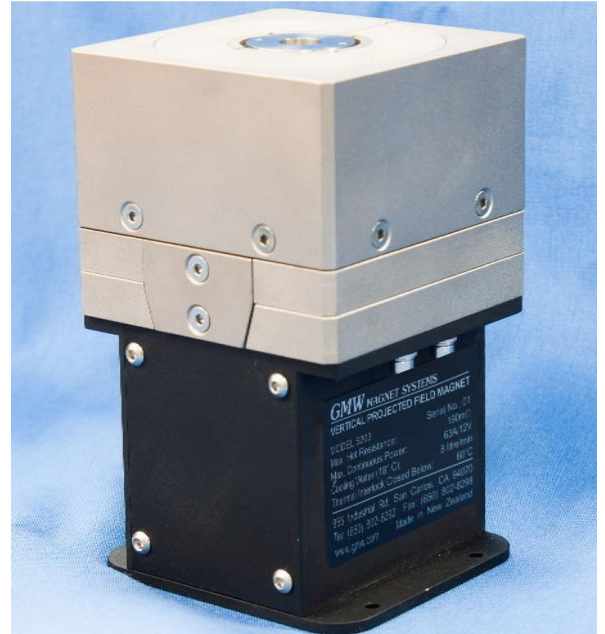


OVERVIEW

The 5203 electromagnet is a projected field magnet providing uniform field at a location above the magnet surface. It is intended for applications where the space around the working volume needs to be freely accessible.

Poles are interchangeable and are available with an axial access bore. The 5203 can be mounted in any orientation and the light weight (2.5kg) allows the magnet to be integrated into dynamic applications such as wafer testing.



FEATURES

- Uniform projected field ($\pm 1\%$) above 0.5T
- Interchangeable poles
- Small and light weight
- Peak fields up to 0.8T
- Any mounting orientation
- Fast cycle times

APPLICATIONS

- Spintronic Devices
- Hall Effect Studies
- Magneto-Optical Studies

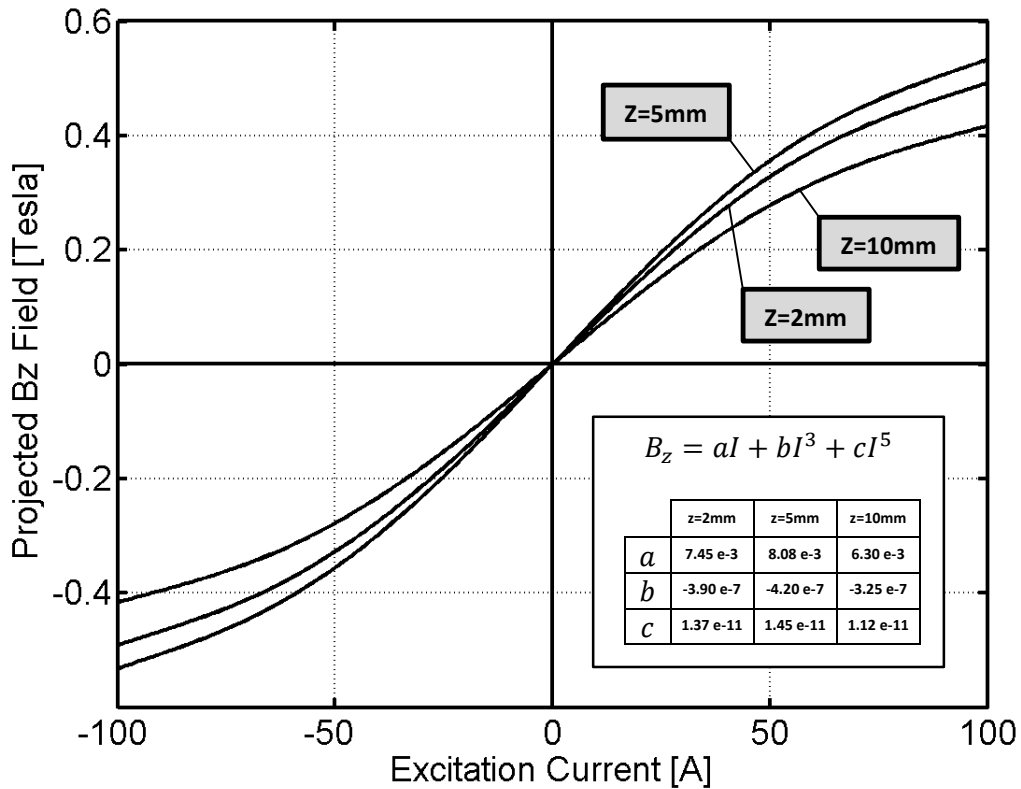
MODEL 5203 GENERAL SPECIFICATIONS

Dimensions	74mm W x 74mm D x 123.5mm H (2.91 inch w x 2.91 inch D x 4.86 inch H)
Weight (excluding hoses and water)	2.5 kg (5.2 pounds)
Pole Face Diameter	24.4mm (0.96 inch)

Coils (series connected)

Resistance (20°C)	173	mΩ
Max. Resistance (80°C)	240	mΩ
Max. continuous current	63	A
Max Peak Current	100	A
Max. continuous Power	750	W
Max Peak Power	2000	W
Low Field Inductance	3500	μH
High Field Inductance	895	μH
Ramp Rate (0-0.5T, linear B vs t)	0.1	seconds
Ramp Rate (0-0.5T, non-linear B vs t)	0.01	seconds
Water Cooling (supply 18°C @ 15 psi)	Up to 8	Litre/min
Anticipated max. sinusoidal frequency (0.5T)	10	Hz
Over Temperature Interlock	80	°C

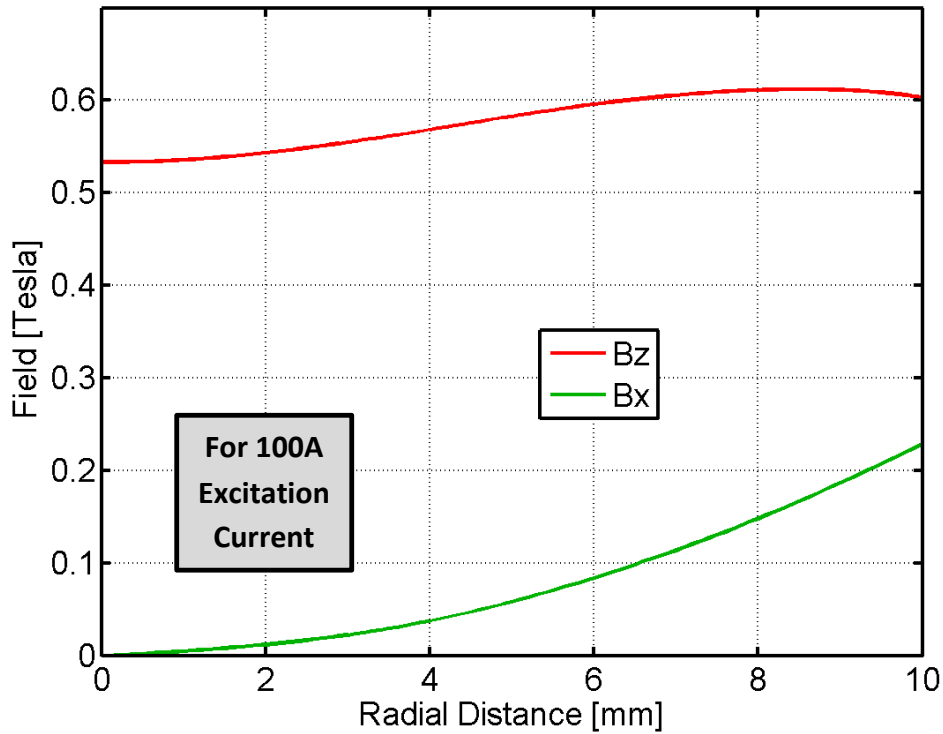
Excitation curves for the Bz field at 2mm, 5mm and 10mm above the pole face



Bipolar Power Supply	DC OUTPUT RANGE		Power (W)
	Voltage (V _{DC})	Current (A _{DC})	
BOP 20-50MG*	0 to ±20 V	0 to ±50 A	1000

* Two supplies in parallel required for full excitation.

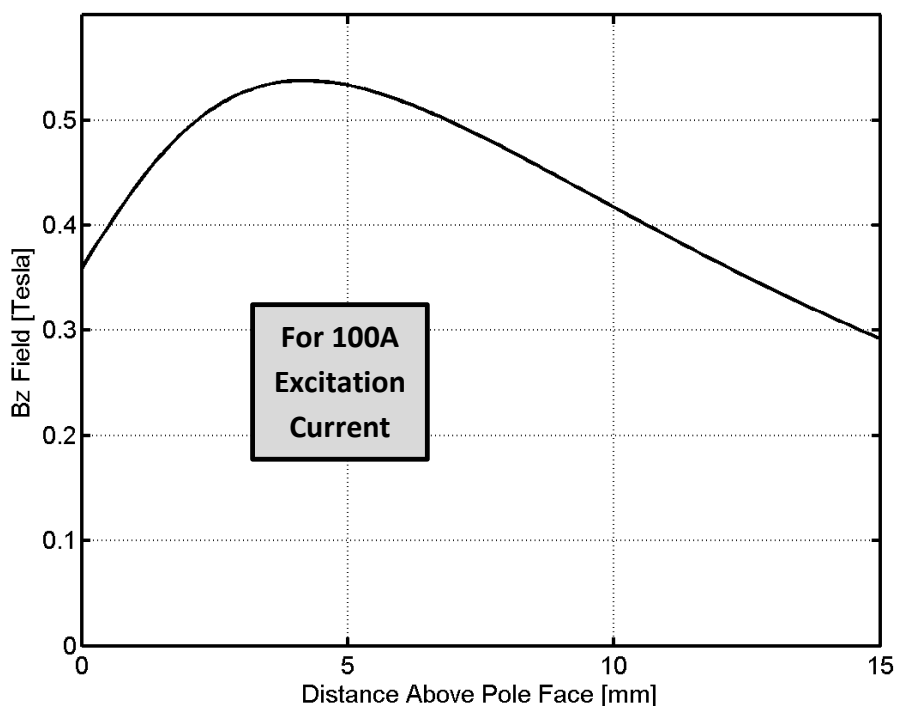
Variation of Bx and Bz fields at 5mm above pole face with radial distance



Distance Above Pole [mm]	Bz Field [T]	Uniformity (Bx/Bz) [%]	Uniformity (Bz) [%]
2	0.51	±4.2	±2.5
5	0.53	±1.0	±0.8
10	0.42	±3.2	±0.1

* Uniformity is measured over a disc of diameter 4mm.

Bz field above the pole face along the z-axis

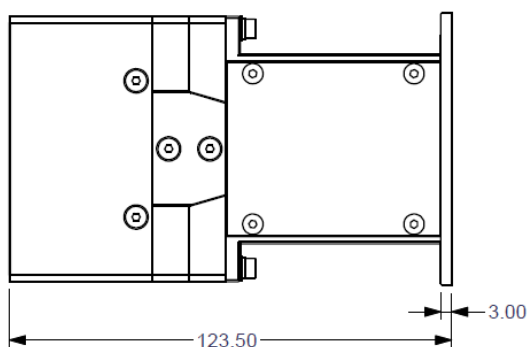
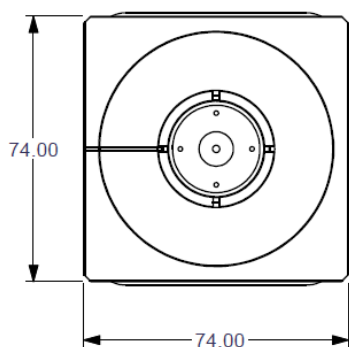
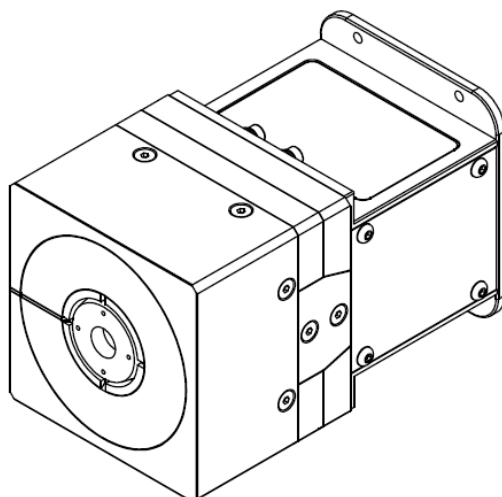


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GENERAL DIMENSIONS

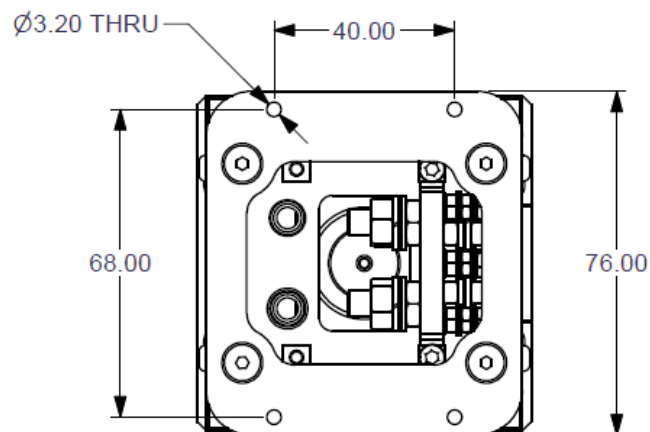
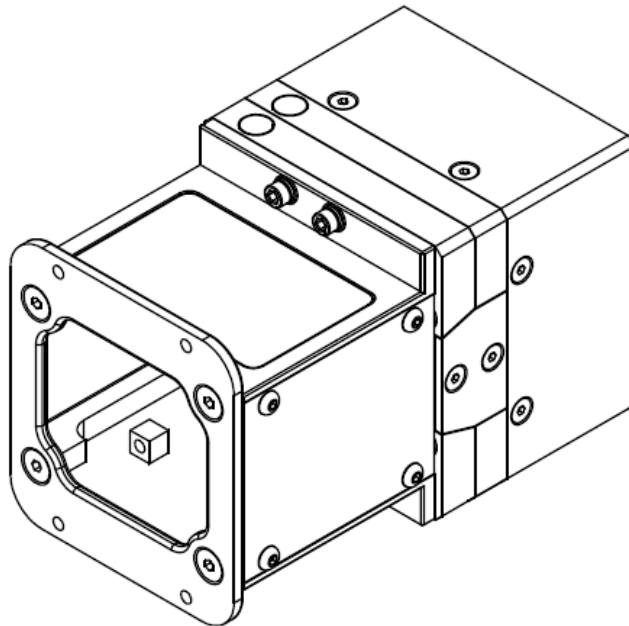


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MOUNTING DETAIL



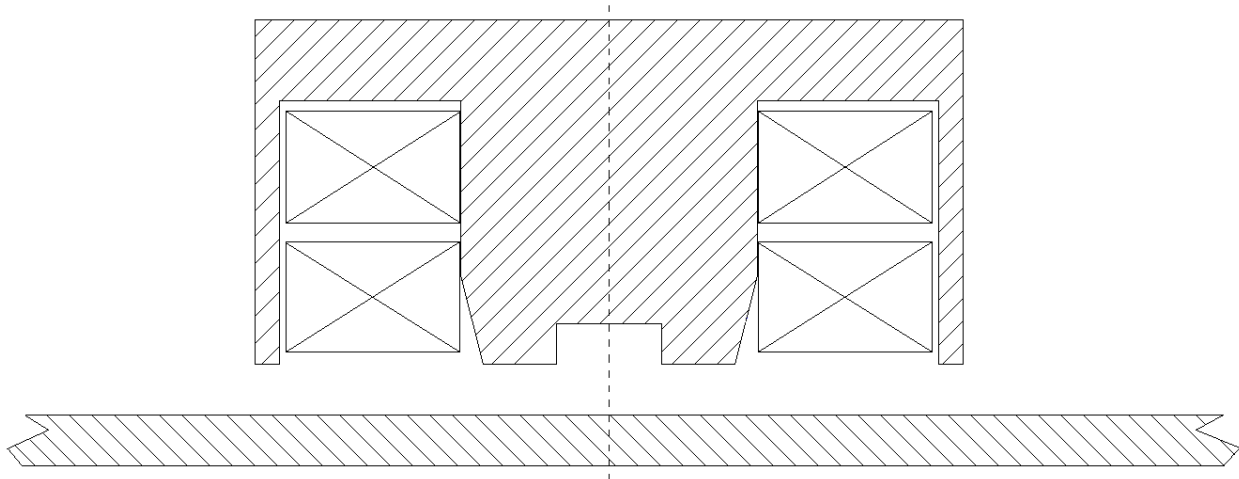
Requires 4xM3 or 4xUNC4-40 or 4xUNF4-48

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APPLICATION NOTE 1: Ferromagnetic backing plate (5mm thick)



Separation [mm]	Operating Current [A]	Field at sample [T]	Force on plate [N]	Uniformity (Bx/Bz) [%]	Uniformity (Bz) [%]
2	100	1.09	826	±0.7	±3.5
5	100	1.22	527	±0.2	±1.1
10	100	0.88	242	±0.02	±0.05
2	63	0.95	697	±0.9	±4.2
5	63	1.04	385	±0.2	±1.2
10	63	0.71	156	±0.02	±0.08

* Uniformity is measured over a disc of 4mm diameter located 0.2mm from the backing plate.

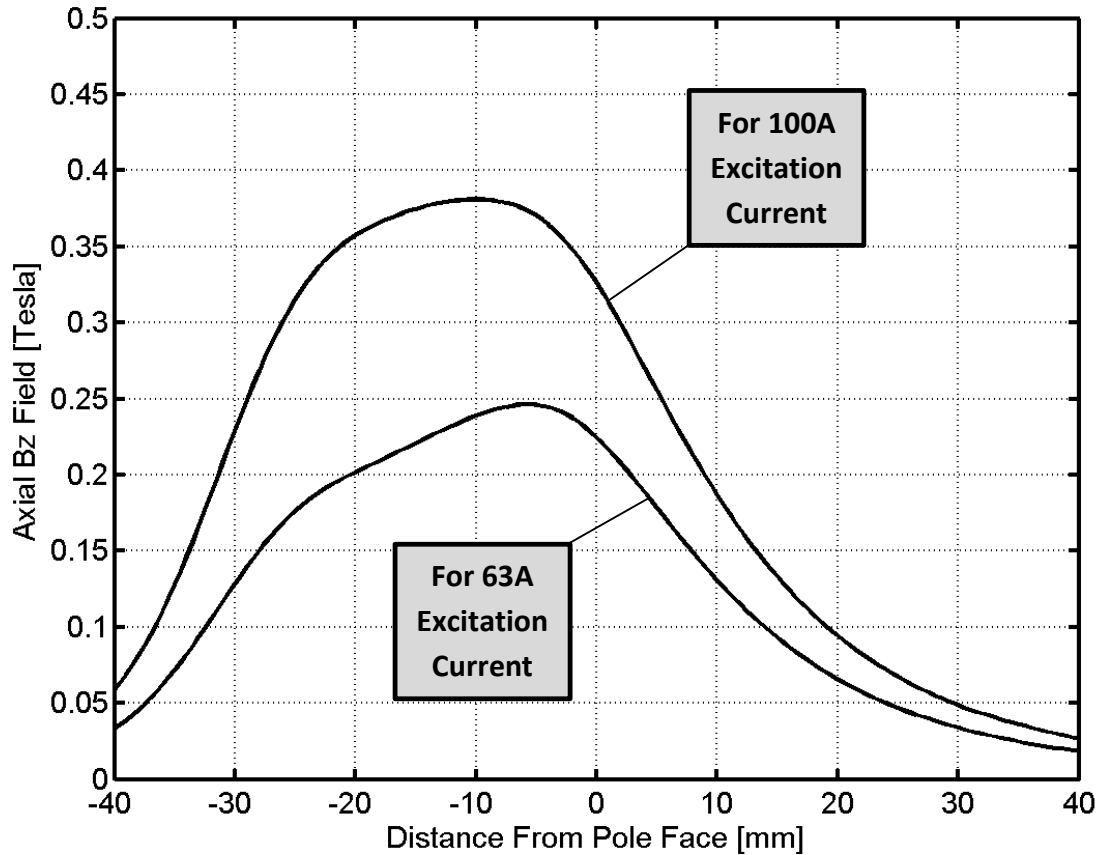
APPLICATION NOTE 2: Field enhanced pole series

An indication of the field strength increase that can be achieved when field uniformity requirements are relaxed.

Pole Style	Peak Field [T]	Uniformity* (Bx/Bz) [%]	Uniformity* (Bz) [%]
A	0.53	±0.91	±0.83
B	0.60	±1.83	±0.68
C	0.66	±2.75	±0.40
D	0.79	±5.42	±0.64

* Uniformity is measured over a disc of 4mm diameter located 0.2mm from the backing plate.

APPLICATION NOTE 3: Axial field with pole removed



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