# SECTION 1

# GENERAL

## TABLE OF CONTENTS

- THIS PAGE INTENTIONALLY LEFT BLANK -

# SECTION 1

# GENERAL

## 1.1 INTRODUCTION

Vulcanair V1.0 is an utility category, single engine, high wing, small aircraft equipped with fixed tricycle landing gear and digital cockpit.

Section 1 of this handbook presents basic aircraft data and general information which will be of value to the user.

## 1.2 ASSOCIATED PUBLICATIONS

Useful publications relating to equipment are listed below for the convenience of the user:

(a) V1.0 Aircraft Maintenance Manual p/n AMM10.702-5

(b) LYCOMING IO-360-M1A Operation and Installation Manual (FAA Approved Manual 60297-36)

(c) HARTZELL Propeller Owner's Manual (FAA Approved Manual 115N)

(d) GARMIN G500 Pilot's Guide (FAA Approved Manual 190-01102-02) [for aircraft installing GDU620 up to SW version 6.21]

(e) GARMIN G500 Pilot's Guide (FAA Approved Manual 190-00601-02) [for aircraft installing GDU620 from SW version 7.30 onwards]

(f) GARMIN G500 Cockpit Reference Guide (FAA Approved Manual 190-01102-03)

(g) JPI EDM-930 Pilot's Guide (FAA Approved Manual)

(h) MidContinent SAM MD-302 Pilot's Guide (FAA Approved Manual 9017846)

(i) Any further Operating Instructions for Navigation and Communication installations, as published by the relevant equipment manufacturers

## 1.3 ENGINE

| | | |
|---|---|---|
| (a) | Number of Engines | 1 |
| (b) | Engine Manufacturer | Lycoming Engines |
| (c) | Engine Model Number | IO-360-M1A |
| (d) | Rated Horsepower (BHP) | 180 |
| (e) | Propeller Speed (RPM) | 2700 |
| (f) | Engine Type | Fuel injected, direct drive, four cylinder, horizontally opposed, air cooled with down exhaust, 361 cubic inches displacement |

## 1.4 PROPELLER

| | | |
|---|---|---|
| (a) | Number of Propellers | 1 |
| (b) | Propeller Manufacturer | Hartzell Propeller Inc. |
| (c) | Blade Model | F7497 |
| (d) | Number of Blades | 2 |
| (e) | Hub Model | HC-C2YR-1BFP |
| (f) | Propeller Diameter (in/m) | 74 / 1.880 |
| (g) | Propeller Type | Constant speed, not counterweighted, single-acting, hydraulically actuated, no feathering capability |

## 1.5 FUEL

(a) Total and usable fuel

FUEL TABLE

| TOTAL FUEL CAPACITY | | USABLE FUEL | |
|---|---|---|---|
| U.S. gals | lt | U.S. gals | lt |
| 52.8 | 200 | 50.2 | 190 |

***NOTE***

*To ensure maximum fuel capacity, level correctly the aircraft (see Figure 1-1 below for reference dimensions). Maximum fuel capacity is achieved when the fuel reaches the lower surface of the refueling hole. Gently rock the wing prior to reach the full tank capacity.*

(b) Fuel Specifications — See Section 2

## 1.6 OIL

(a) Oil Sump Capacity (U.S. gal/lt) — 2.0 / 7.5

(b) Usable Oil (U.S. gal/lt) — 1.5 / 5.7

(c) Oil Specification — See Section 2

## 1.7 WEIGHTS

| | | lb | kg |
|---|---|---|---|
| (a) | Maximum Take-Off Weight | 2546 | 1155 |
| (b) | Maximum Landing Weight | 2425 | 1100 |
| (c) | Maximum Weight in Baggage Compartment at 1.600 m aft of datum | 88 | 40 |

## 1.8 THREE VIEW

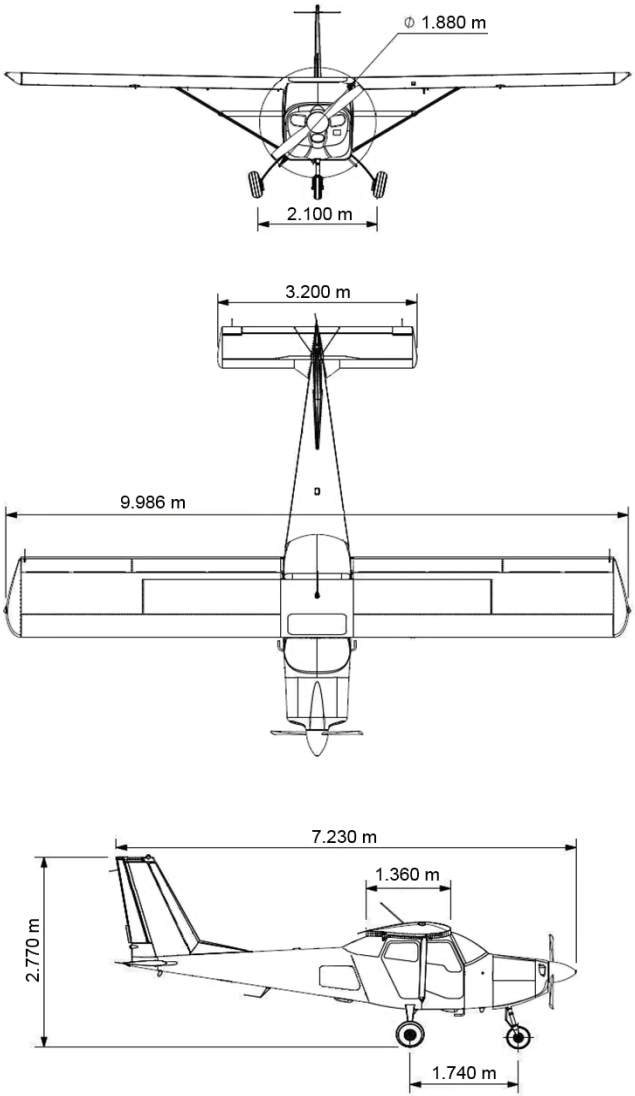


**Figure 1-1 Three View**

## 1.9 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following definitions are of symbols, abbreviations and terminology used throughout the handbook and those which may be of added operational significance to the pilot.

(a) General Airspeed Terminology and Symbols

| | |
|---|---|
| CAS | Calibrated Airspeed means the indicated speed of an aircraft, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level. |
| KCAS | Calibrated Airspeed expressed in "Knots". |
| IAS | Indicated Airspeed is the speed of an aircraft as shown by the airspeed indicator when corrected for instrument error. IAS values published in this manual assume zero instrument error. |
| KIAS | Indicated Airspeed expressed in "Knots". |
| TAS | True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature and compressibility. |
| KTAS | True Airspeed expressed in "Knots". |
| $V_A$ | Manoeuvring Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane. |
| $V_{FE}$ | Maximum Flaps Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position. |

| | |
|---|---|
| $V_{NO}$ | Maximum Structural Cruising Speed is the speed that should not be exceeded except in calm air and then only with caution. |
| $V_{NE}$ | Never Exceed Speed is the speed limit that may not be exceeded at any time. |
| $V_S$ | Stalling Speed or the minimum steady flight speed at which the aircraft is controllable. |
| $V_{S1}$ | Stalling speed or the minimum steady flight speed obtained in a specific configuration. |
| $V_{S0}$ | Stalling Speed or the minimum steady flight speed at which the aircraft is controllable in the landing configuration. |
| $V_X$ | Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance. |
| $V_Y$ | Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time. |
| SCREEN SPEED | The speed which must be obtained at, or before, the screen height of 50 feet is reached. |

(b) Meteorological Terminology

| | |
|---|---|
| ISA | International Standard Atmosphere in which the air is assumed as a dry perfect gas. The temperature at sea level is 15°C (59 °F). The pressure at sea level is 29.92 in.Hg (1013.32 mbar). The temperature gradient from sea level to the altitude at which temperature is -56.5 °C (-69.7 °F) is -0.00198 °C (-0.003566 °F) per foot and zero above that altitude. |
| OAT | Outside Air Temperature is the free air static temperature obtained either from in-flight temperature indications or ground meteorological sources, corrected for instrument error and density effects. |
| PRESSURE ALTITUDE | Altitude measured from standard sea-level pressure (29.92 in.Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero. |
| WIND | The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds. |

(c) Power Terminology

| | |
|---|---|
| BHP | Brake Horsepower means the power delivered at the propeller shaft. |
| MAXIMUM CONTINUOUS POWER | Maximum power permissible for unrestricted periods of use. |
| RPM | Rotational speed of the propeller shaft measured in Revolutions Per Minute. |

(d) Aircraft Performance and Flight Planning Terminology

| | |
|---|---|
| DEMONSTRATED CROSS-WIND | The demonstrated cross-wind velocity is the velocity of the cross-wind component for which adequate control of the aircraft during take-off and landing was actually demonstrated during certification tests, but is not considered a limitation. |

(e) Weight and Balance Terminology

| | |
|---|---|
| REFERENCE DATUM | An imaginary vertical plane from which all horizontal distances are measured for balance purposes. |
| ARM | The horizontal distance from the reference datum to the center of gravity (C.G.) of an item. |
| MOMENT | Product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits). |
| CENTER OF GRAVITY (C.G.) | The point at which an aircraft would balance if suspended. Its distance from the reference (C.G.) datum is found by dividing the total moment by the total weight of the aircraft. |
| C.G. ARM | The arm obtained by adding the individual component moments and dividing the sum by the total weight. |
| C.G. LIMITS | The extreme center of gravity locations within which the aircraft must be operated at a given weight. |
| USABLE FUEL | Fuel available for flight planning. |
| UNUSABLE FUEL | Fuel remaining after a runout test has been completed in accordance with certification regulations. |

| | |
|---|---|
| STANDARD EMPTY WEIGHT | Manufactured empty weight plus unusable fuel, full operating fluids including engine oil and hydraulic oil. |
| BASIC EMPTY WEIGHT | Standard Empty Weight plus optional equipment actually installed. |
| PAYLOAD | Weight of occupants, cargo and baggage. |
| MAXIMUM TAKE-OFF WEIGHT | Maximum weight approved for the start of the take-off run. |
| MAXIMUM LANDING WEIGHT | Maximum weight approved for the landing touchdown. |

## 1.10 CONVERSION TABLE FOR ALTIMETERS

| mbar | in.Hg |
|---|---|
| 800 | 23.62 |
| 805 | 23.77 |
| 810 | 23.92 |
| 815 | 24.07 |
| 820 | 24.21 |
| 825 | 24.36 |
| 830 | 24.51 |
| 835 | 24.66 |
| 840 | 24.81 |
| 845 | 24.95 |
| 850 | 25.10 |
| 855 | 25.25 |
| 860 | 25.40 |
| 865 | 25.54 |
| 870 | 25.69 |
| 875 | 25.84 |
| 880 | 25.99 |

| mbar | in.Hg |
|---|---|
| 885 | 26.13 |
| 890 | 26.28 |
| 895 | 26.43 |
| 900 | 26.58 |
| 905 | 26.72 |
| 910 | 26.87 |
| 915 | 27.02 |
| 920 | 27.17 |
| 925 | 27.32 |
| 930 | 27.46 |
| 935 | 27.61 |
| 940 | 27.76 |
| 945 | 27.91 |
| 950 | 28.05 |
| 955 | 28.20 |
| 960 | 28.35 |
| 965 | 28.50 |

| mbar | in.Hg |
|---|---|
| 970 | 28.64 |
| 975 | 28.79 |
| 980 | 28.94 |
| 985 | 29.09 |
| 990 | 29.23 |
| 995 | 29.38 |
| 1000 | 29.53 |
| 1005 | 29.68 |
| 1010 | 29.83 |
| 1015 | 29.97 |
| 1020 | 30.12 |
| 1025 | 30.27 |
| 1030 | 30.42 |
| 1035 | 30.56 |
| 1040 | 30.71 |
| 1045 | 30.86 |
| 1050 | 31.01 |

**1 mbar = 0.02952998751 in.Hg**

# 1.11 UNIT CONVERSION CHART

| *MULTIPLYING* | | *BY* → | *GET* | |
|---|---|---|---|---|
| **TEMPERATURE** | | | | |
| Fahrenheit | [°F] | $\frac{5}{9}\cdot(F-32)$ | Celsius | [°C] |
| Celsius | [°C] | $\left(\frac{9}{5}\cdot C\right)+32$ | Fahrenheit | [°F] |
| **FORCES** | | | | |
| Kilograms | [kg] | 2.205 | Pounds | [lbs] |
| Pounds | [lbs] | 0.4536 | Kilograms | [kg] |
| **SPEED** | | | | |
| Meters per second | [m/s] | 196.85 | Feet per minute | [ft/min] |
| Feet per minute | [ft/min] | 0.00508 | Meters per second. | [m/s] |
| Knots | [kts] | 1.852 | Kilometres / hour | [km/h] |
| Kilometres / hour | [km/h] | 0.54 | Knots | [kts] |
| **PRESSURE** | | | | |
| Atmosphere | [atm] | 14.7 | Pounds / sq. in | [psi] |
| Pounds / sq. in | [psi] | 0.068 | Atmosphere | [atm] |
| **LENGTH** | | | | |
| Kilometers | [km] | 0.54 | Nautical miles | [nm] |
| Nautical miles | [nm] | 1.852 | Kilometers | [km] |
| Meters | [m] | 3.281 | Feet | [ft] |
| Feet | [ft] | 0.3048 | Meters | [m] |
| Centimeters | [cm] | 0.3937 | Inches | [in] |
| Inches | [in] | 2.540 | Centimeters | [cm] |
| **VOLUME** | | | | |
| Liters | [l] | 0.2642 | U.S. Gallons | [US Gal] |
| U.S. Gallons | [US Gal] | 3.785 | Liters | [l] |
| **AREA** | | | | |
| Square meters | [$m^2$] | 10.76 | Square feet | [sq ft] |
| Square feet | [sq ft] | 0.0929 | Square meters | [$m^2$] |

- THIS PAGE INTENTIONALLY LEFT BLANK -