Compact Rotation Stage Suitable for Vacuum

Precision Positioning

RS-40 V7

- Vacuum compatible up to 10^{-7} hPa
- Unlimited travel range
- Repeatability to 87 µrad
- 20 mm Ø aperture
- Reference switch

Standard-class rotation stage
Worm drive. Aperture with 20 mm Ø. Reference switch.

Reduced outgassing especially for use in vacuum environments
Most notably, for the lubrication of the guides and the spindle a material with particularly low outgassing is used. This allows a bakeout temperature of up to 80° C.

Higher quality for applications in high vacuum
In this case, special components suitable for high vacuum are used, such as motor, measuring system, and limit switches. In addition, the surface is made of uncoated aluminum and the spindles and guides are made of stainless steel. With this, the PI V7 vacuum class is reached, which means up to 10^{-7} hPa.

Drive
Stepper motor with gearhead.

Application fields
Vacuum chambers. Research. Beamline instrumentation. Microscopy. Electronics assembly and inspection.

Motion	Unit	Tolerance	3216V21000
Active axes			θZ
Rotation range in θZ	°		360
Maximum angular velocity in θZ, unloaded	°/s		20
Radial error in X	µm	Typ.	±5
Axial error	µm	Typ.	±5
Tilt error around X (wobble)	µrad	Typ.	±35

Positioning	Unit	Tolerance	3216V21000
Minimum incremental motion in θZ	µrad	Typ.	87
Unidirectional repeatability in θZ	µrad	Typ.	±43.5
Bidirectional repeatability in θZ	µrad	Typ.	1400
Reference switch			Hall effect, N/C contact, 3.8 V to 24 V, NPN

Drive Properties	Unit	Tolerance	3216V21000
Drive type			2-phase stepper motor
Nominal voltage	V		24
Motor resolution	Full steps/ rev.		200
Drive torque clockwise in θZ	N·m	Max.	0.2
Drive torque counterclock-wise in θZ	N·m	Max.	0.2

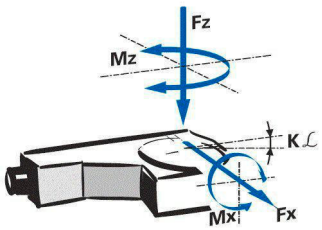
Mechanical Properties	Unit	Tolerance	3216V21000
Permissible push force in Y	N	Max.	5
Permissible push force in Z	N	Max.	20
Permissible torque in θX	N·m	Max.	2
Permissible torque in θY	N·m	Max.	2
Holding torque in θZ, passive	N·m		0.2
Moment of inertia in θZ, un-loaded	kg·mm²	±20 %	15.5
Moved mass in X, unloaded	g		90
Worm gear reduction			90 : 1
Bearing type			Ball bearings
Overall mass	g		400
Material			Aluminum, stainless steel, red bronze

Miscellaneous	Unit		3216V21000
Operating temperature range	°C		5 to 40
Vacuum class	hPa		10^{-7}
Connector			D-sub 15 (f)
Cable length	m		2
Recommended controllers/ drivers			C-663.12 C-885 with C-663.12C885 ACS modular controller

Note on cable length: Fixed cable, firmly attached to the product

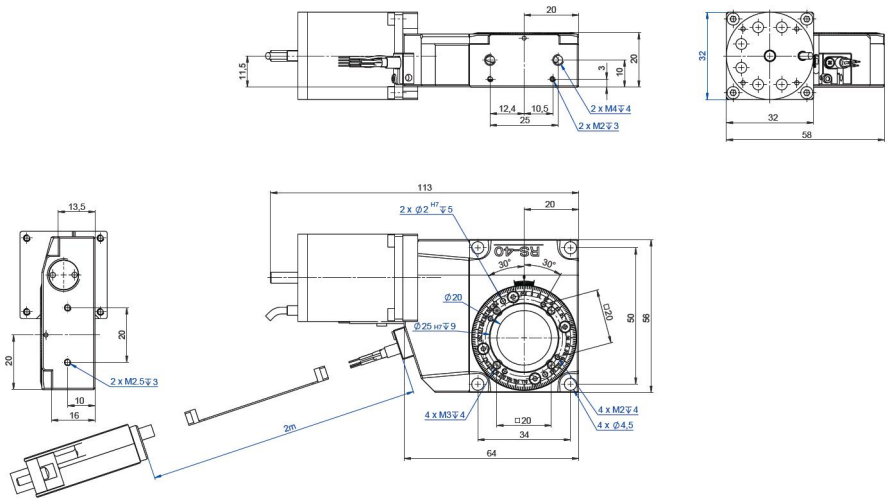
At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



Direction of the axes and torques for rotation stages

Drawings / Images



RS-40 rotation stage, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

3216V21000
Vacuum-compatible compact rotation stage; 2-phase stepper motor; 360 ° rotational angle; 10 N load capacity; 20 °/s maximum angular velocity; vacuum compatible to 10 hPa; 2 m cable length