BECKER
AVIONIC SYSTEMS

OPERATING INSTRUCTIONS

VHF Transceiver AR 3209

Subject to technical changes

Fault description

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Unit type :　　　　　　Serial number :
Aircraft type :
Brief description of the fault :
....
....
....
....

Should the fault only occur sporadically, please answer the following questions :

The fault occurs after . . . . . minutes of operation.
The fault occurs under the following environmental conditions :

- ❑　low temperature
- ❑　high temperature
- ❑　high humidity
- ❑　vibration

The fault is engine speed-dependent and occurs above/below . . . . rpm.
Should any problems arise, I may be contacted under the following adress :

....　I am available between 8 a.m.
....　and 4 p.m. under the following
....　telephone number :
.... office:　...................................
....private :　...................................

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REPAIR INSTRUCTIONS

If an equipment fault the unit may be sent to a Becker Dealer or the Becker customer service together with a description of the fault. The completed fault description shortens the repair times and hence lowers the resultant costs.

These operating instructions do not replace the equipment manuals listed below.

❒ **Equipment manuals**

to be purchased from the manufacturer or Becker Dealer :

Installation and Operation DV 37501.03, Article No.: 892.531-071
Maintenance and Repair DV 37501.04, Article No.: 892.548-071

❏   **General data AR 3209 - (09) / AR 3209 - (11)**

Frequency range	118.000 MHz to 136.975 MHz
Number of channels	760
Channel spacing	25 kHz
Operating temperature range	- 20° C to + 55° C
Dimensions	
Front panel	146 mm x 47.5 mm
Depth of unit without cable connector	194 mm
Weight	
- AR 3209 - (09)	1 kg
- AR 3209 - (11)	1.2 kg
Fuse internal	5 A

IMPORTANT

Carefully read these operating instructions right through before attempting to operate the VHF transceiver.

Keep these operating instructions carefully. They contain important safety and operating instructions for the VHF transceiver.

INTRODUCTION

Thank you for purchasing the BECKER VHF transceiver. The VHF transceiver can be installed in the instrument panel or centre console or operating console and is easy to operate. The technology used is to the state of the art.

To fully utilise the capabilities of your VHF transceiver, please carefully read these operating instructions right through before you start operating the set.

If you have any questions regarding the operation of the VHF transceiver, please get in touch with your nearest Becker Dealer or with the Becker Customer Service.with your nearest Becker Dealer or with the Becker Customer Service.

The CAUTION, WARNING and NOTE highlights have the following meanings :

WARNING	Failure to comply, or incorrect compliance, with these instructions or procedures can lead to injuries or fatal accidents.
CAUTION	Failure to comply, or incorrect compliance, with these instructions or procedures can lead to damage to equipment.
NOTE	Feature to which attention should be drawn.

CAUTION

- Never connect the VHF transceiver to alternating current voltage or to voltage sources exceeding 32 V DC.
- Never connect the VHF transceiver with reversed polarity to a voltage source.
- The installation or use of the VHF transceiver in ambient temperatures below -20° C or above +55° C is to be avoided.
- Switch off the unit when starting or shutting down engines.

Technical Data

Power supply voltage AR 3209 - (09)

Nominal supply voltage	13.75 V DC
Supply voltage range	12.4 V to 15.1 V
Emergency operation (10.0 V)	Good intercom

Power consumption without panel lighting

"Standby" reception mode	70 mA
Reception mode	500 mA
Transmission mode	2.5 A

Panel lighting	1 A at 5 V DC
	400 mA at 13.75 V DC

Power supply voltage AR 3209 - (11)

Nominal supply voltage	13.75 V DC
Supply voltage range	12.4 V to 15.1 V
Emergency operation (10.0 V)	Good intercom

or

Nominal supply voltage	27.5 V DC
Supply voltage range	24.8 V to 30.3 V
Emergency operation (20.0 V)	Good intercom

Power consumption without panel lighting

"Standby" reception mode	70 mA
Reception mode	500 mA
Transmission mode	2.5 A

Panel lighting	1 A at 5 V DC
	400 mA at 13.75 V DC
	200 mA at 27.5 V DC

❑   **Speaker muting switch ON/OFF**

Call up function SF 12 using the MDE key. The following displays appears :

Top line	SF12
Bottom line	OFF or On
OFF =	Speaker muting on
On =	Speaker always switched on

Select the function using the kHz switch. Store the required function by pressing the STO key. This selection becomes active after ending the service mode.

❑   **Indication the software version and change status**

Call up function SF 13 using the MDE key (4). The following displays appear :

left LC display (7)	Software version and change status : Microprocessor
right LC display (8)	Software version and change status : CO-Miroprocessor (PIC)

❑   **Ending of the service mode**

The VHF transceiver must be switched off to end the service mode.

SAFETY INFORMATION

● A speech test is to be performed before startup and it should be noted that if the speech test is carried out close to the ground station the results may be positive even if the antenna cable is broken or short-circuited. At a distance of 5 to 10 km no connection will be made.

● Use a loud voice for speech communication and hold the microphone close to the lips. Otherwise cabin noise can be intrusive and make understanding difficult.

● Use only microphones or headsets which are suitable for use in aircraft. In aircraft made of wood or synthetic materials or in gliders or helicopters, incoming radiation on the equipment antenna can affect the integrated amplifier of the microphone (feedback). This is noticeable in the ground station by whistling and/or heavy distortion. The described disturbances can occur in different ways on the different transmission channels.

● Transmit buttons can stick and cause continuous transmission. Therefore, when transmitting ensure that the green LED disappears when the transmission button is released.

❐   **Inhibiting the transmit mode for one or more**

memory channel

Call up function SF 10 using the MDE key (4). The following displays appear :

left LC display (7)   SF 10
right LC display (8)   CH channel number

Using the kHz (10) (steps of 1) or MHz (9) (steps of 10) switch, select the desired channel for inhibiting the transmit mode. Store the channel by pressing the STO key (3). Several channels can be selected on priority channels. When the STO key (3) is pressed again, the inhibiting transmit mode is canceled.

Blank

❐   **FSqL**

no function

Set any 4-digit numerical code using the kHz (10) (steps of 1) or MHz (9) (steps of 10) switch. Store the numerical code by pressing the STO key (3).

GENERAL INFORMATION

The VHF transceiver AR 3209 enables voice communication on 760 channels in the 118.000 MHz to 136.975 MHz range with a channel spacing of 25 kHz. It complies with the requirements of ICAO Annex 10 valid from 01.01.1995.

NOTE

As soon as a password is given a 0 appears in the bottom line when the service mode is called up. The numerical code must then be input using the MHz (9) or kHz switch (10) and press the STO key. If the VHF transceiver detects a false numerical code, it automatically switches to the last mode. If the password is to be erased or changed, this is done by calling up the service mode using the old password. The SF 15 function is then chosen and either a 0 is entered everywhere or the changed numerical code is entered.

The VHF transceiver is designed with sufficient mechanical strength to enable it to be fitted in an aircraft without any limitations. There is no restriction within the verified environmental classes on fitting in the instrument panel or centre console or operating console, or fixed mounting in the fuselage, of all types of aircraft including helicopter.

☐ **Setting the dynamic mike input sensitivity**

Call up function SF 9 using the MDE key (4). The following displays appear :

left LC display (7)   SF 9
right LC display (8)   00 bis 63   Standard value 32
                                 (LO sensitivity HI)

The dynamic mike input sensitivity can be changed upwards or downwards using using the kHz (10) (steps of 1) or MHz (9) (steps of 10) switch. The set value is stored by pressing the STO key (3).

CONTROLS AND INDICATORS
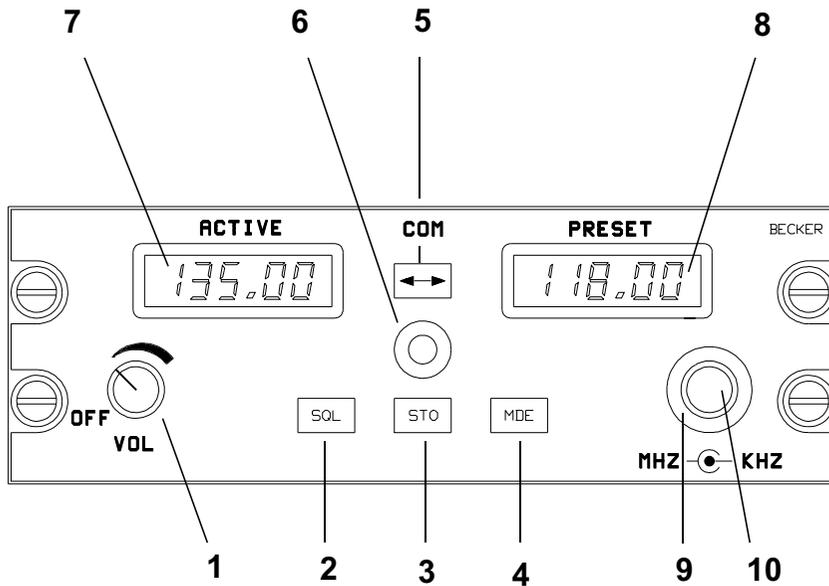
Function of controls and indicators

1   ON/OFF rotary switch   Adjustment of volume.

2   Squelch key   Switching the squelch on or off.

3   Store key   Storage of set frequency or other settings.

4   Function key   Selection of mode.

OFF =   The storage of frequencies in the individual channels is not possible. The VHF transceiver can only work on the set frequency.

ON =   Storage of frequencies in the individual channels is possible (standard setting)

☐   **Erase stored frequencies**

Call up function SF 7 using the MDE key (4). The following displays appear :

left LC display (7)	SF 7
right LC display (8)	CH channel number

Select the channel to be erased using the kHz (10) (steps of 1) or MHz (9) (steps of 10) switch. The stored frequency is erased by pressing the STO key (3). The channel No. 1 cannot erased.

☐   **Entry of password to interlock the equipment configuration**

Call up the COdE function using the MDE key (4). The following displays appear :

left LC display (7)	COdE
right LC display (8)	0

☐ **Release the frequency setting (channel selection only)**

Call up function SF 5 using the MDE key (4). The following displays appear :

left LC display (7)	SF 5
right LC display (8)	ON or OFF

Select the required function using the kHz switch (10) and store the function by pressing the STO key (3).

OFF =	Frequency setting not possible.
	The VHF transceiver can only work on the frequencies
	stored in the individual channels.
ON =	Frequency setting possible (standard setting).

☐ **Release the frequency storage**

Call up function SF 6 using the MDE key (4). The following displays appear :

left LC display (7)	SF 6
right LC display (8)	ON or OFF

Select the required function using the kHz switch (10) and store the selection by pressing the STO key (3).

5	Exchange key	Mode 2: Exchange of preset frequency and active frequency.
6	LE diode, green	Transmit indication (PTT button pressed).
7	LC display	Indication of active transmission/ reception frequency (active frequency).
8	LC display	Indication of preset transmission/ reception frequency (preset frequency).
		CH indication steady : Indicates the storage channel. CH indication flashes : If the initiated storage operation is not completed by pressing the store key.
9	Frequency selector switch	Switching the indicated switch frequency in 1 MHz steps or the storage channel upwards or downwards in steps of 10.
10	Frequency selector switch	Switches the indicated switch frequency in 25 kHz steps or the storage channel by 1 step in each case upwards or downwards, without carry over.

OPERATING INSTRUCTIONS

☐ **Switching on the unit**

<div style="border:1px solid; background:#f5e7a0; padding:5px; text-align:center">CAUTION</div>

Do not switch on the VHF transceiver when engines are being started or shut down.

Switch on the VHF transceiver using the ON/OFF rotary switch (1) (rotate volume control clockwise). Both LC displays (7, 8) must show the numbers 188.88 flashing (unit test approximately 2 seconds).

If the test is positive, the transceiver automatically switches to the mode which was selected before switch-off.

If the test is negative, the LC display (7) flashes for approximately 5 seconds.

A fault report can be called up by pressing the store key. After approximately 5 seconds the transceiver automatically switches to the mode which was selected before switch-off. The fault report in the display can be interrupted by pressing the STO key (3).

The following fault signals are possible :

- ● E1 Processor defective
- ● E2 Synthesizer failed
- ● E3 Fault in EE-PROM
- ● E4 Controller (PIC) audio assembly defective

☐ **Setting the audio auxiliary level**

Call up the AU function using the MDE key (4). The following displays appear :

left LC display (7)	AU
right LC display (8)	00 to 63 Standard value 63
	(LO level HI)

Using the MHz switch (9) the audio auxiliary level can be altered upwards or downwards in steps of 10 and using the kHz switch (10), you can be altered upwards or downwards in steps of 1. The set value is stored by pressing the STO key (3).

☐ **Setting the IC level**

Call up the IC function using the MDE key (4). The following displays appear :

left LC display (7)	IC
right LC display (8)	00 to 63 Standard value 32
	(LO level HI)

Using the MHz switch (9) the IC level can be altered upwards or downwards in steps of 10 and using the kHz switch (10), you can be altered upwards or downwards in steps of 1. The set value is stored by pressing the STO key (3).

❒   **Setting the squelch threshold**

If function SqL is called up, the following displays appear :

left LC display (7)   SqL
right LC display (8)   00 to 200   Standard value 100
    sensitivity   (HI < -> LO)

Using the MHz switch (9) the squelch threshold can be altered upwards or downwards in steps of 10 and using the kHz switch (10), you can be altered upwards or downwards in steps of 5. The set value is stored by pressing the STO key (3).

❒   **Setting the sidetone level**

Call up the SIdE function using the MDE key (4). The following displays appear :

left LC display (7)   SF 2
right LC display (8)   00 to 63 Standard value 32
    (LO level HI)

Using the MHz switch (9) the sidetone level can be altered upwards or downwards in steps of 10 and using the kHz switch (10), you can be altered upwards or downwards in steps of 1. The set value is stored by pressing the STO key (3).

The various modes are comprehensively described, toghether with the setting of the equipment configuration in the service mode, in the Annex to the General Operating Instructions.

❒   **Transmit/receive mode**

Set the frequency of the local ground station in the preset display and press the exchange key (5). Rotate the VOL control (1) to the centre position.

NOTE
If the error message E2 appears in the left indication during operation, the synthesizer is not latching and further R/T operation is no longer possible. The VHF transceiver must be checked in the next service station.

Operate the transmit button and call the ground station. Hold the microphone close to the lips for optimum speech transmission.

NOTES
The green LED (6) indicates transmit mode. During transmission a protective circuit prevents a frequency change or frequency channel change even if the frequency selector switch (9, 10) is rotated. The keying functions on the control panel are also inhibited.

Where there is acoustic feedback during transmission the side tone volume on the VHF transceiver must be turned down (refer to Service Mode for adjustment).

Set the correct reception volume using the VOL control (1) whilst the ground station is answering.

Switch on the squelch (2) (press SQL key again). Weak reception signals and reception noises are suppressed. The switch-on threshold of the squelch can be set in the service mode.

NOTES

When changing the mode or the frequencies (PRESET-ACTIVE frequency) the change is automatically stored 2 seconds after the last change took place. Due to this delay changes which were made immediately before switching off the transceiver will not be memorized. Exception: Memory actions are stored by pressing the STO key (3).

☐ Operation of intercom mode

Switch on the IC switch (external). Operate the intercommunication (IC). If necessary, the IC volume can be adjusted to the noise level of the aircraft (for adjustment refer to service mode).

☐ Calling up the service mode

Switch off the VHF transceiver. Hold the MDE key (4) pressed and at the same time switch on the unit. The VHF transceiver switches to the service mode without a unit test. S^{q}L appears in the left LC display (7) and the switch on threshold of the squelch is shown on the right LC display (8).

NOTES

● The settings S^{q}L to Spec. no.: are selected in steps by briefly pressing the MDE key (4) in the service mode. If the MDE key (4) is pressed at the end of the setting Spec. no.:, the setting S^{q}L then appears. If a direct return to the S^{q}L setting is required the MDE key (4) must be pressed for at least one second.

● In the service mode the VHF transceiver operates independently of the settings on the control panel, on the frequency which was last set as the active frequency.

● The user can interlock his equipment configuration settings with the aid of a password. The VHF transceiver is delivered from the factory without a password. Section COdE "Entry of password for interlocking the equipment configuration" describes how to enter a password.

SF7	Erasure of stored frequencies
COdE	Entering a password to interlock the equipment configuration
SF9	Dynamic mike input sensitivity
SF10	Inhibiting the transmit mode for one or more memory channel
FSqL	no function
SF 12	Speaker muting switch ON/OFF
—.—	Indication the software version and change status

NOTE

The standard values for the equipment configuration SqL, SIdE, AU, IC and SF9 are stored in the EE-PROM. If reversion to the standard values is required, the portable VHF transceiver must be switched off and switched on again by simultaneously pressing the STO (3) and MDE (4) keys.

☐ **Audio auxiliary input**

A second and third radio unit (navigational receiver) can be monitored simultaneously via the Audio auxiliary input. During transmission the auxiliary input is switched off from the Audio end amplifier. If necessary, the input sensitivity can be matched to the noise level of the aircraft (for setting refer to service mode).

☐ **Jamming of transmit button**

The VHF transceiver is fitted with a protective circuit to protect against jamming of the transmit button or a short circuit on the key supply line. For continuous transmissions exceeding two minutes the protective circuit automatically switches from transmission to reception. This avoids the switched channel being blocked.

It is possible to activate the transmitter again immediately by re-pressing the transmit button. In the event of a fault, this is only possible after the short circuit has been cleared or the transmit button released.

> **CAUTION**

In Stock to be able to continue transmitting even with the transmit button jammed, the VHF Transceiver must be switched off and then back on again. After that the VHF transceiver then continues to operate in the transmit mode for a further two minutes.

Operation of the various modes

The VHF transceiver performs various functions which are covered by individual operating modes. The mode is selected by briefly pressing the MDE key (4).

☐ **Modes**

1　Indication of active frequency in the left LC display (7).
　　The right LC display (8) is switched off.
　　The active frequency can be directly changed using the frequency selector switches (9, 10). Frequencies can also be stored in the individual storage channels.

2　Indication of active and preset frequencies.
　　The preset frequency can be set using the frequency selector switches (9, 10). When the exchange key (5) is pressed the active and preset frequencies are interchanged.
　　Further activation of the key reverses the frequency change. Frequencies can also be stored in the individual storage channels.

3　Display of the storage frequencies in the storage channels and storing frequencies in the storage channels.

4　Service mode, for setting the equipment configuration.

In mode 3 (channel selection mode) the actuelly memoried frequency in the left display (7) becomes active frequency

Note
It is not possible to erease memory channel 1, channel 1 only can be over-written.

Leaving the mode

Press the MDE key (4) to leave the mode 3.

☐ **Service mode (equipment configurations)**

Note
The service mode is meant to enable the ground technicians to set the equipment configuration and must not be used in flight.

The following settings can be changed or set :

SqL	Setting the switch-on threshold of the squelch
SIdE	Setting the sidetone volume
AU	Setting the audio auxiliary volume
IC	Setting the IC volume
SF5	Inhibiting the frequency setting (channel selection only) (ON/OFF)
SF6	Inhibiting the frequency storage (ON/OFF)

❐   **Mode 3 (Displays of fixed frequencies in the various channels)**

Channel selection mode

Select the mode using the MDE key (4). The last indicated storage channel appears in the right LC display (8) and the stored frequency in the left LC display (7). The VHF transceiver is ready to transmit and receive on this frequency.

```
  ACTIVE      COM       PRESET
┌─────────┐  ┌───┐   ┌─────────┐
│ 135.00  │  │ ◄►│   │  CH 01  │
└─────────┘  └───┘   └─────────┘
```

Select the required channel using the kHz frequency selector switch (10) (steps of 1) or MHz frequency selector switch (9) (steps of 10).

NOTE
The VHF transceiver is always ready to transmit and receive on the frequency shown in the left "ACTIVE" display.

Storage process

Pressing the STO key (3) activates a storage process as described in Mode 1 (with a slight change).

In Modes 1 and 2 the frequency shown in the left LC display (7) remains active regardless of the storage process.

NOTE
When changing the mode or the frequencies (PRESET-ACTIVE frequency) the change is automatically stored 2 seconds after the last change took place. Due to this delay changes which were made immediately before switching off the transceiver will not be memorized. Exception: Memory actions are stored by pressing the STO key (3).

❐   **Mode 1**

Standard mode

The left LC display (7) indicateds the active frequency. The right LC display (8) is switched off.

```
  ACTIVE      COM       PRESET
┌─────────┐  ┌───┐   ┌─────────┐
│ 135.00  │  │ ◄►│   │         │
└─────────┘  └───┘   └─────────┘
```
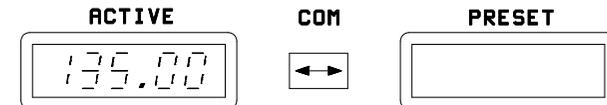
The active frequency can be changed with the MHz and kHz frequency selector switches (9, 10).

Storage operation

Press STO key (3). The active frequency remains displayed in the left LC display (7), the VHF transceiver is ready to transmit and receive on this frequency. The active frequency appears flashing in the right LC display (8).

The required frequency can be set using the kHz frequency selector switch (10) and MHz frequency selector switch (9).

Press STO key (3). The next free channel is shown flashing "ch". Press the STO key (3). The selected frequency is stored in the free speaker channel and the storage process is ended.

A no memory channel is free, the highest assign memory channel is selected automatically or select the channel to be overwritten using the kHz frequency selector switch (10) and press the STO key (3). This means that this channel will be overwritten with the new frequency and the storage process ended.

NOTE

If no input takes place within approximately seven seconds, the VHF transceiver switches to the previously set mode.

Leaving the mode

To leave the mode, press the MDE key (4).

☐ **Mode 2**

Select mode 2 using the MDE key (4). The last indicated active and preset frequencies in each case are displayed in the right (8) and left (7) LC displays.
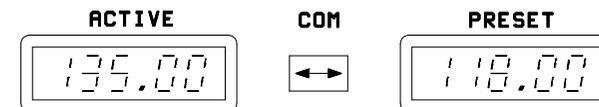
The preset frequency (right LC display (8)) is set using the MHz and kHz frequency selector switches (9, 10).

Press the Exchange key (5) to effect an exchange from the active to the preset frequency. Further activation of the key reverses the frequency change.

Storage process

Pressing the STO key (3) activates a storage operation as described in Mode 1. The preset frequency appears flashing in the right hand LCD.

Leaving the mode

Press the MDE key (4) to leave the mode.