

MIRROR SYSTEMS – Modular Design

DESCRIPTION



The basic principle of IRELEC mirror systems is a modular design based on standard sub-assemblies:

- Double-axis goniometer R400 or R600
- Vertical translation stage
- Horizontal translation stage
- Rotation stage around the vertical direction.

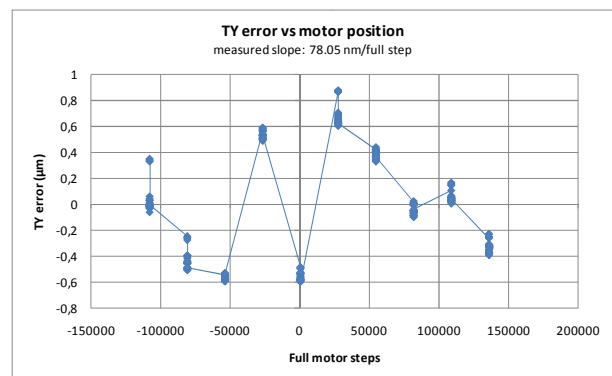
These mechanisms, fixed on a heavy girder, are in air. Each axis is motorised by stepper motors and equipped with high precision end switches. Mirror systems are designed for optics from 200 mm up to 1500 mm long and are fully compliant with UHV requirements (base pressure down to 10^{-10} mbar). It provides up to five degrees of freedom for either vertical or horizontal deflecting mirrors.

PERFORMANCES

Motion	Basic Stroke*	Resolution (full step)	Accuracy**	Repeatability**
Vertical translation	± 25 mm	0.08 µm	2 µm	0.5 µm
Horizontal translation	± 15 mm	0.1 µm	2 µm	0.5 µm
Rotation around vertical axis	± 10 mrad	0.25 µrad	3 µrad	1.5 µrad
Two rotations of the goniometer	± 17 mrad	0.25 or 0.16 µrad	3 µrad	1.5 µrad
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* Adaptable upon request

** Equal to resolution with the use of incremental encoders



DETAILED CHARACTERISTICS

Support structure

The support structure is made of natural granite, synthetic granite or steel, depending upon requirements. Manual adjustments are available for alignment.

Motion	Basic stroke	Resolution
TX	± 10 mm	0.1 mm
TY	± 10 mm	0.1 mm

Vacuum chamber

The design of the IRELEC's mirror-holder fulfils UHV requirements (compatibility down to 10^{-10} mbar). The vacuum chamber is adapted to customer's needs:

- Circular chamber with DN350CF
- Rectangular chamber with base plate or top lid, with aluminium seal.

Electrical interfaces

A patch panel is fixed on the mirror stand for external connection. The electrical connectors are adapted to customer's electrical standard.

Our electrical interfaces are compatible with most of Synchrotron command card standards and fulfils EMC standard. Upon request, we can supply electrical system compliant with LSOHFR standards (IEC 60754-1 and IEC 60332-1).

Surveying

The upper cradle of the goniometer, which is a reliable representation of the optic useful area, is able to receive 4 interfaces for survey monument, easily adaptable to any surveying standard. Furthermore, a dummy mirror, with the same geometrical characteristics as the actual one, is part of our supply. This mirror dummy is equipped at least with 3 interfaces for survey monuments, in order to directly use the "optical" surface to accurately align the system with a laser tracker or theodolite.

Factory tests

The mirror-holder is fully tested in our premises. The tests include :

- Qualification of all motions (range, resolution, accuracy, reproducibility)
- Helium leak test for the vacuum chamber
- Vacuum limit and Residual Gas Analysis.

Documentation

In accordance with our quality management, our equipment is supplied with a full set of support documentation: "as-built" drawings, user's manual, instructions for installation, operation and maintenance. Upon request, we are able to carry out a safety assessment of the equipment and its operation, and employ hazard management techniques to reduce the risk as a result of interaction with the equipment.