

**AIRCRAFT FLIGHT MANUAL (AFM) /
PILOT OPERATING HANDBOOK (POH)**

MAKE: 1972 PIPER CHEROKEE

MODEL: PA-28-180 / N15323

S/N: 28-7305057

ENGINE: LYCOMING

MODEL: O-360 A4A

S/N: L-20639-36E

TABLE OF CONTENTS

1. CHECKLIST, QUICK REFERENCE GUIDES AND PILOT MANUALS

- a. AIRCRAFT CHECKLIST
- b. V-SPEED / STALL SPEED
- c. AIRPORT DIRECTORY
 - i. ALBERT WHITTED AIRPORT (SPG)
 - ii. MANATEE AIRPORT (48X)
- d. GARMIN PILOT'S MANUAL * (DIGITAL DOWNLOAD ONLY)
 - i. GARMIN GTX33X & 3X5
 - ii. GARMIN G3X TOUCH WITH EIS
 - iii. GARMIN GI 275
 - 1. GARMIN GI 275 QUICK REFERENCE CARD
 - iv. GARMIN GMA 245R
 - v. GARMIN GTN 650Xi
 - vi. GARMIN GFC 500 (GMC 507)
 - vii. GARMIN SMART GLIDE

2. AIRCRAFT DOCUMENTATION

- a. CERTIFICATE OF AIRCRAFT REGISTRATION
 - i. DATE OF ISSUE: 03.15.2024
 - ii. EXPIRATION DATE: 03.15.2031
- b. STANDARD AIRWORTHINESS CERTIFICATE
 - i. DATE OF ISSUE: 10.26.1972
 - ii. EXPIRATION DATE: NONE

3. OWNER'S HANDBOOK

4. AIRPLANE FLIGHT MANUAL (AFM) / PILOT OPERATING HANDBOOK (POH) (07.25.1975)

5. AIRPLANE FLIGHT MANUAL SUPPLEMENTS (AFMS)

- a. GARMIN GTX 33X AND GTX 3XG WITH ADS-B (05.31.2024)
- b. GARMIN GI 275 MULTIFUNCTION INSTRUMENT (05.16.2024)
- c. GARMIN GTN 650Xi NAVIGATION SYSTEM (04.19.2024)
- d. GARMIN GFC 500 (GFC507) AUTOPILOT WITH ESP (04.21.2023)
- e. SUREFLY ELECTRONIC IGNITION (06.27.2023)

6. WEIGHT AND BALANCE

- a. WEIGHT AND BALANCE (07.25.1975)
- b. WEIGHT AND BALANCE (RESCINDED: 06.05.2024)
- c. WEIGHT AND BALANCE (08.30.2024)

7. TYPE CERTIFICATE DATA SHEET (TCDS) (09.18.2023)

GARMIN PILOT'S MANUAL * (DIGITAL DOWNLOAD ONLY)

- i. GARMIN GTX335: **TRANSPONDER** (DOI: 2017)
[HTTPS://STATIC.GARMIN.COM/PUMAC/190-00734-11_08.PDF](https://static.garmin.com/pumac/190-00734-11_08.PDF)
S/N:
SYSTEM ID:
- ii. GARMIN G3X (GDU460) TOUCH WITH EIS: **PRIMARY FLIGHT DISPLAY** (DOI: 06.2024)
[HTTPS://STATIC.GARMIN.COM/PUMAC/190-02472-00_B.PDF](https://static.garmin.com/pumac/190-02472-00_B.PDF)
S/N: 7Y9104018
SYSTEM ID: 6000265A93FBC
- iii. GARMIN GI 275: **STANDBY ATTITUDE INDICATOR** (DOI: 06.2024)
[HTTPS://STATIC.GARMIN.COM/PUMAC/190-02246-01_H.PDF](https://static.garmin.com/pumac/190-02246-01_H.PDF)
S/N: 5MZ617493
SYSTEM ID:
- iv. GARMIN GMA 245R: **REMOTE AUDIO PANEL** (DOI: 06.2024)
[HTTPS://STATIC.GARMIN.COM/PUMAC/190-01879-10_G.PDF](https://static.garmin.com/pumac/190-01879-10_G.PDF)
S/N: 44V302053
SYSTEM ID:
- v. GARMIN GTN 650XI: **GPS / NAVIGATION** (DOI: 06.2024)
[HTTPS://STATIC.GARMIN.COM/PUMAC/190-02327-03_F.PDF](https://static.garmin.com/pumac/190-02327-03_F.PDF)
S/N: 5FP053727
SYSTEM ID: 34300657222A3
- vi. GARMIN GFC 500 (GMC 507): **AUTOPILOT** (DOI: 06.2024)
[CHROME-EXTENSION://EFAIDNBMMNNIBPCAJPCLCLEFINDMKAJ/HTTPS://STATIC.GARMIN.COM/PUMAC/190-01112-12_J.PDF](chrome-extension://EFAIDNBMMNNIBPCAJPCLCLEFINDMKAJ/HTTPS://STATIC.GARMIN.COM/PUMAC/190-01112-12_J.PDF)
S/N: 5H1108874
SYSTEM ID: 5H1108874
- vii. GARMIN SMART GLIDE: **EMERGENCY ASSISTANCE TO NEAREST AIRFIELD** (DOI: 06.2024)
[HTTPS://WWW.YOUTUBE.COM/WATCH?V= VVIBFGJKJA](https://www.youtube.com/watch?v=VVIBFGJKJA)
S/N:
SYSTEM ID:

QUICK REFERENCE GUIDE AND PILOT'S MANUAL

1972 Piper Cherokee PA28-180 / N15323

Quick Reference Guide: V-Speed / Stall Speed

V - Speed / Stall Speed*

Speeds	Description	MPH	KIAS
V _r	Rotation	60 - 69	52 - 60
V _y	Best Rate of Climb	85	74
V _x	Best Angle of Climb	74	64
V _{cc}	Cruise Climb	100	87
V _g	Best Glide	80	70
V _a	Maneuvering Speed	127	110
V _{no}	Maximum Structural Cruising	140	121
V _{ne}	Never Exceed	171	148
V _{fe}	Maximum Flaps Extension	115	100
V _{s1}	Stall Speed (clean - no flaps)	68	59
V _{so}	Stall Speed (dirty - full flaps / landing)	61	53
DMMS	Defined Minimum Maneuvering Speed	95	83

Published Stall Speeds at Degree (°) of Banks*

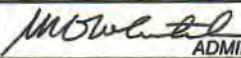
	0°	20°	40°	60°
Clean Configuration (no flaps)	59 KIAS	60 KIAS	67 KIAS	83 KIAS
Dirty Configuration (full flaps / landing)	53 KIAS	54 KIAS	61 KIAS	74 KIAS

Power Off - Gross Weight 2450 lbs*

*This Quick Reference Guide is not a replacement for the Federal Aviation Administration (FAA) Approved Flight Manual (AFM VB-437) inside this aircraft. Any and all information should be verified by the Pilot using the AFM and the Type Certificate Data Sheet (TCDS) specified for the serial number of the appropriate aircraft. Coastal Flight Inc shall not be held liable for any and all information provided or discrepancies identified.

AIRCRAFT DOCUMENTATION

REGISTRATION NOT TRANSFERABLE

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION CERTIFICATE OF AIRCRAFT REGISTRATION		This certificate must be in the aircraft when operated.
NATIONALITY AND REGISTRATION MARKS N 15323		AIRCRAFT SERIAL NO. 28-7305057
MANUFACTURER AND MANUFACTURER'S DESIGNATION OF AIRCRAFT PIPER PA-28-180		
ICAO Aircraft Address Code: 50154016		
ISSUED TO	COASTAL FLIGHT INC 840 PINELLAS BAYWAY S TIERRA VERDE FL 33715-2151 Corporation	
	It is certified that the above described aircraft has been entered on the register of the Federal Aviation Administration, United States of America, in accordance with the Convention on International Civil Aviation dated December 7, 1944, and with Title 49, United States Code, and regulations issued thereunder.	
DATE OF ISSUE - March 15, 2024 EXPIRATION DATE March 31, 2031	 ADMINISTRATOR	
		 U.S. Department of Transportation Federal Aviation Administration

AC Form 8050-3 (10/2019) Supersedes previous editions

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1 NATIONALITY AND REGISTRATION MARKS N15323	2 MANUFACTURER AND MODEL PIPER PA-28-180	3 AIRCRAFT SERIAL NUMBER 28-7305057	4 CATEGORY Normal
5 AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to 49 U.S.C. § 44704 and certifies that, as of the date of issuance, this aircraft has been inspected and found to conform to its type certificate and be in condition for safe operation. This aircraft meets the requirements of the applicable airworthiness standards in Annex 8 to the Convention on International Civil Aviation, except as follows: None			
6 TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the FAA, this airworthiness certificate is effective as long as maintenance, preventative maintenance, and alterations are performed per the applicable Federal Aviation Regulations and the aircraft is registered in the United States.			
DATE OF ISSUANCE R- 26/Oct/1972	FAA REPRESENTATIVE ROHN ANDREW CASH Digitally signed by ROHN ANDREW CASH Date: 2023.12.21 14:15:19 -05'00'		DESIGNATION NUMBER AFG-TPA-PSDO-35
Any alteration, misuse, or reproduction of this certificate for a fraudulent purpose may be punishable by certificate revocation, fine, and / or imprisonment. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT PER THE APPLICABLE FEDERAL AVIATION REGULATIONS. FAA Form 8100-2 (9-2019) Previous Edition May be Used Until Depleted			

Owner's Handbook

(Issued: 01.1972 / Revised: 01.1973)

CHEROKEE 180

PA-28-180

Owner's Handbook



**Piper Aircraft Corporation, Vero Beach, Florida
U.S. A.**

NOTICE

THIS HANDBOOK IS NOT DESIGNED, NOR CAN ANY HANDBOOK SERVE, AS A SUBSTITUTE FOR ADEQUATE AND COMPETENT FLIGHT INSTRUCTION, OR KNOWLEDGE OF THE CURRENT AIRWORTHINESS DIRECTIVES, THE APPLICABLE FEDERAL AIR REGULATIONS, AND ADVISORY CIRCULARS. IT IS NOT INTENDED TO BE A GUIDE OF BASIC FLIGHT INSTRUCTION, NOR A TRAINING MANUAL.

THE HANDBOOK IS DESIGNED:

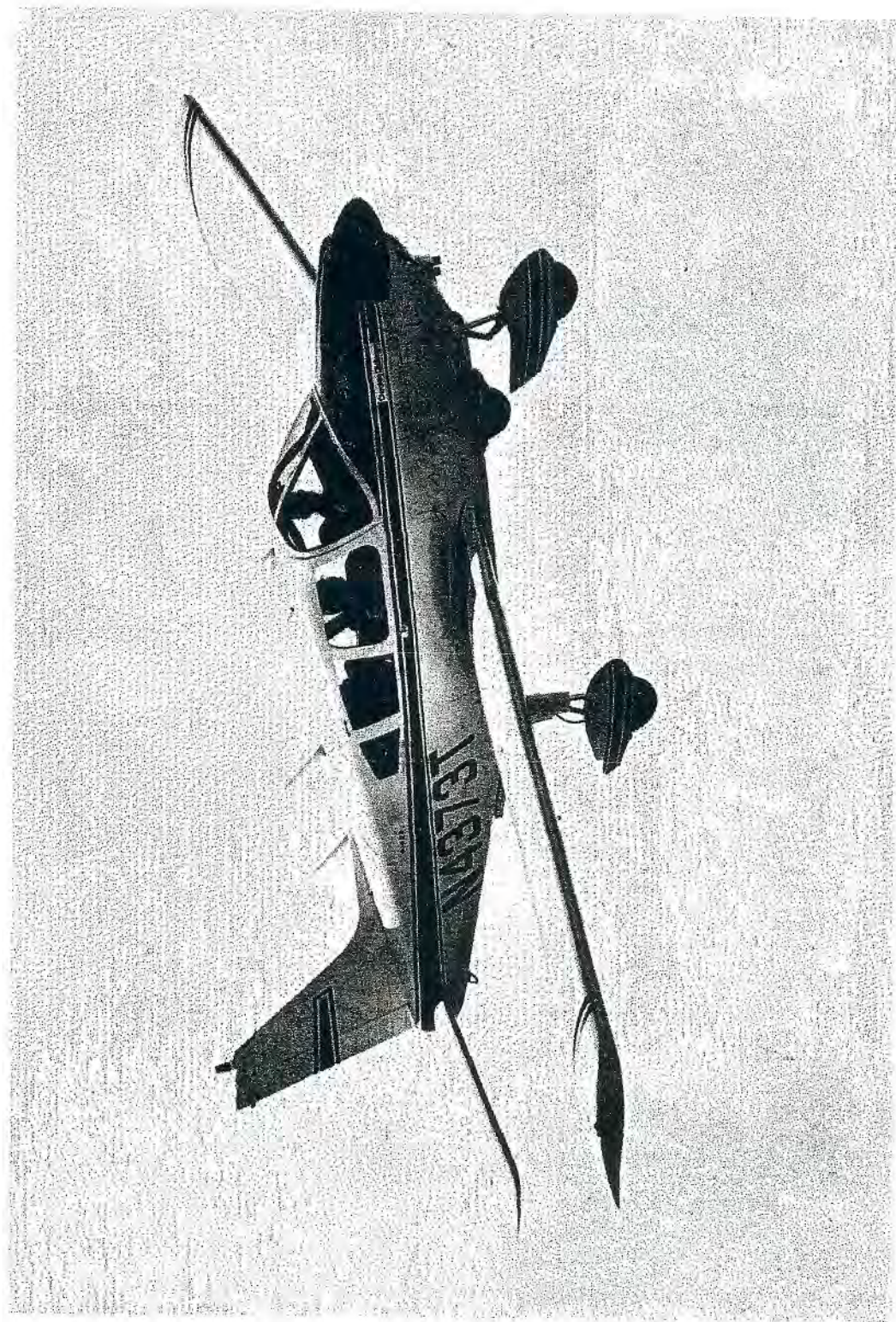
1. TO HELP YOU OPERATE YOUR CHEROKEE WITH SAFETY AND CONFIDENCE.
2. TO MORE FULLY ACQUAINT YOU WITH THE BASIC PERFORMANCE AND HANDLING CHARACTERISTICS OF THE AIRPLANE.
3. TO MORE FULLY EXPLAIN YOUR CHEROKEE'S OPERATION THAN IS PERMISSIBLE TO SET FORTH IN THE AIRPLANE FLIGHT MANUAL.

IF THERE IS ANY INCONSISTENCY BETWEEN THIS HANDBOOK AND THE AIRPLANE FLIGHT MANUAL APPROVED BY THE F.A.A., THE FLIGHT MANUAL SHALL GOVERN.

Revised text and illustrations shall be indicated by a black vertical line in the margin opposite the change.

Additional copies of this manual, Part No. 761 513, may be obtained from your Piper Dealer.

Published by
PUBLICATIONS DEPARTMENT
Piper Aircraft Corporation
761 513
Issued: June 1972
Revised: January 1973



SECTION I
SPECIFICATIONS

Performance	1
Weights	2
Power Plant	2
Fuel and Oil	2
Baggage	2
Dimensions	3
Landing Gear	3

SECTION I
SPECIFICATIONS
PERFORMANCE

Performance figures are for airplanes equipped for cross-country transportation and flown at gross weight under standard conditions at sea level or stated altitude. Any changes in equipment may result in changes in performance.

Take-off Ground Run (S.L. Std., maximum effort, 25° flap) (ft)	720
Take-off over 50-ft Barrier S.L. Std., (maximum effort, 25° flap) (ft)	1625
Best Rate of Climb Speed (mph)	85
Rate of Climb (ft per min)	725
Service Ceiling (ft)	14,150
Absolute Ceiling (ft)	16,500
Top Speed (mph)	148
Optimum Cruise Speed (TAS) (75% power, optimum altitude, leaned to best power) (mph)	141
Cruising Range (75% power, optimum altitude leaned to best economy, no reserves or climb allowance) (mi)	686
Optimum Cruising Range (55% power, 10,000 ft, leaned to best economy, no reserves or climb allowance) (mi)	706
Stalling Speed CAS (flaps down) (mph)	61
Stalling Speed CAS (flaps up) (mph)	68
Landing Roll S.L. Std., (flaps down) (ft)	635*
Landing Roll over 50-ft Barrier S.L. Std., (ft)	1185*

*This value applies only for the conditions indicated on the landing distance versus density altitude chart.

SPECIFICATIONS (cont.)

WEIGHTS

Gross Weight (lbs)	2450
Empty Weight (Standard) (lbs)	1384*
USEFUL LOAD (Standard) (lbs)	1066*

POWER PLANT

Engine (Lycoming)	O-360-A4A
Rated Horsepower	180
Rated Speed (rpm)	2700
Bore (in.)	5.125
Stroke (in.)	4.375
Displacement (cu in.)	361.0
Compression Ratio	8.5:1
Dry Weight (lbs)	285
Propeller	76EM8S5-0-60

FUEL AND OIL

Fuel Capacity (U.S. gal) Usable	48
Oil Capacity (qts)	8
Fuel, Aviation Grade (min octane)	100/130

BAGGAGE

Maximum Baggage (lbs)	200
Baggage Space (cu ft)	24
Baggage Door Size (in.)	20 x 22

* Weight varies with each aircraft

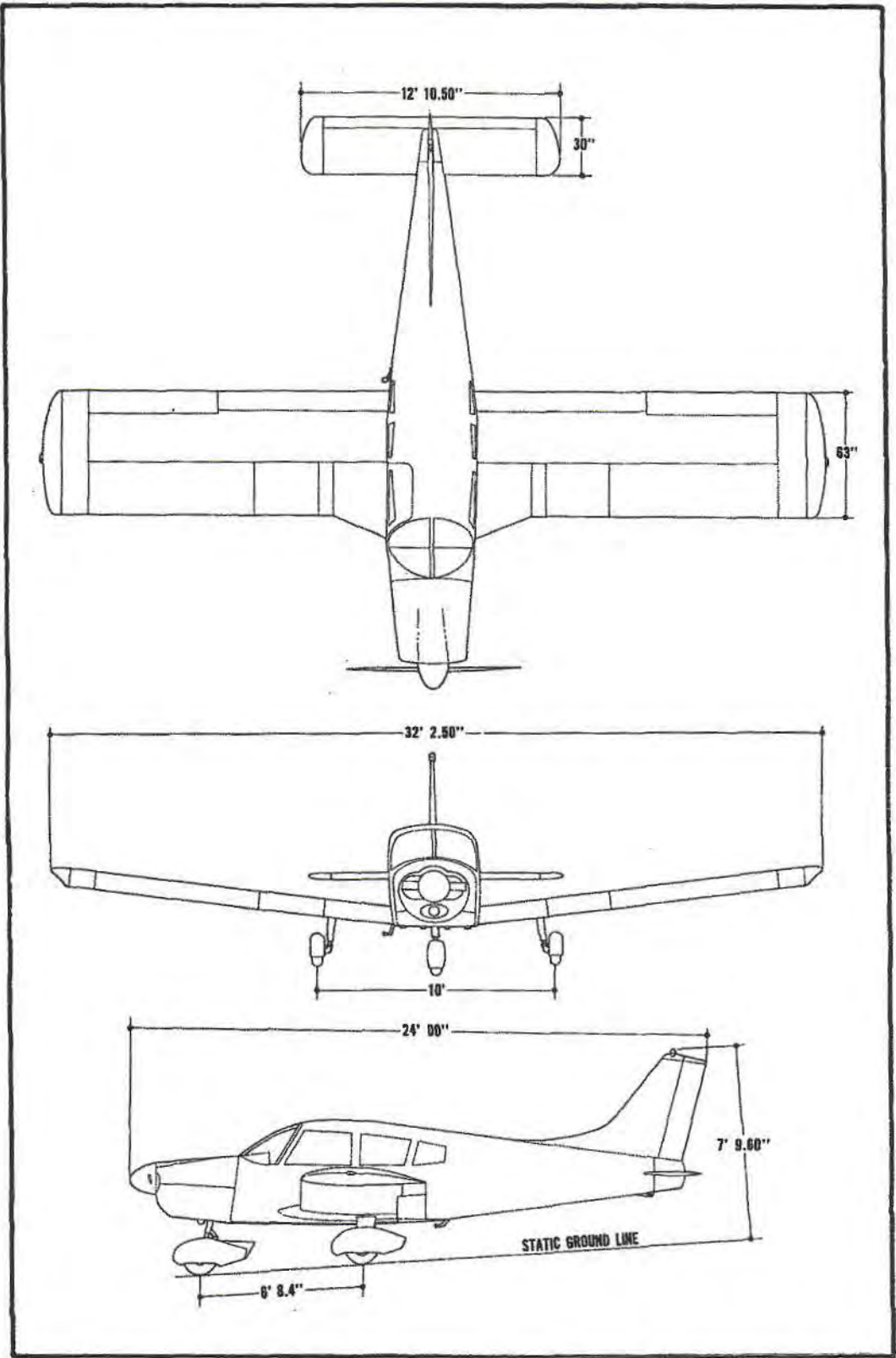
SPECIFICATIONS (cont.)

DIMENSIONS

Wing Span (ft)	32
Wing Area (sq ft)	170
Wing Loading (lbs per sq ft)	14.4
Length (ft)	24.0
Height (ft)	7.8
Power Loading (lbs per hp)	13.6

LANDING GEAR

Wheel Base (ft)	6.7
Wheel Tread (ft)	10
Tire Pressure (psi)	Nose 24
	Main 24
Tire Size	Nose (4 ply rating) 6.00 x 6
	Main (4 ply rating) 6.00 x 6



SECTION II

DESIGN INFORMATION

Engine and Propeller	5
Structures	5
Landing Gear	6
Control Systems	7
Fuel System	7
Electrical System	9
Heating and Ventilating System	13
Cabin Features	13
Optional Equipment	16

SECTION II

DESIGN INFORMATION

ENGINE AND PROPELLER

The Cherokee 180 is powered by a Lycoming O-360-A4A four cylinder, direct drive, horizontally opposed engine rated at 180 HP at 2700 RPM. It is furnished with a starter, 60 ampere 12 volt alternator, shielded ignition, vacuum pump drive, fuel pump, and a dry, automotive type carburetor air filter.

The exhaust system is of the cross-over type to reduce back pressure and improve performance. It is made entirely from stainless steel and is equipped with dual mufflers. A heater shroud around the mufflers is provided to supply heat for the cabin and windshield defrosting.

The Sensenich 76EM8S5-0-60 fixed-pitch propeller is made from a one-piece alloy forging.

STRUCTURES

All structures are of aluminum alloy construction and are designed to ultimate load factors well in excess of normal requirements. All exterior surfaces are primed with etching primer and painted with acrylic lacquer.

The wings are attached to each side of the fuselage by inserting the butt ends of the respective main spars into a spar box carry-through which is an integral part of the fuselage structure, providing in effect a continuous main spar with splices at each side of the fuselage. There are also fore and aft attachments at the rear spar and at an auxiliary front spar.

The wing airfoil section is a laminar flow type, NACA65₂-415 with the maximum thickness about 40% aft of the leading edge. This permits the main spar carry-through structure to be located under the rear seat providing unobstructed cabin floor space ahead of the rear seat.

LANDING GEAR

The three landing gears use a Cleveland 6.00 x 6 wheel, the main wheels being provided with Cleveland single disc hydraulic brake assemblies, No. 30-55. All wheels use 6.00 x 6 four ply tires with tubes.

The nose gear is steerable through a 44 degree arc by use of the rudder pedals. A spring device is incorporated in the rudder pedal torque tube assembly to aid in rudder centering and to provide rudder trim. The nose gear steering mechanism also incorporates a hydraulic shimmy dampener.

The three struts are of the air-oil type, with the normal extension being 3.25 inches for the nose gear and 4.50 inches for the main gear.

The standard brake system for the Cherokee consists of a hand lever and master cylinder which is located below and behind the left center of the instrument sub-panel. The brake fluid reservoir is installed on the top left front face of the firewall. The parking brake is incorporated in the master cylinder and is actuated by pulling back on the brake lever, depressing the knob attached to the handle and releasing the brake lever. To release the parking brake, pull back on the lever to disengage the catch mechanism and allow the handle to swing forward.

Optional toe brakes are available to supplement the standard hand lever and parking brake system.

CONTROL SYSTEMS

Dual controls are provided as standard equipment with a cable system used between the controls and the surfaces. The horizontal tail is of the Flying Tail type (stabilator), with a trim tab mounted on the trailing edge of the stabilator to reduce the control system forces. This tab is actuated by a control wheel on the floor between the front seats. The stabilator provides extra stability and controllability with less size, drag and weight than conventional tail surfaces. The ailerons are provided with a differential action which tends to reduce adverse yaw in turning maneuvers, and which also reduces the amount of coordination required in normal turns. A rudder trim adjustment is mounted on the right side of the pedestal below the throttle quadrant and permits directional trim as needed in flight.

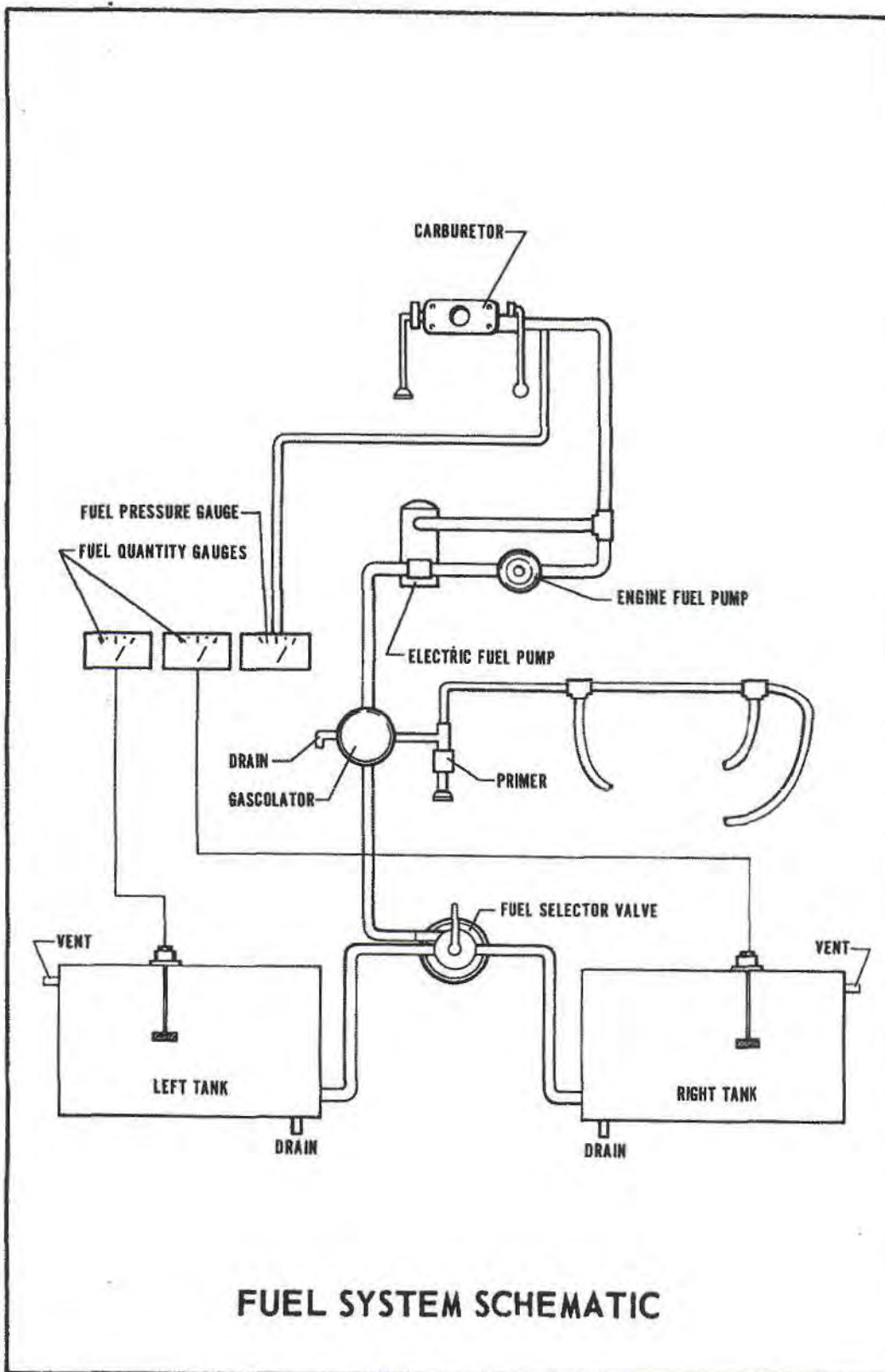
The flaps are manually operated, balanced for light operating forces and spring-loaded to return to the up position. A past-center lock incorporated in the actuating linkage holds the flap when it is in the up position so that it may be used as a step on the right side. The flap will not support a step load except when in the full up position, so it must be completely retracted when used as a step. The flaps have three extended positions: 10, 25 and 40 degrees.

FUEL SYSTEM

Fuel is stored in two twenty-five gallon (24 gal. usable) tanks which are secured to the leading edge structure of each wing by screws and nut plates. This allows easy removal for service or inspection.

The fuel selector control is located on the left side-panel, forward of the pilot's seat. The button on the selector must be depressed and held while the handle is moved to the OFF position. The button releases automatically when the handle is moved back into the ON position.

An auxiliary electric fuel pump is provided in case of failure of the engine driven pump. The electric pump should be on for all take-offs and landings, and when switching tanks. The pump switch is located in the switch panel above the throttle quadrant.



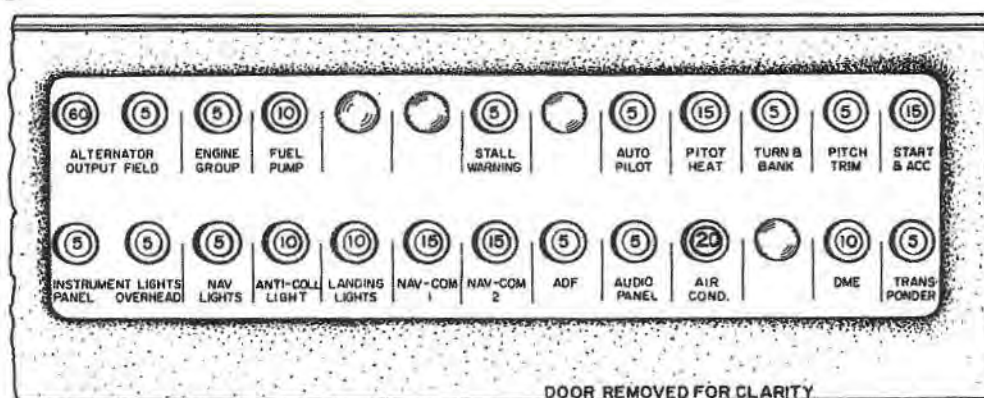
Each tank has an individual quick drain located at the bottom, inboard rear corner, and should be drained to check for water before each flight. The fuel strainer, which is also equipped with a quick drain, is located on the front lower left corner of the firewall. This strainer should be drained regularly to check for water or sediment accumulation. To drain the lines from the tanks, the tank selector valve must be switched to each tank in turn, with the electric pump on, and the gascolator drain valve opened.

Fuel quantity and pressure are indicated on gauges located in a cluster on the left side of the instrument panel.

ELECTRICAL SYSTEM

The electrical system includes a 12 volt 60 amp alternator, battery, voltage regulator, overvoltage relay and master switch relay. The battery is mounted in a stainless steel box immediately aft of the baggage compartment. The regulator and overvoltage relay are located on the forward left side of the fuselage behind the instrument panel.

Electrical switches are located on the right center instrument panel, and the circuit breakers are located on the lower right instrument panel. A rheostat-switch on the left side of the switch panel controls the navigation lights and the dome instrument light. It also dims the dome light. The similar switch on the right side controls and dims the panel lights.



Circuit Breaker Panel

The alternator system offers many advantages over the generator system both in operation and maintenance. The main advantage is full electrical power output at lower engine RPM. This is a great improvement for radio and electrical equipment operation. Since the alternator output is available at all times, the battery will be charging for a greater percentage of use. This will make cold-morning starting easier.

Standard accessories include a starter, electric fuel pump, stall warning indicator, cigar lighter, fuel gauge and ammeter. The navigation lights, anti-collision light, landing light, instrument lighting and cabin dome light are optional. Circuits will handle an entire complement of communications and navigational equipment.

The words "master switch" used hereafter in this manual indicate both sides of the switch, battery side "BAT" and alternator side "ALT" are to be depressed simultaneously to OFF or ON as directed.

Unlike previous generator systems, the ammeter does not indicate battery discharge; rather it displays in amperes the load placed on the alternator. With all electrical equipment off (except master switch) the ammeter will be indicating the amount of charging current demanded by the battery. As each item of electrical equipment is turned on, the current will increase to a total appearing on the ammeter. This total includes the battery. The maximum continuous load for night flight, with radios on, is about 30 amperes. This 30 ampere value, plus approximately two amperes for a fully charged battery, will appear continuously under these flight conditions. The amount of current shown on the ammeter will tell immediately if the alternator system is operating normally, as the amount of current shown should equal the total amperage drawn by the equipment which is operating.

If no output is indicated on the ammeter during flight, reduce the electrical load by turning off all unnecessary electrical equipment. Check both 5 ampere field breaker and 60 ampere output breaker and reset if open. If neither circuit breaker is open, turn off the "ALT" switch for 30 seconds to reset the overvoltage relay. If ammeter continues to indicate no output, maintain minimum electrical load and terminate flight as soon as practical.

Maintenance on the alternator should prove to be a minor factor. Should service be required, contact the local Piper Dealer.

HEATING AND VENTILATING SYSTEM

Heat for the cabin interior and the defroster system is provided by a heater muff attached to the exhaust system. The amount of heat desired can be regulated with the controls located on the far right side of the instrument panel.

The air flow can be regulated between the front and rear seats by levers located on top of the heat ducts next to the console.

Fresh air inlets are located in the leading edge of the wing at the intersection of the tapered and straight sections. A large adjustable outlet is located on the side of the cabin near the floor at each seat location. Cabin air is exhausted through an outlet located below the rear seat.

CABIN FEATURES

The instrument panel of the Cherokee is designed to accommodate the customary advanced flight instruments and the normally required power plant instruments. The Artificial Horizon and Directional Gyro are vacuum operated through use of a vacuum pump installed on the engine, while the Turn and Bank instrument is electrically operated. A vacuum gauge is mounted on the far right side of the instrument panel. A natural separation of the flight group and the power group is provided by placing the flight group in the upper instrument panel and the power group in the center and lower instrument panels. The radios and circuit breakers located on the right hand instrument panel have extra circuits provided for a complete line of optional radio equipment. The microphone is located on the control quadrant cover, see illustration page 14, item 42.

The cabin interior includes a pilot storm window, two sun visors, ash trays, two map pockets, and pockets on the backs of each front seat. The front seats are adjustable fore and aft for pilot-passenger comfort and ease of entry and exit. Arm rests are also provided for the front seats.

A single strap shoulder harness controlled by an inertia reel is standard equipment for the front seats, and is offered as an option for the rear seats. The shoulder strap is routed over the shoulder adjacent to the windows and attached to the lap belt in the general area of the person's inboard hip.

A check of the inertia reel mechanism is made by pulling sharply on the strap. The reel will lock in place under this test and prevent the strap from extending. Under normal movement the strap will extend and retract as required.

The 24 cubic foot baggage area may be reached from the cabin or through a large 20 x 22 inch outside door.

AIR CONDITIONING*

The air conditioning system is a recirculating air system. The major items include; evaporator, condenser, compressor, blower, switches and temperature controls.

The evaporator is located behind the left rear side of the baggage compartment. This cools the air that is used for air conditioning.

The condenser is mounted on a retractable scoop located on the bottom of the fuselage and to the rear of the baggage compartment area. The scoop extends when the air conditioner is "ON" and retracts to a flush position when the system is "OFF."

The compressor is mounted on the forward right underside of the engine. It has an electric clutch which automatically engages or disengages the compressor to the belt drive system of the compressor.

An electrical blower is mounted on the aft side of the rear cabin panel. Air from the baggage area is drawn through the evaporator by the blower and distributed through an overhead duct to individual outlets located adjacent to each occupant.

The switches and temperature control are located on the lower right side of the instrument panel in the climate control center panel. The temperature control regulates the desired temperature of the cabin. Turn the control clockwise for increased cooling, counterclockwise for decreased cooling.

Located inboard of the temperature control is the fan speed switch and the air conditioning "ON-OFF" switch. The fan can be operated independently of the air conditioning. However, it must be on for air conditioner operation. Turning either switch off will disengage the compressor clutch and retract the condenser door. Cooling air should be felt within one minute after the air conditioner is turned on.

*Optional Equipment

NOTE

If the system is not operating in 5 minutes turn the system "OFF" until the fault is corrected.

The "FAN" switch allows operation of the fan with the air conditioner turned "OFF" to aid cabin air circulation if desired. A "LOW," "MED" or "HIGH" flow of air can be selected to the air conditioner outlets located in the overhead duct. The outlets can be adjusted or turned off by each occupant to obtain individual cooling effect.

The "DOOR OPEN" indicator light is located to the left of the radio stack in front of the pilot. The light illuminates whenever the condenser door is open and remains on until the door is closed.

A circuit breaker located on the circuit breaker panel protects the air conditioning electrical system.

Whenever the throttle is in the full throttle position, it actuates a micro switch which disengages the compressor and retracts the scoop. This is done to obtain maximum power and maximum rate of climb. The fan continues to operate and the air will remain cool for approximately one minute. When the throttle is retarded approximately 1/4 inch, the clutch will engage and the scoop will extend, again supplying cool, dry air.

NOTES

SECTION III

OPERATING INSTRUCTIONS

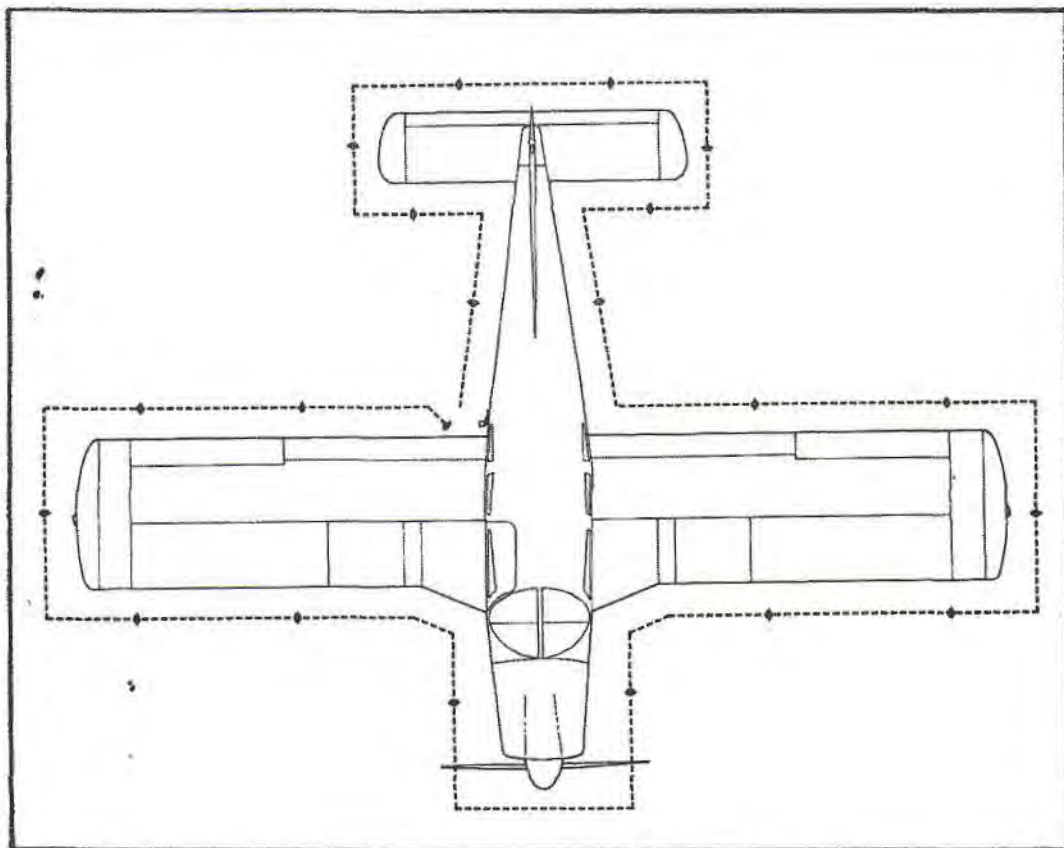
Preflight	19
Starting Engine	20
Warm-Up and Ground Check	22
Take-Off	23
Climb	23
Stalls	24
Cruising	24
Approach and Landing	25
Stopping Engine	26
Engine Power Loss	26
Mooring	27
Weight and Balance	27
Operating Tips	27
Optional Equipment	30

SECTION III

OPERATING INSTRUCTIONS

PREFLIGHT

1. Master switch and ignition OFF.
2. a. Check for external damage and operational interference of control surfaces or hinges.
b. Insure that wings and control surfaces are free of snow, ice or frost.
3. a. Visually check fuel supply and secure caps.
b. Drain fuel tank sumps (two).



- c. Drain fuel system sump (left side of aircraft).
- d. Check that fuel system vents are open.
- e. Check main landing gear shock struts for proper inflation (approximately 4.50 inches showing).
- f. Check tires for cuts, wear and proper inflation.
- g. Check brake blocks and discs for wear and damage.
- 4. a. Check windshield for cleanliness.
- b. Check propeller and spinner for defects or nicks.
- c. Check for obvious fuel or oil leaks.
- d. Check oil level (insure dipstick is properly seated).
- e. Check cowling and inspection covers for security.
- f. Check nose wheel tire for inflation and wear.
- g. Check nose gear shock strut for proper inflation (approximately 3.25 inches showing).
- h. Check for foreign matter in air inlet.
- 5. a. Stow tow-bar and control locks if used.
- b. Check baggage for storage and security.
- c. Close and secure the baggage compartment door.
- 6. a. Upon entering airplane remove seat belt securing control wheel. Check that all primary flight controls operate properly.
- b. Close and secure cabin door.
- c. Check that required papers are in order and in the airplane.
- d. Fasten seat belts and shoulder harness. Check function of inertia reel.

STARTING ENGINE

1. Set parking brake ON.
2. Set the carburetor heat control in the full COLD position.
3. Select the desired tank with fuel selector valve.

Starting Engine When Cold:

1. Open throttle approximately 1/4 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Move the mixture control to FULL RICH.
5. Engage the starter by rotating magneto switch clockwise and pressing in.

6. When the engine fires, advance throttle to desired setting. If the engine does not fire within five to ten seconds, disengage starter and prime with one to three strokes of the priming pump. Repeat the starting procedure.

Starting Engine When Hot:

1. Open the throttle approximately 1/2 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and move the throttle to desired setting.

Starting Engine When Flooded:

1. Open the throttle full.
2. Turn the master switch ON.
3. Turn the electric fuel pump OFF.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and retard the throttle.

Starting With External Power Source:

An optional feature known as Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the aircraft battery.

The procedure is as follows:

1. Turn aircraft MASTER SWITCH to OFF.
2. Connect RED lead of PEP kit jumper cable to POSITIVE (+) terminal of external 12 volt battery and BLACK lead to NEGATIVE (-) terminal.
3. Insert plug of jumper cable into socket located on aircraft fuselage.
4. Turn aircraft MASTER SWITCH to ON and proceed with NORMAL engine starting technique.

5. After engine has been started, turn MASTER SWITCH to OFF and remove jumper cable plug from aircraft.

6. Turn aircraft MASTER SWITCH to ON and check alternator ammeter for indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

When the engine is firing evenly, advance the throttle to 800 RPM. If oil pressure is not indicated within thirty seconds, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication. If the engine has failed to start, refer to the "Lycoming Operating Handbook, Engine Troubles and Their Remedies."

Starter manufacturers recommend that cranking periods be limited to thirty seconds with a two minute rest between cranking periods. Longer cranking periods will shorten the life of the starter.

WARM-UP AND GROUND CHECK

Warm-up the engine at 800 to 1200 RPM for not more than two minutes in warm weather, four minutes in cold weather. Avoid prolonged idling at low RPM as this practice may result in fouled spark plugs. If necessary to hold before take-off, it is recommended that the engine be idled at 1200 RPM.

The magnetos should be checked at 2000 RPM and the drop off on either magneto should not exceed 175 RPM and should be within 50 RPM of the other. Prolonged operation on one magneto should be avoided.

Check vacuum gauge, indicator should read 5" Hg $\pm$.1" Hg at 2000 RPM.

Check both the oil temperature and pressure. The temperature may be low for some time if the engine is being run for the first time of the day, but as long as the pressure is within limits the engine is ready for take-off.

Carburetor heat should also be checked prior to take-off to be sure that the control is operating properly and to clear any ice which may have formed during taxiing. Avoid prolonged ground operation with carburetor heat ON as the air is unfiltered.

Operation of the engine driven fuel pump should be checked while taxiing or during pretake-off engine run up by switching off the electric fuel pump and observing fuel pressure. The electric fuel pump should be on during take-off to prevent loss of power should the engine driven pump fail. The engine is warm enough for take-off when the throttle can be opened without the engine faltering. For air conditioner ground check refer to page 30.

TAKE-OFF

Just before take-off the following items should be checked:

- | | |
|----------------------------|---------------------------|
| 1. Fuel on proper tank | 7. Seat backs erect |
| 2. Electric fuel pump - on | 8. Fasten belts/harness |
| 3. Engine gages checked | 9. Trim tab - set |
| 4. Flaps - set | 10. Controls - free |
| 5. Carb. heat off | 11. Door - latched |
| 6. Mixture - set | 12. Air conditioner - off |

The take-off technique is conventional for the Cherokee. The tab should be set slightly aft of neutral, with the exact setting determined by the loading of the aircraft. Allow the airplane to accelerate to 50 to 60 MPH, then ease back on the wheel enough to let the airplane fly itself off the ground. Premature raising of the nose, or raising it to an excessive angle will result in a delayed take-off. After take-off let the aircraft accelerate to the desired climb speed by lowering the nose slightly.

Take-offs are normally made with flaps up. However, for short field take-offs, and for take-offs under difficult conditions such as deep grass or on a soft surface, distances can be reduced appreciably by lowering flaps to 25°.

CLIMB

The best rate of climb at gross weight will be obtained at 85 MPH. The best angle of climb may be obtained at 74 MPH. At lighter than gross weight these speeds are reduced somewhat. For climbing en route a speed of 100 MPH is recommended. This will produce better forward speed and increased visibility over the nose during the climb. The air conditioner may be turned on after all obstacles have been cleared.

STALLS

All controls are effective at speeds down through the stalling speed, and stalls are gentle and easily controlled.

Stall speed chart on following page is at gross weight. Stall speeds at lower weights will be correspondingly less.

STALL SPEED TABLE		
Angle of Bank	Flaps 40°	Flaps Retracted
0°	61 MPH	68 MPH
20°	63 MPH	70 MPH
40°	70 MPH	78 MPH
60°	86 MPH	96 MPH
Power Off – Gross Weight 2450 lbs.		

CRUISING

The cruising speed is determined by many factors including power setting, altitude, temperature, loading and equipment installed on the airplane.

The normal cruising power is 75% of the rated horsepower of the engine. True airspeeds which may be obtained at various altitudes and power settings can be determined from the charts in Section IV of this handbook.

Use of the mixture control in cruising flight reduces fuel consumption significantly, especially at higher altitudes. The mixture should be leaned during cruising operation above 5000 feet altitude and at pilot's discretion at lower altitudes when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the FULL RICH position for all operations under 5000 feet.

To lean the mixture, pull the mixture control until the engine becomes rough, indicating that the lean mixture limit has been reached in the leaner cylinders. Then enrich the mixture by pushing the control towards the instrument panel until engine operation becomes smooth.

If the airplane is equipped with the optional exhaust gas temperature (EGT) gauge, a more accurate means of leaning is available to the pilot. For this procedure, refer to the AVCO Lycoming Operator's Manual.

In order to keep the airplane in best lateral trim during cruising flight, the fuel should be used alternately from each tank. It is recommended that one tank be used for one hour after take-off, then the other tank be used for two hours, then return to the first tank, which will have approximately one and one half hours of fuel remaining if the tanks were full at take-off. The second tank will contain approximately one half hour of fuel. Do not run tanks completely dry in flight.

APPROACH AND LANDING

Before landing check list:

- | | |
|----------------------------|--------------------------|
| 1. Fuel on proper tank | 4. Seat backs erect |
| 2. Mixture - rich | 5. Flaps - set (115 MPH) |
| 3. Electric fuel pump - on | 6. Fasten belts/harness |
| | 7. Air conditioner - off |

The airplane should be trimmed to an approach speed of about 85 MPH with flaps up. The flaps can be lowered at speeds up to 115 MPH, if desired, and the approach speed reduced 3 MPH for each additional notch of flaps. Carburetor heat should not be applied unless there is an indication of carburetor icing, since the use of carburetor heat causes a reduction in power which may be critical in case of a go-around. Full throttle operation with heat on is likely to cause detonation.

The amount of flap used during landings and speed of the aircraft at contact with the runway should be varied according to the landing surface and conditions of wind and airplane loading. It is generally good practice to contact the ground at minimum possible safe speed consistent with existing conditions.

Normally, the best technique for short and slow landings is to use full flap and enough power to maintain the desired airspeed and approach flight path. Reduce the airspeed during flare out and contact the ground close to stalling speed. After ground contact hold the nose wheel off as long as possible. As the airplane slows down, drop the nose and apply brakes. There will be less chance of skidding the tires if the flaps are retracted before applying the brakes. Braking is most effective when back pressure is applied to the control wheel, putting most of the airplane weight on the main wheels. In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the ground at higher than normal speeds with partial or no flaps.

STOPPING ENGINE

At the pilot's discretion, the flaps should be raised and the electric fuel pump turned off. After parking, the air conditioner and radios should be turned off and the engine stopped by pulling the mixture control to idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the magneto and master switches should be turned off and the parking brake set.

ENGINE POWER LOSS

The most common cause of engine power loss is mismanagement of the fuel. Therefore, the first step to take after engine power loss is to move the fuel selector valve to the tank not being used. This will often keep the engine running even if there is no apparent reason for the engine to stop on the tank being used.

If changing to another tank does not restore the engine:

1. Check fuel pressure and turn on electric fuel pump if off.
2. Push mixture control to full "RICH."
3. Check ignition switch. Turn to best operating magneto - left, right, or both.

MOORING

The Cherokee should be moved on the ground with the aid of the nose wheel tow-bar provided with each plane and secured in the baggage compartment. Tie down ropes may be secured to rings provided under each wing and to the tail skid. The aileron and stabilator controls should be secured by looping the seat belt through the control wheel and pulling it tight. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured. The flaps are locked when in the full up position and should be left retracted.

WEIGHT AND BALANCE

It is the responsibility of the owner and pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight. For weight and balance data see the Airplane Flight Manual and Weight and Balance form supplied with each airplane.

OPERATING TIPS

The following Operating Tips are of particular value in the operation of the Cherokee.

1. Learn to trim for take-off so that only a very light back pressure on the wheel is required to lift the airplane off the ground.
2. The best speed for take-off is about 60 MPH under normal conditions. Trying to pull the airplane off the ground at too low an airspeed decreases the controllability of the airplane in event of engine failure.
3. Flaps may be lowered at airspeeds up to 115 MPH. To reduce flap operating loads, it is desirable to have the airplane at a slower speed before extending the flaps.
4. Before attempting to reset any circuit breaker, allow a two to five minute cooling off period.

5. Before starting the engine, check that all radio switches, light switches, and the pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged.

6. The overvoltage relay is provided to protect the electronics equipment from a momentary overvoltage condition (approximately 16.5 volts and up), or a catastrophic regulator failure. In the event of a momentary condition, the relay will open and the ammeter will indicate "0" output from the alternator. The relay may be reset by switching the "ALT" switch to "OFF" for approximately 30 seconds and then returning the "ALT" switch to "ON."

7. The vacuum gauge is provided to monitor the pressure available to assure the correct operating speed of the vacuum driven gyroscopic flight instruments, it also monitors the condition of the common air filter by measuring the flow of air thru the filter.

If the vacuum gauge registers lower than $5'' \pm .10''$ Hg at 2000 RPM, the following items should be checked before flight:

- a. Common air filter, could be dirty or restricted.
- b. Vacuum lines could be collapsed or broken.
- c. Vacuum pump, worn.
- d. Vacuum regulator, not adjusted correctly. The pressure, even though set correctly, can read lower under two conditions: (1) Very high altitude, above 12000 feet, (2) Low engine RPM usually on approach or during training maneuvers. This is normal and should not be considered a malfunction.

PIPER AUTOMATIC LOCATOR

The Piper Automatic Locator, when installed, is located in the aft portion of the fuselage just below the stabilator leading edge and is accessible through a plate on the right side of the fuselage. It is an emergency locator transmitter which meets the requirements of FAR 91.52. It is automatically activated by a longitudinal force of 5 to 7 g's and transmits a distress signal on both 121.5 MHz and 243.0 MHz for a period of 48 hours in low temperature areas to 100 hours in high temperature areas. The unit operates on a self contained battery.

The battery has a useful life of four years. However, to comply with FAA regulations, it must be replaced after two years of shelf life or service life. The battery should also be replaced if the transmitter has been used in an emergency situation or if the accumulated test time

exceeds one hour. The replacement date is marked on the transmitter label.

The unit has a three position selector switch placarded "OFF," "ARM" and "ON." The "ARM" position is provided to set the unit to the automatic position so that it will transmit only after impact and continue to transmit until the battery power is drained to depletion or the switch is manually moved to the "OFF" position. The "ARM" position is selected when the locator is installed at the factory and should remain in that position whenever the unit is installed in the aircraft. The "ON" position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to check the function of the transmitter periodically.

The "OFF" position is provided for the purpose of changing the battery or if used as a portable transmitter or rearming the unit if it should be activated for any reason.

NOTE

If the switch has been placed in the "ON" position for any reason, the "OFF" position has to be selected before selecting "ARM." If "ARM" is selected directly from the "ON" position the transmitter will continue to transmit in the "ARM" position.

Attached to the unit is a portable antenna, provided so that the locator may be removed from the aircraft, in case of an emergency, and used as a portable signal transmitter.

The locator should be checked during the Ground Check to make certain the unit has not been accidentally activated. Check by tuning a radio receiver to 121.5 MHz. If you hear an oscillating audio sound the locator may have been activated and should be turned off immediately. Reset to "ARM" position and check again to insure against outside interference.

OPTIONAL EQUIPMENT

AIR CONDITIONING

To operate the air conditioning system either on the ground or in flight:

1. Start the engine (ground operation).
2. Turn the air conditioning "Master" switch to "ON."
3. Turn "TEMP" control to desired temperature. Clockwise rotation increases cooling.
4. Select desired "FAN" position, "LOW," "MED" or "HIGH."

AIR CONDITIONER OPERATIONAL CHECK PROCEDURE

Prior to take-off the air conditioner should be checked for proper operation as follows:

1. Check aircraft Master Switch ON.
2. Select desired "FAN" position, "LOW," "MED" or "HIGH."
3. Turn the air conditioner control switch to "ON" - the "Air Cond. Door Open" warning light will turn on, thereby indicating proper air conditioner condenser door actuation.
4. 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.
5. 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.

AIR CONDITIONER EFFECTS ON AIRPLANE PERFORMANCE

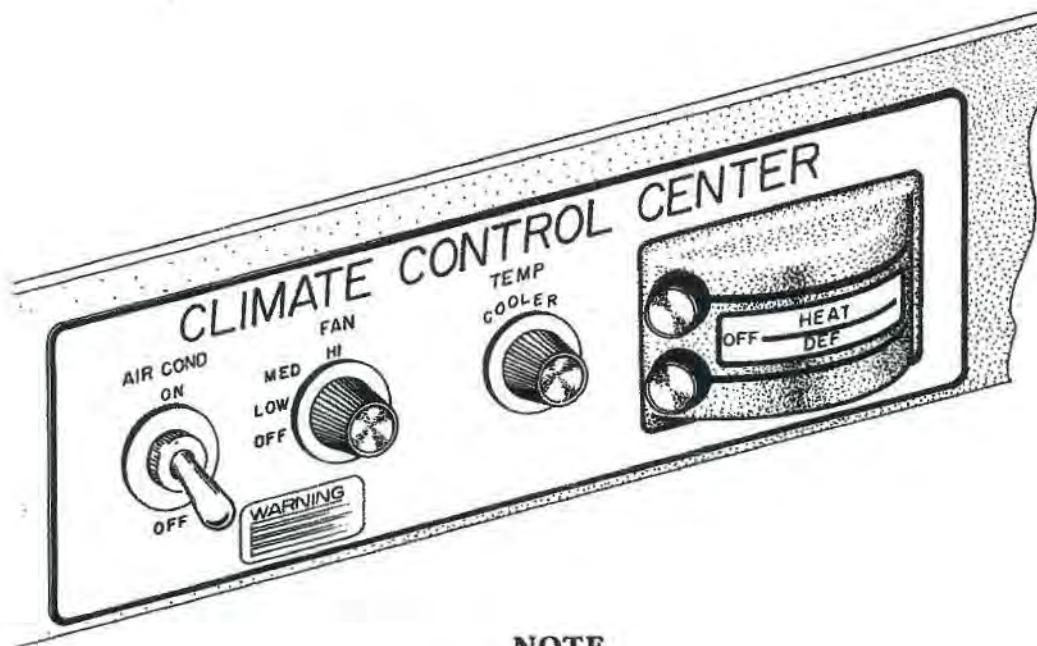
Operation of the air conditioner will cause slight decreases in the cruise speed and range of the Cherokee 180. Power from the engine is required to run the compressor, and the condenser door, when extended, causes a slight increase in drag. When the air conditioner is turned off there is normally no measurable difference in climb, cruise or range performance of the airplane.

NOTE

To insure maximum climb performance the air conditioner must be turned off manually before take-off to disengage the compressor and retract the condenser door. Also the air conditioner must be turned off manually before the landing approach in preparation for a possible go-around.

Although the cruise speed and range are only slightly affected by the air conditioner operation, these changes should be considered in preflight planning. To be conservative, the following figures assume that the compressor is operating continuously while the airplane is airborne. This will be the case only in extremely hot weather.

1. The decrease in true airspeed is approximately 5 mph at all power settings.
2. The decrease in range may be as much as 37 statute miles for the 50 gal. capacity.

**NOTE**

To read power from the Power vs. Density Altitude Chart in this manual, add 50 rpm to the value observed on the tachometer when the air conditioner is operating.

The climb performance of Cherokee 180 is not compromised measurably with the air conditioner operating since the compressor is de-clutched and the condenser door is retracted, both automatically, when a full throttle position is selected. When the full throttle position is not used or in the event of a malfunction which caused the compressor to operate and the condenser door to be extended, a decrease in rate of climb of as much as 100 fpm can be expected. Should a malfunction occur which prevents condenser door retraction when the compressor is turned off, a decrease in rate of climb of as much as 50 fpm can be expected.

SECTION IV

EMERGENCY PROCEDURES

Introduction	33
Ground Operations	33
Take-Off	34
In Flight	35
Power Off Landing	36
Fire	37
Loss of Oil Pressure	37
Loss of Fuel Pressure	38
High Oil Temperature	38
Alternator Failure	38
Engine Roughness	38
Spins	40
Open Door	40

SECTION IV

EMERGENCY PROCEDURES

INTRODUCTION

This section contains procedures that are recommended if an emergency condition should occur during ground operation, take-off, or in flight. These procedures are suggested as the best course of action for coping with the particular condition described, but are not a substitute for sound judgement and common sense. Since emergencies rarely happen in modern aircraft, their occurrence is usually unexpected, and the best corrective action may not always be obvious. Pilots should familiarize themselves with the procedures given in this section and be prepared to take appropriate action should an emergency arise.

Most basic emergency procedures, such as power off landings, are a part of normal pilot training. Although these emergencies are discussed herein, this information is not intended to replace such training, but only to provide a source of reference and review, and to provide information on procedures which are not the same for all aircraft. It is suggested that the pilots review standard emergency procedures periodically to remain proficient in them.

GROUND OPERATIONS

ENGINE FIRE DURING START

Engine fires during start are usually the result of over priming. The procedures below are designed to draw the excess fuel back into the induction system:

1. If engine has not started:
 - a. Mixture - Idle cut-off
 - b. Throttle - Open
 - c. Turn engine with starter (This is an attempt to pull the fire into the engine.)
2. If engine has already started and is running, continue operating to try pulling the fire into the engine.

3. In either case stated in (1) and (2), if the fire continues longer than a few seconds, the fire should be extinguished by the best available external means.

4. If external fire extinguishing is to be applied:

- a. Fuel Selector Valves - Off
- b. Mixture - Idle cut-off

TAKE-OFF

ENGINE POWER LOSS DURING TAKE-OFF

The proper action to be taken if loss of power occurs during take-off will depend on circumstances.

1. If sufficient runway remains for a normal landing, land straight ahead.

2. If insufficient runway remains, maintain a same airspeed and make only a shallow turn to avoid obstructions. Use of flaps depends on circumstances. Normally, flaps should be fully extended for touchdown.

3. If you have gained sufficient altitude to attempt a restart, proceed as follows:

- a. MAINTAIN SAFE AIRSPEED
- b. FUEL SELECTOR - SWITCH TO ANOTHER TANK CONTAINING FUEL
- c. ELECTRIC FUEL PUMP - CHECK ON
- d. MIXTURE - CHECK RICH
- e. CARBURETOR HEAT - ON

NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not regained, proceed with the POWER OFF LANDING procedure.

IN FLIGHT

ENGINE POWER LOSS IN-FLIGHT

Complete engine power loss is usually caused by fuel flow interruption, and power will be restored shortly after fuel flow is restored. If power loss occurs at low altitude, the first step is to prepare for an emergency landing. (See POWER OFF LANDING.) Maintain an airspeed of at least 80 MPH IAS, and if altitude permits, proceed as follows:

1. Fuel Selector - switch to another tank containing fuel.
2. Electric Fuel Pump - On
3. Mixture - Rich
4. Carburetor Heat - On
5. Engine Gauges - check for an indication of the cause of Power Loss.
6. Primer - Check Locked
7. If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When Power is Restored:

8. Carburetor Heat - Off
9. Electric Fuel Pump - Off

If the above steps do not restore power, prepare for an emergency landing. If time permits:

1. Ignition Switch - "L" then "R" then back to "BOTH".
2. Throttle and Mixture - Different settings. (This may restore power if problem is too rich or too lean a mixture, or partial fuel system restriction).
3. Try another fuel tank - (Water in the fuel could take some time to be used up, and allowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal).

NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not restored, proceed with POWER OFF LANDING procedures.

POWER OFF LANDING

If loss of power occurs at altitude, trim the aircraft for best gliding angle (80 MPH IAS) (Air Cond. Off) and look for a suitable field. If measures taken to restore power are not effective, and if time permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. If possible, notify the FAA by radio of your difficulty and intentions. If another pilot or passenger is aboard, let them help.

When you have located a suitable field, establish a spiral pattern around this field. Try to be at 1000 feet above the field at the downwind position, to make a normal approach. Excess altitude may be lost by widening your pattern, using flaps or slipping, or a combination of these.

Touchdowns should normally be made at the lowest possible airspeed, with full flaps.

When committed to landing:

1. Ignition - Off
2. Master Switch - Off
3. Fuel Selector - Off
4. Mixture - Idle Cut-Off
5. Seat belt and harness - Tight

FIRE

The presence of fire is noted through smoke, smell, and heat in the cabin. It is essential that the source of the fire be promptly identified through instrument readings, character of the smoke, or other indications, since the action to be taken differs somewhat in each case.

Source of fire - Check

1. Electrical Fire (smoke in cabin):
 - a. Master Switch - Off
 - b. Vents - Open
 - c. Cabin Heat - Off
 - d. Land as soon as possible.
2. Engine Fire
 - a. Fuel Selector - Off
 - b. Throttle - Closed
 - c. Mixture - Idle cut-off
 - d. Heater - Off (In all cases of fire)
 - e. Defroster - Off (In all cases of fire)
 - f. If terrain permits, land immediately.

The possibility of an engine fire in flight is extremely remote. The procedure given above is general and pilot judgment should be the deciding factor for action in such an emergency.

LOSS OF OIL PRESSURE

Loss of oil pressure may be either partial or complete. A partial loss of oil pressure usually indicates a malfunction in the oil pressure regulating system, and a landing should be made as soon as possible to investigate the cause, and prevent engine damage.

A complete loss of oil pressure indication may signify oil exhaustion or may be the result of a faulty gauge. In either case, proceed toward the nearest airport, and be prepared for a forced landing. If the problem is not a pressure gauge malfunction, the engine

may stop suddenly. Maintain altitude until such time as a dead stick landing can be accomplished. Don't change power settings unnecessarily, as this may hasten complete power loss.

Depending on the circumstances, it may be advisable to make an off airport landing while power is still available, particularly if other indications of actual oil pressure loss, such as sudden increase in temperatures, or oil smoke, are apparent, and an airport is not close.

If engine stoppage occurs, proceed to POWER OFF LANDING.

LOSS OF FUEL PRESSURE

1. Electric boost pump - On
2. Fuel Selector - Check on Full Tank

If problem is not an empty fuel tank, land as soon as practicable, and have engine driven fuel pump checked.

HIGH OIL TEMPERATURE

An abnormally high oil temperature indication may be caused by a low oil level, an obstruction in the oil cooler, damaged or improper baffle seals, a defective gauge, or other causes. Land as soon as practicable at an appropriate airport and have the cause investigated.

A steady rapid rise in oil temperature is a sign of trouble. Land at the nearest airport and let a mechanic investigate the problem. Watch the oil pressure gauge for an accompanying loss of pressure.

ALTERNATOR FAILURE

Loss of alternator output is detected through a zero reading on the ammeter. Before executing the following procedure, insure that the reading is zero and not merely low by actuating an electrically powered device, such as the landing light. If no increase in the ammeter reading is noted, alternator failure can be assumed.

1. Reduce electrical load.
2. Alternator circuit breakers - Check
3. "Alt" switch - Off (for 30 seconds), Then On.

If the ammeter continues to indicate no output, or alternator will not stay reset, turn off "Alt" switch, maintain minimum electrical load and land as soon as practical. All electrical load is being supplied by the battery.

ENGINE ROUGHNESS

Engine roughness is usually due to carburetor icing which is indicated by a drop in RPM, and may be accompanied by a slight loss of airspeed or altitude. If too much ice is allowed to accumulate, restoration of full power may not be possible; therefore, prompt action is required.

1. Carburetor heat-on (See Note). RPM will decrease slightly and roughness will increase. Wait for a decrease in engine roughness or an increase in RPM, indicating ice removal. If no change in approximately one minute, return carburetor heat to COLD. If the engine is still rough, try steps below.

- a. Mixture - Adjust for maximum smoothness. Engine will run rough if too rich or too lean.
- b. Electric Fuel Pump - On
- c. Fuel Selector - Change to other tank to see if fuel contamination is the problem.
- d. Engine Gauges - Check for abnormal readings. If any gauge readings are abnormal, proceed accordingly.
- e. Magneto Switch - "L" then "R", then back to "BOTH". If operation is satisfactory on either magneto, proceed on that magneto at reduced power, with mixture full rich, to a landing at the first available airport.

If roughness persists, prepare for a precautionary landing at pilots discretion.

NOTE

Partial carburetor heat may be worse than no heat at all, since it may partially melt ice, which will refreeze in the intake system. When using carburetor heat, therefore, always use full heat, and when ice is removed return the control to the full cold position.

SPINS

Intentional spins are prohibited in both the normal and the utility category airplane. For approved maneuvers as a utility category airplane, refer to the Flight Manual. Use the following procedure to recover from inadvertent spins.

1. THROTTLE - IDLE
2. RUDDER - FULL OPPOSITE TO DIRECTION OF ROTATION
3. CONTROL WHEEL - FULL FORWARD
4. RUDDER - NEUTRAL (WHEN ROTATION STOPS)
5. CONTROL WHEEL - AS REQUIRED TO SMOOTHLY REGAIN LEVEL FLIGHT ATTITUDE.

OPEN DOOR

The cabin door on the Cherokee is double latched, so the chances of it springing open in flight at both the top and bottom are remote. However, should you forget the upper latch, or not fully engage the lower latch, the door may spring partially open. This will usually happen at take-off or soon afterward. An open door will not affect normal flight characteristics, and a normal landing can be made with the door open.

If both upper and lower latches open, the door will trail slightly open, and airspeed will be reduced slightly.

To close the door in flight, proceed as follows:

1. Slow aircraft to 100 MPH IAS.
2. Cabin Vents - Close

3. Storm Window - Open

4. If upper latch is open - latch. If lower latch is open - open top latch, push door further open, and then close rapidly. Latch top latch.

A slip in the direction of the open door will assist in latching procedure.

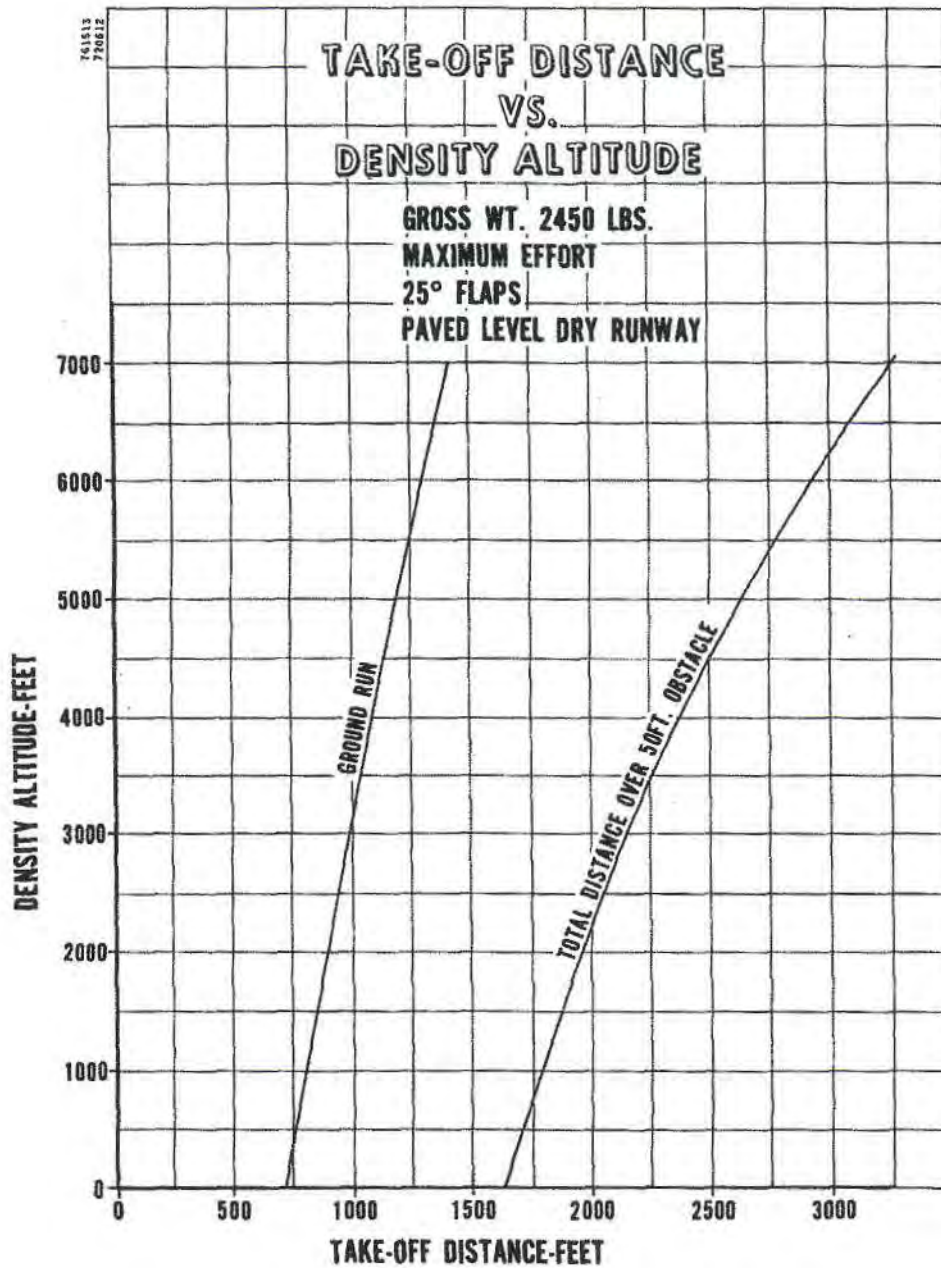
NOTES

SECTION V

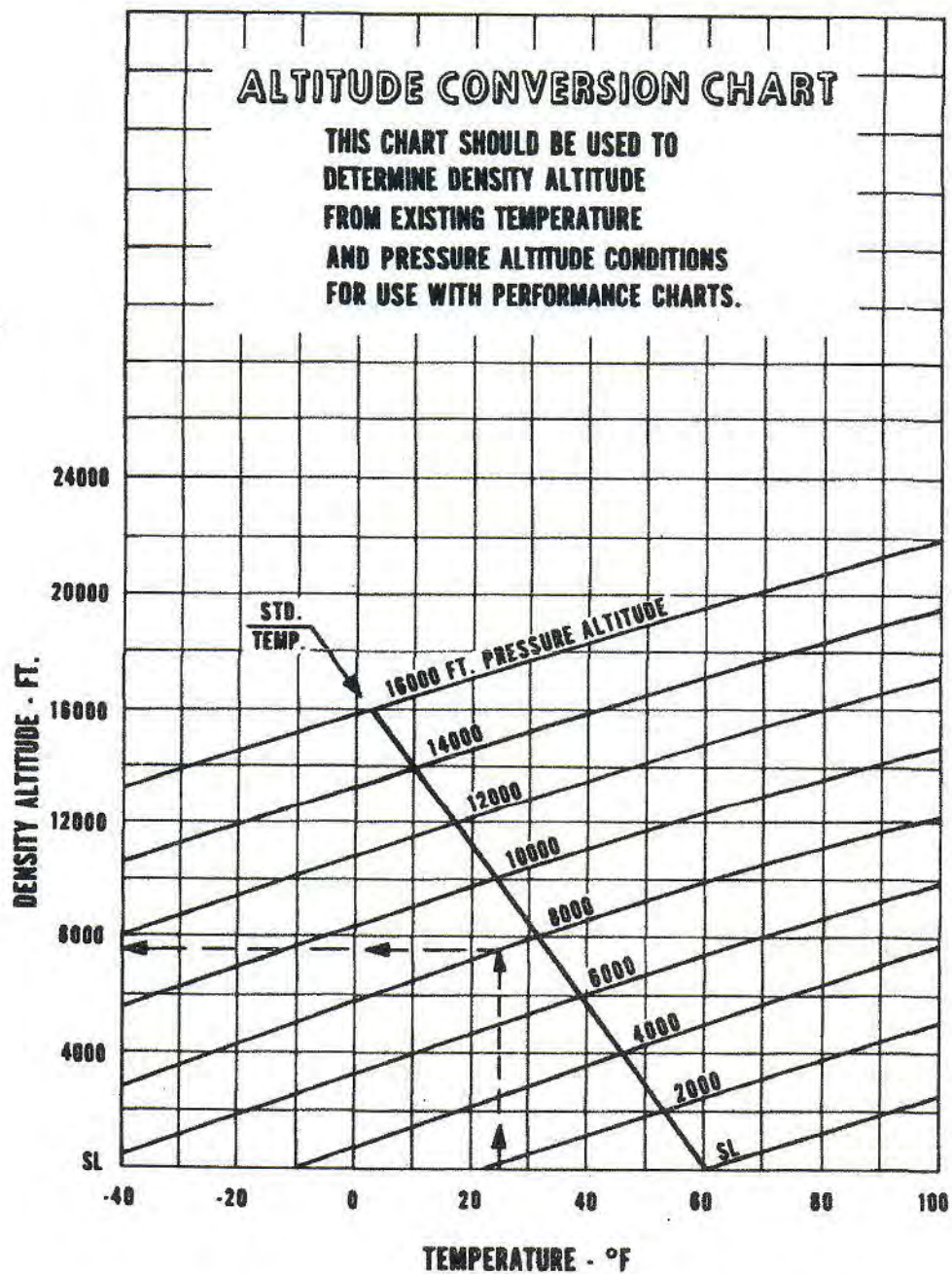
PERFORMANCE CHARTS

Take-off Distance vs Density Altitude	43
Altitude Conversion Chart	44
Rate of Climb vs Density Altitude	45
Range vs Density Altitude	46
True Airspeed vs Density Altitude	47
RPM vs Density Altitude	48
Landing Distance vs Density Altitude	49

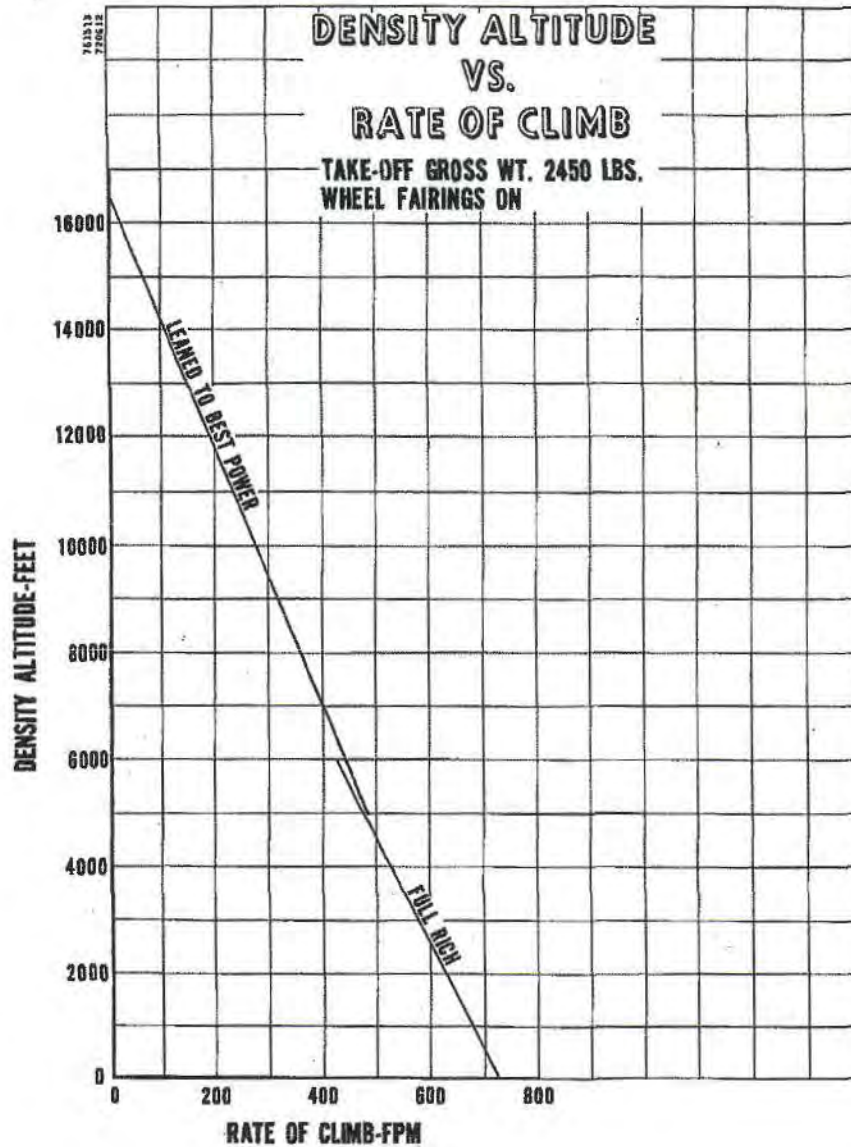
PA-28-180 PIPER CHEROKEE



PA-28-180 PIPER CHEROKEE

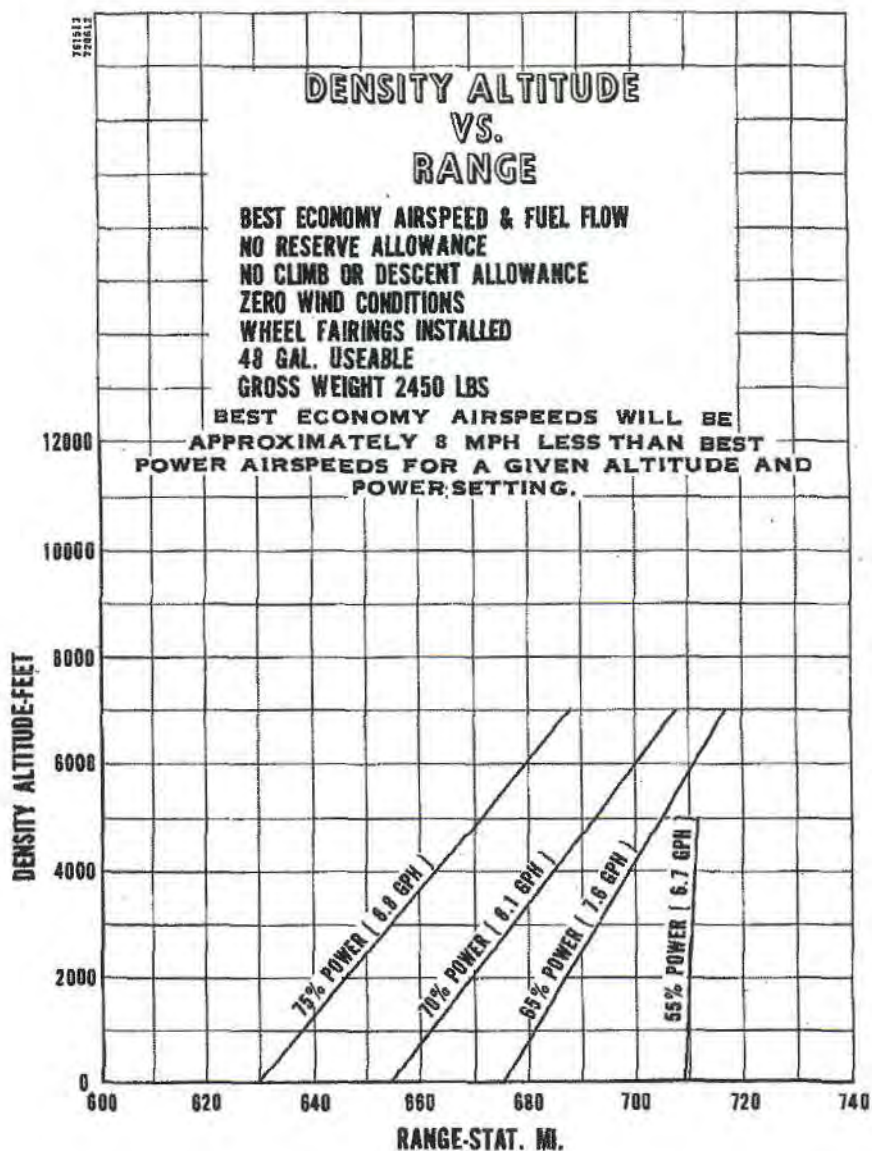


PA-28-180 PIPER CHEROKEE



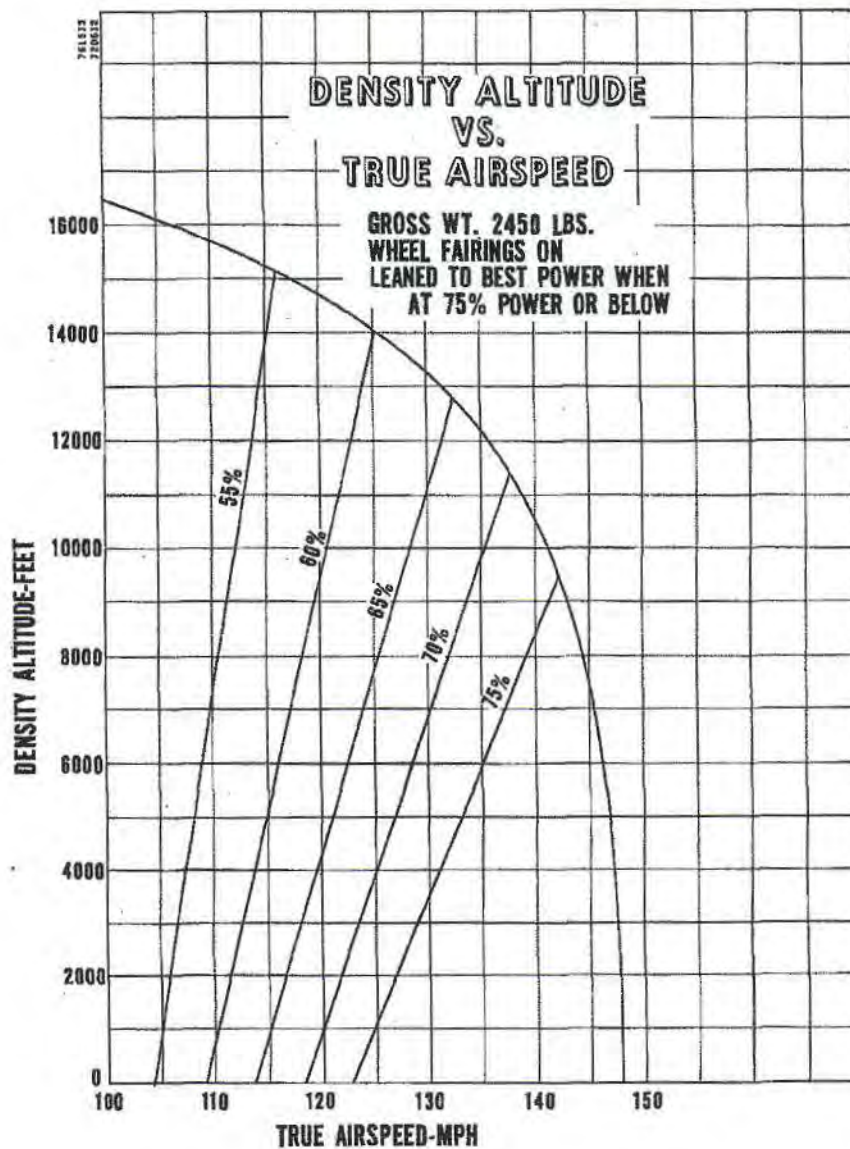
(SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON RATE OF CLIMB)

PA-28-180 PIPER CHEROKEE



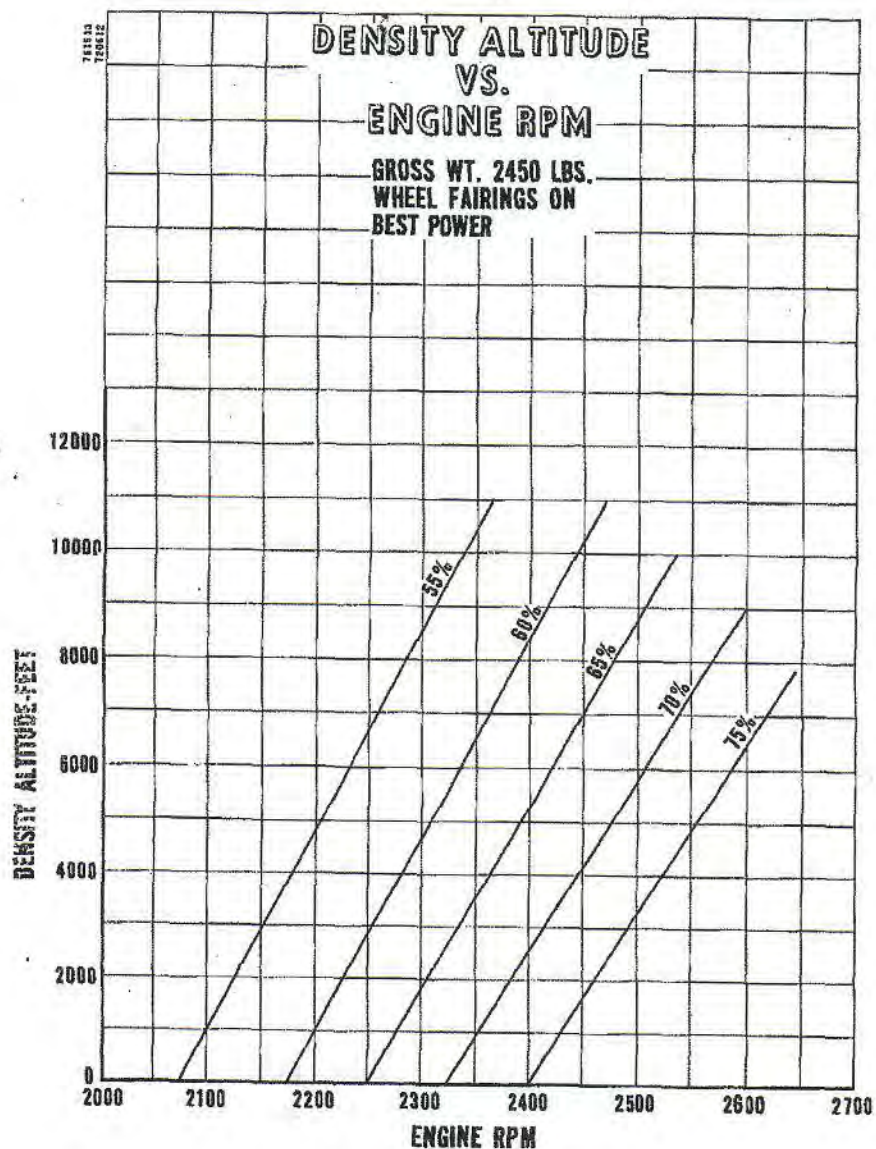
(SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON RANGE)

PA-28-180 PIPER CHEROKEE

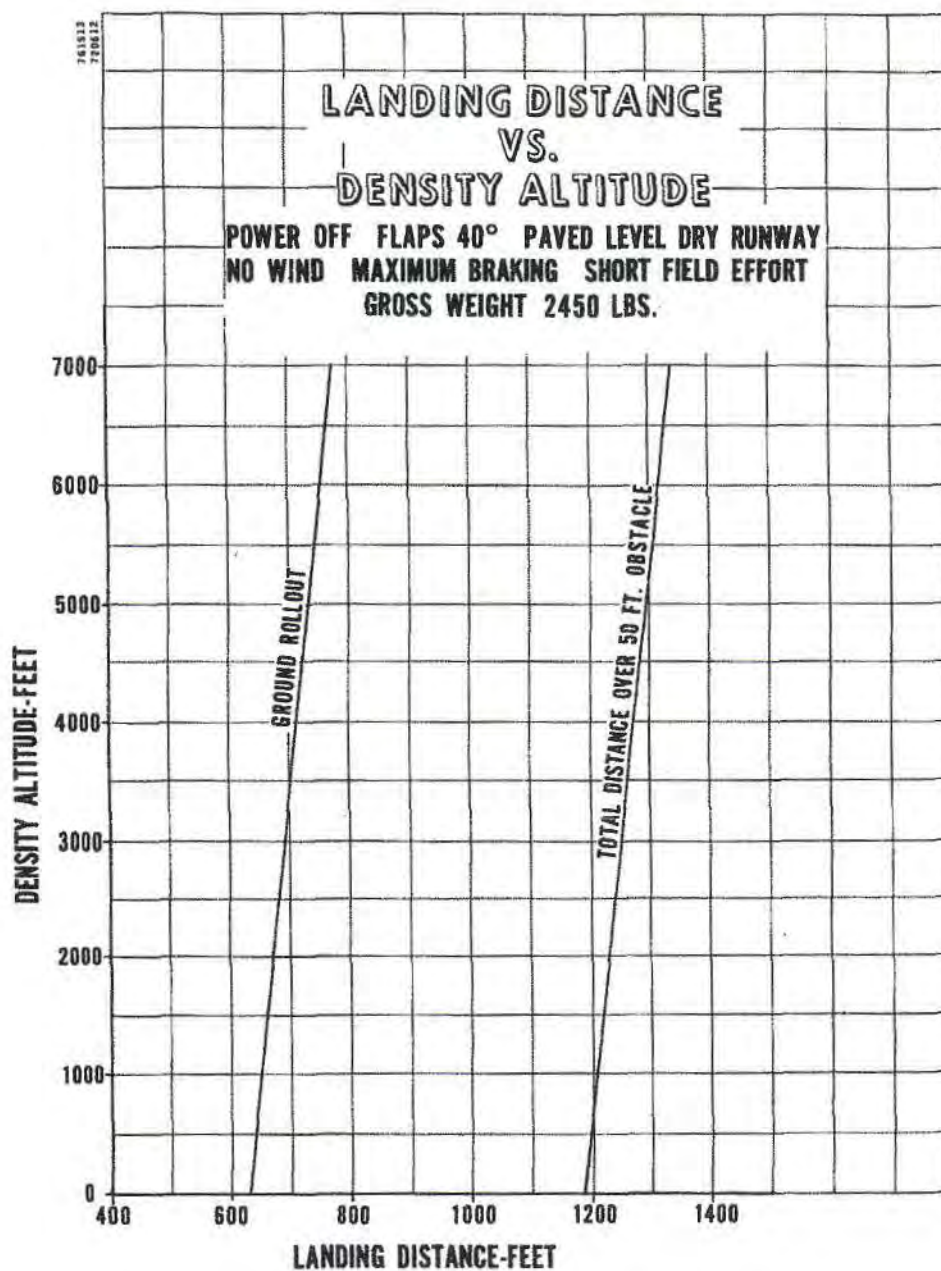


(SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON CRUISE SPEEDS)

PA-28-180 PIPER CHEROKEE



PA-28-180 PIPER CHEROKEE



NOTES

SECTION VI

GENERAL MAINTENANCE

Landing Gear Service	51
Brake Service	53
Tire Inflation	53
Care of Windshield and Windows	54
Battery Service	54
Fuel and Oil Requirements	55
Fuel System	55
Care of Air Filter	55
Leveling and Rigging	56
Serial Number Plate	57

SECTION VI

GENERAL MAINTENANCE

This section of the Cherokee Handbook contains information which pertains to minor maintenance of the airplane. For further maintenance assistance refer to the Service Manual for this airplane. Any complex repairs or modification should be accomplished by a Piper Certified Service Center or equivalent.

LANDING GEAR SERVICE

The main wheels are Cleveland Aircraft Products, Model # 40-86, with Cleveland single disk hydraulic brake assemblies, Model # 30-55. The nose wheel is a Cleveland Aircraft Products, Model # 40-76B. All wheels use a 6.00 x 6, four ply rating, Type III tire with tube.

Main wheels are easily removed by taking off the hub cap, axle nut, and the two bolts holding the brake segment in place, after which the wheel slips easily from the axle.

Tires are demounted from the wheels by deflating the tire, removing the three through-bolts, and separating the wheel halves.

Landing gear oleo struts should be checked for proper strut exposures and fluid leaks. The required extensions for the strut when under normal static load (empty weight of airplane plus full fuel and oil) is 3.25 inches for the nose gear and 4.50 inches for the main gear. Should the strut exposure be below that required, it should be determined whether air or oil is required by first raising the airplane on jacks. Depress the valve core to allow air to escape from the strut housing chamber. Remove the filler plug and slowly raise the strut to full compression. If the strut has sufficient fluid it will be visible up to the bottom of the filler plug hole and will then only require proper inflation.

Should fluid be below the bottom of the filler plug hole, oil should be added. Replace the plug with valve core removed, attach a clear plastic hose to the valve strut of the filler plug and submerge the other end in a container of hydraulic fluid (MIL-H-5606). Fully compress and extend the strut several times thus drawing fluid from the container and expelling air from the strut chamber. To allow the fluid to enter the bottom chamber of the main gear strut housing, the torque link assembly must be disconnected to let the strut be extended a minimum of 10 inches. (The nose gear torque links need not be disconnected.) Do not allow the strut to extend more than 12 inches. When air bubbles cease to flow through the hose, compress the strut fully and again check fluid level. Reinstall the valve core and filler plug, and the main gear torque links, if disconnected.

With fluid in the strut housing at the correct level, attach a strut pump to the air valve and with the airplane on the ground, inflate the oleo strut to the correct height.

In jacking the Cherokee for landing gear or other service, a jack kit (available through Piper Dealers or Distributors) should be used. This kit consists of two hydraulic jacks and a tail stand. At least 250 pounds of ballast should be placed on the base of the tail stand before the airplane is jacked up. The hydraulic jacks should be placed under the jack points on the bottom of the wing and the airplane jacked up until the tail skid is at the right height to attach the tail stand. After attaching the tail stand and adding the ballast, the jacking may be continued until the aircraft is at the height desired.

The steering arms from the rudder pedals to the nose wheel are adjusted at the rudder pedals or at the nose wheel by turning in or out the threaded rod end bearings. Adjustment is normally accomplished at the forward end of the rods and should be done in such a way that the nose wheel is in line with the fore and aft axis of the plane when the rudder pedals and rudder are centered. Alignment of the nose wheel can be checked by pushing the airplane back and forth with the rudder centered to determine that the plane follows a perfectly straight line. The turning arc of the nose wheel is 22 degrees in either direction and factory adjusted at stops on the bottom of the forging. The turning radius of the nose wheel is 17 feet.

The steering arm stops should be carefully adjusted so that the nose wheel reaches its full travel just after the rudder hits its stops. This guarantees that the rudder will be allowed to move through its full travel.

BRAKE SERVICE

The brake system is filled with MIL-H-5606 (Petroleum base) hydraulic brake fluid. This should be checked at every 50 hour inspection and replenished when necessary by filling the brake reservoir on the upper left front side of the firewall to the indicated level. If the system as a whole has to be refilled with fluid it should be done from the brake end of the system by filling with fluid under pressure. This will eliminate air from the system as it is being filled.

No adjustment of brake clearances is necessary on the Cherokee brakes. If after extended service the brake blocks become worn excessively, they are easily replaced with new segments.

TIRE INFLATION

For maximum service from the tires on the Cherokee, keep the tires inflated to the proper pressure of 24 pounds for all three wheels. Interchange the tires on the main wheels if necessary to produce even wear. All wheels and tires are balanced before original installation, and the relationship of the tire, tube, and wheel should be maintained if at all possible. Unbalanced wheels can cause extreme vibration on take-off. In the installation of new components it may be necessary to rebalance the wheel with the tire mounted.

CARE OF WINDSHIELD AND WINDOWS

A certain amount of care is needed to keep the plexiglas windows clean and unmarred. The following procedure is recommended:

1. Flush with clean water and dislodge excess dirt, mud, etc. with your hand.
2. Wash with mild soap and water or Piper Plastic Cleaner. Use a soft cloth or sponge. Do not rub.
3. Remove oil, grease or sealing compounds with a soft cloth and kerosene.
4. After cleaning, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth.
5. A severe scratch or may may be removed by using jeweler's rouge to rub out the scratch, smoothing, and then applying wax.

BATTERY SERVICE

Access for service or inspection of the battery is obtained through the removal of the panel at the right rear side of the baggage compartment. The stainless steel box has a plastic drain tube which is normally closed off with a clamp and which should be opened occasionally to drain off any accumulation of liquid. The battery should be checked for proper fluid level, but must not be filled above the baffle plates. Use only water - no acid. A hydrometer check should be performed to determine the percent of charge present in the battery.

If the battery is not up to charge, recharge starting at a 4 ampere rate and finishing with a 2 ampere rate. Quick charges are not recommended.

FUEL AND OIL REQUIREMENTS

Aviation Grade 100/130 Octane (minimum) fuel must be used in the Cherokee. Because the use of lower grades can cause serious damage in a very short period of time, the engine warranty is invalidated by such use.

The oil capacity of the Lycoming O-360-A4A is 8 quarts, and the minimum safe quantity is 2 quarts. It is recommended that the oil and oil filter be changed every 50 hours, or sooner under unfavorable conditions. The following grades are recommended for the specific temperatures:

Temperatures above 60° F	S.A.E. 50
Temperatures between 30° and 90° F	S.A.E. 40
Temperatures between 0° and 70° F	S.A.E. 30
Temperatures below 10° F	S.A.E. 20

FUEL SYSTEM

The fuel screen in the strainer will require cleaning every 50 hour inspection. The strainer, located ahead of the firewall, is accessible for cleaning by removal of the lower cowl. When the strainer is reassembled after cleaning, a small amount of grease applied to the gasket will facilitate assembly.

CARE OF AIR FILTER

The carburetor air filter must be cleaned at least once every fifty hours. Under extremely adverse conditions of operation it may be necessary to clean the filter daily. Extra filters are inexpensive and a spare should be kept on hand and used as a rapid replacement.

The filter manufacturer recommends that the filter be tapped gently to remove dirt particles. Do not blow out with compressed air.

LEVELING AND RIGGING

Leveling the Cherokee "F" for purposes of weighing or rigging is accomplished as follows:

1. Partially withdraw two machine screws located immediately below the left front side window. These screws are leveling points, and the airplane is longitudinally level when a level placed on the heads of these screws indicates level.

2. To put the airplane in a longitudinally level position on scales, first block the main gear oleos in the fully extended position, then deflate the nose wheel tire until the proper attitude is obtained. For rigging only, the airplane may be placed on jacks for leveling.

3. To level the airplane laterally, place a level across the baggage compartment floor along the rear bulkhead.

Rigging: Although the fixed flight surfaces on the Cherokee cannot be adjusted for rigging purposes, it may be necessary upon occasion to check the position of these surfaces. The movable surfaces all have adjustable stops, as well as adjustable turnbuckles on the cables or push-pull tubes, so that their range of travel can be altered. The positions and angular travels of the various surfaces are as follows:

1. Wings: 7° dihedral, 2° washout.
2. Stabilator Travel: 14° up, 2° down, tolerance $\pm 1^{\circ}$.
3. Fin should be vertical and in line with center of fuselage.
4. Aileron Travel: 30° up, 15° down, tolerance $\pm 2^{\circ}$.
5. Flap Travel: 10° , 25° , 40° , tolerance $\pm 2^{\circ}$.
6. Rudder Travel: 27° right and left, tolerance $\pm 2^{\circ}$.
7. Stabilator Tab Travel: 3° up, 12° down, tolerance $\pm 1^{\circ}$.

Cable tensions for the various controls are as follows:

Rudder: 40 ± 5 #	Stabilator: 40 ± 5 #
Ailerons: 40 ± 5 #	Stabilator Trim: 10 ± 1 #
Flaps: Approx. 10 #	

For extreme cases of wing heaviness, the flap on the wing heavy side may be adjusted down from the zero position as desired.

The service manual should be consulted for the proper method of adjusting surface travels.

SERIAL NUMBER PLATE

The serial number plate is located near the stabilator on the left side of the airplane. Refer to this number for service or warranty matters.

NOTES

INDEX

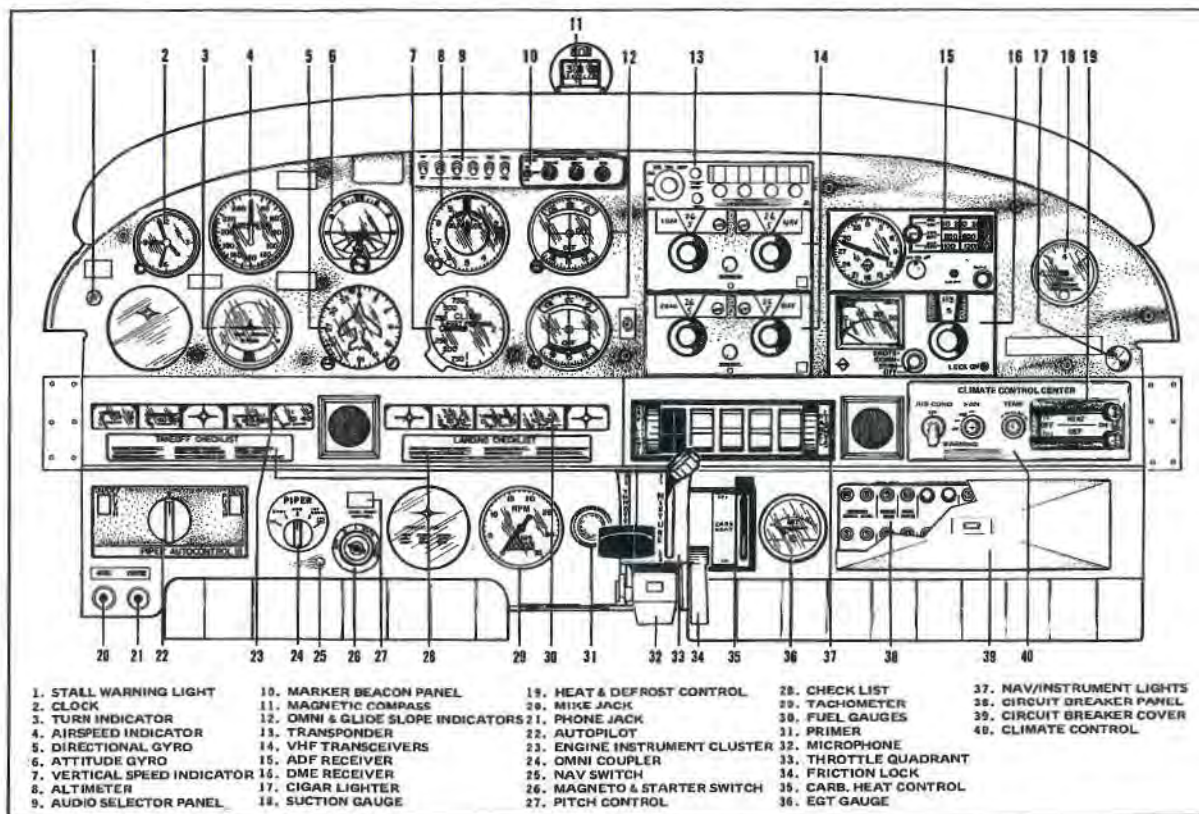
SECTION I	Page
Specifications:	1
Performance	1
Weights	2
Power Plant	2
Fuel and Oil	2
Baggage	2
Dimensions	3
Landing Gear	3
 SECTION II	
Design Information:	5
Engine and Propeller	5
Structures	5
Landing Gear	6
Control System	7
Fuel System	7
Electrical System	9
Heating and Ventilating System	13
Cabin Features	13
Optional Equipment	16
 SECTION III	
Operating Instructions:	19
Preflight	19
Starting Engine	20
Warm-Up and Ground Check	22
Take-Off	23
Climb	23
Stalls	24
Cruising	24
Approach and Landing	25
Stopping Engine	26

INDEX (cont)

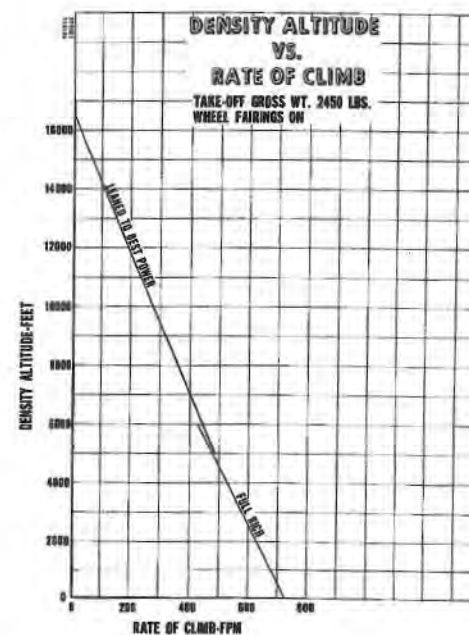
SECTION III (cont)	Page
Engine Power Loss	26
Mooring	27
Weight and Balance	27
Operating Tips	27
Optional Equipment	30
 SECTION IV	
Emergency Procedures:	33
Introduction	33
Ground Operations	33
Take-Off	34
In Flight	35
Power Off Landing	36
Fire	37
Loss of Oil Pressure	37
Loss of Fuel Pressure	38
High Oil Temperature	38
Alternator Failure	38
Engine Roughness	39
Spins	40
Open Door	40
 SECTION V	
Performance Charts:	43
Take-Off Distance vs Density Altitude	43
Altitude Conversion Chart	44
Rate of Climb vs Density Altitude	45
Range vs Density Altitude	46
True Airspeed vs Density Altitude	47
RPM vs Density Altitude	48
Landing Distance vs Density Altitude	49

INDEX (cont)

SECTION VI	Page
General Maintenance:	51
Landing Gear Service	51
Brake Service	53
Tire Inflation	53
Care of Windshield and Windows	54
Battery Service	54
Fuel and Oil Requirements	55
Fuel System	55
Care of Air Filter	55
Leveling and Rigging	56
Serial Number Plate	57

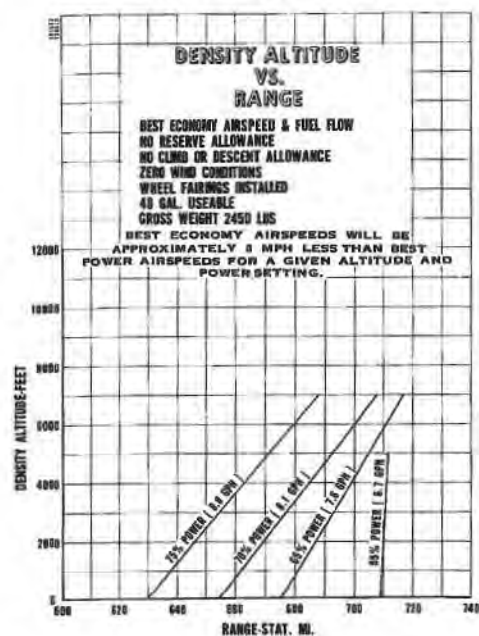


PA-28-180 PIPER CHEROKEE



(SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON RATE OF CLIMB)

PA-28-180 PIPER CHEROKEE



(SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON RANGE)

HEATING AND VENTILATING SYSTEM

Heat for the cabin interior and the defroster system is provided by a heater muff attached to the exhaust system. The amount of heat desired can be regulated with the controls located on the far right side of the instrument panel.

The air flow can be regulated between the front and rear seats by levers located on top of the heat ducts next to the console.

Fresh air inlets are located in the leading edge of the wing at the intersection of the tapered and straight sections. A large adjustable outlet is located on the side of the cabin near the floor at each seat location. Cabin air is exhausted through an outlet located below the rear seat.

CABIN FEATURES

The instrument panel of the Cherokee is designed to accommodate the customary advanced flight instruments and the normally required power plant instruments. The Artificial Horizon and Directional Gyro are vacuum operated through use of a vacuum pump installed on the engine, while the Turn and Bank instrument is electrically operated. A vacuum gauge is mounted on the far right side of the instrument panel. A natural separation of the flight group and the power group is provided by placing the flight group in the upper instrument panel and the power group in the center and lower instrument panels. The radios and circuit breakers located on the right hand instrument panel have extra circuits provided for a complete line of optional radio equipment. The microphone is located on the control quadrant cover, see illustration page 14, item 42.

The cabin interior includes a pilot storm window, two sun visors, ash trays, two map pockets, and pockets on the backs of each front seat. The front seats are adjustable fore and aft for pilot-passenger comfort and ease of entry and exit. Arm rests are also provided for the front seats.

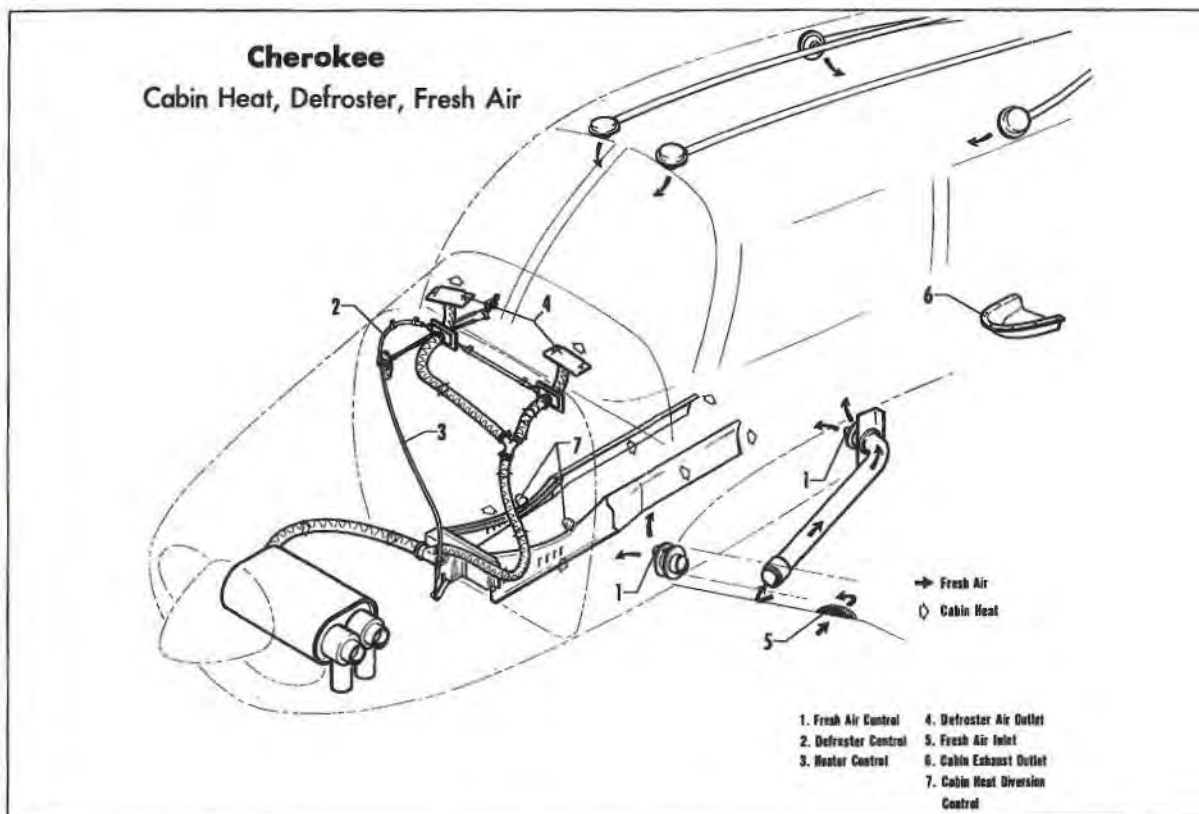
INDEX

SECTION I	Page
Specifications:	1
Performance	1
Weights	2
Power Plant	2
Fuel and Oil	2
Baggage	2
Dimensions	3
Landing Gear	3
 SECTION II	
Design Information:	5
Engine and Propeller	5
Structures	5
Landing Gear	6
Control System	7
Fuel System	7
Electrical System	9
Heating and Ventilating System	13
Cabin Features	13
Optional Equipment	16
 SECTION III	
Operating Instructions:	19
Preflight	19
Starting Engine	20
Warm-Up and Ground Check	22
Take-Off	23
Climb	23
Stalls	24
Cruising	24
Approach and Landing	25
Stopping Engine	26

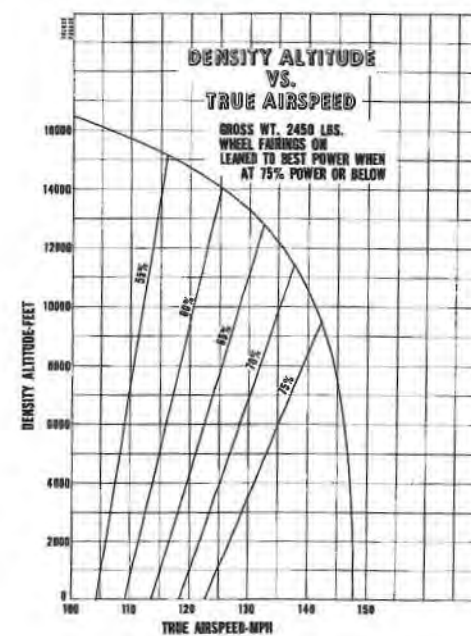
SECTION I SPECIFICATIONS

Performance	1
Weights	2
Power Plant	2
Fuel and Oil	2
Baggage	2
Dimensions	3
Landing Gear	3

SKETCH 4	SKETCH 5	SKETCH 6	SKETCH 7	SKETCH 8	SKETCH 9	SKETCH 10	SKETCH 11	SKETCH 12	SKETCH 13	SKETCH 14	SKETCH 15	EXAMPLE	SYMBOLS 1. LUBRICANT 2. LUBRICANT 3. LUBRICANT 4. LUBRICANT 5. LUBRICANT 6. LUBRICANT 7. LUBRICANT 8. LUBRICANT 9. LUBRICANT 10. LUBRICANT	TYPE OF LUBRICANTS 1. LUBRICANT 2. LUBRICANT 3. LUBRICANT 4. LUBRICANT 5. LUBRICANT 6. LUBRICANT 7. LUBRICANT 8. LUBRICANT 9. LUBRICANT 10. LUBRICANT	PROPERTIES PRODUCT 1. LUBRICANT 2. LUBRICANT 3. LUBRICANT 4. LUBRICANT 5. LUBRICANT 6. LUBRICANT 7. LUBRICANT 8. LUBRICANT 9. LUBRICANT 10. LUBRICANT	SPECIAL INSTRUCTIONS 1. LUBRICANT 2. LUBRICANT 3. LUBRICANT 4. LUBRICANT 5. LUBRICANT 6. LUBRICANT 7. LUBRICANT 8. LUBRICANT 9. LUBRICANT 10. LUBRICANT	NOTES 1. LUBRICANT 2. LUBRICANT 3. LUBRICANT 4. LUBRICANT 5. LUBRICANT 6. LUBRICANT 7. LUBRICANT 8. LUBRICANT 9. LUBRICANT 10. LUBRICANT
-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	------------------	------------------	------------------	------------------	------------------	------------------	-----------------------	--	---	---	---	--

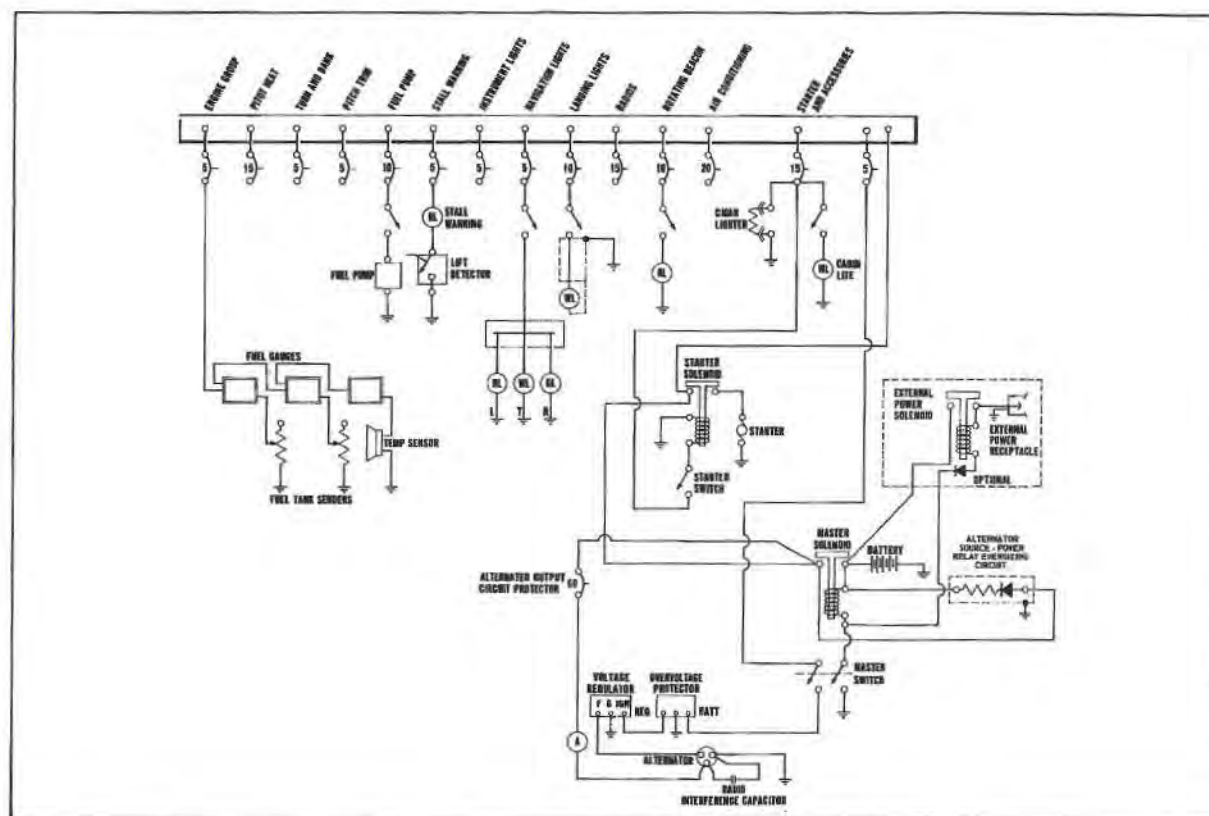
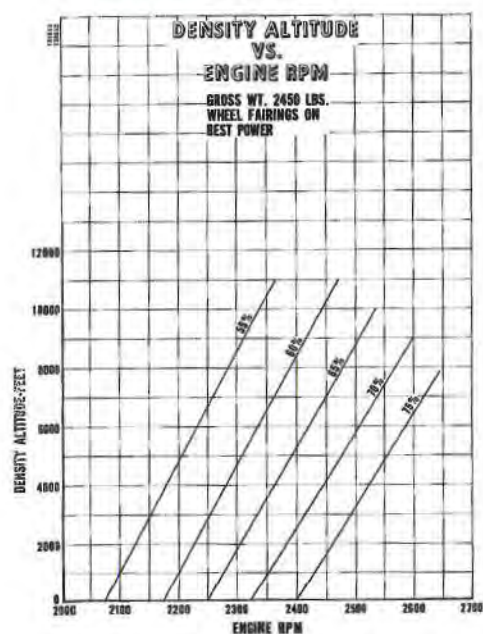


PA-28-180
PIPER CHEROKEE



[SEE SECTION III FOR EFFECTS OF AIR CONDITIONER
INSTALLATION ON CRUISE SPEEDS]

PA-28-180 PIPER CHEROKEE



ELECTRICAL SYSTEM

Airplane Flight Manual (AFM)

(05.22.1972)

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Model PA-28-180
CHECKED		
APPROVED	REPORT VB-437	PAGE _____

DUPLICATE

AIRPLANE FLIGHT MANUAL

MODEL PA-28-180

FAA IDENTIFICATION NO. _____

SERIAL NO. 28-7305057

APPLICABLE TO SERIAL NUMBERS 28-7305001 THROUGH 28-7305601

AND SERIAL NUMBER 28-E13

THIS DOCUMENT MUST BE KEPT IN AIRPLANE AT ALL TIMES.

FAA APPROVED:

H. W. Barnhouse
H. W. Barnhouse, FAA DOA SO-1
Piper Aircraft Corporation

DATE:

May 22, 1972

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.		Airplane Flight Manual Model PA-28-180	
CHECKED				
APPROVED	REPORT VB-437			

Log of Revisions

REV. NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	6	Procedures Section: Added the following wording to Paragraph 3. c: "and full opposite aileron"	<i>H. E. Evans</i>	6-29-72
2	Title	Removed Serial Numbers	<i>H. E. Evans</i>	8-21-72
3	7	Revised Limitations on AutoControl III and AutoFlite II and revised Emergency Procedures on AutoControl III		
	8	Revised Emergency Procedures on AutoFlite II	<i>H. E. Evans</i>	7-1-72
4	8	Corrected item 9. b. for serial number restrictions. Moved Item 3 to Page 9.		
	9	Added information from Page 8.	<i>H. E. Evans</i>	3-20-73
5	TITLE	Added Serial Number Effectivity	<i>H. E. Evans</i>	9-12-73
6	TITLE	Added Serial Number 28-E13	<i>H. E. Evans</i>	5-14-74
7	1	Changed oil pressure gauge markings.	<i>Ward Evans</i>	7-25-75

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Model PA-28-180
CHECKED		
APPROVED	REPORT VB-437	PAGE 1 of 9

Piper Model PA-28-180
Normal and Utility Categories

AIRPLANE FLIGHT MANUAL

1. Limitations Section The following limitations must be observed in the operation of this airplane:
 - Engine Lycoming O-360-A4A with carburetor setting IO-3878
 - Engine Limits For all operations, 2700 rpm, 180 hp.
 - Fuel 100/130 minimum octane aviation fuel.
 - Propeller Sensenich M76EMMS or 76EM8S5. Maximum diameter 76 inches, minimum diameter 76 inches. Static RPM at maximum permissible throttle setting. Not over 2425, not under 2325. No additional tolerance permitted.
 - Power Instruments
 - Oil Temperature: GREEN arc (normal operating range)
75° to 245°
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
25 psi when installed or
60 psi when installed
RED line (maximum) 90 psi
 - Fuel Pressure: GREEN arc (normal operating range)
.5 psi to 8 psi
RED line (minimum) .5 psi
RED line (maximum) 8 psi
 - Tachometer: GREEN arc (normal Operating range)
500 to 2700 rpm
RED line (maximum continuous power)
2700 rpm

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER WILCOX, N.Y.	Airplane Flight Manual Model PA-28-180
CHECKED		
APPROVED		

REPORT VB-437

2 of 9

Airspeed Limits	Never exceed	171 mph
	Maximum structural cruise	140
	Maneuvering	127
	Flaps extended	115
	Maximum positive load factor	3.8 Normal Category
	Maximum positive load factor	4.4 Utility Category
	Maximum negative load factor	No inverted maneuvers approved

Maximum Weight 2450 lbs - Normal Category; 1950 lbs - Utility Category.

Baggage Capacity 200 lbs.

C. G. Range The datum used is 78.4 inches ahead of wing leading edge at the intersection of the straight and tapered section.

1. Normal Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
2450	87.4	93.0
2050	82.0	93.0

2. Utility Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
1950	82.0	86.5

Straight line variation between points given.

NOTE: 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.

Maneuvers

1. Normal Category - All acrobatic maneuvers including spins prohibited
2. Utility Category - Approved maneuvers for Utility Category only.

	Entry Speed
Steep Turns	127 mph
Lazy Eights	127
Chandelles	127

FAA APPROVED 5/22/72

REVISED

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT GROUP 1111 W. BROADWAY WILMINGTON, DEL. 19804	Airplane Flight Manual
CHECKED		Model PA-28-180
APPROVED		REPORT VB-437

3 of 9

Placards

1. In Full View of the Pilot:

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

ALL MARKINGS AND PLACARDS ON THIS AIRPLANE APPLY TO ITS OPERATION AS A UTILITY CATEGORY AIRPLANE. FOR NORMAL AND UTILITY CATEGORY OPERATIONS, REFER TO THE AIRPLANE FLIGHT MANUAL.

NO ACROBATIC MANEUVERS ARE APPROVED FOR NORMAL CATEGORY OPERATIONS. SPINS ARE PROHIBITED FOR BOTH NORMAL AND UTILITY CATEGORIES."

2. In full view of the pilot, the following takeoff and landing checklists will be installed:

TAKEOFF CHECKLIST

Fuel on proper tank	Mixture set	Fasten belts/harness
Electric fuel pump on	Seat backs erect	Trim tab - set
Engine gauges checked		Controls - free
Flaps - set		Door - latched
Carb heat off		Air Conditioner - off

LANDING CHECKLIST

Fuel on proper tank		Flaps - set (115 mph)
Mixture rich	Seat backs erect	Fasten belts/harness
Electric fuel pump on		Air Conditioner - off

The "AIR COND OFF" item in the above takeoff and landing checklists is mandatory for air conditioned aircraft only.

3. In full view of the pilot, in the area of the air conditioner control panel when the air conditioner is installed:

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

4. Adjacent to upper door latch: "ENGAGE LATCH BEFORE FLIGHT."

FAA APPROVED 5/22/72

REVISED

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, WILSON, N.C. 27158	Airplane Flight Manual
CHECKED		Model PA-28-180
APPROVED		REPORT VB-437 PAGE 4 of 9

Placards
(cont'd)

5. On inside of the baggage compartment door:

"BAGGAGE MAXIMUM 200 LBS."

"UTILITY CATEGORY OPERATION - NO BAGGAGE OR AFT PASSENGERS ALLOWED. NORMAL CATEGORY OPERATION - SEE AIRPLANE FLIGHT MANUAL WEIGHT AND BALANCE SECTION FOR BAGGAGE AND AFT PASSENGER LIMITATIONS."
6. In full view of the pilot:

"ROUGH AIR OR MANEUVERING SPEED - 127 MPH."

"UTILITY CATEGORY OPERATION - NO AFT PASSENGERS ALLOWED."
7. 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."
8. On the instrument panel in full view of the pilot when the autoflite is installed:

"FOR HEADING CHANGES: PRESS DISENGAGE SWITCH ON CONTROL WHEEL. CHANGE HEADING, RELEASE DISENGAGE SWITCH."
9. In full view of the pilot: "Utility Category Only."

Acrobatic maneuvers are limited to the following:

	Entry Speed
Steep Turns	127 mph
Lazy Eights	127
Chandelles	127

FAA APPROVED 5/22/72

REVISED

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT DEPT. 1200 W. MAIN ST., PA. REPORT VB-437	Airplane Flight Manual
CHECKED		Model PA-28-180
APPROVED		PAGE 5 of 9

Placards
(cont'd)

10. On the instrument panel in full view of the pilot when the AutoFlite II is installed:

"TURN AUTOFLITE ON. ADJUST TRIM KNOB FOR MINIMUM HEADING CHANGE. FOR HEADING CHANGE, PRESS DISENGAGE SWITCH ON CONTROL WHEEL, CHANGE HEADING, RELEASE SWITCH. ROTATE TURN KNOB FOR TURN COMMANDS. PUSH TURN KNOB IN TO ENGAGE TRACKER. PUSH TRIM KNOB IN FOR HI SENSITIVITY. LIMITATIONS: AUTOFLITE OFF FOR TAKEOFF AND LANDING."

11. 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."

Airspeed
Instrument
Markings

RED radial line	Never Exceed	171 mph (148 knots)
YELLOW arc	Caution Range (Smooth Air Only)	140 to 171 mph (121 to 148 knots)
GREEN arc	Normal Operating Range	68 to 140 mph (59 to 121 knots)
WHITE arc	Flap Down Range	61 to 115 mph (53 to 100 knots)

Air Conditioned
Airplanes.

Air Conditioner must be off for takeoff and landing.

2. Procedures
Section

1. The stall-warning system is inoperative with the master switch off.
2. Electric fuel pump must be on for both landing and takeoff.
3. The PA-28-180 airplane is approved under FAA Regulation CAR 3 which prohibits intentional spins for both normal and utility category operation. The following information is noteworthy:
 - a. The stall characteristics of the PA-28-180 are normal with the nose pitching down moderately following the stall, occasionally with a moderate roll which can be corrected by normal use of ailerons and rudder against the roll.

FAA APPROVED 5/22/72

REVISED

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Airplane Flight Manual Model PA-28-180
CHECKED		
APPROVED	REPORT VB-437	PAGE 6 of 9

Procedures

Section

(cont'd)

- b. Prolonged use of full rudder during stall practice may result in a rapid roll followed by a spin and should be avoided. Recovery from an incipient spin may be effected in less than one additional turn by use of opposite rudder followed by full forward control wheel.
 - c. In the event that a fully developed spin is inadvertently experienced, recovery is best made by using full opposite rudder followed by full forward wheel and full opposite aileron. The control positions against the spin should be maintained during the entire recovery, which may require several turns and a substantial loss of altitude if the airplane is loaded heavily with a rearward center of gravity.
 4. Except as noted above, all operating procedures for this airplane are normal.
 5. (Electric Pitch Trim Installation Only with Pitch Trim Switch)

The following emergency information applies in case of electric pitch trim malfunction:
 - a. In case of malfunction, disengage electric pitch trim by pushing pitch trim switch on instrument panel to OFF position.
 - b. In an emergency, electric pitch trim may be overpowered using manual pitch trim.
 - c. In cruise configuration, malfunction results in 10° pitch change and 200 ft. altitude variation.
 - d. In approach configuration, a malfunction can result in a 5° pitch change and 50 ft. altitude loss.
 6. (Autoflite Installation Only)

The following emergency information applies in case of autoflite malfunction:
 - a. In case of malfunction PRESS disconnect switch on pilot's control wheel.
 - b. Rocker switch on instrument panel - OFF.
 - c. Unit may be overpowered manually.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual
CHECKED		Model PA-28-180
APPROVED		REPORT VB-437
		PAGE 7 of 9

Procedures
Section
(cont'd)

- d. In climb, cruise or descending flight an autopilot runaway, with a 3 second delay could result in a 50° bank, and 190 ft. altitude loss.
 - e. In approach configuration an autopilot runaway, with a 1 second delay could result in a 15° bank and 40 ft. altitude loss.
7. (AutoControl III Installation Only)
- I. Limitations: Autopilot off during takeoff and landing.
AutoFlite use prohibited above 160 mph CAS.
 - II. Procedures:
 - a. Normal Operation

Refer to Manufacturer's Operation Manual
 - b. Emergency
 1. In case of malfunction, turn off autopilot.
 2. In emergency, autopilot may be overpowered manually.
 3. In climb, cruise or descending flight an autopilot runaway, with a 3 second delay could result in 60° bank and 100 ft. altitude loss.
 4. In approach configuration an autopilot runaway, with a 1 second delay could result in 10° bank and 10 ft. altitude loss.
8. (AutoFlite II Installation Only)
- I. Limitations: AutoFlite off for takeoff and landing.
AutoFlite use prohibited above 160 mph CAS.
 - II. Procedures:
 - a. Normal Operation - Refer to Manufacturer's Operation Manual.
 - b. Emergency
 1. In case of malfunction PRESS disconnect switch on pilot's control wheel.
 2. Rocker switch on instrument panel - OFF.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual
CHECKED		Model PA-28-180
APPROVED		PAGE 8 of 9

REPORT VB-437

Procedures

Section (cont'd)

3. Autopilot may be overpowered manually.

4. In climb, cruise or descending flight an autopilot runaway, with a 3 second delay could result in 60° bank, and 190 ft. altitude loss.

5. In approach configuration an autopilot runaway, with a 1 second delay results in 15° bank and 40 ft. altitude loss.

9. (Air Conditioned Models Only)

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

- a. Check aircraft master switch on
- b. (For aircraft serial numbers 7205092 through 7305071). Turn the air conditioner control switch to "AIR COND" - the "AIR COND DOOR OPEN" warning light will turn on, thereby indicating proper air conditioner condenser door actuation.

(For aircraft serial numbers 7305072 and up). 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.

10. Air Conditioned Models only: Warning - The air conditioner must be off to insure normal takeoff performance.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Model PA-28-180
CHECKED		
APPROVED		REPORT VB-437 PAGE 9 of 9

3. Performance Section

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 2450 pounds.

Loss of altitude during stalls varied from 100 to 250 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
Flaps Up	68	70	78	85	96
Flaps Down	61	--	--	--	--

Air Conditioned Models only:

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.

Airplane Flight Manual (AFM)

(07.25.1975)

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GTX 33X and GTX 3X5 Transponders with ADS-B
as installed in

Make and Model Airplane

Registration Number: _____ Serial Number: _____

This document serves as an FAA Approved Airplane Flight Manual Supplement or Supplemental Airplane Flight Manual when the GTX 33X or GTX 3X5 with ADS-B is installed in accordance with Supplemental Type Certificate SA01714WI. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the FAA approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA approved Airplane Flight Manual, markings, or placards.

FAA Approved By: Erik Frisk

Erik Frisk
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 31-MAY-2024

LOG OF REVISIONS				
Revision Number	Date	Page Number	Description	FAA Approved
1	05/01/2013	All	Complete Supplement	<u>Robert Murray</u> Robert Murray ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: <u>05/01/2013</u>
2	03/08/2016	All	New supplement format with GTX 3X5 added.	<u>Michael Warren</u> Michael Warren ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: <u>03/08/2016</u>
3	12/07/2017	All	Updated SW versions and removed section 3.2.3. Updated section 2.2 Corrected PED FAR reference and additional minor corrections.	<u>Erik Frisk</u> Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: <u>12/21/2017</u>
4	09/09/2019	4, 6, 7, 9, 11, 13, 14, 18	Added GTX diversity units, updated SW versions, expanded allowed remote control panels, and incorporated other minor changes	<u>JR Brownell</u> JR Brownell ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: <u>09/09/2019</u>
5	06/16/2021	10, 11, 14, 18	Updated GTX 3X5 Main software to version 2.60, added GI 275 as a control display and GPS 175/GNC 355 as a GPS source	<u>JR Brownell</u> JR Brownell ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: <u>06/16/2021</u>

LOG OF REVISIONS				
Revision Number	Date	Page Number	Description	FAA Approved
6	05/31/2024	12, 15	Added G3X Touch as a control display, updated GTX 3X5 main software to v3.85.	See cover page 1

Table of Contents

SECTION	PAGE
Section 1. GENERAL	5
1.1 GTX 33X	5
1.2 GTX 3X5	7
1.3 Capabilities	10
1.4 Installation Configuration	10
1.5 Definitions	13
Section 2. LIMITATIONS	14
2.1 Minimum Equipment	14
2.2 ADS-B Out	14
2.3 TIS Traffic Display with User Navigation Angle	14
2.4 Applicable System Software	15
2.5 Pressure Altitude Broadcast Inhibit (PABI)	15
2.6 Datalinked Weather Display (GTX 345 Only)	15
2.7 Portable Electronic Devices	15
Section 3. EMERGENCY PROCEDURES	16
3.1 Emergency Procedures	16
3.2 Abnormal Procedures	16
Section 4. NORMAL PROCEDURES	17
4.1 Unit Power On	17
4.2 Before Takeoff	18
Section 5. PERFORMANCE	18
Section 6. WEIGHT AND BALANCE	18
Section 7. SYSTEM DESCRIPTION	19
7.1 GTX TIS Behavior	19
7.2 GTX 345R and G950/1000 No Bearing Traffic Alerts	19

Section 1. GENERAL

1.1 GTX 33X

The Garmin GTX 33X family consists of the GTX 330 ES and GTX 33 ES (Non-Diversity Mode S Transponders) and the GTX 330D ES and GTX 33D ES (Diversity Mode S Transponders). The ES option of any of the transponders provides ADS-B extended squitter functionality.

All Garmin GTX 33X transponders are a radio transmitter/receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. Each unit is equipped with IDENT capability to initiate the SPI (special position identification) pulse for 18 seconds and will reply to ATCRBS Mode A, Mode C and Mode S All-Call interrogation. Interfaces to the GTX 33X are shown in the following block diagrams.

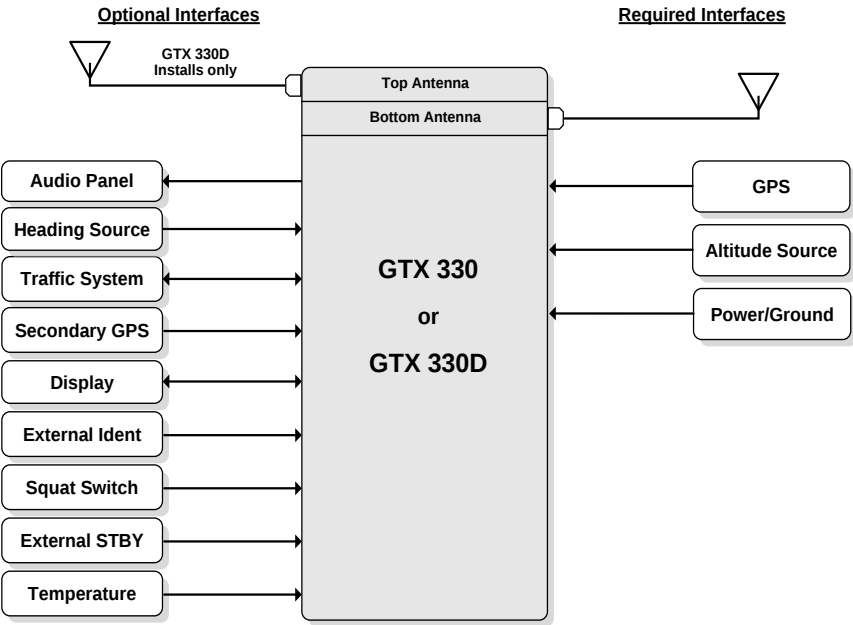


Figure 1 – GTX 330 or GTX 330D Interface Summary

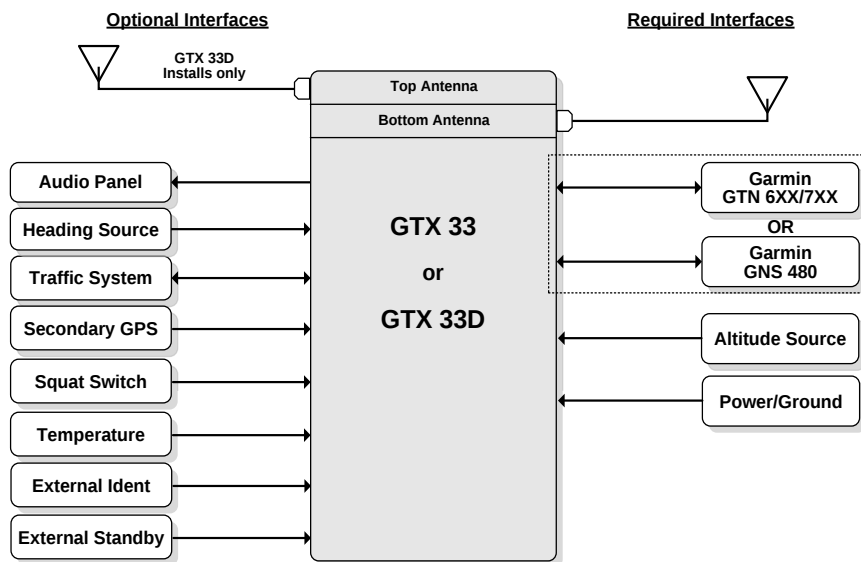


Figure 2 – GTX 33 or GTX 33D Interface Summary

The GTX 33X performs the following functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
 - o Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
 - GPS Position, Altitude, and Position Integrity
 - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
 - Air Ground Status
 - Flight ID, Call Sign, ICAO Registration Number
 - Capability and Status Information
 - Transponder Squawk Codes between 0000-7777.
 - Emergency Status
 - IDENT - initiates SPI (special position identification) pulse for 18 seconds
 - o Pressure Altitude Broadcast Inhibit
- Reception of TIS-A traffic data from a ground station
- Provides TIS-A traffic alerting to the pilot via interfaced display and audio output

1.2 GTX 3X5

The Garmin GTX 3X5 family consists of the GTX 335, 335D, 335R, 335DR, 345, 345D, 345R, and 345DR transponders. The functional differences between each of these transponders are described in Table 1. Transponder models with a “D” designation are diversity capable and support both a top fuselage and bottom fuselage antenna.

Function	GTX 335/ 335D	GTX 335 w/GPS	GTX 335R/ 335DR	GTX 335R w/GPS	GTX 345/ 345D	GTX 345 w/GPS	GTX 345R/ 345DR	GTX 345R w/GPS
Panel mount	x	x			x	x		
Remote mount			x	x			x	x
Mode S	x	x	x	x	x	x	x	x
ADS-B (out)	x	x	x	x	x	x	x	x
ADS-B Traffic					x	x	x	x
FIS-B					x	x	x	x
Internal GPS		x		x		x		x
Bluetooth					x	x	x	x
Optional Garmin Altitude Encoder	x	x	x	x	x	x	x	x

Table 1 – GTX 3X5 Unit Configurations

Interfaces to the GTX 3X5 are shown in Figure 3.

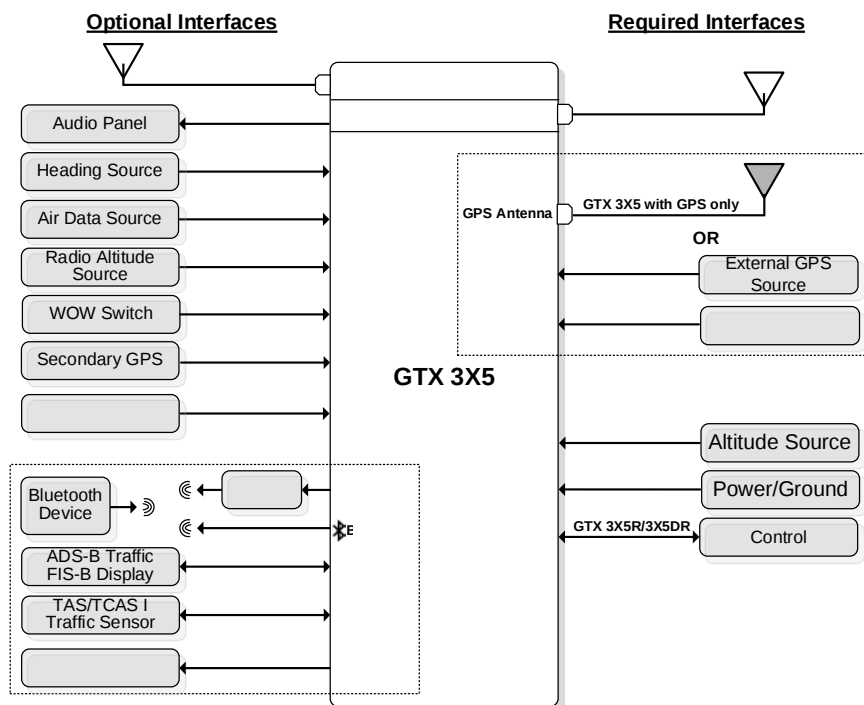


Figure 3 – GTX 3X5 Interface Summary

The GTX 3X5 performs the following functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
 - o Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
 - GPS Position, Altitude, and Position Integrity
 - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
 - Air Ground Status
 - Flight ID, Call Sign, ICAO Registration Number
 - Capability and Status Information
 - Transponder Squawk Codes between 0000-7777.
 - Emergency Status
 - IDENT - initiates SPI (special position identification) pulse for 18 seconds
 - o Pressure Altitude Broadcast Inhibit

The GTX 335 performs the following additional functions:

- Reception of TIS-A traffic data from a ground station
- Provide TIS-A traffic alerting to the pilot via interfaced display and audio output.

The GTX 345 performs the following additional functions:

- Reception of ADS-B In data on 1090 MHz
 - ADS-B (Data directly from another transmitting aircraft)
 - ADS-R (Rebroadcast of ADS-B data from a ground station)
- Reception of ADS-B In data on UAT (978 MHz)
 - ADS-B (Data directly from another transmitting aircraft)
 - ADS-R (Rebroadcast of ADS-B data from a ground station)
 - TIS-B (Broadcast of secondary surveillance radar) (SSR) derived traffic information from a ground station.
 - FIS-B (Broadcast of aviation data from a ground station)
- Provide ADS-B traffic information and alerting to the pilot via an interfaced display
 - Correlation and consolidation of traffic data from multiple traffic sources
 - Aural and visual traffic alerting
- Provide FIS-B data to the pilot via an interfaced display
 - Graphical and textual weather products
 - NEXRAD
 - PIREPs
 - AIRMET/SIGMETs
 - METARs
 - TAFs
 - Winds Aloft
 - Aviation Data
 - TFRs
 - NOTAMs

1.3 Capabilities

The Garmin GTX 33X and GTX 3X5 as installed in this aircraft have been shown to meet the equipment requirements of 14 CFR § 91.227 when operating in accordance with sections 2.1 and 2.2 of this supplement.

1.4 Installation Configuration

This aircraft is equipped with a GTX 33X and/or GTX 3X5 with the following interfaces/ features:

Equipment Installed:

Transponder #1

- ☐ GTX 330
- ☐ GTX 330D
- ☐ GTX 33
- ☐ GTX 33D
- ☐ GTX 335
- ☐ GTX 335D
- ☐ GTX 335R
- ☐ GTX 335DR
- ☐ GTX 345
- ☐ GTX 345D
- ☐ GTX 345R
- ☐ GTX 345DR

Transponder #2 (if installed)

- ☐ GTX 330
- ☐ GTX 330D
- ☐ GTX 33
- ☐ GTX 33D
- ☐ GTX 335
- ☐ GTX 335D
- ☐ GTX 335R
- ☐ GTX 335DR
- ☐ GTX 345
- ☐ GTX 345D
- ☐ GTX 345R
- ☐ GTX 345DR

Interfaced GPS/SBAS Position Source(s):

GPS #1

- ☐ Internal
- ☐ GTN 6XX/7XX Series
- ☐ GNS 400W/500W Series
- ☐ GNS 480
- ☐ GIA 63W
- ☐ GDL 88 (GTX 330 only)
- ☐ GPS 175/GNC 355

GPS #2 (if installed)

- ☐ Internal
- ☐ GTN 6XX/7XX Series
- ☐ GNS 400W/500W Series
- ☐ GNS 480
- ☐ GIA 63W
- ☐ GDL 88 (GTX 330 only)
- ☐ GPS 175/GNC 355

Interfaced Pressure Altitude Source:

Pressure Altitude Source #1

- ☐ _____
- ☐ Garmin Altitude Encoder

Pressure Altitude Source #2 (if installed)

- ☐ _____
- ☐ Garmin Altitude Encoder

Interfaced Remote Control Display (Required for remotely mounted GTX variants):

Transponder #1 Remote Control Display

- ☐ GTN 6XX/7XX
- ☐ GNS 480
- ☐ G950/1000 Display
- ☐ GI 275
- ☐ G3X Touch
- ☐ Gables 7534 Controller
- ☐ Gables 7614 Controller
- ☐ CTL-92 Controller
- ☐ CTL-92E Controller

Transponder #2 Remote Control Display (if installed)

- ☐ GTN 6XX/7XX
- ☐ GNS 480
- ☐ G950/1000 Display
- ☐ GI 275
- ☐ G3X Touch
- ☐ Gables 7534 Controller
- ☐ Gables 7614 Controller
- ☐ CTL-92 Controller
- ☐ CTL-92E Controller

Interfaced Active Traffic System:

- ☐ None
- ☐ TCAD
- ☐ TAS/TCAS

NOTE

If the system includes all of the following components:

- GTX 345R or GTX 345DR,
- G950/1000 Display, and
- TCAD or TAS/TCAS

Then the aircraft is no longer equipped with a TSO compliant active TCAD, TAS or TCAS system. Any operational requirement to be equipped with such system is no longer met.

1.5 Definitions

The following terminology is used within this document:

ADS-B: Automatic Dependent Surveillance-Broadcast

AFM: Airplane Flight Manual

AFMS: Airplane Flight Manual Supplement

ATCRBS: Air Traffic Control Radar Beacon System

CFR: Code of Federal Regulations

ES: Extended Squitter

GNSS: Global Navigation Satellite System

GNS: Garmin Navigation System

GPS: Global Positioning System

GTX: Garmin Transponder

GTN: Garmin Touchscreen Navigator

ICAO: International Civil Aviation Organization

LRU: Line Replaceable Unit

PABI: Pressure Altitude Broadcast Inhibit

POH: Pilot Operating Handbook

SBAS: Satellite-Based Augmentation System

SW: Software

TCAS: Traffic Collision Avoidance System

TIS: Traffic Information Service

TX: Transmit

Section 2. LIMITATIONS

2.1 Minimum Equipment

The GTX 33X and GTX 3X5 must have the following system interfaces fully functional in order to be compliant with the requirements for 14 CFR 91.227 ADS-B Out operations:

Interfaced Equipment	Number Installed	Number Required
Uncorrected Pressure Altitude Source	1	1
GPS SBAS Position Source	1 or more	1
Remote Control Display (for remotely mounted transponders)	1 or more	1

Table 2 – Required Equipment

2.2 ADS-B Out

The GTX 33X and GTX 3X5 only comply with 14 CFR 91.227 for ADS-B Out when all required functions are operational. When the system is not operational, ADS-B Out transmit failure messages will be present on the remote control display interface, or the GTX 330 or GTX 3X5 panel display. If a Gables 7534 controller or Collins CTL-92/92E controller is being used the ADS-B equipment failure condition will be annunciated on the Gables or Collins display “Transponder Fail” while the ADS-B Out Position failure will be annunciated by the remotely installed “ADS-B POSN FAIL” Annunciator.

2.3 TIS Traffic Display with User Navigation Angle

Display of TIS traffic from a GTX 33/330 or GTX 335 is not permitted with an interfacing display configured for a navigation angle of “user”.

2.4 Applicable System Software

This AFMS/AFM is applicable to the software versions shown in Table 3.

The Main GTX software version is displayed on the splash screen during start up for the GTX 330 and GTX 3X5 panel mounted units, and the External LRU or System page on the interfaced remote control display for remotely mounted GTX transponders.

Software Item	Software Version <i>(or later FAA Approved versions for this STC)</i>
GTX 33X Main SW Version	8.04
GTX 3X5 Main SW Version	2.85

Table 3 - Software Versions

2.5 Pressure Altitude Broadcast Inhibit (PABI)

Pressure Altitude Broadcast Inhibit shall only be enabled when requested by Air Traffic Control while operating within airspace requiring an ADS-B Out compliant transmitter. PABI is enabled by selecting the GTX to ON mode.

2.6 Datalinked Weather Display (GTX 345 Only)

Do not use datalink weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by datalink weather products may not accurately depict current weather conditions.

Do not use the indicated datalink weather product age to determine the age of the weather information shown by the datalink weather product. Due to time delays inherent in gathering and processing weather data for datalink transmission, the weather information shown by the datalink weather product may be significantly older than the indicated weather product age.

Do not rely solely upon datalink services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information.

2.7 Portable Electronic Devices

This STC does not relieve the operator from complying with the requirements of 91.21 or any other operational regulation regarding portable electronic devices.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

No Change.

3.2 Abnormal Procedures

3.2.1 LOSS OF AIRCRAFT ELECTRICAL POWER GENERATION

XPDR Circuit Breaker..... **PULL**

Transponder and ADS-B Out functions will no longer be available.

NOTE

This guidance is supplementary to any guidance provided in the POH or AFM for the installed aircraft for loss of power generation.

3.2.2 LOSS OF GPS/SBAS POSITION DATA

When the GPS/SBAS receiver is inoperative or GPS position information is not available or invalid, the GTX will no longer be transmitting ADS-B Out data.

For GTX 330 installations:

NO ADSB annunciator illuminated:

Interfaced GPS position sources..... **VERIFY VALID POSITION**

For GTX 3X5 installations:

NO 1090ES TX annunciator illuminated:

Interfaced GPS position sources..... **VERIFY VALID POSITION**

For GTX 33 and GTX 3X5R installations:

Reference Display Device documentation for applicable annunciation:

Interfaced GPS position sources..... **VERIFY VALID POSITION**

Section 4. NORMAL PROCEDURES

The procedures described below are specific only to the panel mounted GTX 330 or GTX 3X5 transponders. Cockpit Reference Guides and Pilot Guides for interfaced remote control displays will provide additional operating information specific to the displays or other traffic systems.

ADS-B Out functionality resides within the GTX transponders thereby providing a single point of entry for Mode 3/A code, Flight ID, IDENT functionality and activating or deactivating emergency status for both transponder and ADS-B Out functions. Details on performing these procedures are located in the GTX 330/330D Pilot’s Guide and GTX 3X5 Series Transponder Pilot’s Guide.

4.1 Unit Power On

For GTX 330 installations:

GTX Mode **VERIFY ALT**
NO ADSB **CONSIDERED**

For GTX 3X5 installations:

GTX Mode **VERIFY ALT**
NO 1090ES TX **CONSIDERED**

NOTE

The NO ADS-B or NO 1090ES TX Annunciation (or associated display annunciations) may illuminate as the unit powers on and begins to receive input from external systems, to include the SBAS position source.

For GTX 330 installations:

For GTX 3X5 installations:

NOTE

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTION

The Garmin GTX 330 and GTX 3X5 Pilot’s Guides, part numbers, and revisions listed below contain additional information regarding GTX system description, control, and function.

<u>Title</u>	<u>Part Number</u>	<u>Revision</u>
GTX 330 Pilot’s Guide	190-00207-00	Rev. G (or later)
GTX 3X5 Pilot’s Guide	190-01499-00	Rev. A (or later)

Pilot’s Guides for interfaced displays, part numbers and revisions listed below, provide additional operating information for the Garmin GTX 33 and GTX 3X5R.

<u>Title</u>	<u>Part Number</u>	<u>Revision</u>
Garmin GTN 725/750 Pilot’s Guide	190-01007-03	Rev. E (or later)
Garmin GTN 625/635/650 Pilot’s Guide	190-01004-03	Rev. E (or later)
GNS 480 Pilot’s Guide	190-00502-00	Rev. D (or later)
GTX 3X5 Series Transponder G1000 Pilot’s Guide	190-01499-01	Rev. A (or later)
Garmin GI 275 Pilot’s Guide	190-02246-01	Rev. F (or later)
Garmin GPS 175/GNC 355/GNX 375 Pilot’s Guide	190-02488-01	Rev. B (or later)

7.1 GTX TIS Behavior

The TIS Standby/Operate controls for GTX 33/330 and GTX 335/335D units only function when the aircraft is airborne.

7.2 GTX 345R/345DR and G950/1000 No Bearing Traffic Alerts

No visual indication is provided for no bearing traffic alerts. Only an aural indication of the no bearing traffic alert is provided. If an aural alert for no bearing traffic has been previously issued, a “no bearing traffic clear” aural indication will be provided once all traffic alerts are resolved.

All aural alerts are inhibited below 500’ AGL, therefore a “no bearing traffic clear” aural may not be heard in a landing or touch and go flight scenario.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
GARMIN GI 275 MULTIFUNCTION INSTRUMENT
as installed in

Make and Model Airplane

Registration Number: _____

Serial Number: _____

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA02658SE for the installation and operation of the Garmin GI 275 Multifunction Instrument. This document must be carried in the airplane at all times.

The information contained herein supplements or supersedes the information made available to the operator by the aircraft manufacturer in the form of clearly stated placards or markings, or in the form of an FAA approved Airplane Flight Manual, only in those areas listed herein. For limitations, procedures and performance information not contained in this document, consult the basic placards or markings, or the basic FAA approved Airplane Flight Manual. FAA approved sections of the AFMS are labeled "FAA APPROVED". Sections labeled "NOT FAA APPROVED" are for guidance only.

FAA APPROVED BY: JR Brownell

JR Brownell
ODA STC Unit Administrator
GARMIN International, Inc
ODA-240087-CE

DATE: 5/16/2024

LOG OF REVISIONS			
Rev	Page	Description	FAA Approval
1	All	Initial issue.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 1/13/2020
2	7	Added hardware variant functionality information to Table 2	<u>Erik Frisk</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 9/10/2020
	7	Added reference to -20 and -40 hardware variants	
	10	Updated software version number	
	11	Added clarification to Note.	
	12	Added missing installation option	
	14	Removed Section 2.19 “Type Ratings”	
	20	Changed “amber” to “yellow” for consistency throughout document	
	24	Changed “amber” to “yellow” for consistency throughout document	
	29	Corrected AHRS/ADC annunciation figures	
	31	Changed “amber” to “yellow” for consistency throughout document	
	32	Added Note to Section 4.2.1	
	33	Changed “amber” to “yellow” for consistency throughout document	
	33	Added reference to GFC 500	
	38	Changed “amber” to “yellow” for consistency throughout document	
	39	Added reference to -20 and -40 hardware variants	
	39	Changed “amber” to “yellow” for consistency throughout document	
	41	Removed text requiring pilot to verify units match across systems.	
	42	Added reference to -20 and -40 hardware variants	
	45	Corrected typos	
3	10	Updated software version number	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 11/30/2020
	56	Updated the Engine and Airframe Timer descriptions to reflect new Hobbs and Tach Timer functionality	

4	8	Corrected table formatting	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 12/23/2020
	10	Added clarification of Standby Reversionary capabilities	
	11	Added clarification of EIS configuration to include all EIS capabilities and display parameters	
	12	Included VFR GPS antenna and Backup Battery Pack as GI 275 system components	
	13	Added clarifications for Standby instrument configurations with the GI 275; Clarified reversionary function when configured as a Standby instrument; Added Battery Charge Inhibited system message description	
	14	Added ADI to the Definitions	
	15	Added a table to identify AFMS section applicability based on specific system installation	
	16	Added tickbox for GI 275 primary heading installations; Clarified magnetic variation limits for configurations with GI 275 as primary heading source	
	17	Added GPS aiding system message description; Clarified limitations of aerobatic maneuvers for primary and standby ADI configurations; Added clarifications for battery capacity required for aircraft above 25,000ft service ceiling	
	18	Added clarification that QFE altimeter setting is incompatible with GI 275 instrument; Added tickbox selections to define specific system installation and configuration; clarified loss of control warning for IMC flight	
	19	Clarified sensor selection applicability to Garmin cross-comparison AHRS and ADC sensors	
	21	Clarified VFR GPS functionality and limitations; Removed powerplant gauge markings section	
	22	Added original flight instrument requirements for GI 275 system when installed with non GI 275 standby instruments	
	23	Added External EIS Annunciator requirements for GI 275 EIS systems; Added requirement to test any installed annunciator; Added section for recording placards that are removed or modified	
	25	Added a note to clarify that not all emergency procedures may apply to a specific installation	

26	Clarified procedures for AHRS failure; Added a Caution Note to describe Garmin cross-comparison for AHRS/ADC sensors with specific sensor selections enabled
27	Clarified procedures for ADC failure; Added a Caution Note to describe Garmin cross-comparison for AHRS/ADC sensors with specific sensor selections enabled
28	Added underline font to Note
29	Added underline font to Note and Caution; Added battery temp viewed in system menu
32	Added underline font to Note; Added system message description for display overtemperature; Clarified selection of VFR GPS source with the CDI button; Clarified GPS failure procedure to seek VFR conditions
33	Added underline font to Note and Caution
38	Added descriptions and images for Battery Fault and GPSS Invalid failure conditions
39	Added images for ALT and IAS advisories
40	Added steps to test any installed external annunciators and verify the Magnetic angle units to match across interfaced systems; Added clarification of 60 minutes battery for aircraft with ceilings above 25,000ft; Added clarification for checking Battery status
42	Added reference for Autopilot system description section; Clarified that AP Disconnect Test is not needed for Garmin GFC 500 and GFC 600 autopilot interfaces; Added underline font to Notes and Cautions
43	Added underline font to Notes Clarified GPSS modes
44	Clarified that GTN VNAV interface requires barometric altitude; Added clarification for EIS alert functionality
46	Added tickbox selections to define installed unit configurations
49	Added underline font to Caution
52	Added tickboxes to define what audio alerts the GI 275 will provide given the system installation and configuration; Added note to clarify failure of audio system interface results in no audio alerts from GI 275
53	Clarified that Baro Sync is required and not recommended when interfaced with TXi
56	Clarified that barometric altitude is required when interfaced with GTN to provide VNAV functionality
60	Removed typo

	61	Added a note to clarify traffic data availability based on services provided by local region/country; Removed typo	
	67	Added underline font to Note	
	68	Added underline font to Caution	
5	9	Added Transponder page to list of configurable MFD pages	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 6/14/2021
	16	Updated software version number	
	43	Added procedure detail for AP HDG DATUM switch; Added a checkbox for delineating on-screen button versus external switch for the AP HDG DATUM switching function.	
	59	Added system description details for the AP HDG DATUM external switch.	
	70	Added system description for the Transponder Control functions	
6	12	Updated EIS description and image to reflect new EIS User Interface and new gauges.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 7/22/2021
	13	Updated with new EIS percent power gauge.	
	14	Updated wording to clarify GI 275 usability and familiarization info.	
	17	Fixed an incorrect section reference.	
	22	Updated Fuel Computer use to clarify visual fuel inspection as means of determining fuel.	
	23	Updated Fuel Computer use to clarify visual fuel inspection as means of determining fuel; Added clarification about controlling the GI 275 via knob when using gloves.	
	27	Added a table of contents for section 3.	
	41	Added an image of GLIDE annunciation.	
	43	Added a table of contents for section 4.	
	47	Added clarification of new EIS alerting acknowledge.	
	49	Added EIS pilot alerts as a White annunciation.	
	68	Updated with new EIS gauge requirements and availability.	
	69	Updated EIS caution/warning location; updated CHT/EGT page description; Updated Primary EGT/TIT description.	
	70	Updated mixture leaning procedure with new feature description updates and clarifications.	
	71	Updated with details for new Fuel page user interface and layout.	
	72	Updated with reference to new EIS summary page	
7	19	Updated limitations on using the GI 275 ADI in aerobatic maneuvers.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc.
	38	Updated Alert image and description with new EIS red warning triangle.	

	40	Updated Alert image and description with new EIS yellow caution triangle.	ODA-240087-CE Date: 10/7/2021
	47	Updated language to align with new EIS alert triangle.	
8	14	Removed incorrect reference to tablet trainer app.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 5/26/2022
	18	Updated software version number	
	31	Added a note about ALT miscompare with RVSM	
	56	Added clarification for airspeed trend bar behavior; added Mach number display to Primary ADI functions.	
	59	Added Mach number as part of airspeed display when configured.	
	63	Added normal mode flight director selection description.	
	9	<i>Changes made for GI 275 Software v2.60 project updates:</i>	
2		Updated GI 275 applicable Software version to v2.60.	
12		Added STBY INST circuit breaker label option.	
19		Added procedure for Blank Screen with GDL 60 interface.	
36		Clarified wording for Standby ADI pre-flight check of reversionary switch.	
<i>Changes made for AFMS restructure based on recent FAA Guidance:</i>			
Various		Added statement to cover sheet regarding FAA approved markings.	
		Moved acronym definitions into beginning of Section 1.	
		Moved applicable Software information into Section 1 and removed applicable Note.	
		Moved all installation-specific selections and checkboxes into Section 1.	
		Moved descriptive information out of Section 2 into Section 7 and moved procedural information out of Section 2 into Sections 3 and 4.	
		Removed Sensor Selection Section.	
		Removed Synthetic Vision Section.	
		Removed Autopilot Disconnect Section.	
	Removed Terrain/TAWS Alerts Section.		
	Removed Portable Electronic Devices Section.		
	Moved Placarding information into Section 1.		
	Moved descriptive information from Section 3 into Section 7.		

		Moved Terrain Alerts table into Section 3.1 Emergency Procedures.	
		Moved descriptive information from Section 4 into Section 7.	
		Removed EIS Operation Section.	
		Moved installation-specific checkboxes out of Section 7 into Section 1, moved limitations out of Section 7 into Section 2, and moved procedural information into Sections 3 and 4.	
10	All	Updated document margin formatting.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 8/16/2023
	1	Added Electronic Stability Protection (ESP) to list of acronyms.	
	2	Updated the GI 275 software version to the new v3.01 version.	
	8	Updated with guidance that knob rotation or reversionary switch can be used to revert a Standby unit.	
	9	Fixed section 4.1 references; Updated to state that reversionary switch check is only required when the switch is installed.	
	11	Updated wording to state reversionary switch labelling is only required when the switch is installed.	
	16	Removed the reversionary switch as required equipment for the GI 275 Standby ADI.	
	19	Updated to state that the outer knob rotation can also be used for manually reverting the Standby ADI.	
	20	Updated to state that the outer knob rotation can also be used to manually force reversion of the Standby ADI unit.	
	33	Added the ESP Disabled annunciation to Advisories table.	
	35	Updated to state that the reversionary switch check is only required if the switch is installed.	
	42	Updated to state that reversion backup switch is optional and not required for the Standby ADI unit.	
	46	Updated to add description of new configurable chevron range values.	
	48	Updated to add option of GTN controlled CDI selection	
	51-52	Added miscellaneous field section and added g value.	
	57	Added note about CHT and EGT bars not disappearing below indicating range.	

11	2	Updated the GI 275 software version to the new v3.10 version.	<u>JR Brownell</u> ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE Date: 2/2/2024
	9	Improved format and organization of checkbox items for installed placards.	
	14	Clarified the Stormscope interface as a Datalink weather product.	
	19-20	Removed unnecessary and excessive content from ADC/AHRS notes.	
	21	Removed a note about white no-compare message from the ADI caution message section where the note was not applicable. Appropriate content is included in section 3.3.3.	
	22	Added note about viewing the battery fault icon on ground during before takeoff checks.	
	28-29	Added note about in a more than two sensor configuration, this annunciation will only be viewed on the unit that is mis-comparing.	
	30	Updated section to include comment on the battery rundown test.	
	31	Added a note to view advisory messages to inhibit annunciations and added STBY ADC/AHRS sensor designation.	
	33	Updated procedure to refer to section 3.1.9 for battery checks.	
	46	Added section describing the Standby and Side SYNC settings with TXi.	
	49	Clarified G-Meter verbiage.	
12	55	Updated CHT/EGT display descriptions for Single CHT/EGT configuration.	See cover page
	i	Updated NOT FAA APPROVED wording	
	2	Updated the GI 275 software version to the new v3.20 version.	
	12	Added option for gasket style CHT.	
	28	Removed CAUTION Annunciation that is not provided.	
	55	Added system description of gasket style CHT probes.	

TABLE OF CONTENTS

SECTION 1. GENERAL	1
1.1	DEFINITIONS 1
1.2	APPLICABLE SOFTWARE VERSION 2
1.3	SYSTEM DESCRIPTION 2
1.4	ADAHRS 7
1.5	STANDBY INSTRUMENTS AND THE GI 275 ADI 7
1.6	BACKUP BATTERY 7
1.7	FUNCTIONS INCLUDED IN THIS INSTALLATION..... 7
SECTION 2. LIMITATIONS	13
2.1	HEADING OPERATIONAL AREA 13
2.2	MAGNETIC VARIATION OPERATIONAL AREA 13
2.3	NAVIGATION ANGLE..... 13
2.4	ADAHRS NORMAL OPERATING MODE..... 13
2.5	AEROBATIC MANEUVERS 13
2.6	STANDBY AND/OR PRIMARY FLIGHT INSTRUMENTS 13
2.7	MOVING MAPS 13
2.8	TERRAIN DISPLAY 13
2.9	DATALINK PRODUCTS (SIRIUSXM, FIS-B, AND STORMSCOPE) 14
2.10	SURFACE OPERATIONS..... 14
2.11	FUEL FLOW..... 14
2.12	FUEL COMPUTER 14
2.13	DATABASE UPDATES 14
2.14	VFR GPS..... 14
2.15	KINDS OF OPERATIONS 15
2.16	MINIMUM FLIGHT CREW 16
SECTION 3. EMERGENCY PROCEDURES	17
3.1	EMERGENCY PROCEDURES 18
3.2	ABNORMAL PROCEDURES..... 24
3.3	WARNINGS, CAUTIONS, AND ADVISORIES 27
SECTION 4. NORMAL PROCEDURES	32
4.1	BEFORE TAKEOFF 33
4.2	AUTOPILOT OPERATION..... 34
4.3	EIS OPERATION 35
SECTION 5. PERFORMANCE	36
SECTION 6. WEIGHT AND BALANCE	36
SECTION 7. SYSTEM DESCRIPTION	37
7.1	CONTROLS OVERVIEW..... 37
7.2	DISPLAY BRIGHTNESS 38

7.3 SYSTEM POWER SOURCES..... 38

7.4 SYSTEM STATUS 38

7.5 DATABASES 39

7.6 CREW PROFILES..... 39

7.7 INTEGRATED STANDBY SYSTEM 40

7.8 GPS APPROACH MODE ANNUNCIATIONS 41

7.9 VFR GPS..... 41

7.10 MESSAGES 42

7.11 SYSTEM SETTINGS 42

7.12 SYSTEM DATA LOGGING 42

7.13 PRIMARY ADI..... 42

7.14 MFD..... 50

7.15 TERRAIN AWARENESS AND ALERTING 51

7.16 ENGINE INDICATION SYSTEM..... 54

7.17 WIRELESS FUNCTIONS 58

7.18 TRANSPONDER CONTROL 59

Section 1. General

1.1 Definitions

ADAHRS:	Air Data and Attitude Heading Reference System
ADC:	Air Data Computer
ADI:	Attitude Direction Indicator
ADS:	Automatic Dependent Surveillance
AHRS:	Attitude Heading Reference System
AMMD:	Airport Moving Map Display
CDI:	Course Deviation Indicator
CRS:	Course
EIS:	Engine Indication System
ESP:	Electronic Stability Protection
FD:	Flight Director
FLTA:	Forward-looking Terrain Alerting
GPSS:	GPS Steering
HDG:	Heading
HSI:	Horizontal Situation Indicator
IFR:	Instrument Flight Rules
IMC:	Instrument Meteorological Conditions
LOI:	Loss of Integrity
MFD:	Multi-Function Display
MFI:	Multi-Function Instrument
PED:	Portable Electronic Device
SBAS:	Space-based Augmentation System
SVT:	Synthetic Vision Technology
TAWS:	Terrain Awareness and Warning System (a TSO-C151b function)
TIS-A:	Traffic Information Service (Addressed)
TIS-B:	Traffic Information Service (Broadcast)
VFR:	Visual Flight Rules
VMC:	Visual Meteorological Conditions
VNAV:	Vertical Navigation

VS: Vertical Speed

1.2 Applicable Software Version

The following or later software versions must be installed for this AFMS revision to be applicable to the installation:

Component	Software Version
GI 275	3.20

1.3 System Description

The GI 275 Multifunction Instrument (hereafter referred to as the “GI 275”) is a panel-mounted, multifunction instrument with a single touch display and virtual “Pages” within each instrument that may be configured as individual “instruments”. The GI 275 can be configured as an ADI, HSI, EIS or MFD with multiple hazard awareness pages, depending on the number and type of integrated navigation and hazard sensor sources. The GI 275 can be used as a primary Engine Indication System (EIS) for single and twin-engine aircraft. The ADI and HSI can be installed as stand-alone primary flight instruments as long as there are other equivalent source(s) of primary flight information that are independently powered. The ADI or HSI can also be installed as a backup instrument. Any GI 275 ADI, HSI, or MFD may be configured with an optional internal battery to provide an independent and automatic backup power source.

Individual GI 275s may be grouped or connected as follows to expand and enhance their capabilities and to provide redundancy. Groups of connected GI 275s are hereafter referred to as a “GI 275 system” in this document.

Attitude Direction Indicator (ADI)



Units configured as an ADI will contain a single page that displays aircraft attitude.

Altitude, airspeed, vertical speed and heading may also be displayed on the ADI page depending on the aircraft configuration.

Horizontal Situation Indicator (HSI)

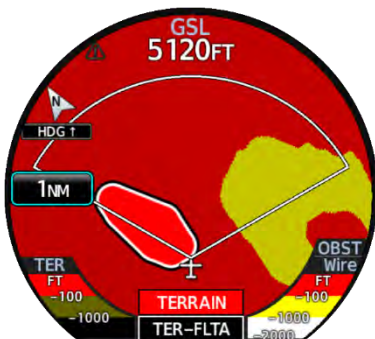


Units configured as an HSI will contain two pages; an HSI page and an HSI Map page.

The HSI Page is a conventional HSI with CDI, VDI, heading indication and compass card. There are navigation annunciations and distance/time fields.

The HSI MAP Page includes a top-down view, inset map, hazard awareness overlays (traffic, terrain, topo), along with traditional lateral and vertical navigation cues.

Multi-Function Display (MFD)



Units configured as an MFD contain multiple installer configurable pages that may include HSI, HSI Map, CDI, Map, Terrain, Traffic, Weather, Radar Altimeter, Stormscope, Transponder, and Engine Indication System (EIS)

Standby ADI



The HSI and MFD can be configured as a “Standby” instrument to preserve the display of primary flight data in the event the primary ADI fails or the pilot reverts the display either through the rotation of the outer knob counter-clockwise or engages the reversionary switch. An ADI page will be available during both normal operation and when reverted to preserve the display of primary flight data.

A stand-alone ADI may also be considered a Standby ADI since it provides full-time display of primary flight data.

Engine Indication System (EIS)



Units configured for EIS will always display Engine RPM, Main Tank Fuel Quantity, and Manifold Pressure (if applicable) on the screen.

Five configurable pages are available on the EIS unit:

- Gauges Main: Contains all gauges with red/yellow markings
- Auxiliary EIS: Contains any other engine gauges that have no markings, or pilot selectable data fields
- CHT/EGT: Includes three modes:
 - Monitor Mode
 - Lean Mode
 - Normalized Mode
- Fuel
- Summary: Includes three pages:
 - Timers
 - RPM and Temp Data
 - Fuel and Lean Data

Available gauges are as follows:

- Engine RPM
- Manifold Pressure
- Oil Pressure
- Oil Temperature
- EGT, Primary EGT
- CHT
- TIT (Single or Dual)
- CDT
- IAT
- CDT-IAT Diff
- Alternator Amps
- Battery Charge/Discharge
- Battery Volts
- Bus Volts
- Fuel Flow
- Fuel Pressure
- Fuel Quantity
- Carb Temp
- Outside Air Temp
- Engine Percent Power

Table 1- GI 275 System Function

Function	GI 275 Base (-00)	GI 275 ADAHRS (-10/-30)	GI 275 ADAHRS + AP (-20/-40)
Primary ADI		✓	✓
MFD/Standby ADI		✓	✓
MFD	✓	✓	✓
EIS	✓	✓	✓
HSI	✓*	✓	✓
HSI/Standby ADI		✓	✓
Autopilot Interface			✓

*Requires interface to another GI 275 with an internal ADAHRS configured.

Table 2- GI 275 Hardware Variant Functionality

GMU 11 and GMU 44B	Magnetometer Heading Sensors
GEA 24 or GEA 110	Engine Sensors
GTP 59	OAT temperature Probe
GSB 15	USB Port
Backup Battery (internal)	Battery Pack
VFR GPS Antenna	GPS Antenna

Table 3- GI 275 System Components

MFD functions are supported by GPS navigator interfaces and a variety of other optional interfaces such as traffic systems, Stormscope®, and satellite and ADS-B weather sources.

Although intuitive and user friendly, the system requires a reasonable degree of familiarity to become proficient in its use while flying. Pilot workload will be higher for pilots who are not familiar with the GI 275 system in an IFR environment, particularly without an autopilot. Garmin provides a detailed Pilot's Guide for the GI 275. Pilots should take full advantage of this guide to enhance their familiarity with the GI 275 system.

1.4 ADAHRS

The integral ADAHRS, included in the GI 275 -10, -20, -30, and -40 variants, senses aircraft attitude and air data for GI 275 display of primary flight data and can provide attitude and air data for use by other installed systems.

The ADAHRS requires GPS and airspeed inputs for aiding the system. GI 275 includes an optional GMU 11 or GMU 44B magnetometer interface to determine magnetic heading and an OAT probe for measuring outside air temperature.

1.5 Standby Instruments and the GI 275 ADI

GI 275 installations may provide standby attitude, altitude, and airspeed instruments. Several types of standby instruments might be installed, including a standby GI 275 ADI, other ADI, or individual analog instruments.

The GI 275 can be a standalone standby instrument without interfacing to other sensors and only using its internal sensors. In this configuration, the GI 275 is a full-time dedicated ADI.

GI 275 system has a configuration for redundancy which is satisfied by using a GI 275 MFD or HSI that is configured as a standby instrument. This configuration is only possible when the GI 275 is providing reversionary capabilities with multiple sensors interfaced to the GI 275. When configured as a standby instrument with reversionary capabilities, the GI 275 MFD and HSI include an ADI Page which is displayed automatically when faults are detected or when selected by the pilot through knob rotation or a reversionary switch.

Both the GI 275 primary and standby ADIs have their own integral ADAHRS and internal batteries for independence and redundancy.

1.6 Backup Battery

The GI 275 may be configured to include a backup battery to provide emergency power to a GI 275 ADI, HSI or MFD. The backup battery is mounted in an internal, partitioned aluminum chassis within the GI 275 to provide thermal security and automatic backup power when aircraft power is unavailable.

NOTE

Backup battery charging requires the battery temperature between 0°C and 60°C. A system message “Charge Inhibited – unable to charge the battery” will indicate that the battery is no longer charging.

1.7 Functions Included in this Installation

The following section identifies information relevant to this installation. This section is for the purpose of navigating the AFMS and to assist with identification of important system functions included with this installation.

The following units are installed in this aircraft:

- ☐ ADI
- ☐ Standby ADI
- ☐ HSI
- ☐ HSI Standby ADI
- ☐ MFD
- ☐ MFD Standby ADI
- ☐ EIS

1.7.1 Heading Operation

- ☐ This installation uses GI 275 as the primary heading source

1.7.2 Standby / Primary Instruments

- ☐ This installation does not have separate standby instruments or does not require standby instruments (aircraft limited to VFR).
- ☐ This installation uses the GI 275 as the primary flight display instrument and uses pneumatic instruments, the aircrafts original flight instruments, or a different electronic display as the standby flight display.
- ☐ This installation uses a connected GI 275 system with independent ADHARS and backup batteries for the primary and standby flight instruments. IFR flight must not be initiated unless the systems check in Section 4.1 is completed successfully to verify the following:
 - The backup battery is operational and sufficiently charged. Refer to Section 4.1.
 - Attitude, heading, altitude, and airspeed from AHRS/ADC 1 are operational on the pilot's primary GI 275 ADI with no warnings, cautions, or advisories present.
 - If installed, selecting the Reversion Backup Switch to the "ON" position causes the standby GI 275 to change and lock to the ADI page and displays primary flight information.
- ☐ This installation uses a GI 275 ADHARS and backup batteries for the standby flight instruments to a separate primary flight display. IFR flight must not be initiated unless the systems check in Section 4.1 is completed successfully to verify the following:
 - The GI 275 backup battery is operational and sufficiently charged. Refer to Section 4.1.

- Attitude, heading, altitude, and airspeed from AHRS/ADC 1 are operational on the pilot's primary GI 275 ADI with no warnings, cautions, or advisories present

WARNING

Failure to observe these limitations may result in the loss of all attitude or air data or both, resulting in loss of aircraft control during flight in IMC.

1.7.3 Placards

- ☐ This installation has the GI 275 Reversion Backup Switch and the following labels are required:

On



Auto

- ☐ This installation is limited to VFR and the following placard is required:

“AIRCRAFT LIMITED TO VFR”

- ☐ No placards have been removed or modified.
 - ☐ The following placards have been removed or modified:
-

1.7.4 GPS Steering

- ☐ This installation provides GPSS capability to the autopilot through GPSS emulation. All GPSS/HDG mode switching is done via the GI275.
- ☐ This installation provides GPSS capability to the autopilot through GPSS emulation. GPSS/HDG mode switching is done via the external AP HDG DATUM switch.

1.7.5 VNAV

- ☐ This installation is equipped and configured to provide Enhanced Descent Only VNAV display and autopilot coupling.
- ☐ This installation is equipped and configured to provide Enhanced Descent Only VNAV *display only*.
- ☐ This installation *does not* support EDO VNAV display or coupling.

1.7.6 Autopilot Interfaces

The GI 275 installation in this aircraft provides the following autopilot functions (appropriate boxes will be checked):

- ☐ This installation *does not* interface with the autopilot.
- ☐ Course / NAV Selection coupling to the autopilot.
- ☐ Heading Bug steering to the autopilot.
- ☐ Roll Steering emulated via heading mode.
- ☐ Roll Steering capable autopilot.
- ☐ Altitude Pre-Selector integrated with the autopilot.
- ☐ Flight Director display driven from external autopilot or FD computer.
- ☐ GI 275 provides attitude / air data to autopilot.

1.7.7 Power Sources

The major components of the GI 275 are protected with resettable circuit breakers available to the pilot. These breakers are labeled as follows (appropriate boxes will be checked):

Installed	Circuit Breaker Label	Equipment
☐	PFD	Primary ADI
☐	EIS	GI 275 configured for Engine Monitoring – Single Engine
☐	EIS L and EIS R or EIS F and EIS R	GI 275 configured for Engine Monitoring – Multi Engine
☐	MFD	GI 275 configured as an MFD
☐	MFD/STBY ADI	GI 275 configured as an MFD with standby ADI
☐	ATT	GI 275 configured as an Attitude Indicator only
☐	HSI	GI 275 configured as an HSI
☐	HSI/STBY ADI	GI 275 configured as an HSI with standby ADI
☐	ENG SNSR	GEA (24 or 110) Engine/Airframe Unit
☐	STBY ADI or STBY INST	Standby ADI (Stand-alone)
☐	USB	GSB 15 USB Interface
☐	CNXT CNXT BATT	Wireless Access

1.7.8 Aircraft Audio Interface

The primary (pilot) ADI is interfaced to the aircraft audio system to provide aural alerts. If multiple ADIs are installed, only the primary ADI is interfaced to the audio system (to prevent duplicate aural alerts).

An MFD may be interfaced to the audio system for terrain alerts or touch clicks, but only if there is no primary ADI installed.

The following aural alerts are configured in this installation:

- ☐ Altitude Alerting
- ☐ Terrain Alerting
- ☐ Decision Height Aural
- ☐ Baro Minimums
- ☐ EIS alerting

NOTE

If the GI 275 interface to the aircraft audio system fails, no aural alerts will be issued from the GI 275 system.

1.7.9 Gasket-style CHT Probe(s) are Installed

- ☐ This installation uses gasket-style CHT probes that were not previously installed.

See section 7.16.3.1 for details of operation with gasket CHT probes.

Section 2. LIMITATIONS

2.1 Heading Operational Area

If the GI 275 is used as the primary heading source, IFR Operations are prohibited north of 72°N and south of 70°S latitudes. In addition, IFR operations are prohibited in the following four regions:

- 1) North of 65° North latitude between longitude 75° W and 120° W
- 2) North of 70° North latitude between longitude 70° W and 128° W
- 3) North of 70° North latitude between longitude 85° E and 114° E
- 4) South of 55° South latitude between longitude 120° E and 165° E

Loss of heading may occur near the poles.

2.2 Magnetic Variation Operational Area

If the GI 275 is used as the primary heading source, IFR operations are prohibited in areas where the magnetic variation is greater than 99.9 degrees East or West.

2.3 Navigation Angle

The Magnetic/True Navigation Angle (as selected in the MENU → SYSTEM → UNITS Page) must match the navigation angle selected on all interfaced GPS/SBAS navigators.

2.4 ADAHRS Normal Operating Mode

Dispatch into IFR flight is prohibited unless the Primary GI 275 ADAHRS is receiving valid GPS *and* air data.

2.5 Aerobatic Maneuvers

Aerobatic maneuvers are prohibited if the GI 275 is installed and being used as a primary or standby ADI.

2.6 Standby and/or Primary Flight Instruments

QFE altimeter operations are prohibited.

2.7 Moving Maps

The GI 275 Map page must not be used as the primary or sole means of navigation or course guidance.

2.8 Terrain Display

Maneuvers and navigation based solely on the display of terrain, obstacles, or wires on the moving map terrain displays is prohibited.

2.9 Datalink Products (SiriusXM, FIS-B, and Stormscope)

Use of datalink weather information as the sole means for maneuvering in, near, or around areas of hazardous weather is prohibited.

Use of datalink services as the primary means to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information is prohibited.

The use of the Stormscope® lightning data on the display for hazardous weather (thunderstorm) penetration is prohibited.

2.10 Surface Operations

Use of the GI275 Map Page as the sole basis for ground maneuvering is prohibited.

2.11 Fuel Flow

Reliance on the fuel flow indication to determine fuel used, fuel remaining, or fuel reserves is prohibited.

2.12 Fuel Computer

The fuel computer functions must not be used as the primary means of determining the quantity of fuel in the tanks.

2.13 Database Updates

In-flight database transfers or updates are prohibited.

2.14 VFR GPS

Use of VFR GPS (VGPS) as primary means of navigation is prohibited in IMC.

2.15 Kinds of Operations

Unless placarded as limited to VFR only operations, equipment installed in a certified aircraft is approved for Day and Night / VFR and IFR operations in accordance with 14 Code of Federal Regulations Part 91, Part 121, and Part 135 when appropriately maintained.

The table below lists the minimum fully functional equipment required for operation of the GI 275.

Equipment	Number installed	VFR	IFR
GI 275 ADI	1	1	1
GI 275 HSI/MFD as Standby ADI	1	0	1
GMU 11 or 44B Magnetometer	1*	0	1*
GPS/SBAS Navigator or VFR GPS antenna	1**	1	1**
Non-stabilized Magnetic Compass	1	1	1

* Connected to GI 275 ADI

** Connected to GI 275 ADI or the GI 275 HSI/MFD as a Standby ADI

Figure 1- Minimum GI 275 Flight Instrument System when installed with a GI 275 Standby ADI

Equipment	Number installed	VFR	IFR
GI 275 ADI	1	1	1
GMU 11 or 44B Magnetometer	1	0	1
GPS/SBAS Navigator or VFR GPS antenna	1	1	1
Non-stabilized Magnetic Compass	1	1	1
Original flight instruments w/ turn rate indicator*	0 or 1	0	0 or 1
Original flight instruments w/ third attitude source*	0 or 1	0	0 or 1

* Either the original flight instruments with a turn rate indicator or the original flight instruments with a third attitude source must be installed as standbys for IFR flight.

Figure 2- Minimum GI 275 Instrument System when installed with non-GI 275, supporting Standby Instruments

Equipment	Number installed	Req'd
GI 275 EIS	1 or 2*	1 or 2*
Engine Adaptor Unit (GEA 24/110)	1 or 2*	1 or 2*
External EIS Annunciator	0, 1, 2, or 4**	0, 1, 2, or 4**

* One GI 275 EIS and GEA 24/110 are required per engine

** An external annunciator is installed when the GI 275 EIS is outside of the pilot's primary field of view.

Figure 3- Engine Indication System

2.16 Minimum Flight Crew

Installation of a GI 275 does not affect a Minimum Flight Crew determination.

Section 3. EMERGENCY PROCEDURES

3.1	EMERGENCY PROCEDURES	18
3.1.1	<i>Loss of Primary Flight Information</i>	<i>18</i>
3.1.2	<i>Blank Screen</i>	<i>18</i>
3.1.3	<i>AHRS Failure</i>	<i>19</i>
3.1.4	<i>ADC Failure</i>	<i>20</i>
3.1.5	<i>ATTITUDE, ALT, or IAS monitor CAUTION</i>	<i>21</i>
3.1.6	<i>Aircraft Electrical System Failure</i>	<i>21</i>
3.1.7	<i>Operation on Backup Battery (if installed)</i>	<i>21</i>
3.1.8	<i>Display Backup Malfunction</i>	<i>22</i>
3.1.9	<i>Backup Battery Malfunction</i>	<i>22</i>
3.1.10	<i>EIS Failure</i>	<i>22</i>
3.1.11	<i>Terrain Alerts</i>	<i>23</i>
3.2	ABNORMAL PROCEDURES	24
3.2.1	<i>Heading Failure</i>	<i>24</i>
3.2.2	<i>Display Overtemperature</i>	<i>25</i>
3.2.3	<i>GPS Data Failure</i>	<i>25</i>
3.2.4	<i>Navigation Data Failure (VOR/LOC/GS)</i>	<i>26</i>
3.2.5	<i>Synthetic Vision Malfunction</i>	<i>26</i>
3.2.6	<i>Electrical Load Shedding</i>	<i>26</i>
3.2.7	<i>AHRS ALIGN</i>	<i>26</i>
3.2.8	<i>EIS Display Parameter Failure</i>	<i>26</i>
3.3	WARNINGS, CAUTIONS, AND ADVISORIES	27
3.3.1	<i>WARNING Annunciations – Red</i>	<i>27</i>
3.3.2	<i>CAUTION Annunciations – Yellow</i>	<i>28</i>
3.3.3	<i>Advisories – White</i>	<i>31</i>

3.1 Emergency Procedures

3.1.1 Loss of Primary Flight Information

If the primary GI 275 ADI fails (loss of some or all primary flight information, display is blank, frozen, or unresponsive).

1. Use standby flight instruments for attitude, airspeed, altitude, and heading reference.
2. If GI 275 reversionary capability is available, the standby GI 275 should automatically change to the ADI page and promptly restore primary flight information. If manual reversion is required, rotate the outer knob left or move the Reversion Backup Switch to the “ON” position.
3. Refer directly to the navigation source for navigation information (such as GPS).
4. Seek VFR conditions or land as soon as practical.
If autopilot is engaged:
 5. Verify autopilot mode selections and cross check against standby flight and navigation data. Consider disengaging the autopilot.

3.1.2 Blank Screen

If the screen is the primary ADI refer to procedure 3.1.1.

1. Increase display lighting brightness with cockpit dimmer if installed.

If the installed equipment in the aircraft includes a GDL 60 Wireless Access unit:

2. Press the screen or rotate either knob at least one click.

If the display returns:

3. Open the CNXT and CNXT BATT circuit breakers.

If the screen is still blank or there is no GDL 60 Wireless Access unit in the aircraft, refer to procedure 3.1.1 for loss of primary flight information if applicable.

3.1.3 AHRS Failure

AHRS failure is indicated by the removal of the attitude/heading information and a red X on the GI 275 ADI. Standard rate turn indications will also be removed. A heading failure may also occur as described in Section 3.2.1.

1. Continue flight by reference to the standby ADI
or
Manually select “ON” on the GI 275 reversionary backup switch
or
Rotate the outer knob to the left to force reversion to ADI Page.
2. Seek VFR conditions or land as soon as practicable if there are no other reliable AHRS sensors capable of providing accurate data.

If multiple AHRS sources are installed:

3. Select the operative AHRS (i.e., AHRS 1, 2 or 3) using the ADI sensors menu (MENU → SENSORS)
4. Press and hold the back button to return to the ADI page.

NOTE

If airborne AHRS alignment is necessary, minimize maneuvering and turbulence during and after the restart process. If maneuvering or turbulence cannot be avoided, carefully cross-check the AHRS for accuracy against other flight instruments until the alignment has completed and becomes stable.

CAUTION

In installations with a Garmin cross-comparison for AHRS/ADC sensors, changing the AHRS/ADC sensor source when a white ATTITUDE/IAS/ALT annunciation is displayed on the primary GI 275 ADI will result in the selection of an inoperative sensor source and subsequent loss of information.

CAUTION

Manually selecting duplicate AHRS sources for multiple displays reduces the redundancy of the system.

3.1.4 ADC Failure

ADC failure is indicated by:

- Red X over the airspeed and altitude tapes
- Yellow X over the digital vertical speed value

If valid GPS data is available, the GI 275 will automatically revert to display GPS-calculated altitude relative to mean sea level. GPS altitude is displayed in magenta, in the same location as normal operation.

1. Use standby Airspeed Indicator and Altimeter
2. Seek VFR conditions or land as soon as practical if there are no other reliable ADC sensors capable of providing accurate data.

If multiple ADC sources are installed:

3. Select the operative ADC (i.e., ADC 1, 2, or 3) using the ADI Sensors menu (MENU → SENSORS)
4. Press and hold the back button to return to the ADI page.

CAUTION

In installations with a Garmin cross-comparison for AHRS/ADC sensors, changing the AHRS/ADC sensor source when a white ATTITUDE/IAS/ALT annunciation is displayed on the primary GI 275 ADI will result in the selection of an inoperative sensor source and subsequent loss of information.

3.1.5 ATTITUDE, ALT, or IAS monitor CAUTION

If an ATTITUDE, ALT, or IAS miscompare CAUTION is displayed in yellow on the attitude display or airspeed/altitude tape:



1. Cross check flight instruments against all available information to determine which indications are correct
2. Seek VFR conditions or land as soon as practical

NOTE

With loss of redundancy of primary altimetry systems, perform appropriate RVSM contingency procedures for the loss of primary altimetry systems.

3.1.6 Aircraft Electrical System Failure

In the event of a total loss of aircraft electrical power, the GI 275 will cease to operate, except for displays which are equipped with an internal backup battery. Refer to procedures for failure of affected equipment and operation on backup battery.

3.1.7 Operation on Backup Battery (if installed)

Displays equipped with a backup battery will continue to operate after a loss of aircraft electrical power. EIS displays will not be functional. Operation on battery power is indicated by the presence of a battery icon on the affected display. Green battery indication provides at least 60mins, yellow battery indication provides a range between 59mins and 15mins, and red battery indication provides less than 15mins of battery operation.



1. Seek VFR conditions and land as soon as practical.

NOTE

For protection, backup battery operation is inhibited if the battery temperature drops below -20° C or exceeds 80° C. Battery parameters such as the battery temperature can be viewed in the System Menu.

CAUTION

To conserve power and to preserve the display of primary flight data and direct-to navigation capabilities with the optional VGPS receiver, GI 275 backup battery operation internally load-sheds interfaces, which will disable the normal interface with certified navigators or other hazard awareness systems. Depending on how these were installed and configured to the GI 275, some information from these configured systems will not be available when the GI 275 is operating on its backup battery.

If a yellow icon is present during the Before Takeoff ADI system check, verify the battery's remaining capacity is more than 30 mins if the aircraft's service ceiling is below 25,000ft, or more than 60 mins if the aircraft's service ceiling is above 25,000ft.

1. Refer to the battery status and information found in the battery menu (Menu → Systems → Battery).

3.1.8 Display Backup Malfunction

Display backup malfunction is indicated by the unit locking on the ADI page. All other configured pages will not be accessible on the standby ADI or HSI.

3.1.9 Backup Battery Malfunction

A malfunction of the backup battery is indicated by the following indication in the upper left corner of the screen with a system advisory message:



1. Seek VFR conditions or land as soon as practicable.

If this icon is present during the Before Takeoff ADI system check, do not depart into IMC.

3.1.10 EIS Failure

EIS failure is indicated by the loss of displayed information on the EIS, including a blank, frozen, or unresponsive display of EIS parameters.

1. Position engine controls to ensure operation within engine limitations.

3.1.11 Terrain Alerts

Aural Alert	Annunciation All Pages	Annunciation Terrain Page	Action
“Terrain, Terrain Pull up, Pull up” -OR- “Obstacle, Obstacle Pull up, Pull up” -OR- “Wire, Wire Pull up, Pull up” -OR- “Warning, Terrain, Terrain” -OR- “Warning, Obstacle, Obstacle” -OR- “Warning, Wire, Wire” -OR- “Pull up”	TER	PULL UP -OR- TERRAIN -OR- OBSTACLE -OR- WIRE	Disconnect autopilot and initiate maximum performance climb (maximum takeoff power and best angle of climb airspeed) NOTE: Only the climb maneuver is recommended, unless operating in VMC or it is determined, based on all available information, that turning in addition climbing is the safest course of action.
“CAUTION, Terrain” -OR- “CAUTION, Obstacle” -OR- “CAUTION, Wire”	TER	TERRAIN -OR- OBSTACLE -OR- WIRE	Take corrective action until the alert ceases. Using all available information to determine the appropriate action, alter the flight path away from the threat by stopping descent, climbing, and/or turning.
“Too low, Terrain”		TERRAIN	Establish climb to the minimum altitude for

Aural Alert	Annunciation All Pages	Annunciation Terrain Page	Action
			present position/procedure
“Sink Rate”		TERRAIN	Decrease rate of descent
“Don’t sink”		TERRAIN	Establish a positive rate of climb

3.2 Abnormal Procedures

3.2.1 Heading Failure

If the GI 275 is configured with a VFR GPS or interfaced to a certified GPS source, the HDG indications will be replaced with track (TRK) indications in magenta in the event of a heading failure. The heading bug and course pointer will continue to function normally, using GPS ground track as a reference instead of magnetic heading.



Figure 4- Bottom of the ADI when HDG failed (with GPS)



Figure 5- Top of the HSI when HDG failed (with GPS)

If there is no GPS in the GI 275 system or if the GPS has failed, the heading failure will be indicated by a red “X” in place of the heading readout on the ADI or HSIs.



Figure 6- Bottom of the ADI when HDG failed (no GPS)



Figure 7- Top of the HSI when HDG failed (no GPS)

If GPS track is not available:

1. Use standby compass for heading reference.

NOTE

Without magnetic heading or GPS track, the CDI provides no directional information. Only course deviation information is presented, and the orientation of the CDI is based on the selected course, regardless of aircraft heading. Course deviation indications will behave like a traditional CDI. VOR deviations will be relative to the selected course with a TO/FROM indication. Localizer deviations will not be affected by the selected course, and reverse sensing will occur when tracking inbound on a localizer back course.

3.2.2 Display Overtemperature

If the display is in an overheating condition, the system will alert the pilot with a system message. The system message will read “Display Overtemperature”

1. Prepare for loss of the affected display.

3.2.3 GPS Data Failure

GPS data failure may be indicated by any or all of the following:

- Loss of GPS course deviation information on HSI
 - Yellow “LOI” text on the ADI
 - Yellow “DR” text on the moving map
 - Yellow “NO GPS POSITION” text on the moving map
 - Loss of waypoint bearing/distance information
1. Select alternate GPS source, if available, by pressing “CDI” button on ADI.
 - If the VFR GPS is configured in the system, while cycling the CDI button the VGPS will become a selectable source. This is limited to Direct-to capability, if configured.

If alternate GPS source is not available:

2. Select alternate navigation source (VOR or LOC, if available) or refer directly to external navigation data.
3. Seek VFR conditions as soon as practical.

3.2.4 Navigation Data Failure (VOR/LOC/GS)

Navigation data failure may be indicated by any or all of the following:

- Loss of course deviation information on ADI
 - Loss of glideslope/glidepath information on ADI
 - Loss of bearing pointer on HSI
1. Select alternate navigation source or refer directly to external navigation data.

3.2.5 Synthetic Vision Malfunction

If the synthetic vision depiction is known or suspected to be inaccurate or malfunctioning:

1. Turn off synthetic terrain using the Menu → Options → Terrain SVT menu on the ADI.

3.2.6 Electrical Load Shedding

The following equipment is considered non-essential. If it becomes necessary to reduce electrical load (for example, during loss of generators or alternators), power to these units may be removed in the order listed.

1. MFD circuit breaker(s) [if installed and not configured as standby ADI] – PULL

NOTE

Any non-required displays on the co-pilot side may also be powered off.

3.2.7 AHRS ALIGN

If an “AHRS ALIGN / Keep Wings Level” annunciation is displayed on the attitude indicator in flight, limit aircraft operation to:

- $\pm 10^\circ$ bank
- $\pm 5^\circ$ pitch
- 200 KTAS or less

CAUTION

Exceeding these values may delay or prevent AHRS alignment.

3.2.8 EIS Display Parameter Failure

Indicated by individual parameters having a red or yellow X drawn through the gauge and data removed (see EIS failure procedure for loss of entire EIS function).

1. Monitor remaining parameters and set engine controls to operate within limitations.

3.3 WARNINGS, CAUTIONs, and Advisories

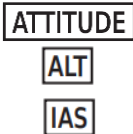
The following tables show the color and significance of the warning, caution, and advisory messages which may appear on the GI 275 displays.

3.3.1 WARNING Annunciations – Red		
<i>Annunciation</i>	<i>Pilot Action</i>	<i>Cause</i>
HDG Fail 	Use Standby Magnetic Compass or GPS track information	Display system is not receiving valid heading input from the ADAHRS or AHRS; accompanied by a red X through the digital heading display.
Red X 	Reference the data source or alternate equipment.	A red X through any display field, indicates that display field is not receiving data or is corrupted.
Red EIS Alert Triangle 	Observe the warning indication on the EIS display and take appropriate action.	One or more engine parameters have exceeded a warning threshold.
Red Engine Parameter 	Take appropriate action to correct condition causing engine parameter exceedance	The engine parameter has exceeded the warning threshold.
Terrain warning 	Take appropriate action to maneuver the aircraft away from the conflicting terrain	Terrain warning due to aircraft proximity to surrounding terrain

3.3.2 CAUTION Annunciations – Yellow		
<i>Annunciation</i>	<i>Pilot Action</i>	<i>Cause</i>
AHRS ALIGN – Keep Wings Level 	Limit aircraft attitude to $\pm 10^\circ$ bank and $\pm 5^\circ$ pitch as AHRS Aligns - OK to taxi.	Attitude and Heading Reference System is aligning. AHRS may not align with excessive pitch/bank angles.
LOI 	Loss of Integrity Monitoring	GPS integrity is insufficient for the current phase of flight.
No GPS Position 	Use alternate information for positional and situational awareness	GPS data is unavailable.
Yellow X 	Reference the data source or alternate equipment.	A yellow X through any display field, indicates that display field is not receiving data or is corrupted.
ATTITUDE 	Fly aircraft manually and crosscheck attitude indication with standby attitude indicator and other sources of attitude information (airspeed, heading, altitude, etc.)	The ADI attitude monitors have detected an AHRS malfunction or an error between AHRS sources (if multiple sources installed). Autopilot may disconnect if AHRS is being used to drive the autopilot. If more than two sensors are installed, only the sensor that miscompares from the others will annunciate. Autopilot may disconnect if AHRS is being used to drive the autopilot.
ALT and/or IAS (text on ADI) 	Cross-check the flagged information against other sources to identify erroneous information.	Differences detected between displayed airspeed and/or altitude (multiple ADC installations only). If more than two sensors are installed, only the sensor that miscompares from the others will annunciate.

AHRS 1/2/3 	Confirm intended AHRS source selection	The ADI is using the cross-side AHRS sensor and AHRS monitor is indicating a miscompare or no-compare (multiple ADI and AHRS installations only).
ADC 1/2/3 	Confirm intended ADC source selection	The ADI is using the cross-side ADC sensor and ADC monitor is indicating a miscompare or no-compare (multiple ADI and ADC installations only).
Yellow EIS Alert Triangle 	Observe the caution indication on the EIS display and take appropriate action.	One or more engine parameters have exceeded a caution threshold.
Yellow EIS Parameter 	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the caution threshold.
Traffic Caution 	Visually acquire the traffic to see and avoid.	The interfaced traffic system has determined that nearby traffic may be a threat to the aircraft.
Terrain Caution 	Take appropriate action to maneuver the aircraft away from the conflicting terrain	Terrain caution due to aircraft proximity to surrounding terrain
TAWS N/A, TAWS FAIL 	Use vigilance, terrain depiction and TAWS alerting are no longer provided.	External system that is providing TAWS alerting has failed, or the GI 275 cannot communicate with the system.
Battery Fault 	Observe the fault condition on the GI 275 by entering the system messages for further details. Seek VFR flight conditions or land as practical.	The Internal battery has detected an issue which may not allow the battery to charge or discharge properly. Such as “Charge Inhibited - unable to charge the battery” or the battery rundown test is out of date.

GPSS Invalid 	Set an active GPS leg to engage GPSS mode or select HDG as the function.	GPSS mode invalid, wings level command sent to autopilot, no active GPS leg, GPS not selected on HSI/ADI 1.
GLIDE 	Smart Glide is active on the GTN.	Reference the GTN Xi AFMS for Smart Glide details and pilot actions.

3.3.3 Advisories – White		
<i>Annunciation</i>	<i>Pilot Action</i>	<i>Cause</i>
ATTITUDE, ALT, or IAS (text on ADI) 	View advisory messages to inhibit the annunciation. Be aware that the other (unselected) AHRS/ADC source is not available	Another (unselected) AHRS/ADC source is unavailable.
AHRS 1/2/3/STBY 	Confirm intended AHRS source selection	The ADI is using the cross-side AHRS sensor (multiple ADI and ADC installations only).
ADC 1/2/3/STBY 	Confirm intended ADC source selection	The ADI is using the cross-side ADC sensor (multiple ADI and ADC installations only).
Messages Icon 	View and consider advisory messages. Refer to the GI 275 Pilot Guide for appropriate pilot or service action.	Typically, these indicate system or database status, or data communication issues within the GI 275 System.
Terrain Inhibited 	Use vigilance, traffic system will not provide alerting.	Terrain is inhibited or a terrain test is in progress
External Navigator Message Icon 	View and consider advisory messages on interfaced navigator. Refer to Pilot Guide for the external navigator for appropriate pilot of service action.	Typically, these indicate system or database status.
Electronic Stability Protection Disabled (GFC 500 only) 	Be aware that ESP is disabled on the interfaced GFC 500 autopilot.	The GFC 500 ESP function has been disabled.

Section 4. NORMAL PROCEDURES

4.1.1 *ADI System Check* 33

4.2 AUTOPILOT OPERATION..... 34

4.2.1 *Autopilot Disconnect Test (Non-Garmin Autopilots)* 34

4.2.2 *Autopilot NAV / APR mode coupling* 34

4.2.3 *GPSS Emulation* 34

4.3 EIS OPERATION 35

4.1 Before Takeoff

1. Review displays for any abnormal warning, caution, or advisory indications.
2. Perform a visual inspection of the fuel tank or other method such as a dipstick, sight gauge, or drip gauge to verify that the fuel quantity indication provided by the GI 275 is accurate.
3. If equipped with a TAWS/Terrain warning system, ensure that the terrain alert audio test can be heard clearly (a system test audio clip is played during the startup self-test).
4. Push to test any installed external annunciators to ensure proper function.
5. Verify that the MAG/TRUE navigation angle selection on the GI 275 and any interfaced navigators match.
6. Verify all engine indications are functional on the EIS display and there are no red or yellow X's on any of the engine gauges.

4.1.1 ADI System Check

1. For IFR aircraft, verify that no yellow or red battery icon is displayed on the primary or standby ADI. If either of these icons are present, refer to section 3.1.7 and 3.1.9.
2. Verify that attitude, heading, altitude, and airspeed are displayed normally on the ADI (no warnings, cautions, or advisories related to these functions).
3. If installed, select the Reversion Backup Switch to the “ON” position
 - a. Verify that the ADI information is displayed on the backup display
 - b. Ensure that attitude, heading, altitude, and airspeed are displayed normally on the standby ADI (no warnings, cautions, or advisories related to these functions)
 - c. Select the Reversion Backup Switch to the “AUTO” position and verify that other configured pages are once again selectable.

4.2 Autopilot Operation

Refer to Section 1.7.6 for the applicable autopilot interface capability and installation details.

4.2.1 Autopilot Disconnect Test (Non-Garmin Autopilots)

1. While on the ground, engage the autopilot.
2. In the ADI Menu → Options, press the AP DISC button and verify that the autopilot disconnects.

CAUTION

Do not use the autopilot if the AP DISC button fails to disengage the autopilot normally.

4.2.2 Autopilot NAV / APR mode coupling

To couple the autopilot NAV / APR mode:

1. Select the desired navigation source on the Pilot's ADI (NAV Options Menu) or the CDI button.
2. Select the desired NAV / APR mode on the autopilot.

NOTE

The autopilot will use the source that is displayed on the Pilot's ADI or HSI.

4.2.3 GPSS Emulation

If enabled, to use GPSS:

1. Select the desired GPS navigation source on the Pilot's ADI.
2. Enable GPSS emulation on the ADI using the AP REF button in the Menu → Options → NAV Options → HDG Options menu (or with the optional AP HDG DATUM external switch).
3. Engage the autopilot in HDG mode.

NOTE

When GPSS emulation is enabled, the GI 275 ADI's heading bug function will be disabled. This is indicated by a hollowed-out heading bug, and the ADI/HSI heading button will display "GPSS" near the crossed-out heading bug. The "GPSS" text will be white when GPSS commands are available, and it will be yellow when there is no GPSS command available.

The following images show GPSS mode active, but no signals are sent.



The following images show GPSS mode active and sending signals.



NOTE

The GPSS commands to the autopilot are based on the GPS source displayed on the pilot's side ADI (typically the primary ADI or ADI #1).

4.3 EIS Operation

Periodically review the engine indications on the Main EIS page if the GI 275 is displaying any other EIS page.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTION

A detailed GI 275 Pilot's Guide is available through the Garmin website or your Garmin dealer.

If a GSB 15 is installed it provides a USB port for loading software and databases. This can also power portable electronic devices but does not provide any data connection to the GI 275 for those devices.

Wireless connectivity is provided for ground database updates. Database updates cannot be performed in-flight. Additionally, the GI 275 supports a Bluetooth connection to personal electronic devices running Garmin Pilot for the supplemental display of traffic, attitude and GPS position. This connection will work in-flight however the personal electronic device must be paired with GI 275 while on the ground.

The following colors are used consistently within the GI 275 system:

Color	Functions
Red	Warning conditions Operating Limits
Yellow	Caution conditions Conditional operating ranges
Green	Safe operating conditions Normal operating ranges VOR/Localizer Data
White	Scales and Markings Current data and values, status EIS pilot set alerts
Magenta	GPS Data Active flight plan legs
Cyan	Pilot-selectable references

7.1 Controls Overview

A dual concentric knob with a center push-button provides the primary means with which to navigate between screens and access menus and functions of the GI 275. The outer knob will always change from Page-to-Page on GI 275s that have multiple pages. A display touch is required in most cases to select the display field of a Page that will be changed by inner knob rotation or press. The inner knob changes the value of the selected field. For primary, stand-alone

ADIs the outer knob does not provide any control since there is no other page available for selection. When the outer knob is rotated, a momentary display of knob function is provided at the top of each page.

To access the Menu, press and hold the inner knob. To access the Menu via touchscreen, swipe up from the bottom of the GI 275 display.

7.2 Display Brightness

Display brightness is controlled automatically based on input to a bezel-mounted photocell. The brightness level can be manually adjusted using controls in the Menu → Backlight selection. Optionally, brightness can be controlled using the aircraft's cockpit lighting dimmer control.

7.3 System Power Sources

The GI 275 primarily depends on aircraft power to function. The GI 275 system is directly connected to the aircraft's main or essential bus and energized when the aircraft master switch is turned on. Other systems, like the navigation equipment, weather datalink, and autopilot are typically located on the avionics bus and may not be functional when this bus is powered off.

7.4 System Status

The GI 275 status can be viewed via the Menu → System → Info menu. This includes the serial number and system ID of the unit, the software version loaded on the unit, and the AHRS and ADC software versions.

An External LRUs list displays information and status of various units that are interfaced to the GI 275 system. This list only includes LRUs that can report status information, which is typically limited to other Garmin LRUs. Software versions, serial numbers, and LRU status is typically provided. A green checkmark indicates normal online status, and a red X indicates offline or failed status. Some LRUs, like the GDL 69, GSR 56, and GTX 345, provide a button to see more detailed information about the status of that unit.

7.5 Databases

The GI 275 utilizes databases to provide some system functions.

Database status information is available to the pilot at system startup on the MFD splash screen and during normal operations on the Menu → System → Databases (or DB) menu. Controls are provided for manually initiating a database update. EIS units only use a Nav database. System time (as received from an interfaced GPS navigator or the internal VFR GPS) is used to determine if a database is within its effective period. Databases are displayed in yellow if they are expired, not yet effective, or if the current date/time is unknown. Databases are displayed in white if they are within their effective date range. All database status information is depicted in white on the System Status page.

Databases can be updated using the USB port, by syncing with other compatible units, or using database concierge through a PED. Databases are stored internally on the GI 275s.

The terrain and basemap databases are updated periodically and do not expire.

The Garmin or Jeppesen navigation database contains data associated with navigation including airports, navigation aids, airways, airspaces, and other data. This database is updated on a 28-day cycle.

The obstacle database contains data for obstacles and wires that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. Wires which have been identified as a hazard to fixed wing aircraft are included in the database. Coverage of the obstacle database includes the United States and Europe. Wire coverage is limited to the United States. This database is updated on a 56-day cycle.

CAUTION

Not all obstacles or wires are included in the databases.

The Garmin SafeTaxi™ database contains airport diagrams for selected airports. This database is updated on a 56-day cycle.

The magnetic variation model contains data about variations in the earth's magnetic field based on location. This database is included with the navigation database and is updated on a five-year cycle.

7.6 Crew Profiles

The crew profile function is provided for all units to allow the retention of pilot-selectable configurations and settings. If the aircraft is operated by multiple pilots, each pilot can recall their individual settings for use. These profiles include settings from all displays in the system.

If an MFD is installed, the splash screen provides the option for the pilot to select a crew profile upon power up. Otherwise, the crew profile can be set in the System → Crew Profile Menu. If no selection is made, the GI 275 will

default to the last crew profile used. Only one profile may be selected as active at a time. New profiles are created with the settings currently in use.

7.7 Integrated Standby System

Standby instruments (attitude, altitude, airspeed) may be provided by a second GI 275 display. The GI 275 can be a standby to itself, consisting of two GI 275 displays installed adjacent to each other, with one display configured as the ADI and the second display configured as either an HSI or an MFD.

The standby ADI needs to be of the -10, -20, -30, or -40 type with its own integral ADAHRS. An optional Reversion Backup Switch may be installed which will force the standby ADI into the display backup mode of operation when moved to the “ON” position.

A backup battery will provide power to the ADI, MFD, HSI, or standby ADI in the event of aircraft power failure. This configuration will provide the following functionality:

- If the ADI fails or communication with the primary ADI is lost, the MFD with a standby ADI or standby HSI will automatically display its backup primary flight information (attitude, altitude, airspeed).
- Two GI 275 -10 variants monitor and compare their independent attitude, altitude, and airspeed data. If either GI 275 detects a difference between any of the parameters (attitude, altitude, or airspeed), the MFD or HSI will automatically revert to display the standby ADI to restore primary flight information. Yellow miscompare annunciations will appear to indicate the discrepancy.

7.8 GPS Approach Mode Annunciations

When interfaced with a certified GPS navigator and the GPS navigator is the selected source, the GI 275 HSI and HSI Map display the current GPS operational mode. The GI 275 abbreviates the approach modes as defined in the table below.

Description	Annunciation
Lateral Navigation	LNAV
Localizer Performance with Vertical Guidance	LPV
Localizer Performance without Vertical Guidance	LP
Localizer performance approach with advisory vertical guidance	LP+V
Lateral and vertical navigation approach	L/VNAV
Lateral navigation approach with advisory vertical guidance	LNAV+V

7.9 VFR GPS

A Garmin GI 275 may be interfaced with its own optional VFR GPS antenna. In the event that the certified GPS navigation information becomes unavailable, the GI 275 VFR GPS (VGPS) provides 2D GPS position information and Direct To navigation capability. Aside from selecting VGPS as the CDI source and then selecting a Direct To waypoint, airport, or navigational aid within the GI 275 Direct To Menu, there is no pilot action required to enable or use the VFR GPS. When VGPS data is in use, "VGPS" is annunciated as the selected navigation source.

Synthetic Vision and Terrain alerting functionality is available with the VGPS.

7.10 Messages

Messages are available on all installed GI 275s. A Message annunciation flashes in the upper left corner of each display to notify the pilot when a new advisory is available. The pilot may select Messages in the Menu to display a list of active Messages.

Not all Messages are common to all interfaced GI 275s, meaning unit specific issues will not be shown on all the other GI 275s.

7.11 System Settings

The Menu → System → Setup page provides pilot controls for click volume, time format, and local time offset. Controls are provided to set the nearest airport criteria so that airports not usable by the aircraft type do not appear in waypoint searches.

Units of Measure for temperature, barometric pressure, and nav angle are pilot controllable via the Menu → System → Units page. These units are propagated throughout the GI 275 system. Adjustments to temperature units will not affect EIS temperature gauges.

The units and markings on the ADI are not user configurable. They match the units as specified in the aircraft's FAA approved Airplane Flight Manual and standby instruments.

If pilot-selected navigation angle settings differ on the navigator and the GI 275, the display aspects will be inaccurate.

7.12 System Data Logging

The GI 275 system incorporates a data logging feature that can record parameters related to the aircraft's primary flight instruments, engine indications, and aircraft configuration. Recorded data is stored in internal memory and can be exported via a USB drive.

7.13 Primary ADI

ADI functions are selected by touching the desired adjustable field on the display. Once selected, the inner knob changes the value (Altitude, IAS, Baro, or Heading). An inner knob press will sync the altitude, IAS, or heading to the current value. Baro sync toggles the ADI in and out of standard altimeter setting (29.92"hg and labeled "STD"). The selectable field defaults to Baro when the knob is idle for a period of time. The default timeout is 10 seconds and may be changed in the Menu.

When interfaced to a Garmin G500/600 TXi, the GI 275 will sync barometer (if Baro Sync is enabled), selected heading, selected altitude, and selected airspeed bugs with the TXi. It is required that BARO SYNC be enabled when using VNAV functionality as the GTN will only use the pilot-side BARO unless there is a failure.

7.13.1 Primary Flight Data

The ADI can display the following parameters depending on the unit configuration; attitude, heading, airspeed, barometric altitude, Mach number, and vertical speed data. Airspeed and altitude displays include a six second trend indicator.

Airspeed trend indication bars are only visible when the speed trend is greater than 5 knots for over 6 seconds.

Pilot selectable bugs may be configured for airspeed, altitude, and heading.

The GI 275 requires at least one GPS source to ensure the integrity of the AHRS.

When dual GI 275 -10, -20, -30, and -40 variants are installed and configured, the pilot is provided with AHRS/ADC source selection controls via the ADI Menu → Options → Sensors menu.

The default ADC and AHRS source on power up is ADC 1 and AHRS 1 for the pilot side ADI and ADC 2 and AHRS 2 for the co-pilot or standby ADI and if a third sensor is installed, it is configured as the standby.

Selection of the non-default sensor source will cause a “ADC [Sensor Number]” or “AHRS [Sensor Number]”, respectively, to be displayed with black text on a white background. If there is an AHRS or ADC miscompare or no-compare while on the off-side sensor “ADC [Sensor Number]” or “AHRS [Sensor Number]” will be displayed with black text on a yellow background.

When dual GI 275 -10, -20, -30, and -40 variants are installed and configured, software monitors provide detection of sensor miscompares. If a monitor detects a difference between sources exceeding the allowable limit, a visual attitude, altitude, heading, or airspeed miscompare annunciation will be shown on the ADI.

Miscompares are annunciated using black text on a yellow background as follows: airspeed miscompare is “IAS” shown near the airspeed pointer, barometric altitude miscompare is “ALT” near the barometric altitude pointer, the near the digital heading readout, and attitude miscompare is “ATTITUDE” on the attitude indicator. The ADI inhibits the “IAS”, “ALT”, and “ATTITUDE” annunciations in dual GI 275 ADI installations when both ADIs are displaying the same sensor source.

A no compare monitor is used to determine when data between GI 275s cannot be compared. No compares are annunciated the same as miscompares, except for the black text on a white background.

7.13.2 Attitude

The attitude display has a blue over brown presentation and may be configured in either a Fixed or Sky Pointer orientation by the installer. The ADI can also display Synthetic Vision data (SVT), available as an option.

Standard rate turn marks are provided on the roll scale for bank angles less than 30 degrees when the GI 275 ADI is configured with an OAT sensor.

The Sky Pointer orientation will automatically declutter the IAS and Altitude selectable fields when bank angles exceed 45°. Red chevrons, which indicate the direction to level pitch to assist recovery, are displayed at a nose up angle of 40° or 50°, and nose down angle of 20° or 30°, depending on configuration.

Slip/skid information is shown using a white trapezoid below the roll angle indicator.

7.13.3 Synthetic Vision Technology

SVT may optionally be provided to assist the pilot in maintaining situational awareness with terrain, obstacles, and airborne traffic.

SVT controls are provided via Menu → Options → Terrain/SVT. Synthetic terrain, horizon headings, and airport signs can be enabled or disabled from this menu.

SVT provides additional information on the ADI:

- **Synthetic Terrain:** an artificial, database-derived, three-dimensional view of the terrain ahead of the aircraft within a field of view of approximately 25 degrees left and 25 degrees right of the aircraft heading.
- **Obstacles:** obstacles such as towers, including buildings over 200 AGL that are within the depicted synthetic terrain field of view. Powerlines are not depicted in synthetic vision.
- **Flight Path Marker (FPM):** an indication of the current lateral and vertical path of the aircraft. The FPM is always displayed when SVT is enabled. The FPM will be dashed when it hits the vertical or lateral display limit.
- **Traffic:** a display on the ADI indicating the position of other aircraft detected by an interfaced traffic system.
- **Horizon Line:** a white line indicating the true horizon is always displayed on the SVT display.
- **Horizon Headings:** Headings may be overlayed just above the horizon line on the ADI.
- **Airport Signs:** pilot-selectable “signposts” displayed on the synthetic terrain display indicating the position of nearby airports that are in the navigation database.
- **Runway Highlight:** a highlighted presentation of the location and orientation of the runway(s) at the destination airport.

The synthetic terrain display is intended to aid the pilot awareness of the terrain and obstacles ahead of the airplane. It may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles. The synthetic vision elements are not intended to be used for primary aircraft control in place of the primary flight instruments.

7.13.4 Airspeed

If configured, the airspeed tape on the left side of the ADI displays red/white striping to indicate the maximum allowable airspeed (V_{NE}/V_{MO}). This maximum allowable airspeed display is configured to indicate the appropriate maximum allowable airspeed for the airplane.

The airspeed tape displays a red low-speed awareness band at the lower range of the airspeed tape. This low-speed awareness band is displayed at airspeed values below V_{S0} . It does not indicate an actual or calculated stall speed and does not adjust with variations in aircraft weight or other factors.

All other airspeed tape indications are configured to indicate the type design limitations. The airspeed tape does not adjust these additional markings for variations with aircraft weight, altitude, or other factors.

Airspeed references (“V speeds”) are shown on the airspeed tape when enabled for display by the pilot via Menu → Options → Airspeeds.

When configured, Indicated Mach Number will be displayed adjacent to the airspeed tape.

7.13.5 Barometric Altitude and Vertical Speed

If configured, barometric altitude is displayed on a tape on the right side of the display. The vertical speed is displayed via an inset window adjacent to the altitude numerical value. The Baro setting may be adjusted by touching the field and rotating the inner knob or simply rotating the knob when the active field reverts to the Baro field home state. Altitude, airspeed, and heading bugs may be configured and synchronized across all GI 275 ADIs and configured G500 TXi displays. The Altitude bug may be removed by adjusting the value to -1,000 ft.

If a GTN is interfaced to provide Vertical Navigation (VNAV) functionality, then barometric altitude is required. Baro sync should be enabled on GI 275 units. VNAV uses the pilot-side baro setting unless that GI 275 fails, in which case the co-pilot side baro setting will be used (if installed).

7.13.6 Navigation

Navigation information is presented on the ADI using an optional lateral deviation indicator (LDI) above the heading display and a VDI to the left of the altitude readout. For MFD installations, the CDI/VDI are shown on CDI, HSI, and HSI map pages. Additionally, the CDI/VDI are displayed on the HSI and

HSI map page on HSI installations. Bearing Pointers may be displayed on the HSI Page.

Navigation information can be cycled through up to four independent sources in normal operation by pressing the “CDI” button at the bottom of the HSI, HSI Map, or CDI pages, or on a GTN Xi. The navigation source can also be changed using the NAV Option Menu on the ADI (Menu → Options) or a configured GTN 750/650 Xi. VGPS will be displayed as an additional navigation source if all certified navigators fail or will be the only navigation source in installations without a certified GPS source. The selected navigation source is shown on the left side of the HSI or LDI. CDI source selection can be synchronized across multiple GI 275 and G500 TXi’s if enabled by the pilot.

The GI 275 can sync both the baro setting and the CDI source selection to a TXi display (if the GI275 is acting as a standby) and to the co-pilot side displays on the aircraft.

If configured, these syncing options are available in a pilot-accessible menu. Turning off Standby SYNC will decouple the GI 275 from a primary TXi display, if the GI275 is configured as the standby.

7.13.7 HSI

The course pointer and deviation indicator are shown as a single, solid line for GPS 1 and VLOC 1, and as an outline with no fill for GPS 2 and VLOC 2. GPS and VLOC sources are further differentiated with color.

The selected course is displayed above and to the right of the HSI. The selected course is set via touchscreen keyboard entry or dual-concentric knob.

In addition, the HSI can display two simultaneous bearing pointers sourced from GPS or VHF NAV.

The bearing pointer display and navigation source are pilot controlled under the Menu → HSI Options → Bearing sub menus.

The HSI Map includes an integral moving map within the HSI depiction. HSI map data is a subset of the data on the MFD map page. Traffic, terrain, obstacle, topographic, and weather overlays are also available for the HSI map. Flight plan, runways, TAWS FLTAs, and TFRs are always displayed. Overlays are controlled on the Menu → HSI Options → HSI Map Options → Map Options menu.

7.13.8 Lateral Deviation Indicator (LDI)

A Lateral Deviation Indicator (LDI) is displayed on the ADI above the heading display when selected in the Menu. This LDI shows course deviation, navigation source, and VLOC station identifier or GPS phase of flight. The LDI uses the same color convention as the HSI .

The LDI incorporates automatic reverse sensing correction into the deviation display. When the difference between the heading and the selected course is greater than 107°, the LDI will enable reverse sensing correction. Reverse sensing correction inverts the course deviation needle and to/from indicator so that they correctly indicate the direction of the course and waypoint. The course deviation needle will be deflected in the direction of the desired course, and the to/from indicator will point in the direction of the waypoint (similar to how the HSI depiction inverts with heading changes).

Message, waypoint, phase of flight, LOI, and DR annunciations from a GTN or GNS interfaced to the GI 275 are annunciated on the LDI.

7.13.9 Vertical Deviation Indication (VDI)

Vertical guidance is shown by a vertical deviation indicator (VDI) adjacent to the altitude tape. The VDI displays glideslope (GS) information from an ILS source, glidepath (GP) information for a GPS approach, or barometric VNAV guidance from a GTN navigator.

7.13.10 Minimum Altitude Display and Alerting

When enabled by the pilot, an altitude minimums bug will be displayed in cyan on the altitude tape. If a radar altimeter is installed, the pilot can select between barometric or radar-altitude minimums. If installed with a G500 TXi, the minimums set on the TXi will crossfill to the GI 275.

Altitude minimums are accessed under the Menu → Options → Minimums sub menu.

Both visual and aural altitude minimums alerts are provided. During a descent to minimums, the minimums bug will change from cyan to white when the aircraft descends to within 100 ft of minimums. An aural “Minimums, Minimums” alert will be triggered when the aircraft’s altitude descends through minimums and the minimums bug will change to yellow. As the aircraft altitude climbs back above minimums, the minimums bug will change to white 50 ft above minimums and cyan 150 ft above minimums. Alerting is rearmed once the aircraft is 150 ft or more above the minimums altitude.

7.13.11 Navigation Data for Autopilots

The GI 275 can provide course and heading data to the autopilot based on the data selected for display on the HSI. For aircraft equipped with multiple GPS/NAV systems, the HSI can act as a selection hub for the autopilot’s NAV mode. Alternatively, the NAV mode can be selected using the NAV Options menu on the ADI. The GI 275 may also provide GPS Steering (GPSS) data.

Not all autopilot systems are approved for providing vertical guidance on GPS-based approaches; consult the AFMS for the autopilot and/or GPS system.

If the installation has pilot and copilot HSIs, control of navigation course, heading, or altitude data affecting the autopilot from the co-pilot side can only be made if the systems are synchronized with each other.

If the autopilot can receive GPSS Roll Steering, the data is transmitted via a digital communications bus from the GI 275 to the autopilot. The HSI receives this data from the GPS. In dual GPS installations, the HSI sends Roll Steering information from the selected GPS source.

When enabled by the installer for autopilots that do not support GPSS roll steering, GPSS allows a configured legacy autopilot to fly GPS curved plan legs (e.g., arcs, procedure turns, etc.) as well as straight legs.

For autopilots which are not GPSS Roll Steering capable, the GI 275 can convert GPSS turn commands into a heading error signal for the autopilot. When the autopilot is operated in HDG mode and GPSS is selected as the GI 275's heading source, the autopilot will fly the turn commands from the GPS navigator selected on the GI 275, allowing a configured legacy autopilot to fly GPS curved plan legs (e.g., arcs, procedure turns, etc.) as well as straight legs.

If an autopilot is interfaced to the GI 275 which supports GPS steering (GPSS), a menu selection is provided in the ADI (Menu → Options → NAV Options → HDG to change the autopilot heading reference between GPSS and selected heading. Additionally, an external AP HDG DATUM switch may be installed to allow external switching between HDG mode and GPSS mode. When GPSS is selected, the heading bug will become hollow and the selected heading display will annunciate "GPSS" with an icon of a crossed out heading bug. The heading bug may still be adjusted by the pilot as a visual reference without affecting GPSS or its steering commands to the autopilot.

If the GPSS data is invalid (for example, if there is no active GPS leg) or the selected HSI source on HSI / ADI 1 is not GPS, the annunciated GPSS text will be yellow and a wings level command will be sent to the autopilot.

GPSS commands are not available when the CDI source is a VOR or LOC.

7.13.12 Flight Director Display

If autopilot flight director commands are interfaced to the GI 275, they will be presented as a single cue flight director on the ADI. Control of the flight director is accomplished via the autopilot/flight director controller. The flight director type may be changed between Single and Dual Cue styles through the GI 275 Main menu. (Menu → ADI Options → FD Format)

The GI 275 limits the distance the flight director pitch commands may deviate from the Aircraft Reference Symbol. If the pitch command provided by the autopilot flight director is greater than the position allowed by the GI 275, the command bars will be displayed at the maximum offset position allowed by the GI 275. As the aircraft pitch changes to satisfy the command bars, the bars will continue to be displayed at the maximum offset from the Aircraft Reference Symbol until the aircraft pitch deviation is within the command display limit.

7.13.13 Attitude and Rate Data Sources for Autopilots

Attitude-based autopilots may be interfaced to the GI 275 ADI, -20/-40 variant. If the GI 275 system is providing attitude to the autopilot, it will be noted in Section 1.7.6 above. Otherwise, the autopilot is receiving attitude or rate information from the standby or a remote gyro and the autopilot attitude input is independent of the attitude displayed on the GI 275 ADI.

It is recommended that pilots thoroughly familiarize themselves with the autopilot system and how it is interfaced with the GI 275 and other installed avionics to enhance operational efficiency and troubleshooting. Refer to the autopilot flight manual for more specific information.

7.13.14 Miscellaneous field

On the ADI, HSI, and HSI map page, the user can configure a Misc. Field to display some data in this location. The following data points can be displayed, as available:

- TAS: True airspeed
- GS: Ground speed
- OAT: Outside air temperature.
- TAT: Total air temperature.
- ISA: Temperature delta from the International Standard Air Temperature (ISA).
- Wind: Wind speed/direction
 - 3 different formats:
 - Headwind/crosswind component
 - Deg/Speed readout
 - Single vector
- G-meter: Current aircraft G loading.

Note

When operating with ice accumulation on the temperature probe, the displayed air temperature may be in error by as much as 4°C.

7.14 MFD

On all MFD pages, the *nose* of the ownship symbol represents the actual location of your aircraft.

7.14.1 Map Page

A 2D moving map function is provided on the MFD. The appearance and determination of data displayed on the moving map is controlled by pilot selections made in the Menu. The Menu provides on/off controls for map overlays, a map detail selector, and a map setup button which accesses additional map controls.

The map range can be altered by “pinch zooming” the touchscreen or rotating the inner knob when the Range field is active. The range scale of the map is indicated by a range ring, centered on the ownship, with the current selected range shown at the 9 o’clock position on the ring. In addition to range adjustment, a panning function is provided to allow the position of the map to be centered on a location other than that of the ownship. The Panning mode is entered by dragging a single finger on the display and exited by touching the BACK softkey. The map orientation is continuously displayed in the top left corner of the Map Page.

The active flight plan of an interfaced navigator is shown in magenta on the Map. Traffic, Terrain, Weather, Land, and Aviation data can be selected for overlay on the Map as well.

The zoomed-in Map page does not comply with the FAA requirements and is not certified as an airport moving map display (AMMD).

7.14.2 Traffic Display

The MFD can display traffic data from interfaced traffic systems. Sources of traffic data include TIS-A, TAS/TCAS, and ADS-B TIS-B. The information from these systems is displayed on and may be controlled within the GI 275 MFD’s Traffic Page.

NOTE

Traffic data availability depends on the services provided in the local region/country as well as the interfaced equipment.

The Traffic Page displays traffic according to selected range, relative to the aircraft ownship. It also shows the traffic system status and allows ADS targets to be selected for more information. Traffic controls and options are contained within the Traffic Page Menu, depending on the interfaced traffic system type. A

display altitude filter is also provided via Menu selection. Filtering of targets based on relative altitude is accomplished by the display and affects the traffic displayed on the Traffic, HSI Map, and Map Pages. When interfaced to a TIS-A traffic system, altitude filtering is not available.

The *center* of the traffic target icon serves as the reported location for the target aircraft.

Additional functions are provided on the dedicated traffic page when an ADS-B traffic system is interfaced, including the depiction of motion vectors.

Absolute motion vectors are white and show the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are green and depict the motion of the traffic target relative to the ownship. The direction the traffic target is pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards the ownship indicates that the traffic target *is* converging with your aircraft.

For ADS-B traffic systems - if while on ground without valid magnetic heading and the aircraft stops the traffic page orientation will change from TRACK UP to LATCHED. In this mode the display remains oriented to the last valid track until a new valid track is obtained.

Traffic can be displayed on the moving map as an overlay. Additional filtering based on traffic type (all, advisories, alerts) can be selected using the Menu Traffic selection. For TIS-A traffic selection of the advisories and alerts will result in display of alerted targets only.

Traffic page units are always in nautical miles and feet. If systems units for altitude are selected to meters, then an annunciation is provided on the traffic page indicating that traffic altitudes are depicted in feet and the traffic overlay icon for the map includes a “FT” indication.

If a traffic alert occurs and the MFD is not selected to the dedicated traffic page, then a traffic “popup window” is provided which depicts the traffic and provides controls to either go to the dedicated traffic page or close the popup window. All other pages on an ADI, HSI or MFD will display a yellow TFC annunciator in the upper right corner of the screen when alerts are present.

7.15 Terrain Awareness and Alerting

The following terrain awareness and alerting functions may be provided by the GI 275 system: Terrain Proximity, Terrain FLTA, or TAWS-B. If the GI 275 system is interfaced to a GNS or GTN navigator equipped with TAWS-B, then the GI 275 will display TAWS-B parameters provided by the GNS or GTN. The

Terrain or TAWS function provided by the GI 275 system is indicated by a text box on the bottom of the Terrain Page.

Terrain Proximity function is a 2D depiction of terrain, obstacle, and powerlines with no alerting. A dedicated terrain page is provided on the MFD on which the relative height of terrain, obstacles, and powerlines are depicted using color to convey the height of the obstruction relative to aircraft altitude based on database data. Obstacle and wires are displayed on the terrain page at certain zoom scales. Obstacle data is displayed at zoom settings of 10nm or less and wire data is displayed at zoom settings of 5nm or less. The Terrain Proximity function is present on the system regardless of other higher level terrain functions that may be selected.

If SVT is enabled in the GI 275 system, then the Terrain - FLTA function is provided. Forward Looking Terrain Alerts and Reduced Terrain Clearance Alerts are provided for terrain, obstacles, and wires.

If the GI 275 is interfaced to a GNS or GTN with TAWS-B enabled, then TAWS alerts are only displayed from the GPS/TAWS navigator interfaced as GPS 1 and are displayed regardless of the CDI 1-2 setting.

Visual indications are provided for terrain, obstacle, and wire alerts as follows:

- For all GI 275 configurations which provide alerts and all configurations where the GI 275 is interfaced to GNS or GTN with TAWS-B enabled:
 - An annunciator located in the upper right corner of all configured pages on ADI, HSI and MFD units provides text annunciations of alert conditions.
- For all GI 275 configurations which provide alerts and all configurations where the GI 275 is interfaced to a GTN with TAWS-B enabled:
 - If a terrain alert occurs and the MFD is not selected to the dedicated terrain page, then a terrain “popup window” is provided, which depicts the obstruction generating the alert with controls provided to either go to the dedicated terrain page, inhibit the terrain alert, or close the popup window. On a primary ADI GI 275, if a terrain alert occurs, an annunciation will illuminate in the top right corner of the display.
 - The terrain page and map page, if the terrain overlay is enabled, will depict the area or obstruction causing the alert as an area of color corresponding to the alert severity and encircling the obstruction.
 - If Synthetic Vision depiction is turned on, an area corresponding to the alert area on the map/terrain page is shaded in the corresponding color for terrain alerts. Obstacle alerts will cause the relevant obstacle to be depicted in the

alert color in SVT. Powerline alerts do not have a corresponding indication in SVT.

- o In Dual ADI installations, GI 275 generated alert audio is only provided by the Pilot side GDU. If the Pilot side GDU becomes inoperative, the Co-Pilot side GDU visual annunciations may still function, but the aural alerts will not be heard.

Controls are provided for terrain, obstacle, and wire alerts as follows:

- For all GI 275 configurations in which the GI 275 system provides alerts:
 - o Controls are provided in the Terrain Page menu. A “Terrain Inhibit” button inhibits terrain, obstacle, and powerline alerts when pressed. An annunciation is provided on all configured pages to indicate that alerts are inhibited. A “Terrain Test” button initiates a self-test sequence which results in aural and visual self-test annunciations.

7.15.1 Weather Data

The MFD can display weather data from interfaced datalink systems. Sources of weather data include the Garmin “GDL 69(A)” and “GDL 69(A) SXM” Sirius XM receivers and Garmin ADS-B transceivers. If one of these optional weather datalink receivers is installed, the pilot will be able to access graphical and text weather products using the MFD. Datalink weather products use color and/or timestamps to indicate the recency with which the data was received.

Selected weather products from each receiver can be overlaid on the map page as well as the enhanced HSI map while all received products can be displayed on the dedicated weather pages. The products available on the map page and HSI are different for each weather receiver. The map page and HSI provide controls to select the desired weather receiver; only one weather receiver can be selected at a time.

Text and graphical datalink weather associated with a facility can only be viewed when a database which includes that facility is installed.

The MFD can optionally display data from Stormscope® lightning detection systems. Stormscope data can be depicted on the map page, dedicated Stormscope page, and HSI map. For detailed information about the capabilities and limitations of the Stormscope system, refer to the documentation provided with that system.

7.15.2 Waypoint Information

The MFD provides pages that display information about the different waypoint types. These pages can be accessed by touching one of the supported waypoint types on the map and then pressing the provided Waypoint Info button.

7.16 Engine Indication System

Engine gauges are optionally provided for single and twin engine aircraft with four and six-cylinder reciprocating engines.

The following indications are provided in all EIS installations:

- Tachometer
- Manifold Pressure (If required)
- Oil Pressure
- Oil Temperature
- Cylinder Head Temperature (CHT)
- Exhaust Gas Temperature (EGT)

Other engine gauges may be provided by either the EIS display or previously installed indicators in their original locations. The following gauges may be provided on the GI 275 EIS display:

- Fuel Flow
- Fuel Pressure
- Electrical gauges (Amps / Volts)
- Main and Auxiliary Fuel Quantity
- Carburetor Air Temperature (CAT)
- Turbine Inlet Temperature (TIT)
- Inlet Air Temperature (IAT)
- Compressor Discharge Temperature (CDT)
- IAT/CDT Differential
- Outside Air Temperature (OAT)
- Engine Percent Power

Additional functions provided by the EIS system include a fuel computer, hour meters, and pilot-selectable engine advisories.

The layout of EIS gauges is dependent on the GI 275 display type and number of engines. The determination of which data is presented in which slot is set by the installer in configuration mode based on data in the STC which specifies the data located in each position. The markings on the EIS gauges are the same as those markings provided by the previously installed gauges and depict the operating ranges and limitations provided in the Airplane Flight Manual and Type Certificate Datasheet.

Some previously installed aircraft gauges include non-required markings such as advisory marks for certain altitude and power combinations. EIS gauges will include all markings required to comply with operating limitations associated with that gauge. Markings not required by regulation and which do not convey limitations or operating ranges are provided to the pilot by means of a placard.

EIS gauges include display characteristics to attract the pilot's attention when outside normal operating ranges. Gauge alerting behavior in caution or warning ranges is suppressed when the engine is OFF and the aircraft is on the ground.

All gauges will highlight the digital readout in yellow or red when entering a non-safe range and cause the colorized CAUTION or WARNING annunciator to flash at the top-left of the EIS screens.

7.16.1 Tachometer

For aircraft in which a starting vibrator is installed the RPM indication is not accurate during engine cranking.

For aircraft equipped with P lead sensors to measure engine RPM, the RPM indication may momentarily fluctuate when selecting operation on a single magneto.

7.16.2 Carburetor Air Temperature

The Carburetor Air Temperature gauge (if installed) is marked with a blue arc from -15 to 5 °C which indicates a range of temperatures where carburetor icing is likely to occur. Operation in this temperature range should be avoided in conditions where carburetor icing is possible (humid air or visible moisture).

7.16.3 CHT/EGT

CHT and EGT are displayed on a graph or as a single EGT/CHT strip gauge on the Main page and the CHT/EGT page. On the CHT/EGT page, each cylinder will numerically display its respective CHT below the indicated bar, and respective EGT above the indicated bar. On the Main page, the selected or hottest CHT/EGT is displayed above the graph. On the CHT/EGT monitor page, the hottest CHT/EGT and TIT values are in reverse video for easy reference. The CHT/EGT graphs will show the temperature bars of the graph at the bottom, even when temperatures are below the minimum indicating range.

7.16.3.1 Gasket-style CHT probes

If the box is checked in section 1.7.9, CHT can read 50-100 degrees F higher than the bayonet-style probes used by most aircraft and engine manufacturers.

7.16.4 Primary EGT and TIT

Primary EGT (if installed) will be displayed by a bar gauge on the right side of the CHT/EGT graph, with the Primary EGT value displayed above.

TIT (if installed) will be displayed by a bar gauge on the right side of the CHT/EGT graph, with the TIT value displayed.

This is unavailable when configured as a single EGT/CHT.

7.16.5 Mixture Leaning

When interfaced with a fuel flow sensor, the GI 275 EIS provides two different lean assist methods, rich of peak or lean of peak.

Lean assist mode is initiated by navigating to the CHT/EGT page and turning the inner knob to activate Lean mode. As the mixture is leaned, Lean mode automatically detects the first and last EGT (or TIT if installed and configured) peak and indicates peak by using a bar above the EGT indicator for the cylinder.

If fuel flow indication is not installed, then the system will only provide “Rich of Peak”.

Rich of peak leaning detects and indicates the first engine cylinder to peak during the leaning process. Once the first peak in EGT is detected, the temperature differential from the recorded maximum EGT of the first cylinder to peak is displayed and the pilot can enrichen the mixture to reach the proper operating temperature from peak using that value.

Lean of peak leaning detects and indicates the last engine cylinder to peak during the leaning process. Once the last cylinder peak EGT is detected, the system will display the temperature differential from the recorded maximum EGT of the last cylinder to peak and the pilot can continue to lean the mixture to reach the proper operating temperature from peak using that value.

NOTE

The Lean Assist is meant to aid the pilot in detecting the peak temperatures. Smooth leaning technique is required for the system to be able to accurately detect the peak temperature.

Caution should be used to ensure that, during the leaning procedure, the engine is not leaned beyond the engine or aircraft limitations and that the engine continues to operate smoothly after setting the mixture. Should any engine roughness occur during leaning, consult the aircraft POH or AFM for appropriate leaning of the engine.

The Lean Assist functions are calculated using the relationship between fuel flow and EGTs (or TIT). If a false EGT peak is observed and does not automatically reset, disable the Lean Assist function, reset throttle and mixture controls, and reattempt.

It is recommended to set the aircraft power settings for cruise flight and to let the engine temperatures settle prior to beginning the lean find process.

7.16.6 Fuel Quantity

Usable fuel may be displayed on the EIS display. Main fuel quantities and aux/tip fuel quantities are grouped together at the bottom of the display.

Previously installed aircraft low fuel quantity annunciators will be deactivated as part of the fuel quantity installation in some aircraft. In this case, the low fuel annunciators will be placarded as deactivated, and a red or yellow arc must be added to the fuel quantity gauge to indicate the fuel level that corresponds to the low fuel annunciation.

The aircraft fuel quantity gauge(s), or visual inspection of the fuel tanks are the primary means of determining fuel quantity.

NOTE

Do not use the unverified fuel quantity indication provided by the GI 275 as the sole means of complying with the requirements of CFR 14 91.103, 91.151, or 91.167.

7.16.7 Fuel Computer

A Fuel Computer/Totalizer is provided on the Fuel page. The fuel computer function provides computation and display of estimated fuel remaining, endurance, and fuel used. When interfaced with a GPS source, the fuel computer also provides range and efficiency. The fuel computer calculates these values using the engine fuel flow sensor, ground speed, flight plan, and estimated fuel remaining. Estimated fuel remaining is independent of the measured fuel quantity shown on the fuel quantity gauges.

Fuel flow values may be in error by as much as 15% if the K factor calibration is improperly set.

CAUTION

The pilot must ensure that the initial estimated fuel quantity value is accurate. The fuel computer calculates the remaining fuel based on the initial fuel value entered by the pilot. The estimated fuel remaining is derived by the fuel computer by subtracting the measured fuel flow from the initial fuel entry. Fuel quantity indications shown on the fuel gauges may not provide the accuracy required for determination of estimated fuel remaining values. “Fuel Est” and “Act Used” buttons are available to aid the pilot in entering the initial estimated fuel.

CAUTION

The fuel computer functions must not be used as the primary means of determining the quantity of fuel in the tanks. The aircraft fuel quantity gauge(s) or visual inspection of the fuel tanks are the primary means of determining fuel quantity.

7.16.8 Engine Advisories

Engine advisories can be configured by the pilot from the Menu → [EIS] Main Opts to provide supplemental advisory notifications when a pilot-configured threshold has been exceeded. These thresholds are determined solely by the pilot and do not affect the EIS Page presentation, EIS operating ranges, or gauge alerting thresholds.

The following parameters may be configured by the pilot to provide advisories: High CHT, Low Oil TEMP, High Oil TEMP, CHT Cooling Rate, EGT DIFF, Low Endurance, Low EST Fuel Remaining, Low Bus Voltage, High Bus Voltage, Low Voltage, High Battery Voltage, and High TIT.

7.16.9 Engine and Airframe Timers

The Timers can be accessed from the Summary page.

Timer Label	Timer Function
FLIGHT	Flight timer increments in tenths of an hour whenever the aircraft is in an airborne state. This can be triggered via a weight on wheels switch, GPS ground speed, airspeed, or engine RPM depending on the aircraft installation.
HOBBS	Similar to an analog HOBBS meter that increments in tenths of an hour whenever one engine is registering >5 PSI of engine oil pressure
TACH	Similar to analog tachometers such that the timer increments in tenths of an hour based on the current engine RPM compared to the cruise power setting for that engine as determined by the installer.

On multi-engine aircraft, the TACH hour meter for each engine will start incrementing when the respective engine is running, and those TACH timers are tracked separately from one another. The HOBBS hour meter will start incrementing when either engine is running, and the HOBBS timer is synchronized for both engines.

7.17 Wireless Functions

The GI 275 has a wireless transceiver to provide data to personal electronic devices (PEDs) and includes a Bluetooth and Wi-Fi transceiver.

Data such as traffic, datalink weather, entertainment audio information, and attitude information is sent from the GI 275 to the PED. Limitations regarding database operations are found in Section 2.13.

Garmin provides a list of tested and compatible devices that can be used with the Connex platform. Connection to the GI 275 may be possible with devices other than those on the supported device list, but Bluetooth® and/or Wi-Fi stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with the Flight Stream product line, please visit: http://garmin.com/connex/supported_devices

7.18 Transponder Control

The GI 275 can be interfaced to a Garmin GTX 345 series transponder for the control and display of the transponder squawk code, mode of operation, and additional transponder functions.

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi
GPS/SBAS Navigation System
as installed in

Make and Model Airplane

Registration Number: _____ Serial Number: _____

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA02019SE-D for the installation and operation of the Garmin GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi GPS/SBAS Navigation System. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the information in the FAA Approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA Approved Airplane Flight Manual, markings, or placards. FAA approved sections of the AFMS are labeled "FAA APPROVED". Sections not labeled "FAA APPROVED" are for guidance only.

FAA Approved by: Erik Frisk

Erik Frisk
ODA STC Unit Administrator
Garmin International Inc.
ODA-240087-CE

Date: 19-APR-2024

LOG OF REVISIONS

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
1	01/03/2020	All	Complete Supplement	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
2	02/19/2020	1 6	Section 1.1 - Fixed Typographical Error Section 1.2 - Fixed Typographical Error	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
3	12/11/2020	All 6 11 12 13 17	Replaced references to AC 90-105 with AC 90- 105A Replaced References to FAA Order 8400.12A and 8400.33 with AC 90-105A Replaced References to AC 90-100A with AC 90-100A CHG 2 Section 1.3 - Updated reference to AC 120-76D Section 2.4 - Replaced references to Garmin WFDE Program with Garmin RAIM Prediction tool. Section 2.5 - Updated software versions Section 2.6 - Removed note Section 2.9 - Removed VOR from list of approaches not approved with GPS guidance	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
		19	Section 2.21 • Changed wording for clarity	
			Section 2.31 • Clarified use of OBS mode	
		31	Added Section 2.33: Glide Range Ring and Best Glide Airport Indicator	
		33	Removed Section 4.8: Database Conflict Resolution	
		48	Section 7.1 • Updated Pilot's Guide revision • Removed sentence to improve clarity	
			Added Section 7.32: Screenshots	
			Added Section 7.33: Knob Control	
			Added Section 7.34: Cross Side Radio Control	
		49	Added Section 7.35: Glide Range Ring and Best Glide Airport Indicator	
			Added Section 7.36: Emergency page	
			Added Section 7.37: Remote Database Confirmation	
4	07/23/2021	4	Section 1.2: Added Smart Glide	Charles S. Roberts For Manager NW Flight Test Section AIR-715, FAA Seattle, WA
		12	Section 2.5: Updated Software versions	

LOG OF REVISIONS

Revision Number	Page		Description	FAA Approved
	Date	Number		
		19	Replaced Section 2.33 Glide Range Ring and Best Glide Airport Indicator with Section 2.33 Smart Glide	
		21	Section 3: Added Section Table of Contents	
		23	Added Section 3.1.2: Loss of Engine Power or Engine Failure in Flight	
		28	Added Section 3.1.3: Smart Glide “Maneuver and Land / Disconnect Autopilot”	
		31	Added Section 3.2.16: Smart Glide Failure	
		31	Added Section 3.2.17: Smart Glide Inadvertent Activation	
		38	Section 4: Added Section Table of Contents	
		43	Section 7.1: Updated Pilot’s Guide Revision	
		48	Section 7.11: Added Smart Glide Switch	
		49	Removed previously numbered Section 7.35: Glide Range Ring and Best Glide Airport Indicator	
		52	Removed previously numbered Section 7.37: Remote Database Confirmation	

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
		53	Section 7.28: Updated VNAV wording for clarification	
		54	Renumbered Section 7.36 to 7.35: Emergency Page	
		63	Added Section 7.36: Smart Glide	
			Added Section 7.37: Single Point Database Acknowledgement	
5	12/28/2021	6	Section 1.2: Updated Document Reference	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
		12	Section 2.5: Updated GTN Xi software versions and instructions to find software version	
		54-63	Section 7.36: Added information about G5 and G3X to smart glide section. Additional corrections and clarifications were made throughout.	

LOG OF REVISIONS

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
6	01/25/2023	Section 1	Updated images and layout. New systems capabilities and descriptions. Reorganized. New installer checkboxes for the aircraft. New applicable software versions.	JR Brownell ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
		Section 2	Updated software versions, new limitations, removed systems descriptions, reorganized. RNP limitation update.	
		Section 3	Updated procedures, reorganized.	
		Section 4	Updated procedures, reorganized.	
		Section 7	New systems descriptions, reorganized. GDL 60 systems description.	
		ALL	Added “FAA APPROVED” or “NOT FAA APPROVED” to footers for all pages.	
7	04/05/2023	3	Moved Minimum Software Version Table from Section 2.4 to Section 1.2.	JR Brownell ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
		24	Rewrote Section 3.1.2 GTN Xi Smart Glide procedure for clarity. Combined Section 3.1.3 into Section 3.1.2.	
		Various	Section paragraphs and Table of Contents updated per the above changes.	

LOG OF REVISIONS				
Revision Number	Page		Description	FAA Approved
	Date	Number		
8	04/19/2024	1	Added TSO-C151d Class A TAWS to Table 1-1	See page i
		3	Updated software versions in Table 1-2	
		18	Added installer checkboxes for TAWS-A configurations	
		21	Added TAWS-A limitations	
		22	Added limitation for entry of procedures and altitude entry	
		24	Added note for TAWS operation in cold weather	
		28, 29, 32-35	Added GPWS and TAWS-A procedures and information	
		40	Added TAWS-A Flap and Glide slope inhibit procedures	
		47-51	Added TAWS-A and TAWS-B information and alerts	
		55	Added GWX 8000 description	
		76	Added Core Procedure selection description	

This Page Intentionally Blank

Table of Contents

SECTION	PAGE
SECTION 1. GENERAL.....	1
1.1 GARMIN GTN Xi NAVIGATORS	1
1.2 APPLICABLE SYSTEM SOFTWARE.....	3
1.3 SYSTEM CAPABILITIES	3
1.4 ELECTRONIC FLIGHT BAG	14
1.5 ELECTRONIC CHECKLISTS	14
1.6 DEFINITIONS	15
1.7 INSTALLATION DESCRIPTION	16
SECTION 2. LIMITATIONS.....	19
2.1 KINDS OF OPERATION	19
2.2 MINIMUM EQUIPMENT	19
2.3 SYSTEM USE	19
2.4 NAVIGATION DATABASE.....	19
2.5 GROUND OPERATIONS	19
2.6 RNAV PROCEDURES.....	20
2.7 QFE BAROMETRIC SETTING.....	21
2.8 TERRAIN ALERTING FUNCTION (ALL UNITS)	21
2.9 TAWS FUNCTION (OPTIONAL)	21
2.10 POLAR OPERATIONS.....	21
2.11 DATALINK WEATHER DISPLAY (OPTIONAL)	21
2.12 TRAFFIC DISPLAY (OPTIONAL)	22
2.13 DEMO MODE.....	22
2.14 WIRE OBSTACLE DATABASE.....	22
2.15 DATABASE UPDATES.....	22
2.16 OBS MODE	22
2.17 ADVISORY VISUAL APPROACHES.....	22
2.18 SMART GLIDE	22
2.19 PROCEDURE ROUTES AND ALTITUDES	22
SECTION 3. EMERGENCY PROCEDURES.....	23
3.1 EMERGENCY PROCEDURES.....	23
3.2 ABNORMAL PROCEDURES	26
3.3 WARNING MESSAGES	32
3.4 CAUTION MESSAGES.....	33
3.5 FAILURE MESSAGES.....	35
SECTION 4. NORMAL PROCEDURES.....	36
4.1 UNIT POWER ON	37
4.2 BEFORE TAKEOFF	37
4.3 HSI AND EHSI OPERATION.....	38
4.4 AUTOPILOT OPERATION.....	38
4.5 COUPLING THE AUTOPILOT DURING APPROACHES	39
4.6 COUPLING THE AUTOPILOT FOR DESCENT VNAV	39
4.7 COUPLING THE AUTOPILOT DURING SEARCH AND RESCUE OPERATIONS	39

4.8	COLD WEATHER COMPENSATION.....	40
4.9	TAWS-A FLAP INHIBIT	40
4.10	TAWS-A GLIDESLOPE INHIBIT	40
SECTION 5. PERFORMANCE		41
SECTION 6. WEIGHT AND BALANCE.....		42
SECTION 7. SYSTEM DESCRIPTIONS		43
7.1	PILOT'S GUIDE	43
7.2	NAVIGATION	43
7.3	TERRAIN PROXIMITY, TERRAIN ALERTING, AND TAWS	46
7.4	GMA 35/35C AUDIO PANEL (OPTIONAL).....	51
7.5	STORMSCOPE® (OPTIONAL)	52
7.6	EXTERNAL SWITCHES.....	52
7.7	AIRSPACE DEPICTION AND ALERTS	53
7.8	GARMIN ADS-B TRAFFIC SYSTEM INTERFACE (OPTIONAL)	53
7.9	GWX 70/75 WEATHER RADAR (OPTIONAL)	54
7.10	GWX 8000 WEATHER RADAR (OPTIONAL)	55
7.11	CHARTS (OPTIONAL)	55
7.12	TRANSPONDER CONTROL (OPTIONAL)	55
7.13	TELEPHONE AUDIO (OPTIONAL).....	55
7.14	TERRAIN, WIRES, AND OBSTACLES	55
7.15	MAP PAGE.....	58
7.16	TIMES AND DISTANCES	58
7.17	GTN Xi-GTN (Xi) CROSSFILL	59
7.18	AUTOMATIC SPEECH RECOGNITION (ASR)	60
7.19	EUROPEAN VISUAL REPORTING POINTS	61
7.20	SCREENSHOTS	61
7.21	KNOB PAGE NAVIGATION	61
7.22	REMOTE RADIO CONTROL (OPTIONAL).....	61
7.23	EMERGENCY PAGE (OPTIONAL)	62
7.24	SMART GLIDE (OPTIONAL).....	62
7.25	AUTOPILOT COUPLING	70
7.26	STORMSCOPE® DISPLAY (OPTIONAL).....	71
7.27	FLIGHT PLANNER/CALCULATOR FUNCTIONS	71
7.28	FUEL RANGE RINGS	71
7.29	GLOVE USE / COVERED FINGERS.....	71
7.30	ACTIVE WEATHER RADAR	72
7.31	TELEPHONE AUDIO.....	72
7.32	MULTI CREW AIRCRAFT (GMA 35 ONLY).....	72
7.33	AUTOMATIC SPEECH RECOGNITION	72
7.34	CONNEXT DATA (OPTIONAL)	73
7.35	SYSTEM DATABASES.....	73
7.36	CORE PROCEDURE SELECTION	76

Section 1. General

1.1 Garmin GTN Xi Navigators

The Garmin GTN Xi navigation system is a GPS system with a Satellite Based Augmentation System (SBAS), comprised of one or more Garmin TSO-C146e GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi navigator(s) and one or more Garmin approved GPS/SBAS antenna(s). The GTN navigation system is installed in accordance with AC 20-138D.

	GTN 625Xi	GTN 635Xi	GTN 650Xi	GTN 725Xi	GTN 750Xi
GPS SBAS Navigation:					
• Oceanic, enroute, terminal, and non-precision approach guidance	X	X	X	X	X
• Precision approach guidance (LP, LPV)					
VHF Com Radio, 118.00 to 136.990, MHz, 8.33 or 25 kHz increments		X	X		X
VHF Nav Radio, 108.00 to 117.95 MHz, 50 kHz increments			X		X
LOC and Glideslope non-precision and precision approach guidance for Cat 1 minimums, 328.6 to 335.4 MHz tuning range			X		X
Moving map including topographic, terrain, aviation, and geopolitical data	X	X	X	X	X
Display of datalink weather products, SiriusXM, FIS-B, Connex (all optional)	X	X	X	X	X
Control and display of airborne weather radar (optional)				X	X
Display of terminal procedures data (optional)				X	X
Display of traffic data, including ADS-B (optional)	X	X	X	X	X
Display of StormScope® data (optional)	X	X	X	X	X
Display of marker beacon annunciators (optional)	X*	X*	X*	X	X
Remote audio panel control (optional)				X	X
Remote transponder control (optional)	X	X	X	X	X
Remote audio entertainment datalink control (optional)	X	X	X	X	X
TSO-C151dClass B TAWS (optional)	X	X	X	X	X
TSO-C151dClass A TAWS (optional)	X	X	X	X	X
Supplemental calculators and timers	X	X	X	X	X
Control of GSR 56 Iridium Satellite Phone and SMS Text	X	X	X	X	X
Control of Flight Stream 210 (optional)	X	X	X	X	X
Control of Flight Stream 510 (optional)	X	X	X	X	X

* Display of marker beacon annunciations on the GTN 6XX is only possible when installed with a Garmin GMA 350 audio panel.

Table 1-1 – GTN Functions

The GPS navigation functions, and optional VHF communication and navigation radio functions are operated by dedicated hard keys, a dual concentric rotary knob, or the touchscreen.

Although intuitive and user friendly, the GTN Xi requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid procedures in VMC. Pilot workload will be higher for pilots with limited familiarity in using the unit in an IFR environment, particularly without the autopilot engaged. Garmin provides a detailed Pilot's Guide, and a tablet trainer app. Pilots should take full advantage of these tools to enhance their familiarity with the system.

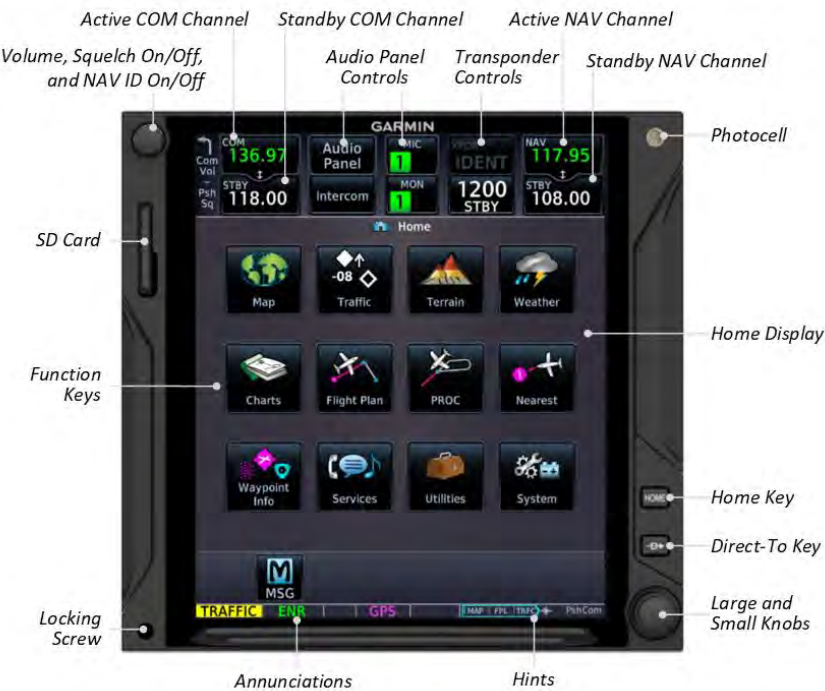


Figure 1 - GTN 750Xi Control and Display Layout



Figure 2 - GTN 635Xi/650Xi Control and Display Layout

1.2 Applicable System Software

All software versions displayed can be viewed on the System – System Status or Connex Setup pages. The following or later software versions must be installed for this AFMS revision to be applicable to the installation.

Software Item	Software Version
Main SW Version	20.41
GPS SW Version	8.6
Com SW Version	2.11
Nav SW Version	2.04
Flight Stream 210	2.90
Flight Stream 510	2.8X
GDL 60	2.30

Table 1-2 - Software Versions

1.3 System Capabilities

This Flight Manual Supplement documents the installed capabilities of the GTN Xi specific to the aircraft for which this manual is created.

The GTN Xi system and associated navigation interface in this aircraft may have the following capabilities, in addition to the core multifunction display capability:

- VHF Communication Radio
- Primary VHF Navigation
- Primary GPS Navigation (Enroute) and Approach Capability (LP/LNAV) – See below
- Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV) – See below
- TSO-C151d Terrain Awareness and Warning System – See section 2.9
- Enroute Baro-VNAV
- Smart Glide

GPS/SBAS TSO-C146e Class 3 Operation

The GTN Xi navigator installed in this aircraft is a TSO-C146e Class 3 approved GPS navigator that complies with AC 20-138D and has airworthiness approval for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR enroute, terminal area, and non-precision approach operations (including those approaches titled “GPS”, “or GPS”, and “RNAV (GPS)” approaches). The Garmin GNSS navigation system is composed of the GTN Xi navigator and antenna and is approved for approach procedures with vertical guidance including “LPV” and “LNAV/VNAV” and without vertical guidance including “LP” and “LNAV”.

The Garmin GTN Xi system as installed in this airplane complies with the equipment, performance, and functional requirements to conduct RNAV operations in accordance with the following table. This table is accurate at the time it was published. However, changes to operational rules, FAA advisory circulars, flight plan formats, etc., are possible. The pilot is responsible to ensure compliance with current operational requirements.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 10 RNP 10 Oceanic and Remote Areas of Operation (Class II Navigation)	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 34 minutes. ¹ Two GNSS systems required to be operational, (one GNSS system for those routes requiring only one long range navigation system). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A, FAA AC 91-70B, EASA AMC 20-12	R	A1	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. When installed with a second GNSS system, the GTN Xi equipment complies with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace, when used in conjunction with an FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision). ¹ Additional equipment may be required to obtain operational approval to utilize RNP-10 performance.
B-RNAV / RNAV 5 (Europe)	This does not constitute an operational approval.	FAA AC 90-96A CHG 1, EASA AMC 20-4A	R	B2	
RNP 4 Oceanic and Remote Areas of Operation (Class II)	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 25 minutes. ¹	FAA AC 20-138D CHG 2, FAA AC 90-105A, FAA AC 91-70B	R	L1	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. Additional equipment may be required to obtain

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Navigation)	Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.				operational approval to utilize RNP-4 performance.
RNAV 2	The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A. In accordance with AC 90-100A, CHG 2, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2	R	C2	Includes RNAV Q and T routes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 1	The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A. In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2	R	D2	Includes RNAV terminal departure, arrival procedures, and approach procedures up to the Final Approach Fix.
P-RNAV (Europe)	This does not constitute an operational approval.	FAA AC 90-96A CHG 1, JAA TGL 10 Rev 1	R	D2	ICAO flight plan code for P-RNAV no longer exists. P-RNAV utilizes RNAV 1 flight plan codes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 0.3	Includes RNP terminal departure and arrival procedures. When flying a RNP procedure with a radius-to fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures with RF legs. In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 90-105A	R	TBD	Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix. AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot. Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 1	When flying a RNP procedure containing an RF leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing radius-to-fix (RF) legs. In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A	R	O2	Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix. AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP-2 (Oceanic / Remote)	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 5 minutes.¹ Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor). No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.	FAA AC 20-138D CHG2, FAA AC 90-105A FAA AC 91-70B	R	TBD	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace. Additional equipment may be required to obtain operational approval to utilize RNP-2 performance. Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.
RNP-2 (Domestic / Offshore En route)	In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP-2 domestic and offshore routes. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A FAA AC 91-70B	R	TBD	Includes RNP-2 domestic and offshore routes. Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV minima	When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs. In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A, EASA AMC 20-27A	R	S1	Includes non-precision approaches based on conventional navigation aids with “or GPS” in the title and area navigation approaches titled “GPS”, “RNAV-(GPS)”, and “RNAV (GNSS)”. This includes procedures with radius-to-fix (RF) legs. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV/VN AV minima	When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs. In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV/VNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A, EASA AMC 20-27A with CM-AS-002	R	S2	Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS).” This includes procedures with radius-to-fix (RF) legs. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.
RNP APCH LP minima	When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs In accordance with AC 90-107, Part 91 operators (except subpart K),	FAA AC 20-138D CHG 2, FAA AC 90-107	N/A	N/A	Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS)” including procedures with radius-to-fix (RF) legs. LP minima are available only when within SBAS coverage. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
	following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LP minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.				Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.
RNP APCH LPV minima	When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs. In accordance with AC 90-107, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LPV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-107, EASA AMC 20-28	B	N/A	Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS)”, including procedures with radius-to-fix (RF) legs. LPV minima are available only when within SBAS coverage. Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Advanced RNP See Notes for specific Advanced RNP functions.	This does not constitute an operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A	N/A	N/A	• <u>RNAV Holding:</u> Supported. • <u>RF Legs:</u> Supported. • <u>Parallel Offsets:</u> <u>RNP-4 parallel offsets as defined by AC 20-138D Chapter 10 are supported.</u> • <u>Advanced RNP parallel offsets as defined by AC20-138D Appendix 3 are supported.</u> • <u>Higher Continuity:</u> <u>Supported only when a second GNSS system is installed and operating.</u> • <u>Scalable RNP:</u> <u>Not supported.</u> • <u>Fixed Radius Transitions (FRT):</u> <u>Not Supported</u> • <u>Time of Arrival Control (TOAC):</u> <u>Not supported.</u>

FDE/RAIM availability worldwide can be determined via the following:

- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision), such as the Garmin RAIM/FDE Prediction program (<https://fly.garmin.com/fly-garmin/support/raim/>)

Also, within the United States:

- Via the FAA's RAIM Service Availability Prediction Tool (SAPT) website: <http://sapt.faa.gov>.
- Contacting a Flight Service Station (not DUATS) to obtain non-precision approach RAIM.

Within Europe,

- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision)
- Europe's AUGER GPS RAIM Prediction Tool at <http://augur.ecacnav.com/augur/app/home>.

This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153A for database integrity, quality, and database management practices for the Navigation database. Flight crews and operators can view the LOA status at FlyGarmin.com then select "Aviation Database Declarations".

1.4 Electronic Flight Bag

The GTN 750Xi/725Xi are operationally suitable as installed equipment, Type B EFB applications in accordance with AC 120-76D when using current FliteChart or ChartView data.

Use of the Flight Stream interface and data for the purpose of Electronic Flight Bag applications is not approved as part of this STC. Additional approval may be required to obtain operational approval for use of the Flight Stream and supplied data to supplement EFB systems.

1.5 Electronic Checklists

The GTN Xi checklist functions are designed to DO-178B software design assurance level B and support a minor failure classification. While this STC does not grant operational approval for operators requiring such approval, there are no limitations precluding operators from obtaining their own operational approval for the checklist function.

1.6 Definitions

The following terminology is used within this document:

ADF	Automatic Direction Finder	LPV	Localizer Performance with Vertical Guidance
ADS-B	Automatic Dependent Surveillance Broadcast	LP +V	Localizer Performance with Advisory Vertical Guidance
AEG	Aircraft Evaluation Group (FAA)	MLS	Microwave Landing System
APR	Approach	MMC	Multi-Media Card
ASR	Automated Speech Recognition	NOTAM	Notice to Air Missions
ATK	<u>Along TracK</u>	OBS	Omni Bearing Selector
CDI	Course Deviation Indicator	PED	Portable Electronic Device
DME	Distance Measuring Equipment	PTC	Push-To-Command
ECAC	European Civil Aviation Conference	RAIM	Receiver Autonomous Integrity Monitoring
EFB	Electronic Flight Bag	RF Leg	Radius-To-Fix Leg of a Charted Instrument Procedure
EGNOS	European Geostationary Navigation Overlay Service	RFL	Reverse Frequency Lookup
EHSI	Electronic Horizontal Situation Indicator	RMT	Remote
FPA	Flight Path Angle	RNAV	Area Navigation
FIS-B	Flight Information Services Broadcast	RNP	Required Navigational Performance
GAGAN	GPS Aided GEO Augmented Navigation	SAR	Search and Rescue
GDU	Garmin Display Unit	SBAS	Satellite Based Augmentation System
GMA	Garmin Multimedia Audio	SD	Secure Digital
GNSS	Global Navigation Satellite System	SDF	Simplified Directional Facility
GPA	Glidepath Angle	SUSP	Suspend
GPS	Global Positioning System	TACAN	Tactical Air Navigation System
GPSS	GPS Roll Steering	TAS	Traffic Awareness System
GTN	Garmin Touchscreen Navigator	TAWS	Terrain Awareness and Warning System
HOT	Hazardous Obstacle Transmission wires	TCAS	Traffic Collision Avoidance System
HSI	Horizontal Situation Indicator	TCH	Threshold Crossing Height
IAP	Instrument Approach Procedure	TFR	Temporary Flight Restriction
IFR	Instrument Flight Rules	TIS	Traffic Information Service
ILS	Instrument Landing System	VHF	Very High Frequency
IMC	Instrument Meteorological Conditions	VFR	Visual Flight Rules
LDA	Localizer Directional Aid	VGSI	Visual Glide-Slope Indicator
LNAV	Lateral Navigation	VLOC	VOR/Localizer
LNAV +V	LNAV with advisory Vertical Guidance	VMC	Visual Meteorological Conditions
L/VNAV	Lateral/Vertical Navigation	VNAV	Vertical Navigation
LOC	Localizer	VOR	VHF Omnidirectional Range
LOC-BC	Localizer Backcourse	VRP	Visual Reporting Point
LP	Localizer Performance	WAAS	Wide Area Augmentation System
		WFDE	WAAS Fault Data Exclusion
		XFR	Transfer

1.7 Installation Description

The following describes the GTN installation and configuration for this aircraft. Reference this section when using the Normal or Emergency Procedures in Sections 3 and 4. A function or installed feature is applicable to this aircraft only when the corresponding box is checked.

The major components are protected with resettable circuit breakers available to the pilot. The breakers installed in the aircraft are checked below.

	Description	Derivative	Circuit Breaker Label(s)
☐	GTN #1	☐ 750 (GPS/COM/NAV) ☐ 735 (GPS/COM) ☐ 725 (GPS Only) ☐ 650 (GPS/COM/NAV) ☐ 635 (GPS/COM) ☐ 625 (GPS Only)	☐ GPS 1 ☐ NAV/GPS 1 ☐ COM ☐ COM 1
☐	GTN #2	☐ 750 (GPS/COM/NAV) ☐ 735 (GPS/COM) ☐ 725 (GPS Only) ☐ 650 (GPS/COM/NAV) ☐ 635 (GPS/COM) ☐ 625 (GPS Only)	☐ GPS 2 ☐ NAV/GPS 2 ☐ COM ☐ COM 2
☐	Integrated Audio Panel	GMA 35	AUDIO
☐	Streaming Device	Flight Stream 210	BT LINK
☐	Wireless Access	GDL 60	CNXT CNXT BATT

1.7.1 Installed Controllers and Annunciators

	Description
☐	Remote TAWS Annunciator
☐	Remote GPS Annunciator

1.7.2 Interfaces and Connections

The following describes the functionality present in the aircraft based on the external interfaces to the GTN Xi.

1.7.2.1 Heading

- ☐ This installation *has* a heading source. The GTN Xi will provide roll steering on heading legs for the autopilot.
- ☐ This installation *does not have* a heading source. The crew cannot use the GTN Xi roll steering to fly heading legs with the autopilot.

1.7.2.2 Altitude

- ☐ This installation *has* a barometric corrected altitude source. The GTN Xi will automatically sequence altitude legs.
- ☐ This installation *does not have* a barometric corrected altitude source. The flight crew will be prompted to manually sequence altitude legs.

1.7.2.3 Autopilot

- ☐ This installation prompts the flight crew and requires the pilot to enable the approach outputs just prior to engaging the autopilot in APR mode.
- ☐ This installation supports coupling to the autopilot in approach mode once vertical guidance is available.
- ☐ The installation *does not* support any vertical capture or vertical tracking.
- ☐ This installation is equipped and configured to provide VNAV display and autopilot coupling.
- ☐ This installation is equipped and configured to provide VNAV *display only*.
- ☐ This installation *does not* support VNAV display or coupling.
- ☐ This installation is configured with VNAV Transition to Approach.

1.7.2.4 Traffic Systems

- ☐ No traffic system is interfaced to the GTN Xi.
- ☐ A TAS/TCAS I traffic system is interfaced to the GTN Xi.
- ☐ A TIS traffic system is interfaced to the GTN Xi.
- ☐ A TCAD traffic system is interfaced to the GTN Xi.
- ☐ A Garmin ADS-B traffic system is interfaced to the GTN Xi.
- ☐ A Garmin ADS-B traffic system is interfaced to the GTN Xi. The ADS-B traffic system is also interfaced to an on-board traffic system.

1.7.3 **Navigation Capabilities**

- ☐ This installation is equipped to support autopilot coupled RF leg navigation up to RNP 1.0.
- ☐ This installation is equipped to support hand-flown RF leg navigation at RNP 1.0.
- ☐ This installation is equipped to support autopilot coupled RF leg navigation at RNP 0.3 and has received required installer approval for such procedures.
- ☐ This installation *does not* support RF leg navigation.

1.7.4 Cold Weather Compensation

- ☐ This installation supports cold weather compensated intermediate approach and minimums altitudes.
- ☐ This installation supports cold weather compensated *intermediate approach altitudes and missed approach altitudes only*.
- ☐ This installation does not support cold weather compensation.

1.7.5 Terrain Awareness

- ☐ This installation supports *Terrain Proximity*. No aural or visual alerts for terrain or obstacles are provided. Terrain Proximity *does not* satisfy the TAWS requirement of 91.223.
- ☐ This installation supports *Terrain Alerting*. Aural and visual alerts are provided. Terrain Alerting *does not* satisfy the TAWS requirement of 91.223.
- ☐ This installation supports *TAWS B*. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.
- ☐ This installation supports TAWS A on GTN 1. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.
- ☐ This installation supports TAWS A on GTN 1 *and* GTN 2. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.

1.7.6 Go-Around Functionality

- ☐ This installation *will* autoswitch from VLOC to GPS when the “Activate GPS Missed Approach” button is pressed.
- ☐ This installation *will not* autoswitch from VLOC to GPS when the “Activate GPS Missed Approach” button is pressed.

1.7.7 Smart Glide Configuration

- ☐ Smart Glide is configured in this installation with the following parameters:

MAX Desired Gust Speed _____ KT

Desired Effective Runway Length _____ ft

Supported Runway Surface Type:

- ☐ HARD
- ☐ HARD & SOFT
- ☐ AMPHIBIOUS (ANY)
- ☐ WATER ONLY

- ☐ Smart Glide is not configured in this installation

Section 2. LIMITATIONS

2.1 Kinds of Operation

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations.

2.2 Minimum Equipment

The GTN Xi must have the following system interfaces fully functional to be used for primary navigation during IFR operations:

Interfaced Equipment	Number installed	Number Required for IFR
External HSI/CDI/EHSI	1 or more	1
External GPS Annunciator	See Note 1	1

Table 2-1 – Required Equipment

Note 1: Certain installations require an external GPS annunciator panel. If installed, this annunciator must be fully functional to use the GTN Xi GPS navigation for IFR operations.

Single engine piston aircraft under 6,000 lbs. maximum takeoff weight:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator

All other aircraft:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator plus a second source of GPS navigation or a separate source of VHF navigation. The separate source of VHF navigation must not be the primary GTN Xi, but it may be a secondary GTN.

Operation in remote or oceanic operation requires two sources of GPS navigation.

2.3 System Use

The moving map and CDI depiction on the GTN Xi display must not be used for primary course guidance.

2.4 Navigation Database

GPS/SBAS based IFR operations are prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

2.5 Ground Operations

Using SafeTaxi, FliteCharts, and ChartView functions as the sole basis for ground maneuvering is prohibited.

2.6 RNAV Procedures

Instrument flight procedures must be loaded from the GTN Xi navigation database.

When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to **True**.

When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions. Pilots are prohibited from flying any approach path that contains manually entered waypoints.

IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GTN Xi and/or the CDI.

2.6.1 RF Legs

The following limitations apply to RNP 1 procedures with RF legs:

- Aircraft is limited to 180 KIAS while on the RF leg
- Hand-flown RF legs are limited to RNP 1 procedures. RNP AR is not approved
- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- GTN Xi Moving Map, EHSI Map, or Distance to Next Waypoint information must be displayed to the pilot during the RF leg when flying without the aid of the autopilot or flight director.
- The active waypoint must be displayed in the pilot's primary field of view.

The following limitations apply to RNP 0.3 procedures with RF legs:

- Two RF leg RNP 0.3 capable navigators are required and must be crossfilled
- Two installed ADAHRS (or ADC/AHRS combination) sources are required
- The aircraft must have a Garmin GFC 500 or GFC 600 autopilot installed and in use during RNP 0.3 operations
- CDI scaling must be manually set to 0.3NM during RNP 0.3 operations
- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- RNP 0.3 is only approved on RF legs prior to the FAF
- Operational approval is limited to FAA AC 90-105 A-RNP NavSpec only. RNP-AR not allowed.
- Installation must be approved for coupled RF capability by installer
- The operator must obtain the necessary LOA or OpSpec approval from the appropriate regulatory agency

2.7 QFE Barometric Setting

When flying procedures requiring the use of QFE barometric settings, the pilot must ensure that the barometric setting for the source interfaced with the GTN Xi is set to QFE as appropriate. GTN Xi does not support barometric VNAV for QFE operations.

2.8 Terrain Alerting Function (All Units)

Maneuvers and navigation must not be based solely on the display of terrain, obstacles, or wires on the moving map terrain displays.

2.9 TAWS Function (Optional)

For TAWS-A operations, one of the following documents must be immediately available to the flight crew during all phases of flight:

- For installations in the Textron Aviation (Cessna) Model 525A with the Garmin G600 TXi PFD installed under Garmin STC #SA02571SE, Garmin CE525A Cockpit Reference Guide, P/N 190-01717-BF, revision 1 (or later revision).
- For all other installations, Garmin GTN 6XX Xi/7XX Xi TAWS-A Cockpit Reference Guide, P/N 190-01007-C5, revision 1 (or later revision).

Flight crews are authorized to deviate from their current ATC clearance to the extent necessary to comply with TAWS warnings. Navigation must not be predicated upon the use of TAWS.

TAWS must be inhibited when landing at an airport that is not included in the airport database or is not designated as a User Airport in the GTN Xi.

If an external TAWS annunciator panel is installed in the aircraft, this annunciator panel must be fully functional to use the TAWS system.

The use of the terrain awareness warning and terrain display functions is prohibited during QFE (atmospheric pressure at airport elevation) operations.

Terrain, and Obstacle databases must be current for TAWS-B functionality. Terrain, Obstacle, and Navigation databases must be current for TAWS-A functionality.

2.10 Polar Operations

Use of the GTN Xi for primary navigation or TAWS-A functionality for latitudes above 89.00° N and below 89.00° S is prohibited.

2.11 Datalink Weather Display (Optional)

Use of datalink weather information as the sole means for maneuvering in, near, or around areas of hazardous weather is prohibited. Use of datalink services as

the primary means to provide Temporary Flight Restriction (TFR) or Notice to Air Missions (NOTAM) information is prohibited.

2.12 Traffic Display (Optional)

Use of traffic display as the sole basis for maneuvering to avoid traffic is prohibited.

2.13 Demo Mode

Demo mode is prohibited in flight.

2.14 Wire Obstacle Database

Use of the “Obstacle/Wire” database is prohibited.

2.15 Database Updates

In-flight database transfers or updates are prohibited.

2.16 OBS Mode

Use of OBS mode for flight plan segments greater than 250_{NM} is prohibited.

2.17 Advisory Visual Approaches

Use of advisory visual approaches in IMC is prohibited.

2.18 Smart Glide

Engaging Smart Glide is prohibited for One-Engine Inoperative operations in multi-engine aircraft. Smart Glide usage for multi-engine aircraft is limited to dual engine failure situations.

2.19 Procedure Routes and Altitudes

Procedures loaded into the GTN default to turbojet routes and altitudes. The crew must verify the route and altitudes when any procedure is loaded into the GTN.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1	<i>TAWS Alerting</i>	24
3.1.2	<i>LOSS OF ENGINE POWER or ENGINE FAILURE IN-FLIGHT</i>	24
3.2	ABNORMAL PROCEDURES	26
3.2.1	<i>LOSS OF GPS/SBAS NAVIGATION DATA</i>	26
3.2.2	<i>GPS APPROACH DOWNGRADE</i>	27
3.2.3	<i>LOSS OF COM RADIO TUNING FUNCTIONS</i>	27
3.2.4	<i>LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)</i>	27
3.2.5	<i>TAWS CAUTION (Terrain or Obstacle Ahead, Sink Rate, Don't Sink)</i>	28
3.2.6	<i>TAWS INHIBIT</i>	28
3.2.7	<i>GPWS INHIBIT (TAWS-A Only)</i>	28
3.2.8	<i>TER N/A, TER FAIL, TAWS N/A, TAWS FAIL, GPWS N/A, GPWS FAIL</i>	29
3.2.9	<i>DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE</i>	29
3.2.10	<i>ASR (VOICE COMMAND) SYSTEM FAILURES</i>	29
3.2.11	<i>LOSS OF GTN TOUCH CONTROL</i>	29
3.2.12	<i>DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE</i>	30
3.2.13	<i>UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS</i>	30
3.2.14	<i>IN-AIR RESTART OF GTN</i>	30
3.2.15	<i>BARO-ALT INPUT FAILURE</i>	30
3.2.16	<i>TEMPERATURE INPUT FAILURE</i>	30
3.2.17	<i>SMART GLIDE FAILURE</i>	30
3.2.18	<i>SMART GLIDE INADVERTANT ACTIVATION</i>	30
3.2.19	<i>BLANK SCREEN</i>	31
3.3	WARNING MESSAGES	32
3.4	CAUTION MESSAGES	33
3.5	FAILURE MESSAGES	35

3.1.1 **TAWS Alerting**

Red annunciator and aural “PULL UP”:

Autopilot**DISCONNECT**
Aircraft Controls **INITIATE MAXIMUM POWER CLIMB**
Airspeed **BEST ANGLE OF CLIMB SPEED**

After Warning Ceases:

Altitude **CLIMB AND MAINTAIN SAFE ALTITUDE**
Advise ATC of Altitude Deviation, if appropriate.

NOTE

Only vertical maneuvers are recommended, unless either operating in visual meteorological conditions (VMC), or the flight crew determines, based on all available information, that turning in addition to the vertical escape maneuver is the safest course of action, or both.

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

NOTE

Operations in extreme cold temperatures, for example, -30 degrees Celsius, will result in a significant reduction in terrain clearance provided by TAWS alerts.

3.1.2 **LOSS OF ENGINE POWER or ENGINE FAILURE IN-FLIGHT**

NOTE

This procedure only applies if SMART GLIDE is enabled on the GTN Xi. If it is not, refer to the aircraft POH or AFM for emergency procedures.

If the aircraft cannot maintain altitude:

Smart Glide**ACTIVATE IF DESIRED**
If smart glide is activated:
Autopilot**AS DESIRED**
Aircraft Emergency Procedures**ACCOMPLISH**

NOTE

Some autopilots may be unable to hold best glide speed. Failure to fly at best glide speed may affect glide performance.

Red annunciator and aural “Disconnect Autopilot”:

Autopilot **DISENGAGE**

NOTE

When Smart Glide alerts “Maneuver and Land, Disconnect Autopilot” the GTN will no longer provide course guidance to the glide airport.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GTN Xi will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GTN by an amber “DR” and/or “LOI”.

If the LOI annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight. If GPS position is lost, the GTN may display DR depending on flight plan and phase of flight conditions.

If the DR annunciation is displayed, the map will continue to be displayed with an amber “DR” overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods such as heading and airspeed inputs and the last known winds. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially.

If Alternate Navigation Sources (ILS, LOC, VOR, DME, ADF) Are Available:

Navigation..... USE ALTERNATE SOURCES

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation..... USE GTN Xi

NOTE

All information normally derived from GPS will become less accurate over time.

LOSS OF INTEGRITY (LOI) MODE (no DR annunciated on the GTN Xi):

Navigation..... FLY TOWARDS KNOWN VISUAL CONDITIONS

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. “NO GPS POSITION” will be annunciated in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

During a LPV, LP +V, LNAV/VNAV, or LNAV +V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GTN Xi will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation to LNAV. The approach may be continued using the LNAV only minimums. If the VISUAL approach is downgraded, the GTN Xi will remove the vertical deviation indication from the VDI but continue to annunciate VISUAL in amber.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GTN Xi will flag all CDI guidance and display a system message “ABORT APPROACH-GPS approach no longer available”. Immediately upon viewing the message, the unit will revert to Terminal navigation mode alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation must be utilized.

3.2.3 LOSS OF COM RADIO TUNING FUNCTIONS

If alternate COM is available:

Communications **USE ALTERNATE COM**

If no alternate COM is available:

COM RMT XFR key (if installed)..... **PRESS AND HOLD FOR 2 SECONDS**

NOTE

This procedure will tune the active COM radio the emergency frequency 121.5, regardless of what frequency is displayed on the GTN Xi. Certain failures of the tuning system will automatically tune 121.5 without flight crew action.

3.2.4 LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)*

Audio Panel Circuit Breaker **PULL**

NOTE

This procedure will force the audio panel into fail safe mode which provides only the pilot with communications and only on a single COM radio. If any non GTN 750Xi COM is installed, communication will be only on that radio. If only a GTN 750Xi is installed in the aircraft, then the pilot will have only the GTN 750Xi COM available. No other audio panel functions including aural alerting and the crew and passenger intercom will function.

* Includes GMA 35 and GMA 35c Audio Panels

3.2.5 TAWS CAUTION (Terrain or Obstacle Ahead, Sink Rate, Don’t Sink)

When a TAWS CAUTION occurs, take corrective action until the alert ceases. Stop descending or initiate either a climb or a turn, or both as necessary, based on analysis of all available instruments and information.

GPWS CAUTION advisories may also be generated when the airplane’s flaps and landing gear are not in the landing position at low altitudes and groundspeeds. Ensure the airplane’s landing gear and flaps are in the desired configuration.

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2.6 TAWS INHIBIT

The TAWS Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GTN Xi Series Pilot’s Guide for additional information.

To Inhibit TAWS:

- Home Hard Key **PRESS**
- Terrain Button **PRESS**
- Menu Button **PRESS**
- TAWS Inhibit Button..... **PRESS TO ACTIVATE**

CAUTION

Inhibiting TAWS function(s) outside those required by limitation in this document is discouraged.

3.2.7 GPWS INHIBIT (TAWS-A Only)

For airplanes equipped with TAWS-A, some GPWS functions may be inhibited to stop alerting if desired. Refer to GTN Xi Series Pilot’s Guide for additional information.

To Inhibit GPWS:

- Home Hard Key **PRESS**
- Terrain Button **PRESS**
- Menu Button **PRESS**
- GPWS Inhibit Button..... **PRESS TO ACTIVATE**

CAUTION

Inhibiting GPWS function(s) outside those required by limitation in this document is discouraged.

NOTE

The GPWS INHIBIT feature will not inhibit Altitude Voice Callouts (VCO) or Glideslope Deviation (GSD) alerting.

3.2.8 TER N/A, TER FAIL, TAWS N/A, TAWS FAIL, GPWS N/A, GPWS FAIL

If the amber **TER N/A, TER FAIL, TAWS N/A, TAWS FAIL, GPWS N/A, GPWS FAIL** status annunciator is displayed, the system will no longer provide TAWS alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.9 DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

Without a heading source to the GTN Xi, the following limitations apply:

- Roll steering will not be provided to the autopilot for heading legs. The autopilot must be placed in HDG mode for heading legs.
- Map cannot be oriented to Heading Up.
- Overlaying traffic data from a TAS/TCAS I or Garmin ADS-B-IN unit interfaced to an on-board traffic system will not be displayed on the main map display. The flight crew must use the dedicated traffic page on the GTN system to display TAS/TCAS I or Garmin ADS-B-IN traffic data.
- All overlaying StormScope® data on the main map display will be removed. The flight crew must use the dedicated StormScope® page on the GTN system to display StormScope® data.
- Onboard weather radar overlay on the main map will not be displayed. The flight crew must utilize the dedicated weather radar page on the GTN system to view weather radar data from the onboard weather radar.

StormScope® must be operated in accordance with Section 7.8 when no heading is available.

3.2.10 ASR (VOICE COMMAND) SYSTEM FAILURES

In the event the ASR system fails and there is a need to disable the voice command inputs to the GTN Xi:

To Disable ASR:

Home Hardkey.....	PRESS
System Button.....	PRESS
Voice Commands Button.....	PRESS
Voice Commands Enable Button.....	TOGGLE OFF

3.2.11 LOSS OF GTN TOUCH CONTROL

In the event the GTN Xi becomes unusable due to uncommanded page changes, the ASR function may be the source.

To Disable ASR:

Audio Panel Circuit Breaker.....	PULL
----------------------------------	-------------

Home Hardkey	PRESS
System Button	PRESS
Voice Commands Button	PRESS
Voice Commands Enable Button	TOGGLE OFF
Audio Panel Circuit Breaker	PUSH

3.2.12 DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

If the GTN Xi is being used to forward pressure altitude to a transponder, the transponder will not be receiving pressure altitude from the GTN while that message is present.

3.2.13 UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS

Remove power from all equipment which is not necessary for flight, including GTN #2 (NAV/GPS 2, COM 2) and the Flight Stream 210 (BT LINK), if installed.

3.2.14 IN-AIR RESTART OF GTN

In the event of a GTN Xi restart in the air, the crew should utilize the CANCEL button if presented with the database update screen after the GTN Xi is restarted. This will ensure restoration of the navigation functions as soon as possible.

3.2.15 BARO-ALT INPUT FAILURE

Barometric altitude is required for descent VNAV functionality and automatic sequencing of altitude terminated legs. If the BARO altitude input to the GTN Xi has failed, enroute barometric VNAV will not be available. The pilot will also be required to manually sequence any altitude terminated legs.

3.2.16 TEMPERATURE INPUT FAILURE

Temperature input is required for the VNAV Transition to Approach functionality. In the event of a temperature input failure, VNAV transition to approach should be disregarded. The crew must ensure that vertical guidance from descent VNAV to approach guidance is appropriate and that if an autopilot is in use, the crew intercepts the approach vertical guidance from below.

3.2.17 SMART GLIDE FAILURE

AHRS, ADC, Terrain Database, Navigation Database, and GPS are all required for Smart Glide. If any of those systems fail, Smart Glide cannot be activated. If those systems fail when Smart Glide is active, a system message will inform the pilot, and an aural alert “SMART GLIDE FAILURE, CONSIDER ALTERNATE LANDING AREA” will be generated.

Alternate Landing Site **CONSIDER**

3.2.18 SMART GLIDE INADVERTANT ACTIVATION

If Smart Glide activates without pilot action:

Autopilot (GFC 500 or GFC 600 only)..... **DISCONNECT**
Smart Glide..... **CANCEL**
Smart Glide Activation..... **DISABLE**
*Go to the GTN Emergency Page, press the MENU button and select
DISABLE.*

If Smart Glide does not disable:
GTN #1 Circuit Breaker **PULL**
*If GTN#1 is providing audio panel control, the audio panel will revert to
reversionary functionality when the GTN power is removed.*

Once Smart Glide is disabled:
Autopilot..... **AS DESIRED**
GTN Flight Plan **ACTIVATE DESIRED LEG**
Altitude Preselector (PFD)..... **SET**

3.2.19 BLANK SCREEN

Panel Lighting Dimmer **INCREASE BRIGHTNESS**

If the installed equipment in the aircraft includes a GDL 60 Wireless
Access unit:

Screen **PRESS**
Knobs..... **ROTATE ONE CLICK EACH**

If the display returns:
CNXT and CNXT BATT circuit breakers..... **OPEN**

If the display is still blank, consider the GTN inoperative.

3.3 Warning Messages

Alert Type	Alert Annunciation	Aural Message	Pilot Action
FLTA Terrain Warning or Reduced Required Terrain Clearance (RTC) Warning or Imminent Terrain Impact (ITI) Warning	PULL UP	“Terrain Ahead, Pull Up; Terrain Ahead, Pull Up”* or “Terrain, Terrain; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
FLTA Obstacle Warning or Reduced Required Obstacle Clearance (ROC) Warning or Imminent Obstacle Impact (IOI) Caution	PULL UP	“Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up”* or “Obstacle, Obstacle; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
FLTA Wire Warning or Reduced Required Line Clearance (RLC) Warning or Imminent Line Impact (ILI) Warning	PULL UP	"Wire Ahead Pull Up; Wire Ahead Pull Up"* or “Wire, Wire; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
Excessive Descent Rate (EDR) Warning	PULL UP	“[Whoop Whoop]; Pull-Up”	Immediately arrest the descent rate.
Excessive Closure Rate (ECR) Warning	PULL UP	“[Whoop Whoop]; Pull-Up”	Immediately execute a climb at obstacle clearance speed

3.4 Caution Messages

Alert Type	Alert Annunciation	Aural Message	Pilot Action
FLTA Terrain Caution or Reduced Required Terrain Clearance (RTC) Caution or Imminent Terrain Impact (ITI) Caution	TERRAIN	“Terrain Ahead; Terrain Ahead”* or “Caution, Terrain; Caution, Terrain”	Execute a climb at obstacle clearance speed
FLTA Obstacle Caution or Reduced Required Obstacle Clearance (ROC) Caution or Imminent Obstacle Impact (IOI) Caution	OBSTCL	Obstacle Ahead; Obstacle Ahead”* or “Caution, Obstacle; Caution, Obstacle”	Execute a climb at obstacle clearance speed
FLTA Wire Caution or Reduced Required Line Clearance (RLC) Caution or Imminent Line Impact (ILI) Caution	WIRE	“Wire Ahead; Wire Ahead”* or “Caution, Wire; Caution, Wire”	Execute a climb at obstacle clearance speed
Premature Descent Alert (PDA) Caution	TERRAIN	“Too Low, Terrain”	Execute a climb at obstacle clearance speed
Excessive Descent Rate (EDR) Caution	TERRAIN	“Sink Rate”	Arrest the descent rate.
Excessive Closure Rate (ECR) Caution	TERRAIN	“Terrain-Terrain”	Execute a climb at obstacle clearance speed
Negative Climb Rate (NCR) Caution	TERRAIN	“Don’t Sink” or “Too Low Terrain”	Execute a climb at obstacle clearance speed

Alert Type	Alert Annunciation	Aural Message	Pilot Action
Flight Into Terrain (FIT) Caution	TERRAIN	“Too Low Terrain” or “Too Low – Gear” or “Too Low – Flaps”	Execute a climb at obstacle clearance speed
Glide Slope Deviation (GSD) Caution	GLIDESLOPE	“Glideslope”	Climb to re-intercept glideslope, or execute missed approach.
Traffic Alert	TRAFFIC	“Traffic”	Visually acquire the traffic to see and avoid.

** Alerts with multiple messages are configurable at installation and are installation dependent. Alerts for the default configuration are indicated with asterisks.*

NOTE

The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with a ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

3.5 Failure Messages

Failure Message	Alert Location	Cause	Pilot Action
“No GPS Position”	Displayed on all pages with a moving map	Loss of GPS position	Use other sources of navigation
Dead Reckoning	Displayed on all pages with a moving map	Loss of GPS position	Use other sources of navigation
LOI	Status Bar	Loss of GPS position	Use other sources of navigation
Red “X”	Over affected equipment interface	Loss of data from equipment	Use inoperative equipment procedures
TAWS N/A TAWS FAIL GPWS N/A GPWS FAIL TER N/A TER FAIL	Status Bar	Loss of GPS Position Or Terrain Database Error	Use vigilance, Terrain Alerts no longer provided.

Section 4. NORMAL PROCEDURES

4.1 UNIT POWER ON 37

4.2 BEFORE TAKEOFF..... 37

4.3 HSI AND EHSI OPERATION 38

4.4 AUTOPILOT OPERATION 38

4.5 COUPLING THE AUTOPILOT DURING APPROACHES..... 39

4.6 COUPLING THE AUTOPILOT FOR DESCENT VNAV 39

4.7 COUPLING THE AUTOPILOT DURING SEARCH AND RESCUE
OPERATIONS..... 39

4.8 COLD WEATHER COMPENSATION..... 40

4.9 TAWS-A FLAP INHIBIT..... 40

4.10 TAWS-A GLIDESLOPE INHIBIT 40

Refer to the GTN Xi Pilot’s Guide defined in Section 7.1 for normal operating procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, VHF communication and navigation, traffic, data linked weather, StormScope®, TAWS, and Multi-Function Display information.

The GTN Xi requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Garmin provides training tools with the Pilot’s Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

4.1 Unit Power On

Databases	REVIEW DATES AND REGIONS
Self-Test.....	VERIFY OUTPUTS TO NAV INDICATORS
Self-Test - TAWS Remote Annunciator (if installed):	
PULL UP	ILLUMINATED
TERR.....	ILLUMINATED
TERR N/A	ILLUMINATED
TERR INHB	ILLUMINATED
Self-Test - GPS Remote Annunciator (if installed):	
VLOC	ILLUMINATED
GPS.....	ILLUMINATED
LOI or INTG.....	ILLUMINATED
TERM.....	ILLUMINATED
WPT.....	ILLUMINATED
APR	ILLUMINATED
MSG	ILLUMINATED
SUSP or OBS	ILLUMINATED

4.2 Before Takeoff

System Messages and Annunciators	CONSIDERED
--	-------------------

4.3 HSI and EHSI Operation

If an HSI is used to display navigation data from the GTN Xi the pilot should rotate the course pointer as prompted on the GTN Xi.

If an EHSI is used to display navigation data from the GTN Xi the course pointer may autoslew to the correct course when using GPS navigation. When using VLOC navigation the course pointer will not autoslew and must be rotated to the correct course by the pilot. For detailed information about the functionality of the EHSI system, refer to the FAA approved Flight Manual or Flight Manual Supplement for that system.

CAUTION

The pilot must verify the active course and waypoint for each flight plan leg. The pilot must verify proper course selection each time the CDI source is changed from GPS to VLOC.

See Section 4.5 for RF leg capabilities related to EHSI.

4.4 Autopilot Operation

The GTN Xi may be coupled to an optional autopilot, if installed in the aircraft, when operating as prescribed in the LIMITATIONS section of this manual.

Autopilots coupled to the GTN Xi system in an analog (NAV) mode will follow GPS or VHF navigation guidance as they would with existing VOR receivers.

Autopilots that support GPSS or GPS Roll Steering in addition to the analog course guidance will lead course changes, fly arcing procedures, procedure turns, and holding patterns if coupled in a roll steering mode.

The GTN Xi supports autopilot roll steering for heading legs when an approved heading source is interfaced to the GTN Xi. This heading interface can also provide map orientation, traffic and StormScope heading data and wind calculations.

CAUTION

The GTN Xi does not provide course deviation to the autopilot for heading legs. Some autopilots do not allow the use of roll steering when course deviation is not provided.

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

4.5 Coupling the Autopilot during approaches

CAUTION

When the CDI source is changed on the GTN, autopilot mode may change. Confirm autopilot mode selection after CDI source change on the GTN. Refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

Analog only autopilots should use APR mode for coupling to LNAV approaches. Autopilots which support digital roll steering commands (GPSS) may utilize NAV mode and take advantage of the digital tracking during LNAV only approaches.

To couple an approach using manual APR outputs:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will issue a flashing message indication.

Flashing Message Button **PRESS**
“Enable APR Output” Button..... **PRESS**

If coupled, Autopilot will revert to ROL mode at this time.

Autopilot..... **ENGAGE APPROACH MODE**

To couple an approach using autopilot approach mode:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will enable vertical guidance.

Vertical Guidance.....**CONFIRM AVAILABLE**
Autopilot..... **ENGAGE APPROACH MODE**

4.6 Coupling the Autopilot for Descent VNAV

The GTN Xi outputs VNAV deviations to properly configured Garmin G500/600 GDU, G500/600/700TXi GDU, GI275, or G5 displays. To provide autopilot coupling to the baro VNAV guidance, the interface must also include either a Garmin GFC500 or GFC600 with VNAV capability. If VNAV is enabled on the GTN Xi in these installations, VNAV guidance may be coupled to the autopilot using the VNAV function of the GFC.

4.7 Coupling the Autopilot during Search and Rescue Operations

Search and Rescue (SAR) patterns created in the GTN Xi flight plan may include turns that cannot be accomplished with standard autopilot turn rates. Monitor autopilot performance relative to the desired path if coupled when using Search and Rescue patterns.

4.8 Cold Weather Compensation

The GTN Xi can compute altitudes for cold weather compensation for applicable IFR approaches. If the instrument approach chart requires temperature compensation, the pilot should enter the destination airport temperature into the GTN Xi. Approach altitudes provided on the map and flight plan are adjusted based on the pilot entered temperature and the altitudes on the flight plan page are appended with a snowflake icon.

Pilots must coordinate with ATC when flying temperature compensated procedures.

Pilots must manually adjust the approach minimums as applicable. The GTN Xi does not provide temperature compensated approach minimum values. Garmin G500/600/700TXi systems can provide compensated minimum values when interfaced with a GTN Xi.

4.9 TAWS-A Flap Inhibit

For TAWS-A installations and intentional landings with flaps not in landing position, the flight crew must use the GPWS flap inhibit function. Open the Terrain page menu, and select Flap Override. FLAP OVRD will be annunciated in the bottom left corner of the GTN.

4.10 TAWS-A Glideslope Inhibit

TAWS-A installations will provide glideslope warnings for ILS, LPV, or LNAV/VNAV approaches. Should it be necessary to inhibit or mute glideslope alerts, open the Terrain page menu, and select G/S Inhibit.

NOTE

The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with a ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

The Garmin GTN Xi Series Pilot's Guide, part number and revision listed below, contain additional information regarding GTN system description, control, and function.

- GTN Xi Series Pilot's Guide P/N 190-02327-03 Rev E or later

7.2 Navigation

The following section describes some of the GTN navigation functionality and provides details on the expected use and limits of the features.

7.2.1 Flight Plan Leg Sequencing

If a barometric corrected altitude source is not interfaced to the GTN Xi, a popup will appear prompting the flight crew to manually sequence the leg once the altitude prescribed in the procedure is reached.

7.2.2 Auto ILS CDI Capture

Auto ILS CDI Capture can automatically switch the CDI from GPS to VLOC before the Final Approach fix. This feature is only available on installations that meet any of the following conditions:

- Equipped with GFC 500 or 600
- GTN CDI key enabled

On these installations the auto-switching will only occur if the following conditions are met:

- ILS Autoswitch setting enabled on GTN
- ILS/LOC approach loaded and activated
- Correct nav frequency tuned on GTN NAV radio
- Aircraft established on the final approach course

Auto ILS CDI Capture will not automatically switch from GPS to VLOC for LOC-BC or VOR approaches.

7.2.3 User Defined Waypoints

When a User Defined Waypoint is created, a default name will automatically be provided, and the pilot is given the option to enter a different name for the waypoint. Pages which have the autofill function will prevent some waypoint names from being used. If it is desired to name the waypoint with a subset of the name of an existing waypoint in the database then this must be accomplished on the Waypoint Info / User Waypoints page.

Waypoints which are created when a Search and Rescue pattern is created are not considered User Waypoints and therefore functions associated with User Waypoints are not provided for these waypoints.

7.2.4 Direct-To Operations

When conducting Direct-To operations the Flight Plan tab provides a list of waypoints in the flight plan for which Direct-To is available. Some entries in the flight plan such as holds, and course reversals are not eligible for Direct-To and the pilot must instead select the associated waypoint if Direct-To operation is desired.

7.2.5 Holding Patterns

The GTN can provide holding guidance for user holds or procedure-based holds. For each hold there are two associated waypoints. If there is more than one published altitude for an approach hold, there will be three waypoints associated with the hold. The pilot can edit or activate the hold as needed for user holds. Holds on the initial, intermediate, or final approach cannot be edited except for the hold altitude constraints. Missed approach holds can be edited.

NOTE

If the aircraft position is outside of the depicted GTN hold, the system may not allow lateral NAV captures with certain autopilots. In this case, the pilot should fly the hold manually or with the HDG mode of the autopilot until they are inside the depicted holding pattern in which case normal NAV captures should be available.

NOTE

If the GTN is in the missed approach hold, the pilot can change or remove the approach procedure and the hold will remain the active navigation. If the GTN active navigation is a hold and the flight plan is deleted, the holding pattern will also be removed, removing active navigation.

7.2.6 Descent BARO VNAV

The GTN can provide multi-waypoint descent baro-VNAV guidance for the enroute and initial approach phases of flight. Altitudes associated with instrument procedures are retrieved from the navigation database when the procedure is added to the flight plan.

Altitudes in cyan on the GTN Xi are valid VNAV guidance waypoints and the GTN Xi will provide vertical guidance based on the displayed altitude constraints and default flight path angle (FPA). Altitude colored white are advisory only.

The following are recommendations for using descent VNAV:

- The pilot should verify all altitudes for procedures after loading the procedure into the flight plan.
- When the GTN Xi is installed with multiple TXi PFDs, it is highly recommended that GDU BARO SYNC be enabled and used during all VNAV operations.

In aircraft where there are multiple GDUs and two GTNs, VNAV will use the barometer setting from the pilot's side GDU for both GTNs. In the event the pilot's side GDU has failed, the GTNs will use the co-pilot's GDU barometer setting.

Descent VNAV is limited to flight path angles (FPA) between -1° and -5° , and a vertical speed required (VSR) descending at less than 4000 fpm. If a flight plan change is made during a VNAV descent, VNAV will be recalculated and could result in active VNAV path changes. If the current VNAV FPA is less than -1° , a new VNAV path may be computed during a flight plan change and result in a new Top of Descent point. This can also occur during VNAV Direct-To operations.

VNAV constraints are not allowed inside the FAF. VNAV altitudes are not saved in the flight plan catalog.

When VNAV is disabled by the pilot, it will be automatically re-enabled when the pilot initiates a lateral Direct-To to a waypoint.

7.2.7 Along Track Waypoints

The GTN Xi allows for the creation of flight plan waypoints that are based off an offset distance from a waypoint in the flight and places the new along track waypoint (ATK) in the flight plan. Once placed in the flight plan, the pilot may navigate using that waypoint in the same manner as other flight plan waypoints.

Along track waypoints cannot be created on a Vectors to Final (VTF) approach and are limited to the lateral constraints of the flight plan. This means that the pilot cannot place an ATK before the first waypoint of a flight plan or after the last waypoint of a flight plan.

ATKs are fixed once placed and will not move if the referenced waypoint is changed or removed from the flight plan. ATKs are not saved in the flight plan catalog. ATKs cannot reference another ATK in the flight plan.

7.2.8 Advisory Visual Approaches

The GTN Xi will provide advisory visual approaches to many runways in the aviation database. Lateral guidance for the visual approach is aligned with the runway bearing. Vertical guidance is provided for those runways with VGSI information for distances up to 4.0NM from the runway. If a terrain database is installed in the GTN Xi, the GTN Xi provides vertical guidance up to 28NM from the runway end unless the computed glideslope would impact terrain or obstacles from the database. If the projected impact point is under 28NM and greater than 4NM, the flight plan line for the approach is shortened to indicate where vertical guidance is active for the approach. If the terrain impact point is less than 4NM from the runway and there is no VGSI data available, vertical

guidance is not provided for that approach. Lateral guidance is still available when vertical guidance is removed.

CDI and VDI indications are equivalent to those of other GPS-based approaches (e.g.- LPV or LNAV+V). The GTN Xi annunciates “VISUAL” in the annunciator bar to indicate a visual approach is active.

When loading, or activating the approach, the GPA and TCH information for that approach will be displayed on a popup. If there is no vertical guidance available, the popup will display “(NO VERTICAL GUIDANCE)”.

All advisory visual approaches shall be conducted in VMC. Visual approaches are intended to be used as an aid to situational awareness. Visual approaches are advisory in nature and do not guarantee terrain and obstacle clearance for the approach runway.

7.3 Terrain Proximity, Terrain Alerting, and TAWS

CAUTION

Not all obstacles and wires are contained in the Obstacle/HOT Line database. The system provides depiction (and alerts if TAWS is installed) only for obstacles and wires contained in the database.

NOTE

The area of coverage may be modified as additional terrain data sources become available.

Terrain on the dedicated terrain page or main map overlay is depicted in the following manner:

- Terrain more than 1,000 feet below the aircraft is not depicted or depicted as black.
- Terrain between 1,000 feet and 100 feet below the aircraft is depicted as amber.
- Terrain within 100 feet below the aircraft, or above the aircraft, is depicted as red.

Obstacles and wires on the dedicated terrain page or main map are depicted in the following manner:

- Obstacles and wires more than 2,000 feet below the aircraft are not depicted.
- Obstacles and wires between 2,000 feet and 1,000 feet below the aircraft are depicted as white.
- Obstacles and wires between 1,000 feet and 100 feet below the aircraft are depicted as amber.
- Obstacles and wires within 100 feet below the aircraft, or above the aircraft, are depicted as red.

Multiple obstacles may be depicted using a single obstacle icon and an asterisk to indicate obstacle grouping is occurring. The color of the asterisk indicates the relative altitude of the tallest obstacle in the group. The asterisk does not indicate any information about the relative altitude or number of obstacles not being displayed in the obstacle group.

The Garmin GTN Xi Series Pilot's Guide provides additional information regarding terrain and obstacle colors and grouped obstacle icons.

In installations of more than one GTN Xi with TAWS-B or TAWS-A, TAWS should be enabled on both GTN Xi units. If both GTN Xi units are configured for TAWS-B, then failure of a single GTN results in TAWS-B still being available within the cockpit from the other GTN. If TAWS-A is configured and installed for both GTN Xi units, loss of one GTN Xi will result in TAWS-A still being available from the second GTN Xi unit. If TAWS-A is configured on both GTN Xi units, but only installed to one unit, then failure of the TAWS-A unit will result in a downgrade to TAWS-B from the second GTN Xi.

7.3.1 TAWS-A

TAWS-A can be broken down into two types of alerting categories, FLTA and GPWS alerts. The GTN Xi TAWS-A system provides the following functionality:

- a) Forward Looking Terrain Avoidance (FLTA)
 - a. Required Terrain Clearance (RTC) / Required Obstacle Clearance (ROC) / Required Line Clearance (RLC)
 - b. Imminent Terrain Impact (ITI) / Imminent Obstacle Impact (IOI) / Imminent Line Impact (ILI)
- b) Premature Descent Alert (PDA)
- c) GPWS Mode 1 – Excessive Descent Rate (EDR)
- d) GPWS Mode 2 – Excessive Closure Rate (ECR)
- e) GPWS Mode 3 – Negative Climb Rate (NCR)
- f) GPWS Mode 4 – Flight Into Terrain (FIT)
- g) GPWS Mode 5 – Glide Slope Deviation (GSD)
- h) GPWS Mode 6 – Voice Call Out (VCO)
- i) GPWS Inhibit
- j) Glideslope Inhibit
- k) Flap Override

The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with a ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

With TAWS-A, Voice Callouts are available from 500 ft down through 10 ft. Individual callouts may be turned on and off in the Terrain page menu, under Voice Callouts.

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
RTC Reduced Required Terrain Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ITI Imminent Terrain Impact (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ROC Reduced Required Obstacle Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
IOI Imminent Obstacle Impact (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
RLC Reduced Required Line Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
ILI Imminent Line Impact (FLTA Alert)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
(TAWS)	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
PDA Premature Descent Alert (TAWS)	Caution	“Too Low Terrain”
	Warning	N/A
EDR Excessive Descent Rate (GPWS Alert)	Caution	“Sink Rate”
	Warning	“[Whoop Whoop], Pull-Up”
ECR (GPWS Alert)	Caution	“Terrain-Terrain”
	Warning	“[Whoop Whoop], Pull-Up”
NCR Negative Climb Rate (GPWS Alert)	Caution	“Don’t Sink” or “Too Low Terrain”
	Warning	N/A
FIT (GPWS Alert)	Caution	“Too Low Terrain” Or “Too Low – Gear” Or “Too Low – Flaps”
	Warning	N/A
GSD (GPWS Alert)	Caution	“Glideslope”
	Warning	N/A
500’ 500’ Voice Call Out (GPWS Alert)	Advisory	“Five Hundred”
400’ 400’ Voice Call Out (GPWS Alert)	Advisory	“Four Hundred”
300’ 300’ Voice Call Out (GPWS Alert)	Advisory	“Three Hundred”
200’ 200’ Voice Call Out (GPWS Alert)	Advisory	“Two Hundred”
100’ 100’ Voice Call Out (GPWS Alert)	Advisory	“One Hundred”
50’ 50’ Voice Fall Out (GPWS Alert)	Advisory	“Fifty”

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
40' 40' Voice Fall Out (GPWS Alert)	Advisory	“Forty”
30' 30' Voice Fall Out (GPWS Alert)	Advisory	“Thirty”
20' 20' Voice Fall Out (GPWS Alert)	Advisory	“Twenty”
10' 10' Voice Fall Out (GPWS Alert)	Advisory	“Ten”

Table 7-1: TAWS-A Alerts

7.3.2 TAWS-B

The GTN Xi TAWS-B system provides the following functionality:

- a) Forward Looking Terrain Avoidance (FLTA)
 - a. Required Terrain Clearance (RTC) / Required Obstacle Clearance (ROC)
 - b. Imminent Terrain Impact (ITI) / Imminent Obstacle Impact (IOI)
- b) Premature Descent Alert (PDA)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
RTC Reduced Required Terrain Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ITI Imminent Terrain Impact (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ROC Reduced Required Obstacle Clearance	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
(FLTA Alert) (TAWS)	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
IOI Imminent Obstacle Impact (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
RLC Reduced Required Line Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
ILI Imminent Line Impact (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
PDA Premature Descent Alert (TAWS)	Caution	“Too Low Terrain”
	Warning	N/A
500’ 500’ Voice Call Out (GPWS Alert)	Advisory	“Five Hundred”

Table 7-2: TAWS-B Alerts

7.4 GMA 35/35c Audio Panel (Optional)

The GTN 725Xi and 750Xi can interface to a GMA 35/35c remotely mounted audio panel and marker beacon receiver. Controls for listening to various radios, activating the cabin speaker, clearance playback control, and marker beacon are accessed by pressing the “Audio Panel” button on the GTN display screen.

Optional Bluetooth pairing functionality can be accessed from the associated System /Connnext Setup page (GMA 35c only). Volume controls for the audio panel are accessed by pressing the “Intercom” button on the GTN Xi display screen.

Aircraft alerting audio may be routed through the GMA 35/35c audio panel. There are no pilot controls for alert audio volumes. In the event of a loss of GMA35/35c function alert audio routed through the audio panel may not be heard.

7.5 StormScope® (Optional)

When optionally interfaced to a StormScope® weather detection system, the GTN Xi may be used to display the StormScope® information. Weather information supplied by the StormScope® will be displayed on the StormScope® page of the GTN Xi system. For detailed information about the capabilities and limitations of the StormScope® system, refer to the documentation provided with that system.

Heading Up mode:

If the GTN Xi system is receiving valid heading information, the StormScope® page will operate in the heading up mode as indicated by the label “HDG UP” presented at the upper right corner of the display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft and *is* automatically rotated to the correct relative position as the aircraft turns.

Heading Not Available mode:

If the GTN Xi system is not receiving valid heading information, either because a compatible heading system is not installed, or the interfaced heading system has malfunctioned, the StormScope® page will continue to operate without a heading source and indicate “HDG N/A” in the upper right corner of the GTN Xi display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft but *is not* automatically rotated to the correct relative position as the aircraft turns. When operating in this mode, StormScope® strikes must be cleared after each turn the aircraft performs.

7.6 External Switches

External switches may be installed and interfaced to the GTN Xi. These switches may be stand alone or integrated with a TAWS or GPS annunciator. Table 7-3 lists the switches and function they perform:

Switch Label	Function
CDI	Toggles between GPS / VLOC sources. This switch may be part of an external annunciator panel.
COM CHAN DN	Toggles down through the preset com frequencies.
COM CHAN UP	Toggles up through the preset com frequencies.
COM RMT XFR	Transfers the COM active / standby frequencies.
NAV RMT XFR	Transfers the NAV active / standby frequencies.

Switch Label	Function
OBS	Performs an OBS or SUSP function. This switch is part of an external annunciator panel and is placarded with the following: “Green OBS indicates OBS or SUSP mode – GTN Xi annunciator bar indicates which is active. Push OBS button to change OBS or SUSP mode.”
OBS/SUSP	Performs an OBS or SUSP function.
TERR INHB	Toggles the TAWS Inhibit function on/off. This switch is part of an external annunciator panel. The terrain display is still presented if TAWS is Inhibited.
PTC	Push-to-Command switch for Voice Command input to the GMA and the GTN Xi.
SMART GLIDE	Optional toggle switch used to activate and cancel Smart Glide.

Table 7-3 – External Switches

7.7 Airspace Depiction and Alerts

The GTN Xi aides the flight crew in avoiding certain airspaces with Smart Airspace and airspace alerts. Smart Airspace de-emphasizes depicted airspace that is not near the aircraft’s current altitude. Airspace Alerts provide a message indication to the flight crew when the aircraft’s current ground track will intercept an airspace type that has been selected for alerting.

NOTE

Smart Airspace and Airspace Alerts are separate features. Turning on/off Smart Airspace does not affect Airspace Alerts, and vice versa.

7.8 Garmin ADS-B Traffic System Interface (Optional)

A Garmin ADS-B traffic system may be interfaced to the GTN Xi. The *nose* of the ownship symbol on both the GTN Xi main map page and dedicated traffic page serves as the actual location of your aircraft. The *center* of the traffic target icon serves as the reported location for the target aircraft. Motion vectors for traffic may be displayed in either absolute or relative motion. The location of the traffic targets relative to the ownship are the same, regardless of the selected motion vector.

Traffic targets displayed on the dedicated traffic page may be selected to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the “Next” button on the dedicated traffic page will cycle through all targets located near where the screen has been touched.

Traffic may be displayed on the GTN Xi when connected to an approved optional TCAS I, TAS, TIS, or ADS-B traffic device. These systems can provide traffic monitoring and alerting to the flight crew. Traffic shown on the display may or may not have traffic alerting available. The display of traffic is an aid to visual acquisition and may not be utilized for aircraft maneuvering.

Absolute motion vectors are colored either cyan or white, depending on unit configuration. Absolute motion vectors depict the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are always colored green and depict the motion of the traffic target relative to your ownship symbol. The direction the traffic target is pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards your ownship indicates that the traffic target *is* converging on your aircraft.

If more than one target is occupying the same area of the screen, the GTN Xi will combine the two or more traffic targets into one traffic group. The presence of an asterisk to the left of a target indicates that traffic has been grouped. The highest priority traffic target in the group is displayed to the pilot. When applied to airborne targets the asterisk will be displayed in white or cyan depending on the traffic depiction color used in the installation. The asterisk will be brown for grouped ground targets. The asterisk will not turn amber, even if an alerted target is included in the group.

An alerted target may be placed in the same group as non-alerted targets. In this case, the alerted target will be displayed. Two alerted targets will not be placed in the same group. All alerted targets will be displayed on the screen.

Traffic is displayed in feet regardless of the unit settings for altitude. If the units for altitude are different than feet, a “FT” label will appear on the traffic icon on and main map page, and the dedicated traffic page will include an “ALT IN FT” notification.

7.9 GWX 70/75 Weather Radar (Optional)

The GWX 70/75 Weather Radar uses Doppler technology to optionally provide advanced features to the flight crew such as turbulence detection and ground clutter suppression. Turbulence detection can detect turbulence up to 40nm from the aircraft and will be displayed at radar ranges of 160nm or less.

NOTE

Turbulence detection does not detect all turbulence especially that which is occurring in clear air. The display of turbulence

indicates the possibility of severe or greater turbulence, as defined in the Aeronautical Information Manual.

7.10 GWX 8000 Weather Radar (Optional)

The GWX 8000 Weather Radar contains the same features as the GWX 70/75, as well as supports predictive lightning and hail detection. Predictive lightning and hail are available out to 100 nm.

The GWX 8000 also contains an Auto mode. Auto mode is a volumetric scanning mode that will process several radar sweeps internally of varying tilts to analyze and compile the data to build a 3D model of the precipitation. The model then displays the system on the radar display as a 2D image. This removes the pilot UI for tilt, bearing, and radar gain.

7.11 Charts (Optional)

The GTN 750Xi/725Xi can display both procedure charts and weather data on the main map page at the same time. When datalink NEXRAD or Precipitation is overlaid on the main map page, the weather data is displayed *below* an overlaid procedure chart. When airborne weather radar is overlaid on the main map page, the radar data is displayed *above* an overlaid procedure chart.

SafeTaxi and ChartView functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD).

7.12 Transponder Control (Optional)

The GTN Xi can be interfaced to a Garmin transponder for control and display of squawk code, mode, and additional transponder functions. The activation of the “Enable ES” button on the transponder page does not indicate the aircraft is in full compliance with an ADS-B Out solution in accordance with TSO-C166b (1090ES). Consult your transponder documentation for additional information.

7.13 Telephone Audio (Optional)

Telephone audio distribution to the crew defaults to OFF on each power cycle of the GTN Xi. Prior to utilizing the telephone function, the crew must distribute telephone audio to the desired recipients. If the crew is utilizing the telephone function it is required that the telephone audio be turned off upon completing telephone usage.

7.14 Terrain, Wires, and Obstacles

Terrain, point obstacle, and wire obstacle information appears on the map and terrain display pages as red and amber terrain, obstacles, or wires and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain, obstacle, and wire information is advisory only and is not equivalent to warnings provided by TAWS.

The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

7.14.1 Dedicated Terrain Page

The dedicated Terrain page will always depict point obstacles at zoom scales of 10 nm or less and depict wire obstacles at zoom scales of 5 nm or less. The obstacle or wire overlay icon (see Figure 3) will be shown near the bottom of the display when the obstacle or wire depiction is active based on the zoom scale.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Terrain page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.



Figure 3 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.14.2 Map Page

The Map page may be configured to depict point obstacles and wire obstacles at various zoom scales by the pilot by using the Map page menu. The obstacle or wire overlay icon (see Figure 4) will be shown near the bottom of the display when the obstacle or wire overlay is active based on the current zoom scale and setting selected by the pilot.

The settings chosen by the pilot on the Map page menu (including obstacle and wire display ranges) are saved over a power cycle.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Map page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

NOTE

The Map page may be configured by the pilot to not show any obstacles or wires at any zoom scale.



Figure 4 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.15 Map Page

7.15.1 Configuration

The moving map and weather pages can display a large quantity and variety of data. Map data is layered to ensure that data which is typically more critical is drawn above less critical data, however at some zoom scales and configurations the map may be cluttered with large amounts of data. Controls are provided on the Map and Weather pages for the pilot to select which data displayed, the declutter level, and the zoom scales at which data is added to or removed from the display. It is the responsibility of the pilot to select settings for the map page that will provide the display of data most appropriate to the operation being conducted.

7.15.2 Flight Plan Depiction

The map page depicts the current active flight plan. When an off-route Direct To is active the flight plan will no longer be depicted on the map.

7.15.3 Fuel Range Ring

The distance between the segmented green reserve ring and the yellow zero fuel ring is 45 minutes at the current aircraft groundspeed by default. The pilot may change the fuel reserve time value on the map setup menu. Changes to the fuel reserve time are persisted over GTN Xi power cycles.

Visibility of the fuel range ring may be affected by the underlying map data selectable by the pilot. The pilot may make changes to the topographic or terrain data in order or more clearly observe the fuel range ring at any time.

Fuel range data is derived from the interfaced fuel totalizer data. Data entered in the Fuel Planning pages will not update the fuel range ring.

7.16 Times and Distances

Time and Distance data to the next waypoint is always calculated from the present position to that waypoint and does not account for the path which may be flown (such as intercepting a course) to reach the waypoint.

When navigating using GPS guidance most legs are TO type legs where distance to the next waypoint decreases along the route. However, some procedures include FROM type legs. When navigating on a leg that is a FROM leg indications that it is a FROM leg include the TO/FROM flag indicating FROM and distances increasing in distance fields.

7.17 GTN Xi-GTN (Xi) Crossfill

Specific data will sync between GTNs when installed in a dual GTN configuration. If data is not included in this list, it is not crossfilled. The following data will crossfill between the two GTNs with CROSSFILL ON or OFF:

- User Waypoints
- FPL Catalog
- Traffic Alerts
- Missed Approach Popups
- Altitude Leg Popups
- Heading
- Date/Time Conventions
- CDI Scale
- Default FPA

The following unit changes will crossfill:

- Temperature
- NAV Angle
- Fuel

The following items are crossfilled only when the GTNs are set to CROSSFILL ON:

- User Holds
- Approaches
- Flight Plan Changes
- Direct-To
- Selected OBS Course Changes

When the GTN is interfaced with other non-GTN Xi Garmin navigators, there will likely be minor discrepancies in the flight plan, course depictions, and turn annunciations based on the differences in the two navigators, even when crossfill is enabled. In such cases it is advisable to utilize the GTN Xi navigator as the primary navigator and if the discrepancy is such that the pilot workload is affected, crossfill should be turned off, and the flight plan on the non-GTN Xi navigator removed.

7.18 Automatic Speech Recognition (ASR)

ASR allows the pilot to interact with the GMA and GTN Xi via voice commands. Commands are constructed around the “Verb – Noun – (Suffix)” syntax for most ASR commands.

- **“SHOW”** Commands – Used to show pages or data fields on the GTN Xi
- **“SAY”** Commands – Used to instruct the ASR engine to say certain phrases related to the flight
- **“TUNE”** Commands – Used to tune certain frequencies into the standby position of the ASR GTN Xi (usually GTN #1)

The “Page” suffix is used in conjunction with the “Show” phrase to command pages to be displayed on the GTN. (e.g.- “Show Main Map Page”)

Audio Panel commands are available to switch audio sources.

- **“SELECT”** to choose which radio the MIC will be selected
- **“TOGGLE”** to toggle the monitor of a specific NAV/COM radio
- **“DISTRIBUTE”** to change the source of audio for the respective seat positions
- **“MUTE”** to mute audio inputs on the audio panel for the respective seat positions

Supplemental commands that allow map zooming, and page navigation are also available.

- **“BACK”**
- **“CANCEL”**
- **“ZOOM IN”**
- **“ZOOM OUT”**

Each command is initiated via the Push-to-Command (PTC) switch. Aural tones will indicate to the pilot the status of the command. A positive tone (low to high) will indicate the system executed a command. A negative tone (high to low) will indicate the system did not understand the command or could not execute due to system state or configuration. “SAY” commands do not provide aural tones as feedback.

The pilot must maintain vigilance regarding ASR command information. Due to the nature of voice recognition, there are times when ASR will interpret a command differently than the pilot intended. The pilot should always cross check the ASR response to the information contained within the GTN Xi as appropriate to ensure in-flight information is accurately understood. If a conflict exists between information gathered via ASR and that available in the GTN Xi system, the pilot should defer to the GTN Xi system information.

Prior to using ASR, the pilot must complete the ASR Qualification Procedure from the GTN Xi Series Pilot’s Guide.

The Command History Page details the commands received by ASR for that power cycle. A full list of commands and guidance for using ASR can be found in the *GTN 6XX/7XX Telligence Voice Command Guide*, 190-01007-50.

When using ASR for “TUNE” commands, it is recommended that the pilot enable Reverse Frequency Lookup (RFL) on the associated GTN Xi.

7.19 European Visual Reporting Points

If the GTN Xi is interfaced with a G500/600 PFD/MFD, and a flight plan in the GTN Xi contains a VRP, the G500/600 must have a database that contains the VRP to appropriately display the VRP on the MFD map. If the database on the PFD/MFD does not contain the VRP, the VRP will display on the MFD map as an intersection.

7.20 Screenshots

The GTN Xi can save screenshots to the removable SD card. To take a screenshot, press and hold the dual concentric knob while pressing the home key. A small camera icon will briefly appear in the bottom right corner of the screen indicating that the screenshot was successful.

7.21 Knob Page Navigation

Knob page navigation is a feature which allows quick navigation to select pages using the dual concentric knob. This feature is similar to the page navigation on Garmin G500/G600 TXi displays. Pages shown in the knob control menu can be customized from the “Page Shortcuts” menu found on the System page. Switching between Knob Control and radio tuning is accomplished by pressing the dual concentric knob.

The default knob behavior can be changed from Page Navigation to COM Radio based on pilot preference. Navigate to the System > Setup > COM/NAV menu and change the “Knob Control Default” setting as desired. After 30 seconds of inactivity, the knob function will return to the selected default behavior.

7.22 Remote Radio Control (Optional)

Remote radio control is a feature which allows each GTN in a dual-GTN installation to control all GTN communication and navigation radios. The feature adds a radios page which can be accessed via a user field or via the menu bar when a radio frequency keyboard is selected. If the user selects “Local and Remote” for Knob Control Radios in the System > Setup > COM/NAV menu, all radios can be accessed by pressing the dual concentric knob.

The pilot can send frequencies from Airport and waypoint information pages directly to either the communication or navigation radios.

7.23 Emergency Page (Optional)

The GTN Xi has an emergency page that will only appear if Smart Glide is enabled for the installation or when interfaced with a G500TXi or G600TXi with an emergency page. The emergency page allows emergency modes to be activated from the GTN Xi. Current supported emergency functions are Smart Glide and Emergency Descent Mode.

7.24 Smart Glide (Optional)

Smart Glide is an emergency assistance feature that quickly configures Garmin avionics to assist during an emergency loss of power with a single pilot action.

Overview

The purpose of Smart Glide is to reduce the workload and increase the situational awareness of a pilot during an emergency. The GTN Xi does this by constantly computing the aircraft glide range and best glide airport in the background.

When activated, the system will provide the following functionality:

Aircraft Equipment	Suitable Airport in Glide Range	No Glide Airport
GTN Xi	Provide navigation guidance and information to the nearest suitable airport within the glide range. Declutter the map display. Provide aural alerts upon activation, the airport distance and clock direction. Switch the CDI to GPS for navigator #1. Tune the airport CTAF or TOWER frequency in the standby for COM #1. (if equipped) CDI scale is set to 0.3NM.	Declutter the map display. Provide aural alerts indicating there are no glide airports within range. Tune the emergency frequency 121.5 in the standby for COM #1. (if equipped)
G500/600 TXi - or - GI 275	Annunciate “GLIDE” Altitude preselector is cleared.	Annunciate “GLIDE” Altitude preselector is cleared.
G3X	Annunciate “GLIDE”	Annunciate “GLIDE”

Aircraft Equipment	Suitable Airport in Glide Range	No Glide Airport
	CDI switches to GPS 1	CDI switches to GPS 1
G5	CDI switches to GPS 1	CDI switches to GPS 1
<i>(optional)</i> GFC 500 - or - GFC 600	IAS to greater of published best glide speed or minimum engagement speed GPS lateral mode. Selected altitude capture is disabled If the aircraft is >2NM from the glide airport and autopilot is not engaged an aural alert will announce “Engaging Autopilot” and the AP will engage.	IAS to greater of published best glide speed or minimum engagement speed ROL lateral mode with level attitude reference. Selected altitude capture is disabled If the autopilot is not engaged an aural alert will announce “Engaging Autopilot” and the AP will engage.

Table 7-4: Smart Glide Functional Description

Smart Glide Usage

Smart Glide is intended to be used both in emergency situations and during training. To get the most out of Smart Glide, it is recommended to practice for an emergency using Smart Glide so that the pilot can understand the benefits and limitations of the system prior to an actual emergency.

It is important to remember that Smart Glide is just a tool and the pilot in command is the final authority with respect to the safety of the flight. Therefore, it is the pilot in command’s responsibility to decide whether Smart Glide should be used in a given emergency and to deviate from the route suggested by Smart Glide if a better landing area is available.

Smart Glide is designed to be most helpful at altitudes where the pilot has enough time to complete an emergency checklist before landing. Smart Glide is not suggested for use during takeoff or landing phases of flight or for use in the traffic pattern. Smart Glide is disabled on the ground and after takeoff until the aircraft reaches 1000ft AGL.

If at any time the “Maneuver and Land” aural and visual annunciation is presented, the pilot should truncate the emergency procedures and focus on making a safe landing.

If at any time the “Airport out of range” aural and visual annunciation is presented, the pilot should determine the best course of action, whether to divert to an alternate landing field or continue to the suggested glide airport.

Alternate Airport Selection

Alternate glide destination selection for Smart Glide may be done by selecting an airport on the map page and pressing the “Glide to Airport” button. A secondary method is to use the “Alternate Airport” button on the Emergency Glide page. This page displays available airports in a list. The maximum number of glide airports supported is 25. Airports ranked lower than the top 25 will not be available until the number of airports in the glide ring is reduced. Activating any other form of navigation will cause smart glide to cancel. If activating a direct-to, smart glide will automatically cancel and the direct-to will be active. Activating any procedure including a visual approach will prompt the user to cancel smart glide before proceeding.

Smart Glide Activation/Deactivation

The system can be activated by a discrete momentary switch if equipped or by a two-second press of the Direct-To button. These methods of activation are mutually exclusive. The Direct-To press and hold is disabled when a discrete activation switch is installed. All aircraft have a secondary method to activate Smart Glide via a button on the GTN Xi emergency page.

The GTN Xi indicates that smart glide is active by the appearance of the Yellow GLIDE button in the menu bar and by the Smart Glide status bar when viewing the emergency page.

When deactivated, the system will return back to normal operational modes including the flight plan that was in the GTN Xi prior to Smart Glide activation. The pilot will need to verify the active flight plan leg and set autopilot modes, airspeed bug, and altitude pre-selector as desired.

In certain situations, crossfill may be turned on or off when Smart Glide is activated. Verify the crossfill status is set as desired after the system is deactivated.

In aircraft equipped with a Garmin GFC autopilot, autopilot and flight director modes including airspeed references may be changed when activating and cancelling smart glide. Always verify the autopilot modes are set as desired after smart glide is cancelled. In certain situations when Smart Glide is cancelled, re-loading of the previous flight plan may cause the active navigation to change abruptly and in some situations the autopilot may begin following this new navigation immediately.

Map Page

The Glide Range Ring and Best Glide Airport Indicator are overlays on the map page. The Glide Range Ring and Best Glide Airport Indicator can be enabled and disabled individually in normal mode.

The Glide Range Ring provides the pilot with an estimated glide range in the event of a loss of engine power. The Glide Range Ring accounts for terrain, obstacles, and winds if wind data is available. If no wind data is available, the pilot will be notified when the glide range ring is displayed. In some cases, glide range ring may rely on datalink wind data which may not reflect current wind conditions.

Glide Range Ring

In normal operation the Glide Range Ring is displayed in cyan. This indicates that the displayed glide range is based on the published glide ratio for the aircraft. See the POH or AFM for the aircraft configuration and conditions required to achieve this range. In normal operation, the Glide Range Ring and Best Glide Indicator update at approximately 5 second intervals. Because of these limitations, the Glide Range Ring is only an estimate and should only be used for situational awareness.

When Smart Glide is active, the cyan Glide Range Ring is replaced with a yellow Smart Glide Range Ring. This range ring does not use a fixed value for glide ratio but instead updates approximately once per second using real-time glide performance. This range ring also accounts for terrain, obstacles, and wind just like the normal range ring. This ring will dynamically change size to reflect changes in glide performance that occur for any reason. The ring is most accurate when the glide is stabilized. Changes in glide ratio due to changes in aircraft configuration, changes in engine power, or un-accounted for changes in wind can cause the glide range ring to change size more rapidly. Because of these limitations, the Smart Glide Range Ring is only an estimate and should only be used for situational awareness.

Arrival AGL

The arrival AGL flag is automatically displayed when Smart Glide is active. This value is calculated based on the Smart Glide Range Ring data and the direct-to course to the glide airport. If the aircraft is further than 2NM from the glide airport the course and arrival AGL will automatically be recalculated when the CDI reaches ½ scale deflection. If the aircraft is within 2NM of the glide airport, the arrival AGL flag will be removed when the aircraft leaves the direct-to course for landing and the course will not be recalculated. The arrival AGL is updated approximately once per second and has the same limitations as the Smart Glide Range Ring on which the data is based.

Best Glide Airport Indicator

The Best Glide Airport Indicator is depicted as cyan chevrons on the map page which point the pilot toward the “best” airport to glide to in the event of loss of engine power. When the best glide airport indicator is enabled, it will be shown if there are any airports within the glide range ring that meet the configured criteria. If there are no airports that meet the criteria, the indicator will not be displayed even when it is enabled. The “best” glide airport is selected based on runway surface type, distance from present position, runway length, and weather

if weather data is available. Additionally, public airports are prioritized over private airports. Because of this fixed determination and the limited information available to the avionics, the best glide airport is a suggestion, and the pilot is responsible for choosing the most favorable landing site in the event of an emergency.

When Smart Glide is activated, the system will use the same logic as the best glide airport indicator to pick a glide destination. The system may choose a different airport when activated if the solution has changed since the best glide indicator was last updated. However, once the glide destination is selected, it will not change while smart glide is active unless modified by the pilot.

Emergency Glide Page

The emergency page on the GTN Xi, G500/600 TXi, and G3X automatically becomes the emergency glide page when Smart Glide is active. This page can be accessed quickly while Smart Glide is active by pressing the yellow GLIDE icon in the menu bar. This page displays information about Smart Glide status, pertinent airport information, and shortcut buttons for common actions during glide. A map shortcut button is always displayed on the emergency glide page. A Squawk 7700 button will be displayed on the controlling unit if a transponder is being controlled by the GTN or G3X.

Nearest Airport Page

The Nearest Airport Page indicates which airports are within the glide range ring by displaying the word “Glide” with a green checkmark.

The GTN Xi uses data about the airport and installer configured data to determine the best suitable glide airport. The airports within the glide range that are of the surface type designated by the installer will be ranked according to:

1. Weather Category (LIFR, IFR, MVFR, VFR) if available.
2. Distance from the aircraft.
3. Runway length.
4. Public vs Private (Public is preferred)

The highest ranked airport will be selected as the glide destination. If no public airports meet the requirements for desired runway length and weather, airports with shorter runway lengths, airports with IFR/LIFR weather, airports with winds above the max desired gust speed, and private airports may be selected. If no airports within the glide range meet the surface type criteria, the system will advise that there are no airports within glide range.

Glide Prediction

When active, the system will continuously monitor the aircraft glide performance and adjust the yellow Smart Glide Range Ring as necessary. If the currently selected airport falls out of glide range as measured by the system, the system will alert the pilot with visual and aural alerts. The pilot has the option to choose an alternate glide airport from the map or the “Alternate

Airport” button on the Emergency Glide page of the GTN Xi. Only airports that are eligible to be glide airports can be selected. Sudden changes in aircraft performance while the system is active will cause a degradation in the accuracy of the glide range estimation.

System Requirements

Smart Glide requires the following to function:

- Valid GPS position fix
- Valid data from a compatible Garmin PFD
- Terrain and Navigation database installed on GTN Xi

Visual/Aural Alerts

The following describes how the system functions as the aircraft approaches the glide airport or off-airport landing areas.

With a Glide Airport Selected

4NM from the Glide Airport

An “Approaching Airport” aural and visual alert is generated.

2NM from the Glide Airport

A “Maneuver and Land” aural and visual alert is generated along with a distance and clock position callout. If the autopilot is still engaged after 10 seconds and the aircraft altitude is low, another aural alert will remind the pilot to “Disconnect Autopilot”. Once the aircraft is within 2NM of the glide airport, the pilot must take full control of the aircraft. At this point Smart Glide will no longer provide range alerts and GPS guidance will not recalculate.

500’ AGL

At 500’ above the ground, a “500” aural alert is generated as a reminder to prepare for touchdown.

With No Glide Airport

Altitude AGL Callouts

At 2000’, 1000’, and 500’ above the ground, an associated aural alert is generated as a reminder to prepare for touchdown. No GPS course guidance is given.

CAUTION

This system is intended to aid the crew in the initial avionics setup during a glide emergency, and if possible, to aid the pilot in finding and navigating to a suitable airport within the glide range of the aircraft. The pilot must make every effort to ensure the system guidance is as desired. Other or more suitable airports or off-airport landing areas may be available but unknown to the Smart Glide system. The pilot must evaluate all options and choose the most appropriate course of action given the conditions.

Alert	Description
“Smart Glide Disabled. Low Altitude”	Smart glide cannot be activated below 1000’ AGL.
“Smart Glide Disabled.”	Smart Glide cannot be activated, but the switch was used to attempt to activate. NOTE: If Smart Glide was manually disabled using the Emergency Page menu, this aural alert will not play.
“Smart Glide Active”	Smart Glide is active and functional.
“Smart Glide Canceled”	Smart Glide was canceled by the pilot.
“Engaging Autopilot”	Smart Glide has engaged the autopilot in GLIDE mode.
“Disconnect Autopilot”	Reminder to the crew that the system is no longer navigating, and the crew should take over for the landing or descent maneuver.
“Airport X o’clock X miles	The glide airport distance and bearing are given relative to the aircraft at the time the alert was generated. Distance is given in nautical miles.
Altitude Aural	Alert the pilot when at specified altitude AGL. A “Five Hundred” callout is standard. Additional “Two Thousand” and “One Thousand” callouts are issued when there is no airport in range.
“No Airports Within Glide Range”	The GTN cannot find an airport for Smart Glide. Consider airports not available in the GTN Xi, or other off-airport landing sites.
“Approaching Airport”	The aircraft is within 4NM of the glide airport.
“Maneuver and Land”	The aircraft is within 2NM of the glide airport. The pilot should maneuver the aircraft for landing.
“Airport Out of Range”	The glide airport is no longer in the predicted glide range.
“Smart Glide Failure, consider alternate landing site.”	The Smart Glide system has failed due to loss of data input or system failure. Smart Glide guidance is not available. The pilot should consider all available alternatives, including continuing to the previously chosen airport, and not rely on the GTN Xi for glide information.
“ALTN Airport Out of Range”	If an alternate airport is selected that is on the edge of the glide range ring, the airport may go out of range while the system is recalculating. If this occurs, the guidance to the current airport will be maintained (if available) and the “ALTN Airport Out of Range” message will be displayed for five seconds.

Table 7-5: Smart Glide Alerts

TXi Integration

Smart Glide is fully compatible with the G500/G600 TXi if a PFD or MFD is configured. When Smart Glide is active, a yellow GLIDE button will appear on the MFD or PFD if no MFD is visible. Pressing the GLIDE button will bring up the emergency glide menu. The G500/G600 MFD map page will mirror the information on the GTN map page when smart glide is active. While information can be viewed on TXi, changing the glide airport can only be done on the GTN Xi.

G3X Touch Integration

Smart Glide is fully compatible with the G3X Touch system if a PFD or MFD is installed. When Smart Glide is active, a yellow GLIDE button will appear on the bottom of the PFD and MFD. Pressing the GLIDE button will bring up the emergency glide page. If displayed, the G3X Touch *Glide Range Ring* will be removed when smart glide is active. Refer to GTN Xi glide range ring display. While information can be viewed on G3X Touch, changing the glide airport can only be done on the GTN Xi.

GI 275 Integration

The GI 275 will indicate when smart glide is active by yellow “GLIDE” text on the top of the altitude tape. When the GI 275 controls a GFC 500, this indication will also indicate when IAS glide mode is active.

GFC Integration

When select Garmin GFC autopilots are interfaced to the system, the autopilot will automatically modify its behavior to assist the pilot when Smart Glide is active. The following table describes compatible GFC 500 and 600 software versions that have Smart Glide compatibility:

GFC Model	Software Version
GFC 600	v2.80 or later. Check the GFC 600 AFMS to determine Smart Glide compatibility and configuration.
GFC 500	GI 275 version: v2.40 or later G3X: v9.00 or later G5: v8.00 or later

Table 7-6: Smart Glide Software Compatibility

If the airplane is more than 2NM from the best glide airport when smart glide is activated, the autopilot will automatically engage the servos and set the flight director to GPS and IAS modes. IAS mode will automatically target best glide speed or autopilot minimum engagement speed if best glide is less than the minimum engagement speed. If the airplane is within 2NM of the best glide airport, the flight director will still be activated in GPS and IAS modes but the autopilot servos will not be engaged. If no airport is within glide range when

Smart Glide is activated, the autopilot will engage servos and the flight director will be set to ROL mode with a wings level reference and IAS mode.

When Smart Glide is active, the behavior of IAS mode is modified so that the airspeed reference initially targets best glide speed or autopilot minimum engagement speed if best glide is less than the minimum engagement speed. The airspeed reference and vertical mode may be changed by the pilot at any time, but if IAS mode is selected again, it will set the airspeed reference back to the initial smart glide speed. This behavior is indicated by the presence of the “GLIDE” indication on GTN and on GFC 600 by “GLIDE” being annunciated on the GMC 605. As soon as Smart Glide is cancelled, IAS mode reverts to its normal function.

Smart glide only engages the autopilot servos on initial activation when further than 2NM from the best glide airport. It is the pilot’s responsibility to manage the autopilot and disconnect it at the appropriate time. There is no automated autopilot disconnect. If the pilot later selects a new glide destination, the flight director modes will be switched to GPS and IAS modes, however the autopilot servos will not be automatically engaged. The pilot may manually engage the autopilot servos by pressing the AP button on the autopilot mode controller.

When Smart Glide is cancelled, autopilot mode changes may occur. It is the pilot’s responsibility to disconnect the autopilot or verify the flight director modes are as desired after cancelling Smart Glide.

7.25 Autopilot Coupling

It is possible to create flight plan waypoint sequences, including Search and Rescue patterns, which exceed the autopilot’s bank angle capabilities. The pilot shall monitor autopilot performance regarding flight path deviation.

7.25.1 RNP 1.0 RF Leg Types

This STC does not grant operational approval for RF leg navigation for those operators requiring operational approval. Additional FAA approval may be required for those aircraft intending to use the GTN Xi to provide RNP 1 or RNP 0.3 navigation in accordance with FAA Advisory Circular AC 90-105A.

AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.

This STC has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the GTN Xi installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RNP 1.0 RF procedures, if available, but it is not required to do so.

7.25.2 RNP 0.3 RF Leg Types

This STC has demonstrated acceptable crew workload and Flight Technical Error for coupled procedures with RF legs when the GTN Xi installation complies with limitation set forth in Section 2.6.1 of this document. It is required to couple the autopilot for RNP 0.3 RF procedures.

7.26 StormScope® Display (Optional)

StormScope® lightning information displayed by the GTN Xi is limited to supplemental use only. The use of the StormScope® lightning data on the display for hazardous weather (thunderstorm) penetration is prohibited. StormScope® lightning data on the display is intended only as an aid to enhance situational awareness of hazardous weather, not penetration. It is the flight crew's responsibility to avoid hazardous weather using official weather data sources.

When the GTN Xi StormScope® page is operating without a heading source, as indicated by the "HDG N/A" label at the upper right corner of the StormScope® page, strikes must be cleared after each heading change.

7.27 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board or Fuel Flow as received from an on-board fuel totalizer, as entered by the pilot at system startup, or as entered by the pilot when on the Fuel Planning page. This *is not* a direct indication of actual aircraft fuel flow or fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

7.28 Fuel Range Rings

The fuel range rings displayed on the moving map are intended for situational awareness and do not represent a direct indication of endurance or fuel remaining. The distance between the segmented green reserve ring and the yellow zero fuel ring is 45 minutes by default. The reserve value can be changed from the GTN Xi map setup menu.

Fuel range data is derived by the interfaced fuel totalizer data. Data entered in the Fuel Planning pages will not update the fuel range ring.

7.29 Glove Use / Covered Fingers

No glove or covered fingers may be used to operate the GTN Xi touchscreen unless the Glove Qualification Procedure located in the GTN Xi Series Pilot's Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GTN 725Xi, 750Xi or GTN 625Xi, 635Xi, 650Xi combinations.

7.30 Active Weather Radar

Radar is broadcasting energy while in Weather or Ground mapping modes. If the GTN 750Xi/725Xi system is configured to control an airborne weather radar unit, observe all safety precautions, including:

- Do not operate in the vicinity of refueling operations.
- Do not operate while personnel are in the vicinity (approximately 20 feet) of the radar sweep area.

CAUTION

If a radar system is installed, it generates microwave radiation and improper use, or exposure, may cause serious bodily injury. Do not operate the radar equipment until you have read and carefully followed the safety precautions and instructions in the weather radar user manual and/or pilot's guide.

7.31 Telephone Audio

Telephone audio must not be distributed to the pilot or co-pilot unless a phone call is active.

CAUTION

Failure to turn off telephone audio when the telephone is not in use may result in telephone ringer or text message aural notifications being received during critical phases of flight.

7.32 Multi Crew Aircraft (GMA 35 Only)²

For aircraft type certified with more than one required pilot, or operations requiring more than one pilot, the "Group Co-Pilot with Passenger" audio panel option shall not be activated. This option is found in the Intercom Setup Menu when a Garmin GMA 35 audio panel is installed.

Additionally, when the GTN Xi and TXi are installed in the same cockpit, it is recommended that the GTN Xi and TXi have the same chart types and cycles to ensure appropriate lookup and chart syncing/streaming functionality.

7.33 Automatic Speech Recognition

Pilots may not use the ASR function to operate the GTN Xi/GMA unless they have completed the ASR Qualification Procedure located in the GTN Xi Series Pilot's Guide successfully. The ASR Qualification Procedure is specific to each pilot / headset / aircraft combination.

² Includes GMA 35 and GMA 35c Audio Panels

7.34 Connex Data (Optional)

The Connex product line uses a wireless transceiver to provide data to and from a GTN Xi to personal electronic devices (PEDs).

The Flight Stream 210 is a remotely mounted unit that provides the capability to interface Portable Electronic Devices (PEDs) to the GTN Xi via Bluetooth. The Flight Stream 510 is mounted in the GTN SD card slot and includes a Bluetooth and Wi-Fi transceiver. The GDL 60 is a remote mounted wireless access point that includes Bluetooth and Wi-Fi connectivity to the PED, and LTE or Wi-Fi connectivity to Garmin services on the ground.

Data such as traffic, flight plan, datalink weather, entertainment audio information, and attitude information are sent from the Flight Stream or GDL 60 to the PED. The PED can send flight plans and databases (except Flight Stream 210) to the GTN Xi via the access point. Limitations regarding database operations are found in Section 2.15.

Garmin provides a list of tested and compatible devices that can be used with the Flight Stream or GDL 60. Connection to the Flight Stream or GDL 60 may be possible with devices other than those on the supported device list, but Bluetooth® and/or Wi-Fi stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with the Connex product line, please visit: http://garmin.com/connex/supported_devices

7.35 System Databases

7.35.1 Database Provided Altitudes

When the GTN Xi provides altitude data for waypoints included in IFR procedures, the altitudes provided are those shown on the procedure chart for “Turbojet” or “Jet” aircraft. If altitudes for other aircraft such as “Turboprop” or “Prop” are required, the crew must manually edit the waypoint altitude.

7.35.2 Database Sync with G500/600 or G500/600/700TXi GDUs

When a GTN Xi hosts a Flight Stream 510 for database syncing to GDUs, the GTN Xi and GDU must be configured for the same chart database type (FliteCharts or ChartView). If the GDU and GTN are not configured for the same chart type, charts database sync and Chart Streaming will not be available.

7.35.3 Databases and Flight Plan Waypoints/Procedures

Database versions (or cycles) and effective dates are displayed on the start-up database verification page immediately after power-on for those databases with an effective or expiration date. Databases with no effective or expiration date (e.g. - terrain database) are considered effective upon installation in the GTN Xi. Database information can also be viewed on the System – System Status page.

The Obstacle Database has an area of coverage that includes the United States and Europe and is updated as frequently as every 56 days. The HOT Line wire database only includes the continental United States and portions of Canada/Mexico.

Only the Obstacle/HOT Line wire database may be used in accordance with the limitation found in Section 2.14.

If a stored flight plan contains a waypoint or procedure that does not correspond to a waypoint or procedure in the navigation database in use, the waypoint or procedure will become locked (depicted as “lockd”) in the flight plan. Flight plans with locked waypoints may be placed in the active flight plan portion of the system but no navigation will be provided. The locked waypoint/procedure must be resolved by removing or replacing it with the correct waypoint/procedures in the flight plan before the system will provide navigation.

Discrepancies that invalidate a procedure should be reported to Garmin International. The affected procedure is prohibited from being flown using data from the navigation database until a new navigation database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com by selecting “Aviation Data Error Report.” Flight crew and operators can view navigation database alerts at FlyGarmin.com then select “NavData Alerts.”

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

7.35.4 Single Point Database Acknowledgement

For GTN Xi units running software version 20.20 or later, the remote database confirmation feature has been replaced by single point database acknowledgement. This feature is available on all GTN Xi installations, and it gives users a quick way to verify databases on Garmin products are up to date before flight.

Upon startup GTN #1 will display a database summary page. Other Garmin products that support this feature will all skip their database confirmation pages. If all databases are up to date, GTN #1 will display a green check on the database summary page. If some databases are missing or out of date, GTN #1 will display the database details page and highlight the offending databases in yellow as before. If a database mismatch warning appears, that means that the databases are not the same on all the Garmin products. If more information is needed, the user can tap on the database mismatch label to see detailed information about a given database.

Recommendations for managing databases:

1. When downloading databases from the Fly Garmin website, always choose to use Database Sync and always choose to reinstall all databases when creating a database card.
2. If using Database Concierge on Garmin Pilot, verify that all database concierge downloads are up to date before attempting to install databases on GTN.
3. Always load databases to GTN #1 in installations with dual GTN Xi or a G500/G600 TXi. Don't load databases onto the SD cards for GTN #2 or TXi unless necessary. If databases are on the SD card, the unit will not skip the database page.
4. If a database mismatch occurs, power on all units to the home page and wait until the database sync is complete. A system message will appear while database sync is in progress. If a database mismatch still occurs check the Terrain database version on each unit and update as necessary. If the issue persists, contact Garmin Support.

7.35.5 GDL 60 (Optional)

The GDL 60 is a wireless access point for your airplane. It provides wireless access for PEDs in the aircraft similar to a FlightStream 510, automatic wireless database updates for aircraft avionics and wireless sensor data query and database downloads over LTE or wireless internet.

If wireless sensor data query is enabled in an installation, certain displays can power on when queried. During a query, the display backlight will be powered off to conserve battery.

The GDL 60 will wake up on battery power to download databases. Wireless sensor data query also uses a small amount of battery to listen for a request to wake up the avionics. It is recommended to install and use a battery tender in conjunction with the GDL 60.

If the aircraft will not be flown for an extended period without a battery tender or you are in a remote location and wish to eliminate the possibility of battery drain, open the "CNXT BATT" breaker to disable the GDL 60 live query functionality. While this breaker is open the GDL 60 will not download databases or respond to sensor queries.

7.35.6 Charts Database (Dual GTN7XX and TXi GDU)

When the aircraft installation includes 2 GTNs capable of displaying charts (GTN 725, 725Xi, 750, or 750Xi) and crossfill is enabled between the GTNs, the GTNs should have identical chart types (ChartView or FliteCharts) and charts cycles installed. Failure to have identical charts could affect the chart lookup features and automatic chart selection.

7.36 Core Procedure Selection

With GTN 20.41, runway selection may be deferred when loading a SID or STAR, if possible for that procedure. If the runway selection is deferred, this will result in only the procedure core being added to the flight plan. The core of the procedure is the section of the procedure that does not change *route or altitudes* based on the runway transition.

The runway may be selected in the flight plan page on next to the procedure header, in which case the runway transition will be added to the flight plan. If user modified altitudes exist within the route, a popup will be provided asking if the user would like the GTN to attempt to retain user modified data. When selecting a runway transition, verify flight plan and crossing altitudes remain correct per the published procedure.

The runway may also be selected by returning to the procedures page, however that loading procedure will revert all user modified data to the database values.

GARMIN Ltd. or its subsidiaries
c/o GARMIN International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

GFC 500 Autopilot with ESP

Installed in

Piper PA-28-180 / 160 / 150 / 140

And

Piper PA-28-181 / 161 / 151

Dwg. Number: 190-02291-07 Rev. 9

This Supplement must be attached to the FAA Approved Airplane Flight Manual when the GFC 500 Autopilot system is installed in accordance with STC SA01866WI. The information contained herein supplements the information of the basic Airplane Flight Manual. For Limitations, Procedures, and Performance information not contained in this Supplement consult the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA approved sections of this supplement are labeled as "FAA APPROVED". Sections not labeled "FAA APPROVED" are provided for guidance information only.

Airplane Serial Number: _____

Airplane Registration Number: _____

FAA Approved By: Paul Mast

Paul Mast
ODA STC Unit Administrator
Garmin International, Inc
ODA-240087-CE

Date: 4-21-2023

© Copyright 2018 – 2020, 2023
Garmin Ltd. or its subsidiaries
All Rights Reserved

Except as expressly provided herein, no part of this manual may be reproduced, copied, transmitted, disseminated, downloaded or stored in any storage medium, for any purpose without the express prior written consent of Garmin. Garmin hereby grants permission to download a single copy of this manual and of any revision to this manual onto a hard drive or other electronic storage medium to be viewed and to print one copy of this manual or of any revision hereto, provided that such electronic or printed copy of this manual or revision must contain the complete text of this copyright notice and provided further that any unauthorized commercial distribution of this manual or any revision hereto is strictly prohibited.

Garmin International, Inc.
1200 E. 151st Street
Olathe, KS 66062 USA
Telephone: 913-397-8200
www.garmin.com

Garmin International, Inc
Log of Revisions
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
GFC 500 Autopilot with ESP
Installed in
Piper PA-28-180 / 160 / 150 / 140
And
Piper PA-28-181 / 161 / 151

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	03/16/2018	Erik Frisk Garmin ODA STC Unit Administrator
2	ALL	Added VNAV	07/27/2018	Paul Mast Garmin ODA STC Unit Administrator
3	ALL	Added PA-28-140	08/29/2018	Erik Frisk Garmin ODA STC Unit Administrator
4	ALL	Corrected Typographical Errors	01/18/20019	Robert G. Murray Garmin ODA STC Unit Administrator
5	All	Added G3X Information	03/15/2019	Robert G. Murray Garmin ODA STC Unit Administrator
6	ALL	Various procedure corrections	12/16/20	Robert G. Murray Garmin ODA STC Unit Administrator
7	ALL	Added GI 275 Information	9/10/20	Erik Frisk Garmin ODA STC Unit Administrator
8	ALL	Added missing signature page	9/17/20	Erik Frisk Garmin ODA STC Unit Administrator

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
9	ALL	Added ESP Disable	See Cover	See Cover

Table of Contents

Section 1 – General	1-1
USE OF THE SUPPLEMENT	1-1
ABBREVIATIONS AND TERMINOLOGY	1-2
INSTALLED EQUIPMENT INTERFACES.....	1-3
INSTALLED FEATURES CHECKLIST	1-4
Section 2 – Limitations	2-1
Section 3 – Emergency Procedures	3-1
AUTOPILOT MALFUNCTION / PITCH TRIM RUNAWAY.....	3-1
AUTOPILOT FAILURE / ABNORMAL DISCONNECT	3-2
PITCH TRIM FAILURE	3-2
ESP ACTIVATION	3-2
OVERSPEED PROTECTION (MAXSPD).....	3-3
UNDERSPEED PROTECTION (MINSPD)	3-3
Section 3A – Non-Normal Procedures.....	3-5
AUTOPILOT PRE-FLIGHT TEST FAIL.....	3-5
MANUAL AUTOPILOT DISCONNECT	3-5
LOSS OF NAVIGATION INFORMATION.....	3-5
LOSS OF AIRSPEED DATA	3-6
LOSS OF ALTITUDE DATA	3-6
LOSS OF GPS INFORMATION.....	3-6
HEADING DATA SOURCE FAILURE.....	3-7
ELEVATOR MISTRIM (AUTOTRIM)	3-7
Section 4 – Normal Procedures	4-1
GFC 500 POWER UP	4-1
FLIGHT DIRECTOR / AUTOPILOT NORMAL OPERATING PROCEDURES.....	4-1
VERTICAL MODES	4-2
VERTICAL SPEED (VS) MODE	4-2
INDICATED AIRSPEED (IAS) MODE	4-2
ALTITUDE HOLD (ALT) MODE, MANUAL CAPTURE	4-2
VERTICAL NAVIGATION (VNAV).....	4-3
GO AROUND.....	4-4
MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED	4-4
LATERAL MODES.....	4-5
HEADING MODE (HDG)	4-5

TRACK MODE (TRK)	4-5
NAVIGATION (VOR).....	4-5
NAVIGATION (GPS).....	4-6
APPROACHES	4-7
ILS.....	4-7
LOC (GS out)	4-8
GPS Approach (LPV, LNAV/VNAV, LP+V, or LNAV+V)	4-9
GPS Approach (LP, LNAV).....	4-9
BC	4-10
VOR Approach.....	4-11
DISABLING ESP.....	4-12
Section 5 – Performance	5-1
Section 6 – Weight and Balance	6-1
Section 7 – System Description.....	7-1
AFCS OVERVIEW	7-1
AUTOPILOT CONTROL UNIT AND DISPLAY	7-4
PREFLIGHT TEST	7-7
MESSAGES AND ANNUNCIATIONS	7-7
LIGHTING.....	7-8

SECTION 1 – GENERAL

The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (POH/AFM) when the airplane has been modified by installation of the Garmin GFC 500 Autopilot system in accordance with Garmin International, Inc. approved data.

The information in this supplement supersedes or adds to the basic POH/AFM only as set forth below. Users of the manual are advised to always refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

USE OF THE SUPPLEMENT

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout the supplement:

WARNING

Operating procedures, techniques, etc., which may result in personal injury or loss of life if not carefully followed.

CAUTION

Operating procedures, techniques, etc., which may result in damage to equipment if not carefully followed.

NOTE

Operating procedures, techniques, etc., which is considered essential to emphasize.

ABBREVIATIONS AND TERMINOLOGY

The following glossary is applicable within the airplane flight manual supplement

AFCS	Automatic Flight Control System	LNAV/VNAV	Lateral Navigation / Vertical Navigation Approach
AFM	Airplane Flight Manual	LOC	Localizer (no glideslope available)
AFMS	Airplane Flight Manual Supplement	LP	Localizer Performance
AGL	Above Ground Level	LP+V	Localizer Performance with Advisory Vertical Guidance
AHRS	Attitude and Heading Reference System	LPV	Localizer Performance with Vertical Guidance
ALT	Altitude	LVL	Level
AP	Autopilot	MDA	Minimum Descent Altitude
APR	Approach	MPH	Miles per Hour
ATC	Air Traffic Control	PFT	Preflight Test
BC	Back Course Approach	POH	Pilot's Operating Handbook
CDI	Course Deviation Indicator	STC	Supplemental Type Certificate
DA	Decision Altitude	TO	Takeoff
DISC	Disconnect	TRK	Track
DWG	Drawing	VHF	Very High Frequency
ESP	Electronic Stability and Protection	VOR	VHF Omni-directional Range
FAA	Federal Aviation Administration	VS	Vertical Speed
FAF	Final Approach Fix		
FD	Flight Director		
GA	Go Around		
GFC 500	Garmin Autopilot		
GMC 507	Autopilot Mode Control Panel		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
GS	Glideslope		
GSA	Garmin Servo Actuator		
HDG	AFCS heading mode		
IAS	Indicated Airspeed		
ILS	Instrument Landing System		
INT	Interrupt		
KIAS	Knots Indicated Airspeed		
KT	Knot		
LNAV	Lateral Navigation		
LNAV+V	Lateral Navigation with Advisory Vertical Guidance		

INSTALLED EQUIPMENT INTERFACES

The following is the list of installed equipment and functions associated with the GFC 500 Autopilot installation in this airplane.

Table 1-1: Table of Installed Equipment Interfaces

DEVICE TYPE	Manufacturer / Model If not installed, note N/A	Additional Information
GPS Navigator #1		Is Navigator #1 interfaced to GFC 500? ☐ YES ☐ NO
VHF Nav Radio #1		Is VHF Nav Radio #1 interfaced to GFC 500? ☐ YES ☐ NO
VHF Nav Radio #2		
Pitch Trim Servo		

INSTALLED FEATURES CHECKLIST

The checked autopilot modes and features are available on this aircraft.

Basic AP Features

- ☒ Flight Director
- ☐ Electric Pitch Trim
- ☒ Overspeed Protection
- ☒ Underspeed Protection

Electronic Stability and Protection

- ☒ Pitch/Roll Attitude
- ☒ High Speed Protection
- ☐ Low Speed Protection

Vertical Autopilot Modes

- ☒ Pitch (PIT)
- ☒ Level (Zero vertical speed)
- ☒ Go Around (GA)
- ☒ Altitude Hold
- ☒ Vertical Speed
- ☒ Altitude Capture via Altitude Preselect
- ☒ Indicated Airspeed (IAS)
- ☐ Vertical Navigation (VNAV)
- ☐ GPS Approach Glidepath
- ☐ ILS Glideslope

Lateral Autopilot Modes

- ☒ Roll (ROL)
- ☒ Level (Wings Level)
- ☒ Go Around (GA)
- ☐ Heading
- ☒ Track
- ☐ GPS Navigation
- ☐ VHF Navigation
- ☐ Approach Mode
 - ☐ GPS
 - ☐ VOR/LOC

SECTION 2 – LIMITATIONS

The Garmin G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, part number 190-01112-12 Rev B (or later approved revisions), must be immediately available to the flight crew (when G5 is installed).

The Garmin G3X Touch Pilot's Guide for Certified Aircraft, part number 190-02472-00, Rev A (or later approved revisions) must be immediately available to the flight crew (when G3X EFIS system is installed).

The Garmin GI 275 Pilot's Guide for Certified Aircraft, part number 190-02246-01, Rev B (or later approved revisions) must be immediately available to the flight crew (when GI 275 system is installed). This AFMS is applicable to the software versions shown below:

Software Item	Software Version (or later FAA Approved version for this STC)
G5 Software Version	8.20
G3X Software Version	9.15
GI 275 Software Version	2.60

A pilot must be seated in the left pilot's seat, with seatbelt fastened, during all autopilot operations.

Do not use autopilot during takeoff and landing.

The GFC 500 AFCS preflight test must complete successfully prior to use of the autopilot, flight director or manual electric trim.

The maximum fuel imbalance with the autopilot engaged is 10 gallons.

The autopilot must be disengaged below 200 feet AGL during approach operations and below 800 feet AGL during all other operations.

The GFC 500 autopilot is approved for Category 1 precision approaches and non-precision approaches only.

Autopilot Engagement Speed	
Minimum	65 KIAS (75 MPH)
Maximum	140 KIAS (160 MPH)

This page intentionally left blank.

SECTION 3 – EMERGENCY PROCEDURES

Some emergency situations require immediate memorized corrective action. These steps are printed in bold in the emergency procedures and should be accomplished without the aid of the checklist.

AUTOPILOT MALFUNCTION / PITCH TRIM RUNAWAY

If the airplane deviates unexpectedly from the planned flight path:

1. **Control Wheel** **GRIP FIRMLY**
2. **AP DISC / TRIM INT Button** **PRESS AND HOLD**
(Be prepared for high elevator control forces)
3. **Aircraft Attitude** **MAINTAIN / REGAIN AIRCRAFT CONTROL**

NOTE

Do not release the AP DISC / TRIM INT Button until after pulling the AUTOPILOT Circuit Breaker.

4. **Elevator Trim** **RE-TRIM** if necessary using Elevator Trim Control Wheel
5. **AUTOPILOT Circuit Breaker** **PULL**

NOTE

Pulling the AUTOPILOT circuit breaker will render the autopilot and ESP inoperative.

6. **AP DISC / TRIM INT Button** **RELEASE**

WARNING

In flight, do not overpower the autopilot. The trim will operate in the direction opposing the overpower force, which will result in large out-of-trim forces.

Do not attempt to re-engage the autopilot or use manual electric pitch trim until the cause of the malfunction has been corrected.

AUTOPILOT FAILURE / ABNORMAL DISCONNECT

(Red AP in autopilot status box on display, continuous aural disconnect tone.)

1. AP DISC / TRIM INT Button or:
 - a. G5 Knob
 - b. G3X Autopilot Status Bar
 - c. GI 275 Knob or Autopilot Status Button..... PRESS AND RELEASE
(to cancel disconnect tone)
2. Aircraft Attitude..... MAINTAIN / REGAIN AIRCRAFT CONTROL

NOTE

The autopilot disconnect may be accompanied by a red AFCS in the autopilot status box, indicating the automatic flight control system has failed. The flight director will not be available and the autopilot cannot be re-engaged with this annunciation present.

If the disconnect is accompanied by an amber AP with a red X, the autopilot will not be available however the flight director will still be functional.

In the event of a GMC failure, pressing the G5 knob, GI 275 knob or autopilot status button, or G3X Autopilot status bar will acknowledge the disconnect tone.

PITCH TRIM FAILURE

(Red PTRIM on G5, GI 275, or G3X display.)

This failure will only occur if the optional pitch trim servo is installed.

1. Indicates a failure of the pitch trim servo.
2. Control Wheel GRIP FIRMLY
3. AP DISC / TRIM INT Button..... PRESS and RELEASE
(Be prepared for high elevator control forces)
4. Elevator Trim AS REQUIRED USING ELEVATOR TRIM CONTROL WHEEL

NOTE

The autopilot may be re-engaged. Refer to the normal procedures section of this AFMS, MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED.

ESP ACTIVATION

1. Power..... AS REQUIRED
2. Aircraft Attitude..... MAINTAIN / REGAIN AIRCRAFT CONTROL

NOTE

If ESP is active for approximately 10 seconds, the autopilot will automatically engage in LVL mode, an aural 'ENGAGING AUTOPILOT' will be played, (or a Sonalert tone will sound for installations without a supported audio panel) and the autopilot will roll the wings level and fly at zero-vertical speed. Refer to Section 7, System Description for further information.

ESP will be disabled by pressing and holding the AP DISC / TRIM INT button. Releasing the button will allow ESP to function.

OVERSPEED PROTECTION (MAXSPD)

(MAXSPD displayed on G5, GI 275, or G3X, AIRSPEED – AIRSPEED Aural sounds.)

1. **Power**.....**REDUCE**
2. **Aircraft Attitude and Altitude**.....**MONITOR**

After overspeed condition is corrected:

3. AutopilotRESELECT VERTICAL AND LATERAL MODES (if necessary)
4. PowerADJUST as necessary

NOTE

Autopilot Overspeed Protection Mode provides a pitch up command to maintain 140 KIAS (160 MPH).

UNDERSPEED PROTECTION (MINSPD)

(MINSPD displayed on G5, GI 275, or G3X, AIRSPEED – AIRSPEED Aural sounds.)

1. **Power**.....**INCREASE POWER AS REQUIRED TO CORRECT UNDERSPEED**
2. **Aircraft Attitude and Altitude**.....**MONITOR**

After underspeed condition is corrected:

3. AutopilotRESELECT VERTICAL AND LATERAL MODES (if necessary)
4. PowerADJUST as necessary

NOTE

Autopilot Underspeed Protection Mode provides a pitch down command to maintain 65 KIAS (75 MPH).

This page intentionally left blank.

SECTION 3A – NON-NORMAL PROCEDURES

AUTOPILOT PRE-FLIGHT TEST FAIL

(Amber AP with a red X in G5, GI 275, or G3X autopilot status box.)

1. Indicates the AFCS system failed the automatic Pre-Flight test. The autopilot, ESP, and electric elevator trim are inoperative.

MANUAL AUTOPILOT DISCONNECT

If necessary, the autopilot may be manually disconnected using any one of the following methods:

1. AP DISC / TRIM INT Button..... PRESS and RELEASE
(Pilot's control wheel)
2. AP Key PRESS
3. Pitch Trim Switch ACTIVATE
4. AUTOPILOT Circuit Breaker PULL

LOSS OF NAVIGATION INFORMATION

(Amber GPS, VOR, LOC, or BC flashes for 10 seconds on G5, GI 275, or G3X.)

NOTE

If a navigation signal is lost while the autopilot is tracking it, the autopilot will roll the aircraft wings level and default to roll mode (ROL).

1. GMC 507 Mode Panel..... SELECT HDG mode and SET desired heading
2. NAV Source SELECT a valid NAV source
3. NAV Key..... PRESS

If on an instrument approach at the time the navigation signal is lost:

4. Missed Approach Procedure..... EXECUTE (as applicable)

LOSS OF AIRSPEED DATA

(Red X through airspeed tape on the G5, GI 275, or G3X display, amber AP with a red X in autopilot status box.)

NOTE

If airspeed data is lost while the autopilot is tracking airspeed, the flight director will default to pitch mode (PIT).

1. AP DISC / TRIM INT Button..... PRESS AND RELEASE
(to cancel disconnect tone)
2. Aircraft Attitude..... MAINTAIN / REGAIN AIRCRAFT CONTROL
3. Manual Elevator Trim TRIM as required

NOTE

The autopilot cannot be re-engaged. The flight director is available however IAS mode cannot be selected. Loss of airspeed will be accompanied by a red PTRIM indication on the G5, GI 275, or G3X (if a pitch trim servo is installed).

LOSS OF ALTITUDE DATA

(Red X through altitude tape on the G5, GI 275, or G3X display.)

NOTE

If altitude data is lost while the autopilot is tracking altitude, the autopilot will default to pitch mode (PIT).

1. Autopilot SELECT different vertical mode

LOSS OF GPS INFORMATION

(GPS position information is lost to the autopilot.)

NOTE

If GPS position data is lost while the autopilot is tracking a GPS, VOR, LOC or BC course, the autopilot will default to roll mode (ROL). The autopilot will default to pitch mode (PIT) if GPS information is lost while tracking an ILS. The autopilot uses GPS aiding in VOR, LOC and BC modes.

1. AutopilotSELECT different lateral and vertical mode (as necessary)

If on an instrument approach:

- AP DISC / TRIM INT buttonPRESS, Continue the approach manually
Or
- Missed Approach Procedure EXECUTE (as applicable)

HEADING DATA SOURCE FAILURE

Without a heading source to the navigator, GPSS will not be provided to the autopilot for heading legs. Navigator map cannot be oriented heading up.

Track information will be displayed on the G5, GI 275, or G3X.

1. Autopilot SELECT different lateral mode (as necessary)

ELEVATOR MISTRIM (AUTOTRIM)

(Amber TRIM UP or TRIM DOWN displayed on the G5, GI 275, or G3X.)

Indicates a mistrim of the elevator while the autopilot is engaged. If a pitch trim servo is not installed, refer to the normal procedures section of this AFMS, MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED. If a pitch trim servo is installed, the autopilot will normally trim the airplane as required. However, during rapid acceleration, deceleration, configuration changes, or near either end of the elevator trim limits, momentary illumination of this message may occur. If the autopilot is disconnected while this message is displayed, high elevator control forces are possible.

WARNING

Do not attempt to overpower the autopilot in the event of a pitch mistrim. The autopilot servo will oppose pilot input and will cause pitch trim to run opposite the direction of pilot input. This will lead to a significant out-of-trim condition, resulting in large control wheel force when disengaging the autopilot.

If a pitch trim servo is not installed:

1. Refer to the normal procedures section of this AFMS, MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED.

If a pitch trim servo is installed:

NOTE

Momentary display of the TRIM UP or TRIM DOWN message during configuration changes or large airspeed changes is normal.

1. Control Wheel GRIP FIRMLY

WARNING

Be prepared for significant sustained control forces in the direction of the mistrim annunciation. For example, TRIM DOWN indicates nose down control wheel force will be required upon autopilot disconnect.

2. AP DISC / TRIM INT Button PRESS AND RELEASE
3. Manual Elevator Trim RE-TRIM as required

Electric pitch trim should be considered inoperative until the cause of the mistrim has been investigated and corrected.

This page intentionally left blank.

SECTION 4 – NORMAL PROCEDURES

GFC 500 POWER UP

During the preflight test the G5, GI 275, or G3X will display PFT in the autopilot status box. When the GFC 500 passes preflight test, PFT will be removed from the autopilot status box.

FLIGHT DIRECTOR / AUTOPILOT NORMAL OPERATING PROCEDURES

Autopilot/Flight Director mode annunciations are displayed at the top of the G5 Electronic Flight Instrument, at the top of the G3X Electronic Flight Instrument System PFD, or at the bottom of the GI 275 Electronic Flight Instrument ADI. Green text indicates active autopilot/flight director modes. Armed modes are indicated in white text. Normal mode transitions will flash inverse video for 10 seconds before becoming steady. Abnormal mode transitions will flash for 10 seconds in amber text before the default mode is annunciated as the active mode in green text. Default autopilot/flight director modes are Roll (ROL) and Pitch (PIT) modes.

The autopilot status box displays the autopilot engagement status as well as armed and active flight director modes.

Autopilot Engagement with Flight Director Off — Upon engagement, the autopilot will be set to hold the current attitude of the airplane if the flight director was not previously on. In this case, 'ROL' and 'PIT' will be annunciated.

Autopilot Engagement with Flight Director On — If the flight director is on, the autopilot will smoothly pitch and roll the airplane to capture the FD command bars. The prior flight director modes remain unchanged.

Autopilot Disengagement — The most common way to disconnect the autopilot is to press and release the AP DISC / TRIM INT button located on the control yoke. An autopilot disconnect tone will sound and an amber AP will be annunciated on the G5, GI 275, or G3X autopilot status box. Other ways to disconnect the autopilot include:

- Pressing the AP Key on the GMC 507 Mode Controller
- Operating the Electric Pitch Trim Switch (located on the control wheel)
- Pulling the AUTOPILOT circuit breaker

In the event of unexpected autopilot behavior, press and holding the AP DISC / TRIM INT button will disconnect the autopilot and remove all power to the servos.

VERTICAL MODES

VERTICAL SPEED (VS) MODE

- 1. Altitude Preselect SET to Desired Altitude
- 2. Press VS Key, autopilot synchronizes to the airplane's current vertical speed.
- 3. Vertical Speed ReferenceADJUST using UP / DN Wheel
- 4. Green ALT..... VERIFY Upon Altitude Capture

INDICATED AIRSPEED (IAS) MODE

- 1. Altitude Preselect SET to Desired Altitude
- 2. Press IAS Key, autopilot synchronizes to the airplane's current indicated airspeed.
- 3. AIRSPEED ReferenceADJUST using UP / DN Wheel
- 4. Adjust throttle as required INCREASE POWER to climb
DECREASE POWER to descend
- 5. Green ALT..... VERIFY Upon Altitude Capture

ALTITUDE HOLD (ALT) MODE, MANUAL CAPTURE

- 1. When at the desired altitudePRESS ALT key
The autopilot will hold the altitude at which the ALT key was pressed.
If climbing or descending at a high rate when the ALT key is pressed, the airplane will overshoot the reference altitude and then return to it. The amount of overshoot will depend on the vertical speed when the ALT key is pressed.
The altitude reference is displayed in the autopilot status box. The reference may be changed by +/- 200 FT using the UP / DN wheel.

VERTICAL NAVIGATION (VNAV)

1. Navigation Source..... SELECT CDI to GPS
2. Vertical Navigation ProfileLOAD into the GPS navigator's flight plan
3. Altitude Preselect SET to the vertical clearance limit
When ATC clearance received.
4. GMC 507 Mode Panel..... PRESS VNAV

NOTE

Vertical navigation will not function for the following conditions:

- Selected navigation source is not GPS navigation. VNAV will not function if the navigation source is VOR or Localizer.
- VNAV is not enabled on the GPS Navigator
- If the altitude preselect is not set below the current aircraft altitude.
- No waypoints with altitude constraints in the flight plan
- Glideslope or Glidepath is the active flight director pitch mode.
- OBS mode is active
- Dead Reckoning mode is active
- Parallel track is active
- Aircraft is on the ground

Vertical navigation is not available between the final approach fix (FAF) and the missed approach point (MAP)

ALTV will be the armed vertical mode during the descent if the altitude preselect is set to a lower altitude than the VNAV reference altitude. This indicates the autopilot / flight director will capture the VNAV altitude reference. ALTS will be the armed mode during the descent if the altitude preselect is set at or above the VNAV reference altitude, indicating that the autopilot / flight director will capture the altitude preselect altitude reference.

GO AROUND

- 1. GO AROUND buttonPRESS – Verify GA / GA on G5, GI 275, or G3X
autopilot will not disengage
- 2. Autopilot (if engaged)VERIFY airplane pitches up following flight director command bars
- 3. PowerAPPLY Go Around power
- 4. GMC 507 Mode Panel.....PRESS NAV to couple to selected navigation source
OR
PRESS HDG to Fly ATC Assigned Missed Approach Heading
- 5. Altitude Preselect VERIFY
Set to appropriate altitude.

NOTE

The pilot is responsible for initial missed approach guidance in accordance with published procedure. When the GA button is pressed the Flight Director command bars will command go-around pitch attitude and wings level. The pilot must select the CDI to the appropriate navigation source and select the desired lateral and vertical flight director modes.

MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED

(Amber TRIM UP or TRIM DOWN displayed on G5, GI 275, or G3X.)

If the aircraft is not equipped with a pitch trim servo, the pilot must manually adjust the pitch trim when airspeed and aircraft configuration changes are made. A message will be displayed on the G5, GI 275, or G3X display to indicate the pitch servo is holding sustained force, and the pilot must manually trim the aircraft.

- 1. If TRIM UP message is displayed.....MANUALLY TRIM nose up
- 2. If TRIM DOWN message is displayed MANUALLY TRIM nose down

LATERAL MODES

HEADING MODE (HDG)

1. HDG KeyPRESS
The autopilot will turn the airplane in the direction of the heading bug.
2. HDG/TRK Knob..... Rotate to set heading bug to desired heading.
3. When the airplane reaches the heading bug, the autopilot will roll the wings level to track the reference.

TRACK MODE (TRK)

1. TRK KeyPRESS
The autopilot will turn the airplane in the direction of the track bug.
2. HDG/TRK Knob..... Rotate to set track bug to desired track.
3. When the airplane reaches the track bug, the autopilot will roll the wings level to track the reference.

NAVIGATION (VOR)

1. Navigation Source.SELECT CDI to VHF NAV
Tune and identify the station frequency.
2. Course PointerSET CDI to the Desired Course
3. Intercept Heading ESTABLISH in HDG, TRK or ROL mode
4. NAV Key.....PRESS

NOTE

If the Course Deviation Indicator (CDI) is greater than one dot from center, the autopilot will arm the VOR mode. The pilot must ensure that the current heading will result in a capture of the selected course. If the CDI is one dot or less from center, the autopilot will enter the capture mode when the NAV key is pressed.

NAVIGATION (GPS)

- 1. Navigation Source..... SELECT CDI to GPS
- 2. Waypoint SELECT on Navigation Source
- 3. Course Pointer VERIFY CDI set to the Desired Course
- 4. Intercept Heading ESTABLISH in HDG or ROL mode
- 5. NAV Key PRESS

NOTE

If the Course Deviation Indicator (CDI) is greater than one dot from center, the autopilot will arm the GPS mode. The pilot must ensure that the current heading will result in a capture of the selected course. If the CDI is one dot or less from center, the autopilot will enter the capture mode when the NAV key is pressed.

APPROACHES

ILS

1. Navigation Source..... SELECT CDI to VHF Nav
Tune and Identify an ILS station frequency.
2. CDI SET to front LOC course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press APR Key VERIFY LOC and GS ARMED
5. Verify Airplane Captures and Tracks LOC and GS
6. Set Missed Approach Altitude in Altitude preselect.
7. At Decision Altitude (DA),
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

If the Course Deviation Indicator (CDI) is greater than half scale deflection, the autopilot will arm the LOC mode. The pilot must ensure that the current heading will result in a capture of the selected course. If the CDI is within half scale deflection, the autopilot will enter the capture mode when the APR key is pressed.

When the selected navigation source is an ILS, glideslope coupling is automatically armed when the APR key is pressed. The glideslope cannot be captured until the localizer is captured. The autopilot can capture the glideslope from above or below the glideslope.

LOC (GS out)

1. Navigation Source..... SELECT CDI to VHF Nav
Tune and Identify an ILS station frequency.
2. Course Pointer SET to front LOC course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press NAV Key VERIFY LOC ARMED
5. Verify Airplane Captures and Tracks LOC Course
6. Once airplane is in ALT mode inbound to the FAF, set the altitude preselect to the next required step down altitude. Use VS mode to descend airplane along the vertical step downs and to the MDA.
7. When in ALT mode at the MDA, set missed approach altitude in the altitude preselect.
8. At Missed Approach Point,
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.
 - Set missed approach altitude in the altitude preselect.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

GPS Approach (LPV, LNAV/VNAV, LP+V, or LNAV+V)

1. Navigation Source..... SELECT CDI to GPS
2. Course Pointer VERIFY CDI set to the Desired Course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press APR Key VERIFY GPS and GP ARMED
5. Verify Airplane Captures and Tracks GPS and GP
6. Press ALT Key to level off at the MDA for a LP+V or LNAV+V approach
7. At DA (LPV or LNAV/VNAV approach), or MDA and Missed Approach Point (LP+V or LNAV+V)
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.
 - Set missed approach altitude in the altitude preselect.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

GPS Approach (LP, LNAV)

1. Navigation Source..... SELECT GPS on the CDI
2. Course Pointer VERIFY CDI set on the Desired Course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press NAV Key VERIFY GPS ARMED
5. Verify Airplane Captures and Tracks GPS Course
6. Once airplane is in ALT mode inbound to the FAF, set the altitude preselect to the next required step down altitude. Use VS mode to descend airplane along the vertical step downs and to the MDA.
7. When in ALT mode at the MDA, set missed approach altitude in the altitude preselect.
8. At Missed Approach Point,
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.
 - Set missed approach altitude in the altitude preselect.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

BC

1. Navigation Source..... SELECT CDI to VHF Nav
Tune and Identify an ILS station frequency
2. Course Pointer SET CDI to LOC Front Course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press NAV Key VERIFY BC ARMED
(when heading is within 75 degrees of BC course)
5. Verify Airplane Captures and Tracks BC Course
6. Once airplane is in ALT mode inbound to the FAF, set the altitude preselect to the next required step down altitude. Use VS mode to descend airplane along the vertical step downs and to the MDA.
7. When in ALT mode at the MDA, set missed approach altitude in the altitude preselect.
8. At Missed Approach Point:
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.
 - Set missed approach altitude in the altitude preselect.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

VOR Approach

1. Navigation Source..... SELECT CDI to VHF Nav
Tune and identify the station frequency
2. Course PointerSET CDI to the Desired Course
3. Ensure that the current heading will result in a capture of the selected course.
4. Press NAV Key VERIFY VOR ARMED
5. VerifyAirplane Captures and Tracks VOR Course
6. Once airplane is in ALT mode inbound to the FAF, set the altitude preselect to the next required step down altitude. Use VS mode to descend airplane along the vertical step downs and to the MDA.
7. When in ALT mode at the MDA, set missed approach altitude in the altitude preselect.
8. At Missed Approach Point:
 - AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
 - GO AROUND (GA) button..... PRESS, Execute Missed Approach Procedure
 - Apply GA power.
 - Set missed approach altitude in the altitude preselect.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

DISABLING ESP

ESP can be disabled on the G5 attitude indicator with the following procedure. ESP will default to “Enabled” on the next power cycle.

- 1. G5 KnobPRESS
- 2. ESPSELECT
- 3. G5 KnobPRESS

ESP can be disabled on the G3X with the following procedure. ESP will default to “Enabled” on the next power cycle.

- 1. Autopilot Status Box TOUCH
- 2. ESP Button TOUCH
- 3. Back ButtonPRESS

ESP can be disabled on the GI 275 with the following procedure. ESP will default to “Enabled” on the next power cycle.

- 1. GI 275 KnobPRESS and HOLD
- 2. Options SELECT
- 3. ESP Button SELECT
- 4. Back ButtonPRESS and HOLD

ESP can be disabled, but only while in the air, with the following procedure. ESP will default to “Enabled” on the next power cycle.

- 1. AP DISC switchPRESS and HOLD for 5 seconds

SECTION 5 – PERFORMANCE

No Change.

This page intentionally left blank.

SECTION 6 – WEIGHT AND BALANCE

No change to loading information. Refer to current weight and balance report and equipment list for changes to empty weight/moment and installed equipment.

This page intentionally left blank.

SECTION 7 – SYSTEM DESCRIPTION

AFCS OVERVIEW

The GFC 500 is a digital Automatic Flight Control System (AFCS). It is a two-axis autopilot and flight director system which provides the pilot with the following features:

G5 Outputs to Autopilot — The G5 flight instrument (when installed) provides attitude, rate, and acceleration information to the servos. Additionally, indicated airspeed, vertical speed, pressure altitude and GPS information are sent to the autopilot for mode control.

G3X Outputs to Autopilot — The G3X electronic flight instrument system provides attitude, rate, and acceleration information to the servos. Additionally, indicated airspeed, vertical speed, pressure altitude and GPS information are sent to the autopilot for mode control.

GI 275 Outputs to Autopilot — The GI 275 electronic flight instrument system provides attitude, rate, and acceleration information to the servos. Additionally, indicated airspeed, vertical speed, pressure altitude and GPS information are sent to the autopilot for mode control.

Flight Director (FD) — The flight director processing occurs in the G5, GI 275, or G3X instrument. Selected modes for the flight director are displayed on the G5, GI 275, or G3X autopilot status box.

The flight director provides:

- Command Bars showing pitch/roll guidance
- Vertical / lateral mode selection and processing

Autopilot (AP) — Autopilot operation occurs within the pitch, roll, and optional pitch trim servo. It also provides servo monitoring, and automatic flight control in response to flight director steering commands, attitude and rate information, and airspeed.

Optional Electric Pitch Trim — The pitch trim servo provides manual electric pitch trim capability when the autopilot is not engaged. The trim servo provides automatic pitch trim when the autopilot is engaged and the airplane is in the air. Automatic trim functionality is disabled on the ground.

GMC 507 — Pilot commands to the autopilot and flight director are entered through the GMC 507 autopilot mode panel. The GMC 507 contains internal sensors which calculate the aircraft attitude, attitude rate and accelerations. These inertial sensors are completely independent from the sensors within the G5, GI 275, or G3X and the rest of the autopilot system, and are not used for the flight director, autopilot, trim or ESP functions. They are used solely to provide independent monitoring of the GFC 500.

Airspeed and Altitude Information — The GFC 500 requires airspeed and altitude information from the G5 instrument, the GI 275 system, or the G3X system.

Other components of the AFCS include the GSA 28 pitch, roll, and optional pitch trim servo that also contain autopilot processors, control wheel mounted elevator trim switch (if trim servo is installed), control wheel mounted autopilot disconnect and trim interrupt button (AP DISC / TRIM INT), and a Go-Around (GA) button.

Underspeed Protection (USP) — The GFC 500 will provide Underspeed Protection when the autopilot is engaged.

When the minimum airspeed of 65 KIAS (75 MPH) is reached, a visual MINSPD message will appear above the airspeed tape and the autopilot will lower the nose to maintain 65 KIAS (75 MPH). An aural “AIRSPEED, AIRSPEED” voice alert will sound for installations connected to an audio panel.

Underspeed Protection is inhibited when the airspeed exceeds 70 KIAS (80 MPH).

Overspeed Protection (OSP) — The GFC 500 will provide Overspeed Protection when the autopilot is engaged.

When the maximum airspeed of 140 KIAS (160 MPH) is reached, visual MAXSPD message will appear above the airspeed tape and the autopilot will raise the nose of the aircraft to avoid exceeding 140 KIAS (160 MPH). An aural “AIRSPEED, AIRSPEED” voice alert will sound for installations connected to an audio panel.

Overspeed Protection is inhibited when the airspeed is below 135 KIAS (155 MPH).

Coupled Go-Around — Pressing the GA button will not disengage the autopilot. Instead, the autopilot will attempt to capture and track the flight director command bars. If insufficient airplane performance is available to follow the commands, the autopilot will enter Underspeed Protection mode at the minimum airspeed.

Electronic Stability and Protection (ESP) — The GFC 500 will provide Electronic Stability and Protection when the autopilot is not engaged.

Electronic Stability and Protection (ESP) uses the autopilot servos to assist the pilot in maintaining the airplane in a safe flight condition within the airplane's normal pitch, roll and airspeed envelopes.

Electronic Stability and Protection is activated when the pilot allows the airplane to exceed one or more conditions beyond normal flight as defined below:

- Pitch attitude beyond normal flight ($+20^\circ$, -15°)
- Roll attitude beyond normal flight (45°)
- High airspeed beyond normal flight (above $V_{NE} + 1$ KIAS [1 MPH])
- Low airspeed below normal flight (below $V_s + 5$ KIAS [5 MPH])

ESP requires:

- Pitch and Roll servos are installed and functioning
- Autopilot not engaged
- The GPS altitude above ground is more than 200 feet (for low airspeed mode)
- Aircraft is within the autopilot engagement envelope ($\pm 50^\circ$ in pitch and $\pm 75^\circ$ in roll)

Protection for excessive Pitch, Roll, and Airspeed is provided when the limit thresholds are first exceeded, which engages the appropriate servo in ESP mode at a nominal torque level to bring the airplane back within the normal flight envelope. If the airplane deviates further from the normal flight envelope, the servo torque will increase until the maximum torque level is reached in an attempt to return the airplane into the normal flight envelope. Once the airplane returns to within the normal flight envelope, ESP will deactivate the autopilot servos.

When the normal flight envelope thresholds have been exceeded for more than 10 seconds, ESP Autolevel Mode is activated. Autolevel Mode engages the autopilot to bring the airplane back into straight and level flight based on 0° roll angle and 0 FPM vertical speed. An aural, "ENGAGING AUTOPILOT" (or a Sonalert tone), sounds and the Flight Director mode annunciation will indicate LVL for the pitch and roll modes.

Any time an ESP mode is active, the pilot can interrupt ESP by using the Autopilot Disconnect (AP DISC / TRIM INT) switch, or simply override ESP by overpowering the autopilot servos. The pilot may also disable ESP through the G5, GI 275, or G3X menu.

The engagement and disengagement attitude limits are displayed with double hash marks on the roll indicator depending on the airplane attitude and whether or not ESP is active in roll. When ESP is inactive (roll attitude within nominal limits) only the engagement limit indications are displayed in order to reduce clutter on the roll indicator.

Display symbology implemented for ESP is illustrated in the following figures.

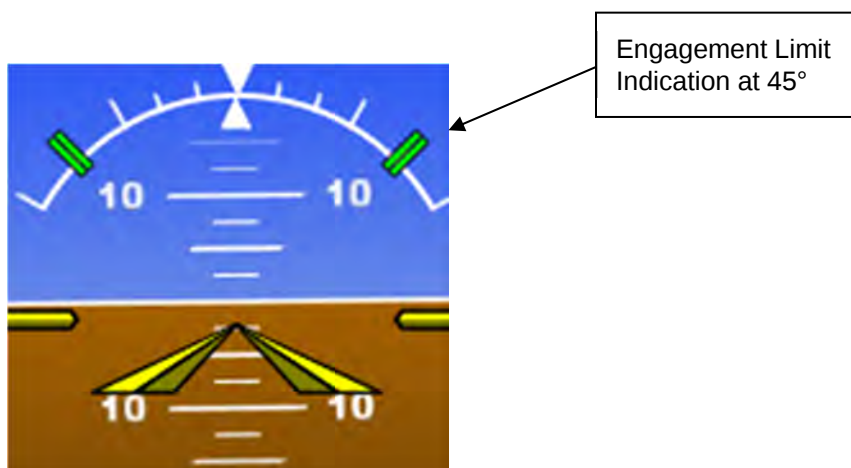


Figure 7-1: Nominal Roll Attitude ESP Engagement Limit Indications

Once ESP becomes active in roll, the engagement limit indication that was crossed (either Left or Right) will move to the lower disengagement limit indication. The opposite roll limit remains at the engagement limit.

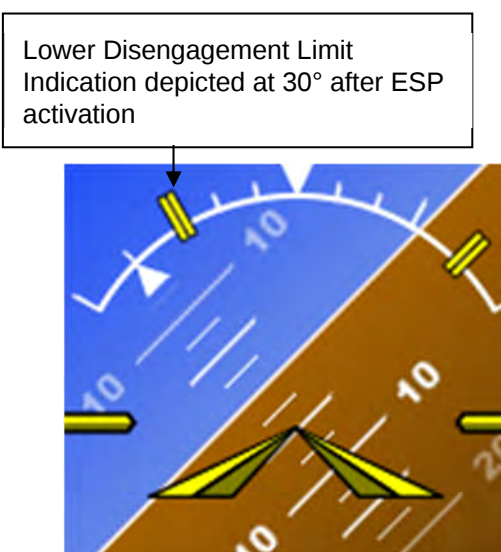


Figure 7-2: Engagement Limit Indications Upon ESP Activation

Disconnect Methods

The following conditions will cause the autopilot to automatically disconnect:

- Electrical power failure, including pulling the AUTOPILOT circuit breaker.
- Internal autopilot system failure (including internal AHRS failure).

The following pilot actions will cause the autopilot to disconnect:

- Pressing the red AP DISC / TRIM INT button on the pilot's control wheel.
- Actuating the manual electric trim switch (if installed).
- Pushing the AP Key on the GMC 507 mode controller when the autopilot is engaged.
- Pulling the AUTOPILOT circuit breaker.

The red AP DISC / TRIM INT button on the pilot's control wheel will interrupt power to the manual electric trim for as long as the switch is depressed.

AUTOPILOT CONTROL UNIT AND DISPLAY



Figure 7-3: GMC 507 Control Unit (Reference Only)



Figure 7-4: G5 Display (Reference Only)

The following tables list the available AFCS vertical and lateral modes with their corresponding controls and annunciations. The UP/DN wheel can be used to change the vertical mode reference while operating in Pitch Hold, Vertical Speed, Altitude Hold, or IAS mode. Increments of change and maximum ranges of values for each of these references using the UP/DN wheel are also listed in the table.

AFCS VERTICAL MODES

Vertical Mode	Control	Annunciation	Reference Range	Reference Change Increment
Pitch Hold	(default)	PIT	20° Nose Up 15° Nose Down	0.5°
Selected Altitude Capture	*	ALTS		
Altitude Hold	ALT Key	ALT nnnnn		10 FT
Vertical Speed	VS Key	VS nnnn	-2000 to +2000 FPM	100 FPM
IAS Hold	IAS Key	IAS nnn	65 to 140 KIAS 75 to 160 MPH	1 KT 1 MPH
Vertical Path Tracking (VNAV)	VNV Key	VNAV		
VNAV Target Altitude Capture	**	ALTV		
Glidepath	APR Key	GP		
Glideslope		GS		
Takeoff or Go Around	GA Button	TO or GA	7°	
Level (LVL)	LVL Key	LVL	Zero Vertical Speed	
ESP High Pitch Engagement			ESP High Pitch Attitude engages at 20° nose up	
ESP Low Pitch Engagement			ESP Low Pitch Attitude engages at 15° nose down	
ESP High Airspeed Engagement			ESP High Airspeed engages at above V _{NE} + 1 KIAS (1 MPH)	
ESP Low Airspeed Engagement			When above 200 FT AGL, ESP Low Airspeed engages at below Vs + 5 KIAS (5 MPH). (This mode only available if height above terrain is available from a compatible Garmin GPS).	

* ALTS arms automatically when PIT, VS, IAS, or GA is active.

** ALTV arms automatically if the VNAV Target Altitude is to be captured instead of the Selected Altitude.

AFCS LATERAL MODES

Lateral Mode	Control	Annunciation	Maximum Roll Command Limit
Roll Mode	(default)	ROL	30°
Heading Select	HDG Key	HDG	30°
Track Select	TRK Key	TRK	30°
Navigation, GPS Arm/Capture/Track	NAV Key	GPS	30°
Navigation, VOR Enroute and Approach Arm/Capture/Track		VOR	30°
Navigation, LOC Arm/Capture/Track (No Glideslope)		LOC	30°
Backcourse Arm/Capture/Track		BC	30°
Approach, GPS Arm/Capture/Track (Glidepath Mode Automatically Armed, if available)	APR Key	GPS	30°
Approach, ILS Arm/Capture/Track (Glideslope Mode Automatically Armed)		LOC	30°
Takeoff or Go Around	GA Button	TO or GA	Wings Level
LVL (Level)	LVL Key	LVL	Wings Level
ESP Roll Attitude Engagement	ESP Roll Attitude engages at 45°		

The autopilot may be engaged within the following ranges:

Pitch 50° nose up to 50° nose down

Roll ±75°

If the above pitch or roll limits are exceeded while the autopilot is engaged, the autopilot will disconnect. Engaging the autopilot outside of its command limits, but within its engagement limits, will cause the autopilot to return the aircraft within command limits. The autopilot is capable of commanding the aircraft in the following ranges:

Pitch 20° nose up to 15° nose down

Roll ±30°

PREFLIGHT TEST

During the preflight test the G5, GI 275, or G3X will display PFT in the autopilot status box. The PFT annunciation is removed at the completion of the preflight test. If GFC 500 fails the PFT, a yellow AP with a red X is displayed in the autopilot status box on the G5, GI 275, or G3X.

MESSAGES AND ANNUNCIATIONS

Autopilot Messages	
AFCS Controller Key Stuck	The system has sensed a key input on the GMC 507 for 30 seconds or longer.
AFCS Controller Audio Database Missing	The audio database is missing from the GMC 507. The aural voice alerts will not be heard.
Servo Clutch Fault	One or more autopilot servos has a stuck clutch. The servo needs service.
Servo Trim Input Fault	The inputs to the trim system are invalid. The trim system needs service.
Autopilot Annunciations	
	Autopilot has failed. Autopilot and trim are inoperative and flight director is not available.
	Autopilot normal disconnect.
	Autopilot abnormal disconnect.
	Autopilot has failed. The autopilot is inoperative. FD modes may still be available.
	Autopilot Overspeed Protection mode is active. Autopilot will raise the nose to limit the aircraft's speed.
	Autopilot Underspeed Protection mode is active. Autopilot will lower the nose to prevent the aircraft's speed from decreasing.
	Autopilot preflight test is in progress.
	Pitch Trim Fail – Manual Electric Pitch Trim is inoperative.
	Elevator Trim Down – Autopilot is holding elevator nose down force. The pitch trim needs to be adjusted nose down.
	Elevator Trim Up – Autopilot is holding elevator nose up force. The pitch trim needs to be adjusted nose up.

LIGHTING

When the aircraft's dimming bus is selected off, or full dim, GMC 507 mode control panel lighting is controlled by integrated photocells which sense the ambient cockpit lighting.

Weight and Balance

Dates: 05.17.1972

06.05.2024

Basic Empty Weight and Balance

Make: Piper Date: June 5, 2024

Model: PA-28-180

Serial No: 28-7305057

Weighed By:


Salvatore O Capra
A-3220583

Registration No: N15323

Certificate No: A-3220583

Reaction Wheel Jack Points	Scale Reading	Tare	Net Weight	Arm	Moment
Right Main	666.00	0.00	666.00		
Left Main	643.00	0.00	643.00		
Sub Total	1309.00	0.00	1309.00	109.60	143466.40
Nose	501.00	1.00	500.00	34.80	17400.00
Total (as weighed)	1810.00	1.00	1809.00		160866.40
Total Items Table I			-288.00		-27360.00
Total Items Table II			0.00		0.00
Certified Empty Weight			1521.00	87.78	133506.40

Table I

Items weighed but not part of aircraft	Weight	Arm	Moment
Aircraft Weighed with Full Fuel and Engine Oil			0.00
			0.00
Remove 48 gallons of Usable fuel @ 6 lbs / gallon	288.00	95.00	27360.00
			0.00
			0.00
			0.00
			0.00
Total	288.00		27360.00

Table II

Items not in when weighed	Weight	Arm	Moment
Aircraft Weighed IAW TCDS 2A13 Rev: 64 and AC43.13 1 B Change 1			0.00
			0.00
			0.00
			0.00
			0.00
Aircraft Weighed with JAWS Platform Scales			0.00
Calibrated and Certified 07/06/23, next due 07/06/24			0.00
Serial No: 137FF9C20, 137FF9DEB, 137FF671C			0.00
Total	0.00		0.00

On-Site Weight and Balance
3751 Airfield Dr West Suite # 92
Lakeland, FL. 33811
863-206-3991

www.onsitewb.com
socapra@onsitewb.com

"A Balance of Cost and Convenience"

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED		PAGE _____ Title _____

DUPLICATE

REPORT VB-439

WEIGHT & BALANCE DATA

AND

EQUIPMENT LIST

MODEL PA-28-180

DATE May 17, 1972

APPLICABLE TO SERIAL NUMBERS 28-7305001 THROUGH 28-7305601

AND SERIAL NUMBER 28-E13

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439	PAGE <u>ii</u>

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	All	Retyped Entire Report		
	1	Rephrased Empty Weight Definition		
	10	Replaced Altimeter 99009-2, -3, -4 or -5 with PS50008-2 or -3		
	13	Replaced Turn Coordinators 99001 and 99004 and Turn and Bank 99005 with Turn and Slip PS50030-2 or -3		
		Manifold Pressure Gauge changed from 99006 to PS50031-3 or -4		
	19	Corrected King KT76/78 and King KMA-20 Weights, Arms, and Moments	<i>N. Tennant</i>	3 AUG 1972
2	4	Corrected Graph of Flight Envelope	<i>Molodtsov</i>	21 Aug. 1972
3	8	Corrected Engine, Fuel Pump, Oil Cooler and Air Filter Weights, Arms and Moments.		
	16	Corrected COMM Antenna Cable Arms and Moments,		
	16a	Added Page and Anti Static Kit	<i>N. Tennant</i>	30 NOV 1972
4	15	Added King KX-175, KN-73, KN-77 and KNI-520 Installations	<i>N. Tennant</i>	25 JAN 1973
5	15	Corrected KX-175 (2nd) Moment	<i>N. Tennant</i>	30 JAN 1973
6	TITLE	Added Serial Number Effectivity	<i>N. Tennant</i>	12 Sept. 1973
7	TITLE	Added Serial Number 28-E13	<i>A. Simpson</i>	14 May 1974

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439	PAGE 1 Section 1

WEIGHT AND BALANCE DATA

MODEL PA-28-180 CHEROKEE

Airplane Serial Number 28-7305057

Registration Number _____

Date _____

DUPLICATE

AIRPLANE EMPTY WEIGHT

Item		Weight (lbs)	x C. G. Arm (Inches Aft of Datum)	= Moment (In-Lbs)
*Empty Weight	Actual Computed			
Unusable Fuel (13-1/3 pints)		10.0	103.0	1030
Standard Empty Weight				
Optional Equipment				
Licensed Empty Weight				

*Empty weight is defined as dry empty weight (including paint and hydraulic fluid) plus 1.8 lbs. undrainable engine oil

AIRPLANE USEFUL LOAD

(Gross Weight) - (Licensed Empty Weight) = Useful Load

Normal Category: (2450 lbs) - (lbs) = lbs.

Utility Category: (1950 lbs) - (lbs) = lbs.

THIS LICENSED EMPTY WEIGHT, C. G. AND USEFUL LOAD FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED		REPORT VB-439 PAGE 2 Section 1

C. G. RANGE AND WEIGHT INSTRUCTIONS

1. Add the weight of all items to be loaded to the licensed empty weight.
2. Use the loading graph to determine the moment of all items to be carried in the airplane.
3. Add the moment of all items to be loaded to the licensed empty weight moment.
4. Divide the total moment by the total weight to determine the C. G. location.
5. By using the figures of Item 1 and Item 4, locate a point on the C. G. range and weight graph. If the point falls within the C. G. envelope, the loading meets the weight and balance requirements.

SAMPLE LOADING PROBLEM (Normal Category)

	Weight (lbs)	Arm Aft Datum (Inches)	Moment (In - lbs)
Licensed Empty Weight			
Oil (8 quarts)	15	27.5	413
Pilot and Front Passenger	340	80.5	27370
Passengers, Aft* (Rear Seat)	340	118.1	40154
Fuel (50 Gal. Maximum)		95.0	
Baggage *		142.8	
Total Loaded Airplane			

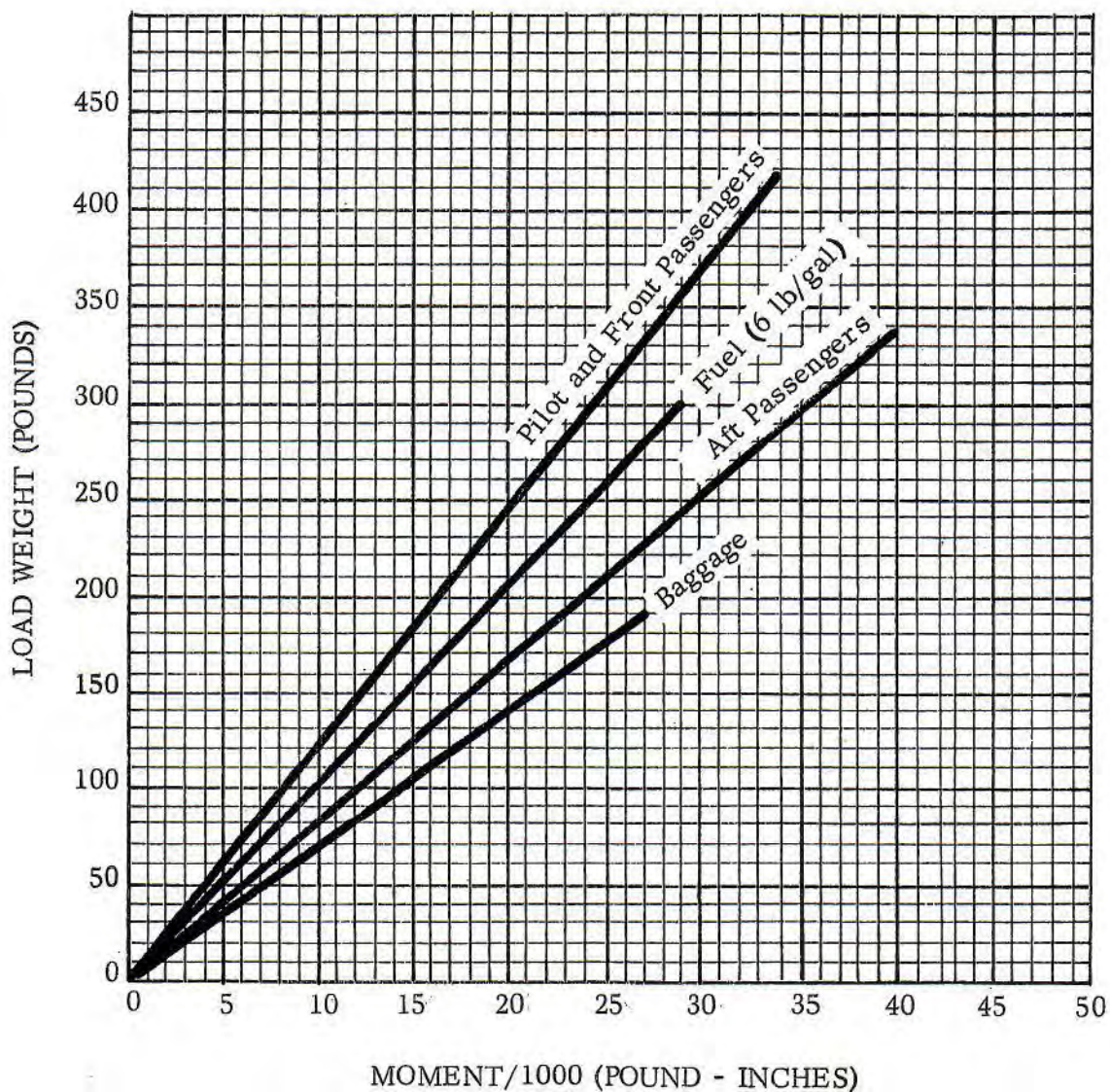
The center of gravity (C. G.) of this sample loading is at _____ inches aft of the datum line. Locate this point () on the C. G. range and weight graph. Since this point falls within the weight - C. G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

* Utility Category Operation - No baggage or aft passengers allowed.

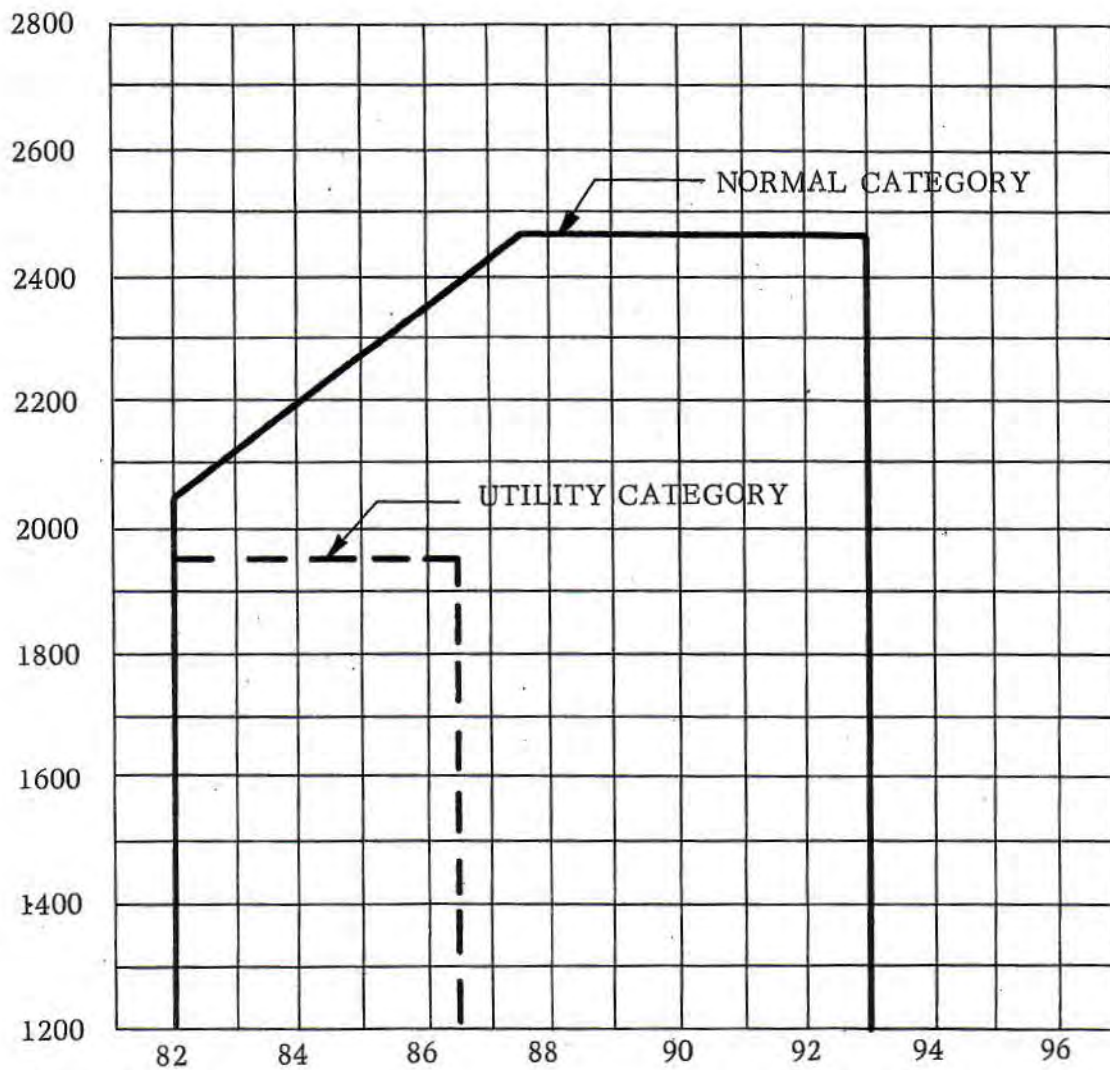
PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439	PAGE 3 Section 1

LOADING GRAPH



PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED		REPORT VB-439 PAGE 4 Section 1

C. G. RANGE AND WEIGHT



PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-439	PAGE 5 Section 1

WEIGHT AND BALANCE DATA

WEIGHING PROCEDURE

At the time of delivery, Piper Aircraft Corporation provides each airplane with the licensed empty weight and center of gravity location. This data is on Page 1, Section 1 of this report.

The removal or addition of an excessive amount of equipment or excessive airplane modifications can affect the licensed empty weight and empty weight center of gravity. The following is a weighing procedure to determine this licensed empty weight and center of gravity location:

1. PREPARATION

- a. Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.
- b. Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.
- c. Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops.
- d. Drain all oil from the engine, by means of the oil drain, with the airplane in ground attitude. This will leave the undrainable oil still in the system. Engine oil temperature should be in the normal operating range before draining.
- e. Place pilot and co-pilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.
- f. Weigh the airplane inside a closed building to prevent errors in scale readings due to the wind.

2. LEVELING

- a. With airplane on scales, block main gear oleo pistons in the fully extended position.
- b. Level airplane (see diagram) by deflating nose wheel tire, to center bubble on level.

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED		REPORT VB-439 PAGE <u>6</u> Section <u>1</u>

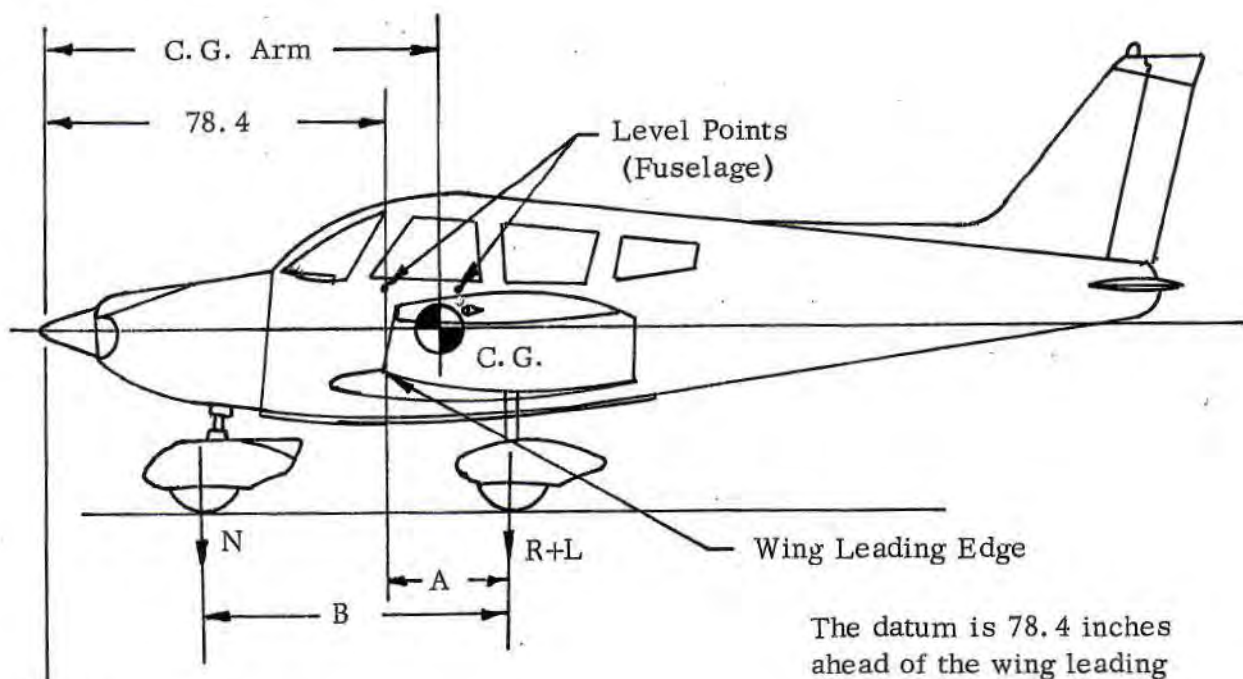
3. WEIGHING - AIRPLANE EMPTY WEIGHT

- a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

Scale Position and Symbol	Scale Reading	Tare	Net Weight
Nose Wheel (N)			
Right Main Wheel (R)			
Left Main Wheel (L)			
Airplane Empty Weight, as Weighed (T)			

4. EMPTY WEIGHT CENTER OF GRAVITY

- a. The following geometry applies to the PA-28-180 airplane when airplane is level (See Item 2).



A =

B =

The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-439	PAGE 7 Section 1

- b. Obtain measurement "A" by measuring from a plumb bob dropped from one wing leading edge, at the intersection of the straight and tapered section, horizontally and parallel to the airplane centerline, to the main wheel centerline.
- c. Obtain measurement "B" by measuring the distance from the main wheel centerline, horizontally and parallel to the airplane centerline, to each side of nose wheel axle. Then average the measurements.
- d. The empty weight center of gravity (as weighed including optional equipment and undrainable oil) can be determined by the following formula:

$$C. G. Arm = 78.4 + A - \frac{B(N)}{T}$$

$$C. G. Arm = 78.4 + (\quad) - \frac{(\quad) (\quad)}{(\quad)} = \quad \text{inches}$$

5. LICENSED EMPTY WEIGHT AND EMPTY WEIGHT CENTER OF GRAVITY

	Weight	Arm	Moment
Empty Weight (as weighed)			
Unusable Fuel (13-1/3 pints)	+10.0	103.0	+1030
Licensed Empty Weight			

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 STANDARD EQUIPMENT LIST	PAGE 8 Section 1

WEIGHT AND BALANCE
STANDARD EQUIPMENT LIST
MODEL PA-28-180

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Engine Accessories</u>			
_____	Engine - Lycoming Model O-360-A4A	288.9	21.1	6096
_____	Fuel Pump, Electric Auxiliary, Bendix Model 478360	1.8	36.8	66
_____	Fuel Pump, Engine Driven, Lycoming Dwg. No. 73297, 74082, 75148 or 75246	1.7	36.3	62
_____	Oil Cooler, Piper Dwg., Harrision #C-8526250	1.9	41.3	78
_____	Air Filter, Fram Model CA-161 PL or Purolator AFP-2	.9	29.5	27
_____	Alternator, 60 Amp., Chrysler No. 2642997	12.5	14.0	175
_____	Starter-Lycoming 76211 (Prestolite MZ4206)*	18.0	14.5	261
	<u>Propeller and Propeller Accessories</u>			
_____	Propeller, Sensenich 76EM8S5-0-60	38.5	3.8	146
_____	Spinner and Attachment Plates	4.3	3.0	13

* Included in Engine Weight.

PREPARED	PIPER AIRCRAFT CORP.		Weight and Balance Data Model PA-28-180	
CHECKED	Development Center, Vero Beach, Fla.			
APPROVED	REPORT VB-439 STANDARD EQUIPMENT LIST		PAGE <u>9</u> Section <u>1</u>	

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Landing Gear and Brakes</u>			
_____	Two Main Wheel Assemblies	32.3	109.6	3540
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-86 Brake Assembly No. 30-55			
	(b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes			
_____	One Nose Wheel 6.00-6	12.8	29.8	381
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-76B (Less Brake Drum)			
	(b) One Nose Wheel 4-Ply Rating Tire 6.00-6 with Regular Tube			
	<u>Electrical Equipment</u>			
_____	Stall Warning Device, Safe Flight Instrument Corporation No. C52207-4	.2	80.2	16
_____	Voltage Regulator, Wico Electric #X-16300B	.5	51.9	26
_____	Battery 12V, 25A.H., Rebat Model S-25	21.5	168.0	3612
_____	Overvoltage Relay, Wico Electric No. X16799	.5	55.4	28

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 STANDARD EQUIPMENT LIST	PAGE 10 Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Instrument</u>			
☐	Compass - Piper Dwg. 67462	.9	59.9	54
☐	Airspeed Indicator, Piper Dwg. 63205-2	.6	61.8	37
☐	Tachometer, Piper Dwg. 62177-3	.7	61.2	43
☐	Altimeter, Piper PS50008-2 or -3	1.0	60.9	61
☐	Engine Cluster, Piper Dwg. 95241-4	.8	62.4	50
☐	Engine Cluster, Piper Dwg. 95241-2	.8	62.4	50
	<u>Miscellaneous</u>			
☐	Forward Seat Belts (2) .75 lbs. each	1.5	81.9	123
☐	Inertia Safety Belts (2) 0.9 lbs. each	1.8	119.6	215
☐	Rear Seat Belts (2) .70 lbs. each	1.4	123.0	172
☐	Rear Seats (2)	22.8	124.2	2832
☐	Flight Manual	---	---	---
☐	Tow Bar	1.3	161.8	210
☐	Nose Wheel Fairing - Piper Dwg. 65348	3.8	29.8	113
☐	Main Wheel Fairings - Piper Dwg. 65237	7.0	109.6	767

THE ABOVE ITEMS ARE INCLUDED IN THE AIRPLANE STANDARD EMPTY WEIGHT.

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 11 Section 1

OPTIONAL EQUIPMENT LIST
MODEL PA-28-180

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Engine Accessories</u>			
_____	Vacuum Pump, Airborne Mfg. Co. Model No. 10-113A1, 113A5, or 200cc and Drive	5.0	32.0	160
_____	Oil Filter - Lycoming No. 75528 (AC #OF5578770)	3.3	35.5	117
_____	Vacuum Regulator	.7	52.0	36
_____	Vacuum Filter	.3	52.0	16
	<u>Electrical Equipment</u>			
_____	Rotating Beacon, Grimes #40-0101-15-12	1.5	263.4	395
_____	Landing Light, G. E. Model 4509	.5	13.1	7
_____	Navigation Lights (2) Grimes Model A1285 (Red and Green)	.4	106.6	43
_____	Navigation Light (Rear) (1) Grimes Model 2064 (White)	.2	281.0	56
_____	Battery 12V, 35 A. H. Rebat R-35 (Weight 27.0 lbs.)	5.5	* 168.0	924

*Weight and moment difference between standard and optional equipment.

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 12 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Electrical Equipment</u> (continued)			
_____	Cabin Light	.3	99.0	30
_____	Cabin Speaker	.8	99.0	79
_____	Auxiliary Power Receptacle, Piper Dwg. 65647	2.7	178.5	482
_____	External Power Cable 62355-2	4.6	142.8	657
_____	Piper Pitch Trim	4.3	155.3	668
_____	Heated Pitot Head	.4	100.0	40
_____	Red Strobe Light, Whelen Engineering Co.			
_____	Power Supply, Whelen Model HS	2.3	198.0	455
_____	Light (Fin Tip)	.4	263.4	105
_____	Cable	.4	230.7	92
_____	Red/White Strobe Light, Whelen Engineering Co.			
_____	Power Supply, Whelen Model HD, T3	3.0	198.0	594
_____	Light (Fin Tip)	.4	263.4	105
_____	Cable	.4	230.7	92
_____	Lights (Wing Tip) (2)	.3	106.6	32
_____	Cables	2.0	115.6	231

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 13 Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Instruments</u>			
☐	Suction Gauge, Piper Dwg. 99480-0 or -2	.5	62.2	31
☐	Vertical Speed, Piper Dwg. 99010-2, -4 or -5	1.0	60.9	61
☐	Attitude Gyro, Piper Dwg. 99002-2, -3, -4 or 05	2.2	59.4	131
☐	Directional Gyro, Piper Dwg. 99003-2, -3 -4, or -5	2.6	59.7	155
☐	Air Temperature Gauge, Piper Dwg. 99479 -0 or -2	.2	72.6	15
☐	Clock Piper Dwg. 99478	.4	62.4	25
☐	Tru-Speed Indicator, Piper Dwg. 62143-2 or -13	(Same as Standard Equipment Weight)		
☐	Turn and Slip Indicator, Piper PS50030-2 or -3	2.6	59.7	155
☐	Manifold Pressure Gauge, Piper PS50031-3 or -4	.9	60.8	55
☐	Exhaust Gas Temperature, Piper Dwg. 99026	.7	55.4	39

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 14 Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>AutoPilots</u>			
☐	Autocontrol III			
☐	Roll Servo, #1C363-1-183R	2.5	122.2	306
☐	Console, #1C338	1.2	60.1	72
☐	Cables	.7	95.5	67
☐	Attitude Gyro, #52D66	2.3	59.4	137
☐	Directional Gyro, #52D54	3.2	59.0	189
☐	Omni Coupler, #1C388	.9	59.3	53
☐	<u>AutoFlite II</u>			
☐	Roll Servo, #1C363-1-183R	2.5	122.2	306
☐	Cable	.7	93.4	65
☐	Panel Unit, #52D75-3 or -4	2.4	59.4	143

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.		Weight and Balance Data	
CHECKED			Model PA-28-180	
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST		PAGE <u>15</u> Section <u>1</u>	

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u>			
☐	Narco Mark 16 (VHF Comm/Nav)			
☐	Transceiver, Single	7.5	56.9	427
☐	Transceiver, Dual	15.0	56.9	854
☐	Narco VOA-50M Omni Converter	2.1	59.9	126
☐	Narco VOA-40 (M) Omni Converter	1.9	59.9	114
☐	Narco VOA-40 Omni Converter	1.9	59.9	114
☐	Narco Comm 10A VHF Transceiver	3.9	57.4	224
☐	Narco Comm 11A VHF Transceiver	3.6	57.4	207
☐	Narco Dual Comm 11A VHF Transceiver	7.1	57.4	408
☐	Narco Nav 10 VHF Receiver	1.9	58.6	111
☐	Narco Nav 11 VHF Receiver	2.8	58.6	164
☐	Narco Nav 12 VHF Receiver	3.4	58.6	199
☐	Narco Dual Nav 11 VHF Receiver	5.6	58.6	328
☐	King KX-175 VHF Transceiver	9.4	56.6	532
☐	King KN-73 Glideslope Receiver	3.2	184.3	590
☐	King KN-77 VOR/LOC Converter	3.6	183.6	661
☐	King KNI-520 VOR/ILS Indicator	1.7	60.5	103
☐	King KX-175 VHF Transceiver (2nd)	8.6	56.6	487
☐	King KN-77 VOR/LOC Converter	4.2	183.6	771
☐	King KNI-520 VOR/ILS Indicator	1.7	60.5	103

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 16 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (continued)			
_____	Genave 200A (VHF Comm/Nav)	5.9	57.7	340
_____	Genave 300 (VHF Comm/Nav)	5.9	57.7	340
_____	Genave Alpha 360	5.0	56.9	285
_____	Genave Theta 100	1.6	59.6	95
_____	King KX 170/175 () (VHF Comm/Nav)			
_____	Transceiver, Single	7.5	56.6	425
_____	Transceiver, Dual	15.0	56.6	849
_____	King KI 201 () VOR/LOC Ind.	2.5	59.6	149
_____	King Dual KI 201 () VOR/LOC Ind.	5.0	59.9	300
_____	King KI 211 () VOR/LOC/GS Ind.	3.3	59.9	198
_____	Nav Receiving Antenna	.5	265.0	133
_____	Cable, Nav Antenna	.9	157.0	141
_____	#1 VHF Comm Antenna	.3	157.8	47
_____	Cable, Antenna #1 VHF	.4	103.4	41
_____	#2 VHF Comm Antenna	.3	192.8	58
_____	Cable, Antenna #2 VHF	.5	120.9	60

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 16a Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	Radio (continued)			
	Anti Static Kit			
	#1 VHF Comm Antenna	1.0	160.8	161
	Cable #1 VHF Comm Antenna	0.4	103.4	41
	#2 VHF Comm Antenna	1.0	195.8	196
	Cable #2 VHF Comm Antenna	0.5	120.9	60
	Low Frequency Antenna	0.5	147.5	74
	Static Wicks	-----	-----	-----

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE <u>17</u> Section <u>1</u>

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Radio</u> (continued)			
☐	Narco ADF-31			
☐	Panel Unit	5.0	58.5	293
☐	Sensor Unit	2.5	162.7	407
☐	Sensor Cable	2.3	100.6	231
☐	Sense Antenna and Cable	.4	150.0	60
☐	Bendix ADF-T-12C			
☐	Bendix ADF-T-12D			
☐	Receiver	3.5	59.4	208
☐	Audio Amplifier	.8	52.4	42
☐	Servo Indicator	1.7	60.9	104
☐	Loop Antenna	1.3	160.8	209
☐	Cable, Interconnecting	2.3	108.0	248
☐	Sense Antenna and Cable	.4	150.0	60
☐	King KR-85			
☐	Receiver	4.3	59.4	255
☐	Servo Indicator	1.2	61.3	74
☐	Loop Antenna	1.3	161.5	210
☐	Loop Cable	1.8	108.0	194
☐	Audio Amplifier	.8	51.0	41
☐	Sense Antenna and Cable	.4	150.0	60

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE <u>18</u> Section <u>1</u>

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Radio</u> (continued)			
☐	PM-1 Marker Beacon			
☐	Receiver	1.1	121.3	133
☐	Remote Unit	.3	128.4	39
☐	Cable	.3	80.0	24
☐	UGR-2 Glide Slope			
☐	Receiver	2.4	173.8	417
☐	Cable	1.8	128.0	230
☐	Antenna	.4	87.4	35
☐	Cable, Antenna	.5	145.0	73
☐	Narco AT6-A Transponder			
☐	Panel Unit	2.0	59.4	119
☐	Remote Unit	5.7	203.0	1157
☐	Antenna and Cable	.3	197.0	59
☐	Cable, Interconnecting	.4	133.7	53

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE <u>19</u> Section <u>1</u>

	ITEM	WEIGHT (LBS)	ARM. AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Radio</u> (continued)			
☐	Narco AT50 Transponder			
☐	Panel Unit	* 3.0	57.3	172
☐	King KT76/78 Transponder			
☐	Panel Unit	3.1	58.1	180
☐	Antenna & Cable	---	--	---
☐	King KMA-20 Audio Panel	2.8	60.2	169
☐	Antenna	.5	116.3	58
☐	Cable	.4	87.5	35

* Weight includes Antenna and Cable

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 20 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (continued)			
	King KN60C DME			
	Receiver	6.8	56.7	386
	Antenna	.2	107.1	21
	Cable, Antenna	0.3	80.6	24
	Piper Automatic Locator			
	Transmitter	1.7	236.2	402
	Antenna and Cable	.2	224.4	45
	Shelf and Access Plate	.3	235.4	71
	Audio Selector Panel, Piper Dwg. 99395-0, -2, or -3	.7	61.3	43
	Microphone	.5	70.0	35
	Headset	.5	60.0	30
	<u>Miscellaneous</u>			
	Fire Extinguisher - Kidde Compact VI (with brackets)	5.3	71.0	376
	Toe Brakes (Dual)	10.5	49.6	521
	Toe Brakes (Single)	5.0	49.6	248
	Assist Step	1.8	156.0	281
	Inertia Safety Belts (Rear) (2) 0.8 lbs. each	1.6	140.3	224

PREPARED	PIPER AIRCRAFT CORP. Development Center, Vero Beach, Fla.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-439 OPTIONAL EQUIPMENT LIST	PAGE 21 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Miscellaneous</u> (continued)			
_____	Lighter	.2	62.9	13
_____	Assist Strap and Coat Hook	.2	109.5	22
_____	Overhead Vent System	1.2	130.0	156
_____	Alternate Static Source	.4	61.0	24
	Calibrated Alternate Static Source			
	Placard Required: Yes _____ No _____			
_____	Headrest (2) (Front)	2.2	94.5	208
_____	Headrest (2) (Rear)	2.2	132.1	291
_____	Air Conditioning Installation 99575-0	67.4	102.8	6929
_____	Zinc Chromate Finish	5.0	158.0	790

TOTAL OPTIONAL EQUIPMENT

EXTERIOR FINISH

Base Color _____

Registration No. Color _____

Trim Color _____

Type Finish _____

Accent Color _____

TYPE CERTIFICATE DATA SHEET (TCDS)

(09.18.2023)

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

2A13 Revision 64 Piper Aircraft, Inc	
PA-28-140	PA-28-151
PA-28-150	PA-28-161
PA-28-160	PA-28-181
PA-28-180	PA-28R-201
PA-28-235	PA-28R-201T
PA-28S-160	PA-28-236
PA-28S-180	PA-28RT-201
PA-28R-180	PA-28RT-201T
PA-28R-200	PA-28-201T
September 18, 2023	

TYPE CERTIFICATE DATA SHEET NO. 2A13

This data sheet, which is a part of Type Certificate 2A13, prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder Piper Aircraft, Inc.
2926 Piper Drive
Vero Beach, Florida 32960

Type Certificate Holder Record The New Piper Aircraft, Inc transferred TC 2A13 to Piper Aircraft, Inc on August 7, 2006.

I - Model PA-28-160 (Cherokee), 4 PCLM (Normal Category), Approved October 31, 1960, for S/N 28-03; 28-1 through 28-4377; and 28-1760A.

Engine Lycoming O-320-B2B or O-320-D2A with carburetor setting 10-3678-32

Fuel 91/96 minimum grade aviation gasoline

Engine Limits For all operations, 2700 r.p.m. (160 hp)

Propeller and Propeller Limits Sensenich M74DM or 74DM6 on S/N 28-1 through 28-1760, and 28-1760A.
Sensenich M74DMS or 74D6S5 on S/N 28-1761 through 28-4377.
Static r.p.m. at maximum permission throttle setting not over 2425 r.p.m.,
not under 2325 r.p.m.
No additional tolerance permitted.
Diameter: Not over 74", not under 72.5".

Propeller Spinner Piper P/N 14422-00 on S/N 28-1 through 28-1760, and 28-1760A.
Piper P/N 63760-04 or P/N 65805-00 on S/N 28-1761 through 28-4377.
See NOTE 11.

Airspeed Limits Never exceed 171 mph (148 knots) CAS
Maximum structural cruising 140 mph (121 knots) CAS
Maneuvering 129 mph (112 knots) CAS
Flaps Extended 115 mph (100 knots) CAS

Page No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Revision No.	64	48	48	48	48	48	64	48	48	48	48	48	48	48	48	48	48	48
Page No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Revision No.	48	50	59	62	63	48	57	50	63	63	59	48	48	48	48	48	59	62
Page No.	37	38	39	40	41	42	43	44	45	46	47							
Revision No.	61	64	59	59	62	57	62	64	59	62	64							

<u>Center of Gravity Range</u>	(+84.0) to (+95.9) at 1650 lb. or less (+85.9) to (+95.9) at 1975 lb. (+89.2) to (+95.9) at 2200 lb. Straight line variation between points given.			
<u>Empty Weight C. G. Range</u>	None			
<u>Maximum Weight</u>	2200 lb.			
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)			
<u>Maximum Baggage</u>	125 lb. at (+142.8) on S/N 28-1 through 28-1760, and 28-1760A. See NOTE 8. 200 lb. at (+142.8) on S/N 28-1761 through 28-4377.			
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.			
<u>Oil Capacity</u>	8 quarts at (+32.5), 6 quarts usable See NOTE 1 for data on system oil.			
<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up	0° Down 40°
	Ailerons	($\pm 2^\circ$)	Up	30° Down 15°
	Rudder	($\pm 2^\circ$)	Left	27° Right 27°
	Stabilator	($\pm 2^\circ$)	Up	18° Down 2°
	Stabilator Tab	($\pm 1^\circ$)	Up	3° Down 12°
<u>Nose Wheel Travel</u>	($\pm 1^\circ$) Left 30° Right 30° (Effective on S/N 28-1 through 28-3377, and 28-1760A) ($\pm 1^\circ$) Left 22° Right 22° (Effective S/N 28-3378 through 28-4377)			
<u>Manufacturer's Serial Nos.</u>	28-03; 28-1 through 28-4377; and 28-1760A.			

II - Model PA-28-150 (Cherokee), 4 PCLM (Normal Category), Approved June 2, 1961, for S/N 28-03; 28-1 through 28-4377; and 28-1760A.

<u>Engine</u>	Lycoming O-320-A2B or O-320-E2A with carburetor setting 10-3678-32			
<u>Fuel</u>	80/87 minimum grade aviation gasoline			
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (150 hp)			
<u>Propeller and Propeller Limits</u>	Sensenich M74DM or 74DM6 on S/N 28-1 through 28-1760, and 28-1760A. Sensenich M74DMS or 74DM6S5 on S/N 28-1761 through 28-4377. Static r.p.m. at maximum permissible throttle setting not over 2375 r.p.m., not under 2275 r.p.m. No additional tolerance permitted. Diameter: Not over 74", not under 72.5".			
<u>Propeller Spinner</u>	Piper P/N 14422-00 on S/N 28-1 through 28-1760, and 28-1760A. Piper P/N 63760-04 or 65805-00 on S/N 28-1761 through 28-4377. See NOTE 11.			
<u>Airspeed Limits</u>	Never exceed	171 mph	(148 knots)	CAS
	Maximum structural cruising	140 mph	(121 knots)	CAS
	Maneuvering	129 mph	(112 knots)	CAS
	Flaps Extended	115 mph	(100 knots)	CAS

<u>Center of Gravity Range</u>	(+84.0) to (+95.9) at 1650 lb. or less (+85.9) to (+95.9) at 1975 lb. (+88.4) to (+95.9) at 2150 lb. Straight line variation between points given.			
<u>Empty Wt. C. G. Range</u>	None			
<u>Maximum Weight</u>	2150 lb.			
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)			
<u>Maximum Baggage</u>	125 lb. at (+142.8) on S/N 28-1 through 28-1760, and 28-1760A. See NOTE 8. 200 lb. at (+142.8) on S/N 28-1761 through 28-4377.			
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.			
<u>Oil Capacity</u>	8 quarts at (+32.5) (6 quarts usable) See NOTE 1 for data on system oil.			
<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up	0° Down 40°
	Ailerons	($\pm 2^\circ$)	Up	30° Down 15°
	Rudder	($\pm 2^\circ$)	Left	27° Right 27°
	Stabilator	($\pm 1^\circ$)	Up	18° Down 2°
	Stabilator Tab	($\pm 1^\circ$)	Up	3° Down 12°
<u>Nose Wheel Travel</u>	($\pm 2^\circ$)	Left	30°	Right 30°
	(Effective on S/N 28-03; 28-1 through 28-3377; and 28-1760A)			
	($\pm 2^\circ$)	Left	22°	Right 22°
	(Effective on S/N 28-3378 through 28-4377)			
<u>Manufacturer's Serial Nos.</u>	28-03; 28-1 through 28-4377; and 28-1760A.			

III - Model PA-28-180 (Cherokee), 4 PCLM (Normal Category), Approved August 3, 1962; 2 PCLM (Utility Category), Approved December 6, 1966, for S/N 28-03; 28-671 through 28-5859; and 28-7105001 through 28-7205318.

<u>Engine</u>	Lycoming O-360-A3A or O-360-A4A with carburetor setting 10-3878 or 10-4164-1
<u>Fuel</u>	91/96 minimum grade aviation gasoline
<u>Engine Limits</u>	S/N 28-671 through 28-1760, and 28-1760A (except S/N 28-1571 and S/N 28-1573) (See NOTE 4): Maximum permissible takeoff, 2475 r.p.m. For all other operations, 2700 r.p.m. (180 hp) S/N 28-1571; 28-1573; 28-1761 through 28-5859; and 28-7105001 through 28-7205318: For all operations, 2700 r.p.m. (180 hp)
<u>Propeller and Propeller Limits</u>	Sensenich M76EMM or 76EM8 on S/N 28-671 through 28-1760, and 28-1760A (except S/N 28-1571 and S/N 28-1573). Sensenich M76EMMS or 76EM8S5 on S/N 28-1571, 28-1573; 28-1761 through 28-5859; and 28-7105001 through 28-7205318. Static r.p.m. at maximum permissible throttle setting not over 2450 r.p.m., not under 2275 r.p.m. No additional tolerance permitted. Diameter: Not over or under 76". See NOTE 10.

Propeller Spinner

Piper P/N 14422-00 on S/N 28-671 through 28-1760, and 28-1760A.
 Piper P/N 63760-04 or 65805-00 on S/N 28-1761 through 28-5859; and 28-7105001
 through 28-7205318.
 See NOTE 11.

Airspeed Limits

Never exceed	171 mph	(148 knots)	CAS
Maximum structural cruising	140 mph	(121 knots)	CAS
Maneuvering	129 mph	(112 knots)	CAS
Flaps Extended	115 mph	(100 knots)	CAS

Center of Gravity RangeUtility Category (See NOTE 9)

(+84.0)	to	(+86.5)	at	1650 lb. or less
(+85.8)	to	(+86.5)	at	1950 lb.

Normal Category (See NOTE 15)

(S/N 28-671 through 28-5859)

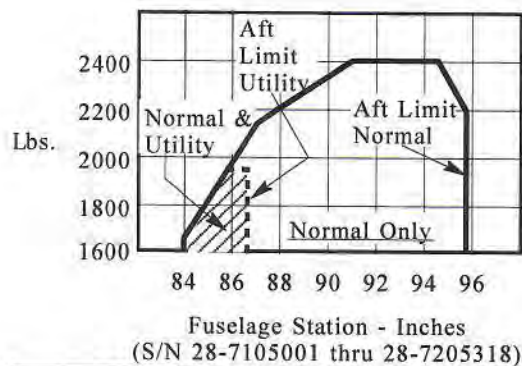
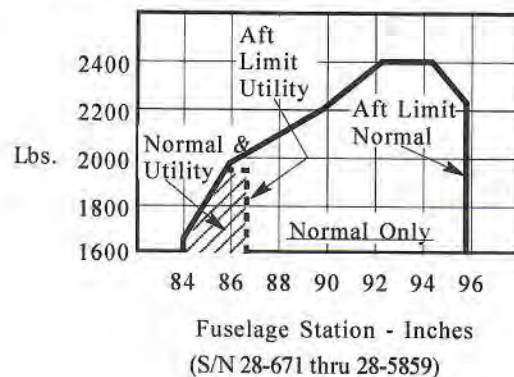
(+84.0)	to	(+95.9)	at	1650 lb. or less
(+85.9)	to	(+95.9)	at	1975 lb.
(+89.2)	to	(+95.9)	at	2200 lb.
(+92.1)	to	(+94.5)	at	2400 lb.

Normal Category

(S/N 28-7105001 through 28-7205318)

(+84.0)	to	(+95.9)	at	1650 lb. or less
(+87.0)	to	(+95.9)	at	2150 lb.
(+87.8)	to	(+95.9)	at	2200 lb.
(+91.0)	to	(+94.5)	at	2400 lb.

Straight Line Variation Between Points Given

Empty Weight C. G. Range

None

<u>Maximum Weight</u>	Normal Category: 2400 lb. Utility Category: 1950 lb.																																																							
<u>No. of Seats</u>	Normal Category: 4 (2 at +85.5, 2 at +118.1) Utility Category: 2 (2 at +85.5)																																																							
<u>Maximum Baggage</u>	Eligible Normal Category Only: 125 lb. at (+142.8) on S/N 28-671 through 28-1760, and 28-1760A. See NOTE 8. 200 lb. at (+142.8) on S/N 28-1761 through 28-5859, and 28-7105001 through 28-7205318.																																																							
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.																																																							
<u>Oil Capacity</u>	8 quarts at (+32.5) (6 quarts usable) See NOTE 1 for data on system oil.																																																							
<u>Control Surface Movements</u>	<table><tr><td>Wing flaps</td><td>(± 2°)</td><td>Up</td><td>0°</td><td>Down</td><td>40°</td></tr><tr><td>Ailerons</td><td>(± 2°)</td><td>Up</td><td>30°</td><td>Down</td><td>15°</td></tr><tr><td>Rudder</td><td>(± 2°)</td><td>Left</td><td>27°</td><td>Right</td><td>27°</td></tr><tr><td>Stabilator</td><td>(± 1°)</td><td>Up</td><td>18°</td><td>Down</td><td>2°</td></tr><tr><td>Stabilator Tab</td><td>(± 1°)</td><td>Up</td><td>3°</td><td>Down</td><td>12°</td></tr></table>	Wing flaps	(± 2°)	Up	0°	Down	40°	Ailerons	(± 2°)	Up	30°	Down	15°	Rudder	(± 2°)	Left	27°	Right	27°	Stabilator	(± 1°)	Up	18°	Down	2°	Stabilator Tab	(± 1°)	Up	3°	Down	12°																									
Wing flaps	(± 2°)	Up	0°	Down	40°																																																			
Ailerons	(± 2°)	Up	30°	Down	15°																																																			
Rudder	(± 2°)	Left	27°	Right	27°																																																			
Stabilator	(± 1°)	Up	18°	Down	2°																																																			
Stabilator Tab	(± 1°)	Up	3°	Down	12°																																																			
<u>Nose Wheel Travel</u>	<table><tr><td>(± 2°)</td><td>Left</td><td>30°</td><td>Right</td><td>30°</td></tr></table> (Effective on S/N 28-671 through 28-3377) <table><tr><td>(± 2°)</td><td>Left</td><td>22°</td><td>Right</td><td>22°</td></tr></table> (Effective on S/N 28-3378 through 28-5859, and 28-7105001 through 28-7205318)	(± 2°)	Left	30°	Right	30°	(± 2°)	Left	22°	Right	22°																																													
(± 2°)	Left	30°	Right	30°																																																				
(± 2°)	Left	22°	Right	22°																																																				
<u>Manufacturer's Serial Nos.</u>	28-03; 28-671 through 28-5859; and 28-7105001 through 28-7205318. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers: <table><tr><td>28-4704</td><td>28-4745</td><td>28-4754</td><td>28-4763</td><td>28-4776</td></tr><tr><td>28-4791</td><td>28-4795</td><td>28-4826</td><td>28-4834</td><td>28-4859</td></tr><tr><td>28-4875</td><td>28-4879</td><td>28-4891</td><td>28-4907</td><td>28-4919</td></tr><tr><td>28-4922</td><td>28-4935</td><td>28-4945</td><td>28-4946</td><td>28-4947</td></tr><tr><td>28-4955</td><td>28-4959</td><td>28-4961</td><td>27-4964</td><td>28-4967</td></tr><tr><td>28-4968</td><td>28-4971</td><td>28-4975</td><td>28-4977</td><td>28-4985</td></tr><tr><td>28-4995</td><td>28-4999</td><td>28-5004</td><td>28-5007</td><td>28-5015</td></tr><tr><td>28-5017</td><td>28-5018</td><td>28-5019</td><td>28-5020</td><td>28-5023</td></tr><tr><td>28-5026</td><td>28-5027</td><td>28-5028</td><td>28-5031</td><td>28-5039</td></tr><tr><td>28-5041</td><td>28-5046</td><td>28-5051</td><td>28-5053</td><td>28-5057</td></tr><tr><td>28-5060</td><td>28-5061</td><td>28-5062</td><td>28-5063</td><td>28-5064</td></tr></table> 28-5066 through 28-5859, and 28-7105001 through 28-7205318 under the delegation option provisions of FAR 21. See NOTE 17 and 20.	28-4704	28-4745	28-4754	28-4763	28-4776	28-4791	28-4795	28-4826	28-4834	28-4859	28-4875	28-4879	28-4891	28-4907	28-4919	28-4922	28-4935	28-4945	28-4946	28-4947	28-4955	28-4959	28-4961	27-4964	28-4967	28-4968	28-4971	28-4975	28-4977	28-4985	28-4995	28-4999	28-5004	28-5007	28-5015	28-5017	28-5018	28-5019	28-5020	28-5023	28-5026	28-5027	28-5028	28-5031	28-5039	28-5041	28-5046	28-5051	28-5053	28-5057	28-5060	28-5061	28-5062	28-5063	28-5064
28-4704	28-4745	28-4754	28-4763	28-4776																																																				
28-4791	28-4795	28-4826	28-4834	28-4859																																																				
28-4875	28-4879	28-4891	28-4907	28-4919																																																				
28-4922	28-4935	28-4945	28-4946	28-4947																																																				
28-4955	28-4959	28-4961	27-4964	28-4967																																																				
28-4968	28-4971	28-4975	28-4977	28-4985																																																				
28-4995	28-4999	28-5004	28-5007	28-5015																																																				
28-5017	28-5018	28-5019	28-5020	28-5023																																																				
28-5026	28-5027	28-5028	28-5031	28-5039																																																				
28-5041	28-5046	28-5051	28-5053	28-5057																																																				
28-5060	28-5061	28-5062	28-5063	28-5064																																																				

IV - Model PA-28S-160 (Cherokee), 4 PCSM (Normal Category), Approved February 25, 1963, for S/N 28-1 through 28-1760; and S/N 28-1760A.

<u>Engine</u>	Lycoming O-320-D2A with carburetor setting 10-3678-32 (See NOTE 18)
<u>Fuel</u>	100/130 minimum grade aviation gasoline
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (160 hp)
<u>Propeller and Propeller Limits</u>	McCauley 1A175-GM Static r.p.m. at maximum permissible throttle setting not over 2360 r.p.m., not under 2260 r.p.m. No additional tolerance permitted. Diameter: Not over 79", not under 78".

<u>Propeller Spinner</u>	Piper P/N 14422-00 spinner required.					
<u>Airspeed Limits</u>	Never exceed	153 mph	(133 knots)	CAS		
	Maximum structural cruising	140 mph	(121 knots)	CAS		
	Maneuvering	129 mph	(112 knots)	CAS		
	Flaps Extended	115 mph	(100 knots)	CAS		
<u>Center of Gravity</u>	(+85.1) to (+93.5)	at	1850 lb. or less			
	(+87.0) to (+93.5)	at	2100 lb.			
	(+87.9) to (+93.5)	at	2140 lb.			
	Straight line variation between points given.					
<u>Empty Weight C. G. Range</u>	None					
<u>Maximum Weight</u>	2140 lb.					
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)					
<u>Maximum Baggage</u>	125 lb. at (+142.8)					
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.					
<u>Oil Capacity</u>	8 quarts at (+32.5) (6 quarts usable) See NOTE 1 for data on system oil.					
<u>Control Surface Movements</u>	Wing flaps	(±2°)	Up	0°	Down	40°
	Ailerons	(±2°)	Up	30°	Down	15°
	Rudder	(±2°)	Left	27°	Right	27°
	Stabilator	(±1°)	Up	18°	Down	2°
	Stabilator Tab	(±1°)	Up	3°	Down	12°
<u>Manufacturer's Serial Nos.</u>	28-03; 28-1 through 28-1760; and 28-1760A.					

V - Model PA-28S-180 (Cherokee), 4 PCSM (Normal Category), Approved May 10, 1963, for S/N 28-671 through 28-5859, and 28-7105001 through 28-7105234.

<u>Engine</u>	Lycoming O-360-A3A or O-360-A4A with carburetor setting 10-4164-1 See NOTE 19.					
<u>Fuel</u>	100/130 minimum grade aviation gasoline					
<u>Engine Limits</u>	S/N 28-671 through 28-1760, and 28-1760A (except S/N 28-1571 and S/N 28-1573): Maximum permissible takeoff, 2350 r.p.m. For all other operations, 2700 r.p.m. (180 hp) See NOTE 4.					
	S/N 28-1571; 28-1573; 28-1761 through 28-5859; and 28-7105001 through 28-7105234: For all operations, 2700 r.p.m. (180 hp)					
<u>Propeller and Propeller Limits</u>	McCauley 1A200-FA8248 on S/N 28-671 to 28-1760, and 28-1760A. McCauley 1A200-DFA8248 on S/N 28-1761 through 28-5859, and 28-7105001 through 28-7105234. Static r.p.m. at maximum permissible throttle setting not over 2190 r.p.m., not under 2140 r.p.m. No additional tolerance permitted. Diameter: Not over 82", not under 81".					

<u>Propeller Spinner</u>	Spinner required. Piper P/N 14422-00 on S/N 28-671 through 28-1760, and 28-1760A. Piper P/N 63760-04 or 65805-00 on S/N 28-1761 through 28-5859, and 28-7105001 through 28-7105234.				
<u>Airspeed Limits</u>	Never exceed	153 mph	(133 knots)	CAS	
	Maximum structural cruising	140 mph	(121 knots)	CAS	
	Maneuvering	129 mph	(112 knots)	CAS	
	Flaps Extended	115 mph	(100 knots)	CAS	
<u>Center of Gravity</u>	(+85.1) to (+92.5) at 1850 lb. or less (+87.0) to (+92.5) at 2100 lb. (+89.8) to (+92.5) at 2222 lb. Straight line variation between points given.				
<u>Empty Weight C. G. Range</u>	None				
<u>Maximum Weight</u>	2222 lb.				
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)				
<u>Maximum Baggage</u>	125 lb. at (+142.8)				
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.				
<u>Oil Capacity</u>	8 quarts at (+32.5) (6 quarts usable) See NOTE 1 for data on system oil.				
<u>Control Surface Movements</u>	Wing flaps	(±2°)	Up	0°	Down 40°
	Ailerons	(±2°)	Up	30°	Down 15°
	Rudder	(±2°)	Left	27°	Right 27°
	Stabilator	(±1°)	Up	18°	Down 2°
	Stabilator Tab	(±1°)	Up	3°	Down 12°
<u>Manufacturer's Serial Nos.</u>	28-671 through 28-5859, and 28-7105001 through 28-7105234. See NOTE 30. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers: 28-4704 28-4745 28-4754 28-4763 28-4776 28-4791 28-4795 28-4826 28-4834 28-4859 28-4875 28-4879 28-4891 28-4907 28-4919 28-4922 28-4935 28-4945 28-4946 28-4947 28-4955 28-4959 28-4961 27-4964 28-4967 28-4968 28-4971 28-4975 28-4977 28-4985 28-4995 28-4999 28-5004 28-5007 28-5015 28-5017 28-5018 28-5019 28-5020 28-5023 28-5026 28-5027 28-5028 28-5031 28-5039 28-5041 28-5046 28-5051 28-5053 28-5057 28-5060 28-5061 28-5062 28-5063 28-5064 28-5066 through 28-5859, and 28-7105001 through 28-7105234 under the delegation option provisions of FAR 21. See NOTE 17 and 20.				

VI - Model PA-28-235 (Cherokee Pathfinder), 4 PCLM (Normal Category), Approved July 15, 1963, for S/N 28-10001 through 28-11378, and 28-7110001 through 28-7210023.

<u>Engine</u>	Lycoming O-540-B2B5, O-540-B1B5, or O-540-B4B5 with carburetor setting 10-4404, 10-5042, or 10-5054. (Baffle P/N 68759 required with 10-5054 setting.)		
<u>Fuel</u>	80/87 minimum grade aviation gasoline		
<u>Engine Limits</u>	For all operations, 2575 r.p.m. (235 hp)		
<u>Propeller and Propeller Limits</u>	McCauley 1P235PFA80 Static r.p.m. at maximum permissible throttle setting not over 2300 r.p.m., not under 2125 r.p.m. No additional tolerance permitted. Diameter: Not over 80", not under 78.5". or Hartzell HC-C2YK-1/8468A-4 or HC-C2YK-1()F/F8468A-4 Pitch: High 27° ± 2°, Low 13.5° ± .2° at 30" station. Diameter: Not over 80", not under 80". Governor assembly: Hartzell F-4-3 () or F-4-13 See NOTE 21. or <u>Approved for Use with O-540-B4B5 Engine Only:</u> Sensenich M80BMM or 80BM8 Pitch from 69" to 71". Static r.p.m. at maximum permissible throttle setting not over 2300 r.p.m., not under 2150 r.p.m. No additional tolerances permitted. Diameter: Not over 80", not under 78.5".		
<u>Propeller Spinner</u>	Piper P/N 65209-00 or P/N 63760-03 with fixed pitch propeller. Spinner required. Piper P/N 65435-0 or P/N 68713 or P/N 66785 spinner tip and P/N 66786 spinner shell or P/N 67790-0 spinner, P/N 67791-0 bulkhead, P/N 67793-0 bulkhead and P/N 99499-0 plate. Two each P/N 67794-0 cuff, or Kit 760 452V with constant speed propeller. See NOTE 14.		
<u>Airspeed Limits</u>	Never exceed	197 mph (171 knots)	CAS
	Maximum structural cruising	156 mph (136 knots)	CAS
	Maneuvering	138 mph (120 knots)	CAS
	Flaps Extended	115 mph (100 knots)	CAS
<u>Center of Gravity Range</u>	S/N 28-10001 through 28-11378 (See NOTE 16): (+81.5) to (+93.5) at 2100 lb. or less (+91.5) to (+93.5) at 2900 lb. S/N 28-7110001 through 28-7210023: (+85.1) to (+93.5) at 2100 lb. or less (+86.0) to (+93.5) at 2600 lb. (+91.5) to (+93.5) at 2900 lb. Straight line variation between points given.		
<u>Empty Weight C. G. Range</u>	None		
<u>Maximum Weight</u>	2900 lb.		
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)		
<u>Maximum Baggage</u>	200 lb. at (+142.8)		

<u>Fuel Capacity</u>	84 gallons at (+95) (50 gallons in 2 wing tanks, 34 gallons in 2 tip tanks). See NOTE 1 for data on system fuel.		
<u>Oil Capacity</u>	12 quarts at (+34.1)(9 ¼ quarts usable) See NOTE 1 for data on system oil.		
<u>Control Surface Movements</u>	Wing flaps	(±2°)	Up 0° Down 40°
	Ailerons	(±2°)	Up 30° Down 15°
	Rudder	(+2°)	Left 27° Right 27°
	Stabilator	(±1°)	Up 18° Down 2°
	Stabilator Tab	(±1°)	Up 3° Down 12°
<u>Nose Wheel Travel</u>	(±2°)	Left 30° Right 30°	
	(Effective on S/N 28-10001 through 28-11039)		
	(±2°)	Left 22° Right 22°	
	(Effective on S/N 28-11040 through 28-11378, and 28-7110001 through 28-7210023)		
<u>Manufacturer's Serial Nos.</u>	28-10001 through 28-11378, and 28-7110001 through 28-7210023. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-11063, 28-11064, 28-11070, 28-11072 through 28-11378, and 28-7110001 through 28-7210023 under the delegation option provisions of FAR 21. See NOTE 17 and 20.		

VII - Model PA-28-140 (Cherokee Cruiser), 2 PCLM (Utility or Normal Category); 1950 lb. Maximum Weight, Approved February 14, 1964; 2150 lb. Maximum Weight, Approved June 17, 1965; for S/N 28-20001 through 28-26946, and 28-7125001 through 28-7725290.

<u>Engine</u>	Lycoming O-320-E2A with carburetor setting 10-3678-32 or O-320-E3D with carburetor setting 10-5009		
<u>Fuel</u>	80/87 minimum grade aviation gasoline		
<u>Engine Limits</u>	For all operations 2700 r.p.m. (150 hp)		
<u>Propeller and Propeller Limits</u>	For 1950 lb. maximum weight - Normal Category; S/N 28-20001 through 28-20939; or Utility Category, S/N 28-20001 through 28-26946, and 28-7125001 through 28-7725290: Sensenich M74DM or 74DM6 Static r.p.m. at maximum permissible throttle setting not over 2425 r.p.m., not under 2150 r.p.m. No additional tolerance permitted. Diameter: Not over 74", not under 72.5".		
	For 2150 lb. maximum weight - Normal Category; S/N 28-20940 through 28-26946, and 28-7125001 through 28-7725290: Sensenich M74DM or 74DM6 Static r.p.m. at maximum permissible throttle setting not over 2425 r.p.m., not under 2275 r.p.m. No additional tolerance permitted. Diameter: Not over 74", not under 72.5".		
<u>Propeller Spinner</u>	Piper P/N 14422-00. See NOTE 11.		
<u>Airspeed Limits</u>	Never exceed	171 mph (148 knots)	CAS
	Maximum structural cruising	140 mph (121 knots)	CAS
	Maneuvering	129 mph (112 knots)	CAS
	Flaps Extended	115 mph (100 knots)	CAS

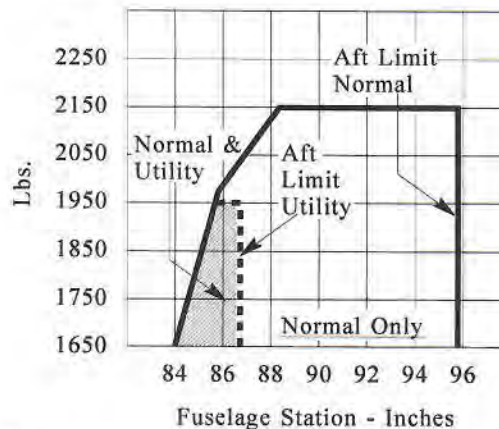
Center of Gravity RangeUtility Category

(+84.0) to (+86.5) at 1650 lb. or less
 (+85.8) to (+86.5) at 1950 lb.

Normal Category

(+84.0) to (+95.9) at 1650 lb. or less
 (+85.9) to (+95.9) at 1975 lb.
 (+88.4) to (+95.9) at 2150 lb.

Straight line variation between points given.

Empty Weight C. G. Range

None

Maximum Weight

Normal Category: 1950 lb. on S/N 28-20001 through 28-20939 (See NOTE 6).
 2150 lb. on S/N 28-20940 through 28-26946, and 28-7125001 through 28-7725290.

Utility Category: 1950 lb. on S/N 28-20001 through 28-26946, and 28-7125001 through 28-7725290.

No. of Seats

2 at (+85.5)

Maximum Baggage

Eligible Normal Category Only:

100 lb. at (+117) on S/N 28-20001 through 28-20939 (See NOTE 12).

200 lb. at (+117) on S/N 28-20940 through 28-26946, and 28-7125001 through 28-7725290.

300 lb. at (+117 and +133) on S/N 28-20940 through 28-26946, and 28-7125001 through 28-7725290 (See NOTE 13).

Fuel Capacity

50 gallon at (+95) (2 wing tanks)
 See NOTE 1 for data on system fuel.

Oil Capacity

8 quarts at (+32.5) (6 quarts usable)
 See NOTE 1 for data on system oil.

Control Surface Movements

Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
Ailerons	($\pm 2^\circ$)	Up	30°	Down	15°
Rudder	($\pm 2^\circ$)	Left	27°	Right	27°
Stabilator	($\pm 1^\circ$)	Up	18°	Down	2°
Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

Nose Wheel Travel

($\pm 2^\circ$) Left 30° Right 30°
 (Effective on S/N 28-20001 through 28-21845; 28-21931 through 28-21934; and 28-7425001 through 28-7725290)
 ($\pm 2^\circ$) Left 22° Right 22°
 (Effective on S/N 28-21846 through 28-21930; 28-21935 through 28-26946; and 28-7125001 through 28-7325674)

Manufacturer's Serial Nos.

28-20001 through 28-26946; and 28-7125001 through 28-7725290. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-24677, 28-24682, 28-24697, 28-24698, 28-24700, 28-24703, 28-24704, 28-24705, 28-24706, 28-24709, 28-24710, 28-24712, 28-24713, 28-24714, 28-24715 through 28-26946, and 28-7125001 through 28-7725290 under the delegation option provisions of FAR 21. See NOTE 17 and 20.

VIII - Model PA-28-140 (Cherokee Cruiser), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved June 17, 1965, for S/N 28-20001 through 28-26946, and 28-7125001 through 28-7725290.

Engine Lycoming O-320-E2A with carburetor setting 10-3678-32 or 10-5009 or O-320-E3D with carburetor setting 10-5009

Fuel 80/87 minimum grade aviation gasoline

Engine Limits For all operations 2700 r.p.m. (150 hp)

Propeller and Propeller Limits Sensenich M74DM or 74DM6
Static r.p.m. at maximum permissible throttle setting not over 2425 r.p.m., not under 2275 r.p.m.
No additional tolerance permitted.
Diameter: Not over 74", not under 72.5".

Propeller Spinner Piper P/N 14422-00.
See NOTE 11.

<u>Airspeed Limits</u>	Never exceed	171 mph	(148 knots)	CAS
	Maximum structural cruising	140 mph	(121 knots)	CAS
	Maneuvering	129 mph	(112 knots)	CAS
	Flaps Extended	115 mph	(100 knots)	CAS

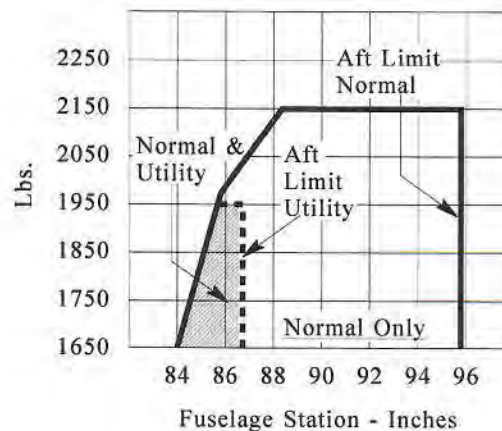
Center of Gravity Range

<u>Utility Category</u>			
(+84.0)	to	(+86.5)	at 1650 lb. or less
(+85.8)	to	(+86.5)	at 1950 lb.

Normal Category

(+84.0)	to	(+95.9)	at 1650 lb. or less
(+85.9)	to	(+95.9)	at 1975 lb.
(+88.4)	to	(+95.9)	at 2150 lb.

Straight line variation between points given.



<u>Empty Weight C. G. Range</u>	None																														
<u>Maximum Weight</u>	Normal Category: 2150 lb. Utility Category: 1950 lb.																														
<u>No. of Seats</u>	Normal Category: 4 (2 at +85.5, 2 at +117) Utility Category: 2 (2 at +85.5)																														
<u>Maximum Baggage</u>	Eligible Normal Category only; 100 lb. at (+117) on S/N 28-20001 through 28-20939 (See NOTE 12). 200 lb. at (+117) on S/N 28-20940 through 28-26946; and 28-7125001 through 28-7725290. 300 lb. at (+117 and +133) on S/N 28-20940 through 28-26946; and 28-7125001 through 28-7725290 (See NOTE 13).																														
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.																														
<u>Oil Capacity</u>	8 quarts at (+32.5) (6 quarts usable) See NOTE 1 for data on system oil.																														
<u>Control Surface Movements</u>	<table><tr><td>Wing flaps</td><td>(±2°)</td><td>Up</td><td>0°</td><td>Down</td><td>40°</td></tr><tr><td>Ailerons</td><td>(±2°)</td><td>Up</td><td>30°</td><td>Down</td><td>15°</td></tr><tr><td>Rudder</td><td>(±2°)</td><td>Left</td><td>27°</td><td>Right</td><td>27°</td></tr><tr><td>Stabilator</td><td>(±1°)</td><td>Up</td><td>18°</td><td>Down</td><td>2°</td></tr><tr><td>Stabilator Tab</td><td>(±1°)</td><td>Up</td><td>3°</td><td>Down</td><td>12°</td></tr></table>	Wing flaps	(±2°)	Up	0°	Down	40°	Ailerons	(±2°)	Up	30°	Down	15°	Rudder	(±2°)	Left	27°	Right	27°	Stabilator	(±1°)	Up	18°	Down	2°	Stabilator Tab	(±1°)	Up	3°	Down	12°
Wing flaps	(±2°)	Up	0°	Down	40°																										
Ailerons	(±2°)	Up	30°	Down	15°																										
Rudder	(±2°)	Left	27°	Right	27°																										
Stabilator	(±1°)	Up	18°	Down	2°																										
Stabilator Tab	(±1°)	Up	3°	Down	12°																										
<u>Nose Wheel Travel</u>	<table><tr><td>(±2°)</td><td>Left</td><td>30°</td><td>Right</td><td>30°</td></tr></table> (Effective on S/N 28-20940 through 28-21845; 28-21931 through 28-21934; and 28-7425001 through 28-7725290) <table><tr><td>(± 2°)</td><td>Left</td><td>22°</td><td>Right</td><td>22°</td></tr></table> (Effective on S/N 28-21846 through 28-21930; 28-21935 through 28-26946; and 28-7125001 through 28-7325674)	(±2°)	Left	30°	Right	30°	(± 2°)	Left	22°	Right	22°																				
(±2°)	Left	30°	Right	30°																											
(± 2°)	Left	22°	Right	22°																											
<u>Manufacturer's Serial Nos.</u>	28-20001 through 28-26946, and 28-7125001 through 28-7725290. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-24677, 28-24682, 28-24697, 28-24698, 28-24700, 28-24703, 28-24704, 28-24705, 28-24706, 28-24709, 28-24710, 28-24712, 28-24713, 28-24714, 28-24715 through 28-26946, and 28-7125001 through 28-7725290 under the delegation option provisions of FAR 21. See NOTE 17 and 20.																														

IX - Model PA-28R-180 (Arrow), 4 PCLM (Normal Category), Approved June 8, 1967, for S/N 28R-30002 through 28R-31270, and 28R-7130001 through 28R-7130013.

<u>Engine</u>	Lycoming IO-360-B1E
<u>Injector</u>	Bendix type RSA-5ADI Parts List No. 2524297
<u>Fuel</u>	100/130 minimum grade aviation gasoline
<u>Engine limits</u>	For all operations, 2700 r.p.m. (180 hp)
<u>Propeller and Propeller Limits</u>	Hartzell constant speed Model HC-C2YK-()/7666A-0 or HC-C2YK-1()/F7666A Pitch: High $29.0^\circ \pm 1^\circ$, Low $13.0^\circ \pm .2^\circ$ at 30" Station. Diameter: Not over 76", not under 74.5". Governor Assembly: Hartzell F-2-2 () or F-2-7 () Avoid continuous operation between 2000 - 2200 r.p.m.

<u>Propeller Spinner</u>	Piper P/N 68713 or P/N 66785 spinner tip and P/N 66786 spinner shell, or P/N 67790-0 spinner, P/N 67791-0 bulkhead, P/N 67793-0 bulkhead, and P/N 99499-0 plate. Two each P/N 67794-0 cuff or Kit 760 410V. See NOTE 11.			
<u>Airspeed Limits</u>	Never exceed	214 mph	(186 knots)	CAS
	Maximum structural cruising	170 mph	(148 knots)	CAS
	Maneuvering	134 mph	(116 knots)	CAS
	Flaps extended	125 mph	(109 knots)	CAS
	Maximum gear extension	150 mph	(130 knots)	CAS
	Maximum gear retraction	125 mph	(109 knots)	CAS
<u>Center of Gravity Range</u>	(+81.0) to (+95.9) at 1925 lb. or less (+91.0) to (+95.9) at 2500 lb. Straight line variation between points given. Moment due to retracting of landing gear (+819 in-lb.)			
<u>Empty Weight C. G. Range</u>	None			
<u>Maximum Weight</u>	2500 lb.			
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)			
<u>Maximum Baggage</u>	200 lb. at (+142.8)			
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.			
<u>Oil Capacity</u>	8 quarts at (+29.5) (6 quarts usable) See NOTE 1 for data on system oil.			
<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up 0°	Down 40°
	Ailerons	($\pm 2^\circ$)	Up 30°	Down 15°
	Rudder	($\pm 2^\circ$)	Left 27°	Right 27°
	Stabilator	($\pm 1^\circ$)	Up 18°	Down 2°
	Stabilator Tab	($\pm 1^\circ$)	Up 3°	Down 12°
<u>Nose Wheel Travel</u>	($\pm 2^\circ$)	Left 30°	Right 30°	
<u>Manufacturer's Serial Nos.</u>	28R-30002 through 28R-31270, and 28R-7130001 through 28R-7130013. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers: 28R-30538 28R-30546 28R-30559 28R-30586 28R-30587 28R-30602 28R-30603 28R-30605 28R-30624 28R-30627 28R-30638 28R-30639 28R-30642 28R-30684 28R-30697 28R-30708 28R-30726 28R-30739 28R-30740 28R-30747 28R-30750 28R-30752 28R-30759 28R-30760 28R-30766 28R-30776 28R-30779 28R-30785 28R-30787 28R-30795 28R-30801 28R-30809 28R-30815 28R-30819 28R-30821 28R-30824 28R-30827 28R-30832 28R-30835 28R-30838 28R-30842 28R-30845 28R-30849 28R-30853 28R-30857 28R-30860 28R-30865 28R-30866 28R-30867 28R-30868 28R-30869 28R-30872 28R-30874 28R-30875 28R-30877 through 28R-31270, and 28R-7130001 through 28R-7130013 under the delegation option provisions of FAR 21. See NOTE 17 and 20.			

X - Model PA-28R-200 (Arrow), 4 PCLM (Normal Category), Approved January 16, 1969, S/N 28R-35001 through 28R-35820 and 28R-7135001 through 28R-7135229.

<u>Engine</u>	Lycoming IO-360-C1C				
<u>Injector</u>	Bendix Type RSA-5AD1, Parts List Number 2524450				
<u>Fuel</u>	100/130 minimum grade aviation gasoline				
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (200 hp)				
<u>Propeller and Propeller Limits</u>	Hartzell constant speed Model HC-C2YK-1 ()/7666A-2 or HC-C2YK-1 ()F7666A Pitch: High 29.0° ±2°, Low 14.0° ±2° at 30 " Station Diameter: Not over 74", not under 72.5" Governor Assembly: Hartzell F-2-7 () Avoid continuous operation between 2000 - 2350 r.p.m.				
<u>Propeller Spinner</u>	Piper P/N 66785 spinner tip and P/N 66786 spinner shell or P/N 67790-0 spinner, P/N 67791-0 bulkhead, P/N 67793-0 bulkhead, and P/N 99499-0 plate. Two each P/N 67794-0 cuff or Kit 760 410V. See NOTE 11.				
<u>Airspeed Limits</u>	Never exceed	214 mph	(186 knots)	CAS	
	Maximum structural cruising	170 mph	(148 knots)	CAS	
	Maneuvering	134 mph	(116 knots)	CAS	
	Flaps Extended	125 mph	(109 knots)	CAS	
	Maximum gear extension	150 mph	(130 knots)	CAS	
	Maximum gear retraction	125 mph	(109 knots)	CAS	
<u>Center of Gravity Range</u>	(+81.0) to (+95.9) at 1925 lb. or less (+90.0) to (+95.9) at 2600 lb. Straight line variation between points given. Moment due to retracting of landing gear (+819 in-lb.)				
<u>Empty Weight C. G. Range</u>	None				
<u>Maximum Weight</u>	2600 lb.				
<u>No. of Seats</u>	4 (2 at +85.5, 2 at +118.1)				
<u>Maximum Cargo</u>	200 lb. (at +142.8)				
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.				
<u>Oil Capacity</u>	8 quarts at (+29.5) (6 quarts usable) See NOTE 1 for data on system oil.				
<u>Control Surface Movements</u>	Wing flaps	(±2°)	Up	0°	Down 40°
	Ailerons	(±2°)	Up	30°	Down 15°
	Rudder	(±2°)	Left	27°	Right 27°
	Stabilator	(±1°)	Up	18°	Down 2°
	Stabilator Tab	(±1°)	Up	3°	Down 12°
<u>Nose Wheel Travel</u>	(±2°)	Left	30°	Right	30°
<u>Manufacturer's Serial Numbers</u>	28R-35001 through 28R-35820, and 28R-7135001 through 28R-7135229. The manufacturer is authorized to issue airworthiness certificates for airplanes serial numbers 28R-35001 through 28R-35820, and 28R-7135001 through 28R-7135229 under the delegation option provisions of FAR 21.				

XI - Model PA-28R-200 (Arrow II), 4 PCLM (Normal Category), Approved December 2, 1971, for S/N 28R-7235001 through 28R-7635545.

This series differs from the basic PA-28R-200 (Item X) by the addition of a five-inch fuselage extension, larger horizontal tail, wing span increase, gross weight increase, and other minor changes.

<u>Engine</u>	Lycoming IO-360-C1C (See NOTE 22) Lycoming IO-360-C1C6 (See NOTE 23)			
<u>Injector</u>	Bendix Type RSA-5AD1, Part List Number 2524450			
<u>Fuel</u>	100/130 minimum grade aviation gasoline			
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (200 hp)			
<u>Propeller and Propeller Limits</u>	Hartzell Constant Speed Model HC-C2YK-1 () or HC-C2YK-1 () F Blade Model 7666A-2 or F7666A-2 (See NOTE 22) Pitch: High $29.0^{\circ} \pm 2^{\circ}$, Low $14.0^{\circ} \pm .2^{\circ}$ at 30" Station. Diameter: Not over 74", not under 72.5". Governor Assembly: Hartzell F-2-7 () Avoid continuous operation between 2000 - 2350 r.p.m. or McCauley Constant Speed Model B2D34C213, Blade Model 90DHA-16 (See NOTE 23) Pitch: High $27.5^{\circ} \pm .5^{\circ}$; Low $12.5^{\circ} \pm .2^{\circ}$ at 30" Station. Diameter: Not over 74", not under 73". Governor Assembly: Hartzell F-2-7 () Avoid continuous operation between 1500 and 1950 r.p.m. below 15" manifold pressure.			
<u>Propeller Spinner</u>	For the Hartzell Propeller: Piper P/N 66785-00 spinner tip, P/N 66786 spinner shell and P/N 68734-0 bulkhead or P/N 99374-0 spinner installation (same as Kit No. 760 410V). See NOTE 11. For the McCauley Propeller: Piper P/N 66785 spinner tip and P/N 66786 spinner shell or P/N 67790-0 spinner, P/N 67791-0 bulkhead, P/N 67793-0 bulkhead, and P/N 99499-0 plate. Two each P/N 67794-0 cuff, or Kit 760 410V. Spinner and attachment plate installation P/N 35828-2. See NOTES 11 and 23.			
<u>Airspeed Limits</u>	Never exceed	214 mph	(186 knots)	CAS
	Maximum structural cruising	170 mph	(148 knots)	CAS
	Maneuvering	131 mph	(114 knots)	CAS
	Flaps Extended	125 mph	(109 knots)	CAS
	Maximum gear extension	150 mph	(130 knots)	CAS
	Maximum gear retraction	125 mph	(109 knots)	CAS
<u>Center of Gravity Range</u>	(+80.0) to (+93.0) at	1800 lb. or less		
	(+82.0) to (+93.0) at	2300 lb.		
	(+87.3) to (+93.0) at	2650 lb.		
<u>Empty Weight C. G. Range</u>	None			
<u>Maximum Weight</u>	2650 lb.			
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)			
<u>Maximum Cargo</u>	200 lb. (at +142.8)			
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.			
<u>Oil Capacity</u>	8 quarts at (+24.5) (6 quarts usable) See NOTE 1 for data on system oil.			

<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
	Ailerons	($\pm 2^\circ$)	Up	30°	Down	15°
	Rudder	($\pm 2^\circ$)	Left	27°	Right	27°
	Stabilator	($\pm 1^\circ$)	Up	16°	Down	2°
	Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

<u>Nose Wheel Travel</u>	($\pm 2^\circ$)	Left	30°	Right	30°
--------------------------	-------------------	------	-----	-------	-----

Manufacturer's Serial Numbers 28R-7235001 through 28R-7635545. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28R-7235001 through 28R-7635545 under the delegation option provisions of FAR 21. See NOTE 20.

XII - Model PA-28-180 (Archer), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved May 22, 1972, for S/N 28- E13, and 28-7305001 through 28-7505260.

This series differs from the basic PA-28-180 (Item III) by the addition of a five inch fuselage extension, wing span increase, larger horizontal tail, gross weight increase and other minor changes.

Engine Lycoming O-360-A4A or O-360-A4M with carburetor settings 10-3878 or 10-5193

Fuel 100/130 minimum grade aviation gasoline

Engine Limits For all operations, 2700 r.p.m. (180 hp)

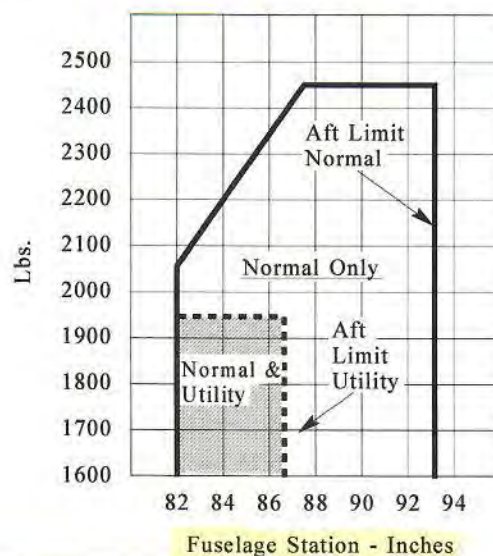
Propeller and Propeller Limits Sensenich or 76EM8S5 or M76EMMS
Static r.p.m. at maximum permissible throttle setting not over 2425 r.p.m.,
not under 2325 r.p.m.
No additional tolerance permitted.
Diameter: Not over or under 76".

Propeller Spinner Piper P/N 65805-00.
See NOTE 11.

<u>Airspeed Limits</u>	Never exceed	171 mph	(148 knots)	CAS
	Maximum structural cruising	140 mph	(121 knots)	CAS
	Maneuvering	127 mph	(110 knots)	CAS
	Flaps Extended	115 mph	(100 knots)	CAS

Center of Gravity Range Normal Category
(+82.0) to (+93.0) at 2050 lb. or less
(+87.4) to (+93.0) at 2450 lb.

Utility Category
(+82.0) to (+86.5) at 1950 lb. or less
Straight line variation between points given.

Empty Weight C. G. Range

None

Maximum Weight

Normal Category: 2450 lb.

Utility Category: 1950 lb.

No. of Seats

Normal Category: 4 (2 at +80.5 2 at +118.1)

Utility Category: 2 (2 at +80.5)

Maximum Baggage

200 lb. at (+142.8)

Fuel Capacity50 gallons at (+95) (2 wing tanks)
See NOTE 1 for data on system fuel.Oil Capacity8 quarts at (+27.5) (6 quarts usable)
See NOTE 1 for data on system oil.Control Surface Movements

Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
Ailerons	($\pm 2^\circ$)	Up	30°	Down	15°
Rudder	($\pm 2^\circ$)	Left	27°	Right	27°
Stabilator	($\pm 1^\circ$)	Up	14°	Down	2°
Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

Nose Wheel Travel

($\pm 2^\circ$)	Left	22°	Right	22°
(S/N 28-E13, 28-7305001 through 28-7305601)				
($\pm 2^\circ$)	Left	30°	Right	30°
(S/N 28-7405001 through 28-7505260)				

Manufacturer's Serial Numbers

28-E13, and 28-7305001 through 28-7505260. The manufacturer is authorized to issue airworthiness certificates for airplanes serial numbers 28-7305001 through 28-7505260 under the delegation option provisions of FAR 21. See NOTE 20.

XIII - Model PA-28-235 (Cherokee Pathfinder), 4 PCLM (Normal Category), Approved June 9, 1972, for S/N 28E-11, and 28-7310001 through 28-7710089.

This series differs from the basic PA-28-235 (Item VI) by the addition of a five inch fuselage extension, larger horizontal tail, gross weight increase, and other minor changes.

Engine

Lycoming O-540-B4B5 with carburetor setting 10-5404

Fuel

80/87 minimum grade aviation gasoline

<u>Engine Limits</u>	For all operations, 2575 r.p.m. (235 hp)					
<u>Propeller and Propeller Limits</u>	Hartzell HC-C2YK-1()F/F 8468A-4 Pitch: High 27° ± 2°, Low 13.5 ° ± .2° at 30" station. Diameter: Not over 80", not under 80". Governor Assembly: Hartzell F-4-3() or F-4-13 (). See NOTE 21.					
<u>Propeller Spinner</u>	P/N 99374 Spinner Installation. Spinner required.					
<u>Airspeed Limits</u>	Never exceed	197 mph	(171 knots)	CAS		
	Maximum structural cruising	156 mph	(135 knots)	CAS		
	Maneuvering	138 mph	(119 knots)	CAS		
	Flaps Extended	115 mph	(99 knots)	CAS		
<u>Center of Gravity Range</u>	(±79.0) to (±91.5) at 1900 lb. or less (±82.0) to (±91.5) at 2500 lb. (±88.0) to (±91.5) at 3000 lb. Straight line variation between points given.					
<u>Empty Weight C. G. Range</u>	None					
<u>Maximum Weight</u>	3000 lb.					
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)					
<u>Maximum Baggage</u>	200 lb. at (+142.8)					
<u>Fuel Capacity</u>	84 gallons (50 gallons in 2 wing tanks at (+95) and 34 gallons in 2 tip tanks at (+95)) See NOTE 1 for data on system fuel.					
<u>Oil Capacity</u>	12 quarts at(+29.1) (9¼ quarts usable) See NOTE 1 for data on system oil.					
<u>Control Surface Movements</u>	Wing flaps	(±2°)	Up	0°	Down	40°
	Ailerons	(±2°)	Up	30°	Down	15°
	Rudder	(±2°)	Left	27°	Right	27°
	Stabilator	(±2°)	Up	16°	Down	2°
	Stabilator Tab	(±1°)	Up	3°	Down	12°
<u>Nose Wheel Travel</u>	(±2°)	Left	22°	Right	22°	
	(S/N 28-E11, 28-7310001 through 28-7310176)					
	(±2°)	Left	30°	Right	30°	
	(S/N 28-7410001 through 28-7710089)					
<u>Manufacturer's Serial Numbers</u>	28-E11, and 28-7310001 through 28-7710089. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-E11, and 28-7310001 through 28-7710089 under the delegation option provisions of FAR 21. See NOTE 20.					

**XIV - Model PA-28-151 (Cherokee Warrior), 4 PCLM (Normal Category), 2 PCLM (Utility Category),
Approved August 9, 1973, for S/N 28-7415001 through 28-7715314.**

<u>Engine</u>	Lycoming O-320-E3D with carburetor setting 10-5009, or 10-5009N, or 10-5135
<u>Fuel</u>	80/87 minimum grade aviation gasoline
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (150 hp)

Propeller and Propeller Limits

Sensenich M74DM6

Static r.p.m. at maximum permissible throttle setting not over 2375 r.p.m.,
not under 2275 r.p.m.

No additional tolerance permitted.

Diameter: Not over 74", not under 72".

or

McCauley 1C160 EGM 7653

Static r.p.m. at maximum permissible throttle setting not over 2400 r.p.m.,
not under 2300 r.p.m.

No additional tolerance permitted.

Diameter: Not over 76", not under 74.5".

Propeller Spinner

Piper P/N 35323.

See NOTE 11.

Airspeed Limits

Never exceed 176 mph (153 knots) CAS

Maximum structural cruising 140 mph (122 knots) CAS

Maneuvering 111 mph (108 knots) CAS

Flaps Extended 125 mph (109 knots) CAS
(S/N 28-7415001 through 28-7515449)

Flaps Extended 115 mph (100 knots) CAS
(S/N 28-7615001 through 28-7715314)

Center of Gravity RangeNormal Category

(+83.0) to (+93.0) at 1950 lb. or less

(+87.0) to (+93.0) at 2325 lb.

Utility Category

(+83.0) to (+86.5) at 1950 lb. or less

Straight line variation between points given.

Empty Weight C. G. Range

None

Maximum Weight

Normal Category: 2325 lb.

Utility Category: 1950 lb.

No. of Seats

Normal Category: 4 (2 at +80.5, 2 at +118.1)

Utility Category: 2 (2 at +80.5)

Maximum Baggage

Eligible Normal Category only:

200 lb. at (+142.8)

Fuel Capacity

50 gallons at (+95) (2 wing tanks)

See NOTE 1 for data on system fuel.

Oil Capacity

8 quarts at (+27.5) (6 quarts usable)

See NOTE 1 for data on system oil.

Control Surface Movements

Wing Flaps ($\pm 2^\circ$) Up 0° Down 40°

Ailerons ($\pm 2^\circ$) Up 23° Down 17°

(S/N 28-7415001 through 28-7515449)

Ailerons ($\pm 2^\circ$) Up 25° Down 12.5°

(S/N 28-7615001 through 28-7715314)

Rudder ($\pm 2^\circ$) Left 27° Right 27°

Stabilator ($\pm 1^\circ$) Up 14° Down 2°

Stabilator Tab ($\pm 1^\circ$) Up 3° Down 12°

Nose Wheel Travel

($\pm 1^\circ$) Left 30° Right 30°

Manufacturer's Serial Numbers 28-7415001 through 28-7715314. The manufacturer is authorized to issue airworthiness certificates for airplanes serial numbers 28-7415001 through 28-7715314 under the delegation option provisions of FAR 21.

XV - A.- Model PA-28-181 (Archer II), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved July 8, 1975, for S/N 28-7690001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205.

<u>Engine</u>	Lycoming O-360-A4M with carburetor settings 10-3878 or 10-5193 or Lycoming O-360-A4A with carburetor setting 10-5193.																						
<u>Fuel</u>	100/130 minimum grade aviation gasoline																						
<u>Engine Limits</u>	Applicable to S/N 28-7690001 through 28-7990589: For all operations, 2700 r.p.m. (180 hp) Applicable to S/N 28-8090001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205: For takeoff 5 minutes at 2700 r.p.m. (180 hp) For maximum continuous operation, 2650 r.p.m. (178 hp)																						
<u>Propeller and Propeller Limits</u>	Sensenich 76EM8S5 For S/N 28-7690001 through 28-7790607: Static r.p.m. at maximum permissible throttle setting, not over 2425 r.p.m., not under 2325 r.p.m. at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.) No additional tolerance permitted. Diameter: Not over or under 76". For S/N 28-7890001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205: Static r.p.m. at maximum permissible throttle setting, not over 2340 r.p.m., not under 2240 r.p.m. at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.) No additional tolerance permitted. Diameter: Not over or under 76".																						
<u>Propeller Spinner</u>	Piper P/N 65805-00. See NOTE 11.																						
<u>Airspeed Limits</u>	<table> <tr> <td>Never exceed</td><td>171 mph</td><td>(148 knots)</td><td>CAS</td></tr> <tr> <td>Maximum structural cruising</td><td>140 mph</td><td>(121 knots)</td><td>CAS</td></tr> </table> For S/N 28-7690001 thru 28-7690467: Maneuvering 124 mph (108 knots) CAS For S/N 28-7790001 thru 28-7990589, 28-8090001 through 28-8690056, 28-8690061, 28-8690062, and 2890001 through 2890205: <table> <tr> <td>Maneuvering @ 2550 lbs.</td><td>128 mph</td><td>(111 knots)</td><td>CAS</td></tr> <tr> <td>Maneuvering @ 1634 lbs.</td><td>102 mph</td><td>(89 knots)</td><td>CAS</td></tr> <tr> <td>Flaps Extended</td><td>115 mph</td><td>(100 knots)</td><td>CAS</td></tr> </table>			Never exceed	171 mph	(148 knots)	CAS	Maximum structural cruising	140 mph	(121 knots)	CAS	Maneuvering @ 2550 lbs.	128 mph	(111 knots)	CAS	Maneuvering @ 1634 lbs.	102 mph	(89 knots)	CAS	Flaps Extended	115 mph	(100 knots)	CAS
Never exceed	171 mph	(148 knots)	CAS																				
Maximum structural cruising	140 mph	(121 knots)	CAS																				
Maneuvering @ 2550 lbs.	128 mph	(111 knots)	CAS																				
Maneuvering @ 1634 lbs.	102 mph	(89 knots)	CAS																				
Flaps Extended	115 mph	(100 knots)	CAS																				
<u>Center of Gravity Range</u>	<u>Normal Category</u> (+82.0) to (+93.0) at 2050 lb. or less (+88.6) to (+93.0) at 2550 lb. <u>Utility Category</u> (+82.0) to (+93.0) at 2050 lb. or less (+83.0) to (+93.0) at 2130 lb. Straight line variation between points given.																						
<u>Empty Weight C. G. Range</u>	None																						
<u>Maximum Weight</u>	Normal Category: Ramp - 2558 lb. *																						

Takeoff - 2550 lb.
 Utility Category: Ramp - 2138 lb. *
 Takeoff - 2130 lb.
 * - Ramp weights for S/N 28-8090001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205 only.

No. of Seats Normal Category: 4 (2 at +80.5, 2 at +118.1)
 Utility Category: 2 (2 at +80.5)

Maximum Baggage 200 lb. at (+142.8)

Fuel Capacity 50 gallons at (+95) (2 wing tanks)
 See NOTE 1 for data on system fuel.

Oil Capacity 8 quarts at (+27.5) (6 quarts usable)
 See NOTE 1 for data on system oil.

Control Surface Movements

Wing flaps	(±2°)	Up	0°	Down	40°
Ailerons	(±2°)	Up	25°	Down	12.5°
Rudder	(±2°)	Left	27°	Right	27°
Stabilator	(±1°)	Up	14°	Down	2°
Stabilator Tab	(±1°)	Up	3°	Down	12°

Nose Wheel Travel (±2°) Left 30° Right 30°

Manufacturer's Serial Numbers 28-7690001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-7690001 through 28-8690056; 28-8690061; 28-8690062; and 2890001 through 2890205 under the delegation option provisions of FAR 21. See NOTE 20.

XV - B.- Model PA-28-181 (Archer III), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved August 30, 1994, for S/N 2890206 through 2890231, 2843001 and up, and 2881001 and up.

Engine Lycoming O-360-A4M with carburetor settings 10-6102 or 10-5193 for aircraft prior to S/N 2843501
 or
 Lycoming IO-360-B4A engine with injector model RSA-5AD1, Lycoming Part Number 61J28702, Avstar Part Number AV 2581600

Fuel 100 or 100LL aviation grade fuel

Engine Limits For all operations, 2700 r.p.m. (180 hp)

Propeller and Propeller Limits Sensenich 76EM8S14-0-62
 Static r.p.m. at maximum permissible throttle setting, not over 2340 r.p.m., not under 2240 r.p.m. at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.)
 No additional tolerance permitted.
 Diameter: Not over or under 76".

Propeller Spinner Piper P/N 83349-12

Airspeed Limits

Never exceed	171 mph	(148 knots)	CAS
Maximum structural cruising	140 mph	(121 knots)	CAS
Maneuvering @ 2550 lbs.	128 mph	(111 knots)	CAS
Maneuvering @ 1634 lbs.	102 mph	(89 knots)	CAS
Flaps Extended	115 mph	(100 knots)	CAS

<u>Center of Gravity Range</u>	<u>Normal Category</u> (+82.0) to (+93.0) at 2050 lb. or less (+88.6) to (+93.0) at 2550 lb. <u>Utility Category</u> (+82.0) to (+93.0) at 2050 lb. or less (+83.0) to (+93.0) at 2130 lb. Straight line variation between points given.				
<u>Empty Weight C. G. Range</u>	None				
<u>Maximum Weight</u>	Normal Category: Ramp - 2558 lb. Takeoff - 2550 lb. Utility Category: Ramp - 2138 lb. Takeoff - 2130 lb.				
<u>No. of Seats</u>	Normal Category: 4 (2 at +80.5, 2 at +118.1) Utility Category: 2 (2 at +80.5)				
<u>Maximum Baggage</u>	200 lb. at (+142.8)				
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.				
<u>Oil Capacity</u>	8 quarts at (+27.5) (6 quarts usable) See NOTE 1 for data on system oil.				
<u>Control Surface Movements</u>	Wing flaps	Up	0° (±1°)	Down	10°, 25°, 40° (±2°)
	Ailerons	(±2°)	Up	25°	Down 12.5°
	Rudder	(±1°)	Left	28°	Right 28°
	Stabilator	(±1°)	Up	14°	Down 2°
	Stabilator Tab	(±1°)	Up	3°	Down 12°
<u>Nose Wheel Travel</u>	(±2°)	Left	30°	Right	30°
			(S/N 2890206 through 2890231)		
	(±1°)	Left	20°	Right	20°
			(S/N 2843001 & up, and 2881001 & up)		
<u>Manufacturer's Serial Numbers</u>	2890206 through 2890231, 2843001 and up, and 2881001 and up. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 2890206 through 2890231, 2843001 and up, and 2881001 and up under the delegation option provisions of FAR 21. Lycoming IO-360-B4A available on airplane serial numbers 2843821, 2843852 and up, and 2881001 and up.				

XV - C.- Model PA-28-181 (Piper Pilot 100i), 3 PCLM (Normal Category), Approved November 16, 2020, for S/N 28020001 and up.

<u>Engine</u>	Lycoming IO-360-B4A engine with injector model RSA-5AD1, Lycoming Part Number 61J28702, Avstar Part Number AV 2581600.
<u>Fuel</u>	100 or 100LL aviation grade fuel
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (180 hp)
<u>Propeller and Propeller Limits</u>	Sensenich 76EM8S14-0-62 Static r.p.m. at maximum permissible throttle setting, not over 2340 r.p.m., not under 2240 r.p.m. at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.) No additional tolerance permitted. Diameter: Not over or under 76".

Propeller Spinner

Piper P/N 83349-12

Airspeed Limits

Never exceed	171 mph	(148 knots)	CAS
Maximum structural cruising	140 mph	(121 knots)	CAS
Maneuvering @ 2550 lbs.	128 mph	(111 knots)	CAS
Maneuvering @ 1634 lbs.	102 mph	(89 knots)	CAS
Flaps Extended	115 mph	(100 knots)	CAS

Center of Gravity Range

(+82.0) to (+93.0) at 2050 lb. or less
 (+88.6) to (+93.0) at 2550 lb.
 Straight line variation between points given.

Empty Weight C. G. Range

None

Maximum Weight

Ramp - 2558 lb.
 Takeoff - 2550 lb.

No. of Seats

3 (2 at +80.5, 1 at +118.1)

Maximum Baggage

200 lb. at (+142.8)

Fuel Capacity

50 gallons at (+95) (2 wing tanks)
 See NOTE 1 for data on system fuel.

Oil Capacity

8 quarts at (+27.5) (6 quarts usable)
 See NOTE 1 for data on system oil.

Control Surface Movements

Wing flaps		Up	0° (±1°)	Down	10°, 25°, 40° (±2°)
Ailerons	(±2°)	Up	25°	Down	12.5°
Rudder	(±1°)	Left	28°	Right	28°
Stabilator	(±1°)	Up	14°	Down	2°
Stabilator Tab	(±1°)	Up	3°	Down	12°

Nose Wheel Travel

(±1°)	Left	20°	Right	20°
-------	------	-----	-------	-----

Manufacturer's Serial Numbers 28020001 and up.

XVI - A. - Model PA-28-161 (Warrior II), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved October 22, 1976, for S/N 28-7716001 through 28-8216300, and 2841001 through 2841365 (Cadet only)

Engine

Lycoming O-320-D3G with carburetor setting 10-5135, 10-5009 or 10-5217, or
 Lycoming O-320-D2A with carburetor setting 10-5135 or 10-5217.

Fuel

100 octane minimum grade aviation gasoline

Engine Limits

For all operations, 2700 r.p.m. (160 hp)

Propeller and Propeller Limits

Sensenich 74DM6-0-60
 Static r.p.m. at maximum permissible throttle setting not over 2430 r.p.m., not under 2330 r.p.m., at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.)
 No additional tolerance permitted.
 Diameter: Not over 74", not under 72".

or

Sensenich 74DM6-0-58

Static r.p.m. at maximum permissible throttle setting not over 2465 r.p.m.,
not under 2365 r.p.m., at sea level, ISA conditions. (Reference aircraft Maintenance
Manual for test procedure to determine approved static r.p.m. under nonstandard
conditions.)

No additional tolerance permitted.

Diameter: Not over 74", not under 72".

Propeller Spinner

Piper P/N 35323 or P/N 36850.

See NOTE 11.

Airspeed Limits

Never exceed	160 KIAS
Maximum structural cruising	126 KIAS
Maneuvering at 2325 lb. gross weight	111 KIAS
Maneuvering at 1531 lb. gross weight	88 KIAS
Flaps Extended	103 KIAS

Center of Gravity RangeNormal Category

(+83.0) to (+93.0) at 1950 lb. or less

(+87.0) to (+93.0) at 2325 lb.

See NOTE 27.

Utility Category

(+83.0) to (+93.0) at 1950 lb. or less

(+83.8) to (+93.0) at 2020 lb.

Straight line variation between points given.

Empty Weight C.G. Range

None

Maximum Weight

Normal Category: 2325 lb.

Utility Category: 2020 lb.

Ramp: 2332 lb. (Cadet only) See NOTE 27.

No. of Seats

Normal Category: 4 (2 at +80.5, 2 at +118.1)

Utility Category: 2 (+2 at +80.5)

Maximum Baggage

Eligible Normal Category only:

200 lb. at (+142.8)

50 lb. (Cadet only)

Fuel Capacity

50 gallons at (+95) (2 wing tanks)

See NOTE 1 for data on system fuel.

Oil Capacity

8 quarts at (+27.5) (6 quarts usable)

See NOTE 1 for data system oil.

Control Surface Movements

Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
Ailerons	($\pm 2^\circ$)	Up	25°	Down	12.5°
Rudder	($\pm 2^\circ$)	Left	27°	Right	27°
Stabilator	($\pm 1^\circ$)	Up	14°	Down	2°
Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

Nose Wheel Travel($\pm 1^\circ$) Left 30° Right 30°

S/N 28-7716001 thru 28-8216300

($\pm 1^\circ$) Left 20° Right 20°

S/N 2841001 thru 2841365 (See Note 29)

Manufacturer's Serial Numbers

28-7716001 through 28-8216300, and 2841001 through 2841365 (Cadet only). The
manufacturer is authorized to issue airworthiness certificates for airplane serial numbers
28-7716001 through 28-8216300, and 2841001 through 2841365 under the delegation
option provisions of FAR 21. See NOTE 20.

XVI - B. Model PA-28-161 (Warrior II), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved July 1, 1982, for S/N 28-8316001 through 28-8616057, and 2816001 through 2816109.

<u>Engine</u>	Lycoming O-320-D3G with carburetor setting 10-5135, 10-5009 or 10-5217, or Lycoming O-320-D2A with carburetor setting 10-5135 or 10-5217.		
<u>Fuel</u>	100 octane minimum grade aviation gasoline		
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (160 hp)		
<u>Propeller and Propeller Limits</u>	Sensenich 74DM6-0-60 Static r.p.m. at maximum permissible throttle setting not over 2430 r.p.m., not under 2330 r.p.m. at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.) No additional tolerance permitted. Diameter: Not over 74", not under 72". or Sensenich 74DM6-0-58 Static r.p.m. at maximum permissible throttle setting not over 2465 r.p.m., not under 2365 r.p.m., at sea level, ISA conditions. (Reference aircraft Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.) No additional tolerance permitted. Diameter: Not over 74", not under 72".		
<u>Propeller Spinner</u>	Piper P/N 36850. See NOTE 11.		
<u>Airspeed Limits</u>	Never exceed Maximum structural cruising Maneuvering at 2440 lb. gross weight Maneuvering at 1531 lb. gross weight Flaps Extended	160 KIAS 126 KIAS 111 KIAS 88 KIAS 103 KIAS	See NOTE 26.
<u>Center of Gravity Range</u>	<u>Normal Category</u> (+83.0) to (+93.0) at 1950 lb. or less (+88.3) to (+93.0) at 2440 lb. See NOTE 26. <u>Utility Category</u> (+83.0) to (+93.0) at 1950 lb. or less (+83.8) to (+93.0) at 2020 lb. Straight line variation between points given		
<u>Empty Weight C.G. Range</u>	None		
<u>Maximum Weight</u>	Normal Category: Ramp - 2447 lb. Takeoff - 2440 lb. See NOTE 26. Utility Category: Ramp - 2027 lb. Takeoff - 2020 lb.		
<u>No. of Seats</u>	Normal Category: 4 (2 at +80.5, 2 at +118.1) Utility Category: 2 (2 at +80.5)		
<u>Maximum Baggage</u>	Eligible Normal Category only: 200 lb. at (+142.8)		
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.		
<u>Oil Capacity</u>	8 quarts at (+27.5) (6 quarts usable) See NOTE 1 for data on system oil.		

<u>Control Surface Movements</u>	Wing flaps		Up	0° (±1°)	Down	40°	
				(±2°)			
	Ailerons	(±2°)	Up	25°	Down	12.5°	
	Rudder	(±2°)	Left	27°	Right	27°	
	S/N 28-8316001 thru 28-8416095						
	Rudder	(±1°)	Left	28°	Right	28°	
	S/N 28-8416096 & Up, 2816001 thru 2816109						
	Stabilator	(±1°)	Up	14°	Down	2°	
	Stabilator Tab	(±1°)	Up	3°	Down	12°	
<u>Nose Wheel Travel</u>			(±1°)	Left	30°	Right	30°
	S/N 28-8316001 thru 28-8416095						
			(±1°)	Left	20°	Right	20°
	S/N 28-8416096 & Up, 2816001 thru						
	2816109 (See Note 29)						

Manufacturer's Serial Nos. 28-8316001 through 28-8616057, and 2816001 through 2816109. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-8316001 through 28-8616057, and 2816001 through 2816109 under the delegation option provisions of FAR 21. See NOTE 20.
28-8616006{this serial number aircraft has been reported stolen and its airworthiness condition is unknown}

XVI - C. Model PA-28-161 (Warrior III), 4 PCLM (Normal Category), 2 PCLM (Utility Category), Approved July 1, 1994, for S/N 2816110 through 2816119, and 2842001 and up.

<u>Engine</u>	Lycoming O-320-D3G with carburetor setting 10-5135, 10-5009 or 10-5217		
<u>Fuel</u>	100 or 100LL aviation grade gasoline		
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (160 hp)		
<u>Propeller and Propeller Limits</u>	Sensenich 74DM6-0-60		
	Static r.p.m. at maximum permissible throttle setting not over 2430 r.p.m.,		
	not under 2330 r.p.m., at sea level, ISA conditions. (Reference aircraft		
	Maintenance Manual for test procedure to determine approved static r.p.m. under nonstandard conditions.)		
	No additional tolerance permitted.		
	Diameter: Not over 74", not under 72".		
<u>Propeller Spinner</u>	Piper P/N 36850. See NOTE 11.		
<u>Airspeed Limits</u>	Never exceed	160 KIAS	
	Maximum structural cruising	126 KIAS	
	Maneuvering at 2440 lb. gross weight	111 KIAS	See NOTE 26.
	Maneuvering at 1531 lb. gross weight	88 KIAS	
	Flaps Extended	103 KIAS	
<u>Center of Gravity Range</u>	<u>Normal Category</u>		
	(+83.0) to (+93.0)	at	1950 lb. or less
	(+88.3) to (+93.0)	at	2440 lb.
	See NOTE 26.		
	<u>Utility Category</u>		
	(+83.0) to (+93.0)	at	1950 lb. or less
	(+83.8) to (+93.0)	at	2020 lb.
	Straight line variation between points given		

<u>Empty Weight C.G. Range</u>	None				
<u>Maximum Weight</u>	Normal Category: Ramp - 2447 lb. Takeoff - 2440 lb. See NOTE 26.				
	Utility Category: Ramp - 2027 lb. Takeoff - 2020 lb.				
<u>No. of Seats</u>	Normal Category: 4 (2 at +80.5, 2 at +118.1) Utility Category: 2 (2 at +80.5)				
<u>Maximum Baggage</u>	Eligible Normal Category only: 200 lb. at (+142.8)				
<u>Fuel Capacity</u>	50 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.				
<u>Oil Capacity</u>	8 quarts at (+27.5) (6 quarts usable) See NOTE 1 for data on system oil.				
<u>Control Surface Movements</u>	Wing flaps	Up	0° (±1°)	Down	10°, 25°, 40° (±2°)
	Ailerons (±2°)	Up	25°	Down	12.5°
	Rudder (±1°)	Left	28°	Right	28°
	Stabilator (±1°)	Up	14°	Down	2°
	Stabilator Tab (±1°)	Up	3°	Down	12°
<u>Nose Wheel Travel</u>	(±1°)	Left	20°	Right	20°
<u>Manufacturer's Serial Nos.</u>	2816110 through 2816119, and 2842001 and up. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 2816110 through 2816119, and 2842001 and up under the delegation option provisions of FAR 21.				

XVII - Model PA-28R-201 (Arrow III), 4 PCLM (Normal Category), Approved November 3, 1976, for S/N 28R-7737002 through 28R-7837317; 2837001 through 2837061; and 2844001 and up.

<u>Engine</u>	Lycoming IO-360-C1C6
<u>Injector</u>	Bendix Type RSA-5AD1, Part List Number 2524450 Precision Airmotive (PAC) formerly Bendix: Part List Number PAM 2524450-9
<u>Fuel</u>	100 or 100LL aviation grade gasoline
<u>Engine Limits</u>	For all operations, 2700 r.p.m. (200 hp)
<u>Propeller and Propeller Limits</u>	McCauley Constant Speed Hub Model B2D34C213, Blade Model 90 DHA-16 Pitch: High $27.5^\circ \pm .5^\circ$, Low $12.5^\circ \pm .2^\circ$ at 30" station. Diameter: Not over 74", not under 73". Governor Assembly: Hartzell Model F-2-7 () Avoid continuous operation between 1500 and 1950 r.p.m. below 15" manifold pressure. or Hartzell Constant Speed Hub Model HC-C2YK-1()F, Blade Model F7666A-2R Pitch: High $29.0^\circ \pm 2^\circ$, Low $14.0^\circ \pm .2^\circ$ at 30" station. Diameter: Not over 74", not under 72". Governor Assembly: F-2-7 ()
<u>Propeller Spinner</u>	For McCauley propeller: Piper P/N 35828-2 For Hartzell propeller: Piper P/N 99374 See NOTE 11.

<u>Airspeed Limits</u>	Never exceed	183 KIAS
	Maximum structural cruising	146 KIAS
	Maneuvering	118 KIAS
	Flaps Extended	103 KIAS
	Maximum Gear Extension	129 KIAS
	Maximum Gear Retraction	107 KIAS
<u>Center of Gravity Range</u>	(+82.0) to (+91.5) at 2375 lb. or less (+88.9) to (+91.5) at 2750 lb. Straight line variation between points given. Moment due to retraction of gear (+819 in.-lb.)	
<u>Empty Weight C.G. Range</u>	None	
<u>Maximum Weight</u>	2750 lb.	
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)	
<u>Maximum Baggage</u>	200 lb. at (+142.8)	
<u>Fuel Capacity</u>	77 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.	
<u>Oil Capacity</u>	8 quarts at (+24.5) (6 quarts usable) See NOTE 1 for data on system oil.	
<u>Control Surface Movements</u>	Wing flaps	Up 0° (±1°) Down 10°, 25°, 40° (±2°)
	Ailerons (±2°)	Up 25° Down 12.5°
	Rudder (±1°)	Left 28° Right 28°
	Stabilator (±1°)	Up 16° Down 2°
	Stabilator Tab (±1°)	Up 3° Down 12°
<u>Nose Wheel Travel</u>	(±2°)	Left 30° Right 30°
<u>Manufacturer's Serial Numbers</u>	28R-7737002 through 28-7837317; 2837001 through 2837061; and 2844001 and up. The manufacturer is authorized to issue airworthiness certificates for airplanes serial numbers 28R-7737002 through 28-7837317; 2837001 through 2837061; and 2844001 and up under the delegation option provisions of FAR 21. See NOTE 20.	

XVIII - Model PA-28R-201T (Turbo Arrow III), 4 PCLM (Normal Category), Approved October 8, 1976, for S/N 28R-7703001 through 28R-7803373, and 2803001 through 2803012.

<u>Engine</u>	Continental TSIO-360-F or TSIO-360-FB
<u>Fuel</u>	100/130 minimum grade aviation gasoline
<u>Engine Limits</u>	For all operations, 2575 r.p.m. at 41" Hg. manifold pressure (200 hp)
<u>Propeller and Propeller Limits</u>	1 Hartzell Hub Model BHC-C2YF-1BF, Blade Model F8459A-8R Pitch Setting at 30" Station: High: $29^\circ \pm 1.0^\circ$, Low: $14.4^\circ \pm 0.2^\circ$. Diameter: Not over 76", not under 75". Governor: Hartzell E-5 or Woodward G210681 Avoid continuous operation between 2000 and 2200 r.p.m. with engine manifold pressure above 32" Hg. Avoid continuous ground operation in cross and tail winds of over 10 knots between 1700 and 2100 r.p.m.
<u>Propeller Spinner</u>	Hartzell P/N C3568 Spinner Assembly. See NOTE 11.

<u>Airspeed Limits</u>	Never exceed	183 KIAS																													
	Maximum structural cruising	146 KIAS																													
	Maneuvering	119 KIAS																													
	Flaps Extended	103 KIAS																													
	Maximum Gear Retraction	107 KIAS																													
	Maximum Gear Extension	129 KIAS																													
	Maximum Gear Extended	129 KIAS																													
<u>Center of Gravity Range</u>	(+86.0) to (+90.0) at 2900 lb. (+78.0) to (+90.0) at 2240 lb. or less Straight line variation between points given. Moment due to retraction of landing gear (+819 in-lb.)																														
<u>Empty Weight C. G. Range</u>	None																														
<u>Maximum Weight</u>	Ramp: 2912 lb. Takeoff: 2900 lb.																														
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)																														
<u>Maximum Baggage</u>	200 lb. at (+142.8)																														
<u>Fuel Capacity</u>	77 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.																														
<u>Oil Capacity</u>	8 quarts at (+13.5) (5 quarts usable) See NOTE 1 for data on system oil.																														
<u>Maximum Operating Altitude</u>	20,000 feet																														
<u>Control Surface Movements</u>	<table><tr><td>Wing flaps</td><td>(±2°)</td><td>Up</td><td>0°</td><td>Down</td><td>40°</td></tr><tr><td>Ailerons</td><td>(±2°)</td><td>Up</td><td>25°</td><td>Down</td><td>12.5°</td></tr><tr><td>Rudder</td><td>(±1°)</td><td>Left</td><td>28°</td><td>Right</td><td>28°</td></tr><tr><td>Stabilator</td><td>(±1°)</td><td>Up</td><td>16°</td><td>Down</td><td>2°</td></tr><tr><td>Stabilator Tab</td><td>(±1°)</td><td>Up</td><td>3°</td><td>Down</td><td>12°</td></tr></table>	Wing flaps	(±2°)	Up	0°	Down	40°	Ailerons	(±2°)	Up	25°	Down	12.5°	Rudder	(±1°)	Left	28°	Right	28°	Stabilator	(±1°)	Up	16°	Down	2°	Stabilator Tab	(±1°)	Up	3°	Down	12°
Wing flaps	(±2°)	Up	0°	Down	40°																										
Ailerons	(±2°)	Up	25°	Down	12.5°																										
Rudder	(±1°)	Left	28°	Right	28°																										
Stabilator	(±1°)	Up	16°	Down	2°																										
Stabilator Tab	(±1°)	Up	3°	Down	12°																										
<u>Nose Wheel Travel</u>	(±2°)	Left	30°	Right	30°																										
<u>Manufacturer's Serial Numbers</u>	28R-7703001 through 28R-7803373, and 2803001 through 2803012. The manufacturer is authorized to issue airworthiness certificates for airplanes serial numbers 28R-7703001 through 28R-7803373, and 2803001 through 2803012 under the delegation option provisions of FAR 21. See NOTE 20.																														

XIX - Model PA-28-236 (Dakota), 4 PCLM (Normal Category), Approved June 1, 1978, for S/N 28-7911001 through 28-8611008; 2811001 through 2811050.

<u>Engine</u>	Lycoming O-540-J3A5D with carburetor setting 10-5054
<u>Fuel</u>	100/130 minimum grade aviation gasoline
<u>Engine Limits</u>	For all operations, 2400 r.p.m. (235 hp)
<u>Propeller and Propeller Limits</u>	Hartzell HC-F2YR-1()/F 8468A-4R Pitch: High $32^\circ \pm 2^\circ$, Low $16.25^\circ \pm \frac{1}{4}^\circ$. Diameter: Not over 80", not under 78". Governor Assembly: Hartzell F-4-21()

Propeller Spinner

Hartzell P/N C3568 Spinner Assembly.
See NOTE 11.

Airspeed Limits

Never exceed	197 mph	(171 knots)	CAS
Maximum structural cruising	156 mph	(135 knots)	CAS
Maneuvering at 3000 lb.	140 mph	(122 knots)	CAS
Maneuvering at 1761 lb.	108 mph	(94 knots)	CAS
Flaps Extended	115 mph	(100 knots)	CAS

Center of Gravity Range

(+79.8) to (+92.0) at 1900 lb. or less
(+82.5) to (+92.0) at 2500 lb.
(+88.5) to (+92.0) at 3000 lb.
Straight line variation between points given.

Empty Weight C. G. Range

None

Maximum Weight

3000 lb.

Number of Seats

4 (2 at +80.5, 2 at +118.1)

Maximum Baggage

200 lb. at (+142.8)

Fuel Capacity

77 gallons at (+95) (2 wing tanks)
See NOTE 1 for data on system fuel.

Oil Capacity

12 quarts at (+29.1) (9 1/2 quarts usable)
See NOTE 1 for data on system oil.

Control Surface Movements

Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
Ailerons	($\pm 2^\circ$)	Up	25°	Down	12.5°
Rudder	($\pm 1^\circ$)	Left	28°	Right	28°
Stabilator	($\pm 1^\circ$)	Up	16°	Down	2°
Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

Nose Wheel Travel

($\pm 1^\circ$) Left 30° Right 30°

Manufacturer's Serial Numbers

28-7911001 through 28-8611008; and 2811001 through 2811050. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-7911001 through 28-8611008; and 2811001 through 2811050; under the delegation option provisions of FAR 21. See NOTE 20.

XX - A. Model PA-28RT-201 (Arrow IV), 4 PCLM (Normal Category), Approved November 13, 1978, for S/N 28R-7918001 through 28R-7918267.

Engine

Lycoming IO-360-C1C6

Injector

Bendix Type RSA-5AD1, Part List Number 2524450

Fuel

100/130 minimum grade aviation gasoline

Engine Limits

For all operations, 2700 r.p.m. (200 hp)

Propeller and Propeller Limits

McCauley Constant Speed Hub Model B2D34C213, Blade Model 90 DHA-16
Pitch: High $27.5^\circ \pm .5^\circ$, Low $12.5^\circ \pm .2^\circ$ at 30" station.
Diameter: Not over 74", not under 73".
Governor Assembly: Hartzell Model F-2-7 ()
Avoid continuous operation between 1500 and 1950 r.p.m. below 15" manifold pressure.

or

Hartzell Constant Speed Hub Model HC-C2YK-1()F, Blade Model F7666A-2R

Pitch: High $29.0^\circ \pm 2^\circ$, Low $14.0^\circ \pm .2^\circ$ at 30" station.
 Diameter: Not over 74", not under 72".
 Governor Assembly: Hartzell Model F-2-7()

<u>Propeller Spinner</u>	For the McCauley propeller: For the Hartzell propeller: See NOTE 11.	Piper P/N 35828-2 Piper P/N 99374
<u>Airspeed Limits</u>	Never exceed Maximum structural cruising Flaps extended Maximum gear extension Maximum gear retraction Maximum gear extended Maneuvering at 2750 lb. Maneuvering at 1863 lb.	190 KIAS 149 KIAS 108 KIAS 130 KIAS 109 KIAS 130 KIAS 121 KIAS 96 KIAS
<u>Center of Gravity Range</u>	(+85.5) to (+93.0) at 2400 lb. or less (+90.0) to (+93.0) at 2750 lb. Straight line variation between points given. Moment due to retraction of gear (+819 in.-lb.)	
<u>Empty Weight C. G. Range</u>	None	
<u>Maximum Weight</u>	2750 lb.	
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)	
<u>Maximum Baggage</u>	200 lb. at (+142.8)	
<u>Fuel Capacity</u>	77 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.	
<u>Oil Capacity</u>	8 quarts at (+24.5) 6 quarts usable See NOTE 1 for data on system oil.	
<u>Control Surface Movements</u>	Wing flaps Ailerons Rudder Stabilator Stabilator Tab	(±2°) Up 0° Down 40° (±2°) Up 25° Down 12.5° (±1°) Left 33° Right 33° (±1°) Up 14° Down 10° Up 2.5° (±1°) Down 10° (±.5°)
<u>Nose Wheel Travel</u>	(±2°) Left 30° Right 30°	
<u>Manufacturer's Serial Numbers</u>	28R-7918001 through 28R-7918267. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28R-7918001 through 28R-7918267 under the delegation option provisions of FAR 21.	

XX - B. Model PA-28RT-201 (Arrow IV), 4 PCLM (Normal Category), Approved November 13, 1978, for S/N 28R-8018001 through 28R-8218026.

<u>Engine</u>	Lycoming IO-360-C1C6
<u>Injector</u>	Bendix Type RSA-5AD1, Part List Number 2524450
<u>Fuel</u>	100/130 minimum grade aviation gasoline
<u>Engine Limits</u>	For 5-minute takeoff, 2700 r.p.m. (200 hp) For maximum continuous operation, 2650 r.p.m. (196 hp)
<u>Propeller and Propeller Limits</u>	McCauley Constant Speed Hub Model 2D34C215, Blade Model 90 DJA-14E

Pitch: High $27.5^\circ \pm .5^\circ$; Low $12.5^\circ \pm .2^\circ$ at 30" station.
 Diameter: Not over 76", not under 75".
 Governor Assembly: Hartzell Model F-2-7 ()
 Avoid continuous operation between 1400 and 1750 r.p.m. below 15" manifold pressure.

Propeller Spinner

Piper P/N 35828-2.
 See NOTE 11.

Airspeed Limits

Never exceed	190 KIAS
Maximum structural cruising	149 KIAS
Flaps Extended	108 KIAS
Maximum gear extension	130 KIAS
Maximum gear retraction	109 KIAS
Maximum gear extended	130 KIAS
Maneuvering at 2750 lb. gross weight	121 KIAS
Maneuvering at 1863 lb. gross weight	96 KIAS

Center of Gravity Range

(+85.5) to (+93.0) at 2400 lb. or less
 (+90.0) to (+93.0) at 2750 lb.
 Straight line variation between points given.
 Moment due to retraction of gear (+819 in.-lb.)

Empty Weight C. G. Range

None

Maximum Weight

2750 lb.

Number of Seats

4 (2 at +80.5, 2 at +118.1)

Maximum Baggage

200 lb. at (+142.8)

Fuel Capacity

77 gallons at (+95) (2 wing tanks)
 See NOTE 1 for data on system fuel.

Oil Capacity

8 quarts at (+24.5) (6 quarts usable)
 See NOTE 1 for data on system oil.

Control Surface Movements

Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
Ailerons	($\pm 2^\circ$)	Up	25°	Down	12.5°
Rudder	($\pm 1^\circ$)	Left	33°	Right	33°
Stabilator	($\pm 1^\circ$)	Up	14°	Down	10°
Stabilator Tab		Up	$2.5^\circ (\pm 1^\circ)$	Down	$10^\circ (\pm .5^\circ)$

Nose Wheel Travel

($\pm 2^\circ$)	Left	30°	Right	30°
-------------------	------	------------	-------	------------

Manufacturer's Serial Numbers

28R-8018001 through 28R-8218026. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28R-8018001 through 28R-8218026 under the delegation option provisions of FAR 21. See NOTE 20.

XXI - Model PA-28RT-201T (Turbo Arrow IV), 4 PCLM (Normal Category), Approved November 13, 1978, for S/N 28R-7931001 through 28R-8631005, and 2831001 through 2831038.

<u>Engine</u>	Continental TSIO-360-FB																
<u>Fuel</u>	100/130 minimum grade aviation gasoline																
<u>Engine Limits</u>	For all operations, 2575 r.p.m., 41" Hg. manifold pressure (200 hp)																
<u>Propeller and Propeller Limits</u>	1 Hartzell Hub Model BHC-C2YF-1()F, Blade Model F8459A-8R Pitch: High $29^{\circ} \pm 1.0^{\circ}$, Low $14.4^{\circ} \pm .2^{\circ}$ at 30" station. Diameter: Not over 76", not under 75". Governor: Hartzell E-5 or Woodward G210681 Avoid continuous operation between 2000 and 2200 r.p.m. with engine manifold pressure above 32" Hg. Avoid continuous ground operation in cross and tail winds of over 10 knots between 1700 and 2100 r.p.m. or 1 Hartzell Hub Model PHC-C3YF-1()F, Blade Model F7663-2R Pitch: High $33^{\circ} \pm 1^{\circ}$, Low $13.2^{\circ} \pm .2^{\circ}$. Diameter: Not over 76", not under 72". Governor: Hartzell E-5, Woodward G210681 or G210776																
<u>Propeller Spinner</u>	For the Hartzell Hub Model BHC-C2YF-1()F: Hartzell P/N C3568 Spinner Assembly For the Hartzell Hub Model PHC-C3YF-1()F: Piper PS50077-80 Spinner Assembly (Hartzell C3570) See NOTE 11.																
<u>Airspeed Limits</u>	<table> <tr> <td>Never exceed</td><td>193 KIAS</td></tr> <tr> <td>Maximum structural cruising</td><td>152 KIAS</td></tr> <tr> <td>Maneuvering at 2900 lb.</td><td>124 KIAS</td></tr> <tr> <td>Maneuvering at 1893 lb.</td><td>97 KIAS</td></tr> <tr> <td>Flaps Extended</td><td>108 KIAS</td></tr> <tr> <td>Maximum Gear Retraction</td><td>111 KIAS</td></tr> <tr> <td>Maximum Gear Extension</td><td>133 KIAS</td></tr> <tr> <td>Maximum Gear Extended</td><td>133 KIAS</td></tr> </table>	Never exceed	193 KIAS	Maximum structural cruising	152 KIAS	Maneuvering at 2900 lb.	124 KIAS	Maneuvering at 1893 lb.	97 KIAS	Flaps Extended	108 KIAS	Maximum Gear Retraction	111 KIAS	Maximum Gear Extension	133 KIAS	Maximum Gear Extended	133 KIAS
Never exceed	193 KIAS																
Maximum structural cruising	152 KIAS																
Maneuvering at 2900 lb.	124 KIAS																
Maneuvering at 1893 lb.	97 KIAS																
Flaps Extended	108 KIAS																
Maximum Gear Retraction	111 KIAS																
Maximum Gear Extension	133 KIAS																
Maximum Gear Extended	133 KIAS																
<u>Center of Gravity Range</u>	(+89.0) to (+93.0) at 2900 lb. (+85.0) to (+93.0) at 2240 lb. or less Straight line variation between points given. Moment due to retraction of landing gear (+819 in-lb.)																
<u>Empty Weight C. G. Range</u>	None																
<u>Maximum Weight</u>	Ramp: 2912 lb. Takeoff: 2900 lb.																
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)																
<u>Maximum Baggage</u>	200 lb. at (+142.8)																
<u>Fuel Capacity</u>	77 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.																
<u>Oil Capacity</u>	8 quarts at (+13.5) (5 quarts usable) See NOTE 1 for data on system oil.																

<u>Maximum Operation Altitude</u>	20,000 feet					
<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
	Ailerons	($\pm 2^\circ$)	Up	25°	Down	12.5°
	Rudder	($\pm 1^\circ$)	Left	33°	Right	33°
	Stabilator	($\pm 1^\circ$)	Up	14°	Down	10°
	Stabilator Tab		Up	$2.5^\circ (\pm 1^\circ)$	Down	$10^\circ (\pm .5^\circ)$
<u>Nose Wheel Travel</u>	($\pm 2^\circ$)	Left	30°	Right	30°	

Manufacturer's Serial Numbers 28R-7931001 through 28R-8631005, and 2831001 through 2831038. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28R-7931001 through 28R-8631005, and 2831001 through 2831038 under the delegation option provisions of FAR 21. See NOTE 20.

XXII - Model PA-28-201T (Turbo Dakota), 4 PCLM (Normal Category), Approved December 14, 1978, for S/N 28-7921001 through 28-7921095.

<u>Engine</u>	Continental TSIO-360-FB		
<u>Fuel</u>	100/130 minimum grade aviation gasoline		
<u>Engine Limits</u>	For all operations, 2575 r.p.m., 41" Hg. manifold pressure (200 hp)		
<u>Propeller and Propeller Limits</u>	1 Hartzell Hub Model BHC-C2YF-1()F, Blade Model F8459A-8R Pitch: High $29^{\circ} \pm 1.0^{\circ}$, Low $14.4^{\circ} \pm .2^{\circ}$ at 30" station. Diameter: Not over 76", not under 75". Governor: Hartzell E-5 or Woodward G210681 Avoid continuous operation between 2000 and 2200 r.p.m. with engine manifold pressure above 32" Hg. Avoid continuous ground operation in cross and tail winds of over 10 knots between 1700 and 2100 r.p.m.		
<u>Propeller Spinner</u>	Hartzell P/N C3568 Spinner Assembly. See NOTE 11.		
<u>Airspeed Limits</u>	Never exceed	169 KIAS	
	Maximum structural cruising	140 KIAS	
	Maneuvering at 2900 lb.	122 KIAS	
	Maneuvering at 1841 lb.	96 KIAS	
	Flaps Extended	102 KIAS	
<u>Center of Gravity Range</u>	(+86.0) to (+90.0)	at 2900 lb.	
	(+78.0) to (+90.0)	at 2240 lb. or less	
	Straight line variation between points given.		
<u>Empty Weight C. G. Range</u>	None		
<u>Maximum Weight</u>	2900 lb.		
<u>No. of Seats</u>	4 (2 at +80.5, 2 at +118.1)		
<u>Maximum Baggage</u>	200 lb. at (+142.8)		
<u>Fuel Capacity</u>	77 gallons at (+95) (2 wing tanks) See NOTE 1 for data on system fuel.		
<u>Oil Capacity</u>	8 quarts at (+13.5) (5 quarts usable) See NOTE 1 for data on system oil.		

Maximum Operation Altitude 20,000 feet

<u>Control Surface Movements</u>	Wing flaps	($\pm 2^\circ$)	Up	0°	Down	40°
	Ailerons	($\pm 2^\circ$)	Up	25°	Down	12.5°
	Rudder	($\pm 2^\circ$)	Left	27°	Right	27°
	Stabilator	($\pm 1^\circ$)	Up	16°	Down	2°
	Stabilator Tab	($\pm 1^\circ$)	Up	3°	Down	12°

Nose Wheel Travel ($\pm 1^\circ$) Left 30° Right 30°

Manufacturer's Serial Numbers 28-7921001 through 28-7921095. The manufacturer is authorized to issue airworthiness certificates for airplane serial numbers 28-7921001 through 28-7921095 under the delegation option provisions of FAR 21. See NOTE 20.

DATA PERTINENT TO ALL MODELS

Datum 78.4" forward of wing leading edge (straight wing only).
78.4" forward of inboard intersection of straight and tapered sections (semi-tapered wings).

Leveling Means Two screws left side fuselage below window.

Certification Basis Type Certificate No. 2A13 issued October 31, 1960.
Date of Application for Type Certificate, February 14, 1958.

Delegation Option Authorization granted per FAR 21, Subpart J, July 17, 1968.

PA-28-140 and PA-28-151: CAR 3 effective May 15, 1956, including Amendments 3-1, 3-2, and 3-4; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.955 and 23.959 as amended by Amendment 23-7 effective September 14, 1969; and FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977.

PA-28-150, PA-28-160, PA-28-180, PA-28-235, PA-28S-160, PA-28S-180, PA-28R-180, and PA-28R-200: CAR 3 effective May 15, 1956, including Amendments 3-1 and 3-2; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.955 and 23.959 as amended by Amendment 23-7 effective September 14, 1969; and FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977.

PA-28-161: CAR 3 effective May 15, 1956, including Amendments 3-1 and 3-2; paragraph 3.387(d) of Amendment 3-4; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.955 and 23.959 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; and FAR 36 effective December 1, 1969, through Amendment 36-4.

For aircraft equipped with Piper factory installed optional Avidyne Entegra system and Mid-Continent Model 4300-411 Electric Attitude Indicator (See Piper Report VB-1892, Appendix E), the additional certification basis for installation specific items only is: 14 CFR Part 23 regulations FAR 23.301, 23.337, 23.341, 23.473, 23.561(b)(3), 23.607, 23.611, as amended by Amdt. 23-48; FAR 23.303, 23.307, 23.601, 23.609, 23.1367, 23.1381 issued on 02/01/65; FAR 23.305, 23.613, 23.773, 23.1525, 23.1549 as amended by Amdt. 23-45; FAR 23.603, 23.605 as amended by Amdt. 23-23; FAR 23.777, 23.955, 23.1191, 23.1337 as amended by Amdt. 23-51; FAR 23.1301, 23.1327, 23.1335 as amended by Amdt. 23-20; FAR 23.867, 23.1303, 23.1307, 23.1309, 23.1311, 23.1321, 23.1323, 23.1329, 23.1351, 23.1353, 23.1359, 23.1361, 23.1365, as amended by Amdt. 23-49; FAR 23.1305 as amended by Amdt. 23-52; FAR 23.1322, 23.1331, 23.1357, 23.1431 as amended by Amdt. 23-43; FAR 23.1325, 23.1543, 23.1545, 23.1555, 23.1563, 23.1581, 23.1583, 23.1585 as amended by Amdt. 23-50; FAR 23.771 as amended by Amdt. 23-14; FAR 23.1501, 23.1541 as amended by Amdt. 23-21; FAR 23.1523 as amended by Amdt. 23-34; FAR 23.1529 as amended by Amdt. 23-26; Special Condition for HIRF (Docket # CE207), date July 30, 2004.

PA-28-181: CAR 3 effective May 15, 1956, including Amendments 3-2 and 3-4; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.207, 23.221, 23.955 and 23.959 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; and FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977. FAR 36, Appendix G, Amendment 36-16 for the PA-28-181 (Archer III, Piper Pilot 100i), S/N 2890206 through 2890231, 2843001 and up, 2881001 and up, and 28020001 and up.

For aircraft equipped with Piper factory installed optional Avidyne Entegra system and Mid-Continent Model 4300-411 Electric Attitude Indicator (See Piper Report VB-1892, Appendix E), as installed by Piper Drawing Number 85191, the additional certification basis for installation specific items only is: 14 CFR Part 23 regulations FAR 23.301, 23.337, 23.341, 23.473, 23.561(b)(3), 23.607, 23.611, as amended by Amdt. 23-48; FAR 23.303, 23.307, 23.601, 23.609, 23.1367, 23.1381 issued on 02/01/65; FAR 23.305, 23.613, 23.773, 23.1525, 23.1549 as amended by Amdt. 23-45; FAR 23.603, 23.605 as amended by Amdt. 23-23; FAR 23.777, 23.955, 23.1191, 23.1337 as amended by Amdt. 23-51; FAR 23.1301, 23.1327, 23.1335 as amended by Amdt. 23-20; FAR 23.867, 23.1303, 23.1307, 23.1309, 23.1311, 23.1321, 23.1323, 23.1329, 23.1351, 23.1353, 23.1359, 23.1361, 23.1365, as amended by Amdt. 23-49; FAR 23.1305 as amended by Amdt. 23-52; FAR 23.1322, 23.1331, 23.1357, 23.1431 as amended by Amdt. 23-43; FAR 23.1325, 23.1543, 23.1545, 23.1555, 23.1563, 23.1581, 23.1583, 23.1585 as amended by Amdt. 23-50; FAR 23.771 as amended by Amdt. 23-14; FAR 23.1501, 23.1541 as amended by Amdt. 23-21; FAR 23.1523 as amended by Amdt. 23-34; FAR 23.1529 as amended by Amdt. 23-26; Special Condition for HIRF (Docket # CE207), date July 30, 2004.

For aircraft equipped with Piper factory installed optional Garmin International Model G1000 Integrated Avionics system and the Aspen Evolution Model EFD 1000 Standby Instrument, as installed by Piper Drawing Number 107500, the additional certification basis for installation specific items only is: 14 CFR Part 23 regulations: 23.207(a)(b)(c) as amended by Amdt. 23-45; 23.21, 23.23(a), 23.25, 23.29, 23.251, 23.301(a)(b)(c), 23.303, 23.305, 23.307, 23.337, 23.341(a)(c), 23.473, 23.561(a)(b)(3)(e), 23.601, 23.603, 23.605(a), 23.607, 23.609, 23.611, 23.613, 23.625, 23.773(a)(1)(2), 23.777(a)(b), 23.867, 23.1301, 23.1305(a)(1)(2)(3)(b)(2)(4)(i), 23.1306, 23.1307, 23.1308(a)(b)(c), 23.1309(a)(1)(2)(b)(c)(d)(e), 23.1311, 23.1321, 23.1322, 23.1323(a)(c), 23.1325(a)(b)(1)(2)(i), 23.1326, 23.1327(a), 23.1329(d)(g)(h), 23.1335, 23.1337(b)(1)(4), 23.1351(a)(1)(2)(i)(b)(1)(i)(3)(c)(4)(d), 23.1353, 23.1357, 23.1359(c), 23.1361(c), 23.1365, 23.1367, 23.1381, 23.1431(a)(b)(e), 23.1501, 23.1507, 23.1523, 23.1525, 23.1529, 23.1541(a)(b), 23.1543(b)(c), 23.1545(a)(b), 23.1549(a)(b)(c), 23.1553, 23.1555(a)(b), 23.1563(a), 23.1581(a)(c), 23.1583(g)(h)(m), 23.1585(j), 23.1589(a) as amended by Amdt. 23-61; 23.1303(a)(b)(c)(f) as amended by Amdt. 23-62

For aircraft equipped with Piper factory installed optional Lycoming Fuel Injected IO-360-B4A engine, as installed by Piper Drawing Number 107500, the additional certification basis for installation specific items only is: 3.71, 3.73, 3.74, 3.75, 3.76, 3.171(a), 3.172, 3.173, 3.174, 3.186, 3.188, 3.195(a)(2)(b), 3.241, 3.291, 3.292, 3.293, 3.294, 3.295, 3.296, 3.301, 3.302, 3.306, 3.307, 3.384, 3.386(a), 3.411(a)(b), 3.415, 3.416(a)(b), 3.417, 3.419, 3.422(a)(1)(2)(b)(c)(1)(2), 3.429, 3.430, 3.437(a)(b)(e)(f), 3.438, 3.440, 3.441(a)(1)(b)(c), 3.442, 3.443, 3.444, 3.445, 3.446(a), 3.448, 3.449(a)(b), 3.550, 3.551, 3.552, 3.553, 3.554, 3.562, 3.570, 3.572, 3.575(a), 3.576, 3.581, 3.582, 3.583, 3.584, 3.585, 3.586, 3.605(a)(b), 3.611, 3.615, 3.616, 3.617, 3.618, 3.623, 3.624(a)(b), 3.625, 3.627, 3.628, 3.629, 3.630, 3.633, 3.635, 3.638, 3.651, 3.652, 3.655(c)(2), 3.671, 3.673, 3.674, 3.681(a), 3.685, 3.693, 3.744, 3.745(a), 3.746(a)(c), 3.747, 3.755(a)(b), 3.762, 3.777(a), 3.778(b), 3.779, as amended by 3-2; 14 CFR Part 23.1101 and as amended by Amdt. 23-43; 23.955(a)(c)(1)(3)(e)(1), 23.1093(a)(5), and 23.1105 as amended by Amdt. 23-51; 23.1337(b)(1)(4) and 23.1549(a)(b)(c) as amended by Amdt. 23-61.

For aircraft equipped with Piper factory installed optional Garmin G1000 NXi as installed by Piper Drawing Number 107500, the additional certification basis for installation specific items only is:

14 CFR Part 23.21, 23.23(a), 23.25(a)(b), 23.29, 23.301(a)(b)(c), 23.303, 23.305, 23.307, 23.337, 23.341(a)(c), 23.473, 23.561(a)(b)(3)(e), 23.601, 23.603, 23.605(a), 23.607, 23.609, 23.611, 23.613, 23.625, 23.627, 23.771(a), 23.773(a)(1)(2), 23.777(a)(b), 23.867, 23.1301(a)(b)(c)(d), 23.1305(a)(1)(2)(3)(b)(2)(4)(i), 23.1306, 23.1307, 23.1308(a)(b)(c), 23.1309(a)(1)(2)(b)(c)(d)(e), 23.1311(a)(1)(2)(3)(4)(5)(6)(7)(b)(c), 23.1321(a)(c)(d)(5)(e), 23.1322(a)(b)(c)(d)(e), 23.1323(a)(c), 23.1325(a)(b)(1)(2)(i), 23.1326(a)(b), 23.1327(a), 23.1329(h), 23.1335, 23.1337(b)(1)(4), 23.1351(a)(1)(2)(i), 23.1353(h), 23.1357(a)(b)(c)(d), 23.1359(c), 23.1365, 23.1381(a)(b)(c), 23.1383(c), 23.1385(a)(b)(c)(d), 23.1387(a)(b)(c)(d)(e), 23.1389(a)(b)(c), 23.1391, 23.1393, 23.1395(a)(b), 23.1397(a)(b)(c), 23.1401(a)(b)(c)(d)(e)(f), 23.1431(a)(b)(e), 23.1523, 23.1525, 23.1541(a)(b), 23.1543(b)(c), 23.1545(a)(b), 23.1549(a)(b)(c), 23.1501, 23.1529, 23.1553, 23.1555(a)(b), 23.1581(a)(c), 23.1583(g)(h)(m), 23.1585(j), 23.1589(a) as amended by Amndt. 23-61, 14 CFR 23.1303(a)(b)(c)(f) as amended by Amndt. 23-62
CAR3 sections 3.581, 3.582, 3.583, 3.586, 3.635, effective May 15, 1956 including Amendment 3-2.

For aircraft equipped with Piper factory installed optional Garmin G1000 NXi Phase II and GFC700 AFCS (or Garmin G1000NXi Phase II only), as installed by Piper Drawing Number 107500, the additional certification basis for installation specific items only is:
CAR3 sections 3.581, 3.582, 3.583, 3.586 effective May 15, 1956 including Amendment 3-2

14 CFR Part 23.21(b), 23.23(a), 23.25(a)(b), 23.29, 23.143(a)(b), 23.207(a)(b)(c)(d)(e), 23.301(a)(b)(c), 23.303, 23.305, 23.307, 23.337, 23.341(a)(c), 23.397, 23.399, 23.473, 23.561(a)(b)(3)(e), 23.601, 23.603, 23.605(a), 23.607, 23.609, 23.611, 23.613, 23.625, 23.627, 23.681, 23.683, 23.693, 23.771(a), 23.777(a)(b), 23.779, 23.867, 23.1141(d), 23.1301(a)(b)(c)(d), 23.1305(a)(1)(2)(3)(b)(2)(4)(i), 23.1306, 23.1308, 23.1309(a)(1)(2)(b)(c)(d)(e), 23.1311(a)(1)(2)(3)(4)(5)(6)(7)(b)(c), 23.1321(c)(d)(5)(e), 23.1322(a)(b)(c)(d)(e), 23.1323(a)(c), 23.1325(a)(b)(1)(2)(i), 23.1327(a), 23.1329(a)(1)(b)(c)(d)(e)(f)(g)(h), 23.1335, 23.1337(b)(1)(4), 23.1351(a)(1)(2)(i), 23.1353(h), 23.1357(a)(b)(c)(d), 23.1359(c), 23.1365, 23.1367(a)(b)(c)(d), 23.1381(a)(c), 23.1431(a)(b)(e), 23.1501, 23.1523, 23.1525, 23.1529, 23.1541(a)(b), 23.1543(c), 23.1545(a)(b), 23.1549(a)(b)(c), 23.1553, 23.1555(a), 23.1581(a)(c), 23.1583(g)(h)(m), 23.1585(a)(1)(j), 23.1589(a) as amended by Amndt. 23-61;
14 CFR 23.1303(a)(b)(c)(f) as amended by Amndt. 23-62

For aircraft equipped with Piper factory installed optional Garmin G5 standby instrument, as installed by Piper Drawing Number 107569 Rev G or later FAA approved revision, the additional certification basis for installation specific items only is:

14 CFR Part 23.303, 23.307(a), 23.1306(a)(b), 23.1381(a)(b), as amended by Amndt. 23-0
14 CFR Part 23.771(a) as amended by Amndt. 23-14
14 CFR Part 23.1301(d), 23.1327(a)(1)(2), as amended by Amndt. 23-20
14 CFR Part 23.1541(a)(b)(c) as amended by Amndt. 23-21
14 CFR Part 23.601, 23.603, 23.605(a) as amended by Amndt. 23-23
14 CFR Part 23.1529 as amended by Amndt. 23-26
14 CFR Part 23.1322(a)(e), 23.1357(a)(b)(c)(d), as amended by Amndt. 23-43
14 CFR Part 23.305, 23.613(a)(b), 23.773(a)(2) as amended by Amndt. 23-45
14 CFR Part 23.301(a), 23.337(a)(b), 23.607(b) as amended by Amndt. 23-48
14 CFR Part 23.1307, 23.1309(b)(1)(2)(4)(e), 23.1321(c)(e), 23.1351(a)(1)(2)(i), 23.1359, 23.1365(a)(b)(c)(d)(e), 23.1431(b) as amended by Amndt. 23-49
14 CFR Part 23.1325(a)(b), 23.1543(b), 23.1581(a)(b)(d)(f) as amended by Amndt. 23-50
14 CFR Part 23.25(a)(b), 23.29, 23.1308(a)(b)(c) as amended by Amndt. 23-61
14 CFR Part 23.251(a), 23.561(a)(b)(3)(c), 23.777(a)(b), 23.853(a), 23.1301(a)(b)(c), 23.1303(a)(b)(c)(f), 23.1309(a)(1)(2), 23.1311(a)(1)(2)(3)(6)(7)(b), 23.1323(a)(b)(c), 23.1331(a)(b)(1)(c), 23.1353(h), 23.1431(a), 23.1545(a)(b)(c), 23.1555(a)(b), 23.1583(m), 23.1585(a) as amended by Amndt. 23-62
14 CFR Part 23.2515(a)(b), 23.2520(a)(b) as amended by Amndt. 23-64

For aircraft equipped with Piper factory installed High Temperature Operation Improvements, as installed by Piper Drawing Number 107500-011,-012 Rev AD or later FAA approved revision, the additional certification basis for installation specific items only is:

CAR Part 3 Amdt 3-2 - 3.71, 3.73, 3.74, 3.75, 3.76, 3.171(a), 3.172, 3.173, 3.174, 3.186, 3.188, 3.291, 3.292, 3.293, 2.294, 3.295, 3.296, 3.301, 3.302, 3.306, 3.307, 3.386(a), 3.411, 3.429, 3.430, 3.437(a)(b)(e)(f), 3.438, 3.440, 3.441(a)(1)(b)(c), 3.442, 3.443, 3.444, 3.445, 3.446(a), 3.448, 3.449(a)(b), 3.550, 3.551, 3.552, 3.553, 3.554, 3.562, 3.570, 3.572, 3.575(a), 3.576, 3.581, 3.582, 3.583, 3.584, 3.585, 3.586, 3.623, 3.624, 3.625, 3.633, 3.638, 3.651, 3.652, 3.655(b), 3.674, 3.744, 3.755(a)(b), 3.764(a)(b)(d), 3.777(b), 3.778(b), 3.779
14 CFR Part 21 Amdt. 21-97 - 21.93(b)
14 CFR Part 23 Amdt. 23-50 - 23.1521(a)(b)(5)(c)(4)
14 CFR Part 23 Amdt. 23-51 - 23.779(b)(2), 23.955(a)(c)(1)(3)(e)(1), 23.975(b)
14 CFR Part 23 Amdt. 23-61 - 23.1301(d), 23.1309(a)(1)(2)(b),
23.1311(a)(1)(2)(3)(4)(6)(7), 23.1321(a)(e), 23.1322(a)(b)(c)(d)(e), 23.1337, 23.1359(c),
23.1543(b)(c), 23.1549(a)(b)(c), 23.1581(a)(1)(2)(c), 23.1583(b), 23.1585(j)

For Piper Pilot 100i aircraft is equipped with the Lycoming Fuel Injected IO-360-B4A engine, and the Garmin G5 standby instrument and is defined by Piper Drawing 28G00A001 Revision NEW or later FAA approved revision. The additional certification basis is:

CAR Part 3 Amdt 3-2 - 3.171, 3.172, 3.173, 3.174, 3.185, 3.186 (a)(b), 3.187, 3.188, 3.189, 3.190, 3.191, 3.212, 3.213, 3.214, 3.215, 3.216, 3.217, 3.218, 3.219, 3.222, 3.223, 3.224, 3.242, 3.243, 3.244, 3.248, 3.249, 3.253, 3.254, 3.255, 3.256, 3.393, 3.411 (b), 3.581, 3.582, 3.583, 3.584, 3.585, 3.586, 3.624
14 CFR Part 21 Amndt. 21-97 - 21.93 (b)
14 CFR Part 23 Amndt. 23-Orig - 23.21 (a)(1)(b), 23.305 (b), 23.399, 23.601, 23.609, 23.627, 23.671, 23.1367, 23.1381 (a)(b)(c), 23.1519, 23.1543 (b)
14 CFR Part 23 Amndt. 23-7 - 23.395 (a)(1), 23.689 (a)(2)(3)(b)
14 CFR Part 23 Amndt. 23-14 - 23.771 (a), 23.1182
14 CFR Part 23 Amndt. 23-17 - 23.685 (a)(c)(d)
14 CFR Part 23 Amndt. 23-20 - 23.1301 (d), 23.1327 (a)(b), 23.1335, 23.1547 (a)(b)(c)(d)(e)
14 CFR Part 23 Amndt. 23-21 - 23.1501 (a)(b), 23.1541 (a)(b), 23.1555 (a)(b)
14 CFR Part 23 Amndt. 23-23 - 23.603, 23.605 (a)
14 CFR Part 23 Amndt. 23-26 - 23.1529
14 CFR Part 23 Amndt. 23-33 - 23.777 (a),
14 CFR Part 23 Amndt. 23-34 - 23.863 (a)(b), 23.1523
14 CFR Part 23 Amndt. 23-43 - 23.993, 23.1322 (a)(b)(c)(d)(e), 23.1357 (a)(b)(c)(d)
14 CFR Part 23 Amndt. 23-45 - 23.23 (a), 23.251, 23.397, 23.613 (a)(b)(c), 23.773 (a)(2), 23.1525, 23.1549 (a)(b)(c)
14 CFR Part 23 Amndt. 23-48 - 23.607, 23.611
14 CFR Part 23 Amndt. 23-49 - 23.677 (a)(d), 23.785 (a)(1)(2)(d)(j)(n)(1)(2)(3), 23.1307, 23.1321 (a)(c)(d)(5)(e), 23.1326 (a)(b), 23.1329 (a)(1)(2)(b)(c)(d)(e)(f)(g)(h), 23.1351 (a)(1)(2)(i)(b)(1)(i)(ii)(iii)(3)(c)(4)(d)(e), 23.1359 (a)(b)(c), 23.1361 (a)(c), 23.1365 (a)(b)(c)(1)(2)(d)(e)(f), 23.1383 (a)(b)(c)
14 CFR Part 23 Amndt. 23-50 - 23.25, 23.143 (c), 23.1325 (a)(b)(1)(2)(i), 23.1521 (a)(b)(1)(c)(1)(4), 23.1543 (b)(c), 23.1553, 23.1581 (a)(b)(2)(c)
14 CFR Part 23 Amndt. 23-51 - 23.955 (a)(2)(3)(4)(c), 23.963 (e), 23.1183, 23.1337 (a)(b)(1)(c)
14 CFR Part 23 Amndt. 23-52 - 23.1305 (a)(1)(2)(3)(b)(2)(4)(i)
14 CFR Part 23 Amndt. 23-53 - 23.901 (a)(b)(1)(e)
14 CFR Part 23 Amndt. 23-61 - 23.29, 23.207 (a)(b), 23.625, 23.867, 23.1563 (a), 23.1589 (a)
14 CFR Part 23 Amndt. 23-62 - 23.561 (a)(b)(3)(e), 23.777 (a)(b), 23.853 (a), 23.1193 (a)(b)(c)(d)(e), 23.1301 (a)(b)(c), 23.1303 (a)(b)(c)(f), 23.1309 (a)(1)(2)(b)(c)(d), 23.1310 (a), 23.1311 (a)(1)(2)(3)(4)(5)(6)(7)(b)(c), 23.1323 (a)(b)(c)(d), 23.1331 (a)(b)(1)(2)(c), 23.1353 (a)(b)(c)(d)(e)(h), 23.1431 (a)(b)(e), 23.1545 (a)(b)(1)(2)(3)(4), 23.1555 (a)(b)(d)(3), 23.1559 (c), 23.1583 (d)(h)(j)(m), 23.1585 (a)(j)
14 CFR Part 23 Amndt. 23-64 - 23.2335, 23.2510, 23.2515, 23.2520

For PA-28-181 aircraft equipped with main wing spar assembly, defined by Piper drawing 28W57A013, the additional certification basis for the main wing spar assembly structure is:
14 CFR 23.1529, 23.2010, 23.2240(a) as amended by Amendment 23-64 effective August 30, 2017.

PA-28R-201: CAR 3 effective May 15, 1956, including Amendments 3-1 and 3-2; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.965 of FAR 23 effective February 1, 1965; FAR 23.221, 23.955, 23.959 and 23.1091 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.967(e)(2) as amended by Amendment 23-14 effective December 20, 1973; FAR 23.1093 as amended by Amendment 23-15 effective October 31, 1974; FAR 23.1557(c)(1) as amended by 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; and FAR 36 effective December 1, 1969, through Amendment 36-4 (no acoustical change).

For aircraft equipped with Piper factory installed optional Avidyne Entegra system and Mid-Continent Model 4300-411 Electric Attitude Indicator (See Piper Report VB-1892, Appendix E), the additional certification basis for installation specific items only is: 14 CFR Part 23 regulations FAR 23.301, 23.337, 23.341, 23.473, 23.561(b)(3), 23.607, 23.611, as amended by Amdt. 23-48; FAR 23.303, 23.307, 23.601, 23.609, 23.1367, 23.1381 issued on 02/01/65; FAR 23.305, 23.613, 23.773, 23.1525, 23.1549 as amended by Amdt. 23-45; FAR 23.603, 23.605 as amended by Amdt. 23-23; FAR 23.777, 23.955, 23.1191, 23.1337 as amended by Amdt. 23-51; FAR 23.1301, 23.1327, 23.1335 as amended by Amdt. 23-20; FAR 23.867, 23.1303, 23.1307, 23.1309, 23.1311, 23.1321, 23.1323, 23.1329, 23.1351, 23.1353, 23.1359, 23.1361, 23.1365, as amended by Amdt. 23-49; FAR 23.1305 as amended by Amdt. 23-52; FAR 23.1322, 23.1331, 23.1357, 23.1431 as amended by Amdt. 23-43; FAR 23.1325, 23.1543, 23.1545, 23.1555, 23.1563, 23.1581, 23.1583, 23.1585 as amended by Amdt. 23-50; FAR 23.771 as amended by Amdt. 23-14; FAR 23.1501, 23.1541 as amended by Amdt. 23-21; FAR 23.1523 as amended by Amdt. 23-34; FAR 23.1529 as amended by Amdt. 23-26; Special Condition for HIRF (Docket # CE207), date July 30, 2004.

PA-28R-201T: CAR 3 effective May 15, 1956, through Amendment 3-2 including paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.965 of FAR 23 effective February 1, 1965; FAR 23.221, 23.901, 23.909, 23.955, 23.959, 23.1041, 23.1043, 23.1047, 23.1143, and 23.1527 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.1441 as amended by Amendment 23-9 effective June 17, 1970; FAR 23.967(e)(2) as amended by Amendment 23-14 effective December 20, 1973; FAR 23.1305 as amended by Amendment 23-15 effective October 31, 1974; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; and FAR 36 effective December 1, 1969, through Amendment 36-4.

PA-28-236: CAR 3 effective May 15, 1956, through Amendment 3-2; paragraphs 3.84a of Amendment 3-4 effective January 15, 1951, 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.221, 23.955, 23.959 and 23.1091 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.1093 as amended by Amendment 23-17 effective February 1, 1977; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; FAR 23.1581(b)(2) as amended by Amendment 23-21 effective March 1, 1978; and applicable portions of FAR 36 as amended by Amendment 36-9 effective April 3, 1978.

PA-28RT-201: CAR 3, effective May 15, 1956, through Amendment 3-2; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.965 of FAR 23 effective February 1, 1965; FAR 23.207, 23.221, 23.955, 23.959, and 23.1091 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.201, 23.203, 23.427(c), and 23.967(e)(2) as amended by Amendment 23-14 effective December 20, 1973; FAR 23.1093 as amended by Amendment 23-15 effective October 31, 1974; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; FAR 23.1581(b)(2) as amended by Amendment 23-21 effective March 1, 1978; and applicable portions of FAR 36 as amended by Amendment 36-10 effective July 31, 1978.

PA-28RT-201T: CAR 3 effective May 15, 1956, through Amendment 3-2; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.207, 23.221, 23.901, 23.909, 23.955, 23.959, 23.1041, 23.1043, 23.1047, 23.1091, 23.1143, and 23.1527 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.201, 23.203, 23.427(c), and 23.967(e)(2) as amended by Amendment 23-14 effective December 20, 1973; FAR 23.1093 and 23.1305 as amended by Amendment 23-15 effective October 31, 1974; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; FAR 23.1581(b)(2) as amended by Amendment 23-21 effective March 1, 1978; and applicable portions of FAR 36 as amended by Amendment 36-10 effective July 31, 1978. Compliance with FAR 23.1441 as amended by Amendment 23-9 effective June 17, 1970, will be established with optional oxygen equipment.

PA-28-201T: CAR 3 effective May 15, 1956, through Amendment 3-2; paragraphs 3.304 and 3.705 of Amendment 3-7 effective May 3, 1962; FAR 23.965 of FAR 23 effective February 1, 1965; FAR 23.207, 23.221, 23.901, 23.909, 23.955, 23.959, 23.1041, 23.1043, 23.1047, 23.1091, and 23.1527 as amended by Amendment 23-7 effective September 14, 1969; FAR 23.201 and 23.203 as amended by Amendment 23-14 effective December 20, 1973; FAR 23.1305 as amended by Amendment 23-15 effective October 31, 1974; FAR 23.1093 and 23.1143 as amended by Amendment 23-17 effective February 1, 1977; FAR 23.1557(c)(1) as amended by Amendment 23-18 effective May 2, 1977; FAR 23.1327 and 23.1547 as amended by Amendment 23-20 effective September 1, 1977; FAR 23.1581(b)(2) as amended by Amendment 23-21 effective March 1, 1978; and applicable portions of FAR 36 as amended by Amendment 36-10 effective July 31, 1978. Compliance with FAR 23.1441 as amended by Amendment 23-9 effective June 17, 1970, will be established with optional oxygen equipment.

Equivalent Safety Finding: CAR 3.757 for Models PA-28-161, PA-28R-201, PA-28R-201T, PA-28-236, PA-28RT-201, PA-28RT-201T, and PA-28-201T only.

Production Basis

Production Certificate No. 206 issued and the manufacturer authorized to issue airworthiness certificates under the delegation option provisions of FAR 21.

Equipment

The basic required equipment as prescribed in the applicable airworthiness regulation (see Certification Basis) must be installed in the aircraft for certification.
In addition, the following documents are required:

<u>MODEL</u>	<u>AFM/POH</u>	<u>REPORT NO.</u>	<u>APPROVED</u>	<u>SERIAL EFFECTIVITY</u>
PA-28-140	AFM	VB-160	2/14/64	28-20001 through 28-26946, and 28-7125001 through 28-7125641
	AFM	VB-339	7/21/71	28-7225001 through 28-7325674
	AFM	VB-557	5/14/73	28-7425001 through 28-7625275
	POH	VB-770	6/16/76	28-7725001 through 28-7725290
PA-28-150	AFM	VB-166	6/2/61	28-1 through 28-4377
PA-28-151	AFM	VB-573	7/25/73	28-7415001 through 28-7615435
	POH	VB-780	6/18/80	28-7715001 through 28-7715314
PA-28-160	AFM	VB-168	10/25/60	28-1 through 28-4377, and 28-1760A
PA-28S-160	AFM	VB-177	2/25/63	28-1 through 28-1760, and 28-1760A
PA-28-161	POH	VB-880	12/16/76	28-7716001 through 28-8216300
	POH	VB-1180	7/1/82	28-8316001 through 28-8616057, and 2816001 through 2816119
	POH	VB-1610	7/12/95	2842001 and up
	POH Supp.	VB-1546	6/30/92	28-8316001 through 28-8616057, and 2816001 through 2816119 (See NOTE 28)
	POH	VB-1360	9/9/88	2841001 through 2841365
	POH Supp.	VB-1545	5/29/92	2841001 through 2841365 (See NOTE 28)
	POH	VB-1565	7/1/94	2816110 through 2816119
PA-28-180	AFM	VB-163	8/3/62	28-671 through 28-5600
	AFM	VB-210	4/22/69	28-5601 through 28-5859, and 28- 7105001 through 28-7205091
	AFM	VB-355	9/1/71	28-7205092 through 28-7205318
	AFM	VB-437	5/22/72	28-7305001 through 28-7305601 and 28-E13
	AFM	VB-558	5/14/73	28-7405001 through 28-7505260
PA-28S-180	AFM	VB-179	5/10/63	28-671 through 28-5859, and 28-7105001 through 28-7105234
PA-28-181	POH	VB-760	8/15/75	28-7690001 through 28-7690467
	POH	VB-790	6/18/76	28-7790001 through 28-7990589
	POH	VB-1120	7/2/79	28-8090001 through 28-8690056, 28-8690061, 28-8690062, and 2890001 through 2890205
	POH	VB-1611	7/12/95	2843001 and up
	POH	VB-1563	8/19/94	2890206 through 2890231
	POH	VB-2266	4/16/2013	2843701, 2843703 and up
	POH	VB-2596	10/03/2016	2843852, 2843854 and up
	POH	VB-2749	12/22/2017	2843823, 2881001 and up
	POH	VB-2960	11/16/2020	28020001 and up
	AFM	VB-173	6/8/67	28R-30001 through 28R-31270, and 28R-7130001 through 28R-7130013

(continued)

<u>MODEL</u>	<u>AFM/POH</u>	<u>REPORT NO.</u>	<u>APPROVED</u>	<u>SERIAL EFFECTIVITY</u>
PA-28R-201	POH	VB-870	12/21/76	28R-7737001 through 28R-7837317
	POH	VB-1365	9/15/88	2837001 through 2837061
	POH	VB-1612	7/12/95	2844001 and up
PA-28R-200	AFM	VB-175	1/9/69	28R-35001 through 28R-35820, and
	AFM	VB-343	10/14/71	28R-7135001 through 28R-7135229
	AFM	VB-560	5/14/73	28R-7235001 through 28R-7335446
PA-28R-201T	POH	VB-800	12/20/76	28R-7435001 through 28R-7635545
	POH	VB-1370	11/9/89	28R-7703001 through 28R-7803373
				2803001 through 2803012
PA-28-235	AFM	VB-170	7/15/63	28-10001 through 28-11378, and
	AFM Supp.	VB-357	8/25/71	28-7110001 through 28-7210023
	AFM	VB-442	6/9/72	28-10001 through 28-11378, and
	AFM	VB-559	5/14/73	28-7110001 through 28-7110023
	POH	VB-810	1/21/77	28-7310001 through 28-7310176
				and 28-E11
				28-7410001 through 28-7610202
				28-7710001 through 28-7710089
PA-28-236	AFM	FT-124, App E. OR	6/1/78	28-7911001 through 28-8611008, and
	POH	VB-910	6/1/78	2811001 through 2811050
				28-7911001 through 28-8611008, and
				2811001 through 2811050
PA-28RT-201	AFM	FT-121, App C. OR	11/7/78	28R-7918001 through 28R-8218026
	POH	VB-930	11/30/78	28R-7918001 through 28R-7918267
PA-28RT-201	POH	VB-1130	9/14/79	28R-8018001 through 28R-8218026
PA-28RT-201T	AFM	FT-130, App E. OR	11/7/78	28R-7931001 through 28R-8631005, and
	POH	VB-940	11/30/78	2831001 through 2831013
				28R-7931001 through 28R-8631005, and
				2831001 through 2831013
PA-28-201T	AFM	FT-126, App E. OR	12/14/78	28-7921001 through 28-7921095
		VB-920	1/25/79	28-7921001 through 28-7921095

NOTE 1:

Current weight and balance report, including list of equipment included in certification empty weight and loading instructions, when necessary, must be provided for each aircraft at the same time of original certification.

The certificated empty weight and corresponding center of gravity location must include undrainable system oil (not included in the oil capacity) and unusable fuel as noted below.

Unusable Fuel and Oil Quantity

Fuel 12.0 lb. at (+103.0)

Fuel 12.0 lb. at (+103.0)

Fuel 12.0 lb. at (+103.0)

Fuel 2.2 lb. at (+103.0)

Fuel 2.2 lb. at (+103.0)

Oil 1.8 lb. at (+27.5)

Oil 1.8 lb. at (+27.5)

Applicable Models and Serial Numbers

PA-28R-180, PA-28R-200: all Serial Nos.

PA-28-180: S/N 28-E13, and 28-7305001 through 28-7505260

PA-28-235: S/N 28-E11, and S/N 28-7310001 through 28-7710089

PA-28-151: S/N 28-7415001 through 28-7715314

PA-28-140, PA-28-150, PA-28-160: all Serial Nos.

PA-28-180: S/N 28-03, S/N 28-671 through 28-5859, and 28-7105001 through 28-7205318

PA-28-140, PA-28-150, PA-28-160, PA-28-180: S/N 28-03, 28-1 through 28-1760, and 28-1760A

PA-28-151: S/N 28-7415001 through 28-7715314

Unusable Fuel and Oil Quantity

Oil 1.8 lb. at (+40.5)

Oil 1.8 lb. at (+35.5)

Oil 1.8 lb. at (+36.5)

Oil 3.9 lb. at (+35.6)

Fuel 2.3 lb. at (+103.0)

Oil 2.4 lb. at (+41.0)

Oil 2.4 lb. at (+36.0)

Oil 3.9 lb. at (+30.6)

Oil 1.8 lb. at (+35.5)

Fuel 12.0 lb. at (+103.0)

Fuel 30.0 lb. at (+103.0)

Oil 3.9 lb. at (+30.6)

Fuel 30.0 lb. at (+103.0)

Oil 6.0 lb. at (+19.1)

Fuel 12.0 lb. at (+103.0)

Oil 1.8 lb. at (+27.5)

Fuel 30.0 lb. at (+103.0)

Oil 5.2 lb. at (+36.0)

Fuel 30.0 lb. at (+103.0)

Oil 3.9 lb. at (+30.6)

Fuel 30.0 lb. at (+103.0)

Oil 6.0 lb. at (+19.1)

Fuel 30.0 lb. at (+103.0)

Oil 6.0 lb. at (+19.1)

Applicable Models and Serial Numbers

PA-28-150, PA-28-160: S/N 28-1761 through 28-4377

PA-28-180: S/N 28-1761 through 28-5859, and 28-7105001 through 28-7205318

PA-28-180: S/N 28-E13, 28-7305001 through 28-7505260

PA-28R-180: all Serial Nos.

PA-28R-200: S/N 28R-35001 through 28R-35820, and 28R-7135001 through 28R-7135229

PA-28-235: S/N 28-10001 through 28-11378, and 28-7110001 through 28-7210023

PA-28-235: S/N 28-E11, and 28-7310001 through 28-7710089

PA-28R-200: S/N 28R-7235001 through 28R-7635545

PA-28-181: S/N 28-7690001 through 28-8690056, 28-8690061, 28-8690062, and 2890001 through 2890231, 2843001 and up, 2881001 and up, and 2802001 and up

PA-28R-201: S/N 28R-7737001 through 28R-7837317, 2837001 through 2837061, and 2844001 and up

PA-28R-201T: S/N 28R-7703001 through 28R-7803373, 2803001 through 2803012

PA-28-161 Cadet: S/N 2841001 through 2841365

PA-28-161: S/N 28-7716001 through 28-8616057, and 2816001 through 2816119 and 2842001 and up

PA-28-236: S/N 28-7911001 through 28-8611008, and 2811001 through 2811050

PA-28RT-201: S/N 28R-7918001 through 28R-8218026

PA-28RT-201T: S/N 28R-7931001 through 28R-8631005, 2831001 through 2831013

PA-28-201T: S/N 28-7921001 through 28-7921095

NOTE 2

The following placards must be displayed in clear view of the pilot:

In Normal Category Aircraft**"THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUAL."****In aircraft certificated in both Normal and Utility Categories****"THIS AIRPLANE MUST BE OPERATED AS A NORMAL OR UTILITY CATEGORY AIRPLANE IN COMPLIANCE WITH OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS."**

Reference AFM for additional required placards.

- NOTE 3 Instructions for Continued Airworthiness, including Airworthiness Limitations (e.g., Life Limits, if applicable), are identified in the following manuals:
- (a) PA-28-140, PA-28-150, PA-28-160, PA-28-180, PA-28-235, PA-28R-180 and PA-28R-200
– Service Manual 753-586 (some content applies to PA-28S-160 and PA-28S-180)
 - (b) PA-28-151 and PA-28-161 (S/Ns through 2816119)
– Service Manual 761-539
 - (c) PA-28-161 (Cadet, S/Ns 2841001 through 2841365)
– Service Manual 761-829
 - (d) PA-28-161 (S/Ns 2842001 & Up)
– Airplane Maintenance Manual 761-882
 - (e) PA-28-181 (S/Ns 28-7690001 through 2890231)
– Airplane Maintenance Manual 761-679
 - (f) PA-28-181 (S/Ns 2843001 and Up, 2881001 and Up, 28020001 and Up)
– Airplane Maintenance Manual 761-883 (S/Ns 2843001 and Up, 2881001 and Up, 28020001 and Up)
– Airplane Maintenance Manual Supplement 767-111 (S/Ns 2881041, 28020001 and Up)
 - (g) PA-28-201T
– Airplane Maintenance Manual 761-702
 - (h) PA-28-236
– Airplane Maintenance Manual 761-681
 - (i) PA-28R-201 (S/Ns 28R-7737002 through 28R-7837317, 2837001 through 2837061) and PA-28R-201T
– Service Manual 761-639
 - (j) PA-28R-201 (S/Ns 2844001 and Up)
– Airplane Maintenance Manual 761-895
 - (k) PA-28RT-201T and PA-28RT-201T
– Airplane Maintenance Manual 761-694
- Note: See NOTE 30 for converted seaplane configurations (identified as NOTE 3 prior to Revision 64).
- NOTE 4 Takeoff r.p.m. for Models PA-28-180 and PA-28S-180, S/N 28-671 through 28-1760, and 28-1760A, restricted due to fuel flow capability of the emergency pump.
- NOTE 5 The Models PA-28-150, PA-28-160, PA-28-180; S/N 28-03, 28-1 through 28-5859, and 28-7105001 through 28-7205318 and PA-28-235; S/N 28-10001 through 28-11378, and 28-7110001 through 28-7210023, may be operated with the door removed in accordance with the FAA approved Airplane Flight Manual Supplement, Piper Report VB-182, dated September 3, 1963.
- The Model PA-28-140 may be operated with the door removed in accordance with the FAA approved Airplane Flight Manual Supplement dated August 12, 1965.
- NOTE 6 The Model PA-28-140, 2 PCLM (Normal Category Only), S/N 28-20001 through 28-20939 may be converted:
- (a) To a maximum weight of 2150 lb. by the installation of Piper Kit 756 962 and Sensenich propeller M74DM58.
 - (b) To the four place, 4 PCLM (See Item VIII), configuration in accordance with Piper Drawing 65599.
- NOTE 7 The Model PA-28-140, 2 PCLM, S/N 28-20940 through 28-26946, and 28-7125001 through 28-7725290, may be converted to the four place, 4 PCLM (See Item VIII), configuration by the installation of Piper Kit 756 941 and appropriate seats.
- NOTE 8 The maximum cargo allowable of 125 lb. for S/N 28-1 through 28-1760, and 28-1760A may be increased to 200 lb. in accordance with Piper Service Spares Letter No. 242.
- NOTE 9 The Model PA-28-180 (Normal Category), S/N 28-671 through 28-3832, may be operated in Utility Category in accordance with Service Spares Letter No. 258.
- NOTE 10 All PA-28 models with Lycoming O-360-A3A engine and Sensenich propeller Model M76EMM-0, M76EMMS-0, 76EM8S5-0, or 76EM8-0 must avoid continuous operation between 2150 and 2350 r.p.m. Placards must be installed in accordance with Piper Service Letter No. 526, and Airplane Flight Manual Supplement No. 1, dated April 22, 1969.

- NOTE 11 The Models PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-180; S/N 28-03, 28-1 through 28-5859, and 28-7105001 through 28-7205318; PA-28R-180 and PA-28R-200 may be operated with the spinner dome removed, or with the spinner dome and rear bulkhead removed. The PA-28-151, S/N 28-7415001 through 28-7715314, may be operated with the spinner dome removed, or with the spinner dome and front and rear bulkheads removed. The PA-28-180, S/N 28-7305001 through 28-7505260, and the PA-28-181; S/N 28-7690001 through 28-8690062, and 2890001 through 2890205, may be operated with the spinner dome removed. The PA-28R-201; S/N 28R-7737002 through 28R-7837317, 2837001 through 2837061, and 2844001 and up, may be operated with the spinner dome removed. The PA-28R-201T; S/N 28R-7703001 through 28R-7803373, and 2803001 through 2803012, may be operated with the spinner dome removed. The PA-28-161, S/N 28-7716001 through 28-8216300 may be operated with the spinner dome and front and rear bulkheads removed. The PA-28-161; S/N 28-8316001 through 28-8616057, 2816001 through 2816119, and PA-28-161 (Cadet), S/N 2841001 through 2841365, may be operated with the spinner dome removed, or with the spinner dome and front and rear bulkheads removed. The PA-28-236; S/N 28-7911001 through 28-8611008, and 2811001 through 2811050, may be operated with the spinner dome removed. The PA-28RT-201, S/N 28R-7918001 through 28R-8218026, may be operated with the spinner dome removed. The PA-28RT-201T; S/N 28R-7931001 through 28R-8631005, and 2831001 through 2831013, may be operated with the spinner dome removed. The PA-28-201T, S/N 28-7921001 through 28-7921095, may be operated with the spinner dome removed.
- NOTE 12 Maximum baggage may be increased to 200 lb. at (+117) by the installation of Piper Kit 756 962 and Sensenich propeller M74DM-58 or 74DM6-0-58. Maximum baggage may be increased to 300 lb. (200 lb. at +117 and 100 lb. at +133) by the installation of Piper Kit 756 962, Sensenich propeller M74DM-58 or 74DM6-0-58 and when modified in accordance with Piper Drawing 66671.
- NOTE 13 Maximum baggage may be increased to 300 lb. (200 lb. at +117 and 100 lb. at +133) when modified in accordance with Piper Drawing 66671.
- NOTE 14 The Model PA-28-235; S/N 28-10001 through 28-11378, and 28-7110001 through 28-7210023, may be operated with the spinner dome removed, or with the spinner dome and rear bulkhead removed on the constant speed propeller installation only.
- NOTE 15 The Model PA-28-180, S/N 28-671 through 28-5859, may be operated to the expanded C.G. envelope:
- (a) For S/N 28-671 through 28-3072 by the installation of P/N 65280-00 tube - Landing Gear Strut Piston in accordance with Piper Service Letter 567 and in accordance with FAA approved Airplane Flight Manual Supplement No. 2, dated September 14, 1970, for Model PA-28-180 (Piper Report VB-261).
 - (b) For S/N 28-3073 through 28-5859 in accordance with FAA approved Airplane Flight Manual Supplement No. 2, dated September 14, 1970, for Model PA-28-180 (Piper Report VB-261).
- NOTE 16 The Model PA-28-235, S/N 28-10001 through 28-11378, may be operated to the expanded C.G. envelope in accordance with FAA approved Airplane Flight Manual Supplement No. 1, dated September 14, 1970, for Model PA-28-235 (Piper Report VB-274).
- NOTE 17 The following serial numbered aircraft are not eligible for import certification to the U.S.: 28-5035, 28-5047, 28-5178, 28-5262, 28-5397, 28-5435, 28-11077, 28-11101, 28-11140, 28-11180, 28-11200, 28-11212, 28-11227, 28-11254, 28-11255, 28-24660, 28-24701, 28R-30861, 28R-30952, 28R-30972, 28R-31043, and 28R-31091. These aircraft have identification plates stamped "Ensenblado en Colombia."
- NOTE 18 Two propeller flange bushings must be replaced with Lycoming #72068S bushings at propeller blade positions corresponding to noncounterbored bolt holes in order to use the McCauley propeller.
- NOTE 19 Two propeller flange bushings must be replaced with Lycoming #72060S index bushing and Lycoming #721061S bushing, at flange index mark and opposite, in order to use the McCauley propellers. A spacer, Piper P/N 79528-0, is also required between propeller and engine flange.
- NOTE 20 The following model and serial number aircraft are not eligible for import certification to the U.S.:
PA-28-140:
 28-24660, 28-24701, 28-7225490, 28-7225491, 28-7225492, 28-7225493, 28-7225494, 28-7225495, 28-7225496, 28-7225497, 28-7225498, 28-7225499, 28-7325238, 28-7325371, 28-7325372, 28-7325373, 28-7325374, 28-7325375, 28-7325376, 28-7325377, 28-7325378, 28-7325379, 28-7325508, 28-7325516, 28-7325525, 28-7325526, 28-7325555, 28-7325556, 28-7325557, 28-7325558, 28-7325580, 28-7325581, 28-7325599, 28-7325600, 28-7425217, 28-7425222, 28-7425224, 28-7425271, 28-7425272, 28-7425273, 28-7425274, 28-7425275, 28-7425276, 28-7425277, 28-7425278, 28-7425279, 28-7425304, 28-7425305, 28-7425306, 28-7425307, 28-7425383, 28-7425384, 28-7525142, 28-7525144, 28-7525177,

28-7525180, 28-7525181, 28-7525182, 28-7525197, 28-7525201, 28-7525215, 28-7525216, 28-7525217, 28-7525218, 28-7525230, 28-7525238, 28-7525243, 28-7525244, 28-7525246, 28-7525247, 28-7625060, 28-7625061, 28-7625130, 28-7625144, 28-7625272, 28-7625273, 28-7625274, 28-7625275, 28-7725053, and 28-7725188.

PA-28-161:

28-7816330, 28-7916235, 28-8016266, 28-8116157, 28-8116158, 28-8316031, 28-8316032, 28-8616007, 2816006, 2816020, 2816021, and 2816022.

PA-28-180:

28-5047, 28-5178, 28-5262, 28-5397, 28-5435, 28-7305315, 28-7305316, 28-7305499, 28-7405136, 28-7405137, 28-7405138, 28-7405139, 28-7405158, 28-7405160, 28-7405161, 28-7405167, 28-7405184, 28-7405185, 28-7405186, 28-7405187, 28-7405223, 28-7505138, 28-7505148, 28-7505159, 28-7505168, 28-7505169, 28-7505179, 28-7505189, and 28-7505260.

PA-28-181:

28-7690362, 28-7790343, 28-7790344, 28-7790388, 28-7790533, 28-7790571, 28-7790605, 28-7890060, 28-7890185, 28-7890290, 28-7890351, 28-7890352, 28-7890406, 28-7890407, 28-7890463, 28-7890464, 28-7890465, 28-7890466, 28-7890480, 28-7890481, 28-7890507, 28-7890508, 28-7890509, 28-7890510, 28-7890534, 28-7890550, 28-7890551, 28-7990158, 28-7990251, 28-8090203, 28-8090243, 28-8090274, 28-8090349, 28-8190032, 28-8190098, 28-8190099, 28-8190174, 28-8190175, 28-8190200, 28-8190201, 28-8190261, 28-8190262, 28-8190317, 28-8190318, 28-8290020, 28-8290021, 28-8290022, 28-8290122, 28-8290123, 28-8290124, 28-8290125, 28-8290146, 28-8290147, 28-8290148, 28-8290149, 28-8390031, 28-8390032, 28-8390057, 28-8390058, 28-8390059, 28-8390060, 28-8690061, 28-8690062, 2890035, and 2890036.

PA-28-201T:

28-7921085

PA-28-235:

28-11077, 28-11101, 28-11140, 28-11180, 28-11200, 28-11212, 28-11227, 28-11254, 28-11255, 28-11370, 28-11371, 28-11372, 28-11373, 28-7310074, 28-7310152, 28-7310153, 28-7310172, 28-7410074, 28-7410078, 28-7410089, 28-7410090, 28-7510072, 28-7510073, 28-7610087, 28-7610168, 28-7710033, 28-7710068, and 28-7710089.

PA-28-236:

28-7911027, 28-7911028, 28-7911029, 28-7911030, 28-7911136, 28-7911219, 28-7911220, 28-7911221, 28-7911252, 28-8011020, 28-8011021, 28-8011062, 28-8011092, 28-8011093, 28-8011094, 28-8011107, 28-8111030, 28-8111038, 28-8111058, 28-8111068, 28-8111069, 28-8111070, 28-8411021, 28-8411022, 28-8411023, 28-8411024, 28-8411026, 28-8411027, 28-8411028, and 28-8411029.

PA-28R-180:

28R-31091

PA-28R-200:

28R-7335201, 28R-7335202, 28R-7335326, 28R-7335328, 28R-7335377, 28R-7335387, 28R-7335395, 28R-7335397, 28-7435214, 28-7435229, 28-7435252, 28-7435253, 28R-7535146, 28R-7535149, 28R-7535167, 28R-7535168, 28R-7535214, 28R-7535217, and 28R-7635377.

PA-28R-201:

28R-7737119, 28R-7837076, 28R-7837148, 28R-7837149, 28R-7837188, 28R-7837189, 28R-7837225, 28R-7837226, 28R-7837248, 28R-7837249, 28R-7837273, 28R-7837274, 28R-7837294, 28R-7837316, and 28R-7837317.

PA-28R-201T:

28R-7703069, 28R-7703132, 28R-7703184, 28R-7703185, 28R-7703285, 28R-7703382, 28R-7803064, 28R-7803156, 28R-7803207, 28R-7803208, 28R-7803251, 28R-7803291, 28R-7803292, 28R-7803293, 28R-7803294, 28R-7803295, 28R-7803299, 28R-7803300, 28R-7803317, 28R-7803318, 28R-7803319, 28R-7803320, 28R-7803344, 28R-7803360, 28R-7803361, 28R-7803370, 28R-7803371, 28R-7803372, and 28R-7803373.

PA-28RT-201:

28R-8118029, 28R-8118054, 28R-8118078, 28R-8218015, and 28R-8218016.

PA-28RT-201T:

28R-7931122, 28R-7931205, 28R-7931206, 28R-7931262, 28R-7931296, 28R-7931297, 28R-8031062, 28R-8131029, 28R-8131083, and 28R-8131183.

In addition, aircraft having the following serial number are not eligible for import certification to the U.S.:

AR28-7325238, AR28-7325371, AR28-7325372, AR28-7325373, AR28-7325374, AR28-7325375, AR28-7325376, AR28-7325377, AR28-7325378, AR28-7325379, AR28-7305315, AR28-7305316, AR28-7335201, AR28-7335202, AR28-7325508, AR28-7325516, AR28-7325525, AR28-7325526, AR28-7310152, AR28-7310153, AR28-7325555, AR28-7325556, AR28-7325557, AR28-7325558, AR28-7305480, AR28-7305499, AR28-7335326, AR28-7335328, AR28-7325580, AR28-7325581, AR28-7325599, AR28-7325600, AR28-7335395, and AR28-7335397.

- NOTE 21 Engines with serial numbers ending with "A" require the F-4-13 propeller governor assembly. Other engines require the F-4-3() propeller governor assembly.
- NOTE 22 Hartzell Propeller HC-C2YK-1()/7666A-2 or HC-C2YK-1()/F7666A-2 approved with IO-360-C1C engine only (S/N 28R-7235001 through S/N 28R-7635516).
- NOTE 23 McCauley Propeller B2D34C213/90DHA-16 approved with IO-360-C1C6 engine only (S/N 28R-7635517 through 28R-7635545).
- NOTE 24 On Models PA-28-161; S/N 28-7816001 through 28-8616057, and S/N 2816001 through 2816109, and PA-28-181; S/N 28-7890001 through 28-8690056, 28-8690061, 28-8690062, 2890001 through 2890231, 2843001 and up, and 2881001 and up, the wheel fairings but not the landing gear strut fairings may be removed.
- NOTE 25 On Models PA-28-201T; S/N 28-7921001 through 28-7921095, and PA-28-236; S/N 28-7911001 through 28-8611008, and 2811001 through 2811050, the wheel fairings alone or the wheel fairings but not the landing gear strut fairings may be removed.
- NOTE 26 With installation of Piper Kit 88050, PA-28-161 2325 lb. Maximum Gross Weight Modification, the following weights apply:
- Normal Category: Ramp - 2332 lb.
Takeoff - 2325 lb.
- Utility Category: Ramp - 2027 lb.
Takeoff - 2020 lb.
- (See POH VB-1180 Supplement dated October 5, 1985.)
- NOTE 27 With installation of Piper Kit 88168, PA-28-161 Cadet 2202 lb. Maximum Gross Weight Modification, the following weights apply:
- Normal Category: Ramp - 2209 lb.
Takeoff - 2202 lb.
- Utility Category: Ramp - 2027 lb.
Takeoff - 2020 lb.
- (See POH VB-1410 dated March 14, 1990.)
- NOTE 28 POH Supplement VB-1546 is applicable to POH VB-1180. POH Supplement VB-1545 is applicable to POH VB-1360. Supplements VB-1545 and VB-1546 restrict maximum r.p.m. limitation to 2600 r.p.m. for foreign countries requiring reduced noise level operation.
- NOTE 29 If S/N 28-7716001 thru 28-8416095 has kit Piper P/N 764-975 removing bungee steering and installing solid rod steering, rig nose wheel travel ($\pm 1^\circ$) 20° left 20° right.
- NOTE 30 The Models PA-28-160 and PA-28-180, S/N 28-508 to 28-1760, and 28-1760A may be converted to the seaplane configuration, PA-28S-160 and PA-28S-180, in accordance with Piper Drawing No. 62008.
- The Model PA-28-180, S/N 28-1761 through 28-5859, and 28-7105001 through 28-7205318, may be converted to the seaplane configuration, PA-28S-180, in accordance with Piper Drawing No. 65680.

...END...