THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY THE FEDERAL AVIATION REGULATIONS, AND CONSTITUTES THE FAA APPROVED AIRPLANE FLIGHT MANUAL. THIS DOCUMENT MUST BE CARRIED IN THE AIRCRAFT AT ALL TIMES.

MOONEY AIRCRAFT CORPORATION
P.O. BOX 72, KERRVILLE, TEXAS 78028-0072

SERIAL NUMBER:______________________________________________________

REGISTRATION NUMBER:______________________________________________

FAA APPROVED:________________________________________________________

Henry A. Armstrong, Manager
Airplane Certification Office
FEDERAL AVIATION ADMINISTRATION
Fort Worth, Texas
76193-0150

FAA APPROVED in Normal Category based on CAR PART 3; applicable to Model M20J S/N listed above only.

ISSUED 8 - 89
REV. A 3-90
REV. B 1-92

MANUAL NUMBER 3210
# MOONEY
## MODEL M20J

### AT INTRODUCTION

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**POH/AFM NUMBER 3210 [REVISION B]**

This POH/AFM effective beginning with M20J, S/N 24-1686-14

**ISSUED 8-89**

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<td>A</td>
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<td>8-7 thru 8-10</td>
<td>Original</td>
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<tr>
<td>9-1 thru 9-4</td>
<td>Original</td>
</tr>
<tr>
<td>10-1 thru 10-12</td>
<td>Original</td>
</tr>
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<td>---------------</td>
</tr>
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<tr>
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<td>1-5, 1-6, 2-6</td>
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<td>1-7, 1-8, 3-9, 3-10</td>
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<th>DATE</th>
</tr>
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No. 3210
REVISION B

iv REV. B 1 - 92 ISSUED 8 - 89
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 Regulations. SECTION IX contains supplemental data supplied by Mooney Aircraft Corporation. SECTION I contains information of general interest to the pilot. It also contains definitions of the terminology used in this Operators Manual. 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 ........................................ TEXITRON-Lycoming
Model ................................................................ 10-360-A3B6D
Recommended TBO ............................................. 2000 Hours
Type ................................................................ Reciprocating, aircooled, fuel injected.
Number of cylinders ........................................... 4, Horizontally opposed
Displacement ......................................................... 361 Cu. In. (5915.7 cc)
Bore ................................................................ 5.125 in. (13.02 cm)
Stroke ................................................................ 4.375 in. (11.11 cm)
Compression ratio .................................................. 8.7:1

Fuel System

Type .................................................................. Fuel Injection Flow
Make ................................................................ Bendix, RSA-5-AD1
Fuel - Aviation Gasoline ........................................ 100 Octane or 100LL (min. grade)

Accessories

Magnetos ............................................................... Bendix D4LN 2021
Spark Plugs ........................................................... 18 MM X .750-20 Thd. Connection
Alternator ............................................................. Prestolite 12V, 60A
Starter ................................................................. Prestolite 12 Volts

Ratings:

Maximum Continuous Sea Level-BHP/RPM ............... .200/2700

PROPELLER

Number ................................................................. 1
Manufacturer ........................................................ McCauley*
Model Number ..................................................... B2D34C214/80DHB-16E*
Number of Blades .................................................. 2
Diameter Max. ....................................................... .740 in. (187.9 cm)*
Min. ...........................................................................
Type ................................................................. Constant Speed
### Governing
Hydraulically controlled by engine oil

### Blade Angles @ 30 in. Sta. (75 cm):
- **Low**: 13.9 degrees +/- 0.2 degrees*
- **High**: 33.0 degrees +/- 0.5 degrees*

### FUEL
- **Minimum Fuel Grade (Color)**: 100 Octane (Green)/100 LL (Blue)
- **Total Capacity**: 66.5 U.S. Gal. (251.8 Liters) (55.4 Imp. Gal.)
- **Usable**: 64.0 U.S. Gal. (242.4 Liters) (53.3 Imp. Gal.)

### OIL
- **Total Oil Capacity**: 8 Qts. (7.57 Liters)
- **Oil Capacity Minimum for Flight**: 5 Qts. (4.73 Liters)
- **Oil Filter**: Full Flow

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

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel Base</td>
<td>71 9/16 in. (181.73 cm)</td>
</tr>
<tr>
<td>Wheel Track</td>
<td>110 in. (279.4 cm)</td>
</tr>
<tr>
<td>Tire Size:</td>
<td></td>
</tr>
<tr>
<td>Nose</td>
<td>5.00 x 5 (6 ply Type III)</td>
</tr>
<tr>
<td>Main</td>
<td>6.00 x 6 (6 ply Type III)</td>
</tr>
<tr>
<td>Tire Pressure:</td>
<td></td>
</tr>
<tr>
<td>Nose</td>
<td>49 PSI</td>
</tr>
<tr>
<td>Main</td>
<td>30 PSI</td>
</tr>
<tr>
<td>Min. Turning Radius (No brakes applied)</td>
<td>41 ft. (12.5 m)</td>
</tr>
</tbody>
</table>

### MAXIMUM CERTIFICATED WEIGHTS
- **Gross Weight**: 2740 Lbs. (1243 Kg)
- **Baggage Area**: 120 Lbs. (54.4 Kg)
- **Hat Rack**: 10 Lbs. (4.54 Kg)
- **Cargo (Rear Seats Folded Down)**: 340 Lbs. (154.2 Kg)

### STANDARD AIRPLANE WEIGHTS
- **Basic Empty Weight**: Varies with installed equipment
- **Useful Load**: See SECTION VI for specific airplane weight.
CABIN AND ENTRY DIMENSIONS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabin Width</td>
<td></td>
<td>43.5 in. (110.5 cm)</td>
</tr>
<tr>
<td>Cabin Length</td>
<td></td>
<td>114 in. (290 cm)</td>
</tr>
<tr>
<td>Cabin Height</td>
<td></td>
<td>44.5 in. (113 cm)</td>
</tr>
<tr>
<td>Entry Width</td>
<td></td>
<td>29.0 in. (73.4 cm)</td>
</tr>
<tr>
<td>Entry Height</td>
<td></td>
<td>35.0 in. (88.9 cm)</td>
</tr>
</tbody>
</table>

BAGGAGE SPACE AND ENTRY DIMENSIONS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compartment Width</td>
<td></td>
<td>24 in. (60.9 cm)</td>
</tr>
<tr>
<td>Compartment Length</td>
<td></td>
<td>35 in. (88.9 cm)</td>
</tr>
<tr>
<td>Compartment Height</td>
<td></td>
<td>35 in. (88.9 cm)</td>
</tr>
<tr>
<td>Compartment Volume S/N 24-1686-14</td>
<td></td>
<td>17.0 cu. ft. (481 cu m)</td>
</tr>
<tr>
<td>Compartment Volume S/N 24-1687-14 thru 24-2999</td>
<td>15.3 Cu. Ft. (433 cu m)</td>
<td></td>
</tr>
<tr>
<td>Cargo Area (with rear seats folded down)</td>
<td>33.0 Cu. Ft. (924 cubic meters)</td>
<td></td>
</tr>
<tr>
<td>Entry Height (Minimum)</td>
<td></td>
<td>20.5 in. (52.1 cm)</td>
</tr>
<tr>
<td>Entry Weight</td>
<td></td>
<td>17.0 in. (43.2 cm)</td>
</tr>
<tr>
<td>Ground to Bottom of Sill</td>
<td></td>
<td>46.0 in. (116.8 cm)</td>
</tr>
</tbody>
</table>

SPECIFIC LOADINGS

<table>
<thead>
<tr>
<th>Loading</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing Loading @ Maximum Gross Weight</td>
<td>15.68 Lbs./Sq. Ft. (79.03 Kg/Sq. m)</td>
<td></td>
</tr>
<tr>
<td>Power Loading @ Maximum Gross Weight</td>
<td>13.7 Lbs./HP (6.21 Kg/HP)</td>
<td></td>
</tr>
</tbody>
</table>

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.

SOURCES, 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.

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 and temperature.

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.
$V_{lb}$  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 - 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.

EGT  EXHAUST GAS TEMPERATURE - Temperature of the exhaust gas fuel/air mixture during engine operation.

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 and is expressed in inches of mercury (Hg).

RPM  REVOLUTIONS PER MINUTE - Engine speed.

**AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY**

Demonstrated Crosswind  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 Velocity is NOT considered to be limiting.

$g$  Acceleration due to gravity.

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 speed.

Throttle Control  The control used to select engine power by controlling MP.
ENGINE CONTROLS & INSTRUMENTS TERMINOLOGY (cont.)

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<thead>
<tr>
<th>Term</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Mixture Control</td>
<td>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 engine down.</td>
</tr>
<tr>
<td>CHT Gauge</td>
<td>Cylinder head temperature indicator used to determine that engine operating temperature is within manufacturers specifications.</td>
</tr>
<tr>
<td>EGT Gauge</td>
<td>Exhaust gas temperature indicator used to identify correct lean fuel flow mixtures for various power settings.</td>
</tr>
<tr>
<td>Tachometer</td>
<td>An instrument that indicates rotational speed of the engine. The speed is shown as propeller revolutions per minute (RPM).</td>
</tr>
<tr>
<td>Propeller Governor</td>
<td>The device that regulates the RPM of the engine/propeller by increasing or decreasing the propeller pitch, through a pitch change mechanism in the propeller hub.</td>
</tr>
</tbody>
</table>

METEOROLOGICAL TERMINOLOGY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGL</td>
<td>Above ground level.</td>
</tr>
<tr>
<td>Density Altitude</td>
<td>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.</td>
</tr>
<tr>
<td>Indicated Altitude</td>
<td>The altitude actually read from an altimeter when, and only when, the barometric subscale has been set to Station Pressure.</td>
</tr>
<tr>
<td>ISA</td>
<td>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 (1913.2 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 (-0.00356° F) per foot.</td>
</tr>
<tr>
<td>OAT</td>
<td>OUTSIDE AIR TEMPERATURE - The free air static temperature, obtained either from inflight temperature indications or ground meteorological sources. It is expressed in °C.</td>
</tr>
<tr>
<td>Pressure Altitude</td>
<td>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.</td>
</tr>
<tr>
<td>Station Pressure</td>
<td>Actual atmospheric pressure at field elevation.</td>
</tr>
</tbody>
</table>

WEIGHT AND BALANCE TERMINOLOGY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm</td>
<td>The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.</td>
</tr>
<tr>
<td>Basic Empty Weight</td>
<td>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 unusable fuel and full oil.</td>
</tr>
</tbody>
</table>
### WEIGHT AND BALANCE TERMINOLOGY (cont.)

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center of Gravity (C.G.)</td>
<td>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.</td>
</tr>
<tr>
<td>C.G. Arm</td>
<td>The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.</td>
</tr>
<tr>
<td>C.G. in % MAC</td>
<td>Center of Gravity expressed in percent of mean aerodynamic chord.</td>
</tr>
<tr>
<td>C.G. Limits</td>
<td>The extreme center of gravity locations within which the airplane must be operated at a given weight.</td>
</tr>
<tr>
<td>MAC</td>
<td>Mean Aerodynamic Chord.</td>
</tr>
<tr>
<td>Maximum Weight</td>
<td>The maximum authorized weight of the aircraft and its contents as listed in the aircraft specifications.</td>
</tr>
<tr>
<td>Moment</td>
<td>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.)</td>
</tr>
<tr>
<td>Reference Datum</td>
<td>An imaginary vertical plane from which all horizontal distances are measured for balance purposes.</td>
</tr>
<tr>
<td>Station</td>
<td>A location along the airplane fuselage usually given in terms of distance from the reference datum.</td>
</tr>
<tr>
<td>Tare</td>
<td>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.</td>
</tr>
<tr>
<td>Unusable Fuel</td>
<td>Fuel remaining after a runout test has been completed in accordance with governmental regulations.</td>
</tr>
<tr>
<td>Usable Fuel</td>
<td>Fuel available for airplane propulsion.</td>
</tr>
<tr>
<td>Useful Load</td>
<td>The basic empty weight subtracted from the maximum weight of the aircraft. This load consists of the pilot, crew if applicable, fuel, passengers, and baggage.</td>
</tr>
</tbody>
</table>
**POWER PLANT LIMITATIONS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Number of Engines</td>
<td>1</td>
</tr>
<tr>
<td>Engine Manufacturer</td>
<td>TExtron Lycoming</td>
</tr>
<tr>
<td>Engine Model Number</td>
<td>IO-360-A3B6D</td>
</tr>
<tr>
<td>Engine Operating Limits for Takeoff and Continuous Operations:</td>
<td></td>
</tr>
<tr>
<td>Maximum Power</td>
<td>200 BHP</td>
</tr>
<tr>
<td>Maximum Engine Speed</td>
<td>2700 RPM</td>
</tr>
<tr>
<td>Transient Engine RPM Limit</td>
<td>2970 RPM for 3 seconds or less</td>
</tr>
<tr>
<td>Max. Cylinder Head Temperature</td>
<td>475°F (246°C)</td>
</tr>
<tr>
<td>Maximum Oil Temperature</td>
<td>245°F (118°C)</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td></td>
</tr>
<tr>
<td>Normal Operating</td>
<td>60-90 PSI</td>
</tr>
<tr>
<td>Minimum (IDLE ONLY)</td>
<td>25 PSI</td>
</tr>
<tr>
<td>Maximum (cold oil)</td>
<td>100 PSI</td>
</tr>
<tr>
<td>Fuel Pressure</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>14 PSI</td>
</tr>
<tr>
<td>Maximum</td>
<td>30 PSI</td>
</tr>
<tr>
<td>Fuel Grade (Color)</td>
<td></td>
</tr>
<tr>
<td>100/130 (Green)</td>
<td></td>
</tr>
<tr>
<td>100LL (Blue)</td>
<td></td>
</tr>
<tr>
<td>Number of Propellers</td>
<td>1</td>
</tr>
<tr>
<td>Propeller Manufacturer</td>
<td>McCauley</td>
</tr>
<tr>
<td>Propeller Model Number</td>
<td>B2D34C214/90DHB-16E</td>
</tr>
<tr>
<td>Propeller Diameter:</td>
<td></td>
</tr>
<tr>
<td>Min.</td>
<td>73.0 In. (185.4 cm)</td>
</tr>
<tr>
<td>Max. (No cutoff allowed)</td>
<td>74.0 In. (187.9 cm)</td>
</tr>
<tr>
<td>Propeller Blade Angles @ 30 In. sta.:</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13.9° +/- 2°</td>
</tr>
<tr>
<td>High</td>
<td>33.0° +/- 5°</td>
</tr>
<tr>
<td>Propeller Operating Limits</td>
<td>2700 RPM</td>
</tr>
</tbody>
</table>

100LL fuel is calibrated at 5.82 lb/gal (.69 Kg/liter)
100/130 octane fuel is calibrated at 6.0 lb/gal (.72 Kg/liter)

---

**NOTE**

No cutoff allowed on propeller when de-ice boots are installed.
### POWER PLANT INSTRUMENT MARKINGS

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>REDLINE (MINIMUM LIMIT)</th>
<th>GREEN ARC (NORMAL OPERATING)</th>
<th>YELLOW ARC (CAUTION RANGE)</th>
<th>REDLINE (MAXIMUM LIMIT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachometer</td>
<td>1950 - 2700</td>
<td>1500 - 1950</td>
<td></td>
<td>2700 RPM</td>
</tr>
<tr>
<td>Cylinder Head</td>
<td>300 - 475°F (149 - 246°C)</td>
<td>150 - 245°F (65 - 118°C)</td>
<td></td>
<td>245°F (118°C)</td>
</tr>
<tr>
<td>Oil Temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil Pressure</td>
<td>25 PSI</td>
<td>60 - 90 PSI</td>
<td>(IDLE ONLY)</td>
<td>100 PSI</td>
</tr>
<tr>
<td>Fuel Pressure</td>
<td>Radial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yellow Arc (starting and warm-up range)</td>
<td>. . . .</td>
<td>90-100 PSI</td>
<td></td>
</tr>
</tbody>
</table>

---

**NOTE**

Refer to TEXTRON-Lycoming Engine Maintenance and Operators Manual Section on Engine Specifications and Operating Limits for recommended cruise power and temperature limitations.

### FUEL LIMITATIONS

**NOTE**

A reduced fuel quantity indicator is installed in each tank. The bottom tip of these indicators shows the 25 U.S. gallon (94.7 liters) (20.8 IMP. Gal.) usable fuel level in each tank.

**NOTE**

An optional visual fuel quantity gauge may be installed on top of each tank and is to be used as a reference for refueling tanks only.

| Standard Tanks: (2) | . . . . | 33.25 U.S. Gal. each (126 Liters)(27.7 Imp. Gal.) |
| Total Fuel:         | . . . . | 66.5 U.S. Gal (252 Liters)(55.4 Imp. Gal.)     |
| Usable Fuel:        | . . . . | 64.0 U.S. Gal (247 Liters)(53.3 Imp. Gal.)     |
| Unusable Fuel:      | . . . . | 2.5 U.S. Gal (9.5 Liters)(2.1 Imp. Gal.)       |
| Fuel Grade (and Color): | 100 Octane | minimum grade aviation fuel (green). |
|                     | 100LL     | (low lead) aviation fuel (blue) with a lead |
|                     | . . . .   | content limited to 2 cc per gallon is also approved. |
To reduce the possibility of ice formation within the aircraft or engine fuel system it is permissible to add ISO-PROPYL alcohol to the fuel supply in quantities NOT TO EXCEED 1% of the total fuel volume per tank. DO NOT add other additives to the fuel system due to potential deteriorating effects within the fuel system.

**FUEL LIMITATIONS**

<table>
<thead>
<tr>
<th>WEIGHT LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Weight (takeoff and landing)</td>
</tr>
<tr>
<td>Maximum Weight in Baggage Compartment</td>
</tr>
<tr>
<td>Maximum Weight in Hatrack</td>
</tr>
<tr>
<td>Maximum Weight in Cargo Area (Rear seats folded down)</td>
</tr>
</tbody>
</table>

**CENTER OF GRAVITY LIMITS (GEAR DOWN)**

| Most Forward | Fuse. Sta. 41.0 IN.(103 cm) @ 2250 LBS(1120 Kg). 13.4% MAC |
| Intermediate Forward | Fuse. Sta. 41.8 IN.(106 cm) @ 2470 LBS (1120 Kg) 14.7% MAC |
| Forward Gross | Fuse. Sta. 45.0 IN.(113 cm) @ 2740(1243 Kg) 20.1% MAC |
| Aft Gross | Fuse. Sta. 50.1 IN.(126 cm) @ 2740 lb. (1243 Kg). 38.7% MAC |

MAC (at Wing Sta. 93.83) (238 cm) . . . . . . . . . . . . . . 59.18 IN.(150 cm)

Datum (station zero) is 5 inches(12.5 cm) aft of the center line of the nose gear attaching bolts, and 33 inches(84 cm) forward of the wing leading edge at wing station 59.25(150 cm).

**MANEUVER LIMITS**

This airplane must be operated as a Normal Category airplane. Aerobatic maneuvers, including spins, are prohibited.

//WARNING//

Takeoff maneuvers, prolonged sideslips or steep descents when the selected fuel tank contains less than 8 gallons (48.0 lbs., 30.3 liters, 6.6 IMP. Gal.) of fuel have not been demonstrated and may cause loss of power.
SECTION II
LIMITATIONS

MOONEY
MODEL M20J

NOTE

Up to 290 foot altitude loss may occur during stalls at maximum weight.

Slow throttle movement required at airspeed above 165 KIAS. Above 165 KIAS, rapid throttle movement may result momentary propeller RPM overspeed.

FLIGHT LOAD FACTOR LIMITS

Maximum Positive Load Factor
- Flaps Up .................................................. +3.8 g.
- Flaps Down (33 °) ...................................... +2.0 g.

Maximum Negative Load Factor
- Flaps Up .................................................. -1.5 g.
- Flaps Down .............................................. 0.0 g.

FLIGHT CREW

- Pilot ..................................................... 1
- Maximum Passenger seating configuration ......... 3

OPERATING LIMITATIONS

If this airplane is not equipped with an approved oxygen system and flight operations above 12,500 feet are desired, this airplane must be, (1) equipped with supplemental oxygen in accordance with FAR 23.1441, (2) operated in accordance with FAR 91.32 and (3) equipped with avionics in accordance with FAR 91 or FAR 135.

KINDS OF OPERATION LIMITS

This is a Normal Category airplane approved for VFR/IFR day or night operations when equipped in accordance with FAR 91.

DO NOT OPERATE IN KNOWN ICING CONDITIONS.

Autopilot Limitations - See SECTION IX.

KINDS OF OPERATION EQUIPMENT LIST

The following equipment was approved during Type Certification and must be installed and operable for each kind of operation as specified.

NOTE

The KINDS OF OPERATION EQUIPMENT list may not include all the equipment as required by applicable operating rules.

SEE NEXT PAGE FOR LISTINGS.
The following placards must be installed on the exterior of the aircraft at the locations specified.

**TIRE PRESSURE 30 PSI (207 KPA)**

**ON MAIN GEAR DOORS**

**TIRE PRESSURE 49 PSI (338 KPA)**

**ON NOSE GEAR DOOR**

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel-100 (Green) or 100LL (Blue) Min. Oct. 32 U.S. Gal.</td>
<td>FUEL-100 (GREEN) or 100LL (BLUE) MIN. OCT. 121.2 LITERS USEABLE</td>
<td>FUEL-100 (GREEN) or 100LL (BLUE) MIN. OCT. 26.6 IMP GAL USEABLE</td>
</tr>
</tbody>
</table>

**ON FUEL TANK CAPS**

**TOWING LIMITS**

**DO NOT PUSH**

**WARNING**

DO NOT EXCEED TOWING LIMITS

**ON NOSE GEAR LEG**

**NO STEP**

ON INBOARD END OF FLAPS, WING LEADING EDGES AND WING AHEAD OF FLAPS
| **HOIST POINT**  
| ---  
| -011  
| ON UNDERSIDE OF WINGS (2 PLCS)  

<table>
<thead>
<tr>
<th><strong>FUEL DRAIN</strong></th>
<th><strong>PITOT DRAIN</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDER EACH WING NEAR SUMP DRAINS</td>
<td>UNDER LEFT HAND WING LEADING EDGE NEAR FUSELAGE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GASCOLATOR DRAIN</strong></th>
<th><strong>STATIC DRAIN</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDER FUSELAGE AFT OF NOSE WHEEL WELL</td>
<td>UNDER TAILCONE AFT OF WING TRAILING EDGE</td>
</tr>
</tbody>
</table>

J90DEC-8
FORCED LANDING EMERGENCY

POWER OFF - GEAR RETRACTED OR EXTENDED

Emergency Locator Transmitter ........................................ ARMED
Seat Belts/Shoulder Harnesses ...................................... SECURE
Cabin Door ........................................................................ UNLATCHED
Fuel Selector ....................................................................... OFF
Mixture ................................................................................ IDLE CUTTOFF
Magneto/ Starter ................................................................. OFF
Wing Flaps ........................................................................... Full DOWN (33° Degrees)
Landing Gear ....................................................................... DOWN or UP Depending on Terrain
Approach Speed ................................................................... 71 KIAS
Master Switch ......................................................................... OFF, prior to landing

POWER ON - GEAR RETRACTED

Emergency Locator Transmitter ........................................ ARMED
Seat Belts and Shoulder Harnesses ................................. SECURE
Cabin Door ........................................................................ UNLATCHED
Fuel Selector ....................................................................... OFF
Throttle ............................................................................... CLOSED
Mixture ................................................................................ IDLE CUTTOFF
Magneto/ Starter ................................................................. OFF
Wing Flaps ........................................................................... Full DOWN (33°)
Master Switch ......................................................................... OFF
Approach Speed ................................................................ As Slow As Possible
Wings ..................................................................................... Keep LEVEL

SYSTEMS EMERGENCIES

PROPELLER

PROPELLER OVERSPEED

Throttle ............................................................................... RETARD
Oil Pressure .......................................................................... CHECK
Propeller .............................................................................. DECREASE, set if any control available
Airspeed ............................................................................... REDUCE
Throttle ............................................................................... AS REQUIRED to maintain RPM below 2700 RPM

FUEL

LOW FUEL FLOW

Check Mixture ........................................................................ ENRICH
Fuel Selector ........................................................................ Fullest TANK
If condition persists, use Fuel Boost Pump as necessary and LANDING SHOULD BE MADE AS SOON AS PRACTICABLE.

ELECTRICAL

ALTERNATOR OVERTENSION
(Voltage warning light illuminated steady/Alternator C/B may be tripped.)

Alternator Field Circuit Breaker ..................................... RESET or PULL out, then PUSH IN
If circuit breaker will not reset, the following procedures are required:
1. Reduce electrical load.
2. Land, when practical, to correct malfunction.
ALTERNATOR OUTPUT LOW AND AMMETER SHOWING DISCHARGE
(Voltage warning light flashing)

Radio Master . . . . . . . . . . . . . . . . . . . . OFF
Master Switch . . . . . . . . . . . . . . . . . . . . OFF, then ON

If Warning Light is still flashing, the following steps are required:
Non-Essential Electrical Equipment . . . . . . Turn OFF one at a time
Ammeter . . . . . . . . . . . . . . . . . . . . . CHECK
- for charging condition as each unit of Electrical Equipment is turned OFF

Alternator Field Circuit Breaker . . . . . . . . . . . . PULL
Non-essential electrical equipment . . . . . . OFF to conserve battery power

LAND AS SOON AS PRACTICABLE

--------
NOTE
--------

A tripped main alternator circuit breaker can only be caused by a shorted
alternator circuit and cannot be corrected by resetting the breaker. This
should be verified by attempting to reset the breaker not more than one
time. If this fails, pull alternator field circuit breaker. Turn off all
non-essential electrical equipment and terminate the flight as soon as
practical. Repair the malfunctioning alternator prior to next flight.

LANDING GEAR

FAILURE OF LANDING GEAR TO EXTEND ELECTRICALLY

Airspeed . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 132 KIAS or less
Landing Gear Actuator Circuit Breaker . . . . . . . . . . . . PULL
Gear Switch . . . . . . . . . . . . . . . . . . . . . DOWN
Manual Gear Extension Mechanism . . . . . . . . . . . . . . . . . LATCH FORWARD/LEVER BACK,
to engage manual extension mechanism

--------
NOTE
--------

Slowly pull “T” handle 1 to 2 inches (2.5 to 5.1 cm) to rotate clutch
mechanism and allow it to engage drive shaft.

T-Handle . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . PULL (7 to 20 times
and RETURN until gear is down and locked,
GEAR DOWN light illuminated; STOP when resistance is felt.
- - - - SYSTEM MAY BECOME DAMAGED - - -
Visual Gear Down Indicator . . . . . . . . . . . . . . . . . . CHECK ALIGNMENT
by viewing from directly above the indicator.

~ ~ ~ ~ ~ ~ ~ ~ ~ ~

CAUTION

~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Continuing to pull on T-Handle after GEAR DOWN light ON will bind
actuator; electrical retraction MAY NOT be possible until binding is
eliminated.

Return lever to normal position and secure with latch. Reset Landing Gear Actuator Circuit
Breaker.

~~~~~~~~~~~~~~~~~~
WARNING/
~~~~~~~~~~~~~~~~~~

Do not operate landing gear electrically with manual extension system
engaged.

3 - 10

REV. B 1 - 92

ISSUED 8 - 89
Windshield .............................................. CLEAN
Cabin Air Inlet ...................................... UNOBSERCTED

9. Right Wing -
Fuel Tank Sump Drain ................................ DRAIN until clear
Right Main Gear, Shock Discs, Tire, Doors & Linkage ..... INSPECT
Wheel Chock ......................................... REMOVE
Tank Vent ............................................ UNOBSERCTED
Tiedown Ropes/chains ................................ REMOVE
Landing/Taxi Lights .................................. INSPECT lens/bulbs
Fuel Tank ........................................... CHECK QUANTITY-SECURE CAP

[NOTE]
The reduced fuel indicator is located in the filler neck. This indicator is used to indicate usable fuel capacity of 25 U.S. gallons (94.7 liters) (20.8 IMP. gal.)

[NOTE]
The optional visual fuel quantity gauge is to be used for partial refueling purposes only; DO NOT use for preflight check.

Wing Tip, Lights & Lens ................................ INSPECT
Aileron and attach points ................................ INSPECT
Flap and attach points ................................ INSPECT
Control Linkages ..................................... INSPECT
General Skin Condition ................................ INSPECT-REMOVE ice, snow or frost

10. Baggage Door .................................. Verify SECURED
   Verify inside latch mechanism is properly secured.
   (Check outside handle operation)
   RETURN TO COCKPIT - MASTER/ROCKER SWITCHES ....... OFF

BEFORE STARTING CHECK

Preflight Inspection ................................... COMPLETED
Seats, Seat Belts/Shoulder Harness ....................... ADJUST & SECURE
Magneto/Starter Switch ................................ OFF
Master Switch ......................................... OFF
Radio Master Switch .................................. OFF
Fuel Boost Pump ...................................... Push OFF
Alternate Static Source ................................ OFF
Pitot Heat ............................................ CLOSED
Throttle ............................................... HIGH RPM
Propeller ............................................ IDLE CUTOFF
Mixture ................................................ VERIFY OPEN
Cowl Flaps ............................................ SET
Parking Brake ......................................... CENTERED (Flaps UP)
Wing Flap Switch ..................................... AS DESIRED
Cabin Vent ........................................... PUSH OFF
Cabin Heat ............................................ PUSH OFF
Defrost ................................................ FUEL TANK
Fuel Selector .......................................... SLAVED (if installed)
Directional Gyro (slave/free switch) ..................... CHECK
Circuit Breakers ...................................... ARM
Emergency Locator Transmitter ......................... SET FREQUENCIES (Non-digital radios)
Radios .................................................. CHECK - Master Switch ON, then OFF
Radio Blower .......................................... DOWN
Landing Gear Switch .................................. DOWN & LATCHED
RED Emergency Gear Handle ............................ OFF
Internal/External Lights ................................ Emergency/General Information briefing
Passengers ............................................

ISSUED B - 89
REV. B 1 - 92
4 - 5
Refer to SECTION IX for Optional Equipment Checks.

Obtain local information prior to engine start.

**ENGINE START**

~~~ CAUTION ~~~

When battery will not start engine, inspection should be conducted to determine reason. If determination is made that battery voltage is low, servicing of the battery is essential and charging for at least one hour should be done before engine is started. The battery or other electrical circuits may be damaged if aircraft is operated with a low battery.

<table>
<thead>
<tr>
<th>Throttle</th>
<th>Propeller</th>
<th>Mixture</th>
<th>Master Switch</th>
<th>Annunciator Lights</th>
<th>Fuel Boost Pump</th>
<th>Mixture</th>
<th>Propeller Area</th>
<th>Magneto/Starter Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH RPM</td>
<td>FULL FORWARD</td>
<td>PRESS TO TEST (All lights except 'START POWER ON' should illuminate)</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>IDLE-CUTOFF</td>
<td>CLEAR</td>
<td>CLEAR</td>
</tr>
<tr>
<td>Throttle</td>
<td>Propeller</td>
<td>Mixture</td>
<td>Master Switch</td>
<td>Annunciator Lights</td>
<td>Fuel Boost Pump</td>
<td>Mixture</td>
<td>Propeller Area</td>
<td>Magneto/Starter Switch</td>
</tr>
<tr>
<td>1/4 OPEN</td>
<td>HIGH RPM</td>
<td>FULL FORWARD</td>
<td>PRESS TO TEST</td>
<td>PRESS TO TEST</td>
<td>PRESS TO TEST</td>
<td>PRESS TO TEST</td>
<td>PRESS TO TEST</td>
<td>PRESS TO TEST</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
</table>

"START POWER" warning light should illuminate when magneto/starter switch is in "START" position.

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
</table>

Cranking should be limited to 30 seconds and several minutes allowed between cranking periods to permit the starter to cool.

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Throttle</th>
<th>Engine Oil Pressure</th>
<th>Ammeter</th>
<th>Fuel Flow Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move slowly and smoothly to RICH</td>
<td>Set at 1000 to 1200 RPM</td>
<td>CHECK GREEN ARC - if MINIMUM OIL PRESSURE is not indicated within 30 seconds, STOP ENGINE and determine problem.</td>
<td>CHECK (Turn Ldg. Lt. ON; observe negative movement of needle)</td>
<td>PUSH &quot;TEST/USED&quot; button MOMENTARILY to stop digits from flashing.</td>
</tr>
</tbody>
</table>

**FLOODED ENGINE START**

<table>
<thead>
<tr>
<th>Fuel Boost Pump</th>
<th>Throttle</th>
<th>Mixture</th>
<th>Magneto/Starter Switch</th>
<th>Mixture</th>
<th>Throttle</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>FULL FORWARD</td>
<td>FULL FORWARD</td>
<td>TURN and PUSH to START release to both when engine starts.</td>
<td>FULL FORWARD</td>
<td>Retard to 1200 RPM</td>
</tr>
</tbody>
</table>
Landing information for reduced flap settings are not available. See SECTION V for landing Distance tables.

**CAUTION**
The landing gear may retract during landing roll if landing gear switch is inadvertently placed in the UP position.

### TAXI AFTER LANDING

<table>
<thead>
<tr>
<th>Action</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle</td>
<td>1000 to 1200 RPM</td>
</tr>
<tr>
<td>Boost Pump</td>
<td>OFF</td>
</tr>
<tr>
<td>Wing Flaps</td>
<td>RETRACT</td>
</tr>
<tr>
<td>Cowl Flaps</td>
<td>OPEN</td>
</tr>
<tr>
<td>Trim</td>
<td>RESET to Takeoff</td>
</tr>
<tr>
<td>Avionics/Radios</td>
<td>As required</td>
</tr>
<tr>
<td>Lighting</td>
<td>As required</td>
</tr>
</tbody>
</table>

### SHUTDOWN

<table>
<thead>
<tr>
<th>Action</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Brake</td>
<td>SET</td>
</tr>
<tr>
<td>Throttle</td>
<td>1000 to 1200 RPM</td>
</tr>
<tr>
<td>Radio Master</td>
<td>OFF</td>
</tr>
<tr>
<td>Internal/External Lights</td>
<td>OFF</td>
</tr>
<tr>
<td>Pitot Heat</td>
<td>OFF</td>
</tr>
<tr>
<td>Magneto/ Starter Switch</td>
<td>Grounding Check</td>
</tr>
<tr>
<td>Mixture</td>
<td>IDLE CUTOFF</td>
</tr>
<tr>
<td>Magneto/ Starter Switch</td>
<td>OFF when propeller stops</td>
</tr>
<tr>
<td>Master Switch</td>
<td>OFF</td>
</tr>
<tr>
<td>Oxygen System (if equipped)</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### SECURING AIRCRAFT

<table>
<thead>
<tr>
<th>Action</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto/ Starter Switch</td>
<td>OFF/Key removed</td>
</tr>
<tr>
<td>Master Switch</td>
<td>VERIFY OFF</td>
</tr>
<tr>
<td>Radio Master</td>
<td>VERIFY OFF</td>
</tr>
<tr>
<td>Electrical Switches</td>
<td>VERIFY OFF</td>
</tr>
<tr>
<td>Parking Brake</td>
<td>RELEASE and install wheel chocks</td>
</tr>
</tbody>
</table>

For extended parking:
- Control wheel: SECURED with seat belts, cabin vents CLOSED,
- Tie down aircraft at wing and tail points.
SECTION IV
NORMAL PROCEDURES

AT
MOONEY
MODEL M20J

BLANK
3. SPARE (FILLER) (14 Volt A/C)

4. RADIO MASTER
The Radio Master Switch/Circuit Breaker operates a relay supplying power to the radio buss bars. Since the relay is energized to cut the power to the radio buss, failure of the relay coil will still allow power to the radio buss. Energizing the starter automatically energizes the relay and disconnects the radios from the buss.

5. ALTERNATE STATIC SOURCE VALVE
Pulling alternate static source valve to full aft position changes the source of static air for the altimeter, airspeed indicator and rate-of-climb indicator from outside of the aircraft to cabin interior. Airspeed and altimeter readings are affected slightly when alternate static source is used (Refer to SECTION V).

6. STROBE LIGHT SWITCH/CIRCUIT BREAKER
Pushing ON the strobe light combination switch/circuit breaker turns on the wing tip and tail strobe lights. Should a short occur, the combination switch/circuit breaker will automatically trip to the OFF position.

7. NAVIGATION LIGHT SWITCH/CIRCUIT BREAKER
Pushing ON the navigation light combination switch/circuit breaker turns on the wing tip and tail navigation lights. Should a short occur, the combination switch/circuit breaker will automatically trip to the OFF position.

8. RECOGNITION LIGHT SWITCH/CIRCUIT BREAKER (IF INSTALLED)
Pushing ON the recognition light combination switch/circuit breaker turns on the recognition light. Should a short occur, the combination switch/circuit breaker will automatically trip to the OFF position.

9. TAXI/LANDING LIGHT SWITCHES (L & R)
Select and PUSH split switches ON to turn desired set of lights on. Push switches OFF to turn desired set of lights off. Lights should be operated only for short time periods while not in flight to preclude overheating of lamp. Overload protection is achieved by circuit breakers in the panel.

10. PITOT HEAT SWITCH/CIRCUIT BREAKER
Pushing ON the pitot heat combination switch/circuit breaker turns on the heating elements within the pitot tube. Should a short occur, the combination switch/circuit breaker will automatically trip to the OFF position.

11. OPTIONAL/ELECTRIC TRIM SWITCH/CIRCUIT BREAKER (IF INSTALLED)
This switch is normally left in the ON position and serves as both a circuit protector and as a master disconnect for the electric trim system in the event of a malfunction.

12. FUEL BOOST PUMP SWITCH
Pushing ON or OFF the switch/circuit breaker controls operation of the electric fuel boost pump. Use of the fuel boost pump should be limited to starting, takeoff, switching fuel tanks, landing and emergency situations. The fuel boost pump is capable of supplying fuel to the engine at the rated quantities and pressures to permit the engine to develop rated power.

13. THROTTLE CONTROL
Pushing the throttle control forward increases the manifold pressure thereby increasing the engine power. Pulling the control aft decreases the manifold pressure thereby decreasing the engine power.

14. PROPELLER CONTROL
Pushing the propeller control forward increases engine RPM; pulling the control aft decreases the engine RPM. The control is of the vernier type and fine adjustments of RPM can be obtained by turning the knob clockwise to increase RPM and counterclockwise to decrease RPM. The knob should not be turned in any closer than 1/8" to the panel nut face.
15. **MIXTURE CONTROL**
The mixture control allows the pilot to adjust the fuel-air ratio (mixture) of the engine. Pushing the control forward richens the mixture. Pulling the control full aft closes the idle cutoff valve shutting down the engine. The control is of the vernier type and fine adjustments of the mixture can be obtained by turning the knob clockwise to richen the mixture, and counterclockwise to lean. The knob should not be turned in any closer than 1/8" to the panel nut face.

16. **COWL FLAP CONTROL**
Pulling the cowl flap control full aft opens the cowl flap doors allowing additional airflow to properly cool the engine on the ground and during low speed high power climbs. During cruise the cowl flaps may be partially opened, (control pulled aft approximately three inches) if necessary, to maintain oil and cylinder head temperatures within the normal operating range.

17. **PARKING BRAKE CONTROL**
Depressing the brake pedals and pulling the parking brake control sets the parking brake. Pushing in the parking brake control releases the parking brake.

18. **STAND-BY VACUUM SWITCH** (If installed)
PUSH this switch ON if vacuum warning light illuminated or Vacuum Pressure goes below 4.75 In. vac. pressure

19. **FLAP SWITCH AND INDICATOR**
The flap switch, in a recess on the right of the console, operates the electrically actuated wide span wing flaps. Holding the spring-loaded switch in the FLAPS DOWN position lowers the flaps to the desired angle of deflection. Simply releasing downward pressure on the switch allows it to return to the OFF position, stopping the flaps at any desired intermediate position during extension. When FLAPS UP position is selected, flaps will retract to full UP position unless the switch is returned to the neutral position for a desired intermediate setting.

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**NOTE**

Placing switch in the UP position retracts the flaps completely.

Wing flap position is mechanically indicated through a cable mounted directly to the flap jackshaft. A pointer in the flap position indicator indicates flap position. The intermediate mark in the pointer range is the flap TAKEOFF setting (15 degrees).

20. **CABIN VENT CONTROL (FRESH AIR)**
Pulling the cabin vent control AFT opens the vent control to allow fresh air from NACA vents located on both sides of the airplane forward cabin. Optimum use of the cabin vent control is described in the Cabin Environment Section.

21. **CABIN HEAT CONTROL**
Pulling the cabin heat control turns on cabin heat. To lower cabin temperature the cabin heat control is pushed forward toward the OFF position. Optimum use of the cabin heat control is described in the Cabin Environment Section.

22. **DEFROST CONTROL**
Pulling the defrost control decreases air flow to the lower cabin and increases air flow to the windshield in the front of the glareshield area. Optimum use of the defrost control is described in the Cabin Environment Section. The optional blower motor switch is activated when the control is pulled aft. This turns on a fan within the ventilation system to move more air over the windshield.

23. **GASCOTLATOR CONTROL**
The gascolator, located to the left of the console on the floorboard, allows the pilot
Fuel is carried in two integral sealed sections of the forward inboard area of the wings. Total usable fuel capacity is 64 gallons (242.4 liters)(53.3 Imp. Gal.). Both tanks have fuel level indicators visible through the filler ports. These indicators show the 25-gallon (94.7 liters)(20.8 Imp. Gals.) level in each tank. There are sump drains at the lowest point in each tank for taking fuel samples to check for sediment contamination or condensed water accumulation.

The recessed three-position fuel selector handle aft of the console on the floor allows the pilot to set the selector valve to LEFT tank, RIGHT tank, or OFF position. The gascolator, located to the left of the selector valve in the floorboard, is for draining condensed water and sediment from the lowest point in the fuel lines before the first flight of the day and after each refueling.

Fuel feeds from one tank at a time to the selector valve and through the electric fuel pump (boost pump) enroute to the engine-driven pump and the fuel injector unit. The electric fuel pump is capable of supplying sufficient pressure and fuel flow for rated engine performance should the engine driven pump fail.

Electric fuel-level transmitters in the tanks operate the fuel gauges. The master switch actuates the fuel quantity indicator system to maintain an indication of fuel remaining in each tank. The fuel pressure gauge registers fuel pressure in the line to the injector. Vents in each fuel tank allow for overflow and ventilation.

The optional, visual fuel quantity indicators located in each wing tank are to be used for PARTIAL FUEL LOADING only and not for preflight inspection purpose.

Fuel Flow is presented digitally and indicates volume of fuel being used in GPH (pounds or liters optional) and/or total fuel used. Optional fuel flow systems are available and each depicts its information differently. Refer to appropriate operational procedure for specific data. A "Fuel Flow Memory" switch is located in the top of the right hand radio panel to shut off the memory circuit if the aircraft is to be stored for long periods of time.
ALTERNATOR & BATTERY

A standard 12-volt, 35-ampere-hour storage battery (in the tailcone) and a 14 Volt, 70 ampere self-rectifying alternator (24-volt, 10-ampere-hour system optional) supply electrical power for equipment operation. The ammeter depicts battery charge/discharge rate. A power loss in the alternator or voltage regulator will be shown as a discharge reading on the ammeter; a discharged battery will be indicated by a high-charge reading. The voltage regulator adjusts alternator output to current load while maintaining a constant voltage level. A voltage warning light illuminates steadily when voltage limits are exceeded and flashes when voltage is low.

~ ~ ~ ~ ~ ~ ~
~ CAUTION ~
~ ~ ~ ~ ~ ~ ~

Starting with an external power source should not be done while the battery is completely depleted. It will not accept the high charge rate from the alternator and electrical failure may result.

SCHEMATIC (SEE FIGURE 7-7)

CIRCUIT BREAKER PANEL (SEE FIGURE 7-8)

Push-pull, or rocker switch-circuit breakers automatically break the electrical current flow if the system or unit receives an overload, thus preventing damage to electrical wiring. The main circuit breaker panel is in the extreme right panel. Figure 7-8 illustrates the main circuit breaker panel with its push-pull circuit breakers. All rocker switch-circuit breakers are at the bottom of the flight panel. The alternator push-pull circuit breaker on the main breaker panel furnishes an emergency overload break between alternator and the main bus. Since the alternator is incapable of output in excess of the circuit breaker capacity, a tripped breaker normally indicates a fault within the alternator. Since the alternator is then cut out of the power circuit, the storage battery supplies electrical power in steadily diminishing output with master switch ON. The alternator field has a push-pull circuit breaker to furnish an emergency break in the alternator field excitation circuit in the event of alternator or voltage regulator malfunction. If regulator output voltage exceeds limits, the red voltage warning light illuminates steadily. Turning off radio master switch and then turning master switch OFF and ON, will reset the voltage regulator. The overvoltage annunciator light should remain out. If overvoltage light comes on again, pulling out alternator-field circuit breaker cuts alternator out of the power circuit. Once again the battery is the only source of electrical power; therefore, all electrical equipment not essential for flight should be turned off and the flight terminated as soon as practical to correct the malfunction.

| NOTE |

The circuit breakers installed in the panel may vary depending on installed equipment per customer order.

ANNUNCIATOR PANEL

The landing gear lights, low fuel lights, voltage light, vacuum warning light and starter engaged light are grouped in the annunciator panel. A test switch and dim switch, are also found in the panel and each of the lights and switches are discussed elsewhere in this section.
FIGURE 7-7  A T - ELECTRICAL SCHEMATIC