CHRISTAVIA MK1

Flight Manual

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CHRISTAVIA MK 1

FLIGHT INFORMATION MANUAL

The Christavia Mk1 has been designed to provide the amateur aircraft builder with a safe and easy to build two seat aircraft, that has demonstrated excellent performance using a variety of engines in the 65 to 100 horse power range. While the great majority of builders will use 4130 tubing throughout the aircraft, the design provides for the use of standard industrial 1010/15 low carbon or mild steel, in areas where the normal structural stresses are relatively low. In countries where 4130 tubing is at a premium, the costs can be substantially reduced without affecting the structural integrity of the airframe.

The fuselage and tail section is fabricated from steel tubing, plate and sheet metal, while the wings are in the main constructed from aircraft grade spruce. The covering is aircraft grade fabric and any suitable paint system.

The Christavia Mk1 has been designed from its original concept with the first time builder in mind. It can be built in a single car garage using normal hand tools found in many home workshops. A gas welder is the only extra piece of major equipment required. MIG or TIG, inert gas welding is not recommended unless the welder has considerable experience welding aircraft structures. No machining is necessary and no exotic parts need be purchased. The average time for a first time builder to complete the Christavia Mk1 is about 2,000 hours. For further details or enquiries, write or call:

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INTRODUCTION TO CHRISTAVIA

Chrlstavla was designed as a mission fleld workhorse. The major requirements being: short take off and landing, small engine (low fuel), low stall speed, good cruise speed, good rate of climb, large cabin area, low maintenance and high safety factor In event of forced landing.

AIRFRAME

Construction of the fuselage Is conventional, steel tube covered In long life dacron, finished In dope. Wings are two spar sltka spruce with truss type ribs, covered In dacron finished In dope. Ailerons are conventlonal balanced frlse single spar covered In dacron and finished In dope. The wings are strut braced and are designed to sustain a wing load Ing of + 4.8 -2.8 with a built-In safety factor. The empenage Is constructed of steel tube fabric covered and externally braced, finished In dope. landing gear Is cub-type rubber shocks with 600.6 wheels. Brakes are toe-type hydraulic disk. Full swivel tall wheel Is used to control steering.

FLIGHT CONTROL

The flight control system Is dual and consists of a standard stick controlling ailerons and elevators. Two sets of pedals control rudder and brake action. A park brake .Is also Included. Elevator trim Is controlled from the cabin roof. All fllght control systems use standard 7 /19 cable to activate control surfaces In a smooth and balanced fashion.

INSTRUMENT PANEL

The Instrument panel Includes all standard Instruments plus optional gyro and engine Instruments. Provision Is made to mount

radio equipment on each side of the panel. Switches and controls are located along the bottom of the panel. A red instrument panel light is located to the right of the instrument panel and is operated in conjunction with the nav. lights.

LANDING LiGHTS

A standard landing lamp is located in the front engine cowl and is operated by a switch on the instrument panel.

STROBE LAMP

A strobe lamp is located under the aircraft cabin on the aluminum boot cowl and is operated by a switch on the instrument panel.

RADIO

the radio is solid state and is located to the right and under the instrument panel, and is operated by the master and radio switch.

INTERCOM

An intercom system is located behind the instrument panel with plug in Jacks located in the instrument panel and to the right of the rear seat.

ELECTRICAL SYSTEM

Energy is supplied by a 12 volt 10 amp-hr motor cycle battery located on the floor boards behind the firewall. it has been found that one full charge will supply current under normal use for about 12 - 15 hrs. of flying. This time can be expanded by conservative use of radio and lights. The master switch located at the left side of the instrument panel controls all systems. A single master fuse is located in the + side of the battery main feed wire.

EXTERiOR LIGHTiNG

Conventional navigation lights are supplied and operated by the nav. light switch on instrument panel.

SEATS

Two seats in tandem are provided to give comfortable accomodation for two full size people. The front seat is of steel tube covered in foam and leatherette type material and can be adjusted. The rear seat is constructetl into the cabin structure and is bench type covered as the front seat. Seat belts and shoulder harness is provided front and rear.

BAGGAGE

A good size baggage compartment is located behind the rear seat, and can accomodate quite large volumes. The are is easily accessible to the rear passenger.

WINDOWS

All windows and windshields are fabricated from plexlglass. The left side front window is sliding and can be opened at any speed. This window will also function as an emergency exit by pushing out from either side.

ENTRANCE

Entry to cabin is through door oh right side of aircraft. A large window, door lock and map pockets are included in the door.

CABIN HEAT AND VENTILATiON

Cabin heat is provided from one of two heat muffs in the exhaust system. Outside cold air is forced through the system into the cabin through a control valve in the firewall. Snap vents are located in the boot cowl to provide cool air ventilation.

CONTROL LOCKS

The front seat belt can be fastened around the control stick to hold the system firm.

ENGINES

Engines from 50 HP to 150 HP may be used to power this aircraft. 85 to 100 HP Is the most efficient range, but excellent performance is obtained from the Continental A65/75. The figures in this book (Chrl.stavla MK 1) are based on the Continental A65/75.

ENGINE COOLING

A conventional pressure cowl is used to cool the engine. In very cold temperatures, a winter kit may be found necessary.

FUEL SYSTEM

The fuel system is simple and efficient. The main fuel tank is located between the firewall and the instrument panel. A 6 gallon tank may be mounted in the first bay of each wing for long range work. For lower power engines, a gravity system is used to supply fuel to the engine. The main fuel tap is located under the tank and can be reached from the front seat. A fuel strainer is located on the firewall under the front engine cowl. A standard primer is located on the instrument panel to aid starting.

STALLS

The stall characteristics are conventional for this type of aircraft. At gross weight the stall will take place at approximately 40 mph. The break Is clean and straight ahead, returning the aircraft to normal flight.

NOTE: Before attempting stalls, make sure weight and balance Is correct, and no loose equipment Is left unsecured.

SPINS

Spin characteristics are again normal for this type of aircraft. Conventional entry and recovery procedures should be used. NOTE: It Is most Important that the aircraft C of G not be behind the rear most position - see weight and balance chart. It Is recommended the spin be completed 4000 ft. above ground. Consider that a one turn spin and recovery will use up about 1000 ft., and a 6 turn spin about 2500 ft.

GENERAL FLIGHT CHARACTERISTICS

Christavla Is very easy to fly due to Its Inherent stability. The flight controls are responsive making the aircraft very maneuverable. Flaps are not required as a good side sllp will give a descent up to 1200 FPM, at low speeds. Landing Is straight forward even In crosswind conditions. The cabin Is very large for this weight of aircraft, making long fllghts most comfortable.

GENERAL SPECIFICATIONS

Overall length ..... 20′ - 8″

Overall height ..... 7′ - O″

Wing span ..... 32′ - 6″

Wing chord ..... 4′ - 6″

Wheel tread . ..... 6′ - O″

Wheel base..... 14′ - 8″

Wing area ..... 146.25 sq ft.

Wing dihedral ..... I to 1.5 deg

Wing incidence..... Built in 3 deg

Stabilizer incidence..... +1 to -2 deg

Tail fin offset ..... 0.5″ left

Empty weight ..... 750 to 850 lbs

Gross weight ..... 1500 lbs

Load factors ..... + 4.5 -2.5

Fuel capacity normal ..... 15 US galls

Fuel capacity long range..... 25 US galls

Engine H P range ..... 65 to 100

Recommended engines - Continental A65 to 0-200

GENERAL PERFORMANCE SPECIFICATIONS BASED ON A CONTINENTAL A65/75

SPEEDS

Max at sea level ..... 120 MPH
Cruise 75% power at 2000 ft. ..... 105 MPH
Cruise 65% power at 2000 ft. ..... 100 MPH
Cruise 45% power at 2000 ft ..... 85 MPH
Stall speed, power off ..... 42 MPH
Stall speed, power on ..... 35 MPH
Best climb speed ..... 70/75 MPH
Best approach speed ..... 70 MPH
Never exceed speed ..... 135 MPH
Max. structural speed ..... 128 MPH
Maneuvering speed ..... 95 MPH
Side slip speed ..... 70/75 MPH

CLIMB

Rate of climb at sea level ..... 850 Fpm
Rate of climb at 1100 lbs. ..... 1000 Fpm
Service celling ..... 13000 Ft.
Take offground roll at sea level ..... 350 Ft.
Distance over 50 ft. obstacle ..... 550 Ft.
Landing distance over 50 ft. obstacle ..... 650 Ft.

RANGE

Range at 75% power (15 gal) ..... 315 st Mis.
Range at 65% power ..... 350 st Mis.
Range at 45% power ..... 440 st Mis.

WEIGHT

Max gross weight 1500 lbs./13c
Standard empty weight ..... 745 lbs.
Useful load Inc. fuel ..... 555 Lbs.
Max fuel (80/87) ..... 15 Gals.
Oil cap ..... 4 Qts.
Baggage - normal ..... 20 Lbs.
Baggage - front solo ..... 75 Lbs.

- FOR ENGINE SPECS SEE ENGINE MANUAL

PERFORMANCE CHARTS

STALL SPEEDS
POWER OFF

WEIGHT	STRAIGHT	BANK ANGLE TURNS 30°	45°	60°
1300	42 mph	45	50	62
1200	41	44	48	59
1100	40	43	47	57
1000	39	42	46	55
900	38	41	45	54

AIRSPEED LIMITATIONS

	SPEED	MPH
Vne	never exceed speed	135
Vno	max structural cruise speed	128
Va	Maneuvering speed 1300 lb. 1200 lb. 1100 lb. 1000 lb.	95 93 90 90
Vwo	max window open speed	128

POWER LIMITATIONS

Engine Continental A75
Maximum power 75 BHP at 2600 RPM
Maximum oil temp 116°C/240°F
Oil pressure Max 50 PSI Min 30 PSI

TAKE OFF DISTANCE

DISTANCE TO CLEAR A 50 FT. OBSTACLE

A/C WEIGHT	SPEED OFF	MPH 50 ft	PRESS ALT	0°C Gnd	0°C Roll	0°C 50 ft.	20°C Gnd	20°C Roll	20°C 50 ft.	40°C Gnd	40°C Roll	40°C 50 ft.
1300 lbs	50	65	S.L.	250		500	300		560	560		950
1300	50	65	2000	375		625	530		785	780		1075
1300	50	65	4000	510		760	660		920	920		1210
1300	50	65	6000	640		880	800		1050	1050		1330
1300	50	65	8000	775		1025	925		1175	1175		1475
1300	50	65	10000	900		1150	1060		1320	1320		1610
1000	50	65	S.L.	200		415	345		575	560		850
1000	50	65	2000	325		550	475		700	700		980
1000	50	65	4000	465		675	610		825	840		1120
1000	50	65	6000	580		810	740		960	965		1250
1000	50	65	8000	725		940	865		1100	1100		1300
1000	50	65	10000	850		1065	1000		1220	1240		1500

CONDITIONS: HARD DRY RUNWAY
ZERO WIND
FULL THROTTLE

RATE OF CLIMB MAXIMUM

CONDITIONS: FULL THROTTLE

WEIGHT	PRESS ALT	CLIMB MPH SPEED MPH	RATE IN F.P.M. 0°C	20°C	40°C
1300 lb	S.L.	65/70	850	790	725
1300	2000	65/70	690	650	550
1300	4000	65/70	540	475	360
1300	6000	65/70	370	290	200
1300	8000	65/70	200	150	75
1300	10000	65/70	95	50	10
1000	S.L.	65/70	1025	980	940
1000	2000	65/70	900	860	825
1000	4000	65/70	800	720	700
1000	6000	65/70	650	560	540
1000	8000	65/70	485	400	365
1000	10000	65/70	305	220	190

LANDING DISTANCE OVER A 50 FT OBSTACLE TO FULL STOP

CONDITIONS: HARD DRY RUNWAY
ZERO WIND
APPROACH SPEED 70 MPH

WEIGHT	SPEED AT 50 FT	PRESS ALT	RUNWAY DISTANCE OVER 50 FT OBS 0°C	20°C	40°C
1300	60/65	S.L.	600	650	690
1300	60/65	2000	640	690	735
1300	60/65	4000	675	725	765
1300	60/65	6000	710	760	810
1300	60/65	8000	755	815	855
1300	60/65	10000	810	860	910

CRUISE PERFORMANCE

CONDITIONS: 1300 lb.
RECOMMENDED LEAN MIXTURE
STANDARD TEMP.

PRESS ALT	RPM	% BHP	MPH	GPH
2000	2350	75	105	4.4
	2275	65	100	3.7
	2150	55	91	3.0
	2050	45	85	2.4
4000	2400	75	107	4.1
	2300	65	102	3.2
	2200	55	95	2.8
	2100	45	87	2.2
MAX CRUISE SHORT PERIODS ONLY				
2000	2600	100	118	5.0
	2500	85	115	4.8

RANGE PROFILE

CONDITIONS: 1300 lbs
15 GAL
ZERO WIND
45 MIN RESERVE AT 45% THROTTLE

PRESS ALT	RPM	MPH	DISTANCE
2000	2350 2275 2150 2050	105 200 91 85	315 st 350 390 445
4000	2400 2300 2200 2100	107 102 95 87	321 st 408 427 490

WEIGHT AND BALANCE INFORMATION

Datum point is centre of front wheel axle.
Leveling ref is cabin floor by front seat.
leveling device is an accurate spirit level.
Datum to wing L E. is 3.25 ins.
Distance between front and tail wheel is 175 ins.
Wing chord is 54 ins.
Forward C of G limit is 10.5 ins from wing L E.
Rear C of G limit is 19.5 ins from wing L E.
Datum to pilot is + 18 ins.
Datum to passenger is + 47 ins.
Datum to baggage is + 63 ins.
Datum to fuel tank is - 15 ins.

Note that if the datum point is changed, (eg spinner point) new distances will have to be determined.

Typical empty wheel weights using a Continental A-65/75 would be:

Weight on right wheel .....341 lbs
Weight on left wheel .....333 lbs
Weight on tail wheel..... 72 lbs

Note that the maximum designed gross weight is 1500 lbs. If conventional floats are fitted, then gross weight may be increased to 1600 lbs, with a placard stating no aerobatics. Any conventional formula may be used to calculate the actual weight and balance of the completed aircraft. Be sure that in all weight configurations, the balance point falls within the forward and rearward limits on the wing airfoil.

SCHEDULE OF MAINTENANCE

The builder is requested to prepare a schedule of maintenance. The following is recommended:

PREFLIGHT INSPECTION

A standard preflight visual inspection must be performed before each flight. Be sure to check fuel vents for obstructions.

50 HOUR INSPECTION

CLEAN:

All paint work
All glass
Fuel filter
Oil filter

SERVICE:

Battery
Tires
Spark plugs
Fuel system
Propellor
Spinner
Brakes
Tail wheel

CHECK:

Control system
Engine compartment
All lights
Cabin interior
Fire extinguisher

LUBE

Controls and hinges
Cables

100 HOUR INSPECTION

Same as 50 hour but with these additional items.

ENGINE COMPARTMENT

Tighten all components and fastenings. Test compression and record. Clean or replace Air Filter. Check all belts. Fuel system check. All engine controls.

AIRFRAME

Lube and check all control system parts. Check all brace wires for correct tension. Check electrical system. Check operation of all instruments and guages. Check seats and belts. Touch up paint chips. Check for any signs of corrosion and repair. Re-pack wheel bearings. Check brake puck ware. Top up brake fluid. Check all fastenings.

CHRISTA VIA MKI
NORMAL CHECKS AND PROCEDURES

PRE START

1. COMPLETE PRE-FLIGHT INSPECTION,
2. SEATS, BELTS, HARNESS ADJUST AND LOCK
3. FUEL QUANT, FUEL SHUT OFF IN ON POSITION
4. AVIONICS EQUIPMENT TURNED OFF
5. BRAKES TEST AND SET
6. CIRCUIT BREAKERS ALL ON
7. MASTER SWITCH IN ON POSITION

START

1. MIXTURE RICH
2. CARBURETTOR HEAT TO COLD POSITION
3. PRIME AS REQUIRED
4. THROTTLE OPEN 1/8 INCH
5. PROPELLER AREA IS CLEAR - CALL “CLEAR”
6. MAG SWITCHES AS REQUIRED FOR START
7. ST ART ENGINE
8. CHECK OIL PRESSURE
9. CHECK BOTH MAGS TO ON POSITION

PRE-TAKEOFF

1. BRAKES SEf, OR PARK BRAKE ON
2. CABIN DOOR CLOSED AND LOCKED
3. FLIGHT CONTROLS ARE FULL AND FREE
4. FLIGHT INSTRUMENTS SET AND CHECKED
5. FUEL SHUT OFF VALVE TO ON POSITION
6. MIXTURE SET TO FULL RICH
7. TRIM TABS SET FOR TAKE-OFF
8. PERFORM MAG TEST ON BOTH MAGS 1700
9. PERFORM CARB HEAT TEST
10. CHECK SUCTION GAUGE
11. SET ALL RADIOS AND AVIONICS
12. BEACON AND NA V LIGHTS AS REQ
13. ENGINE IDLE TEST
14. BRAKES OFF

TAKE OFF

1. ENGINE TEMPERATURE AT 75 DEG F MIN
2. SET CARBURETTOR HEAT TO COLD
3. CHECK WIND AND DIRECTION FOR TAKE OFF
4. CONTROL STICK FULL BACK
5. APPLY FULL THROTTLE - GENTLY
6. ON ROLLOUT, STICK FORWARD - GENTLY
7. LIFf OFF AT 50/55 MPH
8. CLIMB OUT AT 65/75 MPH
9. SET TRIM AS REQUIRED

ENROUTE CLIMB

1. INCREASE AIRSPEED TO 75/80 MPH
2. ADJUST THROTTLE AS REQUIRED
3. ADJUST ELEV ATOR TRIM AS REQUIRED
4. ADJUST MIXTURE OVER 3,000 FEET

CRUISE FLIGHT

1. SET THROTTLE TO 2300 RPM OR 75%
2. ADJUST TRIM AS REQUIRED
3. ADJUST MIXTURE AS REQU1RED
4. CHECK CARB HEAT EVERY 15 MINUTES
5. MONITOR ALL ENGINE GAUGES
6. MONITOR FUEL REMAINING

PRE LANDING

1. ALL SEAT BELTS SECURE
2. ALL BAGGAGE SECURED
3. MIXTURE SET FULL RICH
4. CARB HEAT HOT BEFORE CLOSING TIIROTIT,E
5. RADIO INTENTIONS

LANDING

1. ADJUST AIRSPEED TO 65/75 MPH
2. IN COLD WEATHER, MAINTAIN 1000 RPM
3. FULL STALL LANDINGS AT 40/45 MPH
4. BRAKE GENTLY TO A VOID A NOSE OVER

PERFORMANCE DATA PERFORMANCE DATA

Include your own performance data here.

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