5203 Electromagnet

OVERVIEW

The **5203 Electromagnet** is a projected field magnet providing perpendicular 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 optimized for either peak field or uniform field. They are interchangeable and are available with an axial access bore. The 5203 can be mounted in any orientation and light weight (2.5kg) allows the magnet to be integrated into dynamic applications such as wafer testing.

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Features

- Uniform Projected Field (± 1%) Above 0.85T
- Interchangeable Poles
- Small and Lightweight
- Any Mounting Orientation
- Fast Cycle Times

Applications

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

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Model 5203 General Specifications

Mechanical

Dimensions	74mm W x 74mm D x 123.5mm H
Weight (excluding hoses and water)	2.5kg
Field at Distance (5mm) from Face	0.5T over 4mm disc
Field Orientation	perpendicular to surface
Field Uniformity	1%, 4mm x 4mm array (type A standard pole)
Pole Face Diameter	24.4mm
Routing of Water Hoses and Electrical Cables	base or side

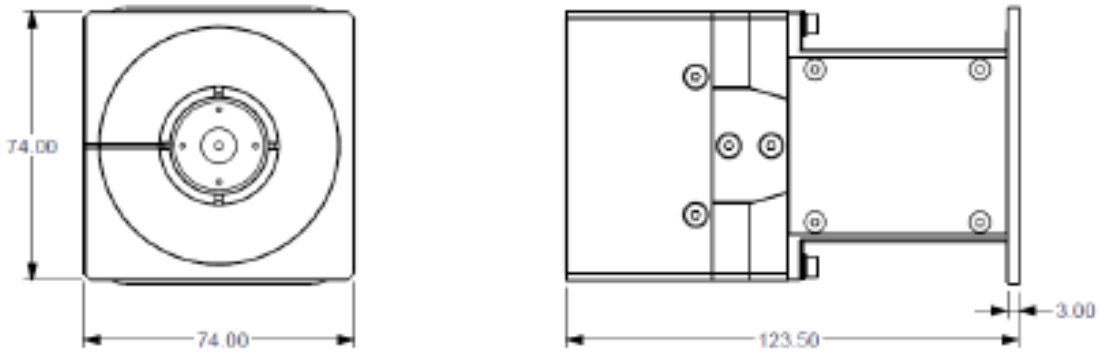
Coils

Resistance (20°C)	173mΩ
Max. Resistance (80°C)	240mΩ
Low Current Inductance	0.0035H
High Current Inductance	0.0017H
Max. Continuous Power (water)	63A, 15V, 1.1kW
Max. Peak Power (water)	100A, 30V, 3kW
Water Cooling (supply 18°C @15 psid)	up to 8liters/min

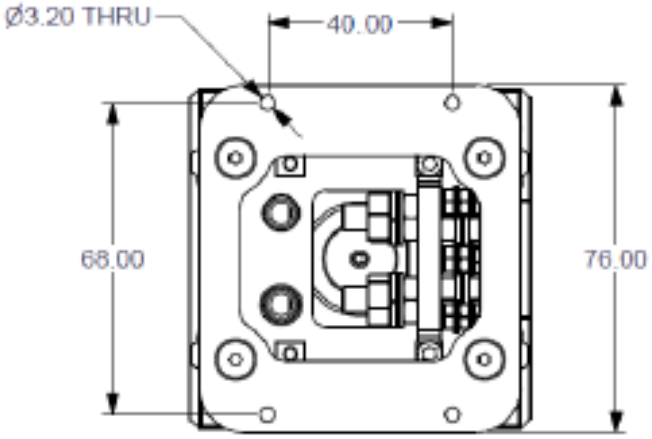
Safety

Over Temperature Interlock	Selco UP62-082C thermostat. Open circuit above 80°C coil temp
Water Flow	GEM FS380/168435 flow switch. 0.51 liters/min
Diameter Sphere Containing 5G-surface ("fringe field")	200mm

GENERAL DIMENSIONS

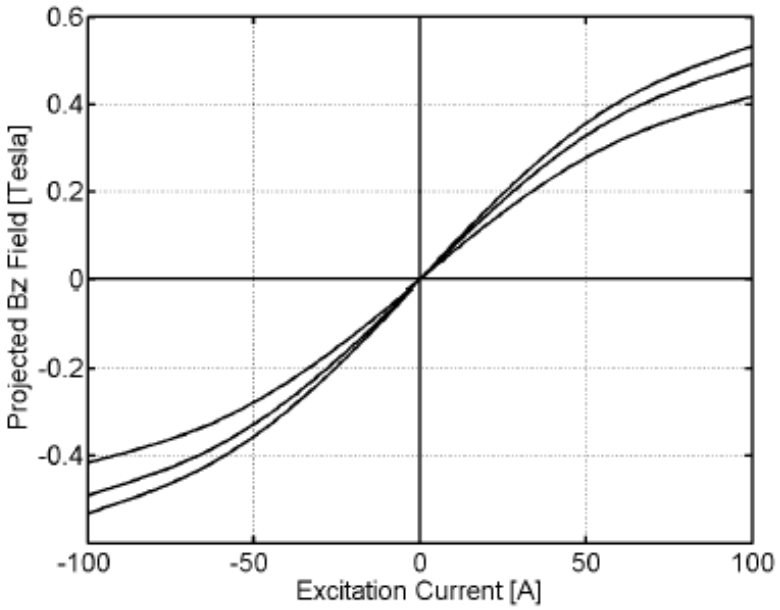


MOUNTING DETAIL



Magnet with 3mm Flux Plate

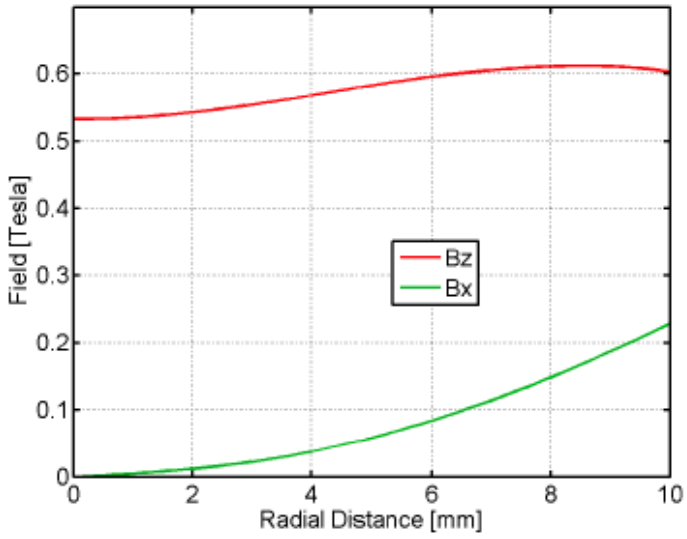
Excitation curves for the Bz field at 2mm, 5mm and 10mm above the pole face



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.**

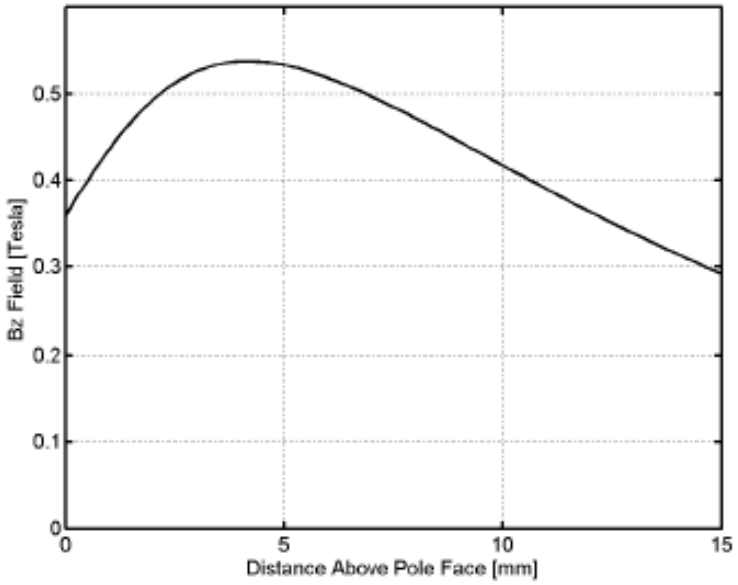
Variation of Bx and Bz fields at 5mm above pole face with radial distance



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



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.