ISARA 2

IRELEC

Fast, Reliable and User-friendly

Robotic Sample Changer for X-Ray Crystallography on Synchrotron Beamlines

precision in motion

© CMCF-ID beamline at the Canadian Light Source, Saskatoon

Reliability

- High precision automatic teaching and calibration
- High mechanical compliance and low thermal inertia gripper with sample detection
- Robust and field-proven software

High throughput

- Large storage capacity with a limited footprint
- Double gripper for fast sample transfer
- Simple interface adaptable to any Synchrotron beamline supervision software

Usability

- Flawless communication with all diffractometers
- Capacity to accommodate various standards of sample supports
- Automatic procedures for easy operation and maintenance (Dewar automatic drying, puck-loading assistance …)

Safety

- Smart anti-collision system
- Next generation robot arm with built-in collaborative functions
- Vision control

Technical data

Key figures

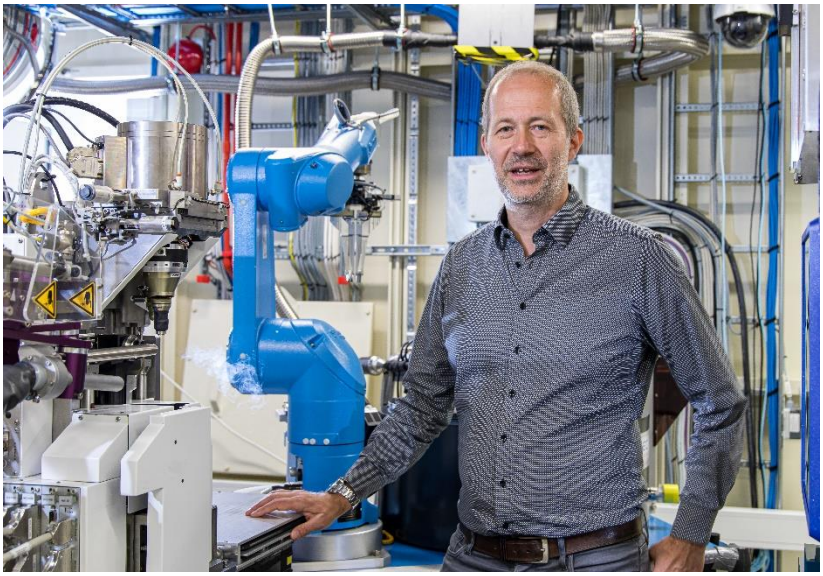
Sample exchange time	< 10 s
Storage capacity	29 pucks in ∅700 mm (vacuum-insulated Dewar) 464 samples with Unipuck (With individual puck detection by electrical switches)
Sample picking success rate	> 99.9%

Technical characteristics

Standards accommodated	Unipuck, SC3 pucks, Spine and MiniSpine (Non-Spine magnetic caps upon request) SBS plate
LN_2 refilling system	Automatic with continuous level probe Low- and high-level alarms Phase separator
LN_2 consumption	~2 L/h
Gripper(s) calibration	Automatic within ± 30 µm accuracy
Environment teaching	Automatic within ± 80 µm accuracy
Safety & risk prevention	Smart current monitoring of robot arm for anti-collision Automatic recovery procedures Sample detection inside gripper Tool (gripper) identification ★ Restricted zone programming (safe zone) ★
Man-Machine collaboration	Optional SIL3-PLe safety ★ Safe limit speed, safe stop, safe tools & safe touch 
Maintenance	Automatic Dewar drying for maintenance ★ Remote access for maintenance and troubleshooting ★ System status indicators and warning alarms ★
Vision features	High-definition surveillance camera ★ for: Pucks and samples presence detection inside the Dewar Incident detection, process optimisation and diagnosis
Others	Assistance for puck loading ★ inside the Dewar with puck barcode reading Assistance for plate loading ★ with plate barcode reading Room-temperature puck(s) for mounting/unmounting specific tools on the diffractometer or into the beam path. Automatic management of various sample loading positions in a given volume
Communication	Via Ethernet by means of TCP/IP sockets
Weight & Dimensions	M = 590 kg L x W x H = 1240 x 700 x 2230 mm

★ New features available with ISARA2

An efficient teammate



© BioMAX experimental station at MAX IV Laboratory, Lund, Sweden

Since 2007, IRELEC's robotic sample changers have become the preferred choice for the automation of X-ray diffraction experiments on Synchrotron macro-molecular crystallography (MX) beamlines.

First CATS, then ISARA, have created a new standard for MX sample changers, whether in terms of high throughput capabilities, reliability or user-friendliness.

While building on these strengths, ISARA2 still improve the beamline uptime with unique features that both improve the whole process reliability and minimize the required human intervention during the normal use, further to an incident and for routine maintenance operations.

ISARA2 is a smart system, its software architecture and integrated sensors enable:

- to detect and recover automatically errors, so as to always preserve the manipulated samples
- to define exclusion areas, so as to protect the equipment and the surrounding high value devices
- to assist the users when operating the system:
  - Visualization and detection of proper puck loading
  - Sample detection inside the Dewar
  - Automated maintenance procedures
  - Remote maintenance gateway for assistance.

ISARA2 is flexible system which is specifically built to interface with any end-station configuration and that can be smoothly integrated with all supervision beamline software.

ISARA users' community

MAX IV (BioMAX & MicroMAX) | BESSY II (BL14.2) | ALBA (XAIRA & XALOC) | CLS (CMCF-ID) | PLS II (BL 5C) | TPS (BL 05A & 07A) | SSRF (MPX) | APS (LRL-CAT) | NSLS II (NYX) | Australian Synchrotron (MX3 & MX2) | …

CATS users' community

BESSY II (BL14.1) | SLS | DLS | APS (LS-CAT) | ALBA (XALOC) | SOLEIL (PX1 & PX2) | MAX II | SSRF (BL17B) | PLS II (BL 11C)

Customer testimonials

Dr Uwe MUELLER
Beamline Scientist at the HZB Macromolecular Crystallography Group

"

ISARA and ISARA2 are very reliable, high performance research infrastructures, which play an important role for the success of the user program of our MX beamlines at HZB and elsewhere.

"

Dr Tom CARADOC-DAVIES
Lead scientist / MX3 beamline at the Australian Synchrotron

"

Irelec staff were very accommodating and the delivered system is excellent. They are very professional and are open to discussing changes and modifications. They get the fine balance between meeting our local needs and keeping the robot [ISARA2] reliable and stable.

"

Dr Kevin BATTAILE
Director of NYX beamline at NSLS-II

"

Everything worked great with the robot [ISARA2] last run and I am very happy with how it is performing.

"

Dr Oskar AURELIUS
Researcher at MAX IV Laboratory

"

The ISARA2 system delivered to the MicroMAX beamline at the MAX IV Laboratory, provided a sample changer solution with a swift sample exchange time, that could smoothly be integrated into the beamline environment.

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