

XtaLAB Synergy Flow

INTELLIGENT WORKFLOW AUTOMATION



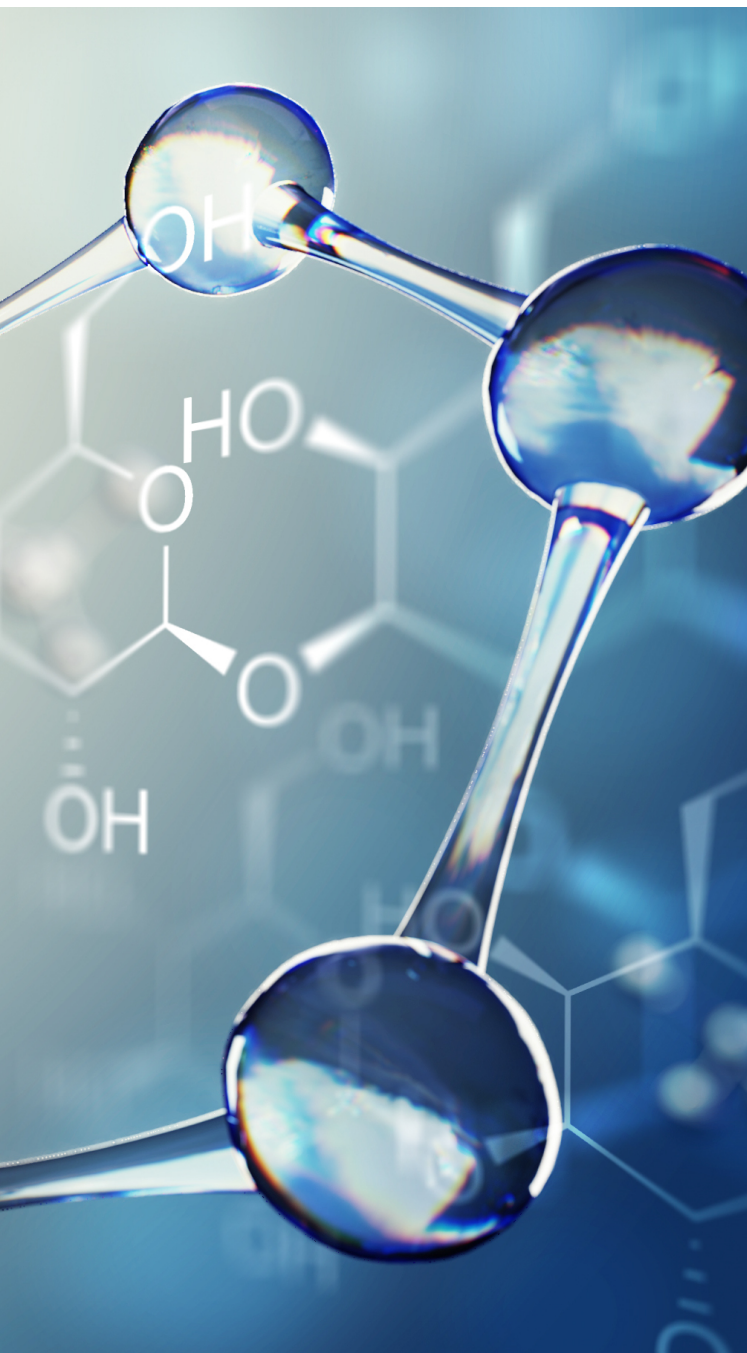
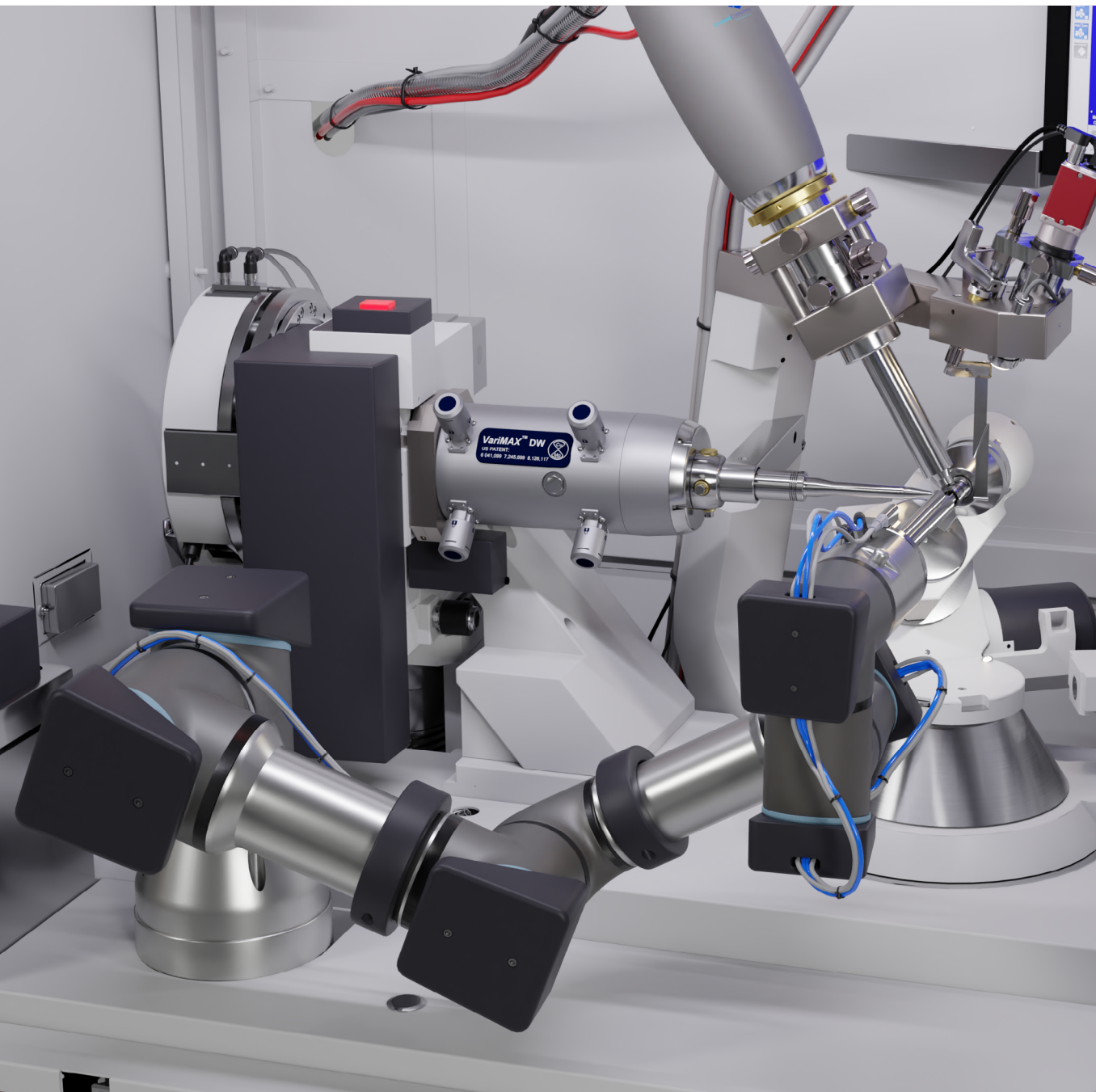


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THE XtaLAB Synergy Flow

We understand that your time is your most valuable commodity. The XtaLAB Synergy Flow is designed to give you back as much of your time as possible. Building on lessons learned with our highly popular ACTOR™ sample changer, the XtaLAB Synergy Flow incorporates many innovations and enhancements to provide a reliable, safe and convenient sample-changing robot. Whether you are screening protein samples or running a high-throughput chemistry instrument, the XtaLAB Synergy Flow has features that are sure to please the most demanding of crystallographers.

In today's uncertain times, maintaining critical research output is more important than ever yet increasingly difficult with workplace social distancing rules in place. The XtaLAB Synergy Flow reduces the need for direct interaction with the instrument in turn reducing touch contamination and the time you need to be physically in the lab. This means you can minimize viral transfer through contact with shared surfaces but more critically avoid overcrowding of the lab.

DEWAR DESIGN THAT ENHANCES YOUR WORKFLOW

CONTINUOUS OPERATION—REALLY

In a busy lab, samples are being prepared all the time. You don't need to wait until you have all of your pucks ready to begin data collection. The XtaLAB Synergy Flow features a unique, X-ray safe dewar-drawer system that can be opened from the side of the cabinet to provide user access while data collection continues unimpeded.

This means you can now add samples at any time, day or night, whether an experiment is running or not, without interrupting data collection on a precious, fragile sample, interrupting another user's instrument time or planning your work around instrument activity. We called it the Flow because it is designed to seamlessly fit into your workflow rather than demanding you wait for it.

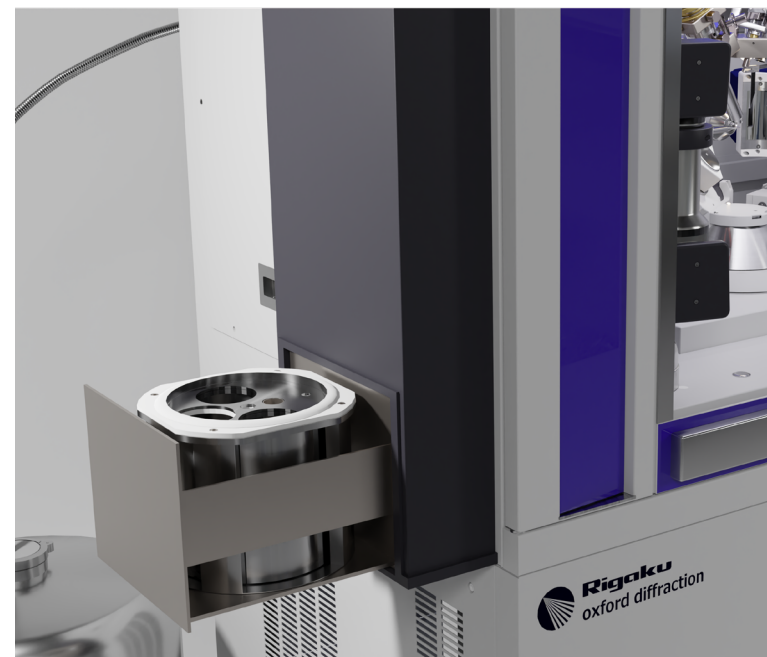
SAMPLE STORAGE

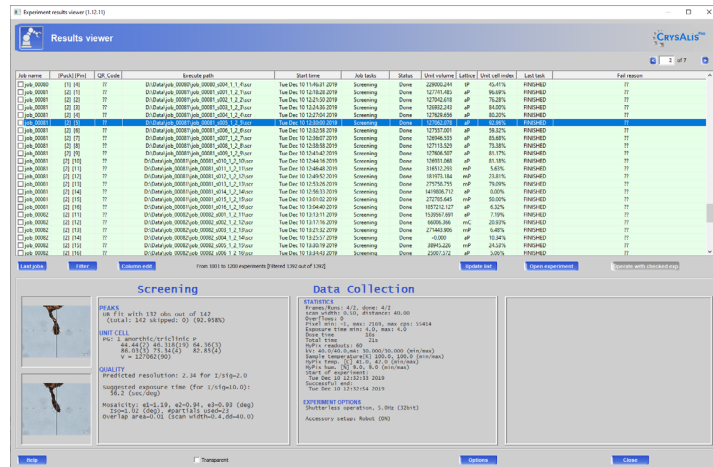
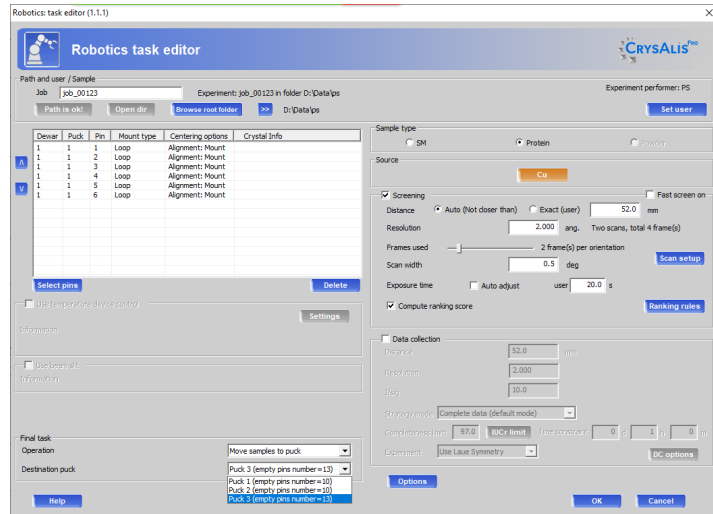
The sample storage dewar features an auto-filling mechanism to ensure your samples stay perfectly cold and protected under liquid nitrogen for up to seven days without user intervention. The delivery system is designed for micro-dosing to ensure the dewar level is maintained without introducing turbulence around the samples. Our dewar is compatible with the commonly used uni-puck for storage of 48-samples at one time. Thanks to the dewar design, samples can be added and removed at any time—even while the diffractometer is collecting data—so you can have continuous operation.

SAMPLE SORTING

The XtaLAB Synergy Flow is controlled by CrysAlis^{Pro} for frustration-free operation including sample addition, experiment queuing and sample sorting. Samples can be sorted into “good” pucks that can then be queued up for long experiments or removed and stored for transport to a synchrotron.

Judgements on good samples can be made automatically or by the user on inspection of the results later.



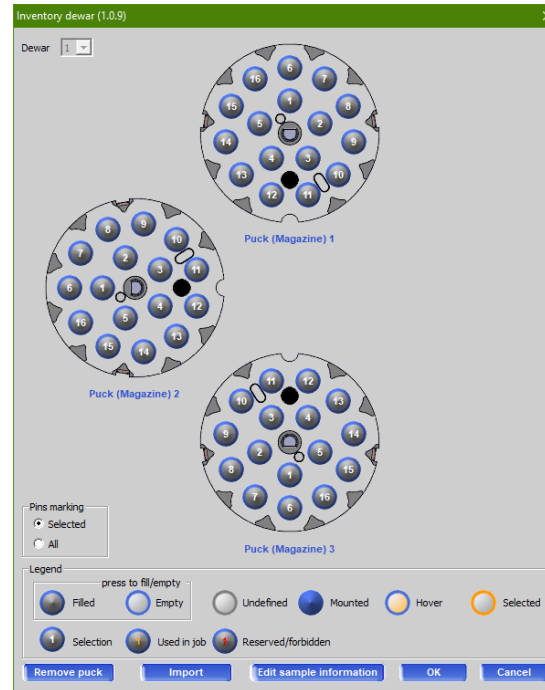


INTELLIGENT SOFTWARE

Powerful hardware requires powerful software. Our user-inspired CrysAlis^{Pro} software takes care of the difficult stuff, leaving you with the simple task of queuing up jobs.

In conjunction with the Intelligent Goniometer Head (IGH), the robot can mount, center, screen, collect data, dismount and repeat, all without user intervention. Taking reliable automation to new heights, optical image recognition, fully automated experiment strategy calculation and sample analytics make your robotic instrument easy to use and incredibly productive.

With optical sample pin detection, the XtaLAB Synergy Flow knows where your samples are the same way you do—by looking at them.



CLEVER DESIGN



MACHINE VISION

XtaLAB Synergy Flow uses intelligent machine vision to detect and center samples and ensure smooth robot operation.

FORCE-FREE END EFFECTOR

The XtaLAB Synergy Flow has a completely redesigned end effector that protects and transports samples at low temperature and under a nitrogen atmosphere. The unique design closes around your sample without applying force to the pin itself to reduce the risk to your sample and maximize success.

PRE-PROGRAMMED OPERATIONS

The XtaLAB Synergy Flow comes as a complete system with pre-programmed soaking, drying and annealing operations to protect sample integrity and make sure the best result can be provided.



PIN STANDARDS

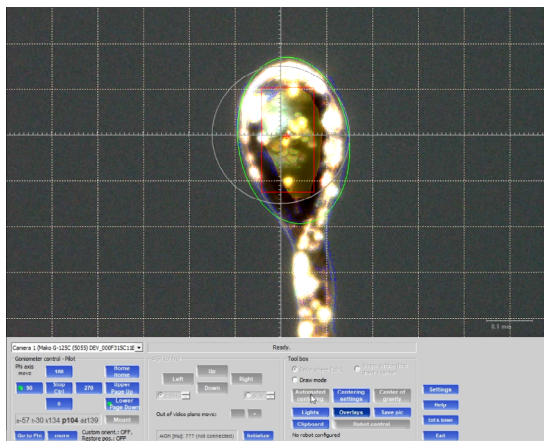
The XtaLAB Synergy Flow and IGH are both designed to accommodate the world's most popular robotic sample changer standards: The ALS standard and the SPINE standard from EMBL.

Standards like these mean you can adopt the XtaLAB Synergy Flow into your lab without replacing all of your mounts, having to cope with special arrangements at your local synchrotron or purchasing new tools.

INTELLIGENT GONIOMETER HEAD

Our Intelligent Goniometer Head is a motorized marvel with fast response and intelligence built in. Automated sample centering can be as fast as 6 seconds on dual-camera systems, the standard for our robotic instruments. Manual and point-and-click control are also available for fine-tuning centering or targeting a specific feature or part of the sample.

CLEVER DESIGN



AUTOMATED OPTICAL OBJECT CENTERING

For any truly automated system, reliably getting the sample centered in the X-ray beam without user input is essential. While older approaches used basic loop centering or scanning through the X-ray beam, the IGH uses the latest in optical image recognition techniques to detect sample holder presence, recognize the crystal and center not just the loop, but objects found within it. This fast approach can be completed in **as little as 6 seconds*** and thus minimizes dead time, avoids use of X-rays on sensitive samples and allows unattended data collection of an entire queue of samples.

**Dependant on mount type, sample and starting position.*



BUILT-IN BARCODE READER

Keep track of your samples with the built-in barcode reader. As samples are en route to the goniometer, sample barcodes are scanned on the fly as the sample passes the reader. Barcodes are then stored with the experimental information for the sample for later reference.

PROTECT, PROTECT, PROTECT

We understand that most robotic systems are used with sensitive samples. Keeping samples cold and transferring them quickly are important when it comes to protection of fragile samples. Our unique sample gripper encapsulates the sample to keep it cold and in a nitrogen atmosphere while being transferred. Transfer is completed in 14 seconds with a barcode scan for sample ID en route to the goniometer.

De-icing routines and hardware make sure the gripper stays dry and free from ice when it is crucial and for as long as possible to make sure no ice is transferred to the sample.

SELECTED TECHNICAL SPECIFICATIONS



SAFETY

With any robot, safety is key. Just like the XtaLAB Synergy, the XtaLAB Synergy Flow is built to comply with the EU machinery directive 2006/42/EC to ensure operators are safe from harm while maximizing their productivity.

STABLE MOUNTING

Robots are heavy. The last thing you want with a fast moving, heavy robotic system is calibration drift due to a flexing mount point or shaking of the

whole cabinet. We made sure to keep the center of gravity low and mounted to the most stable part of our cabinet, the goniometer table, for the most robust solution while maximizing speed. This means the XtaLAB Synergy Flow finds its target time after time with micron precision with no concerns about differential movement between the goniometer, dewar and robot itself.

Robot Arm with Gripper

Robotic Arm:	UR3 (Universal Robot)
Degrees of Freedom:	6 rotating joints
Positioning Accuracy:	±0.1 mm
Robot Mount:	Solidly mounted on common base with goniometer to prevent calibration drift
End Effector:	Force-free sample gripper
Payload:	3 kg
Transit Time:	14 seconds (unloading and loading including barcode reading)

Dewar System

Sample Dewar Capacity:	48 samples in three Uni-pucks
Accepted Pin Standards:	SPINE or ALS
Access to Dewar:	Pneumatic drawer design for convenient access from the outside of the cabinet
Parallel Loading during Data Collection:	Yes
Dewar Accessories:	Barcode reader, defrost system, rotatable lid, level sensor, automatic LN ₂ dosing system
Filling Time from Room Temp.:	7 min.
LN ₂ Consumption:	<0.85 L/h

