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
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
GARMIN G3X TOUCH ELECTRONIC FLIGHT INSTRUMENT SYSTEM
as installed in

Cessna 182P

Make and Model Airplane

Registration Number: N9989E Serial Number: 18264049

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 SA01899WI for the installation and operation of the Garmin G3X Touch Electronic Flight 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 this supplement are labeled as "FAA Approved". Sections not labeled "FAA Approved" are provided for guidance information only.

FAA APPROVED BY: Paul Mast

Robert Murray

ODA STC Unit Administrator

GARMIN International, Inc

ODA-240087-CE

DATE: 4-21-2023

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REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	03/15/19	Robert Murray ODA STC Unit Administrator
2	2-2, 2-5	Added limitation for installations with an autopilot other than GFC500.	04/05/19	Paul Mast ODA STC Unit Administrator
3	1-5, 2-1	Added GPS 175 / GNX 375 as approved IFR navigators.	5/30/19	Paul Mast ODA STC Unit Administrator
4	ALL	Incorporate system software v8.60 and associated hardware changes.	12/20/19	Robert Murray ODA STC Unit Administrator
5	ALL	Formatting changes throughout document. Clarified requirements for IFR vs. VFR navigation, updated emergency procedures, annunciations, and autopilot configuration applicability. Added graphics for deviation indicators. Revised transponder mode description. Addition of Smart Glide.	12/29/21	Robert Murray ODA STC Unit Administrator
6	ALL	Added GI 275 integration, traffic aural alert limitation information, minor clerical and formatting corrections throughout document.	SEE COVER	SEE COVER

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Table of Contents

1 GENERAL

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The G3X Touch provides one or more of the following functions:

- Primary Flight Display (PFD) – Provides attitude, air data, heading, and navigation information to the pilot.
- Multi-Function Display (MFD) – Provides pilot awareness of factors that may affect the overall conduct of the flight such as advanced moving map including terrain, obstacle and traffic alerts, georeferenced FliteCharts® or Jeppesen® ChartView™ charts and SafeTaxi® airport diagrams.
- Engine Indication System (EIS) – Provides engine and airframe operating parameters to the pilot.

The G3X Touch is scalable with a variety of configurations made up of the 7" portrait GDU 470 and the 10" landscape GDU 460. Installations may consist of one or both display types in any combination from one to three displays (or up to four displays total in tandem cockpit aircraft). A minimum installation with a single display may be a standalone MFD or a PFD which can be split screened to provide both PFD and MFD functions. EIS can optionally be displayed on any GDU except a 7" portrait PFD. Only one display per cockpit can be installed as a PFD (any second or third display is an MFD).

Single 7" Portrait GDU (PFD with MFD in split mode, No EIS)

Single 10" GDU (PFD & MFD, EIS Optional)

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Single 7" Portrait GDU (PFD with MFD in split mode, No EIS)

Single 10" GDU (PFD & MFD, EIS Optional)

Dual 7" Portrait GDUs (PFD & MFD, EIS Optional)

One 10" + One 7" Portrait GDU (PFD & MFD, EIS Optional)

The PFD has an internal WAAS GPS receiver for VFR operations and a touchscreen interface. The G3X Touch system also can interface with an external, IFR approved navigator for IFR operations. Aircraft without an external, IFR approved navigator are approved for VFR operations only. Refer to equipment requirements for IFR operations in Limitations Section 2.3, *Navigation Systems for IFR Operations*, and the table in Section 2.24, *Kinds of Operations*.

PFD installations require the installation of a GSU 25 ADAHRS, GMU 11 magnetometer, and GTP 59 temperature probe. A GAD 27 voltage stabilizer or TCW IBBS back-up battery is required for 14V airframes with EIS. For all PFD installations in aircraft approved for IFR operations, standby instruments and an IFR approved navigation system are required.

If the installation includes a separate PFD and MFD, reversionary backup is available should a failure of either display occur. In reversionary mode, the remaining G3X Touch display combines critical flight instrumentation with engine readouts (if installed) and navigation information in a single-screen consolidated presentation.

If EIS functions are installed, they require the installation of a remote mounted GEA 24 Engine Airframe unit and associated engine sensors.

MFD functions are supported by an internal GPS receiver or connection to an external, IFR approved GPS navigator. G3X Touch flight displays can be integrated with a variety of systems including VHF radios, transponders, audio panels, ADS-B, SiriusXM® data links, mobile devices via Garmin Connext® and autopilot systems.

Carefully review the contents of this Airplane Flight Manual Supplement before operating the airplane. Also review Pilot's Guide 190-02472-00 Rev A, or later version applicable to the approved software version of the G3X Touch system installed on the aircraft. The Pilot's Guide provides details on the features of the G3X Touch system.

USE OF THE AFMS

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout the AFMS:

WARNING

Operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

CAUTION

Operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

NOTE

Operating procedures, techniques, etc., which are considered essential to emphasize.

1.1 G3X Touch GNSS (GPS/SBAS) Navigation Equipment Approvals

G3X Touch is capable of IFR operations when an external, IFR approved navigation system is installed and connected to the system and when the pilot selects the **FPL Source** to **External.** Refer to equipment requirements for IFR operations in Limitations Section 2.3, *Navigation Systems for IFR Operations*, and the table in Section 2.24, *Kinds of Operations*.

When no external, IFR approved navigator is connected, or when the pilot selects **FPL Source** to **Internal**, G3X Touch provides VFR flight planning capabilities and guidance on the HSI.

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1.2 Abbreviations and Terminology

The following glossary is applicable within the airplane flight manual supplement

AC	Advisory Circular
ADAHRS	Air Data Attitude Heading Reference System
ADC	Air Data Computer
ADS-B	Automatic Dependent Surveillance-Broadcast
AFCS	Automatic Flight Control System
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AHRS	Attitude Heading Reference System
ALT	Altitude
AML	Approved Model List
AMMD	Airport Moving Map Display
AOA	Angle of Attack
AP	Autopilot
APV	Approach with Vertical Guidance
ATC	Air Traffic Control
ATT	Attitude
Baro	Barometric
BC	Back Course
CAN	Controller Area Network
CB	Circuit Breaker
CDI	Course Deviation Indicator
CFR	Code of Federal Regulations
COM	Communication
DA	Decision Altitude
DG	Directional Gyro
ECS	Electrical Control System
EIS	Engine Indication System
ESP	Electronic Stability and Protection
GA	Go Around
GP	Glide Path
GPSS	GPS Steering
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FD	Flight Director

FIS-B	Flight Information Service – Broadcast
FPL	Flight Plan
FPM	Feet Per Minute
GAD	Garmin Adaptor Device
GDU	Garmin Display Unit
GEA	Garmin Engine and Airframe
GFC	Garmin Flight Control
GMU	Garmin Magnetometer Unit
GNC 255	Garmin Navigation and Communication Transceiver
GNS	Garmin Navigation System
GNSS	Global Navigation Satellite System
GNX	Garmin Navigator Transponder
GP	Glide Path
GPS	Global Positioning System
GS	Glide Slope or Ground Speed
GSU	Garmin Sensor Unit (ADAHRS)
GTN	Garmin Touch Navigation
GTP	Garmin Temperature Probe
HDG	Heading
HSI	Horizontal Situation Indicator
IAF	Initial Approach Fix
IAS	Indicated Airspeed
IDENT	Identification button on Transponder
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INT	Internal
K factor	Fuel flow transducer calibration factor
LNAV	Lateral Navigation
LNAV+V	Lateral Navigation with Vertical Guidance
LP	Localizer Precision
LP+V	Localizer Precision with Advisory Vertical Guidance
LPV	Localizer Precision with Vertical Guidance
LOC	Localizer
LOI	Loss of Integrity
MAX	Maximum
MDA	Minimum Descent Altitude

MFD	Multi-Function Display
MIN	Minimum
MSG	Message
N/A	Not Available
NAV	Navigation
NOTAM	Notice to Airmen
NRST	Nearest
PFD	Primary Flight Display
POH	Pilot's Operating Handbook
PTRIM	Pitch Trim
OAT	Outside Air Temperature
OBS	Omni Bearing Selector
ODA	Organizational Designation Authorization
REV	Revision or Reversion
RNAV	Area Navigation
RPM	Revolutions per Minute
SBAS	Satellite Based Augmentation System
SD Card	Secure Digital Card
SFD	Standby Flight Display
SL30	Garmin nav/com transceiver
STBY	Standby
STC	Supplemental Type Certificate
SYNC	Synchronize
TAS	True Airspeed
TAWS	Terrain Alert and Warning System
VDI	Vertical Deviation Indicator
TFR	Temporary Flight Restriction
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	VHF Omni-directional Range
VSI	Vertical Speed Indicator
WAAS	Wide Area Augmentation System
XTK	Cross Track Error
YD	Yaw Damper

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2 LIMITATIONS

2.1 System Software Requirements

The G3X Touch must use the following or later FAA approved software versions for this AFMS revision to be applicable:

Component	Software Version
G3X Touch System Software	9.15

NOTE

This section is not intended to be a comprehensive list of approved software. It is intended to provide a means to determine if this AFMS revision is applicable to the software that is installed in the aircraft. Do not use this AFMS revision if the installation has a software version less than that shown in the table above.

2.2 Standby Flight Instruments

Standby Instruments are required for aircraft approved for IFR operations. Refer to the table in Section 2.24, *Kinds of Operations*.

2.3 Navigation Systems for IFR Operations

Aircraft approved for IFR operations must use one of the following navigation systems connected to the G3X Touch system, and **FPL Source** on the PFD must be selected to **External**.

- Garmin GNC 300XL / GPS 155XL
- Garmin GPS, GNC, or GNS 4XX(W) / 5XX(W)
- Garmin GNS 480
- Garmin GTN 6XX / 7XX
- Garmin GPS 175 / GNX 375
- Garmin SL30
- Garmin GNC 255
- Garmin GNC 355/355A

OR

- A separate, non-Garmin, IFR approved GPS and/or VHF navigation system along with a dedicated Course Deviation Indicator (CDI) separate from G3X Touch.

Refer to the table in Section 2.24, *Kinds of Operations*.

NOTE

Refer to the approved Airplane Flight Manual Supplement for the non-Garmin navigation system (if installed) for information on IFR operations.

IFR operations are prohibited using G3X Touch while **FPL Source** is selected to **Internal** GPS navigation as the navigation source on G3X Touch. When the internal navigation source is selected, a cyan **INT** and magenta **VFR** annunciation is displayed on the HSI. When **INT** and **VFR** are annunciated, IFR operations are prohibited based solely on guidance provided by G3X Touch.

IFR operations are prohibited using G3X Touch for navigation when the G3X system is not connected to an external, IFR approved navigator. Installations without an external, IFR approved navigator are limited to VFR operations only and have a placard located near the pilot PFD. Refer to Section 2.25, *Placards*.

2.4 Databases

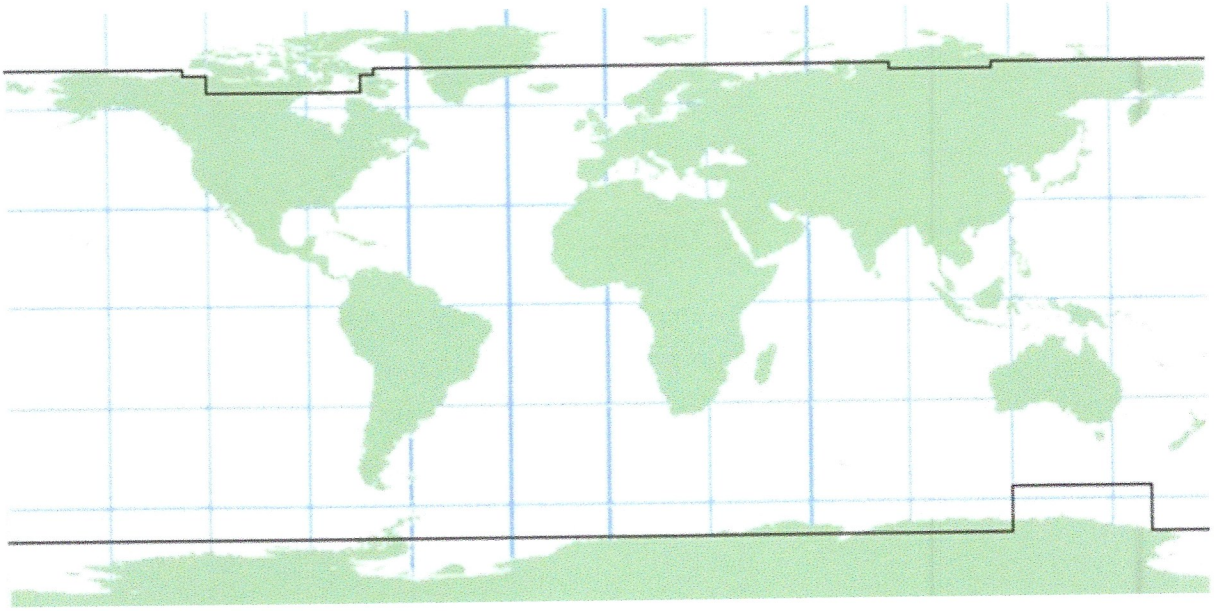
Database updates via SD card must be done while the aircraft is on the ground and stationary. Database transfers or updates are prohibited in flight.

2.5 AHRS Operational Area

IFR operations are prohibited in the following regions:

1) North of 72° North latitude, at all longitudes
2) South of 70° South latitude, at all longitudes
3) North of 65° North latitude between longitude 75° W and 120° W (Northern Canada)
4) North of 70° North latitude between longitude 70° W and 128° W (Northern Canada)
5) North of 70° North latitude between longitude 85° E and 114° E (Northern Russia)
6) South of 55° South latitude between longitude 120° E and 165° E (A region south of Australia and New Zealand)

Loss of heading may occur when operating in these regions.



2.6 Magnetic Variation Operational Area

IFR operations are prohibited in areas where the magnetic variation is greater than 99.9 degrees East or West.

2.7 Navigation Angle

The Magnetic/True Navigation Angle (as selected on the System Units page) must match the navigation angle selected on all interfaced GPS/SBAS navigators.

2.8 ADAHRS Systems Status

Valid air data, attitude, and heading must be displayed on the G3X Touch PFD and Standby Instruments for IFR operations. Refer to Section 2.24, *Kinds of Operations*, for specific equipment requirements for VFR and IFR. IFR operations are prohibited if any of the following System Status Messages are displayed:

AHRS not receiving GPS data

AHRS not receiving air data

AHRS not receiving magnetometer data

AHRS REVERT

ADC REVERT

AHRS FAIL

ADC FAIL

2.9 Aerobatic Maneuvers

Do not conduct aerobatic maneuvers if uninterrupted attitude information is required on the PFD. Refer to Section 3.2, *Attitude Failure (GSU 25)*, if the amber **AHRS ALIGN** caution is displayed on the PFD.

2.10 Other Autopilots

On aircraft with an autopilot other than a GFC 500, the pilot must select **FPL Source** to **External** on the PFD when using the autopilot in navigation (NAV or APR) modes. For those aircraft, it is prohibited to use the autopilot in navigation modes when **FPL Source** is selected to **Internal** on the PFD.

NOTE

Refer to the approved Airplane Flight Manual Supplement for the non-Garmin autopilot system (if installed) for information on modes of operation.

2.11 Synthetic Vision

The synthetic vision presentation must not be used as the sole reference for aircraft control (without reference to the primary flight instruments).

The synthetic vision presentation must not be used as the sole reference for navigation or obstacle/terrain/traffic avoidance.

2.12 Moving Maps

Moving map displays (ownship position relative to map features) must not be used as the primary or sole means of navigation or course guidance.

2.13 Terrain Display

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

2.14 Terrain Alerts

Terrain alerts must be inhibited when landing at an airport that is not in the airport database.

2.15 Traffic Display and Alerts

The display of traffic and aural traffic alerts are intended as an aid to visual acquisition and must not be used as the sole basis for aircraft maneuvering.

2.16 Surface Operations

SafeTaxi or Chartview functions shall not be used as the sole basis for ground maneuvering. 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). SafeTaxi and Chartview use is limited to airport surface orientation to improve flight crew situational awareness during ground operations.

2.17 Glide Range Ring

In the event of engine failure or engine malfunction, the Glide Range Ring must not be used to determine gliding distance. Refer to the airplanes' Pilot's Operating Manual / Airplane Flight Manual for engine failure emergency procedures and glide distance data.

2.18 Powerplant Gauge Markings

Aircraft that were previously equipped with a fuel flow gauge which measured metered fuel pressure may have this gauge replaced by a gauge which measures fuel flow directly. When these gauges are replaced in accordance with this STC, the fuel pressure and fuel flow markings on such gauges are replaced by equivalent fuel flow markings.

Fuel flow values may be in error by as much as 15% if the K factor calibration is improperly set. Do not depend solely on the fuel flow indication or the fuel totalizer to determine fuel used, fuel remaining, or fuel reserves.

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

The Manifold Pressure gauge and the Propeller RPM gauge are the primary means for setting engine power. The Engine Power display is for information purposes only.

2.19 Weight and Balance

Weight and balance data provided by the G3X Touch is for flight planning purposes only. Consult the aircraft's Pilot's Operating Handbook for the official weight and balance data.

2.20 Data link Products (SiriusXM, FIS-B, and Connext)

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

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

Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information. Not all TFRs and NOTAMS may be depicted.

2.21 Glove Usage

No device or apparel may cover the pilot's fingertips used to operate the G3X Touch display.

2.22 Service Required

It is prohibited to initiate flight when a "Service Required" advisory is present on the PFD, MFD, or EIS display.

2.23 Portable Electronic Devices

This STC does not relieve the operator from complying with applicable requirements regarding the operation of portable electronic devices.

Data provided to a portable electronic device from the G3X Touch Bluetooth interface is not approved to replace any aircraft display equipment, including navigation or traffic/weather display equipment.

2.24 Kinds of Operations

G3X Touch is approved for Day and Night, VFR and IFR operations when the system is appropriately inspected and maintained in accordance with applicable requirements. Aircraft with a placard that reads **AIRCRAFT LIMITED TO VFR** are limited to VFR operations. Refer to Section 2.25, *Placards*.

The tables below list the minimum fully functional equipment required for flight.

This table applicable to aircraft with a G3X PFD Installed			
Equipment	**Number Installed**	**Number Required**	
		VFR	**IFR**
Primary Flight Display	1	1	1
Approved Garmin Navigator (interfaced to a PFD) **OR** Non-Garmin IFR approved navigator with standalone dedicated CDI	1	-	1
Air data and Attitude / Heading Unit (ADAHRS)	1	1a*	1
Magnetometer (GMU)	1	-	1
Standby Attitude Indicator	1	-	1
Standby Airspeed Indicator	1	1b*	1
Standby Altimeter	1	1b*	1
Non-stabilized Magnetic Compass	1	1	1

The following notes apply where indicated:

* FAA approved aircraft operating under 14 CFR Part 91 must have at least one source of altitude and airspeed information functioning for VFR operations. The altitude and airspeed information may be displayed on the PFD or on the standby instruments. The aircraft must have all "1a" items or all "1b" items from the tables above.

NOTE

Operators of aircraft approved by an airworthiness authority other than the FAA are responsible to verify equipment requirements for VFR operations and equip the aircraft accordingly.

Engine Indicating System (EIS):

The table below lists the minimum, fully functional equipment if previously installed engine instruments are replaced by G3X Touch. Refer to Section 7.6, *Engine Indication System*.

Equipment	Number Installed	Number Required
EIS Display	1	1
Engine Adaptor Unit (GEA 24)	1	1

The following engine indications must be functional on the EIS display (if these gauges are present on the EIS display as installed): Tachometer, Manifold Pressure, Oil Pressure, Oil Temperature, Fuel Quantity, and any additional engine instruments required by the aircraft Kinds Of Equipment list as listed in the Aircraft Flight Manual.

2.25 Placards

Installations Limited to VFR

☒ This installation is not limited to VFR.

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

AIRCRAFT LIMITED TO VFR

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3 EMERGENCY PROCEDURES

3.1 ADC Failure (GSU 25)

ADC FAIL

ADC failure is indicated by:

- Red X over the airspeed and altitude tapes.
- Red X over the vertical speed tape.
- Red X over the TAS and OAT fields.

1. Use Standby Airspeed Indicator and Altimeter.

NOTE

If a Garmin G5 or GI 275 Electronic Flight Instrument is installed as the Standby Flight Instrument and the primary ADC fails, the G3X Touch will automatically revert and use air data from the G5 or GI 275. An amber **ADC REVERT** annunciation will automatically be displayed on the PFD and air data from the G5 or GI 275 will be displayed on the G3X Touch.

For G5 installations: If installed, the GFC 500 autopilot will function normally.

For GI 275 installations: If installed, the GFC 500 autopilot will be unavailable.

3.2 Attitude Failure (GSU 25)

AHRS FAIL

Attitude failure is indicated by:

- removal of the sky/ground presentation.
- Red X and **ATTITUDE FAIL** over the sky/ground presentation.

1. Use Standby Flight Instruments.

NOTE

If a Garmin G5 or GI 275 Electronic Flight Instrument is installed as the Standby Flight Instrument and the primary AHRS fails, the G3X Touch automatically reverts and uses attitude information from the G5 or GI 275. An amber **AHRS REVERT** annunciation will be displayed on the PFD and attitude information from the G5 or GI 275 will automatically be displayed on the G3X Touch.

For G5 installations: If installed, the GFC 500 autopilot will function normally.

For GI 275 installations: If installed, the GFC 500 autopilot will be unavailable.

3.3 Attitude Aligning / Keep Wings Level

If the ALIGNING KEEP WINGS LEVEL indication occurs during flight, the G3X Touch has detected an invalid attitude solution and will not display any attitude information.

1. Use standby instruments to maintain 1° nose up pitch and wings level flight. The system will display attitude when internal accuracy tolerances have been met.
2. Limit aircraft attitude to ±10° bank, ±5° pitch, 200 KTAS or less.
3. If attitude does not return, continue to use the standby flight instruments for aircraft attitude control.

3.4 AHRS ALIGN

The AHRS ALIGN annunciation indicates that the AHRS attitude information is still usable, but the internal sensors are trying to realign themselves. The attitude presentation behind the annunciation is still valid but should be crosschecked using the standby instruments.

1. Crosscheck aircraft attitude with standby attitude display.

3.5 Autopilot Abnormal Disconnect (GFC 500)

Red AP or AFCS flashing on PFD, Continuous high-low aural tone

1. Aircraft Attitude .....MAINTAIN/REGAIN AIRCRAFT CONTROL
2. AFCS Status Box on PFD .....PRESS
   (to cancel disconnect tone and extinguish annunciator)

3.6 Incorrect Barometric Synchronization (Standby to G3X Sync)

If the system is incorrectly changing the G5/GI 275 or G3X altimeter setting without the pilot manually changing either setting, disable **SFD Baro Sync** on the G3X Touch PFD using the following procedure:

1. Press MENU twice
2. Scroll down to SETUP and Select.
3. Scroll down to PFD and Select.
4. Scroll down to SFD BARO SYNC and Select.
5. Change the selection from ENABLED to DISABLED.
6. Press and hold the BACK button to return to a normal PFD display.
7. Readjust the Altimeter Barometric Settings on the G5/GI 275 and G3X Touch PFD to the desired setting.
8. If Altimeter Barometric Setting does not remain on the desired value for either the G5/GI 275 or G3X PFD, disregard the affected altimeter and use the other altimeter.

3.7 EIS Failure

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

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

3.8 Erroneous Air Data or Attitude Information on the G3X PFD

(On installations with a G5 or GI 275 Standby Flight Instrument)

1. PULL the ADAHRS Circuit Breaker
2. PULL the GAD 27 Circuit Breaker

G5 or GI 275 air data and AHRS data will automatically revert to be displayed on the PFD on G3X Touch. ADC FAIL, AHRS FAIL, ADC REVERT, AHRS REVERT, and ECS FAIL * messages will be displayed. This procedure will restore availability of the GFC 500 autopilot and flight director if G5 Standby Flight Instrument is installed.

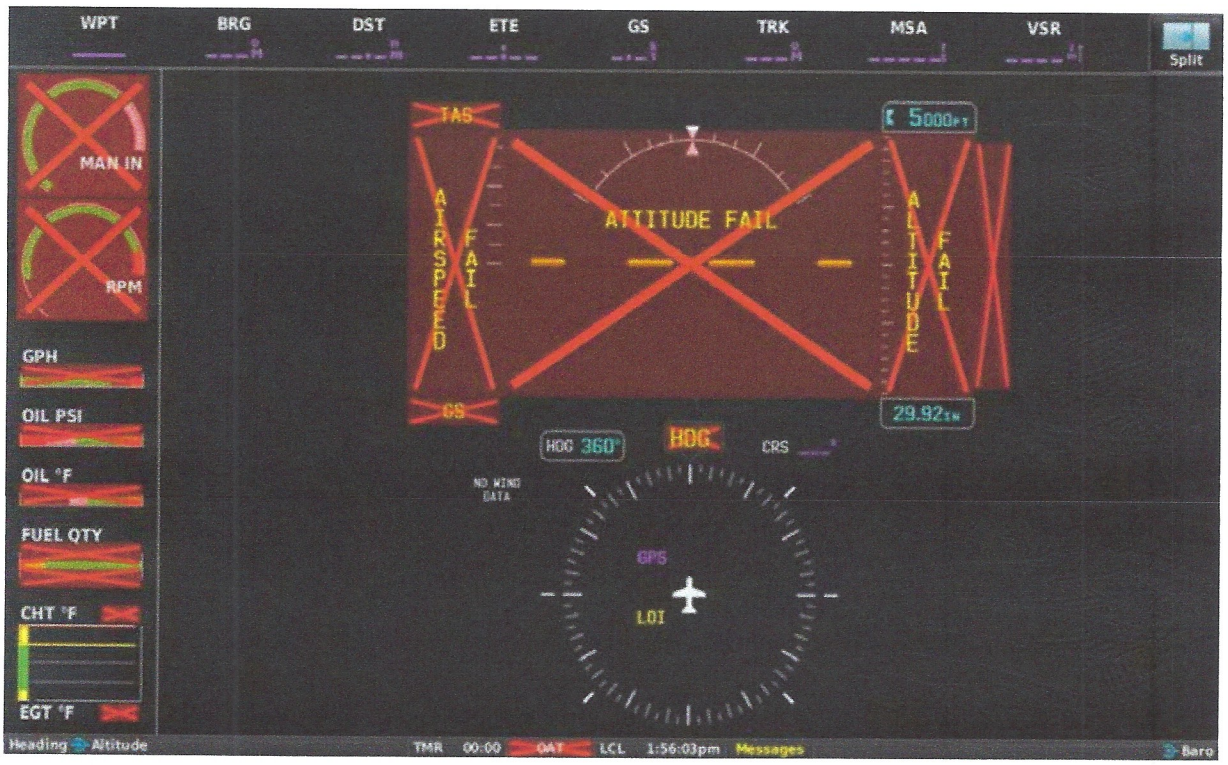
* The ECS FAIL will display when the GAD 27 circuit breaker is pulled out or the GAD 27 fails. This message is applicable only to aircraft with a 14 VDC electrical system or those with flashing (wig-wag) landing and taxi lights.

NOTE

When ECS FAIL is displayed, Landing and Taxi Lights may be inoperative if the aircraft is equipped with flashing (wig-wag) landing and taxi lights.

3.9 G3X Touch Failure Annunciations

If a G3X Touch function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G3X Touch power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up. If any instrument remains flagged the G3X Touch should be serviced by a Garmin-authorized repair facility.



G3X Failure Annunciations

3.10 Heading Failure, Loss of Magnetometer Data, or Magnetic Field Error

A heading failure, loss of magnetometer data, or magnetic field error is indicated by removal of the digital heading readout, a red X, and an amber "HDG" on the display.

1. Use standby magnetic compass.

NOTE

If the G3X Touch DG/HSI has a valid GPS signal the G3X Touch DG/HSI instrument will display the GPS track information in magenta.

3.11 PFD Failure

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

1. If IFR, use standby flight instruments for attitude, airspeed, altitude, and heading reference and land as soon as practical.
2. If VFR, use visual references and standby flight instruments (if installed) for attitude, airspeed, altitude, and heading reference and land as soon as practical.
3. Refer directly to the navigation source for navigation information (such as GPS).
4. If the autopilot is engaged, verify autopilot mode and cross check against visual references and standby flight instruments (if installed) and navigation data.

3.12 Navigation Data Failure (GPS/VOR/LOC/GS)

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

- Loss of course deviation information on PFD
- Loss of glideslope/glidepath information on PFD
- Loss of bearing pointer on HSI

1. Select an alternate navigation source on the external navigator's CDI Key.

   Or

2. Use the internal GPS navigator in G3X by changing **FPL Source** from **External** to **Internal** on the PFD. When the external GPS navigation source has failed, an amber **REV** and amber **VFR** annunciation are displayed on the HSI. When **REV** and **VFR** are annunciated, IFR operations are prohibited based solely on guidance provided by G3X Touch. Refer to Limitations, Section 2.3, *Navigation Systems for IFR Operations* for VFR operations using the G3X Touch internal navigator.

If No Alternate Navigation Sources Are Available and 'REV' is Displayed on HSI:

1. Use the CDI for course information.
2. Fly toward known visual conditions.

NOTE

In the event that all configured external GPS navigators fail, the G3X Touch reverts to its internal VFR GPS for navigation and flight plan modifications.

3.13 TERRAIN ALERTS

Aural Alert	Visual Alert	Action
"Terrain Ahead! Pull Up!" "Terrain, Terrain Pull up! Pull Up!" "Obstacle Ahead! Pull Up!" "Obstacle, Obstacle Pull Up! Pull Up!" "Sink Rate, Pull Up!" "Pull Up!"	TERRAIN -OR- OBSTACLE -OR- TERRAIN → NOTE: The arrow indicates the terrain is outside the Synthetic Vision field of view.	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" "Caution, Terrain Ahead" "CAUTION, Obstacle" "CAUTION, Obstacle Ahead" "CAUTION, Sink Rate"	TERRAIN -OR- OBSTACLE -OR- ← OBSTACLE NOTE: The arrow indicates the obstacle is outside the Synthetic Vision field of view.	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.

3.14 WARNINGS, CAUTIONS, and ADVISORIES

The following tables show the color and significance of the warning, caution, and advisory messages which may appear on the G3X Touch display.

WARNING Annunciations – Red		
Annunciation	*Pilot Action*	*Cause*
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 Engine Parameter on EIS (if EIS is installed)	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the warning threshold.
AP	Manually fly the airplane. Silence the autopilot disconnect tone and extinguish the annunciation by pressing the AP annunciation in the AFCS Status Box.	GFC 500 Autopilot has failed or is inoperative.
AFCS	Manually fly the airplane.	GFC 500 Flight Director and Autopilot have failed
	Manually fly the airplane.	GFC 500 Autopilot Failure
PTRIM	Manually trim the airplane using the pitch trim wheel.	Electric pitch trim is inoperative. (if installed and interfaced with the GFC 500 autopilot)
	Select full screen mode on display to view WARNING annunciations.	Display is in split screen mode and WARNING annunciations are not displayed.

CAUTION Annunciations – Amber		
Annunciation	*Pilot Action*	*Cause*
AP	Manually fly the airplane	Pilot has disconnected the GFC 500 autopilot
YD	NONE	GFC 500 Yaw Damper has disconnected
↑ TRIM UP ↑	Move the elevator trim in the nose up direction until the annunciation extinguishes.	The GFC 500 autopilot is holding excessive force due to the aircraft being out of trim due to changes in airspeed or power.
↓TRIM DOWN↓	Move the elevator trim in the nose down direction until the annunciation extinguishes.	The GFC 500 autopilot is holding excessive force due to the aircraft being out of trim due to changes in airspeed or power.
MIN SPEED	Add maximum available power. Autopilot will lower aircraft nose to increase airspeed.	Airspeed is too slow, approaching stall speed (GFC 500 autopilot).
MAX SPEED	Reduce power. Autopilot will raise aircraft nose to reduce airspeed.	Airspeed is approaching maximum airspeed limit (GFC 500 autopilot).
HDG (amber background)	Use standby compass	Displayed heading is outside of the internal accuracy limits.
	Select full screen mode on display to view CAUTION annunciations.	Display is in split screen mode and CAUTION annunciations are not displayed.
AHRS ALIGN – Keep Wings Level	Fly aircraft manually and crosscheck attitude indication with standby attitude indicator and other sources of attitude information. Limit aircraft attitude to ±10° bank and ±5° pitch as AHRS Aligns - OK to taxi.	Attitude and Heading Reference System is aligning. AHRS may not align with excessive pitch/bank angles.
AHRS ALIGN	Fly aircraft manually and crosscheck attitude indication with standby attitude indicator and other sources of attitude information (airspeed, heading, altitude, etc.)	The AHRS monitors have detected a possible AHRS malfunction or an error with the attitude presentation. The AHRS is attempting to realign itself. The GFC 500 autopilot may automatically disconnect.
ATT MISCOMP HDG MISCOMP	Cross-check the flagged information against other sources to identify erroneous information.	Difference detected between the G3X Touch attitude or heading display and the G5 attitude or heading display. NOTE G3X will not display miscompare annunciations for GI 275 miscompares. Only the GI 275 will display miscompare annunciations for attitude.

CAUTION Annunciations – Amber		
Annunciation	*Pilot Action*	*Cause*
AHRS FAIL ATTITUDE FAIL	Use standby attitude source, or, if AHRS REVERT message is also displayed, continue to use the G3X Touch. Attitude will be from the Standby Indicator.	The GSU 25 AHRS has failed.
AHRS REVERT	Continue to use the G3X Touch.	The GSU 25 AHRS has failed and attitude from the Standby Indicator is being displayed on the G3X Touch.
ALT MISCOMP IAS MISCOMP	Cross-check the flagged information against other sources to identify erroneous information.	Difference detected between the G3X Touch airspeed or altitude and the G5 airspeed or altitude. NOTE G3X will not display miscompare annunciations for GI 275 miscompares. Only the GI 275 will display the miscompare annunciations.
ADC FAIL	Use standby airspeed and altimeter indicator, or, if ADC REVERT message is also displayed, continue to use the G3X Touch.	The GSU 25 air data computer has failed.
ADC REVERT	Continue to use the G3X Touch.	The GSU 25 air data computer has failed and air data from the Standby Indicator is being displayed on the G3X Touch.
(Flashing) MESSAGE	Press the flashing message annunciation to view a new system message.	A new system message has annunciated.
Amber engine Parameter on EIS (if EIS is installed)	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the caution threshold.
GPSS	De-select GPSS on the G3X Touch and select desired alternate autopilot lateral mode.	The GPS Steering command to the autopilot has been lost.
TRAFFIC	Visually acquire the traffic to see and avoid.	The interfaced traffic system has determined that nearby traffic may be a threat to the aircraft.
TAWS N/A, TAWS FAIL	Use vigilance, terrain depiction and TAWS alerting is no longer provided.	Database errors or lack of required GPS position.
ECS FAIL	Landing and Taxi lights may be inoperative if the aircraft is equipped with flashing (wig-wag) landing and taxi lights. At night, consider a well-lighted runway.	The GAD 27 has lost power or has failed.

CAUTION Annunciations – Amber		
Annunciation	*Pilot Action*	*Cause*
GLIDE	Smart Glide is active	Follow the Smart Glide procedures in the GTN Xi AFMS.

ADVISORY Annunciations – White		
Annunciation	*Pilot Action*	*Cause*
NO COMP	Cross check information between the G5 and the PFD to determine which unit is in error.	The unit will not be able to perform the miscompare monitor function. NOTE G3X will not display miscompare or NO COMP annunciations with GI 275 installed as standby indicator. Only the GI 275 will display the miscompare or no compare annunciations.

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4 NORMAL PROCEDURES

4.1 Before Starting Engine

1. Database Acknowledgement.....(PFD) Press "CONTINUE' button

NOTE

The data link weather advisory and current database information are displayed during power-up including valid operating dates, cycle number, and database type. When this information has been reviewed for currency (to ensure that no databases have expired), the pilot is prompted to continue.

4.2 After Starting Engine

1. Avionics Master Switch.....ON
2. Database Acknowledgment (All other displays and NAV units) ..... Press "CONTINUE" button
3. Flight Plan Source (FPL) .....Select EXTERNAL or INTERNAL navigation source
4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. In the CDI Source window.....Select GPS 1 or GPS 2 (if installed) for IFR or VFR flight, or, Select Internal GPS for VFR flight
6. Touch the HSI display on the PFD to return to normal PFD display
7. Enter a Flight Plan ..... For IFR or VFR Flight, into the External GPS Navigator, or, For VFR flight only, into the PFD Internal Flight Plan

WARNING

Do not use the approach information provided by the VFR navigation database residing within the G3X Touch as a means of navigating any instrument approach. The G3X Touch VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.

8. Altimeters.....Set (PFD and Standby Altimeter)
   - Touch the Barometric Pressure Display on the PFD.
   - Enter the desired pressure using the keypad and touch ENTER.
   - Verify Barometric setting on the Standby Altimeter matches the G3X Touch.

4.3 COM Radio Tuning (Optional)

The COM Frequency Box is composed of two fields; one active frequency is on the left side and the standby frequency is on the right.

To tune the COM radio:

1. Touch STBY COM display window
2. Enter the frequency using the keypad or dual concentric knob
3. Touch ENTER to enter the frequency in the STBY window, or,
4. Touch ⬌ to transfer the entered frequency directly into the COM window.

To transfer STBY frequency to Active frequency:

1. Touch the Active COM frequency field

4.4 Lateral Navigation

Procedures below involve the Garmin GFC 500 autopilot. Information regarding a non-Garmin autopilot are provided in the G3X Touch Pilot's Guide and Airplane Flight Manual Supplement for the non-Garmin autopilot.

Changing the Navigation Source

When an external navigator that supports both GPS and VOR/ILS capabilities (i.e., GTN or GNS Series) is selected, the external navigator's **CDI** Key is used to switch the G3X Touch HSI between GPS and VOR/ILS navigation.

VOR

1. Tune a VOR station in the external navigator.
2. Navigation Source ..... Select VOR on the external navigator
3. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
4. Select the external navigator from the CDI Source window (VOR 1 or 2).
5. Press and Hold **BACK** Button to return to normal PFD display.
6. Set the CDI to the desired course ..... Touch the Selected Course window on the PFD
7. Enter the desired VOR course, press ENTER
8. Establish Intercept Heading
9. Select GFC 500 autopilot modes for intercepting or tracking the selected course ..... VOR will be displayed on the AFCS Status Box.

NOTE

VOR will be annunciated in WHITE if the mode is armed or in GREEN if VOR is the active lateral mode.

GPS DIRECT TO

1. Navigation Source ..... Select GPS on the external navigator
2. Select waypoint and execute the Direct-TO on the external navigator
3. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
4. Select the external navigator from the CDI Source window (GPS).
5. Press and Hold **BACK** Button to return to normal PFD display.

GPS OBS

1. Navigation Source ..... Select GPS on the external navigator
2. Select waypoint and make it the active waypoint.
3. Set external navigator to OBS mode
4. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (GPS 1 or 2).
6. Press and Hold **BACK** Button to return to normal PFD display.
7. Set the CDI to the desired course ..... Touch the Selected Course (OBS) window on the PFD.
8. Enter the desired GPS course, press ENTER
9. Establish Intercept Heading
10. Select GFC 500 autopilot modes for intercepting or tracking the selected course ..... GPS will be displayed on the FD mode bar.

4.5 Approaches

ILS

1. Load the approach into the External navigator .....Verify external navigator tunes the proper frequency. Select it as the active frequency.
2. Navigation Source ..... Select LOC on the external navigator
3. Approach Minimums..... Set the barometric minimums alert bug
   - On the PFD, Touch the **HSI.**
   - Touch the Highlight Minimums window.
   - Enter Barometric Altitude Minimums and touch ENTER
4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (LOC 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator, verify CDI changes to LOC and slews to the inbound course,

   OR

   - If using a VHF navigation receiver, set the CDI to the desired course .....Touch the Selected Course window on the PFD.
   - Enter the desired LOC course, press ENTER.

8. Establish Intercept Heading.
9. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
10. Upon reaching the LOC course, turn inbound and follow the ILS course and vertical guidance.
11. Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the missed approach altitude.
12. At Decision Altitude (DA), continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator
9. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure. When the airplane is inbound towards the final approach course, the CDI will automatically switch from GPS navigation to LOC navigation.

13. Verify ..... Course pointer slews to the front course.
14. Upon reaching the LOC course ..... Turn inbound and follow the ILS course and vertical guidance.
15. Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the missed approach altitude.
16. At Decision Altitude (DA), Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

ILS GLIDE SLOPE INOPERATIVE

1. Load the approach into the External navigator ..... Verify external navigator tunes the proper frequency. Select it as the active frequency.
2. Navigation Source ..... Select LOC on the external navigator
3. Approach Minimums ..... Set the barometric minimums alert bug:
   - On the PFD, Touch the HSI.
   - Touch the Highlight Minimums window.
   - Enter Barometric Altitude Minimums and touch ENTER
4. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (LOC 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator, Verify CDI changes to LOC and slews to the inbound course,

   OR

   - If using a VHF navigation receiver, set the CDI to the desired course .....Touch the Selected Course window on the PFD.
   - Enter the desired LOC course, press ENTER.

8. Establish Intercept Heading.
9. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
10. Upon reaching the LOC course, turn inbound and follow the LOC course.
11. Set Minimum Descent Altitude (MDA)..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
12. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
13. At the Minimum Descent Altitude, Set Missed Approach Altitude .....Touch the Reference Altitude display. Enter the Missed Approach Altitude.
14. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator,

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator
9. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure. When the airplane is inbound towards the final approach course, the CDI will automatically switch from GPS navigation to LOC navigation.

13. Verify.....Course pointer slews to the front course.
14. Upon reaching the LOC course, turn inbound and follow the LOC course.
15. Set Minimum Descent Altitude (MDA)..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
16. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
17. At the Minimum Descent Altitude, Set Missed Approach Altitude .....Touch the Reference Altitude display. Enter the Missed Approach Altitude.
18. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

RNAV (GPS) OR RNAV (GNSS) – (LPV, LP+V, LNAV/VNAV, or LNAV+V)

NOTE

Some RNAV (GPS) or (GNSS) approaches provide a vertical descent angle as an aid in flying a stabilized approach. These approaches are NOT considered Approaches with Vertical Guidance (APV). Approaches that are annunciated on the HSI as LP+V, LNAV, or LNAV+V are considered Non-precision Approaches (NPA) and are flown to an MDA even though vertical glidepath (GP) information may be provided. LP approaches may not be available outside of the United States.

1. Load the approach into the External navigator.
2. Navigation Source ..... Select GPS on the external navigator
3. Approach Minimums..... Set the barometric minimums alert bug:
   - On the PFD, Touch the HSI.
   - Touch the Highlight Minimums window.
   - Enter Barometric Altitude Minimums and touch ENTER
4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (GPS 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator .... Verify CDI slews to the inbound course.

8. Establish Intercept Heading.
9. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
10. Upon reaching the GPS course, turn inbound and follow the GPS course and GP vertical guidance.
11. Verify on the HSI the Navigation mode indicates the approach being flown, (LPV, LP+V, LNAV/VNAV, or LNAV+V)
12. Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the missed approach altitude.
13. At Decision Altitude (DA or MDA for an LNAV+V), Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator,

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator
9. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure. When the airplane is inbound towards the final approach course, the CDI will automatically slew to the inbound course.

13. Verify ..... Course pointer slews to the front course
14. Upon reaching the GPS course, turn inbound and follow the GPS course and GP vertical guidance.
15. Verify on the HSI the Navigation mode indicates the approach being flown, (LPV, LP+V, LNAV/VNAV, or LNAV+V)
16. Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the missed approach altitude.

17. At Decision Altitude (DA or MDA for a LPV+V or LNAV+V), continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

RNAV (GPS) OR RNAV (GNSS) – (LNAV, LP)

NOTE

Some RNAV (GPS) or (GNSS) approaches provide a vertical descent angle as an aid in flying a stabilized approach. These approaches are NOT considered Approaches with Vertical Guidance (APV). Approaches that are annunciated on the HSI as LP+V, LNAV, or LNAV+V are considered Non-precision Approaches (NPA) and are flown to an MDA even though vertical glidepath (GP) information may be provided. Approaches that are annunciated on the HSI as LP will not have vertical glidepath (GP) information provided. LP approaches may not be available outside of the United States.

1. Load the approach into the External navigator.
2. Navigation Source ..... Select GPS on the external navigator
3. Approach Minimums..... Set the barometric minimums alert bug:
   - On the PFD, Touch the HSI.
   - Touch the Highlight Minimums window.
   - Enter Barometric Altitude Minimums and touch ENTER
4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (GPS 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator .... Verify CDI slews to the inbound course.
8. Establish Intercept Heading.
9. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
10. Upon reaching the GPS course, turn inbound and follow the GPS course.
11. Verify on the HSI the Navigation mode indicates the approach being flown, (LNAV or LP)
12. Set Minimum Descent Altitude (MDA)..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
13. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
14. At the Minimum Descent Altitude, Set Missed Approach Altitude .....Touch the Reference Altitude display. Enter the Missed Approach Altitude.
15. At Missed Approach Point, Continue visually for a normal landing,

OR

Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator,

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator
9. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure. When the airplane is inbound towards the final approach course, the CDI will automatically slew to the inbound course.

13. Verify ..... Course pointer slews to the front course
14. Upon reaching the GPS course, turn inbound and follow the GPS course.
15. Verify on the HSI the Navigation mode indicates the approach being flown, (LNAV or LP)
16. Set Minimum Descent Altitude (MDA) ..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
17. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
18. At the Minimum Descent Altitude, Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the Missed Approach Altitude.
19. At Missed Approach Point, Continue visually for a normal landing,

OR

Press GO AROUND button and fly the missed approach procedure.

VOR APPROACH

1. Load the approach into the External navigator .....Verify external navigator tunes the proper frequency. Select it as the active frequency.
2. Navigation Source ..... Select GPS on the external navigator
3. Approach Minimums..... Set the barometric minimums alert bug:
   - On the PFD, Touch the HSI.
   - Touch the Highlight Minimums window.
   - Enter Barometric Altitude Minimums and touch ENTER
4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (GPS 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator, Verify CDI slews to the appropriate course.
8. Navigation Source .....Select VOR on the external navigator.
9. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (VOR 1 or 2).
11. Verify the selected course .....Touch the Selected Course window to adjust if needed.
12. Establish Intercept Heading.
13. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
14. Upon reaching the VOR course, turn inbound and follow the VOR course.
15. Set Minimum Descent Altitude (MDA)..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
16. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
17. At the Minimum Descent Altitude, Set Missed Approach Altitude .....Touch the Reference Altitude display. Enter the Missed Approach Altitude.
18. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator,

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator
9. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure.

13. When established inbound to the FAF ..... Navigation Source, Select VOR on the external navigator.
14. Verify ..... VOR is annunciated in the HSI.
15. Verify ..... Course pointer is on the FAF inbound course.
16. Set Minimum Descent Altitude (MDA) ..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
17. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
18. Adjust VOR course if needed inside the FAF.
19. At the Minimum Descent Altitude, Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the Missed Approach Altitude.
20. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

BACK COURSE (BC)

1. Load the approach into the External navigator ..... Verify external navigator tunes the proper frequency. Select it as the active frequency.
2. Navigation Source ..... Select GPS on the external navigator
3. Approach Minimums ..... Set the barometric minimums alert bug:

- On the PFD, Touch the HSI.
- Touch the Highlight Minimums window.
- Enter Barometric Altitude Minimums and touch ENTER

4. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
5. Select the external navigator from the CDI Source window (GPS 1 or 2).
6. Press and Hold BACK Button to return to normal PFD display.

If Flying Vectors-To-Final:

7. Activate Vectors-to-Final on the external navigator, Verify CDI changes slews to the localizer front course.
8. Navigation Source ..... Select LOC on the external navigator.
9. G3X Touch CDI source .....Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (LOC 1 or 2).
11. Verify the selected front course.....Touch the Selected Course window to adjust if needed.
12. Establish Intercept Heading.
13. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.
14. Upon reaching the BC course, turn inbound and follow the BC course guidance.
15. Set Minimum Descent Altitude (MDA)..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
16. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
17. At the Minimum Descent Altitude, Set Missed Approach Altitude .....Touch the Reference Altitude display. Enter the Missed Approach Altitude.
18. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

If Flying Full Approach Including Transition:

ACTIVATE THE APPROACH on the External navigator,

OR

ACTIVATE a DIRECT TO the IAF on the External navigator.

7. Navigation Source ..... Select GPS on the external navigator
8. Select IAF waypoint and execute the Direct-TO on the external navigator

9. G3X Touch CDI source ..... Touch the HSI display on the PFD. PFD Options window opens.
10. Select the external navigator from the CDI Source window (GPS 1 or 2).
11. Press and Hold BACK Button to return to normal PFD display.
12. Verify ACTIVE and ARMED modes on the AFCS Status Box on the PFD, if using the GFC 500 autopilot/FD.

NOTE

The airplane will navigate in GPS mode throughout the intermediate portion of the approach procedure.

13. When established inbound to the FAF ..... Navigation Source, Select LOC on the external navigator.
14. Verify ..... BC is annunciated in the HSI.
15. Verify ..... Course pointer is on the front course.
16. Set Minimum Descent Altitude (MDA) ..... Touch the Reference Altitude display. Enter the Minimum Descent Altitude.
17. At the Final Approach Fix (FAF), begin descent to an intermediate altitude or the Minimum Descent Altitude.
18. At the Minimum Descent Altitude, Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the Missed Approach Altitude.
19. At Missed Approach Point, Continue visually for a normal landing,

    OR

    Press GO AROUND button and fly the missed approach procedure.

GO AROUND (GA)

1. Control Wheel ..... GRASP FIRMLY
2. GO AROUND button ..... PUSH
3. Rotate to Go Around attitude
4. Go Around ..... EXECUTE

NOTE

If using a Garmin external navigator and an instrument approach is loaded, the HSI will automatically change to GPS course guidance, and the flight plan will automatically sequence onto the missed approach portion of the flight plan.

5. Verify the HSI changes to the GPS navigation.
6. Verify that leg sequencing has unsuspended. If not, unsuspend leg sequencing.
7. Fly Published Missed Approach Procedure,

OR

Fly ATC Assigned Missed Approach Heading

NOTE

The pilot is responsible for initial missed approach guidance in accordance with published procedure. The G3X Touch may not provide correct guidance until the airplane is established on a defined leg of the procedure.

8. Set Missed Approach Altitude ..... Touch the Reference Altitude display. Enter the Missed Approach Altitude.

4.6 Barometric Minimums Alert

A barometric minimums alert is provided in the G3X Touch to enhance the pilot's awareness of approaching altitude minimums while flying an instrument approach procedure.

Setting the barometric minimums alert bug:

1. On the PFD, Touch the HSI.
2. Touch the Highlight Minimums window.
3. Enter Barometric Altitude Minimums and touch ENTER

CAUTION

If a new approach is loaded into an external IFR capable navigator, the pilot will need to update the Barometric Minimums Alert in the G3X Touch with the new approach's altitude minimums.

4.7 Transponder Operation (Optional)

Entering Transponder Code

1. Touch the transponder data box.
2. Use the keypad to enter a code and touch ENTER.

IDENT

1. Touch IDENT, the green bar illuminates momentarily.

4.8 Disable Electronic Stability Protection (ESP)

(If Installed, GFC 500 Autopilot)

To disable ESP for flight training purposes or aerobatic maneuvers:

On ground or in flight:

1. Touch the AFCS Status Box at the top of the PFD. Automatic Flight Control System window opens.
2. Highlight and Select ESP. The green ESP status bar extinguishes. ESP is disabled.

3. Press and Hold the BACK button to close the Automatic Flight Control System window and return to PFD display.

In flight only:

1. Press and hold the AP DISC switch for 5 seconds.

To reenable ESP:

1. Touch the AFCS Status Box at the top of the PFD. Automatic Flight Control System window opens.
2. Highlight and Select ESP. The green ESP status bar illuminates. ESP is enabled.
3. Press and Hold the BACK button to close the Automatic Flight Control System window and return to PFD display.

5 PERFORMANCE

No change.

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6 WEIGHT AND BALANCE

See current weight and balance data.

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7 SYSTEM DESCRIPTION

The G3X Touch EFIS is scalable with a variety of configurations supported. The functions described in this section may not be available in all aircraft depending on installed equipment and interfaces. A minimum installation with a single display may be a standalone MFD or a PFD which can be split screened to provide both PFD and MFD functions. Optional functions include EIS, datalink traffic and weather, AOA, autopilot interface, remote audio panel, GPS/NAV/COM interface, transponder interface, and others.

7.1 Primary Flight Instruments

When a PFD is installed, attitude information is displayed over a virtual blue sky and synthetic ground with a white horizon line. The Attitude Indicator displays the pitch (indicated by the Amber symbolic aircraft on the pitch scale), roll, and slip/skid information.

The horizon line is part of the pitch scale. Pitch markings occur at 2.5˚ intervals through all pitch ranges.

The inverted white triangle indicates zero on the roll scale. Major tick marks at 30˚ and 60˚ and minor tick marks at 10˚, 20˚, and 45˚ are shown to the left and right of the zero. Angle of bank is indicated by the position of the pointer on the roll scale.

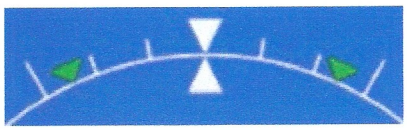
Slip/skid is indicated by the location of the ball.

Bezel Overview (GDU 460)

Bezel Overview (GDU 470)

NRST Key	Press to display the Nearest Page for viewing the nearest airports, intersections, NDBs, VORs, waypoints, frequencies, and airspaces
Direct-To Key	Press to activate the Direct-To function, enter a destination waypoint establish a direct-to course to the selected destination
MENU Key	Press once to view the Page Menu Press twice to view the Main Menu Press a third time to clear the Main Menu enabled.
BACK Key	Press to return to the previous screen Press and hold to return to the default MFD Page

The Standard Rate Turn Bank Angle Pointers are green pointers displayed on the roll scale that show the bank angle corresponding to a standard rate turn.



Standard Rate Turn Bank Angle Pointers

The Turn Rate Indicator is located at the top of the HSI. Tick marks to the left and right of the displayed heading denote standard turn rates (3 deg/sec). A magenta Turn Rate Trend Vector shows the current turn rate. The end of the trend vector gives the heading predicted in 6 seconds, based on the present

turn rate. A standard-rate turn is shown on the indicator by the trend vector stopping at the standard turn rate tick mark, corresponding to a predicted heading of 18° from the current heading. At rates greater than 4 deg/sec, an arrowhead appears at the end of the magenta trend vector and the prediction is no longer valid.

The Airspeed Indicator may be displayed as a vertical tape or a round dial. When the Airspeed Indicator is displayed as a tape, it displays a range of 70 knots on a rolling number gauge using a vertical tape. Numeric labels and major tick marks are shown at intervals of 10 knots. Minor tick marks are at intervals of 5 knots. The current airspeed is displayed in the black pointer. The True Airspeed (TAS) is displayed above the scale in white digits and the Ground Speed (GS) is displayed below the scale in magenta digits.

The Altimeter may be displayed as a vertical tape or a round dial. When the Altimeter is displayed as a tape, it displays 400 feet of barometric altitude values at a time on a rolling number gauge using a moving tape. Numeric labels and major tick marks are shown at intervals of 100 feet. Minor tick marks are at intervals of 20 feet. The current altitude is displayed in the black pointer. The barometric pressure setting is displayed below the Altimeter in inches of mercury (in Hg) or hectopascals (hPa) when metric units are selected.

The Selected Altitude is displayed above the Altimeter in the box indicated by a selection bug symbol. A bug corresponding to this altitude is shown on the altimeter; if the Selected Altitude exceeds the range shown on the tape, the bug appears at the corresponding edge of the tape.

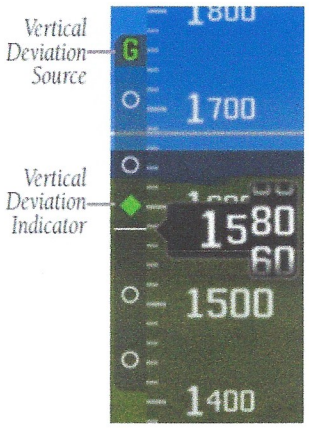
The Altitude Alerting function provides the pilot with visual and aural alerts when approaching the Selected Altitude. Whenever the Selected Altitude is changed, the Altitude Alerter is reset. The following will occur when approaching the Selected Altitude:

- Passing within 1000 feet of the Selected Altitude, the Selected Altitude (shown above the Altimeter) flashes for 5 seconds and an aural tone is generated.
- When the aircraft passes within 200 feet of the Selected Altitude, the Selected Altitude flashes for 5 seconds and an aural tone is generated to indicate that the aircraft is approaching the selected altitude.
- After reaching the Selected Altitude, if the pilot flies outside the deviation band (±200 feet of the Selected Altitude), the Selected Altitude changes to Amber text on a black background, flashes for 5 seconds, and an aural tone is generated.

The Vertical Speed Indicator (VSI) may be displayed as a tape or an arc segment. The VSI displays the aircraft vertical speed using a non-moving tape labeled at 500, 1000 and every 1000 fpm up to the maximum with minor tick marks every 100 feet up to 1000 fpm. The current vertical speed is displayed using a white arrow along the scale.

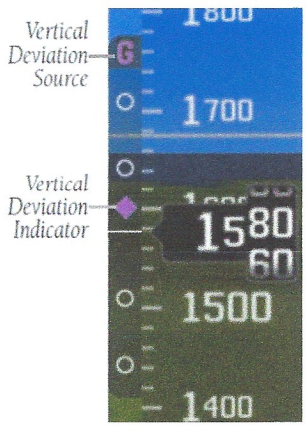
7.2 Vertical Deviation Indicators

The Vertical Deviation (Glideslope) Indicator (VDI) appears to the left of the altimeter whenever an ILS frequency is tuned in the active NAV field of an external navigator. A green diamond acts as the VDI Indicator. The green 'G' indicates an external glideslope source. If a localizer frequency is tuned and there is no glideslope signal, "NO GS" is annunciated.



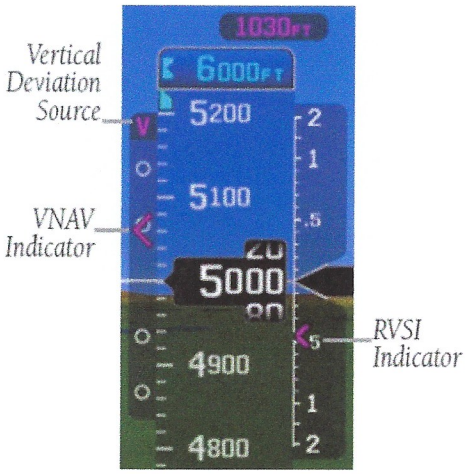
Vertical Deviation Indicator (Glideslope – ILS Source)

The Vertical Deviation (Glidepath) Indicator (VDI) also appears to the left of the altimeter during a GPS approach. The glidepath is analogous to the glideslope for GPS approaches supporting WAAS vertical guidance (LNAV+V, L/VNAV, LPV). The Glidepath Indicator appears on the G3X Touch as a magenta diamond. The magenta 'G' indicates a GPS source. If the approach type downgrades past the final approach fix (FAF), "NO GP" is annunciated.



Vertical Deviation Indicator (Glidepath – GPS Source)

An external navigation source is not required to receive VNAV indications. A magenta chevron (VNAV Indicator) to the left of the altimeter on the Vertical Deviation Scale shows the VNAV profile, and a magenta chevron (Required Vertical Speed Indicator (RVSI)) on the Vertical Speed Indicator indicates the required vertical speed to reach the target altitude. The magenta 'V' indicates a VNAV profile is active.



VNAV Indicator

7.3 HSI Annunciations

Some or all HSI annunciations may appear in the four quadrants of the G3X Touch HSI depending on the external navigator(s) configured.

Amber **LOI** – Loss of GPS integrity

Amber or Magenta **VFR** – An external GPS source is configured but there is not enough guidance data for IFR use.

Amber **REV** – External navigation source failed. Reverted to internal VFR GPS for navigation.

Amber **MSG** – External navigation source has a pending message

Cyan **INT** – The pilot has elected to use the internal GPS navigation source instead of the external GPS navigation source.

7.4 Course Deviation Indicator (CDI)

The HSI contains a Course Deviation Indicator (CDI), with a Course Pointer, To/From Indicator, and a sliding deviation bar and scale. The course pointer is a single line arrow (GPS1, VOR1, and LOC1) or a double line arrow (GPS2, VOR2, and LOC2) which points in the direction of the set course. The To/From arrow rotates with the course pointer and is displayed when the active NAVAID is received.

The Course Deviation Indicator (CDI) moves left or right from the course pointer along a lateral deviation scale to display aircraft position relative to the course. If the course deviation data is not valid, the CDI is not displayed.

Another Lateral Deviation Scale and combination Course Deviation and To/From Indicator is located below the slip/skid indicator.

CDI and Lateral Deviation Indication

The CDI can display two sources of navigation: GPS or NAV (VOR, localizer) depending on the external navigator(s) configured. Color indicates the current navigation source: magenta (for GPS) or green (for VOR and LOC). The full-scale limits for the CDI are defined by a GPS-derived distance when coupled to GPS. When coupled to a VOR or localizer (LOC), the CDI has the same angular limits as a mechanical CDI. If the CDI exceeds the maximum deviation on the scale (two dots) while coupled to GPS, the crosstrack error (XTK) is displayed below the white aircraft symbol.

In addition to the flight instruments, the PFD also displays supplemental information, including the Outside Air Temperature (OAT), wind data, User Timer, and G-Meter.

7.5 Display of PFD information on MFD

MFDs installed as part of the G3X touch system can display PFD information if manually selected by the pilot, or will automatically do so if the installed PFD display fails. The display of PFD information on an MFD is a duplication of the original PFD information and is not an independent compilation of data from other sources.

To manually display backup PFD information on an MFD:

1. On the MFD, press the MENU button twice.
2. Select Setup.
3. Select Display.
4. On a 7" GDU 470, set Full MFD/PFD Toggle to Enabled. On a 10" GDU 460, set MFD Split Screen Page to PFD.
5. Press and hold the BACK button to close the Display Setup window and return to MFD display.
6. On a 7" MFD, touch the PFD button in the upper corner to select the backup PFD display. On a 10" MFD, touch the Split button in the upper corner to select the backup PFD display.

7.6 Engine Indication System

The G3X Touch EIS (if installed) displays engine, electrical, and other system parameters. Gauges required to be displayed full time are located on the Main Engine Display which is always in view. Additional EIS information can be viewed on the Eng Page which can be selected by touching the Main Engine Display or by turning the 'Select Page' knob to the right on an MFD window.

Green bands on the instruments indicate normal ranges of operation; amber and red bands indicate caution and warning, respectively. When unsafe operating conditions occur, the corresponding caution readout will display solid amber and the warning readout will flash red. Most EIS caution and warning conditions also generate an alert message on the PFD, including gauges that may appear only on the Eng Page. An aural alert is also issued with a flashing red warning. If sensor data for an instrument becomes invalid or unavailable, a red "X" is displayed across the instrument.

7.7 Communication / Navigation / Surveillance System

The Communication/Navigation/Surveillance (CNS) system includes the audio interface, communication radios, navigation radios, and Mode S transponder. These functions can be accessed from the boxes that make up the CNS Data Bar located at the top of the PFD and/or MFD.

CNS Data Bar

7.8 Remote Transponder Interface

The G3X Touch is capable of interfacing with several remote transponders providing Mode S interrogation and reply capabilities. Transponder tuning for panel mount transponders is also supported.

Ground and Altitude Modes

Most Garmin transponders automatically transition between on-ground and in-air and operate in the appropriate mode at all times. No pilot action is required to manage modes unless there is a need to manually select STBY or ON modes.

G3X displays a green GND indication and transponder code in the Transponder Data Box while on-ground, and a green ALT indication when in-air, when not set to STBY or ON.

NOTE

> Some panel mount transponders may indicate ALT on their dedicated display at all times, even while on-ground. As a result, in some installations, the transponder display and G3X display will indicate different modes while on the ground, although they are functionally equivalent.

Standby Mode (Manual)

When Standby mode is selected, the transponder does not reply to interrogations, but new codes can be entered. A white STBY indication and transponder code appear in the Transponder Data Box. The transponder will not automatically transition from STBY to ALT mode when the aircraft transitions from on-ground to in-air.

On Mode (Manual)

ON Mode can be selected at any time. ON Mode generates Mode A and Mode S replies, but Mode C altitude reporting is inhibited. In ON Mode, a green ON indication and transponder code appear in the Transponder Data Box.

Reply Status

When the transponder sends replies to interrogations, a green R indication appears momentarily in the Transponder Data Box.

IDENT Function

Touching IDENT sends a distinct identity indication to Air Traffic Control (ATC). The indication distinguishes the identing transponder from all the others on the air traffic controller's screen. After touching IDENT the bar on the button turns green momentarily.

7.9 Minimum Altitude Display and Alerting

When enabled by the pilot, an altitude minimums bug will be displayed in cyan on the barometric altitude tape.

Altitude minimums are accessed under the PFD Options Menu → Minimums sub menu and can be set by touchscreen keypad or dual-concentric knob.

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 Amber. 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 minimum's altitude.

If a new approach is loaded into the external navigator, the Minimums Altitude display is not automatically updated with the new approach minimums. The pilot must update the Minimums Altitude Display with the MDA/DH for the approach loaded into the navigator.

7.10 AOA Probe

The G3X Touch PFD will display angle of attack from the GAP 26 AOA probe if installed. The GSU 25 uses the pressure from the GAP 26 probe and the pitot/static pressures it already receives from the existing aircraft pitot/static system to determine the aircraft's angle of attack (AOA).

The AOA indications and warnings presented on the G3X system are for reference only and are not intended as replacements for the aircraft's original stall warning system. The AOA stall warning margin and indications may not be the same at different flap settings and are only supported for positive G flight.

7.11 GAD 27 Wig Wag

The GAD 27 module (if installed) provides a feature that provides the ability to flash the Landing and Taxi lights of the airplane in an alternating fashion, otherwise known as "Wig Wag". Two 3-position switches control this feature, one for the landing lights and one for the taxi lights:

- ON – Respective light is on
- FLASH – Respective light will flash
- OFF – Respective light is off

When both switches are in the FLASH position, the landing and taxi lights alternate off and on with each other to produce the 'Wig-Wag' effect.

Before landing, switch to ON for steady landing lights.

7.12 EIS Caution / Warning Lights

If the G3X EIS display is outside the pilot's primary field of view and a PFD is not installed to provide EIS annunciations, discreet Caution/Warning lights are installed. The lights are installed in the primary field of view and are labeled ENGINE. Only a G3X EIS exceedance from a gauge on the Main EIS Display triggers the EIS Caution/Warning lights. EIS gauges that are not on the Main EIS Display do not alert.

7.13 Smart Glide

When installed with a Garmin GTN Xi with Smart Glide enabled, the G3X Touch will provide Smart Glide map indications, annunciation of GLIDE, and Emergency Page data for the Smart Glide feature. For more details on the Smart Glide function, refer to the GTN Xi Pilot's Guide (190-02327-03, revision D or later) and GTN Xi AFMS (P/N 190-01007-C2 or 190-01007-C3, revision 4 or later).

7.14 SFD Baro Sync

Cyan background coloring of the altimeter barometric window on either the G5/GI 275 or G3X PFD altimeters indicates that the altimeter setting is automatically changing to synchronize with the other unit. This feature is called **SFD Baro Sync**.

SFD Baro Sync can be **Enabled** or **Disabled** in the G3X Touch PFD Menu. It defaults to Enabled when the system is powered on. When **SFD Baro Sync** is enabled, and the pilot changes the altimeter setting on one altimeter, the other altimeter setting changes automatically and indicates in inverse video (cyan background with black numbers).

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