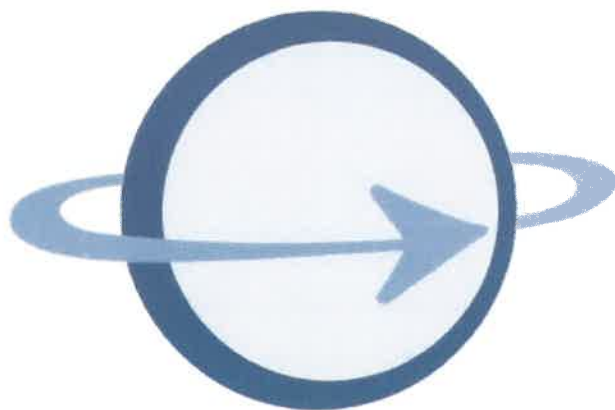




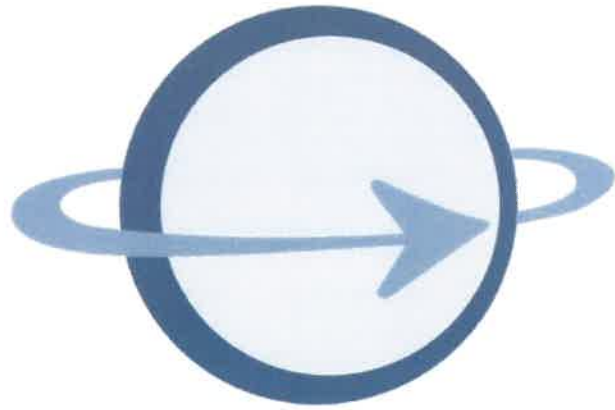
Bragg Avionics, Inc.

N733TT

UNITS INSTALLED

GFC 500

**Airplane Flight Manual Supplement (AFMS)
Instructions for Continued Airworthiness (ICA)
FAA Form 337
Weight & Balance (W&B)**



Bragg Avionics, Inc.

N733TT

UNITS INSTALLED

GFC 500

**Airplane Flight Manual Supplement (AFMS)
Instructions for Continued Airworthiness (ICA)
FAA Form 337
Supplemental Equipment List (SEL)**

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

**Textron Aviation 172E / 172F / 172G / 172H / 172I / 172K / 172L / 172M /
172N / 172P / 172Q / 172R / 172S / R172K**

And

**Cessna F172E / F172F / F172G / F172H / F172K / F172L / F172M / F172N /
F172P / FR172K**

Dwg. Number: 190-02291-02 Rev. 10

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: 17268542

Airplane Registration Number: N788TT

FAA Approved By: Paul Mast

Paul Mast
ODA STC Unit Administrator
Garmin International, Inc
ODA-240087-CE

Date: 7-12-2024

Garmin International, Inc
Log of Revisions
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
GFC 500 Autopilot with ESP
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And

**Cessna F172E / F172F / F172G / F172H / F172K / F172L / F172M / F172N /
F172P / FR172K**

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	12/21/2017	Robert G. Murray Garmin ODA STC Unit Administrator
2	ALL	Add model 172E	5/11/2018	Robert G. Murray Garmin ODA STC Unit Administrator
3	ALL	Add VNAV Procedures	07/27/2018	Paul Mast Garmin ODA STC Unit Administrator
4	ALL	Correct Typographical errors	01/18/19	Robert G. Murray Garmin ODA STC Unit Administrator
5	ALL	Add G3X Information	03/15/19	Robert G. Murray Garmin ODA STC Unit Administrator
6	ALL	Added R172K/FR172K/F172E	05/30/19	Paul Mast Garmin ODA STC Unit Administrator
7	ALL	Updated various procedures	12/16/19	Robert G. Murray Garmin ODA STC Unit Administrator

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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.

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	GTN 650X1	Is Navigator #1 interfaced to GFC 500? ☒ YES ☐ NO
VHF Nav Radio #1	GTN 650X1	Is VHF Nav Radio #1 interfaced to GFC 500? ☒ YES ☐ NO
VHF Nav Radio #2	None	
Pitch Trim Servo	GSA-28	

SECTION 2 – LIMITATIONS

The Garmin G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, part number 190-01112-12 Rev A (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.

All speeds shown are indicated airspeeds unless otherwise noted.

Autopilot maximum engagement speed is 150 KIAS (172 MPH).

Autopilot engagement is limited to flap positions no greater than 10 degrees.

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.

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**

CAUTION

Be prepared for high elevator control forces.

3. **Aircraft Attitude**.....**MAINTAIN / REGAIN AIRCRAFT CONTROL**
4. Elevator Trim.....**RE-TRIM** if necessary using Elevator Trim Control Wheel
5. **AUTOPILOT Circuit Breaker**..... **PULL**

NOTE

Do not release the AP DISC / TRIM INT Button until after pulling the AUTOPILOT Circuit Breaker.

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.

OVERSPEED PROTECTION (MAXSPD)

(MAXSPD displayed on G5, GI 275, or G3X, AIRSPEED – AIRSPEED Aural sounds.)

- 1. Throttle.....REDUCE
- 2. Aircraft Attitude and Altitude.....MONITOR

After overspeed condition is corrected:

- 3. AutopilotRESELECT VERTICAL AND LATERAL MODES (if necessary)
- 4. ThrottleADJUST as necessary

NOTE

Overspeed protection mode provides a pitch up command to decelerate the airplane at or below the maximum autopilot operating speed.

UNDERSPEED PROTECTION (MINSPD)

(MINSPD displayed on G5, GI 275, or G3X, AIRSPEED – AIRSPEED Aural sounds.)

- 1. Throttle..... 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. ThrottleADJUST as necessary

NOTE

Autopilot Underspeed Protection Mode provides a pitch down command to maintain 50 KIAS (58 MPH).

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.

NOTE

The autopilot, ESP, and electric elevator trim are inoperative.

LOSS OF NAVIGATION INFORMATION

This procedure applies only if the optional GPS and/or VHF navigator is installed.

(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)

HEADING DATA SOURCE FAILURE

1. Autopilot SELECT different lateral mode (as necessary)

NOTE

Track information will be displayed on the G5, GI 275, or G3X.

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.

ELEVATOR MISTRIM (AUTOTRIM)

(Amber TRIM UP or TRIM DOWN displayed on the G5, GI 275, or G3X.)

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.

NOTE

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.

If a pitch trim servo is not installed:

1. Refer to the normal procedures section of this AFMS, MANUAL PITCH TRIM WITH AUTOPILOT ENGAGED.

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.

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

VERTICAL NAVIGATION (VNAV)

1. Navigation Source..... SELECT CDI to GPS
2. Vertical Navigation Profile.....LOAD 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.

LATERAL MODES

HEADING MODE (HDG)

1. HDG Key PRESS
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.

TRACK MODE (TRK)

1. TRK Key PRESS
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.

NAVIGATION (VOR)

1. Navigation Source. SELECT CDI to VHF NAV
Tune and identify the station frequency.
2. Course Pointer SET 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.

APPROACHES

ILS APPROACH

1. Navigation Source..... SELECT CDI to VHF Nav
Tune and Identify an ILS station frequency.
2. CDI SET to front LOC course

NOTE

Ensure that the current heading will result in a capture of the selected course.

3. APR Key..... PRESS, verify LOC and GS ARMED
4. LOC and GS Mode..... VERIFY airplane Captures and Tracks LOC and GS
5. Missed Approach Altitude SET in Altitude preselect.

At Decision Altitude (DA),

6. AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
7. GO AROUND (GA) button PRESS, Execute Missed Approach Procedure
8. 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.

GPS APPROACH (LPV, LNAV/VNAV, LP+V, or LNAV+V)

1. Navigation Source..... SELECT CDI to GPS
2. Course PointerVERIFY CDI set to the Desired Course

NOTE

Ensure that the current heading will result in a capture of the selected course.

3. APR Key..... PRESS, verify GPS and GP ARMED
4. GPS and GP ModeVERIFY airplane Captures and Tracks GPS and GP
5. ALT KeyPRESS to level off at the MDA for a LP+V or LNAV+V approach

At DA (LPV or LNAV/VNAV approach), or MDA and Missed Approach Point (LP+V or LNAV+V),

6. AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or

7. GO AROUND (GA) button PRESS, Execute Missed Approach Procedure
8. Apply GA power.
9. 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 PointerVERIFY CDI set on the Desired Course

NOTE

Ensure that the current heading will result in a capture of the selected course.

3. NAV Key..... PRESS, verify GPS ARMED
4. GPS Mode..... VERIFY airplane Captures and Tracks GPS Course
5. Altitude PreselectSET to next required step down altitude
6. Missed Approach AltitudeSET when in ALT mode at the MDA

At Missed Approach Point,

7. AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or

8. GO AROUND (GA) button PRESS, Execute Missed Approach Procedure
9. Apply GA power.

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

NOTE

Ensure that the current heading will result in a capture of the selected course.

3. NAV Key..... PRESS, verify VOR ARMED
4. VOR Mode VERIFY airplane Captures and Tracks VOR Course
5. Altitude PreselectSET to next required step down altitude
6. Missed Approach AltitudeSET when in ALT mode at the MDA

At Missed Approach Point,

7. AP DISC / TRIM INT button PRESS, Continue visually for a normal landing
Or
8. GO AROUND (GA) button PRESS, Execute Missed Approach Procedure
9. Apply GA power.

NOTE

Pressing the GA button will not disconnect the autopilot. Select NAV or HDG mode to fly the missed approach procedure.

SECTION 5 – PERFORMANCE

No Change.

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.

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 60 KIAS (69 MPH) is reached, a visual MINSPD message will appear above the airspeed tape and the autopilot will lower the nose to maintain 60 KIAS (69 MPH). An aural "AIRSPEED, AIRSPEED" voice alert will sound for installations connected to an audio panel.

Underspeed Protection is exited automatically when airspeed exceeds 65 KIAS (75 MPH).

Overspeed Protection (OSP) — The GFC 500 will provide Overspeed Protection when the autopilot is engaged.

When the maximum airspeed of 150 KIAS (172 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 the maximum configured airspeed. An aural "AIRSPEED, AIRSPEED" voice alert will sound for installations connected to an audio panel.

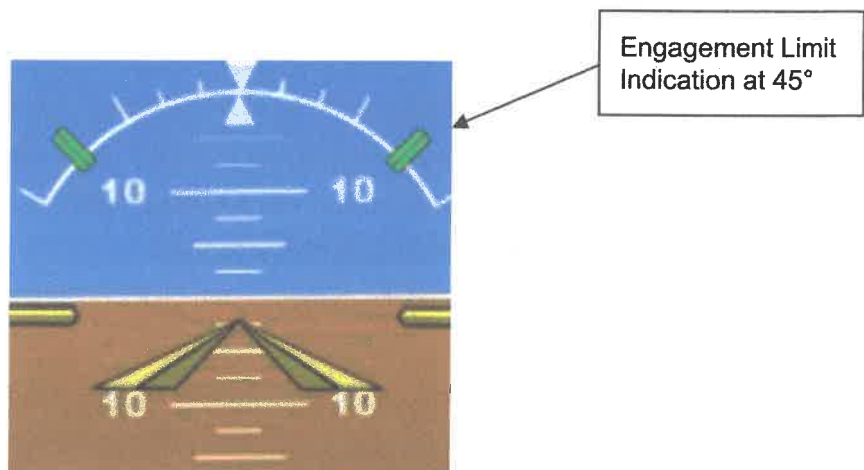


Figure 7-1: Nominal Roll Attitude ESP Engagement Limit Indications

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.

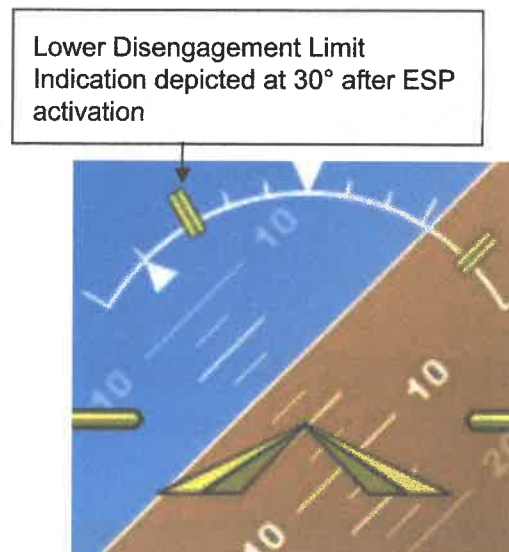


Figure 7-2: Engagement Limit Indications Upon ESP Activation

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	60 to 150 KT (69 to 172 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 161 KIAS (185 MPH)	
ESP Low Airspeed Engagement			When above 200 FT AGL, ESP Low Airspeed engages at 50 KIAS (58 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.

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.

4. Instructions for Continued Airworthiness

This document is designed as Instructions for Continued Airworthiness in accordance with 14 CFR 23.1529 Appendix G for use by the owner/operator of the airplane to maintain the GFC 500 Automatic Flight Control System installed under STC SA01866WI.

4.1 Airworthiness Limitations

The GFC 500 Autopilot is airworthy when installed, configured, and maintained in accordance with this section.

There are no new or additional Airworthiness Limitations associated with this equipment and/or this installation.

The Airworthiness Limitations section is FAA-approved and specifies maintenance required under §§ 43.16 and 91.403 of Title 14 of the Code of Federal Regulations unless an alternative program has been FAA-approved.

FAA APPROVED

Erik Frisk
Erik Frisk
STC Unit Administrator
ODA-240087-CE

13-FEB-2016
Date

4.2.2 Required Tools

The following tools are needed to perform maintenance tasks on GFC 500 Autopilot equipment:

- Calibrated Milliohm meter with Kelvin probes, OR
 - Ammeter capable of measuring 1.5 Amps of current with a minimum resolution of 0.1A.
 - Voltmeter capable of measuring millivolts with a minimum resolution of 0.1mV.
 - Variable DC Power Supply capable of providing 1 amp current
- 3/32" Hex tool
- Calibrated VHF NAV/COM/ILS ramp tester or equivalent
- Calibrated pitot/static ramp tester
- Outdoor line-of-site to GPS satellite signals or GPS indoor repeater
- Headset/microphone
- Ground Power Unit
- Calibrated Flight Control Cable Tension Meter or equivalent
- Calibrated torque wrench capable of measuring 0 – 70 in/lbs.
- Standard sockets & wrenches

4.2.3 Special Tools

There are no special tools required to perform maintenance on the GFC 500 Autopilot.

4.2.3.1 Optional Tools

The following tools are available to assist in performing maintenance tasks on GFC 500 Autopilot equipment:

- ADS ATAT-1100 Walker (or equivalent) bridle cable tensioning tool

4.4 Visual Inspection

Perform a visual inspection in accordance with requirements in Table 4-2. Check for corrosion, damage, or other defects of the GMC 507 and the GSA 28s. Replace any damaged parts as required. Inspection may require the temporary removal of a unit or units to gain access to connectors. Follow guidance in Section 6 for equipment removal and replacement. Refer to the aircraft manufacturer service or maintenance manual for instructions on access panel locations.

Table 4-2 – Visual Inspection Procedure

Item	Description/Procedure	Initials
GFC 500 Equipment Visual Inspections	a) Conduct a visual inspection of the GMC 507 and GSA 28 equipment installations in accordance with 14 CFR Part 43, Appendix D. If the equipment does not pass the visual inspection, complete the following procedure: i. Correct improper installations and ensure that all install racks, brackets, and fasteners are secure. Correct improper wire routing and ensure that the wire harness is securely mounted. Replace install racks, brackets, wiring and associated electrical bonding or shielding components with obvious defects ii. Complete the equipment electrical bonding test as described in section 4.5 for any components that are replaced. iii. Equipment shield terminations shall be free of corrosion and secure to the backshell or aircraft ground. b) Inspect all exposed wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AC 43.13-1B, Chapter 11, Section 8, Paragraph 11-96.	
Servos, Servo Control Cables, and associated hardware	a) Using a flashlight, inspect the GSA 28 servos, connectors, support structure, and control cables to ensure that no corrosion, chafing, cracks, or other defects exist. b) Have an assistant manually move the control surfaces from stop to stop and visually observe the servo and control cabling/chain. Ensure there is no binding in the control cabling or chain, that the capstan/sprocket rotates freely, and that there is no rough turning or noise from the servo bearings. c) Check the servo control cables in accordance with AC 43.13-1B, Chapter 7, Section 8, Paragraph 7-149 to ensure no fraying, corrosion, or other damage exists. If the condition of any cable is questionable, replace it with a new one. Additionally, where servo cables wrap around capstans and pulleys, measure the cable diameter with cable tension applied. If the cable has lost 30% or more of its nominal diameter, replace the servo cable. d) Lubricate any aircraft cables which have been replaced by this STC (e.g. continuous travel pitch trim cables) in accordance with the service manual applicable to the aircraft model. e) Check the tension on the servo control cables. Refer to the appropriate Install Manual Addendum for the aircraft type for cable tension specifications: f) Ensure that each cable is correctly attached to the existing flight control system as shown in the appropriate Install Manual Addendum. If servo cable clamps are installed, inspect the torque seal tamper indicator at the intersection of the cable and clamps. If torque seal is cracked or damaged, remove cable clamps for further inspection. g) Visually inspect the condition of lock nuts, cable guard support plate, cable guard posts, self-locking castle nuts, cotter pin, split lock washer, flat washer and the output shaft to ensure no corrosion, cracks, or other defects exist. h) For continuous travel servos only, visually inspect the condition of the idler pulley, shaft, washer, and E-ring, to ensure no corrosion, chafing, cracks, or other defects exist. i) For aircraft with roller type cable guides, visually inspect the rollers guiding servo cables. Replace roller if wear exceeds 0.04 inches. Refer to applicable installation manual addendum (190-02291-XX) for roller locations. j) For aircraft with cushion clamps (such as Adel clamps), visually inspect the clamp for security, condition of the cushion material, condition of the tubular frame, and any evidence of corrosion. k) Visually inspect fairleads for wear. Replace if wear exceeds 10% of the width of the section of the part, or if the wear is greater than 0.01 inch. Refer to applicable installation manual addendum (190-02291-XX) for fairlead locations.	

4.5.2 Test Equipment

A milliohm meter and Kelvin probes are recommended for this test. However, an alternate method may be used to provide equivalent results by using the following procedure and a standard voltmeter, power supply with adjustable current limit, and ammeter. The test set up for this alternate method is described below.

All test equipment used for the bond checks must be calibrated.

1. Connect the positive lead of the power supply to airframe ground. Connect/touch the positive lead of the voltmeter to the same point.

NOTE

Ensure that the voltmeter and power supply probes do not touch, so as not to induce contact resistance.

2. Touch negative lead of power supply to each of the test points listed while performing Step 3. At each required point, configure the power supply to produce 1 amp before measuring voltage. (Use an ammeter to ensure current is within minimum of 1 amp ± 100 milliamp at each point). Do not allow the reference current to exceed 1.5 amps for safety.
3. With the current set to 1A, the voltage reading will be the value of the bonding resistance. Set the voltmeter to measure millivolts and null the reading. Measure the voltage from airframe ground (step 1) to each required test points and record the voltage. (Perform Step 2 at each required point and ensure that minimum of 1 amp ± 100 milliamp is present when measuring the voltage.)

TIP: When a 1A current is used all the millivolt readings are the same as m Ω , and required no further calculation of bond resistance. If 1 amp reference current cannot be maintained and is higher divide the measured voltage by current to get the resistance value.

4.5.3 Electrical Bonding Procedure

Using one of the two measurement methods in Section 4.5.2 record the bonding measurement for the following equipment. Some equipment in the list is optional and may not be installed.

Ensure that the measurements do not exceed the values shown in Table 2-2. If the values exceed those listed, perform the reconditioning procedure in Section 2.4.

- GMC 507 case: 2.5 m Ω
- GSA 28 (Roll) chassis: 2.5 m Ω
- GSA 28 (Pitch) chassis: 2.5 m Ω
- GSA 28 (Pitch Trim) chassis: 2.5 m Ω
- GSA 28 (Yaw Damper) chassis: NA m Ω
- American Champion Model 8GCBC Belly Panel: NA m Ω



US Department
of Transportation
Federal Aviation
Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

OMB No. 2120-0020
Exp. 01/31/2023

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark N733TT	Serial No. 17268542	
	Make CESSNA	Model 172N	Series
2. Owner	Name (As shown on registration certificate) TEENS IN FLIGHT INC		Address (As shown on registration certificate) Address 275 OLD MOODY BLVD
			City PALM COAST State FL
			Zip 32164-2470 Country UNITED STATES

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☒	AIRFRAME		(As described in Item 1 above)	
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type		
			Manufacturer		

6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency	
Name Bragg Avionics, Inc.		☐ U. S. Certificated Mechanic	☐ Manufacturer
Address 882 Bragg Avenue		☐ Foreign Certificated Mechanic	C. Certificate No.
City Jacksonville State FL		☒ Certificated Repair Station	UV1R546K
Zip 32225 Country UNITED STATES		☐ Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐	Signature/Date of Authorized Individual 2026-08-17 
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7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ Approved ☐ Rejected

BY	FAA Flt. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee ☒	Repair Station	Inspection Authorization	

Certificate or Designation No. UV1R546K	Signature/Date of Authorized Individual 2026-08-17 
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WEIGHT & BALANCE

Work Order: 16752

Date: August 17, 2026

Bragg Avionics, Inc.

882 Bragg Ave.

Jacksonville, Florida 32225

Michael Bragg • info@braggavionics.com • 904-564-1717

CRS#: UV1R546K

Registration #: N733TT

Serial: 17268542

Make: CESSNA

Model: 172N

Previous Weight Information

Aircraft Gross Weight: 2400.0

Previous Weight: 1462.1

Previous Arm: 39.06

Previous Moment: 57108.1

Date: April 25, 2025

Items Removed

Item	Part Number	Serial Number	Weight	Arm	Moment
Roll Servo	0105-R9		3.3	180.0	594.0
Pitch Servo	0107-P4		3.5	78.0	273.0
Flight Programmer	1C497-10		2.8	14.0	39.2
Absolute Pressure Transducer	0111		0.3	143.0	42.9
Auto Pilot	Cable Assembly		2.5	50.0	125.0
Total of Items Removed			12.4		1074.1

Items Installed

Item	Part Number	Serial Number	Weight	Arm	Moment
GMC 507 Control Head	011-04548-01	5H1116178	0.7	16.6	11.6
TOP ASSY, GSA 28, W/ BALL BEARINGS, FAA-PMA	011-02927-21	6N2035865	1.4	70.4	98.6
TOP ASSY, GSA 28, W/ BALL BEARINGS, FAA-PMA	011-02927-21	6N2036019	1.4	175.0	245.0
TOP ASSY, GSA 28, W/ BALL BEARINGS, FAA-PMA	011-02927-21	6N2035976	1.4	112.3	157.2
Total of Items Installed			4.9		512.4

New Aircraft

Empty Weight	Empty Weight CG	Moment	Useful Load
1454.6	38.87	56546.4	945.4

FOR AIRCRAFT LOADING, SEE INSTRUCTIONS IN AIRCRAFT FLIGHT MANUAL

Computed By: Michael Bragg

Certificate #: Repair Station UV1R546K

Signed: