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GARMIN GNS 430

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**SECTION 9
SUPPLEMENTS**

9.1 GENERAL

This section provides information in the form of Supplements which are necessary for efficient operation of the airplane when equipped with one or more of the various optional systems and equipment not provided with the standard airplane.

All of the Supplements provided by this section are "FAA Approved" and consecutively numbered as a permanent part of this Handbook. The information contained in each Supplement applies only when the related equipment is installed in the airplane.

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SUPPLEMENT 3

AUTOCONTROL IIIB AUTOPILOT INSTALLATION

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional Piper AutoControl IIIB Autopilot is installed. The information contained within this supplement is to be used "as described" in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional Piper AutoControl IIIB Autopilot is installed.

SECTION 2 - LIMITATIONS

- (a) Autopilot use prohibited above 165 MPH CAS.
- (b) Autopilot "OFF" during takeoff and landing.

SECTION 3 - EMERGENCY OPERATION

- (a) In an emergency the AutoControl IIIB can be disconnected by:
 - (1) Pushing the roll ON-OFF Rocker Switch "OFF."
 - (2) Pulling the Autopilot Circuit Breaker.
- (b) The autopilot can be overpowered at either control wheel.
- (c) An autopilot runaway, with a 3 second delay in the initiation of recovery while operating in a climb, cruise or descending flight, could result in a 45° bank and 180' altitude loss. Maximum altitude loss measured at 165 MPH in a descent.
- (d) An autopilot runaway, with a 1 second delay in the initiation of recovery, during an approach operation, coupled or uncoupled, could result in a 18° bank and 10' altitude loss.

SECTION 4 - NORMAL PROCEDURES

PREFLIGHT

- (a) AUTOPILOT
 - (1) Place Radio Coupler in "HDG" Mode (if installed) and place the AP "ON-OFF" switch to the "ON" position to engage roll section. Rotate roll command knob left and right and observe that control wheel describes a corresponding left and right turn, then center knob.
 - (2) Set correct compass heading on D.G. and turn HDG bug to aircraft heading. Engage "HDG" mode rocker switch and rotate HGD bug right and left. Aircraft control wheel should turn same direction as bug. Grasp control wheel and manually override servo, both directions.

(b) RADIO COUPLER -(OPTIONAL)

- (1) Tune and identify VOR or VOT station. Position Radio Coupler to OMNI Mode. Engage Autopilot ROLL and HDG switches. Set HDG bug to aircraft heading and rotate O.B.S. to cause OMNI indicator Needle to swing left and right slowly. Observe that control wheel rotates in direction of needle movement.
- (2) Disengage AP "ON-OFF" switch. Reset Radio Coupler control to HDG.

IN-FLIGHT

- (a) Trim airplane (ball centered).
- (b) Check air pressure vacuum to ascertain that the directional gyro and attitude gyro are receiving sufficient air.
- (c) Roll Section.
 - (1) To engage, center ROLL knob, push AP "ON-OFF" switch to "ON" position. To turn, rotate console ROLL knob in desired direction. (Maximum angle of bank should not exceed 30°.)
 - (2) For heading mode. set directional gyro with magnetic compass. Push directional gyro HDG knob in, rotate bug to aircraft heading. Push console heading rocker (HDG) switch to "ON" position. To select a new aircraft heading, push D.G. heading knob "IN" and rotate, in desired direction of turn, to the desired heading.
- (d) Radio Coupling — VOR/ILS with Standard directional gyro. (Optional)
 - (1) For VOR Intercepts and Tracking:
Select the desired VOR course and set the HDG bug to the same heading. Select OMNI mode on the coupler and HDG Mode on the autopilot console.
 - (2) For ILS Front Course Intercepts and Tracking:
Tune the localizer frequency and place the HDG bug on the inbound, front course heading. Select LOC-NORM mode on the coupler and HDG mode on the autopilot console.
 - (3) For LOC Back Course Intercepts and Tracking:
Tune the localizer frequency and place the HDG bug on the inbound course heading to the airport. Select LOC-REV mode with coupler and HDG mode on the autopilot console.

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of this Pilot's Operating Handbook are necessary for this supplement.

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Nord Flyg Service AB
Eskilstuna flygplats
SE-635 06 ESKILSTUNA

GARMIN GNS 430
Navigation system

LFV APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR

MODEL: PIPER PA 28-181

SERIAL NO: 28- 7690149

REG NO: SE- GNF

This supplement must be attached to the LFV approved Airplane Flight Manual when the GARMIN GNS 430 is installed in accordance with unit installation manual, GARMIN GNS 430 installation manual P/N 190-00140-02, Rev E. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

GPS APPROACH IS NOT APPROVED

LFV Supplement No. S36/00
Approved 2000-06-12

Sven Jakobson

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SECTION I GENERAL

1. The GNS 430 System is a fully integrated, panel mounted instrument which contains a VHF Communications Transceiver, a VOR/ILS receiver and a Global Positioning System (GPS) Navigation computer. The system consists of a GPS antenna, GPS receiver, VHF/VOR/LOC/GS antenna, VOR/ILS receiver, VHF COM antenna and a VHF Communications Transceiver. The primary function of the VHF Communication portion of the equipment is to facilitate communication with Air Traffic Control. The primary function of the VOR/ILS Receiver portion of the equipment is to receive and demodulate VOR, Localizer and Glide Slope signals. The primary function of the GPS portion of the system is to acquire signals from the GPS system satellites, recover orbital data, make range and Doppler measurements, and process this information in real time to obtain the user's position, velocity and time.
2. Provided the GARMIN GNS 430's GPS receiver is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications for:
 - a. VFR/IFR enroute, terminal and non-precision instrument approach (GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation in accordance with AC 20-138.
 - b. One of the approved sensors, for a single or dual GNS 430 installation, for North Atlantic Minimum Navigation Performance Specification (MNPS) Airspace in accordance with AC 91-49 and AC 120-33.
 - c. The system meets RNP5 airspace (BRNAV) requirements of AC 90-96 and in accordance with AC 20-138, and JAA AMJ 20X2 Leaflet 2 Revision 1, provided it is receiving usable navigation information from the GPS receiver.

Navigation is accomplished using the WGS-84 (NAD-83) coordinate reference datum. Navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States of America.

SECTION II LIMITATIONS

1. The GARMIN GNS 430 Pilots Guide P/N 190-00140-00, Rev A, dated October 1998 or later appropriate revision must be immediately available to the flight crew whenever navigation is predicated on the use of the system.
2. The GNS 430 must utilize the following or later FAA approved software versions

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Subsystem	Software Version
Main	2.12
GPS	2.00
COM	1.22
VOR/LOC	1.25
G/S	2.00

The main software version is displayed on the GNS 430 self test page immediately after turn-on for 5 seconds. The remaining system software versions can be verified on the AUX group sub page 2, "SOFTWARE DATABASE VER".

3. IFR enroute and terminal navigation predicated upon the GPS 430's GPS Receiver is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
4. Instrument approach navigation predicated upon the GPS 430's GPS Receiver must be accomplished in accordance with approved instrument approach procedures that are retrieved from the GPS equipment data base. The GPS equipment database must incorporate the current update cycle.
 - a. Instrument approaches utilizing the GPS receiver must be conducted in the approach mode and Receiver Autonomous Integrity Monitoring (RAIM) must be available at the Final Approach Fix.
 - b. Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for GPS overlay with the GNS 430's GPS receiver is not authorized.
 - c. Use of the GNS 430 VOR/ILS receiver to fly approaches not approved for GPS require VOR/ILS navigation data to be present on the external indicator.
 - d. When an alternate airport is required by the applicable operation rules it must be served by an approach based on other than GPS or Loran-C navigation, the aircraft must have the operational equipment capable of using that navigation aid and the required navigation aid must be operational.
 - e. VNAV information may be utilized for advisory information only. Use of VNAV information for Instrument Approach Procedures does not guarantee Step-Down Fix altitude protection or arrival at approach minimums in normal position to land.
5. If not previously defined, the following default settings must be made in the "SETUP 1" menu of the GNS 430 prior to operation (refer to Pilot's Guide for procedure in necessary):

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- | | | |
|----|-----------|---|
| a. | dis, spd | nm kt (sets navigation units to "nautical miles" and "knots") |
| b. | alt, vs | ft fpm (sets altitude units to "feet" and "feet per minute") |
| c. | map datum | WGS 84 (sets map datum to WGS-84, see note below) |
| d. | posn | deg-min (sets navigation grid units to decimal minutes) |

NOTE: In some areas outside the United States, datums other than WGS-84 or NAD-83 may be used. If the GNS 430 is authorized for use by the appropriate Airworthiness authority, the required geodetic datum must be set in the GNS 430 prior to its use for navigation.

SECTION III EMERGENCY PROCEDURES

ABNORMAL PROCEDURES

1. If GARMIN GNS 430 navigation information is not available or invalid, utilize remaining operational navigation equipment as required.
2. If "RAIM POSITIONING WARNING" message is displayed the system will flag and no longer provide GPS based navigational guidance. The crew should revert to the GNS 430 VOR/ILS receiver or an alternate means of navigation other than the GNS 430's GPS Receiver.
3. If "RAIM IS NOT AVAILABLE" message is displayed in the enroute, terminal, or initial approach phase of flight, continue to navigate using the GPS equipment or revert to an alternate means of navigation other than the GNS 430's GPS Receiver appropriate to the route and phase of flight. When continuing to use GPS navigation, position must be verified every 15 minutes using the GNS's VOR/ILS receiver or another IFR-approved navigation system.
4. If "RAIM IS NOT AVAILABLE" message is displayed while on the final approach segment, GPS based navigation will continue for up to 5 minutes with approach CDI sensitivity (0.3 nautical mile). After 5 minutes the system will flag and no longer provide course guidance with approach sensitivity. Missed approach course guidance may still be available with 1 nautical mile CDI sensitivity by executing the missed approach.
5. In an in-flight emergency, depressing and holding the COM transfer button for 2 seconds will select the emergency frequency of 121.500 MHz into the "Active" frequency window.

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SECTION IV NORMAL PROCEDURES

1. DETAILED OPERATION PROCEDURES

Normal operation procedures are described in the GARMIN GNS 430 Pilot's Guide, P/N 190-00140-00, Rev. A, dated October 1998, or later appropriate revision.

2. PILOT'S DISPLAY

The GNS 430 System data will appear on the Pilot's ~~DIS~~^{OBI}. The source of data is either GPS or VLOC as annunciated on the display above the CDI key.

3. AUTOPILOT / FLIGHT DIRECTOR OPERATION

Navigation system's are not connected to the autopilot. Refer to the Century II-B autopilot's flight manual supplement for autopilot operation and flight procedures.

4. CROSSFILL BETWEEN NUMBER ONE AND TWO GNS 430 SYSTEMS

For dual GNS 430 installations, manual crossfill capabilities exist between the number one and number two GNS 430 systems. Refer to the GARMIN GNS 430 Pilot's Guide for detailed crossfill operation instructions.

5. AUTOMATIC LOCALIZER COURSE CAPTURE

By default , the GNS 430 automatic localizer capture feature is enabled. This feature provides a method for system navigation data present on the external indicators to be switched automatically from GPS guidance to localizer/glide slope guidance at the point of course intercept on a localizer at which GPS derived course deviation equals localizer derived course deviation. If an offset from the final approach course is being flown, it is possible that the automatic switch from GPS course guidance to localizer/glide slope course will not occur. It is the pilot's responsibility to ensure correct system navigation data is present on the external indicator before continuing a localixer based approach beyond the final approach fix.

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**SECTION V
PERFORMANCE**

No change

**SECTION VI
WEIGHT AND BALANCE**

See current weight and balance data.

**SECTION VII
AIRPLANE AND SYSTEM DESCRIPTIONS**

See GNS 430 Pilot's Guide for a complete description of the GNS 430 system.

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