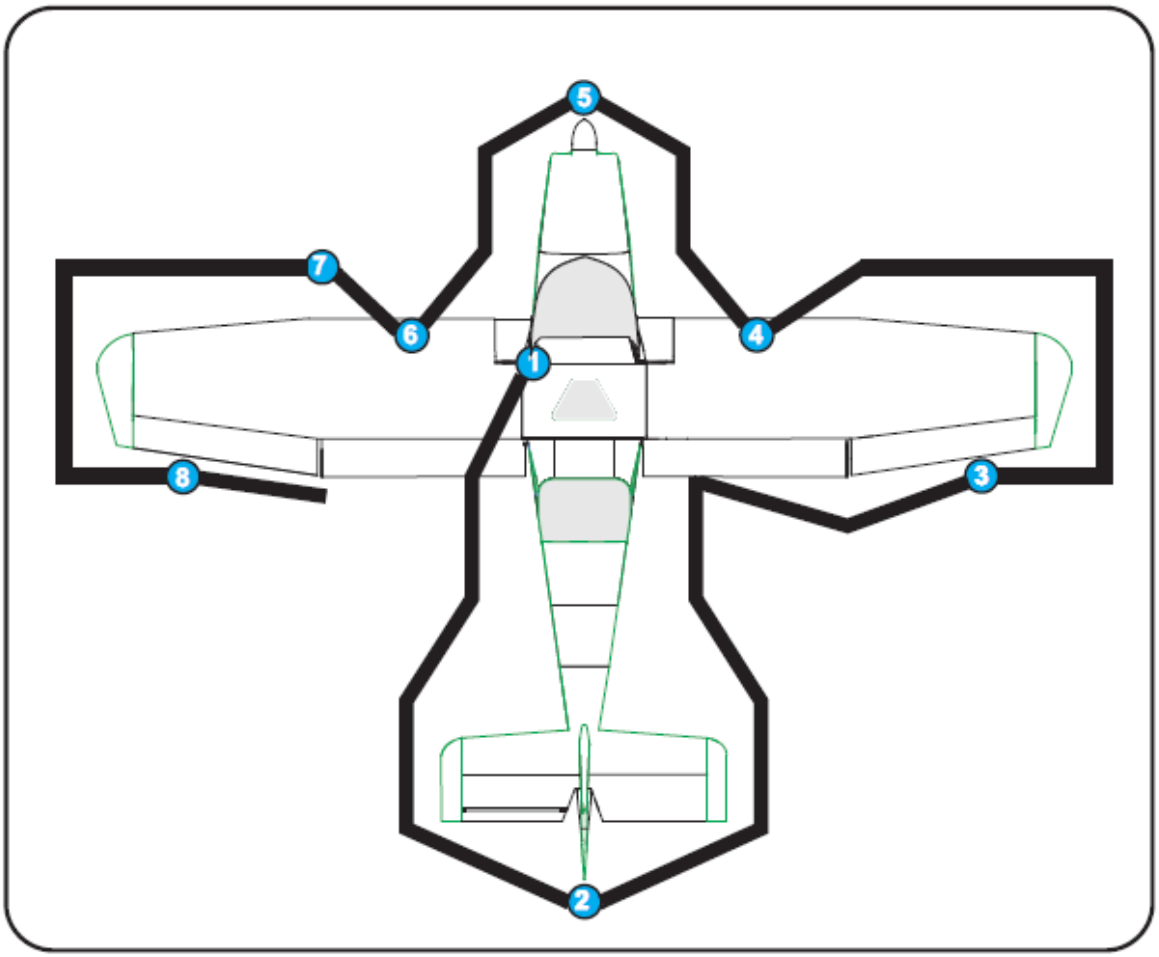

Figure 4-1. Preflight Inspection

CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

1. CABIN

2. Control Wheel Lock……. REMOVE. (If installed)
3. Ignition Switch…… OFF.
4. Master Switch……..…… OFF.
5. Fuel Quantity Indicators…… CHECK QUANTITY.(Visual)
6. Master Switch……..….OFF.
7. Fuel Valve ON -OFF……..... OFF.

2. EMPENNAGE

1. Rudder Gust Lock…….. REMOVE. (If installed)
2. Tail Tie-Down…….. DISCONNECTS.
3. Control Surfaces…….... CHECK freedom of movement and security.

3. RIGHT WING Trailing Edge

1. Aileron……..CHECK freedom of movement and security.

2. Aileron and flaps Control ……..…CHECK surfaces.

4. RIGHT WING

1. Wing Tie-Down…… DISCONNECT.
2. Main Wheel Tire…… CHECK for proper inflation.
3. Before first flight of the day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick drain valve to check for water, sediment, and proper fuel grade. (If installed)
4. Strut and jury strut
5. Fuel Tank Vent Cover…… Remove. (If installed)
6. Fuel Quantity……..CHECK VISUALLY for desired level.
7. Fuel Filler Cap…… SECURE.

5. NOSE

1. Engine Oil Level……..CHECK, do not operate with less than three quarts. For extended flight.
2. Before first flight of the day and after each refueling, pull out strainer drain knob for about four seconds to clear fuel strainer of possible water and sediment. Check strainer drain closed. If water is observed, the fuel system may contain additional water, and further draining of the system at the strainer,

fuel tank sumps, and fuel line drain plug will be necessary.

3. Propeller and Spinner ……...CHECK for nicks and security.
4. Carburetor Air Filter……CHECK for restrictions by dust or other foreign matter.
5. Landing Light(s)……CHECK for condition and cleanliness. (If installed)
6. Nose Wheel fairing and Tire…..CHECK for proper inflation.
7. Nose Tie-Down…….…. DISCONNECT.
8. Static Source Opening in if stalled (left side of fuselage) …
9. CHECK for stoppage. (If installed)

6. LEFT WING

1. Main Wheel Tire……CHECK for proper inflation.
2. Before first flight of day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment and proper fuel grade. (If installed)
3. Fuel Quantity……CHECKS VISUALLY for desired level.
4. Fuel Filler Cap……...SECURES.
5. Strut and Jury Strut.
6. Fuel Tank Vent Cover……. Remove. (If installed)
7. Wing Tie-Down……..…. DISCONNECTS.

7. LEFT WING Leading Edge

1. Pitot tube Cover……REMOVE and check opening for stoppage.
2. Stall Warning Opening (if installed)…CHECK for stoppage. To check the system, place a clean handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation.

8. LEFT WING Trailing Edge

1. Aileron……CHECK freedom of movement and security.
2. Aileron and flaps Control …… CHECK surfaces.

BEFORE STARTING ENGINE

1. Preflight Inspection……..…. COMPLETES.
2. Seats, Belts, Shoulder Harnesses ADJUST and LOCK.
3. Fuel Valve ON -OFF……ON
4. Radios, Electrical Equipment…....OFF.
5. Brakes……TEST and SET.

6. Circuit Breakers……CHECK IN.
7. Electric fuel pump……ON
8. Throttle……IDLE POSITION

STARTING ENGINE

1. Throttle……IDLE POSITION
2. Choke pulled……AS REQUIRED.
3. Propeller Area ……CLEARS.
4. Master Switch……ON.
5. Magnetos both……ON
6. Ignition Switch…… START (release when engine starts).
7. Oil Pressure……CHECK.
8. Throttle……ADJUST for 1400 RPM (Idle speed).
9. Beacon (if installed)……ON
10. Radio……ON
11. Flap……CHECK

BEFORE TAKEOFF

1. Parking Brake ……SET. (If installed)
2. Cabin Doors ……CLOSED and LATCHED.
3. Flight Controls…….... FREE and CORRECT.
4. Wing Flaps…… ....10°.)
5. Flight Instruments……SET.
6. Auxiliary Fuel Pump…….. ON.
7. Fuel ON-OFF ……..…… ON.
8. Elevator Trim…… TAKE OFF
9. Throttle…… 3000 RPM.
   a. Magnetos……CHECK (RPM drop should not exceed 125 on either magneto or 50 RPM differential between magnetos).
   b. Engine Instruments and Ammeter…. CHECK.
10. Radios……SET.
11. Flashing Beacon, landing lights, Navigation Lights and /or Strobe Lights…….ON (as required.)
12. Throttle Friction Lock…….… ADJUST. (If installed)

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps……..	0°-10° (As required)
2. Brakes……	RELEASE
3. Throttle……	FULL OPEN (HIGH RPM).
4. Elevator Control ……	LIFT NOSE WHEEL at 43 Kts.
5. Climb Speed ……	57-61 Kts.
6. Propeller ……	30” MAP (MAX)
7. After 2 minutes…..……	Reduce Throttle.
8. Propeller……	29” MAP. (As required)
9. Auxiliary Fuel Pump……	OFF.

SHORT FIELD TAKEOFF

1. Wing Flaps……..	10°. (As required)
2. Fuel Pump……..	ON.
3. Brakes ……	APPLY.
4. Throttle……	FULL OPEN.
5. Propeller ……	HIGH RPM
6. Brakes ……	RELEASE
7. Elevator Control……..	SLIGHTLY TAIL LOW
8. Climb Speed……	47Kts (until all obstacles are cleared).
9. Wing Flaps ……..	RETRACT slowly after reaching 52Kts

ENROUTE CLIMB

1. Airspeed ……..	57Kts.
2. Throttle……	FULL OPEN.
3. Propeller……	Adjusted 29” MAP. (As required)

NOTE:

If a maximum performance climb is necessary, use speeds shown in the Rate of Climb chart in section 5.

CRUISE

1.	Power ……	5000 RPM (no more than 75%).
2.	Elevator Trim ……..……..	ADJUST.
3.	Propeller…….	ADJUST.

BEFORE LANDING

1. Seats, Belts, Harnesses	ADJUST and LOCK.
2. Auxiliary Fuel Pump ……	ON
3. Propeller……	HIGH RPM.
4. Set throttle…… .	FULL OPEN

LANDING
NORMAL LANDING

1. Airspeed ……..	52Kts-61Kts (flaps UP).
2. Wing Flaps …….	AS DESIRED (below 52-61Kts)
3. Airspeed …….	48-56 Kts (Flaps DOWN).
4. Touchdown…….	MAIN WHEELS FIRST.
5. Landing Roll……..	LOWER NOSE WHEEL GENTLY.
6. Braking ……	MINIMUM REQUIRED.

SHORT FIELD LANDING

1. Airspeed …….	39-48 Kts (flaps UP).
2. Wing Flaps …….	30° (Below 56 Kts).
3. Airspeed…….	MAINTAIN 48 Kts.
4. Power……..	REDUCE to idle as obstacle is cleared.
5. Touchdown…….	MAIN WHEELS FIRST.
6. Brakes ……	APPLY HEAVILY.
7. Wing Flaps ……	RETRACT.

BALKED LANDING

1. Throttle……	FULL OPEN.
2. Propeller……..	HIGH RPM.
3. Wing Flaps……	RETRACT to 20°.
4. Airspeed ……	48 Kts.
5. Wing Flaps……	RETRACT (slowly).

AFTER LANDING

1. Wing Flaps…….	UP.

SECURING AIRPLANE

1. Parking Brake ……..	SET.
2. Radios, Electrical Equipment….	OFF.
3. Throttle…….	CUT-OFF (pull full out).
4. Ignition Switch……	OFF.
5. Master Switch……..	OFF.
6. Magnetos……..	OFF.
7. Control lock……..	INSTALL.
8. Fuel Shut Off Valve……	CLOSE.

AMPLIFIED PROCEDURES

STARTING ENGINE

During engine starting, close the throttle. If the engine is warm, no choke will be required. In extremely cold temperatures, it may be necessary to continue pooling while cranking the engine and after it starts until it is running smoothly. The carburetor is not equipped with an accelerator pump and therefore pumping the throttle does not enrich the mixture for starting.

Weak intermittent firing followed by puffs of black smoke from the exhaust stack indicate over priming or flooding. Excess fuel can be cleared from the combustion chambers by the following procedures: throttle full open, and crank the engine through several revolutions with the starter. Repeat the starting procedure without any additional throttle.

If the engine is under primed (most likely in cold weather with a cold engine) it will not fire at all, and additional throttle will be necessary. As soon as the cylinders begin to fire, close the throttle slightly to keep it running.

After starting, if the oil gage does not begin to show pressure within 30 seconds in the summertime and about twice that long in very cold weather, stop engine and investigate. Lack of oil pressure can cause serious engine damage.

NOTE:

Additional details concerning cold weather starting and operation may be found under COLD WEATHER OPERATION paragraphs in this section.

TAXIING

When taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized (see Taxiing Diagram, figure 4-2) to maintain directional control and balance.

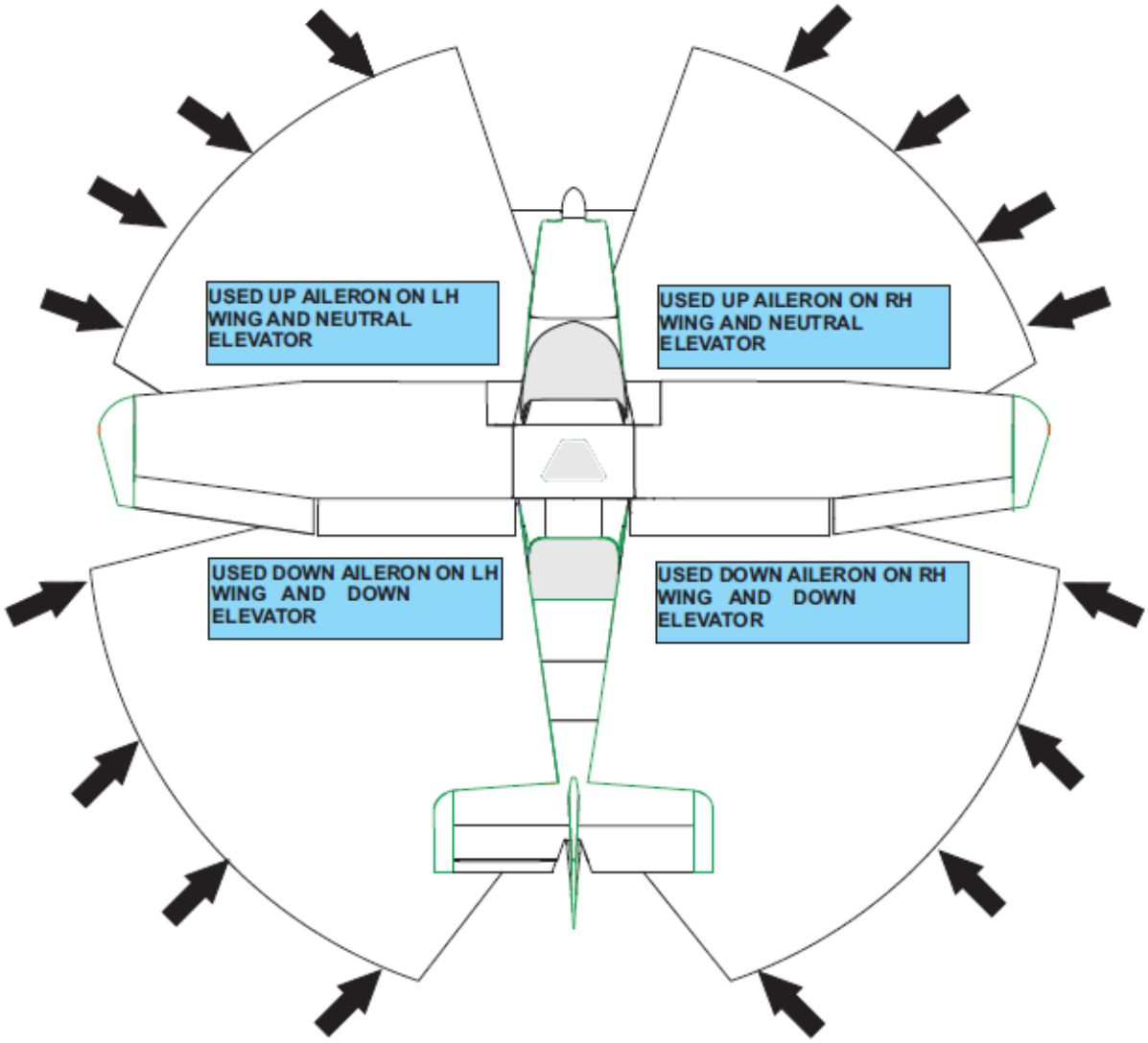

Figure 4-2 Taxiing Diagram

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.

The nose wheel is designed to automatically center straight ahead when the nose strut is fully extended. In the event the nose strut is over-inflated and the airplane is loaded to a rearward center of gravity position, it may be necessary to partially compress the strut to permit steering. This can be accomplished prior to taxiing by depressing the airplane nose (by hand) or during taxi by sharply applying brakes.

BEFORE TAKEOFF

WARM-UP

Starting warm period at 2000 r.p.m. for approx. 2 minutes, continue at 2500 r.p.m.duration depending on ambient temperature, until oil temperature reaches 50 ° C (120°F).

- Check Temperatures and pressures.

Throttle Response:

- Short full throttle ground test.

CAUTION:

After a full-load ground test allow a short cooling run to prevent vapor formation in the cylinder heat.
Most of the warm-up will have been conducted during taxi, and additional warm-up before takeoff should be restricted to the checklist procedures. Since the engine is closely cow led for efficient in-flight cooling, precautions should be taken to avoid overheating on the ground.

MAGNETO CHECK

The magneto check should be made at **4000 RPM** as follows. Move ignition switch (if Installed) first to R position and note RPM. Next move switch back to BOTH to clear the other set of plugs. Then move switch to the L position, note RPM and return the switch to the BOTH position. RPM drop should not exceed 125 RPM on either magneto or show greater than 50 RPM differential between magnetos. If there is a doubt concerning operation of the ignition system, RPM checks at higher engine speeds will usually confirm whether a deficiency exists.

An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system or should be cause for suspicion that the magneto timing is set in advance of the setting specified.

Check the two ignition circuits at **4000 r.p.m.** (approx. 1700 r.p.m. propeller).

- Speed drop with only one ignition circuit must no exceed **300 r.p.m.** (approx. 130 r.p.m. Propeller).

- **120 r.p.m.** (approx. 50 r.p.m. propeller) max difference of speed by use of either circuit, A or B.

NOTE: The propeller speed depends on the actual reduction ratio.

ALTERNATOR CHECK (optional)

Prior to flights where verification of proper alternator if installed and voltage regulator operation is essential, a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light, or by operating the wing flaps during the engine run up (3000 RPM). The ammeter will remain within a needle width of its initial position if the alternator and voltage regulator are operating properly.

TAKEOFF

POWER CHECK

It is important to check full-throttle engine operation early in the takeoff run. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff. If this occurs, you are justified in making a thorough full-throttle static run up before another takeoff is attempted.
Full throttle run ups over loose gravel are especially harmful to propeller tips. When takeoffs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before high RPM is developed, and the gravel will be blown back of the propeller rather than pulled into it. When unavoidable small dents appear in the propeller blades, they should be immediately corrected.
Prior to takeoff from fields above 500 feet elevation, the propeller should be adjusted to give maximum RPM in a full-throttle, static run up.
After full throttle is applied, adjust the throttle friction lock (if installed) clockwise to prevent the throttle from creeping back from a maximum power position. Similar friction lock adjustment should be made as required in other flight conditions to maintain a fixed throttle setting.

WING FLAP SETTINGS

Normal takeoffs are accomplished with wing flaps 0°-10°. Using 10° wing flaps reduces the total distance over an obstacle by approximately 10%. Flap deflections

greater than 10° are not approved for takeoff. If 10° wing flaps are used for takeoff, they should be left down until all obstacles are cleared and a safe flap retraction speed of 52 Kts is reached.

On a short field, 10° wing flaps and an obstacle clearance speed of 47 Kts should be used. This speed provides the best overall climb speed to clear obstacles when taking into account turbulence often found near ground level.

Soft or rough field takeoffs are performed with 10° wing flaps by lifting the airplane off the ground as soon as practical in a slightly tail low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a higher climb speed.
Takeoffs into strong crosswinds normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. The airplane is accelerated to a speed slightly higher than normal, and then pulled off abruptly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

ENROUTE CLIMB

Normal climbs are performed with flaps up and full throttle and at speeds 4 to 9 Kts higher than best rate-of-climb speeds for the best combination of performance, visibility and engine cooling. The propeller should be adjusted below 500 feet for smoother operation or to obtain maximum RPM. For maximum rate of climb, use the best rate-of-climb speeds shown in the Rate of Climb chart in Section 5. If an obstruction dictates the use of a steep climb angle, the best angle-of-climb speed should be used with flaps up and maximum power. Climbs at speeds lower than the best rate-of-climb speed should be of short duration to improve engine cooling.

CRUISE

Normal cruising is performed between 70% and 75% power. The engine RPM and corresponding fuel consumption for various altitudes can be determined by using your IBIS information on data in Section 5.

NOTE:

Cruising should be done at 70% to 75% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The data in Section 5 shows the increased range and improved fuel economy that is obtainable when operating at lower power settings. The use of lower power settings and the selection of cruise altitude on the basis of the most favorable wind conditions are significant factors that should be considered on every trip to reduce fuel consumption.

	75% POWER	70% POWER
ALTITUDE	kts	kts
Sea Level	90	82
8000 Feet.	93	84
10000 Feet.	96	87
Standard conditions		Zero Wind

Figure 4-3 Cruise Performance Table

The Cruise Performance Table, figure 4-3, shows the true airspeed (knot) during cruise for various altitudes and percent powers. This table should be used as a guide, along with the available winds aloft information, to determine the most favorable altitude and power setting for a given trip.

To achieve the recommended fuel consumption figures shown in Section 5, the propeller should be adjusted slightly to obtain smooth operation.

Carburetor ice, as evidenced by an unexplained drop in RPM, to prevent carburetor ice, during flight, avoided flight in very heavy rain condition, this prevent the possibility of engine stoppage due to excessive water ingestion.

FUEL SAVINGS PROCEDURES FOR FLIGHT

TRAINING OPERATIONS

For best fuel economy during flight training operations, the following procedures are recommended.

1. Use 75% power while transitioning to and from the practice area (approximately 5000 RPM).
2. Propeller may be adjusted during climbs above 1000 feet and for practicing such maneuvers as stalls.

NOTE:

When cruising at 75% or less power, the propeller may be adjusted. This is especially applicable to cross-country training flights, but may also be practiced during transition flights to and from the practice area.

Using the above recommended procedures can provide fuel savings of up to 13%. When compared to typical training operations.

STALLS

The stall characteristics are conventional for the flaps up and flaps down condition. The stall warning horn (if installed) produces a steady signal 4 to 9 Kts before the actual stall is reached and remains on until the airplane flight attitude is changed. Stall speeds for various combinations of flap setting and bank angle are summarized in Section 5.

SPINS

Intentional spins are approved in this airplane (see Section 2). Before attempting to perform spins, however, several Items should be carefully considered to assure a safe flight. No spins should be attempted without first having received dual instruction in both spin entries and spin recoveries from a qualified instructor who is familiar with the spin characteristics of the **IBIS MAGIC GS 700**.

The cabin should be clean and all loose equipment (including the microphone) should be stowed. For a solo flight in which spins will be conducted, the copilot's seat belt and shoulder harness should be secured. **Spins with baggage loadings is not approved.**

The seat belts and shoulder harnesses should be adjusted to provide proper restraint during all anticipated flight conditions. However, care should be taken to

ensure that the pilot can easily reach the flight controls and produce maximum control travels.

It is recommended that, where feasible, entries be accomplished at high enough altitude that recoveries are completed 4000 feet. Or more above ground level. At least 1000 feet of altitude loss should be allowed for a 1-turn spin and recovery, while a 6-turn spin and recovery may require somewhat more than twice that amount. For example, the recommended entry altitude for a 6-turn spin would be 6000 feet above ground level. In any case, entries should be planned so that recoveries are completed well above the minimum 1500 feet above ground level required by FAR 91.71. Another reason for using high altitudes for practicing spins is that a greater field of view is provided which will assist in maintaining pilot orientation.

The normal entry is made from a power-off stall. As the stall is approached, the elevator control should be smoothly pulled to the full aft position. Just prior to reaching the stall "break", rudder control in the desired direction of the spin rotation, should be applied so that full rudder deflection is reached almost simultaneously with reaching full aft elevator. A slightly greater rate of deceleration than for normal stall entries or the use of partial power at the entry will assure more consistent and positive entries to the spin. Both elevator and rudder controls should be held full with the spin until the spin recovery is initiated. An inadvertent relaxation of either of these controls could result in the development of a nose-down spiral.

NOTE:

Careful attention should be taken to assure that the aileron control is neutral during all phases of the spin since any aileron deflection in the direction of the spin may alter the spin characteristics by increasing the rotation rate and changing the pitch attitude.

For the purpose of training in spins and spin recoveries, a 1 to 2-turn spin is adequate and should be used. Up to 2 turns, the spin will progress to a fairly rapid rate of rotation and a steep attitude. Application of recovery controls will produce prompt recoveries of from 1/4 to 1/2 of a turn.

If the spin is continued beyond the 2 to 3-turn range, some change in character of the spin may be noted. Rotation rates may vary and some additional sideslip may be felt. Normal recoveries from such extended spins may take up to a full turn or more.

Regardless of how many turns the spin is held or how it is entered, the following recovery technique should be used:

1. VERIFY THAT AILERONS ARE NEUTRAL AND THROTTLE IN IDLE POSITION.
2. **APPLY AND** HOLD FULL RUDDER OPPOSITE TO THE DIRETION OF ROTATION.
3. **JUST AFTER** THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL.
   Full down elevator may be required at aft center of gravity loadings to assure optimum recoveries.
4. **HOLD** THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.
5. **AS ROTATION** STOPS, NEUTRALIZE RUDDER, AND MAKE SMOOTH RECOVERY FROM THE RESULTING DIVE.

NOTE:

If disorientation precludes a visual determination of the direction of rotation, the symbolic airplane in the turn coordinator (IF INSTALLED) may be referred to for this information.

Variations in basic airplane rigging or in weight and balance due to installed equipment or cockpit occupancy can cause differences in behavior particularly in extended spins. These differences are normal and will result in variations in the spin characteristics and in the recovery lengths for spins of more than 3 turns. However, the above recovery procedure should always be used and will result in the most expeditious recovery from any spin.

Intentional spins with flaps extended are prohibited, since the high speeds which may occur during recovery are potentially damaging to flap/wing structure.

LANDING

Normal landing approaches can be made with power-on or power-off Speeds of 52 to 60 Kts with flaps up, and 48 to 56 Kts with flaps down. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds.

Actual touchdown should be made with power-off and on the Wheels first. The nose wheel should be lowered smoothly to the runway as speed is diminished.

SHORT FIELD LANDING

For a short field landing in smooth air conditions, make an approach at 47 Kts with 30° flaps using enough power to control the glide path. After all approach obstacles are cleared, progressively reduce power and maintain 47 Kts by lowering the nose of the airplane. Touchdown should be made with power-off and on the main wheels first. Immediately after touchdown, lower the nose wheel and apply heavy braking as required. For maximum brake effectiveness, retract the flaps, hold full nose-up elevator, and apply maximum brake pressure without sliding the tires.

Slightly higher approach speeds should be used under turbulent air conditions.

CROSSWIND LANDING

When landing in a strong crosswind, use the minimum flap setting required for the field length. Use a wing low, crab, or a combination method of drift correction and land in a nearly level attitude.

BALKED LANDING

In a balked landing (go-around) climb, the wing flap setting should be reduced to 20° immediately after full power is applied. Upon reaching a safe airspeed, the flaps should be slowly retracted to the full up position.

COLD WEATHER OPERATION

Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy.

NOTE:

When pulling the propeller through by hand, treat it as if the ignition switch is turned on. A loose or broken ground wire on either magneto could cause the engine to fire.
In extremely cold (-18°C and lower) weather, the use of an external preheated is recommended whenever possible to reduce wear and abuse to the engine and electrical system.

Cold weather starting procedures are as follows:

With Preheat:

1. with ignition switch OFF and throttle closed, pull the choke as the propeller is being turned over by hand.

NOTE:

Use choke for best result.

1. Propeller Area……CLEAR.
2. Master Switch…….. ON.
3. Choke …….. PULL ON.
4. Throttle…….. FULL AFT POSITION.
5. Ignition Switch…… START.
6. Release ignition switch to BOTH when engine starts.
7. Pull choke knob full on after engine has started. Leave on until engine is running smoothly.
8. Oil Pressure…… CHECK
9. Choke…… FULL AFT POSITION

Without Preheat:

1. Pull Choke……Full forward position while the propeller is being turned by hand with the throttle closed.

2. Propeller Area…… CLEAR.
3. Master Switch…… ON.
4. Propeller …….. HIGH RPM.
5. Throttle…….. IN IDLE POSITION.
6. Ignition Switch…….. START.
7. Release ignition switch to BOTH when engine starts.
8. Pull choke knob full on after engine has started. Leave on until engine is Running smoothly.
9. Oil Pressure…….. CHECK.
10. Choke…… FULL AFT POSITION

NOTE:

If the engine does not start during the first few attempts, or if engine firing diminishes in strength, it is probable that the spark plugs have been frosted over. Preheat must be used before another start is attempted.

During cold weather operations no indication will be apparent on the oil temperature gage prior to takeoff if outside air temperatures are very cold. After a suitable warm-up period (2 to 5 minutes at 1000 RPM accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is ready for takeoff.

NOISE ABATEMENT

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

We as pilots can demonstrate our concern for environmental improvement, by application of the following suggested procedures, and thereby tend to build public support for aviation:

1. Pilots operating aircraft under VFR over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.
2. During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas.

NOTE:

The above recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgment, an altitude of less than 2000 feet is necessary for him to adequately exercise his duty to see and avoid other aircraft. The certificated noise level for the Model MAGIC GS-700 at 1320 Lb. maximum weight is **18.0dB (**A). No determination has been made by the Federal Aviation Administration that the noise level of this airplane are or should be acceptable or unacceptable for operation at, into or out of, any airport.

SECTION 5

PERFORMANCE

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INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

Some indeterminate variables, such as mixture leaning (if installed) technique, fuel metering characteristics, engine and propeller condition, and air turbulence may account for variations of 10% or more in range and endurance. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight.

USE OF PERFORMANCE CHARTS

Performance data is presented in tabular or graphical form to illustrate the effect of different variables. Sufficiently detailed information is provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

SAMPLE PROBLEM

The following sample flight problem utilizes information from the various charts to determine the predicted performance data for a typical flight. The following information is known:

AIRPLANE CONFIGURATION

Takeoff weight	1320 Pounds.
Usable fuel	18.5 Gallons.

TAKEOFF

Field pressure altitude	1000 feet.
Temperature	82°F (60°F above standard)
Wind component along runway	12 Knot. Headwind
Field length	500 feet

CRUISE

Total distance	120 MPH Miles.
Pressure altitude	5500 Feet
Temperature	68°F (61°F above standard)
Expected wind enrooted	10 knot Headwind

LANDING

Field pressure altitude	2000 Feet
Temperature	77°F (25°C)
Field length	705 Feet

TAKEOFF

The takeoff distance chart, figure 5-4, should be consulted, keeping in mind that the distances shown are based on the short field technique. Conservative distances can be established by reading the chart at the next higher value of altitude and temperature. For example, in this particular sample problem, the takeoff distance information presented for a pressure altitude of 2000 feet and a temperature of 30°C should be used and in the following:

Ground roll	594 Feet
Total distance to clear a 50-foot obstacle	986 Feet

These distances are well within the available takeoff field length. However, a correction for the effect of wind may be made based on Note 3 of the takeoff chart. The correction for a 12 knot headwind is:

(12 Knots/9 Knots) X .10% = **13%** Decrease

This results in the following distances, corrected for wind:

Ground roll, zero wind	594 Ft.
Decrease in ground roll (193 feet x 13%)	77 Ft.
Corrected ground roll	517 Ft.
Total distance to clear a 50 feet obstacle, zero wind	986 Ft.
Decrease in total distance (352 feet x 13%)	128 Ft.
Corrected total distance to clear 50 feet obstacle	858 Ft.

CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft, and the airplane's performance. However, the power setting selection for cruise must be determined based on several considerations. Considerable fuel savings a longer range result when lower power settings are used.

FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in figures 5-6 and 5-7. For this sample problem, figure 5-6 shows that a climb from 2000 Feet to 6000 Feet requires 1.48 gallon of fuel.

The corresponding distance during the climb is 10 nautical miles. These values are for a standard temperature (as shown on the climb chart) and are sufficiently accurate for most Right planning purposes. However, a further correction for the effect of temperature may be made as noted on the climb chart. The approximate effect of a non-standard temperature is to increase the time, fuel, and distance by 10% for each IO°C above standard temperature, due to the lower rate of climb. In this case, assuming a temperature (16°C) above standard, the correction would be:

16° C / 10°C = 16% Increase

With this factor included, the fuel estimate would be calculated as follows:

Fuel to climb, standard temperature		1.48 gallons
Increase due to non-standard temperature	(1.0 X16%)	0.2 gallons
Corrected fuel to climb		1.5 gallons

Using a similar procedure for the distance to climb results in 10 miles.
The resultant cruise distance is:

Total distance	120
Climb distance	-10
Cruise distance	110 Miles.

With an expected 10 knot headwind, the ground speed for cruise is predicted to be:

99
- 10
89 Miles.

Therefore, the time required for the cruise portion of the trip is:

110 Miles / 89 Miles = 1.23 Hours

The fuel required for cruise is: 1.23 hours x 5.3 gallons/hour = 6.51 gallons
The total estimated fuel required is as follows:

Engine start, taxi, and takeoff	0.6
Climb	1.5
Cruise	6.51
Total fuel required	8.61 Gallons

This will leave a fuel reserve of:	16.5
	-8.61
	7.89 Gallons

Once the flight is underway, ground speed checks will provide a more accurate basis for estimating the time enrooted and the corresponding fuel required completing the trip with ample reserve.

LANDING

A procedure similar to takeoff should be used for estimating the landing distance at the destination airport. Figure 5-8 presents landing distances for various airport altitude and temperature combinations are using the short field technique. The distances corresponding to 2000 feet and 86 °F (30°C) are as follows:

Ground rolls	559 Feet
Total distance to clear a 50-feet obstacle	928 Feet

A correction for the effect of wind may be made based on Note 2 of the landing chart using the same procedure as outlined for takeoff.

AIRSPEED CALIBRATION

CONDITIONS:

Power required for level flight or maximum rated RPM dive.

FLAPS UP											
	40	50	60	70	80	90	100	110	120	130	140
KIAS	46	53	60	69	78	88	97	107	117	127	136
KCAS											
FLAPS 10°											
	40	50	60	70	80	85.....					
KIAS	44	52	61	70	80	84.....					
KCAS											
FLAPS 30°											
	40	50	60	70	80	85.....					
KIAS	43	51	61	71	82	87.....					
KCAS											

Figure 5 - 1 Airspeed Calibration

NOTE:

KIAS knots indicated air speed shown on the air speed indicator an expressed in knots.

TEMPERATURE CONVERSION CHART

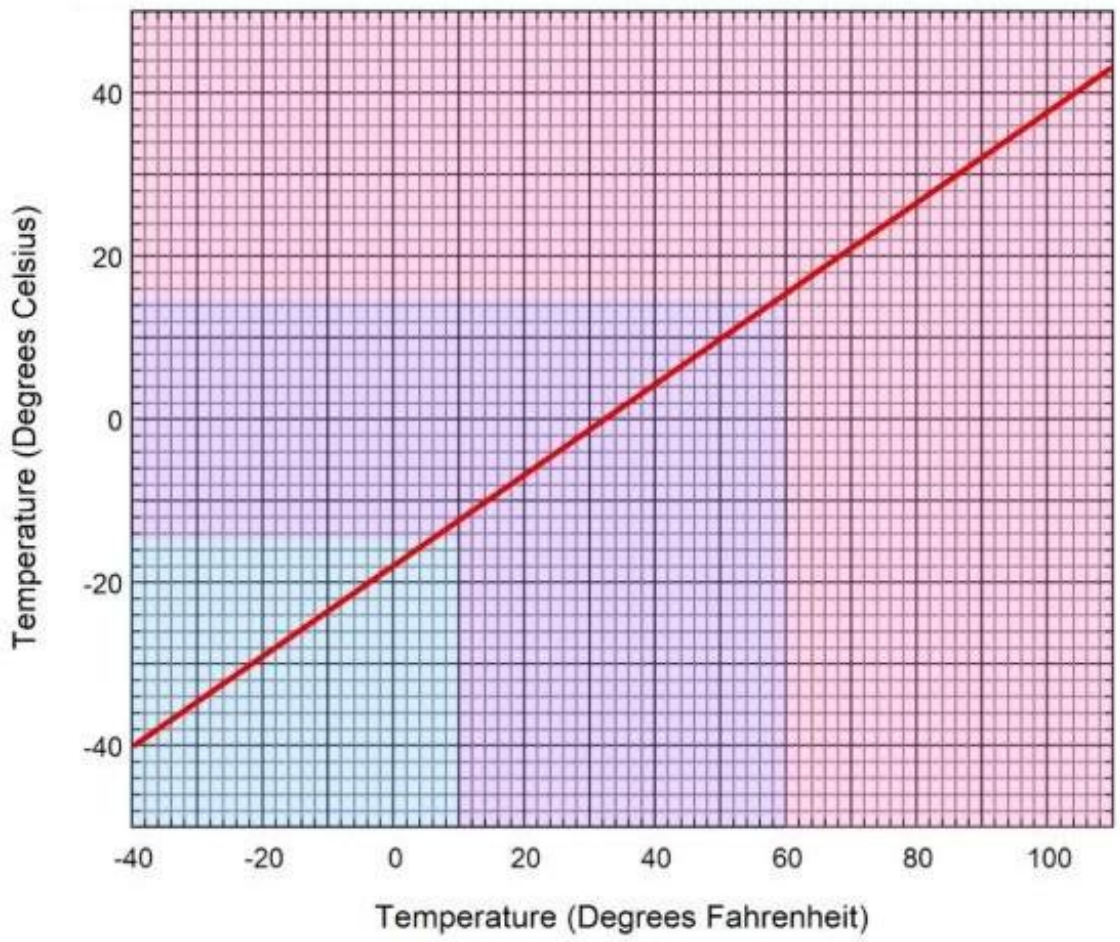

Figure 5-2, Temperature Conversion Chart

CONDITIONS:

Power Off

NOTE:

KIAS values are approximate and are based on airspeed calibration data with power off.

MOST REARWARD CENTER OF GRAVITY

GROSS WEIGHT	FLAP SETTING	ANGLE OF BANK							
		0°		30 °		45°		60°	
		KIAS	MPH(IAS)	KIAS	MPH(IAS)	KIAS	MPH(IAS)	KIAS	MPH(IAS)
1320 Lb.	UP	36	41	38	44	42	48	50	58
	10	36	41	45	52	42	48	50	58
	30	31	35	43	50	36	42	43	50

MOST FORWARD CENTER OF GRAVITY

GROSS WEIGHT	FLAP SETTING	ANGLE OF BANK							
		0 °		30°		45°		60°	
		KIAS	MPH(IAS)	KIAS	MPH(IAS)	KIAS	MPH(IAS)	KIAS	MPH(IAS)
1320 Lb.	UP	39	45	42	48	48	55	56	65
	10	40	46	43	49	48	55	56	65
	30	35	40	37	43	41	47	49	56

Figure 5 - 3 Stall Speeds

TAKE OFF DISTANCE-SHORT FIELD

CONDITIONS:

Flaps 10º

Full Throttle **MAP** 30" Prior to Brake Release / Paved, Level Dry Runway

Zero Wind

Notes:

1. Prior to takeoff from fields above 500 feet elevation, the propeller should be adjusted to give optimum RPM in a full throttle, static run-up
2. Decrease distances 10% for each 9 knots of headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry grass runway, increase distances by 15% of the "ground roll" figure.

WT Lb.	TAKE OFF SPEED Kts		PRESS ALT(Ft)	0°		10°		20°		30°		40 °	
	LIFT OFF	AT 43		GRND RUN(ft)	TO CLEAR 50 OBS(ft)	GRND RUN(ft)	TO CLEAR 50 OBS(ft)	GRND RUN(ft)	TO CLEAR 50 OBS(ft)	GRND RUN(ft)	TO CLEAR 50 OBS(ft)	GRND RUN(ft)	TO CLEAR 50 OBS(ft)
			S.L	509	845	518	860	528	877	537	891	548	910
1320	35	47	1000	520	863	529	878	539	895	550	913	562	933
			2000	552	916	565	938	580	963	594	986	609	1011
			3000	566	940	579	961	598	993	613	1018	629	1044
			4000	582	966	591	981	606	1006	623	1034	667	1107
			5000	601	998	617	1024	634	1052	653	1083	694	1152
			6000	619	1027	640	1062	659	1093	680	1129	702	1165
			7000	633	1050	652	1082	665	1103	687	1140	708	1175
			8000	684	1135	708	1175	734	1218	767	1273	797	1323

Figure 5 - 4 Takeoff Distance

RATE OF CLIMB DATA

MAXIMUM

Conditions:

Flaps Up
Full Throttle 30" **MAP**

NOTE:

Propeller adjusted above 500 ft for maximum RPM

WT Kg.	PRESS ALT (FT)	CLIMB SED KTS	RATE OF CLIMB FPM			
			0 °	20°	30 °	40 °
1320	S.L	58	835	765	700	630
	2000	57	735	670	600	535
	4000	56	635	570	505	445
	6000	55	535	475	415	355
	8000	54	440	380	320	265
	10000	53	340	285	230	175
	12000	52	245	190	135	85

Figure 5 - 5 Rate of Climb

TIME FUEL AND DISTANCE TO CLIMB

MAXIMUM RATE OF CLIMB

Conditions:

Flaps Up / Full Throttle 30" **MAP**

Standard Temperature

NOTES:

1. Add 0.6 gallon of fuel for engine start, taxi, and takeoff allowance
2. Propeller adjusted above 500 ft for maximum RPM
3. Increase time, fuel and distance by 10% for each 10° degrees above standard temperature
4. Distances shown are based on zero wind

WT Kg.	PRESS ALT FT.	TEMP ^{0}F.	CLIMB SPEED KTS	RATE OF CLIMB FPM	FROM SEAL LEVEL		
					TIME MIN	FUEL USED GALLONS	DISTANCE MILES.
1320 Lb	S.L	59(15 ^{0}C).	58	715	0	0	0
	1000	55(13^{0}C)	57	675	1	0.68	2
	2000	52(11^{0}C)	57	630	3	0.86	3
	3000	48(9^{0}C)	56	590	5	1.04	5
	4000	45(7^{0}C)	56	550	6	1.13	7
	5000	41(5^{0}C)	55	505	8	1.30	9
	6000	37(3^{0}C)	55	465	10	1.48	12
	7000	34(1^{0}C)	55	425	13	1.78	14
	8000	30(-1^{0}C)	54	380	15	1.90	17
	9000	27(-3^{0}C)	54	340	18	2.19	21
	10000	23(-5^{0}C)	53	300	21	2.45	25
	11000	19(-7^{0}C)	53	255	25	2.8	29
	12000	16(-9^{0}C)	52	215	29	3.16	34

Figure 5 - 6 Time, Fuel and Distance to Climb

CRUISE PERFORMANCE

Conditions:

1320 Pounds
Recommended: prior to takeoff from fields above 50 ft elevations, the propeller should be adjusted to give optimum cruise speeds.

PRESSURE ALTITUDE FT.	RPM	20º Below Stándard temperature						
		% BHP	KTS	GPH	TIME	MILES	TIME	MILES
8000	4800	72	88	5.0	3.3	333	6.9	697
10000	4800	72	90	5.0	3.3	342	6.9	717
8000	4900	73	89	5.1	3.2	380	6.7	690
10000	4900	73	91	5.1	3.2	336	6.7	704
8000	5000	75	93	5.3	3.11	333	6.5	696
10000	5000	75	96	5.3	3.11	345	6.5	722
8000	5100	76	94	5.4	3.05	330	6.38	690
10000	5100	76	97	5.4	3.05	336	6.38	719
80000	5200	78	95	5.5	3.0	327	6.27	684
10000	5200	78	98	5.5	3.0	339	6.27	709
80000	5300	80	96	5.6	2.94	324	6.16	678
10000	5300	80	99	5.6	2.94	335	6.16	702
80000	5400	81	96	5.7	2.89	321	6.05	672
10000	5400	81	100	5.7	2.89	332	6.05	696
8000	5500	82	97	6.0	2.75	308	5.75	644
10000	5500	82	101	6.0	2.75	319	5.75	667

Figure 5 - 7 Cruise Performance

LANDING DISTANCE

SHORT FIELD

Conditions:

Flaps 30º / Power Off / Maximum Braking / Paved, Level, Dry Runway / Zero Wind

NOTES:

1. Decrease distances 10% for each 9 knots. Head wind. For operation with tail winds up to 10 knots. Increase distances by 10% for each 2 knots.
2. For operation on a dry, grass runway, increase distances by 45% of the "ground roll" figure.

WT Lb	SPEED AT 43 KTS	PRESS ALT FT	0 º		10 º		20 º		30 º		40 º	
			GRND RUN	TO CLEAR 50 OBS	GRND RUN	TO CLEAR 50 OBS	GRND RUN	TO CLEAR 50 OBS	GRND RUN	TO CLEAR 50 OBS	GRND RUN	TO CLEAR 50 OBS
			(FT)	(FT)	(FT)	(FT)	(FT)	(FT	(FT)	(FT)	(FT)	(FT)
		S.L	536	890	539	895	544	903	549	911	554	920
1320	47	1000	542	900	547	908	550	913	554	920	559	928
		2000	546	906	550	913	555	921	559	928	563	935
		3000	550	913	555	921	560	930	565	938	568	943
		4000	554	920	558	927	563	935	568	943	573	952
		5000	558	926	562	933	566	940	571	948	578	960
		6000	562	933	566	940	570	946	575	953	584	970
		7000	566	940	570	946	574	952	579	961	590	980
		8000	570	946	575	955	580	963	585	971	595	988

Figure 5 - 8 Landing Distance

SECTION 6

WEIGHT & BALANCE / EQUIPMENT LIST

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INTRODUCTION

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

It should be noted that specific information regarding the weight, arm, moment and installed equipment list for this airplane can only be found in the appropriate weight and balance records carried in the airplane.
It is the responsibility of the pilot to ensure that the airplane is loaded properly.

AIRPLANE WEIGHING PROCEDURES

1. Preparation:
    a. Inflate tires to recommended operating pressures.
    b. Remove the fuel tank sump quick-drain fittings and fuel line drain plug to drain all fuel.
    c. Remove oil sump drain plug to drain all oil.
    d. Move sliding seats to the most forward position.
    e. Raise flaps to the fully retracted position.
    f. Place all control surfaces in neutral position.

2. Leveling:
    a. Place scales under each wheel (500# minimum capacity for scales).
    b. Deflate nose tire and/ or lower or raise the nose strut to center bubble on level (see figure 6-1).

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

4. Measuring:

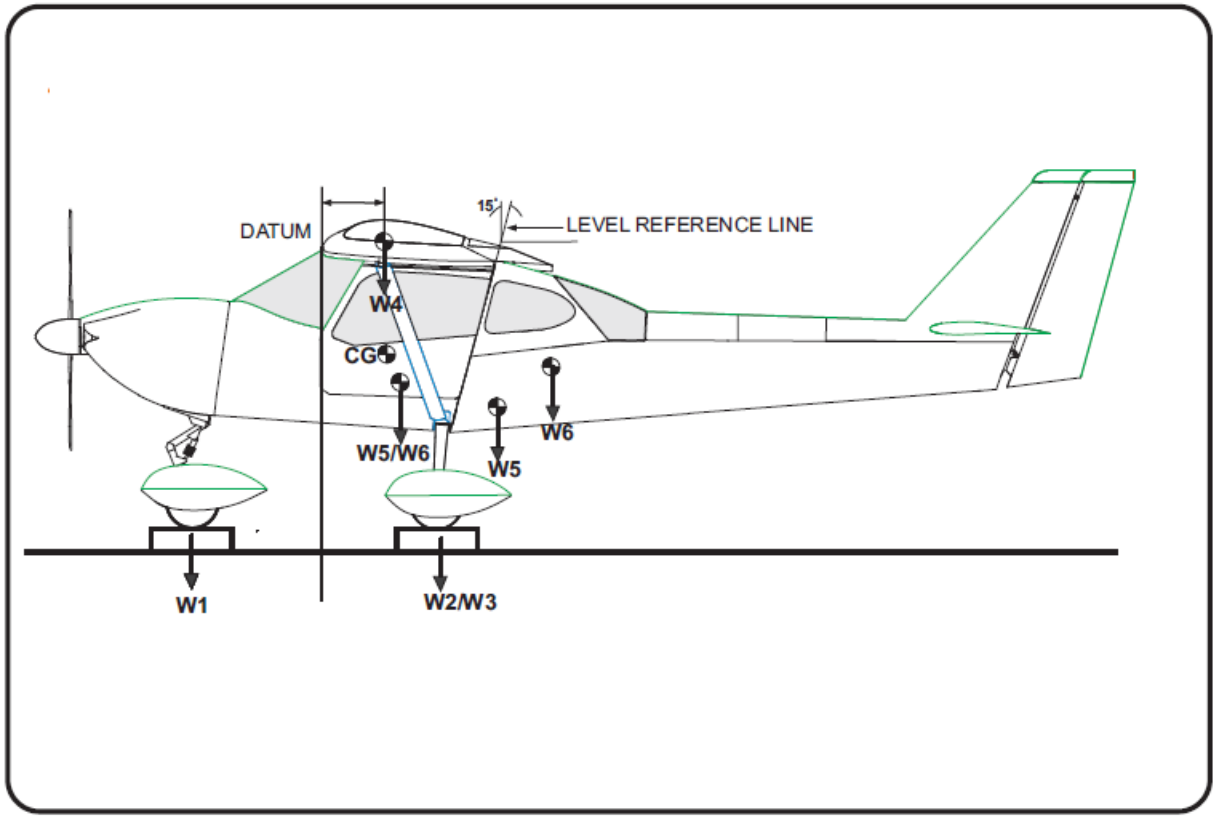
a. Obtain measurement A by measuring horizontally (along the airplane center line) from a line stretched between the main wheel centers to a plumb bob dropped from the firewall.

b. Obtain measurement B by measuring horizontally and parallel to the airplane center line, from center of nose wheel axle, left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and average the measurements.

5. Using weights from item 3 and measurements from item 4, the airplane weight and C.G. can be determined.

Basic Empty Weight may be determined by completing figure 6-1.

WEIGTH AND BALANCE CALCULATION PROCEDURE



Note: Reference Datum: Wing leading edge

DESCRIPTION.

1. - Determine weight distribution on the wheels of the empty aircraft (W1, W2, y W3)
2. - Determine weight of the W items (W4, W5, W6, W7, y W8)
3. - Measure distance between DATUM and Center of Gravity of the W items (arm)
4. - Fill the table and make sure that CG is between 10,59 inch and 18,54 inch AFT of the DATUM

ITEM	DESCRIPTION	WEIGHT (Kg)	ARM (mm)	MOMENT (Kg x mm)
W1	Nose Wheel	104,00	-690,00	-71.760,00
W2	LH Main Wheel	109,00	710,00	77.390,00
W3	RH Main Wheel	109,00	710,00	77.390,00
W4	Wing Fuel Tanks	52,18	650,00	33.917,00
W5	Pilot	80,00	550,00	44.000,00
W6	Passenger	80,00	550,00	44.000,00
W7	Baggage	30,00	1.205,00	36.150,00
W8	Reservor Fuel Tank (2GL)	5,140	1.054,10	5.418,07
	TOTAL GROSS WEIGHT:	569,32	***MOMENT:***	246.505,07

C of G = *Total Moment:* 246.505,07 / *Total Weight:* 569,32 ***C of G =*** **432,98** *mm AFT from DATUM*

This aircraft is between permitted range

Wing Chord	269,2	20%
1346 MM	**432,98**	**32%**
	471,1	35%

Figure 6-1 Sample Airplane Weighing

WEIGHT AND BALANCE

The following information will enable you to operate your IBIS MAGIC GS 700 within the prescribed weight and center of gravity limitations. To figure weight and balance, use the Sample Problem, Loading Graph, and Center of Gravity Moment Envelope as follows.

Take the basic empty weight and moment from appropriate weight and balance records carried in your airplane, and enter them in the column titled YOUR AIRPLANE on the Sample Loading Problem.

NOTE

In addition to the basic empty weight and moment noted on these records, the C.G. arm (fuselage station) is also shown, but need not be used on the Sample Loading Problem. The moment which is shown must divided by 1000, and this value used as the moment/1000 on the loading problem.

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

NOTE

Loading Graph information for the pilot, passengers and baggage is based on seats positioned for average occupants and baggage loaded in the center of the baggage areas as shown on the Loading Arrangements diagram. For loadings which may differ from these, the Sample Loading Problem lists fuselage stations for these items to indicate their forward and aft C.G. range limitation (baggage area limitation). Additional moment calculations, based on the actual weight and C.G. arm (fuselage station) of the item being loaded, must be made if the position of the load is different from that shown on the Loading Graph.

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

Figure 6 - 3 Baggage Loading Arrangements

LOADING ARRANGEMENTS

* Pilot or passenger center of gravity on adjustable seats positioned for average occupant. Numbers in parenthese indicate forward and after limit of ocupant center of gravity range.

** Arms measured to the center of the areas shown.

NOTE:

The after baggage wall, can be used as a convenient interior reference point for determining the location of baggage area fuselage staion.

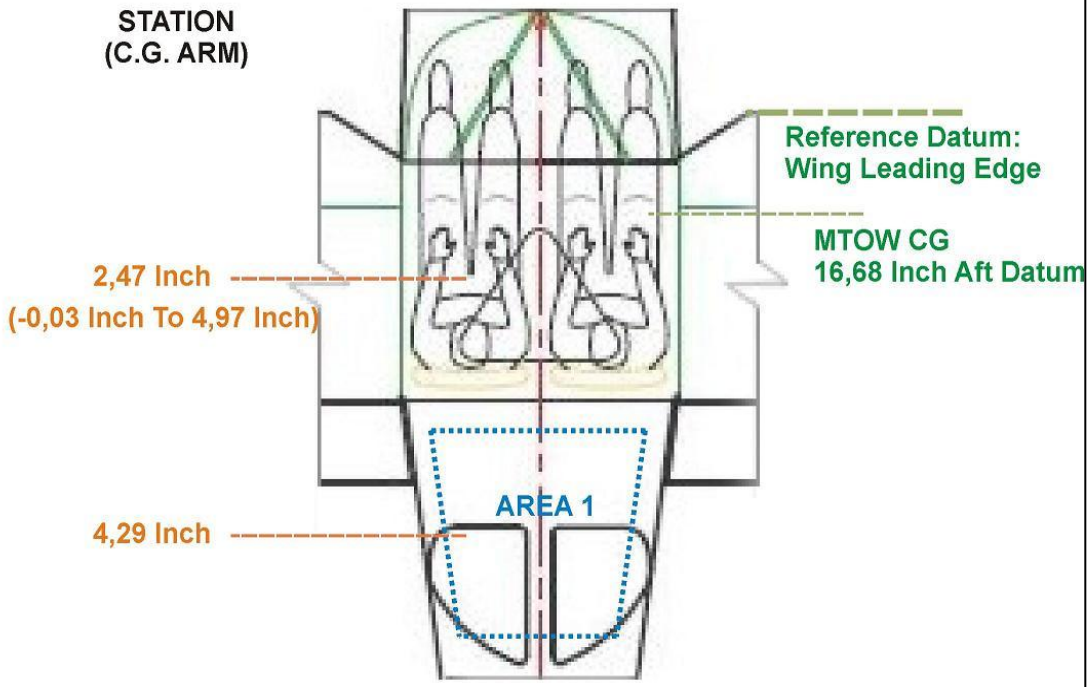
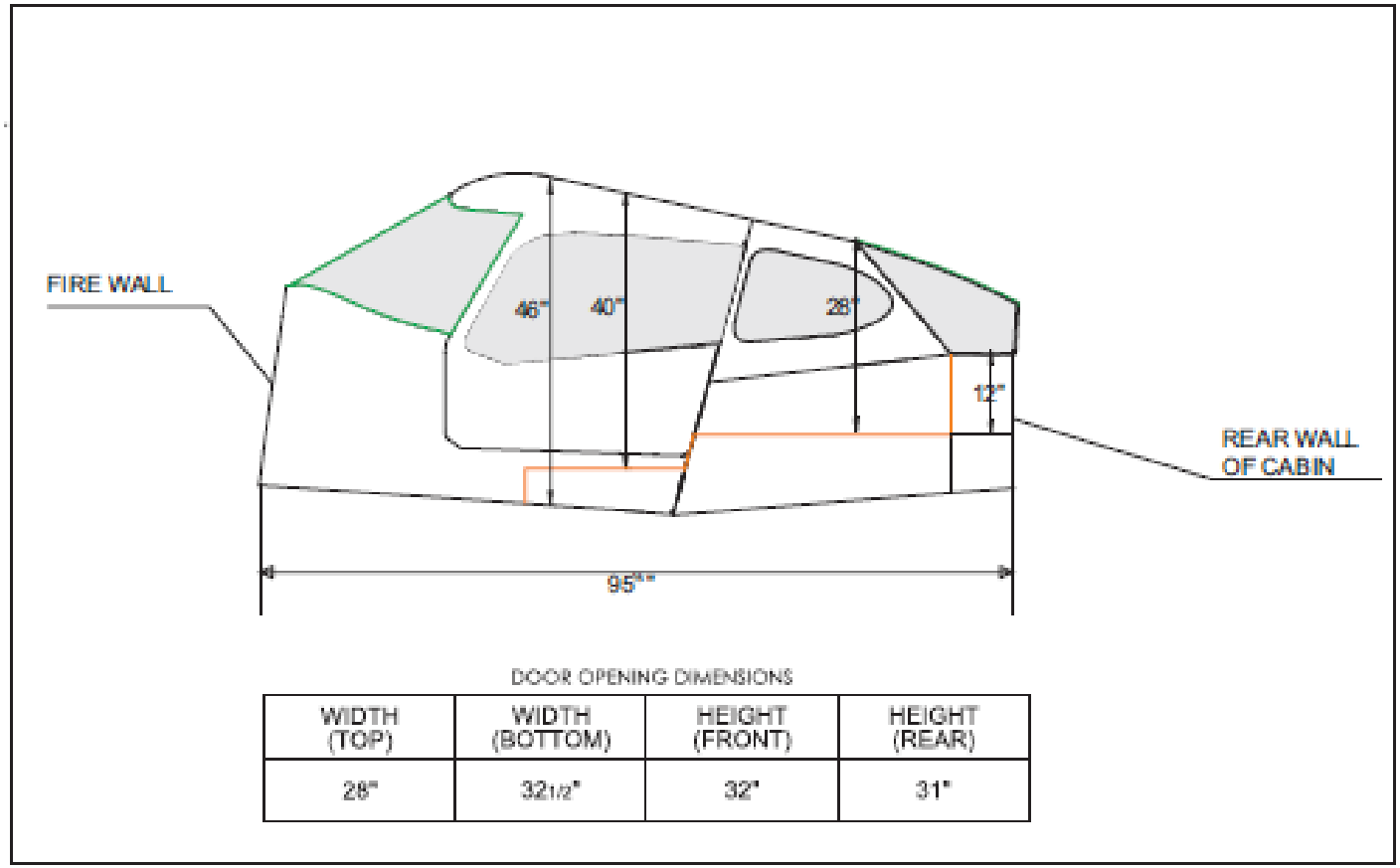


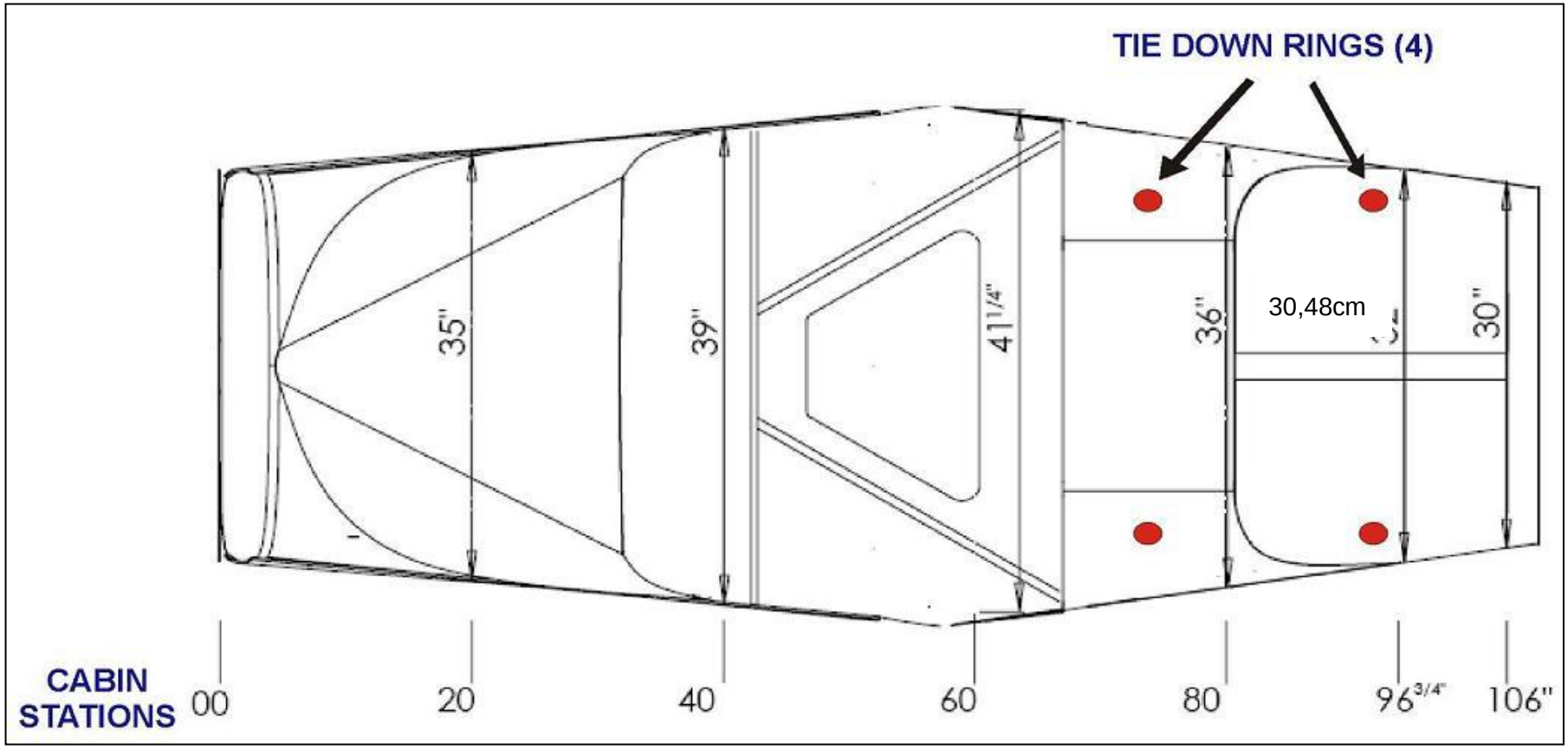
Figure 6 - 4 Baggage's loading and Tie-Down / Cabin Height Measurements



DOOR OPENING DIMENSIONS

WIDTH (TOP)	WIDTH (BOTTOM)	HEIGHT (FRONT)	HEIGHT (REAR)
28"	32 1/2"	32"	31"

CABIN WIDHT MEASUREMENTS



SECTION 7

AIRPLANE & SYSTEMS DESCRIPTIONS

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INTRODUCTION

This section provides description and operation of the airplane and its systems. Some equipment described herein is optional and may not be installed in the airplane.

AIRFRAME

The airplane is an all-metal, two-place, high-wing, single-engine airplane equipped with tricycle landing gear and is designed for general utility purposes.

The construction of the fuselage is a conventional formed sheet metal bulkhead, stringer, and skin design referred to as semi-monocoque. Major items of structure are the front and rear carry-through spars to which the wings are attached, a bulkhead and forgings for main landing gear attachment at the base of the rear door posts, and a bulkhead with attaching plates at the base of the forward door posts for the lower attachment of the wing struts. Four engine mount stringers are also attached to the forward door posts and extend forward to the firewall.

The externally braced wings, containing the fuel tanks, are constructed of a front and rear spar with formed sheet metal ribs, doublers, and stringers. The entire structure is covered with aluminum skin. The front spars are equipped with wing-to-fuselage and wing-to-strut attaches fit-tings. The aft spars are equipped with wing-to-fuselage attach fittings, and are partial-span spars. Conventional hinged ailerons and single-slotted flaps are attached to the trailing edge of the wings. The ailerons are constructed of a forward spar containing balance weights, for*m*ed sheet metal ribs and "V" type corrugated aluminum skin joined together at the trailing edge. The flaps are constructed basically the same as the ailerons, with the exception of the balance weights and the addition of a formed sheet metal leading edge section.

The empennage (tail assembly) consists of a conventional vertical stabilizer, rudder, horizontal stabilizer, and elevator. The vertical stabilizer consists of a spar, formed sheet metal ribs and reinforcements. A wraparound skin panel, formed leading edge skin and a dorsal. The rudder is constructed of a formed leading edge skin

containing hinge halves, a wrap-around skin panel and ribs, and a formed trailing edge skin with a ground adjustable trim tab at its base. The top of the rudder incorporates a leading edge extension which contains a balance weight. The horizontal stabilizer is constructed of a forward spar, main spar, formed sheet, metal ribs and stiffeners, a wrap-around skin panel, and formed leading edge skins. The horizontal stabilizer also contains
Electrical elevator trim tab actuator. Construction of the elevator consists of a main spar and bell crank, left and right wrap-around skin panels, and a formed trailing edge skin on the left half of the elevator; the entire trailing edge of the right half is hinged and forms the elevator trim tab. The leading edge of both left and right elevator tips incorporate extensions which contain balance weights.

FLIGHT CONTROLS

The airplane's flight control system (see figure 7-1) consists of conventional aileron, rudder, and elevator control surfaces. The control surfaces are manually operated through mechanical linkage using a control wheel for the ailerons and elevator, and rudder/brake pedals for the rudder.

TRIM SYSTEM

An electrical operated elevator trim tab is provided. Elevator trimming is accomplished through the elevator trim tab by utilizing the switch mounted trim control. Down position of the trim switch will trim nose-down; conversely, up position will trim nose-up.

INSTRUMENT PANEL

The instrument panel is designed to place the primary flight instruments directly in front of the pilot. The gyro-operated flight instruments are arranged one above the other, slightly to the left of the control column. To the left of these instruments is the airspeed indicator, turn coordinator, and suction gage (If Installed). The clock (optional), altimeter, rate-of-climb indicator, and navigation instruments are above and/or to the right of the control column. Avionics equipment is stacked approximately on the centerline of the panel, with space for additional equipment on

the lower right side of the instrument panel. The right side of the panel also contains the tachometer, and additional instruments such as a flight hour recorder. Engine instruments positioned right side the pilot's space for control wheel. The electrical switches, radio, ignition master switches and choke, are located below de pilot´s control wheel. The engine controls, wing flap switch, are to the left of the pilot, at the center of the switch and control panel. Directly below these controls are the elevator trim control wheel, trim position indicator, microphone, and circuit breakers.

For details concerning the instruments, switches, circuit breakers, and controls on this panel, refer in this section to the description of the systems to which these items are related.

GROUND CONTROL

Effective ground control while taxiing is accomplished through nose wheel steering by using the rudder pedals; left rudder pedal to steer left and right rudder pedal to steer right. When a rudder pedal is depressed, a spring-loaded steering bungee (which is connected to the nose gear and to the rudder bars) will turn the nose wheel through an arc of approximately 8.5º each side of center. By applying either left or right brake, the degree of turn may be increased up to 30º side of center.

Moving the airplane by hand is most easily accomplished by attaching a tow bar to the nose gear strut. If a tow bar is not available, or pushing is required, use the wing struts as push points. Do not use the vertical or horizontal surfaces to move the airplane. If the airplane is to be towed by vehicle, never turn the nose wheel more than 30º either side of center or structural damage to the nose gear could result.

The minimum turning radius of the airplane, using differential braking and nose wheel steering during taxi, is approximately 23 feet. To obtain a minimum radius turn during ground handling, the airplane may be rotated around either main landing gear by pressing down on the tail cone just forward of the vertical stabilizer to raise the nose wheel off the ground.

WING FLAP SYSTEM

The wing flaps are of the single-slot type (see figure 7-3), and are extended or retracted by positioning the wing flap switch lever on the instrument panel to the desired flap deflection position. The switch lever is moved up or down. For flap settings greater than 10º, move the switch lever to the right to clear the stop and position it as desired. A scale and pointer on the top of the switch lever indicates flap travel in degrees. The wing flap light system circuit is protected by a 10 ampere circuit breaker.

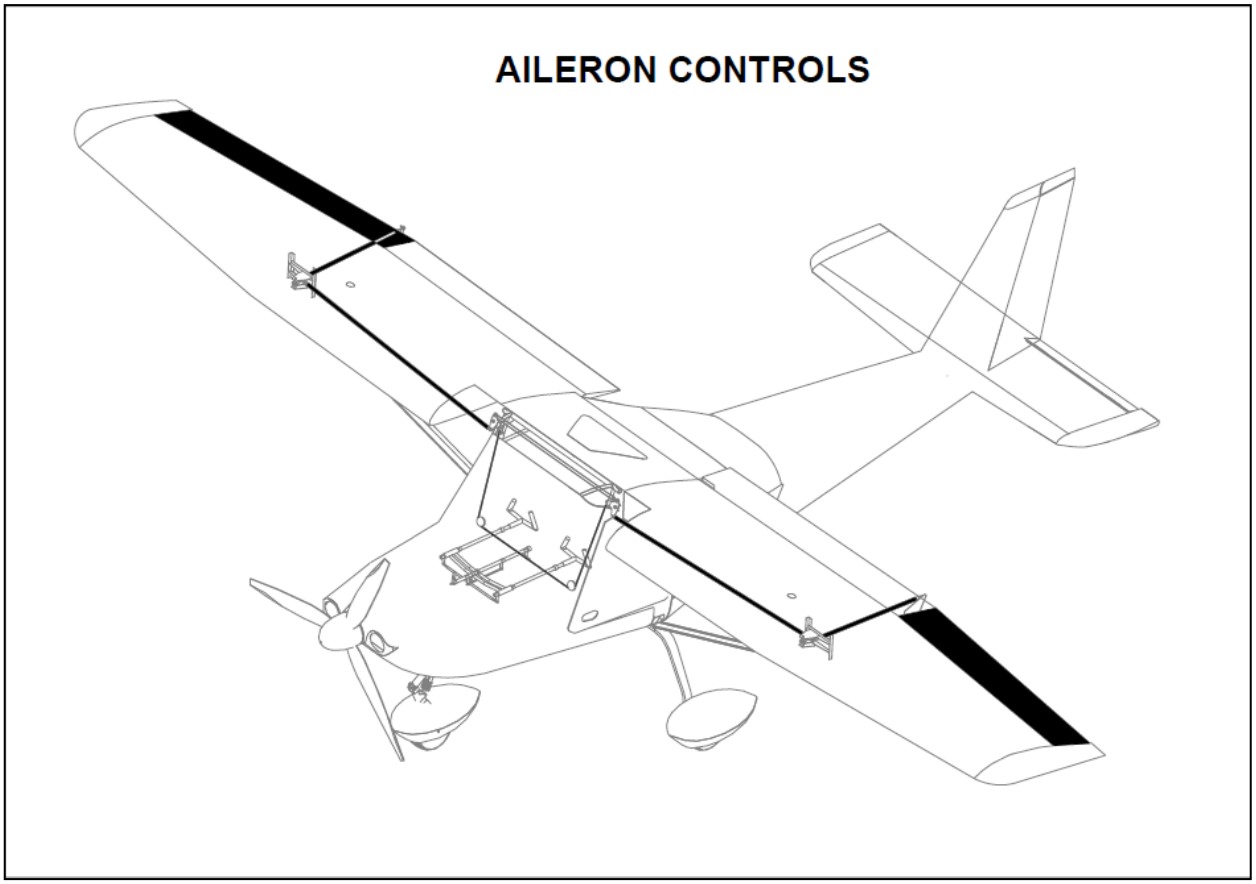
LANDING GEAR SYSTEM

The landing gear is of the tricycle type with a steerable nose wheel and two main wheels. The landing gear may be equipped with wheel fairings. Shock absorption is provided by the tubular spring-steel main landing gear struts and the air/oil nose gear shock strut. Each main gear wheel is equipped with a hydraulically actuated disc-type brake on the inboard side of each wheel. When wheel fairings are installed an aerodynamic fairing covers each brake.

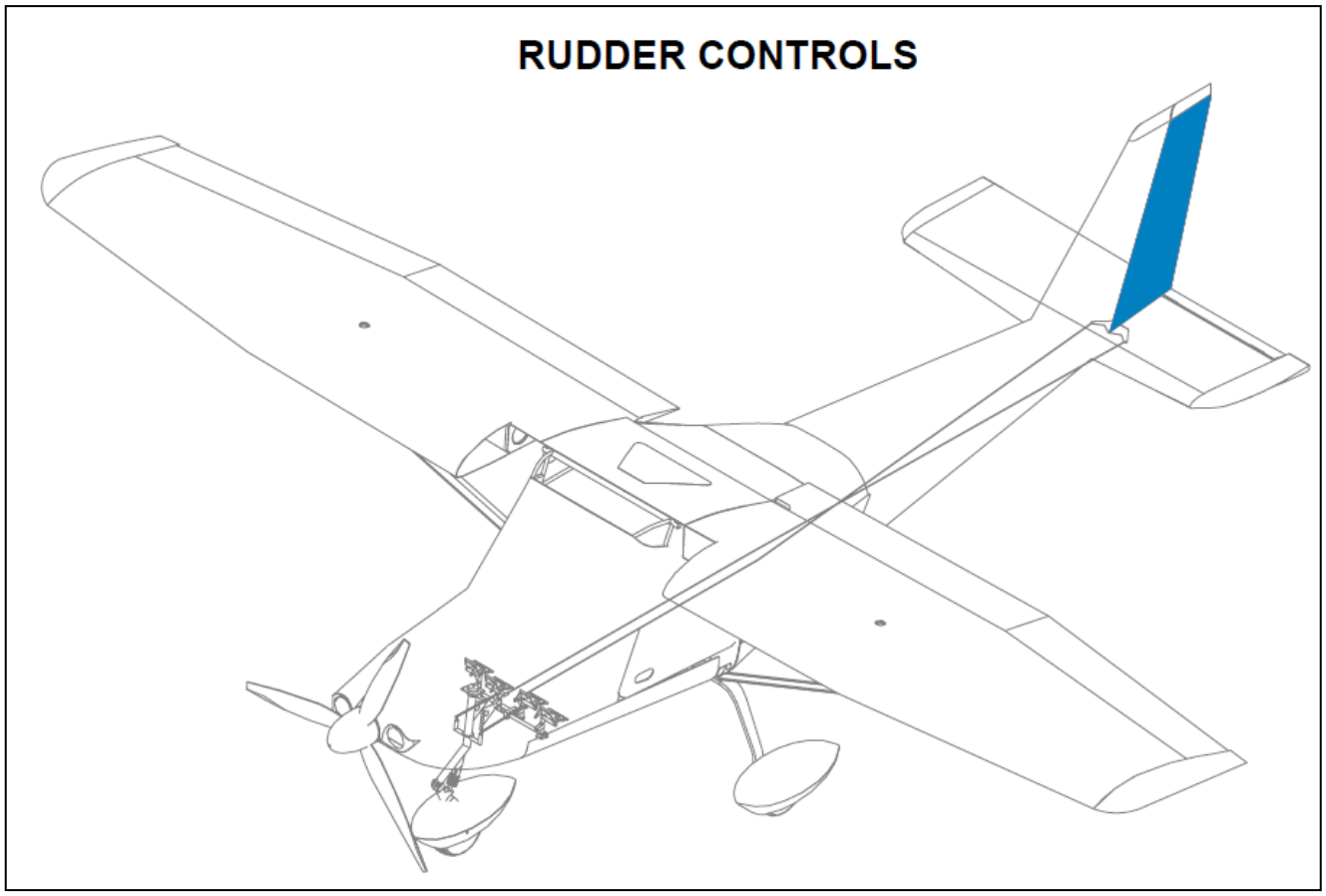
BAGGAGE COMPARTMENT

The baggage compartment consists of the area from the back of the pilot and passenger's seats to the aft cabin bulkhead. Access to the baggage compartment is gained from within the airplane cabin. A baggage net with four tie-down straps is provided for securing baggage and is attached by tying the strop to tie-down rings provide in the airplane when loading airplane children should not be placed or permitted in the baggage compartment, and any material that might be hazardous to the airplane or occupants should not be placed anywhere in the airplane. For baggage area dimensions, refer to Section 6.

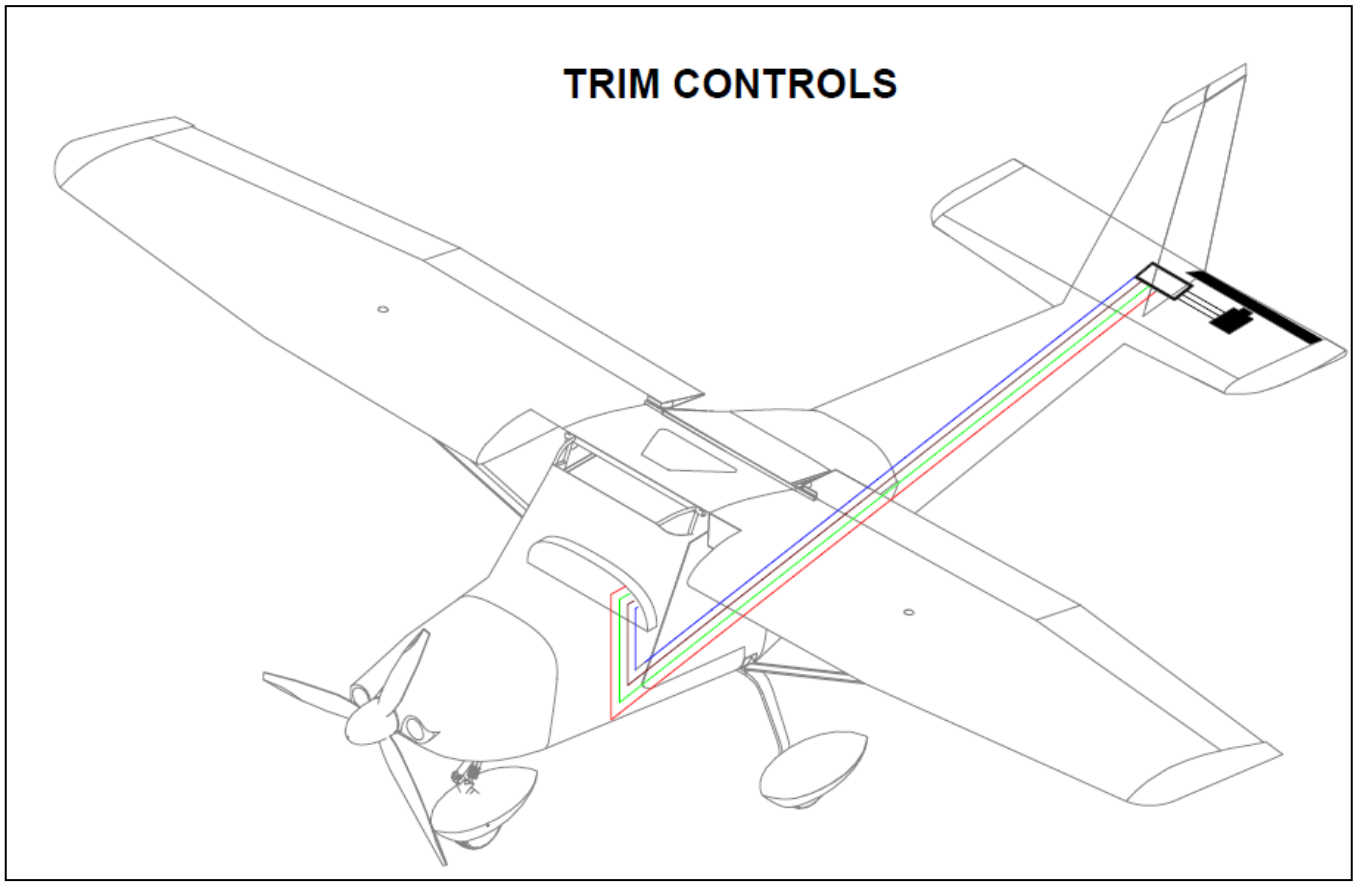
AILERON CONTROL SYSTEM



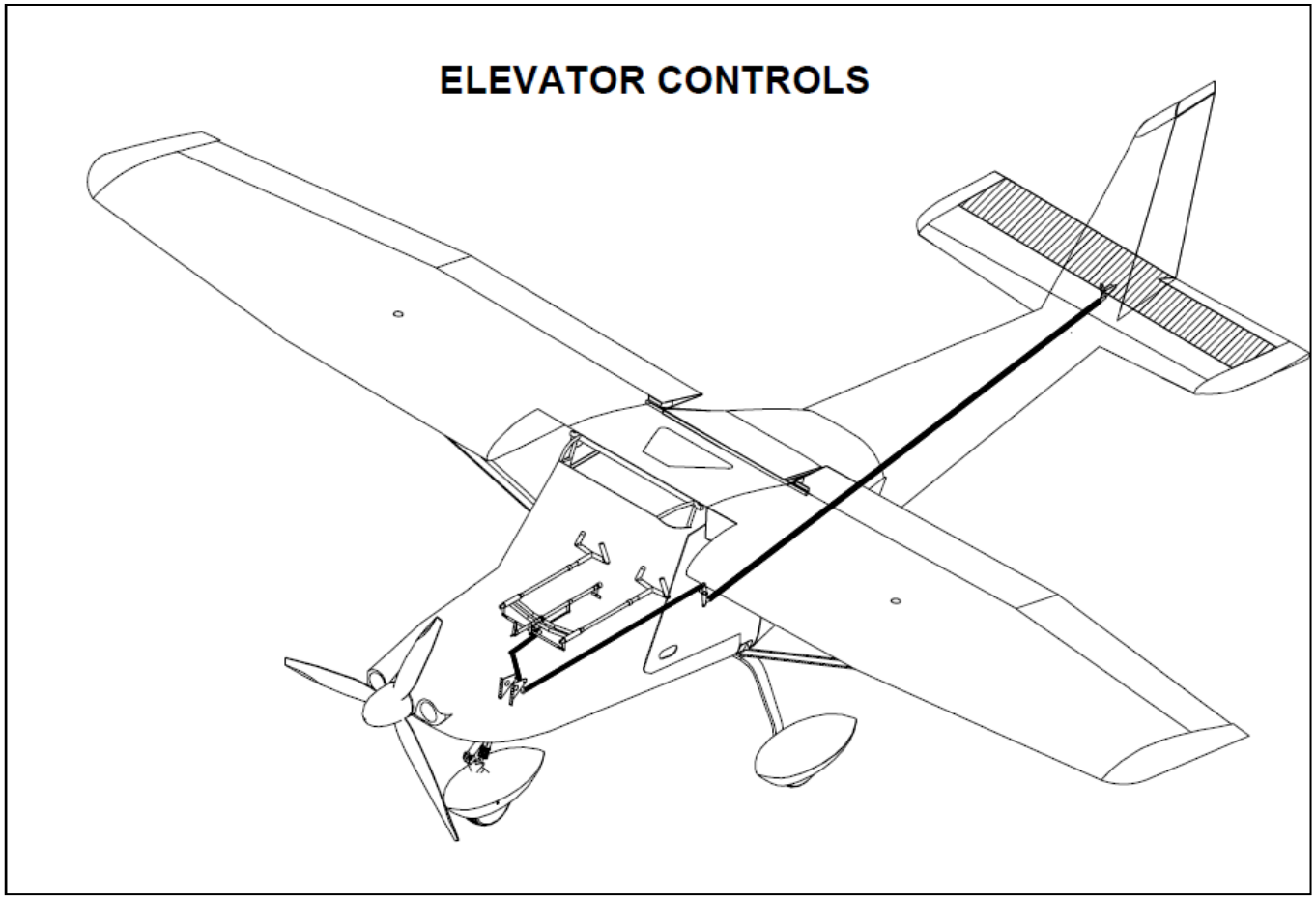
RUDDER CONTROL SYSTEM



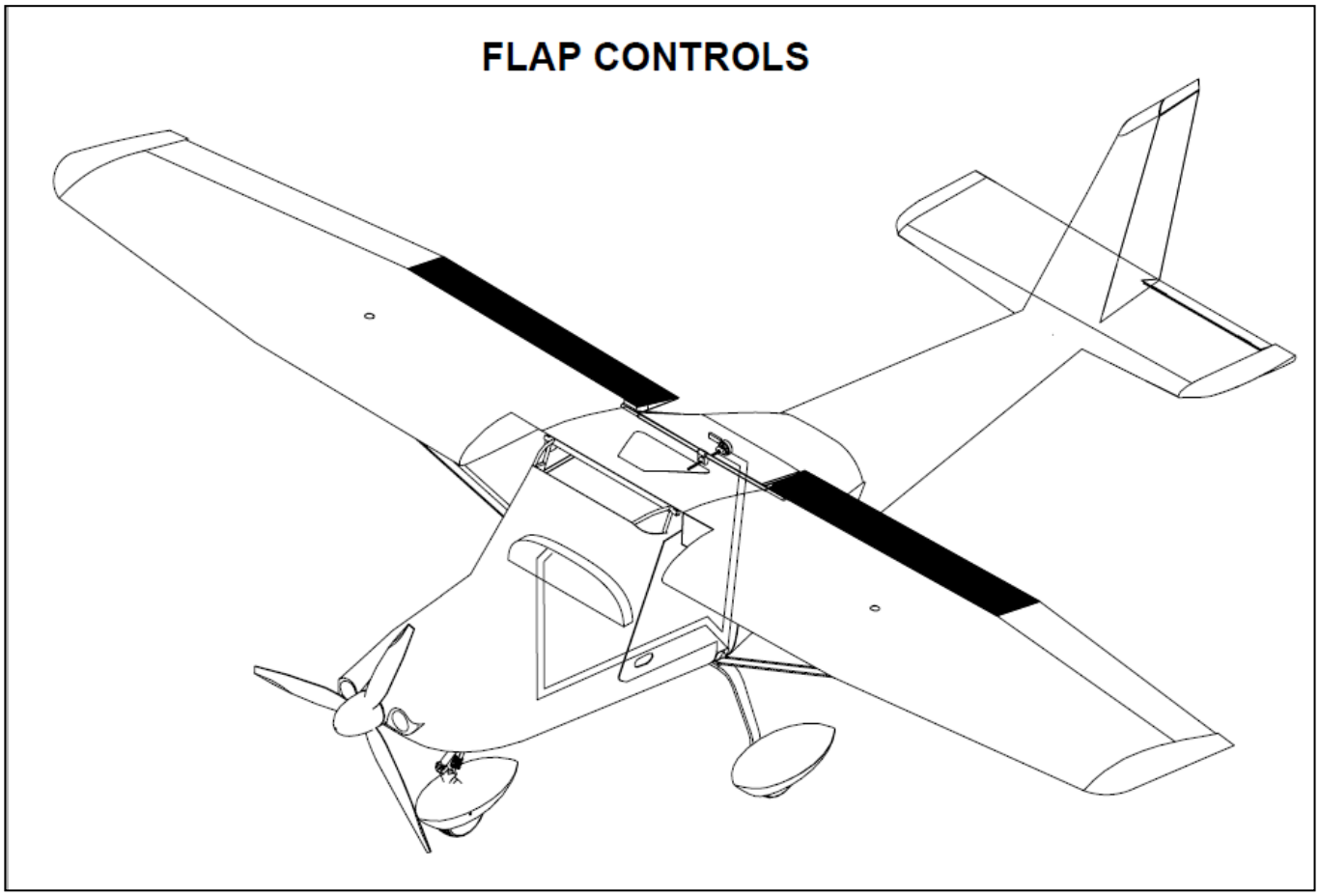
ELEVATOR TRIM CONTROL SYSTEM



ELEVATOR CONTROL SYSTEM



WING FLAP SYSTEM



SEATS

The seating arrangement consists of two separate adjustable seats for the pilot and passenger. The pilot's and passenger's seats are available in one design: three way adjustable.

Three-way seats may be moved forward or aft, to adjust the seat back, pull forward on the knob under the center of the seat and apply pressure to the back. To return the seat back to the upright position, pull forward on the exposed portion of the seat back frame. Both seat backs will also fold full forward.

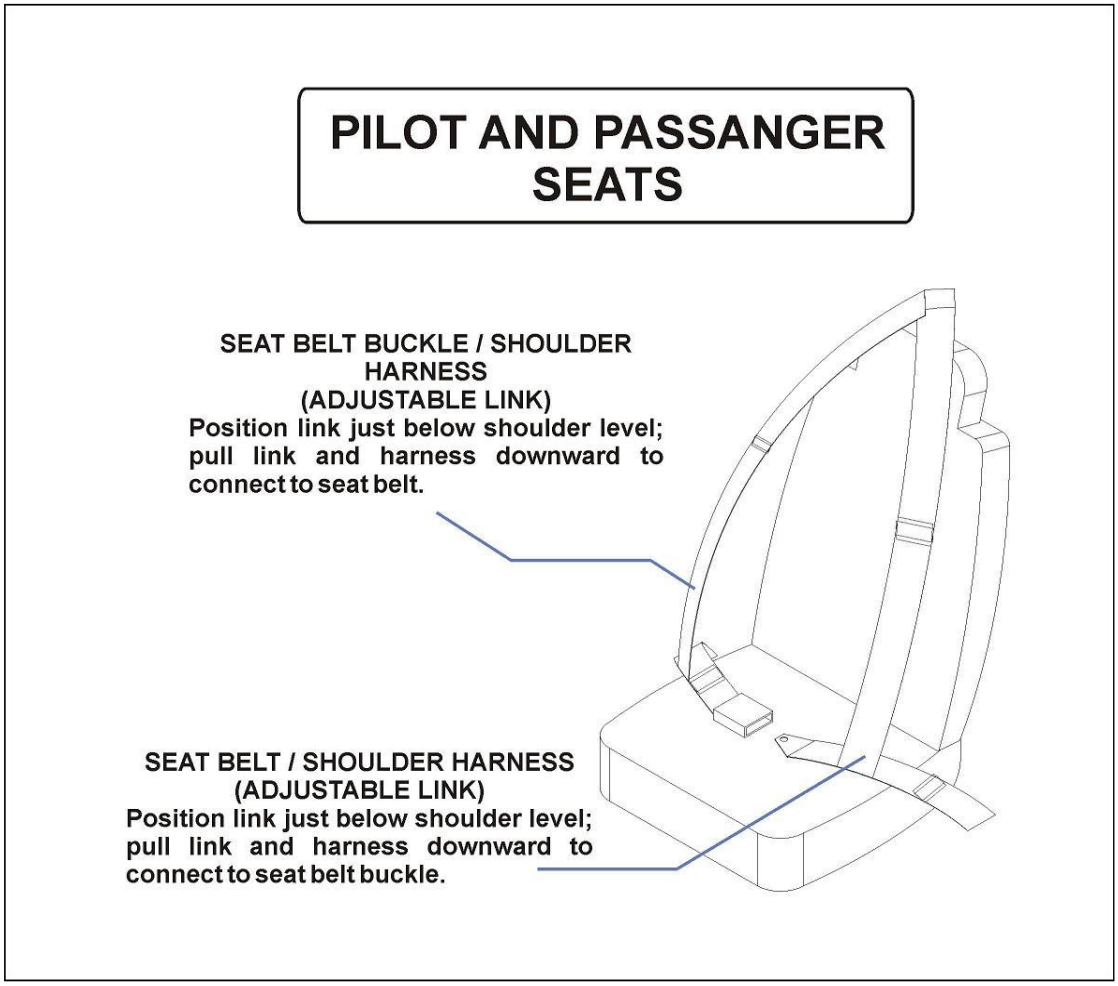


Figure 7-4 seat Belts and Shoulder Harnesses

SEAT BELTS AND SHOULDER HARNESSES

All seat positions are equipped with seat belts (see figure 7-4). The pilot's and passenger's seats are also equipped with separate shoulder harnesses. Integrated

seat belt/ shoulder harnesses with inertia reels can be furnished for the pilot's and passenger's seat positions if desired.

SEAT BELTS

The seat belts used with the pilot's. The buckle half of the seat belt is inboard of each seat and has a fixed length; the link half of the belt is outboard and is the adjustable part of the belt.

To use the seat belts for the pilot's and passenger's seats, position the seat as desired, and then lengthen the link half of the belt as needed by grasping the sides of the link and pulling against the belt. Insert and lock the belt link into the buckle. Tighten the belt to a snug fit by pulling the free end of the belt. To release the seat belts, grasp the top of the buckle opposite the link and pull upward.

SHOULDER HARNESSES

Each shoulder harness is attached to a rear doorpost above the window line and is stowed behind a stowage sheath above the cabin door. To stow the harness, fold it and place it behind the seat.

The shoulder harnesses are used by fastening and adjusting the seat belt first. Then, lengthen the harness as required by pulling on the connecting link on the end of the harness and the narrow release strap. Snap the connecting link firmly onto the retaining stud on the seat belt link half. Then adjust to length. Removing the harness is accomplished by pulling upward on the narrow release strap and removing the harness connecting link from the stud on the seat belt link. In an emergency, the shoulder harness may be removed by releasing the seat belt first and allowing the harness, still attached to the link half of the seat belt, to drop to the side of the seat.

Adjustment of the shoulder harness is important. A properly adjusted harness will permit the occupant to lean forward enough to sit completely erect, but prevent excessive forward movement and contact with objects during sudden deceleration. Also, the pilot will want the freedom to reach all controls easily.

ENTRANCE DOORS AND CABIN WINDOWS

Entry to, and exit from the airplane is accomplished through either of two entry doors, one on each side of the cabin (refer to Section 6 for cabin and cabin door dimensions). The doors incorporate a recessed exterior and interior door handle, a key-operated door lock (left door only), and a door stop mechanism.

To open the doors from outside the airplane, utilize the recessed door handle near the aft edge of each door. Grasp the forward edge of the handle and pull out. To close or open the doors from inside the airplane, use the recessed door handle and arm rest. Both cabin doors should be checked for security prior to flight, and should not be opened intentionally during flight.

NOTE:

Accidental opening of a cabin door in flight due to improper closing does not constitute a need to land the airplane. The best procedure is to set up the plane in a trimmed condition at approximately 56 Kts, momentarily shove the door outward slightly, and forcefully close the door.

Exit from the airplane is accomplished by grasping the forward edge of the door handle and pulling. To lock the airplane, lock the right cabin door from the inside by lifting up on the lever near the aft edge of the door, close the left cabin door, and using the ignition key, lock the door.

ENGINE

The airplane is powered by a horizontally-opposed, four-cylinder, overhead-valve, air-cooled, carbureted engine with a dry sump oil system. The engine is a ROTAX Model 912 UL or 912 ULS and is rated at 80-100 horse power at 5800 RPM. Major engine accessories (mounted on the front of the engine) include a starter, a belt-driven alternator, if installed and oil cooler. Dual magnetos are mounted on an accessory drive pad on the rear of the engine. Provisions are also made for a vacuum pump and full flow oil filter.

ENGINE CONTROLS

Engine power is controlled by a throttle located on the lower center portion of the instrument panel. The throttle operates in a conventional manner; in the full forward position, the throttle is open, and in the full aft position, it is closed.

ENGINE INSTRUMENTS

Engine operation is monitored by the following instruments: oil pressure gauge, oil temperature gauge, tachometer, water temperature gauge, and EGT.

The oil pressure gage, located on the right side off subpanel, is operated by oil pressure. A direct pressure oil line from the engine delivers oil at engine operating pressure to the oil pressure gauge. Gauge markings indicate that minimum idling pressure is 1.5 bar (22 PSI) red line, the normal operating range is 1.9 to 6.4 bar (27- 93 PSI) (green arc), and maximum pressure is 6.9 bar (100 PSI) (red line).

Oil temperature is indicated by a gauge located on the right side of subpanel. The gage is operated by an electrical-resistance type temperature sensor which receives power from the airplane electrical system. Oil temperature limitations are the normal operating range (green arc) which is 90º C to (194ºF) to 230ºF (110 º C) and the maximum (red line) which is 266ºF (130º C).

The engine-driven electrical tachometer is located near the upper right portion of the instrument panel. The instrument is calibrated in increments of 100 RPM and indicates engine speed. An hour meter below the center of the tachometer dial records elapsed engine time in hours and tenths. Instrument markings include a normal operating range (green arc) of 2200 to 5800 RPM, and a maximum (red line) of 5800 RPM.

NEW ENGINE BREAK-IN AND OPERATION

The engine underwent a run-in at the factory and is ready for the full range of use. It is, however, suggested that cruising be accomplished at 65% to 75% power until a

total of 50 hours has accumulated or oil consumption has stabilized. This will ensure proper seating of the rings.

The airplane is delivered from the factory with oil in the engine. At the first 5 hours, oil must be replaced. (See Rotax Manual).

ENGINE OIL SYSTEM

Oil for engine lubrication is supplied from a sump on the bottom of the engine. The capacity of the engine sump is three. Oil is drawn from the sump through an oil suction strainer screen into the engine-driven oil pump. From the pump, oil is routed to a bypass valve. If the oil is cold, the bypass valve allows the oil to bypass the oil cooler and go directly from the pump to the oil pressure screen (full flow oil filter, if installed). If the oil is hot, the bypass valves routes the oil cooler on the front side of the left forward engine baffle. Pressure oil from the cooler returns to the accessory housing where it passes through the pressure strainer screen (full flow oil filter, if installed) The filtered oil then enters a pressure relief valve which regulates engine oil pressure by allowing excessive oil to return to the sump, while the balance of the pressure oil is circulated to various engine parts for lubrication. Residual oil returns to the sump by gravity flow.

An oil filler cap/ oil dipstick is located at the rear of the engine on the right side. The filler cap/ dipstick are accessible through an access door in the engine cowling. The engine should not be operated on less than three quarts of oil. To minimize loss of oil through the breather, fill to three quarts for normal flights for engine oil grade and specifications, refer to Section 8 of this handbook.

IGNITION-STARTER SYSTEM

Engine ignition is provided by two engine-driven magnetos, and two spark plugs in each cylinder. The right magneto fires the lower right and the upper left spark plugs, and the left magneto fires the lower left and upper right spark plugs. Normal operation is conducted with both magnetos due to the more complete burning of the fuel-air mixture with dual ignition.

Ignition and starter operation is controlled by a rotary type switch located on the left subpanel. The switch is labeled clockwise OFF, R, L, BOTH and STARTS. The engine should be operated on both, magnetos (BOTH position) except for magneto checks. The R and L positions are for checking purposes and emergency use only. When the switch is rotated to the spring-loaded START position, (with the master switch in the ON position), the starter contactor is energized and the starter will crank the engine. When the switch is released, it will automatically return to the BOTH position.

AIR INDUCTION SYSTEM

The engine air induction system receives ram air through an intake in the lower portion of the engine cowling. The intake is covered by an air filter which removes dust and other foreign matter from the induction air. Airflow passing through the filter enters an air box. After passing through the air box, induction air enters the inlet in the carburetor, and is then ducted to the engine cylinders through intake manifold tubes.

EXHAUST SYSTEM

Exhaust gas from each cylinder passes through riser assemblies to a muffler and tail pipe on the underside of the engine.

CARBURETOR

The engine is equipped with two an up-draft, float-type, fixed jet carburetor mounted on the top of the engine. The carburetor has throttle mechanism and manual choke control.

COOLING SYSTEM

Ram air for engine cooling enters through two intake openings in the front of the engine cowling. The cooling air is directed around the cylinders and other areas of

the engine by baffling, and is then exhausted through an opening at the bottom aft edge of the cowling. No manual cooling system control is provided.

PROPELLER

The airplane is equipped with a three-bladed, electric controller pitch propeller; the propeller is (70 –72) inches in diameter.

FUEL SYSTEM

The airplane may be equipped with either a standard fuel system or long range system (see figure 7-6) both systems consist of two vented fuel tanks (two in each wing), a fuel shutoff valve, fuel strainer, manual choke and carburetor. Refer to figure 7-5 for fuel quantity data for both systems.

FUEL QUANTITY DATA (U.S. GALLONS)			
TANKS	TOTAL USABLE FUEL ALL FLIGHT CONDITION	TOTAL UNUSABLE FUEL	TOTAL FUEL VOLUME
STANDARD (9 us Gallons each wing) and Reserve tank	18.5 Gallons	1.5	20
LONG RANGE (9 us Gallons each wing)	18 Gallons	0	18

FUEL QUANTITY DATA GRAPH

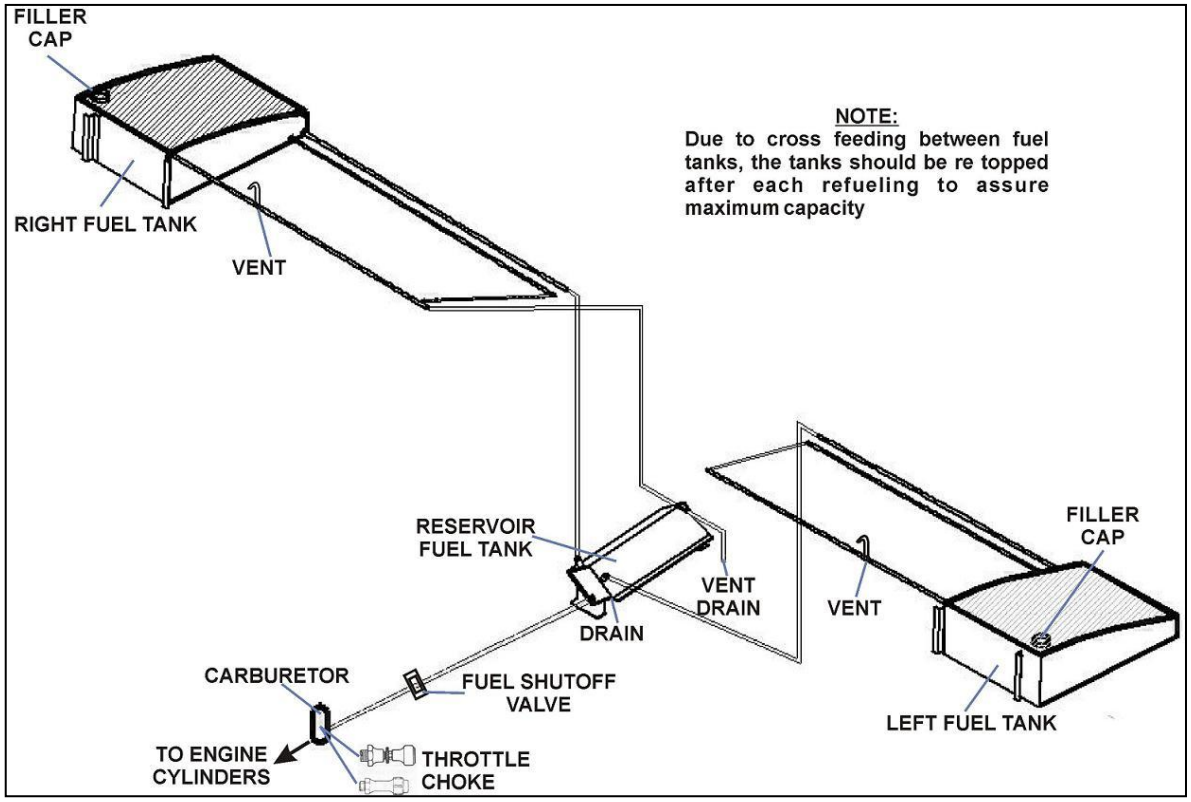


Figure 7-5 Fuel Quantity Data

Fuel flows by gravity from the two wing tanks to a fuel shutoff valve. With the valve in the ON position, fuel flows through a strainer to the carburetor. From the carburetor, mixed fuel and air flows to the cylinders through intake manifold tubes.

Fuel system venting is essential to system operation. Blockage of the venting system will result in a decreasing fuel flow and eventual engine stoppage. Venting is accomplished by an interconnecting line from the right fuel tank to the left tank. The left tank is vented overboard through a vent line which is equipped with a check valve, and protrudes from the bottom surface of the left wing near the wing strut attach point. The right fuel tank filler cap is also vented.

Fuel quantity is measured by two visual fuel low level indication system one in each side of the cabin. The indicators cannot be relied upon for accurate readings during skids, slips, or unusual attitudes.

The amount of unusable fuel is relatively small due to the dual outlets at each tank. The maximum unusable fuel quantity, as determined from the most critical flight condition, is about 1.5 gallons total. This quantity was not exceeded by any other reasonable flight condition, including prolonged 30 second full-rudder sideslips in the landing configuration. Takeoffs have not been demonstrated with less than 2 gallons total fuel (1 gallon per tank).

The fuel system is equipped (if installed) with drain valves to provide a means for the examination of fuel in the system for contamination and grade. The system should be examined before the first flight of every day and after each refueling, by using the sampler cup provided to drain fuel from the wing tank sumps, and by utilizing the fuel strainer drain. The fuel tanks should be filled after each flight to prevent condensation.

When the airplane is equipped with long ranger tanks, it may be serviced to a reduced fuel capacity to permit heavier cabin loadings. This is accomplished by filling each tank to the bottom of the indicator on the fuel filler neck. When filled to this level, the tank contains 9 gallons (8.25 usable in all flight conditions).

BRAKE SYSTEM

The airplane has a single-disc, hydraulically-actuated brake on each main landing gear wheel. Each brake is connected, by a hydraulic line to a master cylinder attached to each of the pilot's rudder pedals. The brakes are operated by applying pressure to the top of either the left (pilot's) or right (copilot's) (if installed) set of rudder pedals, which are interconnected. For maximum brake life, keep the brake system properly maintained. and minimize brake usage during taxi operations and landings.

Some of the symptoms of impending brake failure are: gradual decrease in braking action after brake application, noisy or dragging brakes, soft or spongy pedals, and excessive travel and weak braking action. If any of these symptoms appear, the brake system is in need of immediate attention. If, during taxi or landing roll, braking action decreases, let up on the pedals and then re-apply the brakes with heavy pressure. If the brakes become spongy or pedal travel increases, pumping the pedals should build braking pressure. If one brake becomes weak or fails, use the other brake sparingly while using opposite rudder, as required, to offset the good brake.

ELECTRICAL SYSTEM

Electrical energy (see figure 7-7) is supplied by battery with 12 volt – 17 amps. Hour battery, located on the right forward side of the firewall. Power is supplied through a single bus bar; a master switch controls this power to all circuits, except the engine ignition system, or flight hour recorder (if installed). All avionics equipment should be turned off prior to starting the engine or using an external power source (if installed) to prevent harmful transient voltages from damaging the transistors in this equipment.

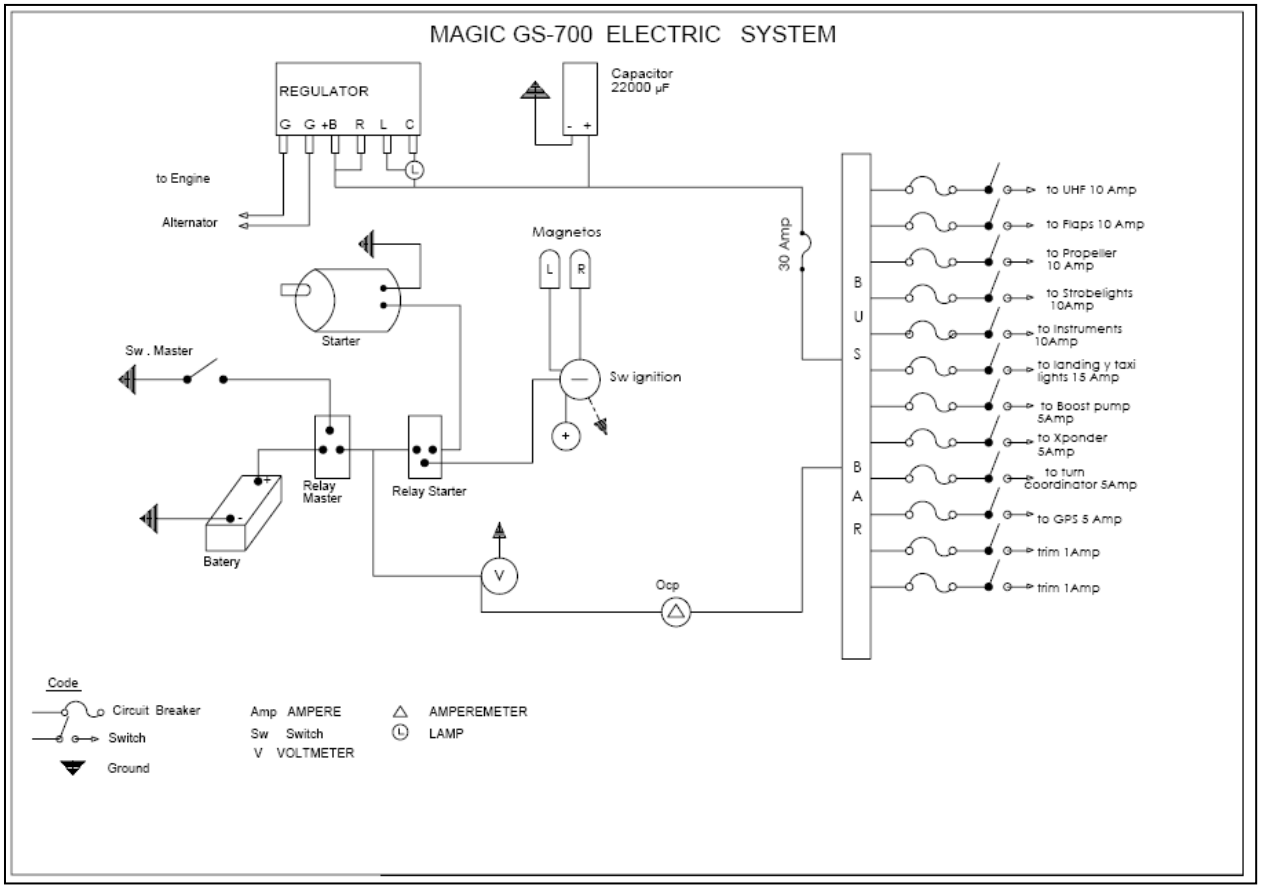
MASTER SWITCH (OPTIONAL)

The master switch is a split-rocker type switch (if installed) labeled MASTER, and is ON in the up position and OFF in the down position. The right half of the switch,

labeled BAT, controls all electrical power to the airplane. The left half, labeled ALT, controls the alternator (If Installed).

Normally, both sides of the master switch should be used simultaneously; however, the BAT side of the switch could be turned ON separately to check equipment while on the ground. The ALT side of the switch, when placed in the OFF position, removes the alternator from the electrical system. With this switch in the OFF position, the entire electrical load is placed on the battery. Continued operation with the alternator switch in the OFF position will reduce battery power low enough to open the battery contactor, remove power from the alternator field, and prevent alternator restart.

ELECTRIC SYSTEM GRAPHIC



AMMETER (IF INSTALLED)

The ammeter, located on the upper right side of the instrument panel, indicates the flow of current, in amperes, from the alternator to the battery or from the battery to the airplane electrical system. When the engine is operating and the master switch is turned on, the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning or the electrical load exceeds the output of the alternator, the ammeter indicates the battery discharge rate.

OVER-VOLTAGE SENSOR AND WARNING LIGHT (IF INSTALLED)

The airplane is equipped with an automatic over–voltage protection system consisting of an over-voltage sensor behind the instrument panel and a red warning light, labeled HIGH VOLTAGE, under the ammeter.

In the event an over-voltage condition occurs, the over-voltage sensor alternator automatically removes alternator field current and shuts down the alternator. The red warning light will then turn on indicating to the pilot that the alternator is not operating and the battery is supplying all electrical power.

The over-voltage sensor may be reset by turning the master switch off and back on again. If the warning light does not illuminate, normal alternator charging has resumed; however, if the light does illuminate again, a malfunction has occurred, and the flight should be terminated as soon as practical.

The warring light may be tested by momentarily turning off the ALT portion of the master switch and leaving the BAT portion turned on.

CIRCUIT BREAKERS AND FUSES

Most of the electrical circuits in the airplane are protected by "push-to reset" circuit breakers mounted under the engine controls on the instrument panel. The cigar lighter (If Installed) is equipped with a manually-reset type circuit breaker located on the back of the lighter and a fuse behind the instrument panel.

GROUND SERVICE PLUG RECEPTACLE (IF INSTALLED)

A ground service plug receptacle may be installed to permit the use of an external power source for cold weather starting and during lengthy maintenance work on the electrical and electronic equipment. The receptacle is located behind a door on the left side of the fuselage near the aft edge of the cowling.

Just before connecting an external power source (generator type or battery cart), the master switch should be turned ON. This is especially important since it will enable the battery to absorb transient voltages which otherwise might damage the transistors in the electronic equipment.

The battery and external power circuits have been designed to completely eliminate the need to jumper across the battery contactor to close it for charging a completely “dead” battery. An especial fused circuit in the external power system supplies the needed jumper across the contacts so that with “dead” battery and an external power source applied, turning the master switch ON will close the battery contactor.

LIGHTING SYSTEMS

EXTERIOR LIGHTING (IF INSTALLED)

Conventional navigation lights are located on the wing tips and top of the rudder. a single landing light is installed in the cowl nose cap, and a flashing beacon is mounted on top of the vertical fin, and a strobe light on each wing tip. All exterior lights are controlled by rocker type switches on the lower left side of the instrument panel. The switches are ON in the up position and OFF in the down position.

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

The high intensity strobe lights will enhance anti-collision protection. However, the lights should be turned off when taxiing in the vicinity of other airplanes, or during night flight through clouds, fog or haze.

The most probable cause of a light failure is a burned out bulb; however, in the event any of the lighting systems fail to illuminate when turned on, check the appropriate circuit breaker. If the circuit breaker has opened (white button popped out), and there is no obvious indication of a short circuit (smoke or odor), turn off the light switch of the affected lights, reset the breaker, and turn the switch on again, do not reset it.

CABIN VENTILATING SYSTEM

Full ventilation air may be obtained by utilization of Dual adjustable fresh air vents near the upper left and right corners of the Windshield.

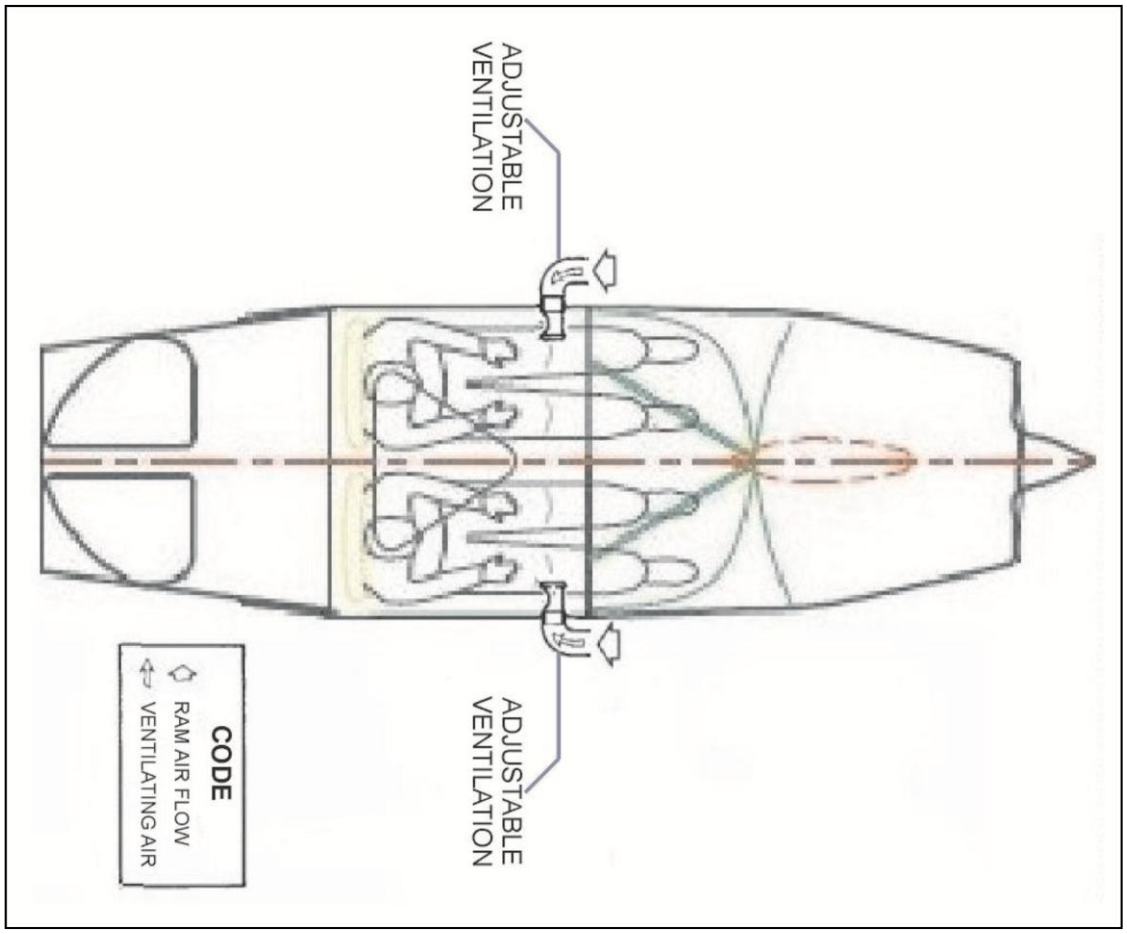


Figure 7-8 Cabin Heating Ventilating and defrosting System

PITOT-STATIC SYSTEM AND INSTRUMENTS

The pitot-static system supplies ram air pressure to the airspeed indicator and static pressure to the airspeed indicator, rate-of-climb indicator and altimeter. The system is composed of either an unheated pitot tube mounted on the lower surf ace of the left wing, and the associated plumbing necessary to connect the instruments to the sources.

AIRSPEED INDICATOR

The airspeed indicator is calibrated miles per hour. Limitation and range markings include the white are (30 to 60 miles), green are (45 to 100 miles, yellow are 100 to 120 miles), and a red line (130 miles).

If a true airspeed indicator is installed, it is equipped with a rotatable ring which works in conjunction with the airspeed indicator dial in a manner similar to the operation of a flight computer. To operate the indicator, first rotate the ring until pressure altitude is aligned with outside air temperature in degrees Fahrenheit. Pressure altitude should not be confused with indicated altitude. To obtain pressure altitude, momentarily set the barometric scale on the altimeter to 29.92 and read pressure altitude on the altimeter. Be sure to return the altimeter barometric scale to the original barometric setting after pressure altitude has been obtained. Having set the ring to correct for altitude and temperature; read the true airspeed shown on the rotatable ring by the indicator pointer. For best accuracy, the indicated airspeed should be corrected to calibrated airspeed by referring to the Airspeed Calibration chart in Section 5. Knowing the calibrated airspeed; read true airspeed on the ring opposite the calibrated airspeed.

RATE-OF-CLIMB INDICATOR

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

ALTIMETER

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

VACUUM SYSTEM AND INSTRUMENTS (OPTIONAL)

An engine-driven vacuum system (if installed) (see figure 7-9) is available and provides the suction necessary to operate the attitude indicator and directional indicator. The system consists of a vacuum pump mounted on the engine; a vacuum relief valve and vacuum system air filter on the aft side of the firewall below the instrument panel, and instruments (including a suction gage) on the left side of the instrument panel.

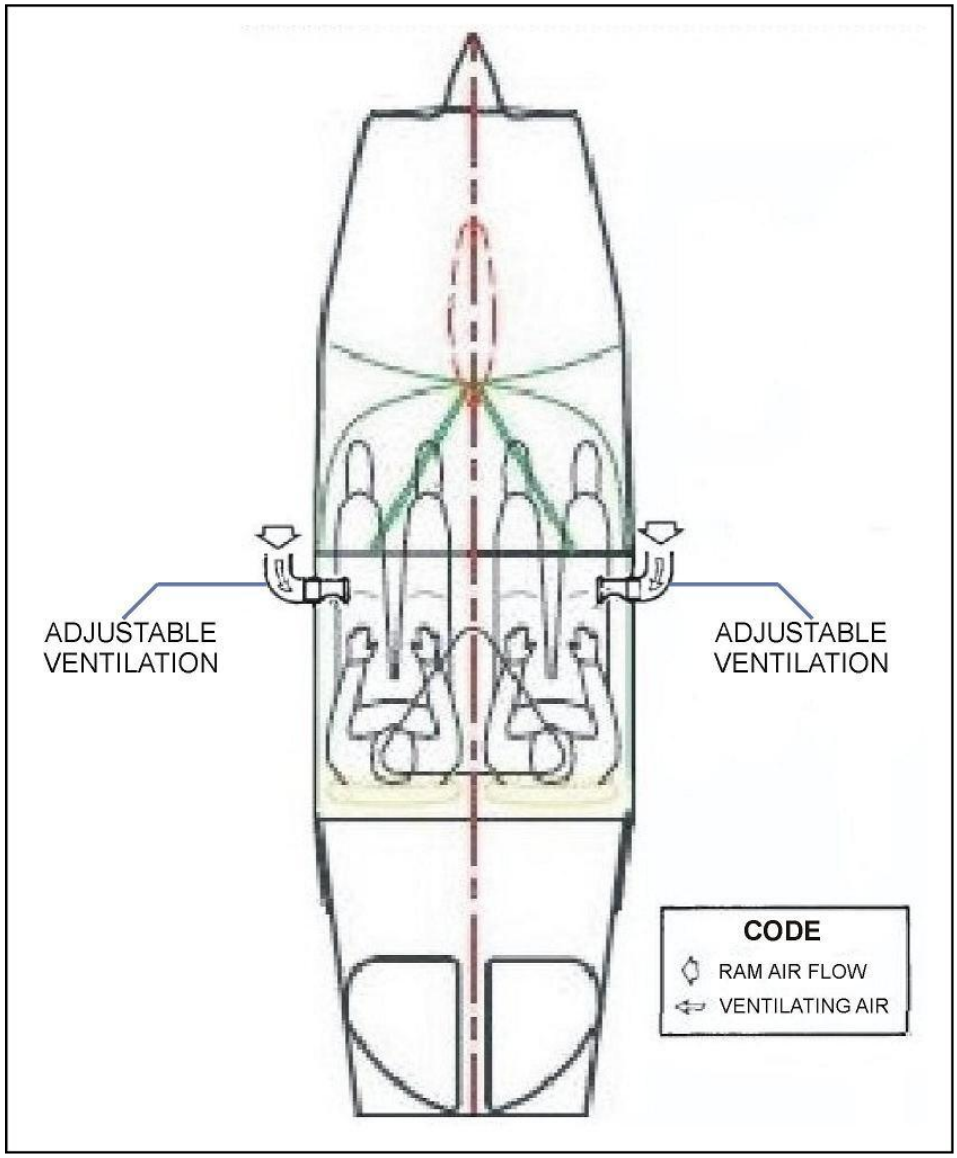
ATTITUDE INDICATOR (OPTIONAL)

An attitude indicator (if installed) is available and gives a visual indication of flight attitude. Bank attitude is presented by a pointer at the top of the indicator relative to the bank scale which has Index marks at 10°, 20°, 30°, 60°, and 90° either side of the center mark. Pitch and roll attitudes are presented by a miniature airplane in relation to the horizon bar. A knob at the bottom of the instrument is provided for in-flight adjustment of the miniature airplane to the horizon bar for a more accurate flight attitude indication.

DIRECTIONAL INDICATOR (OPTIONAL)

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

CABIN HEATING VENTILATING AND DEFROSTING SYSTEM GRAPH



SUCTION GAUGE (OPTIONAL)

Suction gage (if installed) is located on the left side of the instrument panel when the airplane is equipped with a vacuum system. Suction available for operation of the attitude indicator and directional indicator is shown by this gage, which is calibrated in inches of mercury. The desired suction range is 4.6 to 5.4 inches of mercury- A suction reading below this range may indicate a system malfunction or improper adjustment, and in this case, the indicators should not be considered reliable.

STALL WARNING SYSTEM (OPTIONAL)

The airplane is equipped (if installed) with a pneumatic-type stall warning system consisting of an inlet in the leading edge of the left wing, an air-operated horn near the upper left corner of the windshield, and associated plumbing. As the airplane approaches a stall, the low pressure on the upper surface of the wings moves forward around the leading edge of the wings. This low pressure creates a differential pressure in the stall warning system which draws air through the warning horn, resulting in an audible warning at 5 to 10 knots above stall in all flight conditions.

The stall warning system should be checked during the preflight inspection by placing a clean handkerchief over the vent opening and applying suction. A sound from the warning horn will confirm that the system is operative.

AVIONICS SUPPORT EQUIPMENT

The airplane may, at the owner's discretion, be equipped with various types of avionics support equipment such as an audio control panel and static dischargers. The installation of **IBIS** radio equipment provides certain audio back-up capabilities and transmitter selector switch functions that the pilot should be familiar with. The audio amplifier in the COM radio is required for speaker and transmitter operation. The amplifier is automatically selected, along with the transmitter, by the transmitter selector switch. In the event the audio amplifier in use fails, as evidenced by loss of all speaker audio and transmitting capability of the selected transmitter, select the other transmitter. This should re-establish speaker audio and transmitter operation. Since headset audio is not affected by audio amplifier operation, the pilot should be aware

that, while utilizing a headset, the only indication of audio amplifier failure is loss of the selected transmitter. This can be verified by switching to the speaker function.

The speaker-phone switches determine whether the output of the receiver in use is fed to the headphones or through the audio amplifier to the speaker. Place the switch for the desired receiving system either in the up position for speaker operation or in the down position for headphones. The center OFF position will remove receiver output to either headphones or the speaker.

STATIC DISCHARGERS (OPTIONAL)

Installation of wick-type static dischargers is recommended to improve radio Communications during flight through dust or various forms of precipitation (rain, snow or ice crystals). Under these conditions, the build-up and discharge of static electricity from the trailing edges of the wings, rudder, elevator, propeller tips, and radio antennas can result in loss of usable radio signals on all Communications and navigation radio equipment. Usually the ADF (if installed) is first to be affected and VHF communication equipment is the last to be affected.

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

SECTION 8
AIRPLANE HANDLING, SERVICE & MAINTENANCE

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INTRODUCTION

This section contains factory-recommended procedures for proper ground handling and routine care and servicing of your **IBIS**. It also identifies certain inspection and maintenance requirements which must be followed if your airplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered in your locality.

Keep in touch with your **IBIS** Dealer and take advantage of his knowledge and experience. He knows your airplane and how to maintain it. He will remind you when lubrications and oil changes are necessary, and about other seasonal and periodic services.

IDENTIFICATION PLATE

All correspondence regarding your airplane should include the SERIAL NUMBER. The Serial Number, Model Number, Production Certificate Number (PC) and Type Certificate Number (TC) can be found on the Identification Plate, located on the left rear of the fuselage.

- CUSTOMER CARE PROGRAM BOOK
- PILOT'S OPERATING HANDBOOK/SUPPLEMENTS FOR YOUR AIRPLANE.
- PILOT'S CHECKLISTS
- SALES AND SERVICE DEALER DIRECTORY

The following additional publications, plus many other supplies that are applicable to your airplane, are available from your IBIS Dealer.

- SERVICE MANUALS AND PARTS CATALOGS FOR YOUR AIRPLANE.

ENGINE AND ACCESSORIES

Your **IBIS** Dealer has a Customer Care Supplies Catalog covering all available Items, many of which he keeps on hand. He will be happy to place an order for any item which is not in stock.

AIRPLANE FILE

There are miscellaneous data, information and licenses that are a part of the airplane file. The following is a checklist for that file. In addition, a periodic check should be made of the latest Federal Aviation Regulations to ensure that all data requirements are met.

A. To be displayed in the airplane at all times:

1. Aircraft Airworthiness Certificate. (FAA form 8100-2)
2. Aircraft Registration Certificate. (FAA form 8050-3)
3. Aircraft Radio Station License, if transmitter installed. (FCC form 556)

B. To be carried in the airplane at all times:

1. Weight and Balance, and associated papers (latest copy of the repair and alteration foul. FAA form 337 if applicably)
2. Equipment list

C. To be made available upon request:

1. Airplane Log Book.
2. Engine Log Book.

Most of the items listed are required by the United States Federal Aviation Regulations. Since the Regulations of other nations may require other documents and data, owners of airplanes not registered the United States should check with their own aviation officials to determine their individual requirements.

IBIS recommends that these items, plus the Pilot's Operating Handbook, Pilot's Checklists, Customer Care Program book and Customer Care Card, be carried in the airplane at all times.

NON OWNER BUILT AIRCRAFT

If you purchased your **IBIS** from the builder, it then falls under rules of all other aircraft and owner/pilot maintenance is significantly restricted. It is then treated just as a commercially built aircraft except than an AI is not required for annuals on any A&P. can perform annuals on an “amateur built” aircraft. (The original builder still may perform any and all work on the aircraft for which he holds repairman’s certificate).

For aircraft registered in the Unite Stated, FAR 43 defines the types of servicing and maintenance that the certified pilot who owns or operates the aircraft may perform. For other countries, the registered of that country should be consulted to the fine the work may be performed by appropriately licensed personnel.

AIRPLANE INSPECTION PERIODS

The airplane may require inspections by the issuance of airworthiness directives applicable to the airplane, engine, propeller and components. It is the responsibility of the owner/operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent inadvertent noncompliance.

In lieu of the 100 HOURS and ANNUAL inspection requirements, an airplane may be inspected in accordance with a progressive inspection schedule, which allows the work load to be divided into smaller operations that can be accomplished in shorter time periods.
The **IBIS** PROGRESSIVE CARE PROGRAM has been developed to provide a modern progressive inspection schedule that satisfies the complete airplane inspection requirements of both the 100 HOUR and ANNUAL inspections as applicable to **IBIS** airplanes. The program assists the owner in his responsibility to comply with all FAA inspection requirements, while ensuring timely

replacement of life-limited parts and adherence to factory-recommended inspection intervals and maintenance procedures.

IBIS PROGRESSIVE CARE

The **IBIS PROGRESSIVE CARE PROGRAM** has been designed to help you realize maximum utilization of your airplane at a minimum cost and downtime. Under this program, your airplane is inspected and maintained in four operations at 50-hour intervals during a 200-hour period. The operations are recycled each 200 hours and are recorded in a specially provided Aircraft Inspection Log as each operation is conducted.

The **IBIS Aircraft S.A** recommends Progressive Care for airplanes that are being flown 200 hours or more per year, and the 100-hour inspection for all other airplanes. The procedures for the Progressive Care Program and the 100-hour inspection have been carefully worked out by the factory and are followed by the **IBIS Dealer Organization**. The complete familiarity of **IBIS** Dealers with IBIS equipment and factory-approved procedures provides the highest level of service possible at lower cost to **IBIS** owners.

Regardless of the inspection method selected by the owner, he should keep in mind that FAR Part 43 and FAR Part 91 establishes the requirement that properly certified agencies or personnel accomplish all required FAA inspections and most of the manufacturer recommended inspections.

IBIS CUSTOMER CARE PROGRAM

Specific benefits and provisions of the **IBIS** WARRANTY plus other important benefits for you are contained in your CUSTOMER CARE PROGRAM book supplied with your airplane. You will want to thoroughly review your Customer Care Program book and keep it in your airplane at all times.

Coupons attached to the Program book entitle you to an initial inspection and either a Progressive Care Operation No. 1 or the first 100-hour inspection. If you take delivery from your Dealer, the initial inspection will have been performed before delivery of the airplane to you. If you pick up your airplane at the factory, plan to take it to your Dealer reasonably soon after you take delivery, so the

initial inspection may be performed allowing the Dealer to make any minor adjustments which may be necessary.

You will also want to return to your Dealer either at 50 hours for your first Progressive Care Operation, or at 100 hours for your first 100-hour inspection depending on which program you choose to establish for your airplane. While these important inspections will be performed for you by any IBIS Dealer, in most cases you will prefer to have the Dealer from whom you purchased the airplane accomplish this work.

PILOT CONDUCTED PREVENTIVE MAINTENANCE

A certified pilot who owns or operates an airplane not used as an air carrier is authorized by FAR Part 43 to perform limited maintenance on his airplane. Refer to FAR Part 43 for a list of the specific maintenance operations which are allowed.

NOTE:

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the country of certification for information on preventive maintenance that may be performed by pilots.

A Service Manual should be obtained prior to performing any preventive maintenance to ensure that proper procedures are followed. Your IBIS Dealer should be contacted for further information or for required maintenance which must be accomplished by appropriately licensed personnel.

ALTERATIONS OR REPAIRS

In the interest of safety we strongly recommended that you seek experienced consultation before making any modification to your IBIS. We take pride in your IBIS as well and have your interest heart. Any modifications or change that affect the airworthiness, or that is considered a mayor change, must be approved by the factory.

If you want to make any modifications contact **IBIS aircraft S.A**. for advice. In any case, the work must be performed by properly licensed personnel. It is essential that the **IBIS aircraft S.A** be contacted prior to any alterations on the airplane to ensure that airworthiness of the airplane is not violated. Alterations or repairs to the airplane must be accomplished by licensed personnel.

NOTE:

Only **IBIS** approved parts should be used for any repairs to your IBIS. Salvage parts whose history cannot be, fully traced and their care in storage and handling completely defined and determined acceptable by **IBIS aircraft S.A** are not acceptable and are considered unsafe for use.

GROUND HANDLING

TOWING

The airplane is most easily and safely maneuvered by hand with the tow-bar attached to the nose wheel. When towing with a vehicle, do not exceed the nose gear turning angle of 30° either side of center or damage to the gear will result. If the airplane is towed or pushed over a rough surface during hangaring, watch that the normal cushioning action of the nose strut does not cause excessive vertical movement of the tail and the resulting contact with low hangar doors or structure. A flat nose tire or deflated strut will also increase tail height.

CAUTION:

Do not exert force on the propeller or control surfaces during towing by hand use care when turning the propeller ASSUME THE MAGNETOS ARE HOT. If the nose wheel must be raised, apply weight on the rear fuselage forward of the horizontal stabilizer. Whit the nose wheel off the ground, the aircraft can be pivoted around the main gear as required.

PARKING

When parking the airplane, head into the wind, install the control wheel lock and chock the wheels. In severe weather and high wind conditions, tie the airplane down as outlined in the following paragraph.

TIE-DOWN

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

1. Chock the wheels and install the control wheel lock.
2. Install a surface control lock between each aileron and flap.
3. Tie sufficiently strong ropes or chains (700 pounds tensile strength) to the wing and tail tie-down fittings and secure each rope to a ramp tie-down.
4. Install a surface control lock over the fin and rudder.
5. Tie a rope (no chains or cables) to an exposed portion of the Engine mount and secure to a ramp tie-down.
6. Install a Pitot tube cover.

JACKING

When a requirement exists to jack the entire airplane off the ground, or when wing jack points are used in the jacking operation, refer to the Service Manual for specific procedures and equipment required.

Individual main gear may be jacked by using the jack pad which is incorporated in the main landing gear strut step bracket. When using the individual gear strut jack pad, flexibility of the gear strut will cause the main wheel to slide inboard as the wheel is raised, tilting the jack. The jack must then be lowered for a second jacking operation. **Do not** jack both main wheels simultaneously using the individual main gear jack pads.

If nose gear maintenance is required, the nose wheel may be raised off the ground by pressing down on a tail cone bulkhead, just forward of the horizontal stabilizer, and allowing the tail to rest on the tail tie-down ring.

NOTE:

Do not apply pressure on the elevator or outboard stabilizer surfaces. When pushing on the tail cone, always apply: pressure at a bulkhead to avoid buckling the skin.

To assist in raising and holding the nose wheel off the ground, weight down the tail by placing sand-bags, or suitable weight, on each side of the horizontal stabilizer, next to the fuselage. If ground anchors are available, the tail should be securely tied down.

NOTE:

Ensure that the nose will be held off the ground under all conditions by means of suitable stands or supports underweight supporting bulkheads near the nose of the airplane.

FLYABLE STORAGE

The aircraft is to be put flyable storage, airplanes placed in non-operational storage for a maximum of 30 days or those which receive only intermittent operational use for the first 25 hours are considered in flyable storage status. Every seventh day during these periods, the propeller should be rotated by hand through five revolutions. This action every seven days, stop the propeller at 45º - 90º deg this action "limbers" the oil and prevents any accumulation of corrosion on engine cylinder walls.

WARNING!

For maximum safety, check that the ignition switch is **OFF**, the throttle is closed, and the fuel valve control is in cut-off position, and the airplane is secured before rotating the propeller by hand. Do not stand within there are of the propeller blades while turning the propeller.

After 30 days, the airplane should be flown for 30 minutes or a ground run-up should be made just long enough to produce an oil temperature within the lower green are range. Excessive ground run-up should be avoided.

Engine run-up also helps to eliminate excessive accumulations of water in the fuel system and other air spaces in the engine. Keep fuel tanks full to minimize condensation in the tanks. Keep the battery fully charged to prevent the electrolyte from freezing in cold weather. If the airplane is to be stored temporarily, or indefinitely, refer to the Service Manual for proper storage procedures.

OUT OF SERVICE CARE

Should you be required to place your **IBIS** in storage, precautions to protect it from deterioration are recommended. It long term storage is required protection from the elements is the primary concern with the **IBIS**, it may be easiest to remove the wings and store it in your garage where you have (or can provide), some control over temperature and humidity. In any case, the most susceptible element of your aircraft is the engine's cylinder walls and Bering surface. The engine should be preserved according to the manufacturer's directions. These will essentially require it to have desiccant plugs installed and replace the oil with preservative oil, as well as plugging the intake and exhaust ports with a desiccant. Again, refer to the engine manufacturer for detailed instructions.

PREPARATION FOR SERVICE

Following storage, the aircraft preparations or flight should include the following: Remove all tape openings, plugs, and control locks clean and thoroughly inspect the aircraft, checking the gear tires, control pitot and static ports install, a serviced battery, install spark plug and check the oil level, the preservative oil used for storage should be remove and proper oil installed.
The fuel tanks should be checked for water accumulation and purged as required. Following a short but through engine ground check the aircraft should be flow for 30 minutes maximum and given every through post Flight Inspection.

SERVICING

In addition to the PREFLIGHT INSPECTION covered in Section 4, COMPLETE servicing, inspection, and test requirements for your airplane are detailed in the Service Manual. The Service Manual outlines all items which require attention at 50,

100, and 200 hour intervals plus those items which require servicing, inspection, and/or testing at special intervals.

Since IBIS Dealers conduct all service, inspection, and test procedures in accordance with applicable Service Manuals, it is recommended that you contact your **IBIS** Dealer concerning these requirements and begin scheduling your airplane for service at the recommended intervals.

IBIS Progressive Care ensures that these requirements are accomplished at the required intervals to comply with the 100-hour or ANNUAL inspection as previously covered.

Depending on various flight operations, your local Government Aviation Agency may require additional service, inspections, or tests. For these regulatory requirements, owners should check with local aviation officials where the airplane is being operated. For quick and ready reference, quantities, materials, and specifications for frequently used service items are as follows.

BATTERY (IT DEPENDS ON THE TYPE OF BATTERY)

The battery should be checked for electrolyte level at each 50 hours inspection and serviced as necessary with distilled water. Do not overfill, nor should the battery serviced in a low discharged condition. If the battery is low in charged, service to cover the plates, charge to full, then service to full. Full is generally indicated by a “service level” within each cell of the battery.

ENGINE CARE

Clean the engine with a neutral solvent. While the engine is warm but not hot, spray with solvent and allow setting a few minutes. Follow with a spray wash and allow drying. Avoid excessively high pressure which can force entry water and/or solvents under seals resulting in contamination of the seal system or entry through the five walls in to the cabin. Use caution and protect any electrical relays or switches your may have installed in the engine compartment as well. Use solvents which do not attack rubber or plastics.

CAUTION:

Particular care should be given to electrical equipment before cleaning. Cleaning fluids should not be allowed to enter magnetos, starter, alternator and the like. Protect these components before saturating the engine with sol-vents. All other openings should also be covered before cleaning the engine assembly. Caustic cleaning solutions should be used cautiously and should always be properly neutralized after their use.

CAPACITY OF ENGINE SUMP – 3 Quarts.

Do not operate on less than 3 quarts. To minimize loss of oil through breather, fill to 3 quart level for normal flights of less than 3 hours. For extended flight, full to 3 quarts. These quantities refer to oil dipstick level readings. During oil and oil filter changes, one additional part is required when the filter is changed.

OIL AND OIL FILTER CHANGE

The airplane was the delivered from the factory with oil in the engine, during the first 5 hours, oil must be changed and then minimum of each 50 hours of flight time. The engine oil should be drained while the engine is thoroughly warm with the aircraft in a level position.

The filter should be change at each oil change and the element examined for its contents. Sand type material is indicative of inadequate air filtration and may warrant corrective action ranging for more frequent changes to the installation of and improved filter system. Metallic particle may vary from aluminum to steel to stainless steel. Following the initial break in period during which some metallic particles are normal, almost any amount becomes cause for concern. If subsequent change should additional metallic particles, the source should be determined. The type can be somewhat determined by separating by category, i.e. magnetic or not, steel or aluminum, silicon, (sand) etc.

Another method of determining the source is the use spectral analysis of an oil sample.

After the first 25 hours of operation, drain engine oil sump and oil cooler and clean the oil pressure screen. If an oil filter is installed change filter at this time. Refill sump with straight mineral oil and use until a total of 50 hours has accumulated or oil consumption has stabilized; then changes to dispersant oil. On airplanes which have an oil filter, the oil change interval may be extended to 100-hour intervals, providing the oil filter is changed at 100-hour intervals. Change engine oil at least every 6 months even though less than the recommended hours have accumulated. Reduce intervals for pro-longed operation in dusty areas, cold climates, or when short flights and long idle periods result in slugging conditions.

FUEL SERVICING

The ibis fuel requirements are dependent on the engine installed the engine manual should be cheeked for the recommended grade. In any case, the fuel should be clean and water free, the firewall gas collector should be checked on preflight inspection four evidence of water and the filter checked four solid foreign materials. It is a practice to leave the tanks full to minimize the amount of combustible fuel/air vapor present in the tanks this also helps minimize the amount of water vapor in the fuel system.

FUEL APPROVED FUEL GRADES

94 Grade Fuel.

100(Formerly 100/130) Grade Aviation Fuel.

CAPACITY EACH STANDARD TANKS each WING – 9 Gallons.

CAPACITY EACH LONG RANGE TANKS each WING - 9 Gallons.

NOTE:

Due to cross-feeding between fuel tanks, the tanks should be re-topped after each refueling to assure maximum capacity.

LANDING GEAR

NOSE WHEEL TIRE PRESSURE – 1.7 bar (25 PSI)

MAIN WHEEL TIRE PRESSURE – 1.7 bar (25 PSI)

NOSE GEAR SHOCK STRUT -

Note: Do not over-inflate.

The Ibis tires should be properly inflated at all times. Maintaining the proper inflation will minimize tread wear and aid in ground control of the aircraft. When inflating visually check both sides of the tires for bulges, cracking of the side wall and cuts.

WARNING!

Tire size is important on your **IBIS MAGIC GS 700**. Use only the specified tire. Other sizes will not fit into the wheel and damage the mechanism and aircraft structure.

BRAKES

Hydraulic disk brakes system pilot, side with independent master cylinders. Dual articulating hydraulic pilot breaks. The brakes are independent systems on each of the main gear wheels. The fluid reservoir for each is located on the top of the each pedal. The toe brakes should depress approximately ½ inch before any pressure is generated on the brake when properly serviced. Lines should be checked for leaks and chaffing due to rubbing on the tire, or the air frame.

CLEANING AND CARE

WINDSHIELD-WINDOWS

Windshield and Windows of polycarbonate plastic, highly resistant to impacts should be cleaned with an aircraft windshield cleaner. Apply the cleaner sparingly with soft cloths, and rub with moderate pressure until all dirt, oil scum and bug stains are removed. Allow the cleaner to dry, and then wipe it off with soft flannel cloths.

If a windshield cleaner is not available, the polycarbonate plastic can be cleaned with soft cloths moistened with Stoddard solvent to remove oil and grease.

NOTE:

Never use gasoline, benzene, alcohol, acetone, carbon tetrachloride, fire extinguisher or anti-ice fluid, lacquer thinner or glass cleaner to clean the polycarbonate plastic. These materials will attack the plastic and may cause it to craze.

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

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

PAINTED SURFACES

The painted exterior surfaces of your new **IBIS** have a durable, long lasting finish and, under normal conditions, require no polishing or buffing. Approximately 30 days are required for the paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by someone experienced in handling uncured paint.

Generally, the painted surfaces can be kept bright by washing with water and mild soap, followed by a rinse with water and drying with cloths or a chamois. Harsh or abrasive soaps or detergents which cause corrosion or scratches should never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent.

Waxing is unnecessary to keep the painted surfaces bright. However, if desired, the airplane may be waxed with a good automotive wax. A heavier coating of wax on the

leading edges of the wings and tail and on the engine nose cap and propeller spinner will help reduce the abrasion encountered in these areas.

CAUTION:

Avoid the use of high pressure cleaning systems and solvents. They can damage parts such as propeller hubs, pitot probes and static ports. Cover cooling ports to the interior and avionics.

When the airplane is parked outside in cold climates and it is necessary to remove ice before flight, care should be taken to protect the painted surfaces during ice removal with chemical liquids. A 50-50 solution of isopropyl alcohol and water will satisfactorily remove ice accumulations without damaging the paint. A solution with more than 50% alcohol is harmful and should be avoided. While applying the de-icing solution, keep it away from the windshield and cabin Windows since the alcohol will attack the polycarbonate plastic and may cause it to craze.

PROPELLER CARE

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

Your propeller should be serviced according to the manufacturer's instruction. Treat it with care. The propeller is sensitive to leading edge damage and possible erosion shield delaminating. Refer to their service bulletins for tolerances and repairs.

WARNING!

Use care when handling the propeller insure that the magnetos are off, the throttle closed. Then remain as clear is possible during the dressing operation. Be prepared for a cylinder to fire when moving the propeller to a new position.

INTERIOR CARE

To remove dust and loose dirt from the upholstery and carpet, clean the interior regularly with a vacuum cleaner.
Blot up any spilled liquid promptly with cleansing tissue or rags. Don't pat the spot; press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife, and then spot-clean the area.

Oily spots may be cleaned with household spot removers, used sparingly. Before using any solvent, read the instructions on the container and test it on an obscure place on the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

Soiled upholstery and carpet may be cleaned with foam-type detergent, used according to the manufacturer's instructions. To minimize wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

The plastic trim, headliner, instrument panel and control knobs need only be wiped off with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with Stoddard solvent. Volatile solvents, such as mentioned in paragraphs on care of the windshield, must never be used since they soften and craze the plastic.