



## Ferronato® BH300HF-3-B

- Helmholtz coils to generate homogeneous magnetic fields at high frequencies, to about 300 kHz.
- It is same as our standard BH300-3-A coil-set, excepting for the number of wire turns -which is much reduced in here- and the turns-related specifications.
- Also available in versions of 2 and 1 axes:
  - BH300HF-2A-B, with X/Y axes
  - BH300HF-2B-B, with X/Z axes
  - BH300HF-1A-B, with X axis
  - BH300HF-1B-B, with Z axis

### Coil-set specifications

<b>Field/Current ratio</b>	54 $\mu\text{T/A} \pm 2\%$ , for each X, Y or Z pair. See in below for more precision.
<b>Maximum field</b>	430 $\mu\text{T}$ at DC or low frequency, steady way, each pair, for a moderate coil heating. About 162 $\mu\text{T}_{\text{peak}}$ (114 $\mu\text{T}_{\text{rms}}$ for sine wave) at 150 kHz, steady way, each pair. <sup>(4)</sup>
<b>Maximum current</b>	8 A DC or low frequency, steady way, each pair, for a moderate coil heating. 3 $A_{\text{peak}}$ (or 2.1 $A_{\text{rms}}$ for sine wave) at 150 kHz, steady way, each pair. <sup>(4)</sup>
<b>Maximum HF voltage</b>	500 $V_{\text{peak}}$ at high frequencies (HF), or pulsed / 352 $V_{\text{rms}}$ for sine wave.
<b>Isolation voltage</b>	500 V DC minimum, or 500 $V_{\text{peak}}$ AC or pulsed, in between windings and forms and in between coil pairs. Tested to 1000 V DC.
<b>Field homogeneity</b>	Differences smaller than $\pm 1\%$ , in respective to the centre, in a spherical volume of 70 mm in diameter, coil centred. Differences smaller than $\pm 5\%$ in a spherical volume of 100 mm in diameter. Volumes to 1% and 5% are larger on some directions. These homogeneity degrees are practically same at DC than at 150 kHz.
<b>Orthogonality error</b>	$< 0.2^\circ$ .
<b>Connections</b>	A single row barrier strip terminal block with six 4 mm (M4) brass screws.
<b>Max. working temperature</b>	50 $^\circ\text{C}$ for the whole coil-set. 100 $^\circ\text{C}$ for the windings, measured at coils surface.
<b>Coils section</b>	Windings: 1 x 10 mm, maximum. Total (forms): 10 x 13 mm.
<b>Materials</b>	Windings in enamelled copper wire, filled with epoxy resin. Coil forms in aluminium alloy. Coil terminal boards in epoxy resin/glass fibre (FR4) with covers in PVC. Lower and upper support plates in foamed PVC. Supporting pillars and brackets in Acetyl. Screws in brass and Nylon.
<b>Maximum dimensions</b>	Height 365 mm x Width 309 mm x Depth 276 mm.
<b>Weight</b>	2.75 kg.
<b>Included accessories</b>	Instruction Manual (in English).
<b>Warranty</b>	Two years.

### Specifications for each coil pair

	X Pair (larger)	Y Pair (medium)	Z Pair (smaller)
<b>Field/Current ratio, for DC, in <math>\mu\text{T/A}</math>, <math>\pm 1\%</math></b>	54.3	54.3	53.4
<b>Effective diameter, in mm, <math>\pm 1</math> mm</b>	299.0	265.6	236.4
<b>Number of turns (per coil)</b>	9	8	7
<b>DC resistance, at 20 <math>^\circ\text{C}</math>, in Ohm, <math>\pm 3\%</math></b> <sup>(1)</sup>	0.50	0.41	0.32
<b>Resistance at 150 kHz, at 20 <math>^\circ\text{C}</math>, in Ohm, <math>\pm 5\%</math></b> <sup>(2)</sup>	3.3	2.3	1.5
<b>Self-inductance, in <math>\mu\text{H}</math>, at 150 kHz, <math>\pm 5\%</math></b> <sup>(2)</sup>	133	93	64
<b>Self-resonance frequency [1], in MHz, <math>\pm 10\%</math>.</b> With external 50 pF in parallel. With one end of the forms wired to one end of the windings. Example: Xs- to X-.	0.94	1.28	1.73
<b>Self-resonance frequency [2], in MHz, <math>\pm 10\%</math>.</b> With external 50 pF in parallel. Without connection to the forms. "Floating" windings.	1.46	1.83	2.36
<b>Field as generated only by the forms when used as coils (Xs, Ys, Zs), in DC, in <math>\mu\text{T/A}</math>, <math>\pm 2\%</math></b> <sup>(3)</sup>	6.0	6.9	7.6

<sup>(1)</sup> - Resistance values as measured at CON1 terminal block. Resistance increases with frequency.

<sup>(2)</sup> - Inductance decreases a little with the frequency. At 100 Hz it is about 8 % higher than at 150 kHz.

<sup>(3)</sup> - We call this concept "In-Circuit Coil Forms".

<sup>(4)</sup> - Mostly the isolation voltage limits the current at high frequencies, due to the high impedance of the coils.

- These specifications are subject to minor changes without prior notice -