CKD

New Products

ABSODEX

Actuator AX1R Series
AX2R Series
AX4R Series
Driver AXD Series

Improved ease of use

Evolution of usability

ABSODEX

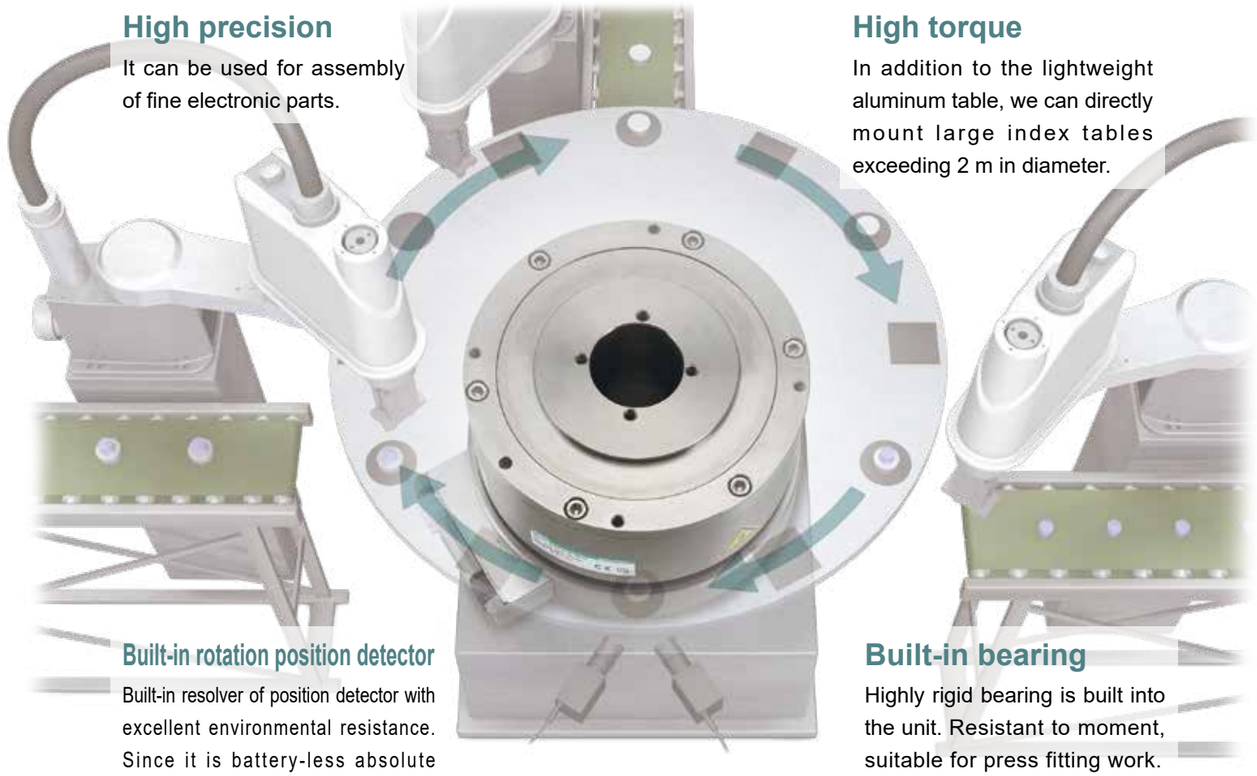
CKD Corporation
CC-1614AA

There's a reason why they keep choosing us.
Ready-to-Use ABSODEX

ABSODEX is a rotary actuator that enables high-precision positioning by simply mounting a load directly. Since the index table equipment can be easily created, design and assembly hours are reduced, simplifying production facilities and increasing production efficiency are achieved.

High precision
It can be used for assembly of fine electronic parts.

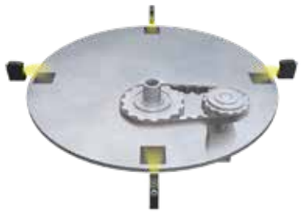
High torque
In addition to the lightweight aluminum table, we can directly mount large index tables exceeding 2 m in diameter.



Built-in rotation position detector
Built-in resolver of position detector with excellent environmental resistance. Since it is battery-less absolute specification, origin return is eliminated and the angle on the table is recognized.

Built-in bearing
Highly rigid bearing is built into the unit. Resistant to moment, suitable for press fitting work.

Advantages of ABSODEX



Motor + Timing belt

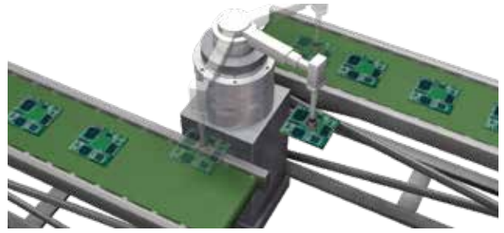
ABSODEX

- Reduced number of parts
- No backlash
- Space saving
- Maintenance-free
- Sensorless
- Reduced design processes
- Silent
- Improved environmental friendliness

Examples of applications

Assembly, inspection
The table is operated in equal divisions and the work is performed at each position.

Pick and Place
The arm swivels and transports the product to the next process.



Glass substrate alignment
Monitors the workpiece and adjusts the fine angle. Settings can be changed to high resolution (approx. 2 million pulses).

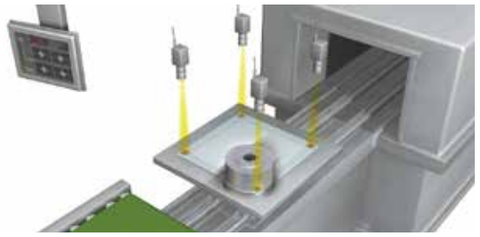
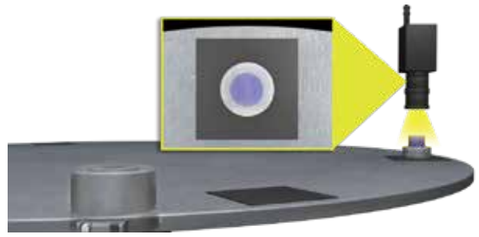
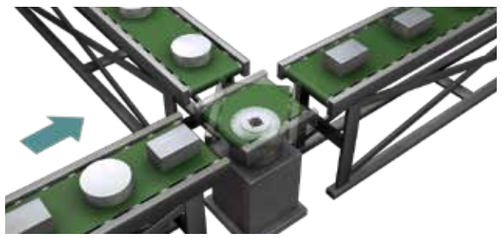


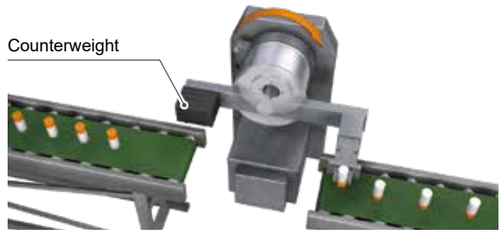
Image inspection of electronic parts
The camera inspects the image of the workpiece on the table. Slight vibrations at standstill are reduced compared to conventional products.



Conveyor transport direction conversion
Changes direction of workpieces flowing on the conveyor to match the type of product. *Pay attention to the * rigidity. A constant strength is required.



Reversing transport of parts
Mount on the wall and rotate by 180°. Counterweight is used for unbalanced workpieces.



Adhesive application
Apply the adhesive by rotating the workpiece once at a constant speed.

Stocker
Used as several types of parts stocker. Positioning in conjunction with a robot for take-out.

Actuator lineup

AX1R Series High precision

5 sizes from 22 to 210 N·m are available

Built-in high precision bearing with high indexing accuracy, shaft runout and surface runout, making it ideal for compact part assembly and inspection.

Assembly and inspection machine for small workpieces

Best-fit applications

- Precision measurement
- Inspection machine
- Assembling machine

AX2R Series High speed rotation

3 sizes from 6 to 18 N·m are available

Compact design with small diameter is ideal for space saving. Because the axis inertia is small, this is the fastest series that enables high speed operation.

P&P at the arm

Best-fit applications

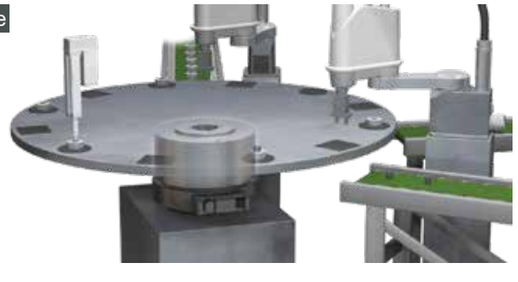
- P&P
- Assembling machine

AX4R Series Standard

8 sizes from 9 to 1000 N·m are available

Built-in bearing resistant to load and equipped with the most robust body. The only one in the series to offer an electromagnetic brake option.

Indexing table



Best-fit applications

- Assembling machine
- P&P
- Inspection machine

Driver lineup

AXD Series Driver

Two capacities available: 400 W, 800 W

AXD-S (400 W)

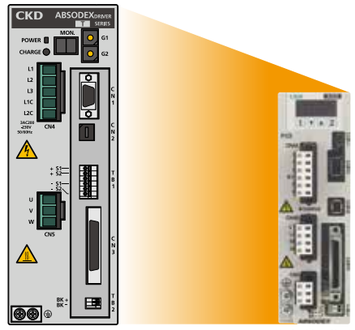
AXD-H (800 W)

New

Downsizing of driver

Replacement

Reduces driver volume by up to 50% compared to conventional models. Far more compact.



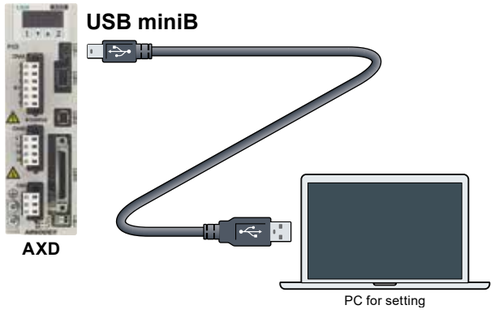
New

Easy setup via USB

Reduced work-hours

High versatility

The USB miniB port is used for connection with the setting PC. The dedicated cable and conversion cable are not required. Compared to conventional products, the communication speed is increased, and settings are easy as automatic connection is performed even after communication is cut off.



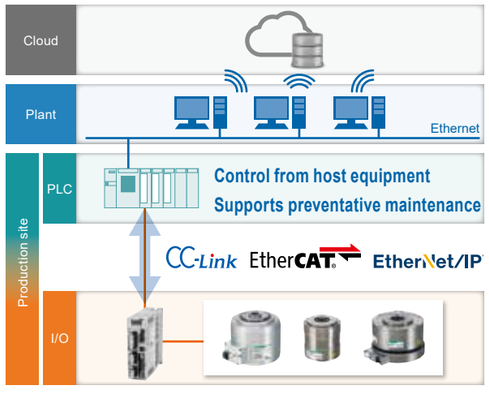
Compatible with all-types of networks

Safety & Security

Productivity improved

Supports IoT

Our product is compatible with all-types of industrial networks. Control is possible from the host device via Ethernet for preventive maintenance.



- **Data input operation**
  Performs arbitrary operation using data from the PLC.
- **Point table operation**
  Operates by selecting table data that can be rewritten from the PLC.
- **Monitor function**
  Monitors the current status such as the current position, position deviation, actuator load factor, etc.
- **Data reading/writing**
  Read details of alarms that have occurred, write parameters, etc.

Flexible Operation

High versatility

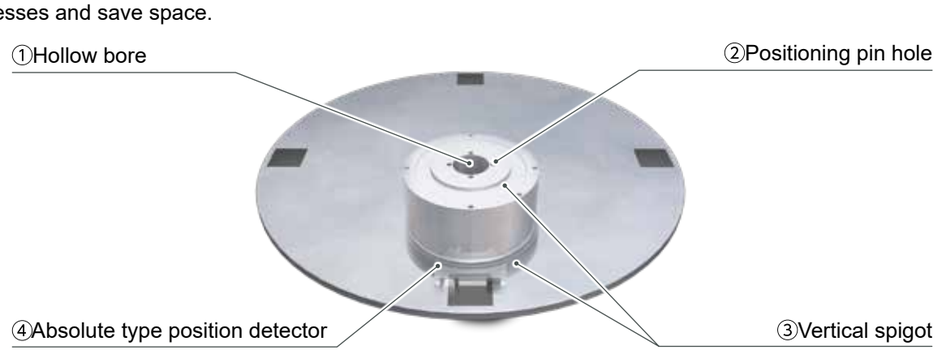
With abundant programming functions realize the operation that you want. Easy to change operations, allowing flexibility when changing specifications of equipment or lines. It can also be reused.

Indexing operation　　Oscillations　　Continuous rotation

Convenient standard mechanism

Replacement　Reduced design hours　Reduced work-hours

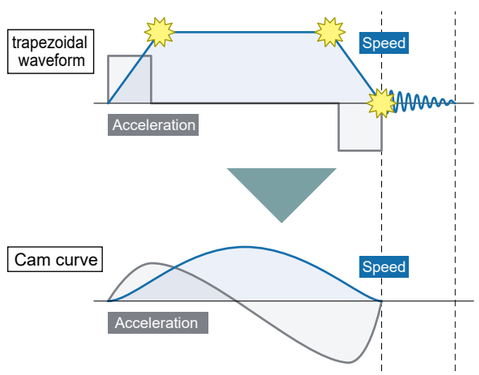
Simple design of equipment with 4 convenient standard mechanisms. This flexibility helps to reduce work processes and save space.

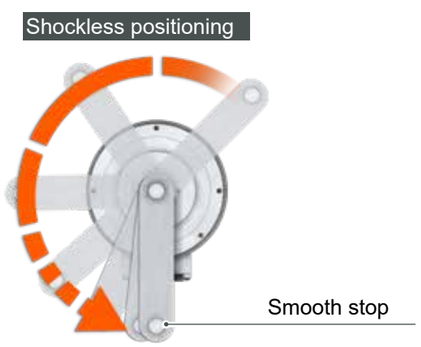


High motion characteristics

Productivity improved

Smooth acceleration/deceleration operation with cam curve enables high-speed and high-cycle operation.

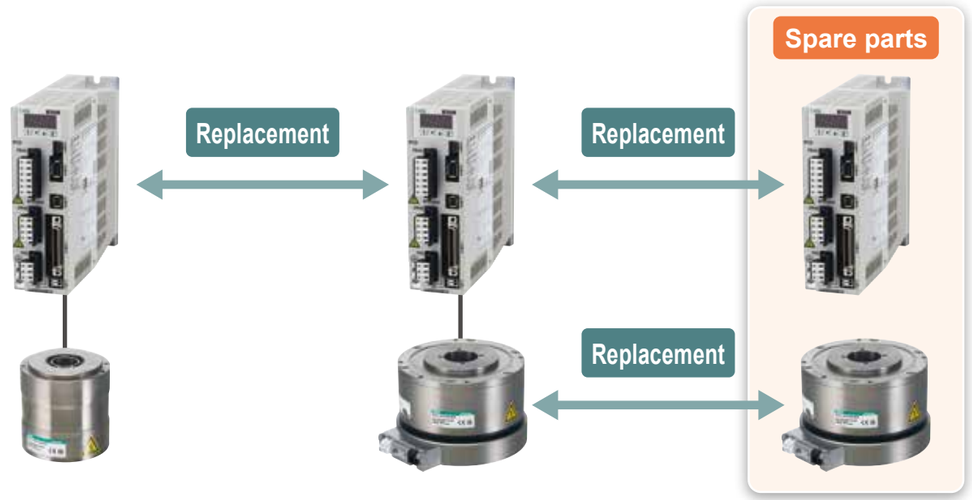




Driver compatibility

Reduced work-hours　Reduced stock

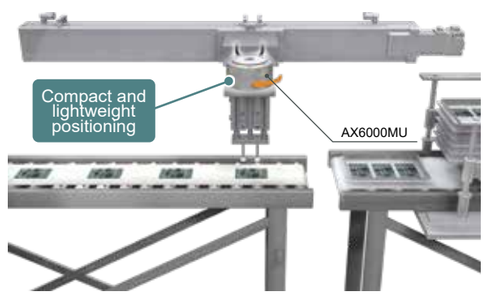
2 sizes are available for the driver. Compatibility makes it easy to replace in the event of problems. Equipped with an automatic recognition function that reads actuator information, for less work during initial setting.



Related products

AX6000M Series

Two sizes from 1.2 to 3 N·m are available.This is the smallest and lightest series and can be mounted on sliders and other moving parts.



Best-fit applications

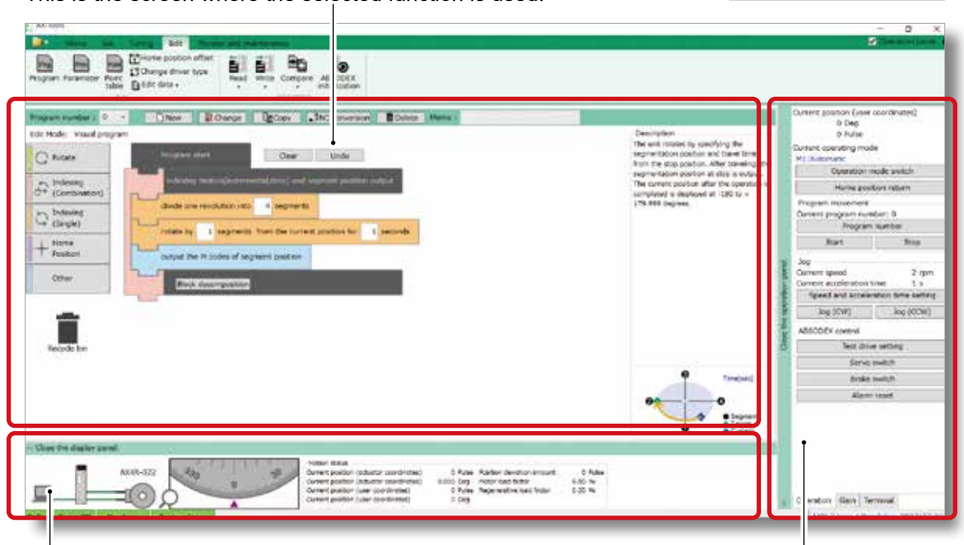
●Conveying fine workpieces ●Θ-axis correction

Ready for everyone to use New AX-Tools

Free software

Main View

This is the screen where the selected function is used.



Display panel & communication status bar

Displays the status of the PC, driver, and actuator, as well as the communication status.

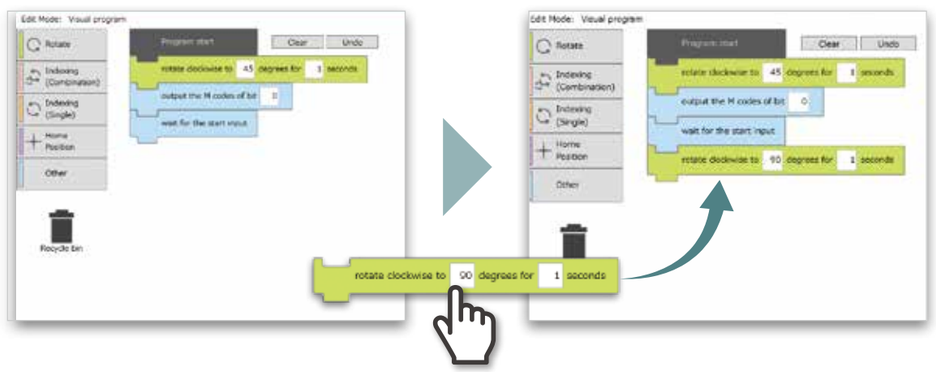
Operation panel

Actuator operation and gain can be adjusted.

Visual program

Easy Controls

Added a visual program mode that allows easy program creation by mouse operation. Anyone can easily and intuitively create an operation program.

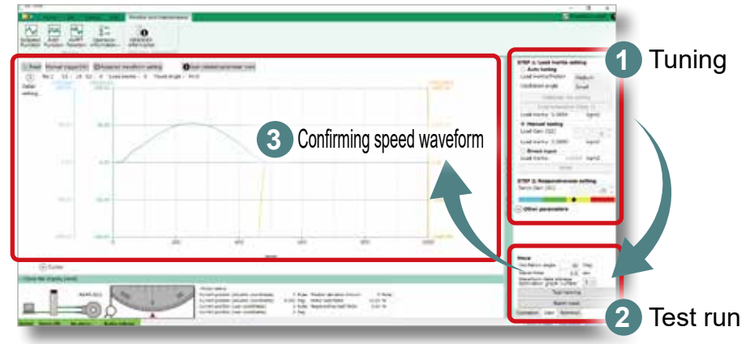


Gain adjustment made with just 1 screen

Easy adjustment

Reduced work-hours

Gain adjustment is a 2-step process of load estimation and responsiveness adjustment. For load estimation, in addition to the conventional auto-tuning, inertia values can now be set directly. For responsiveness adjustment, 32 steps are available instead of the conventional 16 steps, allowing for more detailed adjustment. In addition, test runs can be performed to immediately check the adjustment results, reducing adjustment time. *Auto-tuning is available for all sizes.



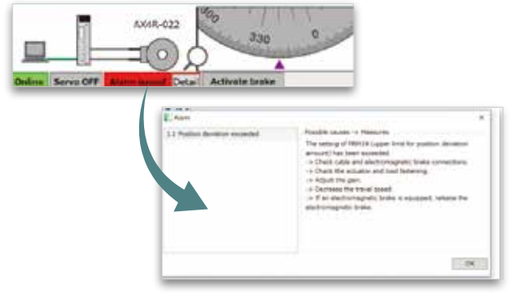
Easy product status monitor

Easy maintenance

Displays network communication transmission and reception data. Difference in the communication contents of the PLC and the driver can be confirmed. It also allows the user to immediately check the contents of the alarm that occurred and what to do about it.

[Transmitted/Received data]

[Alarm]

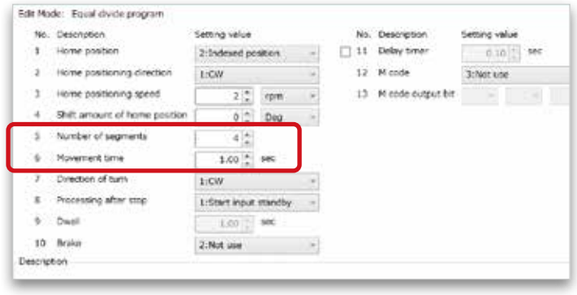


Ready-to-run equal division program

Easy Controls

Reduced work-hours

This function is recommended if you want to work with equal divisions. Simply enter the number of divisions and travel time, and you are ready to go.



ABSODEX system table

	Series	Max. torque (N·m)											
		6	9	12	18	22	45	75	150	210	300	500	1000
Actuator	AX1R Series					 AX1R-022	 AX1R-045	 AX1R-075	 AX1R-150	 AX1R-210			
	AX2R Series	 AX2R-006		 AX2R-012	 AX2R-018								
	AX4R Series		 AX4R-009			 AX4R-022	 AX4R-045	 AX4R-075	 AX4R-150		 AX4R-300	 AX4R-500	 AX4R-10W
Driver	AXD Series	 AXD-SA2							 AXD-HA2				

Index accuracy (sec)	Repeatability (sec)	Shaft runout (mm)	Surface runout (mm)	Features	Applications	Listed Page
±15	±5	0.01	0.01	●High precision (Indexing accuracy and output shaft runout accuracy)	●Precision measurement ●Inspection machine ●Assembling machine	4
±30	±5	0.03	0.03	●High-speed rotation (300 rpm) ●Compact with small diameter ●Large hollow diameter (ø30)	●P&P ●Assembling machine	14
±30	±5	0.03	0.05 (0.08) *1	●Supports large moments of inertia load ●Large hollow diameter and a variety of size options ●Electromagnetic brake can be selected (except for some sizes)	●Assembling machine ●P&P ●Inspection machine	22
-	-	-	-	●Common actuators can be used for supported actuators. ●The controller function allows you to use an NC program to desirably set the actuator's rotation angle, movement time, timer, etc. ●M code output, encoder output, etc. are available to connect to an external PLC, motion controller, etc.		38

*1 AX4R-10W

AX1R

actuator (high precision)

ABSODEX

CONTENTS

ABSODEX

AX1R Series

High accuracy (index accuracy, output shaft runout, etc.)
●Max. torque: 22/45/75/150/210 N·m
●Supported driver: AXD-S/H

How to order

AX1R - 022 N - BS NN
① ② ③

① Size (max. torque)	
022	22 N·m
045	45 N·m
075	75 N·m
150	150 N·m
210	210 N·m

② Connector mounting direction	
N	Standard (connector horizontal mounting)
D	Connector downward mounting

③ Mounting base *3	
NN	Standard (without mounting base)
BS	With mounting base

* 1: Select the driver according to the compatibility table below.

Driver power voltage compatibility table

Model \ Driver Type	Three-phase/single-phase 200 to 240 VAC	
	AXD-S Type	AXD-H Type
AX1R-022	●	
AX1R-045	●	
AX1R-075	●	
AX1R-150		●
AX1R-210		●

* 2: The calculation of torque limit area is different from usual when used in single-phase 200 VAC. Contact CKD to determine usability.
* 3: The lower surface positioning pin hole cannot be used if the "BS" option for mounting base is selected. The surface is treated with electroless nickel plating.
* 4: Positioning pin holes may not be surface treated.

* Made to order supported products are CE, UKCA, UL/cUL, and RoHS non-compliant.

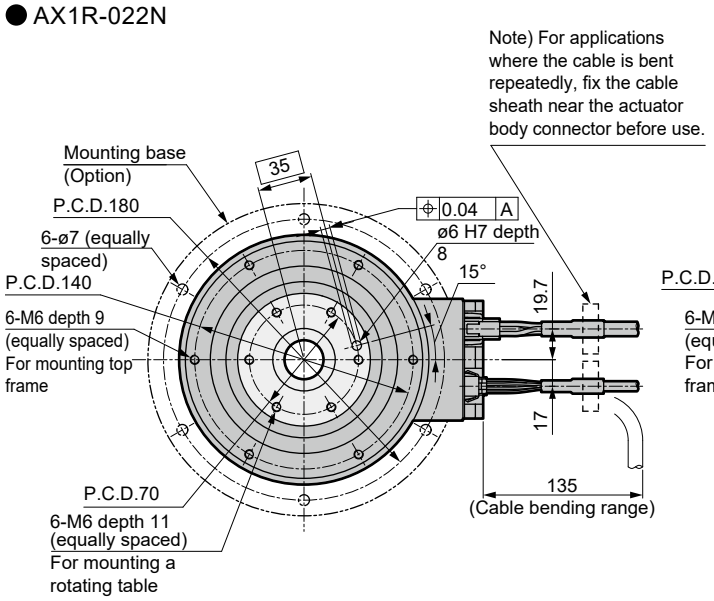
Actuator specifications

Item		AX1R-022	AX1R-045	AX1R-075	AX1R-150	AX1R-210
Max. output torque	N·m	22	45	75	150	210
Continuous output torque	N·m	7	15	25	50	70
Max. rotation speed	rpm	240 (*1)		140	120	
Allowable axial load	N	600		2200		
Allowable moment load	N·m	19	38	70	140	170
Output shaft moment of inertia	kg·m²	0.00505	0.00790	0.03660	0.05820	0.09280
Allowable moment of load inertia	kg·m²	0.6	0.9	4.0	6.0	10.0
Index accuracy (*4)	sec	±15				
Repeatability (*4)	sec	±5				
Output shaft friction torque	N·m	2.0		8.0		
Resolution	P/rev	540672/2097152 (*2)				
Insulation class		Class F				
Withstand voltage		1500 VAC 1 min.				
Insulation resistance		10 MΩ and over, 500 VDC				
Operating ambient temperature		0 to 40°C				
Operating ambient humidity		20 to 85% RH, no condensation				
Storage ambient temperature		-20 to 80°C				
Storage ambient humidity		20 to 90% RH, no condensation				
Atmosphere		No corrosive gas, explosive gas, or dust				
Weight	kg	8.9 (10.8) (*3)	12.0 (13.9) (*3)	23.0 (27.1) (*3)	32.0 (36.1) (*3)	44.0 (48.1) (*3)
Output shaft runout (*4)	mm	0.01				
Output shaft surface runout (*4)	mm	0.01				
Degree of protection		IP20				

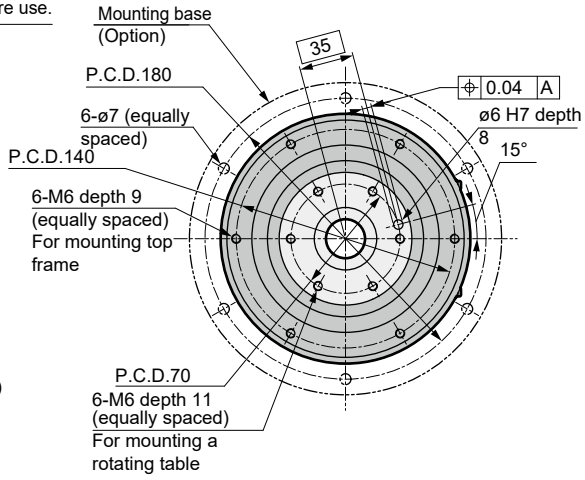
* 1: Use at a speed of 140 rpm or less under the resolution of 2097152 P/rev conditions.
* 2: Shipment status is 540672 P/rev resolution. The resolution can be switched to 2097152 P/rev with the PC software.
* 3: The values in ( ) are the actuator weight with the mounting base option.
* 4: Refer to the ”Glossary” on page 54 for index accuracy, repeatability, output shaft runout and output shaft surface runout.

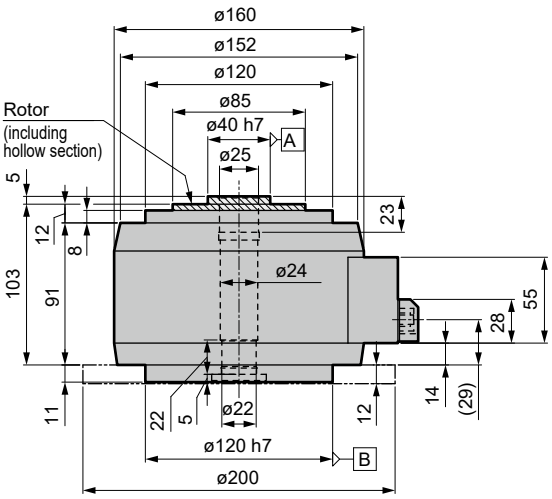
Dimensions

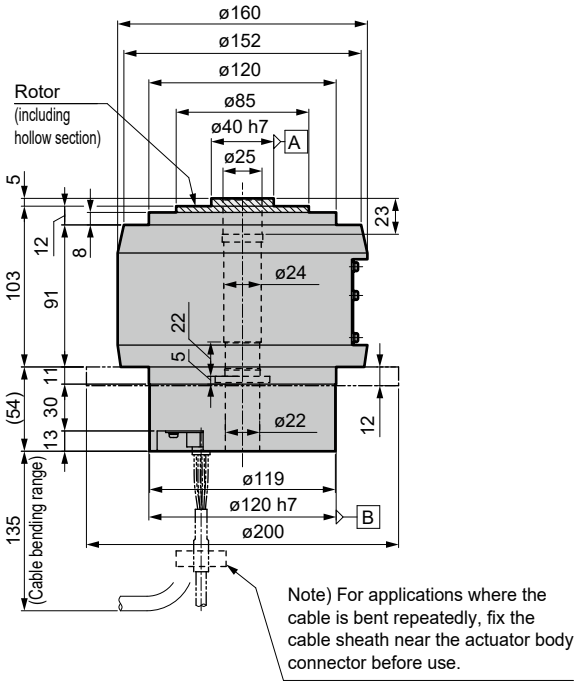
● AX1R-022N

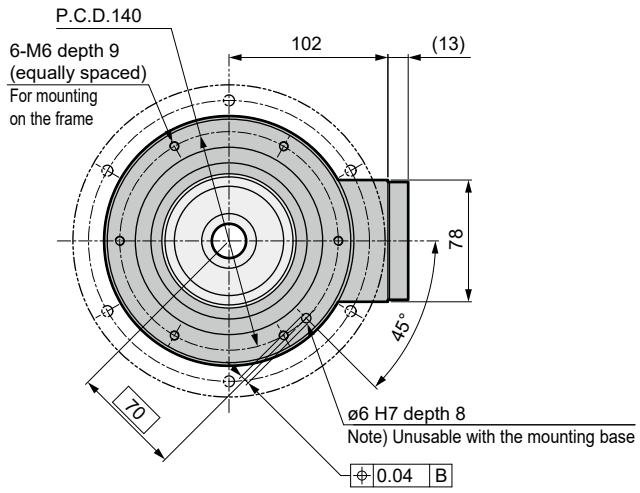


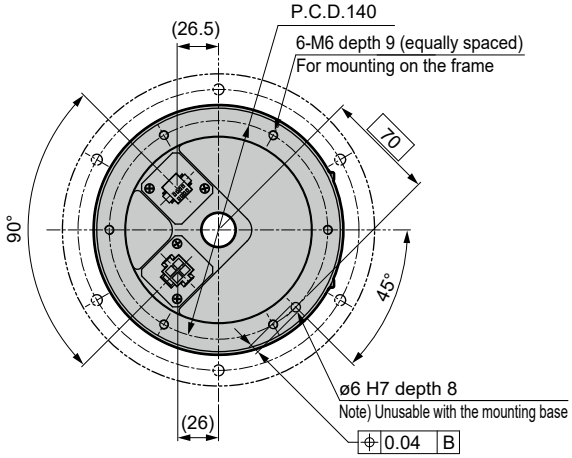
● AX1R-022D







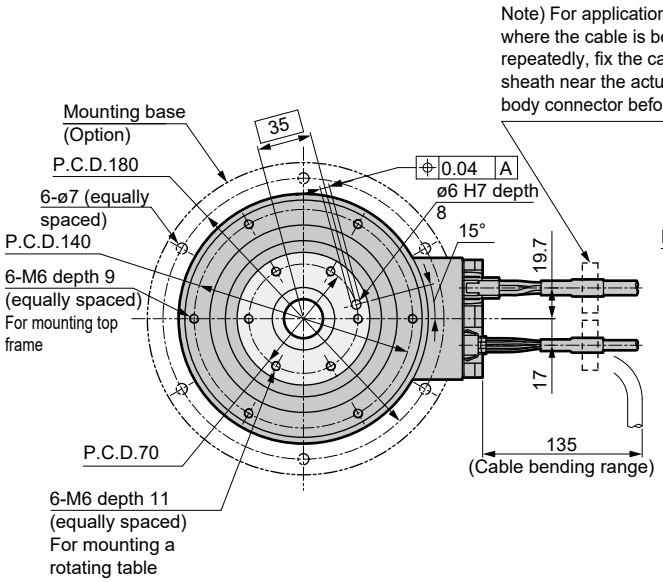


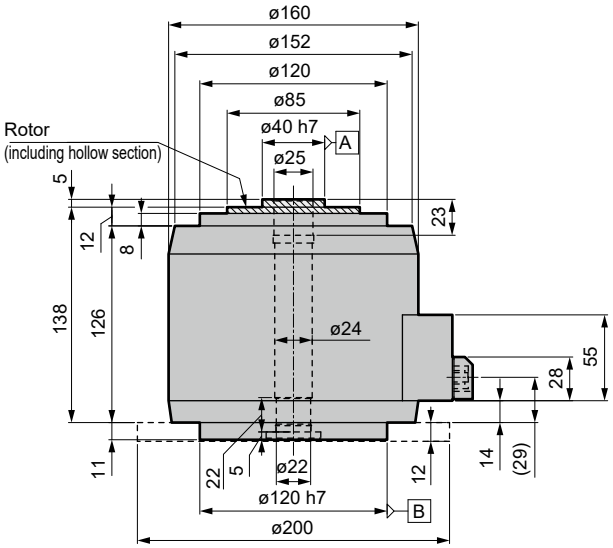


* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

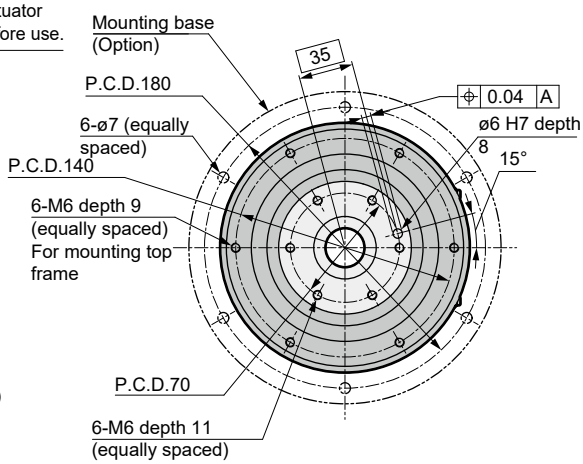
Dimensions

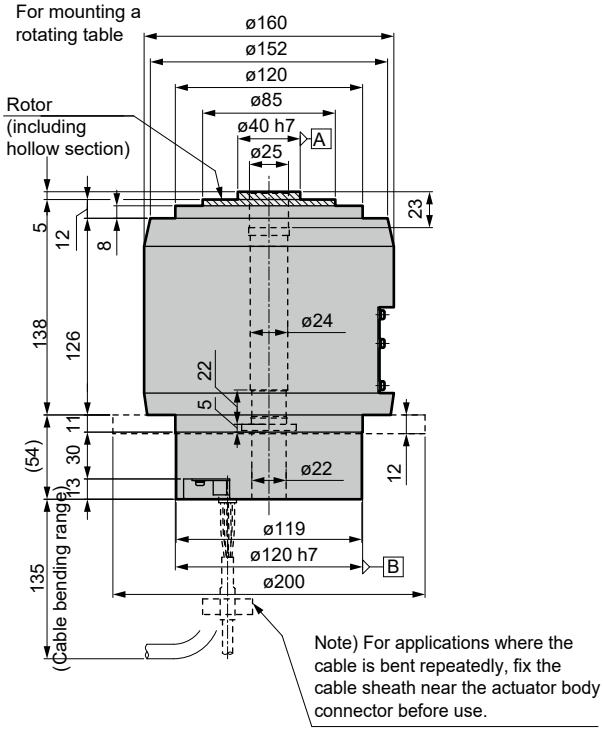
● AX1R-045N

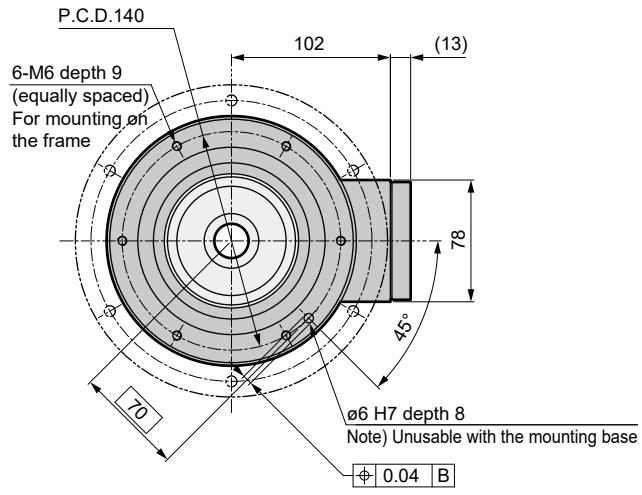


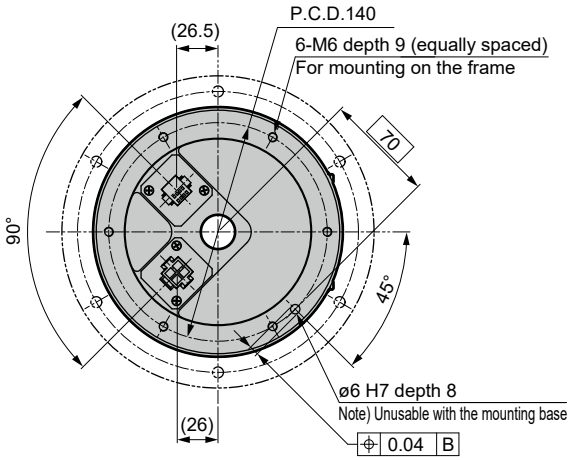


● AX1R-045D





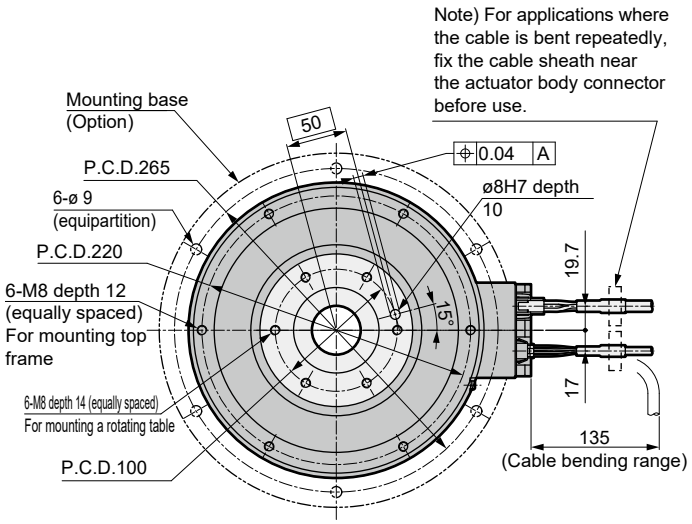




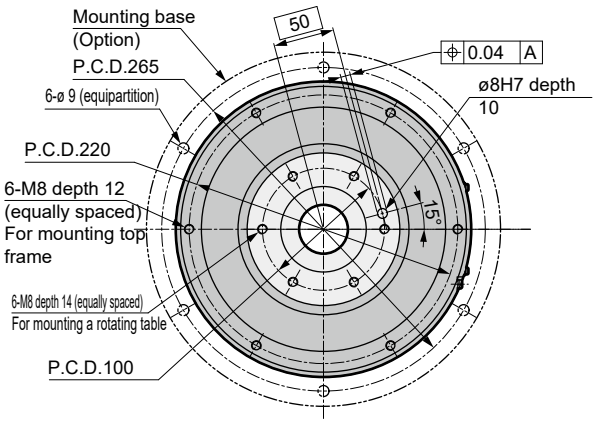
* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

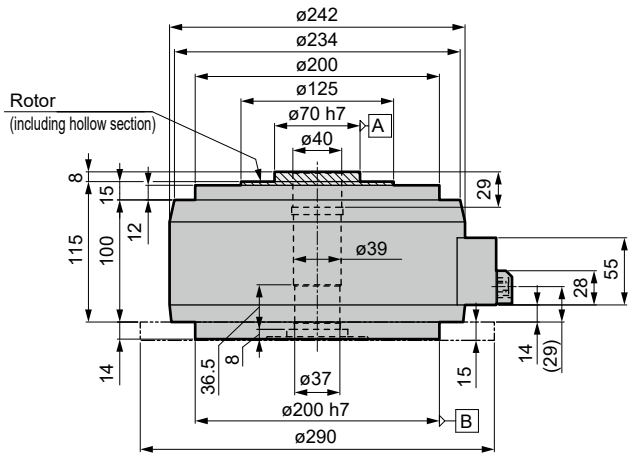
Dimensions

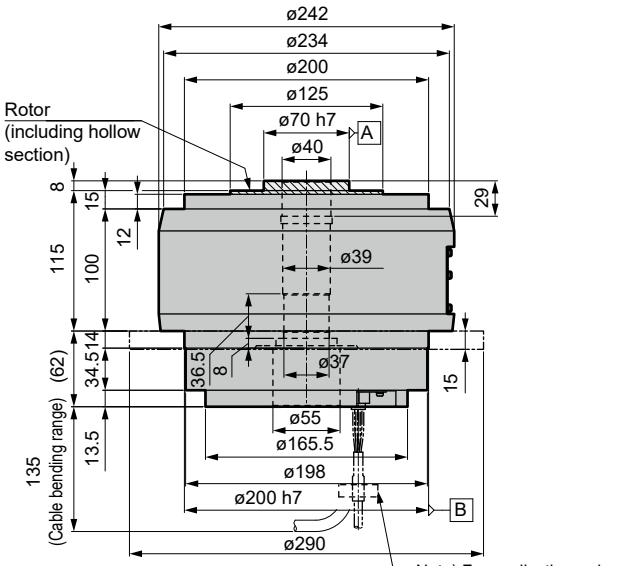
● AX1R-075N



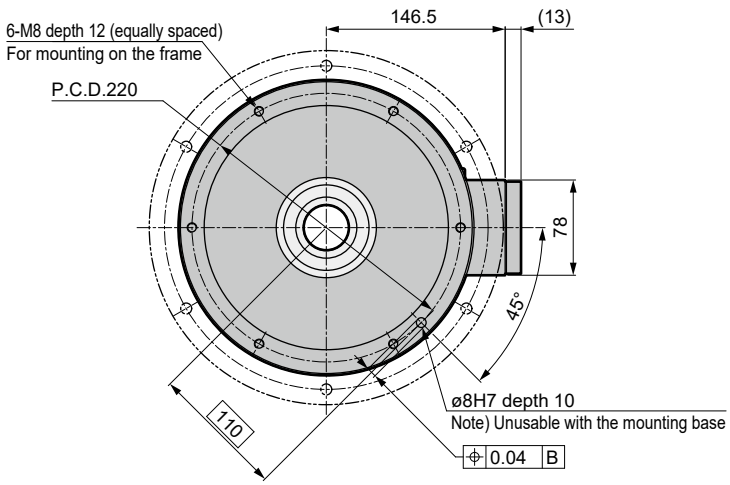
● AX1R-075D

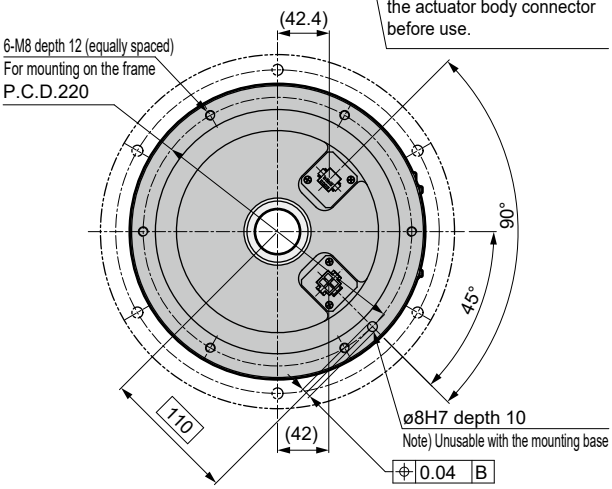






Note) For applications where the cable is bent repeatedly, fix the cable sheath near the actuator body connector before use.

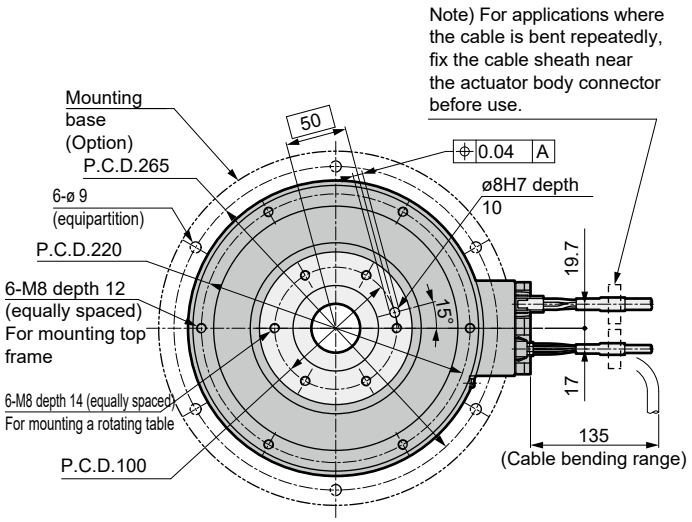


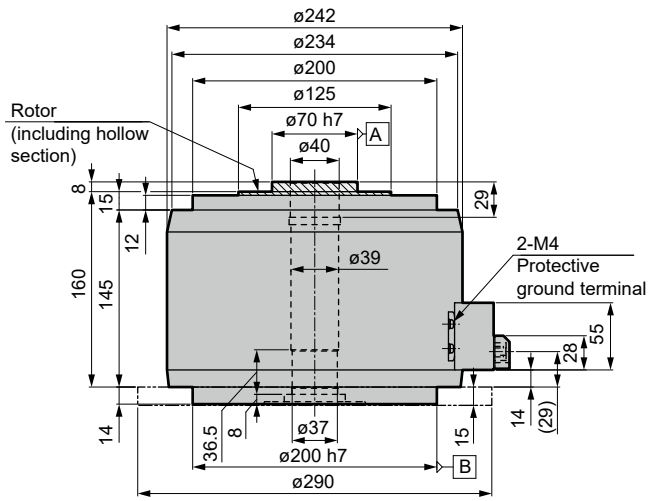


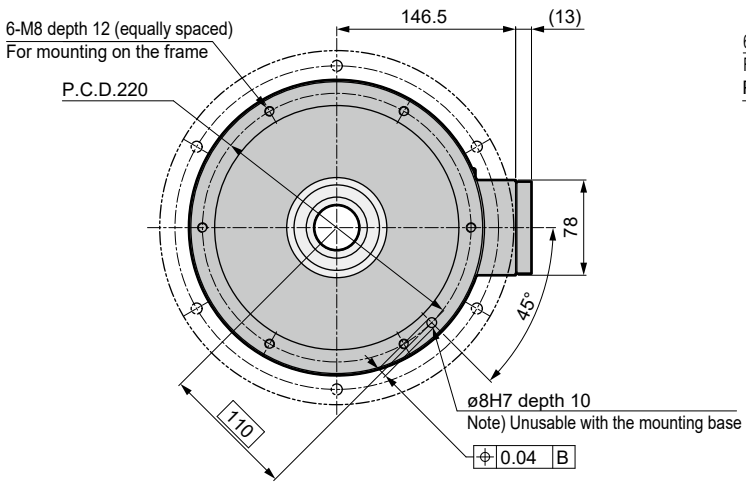
* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

Dimensions

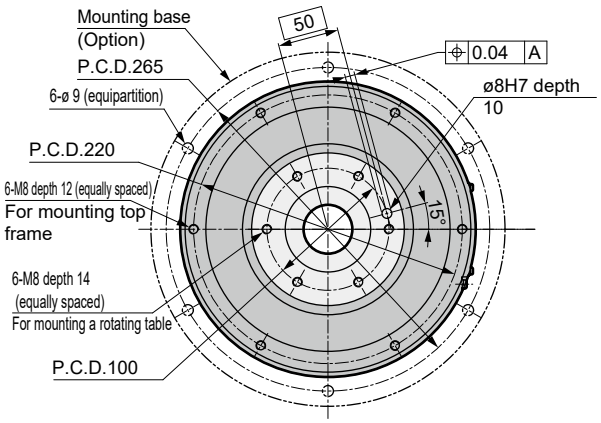
● AX1R-150N

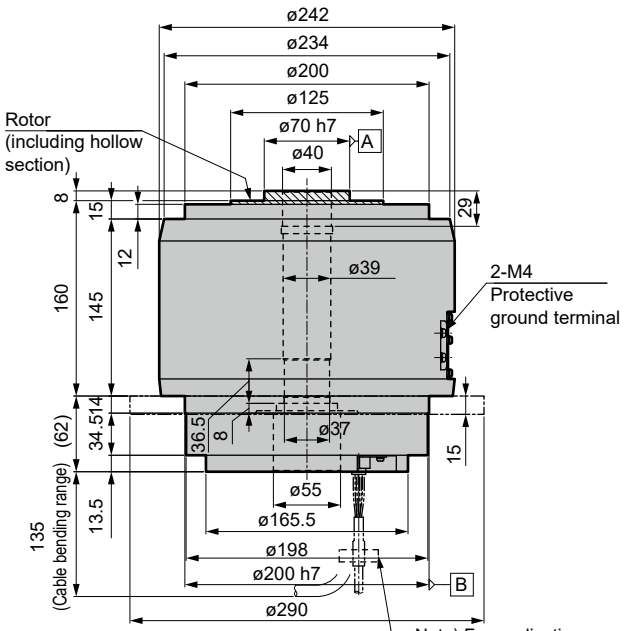


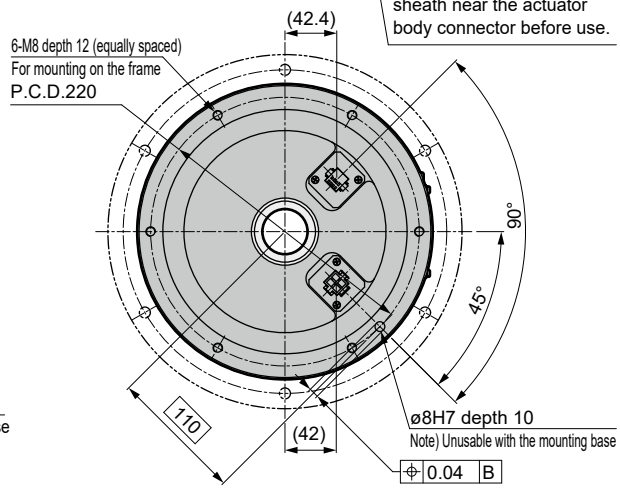




● AX1R-150D



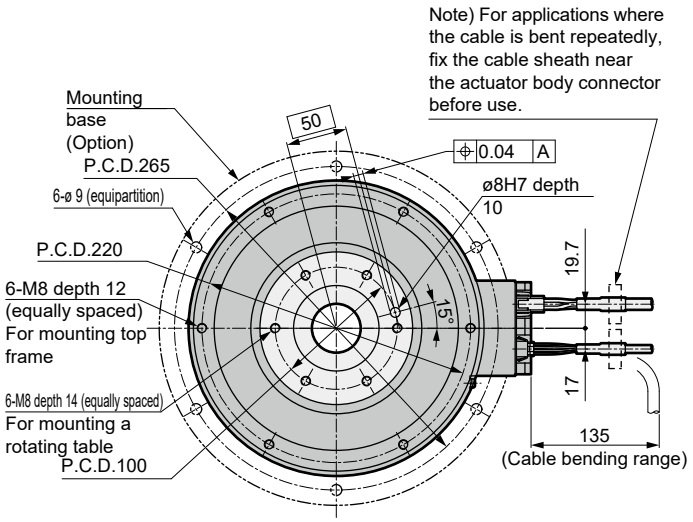


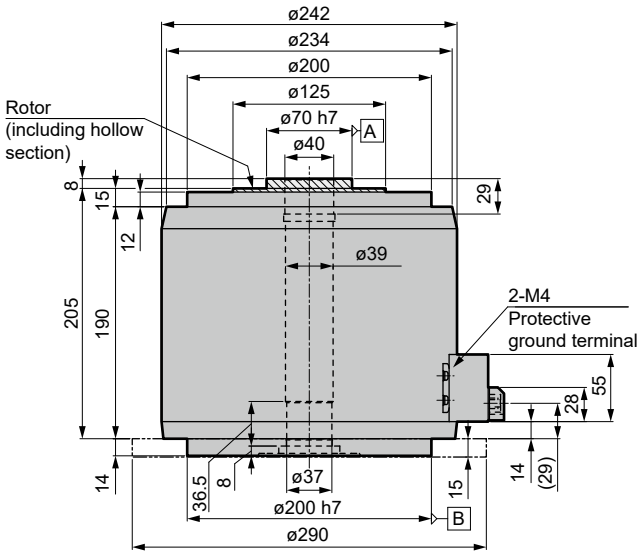


* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

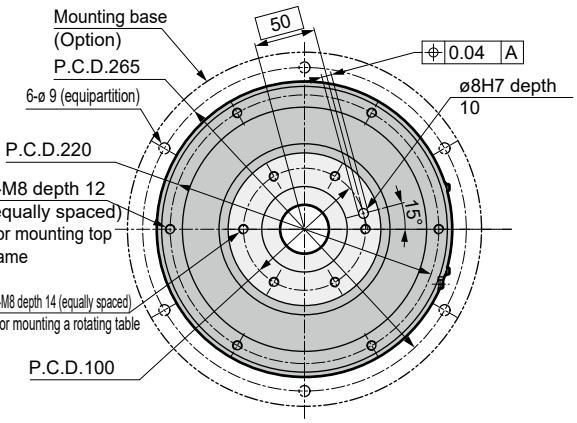
Dimensions

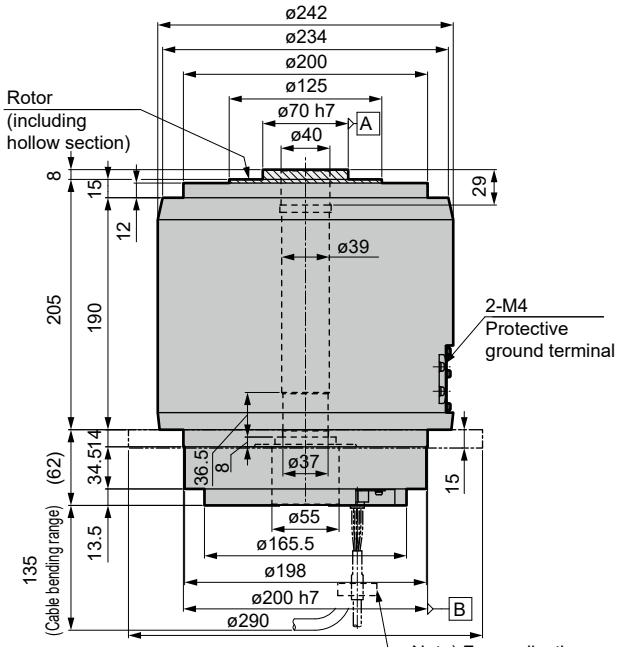
● AX1R-210N



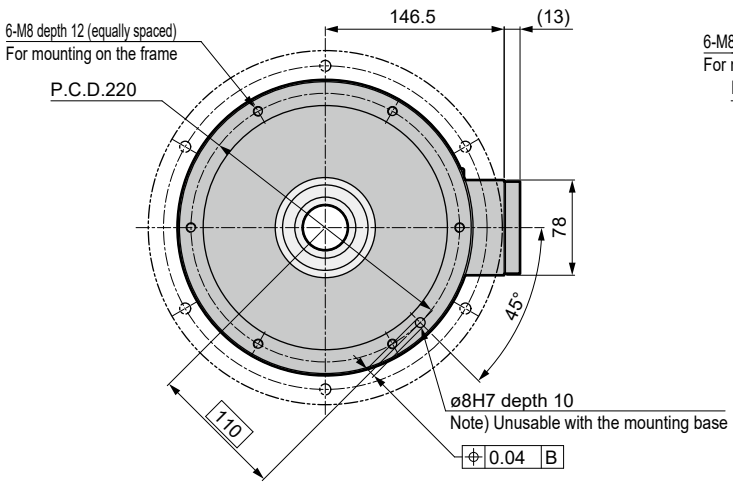


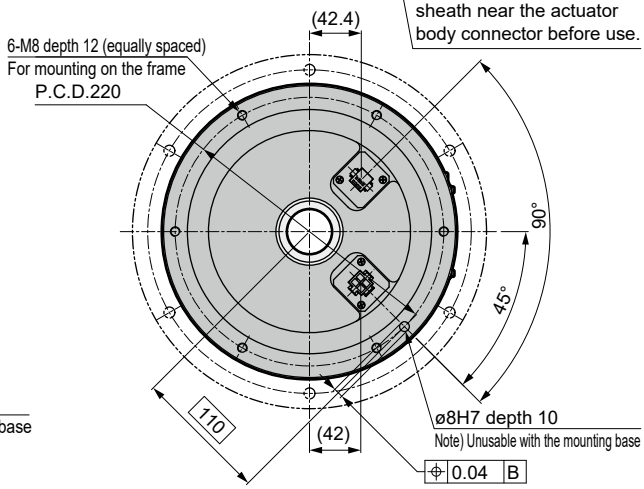
● AX1R-210D





Note) For applications where the cable is bent repeatedly, fix the cable sheath near the actuator body connector before use.

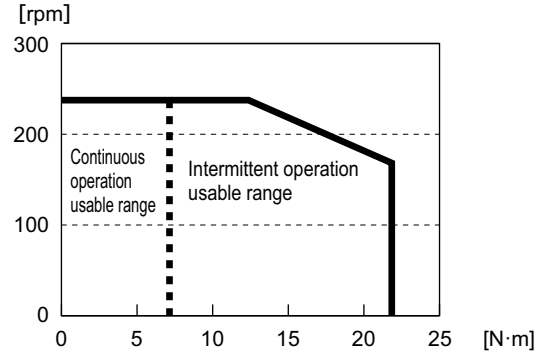




* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

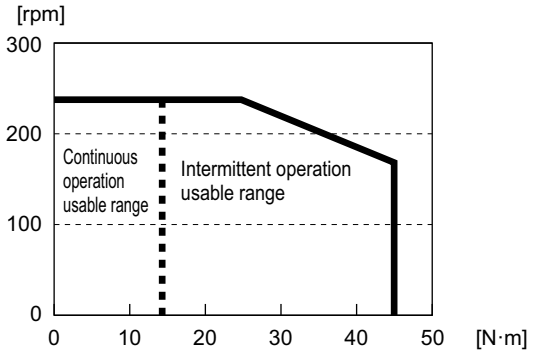
Speed/Maximum torque characteristics

● AX1R-022



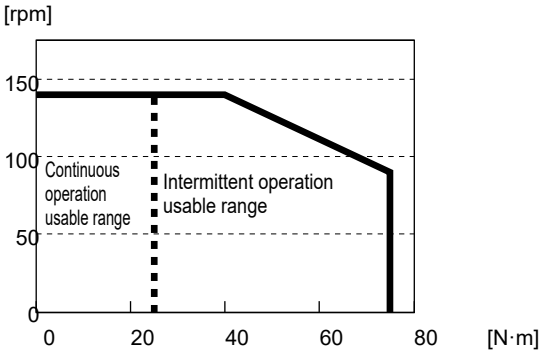
* The graph shows the characteristics of three-phase 200 VAC.

● AX1R-045



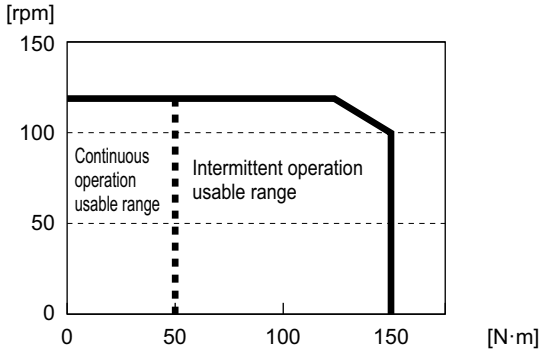
* The graph shows the characteristics of three-phase 200 VAC.

● AX1R-075



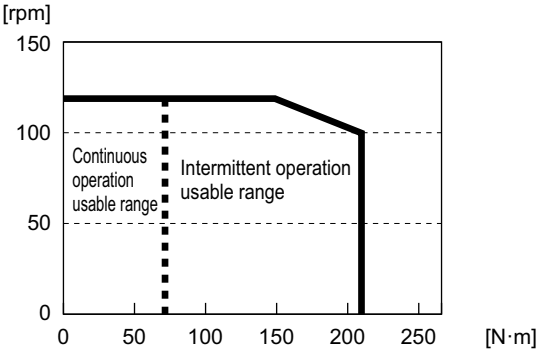
* The graph shows the characteristics of three-phase 200 VAC.

● AX1R-150



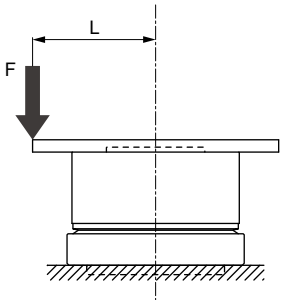
* The graph shows the characteristics of three-phase 200 VAC.

● AX1R-210



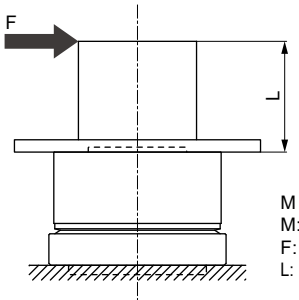
* The graph shows the characteristics of three-phase 200 VAC.

Moment load (simple formula)



M (N·m)=F (N) x (L) (m)
M: Moment load
F: Load
L: Distance from output shaft center

(Fig. a)



M (N·m)=F (N) x (L+0.02) (m)
M: Moment load
F: Load
L: Distance from output shaft flange surface

(Fig. a)

AX2R

ABSODEX

actuator (high speed rotation)

CONTENTS

ABSODEX

AX2R Series

High speed rotation (max. rotation speed 300rpm)
- Max. torque: 6/12/18 N·m
- Supported driver: AXD-S

How to order

AX2R - 018 N - BS NN
(1) (2)

❶ Size (max. torque)	
006	6 N·m
012	12 N·m
018	18 N·m

❷ Mounting base *4	
NN	Standard (without mounting base)
BS	With mounting base

* 1: Select the driver according to the compatibility table below.

Driver power voltage compatibility table

Model \ Driver Type	Three-phase/single-phase 200 to 240 VAC	
	AXD-S Type	AXD-H Type
AX2R-006	●	
AX2R-012	●	
AX2R-018	●	

* 2: The calculation of torque limit area is different from the usual when used in single-phase 200 VAC. Contact CKD to determine usability.

* 3: The body lead-out cable is not a movable cable.

* 4: ❷If the "BS" option with the mounting base is selected, the positioning pin hole on the bottom is not available. The surface is treated with electroless nickel plating.

* 5: Positioning pin holes may not be surface treated.

* 6: The surface is treated with electroless nickel plating.

* Made to order supported products are CE, UKCA, UL/cUL, and RoHS non-compliant.

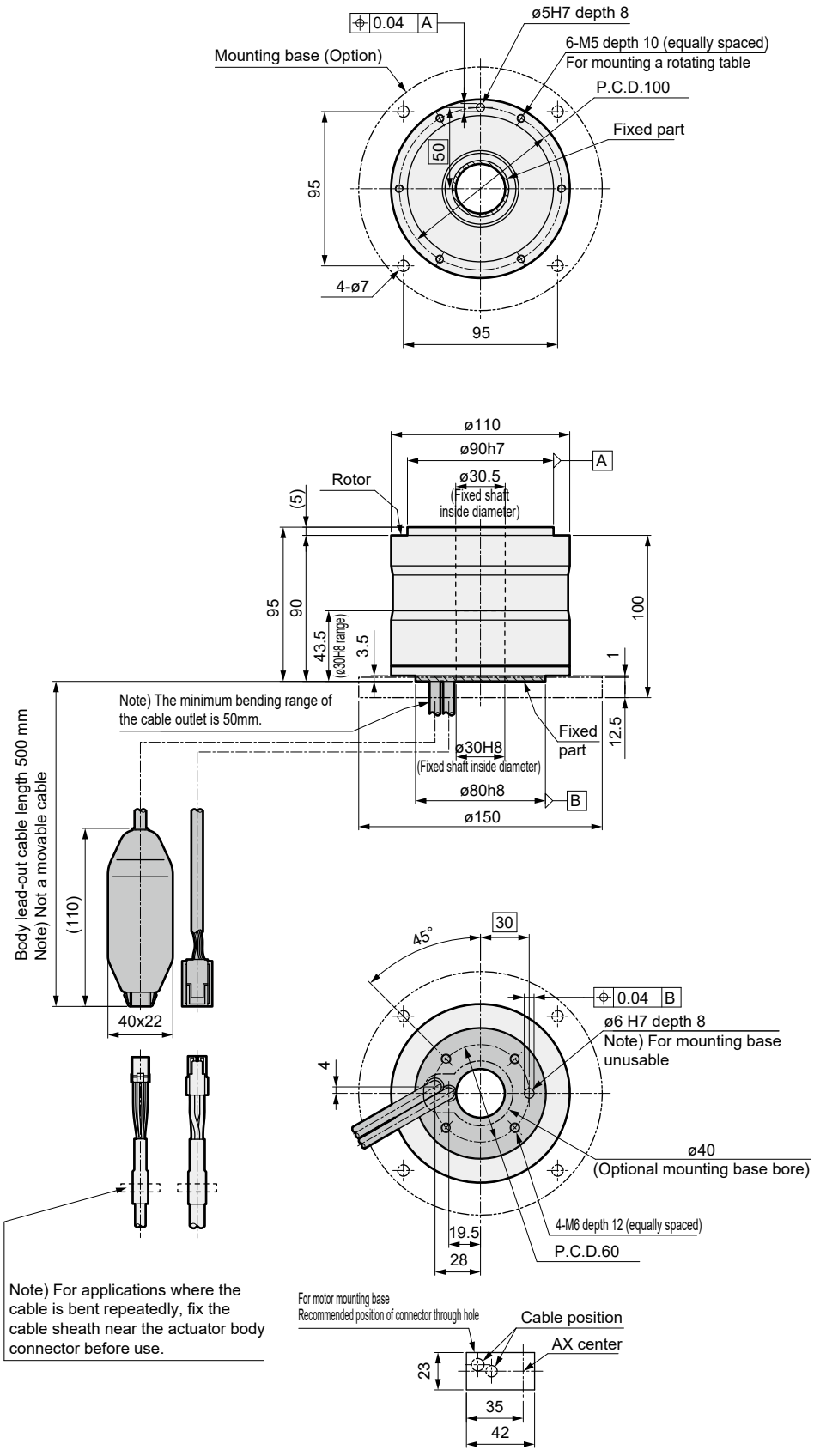
Actuator specifications

Item		AX2R-006	AX2R-012	AX2R-018
Max. output torque	N·m	6	12	18
Continuous output torque	N·m	2	4	6
Max. rotation speed	rpm	300 (*1)		
Allowable axial load	N	1000		
Allowable moment load	N·m	40		
Output shaft moment of inertia	kg·m^2	0.00575	0.00695	0.00910
Allowable moment of load inertia	kg·m^2	0.3	0.4	0.5
Index accuracy (*4)	sec	±30		
Repeatability (*4)	sec	±5		
Output shaft friction torque	N·m	0.6		0.7
Resolution	P/rev	540672/2097152 (*2)		
Insulation class		Class F		
Withstand voltage		1500 VAC 1 min.		
Insulation resistance		10 MΩ and over, 500 VDC		
Operating ambient temperature		0 to 40°C		
Operating ambient humidity		20 to 85% RH, no condensation		
Storage ambient temperature		-20 to 80°C		
Storage ambient humidity		20 to 90% RH, no condensation		
Atmosphere		No corrosive gas, explosive gas, or dust		
Weight	kg	4.7 (6.0) (*3)	5.8 (7.1) (*3)	7.5 (8.8) (*3)
Output shaft runout (*4)	mm	0.03		
Output shaft surface runout (*4)	mm	0.03		
Degree of protection		IP20		

*1: Use at a speed of 140 rpm or less under the resolution of 2097152 P/rev conditions.
*2: Shipment status is 540672 P/rev resolution. The resolution can be switched to 2097152 P/rev with the PC software.
*3: The values in ( ) are the actuator weight with the mounting base option.
*4: Refer to the ”Glossary” on page 54 for index accuracy, repeatability, output shaft runout and output shaft surface runout.

Dimensions

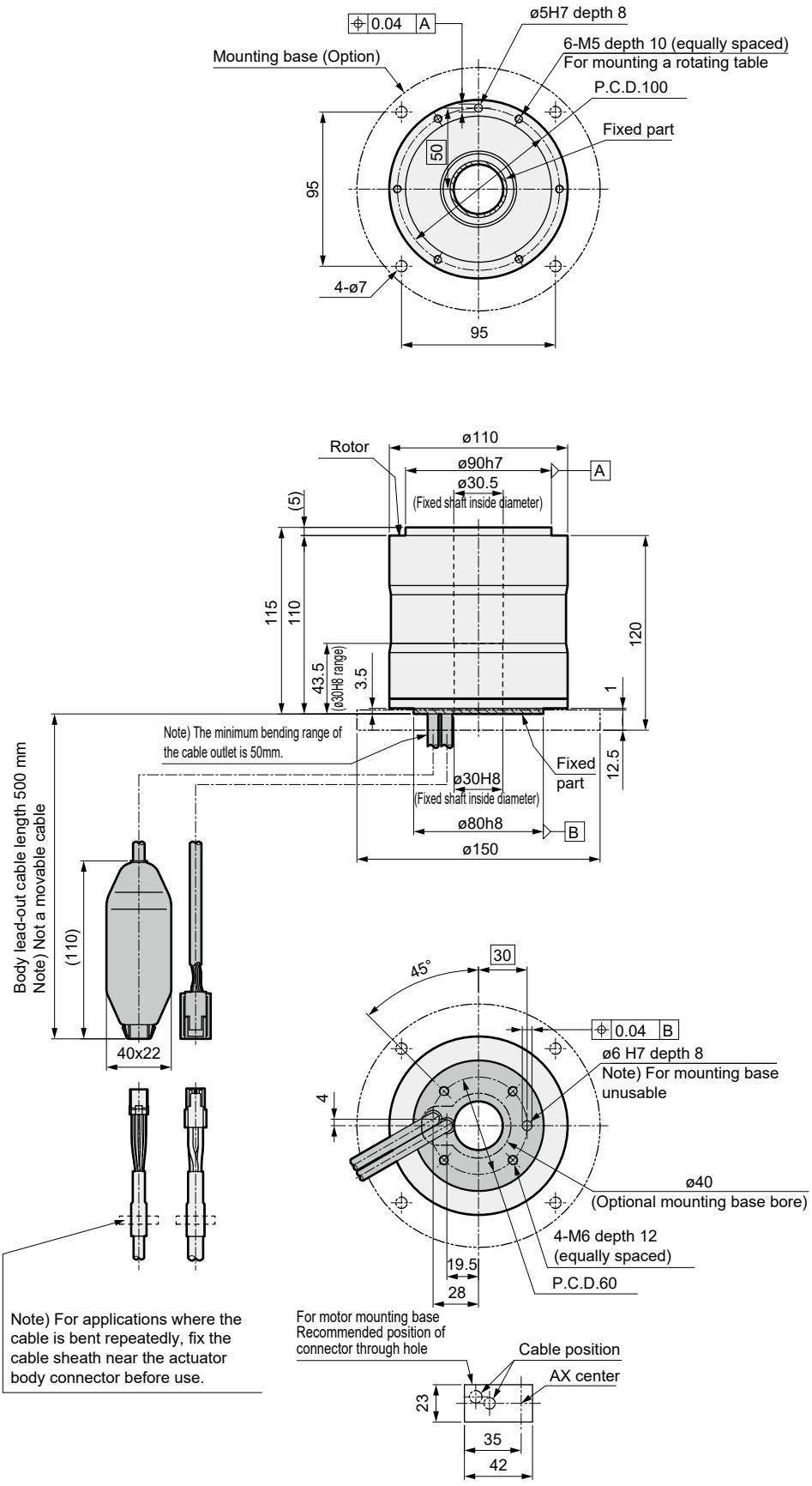
● AX2R-006



* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The lead-out cable of the actuator section is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.

Dimensions

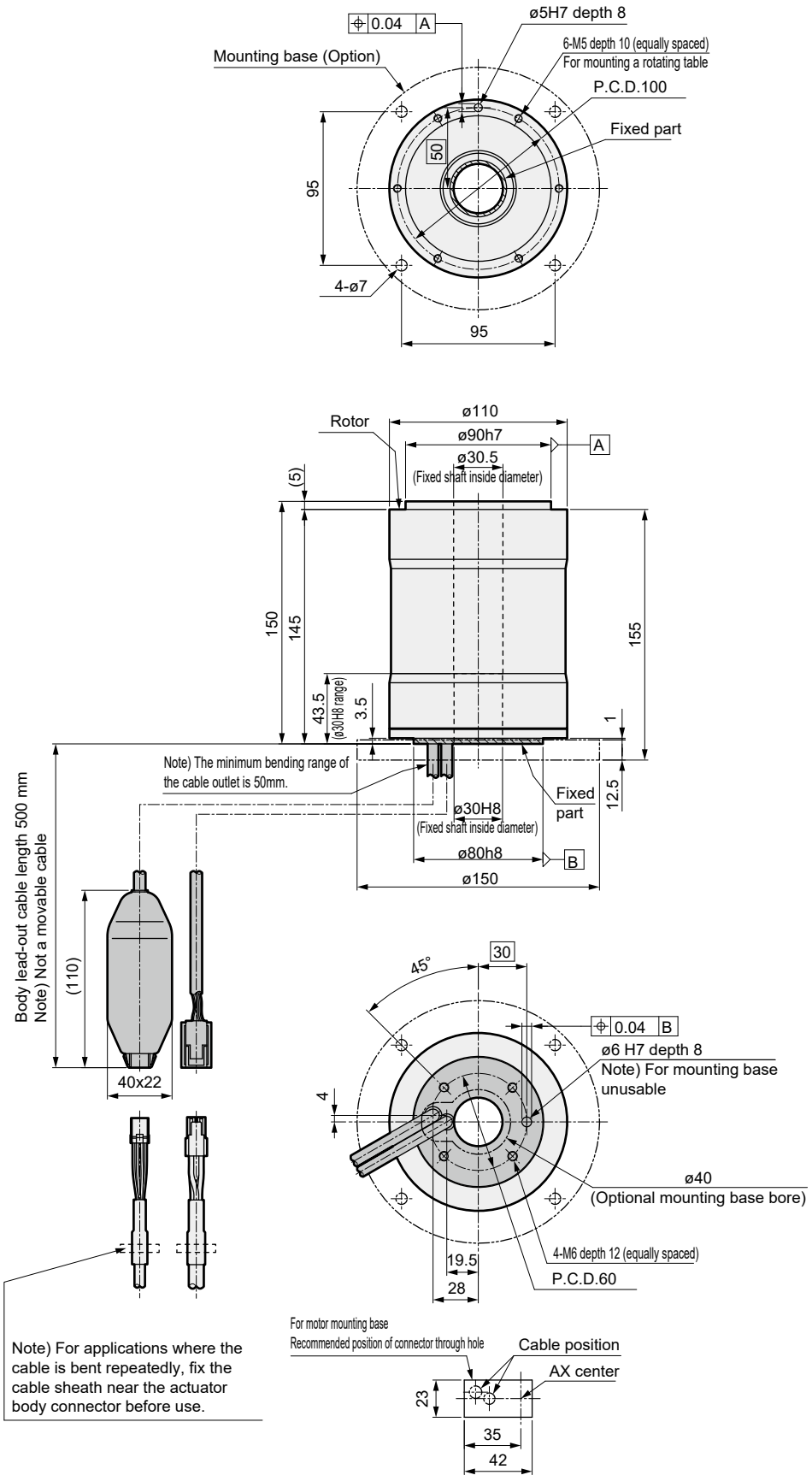
● AX2R-012



* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The lead-out cable of the actuator section is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.

Dimensions

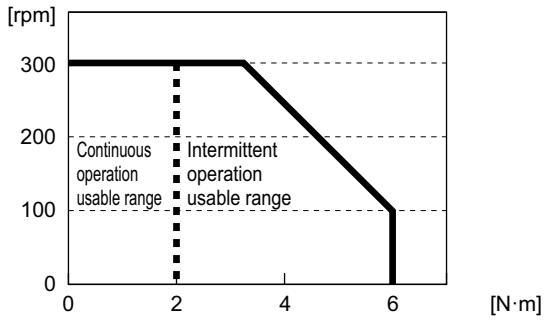
● AX2R-018



* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The lead-out cable of the actuator section is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.

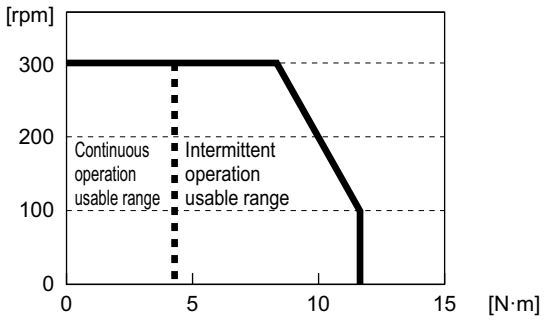
Speed/Maximum torque characteristics

●AX2R-006



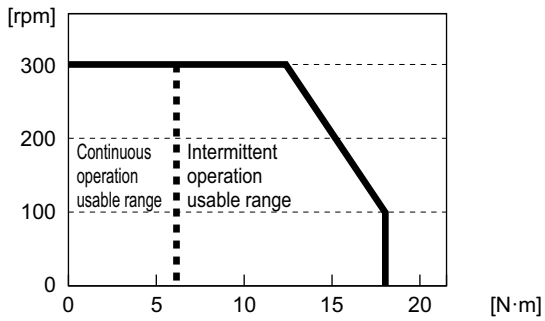
* The graph shows the characteristics of three-phase 200 VAC.

●AX2R-012



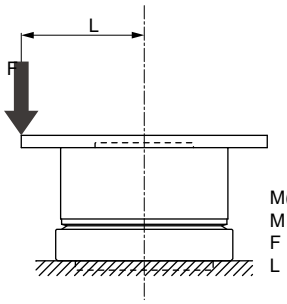
* The graph shows the characteristics of three-phase 200 VAC.

●AX2R-018



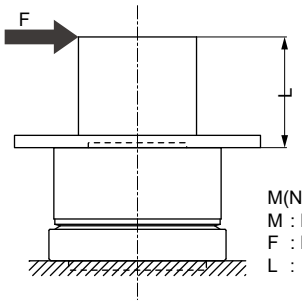
* The graph shows the characteristics of three-phase 200 VAC.

Moment load (simple formula)



M(N·m)=F(N)×L(m)
M : Moment load
F : Load
L : Distance from the output shaft center

(Fig. a)



M(N·m) = F(N)×(L+0.02)(m)
M : Moment load
F : Load
L : Distance from the output shaft flange surface

(Fig. b)

AX4R

ABSODEX

actuator (standard)

CONTENTS

ABSODEX

AX4R Series

Standard
- Max. torque: 9/22/45/75 N·m
- Supported driver: AXD-S

How to order

AX4R - 045 N - BS EB
(1) (2) (3)

❶ Size (max. torque)	
009	9 N·m
022	22 N·m
045	45 N·m
075	75 N·m

❷ Mounting base *4	
NN	Standard (without mounting base)
BS	With mounting base

❸ Brake *6	
NN	Standard (without electromagnetic brake)
EB	Negative-actuated electromagnetic brake

*1: Select the driver according to the compatibility table below.

Driver power voltage compatibility table

Model \ Driver Type	Three-phase/single-phase 200 to 240 VAC	
	AXD-S Type	AXD-H Type
AX4R-009	●	
AX4R-022	●	
AX4R-045	●	
AX4R-075	●	

*2: The calculation of torque limit area is different from the usual when used in single-phase 200 VAC. Contact CKD to determine usability.
*3: The body lead-out cable is not a movable cable.
*4: ❷ The lower surface positioning pin hole cannot be used if the "BS" option for Mounting base is selected. The surface is treated with electroless nickel plating.
*5: Positioning pin holes may not be surface treated.
*6: When selecting an electromagnetic brake, refer to the precautions for the electromagnetic brake connection method (page 59). For options, select according to the "Option compatibility table" below.

Option compatibility Table

	AX4R-009	AX4R-022	AX4R-045	AX4R-075
Mounting base (-BS)		●	●	●
Brake (-EB)		●	●	●

*7: The surface of the body is treated with electroless nickel plating.

* Made to order supported products are CE, UKCA, UL/cUL, and RoHS non-compliant.

Actuator specifications

Item		AX4R-009	AX4R-022	AX4R-045	AX4R-075
Max. output torque	N·m	9	22	45	75
Continuous output torque	N·m	3	7	15	25
Max. rotation speed	rpm	240 (*1)			140
Allowable axial load	N	800	3700		20000
Allowable moment load	N·m	40	60	80	200
Output shaft moment of inertia	kg·m^2	0.009	0.0206	0.0268	0.1490
Allowable moment of load inertia	kg·m^2	1.75	3.00	5.00	25.00
Index accuracy (*4)	sec	±30			
Repeatability (*4)	sec	±5			
Output shaft friction torque	N·m	0.8	3.5		10.0
Resolution	P/rev	540672/2097152 (*2)			
Insulation class		Class F			
Withstand voltage		1500 VAC 1 min.			
Insulation resistance		10 MΩ and over, 500 VDC			
Operating ambient temperature		0 to 40°C			
Operating ambient humidity		20 to 85% RH, no condensation			
Storage ambient temperature		-20 to 80°C			
Storage ambient humidity		20 to 90% RH, no condensation			
Atmosphere		No corrosive gas, explosive gas, or dust			
Weight	kg	5.5	12.3 (14.6) (*3)	15.0 (17.3) (*3)	36.0 (41.0) (*3)
Total weight with brake	kg	-	16.4 (18.7) (*3)	19.3 (21.6) (* 3)	54.0 (59.0) (*3)
Output shaft runout (*4)	mm	0.03			
Output shaft surface runout (*4)	mm	0.05			
Degree of protection		IP20			

* 1: Use at a speed of 140 rpm or less under the resolution of 2097152 P/rev conditions.
* 2: Shipment status is 540672 P/rev resolution. The resolution can be switched to 2097152 P/rev with the PC software.
* 3: The values in ( ) are the actuator weight with the mounting base option.
* 4: Refer to the "Glossary" on page 54 for index accuracy, repeatability, output shaft runout and output shaft surface runout.

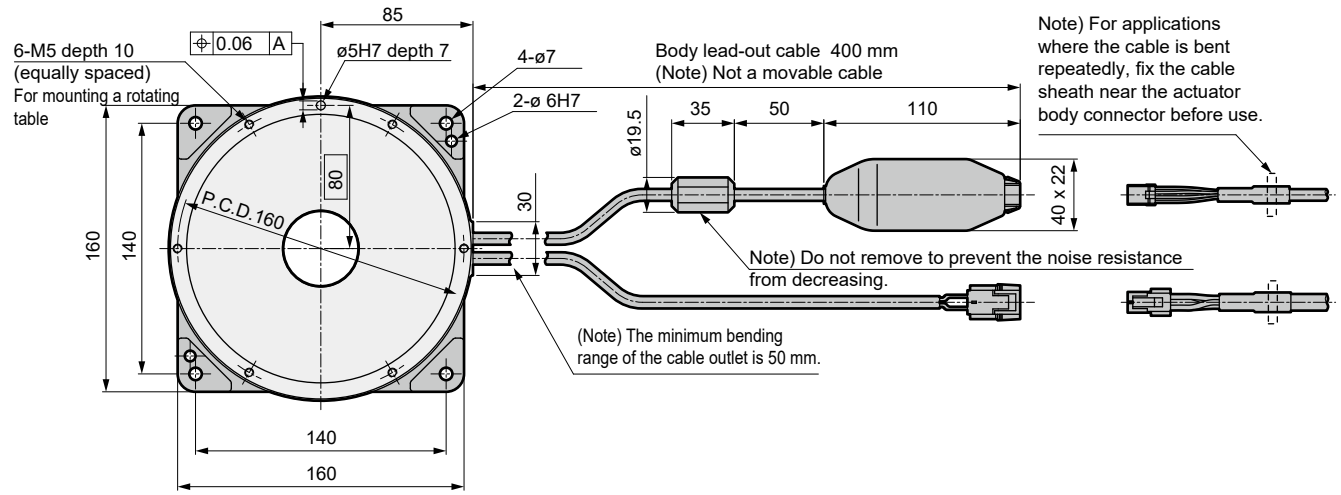
Electromagnetic brake specifications (option)

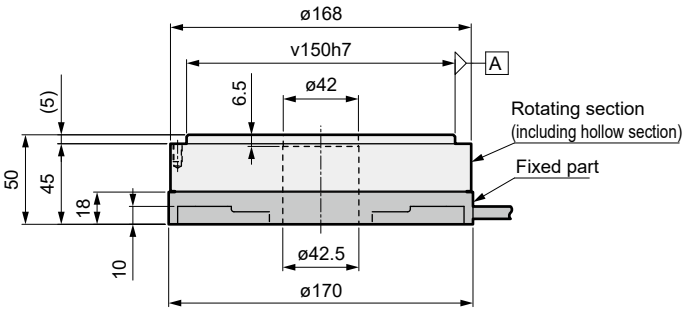
Item \ Compatibility		AX4R-022, AX4R-045	AX4R-075
Type		Non-backlash dry type non-excitation	
Rated voltage	V	24 VDC	
Power capacity	W	30	55
Rated current	A	1.25	2.30
Static friction torque	N·m	35	200
Armature release time (brake on)	msec	50 (reference value)	50 (reference value)
Armature suction time (brake off)	msec	150 (reference value)	250 (reference value)
Retention accuracy	Minutes	45 (reference value)	
Max. operating frequency	cycles/min.	60	40

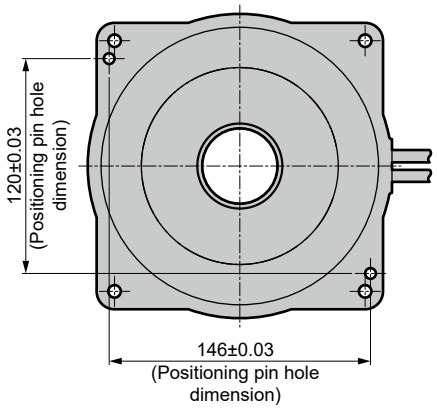
*1: During output shaft rotation, the electromagnetic brake disk and fixed part may cause a scraping sound. Impact noise is generated when the electromagnetic brake is activated.
*2: For travel after brake off, you must change the parameter delay time by the above-mentioned armature suction time.
*3: Though it is a non-backlash type, holding a constant position is difficult if load is applied in the rotation direction. It is not for brake/accuracy retention.
*4: The electromagnetic brake can be manually released by uniformly tightening the bolts in the manual release tap (3 locations).
*5: To pass a shaft through the hollow of the model equipped with an electromagnetic brake, use a non-magnetic material (such as SUS303). Magnetization may cause a magnetic effect on peripheral devices.
*For details on precautions, refer to the technical data and instruction manual.

Dimensions

● AX4R-009



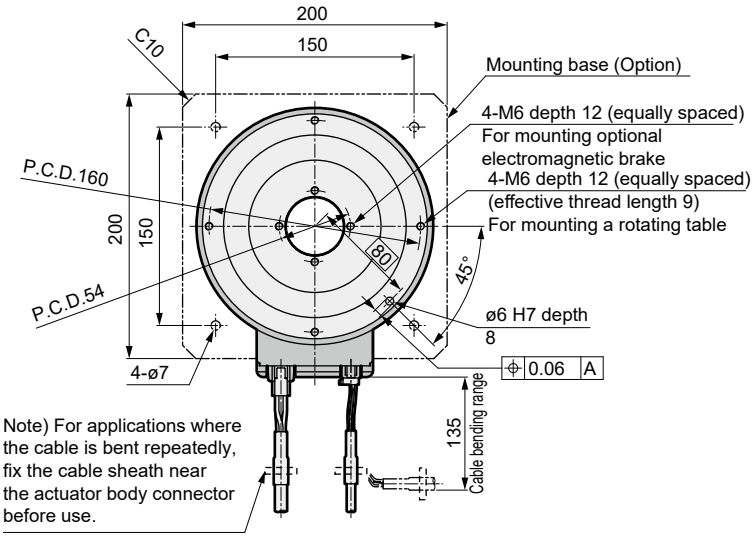




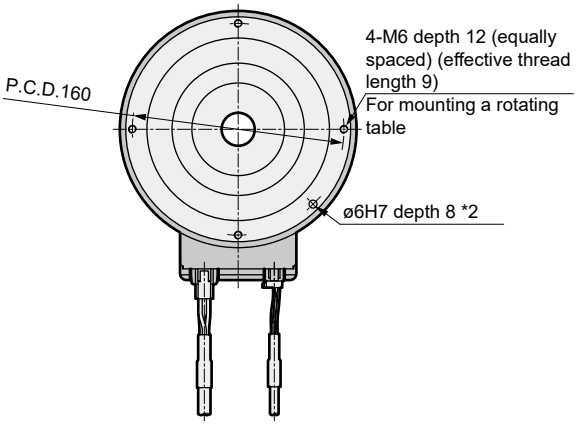
* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The lead-out cable of the actuator section is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.

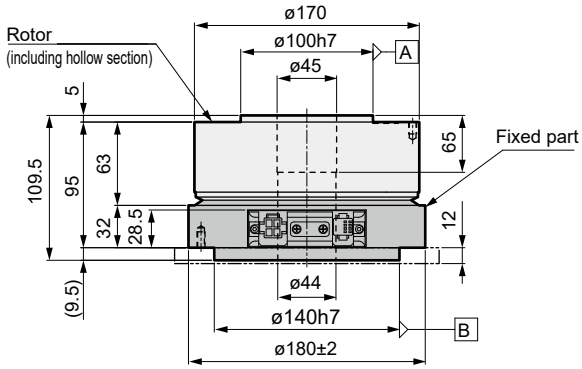
Dimensions

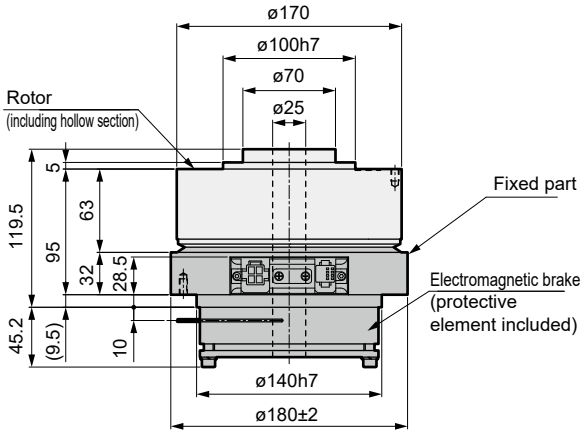
● AX4R-022

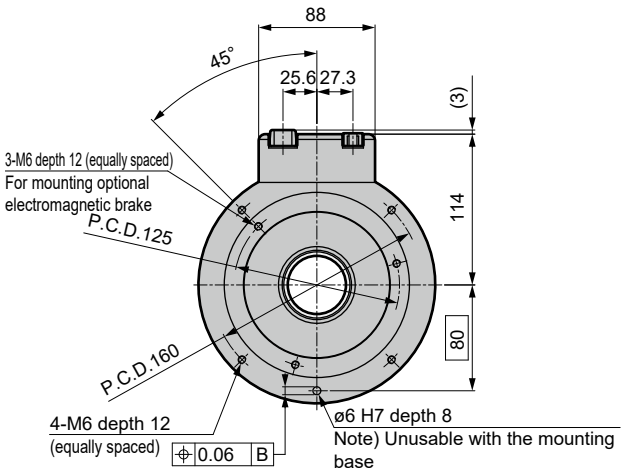


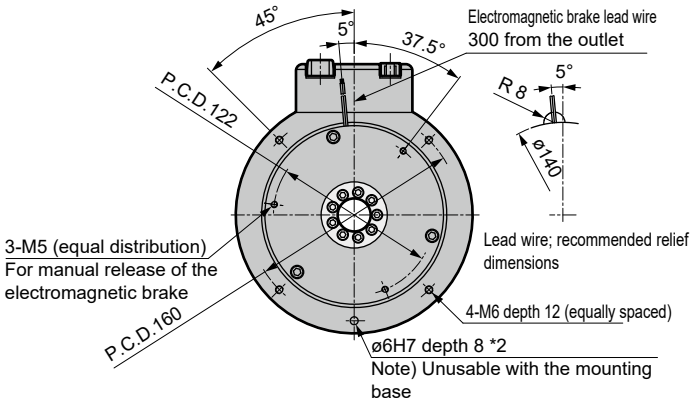
● AX4R-022-EB
With electromagnetic brake
For other options, refer to the left figure on the left.







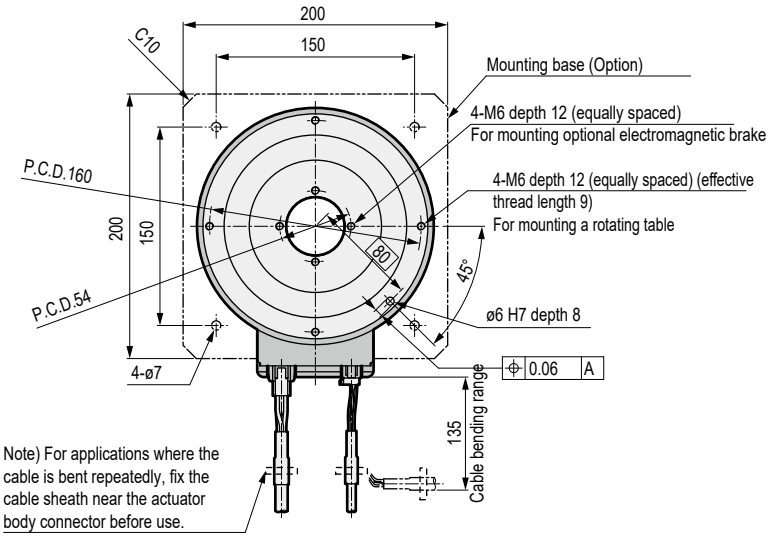




* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The position of the positioning pin hole is the same as that of AX4R-022.

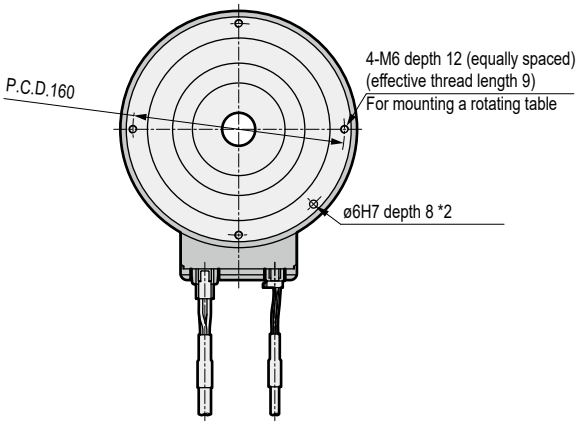
Dimensions

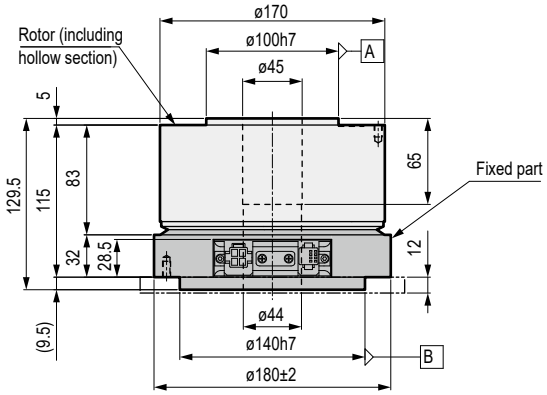
● AX4R-045

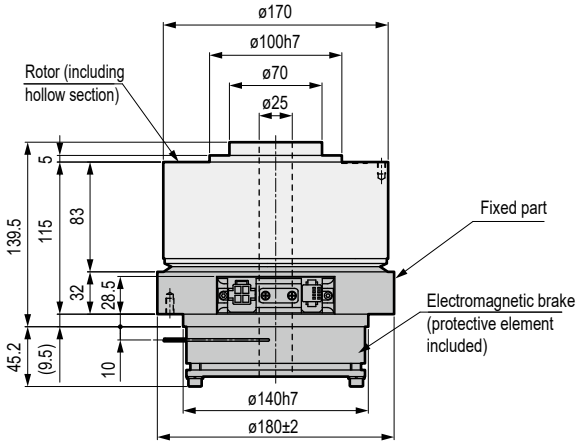


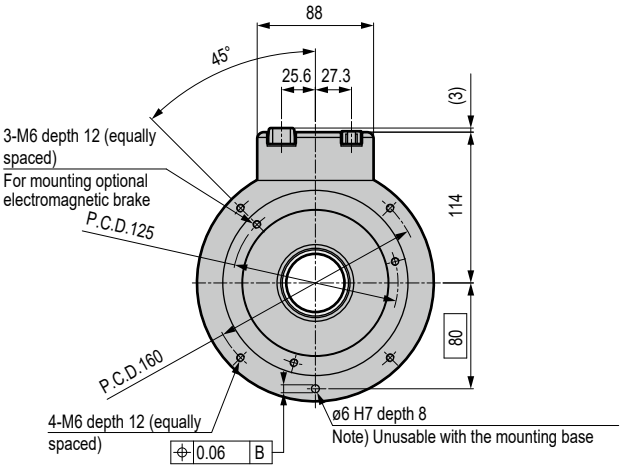
● AX4R-045-EB

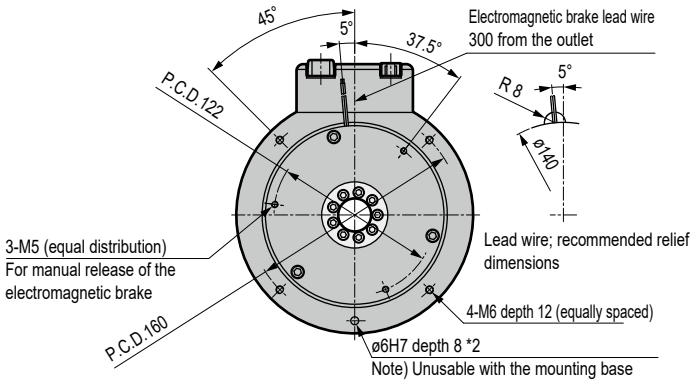
With electromagnetic brake
For other options, refer to the left figure on the left.







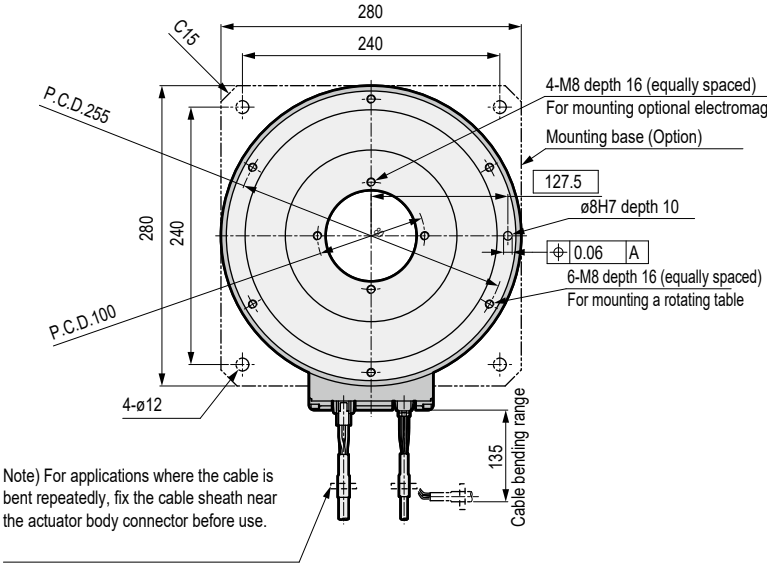




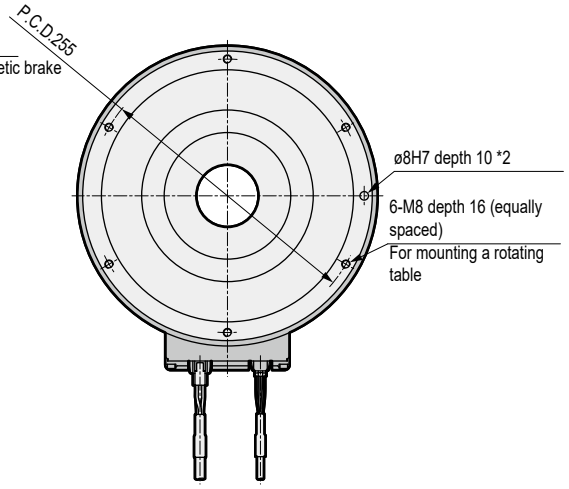
* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The position of the positioning pin hole is the same as that of AX4R-045.

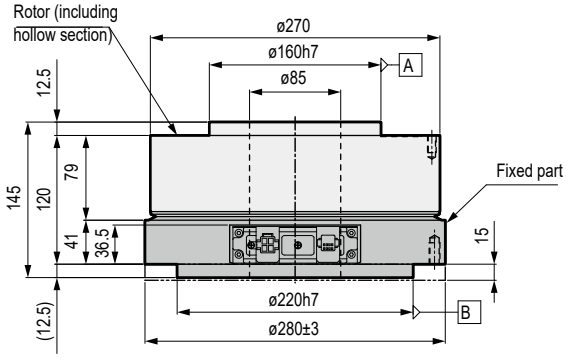
Dimensions

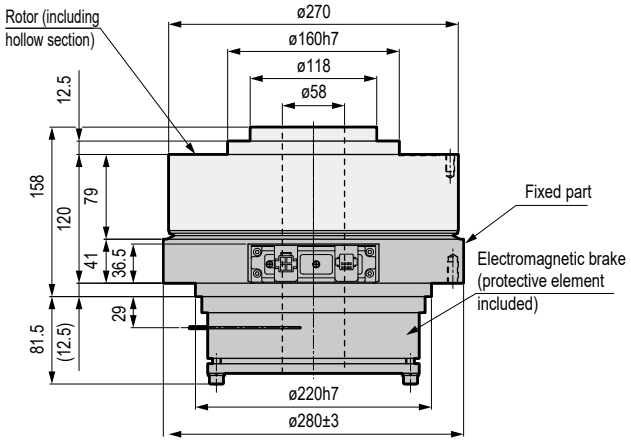
● AX4R-075

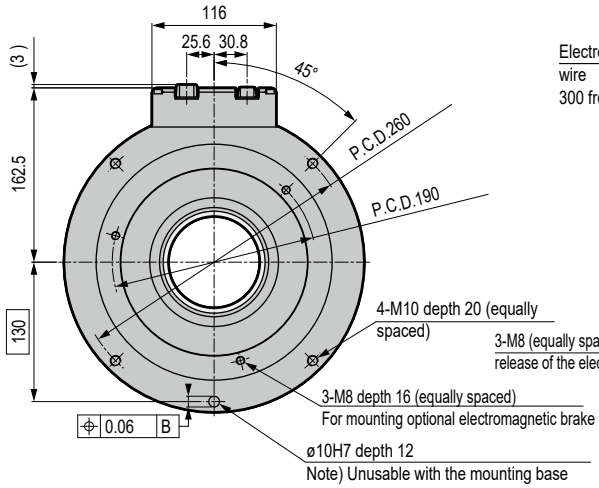


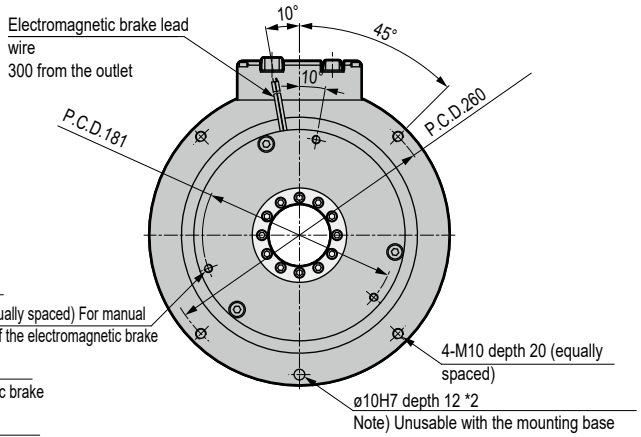
● AX4R-075-EB
With electromagnetic brake
For other options, refer to the left figure on the left.











* 1:The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The position of the positioning pin hole is the same as that of AX4R-075.

ABSODEX

AX4R Series

Standard
- Max. torque: 150/300/500/1000 N·m
- Supported driver: AXD-H

How to order

AX4R - 300 N - BS EB
(1) (2) (3)

❶ Size (max. torque)	
150	150 N·m
300	300 N·m
500	500 N·m
10W	1000 N·m

❷ Mounting base *3	
NN	Standard (without mounting base)
BS	With mounting base

❸ Brake *4	
NN	Standard (without electromagnetic brake)
EB	Negative-actuated electromagnetic brake

*1: Select the driver according to the compatibility table below.

Driver power voltage compatibility table

Model \ Driver Type	Three-phase/single-phase AC200 to 240V	
	AXD-S Type	AXD-H Type
AX4R-150		●
AX4R-300		●
AX4R-500		●
AX4R-10W		●

*2: The calculation of torque limit area is different from the usual when used in single-phase 200 VAC. Contact CKD to determine usability.

*3: ❷ The lower surface positioning pin hole is
Not available. The surface is treated with electroless nickel plating.

*4: When selecting an electromagnetic brake, refer to the precautions for the electromagnetic brake connection method (page 59). For options, select according to the "Option compatibility table" below.

Option compatibility table

	AX4R-150	AX4R-300	AX4R-500	AX4R-10W
Brake (-EB)	●	●		

*5: Positioning pin holes may not be surface treated.

*6: The surface is treated with electroless nickel plating.

* Made to order supported products are CE, UKCA, UL/cUL, and RoHS non-compliant.

Actuator specifications

Item		AX4R-150	AX4R-300	AX4R-500	AX4R-10W
Max. output torque	N·m	150	300	500	1000
Continuous output torque	N·m	50	100	160	330
Max. rotation speed	rpm	100		70	30
Allowable axial load	N	20000			
Allowable moment load	N·m	300	400	500	400
Output shaft moment of inertia	kg·m^2	0.2120	0.3260	0.7210	2.7200
Allowable moment of load inertia	kg·m^2	75.00	180.00	300.00	600.00
Index accuracy (*3)	sec	±30			
Repeatability (*3)	sec	±5			
Output shaft friction torque	N·m	10.0		15.0	20.0
Resolution	P/rev	540672/2097152 (*1)			
Insulation class		Class F			
Withstand voltage		1500 VAC 1 min.			
Insulation resistance		10 MΩ and over, 500 VDC			
Operating ambient temperature		0 to 40 °C			
Operating ambient humidity		20 to 85% RH, no condensation			
Storage ambient temperature		-20 to 80°C			
Storage ambient humidity		20 to 90% RH, no condensation			
Atmosphere		No corrosive gas, explosive gas, or dust			
Weight	kg	44.0 (49.0) (*2)	66.0 (74.0) (*2)	115.0 (123.0) (*2)	198.0 (217.0) (*2)
Total weight with brake	kg	63.0 (68.0) (*2)	86.0 (94.0) (*2)	-	-
Output shaft runout (*3)	mm	0.03			
Output shaft surface runout (*3)	mm	0.05			0.08
Degree of protection		IP20			

*1: Shipment status is 540672 P/rev resolution. The resolution can be switched to 2097152 P/rev with the PC software.
*2: The values in ( ) are the actuator weight with the mounting base option.
*3: Refer to the "Glossary" on page 54 for index accuracy, repeatability, output shaft runout and output shaft surface runout.

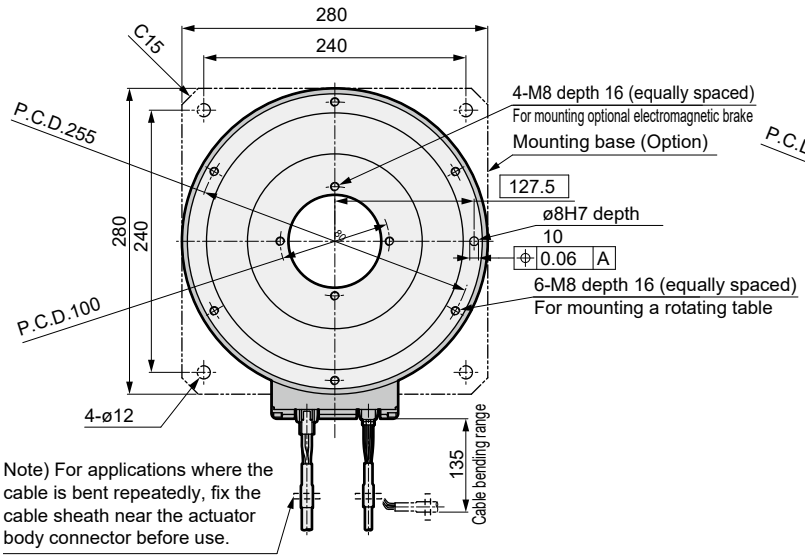
Electromagnetic brake specifications (option)

Item \ Compatibility		AX4R-150, AX4R-300
Type		Non-backlash dry type non-excitation
Rated voltage	V	24 VDC
Power capacity	W	55
Rated current	A	2.30
Static friction torque	N·m	200
Armature release time (brake on)	msec	50 (reference value)
Armature suction time (brake off)	msec	250 (reference value)
Retention accuracy	Minutes	45 (reference value)
Max. operating frequency	cycles/min.	40

*1: During output shaft rotation, the electromagnetic brake disk and fixed part may cause a scraping sound. Impact noise is generated when the electromagnetic brake is activated.
*2: For travel after brake off, you must change the parameter delay time by the above-mentioned armature suction time.
*3: Though it is a non-backlash type, holding a constant position is difficult if load is applied in the rotation direction. It is not for brake/accuracy retention.
*4: The electromagnetic brake can be manually released by uniformly tightening the bolts in the manual release tap (3 locations).
*5: To pass a shaft through the hollow of the model equipped with an electromagnetic brake, use a non-magnetic material (such as SUS303). Magnetization may cause a magnetic effect on peripheral devices.
*For details on precautions, refer to the technical data and instruction manual.

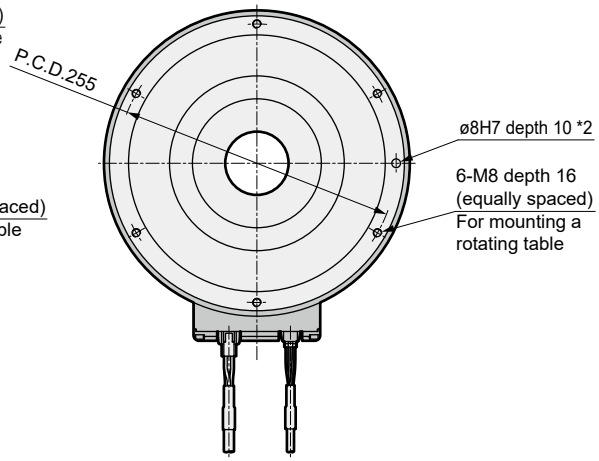
Dimensions

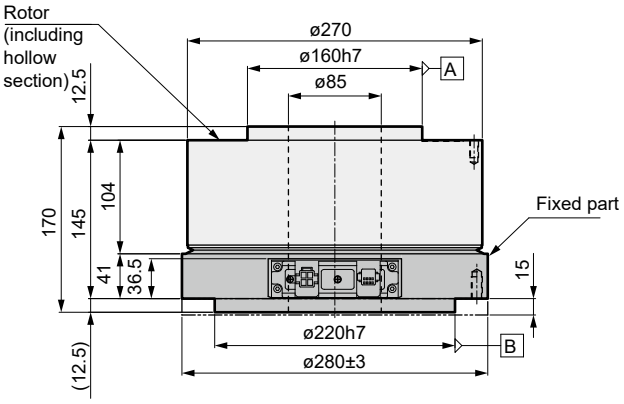
● AX4R-150

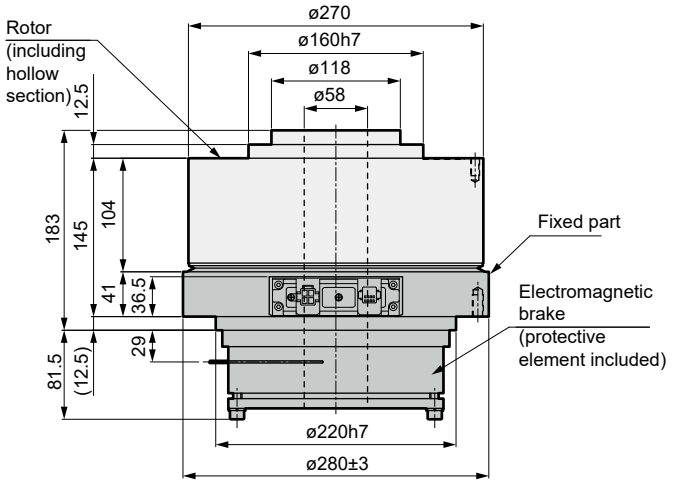


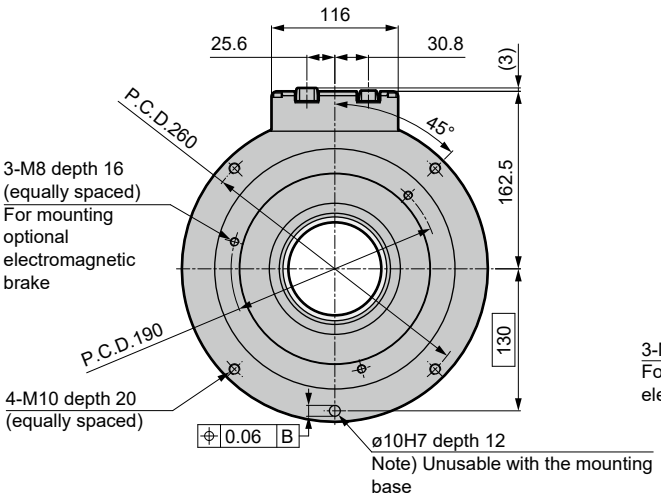
● AX4R-150-EB

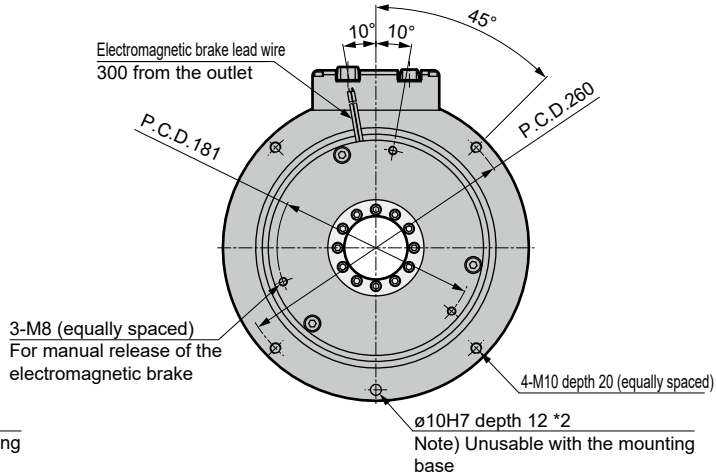
With electromagnetic brake
For other options, refer to the left figure on the left.







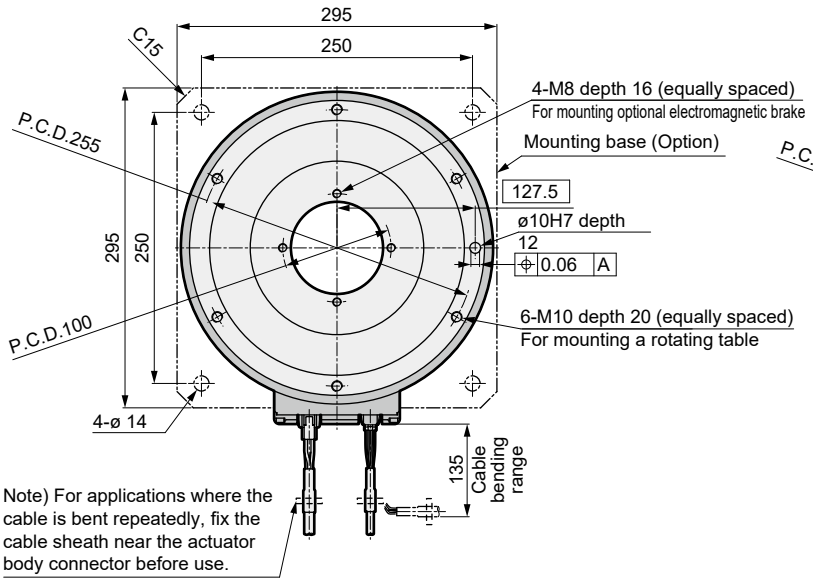




* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The position of the positioning pin hole is the same as that of AX4R-150.

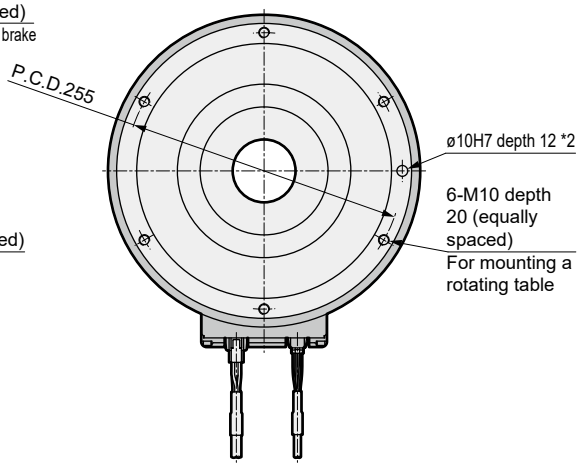
Dimensions

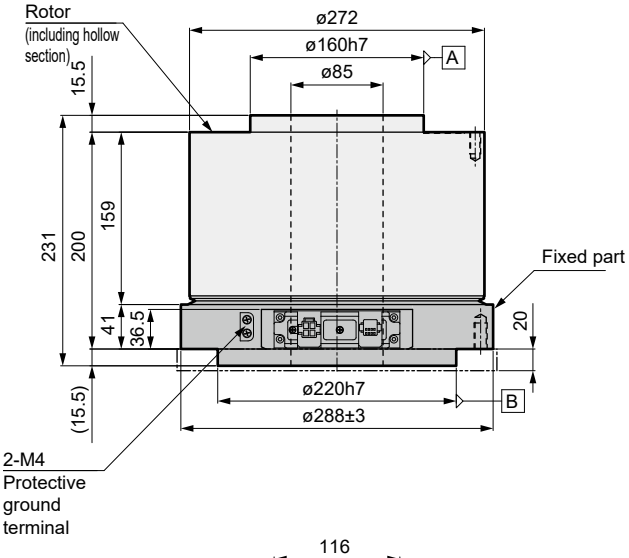
● AX4R-300

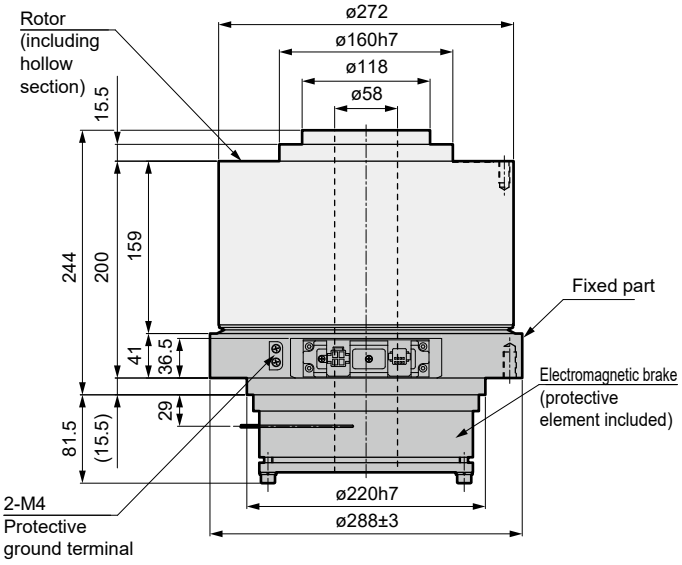


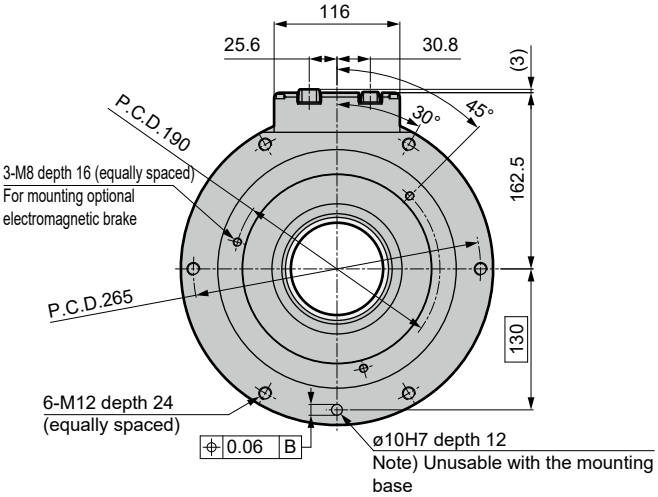
Note) For applications where the cable is bent repeatedly, fix the cable sheath near the actuator body connector before use.

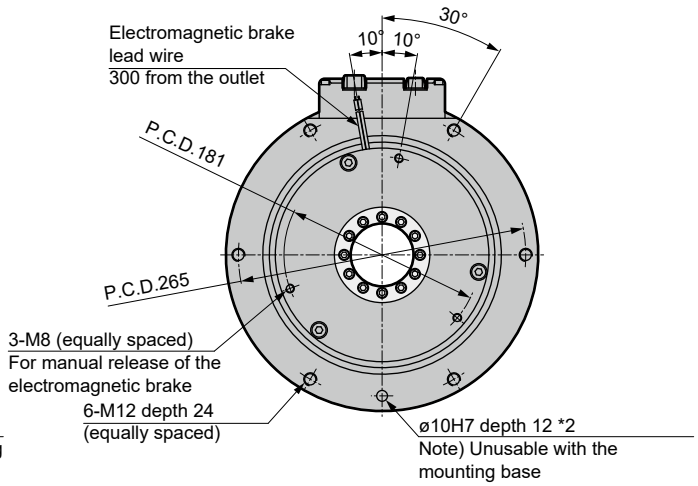
● AX4R-300-EB
With electromagnetic brake
For other options, refer to the left figure on the left.







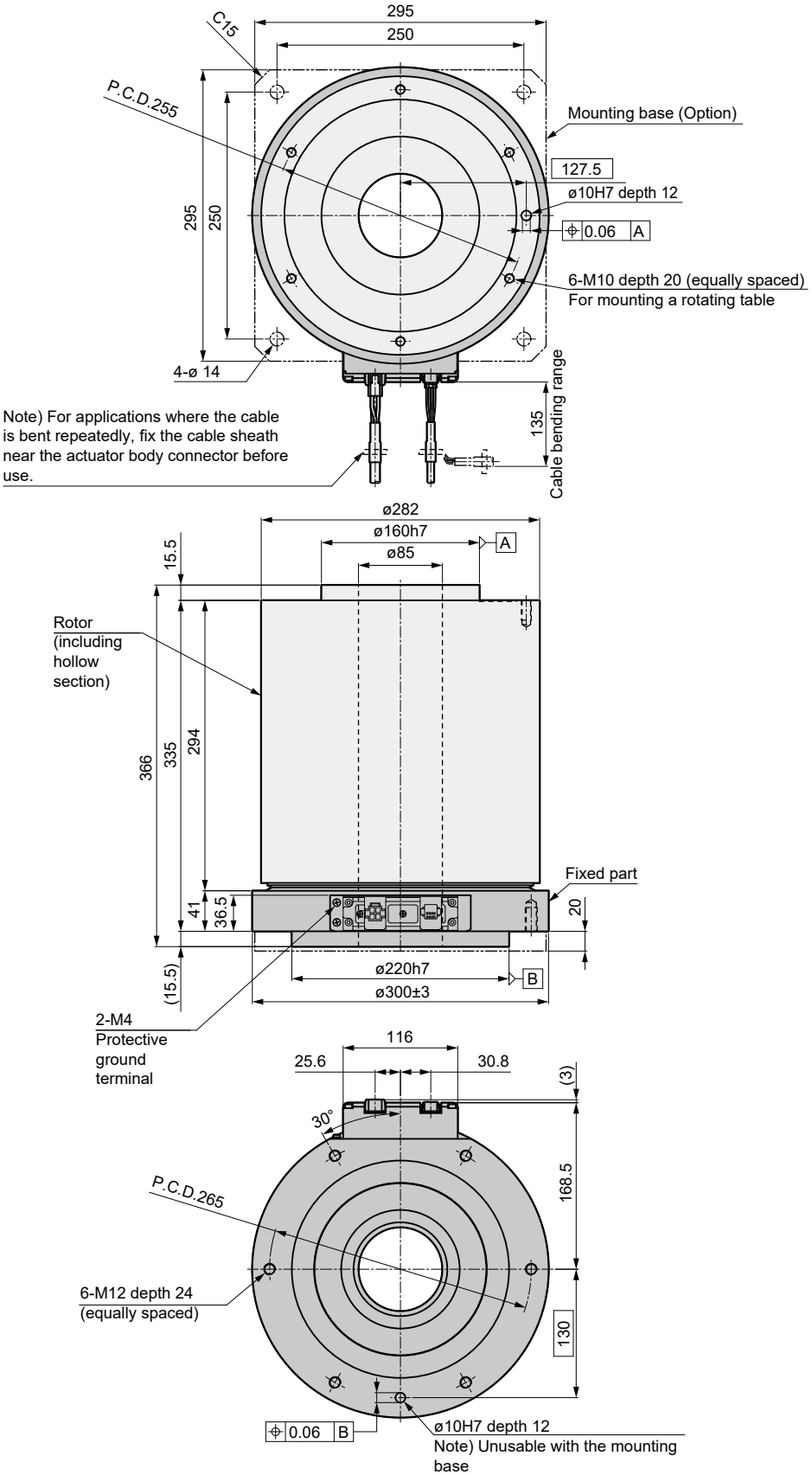




* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.
* 2: The position of the positioning pin hole is the same as that of AX4R-300.

Dimensions

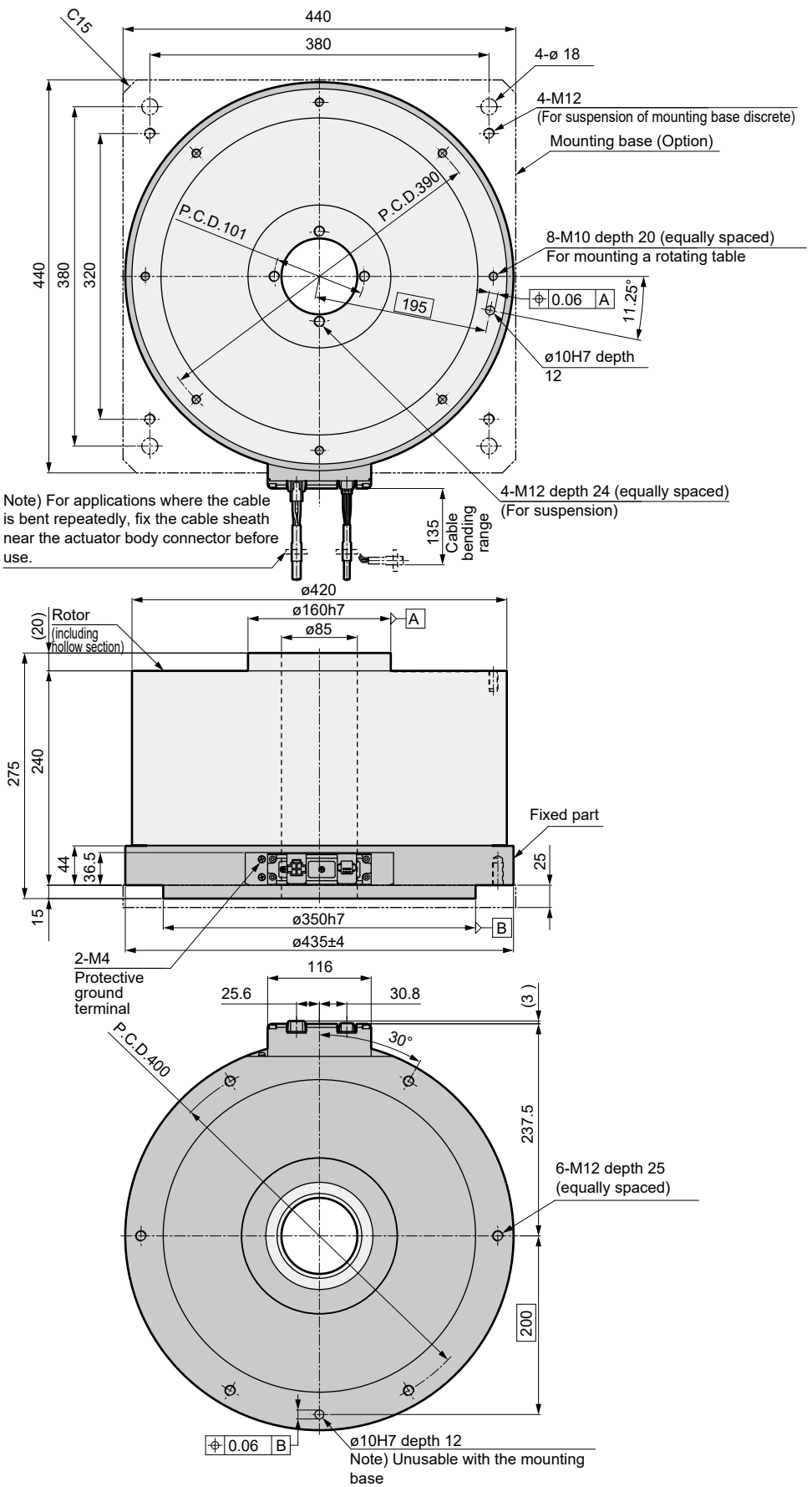
● AX4R-500



* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

Dimensions

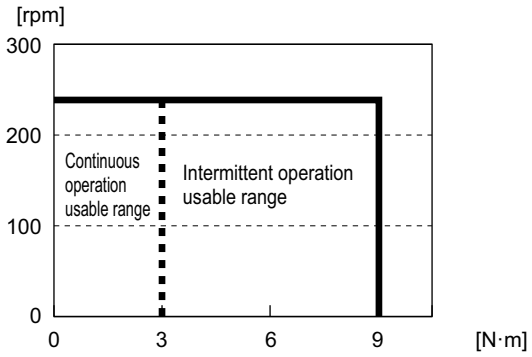
● AX4R-10W



* 1: The actuator origin position may differ from the dimensions. The origin offset function allows you to set an arbitrary home position.

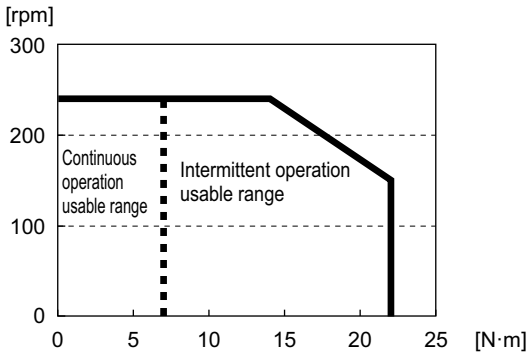
Speed/Maximum torque characteristics

●AX4R-009



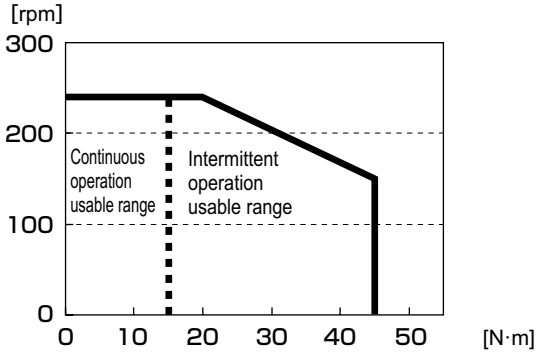
* The graph shows the characteristics of three-phase 200 VAC.

●AX4R-022



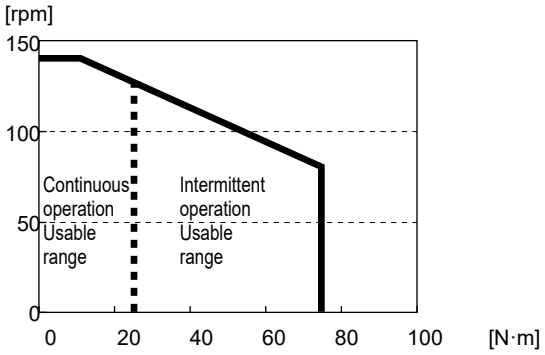
* The graph shows the characteristics of three-phase 200 VAC.

●AX4R-045



* The graph shows the characteristics of three-phase 200 VAC.

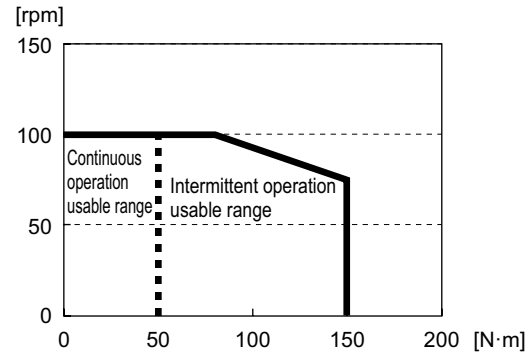
●AX4R-075



* The graph shows the characteristics of three-phase 200 VAC.

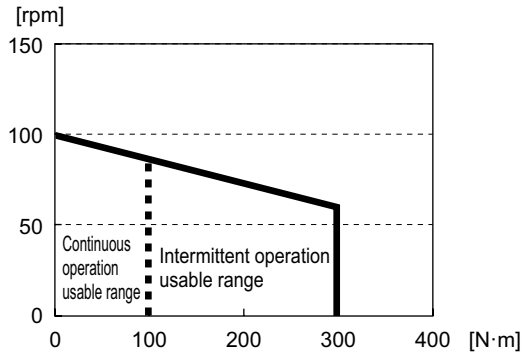
Speed/Maximum torque characteristics

●AX4R-150



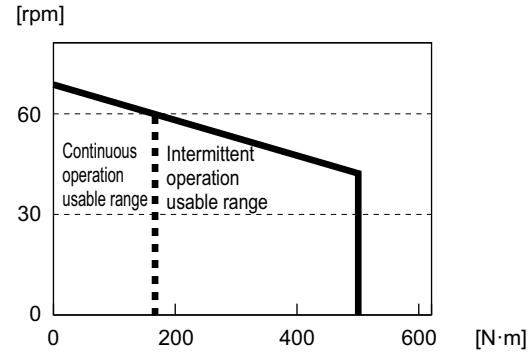
* The graph shows the characteristics of three-phase 200 VAC.

●AX4R-300



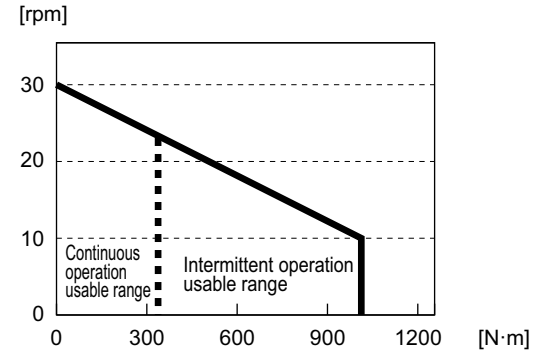
* The graph shows the characteristics of three-phase 200 VAC.

●AX4R-500



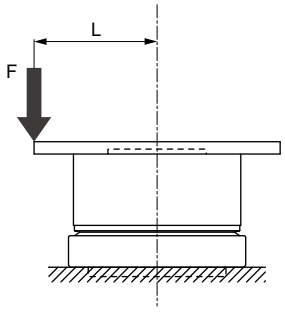
* The graph shows the characteristics of three-phase 200 VAC.

●AX4R-10W



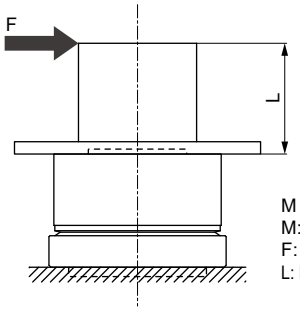
* The graph shows the characteristics of three-phase 200 VAC.

Moment load (simple formula)



M (N·m)=F (N) x (L) (m)
M: Moment load
F: Load
L: Distance from output shaft center

(Fig. a)



M (N·m)=F (N) x (L+0.02) (m)
M: Moment load
F: Load
L: Distance from output shaft flange surface

(Fig. a)

AXD

ABSODEX driver

CONTENTS

ABSODEX

AXD Series

Interface specifications: Parallel I/O, CC-Link, EtherCAT, EtherNet/IP

How to order

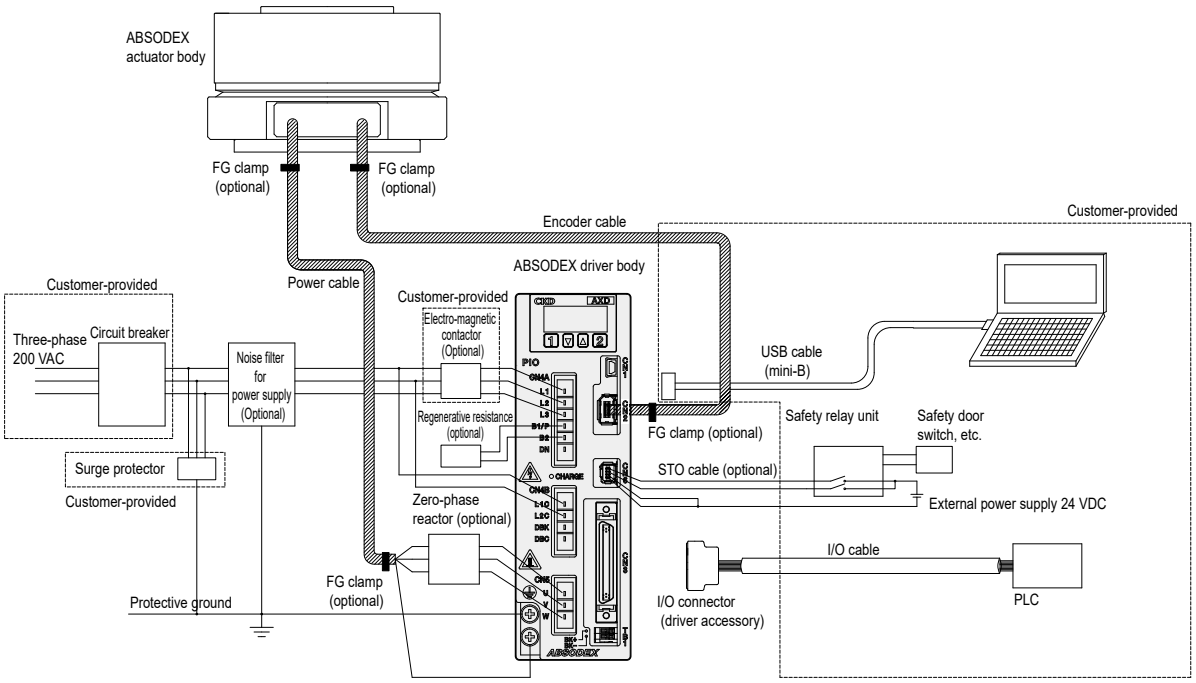
AXD - S A2 - NP

Power supply voltage 200 VAC

❶ Driver size (rated output)	
S	Compact (400 W)
H	Large (800 W)

❷ Interface specifications	
NP	Parallel I/O (NPN, PNP)
CL	CC-LINK
EC	EtherCAT
EN	EtherNet/IP

System configuration



To comply with the CE marking, the parts shown below or overcurrent/short circuit protection components are required. In addition, the driver must be installed within the switchboard. For details on the selection, installation and wiring methods of these components, refer to the instruction manual.

*2

Part name	Application	Model No.	Manufacturer
Noise filter	Three-phase	3SUP-EF10-ER-6	Okaya Electric Industries Co., Ltd.
		NF3010A-VZ	Soshin Electric Co., Ltd.
	Single phase	NF2015A-OD	Soshin Electric Co., Ltd.
		NF2016A-UP	
		NF2016A-UPF	
Zero phase reactor	Single phase Three-phase	RC5060ZZ	Soshin Electric Co., Ltd.
Surge protector		RSPD-250-U4	Okaya Electric Industries Co., Ltd.
		LT-CS32G801WS	Soshin Electric Co., Ltd.
		LT-C32G801WS	
FG clamp *1		FGC-5, FGC-8	Kitagawa Industries Co., Ltd.

* 1: FG clamps are used to ground the power cable and encoder cable shields.
* 2: Parts available for purchase from CKD. Refer to related parts (page 48).

General specifications

Item			Model No. AXD-SA2	Model No. AXD-HA2
Rated output		W	400	800
Main circuit Input power	Rated voltage	V	AC200 to 240 Single-phase or three-phase *1, *4, *5	
	Frequency	Hz	50/60	
	Allowable voltage fluctuation	V	AC170 to 264	
	Rated current	A	5.5 (single-phase) 3.2 (three-phase)	9.0 (single-phase) 5.2 (three-phase)
	Rated capacity	kVA	1.1	1.8
	Rush current *2	A	45 (5ms)	45 (9ms)
Control circuit Input power	Rated voltage	V	AC200 to 240 Single-phase *1, *4, *5	
	Frequency	Hz	50/60	
	Allowable voltage fluctuation	V	AC170 to 264	
	Rated current	A	0.12	
	Power consumption	W	15	
	Rush current *2	A	17 (3ms)	
Continuous output current		A	3.5	6.8
Instantaneous output current		A	9.9	17.0
Structure (degree of protection)			Natural cooling (IP20)	Forced cooling (IP20)
Operating ambient temperature			0 to 55 °C	
Storage ambient temperature			-20 to 65 °C	
Operating ambient humidity Storage ambient humidity			90% or less, no condensation	
Atmosphere			Avoid a harmful atmosphere such as corrosive gas, grinding oil, metal powder, and oil Indoor place not exposed to direct sunlight	
Sea level			1000 m or less	
Vibration resistance			5.9m/s^2 (10 to 55Hz) No resonance	
Drive method			3-phase sine wave PWM	
Braking method			Regenerative braking force: External regenerative resistor *3	
Mounting method			Panel mounting	
Weight		kg	Approx. 1.0	Approx. 1.5

* 1: The calculation of torque limit area is different from the usual when used in single-phase 200 VAC. Contact CKD to determine usability.
* 2: Value at rated voltage 240 VAC. The numbers in ( ) are the time constants of the inrush current. Use three times the values in ( ) as a guide for the time until the rush current stops.
* 3:Regenerative resistor is optional.
* 4: If the main power is cut off while the actuator is rotating, the rotation may continue due to inertia.
* 5: After the main power supply is cut OFF, the motor may rotate by the residual voltage of the driver.

Performance specifications

Item	Description
No. of control axes	1 axis, 540, 672 pulse/1 rotation (2,097,152 pulses/1 rotation)
Angle setting unit	° (degree), pulse, indexing No.
Angle min. setting unit	0.001°, 1 pulse
Speed setting unit	sec., rpm
Speed setting range	0.01 to 100 sec / 0.01 to 300rpm (*1)
Equal divisions	1 to 255
Max. command value	8-digit numeric input ±99,999,999
Timer	0.01 sec. to 99.99 sec
Programming language	NC
Programming method	Set data through USB port with a PC, etc. (*2)
Operation mode	Auto, MDI, jog, single block, servo off, pulse train input mode, network operation
Coordinates	Absolute, incremental
Acceleration curve	[5 types] Modified Sine (MS), Modified Constant Velocity (MC/ MC2), Modified Trapezoid (MT), Trapecloid (TR)
Status display	LED display CHARGE: Main power supply
Operation display	Indicator with 7-segment LED (5 digits)
Communication interface	USB2.0 standard compliant (FULL Speed) mini-B
I/O signal	Refer to interface specification pages.
Program capacity	Approx. 6000 characters (256)
Load factor	Overheating protection for actuator

* 1: Maximum rotation speed differs depending on the actuator connected and the resolution setting of the actuator.
* 2: "AX-Tools" PC software is available. (Provided free of charge for the Windows version) Please download and use the latest version of the PC software "AX-Tools" from our website.

Breaker capacity

●AXD-SA2

Actuator model No.	Breaker capacity Rated current (A)
AX1R-022, AX1R-045, AX1R-075	10
AX2R-006, AX2R-012, AX2R-018	
AX4R-009, AX4R-022, AX4R-045, AX4R-075	

●AXD-HA2

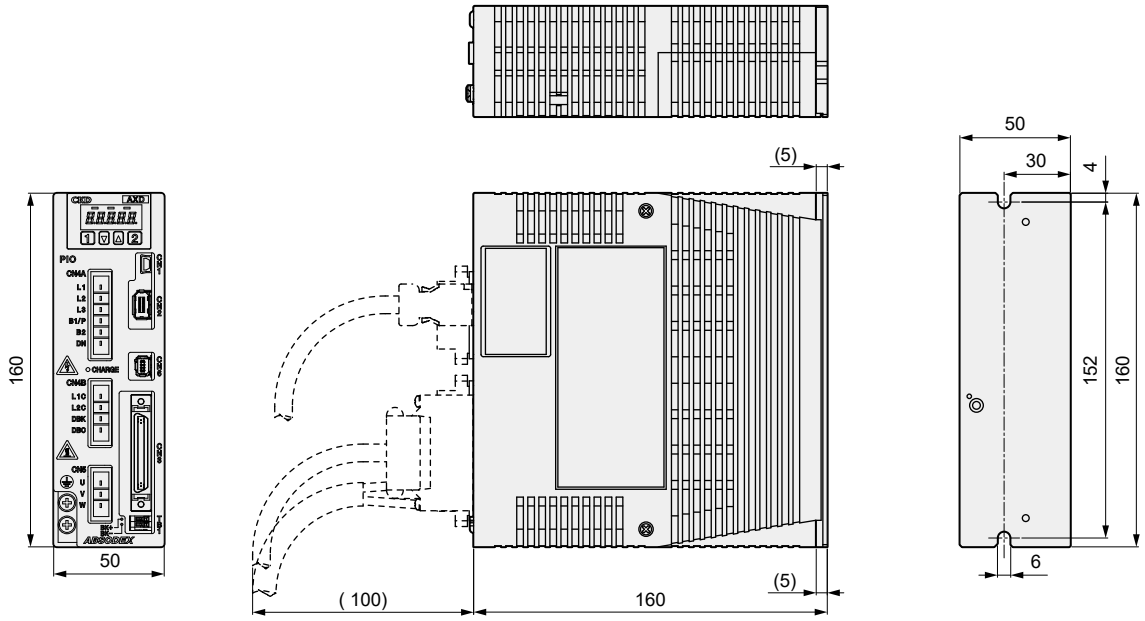
Actuator model No.	Breaker capacity Rated current (A)
AX1R-150, AX1R-210	20
AX4R-150, AX4R-300, AX4R-500, AX4R-10W	

Operation mode

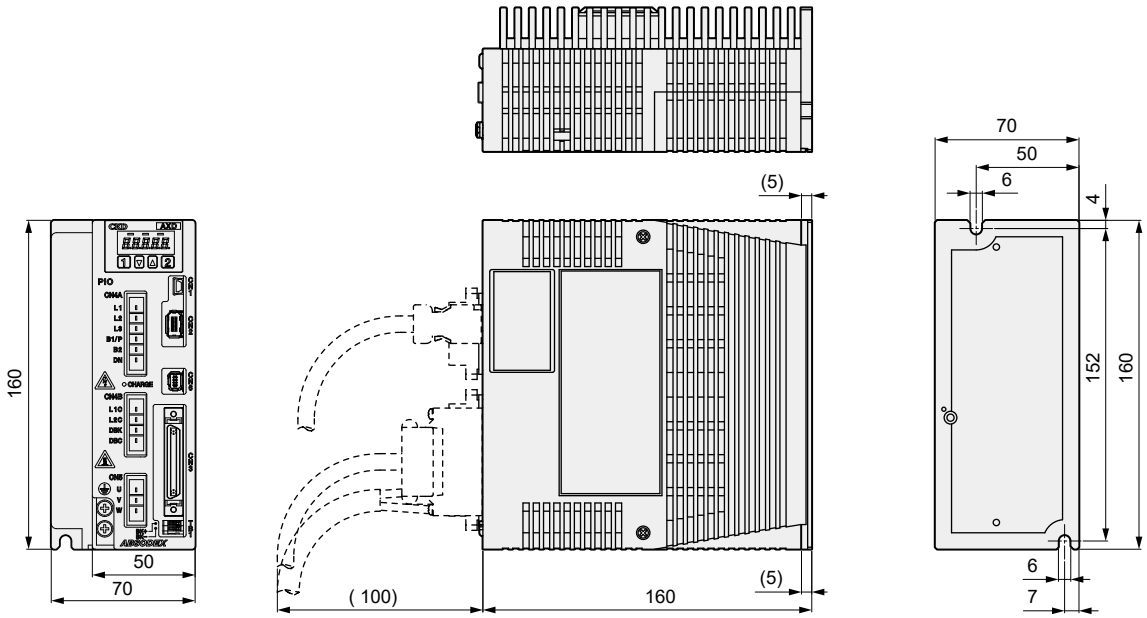
Operation mode	Overview
Automatic operation mode	Mode in which a program is executed continuously. In the shipping state, this automatic operation mode is entered after the power supply is turned ON.
Single block mode	Mode in which one block of the program is executed and stopped (program stop) for each start input.
MDI mode	In this mode, the NC code input from the USB port is immediately executed.
Job mode	Mode in which to perform jog operation.
Servo off mode	Mode in which the servo on is released.
pulse train input mode	Mode in which the device operates by connecting to the pulse train output controller. It is impossible to operate by an NC program, change parameter, etc.
Network operation mode	This operation mode can be used with the reduced wiring specifications -CL, -EC, -EN (CC-Link, EtherCAT, EtherNet/IP).

Dimensions

● AXD-SA2



● AXD-HA2



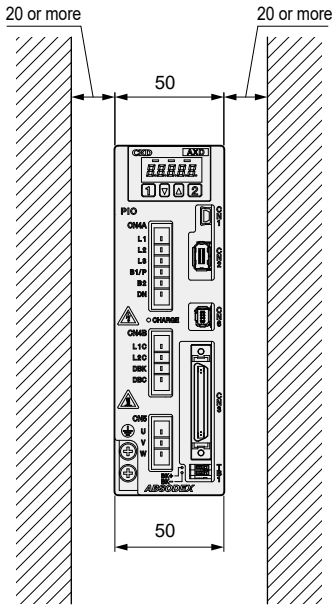
Driver accessory

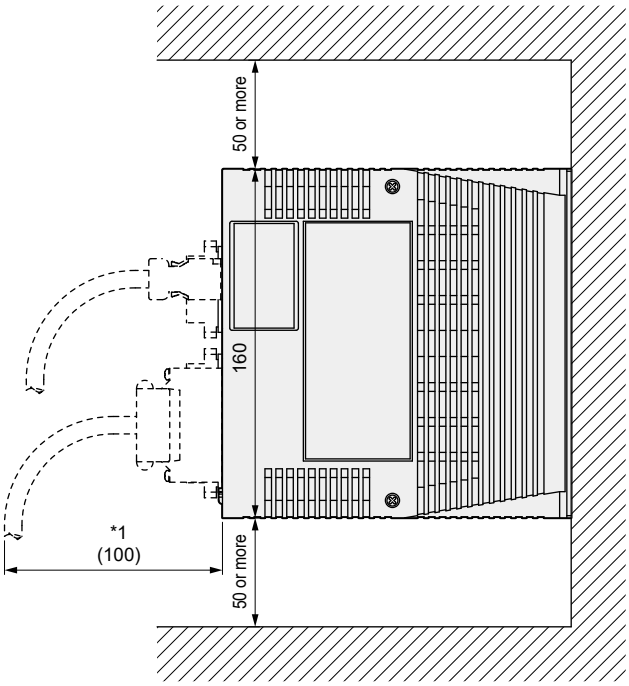
Model No.	Interface Specifications	Signal connector		Connector for power supply
AXD-□A2-NP	Parallel I/O	[CN3] Sumitomo 3M Ltd. 10150-3000PE (plug) 10350-52A0-008 (shell)	[CN6] Japan Aircraft Electronics Industries Co., Ltd. DZ02B008DC1	[CN4A] J.S.T. Mfg Co., Ltd. 06JFAT-SBXGF-I or 06JFAT-SBXGGKS-A [CN4B] J.S.T. Mfg Co., Ltd. 04JFAT-SBXGF-I or 04JFAT-SBXGGKS-A [CN5] J.S.T. Mfg Co., Ltd. 03JFAT-SBYGF-I or 03JFAT-SBYGGKS-A [Operation lever for connector] J.S.T. Mfg. Co., Ltd. J-FAT-OT or J-FAT-OT(N)
AXD-□A2-CL	CC-LINK	[CN3] Weidmüller BLZP5.08HC/05/180F SN OR BX		
AXD-□A2-EC	EtherCAT	[CN3A, CN3B] Not included		
AXD-□A2-EN	EtherNet/IP	[CN3A, CN3B] Not included		

When ordering additional parts, refer to the related parts list.

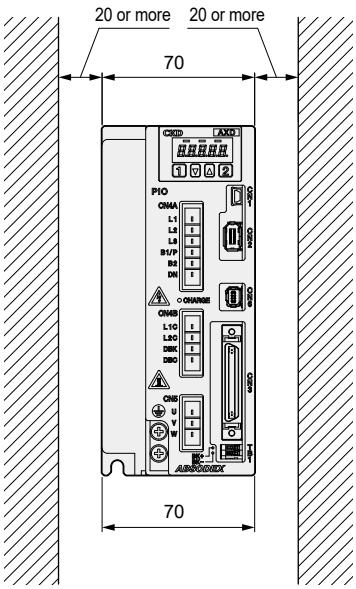
Installation dimensions

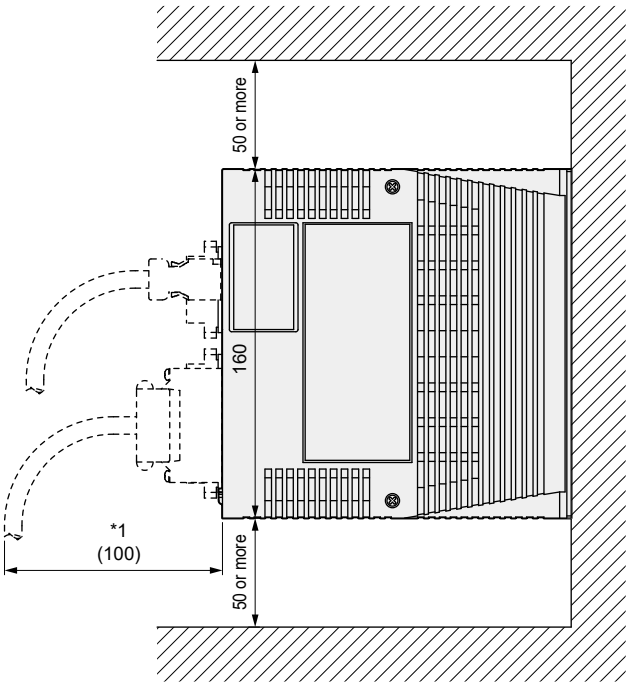
● AXD-SA2





● AXD-HA2





* 1: Determine the dimension with extra allowance according to the cable you want to use.

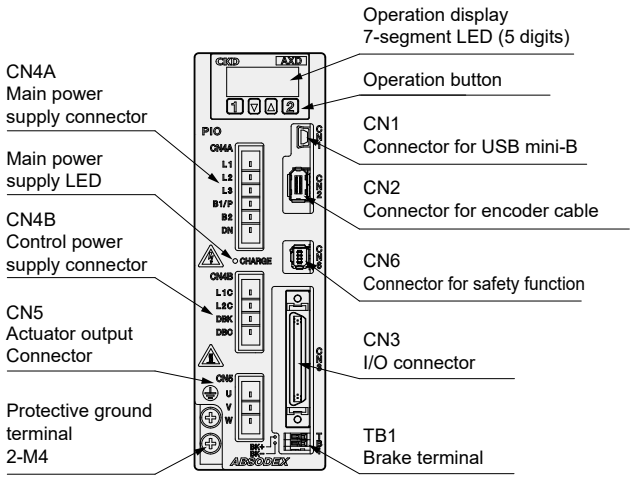
Safety precautions

● The ABSODEX driver is not dustproof or waterproof.
Provide protection in your working environment to prevent dust, water, oil, and other substances from entering the driver.

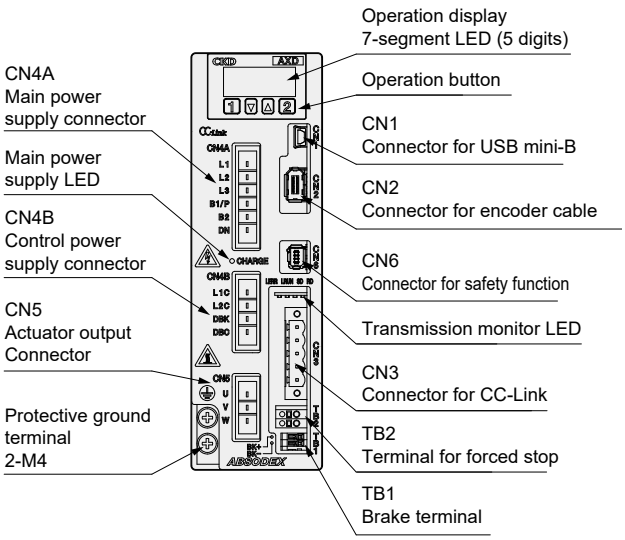
● Install the ABSODEX driver away from other Components, walls or other structures by 50 mm or more from both top and bottom and 20 mm or more from sides. If heat is generated from other drivers or devices, be careful that the ambient temperature does not rise to 55 °C or more.

Panel description

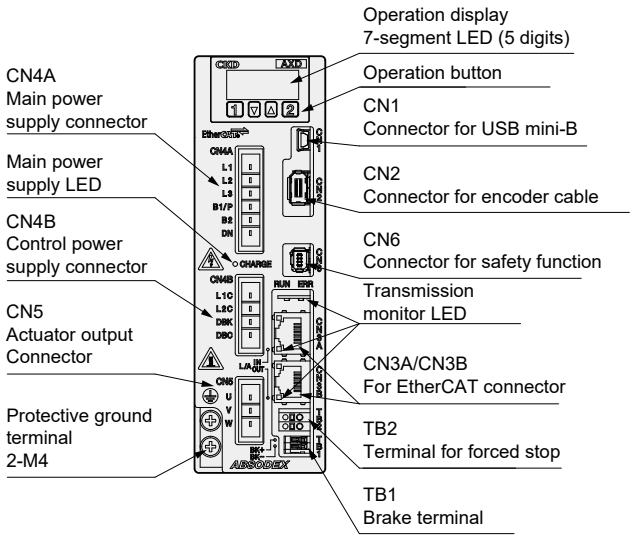
● Parallel I/O



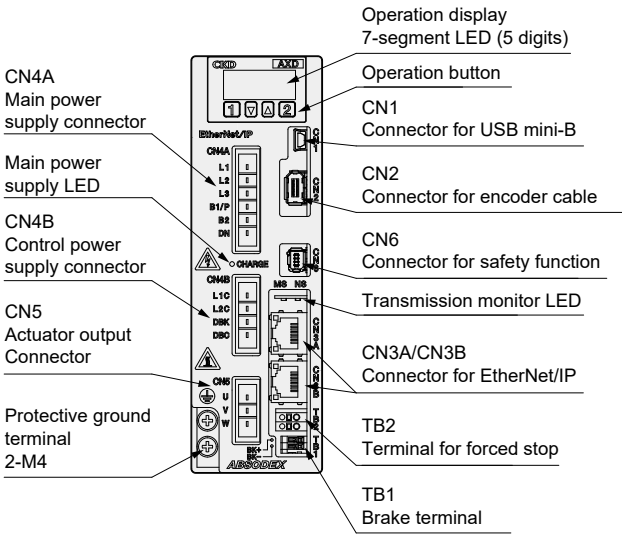
● CC-LINK



● EtherCAT



● EtherNet/IP



Parallel I/O

CN3 input signal

Pin No.	Signal name	Logic	Judgment
1 to 2	Input signal power supply common		
3 to 4	Output signal power supply common		
5	Program No. selection input (bit 0)	Positive	Level
6	Program No. selection input (bit 1)	Positive	Level
7	Program No. selection input (bit 2)	Positive	Level
8	Program No. selection input (bit 3)	Positive	Level
9	Program number setting input 2nd digit/ Program number selection input (bit 4)	Positive	Edge Level
10	Program number setting input 1st digit/ Program number selection input (bit 5)	Positive	Edge Level
11	Reset input	Positive	Edge
12	Origin position return command input	Positive	Edge
13	Startup input	Positive	Edge
14	Servo on input/ Program stop input	Positive	Level Edge
15	Ready return/Continuous rotation stop input	Positive	Edge
16	Answer input/Position deviation counter reset input	Positive	Level Edge
17	Forced stop input	Negative	Level
18	Brake release input	Positive	Level

CN3 output signal

Pin No.	Signal name	Logic
33	M-code output (bit 0)	Positive
34	M-code output (bit 1)	Positive
35	M-code output (bit 2)	Positive
36	M-code output (bit 3)	Positive
37	M-code output (bit 4)	Positive
38	M-code output (bit 5)	Positive
39	M-code output (bit 6)	Positive
40	M-code output (bit 7)	Positive
41	In-position output	Positive
42	Output of positioning completion	Positive
43	Startup input standby output	Positive
44	Alarm output 1	Negative
45	Alarm output 2	Negative
46	Output 1 during indexing/Origin position output	Positive
47	Output 2 during indexing/Servo state output	Positive
48	Ready output	Positive
49	Split position strobe output	Positive
50	M-code strobe output	Positive

CN3 pulse train input signal

Pin No.	Signal name
19	PULSE/UP/A-phase
20	-PULSE/-UP/-A-phase
21	DIR/DOWN/B-phase
22	-DIR/-DOWN/-B-phase

CN3 encoder output signal (incremental)

Pin No.	Signal name
23	A-phase (line driver output)
24	-A-phase (line driver output)
25	B-phase (line driver output)
26	-B-phase (line driver output)
27	Z-phase (line driver output)
28	-Z-phase (line driver output)

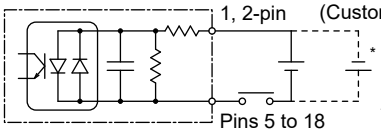
I/O circuit specifications

Description	1 circuit current (mA)	Max. number of points (Circuit)	Max. current (mA)	Max. current consumption (mA)
Input circuit	5	14	70	1120
Output circuit	50	18	900	
Brake output (BK+, BK-)	75	2	150	

* The maximum simultaneous output points of the output circuit are 14 points out of 18 points.

CN3 I/O circuit specifications

● Input circuit

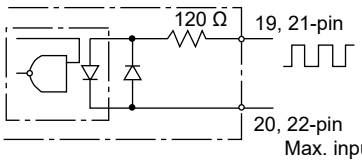


External power supply 24 VDC (Customer-provided)

*Connectable even if the polarities of the external power supply are reversed.

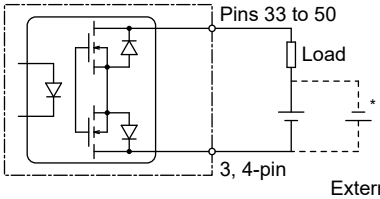
Rated voltage: 24 V±10% (including ripple)
Rated current: 5 mA (with 24 VDC)

● Pulse train input circuit



Max. input frequency
Line driver: 4 Mpps
Open collector: 250 Kpps

● Output circuit

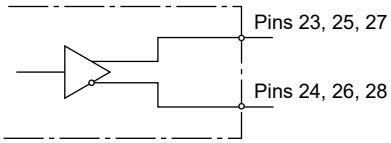


*Connectable even if the polarities of the external power supply are reversed.

External power supply 24 VDC (Customer-provided)

Rated voltage: 24 V±10% (including ripple)
Load current: 50mA (MAX)

● Encoder output circuit



Output: Line driver
Line driver used: 26 LS31 or equiv.
Recommended Line Driver: 26 LS32 or equiv.

CC-LINK

Communication specifications

Item	Specifications
Power	5 VDC is supplied from the servo amplifier.
CC-Link version	Ver1.10
Number of occupied stations (Station type)	2 stations (Remote device station)
Remote input points	64 points (including unusable)
Remote output points	64 points (including unusable)
Remote register input/output	Input 8 words/Output 8 words
Communication speed	10M/5M/2.5M/625k/156kbps (Selected by parameter setting)
Connection cable	CC-Link Ver. 1.10 compliant cable (3-conductor twisted pair cable with shield)
Transmission format	HDLC compliant
Remote station No.	1 - 63 (Set by a parameter)
Number of connected units	For remote device station only, Max. 32 units/2 stations occupied
Monitor function	Present position within 1 rotation (degree, pulse), Position deviation amount, program No., Load factor, rotation speed, Point table No., torque load factor, Angular acceleration, alarm, parameters, Operation mode

I/O signal

PLC → AXD (Input)

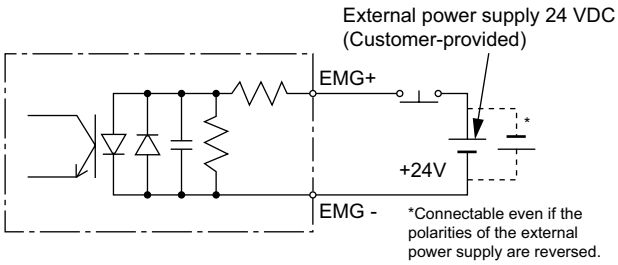
Device No.	Signal name	Logic	Judgment
RYn0	Program No. selection input (bit 0)	Correct	Level
RYn1	Program No. selection input (bit 1)	Correct	Level
RYn2	Program No. selection input (bit 2)	Correct	Level
RYn3	Program No. selection input (bit 3)	Correct	Level
RYn4	Program No. setting 2nd digit input/ Program No. selection input (bit 4)	Correct	Edge Level
RYn5	Program No. setting 1st digit input/ Program No. selection input (bit 5)	Correct	Edge Level
RYn6	Reset input	Correct	Edge
RYn7	Origin position return command input	Correct	Edge
RYn8	Startup input	Correct	Edge
RYn9	Servo ON input/ Program stop input	Correct	Level edge
RYnA	Ready return input/ Continuous rotation stop input	Correct	Edge
RYnB	Answer input/ Position deviation counter reset input	Correct	Edge Level
RYnC	Forced stop input	Negative	Level
RYnD	Brake release input	Correct	Level
RYnE	Job operation input (CW direction)	Correct	Level
RYnF	Job operation input (CCW direction)	Correct	Level
RY(n+1)0	Unusable/Travel unit selection input (Bit 0)	Correct	Level
RY(n+1)1	Unusable/Travel unit selection input (Bit 1)	Correct	Level
RY(n+1)2	Unusable/Travel speed unit selection input	Correct	Level
RY(n+1)3	Operation by table, Operation by data input Switching input	Correct	Level
RY(n+1)4 to RY(n+1)F	Unusable		
RY(n+2)0	Monitor output execution request	Correct	Level
RY(n+2)1	Command code execution request	Correct	Edge
RY(n+2)2 to RY(n+2)F	Unusable		
RY(n+3)0 to RY(n+3)F	Unusable		
RWwn0	Monitor code 1		
RWwn1	Monitor code 2		
RWwn2	Command code		
RWwn3	Write data/ A-cord or P-cord		
RWwn4			
RWwn5	Data specification/F code		
RWwn6	-		
RWwn7	-		

AXD (Output) → PLC

Device No.	Signal name	Logic
RXn0	M-code output (bit 0)	Correct
RXn1	M-code output (bit 1)	Correct
RXn2	M-code output (bit 2)	Correct
RXn3	M-code output (bit 3)	Correct
RXn4	M-code output (bit 4)	Correct
RXn5	M-code output (bit 5)	Correct
RXn6	M-code output (bit 6)	Correct
RXn7	M-code output (bit 7)	Correct
RXn8	In-position output	Correct
RXn9	Output of positioning completion	Correct
RXnA	Startup input standby output	Correct
RXnB	Alarm output 1	Negative
RXnC	Alarm output 2	Negative
RXnD	Output 1 during indexing/Origin position output	Correct
RXnE	Output 2 during indexing/Servo state output	Correct
RXnF	Ready output	Correct
RX(n+1)0	Split position strobe output	Correct
RX(n+1)1	M-code strobe output	Correct
RX(n+1)2 to RX(n+1)F	Unusable	
RX(n+2)0	Monitoring	Correct
RX(n+2)1	Command code execution completed	Correct
RX(n+2)2 to RX(n+2)F	Unusable	
RX(n+3)0 to RX(n+3)A	Unusable	
RX(n+3)B	Remote READY	Correct
RX(n+3)C to RX(n+3)F	Unusable	
RWrn0	Monitor data 1	
RWrn1		
RWrn2	Response code	
RWrn3	Read data	
RWrn4		
RWrn5	Monitor data 2	
RWrn6		
RWrn7	-	

*n is determined by the setting of the station No.

TB2 Input circuit specifications (forced stop)



*Connectable even if the polarities of the external power supply are reversed.

Rated voltage 24 V ±10%, Rated current 5 mA or less

Safety precautions

- Reserve a sufficient distance between the communication cable and power cable (power cable, power supply cable, etc.).
- Placing the communication cable and power cable close to each other or bundling these cables makes communication unstable due to noise, possibly resulting in a communication error or retry.
- For details on the installation of the communication cable, refer to the CC-Link installation manuals on the website of the CC-Link Partner Association.

EtherCAT

Communication specifications

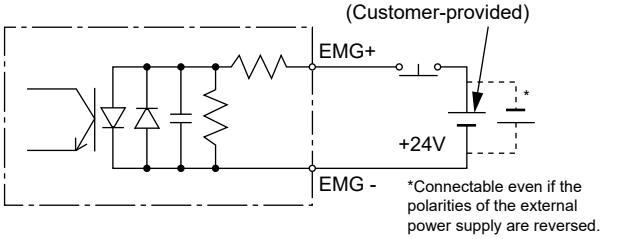
Item	Specifications
Communication protocol	EtherCAT
Communication speed	100Mbps (fast Ethernet, full duplex)
Process data	Fixed PDO mapping
Max. PDO data length	RxPDO: 40 bytes/TxPDO: 40 bytes
Station alias	0 to 65535 (set from master)
Connection cable	EtherCAT compliant cable (Twisted pair cable of CAT5e or higher (Double shielding with aluminum tape and braid is recommended)
Node address	Automatic indexing the master
Monitor function	Present position within 1 rotation (degree, pulse), Position deviation amount, program No., Load factor, rotation speed, Point table No., torque load factor, Angular acceleration, alarm, parameters, Operation mode

I/O signal

PLC → AXD (Input)

INDEX	Sub INDEX	Indicator name	bit	Signal name	Logic	Judgment
0x3000	0x01	Input signal 1	0	Program No. selection input (bit 0)	Correct	Level
			1	Program No. selection input (bit 1)	Correct	Level
			2	Program No. selection input (bit 2)	Correct	Level
			3	Program No. selection input (bit 3)	Correct	Level
			4	Program No. setting 2nd digit input/ Program No. selection input (bit 4)	Correct	Edge level
			5	Program No. setting 1st digit input/ Program No. selection input (bit 5)	Correct	Edge Level
			6	Reset input	Correct	Edge
			7	Origin position return command input	Correct	Edge
			8	Startup input	Correct	Edge
			9	Servo ON input/ Program stop input	Correct	Level Edge
			10	Ready return input/ Continuous rotation stop input	Correct	Edge
			11	Answer input/ Position deviation counter reset input	Correct	Edge Level
			12	Forced stop input	Negative	Level
			13	Brake release input	Correct	Level
			14	Job operation input (CW direction)	Correct	Level
			15	Job operation input (CCW direction)	Correct	Level
			16	Unusable/Travel unit selection input (Bit 0)	Correct	Level
			17	Unusable/Travel unit selection input (Bit 1)	Correct	Level
			18	Unusable/Travel speed unit selection input	Correct	Level
			19	Operation by table, Operation by data input Switching input	Correct	Level
			20 to 31	Unusable		
	0x02	Input signal 2	0	Monitor output execution request	Correct	Level
			1	Command code execution request	Correct	Edge
			2 to 31	Unusable		
0x3001	0x01	Input data 1	-	Monitor code 1		
	0x02	Input data 2	-	Monitor code 2		
	0x03	Input data 3	-	Monitor code 3		
	0x04	Input data 4	-	Monitor code 4		
	0x05	Input data 5	-	Monitor code 5		
0x3002	0x01	Input command 1	-	Command code		
	0x02	Input command 2	-	Write data/A code or P code		
	0x03	Input command 3	-	Data specification/F code		

TB2 Input circuit specifications (forced stop)



Rated voltage 24 V ±10%, Rated current 5 mA or less

PDO mapping

RxPDO

INDEX	Sub Index	Indicator name	Description
0x1600	0x00	Number of PDO objects	10
	0x01	Input signal 1	0x3000-0x01
	0x02	Input signal 2	0x3000-0x02
	0x03	Input data 1	0x3001-0x01
	0x04	Input data 2	0x3001-0x02
	0x05	Input data 3	0x3001-0x03
	0x06	Input data 4	0x3001-0x04
	0x07	Input data 5	0x3001-0x05
	0x08	Input command 1	0x3002-0x01
	0x09	Input command 2	0x3002-0x02
	0x0A	Input command 3	0x3002-0x03

TxPDO

INDEX	Sub Index	Indicator name	Description
0x1A00	0x00	Number of PDO objects	10
	0x01	Output signal 1	0x2000-0x01
	0x02	Output signal 2	0x2000-0x02
	0x03	Output data 1	0x2001-0x01
	0x04	Output data 2	0x2001-0x02
	0x05	Output data 3	0x2001-0x03
	0x06	Output data 4	0x2001-0x04
	0x07	Output data 5	0x2001-0x05
	0x08	Output command 1	0x2002-0x01
	0x09	Output command 2	0x2002-0x02
	0x0A	Output command 3	0x2002-0x03

I/O signal

AXD (Output) → PLC

INDEX	Sub INDEX	Indicator name	bit	Signal name	Logic
0x2000	0x01	Output signal 1	0	M-code output (bit 0)	Correct
			1	M-code output (bit 1)	Correct
			2	M-code output (bit 2)	Correct
			3	M-code output (bit 3)	Correct
			4	M-code output (bit 4)	Correct
			5	M-code output (bit 5)	Correct
			6	M-code output (bit 6)	Correct
			7	M-code output (bit 7)	Correct
			8	In-position output	Correct
			9	Output of positioning completion	Correct
			10	Startup input standby output	Correct
			11	Alarm output 1	Negative
			12	Alarm output 2	Negative
			13	Output 1 during indexing/ Origin position output	Correct
			14	Output 2 during indexing/ Servo state output	Correct
			15	Ready output	Correct
			16	Split position strobe output	Correct
			17	M-code strobe output	Correct
			18 to 31	Unusable	
	0x02	Output signal 2	0	Monitoring	Correct
			1	Command code execution completed	Correct
			2 to 31	Unusable	
0x2001	0x01	Output data 1	-	Monitor data 1	
	0x02	Output data 2	-	Monitor data 2	
	0x03	Output data 3	-	Monitor data 3	
	0x04	Output data 4	-	Monitor data 4	
	0x05	Output data 5	-	Monitor data 5	
0x2002	0x01	Output command 1	-	Response code	
	0x02	Output command 2	-	Read data	
	0x03	Output command 3	-	-	

Safety precautions

- Reserve a sufficient distance between the communication cable and power cable (power cable, power supply cable, etc.).
- Placing the communication cable and power cable close to each other or bundling these cables makes communication unstable due to noise, possibly resulting in a communication error or retry.
- For details on the installation of the communication cable, refer to EtherCAT Technology Group installation guidelines on the EtherCAT website.

EtherNet/IP

Communication specifications

Item	Specifications
Communication protocol	EtherNet/IP
Communication speed	Automatic setting (100 Mbps/10 Mbps, full duplex/half duplex)
Occupied bytes	Input: 32 bytes/output: 32 bytes
IP address	0.0.0.0 to 255.255.255.255 (Set by a parameter or DHCP)
Subnet mask	0.0.0.0 to 255.255.255.255 (Set by a parameter or DHCP)
Default gateway	0.0.0.0 to 255.255.255.255 (Set by a parameter or DHCP)
RPI (Packet interval)	2 msec to 10000 msec
Connection cable	EtherNet/IP compliant cable (CAT5e or higher twisted pair cable (double shield with aluminum tape and braid) is recommended.)
Monitor function	Present position within 1 rotation (degree, pulse), Position deviation amount, program No., Load factor, rotation speed, Point table No., torque load factor, angular acceleration, alarm, Parameters and operation mode

I/O signal

PLC → AXD (Input)

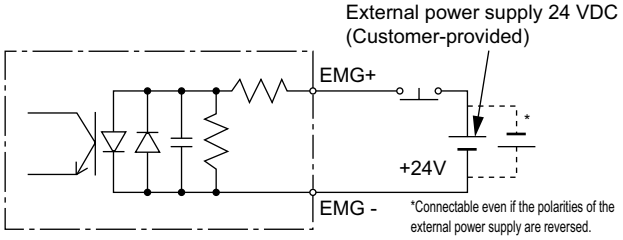
Byte	bit	Signal name	Logic	Judgment
0	0	Program No. selection input (bit 0)	Correct	Level
	1	Program No. selection input (bit 1)	Correct	Level
	2	Program No. selection input (bit 2)	Correct	Level
	3	Program No. selection input (bit 3)	Correct	Level
	4	Program No. setting 2nd digit input /Program No. selection input (Bit 4)	Correct	Edge Level
	5	Program No. setting 1st digit input /Program No. selection input (bit 5)	Correct	Edge Level
	6	Reset input	Correct	Edge
	7	Origin position return command input	Correct	Edge
1	0	Startup input	Correct	Edge
	1	Servo on input /Program stop input	Correct	Level Edge
	2	Ready return input /Continuous rotation stop input	Correct	Edge
	3	Answer input /Position deviation counter reset input	Correct	Edge Level
	4	Forced stop input	Negative	Level
	5	Brake release input	Correct	Level
	6	Job operation input (CW direction)	Correct	Level
	7	Job operation input (CCW direction)	Correct	Level
2	0	Unusable/Travel unit selection input (Bit 0)	Correct	Level
	1	Unusable/Travel unit selection input (Bit 1)	Correct	Level
	2	Unusable/Travel speed unit selection input	Correct	Level
	3	Operation by table, Operation by data input Switching input	Correct	Level
	4 to 7	Unusable		
3	-	Unusable		
4	0	Monitor output execution request	Correct	Level
	1	Command code execution request	Correct	Edge
	2 to 7	Unusable		
5	-	Unusable		
6	-	Unusable		
7	-	Unusable		
8	-	Monitor code 1		
9	-			
10	-			
11	-			
12	-	Monitor code 2		
13	-			
14	-			
15	-			
16	-	Monitor code 3		
17	-			
18	-			
19	-			
20	-	Command code		
21	-			
22	-			
23	-			
24	-	Writing data /A-code or P-code		
25	-			
26	-			
27	-			
28	-	Data settings /F code		
29	-			
30	-			
31	-			

I/O signal

AXD(Output) → PLC

Byte	bit	Signal name	Logic
0	0	M-code output (bit 0)	Correct
	1	M-code output (bit 1)	Correct
	2	M-code output (bit 2)	Correct
	3	M-code output (bit 3)	Correct
	4	M-code output (bit 4)	Correct
	5	M-code output (bit 5)	Correct
	6	M-code output (bit 6)	Correct
	7	M-code output (bit 7)	Correct
1	0	In-position output	Correct
	1	Output of positioning completion	Correct
	2	Startup input standby output	Correct
	3	Alarm output 1	Negative
	4	Alarm output 2	Negative
	5	Output 1 during indexing /Origin position output	Correct
	6	Output 2 during indexing /Servo state output	Correct
	7	Ready output	Correct
2	0	Split position strobe output	Correct
	1	M-code strobe output	Correct
	2 to 7	Unusable	
3	-	Unusable	
4	0	Monitoring	Correct
	1	Command code execution completed	Correct
	2 to 7	Unusable	
5	-	Unusable	
6	-	Unusable	
7	-	Unusable	
8	-	Monitor data 1	
9	-		
10	-		
11	-		
12	-	Monitor data 2	
13	-		
14	-		
15	-		
16	-	Monitor data 3	
17	-		
18	-		
19	-		
20	-	Response code	
21	-		
22	-		
23	-		
24	-	Read data	
25	-		
26	-		
27	-		
28	-	Unusable	
29	-		
30	-		
31	-		

TB2 Input circuit specifications (forced stop)



Rated voltage 24 V ±10%, Rated current 5 mA or less

Safety precautions

- Reserve a sufficient distance between the communication cable and power cable (power cable, power supply cable, etc.).
- Placing the communication cable and power cable close to each other or bundling these cables makes communication unstable due to noise, resulting in a communication error, Otherwise, this could lead to a communication retry.
- For details on the installation of the communication cable, refer to the EtherNet/IP installation manuals on the ODVA website.

Cable specifications

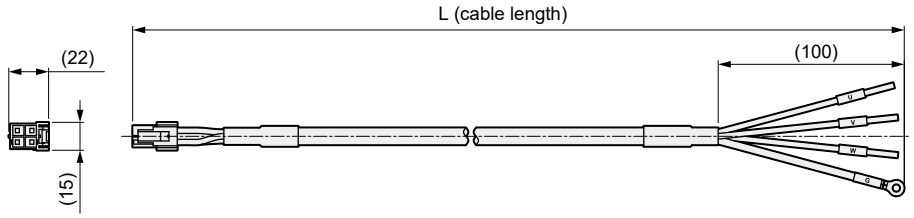
Model No.

AXP - CBLM1 - R02

❶ Cable type	
CBLM1	Power cable
CBLE1	Encoder cable

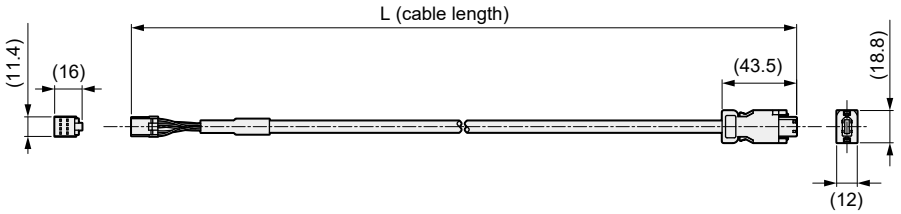
❷ Cable length	
R02	2 m
R04	4 m
R06	6 m
R08	8 m
R10	10 m
R15	15 m
R20	20 m

● Power cable



*Minimum cable bending radius: 90 mm

● Encoder cable



*Minimum cable bending radius: 60 mm

Safety precautions

- Connect the correct power cable and driver by checking the mark tube of the cable and the display of the driver.
- For applications where the cable is bent repeatedly, fix the cable sheath near the actuator body connector before use.
- For the AX2R Seriesand AX4R-009, the lead-out cable of the actuator section is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.
- When connecting the cable, fully insert the connector. Also, tighten the connector mounting screws and fixing screws securely.
- Do not modify the cable by cutting it, extending it, etc. Such modifications may cause failure or malfunction.
- For cable length L, refer to the cable length in ”How to Order”.

Related parts

Related parts

● STO-compliant cable

Used to connect to a safety relay, etc.
Safety function (STO: Safe Torque Off) turns OFF the actuator torque.

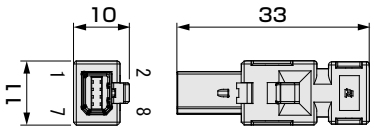
Model No.

AXP - CBLST1 - 01

Cable length	
01	1 m
02	2 m
03	3 m

● STO Compatible Connector Kit

Only the connector part of the STO-compliant cable (AXP-CBLST1) is available.

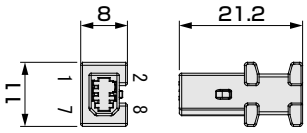


Model No.

AXP - CN - STK1

● STO Short Circuit Plug

Plug for short-circuit when not using the safety function. Included with the product when purchasing AXD.

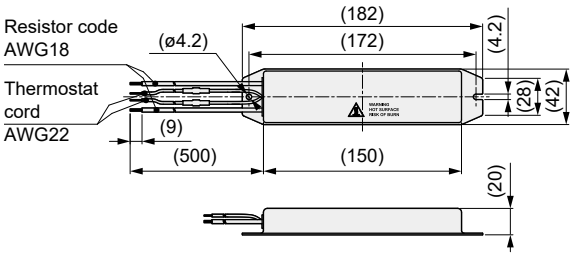


Model No.

AXP - CN - STS1

● Regenerative resistance

A supplemental Component that absorbs regenerative energy. Prevents alarm generation and driver damage due to excessive regenerative energy generation. Check the necessity with CKD model selection system.



Model No.

AXP - RR1

Related parts

● Mounting base

Compatible model No.	Model No.
AX1R-022	AXP-BS-1R022
AX1R-045	AXP-BS-1R045
AX1R-075	AXP-BS-1R075
AX1R-150	AXP-BS-1R150
AX1R-210	AXP-BS-1R210
AX2R-006	AXP-BS-2R006
AX2R-012	AXP-BS-2R012
AX2R-018	AXP-BS-2R018

Compatible model No.	Model No.
AX4R-022	AXP-BS-4R022
AX4R-045	AXP-BS-4R045
AX4R-075	AXP-BS-4R075
AX4R-150	AXP-BS-4R150
AX4R-300	AXP-BS-4R300
AX4R-500	AXP-BS-4R500
AX4R-10W	AXP-BS-4R10W

● Noise filter

Part name	Compatible model No.	Model No.	Manufacturer [Model No.]
Noise filter for power supply (three phase/ single phase 200 VAC to 240 VAC)	AXD Series	AXP-NSF-A2	Okaya Electric Industries Co., Ltd. [3SUP-EF10-ER-6]
Noise filter for power supply (single phase 250 VAC/15A)	AXD Series	AXP-NSF-A1	Soshin Electric Co., Ltd. [NF2015A-0D]
Zero phase reactor	AXD Series	AXP-NSF-ZR1	Soshin Electric Co., Ltd. [RC5060ZZ]

(*1) To make these products compliant with EU standards and CE marking or UL standards, the user is required to provide accessories such as a circuit breaker and FG clamp. Refer to the Instruction Manual for details.

● Other components

Part name	Compatible model No.	Model No.
Main power supply connector (CN4A)	AXD Series	AXP-CN-PW1
Control power supply connector (CN4B)	AXD Series	AXP-CN-PW2
Power cable connector (CN5)	AXD Series	AXP-CN-PW3
I/O connector (CN3: For Parallel I/O)	AXD Series (-NP)	AXP-CN-NP1
I/O connector (CN3: For CC-Link)	AX Series (-CL)	AXP-CN-CL1
Protection element for electromagnetic brake	AX*R Series (-EB)	AXP-EBP1

* The parts listed on this page can be purchased from CKD.

Model selection

STEP 1 Model (series) selection

Check the actuator series to be selected.

	Max. rotation speed [rpm]	Index accuracy [sec]	Repeatability [sec]
AX1R Series	240	±15	±5
AX2R Series	300	±30	±5
AX4R Series	240	±30	±5

STEP 2 Confirming operating conditions

Check the required travel angle, travel time and cycle time.

STEP 3 Confirming load conditions

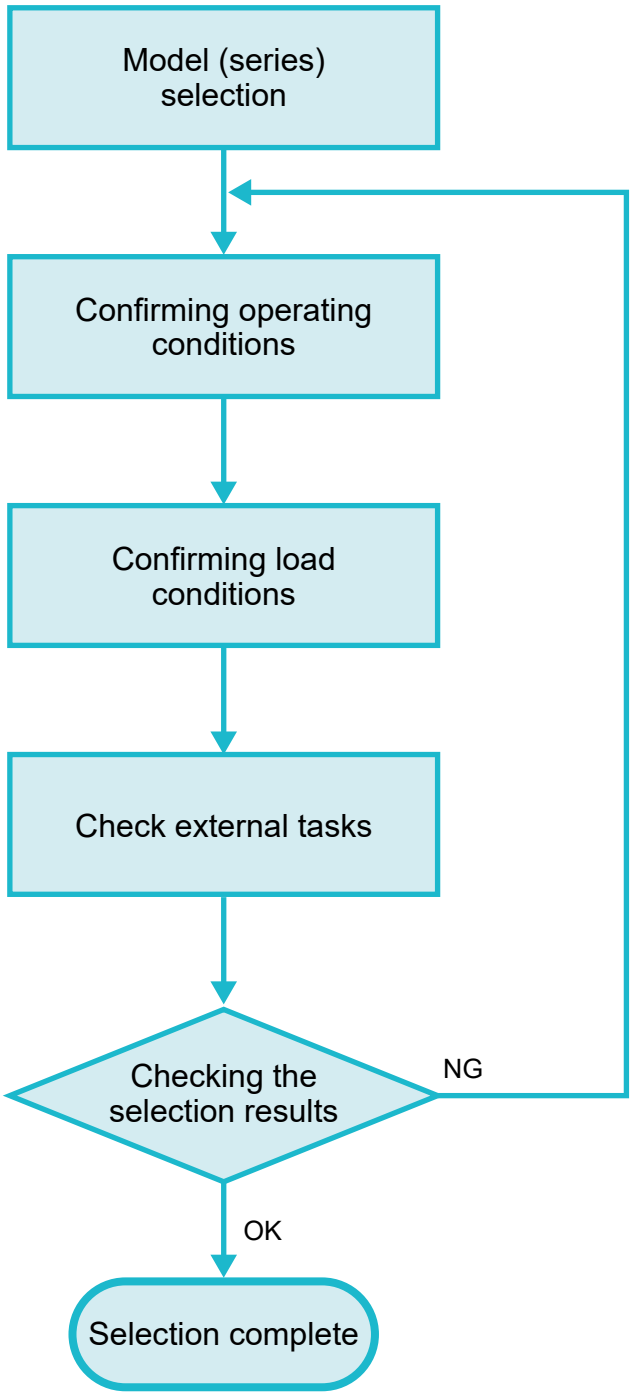
Check load conditions of table, workpiece, etc.

STEP 4 Check external tasks

When mounting the actuator vertically, check for an external load, etc., that works as the load on the output shaft.

Selection flow

Download the model selection software (Mechanical indexer/direct drive motor model selection system) from our website and select a model. If there are problems with the results of the model selection, review the operation conditions, load conditions, etc., and reconfirm the selection results.

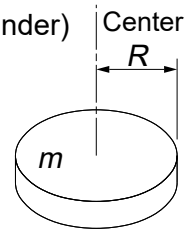


Formulas of moment of inertia

[m: Weight of body (kg)]

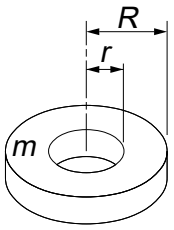
A When the center of rotation is the actuator's own axis

1. Disk (cylinder)



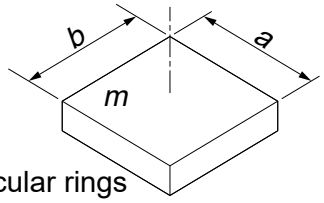
$$J = \frac{mR^2}{2}$$

2. Hollow disk (Hollow cylinder)



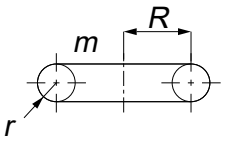
$$J = \frac{m(R^2 + r^2)}{2}$$

3. Rectangular parallelepiped



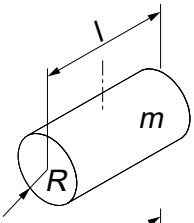
$$J = \frac{m(a^2 + b^2)}{12}$$

4. Circular rings



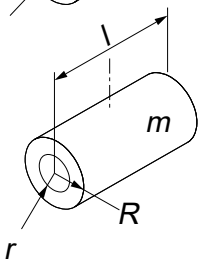
$$J = \frac{m(4R^2 + 3r^2)}{4}$$

5. Cylinder



$$J = \frac{m(3R^2 + l^2)}{12}$$

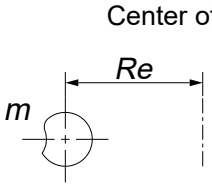
6. Hollow cylinder



$$J = \frac{m(R^2 + r^2 + l^2/3)}{4}$$

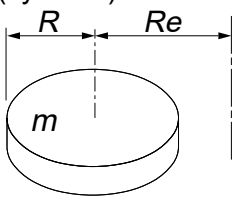
B When the center of rotation is not the actuator's own

1. Any form (when small enough)



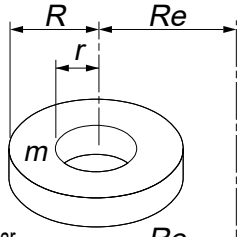
$$J = mRe^2$$

2. Disk (cylinder)



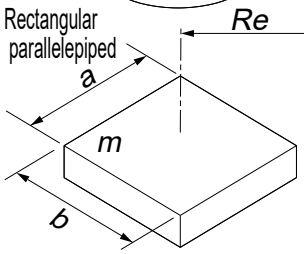
$$J = m\left(\frac{R^2}{2} + Re^2\right)$$

3. Hollow disk (Hollow cylinder)



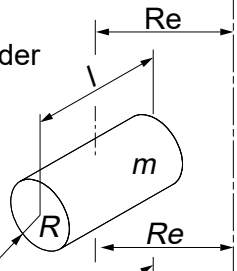
$$J = m\left(\frac{R^2 + r^2}{2} + Re^2\right)$$

4. Rectangular parallelepiped



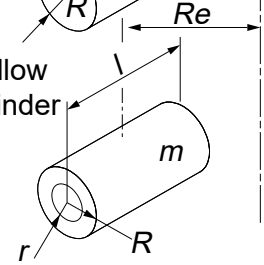
$$J = m\left(\frac{a^2 + b^2}{12} + Re^2\right)$$

5. Cylinder



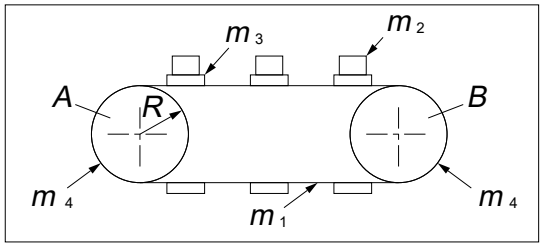
$$J = m\left(\frac{3R^2 + l^2}{12} + Re^2\right)$$

6. Hollow cylinder



$$J = m\left(\frac{R^2 + r^2 + l^2/3}{4} + Re\right.$$

For conveyor



m_1 : Chain weight
m_2 : Workpiece total weight
m_3 : Jig (pallet) total weight
m_4 : Sprocket A (drive) + B total weight
R : Sprocket radius on the drive side

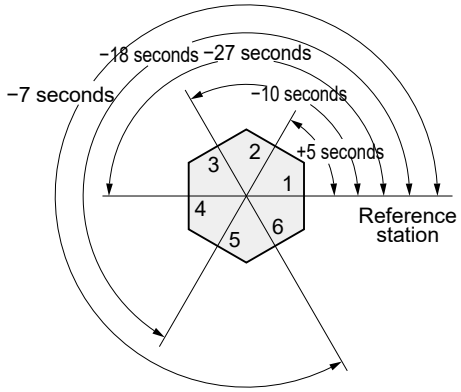
$$J = \left(m_1 + m_2 + m_3 + \frac{m_4}{2}\right) \cdot R^2$$

Glossary

Index accuracy

The ABSODEX index accuracy is the difference between the target position set by the NC program and the actual stop position. The target position is the angle (seconds) from the reference station (origin return position). Index accuracy is calculated from the maximum and minimum values of the difference between each target position and the actual stopped position as shown in the right figure. The value expresses the width in terms of ± seconds, as shown on the right. A high precision encoder is used for angular measurement.

Index accuracy measurement example



Measurement position	Measured value
1	0
2	+5 seconds
3	−10 seconds
4	−27 seconds
5	−18 seconds
6	−7 seconds

Index accuracy ±16 seconds

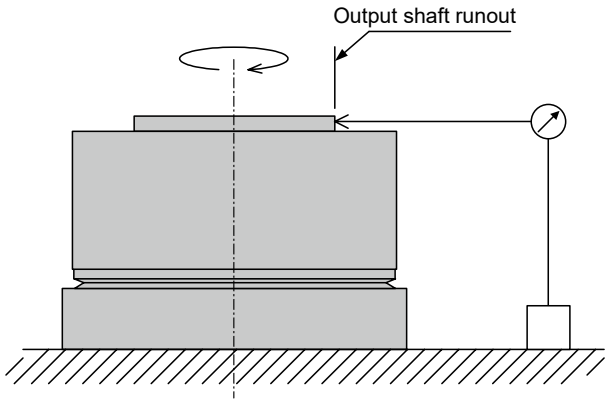
Repeatability

The repeatability expressed by angle (seconds) is the maximum value of angle irregularities of the repeat stop positions when reciprocating operation is performed for a certain target position under the same conditions. Depending on the accuracy characteristics required by the equipment, it is necessary to differentiate repeat accuracy and index accuracy.

*Angle (seconds) Unit to express angle in degrees, minutes, and seconds. 1 degree = 60 minutes = 3600 seconds

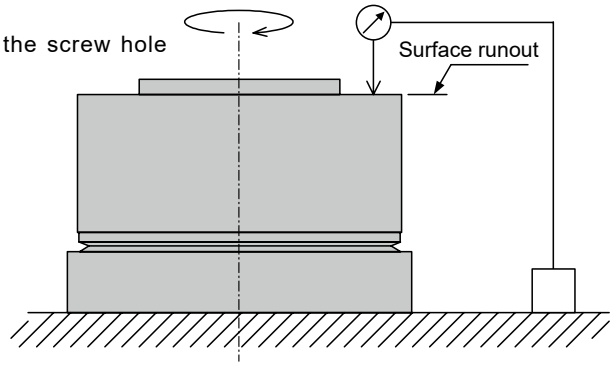
Output shaft runout

Runout accuracy of the inlay side of the table mounting part.



Output shaft surface runout

Runout accuracy of the inlay side of the table mounting surface.
*Measured at the periphery of the screw hole for mounting the table.



Safety Precautions

Always read this section before use.

When designing equipment using ABSODEX, the manufacturer is obligated to ensure that the safety of the mechanism and the system that runs by the electrical controls are secured.
It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely. Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use the product within specifications range.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use as a device or part for general-purpose industrial machinery. It is not intended for use outdoors or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency operation (cutoff, release, etc.) circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of the device design.

4 Do not remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming the safety of the system by for instance turning off the nearby devices and connected devices.
❷ Note that there may be hot or charged sections even after operation is stopped. Be careful when handling devices at the time of inspection and servicing.
❸ When inspecting or servicing the device, turn off the device and the power to the facility. Discharge any compressed air from the system, and pay close attention to possible water leakage and leakage of electricity during inspection and servicing.

5 Observe the instructions and cautions of each product to prevent accidents.

❶ When the device is off, do not turn the output shaft of the actuator to a speed exceeding 30 rpm.
The power generation of the actuator may damage the driver or may cause electrical shock.
❷ Servo off (including emergency stop and alarm) or brake off with rotational force being applied, e.g. by gravity, may cause the output shaft to rotate due to turning force.
Operate the actuator in the balanced condition so that no rotational force is applied for these operations or after safety is confirmed.
❸ Keep hands away from the output shaft, as sudden motion may take place during gain adjustments or trial run. When operating the actuator from a position in which motion cannot be confirmed, make sure that safety is assured when the output shift is rotated beforehand.
❹ The brake built-in actuators do not completely clamp the output shaft in all cases.
The built-in brake alone is not enough to secure safety when performing maintenance in applications in which the output axis may rotate due to an unbalanced load, or when the machine is stopped for an extended period of time. Be sure that the equipment is in a balanced state or provide a mechanical locking mechanism.
❺ It may take several seconds to stop in an emergency depending on rotation speed and load.

6 Observe the following precautions to prevent electric shock.

❶ The power terminals on the front side of the driver and the motor cable connection terminals are high voltage parts. For the terminal blocks, make sure to install the attached terminal cover. Do not touch the actuator and the driver while the power supply is on.
Immediately after the power is turned off, high voltage is applied, so also do not touch them for 5 minutes or more, until the electrical charge accumulated in the capacitor inside the driver is released.
❷ For operations with the side cover removed, such as maintenance and inspection or change of the switch inside the driver, make sure to turn off the actuator and release the electrical charge for 5 minutes or more before work; otherwise, an electric shock may occur from the high-voltage device.
❸ Do not attach or remove any connectors with the power supply on. Doing so may cause malfunction, failure, or electric shock.

7 Before restarting the machine and devices, confirm that measures are taken to prevent the loaded objects from being removed.

8 Install an overcurrent protector.

The wiring to the driver should be in accordance with JIS B 9960-1:2019 (IEC 60204-1:2016) Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements. Install an overcurrent protector (a circuit breaker or circuit protector for wiring) on the main power, control power, and I/O power.

(Reference: JIS B 9960-1 7.2.1 General description)
If there is a possibility the circuit current may exceed the rated value of the component or the allowable current of the conductor, an overcurrent protection must be provided. The details of the ratings or set values to be selected shall be provided in 7.2.10.

9 Observe the precautions on the following pages to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

WARNING: If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury.

CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. Every item provides important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.
Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility confirmation

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Product-specific cautions: ABSODEX AX*R/Driver AXD

Design/Selection

CAUTION

1 The actuator and driver are not waterproof. Provide waterproofing measures when using the product in an environment where it may be exposed to water or oil.

2 If chips or dusts adhere to the actuator or driver, it may cause leakage of electricity or failure. Do not allow these-types of materials to adhere to the product.

3 Repeated power ON and OFF may cause damage to the elements inside the driver.

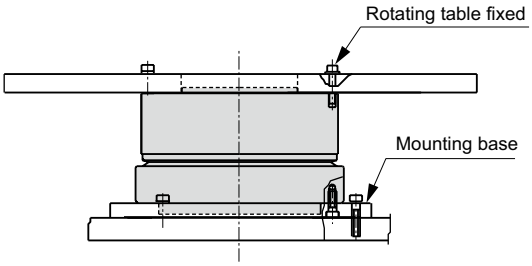
4 From the servo-ON state (holding state), when power is turned OFF or servo-OFF, the output axis may move from the holding position without external force being applied.

5 The optional electromagnetic brake is provided to increase the holding rigidity when stopping the output shaft. Do not use it to brake or stop the rotating output shaft.

6 The actuator and driver are not guaranteed to be rustproof. Give careful consideration to the storage, installation, and operating environment.

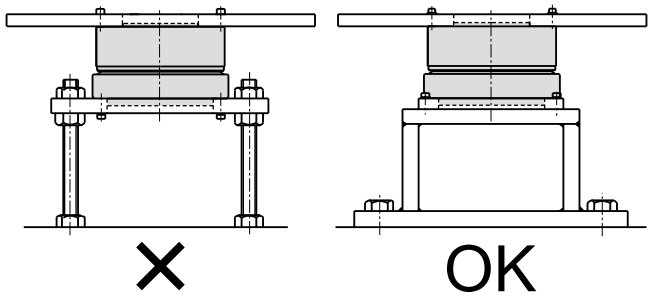
7 Machines in which ABSODEX is installed should have high rigidity to realize the full performance of ABSODEX. If the mechanical natural frequency of the load equipment or frame is relatively low (around 200 to 300 Hz or less), resonance could occur between the ABSODEX and load equipment or frame. Fix the rotary table and the mounting bolt of the main unit firmly and ensure sufficient rigidity without any looseness. [Fig. 1]

[Fig. 1] Actuator installation



In addition, gain adjustment is required due to the size of the load table. When ABSODEX cannot be directly installed in the machine, it should be installed on a frame having the highest rigidity possible. [Fig. 2]

[Fig. 2] Actuator mounting



8 When extending the output shaft, refer to the values in Table 1 as a guide for determining the diameter and length of the extended shaft. In addition, install a dummy inertia using Fig. 3 as a reference.

[Table 1] Reference for diameter of extended output shaft

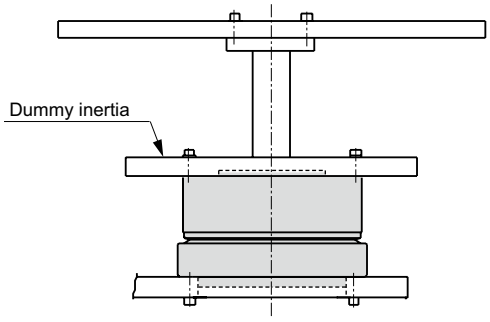
Maximum torque (N·m)	Shaft extension (mm)				
	50	100	200	300	500
6	ø35	ø40	ø46	ø50	ø60
9,12	ø40	ø46	ø55	ø60	ø70
18, 22	ø45	ø55	ø65	ø70	ø80
45	ø55	ø65	ø75	ø85	ø95
75	ø62	ø75	ø90	ø95	ø110
150	ø75	ø90	ø110	ø115	ø130
210	ø80	ø95	ø115	ø125	ø140
300	ø90	ø105	ø125	ø140	ø155
500	ø100	ø120	ø145	ø160	ø180
1000	ø120	ø140	ø170	ø185	ø210

Note: The figures in the table above are reference values for an extended output shaft constructed of steel (solid shaft). If the material of the extension shaft is different, please contact us for the standard value when using a hollow shaft.

9 If machine rigidity cannot be sufficiently attained, you can suppress the machine resonance to some degree by installing a dummy inertia as close as possible to the actuator. Examples of adding dummy inertia are shown below.

- As a reference, dummy inertia is [load inertia] × (0.2 to 1). [Fig. 3]

[Fig. 3] Dummy inertia installation example 1



Design/Selection

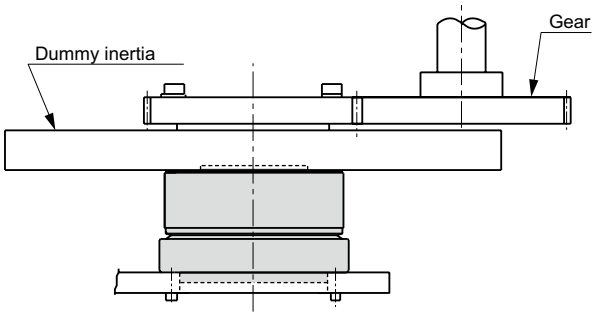
CAUTION

- When coupling with a belt, gears, or spline, or when joining with a key, dummy inertia should be [load inertia] × (0.5 to 2).

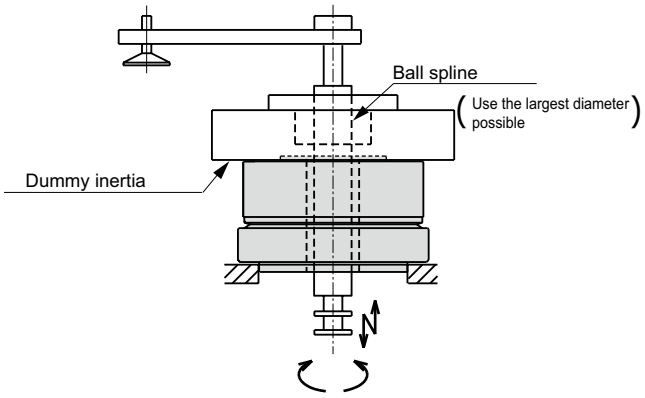
- If the speed can be changed due to belts or gears, use load inertia as the actuator output shaft conversion value, and install the dummy inertia on the actuator. [Fig. 4] [Fig. 5]

(CAUTION): Install the largest dummy inertia possible that is within the capacity range of the actuator. (Use steel with a high specific gravity.)

[Fig. 4] Dummy inertia installation example 2



[Fig. 5] Dummy inertia installation example 3



10 The ABSODEX has a built-in resolver (magnetic position detector). Do not place objects that produce strong magnetic fields, such as rare earth magnets, near the actuator. Do not pass high-current wires through the hollow hole. If you do, the full performance may not be achieved, and malfunction or fault may result.

11 If there is a possibility of components breaking down due to lightning surge, it is recommended to install a surge protector.

For other precautions, refer to the precautions in the materials below before use.

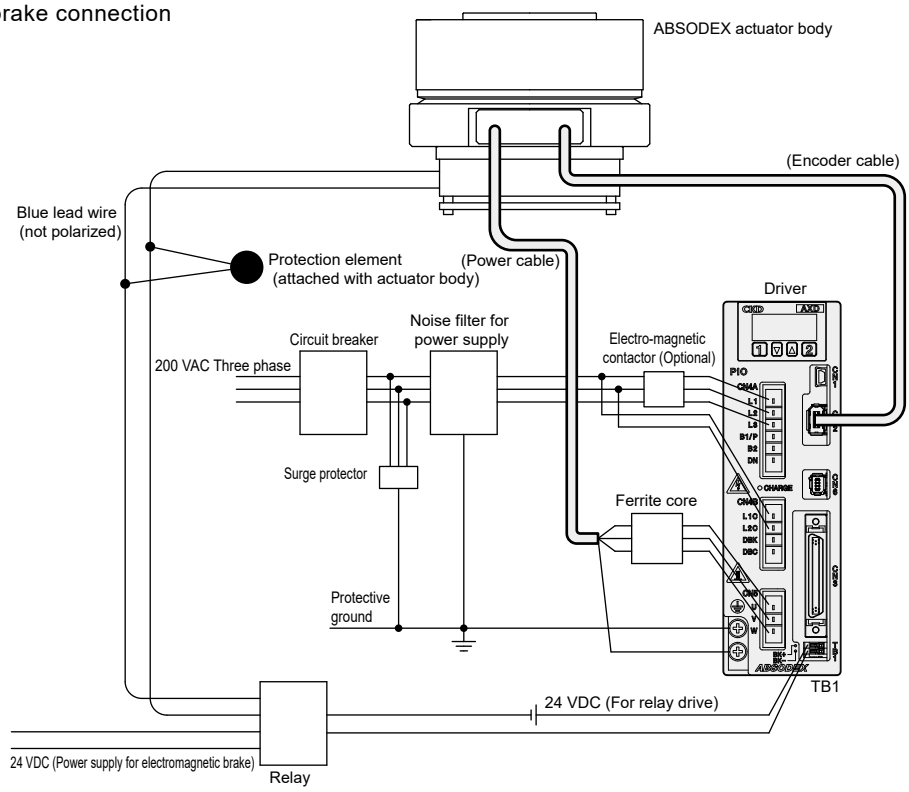
1. CKD website
   CKD Component Product Website
   https://www.ckd.co.jp/kiki/en/
   • Instruction manual

Design/Selection

CAUTION

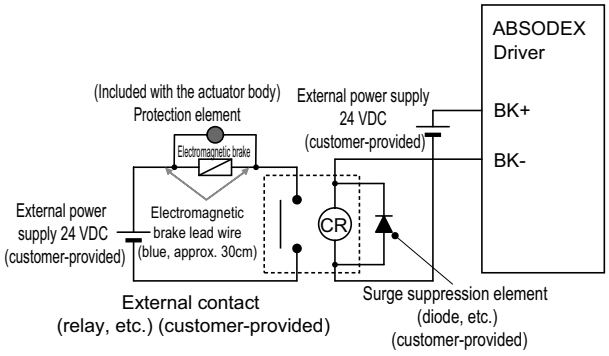
12 Electromagnetic brake connection

AX4R-EB



1) Do not use the electromagnetic brake to brake or stop the rotating output shaft.
2) Connecting the BK+ or BK- of the driver directly with the electromagnetic brake will damage the driver.
3) To connect inductive loads such as the relay shown below to the external contact, use surge countermeasures with a rated coil voltage 24 VDC of 100 mA or less.

Recommended circuit for electromagnetic brake

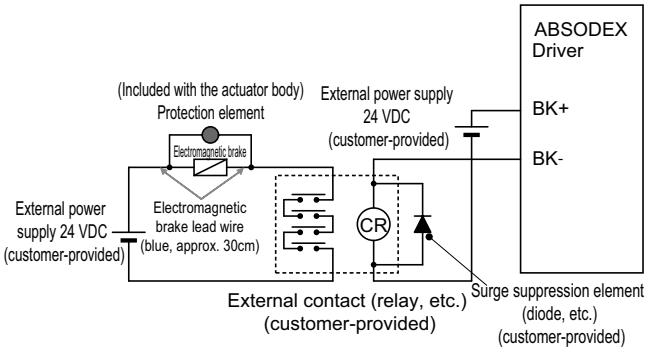


● Operation

1. Control by the NC program (M68/M69)
   When the “M68” code is executed, the current is stopped (brake activated) across BK+ and BK-, and when the “M69” code is executed, the current flows (brake released).
2. Ctrl by brake release input (I/O connector, 18 pin)
   With the brake activated, when brake release is input, the current flows (brake released) between BK+•BK and -.

● When the electromagnetic brake is operated frequently (ON-OFF times), use a solid state relays (SSR) for the external contact.
Recommended model G3NA-D210B-UTU DC5-24 (OMRON)
Read the instruction manual of SSR before use.

• For reed relay serial connection



● Use a relay with the contact capacity of 10 times or more the rated current. For relays with less capacity than the above, use a multi-polar relay for two or more relay contacts to be serially connected. Connection in this way can extend the lifetime of the contact of the relay having contacts.

13 During output shaft rotation, the electromagnetic brake disc and fixed part may cause a scraping sound. Impact noise is generated when the electromagnetic brake is activated.

14 o pass a shaft through the hollow of the model equipped with an electromagnetic brake, use a non-magnetic material (such as SUS303). If a magnetic material (such as S45C) is used, the shaft will be magnetized, causing stuck iron powder on the equipment or giving magnetic effects on peripheral devices.

15 Note that the magnetic force of the electromagnetic brake may cause stuck iron powder or effects on measuring instruments, sensors or other devices.

16 For other precautions, refer to the instruction manual (technical data).

Mounting, Installation and Adjustment

CAUTION

1 Make sure to use the dedicated cable for connecting between the actuator and driver. Do not modify the length or material of the dedicated cable, as it could cause malfunction or failure.

2 Make sure to connect the proper power supply. Connecting a non-designated power supply could cause failure. When turning ON the power supply after it has been turned OFF, check that the actuator output shaft has stopped. Wait at least 10 seconds after turning OFF the power supply.

3 Before adjusting the gain, securely install the ABSODEX in the machine and securely mount the loads such as the table. Confirm that no interference occurs and that safety is ensured when movable parts are rotated.

4 Do not tap the output shaft with a hammer or apply excessive force during assembly. Doing so could prevent the achievement of full accuracy and performance, or cause failure.

5 Do not place objects that produce strong magnetic fields, such as rare earth magnets, near the actuator. It may not be possible to maintain the original accuracy.

6 The actuator may become hot, depending on the working conditions. Provide a cover or other means to prevent the actuator from being touched.

7 The driver surface may become hot, depending on the working conditions. Place it inside the switchboard or take other measures to prevent it from being touched.

8 Do not drill holes into the actuator. Contact CKD if machining is required.

9 Please do not perform maintenance work on the actuator, the rotary table attached to the actuator or other moving parts.

10 About combining the actuator and driver
- If the actuator and driver are combined mistakenly after program input (after parameter settings are configured), alarm 3 is activated. Check the actuator and driver combination.
  (Note) Alarm 3 occurs to prevent malfunction if the actuator and driver combination differs from when the program was input. Alarm 3 is reset when the program and parameters are input again.
- If operation is started with an incorrect actuator and driver combination after the program input (after parameter settings are configured), malfunction could occur or equipment be damaged.
- Order a separate cable when the length of the cable needs to be changed.
- If a driver other than the compatible type is connected, it could cause the actuator to burn out.

11 When using a circuit breaker, select one that incorporates high-frequency measures for inverter use.

12 The position of the output shaft on the actuator dimensions does not represent the actuator's origin position. When using it at the output shaft shown in dimension drawings, the origin must be adjusted by the origin offset function.

13 The lead-out cable for the AX2R series and AX4R-009 is not movable. Make sure to secure the cable at the connector so that it does not move. Do not lift up the body by the lead-out cable or apply excessive force to the cable. Doing so may activate the malfunction alarm or cause the connector to break or become disconnected.

14 Refer to the instruction manual for other precautions and conditions of compatibility with international standards.

15 Do not pull strongly on the actuator lead-out cable or connector part, as it could cause the lead-out cable shield braid to become exposed.

Use/Maintenance

CAUTION

1 Do not pull the cable forcibly, apply excessive force to it, or damage it.

2 Do not overhaul the actuator to the original functions. In particular, taking apart the rotational position detection unit may cause malfunction or accuracy degradation.

3 When conducting a withstand voltage test on the machine with the ABSODEX installed, disconnect the main power cable to the ABSODEX driver and ensure that no voltage is applied to the driver. This may lead to failure.

4 Alarm "4" (actuator overload: load factor) must be restarted before the actuator temperature drops. Alarm "4" may be activated in the cases described below. Remove the cause before resuming use.
- Resonance or vibration: Ensure sufficient mounting rigidity.
- Tact or speed: Increase the travel time or stop time.
- When the structure constrains the output shaft, add → M68 and M69 commands.

5 The actuator coordinates are recognized after the power is turned ON. Make sure that the output shaft does not move for several seconds after the power is turned ON.

6 Refer to the instruction manual for other precautions and troubleshooting information for the alarm displays.

For other precautions, check the materials below.

1. CKD website
   https://www.ckd.co.jp/kiki/en/
   • Instruction manual

ABSODEX model selection specifications check sheet table direct drive			(Note) For chain drive or gear drive, contact CKD.
Company		Name Fax	
Department			
TEL			

■ Operating conditions

1. Indexing 2. Oscillating		
Travel angle	ψ (°)	or indexing
Travel time	t1 (s)	
Cycle tim	t0 (s)	Cycle time = travel time + stop time

(Note) Indexing time is travel time + stabilization time.
Though the stabilization time depends on working conditions, it is approximately 0.025 to 0.20 seconds.

■ Load conditions

Table

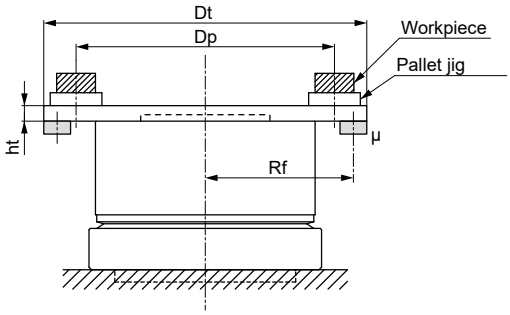
Material 1. Steel 2. Aluminum		
Shape	Dt (mm)	
Plate thickness	ht (mm)	
Weight	m1 (kg)	

Work

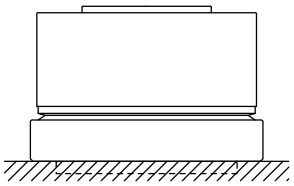
Piece quantity	nw (pc)	
Maximum weight	mw (kg/pc)	
Mounting center	Dp (mm)	

Pallet jig

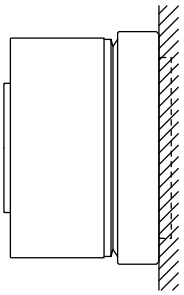
Quantity	np (pc)	
Maximum weight	mp (kg/pc)	



(Fig. 1) Load conditions



(Fig. 2) Mounting direction: Horizontal



(Fig. 3) Mounting direction: Vertical

■ Other load conditions

Mounting direction

1. Horizontal (Fig. 2) 2. Vertical (Fig. 3)

External work

1. No 2. Yes

(Note) Eccentric load due to gravity during vertical mounting, external load due to crimping work, etc.

Table bottom support

1. No 2. Yes	
Friction coefficient	μ
Radius of action	Rf (mm)

Device rigidity

1. High 2. Low (Note)

(Note) Use of spline, when unable to fix directly to equipment (Fig. 4), when there are mechanisms such as chucks on the table, etc.

Extension by table shaft

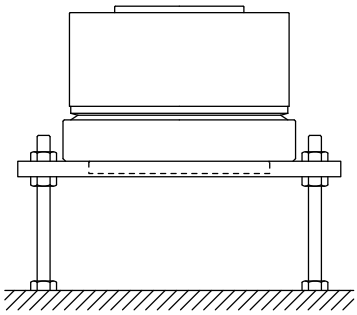
1. No 2. Yes (Fig. 5)

Actuator movement

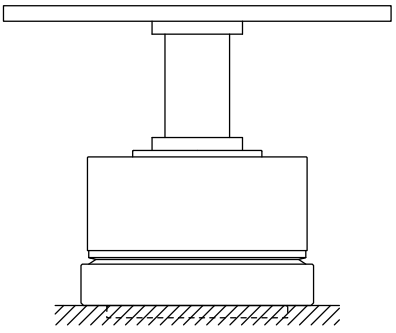
1. No 2. Yes

(Note) When the actuator is movable by mounting on an X-Y table or hoist mechanism, etc.

(Note) If selecting "2" for any items, contact CKD.



(Fig. 4) Mounting rigidity: Low



(Fig. 5) Extension by shaft

(Note) For more accurate model selection, we recommend that you attach reference drawings giving an overview of the equipment.

MEMO

Related products

■ ABSODEX

AX1000/2000/4000TS, TH

AX6000MU Series

The Direct Drive Actuator, which strives for ease of use
From palm-sized to large torques. Conveyance, positioning, and simple construction of various devices.

■ τDISC Series

The Direct Drive Servo Motor, which boasts high performance
A diverse lineup to meet various requirements such as high precision, high speed and speed stability.
Achieves one level higher performance.

NIKKI DENSO

Mechanical indexer ZRS Series

"Roller gear cam unit" that is good at high precision indexing

■ Secure positioning and high reliability

High precision positioning, and while stopped, position is securely held by a mechanical lock.

■ High motion characteristics

Smooth acceleration/deceleration operation by the cam enables high-speed and high-cycle operation.

■ Synchronous operation enabled using a general-purpose motor

Synchronized operation with multiple axes or other mechanisms is possible.

■ Two motions available

Indexing and oscillating motions can be selected.

Catalog No.CC-1601A

Related products

Rotary fitting RJF Series

Catalog No. CB-024SA

- Built-in bearing for high rigidity/low sliding resistance
- Vast lineup with 4, 6, 8, 12, 16 circuits
- Space saving types available for 12 and 16 circuits
- M5 and Rc1/8 port sizes are available.
  (Rotation speed 4/6/8)

Electric actuator ROBODEX pulse

Catalog No. RJ-014

Wide-range lineup of electric actuators with motor specifications

■ Slider	EJSG/EBS/EBR Series
■ Rod	EBR Series
■ F Series	FLCR/FGRC/FLSH/FFLD Series
■ G Series	GSSD2/GSTK/GSTG/GSTS/STL/GCKW Series
■ D Series	DSSD2/DSTK/DSTG/DSTS/STL/DMSDG/DLSH/DCKW Series

A lineup of 4 types of controllers for electric actuators

■ Multi-axis controller	ECMG Series
■ Single axis controller	ECG/ECR/ESC4 Series

Electric Actuator Motorless General Catalog

Catalog No. CB-055A

Wide-ranging lineup of motorless electric actuators

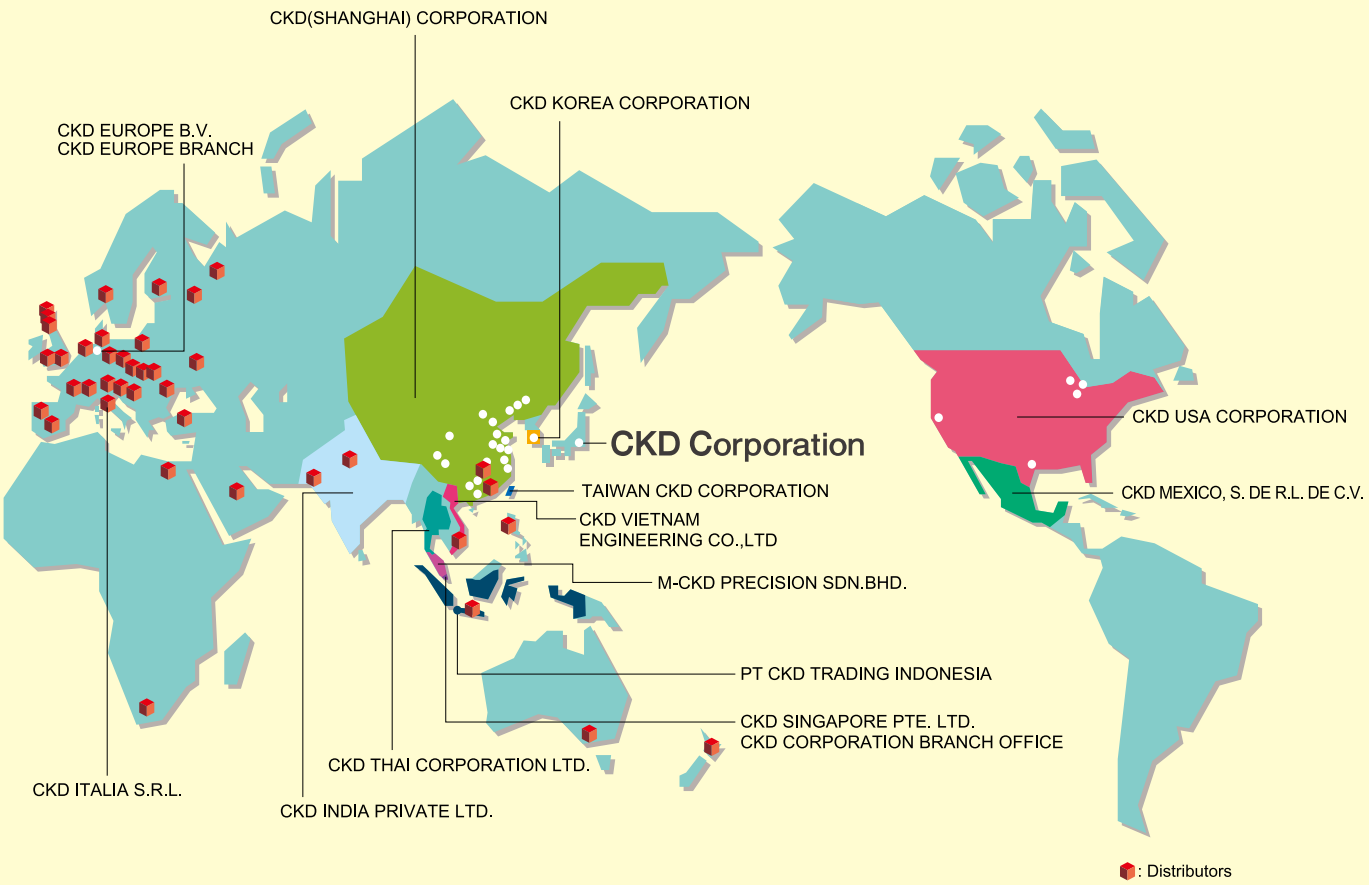
■ Slider

For high speed transport	EBS-L Series
For high load transport	ETS/ECS Series
For long stroke transport	ETV/ECV Series
For fast tact transport	EKS-L Series

■ Rod

For press fitting and hoisting	EBR-L Series

WORLD-NETWORK



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- 昆山事務所(KUNSHAN OFFICE)
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