5404 Electromagnet

OVERVIEW

The 5404 electromagnet is a dipole with fixed gap selectable between 1mm and 5mm. It is intended for applications requiring a small volume of high field in the range of 4T to 5T. Poles are interchangeable and are available in Solid or Axial Hole versions. The 5404 can be mounted in any orientation and the modest weight of about 170 kg (380 lb) allows mounting on an optical table for MOKE applications.

Features

- Peak field of 4T to 5T for Pole gaps of 5mm to 1mm
- Copper coils with water cooling, No cryogenic cooling
- Modest size and weight
- Selectable pole gap, 1mm to 5mm • Any mounting orientation
- Removable poles for split solenoid configuration
- Solid and Axial Hole pole options
- Full ±5T field cycle in less than 10 seconds with matching Bipolar Power Supply

Applications

- Hall Effect Studies
- Magneto-Optical Studies
- Magnetic alignment of small components
- Chemical reaction rate studies

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Model 5404 General Specifications

Mechanical

Dimensions	284mm W x 356.5mm D x380mm H
Weight	170kg
Available Pole Spacing	1 to 5mm
Lateral Access Width	153mm
Lateral Access Height	5.2mm

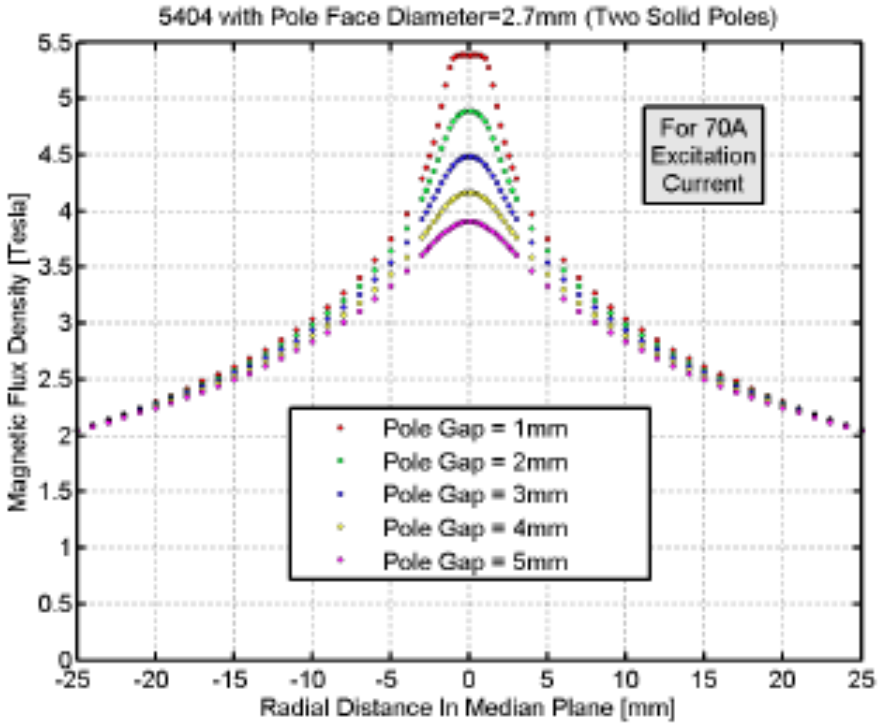
Coils (series connected)

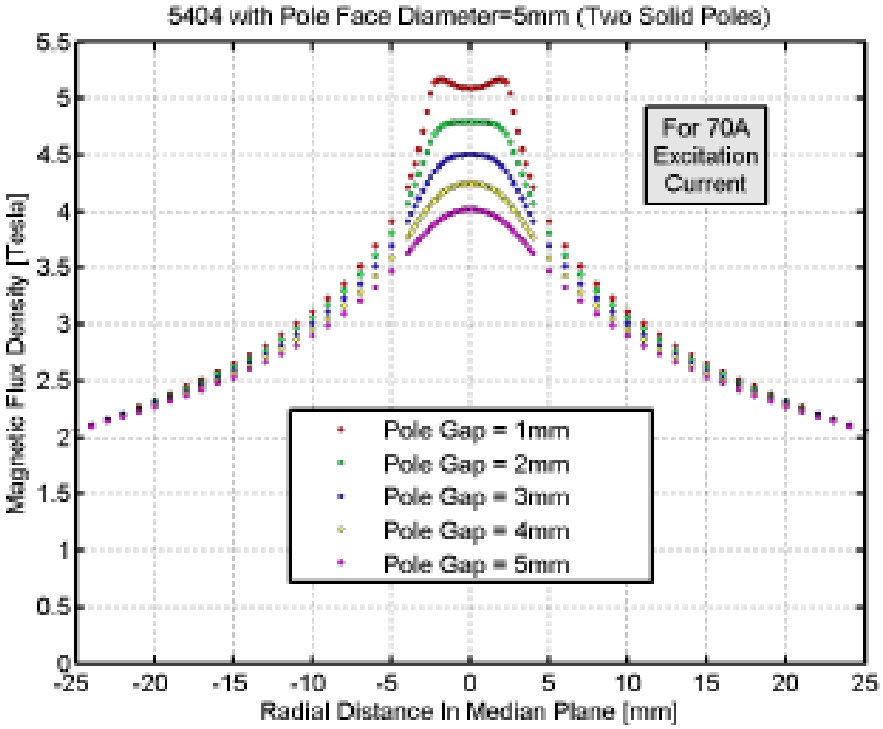
Resistance (20°C)	1.84 Ω
Max Resistance (70°C)	2.21 Ω
Max Continuous Power	+/-64A, +/-140V, 9.1kW
Max Peak Power	+/-70A, +/-160V, 11.2kW
Low Field Unsaturated Inductance	450mH
High Field Saturated Inductance	350mH
Ramp Rate (0 to 5T, max linear B v t)	2.5 seconds
Ramp Rate (0 to 5T, max, non-linear B v t)	0.5 seconds
Water Cooling (20°C)	10 liters/min at 1.0 bar(2.6 US GPM,15psi)

Safety

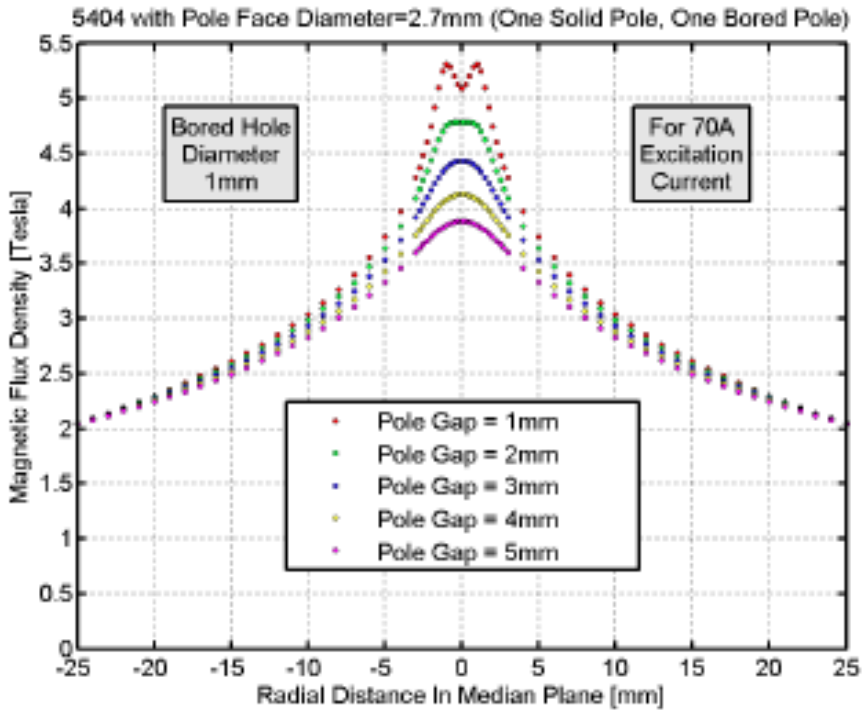
Overtemperature Interlock	Open circuit above 60°C (140°F) coil temperature
Diameter Sphere Containing 5G-surface ("fringe field") [mm]	600

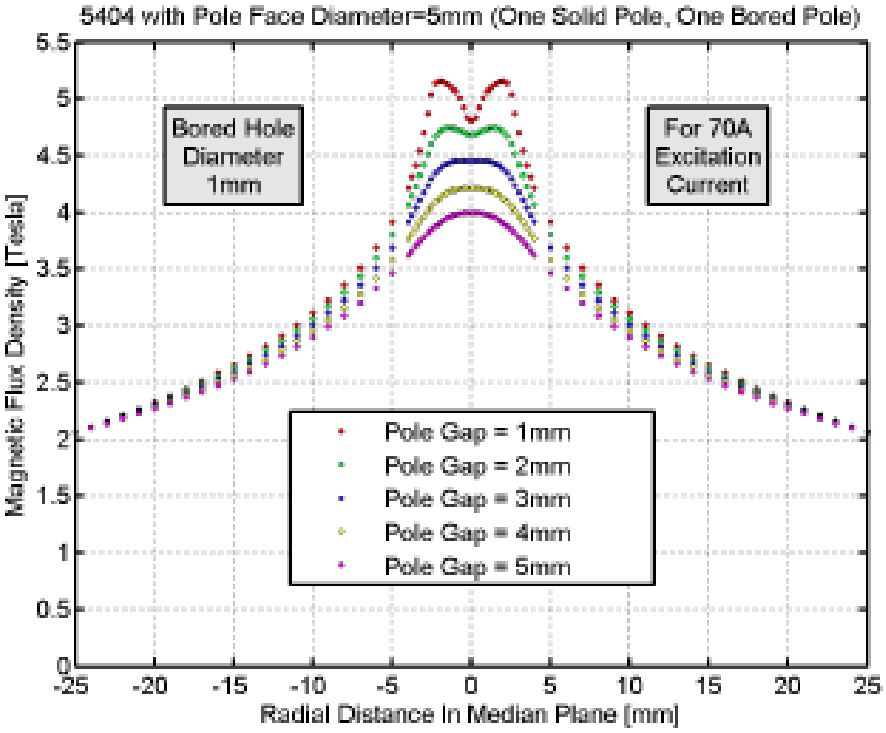
Magnetic Flux Density vs. Radial Distance in Median Plane, Two Solid Poles, Model Data



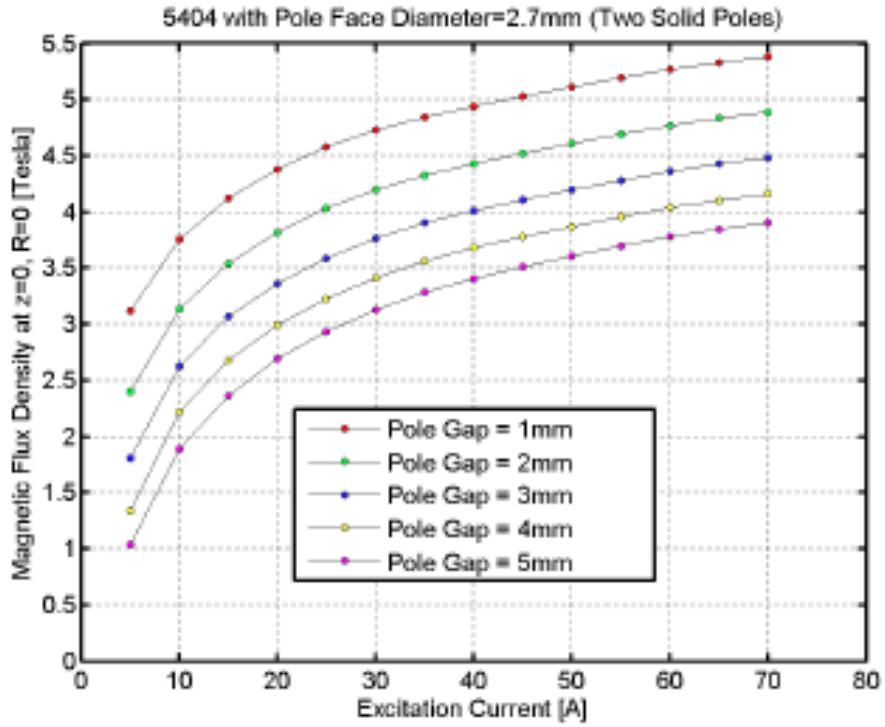


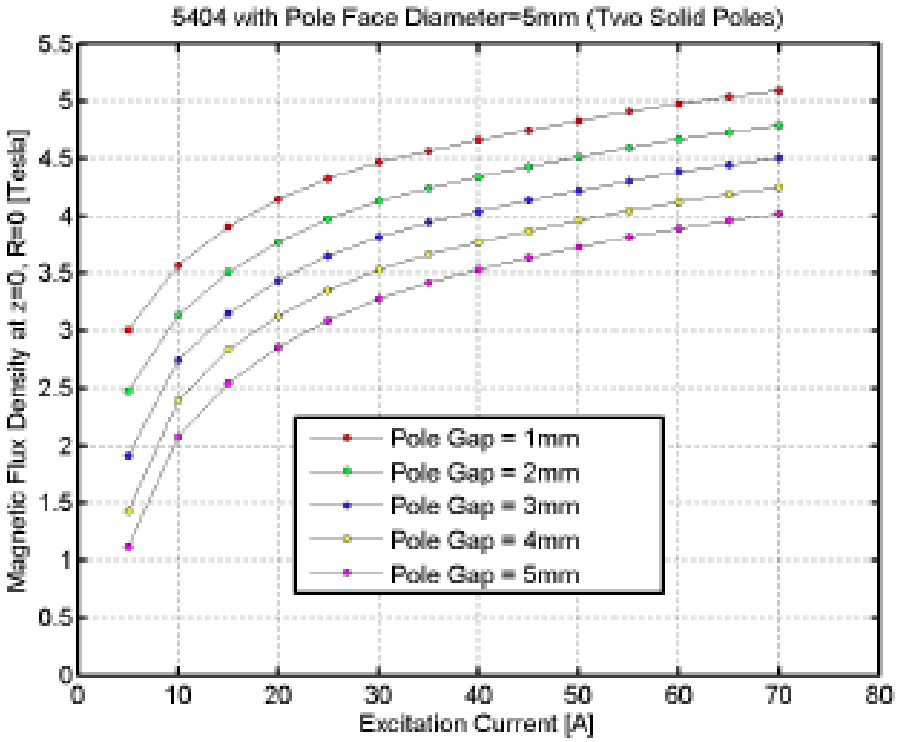
Magnetic Flux Density vs. Radial Distance in Median Plane, 1mm Diameter Axial Hole in One Pole, Model Data



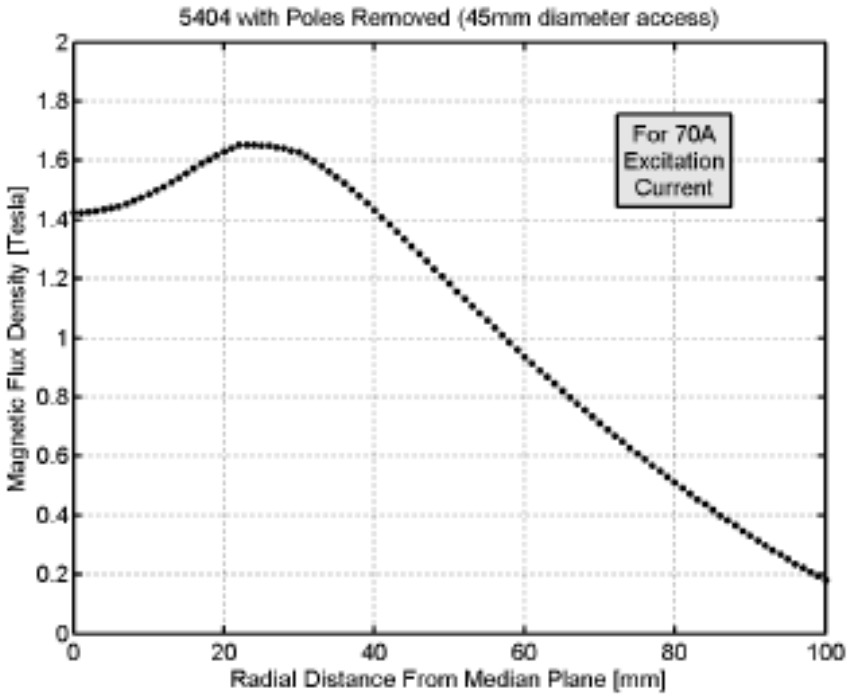


Magnetic Flux Density vs. Excitation Current, Two Solid Poles, Model Data

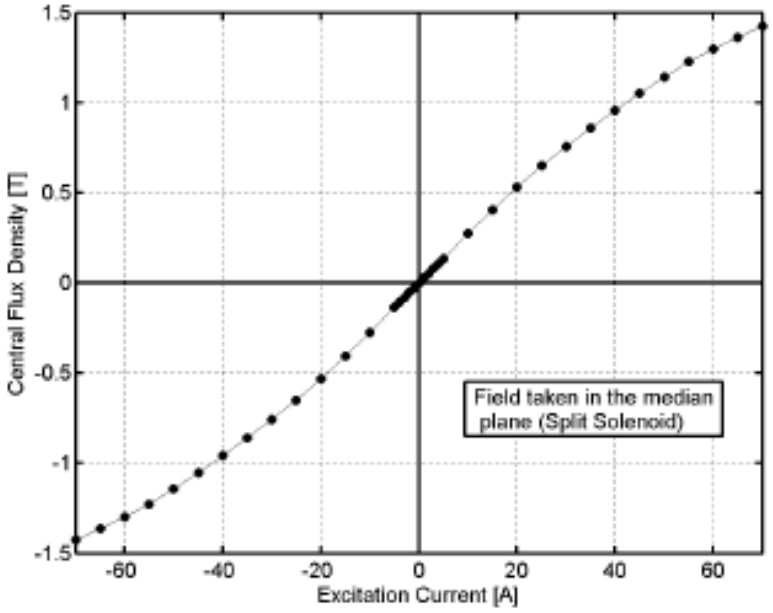




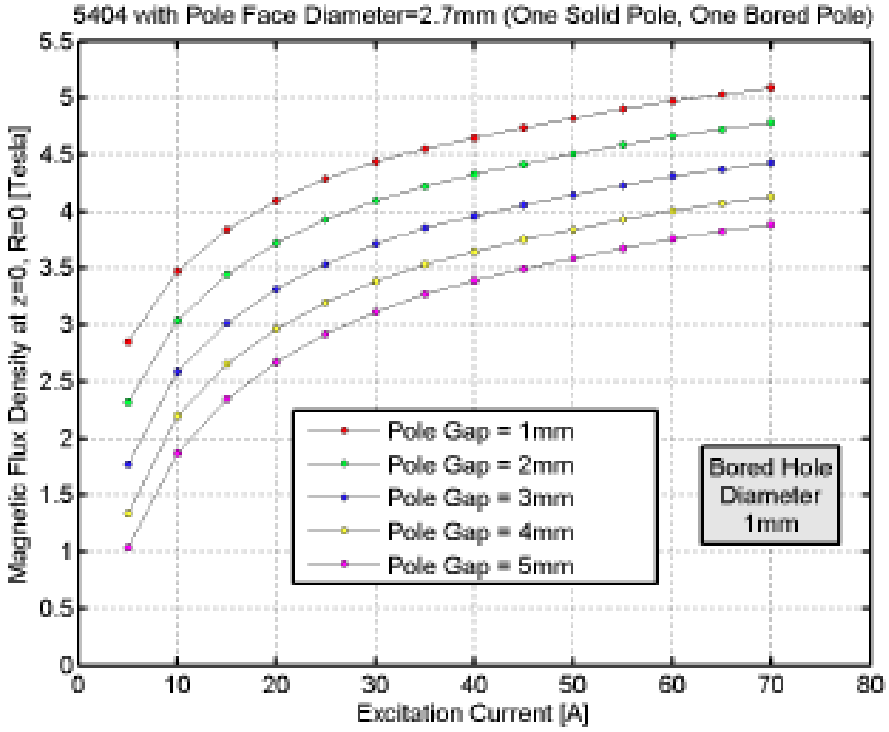
Magnetic Flux Density vs. Radial Distance in Median Plane, Split Solenoid Configuration, Model Data

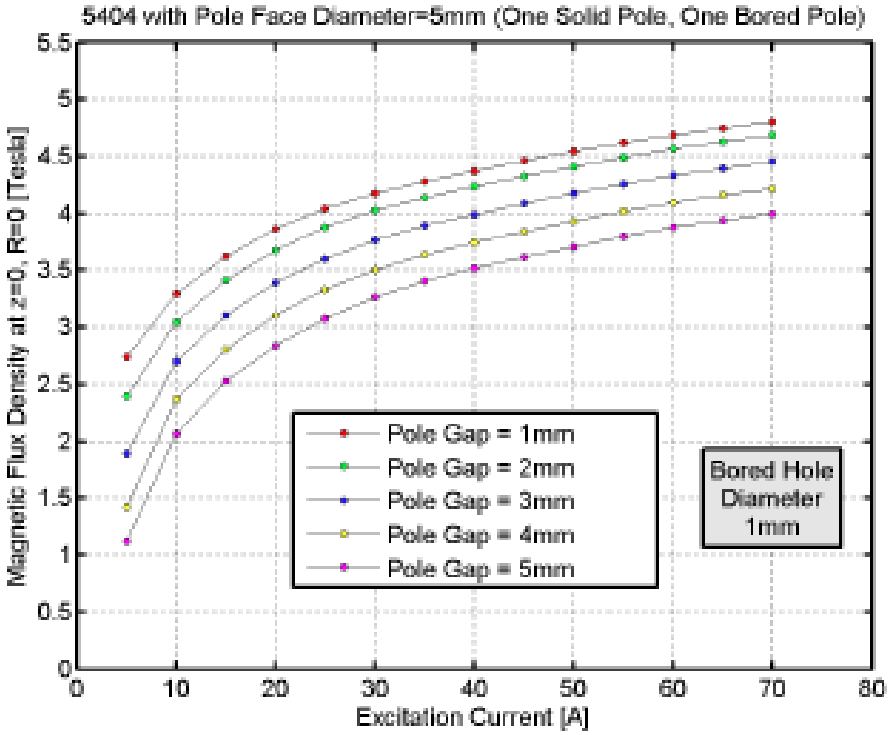


Magnetic Flux Density vs. Excitation Current, Split Solenoid Configuration, Model Data

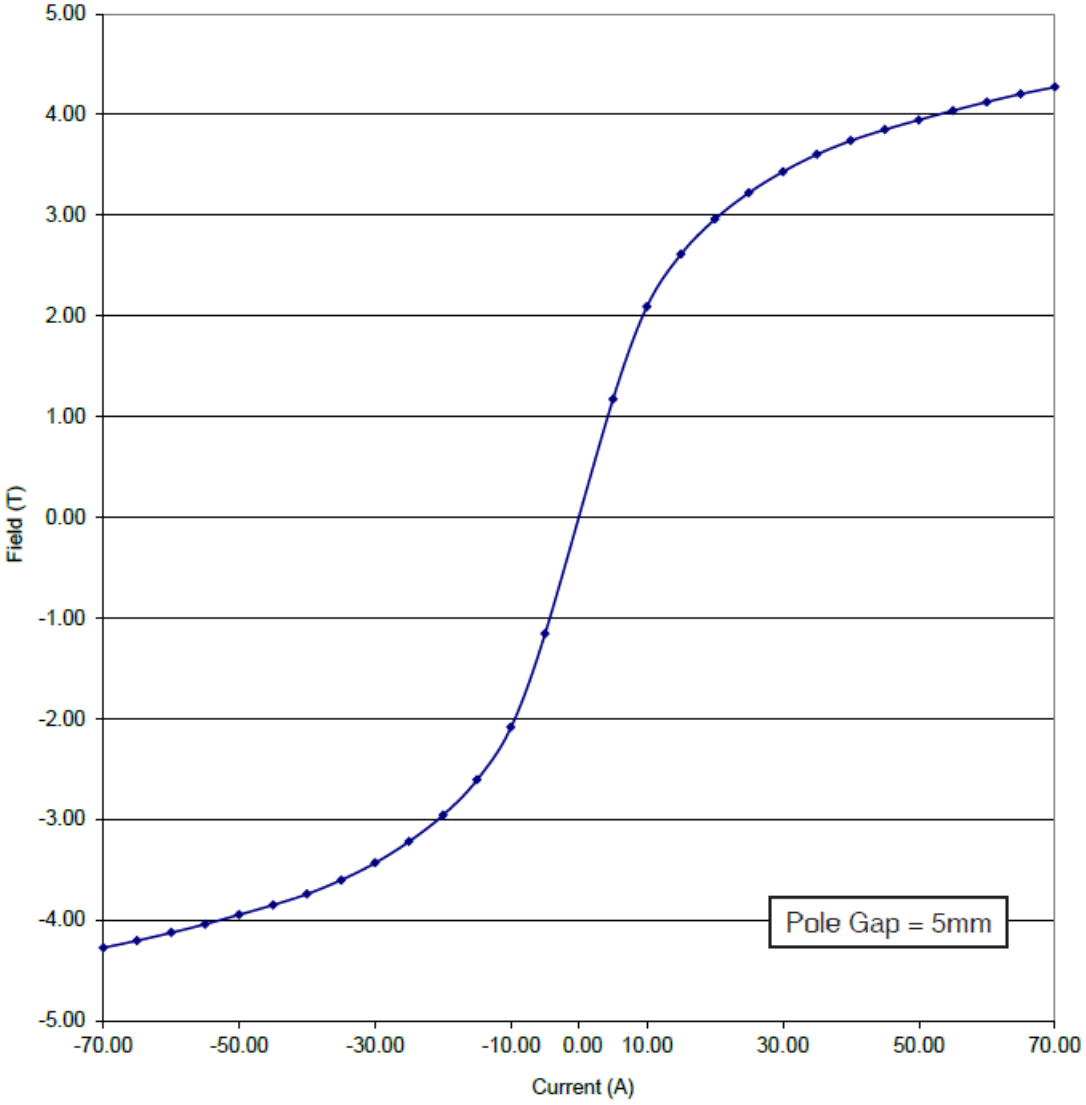


Magnetic Flux Density vs. Excitation Current, 1mm Diameter Axial Hole in One Pole, Model Data

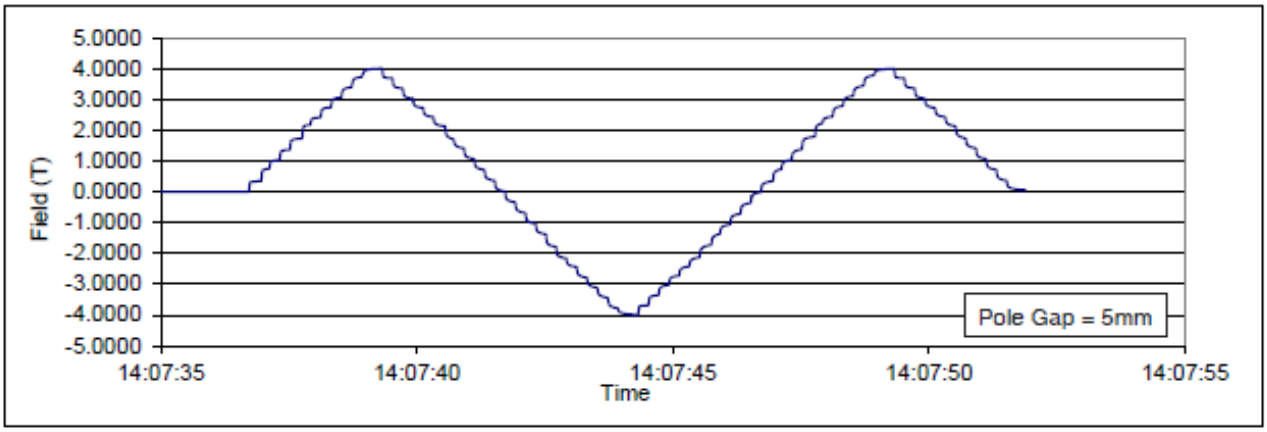




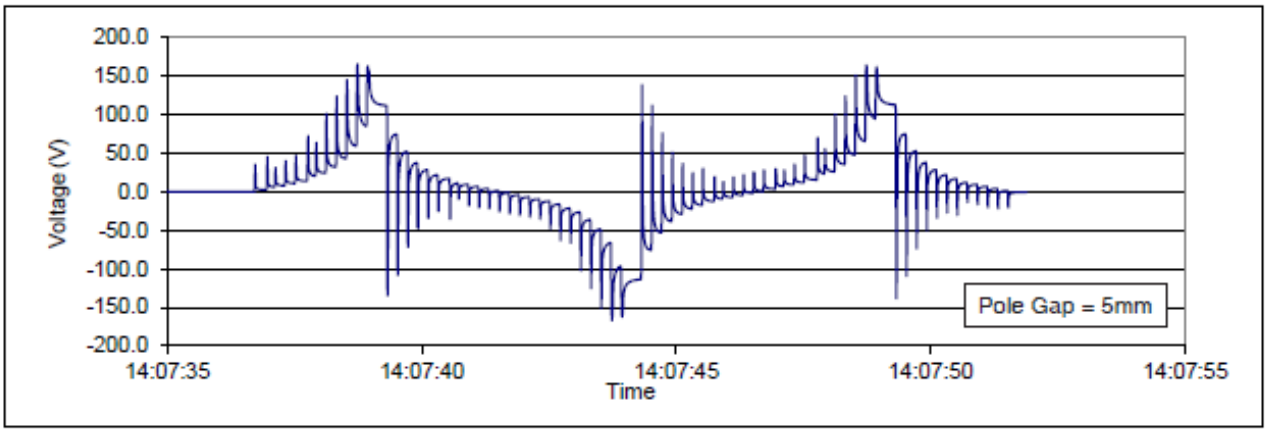
Magentic Flux Density vs. Excitation Current, Two Solid Poles, Test Data



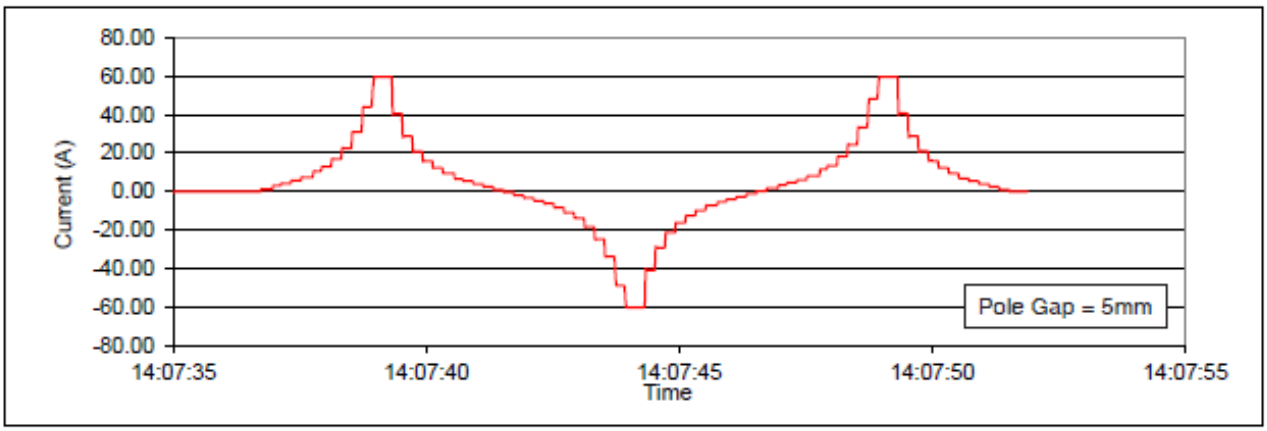
Magnetic Flux Density vs. Time, Two Solid Poles, Test Data



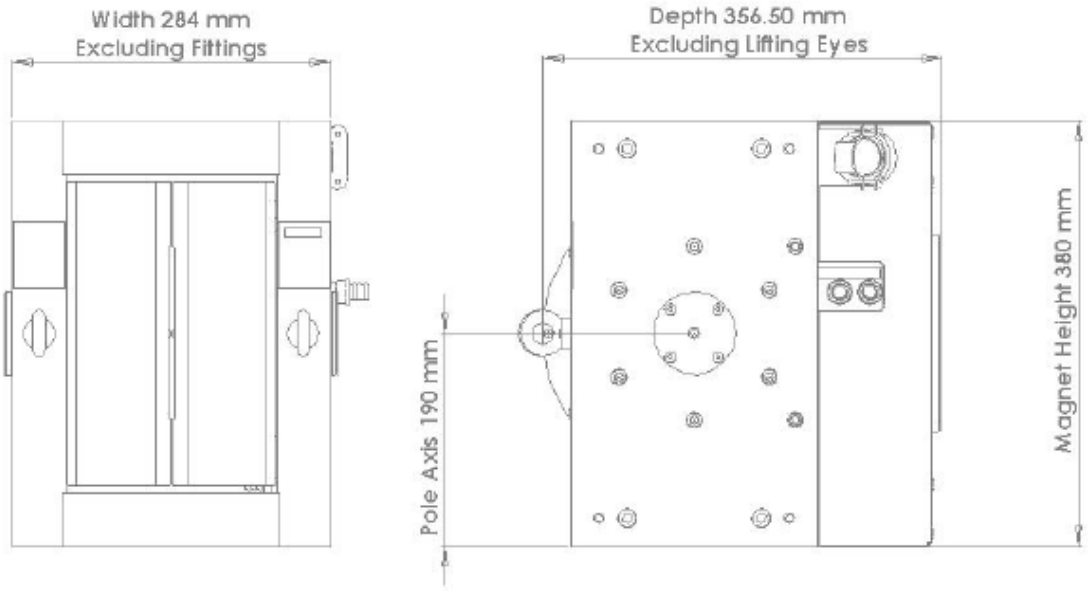
Voltage vs. Time, Two Solid Poles, Test Data



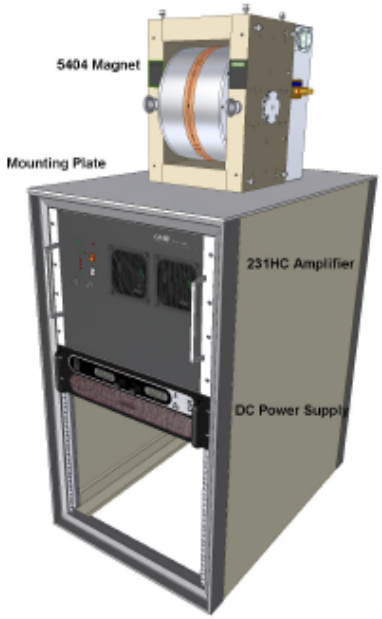
Current vs. Time, Two Solid Poles, Test Data



Drawings, General Outer Dimensions



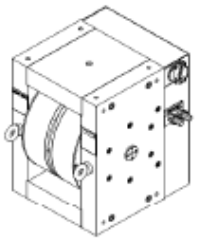
Rack mount with 231HC Power Amplifier and DC Power Supply.



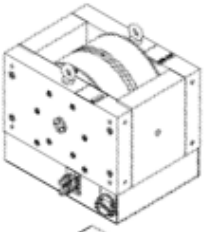
19" Rack - 22W x 36H x 30D inches
(55W x 914H x 762D mm)

Drawings, Other Mounting Options

In this configuration the field direction is horizontal and the sample can be loaded from the side. For a wafer like sample the wafer is oriented in a vertical plane.



For this configuration the sample is loaded fromeither above or below the magnet. The field is oriented horizontally.



This configuration provides a vertical field and horizontal sample loading. In this arrangement a wafer like sample is loaded while lying in a horizontal plane.