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GBA-EN – HEG neuro – V1 – 21.07.2022



HEG neuro und HEG neuro-System

Instructions for use



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Foreword

HEG stands for haemo-encephalography. With the help of red/infrared light, the degree of redness in a certain area of the forehead is determined locally; this in turn offers conclusions about the degree of intensity of the blood flow and thus also the oxygen supply in this area.

If you are interested, you will find further information and background on haemo-encephalography at the end of this manual.

You can use the HEG neuro in two ways:

1. *Targeted relaxation and concentration training in conjunction with a smart-phone or tablet with the Body & Mind app installed.* The app is available for both iOS and Android devices and can be downloaded free of charge from the internet. Optionally, the training can be extended with the TPS sensor from Thought Technology.
2. *For integration into classic biofeedback and neurofeedback with a ProComp encoder from Thought Technology.* For this purpose, a HEG neuro Connector is required, which ensures the transmission between HEG neuro and the ProComp encoder. This makes it possible to measure and train a large number of peripheral parameters such as muscle tension, pulse, ECG, ... but also neuronal parameters such as the targeted change of certain brain frequencies.

For your notes

Warranty

With the acquisition of the HEG neuro of

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you receive a warranty claim for two years for the perfect function* of the device. In addition to this warranty, we offer you a telephone hotline service for the entire time you are working with the device.

This service includes:

- Advice on the use of the HEG neuro
- Assistance with possible malfunctions
- Answers to questions „about biofeedback and neurofeedback“.

You can reach the telephone hotline under the number

+49 (0) 5130 – 9 77 78-0

Of course you can also send us your questions

send us a fax: +49 (0) 5130 – 9 77 78-22

by email: service@meditech.de

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* Excluded are malfunctions and damages caused by improper actions of the user.


Safety instructions


The HEG neuro has been developed for use in concentration and relaxation training. The aim is to train the user to regulate the oxygen concentration of the blood in the forehead area in a targeted manner.

The use for other purposes is not intended and therefore not permitted.

 **Attention** Do not place the HEG neuro too tightly against the head. It could squeeze the exerciser and / or lead to incorrect training data due to increased stress.

Putting the headband on too loosely is not dangerous, but can also lead to incorrect training data.

 **Attention** Do not charge the HEG neuro when it is applied to the trainee's head. It should also only be charged when switched off. This prevents injuries and has a positive effect on the battery life.

 **Attention** *Do not open the housing of the device without authorisation! Do not repair faults and defects on your own! The device could be permanently damaged.*

follow-up time; the application is free of EEG-typical interference and leads to fast conditioning processes that are comprehensible to the client. ADS clients thus learn to control their own attention and concentration in a more targeted way - here new hope is created for the fidgety.

HEG biofeedback is thus particularly suitable for the treatment of children and adults with attention disorders and lack of impulse control, such as ADD / ADHD.

In companies and institutions, this method can be used to increase mental performance, alleviate depressive moods, promote concentration and creativity and develop a trusting and positive basic mood in everyday life.

The movement-insensitive application of the HEG sensor naturally also opens up new possibilities for all other biofeedback therapies, e.g. in the treatment of headaches or depression, in which the activation of the frontal brain plays a role.

Background to the HEG training

„HEG“ stands for hemo-encephalography. With the help of red/infrared light, the degree of redness in a certain area of the forehead is determined locally; this in turn offers conclusions about the degree of intensity of the blood flow and thus also the oxygen supply in this area. In many cases, a change (increase) in the blood flow can lead to a higher oxygen saturation and thus a higher performance of the area addressed. When a specific area in the brain is activated to perform a task assigned to it, the blood flow in that area increases to maintain the supply of oxygen, glucose and other important nutrients. This activation is always accompanied by a clearly increased cell metabolism. It supplies the affected cells with the necessary energy. This process is called HEG biofeedback training.

HEG biofeedback is understood as a special form of neurofeedback (EEG-based biofeedback), as it is based on the conscious control of blood flow and metabolism in the brain. Clients are conditioned according to the classical principles of biofeedback (feedback of body signals).

The decisive advantage of HEG compared to classical neurofeedback sensors is the fast, simple and movement-insensitive application and fixation of the sensor. In contrast to EEG biofeedback, HEG biofeedback requires virtually no preparation or



Attention Protect the HEG neuro from rain, high humidity and perspiration. The red/infrared LED and the photoelectrode could be damaged.



Hint For medical reasons, the stimulation LEDs emit red and infrared light. For technical reasons, the colour RED is required for the charging light on the HEG neuro, although according to DIN EN 60601-1 this colour is only intended to indicate danger or urgent need for action. When using the HEG neuro, there is no dangerous situation that needs to be indicated in this way.



Hint Do not tear the retaining straps. Although these are quite stable, they can lose their elasticity and are then no longer suitable for the high wearing comfort of the HEG neuro.

A training session with the HEG neuro

The HEG neuro is intended for training as well as for changing and controlling the blood oxygen concentration in the forehead area. To use the HEG neuro, the following procedure has proven to be effective:

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2. Connect the HEG neuro to the receiver 8
 - with Body & Mind App on mobile device
 - with ProComp encoder via HEG neuro Connector
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5. Set HEG neuro down 13
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Learn how to perform these steps on the following pages.

Rot-LED		* (at a temperature of 25 °C)
Shape	3.2 mm x 1.6 mm	
Colour	rot	
Wavelength	660 nm	
Beam angle	40°	
Operating voltage *	2.1 V	
Maximum voltage *	2.5 V	
I _{F(max)}	30 mA / 150mA (at 0.1 ms pulse width)	
InfraRot-LED		* (at a temperature of 25 °C)
Shape	3.2 mm x 1.6 mm	
Colour	infrarot	
Wavelength	880 nm	
Beam angle	40°	
Operating voltage *	1.3 V	
Maximum voltage *	1.6 V	
I _{F(max)}	50mA / 1200 mA (at 10us pulse width)	

Technical data

Power supply	2.8 - 4.2 V (3.7 V LiPo battery)
Operating current	23 mA
Sampling rate	64 sps
Connections	5 V USB-C socket
Frequency range	2 Hz - 1,000 Hz
Output signal	Digital data transmission via wireless connection
Dimensions (W x H x D in cm)	<i>HEG neuro sensor: 6.5 x 3.8 x 2</i> <i>Closure clip unit: 7.5 x 3.5 x 2.5</i> <i>Total length with retaining strap: up to 73 cm</i>
Weight	63.5 g (incl. battery and retaining strap)
Enclosure protection class	IP 20
Operation	
Ambient temperature	+10 °C up tp +40 °C
Relative humidity	30% up tp 75%
Air pressure	700 - 1.060 hPa
Storage and transport	
Ambient temperature	+ 10 °C bis +50 °C
Relative humidity	20 % bis 95 %
Air pressure	700 - 1.060 hPa

1. Switch on the HEG neuro

Briefly press the on/off switch of the HEG neuro.

The upper light starts to flash.

On the flat back of the HEG neuro, an additional control lamp lights up very briefly.



Note

If this is not the case, press the button again. If the light still does not start flashing, the HEG neuro is probably discharged. Then connect it to a power source before the training session. Follow the instructions in the subchapter Charging the HEG neuro.

2. Connect the HEG neuro to the receiver

You can use the HEG neuro in many ways. The connection to the receiver is wireless:

1. *Connect to a mobile end device (smartphone or tablet) for relaxation and concentration training. To do this, follow the procedure as described in the instructions for use for the Body & Mind app.*
2. *For integration into classic biofeedback and neurofeedback with a ProComp encoder. To do this, follow the procedure as described in the instructions for use for the HEG neuro Connector. This creates a wireless connection to the HEG neuro Connector and from this a wired connection to the ProComp encoder.*

Important!

Do NOT start the session yet. Attaching the HEG neuro to the head would generate measurement results that would lead to errors in the evaluation and thus to misinterpretations.

If the HEG neuro is correctly connected to the receiver, the upper light is permanently green.



<p><i>The HEG neuro only sends data to the receiver irregularly.</i></p>	<p>Check the positioning of the HEG neuro housing. It is important that there is always contact between the skin and the stimulation LED and the photoreceptor.</p> <p>The battery of the HEG neuro may be discharged. Check whether the function light (upper light) is permanently lit. If this is not the case, press the start button on the device.</p>
<p><i>The HEG neuro 'loses' the wireless connection to the receiver.</i></p>	<p>Check the settings and battery status of the terminal device. Occasionally the connections are interrupted.</p> <p>Also check the battery charge of the HEG neuro. Too low a battery charge may be the cause. Is the upper light still on?</p>

Do any other errors or problems occur when using the HEG neuro?

Please contact our technical customer support

on +49-(0)5130-97778-0 or via mail: service@meditech.de



We can then discuss further steps together!

Questions and troubleshooting

Error	Suggested solution
<i>The HEG neuro flashes on the flat underside at the stimulus LEDs</i>	This occurs when a session has been started on the computer or on the mobile terminal. The light and the measuring sensor are used to measure the blood oxygen concentration of the skin on the forehead. The light is harmless and is used for training.
<i>The HEG neuro causes headaches for the trainee.</i>	The strap is probably too tight and creates too much pressure. Remove the HEG neuro from the exerciser's head. While he is recovering, you can use the clamps and the scissors to lengthen the strap so that it is looser on his head. It is also possible that the training is too strenuous for the user. Interrupt the training and continue it later with a shorter duration.
<i>The HEG neuro often slips down.</i>	The strap may be too loose. Tighten it with the help of the clamps.

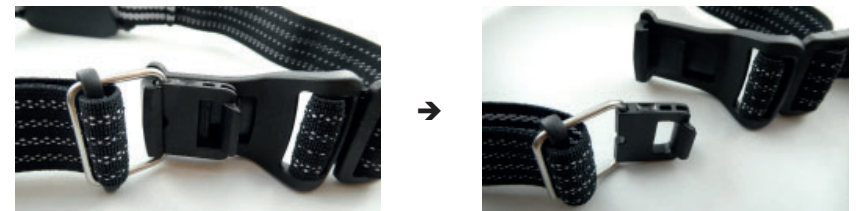
3. Attach HEG neuro to head

Advance notes

- Remove grease, sweat and make-up from the contact surface of the HEG neuro with a cloth. Make sure that the HEG neuro rests directly on the forehead of the user. Hair and make-up should be removed from the contact surface - or at least from the location of the lamps.
- The HEG neuro should be positioned above the eyebrows and orbital bones.

Procedure

1. Open the clasp that connects the two ends of the headband. ends together. Pull the clasp parts away from each other. The clasp parts are magnetic, so you will feel a slight resistance.



2. If necessary, change the length of the headband. To do this, push the bar on the wire eyelet at the snap-in clip into the middle, pull the band loop in one direction or the other until the desired length is reached and push the bar back to the edge of the wire eyelet. This fixes the length of the headband.



3. Place the HEG neuro on the forehead of the exerciser. Make sure that the HEG neuro is correctly aligned: the flat surface is against the forehead. The writing on the front (curved surface) should be 'normally' legible, i.e. not upside down.

Hint: If you put on the HEG neuro yourself, you can feel the correct alignment: The raised lettering can be felt at the bottom of the front of the housing, and you can feel the on/off switch at the top as a hemisphere.

4. Hold the HEG neuro housing with one hand and pull the headband side with the clip holder above the trainee's ear to the back of the head.

Disposal

The housing of the HEG neuro consists of plastics and electronic components and can be disposed of and recycled accordingly. The HEG neuro contains a 3.7 V lithium polymer battery that must not be disposed of with household waste.



Find out from your local recycler what disposal is required for these components. This may vary from region to region.

For disposal, we recommend removing the retaining strap and the fastening clips from the HEG neuro so that they can be sorted and processed more easily by recycling machines. easier for recycling machines to sort and process.

- Keep the LED lights clean. You can remove dust with a dry cloth or a very soft brush.



Note The housing of the HEG neuro is glued and not intended to be opened - not even for cleaning. Opening the housing is not permitted and will invalidate any claims against Medi-TECH.

After each change of exerciser:

- Clean the housing of the HEG neuro with a damp, lint-free cloth. Moisten the cloth with cleaning alcohol isopropanol 70 %.
- Spray the fastening straps with a disinfectant spray and wait until it is dry again before using the HEG neuro again.

5. With the hand that was previously holding the HEG neuro housing, stroke along the other side of the headband and use it to place the band on the head. Pull the band minimally so that the HEG neuro case remains against the forehead.
6. Continue to pull the band against the head with your hand until you reach the closure clip.
7. Insert the closure clip into the clip holder. It is usually sufficient to hold the closure clip over the clip holder. The magnetic ends usually already pull together. Watch out for the trainee's hair. The fastener could pull.
8. If necessary, correct the position of the HEG neuro housing on the forehead. It should be positioned centrally on the forehead. The sensor may be too tight or too loose. Then change the length of the straps again.



4. Start and conduct session

HEG neuro is now available as a sensor for the training.

You can start and conduct the session as described in the instructions for use of the Body & Mind app or BioGraph.

During the session, the stimulation LEDs located on the underside of the HEG neuro generate red and infra-red light. The reflections returned by the skin are determined by the photoreceptor.

These values are transmitted wirelessly to the receiver, calculated and evaluated with the help of the corresponding programme and displayed graphically. Depending on the task set during the training, the trainee can watch a movie or other feedbacks are given that serve the training purpose.

Hint:

Pay attention to the exerciser during the training. If there is any discomfort or other symptoms, stop the training. It may be necessary to discontinue the HEG neuro should it be pressing.

Storage and care

- Store the HEG neuro in the soft case in which it was delivered. This protects it from damage, dust and strong light. The plastic housing, the LED lights and the headband are then more durable.



The lower light of the HEG neuro starts to glow red. This signals that the charging process has started.

4. Place the HEG neuro next to the charger so that it can be charged in peace and without damage.



A complete charge of the HEG neuro takes about 3 hours. The end of the charging process is reached when the lower light on the HEG neuro lights up green.

5. Pull the USB plug of the charging cable out of the power source.
6. Pull the USB-C plug out of the HEG neuro socket.



The HEG neuro is now fully charged again. You can store it in the soft case or continue with the training.

5. Set HEG neuro down

At the end of the training session, the HEG neuro can be removed from the head again. To do this, simply open the locking clip again from the clip holder. You can then simply remove the HEG neuro from the head.



6. Switch off HEG neuro

After the HEG neuro has been set down, it can be switched off. To do this, press the button next to the lights for about four seconds. The light goes out again.


You can now clean the HEG neuro and store it in the soft case.



7. Charging the HEG neuro

Depending on the training duration and intensity, the included battery has a runtime of 10 to 15 hours. However, the capacity may decrease in the course of the service life.

We recommend keeping an eye on the training duration - especially during intensive use - and charging the HEG neuro after about 12 hours of operation to ensure sufficient battery charge.

 **Attention** Do not charge the HEG neuro when it is applied to the trainee's head. It should also only be charged when switched off. This prevents injuries and has a positive effect on the battery life.

1. Switch off the HEG neuro.
2. Insert the USB-C plug of the charging cable (included in the scope of delivery) into the socket provided on the HEG neuro.
3. Plug the other end (USB-A) of the charging cable into the USB-A socket of a charger, power bank or computer.

