

AIRPLANE FLIGHT MANUAL

FOR

CHEROKEE ARROW

WARNING

EXTREME CARE MUST BE EXERCISED TO LIMIT THE USE OF THIS MANUAL TO APPLICABLE AIRCRAFT. THIS MANUAL REVISED AS INDICATED BELOW OR SUBSEQUENTLY REVISED IS VALID FOR USE WITH THE AIRPLANE IDENTIFIED BELOW WHEN APPROVED BY PIPER AIRCRAFT CORPORATION. SUBSEQUENT REVISIONS SUPPLIED BY PIPER AIRCRAFT CORPORATION MUST BE PROPERLY INSERTED.

MODEL PA-28R-200

AIRCRAFT SERIAL NO. 28R-7635034 REGISTRATION NO. N4389X

AIRPLANE FLIGHT MANUAL, REPORT NUMBER VB-560 REVISION 3

PIPER AIRCRAFT CORPORATION

APPROVAL SIGNATURE AND STAMP M. Keller



NOTE

THIS MANUAL MUST BE KEPT IN THE AIRPLANE AT ALL TIMES

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AIRPLANE FLIGHT MANUAL LOG OF REVISIONS

Revision	Revised Pages	Description and Revision	FAA Approved Date
1	Title	Added PAC Approval Form. (NOTE: AIRCRAFT DELIVERED WITH MANUALS PRIOR TO THIS REVISION DO NOT REQUIRE THIS REVISION.)	 D. H. Trompler March 25, 1974
2	3-i 3-7 3-8 3-15 3-21, 3-22, 3-23, 3-24	Added Item E., AutoControl IIIB to Supplements. Added Gear Light Warning to Item 4. (b); Relocated Items 4. (c) and 4. (d). Added Info from Page 3-7. Added Item E., Installation of Piper AutoControl IIIB. Added pages (AutoControl IIIB Supplement info added).	 D. H. Trompler June 18, 1974
3	3-i 3-15 3-17 3-18 3-19 3-20 3-21 3-24	Revised Section IV Title (Supplements to Optional Equipment); deleted item B. (AutoControl III); revised existing item letters; added AutoControl III to new item D. Revised Section IV Title (Supplements to Optional Equipment); revised Note; deleted item B. (AutoControl III); revised existing item letters; added AutoControl III to new item D. Revised item A. (Electric Pitch Trim Installation) info. Delete item B. (AutoControl III). Revised item letter (C. to B.); revised item 2. b (1); added new item (2); revised existing item nos. Revised item letter (D. to C.). Revised item letter (E. to D.); added AutoControl III to Title. Deleted IIIB designation from item nos. c. (1) and c. (2).	 Ward Evans June 27, 1975

AIRPLANE FLIGHT MANUAL LOG OF REVISIONS (cont.)

Revision	Revised Pages	Description and Revision	FAA Approved Date
4	3-24	Revised Item c. (1).	<i>Ward Evans</i> Ward Evans Dec. 8, 1975
5	3-1 3-11	Added Lycoming OI-360-C1C6 Engine and McCauley Propeller; added Tachometer Green Arc for McCauley prop. Added info to item B.1. (Emergency Landing Gear Extension).	<i>Ward Evans</i> Ward Evans Feb. 28, 1977
6	3-1	Revised item B.	<i>Ward Evans</i> Ward Evans Feb. 29, 1984
7	3-4 3-7, 3-8 3-11	Added placard note. Revised landing gear system operation. Revised emergency landing gear extension procedures.	<i>D.H. Trompler</i> D.H. Trompler May 14, 1987
8	3-11	Revised item B.1.(h).	<i>Linda J. Dicken</i> Linda J. Dicken Feb. 7, 2005

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SECTION 1

LIMITATIONS

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

A. ENGINE

- Lycoming IO-360-C1C (Serial Nos. 28R-7435001 through 28R-7635516)
Lycoming IO-360-C1C6 (Serial Nos. 28R-7635517 and up)

ENGINE LIMITS

For all operations 2700 RPM 200 HP

B. FUEL

100/130 Octane Aviation Gasoline (Minimum)

C. PROPELLER - S/N 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

Low 14 + .2

Diameter: Maximum 74 inches

Minimum 72.5 inches

(Avoid continuous operation

2100-2350 RPM)

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

Pitch Settings at 30 in. Station:

High 29.8 + 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 2100 and 2350 to 2700 RPM

Red Arc

2100 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)

2700 RPM

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E. AIRSPEED LIMITATIONS AND INSTRUMENT MARKINGS (Calibrated Airspeed)

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

AIRSPEED INSTRUMENT MARKINGS

<u>Red Radial Line (Never Exceed)</u>	214 MPH (186 KT)
<u>Yellow Arc (Caution Range)</u> (Smooth Air Only)	170 MPH to 214 MPH (148 KT to 186 KT)
<u>Green Arc (Normal Operating Range)</u>	71 MPH to 170 MPH (62 KT to 148 KT)
<u>White Arc (Flap Down Range)</u>	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 After 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 (150 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.”

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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
150 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 AutoFlite 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 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 105 mph IAS 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 (10°) 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.

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- (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 IAS at sea level to approximately 100 mph IAS 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 has 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:

- (j) 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 gear 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 after 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 switch 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	0°	20°	40°	50°	60°
<u>Flaps up (gear down)</u>	<u>71</u>	73	81	88	100
<u>Flaps down (gear down)</u>	<u>64</u>	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 5° pitch change and 50 ft. altitude loss.

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B. AUTOFLITE II 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.
 - x (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. Turn 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 be off to insure normal takeoff performance.

D. INSTALLATION OF PIPER AUTOCONTROL III AND/OR AUTOCONTROL IIIB**1. LIMITATIONS**

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

2. 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 Heading Indice to aircraft heading. Engage "Heading" mode switch and rotate Heading Indice right and left. Aircraft control wheel should turn same direction as Indice. 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

- (1) Trim airplane (ball centered).
- (2) 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 HDG knob in, rotate to aircraft heading. Place the console HDG 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

In HDG mode the maximum bank angles are limited to approximately 20° and single command, heading changes should be limited to 150°. (HDG Indice 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 nears selected radial, interception and crosswind correction will be automatically accomplished without further switching.

NOTE

If aircraft position is less than 45° from selected radial, aircraft will intercept before station. If 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 indication of station passage.

(b) To select new course:

1. To select a new course or radial, rotate the HDG 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:

1. 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 D.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 HDG mode and select outbound procedure turn heading. After 40 seconds to 1 minute select a turn 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 selector 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 dial 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 mode 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 placing the A/P ON/OFF switch to the "OFF" position.
- (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.

Insight Instrument Corp.
Box 194 Ellicott Station
Buffalo, New York 14205

Airplane Flight Manual Supplement No. 1
(For Aircraft Applicability List, see Master
Eligibility List of STC SA157NE)

I. Limitations: The Graphic Engine Monitor instrument does not replace any existing aircraft cylinder head temperature (CHT) indicator, exhaust gas temperature (EGT) indicator or turbine inlet temperature TIT indicator.

II. Procedures:

a. Description: The Graphic Engine Monitor (GEM) Model 602 displays electronic bar graph readings of exhaust gas temperature. All temperature information is presented as vertical columns (one per cylinder) while CHT is indicated by a non-illuminated "black" bar in the field of orange bars. (One bar represents 25°F.) Actual CHT values are determined by comparing the black bar to the scale along the right edge of the gauge.

b. The Graphic Engine Monitor Model 603 performs identically to the Model GEM-602 except that it incorporates a digital numeric readout of turbocharger TIT in addition to existing digital bar graph displays of CHT and EGT. The turbocharger numeric display shows TIT in tens of degrees Fahrenheit (Rdg x10).

The Graphic Engine Monitor has two modes of operation.

- (a) Lean Mode
- (b) Monitor Mode

The Lean Mode is identified by the "EGT" annunciator blinking. It may be entered at any time by holding the Reset Button for two seconds until the "EGT" annunciator blinks. Lean Mode is used to adjust the mixture for cruise and identify the leanest cylinder. The instrument then enters the Monitor Mode.

FAA Approved: June 14, 1983

Revised: May 6, 1985

Insight Instrument Corp.
Box 194 Ellicott Station
Buffalo, New York 14205

Airplane Flight Manual Supplement No. 1
(For Aircraft Applicability List, see Master
Eligibility List of STC SA157NE)

b. Normal Procedure:

Cruise Leaning Procedure Using Insight GEM

1. Establish cruise power setting. If "EGT" annunciator is not blinking, hold reset switch until it does blink.
2. Lean mixture slowly until one column blinks. Stop leaning when column starts blinking. The blinking identifies that cylinder as the leanest and that it has just gone past peak EGT. Push the reset switch briefly to stop the blinking. The instrument then enters the monitor mode.
3. Enrichen until the leanest cylinder's EGT drops one bar (25°F). This sets the mixture to peak EGT for "best economy" setting. To select the best power setting, the mixture should be enriched further to drop the EGT 3 to 4 bars (75-100°F). If best power is selected, the reset switch should be pushed briefly to trigger the storage of normal temperature for monitor mode.

FAA Approved: June 14, 1983

Revised: May 6, 1985

Insight Instrument Corp.
Box 194 Ellicott Station
Buffalo, New York 14205

FAA Approved
Airplane Flight Manual Supplement No. 1
For

Single and Twin Engine Powered Small Airplanes (4 or 6 cylinder engines only) as Listed on Master Eligibility List of STC SA157NE.

This Supplement must be attached to the FAA Approved Airplane Flight Manual when the Insight Instrument Corp. Graphic Engine Monitor System is installed in accordance with Supplemental Type Certificate (STC) SA157NE. On aircraft which require an Airplane Flight Manual, the AFMS must be attached. The information contained herein supplements the information of the basic AFM; for limitations, procedures and performance information not contained in this Supplement, consult the basic Airplane Flight Manual.

FAA Approved: *John Norman J. Blinn*
Manager, New York Aircraft
Certification Office

Date: June 14, 1983

Revised: May 6, 1985

Insight Instrument Corp.
Box 194 Ellicott Station
Buffalo, New York 14205

Airplane Flight Manual Supplement No. 1
(See Title Page (page 1) For
Aircraft Applicability List)

REVISION LOG PAGE

Rev. No.	Description	Pages Affected	Approval
1	Change to multiple approval	All	<i>for W. J. Bray</i> Raymond J. Borowski Mgr. N.Y. Aircraft Certification Office August 30, 1983
2	Add additional aircraft models	All	<i>for N. J. Glenn</i> Raymond J. Borowski Mgr. N.Y. Aircraft Certification Office October 13, 1983
3	Add GEM-603 with a numeric digital TIT readout and additional aircraft models	All	<i>for N. J. Glenn</i> Raymond J. Borowski Mgr., N.Y. Aircraft Certification Office May 6, 1985

FAA Approved: June 14, 1983

HARTZELL PROPELLER INC.

One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.

HARTZELL

AFM SUPPLEMENT

PIPER MODELS PA-28R-180, PA-28R-200, PA-28R-201, PA-28RT-201

STC SA4528NM

Limitations Section

Propeller Hartzell HC-C3YR-1RF/F7282

Pitch: High, 30.5 ± 1 degrees,
Low, PA-28R-180 11.8 ± 0.2 degrees
PA-28R-200 12.5 ± 0.2 degrees
PA-28R-201 12.5 ± 0.2 degrees
PA-28RT-201 12.5 ± 0.2 degrees
Measured at 30 inch station

Maximum Diameter: 74 inches

Minimum Diameter: 73 inches

Avoid continuous operation below 15 inches HG
between 1950 to 2350 rpm.

Spinner Hartzell 835-47() or 835-52()

Power Instruments Tachometer:
Green Arc (normal operating range) 500 to 2700 rpm
Red Radial (max. continuous power) 2700 rpm

Placards Between the tachometer and the manifold pressure guage:
"AVOID CONTINUOUS OPERATION BELOW 15
INCHES HG BETWEEN 1950 TO 2350 RPM."

Procedures Section

No change

Performance Section

No change

FAA Approved *Markon Anderson*

Date JUL 2 8 1988

HARTZELL PROPELLER INC.

SERVICE CENTER

One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.


HARTZELL

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
TO
PIPER MODELS PA28R-180, PA28R-200, PA28R-201, PA28RT-201
AIRPLANE FLIGHT MANUAL

Serial Number: 28R-7635034 Registration Number: N4389X

This supplement must be attached to the FAA Approved Airplane Flight Manual when the airplane is modified by the installation of a Hartzell HC-C3YR-1RF/F7282 propeller in accordance with STC SA4528NM.

The information contained herein supplements or supercedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the Airplane Manual.



Carl F. Mittag
Manager, Flight Test Branch
Chicago Aircraft Certification Office
Federal Aviation Administration
Des Plaines, IL 60018

FAA Approved _____

Date: FEB 10 1995

FAA APPROVED AIRPLANE FLIGHT MANUAL
SUPPLEMENT
OR
SUPPLEMENTAL FLIGHT MANUAL
FOR

AIRCRAFT MODEL: PA28R200
SERIAL NUMBER: 28R-7635034
REGISTRATION NUMBER: N4389X

This supplement must be attached to the FAA approved Airplane Flight Manual, when the Precise Flight Standby Vacuum has been installed in accordance with STC(s).

SA2160NM, SA2161NM, SA2162NM, SA2164NM, SA2167NM,
SA2168NM, SA2683NM - Aircraft

&

SE1779NM - Lycoming Engine

or

SE1780NM - Continental Engine

The information contained in this document supplements or supersedes the basic manual only in those areas listed. For Limitations, Procedures, and Performance information not contained in this supplement, consult the basic Airplane Flight Manual.

FAA APPROVED: 
Manager,
Special Certification Branch
Seattle Aircraft Certification Office

DATE OF APPROVAL: Feb. 4, 2000

SYSTEM DESCRIPTION

A Precise Flight Standby Vacuum System may be installed to provide a temporary vacuum system in the event of a primary vacuum failure. The Standby Vacuum System operates on the differential between the intake manifold and ambient air pressure and is directed through a shuttle valve system to drive your flight instruments.

CAUTION: The use of the Standby Vacuum System requires a degree of Pilot skill and proficiency that is best maintained through practice. It is recommended, upon recurrent IFR training, in VFR conditions, in the presence of a CFI, that the aircraft be flown at the RPM and or Manifold Pressure settings found on the required placard and entered in this AFMS. This procedure will familiarize the pilot with limitations of using engine manifold vacuum for instrument power and maintaining level flight.

PRECISE FLIGHT, INC.
For
INSTALLATION OF PRECISE FLIGHT STANDBY VACUUM SYSTEM

Issue Date: May 23, 1988

Item	Aircraft Make	Aircraft Model	Original Certificate Type Number	Certification Basis for Alteration	FAA Approved Airplane Flight Manual Supplement*	FAA Approved Drawing*		AML Amdt. Date
						Number	REV	
95	VARGA Aircraft Corp. (Augustair, Inc.)	2150, 2150A, 2180	4A19	CAR 3	Supplemental Flight Manual for SA2683NM dated 6/8/98. (SVS III)	SVS III Engineering Drawing 000V0000 And Installation Report No. 50050	Rev. -, dated 3/10/2000 Rev. 25, dated 8/26/99	3/17/2000
96	VARGA Aircraft Corp. (Augustair, Inc.)	2150, 2150A, 2180	4A19	CAR 3	Supplemental Flight Manual for Push Operated Cable Valve dated 2/4/2000. (SVS V) OR Supplemental Flight Manual for Pull Operated Cable Valve dated 2/4/2000. (SVS V)	SVS V Engineering Drawing 000V0000 And Installation Report No. 08072	Rev. -, dated 3/10/2000 Rev. -, dated 12/22/1999	3/17/2000

* or later FAA Approved Revision

I. OPERATING LIMITATIONS

A. INSTRUCTIONS

1. The Standby Vacuum System is for emergency or standby use only and not for dispatch purposes.
2. Vacuum powered and/or Vacuum gyro directed autopilot operation may be unreliable when the Standby Vacuum System is the sole source of vacuum. Vacuum powered or vacuum gyro directed autopilot should be OFF when operating with a failed primary vacuum system.
3. The Supplemental Vacuum System is not designed to operate pneumatic de-ice systems. DO NOT operate a pneumatic de-ice system when operating with a failed primary vacuum system.
4. Above 10,000 ft. pressure altitude, engine power settings may have to be significantly reduced to provide adequate vacuum power for proper gyro instrument operation.
5. The following placards are required to be in full view of pilot:

I. OPERATING LIMITATIONS (CONT.)

B. PLACARDS

Placard to be located on the push/pull control cable

Placard to be located around the LED for the pump inop warning light.

Placard to be placed in front and in full view of the pilot.

STANDBY VACUUM SYSTEM EQUIPPED: FOR
OPERATING INSTRUCTIONS AND LIMITATIONS SEE
SUPPLEMENT IN OWNERS MANUAL OR PILOTS
OPERATING HANDBOOK

I. OPERATING LIMITATIONS (CONT.)

B. PLACARDS

One of the following placards must be placed in full view of the pilot near the instrument vacuum indicator after appropriate entries have been made.

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with Constant Speed Propeller - Maximum Continuous RPM.

PRESS ALT. (FT.)	RPM	MAN. PRESSURE	SVS VACUUM IN. HG MIN.
2000	Max. Cont.		
4000	Max. Cont.		
6000	Max. Cont.		
8000	Max. Cont.		
10,000	Max. Cont.		

Approximate Standby Vacuum Available - Altitude - Power Chart for aircraft with a Fixed Pitch Propeller

PRESS ALT. (FT.)	RPM	SVS VACUUM IN. HG MIN.
2000		
4000		
6000		
8000		
10,000		

II. OPERATING PROCEDURES

A. NORMAL PROCEDURES

1. GROUND CHECK

- a. Cycle the Standby Vacuum Control Knob **IN - OFF - position**, and return Control Knob **IN - OFF - position**.

2. BEFORE TAKEOFF

- a. Idle Engine at low speed, momentarily pull the standby vacuum knob **OUT - ON -** and check vacuum gauge. Normally, the vacuum reading will be slightly higher. After checking system push Standby Vacuum System knob **IN - OFF -**. Check that vacuum gauge has returned to the previous reading.

3. ENROUTE

- a. Regularly check vacuum gauge and monitor warning light for proper vacuum system operation.

B. EMERGENCY PROCEDURES

1. PRIMARY VACUUM FAILURE WARNING LIGHT ILLUMINATES

- a. Pull the Standby Vacuum System knob **OUT -ON-** and adjust throttle setting as required to maintain adequate vacuum for the primary instruments - Suction Gauge Reading in the Green Arc - If necessary descend to a lower altitude to obtain a larger differential between manifold and ambient pressure. Vacuum power must be closely monitored by checking the vacuum gauge frequently.
- b. The SVS is not designed for continued IFR flight. Immediate steps should be taken to return to VFR conditions or to land. If this is not possible, IFR flight should be continued only as long as necessary to return to VFR conditions or land the airplane.

WARNING: FAILURE OF THE VACUUM SYSTEM STILL CONSTITUTES AN EMERGENCY SITUATION REGARDLESS OF THE INSTALLATION OF THE SVS. IT MAY NOT BE POSSIBLE TO MAINTAIN A SAFE ALTITUDE AND MAKE USE OF THE SVS. IN SUCH A SITUATION THE AIRPLANE MUST BE FLOWN USING NON-VACUUM POWERED INSTRUMENTS.

ISSUED: February 4, 2000

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B. EMERGENCY PROCEDURES (CONT.)

- c. If descent is impractical:
- Periodically and temporarily reduce power as required to provide adequate vacuum to the aircraft primary instruments.
- Reapply power as required, while comparing vacuum driven gyros against the Turn and Bank Indicator, Turn Coordinator, VSI and/or other flight instruments.
- When an obvious discrepancy is noted between the vacuum driven instruments and other flight instrumentation. Periodically and temporarily reduce power as required to provide adequate vacuum to the aircraft primary instruments.

III. PERFORMANCE

NO CHANGE

-- END --

ISSUED: February 4, 2000

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