SECTION 1
GENERAL

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GENERAL

This manual contains the material required to be furnished to the pilot by the United States Code of Federal Regulations title 14, part 23. It also contains supplemental data supplied by Liberty Aerospace, Inc.

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

The following definitions apply to Warnings, Cautions, and Notes found throughout this manual:

**WARNING**

*AN OPERATING PROCEDURE, OR PRACTICE, WHICH IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.*

**CAUTION**

*An operating procedure, or practice, which if not strictly observed, could result in damage or destruction of equipment.*

**NOTE**

*An operating procedure, practice, condition, etc., which is deemed essential to highlight.*
Non factory installed supplemental type certificate (STC) and form 337 items should be evaluated by the maintenance technician to verify that they have no impact on the Liberty XL-2 component installation and maintenance required to comply with the 1750 lbs gross weight increase and/or that these items do not affect aircraft airworthiness when operated at 1750 lbs.

Liberty Aerospace, Inc. is not liable for the weight distribution and balance arm that result from non-factory STC and form 337 items.

For gross weight at 1750 lbs, refer to SIL-08-001:

**WARNING**

**THE RESULT OF OPERATING THE AIRCRAFT ABOVE A WEIGHT OF 1653 LBS, WITHOUT THE MANDATORY MODIFICATIONS, IS AN AIRCRAFT THAT DOES NOT COMPLY WITH THE FAA REGULATIONS AND MAY RESULT IN AN ACCIDENT, AND SERIOUS OR FATAL INJURY.**

**WARNING**

**IT IS THE RESPONSIBILITY OF THE OWNER/OPERATOR TO ENSURE THAT PARTS FITTED TO THE AIRCRAFT AT 1653 LBS ARE NOT MIXED WITH THE PARTS REQUIRED TO SHOW COMPLIANCE WHEN OPERATED AT 1750 LBS GROSS WEIGHT. A SUITABLY QUALIFIED AIRCRAFT MECHANIC/TECHNICIAN MUST PERFORM REMOVAL AND REPLACEMENT OF ITEMS REQUIRED FOR THE GROSS WEIGHT INCREASE.**
AIRPLANE THREE VIEWS

Figure 1 - Top view of the XL-2 Airplane

Figure 2 - Front View of the XL-2 Airplane

Figure 3 - Side View (Port) of the XL-2 Airplane
DESCRIPTIVE DATA

ENGINE
Number of Engines ................................................................. 1
Number of Cylinders ................................................................. 4
Engine Manufacturer ...................................................... Teledyne Continental
Engine Model ................................................................. IOF-240-B with FADEC
Fuel System ....................................................................... Fuel Injected
Engine Cooling ................................................................. Air Cooled
Engine Type ................................................................. Horizontally Opposed, Direct Drive
Horsepower Rating .............................................................. 125 HP @ 2800 RPM

PROPELLER
Propeller Manufacturer ................................ MT-Propeller Entwicklung GmbH
Propeller Model Number ................................................... MT175R127-2Ca
Number of Blades ................................................................. 2
Propeller Diameter ................................................................. 69 in
Propeller Type ................................................................. Wood/Composite, Fixed Pitch

FUEL
Fuel Capacity ................................................................. 29.5 U.S. Gallons
Total Usable ................................................................. 28.0 U.S. Gallons
Approved Fuel Grades ..................................... 100LL Grade Aviation Fuel (Blue)
................................................................. 100 Grade Aviation Fuel (Green)

WARNING
USE OF UNAPPROVED FUELS MAY RESULT IN ENGINE DAMAGE OR ENGINE FAILURE.

NOTE
Park the airplane in a level attitude to ensure maximum fueling capacity
**OIL**

Oil Capacity ................................................................. 6 U.S. Quarts

**OIL GRADES:**

All Temperatures ....................................................... SAE 20W50 or 20W60
Below 40°F (4°C) .......................................................... SAE 30 or 15W50
Above 40°F (4°C) .......................................................... SAE 50

**MAXIMUM CERTIFICATED WEIGHTS**

**WARNING**

**OPERATING THE AIRCRAFT ABOVE A WEIGHT OF 1653LBS WITHOUT THE MANDATORY MODIFICATIONS RESULTS IN AN AIRCRAFT THAT DOES NOT COMPLY WITH THE FAA REGULATIONS AND MAY RESULT IN AN ACCIDENT, AND SERIOUS OR FATAL INJURY.**

Takeoff Weight ............................................................ 1653 lbs
Landing Weight ............................................................. 1653 lbs
Weight in baggage compartment ................................. 100 lbs
(See Section 6 for weight and balance limits)

**STANDARD AIRPLANE WEIGHTS**

Standard empty weight .............................................. 1174 lbs
Maximum useful load .................................................. 479 lbs

**SPECIFIC LOADINGS**

Wing Loading ............................................................ 14.8 lbs/sq ft
Power Loading ........................................................... 13.2 lbs/HP

**CABIN AND ENTRY DIMENSIONS**

Detailed dimensions of the cabin interior and entry door openings are illustrated in Section 7 of this Airplane Flight Manual.
**BAGGAGE AND ENTRY DIMENSIONS**

See Figure 4 on the next page for a detailed illustration of the baggage compartment and associated features.

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**NOTE**

Maximum baggage weight is 100 lbs. Only FAA approved restraints may be used to secure cargo to restraint net mounting brackets.

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Figure 4 Baggage Bay Dimensions
SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

**KCAS** Knots Calibrated Airspeed is the indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in a standard atmosphere at sea level.

**KIAS** Knots Indicated Airspeed is the speed shown on the airspeed indicator expressed in knots.

**KTAS** Knots True Airspeed is KCAS corrected for altitude and temperature. It is the airspeed expressed in knots relative to undisturbed air.

**VA** Maneuvering Speed is the maximum speed at which full or abrupt control movements are permissible without overstressing the airframe.

**VFE** Maximum Flap Extended Speed is the highest speed permissible with wing flaps in an extended position.

**VNO** Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air, then only with caution.

**VNE** Never Exceed Speed is the speed limit that may not be exceeded in any operation.

**VS** Stalling Speed or the Minimum Steady Flight Speed is the minimum speed at which the airplane is controllable.

**VSO** Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration is the minimum speed at which the airplane is controllable in the landing configuration and at the most forward center of gravity at maximum weight.

**VX** Best Angle-of-Climb Speed is the speed that results in the greatest gain of altitude in a given horizontal distance.

**VY** Best Rate-of-Climb Speed is the speed that results in the greatest gain of altitude in a given time.
LIBERTY XL-2 AIRPLANE ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>ACU</td>
<td>Alternator Control Unit</td>
</tr>
<tr>
<td>ALT</td>
<td>Alternator</td>
</tr>
<tr>
<td>BAT</td>
<td>Battery</td>
</tr>
<tr>
<td>BPMS</td>
<td>Boost Pump Mode Switch</td>
</tr>
<tr>
<td>CHT</td>
<td>Cylinder Head Temperature</td>
</tr>
<tr>
<td>COM</td>
<td>Communication</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>EBAT FL</td>
<td>Emergency Battery Fail</td>
</tr>
<tr>
<td>ECU</td>
<td>Electronic Control Unit</td>
</tr>
<tr>
<td>EGT</td>
<td>Exhaust Gas Temperature</td>
</tr>
<tr>
<td>ELT</td>
<td>Emergency Locator Transmitter</td>
</tr>
<tr>
<td>FADEC</td>
<td>Full Authority Digital Engine Control</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HSA</td>
<td>Health Status Annunciator</td>
</tr>
<tr>
<td>IMC</td>
<td>Instrument Meteorological Conditions</td>
</tr>
<tr>
<td>INSTR</td>
<td>Instrument</td>
</tr>
<tr>
<td>L</td>
<td>Left</td>
</tr>
<tr>
<td>MFD</td>
<td>Multi-Function Display</td>
</tr>
<tr>
<td>NAV</td>
<td>Navigation</td>
</tr>
<tr>
<td>PMP</td>
<td>Pump (Fuel)</td>
</tr>
<tr>
<td>PPWR FL</td>
<td>Primary Power Fail</td>
</tr>
<tr>
<td>R</td>
<td>Right</td>
</tr>
<tr>
<td>SPSC</td>
<td>Secondary Power Source Circuit</td>
</tr>
<tr>
<td>SSA</td>
<td>Speed Sensor Assembly</td>
</tr>
<tr>
<td>STN</td>
<td>Station</td>
</tr>
<tr>
<td>V</td>
<td>Volts</td>
</tr>
<tr>
<td>VOR</td>
<td>VHF Omni-Directional Range</td>
</tr>
<tr>
<td>WOT</td>
<td>Wide Open Throttle</td>
</tr>
<tr>
<td>xponder</td>
<td>Transponder</td>
</tr>
</tbody>
</table>
METEOROLOGICAL TERMINOLOGY

OAT - Outside Air Temperature is the free air static temperature. It may be expressed in either degrees Celsius or degrees Fahrenheit.

Standard Temperature is 15° C at sea level pressure altitude and decreases by 2° C for every 1000 feet of altitude.

Pressure Altitude is the altitude read from an altimeter when the altimeter’s barometric scale has been set to 29.92 in. Hg.(1013 mb).

ENGINE POWER TERMINOLOGY

BHP Brake Horsepower - The power developed by the engine.

RPM Revolutions per Minute - The rotational speed of the engine and propeller.

Static RPM - The engine speed attained during a full throttle engine runup when the airplane is on the ground and stationary.

psi - Pounds per square inch.

AIRPLANE PERFORMANCE & FLIGHT PLANNING TERMINOLOGY

Demonstrated Crosswind Velocity - The velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification test. The value shown is not considered to be limiting.

Usable Fuel - The fuel that is available for flight planning.

Unusable Fuel - The quantity of fuel that cannot be used in flight.

Gallons Per Hour (GPH) - The amount of fuel consumed per hour in gallons.

Feet per Minute (fpm) - The distance, in feet, that can be traveled in a minute.

g - Acceleration expressed as a multiple of the earth’s normal gravity (1 g).
WEIGHT AND BALANCE TERMINOLOGY

Reference Datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.

Station is a location along the airplane fuselage given in terms of distance from the reference datum.

Arm is the horizontal distance from the reference datum to the center of gravity (C.G.) of an item, or of the airplane as a whole.

Moment is the product of the weight of an item, or of the airplane as a whole, multiplied by its arm. (Moment divided by a constant of 1000 is used in this manual to simplify calculations by reducing the number of digits, and is expressed as Moment/1000.)

Center of Gravity (C.G.) is the point at which the airplane would balance if suspended from that point. Its distance from the reference datum is determined by dividing the total moment by the total weight of the airplane.

C.G. Arm is the arm obtained by adding the airplane’s individual moments and dividing the sum by the total weight.

Center of Gravity Limits are the extreme center of gravity locations within which the airplane must be operated at a given weight.

Standard Empty Weight is the weight of a standard airplane including unusable fuel, full operating fluids, and full engine oil.

Basic Empty Weight is the standard empty weight plus the weight of optional equipment installed on a specific airplane.

Useful Load is the difference between ramp weight and the basic empty weight.

Mean Aerodynamic Chord (MAC) is the chord of an imaginary rectangular wing having the same pitching moments throughout the flight range as that of the actual wing. It may be determined by dividing the wing area by the wingspan.

Maximum Ramp Weight is the maximum weight approved for ground maneuvers, and includes the weight of fuel used for start up, taxi, and run up.

Maximum Takeoff Weight is the maximum weight approved for the start of the takeoff roll.

Maximum Landing Weight is the maximum weight approved for landing touchdown.

Tare is the weight of chocks, blocks, stands, etc. used when weighing the airplane, and is included in the scale readings. Tare is deducted from scale readings to obtain actual (net) weight of the airplane.