GMT

Motorized Linear Stage

AFAQ

ISO 9001

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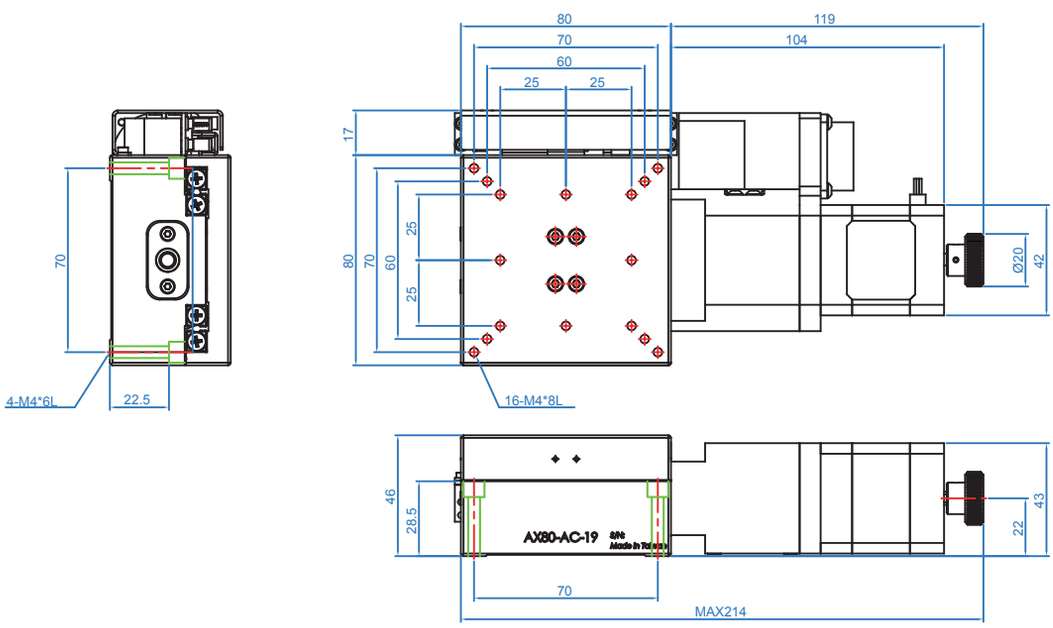
AX80-AC-19



◆Specification

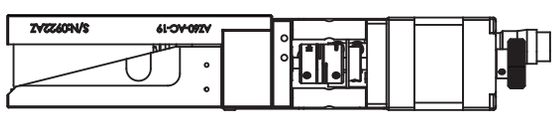
Model	Stage Size	Travel Distance	Weight (kg)	Feed Screw	Guide	Material	Surface Finish
AX80-AC-19	80*80	30	1.4	Ball Screw Ø8 Lead 1	Crossed-roller Guide	Aluminum Alloy	Black Anodized

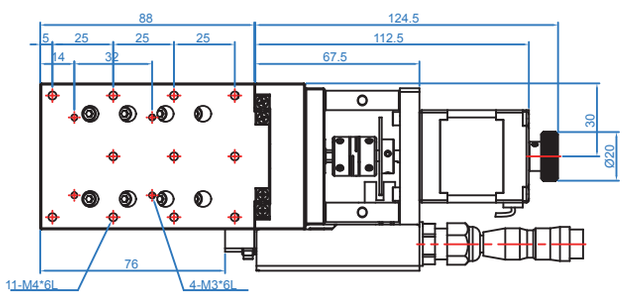
◆Accuracy Specification

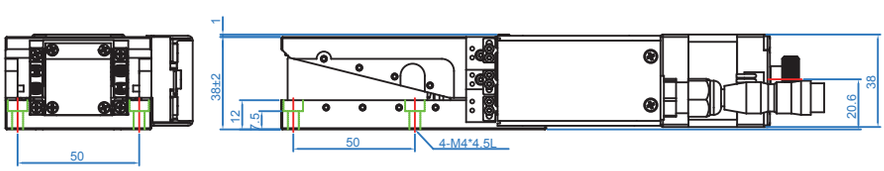
unit：mm

Resolution(/ pulse)		MAX Speed mm/sec	Positioning Accuracy	Repeated Positioning Accuracy	Load Capacity (kg)	Lost Motion	Backlash	Parallelism	Driving Parallelism
Full	Half								
1 μm	0.5 μm	10	5μm or less	±0.3μm	20	1 μm or less	0.5 μm or less	50 μm	10 μm or less

AZ60-AC-19L







◆Specification

unit：mm

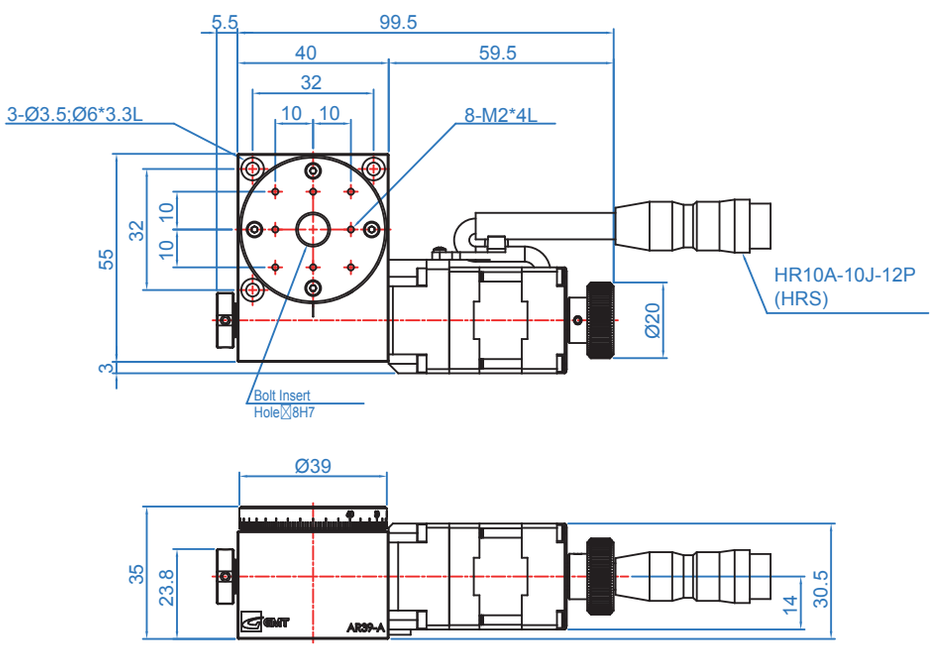
Model	Stage Size	Travel Distance	Weight (kg)	Feed Screw	Guide	Material	Surface Finish
AZ60-AC-19L	60*60	4	1.14	Ball Screw Ø8 Lead 1	Crossed-roller Guide	Aluminum Alloy	Black Anodized

◆Accuracy Specification

unit：mm

Resolution(/ pulse)		MAX Speed mm/sec	Positioning Accuracy	Repeated Positioning Accuracy	Load Capacity (kg)	Driving Parallelism
Full	Half					
0.25 μm	0.125 μm	25	7 μm or less	±0.05μm or less	7	50 μm or less

AR39-A



◆Specification

unit：mm

Model	Sensor Voltage(v)	Stage Size	Travel Distance	Feed Screw	Guide	Load Capacity (kgf)	Weight (kg)	Material	Surface Finish
AR39-A	DC5 or less	Ø39mm	360°	Worm Gear (1/120)	Deep Groove Ball Bearing	3	0.4	Aluminum Alloy	Black Anodized

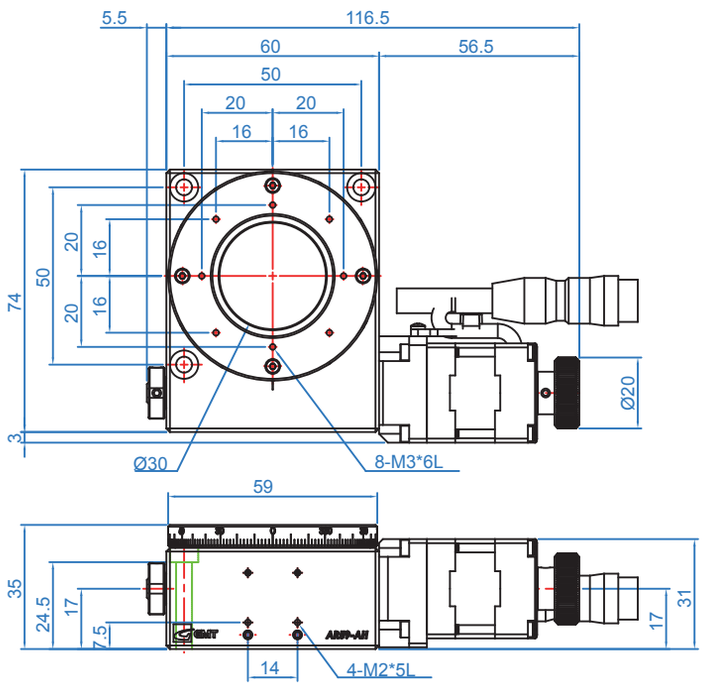
◆Accuracy Specification

unit：mm

Model	Positioning Accuracy	Moment Rigidity (”/N.cm)	Resolution(/ pulse)		MAX Speed /sec〔5kHz〕	Repeated Positioning Accuracy	Lost Motion	Backlash	Parallelism
			Full	Half					
AR39-A	within ±0.01°	0.74	0.006°	0.003°	30°	±0.01°	0.05°	0.1° or less	50 μm or less

★ Eccentricity is 5μm or less ; plane fluctuation is 30μm or less。

AR59-A



Specification

unit：mm

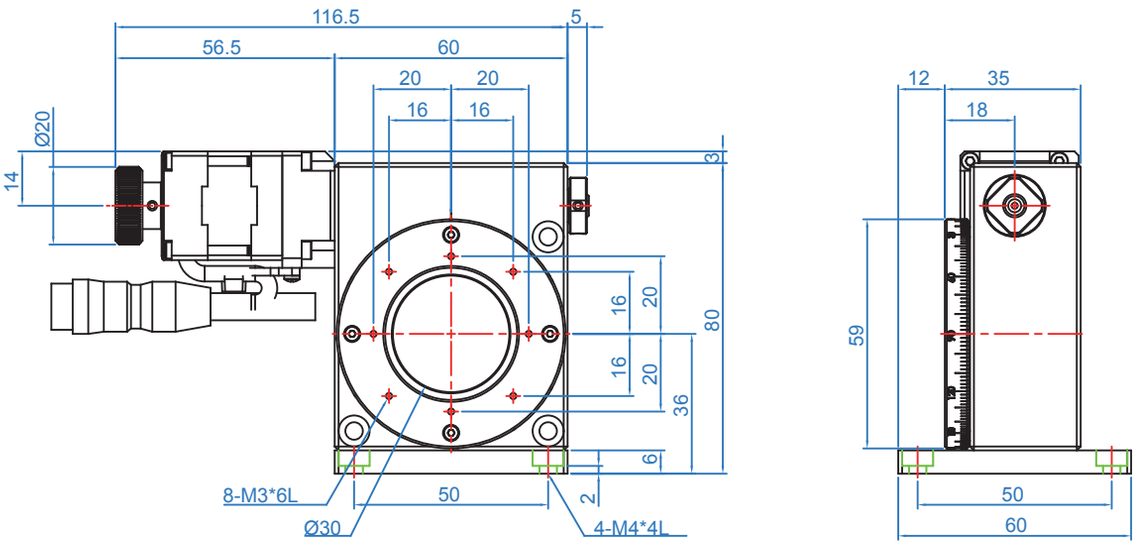
Model	Stage Size	Travel Distance	Weight (kg)	Feed Screw	Guide	Material	Surface Finish
AR59-A	Ø59	360°	0.6	Worm Gear (1/180)	Deep Groove Ball Bearing	Aluminum Alloy	Black Anodized

Accuracy Specification

unit：mm

Positioning Accuracy	Moment Rigidity (”/N.cm)	Resolution(/ pulse) Full	Resolution(/ pulse) Half	MAX Speed /sec [5kHz]	Repeated Positioning Accuracy	Load Capacity (kgf)	Lost Motion	Backlash	Parallelism	Eccentricity	Plane Fluctuation
±0.01°	0.84	0.004°	0.002°	20°	±0.01°	3	±0.05°	0.05°> or less	50 μm or less	5 μm or less	30 μm or less

AR59-AV



◆Specification

unit：mm

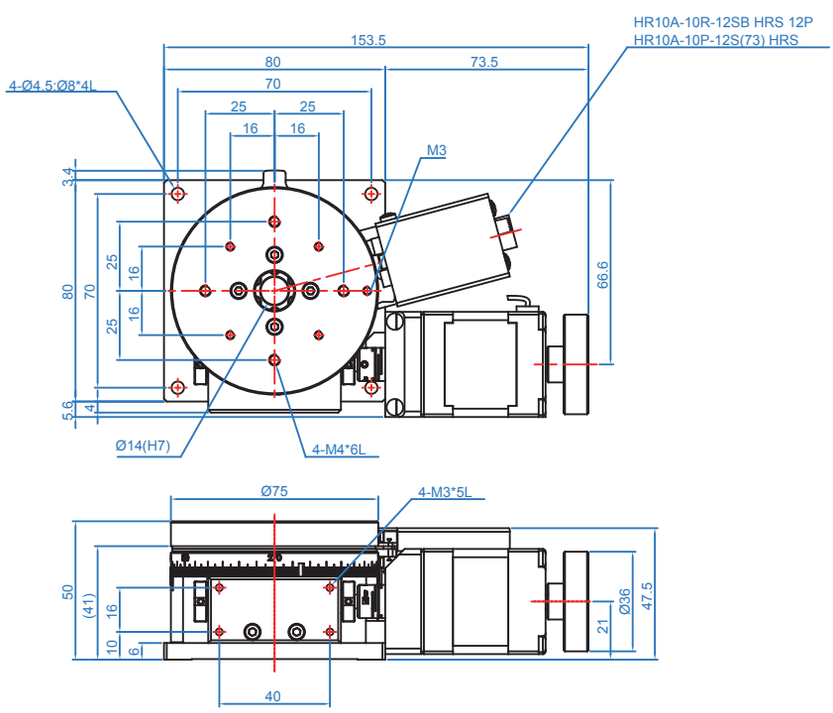
Model	Stage Size	Travel Distance	Weight (kg)	Feed Screw	Guide	Material	Surface Finish
AR59-AV	Ø59	360˚	0.7	Worm Gear (1/180)	Deep Groove Ball Bearing	Aluminum Alloy	Black Anodized

◆Accuracy Specification

unit：mm

Positioning Accuracy	Resolution(/ pulse)		MAX Speed	Repeated Positioning Accuracy	Load Capacity	Lost Motion	Backlash	Parallelism	Eccentricity	Plane Fluctuation
	Full	Half	/sec [5kHz]		(kgf)					
±0.01˚	0.004˚	0.002˚	20˚	±0.01˚	1	±0.05˚	0.05˚> or less	50 μm or less	5 μm or less	30 μm or less

AR75-A



◆Specification

unit : mm

Model	Sensor Voltage(v)	Stage Size	Travel Distance	Feed Screw	Guide	Load Capacity (kgf)	Weight kg	Material	Surface Finish
AR75-A	DC5 or less	Ø75	360°	Worm Gear (1/144)	Deep Groove Ball Bearing	103	1	Aluminum Alloy	Black Anodized

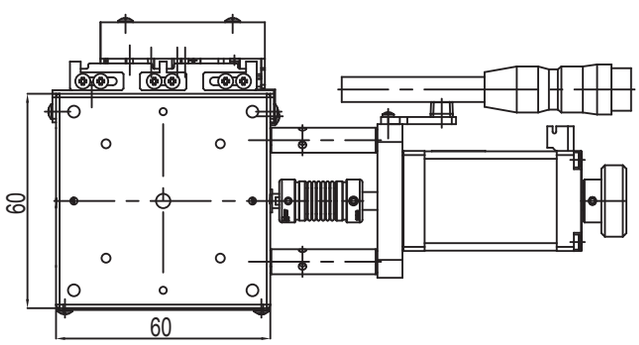
◆Accuracy Specification

Model	Positioning Accuracy	Moment Rigidity (”/N.cm)	Resolution(/ pulse)		MAX Speed /sec [5kHz]	Repeated Positioning Accuracy	Lost Motion	Backlash	Parallelism
			Full	Half					
AR75-A	±0.03°	0.15	0.0025°	0.00125°	25°	±0.005°	0.005° or less	0.005° or less	120 μm or less

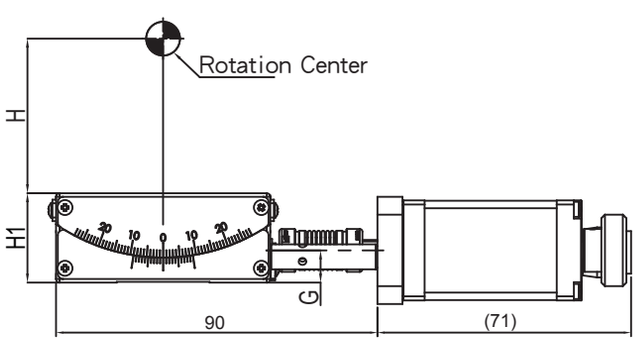
★ Eccentricity is 5μm or less ; plane fluctuation is 20μm or less ◦

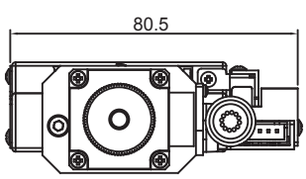
AXG6-35CSW

AXG6-60CSW



5-Phase Stepping Motor Driver			
Type	ORIENTAL	TROY	SANYO DENKI
Model	CRD51□□P	TR515B	PMM-BD-53130 PMM-BD-53130
Dimension WxDxH unit:mm	45X65X25	65X90X32.5	64X70X52
Weight	40g	280g	200g





Model	H	H1	G	Q
AXG6-35CSW	35	25	9	10
AXG6-60CSW	60	20	7	8.5
AXG6-80CSW	80	20	7	8.5

◆Specification and accuracy

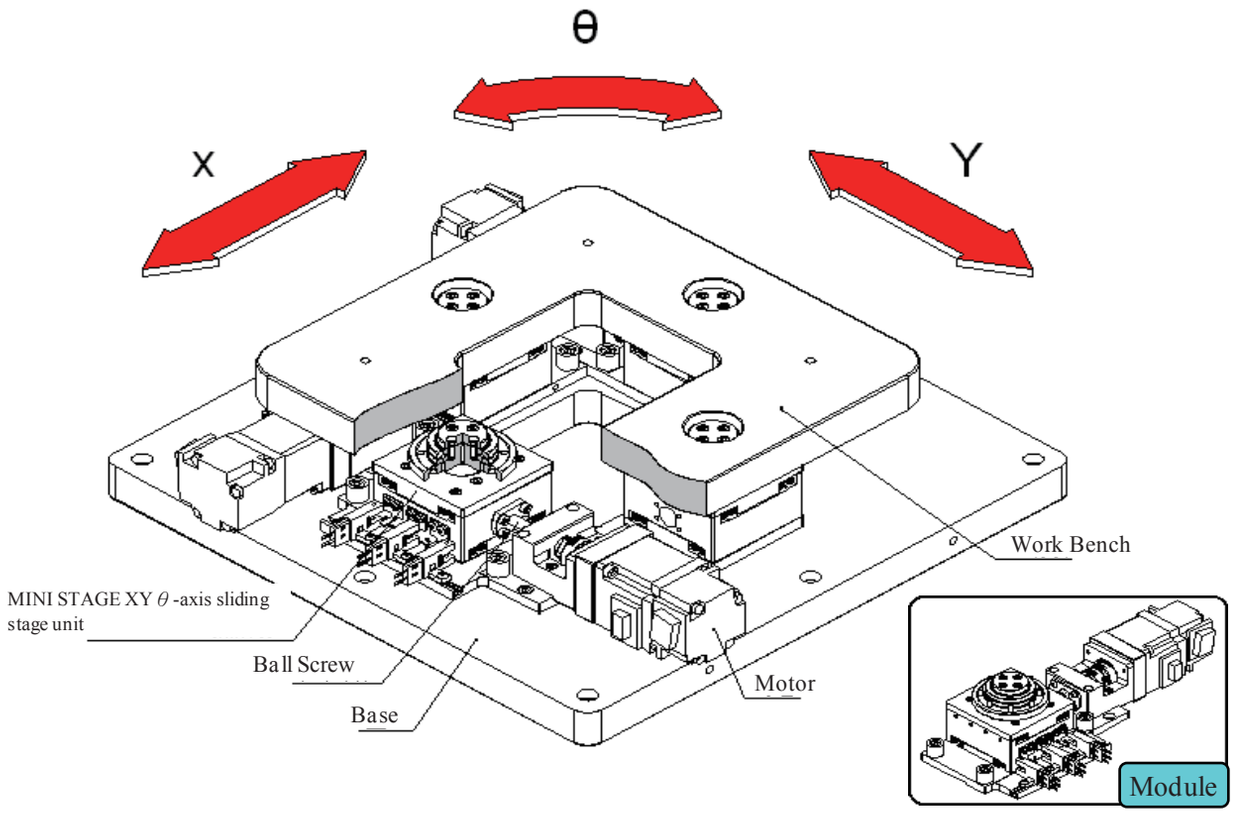
★MAX Speed 5.6° /sec[5000pps]

★Repeated positioning accuracy is ± 0.003° ; lost motion is 0.02° or less.

Model	Stage Size	Height of Rotation Center	Travel Distance	Rotation Center Deflection Accuracy	Resolution(/ pulse)	Load Capacity	Weight	Material	Surface Finish
					Full	(kgf)	(kg)		
AXG6-35CSW	60*60	35	±25°	∅0.1mm	0.085°	6	0.72	Brass Alloy	Black Fluororesin
AXG6-60CSW		60	±20°		0.072°		0.58		
AXG6-80CSW		80	±15°		0.065°				

unit：mm

Model GAS Mechanical Structure & Operating Features



Basic Structure Design of Model GAS

■Apply the innovative extra-thin stage module.

The unique module structure of equipping the MINI STAGE XYθ sliding units and special cross-roller bearing at the four ends located between the base and bench.

● Respective Large Work-piece

The standard large-size stage with the largest work bench (1500mm×1500mm)
Can be applied to the bigger size over adding more modules.

● Hollow Structure

It obtains bigger space at the center of bench & base, used for the optical inspection devices or conduction tester

● Light-weight and Extra-thin

It creates the wing-free thin & lighter mechanism by applying the XYθ module.

● High Rigidity & Precision

The module XY-axis stage and special cross-roller bearings have been pre-loaded, to perform the whole unit high precision and rigidity.

Applications

- ◆ The LCD manufacturing equipments & inspecting devices
- ◆ The semiconductor manufacturing equipments & inspecting devices
- ◆ Screen printing machines
- ◆ The PCB manufacturing equipment & inspecting devices

GAS Model Explanation

GAS01 - 250

- GAS01 — Nominal Model Number
- 250 — Work bench size (Example: 250 = 250mmx250mm)

Model GAS Mechanical Specification

Nominal Model Number	GAS01		GAS02			GAS03	
	250	350	400	500	750	1000	1500
Work-bench Size (mm)	250×250	350×350	400×400	500×500	750×750	1000×1000	1500×1500
Stroke (mm)	10×10×6°	10×10×4°	10×10×7°	10×10×5°	10×10×3°	10×10×4°	10×10×2°
Encoder Resolution (P/R)	2048		8192 (13-bit serial encoder)				
Ball-screw Lead Length (mm)	1		2			4	
Repeated Positioning Accuracy (μm)	±1						
Parallelism (μm)	30	40	50	80	180	300	700
Load (Kg)	20		50			150	
Rated Static Load (kN)	34.1		54			127.2	254.4
Weight (Kg)	18	23	37	44	63	600	1150
Motor Model No.	Servo/Stepping (50W)		Servo/Stepping (100W)			Servo/Stepping (200W)	
Driver Model No.	Universal Pulse Type (50W)		Universal Pulse Type (100W)			Universal Pulse Type (200W)	
Micro-optic Sensor Model No.(OMRON)	EE-SX672 (Connector: EE-1001)						
Grease Selection	LVP/LOT-17993 Grease (DU PONT Krytox)						
Bench & Base Materials/Surface Treatment	6061T651/Black Anodized		7075T651/Black Anodized			S50C/Black Chrome Plating	

◎ 1. θ-stroke is generated while the work-bench is positioned in the middle of XY-axis Stroke.

◎ 2. Power supplied to the motor driver is AC100V (220V as an optional). (Others: AC100V)

◎ 3. The cable connecting the motor & driver is attached (3m).

◎ 4. Client is expected to perform final adjustment of the micro-optic sensor position.

★ The spec of this alignment stage is within 20±2℃.

Minimum Resolution of Each Axis

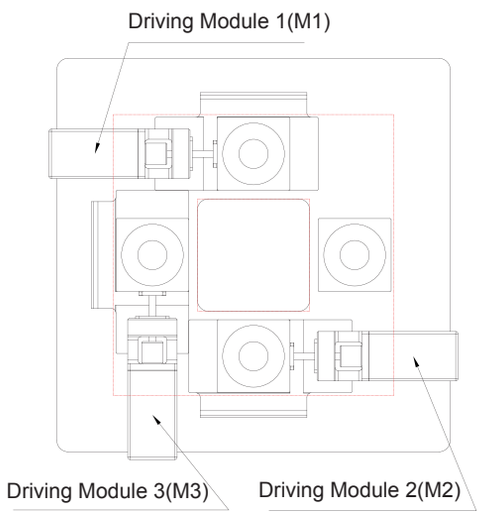
Nominal model number	X - Axis (μm)	Y - Axis (μm)	θ - Axis (sec)
GAS01-250	0.12	0.12	0.29
GAS01-350	0.12	0.12	0.19
GAS02-400	0.24	0.24	0.34
GAS02-500	0.24	0.24	0.25
GAS02-750	0.24	0.24	0.15
GAS03-1000	0.49	0.49	0.25
GAS03-1500	0.49	0.49	0.16

★The minimum resolution of GAS01 represents the 4x resolution of

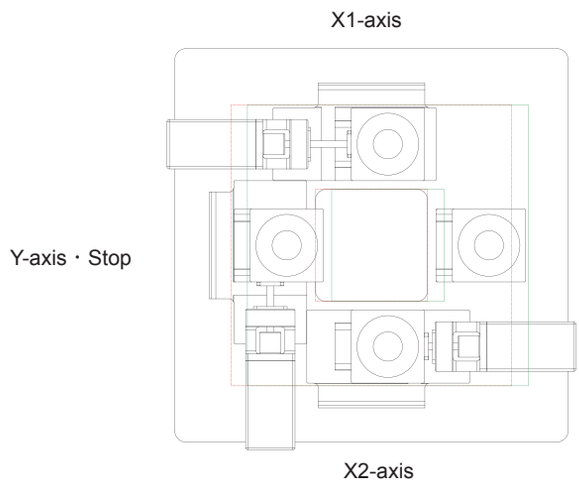
Mechanical Operating Theorem

The model GAS alignment stage applies the combination of axis-X1, X2 & Y movements as graphically displayed in the following picture, which can perform various stage operations (the green is the changed locations).

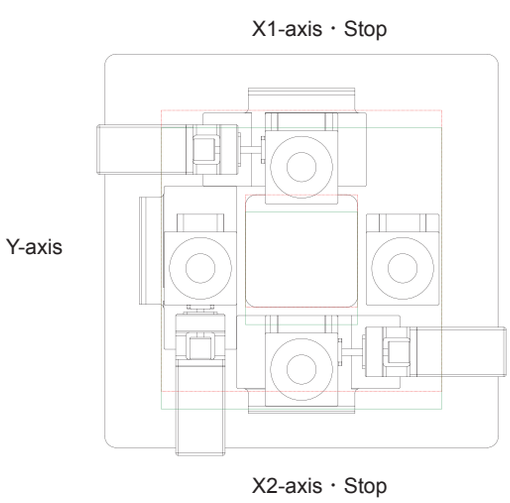
▼Reference Position



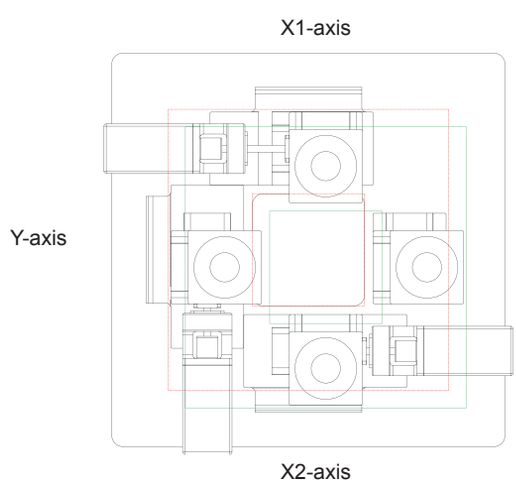
▼X-direction Moving (M1 & M2 Driving)



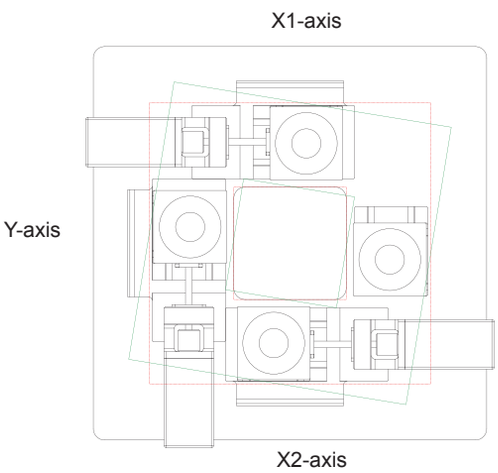
▼Y-direction Moving (M3 Driving)



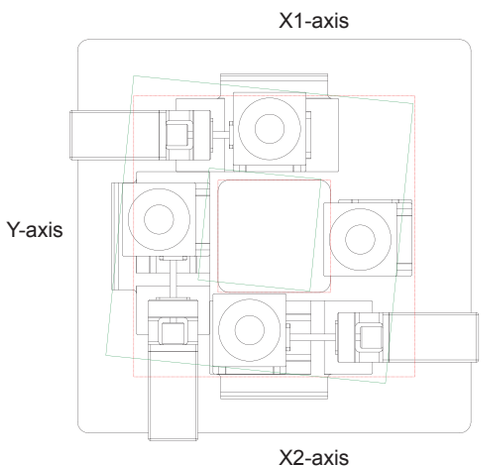
▼Diagonal Moving (M1, M2 & M3 Driving)



▼Bench-center Spinning (M1, M2 & M3 Driving)

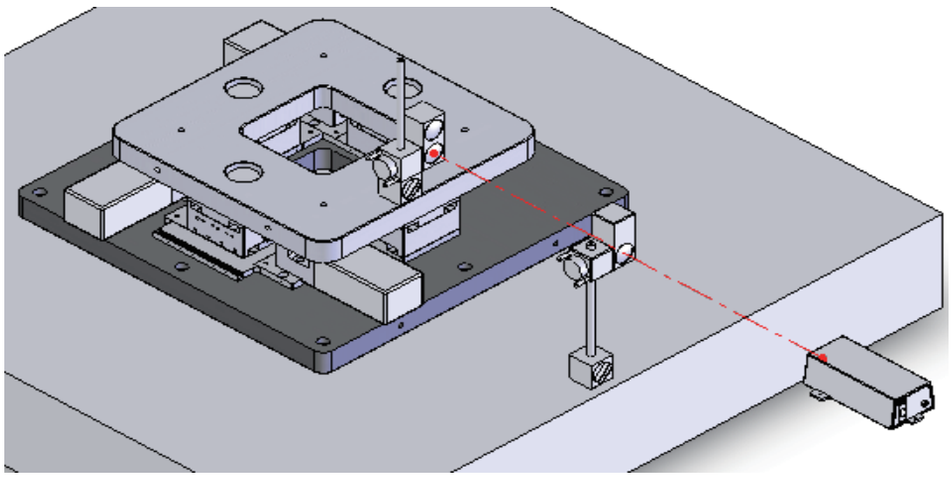


▼Spinning Movement (M1, M2 & M3 Driving)



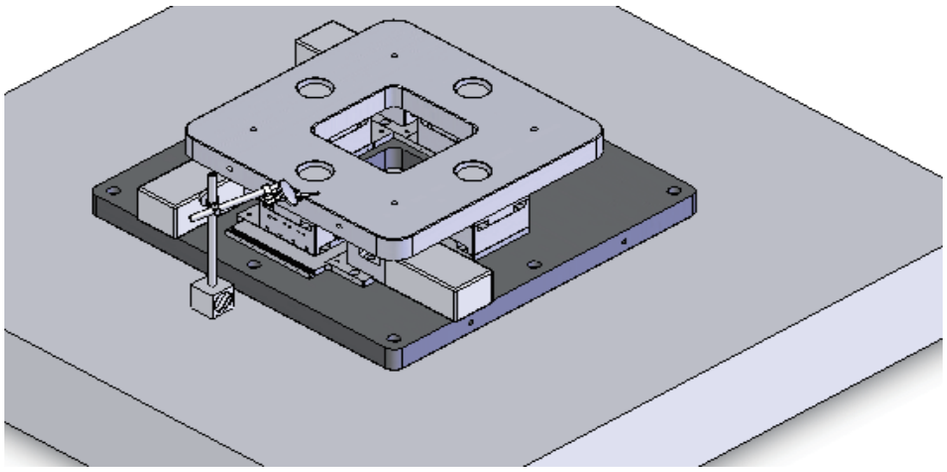
Precision Measurement

◆ Repeated Positioning Accuracy



Use the length-measuring laser interferometer to make repetitive positioning procedures for seven times in the same direction at any chosen point and measure the respective stop positions; find half of the maximum deviation. Perform measurements at center and both ends of the moving distance; pick the maximum value as the measured value; and add the "±" to the half of maximum deviation value.

◆ Parallelism



Put the alignment stage onto the bench under inspection; fully make measurements by sliding the test indicator. Now locate the bench at the stroke-middle point. Use the maximum deviation made during the bench-measuring zone as the measuring value.

⚠ Notes in Operation:

Avoid equipping this alignment stage at the following environments

※ The ambient temperature is beyond the 0~40°C range or the RH is above 85%, or there is any condensate, corrosive gas or inflammable/combustible gas generated.

※ The area with Fe or other medium powders, dust, oil mist, cutting fluid, water, salt or organic-solvent-splashing condition.

※ The place under direct sunbeam or radiation heat.※ The place with intense E/M field.

※ The place under vibration or shocks.

Moving Distance Calculating Formula

Formula of the relative feedings of axis made to get the arbitrary bench-rotating angle δθ.

X1 - axis: $\delta X1 = R \cos(\delta\theta + \theta X1 + \theta 0) - R \cos(\theta X1 + \theta 0)$ (1)

X2 - axis: $\delta X2 = R \cos(\delta\theta + \theta X2 + \theta 0) - R \cos(\theta X2 + \theta 0)$ (2)

Y - axis : $\delta Y = R \sin(\delta\theta + \theta Y + \theta 0) - R \sin(\theta Y + \theta 0)$ (3)

δX1: axis - X1 relative feeding (mm)

δX2: axis -X2 relative feeding (mm) } Feeding of ball-screw

δY: axis -Y relative feeding (mm)

θX1: the angle made between the centerlines of cross-roller-bearings in the axis -X1(°) (refer to the parameter table)

θX2: the angle made between the centerlines of cross-roller-bearings in the axis -X2 (°) (refer to the parameter table)

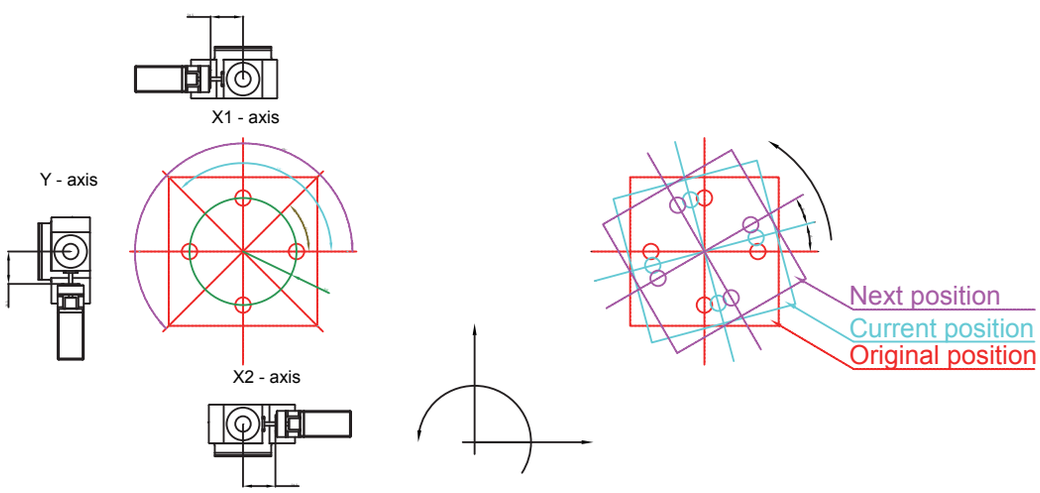
θy: the angle made between the centerlines of cross-roller-bearings in the axis -Y (°) (refer to the parameter table)

θ0: the bench angle calculated prior to movement (°)

δθ: the bench's rotating angle(°)

R: the radii of assumed circle that links the cross-roller-bearing centers of different axis (mm) (Refer to the parameter table)

Symbol Interpreting Diagram for the Formula



Parameter Table

Nominal Model Number		R	θY	θX_1	θX_2
GAS01	250	85	0°	90°	270°
	350	135			
GAS02	400	$145\sqrt{2}$	45°	135°	225°
	500	$195\sqrt{2}$			
	750	$320\sqrt{2}$			
GAS03	1000	$400\sqrt{2}$			
	1500	$650\sqrt{2}$			

Precision Measurement

【Example of Calculation】

Model No.: GAS02-400

Moving Mode: take the axis stroke-center as the original point; find the feeding of each axis by letting the upper sliding stage follow the following moving sequences:

(1): Parallel moving by X-direction: ＋1mm, Y-direction: ＋0.5mm.

↓

(2):＋2° spin around the bench center.

↓

(3): Perform－0.3° spin from state (2) above.

Steps

First, not to calculate the movement in X or Y direction; use the existed values as the axis-feeding values.

Next, calculate the＋2° spinning.

The parameter value of GAS01-400 is θX1＝135° found from the parameter table.

$R=145\sqrt{2}$　　θY ＝45°　　θX1＝135°

θX2＝225°

Or follow the moving mode condition to get that

θ0 ＝0°（since the current position is the initial one.）

δθ＝2°

Feed the aforesaid data into Formula (1), (2) & (3), we thus can calculate the data regarding axis-X1 as

$\delta X1 = 145\sqrt{2}\cos(2+135+0) - 145\sqrt{2}\cos(135+0) = -4.97210$（㎜）

And calculate the axis X2 and axis-Y in the same way, the result is shown in below.

δX2＝＋5.14876（㎜）

δY ＝＋4.97210（㎜）

Finally, find the feedings of each of the axis after rotating - 0.3° from the current status.

Per the condition of action mode we get that

θ0＝2°

δθ＝－ 0.3°

Feed the data into Formula (1), (2) & (3), we thus can calculate the data regarding axis-X1 as

$\delta X1 = 145\sqrt{2}\cos((-0.3)+135+2) - 145\sqrt{2}\cos(135+0)$

＝＋0.73431(㎜)

And calculate the axis X2 and axis-Y in the same way, the result is shown in below.

δX2＝－ 0.78333（㎜）

δY ＝－ 0.73431（㎜）

Calculation Result

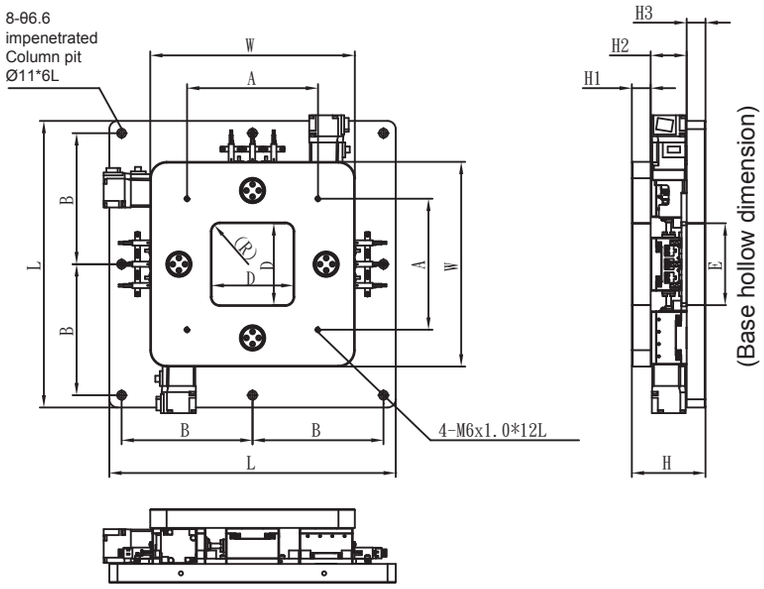
【　】means the absolute feeding value relative to the original point.

Unit: mm

Axis	Relative Feeding			
	X-direction:＋1mm	Y-direction:＋0.5mm	Spin:＋2°	Spin:－0.3°
X1	＋ 1	0	－ 4.97210	＋ 0.73431
	【＋ 1】	【0】	【－ 3.97210】	【－ 3.23779】
X2	＋ 1	0	＋ 5.14876	－ 0.78333
	【＋ 1】	【0】	【＋ 6.14876】	【＋ 5.36543】
Y	0	＋ 0.5	＋ 4.97210	－ 0.73431
	【0】	【＋ 0.5】	【＋ 5.47210】	【＋ 4.73779】

Model-GAS Outline Scheme

GAS01

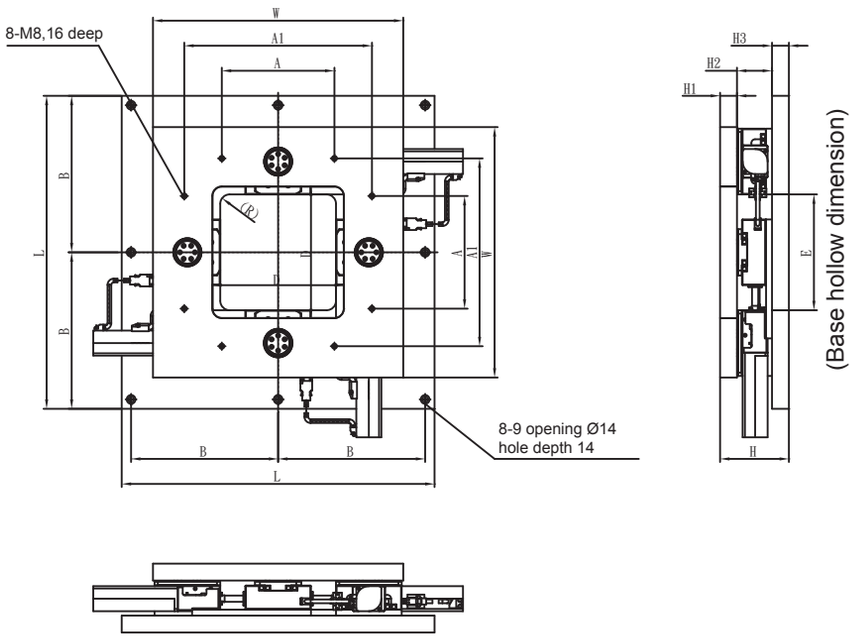


Unit: mm

【Common dimension】 Height: H＝90, H1＝23, H2＝44, H3＝23

Nominal Model Number	Maximum Stroke Length	Work Bench			Work Bench			
		L	B	E	W	D	A	（R）
GAS01-250	10×10×6°	350	160	80	250	80	160	10
GAS01-350	10×10×4°	450	210	180	350	180	220	

GAS02

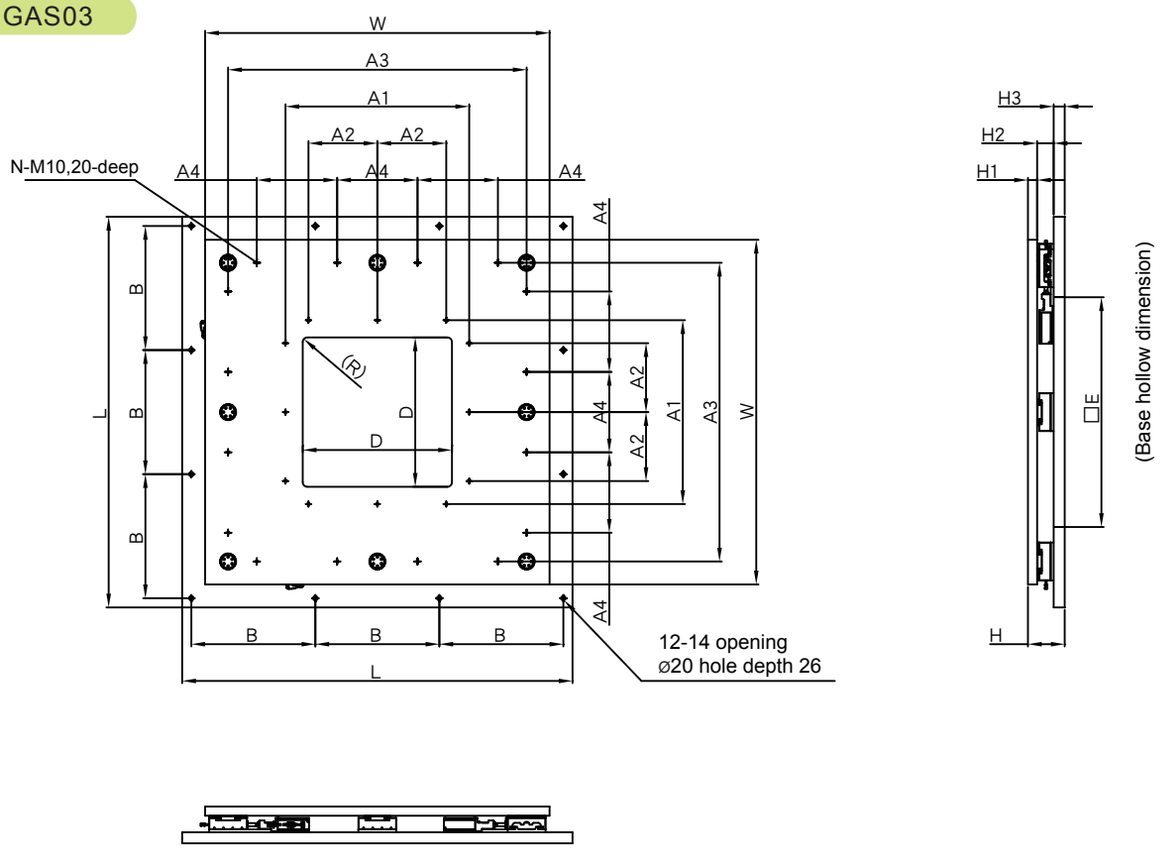


Unit: mm

【Common dimension】 Height: H＝110, H1＝27, H2＝56, H3＝27, Work Bench:（R）＝15

Nominal Model Number	Maximum Stroke Length	Base			Work Bench			
		L	B	E	W	D	A	C
GAS02-400	20×20×7°	500	235	185	400	210	180	300
GAS02-500	20×20×5°	600	285	285	500	285	280	400
GAS02-750	20×20×3°	850	410	535	750	535	530	650

GAS03



Unit: mm

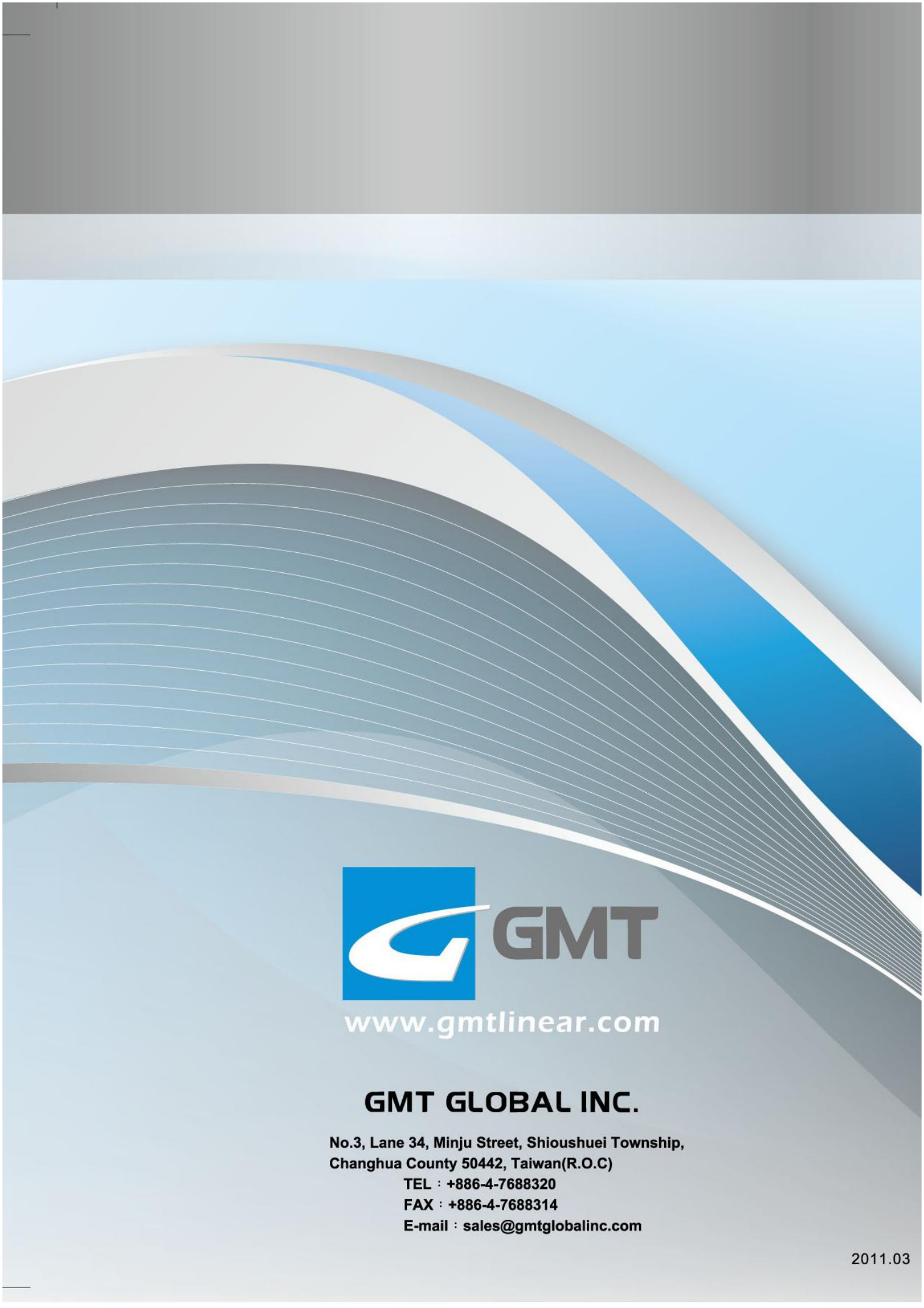
【Common dimension】 Height: H＝160, H1＝40, H2＝72, H3＝48

Nominal Model Number	Work Bench			
	A1	A2	A3	A4
GAS03-1000	800	300	—	—
GAS03-1500	—	—	1300	350

Nominal Model Number	Maximum Stroke Length	Work Bench			Work Bench			
		L	B	E	W	D	N	(R)
GAS03-1000	30×30×4°	1200	380	635	1000	635	12	20
GAS03-1500	30×30×2°	1700	540	1000	1500	1000	16	

Notes:

※Some pictures or photos shown in this catalog might vary from the actual products.
※We might upgrade the outer appearance or spec without pre-notice; please inquire us before applying the products.
※We produce this catalog in a very serious manner; yet, we cannot be responsible to any possible error or missing texts in it.
※For the export or export-purpose sales of our products & technologies, the basic policy is to comply with the espective foreign exchanges, trade acts and other related enactments.
※To export our products in a single-piece basis, please contact us first.



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2011.03