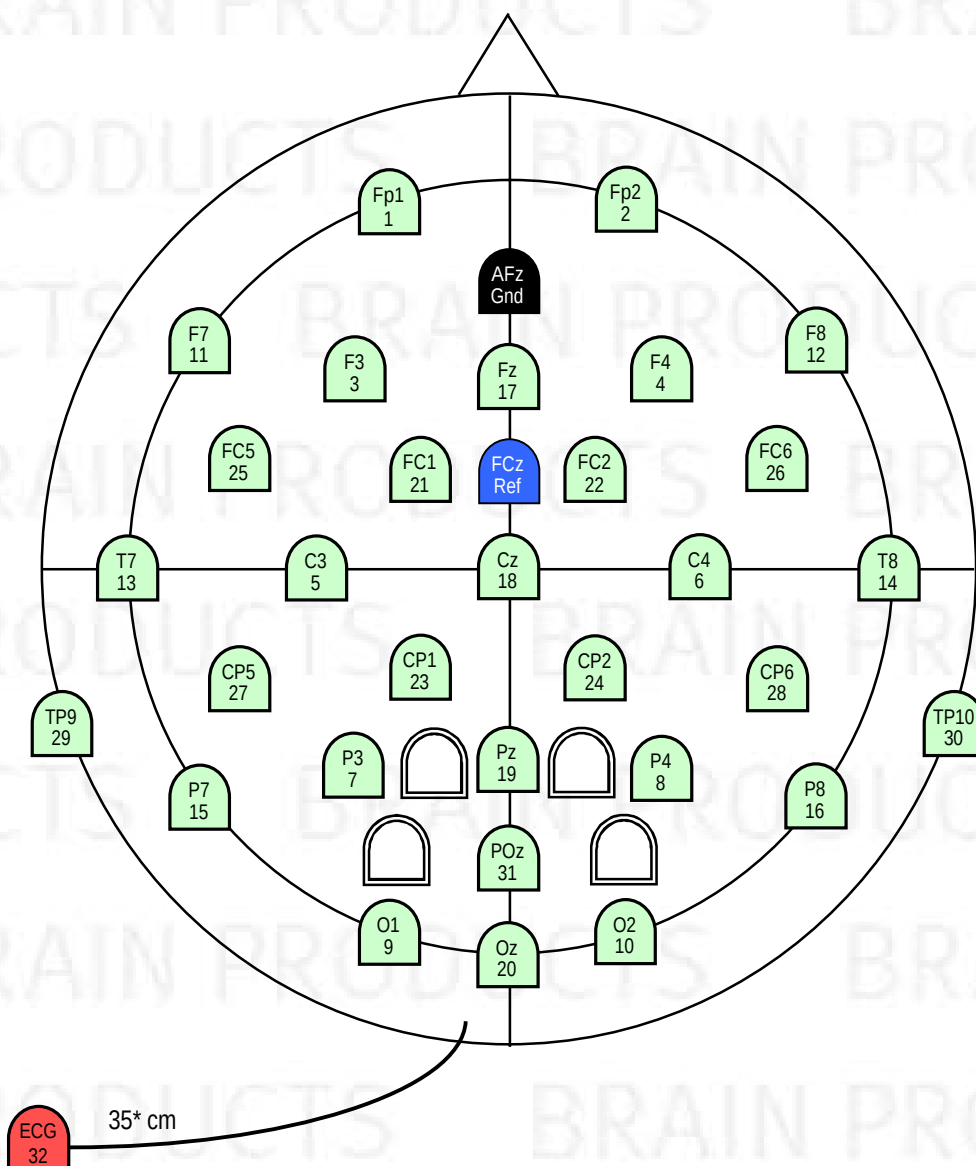




32Ch Standard BrainCap-MR with Multitrodes

Electrode Layout and Channel Assignment:



Details

When ordering please give Article Number, Cap Cut, Exit Point, and Size
(e.g. *BC-MR-32, C-Cut, Exit FFCz, 56*):

- Article Number: *BC-MR-32*
- Cap Cut: *C-Cut or A-Cut*
- Exit Point: *Cable Tree Exit Frontal (at FFCz) or Central (at CPz)*
- Size (head circumference, given in cm):
 - Adult caps: 54, 56, 58, 60, 62, 64 (average male: 58, average female: 56)
 - Children caps: 50 (3-4 years), 52 (5-10 years), 54 (11-14 years)
 - Infant caps: 34, 36 (*newborn*), 38, 40 (*3 months*), 42, 44 (*7 month*), 46, 48 (*2 years*)

The catalogue-number comprises the cap as described. For further information about accessories or consumables, please visit our website or contact our local distributor.

Cap

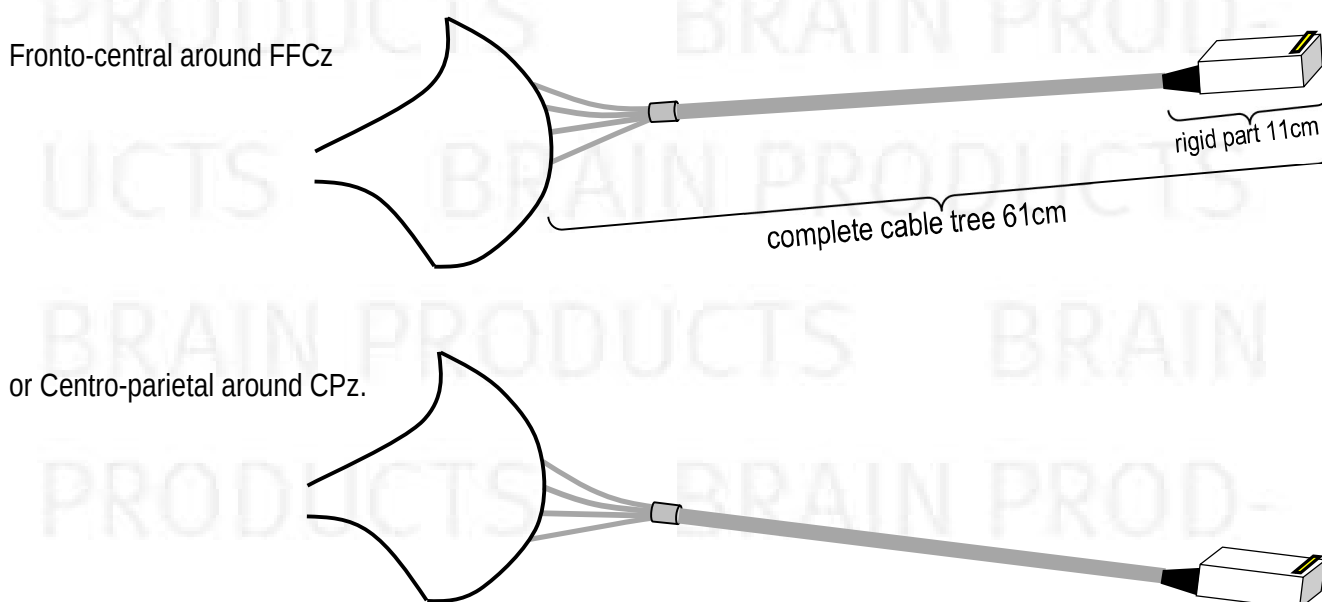
Standard: Subtemporal Cap with integrated chin belt, white.

Sizes 52 – 60 made from High Precision Fabric, Sizes 50 and smaller made from High Comfort Fabric

Options: *C-Cut or A-Cut, Size. For further variations, contact us*

Exit Point of Cable Tree

In MR caps, depending on headcoil being used, the optimal exit point of the cable tree can be either



Please choose one of these options when ordering, depending on the headcoil being used.

Options: *Exit FFCz, Exit CPz*

Electrodes

All electrodes are Multitrodes for MR with sintered Ag/AgCl sensors. They are buttoned directly into the cap (total height less than 3,5 mm) or can be attached to the skin with washers (= double-sided adhesive rings). In the parieto-occipital area, empty electrode housings (double border lines in the layout) provide more comfort.

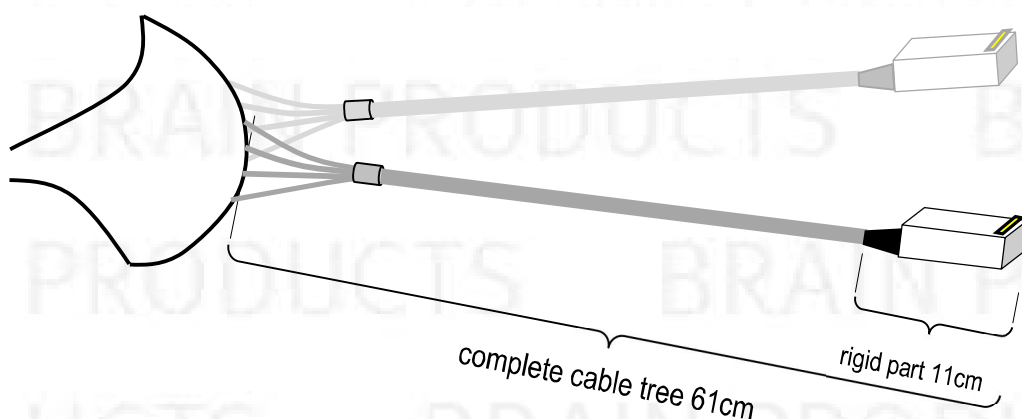
All electrodes in the cap are fitted with 5 kOhm-resistors directly after the sensor. Drop-down ECG-electrodes are fitted with 15 kOhm resistor.

The electrode housing colours are according to the above figure. All cables are white, except Ch32 (red cable), Ref (blue cable), and Gnd (black cable). All electrodes are name-labelled (Fp1, Fp2, ...) near the sensor.

The ECG electrode cable part outside the cap is covered in silicone wherever possible, for waterproofing - or if more suitable in spiral tube - to avoid direct contact to skin.

* ECG cable length is dependent on cap size, and will be reduced for children caps

All cables are led on the outside of the cap directly to the exit point of the cable tree. Cables are fixed with double-T-nylon threads. The cables leave the cap in branches of approx. 8 cables. These branches leave radially from the area around FFCz or CPz, straight into a uniting point after approx. 5 cm. After the uniting point, a cable tree continues to the BrainCap-connector-box. The overall length of the cable tree is approx. 61 cm.



Termination

The cable tree leads to a Connector box. From here the caps are connected to BrainAmp-MR with 30 cm-flat-ribbon-cables. These flat ribbon cables are bundled with the BrainAmps. Additional cables can be re-ordered from BrainProducts (Cat-No. BP-02400-NN) or from Easycap (Cat.-No. E80).

Inside each connector box is another 5 kOhm-resistor on each channel, Ref, Gnd.

Further Option with Surcharge

Carbon Wire Loops

The BrainCap MR can be equipped with additional carbon wire loops (CWL) for better artefact correction.

Carbon wire loops will terminate into a BrainAmp ExG.

For ordering, please add "with CWL", e.g. *BC-MR-32, C-Cut, Exit FFCz, 56, with CWL*.

Theta / Phi Coordinates for BC-MR-32

Channel-Number	Name	Theta	Phi
1	Fp1	-90	-72
2	Fp2	90	72
3	F3	-60	-51
4	F4	60	51
5	C3	-45	0
6	C4	45	0
7	P3	-60	51
8	P4	60	-51
9	O1	-90	72
10	O2	90	-72
11	F7	-90	-36
12	F8	90	36
13	T7	-90	0
14	T8	90	0
15	P7	-90	36
16	P8	90	-36
17	Fz	45	90
18	Cz	0	0
19	Pz	45	-90
20	Oz	90	-90
21	FC1	-31	-46
22	FC2	31	46
23	CP1	-31	46
24	CP2	31	-46
25	FC5	-69	-21
26	FC6	69	21
27	CP5	-69	21
28	CP6	69	-21
29	TP9	-113	18
30	TP10	113	-18
31	POz	67	-90
32	ECG		
Ref	FCz	23	90
Gnd	AFz	67	90

These values are standardized to a Theta of 90° for the plane through Fpz, T7, T8, Oz.

The signs follow this convention:

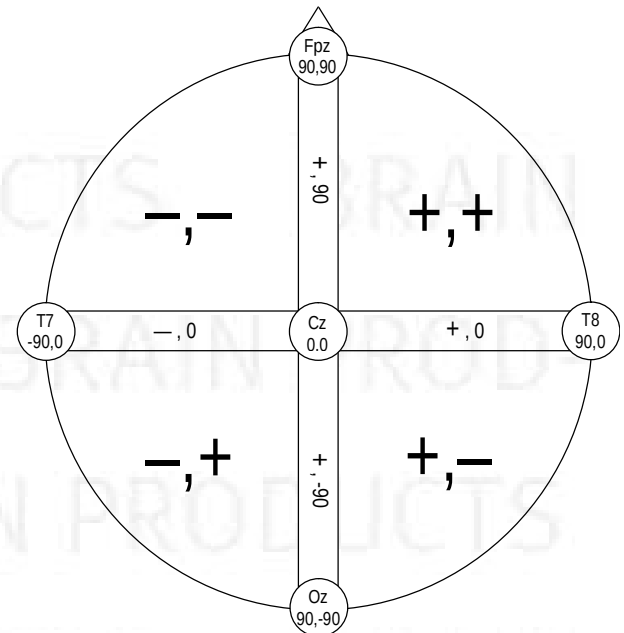


Table of ECG cable lengths

head circumference	length of ECG cable
64-52	35
50	30
48	28
46	26
44	24
42	22
40	20
38	18
36	16
34	14
32	12
30	10
29	9
28	8
26	7
24	6
22	5

Summary of Safety Rules for BrainCap MR

Together, the BrainCap MR and the BrainAmp MR / MR plus form a MR-conditional system according to ASTM 2503-20 and IEC 62570:2014.



In this context, the term MR-conditional means that restrictions from the manufacturer regarding field strength and imaging sequences apply to the product. A detailed explanation of the conditions for use can be found in the document '*Performing simultaneous EEG-fMRI measurements - Conditions for the safe use of BrainAmp MR amplifiers and accessories in the MR environment*'. A hard copy can be ordered from Brain Products (BP-265-4000) or it can be downloaded from the Brain Products website.

A summary of the main safety related points can be found below.

Any safety rules stipulated by the manufacturer of the MRI-Scanner and the local scanning facility must also be followed.

Scanner field strength and MR-sequences:

The BrainCap MR is designed and approved for field strengths up to 3T.

For MRI sequences used with the BrainCap MR there is a maximum allowed RF power; at 3 T B1+rms must not exceed 1 μ T.

All other conditions specified in the BrainAmp MR user manual must also be met.

Cable Routing:

No loops in connection cables or electrode leads are allowed. When recording in the MR environment all cables between the BrainCap MR and the BrainAmp MR / MR plus must be routed as straight as possible and must never form loops or similar (e.g. meander).

Amplifier protection:

To protect amplifiers from RF overload it is important that all connected electrodes have low impedance values during measurements in the MR scanner. Impedance values can be verified by means of the impedance mode in BrainVision Recorder.

This also applies if the BrainCap MR is used for measurements on imaging phantoms; all electrodes must be connected and have a low impedance. This can be achieved by covering the entire phantom surface with electrode gel and filling all electrodes with gel. Never perform phantom measurements with the BrainCap MR connected to the amplifier with unterminated electrodes.

Repair:

The cap may not be altered by the customer. For any repair the cap must be sent to Brain Products via the local Brain Products distributor.