

Garmin International, Inc.
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FAA Approved
AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL AIRPLANE FLIGHT MANUAL

Garmin GTX 330/33 with ADS-B Out

Dwg. Number: 190-00734-15 Rev. 1

This document serves as an FAA Approved Airplane Flight Manual Supplement or Supplemental Airplane Flight Manual when the GTX 330/33 with ADS-B Out is installed in accordance with Supplemental Type Certificate SA01714WI. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

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

Make and Model Airplane:

PIPER PA28-236

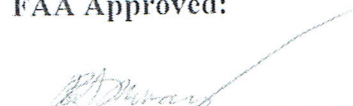
Airplane Serial Number:

28-7911306

Airplane Registration Number:

N 2363U

FAA Approved:


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Garmin GTX 330/33 with ADS-B Out

Log of Revisions

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	See Cover	See Cover

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Table of Contents

Section 1.	General.....	7
Section 2.	Limitations	11
Section 3.	Emergency Procedures.....	12
Section 4.	Normal Procedures.....	14
Section 5.	Performance	14
Section 6.	Weight and Balance	14
Section 7.	Systems Description.....	14
Section 8.	Handling, Service, and Maintenance	15

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Section 1. General

1.1 GTX 330/33 ES

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

All Garmin GTX transponders are a radio transmitter/receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. Each unit is equipped with IDENT capability and will reply to ATCRBS Mode A, Mode C and Mode S All-Call interrogation. Interfaces to the GTX 330/33 are shown in the following block diagrams.

Figure 1. GTX 330 or GTX 330D Interface Summary

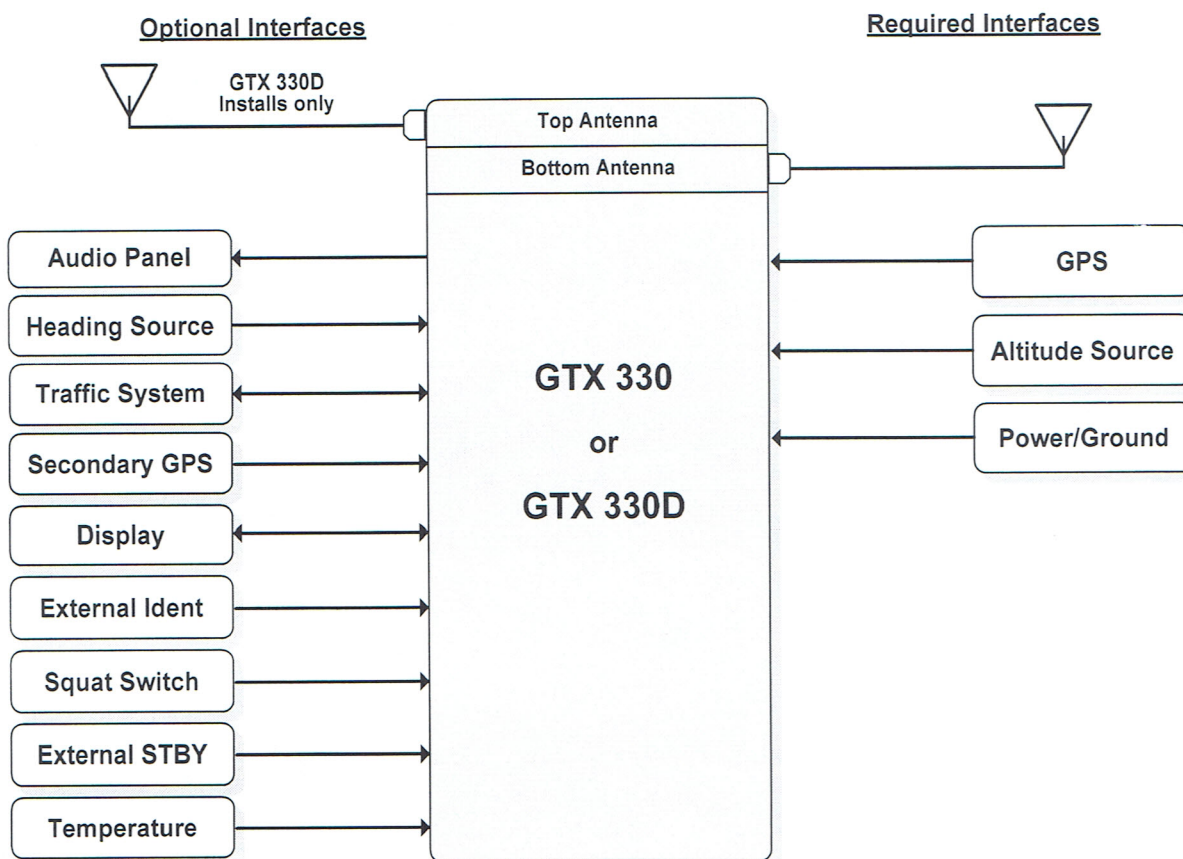
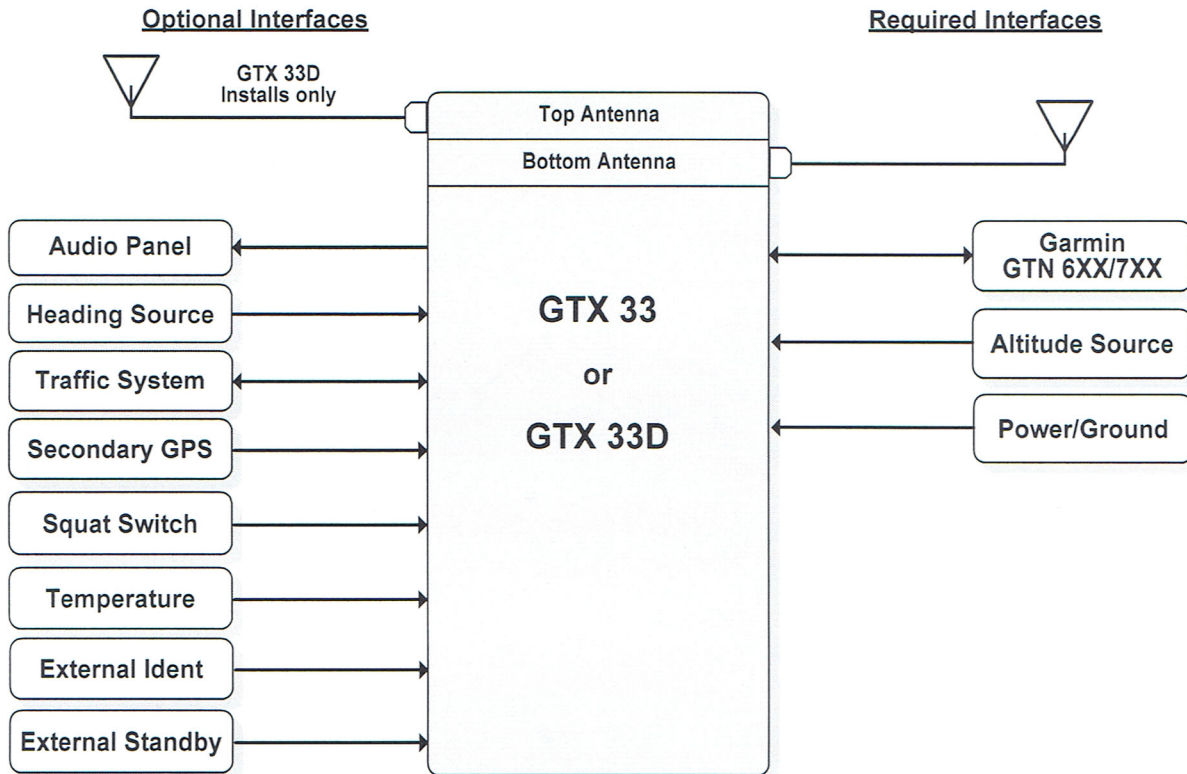


Figure 2. GTX 33 or GTX 33D Interface Summary



The GTX 330/33 performs the following ADS-B Out functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090ES) (1090 MHz)
- Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
 - GPS Position, Altitude, and Position Integrity
 - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
 - Air Ground Status
 - Flight ID, Call Sign, ICAO Registration Number
 - Capability and Status Information
 - Transponder squawk code, IDENT, and emergency status
- Pressure Altitude Broadcast Inhibit

1.2 Capabilities

The Garmin GTX 330/33 with ADS-B Out functionality as installed in this aircraft has been shown to meet the equipment requirements of 14 CFR § 91.227.

1.3 Installation Configuration

This aircraft is equipped with a GTX 330/33 with ADS-B Out system with the following interfaces/features:

Equipment Installed:

- | | |
|--|-------------------------------------|
| <input checked="" type="checkbox"/> #1 GTX 330 | <input type="checkbox"/> #1 GTX 33 |
| <input type="checkbox"/> #1 GTX 330D | <input type="checkbox"/> #1 GTX 33D |
| <input type="checkbox"/> #2 GTX 330 | <input type="checkbox"/> #2 GTX 33 |
| <input type="checkbox"/> #2 GTX 330D | <input type="checkbox"/> #2 GTX 33D |

Interfaced GTN 6XX/7XX or GNS 4XX/5XX Position Source(s):

	Transponder (#1 or #2)		Transponder (#1 or #2)		Transponder (#1 or #2)
<input type="checkbox"/> GTN 725	_____	<input type="checkbox"/> GNS 430AW	_____	<input type="checkbox"/> GNS 530AW	_____
<input type="checkbox"/> GTN 750	_____	<input checked="" type="checkbox"/> GNS 430W	<i>#1</i>	<input type="checkbox"/> GNS 530W	_____
<input type="checkbox"/> GTN 625	_____	<input type="checkbox"/> GNC 420AW	_____	<input type="checkbox"/> GPS 500W	_____
<input type="checkbox"/> GTN 635	_____	<input type="checkbox"/> GNC 420W	_____		
<input type="checkbox"/> GTN 650	_____	<input type="checkbox"/> GPS 400W	_____		

1.4 Definitions

The following terminology is used within this document:

ADS-B:	Automatic Dependent Surveillance-Broadcast
AFM:	Airplane Flight Manual
AFMS:	Airplane Flight Manual Supplement
ATCRBS:	Air Traffic Control Radar Beacon System
CFR:	Code of Federal Regulations
ES:	Extended Squitter
GNSS:	Global Navigation Satellite System
GNS:	Garmin Navigation System
GPS:	Global Positioning System
GTX:	Garmin Transponder
GTN:	Garmin Touchscreen Navigator
ICAO:	International Civil Aviation Organization
LRU:	Line Replaceable Unit
PABI:	Pressure Altitude Broadcast Inhibit
POH:	Pilot Operating Handbook
SBAS:	Satellite-Based Augmentation System
SW:	Software
TCAS:	Traffic Collision Avoidance System
TX:	Transmit

Section 2. Limitations

2.1 Minimum Equipment

The GTX 330/33 with ADS-B Out must have the following system interfaces fully functional in order to be compliant with the requirements for 14 CFR 91.227 ADS-B Out operations:

Table 1. Required Equipment

Interfaced Equipment	Number Installed	Number Required
Uncorrected Pressure Altitude Source	1	1
GPS SBAS Position Source	1 or more	1
GTN series navigator (for aircraft equipped with GTX 33/33D only)	1 or more	1

2.2 ADS-B Out

The GTX 330/33 only complies with 14 CFR 91.227 for ADS-B Out when all required functions are operational. When the system is not operational, ADS-B Out transmit failure messages will be present on the GTN control interface, or GTX 330 display.

2.3 Applicable System Software

This AFMS/AFM is applicable to the software versions shown in Table 2.

The Main GTX software version is displayed on the splash screen during start up, for the GTX 330, and the external LRU page on the GTN for the GTX 33.

Table 2. Software Versions

Software Item	Software Version <i>(or later FAA Approved versions for this STC)</i>
Main SW Version	7.02

2.4 Pressure Altitude Broadcast Inhibit (PABI)

Pressure Altitude Broadcast Inhibit shall only be enabled when requested by Air Traffic Control while operating within airspace requiring an ADS-B Out compliant transmitter, per 14 CFR 91.227. PABI is enabled by selecting the GTX to ON mode.

Section 3. Emergency Procedures

3.1 Emergency Procedures

None

3.2 Abnormal Procedures

3.2.1 Abnormal Indications

The loss of an interfaced input to the GTX 330/33 may cause the transponder to stop transmitting ADS-B Out data. Depending on the nature of the fault or failure, the GTX may no longer be transmitting all of the required data in the ADS-B Out messages.

For GTX 330 installations:

If the GTX 330 detects any internal faults or failures with the ADS-B Out functionality, the GTX 330 will annunciate this event via the NO ADSB annunciator on the GTX 330 display screen. When the GTX 330 annunciates the NO ADSB annunciation, one of the following failures or faults have occurred:

- Loss of adequate GPS position data
- ADS-B TX (transmit) is selected OFF

When the GTX 330 annunciates FAIL to the flight crew, the GTX 330 has detected an internal failure and no transponder data is transmitted.

When a GTX 330 NO ADSB, or FAIL annunciation is received, verify proper operation of all interfaced equipment (refer to Section 1.3) as the failure of one of these devices could be the cause of the abnormal indication.

For GTX 33 installations:

Reference Display Device documentation for applicable annunciations.

3.2.2 Loss of Aircraft Electrical Power Generation

Loss of electrical power generation **REMOVE POWER FROM GTX**

If the GTX should be load shed due to a loss of electrical power generation, ADS-B Out data will no longer be available.

NOTE

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

3.2.3 Loss of GPS/SBAS Navigation Data

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

For GTX 330 installations:

NO ADSB annunciator illuminated:

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

For GTX 33 installations:

Reference Display Device documentation for applicable annunciation:

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

Section 4. Normal Procedures

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

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

4.1 Unit Power On

NO ADSB..... **CONSIDERED**

NOTE

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

4.2 Before Takeoff

NO ADSB..... **EXTINGUISHED**

NOTE

The NO ADS-B Annunciation (or associated display annunciations) must be **EXTINGUISHED** for the system to meet the requirements specified in 14 CFR 91.227. This system must be operational (NO ADSB annunciator **EXTINGUISHED**) in certain airspace after January 1, 2020 as specified by 14 CFR 91.225.

Section 5. Performance

No Change

Section 6. Weight and Balance

See current Weight and Balance data

Section 7. Systems Description

The Garmin GTX 330 Pilot's Guide, part number and revision listed below, contain additional information regarding GTX system description, control, and function. Pilots Guides for interfaced displays, part number and revision listed below, provide additional operating information for the Garmin GTX 33.

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<u>Title</u>	<u>Part Number</u>	<u>Revision</u>
GTX 330 Pilot's Guide	190-00207-00	Rev G (or later)
Garmin GTN 725/750 Pilot's Guide	190-01007-03	Rev. E (or later)
Garmin GTN 625/635/650 Pilot's Guide	190-01004-03	Rev. E (or later)

Section 8. Handling, Service, and Maintenance

No Change