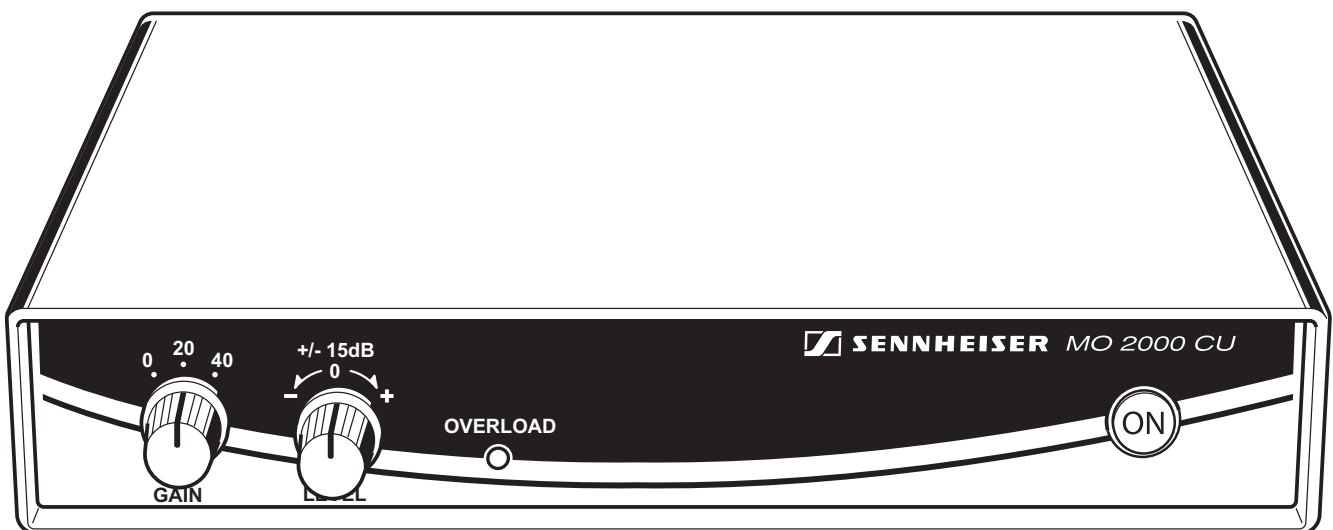


# MO 2000 Set

Instruction manual





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# Safety instructions



This instruction manual contains important safety information.

Read this instruction manual.

Keep this instruction manual in a safe place. Always include this instruction manual when passing the system on to third parties.

Heed all warnings.

Follow all instructions.

**WARNING:** To reduce the risk of fire or electric shock, do not expose the device and the mains unit to rain or moisture.

Disconnect the mains connector from the wall socket to completely disconnect the device from the mains during lightning storms or when unused for long periods of time.

Use only the supplied mains unit.

Ensure that the mains unit is:

- always readily operable and easily accessible,
- properly plugged into the wall socket,
- only operated within the permissible temperature range (see “Specifications” on page 11)
- not covered or exposed to direct sunlight for longer periods of time in order to prevent heat accumulation.

## Use of the MO 2000 CU central unit



The MO 2000 CU central unit has been designed for use with the MO 2000 H optical microphone.

## Rack mounting

When installing the device in a closed or multi-rack assembly, please consider that, during operation, the ambient temperature within the rack may significantly rise above room temperature. However, the ambient temperature within the rack must not exceed the temperature limit specified in the specifications.

When installing the device in a rack, take good care not to affect the ventilation required for safe operation or provide additional ventilation.

Make sure the mechanical loading of the rack is even to avoid a hazardous condition such as a severely unbalanced rack.

When installing the device in a closed or multi-rack assembly, please note that intrinsically harmless leakage currents of the individual devices may accumulate, thereby exceeding the allowable limit value. As a remedy, ground the rack via an additional ground connection.

## Operation

This device must be operated only from the type of power supply indicated on the type plate. Observe correct polarity!

Never push objects of any kind through openings of this device as they may touch dangerous voltage points or short-out parts that could result in fire or electric shock.

Ensure sufficient ventilation. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

Do not install near any heat sources such as central heating radiators, electric heaters, stoves, or other devices that produce heat (e.g. amplifiers). Keep the device away from direct sunlight and similar sources of heat.

Only use attachments/accessories specified by Sennheiser.

Use the device in dry rooms only. Do not expose the device to dripping or splashing and ensure that no objects filled with liquids, such as vases or coffee cups, are placed on the device. Do not use the device near water or liquids.

Should a spillage occur, unplug the device and have it checked by a technician.

## Service

No user serviceable parts inside! Do not attempt to service devices yourself as opening or removing covers may expose dangerous voltage or other hazards. If devices are opened by customers in breach of this instruction, the warranty becomes null and void.

Refer all servicing to qualified service personnel. Servicing is required if a device has been damaged in any way, such as mains cable or plug damage, liquid has been spilled, objects have fallen inside, the device has been exposed to rain or moisture, does not operate properly or has been dropped.

## Intended use of the device

"Intended use" means that the device should be used within the operating conditions and limitations described in this instruction manual. "Improper use" means using the device other than as described in this instruction manual, or under operating conditions which differ from those described herein.

## MO 2000 Set

The MO 2000 Set optical microphone system consists of the following main components:

- MO 2000 H optical microphone
- MO 2000 CU central unit

The MO 2000 H optical microphone consists of an opto-acoustic microphone head which is fitted with a fixed 3 m double fiber optic cable. The fiber optic cable is connected to the MO 2000 CU central unit. Power is supplied via an external wide voltage range power supply unit.

The MO 2000 H is an omni-directional microphone designed for picking up airborne sound. The components of the MO 2000 H microphone head (outside dimensions: 1/2 inch) are made of plastic suitable for permanent stationary use in areas where aggressive substances (gases, salts, moisture) or radiation are present. All components of the MO 2000 H microphone head are metal-free, including the fiber optic cable feed.

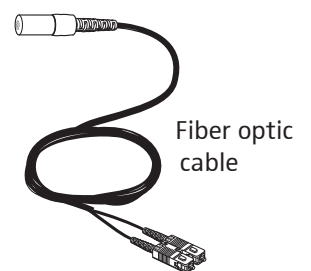
The main areas of application of the optical microphone are acoustic measurement and communication tasks in industrial environments and EMC-sensitive areas as well as medical magnetic resonance imaging and magnetoencephalographic measurement (MEG). Other applications are to be found in the field of non-detectable acoustic surveillance.

## Delivery includes

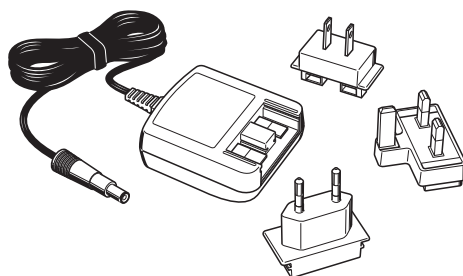
- 1 MO 2000 H optical microphone with 3 m fiber optic cable
- 1 MO 2000 CU central unit
- 1 mains unit with different country adapters
- 1 carrying case
- 1 instruction manual



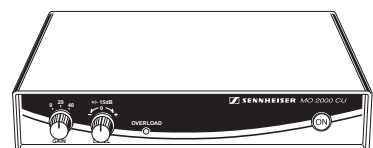
Optical microphone



Fiber optic cable

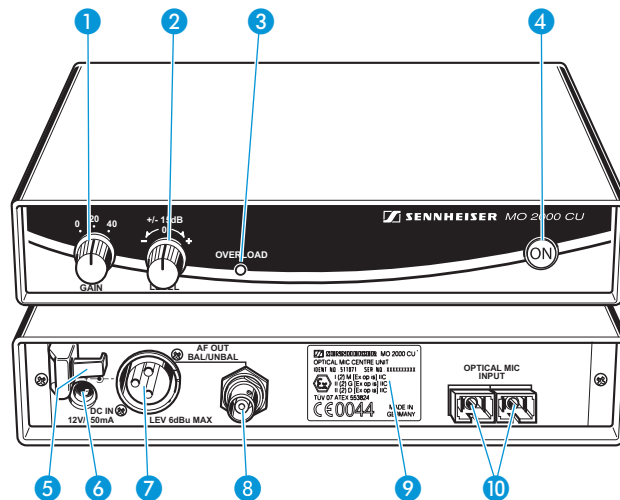


Mains unit

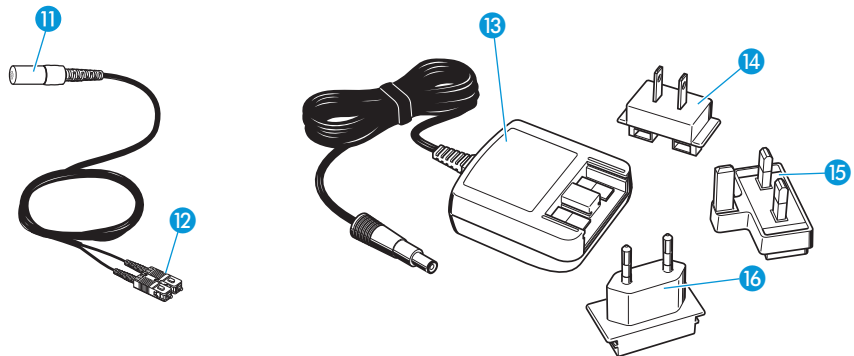


MO 2000 CU

# Product overview MO 2000 Set



- 1 Gain switch (coarse adjustment)
- 2 Level control (fine adjustment), with 0 dB mark
- 3 OVERLOAD LED
- 4 ON/OFF button
- 5 Cable grip for power supply DC cable
- 6 DC socket for connection of power supply unit (DC IN)
- 7 Audio output (AF OUT BAL), XLR-3M, balanced
- 8 Audio output (AF OUT UNBAL), BNC socket, unbalanced
- 9 Type plate
- 10 SC duplex optical connection for microphone



- 11 Optical microphone
- 12 SC duplex connector
- 13 Mains unit
- 14 US adapter
- 15 UK adapter
- 16 EU adapter (preassembled)



# Putting the system into operation

## Fitting the device feet

**CAUTION!** Risk of staining of furniture surfaces!



Some furniture surfaces have been treated with varnish, polish or synthetics which might cause stains when they come into contact with other synthetics. Despite a thorough testing of the synthetics used by us, we cannot rule out the possibility of staining.

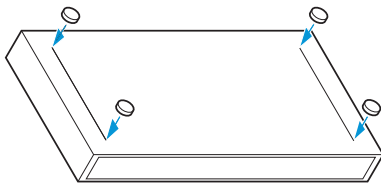
▶ Do not place the central unit on delicate furniture surfaces.

You can set up the device on an even surface or mount it into a 19" rack.

**Note:**

Do not fit the rubber feet when rack mounting the device.

## Setting up the device



To ensure that the device cannot slip on the surface on which it is placed, fix the supplied four self-adhesive soft rubber feet to the base of the device.

- ▶ Ensure that the base of the device is clean and free from grease before fitting the rubber feet.
- ▶ Fix the rubber feet to the base of the device by peeling off the backing paper and fitting them as shown.

## Rack mounting

**CAUTION!** Danger of heat damage!



When installing the device in a closed or multi-rack assembly, please consider that, during operation, the temperature within the rack may rise significantly.

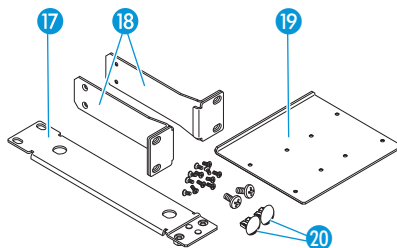
▶ Make sure not to affect the ventilation required for safe operation or provide additional ventilation.

**CAUTION!** Danger of electric shock!



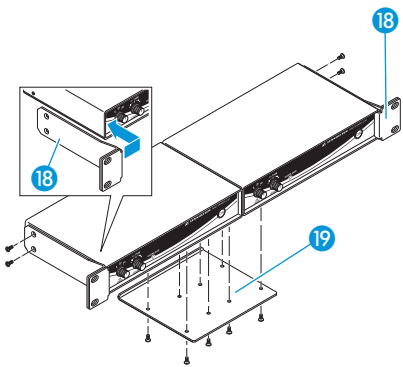
When installing the device in a closed or multi-rack assembly, please note that intrinsically harmless leakage currents of the individual devices may accumulate, thereby exceeding the allowable limit value.

▶ Ground the rack via an additional ground connection.



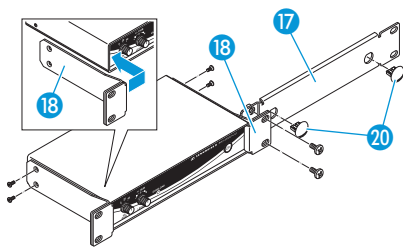
For mounting two central units into a 19" rack, you require the GA 2 rack adapter. The GA 2 rack adapter consists of:

- 1 blinking plate 17
- 2 rack mount "ears" 18
- 1 jointing plate 19
- 2 blinking plugs 20 for closing off unused BNC holes
- 12 recessed head screws M 3x6
- 2 recessed head screws M 6x10



To mount **two** central units into a rack:

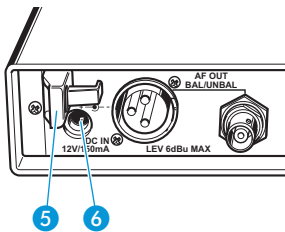
- ▶ Place the two central units side by side upside-down onto a flat surface.
- ▶ Align the jointing plate 19 over the holes in the bottom sides of the central units.
- ▶ Secure the jointing plate 19 to the central units using eight of the supplied recessed head screws (M 3x6).
- ▶ Hook the two rack mount "ears" 18 to the front panels of the central units.
- ▶ Secure the rack mount "ears" to the central units using two of the supplied recessed head screws (M 3x6) respectively.
- ▶ Slide the central units into the 19" rack.
- ▶ Secure the rack mount "ears" to the rack.



To mount only **one** central unit into a rack:

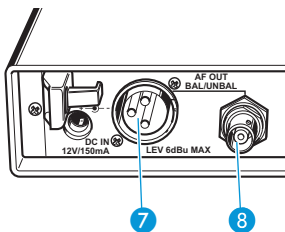
- ▶ Hook the two rack mount "ears" 18 to the front panel of the central unit.
- ▶ Secure the rack mount "ears" to the central unit using two of the supplied recessed head screws (M 3x6) respectively.
- ▶ Secure the blanking plate 17 to one of the rack mount "ears" 18 using two of the supplied recessed head screws (M 6x10).
- ▶ If you are not front mounting the BNC output connector, insert the two blanking plugs 20 into the holes of the blanking plate.
- ▶ Slide the central unit into the 19" rack.
- ▶ Secure the rack mount "ears" to the rack.

## Connecting the mains unit



- ▶ Connect the supplied mains unit to the socket 6 (DC IN). Use the cable grip 5 to secure the power supply DC cable.
- ▶ Connect the suitable adapter to the mains unit 13.
- ▶ Connect the mains unit 13 to the mains. The device switches on automatically.

## Connecting the amplifier



The audio outputs are available as a balanced XLR-3M output 7 and an unbalanced BNC output 8, allowing you to simultaneously connect two devices (amplifier, etc.). Both outputs deliver the same output voltage, are short-circuit proof and decoupled from each other.

- ▶ Connect the amplifier/mixing console to the balanced XLR-3M output 7 or the unbalanced BNC output 8. For details on balanced or unbalanced connection, see "Connector assignment" on page 12.

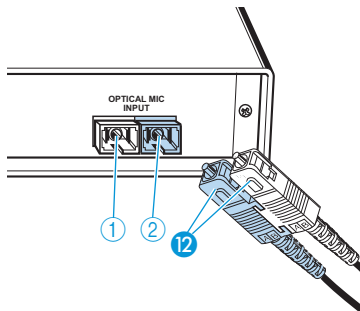
## Connecting the optical microphone

### CAUTION! Risk of damage to fiber optic cable!



Fiber optic cable must not be bent like conventional cable!

- ▶ When installing fiber optic cable, make sure not to bend it beyond a **bend radius** of 50 mm.



- ▶ Before connecting the optical microphone, remove the protection caps from the microphone connections ① and ② of the central unit. Keep the protection caps in a safe place for reuse during transport or storage. They protect the microphone connections against dirt.
- ▶ Connect the duplex connector ⑫ of the optical microphone to the microphone connections ① and ② of the central unit. Please observe the correct insertion direction of the connector. The duplex connector is connected the correct way round when the label on the connector is facing downwards as shown.

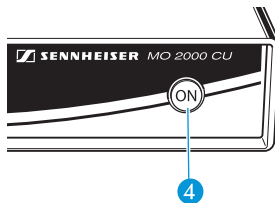
## Switching the central unit on/off

After connection to the mains, the device switches on automatically and the **ON** button ④ lights up.

- ▶ Press the **ON** button ④ to switch the MO 2000 CU central unit on or off.

### Note:

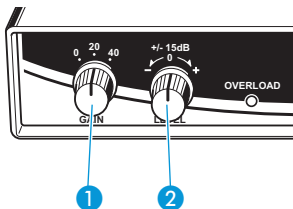
If the power supply is interrupted for several seconds (e.g. due to a power failure), the device switches on automatically even if it was switched off before.



## Adjusting the sensitivity

With the microphone connected and both the gain switch ① and the level control ② set to 0 dB, the specified sensitivity (mV/Pa) is obtained.

- ▶ Use the gain switch ① to increase the output voltage level by 20 dB (tenfold increase) or 40 dB (hundredfold increase).
- ▶ Use the level control ② to steplessly adjust the output voltage level between -15 dB and +15 dB.

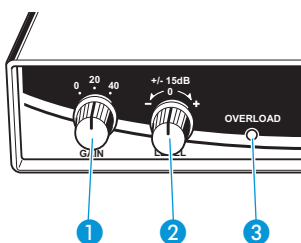


## Overload indication

The **OVERLOAD** LED ③ indicates both positive and negative voltage peaks.

If the **OVERLOAD** LED ③ lights up:

- ▶ Use the gain control ① and/or the level control ② to reduce the output voltage level so that the **OVERLOAD** LED ③ no longer lights up.



## Care and maintenance

---

**CAUTION!** Liquids can damage the electronics of the MO 2000 CU central unit!



Liquids entering the housing of the device can cause a short-circuit and damage the electronics.

- ▶ Keep all liquids far away from the device.
  - ▶ Before cleaning, disconnect all devices from the mains.
- 

**To clean the MO 2000 CU central unit:**

- ▶ Before cleaning, disconnect the device from the mains.
- ▶ Use a soft, dry cloth to clean the device.

## Accessories

| Cat.-No. | Accessory                    |
|----------|------------------------------|
| 009823   | GA 2 rack adapter            |
| 525700   | MO 2000 H optical microphone |
| 525701   | MO 2000 CU central unit      |
| 067510   | Mains unit                   |
| 502186   | MZQ 2000 microphone clamp    |
| 511999   | Carrying case                |
| 516503   | Instruction manual           |

# Specifications

## MO 2000 CU central unit

|                                      |  |
|--------------------------------------|--|
| Housing                              | $\frac{1}{2}$ 19" metal housing  |
| Front panel connections and controls | ON/OFF button with operation indicator, <b>OVERLOAD</b> LED, gain control (coarse adjustment), level control (fine adjustment), with 0 dB mark |
| Rear panel connections and controls  | DC socket for connection of mains unit, SC duplex input for microphone, XLR socket, balanced<br>BNC socket                                     |
| Power supply                         | mains unit with country adapter<br>100-240 V AC to 12 V DC, 5.4 W  |
| Power consumption of CU              | 1.5 W at 12 V DC   |
| Current consumption                  | 120 mA   |
| Gain                                 | steplessly adjustable between $\pm 15$ dB, three settings: 0 dB, +20 dB, +40 dB  |
| AF output level                      | 15 mV/Pa (level control set to central position, gain switch set to 0 dB)  |
| Output impedance                     | approx. 330 $\Omega$ unbalanced/660 $\Omega$ balanced  |
| Max. output level                    | 1.55 V   |
| Operating temperature range          | 0 °C to +40 °C   |
| Storage temperature range            | -20 °C to +70 °C   |

## MO 2000 H optical microphone

|                             |  |
|-----------------------------|--|
| Design                      | MO 2000 H microphone head with 3 m fiber optic cable |
| Pick-up pattern             | omni-directional                                     |
| Frequency response          | 20 Hz to 40 kHz ( $\pm 6$ dB)                        |
| Sensitivity                 | 15 mV/Pa   |
| S/N ratio at 1 Pa SPL       | > 50 dB(A)   |
| Max. SPL                    | 134 dB   |
| Operating temperature range | -10 °C to +70 °C                                     |
| Storage temperature range   | -20 °C to +70 °C                                     |

### Connection : fiber optic cable – extension (optional)

|            |                                 |
|------------|---------------------------------|
| Interface  | SC                              |
| Design     | multimode 200/230 $\mu\text{m}$ |
| Cable loss | approx. 3–4 dB per 100 m        |

### Optical transducer (optional)

|                 |                          |
|-----------------|--------------------------|
| Interface       | socket/socket            |
| Design          | type SC                  |
| Coupling losses | 5–6 dB per coupling pair |

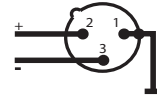
### AF cable

|        |  |
|--------|--|
| Design | balanced microphone cable with shielding |
|--------|--|

### Connector assignment

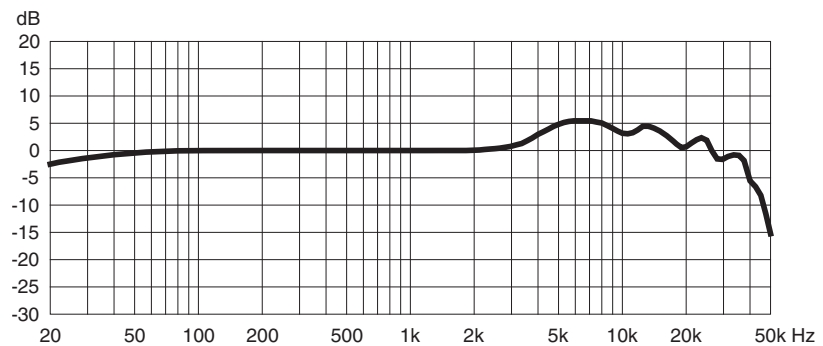


DC connector for mains unit



XLR-3F connector, balanced

### Frequency response curve



# Manufacturer Declarations

## Warranty

Sennheiser GmbH & Co. KG gives a warranty of 24 months on this product.

For the current warranty conditions, please visit our web site at [www.sennheiser.com](http://www.sennheiser.com), or contact your Sennheiser partner.

## CE Declaration of Conformity



This equipment is in compliance with the essential requirements and other relevant provisions of Directives 2004/108/EC and 2006/95/EC.

## Statements regarding FCC and industry Canada


This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this equipment not expressly approved by Sennheiser electronic Corp. may void the FCC authorization to operate this equipment.









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Printed in Germany

Publ. 08/08

524194/A01

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