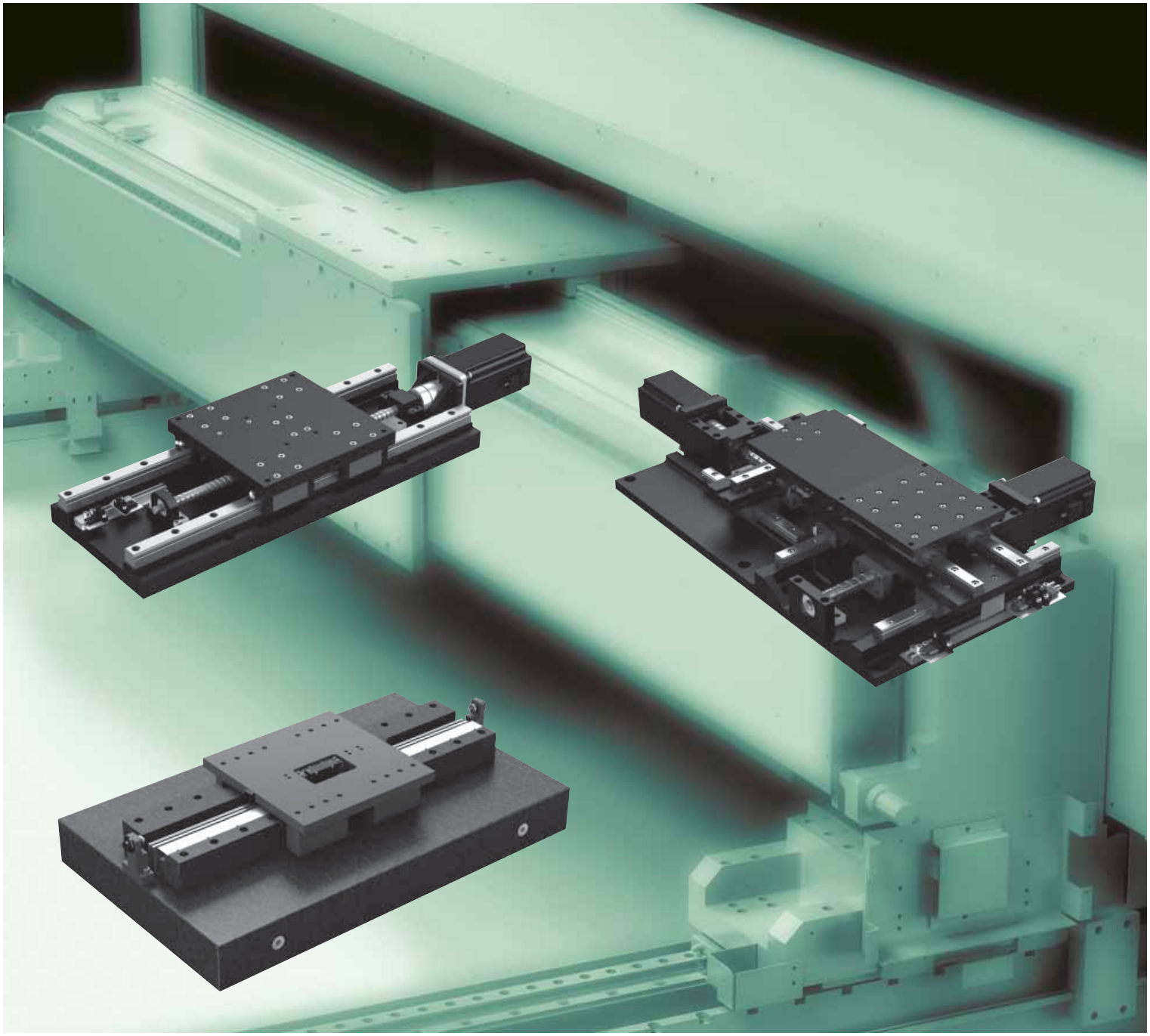
MOTION & CONTROL™

NSK

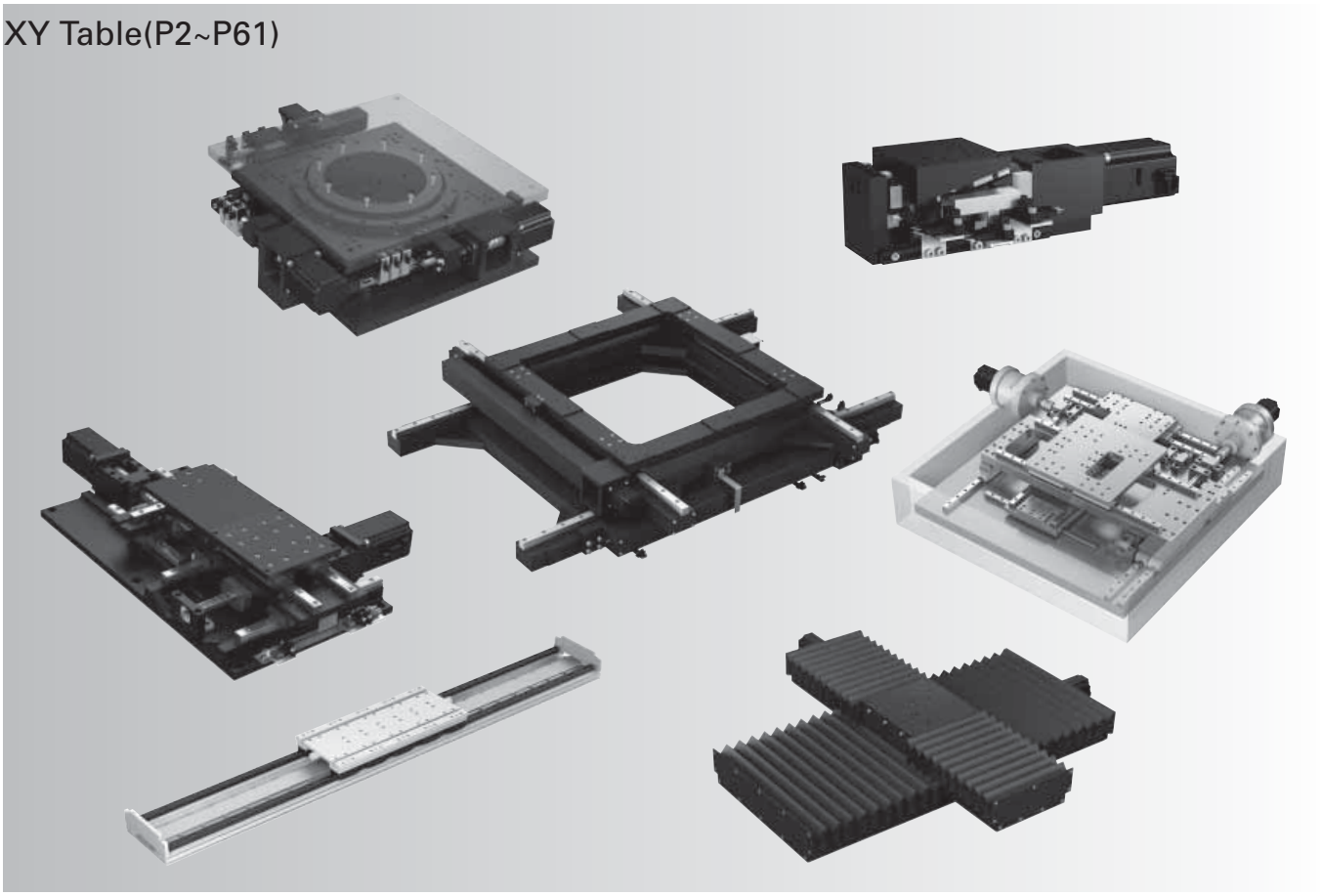
Precision Positioning Table

High precision positioning table accomplished by uniquely developed advanced positioning technology and evaluation technology.



NSK Precision Positioning Tables

XY Table(P2~P61)



Air Bearing Slide(P62~P71)

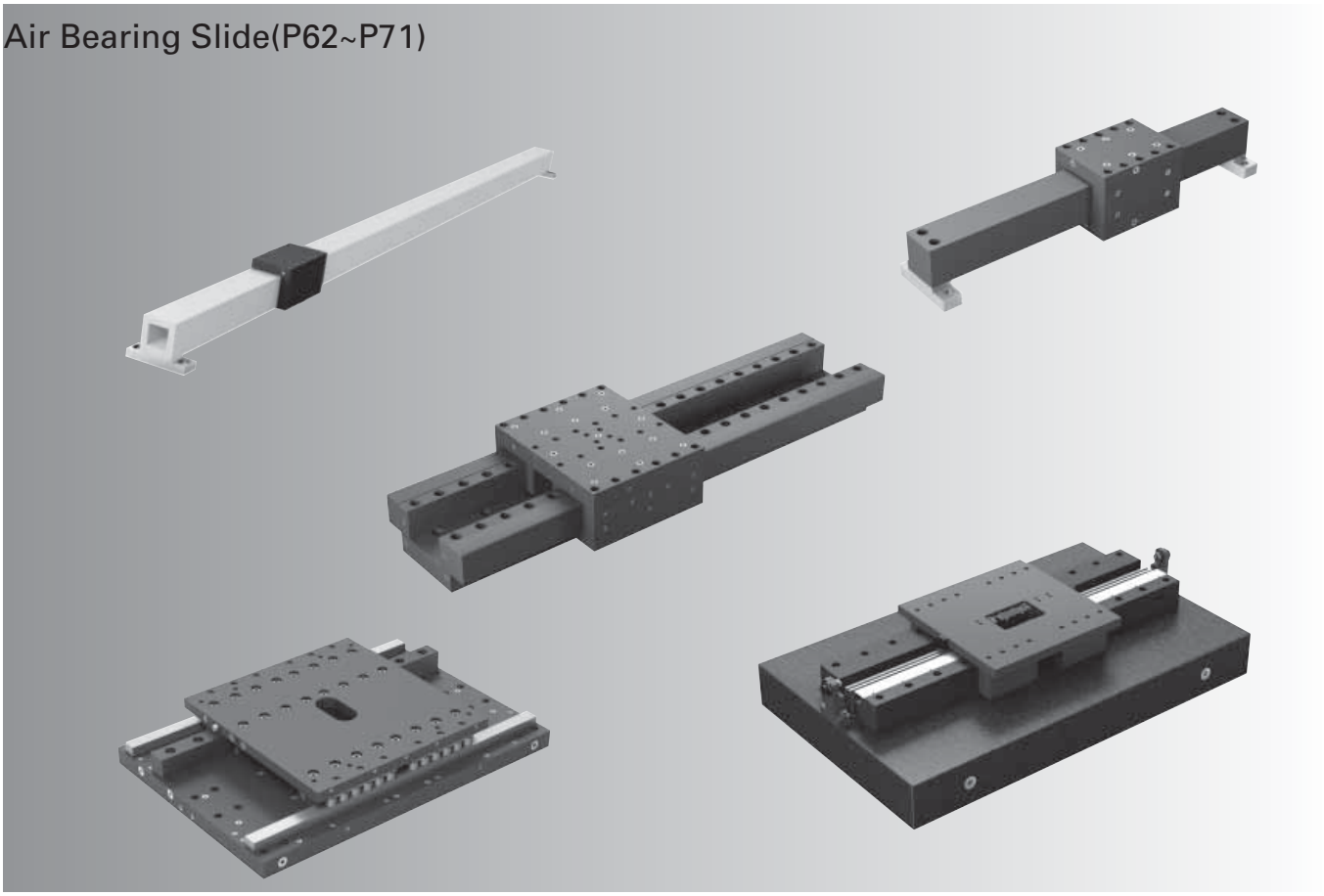


Table of contents

XY-1 XY Table Features

1. Many variations available

A broad lineup consisting of combinations of single axis, two-axes, Z-axis and θ -axis.

2. XY table optimized for applications

Customized design for intended purposes, such as machining, assembly, inspection and conveyance.

3. Significant reduction in design workload

Improved design efficiency with adoption of modular system for drive axes

4. Systematic combination of highly acclaimed NSK products

Made with NSK ball screws, support units, linear guides, crossed roller guides and air bearing slides.

5. Choice of motor

Can be fitted with AC servo motors, stepping motors and linear motors from various makers.

XY-2 XY Table Series Lineup

H Series	Table with Linear Guides for straight motion
HW Series	Z axis table with a wedge mechanism
HT Series	Two-axis table with a fixed motor structure
HD Open-Frame Series	Open-frame table
C Series	Table with Crossed Roller Guides for straight motion
SS Series	Micro θ-axis table
MC Series	Slim alignment three-axis table
L Series	Linear motor drive table
Linear Positioning Stages	Table with pre-mounted stepping motor and pre-wired sensor
Compact CD Series	Small two-axis table with pre-mounted stepping motor and pre-wired sensor
Positioning actuator	Actuator with built-in motor controller
Table for vacuum environment	Table specifically designed for vacuum environments

XY-3 Coding of Reference Number

Example of reference number: **XY - H S 00 25 - ✻ ✻ ✻ ✻ - ✻ ✻ ✻**

- XY: Indication of XY table
- H: Type of guideway bearing
  - H: Linear guide
  - C: Crossed-roller guide
  - A: Air bearing slide
  - S: Swivel (θ-axis only)
  - F: Slide bearing
  - M: Combined (mix)
  - L: Spline
- S: Number and shape of guideways
  - S: Single
  - D: Double
  - T: Triple
  - C: Combination
  - W: Wedge
- 00: Table with multiple axes
- 25: Stroke of upper axis
- Stroke of lower axis
- ✻ ✻ ✻ ✻: Design symbol
- ✻ ✻ ✻: Subunit assembly serial number

Type symbol	Table type H series
C	13
P	17
H	18
R	22
M	30
W	42
S	SS (small)
E	SS (large)
A	HW(1/4)
B	HW(1/2)
D	HW(1/10)
T	HW(1/2)
N	Open-frame 48
G	Open-frame 74
J	MC180
K	MC270
L	Linear motor

XY-4 Selection Guide

Note)
- Maximum transportable mass may vary depending on usage, acceleration and deceleration, etc. Contact NSK for further information.
- Respective single-axis tables are available in two-axis (multiaxis) combination.
- Contact NSK for special application.

Stroke [mm] and maximum speed [mm/s]
(Values in the following bars are maximum speed.)

		Ball screw lead[mm]	Axis name	0 – 100 – 200 – 250 – 300 – 400 – 500 – 600 – 700 – 800 – 900 – 1000 – 1500 – 2000 – Stroke(mm) 2500 – 3000~	Maximum transportable (horizontal) mass[kg]	Motor rated output[W]	Page
Single-axis table H series Type 13 (130 wide x 85 high)		5 10 20	X-axis X-axis X-axis	Special application: 250[mm/s] / 500[mm/s] / 1000 [mm/s]; 500[mm/s] / 800[mm/s]	50 50 30	200 200 200	8
Single-axis table H series Type 17 (170 wide x 85 high)		5 10	X-axis X-axis	Special application: 250[mm/s] / 500[mm/s]; 164[mm/s] / 327[mm/s]	56 56	200 200	10
Single-axis table H series Type 18 (180 wide x 145 high)		20		Special application: 1000 [mm/s]; 750[mm/s]; 550[mm/s]; 350 [mm/s]; Special application	60	400 750	12
Single-axis table H series Type 22 (220 wide x 90 high)		5 10 20	X-axis X-axis X-axis	Special application: 250[mm/s] / 500[mm/s] / 1000[mm/s]; 350[mm/s] / 700[mm/s]; Special application	60	400 750	15
Single-axis table H series Type 22 (220 wide x 100 high) with cover		5 10 20	X-axis X-axis X-axis	Special application: 250[mm/s] / 500[mm/s] / 1000[mm/s]; 350[mm/s] / 700[mm/s]; Special application	60	400 750	16
Single-axis table H series Type 22 (220 wide x 100 high) with bellows		5 10 20	X-axis X-axis X-axis	Special application: 250[mm/s] / 500[mm/s] / 1000[mm/s]; 350[mm/s] / 700[mm/s]; Special application	60	400 750	17
Single-axis table H series Type 30 (300 wide x 157 high)		20	X-axis	Special application: 1000 [mm/s]; 750 [mm/s]; 450 [mm/s]; 300 [mm/s]; Special application	150	1000	20
Single-axis table CS series		5 10	X-axis X-axis	250[mm/s]; 500[mm/s]; Special application	Stroke : Mass 50 : 20 100 : 22 150 : 25 200 : 37 250 : 42	400	29
Two-axis table CT series		5 10	X-axis Y-axis X-axis Y-axis	Special application: 250[mm/s]; 250[mm/s]; 500[mm/s]; 500[mm/s]	Stroke : Mass 50 : 15 100 : 20 140 : 25	750	31
Two-axis table Open Frame series		5 10	X-axis Y-axis X-axis Y-axis	250 [mm/s]: Special application: 250[mm/s]; 500 [mm/s]: Special application: 500[mm/s]	30 30	400 750	26
Three-axis table MC series (alignment)		1	X-axis Y-axis θ-axis	Stroke 4 mm Stroke 4 mm Stroke 6°	30~60	50 ~100	34
Single-axis table SS series (micro θ-axis)		2	θ-axis	Stroke 10°	30~60	50 ~100	32
Two-axis table HT series		10	X-axis Y-axis	Special application: 500[mm/s]; 500[mm/s]	56	200	24
Single-axis table HW series (wedge Z-axis)		1 2 5	Z-axis	Stroke 5 mm Stroke 10 mm Stroke 30 mm	1.5~25	50 ~100	22
Single-axis table L series (linear motor)		–	X-axis	Special application: 2000[mm/s]	Type S : 40 Type M : 80 Type L : 120		36
Two-axis table (for vacuum environment)		4 5	X-axis Y-axis X-axis Y-axis	Special application: 200[mm/s]; 200[mm/s]; 250[mm/s]; 250[mm/s]			44

XY-5 H Series Features

1. Lightweight and compact

Custom designed Aluminum alloy base.

2. High rigidity

A high level of moment rigidity is achieved through the optimal design of the cross-section shape.

3. Wide variations available

This series has a range of cross-section shapes

4. High speed and low noise

A new ball screw circulation system using low-noise ball screws

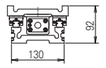
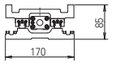
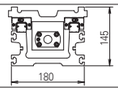
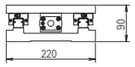
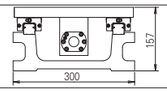
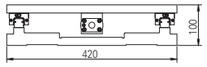
5. Long life

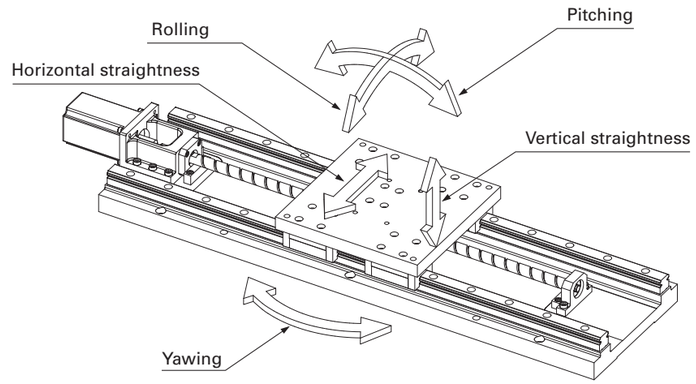
Premium components, including ball screws, support units and linear guides are used.

6. Choice of motor

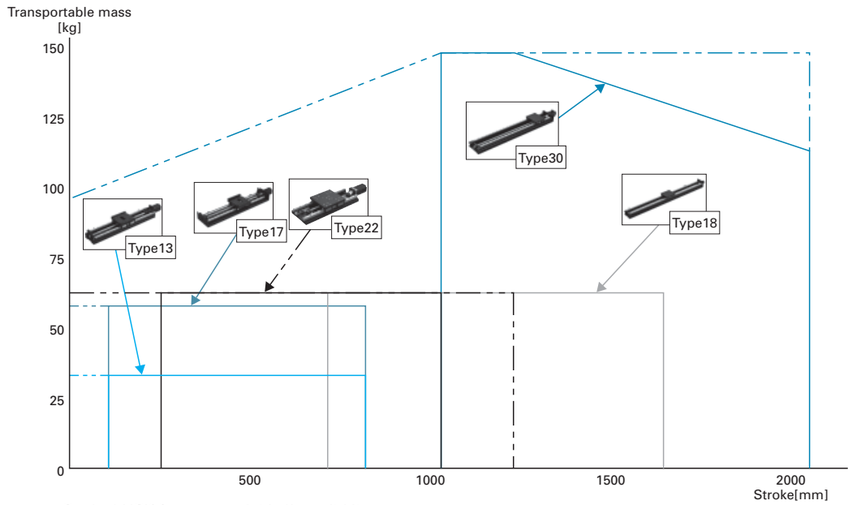
Can be fitted with AC servo motors, stepping motors, and linear motors from various makers.

(1) Table of moment rigidity and transportable moment

Type	Cross-section shape	Moment rigidity (X10^5 Nm/rad)			Transportable moment (Nm)		
		Pitching	Yawing	Rolling	Pitching	Yawing	Rolling
13		3.74	2.89	4.76	71	57	95
17		5.33	6.09	3.62	66	53	59
18		17.5	10.1	10.9	285	228	273
22		20.5	15.0	20.4	253	199	312
30		21.8	28.6	46.3	360	290	550
42		28.3	20.6	97.7	311	244	700



(2) Selection graph



*Contact NSK for areas outside the solid line.

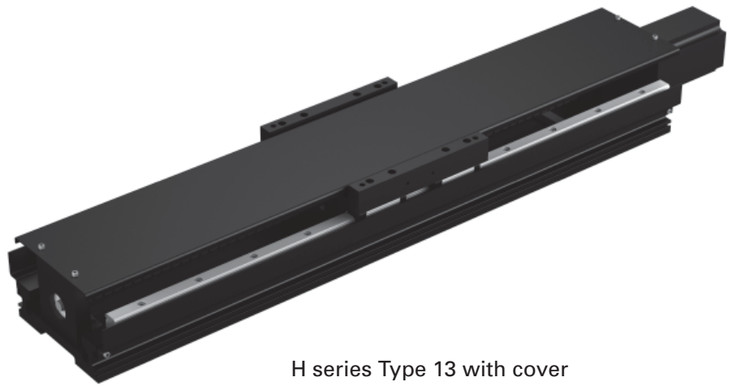
(3) H series Type 13: Features

1. Smallest width in H Series

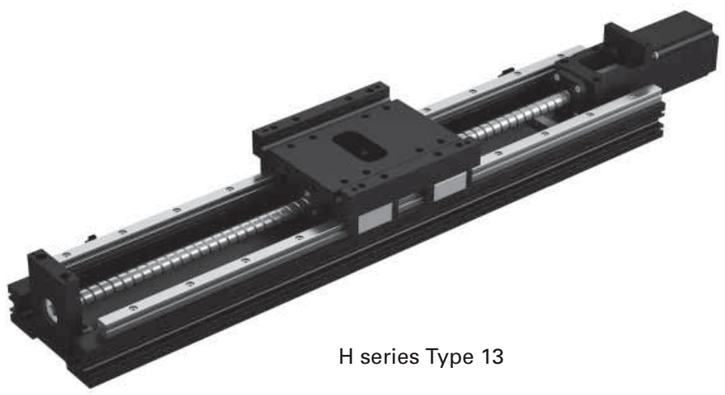
2. Sensor and wiring can be easily fitted.

3. Multi-axis combinations possible

4. Choice of motor

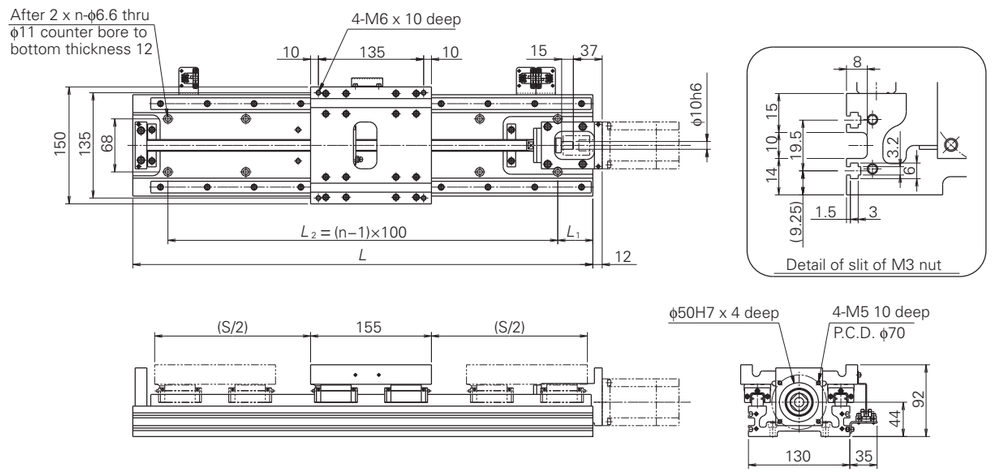


H series Type 13 with cover



H series Type 13

H series Type 13



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length				Mass
	S		*L*	L_1	L_2	*n*	(kg)
XY-HS0020-34C*	200	210	390	45	300	4	7.0
XY-HS0025-34C*	250	260	440	70	200	4	7.6
XY-HS0030-34C*	300	310	490	45	400	5	8.2
XY-HS0040-34C*	400	410	590	45	500	6	9.3
XY-HS0050-34C*	500	510	690	45	600	7	10.4
XY-HS0060-34C*	600	610	790	45	700	8	11.5
XY-HS0070-34C*	700	710	890	45	800	9	12.7
XY-HS0080-34C*	800	810	990	45	900	10	13.8

Specifications

Table reference number	Table specifications (μm)			Ball screw lead and inertia of movable parts ($\times 10^{-4}$kg·m^2)			Starting torque (N·cm)			Transportable mass (kg)	
										Horizontal	
	Repeatability	Positioning accuracy	Backlash	5mm	10mm	20mm	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Ball screw lead 5·10mm	Ball screw lead 20mm
XY-HS0020-34C*	±2	40	1	0.15	0.19	0.36	20	30	36	50	30
XY-HS0025-34C*				0.17	0.21	0.38					
XY-HS0030-34C*				0.19	0.23	0.4					
XY-HS0040-34C*	±3	50		0.23	0.27	0.44					
XY-HS0050-34C*				0.27	0.31	0.48					
XY-HS0060-34C*				0.31	0.35	0.52					
XY-HS0070-34C*	±5	60		—	0.39	0.56					
XY-HS0080-34C*					0.43	0.6					

Maximum speed **Unit: mm/s**

Lead \ Stroke	~600mm	700mm	800mm
5mm	250	—	—
10mm	500	500	500
20mm	1 000	1 000	800

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

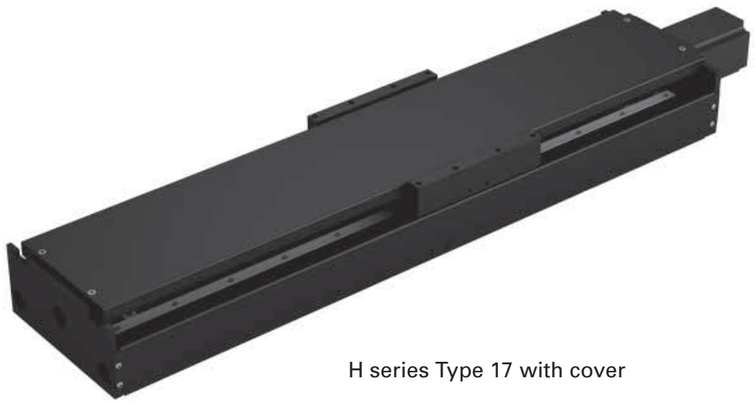
(4) H series Type 17: Features

1. Low profile type. 85mm high and 170mm wide.

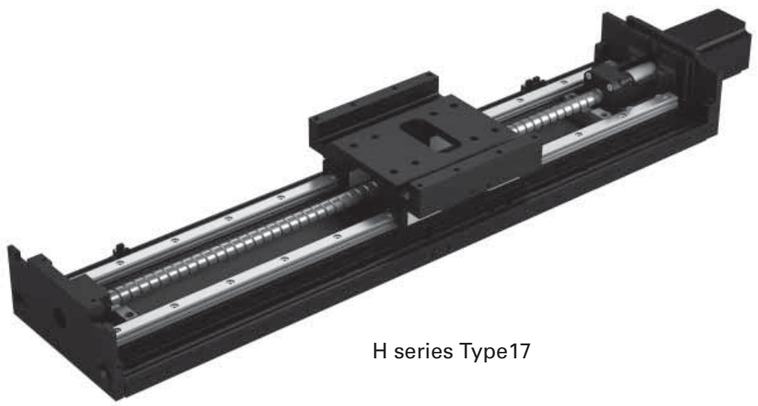
2. Built-in Sensor unit

3. Some models come with top and side covers.

4. Choice of motor

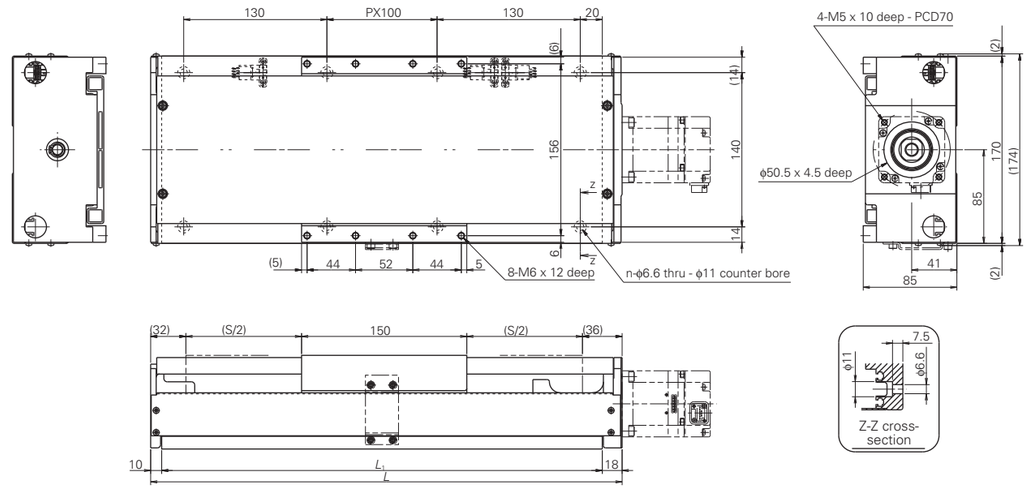


H series Type 17 with cover



H series Type17

H series Type 17



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length			Mass
	S		*L*	*P*	*n*	(kg)
XY-HS0010-34P*	100	110	328	0	6	9.0
XY-HS0020-34P*	200	210	428	1	8	10.0
XY-HS0030-34P*	300	310	528	2	10	12.0
XY-HS0040-34P*	400	410	628	3	12	13.0
XY-HS0050-34P*	500	510	728	4	14	14.0
XY-HS0060-34P*	600	610	828	5	16	16.0
XY-HS0070-34P*	700	710	928	6	18	17.0
XY-HS0080-34P*	800	810	1 028	7	20	19.0

Specifications

Table reference number	Table specifications (μm)			Ball screw lead and inertia of movable parts ($\times 10^{-4}$kg·m^2)		Starting torque (N·cm)		Transportable mass (kg) Horizontal
	Repeatability	Positioning accuracy	Backlash	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 5·10mm
XY-HS0010-34P*	±2	30	5	0.11	0.15	20	30	56
XY-HS0020-34P*				0.15	0.19			
XY-HS0030-34P*	±3	40		0.19	0.23			
XY-HS0040-34P*				0.23	0.27			
XY-HS0050-34P*				0.27	0.31			
XY-HS0060-34P*	±5	50		0.31	0.35			
XY-HS0070-34P*				—	0.39			
XY-HS0080-34P*					0.43			

Maximum speed **Unit: mm/s**

Lead \ Stroke	~600mm	700mm	800mm
5mm	250	—	—
10mm	500	500	500

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

(5) H series Type 18: Features

1. Option of increasing stroke to 2500mm*

2. Components can be secured with M6 bolts through T slots on either side of the main body

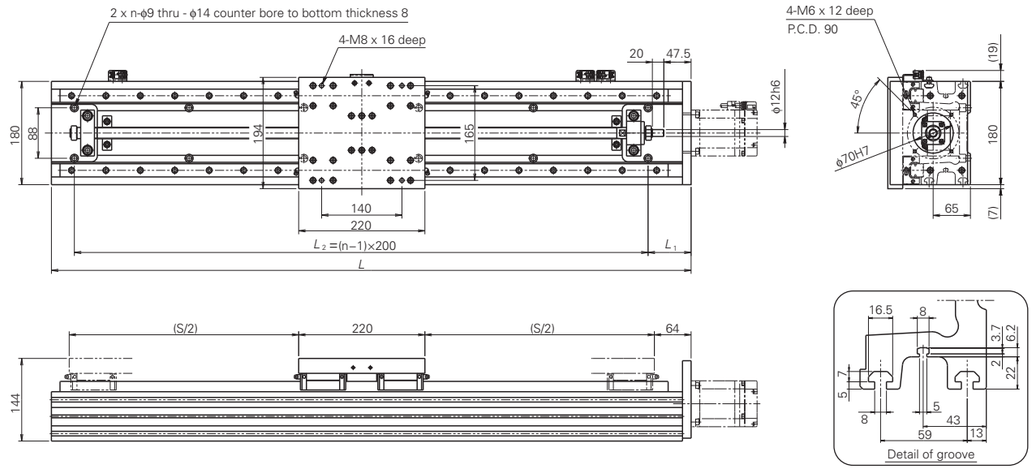
3. Sensor and wiring can be easily fitted.

4. Covers available*

5. Choice of motor

* Adjustment required for options means that dimensions may be different from those shown in the catalog.

H series Type 18



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length				Mass
	S		*L*	L_1	L_2	*n*	(kg)
XY-HS0080-34H*	800	820	1 130	75	1 000	6	39
XY-HS0100-34H*	1 000	1 020	1 330	75	1 200	7	45
XY-HS0120-34H*	1 200	1 220	1 530	75	1 400	8	50
XY-HS0160-34H*	1 600	1 620	1 930	75	1 800	10	60

Specifications

Table reference number	Table specifications (μm)		Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)	Starting torque (N·cm)	Transportable mass (kg)	Maximum speed
	Repeatability	Backlash	Ball screw lead		Horizontal	
XY-HS0080-34H*	±10	1	1.8	60	60	1 000
XY-HS0100-34H*			2.1			750
XY-HS0120-34H*			2.4			550
XY-HS0160-34H*			3.1			350

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

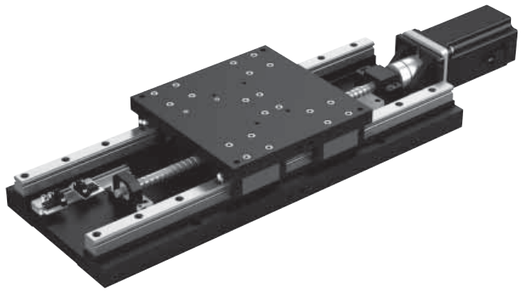
(6) H series Type 22: Features

1. Options for super high-precision positioning available.

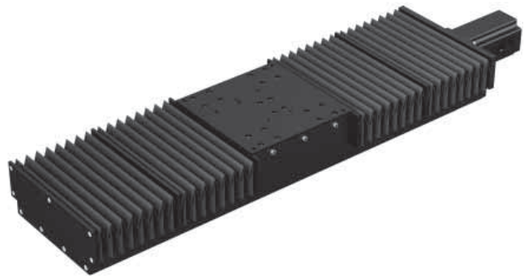
2. Some models come with top and side covers.

3. Some models have bellows for dust prevention

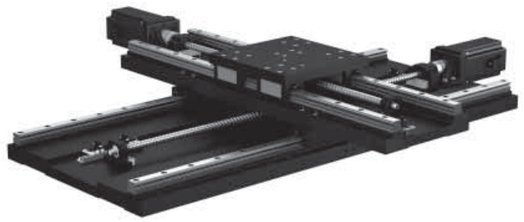
4. Choice of motor



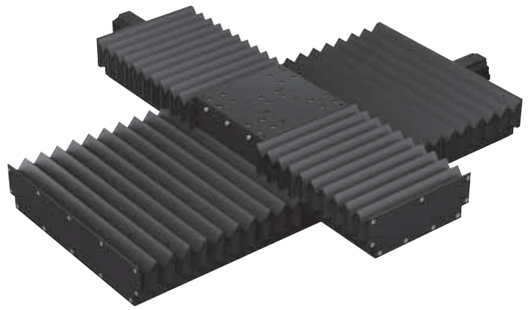
H series Type 22



H series Type 22 with bellows



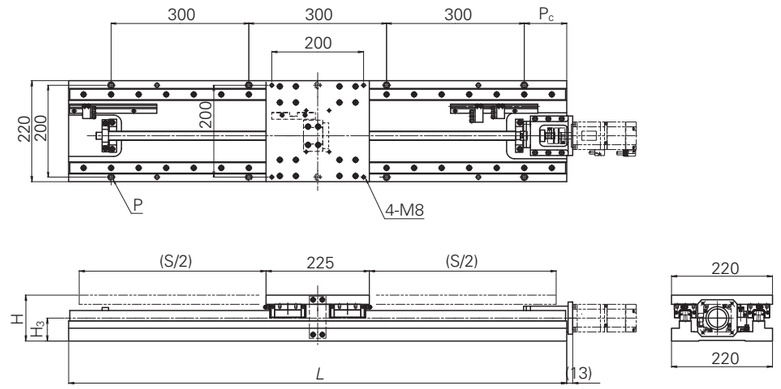
H series Type 22 in two-axis combination



H series Type 22 with bellows in two-axis combination

H series Type 22 with cover

H series Type 22



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length	Height		For mounting holes		Mass
	S		*L*	*H*	*H*3	*P*	*P*c	(kg)
XY-HS0025-34R*	250	270	535	90	45	4-M8	117.5	18
XY-HS0030-34R*	300	320	585	90	45	4-M8	142.5	20
XY-HS0040-34R*	400	420	685	90	45	6-M8	42.5	22
XY-HS0050-34R*	500	520	785	90	45	6-M8	92.5	24
XY-HS0060-34R*	600	620	885	90	45	6-M8	142.5	26
XY-HS0070-34R*	700	720	985	90	45	8-M8	42.5	28
XY-HS0080-34R*	800	820	1 085	100	50	8-M8	92.5	36
XY-HS0090-34R*	900	920	1 185	100	50	8-M8	142.5	39
XY-HS00100-34R*	1 000	1 020	1 285	100	50	10-M8	42.5	42

Specifications

Table reference number	Table specifications (μm)				Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)			Starting torque (N·cm)			Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	5mm	10mm	20mm	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Horizontal
XY-HS0025-34R*	±1	20	1	15	0.128	0.293	0.628	20	30	36	60
XY-HS0030-34R*					0.140	0.313	0.641				
XY-HS0040-34R*	±2	30		20	0.164	0.353	0.668				
XY-HS0050-34R*					0.189	0.390	0.695				
XY-HS0060-34R*					0.213	0.428	0.721				
XY-HS0070-34R*	±3	40		30	—	0.468	0.748				
XY-HS0080-34R*						1.363	1.393				
XY-HS0090-34R*						1.458	1.483				
XY-HS00100-34R*						1.608	1.573				

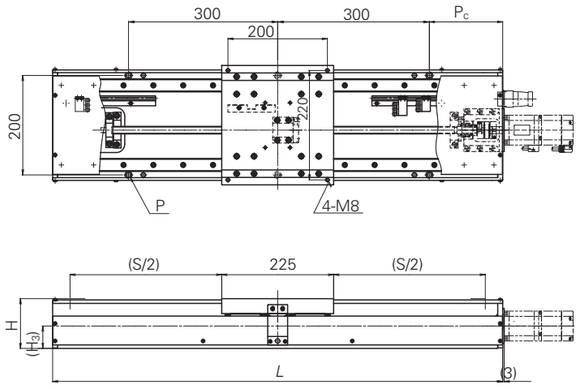
Maximum speed **Unit: mm/s**

Lead \ Stroke	~600mm	700mm	800mm	900mm	1 000mm
5mm	250	—	—	—	—
10mm	500	500	*500	*400	*350
20mm	1 000	1 000	*1 000	*800	*700

*Shaft diameter of ball screw is ϕ15 to ϕ20 mm for nominal stroke of 800 mm or more.

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

H series Type 22 with cover



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length	Height		For mounting holes		Mass
	S		*L*	*H*	*H*3	*P*	*P*C	(kg)
XY-HS0025-74R*	250	270	555	100	45	4-M8	127.5	20
XY-HS0030-74R*	300	320	605	100	45	4-M8	152.5	22
XY-HS0040-74R*	400	420	705	100	45	6-M8	52.5	24
XY-HS0050-74R*	500	520	805	100	45	6-M8	102.5	26
XY-HS0060-74R*	600	620	905	100	45	6-M8	152.5	28
XY-HS0070-74R*	700	720	1 005	100	45	8-M8	52.5	30
XY-HS0080-74R*	800	820	1 105	110	50	8-M8	102.5	39
XY-HS0090-74R*	900	920	1 205	110	50	8-M8	152.5	41
XY-HS00100-7R2*	1 000	1 020	1 305	110	50	10-M8	52.5	44

Specifications

Table reference number	Table specifications (μm)				Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)			Starting torque (N·cm)			Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	5mm	10mm	20mm	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Horizontal
XY-HS0025-74R*	±1	20	1	15	0.140	0.281	0.708	20	30	36	60
XY-HS0030-74R*					0.152	0.299	0.721				
XY-HS0040-74R*	±2			20	0.177	0.334	0.748				
XY-HS0050-74R*		30			0.201	0.375	0.775				
XY-HS0060-74R*					0.226	0.406	0.801				
XY-HS0070-74R*	±3			30	—	0.442	0.828				
XY-HS0080-74R*		40				1.253	1.473				
XY-HS0090-74R*						1.356	1.563				
XY-HS00100-7R2*						1.469	1.653				

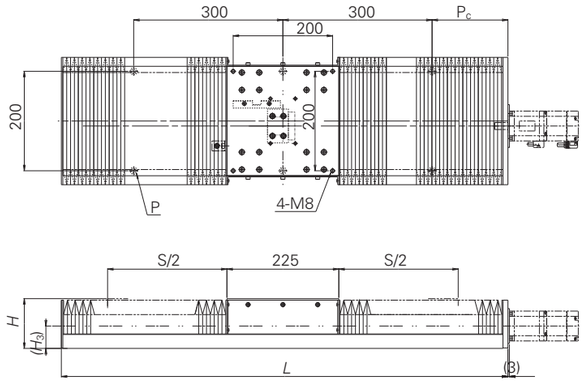
Maximum speed **Unit: mm/s**

Lead \ Stroke	~600mm	700mm	800mm	900mm	1 000mm
5mm	250	—	—	—	—
10mm	500	500	*500	*400	*350
20mm	1 000	1 000	*1 000	*800	*700

*Shaft diameter of ball screw is ϕ15 to ϕ20 mm for a nominal stroke of 800 mm or more.

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

H series Type 22 with bellows



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length	Height		For mounting holes		Mass
	S		*L*	*H*	*H*3	*P*	*P*C	(kg)
XY-HS0020-64R*	200	210	548	100	45	4-M8	127.5	21
XY-HS0024-64R*	240	260	598	100	45	4-M8	152.5	24
XY-HS0032-64R*	320	340	698	100	45	6-M8	52.5	26
XY-HS0041-64R*	410	430	798	100	45	6-M8	102.5	28
XY-HS0048-64R*	480	500	898	100	45	6-M8	152.5	30
XY-HS0056-64R*	560	580	998	100	45	8-M8	52.5	32
XY-HS0062-64R*	620	640	1 098	110	50	8-M8	102.5	40
XY-HS0068-64R*	680	700	1 198	110	50	8-M8	152.5	43
XY-HS0076-64R*	760	780	1 298	110	50	10-M8	52.5	46

Specifications

Table reference number	Table specifications (μm)				Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)			Starting torque (N·cm)			Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	5mm	10mm	20mm	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Horizontal
XY-HS0020-64R*	±1	20	1	15	0.160	0.350	0.843	20	30	36	60
XY-HS0024-64R*					0.189	0.380	0.856				
XY-HS0032-64R*	±2			20	0.260	0.420	0.883				
XY-HS0041-64R*		30			0.299	0.458	0.910				
XY-HS0048-64R*					0.338	0.505	0.936				
XY-HS0056-64R*	±3	40		30	—	0.545	0.963				
XY-HS0062-64R*						1.440	1.608				
XY-HS0068-64R*						1.573	1.698				
XY-HS0076-64R*		50				1.695	1.788				

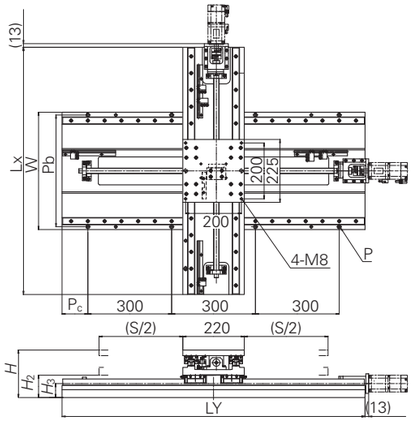
Maximum speed **Unit: mm/s**

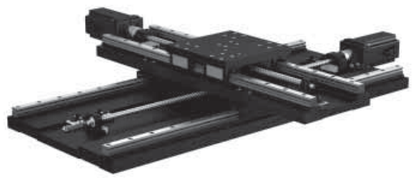
Lead \ Stroke	~600mm	700mm	800mm	900mm	1 000mm
5mm	250	—	—	—	—
10mm	500	500	*500	*400	*350
20mm	1 000	1 000	*1 000	*800	*700

*Shaft diameter of ball screw is ϕ15 to ϕ20 mm for nominal stroke of 800 mm or more.

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

H series Type 22 in two-axis combination





Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length		Width	Height			For mounting holes		Mass (kg)
	S (Upper axis x lower axis)		*LX*	*LY*	*W*	*H*	H_2	H_3	*P*	P_C	
XY-HD2525-34R*	250 × 250	270 × 270	535	535	220	160	70	45	4-M8	117.5	34
XY-HD3030-34R*	300 × 300	320 × 320	585	585	220	160	70	45	4-M8	142.5	36
XY-HD4040-34R*	400 × 400	420 × 420	685	685	420	160	70	45	6-M8	42.5	52
XY-HD5050-34R*	500 × 500	520 × 520	785	785	420	160	70	45	6-M8	92.5	58
XY-HD5060-34R*	500 × 600	520 × 620	785	885	420	160	70	45	6-M8	142.5	62
XY-HD5070-34R*	500 × 700	520 × 620	785	985	420	160	70	45	8-M8	42.5	66
XY-HD5080-34R*	500 × 800	520 × 820	785	1 085	420	170	80	50	8-M8	92.5	90
XY-HD5090-34R*	500 × 900	520 × 920	785	1 185	420	170	80	50	8-M8	142.5	96
XY-HD50100-34R*	500 × 1 000	520 × 1 020	785	1 285	420	170	80	50	10-M8	42.5	101

Specifications

Table reference number	Table specifications (μm)					Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)						Starting torque (N·cm)			Transportable mass (kg)
						5mm		10mm		20mm					
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	Squareness of motion	Upper axis	Lower axis	Upper axis	Lower axis	Upper axis	Lower axis	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Horizontal
XY-HD2525-34R*	±1	20	1	20	20	0.128	0.225	0.293	0.680	0.628	2.173	21	32	42	30
XY-HD3030-34R*		30				0.140	0.250	0.313	0.763	0.641	2.388				
XY-HD4040-34R*	±2			30	30	0.164	0.286	0.353	0.840	0.668	2.618				
XY-HD5050-34R*		40				0.189	0.321	0.390	0.940	0.695	2.848				
XY-HD5060-34R*				40	40	0.189	0.335	0.390	0.980	0.695	2.874				
XY-HD5070-34R*	±3	50				—	—	0.390	1.080	0.695	2.901				
XY-HD5080-34R*				50	50			0.390	1.920	0.695	3.546				
XY-HD5090-34R*	±4	60						0.390	2.043	0.695	3.636				
XY-HD50100-34R*								0.390	2.165	0.695	3.726				

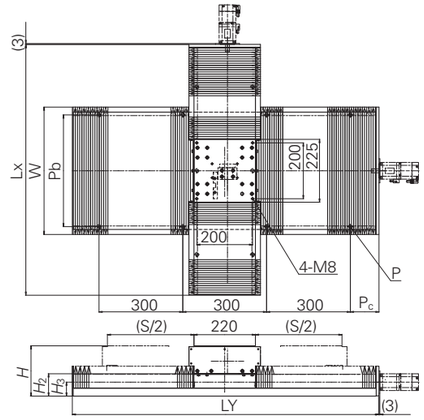
Maximum speed **Unit: mm/s**

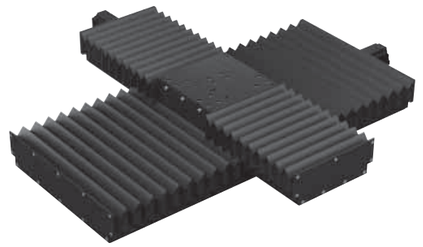
Lead \ Stroke	~600mm	700mm	800mm	900mm	1 000mm
5mm	250	—	—	—	—
10mm	500	500	*500	*400	*350
20mm	1 000	1 000	*1 000	*800	*700

*Shaft diameter of ball screw is ϕ15 to ϕ20 mm for a nominal stroke of 800 mm or more.

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

H series Type 22 with bellows in two-axis combination





Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length		Width	Height			For mounting holes			Mass (kg)
	S (Upper axis x lower axis)		*LX*	*LY*	*W*	*H*	H_2	H_3	*P*	P_b	P_C	
XY-HD2020-64R*	200 × 200	210 × 210	548	548	256	170	70	45	4-M8	200	127.5	38
XY-HD2424-64R*	240 × 240	260 × 260	598	598	256	170	70	45	4-M8	200	152.5	44
XY-HD3232-64R*	320 × 320	340 × 340	698	698	256	170	70	45	6-M8	200	52.5	48
XY-HD4141-64R*	410 × 410	430 × 430	798	798	456	170	70	45	6-M8	400	102.5	66
XY-HD4848-64R*	480 × 480	500 × 500	898	898	456	170	70	45	6-M8	400	152.5	75
XY-HD4856-64R*	480 × 560	500 × 560	898	998	456	170	70	45	8-M8	400	52.5	79
XY-HD4862-64R*	480 × 620	500 × 640	898	1 098	456	180	80	50	8-M8	400	102.5	104
XY-HD4868-64R*	480 × 680	500 × 700	898	1 198	456	180	80	50	8-M8	400	152.5	108
XY-HD4876-64R*	480 × 760	500 × 780	898	1 298	456	180	80	50	10-M8	400	52.5	112

Specifications

Table reference number	Table specifications (μm)					Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)						Starting torque (N·cm)			Transportable mass (kg)
						5mm		10mm		20mm					
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	Squareness of motion	Upper axis	Lower axis	Upper axis	Lower axis	Upper axis	Lower axis	Ball screw lead 5mm	Ball screw lead 10mm	Ball screw lead 20mm	Horizontal
XY-HD2020-64R*	±1	20	1	20	20	0.160	0.268	0.350	0.758	0.843	2.530	22	32	43	30
XY-HD2424-64R*		30				0.189	0.316	0.380	0.855	0.856	2.847				
XY-HD3232-64R*	±2			30	30	0.260	0.399	0.420	0.943	.0.883	3.077				
XY-HD4141-64R*		40				0.299	0.451	0.458	1.033	0.910	3.307				
XY-HD4848-64R*				40	40	0.338	0.503	0.505	1.123	0.936	3.535				
XY-HD4856-64R*	±3	50				—	—	0.505	1.160	0.936	3.562				
XY-HD4862-64R*				50	50			0.505	2.045	0.936	4.207				
XY-HD4868-64R*	±4	60						0.505	2.170	0.936	4.297				
XY-HD4876-64R*								0.505	2.293	0.936	4.387				

Maximum speed **Unit: mm/s**

Lead \ Stroke	~600mm	700mm	800mm	900mm	1 000mm
5mm	250	—	—	—	—
10mm	500	500	*500	*400	*350
20mm	1 000	1 000	*1 000	*800	*700

*Shaft diameter of ball screw is 15 to 20 mm for a nominal stroke of 620 mm or more.

1. The values of table inertia and starting torque do not include the coupling
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

(7) H series Type30 Features

1. Option for up to 3000 mm stroke available.

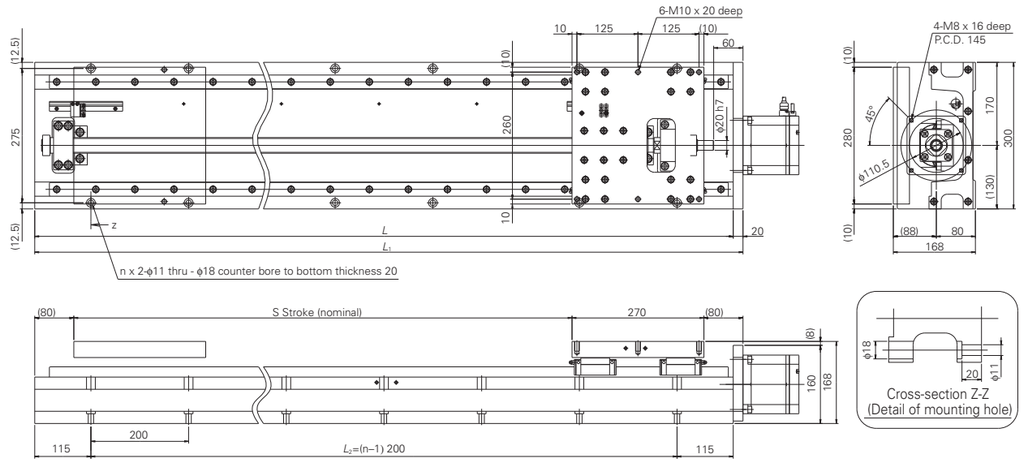
2. The highest rigidity in H Series*1

3. Maximum transportable mass is 150 kg*2

4. Choice of motor

*1 Pitching, yawing
*2 Depending on operating conditions, a reducer may be needed.

H series Type 30



Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length			No. of mounting holes	Mass (kg)
	S		*L*	*L*1	*L*2	*n*	
XY-HS00100-34M*	1 000	1 020	1 430	1 450	1 200	7	85
XY-HS00120-34M*	1 200	1 220	1 630	1 650	1 400	8	95
XY-HS00160-34M*	1 600	1 620	2 030	2 050	1 800	10	115
XY-HS00200-34M*	2 000	2 020	2 430	2 450	2 200	12	135

Note)
① This type with cover is available. (In this case, contact NSK for external dimensions.)
② Consult with NSK about 1000-mm stroke or less and 2000-mm stroke or more.

Specifications

Table reference number	Table specifications (μm)		Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)	Starting torque (N·cm)	Transportable mass (kg)	Maximum speed
	Repeatability	Backlash	Ball screw lead		Horizontal	
XY-HS00100-34M*	±10	5	4.8	113	150	1000
XY-HS00120-34M*			5.3		150	750
XY-HS00160-34M*			6.3		140	450
XY-HS00200-34M*			7.3		120	300

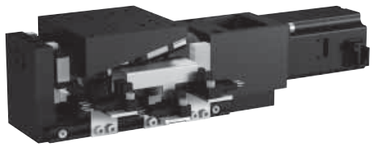
1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

XY-6 HW series Features

1. High precision achieved through wedge mechanism

2. Space-saving Z-axis table with low cross-section height

3. The Series lineup includes reduction ratios of 1/2, 1/4, and 1/10.



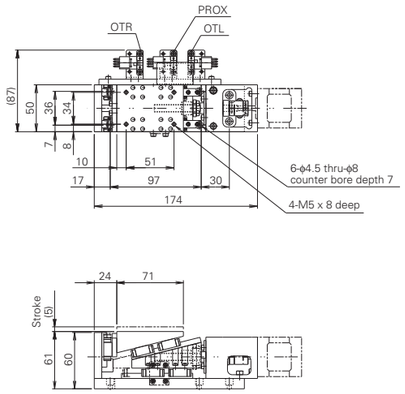
Type A Reduction ratio 1/4

Type D Reduction ratio 1/10

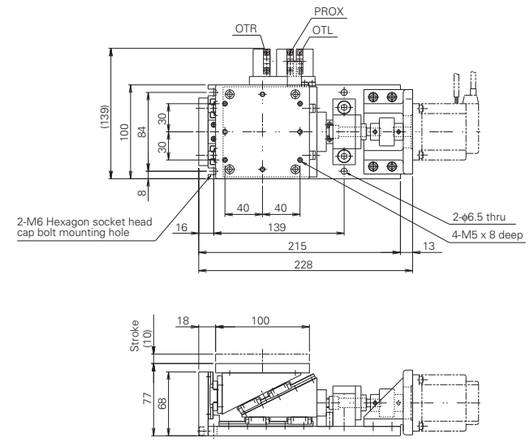
Specifications

Table reference number	Table specifications				Transportable mass (kg)	Mass (kg)
	Stroke	Wedge reduction ratio	Repeatability	Positioning accuracy		
XY-HW0001-34A*	5	1/4	±2	10	10	1.5
XY-HW0001-34B*	10	1/2	±3			5.5
XY-HW0001-34D*	5	1/10	±2	15	30	15
XY-HW0003-34T*	30	1/2	±3	20	20	25

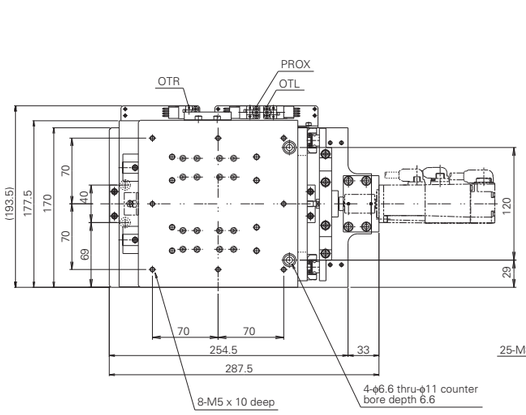
1. Specifications have no load and may vary depending on load mass.
2. Specified motor, driver, sensor, etc. can be selected and mounted.
3. Please contact NSK for special specifications.



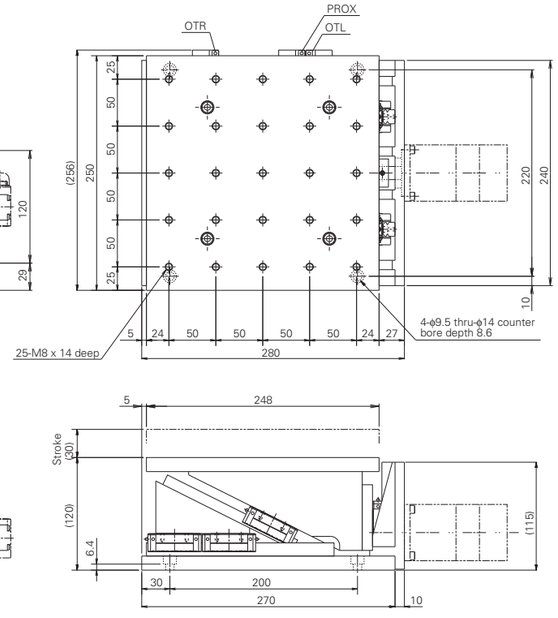
XY-HW0001-34A * (Reduction ratio 1/4)



XY-HW0001-34B * (Reduction ratio 1/2)



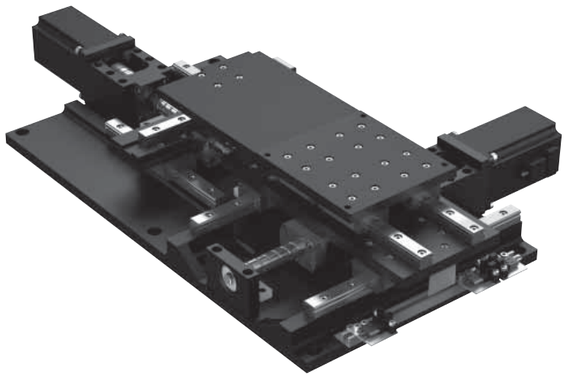
XY-HW0001-34D * (Reduction ratio 1/10)



XY-HW0003-34T * (Reduction ratio 1/2)

XY-7 HT series: Features

1. Less wiring required due to the two-axis table design with a fixed motor structure.
2. Compared to two-stage XY tables with upper and lower axes, cross-section height is low, enabling a space-saving design.
3. Excellent controllability due to equal inertia of upper and lower axes



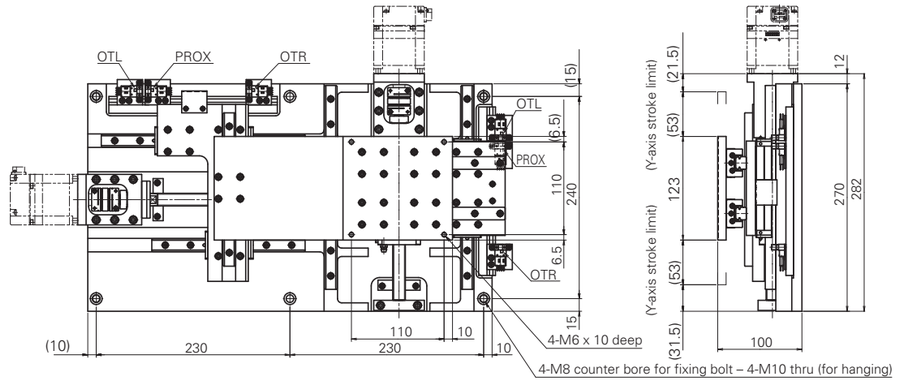
XY-HT1010-34*-***

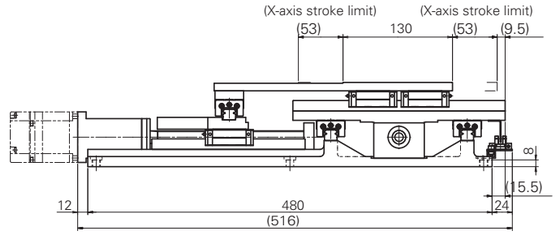
Specifications

Table reference number	Table specifications (μm)			Ball screw lead and inertial of movable parts $\times 10^{-4}$(kg·m^2)		Starting torque (N·cm)		Transportation mass (kg)
	Repeatability	Positioning accuracy	Backlash	Ball screw lead				
				X-axis	Y-axis	X-axis	Y-axis	Horizontal
XY-HT1010-34*-*	±2	20	1	0.23	0.24	27	24	56
XY-HT2525-34*-*				0.35	0.36	27	24	

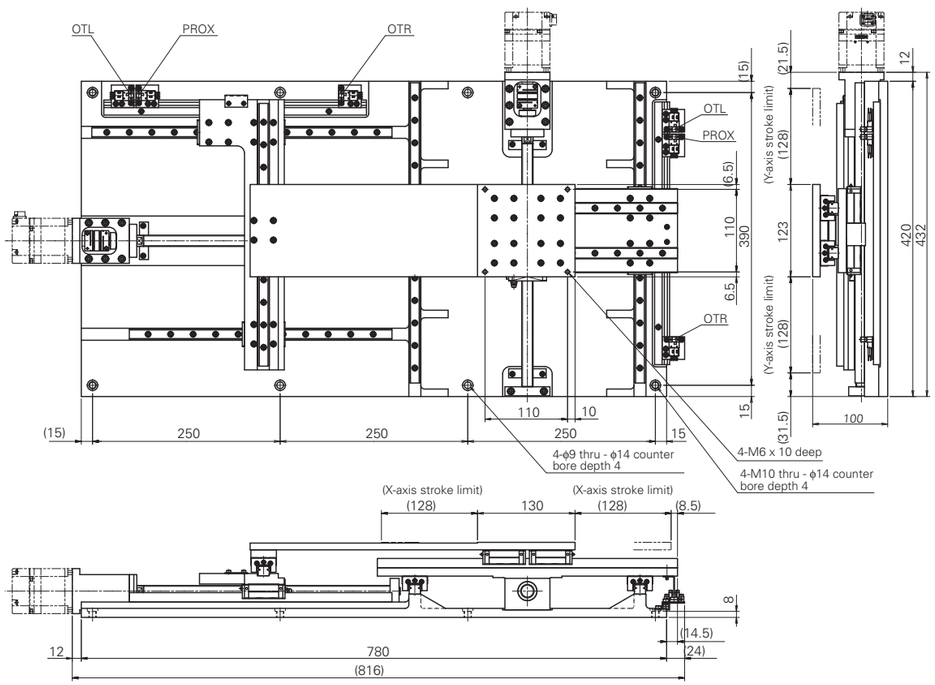
1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

HT series





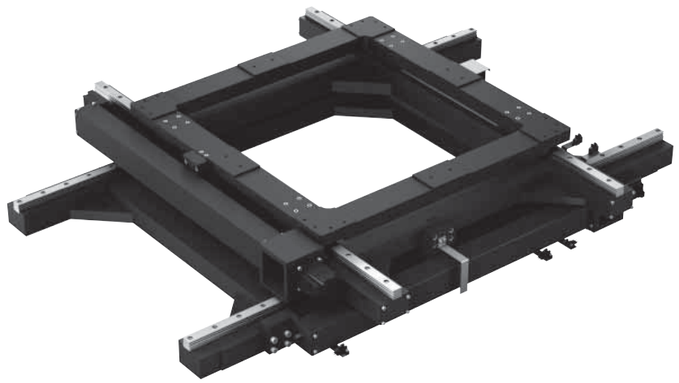
XY-HT1010-34*(Stroke 100 mm x 100 mm type)



XY-HT2525-34*(Stroke 250 mm x 250 mm type)

XY-8 HD Open-Frame Series: Features

1. An open-frame design by placing ball screws on the exterior.
2. Work piece can be measured and processed on top and bottom faces.
3. A light weight design that uses an aluminum casting frame



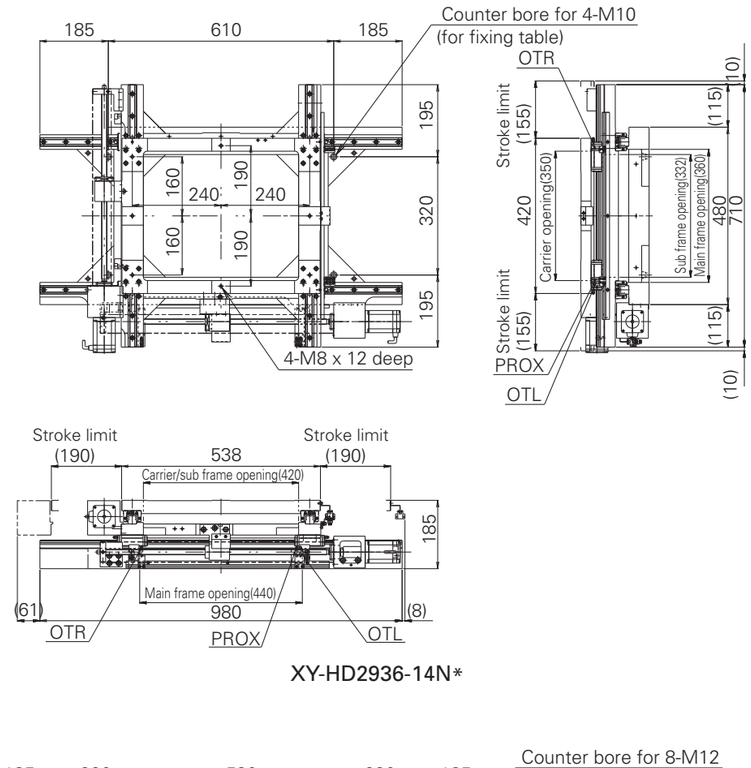
XY-HD5560-14G*

Specifications

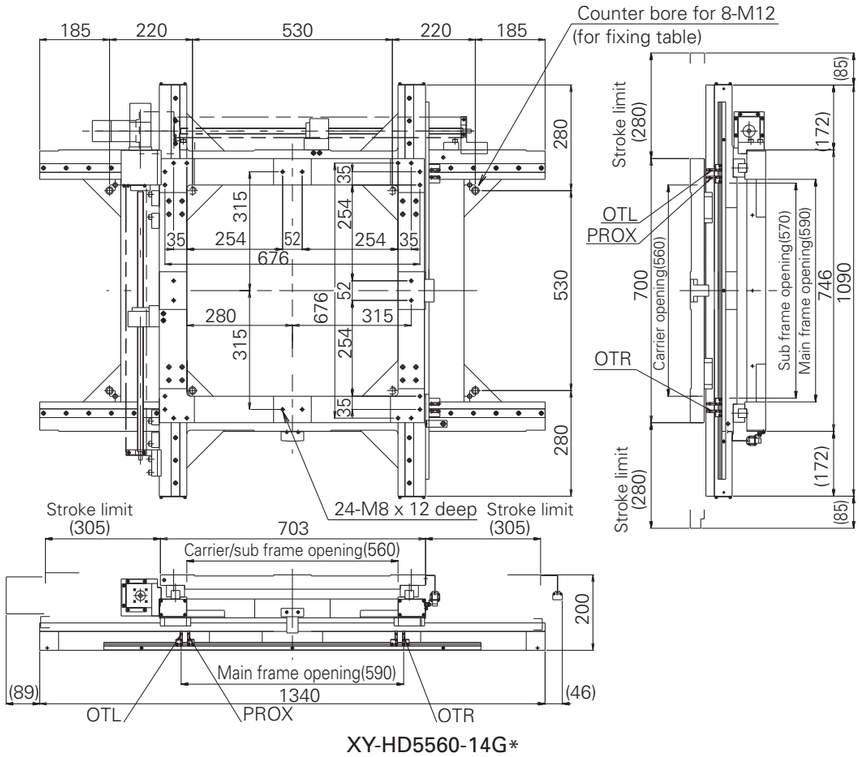
Table reference number	Table specifications (μm)					Mass (kg)	Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	Squareness of motion		Horizontal
XY-HD2936-14N*	±2	30	1	30	20	60	100
XY-HD5560-14G*	±3				30	105	

1. Specifications have no load and may vary depending on load mass.
2. Specified motor, driver, sensor, etc. can be selected and mounted.
3. Please contact NSK for special specifications.

Open-Frame Series



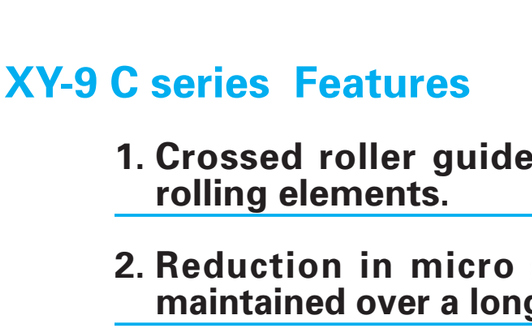
XY-HD2936-14N*



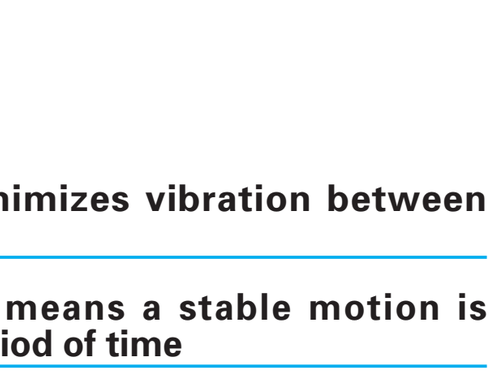
XY-HD5560-14G*

XY-9 C series Features

1. Crossed roller guide minimizes vibration between rolling elements.
2. Reduction in micro slip means a stable motion is maintained over a long period of time
3. A smooth motion achieved by incorporating a roller with a retainer
4. High rigidity because of the long contact surface between roller and rolling surface
5. A long product life achieved by using durable materials



CS series



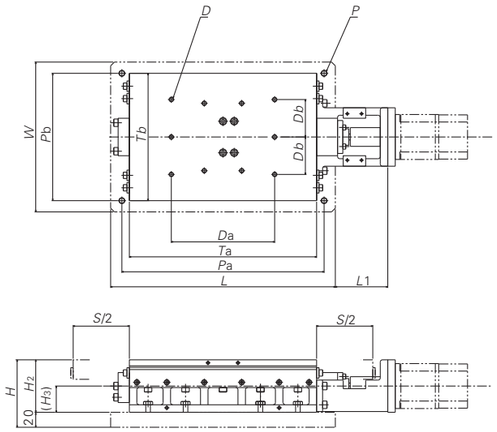
CD series

CT series

CS series

(1) CS series Features

1. High rigidity due to box structure made of cast iron
2. A slim shape achieved by use of a crossed roller guide



Dimensions

Unit: mm

Table reference number	Stroke (nominal)	Stroke (limit)	Length		Width	Height			For mounting hole			Table/thread hole					Mass (kg)
	S		*L*	L_1	W	*H*	H_2	H_3	*P*	*Pa*	*Pb*	*Ta*	*Tb*	*D*	*Da*	*Db*	
XY-CS0005-14*	50	57	170	77.5	160	83	63	30	4-M8	150	140	125	125	4-M6	103	52.5	11
XY-CS0010-14*	100	114	250	70	200	90	70	35	4-M8	220	170	200	170	8-M6	138	50	23
XY-CS0015-14*	150	159	300	70	200	90	70	35	4-M8	270	170	250	170	6-M6	138	50	26
XY-CS0020-14*	200	216	400	95	250	90	70	35	4-M8	370	220	350	220	10-M6	188	50	45
XY-CS0025-14*	250	259	450	125.0	250	90	70	35	4-M8	420	220	400	220	8-M6	188	50	50

Remarks
1. Stroke (limit) may vary depending on ball screw lead.

Specifications

Table reference number	Table specifications (μm)				Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)			Starting torque (N·cm)			Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	2mm	5mm	10mm	Ball screw lead 2mm	Ball screw lead 5mm	Ball screw lead 10mm	Horizontal
XY-CS0005-14*	±1	5	1	5	0.019	0.043	—	10			20
XY-CS0010-14*				10	0.042	0.108	0.230				22
XY-CS0015-14*		10		12	0.050	0.135	0.288				25
XY-CS0020-14*				15	0.073	0.208	0.418				37
XY-CS0025-14*				20	0.081	0.240	0.545				42

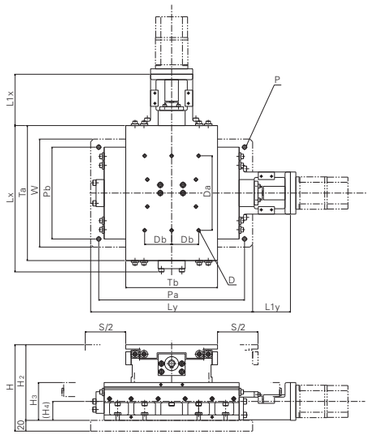
1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

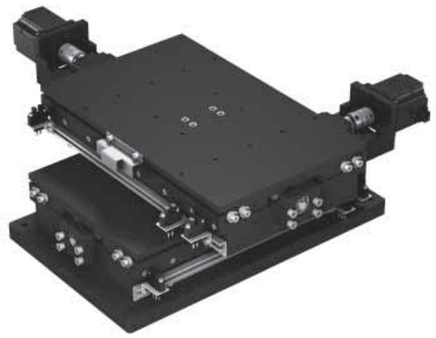
(2) CD Series Features

1. High rigidity due to box structure made of cast iron

2. A slim shape achieved by use of a crossed roller guide

3. Good positioning accuracy despite two-axis combination





Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Stroke (limit)	Length				Width	Height				For mounting hole			Table/thread hole					Mass (kg)
	S (upper axis x lower axis)		L_x	L_{1x}	L_y	L_{1y}	W	*H*	H_2	H_3	H_4	*P*	*Pa*	*Pb*	*Ta*	*Tb*	*D*	*Da*	*Db*	
XY-CD0505-14*	50×50	57×57	156	88	170	75.5	160	146	126	63	30	4-M8	150	140	125	125	4-M6	103	52.5	18
XY-CD1010-14*	100×100	114×114	221	95	250	70	200	160	140	70	35	4-M8	220	170	200	170	8-M6	138	52.5	38
XY-CD1515-14*	150×150	159×159	271	95	300	70	200	160	140	70	35	4-M8	270	170	250	170	6-M6	138	50	43
XY-CD2020-14*	200×200	216×216	371	120	400	95	250	160	140	70	35	4-M8	370	220	350	220	10-M6	188	50	74
XY-CD2525-14*	250×250	259×259	421	150	450	125	250	160	140	70	35	4-M8	420	220	400	220	8-M6	188	50	82

Remarks
1. Stroke (limit) may vary depending on ball screw lead.

Specifications

Table reference number	Table specifications (μm)					Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)						Starting torque (n·cm)			Transportable mass (kg)
						2mm		5mm		10mm					
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	Squareness of motion	Upper axis	Lower axis	Upper axis	Lower axis	Upper axis	Lower axis	Ball screw lead 2mm	Ball screw lead 5mm	Ball screw lead 10mm	Horizontal
XY-CD0505-14*	±1	5	1	8	5	0.019	0.026	0.043	0.080	—	—	15			15
XY-CD1010-14*		10		12	15	0.042	0.057	0.108	0.195	0.230	0.588				16
XY-CD1515-14*				20	20	0.050	0.067	0.135	0.240	0.288	0.700				
XY-CD2020-14*		15			25	0.073	0.102	0.208	0.385	0.418	0.993				23
XY-CD2525-14*		20		25		0.081	0.113	0.240	0.438	0.545	1.335				26

1. The values of table inertia and starting torque are those not including the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

(3) CT series Features

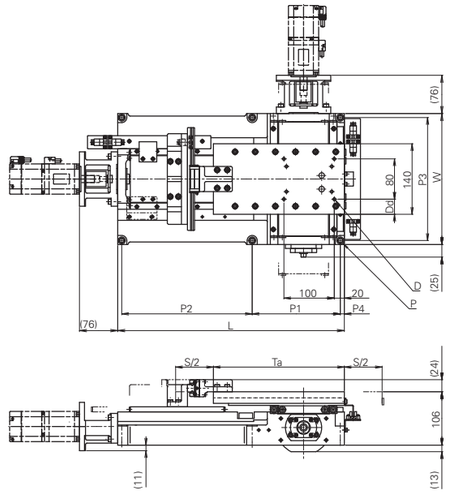
1. High rigidity due to box structure made of cast iron

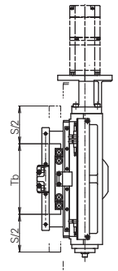
2. A slim shape achieved by the use of a crossed roller guide

3. Less wiring required due to the two-axis table design with a fixed motor structure

4. Low table height enables a space saving design

5. Excellent controllability due to equal inertia of upper and lower axes





Dimensions **Unit: mm**

Table reference number	Stroke (nominal)	Length	Width	For mounting hole				Table/tap hole		Mass (kg)
	S (upper axis x lower axis)	*L*	*W*	P_1	P_2	P_3	P_4	*Ta*	*Db*	
XY-CT0505-4**	50 × 50	365	170	165	180	150	10	195	30	25
XY-CT1010-4**	100 × 100	415	220	173	222	200	10	225	30	31
XY-CT1414-4**	140 × 140	450	260	175	259	244	8	260	60	38

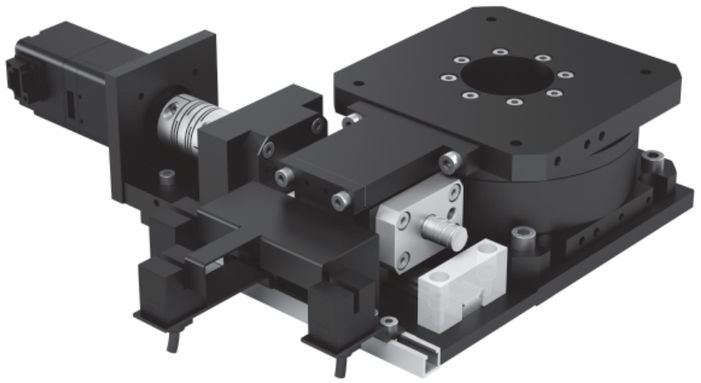
Specifications

Table reference number	Table specifications (μm)					Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)				Starting torque (N·cm)		Transportable mass (kg)
						5mm		10mm				
	Repeatability	Repeatability Positioning accuracy	Backlash	Parallelism A of motion	Squareness of motion	Upper axis	Lower axis	Upper axis	Lower axis	Ball screw lead 5mm	Ball screw lead	Horizontal
XY-CT0505-4**	±1	5	1	15	5	0.112	0.117	0.225	0.246	18	18	15
XY-CT1010-4**		10			8	0.132	0.145	0.274	0.327			20
XY-CT1414-4**					12	0.149	0.174	0.322	0.382			30

1. The values of table inertia and starting torque do not include the coupling and load mass.
2. Refer to the above starting torque for selection of motors.
3. Specifications have no load and may vary depending on load mass.
4. Specified motor, driver, sensor, etc. can be selected and mounted.
5. Please contact NSK for special specifications.

XY-10 SS series Features

1. High rigidity micro positioning θ-axis table using a crossed roller bearing
2. Loss of motion is small thanks to a unique structure where linear motion of ball screws is converted to rotational motion.
3. Open-frame options available



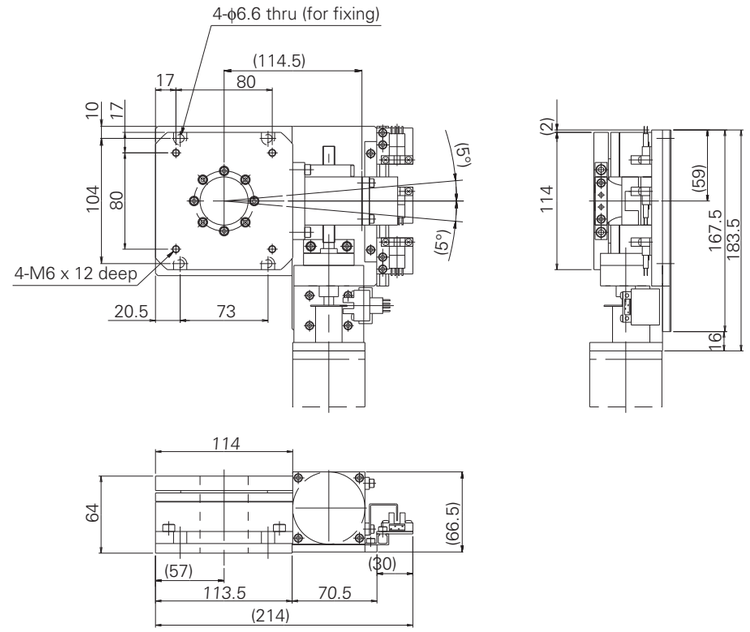
XY-SS0001-14S*

Specifications

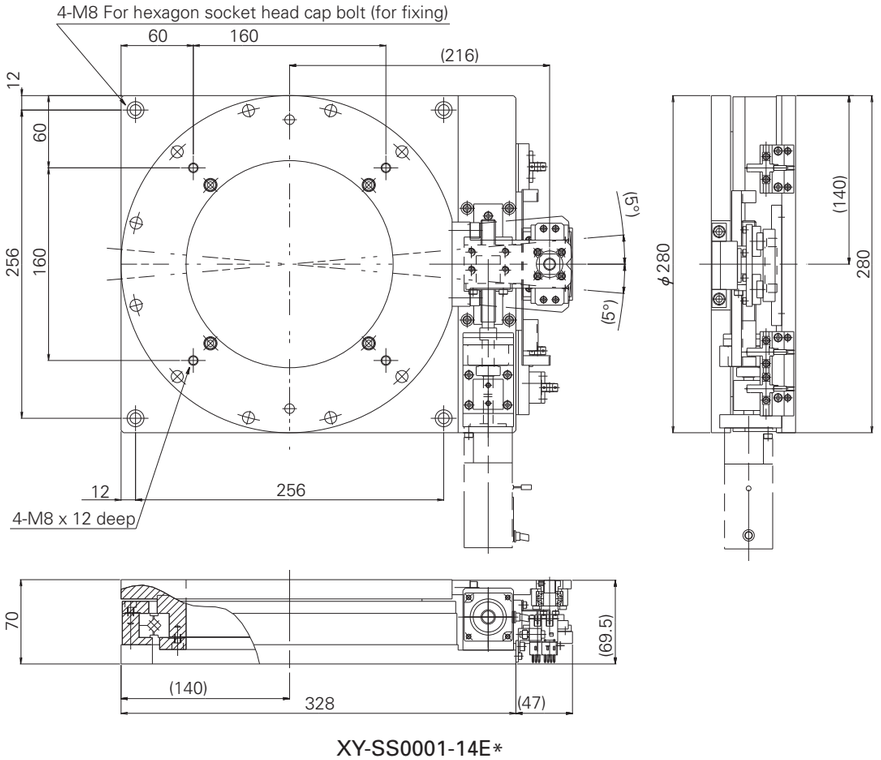
Table reference number	Table specifications				Mass (kg)	Mass Transportable mass (kg)
	Stroke (°)	Repeatability (μm)	Resolution (°)	Ball screw lead (mm)		Horizontal
XY-SS0001-14S*	10	±2	30	2	5.5	30
XY-SS0001-14E*	10				25.5	60

1. Specifications have no load and may vary depending on load mass.
2. Specified motor, driver, sensor, etc. can be selected and mounted.
3. Please contact NSK for special specifications.

SS series (Micro θ-axis)



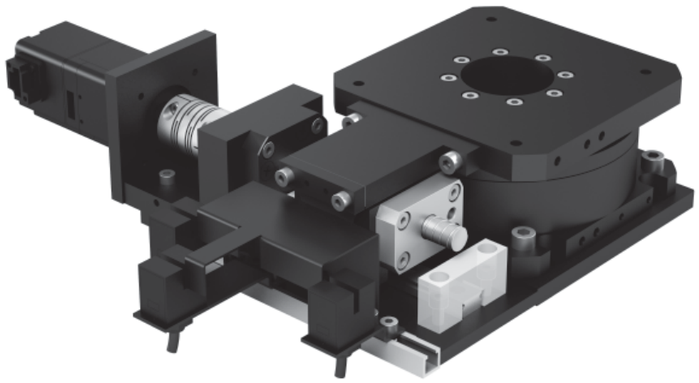
XY-SS0001-14S*



XY-SS0001-14E*

XY-11 MC Series: Features

1. A slim alignment unit that allows X, Y and θ motions in a single table.
2. Precision bearings provide high accuracy and high rigidity alignment
3. Open-frame options available



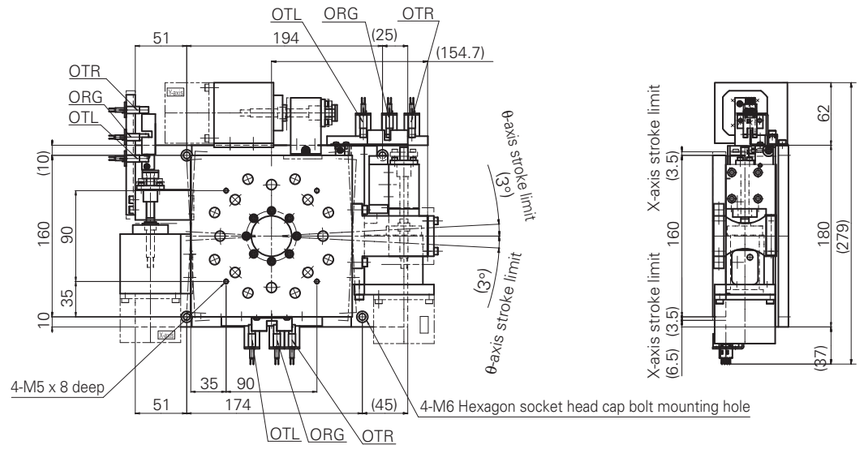
XY-SS0001-14S*

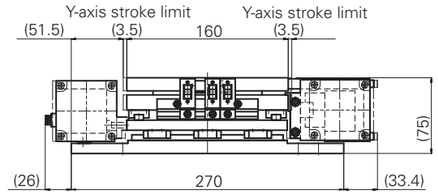
Specifications

Table reference number	Stroke			Table specifications						Mass (kg)	Transportable mass (kg)
				Repeatability			Ball screw lead (mm)				
	X-axis (mm)	Y-axis (mm)	θ-axis (°)	X-axis (μm)	Y-axis (μm)	θ-axis (°)	X-axis	Y-axis	θ-axis		Horizontal
XY-MC0101-14J*	4	4	6	±1	±1	±2	1	1	1	30	30
XY-MC0101-14K*										41	60

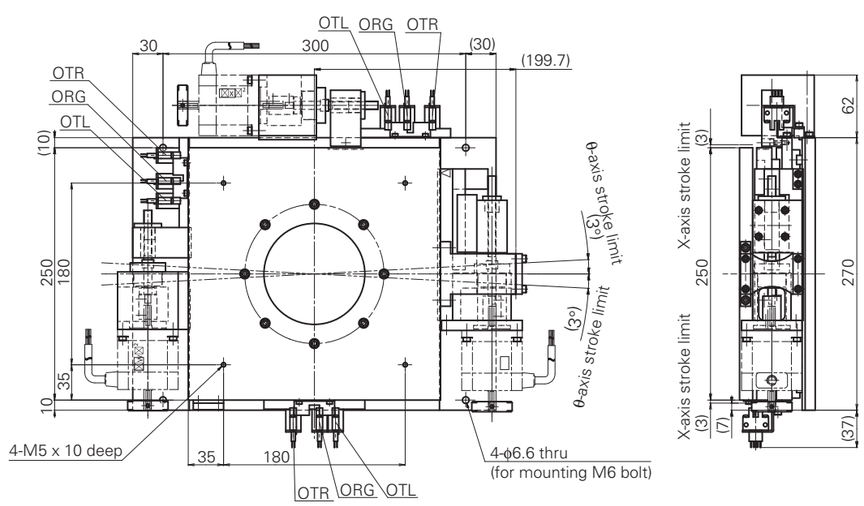
1. Specifications have no load and may vary depending on load mass.
2. Specified motor, driver, sensor, etc. can be selected and mounted.
3. Please contact NSK for special specifications.

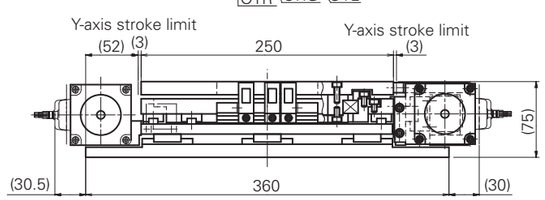
MC series





XY-MC0101-14J*

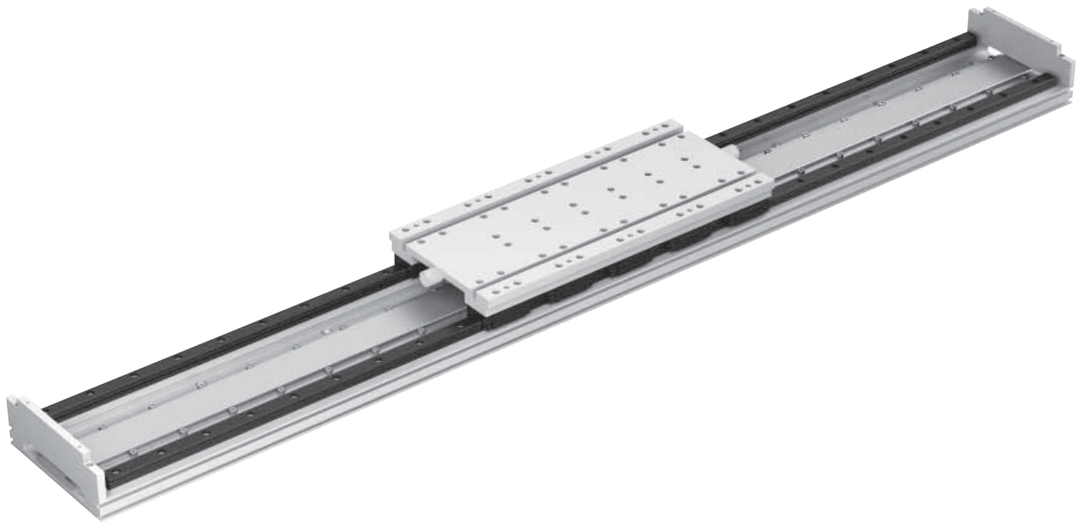




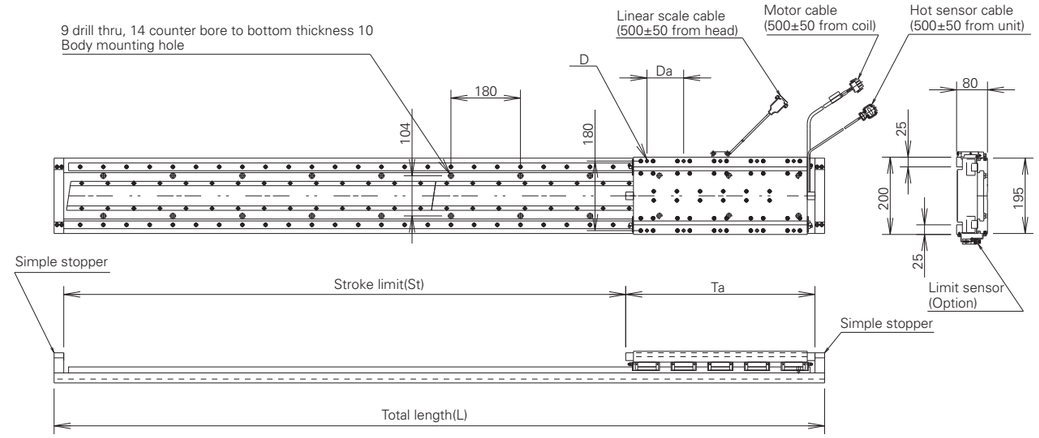
XY-MC0101-14K*

XY-12 L Series: Features

1. Maximum speed of 2000 mm/s possible through use of linear motor
2. High resolution achieved with a high precision optical linear scale
3. Long strokes available, exceeding those driven by ball screws.
4. Multiple sliders placed on a single axis can be driven independently



L series



L series: Dimensions

Type S **Unit: mm**

Table reference number	Total base length L	Stroke (limit) St	Stroke (nominal)	Total mass (kg)	Table/thread hole Ta	Table/thread hole Da	Table/thread hole D	Movable part mass
XY-HS0030-84YS-***	585	315	300	16	220	110	4-M8 depth 16	6
XY-HS0048-84YS-***	765	495	480	19				
XY-HS0072-84YS-***	1 005	735	720	23				
XY-HS0096-84YS-***	1 245	975	960	27				
XY-HS00114-84YS-***	1 425	1 155	1 140	30				
XY-HS00138-84YS-***	1 665	1 395	1 380	34				
XY-HS00156-84YS-***	1 845	1 575	1 560	37				
XY-HS00180-84YS-***	2 085	1 815	1 800	40				
XY-HS00204-84YS-***	2 325	2 055	2 040	45				
XY-HS00222-84YS-***	2 505	2 235	2 220	47				
XY-HS00246-84YS-***	2 745	2 475	2 460	51				
XY-HS00264-84YS-***	2 925	2 655	2 640	54				
XY-HS00288-84YS-***	3 165	2 895	2 880	58				
XY-HS00312-84YS-***	3 405	3 135	3 120	62				
XY-HS00330-84YS-***	3 585	3 315	3 300	65				
XY-HS00354-84YS-***	3 825	3 555	3 540	69				

Type M **Unit: mm**

Table reference number	Total base length L	Stroke (limit) St	Stroke (nominal)	Total mass (kg)	Table/thread hole Ta	Table/thread hole Da	Table/thread hole D	Movable part mass
XY-HS0030-84YM-***	705	315	300	23	340	115	6-M8 depth 16	9
XY-HS0048-84YM-***	885	495	480	26				
XY-HS0078-84YM-***	1 185	795	780	32				
XY-HS00102-84YM-***	1 425	1 035	1 020	36				
XY-HS00132-84YM-***	1 725	1 335	1 320	42				
XY-HS00156-84YM-***	1 965	1 575	1 560	47				
XY-HS00186-84YM-***	2 265	1 875	1 860	53				
XY-HS00210-84YM-***	2 505	2 115	2 100	57				
XY-HS00240-84YM-***	2 805	2 415	2 400	63				
XY-HS00264-84YM-***	3 045	2 655	2 640	68				
XY-HS00294-84YM-***	3 345	2 955	2 940	73				
XY-HS00318-84YM-***	3 585	3 195	3 180	78				
XY-HS00348-84YM-***	3 885	3 495	3 480	84				

Type L **Unit: mm**

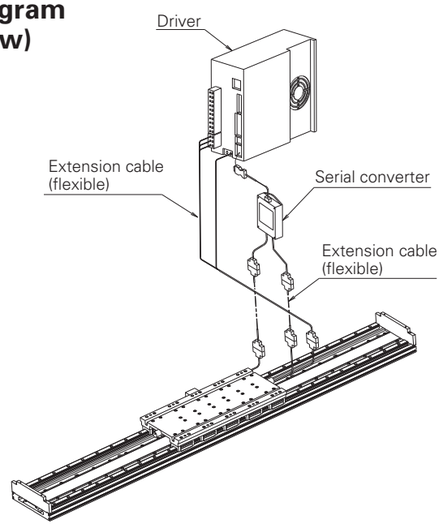
Table reference number	Total base length L	Stroke (limit) St	Stroke (nominal)	Total mass (kg)	Table/thread hole Ta	Table/thread hole Da	Table/thread hole D	Movable part mass
XY-HS0033-84YL-***	885	345	330	32	490	95	10-M8 depth 16	15
XY-HS0063-84YL-***	1 185	645	630	38				
XY-HS0087-84YL-***	1 425	885	870	42				
XY-HS00117-84YL-***	1 725	1 185	1 170	48				
XY-HS00141-84YL-***	1 965	1 425	1 410	53				
XY-HS00171-84YL-***	2 265	1 725	1 710	58				
XY-HS00195-84YL-***	2 505	1 965	1 950	63				
XY-HS00225-84YL-***	2 805	2 265	2 250	69				
XY-HS00249-84YL-***	3 045	2 505	2 490	74				
XY-HS00279-84YL-***	3 345	2 805	2 790	79				
XY-HS00303-84YL-***	3 585	3 045	3 030	84				
XY-HS00333-84YL-***	3 885	3 345	3 330	90				

L series: Specifications

	Item		Unit	Type S	Type M	Type L
Whole	Structural materials (base, slider)			Aluminum alloy (Alumite treatment)		
	Sliding guide			Linear guide bearing (recirculating ball type)		
	Motor type			Linear servo motor (with core)		
	Position sensor			Optical tape scale		
	Resolution	Least input increment	(μm)	1		
		Control resolution	(nm)	20μm=/256÷76nm		
	Maximum speed		(m/s)	2		
	Positioning accuracy		(μm)	(30/1000) x (Stroke mm) + 5		
	Repeatability		(±μm)	1		
	Permissible mass of load (horizontal)		(kg)	40	80	100
Linear guide	Moment rigidity	Rolling	(Nm/rad)	12.7	15.1	16.8
		Yawing		11.1	29.7	71.4
		Pitching		12.3	44.1	107
	Transportable moment	Rolling	(Nm)	89	87	118
		Yawing		70	90	136
		Pitching		80	118	243
	Basic load rating per bearing	C: Dynamic load rating	(N)	11 700		
		Co: Static load rating	(N)	23 500		
	No. of bearings per slider		( )	4	6	10
	Installation span of bearings		(mm)	W148*P110	W148*P230	W148*P340
Linear motor	Rated thrust*		(N)	80	280	560
	Rated current*		(Arms)	1.4	5	10
	Peak thrust*		(N)	220	600	1 200
	Maximum current*		(Arms)	4.4	12.4	25
	Magnetic attraction		(N)	809	1 650	3 260
	Mass of slider		(kg)	6	9	15
	Total mass			Shown in the specifications separately.		
	Time rating			Continuous		
	Dielectric strength			1500 VAC for 1 minute		
	Insulation resistance			500 VDC, 10 M□ or more		
	Cooling system			Self-cooling		
	Applicable ambient temperature		(°C)	20±10		
	Applicable ambient humidity		(%)	20 to 80 (Without condensation)		
	Excitation system			Permanent magnet type		
	Permissible coil temperature		(°C)	130 (Class B)		

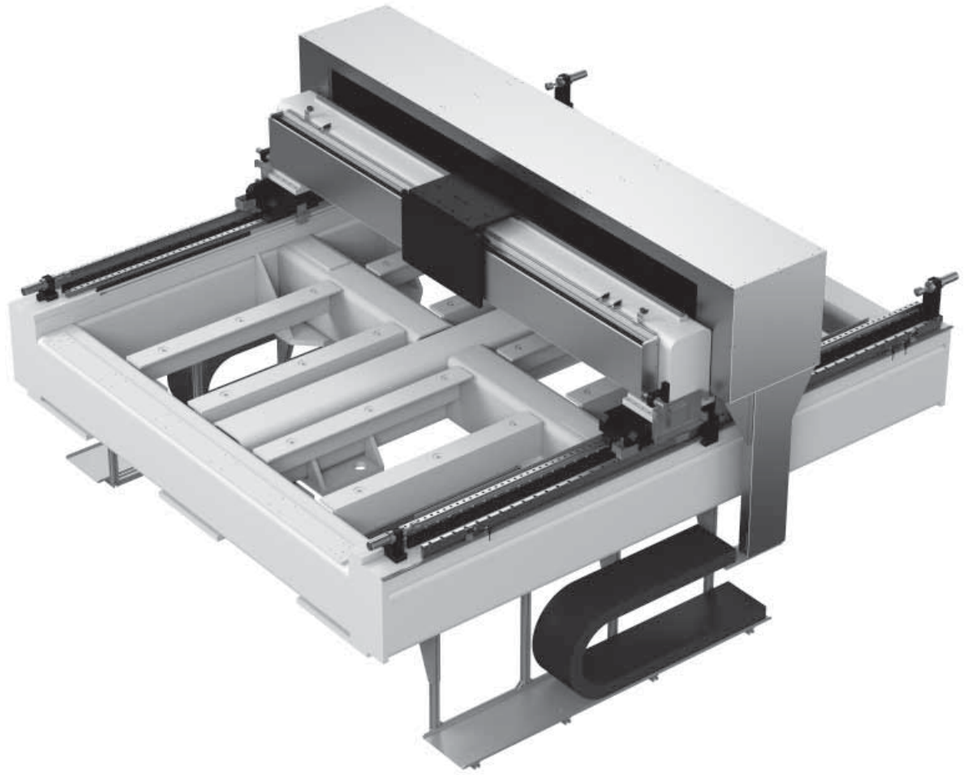
(Note 1) Items with asterisks (*) are values when operated with driver at 100°C of armature coil temperature, and other items are values when operated with driver at 20°C of armature coil temperature.

Whole configuration diagram (Oblique perspective view)



L series: Example of special application.

NSK can also build a large table of a linear motor gantry type to be used as Flat Panel Display related equipment.



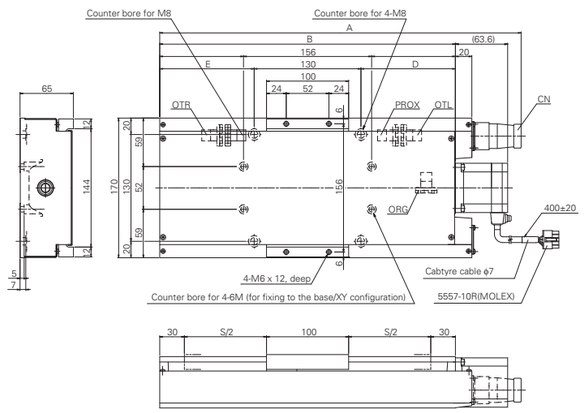
External dimensions W x D x H	3 200 x 3 500 x 2 050mm
Stroke limit	2 495(upper) x 2 755(lower)
Maximum speed	1400mm/s(α=0.3G)
Repeatability	±3μm

XY-13 Linear positioning stages Features

1. Stepping motor pre-mounted and pre-wired sensor

2. Available for shipping in two-axis combination

3. Top and side covers mounted as standard



Dimensions

Unit: mm

Table reference number	Stroke (nominal)	Stroke (limit)	Length		For mounting holes			Mass (kg)
	S		*A*	*B*	*D*	*E*	*F*	
XY-HS0010-7423-515	100	110	340	260	65	65	52	7
XY-HS0015-7423-515	150	160	390	310	70	70	77	7
XY-HS0020-7423-515	200	210	440	360	115	115	102	8
XY-HS0025-7423-515	250	260	490	410	140	140	127	9
XY-HS0030-7423-515	300	310	540	460	165	165	152	10

Specifications

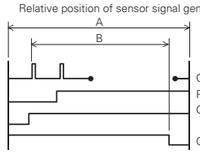
Table reference number	Table specifications (μm)					Ball screw lead and inertia of movable parts ($\times10^{-4}$kg·m^2)	Transportable mass (kg)
	Repeatability	Positioning accuracy	Backlash	Parallelism A of motion	Perpendicularity of motion	10mm	Horizontal
XY-HS0010-7423-515	±3	20	5	20	50	0.525	20
XY-HS0015-7423-515		25		25		0.525	
XY-HS0020-7423-515		30		30		0.550	
XY-HS0025-7423-515		35		40		0.550	
XY-HS0030-7423-515		40		45		0.575	

●Connector pin arrangement

CN1: Sensor SRCN6A25-24S (JAE)

Pin No.	1~6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Item	—	Voc	OUT	L	0v	—	Voc	OUT	L	0v	Voc	OUT	L	0v	Voc	OUT	L	0v	Shield
		ORG					PROX				OTR				OTL				

Relative position of sensor signal generation



ORG Origin Output per revolution of motor
PROX In the proximity of origin
OTL Overrun. On the motor side
OTR Overrun. On the opposite side of motor

Sensor type EE-SX671 (Omron)

Relative position of sensor signal generation

	XY-HS0010-7423-515	XY-HS0015-7423-515	XY-HS0020-7423-515	XY-HS0025-7423-515	XY-HS0030-7423-515
A	112 or less	162 or less	212 or less	262 or less	312 or less
B	100 or more	150 or more	200 or more	250 or more	300 or more

●For the driver unit, use the standard driver unit ASD-24A-A Series available from Oriental Motor Co., Ltd.

●Linear Positioning Stages two-axis combination

The linear positioning stages are manufactured as a single-axis table, but can also be used in a two-axis combination. The user can make this combination through the utilization of bolts, supplied as an accessory, and standard mounting holes, while NSK can meet the shipment needs. The specification of orthogonality shall be 0.05mm or less for a combined X–Y table.

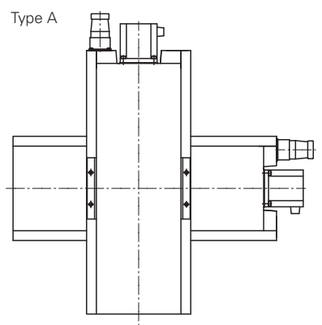
Reference number of combination

XY-ADJ-M/CA 10 10 A

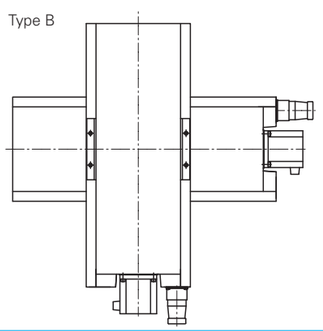
- Combined direction (A, B) Refer to the figure below.
- Lower-axis stroke
- Upper-axis stroke

	XY-HS0010-7423-515	XY-HS0015-7423-515	XY-HS0020-7423-515	XY-HS0025-7423-515	XY-HS0030-7423-515
XY-HS0010-7423-515	**XY-ADJ-M/CA1010***	**XY-ADJ-M/CA1510***	**XY-ADJ-M/CA2010***	**XY-ADJ-M/CA2510***	**XY-ADJ-M/CA3010***
XY-HS0015-7423-515	**XY-ADJ-M/CA1015***	**XY-ADJ-M/CA1515***	**XY-ADJ-M/CA2015***	**XY-ADJ-M/CA2515***	**XY-ADJ-M/CA3015***
XY-HS0020-7423-515	**XY-ADJ-M/CA1020***	**XY-ADJ-M/CA1520***	**XY-ADJ-M/CA2020***	**XY-ADJ-M/CA2520***	**XY-ADJ-M/CA3020***
XY-HS0025-7423-515	**XY-ADJ-M/CA1025***	**XY-ADJ-M/CA1525***	**XY-ADJ-M/CA2025***	**XY-ADJ-M/CA2525***	**XY-ADJ-M/CA3025***
XY-HS0030-7423-515	**XY-ADJ-M/CA1030***	**XY-ADJ-M/CA1530***	**XY-ADJ-M/CA2030***	**XY-ADJ-M/CA2530***	**XY-ADJ-M/CA3030***

Type A



Type B



XY-14 Compact CD Series Features

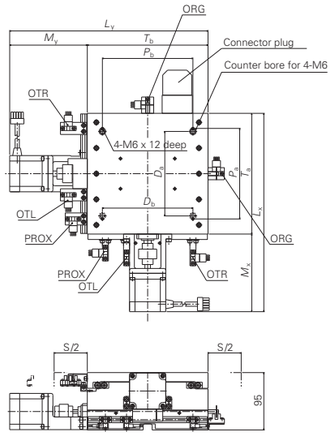
1. High-grade straightness with crossed-roller guides

2. Light weight with aluminum alloy

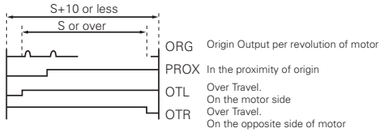
3. Low vibration as rollers are not re-circulated

4. Step motor is pre-mounted and sensor is pre-wired.

CD type two-axis table (Compact)



Relative position of sensor signal generation



Sensor wiring specifications

Connector (Manufacturer: Honda Tsushin Kogyo Co., Ltd.					
Receptacle			Flag		
MR-25RM			MR-25LF		
Pin No.	Signal code	Pin No.	Signal code	Pin No.	Signal code
1	+V	—	—	17	X ORG OUT
2	+V	10	+V	18	V PROX OUT
3	X PROX L	11	X ORG L	19	X CTL OUT
4	X OTL L	12	Y ORG L	20	X OTR OUT
5	X OTR L	13	—	21	Y ORG OUT
6	Y PROX L	14	—	22	Y PROX OUT
7	Y OTL L	15	—	23	Y OTL OUT
8	Y OTR L	16	OV	24	Y OTR OUT
9	OV	—	—	25	Shield

*Supply power for PROX, OTL and OTR to Pin Nos. 1 and 2, and power for ORG to Pin No. 10, respectively. Also for OV (Pin Nos. 9 and 16), separate wiring should be made.

Dimensions **(Unit: mm)**

Table reference number	Stroke	Length				Mounting holes		Table/tap holes				Mass (kg)
	S (UpxDown)	L_x	M_x	L_y	M_y	P_a	P_b	T_a	T_b	D_a	D_b	
XY-CD0505-410-506(516)	50×50	238.6	113.6	238.6	113.6	80	105	125	125	90	90	7
XY-CD0505-414-506(516)												
XY-CD1010-410-506(516)	100×100	328.6	128.6	328.6	128.6	140	150	200	200	150	150	10
XY-CD1010-414-506(516)												

Specifications **(Unit: mm)**

Table reference number	Repeatability	Positioning accuracy	Backlash	Parallelism A of X-Y motion	Squareness of X-Y motion	Ball screw lead (mm)	Inertia $J\times10^{-2}(kg\cdot m^2)$	Maximum speed (mm/s)	Starting torque (N·m)	Horizontally transportable mass (kg)
XY-CD0505-410-506(516)	±2	8	1	5	5	5	0.464	200	0.04	10
XY-CD0505-414-506(516)						2	0.435	100		
XY-CD1010-410-506(516)						5	0.477	200		
XY-CD1010-414-506(516)						2	0.438	100		

Remarks
1. The values of table inertia are those including the coupling and load.
2. The value of starting torque is the guaranteed value at the time of no-load operation.
3. Standard equipment: Motor: SM66AA. Sensor: EE-SX671
4. For the driver unit, use the standard driver unit ASD24A-A series available from Oriental Motor Co., Ltd.
5. The horizontally transportable mass is the maximum payload to which the accuracy in the table above can be guaranteed.
6. The reference number for the model including the wiring is 516.
7. When you wish to start mounting from the bottom, use M8.

XY-15 Positioning Actuator

Example of reference number coding **XY-HS 00100 - M10**

- XY-HS: Positioning actuator
- 00100: Stroke, 4 digits + 5 digits
- M10: Actuator size
  - For light load transportation
  - For medium load transportation
  - For heavy load transportation

Series table

Reference number \ Stroke(mm)	300	400	500	600	700	800	900	1 000
For light load transportation(~7.5kg) XY-HS****-M05	●	●	●	●				
For medium load transportation(~15kg) XY-HS****-M08	●	●	●	●	●	●		
For heavy load transportation(~20kg) XY-HS****(*)-M10							●	●

■Controller specification

Memory capacity	No. of program banks		29
	No. of data	Position	200
		Speed	15
		Acceleration	8
		Torque limit	8
		General variable	8
I/O	Control input	Digital input	6
		Analog input	1
	Control output	Digital output	4
		Analog output	1
	Communication port	RS-232C	2
Protective functions		5 (Position error overflow, over voltage, overload, temperature, error, and power module error)	

■Optional components

Power cable	Cable for power supply
Communication cable	For communication with the computer
I/O cable	For connection to sensor, switch, PLC, etc.
Cover	For protection of movable parts
Sensor	Photosensor for overrun/origin and mounting rail

■Specifications

Positioning resolution (mm)	0.001
Maximum speed (mm/s)	720~1 000※1
Maximum acceleration (mm/s²)	9 800(1G)※1
Repeatability (mm)	±0.003
Backlash (mm)	0.003
Environmental condition	Operating temperature, Operating humidity, Use indoors, Free from dust, condensation, and corrosive gas. Please note that contact with grease removing organic solvent and immersion in white kerosene (including white kerosene contained material) or anti-rust oil lead to decreased lubrication.

For light load transportation(~7.5kg)

Effective stroke (mm)	Transportable mass (kg)	Maximum speed (mm/s)	Mass (kg)	Parallelism (mm)	No. of mounting holes (n)	L_1 (mm)	L_2 (mm)	L_3 (mm)
300	7.5	1 000	3.5	0.01	9	607.2	430	400
400	7.5	1 000	3.9	0.01	11	707.2	530	500
500	7.5	1 000	4.3	0.01	13	807.2	630	600
600	7	1 000	4.7	0.01	15	907.2	730	700

*2 Gravity center position of carrying load: 40 mm or less above the center of the slider

For medium load transportation(~15kg)

Effective stroke (mm)	Transportable mass (kg)	Maximum speed (mm/s)	Mass (kg)	Parallelism (mm)	No. of mounting holes (n)	L_1 (mm)	L_2 (mm)	L_3 (mm)
300	15.0	1 000	8.0	0.010	5	713.2	470	400
400	14.5	1 000	8.9	0.010	6	791	570	500
500	14.5	1 000	9.9	0.012	7	891	670	600
600	14.0	1 000	10.5	0.012	8	991	770	700
700	13.5	1 000	12.0	0.015	9	1 091	870	800
800	13.5	780	12.7	0.015	10	1 191	970	900

*3 Gravity center position of carrying load: 60 mm or less above the center of the slider

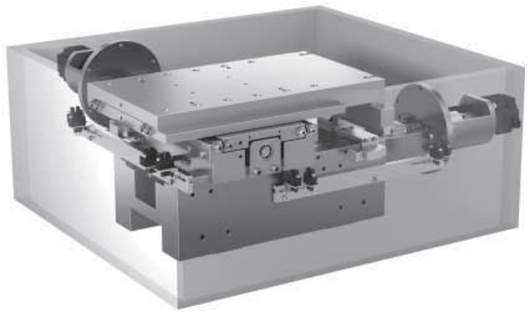
For heavy load transportation(~20kg)

Effective stroke (mm)	Transportable mass (kg)	Maximum speed (mm/s)	Mass (kg)	Parallelism (mm)	No. of mounting holes (n)	L_1 (mm)	L_2 (mm)	L_3 (mm)
900	20	880	23.2	0.015	11	1349.4	1 080	1 000
1 000	19	720	24.9	0.015	11	1449.4	1 180	1 000

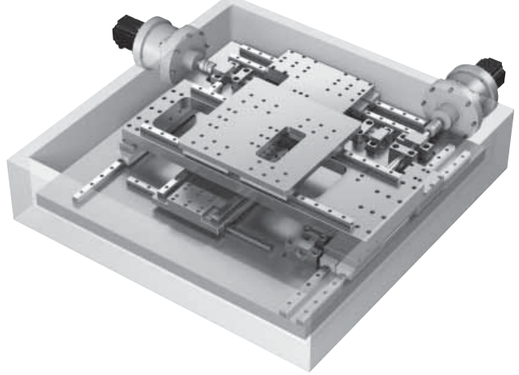
*4 Gravity center position of carrying load: 70 mm or less above the center of the slider
*5 In case of 1000-mm stroke: Dimension is 90 instead of 40.

XY-16 XY Table for Vacuum Environment (Special Application Design)

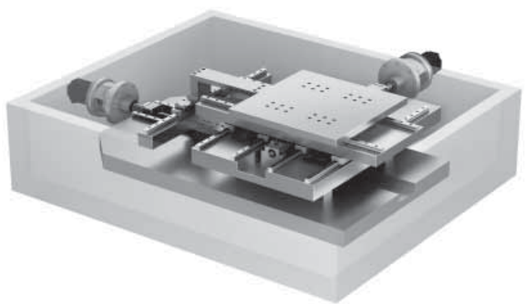
1. **Vacuum grease and NSK-developed DFO lubricant coating for vacuum and clean environments are used for components**
2. **Stainless steel, titanium, ceramic, etc. are used for components.**
3. **Motor is mounted on the atmospheric side so wiring installation is easy.**



CT series Example (8 inches)

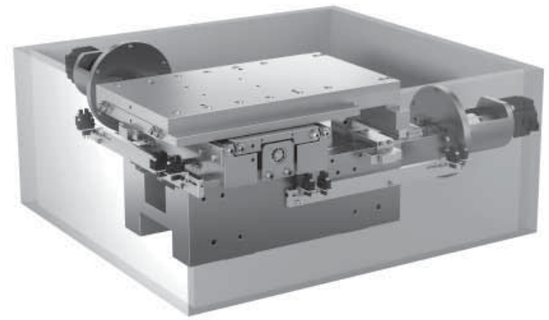


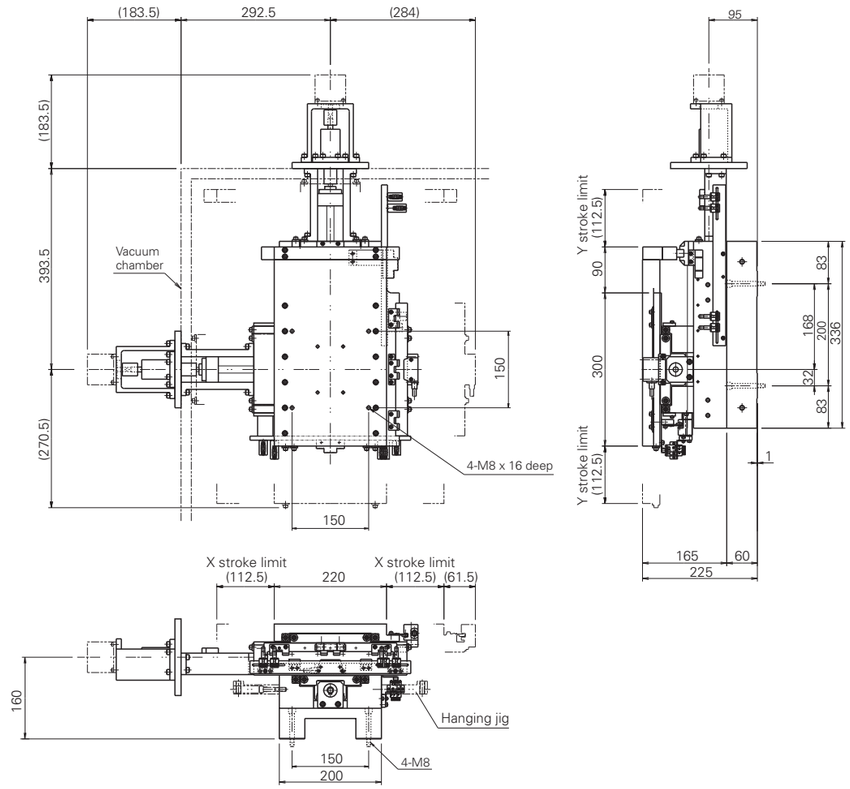
HT series Example (8 inches)



HT series Example (to 12 inches)

(1) CT series: Example (8 inches)

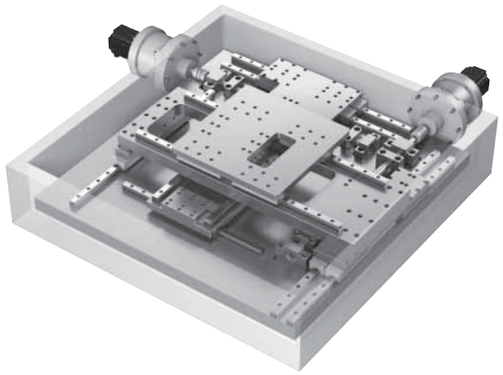


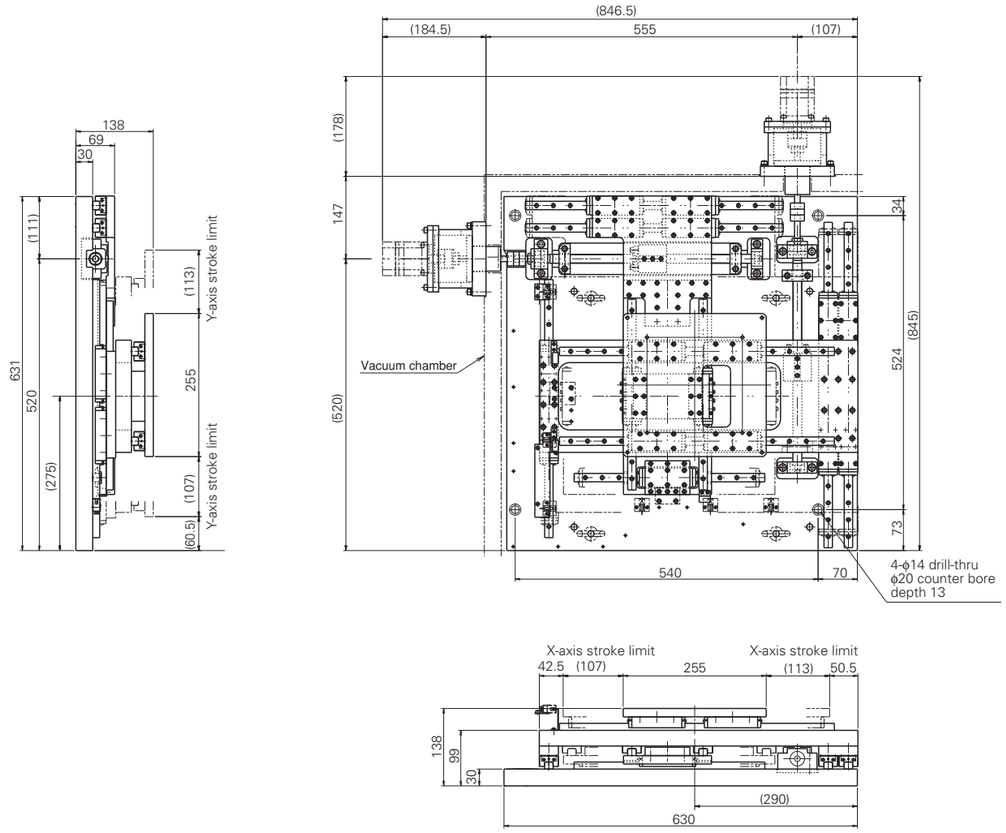


Specifications **Unit: μm**

Table reference number	Repeatability	Positioning accuracy	Backlash	Parallelism A of X-Y motion	Squareness of X-Y motion	Ball screw lead (mm)	Transportable mass (kg) Horizontal
XY-CT2121-9-*****	±1	25	1	15	10	4	10

(2) HT series: Example (8 inches)

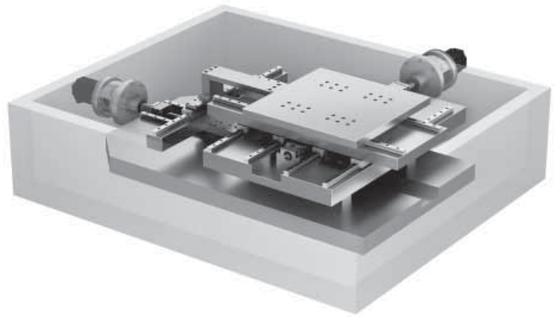


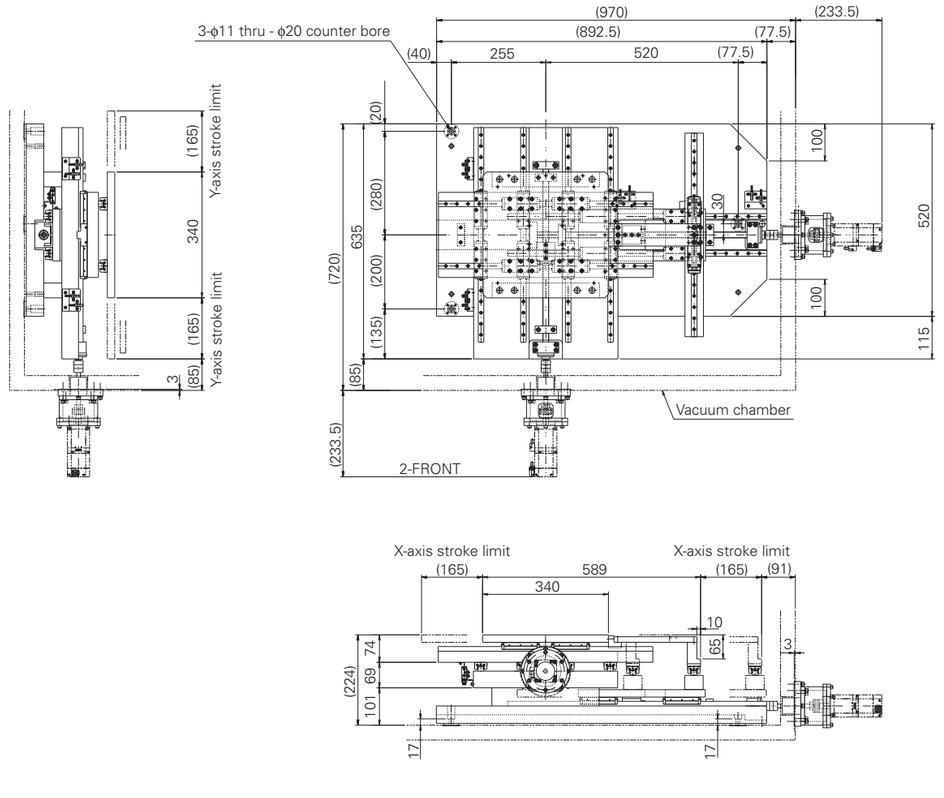


Specifications **Unit: μm**

Table reference number	Repeatability	Positioning accuracy	Backlash	Parallelism A of X-Y motion	Squareness of X-Y motion	Ball screw lead	Transportable mass (kg)
							Horizontal
XY-HT2121-3-*****	±1	20	1	15	8	4	10

(3) HT series: Example (8 inches, 12 inches)

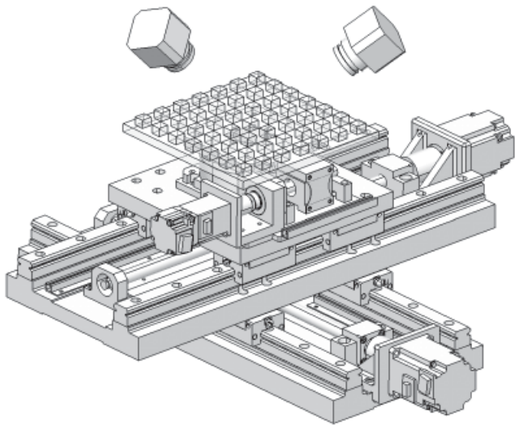




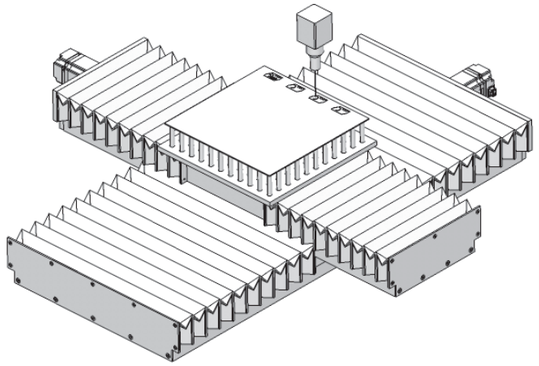
Specifications **Unit: μm**

Table reference number	Repeatability	Positioning accuracy	Backlash	Parallelism A of X-Y motion	Squareness of X-Y motion	Ball screw lead	Transportable mass (kg)
							Horizontal
XY-HT3232-3-*****	±1	30	1	20	12	4	30

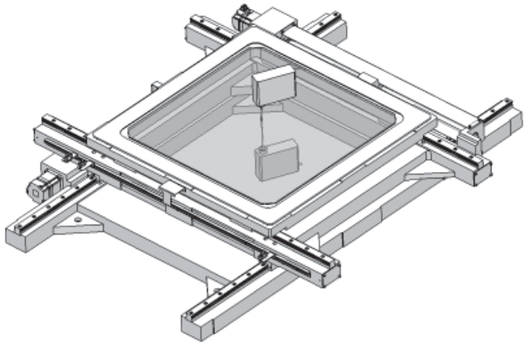
XY-17 Example of Use



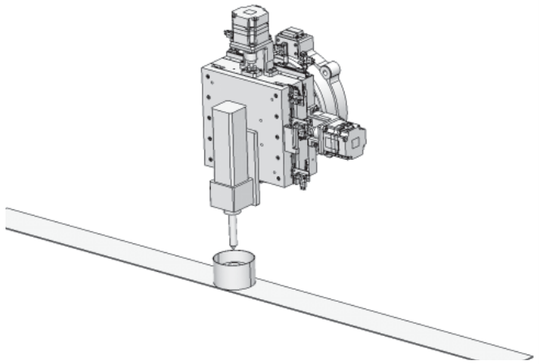
Electronic parts manufacturing inspection



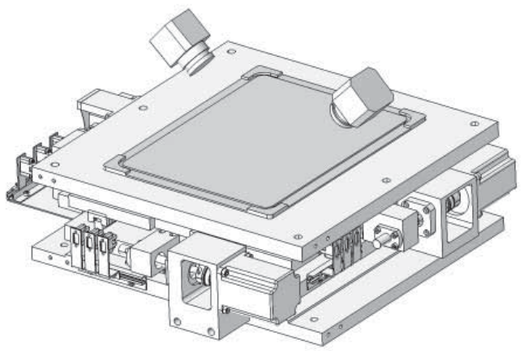
Laser beam machines



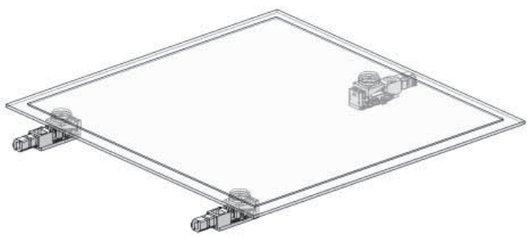
Thickness measuring equipment



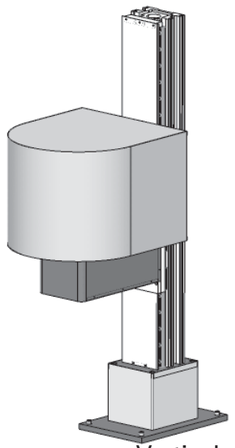
Lens machining equipment



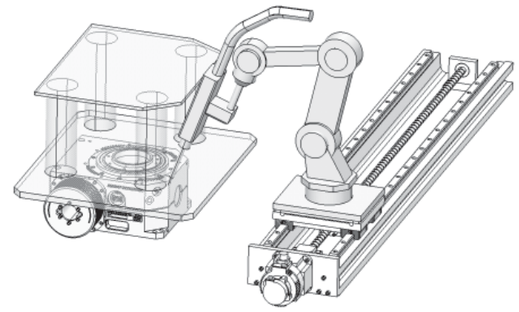
PCB alignment (XYθ)



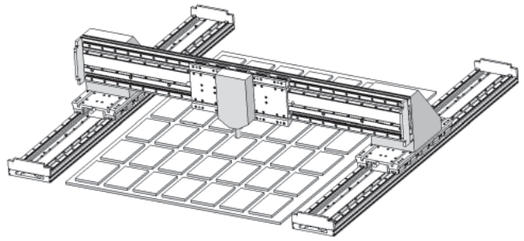
PCB alignment (tilt)



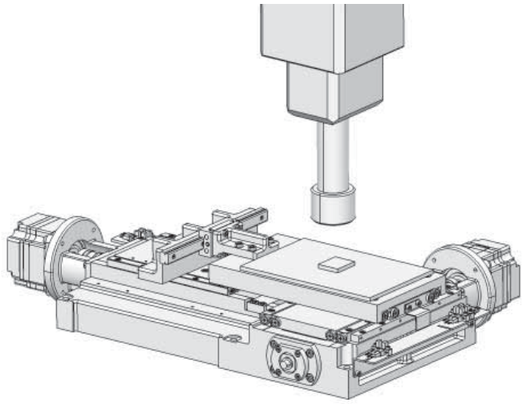
Vertical wafer conveyor



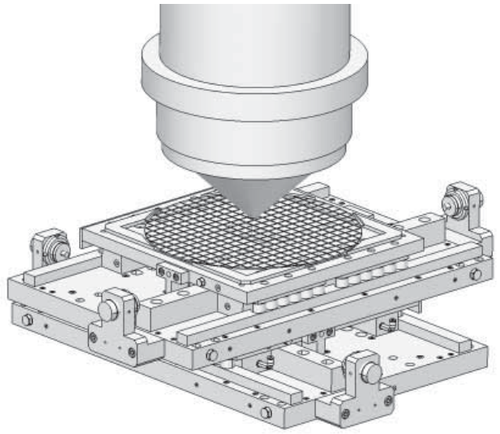
Conveying axis of welding robot



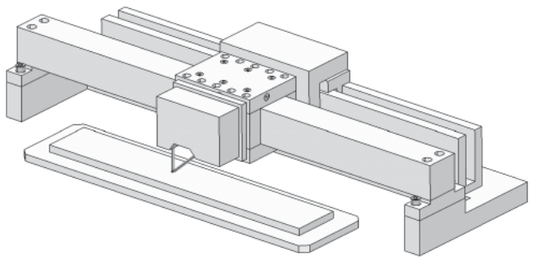
Electronic parts mounting equipment



Bonding



Wafer inspection

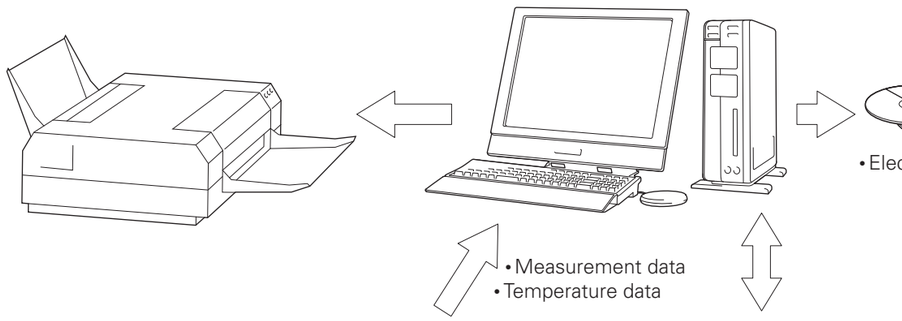


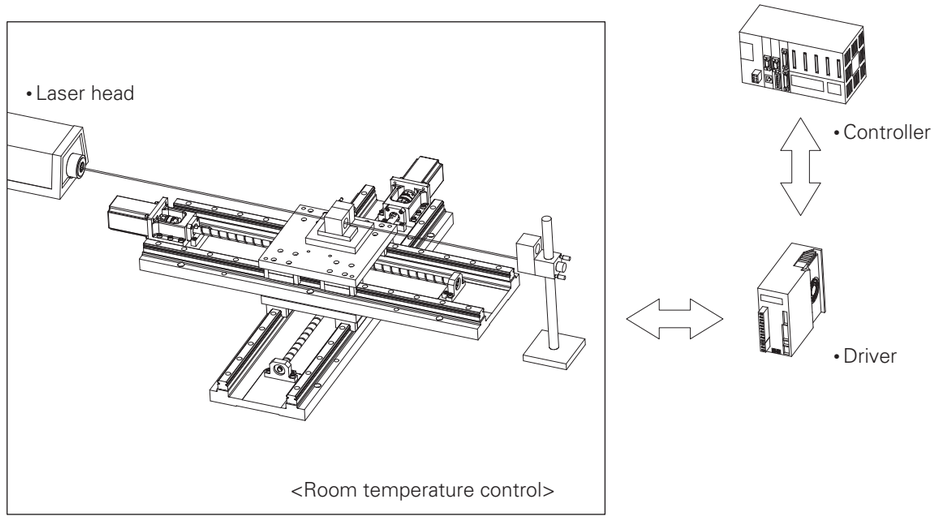
Shape measuring equipment

XY-18 Technical Description

(1) Accuracy evaluation system

NSK High-Precision Linear Positioning Tables are capable of meeting the required characteristics with the use of "Accuracy evaluation system for high precision linear positioning tables" originally developed by NSK.





(2)Example of XY table accuracy evaluation data

Target product: XY-MC3030–8**–***

Guide: Linear guide

Drive system: Ball screw driven by AC servo motor (semi-closed loop control)

·Evaluation conditions

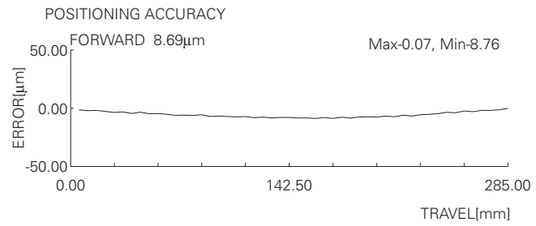
NSK

TEMP =	23.0 [°C]	HUMIDITY	=	50 [%]	PRESSURE	=	100.65 [kPa]
SCAN =	7	DISTANCE	=	5.7 [mm/step]	SAMPLE DATA	=	51 [points]
SPEED =	50.0 [mm/s]	RESOLUTION	=	2.000 [mm/pulse]			

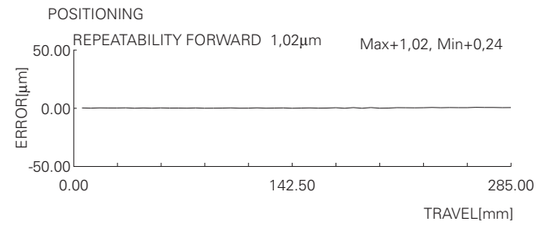
***** *JIS B 6330-1980* *****

	ACCURACY [μm]	REPEATABILITY [±μm]	LOST MOTION [μm]	ACCUM. [μm/100mm]	RANGE(WOBBLE) [μm]
STD.	50.00	5.00			
FORWARD	8.69	1.02		8.33	8.64
BACK	7.25	1.12		6.91	7.08
BIDIRECTIONAL	7.22	1.07	1.55	6.88	7.11

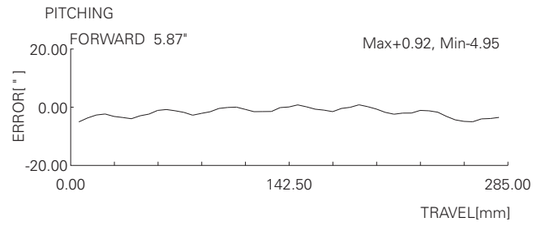
·Positioning accuracy



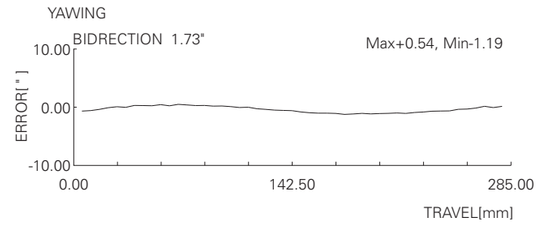
·Repeatability



·Pitching



·Yawing



Target product: XY–CT0505–4**

Guide: Crossed-roller guide

Drive system: Ball screw driven by AC servo motor

·Dynamic characteristics (step responsiveness)

●Measurement conditions

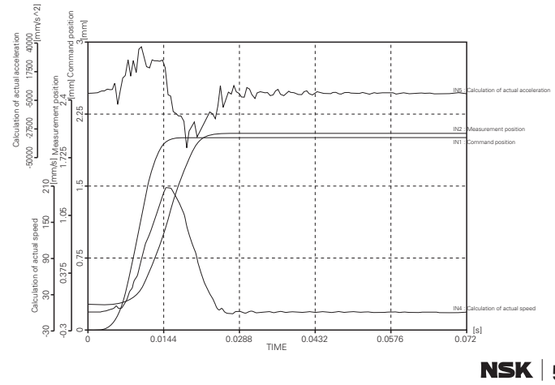
· Atmospheric temperature	21.27[°C]	· Command pattern	Trapezoidal
· Humidity	50.00[%]	· Command speed	300.0[mm/s]
· Atmospheric pressure	99.3[kPa]	· Acceleration time	0.005[s]
· Motor resolution	2.5000[μm/p]	· Deceleration time	0.005[s]
· Sampling period	0.50[ms]	· Measurement distance	2.0[mm]
· In-position signal	None	· Measurement direction	FORWARD
· Driver setting: Setting width for positioning	0.0[μm]	· Setting width for positioning	1.500[μm]
· Driver setting memo (text)			

●To be evaluated — IN4: Calculate actual speed.

· Evaluated section	0.0000–0.0720[s]	· Maximum value	2.001385[mm]
· Average value	1.585514[mm]	· Minimum value	–0.000030[mm]

●Evaluation results

· Positioning time	0.0360[s]	· Setting width for positioning	–.–––[μm]
· Temporary positioning time	0.0175[s]		

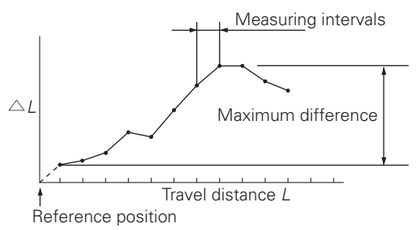


(3)Characteristics and evaluation method

NSK's inspection procedures for linear positioning tables are established in accordance with the evaluation items for mechanical equipment standardized in the Japanese Industrial Standards (JIS). This will be helpful for you to select a linear positioning table having the quality and functions best-suited for the machine in which the table is to be used.

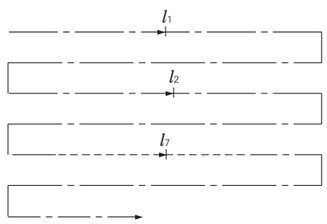
①Positioning accuracy

Perform positioning successively from the reference position in a specific direction. Measure the difference between the actual and desired travel distances for each point from the reference position. Repeat this measurement seven times to determine the average value. Measure such average value almost over the entire travel distance at the intervals specified for each model. Take the maximum difference of the average values determined at respective positions as the measured value.



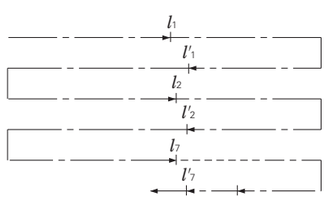
②Repeatability

Repeat positioning at any point seven times from the same direction to measure the stopping position and determine one half of the maximum difference of readings. Repeat this measurement almost over the entire travel distance at the intervals specified for each model. Take the maximum difference of the determined values as the measured value. Express one half of the maximum difference with a plus-or minus (±) sign.



③Lost motion

First, perform positioning for one point in a positive direction to measure its position (See figure below). Then, give a command to the table to travel in the same direction to another point. Give the same command to the table to travel in a negative direction. Perform positioning for the point in the negative direction to measure its position (See figure below). Give the same command to the table travel further in the negative direction to the start point. Give the same command to the table to travel in a positive direction. Perform positioning for the point in the positive direction to measure its position (the following figure). Repeat this motion and measurement several times in the positive and negative directions to determine the difference in average values of stopping positions for seven times of positioning, respectively. Perform this measurement almost over the entire travel distance at the intervals specified for each model. Take the maximum difference of the determined values as the measured value.

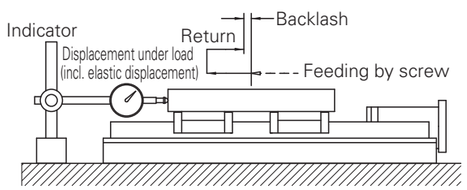


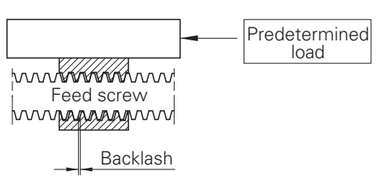
Measured value of lost motion

$$=\left\{\frac{1}{7}(l_1+l_2+\ldots+l_7)-\frac{1}{7}(l'_1+l'_2+\cdots+l'_7)\right\}\max$$

④Backlash

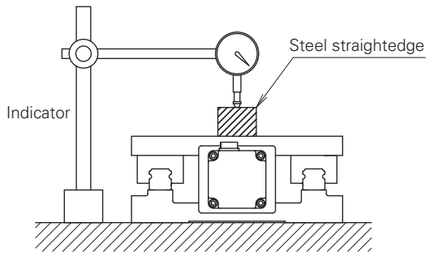
Feed the table slightly in any direction and record the reading of a test indicator in this condition as a reference value. Apply a predetermined load in the table feeding direction without the use of the table feed system. (see figure below). Then, release the load and read the test indicator again. The difference between the value obtained and the reference value is the measured backlash value. This measurement is to be made at the center and near both ends of the stroke to determine the maximum value.





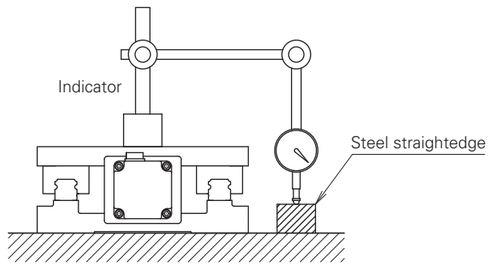
⑤Parallelism A of X-Y motion

Parallelism of the X-Y motion (indicator is fixed to the flat surface on which the table is mounted.)
Set the indicator stand to the flat surface, on which the table is mounted. Set the indicator probe on the center of the table. Move the table the full stroke in both the X and Y directions and take the maximum difference of the indicator reading as the measured value.



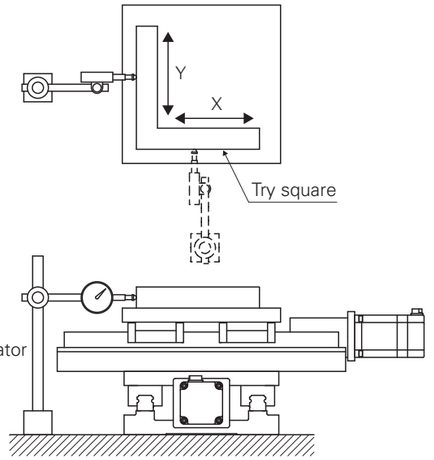
⑥Parallelism B of X-Y motion

Parallelism of the X-Y motion (indicator probe is moving along the flat surface on which the table is mounted.) Fix the indicator stand to the center of the table. Set the indicator probe on the flat surface on which the table is mounted. Move the table the full stroke in both the X and Y directions and take the maximum difference of indicator readings as the measured value.



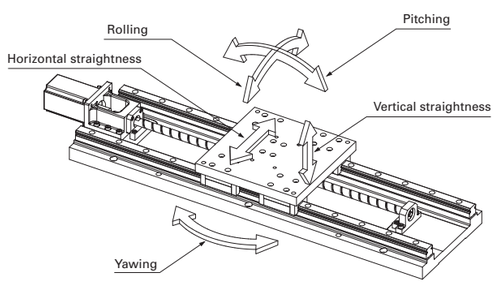
⑦Orthogonality of X-Y motion

This means the squareness of X axis and Y axis.
A try square is placed on the table so that either one of the legs in X or Y travel direction is set as a reference. Apply the indicator probe to the try square leg in the direction of travel, and move the table the full stroke in that direction. Take the maximum difference of the indicator reading as the measured value.



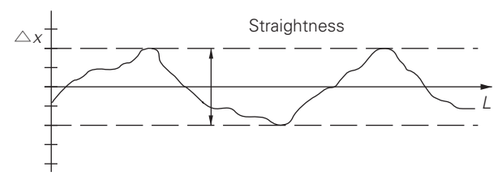
⑧Other evaluation items

In addition to the motions as given above, an XY table has the following motions in respect to the moving axes. Depending on the accuracy and the applications of individual XY tables, it may be necessary to consider these motions.
Based on the specifications for the linear positioning table, NSK is making voluntary checks of these characteristics, too.



ⓐStraightness

This means the degree of deviation of the table motion, which should be linear, from the ideal straight line.
Horizontal straightness: Horizontal direction of table moving axis.
Vertical straightness: Vertical direction of table moving axis.
The straightness is measured by a test bar and indicator or by a laser straightness measuring system. It is expressed as the minimum distance between two straight lines being parallel with each other.
The straightness is to be determined by calculation if it is not possible to make the reference axis and table moving axis completely parallel with each other for measurement.



ⓑPitching and yawing

Pitching: Longitudinal angle change upon table movement
Yawing: Lateral angle change upon table movement
The pitching and yawing are measured by a laser angle measuring system and expressed as the maximum difference of readings.

XY-19 Selection Procedure

(1) Selection of tables

In order to determine the rough specifications for any linear positioning table, select the type of table in consideration of the stroke, load conditions, application, accuracy grade or other specifications. When the table is to be used in any special environment, dustproofing, lubrication, materials and other relevant factors should also be taken into consideration.

NSK offers a variety of products so as to meet the user's needs. Please contact your nearest NSK branch office or sales office.

(2) Selection of drive system

In consideration of the accuracy grade, speed, response, price or other relevant factors, select any of the following drive systems:

① Open loop control by stepping motor
② Semi-closed loop control by servo motor
③ Full-closed loop control by linear scale

(3) Investigation of resolution

Resolution is the smallest positioning increment (distanced traveled) of the table that can be achieved per motor pulse. It is expressed by the following equation using the ball screw lead and the number of divisions per revolution of the motor.

$$P_1 = \frac{l_1}{P} \qquad (\mathrm{I}\text{-}1)$$

l_1 : Ball screw lead = 10 [mm]
P : Number of divisions per revolution of the motor = 2000 [pulse/r]
P_1 : Resolution (least input increment) [mm]

(Example)
Ball screw lead
Number of divisions per revolution of motor

$$\text{Resolution} = \frac{10}{2\,000}$$

In case of a full-closed loop control, the resolution is the same as the linear scale.

(4) Investigation of speed

The maximum travel speed of the linear positioning table is expressed by the following equation using the ball screw lead and allowable maximum motor speed.

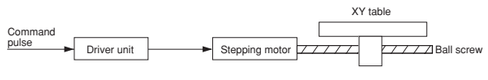
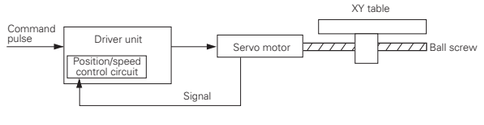
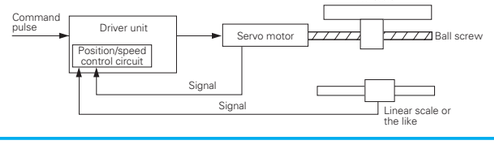
$$V_1 = l_1 \times \frac{N}{60} \qquad (\mathrm{I}\text{-}2)$$

V_1 : Travel speed [mm/s]
l_1 : Ball screw lead [mm]
N : Allowable maximum motor speed [r/min]

(Example)
Ball screw lead 10mm
Allowable motor speed 3 000r/min

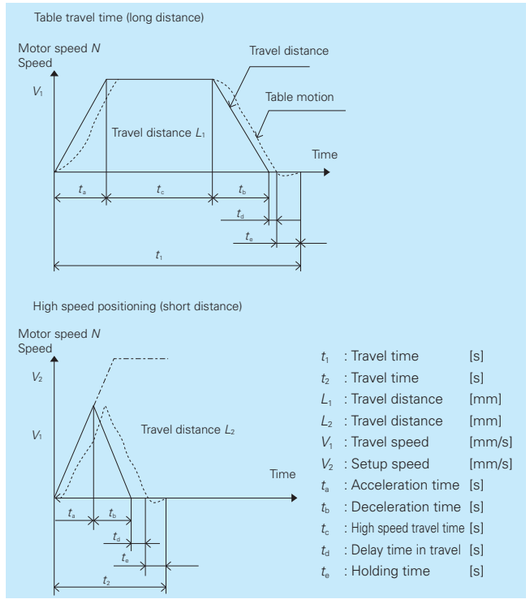
$$V = 10 \times \frac{3\,000}{60} = 500\text{mm/s}$$

In this case, the motor output should be enough to cope with the table torque load. In the case of a stepping motor, its output torque will decrease sharply with higher speed. So, care should be paid to the case when the motor is used at the speed of 1,500 r/min or higher. In the case of the full-closed loop control, the maximum motor speed is restricted by the highest output frequency of the linear scale, or the highest input frequency of the motor driver unit, whichever is lower.

Control method	Configuration	Features
Open loop		· Simple structure · No gain control required · Loud driving noise · Not applicable to absolute position control · Generation of intense heat from motor · Stable at a standstill · Inexpensive
Semi-closed loop		· Capable of quick response · Serviceable at the limiting performance of motor · Low driving noise · Gain control required · Inexpensive
Full Closed loop		· Capable of high-accuracy positioning · Less susceptible to the influence of external interference · High resolution · Troublesome adjustment owing to the complicated servo system · Expensive

(5) Examination of operating conditions

The linear positioning table travel speed, as examined in Section (4) above, is the maximum operating speed of the table including its control system. For the table travel time, acceleration/deceleration time as well as holding time until vibrations are reduced to a predetermined value must be considered. The actual travel time is obtained by adding these times to the time determined from the travel distance/maximum speed.



①Calculation of acceleration/deceleration time

The acceleration time is found by the formula below:

$$t_a = \frac{2\pi \cdot N \cdot (J_M + J_L) \cdot k}{60 \cdot (T_{PM} - T_L)} \qquad (\mathrm{I}\text{-}3)$$

J_M : Rotor inertia of motor [kg·m²]
J_L : Load inertia of table [kg·m²]

$$J_L = J_{L1} + J_{L2} \qquad (\mathrm{I}\text{-}4)$$

$$J_{L1} = \frac{\pi \cdot P}{30} D^4 \cdot L \text{(Inertia of screw shaft)} \qquad (\mathrm{I}\text{-}5)$$

$$J_{L2} = M \cdot (l_2/2\pi)^2 \text{(Inertia of movable parts)} \qquad (\mathrm{I}\text{-}6)$$

p : Material density (7.8 x 103 for steel) [kg/m³]
M : Mass of movable parts (including the load) [kg]
l_2 : Ball screw lead [m]
L : Length of ball screw [m]
D : Ball screw diameter [m]
N : Motor speed [min⁻¹]
T_{PM} : Motor acceleration/deceleration torque [N·m]
T_L : Load torque converted to motor shaft [N·m]

$$T_L = T_{pmax} + T_U + T_M \qquad (\mathrm{I}\text{-}7)$$

T_{pmax} : Dynamic friction torque of ball screw [N·m]
T_U : Friction torque of support bearings [N·m]
T_M : Load torque converted to ball screw shaft [N·m]

$$T_M = \frac{(\mu \cdot M \cdot g + F + f) \cdot l_2}{2\pi \cdot \eta} \qquad (\mathrm{I}\text{-}8)$$

F : Sliding resistance [N]
f : External axial load [N]
μ : Friction coefficient (0.01)
η : Transfer efficiency of ball screw system (0.9 to 0.95)
k : Constant 1.3 to 2.0 · · · Servo motor
1.5 to 3.0 · · · Stepping motor
g : Acceleration of gravity (9.8m/s²)

The load inertia J_L and starting torque T_L of the table are given in the dimensions table of the linear positioning tables. When calculating, add the load inertia and inertia of coupling to them.

The deceleration time is found by the formula below:

$$t_b = \frac{2\pi \cdot N \cdot (J_M + J_L) \cdot k}{60 \cdot (T_{PM} - T_L)} \qquad (\mathrm{I}\text{-}9)$$

The deceleration time may be calculated by the formula as given above. However, it is generally acceptable to consider that t_a is equal to t_b.

<Hints on calculation>

T_{PM}: For calculation of the acceleration/deceleration time of a servo motor, use the instantaneous maximum torque. In the case of a stepping motor, use the output torque at the operating motor speed from the torque curve.

②Calculation of accelerating distance

The accelerating distance is found by the formula below:

$$L_3 = \frac{1}{2} \times V_1 \times t_a \qquad (\mathrm{I}\text{-}10)$$

The decelerating distance is found by the formula below:

$$L_4 = \frac{1}{2} \times V_1 \times t_b \qquad (\mathrm{I}\text{-}11)$$

L_3 : Accelerating distance [mm]
L_4 : Decelerating distance [mm]
V_1 : Travel speed [mm/s]

The decelerating distance may be calculated by the formula as given above. However, it is generally acceptable to consider that L_3 is equal to L_4.

③Calculation of acceleration from the acceleration/deceleration time.

The acceleration at the time of acceleration is found by the formula below:

$$G_1 = \frac{V_1}{t_a} \qquad (\mathrm{I}\text{-}12)$$

The deceleration at the time of deceleration is found by the formula below:

$$G_2 = \frac{V_1}{t_b} \qquad (\mathrm{I}\text{-}13)$$

G_1 : Acceleration at the time of acceleration [mm/s²]
G_2 : Deceleration at the time of deceleration [mm/s²]

The deceleration at the time of deceleration may be calculated by the formula as given above. However, it is generally acceptable to consider that G_1 is equal to G_2.

④Calculation of travel time

The travel time is found by the formula below:

(In case of long distance)

$$t_1 = t_a + t_b + t_c + t_d + t_e \qquad (\mathrm{I}\text{-}14)$$

(In case of short distance)

$$t_2 = t_a + t_b + t_d + t_e \qquad (\mathrm{I}\text{-}15)$$

⑤ Calculation of travel distance

The travel distance is found by the formula below:

(In case of long distance)

$$L_1 = V_1 \cdot t_c + L_3 + L_4 \qquad (\mathrm{I}\text{-}16)$$

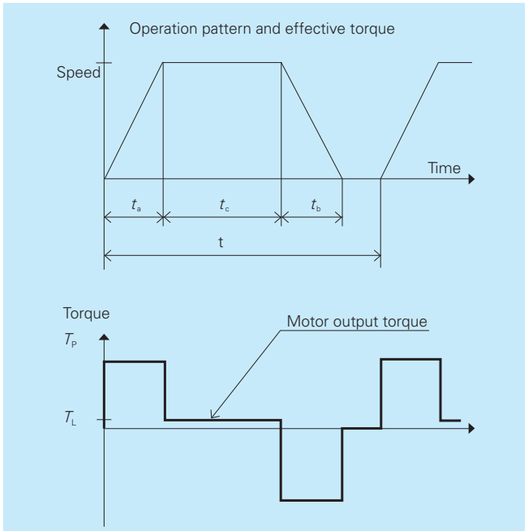
(In case of short distance)

$$L_2 = \frac{1}{2} \times V_1 \times t_a^2 + \frac{1}{2} \times V_1 \times t_b^2 \qquad (\mathrm{I}\text{-}17)$$

(6) Investigation of effective torque

Effective torque is the torque the motor will see during the entire move cycle. It is necessary to make sure the effective torque is lower than the rated torque of the motor during the motor cycle. The effective torque is a function of both the peak torque (accel/decal) and the continuous torque (at speed) of the move cycle.

In the case when a servo motor is used, an instantaneous maximum torque is applied at the time of acceleration/deceleration. Therefore, the motor may burnout unless the effective torque of the system is less them the rated torque of the motor. Since a protective circuit in the driver unit serves to prevent the burnout of the motor, it may not take place. However, it is necessary to make sure that the effective torque is lower than the rated torque.



①Calculation of acceleration/deceleration torque

The acceleration torque is found by the formula below:

$$T_{P1}=\frac{2\pi\cdot N\cdot(J_M+J_L)}{60\cdot t_a}\times T_L \qquad (\text{I}\text{-}18)$$

The deceleration torque is found by the formula below:

$$T_{P2}=\frac{2\pi\cdot N\cdot(J_M+J_L)}{60\cdot t_b}\times T_L \qquad (\text{I}\text{-}19)$$

T_{P1} : Motor acceleration torque [N·m]
T_{P2} : Motor deceleration torque [N·m]

②Calculation of effective torque

The effective torque is expressed by the formula below:

$$T_{rms}=\sqrt{\frac{T_{P1}^2\cdot t_a+T_L^2\cdot t_c+T_{P2}^2\cdot t_b}{t}} \qquad (\text{I}\text{-}20)$$

T_{rms} : Effective torque [N·m]

If the effective torque T_{rms} is lower than the rated motor torque, the motor can be operated continuously in this operation pattern. If effective torque Trms is in excess of the rated torque, change to another type of motor or change the operation pattern to make a period of one cycle longer.

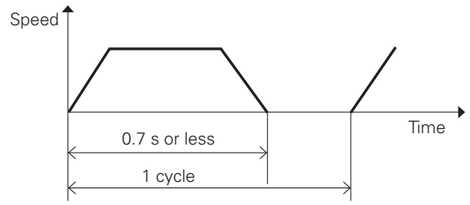
In the case when a stepping motor is used, there is no need for calculation of effective torque. This is because the driver unit supplies constant current to the motor particularly in the case when a constant-current type driver unit is used. Since the rated current flows even when the motor is stopped, the temperature of the stepping motor is usually higher than that of servo motor.

For this reason, it is necessary to consider such countermeasures as to reduce the current when the motor is stopped by using the current-down function of the driver unit or to cool the motor with a fan or other suitable means.

②Calculation example of effective torque

Specifications

1. Travel distance 90mm
2. Positioning accuracy 10μm
3. Repeatability ±3μm
4. Parallelism 10μm
5. Load mass 5kg
6. Positioning frequency 150/mim
7. Operation pattern



Selection

In consideration of the operating conditions, the CS type table is selected here.

1. Table XY-CS0010-140
   - Ball screw lead 5mm
   - Table inertia 0.11×10^{-4}kg·m²
   - Load torque 0.07N·m
   - Load inertia converted to motor shaft (See Formula Ⅰ-6)
     $5\times(0.005/2\pi)2=0.03\times10^{-4}$kg·m²
   - Coupling inertia 0.03×10^{-4}kg·m²
   - Total load inertia 0.17×10^{-4}kg·m²
     (See Formula Ⅰ-4)
2. Motor
   From the load inertia, 100W AC servo motor is selected here.

Specifications for selected motor	
Rotor inertia	0.04×10^{-4}kg·m²
Rated motor torque	0.32N·m
Instantaneous maximum motor torque	0.96N·m
Rated motor speed	3 000min⁻¹

3. Acceleration time (See Formula Ⅰ-3)
   $\frac{2\pi\times3000\times(0.04+0.17)\times10^{-4}\times1.3}{60\times(0.96-0.07)}=0.01$s
   The deceleration time is considered to be equal to the acceleration time.
4. Acceleration distance
   $\frac{1}{2}\times250\times0.01=1.25$mm
5. Travel time
   L_1=90−(1.25×2)=87.5(High speed travel distance)
   87.5÷250
   =0.35s(High speed travel time)
   0.01+0.35+0.01=0.37 (See Formula Ⅰ-14)
   0.37s<0.7s(Specified travel time)
6. Acceleration torque (See Formula Ⅰ-18)
   $\frac{2\pi\times3\,000\times(0.04+0.17)\times10^{-4}}{60\times0.01}+0.07$
   =0.73N·m<0.96N·m(Instantuneous maximum torque)
7. Effective torque (See Formula Ⅰ-20)
   $\sqrt{\frac{(0.73^2\times0.01\times0.07^2\times0.35\times0.73^2\times0.01)\times150}{60}}$
   =0.18N·m<0.32N·m(Rated torque)

Judging from the calculations made above, it could be confirmed that the acceleration/deceleration torque 0.73N·m is 76% of the instantaneous maximum motor torque and the effective torque 0.18N·m is 56% of the rated motor torque. Therefore, the specifications are satisfied.

(7) Influence of pitching and yawing

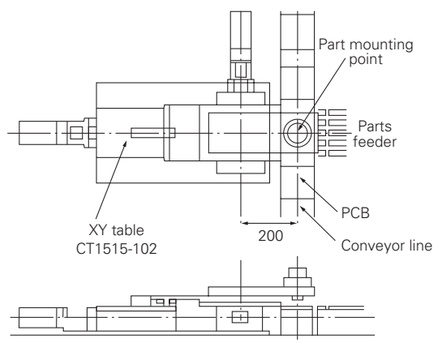
Position accuracy is defined as the maximum value of positioning error for an arbitrary distance within the specified travel range, i.e. the absolute accuracy guaranteed over the entire stroke. It is said that the positioning accuracy depends on the accuracy grade of the feed ball screw or that of the linear scale in the case of a closed loop system. However, since it is practically impossible to bring the working point of the machine into coincidence with the ball screw and scale, the positioning accuracy may be influenced by pitching and yawing; although this depends on the table structure and the position of the working point.

In the case when the working point is located outside the table as shown in Fig.(7)-2 (a), the positioning accuracy may be greatly influenced by yawing. Positioning accuracy may be less influenced in the case when the working point is located on the table as shown in Fig.(7)-2 (b). However, if the working point is high, the positioning accuracy may be influenced by pitching.

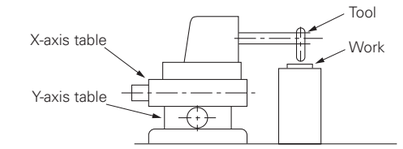
An example of XY table application as a chip mounter is shown in Fig.(7)-1. The yawing angle of 1 second leads to the positioning error of 0.001mm and that of 10 seconds to 0.01mm at a point 200mm apart. Moreover, it should be noted that yawing of the same table may affect the positioning accuracy in different directions depending on the overhanging direction as shown in the figure.

Pitching also leads to the positioning error in the same way when the working point is located significantly higher than the table work surface.

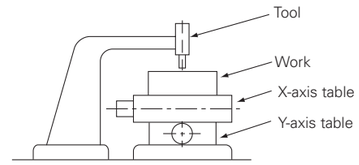
As mentioned above, not only the required accuracy, but also the required accuracy items may vary greatly with the table applications. So, full consultation and prearrangement should be made depending on the applications.



Schematic of XY Table Application as Chip Mounter
Fig. (7)-1

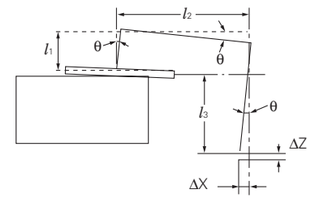


(a) In case when the working point is outside the table



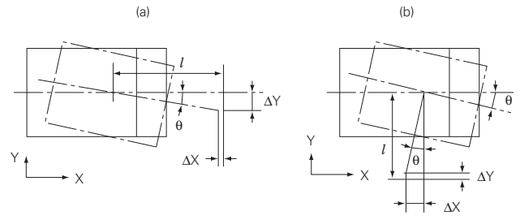
(b) In case when the working point is on the table

Relation between Positioning Table and Working Point
Fig. (7)-2



$\Delta X=l_1\sin\theta-l_1\sin\theta-l_3\sin\theta=-l_3\sin\theta$
$\Delta Z=l_1(1-\cos\theta)-l_2\sin\theta-l_3(1-\cos\theta)\fallingdotseq-l_2\sin\theta$ (Levelness)
$\Delta Y=0$
l_3 = 100mm When l_3 = 100 mm and θ =10 sec.:
$\Delta X=-0.005$mm

Influence of Pitching on Positioning Accuracy



$\Delta X\fallingdotseq l(1-\cos\theta)$
(Positioning error in X-axis direction)
$\Delta Y\fallingdotseq l\sin\theta$
(Positioning error in Y-axis direction)
The positioning accuracy at the working point where 200 mm overhanging in X-axis direction takes place at the yawing angle of 10 seconds (l=200, θ =10 sec.) is:
$\Delta X\fallingdotseq0.0000004\fallingdotseq0$
$\Delta Y\fallingdotseq0.010$
$\Delta X\fallingdotseq l\sin\theta$
$\Delta Y\fallingdotseq l(1-\cos\theta)$

The positioning accuracy at the working point where 200 mm overhanging in Y-axis direction takes place at the yawing angle of 10 seconds (l = 200, θ = 10 sec.)is:
$\Delta X\fallingdotseq0.010$
$\Delta Y\fallingdotseq0.0000004\fallingdotseq0$

Influence of Yawing on Positioning Accuracy

XY-20 Precautions for Handling

1) Please pay extra attention to handling of XY table since it is precision equipment.
2) Do not apply excessive load or impact when moving and installing XY table.
3) Do not hold motors or guides. Use hanging bolts provided for the heavy table.
4) Be sure to keep foreign matter, detrimental convex areas, etc. away from XY table mounting surface.
5) Avoid introducing foreign matter because it can cause ball screw and guide accuracy to deteriorate more quickly than normal. Remove any foreign matter as soon as possible. At the same time, make sure to apply grease. Use grease designated by NSK.
6) See the following table,"Inspection of grease lubrication, grease replenishment intervals" for maintenance frequency of grease.
7) Do not disassemble parts so that the guaranteed accuracy is affected.
8) The service limit of XY table depends on the respective service environment, frequency of use, and accuracy criteria. Please consult NSK when you see signs of accuracy deterioration.
9) Apply a corrosion inhibitor when the unit will not be used for an extended period of time. Apply new grease to the ball screw and guides when re-starting.

Service environment

No.	Item	Criteria
1	Temperature	23°C±3°C
2	Humidity	50±10%(No condensation)

Storage environment

No.	Item	Criteria
1	Temperature	23°C±15°C
2	Humidity	50±20%(No condensation)

(1) Maintenance and inspection

Even though high quality grease is used, its property and functions deteriorate as time passes. The grease needs to be Although the grease is of high quality, it gradually deteriorates and its lubrication function diminishes. Also, the grease is gradually removed by stroke movement. In some environments, the grease becomes dirty, and foreign objects may enter. Grease should be replenished depending on the frequency of use.
The following table shows general grease replenishment intervals.

Inspection of grease lubrication, grease replenishment intervals

Inspection period	Item inspected	Replenishment intervals
3 to 6 months	Contamination, foreign matter such as chips	Regular: Every year. Units that go more than 3000 km/year should be replenished every 3000 km. It can also be required based on inspection results.

Remarks

1) As a general rule, avoid mixing greases of different brands. If greases with different thickeners are mixed, the grease structure may break down. Even if they have the same type of thickener, different additives can negatively affect each other.
2) Viscosity of grease varies with temperature. Please note that friction force of linear guide bearing and ball screw torque increase because low temperatures, especially in winter, raise viscosity.
3) If it is difficult to apply grease at low temperatures in winter, warm the grease to room temperature first.
4) In an environment where coolant spatters or falls, grease lubrication performance may significantly decrease due to emulsified lubricant and washing. Keep coolant away from grease with cover, etc.

(2) NSK grease unit

NSK provides a hand operated grease pump and various types of grease in a bellows tube container (80 g/pc) that can be attached to a pump.

Grease in bellows tube container

	Name	(tube type)	Reference number
NSK Grease Unit			
NSK Grease (80g in bellows tube container)	NSK Grease AS2	Yellow	NSK GRS AS2
	NSK Grease PS2	Orange	NSK GRS PS2
	NSK Grease LR3	Green	NSK GRS LR3
	NSK Grease LG2	Blue	NSK GRS LG2
	NSK Grease LGU	Yellow	NSK GRS LGU
	NSK Grease NF2	Gray	NSK GRS NF2
NSK Hand Grease Pump Unit			
NSK Hand Grease Pump (One straight nozzle NSK HGP NA1 provided in the unit)			NSK HGP
Grease nozzle (Used for the above)			
	NSK straight nozzle		NSK HGP NZ1
	NSK chuck nozzle		NSK HGP NZ2
	NSK fitting nozzle		NSK HGP NZ3
	NSK point nozzle		NSK HGP NZ4
	NSK flexible nozzle		NSK HGP NZ5
	NSK flexible extension pipe		NSK HGP NZ6
	NSK straight extension pipe		NSK HGP NZ7
	NSK MCH exclusive fitting nozzle		NSK HGP NZ8

(3) Compliance with RoHS Directive

Products in the catalog (products with specifications for special environments excluded) are RoHS Directive-compliant.
Please consult with NSK for special parts or special lubricants requested by a customer as well as customer-supplied products.

(4) Warranty period and scope

1) Warranty period

The period of warranty is one year from the date of delivery of the product or 2,400 operation hours, whichever comes first.

2) Scope of warranty

- The warranty applies to the product supplied by NSK (excluding consumable parts).
- The warranty does not apply to products supplied by the user or other companies.
- If the product fails during the warranty period, NSK will repair it free of charge.
- The user shall be charged for repairs outside the warranty period..
- The price of the product NSK supplies does not include service expenses such as dispatch of engineers.
- If set up, service, or adjustment is required by our engineers during the warranty period, the user will be charged for it. In such cases, the amount we charge is based on our schedule of fee-based services.

3) Exemptions

NSK reserves the right to invalidate the warranty during the warranty period if the following applies.

- The product has broken down as a result of installation or operation not compliant with the operating instruction book specified by NSK
- The product has broken down as a result of inappropriate handling, usage, modification or careless handling by the user.
- The product has broken down due to causes not related to NSK.
- The product has broken down as a result of modification or repair undertaken by a party other than NSK.
- The product has broken down as a result of force majeure, such as natural disasters, beyond NSK's responsibility.

Warranty mentioned here is extended only to our product. NSK is not responsible for consequential damage resulting from malfunction of our product.

(5) Applications for special purposes

This product is intended for general industrial use. It is not designed or manufactured for use in situations and environments that may affect human life.

Please contact NSK ahead of time if the product is to be usedfor special purposes, such as nuclear control, aerospace instruments, medical equipment or equipment for a variety of safety devices.

NSK products are manufactured under stringent quality control. However, we recommend that safety devices be installed if fault or malfunction of our product used in conjunction with specific equipment may result in a serious accident or damage.

XY-21 Checklist for table requirements specification

Checklist for XY table requirements specification

Form for customers and Giren

Items with ◎ are minimum requirements for selection. Fill out the items with details as much as you can.

◎Company name _____ Date _____

◎Name _____ ◎Department you belong _____

◎Person in charge of NSK _____ ◎Contact details Phone Fax No. Email _____

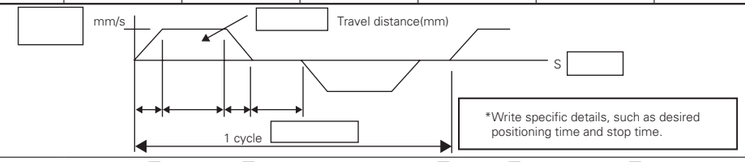
◎Usage and device name (specific details unless it has little effect)								
◎Installation type	Horizontal (suspended), on a wall, vertical							
◎Attachments	Yes (Material type)/No							
In case of Yes, you don't need to copy it to the following table.								
	Item	Unit	X-axis	Y-axis	Z-axis	θ axis	( ) axis	( ) axis
Specifications	Guide/drive ◎	——				°		
	Effective stroke ◎	mm				°		
	Stroke limit ◎	mm						
	Carrier dimensions ◎	mm						
	Installation space ◎	mm						
	Ball screw lead	mm						
	Resolution	μm/pulse						
	Load mass ◎	kg						
	External load ◎	N						
	Travel speed ◎	mm/s						
	Acceleration time ◎	s				S-1		
	1-cycle time	s						
	Main material Specified/Not specified	Material						
	Surface treatment Specified/Not specified	Type						
Accuracy	Repeatability ◎	μm					sec (")	
	Positioning ◎	μm					sec (")	
	Squareness of XY motion	μm						
	Parallelism A of XY motion	μm						
	Backlash	μm					sec (")	
	Special notes for accuracy measurement (Write specific details if you have any special request when measuring accuracy.)							
Scope of manufacturing	Configuration	Inquiry						
	Table	Yes/No/Supplied						
	Motor (Manufacturer, type)	Yes/No						
	Driver (Manufacturer, type)	Yes/No						
	Sensor (Manufacturer, type)	Yes/No						
	External encoder (Linear scale)	Yes/No						
	Other (Option)	Yes/No						
Other/requested items	Cycle pattern ◎ 1-cycle diagram Attach a separate sheet if there are several patterns.							
	Environmental conditions ◎	Service environment ☐ General ☐ Oil, water, chemicals, etc. ☐ Clean ☐ Chip and dust ☐ Other Applicable temperature ☐ 22 to 24°C ☐ 10 to 24°C ☐ Other(°C) *Contact NSK for information on the proper environment which guarantees the specified accuracy, and the recommended storage environment.						
	Product information Existence of supplied parts Supplemental Free space Special environment Degree of vacuum							

Table of contents

AS-1 Coding of Reference Number

Example of reference number coding GLS 50 A 125 / 100- ***

- GLS: Air bearing slide
- 50: Guide rail width. In case when two or more guide rails are to be used; outside dimensions
- A: Type
- 125: Table length [mm]
- 100: Stroke [mm]
- ***: Design No.

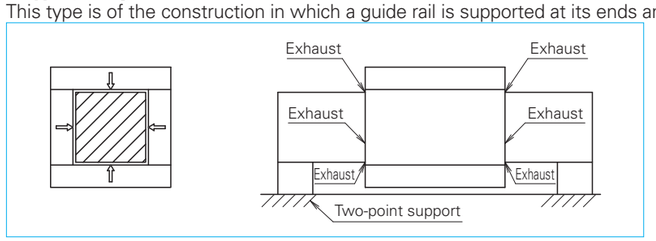
In case when a drive system is added, it is expressed as follows.(See page 3.)

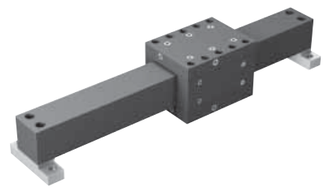
XY-A*□□□□-***

AS-2 Construction

A type (for light load)

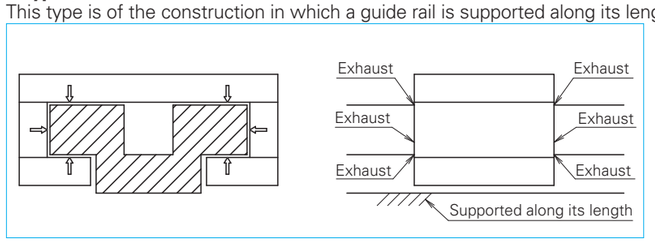
This type is of the construction in which a guide rail is supported at its ends and is best-suited for light load application.

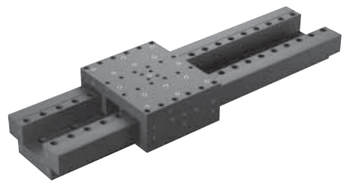




B type (for medium load)

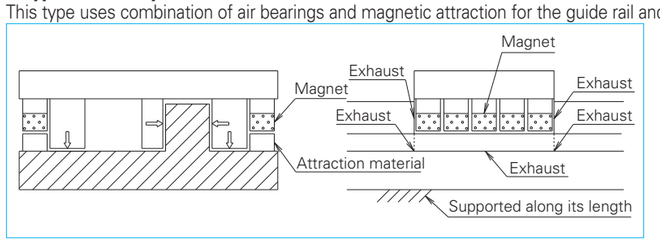
This type is of the construction in which a guide rail is supported along its length and is best-suited for medium load application.

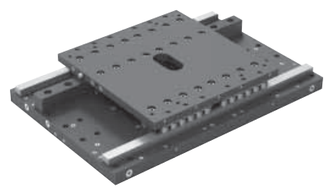




C type (for heavy load)

This type uses combination of air bearings and magnetic attraction for the guide rail and is best suited for heavy load and long stroke application.





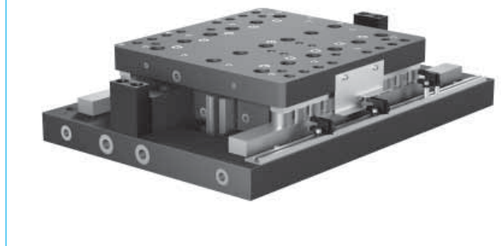
In each figure, the hatched area indicates the guide rail (fixed).
An arrow ⇨ shows the point from which compressed air is injected.

AS-3 Features

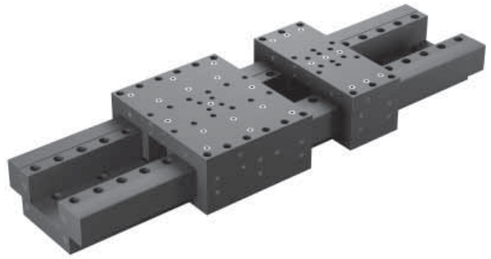
1. **High rigidity and low consumption flow rate obtained by adopting porous restrictor type aerostatic bearing**
2. **Seizure reduced by using alumina ceramic for structural materials and graphite with good sliding properties for bearing materials**
3. **Provides special air bearing slide depending on intended use**

AS-4 Example of Special-Purpose Products

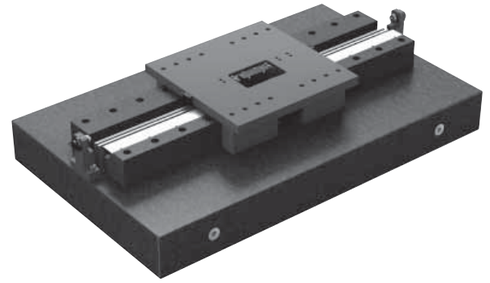
B type (linear motor drive)



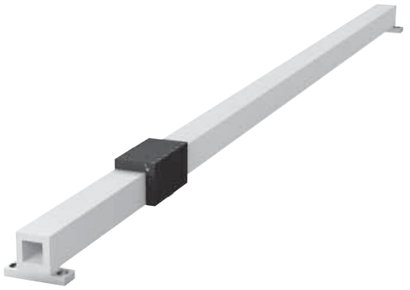
C type (linear motor drive)



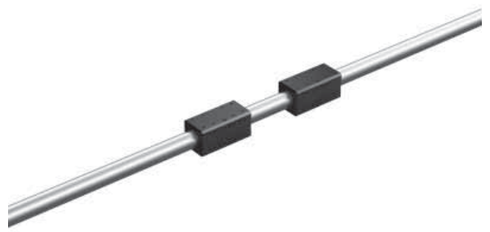
B type (double-slider)



C type (linear motor drive/long)



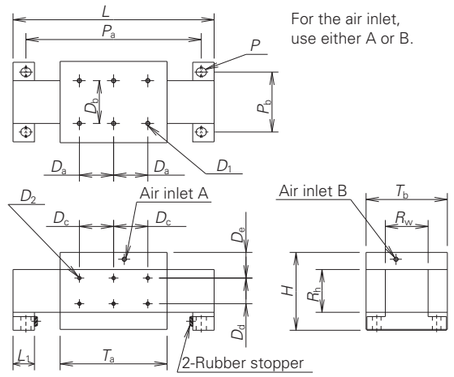
L type (long)



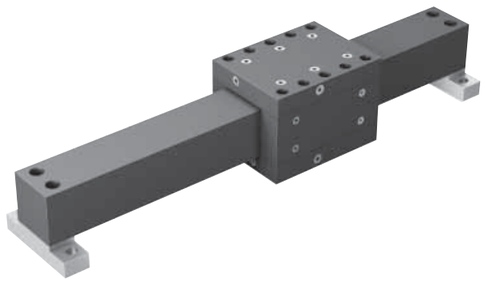
R type (long)

AS-5 Types of Air Bearing Slide

(1) A type air bearing slide



For the air inlet, use either A or B.



The color is subject to change without notice.

Dimensions **Unit: mm**

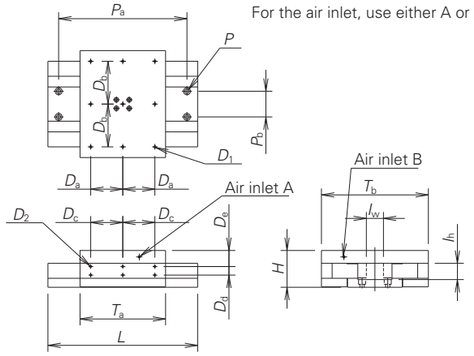
Reference No.	Table dimensions						Table mounting dimensions							Base mounting dimensions			Rail dimensions	
	Stroke	T_a	T_b	H	L	L_1	D_a	D_b	D_1	D_c	D_d	D_e	D_2	P_a	P_b	P	R_w	R_h
GLS35A75/25	25	75	70	61	155	23.5	50	35	4-M4	38	—	30	2-M4	135	50	Hole for M6	35	30
50	50				180									160				
100	100				230									210				
GLS35A110/25	25	110	70	61	190	23.5	45	35	6-M4	36	—	30	3-M4	170	50	Hole for M6	35	30
50	50				215									195				
100	100				265									245				
GLS50A125/25	25	125	95	91	215	28.5	40	50	6-M5	80	30	30	4-M4	185	70	Hole for M8	50	50
50	50				240									210				
100	100				290									260				
200	200				395									365				
300	300				495									465				
400	400				595									565				
500	500				695									665				
GLS50A175/200	200	175	95	91	445	28.5	75	50	6-M5	60	30	30	6-M4	415	70	Hole for M8	50	50
300	300				545									515				
400	400				645									615				
500	500				745									715				
GLS80A175/250	250	175	140	131	495	28.5	60	80	6-M6	50	50	40	6-M5	465	110	Hole for M10	80	80
500	500				745									715				
600	600				845									815				
700	700				945									915				
800	800				1045									1015				

Specifications **Air pressure: 0.4 MPa**

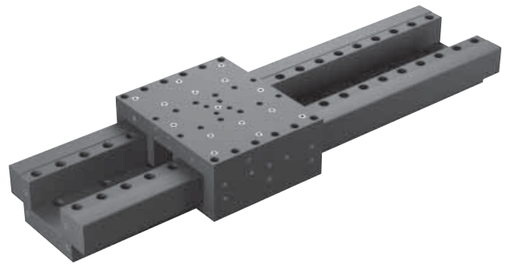
Reference No.	Bearing rigidity (N/μm)		Bearing load capacity (N)		Straightness (μm/100mm)		Bearing air consumption flow rate (L/min) (Normal)	Movable part mass (kg)
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal		
GLS35A75	85	60	85	60	0.3	0.2	5	1
GLS35A110	120	90	120	90	0.3	0.2	7	1.5
GLS50A125	250	200	250	200	0.3	0.3	8	2.7
GLS50A175	350	280	350	280	0.3	0.3	12	4
GLS80A175	570	470	570	470	0.3	0.3	25	7.5

Note 1) For the bearing rigidity, given in the table above are the values only for the air bearing in which elastic deformation of guide is not taken into account.
Note 2) For the straightness, the values at no-load are given in the table above. These values are larger in proportion to the load.
Note 3) For the movable part mass, the values in case of alumina/ceramic material are given.

(2) B type air bearing slide



For the air inlet, use either A or B.



The color is subject to change without notice.

Dimensions **Unit: mm**

Reference No.	Table dimensions					Table mounting dimensions							Base mounting dimensions			Center opening	
	Stroke	T_a	T_b	H	L	D_a	D_b	D_1	D_c	D_d	D_e	D_2	P_a	P_b	P	I_w	I_h
GLS115B150/50	50	150	160	76	200	50	50	9-M5	50	—	40	3-M4	100	—	Hole for M6	25	39
100	100				250												
150	150				300												
200	200				350												
250	250				400												
300	300				450												
GLS200B200/50	50	200	250	86	250	75	100	9-M5	75	20	37.5	6-M4	100	60	Hole for M8	40	35
100	100				300												
150	150				350												
200	200				400												
250	250				450												
300	300				500												
GLS240B250/50	50	250	300	105	300	100	120	9-M6	100	20	45	6-M5	100	80	Hole for M10	60	40
100	100				350												
150	150				400												
200	200				450												
250	250				500												
300	300				550												

Specifications **Air pressure: 0.4 MPa**

Reference No.	Bearing rigidity (N/μm)		Bearing load capacity (N)		Straightness (μm/100mm)		Bearing air consumption flow rate (L/min) (Normal)	Movable part mass (kg)
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal		
GLS115B150	250	120	500	240	0.2	0.2	6	4
GLS200B200	470	400	940	800	0.2	0.2	15	9
GLS240B250	690	570	1 380	1 140	0.2	0.2	21	17

Note 1) For the bearing rigidity, given in the table above are the values only for the air bearing in which elastic deformation of guide is not taken into account.
Note 2) For the movable part mass, the values in case of alumina/ceramic material are given.

(3) C type air bearing slide

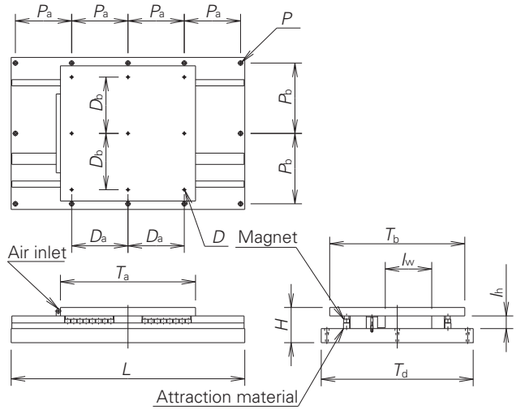
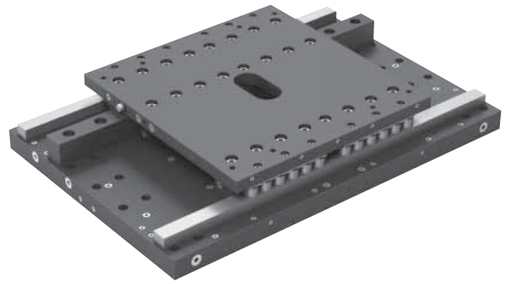


Fig. 3·3



The color is subject to change without notice.

Dimensions **Unit: mm**

Reference No.	Table dimensions					Table mounting dimensions			Base mounting dimensions			Center opening	
	Stroke	T_a	T_b	H	L	D_a	D_b	D	P_a	P_b	P	l_w	l_h
GLS40C480/350	350	480	480	125	830	200	200	9-M8	200	200	Hole for M8	165	45
700	700			195	1 200								
1 000	1 000			225	1 500								

Specifications **Air pressure: 0.4 MPa**

Reference No.	Bearing rigidity (N/μm)		Bearing load capacity (N)		Straightness (μm/100mm)		Bearing air consumption flow rate (L/min) (Normal)	Movable part mass (kg)
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal		
GLS40C480	600	500	1 200	1 000	0.2	0.2	24	30

Note 1) For the bearing rigidity, given in the table above are the values only for the air bearing in which elastic deformation of guide is not taken into account.
Note 2) For the movable part mass, the values in case of alumina/ceramic material are given.
Note 3) For the air bearing slide with the reference number marked with an asterisk (*), a stone surface plate is used for the base.
Note 4) For the sliders with a stroke of more than 1,000 mm, please consult with NSK separately.

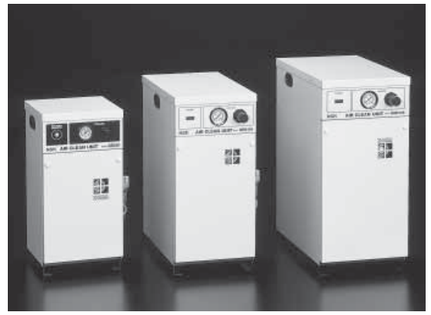
AS-6 Option

(1) Air cleaner unit

Specifications

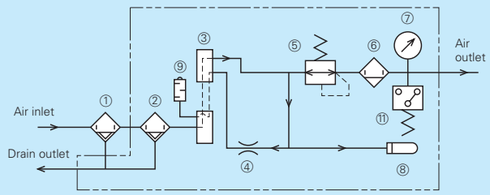
Characteristics \ Reference No.	GBD01B	GBD10B	GBD30B
Air flow capacity	20	100	300
Supply air pressure range	0.38～0.88	0.4～1.0	
Power voltage	Unnecessary	AC100	
Oil mist concentration on secondary side	*Less than 100 particles of 0.3 μm or larger in size per 28.3L		
Nominal filtration rating	0.01(95% collected particle size)		
Dew point (under atmospheric pressure)	−20	−17	
Reducing valve setting range	0.05～0.7	0.05～1.0	
Drain connector diameter	Rc1/4		
Air inlet/outlet connector diameter	Rc1/4		Rc3/8
Safety function	Filter clogging indicator		
Mass	11	25	30

(Note) The value marked with an asterisk (*) is to be obtained at the time when the oil mist discharging from the compressor has a concentration of 30 mg/m^3.

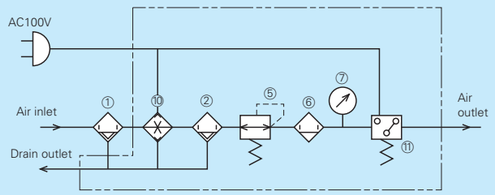


Block diagram

GBD01B type (Membrane module type)



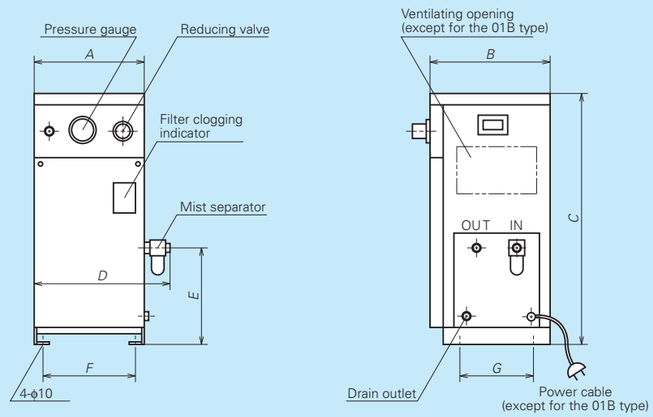
GBD10B, 30 B type (Refrigerating air dryer type)



- ●Air cleaner unit indispensable for NSK air bearing unit.
- ●Compact and space-saving air cleaner unit of package type in which a refrigerating dryer, air filter, super mist separator, decompression valve, etc. are housed.
- ●A color indicator(safety monitor) is provided for all models denoting the filter clogging condition.

①Mist separator
②Micro mist separator
③Filter module
④Throttle
⑤Reducing valve
⑥Super mist separator
⑦Pressure gauge
⑧Dew point indicator
⑨Silencer
⑩Refrigerating dryer
⑪Pressure switch

Outside drawing



Dimensions **Unit: mm**

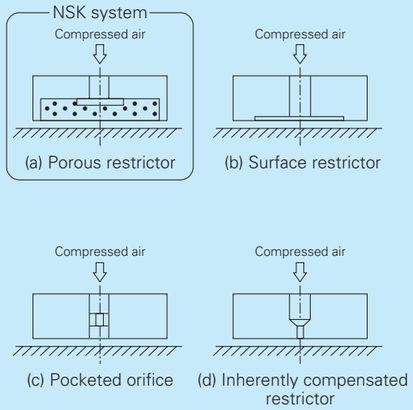
Reference No.	*A*	*B*	*C*	*D*	*E*	*F*	*G*
GBD01B	250	250	500	318	230	220	190
GBD10B	255	440	550	323	260	225	380
GBD30B	280	480	600	360	270	250	420

AS-7 Technical Description of Air Bearing Slide

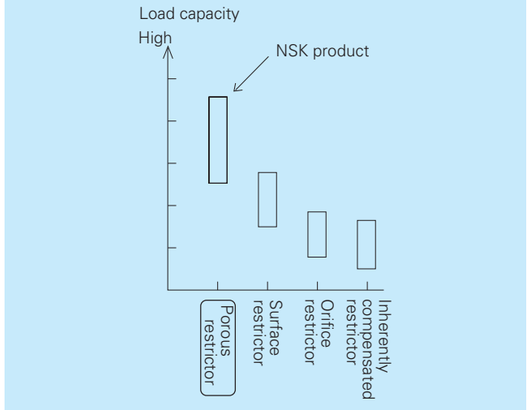
(1) Principle and features

- By machining the guide rail and air bearing slide parts with high accuracy, straightness in submicrons is realized.
- The ideal compactness, high rigidity, and low consumption flow rate are achieved by use of a porous restrictor for the air bearing.
- Since the structural materials are made of ceramics, high accuracy can be maintained for a long period of time.
- Since a slider is supported by air film in contactless manner, sliding resistance is very low, thus leading to the improvement in accuracy of motion (low vibration, high accuracy positioning, low velocity ripple, etc.)
- The air bearing slide is lubricated with dry and clean air. The dry and clean air will cause no environmental contamination which is not the case with lubricating oil. The air bearing slide can be used for very clean applications.

*This air bearing slide can be used with various types of drive systems.

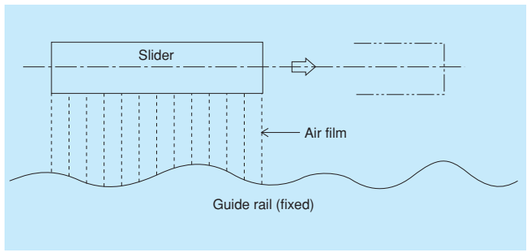


Type of restrictor



Comparison of restrictors and bearing performance

"The air bearing slide is floating on compressed air film and is not susceptible to influence of bearing surface profile and surface roughness. This provides equalized floating. Owing to the equalization effect; the straightness and repeatability of movable parts can be improved.



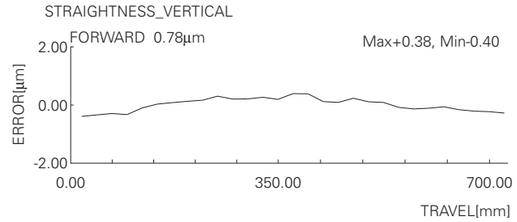
Comparison of bearing characteristics

Item \ Type	Aerostatic bearing	Hydrostatic bearing	Ball bearing
Accuracy of motion	◎	○	△
Stiffness	○	◎	◎
Load capacity	△	◎	△
Vibration	◎	○	△
Damping	○	◎	◎
Heat generation	◎	○	△
Service life	◎	◎	△
Dust generation	◎	△	○
Cost	○	△	◎

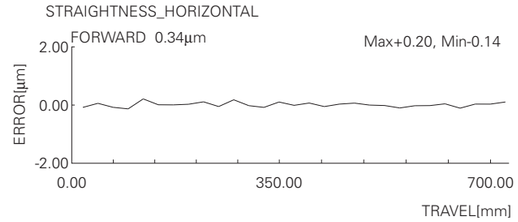
(2) Example of performance evaluation data

Target product: XY-AS0070—8＊＊—＊＊＊
Guide: Air bearing slide
Drive system: Coreless linear motor

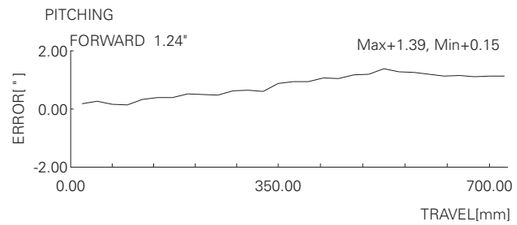
· Straightness (vertical)



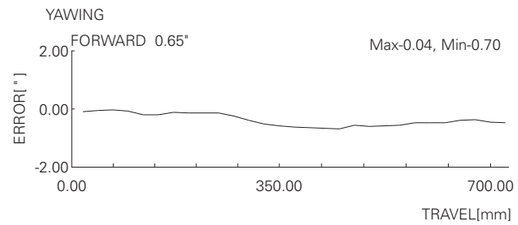
· Straightness (horizontal)



· Pitching



· Yawing



·Speed ripple

●Measurement conditions

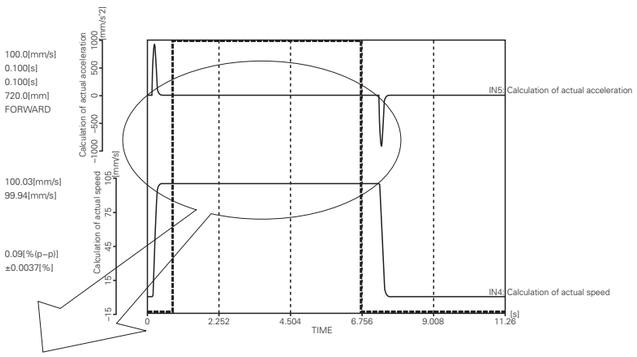
· Atmospheric temperature	22.44[°C]	· Command pattern	
· Humidity	50.00[%]	· Command speed	100.0[mm/s]
· Atmospheric pressure	101.3[kPa]	· Acceleration time	0.100[s]
· Motor resolution	0.1000[μm/p]	· Deceleration time	0.100[s]
· Sampling period	10.00[ms]	· Measurement distance	720.0[mm]
· In-position signal	None	· Measurement direction	FORWARD
· Driver setting: Setting width for positioning	0.0[μm]		
· Driver setting memo (text)			

●To be evaluated IN4: Calculate actual speed.

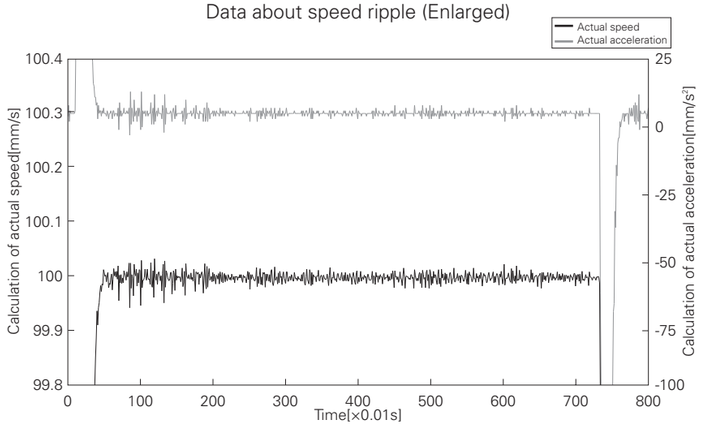
· Evaluated section	0.8000–6.7000[s]	· Maximum value	100.03[mm/s]
· Average value	99.99[mm/s]	· Minimum value	99.94[mm/s]

●Evaluation results

· Average speed	99.996[mm/s]		
· Speed ripple	±0.045[%]	· Speed ripple(p–p)	0.09[%(p–p)]
· Speed accuracy	±0.0037[mm/s]	· Speed accuracy(%)	±0.0037[%]



Data about speed ripple (Enlarged)

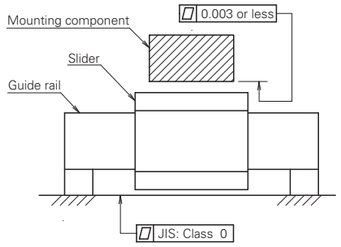


AS-8 Precautions for Handling of Air Bearing Slide

1. Air supply
   1) Supply clean, dry air. We recommend the use of NSK Air Clean Unit.
   2) Follow the prescribed air supply method. For additional safety, set up an interlock circuit in case of a drop in air supply pressure.

2. Mounting components
   1) Build the components so that the surface accuracy of the face mounted on the air bearing slide is up to 0.003 mm.
   2) If a component with poor flatness is mounted, the bearing may be deformed and cause malfunctions due to the very small bearing gap in the air bearing slide.

3. Accuracy of the air bearing slide installation surface
   1) Install the air bearing slide on the surface with accuracy of JIS class 0 or better. Poor accuracy of the installation surface adversely affects straightness accuracy.
   For best bearing performance, do not install the air bearing slide in an enclosed space or block the exhaust outlet while it is in use.



4. Precautions in assembly
   1) When mounting a component on the air bearing slide, make sure that compressed air is supplied to the air bearing slide as prescribed.
   2) The bearing is made with material that slides well. Do not operate the air bearing slide or fit components to it without air supply as it may damage the bearing and result in malfunction.

5. Exhaust disposal in the air bearing slide
   1) Due to the design of the air bearing slide, load capacity may drop or the air bearing may lock when the air exhaust outlet is blocked. Pay attention to mounting components around the exhaust outlet to ensure a smooth exhaust disposal from the exhaust outlet.

6. Environment

Service environment

No.	Item	Criteria
1	Temperature	18°C～24 °C, temperature change ± 1°C or more
2	Humidity	50±10%(no condensation)
3	Cleanness	No dust (clean room recommended)

Storage environment

No.	Item	Criteria
1	Temperature	20°C ± 10°C
2	Humidity	50±20%(no condensation)
3	Cleanness	No dust (clean room recommended)

Note: When the material of the air bearing slide and surface plate mounted onto it have different thermal expansion coefficients, the guaranteed accuracy may not be reproduced even if the service temperature change is in the specified range. If the temperature change has exceeded the standard range, loosen the tightening bolt of the mounting material, adjust the temperature (for 1 to 3 days), then reassemble.

Checklist for air bearing slide requirements specification

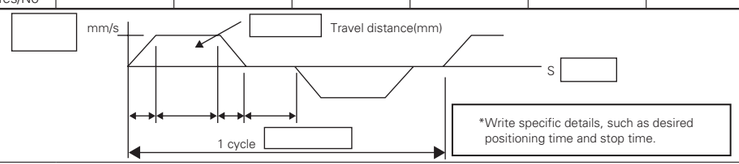
Form for customers and Giren

Items with ◎ are minimum requirements for selection. Fill out the items with details as much as you can.

◎Company name _____ Date _____

◎Name _____ ◎Department you belong _____

◎Person in charge of NSK _____ ◎Contact details Phone Fax No. Email _____

◎Usage and device name (specific details unless it has little effect)								
◎Installation type	Horizontal (suspended), on a wall, vertical							
◎Attachments	Yes (Material type)/No							
In case of Yes, you don't need to copy it to the following table.								
	Item	Unit	X-axis	Y-axis	Z-axis	θ axis	( ) axis	( ) axis
Specifications	Guide/drive ◎	——						
	Effective stroke ◎	mm						
	Stroke limit ◎	mm						
	Carrier dimensions ◎	mm						
	Installation space ◎	mm						
	Resolution	μm/pulse						
	Load mass ◎	kg						
	External load ◎	N						
	Travel speed ◎	mm/s						
	Acceleration time ◎	s						
	1-cycle time	s						
	Main material Specified/Not specified	Material						
	Surface treatment Specified/Not specified	Type						
Accuracy	Repeatability ◎	μm						
	Positioning ◎	μm						
	Speed ripple ◎	±%						
	Squareness of XY motion	μm						
	Straightness ◎	μm						
	Pitching	"						
	Yawing	"						
	Special notes for accuracy measurement (Write specific details if you have any special request when measuring accuracy.)							
Scope of manufacturing	Configuration	Inquiry						
	Air bearing slide	Yes/No/Supplied						
	Motor (Manufacturer, type)	Yes/No						
	Driver (Manufacturer, type)	Yes/No						
	Sensor (Manufacturer, type)	Yes/No						
	External encoder (Linear scale)	Yes/No						
	Other (Option)	Yes/No						
Other/requested items	Cycle pattern 1-cycle diagram ◎ Attach a separate sheet if there are several patterns.							
	Environmental conditions ◎	Service environment ☐ General ☐ Clean ☐ Other Applicable temperature ☐ ±1°C between 18 to 24°C ☐ Other(～ °C) *Contact NSK for accuracy guarantee environment and storage environment.						
	Product information Existence of supplied parts Supplemental Free space Special environment Degree of vacuum							

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<As of January 2015>
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CAT. No.E3418 2015 Z-X Printed in Japan ©NSK Ltd. First edision published in APR. 2006