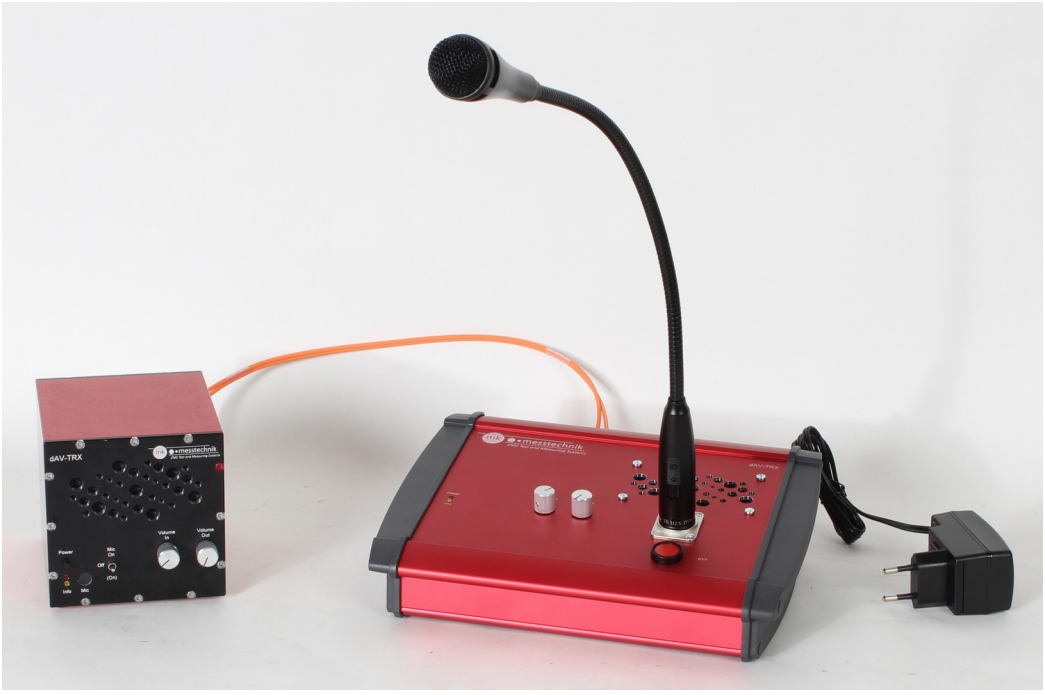
Intercom

dAV-TRX

Manual

Intercom system
with digital optical transmission



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WEEE-Reg.--No. DE 21806070

Operating Instructions revision 1.0, Date 2019-04-04, Subject to technical modifications

Contents

1 Scope of Delivery

Quantity	Content
1	Intercom console device with speaker/microphone
1	Intercom mobile device with speaker/microphone and built-in batteries
1	Chargers for built-in batteries
1	Power Supply for console device
2	Optical fiber, duplex 62.5 / 125 µm, cable length customized (20 m standard)
1	Operating Instructions
X	Accessories like cables, secondary mic unit, external power supplies etc. depending on order

The components from mk messtechnik GmbH are matched to each other and may not be modified and not be applied otherwise

The delivery is carried out with fully charged batteries. Due to the self-discharge, the batteries should be recharged again before use.

Please read chapter 9, before recharging battery packs and devices.

2 Fields of application

The Intercom system is used for optical transmission of audio signals (speech).

3 Properties

The system is suited for the undisturbed isolated transmission of audio signals in surroundings with high demands on electromagnetic compatibility. After applying an optical fiber between both devices the system can be used to communicate between the absorber chamber and the control room. The system can be adapted to the application by adjusting the mic gain and speaker volume independently. The permanent on operation mode allows the user to talk hands free. Any ongoing transmission can be interrupted by the other station and continues when the other station stops its transmission (half duplex). An optional external headset connector allows full duplex communication without acoustic feedback. Other optional features like line in/out connectors or an additional external microphone are available.

4 Intended use

- Transmission of audio signals via fiber over long distances without signal losses
- Use of the optimized components from mk messtechnik GmbH only (correct optical fiber, charger, batteries)
- Charging of the batteries with provided chargers from mk messtechnik GmbH only
- Non-OEM parts, e.g. power supply modules influence the EMC performance and may cause damages to the system

5 Disclaimer of Warranty/Exclusion of Liability

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Under the Following Circumstances the Warranty and Liability is Excluded:

- Usage not according to the intended purpose and misapplication
- Non-observance of the safety instructions
- Manipulation and modification of the devices

6 Special Regulations and Notes

The following regulations have to be respected for all devices. Additionally, all the specific notes for each device have to be respected (see the following chapters).

6.1 Safety

Interferences that are not described in chapter 11, and any damage of the devices (e.g. damaged housing or damaged cables at the charger) have to be reported to the responsible expert immediately.

The affected device has to be decommissioned by the responsible expert and must be protected against incorrect usage until all damages have been repaired.

6.2 Product Care and Maintenance

- Battery packs of the devices have to be maintained on a regular basis (see chapter 9).
- Charging of the battery packs has to be done according to the instructions described in chapter 9.3.
- Other components of the devices are maintenance free.
- Repairs must only be done by the manufacturer.

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Risk of fire, injury, and damage to the electronics

There are no user serviceable parts in the devices. Opening the devices can lead to short circuits if powered components touch the housing of the device. Therefore NEVER open the housings, because there is a risk of fire or injury!

In case of errors consider the notes in chapter 11. If an an error cannot be solved by considering these notes, please send the device in for repair. In this case please contact mk messtechnik GmbH BEFORE you send in the device.

6.3 Cleaning

- Cleaning of the housings only with solvent free cleaning supplies and a soft cloth.
- Do not use aggressive cleaning supplies like alcohol, acetone or abrasive materials.

6.4 Installation Instructions

!	**Risk of Fire or Damage** Do not open the devices. Opening the devices is only allowed with the necessary guidance and previous authorization from mk messtechnik GmbH. Non-observance can lead to fire or damage of the device. Warranty will be void!

§	**Possible Risk of Injury and Damage When not Observing this Manual.** The devices described in this manual are very complex. This manual must be read and respected compellingly before installation and initial operation. Safety instructions must be respected compellingly. Disregard can lead to considerable damage of the devices and serious risk of injury for the user.

- Use the devices only on skid-proof surfaces, respect the specific installation references for each device.
- Electrical connections are only allowed to be done by authorized EMC trained specialist staff.
- Consider electrical parameters and correct pinout assignment.
- Incorrect electrical connections can damage the components of the devices.
- Expert only installation of the connections, provide strain reliefs if necessary.
- Do not mechanically work on devices and cases!
- Do not modify or short circuit plugs and do not shorten or extend included cables without the approval by the manufacturer!

7 Installation and Initial Operation

7.1 Mechanical Assembly

Connect both devices with duplex optical fibres via optical I/O connectors (In → Out).

7.2 Electrical Assembly

The console device is powered by a wall power supply and the mobile device is powered by a battery pack.
Connect the wall power supply with the console device and plug the other end into a grounded socket.

7.3 Operating Elements

7.4 Front Side of the Mobile Device

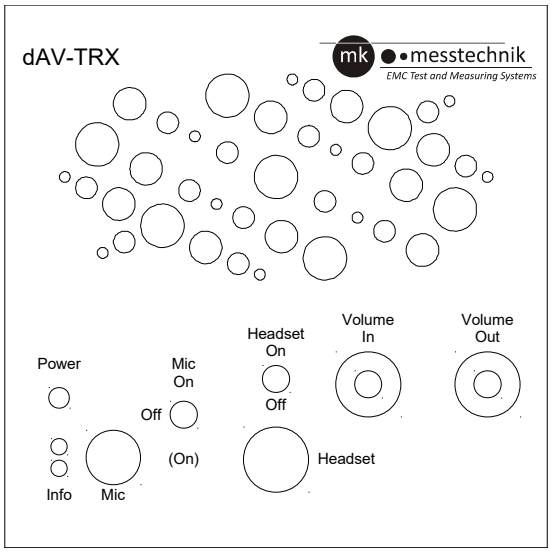

Figure 7-1: front side of mobile device

Power	Turn device on and off	Push button
Power LED	Permanently on when device is powered up, permanently off when device is switched off, blinking when talking is possible	Red LED
Info	Permanently on when battery is low, permanently off when connection to other station is ok and battery is ok, blinking when there is no optical connection to other station, blinking once when resetting to default	Yellow LED
Mic	Capture audio signals	Integrated microphone
Mic On/Off/(On)	Switch to “On” to activate permanent talking, switch to “Off” to deactivate permanent talking, push to “(On)” and hold to talk temporary, release from “(On)” to stop talking temporary	Switch button
Headset On/Off (optional)	Switch to “On” to activate headset and deactivate speaker (full duplex mode), switch to “Off” to deactivate headset and activate speaker (half duplex mode)	Switch button
Headset	Connection of headset	4-pole-socket screw connector

Volume In	Turn right to increase microphone gain, turn to left to decrease microphone gain, push and hold (> 2s) to reset settings to default	Turning knob/Push button (Software control)
Volume Out	Turn to right to increase speaker volume, turn to left to decrease speaker volume	Turning knob (Hardware control)

7.5 Back Side of the Mobile Device

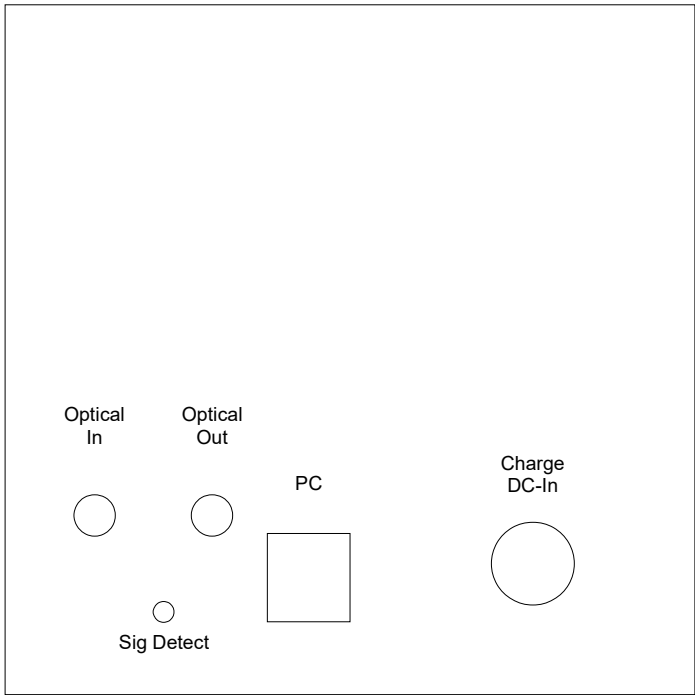

Figure 7-1: back side of mobile device

Sig Detect	Permanently on when light is received via the optical link, permanently off when no light is received via the optical link	Green Signal Detect LED
Optical In	Connection of fiber optic cable (input)	Socket FSMA
Optical Out	Connection of fiber optic cable (output)	Socket FSMA
PC	Connection of host PC	Socket USB-B
Charge DC-In	Connection of charger	5-pole-socket screw connector

7.6 Front Side of the Console Device

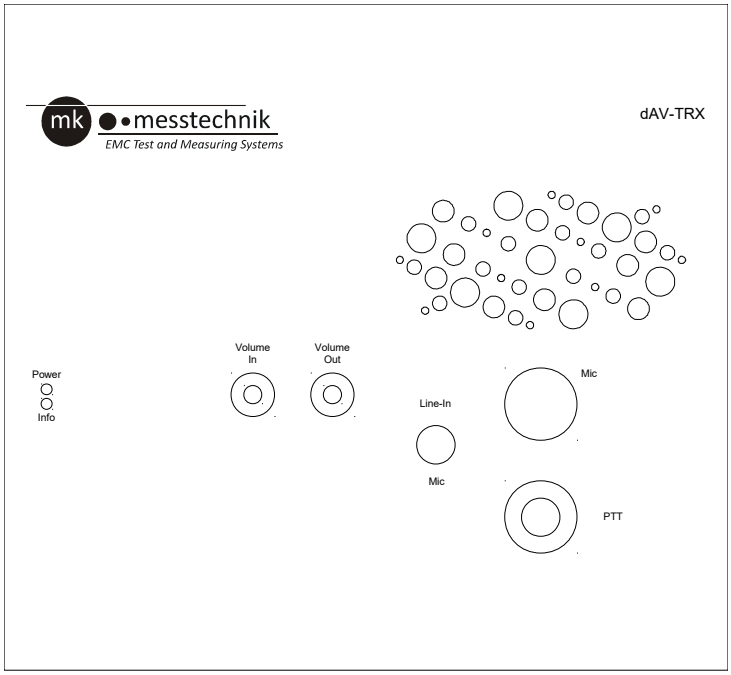

Figure 7-2: front side of console device

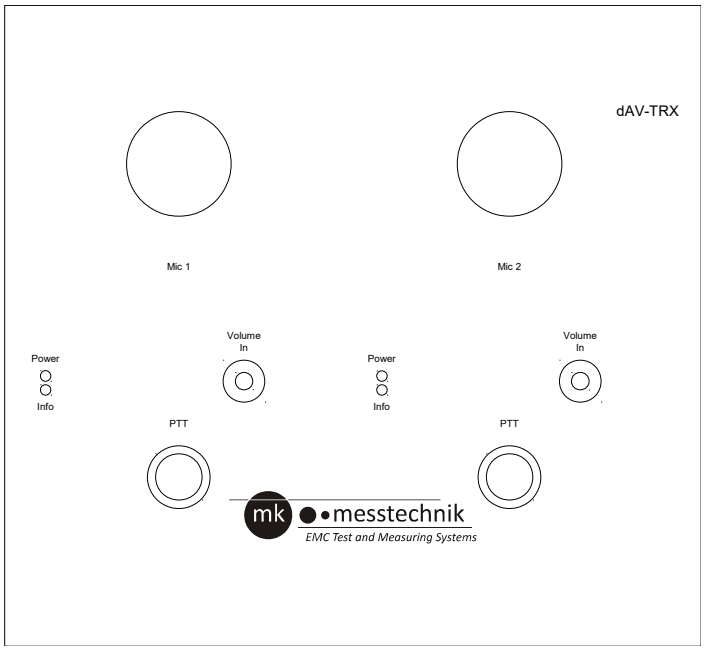

Figure 7-3: front side of console device with 2 channels

Power	Permanently on when device is powered up, permanently off when device is switched off, blinking when talking is possible	Red LED
Info	Permanently off when connection to other station is ok, blinking when there is no optical connection to other station, blinking once when resetting to default	Yellow LED
Mic	Capture audio signals	3-pole-socket XLR connector
PTT (Push to talk)	Push and release (< 250ms) to activate/deactivate permanent talking, push and hold (> 250ms) to talk temporary, release to stop talking temporary	Push button
Line In /Mic (optional)	Switch to “Line In” to activate transmission of line in signal, switch to “Mic” to activate transmission of mic signal	Switch button
Volume In	Turn right to increase microphone gain, turn to left to decrease microphone gain, push and hold (> 2s) to reset settings to default	Turning knob/ Push button (Software control)
Volume Out	Turn to right to increase speaker volume, turn to left to decrease speaker volume	Turning knob (Hardware control)

7.7 Back Side of the Console Device

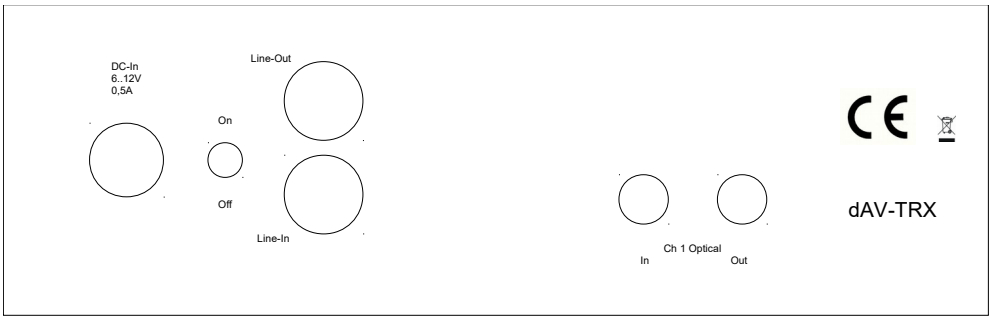

Figure 7-4: back side of console device with line in/out

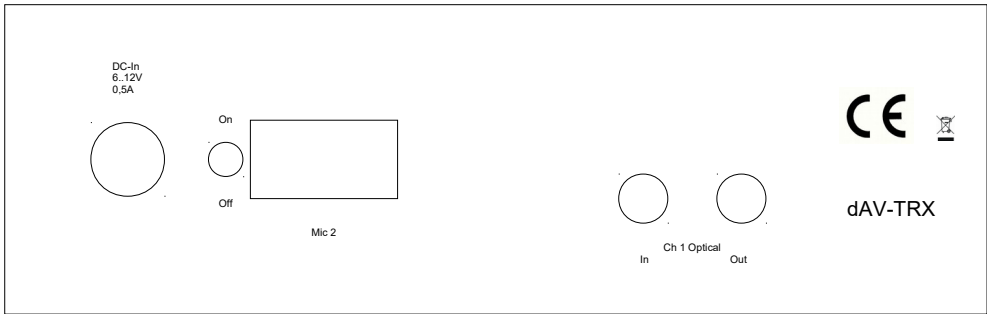

Figure 7-5: back side of console device with secondary mic

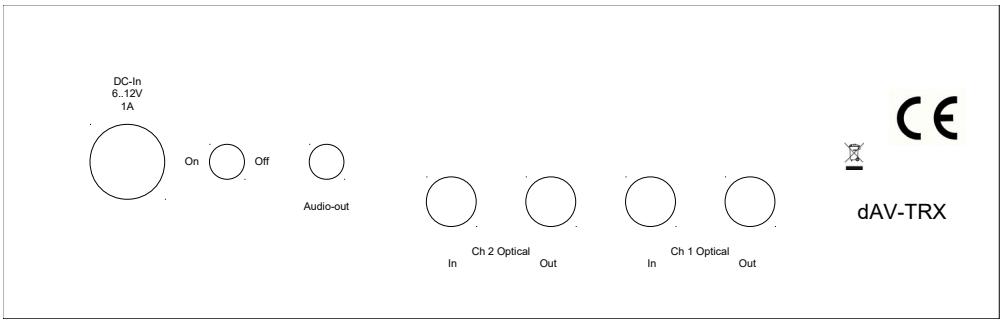

Figure 7-6: back side of console device with 2 channels

DC-In	Input for power supply	Plug power supply
On/Off	Turn device on and off	Switch button
Line-Out (optional)	Output for line signal received via optical link	Socket Cinch
Line-In (optional)	Input for line signal transmitted via optical link	Socket Cinch
Audio-Out (optional)	Output for line signal received via optical link	Phone jack stereo
Mic 2 (optional)	Connection of secondary mic	Socket SUB-D
In	Connection of fiber optic cable (input)	Socket FSMA
Out	Connection of fiber optic cable (output)	Socket FSMA

7.8 Front Side of the Secondary Mic

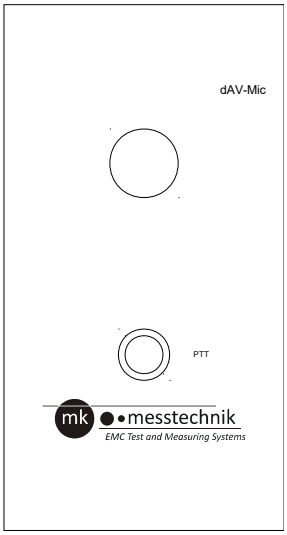

Figure 7-7: front side of secondary mic

Power	Permanently on when device is powered up, permanently off when device is switched off, blinking when talking is possible	Red LED
Mic	Capture audio signals	3-pole-socket XLR connector
PTT (Push to talk)	Push and release (< 250ms) to activate/deactivate permanent talking, push and hold (> 250ms) to talk temporary, release to stop talking temporary	Push button with integrated LED

7.9 Back Side of the Secondary Mic

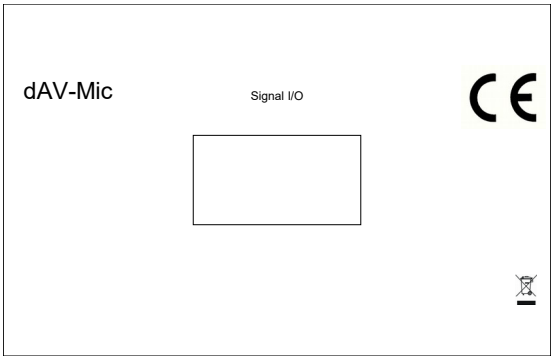

Figure 7-8: back side of secondary mic

Signal I/O	Connection of console device	Socket SUB-D

7.10 Initial Operation

- Turn the “Volume out” knob on both devices completely to the left
- Switch on both devices → Info LED stops blinking when an optical connections is established
- Press and hold “Volume In” knob (> 2s) on both devices to reset settings to default → Info LED blinks once
- Push and release the PTT button (< 250ms) on console device to start talking → Power LED blinks
- Turn the “Volume Out” knob on mobile device to adjust the speaker volume
- If necessary, turn the “Volume In” knob on console device to adjust the mic gain
- Switch the “Mic” button to “On” on mobile device to start talking → Power LED blinks
- Turn the “Volume Out” knob on console device to adjust the speaker volume
- If necessary, turn the “Volume In” knob on mobile device to adjust the mic gain
- Wait at least 20s until mic gain is stored in the devices

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Speaker Damage when volume is too high

A too high speaker volume can lead to extreme loudness or an overload of the speaker. When taking the devices into operation, turn off the speaker volume in order to avoid any damages.

8 Operation

8.1 Start/Stop talking

The console device has a “PTT” (push to talk) button. Push this button to talk to the other station. You can either talk permanently or temporarily. Push the button briefly and release it (< 250 ms) to activate the permanent mode. You do not need to hold or operate any controls while talking in this mode. Push briefly (< 250 ms) to deactivate the mode again. If you push and hold the button (> 250 ms), you activate the temporary mode. In this mode, you can talk as long as you hold down the button. Releasing it deactivates the temporary mode instantly.

The mobile device has a “Mic” switch button. Switch or push this button to talk to the other station. You can either talk permanently or temporarily. Switch the button to "On" to talk permanently. The button stays in this position and allows you to talk to the other station until you switch the button back to "Off“. Push the button to "(On)" to talk temporarily. You can talk as long as you hold the button in this position. The button switches automatically back to "Off” when you release it.

Only one station can talk at a time. A blinking power LED indicates that talking is active.

Example:

The “Mic” button of the mobile device is set to permanently on. If the console “PTT” button is pushed, the mobile device is not allowed to talk anymore, until either the console deactivates talking or the mobile device switches the “Mic” button “Off” and “On” again.

8.2 Volume Control

The mic/line in input gains are controlled by software and can be adjusted by turning the “Volume In” knob. After 20s of inactivity, the values are permanently stored. By pushing and holding (> 2s) the “Volume In” button, the gains can be reset to default which is indicated by a one time blinking of the “Info” LED.

The speaker output volume is controlled by hardware and can be adjusted by turning the “Volume Out” knob.

§

Speaker Damage when volume is too high

A too high speaker volume can lead to extreme loudness or an overload of the speaker. When taking the devices into operation, turn off the speaker volume in order to avoid any damages.

8.3 Line In (optional)

The devices can optionally be equipped with a “Line In/Mic” switch button and a “Line In” connector. The switch is used to select the audio input source which can either be the mic or a line in signal. The line in signal can be connected via the “Line In” connector. The input gains for the mic and line in signal can be adjusted independently.

8.4 Line Out (optional)

An optional “Line Out” or “Audio-Out” connector allows routing of the audio signal received via optical link to other devices. This is especially used in 2 channel console devices which don’t have integrated speakers.

8.5 Secondary Mic (optional)

An additional option for the console device is a connector for a secondary microphone unit. This unit consists of a microphone and a PTT button with integrated LED. Either the secondary mic or the console device can talk with the mobile device at a time. A blinking power/PTT LED indicates that talking is active.

Example:

The console device is set to permanent talking. If the PTT button of the secondary mic is pushed, the mic of the console device is deactivated and the secondary mic is activated. When talking is deactivated at the secondary mic, the mic of the console device is NOT activated again. In order to talk again, the PTT of either the secondary mic or the console device must be pushed.

8.6 Headset Connection (optional)

If the device has installed the headset option, an external headset can be connected to the device. The headset can be activated/deactivated via the “Headset On/Off” switch button. When the headset is activated, the speaker is deactivated and full duplex operation is possible without acoustic feedback. E. g. both devices can talk simultaneously. When headset is deactivated, the integrated speaker is activated and only half duplex operation is possible. In this mode only one device can talk at a time.

9 Battery and Charger

9.1 Properties

Batteries are either integrated into the devices from mk messtechnik GmbH or delivered separately as external battery packs.

The number of cells varies and depends on the required voltages.

The related charger has the following properties:

- Power supply with power plug (Standard EU (type C or F) unless ordered otherwise, optional US (type A), UK (type G), AU (type I))
- Integrated LEDs to display the charging level of the connected devices respectively the connected battery packs.
- Short-circuit-proof, reverse polarity protected
- Suitable for batteries with 4 … 10 cells and a capacity of 1,0 … 10,0 Ah
- Charging process IUoU

Chargers with the charging process IUoU work basically identical to those using the IU (CCCV) charging process. After reaching the end of charging voltage however, the device switches to trickle charging. This way a self-discharge is avoided.

9.2 Regulations and References

Protect the batteries from heat (e.g. long exposure to direct sunlight) and fire. Do not immerse the batteries into fluids. Otherwise there is a risk of explosions.

§	**Risk of Damage and Explosion Because of Incorrect Treatment** Unintentional or incorrect treatment can damage the batteries, which can even lead to explosion of the batteries!

Batteries that are integrated into the devices of mk messtechnik GmbH or are delivered with them, may only be charged with the intended chargers from mk messtechnik GmbH.

These components are compatible to each other, other chargers may damage the system or may reduce the capacity or life span of the batteries significantly.

Respect the following references when operating the chargers:

- **Use chargers only for charging devices and batteries.**
- Switch devices off before connecting the charger.
- Do NOT switch on the device during the charging process.
- Maximum charging current 1.2 A.
- Disconnect charger before turning on the device.
- Prior to first use, charge the batteries completely.

- Charge the batteries before use if you have not used them for a longer period (self discharge of the NiMH batteries) and after use.
- To avoid capacity loss due to the memory effect, discharge the batteries completely every 5 charging cycles. To do this, leave the device on, until it turns off by itself. Then start the charging process as described above.

§	**Risk Through High Voltage at the Charging Device** • The charger works with mains voltage. • Security references for work with mains voltage must be followed.

!	**Warning of Reduced Capacity and Life Span of the Batteries due to Maloperation** Use only the intended chargers from mk messtechnik GmbH. Powered devices must never be used with a connected charger, e.g. for buffering an empty battery. Disregard can lead to a loss of capacity and a shortened life span of the battery in a short time.

9.3 Charging the Batteries (Battery Pack or Integrated into the Device)

Start of the Charging Process

- Place the battery pack or the device to charge onto a stable and skidproof surface.
- Turn off the device (see appropriate chapter for operation and operating controls).
- Connect the charger with the battery pack or the device using the designated screw connector (see appropriate chapter for operating elements).
- Plug the power cord of the charger into the power socket.
- Do not power on the device during charging, this can damage the device.
- Check the status of the charging LED periodically (the meaning of the states are printed onto the housing of the charger).

End of the Charging Process, after the Charging LED Displays the Status “Full”

- Make sure that the device to charge is still turned off.
- Remove the connection between the charger and the screw connectors of the battery pack or the device to charge.
- Remove the power plug of the charger from the socket.
- The device or battery pack is now ready for operation.

10 Environmentally Friendly Disposal

10.1 Disposal of Devices

All devices must be disposed according to the environmental regulations in force.

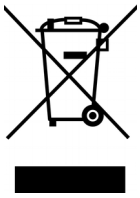
Important Notice for Disposal of Devices

- Used equipment must be collected separately and disposed in an environmentally friendly manner
- Electrical and electronic devices must NEVER be disposed in the household waste.
- You can return old electrical and electronic devices to mk messtechnik GmbH at no cost.

10.2 Disposal of Batteries

Due to their natural capacity loss batteries must be replaced after their lifespan.

NEVER open devices or housings by yourself. Replacement of batteries must be done by mk messtechnik GmbH. Please contact mk messtechnik GmbH for further details.



Important Notice for the Disposal of Batteries

- Disposing of batteries in the household waste is prohibited by law!
- Battery packs and devices containing batteries or environmental pollutants, are marked by a symbol showing a crossed out garbage container (see picture on the left).

11 Troubleshooting

The following list is intended to support the troubleshooting to keep downtimes as low as possible.

Notice!

- If problems occur that you can not solve yourself, please contact mk messtechnik GmbH for further help.
- Please only send in devices after contacting a staff member of mk messtechnik GmbH and receiving an RMA-number.

Error	Possible Cause	Solution
No or incorrect transmission (Info LED is blinking)	Device does not receive an optical signal	Check connectors, cables, and fibers, replace if necessary
	Fiber optic cable soiled	Clean the connectors of the fiber optic cable, see chapter 7.1
	Fiber optic cable or power cable defective or connected incorrectly	Use the correct fiber optic cable (62.5/125µm), check the power cable for defects and replace it if necessary
	Wrong fiber optic cable selected	Use the correct fiber optic cable (62,5/125µm)
	Batteries empty	Charge batteries
	Other device turned off	Turn on other device
No transmission, white noise or silence at the output	Device does not receive an optical signal	Check fiber optic cable / light emission at the transmitter
	Batteries empty	Charge batteries
	Mic gain of other device too low	Increase mic gain of other device by turning Volume In knob
	Talking in other device is deactivated	Activate talking in other device with PTT/Mic button
	Speaker volume too low	Increase speaker volume by turning Volume Out knob
Device can not be turned on / can not be charged	Batteries defective	Send device to manufacturer
	Internal fuse defect	Send device to manufacturer
	Charging device or charging cable defective	Check/exchange charging device/charging cable
	Batteries discharged deeply	Charge battery, use different charging device if necessary (5 cells)
General problems	Defective fiber optic cable / electrical cable or connector	Change fiber optic cable Check connectors and cables

12 Technical Data

12.1 Intercom Device

Housing	Anodized aluminium housing

12.1.1 Optical Transceiver

Optical transmission	Signal transmission by multimode FSMA, (62.5/125 µm)

12.1.1.1 Mobile Device

Power supply	Internal battery packs (see chapter 12.3) or shielded power supply (110 V to 230 V) for fixed installation
Dimensions (W x H x D)	Approx. 100 mm x 100 mm x 150 mm
Weight	Approx. 0,8 kg
Mount	1/4“- tripod thread at bottom, others upon request
Mounting plate with 1/4“-thread (W x H x D)	Approx. 35 mm x 5 mm x 37 mm
Microphone	Internal, mono, single ended

12.1.1.2 Console Device

Power supply	Shielded power supply (110 V to 230 V) for fixed installation
Dimensions without mic (W x H x D)	Approx. 246 mm x 74 mm x 186 mm
Mic length	Approx. 460 mm
Weight	Approx. 1.3 kg (1 channel), 1.44 kg (2 channel)
Microphone	External, mono, differential

12.1.2 Secondary Mic

Power supply	Passive, not needed
Dimensions without mic (W x H x D)	Approx. 144 mm x 74 mm x 186 mm
Mic length	Approx. 460 mm
Weight	Approx. 0.7kg

Microphone	External, mono, differential

12.2 Charger

Input voltage	AC 100 … 240 V, 50...60 Hz
Input current	0.25 … 0.3 A
Output voltage	DC 4.8 … 12 V, depending on the number of detected cells
Output current, max.	0.8 A
Internal fuse	T 0.8 A
Weight	0.14 kg
Type	Power supply with different power plugs (Standard EU Type C, if not stated otherwise)
Connections	Cable 1.8 m with 5-pole screw connector (Binder 712 series), suitable for systems from mk messtechnik GmbH
Temperature of operation	0 … 40°C at maximum load
Temperature of storage	-40 … 70°C
Protection class	IP 40
Insulation class	T40/F
Relative humidity	5 % … 95 % non-condensing
Safety standard	Standards IEC 60335, IEC 60601-1, IEC 61000, class II SELV

12.3 Battery Pack

Nominal voltage	6.0 V
Capacity	4 Ah
Type	Nickel-metal hydride (NiMH) battery, 5 cells
Environmentally friendly disposal note	See chapter 10.2

13 Accessories, Spare parts

For an overview of available accessories please visit www.mk-messtechnik.com.

For spare parts, orders, and repairs please contact mk messtechnik GmbH.