6-axis open cycle cryomanipulator introduction

1. Product introduction

The 6-axis manipulator is developed to fulfill the requirement of cooling the sample below 6K, and at the same time with multiple freedoms to align the samples.

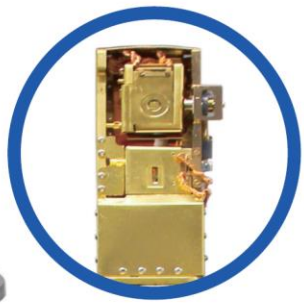
We have different options to customize this manipulator for different applications and requirements. Typical applications includes ARPES, XPS, and XRD et al.

2. Product photos

3. Product datasheet

FERMI INSTRUMENTS

6-axis Liquid Helium Cryogenic Manipulator
LTOCM6-I

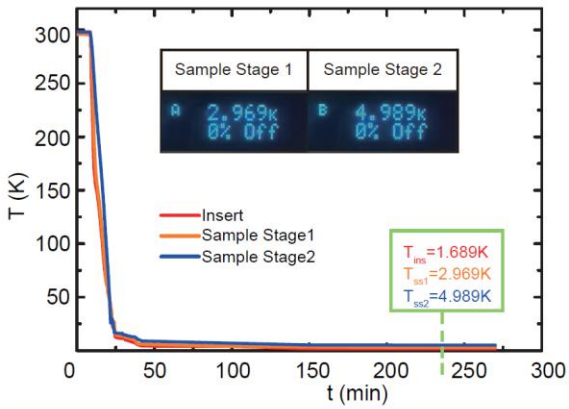


Highlights

- **Vibration Free Cryostat**
  Cooled by liquid helium
- **Multiple Axis**
  Up to 6
- **Lowest Temperature ~3K**
  Working temperature: 3K- 400K
- **Fast Cooling Rate**
  RT to 10K, < 15 min
- **Liquid Nitrogen Compatible**
  < 65 K Operation
- **Fully Customized On Request**
- **Cryostat Maintenance Free**

Options

- **Micro Resolution Manipulator Option**
  The resolution is less than 1um
- **Additional Sample Stage**
  Directly attach to cryostat
- **Motorization**
  All axises could be motorized
- **Sample Current Measurement**
  Dark current < 5E -14 A within full temperature range



Standard Technical Data	
Polar rotation	±180°
Tilt rotation	70° (-10°, +60°)
Azimuthal rotation	180° (-90°, +90°)
X and Y movements	25mm (max 50mm)
Z movements	Up to 700mm,I.D.≥90mm

FERMION INSTRUMENTS (SHANGHAI) CO., LTD
Email : info@fermi-instruments.com
Website : www.fermi-instruments.com
Tel : +86-21-6555 7285 / 7287
Fax : +86-21-6555 7283

6-axis Helium-Free Cryogenic Manipulator
LTCCM6-II

Highlights

- **Liquid Helium Free**
  Low cost of ownership
- **Lowest Temperature < 6K**
  Temperature range: <6K - 400K
- **Fast Cooling Rate**
  RT to 6K, < 4 hours
- **Non-magnetic Materials**
  Ti alloy, BeCu, OFHC-Cu
- **Fully Customized**

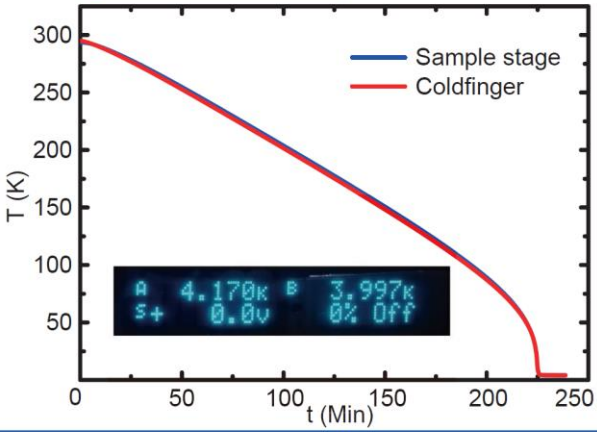
Mechanical Specifications

Polar rotation	±180°
Tilt rotation	60° (-15°, +45°)
Azimuthal rotation	180° (-90°, +90°)
X/Y movements	25mm (max 50mm)
Z movement	Up to 650mm

Options

- **Double Sample Stages**
  Extra stage directy attached to cryostat, with lowest temperature ~ 4K.
- **Motorization**
  All axises could be motorized
- **Sample Current**
  Floating Sample Stage
- **Ultra Low Vibration**
  ~ 1μm

Cooling Curves



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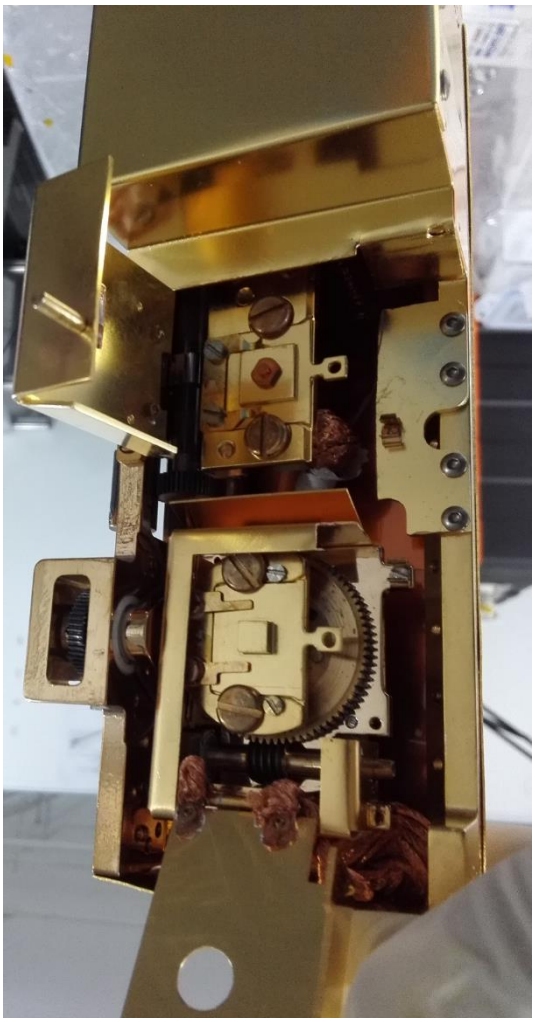
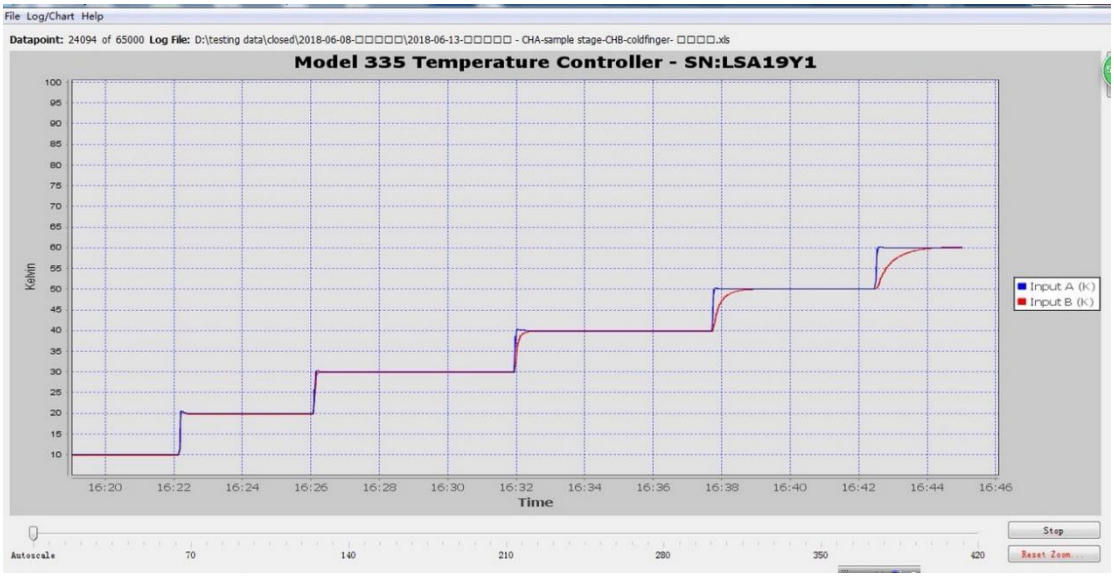
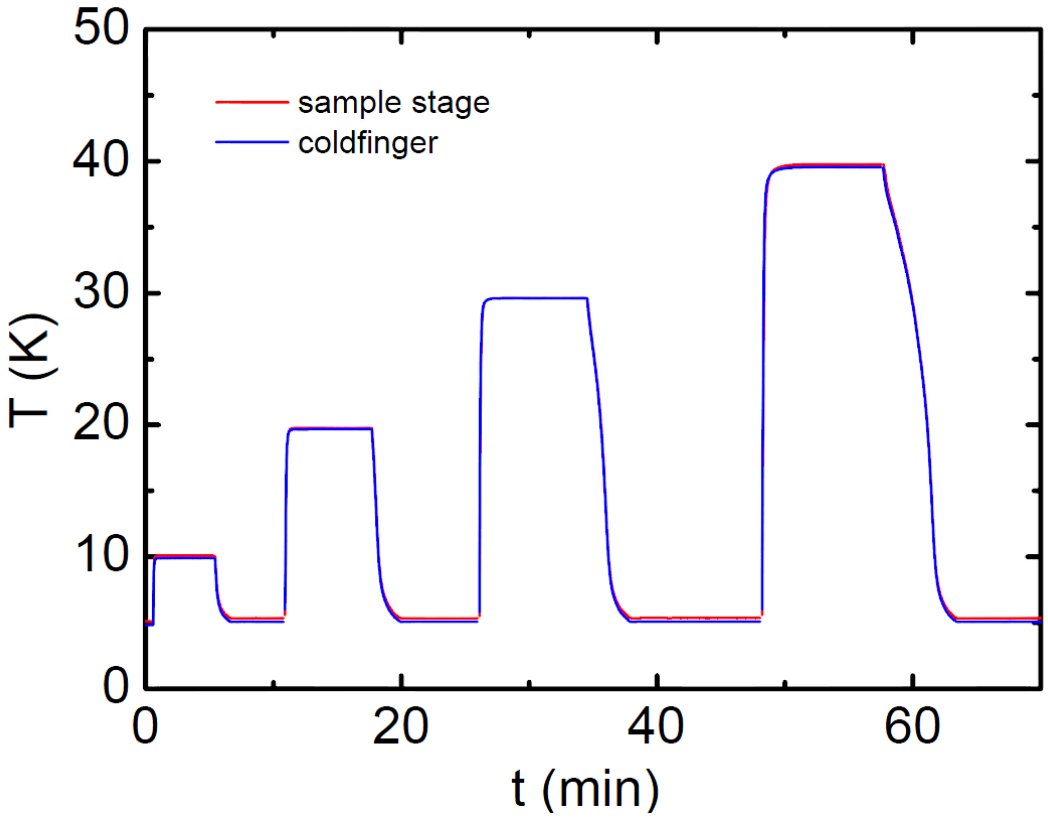
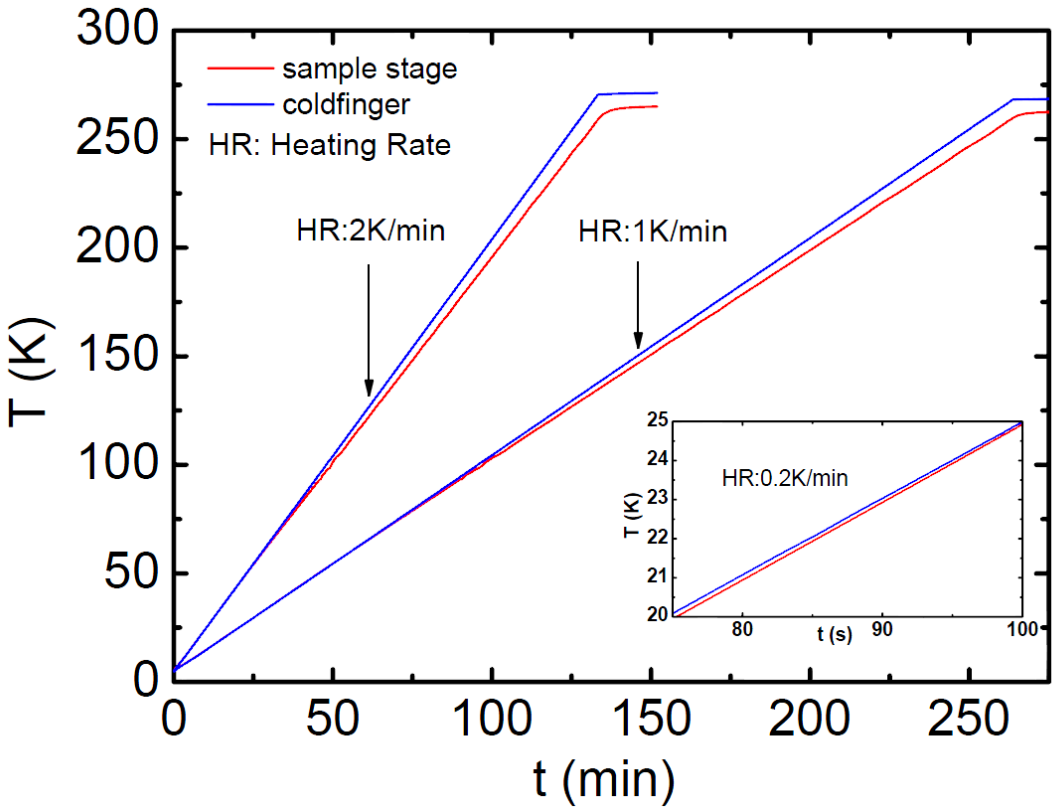
4. Sample stage and sample holder



5. Temperature control test







6. Acceptance test

6 Axis Open Cycle Cryomanipulator			
Serial Number	**D110 1452 24 10010**	**User Signature**	
Data Sheet			
	Specifications	**Factory Test**	**Field Test**
X/Y Range	±12.5 mm	±12.5 mm	±12.5 mm
Z Range	650 mm	650 mm	650 mm
Theta Range	360° (-180°, +180°)	360° (-180°, +180°)	360° (-180°, +180°)
Tilt Range	60°(-15°, +45°)	70°(-20°, +50°)	66° (-15, +45)
Azimuthal Range	180° (-90°, +90°)	180° (-90°, +90°)	180° (-90, +90)
Lowest Temperature	Below 6.0 K	5.85 K	3.5K

Low Temperature 5-axis Closed Cycle Manipulator

Serial Number	NLTCCM5F-1017	User Signature	

Data Sheet

	Specifications	Factory Test	Field Test
X/Y Range	±12.5 mm	±12.5 mm	±12.5mm
Z Range	300 mm	300 mm	300 mm
Theta Range	360° (-180°,+180°)	360° (-180°,+180°)	360° (-180°, +180°)
Tilt Range	60°(-15°,+45°)	60°(-15°,+45°)	60° (-15°, +45°)
Lowest Temperature of Sample Stage	10 K	5.5 K	5.745 K
Lowest Temperature of Coldfinger	-	4.7 K	5.52 K

2018. 7. 12.

6 Axis Open Cycle Cryomanipulator

Serial Number	D110 1452 24 10010	User Signature	

Data Sheet

	Specifications	Factory Test	Field Test
X/Y Range	±12.5 mm	±12.5 mm	±12.5
Z Range	500 mm	500 mm	500
Theta Range	360° (-180°,+180°)	360° (-180°,+180°)	360
Tilt Range	75°(-15°,+60°)	75°(-15°,+60°)	75° (-15, +60°
Azimuthal Range	180° (-90°,+90°)	180° (-90°,+90°)	180 (-90° +90°
Lowest Temperature	5 K	4.246 K	4.734K

Low Temperature 6-axis Closed Cycle Manipulator

Serial Number	SLTCCM6D-1013	User Signature	柳伟
Data Sheet			2018.08.09

	Specifications	Factory Test	Field Test
X/Y Range	±12.5 mm	±12.5 mm	±12.5 mm
Z Range	500 mm	500 mm	500 mm
Theta Range	360° (-180°,+180°)	360° (-180°,+180°)	-180° - 180°
Tilt Range	60°(-15°,+45°)	60°(-15°,+45°)	-15° - 45°
Azimuthal Range	180° (-90°,+90°)	180° (-90°,+90°)	-90° - 90°
Lowest Temperature of Sample Stage	6 K	4.549K	5.5k ~~5.4k~~
Lowest Temperature of Coldfinger	-	4.540K	5.4K

6-axis Liquid Helium Cryogenic Manipulator (LTOCM6)

Product No.	LTOCM6-1006	User Signature	
Data Sheet			

	Specifications	Factory Test	Field Test
Tilt Range	60°(-15°,+45°)	70°(-20°,+50°)	60° (-15°~45°)
Azimuthal rotation	180° (-90°,+90°)	180° (-90°,+90°)	180° (-90°~90°)
Lowest Temperature	below 6 K	4.969 K	4.8 K

7. User list

Closed Cycle Cryomanipulator			
Item	Institute	End-user	Year
1	Nanjing University	Prof. Yuefeng Nie	2016
2	Shanghai Synchrotron Light Research Institute	Prof. Dawei Shen	2016
3	Shanghai Jiao Tong University	Prof.Dong Qian	2016
4	Renmin University of China	Prof. Shancai Wang	2016
5	ShanghaiTech University	Prof. Shan Qiao	2017
6	Fudan University	Prof. Yihua Wang	2016
7	Fudan University	Prof. Donglai Feng	2017
8	Central South University	Prof. Jianqiao Meng	2017
9	Ningbo Institute of Industrial Technology	Prof. Shaolong He	2018
10	Wuhan Universuty of Technology	Prof. Wei Liu	2018
11	Seoul National University	Prof. Changyoung Kim	2018
12	University of Science and Technology of China	Prof. Xianhui Chen	2018
13	Nanjing University	Prof. Yi Zhang	2018
14	Fudan University	Prof. Donglai Feng	2018
15	Cornell University	Prof. K. M. Shen	2018

Open Cycle Cryomanipulator			
Item	Institute	User	Year
1	Shanghai Institute of Microsystem and Information Technology	Prof. Da-wei Shen	2016
2	University of Science and Technology of China	Prof. Zhe Sun	2016
3	Academia Sinica	Prof. Weili Lee	2016
4	Seoul National University	Prof. Changyoung Kim	2016
5	Tsinghua University	Prof. Yu-lin Chen	2017
6	Fudan University	Prof. Donglai Feng	2017
7	National University of Singapore	Prof. Andrivo Rusydi	2016
8	Academia Sinica	Prof. Minghui Hong	2017
9	Taiwan National Tsing Hua University	Prof. Deng-song Lin	2018
10	Taiwan Academia Sinica	Prof. Weili Lee	2017
11	University of Science and Technology of China	Prof. Zhe Sun	2017
12	The Pennsylvania State University	Prof. Cui-zu Chang	2018
13	Shanghai Institute of Microsystem and Information Technology	Prof. Da-wei Shen	2018