

Technical Specifications

General

Stand alone operation

Works with any X-ray source (Mo sealed tube to synchrotrons)
Standard *mar345* or *marCCD* detector mount
Compatible with existing *mar345* and *marCCD* systems

Automatic alignment via remote control or host computer

Dedicated microprocessor

Real-time OS, TCP/IP services
10BaseT Ethernet interface
Industrial serial bus for expansibility
Open software interface for easy customization

Goniometer System

High precision phi-axis

Horizontal configuration

Resolution: 0.000625°/step, speed: up to 900°/min

Accuracy: 0.002°, reproducibility: 0.00125°

Manual gear unlock (anti-clockwise) for crystal centering

Electronic referencing of zero position

Exposure synchronization with shutter feedback

Enhanced IUCR goniometer head mount

Motor driven phi-axis translation

Automatic/manual adjustment, electronic position referencing
±20 mm range for a 49 mm IUCR goniometer head
Resolution: 0.3125 μm/step, speed up to 12.5 mm/sec

Cardanic Cradle

Positional Alignment

High precision vertical and horizontal translation

Automatic primary beam profiling

Vertical range: ± 7.5 mm (352.5 to 367.5 mm above table top)

Vertical resolution: < 1 μm (0.05 μm/step), speed: 0.2 mm/sec

Horizontal: range: ± 10 mm

Horizontal resolution: < 1 μm (0.3125 μm/step),

Speed: 3 mm/sec

Directional Alignment

Spindle driven horizontal and vertical rotation

Automatic beam optimization

Vertical rotation range: -1.3° to +2.0°

Vertical resolution: 0.3 μrad/step

Horizontal rotation range: ± 3.5°

Horizontal resolution: 0.8 μrad/step

Beam Profiling

Configurable beam optimization: any beam from any optic
Fully automatic 3D beam profile analysis

Collimator system

Motorized slits

Automatic beam shape optimization
Variable aperture from 0 to 5 mm with 2.5 μm resolution
Individual settings for vertical and horizontal beam width
Tungsten slits for high quality beam shaping
Automatic or manual operation

Ionization chambers with large dynamic range

Covers sources from 3rd generation synchrotrons to sealed tubes
Fast automatic beam optimization and analysis
Automatic capture of primary beam characteristics

Fast rotary beam shutter

Rotary solenoid for fast operation
Optical open-state and close-state verification
Adaptive exposure synchronization

High resolution CCD microscope

Viewing direction along the beam path (20° offset)
Highly sensitive high resolution CCD camera (0.0003 lux / f1.4)
1.5 mm x 1.5 mm viewing area for crystal location and centering
4" LCD monitor integrated into goniometer (50:1 magnification)
Video outputs for secondary monitor and frame grabber
Crystal view capture during data collection

Motorized precision tungsten primary beamstop

Easy beamstop alignment aided by microscope
Electronic detector collision protection
Easily attachable/detachable
50 mm max. crystal to beamstop for low resolution optimization

Detector Mount

Motorized vertical 2-theta arm (0° to 30°)

mar345: 2-_{max} = 96°, d_{min}(MoKα) = 0.48 Å, d_{min}(CuKα) = 1.04 Å

marCCD: 2-_{max} = 106°, d_{min}(MoKα) = 0.44 Å, d_{min}(CuKα) = 0.96 Å

High resolution positioning (0.0001°/step at about 1°/sec)

Motorized crystal to detector distance translation stage

mar345: 75 mm to 425 mm, *marCCD*: 25 mm to 375 mm
Integrated into 2-theta arm

Options

Cryostream mount

At 45° about the beam axis (5° towards the source)
Cryostream centered within 0.5 mm around the crystal
Distance of cryo-nozzle adjustable from 8 mm to 18 mm

Cryostream exhaust

Adjustable flow rate, up to 50 l/min capacity
Improved flow conditions around the sample

Motorized phi-axis swing (,inverted phi')

Rotation of phi-axis about the beam into vertical position
Easy cryogenic crystal mounting and recovery

Remote control

marresearch

desktop beamline



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Your personal beamline

The desktop beamline® (dtb)

marresearch introduces the most innovative goniometer system in X-ray diffraction. Due to an **autonomous control system**, the **desktop beamline** can accommodate any detector, e.g. the **marCCD**-detector or the **mar345**-Image Plate detector. All **dtb** functions are accessible from a host computer.

High resolution data?

A true **2-theta stage** rotates the detector in a vertical plane up to 30°. Large unit cells can now be measured to high resolution.



Look at these features...

A high resolution CCD-microscope **viewing the crystal in the direction of the X-ray beam** eliminates doubts about the beam hitting the sample. The sample is displayed on a **built-in LCD-monitor** and/or the host computer. The position of the **motorized beamstop** can easily be adjusted according to beam sizes, improving low resolution data.



Push-button alignment

Sit back and relax: alignment does not require user intervention anymore. Two pairs of continuously variable **motorized slits** form part of a **cardanic system** with horizontal and vertical translations and rotations. The intensity of the primary beam is monitored by **ionization chambers** and digitized by **16-bit A/D-converters**. This feature allows **automatic beam search**, centering and **optimization** as well as generation of a **3D-profile** of the primary beam. Slit scans are used to automatically determine suitable aperture settings.



Ideal for MAD data collection

The **high precision phi-axis** operates with a resolution of 0.0006°/step. The maximum speed is 15°/sec.



No more ice!

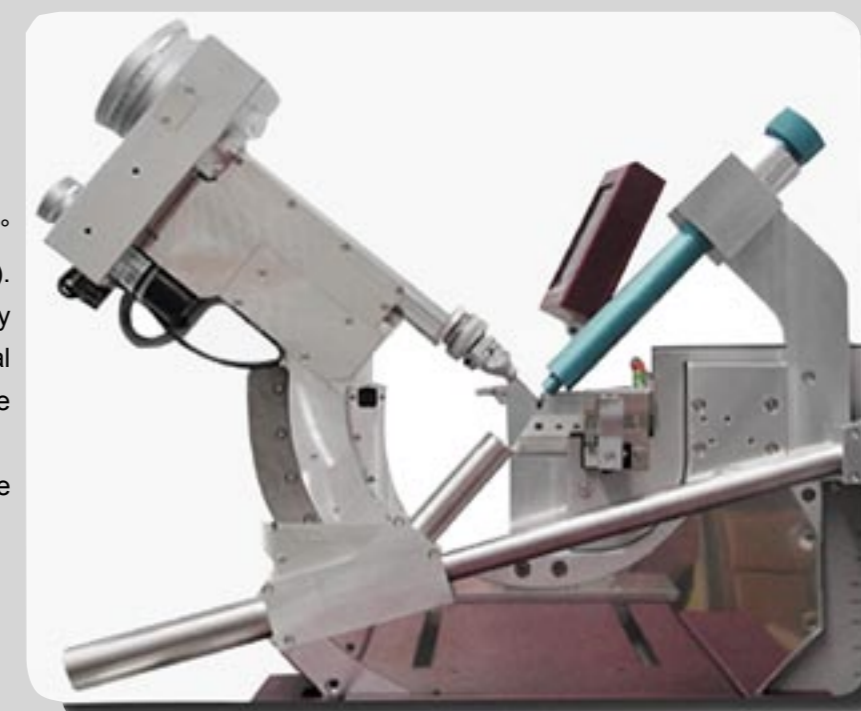
The sample environment has been designed for perfect **integration of cryogenic devices**. Special care has been taken to avoid turbulence in order to keep the cold stream laminar. An additional **cryostream exhaust** eliminates ice formation near the sample. Ample room at the intersection of the beam and the phi-axis simplifies sample mounting.



Sample changing made easy

The optional **phi-axis swing** allows a 90° rotation of the entire phi-axis ('inverted phi'). Cryogenic crystal mounting is greatly simplified in the vertical position. The crystal stays in the cold stream during the entire trajectory.

This feature is mandatory for use with the cryogenic **marresearch sample changer**.



Operate your synchrotron beamline with the dtb!

The **marresearch desktop beamline®** has been designed with expandability in mind. The electronic system can handle up to 64 independent motors with varying characteristics. High resolution motor modules can easily be added to the high speed industrial serial bus (CAN-bus). **marresearch** provides state-of-the-art graphical user interfaces as well as terminal programs with a set of easy to use operating routines.