

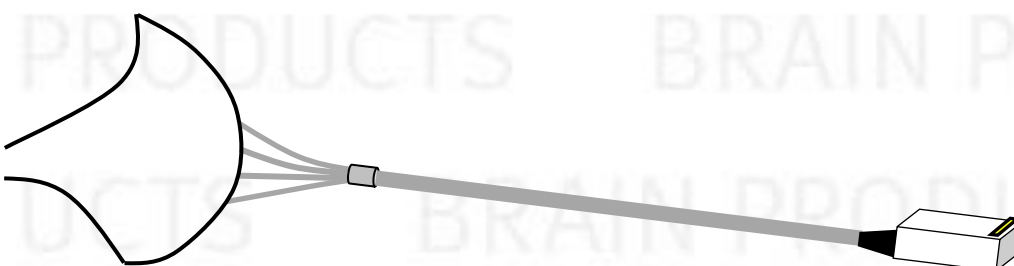
More Details for Users

Exit Point of Cable Tree

In BrainCap-MRS the exit point of the cable tree can be either fronto-central



or centro-parietal.



Upon ordering one of these options needs to be chosen. The decision depends upon the headcoil used.
(All BrainCap-MRS built before October 2019 have the centro-parietal exit point.)

Ordering Information

For ordering please give **Article Number, Cap Cut, Exit Point, and Size**
(e.g. *BC-MRS-128, C-Cut, Exit FFCz, 56*):

- Article Number: **BC-MRS-128**
- Cap Cut: **C-Cut** or **A-Cut**
- Exit Point: **Cable Tree Exiting at FFCz** or **Cable Tree Exiting at CPz**
- Size (given in cm head circumference):
 - Adult caps: **54, 56, 58, 60, 62, 64** (average male: 58, average female: 56)
 - Children caps: **52** (5-10 years), **54** (11-14 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: SubInion Cap with integrated chin belt, white

Sizes 52 – 64 made from High Precision Fabric, Sizes 50 and smaller made from High Comfort Fabric

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

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).

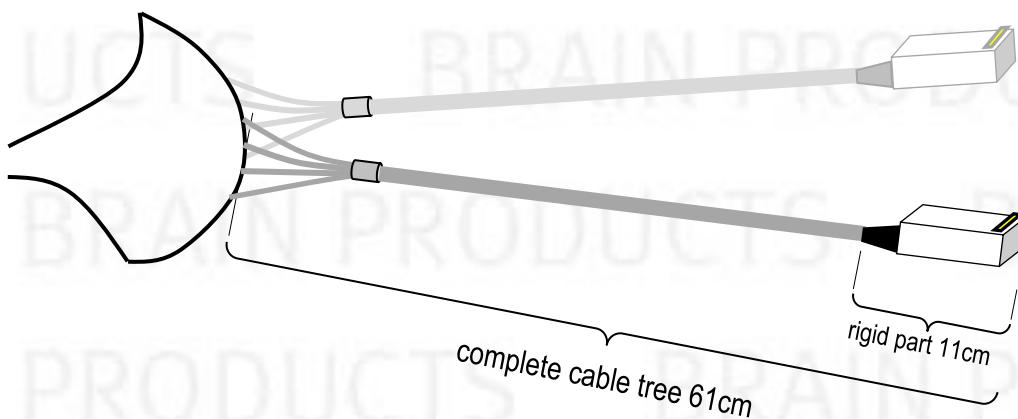
All electrodes in the cap are with 5 kOhm-resistors directly after the sensor. The drop-down electrodes (EMG for chin EMG, and ECG) are with 15 kOhm resistor.

Electrode housing colours are according to the above figure. All cables are white, except Ch 29-32 red, REF = blue cable, GND = black cable. All electrodes are name-labelled (Fp1, Fp2, ...) near sensor.

The drop-down electrode cable parts outside the cap are covered waterproof wherever possible in silicone - or if more suitable in spiral tube - to avoid direct contact to skin.

All cables go on the outside of the cap directly to the leaving point of the cable tree. Cables are fixed with double-T-nylon threads. The cables part from the cap in branches of approx. 8 cables. These branches leave radially from the area around FFCz or CPz and straight/tight to a uniting point after approx. 5 cm. After the uniting point, one cable tree continues to the BrainCap-connector-box.

The length of the cable tree until the end of the connector box is approx. 61 cm.



Termination

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

Inside the connector box there is another 5 kOhm-resistor on each channel, REF, GND..

The top side of the connector box is labelled "BrainCap-MR". The bottom side label states

- 10k Ω in cap electrodes (5k Ω : tip + 5k Ω : box)
- 20k Ω at drop-down (15k Ω : tip + 5k Ω : box)
- Amp1, Amp2, Amp3, Amp4

Theta / Phi Coordinates for BC-MRS-128

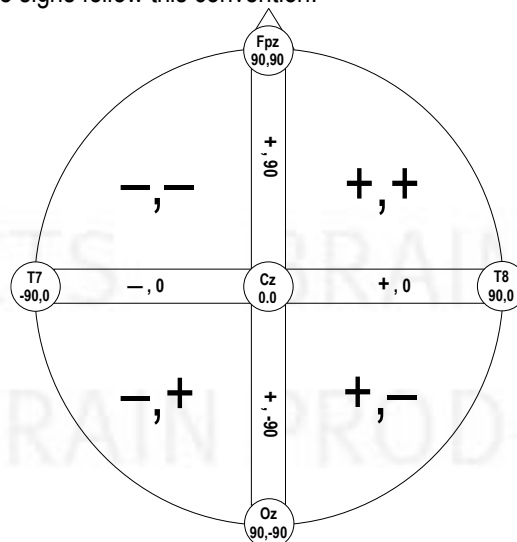
Name	Ch-No.	Theta	Phi
Fp1	1	-90	-72
Fp2	2	90	72
F3	3	-60	-51
F4	4	60	51
C3	5	-45	0
C4	6	45	0
P3	7	-60	51
P4	8	60	-51
O1	9	-90	72
O2	10	90	-72
F7	11	-90	-36
F8	12	90	36
T7	13	-90	0
T8	14	90	0
P7	15	-90	36
P8	16	90	-36
FPz	17	90	90
Fz	18	45	90
Cz	19	0	0
Pz	20	45	-90
POz	21	67	-90
Oz	22	90	-90
FT9	23	-113	-18
FT10	24	113	18
M1	25	-121	18
M2	26	121	-18
EOG1	27	-121	-30
EOG2	28	121	30
EMG1	29	-150	-52
EMG2	30	140	61
EMG3	31	152	53
ECG	32	-162	44
AF3	33	-74	-68
AF4	34	74	68
F1	35	-49	-68
F2	36	49	68
F5	37	-74	-41
F6	38	74	41
FC1	39	-31	-46
FC2	40	31	46
FC3	41	-49	-29
FC4	42	49	29

FC5	43	-69	-21
FC6	44	69	21
FT7	45	-90	-18
FT8	46	90	18
C1	47	-23	0
C2	48	23	0
C5	49	-68	0
C6	50	68	0
CP1	51	-31	46
CP2	52	31	-46
CP3	53	-49	29
CP4	54	49	-29
CP5	55	-69	21
CP6	56	69	-21
TP7	57	-90	18
TP8	58	90	-18
P1	59	-49	68
P2	60	49	-68
P5	61	-74	41
P6	62	74	-41
PO3	63	-74	68
PO4	64	74	-68
AFp1	65	-79	-82
AFp2	66	79	82
AF7	67	-90	-54
AF8	68	90	54
AFF1h	69	-57	-82
AFF2h	70	57	82
AFF5h	71	-72	-55
AFF6h	72	72	55
FFC1h	73	-35	-73
FFC2h	74	35	73
FFC3h	75	-46	-48
FFC4h	76	46	48
FFC5h	77	-62	-35
FFC6h	78	62	35
FFT7h	79	-81	-29
FFT8h	80	81	29
FCC1h	81	-16	-45
FCC2h	82	16	45
FCC3h	83	-35	-19
FCC4h	84	35	19
FCC5h	85	-57	-12

FCC6h	86	57	12
FTT7h	87	-79	-10
FTT8h	88	79	10
CCP1h	89	-16	45
CCP2h	90	16	-45
CCP3h	91	-35	19
CCP4h	92	35	-19
CCP5h	93	-57	12
CCP6h	94	57	-12
TTP7h	95	-79	10
TTP8h	96	79	-10
CPP1h	97	-35	73
CPP2h	98	35	-73
CPP3h	99	-46	48
CPP4h	100	46	-48
CPP5h	101	-62	35
CPP6h	102	62	-35
TPP7h	103	-81	29
TPP8h	104	81	-29
TPP9h	105	-101	27
TPP10h	106	101	-27
P9	107	-113	36
P10	108	113	-36
PPO1h	109	-57	82
PPO2h	110	57	-82
PPO5h	111	-72	55
PPO6h	112	72	-55
PPO9h	113	-101	45
PPO10h	114	101	-45
PO7	115	-90	54
PO8	116	90	-54
PO9	117	-113	54
PO10	118	113	-54
POO1	119	-79	82
POO2	120	79	-82
POO9h	121	-101	63
POO10h	122	101	-63
OI1h	123	-101	81
OI2h	124	101	-81
I1	125	-112	72
I2	126	112	-72
CPz	127	22	-90
Iz	128	112	-90
REF		-23	-90
GND		67	90

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

The signs follow this convention:



EEG data can be referenced offline to mastoid position, e.g. M2, as recommended in AASM manual.

For EOG, please reference the "E1" and "E2" channel offline to Fpz, for EOG left/right:



Summary Safety Rules

Together, the BrainCap MR and the BrainAmp MR / MR plus form a MR-conditional system according ASTM 2503-05.



In this context, the term MR-conditional means that restrictions from the manufacturer regarding field strength and imaging sequences apply to the product. Detailed advice is provided in the safety measures chapter in the BrainAmp MR operating instructions. Alongside the above, any safety rules stipulated by the manufacturer of the MRI-Scanner must be followed.

Scanner field strength and MR-sequences:

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

MR sequences involving higher SAR (FSE, TSE, FLAIR, Multi Band, Multi Echo, spin labeling, customized sequences etc.) are NOT allowed. Use of these sequences is only allowed after the cap has been removed from the subject.

Restrictions regarding allowed MR techniques and field strength are explained in the BrainAmp MR operating instructions.

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:

If the BrainCap MR is used for measurements on imaging phantoms, the connected amplifiers must be protected from RF overload. This means that all electrodes need to be connected with a low impedance. This must be achieved by covering the entire phantom surface with electrode gel, filling all electrodes with gel, and verification of the low impedance state by means of the BrainAmp MR impedance mode. 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.