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SECTION 1

LIMITATIONS

The following limitations must be observed in the operation of this airplane:

A. ENGINE
Lycoming I0-360-ClC (Serial Nos.28R-7435001 through 28R-7635516)
Lycoming I0-360-C1C6 (Serial Nos. 28R-7635517 and up)

ENGINE LIMITS
For all operations 2700 RPM 200 HP

B. FUEL (AVGAS ONLY)
100/130 Octane Aviation Gasoline (Minimum)

C. PROPELLER- *SIN* 28R-7435001 thru 28R-7635516
Hartzell HC-C2HK-1( )/7666A-2 or
Hartzell HC-C2YK-1( )F/F7666A-2
Pitch Settings at 30 in. Station:
High 29.0 ± 2.0
Low 14 ± 0.2
Diameter: Maximum 74 inches
Minimum 72.5 inches
(Avoid continuous operation
2000-2350 RPM)

SIN 28R-7635517 and up
McCauley B2D34C213/90DHA-16

Pitch Settings at 30 in. Station:
High 27.5 ± 0.5
Low 12.5 ± 0.2
Diameter: Maximum 74 inches
Minimum 73 inches
(Avoid continuous operation
between 1500 and 1950 RPM
below 15 inches manifold pressure.)

D. INSTRUMENT MARKINGS (Power Plant)

OIL TEMPERATURE	
Green Arc (Normal Operating Range)	75°F to 245°F
Red Line (Maximum)	245°F
OIL PRESSURE	
Green Arc (Normal Operating Range)	60 PSI to 90 PSI
Yellow Arc (Caution Range)	25 PSI to 60 PSI
Red Line (Minimum)	25 PSI
Red Line (Maximum)	90 PSI
FUEL PRESSURE	
Green Arc (Normal Operating Range)	14 PSI to 45 PSI
Red Line (Minimum)	14 PSI
Red Line (Maximum)	45 PSI
TACHOMETER	
Serial Nos. 28R-7435001 thru 28R-7635516	
Green Arc (Normal Operating Range)	500 to 2000 and 2350 to 2700 RPM
Red Arc	2000 to 2350 RPM
Red Line (Maximum Continuous Power)	2700 RPM
Serial Nos. 28R-7635517 and up	
Green Arc (Normal Operating Range)	500 to 2700 RPM.
Red Line (Maximum Continuous Power)	2700RPM

E. AIRSPEED LIMITATIONS AND INSTRUMENT MARKINGS (Calibrated Airspeed)

NEVER EXCEED SPEED	214 MPH
MAXIMUM STRUCTURAL CRUISE SPEED	170 MPH
MANEUVERING SPEED	131 MPH
FLAPS EXTENDED SPEED	125 MPH
MAXIMUM GEAR EXTENSION SPEED	150 MPH
MAXIMUM GEAR RETRACTION SPEED	125 MPH

AIRSPEED INSTRUMENT MARKINGS

Red Radial Line (Never Exceed)	214 MPH (186 KT)
Yellow Arc (Caution Range)	170 MPH to 214 MPH
(Smooth Air Only)	(148 KT to 186 KT)
Green Arc (Normal Operating Range)	71 MPH to 170 MPH (62 KT to 148 KT)
White Arc (Flap Down Range)	64 MPH to 125 MPH (56 KT to 109 KT)

F. FLIGHT LOAD FACTORS

Positive Load Factor (Maximum)	3.8 G
Negative Load Factor (Maximum)	No inverted maneuvers approved

G. MAXIMUM WEIGHT 2650 LBS

H. BAGGAGE CAPACITY 200 LBS

I. C. G. RANGE

Weight Pounds	Forward Limit Inches Aft of Datum	Rearward Limit Inches Aft of Datum
2650	87.3	93.0
2300	82.0	93.0
1800	80.0	93.0

NOTES

1. Straight line variation between points given.
2. The datum used is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.
3. It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. See "Weight and Balance Section" for proper loading instructions.

J. MANEUVERS
All acrobatic maneuvers including spins prohibited.

K. PLACARDS
In full view of the pilot:

"THIS AIRCRAFT APPROVED FOR NIGHT IFR NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 OR FAR 135."

"THIS AIRCRAFT MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS."

In full view of the pilot, the following takeoff and landing check lists will be installed:

TAKEOFF CHECK LIST

Fuel on Proper Tank	Mixture - Set	Flaps- Set
Electric Fuel Pump - On	Propeller - Set	Trim Tab - Set
Engine Gauges - Checked	Fasten Belts/Harness	Controls- Free
Alternate Air - Closed		Door- Latched
Seat Backs Erect		Air Conditioner - Off

LANDING CHECK LIST

Fuel on Proper Tank	Electric Fuel Pump - On	Gear Down (ISO MPH Max)
Seat Back Erect	Mixture- Rich	Flaps- Set (125 MPH)
Fasten Belts/Harness	Propeller - Set	Air Conditioner - Off

The "AIR CONDITIONER OFF" item in the above takeoff and landing check lists is mandatory for air conditioned aircraft only.

In full view of the pilot:

"NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED."

On the instrument panel in full view of the pilot:

"MANEUVERING SPEED- 131 MPH."

On the instrument panel in full view of the pilot:

"DEMONSTRATED CROSSWIND COMPONENT - 20 MPH."

Adjacent to upper door latch:

"ENGAGE LATCH BEFORE FLIGHT"

On the inside of the baggage compartment door:

"BAGGAGE MAXIMUM 200 LBS. SEE WEIGHT AND BALANCE DATA FOR BAGGAGE LOADINGS BETWEEN !50 LBS AND 200 LBS."

Near emergency gear lever:

"EMERGENCY DOWN"

Near emergency gear lever (aircraft equipped with backup gear extender):

"OVERRIDE ENGAGED AUTO-EXT-OFF
LOCK PIN ON SIDE
TO ENGAGE OVERRIDE:
PULL LEVER FULL UP, PUSH LOCK PIN
TO RELEASE OVERRIDE:
PULL LEVER FULL UP & RELEASE"

Near landing gear selector switch:

"GEAR UP 125 MPH MAX"
"DOWN 150 MPH MAX"

In full view of the pilot when AutoF1ite is installed:

"FOR HEADING CHANGES: PRESS DISENGAGE SWITCH ON CONTROL WHEEL CHANGE HEADING, RELEASE DISENGAGE SWITCH."

On the instrument panel in full view of the pilot when the oil cooler winterization kit is installed:

..OIL COOLER WINTERIZATION PLATE TO BE REMOVED WHEN AMBIENT TEMPERATURE EXCEEDS 50° F."

On the instrument panel in full view of the pilot when the supplementary white strobe lights are installed:

"WARNING - TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT, OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE."

In full view of the pilot in the area of the air conditioner controls when the air conditioner is installed:

"WARNING· AIR CONDITIONER MUST BE OFF TO INSURE NORMAL TAKEOFF CLIMB PERFORMANCE. "

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SECTION II

PROCEDURES

A. SYSTEM OPERATIONS

1. The stall-warning system is inoperative with the master switch off.

2. The electric fuel pump must be on for both landing and takeoff.

3. Some aircraft are equipped with an airspeed - power sensing system (backup gear extender (which extends the landing gear under low airspeed- power conditions* even though the pilot may not have selected gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed - power values are below a predetermined minimum. (See Item 5, Procedures Section.) To override this system or to hold the emergency gear lever in the override up position without maintaining manual pressure on the emergency gear lever, pull the lever full up and push the latch pin in. To release the override, pull lever up to disengage latch pin, then release lever. For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the backup gear extender system were not installed.

•Approximately lOS mph lAS at any altitude, power off.

WARNING

Panel light dimmer switch must be off to obtain gear lights full intensity during daytime flying. When aircraft is operated at night and panel light dimmer switch is turned on, gear lights will automatically dim.

4. Landing gear position indication and warning lights:
   (a) The red gear warning light on the instrument panel and the horn operate simultaneously when:
      (1) In flight, when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or below, and the gear selector switch is not in the down position.
      (2) On aircraft equipped with the backup gear extender, when the system has lowered the landing gear and the gear selector switch is not in the down position and the throttle is not full open.
      (3) On the ground, when the master switch is on and the gear selector switch is in the up position.

NOTE

On aircraft which are not equipped with the backup gear extender an additional switch is installed which activates the warning horn and light whenever the flaps are extended beyond the approach position (100) and the landing gear are not down and locked.

   (b) The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.

(c) The yellow "In Transit" light on the instrument panel operates whenever any of the three gears is not in either the fully retracted position or the fully extended and locked position.

(d) On aircraft equipped with the backup gear extender, the yellow "Auto Ext. Off" light immediately below the gear selector switch flashes whenever the emergency gear lever is in the full up position.

5. Takeoff considerations:

On aircraft equipped with the backup gear extender, after takeoff, if the gear selector switch is placed in the gear up position before reaching the airspeed at which the system no longer commands gear down*, the gear will not retract. For obstacle clearance on takeoff and for takeoffs from high altitude airports, the landing gear can be retracted at the pilot's discretion by placing the gear selector switch in the up position and then latching the emergency gear lever in the override up position. If desired, the override up position can be selected and latched before takeoff, and the gear will then retract as soon as the gear selector switch is placed in the up position. In this case, care should be taken not to retract the gear prematurely, or the aircraft could settle back onto the runway. If the override lock is used for takeoff, it should be disengaged as soon as sufficient airspeed and terrain clearance are obtained, to return the gear system to normal operation. For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, as if the backup gear extender were not installed.

*Approximately 85 mph lAS at sea level to approximately IOO.mph lAS at 10,000 ft, with a straight line variation between.

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B. EMERGENCY PROCEDURES

1. Emergency landing gear extension instructions:
Accomplish the following check prior to initiation of the emergency extension procedures:
(a) Master Switch- Check On
(b) Circuit Breakers - Check
(c) Panel Lights - Off (in daytime)
(d) Gear Indicator Bulbs- Check

If landing gear does not check down and locked:
(e) Reduce airspeed below 100 mph.
(f) Move landing gear selector switch to gear down position.
(g) If gear has failed to lock down, on aircraft equipped with the backup gear extender, raise emergency gear lever to "Override Engaged" position.
(h) If gear bas still failed to lock down, move and *hold* emergency gear lever down to "Emergency Down" position.
(i) If gear has still failed to lock down, yaw the airplane abruptly from side to side with the rudder.

If the nose gear will not lock down using the above procedure, slow the aircraft to the lowest safe speed attainable using the lowest power setting required for safe operation and accomplish the following:
U) On aircraft equipped with backup gear extender, raise emergency gear lever to "Override Engaged" position.
(k) Move landing gear selector switch to gear down position.

If landing gear does not check down, recycle gear through up position, and repeat (k).

When the Emergency Landing Gear Extension Procedure is performed for training purposes, the following changes must be made to the procedure in order to prevent the hydraulic pump from activating during the procedure. On aircraft equipped with the backup gear extender, the landing gear selector _ must be left in the UP position until all ear position indicators are green. On aircraft which do NOT have the backup gear extender a pull type LANDING GEAR PUMP circuit breaker is installed and must be pulled prior to executing the emergency extension procedure. The circuit breaker must be reset aft r the completion of the procedure to allow normal gear system operation.

2. Gear up emergency landing:
In the event a gear up landing is required, proceed as follows:
(a) On aircraft equipped with the backup gear extender, lock emergency gear lever in "Override Engaged" position before airspeed drops to 115 mph to prevent landing gear from inadvertently free falling.
(b) Flaps as desired.
(c) Close throttle and shut off the master and ignition switches.
(d) Turn the fuel selector valve to OFF.
(e) Contact surface at minimum possible airspeed.

NOTE

With the master swit h off, the landing gear cannot be retracted.

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SECTION iII

PERFORMANCE

A. STALLS

The following performance figures were obtained during FAA type tests and may be realized under conditions indicated with the airplane and engine in good condition and with average piloting technique. All performance is given for 2650 pounds.

Loss of altitude during stalls varied from 100 to 300 feet, depending on configuration and power.

Stalling speeds, in mph, power off, versus angle of bank (Calibrated airspeed):

Angle of bank	00	20°	40°	50°	60°
Flaps up (gear down)	71	73	81	88	100
Flaps down (gear down)	64	66	73	80	90

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SECTION IV

OPTIONAL EQUIPMENT

NOTE

THE INFORMATION CONTAINED IN THIS SECTION APPLIES WHEN THE RELATED EQUIPMENT IS INSTALLED IN THE AIRCRAFT.

A. Electric Pitch Trim Installation

B. AutoFlite II Installation

C. Air Conditioner Installation

D. Installation of Piper AutoControl III and/or AutoControl IIIB

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A. ELECTRIC PITCH TRIM INSTALLATION

The following information applies in case of electric trim malfunction:

1. In case of malfunction, disengage electric pitch trim by pushing pitch trim switch on instrument panel to off position.

2. In an emergency, electric pitch trim may be overpowered using manual pitch trim.

3. In cruise configuration, a malfunction can result in a 10° pitch change and *200* ft. altitude variation.

4. In approach configuration, a malfunction can result in a 5o pitch change and 50 ft. altitude loss.

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B. AUTOFILTE ll INSTALLATION

1. LIMITATIONS
   a. Autopilot use is prohibited above 200 MPH-CAS
   b. Autopilot "OFF" for takeoff and landing

2. PROCEDURES
   a. Normal Operation
      Refer to the current AutoFlite II Owner's Handbook

   b. Emergency Operation
      (1) In case of malfunction, press disconnect switch on pilot's control wheel.
      (2) Rocker switch on instrument panel- OFF
      (3) Unit may be overpowered manually at either control wheel.
      (4) An autopilot runaway, with a 3 second delay in the initiation of recovery, while operating in a climb, cruise or descending flight could result in a 50" bank and a 190 foot altitude loss.
      (5) An autopilot runaway, with a 1 second delay in the initiation of recovery, during an approach operation, coupled or uncoupled, could result in a 15° bank and a 40 foot altitude loss.

3. PERFORMANCE
   The airplane performance remains unchanged.

C. AIR. CONDITIONER INSTALLATION

1. LIMITATIONS

Air Conditioner "OFF" for takeoff and landing.

2. PROCEDURES

Prior to takeoff, the air conditioner should be checked for proper operation as follows:

a. Check aircraft master switch on

b. Tum the air conditioner control switch to "ON" and the fan switch to one of the operating positions - the "AIR COND DOOR OPEN" warning light will turn on, thereby indicating proper air conditioner condenser door actuation.

c. Turn the air conditioner control switch to OFF- the "AIR COND DOOR OPEN" warning light will go out, thereby indicating the air conditioner condenser door is in the up position.

d. If the "AIR COND DOOR OPEN" light does not respond as specified above, an air conditioner system or indicator bulb malfunction is indicated and further investigation should be conducted prior to flight.

The above operational check may be performed during flight if an inflight failure is suspected.

3. PERFORMANCE

a. When the full throttle position is not used or in the event of a malfunction which causes the compressor to operate and the condenser door to remain extended, a decrease in rate of climb of as much as 100 fpm can be expected at all altitudes.

b. Warning - The air conditioner must l;>e off to insure normal takeoff performance.

D. INSTALLATION OF PIPER AUTOCONTROL Ill AND/OR AUTOCONTROL IIID

I. LIMITATIONS

a. Autopilot OFf during takeoff and landing.
b. Autopilot use prohibited above 200 MPH CAS.

PROCEDURES

a. PREFLIGHT

(1) Roll Section

(a) Place Radio Coupler in "Heading" mode and place A/P ON/OFF switch in the "ON" position to engage roll section. Rotate roll command knob Left and Right and observe control wheel describes a corresponding Left and Right turn, then center knob.

(b) Set proper D.G. Heading on D.G. and turn Hettding lndice to aircraft heading. Engage "Heading" mode switch and rotate Heading lndice right and left. Aircraft control wheel should tum same direction as lndice. While D.G. indice is set for a left turn, grasp control wheel and override the servo to the right. Repeat in opposite direction for right turn.

(c) If VOR signal available check Omni mode on Radio Coupler by swinging Omni needle left and right slowly. Observe that control wheel rotates in direction of needle movement.

(d) Disengage by placing the A/P ON/OFF switch to the "OFF" position.

b. IN-FLIGHT

(I) Trim airplane (baU centered).

(:!) Check air pressure or vacuum to ascertain that the Directional Gyro and Attitude Gyro are receiving sufficient air.

(3) Roll Section

(a) To engage, center Roll Command Knob. place the A/P ON/OFF switch to the "ON.. position. To turn rotate roll command knob in desired direction. (Maximum angle of bank should not exceed 30°.)

(b) For heading mode, set Directional Gyro with Magnetic Compass. Push directional gyro HOG knob in. rotate to aircraft heading. Place the console HOG ON/OFF switch to the "ON,. position. To select a new aircraft heading, push D.G. heading knob IN and rotate, in desired direction of turn, to the desired heading.

NOTE

ln HDG mode the maximum bank angles are limited to approximately 20° and single command, heading changes should be limited to 150 (HOG lndice not more than 150 from actual aircraft heading.)

(4) VOR

(a) To Intercept:

1. Using OMNI Bearing Selector, dial desired course. inbound or outbound.
2. Set identical heading on Course Selector D.G.
3. After aircraft has stabilized, position coupler mode selector knob to OMNI mode. As aircraft near<; selected radial. interception and crosswind correct ion will be automatically accomplished without further switching.

NOTE

If aircraft position is less than 45 o from selected radial. aircraft will intercept before station. 1f position is more than 45 °, interception will occur after station passage. As the aircraft nears the OMNI station, (1/2 mile) the zone of confusion will direct an "S" turn in alternate directions as the OMNI indicator needle swings. This alternate banking limited · to the standard D.G. bank angle, is an in4ication of station passage.

(b) To select new course:

1. To select a new course or radial. rotate the HOG indice to the desired HDG (match course).
2. Rotate · OBS to the new course. Aircraft will automatically turn to the intercept heading for the new course.

(c) To change stations:

I. If same course is desired. merely tune receiver to new station frequency.
2. If different course is desired. position coupler mode selector to HDG mode. Dial course selector O.G. to new course. Dial OBS to new course and position coupler mode selector to OMNI mode.

(5) VOR Approach

Track inbound to station as described in VOR navigation section. After station passage:

(a) Dial outbound course on Course Selector D.G.. then dial same course on OBS.

(b) After established on outbound radial, position coupler mode selector to HOG mode and select outbound procedure turn heading. After 40 seconds to 1 minute select a tum in the desired direction with the Course Selector D.G. to the inbound procedure turn heading.

(c) Set OBS to inbound course.

(d) · When aircraft heading is 45 • to the inbound course, dial Course .Selector D.G. to inbound course and position coupler mode select r to OMNI mode.

NOTE

For precise tracking over OMNI station, without "S" turn, position coupler mode selector to HDG mode just prior to station passage. If holding pattern is desired, position coupler mode selector to HDG mode at station passage inbound and select outbound heading in direction of turn. After elapsed time, dial inbound course on Course Selector D.G. When aircraft heading is 45° to radial, position coupler mode selector to OMNI mode.

(6) LOC Approach Only
   (a) To intercept dial ILS outbound course on Course Selector D.G. When stabilized, position coupler mode selector to LOC REV mode.
   (b) After interception and when beyond outer marker, position coupler mode selector to HDG mode and dial outbound procedure turn heading. After one minute, dial inbound procedure turn heading in direction of turn.
   (c) When aircraft heading is 45° to ILS inbound course dial inbound course on Course Selector D.G. and position coupler mode selector to LOC NORM mode.
   (d) At the missed approach point (M.A.P.), or when missed approach is elected, position coupler mode selector to HDG mode and execute missed approach procedure.

(7) LOC Approach:- Back Course (Reverse)
   (a) To intercept dial ILS Back Course outbound heading on Course Selector D.G. When stabilized, position coupler mode selector to LOC NORM mode.
   (b) After: interception and when beyond fix, position coupler mode selector to HDG and d1al outbound procedure turn heading. After one minute, dial inbound procedure turn heading in direction of turn.
   (c) When heading 45° to inbound course, dial inbound course on course Selector D.G. and position coupler mode selector to LOC REV mode.
   (d) Approximately 1/2 mile from runway, position coupler modb selector to HDG mode to prevent "S" turn over ILS station near runway threshold.
   (e) Missed approach- same as Front Course. (See (6) d)

c. EMERGENCY OPERATION

(1) In an emergency the AutoControl can be disconnected by:
   (a) Placing the A/P ON/OFF switch to the "OFF" position.
   (b) Pulling the Autopilot circuit breaker (aircraft S/N 28-7635001 and up).

(2) The AutoControl can be overpowered at either control wheel.

(3) An Autopilot runaway. with a 3 second delay in the initiation of recovery, while operating in a climb, cruise or descending flight could result in a 45° bank and 150 foot altitude loss.

(4) An Autopilot runaway, with a 1 second delay in the initiation of recovery, during an approach operation, coupled or uncoupled, could result in a 15° bank and 50 foot altitude loss.

3. PERFORMANCE

No change.