



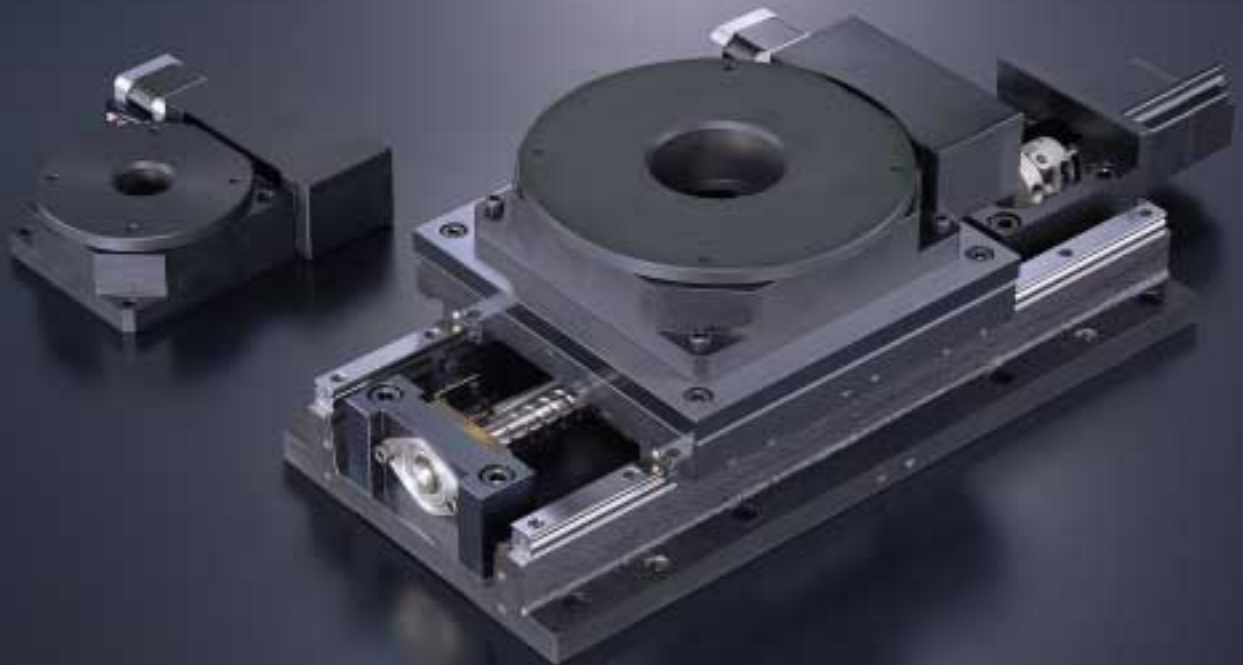
Precision Alignment Table

AT

CAT-57121A

PATENT PENDING

Table diameter 300 mm table is now available !



Compact and low height design

Most suitable for use as a precision angle correction mechanism

Repeatability +/- 1 second

Table diameter 120 mm, 200 mm and 300 mm



*As a compact
two-axis positioning mechanism...*

Precision Positioning Table **CT + AT**
XY- θ (two-axis specification)

IKO

Precision Alignment Table

AT



*As a high rigidity
two-axis positioning mechanism...*

Precision Positioning Table **CTLH + AT**
XY- θ (two-axis specification)



*As a compact
single-axis positioning mechanism...*

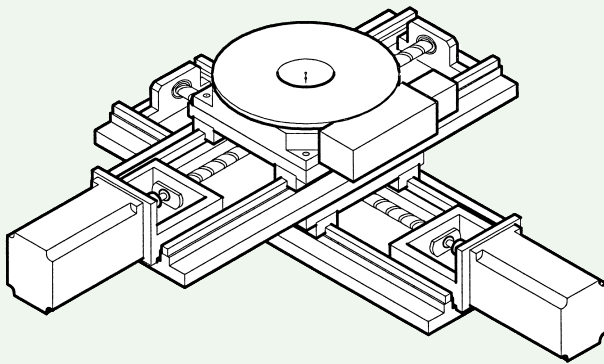
Precision Positioning Table **TS + AT**
X- θ (single-axis specification)

High precision achieved by incorporating Crossed Roller Bearing !

IKO Precision Alignment Table AT is a rotary positioning mechanism for precision angle correction, which consists of a high rigidity steel table and bed assembled with IKO Crossed Roller Bearing as a table support bearing.

Precision Alignment Table AT converts linear motion produced by ball screw drive into circular motion of an appointed operating angle range, and performs positioning in the direction of rotation. Linear Way L is assembled as a linear motion rolling guide in the ball screw drive mechanism and serves to achieve high accuracy positioning in combination with the precision ball screw.

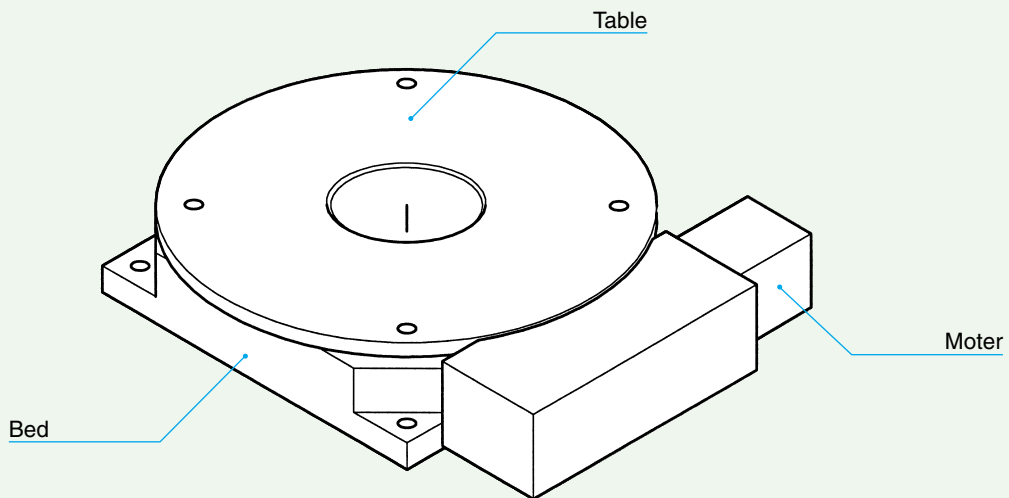
Precision Alignment Table AT can be mounted on top of the slide table of IKO Precision Positioning Table to obtain a low height $XY\theta$ multi-axis positioning mechanism, which can be used as an alignment table for precision measuring instruments, inspection equipment, and assemblers.



Example of multi-axis mechanism using Precision Alignment Table AT



Crossed Roller Bearing



Structure of Precision Alignment Table AT

Compact Size Precision Angle Correction Mechanism

Low sectional height and high rigidity

Low sectional height design and high rigidity are realized by incorporating Crossed Roller Bearing which has high rigidity to loads in all directions.

High repeatability

The rotator which converts linear motion into circular motion is accurately guided by Linear Way L in combination with precision ball screws, and achieves a high repeatability of ± 1 sec.

Hollow structure of table and bed

Hollow structure, featuring a large diameter center through hole from the top surface of the table to the bottom surface of the bed, is useful in various ways, for example, conducting a measurement of transmitted light from the bottom surface of the bed, and using the hole as a cable duct for machines and equipment.

Three sizes available as series

Three sizes with a table diameter of 120 mm, 200 mm and 300 mm are available as series. They can be selected meeting the needs for each application. Also, AC servo motors and stepping motors are available as drive motors.

Sensors provided as the standard specification

Sensors are provided as the standard specification at the limit positions of the operating angle range. These sensors can be used for overrun detection for hazard prevention, and origin setting.

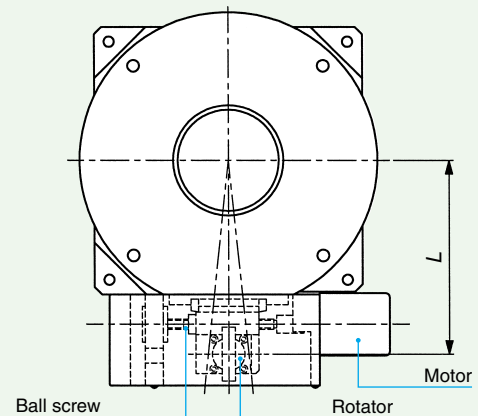
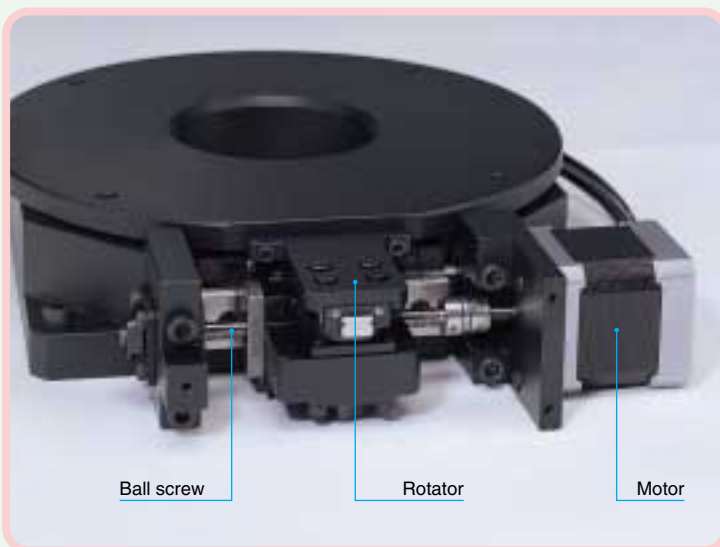
Simple design featuring one-touch connection

Various electric devices for control are available and can be connected by one touch if the dedicated connecting cord is used. This contributes to the reduction of man-hours for design of machines and equipment.

Drive Mechanism of Precision Alignment Table AT

Precision Alignment Table AT is driven by stroking the rotator connected to the outer peripheral surface of the table in the linear direction by ball screw drive. The Length from the center of the table to the rotator linear axis and the table angle change by rotator movement. To make adjustment for these changes, the rotator incorporates linear and rotary motion rolling guide mechanisms that follow the rotator movement in accordance with the table angle.

In Precision Alignment Table AT, therefore, even when the rotator is moved with the same pitch, the rotation angle differs depending on the position, and the rotation speed does not become constant when the rotator is moved at a uniform speed.



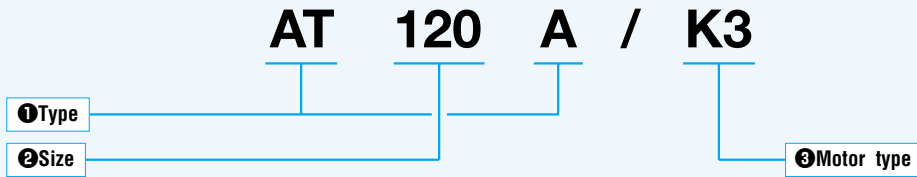
Length L from the center of table unit : mm

| Model number | L |
|--------------|-----|
| AT120A | 100 |
| AT200A | 130 |
| AT300A | 186 |

Identification Number

An example of identification number of Precision Alignment Table AT is shown below. Three sizes with a table diameter of 120 mm, 200 mm, and 300 mm are available. A stepping motor or an AC servo motor can be selected as a drive motor.

Example of identification number



| | |
|---------------------|--|
| 1 Type | AT...A : Precision Alignment Table AT |
| 2 Size | 120 : Table diameter 120mm 200 : Table diameter 200mm 300 : Table diameter 300mm |
| 3 Motor type | AT120 A · AT200 A A5 : AC servo motor SGM-A5B512 (Yaskawa Electric Corporation) K3 : Stepping motor PK545-A (Oriental Motor Co., Ltd.) AT300 A A1 : AC servo motor SGM-01B512 (Yaskawa Electric Corporation) K5 : Stepping motor PK566-A (Oriental Motor Co., Ltd.) |

Characteristics

The characteristics of Precision Alignment Table AT are shown in Table 1. The timing chart of the sensors incorporated in the table is shown in Fig. 1.

Table 1 Characteristics

| Item Size | Ball screw lead | Rotator resolution | ※Operating angle range | Repeatability | Allowable load |
|--------------|--------------------|-----------------------|---------------------------|---------------|-------------------|
| AT120 A | 1mm | 1 μm ⁽¹⁾ | ± 5° | ±1sec. | 100N |
| AT200 A | | | | | 300N |
| AT300 A | 2mm | 2 μm ⁽¹⁾ | ±10° | | 500N |

Note⁽¹⁾ : This is a value when the number of divisions of motor rotation is 1000 pulses.

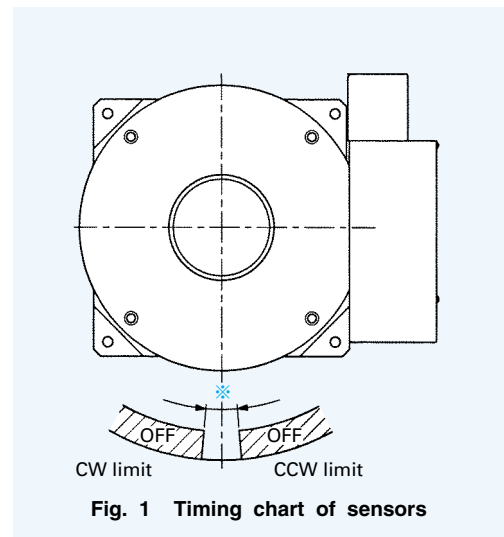
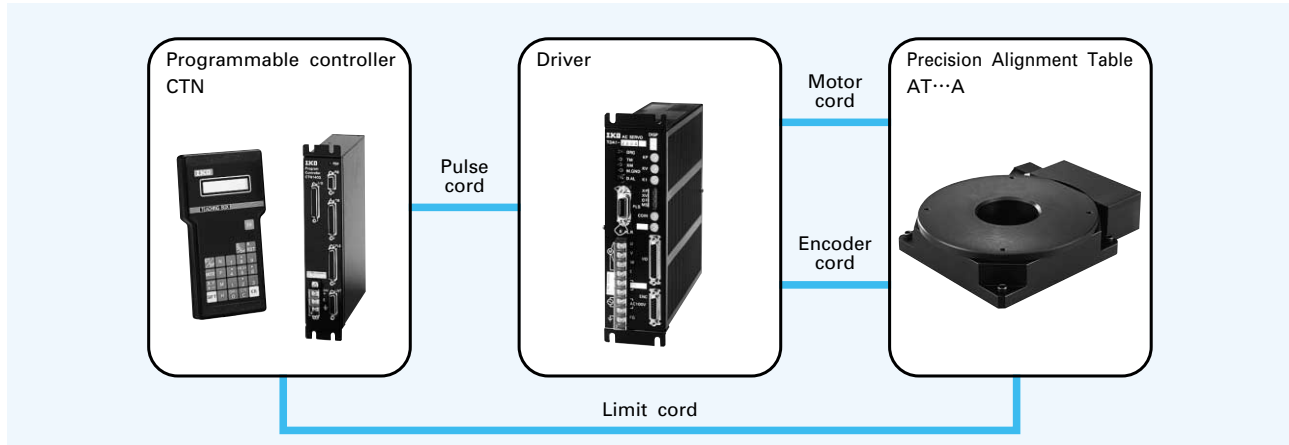


Fig. 1 Timing chart of sensors

System Configuration

Specially designed electric devices for Precision Alignment Table AT are available so as to obtain the full performance of the table. A totally balanced system can be built by using these electric devices in combination with the table.

Table 2 System configuration using driver and programmable controller

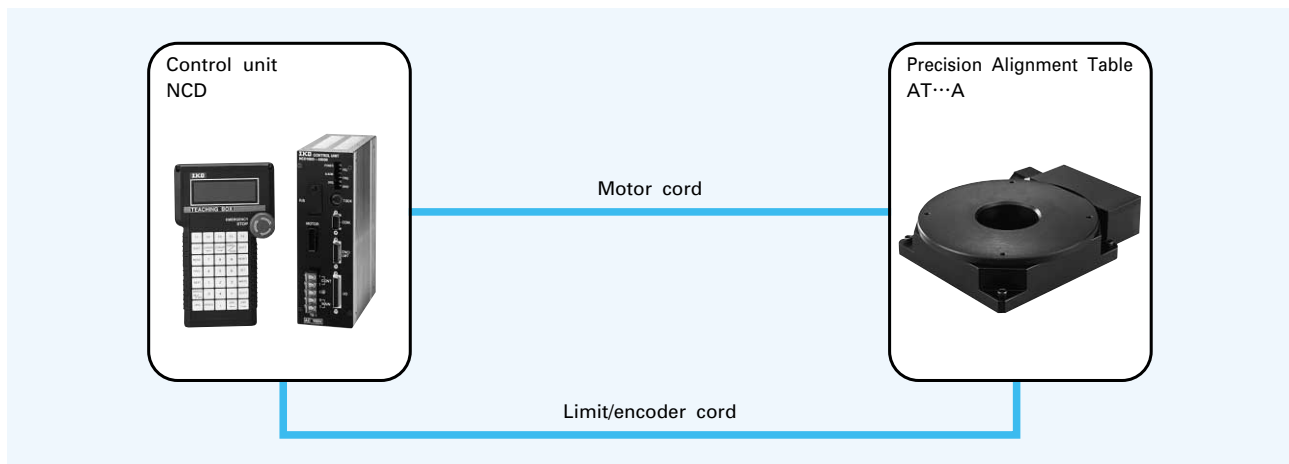


| Motor | | Driver | | | Programmable controller | | | |
|----------------|------------|-----------|----------------------------------|--------------------------------|-------------------------|--------------|-------------|---------------|
| Type | Motor code | Main body | Motor cord | Encoder cord | Main body | Teaching box | Pulse cord | Limit cord |
| AC servo motor | A... | TDA1-1004 | TAE2052-AM03 (TAE2036-AM03) | TAE2054-AE03 (TAE2038-AE03) | CTN140G | TAE1025-TB | TAE1030-PC | TAE1027-LCA03 |
| Stepping motor | K... | TDS1-5071 | TAE2055-SMC03 (TAE2057-SNC03) | — | | | TAE1026-PCA | |

Remark 1. The cords in () have high bending resistance.

2. The standard length of the motor cord, encoder cord, and limit cord is 3 m. The pulse cord is 1.5 m long.

Table 3 System configuration using control unit (AC servo motor specification)



| Motor | | Control unit | | | |
|----------------|------------|---------------|--------------|--------------------------------|----------------------------------|
| Type | Motor code | Main body | Teaching box | Motor cord | Limit/encoder cord |
| AC servo motor | A5 | NCD160G-A5000 | TAE1050-TB | TAE2065-AM03 (TAE2072-AM03) | TAE2066-AEL03 (TAE2073-AEL03) |
| | A1 | NCD160G-A2006 | | | |

Remark 1. The cords in () have high bending resistance.

2. The standard cord length is 3 m.

Table 4 Specifications of driver

| Type | | TDA1-1004 | TDS1-5071 ⁽¹⁾ |
|----------------------------|--|--|--|
| Item | | | |
| Number of drive axes | | One axis | |
| Applicable motor | | AC servo motor (30W, 50W, 100W) | 5-phase stepping motor (0.75 A/phase) |
| Feedback | | Incremental encoder | — |
| Drive method | | — | Bipolar constant-current drive |
| Excitation method | | — | 4-5 phase excitation or 4 phase excitation |
| Command pulse input system | | CW/CCW pulse or direction command/forward and reverse pulses | CW/CCW pulse |
| Command pulse input form | | Line driver or open collector (+5 V level) | |
| General specifications | Supply voltage | AC100V±10% 50/60Hz | DC24V±10% |
| | Maximum current consumption | 10A | 3A |
| | Ambient temperature (during operation) | 0~50°C | 0~45°C |
| | Ambient humidity (during operation) | 35~85%RH (non-condensing) | |
| | External dimensions (reference value) | Width 68 mm×Height 220 mm×Depth 220 mm | Width 43 mm×Height 75 mm×Depth 100 mm |
| | Mass (reference value) | Main body : 2.0kg | Main body : 0.3kg |




Note⁽¹⁾ : Two-axis specification and AC 100 V (supply voltage) drivers are also available. Consult  for further information.

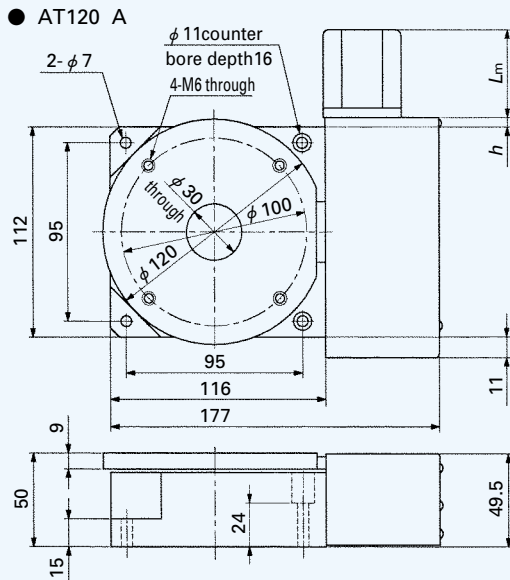
Table 5 Specifications of programmable controller/control unit

| Type | | CTN140G ⁽¹⁾ | NCD160G-A5000 | NCD160G-A2006 ⁽²⁾ | |
|-----------------------------------|--|---|---|--|--|
| Item | | | | | |
| Control specifications | Number of control axes | One axis | | | |
| | Applicable motor | — | AC servo motor (30W, 50W) | AC servo motor (100W, 200W) | |
| | Feedback | — | Incremental encoder | | |
| | Command pulse output system | CW/CCW pulse or direction command/forward and reverse pulses | — | | |
| | Command pulse output form | Line driver | — | | |
| | Maximum command value | ±999999 pulses | ±2147483647 μm | | |
| | Maximum output frequency | 200kpps | — | | |
| Program specifications | Motor speed | — | Rated speed 3,000 rpm, maximum speed 4,500 rpm | | |
| | Input method | MDI, teaching, and PC input via RS-232C | | | |
| | Command input system | Absolute command or incremental command | | | |
| | Program capacity | 1,000 steps | 1,200 steps or more (256 points) | | |
| Input/output specifications | Functions | Jump, call, repetition, timer control, I/O control, branching by input conditions, various editing functions, etc. | | | |
| | Input | Number of input points | LS input : 4 points, I/O input : 8 points | LS input : 3 points, I/O input : 23 points | |
| | | Operation input | Start, stop, emergency stop, forward/reverse manual operation, return to origin, servo control, alarm resetting, interrupt, etc. (Selected and allocated to I/O inputs by parameters) | | |
| | | Input method | Photo coupler input (for no-voltage contact or open collector output) | | |
| | Output | Number of output points | I/O output : 7 points | I/O output : 15 points | |
| | | Operation output | Automatic operation, limit actuation, emergency stop, completion of return to origin, completion of positioning, etc. (Selected and allocated to I/O outputs by parameters) | | |
| | | Output method | Open collector output (DC30V 100mA MAX) | | |
| Power supply for input and output | For I/O : DC24V 1A | | | | |
| Protective functions | — | Over-current, over-voltage, overload, acceleration, voltage drop, encoder error, deviation error, overheat, CPU error, etc. | | | |
| Other major functions | | RS-232C (reading, writing, direct execution, etc.), software limit, LS logic change, check functions | | | |
| | | — | Speed change during movement, torque limitation, torque monitoring, brake/regenerative unit add-on, etc. | | |
| General specifications | Supply voltage | DC24V±10% | AC85~132V 50/60Hz | | |
| | Continuous rated current | — | 1.0Arms | | |
| | Maximum current consumption | 1.4A | 6A | | |
| | Ambient temperature (during operation) | 0~50°C | | | |
| | Ambient humidity (during operation) | 35~85%RH (non-condensing) | | | |
| | Counter measure for power failure | Lithium battery Life : approx. 5 years | Flash memory (requiring no battery change) | | |
| | External dimensions (reference value) | Width 49 mm×Height 220 mm×Depth 156 mm | Width 70 mm×Height 220 mm×Depth 160 mm | | |
| | Mass (reference value) | Main body : 1.2kg Dedicated teaching box (TAE1025-TB) : 0.5kg | Main body : 1.6kg Dedicated teaching box (TAE1050-TB) : 0.5kg | | |

Note⁽¹⁾ : Multi-axis specification, high performance type, and AC 100 V (supply voltage) controllers are also available. Consult  for further information.

⁽²⁾ : Comply to CE Marking specification control unit (NCD162G), consult .

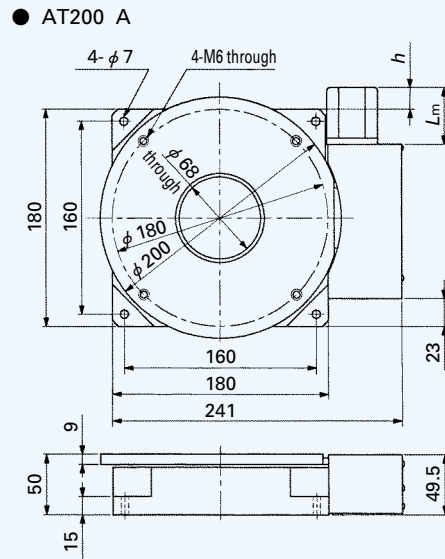
Dimensions of Table



Dimensions of motor L_m unit : mm

| Motor code | L_m | h |
|------------|-------|-----|
| A5 | 77 | 20 |
| K3 | 47 | 5 |

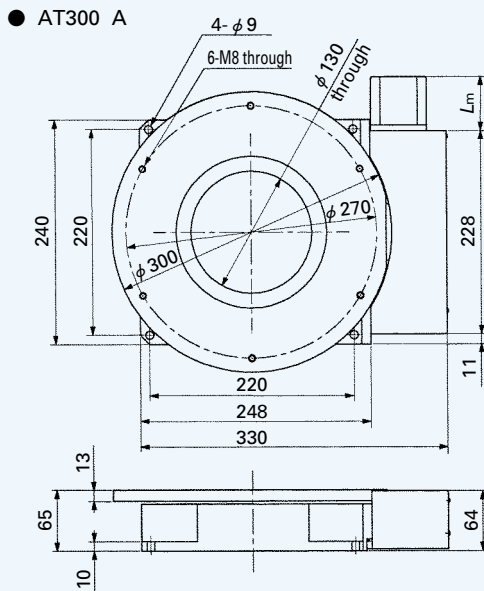
Mass 4.4 kg (The mass of motor is not included.)



Dimensions of motor L_m unit : mm

| Motor code | L_m | h |
|------------|-------|-----|
| A5 | 77 | 3 |
| K3 | 47 | 18 |

Mass 9.9kg (The mass of motor is not included.)



Dimensions of motor L_m unit : mm

| Motor code | L_m |
|------------|-------|
| A1 | 94.5 |
| K5 | 57.5 |

Mass 21.0kg (The mass of motor is not included.)

Configuration of XY- θ Multi-axis Positioning Mechanism

When Precision Alignment Table AT is combined with IKO Precision Positioning Table of single-axis/multi-axis specification, an XY- θ multi-axis positioning mechanism can be readily formed. This positioning mechanism has a compact structure with low assembly height, and can be used to perform high accuracy positioning as an alignment table for precision measuring instruments, inspection machines, assemblers, etc. Table 6 shows examples of configuration of multi-axis positioning mechanism using Precision Alignment Table AT. Various other multi-axis configurations are also available to meet the requirement for each application. Consult IKO for further information.

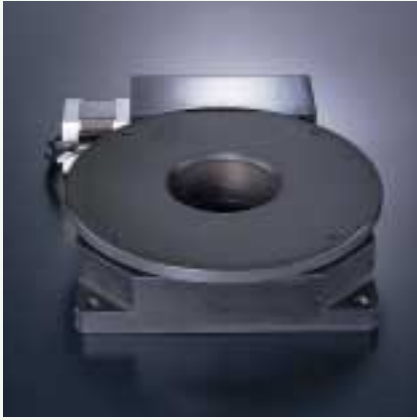
Table 6 Examples of configuration of multi-axis positioning mechanism

| Appearance of multi-axis positioning mechanism | Models of IKO Precision Positioning Table that can be combined with Precision Alignment Table AT | | Stroke length | | |
|---|--|------------------------------|---------------|---------------|-----|
| | | | X axis | Y axis | |
|  | Precision Positioning Table TS and CT | Single-axis specification | TS125/125 | 50 | |
| | | | TS125/220 | 120 | |
| | | | TS220/220 | 120 | |
| | | | TS220/310 | 180 | |
| | | | TS260/350 | 250 | |
|  | Precision Positioning Table LH TSLH and CTLH | Two-axis specification | CT125/125 | 50 | 50 |
| | | | CT220/220 | 120 | 120 |
| | | | CT260/350 | 150 | 250 |
| | | | CT350/350 | 250 | 250 |
|  | Precision Positioning Table LH TSLH and CTLH | Single-axis specification | TSLH120H | 100, 150 | |
| | | | | 200 | |
| | | | | 250 | |
| | | | | 300 | |
| | | | TSLH220H | 150 | |
| | | | | 200, 250, 300 | |
| | | | TSLH320H | 400 | |
| | | | | 300 | |
| | | | TSLH420H | 400, 500 | |
| | | | | 500 | |
| | | | | 600 | |
| | | | | 800 | |
|  | Precision Positioning Table LH TSLH and CTLH | Two-axis specification | CTLH120H | 100 | 100 |
| | | | | 200 | 100 |
| | | | | 200 | 200 |
| | | | | 300 | 200 |
| | | | CTLH220H | 300 | 300 |
| | | | | 200 | 200 |
| | | | | 300 | 200 |
| | | | | 300 | 300 |
| | | | CTLH320H | 400 | 300 |
| | | | | 400 | 400 |
| | | | | 400 | 400 |
| | | | | 300 | 300 |
| | | | | 400 | 300 |
| | | | | 400 | 400 |
| | | | | 500 | 400 |
| | | | | 500 | 500 |

Remark The above table shows specifications and performance of IKO Precision Positioning Table. For the specifications and performance to be obtained by combining it with Precision Alignment Table AT, consult IKO for further information.

unit : mm

| Dimensions of slide table | | Height | Positioning accuracy | Repeatability | Parallelism A in table operation | Parallelism B in table operation | Straightness | Perpendicularity between X and Y motions |
|---------------------------|--------|--------|----------------------|---------------|-------------------------------------|-------------------------------------|--------------|--|
| Width | Length | | | | | | | |
| 125 | 125 | 60 | 0.005 | ±0.002 | 0.005 | 0.015 | — | — |
| 125 | 220 | 60 | 0.008 | | | | | |
| 220 | 220 | 65 | | | | | | |
| 220 | 310 | 70 | 0.015 | | 0.008 | 0.020 | | |
| 260 | 350 | 100 | | | | | | |
| 125 | 125 | 85 | 0.005 | ±0.002 | 0.005 | 0.015 | — | 0.005 |
| 220 | 220 | 100 | 0.008 | | | | | |
| 260 | 350 | 150 | | | 0.015 | 0.008 | 0.020 | — |
| 350 | 350 | 150 | | | | | | |
| 120 | 135 | 65 | 0.010 | ±0.002 | 0.010 | — | 0.005 | — |
| | | | 0.015 | | 0.015 | | 0.010 | |
| | | | 0.020 | | 0.020 | | | |
| 220 | 220 | 90 | 0.010 | ±0.002 | 0.010 | — | 0.005 | — |
| | | | 0.015 | | 0.015 | | 0.010 | |
| | | | 0.020 | | 0.020 | | | |
| 320 | 320 | 120 | 0.015 | ±0.002 | 0.015 | — | 0.005 | — |
| | | | 0.020 | | | | | |
| 420 | 420 | 140 | 0.025 | ±0.002 | 0.025 | — | 0.015 | — |
| | | | 0.030 | | 0.030 | | 0.020 | |
| | | | 0.035 | | 0.035 | | | |
| 120 | 135 | 130 | 0.015 | ±0.002 | 0.015 | — | 0.005 | 0.005 |
| | | | 0.020 | | 0.020 | | 0.010 | |
| | | | 0.030 | | 0.030 | | 0.025 | 0.010 |
| 220 | 220 | 180 | 0.020 | ±0.002 | 0.025 | — | 0.010 | |
| | | | 0.030 | | 0.035 | | 0.020 | 0.015 |
| 320 | 320 | 240 | 0.020 | ±0.002 | 0.020 | — | 0.005 | |
| | | | 0.025 | | 0.025 | | 0.010 | 0.015 |
| | | | 0.030 | | | | | |



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