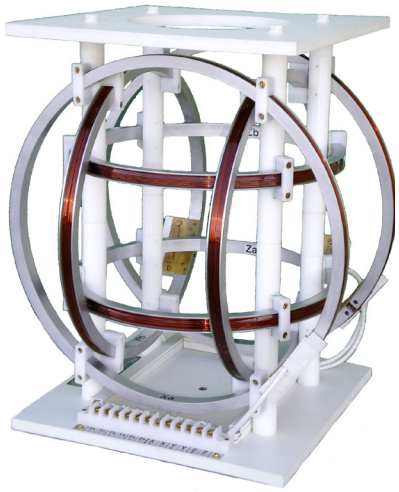

BH300

Ferronato® Helmholtz Coil Systems

These Ferronato® Helmholtz coils are used in the calibration of magnetic field sensors, or for conducting tests or experiments that require a known magnetic environment.

The coils are available in a range of diameters from 300mm to 2m.

Bartington's Helmholtz Control System (PA1, CU1 and CU2) can be used with the Ferronato® coils described here. A compatibility table at the end of this brochure details the performance which can be achieved when using the PA1.

Full system specifications for PA1, CU1, CU2 and recommended National Instruments acquisition card, are available in the Helmholtz coil systems brochure DS2613.

Features

- Option of 1, 2 or 3 axes
- DUT (Device Under Test) mounting setup availabe
- BH1300HF4 coil is suitable for high frequency field generation
- Full system available including active cancellation

Typical Applications

- Calibration of three-axis magnetic field sensors, including satellite and sub assemblies
- Creation of a known magnetic environment

Product Identification

Product name	Variant	Axes	Description
BH300	1A-A	X	1 axis with scaling of 500µT/A field/current ratio
	1B-A	Z	1 axis with scaling of 500µT/A field/current ratio
	2A-A	X, Y	2-axis with scaling of 500µT/A field/current ratio
	2B-A	X, Z	2-axis with scaling of 500µT/A field/current ratio
	3-A	X, Y, Z	3-axis with scaling of 500µT/A field/current ratio
BH300HF	3-B	X, Y, Z	3-axis with scaling of 54µT/A field/current ratio, high frequency
BH600	1A-B	X	1 axis with scaling of 300µT/A field/current ratio
	1B-B	Z	1 axis with scaling of 300µT/A field/current ratio
	2A-B	X, Y	2-axis with scaling of 300µT/A field/current ratio
	2B-B	X, Z	2-axis with scaling of 300µT/A field/current ratio
	3-B	X, Y, Z	3-axis with scaling of 300µT/A field/current ratio
BH1300	1A-A/C	X	1 axis with scaling of 200µT/A (A) or 50.5µT/A (C) field/current ratio
	1B-A/C	Z	1 axis with scaling of 200µT/A (A) or 50.5µT/A (C) field/current ratio
	2A-A/C	X, Y	2-axis with scaling of 200µT/A (A) or 50.5µT/A (C) field/current ratio
	2B-A/C	X, Z	2-axis with scaling of 200µT/A (A) or 50.5µT/A (C) field/current ratio
	3-A/C	X, Y, Z	3-axis with scaling of 200µT/A (A) or 50.5µT/A (C) field/current ratio
BH1300HF4	1A-A	X	1 axis with scaling of ~5.8µT/A field/current ratio, high frequency
	1B-A	Z	1 axis with scaling of ~5.8µT/A field/current ratio, high frequency
	2A-A	X, Y	2-axis with scaling of ~5.8µT/A field/current ratio, high frequency
	2B-A	X, Z	2-axis with scaling of ~5.8µT/A field/current ratio, high frequency
	3-A	X, Y, Z	3-axis with scaling of ~5.8µT/A field/current ratio, high frequency
BHC2000	1A-A/B	Y	1 axis with scaling of 25µT/A (A) or 14.7µT/A (B) field/current ratio
	2A-A/B	X, Y	2-axis with scaling of 25µT/A (A) or 14.7µT/A (B) field/current ratio
	2B-A/B	Y, Z	2-axis with scaling of 25µT/A (A) or 14.7µT/A (B) field/current ratio
	3-A/B	X, Y, Z	3-axis with scaling of 25µT/A (A) or 14.7µT/A (B) field/current ratio

BH300-A Helmholtz Coils

Each pair of coils generates a homogeneous magnetic field in X, Y or Z axis.

BH300-A customers may specify the number of axes required. One-axis, two-axis, or three-axis versions are available in any combination (1A, 1B, 2A, 2B or 3A), which needs to be specified when placing an order.

Specifications

Performance:	X axis	Y axis	Z axis
Field/current ratio	500μT/A (5.0 Gauss/A) ±1%.		
Maximum field	About 2.0mT (20 Gauss) continuous, each pair		
Maximum current	4A continuous limited by wiring capacity, each pair		
Coil homogeneous volume (<1% error)	Spherical 70 mm diameter		
Coil homogeneous volume (<5% error)	Spherical 100 mm diameter		
Orthogonality error	<0.2°, or <0.1° optionally		
Effective (or mean) diameter ±1mm	300mm	266mm	237mm
Number of turns (standard configuration)	83	74	66
Secondary field generated by the forms when used as coils (Xs, Ys, Zs) ±1%	6.0μT/A	7.1μT/A	7.7μT/A

Environmental	
Maximum operating temperature	80°C for the whole set, 100°C for the coils, measured on its surface

Mechanical	BH300-3-A	BH300-2A-A	BH300-2B-A	BH300-1A-A	BH300-1B-A
Winding	Enamelled copper wire set in epoxy resin				
Coil formers	Aluminium alloy				
Dimensions (W x H x D)	309 x 364 x 276mm				
Weight	4.5kg	<4.5kg			

Electrical	X axis	Y axis	Z axis
Field/current ratio ±1%	500μT/A	500μT/A	500μT/A
DC resistance at 20°C ±3% measured at the general terminal block with factory wiring configuration.	4.21Ω	3.35Ω	2.66Ω
Self-inductance ±5%.	10.4mH	7.1mH	4.9mH

BH300HF-B Helmholtz Coils

Each pair of coils generates a homogeneous magnetic field in X, Y or Z axis.

BH300HF-B customers may specify the number of axes required. One-axis, two-axis, or three-axis versions are available in any combination (1A, 1B, 2A, 2B or 3A), which needs to be specified when placing an order.

Specifications

Performance:	X axis	Y axis	Z axis
Field/current ratio	54µT/A (0.54 Gauss/A) ±2%		
Maximum field	About 430µT (4.3 Gauss) each pair		
Maximum current	8A limited by wiring capacity, each pair		
Coil homogeneous volume (<1% error)	Spherical 70 mm diameter		
Coil homogeneous volume (<5% error)	Spherical 100 mm diameter		
Orthogonality error	<0.2°		
Effective (or mean) diameter ±1mm	299mm	265.6mm	236.4mm
Number of turns (standard configuration)	9	8	7
Secondary field generated by the forms when used as coils (Xs, Ys, Zs) ±2%	6.0µT/A	6.9µT/A	7.6µT/A

Environmental	
Maximum operating temperature	50°C for the whole set, 100°C for the coils, measured on its surface.

Mechanical	BH300HF-3-B	BH300HF-2A-B	BH300HF-2B-B	BH300HF-1A-B	BH300HF-1B-B
Winding	Enamelled copper wire set in epoxy resin				
Coil formers	Aluminium alloy				
Dimensions (W x H x D)	309 x 365 x 276mm				
Weight	2.75kg	<2.75kg	<2.75kg	<2.75kg	<2.75kg

Electrical	X axis	Y axis	Z axis
Field/current ratio ±1%	54.3µT/A	54.3µT/A	53.4µT/A
DC resistance at 20°C ±3% measured at the general terminal block with factory wiring configuration.	0.5Ω	0.41Ω	0.32Ω
Self-inductance ±5%.	133µH	93µH	64µH

Ferronato Coils Compatibility Table

When using Bartington's Helmholtz Control System (PA1 and CU1), the following field performances can be achieved.

The values given are worst case scenario (i.e. the smallest calculated field which can be generated) and are calculated using the axis with the highest DC resistance and inductance.

All calculations assume the standard factory wiring without the use of the coil formers.

The PA1 DC offset adjustment will apply a DC bias and therefore when used, reduces the current available.

Coil Version:	DC Max Field (Current)	AC 100Hz Max Field (Current	AC 500Hz Max Field (Current
BH300-A	~2mT each axis - Max current per axis 4A (coil limited) - Max current delivered by PA1 - ~5A spread across 3 axes	~2mT each axis - Max current per axis 4A (coil limited) - Max current delivered by PA1 - ~6A spread across 3 axes	~800µT each axis - Max current delivered by PA1 - ~1.6A spread across 3 axes
BH300HF-B	~430µT each axis - Max current per axis 8A (coil limited) - Max current delivered by PA1 - ~15A spread across 3 axes	~430µT each axis - Max current per axis 8A (coil limited) - Max current delivered by PA1 - ~28A spread across 3 axes	~430µT each axis - Max current per axis 8A (coil limited) - Max current delivered by PA1 - ~28A spread across 3 axes
BH600-B	~810µT each axis - Max current delivered by PA1 - ~2.7A spread across 3 axes	~600µT each axis - Max current delivered by PA1 - ~2A spread across 3 axes	~120µT each axis - Max current delivered by PA1 - ~0.4A spread across 3 axes
BH1300-A	~400µT each axis - Max current delivered by PA1 - ~2A spread across 3 axes	~100µT each axis - Max current delivered by PA1 - ~0.5A spread across 3 axes	~20µT each axis - Max current delivered by PA1 - ~0.1A spread across 3 axes
BH1300-C	~620µT each axis - Max current delivered by PA1 - ~12.5A spread across 3 axes	~350µT each axis - Max current delivered by PA1 - ~7A spread across 3 axes	~80µT each axis - Max current delivered by PA1 - ~1.7A spread across 3 axes
BH1300HF-A	~100µT each axis - Max current delivered by PA1 - ~18A spread across 3 axes	~110µT each axis - Max current per axis 20A (coil limited) - Max current delivered by PA1 - ~28A spread across 3 axes	~110µT each axis - Max current per axis 20A (coil limited) - Max current delivered by PA1 - ~28A spread across 3 axes
BHC2000-A	~350µT each axis - Max current delivered by PA1 - ~14A spread across 3 axes	~125µT each axis - Max current delivered by PA1 - ~5A spread across 3 axes	~25µT each axis - Max current delivered by PA1 - ~1A spread across 3 axes
BHC2000-B	~130µT each axis - Max current delivered by PA1 - ~9A spread across 3 axes	~161µT each axis - Max current per axis 10A (coil limited) - Max current delivered by PA1 - ~11A spread across 3 axes	~44µT each axis - Max current delivered by PA1 - ~3A spread across 3 axes