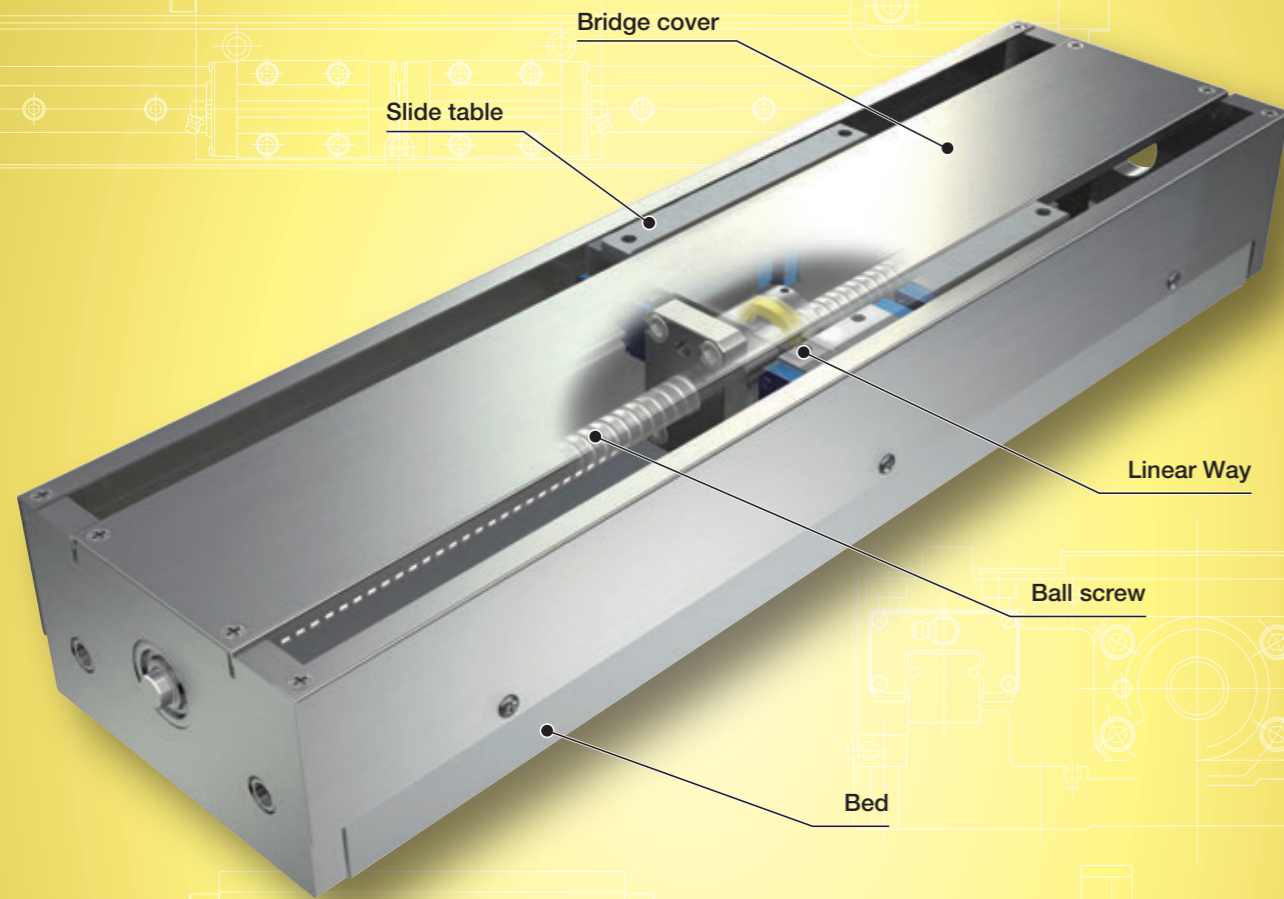
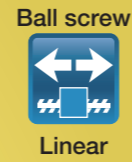


**TSL...M**

TSL...M

# TSL...M



### Major product specifications

Driving method	Precision ball screw
Linear motion rolling guide	Linear Way (ball type)
Built-in lubrication part	Lubrication part "C-Lube" is built-in
Material of table and bed	High-strength aluminum alloy
Sensor	Provided as standard

### Accuracy

Positioning repeatability	±0.002
Positioning accuracy	0.015~0.060
Lost motion	-
Parallelism in table motion A	-
Parallelism in table motion B	0.020~0.070
Attitude accuracy	-
Straightness	-
Backlash	0.003

unit: mm

## Points

### ● Light weight and long stroke positioning table

1 Light weight and long stroke positioning table configured with the slide table and bed made from high-strength aluminum alloy.

### ● Stable high running accuracy and positioning accuracy

2 High running accuracy and high accuracy positioning are realized by incorporating 2 sets of Linear Way in parallel, and combining with precision ball screws.

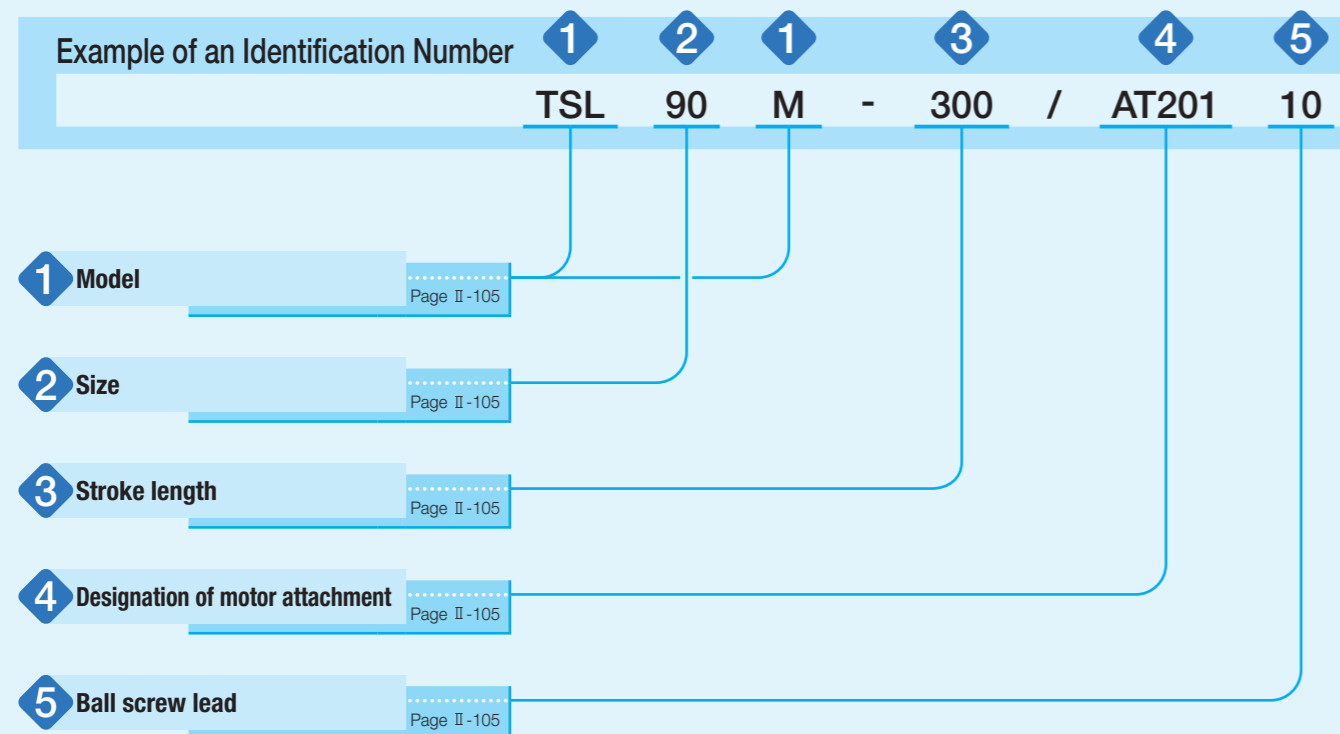
### ● Configuration of multiaxis system available with XY bracket

3 A series of four sizes from 90mm to 220mm (table width) is available. Multiaxis configuration can be easily realized with XY bracket.

### Variation

Shape	Model and size	Table width (mm)	Stroke length (mm)										
			50	100	150	200	250	300	400	500	600	800	1 000
90mm	TSL 90 M	90	☆	☆	☆	☆	☆	☆	-	-	-	-	-
120mm	TSL120 M	120	-	☆	☆	☆	☆	☆	☆	☆	☆	-	-
170mm	TSL170 M	170	-	-	☆	☆	☆	☆	☆	☆	-	-	-
170mm	TSL170SM	170	-	-	-	-	-	☆	☆	☆	☆	☆	☆
220mm	TSL220 M	220	-	-	-	-	-	☆	☆	☆	☆	☆	☆

# Identification Number



# Identification Number and Specification

- 1 **Model**: TSL...M: Precision Positioning Table L
- 2 **Size**: Size indicates table width. Select a size from the list of Table 1.
- 3 **Stroke length**: Select a stroke length from the list of Table 1.

**Table 1 Sizes, table width dimensions, and stroke lengths** unit: mm

Model and size	Table width	Stroke length
TSL 90 M	90	50, 100, 150, 200, 250, 300
TSL120 M	120	100, 150, 200, 250, 300, 400, 500, 600
TSL170 M	170	150, 200, 250, 300, 400, 500
TSL170S M	170	300, 400, 500, 600, 800, 1 000
TSL220 M	220	300, 400, 500, 600, 800, 1 000

- 4 **Designation of motor attachment**: As for a motor attachment, select it from the list of Table 2.
  - Motor should be prepared by customer.
  - Please specify motor attachment applicable to motor for use.
  - A coupling shown in Table 3 is mounted on the main body before shipment. However, the final position adjustment should be performed by customer since it is only temporarily fixed.
  - When specifying an AC servomotor attachment, an origin sensor is not provided.

- 5 **Ball screw lead**: 5: Lead 5mm  
10: Lead 10mm

# Identification Number and Specification

**Table 2 Application of motor attachment**

Type	Models of motor to be used				Flange size mm	Motor attachment			
	Manufacturer	Series	Model	Rated output W		TSL 90M TSL170M	TSL120M	TSL170SM	TSL220M
AC servo motor	YASKAWA ELECTRIC CORPORATION	Σ-7	SGM7J-01A	100	□40	AT201	AT201	—	—
			SGM7A-01A			AT201	AT201	—	—
			SGM7J-02A	200	□60	—	—	AT202	AT202
			SGM7A-02A			—	—	AT202	AT202
	Mitsubishi Electric Corporation	J4/J5	HG-MR13	100	□40	AT201	AT201	—	—
			HG-KR13/HK-KT13W			AT201	AT201	—	—
			HG-MR23	200	□60	—	—	AT202	AT202
			HG-KR23/HK-KT23W			—	—	AT202	AT202
	Panasonic Corporation	MINAS A6	MSMF01	100	□38	AT203	AT203	—	—
			MSMF02	200	□60	—	—	AT204	AT204
Hitachi Industrial Equipment Systems Co., Ltd	AD	ADMA-01L	100	□40	AT201	AT201	—	—	
		ADMA-02L	200	□60	—	—	AT202	AT202	
Stepper motor	ORIENTAL MOTOR Co., Ltd.	α step	ARM66	—	□60	AT205	AT206	—	—
			ARM69			AT205	AT206	—	—
			ARM98			—	—	AT207	AT210
			ARM911			—	—	AT207	AT210
		RKS	—	□60	AT208	AT209	—	—	
		CRK	—	□85	—	—	AT207	AT210	

Note (1) Applicable to the outer diameter φ8 of motor output shaft.  
Remark: For detailed motor specifications, please see respective motor manufacturer's catalog.

**Table 3 Coupling models**

Motor attachment	Coupling models	Manufacturer	Coupling inertia $J_c$ ×10 <sup>-9</sup> kg·m <sup>2</sup>
AT201	UA-25C- 8× 8	Sakai Manufacturing Co., Ltd	0.29
AT202	UA-35C-12×14	Sakai Manufacturing Co., Ltd	1.34
AT203	UA-25C- 8× 8	Sakai Manufacturing Co., Ltd	0.29
AT204	UA-35C-11×12	Sakai Manufacturing Co., Ltd	1.34
AT205	MSTS-25C- 8×10	Nabeya Bi-tech Kaisha	0.71
AT206	MSTS-25C- 8×10	Nabeya Bi-tech Kaisha	0.71
AT207	MSTS-32C-12×14	Nabeya Bi-tech Kaisha	2.70
AT208	MSTS-20C- 8× 8	Nabeya Bi-tech Kaisha	0.25
AT209	MSTS-25C- 8× 8	Nabeya Bi-tech Kaisha	0.71
AT210	MSTS-32C-12×14	Nabeya Bi-tech Kaisha	2.70

Remark: For detailed coupling specifications, please see respective manufacturer's catalog.

# Specifications

**Table 4 Accuracy**

unit: mm

Model and size	Stroke length	Positioning repeatability	Positioning accuracy	Parallelism in table motion B	Backlash
TSL 90 M	50	±0.002	0.015	0.020	0.003
	100		0.020	0.030	
	150		0.025		
	200				
	250				
300	0.030	0.040			
TSL120 M	100	±0.002	0.020	0.030	0.003
	150		0.025		
	200				
	250		0.030	0.040	
	300				
	400		0.040	0.050	
	500		0.045		
600	0.050	0.070			
TSL170 M	150	±0.002	0.020	0.030	0.003
	200		0.025		
	250				
	300		0.030	0.050	
	400				
500	0.045				
TSL170SM TSL220 M	300	±0.002	0.030	0.040	0.003
	400		0.040		
	500			0.045	
	600		0.050		
	800			0.050	
1 000	0.060				

**Table 5 Maximum speed**

Motor type	Model and size	Stroke length mm	Maximum speed mm/s	
			Lead 5mm	Lead 10mm
AC Servomotor	TSL 90 M	—	500	1000
	TSL120 M	500 or less	370	750
		600	370	720
	TSL170 M	—	370	750
	TSL170 SM TSL220 M	800 or less	280	560
1000		190	390	
Stepper motor	TSL 90 M TSL120 M TSL170 M TSL170 SM TSL220 M	—	150	300

Remark: To measure the practical maximum speed, it is required to consider operation patterns based on the motor to be used and load conditions.

**Table 6 Maximum carrying mass**

Model and size	Ball screw lead mm	Carrying mass center of gravity mm Length L Height H	Maximum carrying mass kg							
			Horizontal direction				Vertical direction			
			0	100	200	300	0	100	200	300
TSL 90 M	5	0	46	20	11	8	7	7	7	7
		100	46	20	11	8	7	7	7	7
		200	46	20	11	8	7	7	7	7
	10	0	26	16	9	6	4.7	4.7	4.7	4.7
		100	26	15	9	6	4.7	4.7	4.7	4.7
		200	26	14	8	6	4.7	4.7	4.7	4.7
TSL120 M	5	0	195	144	84	59	18	18	18	18
		100	195	143	83	59	18	18	18	18
		200	195	140	83	58	18	18	18	18
	10	0	97	97	63	44	18	18	18	18
		100	97	97	63	44	18	18	18	18
		200	97	97	61	44	18	18	18	18
TSL170 M	5	0	195	174	104	74	18	18	18	18
		100	195	171	103	74	18	18	18	18
		200	195	166	102	73	18	18	18	18
	10	0	97	97	78	55	17	17	17	17
		100	97	97	77	55	17	17	17	17
		200	97	97	74	54	17	17	17	17
TSL170SM	5	0	218	191	117	84	21	21	21	21
		100	218	190	117	84	21	21	21	21
		200	218	188	116	84	21	21	21	21
	10	0	113	113	90	65	20	20	20	20
		100	113	113	89	64	20	20	20	20
		200	113	113	88	64	20	20	20	20
TSL220 M	5	0	226	226	226	226	19	19	19	19
		100	226	226	226	226	19	19	19	19
		200	226	226	226	226	19	19	19	19
	10	0	111	111	111	111	18	18	18	18
		100	111	111	111	111	18	18	18	18
		200	111	111	111	111	18	18	18	18
300	111	111	111	111	18	18	18	18		

Remark1. The maximum carrying mass is adjusted by the mass when the rating life of the linear motion rolling guide, ball screws, or bearings is 18,000 hours during continuous operation at a number of revolutions of the motor of 3000min<sup>-1</sup> and an acceleration/deceleration time of 0.2s. The mass calculated is based upon the basic static load rating of the linear motion rolling guide.  
2. Please also check the maximum load mass on page III-19.

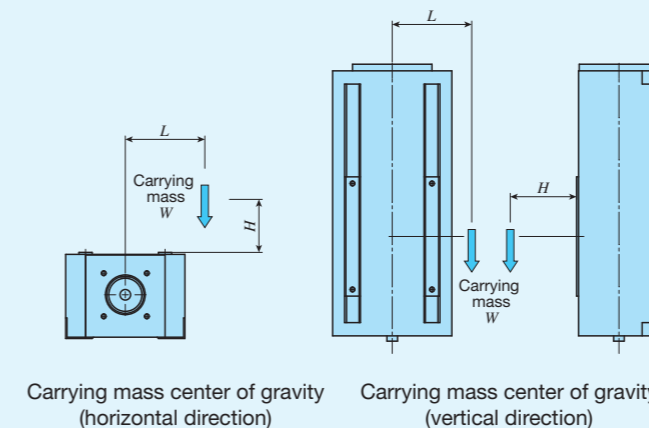
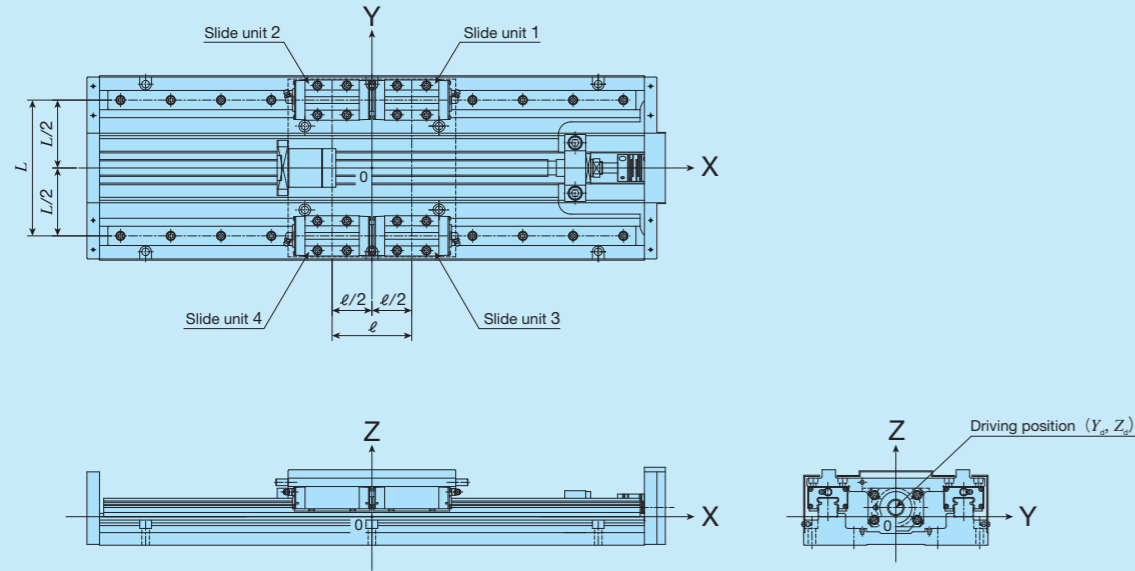


Table 7 Specification of linear motion rolling guide



Model and size	Basic dynamic load rating <sup>(1)</sup> C N	Basic static load rating <sup>(1)</sup> C <sub>0</sub> N	Arrangement			
			L mm	ℓ mm	Y <sub>d</sub> mm	Z <sub>d</sub> mm
TSL 90 M	1 810	2 760	60	60	0	-7
TSL120 M	11 600	13 400	80	66	0	8
TSL170 M			106	66	0	11
TSL170SM			120	130	0	1
TSL220 M	25 200	28 800	162	95	0	11

Note <sup>(1)</sup> Represent the value per slide unit.

Table 8.1 Specifications of ball screw 1

Model and size	Lead mm	Shaft dia. mm	Axial clearance mm	Basic dynamic load rating	Basic static load rating
				C N	C <sub>0</sub> N
TSL 90 M	5	10	0.005	1 470	2 210
	10			1 030	1 370
TSL120 M	5	15	0.005	3 820	6 370
TSL170 M	10			3 820	6 370
TSL170SM	5	20	0.005	4 460	8 580
TSL220 M	10			4 460	8 580

Table 8.2 Specifications of ball screw 2

unit: mm

Model and size	Stroke length	Shaft dia.	Overall length
TSL 90 M	50	10	179
	100		229
	150		279
	200		329
	250		379
TSL120 M	300	15	429
	100		273
	150		323
	200		373
	250		423
	300		473
	400		573
TSL170 M	500	15	673
	600		773
	150		289
	200		339
	250		389
	300		439
TSL170SM	400	20	539
	500		639
	600		739
	800		1 045
	1 000		1 245
TSL220 M	300	20	545
	400		645
	500		745
	600		845
	800		1 045
	1 000		1 245

Table 9 Table inertia and starting torque

Model and size	Stroke length mm	Table inertia J <sub>T</sub> × 10 <sup>-5</sup> kg · m <sup>2</sup>		Starting torque T <sub>s</sub> N · m
		Lead 5mm	Lead 10mm	
TSL 90 M	50	0.20	0.33	0.05
	100	0.25	0.38	
	150	0.28	0.40	
	200	0.33	0.45	
	250	0.35	0.48	
TSL120 M	300	0.40	0.53	0.06
	100	1.3	1.7	
	150	1.5	1.9	
	200	1.7	2.1	
	250	1.9	2.3	
	300	2.1	2.5	
	400	2.4	2.9	
TSL170 M	500	2.8	3.3	0.06
	600	3.2	3.7	
	150	1.4	1.8	
	200	1.6	2.0	
	250	1.8	2.2	
TSL170S M	300	2.0	2.4	0.10
	400	2.3	2.8	
	500	2.7	3.2	
	300	6.9	7.4	
	400	8.1	8.6	
TSL220 M	500	9.3	9.8	0.10
	600	11	11	
	800	13	14	
	1 000	15	16	
	300	7.5	8.5	
TSL220 M	400	8.7	9.7	0.10
	500	9.9	11	
	600	11	12	
	800	14	15	
	1 000	16	17	

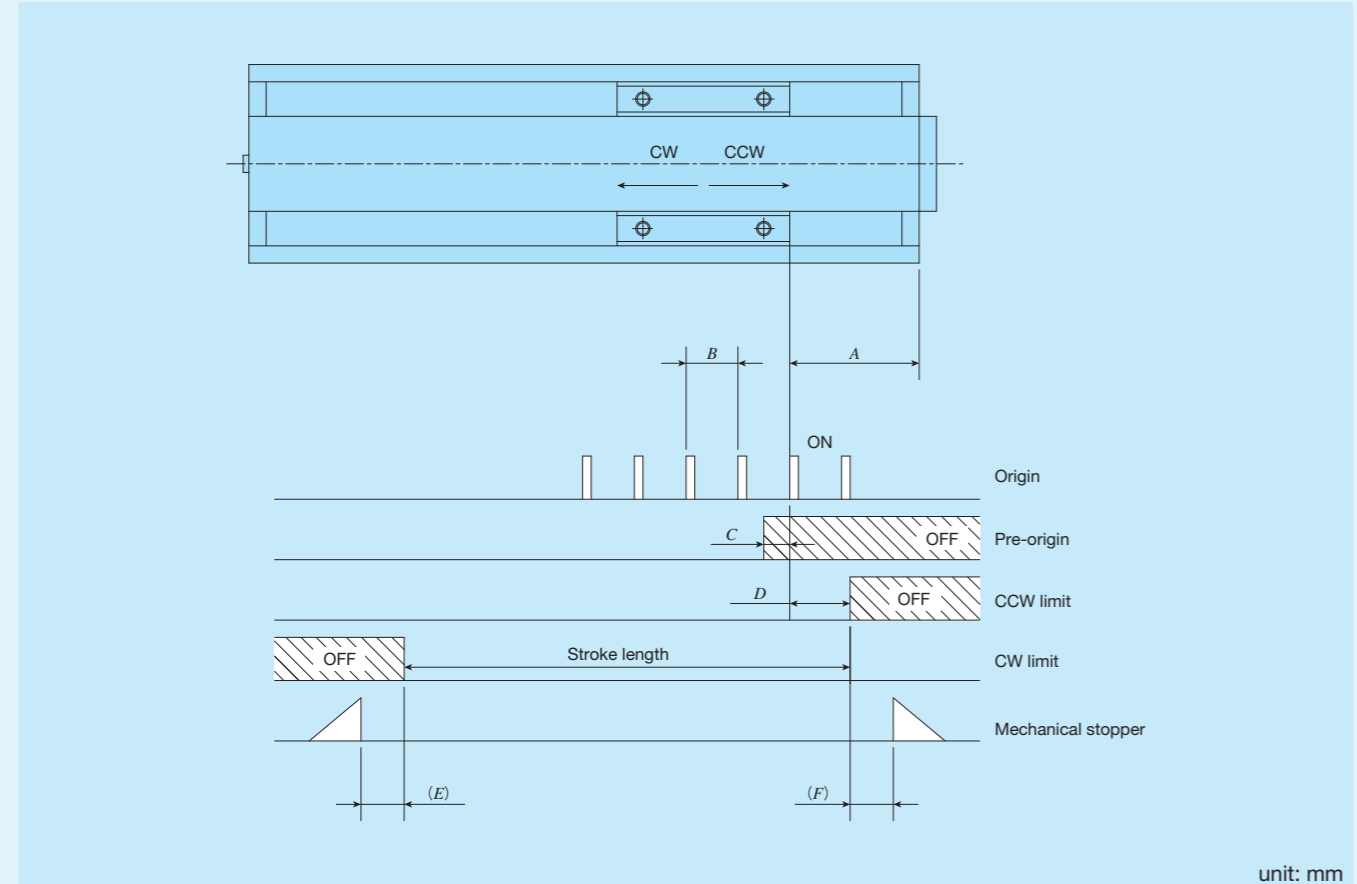


# Mounting

For the processing accuracy of the Precision Positioning Table mounting surface and the tightening torque of the fixing screws, see page III-36.

# Sensor Specification

Table 10 Sensor timing chart



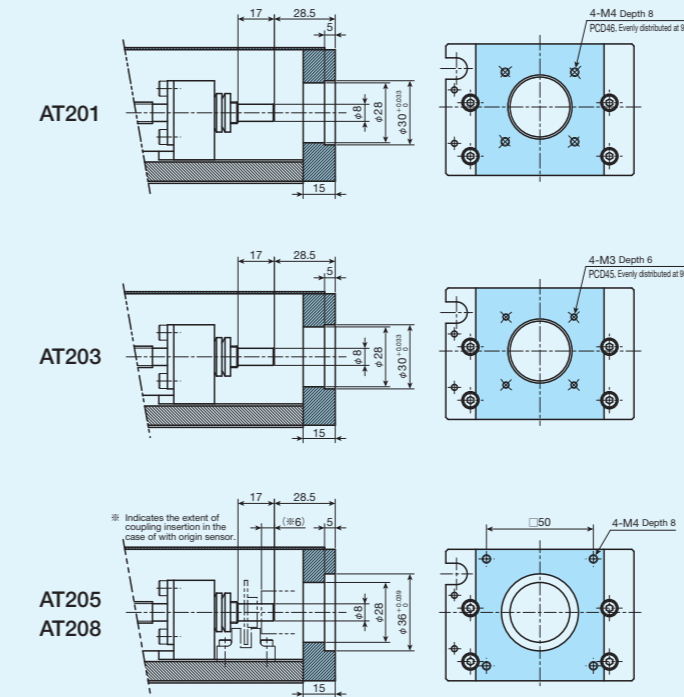
unit: mm

Model and size	Ball screw lead	A	B	C	D	E	F
TSL 90 M	5	50	5	3	20	5	5
	10		10	7			
TSL120 M	5	60	5	3	20	15	15
	10		10	7			
TSL170 M	5	45	5	3	20	3	3
	10		10	7			
TSL170SM	5	60	5	3	20	5	5
	10		10	7			
TSL220 M	5	60	5	3	20	5	5
	10		10	7			

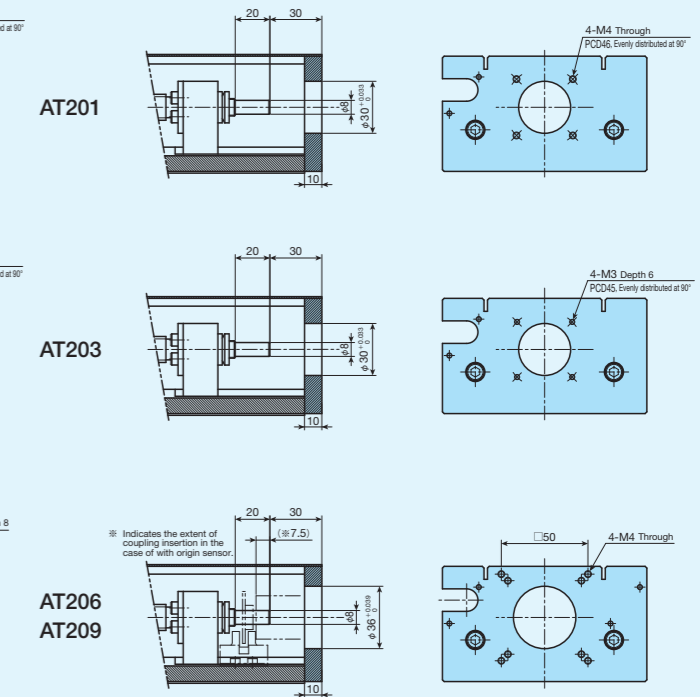
Remark: For detailed specifications of respective sensors, please see the section of sensor specification in General Explanation.

# Dimensions of Motor Attachment

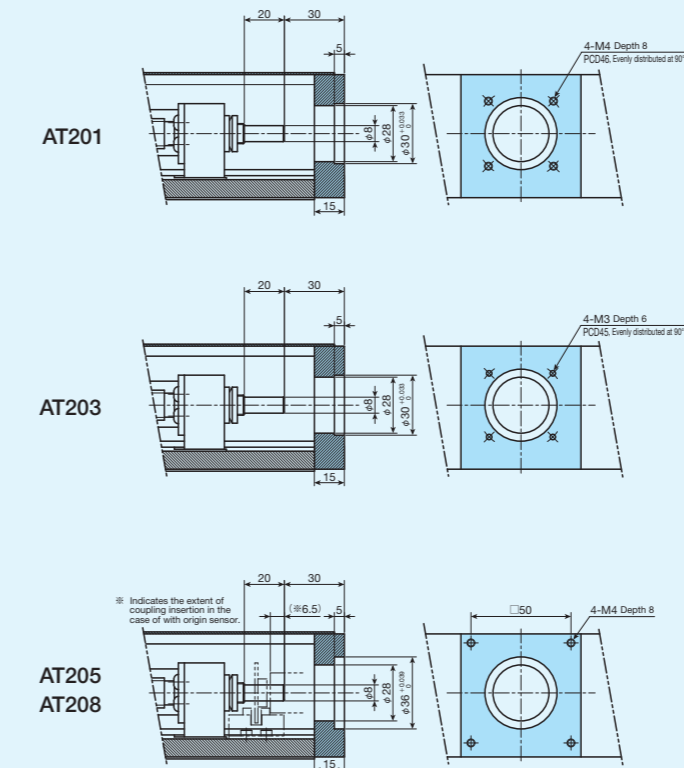
## TSL90M



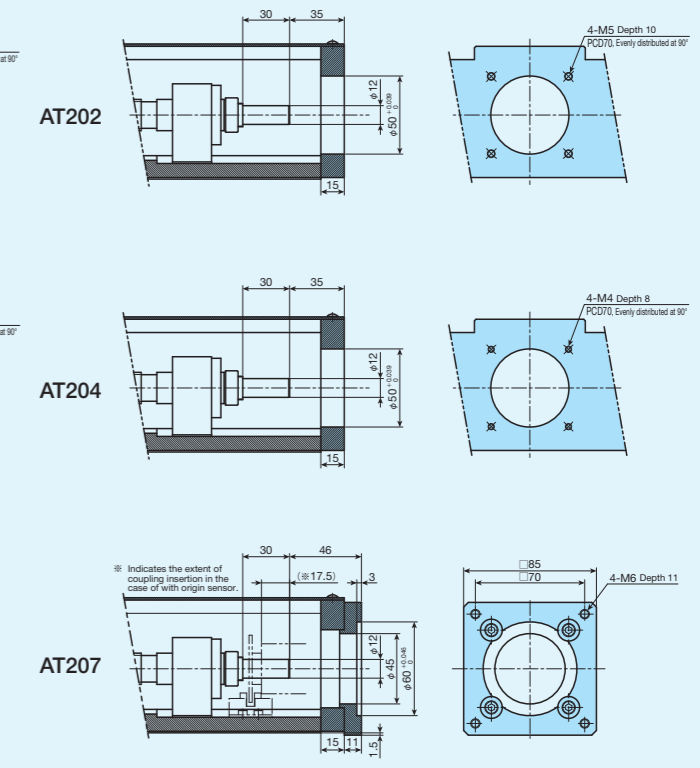
## TSL120M



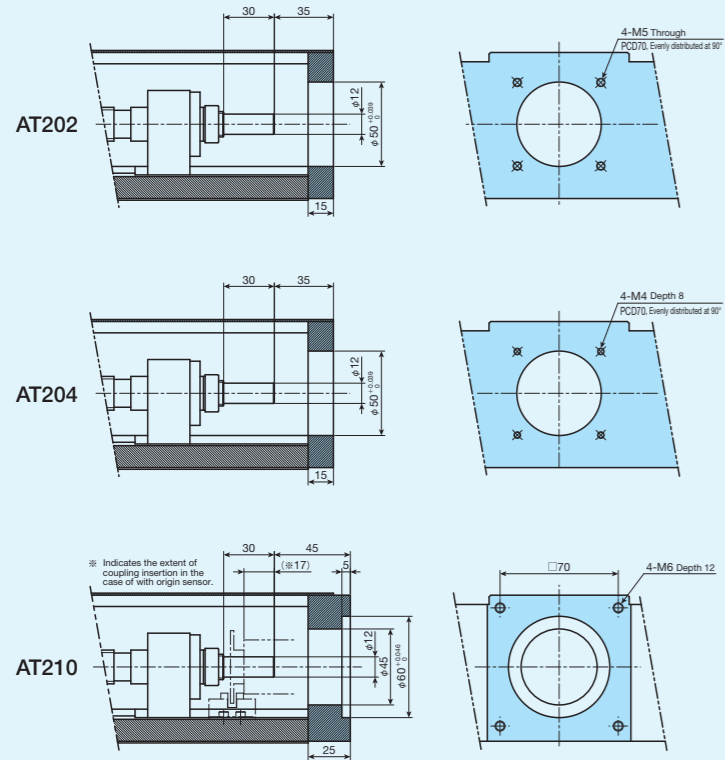
## TSL170M



## TSL170SM

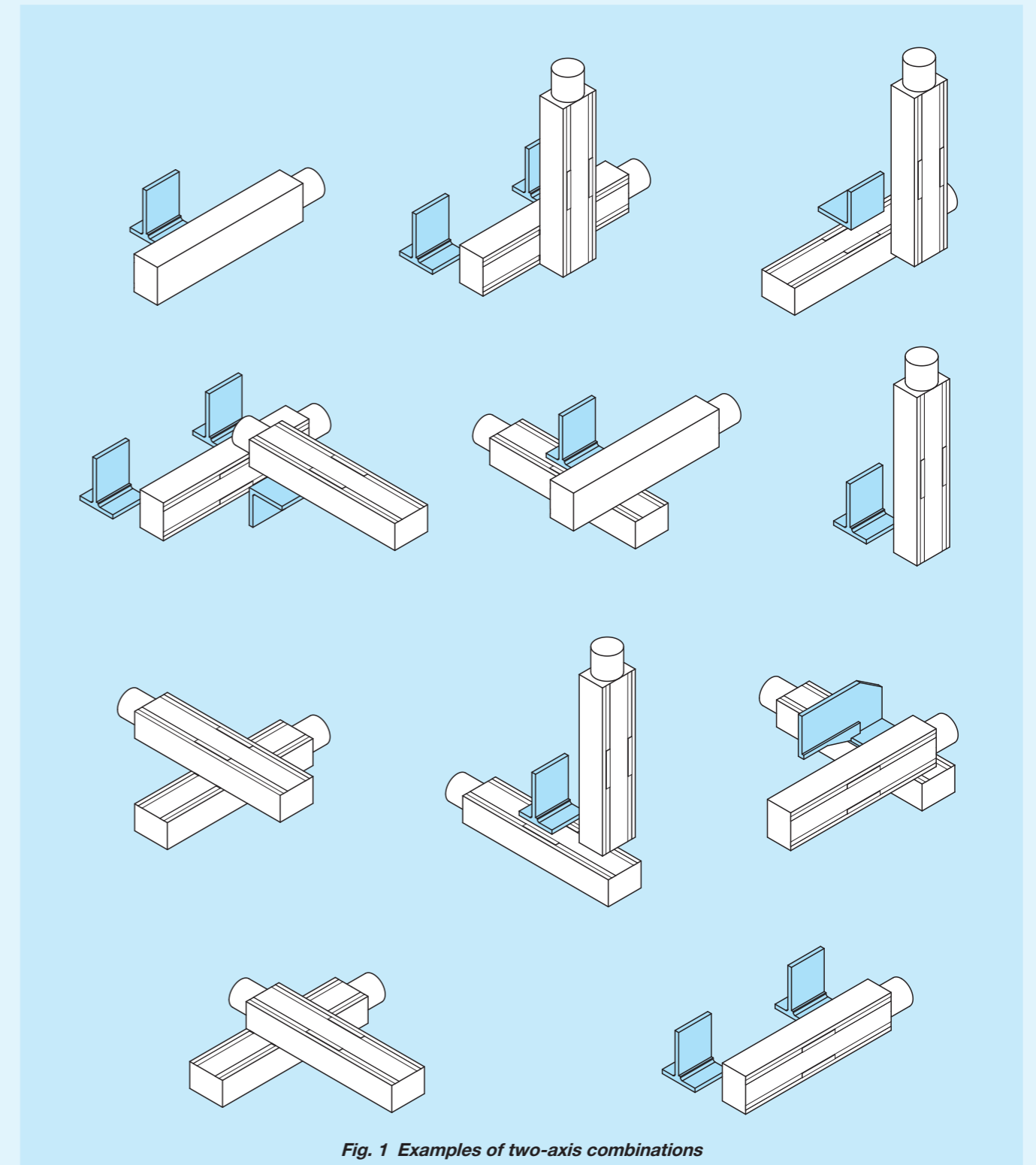


TSL220M

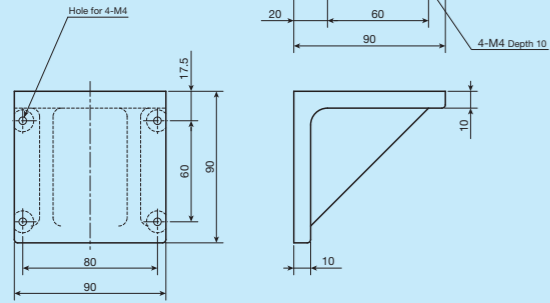


XY Bracket

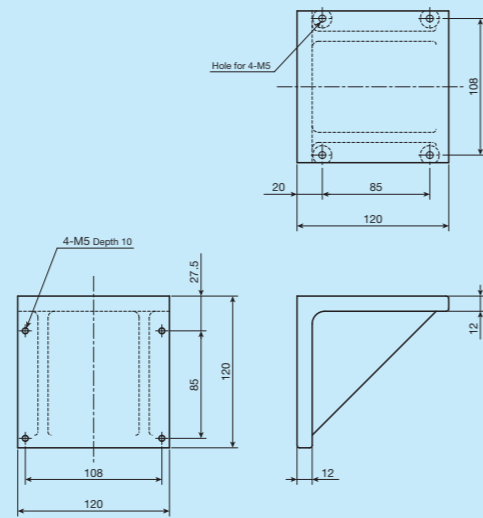
Precision Positioning Table L can configure various combinations of two-axis using XY bracket (aluminum alloy) shown in Fig. 2. If you are interested, please specify the identification number of your desired model from the figure.



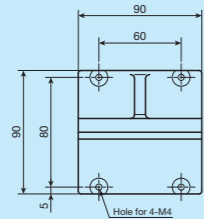
●TSL90-AGL



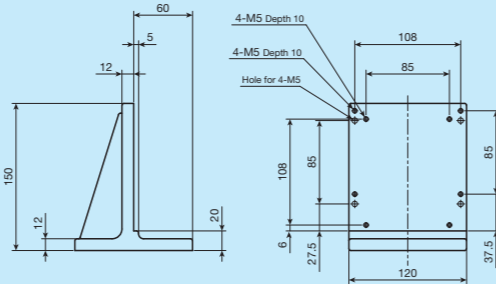
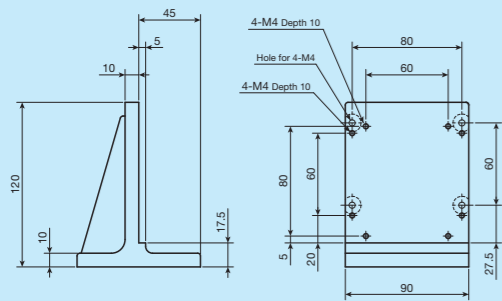
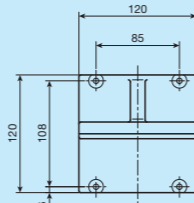
●TSL120-AGL



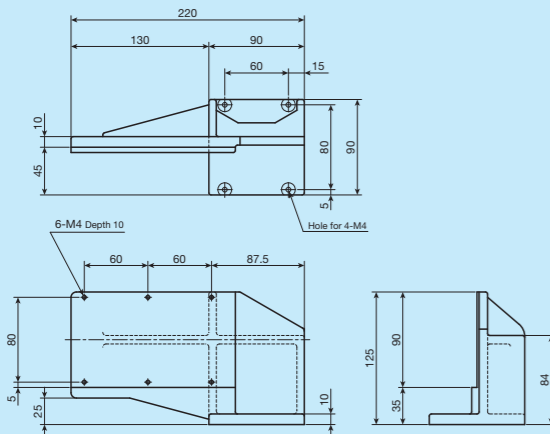
●TSL90-AGI



●TSL120-AGI



●TSL90-AGT



●TSL120-AGT

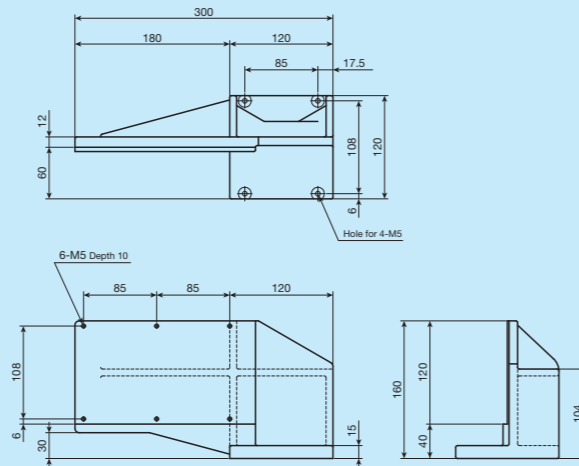
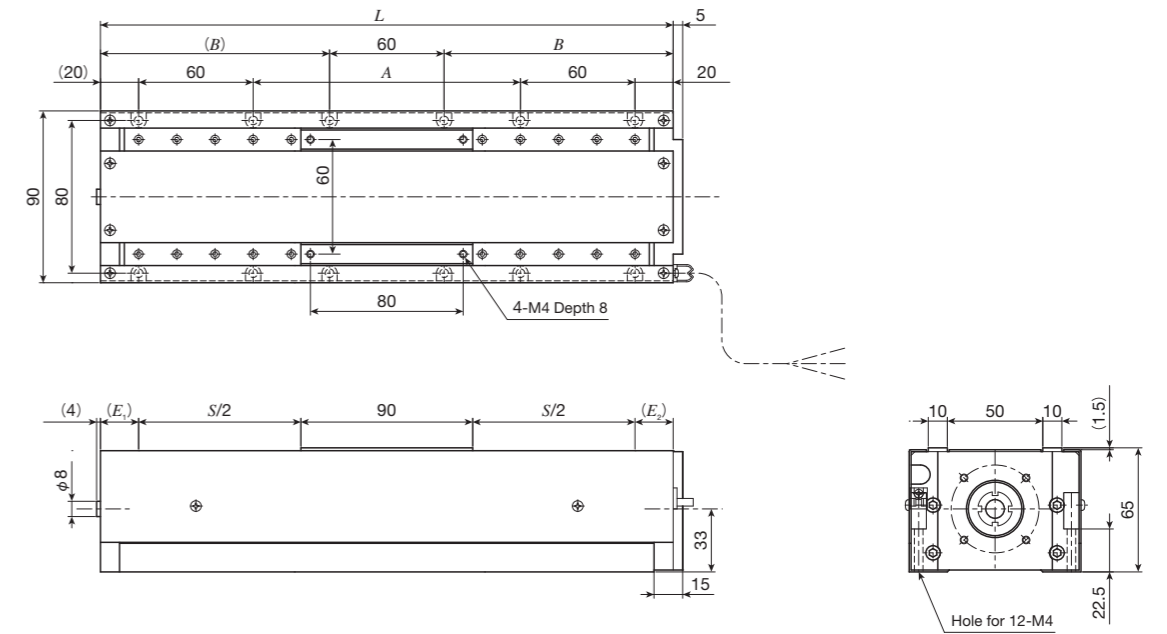


Fig. 2 XY bracket

**IKO Precision Positioning Table L**

TSL90M



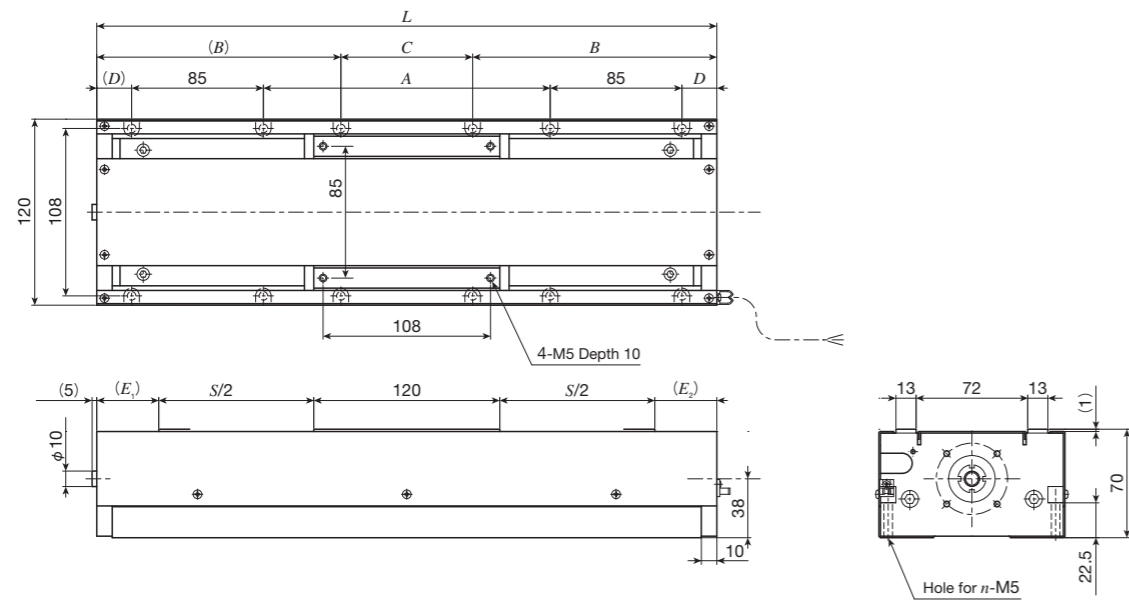
unit: mm

Identification number	Stroke length			Dimensions of table			Mass (Ref.) kg
	S	E <sub>1</sub>	E <sub>2</sub>	Overall length L	Mounting holes of bed		
					A	B	
TSL90M- 50	50	30	30	200	40	70	2.8
TSL90M-100	100			250	90	95	3.2
TSL90M-150	150			300	140	120	3.5
TSL90M-200	200			350	190	145	3.9
TSL90M-250	250			400	240	170	4.2
TSL90M-300	300			450	290	195	4.6



# IKO Precision Positioning Table L

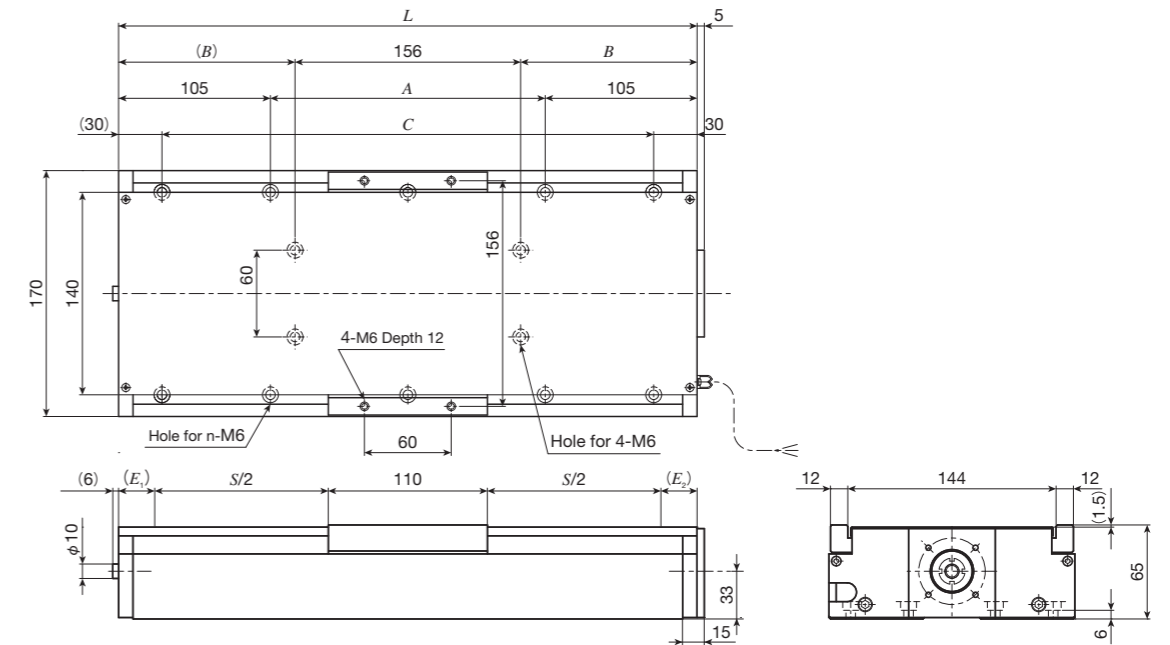
## TSL120M



unit: mm

Identification number	Stroke length			Dimensions of table						Mass (Ref.) kg
	S	E <sub>1</sub>	E <sub>2</sub>	Overall length L	Mounting holes of bed					
					A	B	C	D	n	
TSL120M-100	100	40	40	300	85	107.5	85	22.5	8	6.1
TSL120M-150	150			350	135	132.5	85	22.5	12	6.6
TSL120M-200	200			400	185	157.5	85	22.5	12	7.1
TSL120M-250	250			450	235	182.5	85	22.5	12	7.6
TSL120M-300	300			500	255	207.5	85	37.5	12	8.1
TSL120M-400	400			600	355	207.5	185	37.5	12	9.1
TSL120M-500	500			700	455	207.5	285	37.5	12	10.1
TSL120M-600	600			800	555	207.5	385	37.5	12	11.1

## TSL170M

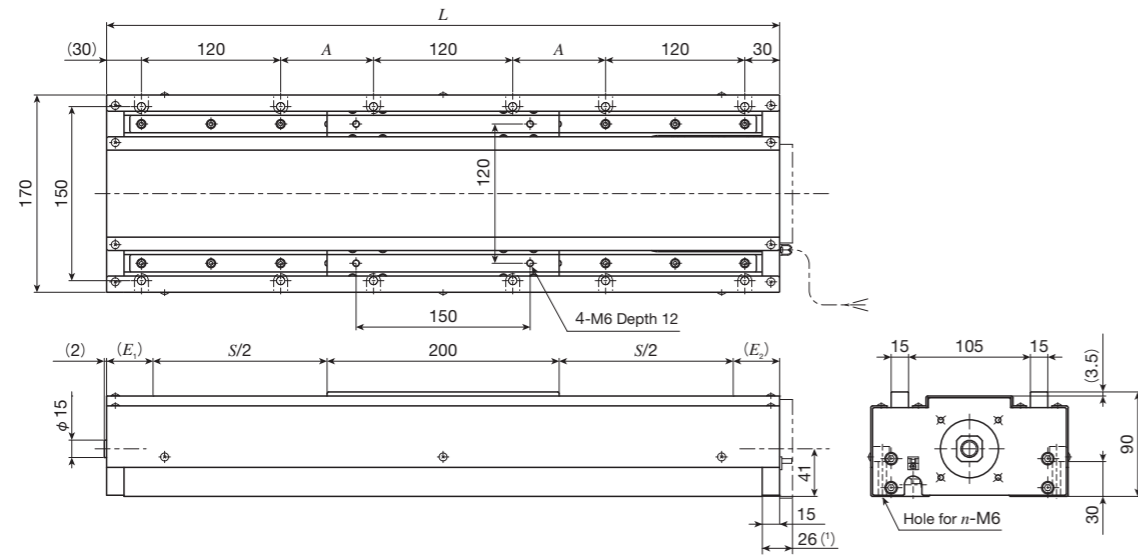


unit: mm

Identification number	Stroke length			Dimensions of table					Mass (Ref.) kg
	S	E <sub>1</sub>	E <sub>2</sub>	Overall length L	Mounting holes of bed				
					A	B	C (the number of holes × pitch)	n	
TSL170M-150	150	25	25	310	100	77	250	8	7.2
TSL170M-200	200			360	150	102	300	8	7.8
TSL170M-250	250			410	200	127	350 (2 × 175)	10	8.4
TSL170M-300	300			460	250	152	400 (2 × 200)	10	9.1
TSL170M-400	400			560	350	202	500 (2 × 250)	10	10.4
TSL170M-500	500			660	450	252	600 (2 × 300)	10	11.6

# IKO Precision Positioning Table L

## TSL170SM

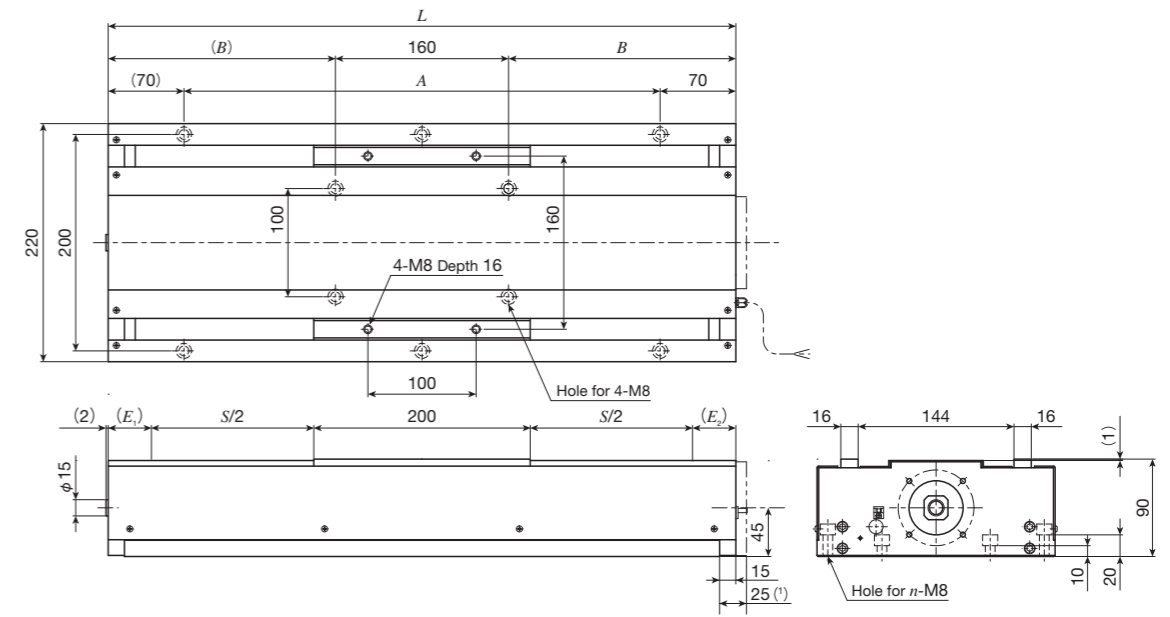


unit: mm

Identification number	Stroke length			Dimensions of table			Mass (Ref.) kg
	S	E <sub>1</sub>	E <sub>2</sub>	Overall length L	Mounting holes of bed A (the number of holes×pitch)	n	
TSL170SM- 300	300	40	40	580	80	12	14.8
TSL170SM- 400	400			680	130	12	16.6
TSL170SM- 500	500			780	180	12	18.5
TSL170SM- 600	600			880	230	12	20.3
TSL170SM- 800	800			1 080	330 (2×165)	16	24.0
TSL170SM-1000	1 000			1 280	430 (2×215)	16	27.7

Note (1) Applicable to AT207.

## TSL220M



unit: mm

Identification number	Stroke length			Dimensions of table			Mass (Ref.) kg	
	S	E <sub>1</sub>	E <sub>2</sub>	Overall length L	Mounting holes of bed A (the number of holes×pitch)	B		n
TSL220M- 300	300	40	40	580	440 (2×220)	210	6	20.1
TSL220M- 400	400			680	540 (2×270)	260	6	22.5
TSL220M- 500	500			780	640 (2×320)	310	6	24.7
TSL220M- 600	600			880	740 (4×185)	360	10	27.0
TSL220M- 800	800			1 080	940 (4×235)	460	10	31.5
TSL220M-1000	1 000			1 280	1 140 (4×285)	560	10	36.2

Note (1) Applicable to AT210.