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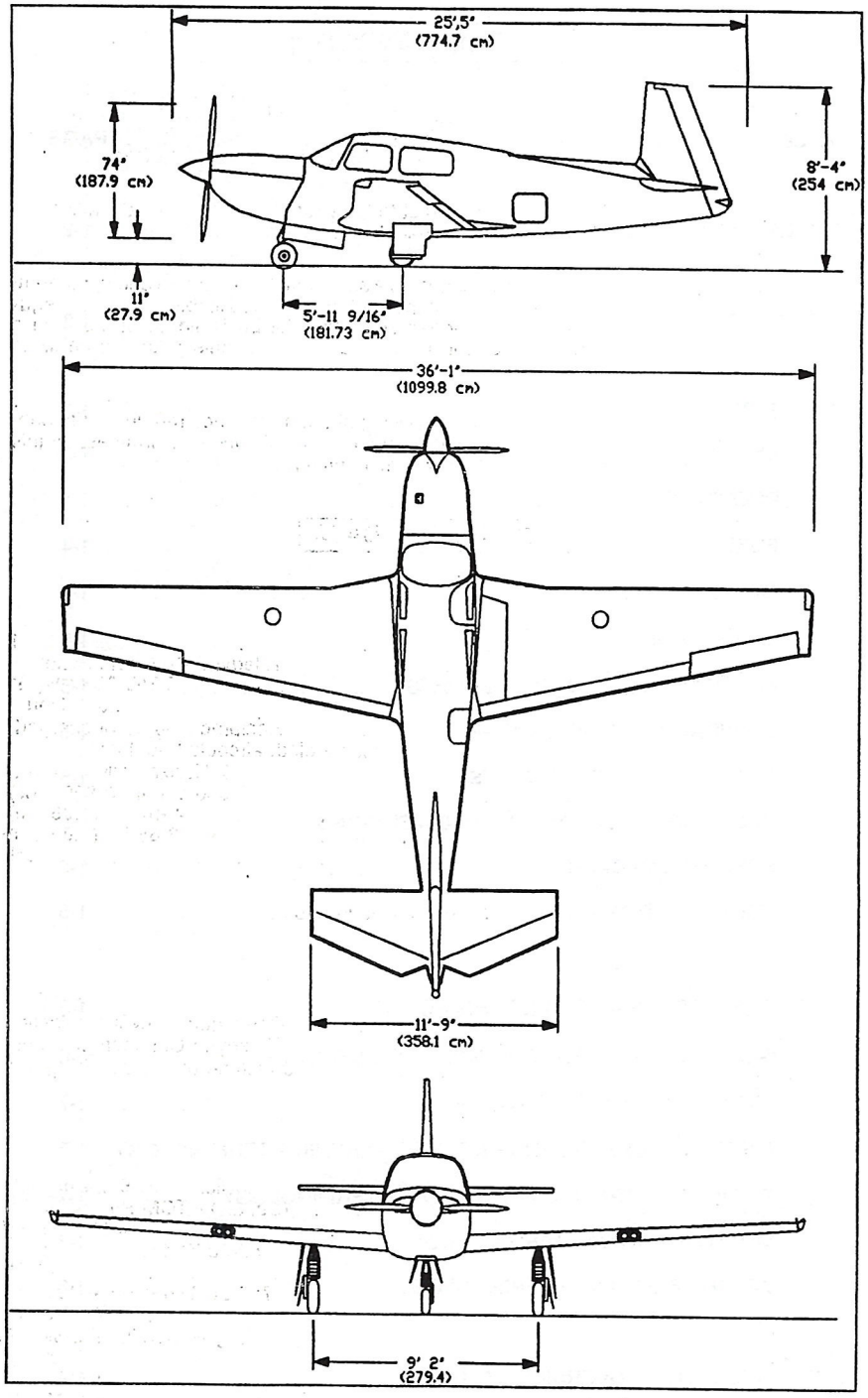


**FIGURE 1-1 - THREE VIEW - M20K**

## INTRODUCTION

This Pilot's Operating Handbook conforms to GAMA Specification No.1 and includes both Manufacturers material and FAA APPROVED material required to be furnished to the pilot by the applicable Federal Aviation Regulation's. Section IX contains supplemental data for optional equipment installed on an aircraft and provided by Mooney Aircraft Corporation.

Section I contains information of general interest to the pilot. It also contains definitions of the terminology used in this Pilot's Operating Handbook.

This Pilot's Operating Handbook is not designed as a substitute for adequate and competent flight instruction, knowledge of current airworthiness directives, applicable federal air regulations or advisory circulars. It is not intended to be a guide for basic flight instruction or a training manual and should not be used for operational purposes unless kept in an up to date status.

All limitations, procedures, safety practices, servicing and maintenance requirements published in this POH/AFM are considered mandatory for the Continued Airworthiness of this airplane in a condition equal to that of its original manufacture.

## DESCRIPTIVE DATA

### ENGINE

| | |
|---|---|
| Number of engines | 1 |
| Engine Manufacturer | Teledyne Continental Motors |
| Model | TSIO-360-SB( )* |
| Recommended TBO | 2000 Hours |
| Type | Reciprocating, turbocharged, intercooled, aircooled, fuel injected |
| Number of cylinders | 6, Horizontally opposed |
| Displacement | 360 Cu. In. (5899.4 cc) |
| Bore | 4.44 In.(11.28 cm) |
| Stroke | 3.88 In. (9.86 cm) |
| Compression ratio | 7.5:1 |

* Refer to TCDS for engine configuration installed in aircraft.

### Fuel System

| | |
|---|---|
| Type | Continuous flow fuel injection |
| Make | Teledyne Continental Motors |
| Fuel-Aviation Gasoline | 100 Octane or 100LL min. grade |

### Accessories

| | |
|---|---|
| Magnetos (Pressurized) | Slick - P/N 6224 or 6324 |
| (OPTIONAL) | (Bendix) - TCM P/N 646979-1 |
| Ignition Harness | 5 MM Shielded (.750-20 Thd. Connection) |
| Spark Plugs | 18 MM (.750-20 Thd. Connection) |
| Turbocharger | Airesearch |
| Oil Cooler | Teledyne Continental Motors |
| Alternator | T C M 28V |
| Starter | T C M 24V |
| Alternator,Standby (Optional) | T C M 28V |
| Intercooler | TCM |

**Ratings:**

| | |
|---|---|
| Maximum Continuous Sea Level BHP-RPM | 220 HP - 2600 RPM |
| Manifold Pressure at S.L | 39.0 In. Hg. |
| Manifold Pressure at Critical Altitude (Density) | 39.0 In. Hg. @ 20,000 ft. (+/- 1500 ft.) |

## PROPELLER

| | |
|---|---|
| Manufacturer | McCauley * |
| Model Number | 2A34C221/90DHC-16E or -16EP * |
| Number of Blades | 2 |
| Diameter (No cutoff allowed) | 74.0 in. (187.96 cm) * |
| Type | Constant Speed |
| Governing | Hydraulically controlled by engine oil |
| Blade Angles @ 30 in.(75 cm) Sta.: | |
| Low | 14.7 degrees +/-.2 degrees * |
| High | 38.0 degrees +/-.5 degrees * |
| * **OPTIONAL:** TBD | |
| Diameter | 73.0" (185.42 cm) (No cutoff allowed) |
| Blade Angles @30 in. sta. (75 cm) | |
| Low: | 14.7 degrees +/- .1 degree |
| High: | 36.5 degrees +/- 1 degree |
| Spinner: | |

## FUEL

| | |
|---|---|
| Minimum Fuel Grade (Color) | 100 Octane (Green)/100 LL (Blue) |
| Total Capacity | 78.6 U.S. Gal. (297.7 Liters) (65.5 Imp. Gal.) |
| Usable | 75.6 U.S. Gal. (286.4 Liters) (63.0 Imp. Gal.) |

## OIL

**(Multi-viscosity 20W-50 Mineral oil recommended for first 25 hours or until oil consumption stabilizes).**

Oil grades, specification and changing recommendations are contained in SECTION VIII.

| | |
|---|---|
| Oil Specification | MHS-24( ) OIL (SAE) & as approved by TCM |
| SAE Oil Grade | |
| All temperatures | 15W-50 or 20W-50 |
| Above 30°F | SAE 30 or 10W30 |
| Below 50°F | SAE 30, 10W30 |
| Total Oil Capacity | 8 Qts. (7.57 Liters) |
| Oil Capacity (Minimum for Flight) | 5 Qts. (4.73 Liters) |
| Oil Filter | Full Flow |

## LANDING GEAR

Electrically operated, fully retractable tricycle gear with rubber shock discs. The main wheels have hydraulically operated,dual puck, disc brakes. The nose wheel is fully steerable 14° left or right of center.

| | |
|---|---|
| Wheel Base | 71 9/16 in. (181.73 cm) |
| Wheel Track | 110 in. (279.4 cm) |
| Tire Size: | |
| Nose | 5.00 x 5 (6 ply) Type III |
| Main | 6.00 x 6 (6 ply) Type III |
| Tire Pressure: | |
| Nose | 49 PSI |
| Main | 42 PSI |
| Min. Turning Radius (No brakes applied) | 41 ft. (12.5 m) |

## MAXIMUM CERTIFICATED WEIGHTS

| | |
|---|---|
| Gross Weight | 3130 Lbs. (1420 Kg) |
| Baggage Area | 120 Lbs. (54.43 Kg) |
| Hat Rack | 10 Lbs. (4.54 Kg) |
| Cargo (Rear Seats Folded Down) | 340 Lbs. (154.2 Kg) |

## STANDARD AIRPLANE WEIGHTS

| | |
|---|---|
| Basic Empty Weight | See Page 1- 8 |
| Useful Load | Varies with installed equipment. See SECTION VI for specific airplane weight (pg. 6-6). |

## CABIN AND ENTRY DIMENSIONS

| | |
|---|---|
| Cabin Width (Maximum) | 43.5 In. (110.5 cm) |
| Cabin Length (Maximum) | 114 In. (290 cm) |
| Cabin Height (Maximum) | 44.5 In. (113 cm) |
| Entry Width (Minimum) | 29.0 In. (73.4 cm) |
| Entry Height (Minimum) | 35.0 In. (88.9 cm) |

## BAGGAGE SPACE AND ENTRY DIMENSIONS

| | |
|---|---|
| Compartment Width | 24 In. (60.9 cm) |
| Compartment Length | 35 In. (88.9 cm) |
| Compartment Height | 35 In. (88.9 cm) |
| Compartment Volume | 15.3 Cu. Ft. (.433 cubic meters) |
| Cargo Area (with rear seat folded down) | 33.0 Cu. Ft. (.924 cubic meters) |
| Entry Height (Minimum) | 20.5 In. (52.1 cm) |
| Entry Width | 17.0 In. (43.2 cm) |
| Ground to Bottom of Sill | 46.0 In.(116.8 cm) |

## SPECIFIC LOADINGS

| | |
|---|---|
| Wing Loading @ Maximum Gross Weight | 17.9 Lbs./Sq. Ft. |
| Power Loading @ Maximum Gross Weight | 14.2 Lbs./HP |

## IDENTIFICATION PLATE

All correspondence regarding your airplane should include the Serial Number as depicted on the identification plate. The identification plate is located on the left hand side, aft end of the tail cone, below the horizontal stabilizer leading edge. The aircraft Serial Number and type certificate are shown.

# SYMBOLS, ABBREVIATIONS & TERMINOLOGY

## GENERAL AIRSPEED TERMINOLOGY & SYMBOLS

| | |
|---|---|
| GS | GROUND SPEED - Speed of an airplane relative to the ground. |
| KCAS | KNOTS CALIBRATED AIRSPEED - 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. |
| KIAS | KNOTS INDICATED AIRSPEED - The speed of an aircraft as shown on its airspeed indicator. IAS values published in this handbook assume zero instrument error. |
| KTAS | KNOTS TRUE AIRSPEED - The airspeed of an airplane relative to undisturbed air which is the KCAS corrected for altitude, temperature and compressibility. |
| $V_a$ | MANEUVERING SPEED - The maximum speed at which application of full available aerodynamic control will not overstress the airplane. |
| $V_{fe}$ | MAXIMUM FLAP EXTENDED SPEED - The highest speed permissible with wing flaps in a prescribed extended position. |
| $V_{le}$ | MAXIMUM LANDING GEAR EXTENDED SPEED - The maximum speed at which an aircraft can be safely flown with the landing gear extended. |
| $V_{lo}$ | MAXIMUM LANDING GEAR OPERATING SPEED - The maximum speed at which the landing gear can be safely extended or retracted. |
| $V_{ne}$ | NEVER EXCEED SPEED or MACH NUMBER - The speed limit that may not be exceeded at any time. |
| $V_{no}$ | MAXIMUM STRUCTURAL CRUISING SPEED - The speed that should not be exceeded except in smooth air and then only with caution. |
| $V_s$ | STALLING SPEED - The minimum steady flight speed at which the airplane is controllable. |
| $V_{so}$ | STALLING SPEED - The minimum steady flight speed at which the airplane is controllable in the landing configuration. |
| $V_x$ | BEST ANGLE-OF-CLIMB SPEED - The airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance. |
| $V_y$ | BEST RATE-OF-CLIMB SPEED - The airspeed which delivers the greatest gain in altitude in the shortest possible time with gear and flaps up. |

## ENGINE POWER TERMINOLOGY

| | |
|---|---|
| BHP | BRAKE HORSEPOWER - The power developed by the engine. |
| CHT | CYLINDER HEAD TEMPERATURE - Operating temperature of engine cylinder(s) being monitored by a sensor unit. Expressed in °F. |
| MCP | MAXIMUM CONTINUOUS POWER - The maximum power for takeoff normal, abnormal or emergency operations. |
| MP | MANIFOLD PRESSURE - Pressure measured in the engine's induction system. Expressed in inches of mercury (Hg). |
| RPM | REVOLUTIONS PER MINUTE - Engine speed. |
| TIT | TURBINE INLET TEMPERATURE - The exhaust gas temperature measured at the turbocharger turbine inlet. |
| Turbo-Charger | A device used to supply increased amounts of air to an engine induction system. In operation, the turbine is driven by engine exhaust gas mixture. The turbine directly drives a compressor which pumps air into the engine intake. |

## AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

| | |
|---|---|
| Critical Altitude | The altitude above which the manifold pressure required for engine rated horsepower, at rated RPM, can no longer be maintained. |
| Demon-strated Crosswind Velocity | The velocity of the crosswind component for which adequate control of the airplane during takeoff and landing test was actually demonstrated during certification. The value shown is not considered to be limiting. |
| g | Acceleration force due to gravity. |
| Certified Ceiling | The maximum altitude for aircraft operations as specified by FAA regulations during Type Certification procedures. |
| Service Ceiling | The maximum altitude at which aircraft at gross weight has the capability of climbing at the rate of 100 ft/min. |

## ENGINE CONTROLS & INSTRUMENTS TERMINOLOGY

| | |
|---|---|
| Propeller Control | The control used to select engine RPM. |
| Throttle Control | The control used to select engine power by controlling MP. |
| Mixture Control | Provides a mechanical linkage to the fuel injector mixture control to control the size of the fuel feed aperture, and therefore the air/fuel mixture. It is the primary method to shut the engine down. |
| T.I.T. Gauge | A temperature measuring system that senses exhaust gas temperature at the inlet side of the turbocharger. The T.I.T. gauge is the primary indicator for mixture leaning in cruising flight at 78.6% power or less. |
| CHT Gauge | Cylinder head temperature indicator used to determine that engine operating temperature is within manufacturer's specifications. |
| Tachometer | An instrument that indicates rotational speed of the engine. The speed is shown as propeller revolutions per minute (RPM). |
| Propeller Governor | The device that regulates RPM of the engine/propeller by increasing or decreasing propeller pitch, through a pitch change mechanism in the propeller hub. |

## METEOROLOGICAL TERMINOLOGY

| | |
|---|---|
| AGL | Above ground level. |
| Density Altitude | Altitude as determined by pressure altitude and existing ambient temperature. In standard atmosphere (ISA) density and pressure altitude are equal. For a given pressure altitude, the higher the temperature, the higher the density altitude. |
| Indicated Altitude | The altitude actually read from an altimeter when, and only when barometric subscale (Kollsman window) has been set to Station Pressure. |
| Indicated Pressure Altitude | The number actually read from an altimeter, when and only when, the barometric subscale (Kollsman Window) has been set to 29.92 inches of Mercury (Hg) or 1013.2 millibars.. |
| ISA | INTERNATIONAL STANDARD ATMOSPHERE - assumes that (1) The air is a dry perfect gas; (2) The temperature at sea level is 15° Celsius (59° F); (3) The pressure at sea level is 29.92 inches Hg (1013.2 mb); (4) The temperature gradient from sea level to the altitude at which the temperature is -56.5° C (-69.7° F) is -0.00198° C (-0.003564° F) per foot. |
| OAT | OUTSIDE AIR TEMPERATURE - The free air static temperature, obtained either from inflight temperature indications or ground meteorological sources. It is expressed in °C. |
| Pressure Altitude | The altitude indicated when Kollsman Window is set to 29.92 in. Hg. or 1013.2 MB. In this handbook, altimeter instrument errors are assumed to be zero. |
| Station Pressure | Actual atmospheric pressure at field elevation. |

## WEIGHT AND BALANCE TERMINOLOGY

| | |
|---|---|
| Arm | The horizontal distance from the reference datum to the center of gravity (C.G.) of an item. |
| Basic Empty Weight | The actual weight of the airplane and includes all operating equipment (including optional equipment) that has a fixed location and is actually installed in the aircraft. It includes the weight of the unusable fuel and full oil. |
| Center of Gravity (C.G.) | The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane. |
| C.G. Arm | The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight. |
| C.G. in percent MAC | Center of Gravity expressed in percent of mean aerodynamic chord. |
| C.G. Limits | The extreme center of gravity locations within which the airplane must be operated at a given weight. |
| MAC | Mean Aerodynamic Chord. |
| Maximum Weight | The maximum authorized weight of the aircraft and its contents as listed in the aircraft specifications. |
| Moment | The 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.) |

## WEIGHT AND BALANCE TERMINOLOGY (con't.)

| | |
|---|---|
| Reference Datum | An imaginary vertical plane from which all horizontal distances are measured for balance purposes. |
| Station | A location along the airplane fuselage usually given in terms of distance from the reference datum. |
| Tare | 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. |
| Unusable Fuel | Fuel remaining after a runout test has been completed in accordance with governmental regulations. |
| Usable Fuel | Fuel available for aircraft engine combustion. |
| Useful Load | The basic empty weight subtracted from the maximum weight of the aircraft. This load consists of the pilot, crew (if applicable), usable fuel, passengers and baggage. |

## MEASUREMENT CONVERSION TABLES

### LENGTH

| U. S. Customary Unit | Metric Equivalents |
|---|---|
| 1 inch | 2.54 centimeters |
| 1 foot | 0.3048 meter |
| 1 yard | 0.9144 meter |
| 1 mile (statute, land) | 1, 609 meters |
| 1 mile (nautical, international) | 1, 852 meters |

### AREA

| U. S. Customary Unit | Metric Equivalents |
|---|---|
| 1 square inch | 6.4516 sq. centimeters |
| 1 square foot | 929.030 sq. centimeters |
| 1 square yard | 0.836 sq. meter |

### VOLUME OR CAPACITY

| U. S. Customary Unit | Metric Equivalents |
|---|---|
| 1 cubic inch | 16.39 cubic centimeters |
| 1 cubic foot | 0.028 cubic meter |
| 1 cubic yard | 0.765 cubic meter |

| U.S. Customary Liquid Measure | Metric Equivalents |
|---|---|
| 1 fluid ounce | 29.573 milliliters |
| 1 pint | 0.473 liter |
| 1 quart | 0.946 liter |
| 1 gallon | 3.785 liters |

| U.S. Customary Dry Measure | Metric Equivalents |
|---|---|
| 1 pint | 0.551 liter |
| 1 quart | 1.101 liters |

## VOLUME OR CAPACITY (con't.)

| British Imperial Liquid and Dry Measure | U. S. Equivalents | Metric Equivalents |
|---|---|---|
| 1 fluid ounce | 0.961 U.S. fluid ounce, 1.734 cubic inches | 28.412 milliliters |
| 1 pint | 1.032 U.S. dry pints, 1.201 U.S. liquid pts., 34.678 cubic inches | 568.26 milliliters |
| 1 quart | 1.032 U.S. dry quarts 1.201 U.S. liquid qts., 69.354 cubic inches | 1.136 liters |
| 1 gallon | 1.201 U.S. 277.420 cubic inches | 4.546 liters |

## WEIGHT

| U. S. Customary Unit (Avoirdupois) | Metric Equivalents |
|---|---|
| 1 grain | 64.79891 milligrams |
| 1 dram | 1.772 grams |
| 1 ounce | 28.350 grams |
| 1 pound | 453.6 grams |

## PRESSURE

| U.S. Customayr Unit | Metric Equivalents |
|---|---|
| 1 PSIG | 6.895 KPA |
| 1 inch Hg | 3.388 KPA |
| 1 inch Hg | 25.40 mm Hg. |