SENNHEISER

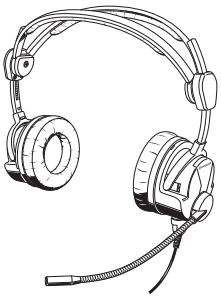
Service manual

SA 100810

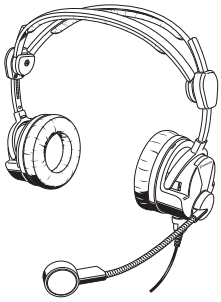
HMD/HMDC/HME 26 Broadcast

Revision 08/2011

Headset variants



HME 26-600
HME 26-600-7
HME 26-100
HME 26-100-7
HME 26-100(4)
HME 26-600(4)



HMD 26-600
HMD 26-600-7
HMD 26-100
HMD 26-100-7
HMD 26-600-X3K1
HMDC 26-600

HME 26-600S

HMD 26-600S

Cable variants
-6, -H-6
-7, -B-7
-X4F, -H-X4F
-X3K1, -H-X3K1
-X3K1-P48
-X5

Short description

These headsets have been designed for broadcast use, e.g. for outdoor broadcast and TV applications.

Features

- Dynamic, closed headphones with supra-aural ear coupling
- Flip-away headphone allows single-sided listening (not for the HME/HMD 26-600S)
- Several microphone variants
- Flexible microphone arm, can be worn on either left or right-hand side
- Single-sided cable routing

Sennheiser electronic GmbH & Co. KG
Am Labor1, 30900 Wedemark, Germany
www.sennheiser.com

Safety requirements

Observe safety regulations.

Observe ESD instructions while handling electrostatically endangered components.

Only skilled persons are allowed to alter and repair. For repairs and exchanges only approved components according to the current spare parts list are allowed.

For safety and certification reasons it is forbidden to alter the product without authorization. Otherwise, the person who has altered the product is liable for any consequential damage.

repairs/exchanges

The following instructions for overhaul and testing must be followed.
In case of unusual problems please contact your Sennheiser service center support.

CAUTION

During SMD component soldering you may destroy them by using a standard soldering iron for several seconds.

Only use adapted soldering tools when soldering SMD components.

Contents

1 Product overview 4

1.1 Headset 4
1.2 Operating control-B-7 (when using the HMDC 26) 4

2 Technical data 5

2.1 Technical data HMD 26 5
2.2 Technical data HMDC 26 6
2.3 Technical data HME 26 7

3 Exploded view 8

3.1 Exploded view of the complete unit 8
3.2 Exploded view of the headband module 9
3.3 Exploded view of the microphone cap module (with microphone arm support and cable) 9
3.4 Exploded view cable -B-7 (for HMDC 26) 10

4 Test and alignment instructions 11

4.1 Measuring and test equipment 11

5 Disassembly/Assembly 12

5.1 Disassembly 12
5.2 Assembly 14

6 Functional test 19

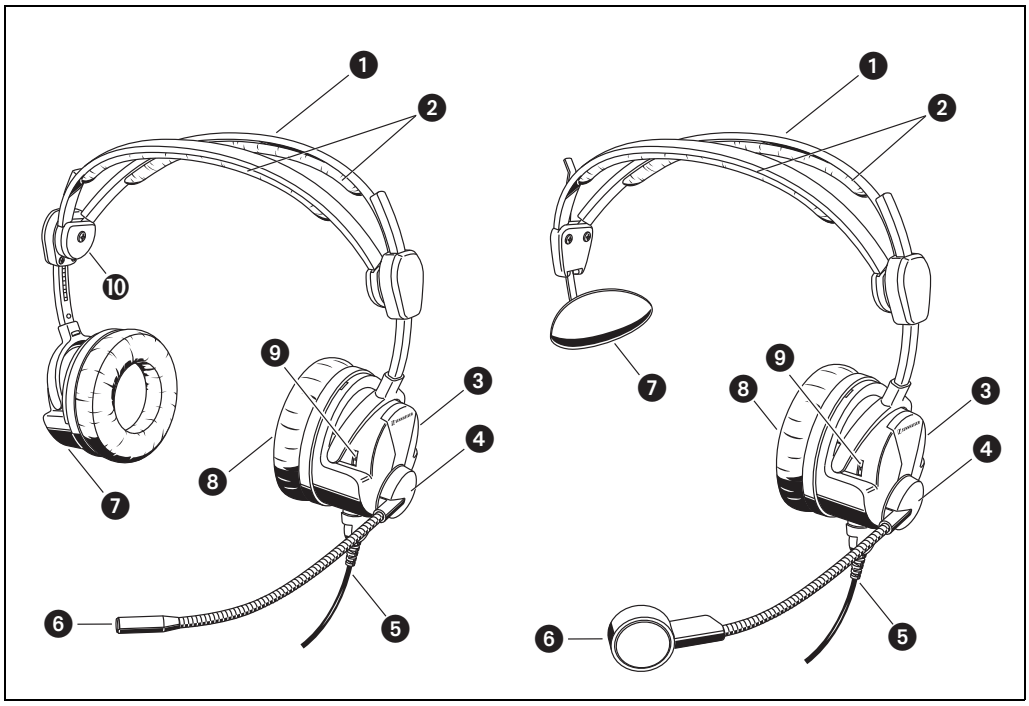
6.1 Functional test of the headphones 19
6.2 Functional test of the microphone 19
6.3 Functional test ActiveGard™ (HMD/HME 26) 20
6.4 Functional test NoiseGard™ (HMDC 26) 20

7 Circuit diagrams 21

7.1 Cable and connector assignment 21
7.2 PCB of the acoustic units of the HMDC 26 22
7.3 PCB of the acoustic units of the HMD/HME 26 23

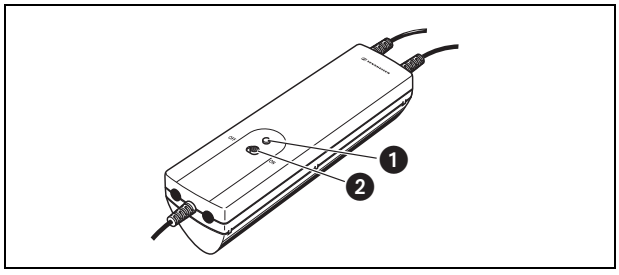
1 Product overview

1.1 Headset



1. Split headband
2. Padding for the split headband (available as accessory)
3. Cap microphone side
4. Microphone arm support of the cap (not visible)
5. Connecting cable with headset connector
   (see ''Cable and connector assignment'', page 21)
6. Microphone arm,
   the visualization depends on the the microphone type, see Technical Data
7. Cap non microphone side/ temple support (HME/HMD 26-600S)
8. Earpad
9. ActiveGard switch (HME/HMD 26 only)
10. Flip-away hinge for flipping away the cap not microphone side
    (not HME/HMD 26-600S)

1.2 Operating control-B-7 (when using the HMDC 26)



1. NoiseGard™ LED
2. NoiseGard™ ON/OFF switch

2 Technical data

2.1 Technical data HMD 26

2.1.1 Headphones

Transducer principle _____ dynamic, closed

Ear coupling _____ supra-aural

Frequency response _____ 20 Hz to 18 kHz

Impedance

- HMD 26-600 _____ 300 Ω mono/600 Ω stereo
- HMD 26-600S _____ 600 Ω mono
- HMD 26-100 _____ 50 Ω mono/100 Ω stereo

Characteristic at 1 kHz, 1 V

- HMD 26-600/-600S _____ 107 dB SPL
- HMD 26-100 (ActiveGard is switched off) _____ 115 dB SPL

Max. SPL at 1 kHz (ActiveGard is switched on) _____ 105 dB SPL

- HMD 26-600/-600S at 200 mW _____ 127 dB SPL
- HMD 26-100 at 200 mW (ActiveGard is switched off) _____ 128 dB SPL

THD at 1 kHz _____ < 0.5%

Contact pressure

- HMD 26-600/-100 _____ approx. 3.6 N
- HMD 26-600S _____ approx. 4.0 N

2.1.2 Microphone

Type _____ BMD 424

Transducer principle of the BMD 424 _____ dynamic, noise-compensating

Pick-up pattern _____ hyper-cardioid

Frequency response _____ 40 to 16,000 Hz

Output voltage at 1 kHz _____ 0.4 mV/Pa

Impedance _____ 300 Ω

2.1.3 General data

Ambient temperature

- Operation _____ –15 °C to 55 °C
- Storage _____ –55 °C to 70 °C

Weight without cable

- HMD 26-600/-100 _____ approx. 200 g
- HMD 26-600S _____ approx. 130 g

Cable and connector assignment _____ see page 21

2.2 Technical data HMDC 26

2.2.1 Headphones

Transducer principle	dynamic, closed
Ear coupling	supra-aural
Frequency response	20 Hz to 18 kHz
Impedance	600 Ω mono/1200 Ω stereo
Characteristic	
at 1 kHz, 1 mW	108 dB SPL
at 1 kHz, 1 V	110 dB SPL
Max. SPL at 1 kHz	120 dB SPL
Active noise compensation	
at 100 Hz to 300 Hz	≥ 18 dB
Attenuation (active and passive)	15 dB to 30 dB
THD at 1 kHz	< 0.5%
Contact pressure	approx. 3.6 N

2.2.2 Mikrophone

Type	BMD 424
Transducer principle BMD 424	dynamic, noise-compensating
Pick-up pattern	hyper-cardioid
Frequency response	40 to 16,000 Hz
Output voltage at 1 kHz	0.4 mV/Pa
Impedance	300 Ω

2.2.3 General data

Ambient temperature	
Operaration	–15 °C to 55 °C
Storage	–55 °C to 70 °C
Weight without cable	approx. 210 g
Power supply NoiseGard	
Batteries	2 x 1,5 V alkaline (type LR 6 = AA)
Rechargeable batteries	2 x 1.2 V (type LR 6 = AA)
Operating time NoiseGard	approx. 60 hours
Cable and connector assignment	see page 21

2.3 Technical data HME 26

2.3.1 Headphones

Transducer principle _____ dynamic, closed

Ear coupling _____ supra-aural

Frequency response _____ 20 Hz to 18 kHz

Impedance

- HME 26-600/-600(4) _____ 300 Ω mono/600 Ω stereo
- HME 26-100/-100(4) _____ 50 Ω mono/100 Ω stereo
- HME 26-600S _____ 600 Ω mono

Characteristic at 1 kHz, 1 V

- HME 26-600/-600S/-600(4) _____ 107 dB SPL
- HME 26-100/-100(4) _____
  (ActiveGard is switched off) _____ 115 dB SPL

Max. SPL at 1 kHz
(ActiveGard is switched on) _____ 105 dB SPL

- HME 26-600/-600S/-600(4)
  at 200 mW _____ 127 dB SPL
- HME 26-100/-100(4) at 200 mW
  (ActiveGard is switched off) _____ 128 dB SPL

THD at 1 kHz _____ < 0.5%

Contact pressure

- HME 26 _____ approx. 3.6 N
- HME 26-600S _____ approx. 4.0 N

2.3.2 Microphone

Type

- HME 26-600/-600S/-100 _____ BKE 4-2
- HME 26-600(4)/-100(4) _____ BKE 4-4

Transducer principle _____ pre-polarized

Pick-up pattern

- BKE 4-2 _____ omni-directional
- BKE 4-4 _____ cardioid

Frequency response _____ 40 to 20.000 Hz

Output voltage _____ 4 mV/Pa ± 2.5 dB

Terminating impedance _____ min. 4.7 kΩ

Supply voltage _____ 5 to 15 V_{DC}

2.3.3 General data

Ambient temperature

- Operation _____ –15 °C to 55 °C
- Storage _____ –55 °C to 70 °C

Weight without cable

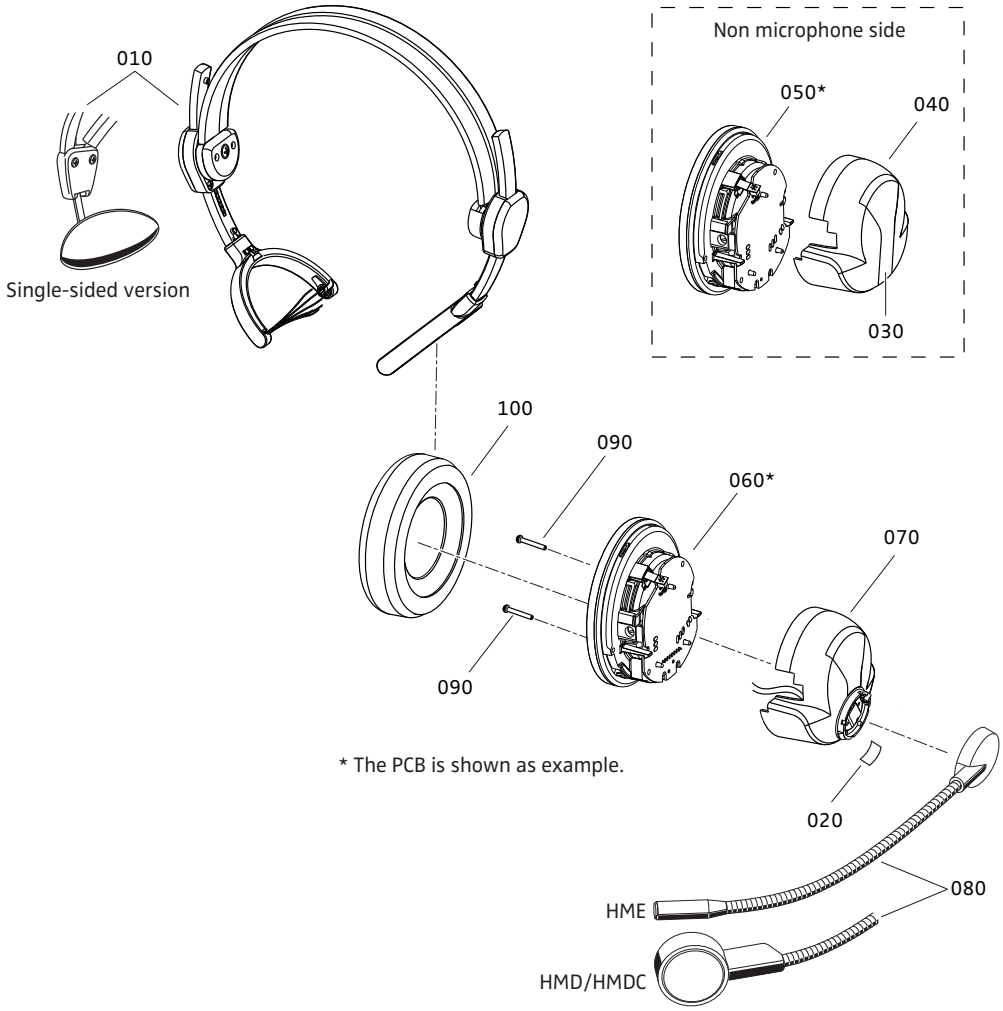
- HME 26 _____ approx. 200 g
- HME 26-600S _____ approx. 130 g

Cable and connector assignment _____ see page 21

3 Exploded view

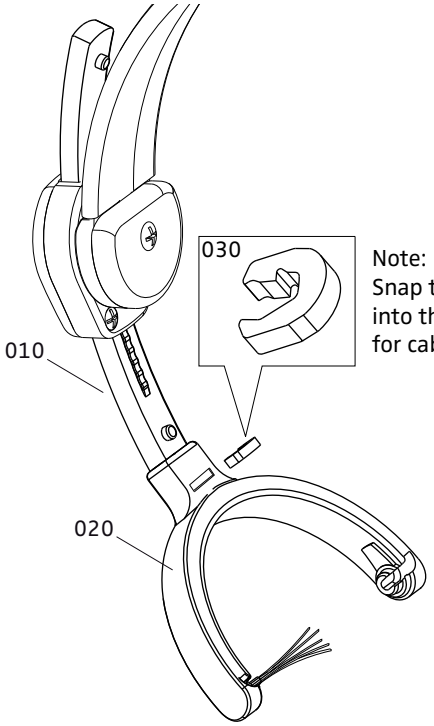
3.1 Exploded view of the complete unit

See also:
See ''Product overview'', page 4.



Item	Designation
010	Headband (headband paddings are not displayed), see page 9
020	Label
030	Clip, non microphone side
040	Cap, non microphone side (not HME/HMD 26-600S)
050	Acoustic unit, non microphone side (not HME/HMD 26-600S)
060	Acoustic unit, microphone side
070	Cap with microphone arm support and cable, see page 9
080	Microphone arm Broadcast
090	Screw 1,8x12
100	Earpads

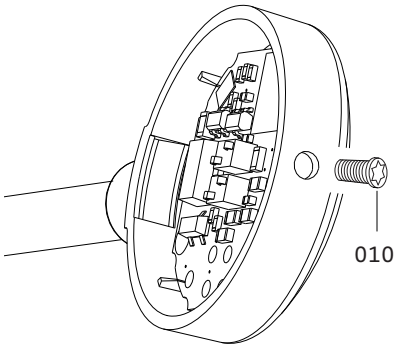
3.2 Exploded view of the headband module



Note:
Snap the latch with the flange into the notch of the end piece for cable routing

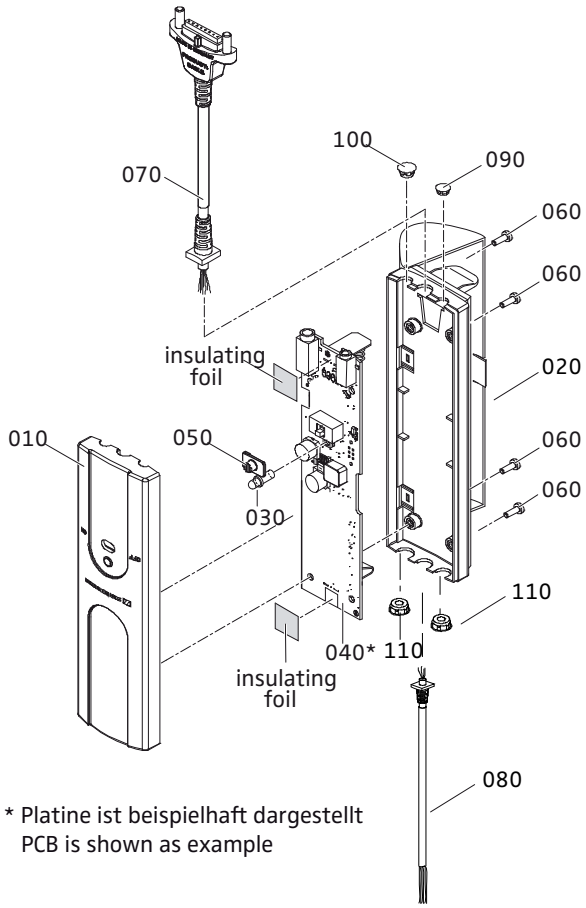
Item	Designation
010	End pieces of headband right and left for HMS 26/46 and 2 latches
020	2 yokes for HMS 26 and 2 latches for left and right side
030	Latch for headband
040	Padding HMS 26/46 (not displayed)

3.3 Exploded view of the microphone cap module (with microphone arm support and cable)



Item	Designation
010	Screw 2x6

3.4 Exploded view cable -B-7 (for HMDC 26)



Item	Designation
010	Cover
020	Battery housing
030	Knob 10.5x3.7
040	PCB mainboard
050	Optical transmitter
060	Screw 2x8 Torx
070	Cable 1.3 m
080	Cable 1.075 m
090	Insert round 5.2x2.7
100	Insert round 6.3x3.8
110	Insert black

4 Test and alignment instructions

4.1 Measuring and test equipment

Note:
Make sure that your measurement and test equipment is regularly calibrated.

Measurement equipment	Specification	Recommendation
Power supply unit	5 A, 2 x 0 to 30 V_{DC}	HAMEG HMP 2020
AF signal generator (function generator)/ Audio analyzer$_{ANALOG/DIG}$	Range from 4 Hz to 100 kHz; Sinus/Rectangle; Sweep function; THD measurement possible; Filter: A-weighted	Rohde & Schwarz UPP 200 with digital interface AES EBU 3 or Audio Precision AP System 2722
Multimeter	Measuring range: μA_{DC}; Displayed at least 4 digits	HAMEG 8012
Oscilloscope	Measuring range up to 100 MHz; 2 channels; Save function; Time base delayed; Sampling rate 1.25 GS/s	Tektronix TDS 3012B
Audio amplifier	With high impedance microphone input (e.g. 47 kΩ)	commercial
Dynamometric key for the headset assembling	—	commercial

5 Disassembly/Assembly

See also:
See ‘‘Exploded view’’, page 8.

5.1 Disassembly

5.1.1 Removing the earpads

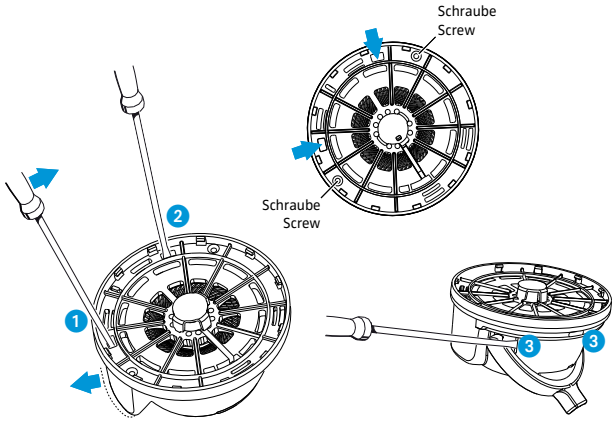
For reasons of hygiene, the earpads should be replaced from time to time. Grasp the edge of the earpad and pull sharply.

5.1.2 Removing the cap/defective acoustic unit

Note for headsets up to serial number <00200100:
The acoustic units (050/060) have been redesigned. For acoustical reasons always replace both acoustic units and both earpads (100).

Note for headsets from serial number 00200100:
Replace the defective acoustic unit only (050 or 060). For hygienical reasons the earpad replacement (100) is recommended.

1. Remove both screws (090) of the acoustic unit (050/060).
2. Carefully put the tip of a small flat-headed screwdriver into the first slot of the cap (040/070) 1.
3. Use the screwdriver to lever the cap (040, 070) to the outer side to unhook the inner nose.
4. Keep the cap (040, 070) and the acoustic unit (050, 060) under some tension to prevent a movement of the hook to its old position.
5. Do steps 2 thru 4 again for the second slot 2.
6. Carefully put the tip of a small flat-headed screwdriver at position 3 on the left and right side near the headband (010).
7. Remove the cap (040/070) from the acoustic unit (050/060) carefully. When you remove the cap at the microphone side (070), you must make sure that the leads which are attached to the PCB do not break off.
8. Desolder the microphone arm and the headband leads from the PCB.



5.1.3 Disassembling the microphone arm

See also:
See service information SI 100702-15.

5.1.4 Disassembling the operating control (for cable -B-7)

1. Remove the 4 Torx screws (060).
2. Remove the cover (010)
3. Take out the knob (030) and the optical waveguide (050), if needed.
4. Take out the inserts (090, 100, 110).
5. Take out the PCB mainboard (040)
6. Desolder the cable (070, 080) from the PCB mainboard (040), if needed.

5.1.5 Disassembly of the split headband

Removal of the latch for headband

1. Use a small flat screwdriver and press out the latch for headband (030).

After the removal the latch can be damaged or get lost. Recommendation: Do not install this removed latch again. Use new headband latches.

Removal of the the yoke

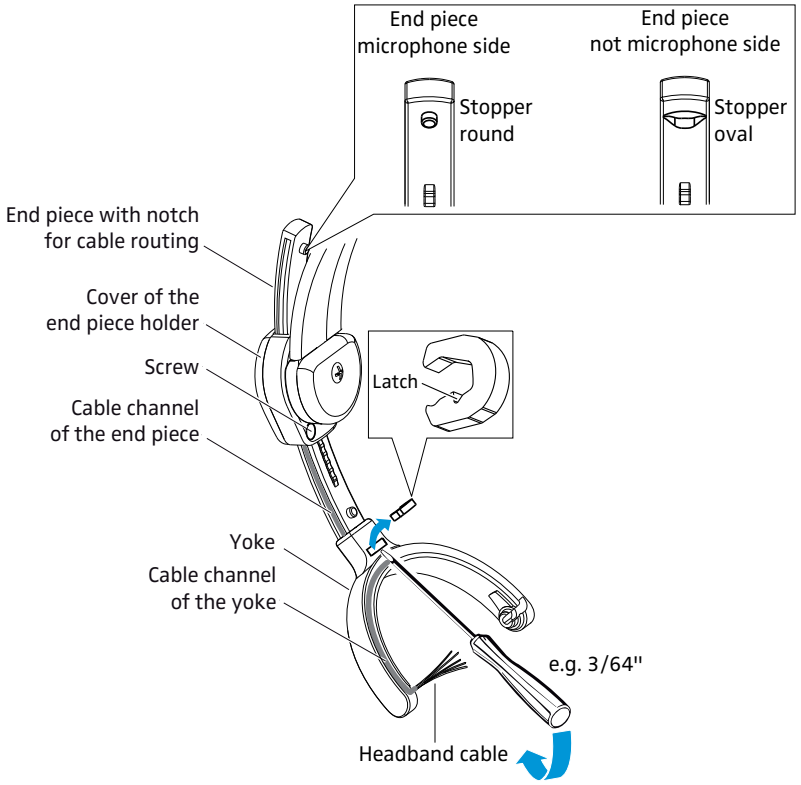
Before you remove the yoke (020), disassemble the cap, see section 5.1.2.

1. Take out the headband cable from the headband channel of the yoke (020)
2. Remove the yoke from the end piece of headband (010).

Removal of the end piece of headband.

1. Do steps described in the last both sections (latch+yoke removement).
2. Unscrew the 2 screws of the end piece holder.
3. Remove the cover of the end piece holder. For the assembly of the end piece keep in mind the laying of the cable.
4. Remove the end piece of headband (010) from the end piece holder. During this step the headband cable in the cable channel of the end piece comes out automatically.

Check the headband cable for damages. If the headband cable is damaged, remove the complete headband.



5.2 Assembly

5.2.1 Assembling the acoustic units and the caps

Note for Headsets up to serial number <00200100:
The acoustic units (050/060) have been redesigned. For acoustical reasons always replace both acoustic units and both earpads (100).

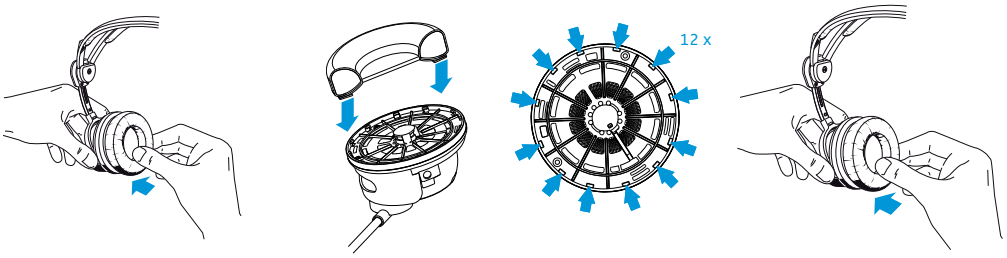
Note for headsets from serial number 00200100:
Replace the defective acoustic unit only (050/060). For hygienical reasons the earpad replacement (100) is recommended.

Note for the microphone side cap replacement
The cap on the microphone side (070) and the microphone arm (080) have mechanically been redesigned. Depending on the serial number of your headset, you either need the matching older spare parts or the new redesigned ones, see also SI 100702-15.

1. Attach the acoustic units (050/060) to the headband (010).
2. Solder the leads of the headband cable to the PCB on left and right side. Solder the microphone cable to the PCB at microphone side
3. Press the caps (040/070) to the acoustic units (050/60).
4. Mount the screws (090) with a torque of 20 Ncm ±3 Ncm.

5.2.2 Attaching the earpads

For reasons of hygiene, both earpads should be replaced from time to time. Attach the new earpad to the earcup by pressing firmly around the earpad until you hear all 12 latches lock into place.



5.2.3 Assembling the microphone arm

See also:
See service information SI 100702-15 and also SI 100202-01.

5.2.4 Assembling the operating control (for cable -B-7)

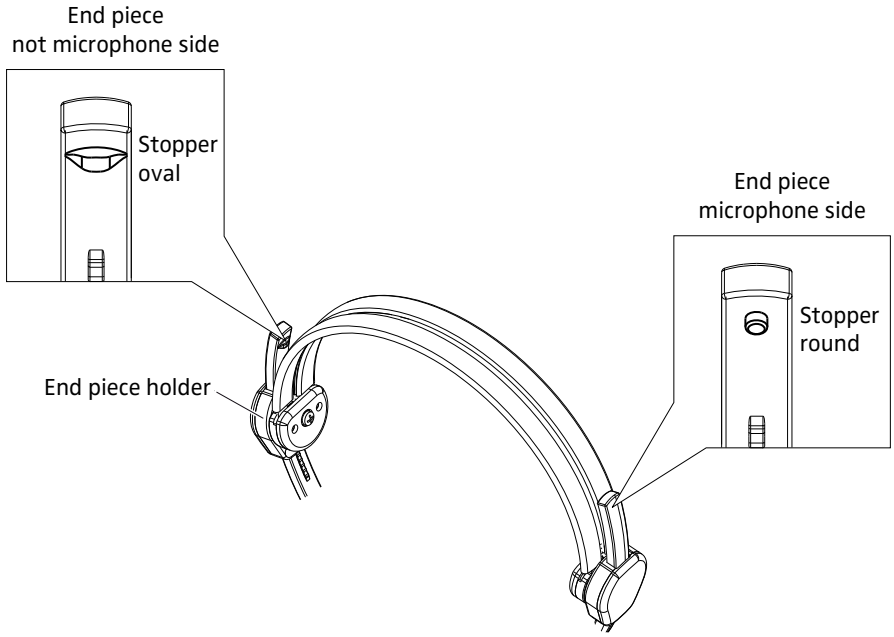
1. Solder the cables (070, 080) at the solder points of the PCB mainboard (040).
2. Attach the knob (030) to the correct position of the PCB mainboard (040).
3. Press the optical waveguide (050) into the cover (010), if necessary.
4. Attach the PCB mainboard (40) with the cable (070, 080) to the correct position of the cover (010).
5. Attach the battery housing (020) and the cover (010).
6. Press the inserts (090, 100, 110) into the battery housing (020), if necessary.
7. Fasten the 4 screws (060) with a torque of 15 Ncm ±1 Ncm.

5.2.5 Assembly of the split headband

Note:
Check the headband cable for damages. If the headband cable is damaged, remove the complete headband.

5.2.6 Assembly of the end piece of the headband

Note:
The left and the right end piece (010) are different parts:
- Use the end piece with the oval stopper for the not microphone side only.
- Use the end piece with the round stopper for the microphone side only.



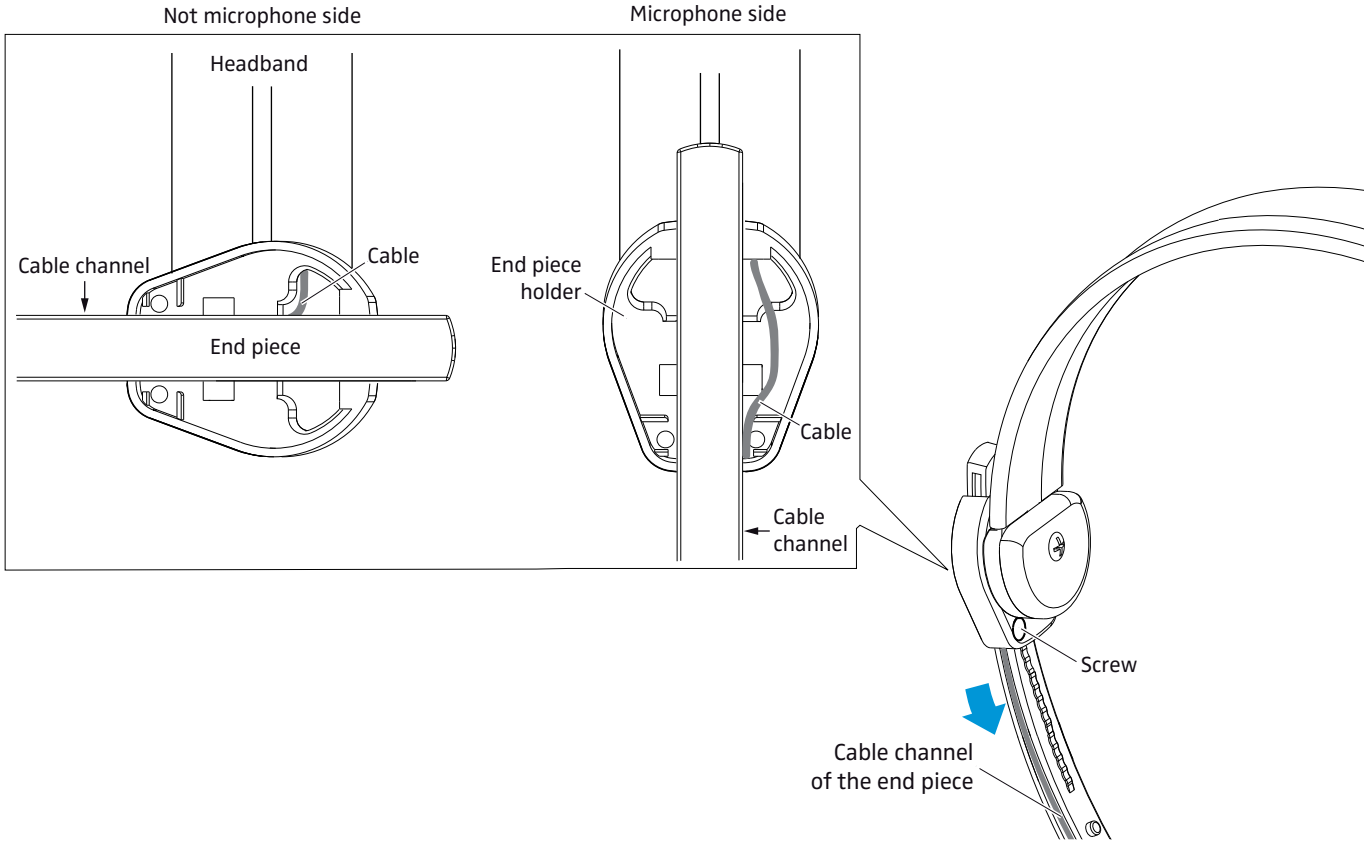
1. Put the end piece of the headband (010) into the end piece holder (see figure below).
2. Completely move down the end piece of the headband (010) to the round/oval end piece stopper.

Caution:
Do not install the headband cable with a sharpen screwdriver. You can damage the headband cable. Use only rounded/stub tools.

3. For the microphone side press the headband cable completely into the headband channel of the end
   piece (010). Install the headband cable as shown below.

   For the not microphone side first turn the end piece holder to the left side. Then press the headband cable completely into the headband channel of the end piece (010). Install the headband cable as shown below and recognize that the cable routing is on the left side/cable channel side.

4. Snap in the cover.
5. Carefully pull the end of the headband cable to prevent wavy cable routings.
6. Fasten the 2 screws.
7. Check the correct movement of the end piece (010): Move the end piece of the headband up and down. Ensure that the headband cable is completely inserted in the cable channel.

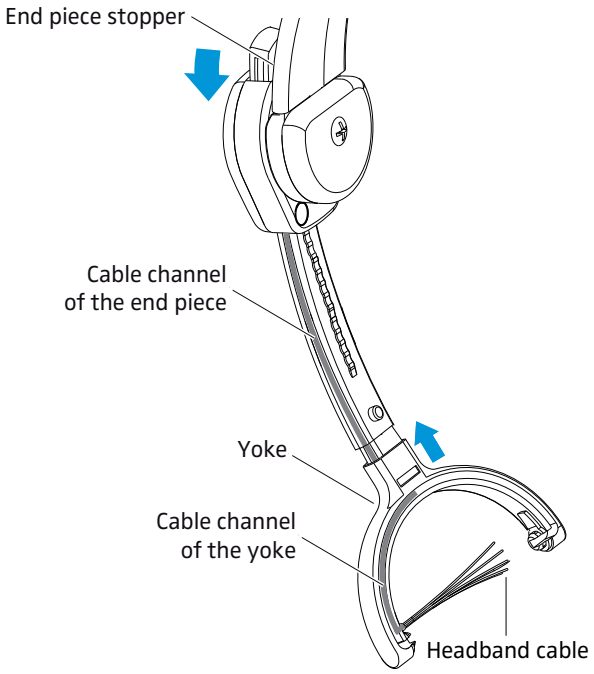


5.2.7 Assembly of the yoke

1. Completely move down the end piece of the headband (010) to the round/oval end piece stopper.

Caution:
Do not install the headband cable with a sharpen screwdriver. You can damage the headband cable. Use only rounded/stub tools.

1. Press the headband cable completely into the headband channel of the end piece (010).
2. Put the yoke (020) to the end piece of the headband (010).
3. Press the headband cable into the left part of the headband channel of the yoke (020).



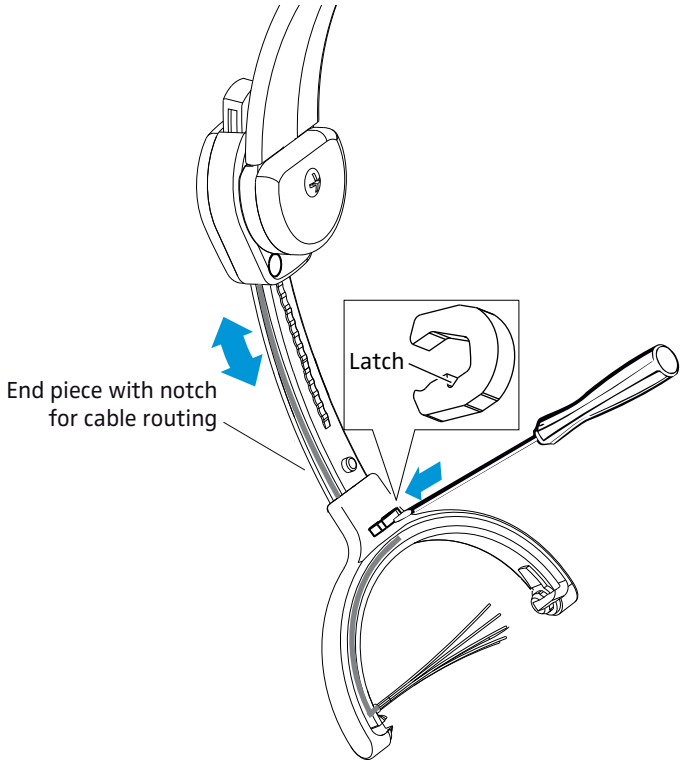
5.2.8 Assembly of the latch for headband

Note:
After the removal the latch can be damaged or get lost. Recommendation: Do not install this removed latch again. Use new headband latches.

1. Press the latch for headband (030) completely into the notch of the headband.

Note:
Ensure the correct direction/postion of the notch. The side with the notch shows to the cable channel side of the end piece of the headband (010).

2. Move the end piece of the headband (010) up and down. Ensure that the cable is completely inserted in the end piece of the headband (010).



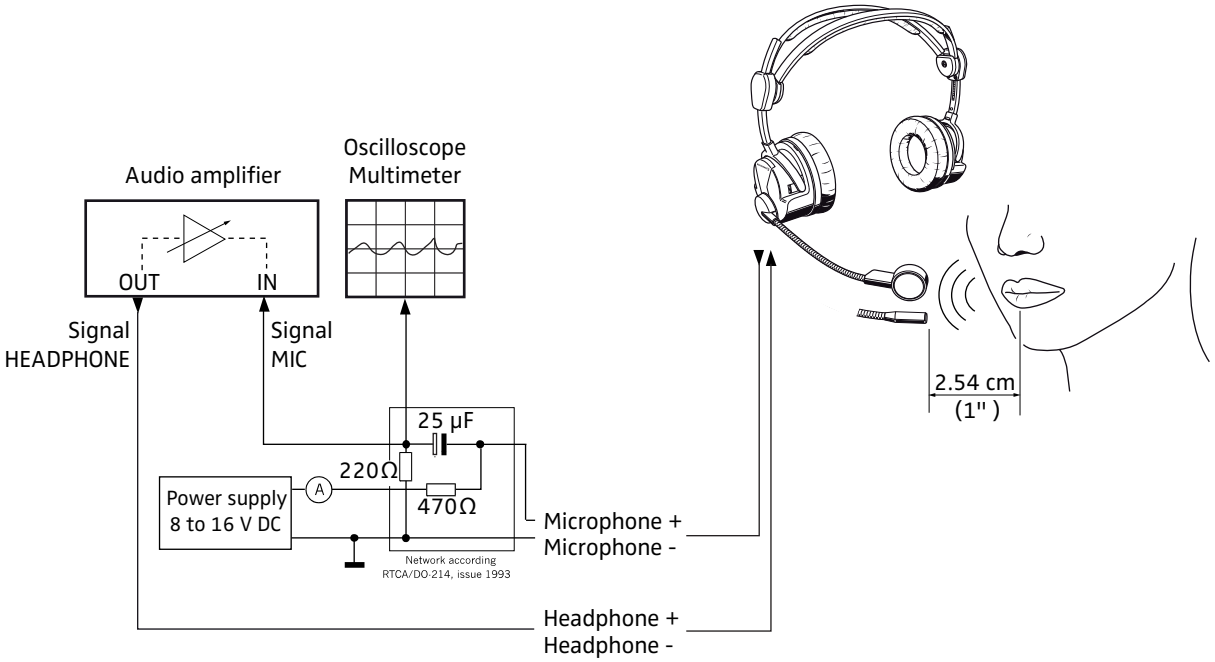
6 Functional test

See also:
- See ''Cable and connector assignment'', page 21.
- See ''PCB of the acoustic units of the HMDC 26'', page 22.
- See ''PCB of the acoustic units of the HMD/HME 26'', page 23.

6.1 Functional test of the headphones

STEP	RESULT
Via AF generator supply **1 kHz/100 mV eff ± 5 mV** to the related pins of the cable´s connector. See ''Cable and connector assignment'', page 21.	
Put on the headset	You can hear the clear 1 kHz signal without any distortions at the left and right capsule.

6.2 Functional test of the microphone



STEP	RESULT
When testing with pre-polarized microphone of the HME 26: Suppy the additional P48 voltage (48 V_{DC}).	
Connect the headphone connector of the headset´s connecting cable to an output of the audio amplifier.	
Connect the microphone connector of the headset´s connecting cable to an input of the audio amplifier.	
Connect the oscilloscope´s test cable to an high impedance output of the audio amplifier.	
Put on the headset, adjust the microphone to the correct position and speak into the microphone	You can hear your speech without any distortion at the left and right capsule. The amplified audio signal of your voice will be displayed at the oscilloscope. This visualization is helpfully for the functional test of the microphone, e.g. trouble shooting.

6.3 Functional test ActiveGard™ (HMD/HME 26)

STEP	RESULT
Set the ''ActiveGard'' switch to ''OFF'', if needed.	
Supply the AF signal **(1 kHz/2 Veff)** via AF generator **(1 kHz/2 Veff)** to the related pins of the cable´s connector: Audio Hi/Audio Lo left and Audio Hi/Audio Lo right. Adjust the AF generator: The 2 V_{eff} amplitude is available at the headset´s input connectors.	
Measure the electrical output signal at the microphone side: Transducer +/- (signal at the left channel) and Loudspeaker +/- (signal at the right channel)	See table below See ''PCB of the acoustic units of the HMDC 26'', page 22. See ''PCB of the acoustic units of the HMD/HME 26'', page 23.

1 kHz test signal at the headphone input	**Measure the level at the transducer +/- ActiveGard switch = OFF**	**Measure the level at the transducer +/- ActiveGard switch = ON**
2 V_{eff}	1.85 V_{eff} ±100 mV	420 mV_{eff} ±130 mV

6.4 Functional test NoiseGard™ (HMDC 26)

STEP	RESULT
Insert 2 completely charged alkaline batteries (type LR 6 = AA, 1.5 V) or 2 rechargeable batteries.	
Put on the headset and switch on NoiseGard via operating control.	Ambient noises/low frequencies are hearable downsized/ decreased.

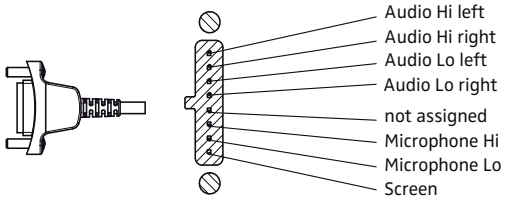
7 Circuit diagrams

For this service manual the following circuit diagrams will be needed. Download the complete circuit diagrams of the cable variants from our service portal (if needed):

- S_100615 -6
- S_100530 -H-6
- S_100616 -7
- S_100604 -B-7 (for HMDC 26)
- S_100528 -X4F
- S_100603 -H-X4F
- S_100527 -X3K1
- S_100602 -H-X3K1
- S_100531 -X3K1P48
- S_100529 -X5

7.1 Cable and connector assignment

Headset connector (HMD/HME)

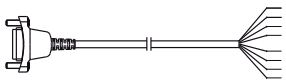


Non solder side	
Audio Hi left	
Audio Hi right	
Audio Lo left	
Audio Lo right	
not assigned	
Microphone Hi	
Microphone Lo	
Screen	

Headset connector (HMDC)

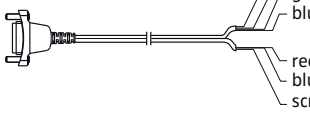
Non solder side	
Audio Hi left	
Audio Hi right	
Factory-made programming line (do not connect !)	
+3.0 V DC PowerSupply NoiseGard	
Factory-made programming line (do not connect !)	
Microphone Hi	
Microphone Lo	
Screen, Audio Lo, DC-	

Cable -6 (HMD/HME)



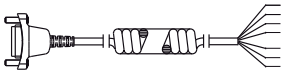
white	Audio Hi left
orange	Audio Hi right
brown	Audio Lo left
green	Audio Lo right
yellow	not assigned
red	Microphone Hi
blue	Microphone Lo
screen	Screen

Cable -7 (steel wire cable, HMD/HME)



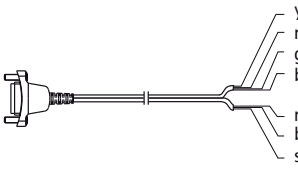
yellow	Audio Hi left
red	Audio Hi right
gray	Audio Lo left
blue	Audio Lo right
red	Microphone Hi
blue	Microphone Lo
screen	Screen

Cable -H-6 (HMD/HME)



white	Audio Hi left
orange	Audio Hi right
bown	Audio Lo left
green	Audio Lo right
red	Microphone Hi
blue	Microphone Lo
screen	Screen

Cable -B-7 with operating control (steel wire cable, HMDC)



yellow	Audio Hi left
red	Audio Hi right
gray	Audio Lo left
blue	Audio Lo right
red	Microphone Hi
blue	Microphone Lo
screen	Screen

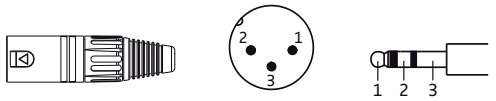
Cable -X4F/Cable -H-X4F (HMD/HME)

Solder side	
1	Microphone Lo
2	Microphone Hi
3	Audio Lo
4	Audio Hi

Cable -X5/cable -H-X5 (HMD/HME)

1	Microphone Lo
2	Microphone Hi
3	Audio Lo
4	Audio Hi left
5	Audio Hi right

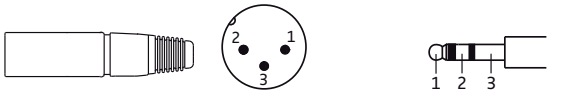
Cable -X3K1/Kabel -H-X3K1 (HMD/HME)



XLR-3 connector **6.3 jack plug**

Solder side	Solder side
1 Screen	1 Audio Hi left
2 Microphone Hi	2 Audio Hi right
3 Microphone Lo	3 Audio Lo

Cable -X3K1-P48 (steel wire cable, HME)



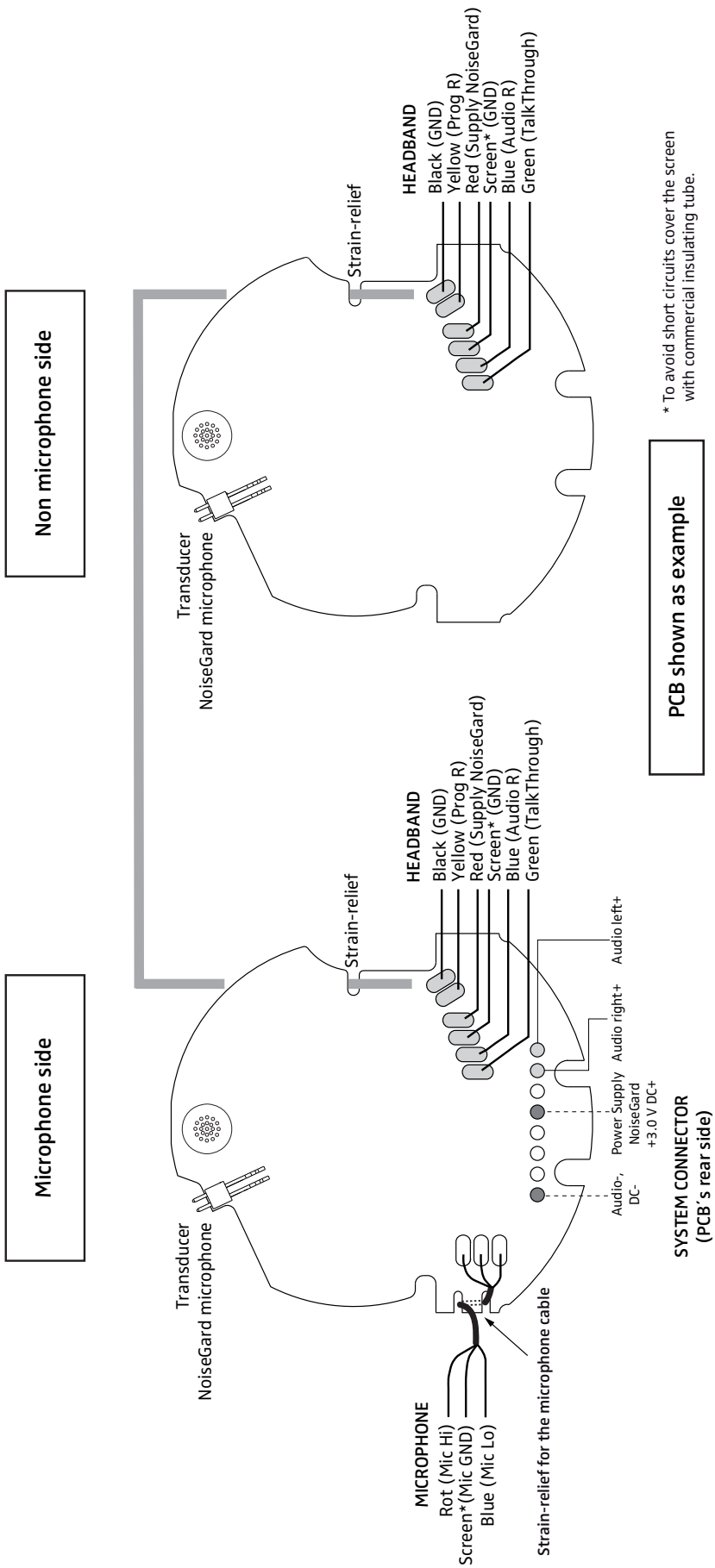
XLR-3 connector 6.3 mm jack plug

Solder side

1 GND/screen	1 Audio Hi left
2 Microphone Hi/48 VDC	2 Audio Hi right
3 Microphone Lo/48 VDC	3 Audio Lo

Together with the cable -X3K1-P48, the HME 26 is designed for P48 phantom powering as per DIN 45596.

7.2 PCB of the acoustic units of the HMDC 26



7.3 PCB of the acoustic units of the HMD/HME 26