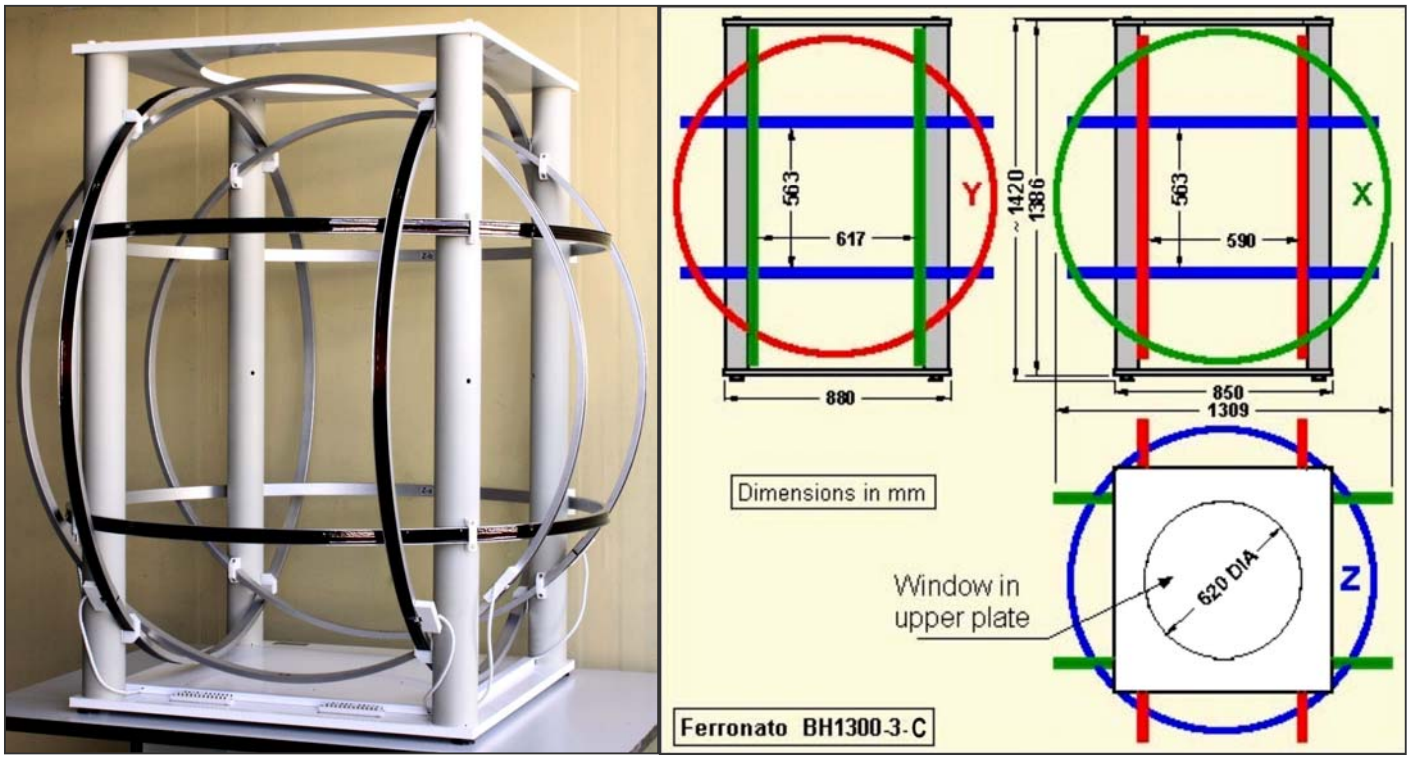
1300-mm Helmholtz Coils
Ferronato® - BH1300-3-C

--- A three-axis Helmholtz coil-set, for laboratory and general purposes.
--- Well suited for many magnetic measurements and experiments, in DC and AC.

- Same field/current ratio for the three coil pairs: **50.5 μT/A** (or 101 μT/A, or 2 x 50.5 μT/A, in according to wiring configuration, easy to modify), in DC or AC.
- Same as our standard BH1300-3-A coil-set, excepting in the windings of less turns with thicker wire, to improve its performance in AC at higher frequencies. Example: impedance at 100 Hz ≈ 6.4 Ω.
- Two-wire (bifilar) windings, wired to the general terminal block, what allow several wiring configurations.
- Accurately made, with error smaller than ±1% in the generated field.
- Thanks to its simple supporting system and joining by screws, the coils arrangement can be modified with relative easiness if needed.
- Coils on non-magnetic aluminium-alloy forms.
- "In-Circuit Coil Forms". Each aluminium form provides a usable extra turn, which is wired to the terminal block. An example of application is the generation of a small magnetic field to modulate the main one. The forms can be also configured to generate small gradients, or these can be grounded, etc.
- The aluminium forms also act like shields to electric fields.
- The coils can undergo heating to at least 100ºC without damage.
- Robust construction but with a reasonably weight.
- Totally constructed with non-ferromagnetic materials.
- Excellent quality/price ratio.
- There are available versions of one or two axes, with similar characteristics per axis:
  - ***BH1300-1A-C***, one-axis, horizontal. Only the *X* pair.
  - ***BH1300-1B-C***, one-axis, vertical. Only the *Z* pair.
  - ***BH1300-2A-C***, two-axis, horizontal/horizontal. *X* and *Y* pairs.
  - ***BH1300-2B-C***, two-axis, horizontal/vertical. *X* and *Z* pairs.



GENERAL SPECIFICATIONS OF THE BH1300-3-C SET

Field/current ratio	**50.5 µT/A** (0.505 Gauss/A) ±2%.. For each axis, X, Y or Z. See values to 1% in below. Optionally 101 µT/A, or 2 x 50.5 µT/A, by modifying the wiring at the terminal block.
Maximum field	About 1.0 mT (10 Gauss) in a steady way. For each axis.
Maximum current	20 A in a steady way. Each axis. Limited by wiring capacity. After about 1 hour at 20 A coil temperature gets stabilised at about 75 ºC, with room at 22 ºC.
Isolation voltage	250 V DC, minimum, between winding and form and in between windings. Tested to 500 V DC.
Magnetic field homogeneity	Differences smaller than ±1% in respective to the centre, in a spherical volume of 404 mm in diameter, centred in the coils. Differences smaller than ±5% in a spherical volume of 586 mm in diameter. The volumes to ±1% and ±5% are larger along some directions.
Orthogonality error	Within ±0.2º.
Connection	Two terminal blocks, one for the coils and another for the forms, with M4 screws (Ø4 mm).
Max. working temp.	80 ºC for the whole set / 100 ºC for the coils, as measured on its surface.
Coil cross-section	Winding: 27 x 13 mm, maximum. Total (forma): 30 x 15 mm
Materials	Windings in 2 + 2-mm (bifilar) copper wire filled with epoxy resin. Coil forms in aluminium alloy, with interior epoxy coating, with terminal boards in resin/glass fibre (FR4) with covers in PVC. Supporting pillars in polypropylene (PP) tube. Upper and lower boards in foamed PVC. Brackets in Acetyl ("Delrin"). Screws in brass and Nylon.
Maximum dimensions	Height 1420 mm x Width 1256 mm x Depth 1309 mm.
Weight	73 kg for the *BH1300-3-C* coil-set. See in below the weights for all the versions.
Included accessories	Delivered with Instruction Manual in English and Spanish. Assembly Instructions are included when it is supplied dismounted.
Warranty	Two years.

SPECIFICATIONS OF EACH COIL-PAIR OF THE BH1300-3-C

	X axis	**Y axis**	**Z axis**
Field/current ratio, in µT/A, ±1 %	50.1	50.9	50.1
Effective (or mean) diameter, in mm, ±1 mm	1295	1241	1187
Number of turns (standard configuration) ([1])	36	35	33
DC resistance, at 20 ºC, ±5 % ([2])	0.84 Ω	0.79 Ω	0.72 Ω
Self-resonance frequency, in kHz, ±5 % ([3])	29.7	32.6	27.0
Self-inductance, at 120 Hz, in mH, ±2 %	10.1	9.2	7.7
Secondary field generated by the forms when used as coils (Xs, Ys, Zs), in µT/A, ±3 % ([4])	1.39	1.45	1.53

([1]) - It is possible to double the number of turns of each pair by modifying the wiring at the terminal block.
([2]) - Resistances as measured at the general terminal block, with the wiring configuration from factory.
([3]) - Self-resonance measured with "floating" windings, without any connection to the coil-forms. If the coil-forms were wired to the coils in some way, these frequencies would be lower to some extent.
([4]) - We call this constructive idea "*In-Circuit Coil Forms*".

MAIN DIFFERENCES AMONG VERSIONS

Version	BH1300-3-C	BH1300-2A-C	BH1300-2B-C	BH1300-1A-C	BH1300-1B-C
Included coils/pairs	X, Y, Z	X, Y	X, Z	X	Z
Weight, in kg	73	56	54	37	35
Minimum pathway width, in cm	130	130	122	90	122

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

Note about carrying the coil-set into buildings: When the coil-sets are supplied mounted, the pathways in the building of destination should have the minimum widths shown in the table in above. When a coil-set can not be carried to its final location because some door or corridor is too narrow, it can be supplied dismounted, in which case will be attached detailed assembly instructions, in English (or Spanish, depending on destination country). Damages caused during coil-set assembly are not covered by the warranty, excepting when the work is performed and supervised by personnel appointed by Serviciencia.

Please, do not hesitate in asking us for further details

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