Maxwell Magnets

- Intelligent Magnet Technology

MRI

Innovation with Integrity

Maxwell Magnet Technology

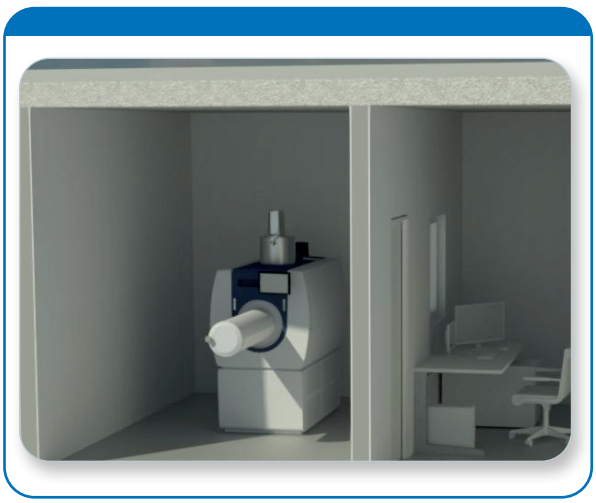
Bruker's revolutionary Maxwell Magnet Technology

- **Features** superconducting magnet conduction cooling technology
- **Eliminates** liquid cryogen filling and the need for quench pipes
- **Simplifies** siting and maintenance
- **Incorporates** automatic self-supervision
- **Empowers** push-button magnet control[1]
- **Enables** most demanding studies

Maxwell Magnet Technology

Maxwell magnet technology makes superconducting Magnetic Resonance Imaging without the need for liquid cryogen filling possible. This revolutionary magnet technology is based on recondensing cooling of a minuscule volume of helium and a patented cooling technology[1]. A powerful dual stage cold head maintains the low temperature of < 4.2 K, allowing constant recondensing of the helium, which in turn cools the superconducting coil.

- 3 Tesla, 7 Tesla, and 9.4 Tesla magnetic field strengths
- No liquid cryogen filling
- Compact, lightweight design
- Small stray field
- Fast pulse tube maintence with extended maintence intervals



Simplified Siting - Elimination of a full liquid helium bath reduces magnet size and weight, simplifying siting. Siting requirements are even further reduced, since neither a quench pipe nor a Faraday cage is required.

Reliable Operation with Maximum Uptime

Study interruption, especially when unplanned can be very costly. With Maxwell magnet technology, neither unforeseen infrastructure malfunctions nor maintenance are reasons for study hindrance. The small recondensed helium reservoir maintains superconductivity and thus continued operation for at least 6 hours during a cooling disruption[2].

Due to its easy accessibility, the maintenance of the most advanced pulse tube can be performed smoothly.

[1] EP3488451, U.S. Pat. Pend.

[2] 3T: 4 hours, 9.4 T: 4 hours during power outage

Continuous Surveillance

During continual use, a multitude of sensors monitor all aspects of the instrument including temperature, pressure, charge, and more, just as if an expert engineer was at hand.

Additionally, Bruker's Maxwell magnets are monitored by the Bruker magnet Monitoring Unit (BMU) which continuously surveils these system parameters, sending email alerts and reporting on magnet status and potential irregularities, allowing immediate action to be taken or preventative maintenance to be planned well in advance. With optional remote monitoring, data are sent through a secure one-way connection to a Bruker server allowing the Bruker support team to continuously supervise the status of the instrument and optimize its maintenance.

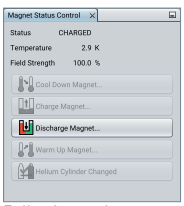
Simple Installation with Integrated Expertise

These approximately 30 integrated sensors enable push button magnet control charging of the magnet within hours after installation at the customer site.[1]

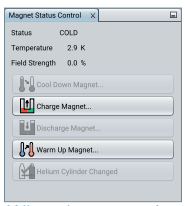
After initial connection of cooling and power lines, a one-click system automatically launches the charging process. The integrated software self-regulates all phases of cooling and full charging.

Self-regulating Magnet Technology

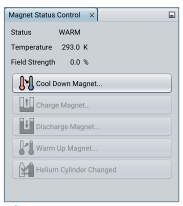
The integrated chiller and pulse tube, combined with the number of continually measured parameters and the handling of these allow the magnet to constantly self-regulate into its optimal state.



Fully charged and operational magnet. The option for discharging is available.



When the magnet is in a cold state, the user has the options to either discharge the magnet or warm it up to ambient temperature.



A warm magnet can be cooled down automatically and subsequently re-charged.

The instrument continually auto-cools[1] itself to its optimal running temperature. Should, for example, a cooling disruption occur, the instrument will auto-cool as soon as the surrounding infrastructure permits. This saves crucial time, since the magnet is cold again as soon as absolutely possible.

This sophisticated internal supervision allows self-regulation of instruments even up to 9.4 Tesla and effectively eliminates common residual field drifts after charging so that even the most challenging applications can be conducted quickly after the charging process.

Push-button Magnet Control with Auto-cooling and Auto-charging[1]

In addition to simple installations and continual self-regulation stability, the integrated sensor supervising algorithm allows the option of taking the magnet from field if desired, i.e. for relocation of the instrument or even warming it up due to planned extended periods of non-usage.

When charged, the magnet status will be shown as Charged within the ParaVision software. The user is assured that the operating temperature is reached and the magnet is fully charged. If it is decided to take the magnet from field, it can be done so easily by selecting Discharge Magnet. The magnet will remain cold and can be recharged at the desired time point, by selecting Charge Magnet or it can be brought up to ambient temperature by selecting Warm Up Magnet. A warm magnet can be cooled down via selection of the Cool Down Magnet button. After cooling, the magnet can be automatically re-charged. Simple selection of any of the desired operation starts the entire process automatically.

Extreme Stability with Maximal Flexibility

Along with this magnet control comes greatest study flexibility, as the 17 cm bore of the Maxwell magnets and corresponding 82 mm volume coil provide maximal freedom for study design of larger samples or studies with intricate peripherals. Additionally, the most advanced pulse-tube cold head technology and an innovative self-leveling floor vibration isolation result in maximal physical stability, allowing even the most physically sensitive studies to be reliably conducted.

[1] Auto-charging is optional. Auto-cooling and auto-charging is only available for 7 T and 9.4 T. Auto-cooling is Pat. Pend.

Maxwell = Maximum Flexibility

Site where you want

Scan when you want

Investigate how you want

Cool and charge when you want

For more information:

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