

Model HE-3-SUHV-PT

Continuous Flow-Type Helium-3 Cryostat

➤ Overview

The FormFactor HE-3-SUHV-PT is a high power, continuous flow-type cryogen-free He-3 cryostat that includes a vacuum shroud, 40 K cold plate and radiation shield, 10 K intermediate cold plate, 3 K cold plate and radiation shield, Joule-Thomson He-3 condensing unit, and the He-3 pot.

A model PT420 two-stage pulse tube refrigerator (PTR) with remote motor valve is used to cool the 40 K cold plate/radiation shield, the 10 K cold plate, and the 3 K cold plate/radiation shield.

The Joule-Thomson He-3 condensing unit contains a recuperate heat exchanger and a JT condensing impedance. No additional compressor is needed for He-3 condensation. No need to warm up the whole system if the impedance is blocked.

Pfeiffer model HiPace 400 turbo pump, backed by a Scroll pump is used to circulate the He-3. This configuration generates approximately 10-milliwatt cooling power at 620 mK.

This system is operated with a gas handling system (GHS). It reaches a base temperature of 435 mK with the continuous flow operation model and 346 mK with single shot mode.

This continuous flow type can also be operated with Helium-4 gas below 900 mK. Better performances can be reached with larger booster pump.

Continuous flow type “wet” He-3 system with similar performance is available per customer’s request.

The continuous flow type of He-3 cryostat is a highly customized system. Additional features can be added to the system per user’s request

This He-3 insert includes the following components:

- Pulse tube refrigerator (PTR)
- Vacuum shroud and radiations shields
- Joule-Thomson He-3 condenser with thermometer
- Condensing impedance with heater and thermometer
- He-3 pot with heater and thermometer
- Mechanical Heat Switch
- Permanently stored He-3 gas
- High speed hermetic pumping station
- Gas handling system
- Operation test



> Features / Benefits

Flexible sample space	<ul style="list-style-type: none">• Customized sample space to fit the user's application
Unlimited holding time	<ul style="list-style-type: none">• Continuous flow type
Stable He-3 pot temperature	<ul style="list-style-type: none">• +/- 1.0 mK at base temperature
Low noise	<ul style="list-style-type: none">• PTR with remote motor; flexible thermal link; rigid design
Multiple operation modes	<ul style="list-style-type: none">• With booster pump on or off• Single shot mode with lower base temperature• Engage the heat switch with pumping station off• Replace He-3 gas with He-4 gas
Magnetic field (option)	<ul style="list-style-type: none">• With room temperature bore (cryogen-free system)• Solenoid or vector (wet system)
Rotating sample holder (option)	<ul style="list-style-type: none">• Rotating range: 0 ~ 90 degrees
Wiring (option)	<ul style="list-style-type: none">• Customized wiring, coaxial cables, fiber optics
Windows (option)	<ul style="list-style-type: none">• Hermetic cold windows

> Design Specifications

Base Temperature	450 mK or lower
Hold Time at Base Temperature	Unlimited
Sample Space	As required

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