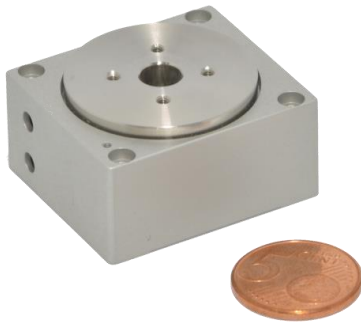


XRT-U series

Compact rotation stage with a small error motion



The XRT-U is a compact and precise rotation stage driven by an ultrasonic piezo motor. Xeryon's ultrasonic piezo motor ensures you high speeds, long lifetime and noiseless operation. This makes the XRT-U a state-of-the-art rotary stage for a broad range of precision positioning applications or metrology applications such as micro-CT, optical microscopy, electron microscopy (vacuum and non-magnetic). The precision ball bearings allow you to achieve error motion values close to air bearing stages, but in a smaller volume and at a lower cost. The XRT-U is available in three sizes and with different options. Stacking onto a Xeryon linear stage is easily done with available interface plates.

Key features

drive principle	patented Crossfixx™ ultrasonic piezo technology
bearings	precision ball bearings
lifetime	> 1000 km / typ. 5 million 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	
			vacuum compatibility (10 ⁻⁶ mbar)	non-magnetic materials*
XRT-U	-30	-109	-HV	-NM
	-40	-49		
	-60	-19		
		-3		

* full ceramic bearings and stainless steel bolts (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

1. Specifications dependant on the encoder resolution (x = diameter)

		XRT-U-x-109	XRT-U-x-49	XRT-U-x-19	XRT-U-x-3	unit	tolerance
ENCODER	type	optical, incremental					
	resolution	109 22.5 6250	49 10.1 2810	19 3.92 1090	3 0.62 170	μrad arcsec μ°	
	index	1 per rev.					
	accuracy	± 0.017				%	typ.
STAGE positioning	resolution = min. step size = min incremental motion (MIM)	125 25 7100	50 10 2800	25 5 1400	15 3 860	μrad arcsec μ°	typ.
	unidirectional repeatability	± 125 ± 25 ± 7100	± 50 ± 10 ± 2800	± 25 ± 5 ± 1400	± 15 ± 3 ± 860	μrad arcsec μ°	typ.
	bidirectional repeatability	± 250 ± 50 ± 14200	± 100 ± 20 ± 5600	± 50 ± 10 ± 2800	± 30 ± 6 ± 1720	μrad arcsec μ°	typ.

2. Specifications dependant on the diameter

			XRT-U-30-series	XRT-U-40-series	XRT-U-60-series	unit	tolerance
STAGE	speed	max. speed	720	540	360	°/s	typ.
		min. speed	0.008	0.006	0.004	°/s	typ.
		stability	1			%	typ.
		point-to-point positioning time	0 kgmm ² inertia 10 kgmm ² inertia	300 500		msec msec	typ.
	error motion (p-p)	radial at 7 mm above top surface	1	2	5	μm	max.
		axial in centre	0.5	1	2.5	μm	max.
		tilt (wobble)	50	100	250	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.

3. Exact counts per revolution in function of encoder resolution and rotor diameter

		rotor diameter (mm)		
		30	40	60
Resolution (μrad)	109	57600	86400	64800
	49	144000	135000	129600
	19	360000	345600	324000
	3	1843200	2764800	2073600

Mechanical properties

		XRT-U-30-series	XRT-U-40-series	XRT-U-60-series	unit	tolerance
dimensions		40 x 35 x 21	50 x 46 x 21	70 x 70 x 34	mm	± 0.1
rotor diameter		32	43	65	mm	± 0.1
aperture		7	12.7	25.4	mm	± 0.1
mass (w/o connector)		82	130	450	g	± 5%
load capacity (payload limitation)	inertia mass*	100 0.5	200 1	2500 5	kgmm ² kg	max.
load capacity (bearing force limitation)	axial radial tilt	25 25 0.15	35 35 0.2	100 100 1	N N Nm	max.
holding torque		7	10	45	mNm	min.
driving torque		14	20	90	mNm	min.
stage material	rotor housing	stainless steel AISI316 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. 40 mm

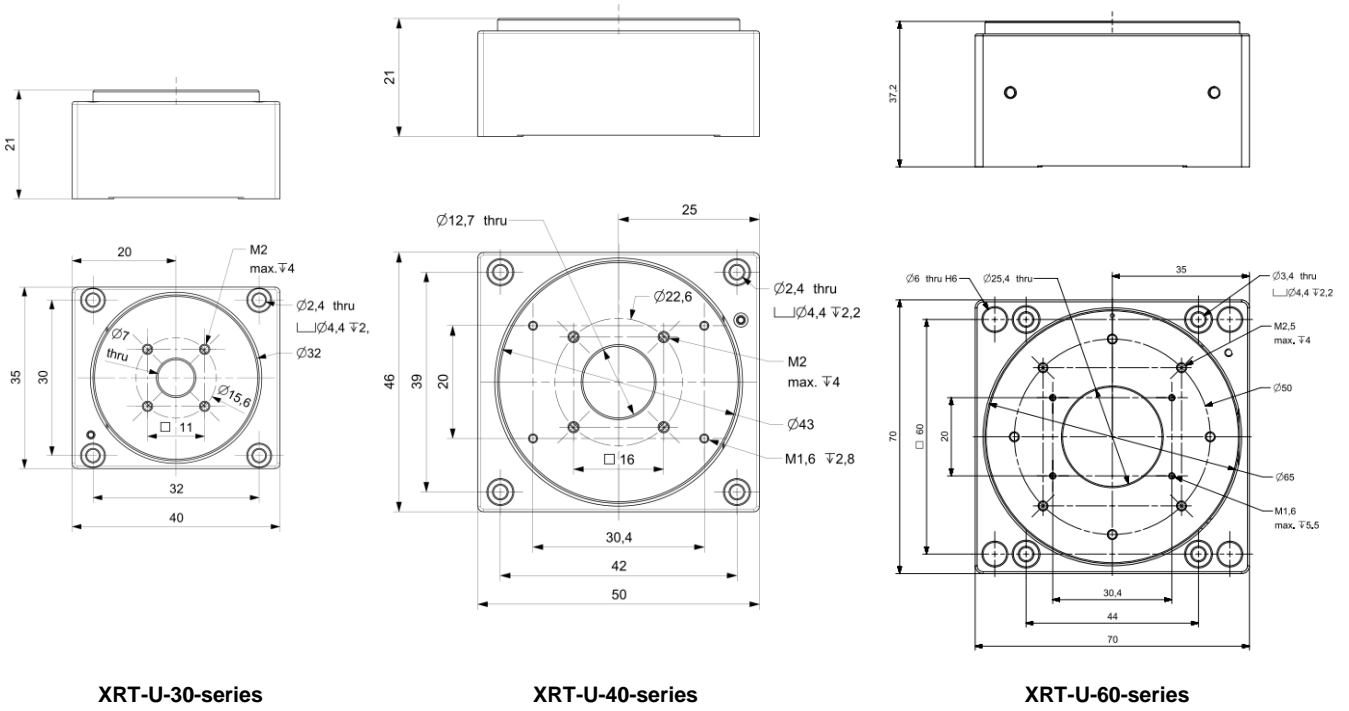
** extension cables available or shorter cable on request

Controller/software

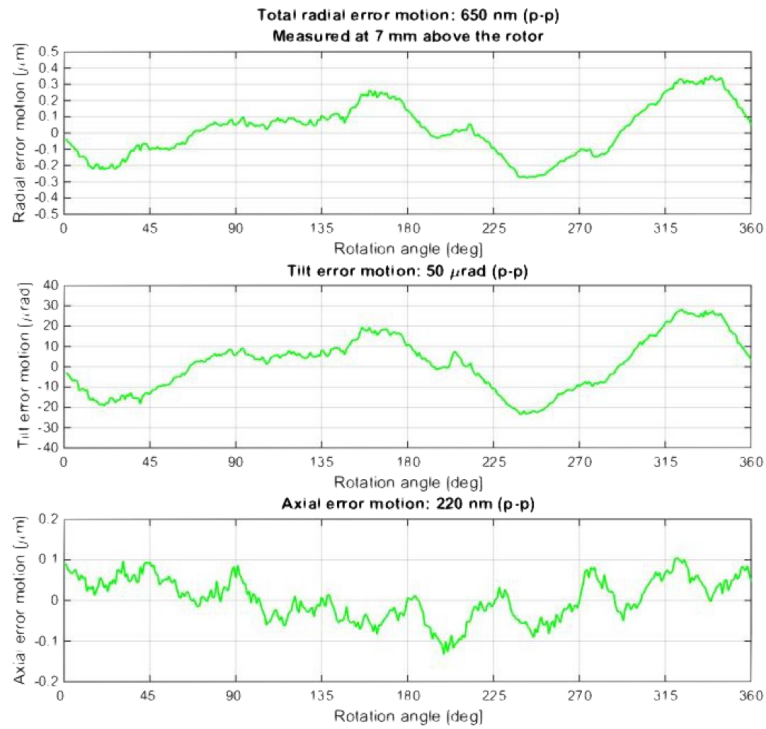
The XRT-U series rotation stages are compatible with all Xeryon controllers. Controlling of the stage is done with:

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

Drawings



Measurement data



Typical measurement of the error motion of an XRT-U-30 rotation stage.

Last updated: 13/01/2020. All specifications are subject to change without prior notice.