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IKO

New

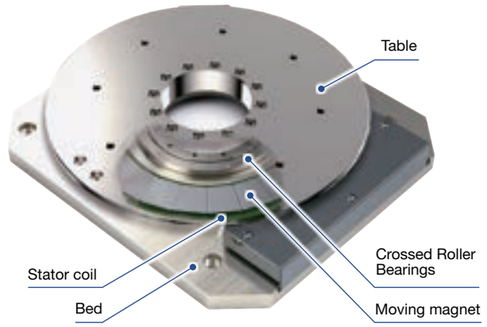
Alignment Stage

SA···DE/T

Now Available with Unlimited Rotation

NIPPON THOMPSON CO., LTD.

SA···DE/T Structure

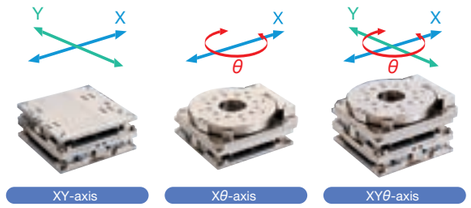


The Alignment Stage SA···DE adopts the direct drive method to achieve low profile and compact XYθ motion.
While the conventional rotation type (SA···DE/S) had limited rotation operating angles, the new unlimited rotation type (SA···DE/T) supports operating angles beyond 360° and continuous rotating operation.

SA···DE/T Features

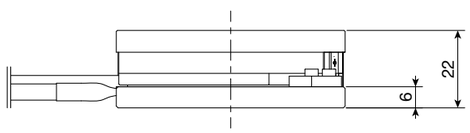
1 Free combination of X, Y, and θ axes

When combined with the linear motion X table, SA···DE/X is an extremely compact alignment stage with three operating directions (X, Y, and θ axes).



2 Thin and Compact

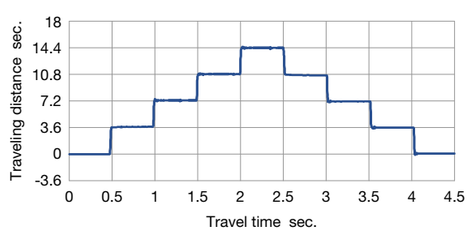
IKO Crossed Roller Bearings are used as the rotation guiding parts for the direct drive method so an extremely low sectional height is achieved.



3 High Resolution and High Responsiveness

Performing full-closed loop control of the direct drive-type stage with a built-in high resolution encoder provides high resolution and high accuracy.

[Measurement conditions] Model number: SA120DE/T
Carrying mass: 1000 g
Feed command: 3.6 sec



Identification Number

Example

SA	120	DE	/	5	XYS	R	4
1	2	1		3	4	5	6

1 Model code

Model code	
SA···DE	Alignment Stage SA···DE

2 Size

Table size [mm]
65
120
200

3 Resolution

Resolution
1
5

Specify the resolution of the encoder for X-axis or XY-axis.
When selecting only S: θ-axis or T: θ-axis in 4, set "No symbol" for the resolution.

4 Axial configuration

Axial configuration	
X	Only X-axis
S	Only θ-axis (limited operating angle specification)
NEW T	Only θ-axis (unlimited rotation specification)
XY	X and Y-based two-axis configuration
XS	X and θ-based two-axis configuration (θ-axis limited operating angle specification)
NEW XT	X and θ-based two-axis configuration (θ-axis unlimited rotation specification)
XYS	X, Y, and θ-based three-axis configuration (θ-axis limited operating angle specification)
NEW XYT	X, Y, and θ-based three-axis configuration (θ-axis unlimited rotation specification)

5 Surface treatment*

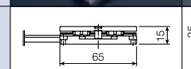
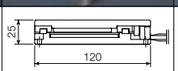
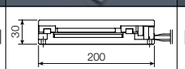
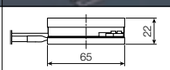
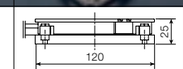
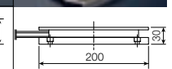
Surface treatment	
No symbol	Electroless nickel plating
R	Black chrome surface treatment

When T (unlimited rotation specification) is included in the axis configuration, black chrome surface treatment is not applicable.
*Surface treatment is performed on the surfaces of table and bed.

6 Specification number

Specification number	
4	Specification number 4 (The specification number is limited to 4)

Alignment Stage SA Specifications

Model and size	SA65DE/X	SA120DE/X	SA200DE/X	SA65DE/S SA65DE/T	SA120DE/S SA120DE/T	SA200DE/S SA200DE/T
Model and size						
Sectional shape	 65 15	 120 25	 200 30	 65 22	 120 25	 200 30
Maximum thrust N	25	70	400 (250)	Maximum torque 0.5N·m	Maximum torque 2.0N·m	Maximum torque 8.0 (6.0)N·m
Rated thrust N	3.5	15	70	Rated torque 0.06N·m	Rated torque 0.4N·m	Rated torque 2.0N·m
Maximum load mass kg	2.4	5.9	30.0 (20.0)	2.2	6.8	21.2 (17.1)
Effective stroke length mm or operating angle deg	10	20	20	/S 50°	/S 60°	/S 280°
				/T Unlimited rotation	/T Unlimited rotation	/T Unlimited rotation
Resolution μm	0.1 / 0.5	0.1 / 0.5	0.1 / 0.5	/S 0.64 sec 5625 pulse/deg	/S 0.36 sec 10000 pulse/deg	/S 0.25 sec 14400 pulse/deg
				/T 0.63 sec 5700 pulse/deg	/T 0.36 sec 10000 pulse/deg	/T 0.50 sec 7200 pulse/deg
Maximum speed mm/s	270 / 500	270 / 800	270 / 800	720 deg/s	/S 400 deg/s	/S 270 deg/s
					/T 720 deg/s	/T 720 deg/s
Positioning repeatability μm	±0.5	±0.5	±0.5	±1.3sec	±0.8sec	/S ±0.5sec
						/T ±1.0sec

Remark Numbers in parentheses indicate values when used with an ADVA-R5ML driver or AD7A-R5MV driver.

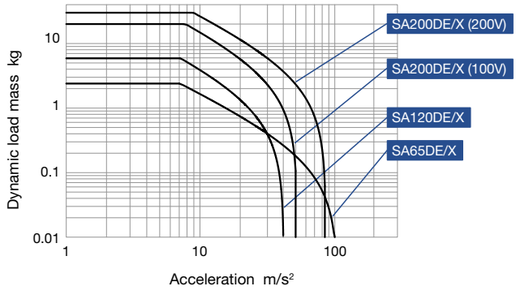
Specifications and Performance

Item \ Identification number		SA65DE/S	SA65DE/T	SA120DE/S	SA120DE/T	SA200DE/S (7)	SA200DE/T (8)
Maximum torque (1)	N·m	0.5		2.0		8.0 (6.0)	
Rated torque (2)	N·m	0.06		0.4		2.0	
Maximum load mass	kg	2.2		6.8		21.2 (17.1)	
Effective operating angle	Degree	50	Unlimited rotation	60	Unlimited rotation	280	Unlimited rotation
Resolution	Second	0.64	0.63	0.36		0.25	0.50
	pulse/degree	5625	5700	10000		14400	7200
Maximum speed (3) (4)	degree/s	720		400	720	270	720
Positioning repeatability (5)	Second	±1.3		±0.8		±0.5	±1.0
Inertia moment of moving table	kg·m²	0.00012		0.002		0.013	
Total mass (6)	kg	0.5		2		6	
Ambient temperature and humidity in operation		0~40°C · 20~80%RH (keep condensation free)					

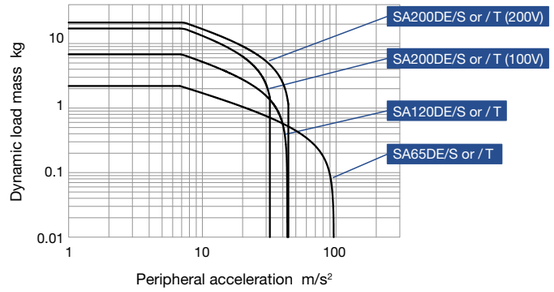
Notes (1) The duration of maximum torque is up to 1 second.
(2) This is based on the case of mounting on a metal mating member material at an ambient temperature of 20°C.
(3) For the case of exceeding the displayed speed, please contact IKO.
(4) This maximum speed may not be reached depending on the maximum output frequency of the controller used, and the driver type or settings.
(5) When the temperature of the product is constant.
(6) Mass of the cord is not included.
(7) Numbers in parentheses indicate values when used with an ADVA-R5ML driver (100V).
(8) Numbers in parentheses indicate values when used with an AD7A-R5MV driver (100V).

● Dynamic load mass

<X(Y)-axis>



<θ-axis>



Remark: Dynamic load mass of θ-axis is a value calculated as cube of steel. And, the acceleration is converted as value of stage periphery.

Mounting

The typical tightening torque to be used when fixing SA···DE in place is indicated in the following table. When high accuracy is required with no vibration and shock, it is recommended to tighten the screws with a lower torque than that indicated in the table and use an adhesive to prevent screws from loosening.

● Screw tightening torque

Unit: N·m

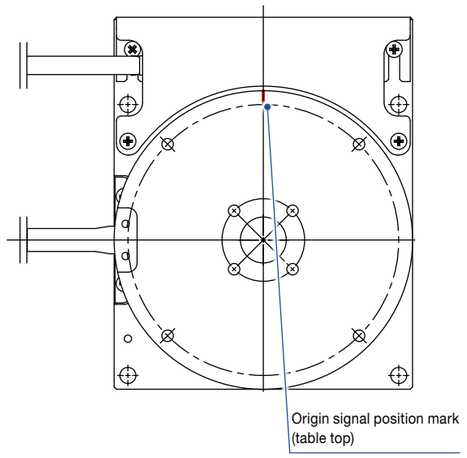
Bolt size	Female thread component		
	Copper	Aluminum alloy	
			Screw insert
M3 × 0.5	1.7	About 60% of steel value	About 80% of steel value
M4 × 0.7	4.0		
M6 × 1	13.3		

Sensor Specification

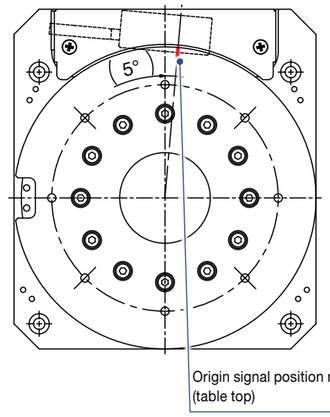
● Origin signal position of the SA···DE/T (unlimited rotation specification)

The table top of the SA···DE/T is engraved with a mark showing the origin signal detection position (red line in the figure below). The origin signal is detected when the table is at the position shown in the figure.
The SA···DE/T does not have a built-in limit sensor or pre-origin sensor. When using with a limited stroke range, install external sensors, stoppers, etc., as needed.

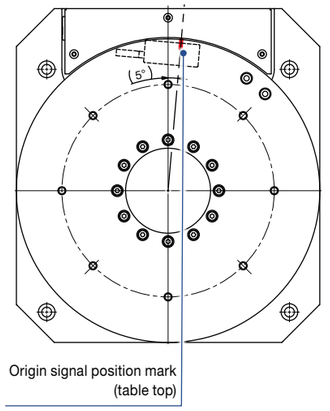
SA65DE/T



SA120DE/T



SA200DE/T



System Configuration

Three series of dedicated drivers, ADVA, AD7A and MR-J4, are available for the Alignment Stage SA. The system configuration varies depending on the driver used. Table 1 shows the applicability of the Alignment Stage SA···DE and driver types. Table 2 shows the table identification numbers and applicable MR-J4 drivers.

Table 1. Applicability table of SA···DE model and driver types

Driver	Command type	SA···DE/S (Limited operating angle)	SA···DE/T (Unlimited rotation)	SA···DE/X
ADVA	EtherCAT	○	-	○
	Pulse train command	○	-	○
AD7A (1)	EtherCAT/Pulse train command	-	◇	-
MR-J4	SSCNET III/H	○	○	○
	Pulse train command	◇	◇	◇

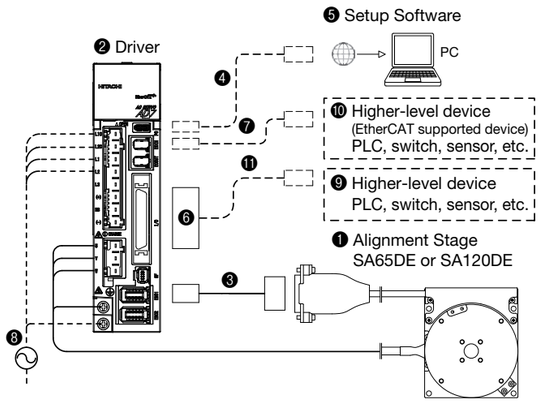
Note (1) Command method (EtherCAT or pulse train commands) for the AD7A can be switched via mode selection.
Remark ◇ is individually corresponding. If needed, please contact IKO.
The use of drivers other than those listed above can also be considered. If needed, please contact IKO.

Table 2. Identification numbers of SA···DE and applicable MR-J4-10B-RJ

Identification number of table	Identification number of driver
SA65DE /S	MR-J4-10B-RJ /SA65DE -S
SA65DE /T	MR-J4-10B-RJ /SA65DE -T
SA65DE /X	MR-J4-10B-RJ /SA65DE -X
SA120DE /S	MR-J4-10B-RJ /SA120DE -S
SA120DE /T	MR-J4-10B-RJ /SA120DE -T
SA120DE /X	MR-J4-10B-RJ /SA120DE -X
SA200DE /S	MR-J4-10B-RJ/SA200DE -S2
SA200DE /T	MR-J4-10B-RJ /SA200DE -T
SA200DE /X	MR-J4-10B-RJ /SA200DE -X

System Configuration

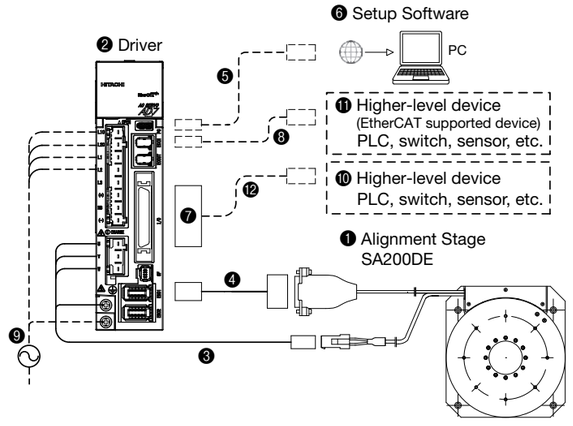
Table 3. System configuration for SA65DE/T, SA120DE/T with driver AD7A



No.	Name	Identification number
❷	Driver	AD7A-01NV (200 V specification) AD7A-R5MV (100 V specification)
❸	Encoder extension cord (2m) (1)	TAE20V4-EC02
❹	PC relay cable	USB Type-C cable (This must be provided by the customer)
❺	Setup Software	ProDriveNext Please download from the official website of Hitachi Industrial Equipment Systems Co., Ltd.
❻	I/O connector	TAE20R5-CN (2)
❼	Ethernet cable (3)	This must be provided by the customer.
❽	Power cord	
❾	Higher-level device (EtherCAT supported device) (3)	
❿	Higher-level device	
⓫	I/O connector connection cable	

Notes (1) For specific cord length, please contact IKO.
(2) The I/O connector TAE20V5-CN is a combined product of 10150-3000PE (connector) and 10350-52F0-008 (cover) from 3M Japan Limited.
(3) Required only when using the AD7A in EtherCAT command mode. Not required when using with pulse train commands.
(Command method [EtherCAT or pulse train] for the AD7A can be switched via mode selection.)

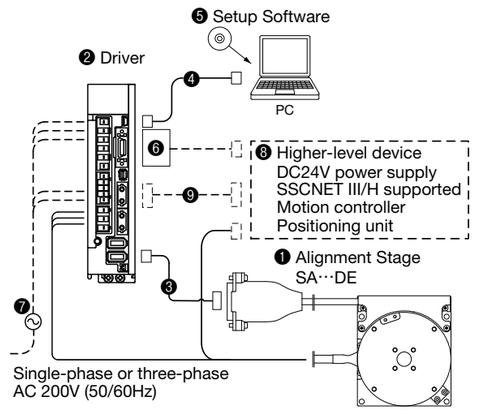
Table 4. System configuration for SA200DE/T with driver AD7A



No.	Name	Identification number
❷	Driver	AD7A-01NV (200 V specification) AD7A-R5MV (100 V specification)
❸	Motor extension cord (3m) (1)	TAE20V3-AM03
❹	Encoder extension cord (2m) (1)	TAE20V4-EC02
❺	PC relay cable	USB Type-C cable (This must be provided by the customer)
❻	Setup Software	ProDriveNext Please download from the official website of Hitachi Industrial Equipment Systems Co., Ltd.
❼	I/O connector	TAE20R5-CN (2)
❽	Ethernet cable (3)	This must be provided by the customer.
❾	Power cord	
❿	Higher-level device (EtherCAT supported device) (3)	
⓫	Higher-level device	
⓬	I/O connector connection cable	

Notes (1) For specific cord length, please contact IKO.
(2) The I/O connector TAE20V5-CN is a combined product of 10150-3000PE (connector) and 10350-52F0-008 (cover) from 3M Japan Limited.
(3) Required only when using the AD7A in EtherCAT command mode. Not required when using with pulse train commands.
(Command method [EtherCAT or pulse train] for the AD7A can be switched via mode selection.)

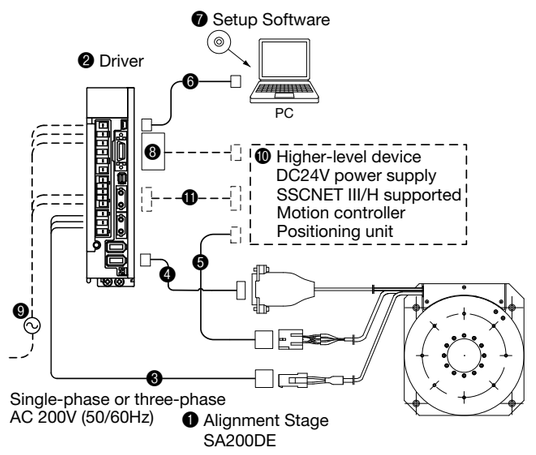
Table 5. System configuration (SSCNET III/H supported) for SA65DE and SA120DE with driver MR-J4-10B



No.	Name	Identification number
❸	Encoder extension cord (2m) (1)	TAE20V6-EC02
❹	PC connection cable (3m)	MR-J3USBCBL3M
❺	Setup Software	SW1DNC-MRC2-J
❻	Connectors for input/output connection	MR-CCN1 (2)
❼	Power cord	This must be provided by the customer.
❽	Higher-level device (3)	
❾	Connection cable for SSCNET III/H	

Notes (1) For specific cord length, please contact IKO.
(2) The I/O connector MR-CCN1 is a combined product of 10120-3000PE (connector) and 10320-52F0-008 (cover) from 3M Japan Limited.
(3) The higher-level devices are a motion controller, positioning unit and DC24V power supply ready for SSCNET III/H from Mitsubishi Electric Corporation.

Table 6. System configuration (SSCNET III/H supported) for SA200DE with driver MR-J4-10B

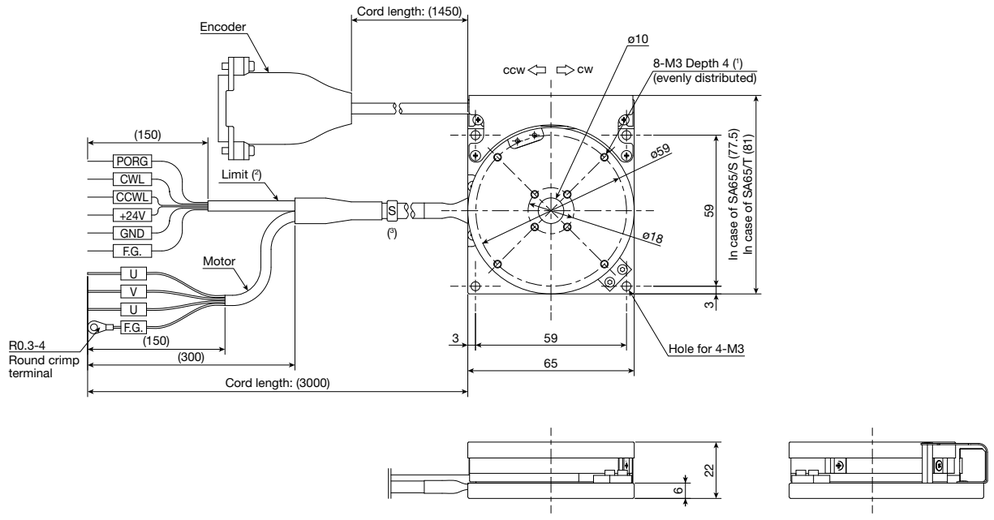


No.	Name	Identification number
❸	Motor extension cord (3m) (1)	TAE20V3-AM03
❹	Encoder extension cord (2m) (1)	TAE20V6-EC02
❺	Sensor extension cord (5)	TAE10V8-LC□□
❻	PC connection cable (3m)	MR-J3USBCBL3M
❼	Setup Software	SW1DNC-MRC2-J
❽	Connectors for input/output connection	MR-CCN1 (3)
❾	Power cord	This must be provided by the customer.
❿	Higher-level device (4)	
⓫	Connection cable for SSCNET III/H	

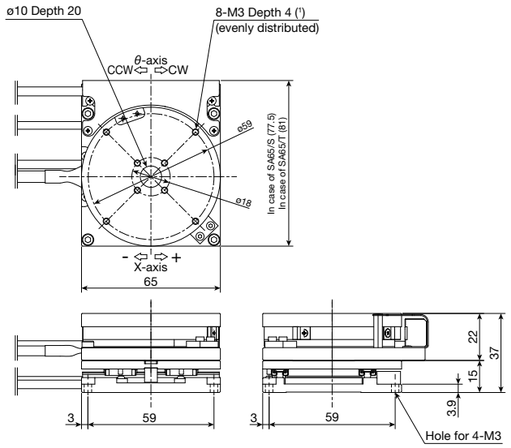
Notes (1) For specific cord length, please contact IKO.
(2) The length of the sensor extension cord is specified in the □□ located at the end of the identification number for lengths of 3 to 10m in units of 1m.
(3) The I/O connector MR-CCN1 is a combined product of 10120-3000PE (connector) and 10320-52F0-008 (cover) from 3M Japan Limited.
(4) The higher-level devices are a motion controller, positioning unit and DC24V power supply ready for SSCNET III/H from Mitsubishi Electric Corporation.
(5) Not available for the SA···DE/T.

Product dimensions

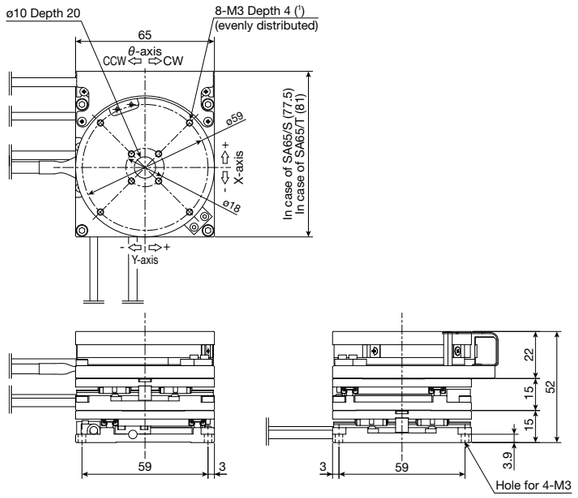
● SA65DE/S, SA65DE/T



● SA65DE/XS, SA65DE/XT

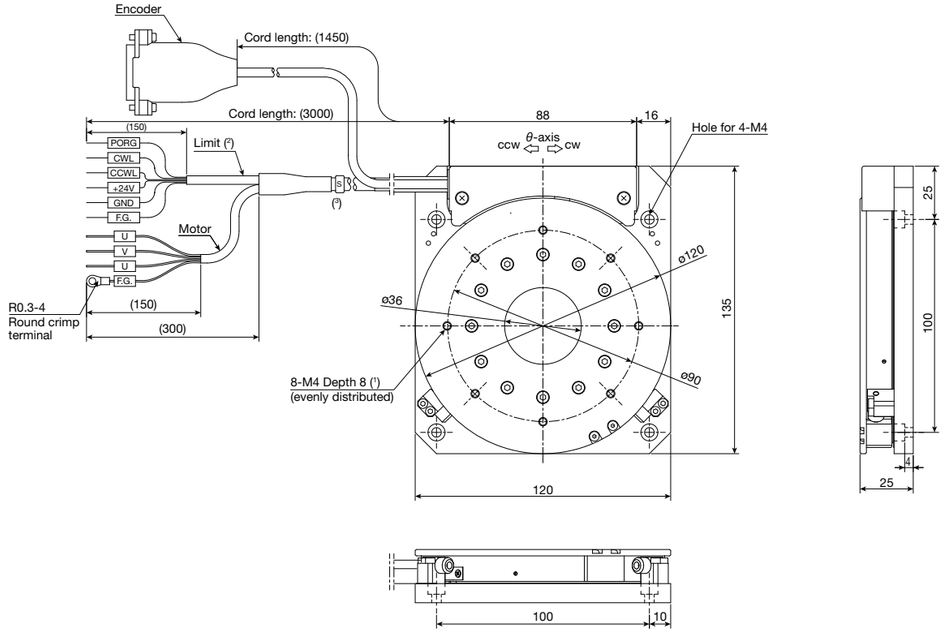


● SA65DE/XYS, SA65DE/XYT

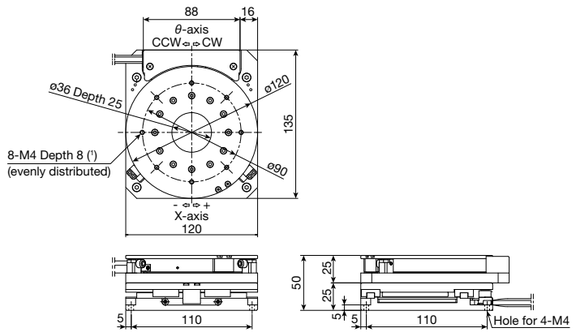


Note (1) Inserting mounting screws too deeply may affect the running performance of the moving table. Never insert a screw longer than the depth of the through hole.
(2) The SA65DE/T (unlimited rotation specification) does not have a limit cord or mechanical stopper.
(3) Both the SA65DE/S and SA65DE/T specifications include the S symbol.
Remark For the cable length, please see the dimension tables for SA65DE/X and SA65DE/S.
The central hole of the θ-table is a through hole.

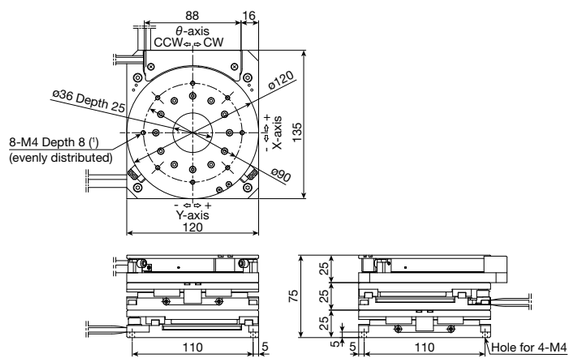
● SA120DE/S, SA120DE/T



● SA120DE/XS, SA120DE/XT



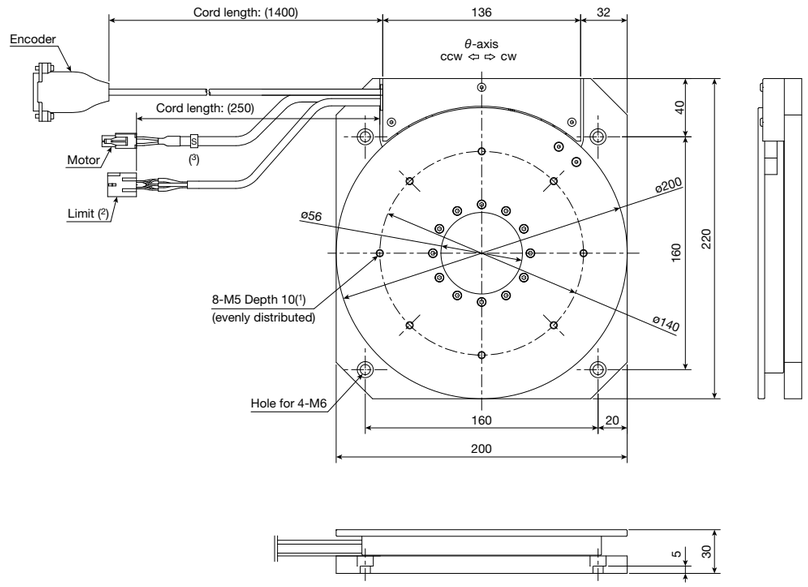
● SA120DE/XYS, SA120DE/XYT



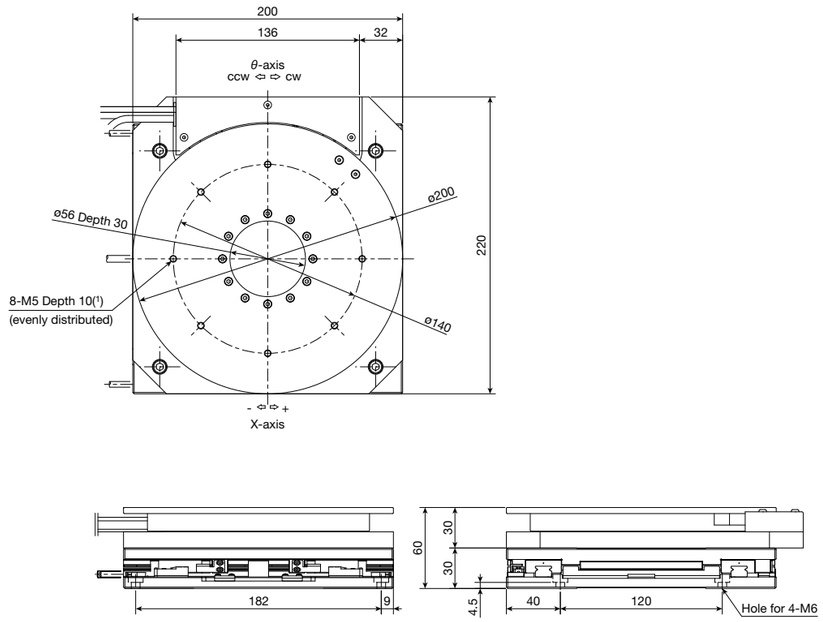
Note (1) Inserting mounting screws too deeply may affect the running performance of the moving table. Never insert a screw longer than the depth of the through hole.
(2) The SA120DE/T (unlimited rotation specification) does not have a limit cord or mechanical stopper.
(3) Both the SA120DE/S and SA120DE/T specifications include the S symbol.
Remark The text direction on the mark tube of the motor / limit cord may vary by product.
The central hole of the θ-table is a through hole.

Product dimensions

● SA200DE/S, SA200DE/T

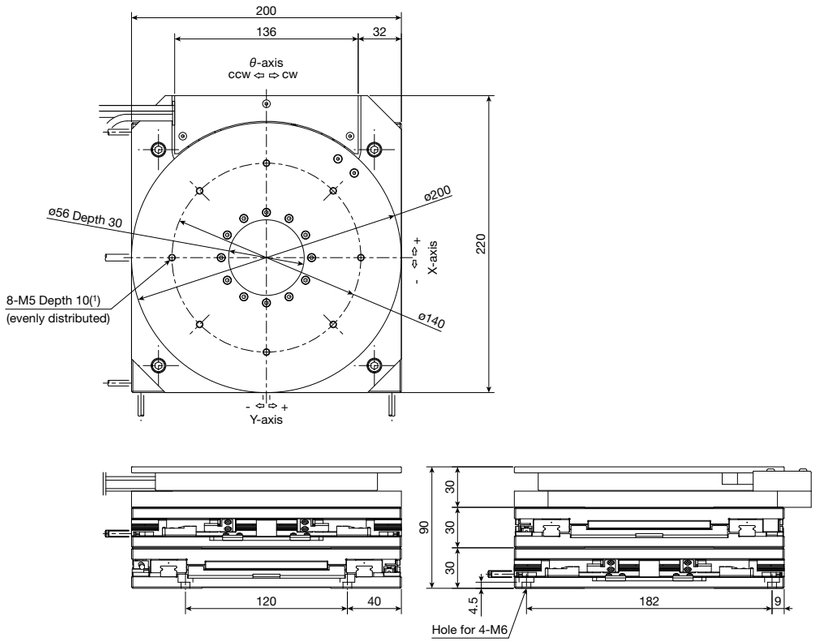


● SA200DE/XS, SA200DE/XT



Note (1) Inserting mounting screws too deeply may affect the running performance of the moving table. Never insert a screw longer than the depth of the through hole.
(2) The SA200DE/T (unlimited rotation specification) does not have a limit cord or mechanical stopper.
(3) Both the SA200DE/S and SA200DE/T specifications include the S symbol.
Remark For the cable length, please see the dimension tables for SA200DE/X and SA200DE/S.
The central hole of the θ-table is a through hole.

● SA200DE/XYS, SA200DE/XYT



Note (1) Inserting mounting screws too deeply may affect the running performance of the moving table. Never insert a screw longer than the depth of the through hole.
Remark For the cable length, please see the dimension tables for SA200DE/X and SA200DE/S.