Helmholtz-Spule HHS 5218-100-2.5

Helmholtz Coil HHS 5218-100-2.5



Beschreibung:

Das Helmholtz-Spulenpaar eignet sich zur Erzeugung exakt definierter magnetischer Felder von DC bis ca. 3 kHz. Die erzeugte Feldstärke steht in streng linearem Zusammenhang zum Spulenstrom. Aus der Spulengeometrie, dem Strom und der Windungszahl lässt sich die resultierende Feldstärke exakt analytisch (oder auch numerisch) berechnen. Letztendlich lässt sich die Kalibrierung der Magnetfeldstärke auf eine Strommessung (oder z.B. auf den Spannungsabfall an einem bekannten Vorwiderstand) zurückführen. Die Helmholtzspule selbst wird wegen des einfachen Zusammenhangs zwischen Strom und Feldstärke in der Regel nicht kalibriert, sondern gilt als Primärnormal. Ansonsten können die erzeugten Feldstärken auch mit Feldspulen (nur AC-Felder) oder Hallsensoren (DC- und AC-Feld) nachgemessen werden.
Ein kurzer Anschlusskabelsatz wird mitgeliefert.

Description:

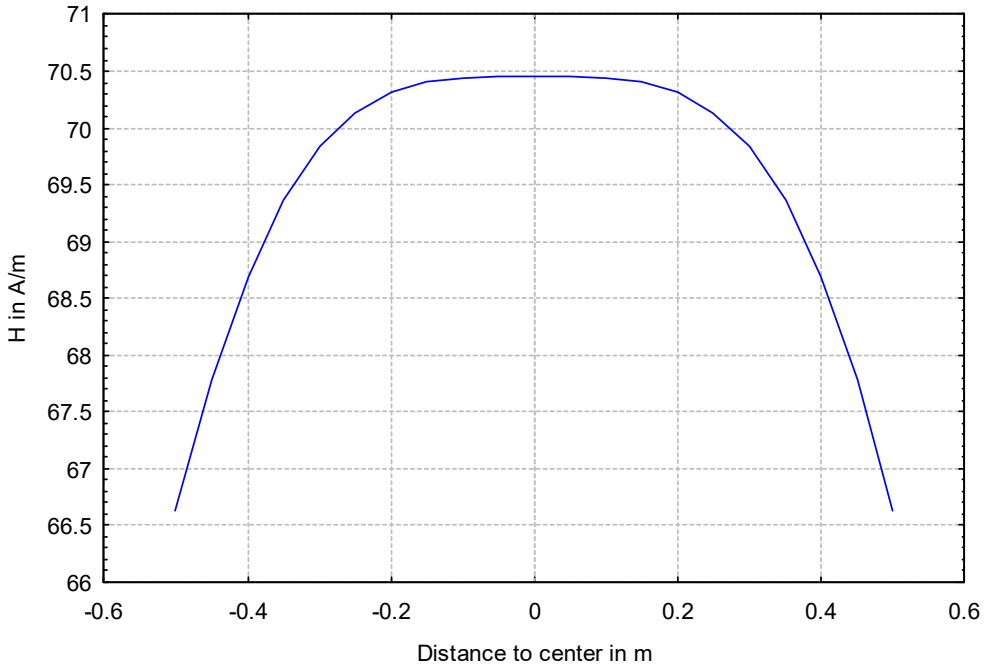
Helmholtz-Coils are especially designed to generate precisely defined magnetic fields from DC to ca. 3 kHz. The generated fields are in a strongly linear relation to the coil current. The fieldstrength can be calculated exactly by analytical (or numerical) methods, based on the coils' geometry, the number of turns and the coil current. The calibration of the magnetic field is finally traceable to a current measurement (or to a voltage drop at a known resistor). The Helmholtz Coil itself is usually considered as primary standard due to the easily calculable relation between current and field strength. If this relation should be controlled, a loop sensor (only AC) or a Hall probe (DC- and AC- field) can be used to determine the actual field strength. A short set of connecting cables is included in the scope of delivery.

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Technische Daten:		*Specifications:*
Windungszahl (pro Spule):	100	*Number of turns (per Coil):*
Maximaler Spulenstrom:	40 A, 5 min.	*Maximum coil current:*
Spulenstrom, nominell:	20 A continuous	*Nominal coil current:*
Spulenfaktor für 0,6m Abstand	86.05m^{-1} (m^{-1}=Amperes/Meter/Ampere)	*Coil factor for 0.6m distance*
Maximale magn. Feldstärke:	ca. 3442 A/m max. 5 min @ 40 A., dist. 0.6 m* coil factor 86.05 m^{-1} (m^{-1}=Amperes/Meter/Ampere)	*Maximum magnetic field strength:*
Abstand für beste Homogenität	1.00 m*	*Distance for best homogeneity:*
Spulenfaktor für 1,00 m Abstand	70.45 m^{-1}	*Coil factor for 1.00 m distance*
Magn. Feldstärke bei 1 A Spulen-strom:	70,45 A/m (Coil dist. 1.00 m*)	*Magnetic field strength caused by 1 A coil current:*
Magn. Nennfeldstärke:	1409 A/m continuous @ 20 A, dist 1.00 m* coil factor 70.45 m^{-1}	*Nominal magnetic field strength:*
Erforderlicher Strom für 100 A/m bei bestmöglicher Homogenität:	1.42 A (Coil dist. 1.00 m*)	*Current required for 100 A/m at best possible homogeneity:*
Außenabmessungen:	2.00 m x 1.91 m x 1.27 m	*Outer mechanical dimensions:*
Mittlere elektrische Kantenlänge	1.844 m	*Average electrical side length:*
Max. Spulenabstand:	1.20 m*	*Maximum coil separation:*
Nutzbarer Frequenzbereich:	0 - 3 kHz	*Usable frequency range:*
Induktivität (pro Spule):	60.5 mH	*Inductance (per coil):*
Induktivität (Spulenpaar, Spulenab-stand 0,9 m*):	133 mH	*Inductance (Pair of coils, coil dist. 0.9 m*):*
Wirkwiderstand (pro Spule):	2.5 Ω	*Resistance (per coil):*
Resonanzfrequenz (Spulenpaar):	> 8 kHz	*Resonant frequency (Pair of coils):*
Gewicht:	91 kg	*Weight:*

* Gemessen von Spulenmitte zu Spulenmitte / *Measured from coil center to coil center*

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Spulenabstand *Coil distance* 1.00 m

Längskomponente der magnetischen Feldstärke entlang der Spulenlängsachse

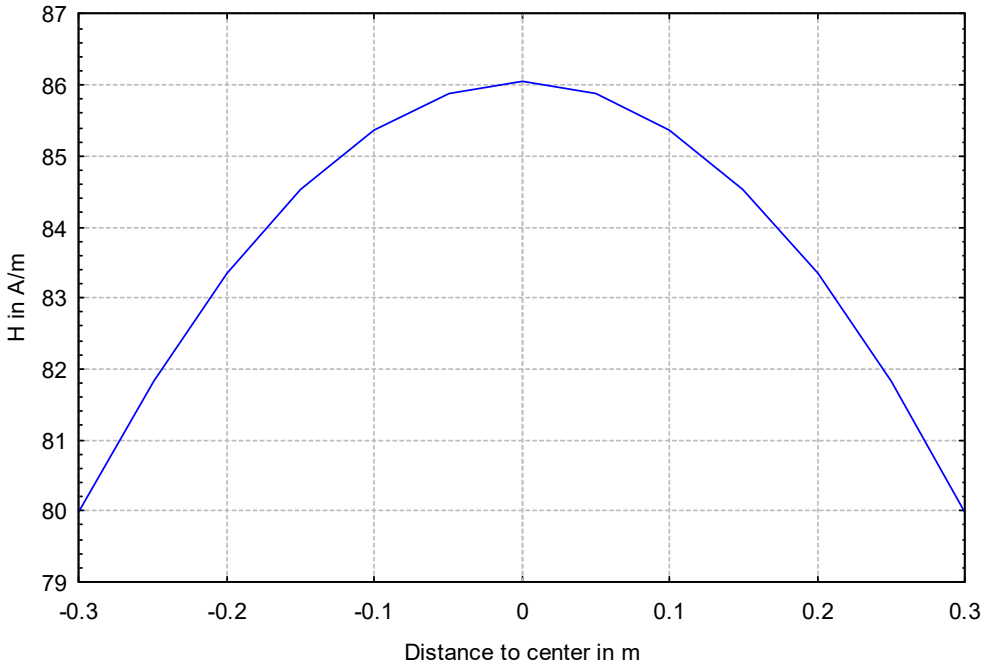
Magnet. Fieldstrength, longitudinal component along rotational axis

Abstand zur Spulenmitte	H1[A/m]	H2[A/m]	Hges[A/m]	H1[dBµA/m]	H2[dBµA/m]	Hges[dBµA/m]
Distance	*H1[A/m]*	*H2[A/m]*	*Hges[A/m]*	*H1[dBµA/m]*	*H2[dBµA/m]*	*Hges[dBµA/m]*
-0.50 Center of Coil 2	17.8014	48.8241	66.6255	145.01	153.77	156.47
-0.45	19.1405	48.6452	67.7857	145.64	153.74	156.62
-0.40	20.5760	48.1151	68.6911	146.27	153.65	156.74
-0.35	22.1096	47.2535	69.3631	146.89	153.49	156.82
-0.30	23.7415	46.0909	69.8324	147.51	153.27	156.88
-0.25	25.4693	44.6667	70.1360	148.12	153.00	156.92
-0.20	27.2880	43.0257	70.3137	148.72	152.67	156.94
-0.15	29.1887	41.2155	70.4042	149.30	152.30	156.95
-0.10	31.1584	39.2833	70.4417	149.87	151.88	156.96
-0.05	33.1791	37.2738	70.4529	150.42	151.43	156.96
0.00 Center Plane	35.2274	35.2273	70.4547	150.94	150.94	156.96
0.05	37.2738	33.1791	70.4529	151.43	150.42	156.96
0.10	39.2833	31.1584	70.4417	151.88	149.87	156.96
0.15	41.2155	29.1887	70.4042	152.30	149.30	156.95
0.20	43.0257	27.2880	70.3137	152.67	148.72	156.94
0.25	44.6667	25.4693	70.1360	153.00	148.12	156.92
0.30	46.0909	23.7415	69.8324	153.27	147.51	156.88
0.35	47.2535	22.1096	69.3631	153.49	146.89	156.82
0.40	48.1151	20.5760	68.6911	153.65	146.27	156.74
0.45	48.6452	19.1405	67.7857	153.74	145.64	156.62
0.50 Center of Coil 1	48.8241	17.8014	66.6255	153.77	145.01	156.47

Spulen Abstand 1.00 m

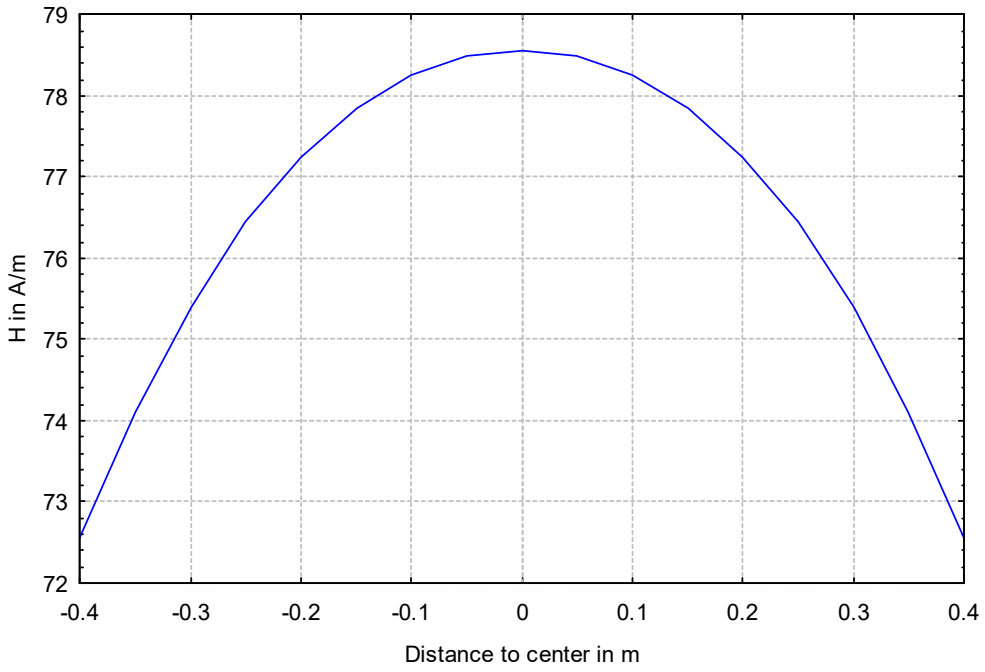
Coil Distance 1.00 m

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HHS 5218-100-2.5 Spulenabstand *Coil distance* 0.6 m Längskomponente der magnetischen Feldstärke entlang der Spulenlängsachse *Magnet. Fieldstrength, longitudinal component along rotational axis*						
Abstand zur Spulenmitte	H1[A/m]	H2[A/m]	Hges[A/m]	H1[dBµA/m]	H2[dBµA/m]	Hges[dBµA/m]
Distance	*H1[A/m]*	*H2[A/m]*	*Hges[A/m]*	*H1[dBµA/m]*	*H2[dBµA/m]*	*Hges[dBµA/m]*
-0.30 Center of Coil 2	31.1584	48.8241	79.9825	149.87	153.77	158.06
-0.25	33.1791	48.6452	81.8243	150.42	153.74	158.26
-0.20	35.2274	48.1151	83.3425	150.94	153.65	158.42
-0.15	37.2738	47.2535	84.5273	151.43	153.49	158.54
-0.10	39.2833	46.0909	85.3742	151.88	153.27	158.63
-0.05	41.2155	44.6667	85.8822	152.30	153.00	158.68
0.00 Center Plane	43.0257	43.0257	86.0515	152.67	152.67	158.70
0.05	44.6667	41.2155	85.8822	153.00	152.30	158.68
0.10	46.0909	39.2833	85.3742	153.27	151.88	158.63
0.15	47.2535	37.2738	84.5273	153.49	151.43	158.54
0.20	48.1151	35.2274	83.3425	153.65	150.94	158.42
0.25	48.6452	33.1791	81.8243	153.74	150.42	158.26
0.30 Center of Coil 1	48.8241	31.1584	79.9825	153.77	149.87	158.06
Spulen Abstand 0.6 m ***Coil Distance 0.6 m***						

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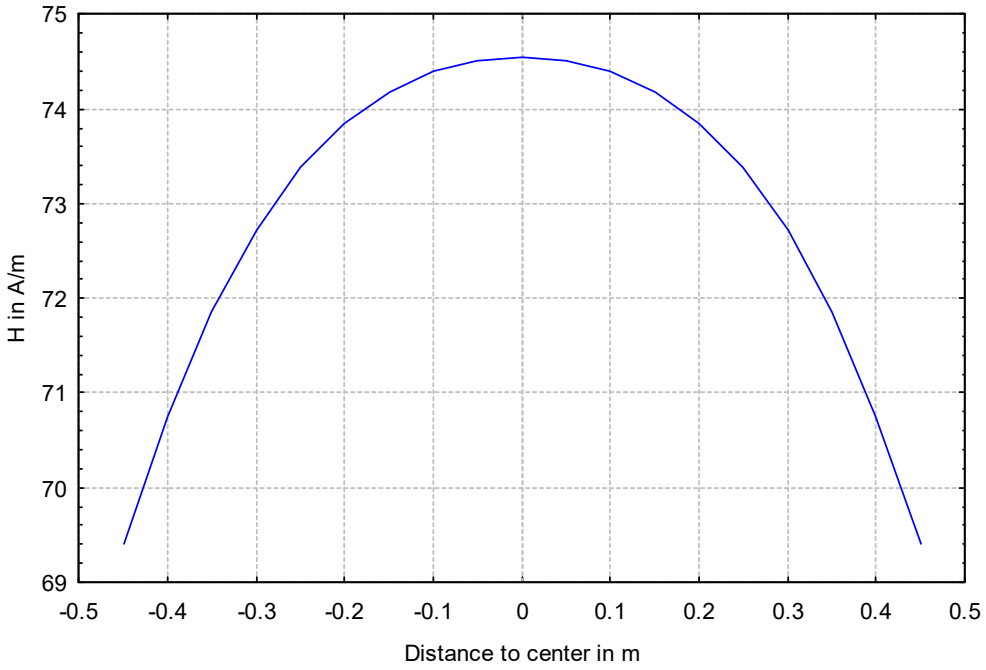


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Spulenabstand *Coil distance* 0.8 m
Längskomponente der magnetischen Feldstärke entlang der Spulenlängsachse
Magnet. Fieldstrength, longitudinal component along rotational axis

Abstand zur Spulenmitte	H1[A/m]	H2[A/m]	Hges[A/m]	H1[dBµA/m]	H2[dBµA/m]	Hges[dBµA/m]
Distance	*H1[A/m]*	*H2[A/m]*	*Hges[A/m]*	*H1[dBµA/m]*	*H2[dBµA/m]*	*Hges[dBµA/m]*
-0.40 Center of Coil 2	23.7415	48.8241	72.5656	147.51	153.77	157.21
-0.35	25.4693	48.6452	74.1145	148.12	153.74	157.40
-0.30	27.2880	48.1151	75.4031	148.72	153.65	157.55
-0.25	29.1887	47.2535	76.4422	149.30	153.49	157.67
-0.20	31.1584	46.0909	77.2493	149.87	153.27	157.76
-0.15	33.1791	44.6667	77.8458	150.42	153.00	157.82
-0.10	35.2274	43.0257	78.2531	150.94	152.67	157.87
-0.05	37.2738	41.2155	78.4893	151.43	152.30	157.90
0.00 Center Plane	39.2833	39.2833	78.5667	151.88	151.88	157.90
0.05	41.2155	37.2738	78.4893	152.30	151.43	157.90
0.10	43.0257	35.2274	78.2531	152.67	150.94	157.87
0.15	44.6667	33.1791	77.8458	153.00	150.42	157.82
0.20	46.0909	31.1584	77.2493	153.27	149.87	157.76
0.25	47.2535	29.1887	76.4422	153.49	149.30	157.67
0.30	48.1151	27.2880	75.4031	153.65	148.72	157.55
0.35	48.6452	25.4693	74.1145	153.74	148.12	157.40
0.40 Center of Coil 1	48.8241	23.7415	72.5656	153.77	147.51	157.21

Spulen Abstand 0.8 m
Coil Distance 0.8 m

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Spulenabstand *Coil distance* 0.9 m

Längskomponente der magnetischen Feldstärke entlang der Spulenlängsachse

Magnet. Fieldstrength, longitudinal component along rotational axis

Abstand zur Spulenmitte	H1[A/m]	H2[A/m]	Hges[A/m]	H1[dBµA/m]	H2[dBµA/m]	Hges[dBµA/m]
Distance	*H1[A/m]*	*H2[A/m]*	*Hges[A/m]*	*H1[dBµA/m]*	*H2[dBµA/m]*	*Hges[dBµA/m]*
-0.45 Center of Coil 2	20.5760	48.8241	69.4001	146.27	153.77	156.83
-0.40	22.1096	48.6452	70.7548	146.89	153.74	157.00
-0.35	23.7415	48.1151	71.8566	147.51	153.65	157.13
-0.30	25.4693	47.2535	72.7228	148.12	153.49	157.23
-0.25	27.2880	46.0909	73.3789	148.72	153.27	157.31
-0.20	29.1887	44.6667	73.8554	149.30	153.00	157.37
-0.15	31.1584	43.0257	74.1841	149.87	152.67	157.41
-0.10	33.1791	41.2155	74.3947	150.42	152.30	157.43
-0.05	35.2274	39.2833	74.5107	150.94	151.88	157.44
0.00 Center Plane	37.2738	37.2738	74.5476	151.43	151.43	157.45
0.05	39.2833	35.2274	74.5107	151.88	150.94	157.44
0.10	41.2155	33.1791	74.3947	152.30	150.42	157.43
0.15	43.0257	31.1584	74.1841	152.67	149.87	157.41
0.20	44.6667	29.1887	73.8554	153.00	149.30	157.37
0.25	46.0909	27.2880	73.3789	153.27	148.72	157.31
0.30	47.2535	25.4693	72.7228	153.49	148.12	157.23
0.35	48.1151	23.7415	71.8566	153.65	147.51	157.13
0.40	48.6452	22.1096	70.7548	153.74	146.89	157.00
0.45 Center of Coil 1	48.8241	20.5760	69.4001	153.77	146.27	156.83

Spulen Abstand 0.9 m
Coil Distance 0.9 m

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Gefahrenhinweis:

Die Stromquelle muss immer abgeschaltet werden, wenn Leitungen angeschlossen oder abgenommen werden müssen.

Während des Betriebes entwickelt sich an den Klemmen von HHS 5218-100-2.5 und NFCN 9732 lebensgefährliche Hochspannung. Bei unsachgemäßer Anwendung besteht für den Benutzer Lebensgefahr!
Starkstrom führt zur Erwärmung der Spulen. Es ist für ausreichende Belüftung des Raumes zu sorgen. Spulenteile dürfen nicht wärmeisolierend abgedeckt werden.

Danger:

Do not touch the terminals during operation. Switch off the complete system before touching any connections.

Attention: During operation the voltages at HHS 5218-100-2.5 and at NFCN 9732 will be much higher than at the amplifier output. Danger to life! High voltages!
High current will lead to heat dissipation of the coils. Sufficient air circulation is a must. Parts of the coil surface should not be covered with heat isolating materials.

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