CONGRATULATIONS....

Welcome to the ranks of Cessna owners! Your Cessna has been designed and constructed by give you the most in performance, economy, and comfort. It is our desire that you will find thying it, either for business or plessure, a pleasant and profitable experience.

This Pilot's Operating Handbook has been prepared as a guide to help you get the most pleasure and utility from your airplane. It contains information about your Cessna's equipment, operating procedures, and performance; and suggestions for its servicing and care. We may you to read it from cover to cover, and to rafer to it frequently.

Our interest in your flying pleasure has not coased with your purchase of a Cassna. Worldwide, the Cassna Dealer Organization backed by the Cassna Customer Services Department shault ready to serve you. The following services are offered by most Cassna Dealers:

- THE CESSNA WARRANTY, which provides coverage for parts and labor, is available
 at Cessna Dealers worldwide. Specific benefits and provisions of warranty, plus other
 important benefits for you, are contained in your Customer Care Program book, supplied with your airplane. Warranty service is available to you at authorized Cessna
 Dealers throughout the world upon presentation of your Customer Care Card which
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- FACTORY TRAINED PERSONNEL to provide you with courteous expert service.
- FACTORY APPROVED SERVICE EQUIPMENT to provide you efficient and accurate workmanship.
- A STORK OF GENUINE CESSNA SERVICE PARTS on hand when you need them.
- THE ATEST AUTHORITATIVE MISCRMATION FOR SERVICING CESSNA AHRBANES whice wasna Dunlers made all of the Service Manuals and Parts Catalogs, kept current by Service Letters and Service News Letters, published by Cosma Aircraft Company.

We array all Cessna owners to use the Cessna Dealer Organization to the fullest.

A current Cessna Dealer Directory accompanies your new airplane. The Directory is revised transportly, and a current copy can be obtained from your Cessna Dealer. Make your Entertury one of your cross-country flight planning aids; a warm welcome awaits you at every Cessna Dealer.

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PERFORMANCES -

MODEL REE

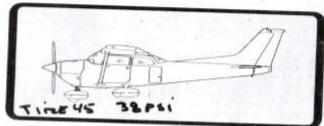
PERFORMANCE - SPECIFICATIONS

2012(6))	
Maximum at the state	
Maximum at Sea Level	133 KNOTH
	130 KM710
	120/1/10/10
togethe built, Gixt, lakeoff climb and to	
reserve at 45% power,	
190' :: Power at 6000 Ft	
180% Power at 6000 Ft	480 NM
Maximum Runge at to noo ra	3.7 1000
49 Gallons Usable Fuel Range	575 NM
BATE OF CLIMB AT SEA LEVEL Time	6, 1 1000
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LANDING PERFORMANCE:	1300 FT
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	620 PT
STALL PEED (CAS):	1270 FT
Flans Up. Power Off	
Flaps Down, Power Off	52 KNOTH
MAXIMUM WEIGHT	16 RNOT#
	2550 LIM
Hawk XP	
	549 L.Diii
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	977 1.00
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	0-300-N
195 BUP at 2600 RPM	J- 3100 - M
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71	5:10

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PILOT'S OPERATING HANDBOOK





HAWK XP

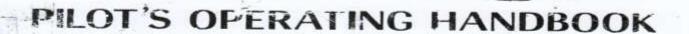
1977 MODEL R172K

Serial No.	
Registration No.	

THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY CAR PART 3

WICHITA, KANSAS, USA





Cessna. 1977

Hawk XP

CESSNA MODEL R172K

SECTION 1 GENERAL

CESSNA MODEL R172K

SECTION 1 GENERAL

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Figure 1-1. Three View

INTRODUCTION

This handbook contains 9 sections, and includes the material required to be furnished to the pilot by CAR Part 3. It also contains supplemental data supplied by Cessna Aircraft Company.

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

DESCRIPTIVE DATA

ENGINE

Number of Engines: 1.

Engine Manufacturer: Teledyne Continental.

Engine Model Number: IO-360-K.

Engine Type: Normally-aspirated, direct-drive, air-cooled, horizontallyopposed, fuel-injected, six-cylinder engine with 360 cu, in. displacement.

Horsepower Rating and Engine Speed: 195 rated BHP at 2600 RPM.

PROPELLER

Propeller Manufacturer: McCauley Accessory Division.

Propeller Model Number: 2A34C203/90DCA-14.

Number of Blades: 2.

Propeller Diameter, Maximum: 76 inches.

Minimum: 74.5 inches.

Propeller Type: Constant speed and hydraulically actuated, with a low pitch setting of 12.0° and a high pitch setting of 25.1° (30 inch station).

FUEL

Approved Fuel Grades (and Colors):

100LL Grade Aviation Fuel (Blue).

100 (Formerly 100/130) Grade Aviation Fuel (Green).

Total Capacity: 52 gallons.

Total Capacity Each Tank: 28 gallons.

Total Usable: 49 gallons.

NOTE

To ensure maximum fuel capacity when refueling, place the fuel selector valve in either LEFT or RIGHT position to prevent cross-feeding.

OIL

Oil Grade (Specification):

MIL-L-6082 Aviation Grade Straight Mineral Oil: Use to replenish supply during first 25 hours and at the first 25-hour oil change. Continue to use until a total of 50 hours has accumulated or oil consumption has stabilized.

NOTE

The airplane was delivered from the factory with a corrosion preventive aircraft engine oil. This oil should be drained after the first 25 hours of operation.

Continental Motors Specification MHS-24A, Ashless Dispersant Oil: This oil must be used after first 50 hours or oil consumption has stabilized.

Recommended Viscosity For Temperature Range: SAE 50 above 4°C (40°F). SAE 10W30 or SAE 30 below 4°C (40°F).

NOTE

Multi-viscosity oil with a range of SAE 10W30 is recommended for improved starting in cold weather.

Oil Capacity: Sump: 8 Quarts. Total: 9 Quarts (if oil filter installed).

MAXIMUM CERTIFICATED WEIGHTS

Takeoff, Normal Category: 2550 lbs. Utility Category: 2200 lbs. Landing, Normal Category: 2550 lbs. Utility Category; 2200 lbs.

Weight in Baggage Compartment, Normal Category:

Baggage Area 1 (or passenger on child's seat)-Station 82 to 108: 200 lbs. See note below.

Baggage Area 2 - Station 108 to 142; 50 lbs. See note below.

NOTE

The maximum combined weight capacity for baggage areas 1 and 2 is 200 lbs.

Weight in Baggage Compartment, Utility Category: In this category, the baggage compartment and rear seat must not be occupied.

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight, Hawk XP: 1549 lbs. Hawk XP II: 1573 lbs.

Maximum Useful Load:

Normal Category Hawk XP: Hawk XP II:

Utility Category 651 lbs. 627 lbs.

CABIN AND ENTRY DIMENSIONS

Detailed dimensions of the cabin interior and entry door openings are illustrated in Section 6.

1001 lbs.

977 lbs.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Dimensions of the baggage area and baggage door opening are illustrated in detail in Section 6.

SPECIFIC LOADINGS

Wing Loading: 14.7 lbs./sq. ft. Power Loading: 13.1 lbs./hp.

Fuel

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

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

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

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

VA Maneuvering Speed is the maximum speed at which you may use abrupt control travel.

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

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

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

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

VSo Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration at the most forward center of gravity.

V_X Best Angle-of-Climb Speed is the speed which results in the greatest gain of altitude in a given horizontal distance.

V_Y Best Rate-of-Climb Speed is the speed which results in the greatest gain in altitude in a given time.

METEOROLOGICAL TERMINOLOGY

OAT
Outside Air Temperature is the free air static temperature. It is expressed in either degrees Celsius (formerly Centigrade) or degrees Fahrenheit. Standard Temperature is 15°C at sea level pressure altitude and decreases by 2°C for each 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 inches of mercury (1013 mb).

ENGINE POWER TERMINOLOGY

RPM Revolutions Per Minute is engine speed.

MP Manifold Pressure is a pressure measured in the engine's induction system and is expressed in inches of mercury

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMI-NOLOGY

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

Usable Fuel is the fuel available for flight planning.

Unusable Fuel is the quantity of fuel that can not be safely fuel used in flight.

GPH Gallons Per Hour is the amount of fuel (in gallons) consumed per hour.

NMPG Nautical Miles Per Gallon is the distance (in nautical miles) which can be expected per gallon of fuel consumed at a specific engine power setting and/or flight configuration.

g g is acceleration due to gravity.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	Reference Datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	Station is a location along the airplane fuselage given in terms of the distance from the reference datum.
Arm	Arm is the horizontal distance from the reference datum to the center of gravity (C.O.) of an item.
Moment	Moment is the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify balance calculations by reducing the number of digits.)
Center of Gravity (C.G.)	Center of Gravity is the point at which an airplane, or equipment, 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	Center of Gravity Arm is the arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	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	Standard Empty Weight is the weight of a standard air- plane, including unusable fuel, full operating fluids and full engine oil.
Basic Empty Weight	Basic Empty Weight is the standard empty weight plus the weight of optional equipment.
Useful Load	Useful Load is the difference between takeoff weight and the basic empty weight.
Gross (Loaded) Weight	Gross (Loaded) Weight is the loaded weight of the airplane.

Maximum Takeoff Weight is the maximum weight approved for the start of the takeoff run.
Maximum Landing Weight is the maximum weight approved for the landing touchdown.
Tare is 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.

SECTION 2 LIMITATIONS

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Note: See Brad E. Isham 210 horsepower modification in section 9 for additional Limitations

INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment. The limitations included in this section have been approved by the Federal Aviation Administration. When applicable, limitations associated with optional systems or equipment are included in Section 9.

NOTE

The airspeeds listed in the Airspeed Limitations chart (figure 2-1) and the Airspeed Indicator Markings chart (figure 2-2) are based on Airspeed Calibration data shown in Section 5 with the normal static source. If the alternate static source is being used, ample margins should be observed to allow for the airspeed calibration variations between the normal and alternate static sources as shown in Section 5.

Your Cessna is certificated under FAA Type Certificate No. 3A17 as Cessna Model No. R172K.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in figure 2-1.

8	SPEED	KCAS	KIAS	REMARKS
V _{NE}	Never Exceed Spend	161	163	Do not exceed this speed in any operation.
V _{NO}	Maximum Structural Cruising Speed	127	129	Do not exceed this speed except in smooth air, and then only with caution.
VA	Maneuvering Speed: 2550 Pounds 2150 Pounds 1750 Pounds	103 94 85	105 96 87	Do not make full or abrupt control movements above this speed.
V _{FE}	Maximum Flap Extended Speed	84	85	Do not exceed this speed with flaps down.
	Maximum Window Open Speed	161	163	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in figure 2-2.

MARKING	OR RANGE	SIGNIFICANCE
White Arc	46 - 85	Full Flap Operating Range. Lower limit is maximum weight V _S in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	54 - 129	Normal Operating Range. Lower limit is maximum weight Vg at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	129 - 163	Operations must be conducted with caution and only in smooth air.
Red Line	163	Maximum speed for all operations.

Figure 2-2. Airspeed Indicator Markings

POWER PLANT LIMITATIONS

Engine Manufacturer: Teledyne Continental.

Engine Model Number: 10-360-K.

Engine Operating Limits for Takeoff and Continuous Operations:

Maximum Power: 195 BHP.

Maximum Engine Speed: 2600 RPM.

Maximum Cylinder Head Temperature: 238°C (460°F).

Maximum Oil Temperature: 116°C (240°F).

Oil Pressure, Minimum: 10 psi.

Maximum: 100 psi.

Fuel Pressure, Minimum: 3 psi.

Maximum: 17 psi (17 gal/hr).
Propeller Manufacturer: McCauley Accessory Division.
Propeller Model Number: 2A34C203/90DCA-14.

Propeller Diameter, Maximum: 76 inches.

Minimum: 74.5 inches.

Propeller Blade Angle at 30 Inch Station, Low: 12.0°.

High: 25.1".

POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code significance are shown in figure 2-3.

CANADAYANA	RED LINE	GREEN ARC	RED LINE
INSTRUMENT	MINIMUM	NORMAL OPERATING	MAXIMUM
Tachometer	14.4.4.	2200 - 2600 RPM	2600 RPM
Manifold Pressure	***	15 - 25 in, Hg	
Oil Temperature		100° - 240°F	240°F
Cylinder Head Temperature		300° - 460°F	460°F
Fuel Flow (Pressure)	(3 psi)	4.5 - 11.5 gal/hr	17 gal/hr (17 psi)
Oil Pressure	10 psi	30 - 60 psi	100 psi

Figure 2-3. Power Plant Instrument Markings

WEIGHT LIMITS

NORMAL CATEGORY

Maximum Takeoff Weight: 2550 lbs.

Maximum Landing Weight: 2550 lbs.

Maximum Weight in Baggage Compartment:

Baggage Area 1 (or passenger on child's seat)-Station 82 to

108: 200 lbs. See note below.

Baggage Area 2 - Station 108 to 142: 50 lbs. See note below.

NOTE

The maximum combined weight capacity for baggage areas 1 and 2 is 200 lbs.

UTILITY CATEGORY

Maximum Takeoff Weight: 2200 lbs. Maximum Landing Weight: 2200 lbs.

Maximum Weight in Baggage Compartment: In the utility category, the baggage compartment and rear seat must not be occupied.

CENTER OF GRAVITY LIMITS

NORMAL CATEGORY

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs, or less, with straight line variation to 41.0 inches aft of datum at 2550 lbs.

Aft: 47.3 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

UTILITY CATEGORY

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs. or less, with straight line variation to 37.5 inches aft of datum at 2200 lbs.

Aft: 40.5 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

MANEUVER LIMITS

NORMAL CATEGORY

This airplane is certificated in both the normal and utility category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°. Aerobatic maneuvers, including spins, are not approved.

UTILITY CATEGORY

This airplane is not designed for purely aerobatic flight. However, in the acquisition of various certificates such as commercial pilot, in strument pilot and flight instructor, certain maneuvers are required by the FAA. All of these maneuvers are permitted in this airplane when operated in the utility category.

CESSNA MODEL R172K

In the utility category, the baggage compartment and rear seat must not be occupied. No aerobatic maneuvers are approved except those listed below:

MANEUVER										R	E	20	M	M	RN	VI.	Œ	D	EN	"	R	Y S	PEED*
Chandelles .		-		ú	Ŷ					16	ij		G.						ĵ.			110	knots
Lazy Eights							-			-							4		1		- 12	110	knots
Steep Turns					-		-	-	-	- 4	-	70	1				1		-	2		1.05	knots
Spins		10				1.4	-	-	4	-	-							81	ow	r.	De	cele	ration
Stalls (Except	V	Vh	ip	S	ta	H	1)	4										SI	ow	ř.	De	cele	ration

^{*}Abrupt use of the controls is prohibited above 105 knots.

Aerobatics that may impose high loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the airplane is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls. Intentional spins with flaps extended are prohibited.

FLIGHT LOAD FACTOR LIMITS

NORMAL CATEGORY

Flight Load Factors (Gross	
*Flaps Up	 + 3.8g, -1.52g

"The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

UTILITY CATEGORY

Flight Load Factors (Gross	Weight - 2200 lbs.):	
*Flaps Up		+4.4g, -1.76g
*Flaps Down	- [이용없는 [사이랑 - 원급명] - 경기다.	*3.00

"The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads. CESSNA MODEL R172K SECTION 2 LIMITATIONS

KINDS OF OPERATION LIMITS

The airplane is equipped for day VFR and may be equipped for night VFR and/or IFR operations. FAR Part 91 establishes the min imum required instrumentation and equipment for these operations. The reference to types of flight operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance.

Flight into known icing conditions is prohibited.

FUEL LIMITATIONS

2 Standard Tanks: 26 U.S. gallons each.

Total Fuel: 52 U.S. gallons.

Usable Fuel (all flight conditions): 49 U.S. gallons.

Unusable Fuel: 3.0 U.S. gallons.

NOTE

To ensure maximum fuel capacity when refueling, place the fuel selector valve in either LEFT or RIGHT position to prevent cross-feeding.

NOTE

Takeoff, climb and land with the fuel selector valve handle in the BOTH position.

Approved Fuel Grades (and Colors): 100LL Grade Aviation Fuel (Blue), 100 (Formerly 100/130) Grade Aviation Fuel (Green).

PLACARDS

The following information is displayed in the form of composite or individual placards.

(1) In full view of the pilot: (The "DAY-NIGHT-VFR-IFR" entry, shown on the example below, will vary as the airplane is equipped.)

This airplane must be operated in compliance with the operating limitations as stated in the form of placards, markings, and manuals.

-MAXIMUMS ----

N	or	mal Category	,	t	ti	lity Category
MANEUVERING SPEED (IAS)	7	105 knots				105 knots
GROSS WEIGHT	27	2550 lbs			٠	2200 lbs.
Flaps Up .	*	+3.8, -1.52	d		4	14.4, -1.76
Flaps Down		+3.0	0	37	-	+3.0

Normal Category - No acrobatic maneuvers including spins approved.

Utility Category - Baggage compartment and rear seat must not be occupied.

---- NO ACROBATIC MANEUVERS APPROVED -----EXCEPT THOSE LISTED BELOW

Maneuver	Recm.	Entry Speed	Maneuver	Recm.	Entry Speed
Chandelles	+1000000	110 knots	Spins	Slow	Deceleration
Lazy Eights	0 -4-4	110 knots	Stalls (exce	pt	
Steep Turns		105 knots	whip stal	ls) Slow	Deceleration

Altitude loss in stall recovery -- 160 feet.
Abrupt use of controls prohibited above 105 knots.
Spins Recovery: opposite rudder - forward elevator - neutralize controls. Intentional spins with flaps extended are prohibited. Flight into known icing conditions prohibited.
This airplane is certified for the following flight operations as of date of original airworthiness certificate:

DAY - NIGHT - VFR - IFR

(2) Near flap indicator:

AVOID SLIPS WITH FLAPS EXTENDED

(3) On the fuel selector valve:

BOTH - 49 GAL. LEFT - 24.5 GAL. RIGHT - 24.5 GAL.

(4) On the fuel selector valve:

WHEN SWITCHING FROM DRY TANK, TURN PUMP ON HIGH MOMENTARILY.

(5) Near fuel tank filler cap:

FUEL 100/130 MIN. GRADE AVIATION GASOLINE CAP. 26 U.S. GAL.

(6) On control lock:

CONTROL LOCK
REMOVE BEFORE STARTING ENGINE.

DISCITION 2

CESSNA MODEL R172K

(7) In baggage compartment:

200 POUNDS MAXIMUM BAGGAGE OR 120 LBS AUX SEAT PASSENGER FORWARD OF BAGGAGE DOOR LATCH

50 POUNDS MAXIMUM BAGGAGE AFT OF BAGGAGE DOOR LATCH

MAXIMUM 200 POUNDS COMBINED

FOR ADDITIONAL LOADING INSTRUCTIONS SEE WEIGHT AND BALANCE DATA

(8) Near manifold pressure/fuel flow gage:

FUEL FLOW AT FULL THROTTLE

SL 2600 RPM 4000 FT 16 GPH 8000 FT 12 GPH 12000 FT 10 GPH

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CESSNA MODEL R172K

EMBRODONCY PROCESSIONS

SECTION 3 EMERGENCY PROCEDURES

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INTRODUCTION

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgement wher unexpected weather is encountered. However, should an energency arise the basic guidelines described in this section should be considered and applied as necesary to correct the problem. Emergency procedures associated with the ELT and other optional systems can be found in Section 9.

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OPERATIONAL CHECKLISTS

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

- (1) Throttle -- IDLE.
- (2) Brakes -- APPLY.
- (3) Wing Flaps -- RETRACT.
- (4) Mixture -- IDLE CUT-OFF.
- (5) Ignition Switch -- OFF.
- (6) Master Switch -- OFF.

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

- (1) Airspeed -- 70 KIAS (flaps UP), 65 KIAS (flaps DOWN).
- (2) Mixture -- IDLE CUT-OFF.
- (3) Fuel Shutoff Valve -- OFF (pull out).
- (4) Ignition Switch -- OFF.
- (5) Wing Flaps -- AS REQUIRED (full down recommended).
- (6) Master Switch -- OFF.

ENGINE FAILURE DURING FLIGHT

- (1) Airspeed -- 75 KIAS.
- (2) Primer IN and LOCKED.
- (3) Fuel Shutoff Valve -- ON (push full in).
- (4) Fuel Selector Valve -- BOTH.
- (5) Mixture -- RICH.
- (6) Throttle -- 1/2 OPEN.
- (7) Auxiliary Fuel Pump -- LOW for 3-5 seconds then OFF.
- (8) Ignition Switch -- BOTH (or START if propeller is stopped).

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

- (1) Airspeed -- 70 KIAS (flaps UP). 65 KIAS (flaps DOWN).
- (2) Seat Belts and Shoulder Harnesses -- SECURE.
- (3) Mixture -- IDLE CUT-OFF.
- (4) Fuel Shutoff Valve -- OFF.
- (5) All Switches (except master switch) -- OFF.
- (6) Wing Flaps -- AS REQUIRED (full down recommended).
- (7) Master Switch OFF.
- (8) Doors -- UNLATCH PRIOR TO TOUCHDOWN.
- (9) Touchdown -- SLIGHTLY TAIL LOW.
- (10) Brakes -- APPLY HEAVILY

PRECAUTIONARY LANDING WITH ENGINE POWER

- (1) Seat Belts and Shoulder Harnesses -- SECURE.
- (2) Wing Flaps -- 20°.
- (3) Airspeed -- 65 KIAS
- (4) Selected Field -- FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed.
- (5) All Switches (except master and ignition switches) -- OFF.

- (6) Wing Flaps -- FULL DOWN (on final approach).
- (7) Airspeed -- 65 KIAS.
- (8) Master Switch -- OFF.
- (9) Doors -- UNLATCH PRIOR TO TOUCHDOWN
- (10) Touchdown -- SLIGHTLY TAIL LOW.
- (11) Ignition Switch -- OFF.
- (12) Brakes -- APPLY HEAVILY.

DITCHING

- (1) Radio -- TRANSMIT MAYDAY on 121.5 MHz, giving location and intentions.
- (2) Heavy Objects (in baggage area) SECURE or JETTISON.
- (3) Seat Belts and Shoulder Harnesses SECURE.
- (4) Wing Flaps -- 20" 40°.
- (5) Power -- ESTABLISH 300 FT/MIN DESCENT at 55 KIAS.
- (6) Approach High Winds, Heavy Seas INTO THE WIND. Light Winds, Heavy Swells -- PARALLEL TO SWELLS

NOTE

If no power is available, approach at 65 KIAS with flaps up or at 60 KIAS with 10° flaps.

- (7) Cabin Doors -- UNLATCH.
- (8) Face -- CUSHION at touchdown with folded coat,
- (9) Touchdown -- LEVEL ATTITUDE AT ESTABLISHED DES-
- (10) Airplane -- EVACUATE through cabin doors. If necessary, open window to flood cabin to equalize pressure so doors can be
- (11) Life Vests and Raft -- INFLATE.

FIRES

DURING START ON GROUND

- (1) Auxiliary Fuel Pump -- OFF,
- (2) Mixture -- IDLE CUT-OFF.
- (3) Parking Brake -- RELEASE.
- (4) Fire Extinguisher -- OBTAIN (have ground attendants obtain if not installed).
- (5) Airplane -- EVACUATE.
- (6) Fire -- EXTINGUISH.

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

- Airspeed -- 70 KIAS (flaps UP).
 KIAS (flaps DOWN).
- (2) Mixture -- IDLE CUT-OFF.
- (3) Fuel Shutoff Valve -- OFF (pull out).
- (4) Ignition Switch -- OFF.
- (5) Wing Flaps -- AS REQUIRED (full down recommended).
- (6) Master Switch -- OFF.

ENGINE FAILURE DURING FLIGHT

- (1) Airspeed -- 75 KIAS.
- (2) Primer -- IN and LOCKED.
- (3) Fuel Shutoff Valve -- ON (push full in).
- (4) Fuel Selector Valve -- BOTH.
- (5) Mixture -- RICH.
- (6) Throttle -- 1/2 OPEN.
- (7) Auxiliary Fuel Pump -- LOW for 3-5 seconds then OFF.
- (8) Ignition Switch -- BOTH (or START if propeller is stopped).

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

- Airspeed 70 KIAS (flaps UP).
 65 KIAS (flaps DOWN).
- (2) Seat Belts and Shoulder Harnesses -- SECURE.
- (3) Mixture -- IDLE CUT-OFF.
- (4) Fuel Shutoff Valve OFF.
- (5) All Switches (except master switch) -- OFF.
- (6) Wing Flaps -- AS REQUIRED (full down recommended).
- (7) Master Switch -- OFF.
- (8) Doors -- UNLATCH PRIOR TO TOUCHDOWN.
- (9) Touchdown -- SLIGHTLY TAIL LOW.
- (10) Brakes -- APPLY HEAVILY.

PRECAUTIONARY LANDING WITH ENGINE POWER

- Seat Belts and Shoulder Harnesses -- SECURE.
- (2) Wing Flaps -- 20°.
- (3) Airspeed -- 65 KIAS.
- (4) Selected Field -- FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed.
- (5) All Switches (except master and ignition switches) -- OFF.

CESSNA MODEL R172K

SECTION 3 EMERGENCY PROCEDURES

- (6) Wing Flaps -- FULL DOWN (on final approach).
- (7) Airspeed -- 65 KIAS.
- (8) Master Switch -- OFF.
- (9) Doors -- UNLATCH PRIOR TO TOUCHDOWN.
- (10) Touchdown -- SLIGHTLY TAIL LOW.
- (11) Ignition Switch -- OFF.
- (12) Brakes -- APPLY HEAVILY.

DITCHING

- Radio -- TRANSMIT MAYDAY on 121.5 MHz, giving location and intentions.
- (2) Heavy Objects (in baggage area) SECURE or JETTISON.
- (3) Seat Belts and Shoulder Harnesses SECURE.
- (4) Wing Flaps -- 20" 40°.
- (5) Power -- ESTABLISH 300 FT/MIN DESCENT at 55 KIAS.
- (6) Approach -- High Winds, Heavy Seas -- INTO THE WIND. Light Winds, Heavy Swells -- PARALLEL TO SWELLS

NOTE

If no power is available, approach at 65 KIAS with flaps up or at 60 KIAS with 10° flaps.

- (7) Cabin Doors -- UNLATCH.
- (8) Face -- CUSHION at touchdown with folded coat.
- (9) Touchdown -- LEVEL ATTITUDE AT ESTABLISHED DES-CENT.
- (10) Airplane -- EVACUATE through cabin doors. If necessary, open window to flood cabin to equalize pressure so doors can be opened.
- (11) Life Vests and Raft -- INFLATE.

FIRES

DURING START ON GROUND

- (1) Auxiliary Fuel Pump -- OFF,
- (2) Mixture -- IDLE CUT-OFF.
- (3) Parking Brake -- RELEASE.
- (4) Fire Extinguisher -- OBTAIN (have ground attendants obtain if not installed).
- (5) Airplane -- EVACUATE.
- (6) Fire -- EXTINGUISH.

- (10) Perform a landing approach using a forward slip, if necessary, for improved visibility.
- (11) Approach at 80 to 90 KIAS, depending upon the amount of the accumulation.
- (12) Perform a landing in level attitude.

STATIC SOURCE BLOCKAGE (Erroneous Instrument Reading Suspected)

- (1) Alternate Static Source Valve -- PULL ON.
- (2) Airspeed -- Consult appropriate calibration table in Section 5 or climb and approach 3 knots faster than normal.
- (3) Altitude -- Cruise and approach 25 feet higher than normal.

LANDING WITH A FLAT MAIN TIRE

- (1) Approach -- NORMAL.
- (2) Wing Flaps -- FULL DOWN.
- (3) Touchdown -- GOOD TIRE FIRST, hold airplane off flat tire as long as possible with aileron control.

ELECTRICAL POWER SUPPLY SYSTEM MAL-FUNCTIONS

OVER-VOLTAGE LIGHT ILLUMINATES

- (1) Master Switch -- OFF (both sides).
- (2) Master Switch -- ON.
- (3) Over-Voltage Light -- OFF.

If over-voltage light illuminates again:

(4) Flight -- TERMINATE as soon as possible.

AMMETER SHOWS DISCHARGE

- (1) Alternator -- OFF.
- (2) Nonessential Electrical Equipment -- OFF.
- (3) Flight -- TERMINATE as soon as practical.

AMPLIFIED PROCEDURES

ENGINE FAILURE

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If an engine failure occurs during the takeoff run, the most important thing to do is stop the airplane on the remaining runway. These extra items on the checklist will provide added safety during a failure of this type.

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takes of. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions. Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway. The checklist procedures assume that adequate time exists to secure the fuel and ignition systems prior to touchdown.

After an engine failure in flight, the best glide speed as shown in figure 3-1 should be established as quickly as possible. While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be at tempted as shown in the checklist. If the engine cannot be restarted, a forced landing without power must be completed.

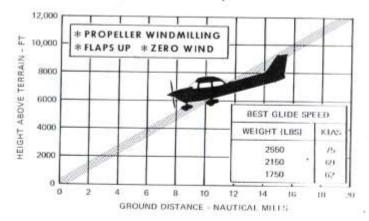


Figure 3-1. Maximum Glide

FORCED LANDINGS

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable field and prepare for the landing as discussed in the checklist for engine-off emergency landings.

Before attempting an "off airport" landing with engine power available, one should drag the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed under the Precautionary Landing With Engine Power checklist.

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area and collect folded coats for protection of occupants' face at touchdown. Transmit Mayday message on 121.5 MHz giving location and intentions. Avoid a landing flare because of difficulty in judging height over a water surface.

LANDING WITHOUT ELEVATOR CONTROL

Trim for horizontal flight to an airspeed of approximately 65 KIAS with flaps set to 20° by using throttle and elevator trim control. Then do not change the elevator trim control setting; control the glide angle by adjusting power exclusively.

At flareout, the nose-down moment resulting from power reduction is an adverse factor and the airplane may hit on the nose wheel. Consequently, at flareout, the elevator trim control should be adjusted toward the full nose-up position and the power adjusted so that the airplane will rotate to the horizontal attitude for touchdown. Close the throttle at touchdown.

FIRES

Improper starting procedures involving the excessive use of auxiliary fuel pump operation can cause engine flooding and subsequent puddling of fuel on the parking ramp as the excess fuel drains overboard from the intake ports. This is sometimes experienced in difficult starts in cold weather where preheat service is not available. If this occurs, the airplane should be pushed away from the fuel puddle before another engine start is attempted. Otherwise, there is a possibility of raw fuel accumulations in the exhaust system igniting during an engine start, causing a long flame from the tailpipe, and possibly igniting the fuel puddle on the pavement. In the event that this occurs, proceed in accordance with the Fire During Start On Ground checklist.

Although engine fires are extremely care in flight, the sleps of the appropriate checklist should be followed if one is encountered. After completion of this procedure, execute a forced landing as suon as possible. Do not attempt to restart the engine.

The initial indication of an electrical fire is usually the odor of burning insulation. The checklist for this problem should result in elimination of the fire.

EMERGENCY OPERATION IN CLOUDS (Vacuum System Failure)

In the event of a vacuum system failure during flight in marginal weather, the directional indicator and attitude indicator will be disabled, and the pilot will have to rely on the turn coordinator or the turn and bank indicator if he inadvertently flies into clouds. The following instructions assume that only the electrically-powered turn coordinator or the turn and bank indicator is operative, and that the pilot is not completely proficient in instrument flying.

EXECUTING A 180° TURN IN CLOUDS

Upon inadvertently entering the clouds, an immediate plan should be made to turn back as follows:

- Note the time of the minute hand and observe the position of the sweep second hand on the clock.
- (2) When the sweep second hand indicates the nearest half-minute, initiate a standard rate left turn, holding the turn coordinator symbolic airplane wing opposite the lower left index mark for 60 per conds. Then roll back to level flight by leveling the miniature air plane.
- (3) Check accuracy of the turn by observing the compass heading which should be the reciprocal of the original heading.
- (4) If necessary, adjust heading primarily with skidding motions rather than rolling motions so that the compass will read more accurately.
- (5) Maintain altitude and airspeed by cautious application of cleva tor control. Avoid overcontrolling by keeping the hands off the control wheel as much as possible and steering only with rudder.

EMERGENCY DESCENT THROUGH CLOUDS

If conditions preclude reestablishment of VFR flight by a 1997 lucu,

a descent through a cloud deck to VFR conditions may be appropriate. If possible, obtain radio clearance for an emergency descent through clouds. To guard against a spiral dive, choose an easterly or westerly heading to minimize compass card swings due to changing bank angles. In addition, keep hands off the control wheel and steer a straight course with rudder control by monitoring the turn coordinator. Occasionally check the compass heading and make minor corrections to hold an approximate course. Before descending into the clouds, set up a stabilized let-down condition as follows:

- Reduce power to set up a 500 to 800 ft./min. rate of descent.
- (2) Adjust the mixture as required for smooth engine operation.
- (3) Adjust the elevator and rudder trim for a stabilized descent at
- (4) Keep hands off control wheel.
- (5) Monitor turn coordinator and make corrections by rudder alone.
- (6) Adjust rudder trim to relieve unbalanced rudder force, if pres-
- (7) Check trend of compass card movement and make cautious corrections with rudder to stop turn.
- (8) Upon breaking out of clouds, resume normal cruising flight.

RECOVERY FROM A SPIRAL DIVE

If a spiral is encountered, proceed as follows:

- (1) Close the throttle.
- (2) Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator with the horizon reference line.
- (3) Cautiously apply elevator back pressure to slowly reduce the airspeed to 75 KIAS.
- (4) Adjust the elevator trim control to maintain a 75 KIAS glide,
- (5) Keep hands off the control wheel, using rudder control to hold a straight heading. Use rudder trim to relieve unbalanced rudder force, if present.
- (6) Clear engine occasionally, but avoid using enough power to disturb the trimmed glide.
- (7) Upon breaking out of clouds, resume normal cruising flight,

FLIGHT IN ICING CONDITIONS

Intentional flight into known icing conditions is prohibited in this airplane. During instrument flights, however, icing conditions may be encountered inadvertently and therefore some corrective action will be required as shown in the checklists. Initiation of a climb is usually the best ice avoidance action to take; however, alternatives are descent to warmer air or to reverse course.

STATIC SOURCE BLOCKED

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If erroneous instrument readings are suspected due to water, i.e. or other foreign matter in the pressure lines going to the standard external static pressure sources, the alternate static source valve should be

A calibration table is provided in Section 5 to illustrate the effect of the alternate static source on indicated airspeeds. With the windows and vents closed the airspeed indicator may typically read as much as 4 knots slower and the altimeter 50 feet lower in cruise. With the vents open and heater on, these variations increase to 7 knots slower and 50 feet lower respectively. If the alternate static source must be used for landing, airspeed errors of up to 10 knots slower with vents open and 4 knots slower with vents closed can be expected. Altimeter errors remain 50 feet low.

NOTE

In an emergency on airplanes not equipped with an alternate static source, cabin pressure can be supplied to the static pressure instruments by breaking the glass in the face of the rate-of-climb indicator.

SPINS

Should an inadvertent spin occur, the following recovery procedure should be used:

- (1) RETARD THROTTLE TO IDLE POSITION.
- (2) PLACE AILERONS IN NEUTRAL POSITION.
- (3) APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DI RECTION OF ROTATION.
- (4) JUST AFTER THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL. Full down elevator may be required at all center of gravity loadings to assure optimum recoveries
- (5) HOLD THESE CONTROL INPUTS UNTIL ROTATION (FFOR:) Premature relaxation of the control inputs may extend the recov-
- (6) AS ROTATION STOPS, NEUTRALIZE RUDDER, AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE

NOTE

If discrientation precludes a visual determination of the direction of rotation, the symbolic airplane in the turn coordinator or the needle of the turn and bank indicator may be referred to for this information.

For additional information on spins and spin recovery, see the discussion under SPINS in Normal Procedures (Section 4).

ROUGH ENGINE OPERATION OR LOSS OF POWER

SPARK PLUG FOULING

A slight engine roughness in flight may be caused by one or more spark plugs becoming fouled by carbon or lead deposits. This may be verified by turning the ignition switch momentarily from BOTH to either L or R position. An obvious power loss in single ignition operation is evidence of spark plug or magneto trouble. Assuming that spark plugs are the more likely cause, lean the mixture to the recommended lean setting for cruising flight. If the problem does not clear up in several minutes, determine if a richer mixture setting will produce smoother operation. If not, proceed to the nearest airport for repairs using the BOTH position of the ignition switch unless extreme roughness dictates the use of a single ignition position.

MAGNETO MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of magneto problems. Switching from BOTH to either L or R ignition switch position will identify which magneto is malfunctioning. Select different power settings and enrichen the mixture to determine if continued operation on BOTH magnetos is practicable. If not, switch to the good magneto and proceed to the mearest airport for repairs.

If ignition system malfunctions occur at high altitude and high power, as evidenced by roughness and possible backfiring on one or both magnetos, the power should be reduced as required. This condition is an indication of excessive spark plug gaps which, in turn, causes arcing across the magneto points.

ENGINE-DRIVEN FUEL PUMP FAILURE

Failure of the engine-driven fuel pump will be evidenced by a and den reduction in the fuel flow indication prior to a loss of power, while operating with adequate fuel in either or both fuel tanks.

In the event of an engine-driven fuel pump failure during talcooff, immediately <u>hold</u> the auxiliary fuel pump switch in the HR3H position until the airplane is well clear of obstacles. Upon reaching a safe altitude, and reducing power to cruise settings, placing the switch in the LOW position will then provide sufficient fuel flow to maintain engine operation while maneuvering for a landing.

If an engine-driven fuel pump failure occurs during cruising flight, apply full rich mixture and hold the auxiliary fuel pump switch in the HIGH position to re-establish fuel flow. Then the LOW position of the fuel pump switch may be used to sustain level flight. If necessary, additional fuel flow is obtainable by holding the pump switch in the HIGH position. If either LOW or HIGH fuel pump switch positions results in rough engine operation, lean the mixture as required for smooth operation.

LOW OIL PRESSURE

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If low oil pressure is accompanied by normal oil temperature, there is a possibility the oil pressure gage or relief valve is malfunctioning. A leak in the line to the gage is not necessarily cause for an immediate precautionary landing because an orifice in this line will prevent a sudden loss of oil from the engine sump. However, a landing at the nearest airport would be advisable to inspect the source of trouble.

If a total loss of oil pressure is accompanied by a rise in oil temper ature, there is good reason to suspect an engine failure is imminent. Reduce engine power immediately and select a suitable forced landing field. Use only the minimum power required to reach the desired touchdown spot.

ELECTRICAL POWER SUPPLY SYSTEM MAL-FUNCTIONS

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and over-voltage warning highly, however, the cause of these malfunctions is usually difficult to deter, mine. A broken alternator drive belt or wiring is most likely the cause of alternator failures, although other factors could cause the problem. A damaged or improperly adjusted voltage regulator can also cause malfunctions. Problems of this nature constitute an electrical emergency and should be dealt with immediately. Electrical power malfunctions usually fall into two categories: excessive rate of charge and insufficient rate of charge. The following paragraphs describe the recommended remedy for each situation.

EXCESSIVE RATE OF CHARGE

After engine starting and heavy electrical usage at low engine speeds (such as extended taxiing) the battery condition will be low enough to accept above normal charging during the initial part of a flight. However, after thirty minutes of cruising flight, the ammeter should be indicating less than two needle widths of charging current. If the charging rate were to remain above this value on a long flight, the battery would overheat and evaporate the electrolyte at an excessive rate. Electronic components in the electrical system could be adversely affected by higher than normal voltage if a faulty voltage regulator setting is causing the overcharging. To preclude these possibilities, an over-voltage sensor will automatically shut down the alternator and the over-voltage warning light will illuminate if the charge voltage reaches approximately 16 volts. Assuming that the malfunction was only momentary, an attempt should be made to reactivate the alternator system. To do this, turn both sides of the master switch off and then on again. If the problem no longer exists, normal alternator charging will resume and the warning light will go off. If the light comes on again, a malfunction is confirmed. In this event, the flight should be terminated and/or the current drain on the battery minimized because the battery can supply the electrical system for only a limited period of time. If the emergency occurs at night, power must be conserved for later use of landing lights and flaps during landing.

INSUFFICIENT RATE OF CHARGE

If the ammeter indicates a continuous discharge rate in flight, the alternator is not supplying power to the system and should be shut down since the alternator field circuit may be placing an unnecessary load on the system. All nonessential equipment should be turned off and the flight terminated as soon as practical. CESSNA MODEL R172K NORMAL PROCEDURES

SECTION 4 NORMAL PROCEDURES

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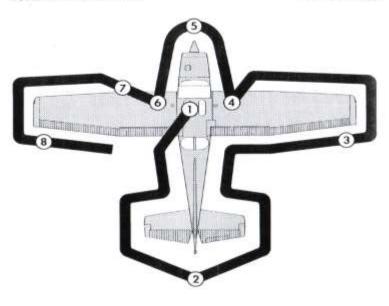
INTRODUCTION

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with Optional Systems can be found in Section 9.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2550 pounds and may be used for any lessar weight. However, to achieve the performance specified in Section 5 for takenff distance, the speed appropriate to the particular weight must be used.

Takeoff, Flaps Up:													
Normal Climb Out				1		÷			- 60		75	-85	KIAS
Short Field Takeoff, Flaps 10°, S	pe	œ	1	ıt.	50	F	ner.	t.				60	KIAS
Enroute Climb, Flaps Up:													
Normal						1	ď.	٠.			NES	-95	KIAN
Best Rate of Climb, Sea Level					1	13						81	KIAS
Best Rate of Climb, 10,000 Feet													
Best Angle of Climb, Sea Level		*		1		٠,					4	5.45	121 0 62
Best Angle of Climb, 10,000 Feet		-	+	3					1			(33)	KIVE
Landing Approach:													
Normal Approach, Flaps Up		v		4	7	4			4	10	65	-75	KIAS
Normal Approach, Flaps Full Do	w	n	-								60	70	KIAS
Short Field Approach, Flaps Full													
Balked Landing:						9					0.0		
Maximum Power, Flaps 20°	į.			27			·			76		DO	KIAS
Maximum Recommended Turbulent :													
2550 Lbs												10%	KIAS
2150 Lbs													KLASS
1250 Lbs			*	-			-	1					KLAS
1750 Lbs		1		1	7		1	*	*		. 1	40.4	W. Carre
Maximum Demonstrated Crosswind													and the second second second
Takeoff and Landing	+	+	+	-	-	+	4				228	9.4%	NOTS



NOTE

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to IFR flight, check that pitot heater (if installed) is warm to touch within 30 seconds with battery and pitot heat switches on. If night flight is planned, check operation of all lights, and make sure a flashlight is available.

Figure 4-1. Preflight Inspection

CESSNA MODEL R172K

SECTION 4 NORMAL PROCEDURES

CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

(1) CABIN

- (1) Control Wheel Lock -- REMOVE and STOW
- (2) Ignition Switch -- OFF.
- (3) Master Switch -- ON.
- (4) Fuel Quantity Indicators -- CHECK QUANTITY
- (5) Master Switch -- OFF.
- (6) Fuel Shutoff Valve -- ON (push full in).
- (7) Fuel Selector Valve -- BOTH.
- (8) Trim Controls -- NEUTRAL.
- (9) Baggage Door -- CHECK for security, lock with key if child's seat is to be occupied.

(2) EMPENNAGE

- (1) Rudder Gust Lock -- REMOVE.
- (2) Tail Tie-Down -- DISCONNECT.
- (3) Control Surfaces -- CHECK freedom of movement and security.

(3) RIGHT WING Trailing Edge

(1) Aileron -- CHECK freedom of movement and security.

(4) RIGHT WING

- (1) Wing Tie-Down -- DISCONNECT.
- (2) Main Wheel Tire -- CHECK for proper inflation.
- (3) Before first flight of the day and after each refueling, une sampler cup and drain small quantity of fuel from fuel tank samp quick-drain valve to check for water, sediment, and proper fuel
- (4) Fuel Quantity -- CHECK VISUALLY for desired level.
- (5) Fuel Filler Cap -- SECURE.

(5) NOSE

- (1) Static Source Openings (both sides of fuselage) CHECK for
- (2) Propeller and Spinner -- CHECK for niclos, security and oil

- (3) Landing Lights -- CHECK for condition and cleanliness.
- (4) Nose Wheel Strut and Tire -- CHECK for proper inflation.
- (5) Nose Tie-Down -- DISCONNECT.
- (6) Engine Oil Level -- CHECK. Do not operate with less than six quarts. Fill to eight quarts for extended flight.
- (7) Before first flight of the day and after each refueling, pull out strainer drain knob for about four seconds to clear fuel strainer of possible water and sediment. Check strainer drain closed. If water is observed, the fuel system may contain additional water, and further draining of the system at the strainer, fuel tank sumps, reservoir drain valve and fuel selector drain plug will be necessary.

(6) LEFT WING

- (1) Main Wheel Tire -- CHECK for proper inflation.
- (2) Before first flight of the day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment and proper fuel grade.
- (3) Fuel Quantity -- CHECK VISUALLY for desired level.
- (4) Fuel Filler Cap SECURE.

(7) LEFT WING Leading Edge

- (1) Pitot Tube Cover -- REMOVE and check opening for stoppage.
- (2) Fuel Tank Vent Opening -- CHECK for stoppage.
- (3) Stall Warning Opening -- CHECK for stoppage. To check the system, place a clean handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system opera-
- (4) Wing Tie-Down -- DISCONNECT.

(8) LEFT WING Trailing Edge

(1) Aileron -- CHECK for freedom of movement and security.

BEFORE STARTING ENGINE

- Preflight Inspection COMPLETE.
- (2) Seats, Belts, Shoulder Harnesses -- ADJUST and LOCK.
- (3) Fuel Shutoff Valve -- ON (push full in).
- (4) Fuel Selector Valve BOTH.
- (5) Radios, Autopilot (if installed), Electrical Equipment -- OFF.
- (6) Brakes TEST and SET.

- (7) Cowl Flap -- OPEN (move lever inboard out of locking hole to
- (8) Circuit Breakers -- CHECK IN.

STARTING ENGINE

- (1) Mixture RICH.
- (2) Propeller HIGH RPM.
- (3) Throttle CLOSED.
- (4) Master Switch -- ON.
- (5) Auxiliary Fuel Pump Switch -- HIGH.
- (6) Throttle -- ADVANCE to obtain 8-10 GPH fuel flow then return
- to CLOSED position.
- (7) Auxiliary Fuel Pump Switch -- OFF,
- (8) Propeller Area -- CLEAR
- (9) Ignition Switch START (release to BOTH when engine starts).

NOTE

The engine should start in two to three revolutions. If it does not continue running, start again at step (3) above. If the engine does not start, leave the auxiliary fuel pump switch off, set the mixture to idle cut-off, open the throttle, and crank until the engine fires (or for approximately 15 seconds). If still unsuccessful, start again using the normal starting procedure after allowing the starter motor to cool.

- (10) Throttle -- 800 to 1000 RPM.
- (11) Oil Pressure -- CHECK.

BEFORE TAKEOFF

- (1) Parking Brake SET.
- (2) Cabin Doors -- CLOSED and LOCKED.
- (3) Flight Controls -- FREE and CORRECT.
- (4) Flight Instruments -- SET.
- (5) Fuel Selector Valve -- BOTH.
- (6) Elevator and Rudder Trim SET.
- (7) Throttle -- 1800 RPM.
 - a. Magnetos -- CHECK (RPM drop should not exceed the RPM on either magneto or 50 RPM differential between magnetos).

- b. Propeller -- CYCLE from high to low RPM; return to high RPM (full in).
- c. Engine Instruments and Ammeter -- CHECK.
- d. Suction Gage -- CHECK (4.6 to 5.4 In.Hg.).
- (8) Radios -- SET.
- (9) Autopilot (if installed) -- OFF.
- (10) Flashing Beacon, Navigation Lights and/or Strobe Lights -- ON as required.
- (11) Throttle Friction Lock -- ADJUST.

TAKEOFF

NORMAL TAKEOFF

- Wing Flaps -- 0° 10° (10° preferred).
- (2) Power -- FULL THROTTLE and 2600 RPM.
- (3) Mixture -- LEAN for field elevation per fuel flow placard.
- (4) Elevator Control -- LIFT NOSE WHEEL at 55 KIAS.
- (5) Climb Speed -- 75-85 KIAS.

SHORT FIELD TAKEOFF

- (1) Wing Flaps -- 10°.
- (2) Brakes -- APPLY.
- (3) Power -- FULL THROTTLE and 2600 RPM.
- (4) Mixture -- LEAN for field elevation per fuel flow placard.
- (5) Brakes RELEASE.
- (6) Elevator Control -- MAINTAIN SLIGHTLY TAIL-LOW ATTI-
- (7) Climb Speed -- 60 KIAS (until all obstacles are cleared).
- (8) Wing Flaps RETRACT after obstacles are cleared.

ENROUTE CLIMB

NORMAL CLIMB

- (1) Airspeed -- 85-95 KIAS
- (2) Power -- FULL THROTTLE and 2600 RPM
- (3) Fuel Selector Valve -- BOTH.
- (4) Mixture -- LEAN for altitude per fuel flow placard.
- (5) Cowl Flap -- OPEN as required.

MAXIMUM PERFORMANCE CLIMB

- (1) Airspeed -- 81 KIAS at sea level to 76 KIAS at 10,000 feet.
- (2) Power -- FULL THROTTLE and 2600 RPM.
- (3) Fuel Selector Valve -- BOTH.
- (4) Mixture -- LEAN for altitude per fuel flow placard.
- (5) Cowl Flap -- OPEN.

CRUISE

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MODEL R172K

- Power 15-25 INCHES Hg, 2200-2600 RPM (no more than 80°) power).
- (2) Elevator and Rudder Trim -- ADJUST.
- (3) Mixture -- LEAN for cruise fuel flow using the EGT gage, Coast
- na Power Computer or the data in Section 5.
- (4) Cowl Flap -- CLOSED.

DESCENT

- (1) Power -- AS DESIRED.
- (2) Mixture -- ENRICHEN as required for engine smoothness.
- (3) Cowl flap -- CLOSED.

BEFORE LANDING

- (1) Seats, Belts, Shoulder Harnesses -- ADJUST and LOCK.
- (2) Fuel Selector Valve -- BOTH.
- (3) Propeller -- HIGH RPM.
- (4) Cowl Flap -- CLOSED.

LANDING

NORMAL LANDING

- (1) Airspeed -- 65-75 KIAS (flaps UP).
- (2) Wing Flaps -- AS DESIRED (below 85 KIAN).
- (3) Airspeed -- 60-70 KIAS (flaps DOWN).
- (4) Elevator and Rudder Trim -- ADJUST

(5) Touchdown -- MAIN WHEELS FIRST.

- (6) Landing Roll -- LOWER NOSE WHEEL GENTLY.
- (7) Braking -- MINIMUM REQUIRED.

SHORT FIELD LANDING

- (1) Airspeed -- 65-75 KIAS (flaps UP).
- (2) Wing Flaps FULL DOWN (below 85 KIAS).
- (3) Airspeed -- MAINTAIN 63 KIAS.
- (4) Elevator and Rudder Trim -- ADJUST.
- (5) Power -- REDUCE TO IDLE as obstacle is cleared.
- (6) Touchdown -- MAIN WHEELS FIRST.
- (7) Brakes -- APPLY HEAVILY.
- (8) Wing Flaps RETRACT for maximum brake effectiveness.

BALKED LANDING

- (1) Power -- FULL THROTTLE and 2600 RPM.
- (2) Wing Flaps -- RETRACT to 20°.
- (3) Airspeed -- 55 KIAS.
- (4) Wing Flaps -- RETRACT slowly after reaching 65 KIAS.
- (5) Cowl Flap -- OPEN.

AFTER LANDING

- (1) Wing Flaps -- RETRACT.
- (2) Cowl Flap -- OPEN.

SECURING AIRPLANE

- (1) Parking Brake SET.
- (2) Radios, Autopilot (if installed), Electrical Equipment -- OFF.
- (3) Throttle -- IDLE.
- (4) Mixture -- IDLE CUT-OFF (pull full out).
- (5) Ignition Switch OFF.
- (6) Master Switch -- OFF.
- (7) Control Lock INSTALL.
- (8) Fuel Selector Valve RIGHT.

AMPLIFIED PROCEDURES

STARTING ENGINE

Proper fuel management and throttle adjustments are the determining factors in securing an easy start from your continuous-flow fuelinjection engine. The procedure outlined in this section should be followed closely as it is effective under nearly all operating conditions.

Conventional full rich mixture and high RPM propeller settings are used for starting: the throttle, however, should be fully closed initially. When ready to start, place the auxiliary fuel pump switch in the HIGH position and advance the throttle to obtain 8-10 gal/hr fuel flow. Then close the throttle and release the auxiliary fuel pump switch. Place the ignition switch in the START position. While cranking, slowly advance the throttle until the engine starts. Slow throttle advancement is essential since the engine will start readily when the correct fuel/air ratio is obtained. When the engine has started, reset the throttle to the desired idle speed (800-1000 RPM).

The continuous-flow fuel injection system will inject atomized fuel in the intake ports as soon as the throttle and mixture controls are opened and the auxiliary fuel pump is turned on. If the auxiliary pump is turned on accidentally while the engine is stopped, with the throttle open and the mixture rich, solid fuel will collect temporarily in the cylinder intake ports, the quantity depending on the amount of the throttle opening and the length of time the pump has been operating. If this happens, it is advisable to wait a few minutes until this fuel drains away before starting the engine. To avoid flooding, turn the auxiliary fuel pump switch off promptly when the fuel flow reaches 10 gal/hr during preparation for engine start.

Engine mis-starts characterized by weak, intermittent firing followed by puffs of black smoke from the exhaust are caused by overpriming or flooding. This situation is more apt to develop in hetweather, or when the engine is hot. If it occurs, repeat the starting routine with the throttle approximately 1/2 open, the mixture in allecut-off and the auxiliary fuel pump switch off. As the engine fires, move the mixture control to full rich and decrease the throttle to idle-

Engine mis-starts characterized by sufficient power to take the engine away from the starter but dying in 3 to 5 revolutions are the result of an excessively lean mixture after the start and can occur in warm or cold temperatures. Repeat the starting procedure but allow additional priming time with the auxiliary fuel pump switch on HIGH before cranking is started. If extremely hot temperatures have caused vapor which prevents a start, it will be necessary to hold the auxiliary fuel

Then turn off the pump and proceed with normal starting procedures. the vapor through the fuel lines and line that received the fall and the contract in teaching denti of groun to charges bit of d not notitised HDIH soft in datives grand

at frequent intervals, since excessive heat may donage the armature. If prolonged cranking is necessary, allow the starter motor to cool

can cause serious engine damage. cold weather, shut off the engine and investigate. Lack of oil pressure grow in abuneus 00 bas semistredmet femion in abnoose 06 millin surg After starting, if the oil pressure gage does not heren to show press

ation paragraphs in this section. and operation may be found under Cold Weather Oper-Additional details concerning cold weather starting

DMIIXAT

figure 4-2) to maintain directional control and balance. mergariti gaitzaT sas) bazililu od afortnoo lla tadi bna muminim a of When taxiing, it is important that speed and use of brakes be held

BEFORE TAKEOFF

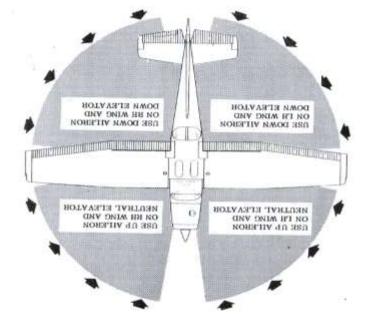
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good reason to suspect that the engine is not turning up property throttle checks on the ground are not recommended unless the prior harprecautions should be taken to avoid overheating on the ground. Full Since the engine is closely cowled for efficient in-flight conting:

MAGNETO CHECK

engine speed will usually confirm whether a deferency exectconcerning operation of the ignition system, RPM checks at higher than 50 RPM differential between magnetos. If there is a doubt quob sportly not exceed 120 KPM on either magnitude or them product position, note El³M and return the switch to the BOTTI preston. 111'M back to BOTH to clear the other set of plugs. Then move meticible belideduces award first to R position and note RPM. Most move control The magneto check should be made at 1800 RPM as follows: Move

> MODEL HIT2RY CESSAV



WIND DIRECTION CODE

MOLE

and rudder to maintain direction. altiplane is in this attitude. Use the steerable nose wheel sudden bursts of the throttle and sharp braking when the Strong quartering tail winds require caution. Avoid

Pigure 4-2. Taxiing Diagram

An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system or should be cause for suspicion that the magneto timing is set in advance of the setting specified.

ALTERNATOR CHECK

Prior to flight where verification of proper alternator and voltage regulator operation is essential (such as night or instrument flights), a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light during the engine runup (1800 RPM). The animeter will remain within a needle width of the initial reading if the alternator and voltage regulator are operating properly.

TAKEOFF

POWER CHECK

It is important to check full-throttle engine operation early in the takeoff run. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff.

Full-throttle runups over loose gravel are especially harmful to propeller tips. When takeoffs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before takeoff RPM is developed, and the gravel will be blown back of the propeller rather than pulled into it. When unavoidable small dents appear in the propeller blades they should be corrected immediately as described in Section 8 under Propeller Care.

For maximum engine power, the mixture should be adjusted during the initial takeoff roll to the fuel flow corresponding to the field elevation. (Refer to the fuel flow placard located adjacent to the fuel flow indicator). The power increase is significant above 3000 feet and this procedure should always be employed for field elevations greater than 5000 feet above sea level.

After full throttle is applied, adjust the throttle friction lock clockwise to prevent the throttle from creeping back from a maximum power position. Similar friction lock adjustment should be made as required in other flight conditions to maintain a fixed throttle setting.

WING FLAP SETTINGS

Normal takeoffs are accomplished with wing flaps 0° 10°. Using 10° wing flaps reduces the ground run and total distance over an obstaele by approximately 5 percent.

CESSNA

MODEL RI72K

If 10° wing flaps are used for takeoff, they should be left down until all obstacles are cleared and a safe flap retruction speed of 70 KIAE is reached. To clear an obstacle with wing flaps 10°, an obstacle clearance speed of 60 KIAS should be used.

Soft field takeoffs can be performed with 15" flags by lifting the airplane off the ground as soon as practical in a slightly tail low attitude. If no obstacles are ahead, the airplane should be leveled off in mediately to accelerate to a safer climb speed. When departing a soft field with an aft e.g. loading, the elevator trim should be adjusted to wards the nose down direction to give comfortable control wheel forces during the initial climb. Flap deflections greater than 15" are not approved for takeoff.

With wing flaps retracted and no obstructions ahead, a take-off climb-out speed of 75-85 KIAS would be most efficient.

CROSSWIND TAKEOFF

Takeoffs into strong crosswinds normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. The airplane is accelerated to a speed slightly higher than normal, then pulled off abruptly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

ENROUTE CLIMB

Normal climbs are performed at 85-95 KIAS with flaps up and maximum power for the best combination of engine cooling, rate of climb and forward visibility. The mixture should be leaned in accordance with the fuel flow placard.

If it is necessary to climb rapidly to clear mountains or reach favorable winds or better weather at high altitudes, the best rate of climb speed should be used. This speed is 81 KIAS at sea level, decreasing to 76 KIAS at 10,000 feet. Maximum power should be used and the mixture should be leaned according to the fact flow placand.

If an obstruction ahead requires a steep climb angle, a best angle of-climb speed should be used with flaps up and maximum power. This speed is 59 KIAS at sea level, increasing to 65 KIAS at 10,000 feet.

CESSNA

CRUISE

Normal cruising is performed between 60% and 80% power. The engine RPM and corresponding fuel consumption for various altitudes can be determined by using your Cessna Power Computer or the data in Section 5.

NOTE

Cruising should be done at 80% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The Cruise Performance Table, figure 4-3, illustrates the advantage of higher altitude on both true airspeed and nautical miles per gallon. In addition, the beneficial effect of lower cruise power on nautical miles per gallon at a given altitude can be observed. This table should be used as a guide, along with the available winds aloft information, to determine the most favorable altitude and power setting for a given trip. The selection of cruise altitude on the basis of the most favorable wind conditions and the use of low power settings are significant factors that should be considered on every trip to reduce fuel consumption.

For reduced noise levels, it is desirable to select the lowest RPM in the green are range for a given percent power that will provide smooth engine operation. The cowl flap should be opened, if necessary, to maintain the cylinder head temperature at approximately two-thirds of the normal operating range (green arc).

	B0% F	OWER	70% P	OWER	60% P	OWER
ALTITUDE	KTAS	NMPG	KTAS	NMPG	KTAS	NMPG
3000 Feet	126	11.2	119	12.0	110	12.9
6000 Feet	130	11.5	122	12.3	112	13.1
9000 Feet			125	12.6	114	13.3

Figure 4-3. Cruise Performance Table

For best fuel economy at 70% power or less, the engine may be operated at one gallon per hour leaner than shown in this handbook and on the power computer. This will result in approximately 8% greater range than shown in this handbook accompanied by approximately a 4 knot decrease in speed.

The fuel injection system employed on this engine is considered to be non-icing. In the event that unusual conditions cause the intake air filter to become clogged or iced over, an alternate intake air valve opens automatically for the most efficient use of either normal or alternate air depending on the amount of filter blockage.

LEANING WITH A CESSNA ECONOMY MIXTURE INDICATOR (EGT)

Exhaust gas temperature (EGT) as shown on the optional Cessma Economy Mixture Indicator may be used as an aid for mixture leaning in cruising flight at 80% power or less. To adjust the mixture, using this indicator, lean to establish the peak EGT as a reference point and then enrichen the mixture by a desired increment based on figure 4-4.

Continuous operation at peak EGT is authorized only at 70% power or less. This best economy mixture setting results in approximately 8% greater range than shown in this handbook accompanied by approximately a 4 knot decrease in speed.

NOTE

Operation on the lean side of peak EGT is not approved.

When leaning the mixture, if a distinct peak is not obtained, use the corresponding maximum EGT as a reference point for enrichening the mixture to the desired cruise setting. Any change in altitude or power will require a recheck of the EGT indication.

MIXTURE DESCRIPTION	EXHAUST GAS TEMPERATURE
HECOMMENDED LEAN (Pilots Operating Handbook and Power Computer)	50°F Rich of Peak 1 ()
BEST ECONOMY (70% Power or Lens)	Peak EGT

Figure 4-4. EGT Table

STALLS

The stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 knots above the stall in all configurations.

Power off stall speeds at maximum weight for both forward and aft e.g. are presented in Section 5.

SPINS

Intentional spins are approved in this airplane within certain restricted loadings. Spins with baggage loadings or occupied rear seat(s) are not approved.

However, before attempting to perform spins several items should be carefully considered to assure a safe flight. No spins should be attempted without first having received dual instruction both in spin entries and spin recoveries from a qualified instructor who is familiar with the spin characteristics of the Cessna R172K.

The cabin should be clean and all loose equipment (including the microphone and rear seat belts) should be stowed or secured. For a solo flight in which spins will be conducted, the copilot's seat belt and shoulder harness should also be secured. The seat belts and shoulder harnesses should be adjusted to provide proper restraint during all anticipated flight conditions. However, care should be taken to ensure that the pilot can easily reach the flight controls and produce maximum control travels.

It is recommended that, where feasible, entries be accomplished at high enough altitude that recoveries are completed 4000 feet or more above ground level. At least 1000 feet of altitude loss should be allowed for a 1- turn spin and recovery, while a 6- turn spin and recovery may require somewhat more than twice that amount. For example, the recommended entry altitude for a 6- turn spin would be 6000 feet above ground level. In any case, entries should be planned so that recoveries are completed well above the minimum 1500 feet above ground level required by FAR 91.71. Another reason for using high altitudes for practicing spins is that a greater field of view is provided which will assist in maintaining pilot orientation.

The normal entry is made from a power-off stall. As the stall is approached, the elevator control should be smoothly pulled to the full aft position. Just prior to reaching the stall "break", rudder control in the desired direction of the spin rotation should be applied so that full rudder deflection is reached almost simultaneously with reaching full

aft elevator. A slightly greater rate of deceleration than for normal stall entries, application of allerons in the direction of the desired spin, and the use of power at the entry will assure more consistent and positive entries to the spin. As the airplane begins to spin, reduce the power to idle and return the allerons to neutral. Both elevator and rudder controls should be held full with the spin unto the spin recovery is initiated. An inadvertent relaxation of either of these controls could result in the development of a nose-down spiral.

For the purpose of training in spins and spin recoveries, a 1 or 2 turn spin is adequate and should be used. Up to 2 turns, the spin will progress to a fairly rapid rate of rotation and a steep attitude. Application of recovery controls will produce prompt recoveries (within 1/4 turn). During extended spins of two to three turns or more, the spin will tend to change into a spiral, particularly to the right. This will be accompanied by an increase in airspeed and gravity loads on the airplane. If this occurs, recovery should be accomplished quickly by leveling the wings and recovering from the resulting dive.

Regardless of how many turns the spin is held or how it is entered, the following recovery technique should be used:

- (1) VERIFY THAT THROTTLE IS IN IDLE POSITION AND ALLERONS ARE NEUTRAL.
- (2) APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.
- (3) JUST AFTER THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL.
- (4) HOLD THESE CONTROL INPUTS UNTIL ROTATION STOPS.
 (5) AS ROTATION STOPS, NEUTRALIZE RUDDER, AND MAKE
- A SMOOTH RECOVERY FROM THE RESULTING DIVE.

NOTE

If disorientation precludes a visual determination of the direction of rotation, the symbolic airplane in the turn coordinator or the needle of the turn and bank indicator may be referred to for this information.

Variation in basic airplane rigging or in weight and balance due to installed equipment or right seat ocupancy can cause differences in behavior, particularly in extended spins. These differences are membral and will result in variations in the spin characteristics; and in the upitaling tendencies for spins of more than 2 turns. However, the second cry technique should always be used and will result in the most expentitious recovery from any spin.

Intentional spins with flaps extended are prohibited, since the high speeds which may occur during recovery are potentially damaging to the flap/wing structure.

LANDING

NORMAL LANDING

Normal landing approaches can be made with power-on or power off at speeds of 65-75 KIAS with flaps up, and 60-70 KIAS with flaps down. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds. Steep slipshould be avoided with flap settings greater than 20° due to a slight tendency for the elevator to oscillate under certain combinations of airspeed, sideslip angle, and center of gravity loadings.

Actual touchdown should be made with power-off and on the main wheels first to reduce the landing speed and subsequent need for braking in the landing roll. The nose wheel is lowered to the runway gent ly after the speed has diminished to avoid unnecessary nose gear loads. This procedure is especially important in rough or soft field landings.

SHORT FIELD LANDING

For a short field landing in smooth air conditions, make an approach at 63 KIAS with full flaps using enough power to control the glide path. (Slightly higher approach speeds should be used under turbulent air conditions.) After all approach obstacles are cleared, progressively reduce power and maintain the approach speed by lowering the nose of the airplane. Touchdown should be made with power off and on the main wheels first. Immediately after touchdown, lower the nose wheel and apply heavy braking as required. For maximum brake effectiveness, retract the flaps, hold the control wheel full back, and apply max imum brake pressure without sliding the tires.

CROSSWIND LANDING

When landing in a strong crosswind, use the minimum flap setting required for the field length. If flap settings greater than 20° are used in sideslips with full rudder deflection, some elevator oscillation may be felt at normal approach speeds. However, this does not affect control of the airplane. Although the crab or combination method of drift correction may be used, the wing-low method gives the best control. After touchdown, hold a straight course with the steerable nose wheel and occasional braking if necessary.

BALKED LANDING

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In a balked landing (go-around) climb, reduce the wing flap setting to 20° immediately after full power is applied and maintain 55 KIAS until immediate obstacles are cleared. Then slowly retract the wing flaps after accelerating to an airspeed of 65 KIAS. If obstacles must be cleared during the go-around climb, leave the wing flaps in the 10° to 20° range and maintain 55 KIAS until the obstacles are cleared. Lean the mixture according to the fuel flow placard. After clearing any obstacles, the flaps may be retracted as the airplane accelerates to the normal flaps-up climb speed of 85-95 KIAS.

COLD WEATHER OPERATION

STARTING

Prior-to starting on a cold morning, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy.

NOTE

When pulling the propeller through by hand, treat it as if the ignition switch is turned on. A loose or broken ground wire on either magneto could cause the engine to

Starting can be expedited by switching the auxiliary fuel pump by HIGH position and advancing the throttle for a fuel flow of 8-10 gal./hr. for 3 to 6 seconds.

In extremely cold (-18°C and lower) weather, the use of an external preheater and an external power source are recommended whenever possible to obtain positive starting and to reduce wear and above to the engine and electrical system. Pre-heat will thaw the oil trapped in the oil cooler, which probably will be congealed prior to starting in extremely cold temperatures. When using an external power source, the position of the master switch is important. Refer to Section 7 under Ground Service Plug Receptacle for operating details.

For quick, smooth engine starts in very cold temperatures, may ass strokes of the manual primer before cranking, with an additional one or two strokes as the engine starts.

WARM-UP

In very cold weather, no oil temperature indication need be apparent before takeoff. After a suitable warm-up period (2 to 5 minutes at 1000 RPM), with cylinder head temperatures showing above 200°F. theorgine is ready for takeoff if it accelerates smoothly and the oil pressure is normal and steady.

INFLIGHT

During let-down, observe engine temperatures closely and carry sufficient power to maintain them in the recommended operating magn

HOT WEATHER OPERATION

Refer to the general warm temperature starting information under Starting Engine in this section. Avoid prolonged engine operation on the ground.

NOISE ABATEMENT

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

We, as pilots, can demonstrate our concern for environmental improvement, by application of the following suggested procedures, and thereby tend to build public support for aviation:

(1) Pilots operating aircraft under VFR over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas should make every effort to fly not less than 2,000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.
(2) During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low attuide near noise-sensitive areas.

NOTE

The above recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude of less than 2,000 feet is necessary for him to adequately exercise his duty to see and avoid other air craft.

The certificated noise level for the Model R172K at 2550 pounds maximum weight is 74.8 dB(A). No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

SECTION 5 PERFORMANCE

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INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

It should be noted that the performance information presented in the range and endurance profile charts allows for 45 minutes reserve fuel based on 45% power. Fuel flow data for cruise is based on the recommended lean mixture setting. Some indeterminate variables such as mixture leaning technique, fuel metering characteristics, engine and propeller condition, and air turbulence may account for variations of 10% or more in range and endurance. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight.

USE OF PERFORMANCE CHARTS

Performance data is presented in tabular or graphical form to illustrate the effect of different variables. Sufficiently detailed information is provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

SAMPLE PROBLEM

The following sample flight problem utilizes information from the various charts to determine the predicted performance data for a typical flight. The following information is known:

AIRPLANE CONFIGURATION	AIRPLANE	CONFIGURATION
------------------------	----------	---------------

Takeoff weight 2500 Pounds Usable fuel 49 Gallons

TAKEOFF CONDITIONS

Field pressure altitude 1500 Feet
Temperature 28°C (16°C above standard)
Wind component along runway
Field length 3500 Feet
3500 Feet

CRUISE CONDITIONS

Total distance 445 Nautical Miles
Pressure altitude 5500 Feet
Temperature 20°C (16°C above standard)
Expected wind enroute 10 Knot Headwind

LANDING CONDITIONS

Field pressure altitude 2000 Feet Temperature 25°C Field length 3000 Feet

TAKEOFF

The takeoff distance chart, figure 5-4, should be consulted, keeping in mind that the distances shown are based on the short field technique. Conservative distances can be established by reading the chart at the next higher value of weight, altitude and temperature. For example, in this particular sample problem, the takeoff distance information presented for a weight of 2550 pounds, pressure altitude of 2000 feet and a temperature of 30°C should be used and results in the following:

Ground rell	1070 Feet
Total distance to clear a 50-foot obstacle	1820 Feet

These distances are well within the available takeoff field length. However, a correction for the effect of wind may be made based on Note 2 of the takeoff chart. The correction for a 12 knot headwind is:

12 Knots * 10%. -13% Decrease

This results in the following distances, corrected for wind:

Ground roll, zero wind	1070
Decrease in ground roll (1070 feet * 13%) Corrected ground roll	139 931 Feet
Total distance to clear a	1820
50-foot obstacle, zero wind Decrease in total distance	1000
(1820 feet * 13%)	237
Corrected total distance to clear a 50-foot obstacle	1583 Feet

CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft, and the airplane's performance. A cruising altitude and the expected wind enroute have been given for this sample problem. However, the power setting selection for cruise must be determined based on several considerations. These include the cruise performance characteristics presented in figure 5-7, the range profile chart presented in figure 5-8, and the endurance profile chart presented in figure 5-9.

The relationship between power and range is illustrated by the range profile chart. Considerable fuel savings and longer range result when lower power settings are used.

The range profile chart indicates that use of 70% power at 5500 feet yields a predicted range of 512 nautical miles with no wind. The endurance profile chart, figure 5-9, shows a corresponding 4.2 hours. Using this information, the estimated distance can be determined for the expected 10 knot headwind at 5500 feet as follows:

Range, zero wind	512
Decrease in range due to wind (4.2 hours * 10 knot headwind)	42
Corrected range	470 Nautical Miles

This indicates that the trip can be made without a fuel stop using approximately 70% power.

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The cruise performance chart for 6000 feet pressure altitude is entered using 20° C above standard temperature. These values most nearly correspond to the planned altitude and expected temperature conditions. The power setting chosen is 2500 RPM and 22 inches of manifold pressure, which results in the following:

Power 70% True airspeed 124 Knots Cruise fuel flow 9.9 GPH

The power computer may be used to determine power and fuel consumption more accurately during the flight.

FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in figures 5-6 and 5-7. For this sample problem, figure 5-6 shows that a normal climb from 2000 feet to 6000 feet requires 1.5 gallons of fuel. The corresponding distance during the climb is 10 nautical miles. These values are for a standard temperature and are sufficiently accurate for most flight planning purposes. However, a further correction for the effect of temperature may be made as noted on the climb chart. The approximate effect of a non-standard temperature is to increase the time, fuel, and distance by 10% for each 10°C above standard temperature, due to the lower rate of climb. In this case, assuming a temperature 16°C above standard, the correction would be:

 $\frac{16^{\circ}\text{C}}{10^{\circ}\text{C}} = 10\% = 16\%$ Increase

With this factor included, the fuel estimate would be calculated as follows:

Using a similar procedure for the distance during climb results in 12 nautical miles.

The resultant cruise distance is:

Total distance 445
Climb distance -12
Cruise distance 433 Nautical Miles

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With an expected 10 knot headwind, the ground speed for cruise is predicted to be:

124 -10 114 Knots

Therefore, the time required for the cruise portion of the trip is:

433 Nautical Miles = 3.8 Hours

The fuel required for cruise is:

3.8 hours * 9.9 gallons/hour = 37.6 Gallons

The total estimated fuel required is as follows:

Engine start, taxi, and takeoff
Climb
Cruise
Total fuel required

1.4
1.7
27.6
40.7 Gallons

This will leave a fuel reserve of:

49.0 -40.7 8.3 Gallons

Once the flight is underway, ground speed checks will provide a more accurate basis for estimating the time enroute and the corresponding fuel required to complete the trip with ample reserve.

LANDING

A procedure similar to takeoff should be used for estimating the landing distance at the destination airport. Figure 5-10 presents landing distance information for the short field technique. The distances corresponding to 2000 feet pressure altitude and a temperature of 30°C are as follows:

> Ground roll 700 Feet Total distance to clear a 50-foot obstacle 1390 Feet

A correction for the effect of wind may be made, based on Note 2 of the landing chart using the same procedure as outlined for takeoff.

AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

1177-117-1	_											
FLAPS UP												
KIAS	50	60	70	80	90	100	110	120	130	140:	150	160
KCA5	53	61	69	78	88	98	108	118	128	138	148	158
FLAPS 10 ⁰												
KIAS	40	50	60	70	80	85						
KCAS	48	54	61	70	79	83					-	0.0
FLAPS 40 ⁰												
KIAS	40	50	60	70	80	85						4.4
KCAS	43	51	61	70	79	84	200					

Figure 5-1. Airspeed Calibration (Sheet 1 of 2)

AIRSPEED CALIBRATION

ALTERNATE STATIC SOURCE

HEATER/VENTS AND WINDOWS CLOSED

FLAPS UP NORMAL KIAS ALTERNATE KIAS	50 43	60 57	70 69	80 79	90 90	100 100	110 109	120 119	130 128	140 137	150 147	160 156
FLAPS 10 ⁰						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
NORMAL KIAS	an	50	60	70	80	85				-		
ALTERNATE KIAS	32	43	56	68	78	84	4.0					
FLAPS 40°												
MORMAL VIAS	40	50	60	70	80	85	200					
NORMAL KIAS ALTERNATE KIAS	31	42	54	64	75	81						

HEATER/VENTS OPEN AND WINDOWS CLOSED

FLAPS UP NORMAL KIAS ALTERNATE KIAS	50	60 56	70 67	80 77	90 87	100	110	120 115	130 125	140 134	150 144	160 153
ALTENNATE KIND	42	ries.	477		-	- 00			_		_	
FLAPS 10 ⁰ NORMAL KIAS ALTERNATE KIAS	40 30	50 41	60 55	70 66	80 76	85 81						:::
FLAPS 40 ^D												
NORMAL KIAS ALTERNATE KIAS	40 25	50 37	60 49	70 61	80 72	85 76						:::

Figure 5-1. Airspeed Calibration (Sheet 2 of 2)

TEMPERATURE CONVERSION CHART

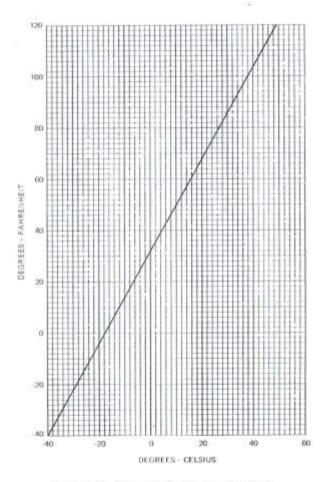


Figure 5-2. Temperature Conversion Chart

STALL SPEEDS

CONDITIONS: Power Off

NOTES:

- 1. Maximum altitude loss during a stall recovery may be as much as 160 feet.
- 2. KIAS values are approximate.

MOST REARWARD CENTER OF GRAVITY

WEIGHT LBS		ANGLE OF BANK											
	FLAP DEFLECTION		ya	3	00	4	5°	60°					
	0 1	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS				
	UP	49	53	53	57	58	63	69	75				
2550	10 ⁰	41	50	44	54	49	59	58	71				
	40°	44	46	47	49	52	55	62	65				

MOST FORWARD CENTER OF GRAVITY

WEIGHT LBS		ANGLE OF BANK												
	FLAP DEFLECTION	(jo.	3	O _O	4	50	60°						
	(KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS					
	*UP	54	56	58	60	64	67	76	79					
2550	10 ⁰	43	51	46	55	51	61	61	72					
	40 ⁰	46	48	49	52	-55	57	65	68					

Figure 5-3. Stall Speeds

TAKEOFF DISTANCE MAXIMUM WEIGHT 2550 LBS

SHORT FIELD

CONDITIONS: Flaps 10° 2500 RPM and Full Throttle Prior to Brake Release Mixture Set at Placard Fuel Flow Cowl Flap Open Paved Level, Dry Runwey Zero Wind

MIXTURE SE	TTING
PRESS ALT	GPH
S.L. 2000 4000 6000 8000	16 15 14 13 12

Short field technique as specified in Section 4.

Short field technique as specified in Section 4.

Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.

For operation on a dry, grass runway, increase distances by 18% of the "ground roll" figure.

WEIGHT LBS		EOFF			20°C :		30°C	40°C									
	K	KIAS ALT		Lessander	TOTAL		TOTAL			respectation.	TOTAL	Telegraphy (TOTAL	ersone 5	TOTAL		TOTAL
	DFF	50 FT	FT		TO CLEAR 50 FT OBS	ROLL	TO CLEAR 50 FT OBS		TO CLEAR 50 FT OBS		TO CLEAR		TO CLEAR 50 FT OBS				
2550	56	60	S.L. 1000 2000 3000 4000 5000 6000 7000 8000	715 780 855 935 1025 1125 1240 1365 1510	1225 1335 1460 1600 1760 1945 2155 2405 2696	770 840 920 1010 1110 1220 1340 1480 1635	1315 1435 1570 1725 1900 2105 2340 2615 2845	830 905 995 1090 1195 1315 1450 1600 1770	1410 1540 1690 1860 2055 2280 2540 2880 3225	895 975 1070 1175 1290 1420 1565 1730 1915	1510 1655 1820 2005 2220 2470 2765 3115 3546	960 1050 1150 1265 1390 1530 1690 1870 2075	1625 1780 1960 2165 2405 2685 3018 3415 3920				

Figure 5:4. Takeoff Distance (Sheet 1 of 2)

TAKEOFF DISTANCE

2400 LBS AND 2200 LBS

SHORT FIELD

REFER TO SHEET 1 FOR APPROPRIATE CONDITIONS AND NOTES.

WEIGHT	SPE	EOFF	PRESS	0°C			10°C		20°C	1	30°C	40°C	
LBS	LIFT	AT 50 FT	FT		TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND	TOTAL TO CLEAM 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
2400	5-4	58	S. L. 1000 2000 3000 4000 5000 6000 7000 6000	620 680 740 810 890 975 1070 1180 1305	1070 1165 1270 1390 1520 1675 1850 2050 2280	570 730 800 875 960 1055 1160 1275 1410	1145 1250 1366 1495 1640 1808 2000 2220 2480	720 790 880 945 1035 1138 1250 1380 1525	1225 1340 1465 1605 1765 1950 2168 2410 2700	775 845 925 1015 1110 1225 1350 1480 1650	1318 1435 1575 1730 1905 2110 2345 2820 2850	835 910 995 1095 1200 1320 1455 1610 1780	1410 1540 1690 1860 2055 2280 2540 2850 3225
2200	52	56	S.L. 1000 2000 3000 4000 5000 6000 7000 8000	510 555 605 660 725 795 870 955 1055	880 955 1040 1135 1240 1355 1490 1645 1815	550 600 655 715 780 855 940 1035 1140	940 1025 1115 1215 1330 1460 1605 1770 1965	590 645 705 770 840 925 1015 1115 1230	1005 1095 1196 1305 1430 1570 1730 1915 2125	635 690 755 825 805 995 1095 1205 1330	1075 1175 1280 1400 1535 1680 1865 2065 2300	680 740 810 890 975 1070 1175 1295	1180 1258 1370 1500 1680 1820 2010 2236 2495

CONDITIONS: Flaps Up 2600 RPM Full Throttle Mixture Set at Placard Fuel Flow Cowl Flap Open

MIXTURE SE	TTING
PRESS ALT	GPH
S.L.	16
4000	14
8000	12
12,000	10

WEIGHT	PRESS	CLIMB	RATE OF CLIMB - FPM						
LBS	FT	KIAS	-20°C	0°C	20°C	40°C			
2550	S.L.	81	1040	945	845	750			
	2000	80	925	830	740	650			
	4000	79	810	720	635	545			
	6000	78	695	615	530	445			
	8000	77	585	505	425	345			
	10,000	76	480	400	320	200			
	12,000	75	370	295	220				

Figure 5-5. Rate of Climb

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TIME, FUEL, AND DISTANCE TO CLIMB

MAXIMUM RATE OF CLIMB

CONDITIONS: Flaps Up 2600 RPM Full Throttle Mixture Set at Placard Fuel Flow Cowl Flap Open Standard Temperature

MIXTURE SE	TTING
PRESS ALT	GPH
S.L.	16
8000	12
12,000	10

NOTES:

- 1. Add 1.4 gallons of fuel for engine start, taxi and takeoff allowance.
- Increase time, fuel and distance by 10% for each 10°C above standard temperature.
- Distances shown are based on zero wind.

Mark Son Com-	PRESSURE	TEMP	CLIMB	RATE OF	9	FROM SEA LE	VEL
WEIGHT LBS	ALTITUDE FT	oC.	SPEED KIAS	CLIMB FPM	TIME	FUEL USED GALLONS	DISTANCE NM
2550	5.L.	15	81	870	0	0	0
	1000	13	80	825	1	0.3	2
	2000	11	80	780	2	0.6	3
	3000	9	79	735	4	3.0	5
	4000	7	79	690	5	(1'3,	5 7
	5000	5	79	645	7	1.6	9
	6000	3	78	600	8	2.0	11
1	7000	1	78	555	10	2.4	14
	8000	-1	77	510	12	2.7	16
	9000	-3	77	465	14	3.2	19
	10,000	-5	76	420	16	3,6	23
	11,000	-7	76	375	19	4.0	26
	12,000	-9	75	330	22	4.5	31

Figure 5-6. Time, Fuel, and Distance to Climb (Sheet 1 of 2)

TIME, FUEL, AND DISTANCE TO CLIMB

NORMAL CLIMB - 90 KIAS

CONDITIONS: Flaps Up 2600 RPM Full Throttle Mixture Set at Placard Fuel Flow Cowl Flap Open Standard Temperature

MIXTURE SE	TTING
PRESS ALT	GPH
S.L.	16
4000	14
8000	12
12,000	10

- Add 1.4 gallons of fuel for engine start, taxi and takeoff allowance.
 increase time, fuel and distance by 10% for each 10°C above standard temperature.
- 3. Distances shown are based on zero wind.

WEIGHT	PRESSURE	TEMP	RATE OF	FROM SEA LEVEL					
LBS	ALTITUDE FT	oC.	CLIMB FPM	TIME	FUEL USED GALLONS	DISTANCE			
2550	S.L.	15	860	0	0	0			
	1000	13	805	1	0.3	2			
	2000	11	755	3	0.6	4_			
	3000	9	700	4 5	1.0	6			
	4000	7	645	5	1.3	6 8			
	5000	- 5	595	7	1.7	ii			
	6000	3	540	9	2.1	14			
	7000	1	485	11	2.5	17			
	8000	- 1	435	13	3.0	20			
	9000	-3	380	16	3.5	25			
	10,000	-5	325	18	4.0	30			
	11,000	-7	275	22	4.6	36			
	12,000	-9	220	26	5.3	43			

Figure 5-6. Time, Fuel, and Distance to Climb (Sheet 2 of 2)

CRUISE PERFORMANCE PRESSURE ALTITUDE 2000 FEET

CONDITIONS: 2550 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH leaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD 1 90C			TANDAR MERATI 11 ⁰ C		20°C ABOVE STANDARD TEMP 31°C		
RPM	MP	% BHP	KTAS	GPH	% BHP	KTAS)	(GPH)	% BHP	KTAS	GPF
2600	24	.22	122	17.1	81	126	11.4	78	127 123	11.0
	23	78	122	11.1	76	122	10.7	73 68	119	9.6
1	22	73	118	10.3	71 65	119	9.3	63	114	9.0
	21	60	2.22	10.00	400	1.00	9.5	100	1000	300
2500	25		0.00		81	126	11.5	79	127	11,1
	24	80	122	11.2	77	123	10.8	74	124	10.8
- 1	23	75	119	10.6	72	120	10.2	70	120	9.0
- 1	22	70	116	9.9	67	116	9.5	65	116	9.3
2400	26	79	122	11.2	76	123	10.8	74	123	10.
	24	74	119	10.5	72	120	10.2	69	120	9.
- 1	23	70	116	9.9	67	116	9.5	65	116	9.
	22	65	112	9.2	63	112	8.9	61	112	8.0
2300	25	74	119	10.5	72	119	10.1	69	120	9.
2000	24	70	116	9.9	67	116	9.5	65	116	9.
	23	65	112	9.2	63	112	8.9	61	112	8.
- 1	22	63	108	8.6	59	108	8.4	57	107	8.
2200	25	69	115	9.8	67	115	9.4	64	115	9.
	24	65	112	9.2	63	112	8.9	61	111	8.
- 1	23	61	108	8.6	59	108	8.3	57	107	8.
- 1	22	57	104	8.1	55	103	7.8	53	102	73
- 1	21*	52	99	7.6	- 51	98	7.3	49	97	7.
	20	48	94	7.0	47	93	6.8	45	91	6.
	19	44	88	6,5	43	87	6.3	41	86	6.

Figure 5-7. Cruise Performance (Sheet 1 of 6)

CRUISE PERFORMANCE PRESSURE ALTITUDE 4000 FEET

CONDITIONS: 2550 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH loaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD T -13 ^O C			TANDAR MERATU 7ºC			OC ABOV NDARD T 27°C	
RPM	MP	% BHP	KTAS	GPH	% BHP	KTAS	GPH.	% BHP	KTAS	GPF
2600	23	81	126	11.5	79	127	11.1	76	127	10.7
	22	76	122	10.8	73	123	10.4	71	123	10.0
- 1	21	71	119	10.0	68	119	9.7	66	119	9.3
- 1	20	66	114	9.3	63	114	9,0	61	113	8.7
2500	24	82	126	11.6	79	127	11.2	77	128	10.8
9933	23	77	123	11.0	75	124	10.6	72	124	10.2
- 1	22	73	120	10.3	70	120	9.9	88	120	9.6
- 1	21	68	116	9.6	65	116	9.3	63	116	9.0
2400	24	77	123	10.9	74	124	10.5	72	124	10.2
2.000	23	72	120	10.2	70	120	9.9	68	120	9.5
- 1	22	68	116	9.6	65	116	9.2	63	116	9.0
- 1	21	63	112	8.9	61	111	8.6	59	110	8.4
2300	24	72	120	10.2	70	120	9.9	67	120	9,5
	23	68	116	9.6	66	116	9.3	63	116	9.0
- 1	22	63	112	9.0	61	112	8.7	59	111	8.4
- 1	21	59	108	8.4	57	107	8.1	55	106	7.5
2200	24	68	116	9.6	65	116	9.2	63	115	8.9
12.00	23	63	112	9.0	61	112	8.7	59	1.11	8,4
	22	59	108	8.4	57	107	8.1	55	106	7.5
	21	55	103	7.9	53	102	7.6	51	101	7.4
- 1	20	51	98	7.3	49	97	7.1	47	95	6.9
- 1	19	46	92	6.8	45	91	6.6	43	89	6.4

Figure 5-7. Cruise Performance (Sheet 2 of 6)

CRUISE PERFORMANCE PRESSURE ALTITUDE 6000 FEET

CONDITIONS: 2550 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH leaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD T -17°C			TANDAR MPERATU 3°C			OC ABOV NDARD T 23 ^O C	
нем	MP	% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2600	23				81	131	11.5	79	131	11.1
	22	79	126	11.2	76	127	10.8	74	127	10,4
- 1	21	74	123	10.5	. 71	123	10.1	69	123	9.7
- 1	20	69	119	9.7	66	118	9.3	64	118	9.1
2500	23	80	127	11.3	77	128	10.9	75	128	10.6
2500	22	76	124	10.7	73	124	10.3	70	124	9.9
- 1	21	71	120	10.0	68	120	9.6	66	120	9,3
	20	66	116	9.3	63	116	9.0	61	115	8.7
2400	23	75	124	10.6	72	124	10.2	70	124	9.9
-100	22	70	120	9.9	68	120	9.6	65	120	9.3
- 1	21	65	116	9.3	63	115	9.0	61	114	8.7
	20	61	111	8.6	59	110	8.4	57	109	8.1
2300	23	71	120	10.0	68	120	9.6	66	120	9.3
2000	22	66	116	9.3	64	116	9.0	61	115	8.7
- 1	21	61	112	8.7	59	111	8.4	57	110	8.2
	20	57	107	8.1	56	105	7.9	53	105	7.5
2200	23	56	116	9.3	63	116	9.0	61	115	8.7
2200	22	62	112	8.7	59	111	8.4	57	110	8.3
	21	57	107	8.2	55	106	7.9	53	105	7.7
	20	53	102	7.6	51	101	7.4	49	99	7.2
	19	49	96	7.1	47	95	6.8	45	93	6.7
	18	44	90	6.6	43	89	6.4	41	87	6.3

Figure 5-7. Cruise Performance (Sheet 3 of 6)

CHARLES .

CRUISE PERFORMANCE PRESSURE ALTITUDE 8000 FEET

CONDITIONS: 2560 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH leaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD T -21°C			TANDAR MPERATU - 1°C			OC ABOV NDARD T 19 ^O C	
RPM	MP	% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2600	21	77	127	10.9	74	128	10.5	72	127	10.1
	20	72	123	10.1	69	123	9.8	67	122	9.4
- 1	19	66	118	9.4	64	118	9.0	62	116	8.8
- 1	18	61	113	8.6	59	111	8,3	57	110	8.1
2500	21	74	125	10.4	71	125	10.0	69	124	9.7
	20	69	120	9.7	66	120	9.4	64	119	9.1
- 1	19	64	116	9.0	61	115	8.7	59	113	8.4
- 1	18	59	110	8.4	56	109	B.1	54	108	7.8
2400	21	68	120	9.6	65	119	9.3	63	118	9.0
0000000	20	63	115	9.0	61	114	8.6	59	113	8.4
- 1	19	58	110	8.3	56	108	8.0	54	107	7.8
- 1	18	54	104	7.7	52	103	7.5	50	101	7.2
2300	21	64	116	9.1	62	115	8.7	59	114	8.5
	20	59	111	8.5	57	109	8.2	55	109	7.9
- 1	19	55	105	7.9	53	104	7.6	51	103	7.4
	18	50	100	7,3	48	98	7.0	47	96	6.8
2200	21	60	111	8.5	57	110	8.2	55	109	7.9
	20	-55	106	7.9	53	105	7.7	51	103	7.4
- 1	19	51	100	7.4	49	99	7.1	47	97	6.9
	18	47	94	6.8	45	93	6.6	43	91	8.4

Figure 5-7. Cruise Performance (Sheet 4 of 6)

CRUISE PERFORMANCE PRESSURE ALTITUDE 10,000 FEET

CONDITIONS: 2550 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH leaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD T -25°C			TANDAR MPERATU -5°C			OC ABOV NDARD T 15°C	
RPM	MP	% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2600	19	69	123	9.8	67	122	9.4	64	121	9.1
2000	18	64	117	9.0	61	116	8.7	59	115	8.4
- 1	17	58	110	8.3	56	109	8.0	54	108	7.8
- 1	16	53	104	7.6	51	102	7,3	49	100	7.1
2500	19	67	120	9.4	64	119	9.1	62	118	8.5
2500	18	62	115	8.7	59	113	8.4	57	112	8.7
- 1	17	56	108	8.0	54	107	7.8	52	105	7.5
	16	50	101	7,3	49	99	7.1	47	97	6.8
2400	19	61	114	8.6	59	112	8.3	56	111	8.
2400	18	56	108	8.0	54	107	7.8	52	105	7.1
	17	51	102	7.4	49	100	7.2	48	99	7.0
	16	47	95	6.8	45	94	6.6	43	91	6.
2300	19	57	109	8.2	55	108	7.9	53	107	7.
2300	18	53	104	7.6	51	102	7.3	49	100	7.
	17	48	97	7.0	46	95	6.8	45	94	6.
2200	19	53	104	7.7	51	103	7.4	49	101	7.
2200	18	49	98	7.1	47	97	6.9	45	95	6.
N 19	17	+ 45	92	6.6	43	90	6.4	42	88	6.
	1,6	1.45				2000	10000			

Figure 5-7. Cruise Performance (Sheet 5 of 6)

CESSNA MODEL R172K CESSNA MODEL R172K SECTION 5 PERFORMANCE

CRUISE PERFORMANCE PRESSURE ALTITUDE 12,000 FEET

CONDITIONS: 2550 Pounds Recommended Lean Mixture Cowl Flap Closed

NOTE

For best fuel economy at 70% power or less, operate at 1 GPH leaner than shown in this chart or at peak EGT if an EGT indicator is installed.

			OC BELO NDARD 1 -29°C			TANDAR MPERATU -9°C			OC ABOV NDARD T 11°C	
RPM	MP	% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2600	18	67	122	9.4	64	121	9.1	62	120	8.8
- 1	17	61	115	8.7	59	114	B.4	57	113	8.1
- 1	16	55	108	7.9	53	10.7	7.7	51	105	7.4
	15	50	100	2,2	48	99	7.0	46	97	6.7
2500	18	64	119	9.1	62	118	8.8	60	117	8.5
	17	59	112	8.4	57	112	B.1	55	110	7.8
- 1	16	53	106	7.7	51	104	7.4	49	102	7.2
- 1	15	47	97	6.9	45	95	6.7	44	93	6.5
2400	18	58	112	8.3	56	111	8.0	54	109	7.8
20000	17	54	106	7.7	52	104	7.5	50	103	7.2
- 1	16	49	100	7.1	47	98	6.9	46	96	6.7
	15	44	93	6.6	43	90	6.4	41	88	6.2
2300	18	55	108	7.9	53	106	7.6	51	104	7.4
	17	50	101	7.3	48	100	7.1	47	98	6.8
	16	46	95	6.7	44	93	6.5	43	90	6.3
2200	18	51	103	7.4	49	101	7.1	47	99	6.9
28011.04 I	17	47	96	6.8	45	94	6.6	44	92	6.4

Figure 5-7. Cruise Performance (Sheet 6 of 6)

RANGE PROFILE 45 MINUTES RESERVE 49 GALLONS USABLE FUEL

CONDITIONS: 2550 Pounds Recommended Lean Mixture for Cruise Standard Temperature Zero Wind

NOTE

- This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb as shown in figure 5-6.
- 2. Reserve fuel is based on 45 minutes at 45% BHP and is 5.0 gallons.

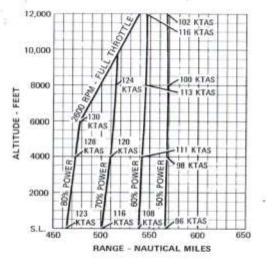


Figure 5-8. Range Profile

SECTION 5 PERFORMANCE

CESSNA MODEL R172K

CESSNA MODEL R172K

ENDURANCE PROFILE 45 MINUTES RESERVE 49 GALLONS USABLE FUEL

CONDITIONS: 2550 Pounds Recommended Lean Mixture for Cruise Standard Temperature

- This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the time during a normal climb as shown in figure 5-6.
- Reserve fuel is based on 45 minutes at 45% BHP and is 5.0 gailons.

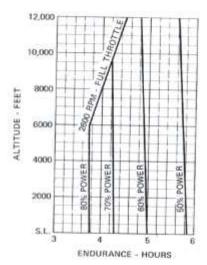


Figure 5-9. Endurance Profile

LANDING DISTANCE

SHORT FIELD

CONDITIONS: Flaps 40° Power Off

NOTES:
1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
2. For operation on a dry, grass namway, increase distances by 40% of the "ground rail" figure.

400C GRND TO CLEAR 50 FT 08S 300C TO CLEAR 50 FT 08S 20°C 10°C 200 PRESS ALT FT SPEED AT 50 FT KIAS WEIGHT

01.0

CESSNA AIRCRAFT COMPANY WICHITA, KANSAS, USA

MODEL R172K

LOADING & CENTER OF GRAVITY CHARTS

IT IS THE RESPONSIBILITY OF THE OPERATOR TO ENSURE THAT THE AIRPLANE IS LOADED PROPERLY.

Using the empty weight, arm and moment of your airplane and the loading and center of gravity charts provided herein, proper loading of your airplane may be calculated.

The weight, arm and moment of your airplane as it left the factory may be found on the Weight and Balance and Installed Equipment Data sheet. (If alterations have been made to the airplane, refer to the airplane weight and balance records for the weight, arm and moment.)

The airplane weight and the moment divided by 1000 should be entered in the column titled YOUR AIRPLANE on the Sample Loading Problem. Use the Loading Arrangements and Loading Graph to determine the weight and moment of other items being loaded, and enter these on the Sample Problem. Complete the Sample Problem to determine the total weight and moment, then plot these values on the Center of Gravity Moment Envelope to confirm that the airplane CG can be computed from the total weight and moment, and the CG checked within limits on the Center of Gravity Limits chart.

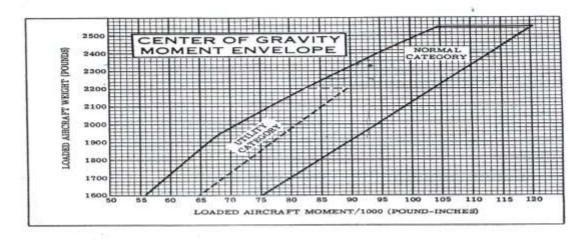
Datum Lower Front Face OF Firewall

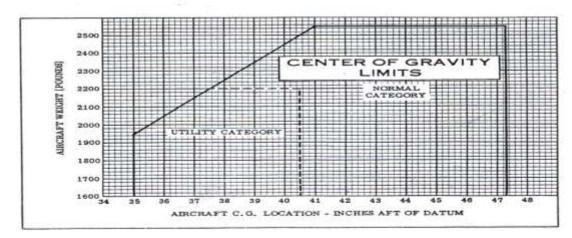
5 (C-04/25) (C-05)	SAMPLE	AIRPLANE	YOUR AL	RPLANE
SAMPLE LOADING PROBLEM	Westports (1986-2	Marrierii IIII	(Mar.)	May - see
Beaut Errophy Weights (Use the claim pertaining to stour straining as it is presently appropriet. Institution organisms that and half will	1682	541.7		-
Charles First (At 6 Line/Cal.) Electric Taris (40 Cal. Magister) Electric Taris (40 Cal. Magister)	340	11.8		-
What and Front Passenger (Station 34 to 46)	340	10.0	-	-
TOTAL WEIGHT AND MEINENT	2172	90.8		
	LOADING PROBLEM (UTLITY CATEDORY) Beec Empty Weeply 10th the date pertaining to your designed as it is presented as a presented as your designed. Installed to your beat for the first Land Land Land Land Land Land Land Land	LOADING PROBLEM (UTLITY CATEDORY) Beec Empty Weight 10s the date participate to store designed to the date participate to store designed to the date participate to store designed to the date participate to the date to th	LOADING PROBLEM (1982) Beec Emery Weight Claim the date pertaining to wave designed on 1 to 1	SAMPLE LOADING PROBLEM (IVELTY CATEGORY) Basic Errory Weight Dise the date personning to compare that and half will Under Front Park (An & Can-Quid) Backer of Yer's 160 East. Magninum; Backer of Yer's 160 Eas

400	LOADING	1			2	4
350		2/				
300		1.	O GAL M			
200		7/A				
300				September 1		
3 100			2.2			
100	1112					
20						
	September 1	10	15	30	25	30
	LOA representing adju-	D MOMEN	T/1000 (7	NOUND-D	CHES	

LOADING AF	RRANGEN	
	STATIOH	IC.G. ARMI
* Plant or passanger center of gravity on advantable make positioned for	-37	5 :22
prorage occupants. Humbers in payments are included to occupant ordinate are gravity range. Acm recognition in the center of the	73 (1141 71	73 - (11.1
areas shorth.	108 2014	- 10x -
MOTE: The pear culos with improvements station 100; we let imaging will improvements station (40) one for time data will improve the conformation of the pear to the conformation of the c	142 STAND	142

_		SAMPLE	AIRPLANE	YOUR A	MPLANE
	LOADING PROBLEM	Weight (10m.)	tinire. /10000	755	/1000
	Specie Simplify Weights 11/16 this ideals partiallying the prince acquisition as it is presently billyinguid. Triplicities characters hast and SMI self.	11660	m1		-
*	Usania Fuel (An & Linc/theid Standard Turks 146 Ost, Maximum)	294	14.1		-
2	Many and Frank Passarope (Stations 34 to 48)	340	12.8		-
-	Am Parison	120	12.4		-
	Suppose Ares 1 or Features on Other's Seet Chatter All to 100, 200 Line, Man. 1	154	14.8		1
	* Response Aries 2 (Stations 108 to 143, 50 Link Man.)		-		1
	TOTAL WEIGHT AND MOMENT	2000	110.4		





CESSNA MODEL R172K SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

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CESSNA MODEL RITZK

SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

INTRODUCTION

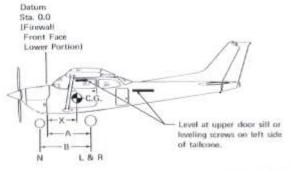
This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided. A comprehensive list of all Cessna equipment available for this airplane is included at the back of this section.

It should be noted that specific information regarding the weight. arm, moment and installed equipment list for this airplane can only be found in the appropriate weight and balance records carried in the airplane.

AIRPLANE WEIGHING PROCEDURES

- (1) Preparation:
 - Inflate tires to recommended operating pressures.
 - b. Remove the fuel tank sump quick-drain fittings and fuel selector valve drain plug to drain all fuel.
 - c. Remove oil sump drain plug to drain all oil.
 - d. Move sliding seats to the most forward position.
 - e. Raise flaps to the fully retracted position.
 - Place all control surfaces in neutral position.
- (2) Leveling:
 - a. Place scales under each wheel (minimum scale capacity, 500 pounds nose, 1000 pounds each main).
 - b. Deflate the nose tire and/or lower or raise the nose strut to properly center the bubble in the level (see Figure 6-1).
- (3) Weighing:
- a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.
- (4) Measuring:
- a. Obtain measurement A by measuring horizontally (along the airplane center line) from a line stretched between the main wheel centers to a plumb bob dropped from the firewall.
 - Obtain measurement B by measuring horizontally and parallel to the airplane center line, from center of nose wheel axle, left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and average the measurements.

CESSNA MODEL R172K



Scale Position	Scale Reading	Tare	Symbol	Net Wright
Left Wheel			L	
Right Wheel			В	
None Wheel				
Sum of Net Weights (As V	Veighed)		w	

$$X = ABM = (A) - (N) \times (B)$$
; $X = \{$ $\} = \{$ $\} \times \{$ $\} = \{$ $\} \setminus N$.

item	Weight (Lbs.)	X C.G. Arm (In.)	Moment/1000 - (i.bsin.)
Airplane Weight (From Item 5, page 6-6)			
Add Oil: No Oil Filter (8 Qts at 7.5 Lbs/Gal)		-21.5	
With Oil Filter (9 Ots at 7.5 Lbs/Gal)		-21.5	
Add Unusable Fuel: Std. Tanks (3 Gal at 6 Lbs/Gal)	18	46.0	.8
Equipment Changes			
Airplane Basic Empty Weight			

Figure 6-1. Sample Airplane Weighing

CESSNA MODEL R172K SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

			SAMPLE WEIGHT AND BALANCE RECORD [Continuous History of Changes in Structure of Equipment Affecting Weight and Balence]	AND ucture of	BAL	ANC	Meght at	Belging CO	20		
ALRIP	AMEN	AIRPLANE MODEL		35.	SERIAL NUMBER	MBER			PAG	PAGE NUMBER	
	100	1000				WEIGHT	WEIGHT CHANGE			RUNNIN	G BASIC
1		TEM NO.	DESCRIPTION		ADDED (+)	-	8.	REMOVED I-	-	EMPTYV	EMPTY WEIGHT
<u> </u>	<u>a</u>	8	OF ANTICLE OR MODIFICATION	Wt. 36.1	Para Direct	Moment 7000	₩ 180	₽¥	Moment /1000	Wt. (Ib.)	Moment /1000
											Ī
					7						
		L									

Figure 6-2. Sample Weight and Balance Record

CESSNA MODEL R172K

- (5) Using weights from (3) and measurements from (4) the airplane weight and C.G. can be determined.
- (6) Basic Empty Weight may be determined by completing Figure 6-1.

WEIGHT AND BALANCE

The following information will enable you to operate your Cessna within the prescribed weight and center of gravity limitations. To figure weight and balance, use the Sample Problem, Loading Graph, and Center of Gravity Moment Envelope as follows:

Take the basic empty weight and moment from appropriate weight and balance records carried in your airplane, and enter them in the column title YOUR AIRPLANE on the Sample Loading Problem.

NOTE

In addition to the basic empty weight and moment noted on these records, the c.g. arm (fuselage station) is also shown, but need not be used on the Sample Loading Problem. The moment which is shown must be divided by 1000 and this value used as the moment/1000 on the loading problem.

Use the Loading Graph to determine the moment/1000 for each additional item to be carried; then list these on the loading problem.

NOTE

Loading Graph information for the pilot, passengers, and baggage is based on seats positioned for average occupants and baggage loaded in the center of the baggage areas as shown on the Loading Arrangements diagram. For loadings which may differ from these, the Sample Loading Problem lists fuselage stations for these items to indicate their forward and aft c.g. range limitations (seat travel and baggage area limitation). Additional moment calculations, based on the actual weight and c.g. arm (fuselage station) of the item being loaded, must be made if the position of the load is different from that shown on the Loading Graph. CESSNA MODEL R172K SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

Total the weights and moments/1000 and plot these values on the Center of Gravity Moment Envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

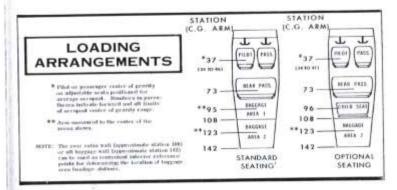


Figure 6-3. Loading Arrangements

MODEL R172K

CESSNA MODEL R172K

SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

AFT BAGGAGE AREA AFT BAGGAGE AREA 10 43" 33" 10 40" 48 40" 48 40 40" 4

DOOR	OPENING	DIMENS	IONS

	WIDTH (TOP)	(BOTTOM)	(FRONT)	(REAR)
CABIN DOOR	52"	37"	40"	417
BAGGAGE DOOR	15%"	15%**	2.2"	21"

* LWE WINDOW LINE * CABIN FLOOR

CABIN WIDTH MEASUREMENTS

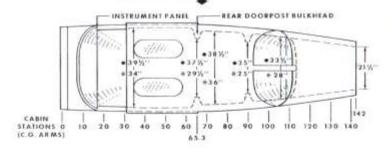
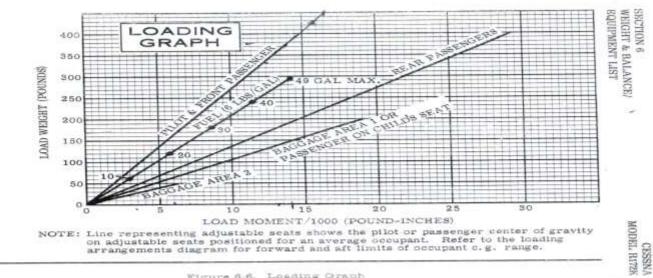


Figure 6-4. Internal Cabin Dimensions

		SAMPLE	AIRPLANE	YOUR A	YOUR AIRPLANE
	SAMPLE LOADING PROBLEM	Weight [Bs]	Moment (lbins. /1000)	Weight (lbs.)	Mament (B Ins. /1000)
1,000	Basic Empty Weight (Use the data pertaining to your sirplane as it is presently equipped. Includes unuable fuel and full oil)	24 25	198.7	13	Ţ,
rv.	Usable Fuel (At 6 Lbs./Gsl.) Standard Tanks (49 Gsl. Maximum)	284	14:1		
ró	Pilot and Front Passenger (Station 34 to 46)	340	12.8		
4	Rear Passengers	170	12.4		
iri	*Baggage Area T or Pasenger on Child's Sest (Station 82 to 108, 200 Lbs. Max.)	翠	14.6		
ιci	* Baggage Area 2 (Station 108 to 142, 50 Lbs. Max.)				
150	TOTAL WEIGHT AND MOMENT	2550	110.4		
05	Locate this point (2550 at 110.4) on the Center of Gravity Moment Envelope, and since this point 1885 within the envelope, the loading is acceptable.	ment Envelope ptable.			
	NOTE				
	* The maximum allowable combined weight capacity for bagage areas 1 and 2 is 200 lbs.	areas 1 and 2	s 200 lbs.		



CESSNA MODEL R172K

Figure 8 6. Loading Graph

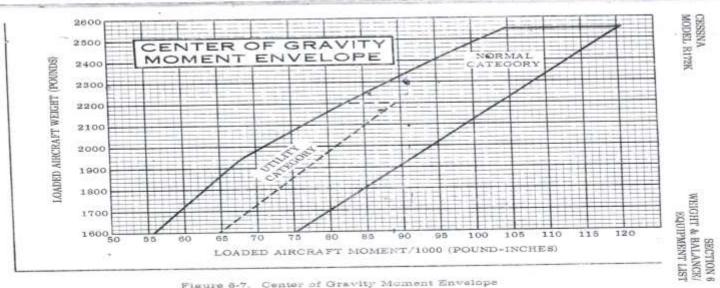


Figure 5-7. Center of Gravity Moment Envelope

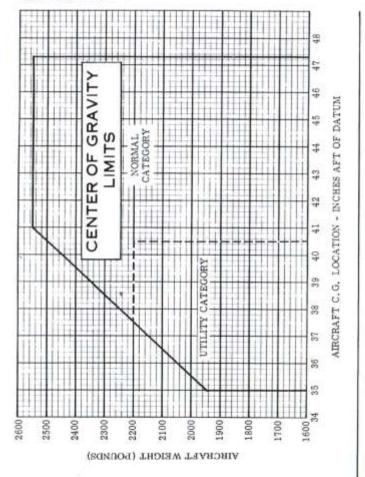
MODEL R172K

CHECKETER A



Gravity

10 Center



CESSNA MODEL R172K

SECTION 6 WEIGHT & BALANCE/ EQUIPMENT LIST

EQUIPMENT LIST

The following equipment list is a comprehensive list of all Cessna equipment available for this airplane. A separate equipment list of items installed in your specific airplane is provided in your aircraft file. The following list and the specific list for your airplane have a similar order of listing.

This equipment list provides the following information:

An item number gives the identification number for the item. Each number is prefixed with a letter which identifies the descriptive grouping (example: A. Powerplant & Accessories) under which it is listed. Suffix letters identify

the equipment as a required item, a standard item or an optional item. Suffix letters are as follows:

R = required items of equipment for FAA certification

-S = standard equipment items

O = optional equipment items replacing required or standard items

 A = optional equipment items which are in addition to required or standard items

A reference drawing column provides the drawing number for the item.

NOTE

If additional equipment is to be installed, it must be done in accordance with the reference drawing, accessory kit instructions, or a separate FAA approval.

Columns showing weight (in pounds) and arm (in inches) provide the weight and center of gravity location for the equipment.

NOTE

Unless otherwise indicated, true values (not net change values) for the weight and arm are shown. Positive arms are distances aft of the airplane datum; negative arms are distances forward of the datum.

NOTE

Asterisks (*) after the item weight and arm indicate complete assembly installations. Some major components of the assembly are listed on the lines immediately following. The summation of these major components does not necessarily equal the complete assembly installation.

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TEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS	MODEL
01-R 004-R 007-A	LIGHT INSTALLATION, CONTAGE	071-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	AND O ODNOONSO4	0.40499 0 0 NOBARORA SHANES N 1 4 NOBARORA 11 (NAN S 6 84004441	MODEL B172K
	D. INSTRUMENTS INDICATOR. TREE PER SPEED INDICATOR ATTURE ATTURE SPEED INDICATOR ATTURE ATTURE SPEED INDICATOR ATTURE ATTURE SPEED INDICATOR ATTURE ATTURE SPEED INDICATOR ATTURE SPEED INDICATOR ATTURE SPEED ALTIMETER ATTURE SPEED ALTIMET	Cee1364-0104 0501377 0501377-0102 Cee1071-0102 Cee1025-0102 0501015 0501059 C744001-0101	1.0	. 14-4*	1 4

ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS
E15-8	BELTUCASE MARLY E SST A SSEL TO TALLET TON.	5-2275-103 5-2275-201 0501046-1	1.0	37.0 37.0 82.0
E 37-5	RATE OF THE PARTY	\$ - 22 75 - 3 3 \$ - 22 75 - 8 3	1 2 2 2 2 2	37:0
THE THE PROPERTY OF THE PROPER	CUP HOLDER, RETRACTABLE (SET OF TWO) HEADREST, FRONT (SET OF TWO) HEADREST, REAR (SET OF TWO)	CEST-10000 0551-180000 0750-180000 0750-180000 180000-18000 180000-18000 180000-18000 180000-18000	10000000000000000000000000000000000000	00000000000 0440-40-9
E57-0 E65-R E71-A E75-A	TINTED GLASS (SET OF 2) TINTED GLASS (ALL AROUND) (NET CHANGE) BAGGAGE TIE DOWN NET RINGS, CARGO TIE DOWN STRETCHER INSTALLATION - BOXED (USE ACTUAL CONTROLS ON ARMOCHANGE S WHEEL PEDALS	2015009-6 0500042 0700164	1:0	95.0
E85-A	CONTROLS DUAL (CO-PILOT'S WHEEL . PEDALS	0504005	4.9*	12.4
E87-5	CONTROL WHEEL STITH PROTECTIVE PADDING	8713328	1:1 3:3	26.0
	F. PLACARDS & WARNING			1
F01-8 F01-0-1	PLACARD: OPERATIONAL LIMITATIONS VER DAY-	8585853	8:8	==
F01-0-2	PLACARD OPERATIONAL LIMITATIONS IFR DAY-	0505053	0.0	
F04-R F10-S F10-0-1	PILOTS CHECK LIST (STANDARD - 0-MA + 320 WED)	020000000000000000000000000000000000000	8:5	28.5

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SECTION 6
WEIGHT & BALANCE/
EQUIPMENT LIST

CESSNA MODEL RITEK

CESSNA MODEL R172K

SECTION 6
WEIGHT & BALANCE/
EQUIPMENT LIST

q.

ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS
F10-0-2	PILOTS CHECK LIST (3004 NAV-0-MATIC) G. AUXILIARY EQUIPMENT	9595066	0.0	
G C C C C C C C C C C C C C C C C C C C	HOOK, TOW (INSTALLED) RINGS: INFOLMED ISTINGERNAL ON (SET OF 10) RINGS: INFOLMED INFOLMED ISTINGER INFOLMED ISTINGER INFOLMED ISTINGER INFOLMED IN	05 04 1 1 5 0 0 5 0 0 1 1 1 1 1 1 1 1 1 1 1 1	90-604-1100 B-4000	OO-IONOOP-SE SISSOOO
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ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS
н10-а	PANDER AS DE DE LES RECEPTOR DE LE CONTROL DE LA CONTROL DE LE CONTROL DE LA CONTROL DE LE CONTROL DE LE CONTROL DE LE CONTROL DE LE CONTROL DE LA CONTROL D	12000988-10000 120001564-001001 12000150001-00101	23.24	000484 000044 11
	ANTERNAL STALLATION. 351 INCHES LONG CABLERS INSTALLATION MICROPHONE INSTALLATION NOISE FILTER SPEAKER INSTALLATION	05 70 40 05 - 6 16 70 70 70 70 70 70 70 70 70 70 70 70 70 7	CADOOT	144.4 41.0 14.0 17.0 -27.0 -37.0
H11-A-1	PANTRONICS PTIO A HE TRANSCEDYER, AND UNIT	20010000000000000000000000000000000000	**************************************	112.5
S-A-11H	SUNANTENNA 1987AL ATIONSE 354 , N. 2 NO UNG T ANTENNA LOAD BOX TEAUTE POWER SUPPLY (PAMEL THOUNTED)	0570400-616 0591015-2 999680	22.5+	114.0
H11-A-3	PANTRONSCEIVER (PANEL MOUNTED) HE PONEL GOPPLY (REMOTE) CABLE ASSEMBLIE (REMOTE) ANTENNA INSTALLATION, 351 IN- LONG	05/10400-115 05/10400-115 05/10400-115 05/10400-115 05/10400-115 05/10400-115	NOC44 GAL	25004454 11444
-11-A-4	SUNATION INSTLAR CONTENTS SUNATIONAL LOAD BOX MOTES. BRD UNIT	3970158-1 3910158-5	200 4.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	82.8* 112.0 114.0
+13-A	CESSAGE TOOR HARKER BEACON 351 IN- LONG	0570400-616	0.3*	34-5+
116-A-1	CESTRANSCIVER NERVEN PRO	2770681-17	2:9+	136-0

WEIGHT & BALANCE/ EQUIPMENT LIST

CESSNA MODEL R172K

SECTION 6
WEIGHT & BALANCE/
EQUIPMENT LIST

CESSNA MODEL R172K

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ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS
H16-A-2	CESSANTENNA (AT 1884)	31530-0001 3110128-21 21470-1115	0.34	128-9-
H19-A	CESSNAND VAR TORANSCEIVER, 1ST UNIT REANACEIVEING ANTENNA CASLE (CO-AX) COMMUNICATIONS ANTENNA CASLE (CO-AX) COMMUNICATIONS SPIKE ANTENNA INSTITUTE MICROPHONE INSTALLATION (MAND-HELD) AUDIO SEITCHING CONTROL SPEAKER INSTALLATION	1144 # 4 01-07 11 1 1 1 1 1 1 1 1	DENDOM-HODOH-HODOO	Deer Deer State Control of the Contr
H20-A	CESSNA 300 VHF TRANSCEIVER, END UNIT TRANSCEIVER (RT-5244) COMMUNICATION ANTENNA CABLE (CO-AX)	70155-8 3970155-8 3970151-14 3960113-2	7:3-	27.78
mee-a-1	RECEIVER TRANSMITTER (RT-308C) VOR/LOC INDICATOR (IN-514B) NOTE1ST UNIT INSTALLATION COMPONENTS	25318=1333	8:2	11:3
H22-A-2	C E S SERVE COLLEGE AND COLLEG	4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	-00000000+-0000+0000+0000+0000+0000+0000+0000+	247-607-400648 247-607-4004-4 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
100000000000000000000000000000000000000	VOR LOCAL INDICATOR TRANSMITTER (RT-324T)	43 340-1123	8:8	17:3
H22-A-3	CESSNA 360 NAVYCOM. 720 CH. FIRST UNIT VOCATIL VOCATION TRANSMITTER (BI-320T) VOCATION TRANSMITTER (BI-320T)	3910152-40 43348-1366	8:7	31.2* 11.5 16.3

ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WT LBS	ARM INS
H25-A-1	C E S S NET DE LEAT LA	3910151-8 45358-1113	9.5*	14:5
H25-A-2	COMMUNICATION ANTENNA CABLE-R M SIDE FOR COMMUNICATION ANTENNA (SIGNAL SIDE TITES) COMMUNICATION ANTENNA (TEMS-INCL MOUNT - CESSNA 300 NAV/COM - 720 CH - SECOND UNIT	3950122-2 3960111-3 3960113-2 3910150-21	0:4 10:5-	27.8 7.0 62.7 10.7
	WITH VORYLOG RECEIVER THE ANSMITTER (RT-328T) VORYLOG, INDICATOR (IN-5149)	43318-1188	5:2	11:3
H28-A-1	EMERGENCY LOCATER TRANSMITTER)	0401008-2209 C5889510-0203 C40108-5	2 - 2 - 2 - 1 - 1 - 8 -	116.0
H28-A-2	EMERGENCY LOCATOR TRANSMITTER (USED IN TRANSMITTER	6589518-8217	3:5	115:3
H31-A-1	NAVAN-HATIC ZOOA CONTROLLE E SAMDUNT (CA-2958) (G-300A) FURN CODROINATON (NET CHNG) (G-300A) RELAY INSTALLATION HING INSTALLATION	3910162-9 39300-0014 3970128-3 05230-4	11.7* 0.4 0.4 0.6	510000 10000 10000
H31-A-2	NAV-D-MATY NO A LARAGED FOR THE CHAST CHAS	10 4 9 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	104-00408-408-408-510	400-DOMOGNAVIONERIO UN-MINARIO RECUNACIONE HIGHMAN GORMANIA GORMANIA Laci
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CESSNA MODEL R172K

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SECTION 6
WEIGHT & BALANCE/
EQUIPMENT LIST

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SECTION 7 AIRPLANE & SYSTEMS DESCRIPTIONS

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Wing Flap System	10		1																*				
Landing Gear Syst	em											4								-			
Baggage Comparts	110	nt		-		. +				-			7			2		U.	- 27	7	-	-	
Seats	77	***	7							-						*		18		*			- 1
Seat Helts and Sho	mi	der	. 1	In.	m	-				-8						*							
Seat Belts				***	***	-				- 2			- 51			-	-	+		- 0			
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Integrated Seat	B	olt	15	in.	***	14	-	11		*		+		714									- 7
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Fuel Injection 8	Sy	STO.	m				-		-	\mathcal{C}^{2}		3.1		27	7	-0	1:	+:	-		-	-	.7
Cooling System ropeller		*:		4						4	+					-	8	+	-				. 7
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uel System	1	4		4			4		9.		+	+	+		-			4					.7
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SECTION 7			
AIRPLANE	Re	SYSTEMS	DESCRIPTION

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Altimeter															7.5
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Static Dischargers									4						7-40

CESSNA MODEL R172K SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS

INTRODUCTION

This section provides description and operation of the airplane and its systems. Some equipment described herein is optional and may not be installed in the airplane. Refer to Section 9, Supplements, for details of other optional systems and equipment.

AIRFRAME

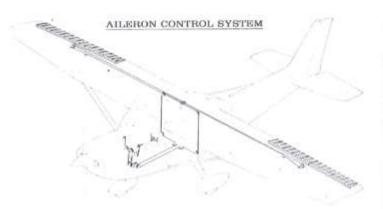
The construction of the fuselage is a conventional formed sheet metal bulkhead, stringer, and skin design referred to as semimonocoque. Major items of structure are the front and rear carrythrough spars to which the wings are attached, a bulkhead and forgings for main landing gear attachment at the base of the rear deorposts, and a bulkhead with attaching plates at the base of the forward doorposts for the lower attachment of the wing struts. Four engine mount stringers are also attached to the forward doorposts and extend forward to the firewall.

The externally braced wings, containing the fuel tanks, are constructed of a front and rear spar with formed sheet metal ribs, doublers, and stringers. The entire structure is covered with aluminum skin. The front spars are equipped with wing-to-fuselage and wing-to-strut attach fittings. The aft spars are equipped with wing-to-fuselage attach fittings, and are partial-span spars. Conventional hinged ailerons and single-slotted flaps are attached to the trailing edge of the wings. The ailerons are constructed of a forward spar containing a balance weight, formed sheet metal ribs and "V" type corrugated aluminum skin joined together at the trailing edge. The flaps are constructed basically the same as the ailerons, with the exception of the balance weight and the addition of a formed sheet metal leading edge section.

The empennage (tail assembly) consists of a conventional vertical stabilizer, rudder, horizontal stabilizer, and elevator. The vertical stabilizer consists of a spar, formed sheet metal ribs and reinforcements, a wrap-around skin panel, formed leading edge skin, and a dorsal. The rudder is constructed of a formed leading edge skin containing hinge halves, a center wrap-around skin panel, ribs, an aft wrap-around skin panel which is joined at the trailing edge of the rudder by a filler strip, and a ground adjustable trim tab at the base of the trailing edge. The top of the rudder incorporates a leading edge extension which contains a balance weight. The horizontal stabilizer is constructed of a forward and aft spar, ribs and stiffeners, center, left, and right wrap-around skin panels, and formed leading edge skins. The horizontal stabilizer also contains the elevator trim tab actuator. Construction of the elevator

SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS

CESSNA MODEL R172K CESSNA MODEL R172K SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS



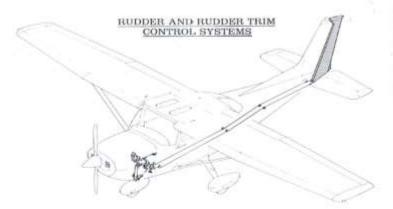
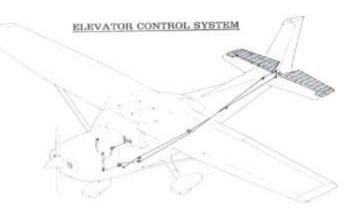


Figure 7-1. Flight Control and Trim Systems (Sheet 1 of 2)



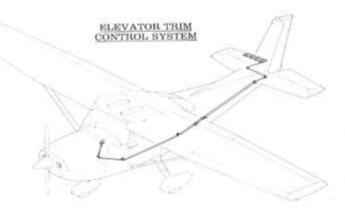


Figure 7-1. Flight Control and Trim Systems (Sheet 2 of 2)

SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS

Cylinder Head Temperature Gage and Ammeter Oil Temperature and Oil

Pressure Gage Left Tank and Right Tank Fuel Quantity Indicators Suction Gage Over-Voltage Warning Light

5. Clock

6. Manifold Pressure/Fuel Flow Indicator Flight Instrument Group

90. Airplane Registration Number

Tachometer

Tachometer
Encoding Altimeter
ADF Bearing Indicator
Omni Course Indicators
Magnetic Compass
Marker Beacon Indicator
Lights and Switches
Rear View Mirror
Audio Control Panel
Radios 11.

13. 14.

15.

16. 17

18,

19. 20.

21.

Autopilot Control Unit Transponder Secondary Altimeter Additional Instrument Space 22.

23. ADF Radio

Flight Hour Recorder

Additional Radio Space 25. 26. Map Compartment

32

31

33

Cabin Heat and Air Control Knobs

Cigar Lighter Cigar Lighter
Wing Flap Switch and
Position Indicator
Mixture Control Knob
Propeller Control Knob
Throttle (With Friction Lock)
Static Pressure Alternate 29. 30.

31. 32.

33. Source Valve

34 Instrument and Radio Dial Light Rheostats

Microphone

36. Cowl Flap Control Lever Rudder Trim Control Lever 37.

38. Fuel Selector Valve Handle Elevator Trim Control Wheel 39.

Electrical Switches

Circuit Breakers Parking Brake Handle Auxiliary Fuel Pump Switch

(Above Ignition Switch) Ignition Switch Master Switch

45. Auxiliary Mike Jack Primer Phone Jack 46.

47.

18 19

0,000

20 21

22

30 29 28

23

48.

Fuel Shutoff Control Knob 49.

Instrument Panel (Sheet 2 of

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AUDITANK & SYSTEMS DESCRIPTIONS

CESSNA MODEL R172K

consists of formed leading edge skins, a forward spar, att channel, ribs torque tube and bellcrank, left upper and lower "V" type corrugated skins, and right upper and lower "V" type corrugated skins incorporating a trailing edge cut-out for the trim tab. The elevator trim tab consists of a spar, rib, and upper and lower "V" type corrugated skins. The leading edge of both left and right elevator tips incorporate extensions which contain balance weights.

FLIGHT CONTROLS

The airplane's flight control system consists of conventional aileron, rudder, and elevator control surfaces (see figure 7-1). The control surfaces are manually operated through mechanical linkage using a control wheel for the ailerons and elevator, and rudder/brake pedals for the rudder.

TRIM SYSTEMS

Manually-operated rudder and elevator trim systems are provided. Rudder trimming is accomplished through a bungee connected to the rudder control system and a trim lever, mounted on the control pedestal. Rudder trimming is accomplished by lifting the trim lever up to clear a detent, then moving it either left or right to the desired trim position. Moving the trim lever to the right will trim the airplane nose-right; conversely, moving the lever to the left will trim the airplane nose-left. Elevator trimming is accomplished through the elevator trim tab by utilizing the vertically mounted trim control wheel. Forward rotation of the trim wheel will trim nose-down; conversely, aft rotation will trim nose-up.

INSTRUMENT PANEL

The instrument panel (see figure 7-2) is designed around the basic T" configuration. The gyros are located immediately in front of the pilot, and arranged vertically over the control column. The airspeed indicator and altimeter are located to the left and right of the gyros respectively. The remainder of the flight instruments are located around the basic "T". Engine instruments and fuel quantity indicators are near the left edge and lower portion of the instrument panel. Avious equipment is stacked approximately on the centerline of the panel, with the right side of the panel containing space for additional instruments and avionics equipment. A subpanel under the primary instrument panel contains the fuel shutoff valve knob, primer, master switch, uxiliary fuel pump and ignition switches, circuit breakers, and electri-

CESSNA MODEL R172K SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS

cal switches on the left side, with the engine controls, light intensity controls, and alternate static air control in the center, over the control pedestal. The right side of the subpanel contains the wing flap switch lever and position indicator, cabin heat and air controls, cigar lighter, and map compartment. A pedestal, installed below the subpanel, contains the elevator trim control wheel and indicator, microphone bracket, cowl flap control lever, and rudder trim control lever. A fuel selector valve handle is located at the base of the pedestal. A parking brake handle is mounted below the subpanel in front of the pilot.

For details concerning the instruments, switches, circuit breakers, and controls on this panel, refer in this section to the description of the systems to which these items are related.

GROUND CONTROL

Effective ground control while taxiing is accomplished through nose wheel steering by using the rudder pedals; left rudder pedal to steer left and right rudder pedal to steer right. When a rudder pedal is depressed, a spring-loaded steering bungee (which is connected to the nose gear and to the rudder bars) will turn the nose wheel through an arc of approximately 10° each side of center. By applying either left or right brake, the degree of turn may be increased up to 30° each side of center.

Moving the airplane by hand is most easily accomplished by attaching a tow bar to the nose gear strut. If a tow bar is not available, or pushing is required, use the wing struts as push points. Do not use the vertical or horizontal surfaces to move the airplane. If the airplane is to be towed by vehicle, never turn the nose wheel more than 30° either side of center or structural damage to the nose gear could result.

The minimum turning radius of the airplane, using differential braking and nose wheel steering during taxi, is approximately 27 feet 5 ½ inches. To obtain a minimum radius turn during ground handling, the airplane may be rotated around either main landing gear by pressing down on a tailcone bulkhead just forward of the horizontal stabilizer to raise the nose wheel off the ground.

WING FLAP SYSTEM

The wing flaps are of the single-slot type (see figure 7-3), and are extended or retracted by positioning the wing flap switch lever on the instrument panel to the desired flap deflection position. The switch

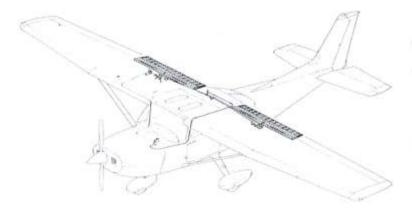


Figure 7-3. Wing Flap System

lever is moved up or down in a slotted panel that provides mechanical stops at the 10° and 20° positions. For flap settings greater than 10°, move the switch lever to the right to clear the stop and position it as desired. A scale and pointer on the left side of the switch lever indicates flap travel in degrees. The wing flap system circuit is protected by a 15 ampere circuit breaker, labeled FLAP, on the left side of the instrument panel.

LANDING GEAR SYSTEM

The landing gear is of the tricycle type with a steerable nose wheel, two main wheels, and wheel fairings. Shock absorption is provided by the tubular spring-steel main landing gear struts and the air/oil nose gear shock strut. Each main gear wheel is equipped with a hydraulically actuated disc-type brake on the inboard side of each wheel, and an aerodynamic fairing over each brake.

BAGGAGE COMPARTMENT

The baggage compartment consists of two areas, one extending from the back of the rear passenger seats to the aft cabin bulkhead, and CESSNA MODEL R172K SECTION 7
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an additional area aft of the bulkhead. Access to both baggage areas is gained through a lockable baggage door on the left side of the airplane, or from within the airplane cabin. A baggage net with eight tie-down straps is provided for securing baggage and is attached by tying the straps to tie-down rings provided in the airplane. When loading the airplane, children should not be placed or permitted in the baggage compartment, unless a child's seat is installed, and any material that might be haxardous to the airplane or occupants should not be placed anywhere in the airplane. For baggage area and door dimensions, refer to section 6.

SEATS

The seating arrangement consists of two separate adjustable seats for the pilot and front passenger, a split-backed fixed seat in the rear, and a child's seat (if installed) aft of the rear seats. The pilot's and front passenger's seats are available in two different designs: four-way and six-way adjustable.

Four-way seats may be moved forward or aft, and the seat back angle changed. To position either seat, lift the tubular handle under the center of the seat, slide the seat into position, release the handle, and check that the seat is locked in place. The seat back is springloaded to the vertical position. To adjust its position, lift the lever under the right front corner of the seat, reposition the back, release the lever, and check that the back is locked in place. The seat backs will also fold full forward.

The six-way seats may be moved forward or aft, adjusted for height, and the seat back angle is infinitely adjustable. Position the seat by lifting the tubular handle, under the center of the seat bottom, and slide the seat into position; then release the lever and check that the seat is locked in place. Raise or lower the seat by rotating a large crank under the right corner of the left seat and the left corner of the right seat. Seat back angle is adjustable by rotating a small crank under the left corner of the left seat and the right corner of the right seat. The seat bottom angle will change as the seat back angle changes, providing proper support. The seat backs will also fold full forward.

The rear passenger's seats consist of a fixed one-piece seat bottom with individually adjustable seat backs. Two adjustment levers, under the left and right corners of the seat bottom, are used to adjust the angle of the respective seat backs. To adjust either seat back, lift the adjustment lever and reposition the back. The seat backs are springloaded to the vertical position.

Headrests are available for any of the seat configurations except the child's seat. To adjust the headrest, apply enough pressure to it to raise or lower it to the desired level. The headrest may be removed at any time by raising it until it disengages from the top of the seat back.

SEAT BELTS AND SHOULDER HARNESSES

All seat positions are equipped with seat belts (see figure 7-4). The pilot's and front passenger's seats are also equipped with separate shoulder harnesses; shoulder harnesses are available for the rear seat positions. Integrated seat belt/shoulder harnesses with inertia recls can be furnished for the pilot's and front passenger's seat positions, if desired.

SEAT BELTS

The seat belts at all seat positions are attached to fittings on the floorboard. The buckle half of the seat belt is inboard of each seat and has a fixed length; the link half of the belt is outboard and is the adjustable part of the belt.

To use the seat belts for the front seats, position the seat as desired, and then lengthen the adjustable half of the belt as needed. Insert and lock the belt link into the buckle. Tighten the belt to a snug fit by pulling the free end of the belt. Seat belts for the rear seats, and the child's seat (if installed), are used in the same manner as the belts for the front seats. To release the seat belts, grasp the top of the buckle opposite the link and pull upward.

SHOULDER HARNESSES

Each front seat shoulder harness is attached to a rear doorpost above the window line and is stowed behind a stowage sheath above the cabin door. To stow the harness, fold it and place it behind the sheath. When rear seat shoulder harnesses are furnished, they are attached adjacent to the lower corners of the rear window. Each rear seat harness is stowed behind a stowage sheath above an aft side window. No harness is available for the child's seat.

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STANDARD SHOULDER HARNESS

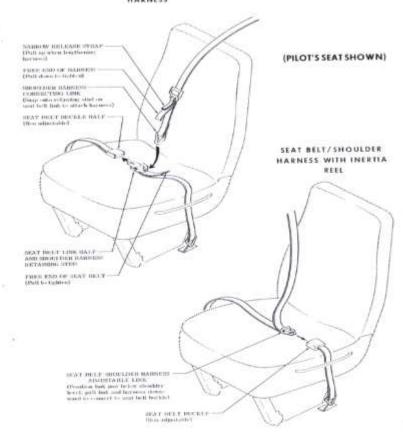


Figure 7-4. Seat Belts and Shoulder Harnesses

To use a front or rear seat shoulder harness, fasten and adjust the seat belt first. Lengthen the harness as required by pulling on the connecting link on the end of the harness and the narrow release strap. Snap the connecting link firmly onto the retaining stud on the seat belt link half. Then adjust to length. A properly adjusted harness will permit the occupant to lean forward enough to set completely erect, but prevent excessive forward movement and contact with objects during sudden deceleration. Also, the pilot will want the freedom to reach all controls easily.

Removing the shoulder harness is accomplished by pulling upward on the narrow release strap, and removing the harness connecting link from the stud on the seat belt link. In an emergency, the shoulder harness may be removed by releasing the seat belt first and allowing the harness, still attached to the link half of the seat belt, to drop to the side of the seat.

INTEGRATED SEAT BELT/SHOULDER HARNESSES WITH INERTIA REELS

Integrated seat belt/shoulder harnesses with inertia reels are available for the pilot and front seat passenger. The seat belt/shoulder harnesses extend from inertia reels located in the cabin ceiling to attach points inboard of the two front seats. A separate seat belt half and buckle is located outboard of the seats. Inertia reels allow complete freedom of body movement. However, in the event of a sudden deceleration, they will lock automatically to protect the occupants.

NOTE

The inertia reels are located for maximum shoulder harness comfort and safe retention of the seat occupants. This location requires that the shoulder harnesses cross near the top so that the right hand inertia reel serves the pilot and the left hand reel serves the front passenger. When fastening the harness, check to ensure the proper harness is being used.

To use the seat belt/shoulder harness, position the adjustable metal link on the harness just below shoulder level, pull the link and harness downward, and insert the link into the seat belt buckle. Adjust belt tension across the lap by pulling upward on the shoulder harness. Removal is accomplished by releasing the seat belt buckle, which will allow the inertia reel to pull the harness inboard of the seat.

ENTRANCE DOORS AND CABIN WINDOWS

Entry to, and exit from the airplane is accomplished through either of two entry doors, one on each side of the cabin at the front seat positions (refer to Section 6 for cabin and cabin door dimensions). The doors incorporate a recessed exterior door handle, a conventional interior door handle, a key-operated door lock (left door only), a door stop mechanism, and an openable window in the left door. An openable right door window is also available.

To open the doors from outside the airplane, utilize the recessed door handle near the aft edge of either door by grasping the forward edge of the handle and pulling outboard. To close or open the doors from inside the airplane, use the combination door handle and arm rest. The inside door handle has three positions and a placard at its base which reads OPEN, CLOSE, and LOCK. The handle is springloaded to the CLOSE (up) position. When the door has been pulled shut and latched, lock it by rotating the door handle forward to the LOCK position (flush with the arm rest). When the handle is rotated to the LOCK position, an over-center action will hold it in that position.

NOTE

Accidental opening of a cabin door in flight due to improper closing does not constitute a need to land the airplane. The best procedure is to set up the airplane in a trimmed condition at approximately 75 knots, momentarily shove the door outward slightly, and forcefully close and lock the door.

Exit from the airplane is accomplished by rotating the door handle from the LOCK position, past the CLOSE position, aft to the OPEN position and pushing the door open. To lock the airplane, lock the right cabin door with the inside handle, close the left cabin door, and using the ignition key, lock the door.

The left cabin door is equipped with an openable window which is held in the closed position by a lock button equipped over-center latch on the lower edge of the window frame. To open the window, depress the lock button and rotate the latch upward. The window is equipped with a spring-loaded retaining arm which will help rotate the window outward and hold it there. An openable window is also available for the right door, and functions in the same manner as the left window. If required, either window may be opened at any spend up to 163 knots. The cabin top windows (if installed), rear side windows, and rear windows are of the fixed type and cannot be opened.

CONTROL LOCKS

A control lock is provided to lock the ailerons and elevator control surfaces in a neutral position and prevent damage to these systems by wind buffeting while the airplane is parked. The lock consists of a shaped steel rod with a red metal flag attached to it. The flag is labeled CONTROL LOCK, REMOVE BEFORE STARTING ENGINE. To install the control lock, align the hole in the top of the pilot's control wheel shaft with the hole in the top of the shaft collar on the instrument panel and insert the rod into the aligned holes. Proper installation of the lock will place the red flag over the ignition switch. In areas where high or gusty winds occur, a control surface lock should be installed over the vertical stabilizer and rudder. The control lock and any other type of locking device should be removed prior to starting the engine.

ENGINE

The airplane is powered by a horizontally-opposed, six-cylinder, overhead-valve, air-cooled, fuel-injected engine with a wet sump oil system. The engine is a Continental Model IO-360-K and is rated at 195 horsepower at 2600 RPM. Major accessories include a propeller governor on the front of the engine and dual magnetos, starter, belt-driven alternator, and vacuum pump on the rear of the engine. Provisions are also made for a full flow oil filter.

ENGINE CONTROLS

Engine manifold pressure is controlled by a throttle located on the lower center portion of the instrument panel. The throttle operates in a conventional manner; in the full forward position, the throttle is open, and in the full aft position, it is closed. A friction lock, which is a round knurled disk, is located at the base of the throttle and is operated by rotating the lock clockwise to increase friction or counterclockwise to decrease it.

The mixture control, mounted above the right corner of the control pedestal, is a red knob with raised points around the circumference and is equipped with a lock button in the end of the knob. The rich position is full forward, and full aft is the idle cut-off position. For small adjustments, the control may be moved forward by rotating the knob slockwise, and aft by rotating the knob counterclockwise. For rapid or large adjustments, the knob may be moved forward or aft by depressing he lock button in the end of the control, and then positioning the control as desired.

ENGINE INSTRUMENTS

Engine operation is monitored by the following instruments; oil pressure gage, oil temperature gage, cylinder head temperature gage, tachometer, and manifold pressure/fuel flow indicator. An economy mixture (EGT) indicator is also available.

The oil pressure gage, located on the left side of the instrument panel, is operated by oil pressure. A direct pressure oil line from the engine delivers oil at engine operating pressure to the oil pressure gage. Gage markings indicate that minimum idling pressure is 10 PSI (red line), the normal operating range is 30 to 60 PSI (green arc), and maximum pressure is 100 PSI (red line).

Oil temperature is indicated by a gage adjacent to the oil pressure gage. The gage is operated by an electrical-resistance type temperature sensor which receives power from the airplane electrical system. Oil temperature limitations are the normal operating range (green arc) which is 38°C (100°F) to 116°C (240°F), and the maximum (red line) which is 116°C (240°F).

The cylinder head temperature gage, located on the left side of the instrument panel, is operated by an electrical-resistance type temperature sensor on the engine which receives power from the airplane electrical system. Temperature limitations are the normal operating range (green arc) which is 149°C (300°F) to 238°C (460°F) and the maximum (red line) which is 238°C (460°F).

The engine-driven mechanical tachometer is located near the lower portion of the instrument panel to the right of the pilot's control wheel. The instrument is calibrated in increments of 100 RPM and indicates both engine and propeller speed. An hour meter below the center of the tachometer dial records elapsed engine time in hours and tenths. Instrument markings include a normal operating range (green arc) of 2200 to 2600 RPM, and a maximum (red line) of 2600 RPM.

The manifold pressure gage is the left half of a dual-indicating instrument and is located near the lower portion of the instrument panel to the left of the pilot's control wheel. The gage is direct reading and indicates induction air manifold pressure in inches of increary. It has a normal operating range (green arc) of 15 to 25 inches of increary.

The fuel flow indicator is the right half of a dual-indicating instrument and is located to the left of the pilot's control wheel. The indicator is a fuel pressure gage calibrated to indicate the approximate gallons per hour of fuel being metered to the engine. The normal operating range (green arc) is from 4.5 to 11.5 gallons per hour, the minimum (red line) is 3 PSI, and the maximum (red line) is 17 gallons per hour (17 PSI).

An economy mixture (EGT) indicator is available for the airplane and is located on the right side of the instrument panel. A thermocouple probe in the left exhaust collector measures exhaust gas temperature and transmits it to the indicator. The indicator serves as a visual aid to the pilot in adjusting cruise mixture. Exhaust gas temperature varies with fuel-to-air ratio, power, and RPM. However, the difference between the peak EGT and the EGT at the cruise mixture setting is essentially constant and this provides a useful leaning aid. The indicator is equipped with a manually positioned peak EGT reference pointer.

NEW ENGINE BREAK-IN AND OPERATION

The engine underwent a run-in at the factory and is ready for the full range of use. It is, however, suggested that cruising be accomplished at 65% to 80% power until a total of 50 hours has accumulated or oil consumption has stabilized. This will ensure proper seating of the rings.

The airplane is delivered from the factory with corrosion preventive oil in the engine. If, during the first 25 hours, oil must be added, use only aviation grade straight mineral oil conforming to Specification No. MIL-L-6082.

ENGINE OIL SYSTEM

Oil for engine lubrication and propeller governor operation is supplied from a sump on the bottom of the engine. The capacity of the engine sump is eight quarts (one additional quart is contained in the engine oil filter, if installed). Oil is drawn from the sump through a filter screen on the end of a pick-up tube to the engine-driven oil pump. Oil from the pump passes through a pressure screen (full flow oil filter, if installed), a pressure relief valve, and a thermostatically controlled oil cooler. Oil from the cooler is then circulated to the oil galleries and propeller governor. The engine parts are then lubricated by oil from the galleries. After lubricating the engine, the oil returns a to the sump by gravity. If a full flow oil filter is installed, the filter is equipped with a bypass valve which will cause lubricating oil to bypass the filter in the event the filter becomes plugged, or the oil temperature is extremely cold.

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An oil filler cap/oil dipstick is located at the rear of the engine on the left side. The filler cap/dipstick is accessible through an access door in the engine cowling. The engine should not be operated on less than six quarts of oil. To minimize loss of oil through the breather, fill to seven quarts for normal flights of less than three hours. For extended flight, fill to eight quarts (dipstick indication only). For engine oil grade and specifications, refer to Section 8 of this handbook.

An oil quick-drain valve is available to replace the drain plug in the oil sump drain port and provides quicker, cleaner draining of the engine oil. To drain the oil with this valve, slip a hose over the end of the valve and push upward on the end of the valve until it snaps into the open position. Spring clips will hold the valve open. After draining, use a suitable tool to snap the valve into the extended (closed) position and remove the drain hose.

IGNITION-STARTER SYSTEM

Engine ignition is provided by two engine-driven magnetos, and two spark plugs in each cylinder. The right magneto fires the lower left and upper right spark plugs, and the left magneto fires the lower right and upper left spark plugs. Normal operation is conducted with both magnetos due to the more complete burning of the fuel-air mixture with dual ignition.

Ignition and starter operation is controlled by a rotary type switch located on the left switch and control panel. The switch is labeled clockwise, OFF, R, L, BOTH, and START. The engine should be operated on both magnetos (BOTH position) except for magneto checks. The R and L positions are for checking purposes and emergency use only. When the switch is rotated to the spring-loaded START position, (with the master switch in the ON position), the starter contactor is energized and the starter will crank the engine. When the switch is released, it will automatically return to the BOTH position.

AIR INDUCTION SYSTEM

Ram air entering the openings in the front of the engine cowling serves as induction air for the engine. The air is drawn through a cylindrical filter on top of the engine and into the induction airbox. The induction airbox contains an alternate air door which is springloaded to the closed position. If the induction air filter becomes blocked, suction created by the engine will open the alternate air door and draw unfiltered air from inside the cowling. An open alternate air SECTION 7 AIRPLANE & SYSTEMS DESCRIPTIONS CESSNA MODEL R172K

door will result in negligible variations in manifold pressure and power. After passing through the airbox, induction air enters the fuel/air control unit, mounted to the induction airbox and is then delivered to the engine cylinders through the induction manifold.

EXHAUST SYSTEM

Exhaust gas from each cylinder passes through riser assemblies to a muffler and tailpipe. The muffler is constructed with a shroud around the outside which forms a heating chamber for cabin heater air.

FUEL INJECTION SYSTEM

The engine is equipped with a fuel injection system. The system is comprised of an engine-driven fuel pump, fuel/air control unit, fuel distributor manifold, fuel flow indicator and air-bleed type injector nozzles.

Fuel is delivered by the engine-driven fuel pump to the fuel/air control unit on the engine. The fuel/air control unit correctly proportions the fuel flow to the induction air flow. After passing through the control unit, induction air is delivered to the cylinders through intake manifold tubes, and metered fuel is delivered to a fuel distributor manifold. The fuel manifold, through spring tension on a diaphragm and valve, evenly distributes the fuel to an air-bleed type injector nozzle in the intake valve chamber of each cylinder. A pressure line is also attached to the fuel manifold, and is connected to the fuel flow indicator on the instrument panel.

COOLING SYSTEM

Ram air for engine cooling enters through two intake openings in the front of the engine cowling. The cooling air is directed around the cylinders and other areas of the engine by baffling, and is then exhausted through a cowl flap on the lower aft edge of the cowling. The cowl flap is mechanically operated from the cabin by means of a cowl flap lever on the right side of the control pedestal. The pedestal is labeled COWL FLAP, OPEN, CLOSED. During takeoff and high power operation, the cowl flap lever should be placed in the OPEN position for maximum cooling. This is accomplished by moving the lever to the left to clear a detent, then moving the lever up to the OPEN position. Anytime the lever is repositioned, it must first be moved to the left. While in cruise flight, the cowl flap should be adjusted to keep the

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cylinder head temperature at approximately two-thirds of the normal operating range (green arc). During extended let-downs, it may be necessary to completely close the cowl flap by pushing the cowl flap lever down to the CLOSED position.

A winterization kit is available and consists of two baffles which attach to the air intakes in the cowling nose cap, insulation for the crankcase breather line, and a placard to be installed near the map compartment door. This equipment should be installed for operations in temperatures consistently below -7°C (20°F). Once installed, the crankcase breather insulation is approved for permanent use in both hot and cold weather.

PROPELLER

The airplane has an all-metal, two-bladed, constant-speed, governor-regulated propeller. A setting introduced into the governor with the propeller control establishes the propeller speed, and thus the engine speed to be maintained. The governor then controls flow of engine oil, boosted to high pressure by the governing pump, to or from a piston in the propeller hub. Oil pressure acting on the piston twists the blades toward high pitch (low RPM). When oil pressure to the piston in the propeller hub is relieved, centrifugal force, assisted by an internal spring, twists the blades toward low pitch (high RPM).

A control knob on the lower center portion of the instrument panel is used to set the propeller and control engine RPM as desired for various flight conditions. The knob is labeled PROP PITCH, PUSH INCR RPM. When the control knob is pushed in, blade pitch will decrease, giving a higher RPM. When the control knob is pulled out, the blade pitch increases, thereby decreasing RPM. The propeller control knob is equipped with a vernier feature which allows slow or fine RPM adjustments by rotating the knob clockwise to increase RPM, and counterclockwise to decrease it. To make rapid or large adjustments, depress the button on the end of the control knob and reposition the control as desired.

FUEL SYSTEM

The fuel system (figure 7-6) consists of two vented fuel tanks (one

in each wing), a fuel selector valve, fuel reservoir tank, fuel shutoff valve, auxiliary fuel pump, fuel strainer, manual primer, engine-driven fuel pump and mixture unit, fuel/air control unit, fuel manifold, and fuel injection nozzles. Refer to figure 7-5 for fuel quantity data.

Fuel flows by gravity from the two wing tanks to a three-position selector valve, labeled BOTH ON, RIGHT TANK, and LEFT TANK. With the selector valve in either the BOTH ON, RIGHT TANK, or LEFT TANK position, fuel flows through a fuel reservoir tank, fuel shutoff valve, a bypass in the auxiliary fuel pump (when it is not in operation), and the fuel strainer to the engine-driven fuel pump. The engine-driven fuel pump delivers the fuel to the fuel/air control unit where it is metered and routed to a fuel manifold which distributes it to each cylinder. Vapor and excess fuel from the engine-driven fuel pump and mixture unit are returned to the fuel reservoir tank by a check valve equipped vapor return line, and from the reservoir tank to the wing tanks.

Fuel system venting is essential to system operation. Blockage of the system will result in decreasing fuel flow and eventual engine stoppage. Venting is accomplished by an interconnecting line from the right fuel tank to the left tank. The left fuel tank is vented overboard through a vent line, equipped with a check valve, which protrudes from the bottom surface of the left wing near the wing strut. The right fuel tank filler cap is also vented.

Fuel quantity is measured by two float-type fuel quantity transmitters (one in each tank) and indicated by two electrically-operated fuel quantity indicators on the left side of the instrument panel. An empty tank is indicated by a red line and the letter E. When an indicator shows an empty tank, approximately 1.5 gallons remain as unusable fuel. The indicators cannot be relied upon for accurate readings during

	FUEL QUANTITY DA	TA (U.S. GALLONS)	
TANKS	TOTAL USABLE FUEL ALL FLIGHT CONDITIONS	TOTAL UNUSABLE FUEL	TOTAL FUEL VOLUME
STANDARD (26 Gal. Each)	49	3	62

Figure 7-5. Fuel Quantity Data

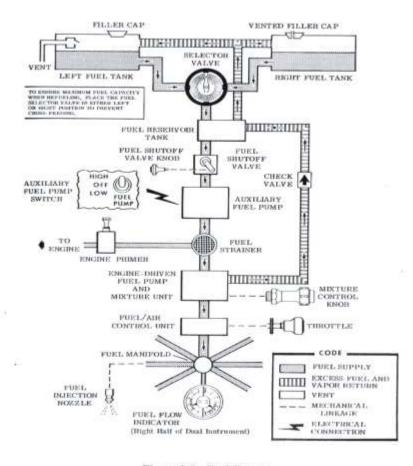


Figure 7-6. Fuel System

skids, slips, or unusual attitudes.

The fuel selector valve should be in the BOTH position for takeoff, climb, landing, and maneuvers that involve prolonged slips or skids.

NOTE

When the fuel selector valve handle is in the BOTH position in cruising flight, unequal fuel flow from each tank may occur if the wings are not maintained exactly level. Resulting wing heaviness can be alleviated gradually by turning the selector valve handle to the tank in the "heavy" wing.

NOTE

It is not practical to measure the time required to consume all of the fuel in one tank, and, after switching to the opposite tank, expect an equal duration from the remaining fuel. The airspace in both fuel tanks is interconnected by a vent line and, therefore, some sloshing of fuel between tanks can be expected when the tanks are nearly full and the wings are not level.

The auxiliary fuel pump switch is a toggle-type switch labeled HIGH, OFF, and LOW, and is located on the left side of the instrument panel. The HIGH position of the switch is spring loaded to the OFF position, and is used primarily for engine starting. The HIGH position is also used in the event of an engine-driven fuel pump failure during takeoff or high power operations, and for extreme vapor purging. Holding the switch in the HIGH position will provide maximum fuel flow.

NOTE

If the auxiliary fuel pump switch is accidentally placed in the HIGH or LOW position with the master switch on, mixture rich, and the engine stopped, the intake manifolds will be flooded.

The LOW position of the switch is used for minor vapor purging and continued engine operation in the event of an engine-driven fuel pump failure. When the switch is placed in the LOW position, the auxiliary fuel pump will operate at one of two flow rates depending on the position of the throttle. With the throttle in a cruise flight position, the pump will provide a high enough fuel flow to maintain flight in the event of an engine-driven fuel pump failure. As the throttle is moved toward the closed position (during letdown, landing, or taxing), fuel flow provided by the pump is automatically reduced by a throttleactuated switch, preventing an excessively rich mixture during periods of reduced engine speed.

NOTE

If the engine-driven fuel pump is functioning and the auxiliary fuel pump switch is placed in the LOW position, an excessively rich fuel/air ratio is produced unless the mixture is leaned. Therefore, this switch should be turned off during takeoff.

If it is desired to completely exhaust a fuel tank quantity in flight, the auxiliary fuel pump will be needed to assist in restarting the engine when fuel exhaustion occurs. Therefore, it is recommended that proper operation of the auxiliary fuel pump be verified prior to running a fuel tank dry by placing the auxiliary fuel pump switch in the HIGH position momentarily and checking for a slight rise in fuel flow indication.

To ensure a prompt engine restart in flight after running a fuel tank dry, immediately switch to the tank containing fuel at the first indication of fuel pressure fluctuation and/or power loss. Then place the auxiliary fuel pump switch in the HIGH position momentarily (3 to 5 seconds) with the throttle at least 4 open. Excessive use of the HIGH position at high altitude and full rich mixture can cause flooding of the engine as indicated by a short (1, to 2 seconds) period of power followed by a loss of power. This can later be detected by a fuel flow indication accompanied by a lack of power. If flooding does occur, turn off the auxiliary fuel pump switch, and normal propeller windmilling should start the engine in 1 to 2 seconds.

If the propeller should stop (possible at very low airspeeds) before the tank containing fuel is selected, place the auxiliary fuel pump switch in the HIGH position and advance the throttle promptly until the fuel flow indicator registers approximately ½ way into the green are for 1 to 2 seconds duration. Then retard the throttle, turn off the auxiliary fuel pump, and use the starter to turn the engine over until a start is obtained.

The fuel system is equipped with drain valves to provide a means for the examination of fuel in the system for contamination and grade. The system should be examined before the first flight of every day and after each refueling, by using the sampler cup provided to drain fuel from the wing tank sumps, and by utilizing the fuel strainer drain CESSNA MODEL R172K

under an access door on the left side of the engine cowling. A quickdrain valve is also provided for the fuel reservoir tank. The valve is located under a plug button in the belly skin of the airplane, and is used to facilitate purging of the fuel system in the event water is discovered during the preflight fuel system inspection. The fuel tanks should be filled after each flight to prevent condensation.

BRAKE SYSTEM

The airplane has a single-disc, hydraulically-actuated brake on each main landing gear wheel. Each brake is connected by a hydraulic line, to a master cylinder attached to each of the pilot's rudder pedals. The brakes are operated by applying pressure to the top of either the left (pilot's) or right (copilot's) set of rudder pedals, which are interconnected. When the airplane is parked, both main wheel brakes may be set by utilizing the parking brake which is operated by a handle under the left side of the instrument panel. To apply the parking brake, set the brakes with the rudder pedals, pull the handle aft, and rotate it 90° down.

For maximum brake life, keep the brake system properly maintained, and minimize brake usage during taxi operations and landings.

Some of the symptoms of impending brake failure are: gradual decrease in braking action after brake application, noisy or dragging brakes, soft or spongy pedals, and excessive travel and weak braking action. If any of these symptoms appear, the brake system is in need of immediate attention. If, during taxi or landing roll, braking action decreases, let up on the pedals and then re-apply the brakes with heavy pressure. If the brakes become spongy or pedal travel increases, pumping the pedals should build braking pressure. If one brake becomes weak or fails, use the other brake sparingly while using opposite rudder, as required, to offset the good brake.

ELECTRICAL SYSTEM

Electrical energy (see figure 7-7) is supplied by a 14-volt, directcurrent system powered by an engine-driven, 60-amp alternator. The 12-volt, 33-amp hour battery is located in the tailcone aft of the baggage compartment wall. Power is supplied to all electrical circuits through a split bus bar, one side containing electronic system circuits and the other side having general electrical system circuits. Both sides of the bus are on at all times except when either an external power source is connected or the starter switch is turned on; then a power contactor is

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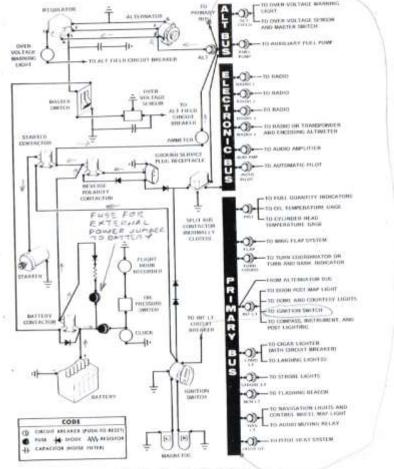


Figure 7-7. Electrical System

automatically activated to open the circuit to the electronic bus. Isolating the electronic circuits in this manner prevents harmful transient voltages from damaging the transistors in the electronic equipment.

MASTER SWITCH

The master switch is a split-rocker type switch labeled MASTER, and is ON in the up position and OFF in the down position. The right half of the switch, labeled BAT, controls all electrical power to the airplane. The left half, labeled ALT, controls the alternator.

Normally, both sides of the master switch should be used simultaneously; however, the BAT side of the switch could be turned ON separately to check equipment while on the ground. The ALT side of the switch, when placed in the OFF position, removes the alternator from the electrical system. With this switch in the OFF position, the entire electrical load is placed on the battery. Continued operation with the alternator switch in the OFF position will reduce battery power low enough to open the battery contactor, remove power from the alternator field, and prevent alternator restart.

AMMETER

The ammeter indicates the flow of current, in amperes, from the alternator to the battery or from the battery to the airplane electrical system. When the engine is operating and the master switch is turned on, the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning or the electrical load exceeds the output of the alternator, the ammeter indicates the battery discharge rate.

OVER-VOLTAGE SENSOR AND WARNING LIGHT

The airplane is equipped with an automatic over-voltage protection system consisting of an over-voltage sensor behind the instrument panel and a red warning light, labeled HIGH VOLTAGE, adjacent to the ammeter.

In the event an over-voltage condition occurs, the over-voltage sensor automatically removes alternator field current and shuts down the alternator. The red warning light will then turn on, indicating to the pilot that the alternator is not operating and the battery is supplying all electrical power.

The over-voltage sensor may be reset by turning the master switch off and back on again. If the warning light does not illuminate, normal alternator charging has resumed; however, if the light does illuminate again, a malfunction has occurred, and the flight should be terminated as soon as practical.

The warning light may be tested by momentarily turning off the ALT portion of the master switch and leaving the BAT portion turned on

CIRCUIT BREAKERS AND FUSES

Most of the electrical circuits in the airplane are protected by "push-to-reset" circuit breakers mounted on the left side of the instrument panel. Exceptions to this are the battery contactor closing (external power) circuit, clock, and flight hour recorder circuits which have fuses mounted near the battery. The control wheel map light is protected by the NAV LT circuit breaker on the instrument panel, and a fuse behind the panel. The cigar lighter is protected by a manually reset circuit breaker on the back of the lighter, and by the LAND LT circuit breaker.

GROUND SERVICE PLUG RECEPTACLE

A ground service plug receptacle may be installed to permit the use of an external power source for cold weather starting and during lengthy maintenance work on the airplane electrical system (with the exception of electronic equipment). The receptacle is located behind a door on the left side of the fuselage near the aft edge of the cowling.

NOTE

Electrical power for the airplane electrical circuits is provided through a split bus bar having all electronic circuits on one side of the bus and other electrical circuits on the other side of the bus. When an external power source is connected, a contactor automatically opens the circuit to the electronic portion of the split bus bar as a protection against damage to the transistors in the electronic equipment by transient voltages from the power source. Therefore, the external power source can not be used as a source of power when checking electronic components.

Just before connecting an external power source (generator type or battery cart), the master switch should be turned on.

The ground service plug receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the electrical system, thereby preventing any damage to the electrical equipment.

The battery and external power circuits have been designed to completely eliminate the need to "jumper" across the battery contactor to close it for charging a completely "dead" battery. A special fused circuit in the external power system supplies the needed "jumper" across the contacts so that with a "dead" battery and an external power source applied, turning on the master switch will close the battery contactor.

LIGHTING SYSTEMS

EXTERIOR LIGHTING

Conventional navigation lights are located on the wing tips and top of the rudder, and dual landing/taxi lights are installed in the cowl nose cap. Additional lighting is available and includes a flashing beacon mounted on top of the vertical fin, a strobe light on each wing tip and two courtesy lights, one under each wing, just outboard of the cabin door. The courtesy lights are operated by the dome light switch on the overhead console. All exterior lights, except the courtesy lights, are controlled by rocker type, switches on the loft switch and control panel. The switches are ON in the up position and OFF in the down position.

The flashing beacon should not be used when flying through clouds or overcust the flashing light reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation.

The two high intensity strobe lights will enhance anti-collision protection. However, the lights should be turned off when taxing in the vicinity of other aircraft, or during night flight through clouds, fog or haze.

INTERIOR LIGHTING

Instrument and control panel lighting is provided by flood lighting, integral lighting, and post lighting (if installed). Two concentric rheostat control knobs below the engine controls, labeled PANEL LT and RADIO LT, control intensity of the instrument and control panel lighting. A slide-type switch (if installed) on the overhead console.

labeled PANEL LTS, is used to select flood lighting in the FLOOD position, post lighting in the POST position, or a combination of post and flood lighting in the BOTH position.

instrument and control panel flood lighting consists of a single red flood light in the forward part of the overhead console. To use the flood lighting, rotate the PANEL LT rheostat control knob clockwise to the desired intensity.

The instrument panel may be equipped with post lights which are mounted at the edge of each instrument or control and provide direct lighting. The lights are operated by placing the PANEL LTS selector switch in the POST position and adjusting light intensity with the PANEL LT rheostat control knob. By placing the PANEL LTS selector switch in the BOTH position, the post lights can be used in combination with the standard flood lighting.

The engine instruments, fuel quantity indicators, radio equipment, and magnetic compass have integral lighting and operate independently of post or flood lighting. Light intensity of the engine instruments, fuel quantity indicators, and radio lighting is controlled by the ftAl)(i) LT rheestat control knob. The integral compass light intensity is controlled by the PANEL LT rheestat control knob.

A cabin dome light, in the aft part of the overhead console, is operated by a switch near the light. To turn the light on, move the switch to the right.

A control wheel map light is available and is mounted on the bottom of the pilot's control wheel. The light illuminates the lower portion of the cabin just forward of the pilot and is helpful when checking maps and other flight data during night operations. To operate the light, first turn on the NAV LT switch; then adjust the map light's intensity with the knurled disk type rheostat control located at the bottom of the control wheel.

A decreest map light, located on the left forward decreest, contains both red and white buibs and may be positioned to illuminate any area desired by the pilot. The light is controlled by a switch, below the light, which is labeled RED, OFF, and WHITE. Placing the switch in the top position will provide a red light. In the bottom position, standard white lighting is provided. In the center position, the map light is turned off.

The most probable cause of a light failure is a burned out bulb: however, in the event any of the lighting systems fail to illuminate when turned on, check the appropriate circuit breaker. If the circuit breaker has opened (white button popped out), and there is no obvious indication of a short circuit (smoke or odor), turn off the light switch of the affected lights, reset the breaker, and turn the switch on again. If the breaker opens again, do not reset it.

CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM

The temperature and volume of airflow into the cabin can be regulated to any degree desired by manipulation of the push-pull CABIN HT and CABIN AIR control knobs (see figure 7-8).

For cabin ventilation, pull the CABIN AIR knob out. To raise the air temperature, pull the CABIN HT knob out approximately 54 to 55 inch for a small amount of cabin heat. Additional heat is available by pulling the knob out farther; maximum heat is available with the CABIN HT knob pulled out and the CABIN AIR knob pushed full in. When no heat is desired in the cabin, the CABIN HT knob is pushed full in.

Front cabin heat and ventilating air is supplied by outlet holes spaced across a cabin manifold just forward of the pilot's and copilot's feet. Rear cabin heat and air is supplied by two ducts from the manifold, one extending down cach side of the cabin to an outlet at the front door post at floor level. Windshield defrost air is supplied by two ducts leading from the cabin manifold to outlets near the lower edge of the windshield.

Separate adjustable ventilators supply additional air; one near each upper corner of the windshield supplies air for the pilot and copilot, and two ventilators are available for the rear cabin area to supply air to the rear seat passengers.

PITOT-STATIC SYSTEM AND INSTRUMENTS

The pitot-static system supplies ram air pressure to the airspeed indicator and static pressure to the airspeed indicator, rate-of-climb indicator and altimeter. The system is composed of either an unheated or heated pitot tube mounted on the lower surface of the left wing, two external static ports, on the lower left and right sides of the forward fuselage, and the associated plumbing necessary to connect the instruments to the sources.

The heated pitot system consists of a heating element in the pitot tube, a rocker-type switch labeled PITOT HT on the lower left side of

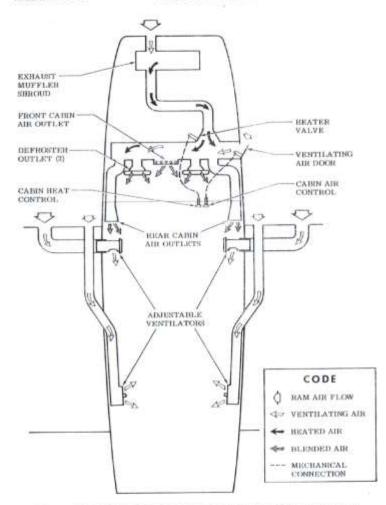


Figure 7-8. Cabin Heating, Ventilating, and Defrosting System

the instrument panel, a 10-amp circuit breaker on the switch and control panel, and associated wiring. When the pitot heat switch is turned on, the element in the pitot tube is heated electrically to maintain proper operation in possible icing conditions. Pitot heat should be used

only as required.

A static pressure alternate source valve may be installed adjacent

to the throttle for use when the external static source is malfunctioning. This valve supplies static pressure from inside the cabin instead of the external static ports.

If erroneous instrument readings are suspected due to water or ice in the pressure line going to the standard external static pressure source, the alternate static source valve should be pulled on.

Pressures within the cabin will vary with open cabin ventilators and windows. Refer to Sections 3 and 5 for the effect of varying cabin pressures on airspeed and altimeter readings.

AIRSPEED INDICATOR

The airspeed indicator is calibrated in knots and miles per hour. Limitation and range markings include the white arc (46 to 85 knots), green arc (54 to 129 knots), yellow arc (129 to 163 knots), and a red line (163 knots).

If a true airspeed indicator is installed, it is equipped with a rotatable ring which works in conjunction with the airspeed indicator dial in a manner similar to the operation of a flight computer. To operate the indicator, first rotate the ring until pressure altitude is aligned with outside air temperature in degrees Fahrenheit. Pressure altitude should not be confused with indicated altitude. To obtain pressure altitude, momentarily set the barametric scale on the altimeter to 29.92 and read pressure altitude on the altimeter. Be sure to return the altimeter barometric scale to the original barometric setting after pressure altitude has been obtained. Having set the ring to correct for altitude and temperature, then read the airspeed shown on the rotatable ring by the indicator pointer. For best accuracy, this indication should be corrected to calibrated airspeed by referring to the Airspeed Calibration chart in Section 5. Knowing the calibrated airspeed, read true airspeed on the ring opposite the calibrated airspeed, read true

RATE-OF-CLIMB INDICATOR

The rate-of-climb indicator depicts airplane rate of climb or descent in feet per minute. The pointer is actuated by atmospheric pressure changes resulting from changes of altitude as supplied by the static source.

ALTIMETER

Airplane altitude is depicted by a barometric type altimeter. A knob near the lower left portion of the indicator provides adjustment of the instrument's barometric scale to the current altimeter setting.

VACUUM SYSTEM AND INSTRUMENTS

An engine-driven vacuum system (see figure 7-9) provides the suction necessary to operate the attitude indicator and directional indicator. The system consists of a vacuum pump mounted on the engine, a vacuum relief valve and vacuum system air filter on the aft side of the firewall below the instrument panel, and instruments (including a suction gage) on the left side of the instrument panel.

ATTITUDE INDICATOR

The attitude indicator gives a visual indication of flight attitude. Bank attitude is presented by a pointer at the top of the indicator relative to the bank scale which has index marks at 10°, 20°, 30°, 60°, and 90° either side of the center mark. Pitch and roll attitudes are presented by a miniature airplane in relation to the horizon bar. A knob at the bottom of the instrument is provided for in-flight adjustment of the miniature airplane to the horizon bar for a more accurate flight attitude indication.

DIRECTIONAL INDICATOR

A directional indicator displays airplane heading on a compass card in relation to a fixed simulated airplane image and index. The indicator will precess slightly over a period of time. Therefore, the compass card should be set in accordance with the magnetic compass just prior to takeoff, and occasionally re-adjusted on extended flights. A knob on the lower left edge of the instrument is used to adjust the compass card to correct for precession.

SUCTION GAGE

The suction gage is located on the left side of the instrument panel and indicates, in inches of mercury, the amount of suction available for operation of the attitude indicator and directional indicator. The desired suction range is 4.6 to 5.4 inches of mercury. A suction reading below this range may indicate a system malfunction or improper adjustment, and in this case, the indicators should not be considered reliable.

STALL WARNING SYSTEM

The airplane is equipped with a pneumatic-type stall warning system consisting of an inlet in the leading edge of the left wing, an air-operated horn near the upper left corner of the windshield, and associated plumbing. As the airplane approaches a stall, the low pressure on the upper surface of the wings moves forward around the leading edge of the wings. This low pressure creates a differential pressure in the stall warning system which draws air through the warning horn, resulting in an audible warning at 5 to 10 knots above stall in all flight conditions.

The stall warning system should be checked during the preflight inspection by placing a clean handkerchief over the vent opening and applying suction. A sound from the warning horn will confirm that the system is operative.

AVIONICS SUPPORT EQUIPMENT

The airplane may, at the owner's discretion, be equipped with various types of avionics support equipment such as an audio control panel, microphone-headset, and static dischargers. The following paragraphs discuss these items.

AUDIO CONTROL PANEL

Operation of radio equipment is covered in Section 9 of this handbook. When one or more radios are installed, a transmitter/audio switching system is provided (see figure 7-10). The operation of this switching system is described in the following paragraphs.

TRANSMITTER SELECTOR SWITCH

A rotary type transmitter selector switch, labeled XMTR SEL, is provided to connect the microphone to the transmitter the pilot desires to use. To select a transmitter, rotate the switch to the number corresponding to that transmitter. The numbers 1, 2 and 3 above the switch correspond to the top, second and third transceivers in the avionics stack.

An audio amplifier is required for speaker operation, and is automatically selected, along with the transmitter, by the transmitter selector switch. As an example, if the number I transmitter is selected, the audio amplifier in the associated NAV/COM receiver is also selected, and functions as the amplifier for ALL speaker audio. In the event the

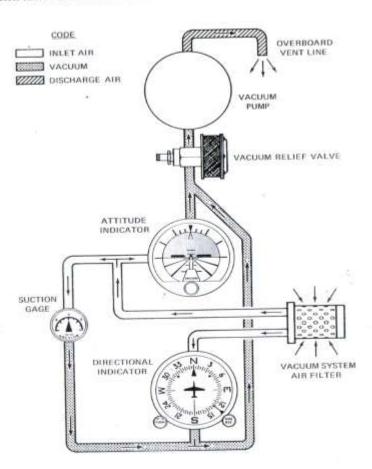
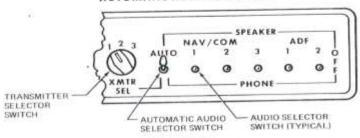


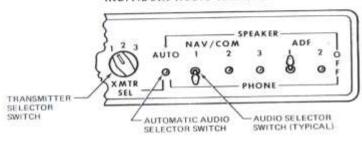
Figure 7-9. Vacuum System

AUTOMATIC AUDIO SELECTION



As illustrated, the number 1 transmitter is selected, the AUTO selector switch is in the SPEAKER position, and the NAV/COM 1, 2 and 3 and ADE 1 and 2 audio selector switches are in the OFF position. With the switches set as shown, the pilot will transmit on the number 1 transmitter and hear the number 1 NAV/COM receiver through the airplane speaker.

INDIVIDUAL AUDIO SELECTION



As illustrated, the number 1 transmitter is selected, the AUTO selector switch is in the OFF position, the number 1 NAV/COM receiver is in the PHONE position, and the number 1 ADF is in the SPEAKER position. With the switches set as shown, the pilot will transmit on the number 1 transmitter and hear the number 1 NAV/COM receiver on a headset, while the passengers are listening to the ADF audio through the airplane speaker. If another audio selector switch is placed in either the PHONE or SPEAKER position, it will be heard simultaneously with either the number 1 NAV/COM or number 1 ADF respectively.

Figure 7-10. Audio Control Panel

audio amplifier in use fails, as evidenced by loss of all speaker audio, select another transmitter. This should re-establish speaker audio. Headset audio is not affected by audio amplifier operation.

AUTOMATIC AUDIO SELECTOR SWITCH

A toggle switch, labeled AUTO, can be used to automatically match the appropriate NAV/COM receiver audio to the transmitter leng solected. To utilize this automatic feature, leave all NAV/COM receiver switches in the OFF (center) position, and place the AUTO selector switch in either the SPEAKER or PHONE position, as desired. Once the AUTO selector switch is positioned, the pilot may then select any transmitter and its associated NAV/COM receiver audio simultaneously with the transmitter selector switch. If automatic audio selection is not desired, the AUTO selector switch should be placed in the OFF (center) position.

AUDIO SELECTOR SWITCHES

The audio selector switches, labeled NAV/COM 1, 2 and 3 and ADF 1 and 2, allow the pilot to initially pre-tune all NAV/COM and ADF receivers, and then individually select and listen to any receiver or combination of receivers. To listen to a specific receiver, first check that the AUTO selector switch is in the OFF (center) position, then place the audio selector switch corresponding to that receiver in either the SPEAKER (up) or PHONE (down) position. To turn off the audio of the selected receiver, place that switch in the OFF (center) position. If desired, the audio selector switches can be positioned to permit the pilot to listen to one receiver on a headset while the passengers listen to another receiver on the airplane speaker.

The ADF 1 and 2 switches may be used anytime ADF audio is desired. If the pilot wants only ADF audio, for station identification or other reasons, the AUTO selector switch (if in use) and all other audio selector switches should be in the OFF position. If simultaneous AHF and NAV/COM audio is acceptable to the pilot, no change in the existing switch positions is required. Place the ADF 1 or 2 switch in either the SPEAKER or PHONE position and adjust radio volume as degreed.

NOTE

If the NAV/COM audio selector switch corresponding to the selected transmitter is in the PHONE position with the AUTO selector switch in the SPEAKER position, all audio selector switches placed in the PHONE position will automatically be connected to both the surplaine speaker and any headsets in use.

MICROPHONE-HEADSET

The microphone-headset combination consists of the microphone and headset combined in a single unit and a microphone keying switch located on the left side of the pilot's control wheel. The microphone-headset permits the pilot to conduct radio communications without interrupting other control operations to handle a hand-held microphone. Also, passengers need not listen to all communications. The microphone and headset jacks are located near the lower left corner of the instrument panel.

STATIC DISCHARGERS

If frequent IPR flights are planned, installation of wick-type static dischargers is recommended to improve radio communications during flight through dust or various forms of precipitation (rain, snow or ice crystals). Under these conditions, the build-up and discharge of static electricity from the trailing edges of the wings, rudder, elevator, propeller tips and radio antennas can result in loss of usable radio signals on all communications and navigation radio equipment. Usually the ADF is first to be affected and VHF communication equipment is the last to be affected.

Installation of static dischargers reduces interference from precipitation static, but it is possible to encounter severe precipitation static conditions which might cause the loss of radio signals, even with static dischargers installed. Whenever possible, avoid known severe precipitation areas to prevent loss of dependable radio signals. If avoidance is impractical, minimize airspeed and anticipate temporary loss of radio signals while in these areas.

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HANDLING, SERVICE & MAINTENANCE

SECTION 8 AIRPLANE HANDLING, SERVICE & MAINTENANCE

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CESSNA MODEL R172K SECTION 8 HANDLING, SERVICE & MAINTENANCE

INTRODUCTION

This section contains factory-recommended procedures for proper ground handling and routine care and servicing of your Cessna. It also identifies certain inspection and maintenance requirements which must be followed if your airplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered in your locality.

Keep in touch with your Cessna Dealer and take advantage of his knowledge and experience. He knows your airplane and how to maintain it. He will remind you when lubrications and oil changes are necessary, and about other seasonal and periodic services.

IDENTIFICATION PLATE

All correspondence regarding your airplane should include the SE-RIAL NUMBER. The Serial Number, Model Number, Production Certificate Number (PC) and Type Certificate Number (TC) can be found on the Identification Plate, located on the lower part of the left forward doorpost. Located adjacent to the Identification Plate is a Finish and Trim Plate which contains a code describing the interior color scheme and exterior paint combination of the airplane. The code may be used in conjunction with an applicable Parts Catalog if finish and trim information is needed.

OWNER FOLLOW-UP SYSTEM

Your Cessna Dealer has an Owner Follow-Up System to notify you when he receives information that applies to your Cessna. In addition, if you wish, you may choose to receive similar notification, in the form of Service Letters, directly from the Cessna Customer Services Department. A subscription form is supplied in your Customer Care Program book for your use, should you choose to request this service. Your Cessna Dealer will be glad to supply you with details concerning these follow-up programs, and stands ready, through his Service Department, to supply you with fast, efficient, low-cost service.

PUBLICATIONS

Various publications and flight operation aids are furnished in the

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airplane when delivered from the factory. These items are listed below

- CUSTOMER CARE PROGRAM BOOK
- PILOT'S OPERATING HANDBOOK/SUPPLEMENTS FOR YOUR AVIONICS AND AUTOPILOT
- PILOT'S CHECKLISTS
- POWER COMPUTER
- SALES AND SERVICE DEALER DIRECTORY
- DO'S AND DON'TS ENGINE BOOKLET

The following additional publications, plus many other supplies that are applicable to your airplane, are available from your Cessna Dealer.

SERVICE MANUALS AND PARTS CATALOGS FOR YOUR AIRPLANE ENGINE AND ACCESSORIES AVIONICS AND AUTOPILOT

Your Cessna Dealer has a Customer Care Supplies Catalog covering all available items, many of which he keeps on hand. He will be happy to place an order for any item which is not in stock.

AIRPLANE FILE

There are miscellaneous data, information and licenses that are a part of the airplane file. The following is a checklist for that file. In addition, a periodic check should be made of the latest Federal Aviation Regulations to ensure that all data requirements are met.

- A. To be displayed in the airplane at all times:
 - Aircraft Airworthiness Certificate (FAA Form 8100-2).
 - (2) Aircraft Registration Certificate (FAA Form 8050-3).
 - (3) Aircraft Radio Station License, if transmitter installed (FCC Form 556).
- B. To be carried in the airplane at all times:
 - (1) Weight and Balance, and associated papers (latest copy of the

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SECTION 8 HANDLING, SERVICE & MAINTENANCE

Repair and Alteration Form, FAA Form 337, if applicable).

- (2) Equipment List.
- C. To be made available upon request:
 - Airplane Log Book.
 - (2) Engine Log Book.

Most of the items listed are required by the United States Federal Aviation Regulations. Since the Regulations of other nations may require other documents and data, owners of airplanes not registered in the United States should check with their own aviation officials to determine their individual requirements.

Cessna recommends that these items, plus the Pilot's Operating Handbook, Pilot's Checklists, Power Computer, Cardonner Care Program book and Customer Care Card, be carried in the airplane at all times.

AIRPLANE INSPECTION PERIODS

FAA REQUIRED INSPECTIONS

As required by Federal Aviation Regulations, all civil aircraft of U.S. registry must undergo a complete inspection (annual) each twelve calendar months. In addition to the required ANNUAL inspection, aircraft operated commercially (for hire) must have a complete inspection every 100 hours of operation

The FAA may require other inspections by the issuance of airworthiness directives applicable to the airplane, engine, propeller and components. It is the responsibility of the owner/operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent madvertent noncompliance.

In lieu of the 100 HOUR and ANNUAL inspection requirements, an airplane may be inspected in accordance with a progressive inspection schedule, which allows the work load to be divided into smaller operations that can be accomplished in shorter time periods.

The CESSNA PROGRESSIVE CARE PROGRAM has been developed to provide a modern progressive inspection schedule that satisfies the complete airplane inspection requirements of both the 100 HOUR and ANNUAL inspections as applicable to Cessna airplanes.

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The program assists the owner in his reponsibility to comply with all FAA inspection requirements, while ensuring timely replacement of life-limited parts and adherence to factory-recommended inspection intervals and maintenance procedures.

CESSNA PROGRESSIVE CARE

The Cessna Progressive Care Program has been designed to help you realize maximum utilization of your airplane at a minimum cost and downtime. Under the program, your airplane is inspected and maintained in four operations at 50-hour intervals during a 200-hour period. The operations are recycled each 200 hours and are recorded in a specially provided Aircraft Inspection Log as each operation is conducted.

The Cessna Aircraft Company recommends Progressive Care for airplanes that are being flown 200 hours or more per year, and the 100-hour inspection for all other airplanes. The procedures for the Progressive Care Program and the 100-hour inspection have been carefully worked out by the factory and are followed by the Cessna Dealer Organization. The complete familiarity of Cessna Dealers with Cessna equipment and factory-approved procedures provides the highest level of service possible at lower cost to Cessna owners.

Regardless of the inspection method selected by the owner, he should keep in mind that FAR Part 43 and FAR Part 91 establishes the requirement that properly certified agencies or personnel accomplish all required FAA inspections and most of the manufacturer recommended inspections.

CESSNA CUSTOMER CARE PROGRAM

Specific benefits and provisions of the CESSNA WARRANTY plus other important benefits for you are contained in your CUSTOMER CARE PROGRAM book supplied with your airplane. You will want to thoroughly review your Customer Care Program book and keep it in your airplane at all times.

Coupons attached to the Program book entitle you to an initial inspection and either a Progressive Care Operation No. 1 or the first 100-hour inspection within the first 6 months of ownership at no charge to you. If you take delivery from your Dealer, the initial inspection will have been performed before delivery of the airplane to you. If you pick up your airplane at the factory, plan to take it to your Dealer reasonably soon after you take delivery, so the initial inspection may be performed allowing the Dealer to make any minor adjustments which may be necessary.

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You will also want to return to your Dealer either at 50 hours for your first Progressive Care Operation, or at 100 hours for your first 100-hour inspection depending on which program you choose to establish for your airplane. While these important inspections will be performed for you by any Cessna Dealer, in most cases you will prefer to have the Dealer from whom you purchased the airplane accomplish this work.

PILOT CONDUCTED PREVENTIVE MAINTENANCE

A certified pilot who owns or operates an airplane not used as an air carrier is authorized by FAR Part 43 to perform limited maintenance on his airplane. Refer to FAR Part 43 for a list of the specific maintenance operations which are allowed.

NOTE

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the country of certification for information on preventive maintenance that may be performed by pilots.

A Service Manual should be obtained prior to performing any preventive maintenance to ensure that proper procedures are followed. Your Cessna Dealer should be contacted for further information or for required maintenance which must be accomplished by appropriately licensed personnel.

ALTERATIONS OR REPAIRS

It is essential that the FAA be contacted prior to any alterations on the airplane to ensure that airworthiness of the airplane is not violated. Alterations or repairs to the airplane must be accomplished by licensed personnel.

GROUND HANDLING

TOWING

The airplane is most easily and safely maneuvered by hand with the tow-bar attached to the nose wheel. When towing with a vehicle, do not exceed the nose gear turning angle of 30° either side of center, or

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CONTRACTOR STREET

damage to the gear will result. If the airplane is towed or pushed over a rough surface during hangaring, watch that the normal cushioning action of the nose strut does not cause excessive vertical movement of the tail and the resulting contact with low hangar doors or structure. A flat nose tire or deflated strut will also increase tail height.

PARKING

When parking the airplane, head into the wind and set the parking brakes. Do not set the parking brakes during cold weather when accumulated moisture may freeze the brakes, or when the brakes are overheated. Install the control wheel lock and chock the wheels. In severe weather and high wind conditions, tie the airplane down as outlined in the following paragraph.

TIE-DOWN

Proper tie-down procedure is the best precaution against damage to the parked airplane by gusty or strong winds. To tie-down the airplane securely, proceed as follows:

- (1) Set the parking brake and install the control wheel lock.
- (2) Install a surface control lock over the fin and rudder.
- (3) Tie sufficiently strong ropes or chains (700 pounds tensile strength) to the wing, tail, and nose tie-down fittings and secure each rope to a ramp tie-down.
- (4) Install a pitot tube cover.

JACKING

When a requirement exists to jack the entire airplane off the ground, or when wing jack points are used in the jacking operation. refer to the Service Manual for specific procedures and equipment re-

Individual main gear may be jacked by using the jack pad which is incorporated in the main landing gear strut step bracket. When using the individual gear strut jack pad, flexibility of the gear strut will cause the main wheel to slide inboard as the wheel is raised, tilting the jack. The jack must then be lowered for a second jacking operation. Do not jack both main wheels simultaneously using the individual main gear jack pads.

If nose gear maintenance is required, the nose wheel may be raised off the ground by pressing down on a tailcone bulkhead, just forward of the horizontal stabilizer, and allowing the tail to rest on the tail tiedown ring.

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NOTE

Do not apply pressure on the elevator or outboard stabilizer surfaces. When pushing on the tailcone, always apply pressure at a bulkhead to avoid buckling the skin.

To assist in raising and holding the nose wheel off the ground, weight down the tail by placing sand-bags, or suitable weights, on each side of the horizontal stabilizer, next to the fuselage. If ground anchors are available, the tail should be securely tied down.

NOTE

Ensure that the nose will be held off the ground under all conditions by means of suitable stands or supports under weight supporting bulkheads near the nose of the airplane.

LEVELING

Longitudinal leveling of the airplane is accomplished by placing a level on leveling screws located on the left side of the tailcone. Deflate the nose tire and/or lower or raise the nose strut to properly center the bubble in the level. Corresponding points on both upper door sills may be used to level the airplane laterally.

FLYABLE STORAGE

Airplanes placed in non-operational storage for a maximum of 30 days or those which receive only intermittent operational use for the first 25 hours are considered in flyable storage status. Every seventh day during these periods, the propeller should be rotated by hand through five revolutions. This action "limbers" the oil and prevents any accumulation of corrosion on engine cylinder walls.

WARNING

For maximum safety, check that the ignition switch is OFF, the throttle is closed, the mixture control is in the idle cut-off position, and the airplane is secured before rotating the propeller by hand. Do not stand within the arc of the propeller blades while turning the propeller.

After 30 days, the airplane should be flown for 30 minutes or a ground runup should be made just long enough to produce an oil temperature within the lower green are range. Excessive ground run-

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up should be avoided.

Engine runup also helps to eliminate excessive accumulation of water in the fuel system and other air spaces in the engine. Keep fuel tanks full to minimize condensation in the tanks. Keep the battery fully charged to prevent the electrolyte from freezing in cold weather. If the airplane is to be stored temporarily, or indefinitely, refer to the Service Manual for proper storage procedures.

SERVICING

In addition to the PREFLIGHT INSPECTION covered in Section 4. COMPLETE servicing, inspection, and test requirements for your airplane are detailed in the Service Manual. The Service Manual outlines all items which require attention at 50, 100, and 200 hour intervals plus those items which require servicing, inspection and/or testing at special intervals.

Since Cessna Dealers conduct all service, inspection, and test procedures in accordance with applicable Service Manuals, it is recommended that you contact your Cessna Dealer concerning these requirements and begin scheduling your airplane for service at the recommended intervals.

Cessna Progressive Care ensures that these requirements are accomplished at the required intervals to comply with the 100-hour or ANNUAL inspection as previously covered.

Depending on various flight operations, your local Government Aviation Agency may require additional service, inspections, or tests. For these regulatory requirements, owners should check with local aviation officials where the airptane is being operated.

For quick and ready reference, quantities, materials, and specifications for frequently used service items are as follows.

ENGINE OIL

GRADE -- Aviation Grade SAE 50 Above 4°C (40°F). Aviation Grade SAE 10W30 or SAE 30 Below 4°C (40°F).

Multi-viscosity oil with a range of SAE 10W30 is recommended for improved starting in cold weather. Ashless dispersant oil, conforming to Continental Motors Specification MHS-24A. must be used.

NOTE

Your Cessna was delivered from the factory with a corrosion preventive aircraft engine oil. If oil must be added during the first 25 hours, use only aviation grade straight mineral oil conforming to Specification No. MIL-L-6082.

CAPACITY OF ENGINE SUMP -- 8 Quarts

Do not operate on less than 6 quarts. To minimize loss of oil through breather, fill to 7 quart level for normal flights of less than 3 hours. For extended flight, fill to 8 quarts. These quantities refer to oil dipstick level readings. During oil and oil filter changes, one additional quart is required when the filter element is changed.

OIL AND OIL FILTER CHANGE --

After the first 25 hours of operation, drain engine oil sump and clean both the oil suction strainer and the oil pressure screen. If an oil filter is installed, change filter element at this time. Refill sump with straight mineral oil and use until a total of 50 hours has accumulated or oil consumption has stabilized; then change to dispersant oil. On airplanes not equipped with an oil filter, drain the engine oil sump and clean both the oil suction strainer and the oil pressure screen each 50 hours thereafter. On airplanes which have an oil filter, the oil change interval may be extended to 100-hour intervals, providing the oil filter element is changed at 50-hour intervals. Change engine oil at least every 6 months even though less than the recommended hours have accumulated. Reduce intervals for prolonged operation in dusty areas, cold climates, or when short flights and long idle periods result in sludging conditions.

FUEL

APPROVED FUEL GRADES (AND COLORS) -100LL Grade Aviation Fuel (Blue).
100 (Formerly 100/130) Grade Aviation Fuel (Green).
CAPACITY EACH TANK -- 28 Gallons.

NOTE

To ensure maximum fuel capacity when refueling, place the fuel selector valve in either LEFT or RIGHT position to prevent cross-feeding.

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LANDING GEAR

NOSE WHEEL TIRE PRESSURE -- 45 PSI on 5.00-5, 6-Ply Rated Tire. MAIN WHEEL TIRE PRESSURE -- 38 PSI on 6.00-6, 6-Ply Rated Tires. NOSE GEAR SHOCK STRUT --

Keep filled with MIL-H-5606 hydraulic fluid and inflated with air to 45 PSI.

CLEANING AND CARE

WINDSHIELD-WINDOWS

The plastic windshield and windows should be cleaned with an aircraft windshield cleaner. Apply the cleaner sparingly with soft cloths, and rub with moderate pressure until all dirt, oil scum and bug stains are removed. Allow the cleaner to dry, then wipe it off with soft flannel cloths.

If a windshield cleaner is not available, the plastic can be cleaned with soft cloths moistened with Stoddard solvent to remove oil and grease.

NOTE

Never use gasoline, benzine, alcohol, acetone, carbon tetrachloride, fire extinguisher or anti-ice fluid, lacquer thinner or glass cleaner to clean the plastic. These materials will attack the plastic and may cause it to craze.

Follow by carefully washing with a mild detergent and plenty of water. Rinse thoroughly, then dry with a clean moist chamois. Do not rub the plastic with a dry cloth since this builds up an electrostatic charge which attracts dust. Waxing with a good commercial wax will finish the cleaning job. A thin, even coat of wax polished out by hand with clean soft flannel cloths, will fill in minor scratches and help prevent further scratching.

Do not use a canvas cover on the windshield unless freezing rain or sleet is anticipated since the cover may scratch the plastic surface.

PAINTED SURFACES

The painted exterior surfaces of your new Cessna have a durable, long lasting finish and, under normal conditions, require no polishing or buffing. Approximately 15 days are required for the paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by someone experienced in handling uncured paint. Any Cessna Dealer can accomplish this work.

Generally, the painted surfaces can be kept bright by washing with water and mild soap, followed by a rinse with water and drying with cloths or a chamois. Harsh or abrasive soaps or detergents which cause corrosion or scratches should never be used. Hemove stubborn oil and grease with a cloth moistened with Stoddard solvent.

Waxing is unnecessary to keep the painted surfaces bright. However, if desired, the airplane may be waxed with a good automotive wax. A heavier coating of wax on the leading edges of the wings and tail and on the engine nose cap and propeller spinner will help reduce the abrasion encountered in these areas.

When the airplane is parked outside in cold climates and it is necessary to remove ice before flight, care should be taken to protect the painted surfaces during ice removal with chemical liquids. A 50-50 solution of isopropyl alcohol and water will satisfactorily remove ice accummulations without damaging the paint. A solution with more than 50% alcohol is harmful and should be avoided. While applying the de-icing solution, keep it away from the windshield and cabin windows since the alcohol will attack the plastic and may cause it to craze.

PROPELLER CARE

Preflight inspection of propeller blades for nicks, and wiping them occasionally with an oily cloth to clean off grass and bug stains will assure long, trouble-free service. Small nicks on the propeller, particularly near the tips and on the leading edges, should be dressed out as soon as possible since these nicks produce stress concentrations, and if ignored, may result in cracks. Never use an alkaline cleaner on the blades; remove grease and dirt with carbon tetrachloride or Stoddard solvent.

ENGINE CARE

The engine may be cleaned with Stoddard solvent, or equivalent, then dried thoroughly.

CESSNA MODEL R172K

CAUTION

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Particular care should be given to electrical equipment before cleaning. Cleaning fluids should not be allowed to enter magnetos, starter, alternator and the like. Protect these components before saturating the engine with solvents. All other openings should also be covered before cleaning the engine assembly. Caustic cleaning solutions should be used cautiously and should always be properly neutralized after their use.

INTERIOR CARE

To remove dust and loose dirt from the upholstery and carpet, clean the interior regularly with a vacuum cleaner.

Blot up any spilled liquid promptly with cleansing tissue or rags. Don't pat the spot; press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife, then spot-clean the area.

Oil spots may be cleaned with household spot removers, used sparingly. Before using any solvent, read the instructions on the container and test it on an obscure place on the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

Soiled upholstery and carpet may be cleaned with foam-type detergent, used according to the manufacturer's instructions. To minimize wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

If your airplane is equipped with leather seating, cleaning of the seats is accomplished using a soft cloth or sponge dipped in mild soap suds. The soap suds, used sparingly, will remove traces of dirt and grease. The soap should be removed with a clean damp cloth.

The plastic trim, headliner, instrument panel and control knobs need only be wiped off with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with Stoddard solvent. Volatile solvents, such as mentioned in para- • graphs on care of the windshield, must never be used since they soften and craze the plastic. THE RESIDENCE OF THE PARTY OF T

INTRODUCTION

This section consists of a series of supplements, each covering a single optional system which may be installed in the airplane. Each supplement contains a brief description, and when applicable, operating limitations, emergency and normal procedures, and performance. Other routinely installed items of optional equipment, whose function and operational procedures do not require detailed instructions, are discussed in Section 7.

SUPPLEMENT

EMERGENCY LOCATOR TRANSMITTER (ELT)

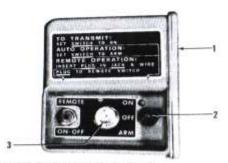
SECTION 1

The ELT consists of a self-contained dual-frequency radio transmitter and battery power supply, and is activated by an impact of 5g or more as may be experienced in a crash landing. The ELT emits an omni-directional signal on the international distress frequencies of 121.5 and 243.0 MHz. (Some ELT units in export aircraft transmit only on 121.5 MHz.) General aviation and commercial aircraft, the FAA, and CAP monitor 121.5 MHz, and 243.0 MHz is monitored by the military. Following a crash landing, the ELT will provide line-of-sight transmission up to 100 miles at 10,000 feet. The duration of ELT transmissions is affected by ambient temperature. At temperatures of +21" to +54"C (+70" to +130"F), continuous transmission for 115 hours can be expected; a temperature of -40"C (-40°F) will shorten the duration to 70 hours.

The ELT is readily identified as a bright orange unit mounted behind the baggage compartment wall in the tailcone. To gain access to the unit, remove the baggage compartment wall. The ELT is operated by a control panel at the forward facing end of the unit (see figure 1).

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this equipment is installed.



- 1. COVER Removable for access to battery.
- 2. FUNCTION SELECTOR SWITCH (3-position toggle switch):
 - ON Activates transmitter instantly. Used for test purposes and if "g" switch is inoperative.
 - OFF Deactivates transmitter. Used during shipping, storage and following rescue.
 - ARM Activates transmitter only when "g" switch receives 5g or more impact.
- ANTENNA RECEPTACLE Connection to antenna mounted on top of the tailcone.

Figure 1. ELT Control Panel

SECTION 3 EMERGENCY PROCEDURES

Immediately after a forced landing where emergency assistance is required, the ELT should be utilized as follows.

(1) ENSURE ELT ACTIVATION: Turn a radio transceiver ON and select 121, 5 MHz. If the ELT can be heard transmitting, it was activated by the "g" switch and is functioning properly. If no emergency tone is audible, gain access to the ELT and place the function selector switch in the ON position.

- (2) PRIOR TO SIGHTING RESCUE AIRCRAFT: Conserve airplane battery. Do not activate radio transceiver.
- (3) AFTER SIGHTING RESCUE AIRCRAFT: Place ELT function selector switch in the OFF position, preventing radio interference. Attempt contact with rescue aircraft with the radio transceiver set to a frequency of 121.5 MHz. If no contact is established, return the function selector switch to ON immediately.
- (4) FOLLOWING RESCUE: Place ELT function selector switch in the OFF position, terminating emergency transmissions.

SECTION 4 NORMAL PROCEDURES

As long as the function selector switch remains in the ARM position, the ELT automatically activates following an impact of 5g or more over a short period of time.

Following a lightning strike, or an exceptionally hard landing, the ELT may activate although no emergency exists. To check your ELT for hadvertent activation, select 121.5 MHz on your radio transceiver and listen for an emergency tone transmission. If the ELT can be heard transmitting, place the function selector switch in the OFF position and the tone should cease. Immediately place the function selector switch in the ARM position to re-set the ELT for normal operation.

SECTION 5 PERFORMANCE

There is no change to the airplane performance data when this equipment is installed.

SUPPLEMENT CESSNA 300 NAV/COM

(COM/VOR, No LOC - Type RT-308C)

SECTION 1

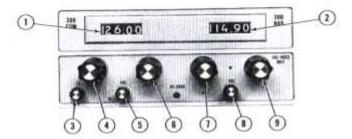
The Cessna 300 Nav/Com (Type RT-308C), shown in Figure 1, consists of a panel-mounted receiver-transmitter (RT-308C) and a single needle course deviation indicator (IN-514R or IN-514B). The RT-308C Receiver-Transmitter includes a 360-channel VHF communication receiver-transmitter and a 160-channel VHF navigation receiver, both of which may be operated simultaneously.

The communication receiver-transmitter receives and transmits signals between 118,00 and 135,95 MHz in 50 kHz steps. The navigation receiver receives and interprets VHF omnidirectional range (VOR) signals between 108,00 and 117,95 MHz. Although localizer signals (all odd-tenth frequencies between 108,1 and 111,9 MHz) can also be received, the navigation receiver does not include the necessary circuits to interpret the signals for localizer indications. However, the audio portion of the localizer is audible so that flight information, such as that broadcast in certain areas on selected localizer frequencies by the Automatic Terminal Information Service (ATIS), may be heard.

All controls for the Cessna 300 Nav/Com (Type RT-308C), except the omni bearing selector (OBS), are mounted on the front panel of the receiver-transmitter. The course selector and the navigation indicators are included in the course deviation indicator. The communication receiver-transmitter and the navigation receiver are synthesizer-controlled and are tuned automatically when the frequency is selected. In addition, when two or more radios are installed, a transmitter selector switch and a speaker-phone selector switch are provided. Each control function is described in Figure 1.

SECTION 2

There is no change to the airplane limitations when this avionic equipment is installed. THE RESERVE OF THE PARTY OF





- RECEIVER-TRANSMITTER FREQUENCY INDICATOR.
- 2. NAVIGATION RECEIVER FREQUENCY INDICATOR.
- SQUELCH CONTROL Used to adjust signal threshold necessary to activate communication receiver audio. Clockwise rotation increases background noise (decreases squelch action); counterclockwise rotation decreases background noise.
- COMMUNICATION RECEIVER-TRANSMITTER MEGA-HERTZ SELECTOR - Selects communication receiver-transmitter frequency in 1-MHz steps between 118 and 135 MHz.

Figure 1. Cessna 300 Nav/Com (Type RT-308C) - VOR only (Sheet 1 of 2)

- OFF/ON VOLUME CONTROL Turns complete set on and controls volume of audio from communication receiver. Clockwise rotation increases audio level.
- COMMUNICATION RECEIVER-TRANSMITTER FRAC-TIONAL MEGAHERTZ SELECTOR - Selects communication receiver-transmitter fractional frequency in 0.05 MHz steps between 0.00 and 0.95 MHz.
- NAVIGATION RECEIVER MEGAHERTZ SELECTOR -Selects navigation receiver frequency in 1-MHz steps between 108 and 117 MHz.
- NAVIGATION RECEIVER VOLUME CONTROL Controls volume of audio from navigation receiver only. Clockwise rotation increases audio level.
- NAVIGATION RECEIVER FRACTIONAL MEGAHERTZ SELECTOR - Selects navigation receiver frequency in 0.05 MHz steps between 0.00 and 0.95 MHz.
- COURSE DEVIATION POINTER Indicates deviation from selected omni bearing.
- OFF/TO-FROM (OMNI) INDICATOR Operates only with VOR signal. "OFF" position (flag) indicates unreliable signal or no signal (shows OFF when localizer frequency is selected). When "OFF" position disappears, indicator shows whether selected course is "TO" or "FROM" VOR station.
- RECIPROCAL COURSE INDEX Indicates reciprocal of selected VOR course.
- OMNI BEARING SELECTOR (OBS) Selects desired course to or from a VOR station.
- BACK COURSE (BC) INDICATOR LIGHT (On IN-5141).
 Only) Not used with this radio.
- BEARING DIAL Rotated by OBS to select course at index.
- COURSE INDEX Indicates selected VOR course.

Figure 1. Cessna 300 Nav/Com (Type RT-308C) - VOR only (Sheet 2 of 2)

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed.

SECTION 4 NORMAL PROCEDURES

COMMUNICATIONS TRANSCEIVER OPERATION:

- OFF/VOL Control -- TURN ON and adjust to desired listening level.
- (2) XMTR SEL Switch -- SET to desired transceiver.
- (3) SPEAKER/PHONE (or AUTO) Switch -- SET to desired mode.
- (4) COM Frequency Selector Knobs -- SELECT desired operating frequency,
- (5) SQ Control -- ROTATE counterclockwise to decrease background noise as required.
- (6) Mike Button:
 - a. To Transmit -- DEPRESS and SPEAK into microphone.
 - b. To Receive -- RELEASE.

NAVIGATION RECEIVER OPERATION:

- (1) COM OFF/VOL Control -- TURN ON.
- (2) SPEAKER/PHONE (or AUTO) Switch -- SET to desired mode.
- (3) NAV Frequency Selector Knobs -- SELECT desired operating frequency.
- (4) NAV VOL Control -- ADJUST to desired listening level.
- (5) OBS Knob -- SELECT desired course.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or several related external antennas, will result in a minor reduction in cruise performance.

SUPPLEMENT

CESSNA 300 NAV/COM

(720-Channel - Type RT-328T)

SECTION 1 GENERAL

The Cessna 300 Nav/Com (Type RT-328T), shown in Figure 1, conmists of a panel-mounted receiver-transmitter and a single- or dualpointer remote course deviation indicator (CDI). The set includes a 720channel VHF communication receiver-transmitter and a 200-channel VHF navigation receiver, both of which may be operated sinultaneously.

The communication receiver-transmitter receives and transmits sigmals between 118,000 and 135,975 MHz in 25-kHz steps. The mavigation receiver receives and interprets VHF omnidirectional and localizer signals between 108,00 and 117,95 MHz in 50-kHz steps. The communication receiver-transmitter and the navigation receiver are synthesizer-controlled and are tuned automatically when the frequency is selected.

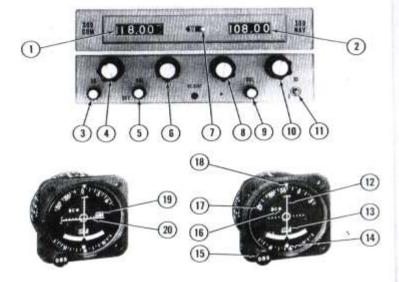
A DME receiver-transmitter or a glide slope receiver, or both, may be interconnected with the Cessna 300 Nav/Com set for automatic selection of the associated DME or GS frequency. When a VOR frequency is selected on the Nav/Com, the associated VORTAC or VOR station frequency will also be selected automatically; likewise, if a localizer frequency is selected, the associated glide slope frequency will be selected automatically.

All controls of the Cessna 300 Nav/Com, except the omni bearing selector knob (OBS), which is located on the course indicator, are mounted on the front panel of the receiver-transmitter. The course indicator includes either a single pointer and related OFF flag for VOR/LOC indication only, or dual pointers and related OFF flags for both VOR/LOC and glide slope indications. The course indicator also incorporates a back-course lamp (BC) which lights when optional back-course operation is selected. In addition, when two or more radios are installed, a transmitter selector switch and a speaker-phone selector switch are provided. Each control function is described in Figure 1.

CESSNA 300 NAV/COM (TYPE RT-328T)

PILOT'S OPERATING HANDBOOK SUPPLEMENT

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- 1. HECKIVER-TRANSMITTER PREQUENCY INDICATOR.
- 2. NAVIGATION RECEIVER PREQUENCY INDICATOR.
- SQUELCH CONTROL Used to adjust signal threshold necessary to activate communication receiver audio. Clockwise rotation increases background notice (decreases squelch action); counterclockwise rotation decreases background notice.
- COMMUNICATION RECEIVER-TRANSMITTER MEGAHERTZ SELECTOR -Selects communication receiver-transmitter frequency in 1-MHz steps between 118 and 135 MHz.
- OFF/ON VOLUME CONTROL Turns set on and controls volume of audio from communications receiver.
- COMMUNICATION RECEIVER-THANSMITTER FRACTIONAL MEGA-HERTZ SELECTOR - Selects communication receiver-transmitter fractoreal frequency in .05-MHz steps between .000 and .950 MHz or between .025 and .975 MHz depending on position of 50-25 MHz selector switch (7).

Figure 1. Cessna 300 Nav/Com (Type RT-328T) (Sheet 1 of 2)

PILOT'S OPERATING HANDBOOK SUPPLEMENT

CESSNA 300 NAV/COM (TYPE RT-328T)

 90-25 FRACTIONAL MHz SKLECTOR SWITCH - In "50" position, enables communication whole MHz frequency readout to display and communication fractional MHz control to select fractional part of frequency in .05-MHz. steps between . 900 and .950 MHz. In "25" position, frequency shaplay and coverage in in .05-MHz steps between .025 and .975.

NOTE

The third-decimal-place digit is not shown on the receivertransmitter frequency readout.

- NAVIGATION HECKIVER MEGAHERTZ SELECTOR Selects navigation receiver frequency in 1-Mifx steps between 108 and 117 MHz; simultaneously selects paired glide alope frequency or DME channel.
- NAVIGATION RECEIVER VOLUME CONTROL Confrols volume of audio from navigation receiver only. Clockwise rotation increases audio level.
- NAVIGATION RECRIVER FRACTIONAL MEGAHERTZ SELECTOR Schools navigation receiver frequency in . 05-MHz steps between . 00 and . 95 MHz; simultaneously paired glide slope frequency or DME channel.
- COMBINED IDENTIFIER SIGNAL SELECTOR AND VOR SELF-TEST SELECTOR. SWITCH (D.-T SWITCH) - With VOR or LOC station selected, in ID position, elaction identifier is audible; in center (numerical) position, identifier in off; in T (numerical) on position, tests VOR margination circuits.
- COURSE DEVIATION POINTER Indicates deviation from selected omni bearing or localizer centerline.
- OFF/TO-FROM (OMNI) INDICATOR Operates only with VOR or localizer signal. "OFF" position (Rag) indicates unreliable signal. When "OFF" position disappears, indicator shows whether selected VOR course is "TO" or "FROM" the station (if LOC frequency is selected, indicator will only show "TO").
- RECIPROCAL COURSE INDEX Indicates reciprocal of selected VOR course.
- OMNI BEARING SELECTOR (OBS) Selects desired course to or from a VOR station.
- BC During LOC operation, when optional Back-Course operation in selected, amber lump illuminates to ident the pilot that CDI indication in reversed.
- 17. BEARING DIAL Rotated by OBS to select course at index.
- 18. COURSE INDEX Indicates selected VOR course.
- GLIDE SLOPE "OFF" PLAG When visible, indicates unreliable glide slope signal or no glide slope signal. The flag disappears when a reliable glide slope signal is being received.
- GLIDE SLOPE DEVIATION POINTER Indicates deviation from normal glide slope.

Figure 1. Cessna 300 Nav/Com (Type RT-328T) (Sheet 2 of 2)

CESSNA 300 NAV/COM (TYPE RT-328T) PILOT'S OPERATING HANDBOOK SUPPLEMENT

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed. However, the pilot should be aware that on many Cessna airplanes equipped with the windshield mounted glide slope antenna, pilots should avoid use of 2700 ±100 RPM (or 1800 ±100 RPM with a three bladed propeller) during ILS approaches to avoid oscillations of the glide slope deviation pointer caused by propeller interference.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed.

SECTION 4 NORMAL PROCEDURES

COMMUNICATIONS TRANSCEIVER OPERATION:

- OFF/VOL Control -- TURN ON and adjust to desired listening level.
- (2) XMTR SEL Switch -- SET to desired transceiver.
- (3) SPEAKER PHONE (or AUTO) Switch -- SET to desired mode,
- (4) 50-25 Fractional MHz Selector Switch -- SELECT desired frequency (does not affect savigation frequencies).
- (5) COM Frequency Selector Knobs -- SELECT desired operating frequency.
- (6) SQ Control -- ROTATE counterclockwise to decrease background noise as required.
- (7) Mike Button:
 - a. To Transmit -- DEPRESS and SPEAK into microphone.
 - b. To Receive -- RELEASE.

NAVIGATION RECEIVER OPERATION:

- (1) COM OFF/VOL Control -- TURN ON,
- (2) SPEAKER/PHONE (or AUTO) Switch -- SET to desired mode.
- (3) NAV Frequency Selector Knobs -- SELECT desired operating frequency.

PILOT'S OPERATING HANDBOOK SUPPLEMENT

CESSNA 300 NAV/COM (TYPE RT-328T)

- (4) NAV VOL Control -- ADJUST to desired audio level.
- (5) ID-T Switch:
 - To Identify Station -- SET to ID to hear navigation station identifier (Morse Code) signal.
 - To Filter Out Station Identifier Signal SET to CENTER (unmarked) position to include filter in audio circuit.
- (6) OBS Knob -- SELECT desired course.

TO SELF TEST VOR NAVIGATION CIRCUITS:

- (1) COM OFF/VOL Control -- TURN ON.
- NAV Frequency Selector Switches -- SELECT mable VOR station signal.
- (3) OBS Knob -- SET for 0" course at index; CDI pointer centers or deflects left or right, depending on bearing of organi; OFF/TO-FROM indicator shows TO or FROM.
- (4) ID-T Switch -- PRESS to T and HOLD at T; CDI pointer should center and OFF/TO-FROM indicator should show FROM.
- (5) OBS Knob -- TURN to displace course approximately 10" to either side of 0" (while holding ID-T switch at T); CDI pointer should deflect full scale in direction corresponding to course displacement. OFF/TO-FROM indicator should still show FROM.

NOTE

This test does not fulfill the requirements of FAR 91, 25,

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or several related external antennas, will result in a minor reduction in cruise performance.

SUPPLEMENT CESSNA 300 ADF

(Type R-546E)

SECTION 1

The Cessna 300 ADF is a panel-mounted, digitally toned automatic direction finder. It is designed to provide continuous I kHz digital tuning in the frequency range of 200 kHz to 1,699 kHz and eliminates the need for mechanical band switching. The system is comprised of a receiver, loop antenna, bearing indicator and a sense antenna. In addition, when two or more radios are installed, speaker-phone selector switches are provided, Each control function is described in Figure 1.

The Cessna 300 ADF can be used for position plotting and homing procedures, and for aural reception of amplitude-modulated (AM) signals.

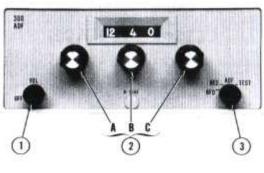
With the function selector knob at ADF, the Censua 300 ADF provides a visual indication, on the bearing indicator, of the bearing to the transmitting station relative to the nose of the airplane. This is done by combining signals from the sense antenna with signals from the loop antenna.

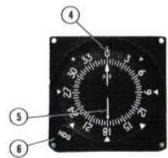
With the function selector knob at REC, the Cessag 300 ADF uses only the sense antenna and operates as a conventional low-frequency receiver.

The Cessna 300 ADF is designed to receive transmission from the following radio facilities: commercial broadcast stations, low-frequency range stations, FAA radio beacons, and ILS compass locators

3. FUNCTION SWITCH:

- BFO: Selects operation as communication receiver using only sense antenna and activates 1000-Hz tone beat frequency oscillator to permit coded identifier of stations transmitting keyed CW signals (Morse Code) to be heard.
- REC: Selects operation as standard communication receiver using only sense antenna.
- ADF: Set operates as automatic direction finder using loop and sense antennas.
- TEST: Momentary-on position used during ADF operation to test bearing reliability. When held in TEST position, slews indicator pointer clockwise; when released, if bearing is reliable, pointer returns to original bearing position.
- INDEX (ROTATABLE CARD) Indicates relative, magnetic, or true heading of aircraft, as selected by HDG control.
- POINTER Indicates station bearing in degrees of azimuth, relative to the nose of the aircraft. When heading control is adjusted, indicates relative, magnetic, or true bearing of radio signal.
- HEADING CONTROL (HDG) Rotates card to set in relative, magnetic, or true bearing information.





- OFF/VOL CONTROL Controls primary power and audio output level. Clockwise rotation from OFF position applies primary power to receiver; further clockwise rotation increases audio level.
- FREQUENCY SELECTORS Knob (A) selects 100-kHz increments of receiver frequency, knob (B) selects 10-kHz increments, and knob (C) selects 1-kHz increments.

Figure 1. Cessna 300 ADF Operating Controls and Indicators (Sheet 1 of 2)

CESSNA 300 ADF (TYPE R-546E) PILOT'S OPERATING HANDBOOK SUPPLEMENT

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed,

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed.

SECTION 4 NORMAL PROCEDURES

TO OPERATE AS A COMMUNICATIONS RECEIVER ONLY:

- (1) OFF/VOL Control -- ON.
- (2) Function Selector Knob -- REC.
- (3) Frequency Selector Knobs -- SELECT operating frequency.
- (4) ADF SPEAKER/PHONE Switch -- SELECT speaker or phone position as desired,
- (5) VOL Control -- ADJUST to desired listening level.

TO OPERATE AS AN AUTOMATIC DIRECTION FINDER:

- (1) OFF/VOL Control -- ON.
- (2) Frequency Selector Knobs -- SELECT operating frequency.
- ADF SPEAKER/PHONE Switch -- SELECT speaker or phone position.
- (4) Function Selector Knob -- ADF position and note relative bearing on indicator.
- (5) VOL Control -- ADJUST to desired listening level.

TO TEST RELIABILITY OF AUTOMATIC DIRECTION FINDER:

- Function Selector Knob -- ADF position and note relative bearing on indicator.
- (2) Function Selector Knob -- TEST position and observe that pointer moves away from relative bearing at least 10 to 20 degrees.
- (3) Function Selector Knob -- ADF position and observe that pointer returns to same relative bearing as in step (1).

PILOT'S OPERATING HANDBOOK

(TYPE R-546E)

TO OPERATE BFO:

- (1) OFF/VOL Control -- ON.
- (2) Function Selector Knob -- BFO.
- (3) Frequency Selector Knobs -- SELECT operating frequency.
- (4) ADF SPEAKER/PHONE Switch -- SELECT speaker or phone
- (5) VOL Control -- ADJUST to desired listening level.

NOTE

A 1000-Hz tone is heard in the audio output when a CW signal (Morse Code) is tuned in properly.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or several related external antennas, will result in a minor reduction in cruise performance.

PILOT'S OPERATING HANDBOOK SUPPLEMENT CESSNA 400 GLIDE SLOPE (TYPE R-443B)

SUPPLEMENT

CESSNA 400 GLIDE SLOPE

(Type R-443B)

SECTION 1

The Cessea 400 Glide Slope is an airborne navigation receiver which receives and interprets glide slope signals from a ground-based Instrument Landing System (ILS), it is used with the localizer function of a VIIF navigation system when making instrument approaches to an airport. The glide slope provides vertical path guidance while the localizer provides horizontal track guidance.

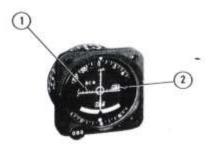
The Cessna 400 Glide Slope system consists of a remote-mounted receiver coupled to an existing navigation system, a panel-mounted indigator and an externally-mounted antenna. The glide slope receiver is designed to receive ILS glide slope signals on any of 40 channels. The channels are spaced 150 kHz apart and cover a frequency range of 329.15 MHz through 335.0 MHz. When a localizer frequency is selected on the NAV receiver, the associated glide slope frequency is selected automatically.

Operation of the Cessna 400 Glide Slope system is controlled by the associated navigation system. The functions and indications of a typical 100 series glide slope indicator are pictured and described in Figure 1. For functions and indications of the optional 400 series indicator or HSI Indicator, refer to the 400 NAV/COM (Type RT-428A) or HSI (Type IG-832A) write-ups if they are listed in this section as options.

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed. However, the pilot should be aware that on many Cessna airplanes equipped with the windshield-mounted glide slope antenna, pilots should avoid use of 2700±100 RPM with a two-bladed propeller (or 1800±100. RPM with a three-bladed propeller) during ILS approaches to avoid oscillations of the glide slope deviation pointer caused by propeller interference.

PILOT'S OPERATING HANDBOOK SUPPLEMENT



- GLIDE SLOPE DEVIATION POINTER Indicates deviation from normal glide slope.
- GLIDE SLOPE "OFF" FLAG When visible, indicates unreliable glide slope signal or improperly operating equipment. The flag disappears when a reliable glide slope signal is being received.

CAUTION

Spurious glide slope signals may exist in the area of the localizer back course approach which can cause the glide slope "OFF" flag to disappear and present unreliable glide slope information. Disregard all glide slope signal indications when making a localizer back course approach unless a glide slope (ILS BC) is specified on the approach and landing chart.

Figure 1. Typical 300 Series VOR/LOC/ILS Indicator

PILOT'S OPERATING HANDBOOK SUPPLEMENT CESSNA 400 GLIDE SLOPE (TYPE R-443B)

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed,

SECTION 4 NORMAL PROCEDURES

TO RECEIVE GLIDE SLOPE SIGNALS:

- NAV Frequency Select Knobs -- SELECT desired localizer frequency (glide slope frequency is automatically selected).
- (2) NAV/COM ID-T Switch -- SELECT ID position to disconnect filter from audio circuit.
- (3) NAV VOL Control -- ADJUST to desired listening level to confirm proper localizer station.

CAUTION

When glide slope "OFF" flag is visible, glide slope indications are unusable.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed.

Brad E. Isham P.O. Box 193 Valley Center, Kansas 67147 (316) 755-0713

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CESSNA R172K
WITH
BRAD E. ISHAM 210 HORSEPOWER MODIFICATION INSTALLED

Registration Number

N172CB

10-360-KB

Registration Number
Serial Number

R1722290 288586-R

This supplement must be included in Section 9 of the pilot's operating handbook and FAA approved Airplane Flight Manual dated July 1, 1978 or subsequent reissue date when Brad E. Isham 210 brake horsepower (BHP) engine installation is installed in accordance with STC's SE1436CE for the engine, and SA1437CE for the airplane (use of engine and optional Model P-1000 tachometer). The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures and performance information not contained in this supplement, consult the basic airplane flight manual.

> Aircraft Certification Office Federal Aviation Administration Wichifa, Kansas

Date:

October 17, 1978

A Approved: Everett W. Pittman, Manager

Revision Date: August 4, 2000

Brad E. Isham P.O. Box 193 Valley Center, Kansas 67147 (316) 755-0713

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CESSNA R172K
WITH
BRAD E. ISHAM 210 HORSEPOWER MODIFICATION

	OC		

		EGG Gr. INE FIGURE	
Revision Number A B	Pages Affected all 2 all	Description of Change Original Original Added Floatplane Added Floatplane Added Floatplane Perision page, changed address, added agine model designation, revised signature block.	oker
С	all	Revised basic manual 08/04/90 pages 1 through 4 to an electronic media format, consistency, and added P-1000 Tachometer as Appendix 1 pages 1 through 8.	

^{*} For, Manager, Wichita Aircraft Certification Office

Page 2 of 4

SECTION 1. GENERAL:

This modification consists of two Supplemental Type Certificates (STC). STC SE1436CE allows modification of the Continental 10-360-K and 10-360-KB engine to run at 210 horsepower for takeoff. STC SA1437CE allows use of the modified engine in the Cessna R172K sirptanes. If the simplane is equipped with the Horizon instruments, Inc. P-1000 Digital Tachometer refer to Appendix 1 of this AFMS.

SECTION 2. LIMITATIONS:

Engine Model Number:

10-360-KC/SE1436CE or 10-360-KBC/SE1436CE

Engine Operating Limits for takeoff and continuous operations:
Takeoff Power -- 5minutes -- Full Throttle, 2800 RPM (210 BHP)
Maximum Continuous Power -- 2800 RPM (195BHP)
Propeller Blade Angle at 30 inch station:
Landplane -- Low 9.7 degrees
Floatplane -- Low 9.8 degrees

Powerplant Markings:

Tachometer:

2200 through 2600 -- green arc 2601 through 2600 -- yellow arc 2601 -- red radial line

Fuel Flow:

3 psi - red radial line 4.5 through 11.5 gai/hr - green arc 18 gai/hr (18.55 psi) - red radial line

Placards:

Adjacent to existing fuel flow placard:

		F																-	
FUL		ш	R	8,	Σ	I.	1	J	d	E	d	à	D	y	Ž.	å	В	2572	RPM
51.											ú	ú					÷	.17	CPH
4000	F		Ī		ũ					ŀ			2					.15	GPH
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SECTION 3. EMERGENCY PROCEDURES - No Change

SECTION 4. NORMAL PROCEDURES:

Takeoff:

Power -- Full Throttle and 2800 RPM

SECTION 5. PERFORMANCE:

The performance of this airplane equipped with STC SE1436CE and SA1437CE is equal to or better than the performance as listed in the original FAA approved Airplane Flight Manual.

SECTION 6. EQUIPMENT LIST - No Change

SECTION 7. AIRPLANE & SYSTEMS DESCRIPTIONS -- No Change

SECTION 8. AIRPLANE HANDLING SERVICE & MANITENANCE -- No Change

FAA Approved Date: October 17, 1978 Revision A: January 28, 1982 Revision B: January 28, 1991 Revision C: August 4, 2000

Page 4 of 4

SECTION 1. GENERAL:

This modification consists of two Supplemental Type Certificates (STC). STC SE1436CE allows modification of the Continental IO-360-K and IO-360-KB engine to run at 210 horsepower for takeoff. STC SA1437CE allows use of the modified engine and the Horizon Instruments, Inc. Model P-1000 Techometer in the Cesana R172K airplanes.

SECTION 2. LIMITATIONS:

Engine Model Number:

10-360-KC/SE1436CE or

IO-360-KBC/SE1436CE

Engine Operating Limits for takeoff and continuous operations:

Takeoff Power — 5minutes — Full Throttle, 2800 RPM (210 BHP)

Maximum Continuous Power — 2600 RPM (195BHP)

Propeller Blade Angle at 30 inch station:

Landplane — Low 9.7 degrees

Floatplane — Low 9.8 degrees

Powerplant Markings:

Tachometer RPM ARC Placarding: RESTRICTED: 2801+ CAUTION: 2601 – 2800 NORMAL: 2200 – 2600

The face of the Tachometer is placarded with the Engine RPM Operating Range information that normally appears on the face of the mechanical tachometer. This includes the red restricted, yellow cautionary or transient, and green normal operation RPM ranges.

A placard is provided to label the newly installed circuit breaker for operation with the P-1000 Tachometer. This placard is placed on the circuit breaker panel. See Figure 1.

TACHOMETER

Figure 1, Circuit Breaker Placard

FAA Approved Date: Odjober 17, 1978 Revision A: January 28, 1982 Revision B: January 28, 1991 Revision C: August 4, 2000 Appendix 1, Page 2 of 8 For use when the Horizon P-1000 Digital Tachometer is installed.

Fuel Flow:

3 psi – red radial line 4.5 through 11.5 gal/hr – green arc 18 gal/hr (18.55 psi) – red radial line

A fuel flow placard is added adjacent to the existing fuel flow placard, Figure 2.

	FUEL FLOW	
FULL TH	ROTTLE AND 2800 RE	M
SL	17 GI	ч
4000 FT.		PH
8000 FT.	13 GI	PH
12006 FT.	11 G	PH

Figure 2, Fuel Flow Placard

See SECTION 3. EMERGENCY PROCEDURES -- No change.

SECTION 4. NORMAL PROCEDURES:

Takeoff

Power - Full Throttle and 2800 RPM

The operation of the Electronic Digital Engine Tachometer is straight-forward. After power is supplied to the Tachometer, the engine is started, and the self tests are performed, the default display of engine RPM appears on the display. The default display is insured via the use of internal timers that will restore the display to the current RPM even in the event that one of the panel buttons becomes stuck or defective.

Internally, two independent tachometers watch the pulses received from each magneto. Each tachometer is accurate to less than 1 RPM and can be individually enabled/disabled via buttons on the face of the Tachometer.

Engine operation ranges are indicated on the large green, yellow and red LEDs, see Figure 3, items D, E, and F.

FAA Approved Date: October 17, 1978 Revision A: January 28, 1982 Revision B: January 28, 1991 Revision C: August 4, 2000 Three small LED magneto system aftert indicator lights are located within the "Status" area on the upper left corner of the Tachometer face, see Figure 3, items A, B, and C. The left and right red afert indicator lights, when illuminated, indicate, because of a loss of ignition signal to the tachometer, a possible mallunction of the respective left or right magneto ignition system.

While performing a magneto check during engine run-up, the red **afert** indicator lights will illuminate, thus identifying the grounding of the respective right of left magneto systems.

Ignition Switch Position	Tachometer Magneto Alert Indicators							
a the way to the t	Right	Left						
OFF	ON	ON						
R	OFF	ON						
L	ON	OFF						
вотн	OFF	OFF						

Between the left and right red magneto ignition system afert indicators is a yellow "RPM Synchronization" indicator. This small yellow indicator is illuminated when there is a difference of more than 80 RPM between the right and left tachometers. This indicator also may flicker during extreme RPM excursions of the engine.

There are three panel buttons, see Figure 3, items I, J, and K. Each button has two modes of operation:

Press-and-hold, Press-and-release.

Press-and-hold button operations instruct the Tachometer to perform a specific operation when a button is pressed and held for more than 2/3 of a second.

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Appendix 1, Page 4 of 8
For use when the Horzon P-1000 Digital Tachometer is installed.

Press-and-hold button operations are placarded on the face of the Tachometer above each button.

Similarly, press-and-release button operation instructs the Tachometer to perform a specific operation when a button is pressed and released in less than 2/3 of a second. Press-and-release button operations are placarded on the face of the Tachometer below each button.

PRESS AND HOLD OPERATIONS:

The left button, K, upon depression, will cause the Tachometer to display the non-fractional portion (0000.) of the current accumulated engine hours. When the button is released, the fractional part of the engine hour (.00) is displayed for a short period of time. The clock is started whenever the engine RPM exceeds 800 RPM and is recorded in real hours.

The right button, I, upon depression, will cause the Tachometer to display the current contents of the RPM trap. This trap records the highest engine RPM achieved before the button was pressed.

The middle button, J, upon depression, clears the RPM trap. During depression of the switch, the RPM trap is zeroed. When the button is released, the trap will record the current engine RPM.

PRESS AND RELEASE OPERATIONS:

During normal operation, the Tachometer presents the average of the left and right internal tachometers on the display. However, a mechanism exists to mask either tachometer from the display, leaving the remaining tachometer to display its RPM.

A masked tachometer is indicated by the regular flashing of the right or left signal loss status indicator LEDs. This feature is handy when attempting to determine magneto/ignition problems.

Quickly pressing and releasing the left button, K, causes the Tachometer to mask or un-mask the left internal tachometer.

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For use when the Horizon P-1000 Digital Techometer is installed.

Quickly pressing and releasing the right button, I, causes the Tachometer to mask or un-mask the right internal tachometer.

An internal interlock prevents masking both internal tachometers at the same time, therefore preventing total loss of RPM indication.

If the tachometer is masked, pressing the button will un-mask it and allow its RPM to show on the display, and conversely, if the tachometer is un-masked, pressing the button will mask it from display.

Quickly pressing and releasing the center button, J, causes the Tachometer to alternately dim or brighten the LED indicators.

The LED indicators, see Figure 3, items A through F, are bright enough to overcome daylight washout conditions. However, during night operations the large green, yellow, and small red and yellow LEDs are dim-able. The large red LED still operates at full intensity to maximize the possibility of gaining pilot attention during excursion into restricted RPM ranges.

Section V. Performance:

The performance of this airplane equipped with STC SE1436CE, SA1437CE and the P-1000 Tachometer is equal to or better than the performance as listed in the original FAA approved Airplane Flight Manual.

Section VI. Weight & Balance and Equipment List:

Negligible change.

Section VII. System Description:

There is no change to the system description for STC's SE1436CE and SA1437CE. The Horizon Instruments' Model P-1000 Electronic Digital Engine Techometer is an electronic replacement for the existing mechanical cable-driven techometer.

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Appendix 1, Page 5 of 8
For use when the Horizon P-1000 Digital Tachometer is installed.

The Tachometer differs from the existing mechanical tachometer in the following areas:

The Tachometer is fully electronic and uses timing information from the primary leads ("P-Leads") of both the left-hand and right-hand magneto ignition systems, operating the Tachometer's internal left and right tachometers, to determine engine RPM instead of a rotating cable driving a magnetic slip-clutch analog type display;

The Tachometer uses super-bright LED indicators to indicate normal range engine operation (Green LED), cautionary range operations (Yellow LED), and do-not-exceed or restricted range RPM (Red LED) as substitutes for the ranges normally painted on the tachometer dial.

The primary display consists of four 1/2* high characters on a back-lit Liquid Crystal Display (LCD), easily and clearly visible in daylight and night flying.

Diagnostic features available include: alert indication of loss of magneto signal, indication that both magnetos are reporting different RPM, and the ability to mask RPM from either magneto.

Magneto test, via the ignition switch, is indicated by the illumination of the grounded magneto system's **alerf** light and the display of the amount of RPM that the engine has slowed. This is indicated as a negative number on the display (number is preceded by a leading hyphen or minus sign):

LED indicators are dim-able (except the restricted or red-light indicator) to reduce pilot annoyance during right flying;

A specific engine hour is pre-set at the factory to accommodate tachometer changes on non-zerotime engines. Engine time may be changed only by Horizon Instruments, Inc., and must be coordinated with an authorized FAA Airframe and Powerplant mechanic or Repair Facility. Horizon Instruments, Inc. must be provided with the certificate number of a Mechanic, or Repair Station with an instrument Rating of Class 2, per FAR 145.31. Refer to Horizon Instruments, Inc. Procedure Document P116042 for additional information.

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- A) Right Magneto System Alert Indicator
- B) RPM Sync Loss Indicator
- C) Left Magneto System Alert Indicator
- D) Normal Operating Green RPM Range Indicator
- E) Cautionary Yellow RPM Range Indicator
- F) Restricted Red RPM Range Indicator
- G) Limitations Placard
- H) 4 Digit LCD Display
- Right switch for Overspeed Trap display and right tachometer enable/disable
- J) Middle switch for Overspeed Trap Clear and LED indicator dimming
- K) Left switch for engine hours display and left tachometer enable/disable.



Figure 3, Basic Tachometer Features

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Appendix 1, Page 8 of 8 For use when the Horizon P-1000 Digital Tachometer is installed.

SECTION 8: ADDITIONAL INFORMATION:

For additional information about the operation and installation, refer to Horizon Instruments, Inc. Document Number P103050, Operator/Installation Manual.

The exterior of the Tachometer is numeritated with all pertinent operational and configuration information, see Figure 5.

> Horizon Instruments, Inc. 556 S. State College Blvd. Fullerton, CA 92631

Model: P-1000 Digital Tachometer H/W P/N: P100-058-619-00 Software P/N: P132001, VERS. 1.06 6-30VDC, 150 MA., 1/2 LB. SERIAL NUMBER: XXXXXXX RESTRICTED: 2801 – UP CAUTION: 2601 - 2800 NORMAL: 2200 - 2600 6 CYLINDERS APPLICATION: R172K WITH STC SA1437CE PATENT NUMBER: 4,811,255

Figure 5, Example of Product Identification Nameplate.

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S-TEC CORPORATION RT. 3, BLDG. 946 WOLTERS INDUSTRIAL COMPLEX MINERAL WELLS, TEXAS 76067

FAA APPROVED SUPPLEMENT

TO PILOT'S OPERATING HANDBOOK AND/OR FAA APPROVED AIRPLANE FLIGHT MANUAL FOR

CESSNA MODELS R172J AND R172K

S-TEC SYSTEM 50 TWO AXIS AUTOMATIC FLIGHT GUIDANCE SYSTEM (14 VOLT SYSTEM)

REG. NO. N172CB SER. NO. 81722290

This supplement must be attached to the applicable FAA Approved Airplane Flight Manual, Pilot's Operating Handbook, or Pilot's Operating Handbook and FAA Approved Airplane Flight Manual modified by the installation of S-TEC System 50 Autopilot Model ST-183-50 installed in accordance with STC SA5314SW-D. The information contained herein supplements the information of the basic POH and/or AFM: for Limitations, Procedures and Performance information not contained in this Supplement, consult the basic POH and/or AFM.

SECTION I

GENERAL

This manual is to acquaint the pilot with the features and functions of the System 50 Two Axis Autopilot and to provide operating instructions for the system when installed in the above aircraft model(s). The aircraft must be operated within the limitations herein provided when the autopilot is in use.

SECTION II

OPERATING LIMITATIONS

Autopilot operation prohibited above 140 KIAS.
 Autopilot must be "OFF" during take-off and landing.
 Flap extension limite to 10^o during operations in altitude hold mode.

FAA/DAS APPROVED P/N: 89427 DATE: 5-08-84



SECTION III

EMERGENCY OPERATING PROCEDURES

In the event of an autopilot malfunction, or any time the autopilot is not performing as expected or commanded, do not attempt to identify the system problem. Immediately regain control of the aircraft by overpowering the autopilot as necessary and then disconnect the autopilot. Do not reengage the autopilot until the problem has been identified and corrected.

- Autopilot may be disconnected by:
 - Depressing the "AP Disconnect" Switch on the left
 - horn of the pilot's control wheel (if installed). Depressing the "ON-OFF" Switch on the autopilot programmer unit.
 - Moving autopilot master switch to "OFF" position.
 - Pulling the autopilot circuit breaker.
- 2. Altitude loss during a malfunction and recovery.
 - a. The following altitude losses and bank angles were recorded after a malfunction with a 3 second recov-Loss

Configuration	Bank Angle/Altitude
Climb	45° / -20'
Cruise	55° / -300'
Descent	45° / -375'

b. The following altitude losses and bank angles were recorded after a malfunction with a 1 second recov-Bank Angle/Altitude Loss ery delay:

Configuration	Bank Angle/Altitu	5
Maneuvering	18° / -100'	
Approach (coupled or uncoupled)	200 / -20'	

The above values are the worst case for all the models covered by this document.

SECTION IV

NORMAL OPERATING PROCEDURES

4-1 SYSTEM DESCRIPTION

The System 50 is a pure rate autopilot which uses an inclined rate gyro in the Turn Coordinator instrument as the primary roll and turn rate sensor and an accelerometer and an absolute pressure transducer as pitch rate sensors. The turn coordinator includes an autopilot pick-off, a gyro RPM detector and an instrument power monitor. Low electrical power will cause the instrument "flag" to appear while low RPM will cause the autopilot to disconnect. The autopilot includes an automatic pre-flight test feature that allows a visual check of all the annunciator lamps and checks critical elements of the accelerometer system. The test feature will not enable autopilot function unless the automatic test sequence is satisfactorly completed.

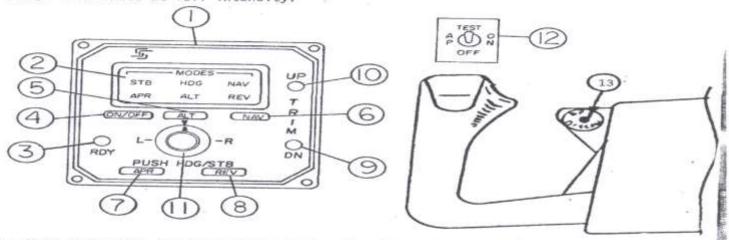
FAA/DAS APPROVED 89427 P/N DATE: 5-08-84



When the pre-flight test is satisfactorily completed and when the rate gyro RPM is correct, the green "RDY" light will illuminate indicating the autopilot is ready for the functional check and operation. The autopilot cannot be engaged unless the "RDY" light is illuminated. When the system is equipped with the optional 3" Air Driven Directional Gyro (D.G.) or a compass system, directional information is provided to the autopilot by a heading bug in the

Pitch axis control is provided for the altitude hold function by use of the accelerometer and the pressure transducer. When the altitude hold mode is engaged an elevator trim sensor in the pitch servo will detect the elevator trim condition. When elevator trim is necessary to re-establish a trimmed condition, trim indicator lights on the programmer unit will illuminate to indicate the direction to trim to restore a trimmed condition.

The indicator and annunciator lamp brilliance is controlled through the aircraft instrument light rheostat, except for the "trim" indicators which always illuminate at full intensity.



- Mode Programmer and Annunciator Unit Provides mode switches and annunciation for the system.
- 2. Mode Annunciation Window Displays mode in use.

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Page 3 of 7



- Ready Light (RDY) Green RDY lamp illuminates when autopilot is ready for engagement.
- 4. ON-OFF Stabilizer Mode Switch Momentary actuation engages roll system in stabilizer (STB) Mode and allows use of the turn knob (Item 11) to command turn rate desired. When the system is operating a momentary actuation will disengage the system and cancel all annunciations.
- Altitude Mode Switch (ALT) Momentary actuation will engage altitude hold mode or disengage altitude mode if previously engaged. This function is also available by use of an optional control wheel mounted altitude engage/disengage switch, for added convenience.
- Navigation Mode Switch (NAV) Momentary activation will engage the VOR Tracking Mode. This mode provides low system gain for comfortable cross country tracking.
- Approach Mode Switch (APR) Momentary actuation will engage the VOR or Localizer Tracking Mode. This mode provides a higher level of system gain for more active tracking of VOR or Localizer front course signals.
- Reverse Approach Mode Switch (REV) Momentary activation will engage the reverse tracking mode for use when tracking a localizer backcourse. This mode provides the same system gain as the APR Mode with reverse needle sensing.
- Down TRIM Light (DN) This light illuminates to indicate the need for nose down trim. When both the UP and DN lights are not lighted, the aircraft is in trim longitudinally.
- UP Trim Light (UP) This light illuminates to indicate the need for nose UP trim.
- 11. Turn Knob and Heading Switch The turn knob allows the selection of turn rates up to standard rate(3°/sec.) either right or left. Turning the knob to the right or left will cause a turn that is proportional to the displacement of the knob from center. For level flight the electronics provide a small dead zone of approximately 10° at the center indice. To actuate heading mode, momentarily depress the turn knob. To return to STB Mode from HDG, depress the turn knob. When the system is operating in any radio mode and the system is equipped with a D.G., depressing the turn knob will return the system to HDG Mode directly.
- Autopilot Master ON-OFF Test Switch Refer to Pre-Flight Procedures for Operating details.

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- 13. Optional remote AP disconnect switch and/or remote altitude hold engagedisengage switch.
- 4-2 PRE-FLIGHT PROCEDURES

NOTE: During system functional checks the system must be provided adequate DC voltage (12 or 24 VDC minimum as appropriate)

MANDATORY PRE-FLIGHT TEST

- 1. AP Master Switch Move to TEST position.
 - Observe all lights and annunciators illuminate.
 - Observe the following light sequence of the trim indicators: (Sequence requires 9 seconds)
 - 1. Initially both trim UP & DN lights are illuminated.
 - Up light extinguishes momentarily and relights.
 DN light then extinguishes and will remain off.
- AP Master Switch Move to ON position, observe ready (RDY) light ill-uminates. Autopilot can be engaged and disengaged repeatedly without repeating the test sequence until electrical power is removed. Once power is interrupted the test must be reconducted to get a ready indication. If the ready light does not illuminate after the test a failure to pass the test is indicated and the system will require service. NOTE: ALTITUDE MODE CANNOT BE ENGAGED UNLESS POWER IS ON

SYSTEM FUNCTIONAL TEST

- Depress ON-OFF Switch STB Annunciator illuminates. Rotate turn knob left and right, observe control wheel moves in corresponding direction. Center turn knob.
- 4. Set D.G. and place bug under lubber line (if installed) push turn knob to engage HDG mode. Observe HDG annunciator. Move HDG bug left and right observe proper control wheel motion.
- Overpower Test Grasp control wheel and overpower roll servo left and right. Overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.
- Turn on NAV Radio, with valid NAV signal, engage NAV Mode and move VOR OBS so that VOR needle moves left 6. Radfo Check - A. and right - control wheel should follow the direction of needle movement.

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- B. Select REV Mode the control wheel should rotate in opposite direction of the NAV needle.
- C. Select APR Mode the control wheel should again follow radio needle movement and with more authority than produced by NAV Mode.
- 7. Move control wheel to level flight position Engage ALT Mode. Move control wheel fore and aft to overpower pitch servo clutch. Overpower action should be smooth with no noise or jerky feel. If unusual sounds or excessive play is detected, have the servo installation inspected prior to flight.
- 8. Trim Check Manually apply back pressure to control wheel for 2-3 seconds observe the DN trim light illuminates. Apply forward pressure to the control wheel for 2-3 seconds, observe the UP trim light illuminates. Move the control wheel to center observe both UP/DN lights extinguish.
- 9. Hold control wheel and depress ON-OFF Switch note that roll and pitch servo release. Move control wheel to confirm roll and pitch motions are free, with no control restriction or binding. If the optional disconnect switch is installed it may be used to effect the disconnect for this check.
- 4-3 IN-FLIGHT PROCEDURES

NOTE: The required pre-flight test can be conducted in the air if necessary. It should be noted, however, that when the UP/DN lights are flashing the pitch servo will momentarily engage and disengage. This alternate engage-disengage sequence is part of the test function. Because of the engage-disengage sequence the test should not be conducted while maneuvering.

- 1. Check RDY light on.
- 2. Trim aircraft for existing flight condition.
- 3. Center turn-knob depress ON-OFF Switch.
- 4. Set turn knob to level or turning flight, as desired.
- Set HDG bug to desired heading (if installed) and depress turn knob to engage heading mode, select headings as desired.
- At desired altitude, depress ALT Mode Switch. Trim aircraft as necessary to establish cruise condition - disengage ALT Mode to climb or descend.

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VOR TRACKING AND VOR-LOC APPROACH

- 1. Tune NAV receiver and select radial.
- Maneuver aircraft to selected radial (or localizer) within $^\pm$ 1 needle width and within 10^0 of the course heading.
- 3. Engage NAV Mode for VOR tracking.
- 4. Engage APR Mode for VOR or LOC approach.

To track the localizer front course outbound to the procedure turn area. maneuver to the localizer center and, when on the outbound heading, select REV Mode. To track the localizer back course inbound, maneuver to the localizer back course center and, when on the inbound heading, select REV

Approach Mode may be used to track VOR radials cross country, if desired. Use of APR Mode for cross country tracking may result in some course scalloping if the VOR signal is weak or otherwise "noisey". In areas of poor signal quality NAV Mode may provide more accurate tracking even with reduced gain.

SECTION V

OPERATIONAL DATA

Text of this Section not affected by installation of this equipment.

SECTION VI

REQUIRED OPERATING EQUIPMENT

Text of this Section not affected by installation of this equipment.

SECTION VII

WEIGHT AND BALANCE

Text of this Section not affected by installation of this equipment.

APPROVED BY

James

Irwin

S-TEC CORPORATION

DAS 5 SW P/N 89427

DATE: 5-08-84

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Airplane Flight Manual Supplement for AML STC SA04112CH

1810 NDSU Research Circle N Fargo, ND 58102 Doc No: 608586-000075, Rev 2:0

FAA-APPROVED

Airplane Flight Manual Supplement

Appareo Stratus ES/ESG

A	DS-B Out Transponder
Aircraft Make and N	Model: Cessner 172-XP
Registration Number	er: N172CB
Serial Number:	R1722290
	ist be attached to the FAA-Approved Airplane Flight s ES/ESG is installed in accordance with
the basic manual on performance, and lo	tained in this document supplements or supersedes ly in those areas listed. For limitations, procedures, ading information not contained in this supplement, plane Flight Manual.
FAA-Approved	Manager, Southwest Flight Test Section, AIR 713 Federal Aviation Administration Ft. Worth, Tx
	Date: Z/as/ess

Page 1 of 7

Airplane Flight Manual Supplement for AML STC SA04112CH

1810 NDSU Research Circle N Fargo, ND 58102 Doc No 606586-000075, Rev. 2.0

Log of Revisions

Revision	Pages Affected	Change Description	FAA Approved	Date
1.0	All	Initial Release		
1.1	All	CM 10298		
1.2	All	CM 10631		
1.3	All	CM 10938		
1.4	All	CM 11058		
1.5	All	CM 11113		
1.6	All	CM 11317	Steve Lardinois	7/7/16
1.7	All	CM 13060	Steve Lardinois	4/12/17
2.0	АШ	Added Stratus ES	Manager, Southwest Flight Test Section, AIR 713 Federal Aviation Administration Ft Worth, Tx	4 feefens

FAA APPROVED
Date: SEP 2 0 2017

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Airplane Flight Manual Supplement for AML STC SA04112CH

1610 NDSU Research Circle N Fargo, ND 58102 Dec No: 506586-000075, Rev. 2.0

Related Documentation

Information specific to the normal operation of Stratus ES/ESG can be found in the Stratus ES/ESG Pilot's Guide (Appareo document number 600890-000049). Additional information about the operation and maintenance of Stratus ES/ESG can be found in the documents below.

Document Number	Title
600840-000032	Stratus ES/ESG Installation Instructions
600845-000025	Stratus ES/ESG Instructions for Continued Airworthiness
601837-000024	Stratus ES/ESG Installation Drawings and Wiring Diagrams

To view the most current version of this document, go to appareo com/dealer-portal or www.appareo.com/resources

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Airplane Flight Manual Supplement for AML STC SA04112CH

1810 NDSU Research Circle N Fargo, ND 58102 Doc No. 806586-000075, Rev. 2.0

Chapter 1. General

Stratus ES/ESG by Appareo is an ADS-B Out transponder designed to help pilots meet the FAA 2020 mandate. Stratus ES/ESG responds to legacy Mode A/C interrogations and Mode S interrogations from both ground radar and airborne collision avoidance systems. Stratus ES/ESG are 1090 ES transponders, where Stratus ES connects to an external GPS and Stratus ESG has a certified WAAS GPS in the same box.

Chapter 2. Operating Limitations

- Stratus ES/ESG meets 14 CFR 91.227 ADS-B Out equipment performance requirements. Ensure that the system is functioning properly, including verifying the following items:
 - Stratus ES/ESG transponder display is functional.
 - GPS integrity is assured. The icon will display if GPS integrity is assured.
 - No built-in-tests (BITs) were detected by the system. If a BIT failure is detected, the A icon will display along with an error message describing the BIT code.
- The Stratus ES/ESG Pilot's Guide (600890-000049) must be immediately available to crew members whenever Stratus ES/ESG is in operation.
- Stratus ES/ESG must operate with current software. Software listed below is current as of the time of publication of this document.

Software	Part number	Revision (or later FAA approved)
Embedded Hardware (FPGA)	501010-000109	R04
Software (DSC)	501010-000113	R06

Chapter 3. Emergency Procedures
No change

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Chapter 4. Normal Procedures

 When directed by ATC to suppress pressure altitude reporting, use Stratus ES/ESG's ON key.

See the Stratus ES/ESG Pilot's Guide (Appareo document number 600890-000049) for a full description of Stratus ES/ESG's function.

Chapter 5. Abnormal Operating Procedures

- The location of the circuit breaker will generally be located on the avionics circuit breaker panel. Location of the breaker may vary with each aircraft. The breaker has a rating of 5 amps and is labeled "XPNDR."
- If the circuit breaker opens, it may be reset only once.
- Use the table below to troubleshoot possible problems with Stratus ES/ESG.

Problem	Troubleshooting Steps
GPS information is not being received	Verify that the aircraft has a clear view of the sky.
	NOTE: Initial GPS fix could take up to 20 minutes.
The power key does not power on Stratus ES/ESG	Verify that the power key is not stuck.
	Verify that the circuit breaker has not tripped.
	If it has tripped: Reset the circuit breaker switch and try the power key again.
	NOTE: If the circuit breaker opens it may be reset only once.
	If it did not trip: Contact your dealer for further assistance.

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The screen displays a BIT failure The display screen will display a warning message and degraded state indicator A if any of Stratus ES/ESG's BITs fail.	The Stratus ES/ESG screen might display a warning message with one of these instructions. See below for how to assess the failure: PRESS FUNC TO CLEAR: A non-critical error has been detected. Stratus ES/ESG will run in a degraded state until the error is resolved. Contact your dealer for further assistance.
	PLEASE RESTART UNIT: A critical error has been detected. Restarting the unit might fix the error. If the message returns after restarting, contact your dealer for further assistance.
	PLEASE SHUTDOWN UNIT: A critical error has been detected. Power off the unit and do not turn it back on. Contact your dealer for further assistance.
	WAITING TO BE UNSTUCK: A key has been depressed for more than 20 seconds. If a key is stuck, try to unstick the key.
	 WAITING FOR RELEASE. The external suppression input is constantly in a suppressed state. Contact your dealer for further assistance.
_	 ATTEMPTING TO RECOVER: A squitter rate error has been detected. The transponder may recover itself, but if it does not, restart the unit. If the message returns after restarting, contact your dealer for further assistance.

Date SEF 2 0 2017

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Airplane Flight Manual Supplement for AML STC SA04112CH

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Chapter 6. Performance

No change.

Chapter 7. Mass and Balance/Equipment Lists

See aircraft Weight & Balance information for current Basic Empty Weight, Center of Gravity (CG), and Moment.

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STRATUS

STRATUS

STRATUS ES/ESG PILOT'S GUIDE

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WARNINGS

- Read this Pilot's Guide before your first flight with Stratus ES/ESG.
- Squawk codes 7500 (hijacking), 7600 (radio failure), and 7700 (emergency) are reserved for emergencies. There may be other reserved codes, depending on the region you are flying in. It is the pilot in command's responsibility to comply with their jurisdiction's operating rules and regulations.
- Use a dry cloth to clean Stratus ES/ESG. If necessary, you can use a lightly damp cloth with a solution of mild detergent. Do not use cleaners containing ammonia, acetone, or other strong acids or bases to clean the Stratus ES/ESG display or faceplate.
- This document must always remain in the aircraft that has Stratus ES/ESG installed.

1. About Stratus ES/ESG

Stratus ES/ESG by Appareo is an ADS-B Out transponder designed to help pilots meet the FAA 2020 mandate. Stratus ES/ESG responds to legacy Mode A/C interrogations and Mode S interrogations from both ground radar and airborne collision avoidance systems. Stratus ES/ESG are 1090 ES transponders, where Stratus ES connects to an external GPS and Stratus ESG has a certified WAAS GPS in the same box.

Using Stratus ES/ESG

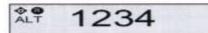


2.1. Usage limitations

There are no limitations associated with the usage of Stratus ES/ESG.

2.2. Default screen

The Default screen displays the currently selected mode, squawk code, and any event indicators.



2.3. Event indicators

When certain events occur, an event indicator will appear on your Stratus ES/ESG display. The table below describes each indicator's meaning.

Indicator	Meaning
•	ADS-B transmission contains GPS position information with a radius of containment under 1 nautical mile.
®	A response was transmitted from a Mode A/C/S interrogation. The indicator will time out if another reply does not occur within one second.
A	A built-in-test (BIT) has failed. See Section 4 for more information about BIT failures.

2.4. Mode selection keys

Use the mode selection keys to change the transponder mode. The table below describes each of these modes.

Mode	Key	Description
Off	PWR	Stratus ES/ESG is powered off.
Standby	SBY	Stratus ES/ESG is powered on and does not send responses to any ATC interrogations.
Altitude	ALT	Stratus ES/ESG is powered on and responds to all Mode A/C/S interrogations. Altitude is reported.
Ground	(none)	Stratus ES/ESG is powered on and in ALT or On mode, but does not report altitude. Ground mode is automatically detected. Press the ALT or ON key to override Ground mode. Press SBY to remove this override.
On	ON	Stratus ES/ESG is powered on and responds to all Mode A/C/S interrogations, but altitude reporting is suppressed.

2.5. FUNC key

Press the FUNC key or the arrow keys to switch from the default screen to the Pressure Altitude screen, GPS screen, Flight ID screen, and Brightness screen. These screens are described below.

Pressure Altitude screen: Displays the current pressure altitude. If no valid altitude is detected or Stratus ES/ESG is in On mode, the altitude field will be replaced by dashes.

ALT 1234 PRESS ALT FL120

GPS screen: Displays the aircraft's GPS position in degrees latitude and longitude. If no GPS signal is being received, the latitude and longitude fields will be replaced by dashes.

ALT 1234 LAT/LON 46°54 2N 136°48 6E

Flight ID screen: Displays the currently entered Flight ID.

1234 FLIGHT ID N9990ZZZ

Brightness screen: Allows for adjustment of screen brightness while in flight. Press ENT, then the left or right arrow keys to adjust brightness. Press ENT again to confirm the new setting.



2.6. Arrow keys

Use the arrow keys to advance forward and backward when entering numbers and letters. They can also be used to cycle through the various display screens.

2.7. Numerical keys

Use the numerical keys to enter information such as the flight ID or squawk code. See Section 3.1 for directions on how to enter the squawk code for your aircraft's flight and Section 3.2 for instructions for how to enter a flight ID.

Sometimes, a textual or non-numerical input will be required. If this is the case, press the number that is associated with the letter group you want to input, according to the graphic on the screen. To cycle through the letters associated with each number, press the number key repeatedly until the letter you want to input appears. You can input a space after cycling through all of the letters for a particular number key. Once the correct character is selected, use the arrow keys to advance to the next field to enter the next character in the sequence.

2.8. Identification (IDENT) key

If you are instructed by ATC to IDENT, press the **IDENT** key on your Stratus ES/ESG. IDENT will make your aircraft's reply pulse on ATC's monitors for 18 seconds. "IDENT" will be shown on the display while IDENT is activated.

2.9. VFR key

Press the VFR key to broadcast the VFR squawk code. The factory-set VFR code is 1200, but this number may be reconfigured by your dealer.

3.3. Configuring transponder settings

Stratus ES/ESG settings were configured by your dealer during installation. If you want to modify a setting, contact your dealer.

4. Troubleshooting

Use the table below to troubleshoot possible problems with Stratus ES/ESG.

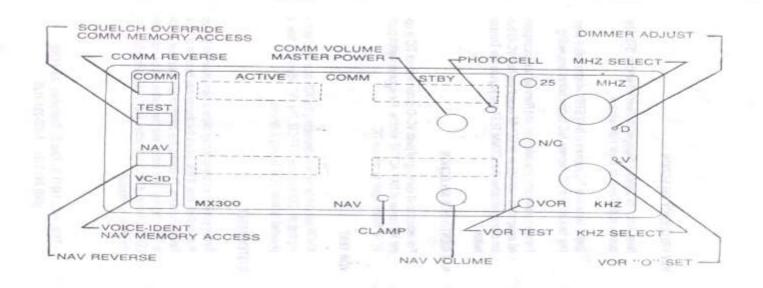
Problem	Troubleshooting Steps	
GPS information is not being received	Verify that the aircraft has a clear view of the sky. NOTE: Initial GPS fix could take up to 20 minutes.	
The power key does not power on Stratus ES/ESG	Verify that the power key is not stuck. Verify that the circuit breaker has not tripped. If It has tripped: Reset the circuit breaker switch and try the power key sgain. NOTE: If the circuit breaker opens it may be reset only once. If it has not tripped: Contact your dealer for further assistance.	

The screen displays a BIT failure

The display screen will display a warning message and a degraded state indicator **A** in the event that any of Stratus ES/ESG's BITs fail.

The Stratus ES/ESG screen might display a warning message with the instructions below. Below is guidance regarding how to assess the failure:

- PRESS FUNC TO CLEAR: A non-critical error has been detected. Stratus ES/ESG will run in a degraded state until the error is resolved. Contact your dealer for further assistance.
- PLEASE RESTART UNIT: A critical error has been detected. Restarting the unit might fix the error. If the message returns after restarting, contact your dealer for further assistance.
- PLEASE SHUTDOWN UNIT: A critical error has been detected. Power off the unit and do not power it back on. Contact your dealer for further assistance.
- WAITING TO BE UNSTUCK: A key has been depressed for more than 20 seconds. If a key is stuck, try to unstick the key.
- WAITING FOR RELEASE. The external suppression input is constantly in a suppressed state. Contact your dealer for further assistance.
- ATTEMPTING TO RECOVER: A squitter rate error has been detected. The transponder may recover itself, but if it does not, restart the unit. If the message returns after restarting, contact your dealer for further assistance.



MICHEL MX-300 PILOTS GUIDE

POWER ON-OFF

COMM VOLUME - MASTER POWER Control switches power for Comm and Nav receiver and provides Volume Control for Comm receiver. Start aircraft engines's prior to furning power switch on.

DISPLAY DIMMING

Display dimming is provided automatically. Adjustment by the pilot is possible, thru the "D" hole by the MHZ Select, to permit setting of minimum intensity.

COMM TEST

Pushing TEST button permits pilot to manually override automatic squelch and allows noise to come through to indicate receiver is operating and to permit reception of weak signals.

COMM FREQUENCY SELECTION

Note: Active frequency is displayed on upper left window. Standby frequency is displayed on upper right window.

Step 1: Make sure NIC TIC (1/2 vertical line) appears in COMM STBY window before selecting frequency. If it does not appear, depress NIC button before proceeding, NIC button transfers TIC and Frequency Control Knobs between COMM and NAV STBY windows.

Step 2: Select desired Mhz and Khz frequency on STBY display using Mhz and Khz Knobs respectively. Knz Knob channels in 50 Khz to frequency just below desired frequency, then push 25 Khz button. This button advances frequency 25 Khz each time it is depressed.

COMM FREQUENCY PRE-SELECT

Hold TEST button depressed with one finger and depress TRANSFER button with another finger. With TEST button held depressed, a new number appears in STBY window each time the TRANSFER button is pushed. Using this procedure you push TRANSFER button until 100.00 appears in STBY window. 100.00 position is used for MEMORY ENTRY of desired frequencies. Now release both buttons and select desired frequency in STBY window with Frequency Knobs. After completion of this operation you may depress buttons and call up 100.00 again. Now enter next desired frequency. Continue this process until you have loaded all desired frequencies into MEMORY.

TO RECALL STORED FREQUENCY

Using the same procedure above, hold TEST button depresed and advance frequency in STBY window with TRANSFER button until desired frequency appears. Next, release TEST button and push TRANSFER button. This will place desired frequency in active window.

TO REMOVE STORED FREQUENCY

Call frequency into STBY window using RECALL method. Now turn Mhz Knob down one position below 118.00 Mhz. At that position the number 100.00 will appear and the previously stored frequency has been removed. Repeat procedure for each frequency you wish to remove from MEMORY.

MEMORY STORAGE TIME

The unit contains a rechargeable battery and memory will be retained for several months.

TRANSMITTER INDICATOR

With aircraft mike selector set to the appropriate position, key aircraft mike and observe TX TIC in upper left corner of COMM ACTIVE window. This TIC indicates that the transmitter is outputting power.

NAV FREQUENCY SELECTION

Note: Active frequency is displayed on lower left window. STBY frequency is displayed on lower right window.

Step 1: Make sure TIC appears in NAV STBY window before selecting frequency. If not, depress N/C button before proceeding.

Frequency selection, Pre-selection, and Removal are accomplished using same methods as for COMM except you hold VC-ID button depressed rather than COMM TEST and you use Nav Transfer button.

NAV IDENT/VOICE SELECTION

For reception of ident signal push VC-ID button and not TIC in upper left corner of NAV ACTIVE window. For voice reception push VC-ID button again to remove TIC.

VOR TEST

A VOR test can be made by depressing the VOR button and verifying that the CDI indicates O FROM. The "V" adjustment hole is provided to allow VOR zeroing if required.

SYSTEM RESET

Severe power line transients may cause a microprocessor lock-up in an endless loop. If this occurs the display may be blank or have flashing numbers. To correct this condition turn the power switch to OFF, depress Test button and the system will be reset with COMM channel of 121.500 in active and 120.00 in standby when the power is restored.

TKM, INC., 14811 N. 73rd St. Scottsdale, AZ 85260 (602) 991-5351 1-800-233-4183