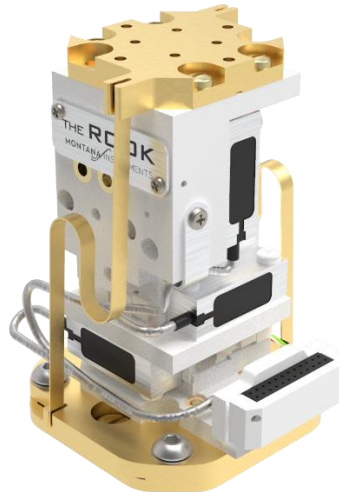


Frequently Asked Questions

Applicable Products	The Rook – Cryogenic Nanopositioning System		
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Purpose

The purpose of this document is to answer common, high-level questions that may be helpful for current and potential customers in understanding more about The Rook nanopositioning system. A Montana Instruments sales engineer can provide further details, and this document may be helpful preparation for such a discussion.

Questions and Answers

How do I control the positioner(s)?

The positioner will be controlled via Montana Instruments touchscreen user interface. Details can be found in the Rook User Manual, including screenshots and button definitions.

How were performance and specifications validated for this product?

Motion performance parameters, i.e., travel, runout, repeatability, and velocity were validated interferometrically.

How is positional repeatability performance achieved?

The Rook is designed to minimize hysteresis and appropriately complimentary encoders.

What is the typical temperature gradient across The Rook?

~0.2-0.6 K between sample chamber platform temperature and the top plate of the flexlink, where the adapter and sample mount are attached. The actual gradient depends on the configuration; sample mount, electrical I/O

What is the result of installing The Rook at base temperature?

- Typically, installing the Rook positioners will impact the platform resulting in an increased base temperature of ≤ 0.5 K.
- Installing the open loop system will have a smaller impact than the closed loop system.

What are the advantages and disadvantages of building the positioner out of ceramic (vs. titanium)

- **Advantage:** dimensional stability over a large temperature range is an advantage to ceramic.
- **Disadvantage:** ceramic takes longer to thermalize than titanium – we recommend a ‘best practice’ of allowing the system to sit at base temp for 30 minutes to let the positioner’s material temperature to catch up to the environment temperature.

What are the advantages and disadvantages of magnetic encoders versus common alternatives (optical, resistive)

- **Advantage:** magnetic encoders have excellent repeatability versus resistive and are not as expensive as optical encoders.
- **Disadvantage:** magnetic encoders are susceptible to interference from external magnetic fields where optical and resistive are not.

What accessories/sample mounts are compatible with the Rook?

All released [accessories](#) for the CryoAdvance are compatible with The Rook.

Can The Rook be installed/uninstalled by the user?

- Installing/uninstalling The Rook can be easily accomplished in the field; the User Manual has detailed instructions.
- Wire management in a CryoAdvance 50 may require some fine-tuning; best practices can be found in the user manual.

What are some best practices when routing the positioner’s wiring

- Be aware X and Y axes are on the bottom of the stack so you can’t simply wrap wires around the base (as once could with attocube).
- Don’t overtighten the thermal clamps.

Can open-loop stages be upgraded to closed-loop?

No.

Can I replace the positioners I currently have in my CryoAdvance product with the Rook?

Yes! the Rook can be added to most CryoAdvance systems. Fitment depends on what other equipment is in the chamber and if any customization has been done. Please contact Montana Instruments sales team for a compatibility analysis.

Do you have examples of scripting with LabVIEW / Python / etc. ?

Scripting examples will be documented in the onboard webserver and included in the 'Rook How-To' video.

What troubleshooting activity can be done by the end user?

A Montana Instruments service engineer can guide users in basic troubleshooting, but deep diagnostics and repair work will require the unit to be sent back to the factory.

Can I purchase The Rook to install in my non-MI cryostat product?

The Rook nanopositioner option is exclusive to compatible Montana Instruments' Cryostation products. Unfortunately, we do not have a standalone nanopositioner for sale at this time, but I will share your interest with our team for consideration as a future product offering.

Such exclusivity does provide The Rook's with distinct advantages over our competitors:

- Performance specifications are qualified and validated while the positioner is fully integrated into an operational CryoAdvance cryostat so users will have clear and confident expectations prior to purchase.
- Positioner performance is optimized, and user experience of sample motion is well predicted when integrated into a Montana Instruments Cryostation product.
- The positioner dimensions and functionality are designed for guaranteed compatibility with the CryoAdvance sample chambers and to be controlled by our proprietary Galaxy software.

Can I install The Rook in my s-line Cryostation?

The rook was designed to be drop-in compatible with the "Gen3" touchscreen-enabled s-line products only. A 'Gen 2 to Gen 3' system upgrade may be possible depending on your specific system configuration, then making it Rook-compatible. To determine the generation of your s-line product please see our [website](#).