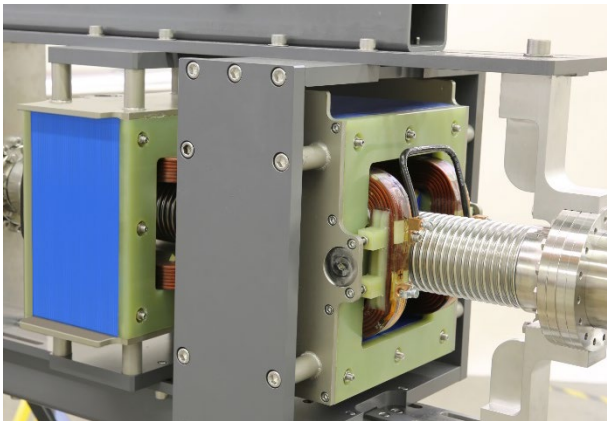
AC SCAN MAGNET SYSTEM, AIR-COOLED

Stand-alone AC Magnet or Turnkey System for Raster Scanning of Charged Particle Beams

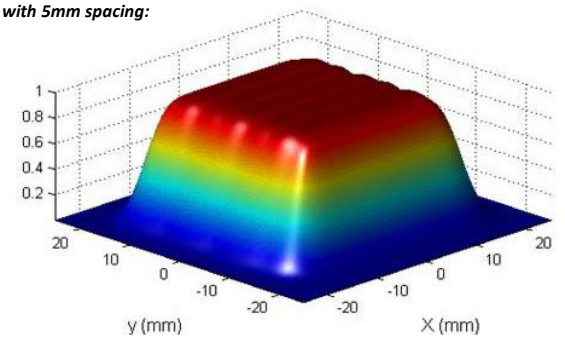


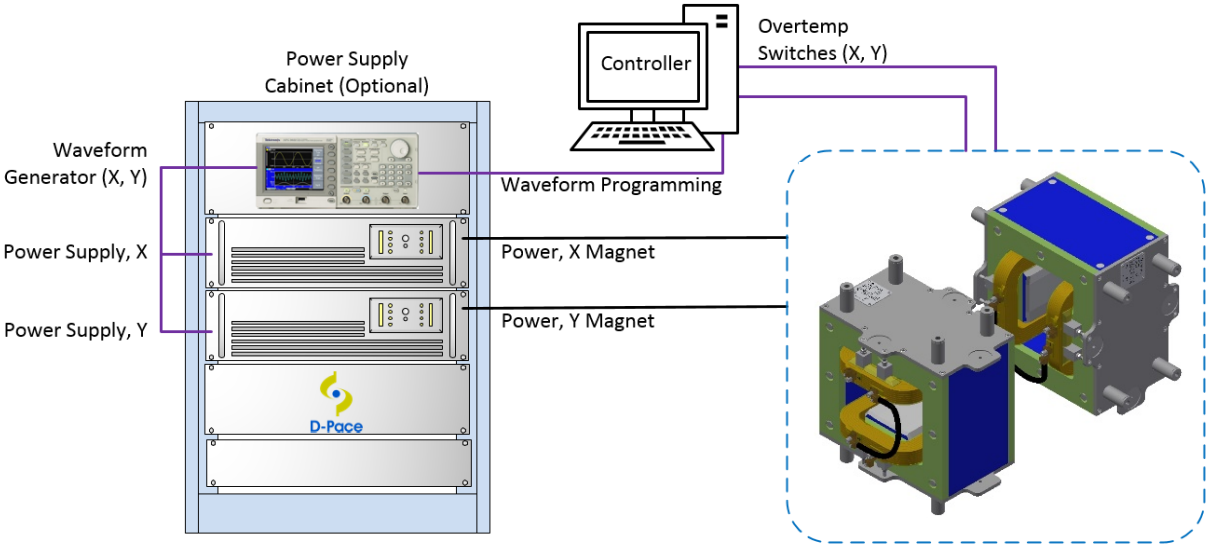
The **D-Pace Scanning Magnet System** is used to deflect a charged particle beam, usually for the purpose of managing power density on targets. Typically used in pairs (one to scan in the X plane, and one to scan in the Y plane) these AC magnets are driven by a dual-axis waveform generator and bi-polar power supplies, which D-Pace can provide in an optional 19" half-height cabinet. Standard patterns include Lissajous, circular, and square raster patterns. D-Pace can create new profiles for customers' specific requirements. Power distribution on the target determines the scanning pattern required. New profiles can be uploaded via USB from the customer's PC. D-Pace can also provide beam pipes or bellows with customer-specific flanges.

OVERVIEW: **Model #: SM97-A**

- Distribute beam power on targets
- Use standard or application-specific patterns
- Magnetic field strength up to 270 Gauss[1]
- Scan frequencies up to 250 Hz[2]
- Pole gap 97 mm
- Compact laminated-core construction
- Magnets available individually or as turnkey system complete with power supplies, instrument rack and beampipe

Example: Beam intensity distribution for XY scan with Gaussian (0-2.5mm) beam, with 5mm spacing:





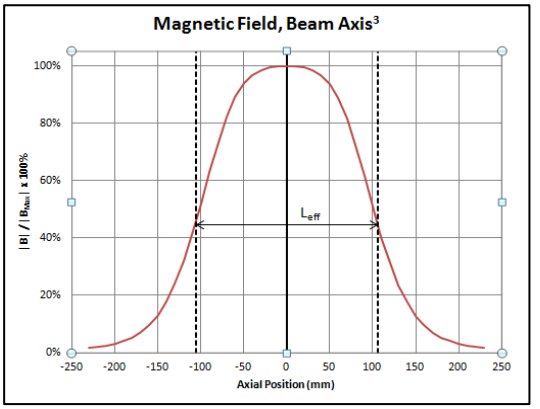
D-Pace, Inc. +1.250.352.5162 info@d-pace.com www.d-pace.com

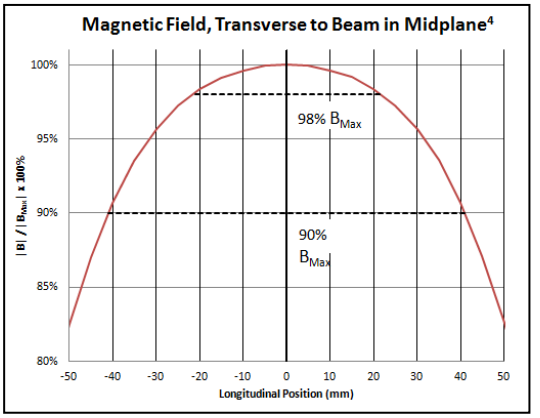
MAGNET SPECIFICATIONS

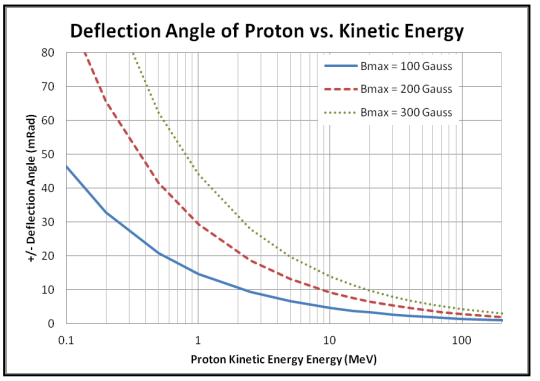
B/I	12.5 Gauss/Amp[6]
Inductance	5.13 mH
Coil Resistance	76 mΩ (DC)
Magnet gap	97 mm
Effective length	212 mm
Field Flatness, Transverse	+/- 20mm off axis: 98% of B_{max} +/- 40mm off axis: 90% of B_{max}
Thermal protection	Resettable thermal switches, one per coil
Dimensions (L x W x H)	310mm x 340mm x 383mm See drawing: 1590277
Mass	85 kg
Power	4-8 AWG Screw Connector
Yoke Style	Non-opening
Alignment Features	6 Alignment fiducials 3 top, 3 bottom

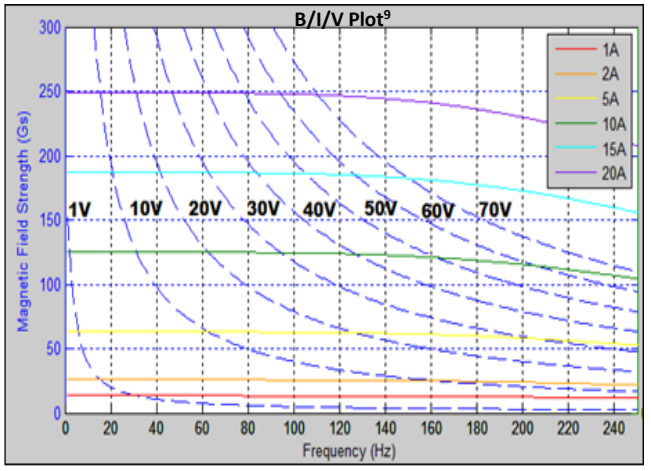
TURNKEY SYSTEM SPECIFICATIONS [5]

1) Power Supplies	Per Customer Requirements
2) Waveform Generator	2 Channels, 14 bits
3) Optional Cabinet (H x W x D) Mass (items 1, 2, 3)	16U Instrument rack 780 x 534 x622mm 70 kg (approx.)
4) Beam Pipe, Optional	Hydro-formed bellows custom flanges









The plot to the left is valid for sinusoidal performance. For triangle wave operation required for flat-topped raster scanning, the peak frequency is about ½ that of sinusoid performance. For example, at 250 Gauss the raster scanning would be at 50 Hz on one axis with triangular wave-form rather than 100 Hz sinusoidal (i.e. with one magnet), and the frame rate would be defined by the frequency of the other axis (other magnet) at usually about 10 Hz.

1. With power supply 20A, 50V, 70Hz maximum.
2. With 2A, 65V power supply (100 Gauss maximum).
3. Scan in magnetic mid-plane along beam axis.
4. Scan in magnetic mid-plane transverse to beam axis.
5. Contact D-Pace for turnkey system customization.
6. Centered, beampipe bellows.
7. See Design Note 2010067: Selecting Power Supplies.
8. See Design Note 2010069: Design of Scan Patterns.
9. Using power supply with shunt capacitance of 55µF.

D-Pace, Inc. +1.250.352.5162 info@d-pace.com www.d-pace.com