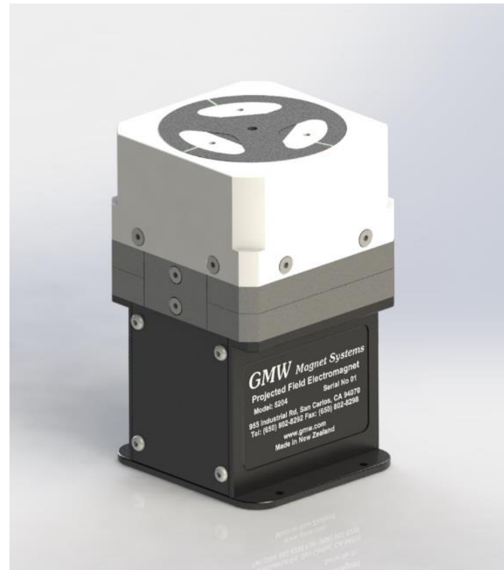
GMW *5204 Projected Vector Field Electromagnet*

OVERVIEW



The 5204 electromagnet is a projected vector field magnet providing field of any orientation at a location above the magnet surface. It is intended for applications where the space around the working volume needs to be freely accessible. A clear path exists all the way through with Ø2.5mm, this allows optical access from the beneath.

Custom pole extensions may be located on the pole faces in order to achieve desired field properties for a specific application. The 5204 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

- **Projected vector field up to 0.3T**
- **Interchangeable pole extensions**
- **Small and light weight**
- **Any mounting orientation**
- **Up to 200 Hz operation**

APPLICATIONS

- **Spintronic Devices**
- **Hall Effect Studies**
- **Magneto-Optical Studies**
- **Point defect research, particularly Nitrogen-Vacancy centres**

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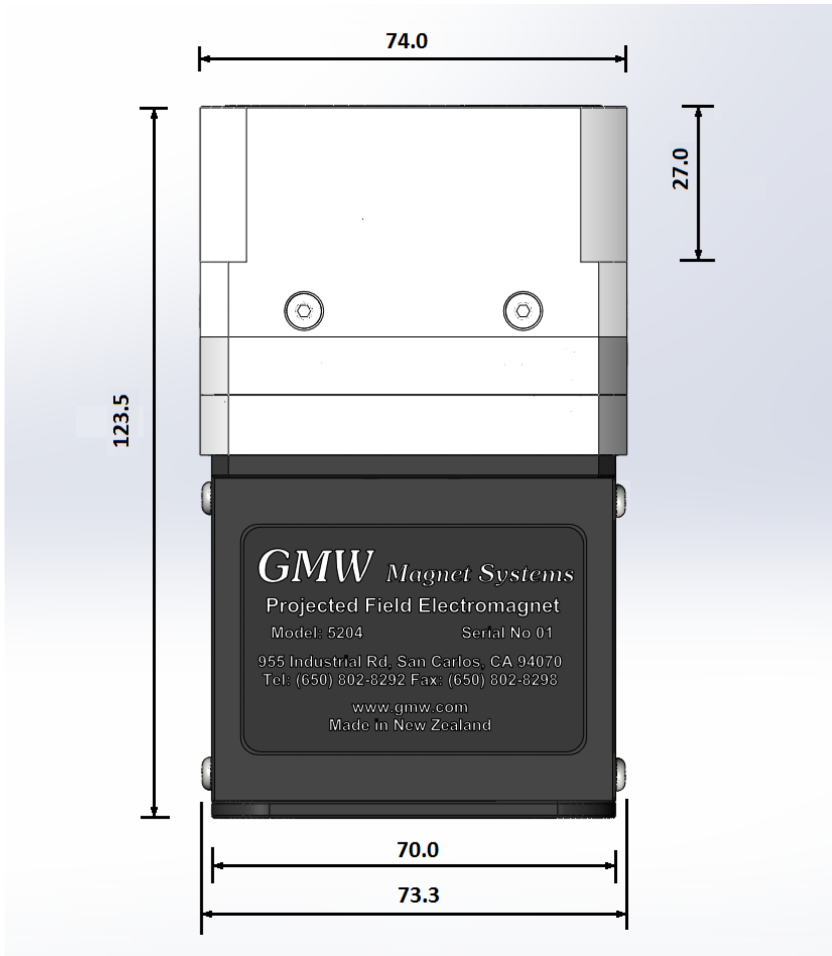
MODEL 5204 GENERAL SPECIFICATIONS	
Peak operating field	Br=±550mT,Bz=±140mT
Axial viewing port	Ø2.5mm
Dimensions	74mm W x 74mm D x 123.5mm H (2.91 inch w x 2.91 inch D x 4.86 inch H)
Weight (excluding hoses and water)	2.5 kg (5.5 pounds)

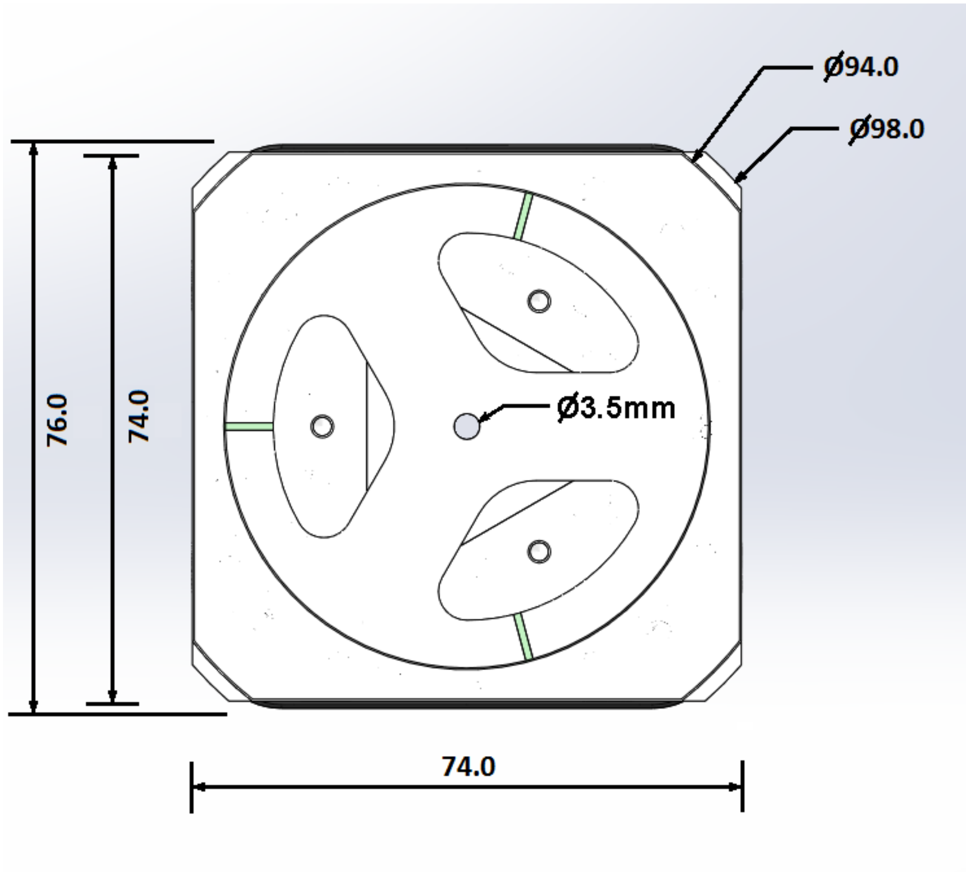
Coils (3 coils per magnet)	
Resistance (20°C)	36.8 mΩ
Max. Resistance (80°C)	45.2 mΩ
Max. continuous current	62A
Max. peak current	100A
Max. continuous Power	175 W/coil
Max. Peak Power	450 W/coil
Coil Inductance	127 μH/coil
Water Cooling (supply 18°C @ 60 psid)	8 Litre/min
Anticipate max. sinusoidal frequency	200 Hz
Over Temperature Interlock	80°C

3-Axis Gradient Amplifier*	OUTPUT RANGE		
	Peak Voltage (V_{AC})	Peak Current (A_{AC})	Continuous Current (A_{DC})
XPA-175-350	0 to ±350	0 to ±175	0 to ±40

* Requires 5kW external power supply.

Revised 4 April 2017


74.0
27.0
123.5
GMW Magnet Systems
Projected Field Electromagnet
Model: 5204
Serial No 01
955 Industrial Rd, San Carlos, CA 94070
Tel: (650) 802-8292 Fax: (650) 802-8298
www.gmw.com
Made in New Zealand
70.0
73.3



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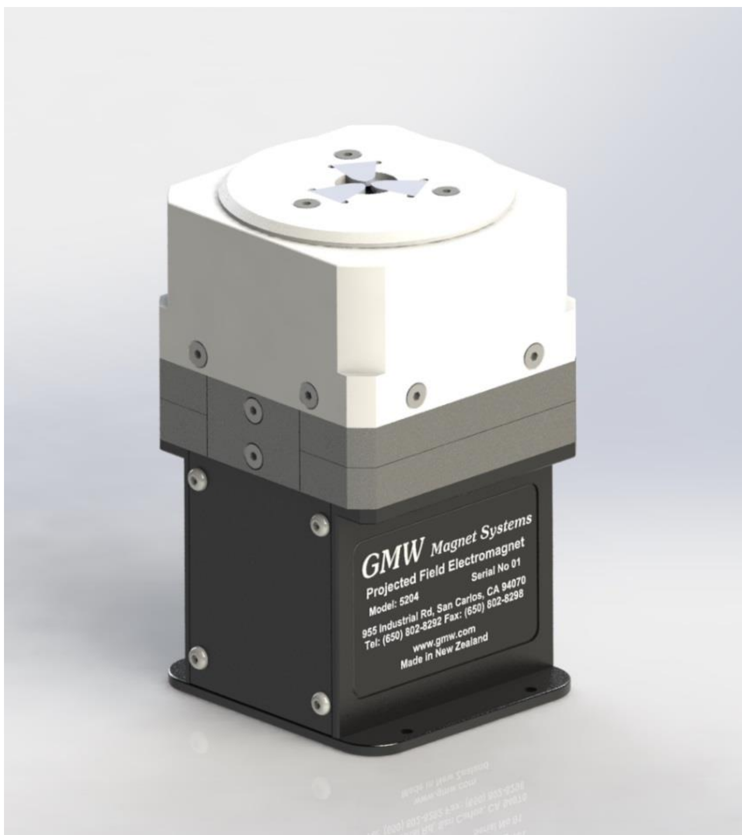
Magnet with 3mm Flux Plate



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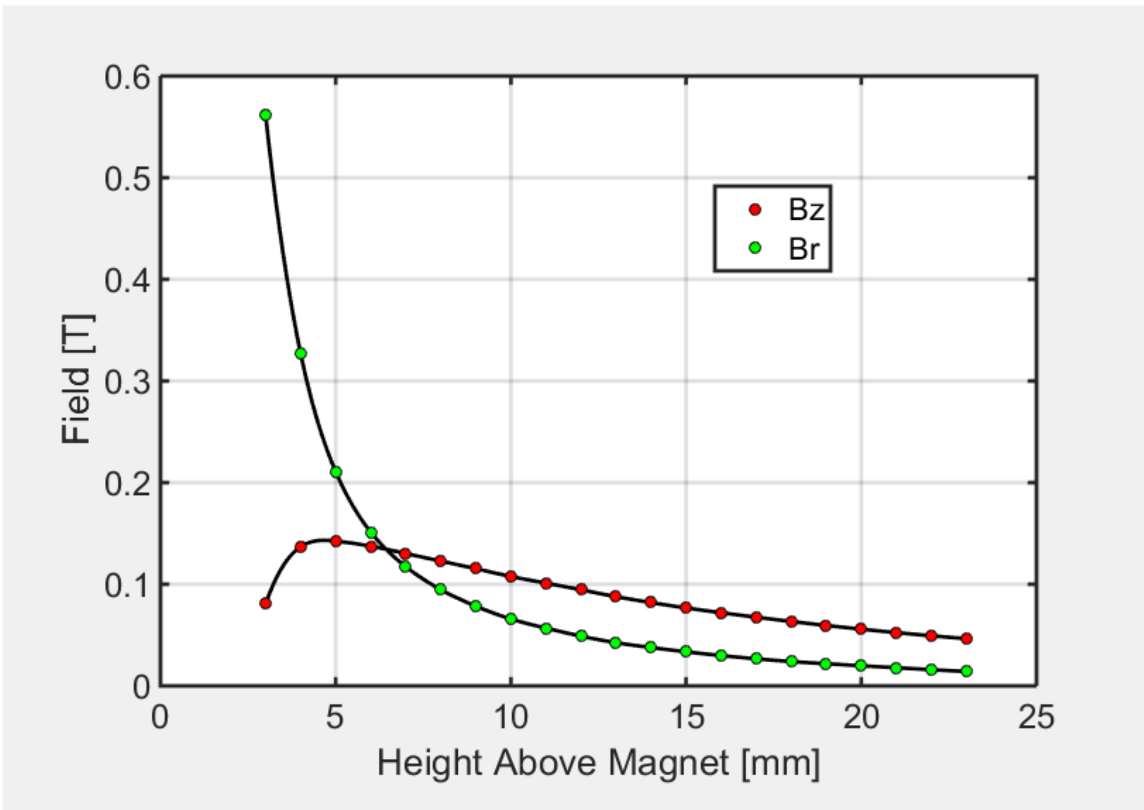
Field Strength Versus Height above Magnet (63A operation)

Magnet fitted with 3mm Flux Plate



Note, Bz values are taken with all three coils equally energised so as to direct flux vertically. Br values are taken with one coil sourcing magnetic flux, one sinking magnetic flux and the other unpowered.

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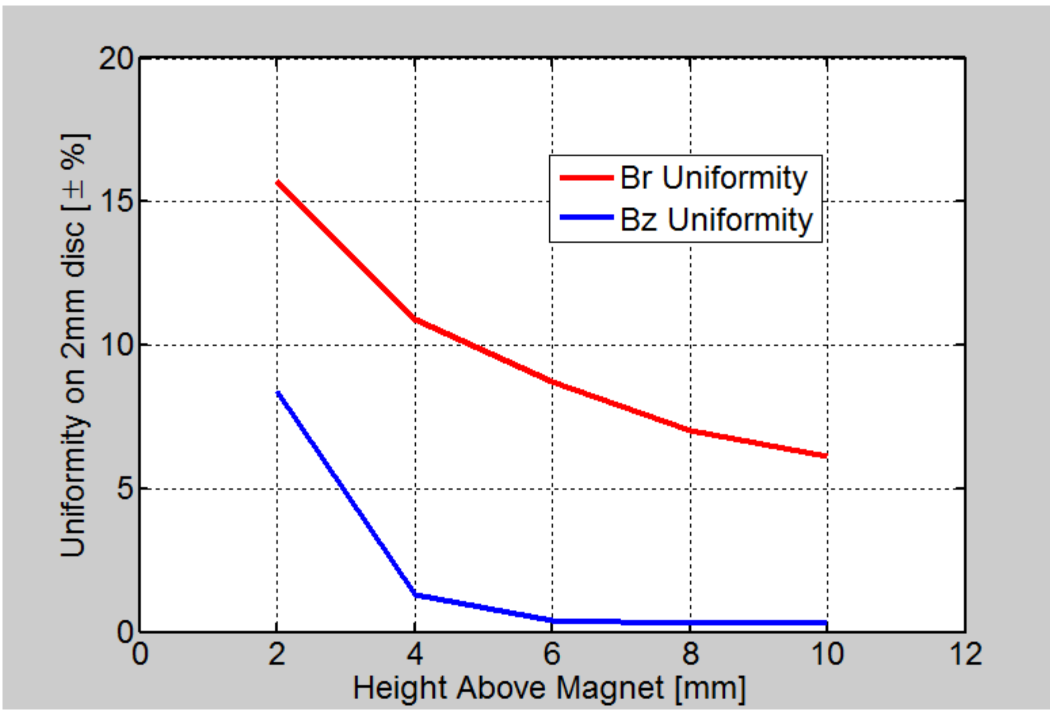
Field Uniformity on a Ø2mm Disc Versus Height Above Magnet



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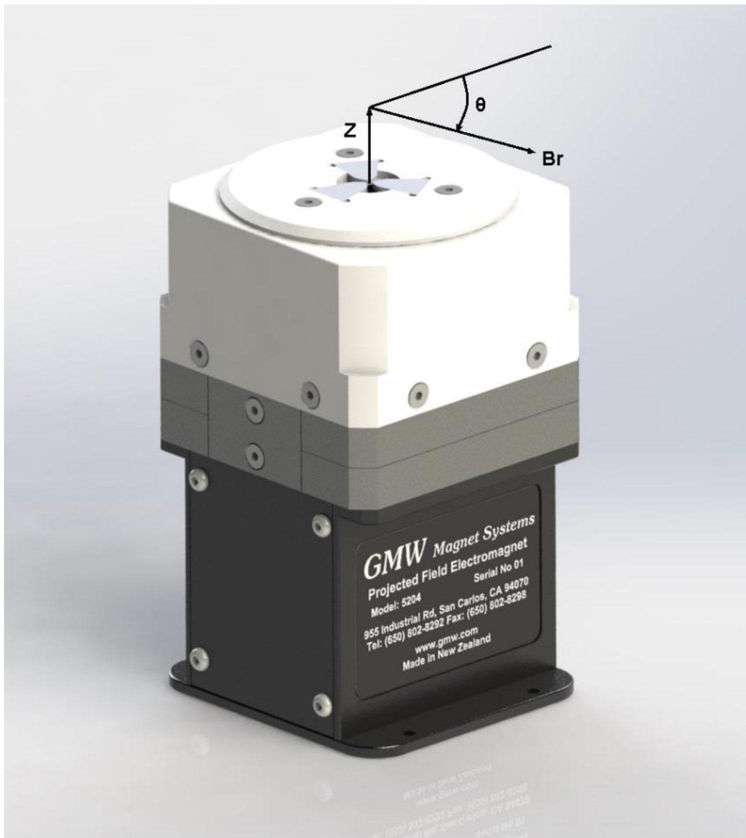
Application Note



Field is measured at 5mm above top of flux plate.

The magnet is fitted with the 3mm flux plate and the excitation curves for each of the three coils are calculated to provide a rotating field of 106 mT in plane at 5mm above the condenser plate. The field rotates at 200 Hz with very low ripple (~0.5 mT) and <0.1 mT of Bz component.

To create a rotating in-plane field the three coils are excited by a waveform with 120° phase angle between each. The waveform is not an ideal sinusoid due to non-linear saturation effects. The residual ripple can be reduced by refinement of the applied waveform.

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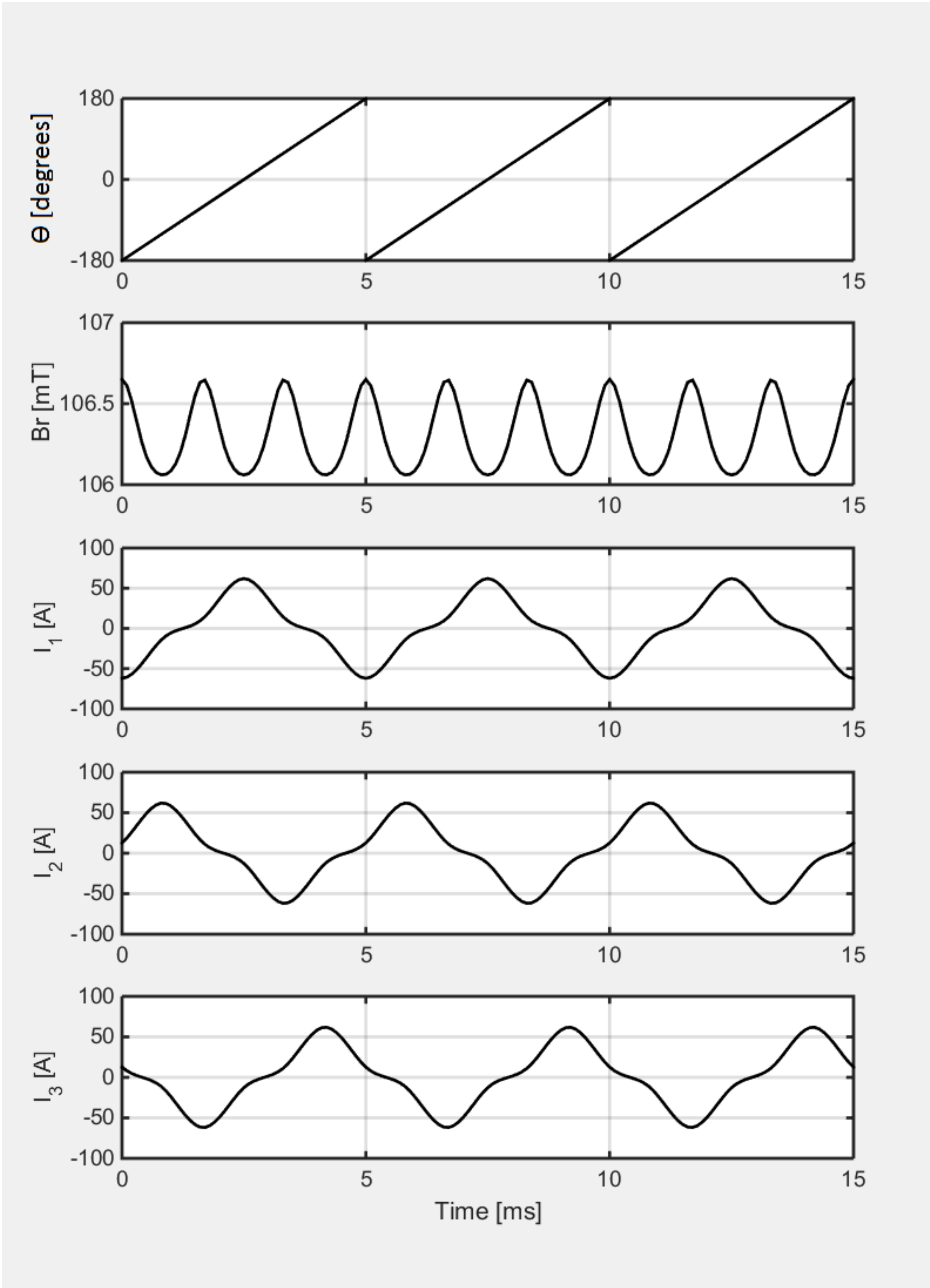

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