

SECTION 9

Pilot's Operating Handbook Supplement AS-13

**Garrecht TRX 2000
Traffic-Sensor**



This supplement is applicable and must be integrated into chapter 9 of the Airplane Flight Manual if a Garrecht TRX 2000 Traffic-Sensor is installed in the AQUILA AT01-100 aircraft. Information in this supplement compliments or replaces chapters in the basic Airplane Flight Manual.

Revision A.02 of AFM Supplement AS-13 ref. FM-AT01-1010-252 is approved under the authority of DOA ref. EASA.21J.025.

15.10.2013
Date, Signature Office of Airworthiness

Document Nr.:	Issue:	supersedes Issue:	Date:	Page:
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0.1 RECORD OF REVISIONS

Issue	Reason for Change	Effected Pages	Date of Issue
A.01	Initial Issue	All	28.05.2013
A.02	Editorial Changes	All	15.10.2013

0.2 LIST OF CURRENT PAGES

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1. General

1.1. Introduction

The information found in this Airplane Flight Manual Supplement is to be used alongside the basic Airplane Flight Manual.

This supplement contains additional information required for the safe operation of an AQUILA AT01-100 equipped with a Garrecht TRX-2000.

The chapters of this Airplane Flight Manual Supplement follow the same structure as the basic Airplane Flight Manual. Only the chapters listed in this document are affected by the installation of the TRX-2000.

For further information and comprehensive operating instructions, please reference the current issue of the TRX-2000 user manual and the user manual of the installed MFD (for example a FlymapL), to which the TRX.2000 can be connected. Please keep in mind that the user and operating manuals must be kept on board the aircraft and be accessible to the pilot at all times. It is the pilot's responsibility to familiarize him or herself with the operation, characteristics and limitations of the TRX-2000 System.

2. Operating Limitations

The operating limitations of the aircraft are in no way affected by the installation of the TRX-2000 Traffic Sensor.

The TRX-2000 Traffic Sensor is optional equipment. Failure of the Traffic Sensor is not critical in any phase of flight.

The Traffic Sensor is only to be used as an aid to situational awareness.

Decisions in flight may not be based solely on visual or acoustic information generated by the TRX-2000 Traffic Sensor. The Traffic Sensor offers no Resolution Advisories (RA).

The TRX-2000 Traffic Sensor can only display aircraft equipped with a FLARM, a FLARM compatible device, or an active transponder. All other aircraft will not be displayed the the TRX-2000.

The TRX-2000 will warn only of the target that it has calculated to be most dangerous. The Traffic Sensor may not always be able to give reliable warnings based on the relative bearing. Under certain conditions the system may give false warnings or may give no warning at all.

It remains the sole responsibility of the pilot to maintain a complete picture of the actual situation in flight. Factors such as position, direction of flight, local traffic, obstacles, terrain, and weather must all be considered before any evasive action is initiated. Use of the TRX-2000 may under no circumstances lead to changes in pilot behavior or habits.

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The frequencies used by the FLARM system are restricted in some countries. It is therefore the pilot's responsibility to make sure that these frequencies are unrestricted before entering that country's airspace. If this is not the case, the TRX-2000 must be switched off by pulling the circuit breaker **Traffic Monitor**. Verification of the FLARM frequencies is to be completed as part of the flight planning process for any border crossing flight!

Due to the nature of the Traffic Sensor, pilots should not fly in a manner that may cause unexpected reactions from other pilots.

2.12 Flight Conditions / Basic Equipment

Use of the TRX-2000 Traffic Sensor is restricted to noncommercial operations in VMC (VFR Meteorological Conditions). The TRX-2000 is not certified for navigational use or acrobatics.

The TRX-2000 is not part of the basic equipment of the aircraft in either D/VFR or N/VFR.

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3. Emergency Procedures

3.1 Introduction

This section contains procedures recommended in the case of an emergency. If the preflight inspection is properly completed and all maintenance requirements are met, the failure of critical components is highly unlikely.

The following procedures are recommended should an emergency occur non the less. Not all types of emergencies situations or combinations can be described in the AFM. A pilot must therefore always use good airmanship and have a sound knowledge of the aircraft and its systems.

3.10 Electrical System Emergencies

3.10.1 Suspected Electrical Fire

If fire, smoke, or the smell of a cable fire gives any indication that they may be caused by the TRX-2000, then the circuit breaker **Traffic Monitor** is to be pulled immediately! The emergency procedures in the basic Airplane Flight Manual continue to apply.

3.10.2 Alternator Failure

3.10.2.1 Failure of ALT 1 (external alternator)

In addition to the procedures described in the Airplane Flight Manual, the TRX-2000 is to be switched off by pulling the circuit breaker **Traffic Monitor**.

3.10.2.2 Failure of ALT 2 (internal alternator)

NOTE

If the aircraft is certified for N/VFR operations, the electrical system has 2 alternators.

The entire power requirement of the aircraft can be supplied by the external alternator. A failure of the internal alternator is therefore not critical. It is nonetheless advisable to reduce power consumption to a minimum, as outlined in the Airplane Flight Manual.

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4.0 Normal Procedures

4.1 General

The user manual of the Garrecht TRX-2000 is to be kept on board the aircraft.

4.2 Starting Up

The Garrecht TRX-2000 is turned on by a short push on the inner dial of the rotary encoder.

4.3 GPS Signal Quality

To function properly the TRX-2000 requires accurate information on its position, which is supplied by a GPS antenna. The quality of the GPS signal depends on a number of factors such as the position of the GPS antenna and the attitude of the aircraft, especially in a turn. Proximity to terrain and areas of poor GPS coverage also reduce the signal strength. Poor signal strength or quality has a pronounced effect on the altitude measuring capability of the System. The TRX-2000 returns to full functionality as soon as the GPS signal is strong enough.

4.4 Flight and Warnings

Targets (other aircraft), with an active FLARM compatible system or an active (being interrogated by air traffic control) transponder, are displayed on the connected MFD as soon as the targets are thought to be a possible threat. Which target is displayed and how targets are displayed is explained in the current issue of the TRX-2000 user manual.

The TRX-2000 was designed only to assist the pilot and may not always give reliable warnings. With the exception of periodically transmitting ADS-B Out transponders, it cannot identify transponder signals that are not currently being interrogated by air traffic control or are out of range of Secondary Surveillance Radar (SSR) stations.

The TRX-2000 gives no Resolution Advisories (RA). Which action, if any, is required remains the sole responsibility of the pilot in command. These actions should be based on proper airspace observation.

4.5 Signal Reception

FLARM compatible systems and transponders must be within range of the TRX-2000 for it to offer any warnings. The reception range is affected to a large degree by the attitude of the antenna and the relative position of the transmitting and receiving aircraft. Transmissions function on a line of sight basis. Terrain will block a transmission.

5.0 Performance

No change to the basic AFM.

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6.0 Weight and Balance

No change to the basic AFM.

7.0 System Description

NOTE

This supplement includes a general description of the integration of the TRX-2000 system in the AQUILA AT01-100 instrument panel. A complete description and extensive operating instructions are found in the Garrecht TRX-2000 user manual.

7.1 Introduction

The Garrecht TRX-2000 obtains position and velocity information from an integrated GPS unit. The position information is supplemented by an integrated pressure sensor. The system calculates the aircraft's anticipated position in advance and broadcasts this information every second as a digital message with a unique identification code. Almost simultaneously the signals from other FLARM systems are received, along with ADS-B, Mode-C and S transponder signals. The information broadcast and received is then compared to determine the expected relative positions.

If a possibly dangerous situation is anticipated, the TRX-2000 warns the user of the currently most dangerous target. If the TRX-2000 is attached to the audio system the warning is acoustic as well as visual, on its own display. As an option the warning can also be displayed on the Flymap L MFD.

The warning intensity depends on the time remaining to a possible collision, not the distance to the object. Due to system characteristics, the warning time is only a few seconds. More information on the warning times can be found in the current issue of the Garrecht TRX-2000 user manual.

TRX-2000 Systems communicate to each other using a proprietary and copyrighted transmission protocol from FLARM. Additionally, FLARM radio transmissions are protected against unauthorized interference. The frequency bands in use are regional.

7.2 Integration in the AQUILA AT01-100

The TRX-2000 is attached to the power supply of the AQUILA AT01-100 through the avionics bus. The system is protected by a push pull type circuit breaker labeled **Traffic Monitor**. The circuit breaker is located with the other circuit breaker on the right hand side of the instrument panel. The avionics bus is operated by the safety switch **Avionics**. Connected to the TRX-2000 unit are 3 antennas. The GPS antenna is attached to the mount below the instrument panel covering. The FLARM and ADS-B antennas are mounted below the fuselage.

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8. Handling, Servicing and Maintenance

8.6 Operation of Avionics

The TRX-2000 must be turned off while starting or shutting down the engine. During this phase voltage peaks can occur, which could damage the unit.

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