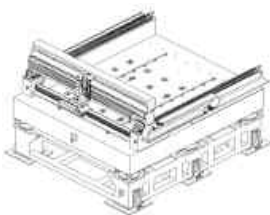
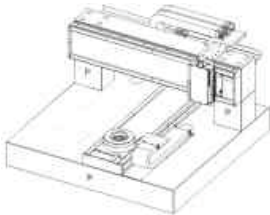
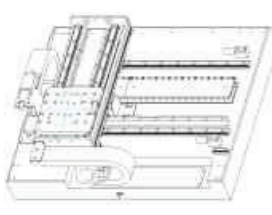


Types and Specifications of Stages

□ Types and Specifications (With LM Guide)

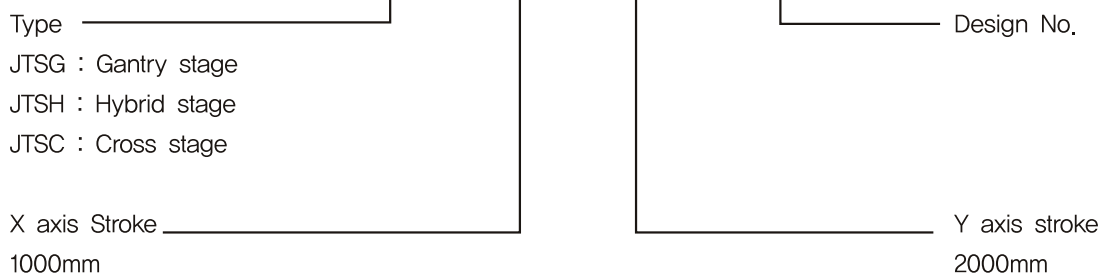
Attributes		Gantry Type	Hybrid Type	Cross Type
Stage type				
Features		Effective space	Structural stability and control performance based on the isolated XY-axis	High precision control enabled by minimized Abbe error
Relative area occupation		1(Criteria)	2	4
Applications		LCD equipment G4,5,6,7,8,11(2200x2500, 3000x3300)		1500x1500
Max velocity(m/s)		2	2	2
Acceleration(m/s ²)		5(average) 10(peak)	2,5(average) 5(peak)	5(average) 10(peak)
Axis	position accuracy _{*1}	3~6	2~5	2~5
	repeatability(um)	±0,5~1	±0,5~1	±0,5~1
Stage	position accuracy _{*1} (um)	10~15	5~10	5~10
	repeatability(um)	±1	±1	±1
Speed Ripple		±0,1	±0,05	±0,2
Jitter		±0,02	±0,02	±0,02
Straightness (um)		Upper axis : 10~15 Lower axis : 5~10	Upper axis : 5~10 Lower axis : 3~6	Upper axis : 5~10 Lower axis : 3~6
Squarness (um)		10~20	10	10
Flatness (um)		Upper axis : 20~30 Lower axis : 8~15	Upper axis : 3~6 Lower axis : 5~10	Upper axis : 10~15 Lower axis : 5~10
Yaw (arcsec)		Upper axis : 5~10 Lower axis : 3~5	Upper axis : 3~5 Upper axis : 3~5	Upper axis : 10~15 Lower axis : 5~10
Pitch (arcsec)		Upper axis : 5~15 Lower axis : 3~5	Upper axis : 3~5 Lower axis : 3~5	Upper axis : 10~15 Lower axis : 5~10

* Note 1 : after compensation, Note 2 : In case of running at a velocity of 0,2 m/s

* The above specifications are for reference only and may change depending upon the work environment

□ Model Name

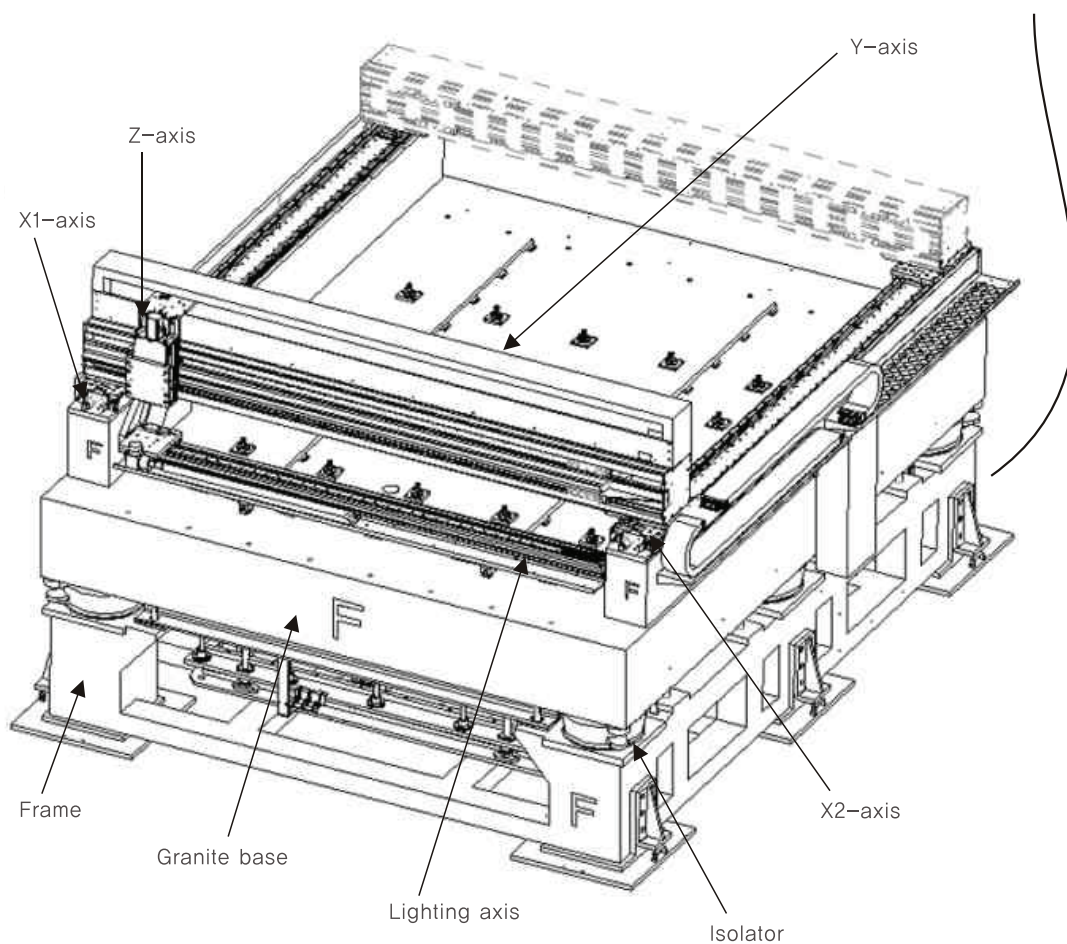
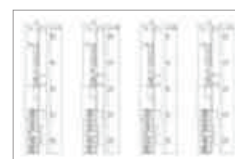
JTSG 1000 2000 - 00



□ System Structure

Controller

Servo driver



LM bearing stages

Standard Frame-Based Gantry Stages

□ Features

- Steel pipe frame design incorporating a high degree of stiffness and minimal resonance, based on FEM analysis
- Improved controllability by use of a new control algorithm mitigating vibration
- Stiff and lightweight upper beam made of composite material (optional)



□ Specifications (Gen. 8~11)

(Pic) Frame-based standard gantry stage

Parameter	Units	X1,X2	Y	Remark
Moter	-	JTKCA050	JTKC5650	Ironcore Type
Dimension	-	3720	3000	Gen. 8
Effective	mm	2700	2400	Gen. 8
Payload	kg	-	140	-
Accuracy	um	2	2	After compensation
Repeatability	um	±1	±1	-
Straightness	um	20	30	-
Flatness	um	40	40	-
Yaw	arcsec	20	20	-
Pitch	arcsec	20	20	-
Squareness	arcsec	-	±5	-
Velocity	mm/s	1600	1600	Maximum
Acceleration	m/s ²	5	5	Average
Speed ripple	%	±0,2/100	±0,2/100	At 100mm/s
Settling time	ms/ln-pos. band(um)	650/±0,5	250/±0,5	200mm move at 400mm/s
In-position stability	um	±0,1	±0,1	-

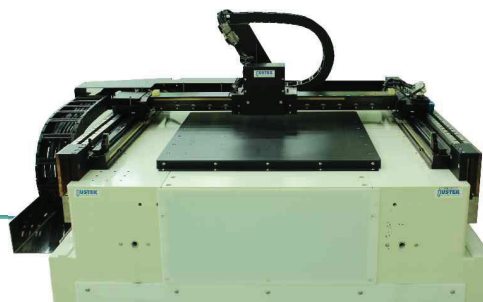
Acu-Positioner II



□ Specifications

Parameter	Units	ACPII400400	ACPII500500	ACPII600600	Remark
Stroke	mm	400X400	500X500	600X600	-
Motor	N	Upper Axis : JTKL3619 (312N)			Coreless
		Lower Axis : JTKC5625 (690N)			Ironcore
Load Mass	kg	20kg			-
Resolution	um	0,1 / 0,5 / 1			-
Accuracy	um	10			After compensation
Repeatability	um	±2			-
Straightness	um	15			-
Flatness	um	20			-
In-pos. Stability	um	0,5			Resolution 0,1um
Velocity	mm/s	2500			Maximum
Acceleration	m/s ²	20			-

Acu-Positioner III



□ Specifications

Basic Model		JTSG – Acu 600*400	JTSG – Acu(D) 600*400
Total Travel		600 * 400	
Motor	Lower axis	Single JTKL5139	Dual JTKL5139
	Upper axis	JTKL3619	
Driver		Direct PWM Amplifier : JSMD-0xD	
		Servo Driver compatible Field Bus (EtherCat [□] *1, MACRO [□] , MechatroLink3 [□] *1)	
Bus Voltage		Up to 340VDC	
Feedback		Noncontact Linear Encoder	
Resolution		4,88nm ~ 1,0um	
Maximum Speed		2m/s	3m/s
Maximum acceleration *2		30m/s ²	50m/s ²
Carriage Moving Mass		5kg	
Lower axis moving mass		35kg	

* Note 1 : to be released on the market Note 2 : acceleration may vary, depending upon load
 * Mechatrolink is the registered trademark of Yaskawa

LM bearing stages

Cross Stage



(Pic) JTSC07500750

Axis	X	Y
Workspace	750	550
Bearing	LM bearing	
Payload	–	100kg
Velocity	500mm/s	
Acceleration	3m/s ²	
Accuracy	10um	
Repeatability	±1um	
Options	bellows cover, granite base assembly	
Applications	laser machining, general-purpose inspection equipment	

Hybrid Stages



(Pic) JTSH12800790

Axis	X	Y
Workspace	1280	790
Bearing	Air-bearing	LM bearing
Payload	40kg/T axis	50kg/Z axis
Velocity	0,3m/s	
Acceleration	3m/s ²	
Accuracy	±2um	
Repeatability	±1um	
Options		
Applications	Inkjet machine for electronic materials, etc.	

Gen. 8 High Acceleration Gantry Stages



<Pic> JTSG26002300

Axis	Y1,2	X1,2
Workspace	2600	2300
Bearing	LM Bearing	
Payload	215kg(Head)	
Velocity	1,6m/s	
Acceleration	4m/s ²	
Accuracy	10um	
Repeatability	±1um	
Options	Z axis and lighting axis	
Applications	laser repair machine	

Gen 5.5 Gantry Stages



<Pic> JTSG19001600

Axis	X1,2	Y
Workspace	1900	1600
Bearing	LM Bearing	
Payload	30kg(head)	
Velocity	500mm/s	
Acceleration	2m/s ²	
Accuracy	2um	
Repeatability	±1um	
Options	glass up/down & lighting axis	
Applications	machine for FPD glass thickness and height, etc.	

LM bearing stages

LM bearing stages

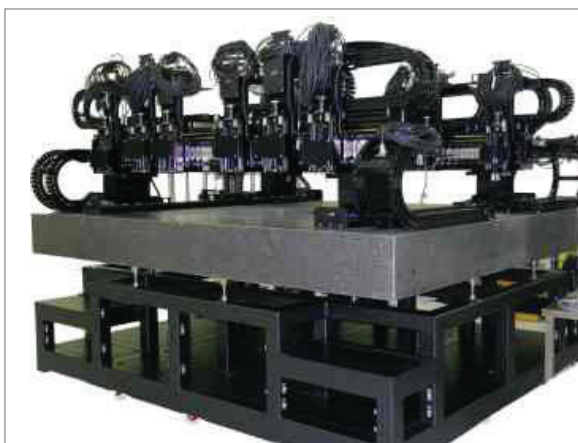
Gen 8 Dual Gantry Stages



<Pic> JTSGD26002600

Axis	X1~3	Y1~4
Workspace	2600	2600
Bearing	LM bearing	
Payload	30kg(head)	
Velocity	500mm/s	
Acceleration	1m/s ²	
Accuracy	8um	
Repeatability	±1um	
Options		
Applications	FPD glass/auto prober, etc.	

Multi Mover Dual Gantry Stages

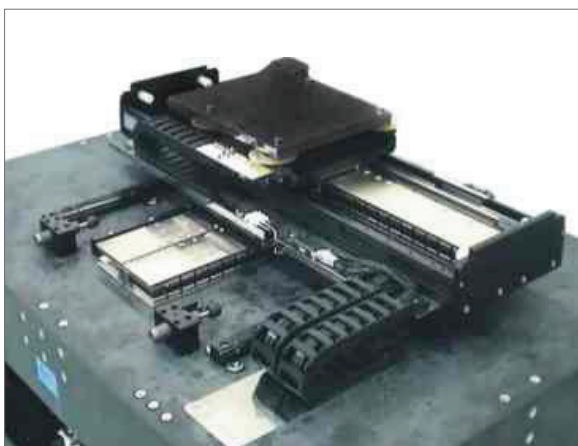


<Pic> JTSGD21002100

Axis	X1~4	Y1~12
Workspace	2100	2100
Bearing	LM Bearing	
Payload	40kg(Head)	
Velocity	500mm/s	
Acceleration	1m/s ²	
Accuracy	10um	
Repeatability	±1um	
Options		
Applications	measuring machine for FPD glass thickness	

High Speed High Precision Linear Motion Systems

300mm Wafer Cross Stages



<Pic> JTSC07000350

Axis	X	Y
Workspace	700	350
Bearing	LM bearing	
Payload	20kg	
Velocity	1.5m/s	
Acceleration	10m/s ²	
Accuracy	3um	
Repeatability	±1um	
Options		
Applications	semiconductor repair machine, etc.	

Water-proof Linear Motors



<Pic> Water-proof Linear motor

Axis	Linear motor
Workspace	1600
Bearing	LM bearing
Payload	500kg
Velocity	1200mm/s
Acceleration	5m/s ²
Accuracy	15um
Repeatability	±2um
Options	
Applications	edge grinders

LM bearing stages

High Acceleration Cross Stages



<Pic> JTSC09000900

Axis	X	Y
Workspace	900	900
Bearing	LM bearing	
Payload	380kg(Work Table)	
Velocity	1.5m/s	
Acceleration	10m/s ²	
Accuracy	5um	
Repeatability	±1um	
Options		
Applications	laser drilling machine, etc.	

Mini Multi - head Linear Motors



<Pic> Mini multi-head linear motor

Axis	Multi Head
Workspace	1000
Bearing	LM Bearing
Payload	10kg
Velocity	500mm/s
Acceleration	-
Accuracy	10um
Repeatability	±1um
Options	
Applications	glass scriber

Air Bearing Stages

Air bearing stages

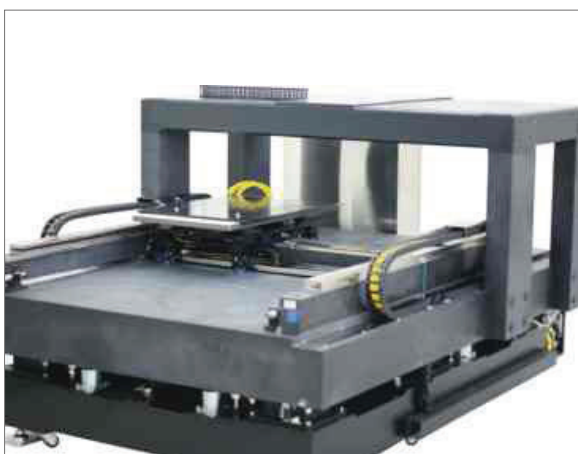
4G XYZ Ceramic Air Bearing Gantry Stages



<Pic> JTSG08000920

Axis	X1,X2	Y
Workspace	800	920
Bearing	granite air bearing	ceramic air bearing
Payload	30kg / Z axis	
Velocity/Acceleration	500mm/s	
Acceleration	5m/s ²	5m/s ²
Accuracy	±0,3um	
Repeatability	±0,1um	
Straightness	2um	
Jitter	±0,05um	
Application	precision length measuring machine, etc.	

5.5G XYT Planar Air Bearing Stages



<Pic> JTSH18000880

Axis	X1,X2	Y
Workspace	1800	880
Bearing	air bearing	
Payload	200kg / T axis	
Velocity/Acceleration	0,5m/s, 1m/s ²	
Accuracy	2um	
Repeatability	±1um	
Straightness	6um	-
Speed ripple	0,1%, @0,1m/s	
T axis	ball screw & R guide, ±3 degree	
Application	laser machining, LCD pattern inspection	

Justek Inc., Linear Motion Technology

Air bearing stages

Small XYZT Planar Air Bearing Stages



(Pic) JTSC05200520

Axis	X		Y	
Workspace	520mm	520mm	X 6mm(Z)	360 (T)
Bearing	Air Bearing			
Payload	20kg			
Acceleration	2m/s ²			
Accuracy	1um			
Repeatability	±0,5um			
Speed ripple	0,1% @100mm/s			
T axis, Z axis	DD Motor, Wedge Type			
Applications	Solar cell, Wafer production equipment			

XYZP Vertical Ceramic Air Bearing Stages



(Pic) Vertical ceramic air bearing stage

Axis	X(Scan)	Y(Step)
Workspace	700mm	800mm
Bearing	Ceramic Air Bearing	Air Bearing
Payload	100kg	-
Acceleration	2m/s ²	
Accuracy	±0,3um	1,1um
Repeatability	±0,2um	±0,2um
Speed ripple	±0,1%@ 10mm/s	-
Straightness	1,8um	2,4um
Applications	photo mask inspection machine	

Gen. 6 Planar Air Bearing Stages



(Pic) JTSC21000400

Axis	X1,2	Y
Workspace	2100	400
Bearing	Air Bearing	
Payload	250kg	
Velocity	800mm/s	
Acceleration	2m/s ²	
Accuracy	4um	
Repeatability	±1um	
Options	Theta Axis	
Applications	FPD glass/pattern inspection machine	

Gen 7.5 Hybrid Air Bearing Stages



(Pic) JTSH31002100

Axis	X	Y
Workspace	3100	2100
Bearing	Air Bearing	LM
Payload	400kg	50kg
Velocity	400mm/s	
Acceleration	1m/s ²	
Accuracy	5um	
Repeatability	±1um	
Options		
Applications	FPD glass/vision inspection machine	

Air bearing stages

Gen 4.5 Hybrid Air Bearing Stages



(Pic) JTSH21000400

Axis	X1,2	Y
Workspace	2100	400
Bearing	Air Bearing	LM
Payload	250kg	40kg
Velocity	800mm/s	
Acceleration	2m/s ²	
Accuracy	4um	
Repeatability	±1um	
Options	Theta axis	
Applications	LCD pattern inspection machine, etc.	

□ Applications

Automatic prober
 color filter inspection machine
 Edge grinding machine
 Vision inspection machine
 IR filter mounter
 Laser direct pattern marker
 Laser glass cutter
 Laser marker
 Laser via hole driller

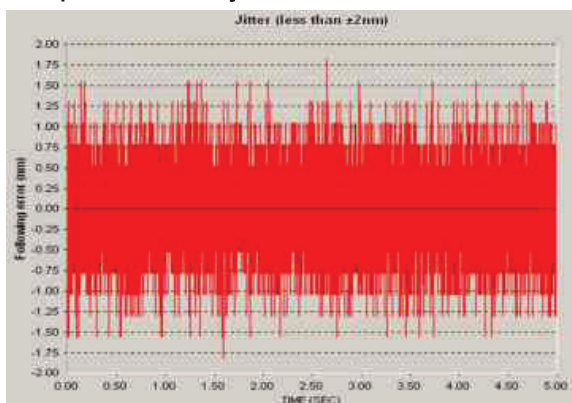
LCD cassette station
 LCD slit coater
 LCD laser trimmer
 LCD probe station
 Inkjet machine
 Laser repair machine
 Tape & reel machine
 Wafer dicer
 Automatic optical inspection machine

Motion Control Technologies

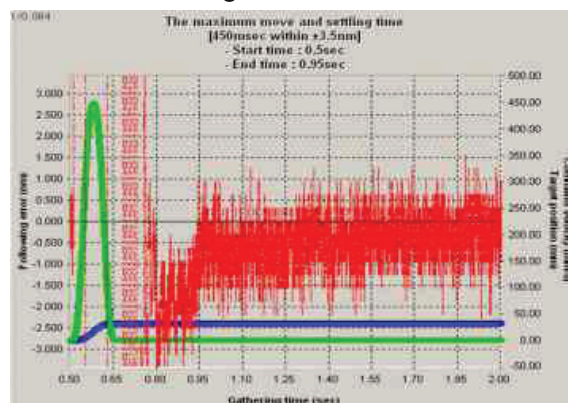
Control Algorithms

Justek motion stages are the optimal choice for high precision and high speed systems applications requiring very low jitter and a quick settling time

In-position Stability $\pm 2.0\text{nm}$

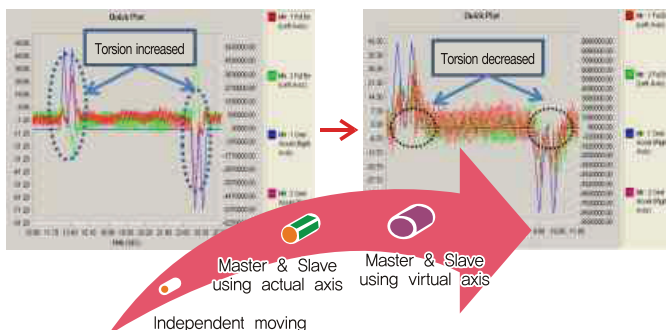


Move and Settling Time $450\text{m} \cdot \text{s} / \pm 3.5\text{nm}$

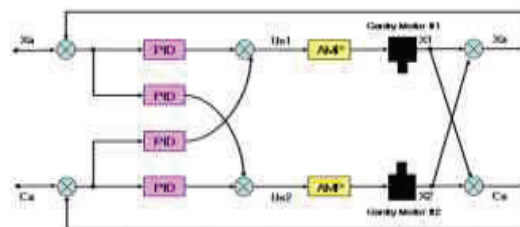


Gantry control algorithm

■ System torsion control by eliminating asynchronous control commands via virtual axis



Cross-coupling (Torsion control)



$$X1 \times X2 = \text{Position feedback of Motor1, 2}$$

$$Xa = 2 \times \text{Desired position}$$

$$Xa = (X1+X2) \text{ The sum of position feedback of 2 axes}$$

$$Ca = (X1-X2)$$

Vibration Suppression Algorithm

