



XRT-A-25-109

Compact rotation stage with nanometer error motion

Compact and ultra-precise piezoelectric rotary stage with an extremely small error motion and large aperture. This makes the XRT-A suited for a broad range of precision positioning applications or for state-of-the-art vacuum and non-magnetic applications like micro and nano-CT scanners, X-ray diffraction systems, electron microscopy and synchrotron applications. The stage can be equipped with active compensation technology to further reduce the radial error motion to less than 0.5 μm . Stacking onto a Xeryon linear stage is easily done with available interface plates.

Key features

drive principle	stick-slip piezo motor
bearings	integrated drive concept
lifetime	> 100000 rev.
control principle	closed-loop position control
operating voltage	20 to 48 V

Model code structure

stage type	approx. rotor diameter (mm)	encoder resolution (μrad)	optional		
			active error motion compensation*	vacuum compatibility (10^{-6} mbar)	non-magnetic materials**
XRT-A	-25	-109	-AC	-HV	-NM

* in radial direction and in one plane with respect to stator (see drawing)

** titanium rotor (Ti-6Al-4V) and stainless steel bolts (A2/A4)

Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 1 W
mounting surface flatness	< 5 μm

Motion performance

		XRT-A-25-109	XRT-A-25-109-AC	unit	tolerance	
ENCODER	type	optical, incremental				
	counts per rev.	57600				
	resolution	109 22.5 6250		μrad arcsec μ°		
	index	1 per rev.				
	accuracy	± 0.017		%	typ.	
STAGE	positioning	resolution = min. step size = min. incremental motion (MIM)	125 25 7100	μrad arcsec μ°	typ.	
		unidirectional repeatability	± 125 ± 25 ± 7100	μrad arcsec μ°	typ.	
		bidirectional repeatability	± 250 ± 50 ± 14200	μrad arcsec μ°	typ.	
	speed	max. speed	12		%/s	typ.
		min. speed	0.012		%/s	typ.
		stability	1		%	typ.
		point-to-point positioning time*	0 kgmm ² inertia 1 kgmm ² inertia	300 500	msec msec	typ.
	error motion (p-p)	radial at 7 mm above top surface	1	0.5	μm	max.
		axial in centre	0.5		μm	max.
		tilt (wobble)	50		μrad	max.

* for a 1° step and settling within bidirectional repeatability range

Note: a detailed description of the technical terms used in this datasheet can be found on the Terminology page of our website.

Mechanical properties

		XRT-A-25-109	XRT-A-25-109-AC	unit	tolerance
dimensions		40 x 31 x 15		mm	± 0.1
rotor diameter		28		mm	± 0.1
aperture		9		mm	± 0.1
mass (w/o connector)		55		g	± 5%
load capacity (payload limitation)	inertia mass*	8 0.1		kgmm ² kg	max.
load capacity (bearing force limitation)	axial radial tilt	1 0.5 6		N N mNm	max.
holding torque		4		mNm	min.
driving torque		4		mNm	min.
stage material	rotor housing	stainless steel AISI316L or titanium Ti-6Al-4V (-NM) anodised aluminium			
cable length**		1.5		m	± 0.1
connector (stage to controller)		1x 15-pin D-sub HD male			

* assuming a solid cylindrical payload of dia. 25.4 mm

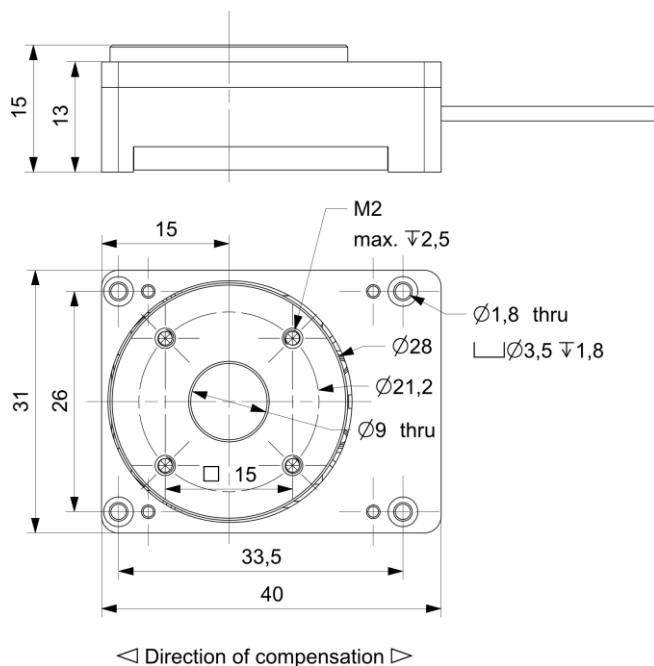
** extension cables available or shorter cable on request

Controller/software

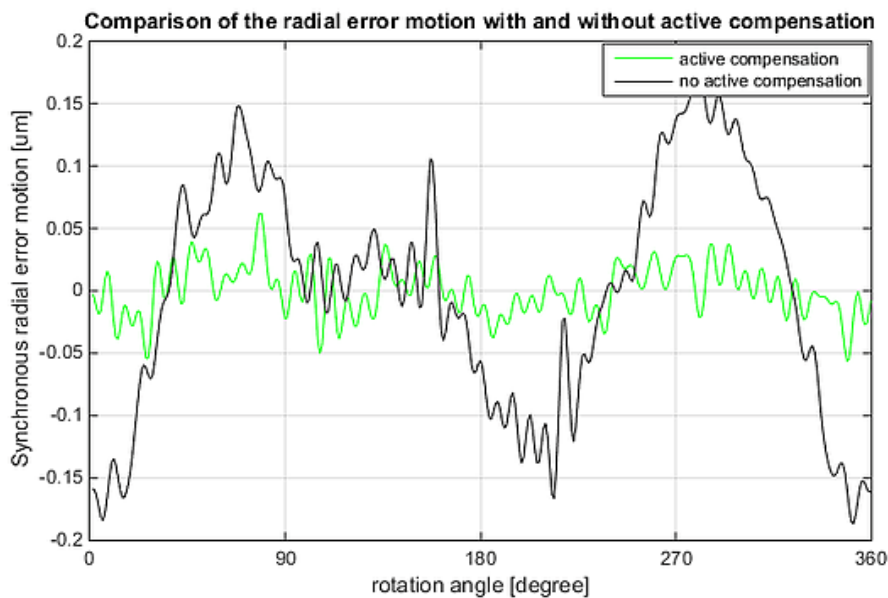
The XRT-A rotation stage is compatible with all Xeryon controllers. Controlling of the stage is done with:

- easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

Drawing



Measurement data



Typical measurement of the synchronous radial error motion of an XRT-A-25-109-AC rotation stage without active compensation (360 nm p-p); and with active compensation (110 nm p-p).