

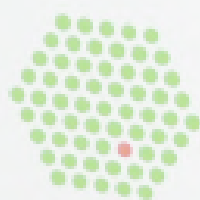


ARINAX

Advanced Research Instrumentation for Neutrons & X-rays

Product catalog

June 2019

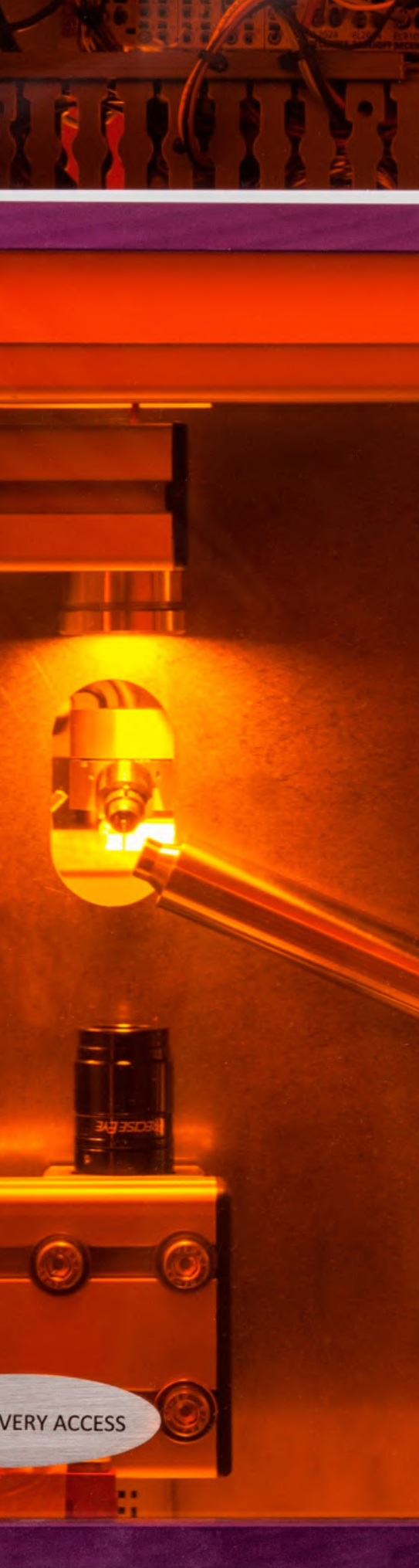


EMBL

MD3-UP

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ABOUT US

Arinax Scientific Instrumentation

WHO WE ARE

Arinax Scientific instrumentation is a trademark of MAATEL, a French company which is located close to the European Synchrotron Radiation Facility (ESRF) and the European Molecular Biology Laboratory (EMBL).

WHAT WE DO

Arinax Scientific instrumentation designs and manufactures high quality instrumentation for synchrotron X-ray and neutron beamlines. Our equipment is dedicated to academic and industrial research in the field of structural biology.

With a strong presence in most of the large scale facilities for X-ray and neutron diffraction all over the world, products from Arinax are also appreciated in laboratories with in-house X-ray sources.

ARINAX AND EMBL COLLABORATION

For over fifteen years we have been working hand in hand with the EMBL instrumentation group, in Grenoble (France), to develop innovative equipment for MX crystallography beamlines in synchrotrons, combining excellent precision, integration and automation.

Our most recent co-development is the CrystalDirect® automatic crystal harvester, for modern crystallization platforms.

OUR EXPERT TEAM

Our expert team is composed of highly qualified engineers with complementary skills in mechanics, electronics and software. This unique combination of people and skills procures to Arinax a strong expertise and a large field of application.



MD3-UP

The new 100 nm diffractometer

The MD3 diffractometer is dedicated to modern macromolecular X-ray crystallography on synchrotron beamlines.

Thanks to its vertical Ω axis configuration and highly performing alignment axes, the MD3 achieves an exceptional sphere of confusion of 100 nm (radius, @100 deg/s) and a dynamic accuracy better than $\pm 0,7$ mdeg (@10 deg/s).

4D data collection strategies

The MD3 is able to perfectly synchronize the Ω axis with the (x,y,z) alignment table and the (x,y) centering stage. Taking advantage of this synchronization, the MD3 offers modern data collection strategies:

- Helical scan
- Grid scan
- Serial crystallography



Key features

- Vertical Ω axis
- 100 nm sphere of confusion
- On-axis crystal visualization
- 4D data collection strategies
- Integrated movable beamstop
- Detector synchronization
- Optional *in situ* crystallography
- Optional κ -goniometer head
- Compatible with sample changer robot (SPINE)



HIGH PRECISION X-RAY MICRODIFFRACTOMETER



Orientation	Vertical Ω axis	Up configuration
Visualization	On-axis video microscope	OAV B-ZOOM
Performances	Sphere of confusion (Ω axis) Max rotational speed Angular resolution Dynamic accuracy	100 nm radius, @100 deg/s 720 deg/s 0.1 mdeg (full step) Better than ± 0.7 mdeg @10 deg/s
Software	User interface Beamline software integration Multi-device servers Sample changer robot Control features	JAVA® Control application Customizable (e.g. MXCube, Blu-Ice) TINE, TANGO, EPICS Robot hardware & software integration Parallax-free sample visualization semi-automatic sample centering 4D data collection strategies Advanced detector synchronization modes Selectable beam shaping tools
Beamstop	Movable beamstop Distance to the sample Beamstop diameter	25 to 77 mm 5 to 57 mm 300 - 400 - 500 μ m
Power	110 VAC to 240 VAC ; 50 to 60 Hz	1000 W
Dimensions (W,H,D)	225 x 600 x 600 mm	
Weight	80 kg	



The Horizontal microdiffractometer

The MD2-S microdiffractometer is dedicated to macromolecular X-ray crystallography on synchrotron beamlines.

The MD2-S combines an excellent sphere of confusion of 1 μm (radius @100 deg/s) with a dynamic accuracy better than ± 2 mdeg (10 deg/s).

K-goniometer head & in situ crystallography

Two optional goniometer heads can be mounted on the Ω axis of the MD2-S:

- The MiniKappa MK3 purveys additional κ & φ axes to enlarge the possibilities of crystal orientation.
- The Plate Manipulator is a motorized well plate holder that gives the possibility of *in situ* crystallography.



Key features

- Horizontal Ω axis
- 1 μm sphere of confusion
- On-axis crystal visualization
- Integrated movable beamstop
- Helical scan
- Detector synchronization
- Optional in situ crystallography
- Optional κ -goniometer head
- Compatible with sample changer robot (SPINE)



X-RAY MICRODIFFRACTOMETER



Orientation	Horizontal Ω axis	
Visualization	On-axis video microscope	OAV B-Zoom
Performances	Sphere of confusion (Ω axis) Max rotational speed Angular resolution Dynamic accuracy	1 μm radius, @100 deg/s 500 deg/s 0.1 mdeg Better than ± 2 mdeg @10 deg/s
Software	User interface Beamline software integration Multi-device servers Sample changer robot Control features	Windows® / JAVA® Control application Customizable (e.g. MXCube, Blu-Ice) TINE, TANGO, EPICS Robot hardware & software integration Parallax-free sample visualization Semi-automatic sample centering 4D data collection strategies Advanced detector synchronization modes Selectable beam shaping tools
Beamstop	Movable beamstop Distance to the sample	25 to 77 mm 5 to 57 mm
	Beamstop diameter	300 - 400 - 500 μm
Power	110 VAC to 240 VAC ; 50 to 60 Hz	1000 W
Dimensions (W,H,D)	270 x 550 x 500 mm	(+100 mm cables Y axis)
Weight	100 kg	



LED & fiber optic cold light source

Luciole combines high flux LED lighting with fiber optic technology for perfect sample illumination with minimized sample heating. Each of the three light sources can produce a luminous flux up to 1050 Lm.

Remote controlled lighting system

The Luciole has two control channels:

- Channel 1 controls 1 independent light source
- Channel 2 controls 2 light sources, providing a dual lighting with the same luminous flux for both sources

The two control channels are independently remote controlled: the light intensity can be adjusted continuously, from 0 to 100%, with a very fine resolution (20.000 steps) giving exceptional sample illumination for all applications in research and automation.



Key features

- Remote controlled light intensity
- Remote control: ethernet, analog, RS 232
- 3 fiber optic light sources with luminous flux of 1050 Lm each
- Compatible with Arinax equipment
- LED Lifetime: 50 000 hours



COLD LIGHT SOURCE



Performances	Light sources	3x LED Luminous flux up to 1050 Lm per LED
	Color temperature Average life time	5700°K 50 000 hours
Controls	Control channels - Channel 1 - Channel 2	1 fiber optic light source 2 fiber optic light sources
	Control modes - Manual - Remote	Ethernet, analog, RS 232
Power	Trigger	TTL compatible
	90 VAC to 264 VAC 47 Hz to 63 Hz	<250 W T°: 15°C to 30°C
Dimensions (W,H,D)	- Luciole - Optical fiber connection	185 x 240 x 95 mm 10 mm diameter Max. active light guide: 9 mm



The millisecond X-ray fast shutter

The Colibri X-ray fast shutter is a millisecond shutter dedicated to MX crystallography beamlines. It achieves a fast rising time of 1ms and presents a robust and slim housing design.

The Colibri technology uses a magnetic guidance for the rising process: the moving part is in levitation inside a magnetic field, avoiding mechanical friction. Its particular design makes it a highly reliable system with extended lifetime (20 years @ 0.1 Hz).

A remote controlled device

The Colibri is designed to be remotely controlled by Arinax diffractometers, such as the MD2-S and MD3 microdiffractometers. Remote control is also possible with other diffractometers or via a sample changer robot.

Moreover, the Colibri continuously transfers an opening status feedback, for example to a diffractometer or to a sample changer robot.



Key features

- Lifetime: 4×10^8 cycles (@ 1 Hz)
- Remote controlled
- No mechanical friction
- Shutter: steel or tungsten
- Sample protection against power failure





X-RAY FAST SHUTTER



Performances	Rise/Fall time (for 0-100% of 2 mm)	1.0 ms
	Delay time Delay time jitter peak	4 ms @ 1Hz ± 0.2 ms
	Max frequency (for 0 - 100 % opening)	80 Hz
	Opening and closing time (for 100 % guaranteed opening and closing)	<5 ms (steel) <7 ms (tungsten)
	Shutter unit lifetime	4 x 10 ⁸ cycles @ 1Hz or 20 years @ 0.1 Hz
Controls	Powered off position Temperature rise (not mounted) Operation temperature range	Automatic close mode +5° @ 10 Hz -20°C to +80°C (shutter)
	Shutter status output signal	yes
	TTL input	yes
Control unit power	80 VAC - 264 VAC 47 Hz - 63 Hz	85 W
Dimensions (W,H,D)	Aperture	2 mm diameter
	Control unit	105 x 55 x 125 mm
	Shutter unit	85 x 35 x 15 mm



OAV Ultra-Zoom

Parallax free sample visualization

The On-Axis Video microscope (OAV) is dedicated to observe and align crystals with respect to an X-ray beam on macromolecular X-ray beamlines. The X-ray beam passes through the objective's lens system by means of a central hole which is coaxial with the optical axis.

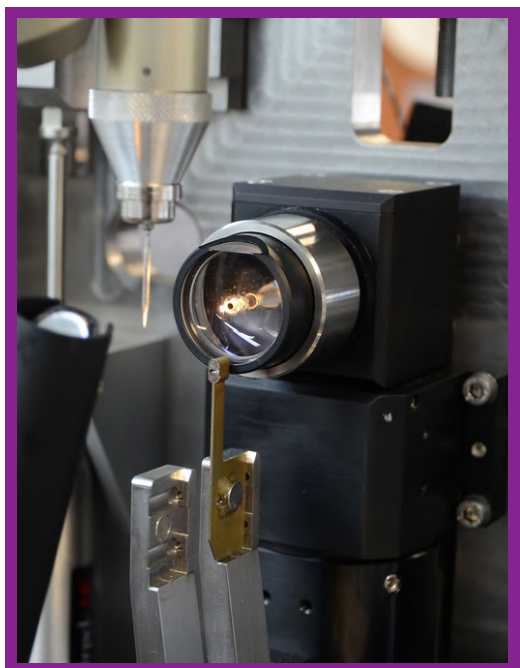
This coaxial video microscope provides a parallax free sample visualization that allows in situ perfect alignment of the sample.

Exceptional optical performance

The OAV is composed of a high resolution drilled objective giving x3 to x30 magnification, a numerical aperture of 0.28 and a working distance of 31.8 mm; it is combined with a high performance zoom and a digital camera which enables a resolution of 659 x 493 px (standard CCD) or 1360 x 1024 px (optional CCD).

The integration of these elements provides excellent optical performance, with a resolution of 0.35 $\mu\text{m}/\text{px}$ (standard CCD) or 0.16 $\mu\text{m}/\text{px}$ (optional CCD).

Consequently, the OAV allows distinguishing objects as small as 1 μm .



Key features

- Parallax free sample visualization
- Exceptional resolution: 0.35 $\mu\text{m}/\text{px}$ (optional CCD: 0.16 $\mu\text{m}/\text{px}$)
- MD2-S & MD3-UP compatible
- Available in stand-alone version



ON-AXIS VIDEO MICROSCOPE



Zoom	Resolution	
	- CCD	0.35 $\mu\text{m}/\text{px}$
	- optional CCD	0.16 $\mu\text{m}/\text{px}$
	Field of view (FOV)	2.1 x 1.6 mm ² @ Zoom min 0.20 x 0.16 mm ² @ zoom max
	Motorized zoom	DC or stepper
Objective	High resolution drilled objective lens	Coaxial hole: 1 mm diameter
	- Working Distance	31.8 mm
	- Magnification	x3 to x30
	- Numerical Aperture	0.28
Digital Camera	Spatial resolution	CCD: 659 x 493 px CCD (optional): 1360 x 1024 px
	Connection	Gigabit ethernet
	Power supply	12 V
Analyzer System (optional)	Motorized analyzer	DC or Stepper
	Polarizer	
	- Single transmission	30%
	- Crossed transmission	0.15%
Dimensions (W,H,D)	OAV Ultra-Zoom	100 x 305 x 88 mm
	OAV Ultra-Zoom with a stand-alone support	177 x 455 x 172 mm





OAV B-Zoom

Parallax free sample visualization

The OAV B-Zoom is dedicated to observe and align crystals with respect to an X-ray beam on macromolecular X-ray beamlines thanks to on-axis visualization.

The hardware offers x5 and x30 optical magnifications, a numerical aperture of 0.28 and a working distance of 34.8 mm.

Hybrid Zooming

Instead of using a motorized zoom, two video cameras are combined: one giving a « low zoom » level, and the second offering a « high zoom » level. This Hybrid Zoom Setup uses images from both cameras to emulate a single camera equipped with a zooming device. **This way, switching between any zoom level is instantaneous.**

The zoom level range of the virtual hybrid camera (with 1280 x 1048px) is **x2.5 to x30, giving a x12 range**. It is possible to go beyond 100% by using up-scaling (interpolation).



Key features

- On-axis visualization
- Optimal working distance
- Instant zoom change
- Integrated video server:
 - Bandwidth 200 MP/s with RGB color treatment
 - Virtual single-camera
 - Linux / Windows libraries



ON-AXIS HYBRID VIDEO MICROSCOPE



Zoom	Resolution	0.16 $\mu\text{m}/\text{px}$ 1.9 $\mu\text{m}/\text{px}$ 2.5 to 30
	- Design resolution @max zoom - Design resolution @min zoom - Hybrid zoom range (combined image)	
Objective	Field of view (FOV)	2.4 x 1.9 mm @ Zoom min; 0.38 x 0.24 mm @ zoom max
	High resolution drilled objective lens - Working distance - Magnification - Numerical aperture	Coaxial hole: 1 mm diameter 34.8 mm (31.8 with protective glass) x5 to x30 0.28
Digital Camera	Spatial resolution Connection Power supply	Color sensor: 2560×2048 px Gigabit Ethernet POE 12 V (Power Over Ethernet)
Video Server	Output image size Image modes	1280×1024 px recommended. Configurable. Simultaneous Raw Images, Auto-selection, Combined
	Image formats	Mono, RGB, BGR
	Protocols	MJPEG, TANGO, (EPICS), library interface
	CPU requirements	22 FPS delivered by the Video Server tested on a PC with one i7-6700 CPU: workload = 25% for two cameras processed in parallel, server output ROI 1280×1024, Bayer conversion included
Dimensions (W,H,D)	94 x 362 x 89 mm	
Weight	1.4 Kg	





The electromagnetic sample holder

The Arinax SmartMagnet is a sample holder which can be mounted on the Ω axis of diffractometers, such as Arinax' MD3-Up and MD2-S.

It uses a remote controlled electromagnetic coil on the nozzle tip that enables easy mounting & dismounting of the sample pins, which is especially suited for sample changer robots using SPINE standard.

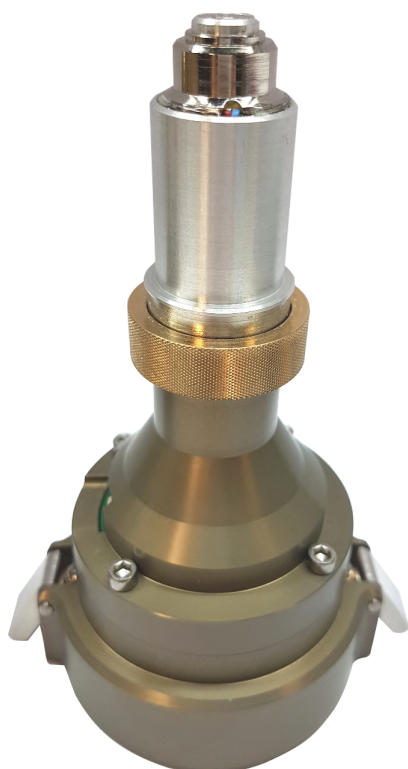
For X-ray beamlines using a gripper for the transfer (e.g. compatible with unipuck), a second version of the SmartMagnet is available.

Sample mount detection

The SmartMagnet senses the electromagnetic field and detects the presence of the sample mount.

The sample detection is performed by the SmartMagnet control electronics which is integrated in the MD3-Up and the MD2-S.

For any other equipment Arinax has developed an external SmartMagnet Control Box.



Key features

- Easy sample exchange
- Sample mount detection
- Compatible with SPINE standard
- Vial or gripper transfer
- Compatible unipuck

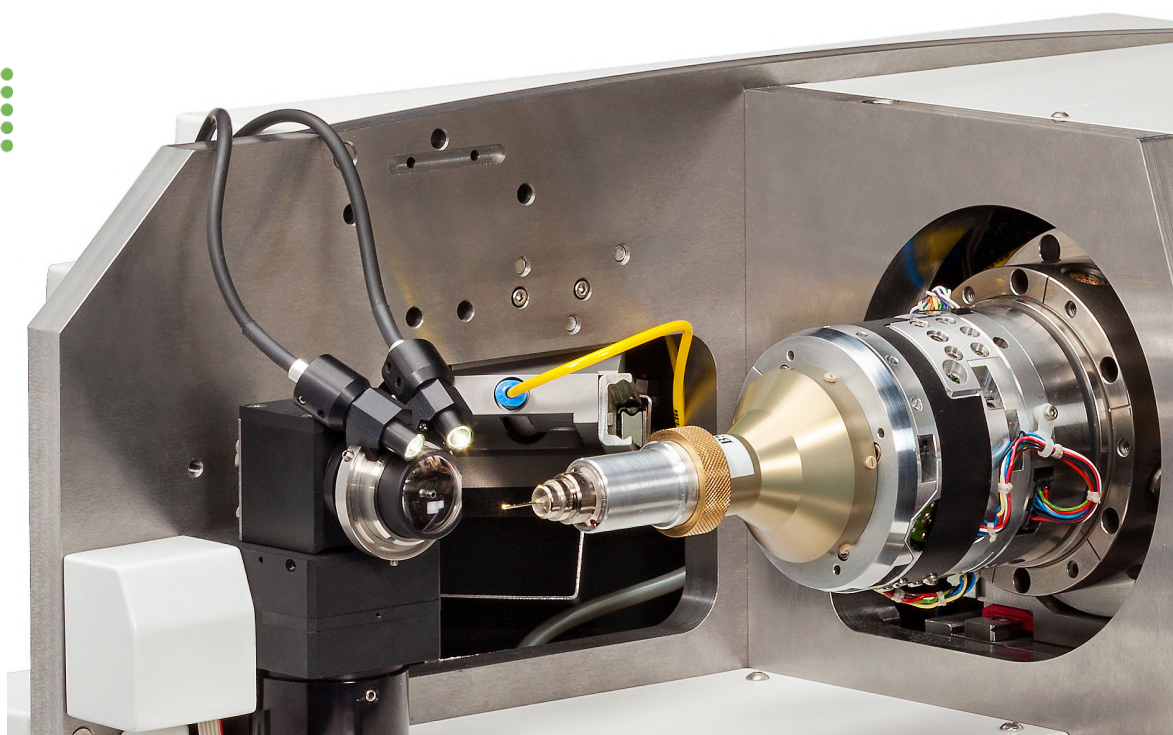


SAMPLE HOLDER



Features	Detection	Detection of the ferromagnetic mounts
	Magnetization Force	Typically 2.5N (depends on mount type) Boost mode: x2 Small residual magnetization
	Compatibility	Vial + unipuck (3 cap)
Control	Software	Remote controlled de/magnetization Detection threshold Tuning JAVA® Control application Adjustable parameters : AC frequency, DC ON/OFF Voltage , demagnetization time, boost amplitude & time Diagnostic tools (sample detection indicator, detection values graph)
	Controller	100 VAC to 240 VAC
Dimensions	Nose - Internal - Base	9.52 mm diameter 10.6 mm diameter
	Controller (W, H, D)	160 x 75 x 225 mm

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License





MiniKappa MK3

The multi-axes solution for MX crystallography

The MiniKappa MK3 is a multi-axes goniometer head with reduced dimensions that purveys additional κ and Φ axes, giving numerous possibilities of crystal reorientation. It reaches a rotational precision of $\pm 0.05^\circ$ for κ axis & $\pm 0.09^\circ$ Φ axis and can be equipped with the SmartMagnet sample holder. It is fully compatible with MD3 and MD2-S. The MiniKappa is also compatible with other diffractometers and sample changer robots.

Optimized data collection strategies

The MiniKappa MK3 enables controlled crystal reorientation which avoids spot overlaps and may lead to improved data quality.



Key features

- Rotational precision: $\kappa \pm 0.05^\circ$; $\Phi \pm 0.09^\circ$
- Compact mechanical design
- International standard SPINE
- Fast & easy mounting system
- Vial & gripper based transfer
- Collision safe system



GONIOMETER HEAD



Sphere of Confusion	Measured on MD3, kappa open	<1 μm
K Kappa axis	Angular range <ul style="list-style-type: none">• Travel range• Resolution Rotational precision	0 to 255° 0.35 mdeg $\pm 0.05^\circ$
Φ Phi axis	Angular range <ul style="list-style-type: none">• Travel range• Resolution Rotational precision	360° (no limit) 1.41 mdeg $\pm 0.09^\circ$
X Chi axis	Angular range/ Travel range	0 to 48° Kappa-axis position dependent
Sample mount	International standard “SPINE” Vial or/and Unipuck transfer	22 mm length
Motors	Stepper motors	
Dimensions	MiniKappa head <ul style="list-style-type: none">• Length• Diameter	120 mm 131 mm
Weight	MiniKappa head	260 g





PlateManipulator

The new solution for *in situ* MX crystallography

The PlateManipulator is a motorized crystal plate holder for standard screening plates (96-well plates) that is dedicated to *in situ* MX crystallography.

Its integrated motorized axis is combined with the translational and rotational movements (alignment table & Ω axis): this way, the crystallization plate can evolve in 3 dimensions, giving access to the 96 wells.

The PlateManipulator has an excellent flexibility: it is easy to mount and dismount on Arinax diffractometers and it can be easily exchanged with other Arinax goniometer heads, such as the MiniKappa MK3.

Key features

- *In situ* MX crystallography
- Motorized axis
- Compatible with *in situ* screening plates
- Fast & easy mounting system
- Compatible with Arinax diffractometers MD2-S & MD3

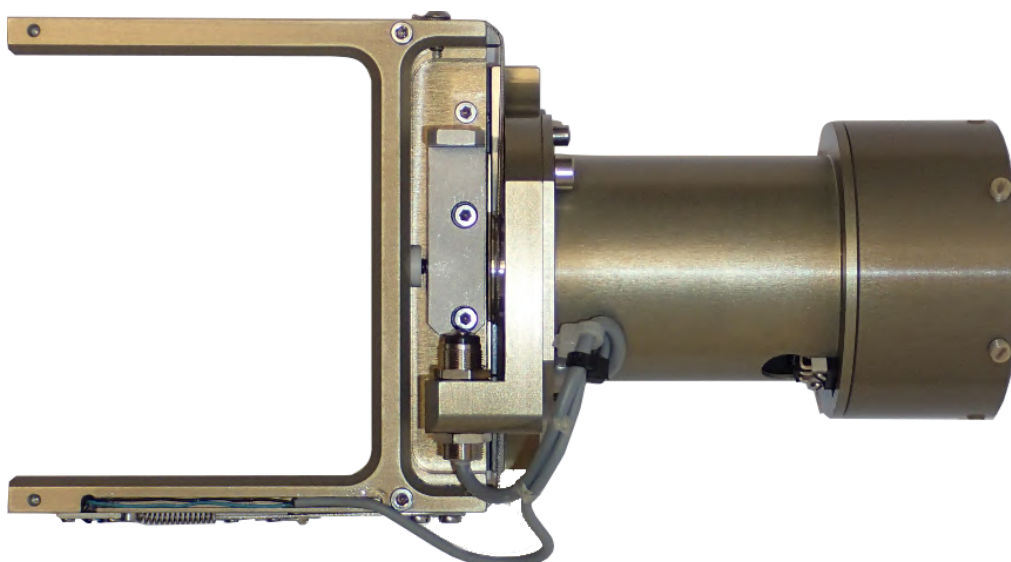




IN SITU GONIOMETER HEAD



Performances	Plate Manipulator: Repeatability of Row selection (PY axis)	$<\pm 20\ \mu\text{m}$
	Mounted on a MD2-S or MD3: - Crystal alignment accuracy - Available Ω scan range	$1\ \mu\text{m}$ 60° (may depend on the configuration)
Compatibility	In situ screening plates	CrystalDirect™ plates In Situ-1™ plates CrystalQuick™ X plate Swissci IntelliPlate
Dimensions	Cylindrical support part Plate holder part	75 mm diameter 100 x 190 x 18 mm 100 x 245 x 18 mm with a crystallization plate



The new automated solution for crystal harvesting

CrystalDirect® is an automatic crystal harvester dedicated to modern crystallization platforms and X-ray beamlines with high throughput workflow.

CrystalDirect® is able to harvest crystals from 96-well CrystalDirect plates by means of laser photoablation and to directly mount them on SPINE compatible sample pins. Then, the samples are placed into a cryo-stream and made available to be transferred into a cryostorage (manually or via sample changer robot).

CrystalDirect® achieves a performance close to 1 harvest per minute and a harvesting success rate superior to 99%.

Flexible harvesting methods

CrystalDirect offers a large amount of laser cutting shapes, adapted to different distributions and types of crystals. By this manner, CrystalDirect can select and harvest a single crystal, a single needle from a cluster, a group of crystals and batches of micro-crystals.

Key features

- Harvesting time: ~ 1 harvest/min
- Harvesting success rate: > 99%
- Flexible harvesting methods
- Sample management
- 96-well CrystalDirect™ plates
- Integrated cryo-cooling process
- Compatible with sample changer robot





AUTOMATIC CRYSTAL HARVESTER ROBOT



Performances	Harvesting time	~1 harvest/min
	Success rate	>99 %
Laser	Laser cutting	No heat transfer Micrometric precision Multiple cut profiles (pre- & user-defined)
	Crystal soaking process	500 μ L reservoirs film piercing: photoablation
Crystals Support	CrystalDirect™ plate	96-well vapor diffusion plate Compatible with standard equipment
Software	User interface Web based crystal selection Multi-device servers Sample changer robot	Windows® / JAVA® CRIMS, customizable TINE, TANGO, EPICS Robot hardware & software integration
Power	110 to 240 VAC; 50 Hz to 60 Hz	<3680 W
Dimensions (W,D,H)	1.0 x 1.0 x 2.3 m	
Weight	440 kg	



The solution for automated sample transfer

The BioSAXS robot is a fully-automated device dedicated to biological SAXS/WAXS beamlines. It transfers liquid samples from a storage unit to the exposure head at high speed: the entire cycle – including sample loading, unloading and capillary cleaning – is achieved within 50 seconds.

Highly controlled sample environment

Combined with its high speed, the BioSAXS also offers numerous control features:

Controlled sample transfer:

- Transferred sample volume: 5 to 200 μL
- Auto-adjustment to sample viscosity
- 2 exposure modes: static or flow

Controlled sample temperature:

- Exposure: 2 to 60°C ($\pm 1^\circ\text{C}$)
- Storage: 4 to 40°C ($\pm 1^\circ\text{C}$)

Key features

- BioSAXS & BioWAXS
- 50 seconds cycle
- Controlled environment
- Automatic cleaning process
- Automatic exposure calibration
- Optional retractable head
- 4 types of sample containers
- *In situ* mixing





AUTOMATIC SAMPLE CHANGER ROBOT



Performances	Solution transfer volume	5 to 200 μ L
	Typical cycle time	50 s
	- Loading/unloading - Cleaning (wash, rinse, dry)	15 s / 15 s 20 s
Controls	Sample Containers	96-well microplates (SBS) 96-deep well microplates (SBS) 4 x 8 wells Eppendorf strips (200 μ L) + 4 x 3 individual 1.5 mL wells (buffers) Customized holders
	Sample exposure modes	Static Flow (0.05 to 20 μ L/s; viscosity dep.)
	Temperature Control	
	- Exposure - Storage	2 to 60 $^{\circ}$ C (\pm 1 $^{\circ}$ C) 4 to 40 $^{\circ}$ C (\pm 1 $^{\circ}$ C)
	Control panel Full remote control	Video assisted automatic liquid positioning TANGO, TINE, EPICS, Web services
Power	230 VAC	3680 W
Dimensions (W,H,D)	Main unit	550 x 800 x 1100 mm
	Fluid management rack	837 x 576 x 900 mm
	Control rack	712 x 576 x 900 mm



The solution for controlled crystal dehydration

The HC-Lab delivers a continuous flux of humid air with controlled Relative Humidity (RH) for the given sample temperature.

The HC-Lab can finely adjust the RH from 30.0 % to 99.5 % (@ 23°C room temperature) with an exceptional stability of ± 0.05 % RMS.

Automatic drop tracking system

The HC-Lab control software exploits sample images, e.g. delivered by a video microscope. Depending on the RH set point the drop of mother liquor surrounding the crystal will shrink (low RH), increase its diameter (high RH) or remain stable in size (equilibrium RH). The drop size is constantly monitored by the control software via image recognition and dynamically plotted in a time diagram together with the actual RH value.



Key features

- RH range: 30.0 to 99.5%
- Accuracy: $\pm 0.5\%$
- Stability: $\pm 0.05\%$
- Synchrotron & Home Laboratory
- Remote controlled
- Automatic nozzle switching when associated with the REX Rapid Nozzle EXchanger
- Automatic drop tracking system



Features	Compressed air supply	
	- Pressure	3 bar mini / 7 bar maxi
	- Flow	< 30 L/min
	- Connection	6 mm diameter
	Nozzle	
	- Diameter	26 mm @ fixing point
	- Length	265 mm
	Tubing length nozzle - HC-Lab	3.0 m
Performances	Humid air stream	
	- Flow	5,5 L/min
	- Relative humidity	
	Range	30.0% - 99.5 % @ 23°C room temp.
	Accuracy	± 0.5 %
	Stability	± 0.05 % RMS (0.20 % peak-to-peak)
	Dry protective air stream	
	- Flow	10 L/min
	Temperature	
	- Range	Room temperature
	- Precision	± 0.05 °C
Software	User interface	Windows® / Linux
	Control parameters	Relative humidity/ dew point
	Monitoring parameters	Temperature and drop size
	Functionalities	Drop visualization
		Automatic drop size tracking
		Time plot (temp., RH, drop size)
Power	90 to 260 VAC; 50Hz to 60Hz	500 W
Dimensions (W,H,D)	230 x 500 x 450 mm	
Weight	20 kg	

The rapid nozzle exchanger

The REX is a remote controlled nozzle exchanger designed to be combined with the HC-Lab for crystal dehydration experiments on MX crystallography beamlines. The REX gives the possibility to switch between the cryo nozzle and the HC-Lab humidity nozzle.

Automatic & remote controlled

The entire REX design is thought to optimize HC-Lab operating time: REX can exchange the nozzles in an easy and fast way. It can also be remotely controlled from within the HC-Lab software: parameters can be set directly from the control hutch, without any need to access the experimental hutch.

Key features

- Automatic & remote nozzle exchange
- Direct control within HC-Lab software
- Stable alignment on the sample position
- Maintained cryo-cooling during sample transfer
- Crystal flash cooling
- Synchrotron & Home Laboratory
- Standard & customized cryo nozzle





RAPID NOZZLE EXCHANGER



Performances	Rough operation times*	
	• Park all - Cryo in	660 ms
	• Park all - Cryo back	305 ms
	• Park all - HC In	470 ms
	• Cryo in - HC In	1110 ms
	• Cryo in - Cryo back	135 ms
	• Cryo in - Park all	665 ms
	• Cryo back - Cryo in	250 ms
	• Cryo back - HC In	1095 ms
	• Cryo back - Park all	625 ms
Controls	• HC In - Cryo in	1090 ms
	• HC In - Cryo back	725 ms
	• HC In - Park all	430 ms
	User interface	Windows® / JAVA®
	Beamline integration	Interlock connection ready
	Software remote control	Ethernet connection
	Hardware remote control	sample changer interface (analog)
	Crystal de/humidification	Adapted to cryo & humidity nozzle
	Power	
	110 VAC -230VAC; 50-60 Hz	150 W
Dimensions (W,H,D)	Pneumatic nozzle exchanger	250 x 500 x 450 mm
	Control rack	360 x 200 x 270 mm
Air supply	6 bars	

*Depending on the installation, the orientation, and the installed cryogenic nozzle



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