Filser Electronic GmbH

ATR-500

VHF COMMUNICATION TRANSCEIVER

OPERATION MANUAL

Manual Number 01.125.010.08

Contents

1 SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the ATR500 VHF Communications Transceiver including operating procedures.

Information relative to the installation can be found in the ATR500 Installation Manual. (Document Number 01.125.010.09)

Information relative to the maintenance, alignment , and procurement of replacement parts may be found in the ATR500 Maintenance Manual (Document Number 01.125.010.10).

1.2 Manufacture:

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1.3 DESCRIPTION OF EQUIPMENT

The ATR500 COM Transceiver consists electrically of five sections: Receiver transmitter board, AF Stage board, Antenna board, display circuitry, and the microprocessor board.

The ATR500 operates at 14VDC and features typical 6 Watts of transmitter power. It can also be operated down to 9VDC with reduced RF power (emergency operation).

The ATR500 has 25KHz receiver selectivity, and operating ranges of 118. 000 to 136. 975 MHz.

It is designed as a single block unit with 57 mm diameter for instrument panel or console mounting.

The ATR500 has the capability of programming up to 9 memory channel frequencies for later recall.

The ATR500 operates like any standard COM radio using an active and stand by display pattern.

To prevent accidental long term transmission the **transmitter turns off** after about two minutes automatically (for example, when a TX button becomes stuck ON).

1.4 TECHNICAL CHARACTERISTICS

SPECIFICATION	CHARACTERISTIC
JTSO ZULASSUNG:	JTSO-2C37e, ED-23B Class 4
:	JTSO-2C38e, ED-23B Class C
TSO COMPLIANCE:	TSO-C37d, RTCA DO-186A Class 4
:	TSO-C38d, RTCA DO-186A Class C
LBA Certification Number	**O.10.911/113 JTSO**
PHYSICAL DIMENSIONS:	
Height:	2.4 in (6,1 cm)
Width:	2.4 in (6,1 cm)
Depth (behind aircraft panel):	7.4 in (19 cm)
WEIGHT:	1,1 lbs (0,49 Kg),
MOUNTING:	Panel mounted, no shock mounting required
TEMPERATURE RANGE:	- 2 0 °C to +55°C with short tim e operation at +70°C
POWER REQUIREMENTS:	14VDC (9 to 15VDC)
Receiver:	0.1 A at standby, max. 0.5A
Transmitter:	average 2A, max 2.5A
FREQUENCY RANGE:	118.000 MHz to 136.975 MHz
FREQUENCY STABILITY:	0.003% from --20°C to +55°C
DESIGN:	All solid state, Printed circuit board and point to point wiring.

TRANSMITTER

POWER OUTPUT: 6 Watts typical
4 Watts minimum;

MODULATION: 70% modulation capability with 98% limiting.
Less than 10% distortion at 85% modulation.

SIDETONE OUTPUT: 100mW into 500Ω headphones

MICROPHONE: Standard carbon dynamic mic. containing
transistorized preamp. Must provide 100mVRMS
into 100Ω load, or Electret
(Mic. gain adjustment is provided,

HARMONIC CONTENT: Greater than 60dB down from carrier.

DUTY CYCLE: 2 minutes on, 4 min. off, auto-turn off after 2min.

RECEIVER

RECEIVER SENSITIVITY: 2.5µV(hard) will produce not less than 6dB
S+N/N   with 1KHz tone modulated 30%

RECEIVER SELECTIVITY:
      Class C, D   6dB bandwidth at not less than 8.0 KHz on each
side. 40dB bandwidth with no more than 17.0 KHz
on each side. 60dB bandwidth with no more than
22.0 KHz on each side.

RECEIVER OUTPUT: 4 W minimum into 4Ω.

AGC CHARACTERISTIC: From 10 µV to 10,000 µV audio output will not
vary more than 3dB.

SQUELCH: Automatic squelch (adjustable carrier--to--noise
setting) with manual disable.

SPURIOUS RESPONSES AND CROSS
MODULATION PRODUCTS: At least 80dB down.
INTERCOM INPUT: The mic. is connected to the intercom input. The
receiver is operational and mic. audio appears at
the audio output along with receive audio.
100mVRMS of mic. audio is required for 100mW
output.

2   Operating Instructions

All elements necessary to operate the transceiver are located in the front side of the unit. The switch of the headset microphones and display contrast adjustment are located at the side of the unit (to be adjusted once on initial installation).

2.1 Turn on/off

The "ON-OFF"-button is mounted on the left of the unit. The radio is active, when the button is pressed for a short time (0,5 sec.). To turn it off the button has to be pressed for more then 3 sec. Also a break in the master power (master switch) will turn off the radio.

After turn on, the display shows type of unit and software version.

```
ATR500
V1.0
```

For example Software version 1.0

2.2 INIT-Mode

```
EXIT    MIC
CON     INIT
```

To enter the INIT-mode to set all default values hold the "↔" button pressed in whilst turning the radio on. Then release the "↔" button. If desired factory settings can be restored by press "↕".

2.2.1 Microphone. level setting

```
EXIT    ST
 MIC : 05
```

To adjust the Mic. level (in the INIT-mode) press "**STORE**" to enter the Microphone menu. The indication MIC:05 shows the general and actual microphone level. If necessary adjust the Mic. level by turning the big **"Tuning"** knob (4). To proceed press "**VOL/SQ**" (EXIT). Factory setting is 16.

2.2.2 Display Contrast. level

The Contrast can be adjusted from 1 (min) to 32 (max). Press"↔" to

```
EXIT
CON : 16
```

enter contrast menu. If necessary adjust the Contrast level by turning the big **"Tuning"** knob (4). To proceed press "**VOL/SQ**" (EXIT). Factory setting is 16.

<table>
<tr><td>

127,50
M4

</td></tr>
</table>

To returnfrom the INIT mode in the normal operation mode press "**VOL/SQ**". The display shows the stored frequency in memory position for example 4.

2.2.2.1 Display Backlight adjustment

To set the Display backlight hold the "↕" button pressed in whilst turning the radio on. Then release the "↕"button.

EXIT		**EXIT**
LIGHT	press "↕" button	**LIGHT: 05**

The Display Backlight is controlled by the Aircraft Dimmer (Pin 4) but it might be necessary to adjust the Transceiver Backlight to the other avionic Units .

2.3 Volume control

The Volume mode is the next default selection
 (Display shows **VOL: 01** to **32**).
Push the "**VOL/SQ**" button once to get into the Volume mode. By turning the big **"Tuning"** knob (4) the Volume can be changed to the desired level. If an other Memory "**MEM"** position is selected the unit will go back to the default frequency select mode.

127,50 **VOL: 13**

To save this volume level as default, push the "**STORE"** button (6) while the Volume mode is active.

2.4 Squelch level control

The squelch eliminates noise in case of missing reception signals.
Push the "**VOL/SQ**" button twice to get into the Squelch mode.
(Display shows **SQ: 01** to **10**).

127,50 **SQ: 03**

 By turning the **"Tuning"** knob (4) the Squelch setting can be changed to the desired level. If an other Memory "**MEM"** position is selected the unit will go back to the default frequency select

mode. The normal Squelch setting is about 3 to 5. With higher settings weak signals may not be heard. The Squelch setting has no influence on the intercom although it still operates normally for an received signal.

The selected level is active until the Radio is switched off. To save this level as default push the "**STORE**" button (6) while the Squelch mode is active.

2.5 VOX level control for Intercom

It refers to the switching-**on** of the headsets, not to the transmission. Task of the VOX-function is to eliminate the background (cabin) noise during the Intercom mode while not speaking.

An electronic switch opens the intercom when the selected voice volume is reached. To assure correct function of this installation, headsets with nearly identical microphones should be used. The intercom function can be switched off by a separately installed intercom switch.

ATTENTION: If the Intercom switch is not installed the corresponding signal wire must be connected to the ground.

127,50
VOX: 03

Push the "**VOL/SQ**" button three times to get into the Intercom mode (Display shows **VOX: 01** to **10**).

By turning the **"Tuning"** knob (2) the Intercom setting (noise level to turn on the intercom by voice) can be changed to the desired level. The higher the selected value is, the louder you have to talk to open the Intercom VOX.

Note: The Volume control described in 2.2 adjusts the received signal only and not the Intercom level.

The selected level is active until the unit is switched off. To use this level as switch on default, push the "**STORE**" button (6) while the Intercom mode is active.

2.6 Memory selector

The memory selector "**MEM"** (7) is located in the upper middle of the unit. It is used for selecting previous stored frequencies or for saving a frequency (9 memories are available).

2.7 Selecting and storing a frequency

Turn the memory selector in the "**SET"** position between memory MEM1 and MEM9 (the white line on the memory selector shows downward). The upper line of the display shows the actual active frequency, in the second line the changeable frequency (stand-by) is displayed with <.

Setting a new Frequency or changing an existing Frequency
The standby Frequency (lower column) can be changed in the following way:

➢ With the ↔ button (3) select MHz- or kHz . A small arrow > on the display (9) indicates MHz- or kHz and can be changed by the **"Tuning"** knob (4).

➢ With the "↕ " button on the lower right side (5) this new frequency can be activated. When it is displayed on the upper line, the old active frequency is deactivated and displayed in the lower line.
It is possible to exchange the two frequencies by just pushing one button.

Storing a Frequency
1. Set the Memory "MEM" knob(7) in position "SET".
2. Select the desired frequency with the **"Tuning"** knob (4) in the Standby line. Switch with the selected frequency from the standby to the active line by pushing the "↕**"** bottom (5).
3. Turn the memory selector "**MEM"** (7) to **M** 1... **9** to where the new frequency is to be stored. Factory setting of the memories are test frequencies. Between MEM 9 an 1 the unit is in set to the operation mode "SET" (as described above).
4. By pressing the "**STORE"** button (6) the active frequency (shown in the **"SET"** mode in the upper line) is stored to the selected memory position.

2.8 Low-battery

If the battery voltage falls below 10,5V a „**B**" will be displayed in upper left corner. The operation of the unit can not be guaranteed thereafter (But do not worry in flight too much as the radio will still work down to only 9VDC).

2.9 Automatic frequency control

If the actual used frequency has an intolerable frequency drift a "**-**" will appear at upper right corner of the display. Than the transmitter can not be activated.
In this case the unit is not working properly and must be returned to the manufacturer.

Note: Sometimes the "**-**" message may be displayed for less than one second. This can be due to strong noise from outside the unit. This is <u>not</u> a malfunction of the ATR500.

2.10 Transmission mode

By using the transmitting key (PTT), the ATR500 will change to the transmit mode and transmit on the frequency shown on the display. When transmitting a "**T**" will be shown instead of the decimal point between the MHz- and kHz-value of the actual frequency. This enables the monitoring of the proper function of the device. By checking the Side-tone in the headphone you have a further verification of a proper transmission.
To prevent unintended long term transmission the transmitter turns itself off automatically after about two minutes.
If the auto turn off becomes active the indication changes from "**T**" to "**E**" (Extended) . To restart transmission release PTT and press again.

## 2.11 Receiving indication

As long as a receiving signal takes place or the squelch is open a "**R**" will be shown instead of the decimal point between the MHz- and kHz- of the actual frequency (upper line).

3   ATR500 Operating Controls

1. **"VOL/SQ" Volume / Squelch / VOX push button**
2. **"ON / OFF"push button**
3. **"↔"MHz / kHz push-button**
4. **Tuning-knob for Volume, Squelch, VOX and standby frequency**
5. **"↕" to Exchange standby frequency with active frequency**
6. **Store-pushbutton**
7. **MEM Select stored frequency**
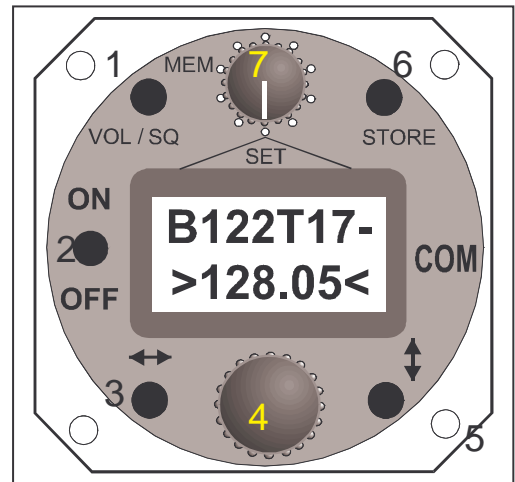
4   Dimensions
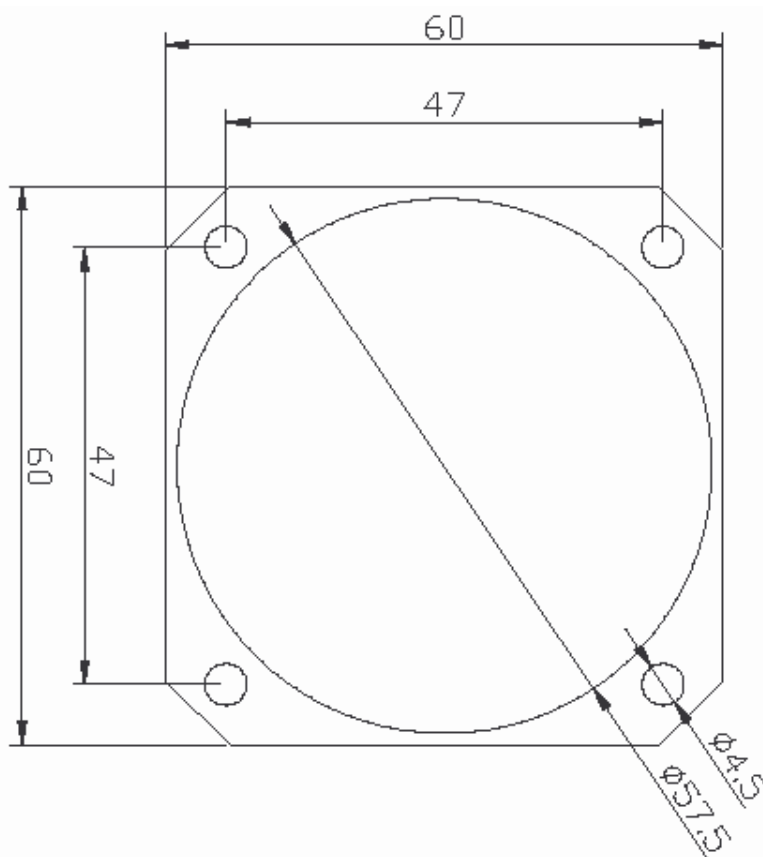
5 Approval

BUNDESREPUBLIK DEUTSCHLAND
LUFTFAHRT-BUNDESAMT

a member of

JOINT AVIATION AUTHORITIES

JOINT TECHNICAL STANDARD ORDER (JTSO) AUTHORISATION

Pursuant to the National Regulations for the time being in force and subject to the conditions specified below, the National Aviation Authority Luftfahrt-Bundesamt in accordance with the JAA Procedures for JTSO Authorisation hereby grants

Filser Electronic GmbH

Gewerbestr. 2

86875 Waal
LBA.G.0078

a JTSO AUTHORISATION
No. LBA.O.10.911/113JTSO

according to JAR-21, Subpart O and JAR-TSO,
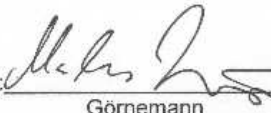JTSO-2C37e, -2C38e

for

ATR500
500-()-()
DDP 01.125.010.04 or subsequent revisions

CONDITIONS:

1. The JTSO Authorisation Holder is only authorised to identify an article with this JTSO marking whilst remaining in compliance with the conditions for the issue of this Authorisation.

2. This AUTHORISATION shall remain valid until surrendered, withdrawn or otherwise terminated.

Date of issue: 2003-04-25   Signed: _____
                                          Görnemann