High-Precision Rotation Stage with Direct Drive

Ideal for Indexing, Positioning, Scanning, Measuring Technology

V-62x

- High efficiency and performance due to direct drive
- 85 mm or 110 mm motion platform diameter
- Eccentricity and flatness < 1 µm
- Mounting in any orientation
- Low profile

Product overview
The direct-drive rotation stages of the V-62x series are designed for precision, high stiffness, a long lifetime, and ease of use, and can be mounted in any orientation. The V-62x stages offer superior performance regarding travel accuracy, flatness, and wobble. The ultra-precise deep groove ball bearings are preloaded and lubricated prior to delivery, meaning they are maintenance-free for the whole lifetime of the rotation stage.

PIMag® direct-drive torque motor
Torque motors are electromagnetic direct drives. They dispense with mechanical components in the drivetrain and transfer the drive force directly and friction-free to the motion platform. The drives reach high velocities and accelerations.

Absolute encoder (optional)
Absolute encoders supply explicit position information that enables immediate determination of the position. Therefore, no referencing is necessary when switching on and this increases efficiency and safety during operation.

Accessories and options
- Encoder type
- Single or multi-axis motion controllers and servo drives
- Multi-axis assemblies

Application fields
Sample inspection. Precision microassembly. Research. Biotechnology. Semiconductor testing and inspection. Measuring technology. Automation technology. Device assembly.

Motion	Unit	Toleran-ce	V-622.A100	V-622.B100	V-623.A100	V-623.B100
Active axes			θZ	θZ	θZ	θZ
Rotation range in θZ	°		360	360	360	360
Maximum angular velocity in θZ, unloaded	min^{-1}		1200	1200	1000	1000
Linear crosstalk in X with motion in θZ	µm	Typ.	± 0.75	± 0.75	± 0.5	± 0.5
Linear crosstalk in Y with motion in θZ	µm	Typ.	± 0.75	± 0.75	± 0.5	± 0.5
Linear crosstalk in Z with motion in θZ	µm	Typ.	± 0.75	± 0.75	± 0.5	± 0.5
Rotational crosstalk in θX with motion in θZ	µrad	Typ.	± 7.5	± 7.5	± 5	± 5
Rotational crosstalk in θY with motion in θZ	µrad	Typ.	± 7.5	± 7.5	± 5	± 5

Positioning	Unit	Tolerance	V-622.A100	V-622.B100	V-623.A100	V-623.B100
Integrated sensor			Incremental angle-measuring system	Absolute angle-measuring system	Incremental angle-measuring system	Absolute angle-measuring system
Bidirectional repeatability in θZ	µrad	Typ.	± 5	± 5	± 5	± 5
Positioning accuracy in θZ, calibrated	µrad	Typ.	± 10	± 10	± 10	± 10
Sensor signal			Sin/cos, 1 V peak-peak	BiSS-C	Sin/cos, 1 V peak-peak	BiSS-C
Sensor signal periods / U			11840		15744	
Sensor resolution, rotational	µrad		0.13	0.0015	0.097	0.0015
Reference switch			1 / revolution, differential pulse over one sensor signal period, 1 V peak-peak		1 / revolution, differential pulse over one sensor signal period, 1 V peak-peak	
Resolution, motor encoder, bit width	bit			32		32

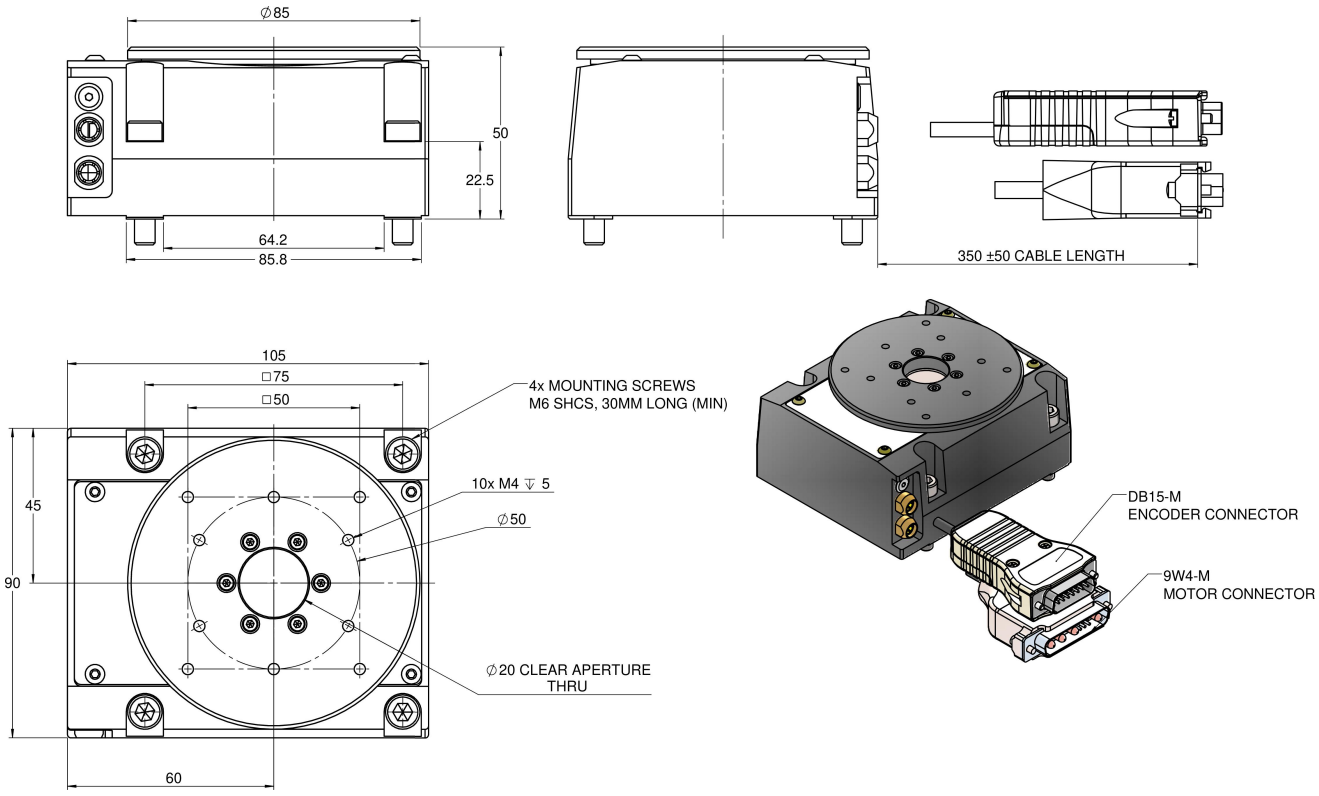
Drive Properties	Unit	Tolerance	V-622.A100	V-622.B100	V-623.A100	V-623.B100
Drive type			Ironless 3-phase torque motor	Ironless 3-phase torque motor	Ironless 3-phase torque motor	Ironless 3-phase torque motor
Peak voltage	V		80	80	80	80
Nominal current, RMS	A	Typ.	4.9	4.9	4.6	4.6
Peak current, RMS	A	Typ.	13.8	13.8	13.8	13.8
Drive torque counterclockwise in θZ	N·m	Max.	0.57	0.57	1.4	1.4
Drive torque clockwise in θZ	N·m	Max.	0.57	0.57	1.4	1.4
Peak torque counterclockwise in θZ	N·m	Max.	1.22	1.22	2.9	2.9
Peak torque clockwise in θZ	N·m	Max.	1.22	1.22	2.9	2.9
Torque constant	N·m/A	Typ.	0.117	0.117	0.3	0.3
Resistance phase-phase	Ω	Typ.	1.7	1.7	2.76	2.76
Inductance phase-phase	mH		2.7	2.7	5.2	5.2
Back EMF, phase-phase, rotational	V/kRPM	Max.	10	10	25	25
Number of pole pairs			12	12	20	20

Mechanical Properties	Unit	Tolerance	V-622.A100	V-622.B100	V-623.A100	V-623.B100
Bearing type			Ball bearings	Ball bearings	Ball bearings	Ball bearings
Moment of inertia in θZ, unloaded	kg·mm²	±20%	331	331	1188	1188
Permissible push force in X	N	Max.	50	50	75	75
Permissible push force in Y	N	Max.	50	50	75	75
Permissible push force in Z	N	Max.	100	100	150	150
Permissible torque in θx	N·m	Max.	5	5	10	10
Permissible torque in θY	N·m	Max.	5	5	10	10
Overall mass	g	±5 %	1300	1300	2400	2400
Material			Hardcoat aluminum (base body), stainless steel (bearing and mounting hardware)	Hardcoat aluminum (base body), stainless steel (bearing and mounting hardware)	Hardcoat aluminum (base body), stainless steel (bearing and mounting hardware)	Hardcoat aluminum (base body), stainless steel (bearing and mounting hardware)
Aperture diameter	mm		20	20	45	45
Motion platform diameter	mm		85	85	110	110

Miscellaneous	Unit		V-622.A100	V-622.B100	V-623.A100	V-623.B100
Connector			D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)
Sensor connector			D-sub 15-pole (m)	D-sub 15-pole (m)	D-sub 15-pole (m)	D-sub 15-pole (m)
Recommended controllers / drivers			A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x
Operating temperature range	°C		5 to 50	5 to 50	5 to 50	5 to 50

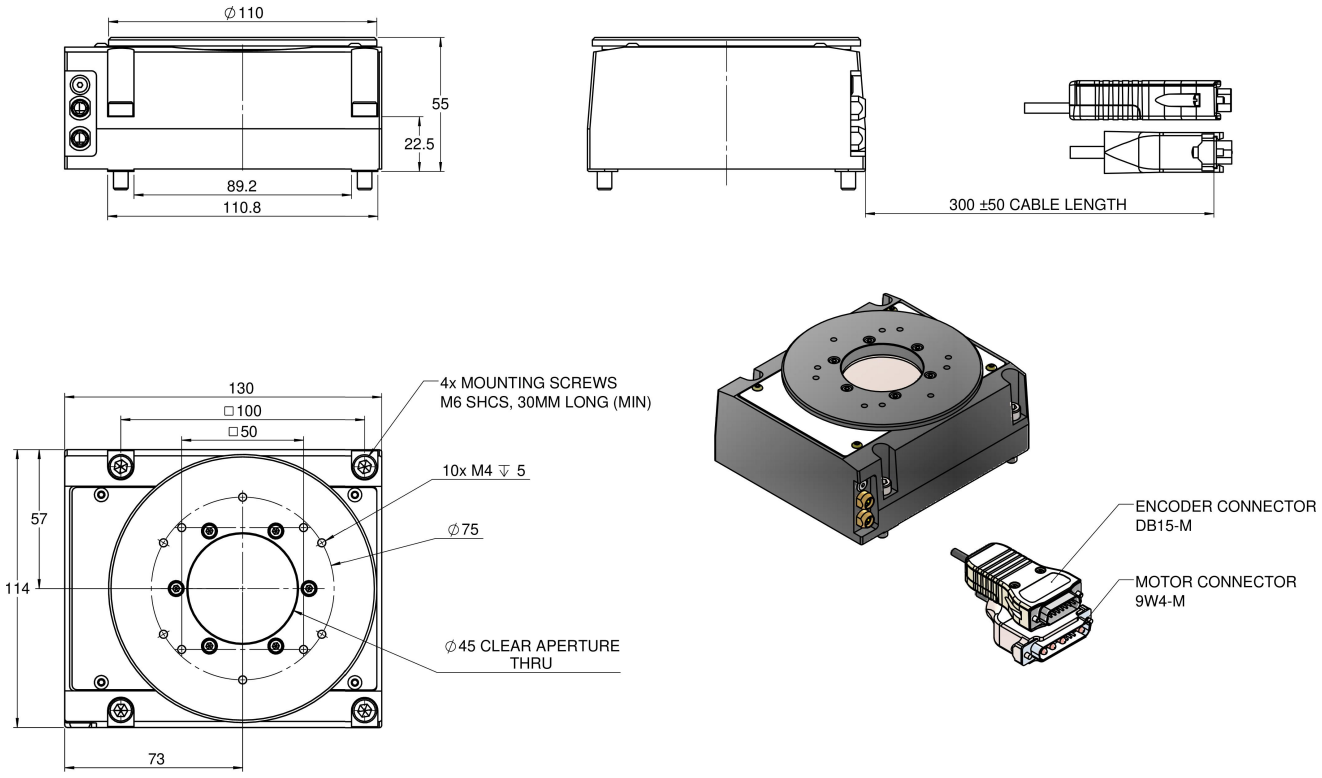
Note on the linear and rotational crosstalk: Depending on the quality of the underlying surface, the payload, the orientation and the forces acting on the stage from the outside. Please contact PI for application-specific parameters. The specified values are static (no rotary motion during measuring) and without load.
Note on angular velocity: May be limited by payload imbalance, controller or drive.
Note on sensor resolution for A-62x.Axxx: Assumes a 4096x interpolation. Contact PI for the use of other factors.
Note on positioning accuracy: The specified values are based on error compensation controlled by the controller. The stage must be ordered with a controller from PI to reach these values. Accuracy values assume short duration and do not consider the long-term effects of thermal drift on the stage.
Note on permissible push force and permissible torque: The maximum load capacities are mutually exclusive, e.g., the stage can be loaded with either the maximum permissible push force in X / Y or with the maximum permissible push force in Z or with the maximum permissible torque in θX / θY.

Drawings / Images



V-622, dimensions in mm

Drawings / Images



V-623, dimensions in mm

Order Information

V-622.A100
High-precision rotation stage with direct drive; ironless 3-phase torque motor; 360 ° rotational angle; 85 mm Ø motion platform; 100 N load capacity; 1200 min^{-1} maximum angular velocity; incremental angle measuring system, 0.13 µrad sensor resolution, rotary, Sin/Cos, 1 V peak-peak

V-622.B100
High-precision rotation stage with direct drive; ironless 3-phase torque motor; 360 ° rotational angle; 85 mm Ø motion platform; 100 N load capacity; 1200 min^{-1} maximum angular velocity; absolute angle measuring system, 0.0015 µrad sensor resolution, rotary, BiSS-C

V-623.A100
High-precision rotation stage with direct drive; ironless 3-phase torque motor; 360 ° rotational angle; 110 mm Ø motion platform; 150 N load capacity; 1000 min^{-1} maximum angular velocity; incremental angle measuring system, 0.097 µrad sensor resolution, rotary, Sin/Cos, 1 V peak-peak

V-623.B100
High-precision rotation stage with direct drive; ironless 3-phase torque motor; 360 ° rotational angle; 110 mm Ø motion platform; 150 N load capacity; 1000 min^{-1} maximum angular velocity; absolute angle measuring system, 0.0015 µrad sensor resolution, rotary, BiSS-C