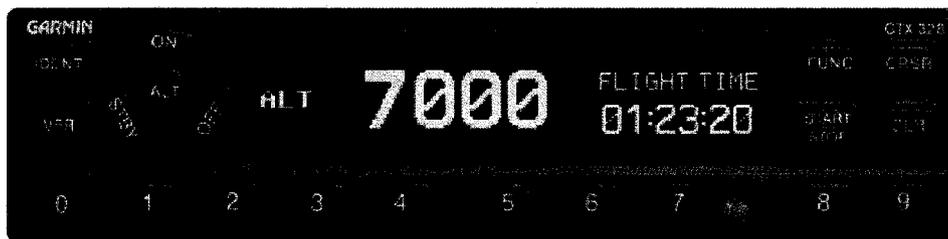


SECTION 9

Airplane Flight Manual Supplement AVE 20

Mode S Transponder GARMIN GTX 328

If the GARMIN GTX 328 Mode S Transponder is installed into the AQUILA AT01, this AFM-Supplement is applicable and must be inserted into Section 9 of the Airplane Flight Manual. The Information in this AFM-Supplement adds or replaces information of the basic Airplane Flight Manual.



The technical content of this Airplane Flight Manual Supplement is approved under the authority of DOA No. EASA.21J.025.

Schönhausen, 17/12/2007

[Signature]
D. Krappel
Office of Airworthiness

[Circular Seal: AQUILA Head of Airworthiness DOA EASA 21J.025]

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0.1 LIST OF REVISIONS AND AMENDMENTS

Revision	Reason for Amendment/Revision	Affected Pages	Date of Issue
A.11	Publication of AVE 16 to 21 (minor change AT01-00245)	all	30/11/2007

0.2 LIST OF EFFECTIVE PAGES

Page	Revision	Date
AVE20-1 to AVE20-10	A.11	30/11/2007

Page	Revision	Date

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1. GENERAL

This Supplement provides the information necessary for the efficient operation of the AQUILA AT01 when the Mode S Transponder GARMIN GTX 328 is installed. It contains a general description of the Transponder, its basic operation and its integration into the AQUILA AT01. For a detailed description of the Mode S Transponder GARMIN GTX 328 and full operating instructions, refer to the effective issue of the GTX 328 Pilot's Guide, P/N 190-00420-03.

The information contained within this Supplement is to be used in conjunction with the complete Airplane Flight Manual. Furthermore, the GTX 328 Pilot's Guide should always be carried on board of the aircraft during flight.

2. OPERATING LIMITATIONS

A connection of the GTX 328 with a TCAS collision avoidance system is currently not intended for the AQUILA AT01. The operating limitations of the basic Airplane Flight Manual apply without any changes or restrictions.

3. EMERGENCY PROCEDURES

TO TRANSMIT AN EMERGENCY SIGNAL:

- **ALT** Key: PRESS.
- Numeric Keys **0-7**: Select **7700** operating code.

TO TRANSMIT A SIGNAL REPRESENTING LOSS OF ALL COMMUNICATION (WHEN IN A CONTROLLED AIRSPACE):

- **ALT** Key: PRESS.
- Numeric Keys **0-7**: Select **7600** operating code.

4. NORMAL PROCEDURES

NOTE

The expected coverage of the GTX 328 is limited to the „line of sight“. Low altitude or aircraft antenna shielding by the aircraft itself may result in reduced range. Range can be improved by climbing to a higher altitude.

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AFTER ENGINE START

1. Avionic Master Switch **ON**

The transponder will switch into the standby (**STBY**) mode.
The transponder is activated but will not respond to any interrogations from the ATC Secondary Surveillance Radar.

BEFORE TAKE-OFF

1. Transponder Mode Selection Key **ALT**

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

NOTE

Pressing the Mode Selection Key "**ON**" activates only Mode A operation of the Transponder. The Transponder will respond to interrogations with the identification code only. The replies do not include altitude information.

AFTER LANDING

1. Transponder Mode Selection Key **STBY or OFF**

5. PERFORMANCE

No change to the basic Airplane Flight Manual.

6. WEIGHT AND BALANCE

The change of the empty weight and corresponding centre of gravity after the installation or removal of the GARMIN GTX 328 Mode S Transponder has to be determined and recorded in accordance with section 6 of the basic Airplane Flight Manual.

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7. SYSTEMS DESCRIPTION

GENERAL

The GARMIN GTX 328 panel mounted Non-Diversity 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 ground-based radar on a frequency of 1090 MHz. The GTX 328 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 selected transponder code, reply symbol and mode of operation, the GTX 328 screen also displays pressure altitude and timer functions. The unit also features an altitude monitor and a flight timer. A voice or tone audio output announces altitude deviation and count down timer expiration.

The GTX 328 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. To activate the Transponder, the **ALT/BAT**-Master Switch as well as the Avionics Master Switch has to be in the **ON** position.

GARMIN GTX 328 FRONT VIEW



TRANSPONDER MODE SELECTION KEYS

- OFF** Powers off the GTX 328. Pressing **STBY**, **ON** or **ALT** key powers on the transponder displaying the last active identification code.
- STBY** Selects the standby mode. When in standby mode, the transponder will not reply to any interrogations.

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ON Selects MODE A operation of the transponder. 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 operation of the transponder. In **ALT** mode, the transponder replies to identification and altitude interrogations, as indicated by the Reply Symbol ('R'). Replies to altitude interrogations include the standard pressure altitude received from an external altitude source (Altitude Encoder), 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 numeric keys (**0-7**) providing 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, removes the cursor and cancels 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 as well as for data selection in the Configuration Mode.

NOTE

The identification code should be entered carefully, irrespective if assigned by ATC, or using a standard transponder code.

Important Codes:

- 1200** - VFR code for any altitude in the US (Refer to ICAO standards)
- 2000** - VFR code commonly used in Europe (Refer to ICAO standards)
- 7000** - VFR code commonly used in Europe (Refer to ICAO standards)
- 7600** - Loss of communications
- 7700** - Emergency

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KEYS FOR OTHER GTX 328 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 the Configuration Mode. Pressing the **VFR** key again will restore the previous identification code.
- FUNC** Changes the page shown on the right side of the display. The displayed data includes Pressure Altitude, Flight Time, Altitude Monitor, Count Up timer and Count Down timer. In the Configuration Mode, pressing this key steps through the function pages.
- START/STOP** Starts and stops the Altitude Monitor, Count Up, Count Down and Flight timers. In the Configuration Mode, pressing this key steps through the functions in reverse.
- CRSR** Initiates starting time entry for the Count Down timer and cancels transponder code entry. Returns the cursor to last code digit if pressed within five seconds after code 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 if pressed within five seconds after code entry. Used also 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 also 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 also in Configuration Mode.

FUNCTION DISPLAY

PRESSURE ALT:

Displays the altitude data supplied to the GTX 328 in feet, hundreds of feet (i.e., flight level), or meters, depending on the configuration.

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FLIGHT TIME:

Timer start is configured as either Manual or Automatic. When Manual is configured, the flight time is displayed, which is controlled by the **START/STOP** and **CLR** keys. When Automatic is configured, the timer begins when take-off is sensed.

ALTITUDE MONITOR:

Controlled by the **START/STOP** key. Activates a voice alarm and warning annunciator when the altitude limit is exceeded.

OAT/DALT:

Displayed when the GTX 328 is configured with temperature input. Displays Outside Air Temperature and Density Altitude.

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 the 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 the Configuration Mode. Contrast is controlled by the **8** and **9** keys.

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 328 Configuration Mode.

TIMER OPERATION**TO OPERATE THE FLIGHT TIMER:**

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

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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 begin 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.
5. When the Count Down timer expires, the '**COUNT DOWN**' banner is replaced with a flashing '**EXPIRED**', and the time begins counting up.
6. Press **CLR** to reset the timer to the initial value.

AUTOMATIC ALT/GND MODE SWITCHING

If the GTX 328 is configured for Automated Airborne Determination, normal operation begins when lift-off is sensed. When the airplane is on the ground the screen automatically displays '**GND**'. The transponder does not respond to ATCRBS interrogations when '**GND**' is annunciated. When a delay time is set in the Configuration Mode, the GTX 328 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**'. When '**FAIL**' is annunciated no transponder data is transmitted.

GTX 328 MODE S TRANSPONDER FEATURES**MODE S DATA TRANSMISSION**

In addition to 4096 codes and pressure altitude, the GTX 328 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.
- **'Timer Expired':** for countdown time.

INTEGRATION INTO THE AQUILA AT01

The electrical circuits of the Mode S Transponder GARMIN GTX 328 are connected to the Avionic Bus of the on-board electrical power supply and protected by a 5 A circuit breaker which enables the complete disconnection of the Transponder unit from electric power. The circuit breaker is labelled with a placard denoted "**Transponder**" and installed in the right section of the instrument panel among the other circuit breakers.

Besides of the Transponder unit, which is installed in the avionic rack in the midsection of the instrument panel, a Transponder antenna and Altitude Encoder is part of the Transponder system. The Altitude Encoder is connected to the on-board Static Pressure System of the aircraft and is attached to a support bracket inside of the instrument panel. The Transponder antenna is installed on the lower surface of the cockpit structure below the co-pilot's seat.

For a detailed description of the integration of the Transponder unit into the aircraft and its connection to the on-board electrical system as well as its installation into the AQUILA AT01, refer to the effective revision of the Maintenance Manual of the AQUILA AT01, document no. MM-AT01-1020-100.

8. HANDLING, SERVICE AND MAINTENANCE

In order to increase the service life of the GTX 328 Mode S Transponder, it should always be deactivated during engine start-up and shut-down since electrical surges during the start-up may cause damage to the unit.

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