SECTION I
GENERAL

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SECTION I

GENERAL

INTRODUCTION

This manual contains the LBA-approved material required to be furnished to the pilot by FAR Part 23 and constitutes the FAA-approved Airplane Flight Manual. It also contains supplemental data supplied by the aircraft manufacturer.

COVERAGE

This Airplane Flight Manual contains the information necessary for the recommended operation of the Ruschmeyer R 90-230 RG.

Note

As the R 90-230 RG may be delivered with different optional equipment, the illustrations contained in this manual might not be applicable to all aircraft.

REVISIONS

Revised pages of this manual are listed in the "Log of Revisions" (Page III). If a page has been revised, page number, revision number, and date can be seen from the "Log of Revisions". After receipt of the revised pages, they must be inserted into the manual and the invalid pages must be removed and destroyed. The actual revision status may be requested from the manufacturer:

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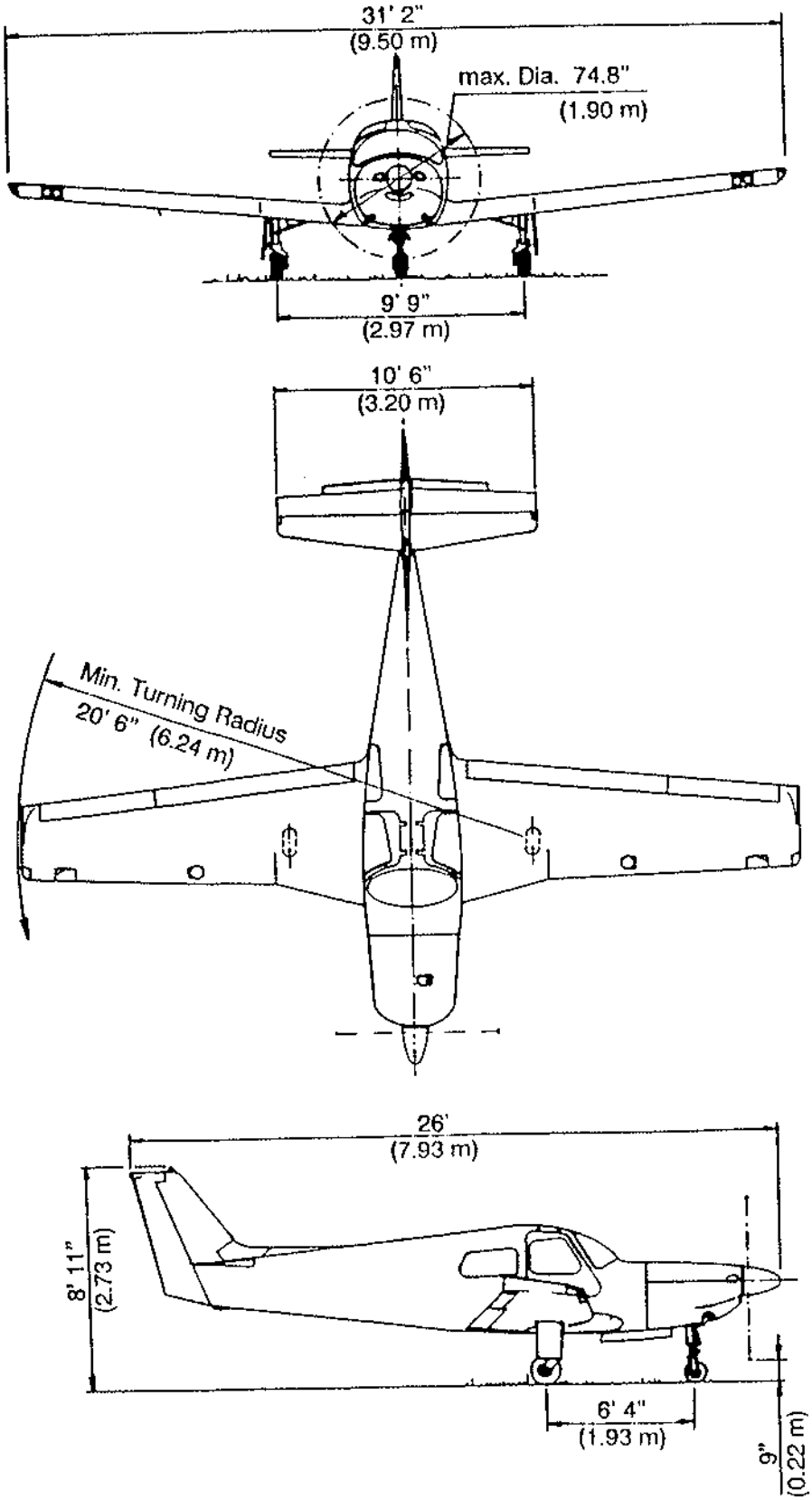
Note

It is the sole responsibility of the owner/operator to maintain this manual for the operation of the Ruschmeyer R 90-230 RG in a current status.

SHORT DESCRIPTION AND TECHNICAL DATA

THREE-VIEW DRAWING INCLUDING MAIN DIMENSIONS



ENGINE

1 Lycoming engine IO-540-C4D5

Type: Six cylinder, horizontally opposed, non turbocharged, direct drive, air cooled engine. Displacement: 541.5 in^3 (8860 cm^3).

Maximum rated power at Sea Level / ISA:
231 hp (172 kW) at 2400 RPM.

Note

Maximum engine speed for the R 90-230 RG is limited to 2400 RPM due to noise reasons.

PROPELLER

1 Mühlbauer mt 4-blade, hydraulically controlled constant speed propeller, Model-No. MTV 14 B. Diameter: 74.8 in (1.90 m).

FUEL

Approved Fuel Grades (Color): Aviation Grade AVGAS 100 (green)
Aviation Grade AVGAS 100LL (blue)

Total Capacity: 66.0 US Gal. (250 l)

Usable Fuel: 62.3 US Gal. (236 l)

OIL

Oil Grades and Ambient Temperatures for Recommended Use

Less than 50 Operating Hours

Straight Mineral Oil (MIL-L-6082B)	Ambient Temperature
SAE 60	above 80°F (27°C)
SAE 50	above 60°F (16°C)
SAE 40	30°F (-1°C) to 90°F (32°C)
SAE 30	0°F (-18°C) to 70°F (21°C)
SAE 20	below 10°F (-12°C)

More than 50 Operating Hours

Ashless Dispersant HD-Oil (MIL-L-22851)	Ambient Temperature
SAE 60	above 80°F (27°C)
SAE 50 or SAE 40	above 60°F (16°C)
SAE 40	30°F (-1°C) to 90°F (32°C)
SAE 40 or SAE 30	0°F (-18°C) to 70°F (21°C)
SAE 30	below 10°F (12°C)
SAE 15 W50 or SAE 20 W50	all temperatures

Note

For more detailed information on the maintenance of the lubrication system, refer to the Aircraft Maintenance Manual.

Total Oil Capacity: 12 qt (11.4 l)

Minimum Safe Oil Quantity: 4 qt (3.8 l)

Oil Quantity Operating Range: 9 to 12 qt (8.51 to 11.4 l)

LANDING GEAR

Nose Wheel Tire and Pressure:	5.00-5 6 PR	5.0 psi (3.4 bar)
Main Wheel Tire and Pressure:	15×6.00-6 6 PR	6.4 psi (4.4 bar)
Brake Hydraulic Fluid:	MIL-H-5606	

MAXIMUM CERTIFIED WEIGHT

Max. Take-Off and Landing Weight:	2977 lbs (1350 kg)
Max. Load in Baggage Compartment:	110 lbs (50 kg)

WEIGHT OF STANDARD AIRCRAFT

Standard Empty Weight:	1980 lbs (898 kg)
Maximum Payload:	997 lbs (452 kg)

SPECIFIC LOADINGS

Wing Loading:	from 15.2 lbs/ft² (74 kg/m²)
	to 21.3 lbs/ft² (104 kg/m²)
Power Loading:	from 9.2 lbs/hp (5.6 kg/kW)
	to 12.8 lbs/hp (7.8 kg/kW)

DIMENSIONS OF BAGGAGE COMPARTMENT ACCESS

Access Width:	15.4 in (0.39 m)
Access Height:	18.9 in (0.48 m)

SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY

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".

GS — Ground Speed is the speed of an aircraft relative to the ground.

IAS — Indicated Airspeed is the speed of an aircraft as shown in the airspeed indicator when corrected for instrument error. IAS values published in this Handbook 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 Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.

V_{FE} Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

V_{LE} Maximum Landing Gear Extended Speed is the maximum speed at which an aircraft can be safely flown with the landing gear extended.

V_{LO} Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.

V_{NE} Never Exceed Speed is the speed limit that may not be exceeded at any time.

V_{NO} Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

V_S Stalling Speed or the minimum steady flight speed at which the airplane is controllable.

V_{SO} Stalling Speed or the minimum steady flight speed at which the airplane is controllable in 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 (steepest climb).

V_Y Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible time (fastest climb).

METEOROLOGICAL TERMINOLOGY

ISA International Standard Atmosphere in which

(1) The air is a dry perfect gas;

(2) The temperature at sea level is 15° Celsius (59° Fahrenheit);

(3) The pressure at sea level is 29.92 inches hg (1013.2 hPa);

(4) The temperature gradient from sea level to the altitude at which the temperature is -56.6 °C (-69.7 °F) is -0.00198 °C (-0.003564 °F) per foot and zero above that altitude.

OAT Outside Air Temperature is the free air static temperature, obtained either from inflight temperature indications or ground meteorological sources, adjusted for instrument error and compressibility effects.

MSL Mean Sea Level is the altitude where the altimeter indication will read "zero" under ISA-conditions at a setting of 29.92 in.hg. (1013.2 hPa).

Indicated Pressure Altitude	The number actually read from an altimeter when the barometric subscale has been set to 29.92 inches of mercury (1013.2 hPa).
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.
Station Pressure	Actual atmospheric pressure at field elevation.
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.

POWER TERMINOLOGY

MCP	Maximum Continuous Power is the maximum rated power approved for use during periods of unrestricted duration. It is obtained by full throttle setting at maximum RPM and full rich mixture.
Leaning of Mixture	Above 85 % of MCP: full rich only.

85 % and below:
BEST PERFORMANCE MIXTURE: This mixture provides the optimum performance of the engine at a given manifold pressure and engine speed setting. It is recommended to determine the best performance mixture by first leaning to peak exhaust gas temperature by means of an exhaust gas temperature indicator*) and then to enrich the mixture again until the exhaust gas temperature is 100°F below its peak value.

80 % and below:
BEST ECONOMY MIXTURE: This mixture provides the lowest permissible fuel flow for a certain performance of the engine at a given manifold pressure and engine speed setting. It is recommended to determine the best economy mixture by leaning to peak exhaust gas temperature. For flight planning purposes, the fuel flow data provided in Section V are to be used.

*) EGT-Indicator

ENGINE CONTROLS AND INSTRUMENTS

Throttle Control Lever — The lever used to control engine power by controlling the manifold pressure (Labelled "Throttle").

Propeller Control — The lever used to select a propeller speed (Labelled "Propeller").

Mixture Lever	Cockpit control which enables the pilot to set the air/fuel mixture (Labelled "Mixture").
EGT	Exhaust Gas Temperature is measured in the exhaust pipe of cylinder No.6. As there is a direct relationship between exhaust gas temperature and air/fuel mixture, leaning of the mixture is done according to the exhaust gas temperature.
Peak EGT	Peak exhaust gas temperature for a certain engine power setting.
CHT	Cylinder-Head Temperature is measured at the cylinder-head of cylinder No. 5 which usually is the hottest during flight. Cylinder-head temperature has to be maintained within the prescribed limits by using the cowl flaps.
Tachometer	An instrument that indicates rotational engine speed.
Propeller Governor	A device that regulates the RPM of the engine by increasing or decreasing the propeller pitch, through a pitch change mechanism in the propeller hub.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient — The demonstrated ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time.

Demonstrated Crosswind Velocity — The demonstrated crosswind velocity (16 kts) is the velocity of the crosswind component for which adequate control of the airplane during take-off and landing was actually demonstrated during certification tests. The value shown is no limitation.

Service Ceiling — The maximum altitude at which a rate of climb of 100 ft/min can be achieved for a given flight weight and max. engine power.

WEIGHT AND BALANCE

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

Fuselage Station — A location along the airplane fuselage given in terms of distance from the reference datum (Abbr.: STA).

Arm — The horizontal distance from the reference datum to the center of gravity of a component, equipment or payload item.

Moment	The product of the weight of a component, equipment or payload item multiplied by ist arm.
Tare	The weight of chocks, blocks, stands, etc. used when weighing an airplane. The weight of these or other items, used during weighing and not carried on board of the airplane has to be deducted from the scale reading(s) to obtain the actual airplane weight.
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.
Center of Gravity arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight (see also center of gravity location).
Center of Gravity Location	Distance of the center of gravity from the reference datum (equal to center of gravity arm).
Center of Gravity Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight (see Section II: Operating Limitations).

Usable Fuel	Fuel available for flight planning (62 US gal. = 236 l).
Unusable Fuel	Remaining fuel which cannot be used safely during flight.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.
Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between take-off weight and basic empty weight.
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.

ELECTRICAL POWER DISTRIBUTION

Master Switch	Rocker-type switch for connecting and disconnecting the power supply to the power distribution network (dual, battery and alternator).
Battery Master Switch	Left half of the master switch.
Alternator Master Switch	Right half of the master switch.
Switch Breaker	Rocker-type ON/OFF switch for electrical equipment with built-in circuit breaker function.
Circuit Breaker	Push-to-reset type circuit breaker for electrical equipment.
Switch	Switch to operate electrical equipment without built-in circuit breaker function.

OTHER TERMINOLOGY

Warning Used where an operating procedure, practice or condition will result in a severe accident or destruction of the airplane if not carefully followed.

Caution Used where damage to equipment will result if an operating procedure, practice or condition is not observed.

Note Used if a special feature of the airplane or its systems, essential to safe and effective operation and handling, should be highlighted.

CONVERSION TO THE METRIC SYSTEM

LENGTH	
U.S. Customary Unit	Metric Equivalents
1 inch	2.54 centimeters
1 foot	0.3048 meter
1 yard	0.9144 meter
1 mile (statue, land)	1.609 kilometers
1 mile (nautical, international)	1.852 kilometers

AREA	
U.S. Customary Unit	Metric Equivalents
1 square inch	6.452 square centimeters
1 square foot	0.0929 square meter

VOLUME OR CAPACITY	
U.S. Customary Unit	Metric Equivalents
1 cubic inch	16.39 cubic centimeters
1 cubic foot	0.0283 cubic meter
U.S. Customary Liquid Measure	Metric Equivalents
1 quart	0.9464 liter
1 gallon	3.785 liters

British Imperial Liquid Measure	U.S. Customary Liquid Equivalents	Metric Equivalents
1 quart	1.201 quarts	1.136 liters
1 gallon	1.201 gallons	4.546 liters

POWER	
U.S. Customary Unit	Metric Equivalents
1 horsepower	0.7457 kilowatt

WEIGHT	
U.S. Customary Unit	Metric Equivalents
1 pound	0.4535 kilogram

FORCE	
U.S. Customary Unit	Metric Equivalents
1 pound	4.449 newtons

PRESSURE	
U.S. Customary Unit	Metric Equivalents
1 pound per square inch	68.95 hectopascals (= 68.95 millibars)
1 inch mercury	33.87 hectopascals (= 33.87 millibars)

TEMPERATURE	
U.S. Customary Unit	Metric Equivalents
(°F - 32) · 5/9 =	°C

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