

User Manual



ECC-basic and ECC-silence hands free
system for ear protection caps,
as well as ECC hand-held

Congratulations!

Now you are in possession of a high-quality device from our special-development. This was designed, manufactured and tested down to the last detail with the latest technology.

Surely, you would like to fully exploit the technical possibilities of your device, so please pay close attention to the operating and installation instructions in your own interest.

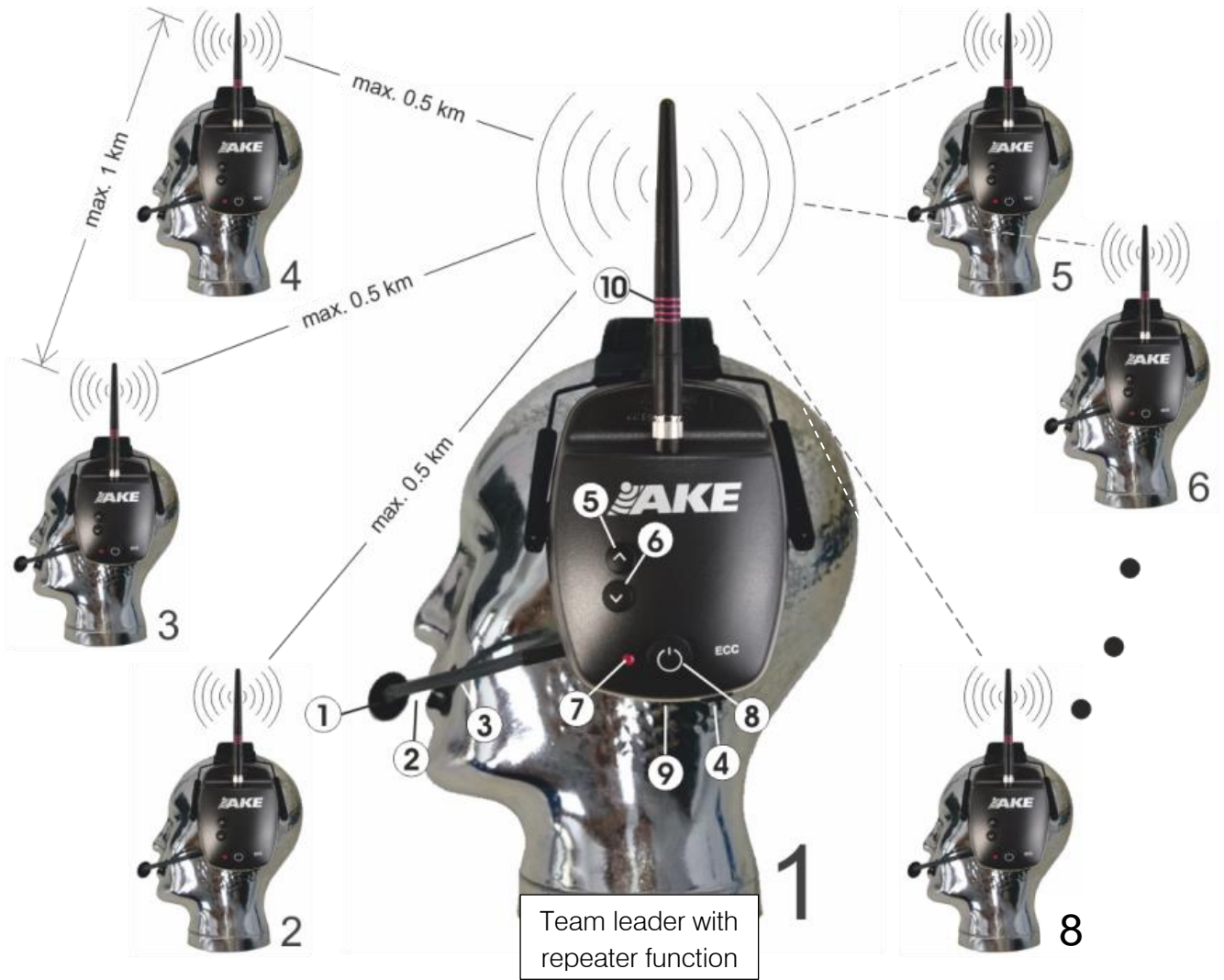
The necessary handles are not complicated. If you still have questions, please contact your dealer or directly us.

We are happy to advise you.

Your AKE-team

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Illustration



Conference participants

Swap participants

Fig .: Team of an ECC hands-free system in ear protection, here **ECC-silence** with headband.

- ① Noise compensating close talk microphone (Signal microphone)
- ② Marking for speech direction
- ③ Flexible microphone boom
- ④ Charge connection
- ⑤ Volume plus
- ⑥ Volume minus
- ⑦ Function display
- ⑧ On- / Off- and multifunction button (MFB)
- ⑨ Microphone for ambient noise control
- ⑩ Interchangeable antenna

Important! Before you start the installation, please read the following lines carefully and observe the respective safety instructions!

Application examples

The **ECC** hands-free system offers a full duplex multi-user communication system developed by **AKE** and, optionally, a standardized Bluetooth® interface.

The **ECC** hands-free system allows up to eight participants to be paired per team. At the same time, four participants can talk and hear (full-duplex) without any operation. **ECC-silence** also supports swap operation for all paired participants, see page 8 for details.

The main field of application of the **ECC** hands-free system is especially for difficult work in the team and in the field of view of the participants.

An observer outside the danger zone can warn the endangered person at any time - even if that person is currently speaking! The hands remain free to hold on, for example in case of danger of falling. Thus, help can be called in immediately in extreme danger situations.

The **ECC-hand-held** is suitable for applications without hearing protection, e.g. crane drivers.

An optional integrated Bluetooth® interface enables the wireless connection of the following Bluetooth® devices (combination A, B or C):

A	Mobile phone and audio player
B	Two-way-radio and audio player
C	Smartphone

Commissioning of the full-duplex team hands free connection

The **ECC** hands-free systems (**E**asy **C**onnect **C**ommunication) developed by **AKE** are extremely easy to connect wirelessly. Once paired devices connect automatically. Please pair **new devices** once as follows:

In two easy steps to the destination: (For more than 4 team members, see details on page 8.)

1. Turn on **all** the devices of a team in a timely manner by briefly pressing the multifunction button ⑧ for all of them - indicated by a fast alternating flashing (red / blue). [● ●]
2. Make **one** device to a team leader system, by briefly pressing the plus button ⑤ once – Displayed by slow alternating flashing (red / blue). [● ●]

The connection will now be made automatically within 30 seconds. A short beep (low / high) indicates that the respective speech connection is active. The selected team composition is saved automatically. Repeat this procedure if not all devices are connected.

To switch off, press and hold the multifunction button ⑧ until the "Power off" announcement.



From now on you only need to switch on the devices for hands-free operation
(with automatic conference hands-free operation for three or more devices)

If desired, the speech connection can be switched to standby and also activated again by briefly pressing the multifunction button ⑧ once in each case.

Display:

Device when pairing ● ●	Member is paired ●	Team leader is searching — ●	Connection active ● ● ●	Connection stand by ●
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On request, individual settings can be made, see section: "System settings".

The optimal noise cancellation

Whenever ear protection capsules are used in workplaces with high noise pollution, sufficient sound insulation (the HML or SNR value) must also be ensured with built-in electronics.

The **ECC** hands-free system from **AKE** offers a number of measures in order not to exceed the permissible signal level of 85 dB (A) at the ear.

- Ambient noise recorded while speaking is effectively reduced by using a special noise canceling close talk microphone.
- If necessary, the microphone can be locked or released by pressing the volume plus and minus key together.
- When installing the electronics, it will be ensured that the sound insulation of the capsule is not reduced, but is usually improved (observance of the SNR value according to the guidelines, details see technical data of the used hearing protection capsule).

Additionally at **ECC-silence**:

- An electronically controlled, active outside noise control ⑨ also allows hearing the acoustic environment information with hearing protection and locks it automatically and immediately when the permissible volume at the ear is exceeded.
- An electronic speech recognition activates the signal microphone ⑩ only when spoken. During pauses, the microphone signal is blocked to 100%.



Electronic Speech Recognition

To get the most out of the benefits of noise cancellation, the microphone will only turn on when it's close to the mouth. The sound entry opening is marked; this should be located towards the mouth.

For control, you hear your voice, when the microphone is on, left as a "side tone" with reduced volume. This function can be switched off for special applications.

Please note that the noise insulation will only be guaranteed in the long term if an authorized specialist company installs and maintains the electronics. Use the **AKE** premium service.

Shading and range

The practical range depends on many factors. In free field can be achieved under ideal conditions to over 1 km. For strong shadows, e.g. through reinforced concrete walls, the range can, however, drop to a few meters.

In practical operation, even obstacles between 100 and 500 m are possible on level terrain, from three devices, through integrated repeater operation, accordingly more range. In battery saving mode, the range is reduced, see section: "System settings".

Exiting the receiving area is indicated acoustically and the search starts.
After returning within 15 minutes, the voice connection is automatically reconnected.

Thereafter, the search of the partner is terminated, but it can be reactivated by the team leader at any time by pressing the multifunction button ⑧ for about one second.

Display

Both, leaving the receiving area, as well as the search, are optically signaled.

Out of range ●● 15 sec. then ●	Team leader is searching —●
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Adjusting the range by selecting the antenna

The following comparison values apply to the approximate range depending on the type of antenna used compared to the standard antenna (*Art.-No., Type, Length, Range*):

<i>Art.-No.</i>	<i>Type</i>	<i>Length</i>	<i>Range app.</i>
14129	Stub antenna, for close range	30 mm	50 %
14141	Standard antenna , is sufficient in most cases	110 mm	100 %
14153	Long antenna, for long range	190 mm	150 %
14191	Special antenna, for stationary use	370 mm	>200 %

Increase the range via repeater function

Each ECC system in which the team leader has been activated can be used as a repeater to increase the range (up to factor 2) in connection with two other devices.

Increase the range via external devices

You can combine the ECC system to increase the range with a two-way-radio, with integrated Bluetooth® interface or with an external Bluetooth® adapter.

If all call partners have a mobile phone with a Bluetooth® interface, a voice connection can also be established via the GSM network with the appropriate range

If only two systems are used, you can skip the following section.



Hands-free mode with more than two systems in a team

With more than two participants, it is advisable – as in a telephone conference – to maintain discussion discipline, which is all the more important the more people are in the team. For large teams, we recommend limiting the conference to a maximum of four participants.

Especially in dangerous situations, it is important for a team leader to take over the leading of the conversation. Therefore each ECC hands-free system is equipped with a special "team leader" function. In this operating mode, the system offers important advantages for team management, allowing the team leader to control conversations.

- The Team leader coordinates the conversations and maintains the voice connection.
- The connection is made in a star shape, with the Team leader in the center.
- If one or more participants of the team are on standby, the Team leader can at any time with one click on his multifunction button Ⓢ restore the voice connection to all.
- The team leader can act as a repeater, e.g. by using this occupies a locally elevated position. This can increase or even double the reach between the participants.
- The team leader automatically checks the authorization of the participants and thus protects against eavesdropping by unauthorized persons.

Subsequent pairing of further team members

Switch off all ECC systems. Then put the team leader into pairing mode by pressing the multifunction button Ⓢ for one second when switching on, *Display:*   Pairing active.

Switch on the new device to be paired. The new participant is automatically added to the team after successful pairing. Repeat this procedure for all new devices to be paired.


To remove paired devices, see page 14 "Secure deletion of existing pairings and settings".

Connecting latecomers or temporarily switched off devices


All devices of a team connect automatically when they are switched on one after the other

within 2 minutes each.

After this time, the connection can be made manually as follows:

- a) *If the team leader is already switched on:* By pressing the multifunction button ⑧ for approx. one second (manual search) when the speech connection is active. The search is optically signaled to the team leader, **Display:**  Search active.
- b) *If the team leader is later switched on:* By pressing the multifunction button ⑧ for about one second at all other team-members.

Hirarchie change (team member becomes team leader) (Only available at ECC-silence)

Only switch on the team leader device, red-blue alternating flashing  and briefly press the Minus key once. This deletes the team leader function. Then switch on all participants promptly and turn a device into a new team leader / repeater by briefly pressing the Plus key once - all connections will now be established within approx. 30 seconds. If the device was not yet a team leader, it first goes into pairing mode and saves the new team composition.



Note that only **one** team leader at a time may be in the team!
We recommend labeling the team leader device accordingly.

Multiple team leaders work alternately (Only available at ECC-silence)

Any number of team leader devices can be paired with the team and then alternately connected to the team. To do this, switch off the old team leader device and then quickly switch on the new team leader device. The devices connect automatically.

Automatic swap for additional employees (Only available at ECC-silence)

If you have paired more than four devices, all others devices can be connected in swap mode:

- Turning off a device connected to the team leader
- Switching on a paired but not currently connected device (within 2 minutes)





The team leader device now automatically connects the new entry with the team.

Commissioning of the Bluetooth® -interface

The integrated Bluetooth® interface enables the wireless connection of a smartphone, etc. with the profiles HFP and A2DP (recommended from version 4.0).

Pairing with a Bluetooth® device

Switch on only one **ECC** hands-free system by briefly pressing the multifunction button ⑧ red and blue alternating flashing indicates the pairing-  or search mode  . Bring the Bluetooth® device to be paired into pairing mode as well. The **ECC** system remains in pairing readiness for other Bluetooth® devices for one minute, as long as it is not connected to any other **ECC** device.



If other **ECC** units are connected,
You should turn it off when pairing with other Bluetooth® devices.

For menu-driven phones, you'll typically find the option "Search for nearby Bluetooth devices". If you select this function then the **AKE ECC** system should be displayed for pairing. If you are asked for a password after confirming, enter 0000. For instructions on pairing Bluetooth® devices, refer to their respective manual.

After successful pairing, the alternating flashing is ended. Now switch off your **ECC** unit. The next time you switch on all paired devices are automatically connected. Note that the phone must be set to "auto-connect".



Do not pair the same phone with two **ECC** systems in the team, otherwise operating problems are possible!

Use with smartphone, etc.

Display:

• Call active

•• Stereo active

••• Mobile stand by

Accept phone calls

Shortly press the multifunction button Ⓢ once. At many mobile phones it is possible to activate the automatic call acceptance. This would reduce the handling to a minimum.

Reject incoming phone calls

During an incoming call, briefly press the multifunction button Ⓢ 1 sec. to reject the call.

End phone calls

Shortly press at the multifunction button Ⓢ or just wait until your calling partner hangs up, the connection will automatically end.

Making phone calls

If you wish to make phone calls, you have to enter the phone number at your mobile phone or use redialing.

Activate and deactivate audio player (only required for team operation)

Press the multifunction button Ⓢ with a short double-click to switch the audio player on or off and to pause or reactivate the team connection.

Start and stop music

Press the multifunction button Ⓢ once to start or stop the music.

Adjust the volume

The volume can be adjusted separately for each operating mode both on the **ECC** system and on the mobile phone. When the highest or lowest volume is reached, a corresponding beep sounds.

Connect devices automatically

Not all mobile phones automatically connect, when they are switched on, the connection can then be activated via the mobile phone menu. If the mobile phone is already switched on, the Bluetooth electronics of the **ECC** system tries to establish the connection automatically when switching on. Some cell phones then require a confirmation.

Voice control (not available on all devices)

Press the multifunction button Ⓢ for about 1 second to start the voice control. For many devices, you will now have to wait for the ready tone next to the confirmation tone, then clearly state the required command (see the operating instructions for the connected device).

Other, every 30 sec. 2 short low tones: connection to the mobile phone interrupted.

Team hands-free operation in combination with a smartphone, etc.

During the music operation or during a telephone conversation, the speech connection to other team members is blocked. In case of a request from the team, the voice connection will be automatically restored in the case of music operation; a call waiting tone will be

transmitted during telephone operation. A control tone indicates if the internal speech connection is active again.

Due to the higher priority of the team leader, there are differences in the operation of the team members.

	<i>Team member</i>	<i>Team leader</i>
Team function in music or phone operation	The speech connection to the team will be interrupted. The connection between the team leader and the other team members remains	The team talk will be ended, all other team members go to standby
Talk request and return to the team with music	The team leader can always reconnect to all team members by briefly pressing the multifunction button ⑧	The team leader can always reconnect to all team members by briefly pressing the MFB*⑧
Talk request during a call	Each team member can knock on the team leader by briefly pressing the multifunction button ⑧	The team leader can knock on all team members at any time by briefly pressing the MFB*⑧
Return to the team on a phone call	A click on the multifunction button ⑧ ends the phone call and the team member is again connected to the team	A click on the MFB*⑧ ends the phone call and the team leader is again connected to the team

*) MFB: Multifunction button



The team leader coordinates the conversations and maintains the voice connection. He should neither make phone calls nor listen to music in security-relevant situations.

Display:



Call active



Stereo active



Team voice connection

If desired, e.g. For security reasons, the Bluetooth® connection can be locked for Team Hands-Free Operation, see section "System settings".

Care of the device and charging the battery

The capsule can be cleaned with a damp cloth and some liquid dish washing detergent. Should water penetrate, switch off the device immediately. Remove padding and foam for cleaning and drying. Store the device in a dry place!

Do not forget to charge the integrated lithium-ion battery at least every 3 months, as well as before use. To do this, connect the USB plug to a USB charging adapter or a PC. No guarantee in case of inadmissible voltage at the charging connection!

The function indicator ⑦ lights up red during charging and changes to blue when the battery is full. The electronics then automatically go to trickle charge.



Never use the **ECC** hands-free system while charging!

If the battery has not been charged for a long time, it is possible that it is deeply discharged. The **AKE ECC** electronics tries deeply discharged batteries again to regenerate, the load control then will blink until the battery is ready to charge again. If the battery cannot be recharged, it must be replaced.

Display:



... Battery regenerate



battery is charging



battery is full

If you do not need the maximum range, we recommend reducing the output power so that you can double the Battery discharge time, see section "System settings".

System settings using the buttons

Turn on only one device – as long as the display alternately flashes blue and red, you can change the settings:

Plus-button ⑤ push 1 x briefly:	Activates the team leader operation
Minus-button ⑥ push 1 x briefly:	Deactivates team leader operation
Plus-button ⑤ short double-click:	Activates High-Power mode for maximum reach*
Minus-button ⑥ short double-click:	Activates power saving mode with shorter range*
Press Plus & Minus together 1 x briefly:	Switches the microphone on and off*
Multifunction button ⑧ short double-click:	Reset to factory settings and power off

Additionally at ECC-silence:

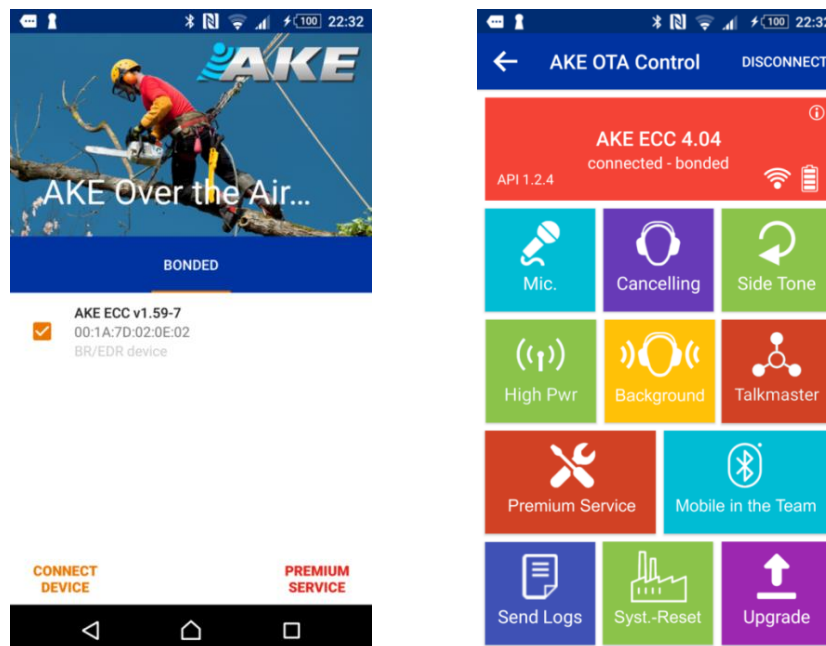
Plus-button ⑤ push for 1 second:	Activates or deactivates background noise control *
Minus-button ⑥ push for 1 second:	Activates or deactivates speech recognition & side tone *

*) Tone low / high: Function is activated, tone high / low: Function is deactivated. Switching is possible during operation.

System settings, Premium-Service and Upgrade over App

- *Simple operation on the device and still individual system settings possible.* With the Over The Air Control App you can easily make the appropriate adjustments to the respective work environment, background noise, etc.
- *You need technical help?* With the Over The Air Control app you can request the manufacturer premium service.
- *Keep your ECC system up to date.* With the Over The Air Control app, you can upgrade wirelessly with any Android phone.

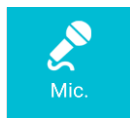
The Over The Air Control App



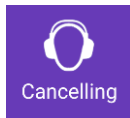
Download the latest **AKE Over the Air Control App** from **Google-Store** or from the homepage **www.ake-elektronik.de** to your Android phone and install it. Connect the **ECC** to your mobile phone via Bluetooth® and open the App. Activate the displayed connection **AKE ECC ...** and select **CONNECT DEVICE**.



In the first field, various device information such as device name, software version number, Bluetooth address, battery charge level, battery mode, receive field strength and more can be queried.



Deactivates the signal microphone ①, if desired. Ambient noise via the signal path is then 100% blocked. It is best if the subscriber only receives messages.



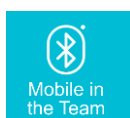
Only **ECC-silence**: Electronic speech recognition, the noise-compensated signal microphone ① only switches on when speaking. Surrounding sounds via the signal path are 100% locked during the speech pauses.



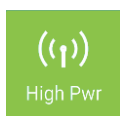
Activates the "side tone". This allows the acoustic control of the electronic speech recognition via the left speaker (should always be switched on, if the electronic speech recognition is active, see above)



Enables the activation or deactivation of the team leader mode, with the deactivation all team settings are deleted and recreated with the activation, see section "Changing the team composition"



Activates the permissibility of a Bluetooth® connection to the mobile phone, especially in teamwork (always permitted in individual operation). Disable this setting if mobile phone operation is not allowed in teamwork.



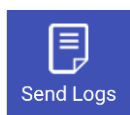
Activates or deactivates the power saving mode. Low-power mode doubles the battery life with reduced range.



Only **ECC-silence**: Allows to register the outside noise also with ear protection. If the permissible volume is exceeded, the ambient noise is automatically blocked.



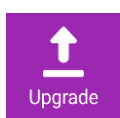
Starts the premium service direct connection to the manufacturer. Qualified emergency aid for all users with a service contract (additional costs may arise).



Allows sending log files with device settings, etc. to the manufacturer's premium service to make troubleshooting easier. No personal data will be transmitted.



System reset, all changes are reset to factory settings, all pairings are deleted and the ECC system switches off. The team leader is also deactivated and must be reactivated if necessary.



Starts the wireless upgrade process. To do this, copy the new device software to the mobile connected via the app. You will receive the appropriate upgrade software from the manufacturer.

Possible malfunctions and their cause. software reset

Very slow pairing or no pairing possible:

In the near of strong W-LAN hotspots, the usable frequencies may be overloaded; pair the devices outside these ranges.

Device out of range, connection lost, LEDs flash 2 x red:

If the connection is not restored automatically, reduce the distance within ¼ hour. In the receiving area, the devices should then connect again.

Disturbances and interruptions:

Radio waves in the frequency range used (2.4 GHz) reflect very strongly on buildings, etc., and there is constant interference during the change of location and thus field strength fluctuations. As a result, disruptions and crashes are possible.

Speech is too quiet or microphone does not turn on:

Check the microphone arrangement, the microphone should have lip contact.

Noise, etc.:

Reduce the volume, at very high volume settings system typical signals (noise, soft singing, etc.) can be heard.

Feedback effects:

Turn down the volume and turn on the electronics only if the earmuffs are used properly.

Interruptions in music transmission via the Bluetooth® interface:

Triple connections (HFP, A2DP and ECC hands-free) may cause occasional interrupts depending on the type and capacity of the Bluetooth® devices after switching from HFP to A2DP (from cell phone to music). This problem can usually be solved by switching to hands-free mode and back shortly.

Unexplained malfunctions, software reset:

Switch the devices off and on again. Recharge the battery, when the USB charging plug is inserted, the software is automatically reset. Clear the memory: See section "Safe deleting of existing pairings and settings".

Secure deletion of existing pairings and settings

Just switch on the team leader device. *Display:*  and press the multifunction button® 2 times in quick succession (short double-click!). The device switches off automatically when all pairings and user settings have been deleted.

Continue on page 5, section: "Commissioning the full-duplex team hands free connection".

Important notes for your safety

Switch this unit off immediately and hand it over to an authorized specialist workshop if inadmissible noise levels occur. We assume no responsibility in case of misuse, malfunction or improper use



Observe the different regulations
for occupational safety and occupational protection,
depending on the sector!

Technical specifications

Bluetooth® System:

Version: 4+

Profiles: HFP, A2DP, AVRCP, BLE

Team communication:

Proprietary **AKE ECC** hands free system

Swap-Mode (only ECC-silence):

pair up to 8 systems and easily change participants in team mode

Transmission power:

Class 1 (100 mW), Power Saving Function Class 2 (2,5 mW)

Automatic power adjustment via RSSI

Receive sensitivity:

Low-noise amplifier, noise floor typical 2 dB

Maximum range: (free field with 3 dBi antennas)

Low Power > 100 m¹, High Power > 500 m, with repeater function up to 1 km¹

Battery:

Lithium-Ionen-Polymer 3,75 V, 600 mAh

Charging time: 3 - 4 hours

Talk time: About 8 hours²

Team leader (with 4 devices at maximum distance) >5 hours

Stand by: 3 days

Charge input:

Mikro-USB, 5V DC, max 200 mA, reverse polarity protected

Battery regeneration when deep discharge

Signal microphone:

High quality noise compensated close talking system

Input sensitivity: -42 dB (0dB=1V/ μ Bar)

Noise attenuation in speech recognition > 20 dB

Noise attenuation in the speech pauses > 20 dB, **ECC-silence** 100%

Outside noise control (only ECC-silence):

Noise microphone with transmission of ambient signals up to 85 dB(A) at the ear, Shut-off reaction time <50 ms (suitable for shooting)

Loudspeaker:

Terminal resistance: 32 Ohm (**ECC-silence**: 2 x 32 Ω)

Output power: 0,2 Watt (**ECC-silence**: 2 x 0,2 Watt)

Amplifier:

Maximum output power at 8 Ω and $U_{\text{Batt}}=3,6$ V: 0,72 Watt (**ECC-silence**: 1,44 W)

Permissible output impedance: 3 Ohm

Frequency range: 20 Hz bis 20 KHz

Stand by:

Stand by current: < 1 μ A

Wake Up time after standby: < 27 ms

Quiescent current: 5 mA

Weight of electronics: Incl. battery about 40 grams

¹ Under optimal conditions

² May be very different depending on the operating mode and ambient temperature

Warranty and other

The devices are largely protected against moisture, but not waterproof. If water has penetrated once, switch off the device immediately, remove the foam cover and let the device dry completely.

Warranty

On the electronics we grant the end user a guaranty based of the two-year implied warranty under German law. Hand over the defective device unopened with a detailed error description to your dealer or send it with your purchase document directly to our service department. In case of a third-party modification, any warranty claim expires! Water damage and batteries are excluded from the warranty! Ear protection capsules and their accessories are covered by the warranty of the respective manufacturer.

Premium-Service



For all devices with a premium service contract, the customer has the option to call for help in the event of problems by phone or app at any time during the contractually agreed period. For immediate assistance he receives direct access from 9:00 am to 6:00 pm German time via a telephone hotline specially set up for this purpose: +49 (0) 176 / 95 84 81 28.

For **ECC-silence** the following applies additionally: In case of repair, the customer will receive a loaner if the repair cannot be completed within 48 hours. Each, one year and two years after the date of purchase, the customer is entitled to a free device check. Defective wearing parts will be exchanged upon request for a fee.

Please send devices for inspection or repair only to the following address: **AKE-Service, Willi-Bleicher-Str.6, D-73230 Kirchheim**

Conformity



This product has been manufactured and tested according to the newest technical requirements. For detailed information regarding the CE-marking contact AKE Elektronik, D-73230 Kirchheim.

PSA approval of the hearing protection capsule

EN352

Manufacturer: Lockweiler, type LA 3016 Jet, approval DIN EN352-3: 2002, EN 13819-1, EN 13819-2. Further information on the approval of the hearing protection capsule can be obtained from the capsule manufacturer.

References to the recycling after the electrical appliance law



This equipment complies with the new European ROHS guideline. If it should not be used any longer, it must not be disposed with regular household garbage but must be turned in at collecting points for electronic waste (free of charge for consumers). This would help us with the recycling of valuable raw materials and at the same time provide a contribution to environmental protection!

Battery recycling: This device contains a lithium-ion polymer battery. Please ensure proper disposal of batteries. Always follow the local laws and regulations for disposal of batteries.

