

Dipole Electromagnet, 45mm Specifications -

General

Pole Diameter	45mm. Reversible, with pole face diameters of 20 and 40mm
Pole Gap	0 to 75mm
Coil Spacing	35 to 75mm
Dimensions	377mm W x 233mm D x 217mm H
Weight	27kg (60lbs)

Coils (series connected)

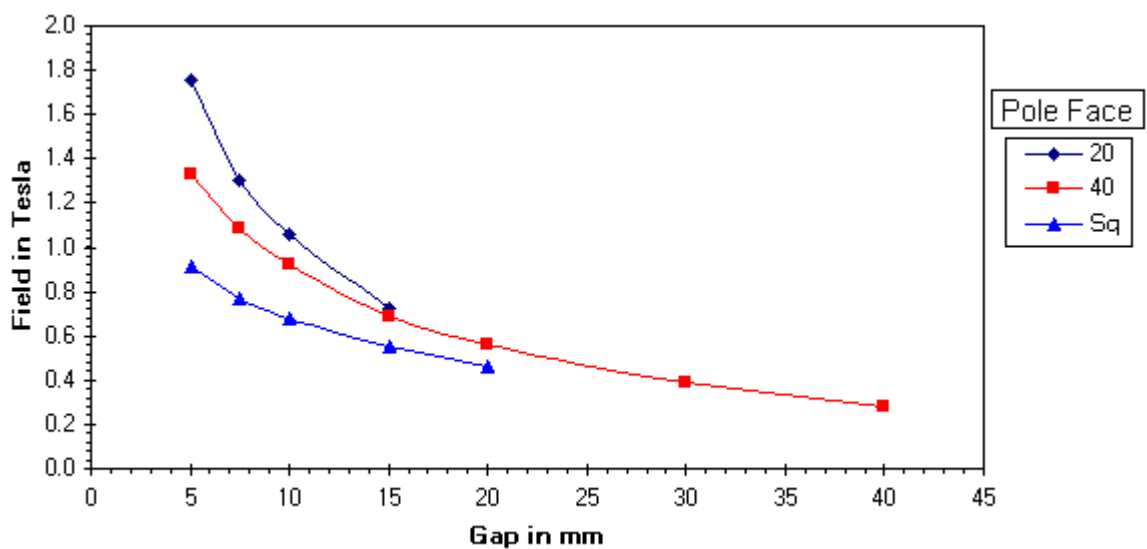
Resistance (20°C)	7.3Ω
Max Resistance	8.8Ω
Max Power (air)	3.5Amps, 31Volts (0.11kW)
Max Power (water)	5.0Amps, 44Volts (0.22kW)
Self Inductance	Approx 50mH
Water Cooling	1 liters/min, 0.3 bar (0.26 US GPM, 5 psid)

Interlocks

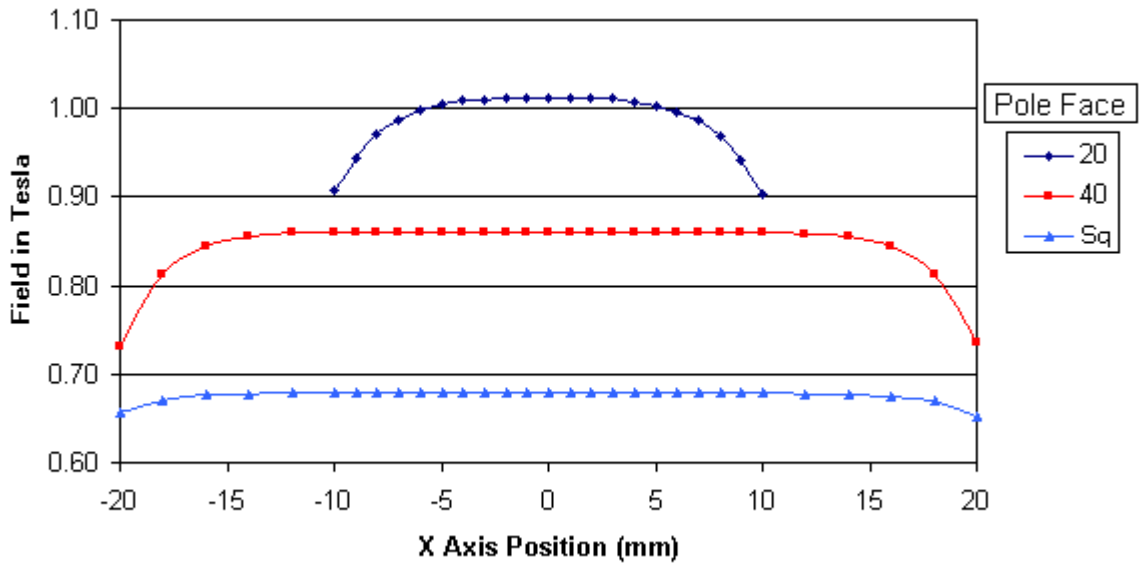
Overtemperature	Elmwood 3450G thermostat, mounted onto each cooling plate, wired in series. Contacts closed below 40°C
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Performance

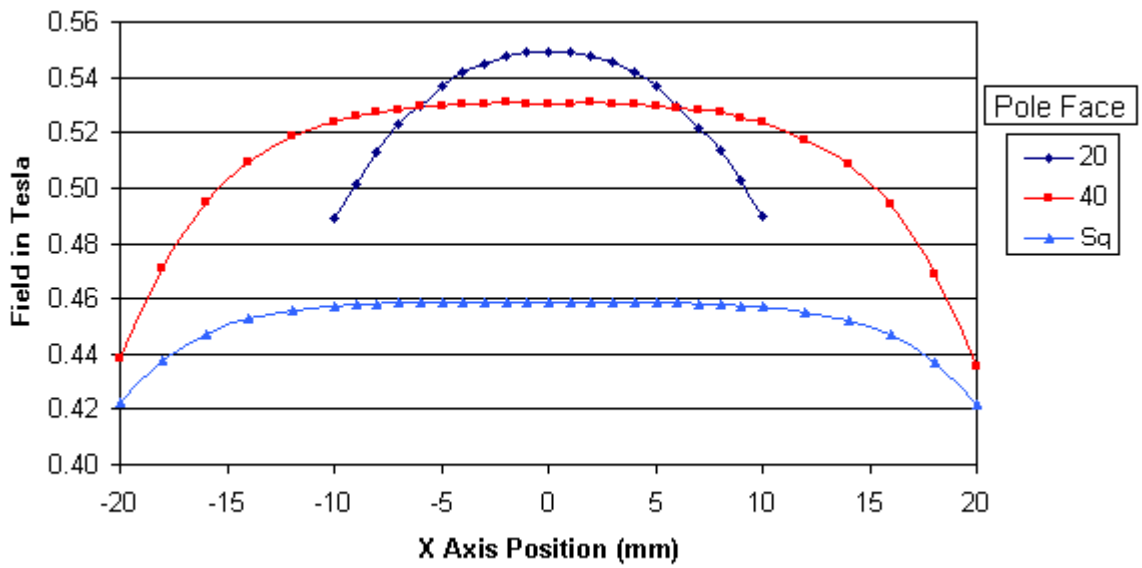
Fields at maximum current of 5 Amps



Field Uniformity



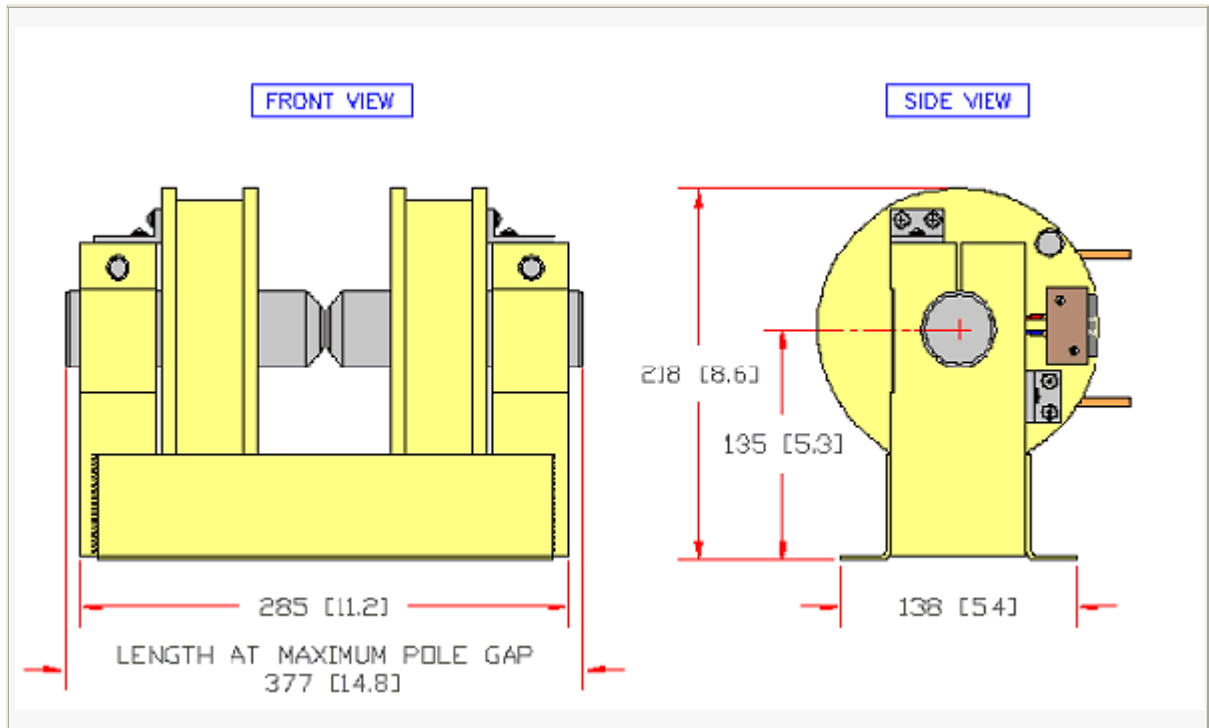
10mm pole gap, 5 Amps excitation current



20mm pole gap, 5 Amps excitation current

Drawings

General Assembly



The Electromagnet is the smallest and lightest standard dipole electromagnet available . It is used in a wide range of teaching, research and industrial applications where a relatively small volume of field is required. The light weight allows it to be used on optical tables and the simple poles enable axial entry & exit holes to be matched to the optical geometry.

Poles

The electromagnet has two 45mm (1 ³/₄ inch) diameter cylindrical pole pieces. One end of each pole piece has a plane cylindrical 40mm pole face and the other end has a tapered 20mm pole face. The 40mm pole face produces the most uniform field. The tapered

20mm pole faces are used when higher gap fields are needed. Each pole piece is clamped in the yoke by a bolt. The pole pieces are adjusted to vary the gap by slackening the clamping bolts. The same procedure is used to remove or reverse the pole pieces. The gap is adjusted in the range from 0 to 75mm. Optional square poles (50mm side) are available. (The square poles have been applied in a simple mass spectrometer as described in "Undergraduate Mass Spectrometer", John W. Dewey, American Journal of Physics, **28** (1960) 452-456.

Coils

The two coils are wound on spools, which have integral, electrically isolated, water cooling tubes and overtemperature interlock switches. Operation with water cooling allows a maximum coil current of 5A. Regular tap water may be used. Without water cooling, the maximum operating current is 3.5A. The coil-to-coil spacing is adjustable over the range from 35 to 75 mm.

Features

- Small Size
- Reversible Plane or Tapered Poles
- Adjustable Pole Gap
- Air or Water Cooled
- Adjustable Coil Spacing
- Bench or Wall Mounting
- Optional 50mm Square Poles



Applications

- Hall Effect Studies
 - Magneto-Optical Studies
 - Laboratory Experiments
 - Magnetic Separation
- experiments
- Magnetic alignment of small components
- changes
- Studying chemical reaction rate changes

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