

Smart Magnet Controller

Purpose

Molecular and Protein Crystallography beamlines as well as pharmaceutical labs work with ferromagnetic vial pins that hold the sample on a tiny loop. These pins are loaded onto a goniometer for X-ray scanning. The goniometer's sample holder usually consists of an electromagnet that is switched on and off by the higher-level control system for loading and unloading the sample pin.

By integrating the magnet specific functions into the **Smart Magnet Controller**, the higher-level control system is released from the cumbersome low-level tasks required for controlling the magnet current and detecting whether or not a sample pin is mounted.



Highlights

- ✓ The **Smart Magnet Controller** is a unit used for setting and controlling the current through electromagnets that hold the sample pins used at **Molecular and Protein Crystallography beamlines** in **Radiation Light Sources** and pharmaceutical research labs.
- ✓ The **Smart Magnet Controller** thereby detects without additional sensors if a sample pin is mounted or not. This **works best by using Hampton CrystalCap Magnetic™ pins**, but the unit can be configured by the user to work with other vial pins as well. Additionally it offers several parameters for adopting it easily and quickly to the specific magnets in use.
- ✓ The **Smart Magnet Controller compensates temperature changes** of the magnet coil as well as long wires between the unit and the magnet.
- ✓ The **Smart Magnet Controller's industrial connectors and standardized interface signals** foresee smooth integration into virtually any surrounding control system.
- ✓ The **Smart Magnet Controller's software can be adapted** to individual customer requirements. This is usually not necessary however, since the unit offers flexibility through software parameter configuration. On request, hardware interface changes are possible too, but again, rarely necessary.

Product Features

- ✓ **Controls the magnet current**; this value can be set via an external voltage signal or locally via a potentiometer
- ✓ **Outputs voltages up to 20VDC and currents up to 100mA** to the magnet coil; this is sufficient for driving all electromagnets for this purpose; higher currents can heat up the sample pin which in turn destroys the mounted sample quickly.
- ✓ **Detects if a sample pin is mounted by modulating the magnet current**; this modulation can be switched on/off by an external digital signal for perfectly steady crystal position in space
- ✓ **Designed from ground up to work well with Hampton CrystalCap Magnetic™** and *vial system* pins; works with other pin types as well
- ✓ Reacts to **input signals from the higher-level control system** and **returns status information**
- ✓ Incorporates **standard industrial connectors** and rugged buttons and LEDs
- ✓ The **electrical interfaces are flexible** and well suited for simple **integration into scientific environments**
- ✓ The **states** of all digital output signals are also **displayed on the front panel's LEDs**

Technical Data

✓ Analog Inputs

- **Set value of the analog current through magnet coil** signal:
[-10V|+10V] transfers to [-100mA|+100mA]

✓ Digital Inputs

- **Activate Sample Detection** signal:
[0V|24V] transfers to [inactive|active]

✓ Analog Outputs

- **Current through magnet coil**, composed of a DC component proportional to the magnet's holding force, and an AC component, which is used for sample detection.
 - Voltage range: $-20V_{DC}..+20V_{DC}$
 - Maximum output current: $\pm 100mA$, short circuit and ESD protected
 - Minimum load: 100Ω
 - Inductance range of the magnet coil: 200..500mH
- **Current Sense signal** corresponding to the actual DC magnet current:
[-10V|+10V] transfers to [-100mA|+100mA]

✓ Digital Outputs

- **Unit Status signal**: [0V|open] transfers to [unit okay|unit not okay]
- **Magnet Output Status signal**: [0V|open] transfers to [magnet okay|magnet not okay]
- **Sample Mounted Status signals**: two lines ([0V|open]) that indicate the mounting status of the sample pin:
invalid, sample not mounted, sample mounted, sample detection suppressed

✓ Push Buttons

- **Local/Remote**: switches the control of the magnet current between local and remote
- **Sample Detection On/Off**: switches the sample detection algorithm on or off
- **Calibrate Sample Mounted**: press this button when a sample pin with average properties is mounted for calibration of this device to the samples in use
- **Calibrate Sample Not Mounted**: press this button when **no** sample pin is mounted for calibration of this device to the magnets in use

✓ Potentiometers

- **Local Current Setting**: when the unit operates in **Local** mode, the current can be set in the range [-100mA|+100mA]

- ✓ **Maximum latency** between input and resulting output signals: **100ms**
- ✓ **USB mini B connector** running RS-232 protocol (115200/8/N/1) for device configuration and firmware updates; **supports Windows 7+, OS X, Linux**; requires terminal emulation program
- ✓ **Inputs and outputs are isolated** from chassis GND **and ESD protected**
- ✓ **Supply voltage** **110V_{AC}..230V_{AC}, 50Hz..60Hz**, max consumption 11VA
- ✓ **EMI filter and fuse integrated**
- ✓ **Housing** ELMA MICROBOX 36C, outer dimensions H/W/D: 86mm/107mm/164mm, ingress protection IP40, protection class I (grounded)
- ✓ **Meets standards** CE, CSA, UL and FCC
- ✓ **3 years warranty**, including free firmware updates

More Information

- ✓ Please **send all inquiries** to info@bitcontrol.ch. Our main task is supporting you.
- ✓ **Need a unit for evaluation?** It's possible! Full refund guaranteed on return.
- ✓ **Need a quote?** Send us an e-mail. 3+ unit orders are eligible for considerable discounts.

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