

**SECTION 9**  
**SUPPLEMENTS**

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**9.1 INTRODUCTION**

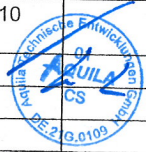
In this section, equipment is described that is optionally installed in your aircraft. Each individual supplement refers to a built-in component. Only supplements concerning your aircraft configuration must be contained.

A *Log of Supplements* page immediately follows this page and precedes all Aquila Supplements produced for this airplane. The *Log of Supplements* page can be utilized as a "Table of Contents" for this section. In the event this airplane is modified at a non Aquila facility through an STC or other approval method, it is the owners responsibility to assure that the proper supplement, if applicable, is installed in the handbook and the supplement is properly recorded on the *Log of Supplements* page.

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**SECTION 9****Supplement AVE4****Garmin GMA 340 Audio System**

When the Garmin GMA 340 Audio Panel is installed in the AQUILA AT01, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Pilot's Operating Handbook. Information in this supplement either adds to, supersedes, or deletes information of the basic AQUILA AT01 Pilot's Operating Handbook.

Approved by: \_\_\_\_\_



Date: \_\_\_\_\_

13. Mai 03

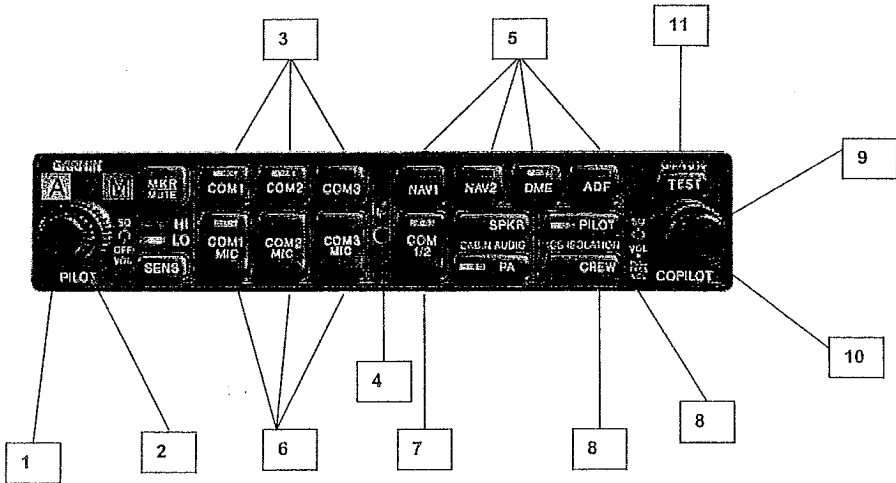
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## 1.0 General

This supplement provides detailed operating instructions for the Garmin 340 Audio Selector Panel/ Intercom System with integrated Marker Beacon function. This supplement covers only the basic operating areas of the Audio Control Panel, which are necessary under VFR operation of the aircraft.

- Power ON / Fail Safe Operation
- Audio / Transceiver Selection
- Intercom (ICS)



1. Pilot Intercom Squelch (outer knob)
2. Power / Intercom volume (inner knob)
3. Transceiver Audio Select Buttons/LED's
4. Photocell
5. Receiver Audio Select Buttons/LED's
6. Transceiver Audio/ Transmit Selector Buttons/LED's
7. Split COM Button/LED
8. Intercom Isolation Buttons (Pilot, Crew)
9. Copilot Intercom Squelch (outer knob)
10. Copilot / Intercom Volume (inner knob)
11. Indicator Test Button

Figure 1-Audio Control Panel

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## 2.0 Limitations

No change from basic handbook.

## 3.0 Emergency Procedures

In the event of an audio panel failure, the radio system will revert to COM1 for the pilot's mic and headphones and the pilot will have transmit and receive capability.

## 4.0 Normal Procedures

Refer to Section 7 – System description in this supplement for a complete description and operation of the Audio Control Panel.

## 5.0 Performance

No change from basic handbook.

## 6.0 Weight & Balance

No change from basic handbook.

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## 7.0 System Description

### Power On and Fail Safe Operation

- ON /OFF** The Audio Control Panel is powered „off“ when the left inner knob (Pilot) is at the full CCW (counter-clockwise) position. Rotating the knob CW (clockwise) activates the unit.
- ICS** CW rotation beyond the „on“ detent increases pilot ICS (intercom system) volume.
- Fail Safe Operation** A fail-safe circuit connects the pilot’s headset directly with COM1 receiver in the event of a power failure to the audio control panel or the panel is switched „off“.
- Test** Pressing the TEST button illuminates all Panel LED’s full bright. During normal operation a photocell mounted at the approximate center of the control panel senses ambient light to allow automatic LED and annunciator intensity adjustment.

### Audio/Tranceiver Selection

Audio selection is performed through the eight selector push buttons in the center of the Audio Control Panel. All audio selector push buttons are push-on, push-off types. Selecting an audio source supplies audio to the headphones. Selected audio sources are indicated by illumination of the push-button switch.

Tranceiver audio is selected by depressing COM1 or COM2 (if installed). When the audio source is selected using the COM1 and COM2 buttons, the audio source will remain active regardless of which transceiver is selected as the active MIC source. Both transceiver audio and MIC (microphone) can be selected by depressing COM1 MIC or COM2 MIC (if installed). Both pilot and copilot are connected to the selected transceiver and both have transmit and receive capabilities. Pilot and copilot must use their respective Push-To-Talk (PTT) switch to transmit. The intercom will function normally. During the transmissions the active transmitter’s COM MIC button LED blinks at 1 Hz rate indicating active transmission.

- Split COM** Pressing the COM ½ button activates the split com function. When split com is active, COM1 is the pilots mic/audio source and COM2 is the copilot mic/audio source. The pilot has transmit and receive

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capabilities on COM1 and the copilot has transmit and receive capabilities on COM2. The pilot and the copilot can still listen to COM3, NAV1, NAV2, DME, ADF and MKR. Pressing the COM ½ button a second time will deactivate the split com function.

**COM Swap Funktion**

Com swap mode is not available in this installation

**Navigation receiver selection**

Navigation receiver audio is selected by depressing NAV1, NAV2 (if installed), MKR, DME (if installed), or ADF (if installed) will select that radio or device as the audio source. Audio level of navigation receivers is controlled through the selected radio volume control.

**Speaker Output** not available in this installation

**PA Funktion** not available in this installation

**Auxiliary Entertainment Inputs** not available in this installation

**Intercom-System (ICS)**

Intercom controls are located towards the leftside of the Audio Control Panel. The controls consist of a volume control for the pilot and copilot , a squelch control and an intercom mode selector switch.

Knob control is as follows:

**Left Inner Knob** ON/OFF Power control and pilot ICS volume. Full CCW is OFF position (Click).

**Left Outer Knob** Pilot ICS Mic VOX level. CW rotation increases the amount if mic audio (VOX level) required to break squelch. Full CCW is the „hot mic“ position.

**Right Inner Knob** When pushed in, rotation controls copilot ICS volume , when out , rotation controls passenger ICS volume. (not installed).

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**Right Outer Knob**

Copilot and passenger Mic VOX level. CW rotation increases the amount of MIC audio (VOX level) required to break squelch. Full CCW is the „hot mic“ position.

**Intercom Modes**

The GMA 340 Audio Panel can be operated in three different Intercom modes, PILOT; CREW and ALL, which can be activated by the buttons PILOT or CREW (CREW=ALL in this installation)

**Mono/Stereo Headset**

If monoaural headsets are plugged into stereo jacks that do not have a switch installed, the unit will not be damaged.

If the pilot uses a monoaural headset in a stereo jack, no audio will be heard during failsafe operation. When using a monoaural headset, the pilots jack must be equipped with a stereo/mono switch and it must be set to the „mono“ position for proper failsafe operation.

**Marker Beacon Receiver**

ILS Approaches are not performed under VFR-operation.

Function for VFR-operation not in use.

**Audio Panels GMA 340 Circuit Protective Devices.**

The electrical circuit of the Audio Panel GMA 340 is protected by a resettable circuit breaker „INTERCOM“ installed in the instrument panel.

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**SECTION 9**

**Supplement AVE5**

**Garmin GNS 430 GPS Navigator  
with VHF NAV and COM**

When the Garmin GNS 430 GPS Navigator with NAV and COM is installed in the AQUILA AT01, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Pilot's Operating Handbook. Information in this supplement either adds to, supersedes, or deletes information of the basic AQUILA AT01 Pilot's Operating Handbook.

Approved by:



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Date:

13. Mai 03

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### 1.0 General

The airplane is equipped with a Garmin GNS 430 Navigator with VHF-NAV and VHF COM herein referred as the „Navigator“.

The GNS 430 is capable of providing IFR enroute, terminal and approach navigation with position accuracies better than 15 meters. In this installation only functions which are necessary for VFR-operation are discussed. The system utilizes the Global Positioning System (GPS) satellite network to derive the airplane’s position (latitude, longitude and altitude).



Figure 1  
Garmin GNS 430 Front Panel

### 2.0 Limitationes

The airplane AQUILA AT01 is limited to operations under the definitions of VFR-day only. The airplane must have other approved navigation equipment, defined as minimum equipment installed and operating appropriate to the route of flight.

The Garmin GNS 430 Navigator is listed and installed as optional equipment the failure of which is uncritical in all operations of flight.

### 3.0 Emergency Procedures

If GPS Navigator information is not available or is invalid, utilize remaining operational navigation equipment as required. (see also Section 2)

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## 4.0 Normal Procedures

Normal operating procedures are outlined in the „Garmin GNS 430 Pilot's Guide and Reference“ (Rev. A, dated Dec. 1998 or later appropriate revision). It is recommended because of the variety and complexity of the functions to have the original manual on board the airplane.

### 4.1 Activate GPS

1. Battery Master Switch ON
2. Avionics Master Switch ON
3. Navigator COM /Power Switch Rotate, ON

The Navigator will display a welcome page while the self-test is in progress. When the self-test is successfully completed, the Navigator asks for NavData database confirmation, acquires position and then displays the acquired position on the Navigator's display.

NOTE
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The GPS Navigator utilizes altitude information from the altitude encoder's altitude digitizer to enhance altitude information.

### 4.2 Deactivate GPS

1. Navigator COM /Power Switch Rotate , OFF (counterclockwise)

## 5.0 Performance

No change from basic handbook

## 6.0 Weight & Balance

No change from basic handbook

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## 7.0 Systems Description

NOTE

This supplement provides a general description of the Garmin GNS 430, its operation and its integration in the instrument panel of the Aquila AT01 airplane. For a detailed description of the GNS 430 and full operation instructions refer to the „Garmin GNS 430 Pilot’s Guide and Reference“ (Revision A, dated Dec. 1998 or later appropriate revision).

### *GPS 430 Integrated GPS/NAV/COM System*

The airplane is equipped with a GNS 430 integrated GPS-Navigator, NAV receiver and COM transceiver. The GPS Navigator consists of a GPS receiver, a navigation computer and a Jeppesen NavData database all contained in the GNS 430 control unit mounted in the center console of the instrument panel.

A VHF NAV receiver and tuner for receiving VHF Omnidirectional Range (VOR), Localizer (LOC) and Glideslope (G/S) is also integrated into the control unit. Additionally a VHF communications receiver is also integrated into the unit.

The following paragraphs describe the GPS, NAV and COM functions of this unit.

For a complete description, as well as full operating instructions, refer to the Garmin GNS 430 Pilot’s Guide and Reference.

### *GPS Navigator*

The GNS 430 is capable of providing IFR enroute, terminal and approach navigation with position accuracies better than 15 meters. In this installation only functions which are necessary for VFR-operation are discussed. The system utilizes the Global Positioning System (GPS) satellite network to derive the airplane’s position (latitude, longitude and altitude).

The GPS-antenna is located behind the rear window in the center of the upper fuselage. All GPS and navigator controls are accessible through the GNS 430 front control panel located in the center console. The panel includes function keys, power switches, status annunciators a LCD-colour display, two concentric selector knobs on each panel and a card slot for the Jeppesen NavData card.

The GPS-Navigator is powered by 14 VDC through the 3 Amp GPS circuit breaker placed on the right side of the instrument panel.

The Jeppesen Navigation Database provides access to data on airports, approaches, and VOR’s and NDB’s frequencies.

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North American and International databases are available. Database information is provided on a card that can be inserted into the card slot on the GPS unit. Subscription information is provided in a subscription package provided with each system.

### ***Navigation-Receiver (NAV)***

The Garmin GNS 430 system provides an integrated Navigation (NAV) receiver with VHF Omirange/Localizer (VOR/LOC) and Glideslope capability.

The VOR/LOC receiver receives on a frequency range from 108.000 Mhz to 117.950 Mhz with 50 Khz spacing.

The NAV-receiver controls are integrated into the Garmin GNS 430 control mounted in the center console. The receiver control provides active and standby frequency indication, frequency memory storage and knob operated frequency selection. IDENT Audio output for VOR and LOC is provided to the audio system.

The NAV-antenna is located on the fuselage ground behind the baggage bulkhead.

The Navigation receiver is powered by 14 VDC through the Avionic Master Switch and a 10 Amp COM/NAV circuit breaker placed on the right side of the instrument panel.

### ***COM Transceiver (COM)***

The Garmin GNS 430 system includes a digitally tuned integrated VHF communications transceiver. The transceiver and integrated controls are mounted in the Garmin GNS 430 unit. The transceiver receives all narrow- and wide-band VHF communication transmissions transmitted within a frequency range of 118.000 MHz to 136.975 MHz in 25.0 kHz steps (720 channels).

For European operations, the COM can be operator configured for 8.33kHz channel spacing (2280 channels).

The tuning controls are collocated with the NAV at the left side of the GNS 430 front panel. Frequency tuning is accomplished by rotating the large and small concentric knobs to select a standby frequency and then transferring the frequency to the active window. The COM frequency display window is at the upper left corner of the GNS 430 display. Auto-tuning can be accomplished by entering a frequency from the window.

The COM 1 Antenna is placed inside the upper part of the vertical tail.

The Navigation receiver is powered by 14 VDC through the Avionic Master Switch and a 10 Amp COM/NAV circuit breaker placed on the right side of the instrument panel.

When a second COM/NAV receiver is installed, the GNS 430 is powered by the circuit breaker COM/NAV 1" and the additional COM/NAV is powered by an additional circuit breaker „COM/NAV 2". The antenna for the COM2 receiver is mounted on the underside of the behind the baggage compartment as bent whip antenna type.

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**SECTION 9****Supplement AVE10****Winterization Kit**

When the Winterization Kit is installed in the AQUILA AT01, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Pilot's Operating Handbook. Information in this supplement either adds to, supersedes, or deletes information of the basic AQUILA AT01 Pilot's Operating Handbook.

Approved by: \_\_\_\_\_



Date: \_\_\_\_\_

10.03.2004

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## 1. General

The Winterization Kit is recommended to be installed for operation in temperatures below 41°F (5°C). The Kit consists of a removable composite plate and a caution placard. The installation is defined by Service Bulletin SB-AT01-002.

## 2. Limitations

The maximum OAT for TAKE OFF with the Winterization Kit installed is 59°F (15°C). The following placard must be installed on the front side of the lower cowling immediately below the landing light.

WINTER KIT MUST BE REMOVED ABOVE 59°F (15°C)  
(WINTER KIT SHOULD BE INSTALLED BELOW 41°F (5°C))

## 3. Emergency Procedures

Not affected, there is no change to the aircraft emergency procedures when the Winter Kit is installed.

## 4. Normal Procedures

### Daily Preflight Check:

Insert after Check-Item (6(h)) of the daily preflight inspection (ref. section 4.4.1 of the Pilot's Operating Handbook):

- > If OAT is below 41°F (5°C) install baffle plate (recommended)
- > If OAT is above 59°F (15°C) remove baffle plate (**mandatory !**)

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## 5. Performance

There is no change in aircraft performance when the Winter Kit is installed.

## 6. Weight and Balance

The effect on weight and balance of the Winter Kit is negligible.

## 7. System Description

The Winterization Kit consists of a composite baffle which is installed with integrated quick release fasteners to the lower cowling in front of the cooler unit. The effect is that the air cooling flow through the coolers is reduced, thereby increasing the operating temperatures.

## 8. Handling

The baffle is removed from the cowling by unlocking the quick release fasteners and then the unit is to be stored in the baggage compartment.

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**SECTION 9****Supplement AVE11****Aircraft Emergency Locator Transmitter (ELT) KANNAD 406 AF**

When an Emergency Locator Transmitter (ELT) KANNAD 406 AF is installed in the AQUILA AT01, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Pilot's Operating Handbook. Information in this supplement either adds to, supersedes, or deletes information of the basic AQUILA AT01 Pilot's Operating Handbook.

Modification is approved under EASA-Approval No.: 2005-5881

Confirmed by:



Date:

23. Juni 05

Luftfahrt-Bundesamt, Referat T3  
Braunschweig

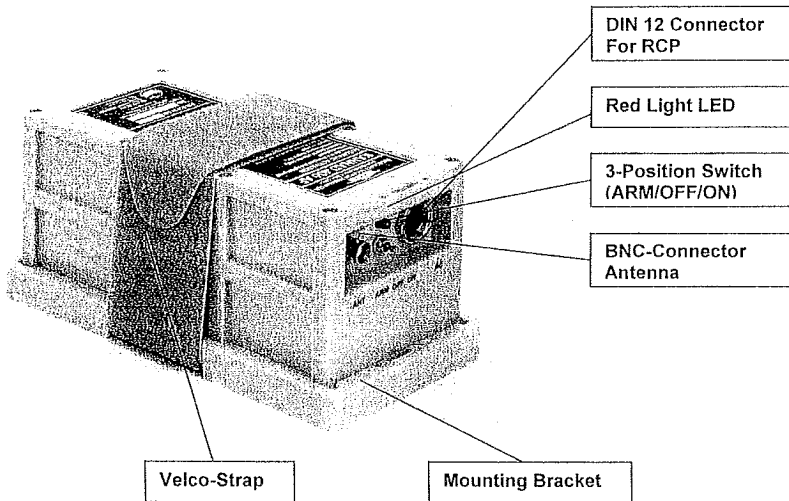
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## 1. ELT Front View



## 2. Description

The Emergency Locator Transmitter Pointer (ELT) is an emergency transmitter that, if activated, both on civilian distress frequency of 121,5 MHz and on military distress frequency of 243,0 MHz, transmits a signal to enable rescue teams to locate a crashed aircraft faster.

Additionally a 406 MHz message is transmitted to COSPAS-SARSAT satellites in polar orbit. The message then is downloaded to one of the 27 ground stations. The transmission carries data which enable the identification of the aircraft in distress and facilitate SAR-Operation. The aircraft is located by Doppler effect with a precision of less than 2 NM at any point of the earth.

The ELT is located on the baggage compartment floorboard on the right side behind the copilot's seat. The ELT antenna (type ROD) is mounted behind the baggage compartment bulkhead on the outside skin of the aircraft. The ELT in the AQUILA AT01 aircraft is operated without the optional remote control panel (RPC).

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## 2.1 Controls

The following controls are to be found on the ELT front panel:

- BNC connector for the antenna
- 3 position switch ARM/OFF/ON
- Red light (LED)
- DIN 12 connector for Remote Control Panel, GPS interface and programming equipment connection.

The red light (LED) gives an indication on the working mode of the beacon:

- After the self-test, a series of short flashes indicate the self-test failed, one long flash indicates that the self-test is OK.
- In operating mode, periodic flashes during 121,5/243 transmission.

A buzzer gives aural information on the working mode of the beacon:

- Continuous beep during self-test.
- 2 beeps per second during 121,5/243 transmission.
- Silence during 406 transmission.

## 2.2 Transmitter

The KANNAD 406 AF transmitter is an integrated design on a single Printed Circuit Board with the main advantage that it uses only one single antenna connector for the transmission on the frequencies 121,5/243 and 406 MHz.

Once activated, the transmitter operates continuously on 121,5 and 243 MHz. The output power is 100 mW on each frequency.

During the 24 first hours of operation, a signal is transmitted on 406 MHz every 50 seconds to the COSPAS-SARSAT satellites with an output power of nearly 5W.

## 2.3 Power Supply

The ELT is supplied with power independently of aircraft electrical system.

The energy is provided by a battery pack (P/N S1820506-xx) composed of three LiMnO<sub>2</sub> D cells.

The autonomy of the battery pack for the 121,5/243 MHz transmission is close to 100 hours at -20°C with new batteries .

The transmitter battery expiry date is fixed as 6 years after manufacturing.

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The battery pack must be replaced after 6 years shelf or service life or for any of the following reasons:

- (a) After the transmitter has been used in an emergency situation (including any inadvertent activation of unknown duration).
- (b) After the transmitter has been operated for more than one cumulative hour (e.g. time accumulated in several tests and an inadvertent activation of known duration).
- (c) On or before battery replacement date (battery replacement date is marked on the battery pack and at the label at the end of the transmitter).

**WARNING**

Do not attempt to recharge battery pack !

### 3. Registration and Programming

**NOTE**

The ELT must be registered at the local registration authority prior to installation on board of the aircraft.

A change of ownership should also be declared and registered with the local registration authority and with the distributor.

For the declaration and registration of 406 MHz ELT's usually form sheets are available at the local registration authority. A programming datasheet which contains all the necessary data for the COSPAS-SARSAT protocol has to be completed and returned to the distributor for the programming of the unit.

### 4. Activation

#### 4.1 Familiarization for the operation in case of emergency

It is recommended that the following steps to be taken to ensure the best possible operation in emergency

- (a) Become thoroughly familiar with the instructions of this supplement.
- (b) Keep them on hand in the aircraft all the times.
- (c) Visually inspect the unit at regular intervals for cleanliness and secureness. Check antenna mounting and cable connections for tightness.

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## 4.2 Operating modes of KANNAD 406 AF ELT

The ELT is located on the baggage compartment floorboard on the right side behind the copilot's seat. No remote switch is installed to operate the ELT.

The following operation modes can be preselected and activated manually:

MANUAL SYSTEM		KANNAD 406 ELT System without remote control panel
Mode	Master Switch on Unit	Function
ARM	„ARM“ (Normal Flight setting)	ELT automatically activated if „g-sensor“ senses predetermined deceleration level.
ON	„ON“	Overrides „g-sensor“ and turns ELT „ON“, so it can be tested for proper operation on the ground.
OFF	„OFF“	Turns ELT „OFF“ in preparation for removal from aircraft or to discontinue signal after rescue or after inadvertent operation.

In order to be activated by the crash sensor, the ELT must be in standby (ARM) mode. This mode is mandatory during flight. It is recommended to switch the ELT off only when the aircraft is parked for a long period or for a maintenance operation.

After a forced landing, if aircraft receiver is operable, listen on 121,5 MHz for KANNAD ELT transmissions. Ensure that the installed antenna is clear of obstructions.

Discontinue the signal of the ELT by shutting the unit „OFF“ only when the rescue team appears.

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## 5. Functional Testing

### 5.1 General

The ELT is fitted with a self-test that enables to perform the "Operational Tests" required by Civil Aviation Authorities.

It is recommended by the manufacturer to test the ELT periodically and within the fixed aircraft checks:

- (a) After initial installation
- (b) After system maintenance, such as battery pack replacement
- (c) Thereafter annual or more frequent inspection intervals are recommended.

### 5.2 Self-Test Procedure

**NOTE**

Do not perform Self-Test without the antenna connected !

SELF-TEST		KANNAD 406 AF without remote control panel (RPC)
3 position switch at the front panel of the ELT		
1	Switch to „OFF“	ELT –unit is placed and fixed behind the copilot’s seat.
2	Switch to „ARM“ (max. 30 Seconds)	The buzzer operates during the whole self-test procedure. After a few seconds the test result is displayed with the LED as follows:  <div style="display: flex; justify-content: space-between;"> <span>1 long flash</span> <span>Test OK</span> </div> <div style="display: flex; justify-content: space-between;"> <span>A series of short flashes</span> <span>Test with Failure</span> </div>
3	Switch to auf „OFF“	Unit „OFF“

If self-test fails, contact the manufacturer/distributor as soon as possible

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Remark:

The number of flashes gives an indication of the faulty parameter detected during the test.

<b>Number of flashes</b>	<b>Failure mode</b>
3+1	Low battery voltage
3+2	Low RF power
3+3	Faulty VCO Locking
3+4	No identification programmed

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## SECTION 9

## Supplement AVE12

## Garmin GTX 330 Transponder

When a Garmin GTX 330 Mode-S Transponder is installed in the AQUILA AT01, this Supplement is applicable and must be inserted in the Supplements Section (Section 9) of the Airplane Flight Manual (AFM). Information in this supplement either adds to, supersedes, or deletes information of the basic AQUILA AT01 Pilot's Operating Handbook.

Approved by: \_\_\_\_\_



Date: \_\_\_\_\_

30.6.05

Alfred Schmiderer

Head of Airworthiness AQUILA GmbH

Approved under the authority of EASA Design-Organisation DOA-No.: EASA.21J.025

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### 1.0 General

This Supplement supplies together with the original Garmin Pilot's Guide for the GTX 330 the information necessary for the efficient operation of the airplane when the Transponder GTX 330 is installed.

### 2.0 Operating Limitations

- Display of TIS traffic information is advisory only and does not relieve the pilot of the responsibility to 'see and avoid' other airplanes. Airplane maneuvers shall not be predicated on the TIS displayed information.
- Display of TIS traffic information does not constitute a TCAS I or TCAS II collision avoidance System as required by 14 CFR Part 121 or Part 135.

NOTE

The GTX 330 Mode S Transponder provides a data link for Traffic Information Service (TIS). TIS is presently only available in North America.

### 3.0 Emergency Procedures

To transmit an emergency Signal:

- ALT Key: PRESS
- Numeric Keys O-7: Select 7700 operating Code

To transmit a Signal representing loss of all communication (when in a controlled airspace):

- ALT Key: PRESS
- Numeric Keys O-7: Select 7600 operating Code

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#### 4.0 Normal Procedures

NOTE

Expected coverage from the GTX 330 is limited to „line of sight“. Low altitude or aircraft antenna shielding by the airplane itself may result in reduced range. Range can be improved by climbing to a higher altitude.

#### 4.1 After Engine Start

1. Avionic Master Switch ON

The transponder will turn ON into standby (STBY) mode.  
The transponder is ON but will not respond to interrogations from ATC secondary surveillance radar.

#### 4.2 Before Take Off

1. Transponder Mode Selector Keys ALT

In this mode the transponder will respond in Mode A and Mode C (altitude and identification) interrogations from ATC and TCAS equipped aircraft.

NOTE

Selecting ON puts the transponder in Mode A (identification) only. The transponder will respond to Mode C (altitude) interrogations with signals that contain no altitude information.

#### 4.3 After Landing

1. Transponder Mode Selector Keys STBY or OFF

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## 5.0 Performance

No change from basic handbook

## 6.0 Weight & Balance

Upon removal or installation of the Transponder GTX 330 the change of empty mass and corresponding Center of gravity of the airplane must be recorded according to chapter 6 of the Airplane Flight Manual (AFM).

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## 7.0 Aircraft- and Systems Description

NOTE

This supplement provides a general description of the Garmin GTX 330 transponder, its operation and its integration in the instrument panel of the Aquila AT01 airplane. For a detailed description of the GTX 330 and full operation instructions refer to the „Garmin GTX 330 Mode S Transponder Pilot’s Guide (Revision A, dated Sept. 2002 or later appropriate revision).

The Garmin GTX 330 transponder system consists of the integrated receiver/transmitter control unit, an antenna and an altitude digitizer.

The Garmin GTX 330 Panel mounted Mode S Transponder is a radio transmitter and receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to groundbased radar on a frequency of 1090 MHz. The GTX 330 is equipped with IDENT capability that activates the Special Position Identification (SPI) pulse for 18 seconds. Mode S transmit/receive capability also requires 1090 MHz transmitting and 1030 MHz receiving for Mode S functions.

In addition to displaying the Code Reply Symbol and Mode of Operation, the GTX 330 Screen will display pressure altitude, and timer functions. The unit also features an altitude monitor and flight timers. A voice or tone audio output announces altitude deviation and count down timer expiration.

To activate the transponder the Battery Main Switch as well as the Avionic Master Switch have to be in position ON.

The GTX 330 transponder is powered ON by pressing the STBY, ALT or ON keys. After Power ON a start-up page will be displayed while the unit performs a self test.

### Mode Selection Keys

- OFF -** Powers off the GTX 330. Pressing STBY, ON or ALT key powers on the transponder displaying the last active identification Code.
- STBY -** Selects the standby mode. When in STBY the transponder will not reply to any interrogations.
- ON-** Selects Mode A. In this mode the transponder replies to interrogations, as indicated by the Reply Symbol ('R'). Replies do not include altitude information.
- ALT -** Selects Mode A and Mode C. In ALT mode the transponder replies to identification and altitude interrogations as indicated by the Reply Symbol

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('R'). Replies to altitude interrogations include the Standard Pressure Altitude received from an external altitude source, which is not adjusted for barometric pressure.

Any time the function ON or ALT is selected the transponder becomes an active part of the Air Traffic Control Radar Beacon System (ATCRBS). The transponder also responds to interrogations from TCAS equipped airplanes.

### Code Selection

Code selection is done with eight keys (0 - 7) that provide 4096 active identification codes. Pushing one of these keys begins the code selection sequence. The new code will not be activated until the fourth digit is entered. Pressing the CLR key will move the cursor back to the previous digit. Pressing the CLR key when the cursor is on the first digit of the Code, or pressing the CRSR key during code entry, will remove the cursor and cancel data entry, restoring the previous code. You may press the CLR key up to five seconds after code entry is complete to return the cursor to the fourth digit. The numbers 8 and 9 are not used for code entry, only for entering a count down time, contrast and display brightness, and data selection in the Configuration Mode.

### Keys for other GTX 330 Functions

- IDENT -** Pressing the IDENT key activates the Special Position Identification (SPI) Pulse for 18 seconds, identifying your transponder return from others on the air traffic controller's Screen. The word 'IDENT' will appear in the upper left corner of the display while the IDENT mode is active.
- VFR -** Sets the transponder code to the pre-programmed VFR code selected in Configuration Mode. Pressing the VFR button again will restore the previous identification code.
- FUNC -** Changes the page shown on the right side of the display. Displayed data includes Pressure Altitude, Flight Time, Count up timer and Count down timer. In the Configuration Mode Steps through the function pages.
- START/STOP -** Starts and Stops the Altitude Monitor, Count Up, Count Down and Flight timers. In Configuration Mode, Steps through functions in reverse .

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- CRSR -** Initiates starting time entry for the Count Down timer and cancels transponder code entry. Returns cursor to last code digit within five seconds after entry. Selects changeable fields in Configuration Mode.
- CLR -** Resets the Count Up, Count Down and Flight timers. Cancels the previous keypress during code selection and Count Down entry. Returns cursor to the fourth code digit within five seconds after entry. Used in Configuration Mode.
- 8 -** Reduces Contrast and Display Brightness when the respective fields are displayed and enters the number eight into the Count Down timer. Used in Configuration Mode.
- 9 -** Increases Contrast and Display Brightness when the respective fields are displayed and enters the number nine into the Count Down timer. Used in Configuration Mode.

### Function Display

- Pressure ALT: Displays the altitude data supplied to the GTX 330 in feet, hundreds of feet (i.e., flight level), or meters, depending on configuration.
- Flight Time: Displays the flight time, which is controlled by the START/STOP and CLR keys.
- Altitude Monitor: Controlled by the START/STOP key. Activates a voice alarm when altitude limit is exceeded.
- Count Up Timer: Controlled by START/STOP and CLR keys.
- Count Down Timer: Controlled by START/STOP, CLR, and CRSR keys. The initial Count Down time is entered with the 0 - 9 keys.
- Contrast: This page is only displayed if manual contrast mode is selected in Configuration Mode. Contrast is controlled by the 8 and 9 keys.
- Display Brightness: This page is only displayed if manual backlighting mode is selected in Configuration Mode. Backlighting is controlled by the 8 and 9 keys.

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### Altitude Trend Indicator

When the 'PRESSURE ALT' page is displayed, an arrow may be displayed to the right of the altitude, indicating that the altitude is increasing or decreasing. Two sizes of arrows may be displayed depending on the rate of climb/descent. The sensitivity of these arrows is set using the GTX 330 Configuration Mode.

### Timer Operation

#### TO OPERATE THE FLIGHT TIMER:

1. Press the FUNC key until 'FLIGHT TIME' is displayed.
2. If desired, you may press START/STOP to pause or restart the timer.
3. Press CLR to reset the timer to Zero.

#### TO OPERATE THE COUNT UP TIMER:

1. Press the FUNC key until 'COUNT UP' is displayed.
2. If necessary, press CLR to reset the Count Up timer to Zero.
3. Press START/STOP to count up.
4. Press START/STOP again to pause the timer.
5. Press CLR to reset the timer to Zero.

#### TO OPERATE THE COUNT DOWN TIMER:

1. Press the FUNC key until 'COUNT DOWN' is displayed.
2. Press CRSR and use the 0 - 9 keys to set the initial time. All digits must be entered (use the 0 key to enter leading Zeros).
3. Press START/STOP to count down.
4. Press START/STOP again to pause the timer.

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- When the Count Down timer expires, the words 'COUNT DOWN' are replaced with a flashing 'EXPIRED', and the time begins counting up.
- Press CLR to reset the timer to the initial time value.

### Automatic ALT/GND Mode Switching

If the GTX 330 is configured with Automated Airborne Determination, normal Operation begins when liftoff is sensed. When the airplane is on the ground the Screen automatically displays GND. The transponder does not respond to ATRCBS interrogations when GND is annunciated. When a delay time is set in the Configuration Mode, the GTX 330 waits a specified length of time after landing before changing to GND mode.

### Failure Annunciation

If the unit detects an internal failure, the screen displays FAIL.

### GTX 330 Mode S Transponder Features

#### Traffic Information Service

The GTX 330 Mode S transponder provides a data link for Traffic Information Service (TIS). TIS is presently only available in North America. TIS provides a graphic display of traffic information in the cockpit for non-TCAS equipped airplanes. Transponder equipped airplanes can be displayed within the coverage volume on indicators such as a Garmin GNS 430 or GNS 530, within range of your position. Airplanes without an operating transponder are invisible to TIS. Refer to 400/500 series pilot literature for details.

#### Mode S Data transmission

In addition to 4096 Codes and pressure altitude, the GTX 330 is capable of transmitting airplane registration number or flight ID, transponder capability and maximum speed range.

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Audio Alerts

(Configuration Options: male/female voice or tone and volume level.)

- 'Leaving Altitude': Altitude deviation exceeded.
- 'Traffic': TIS traffic alert is received.
- 'Traffic Not Available': TIS Service is not available or out of range.
- 'Timer Expired': for Count Down time.

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