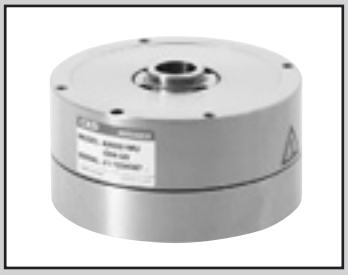


ABSODEX

AX6000M Series

Minimum size of 80 mm diameter
Compatible function allows free combination of driver, actuator, and cable

- Max. torque: 1.2, 3 N·m
- Supported driver: MU driver

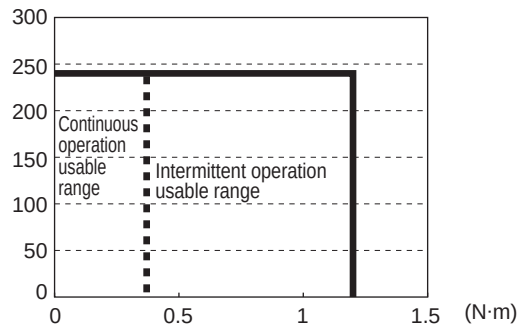
Actuator specifications

Item		AX6001M	AX6003M
Max. output torque	N·m	1.2	3.0
Continuous output torque	N·m	0.4	1.0
Max. rotation speed	rpm	240 (*1)	
Allowable axial load	N	600	
Allowable moment load	N·m	5	
Output shaft moment of inertia	kg·m^2	0.00034	0.00059
Allowable moment of load inertia	kg·m^2	0.034	0.059
Index accuracy (*3)	sec	±90	
Repeatability (*3)	sec	±10	
Output shaft friction torque	N·m	0.13	0.22
Resolution	P/rev	540672	
Motor insulation class		Class A	
Motor withstand voltage		550 VAC 1 minute	
Motor insulation resistance		10 MΩ or more 500 VDC	
Operating ambient temperature		0 to 40°C	
Operating ambient humidity		20 to 85% RH, no condensation	
Storage ambient temperature		-10 to 65°C	
Storage ambient humidity		20 to 90% RH, no condensation	
Atmosphere		No corrosive gas, explosive gas, or dust	
Weight	kg	1.2 (1.4) *2	1.8 (2.0) *2
Output shaft runout (*3)	mm	0.03	
Output shaft surface runout (*3)	mm	0.05	
Degree of protection		IP20	

*1: Use at a speed of 80 rpm or less during continuous rotation operation.
*2: The values in ( ) are the actuator weight with the mounting base option.
*3: Refer to the "Glossary" on page 52 for index accuracy, repeatability, output shaft runout and output shaft surface runout.

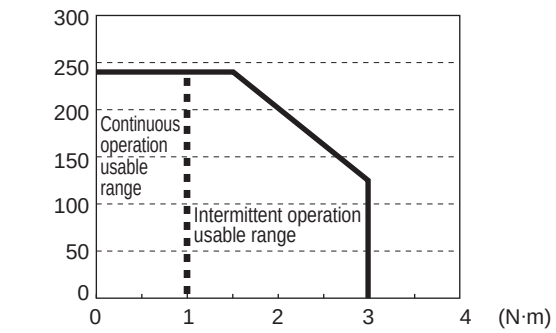
Speed/maximum torque characteristics

● AX6001M



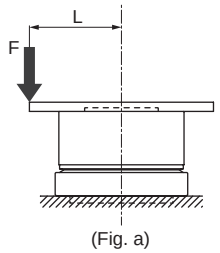
* The graph shows the characteristics when 24 VDC (ambient temperature: 25°C) is connected.

● AX6003M



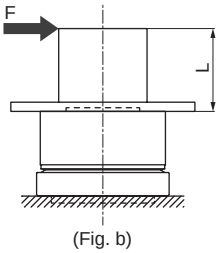
* The graph shows the characteristics when 24 VDC (ambient temperature: 25°C) is connected.

(Note) Moment load (simple formula)



(Fig. a)

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



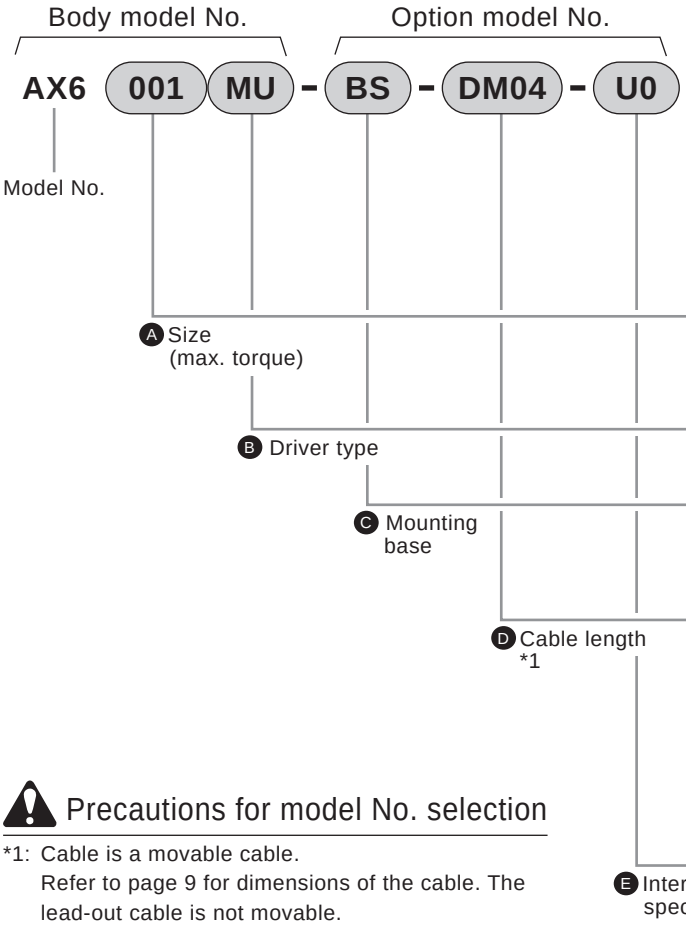
(Fig. b)

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

⚠ Always read the safety precautions on pages 61 to 66 before use.

How to order

● Set model No. (actuator, driver, cable)



Code	Description
A Size (max. torque)	
001	1.2 N·m
003	3.0 N·m
B Driver type	
MU	MU driver
C Mounting base	
Blank	Standard (without mounting base)
BS	With mounting base
D Cable length	
DM00	Without cable
DM02	2 m
DM04	4 m
DM06	6 m
DM08	8 m
DM10	10 m
E Interface specifications	
U0	Parallel I/O (NPN)
U1	Parallel I/O (PNP)

Precautions for model No. selection

*1: Cable is a movable cable.
Refer to page 9 for dimensions of the cable. The lead-out cable is not movable.
*2: C When 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.
*3: Positioning pin holes may not be surface treated.
*4: The surface part is treated with electroless nickel plating. The fixed section is made of stainless steel.

Actuator body discrete model No.

AX6 001 M – BS

A Size C Mounting base

Driver discrete model No.

AX9000MU – U0

E Interface specifications

Cable discrete model No.

• Motor cable
AX-CBLM8 – DM04

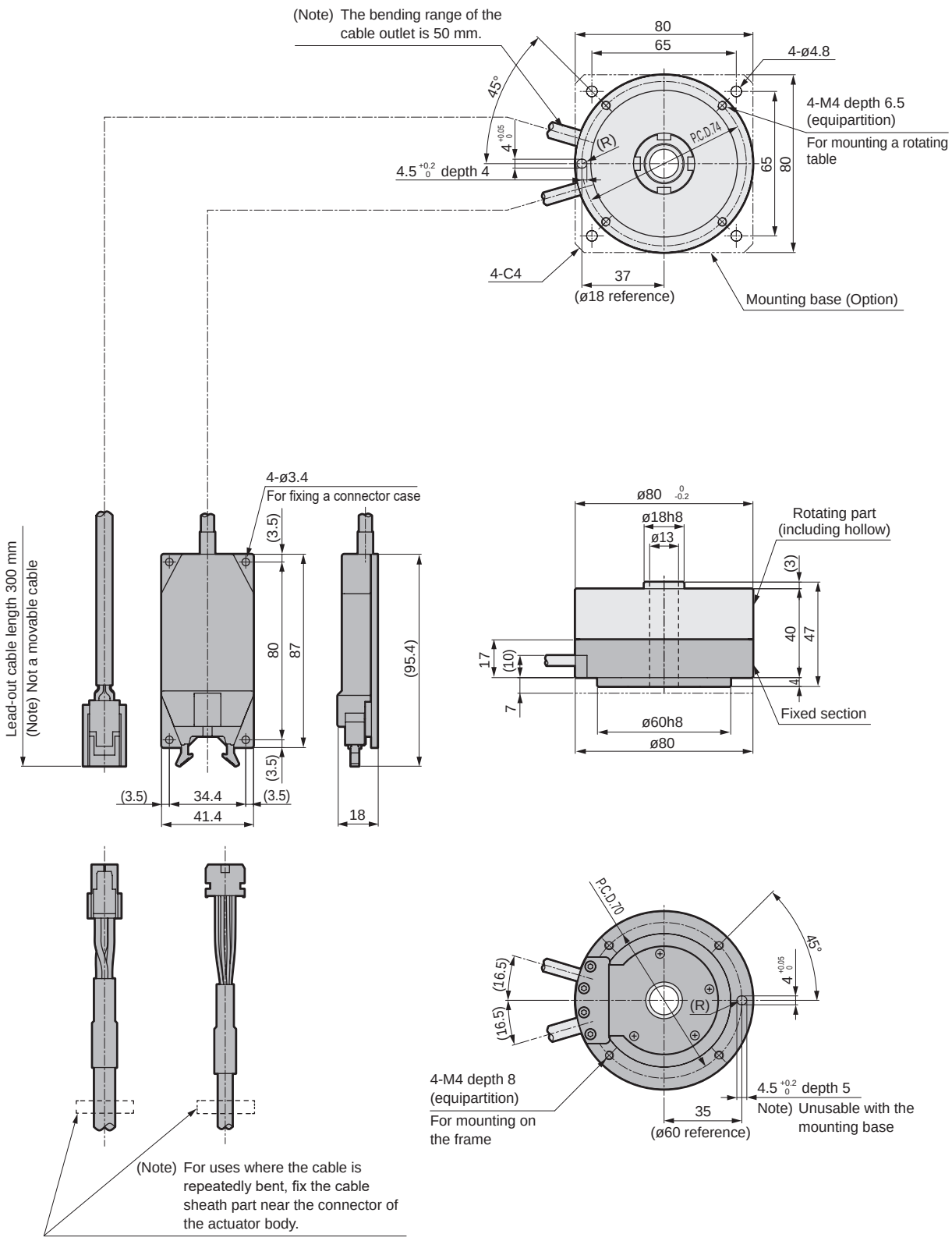
• Resolver cable
AX-CBLR8 – DM04

D Cable length
(Note: "DM04" when cable length is 4 m)

Custom order products are CE and RoHS non-compliant. Contact CKD as needed.

Dimensions

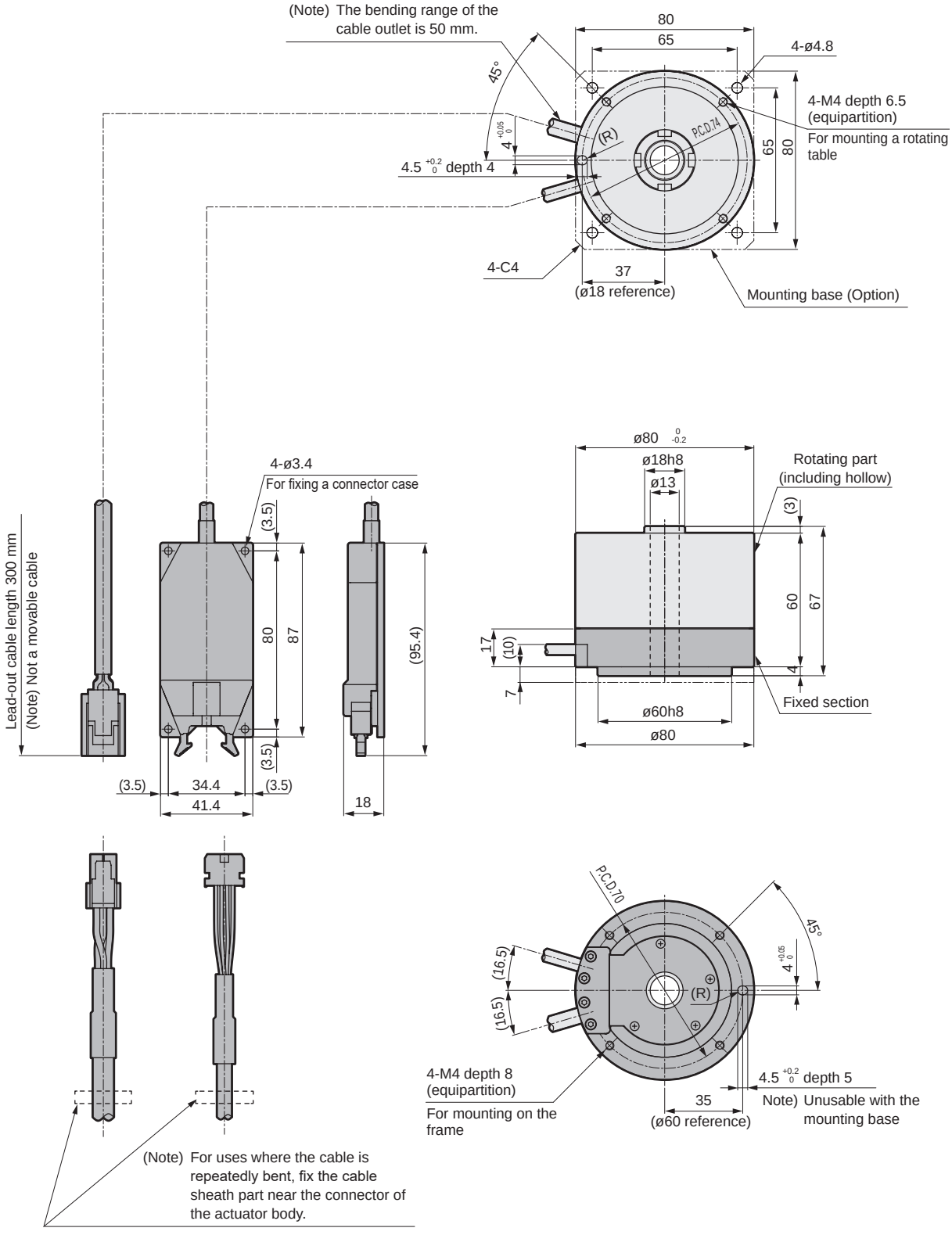
● AX6001M



*1) The origin position of the actuator may differ from that shown in the dimensions.
The origin offset function allows you to set a desired origin position.

Dimensions

● AX6003M



*1) The origin position of the actuator may differ from that shown in the dimensions.
The origin offset function allows you to set a desired origin position.

ABSODEX (AX6000M Series)

MU driver

Interface specifications: Parallel I/O (NPN)
Parallel I/O (PNP)

Features

- Ultra-compact/lighter weight (resin body adopted)
- Easy wiring with connector

How to order

AX9000MU – U0
AX9000MU – U1

Interface specifications
U0: Parallel I/O (NPN)
U1: Parallel I/O (PNP)

General specifications

Item		Model: MU driver AX9000MU
Power supply voltage	Main power supply	24 VDC ±10%
	Control power	24 VDC ±10%
Structure		Driver and controller integrated
Operating ambient temperature		0 to 50°C
Operating ambient humidity		20 to 90% RH (no condensation)
Storage ambient temperature		−10 to 65°C
Storage ambient humidity		20 to 90% RH (no condensation)
Atmosphere		No corrosive gas or dust
Anti-noise		1000 V (P-P), pulse width 1 μsec, rising, falling time 1 nsec impulse noise test, induction noise (capacitive coupling)
Vibration resistance		4.9 m/s^2
Weight		Approx. 0.5 kg
Degree of protection		IP2X

Performance specifications

Item	Description
No. of control axes	1 axis, 540,672 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/0.11 to 240 rpm
Equal divisions	1 to 255
Max. command value	7-digit numeric input ±9,999,999 pulse
Timer	0.01 sec to 99.99 sec
Programming language	NC
Programming method	Set data through RS-232C port with a PC.
Operation mode	Auto, MDI, jog, single block, servo OFF, pulse train input mode
Coordinates	Absolute, incremental
Acceleration curve	[5 types] Modified Sine (MS), Modified Constant Velocity (MC/MC2), Modified Trapezoid (MT), Trapecloid (TR)
Status display	RUN: Normal operating state
	ALM2: Alarm 2 state
	ALM1: Alarm 1 state
	SERVO: Servo state
	CHARGE: Charge state
Communication interface	RS-232C compliant
I/O signal	Refer to interface specification pages.
Program capacity	Approx. 6,000 characters (256)
Electronic thermal	Overheating protection for actuator

Power capacity

Actuator model No.	Driver model No.	Rated input current	Max. input current
AX6001M, AX6003M	AX9000MU	3.3 A	10 A

⚠ Always read the safety precautions on pages 61 to 66 before use.

Custom order products are CE and RoHS non-compliant. Contact CKD as needed.

Parallel I/O (NPN)

CN3 Input signal

Pin No.	Signal name	Logic	Determination
1 to 2	External power supply input +24 V ±10%		
3 to 4	External power supply input GND		
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 No. setting 2nd digit input/ Program No. selection input (Bit 4)	Positive	Edge Level
10	Program No. setting 1st digit input/ Program No. selection input (Bit 5)	Positive	Edge Level
11	Reset input	Positive	Edge
12	Origin return directive input	Positive	Edge
13	Start input	Positive	Edge
14	Servo on input/Program stop input	Positive	Level Edge
15	Continuous rotation stop input	Positive	Edge
16	Answer input/Position deviation counter reset input	Positive	Edge
17	Emergency 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	Imposition output	Positive
42	Positioning completion output	Positive
43	Start input wait 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	Segment 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)

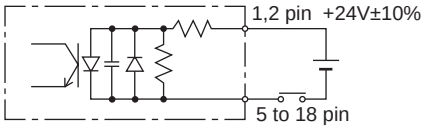
Input/output circuit specifications

Description	1 circuit current (mA)	Max. points (Circuit)	Max. current (mA)	Max. power consumption (mA)
Input circuit	4	14	56	746
Output circuit	30	18	540	
Brake output (BK+, BK−)	75	2	150	

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

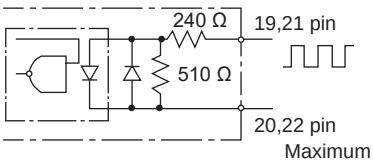
CN3 input/output circuit specifications

● Input circuit



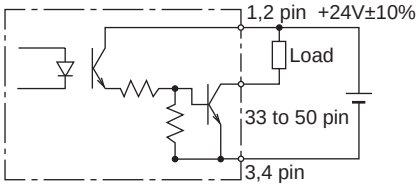
Rated voltage 24 V ±10%
Rated current 4 mA (24 VDC)

● Pulse train input circuit



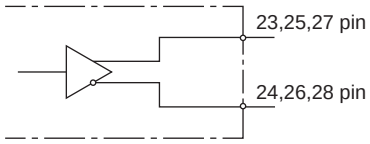
Rated voltage 5 V ±10%
Maximum input frequency
Line driver 1 Mpps
Open collector 250 Kpps

● Output circuit



Rated voltage 24 V ±10%
Rated current 30 mA (MAX)

● Encoder output circuit



Output format: Line driver
Line driver: DS26C31

Always read the safety precautions on pages 61 to 66 before use.

* Custom order products are CE and RoHS non-compliant.

MU driver

Parallel I/O (PNP)

CN3 input signal

Pin No.	Signal name	Logic	Judgment
1 to 2	External power supply input GND		
3 to 4	External power supply input +24V ±10%		
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	Continuous rotation stop input	Positive	Edge
16	Answer input/Position deviation counter reset input	Positive	Edge
17	Emergency 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)

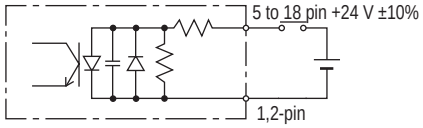
I/O circuit specifications

Description	1 circuit current (mA)	Max. number of points (Circuit)	Max. current (mA)	Max. current consumption (mA)
Input circuit	4	14	56	746
Output circuit	30	18	540	
Brake output (BK+, BK-)	75	2	150	

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

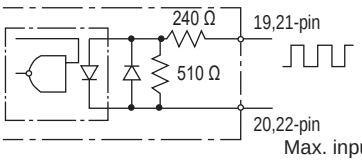
CN3 I/O circuit specifications

● Input circuit



Rated voltage: 24 V ±10%
Rated current: 4 mA (at 24 VDC)

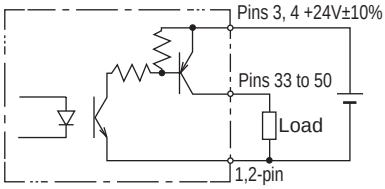
● Pulse train input circuit



Rated voltage: 5 V ±10%

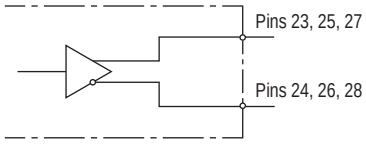
Max. input frequency
Line driver: 1 Mpps
Open collector: 250 Kpps

● Output circuit



Rated voltage: 24 V ±10%
Rated current: 50 mA (max.)

● Encoder output circuit



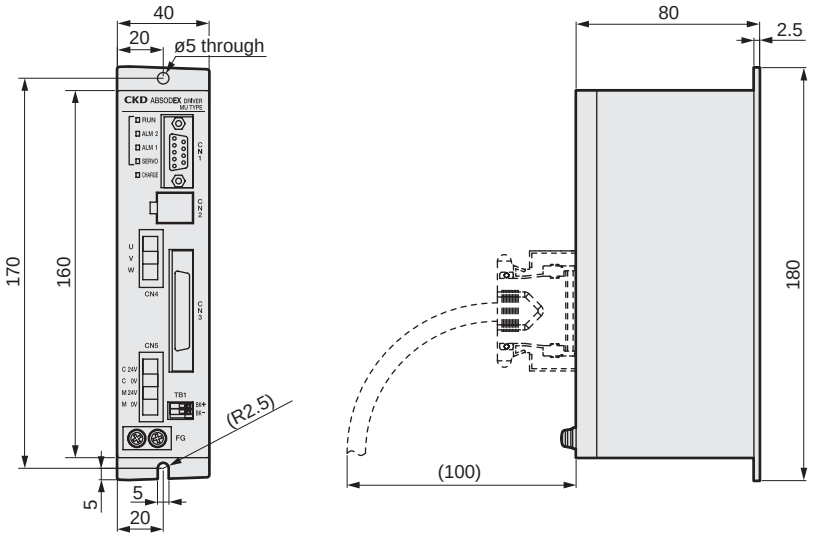
Output format: Line driver
Line driver used: DS26C31

Driver accessory

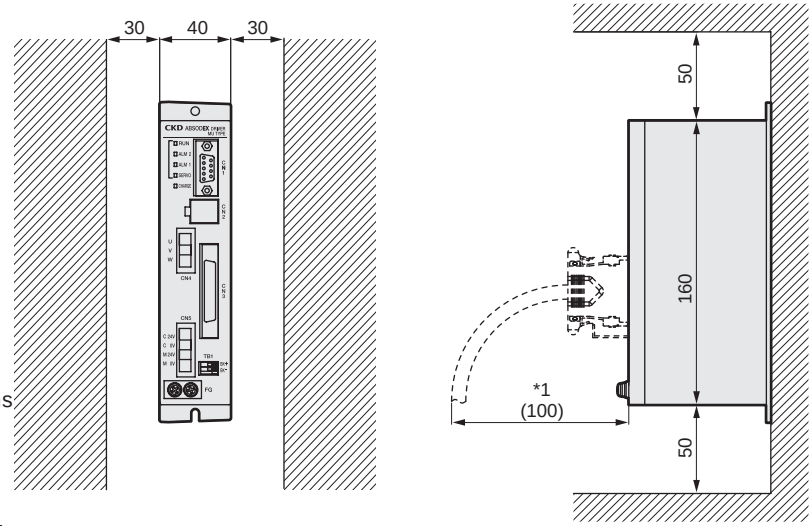
Model No.	Specifications	CN3 connector	CN5 connector
AX9000MU-U0	Parallel I/O (NPN)	10150-3000PE (plug) 10350-52A0-008 (shell) Sumitomo 3M	Power supply connector 04JFAT-SBXGGKS-A Open tool J-FAT-OT J.S.T. Mfg. Co., Ltd.
AX9000MU-U1	Parallel I/O (PNP)		

When ordering additional parts, refer to "How to order".

Dimensions



Installation Dimensions



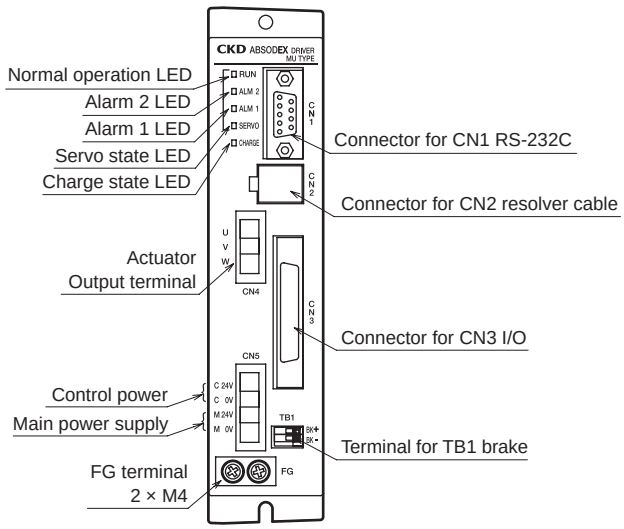
*1) Determine the dimensions with extra allowance according to the cable you want to use.

Safety precautions

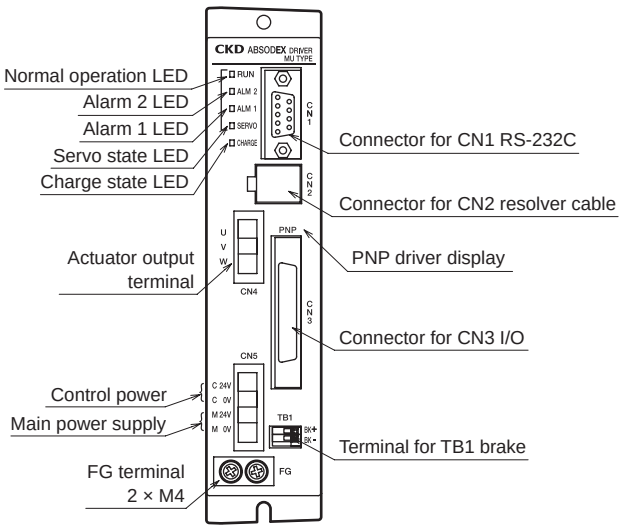
- The ABSODEX driver does not have a dust-proof/waterproof structure. To prevent dust, water, oil or other substances from entering the driver, provide protection according to the working environment.
- Install the ABSODEX driver away from other devices, walls or other structures by 50 mm or more from both top and bottom and 30 mm or more from sides. When heat is generated from other drivers or devices, check that the ambient temperature does not exceed 50°C.

Panel Details

● Parallel I/O (NPN)

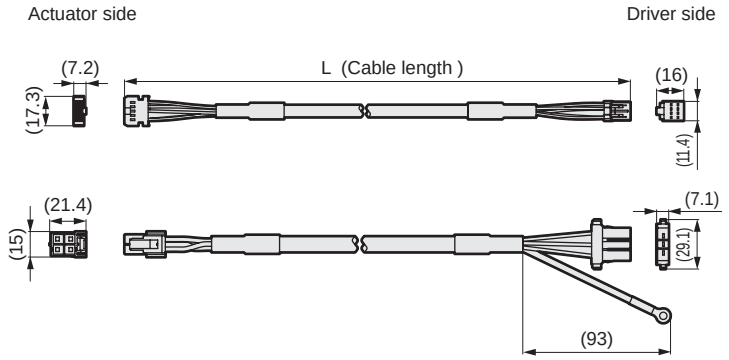


● Parallel I/O (PNP)



Cable Specifications

Cable dimensions



Product name/model No.	Cable's min. bending radius
Resolver cable AX-CBLR8-DM□□ (*1)	60 mm
Motor cable AX-CBLM8-DM□□ (*1)	90 mm

*1) □□ indicates the cable length.

Safety precautions

- For uses in which the cable is repeatedly bent, fix the cable sheath part near the connector of the actuator body.
- The lead-out cable of the actuator section is not movable. Make sure to fix the cable in the connector section to prevent the cable from moving. Do not pull the lead-out cable to lift the unit or apply excessive force to the cable. Otherwise, malfunction, sounding of an alarm, damage of the connector part, or disconnection may result.
- When connecting the cable, fully insert the connector. Also, tighten the connector mounting screws and fix screws securely.
- Do not modify the cable, including disconnection or extension. Such modification may cause failure or malfunction.
- For the cable length L, refer to the cable length shown in the How to order.