Document No.:	SX-DSV03724
Revision No.:	2.0
Date of Issue:	February 1, 2024
Classification:	☐ New ■ Change

SPECIFICATIONS

Product Name: AC Servo Driver

Product Series Name: MINAS A6B Series for Rotary motor

Product Model Number: Sensor Direct type (Displacement Control)

Motion Control Business Unit, Industrial Device Business Division
Panasonic Industry Co., Ltd.
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If you have any questions, please contact the sales office or distributor of the product.

Panasonic

REVISIONS

Date	Rev.	Page	Description	Signed
Feb. 10, 2023	0.0	—	NEWLY ISSUED	—
Apr. 5, 2023	1.0	P43	Removed pin no.23 from table in 7.5.6	—
Feb. 1, 2024	2.0	P6 to P14	Changed product number of X7 analog monitor connector	—
		P46	Changed the connector and terminal product number of the X7 connector cable	
		P77 to P79	Added Compliance with EN61800-5-1:2007/A11:2021	
		P85	Added text to “Load protection and overheating protection” column	
		P99	Corrected typo regarding maximum output current (MGDLTC3BU)	
		Appendix	Updated default parameters	

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Appendix List of Default Parameters and Objects

1 Scope of Application

This specification relates to the MINAS A6B Series for Rotary motor of AC Servo Drivers manufactured by Motion Control Business Unit, Industrial Device Business Division, Panasonic Industry Co., Ltd.

This product is intended for use as industrial equipment. It must not be used for any other purpose (e.g., for home use).

■ Related Materials

Technical Reference Document - Basic Function Specifications -	:	SX-DSV03728
Technical Reference Document - EtherCAT Communication Specification -	:	SX-DSV03729

* Please refer to the Panasonic website for the above documents.

■ EtherCAT Overview

EtherCAT stands for Ethernet for Control Automation Technology, an open network communication technology that uses real-time Ethernet to communicate between master and slave devices, developed by Beckhoff Automation GmbH and managed by the EtherCAT Technology Group (ETG).

EtherCAT® is registered trademark and patented technology,
licensed by Beckhoff Automation GmbH, Germany.

■ Precautions

1 Reproduction of the contents of this document in whole or in part is strictly prohibited.

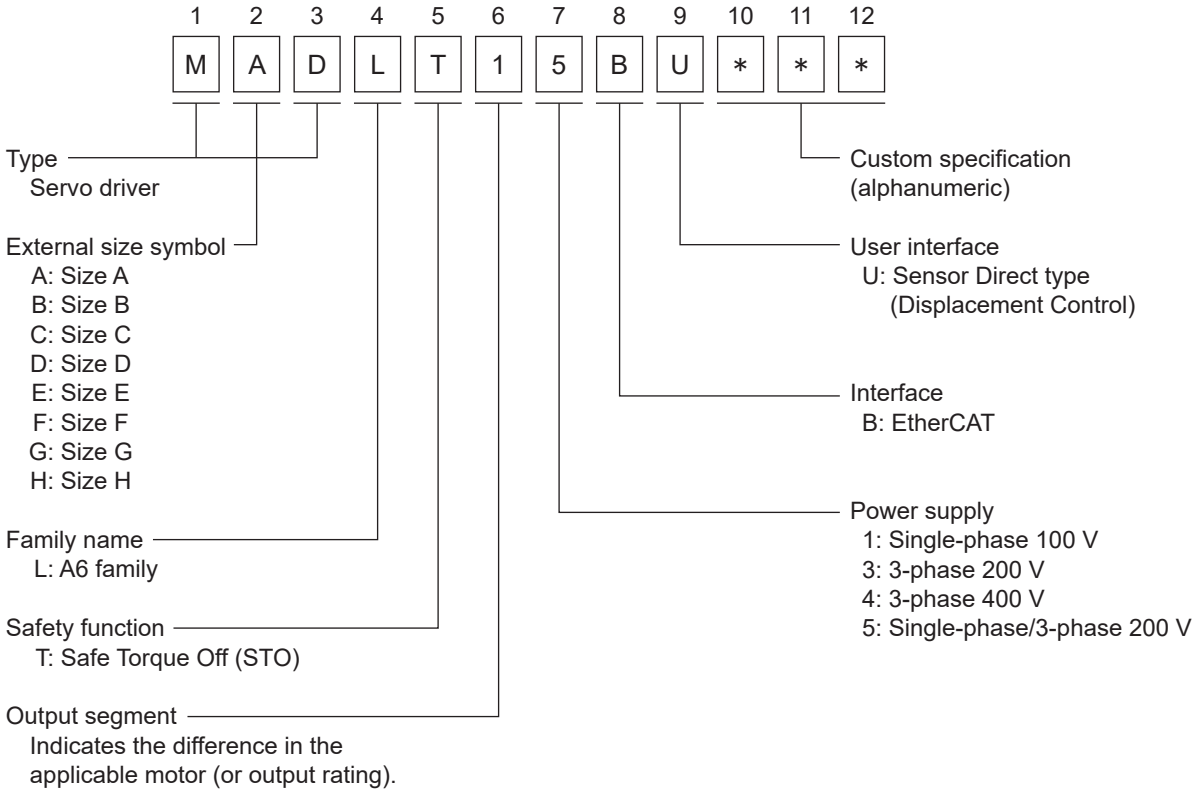
2 Due to product improvements, this document is subject to change without notice.

3 This product may be upgraded, including revisions to specifications from the ETG.
Please note that we are not responsible for labor and costs associated with the version upgrade.

4 This product makes use of open-source software (OSS).
Please refer to the technical documentation for details.
Your company may also have an obligation to use OSS, so please take appropriate measures at your company.

2 How to Read Product Numbers

Product numbers are to be read as follows:



3 Product Line-up

3.1 Sensor Direct type(Displacement Control)

Product number	Product Code (*1)	Size symbol	Power supply input	Rated output of applicable motor
MADLT01BU	61780000	A	Single-phase AC100-120 V	Max 50 W
MADLT11BU	61780001			Max 100 W
MADLT05BU	61780004		Single-phase or 3-phase AC200-240 V	Max 100 W
MADLT15BU	61780005			Max 200 W
MBDLT21BU	61780002	B	Single-phase AC100-120 V	Max 200 W
MBDLT25BU	61780006		Single-phase or 3-phase AC200-240 V	Max 400 W
MCDLT31BU	61780003	C	Single-phase AC100-120 V	Max 400 W
MCDLT35BU	61780007		Single-phase or 3-phase AC200-240 V	Max 750 W
MDDLT45BU	61780008	D	Single-phase or 3-phase AC200-240 V	Max 1000 W
MDDLT55BU	61780009			Max 1500 W
MEDLT83BU	6178000A	E	3-phase AC200-240 V	Max 2000 W
MEDLT93BU	6178000B			Max 2400 W
MFDLTA3BU	6178000C	F	3-phase AC200-240 V	Max 3000 W
MFDLTB3BU	6178000D			Max 5000 W
MGDLTC3BU	6178000E	G	3-phase AC200-240 V	Max 7500 W
MHDLTE3BU	6178000F	H	3-phase AC200-240 V	Max 15000 W
MHDLTF3BU	61780010			Max 22000 W
MDDLT44BU	61780011	D	3-phase 380Y/220-480Y/277 V (*2)	Max 600 W
MDDLT54BU	61780012			Max 1000 W
MDDLT64BU	61780013			Max 1500 W
MEDLT84BU	61780014	E	3-phase 380Y/220-480Y/277 V (*2)	Max 2000 W
MFDLTA4BU	61780016	F	3-phase 380Y/220-480Y/277 V (*2)	Max 3000 W
MFDLTB4BU	61780017			Max 5000 W

*1 This is the product code for our servo driver listed in the ESI file. (hexadecimal notation)

*2 TN (ground the neutral point to earth)

* Some motors may not be used with the combinations shown in this table. For details on servo driver and motor combinations, refer to the MINAS A6 Series catalog.

* All motors with input power 400 V drivers and some motors with input power 200 V drivers use a Chinese-made rare earth magnet.

  The patent licensor has imposed certain restrictions on the regions in which these magnets can be distributed.

  To avoid infringement of the licensing terms, do not carry the motor into Japan or into another country via Japan,either by itself or as part of set.

4 Specifications

Item				Description
Input power supply	100 V type	Main circuit power supply		Single-phase 100–120 V, -15% to +10%, 50/60 Hz
		Control circuit power supply		Single-phase 100–120 V, -15% to +10%, 50/60 Hz
	200 V type	Main circuit power supply	Sizes A–D	Single-phase/3-phase 200–240 V, -15% to +10%, 50/60 Hz
			Sizes E–H	3-phase 200–240 V, -15% to +10%, 50/60 Hz
		Control circuit power supply	Sizes A–D	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
			Sizes E–H	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
	400 V type	Main circuit power supply		3-phase 380Y/220-480Y/277 V, -15% to +10%, 50/60 Hz TN (ground the neutral point to earth)
		Control circuit power supply		DC 24 V, ±15 %
Ambient operating conditions		Temperature		Operating temperature: 0–55°C (no freezing) Storage temperature: –20°C to 65°C (Max. temperature guarantee: 80°C, 72 hours, no condensation (*1))
		Humidity		Operating/storage humidity: 20–85% RH or less (no condensation (*1))
		Elevation		1,000 m or less above sea level
		Vibration		5.88 m/s^2 or less, 10–60 Hz
		Pollution degree		Pollution degree 2
Insulation voltage resistance				Withstanding AC 1,500 V between primary and ground for 1 minute
Control method				IGBT PWM method, sinusoidal drive
Encoder feedback				23-bit (8388608 resolution), 7-wire serial absolute encoder
External scale feedback				A/B phase, homing signal differential input type Panasonic supported serial communication type (*2)
Control signal		Input		8 general inputs Select general input function based on parameters
		Output		3 general outputs Select general output function based on parameters
Analog signal		Input		1 inputs
		Output		2 outputs (analog monitor 1, analog monitor 2)
Pulse signal		Output		2 outputs Line driver output for encoder pulses (A/B phase signals)
Communication function		EtherCAT		Real-time operation command transmission, parameter setting, status monitoring, etc.
		USB		Connect to a computer for parameter setting or status monitoring, etc.
Safety terminal				Connector for functional safety
Front panel				(1) Rotary switch (2) 2-digit, 7-segment LED and 4 lights for status display (3) Analog monitor connector
Regeneration				Sizes A, B, G, H: No built-in regenerative resistor (external only) Sizes C–F: Built-in regenerative resistor (external also possible)
Dynamic brake				Sizes A–G: Built-in / Size H: External only

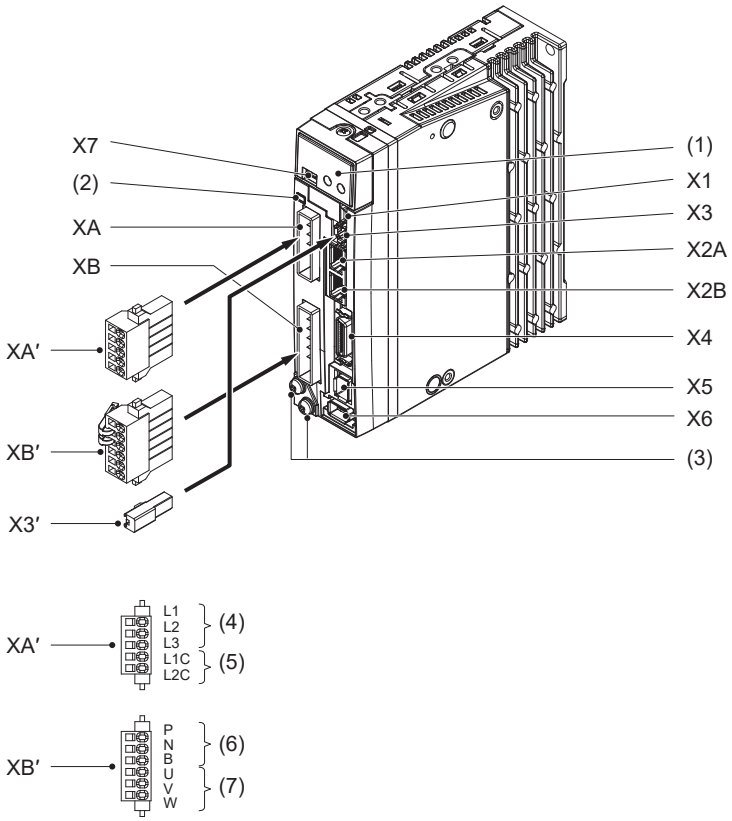
Item	Description
Control mode	Position control: profile position control (pp), cyclic position control (csp), home return position control (hm) Velocity control: profile velocity control (pv), cyclic velocity control (csv) Torque control: profile torque control (tq), cyclic torque control (cst) It is possible to switch between the above control modes using EtherCAT communication commands

*1 Please note that condensation tends occur when the temperature drops.

*2 Please refer to the collaboration catalog for the corresponding scale manufacturer and part number.

5 Appearance and Part Names

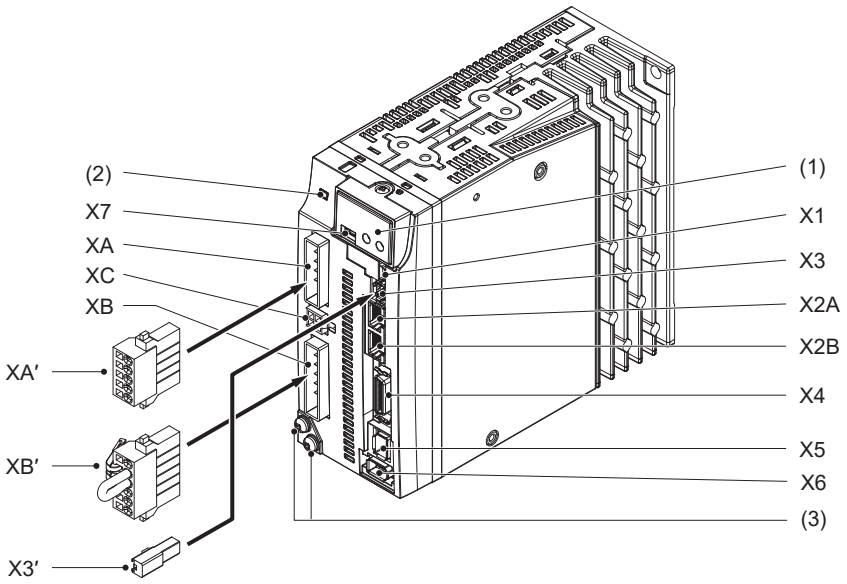
5.1 Size A, B 100 V/200 V

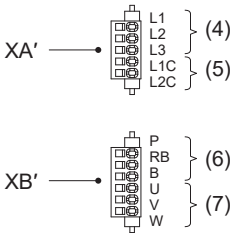


X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XA	Power supply input connector S05B-F32SK-GGXR (JST) equivalent	XA′	Power supply input connector 05JFAT-SAXGGKK-A (JST) equivalent
XB	Motor output connector S06B-F32SK-GGXR (JST) equivalent	XB′	Motor output connector 06JFAT-SAXGGKK-A (JST) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Main power supply input
(5)	Control power supply input	(6)	Regenerative resistor connection
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

5.2 Size C, D 100 V/200 V

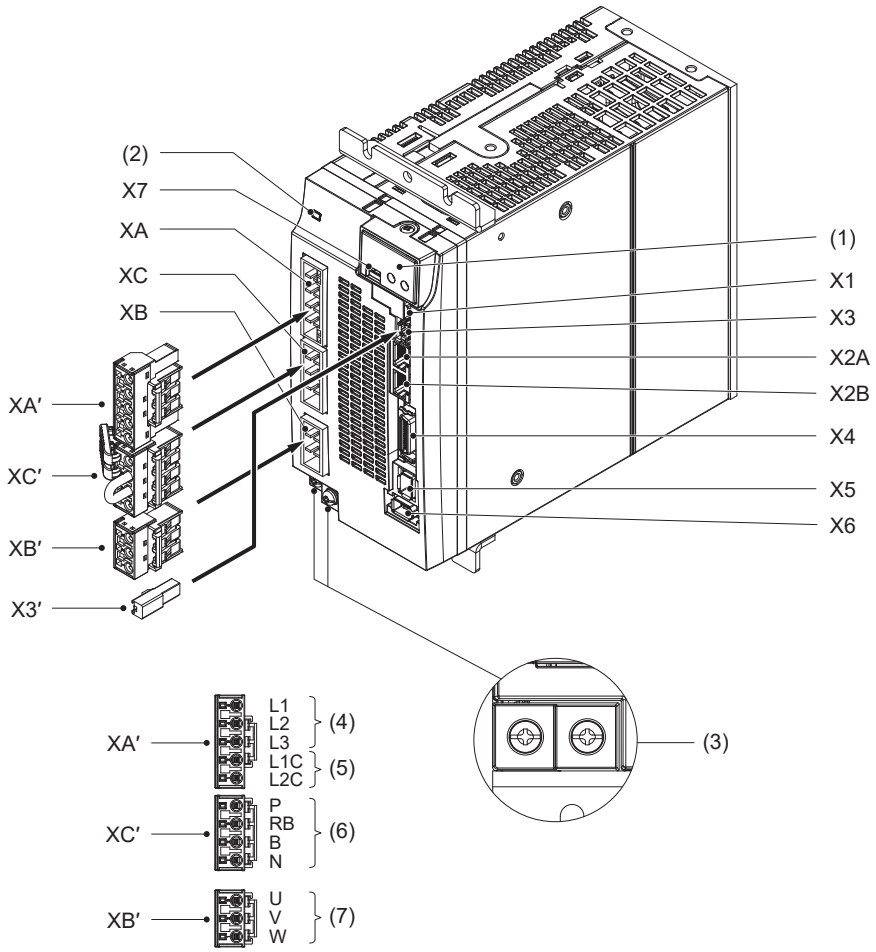




X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XA	Power supply input connector S05B-F32SK-GGXR (JST) equivalent	XA′	Power supply input connector 05JFAT-SAXGGKK-A (JST) equivalent
XB	Motor output connector S06B-F32SK-GGXR (JST) equivalent	XB′	Motor output connector 06JFAT-SAXGGKK-A (JST) equivalent
XC	Manufacturer use (do not connect anything to this connector)	(1)	Front panel
(2)	Charge lamp	(3)	Earth connection screw
(4)	Main power supply input	(5)	Control power supply input
(6)	Regenerative resistor connection	(7)	Motor output

* Remove the safety bypass plug when wiring to X3.

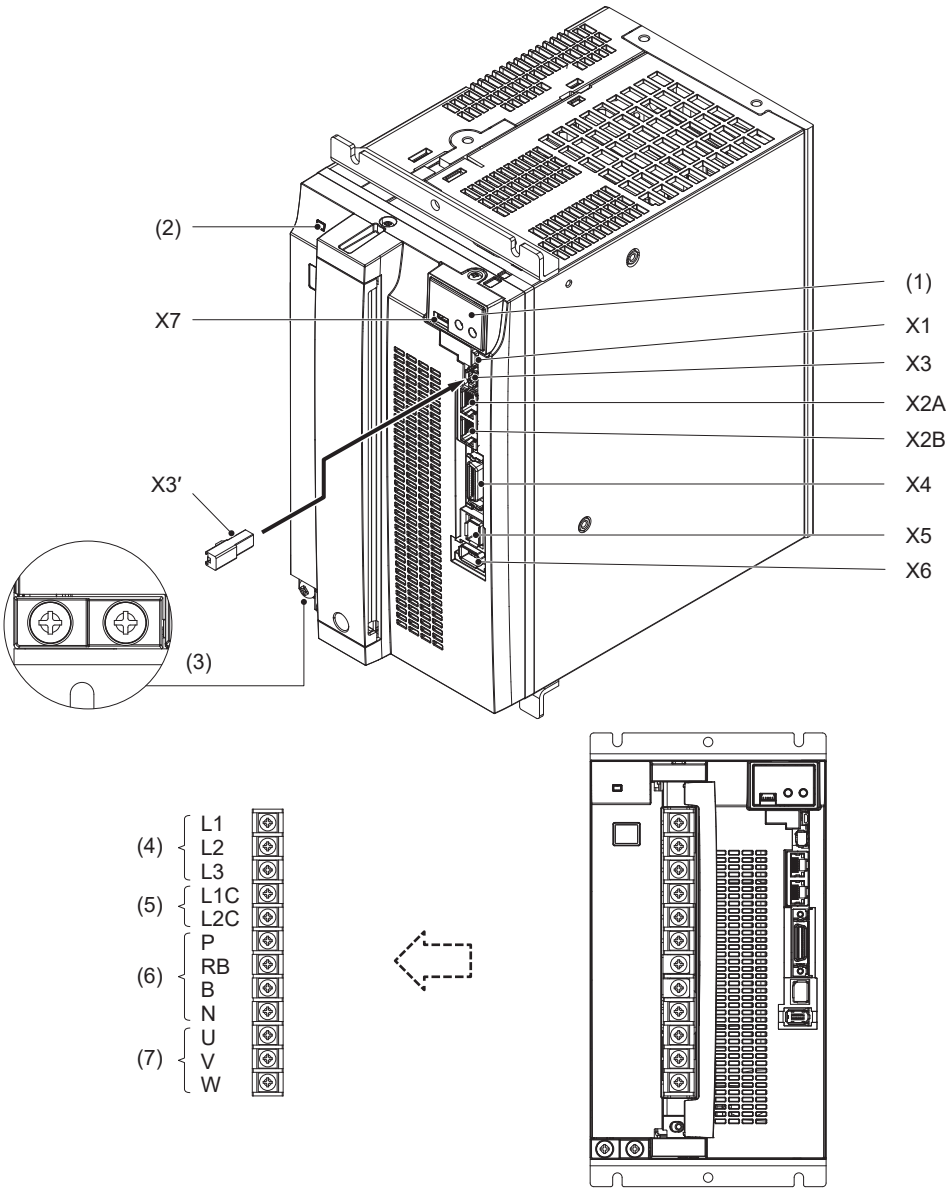
5.3 Size E 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XA	Power supply input connector S05B-JTSLSK-GSANXR (JST) equivalent	XA′	Power supply input connector 05JFAT-SAXGSA-L (JST) equivalent
XB	Motor output connector S03B-JTSLSK-GSANXR (JST) equivalent	XB′	Motor output connector 03JFAT-SAXGSA-L (JST) equivalent
XC	Regenerative resistor connector S04B-JTSLSK-GSANXR (JST) equivalent	XC′	Regenerative resistor connector 04JFAT-SAXGSA-L (JST) equivalent
(1)	Power input connector	(2)	Charge lamp
(3)	Earth connection screw	(4)	Main power supply input
(5)	Control power supply input	(6)	Regenerative resistor connection
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

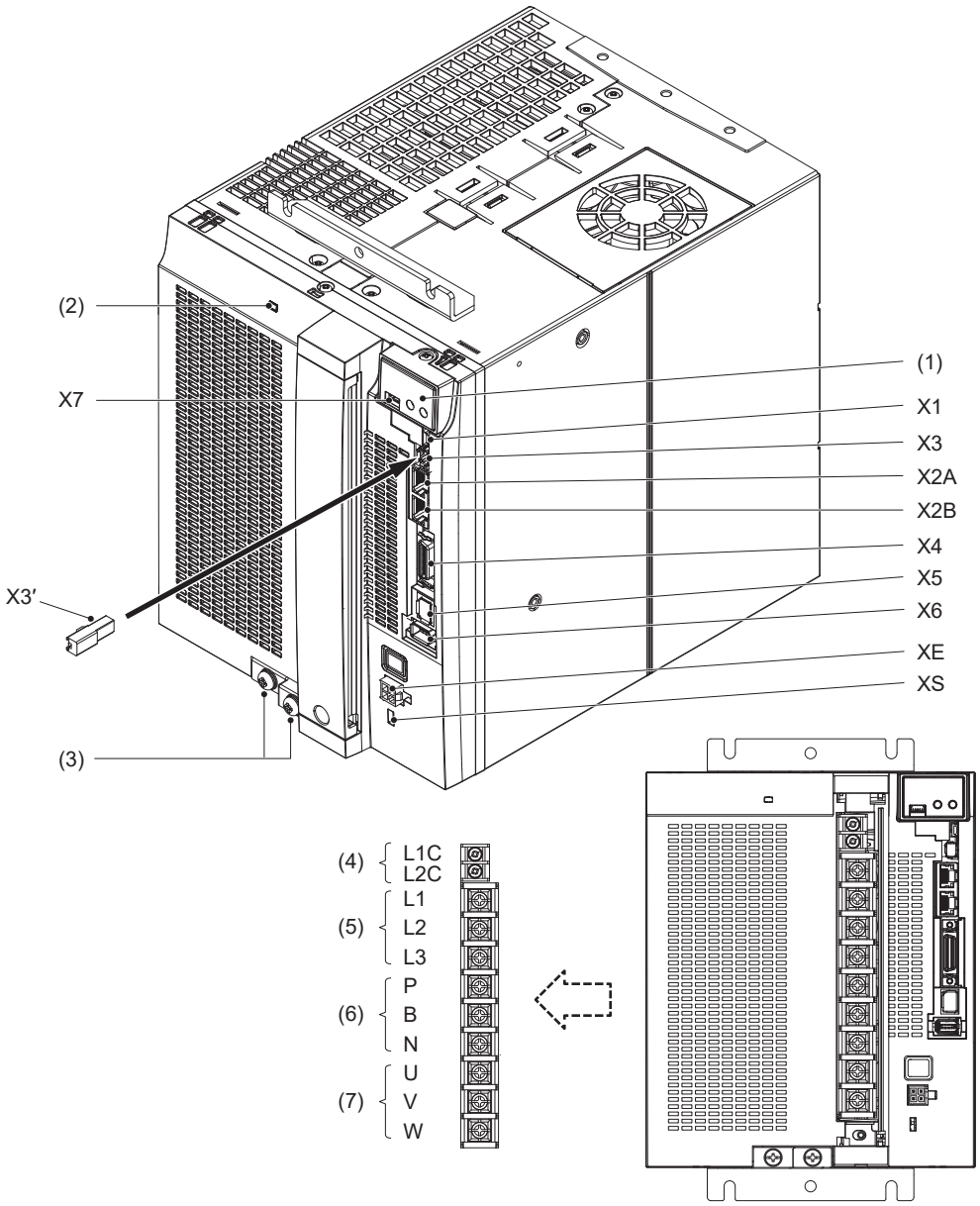
5.4 Size F 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Main power supply input
(5)	Control power supply input	(6)	Regenerative resistor connection (Normal RB-B short circuit)
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

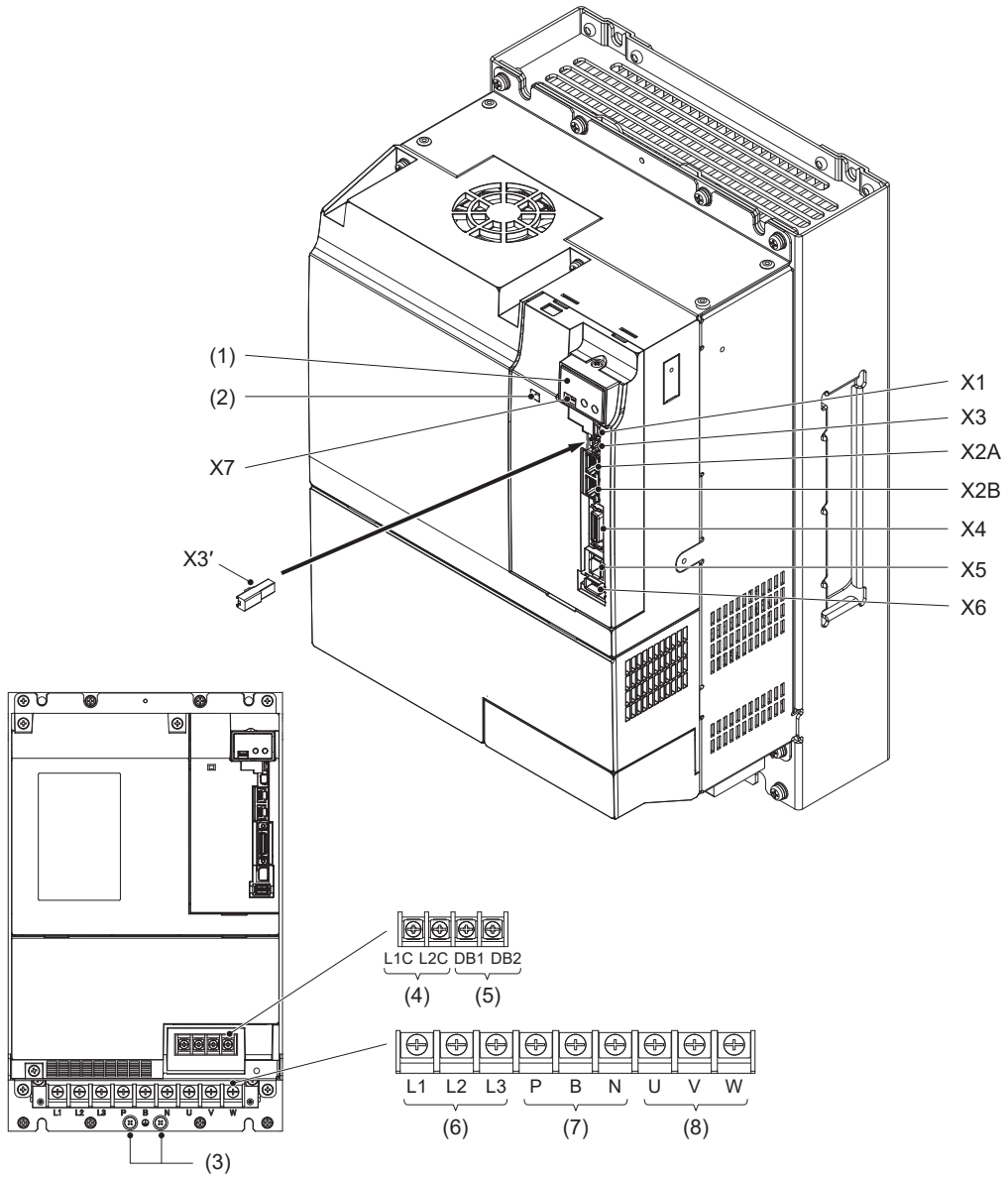
5.5 Size G 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	XE	External DB control connector 5569-04A2-210 (MOLEX) equivalent
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R050NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encoder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XS	Internal DB switch	(1)	Front panel
(2)	Charge lamp	(3)	Earth connection screw
(4)	Control power supply input	(5)	Main power supply input
(6)	Regenerative resistor connection	(7)	Motor output

* Remove the safety bypass plug when wiring to X3.

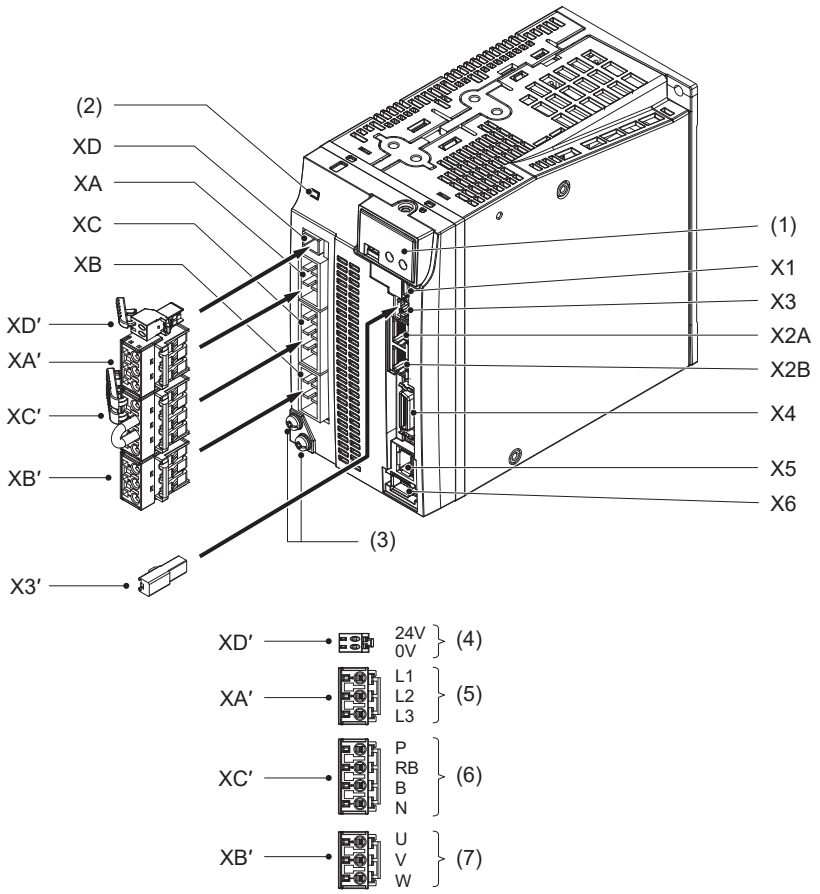
5.6 Size H 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R050NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encoder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Control power supply input
(5)	External DB control connection	(6)	Main power supply input
(7)	Regenerative resistor connection	(8)	Motor output

* Remove the safety bypass plug when wiring to X3.

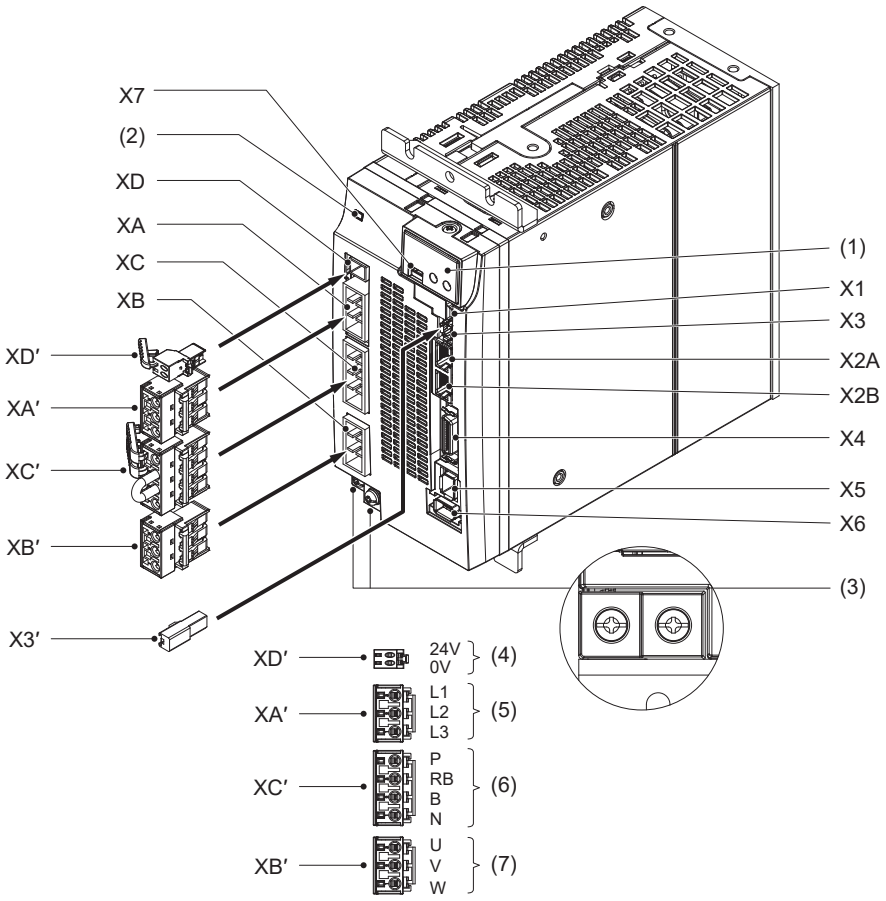
5.7 Size D 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB(LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XA	Power supply input connector S03B-JTSLSS-GSANYR (JST) equivalent	XA′	Power supply input connector 03JFAT-SAYGSA-L (JST) equivalent
XB	Motor output connector S03B-JTSLSK-GSANXR (JST) equivalent	XB′	Motor output connector 03JFAT-SAXGSA-L (JST) equivalent
XC	Regenerative resistor connector S04B-JTSLSK-GSANXR (JST) equivalent	XC′	Regenerative resistor connector 04JFAT-SAXGSA-L (JST) equivalent
XD	Control power supply Input connector S02B-J25SK-GGR (JST) equivalent	XD′	Control power supply Input connector 02MJFAT-SAGF (JST) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Control power supply input
(5)	Main power supply input	(6)	Regenerative resistor connection
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

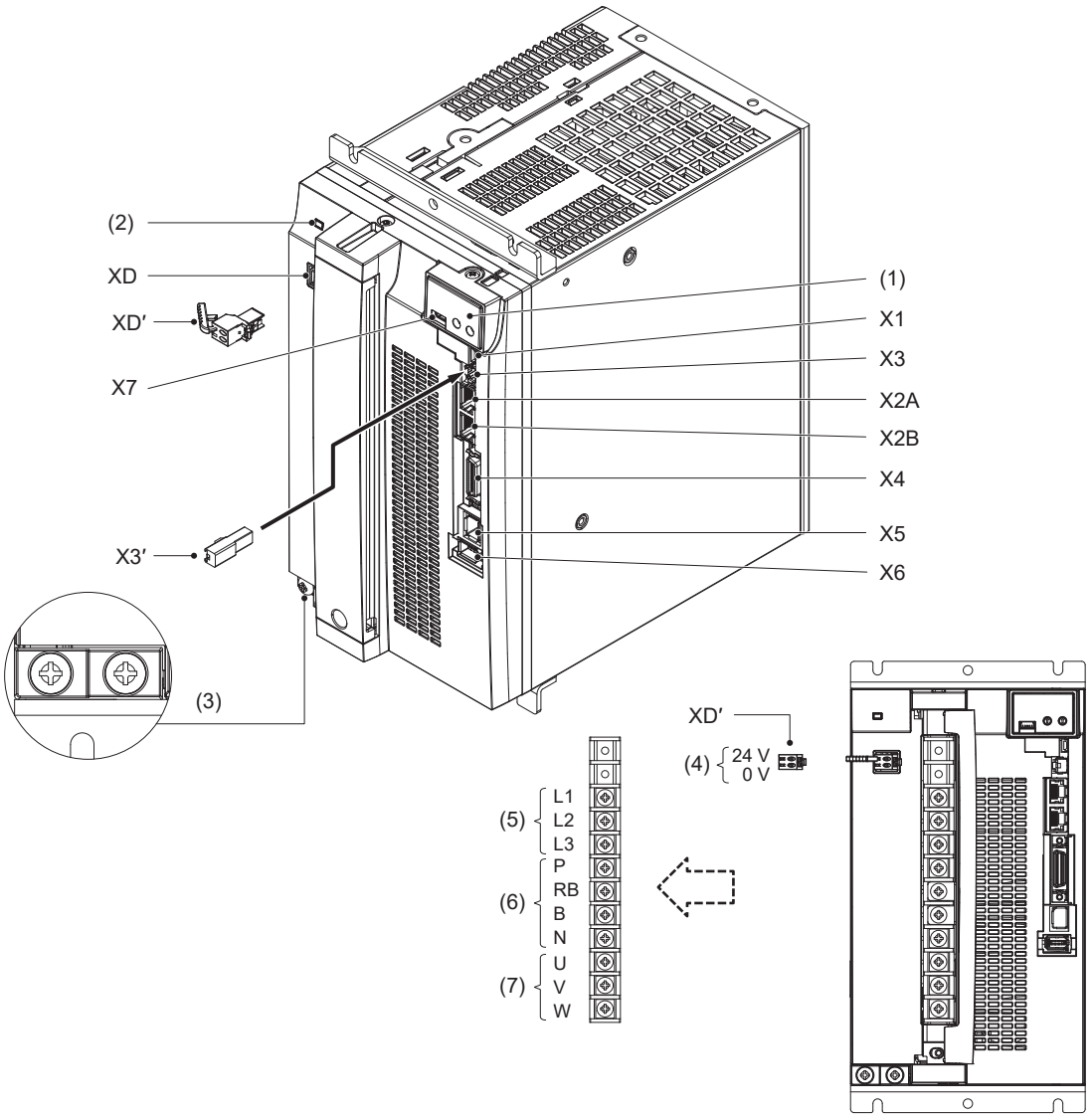
5.8 Size E 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XA	Power supply input connector S03B-JTSLSS-GSANYR (JST) equivalent	XA′	Power supply input connector 03JFAT-SAYGSA-L (JST) equivalent
XB	Motor output connector S03B-JTSLSK-GSANXR (JST) equivalent	XB′	Motor output connector 03JFAT-SAXGSA-L (JST) equivalent
XC	Regenerative resistor connector S04B-JTSLSK-GSANXR (JST) equivalent	XC′	Regenerative resistor connector 04JFAT-SAXGSA-L (JST) equivalent
XD	Control power supply Input connector S02B-J25SK-GGR (JST) equivalent	XD′	Control power supply Input connector 02MJFAT-SAGF (JST) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Control power supply input
(5)	Main power supply input	(6)	Regenerative resistor connection
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

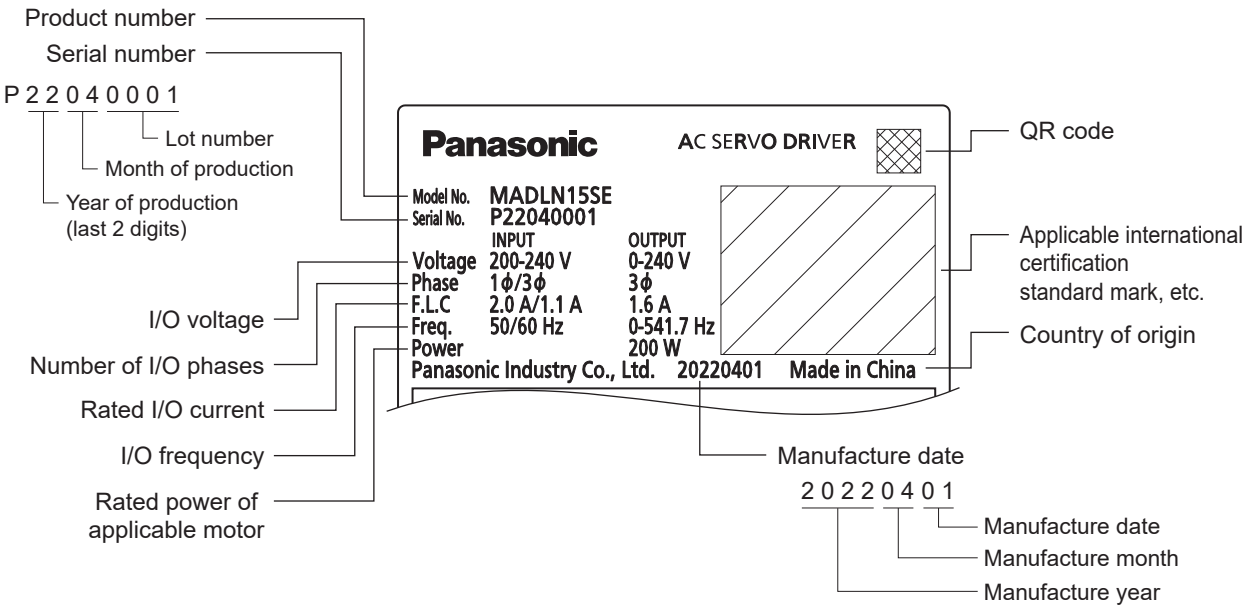
5.9 Size F 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent		
X2A	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent	X2B	EtherCAT connector MOD-WRJ88LY1G-TP+ (HTK) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R026NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encorder connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XD	Control power supply Input connector S02B-J25SK-GGR (JST) equivalent	XD′	Control power supply Input connector 02MJFAT-SAGF (JST) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Earth connection screw	(4)	Control power supply input
(5)	Main power supply input	(6)	Regenerative resistor connection (Normal RB-B short circuit)
(7)	Motor output		

* Remove the safety bypass plug when wiring to X3.

5.10 Example nameplate

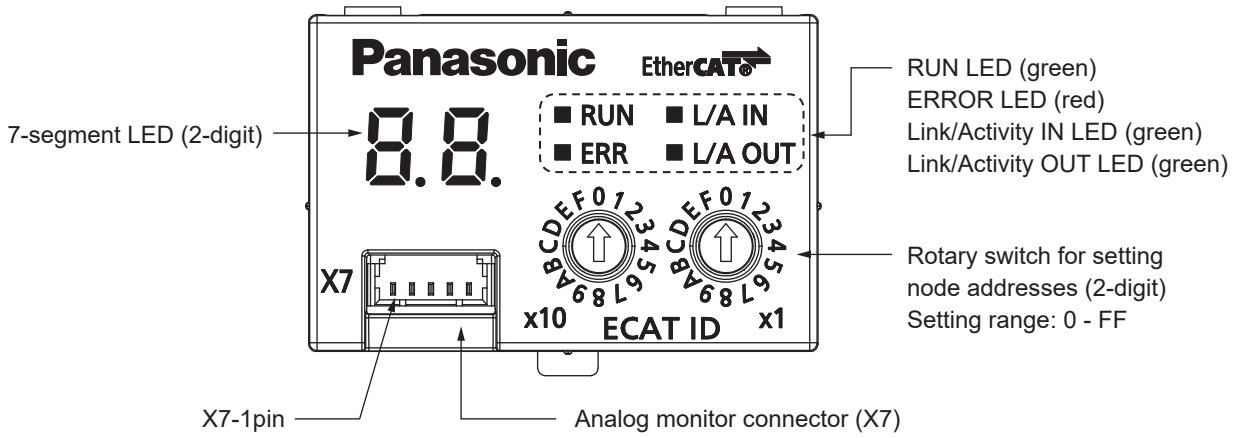


Although serial numbers range from 1 to 33999, they are shown on the name plate in 4-digit format shown as shown below.

The letters “I” and “O” are not used for the fourth digit.

Value of serial number	Notation on the nameplate
1 – 9999	0001 – 9999
10000 – 10999	A000 – A999
11000 – 11999	B000 – B999
⋮	⋮
17000 – 17999	H000 – H999
18000 – 18999	J000 – J999
⋮	⋮
22000 – 22999	N000 – N999
23000 – 23999	P000 – P999
⋮	⋮
33000 – 33999	Z000 – Z999

5.11 Front panel

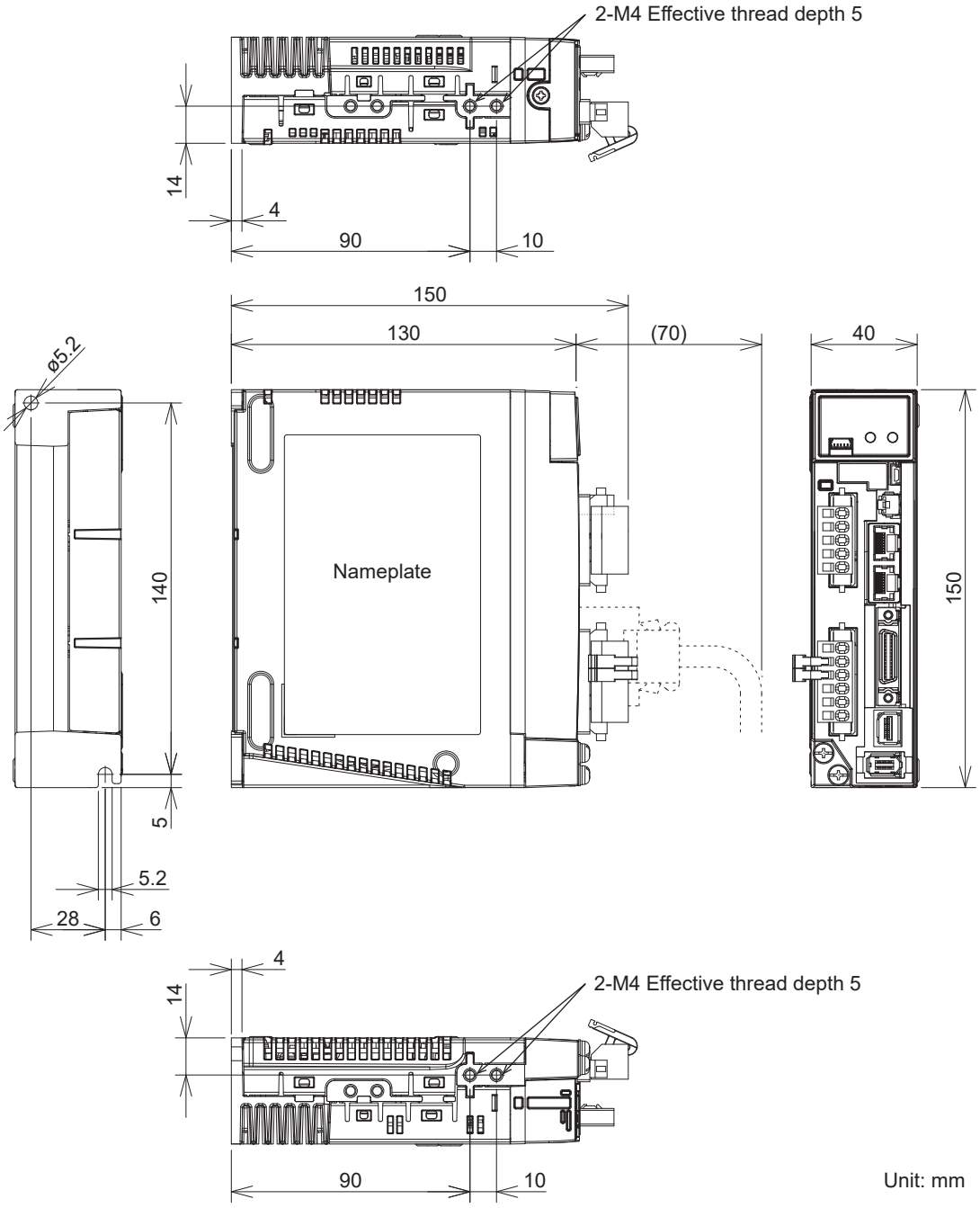


6 Dimensions

Some dimensions for the 400 V model are different (see note).

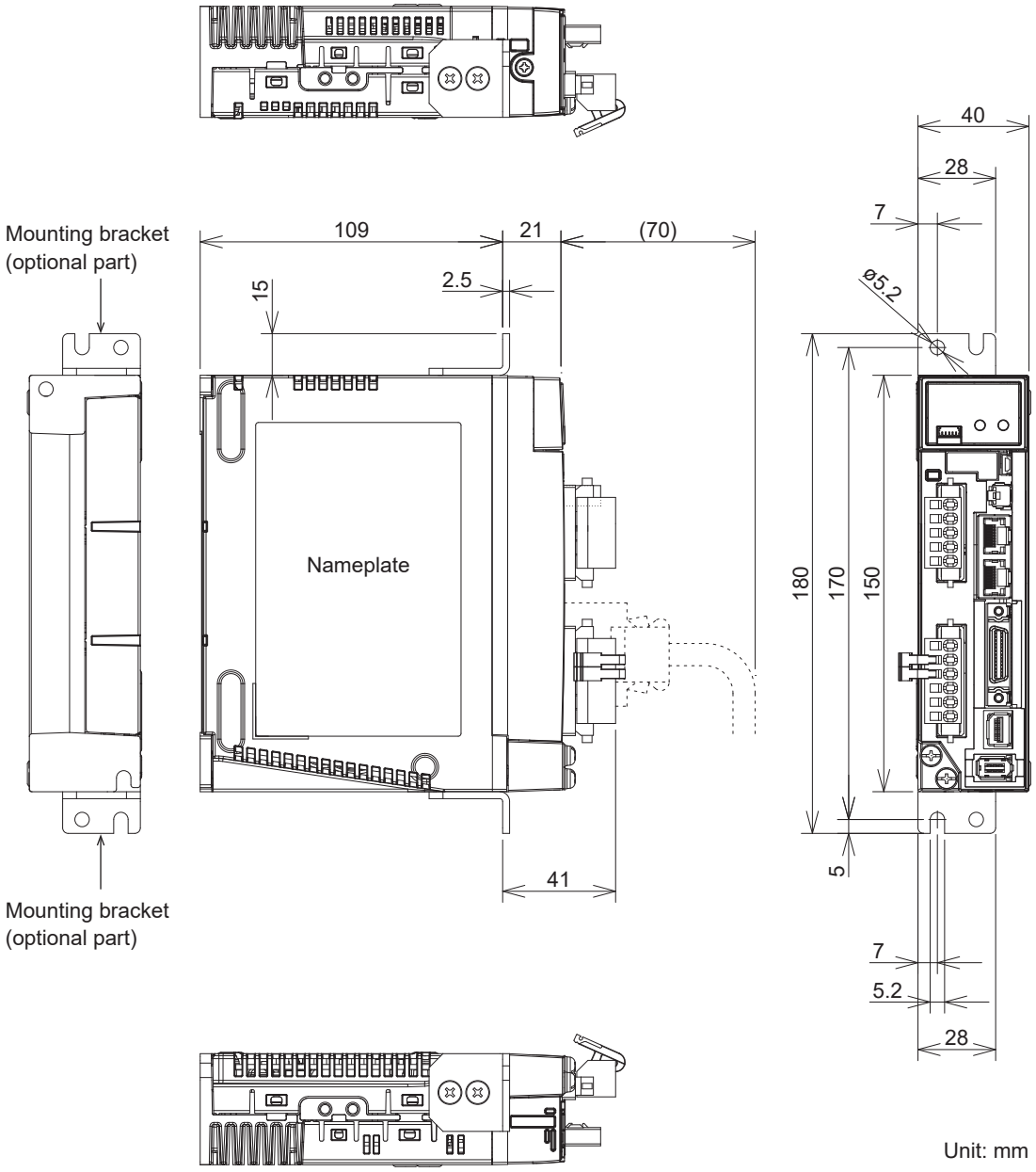
6.1 Size A 100 V/200 V

Base-mounted installation (Standard: Rear-mounted)



*1 Do not use screw holes for which no dimensions are shown.

Rack-mounted installation (Using optional parts: Front-mounted)



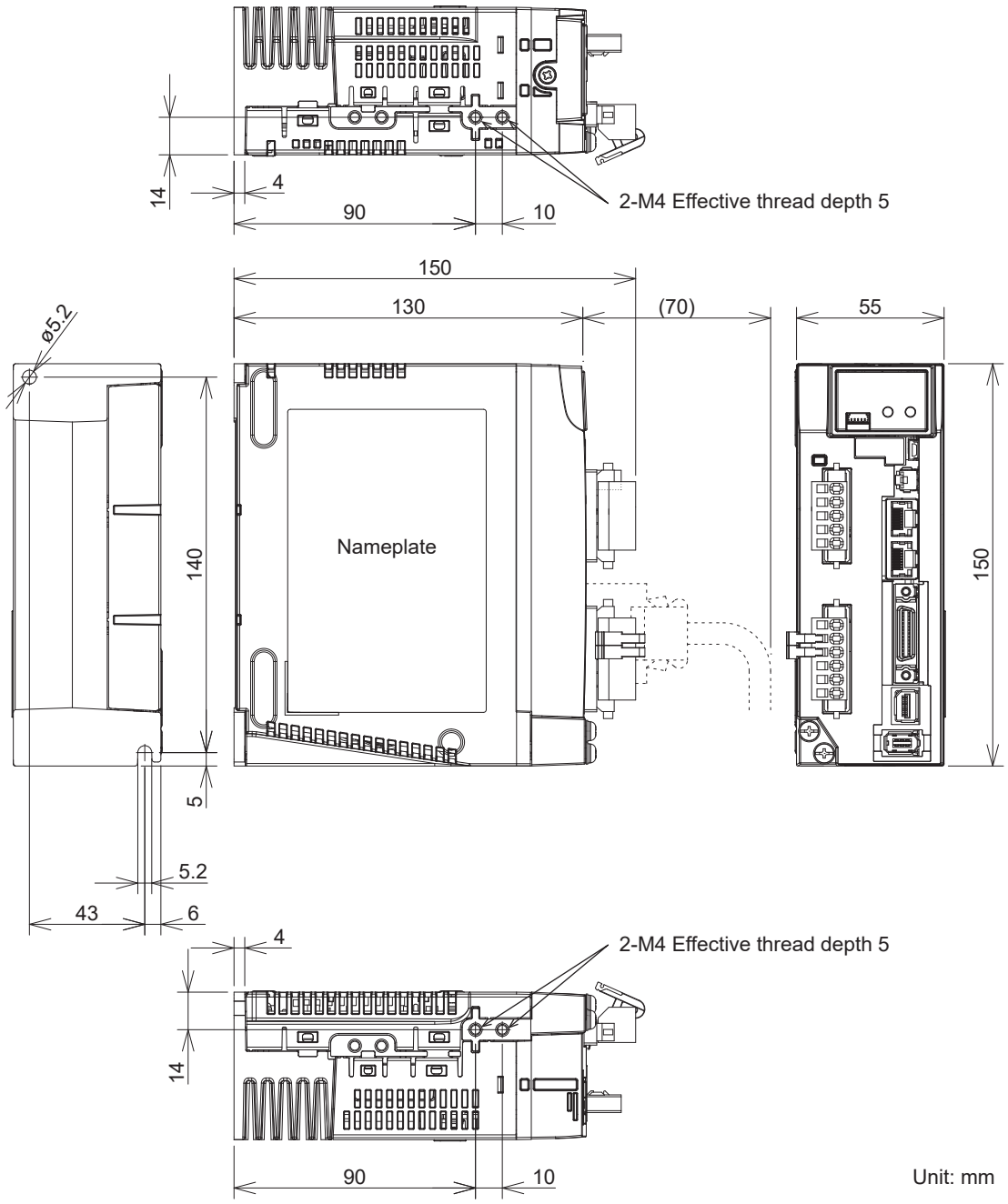
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 Mounting brackets are optional parts. They are not included with the product.

6.2 Size B 100 V/200 V

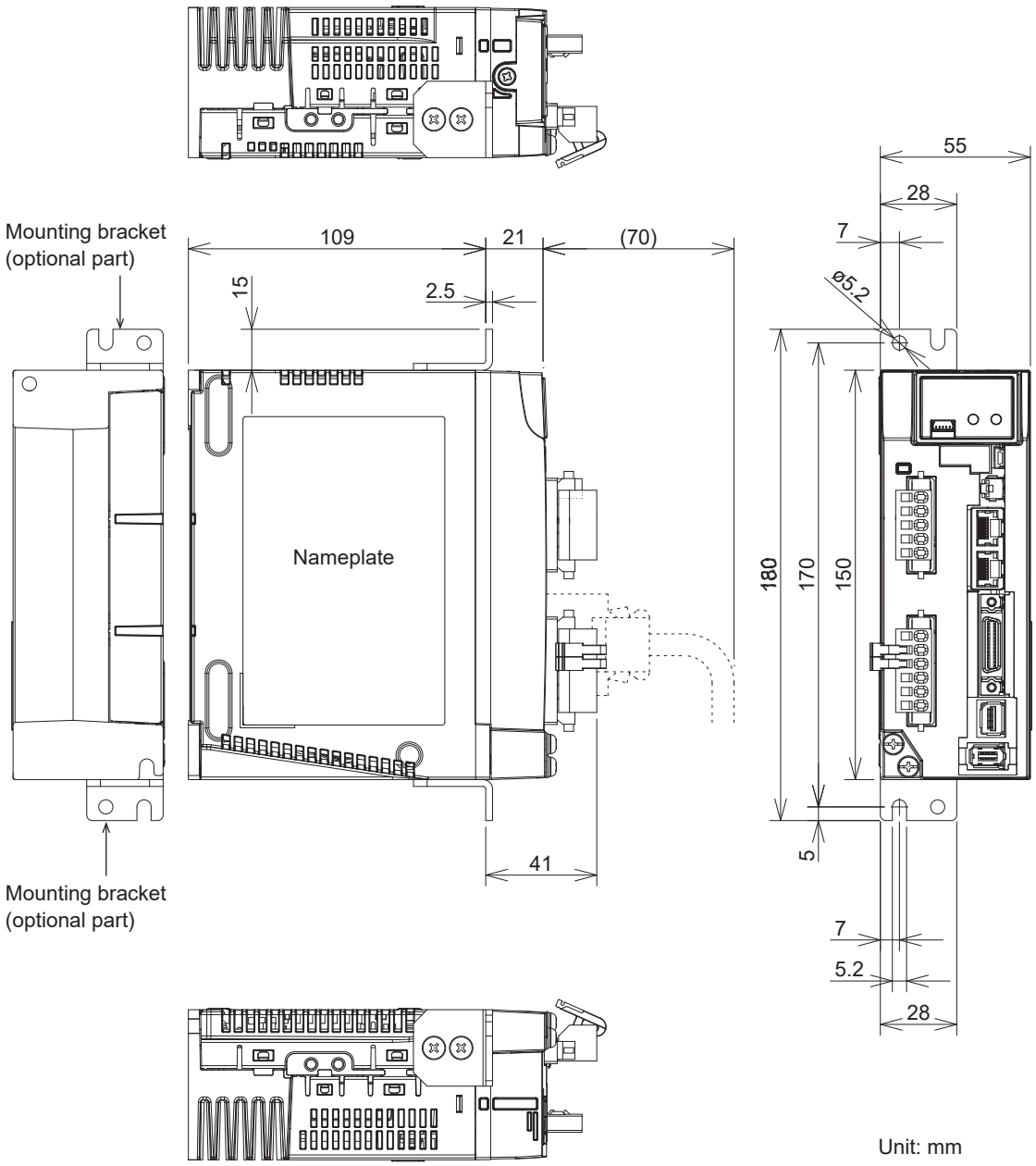
Base-mounted installation (Standard: Rear-mounted)



Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

Rack-mounted installation (Using optional parts: Front-mounted)



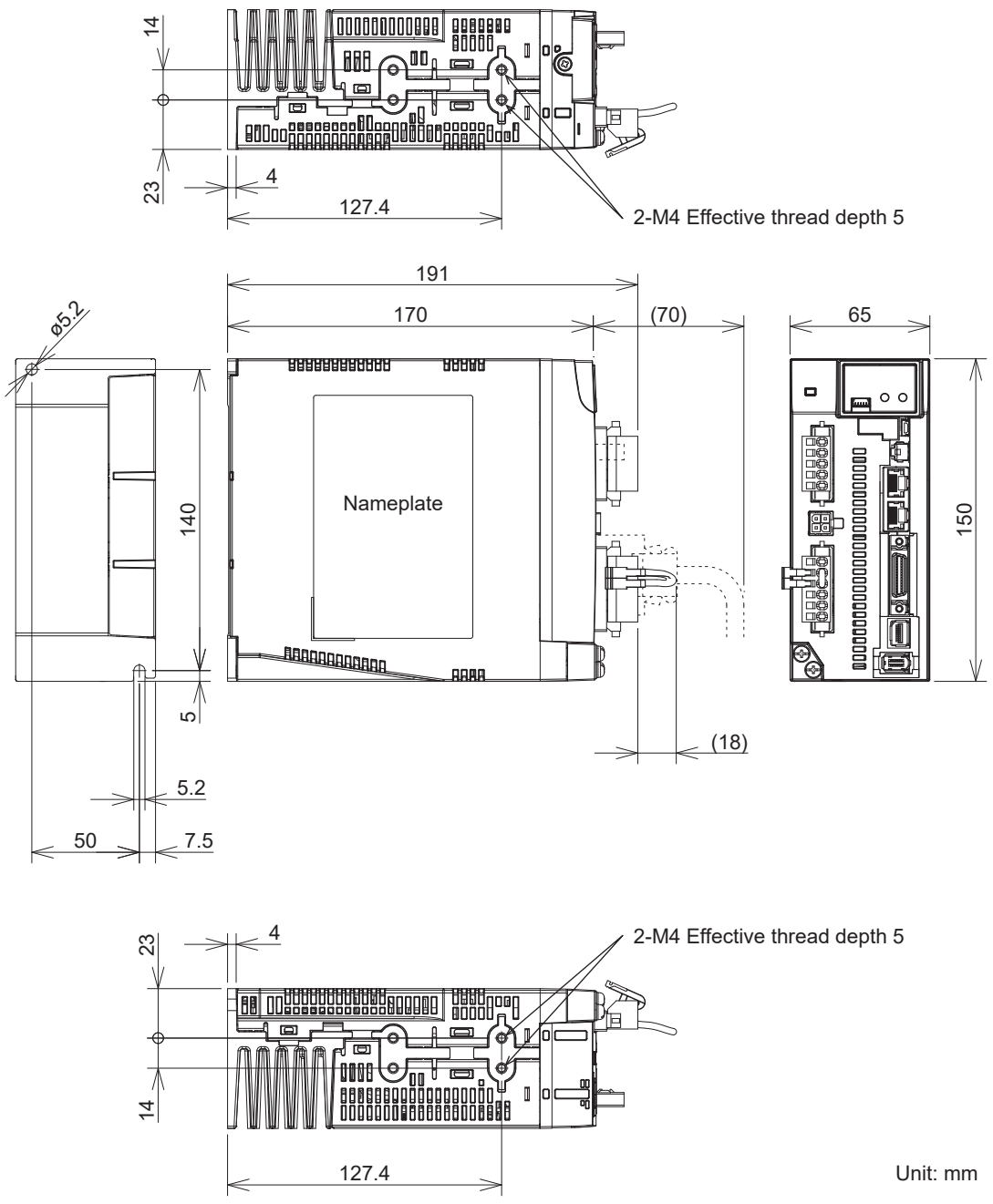
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 Mounting brackets are optional parts. They are not included with the product.

6.3 Size C 100 V/200 V

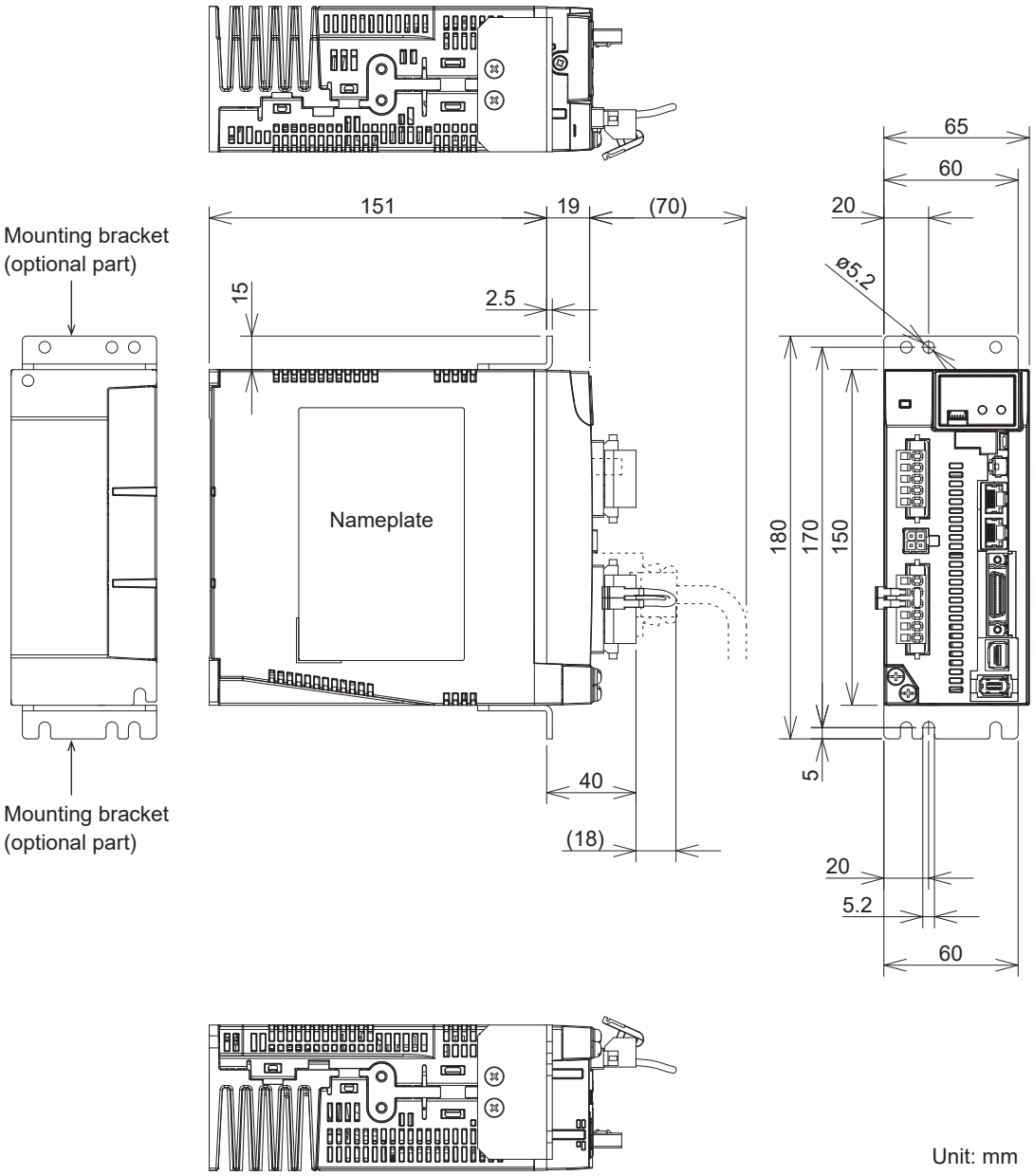
Base-mounted installation (Standard: Rear-mounted)



Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

Rack-mounted installation (Using optional parts: Front-mounted)



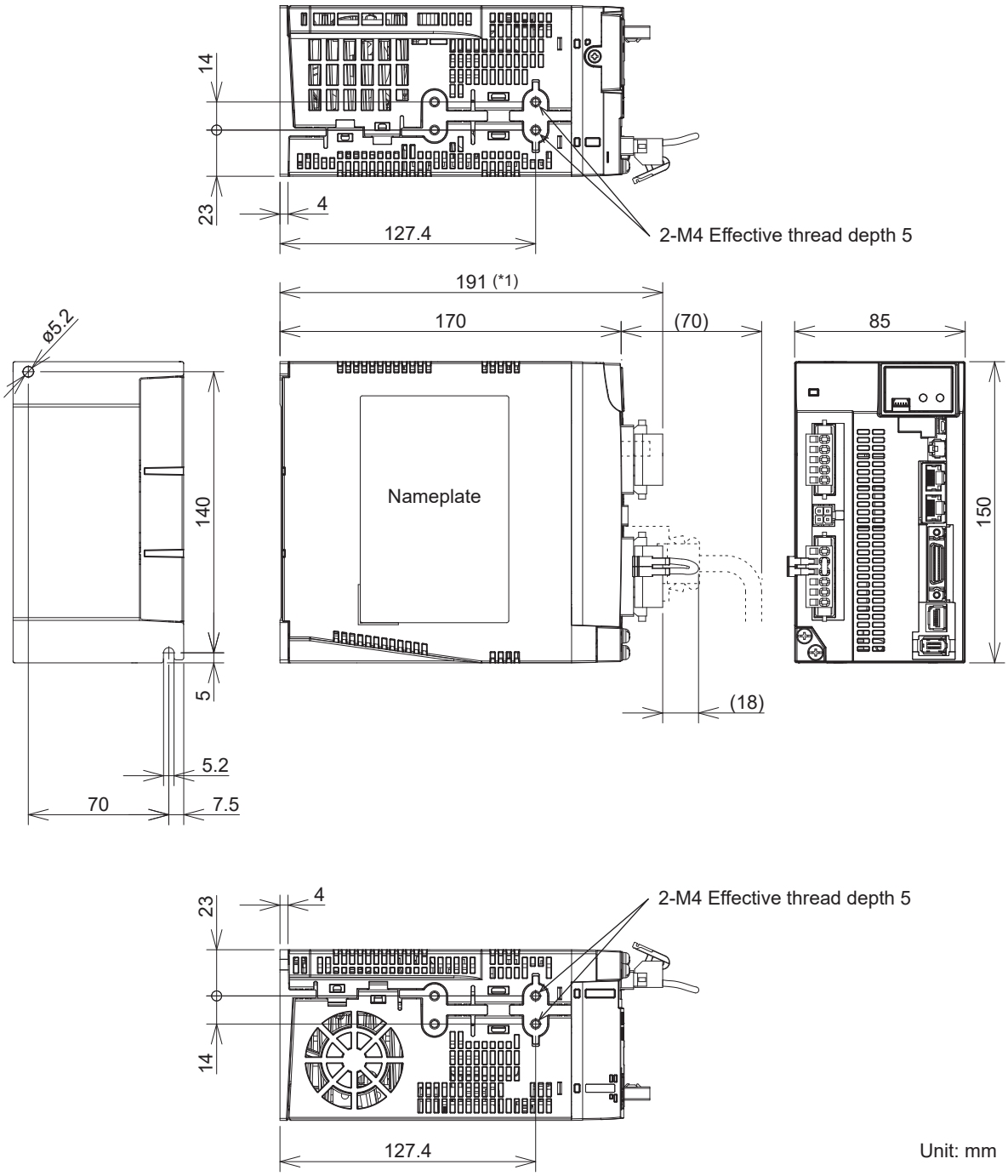
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 Mounting brackets are optional parts. They are not included with the product.

6.4 Size D 200 V/400 V

Base-mounted installation (Standard: Rear-mounted)

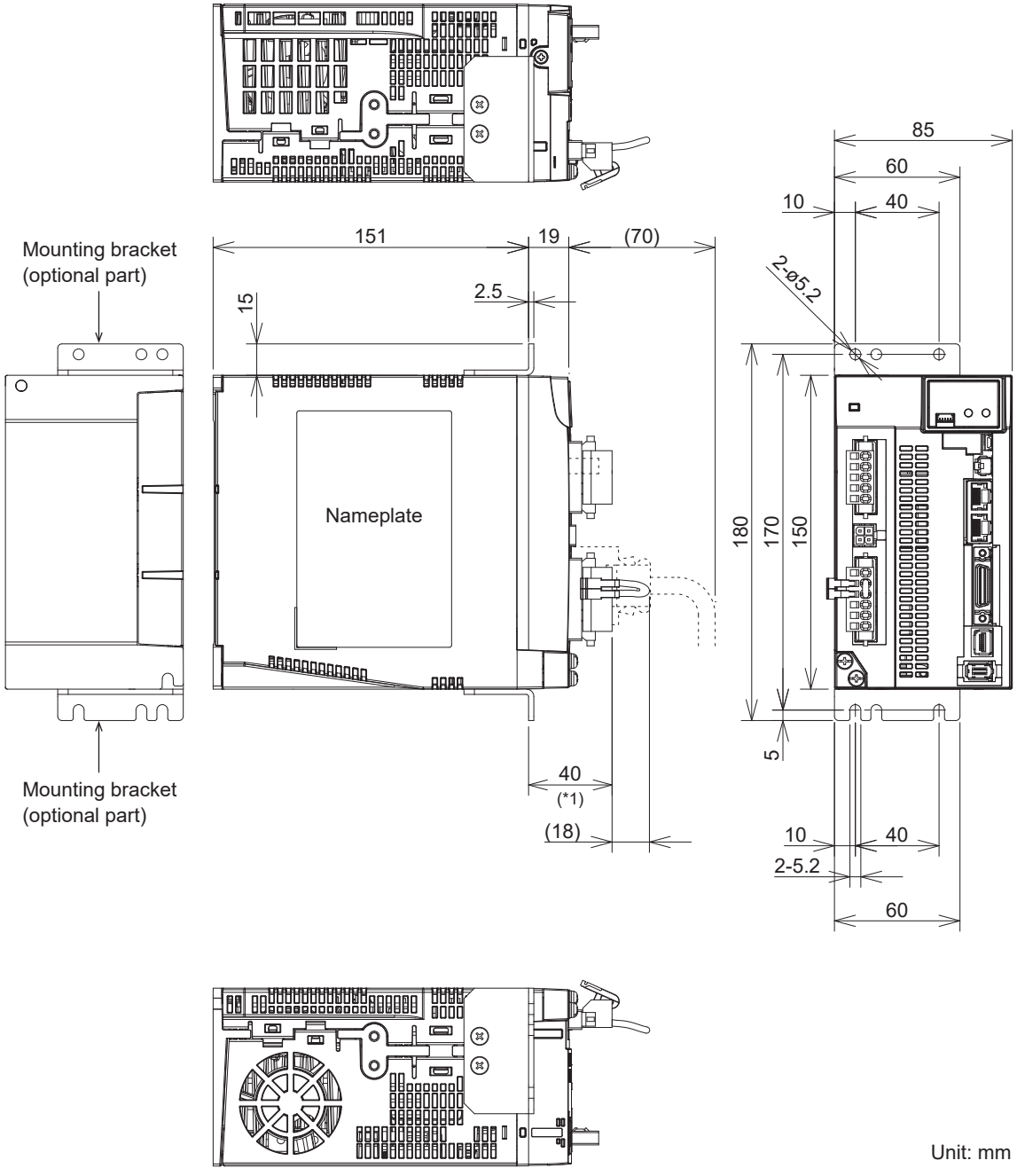


Unit: mm

*1 For the 400 V model, this dimension is 188 mm.

*2 Do not use screw holes for which no dimensions are shown.

Rack-mounted installation (Using optional parts: Front-mounted)



Unit: mm

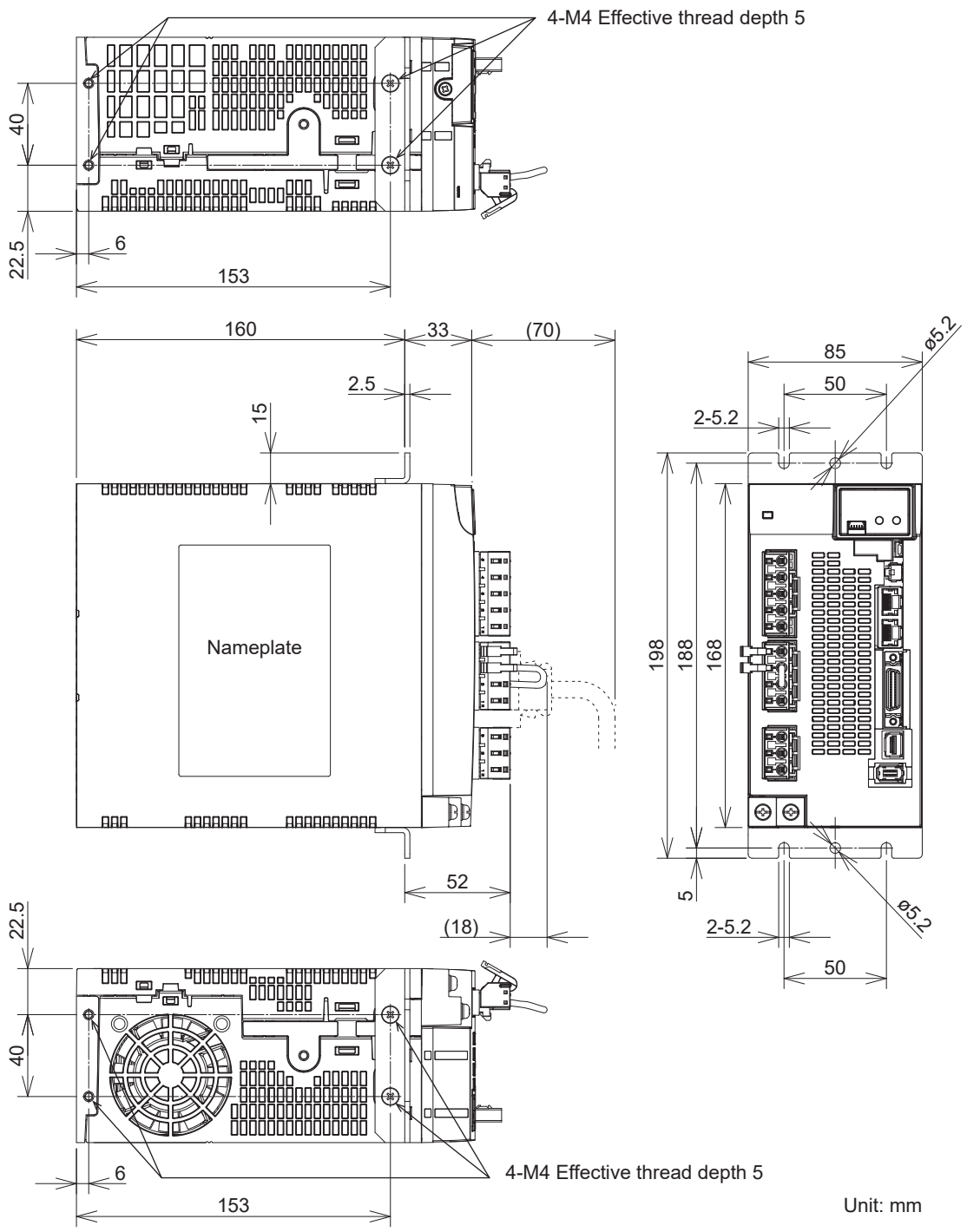
*1 For the 400 V model, this dimension is 37 mm.

*2 Do not use screw holes for which no dimensions are shown.

*3 Mounting brackets are optional parts. They are not included with the product.

6.5 Size E 200 V/400 V

Rack-mounting installation (Standard mounting bracket position: Front-mounted)

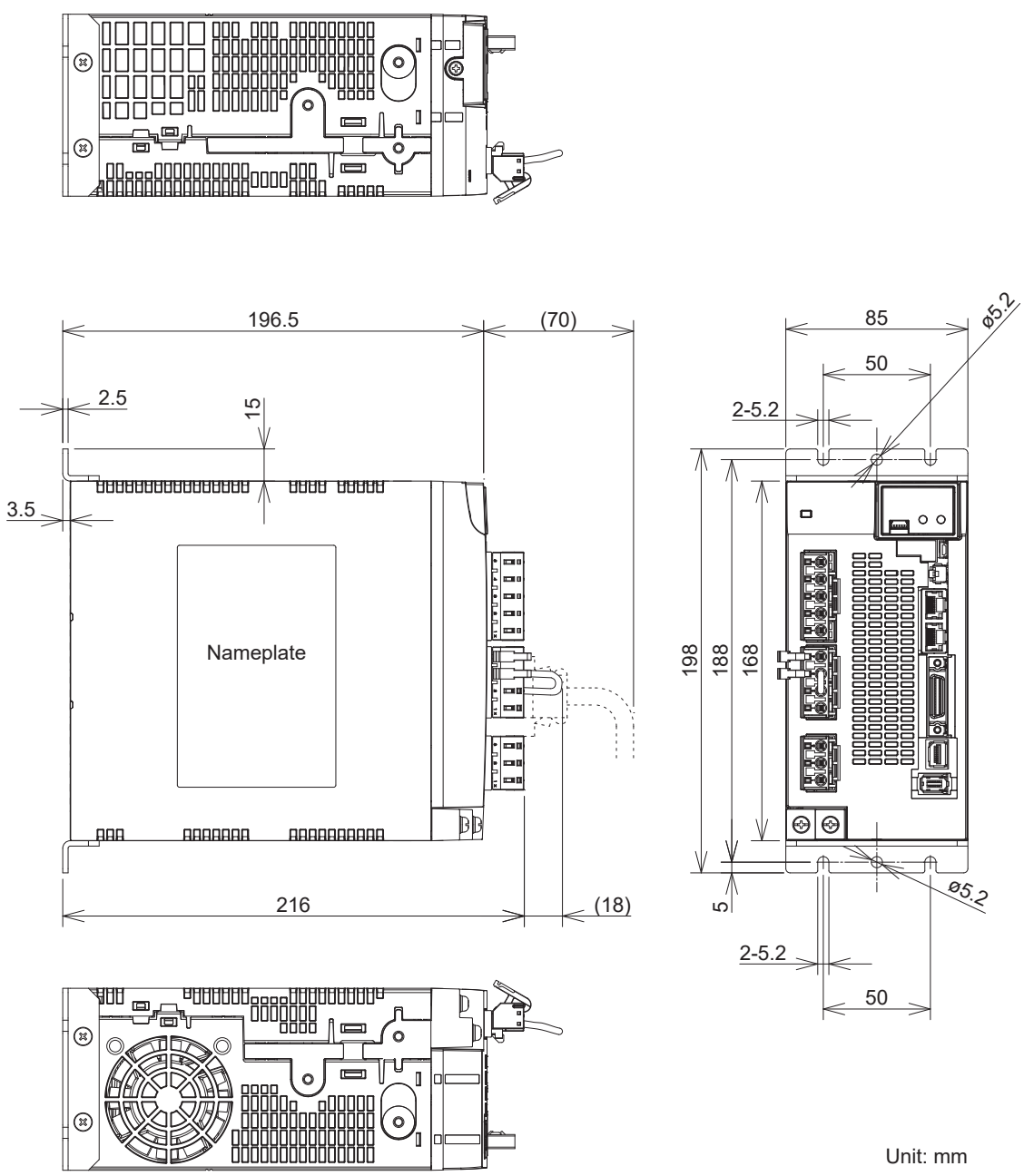


Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

Base-mounted installation (Modified mounting bracket position: Rear-mounted)



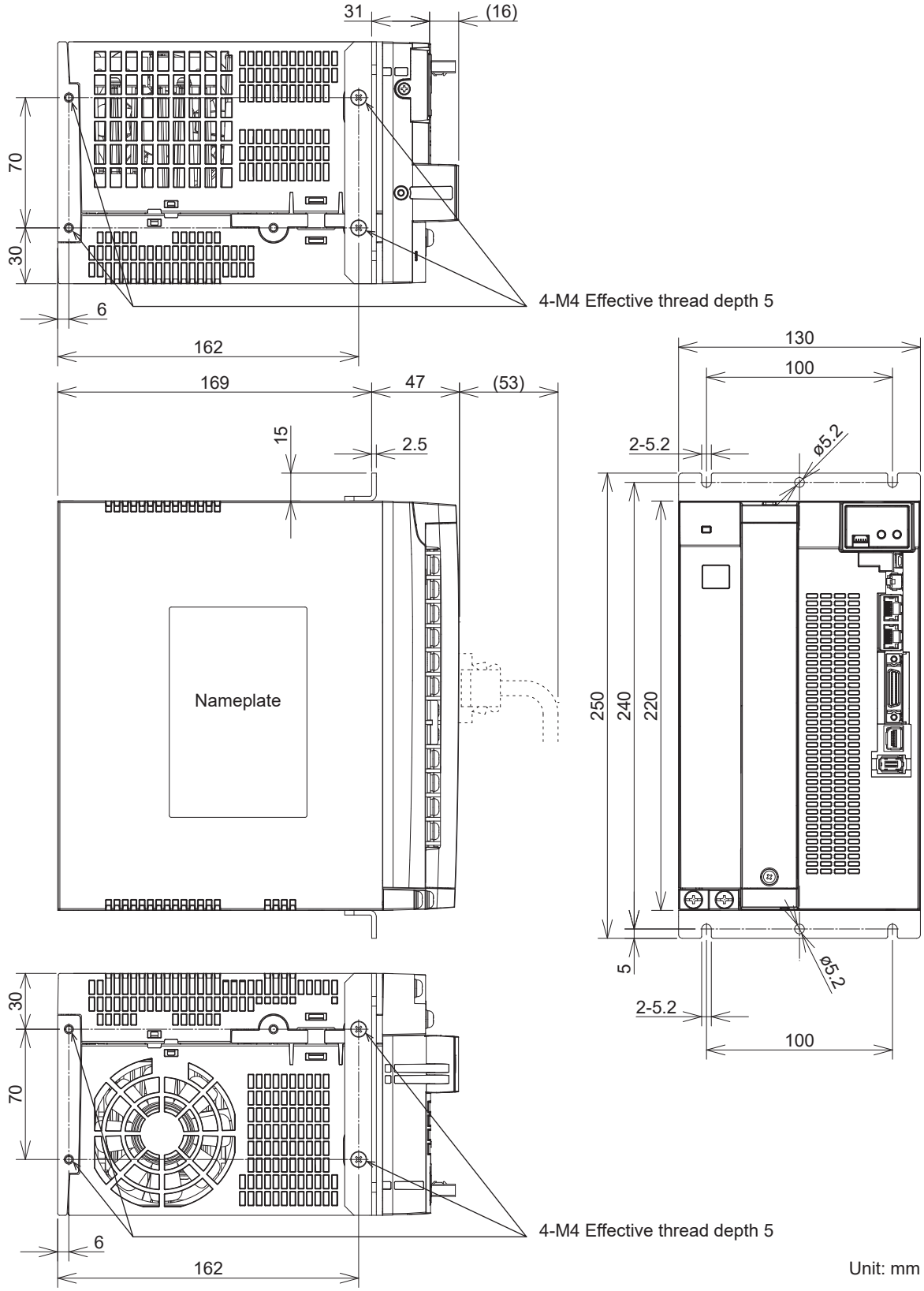
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 サ When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

6.6 Size F 200 V/400 V

Rack-mounting installation (Standard mounting bracket position: Front-mounted)

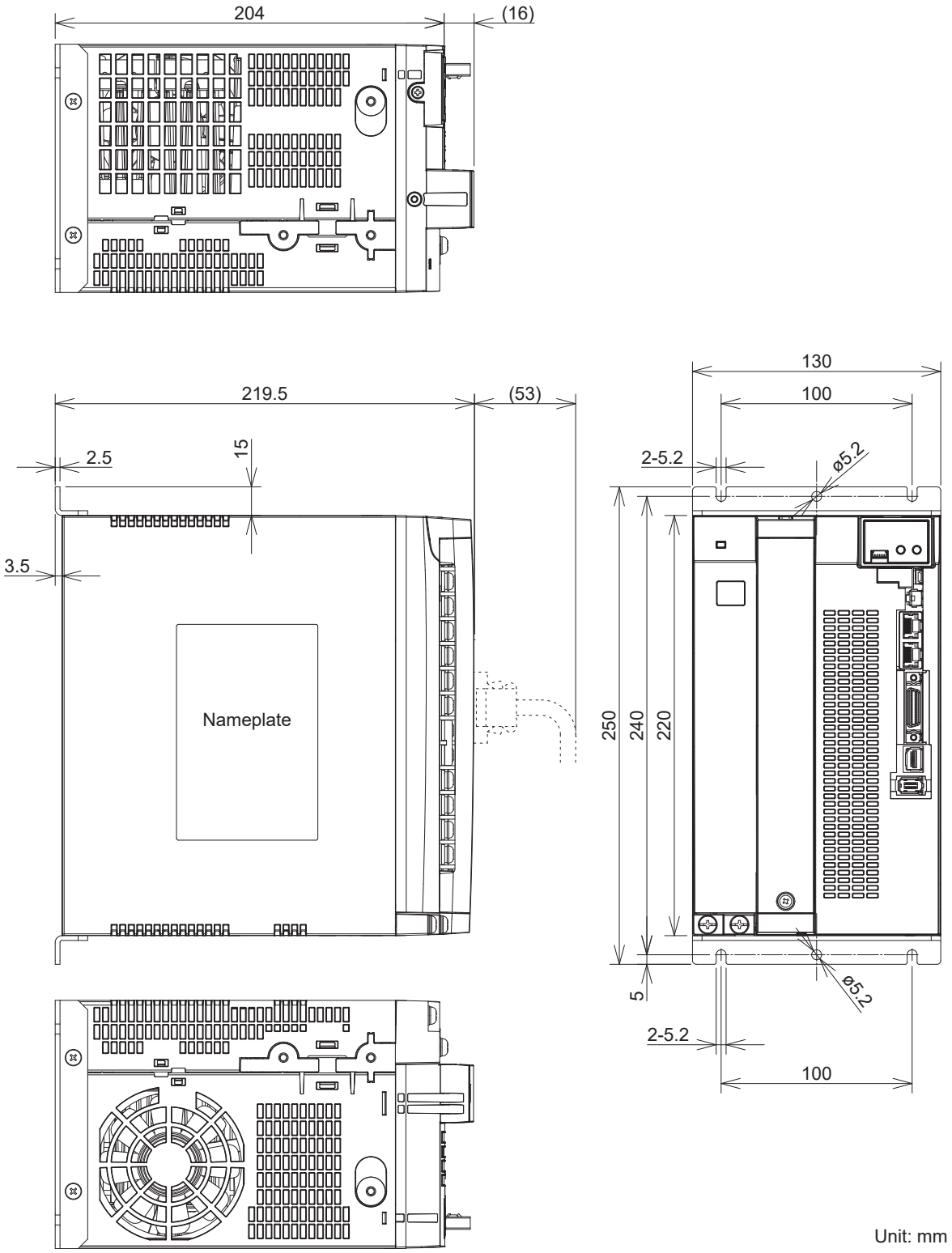


Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

Base-mounted installation (Modified mounting bracket position: Rear-mounted)



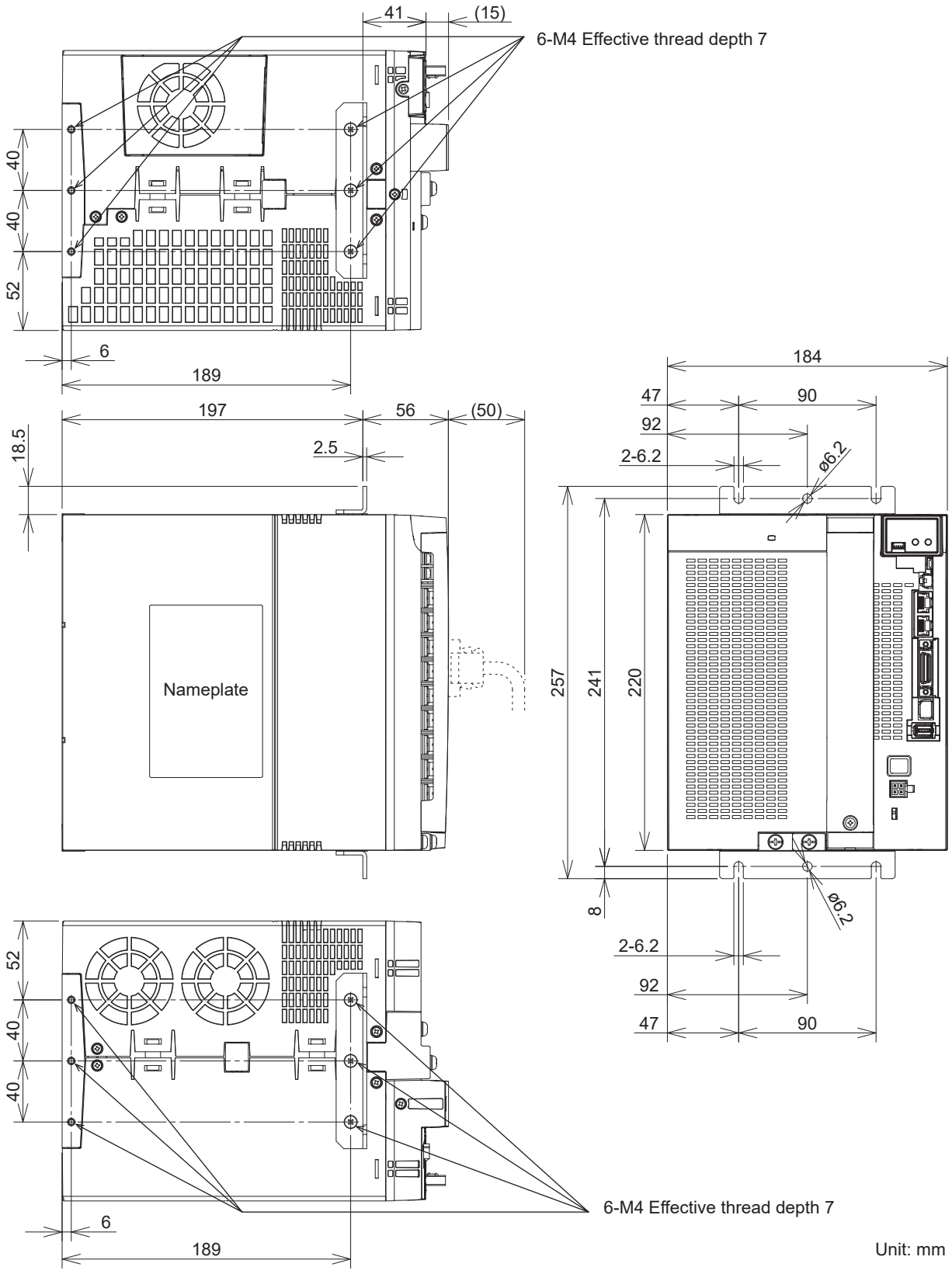
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

6.7 Size G 200 V

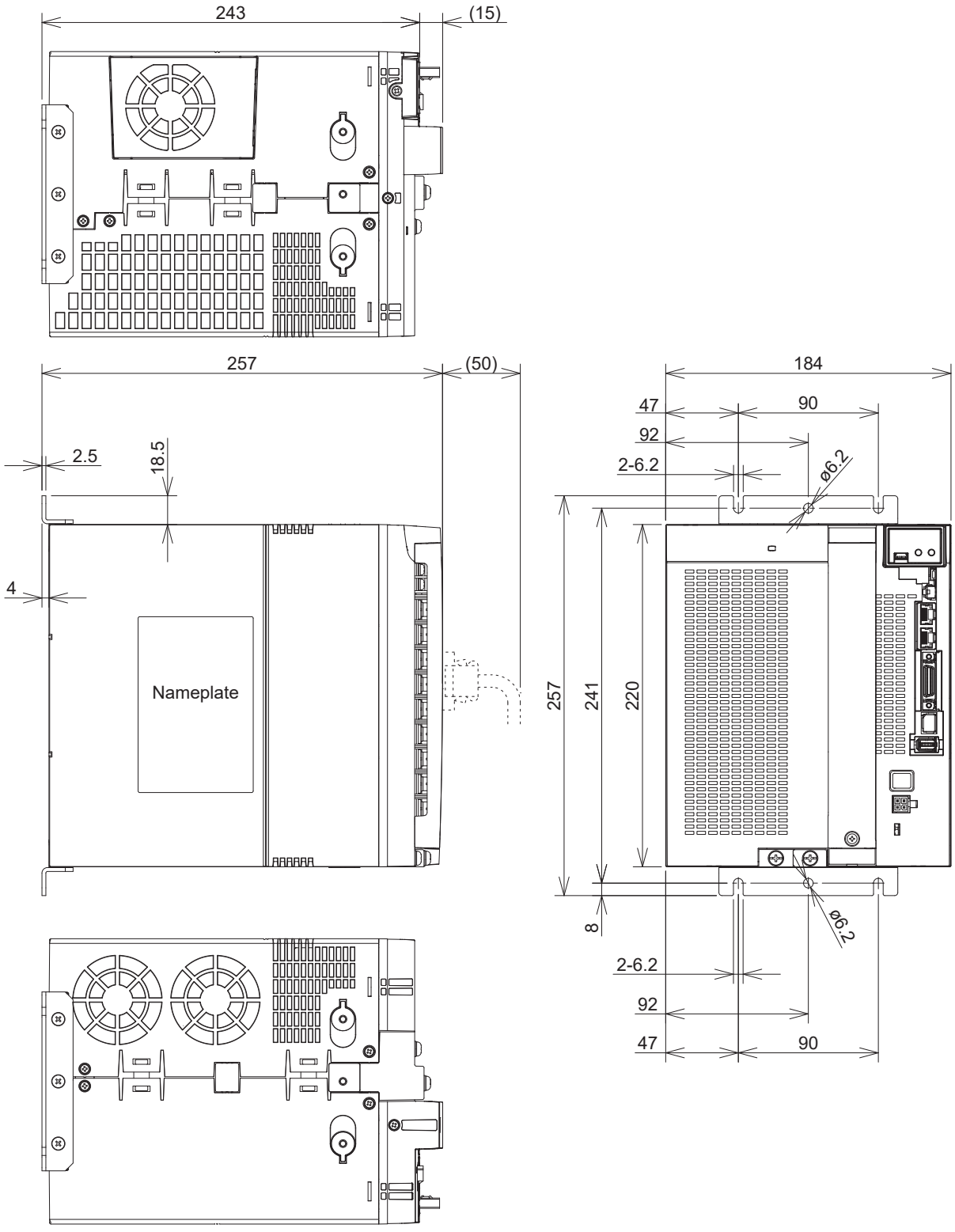
Rack-mounting installation (Standard mounting bracket position: Front-mounted)



*1 Do not use screw holes for which no dimensions are shown.

*2 When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

Base-mounted installation (Modified mounting bracket position: Rear-mounted)



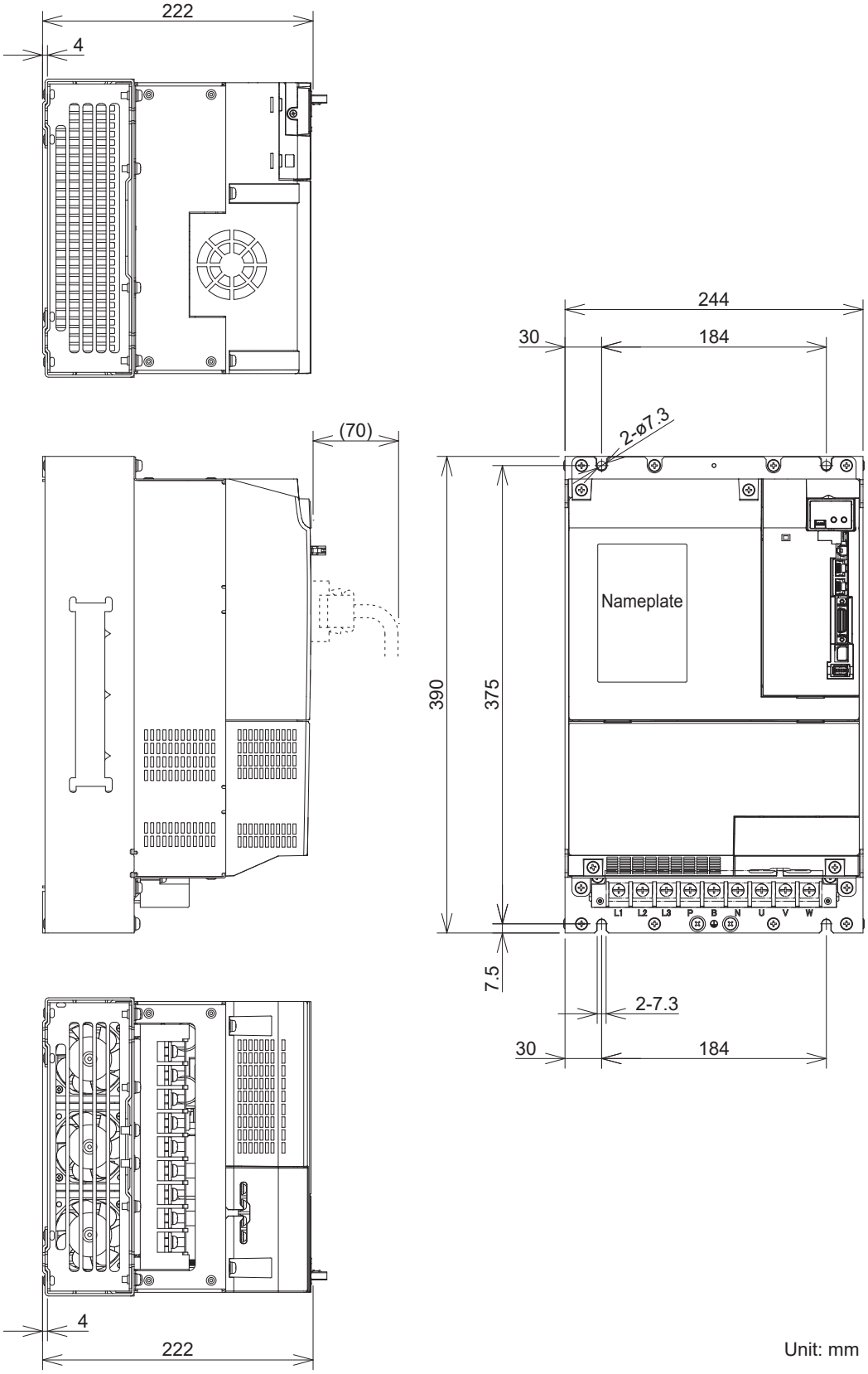
Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

*2 When installing the servo driver, secure it in the four U-shaped notches on the mounting bracket.

6.8 Size H 200 V

Base-mounted installation (Rear-mounted)



Unit: mm

*1 Do not use screw holes for which no dimensions are shown.

7 Configuration of Connectors and Terminal Blocks

7.1 Power Connectors XA, XB, XC, XD and Terminal Blocks

7.1.1 Size A, B 100 V/200 V

	Pin No.	Symbol	Name	Description	
XA	5	L1	Main power supply input terminal	100 V	Single-phase 100–120 V, -15% to +10%, 50/60 Hz Connect to terminals L1 and L3.
	4	L2			
	3	L3		200 V	Single-phase/3-phase 200–240 V, -15% to +10%, 50/60 Hz For single-phase, connect to terminals L1 and L3.
	2	L1C	Control power supply input terminal	100 V	Single-phase 100–120 V, -15% to +10%, 50/60 Hz
	1	L2C		200 V	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
XB	6	P	Regenerative resistor connection terminal	● When using an external regenerative resistor (customer-supplied), connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.	
	5	N			
	4	B			
	3	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase	
	2	V			
	1	W			
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.	

* Tighten the M4 grounding screw to a torque of 1.0–1.2 N·m.

7.1.2 Size C, D 100 V/200 V

	Pin No.	Symbol	Name	Description	
XA	5	L1	Main power supply input terminal	100 V	Single-phase 100–120 V, -15% to +10%, 50/60 Hz Connect to terminals L1 and L3.
	4	L2			
	3	L3		200 V	Single-phase/3-phase 200–240 V, -15% to +10%, 50/60 Hz For single-phase, connect to terminals L1 and L3.
	2	L1C	Control power supply input terminal	100 V	Single-phase 100–120 V, -15% to +10%, 50/60 Hz
	1	L2C		200 V	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
XC	4	N	–	● Do not connect anything to this connector.	
	3				
	2	P			
	1				
XB	6	P	Regenerative resistor connection terminal	● Normally, short circuit between RB and B. ● When using an external regenerative resistor (customer-supplied), open between RB and B and connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”.	
	5	RB			
	4	B			
	3	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase	
	2	V			
	1	W			
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.	

* Tighten the M4 grounding screw to a torque of 1.0–1.2 N·m.

7.1.3 Size E 200 V

	Pin No.	Symbol	Name	Description	
XA	5	L1	Main power supply input terminal	200 V	3-phase 200–240 V, -15% to +10%, 50/60 Hz
	4	L2			
	3	L3			
	2	L1C	Control power supply input terminal	200 V	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
	1	L2C			
XC	4	P	Regenerative resistor connection terminal	● Normally, short circuit between RB and B. ● When using an external regenerative resistor (customer-supplied), open between RB and B and connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.	
	3	RB			
	2	B			
	1	N			
XB	3	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase	
	2	V			
	1	W			
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.	

* Tighten the M4 grounding screw to a torque of 1.0–1.2 N·m.

7.1.4 Size F 200 V

Use terminal blocks.

	Terminal block No. (Upper to lower)	Symbol	Name	Description
Terminal block	1	L1	Main power supply input terminal	3-phase 200–240 V, -15% to +10%, 50/60 Hz
	2	L2		
	3	L3		
	4	L1C	Control power supply input terminal	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
	5	L2C		
	6	P	Regenerative resistor connection terminal	● Normally, short circuit between RB and B. ● When using an external regenerative resistor (customer-supplied), open between RB and B and connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.
	7	RB		
	8	B		
	9	N		
	10	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase
	11	V		
	12	W		
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.

* Tighten the M5 grounding screw to a torque of 1.8–2.0 N·m.

* Tighten the M5 terminal block screw to a torque of 1.8–2.0 N·m.

* Tighten the M3 screw for securing the terminal block cover to a torque of 0.19–0.21 N·m.
* Exceeding the maximum tightening torque may cause damage.

7.1.5 Size G 200 V

Use terminal blocks.

	Terminal block No. (Upper to lower)	Symbol	Name	Description
Upper	1	L1C	Control power supply input terminal	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
	2	L2C		
Lower	1	L1	Main power supply input terminal	3-phase 200–240 V, -15% to +10%, 50/60 Hz
	2	L2		
	3	L3		
	4	P	Regenerative resistor connection terminal	● When using an external regenerative resistor (customer-supplied), connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.
	5	B		
	6	N		
	7	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase
	8	V		
	9	W		
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.

Connector

	Pin No.	Symbol	Name	Description
XE	1	DB1	External dynamic brake control terminal	● This terminal is used to control electromagnetic contactor MC for the external dynamic brake resistor (customer-supplied). Connect if necessary. ● The applied voltage between DB1 and DB2 should be less than AC 300 V and DC 100 V.
	2	DB2		

* Tighten the M5 grounding screw to a torque of 1.8–2.0 N·m.

* Tighten the M3 terminal block (control power supply) screw to a torque of 0.4–0.6 N·m.

Exceeding the maximum tightening torque may damage the terminal block.

* Tighten the M5 terminal block (main power supply, regenerative resistor, motor) screw to a torque of 2.0–2.4 N·m.

Exceeding the maximum tightening torque may damage the terminal block.

* Tighten the M3 screw for securing the terminal block cover to a torque of 0.19–0.21 N·m.

Exceeding the maximum tightening torque may cause damage.

7.1.6 Size H 200 V

Use terminal blocks.

	Terminal block No. (From the left)	Symbol	Name	Description
Upper	1	L1C	Control power supply input terminal	Single-phase 200–240 V, -15% to +10%, 50/60 Hz
	2	L2C		
	3	DB1	Dynamic brake resistor connection terminal	● This terminal is used to control electromagnetic contactor MC for the external dynamic brake resistor (customer-supplied). Connect if necessary. ● The applied voltage between DB1 and DB2 should be less than AC 300 V and DC 100 V.
	4	DB2		
Lower	1	L1	Main power supply input terminal	3-phase 200–240 V, -15% to +10%, 50/60 Hz
	2	L2		
	3	L3		
	4	P	Regenerative resistor connection terminal	● When using an external regenerative resistor (customer-supplied), connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.
	5	B		
	6	N		
	7	U	Motor connection terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase
	8	V		
	9	W		
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.

* Tighten the M6 grounding screw to a torque of 2.4–2.6 N·m.

* Tighten the M4 terminal block (upper: control power supply, dynamic brake) screw to a torque of 0.7–1.0 N·m. Exceeding the maximum tightening torque may damage the terminal block.

* Tighten the M6 terminal block (lower: main power supply, regenerative resistor, motor) screw to a torque of 2.2–2.5 N·m. Exceeding the maximum tightening torque may damage the terminal block.

* Tighten the M3 screw for securing terminal block cover 1 (transparent) to a torque of 0.19–0.21 N·m.

* Tighten the M5 screw for securing terminal block cover 2 (black) to a torque of 2.0–2.5 N·m.

7.1.7 Size D, E 400 V

	Pin No.	Symbol	Name	Description
XD	1	24V	Control power supply input terminal	DC 24 V, ±15 %
	2	0V		
XA	3	L1	Main power supply input terminal	3-phase 380Y/220-480Y/277 V, -15% to +10%, 50/60 Hz TN (ground the neutral point to earth)
	2	L2		
	1	L3		
XC	4	P	Regenerative resistor connection terminal	● Normally, short circuit between RB and B. ● When using an external regenerative resistor (customer-supplied), open between RB and B and connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.
	3	RB		
	2	B		
	1	N		
XB	3	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase
	2	V		
	1	W		
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.

* Tighten the M4 grounding screw to a torque of 1.0–1.2 N·m.

7.1.8 Size F 400 V

Use terminal blocks.

	Terminal block No. (Upper to lower)	Symbol	Name	Description
Terminal block	1	–	Free terminals	
	2	–		
	3	L1	Main power supply input terminal	3-phase 380Y/220-480Y/277 V, -15% to +10%, 50/60 Hz TN (ground the neutral point to earth)
	4	L2		
	5	L3		
	6	P	Regenerative resistor connection terminal	● Normally, short circuit between RB and B. ● When using an external regenerative resistor (customer-supplied), open between RB and B and connect the external regenerative resistor between P and B. In addition, parameters must be used for regenerative resistor settings. For details, refer to “Technical Reference - Functional Specification”. ● Do not connect anything to the N terminal.
	7	RB		
	8	B		
	9	N		
	10	U	Motor output terminal	● Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase
	11	V		
	12	W		
	⏚	⏚	Ground terminal	● Connect with the motor E terminal to ground to earth.

Connector

	Pin No.	Symbol	Name	Description
XD	1	24V	Control power supply input terminal	DC 24 V, ±15 %
	2	0V		

* Tighten the M5 grounding screw to a torque of 1.8–2.0 N·m.

* Tighten the M5 terminal block screw to a torque of 1.8–2.0 N·m.

* Tighten the M3 screw for securing the terminal block cover to a torque of 0.19–0.21 N·m.

* Exceeding the maximum tightening torque may cause damage.

7.2 USB Connector X1

By connecting to computer or NC controller via the USB interface, it is possible to set/change parameters, monitor control status, view error status/history, save/load parameters, etc.

Name	Symbol	Pin No.	Description
USB signal connector	VBUS	1	● Used for communication with computers or NC controllers.
	D-	2	
	D+	3	
For manufacturer use	—	4	● Do not connect anything
Signal ground	GND	5	● Signal ground

The connector type on the servo driver side is USB mini-B.

7.3 EtherCATconnectors X2A, X2B

This is an RJ45 connector for use with EtherCAT.

[X2A]/[X2B]

Name	Symbol	Pin No.	Description
Network output / input +	TX/RX+	1	Connect to pin 1 on the RJ45 connector of communication node.
Network output / input -	TX/RX-	2	Connect to pin 2 on the RJ45 connector of communication node.
Network input / output +	RX/TX+	3	Connect to pin 3 on the RJ45 connector of communication node.
Not used	—	4	Connect to pin 4 on the RJ45 connector of communication node.
Not used	—	5	Connect to pin 5 on the RJ45 connector of communication node.
Network input / output -	RX/TX-	6	Connect to pin 6 on the RJ45 connector of communication node.
Not used	—	7	Connect to pin 7 on the RJ45 connector of communication node.
Not used	—	8	Connect to pin 8 on the RJ45 connector of communication node.
Frame ground	—	Shell	Connect to the cable shield

* Make sure to use shielded twisted pair (STP) cables of Category 5e or higher in the TIA/EIA-568 standard. Please refer to the specification of ETG (EtherCAT Technology Group) for details.

* Auto MDI/MDI-X assigns functions to pin no.1,2,3,6.

7.4 Safety Function Connector X3

This is a connector for functional safety.

Name	Symbol	Pin No.	Description	I/O signal interface
Reserved	—	1	● Do not connect anything	—
	—	2		—
Safety input 1	SF1-	3	● Two independent circuits turn off the drive signal to the power module and cut off the motor current.	i-1
	SF1+	4		
Safety input 2	SF2-	5		
	SF2+	6		
EDM output	EDM-	7	● Monitor output for monitoring safety function faults.	o-1
	EDM+	8		
Frame ground	FG	Shell	● Connected to the ground terminal inside the servo driver.	—

In order to set the safety levels to SIL 3, PL e, DCavg Medium, diagnosis via EDM output is required (max. 3-month diagnostic interval).

Safety levels are SIL 2, PL d, DCavg Low when diagnosis by EDM output is not performed.

7.5 Parallel I/O connector X4

7.5.1 Input signal

Name	Symbol	Pin No.	Description	I/O signal interface
General input common	SI-COM	6	● Connect the positive or negative poles of the external DC power supply (12–24 V). ● Use a power supply of 12 V±5% – 24 V±5%. ● This must be isolated from the primary power supply. Do not connect it to the same power supply. Primary power supply: Power supply for motor brake	—
General input 1	SI1	5	● Functions are assigned using parameters. For details, refer to “Technical Reference - Functional Specification”. ● Be aware that there are restrictions on the assignment of functions. For example, in the case of external latch inputs, EXT1 can only be assigned to SI5, EXT2 to SI6, and EXT3 to SI7.	i-1
General input 2	SI2	7		
General input 3	SI3	8		
General input 4	SI4	9		
General input 5	SI5	10		
General input 6	SI6	11		
General input 7	SI7	12		
General input 8	SI8	13		

7.5.2 Input signals (analog commands) and their functions

Name	Symbol	Pin No.	Description	I/O signal interface
Analog input 1	AI1	23	● Analog input with 16-bit resolution. ● The maximum allowable input voltage is ±10 V. ● Valid only in position control mode	Ai-1

7.5.3 Output signal

Name	Symbol	Pin No.	Description	I/O signal interface
General output 1	SO1+ SO1-	1 2	● Functions are assigned using parameters. For details, refer to “Technical Reference - Functional Specification”.	o-1
General output 2	SO2+ SO2-	25 26		
General output 4	SO3+ SO3-	3 4		

7.5.4 Encoder output signal/position compare output signal

Name	Symbol	Pin No.	Description	I/O signal interface
A-phase output/position compare output 1	OA+/ OCMP1+	17	● Differential output of divided feedback scale signal (A/B phase). (RS422 compatible) ● The division ratio can be set by the parameters. ● The ground of the line driver for the output circuit is connected to the signal ground (GND), and kept non-insulated. ● Maximum output frequency is 4 Mpps (after being multiplied by 4). ● It can be used as position compare output by setting parameters. For details, refer to “Technical Reference - Functional Specification”. ● This differential signal should be received by a line receiver (AM26C32 or equivalent), and a terminating resistor (approx. 330 Ω) should be connected between the line receiver inputs. ● Use shielded twisted-pair cables for wiring, and connect the shielded wires to the connector shell.	Do-1
	OA-/ OCMP1-	18		
B-phase output/position compare output 2	OB+/ OCMP2+	20		
	OB-/ OCMP2-	19		
Position compare output 3	OCMP3+	21		
	OCMP3-	22		
Signal ground	GND	16	● Signal ground. ● Always connect the line receiver ground to this terminal.	—

7.5.5 Battery input for encoder backup

Name	Symbol	Pin No.	Description	I/O signal interface
Battery input for absolute encoder	BTP-I	14	● Connect the absolute encoder battery. For details, refer to *“8.3.4 Wiring to Connector X6”* . BTP-I: positive pole, BTN-I: negative pole ● This provides power to the absolute encoder for multi-turn data storage via the BTP-O (3-pin) and BTN-O (4-pin) of encoder connector X6. ● Connect the absolute encoder battery using one of the following methods: 1 Direct connection to the motor side 2 Connect to the encoder cable 3 Connect to this connector	—
	BTN-I	15		—

7.5.6 Other

Name	Symbol	Pin No.	Description	I/O signal interface
Reserved	—	24	● Do not connect anything.	—
Frame ground	FG	Shell	● Connected to the ground terminal inside the servo driver.	—

7.6 External Scale Connector X5

Name	Symbol	Pin No.	Description
Power supply output for external scale	EX5V	1	● External scale power supply output (*1) (*2)
	EX0V	2	● Ground for external scale power supply output (*3)
External scale signal I/O (Serial signal)	EXPS	3	● Serial signal non-inverted I/O
	/EXPS	4	● Serial signal inverted I/O
External scale signal input (A-/B-/Z-phase signal) (*4)	EXA	5	● A-phase signal non-inverted input
	/EXA	6	● A-phase signal inverted input
	EXB	7	● B-phase signal non-inverted input
	/EXB	8	● B-phase signal inverted input
	EXZ	9	● Z-phase signal non-inverted input
	/EXZ	10	● Z-phase signal inverted input
Frame ground	FG	Shell	● Connected to the ground terminal inside the servo driver.

*1 EX5V of the external scale power supply output is 5 V±5%, 250 mA max.

A customer-supplied external power supply is necessary if using an external scale with a consumption current higher than this.

Also, some external scales may take time to initialize when powering on. In that case, it is possible to adjust the power on wait time, which is a function of the servo driver.

For details, refer to “Technical Reference - Functional Specification”.

*2 If the external scale is powered by an external power supply, the EX5V pin should be open to prevent external voltage from being supplied to this pin.

*3 The EX0V of the power supply output for external scales is connected to the control circuit ground connected to connector X5.

*4 Up to 4 Mpps can be received with A/B phase multiplied by 4. However, if the duty ratio of the scale input signal waveform is not 50%, it may not be able to read correctly.

7.7 Encoder Connector X6

Name	Symbol	Pin No.	Description
Power supply output for encoder	E5V	1	● Encoder power supply output
	E0V	2	● Ground for encoder power supply output (*1)
Battery output for absolute encoder (*2)	BTP-O	3	● Battery output (positive pole)
	BTN-O	4	● Battery output (negative pole)
Encoder signal I/O (Differential serial signal)	PS	5	● Encoder signal non-inverted I/O
	/PS	6	● Encoder signal inverted I/O
Frame ground	FG	Shell	● Connected to the ground terminal inside the servo driver.

*1 E0V of the encoder power supply output is connected to the control circuit ground connected to connector X4 inside the servo driver.

*2 This is connected to absorber battery inputs BTP-I and BTN-I for connector X4 inside the servo driver.

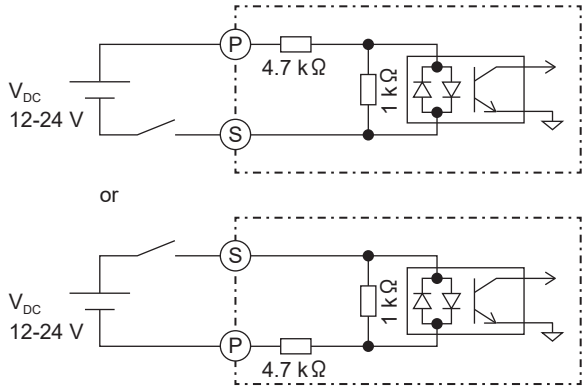
Do not connect anything to this terminal when connecting batteries directly to the encoder connection cable.

7.8 Analog Monitor Connector X7

Name	Symbol	Pin No.	Description	I/O signal interface
Analog monitor output 1	AM1	1	• Outputs analog signals for the monitor. • The meaning of the output signal changes depending on parameter settings.	Ao-1
Analog monitor output 2	AM2	2		
Signal ground	GND	3	• Signal ground	—
Reserved	—	4,5	• Do not connect anything	—

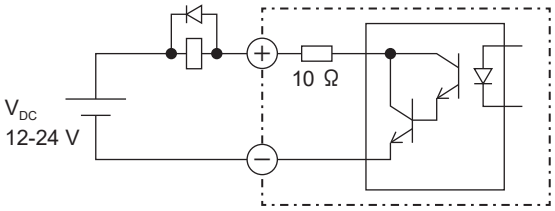
7.9 I/O Signal Interface

i-1



S: [Pins] (X3) 3, 5 / (X4) 5, 7, 8, 9, 10, 11, 12, 13
P: [Pins] (X3) 4, 6 / (X4) 6

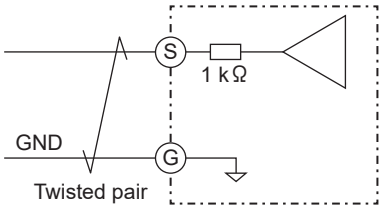
o-1



[Pins] ＋: (X3) 8 / (X4) 1, 3, 25
[Pins] －: (X3) 7 / (X4) 2, 4, 26

* If the relay is to be driven directly, install a diode in parallel with the relay in the direction shown above.

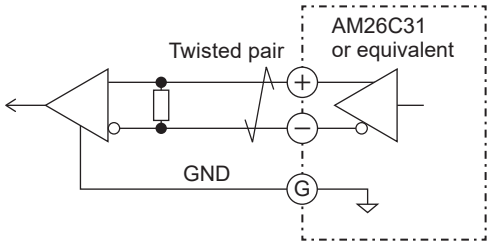
Ao-1



[Pins] S: (X7) 1, 2
[Pins] G: (X7) 3

* The output signal amplitude is ±10 V.

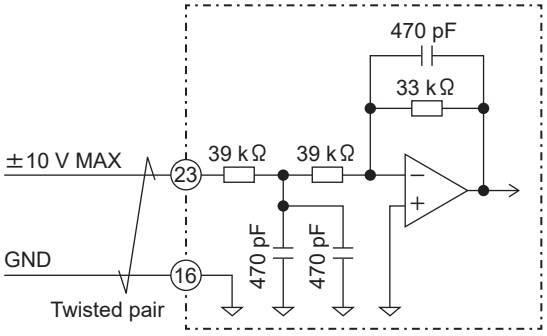
Do-1



[Pins] ＋: (X4) 17,20,21
[Pins] －: (X4) 18,19,22
[Pins] G : (X4) 16

* Connect a terminating resistor (approx. 330 Ω) between the line receiver inputs.

Ai-1



8 Wiring and System Configuration

8.1 Cables Used and Maximum Cable Lengths

Name	Symbol	Maximum wiring length (*1)	Cable(s) used
Main power supply input	L1, L2, L3	—	See *"15 Model Specifications"*
Control power supply input	L1C, L2C (100 V / 200 V)	—	See *"15 Model Specifications"*
	24V, 0V (400 V)	—	See *"15 Model Specifications"*
Motor output	U, V, W, ⏚	20 m	See *"15 Model Specifications"*
Ground cable	⏚	—	See *"15 Model Specifications"*
Encoder connection	X6	20 m	Common shielded twisted-pair wire Core cable: 0.18 mm^2 or more
External scale connection	X5	20 m	
Parallel I/O connection	X4	3 m	
Safety connection	X3	3 m	Core cable: 0.18 mm^2 or more
EtherCAT connection	X2A, X2B	100 m (*2)	TIA/EIA-568 CAT5e STP

*1 The above wiring lengths are the maximum lengths used in Panasonic's evaluation environment. They do not guarantee operation in working environments of customers.

*2 For details, refer to *"8.3.5 Wiring to Connectors X2A, X2B"* .

8.2 Cable Side Connectors

Connector symbol	Product Name	Product number	Manufacturer
X3	Connector	2013595-1	TE Connectivity
X4	Solder plug (soldered type)	DF02P026F22A1	Japan Aviation Electronics Industryry, Ltd. (JAE)
	Plug hood	DF02D026B22A	
X5	Connector	MUF-PK10K-X	J.S.T. Mfg. Co., Ltd.
X6	Receptacle	3E206-0100 KV	3M Japan
	Shell kit	3E306-3200-008	
X7	Connector	510210500	Molex Japan
	Terminal	500588020	
XE (*1)	Connector	5557-04R-210	Molex Japan
	Terminal	5556PBTL	

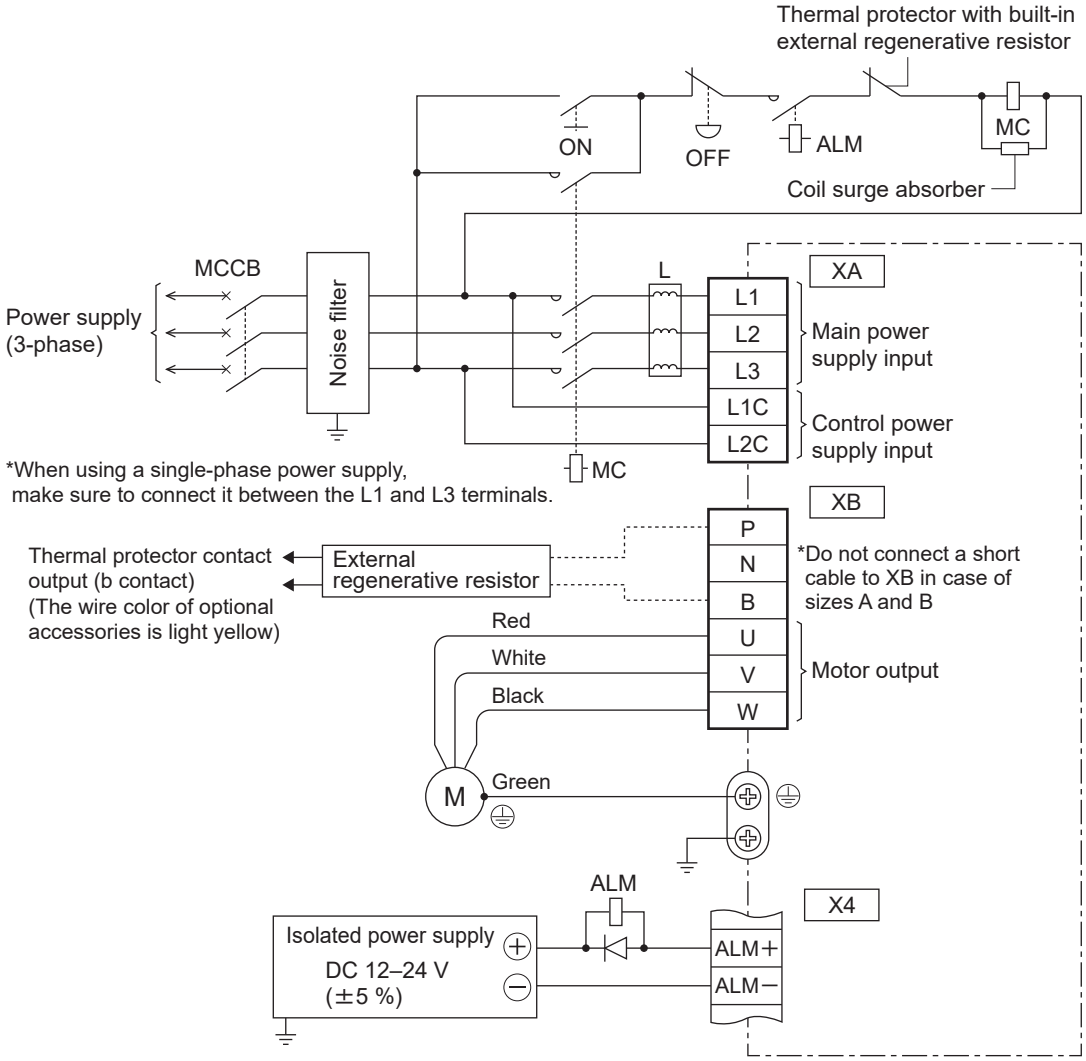
*1 Only size G is supported.

* Use the connectors above or an equivalent.

8.3 Precautions for Wiring

8.3.1 Wiring to Power Connectors and Terminal Blocks

8.3.1.1 Size A, B 100 V/200 V



Regenerative resistor connection

Size	Short cable (accessory)	Built-in regenerative resistor	Connection of connector XB	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size A Size B	None	None	Between P and B: Connect the external regenerative resistor.	Between P and B: Keep open.

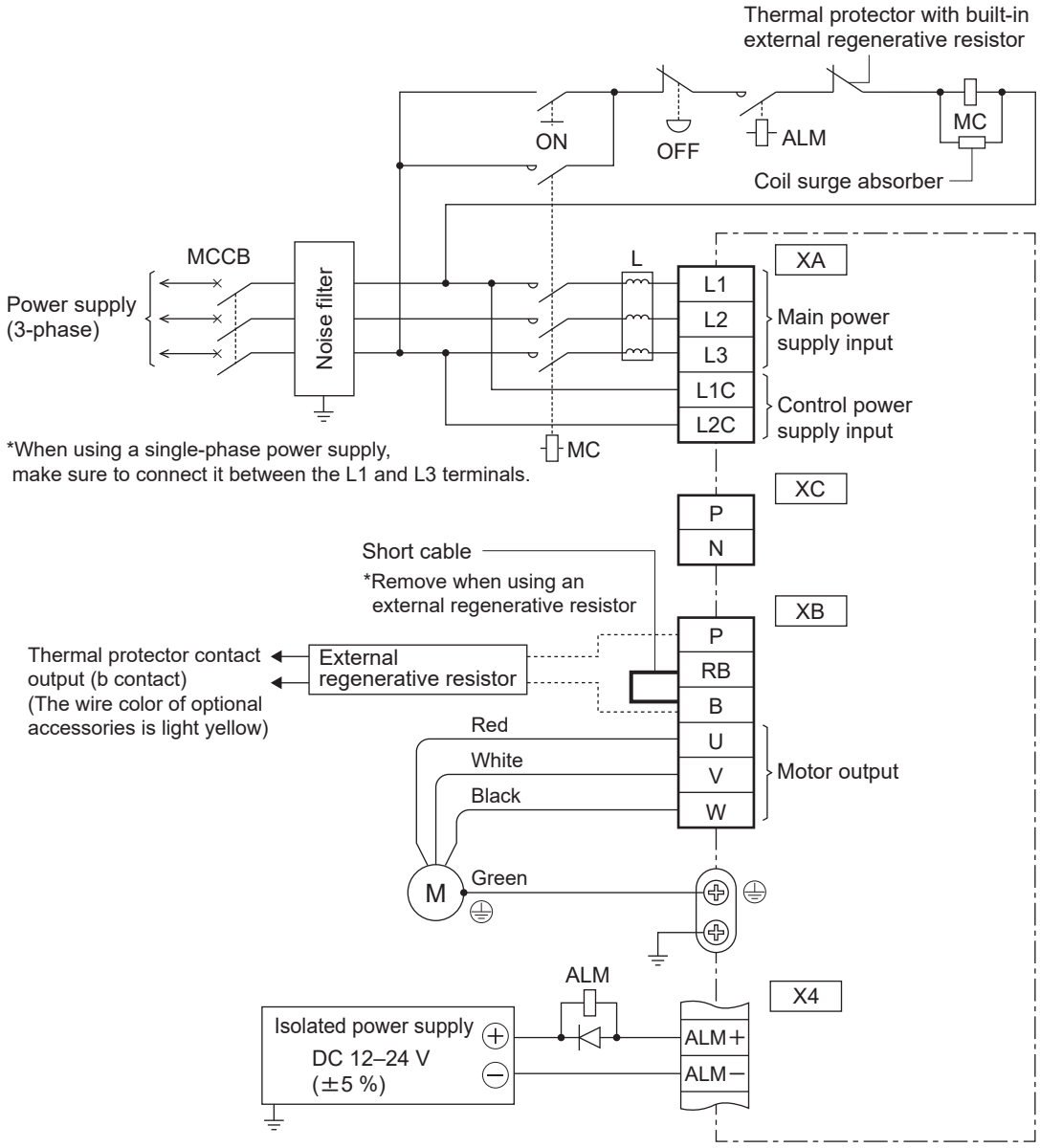
* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* For details, refer to the table in *"7.1.1 Size A, B 100 V/200 V"* .

8.3.1.2 Size C, D 100 V/200 V



Regenerative resistor connection

Size	Short cable (accessory)	Built-in regenerative resistor	Connection of connector XB	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size C Size D	Provided	Provided	Between the RB and B: Disconnect the short cable. Between P and B: Connect the external regenerative resistor.	Between RB and B: Short circuit with the short cable.

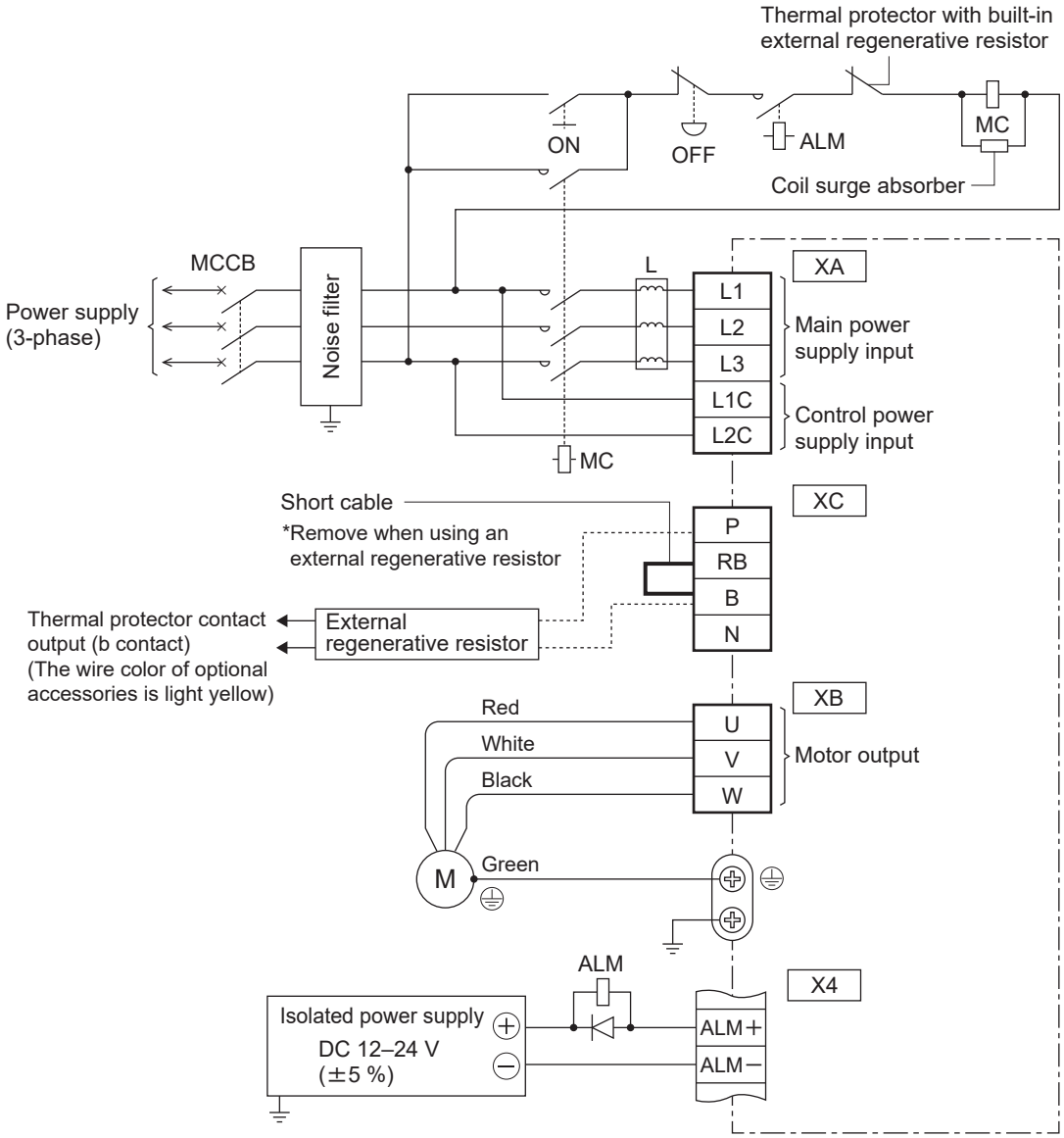
* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* For details, refer to the table in *"7.1.2 Size C, D 100 V/200 V"* .

8.3.1.3 Size E 200 V



Regenerative resistor connection

Size	Short cable (accessory)	Built-in regenerative resistor	Connection of connector XC	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size E	Provided	Provided	Between the RB and B: Disconnect the short cable. Between P and B: Connect the external regenerative resistor.	Between RB and B: Short circuit with the short cable.

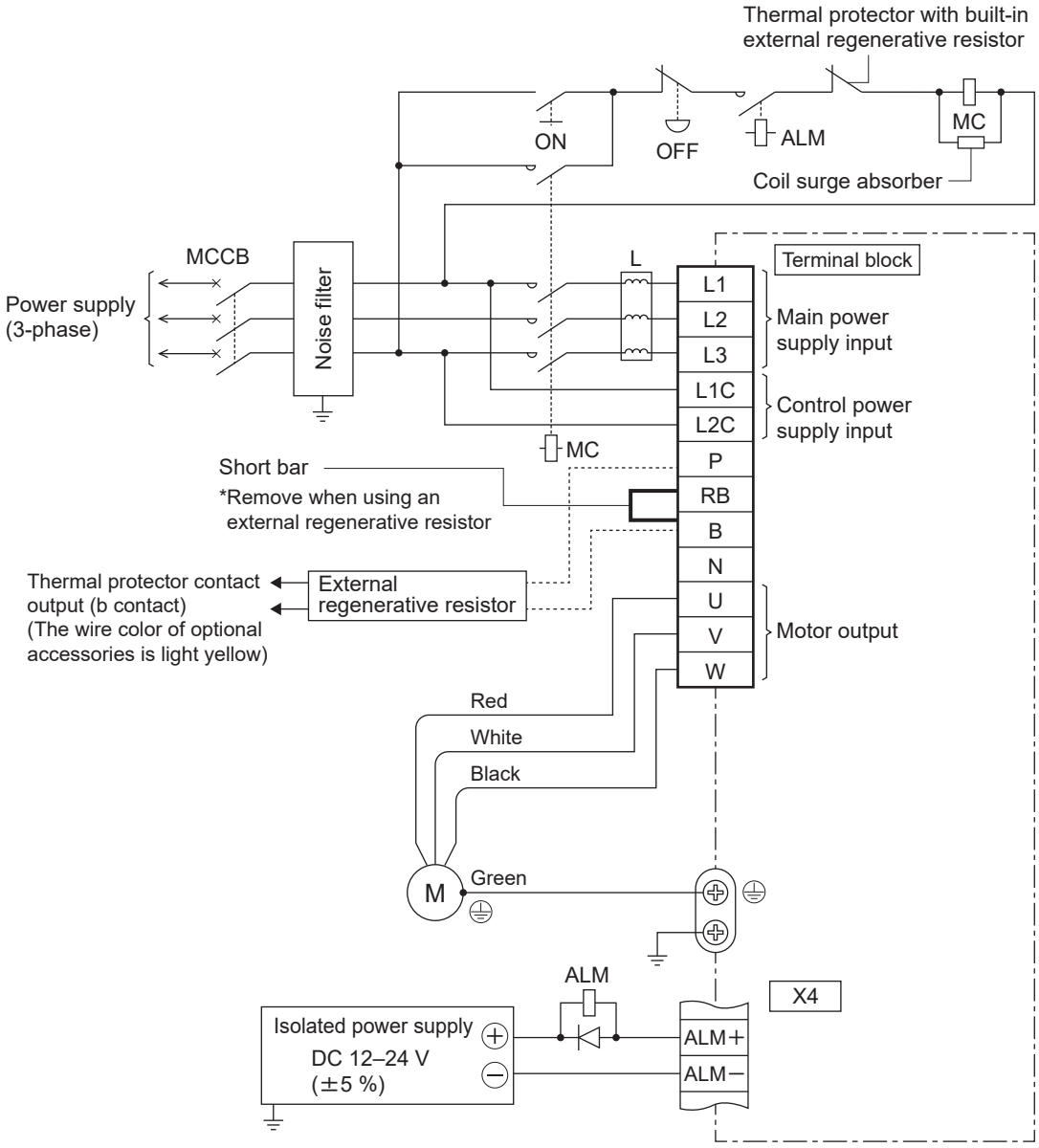
* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* For details, refer to the table in *"7.1.3 Size E 200 V"* .

8.3.1.4 Size F 200 V



Regenerative resistor connection

Size	Short bar (accessory)	Built-in regenerative resistor	Terminal block connection	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size F	Provided	Provided	Between RB and B: Disconnect the short bar. Between P and B: Connect the external regenerative resistor.	Between RB and B: Short circuit with the short bar.

* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

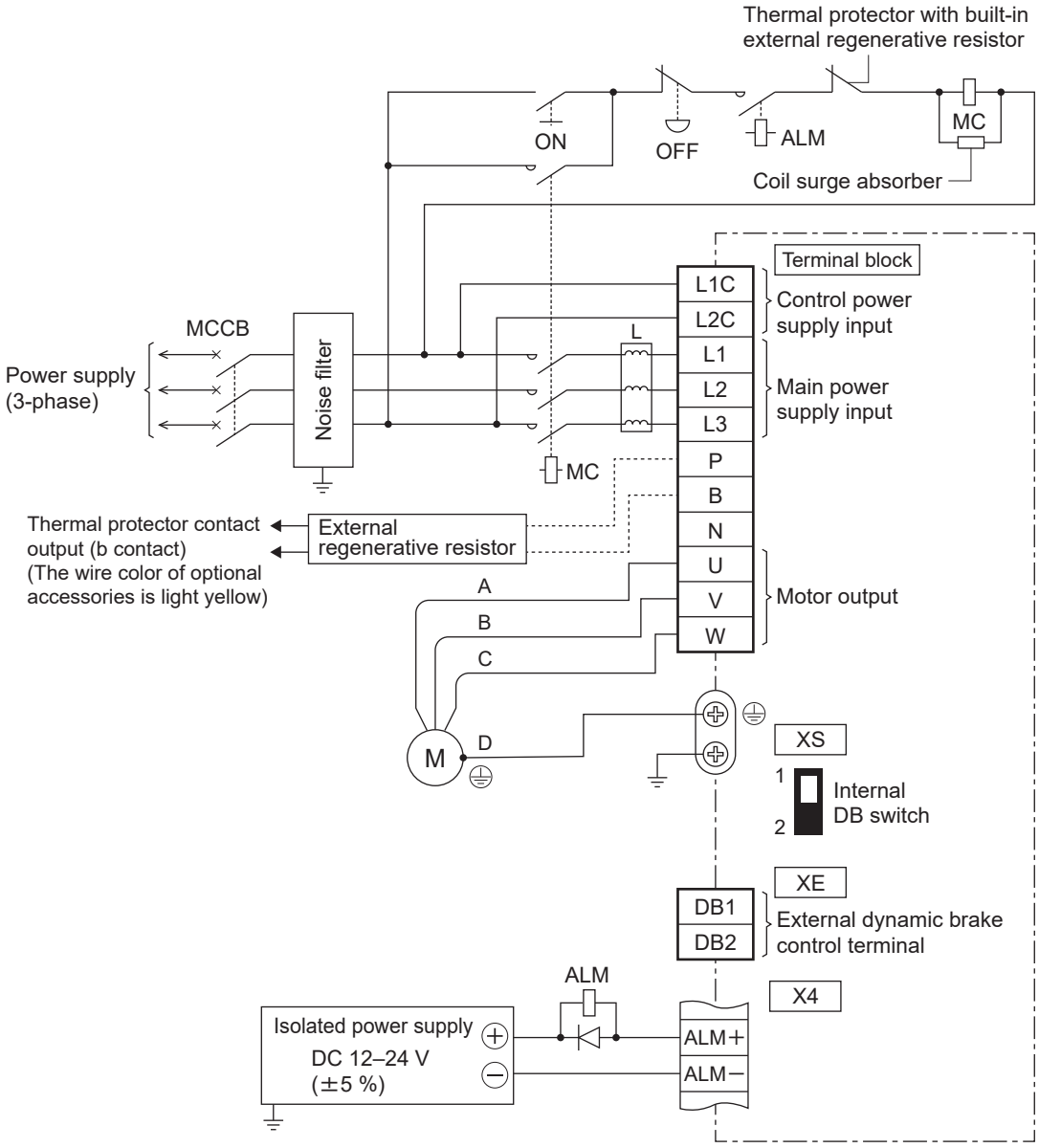
The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

* For details, refer to the table in *"7.1.4 Size F 200 V"* .

8.3.1.5 Size G 200 V



Regenerative resistor connection

Size	Built-in regenerative resistor	Terminal block connection	
		When using an external regenerative resistor	When not using an external regenerative resistor
Size G	None	Between P and B: Connect the external regenerative resistor.	Between P and B: Keep open.

* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* Size G has a built-in dynamic brake. If using the built-in dynamic brake, set switch XS to "1". (It is set to the "1" side by default.)

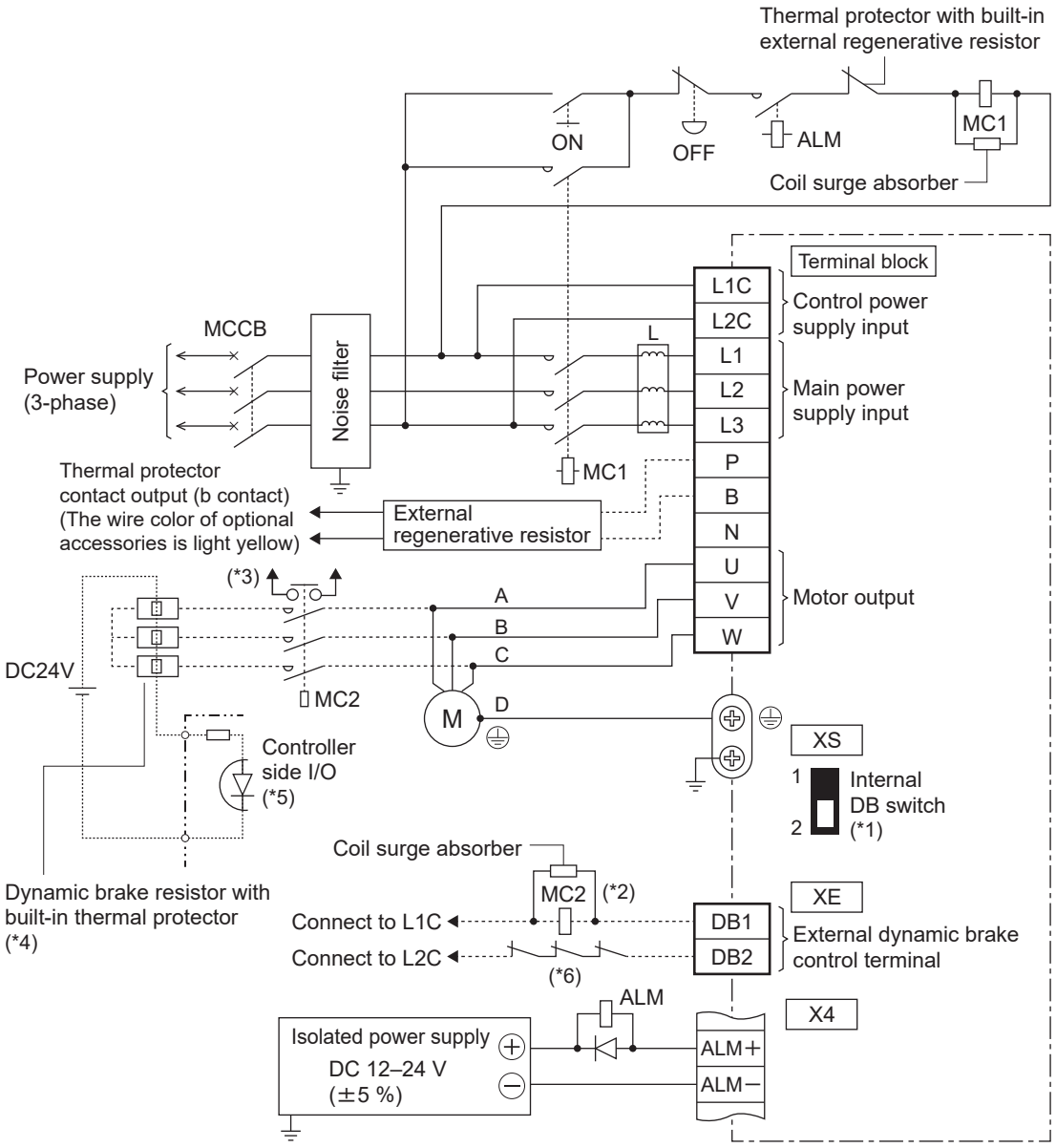
* The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

* If the capability of the built-in dynamic brake resistor is exceeded, set switch XS to "2" to use the external dynamic brake resistor.

See external dynamic brake connection examples for connections.

* For details, refer to the table in *"7.1.5 Size G 200 V"* .

Connection example for Size G 200 V external dynamic brake resistor



*1 If using the external dynamic brake resistor, set switch XS to "2".

*2 The electromagnetic contactor (MC2) must be the same as the electromagnetic contactor (MC1) of the main circuit.

*3 If an auxiliary contact is established and the main contact is welded together, configure protection so that the servo is not turned on using an external sequence.

*4 Use three dynamic brake resistors of 1.2 Ω 400 W.

Install the dynamic brake resistor to nonflammable materials such as metal.

*5 Install a thermal protector on the dynamic brake resistor and monitor it with the controller side I/O. Configure the protection so that the servo does not turn on in sequence when the thermal protector is operated.

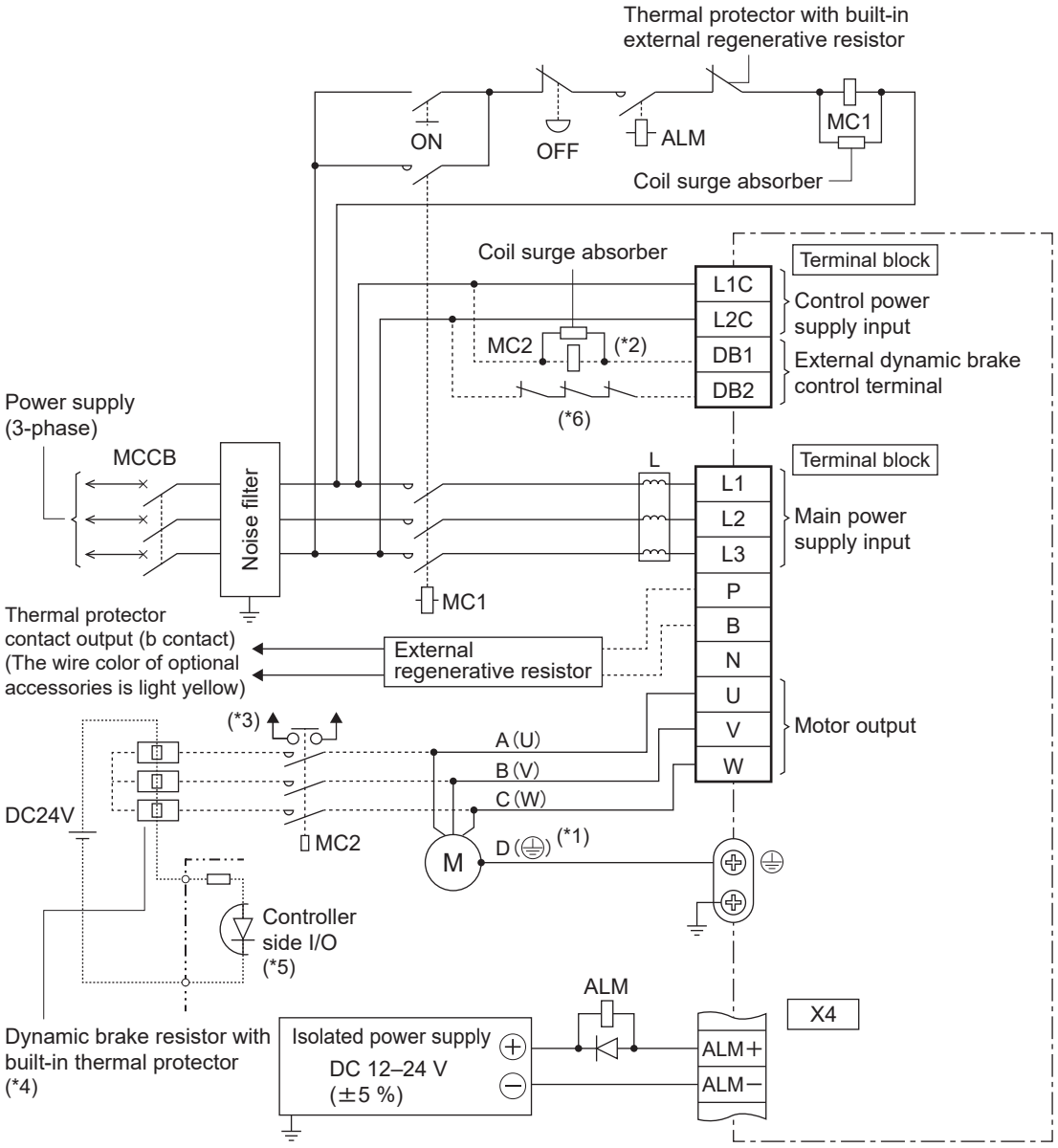
*6 If the thermal protector cannot be monitored by the controller side I/O, input the thermal protector output between L2C and DB2 so that the dynamic brake does not operate when temperature protector operates.

*7 Use the external dynamic brake resistor when the capability of the built-in dynamic brake resistor is exceeded.

*8 Do not use the built-in dynamic brake and external dynamic brake at the same time.

*9 For details, refer to the table in *"7.1.5 Size G 200 V"* .

8.3.1.6 Size H 200 V



*1 The pin number of the connector on the motor side is listed. Only in the case of the 22-kW specification is the connection destination indicated in parentheses.

*2 The electromagnetic contactor (MC2) must be the same as the electromagnetic contactor (MC1) of the main circuit.

*3 If an auxiliary contact is established and the main contact is welded together, configure protection so that the servo is not turned on using an external sequence.

*4 Use three dynamic brake resistors of 1.2 Ω 400 W.

Install the dynamic brake resistor to nonflammable materials such as metal.

*5 Install a thermal protector on the dynamic brake resistor and monitor it with the controller side I/O. Configure the protection so that the servo does not turn on in sequence when the thermal protector is operated.

*6 If the thermal protector cannot be monitored by the controller side I/O, input the thermal protector output between L2C and DB2 so that the dynamic brake does not operate when temperature protector operates.

*7 For details, refer to the table in *"7.1.6 Size H 200 V"* .

Regenerative resistor connection

Size	Built-in regenerative resistor	Terminal block connection	
		When using an external regenerative resistor	When not using an external regenerative resistor
Size H	None	Between P and B: Connect the external regenerative resistor.	Between P and B: Keep open.

* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

  The primary-side power supply (power supply for the motor brake) must be isolated.

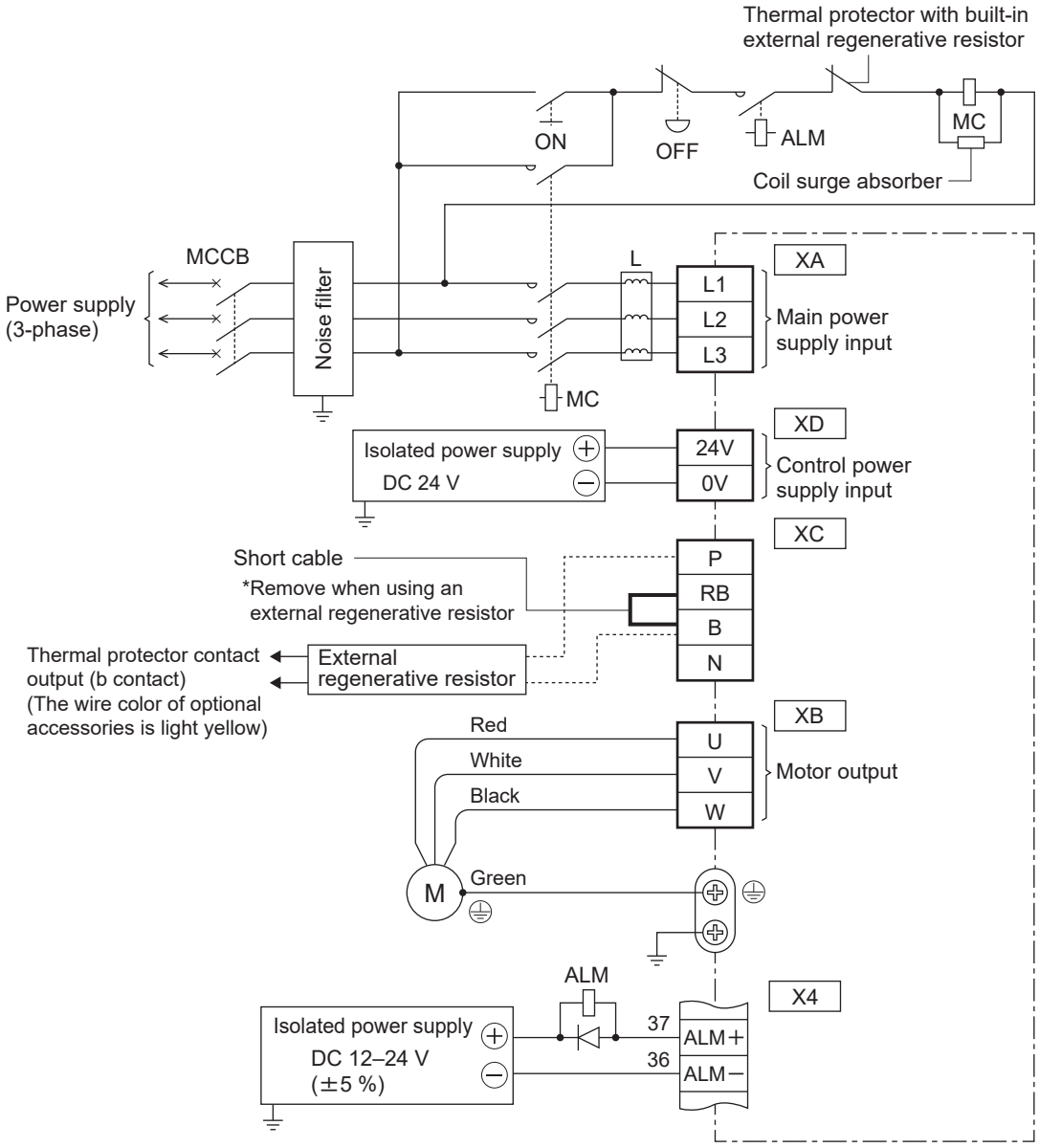
  Do not connect it to the same power supply.

* Because the dynamic brake is not built in, it is in a free-run state when a motor emergency stop occurs.

  Use the external dynamic brake resistor if this could cause a mechanical collision.

* The capability of the external dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

8.3.1.7 Size E, D 400 V



Regenerative resistor connection

Size	Short cable (accessory)	Built-in regenerative resistor	Connection of connector XC	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size D Size E	Provided	Provided	Between the RB and B: Disconnect the short cable. Between P and B: Connect the external regenerative resistor.	Between RB and B: Short circuit with the short cable.

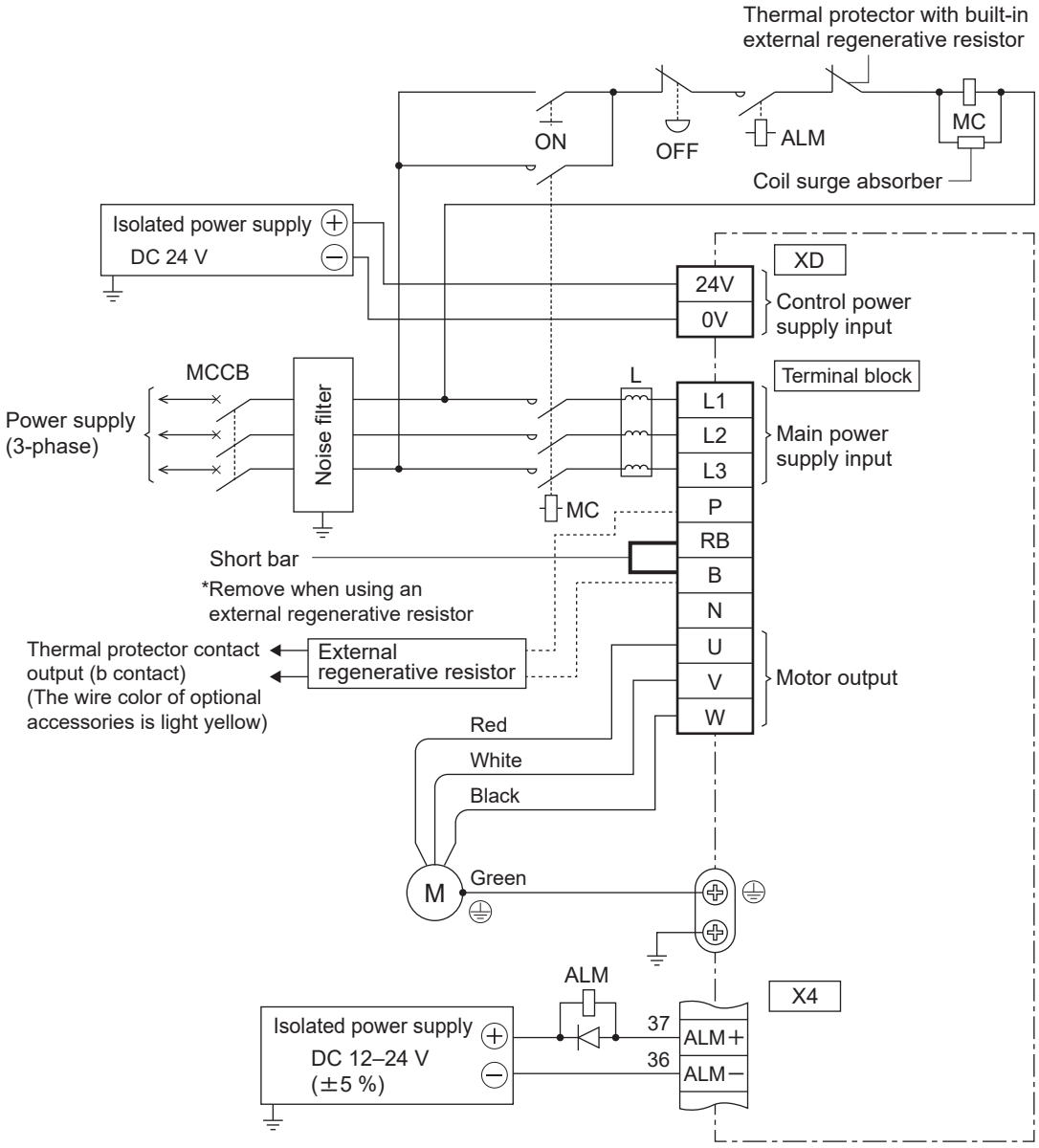
* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* For details, refer to the table in *"7.1.7 Size D, E 400 V"* .

8.3.1.8 Size F 400 V



Regenerative resistor connection

Size	Short bar (accessory)	Built-in regenerative resistor	Terminal block connection	
			When using an external regenerative resistor	When not using an external regenerative resistor
Size F	Provided	Provided	Between RB and B: Disconnect the short bar. Between P and B: Connect the external regenerative resistor.	Between RB and B: Short circuit with the short bar.

* Connectors X1–X7 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

The primary-side power supply (power supply for the motor brake) must be isolated.

Do not connect it to the same power supply.

* The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

* For details, refer to the table in *"7.1.8 Size F 400 V"* .

8.3.1.9 Precautions

1 When the servo driver uses a single-phase power supply for sizes A–D, connect the servo driver to main power supply input terminals L1 and L3. Do not connect anything to the terminal L2.

2 Insert the connector securely until it is locked.

3 Make sure to use an insulation coated crimp terminal when connecting to each terminal on the terminal block. (size F, G, H)

4 For models with terminal block covers, the terminal block cover is screwed on.

When wiring to the terminal block, unscrew these screws to open the cover.

Tighten the cover fixing screw to 0.19–0.21 N·m.

Only tighten the terminal block cover 2 (black) of size H to less than 2.0–2.5 N·m of torque.

5 Apply the power supply of the voltage indicated on the nameplate.

6 Do not reverse-connect the power supply input terminals (L1, L2, and L3) and the motor output terminals (U, V, and W).

7 Do not connect the motor output terminals (U, V, and W) to ground or short circuit them.

8 Power connectors XA, XB, XC, XD, and the terminal block are supplied with voltage, so do not touch them. There is a danger of electric shock.

9 The short-circuit current of the power supply used should be capable of not more than 5,000 Arms symmetrical amperes, below the maximum input voltage of the product.

If the short-circuit current of the power supply exceeds this, limit the short-circuit current by using a currentlimiting device (such as a current-limiting fuse, current-limiting breaker, transformer).

10 Unlike an induction motor, an AC servo motor cannot change the rotation direction by exchanging three phases. Make sure to match the motor output terminals (U, V, and W) of the servo driver with the colors (pin number for cannon plugs) of the motor output cables.

11 Make sure to connect the grounding terminal of the motor to the grounding terminal of the servo driver and ground it together with the ground terminal of the noise filter. Also ground the machine body. Use a D model ground (grounding resistance: 100 Ω or less). Tighten the servo driver's ground screw with the appropriate torque specified for each size.

Use a ground cable with a wire diameter equal to or larger than the wire diameter specified in “Model Specifications”.

Also, avoid direct contact between aluminum and copper to avoid the effects of electrolytic corrosion.

12 Insert surge absorbing circuits for preventing noise to electromagnetic contactors placed around the servo driver, to coils between relay contact points, and to the brake windings of motors with a brake.

13 Install a molded case circuit breaker (MCCB) and make sure to shut off the power supply from outside the servo driver in case of an emergency.

When using a residual current device, use one with countermeasures for high frequencies.

14 Install a noise filter to reduce terminal noise voltage.

15 The power supply for the brake of motors with a brake must be supplied by the customer.

16 Ensure that voltage is applied to the power supply only after wiring has been completed.

17 Regarding external regenerative resistors:

- Sizes A, B, G and H do not have built-in regenerative resistors.
- Sizes C, D, E, and F have built-in regenerative resistors which are activated by shorting between RB and B.
- If tripping occurs due to a regenerative overload protection error (Err18.0), an external regenerative resistor must be installed. For external regenerative resistors, remove the short cable or short bar between RB and B and connect it between the P and B terminals. In addition, parameters must be used for regenerative resistor settings.

  For details, refer to “Technical Reference - Functional Specification”.

- The following resistors are recommended as external regenerative resistors:

Size	Input power supply voltage		
	Single-phase 100 V	Single-phase 200 V/3-phase 200 V	3-phase 400 V
A	DV0P4280	DV0P4281 (100 W or less) DV0P4283 (200 W)	—
B	DV0P4283	DV0P4283	
C	DV0P4282	DV0P4283	
D	—	DV0P4284	DV0PM20048
E		Two DV0P4284 in parallel or one DV0P4285	DV0PM20049
F		Two DV0P4285 in parallel	Two DV0PM20049 in parallel
G	—	Three DV0P4285 in parallel	—
H	—	Six DV0P4285 in parallel	—

* Manufacturer: Iwaki Musen Kenkyusho

Panasonic product number	Manufacturer product number	Specifications			Built-in thermal protector (*2) Operating temperature
		Resistance value	Rated power (reference) (*1)		
			Free air	Fan used	
		Ω	[W]	[W]	
DV0P4280	RF70M	50	10	25	140 ± 5 °C B contact Open/close capacity (resistive load) 1 A, AC 125 V, 6,000 cycles 0.5 A, AC 250 V, 10,000 cycles
DV0P4281	RF70M	100	10	25	
DV0P4282	RF180B	25	17	50	
DV0P4283	RF180B	50	17	50	
DV0P4284	RF240	30	40	100	
DV0P4285	RH450F	20	52	130	
DV0PM20048	RF240TF	120	35	80	
DV0PM20049	RH450FTF	80	65	190	

*1 Available power without running the built-in thermal protector

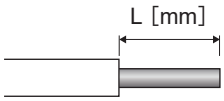
*2 Each regenerative resistor has built-in thermal fuse and thermal protector for safety.

- When using a thermal protector, configure the circuit to turn off the power supply.
  (See *"8 Wiring and System Configuration"*)
- The built-in thermal fuse may break due to heat dissipation conditions, operating temperature range, power supply voltage, or load fluctuation.
  When operating in conditions where the regenerative resistor is likely to generate heat (e.g., when the power supply voltage is high, when load inertia is large, when deceleration times are short), incorporate it into the device to ensure that the surface temperature of the regenerative resistor remains at 100°C or less and confirm the operation thereof.
- Install the regenerative resistor to nonflammable materials such as metal.
- Install the regenerative resistor so that it cannot be touched directly, such as by covering it with non-combustible material.
- Sections which can be touched directly should be kept to less than 70°C.

8.3.1.10 How to wire to the power connector

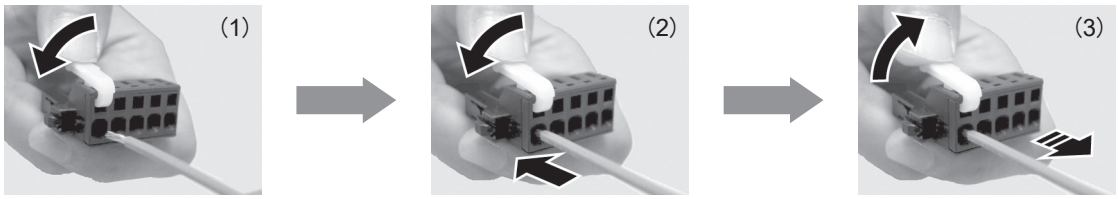
Follow the procedure below to wire to connectors XA, XB, XC and XD .

1 Strip the wires to be used. Refer to the figure below for the stripping length.



Size	Connector	L [mm]
Sizes A - C, Size D 200 V	XA, XB	10 mm
Size D 400 V, Size E	XA, XB, XC	11 mm
Sizes D - F 400 V	XD	8 mm

2 Insert the wire into the connector.



(1) Push down the spring by pushing the control lever attached to the upper operating slot with your fingers.

(2) Insert the wire while pressing the control lever.
* Ensure that all strands are inserted into the spring opening.

(3) Wire it by releasing the control lever. Pull the wire lightly to make sure that the wire is securely connected.

Precautions

- Be careful not to damage or cut the core cable when stripping the wire.
- Because the stripping length of the electric wire will depend on the size and type of electric wire, decide the optimal stripping length based on processing conditions.
- When wiring, disconnect the connector from the servo driver main body.
- Insert one wire into one wire insertion slot of the connector.
- Push down the control lever to remove the wire.

8.3.2 Wiring to Connector X4

1 The customer is required to prepare provide a DC 12 - 24 V control signal power supply for external control to be connected to SI-COM.

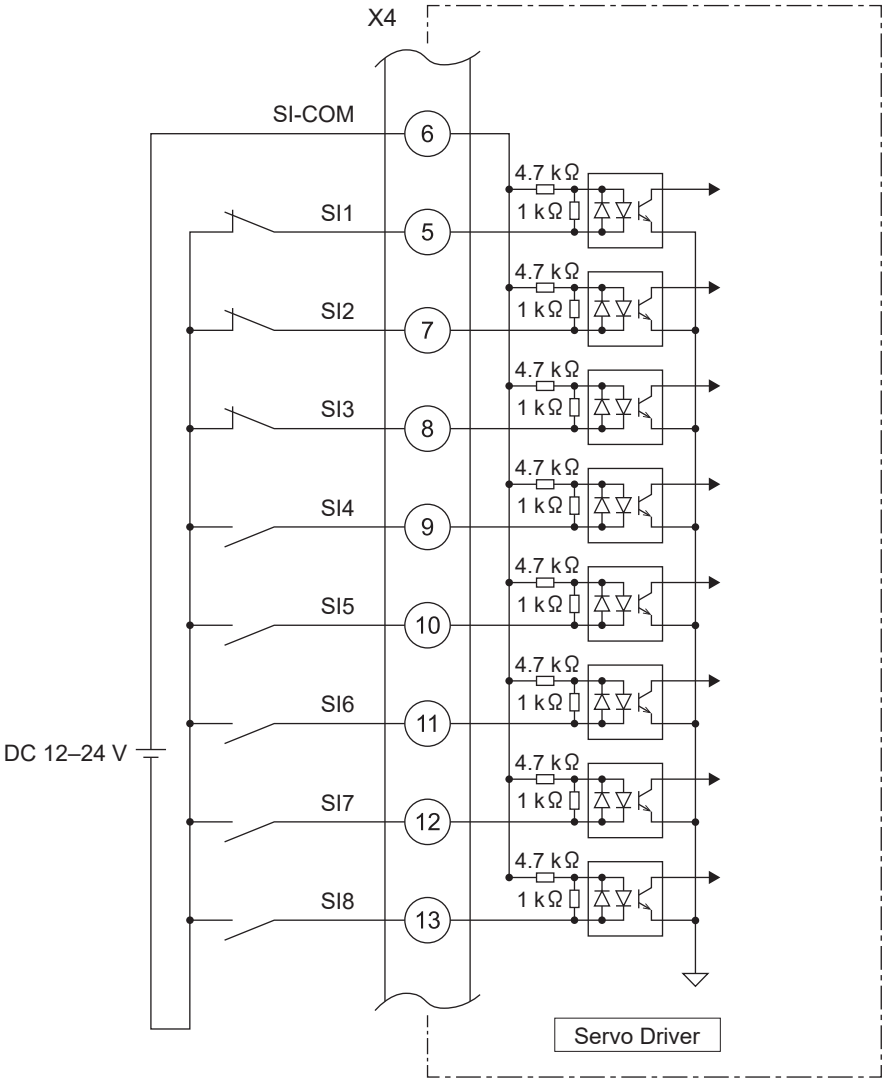
It must be isolated from the primary power supply (motor brake power supply).

Do not connect it to the same power supply.

2 Install peripheral devices as close to the servo driver as possible to minimize the wiring length (within 3 m).

3 Keep the cables as far away from the wiring of the power lines (L1, L2, L3, L1C, L2C, U, V, W, ⏚) as possible (at least 30 cm). Do not put them in the same duct or bind them together.

8.3.2.1 Control input

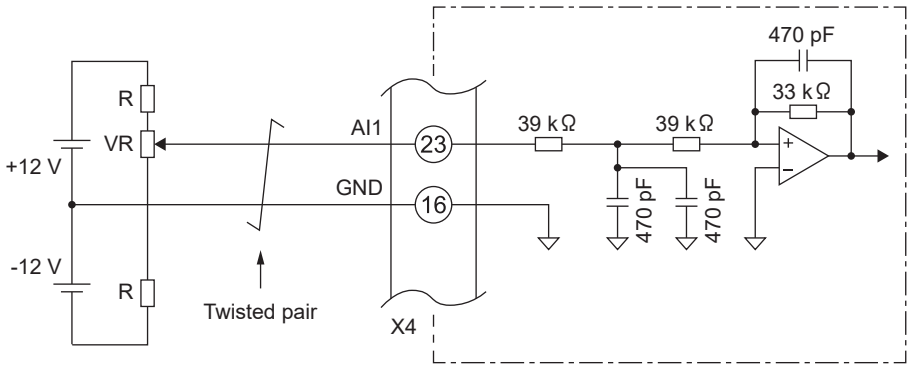


The functions of SI1 to SI8 are assigned using parameters.

For details, refer to “Technical Reference - Functional Specification”.

8.3.2.2 Analog Signal Input

A simple command circuit constructed using a variable resistor (VR) and a resistor (R) is shown in the figure below.



8.3.2.3 Control output

1 Be aware of the polarity of the power supply for control signals. Polarity connections contrary to the figure shown above can damage the servo driver.

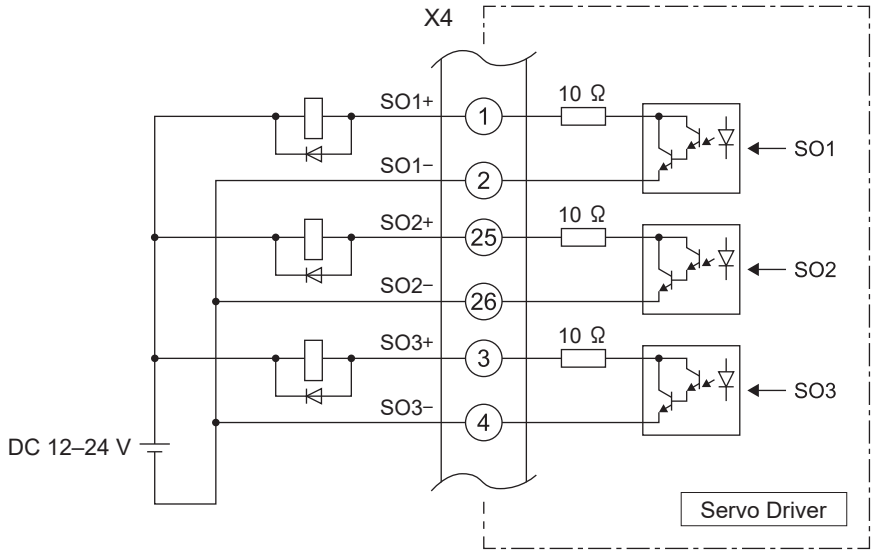
2 If the relay is to be driven directly by the output signal, install a diode in parallel with the relay in the direction shown below. Failure to install a diode or installing it in the opposite direction will damage the servo driver.

3 When each output signal is received by a logic circuit such as a gate, ensure that it is not affected by noise.

4 The current to be passed through each output must not exceed a rated current of 40 mA, a maximum current of 50 mA, or an inrush current of 90 mA.

5 The output circuit is equipped with a limiting resistor (10 Ω).

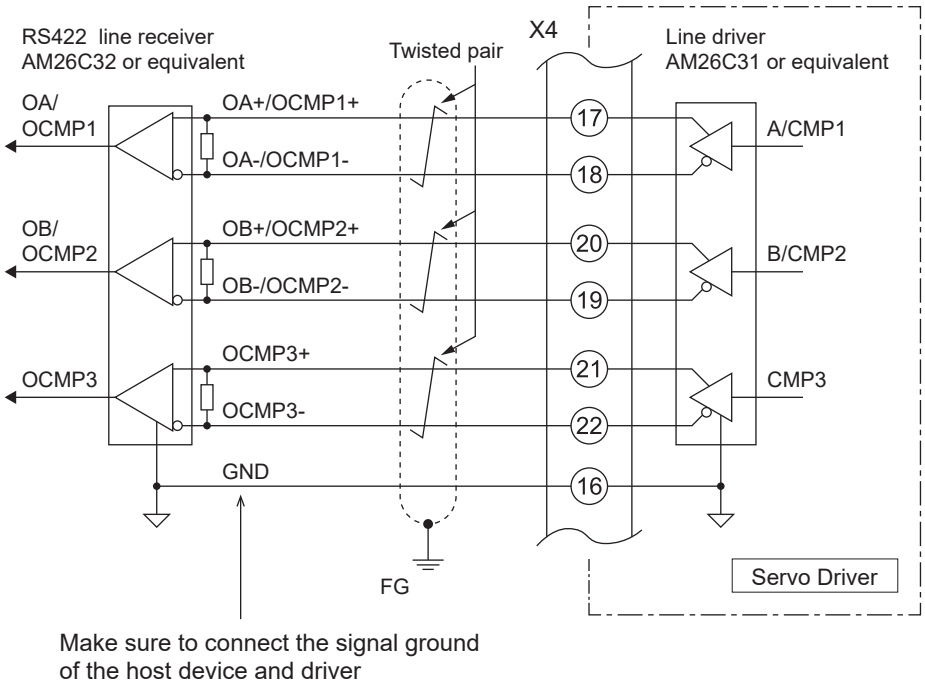
Also, because the output transistor is a Darlington connection, voltage V_{CE} (SAT) is approx. 1 V between the collector and emitter when the transistor is on, meaning that direct connections are not possible due to the fact that V_{IL} cannot be satisfied with a normal TTL IC.



The functions of SO1 to SO3 are assigned using parameters.

For details, refer to “Technical Reference - Functional Specification”.

8.3.2.4 Encoder output signal/position compare signal output



1 Use an RS422 line receiver (AM26C32 or equivalent) to receive output pulses. Ensure that an appropriate terminating resistor (approx. 330 Ω) is installed between the line receiver inputs.

2 Use at a maximum output frequency of 4 Mpps (after being multiplied by 4) or less.

8.3.3 Wiring to Connector X5

1 The core cable of the external scale cable should be a strand wire of 0.18 mm^2 or more. Use a common shielded twisted-pair wire.

2 The maximum cable length is 20 m. For long wiring lengths, double wiring is recommended for the 5 V power supply to reduce the effects of voltage drops.

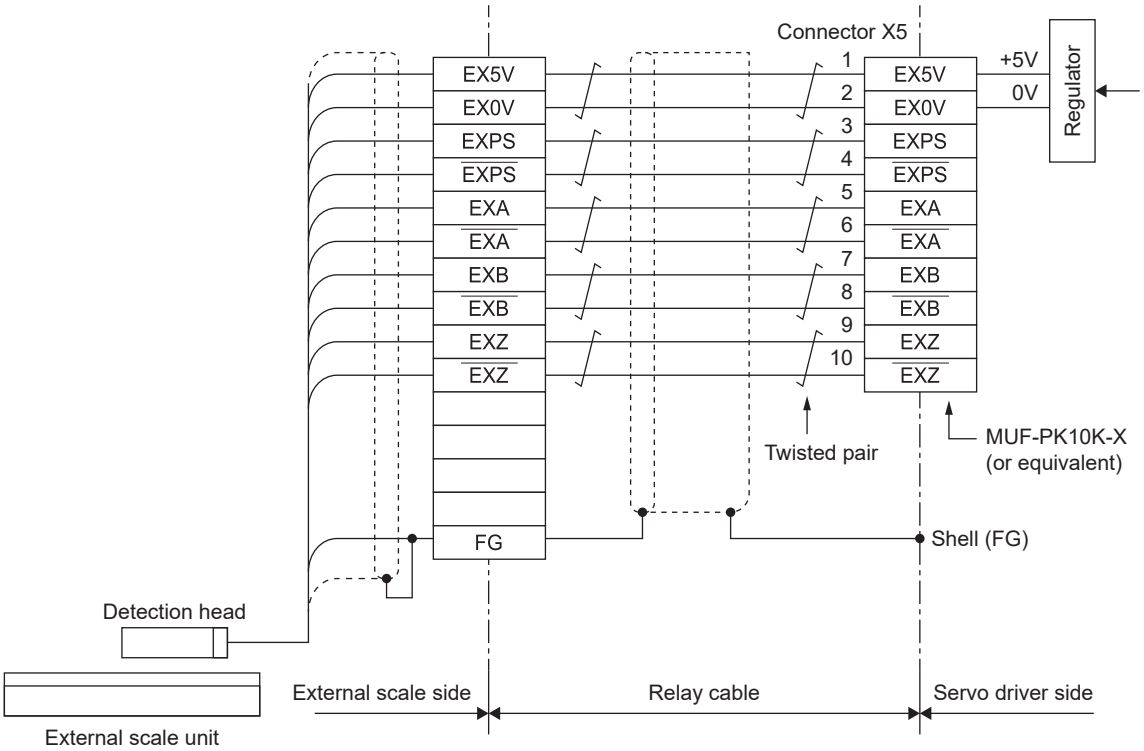
3 Connect the outer sheath of the shielded wire on the motor side to the shield of the shielded wire from the external scale. Make sure to connect the sheath of the shielded wire on the servo driver side to the X5 shell (FG).

4 Keep the cables as far away from the wiring of the power lines (L1, L2, L3, L1C, L2C, U, V, W, ⏚) as possible (at least 30 cm). Do not put them in the same duct or bind them together.

5 Do not connect anything to the empty terminals of X5.

6 The maximum power supply that can be supplied from X5 is 5 V ± 5% 250 mA. A customer-supplied power supply is necessary if using an external scale with a consumption current higher than this. Also, some external scales may take time to initialize when powering on. Create a design that achieves the desired operation timing after power is turned on.

7 If the external scale is powered by an external power supply, the EX5V pin should be open to prevent external voltage from being supplied to this pin. In addition, connect the 0 V (GND) of the external power supply with EX0V (X5, pin no. 2) of the driver to obtain the same electric potential.



8.3.4 Wiring to Connector X6

1 Use an encoder cable in which the strands are common shielded twisted-pair wires whose core is 0.18 mm^2 or more.

2 The maximum cable length is 20 m. For long wiring lengths, double wiring is recommended for the 5 V power supply to reduce the effects of voltage drops.

3 Ensure that the shielded wire of the encoder cable is connected to the FG terminal on the motor side and to the shell (FG) of X6 on the servo driver side.

4 Keep the cables as far away from the wiring of the power lines (L1, L2, L3, L1C, L2C, U, V, W, ⏚) as possible (at least 30 cm). Do not put them in the same duct or bind them together.

8.3.4.1 If not using multi-turn data

*When used as an incremental encoder

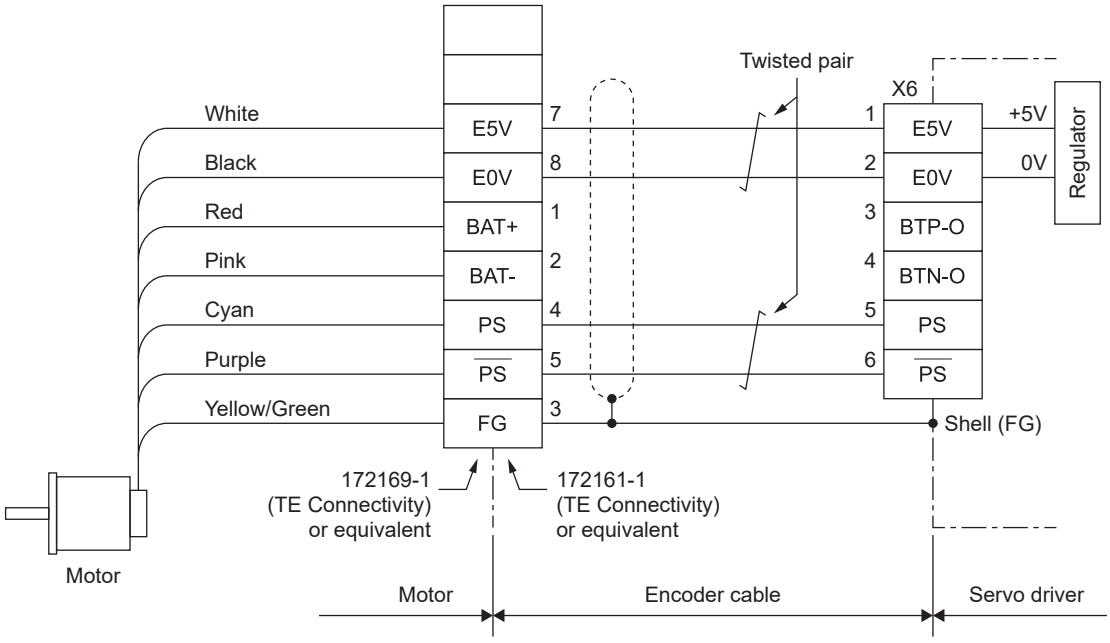
*When used as a single-turn absolute encoder

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

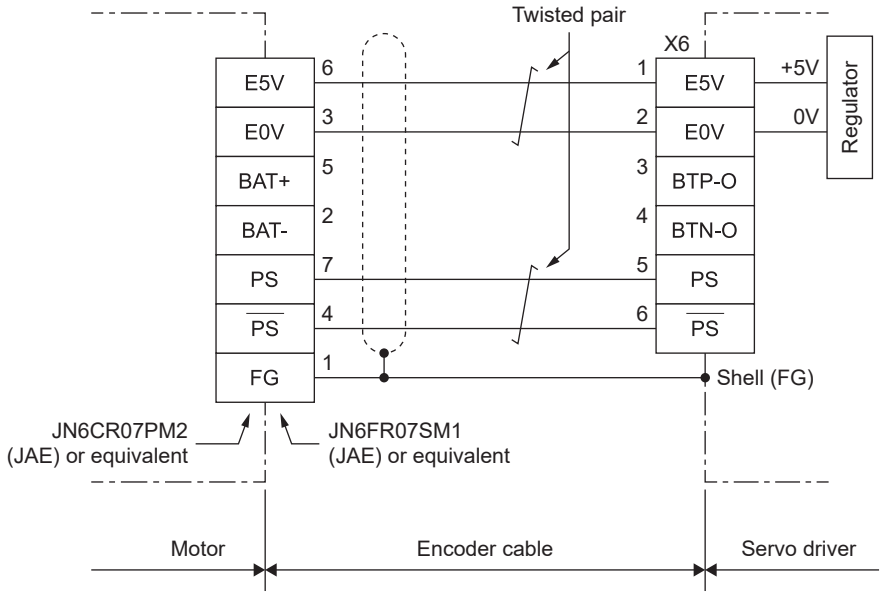


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

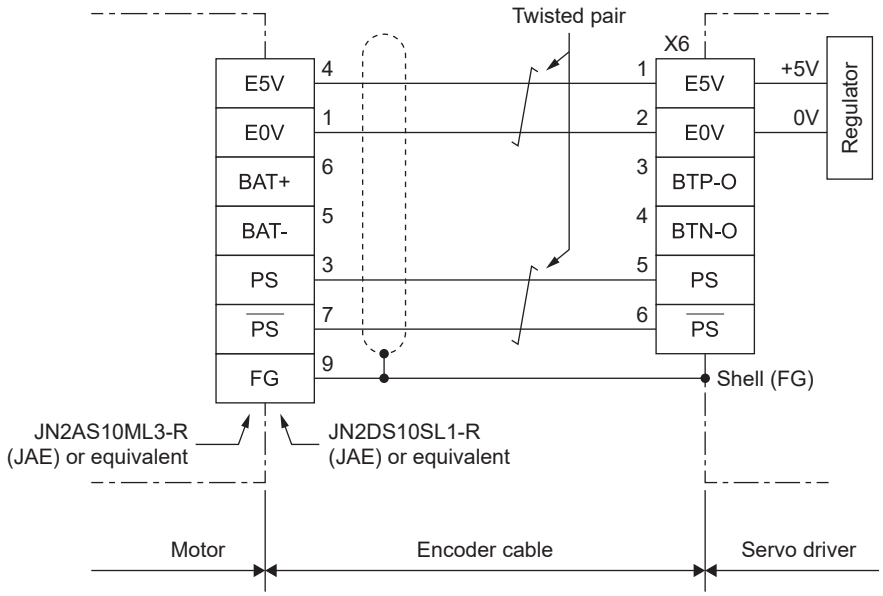


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



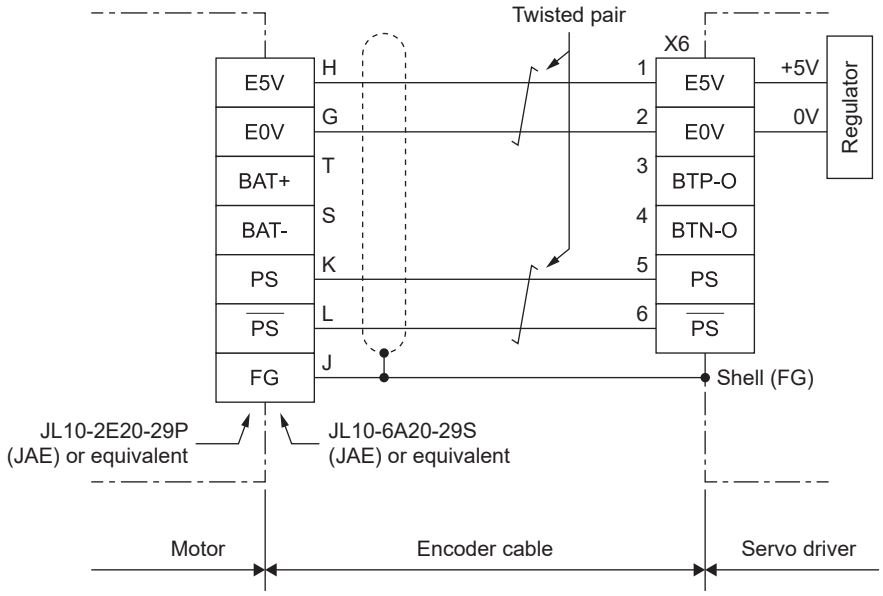
Cannon plug type

MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 7.5 kW

MDMF 1.0 kW - 22.0 kW

MGMF 0.85 kW - 5.5 kW



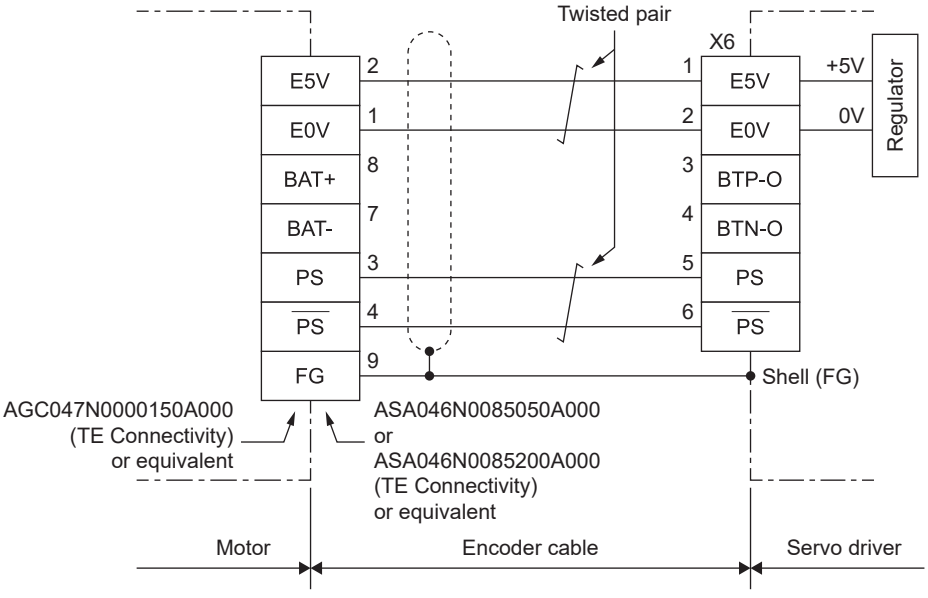
Right-angle cannon plug type

MSMF 1.0 kW - 5.0 kW (400 V)

MHMF 1.0 kW - 5.0 kW (400 V)

MDMF 1.0 kW - 5.0 kW (400 V)

MGMF 0.85 kW - 4.4 kW (400 V)



8.3.4.2 Using multi-turn data

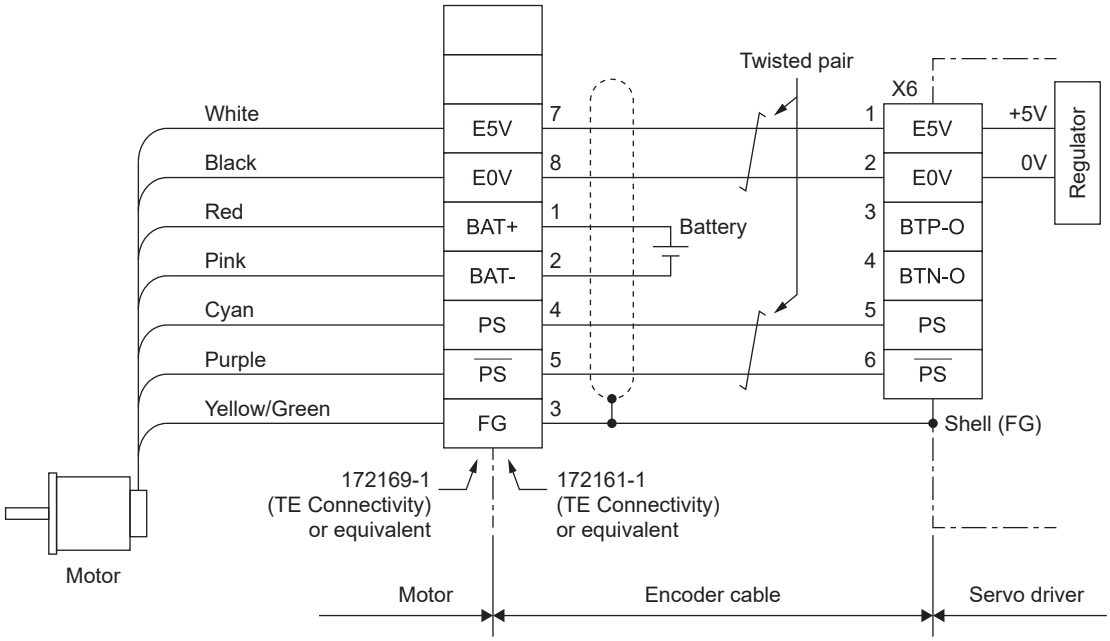
*When building an absolute system

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

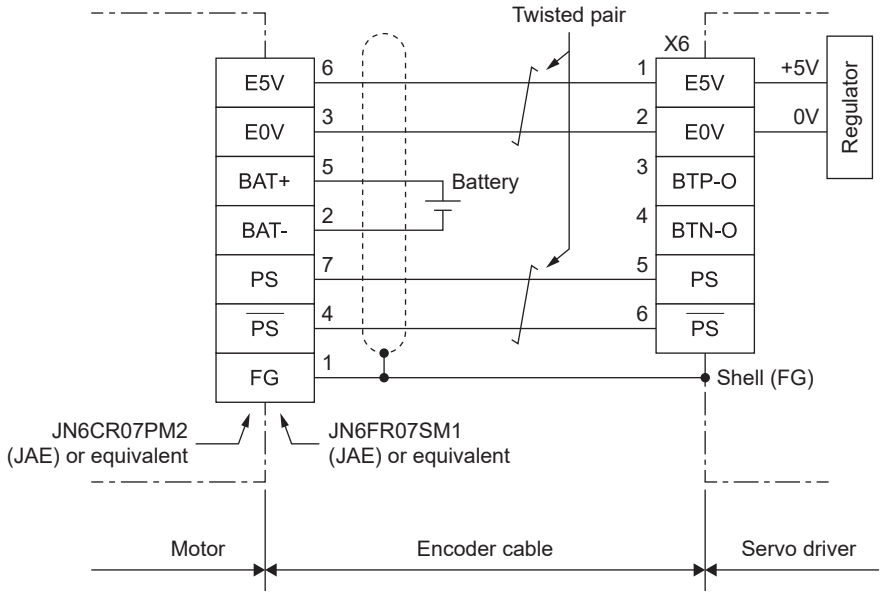


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

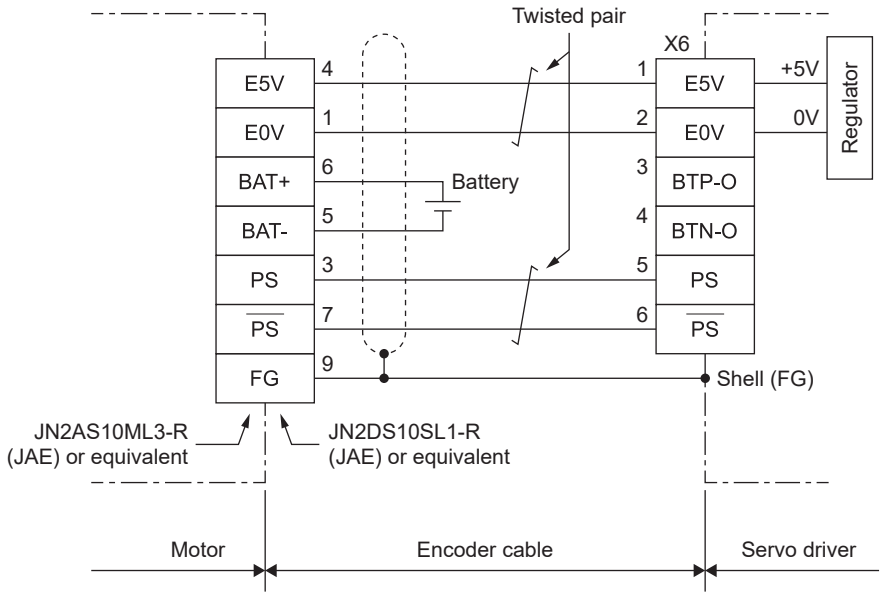


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



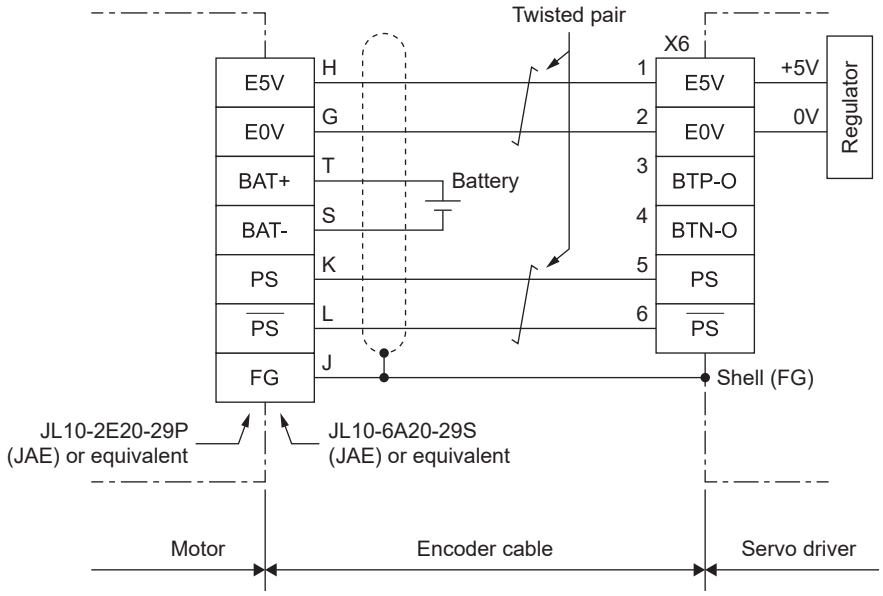
Cannon plug type

MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 7.5 kW

MDMF 1.0 kW - 22.0 kW

MGMF 0.85 kW - 5.5 kW



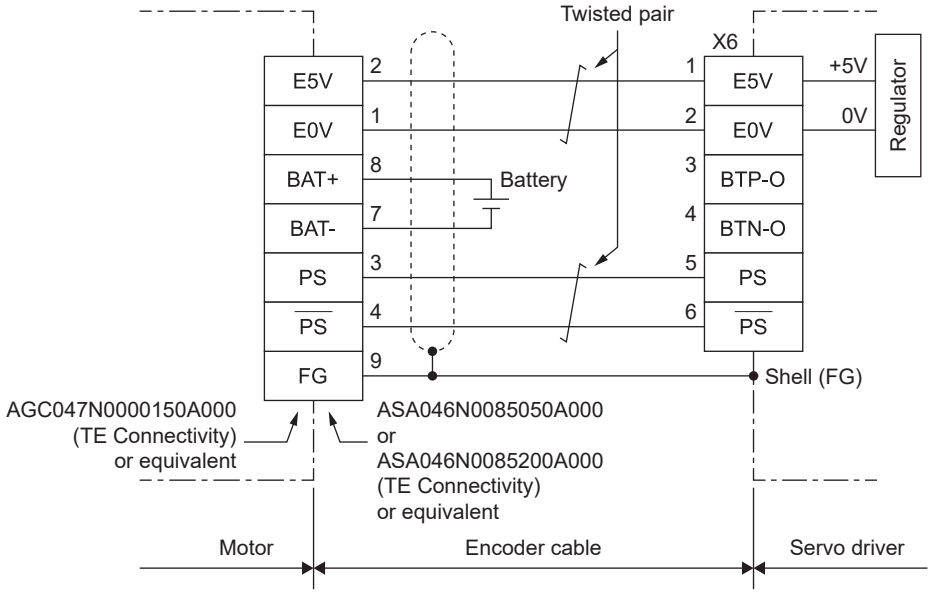
Right-angle cannon plug type

MSMF 1.0 kW - 5.0 kW (400 V)

MHMF 1.0 kW - 5.0 kW (400 V)

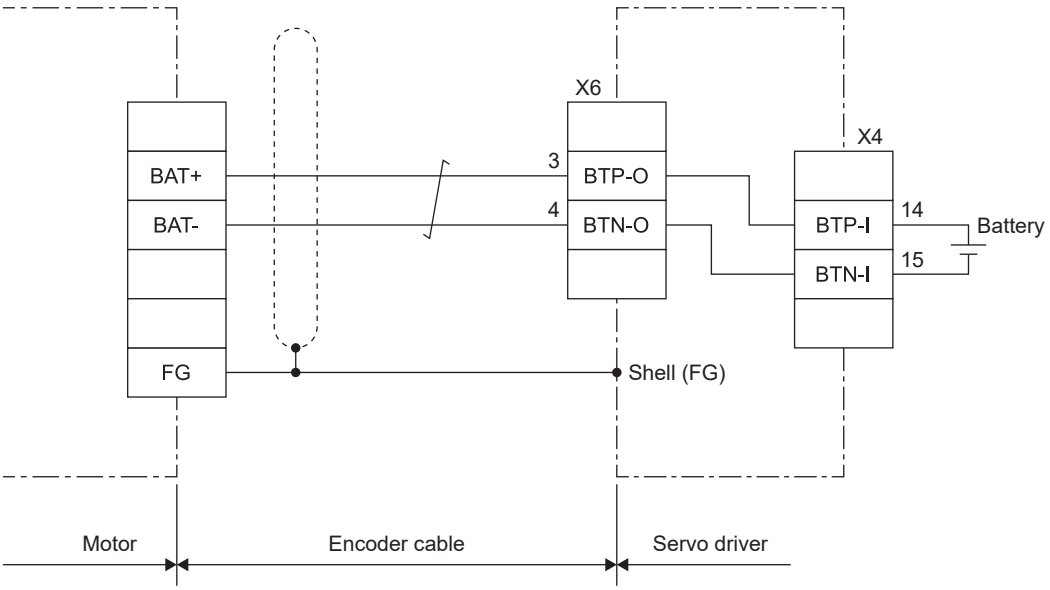
MDMF 1.0 kW - 5.0 kW (400 V)

MGMF 0.85 kW - 4.4 kW (400 V)



8.3.4.3 Connecting the absolute encoder battery

Connect the absolute encoder battery directly between encoder connectors BAT+ and BAT- on the motor side. Alternatively, the battery can be connected between the pins 14 and 15 of X4 connector via pins 3 and 4 of the X6 connector as shown below.



Precautions

- When connecting the battery directly to the encoder connector on the motor side, do not connect anything to pins 3 and 4 of the X6 connector.

8.3.4.4 Precautions for absolute encoder battery usage

- If the battery voltage drops, an error occurs in the absolute encoder.

  Voltage drops can be caused by battery life span or voltage delays.

  1 Be aware that battery life span may be reduced due to surrounding environmental conditions.

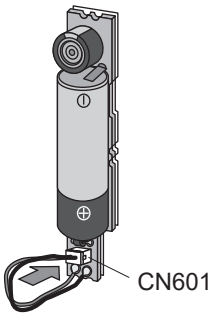
  2 Lithium batteries have a transient minimum voltage (voltage delay) that may temporarily drop when the battery begins to discharge current. For this reason, the battery must be refreshed before being used.

When using the battery for the first time

- If using the optional DV0P2990 battery unit (built-in battery: Toshiba Lifestyle ER6V 3.6 V), connect the connector with lead wire to the CN601 as shown in the figure to the right and let it sit for 5 minutes.

  After that, disconnect the connector from CN601 and attach it to the servo driver.

  Even customer-supplied batteries should be refreshed before using. Consult the battery manufacturer on how to perform refreshing.



After installing the battery unit

- We recommend turning the control power supply on and off approximately once a day.

- Using batteries incorrectly may result in product damage due to battery leakage and in damage to the battery. Make sure to observe the following:

  1 The positive and negative poles must be oriented correctly.

  2 Because leaving batteries that have been used for long periods of time or that are no longer usable inside the device may cause problems such as leaks, replace them immediately. (Replacement is recommended roughly every two years.)

  - The electrolytic solution in the battery is highly corrosive and can corrode peripheral parts. It is also conductive and can cause issues such as short circuits. Make sure to replace the battery periodically.

  3 Do not attempt to disassemble the battery or subject it to fire.

  - Do not attempt to disassemble the battery due to the extreme risks presented were its contents to spray out and get into eyes. It may explode if subjected to fire or heated.

  4 Do not attempt to short circuit the battery or remove its tube.

  - If metal or other such materials were come in contact with the positive or negative pole terminals of the battery, a large current would flow all at once, which would not only weaken the battery, but also generate severe heat and possibly cause the battery to rupture.

  5 This battery cannot be charged. Do not attempt to charge it.

- Because the disposal of used batteries is regulated by municipalities, please dispose of the battery in accordance with the regulations of your municipality.

- Air transportation

  When transporting by aircraft (either passenger or cargo) the submission of a hazardous materials application is required. (UN packaging is required.)

  When requesting air transportation, air transport carriers will require the submission of the necessary documents (parameter sheets, SDS, etc.). These can be obtained from your distributor.

- UN packaging

  Please contact your air transport carrier.

8.3.5 Wiring to Connectors X2A, X2B

1 Use shielded twisted pair (STP) cables of Category 5e or higher.

2 If both ends of the shield are not grounded, EMC properties will degrade.

When attaching the connector plug to each end of the cable, ensure that the shielded wire of the cable is connected to the metal shell of the plug.

3 The lead wire color and connector terminal must be in accordance with TIA/EIA-568B (see *"8.3.5.1 X2A/X2B connection"*).

The two pairs of pins 1-2 and 3-6 are for signal wire. Make sure that the two pairs of unused pins 4-5 and 7-8 are also connected to the connector.

4 The wiring length of the communication cable must be within a range that meets the following conditions.

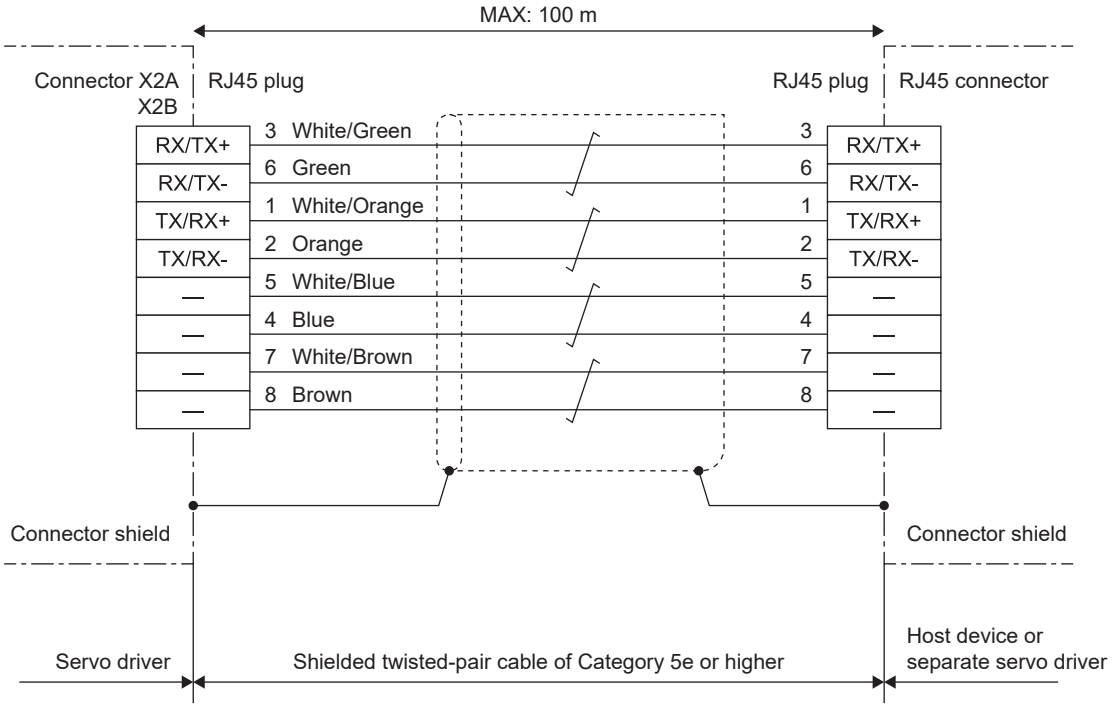
- The length between each node must not exceed 100 m.

5 Cable specifications, such as bending properties, temperature ranges, covering materials, will vary by manufacturer.

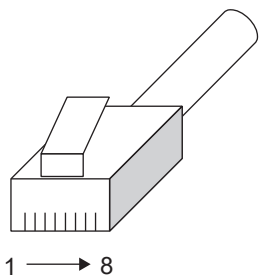
Select a cable that meets the usage conditions at your company.

Also select a movable cable that meets the usage conditions at your company.

8.3.5.1 X2A/X2B connection



8.3.5.2 RJ45 plug pin configuration



8.4 Dynamic Brake

The servo driver (sizes A–G) feature a built-in dynamic brake for emergency stopping.

The size H servo driver does not have a built-in dynamic brake.

The dynamic brake can be activated when the:

1 main power supply is off;

2 servo is off;

3 protection function is activated;

4 over-travel inhibit inputs (POT, NOT) of connector X4 are operated.

Under conditions (1) to (4) above, dynamic brake operation or free running can be selected using parameters during deceleration or after stopping.

However, when the control power supply input is off, the dynamic brake continues operating for servo driver sizes A–F, while the dynamic brake stops operating for servo driver sizes G and H.

Because the dynamic brake is rated for short time periods and is only to be used for emergency stopping, please adhere to the following:

1 Do not start or stop the device by turning the servo-on signal (SRV-ON) on or off.

This may damage the dynamic braking circuit incorporated into the servo drive.

2 Do not run the motor using an external power source.

If the motor is run externally, it will start acting as an electricity generator. This may cause it to short-circuit during operation of the dynamic brake, resulting in smoke or fire.

Doing so may also cause the dynamic brake to become disconnected, preventing it from functioning.

3 If the dynamic brake is applied when the device is operating at a high speed, allow a stop time of approximately 10 minutes.

Failure to do so may cause the dynamic brake to disconnect or the brake to no longer be operable.

A dynamic brake circuit (electromagnetic contactor for driving and resistor) can be externally attached to size G and H servo drivers.

In the case of the size G servo driver, external attachment is recommended when the capacity of the built-in dynamic brake is insufficient.

Wiring according to *"8.3.1 Wiring to Power Connectors and Terminal Blocks"* shown above and the wiring diagrams for *"8.3.1.5 Size G 200 V"* and *"8.3.1.6 Size H 200 V"* .

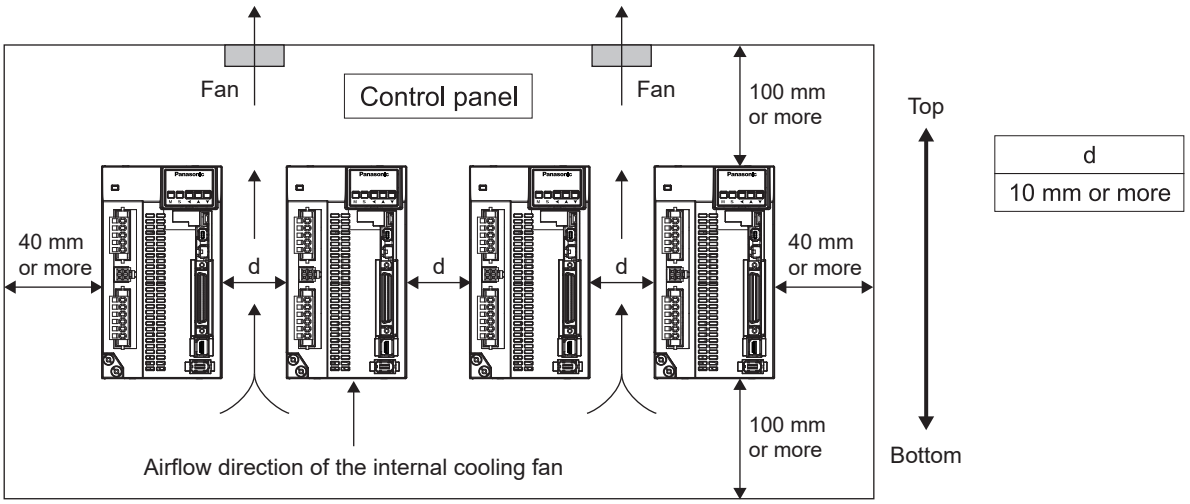
8.5 Mounting Direction and Spacing

- The servo driver is a vertically mounted type. Ensure that it is mounted vertically.
- Servo driver sizes A–D and H come standard as base-mounted types (rear-mounted).
- If changing the mounting surface of servo driver sizes A–D, use a separately sold mounting bracket.
- Select a tightening torque for the mounting screws used to secure your product by considering screw strength and the material to which it will be mounted.

  Example: Mounting to steel with steel screws

  Sizes A–G: M5 2.7–3.3 N·m; H: M6 4.7–5.7 N·m
- To ensure effective cooling, ensure surrounding space for airflow.
- Install a fan to achieve a uniform temperature within the control panel.
- Sizes D–F frames are equipped with a cooling fan on the bottom, while sizes G and H are equipped with cooling fans on the bottom and top.
- Observe the environmental conditions for the control panel as described in chapter *"9.3.1 Installation Environment"* .
- The servo driver must be secured to a grounded conductive frame.
- If the area where the servo driver is to be mounted is painted, removing the paint before installation will help to prevent noise.
- If using custom brackets, the bracket surface must have a conductive plating.
- Measure the ambient temperature of the servo driver at a location that is 50 mm from the side or bottom of the servo driver.

  If measuring from a distance of 50 mm is not possible, instead measure at the midpoint of the gap between the obstacle preventing measurement and the servo driver.



9 Compliance with International Standards

9.1 List of Compliance Standards for Servo Drivers

		Standard No.
EU/UK Standards	EMC	EN55011:2016/A11:2020 (Group 1, Class A) EN61000-6-2 EN61000-6-4 EN61800-3:2004/A1:2012 (Category C3, Second environment)
	Low voltage	EN61800-5-1
	Machinery (Functional Safety)	ISO13849-1 EN61508 EN62061 EN61800-5-2 IEC61326-3-1 IEC60204-1
UL standards		UL61800-5-1 (File No. E164620)
CSA standards		C22.2 No.274
KC		KN11 KN61000-4-2, 3, 4, 5, 6, 8, 11

9.2 EU directives and UK regulations

Our products comply with standards associated with the EU low voltage directive/UK low voltage regulation in order to facilitate compliance of embedded equipment and devices with the EU directives/UK regulations.

9.2.1 Compliance with the EU EMC directive/UK EMC regulation

EN 55011

Warning: Class A equipment is intended for use in an industrial environment. Conductive and radioactive interference can make it difficult to ensure electromagnetic compatibility in other environments.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

EN 61800-3

Servo drivers and servo motors are not intended for general household use or for connection to low-voltage public communication lines. Radio frequency interference may occur when connected to such circuits.

To comply with the EU EMC directive/UK EMC regulation, use a noise filter, a surge absorber, and a ferrite core.

The compliance of machinery and equipment with the EU EMC directive/UK EMC regulation must be confirmed on machinery and equipment in its final state incorporating servo drivers and servo motors.

9.2.2 Compliance with EN 61800-5-1:2007/A11:2021

1 **Earth fault protection**

This product does not have an earth fault protection function. Install a circuit breaker for wiring or an earth leakage breaker according to the grounding system.

Earth fault protection conditions for earth fault circuit breakers are shown below. The requirements of EN 60364-4-41 are met under these conditions.

Obey the laws and regulations of the country or region where you use the TT system. The rated sensitivity current and loop impedance of the earth leakage breaker are specified in some cases. You may also need a type B earth fault circuit breaker.

For TN system

Model	MCCB			Voltage to earth [V]	Acceptable maximum fault loop impedance [Ω]
	Rated current [A]	Type name	Manufacturer		
MADL*01**	10	BW50RAGU	Fuji Electric	100	0.43
MADL*11**	10	BW50RAGU	Fuji Electric	100	0.44
MBDL*21**	10	BW50RAGU	Fuji Electric	100	0.45
MCDL*31**	15	BW50RAGU	Fuji Electric	100	0.34
MADL*05**	10	BW50RAGU	Fuji Electric	115	0.53
MADL*15**	10	BW50RAGU	Fuji Electric	115	0.54
MBDL*25**	10	BW50RAGU	Fuji Electric	115	0.55
MCDL*35**	15	BW50RAGU	Fuji Electric	115	0.42
MDDL*45**	20	BW50RAGU	Fuji Electric	115	0.28
MDDL*55**	20	BW50RAGU	Fuji Electric	115	0.28
MEDL*83**	30	BW50RAGU	Fuji Electric	115	0.16
MEDL*93**	30	BW50RAGU	Fuji Electric	115	0.16
MFDL*A3**	50	BW50RAGU	Fuji Electric	115	0.17
MFDL*B3**	50	BW50RAGU	Fuji Electric	115	0.17

Model	MCCB			Voltage to earth [V]	Acceptable maximum fault loop impedance [Ω]
	Rated current [A]	Type name	Manufacturer		
MGDL*C3**	60	BW100EAGU	Fuji Electric	115	0.12
MHDL*E3**	125	BW125JAGU	Fuji Electric	115	0.06
MHDL*F3**	175	BW50RAGU	Fuji Electric	115	0.03
MDDL*44**	10	BW50RAGU	Fuji Electric	219	1.08
MDDL*54**	10	BW50RAGU	Fuji Electric	219	1.09
MDDL*64**	10	BW50RAGU	Fuji Electric	219	1.10
MEDL*84**	15	BW50RAGU	Fuji Electric	219	0.90
MFDL*A4**	30	BW50RAGU	Fuji Electric	219	0.44
MFDL*B4**	30	BW50RAGU	Fuji Electric	219	0.44

For TT system

Model	ELCB				Voltage to earth [V]	Acceptable maximum fault loop impedance [Ω]
	Rated current [A]	rated sensitivity current [mA]	Type name	Manufacturer		
MADL*01**	10	30	EW50RAGU	Fuji Electric	100	360
MADL*11**	10	30	EW50RAGU	Fuji Electric	100	360
MBDL*21**	10	30	EW50RAGU	Fuji Electric	100	360
MCDL*31**	15	30	EW50RAGU	Fuji Electric	100	360
MADL*05**	10	100	EW50RAGU	Fuji Electric	115	207
MADL*15**	10	100	EW50RAGU	Fuji Electric	115	207
MBDL*25**	10	100	EW50RAGU	Fuji Electric	115	207
MCDL*35**	15	100	EW50RAGU	Fuji Electric	115	207
MDDL*45**	20	100	EW50RAGU	Fuji Electric	115	207
MDDL*55**	20	100	EW50RAGU	Fuji Electric	115	207
MEDL*83**	30	100	EW50RAGU	Fuji Electric	115	207
MEDL*93**	30	100	EW50RAGU	Fuji Electric	115	207
MFDL*A3**	50	100	EW50RAGU	Fuji Electric	115	207
MFDL*B3**	50	100	EW50RAGU	Fuji Electric	115	207
MGDL*C3**	60	100	EW100EAGU	Fuji Electric	115	207
MHDL*E3**	125	100	EW125JAGU	Fuji Electric	115	172
MHDL*F3**	175	100	EW250JAGU	Fuji Electric	115	166
MDDL*44**	10	100	EW50RAGU	Fuji Electric	219	394
MDDL*54**	10	100	EW50RAGU	Fuji Electric	219	394
MDDL*64**	10	100	EW50RAGU	Fuji Electric	219	394
MEDL*84**	15	100	EW50RAGU	Fuji Electric	219	394
MFDL*A4**	30	100	EW50RAGU	Fuji Electric	219	394
MFDL*B4**	30	100	EW50RAGU	Fuji Electric	219	394

2 **Over heat protection/Over load protection**

The servo amplifier has a built-in servo motor overload protection function, but the servo motor does not have an overheat protection function. If it becomes necessary to meet NEC standards, take measures to protect the servo

motor from overheating.（Refer to *"9.5 Compliance with UL Standards"* "4" Load protection and overheating protection）

9.3 Configuration of Peripheral Devices

9.3.1 Installation Environment

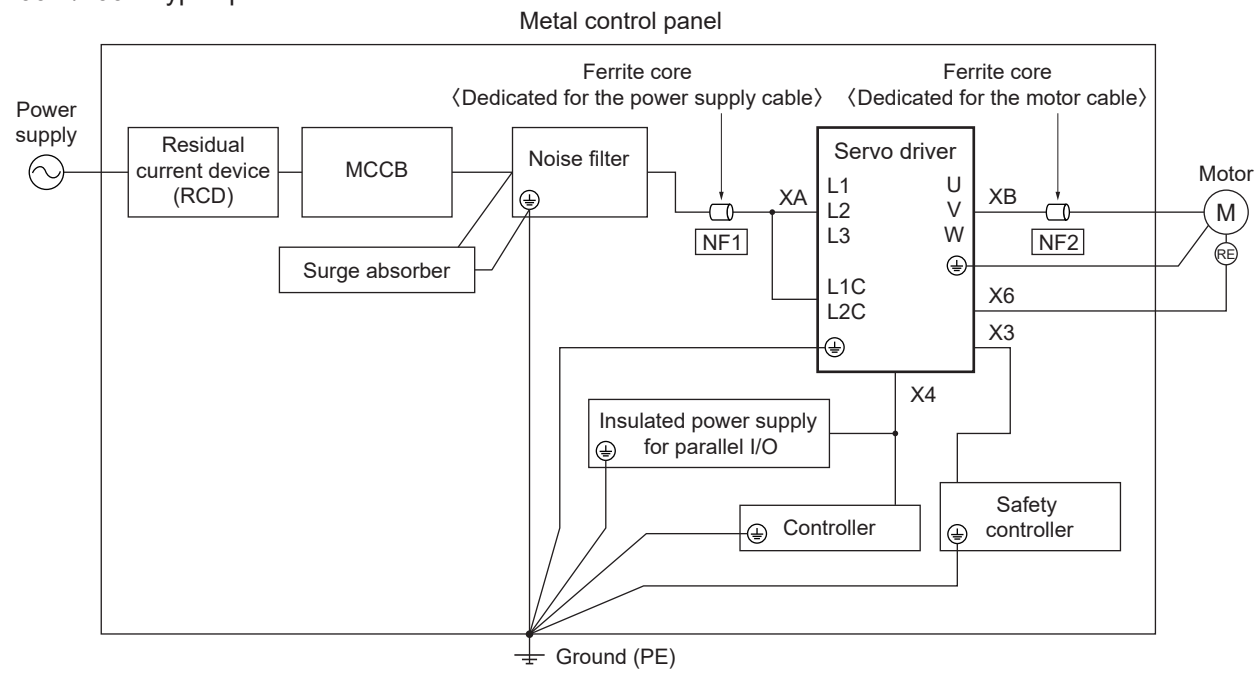
Use in an environment with a pollution degree 2 as stipulated in IEC60664-1.

(Example: Install in an IP54 metal control panel.)

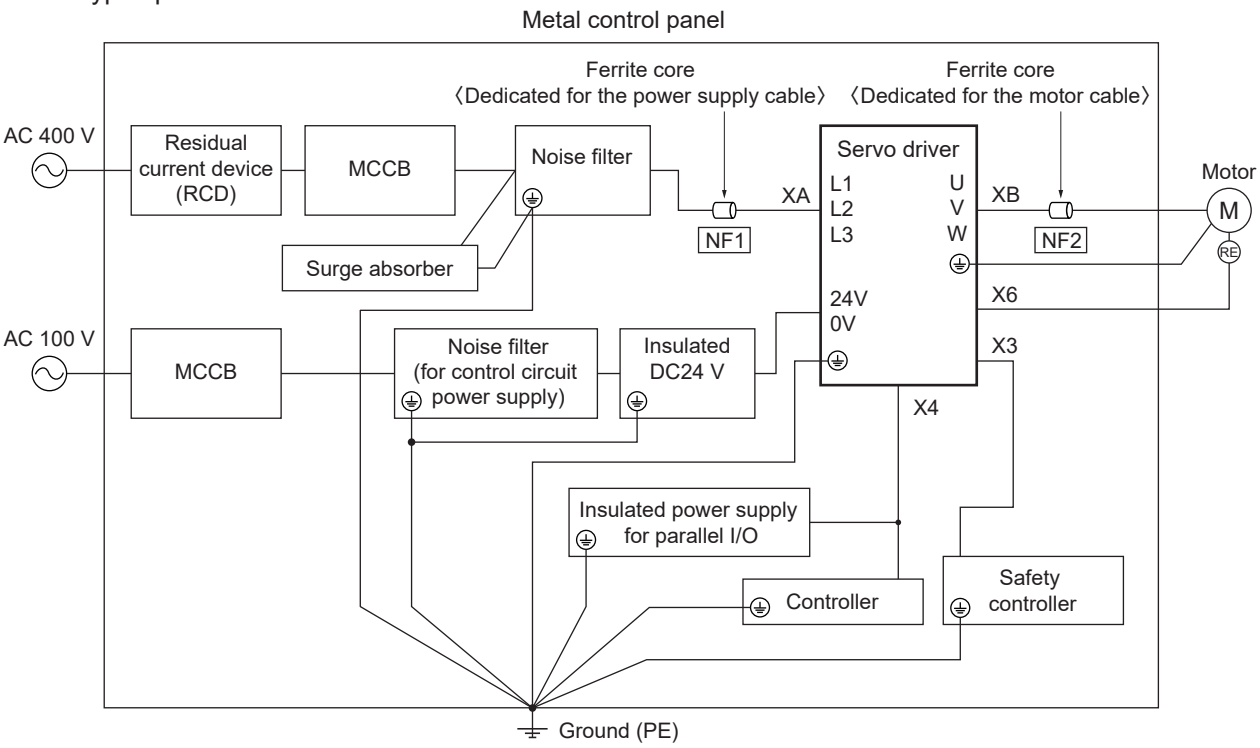
Make sure to connect a molded case circuit breaker (MCCB) or fuse that is compliant with IEC standards or that is UL-approved to the main power supply.

The power supply for parallel I/O should be a DC 24 V power supply with double or reinforced insulation.

100 V/200 V type specification



400 V type specification



Ferrite core installation status during EMC certification test

Symbol	Location	Applicable size	Option product number	Manufacturer product number	Manufacturer	Quantity
NF1	Power supply cable	(100 V) C (200 V) C, D, F	—	—	—	None
		(100 V) A, B (200 V) A, B, E (400 V) D, E, F	DV0P1460	ZCAT3035-1330	TDK Corporation	1 (*1)
		(200 V) G, H	DV0P1460	ZCAT3035-1330	TDK Corporation	3 (*2)
			Recommended parts	RJ8095	Konno Kogyosho Co., Ltd.	1 (*3)
NF2	Motor cable	(100 V) A, B, C (200 V) A, B, C, D, E (400 V) D, E, F	DV0P1460	ZCAT3035-1330	TDK Corporation	1 (*1)
		(200 V) F	DV0P1460	ZCAT3035-1330	TDK Corporation	2 (*4)
		(200V) G, H	DV0P1460	ZCAT3035-1330	TDK Corporation	3 (*2)
			Recommended parts	T400-61D	MICROMETALS	1 (*3)

*1 Power supply cables (L1, L2, L3) should be wound together for one circle. Motor cables (U, V, W) should also be wound together for one circle. One circle (bypass one line).

*2 Power supply cables (L1, L2, L3) should be wound individually for one circle. Motor cables (U, V, W) should also be wound individually for one circle. One circle (bypass one line).

*3 Power supply cables (L1, L2, L3) should be wound together for four circles. Motor cables (U, V, W) should also be wound together for four circles. If four turns is difficult, use two identical ferrite cores and make two turns for each.

*4 Combine motor wires (U, V, W) and attach two ferrite cores in series. One circle (bypass one line).

9.3.2 Power Supply

100 V (Sizes A–C)	:	Single-phase 100–120 V	+10 % -15 %	50/60 Hz
200 V (Sizes A–D)	:	Single-phase/3-phase 200 V–240 V	+10 % -15 %	50/60 Hz
200 V (Sizes E–H)	:	3-phase 200–240 V	+10 % -15 %	50/60 Hz
400 V (Sizes D–F) Main power supply	:	3-phase 380 Y/220–480 Y/277 V TN (ground the neutral point to earth)	+10 % -15 %	50/60 Hz
400 V (Sizes D–F) Controlled power supply	:	DC 24 V	±15 %	

1 Use in an OVC III environment as stipulated in IEC60664-1.

2 Use an insulated DC 12 to 24 V parallel I/O power supply that is in compliance with the CE marking or the EN standard (EN60950).

9.3.3 Molded Case Circuit Breaker (MCCB)

Make sure to connect a molded case circuit breaker (MCCB) that is compliant with IEC standards or that is UL-approved (listed, with Ⓤ mark) between the power supply and noise filter.

The product's short-circuit protection circuit is not intended to protect the branch circuit.

Select branch circuit protection in accordance with the NEC standard and local standards.

9.3.4 Noise Filter

If using multiple servo drivers and installing one noise filter for all to the power supply, consult with the manufacturer of the noise filter.

9.3.5 Surge Absorber

Install the surge absorber to the primary side of the noise filter.

Caution

- Always remove the surge absorber before pressure testing machinery and equipment.
  Failure to do so may result in damage to the surge absorber.

9.3.6 Ferrite Core

Install ferrite cores on the power supply input line and motor output line.

9.3.7 Grounding

1 To prevent electric shock, make sure to connect the protective ground terminal (⏚) of the servo driver with the protective ground (PE) of the control panel.

2 Do not tighten the connection to the protective ground terminal (⏚). There are two protective ground terminals.

9.4 List of Peripheral Devices Applicable to the Servo Driver

Servo driver	Voltage specification	Power supply capacity (At rated load)	Electromagnetic contactor (Rated energizing current/ Open heat current)	MCCB Rated current	Noise filter	Surge absorber	Ferrite core	
							Power supply cable	Motor cable
MADL□01□□	Single-phase 100 V	Approx. 0.4 kVA	20 A	10 A	DV0P4170 (for single-phase) / DV0PM20042	DV0P4190 (for single-phase) / DV0P1450 (for 3-phase)	DV0P1460	DV0P1460
MADL□11□□								
MADL□05□□	Single-phase/ 3-phase 200 V	Approx. 0.5 kVA						
MADL□15□□								
MBDL□21□□	Single-phase 100 V	Approx. 0.5 kVA						
MBDL□25□□	Single-phase/ 3-phase 200 V	Approx. 0.9 kVA						
MCDL□31□□	Single-phase 100 V	Approx. 0.9 kVA		15 A	DV0PM20042			
MCDL□35□□	Single-phase/ 3-phase 200 V	Approx. 1.8 kVA						
MDDL□45□□	Single-phase/ 3-phase 200 V	Approx. 2.4 kVA	30 A	20 A	DV0P4220			
MDDL□55□□		Approx. 2.9 kVA						
MEDL□83□□	3-phase 200 V	Approx. 3.8 kVA	60 A	30 A	DV0PM20043	DV0P1450		
MEDL□93□□		Approx. 4.5 kVA						
MFDL□A3□□		Approx. 5.2 kVA	100 A	50 A	DV0P3410			
MFDL□B3□□		Approx. 7.8 kVA						
MGDL□C3□□		Approx. 11 kVA	100 A	60 A	HF3080C-SZA		DV0P1460 RJ8095	DV0P1460 T400-61D
MHDL□E3□□		Approx. 20 kVA	150 A	125 A	HF3100C-SZA			
MHDL□F3□□		Approx. 28 kVA		175 A				
MDDL□44□□	3-phase 400 V	Approx. 1.8 kVA	20 A	10 A	FN3258-16-44	LT-C34G801WS	DV0P1460	DV0P1460
MDDL□54□□		Approx. 2.4 kVA						
MDDL□64□□		Approx. 2.9 kVA						
MEDL□84□□		Approx. 3.8 kVA	30 A	15 A				
MFDL□A4□□		Approx. 5.2 kVA	60 A	30 A	FN3258-30-33			
MFDL□B4□□		Approx. 7.8 kVA						

* For both single-phase/3-phase 200 V specifications, select the peripherals according to the power supply used.

Notes

- Select a molded case circuit breaker (MCCB) and noise filter with a capacity that matches the power supply capacity (considering load conditions).
- Use copper conductor wires with a temperature rating of 75°C or higher when wiring terminal blocks and ground terminals.

  The protective ground terminal is M4 for sizes A–E, M5 for sizes F and G, and M6 for size H.

  If the tightening torque of the screws exceeds the maximum value (see the terminal block description page), the terminal block may be damaged.
- The wire diameter of the ground cable must be 2.0 mm^2 (AWG 14) or more for outputs between 50 W–2.5 kW, 3.5 mm^2 (AWG 12) or more for outputs between 3.0 kW–5.0 kW, 8.0 mm^2 (AWG 8) or more for an output of 7.5 kW, 22 mm^2 (AWG 4) or more for an output of 15.0 kW, and 38 mm^2 (AWG 2) or more for an output of 22.0 kW.
- For sizes A–E, use the included dedicated connectors.
- The tightening torque of the screw used for connecting connector (X4) to the host controller should be between 0.2 ± 0.05 N·m.

  If the tightening torque of the screws exceeds the maximum value, the connector on the servo driver side may be damaged.

9.5 Compliance with UL Standards

1 Installation environment

Install in an environment with a pollution degree 2 as stipulated in IEC60664-1.

Make sure to connect a molded case circuit breaker (MCCB) or fuse that is UL-approved to the main power supply.

Use copper conductor wires with a temperature rating of 75°C or higher when wiring.

2 Short circuit current rating (SCCR)

This servo driver is compatible with power supplies whose voltage is less than the maximum input voltage and which have a symmetrical current of 5000 Arms or less.

3 Branch circuit protection

Protect the branch circuit in accordance with the NEC (National Electrical Code) and local standards.

4 Load protection and overheating protection

The servo driver has a built-in servo motor overload protection function.

The overload protection function operates based on specified time limit characteristics when current has reached 115% or more of the rating.

For overload protection time characteristics, please refer to "Technical Reference Document - Basic Function Specifications - 7. Protective function/Alarm function".

The servo motor does not have an overheating protection function. If NEC compliance is required, implement overheating protection measures for the servo motor.

The servo driver has the thermal memory (shut down) function specified in EN61800-5-1 / UL61800-5-1, but does not have thermal memory (loss of power) or speed sensitivity functions.

9.6 Radio Waves Act (South Korea)

Under South Korea's Radio Waves Act, this servo driver is classified as a Class A commercial electromagnetic radio wave generator that is not designed for household use.

The user and distributor should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)
이 기기는 업무용(A 급) 전자파적합기기로서 판매자
또는 사용자는 이 점을 주의하시기 바라며, 가정외의
지역에서 사용하는 것을 목적으로 합니다.

(대상기종 : Servo Driver)

[Reference translation]

Class A device (broadcast communication device for business use)

This product is an electromagnetic wave generating device for business use (Class A), which is intended non-household use.

The user and distributor should be aware of this fact.

(Applicable model: Servo Driver)

9.7 Compliance with the SEMI F47 Standard

- The SEMI F47 standard includes requirements for voltage drops in semiconductor manufacturing equipment.
- The control power supply for the servo driver complies with the SEMI F47 standard.

  The main circuit power supply complies with the SEMI F47 standard at no-load and light loads.

Precautions

- This does not apply to single-phase 100 V servo drivers whose control power supply input is DC 24 V.
- Make sure to perform evaluations and confirmation for compatibility with the SEMI F47 standard using the actual equipment.

9.8 Harmonic Suppression Measures

- Harmonic suppression measures vary by country. Install in accordance with local regulations.
- Servo drivers for Japan whose input current exceeds 20 A are applicable to the “Guidelines for harmonic suppression measures for users who receive high-voltage or extra-high voltage power”. Calculate the equivalent capacity and harmonic outflow current based on the guidelines. If the harmonic current is found to exceed the limit value predetermined for the contract demand, appropriate measures must be taken. Furthermore, when calculating the equivalent capacity, assume that the conversion factor of the servo driver is K_{31}=3.4. (Refer to JEM-TR210 and JEM-TR225*.)

  * These are technical documents issued by JEMA (Japan Electrical Manufacturers' Association).

10 SAFETY PRECAUTIONS

This section explains precautions that must be taken to prevent harm to people and damage to property.

⚠ SAFETY PRECAUTIONS

The following symbols represent the extent of the harm or damage that may occur through improper use.

⚠ **DANGER**	This indicates “a significant risk of death or serious injury”.
⚠ **CAUTION**	This indicates “a risk of minor injury or damage to property”.

The following symbols indicate how to comply with safety precautions.

	Something that you must not do.
	Something you must do.

⚠ DANGER

1 Ensure that the product is used in an environment of pollution degree 2 (places free from dust, metal powders, oil mists, and other foreign objects, as well as liquids such as water, oil, or grinding fluids). Do not store or use near combustible materials or in an environment containing corrosive gases (H_2S, SO_2, NO_2, Cl_2, etc.), flammable gases, helium gases, or other gases with low molecular weight.

2 Do not place flammable materials near the motor, servo driver, or regenerative resistor.

3 Do not run the motor using an external power source. If the motor is run externally, it will start acting as an electricity generator. This may cause it to short-circuit during operation of the dynamic brake, which is integrated into the servo driver, resulting in smoke and dust being emitted. Doing so may also cause the dynamic brake to become disconnected, preventing it from functioning.

4 Do not damage the cable, apply undue stress to it, place heavy objects on it, or pinch it.

5 Do not use with the cable submerged in oil or water.

6 Do not install the product next to heating elements such as heaters or large winding resistors. (Protection such as heat shields should be used to protect the product from heating elements.)

7 Do not connect a commercial power supply directly to the motor.

8 Do not use in places susceptible to strong vibrations or impacts. If installing a servo driver near a source of vibration, attach a vibration dampening device to the servo driver mounting surface.

9 Do not touch the rotating parts of the motor during operation.

10 Do not touch the keyway of the motor output shaft with bare hands.

11 Do not put hands inside the servo driver.

12 Do not touch the heat sink and peripheral devices of the motor or servo driver, as they can get very hot.

13 Do not performing wiring or operate the product with wet hands.

⚠ DANGER

14 Wiring work should be carried out by an electrical engineer.

15 Motors other than that specified do not include protective devices. Protect them using overcurrent protection devices, ground-fault circuit interrupters, overheating prevention devices, emergency stop devices, etc.

16 Before operating the servo driver following an earthquake, ensure that the servo driver and motor are properly installed and that the machine is safe.

17 After the power supply is switched off, the internal circuit will be charged at high voltage for a period of time. When relocating, wiring, or inspecting the driver, ensure that the power supply input is completely disconnected on the outside of the servo driver and wait at least 15 minutes before carrying out any work.

18 Install and set up the product so that it does not cause fire or personal injury in the event of an earthquake.

19 Install an external emergency stop circuit must be installed to enable the power supply to be immediately disconnected in the event of an emergency.

20 Install the motor, servo driver, and peripheral devices to nonflammable materials such as metal.

21 Ensure that the product is wired correctly and securely. Insecure or incorrect wiring may cause the motor to malfunction or lead to thermal damage. Also, do not allow any conductive materials such as wire debris to enter the servo driver during installation and wiring.

22 Ensure that the cables are securely connected and that energized parts are insulated.

23 Binding and inserting wires into a metal duct will cause the temperature to increase, which will result in reduced wire current capacity and possibly lead to thermal damage. Please consider the current reduction coefficient before deciding on how to wire the product.

24 Make sure to install a molded case circuit breaker (MCCB) to the power supply. Also, make sure to ground the ground terminal or ground wire.

25 Securely tighten the screws for connecting the terminal block, as well as the grounding screw, using the torque indicated in the specification sheet.

26 When constructing a system using safety features, make sure you understand and comply with the relevant safety standards as well as the information in our user manuals or technical reference documents.

⚠ CAUTION

27 When transporting the product, do not hold it by the cable or motor shaft.

28 When adjusting the parameters of the servo driver, do not set the gain too high or make extreme modifications to settings simultaneously, as doing so may result in unstable operation.

29 Following a power outage, do not get close to the machine once power is restored, as it may restart suddenly. Settings must be made to ensure personal safety even in event the machine restarts suddenly.

30 Do not approach the motor or the machine when it is running during power-up to ensure safety in the event of an unexpected malfunction.

31 Do not subject the motor shaft to strong shock.

32 Do not turn the servo driver main power supply on and off more frequently than necessary.

33 Do not use the electromagnetic contactor installed on the main power supply side to start or stop the motor.

34 If the motor has a built-in brake, it is for maintenance purposes and should not be used as a stopping (braking) device in order to ensure machine safety.

35 Do not drop or tip over the product during transportation or installation.

36 Do not climb on the motor or place heavy objects on it.

37 Do not cover the servo driver louver or allow any foreign objects to enter.

38 Do not expose the product to direct sunlight. When storing the product, keep it away direct sunlight and store at temperatures and humidity within the specified ranges.

39 Do not attempt to overhaul or modify the motor. Overhauls must be carried out by Panasonic or an authorized dealer.

40 Do not start or stop the device by turning the servo-on command (SRV-ON) on or off as this may damage the dynamic braking circuit incorporated into the servo drive.

⚠ CAUTION

41 Use the motor and servo driver in the combination specified by Panasonic. If combining the motor with a different servo driver, make sure to confirm its performance and safety.

42 Failure of the motor or the servo driver it is combined with may result in thermal damage to the motor and may cause smoke and dust to be emitted. Please consider these possibilities when using the device in cleanrooms, etc.

43 Make sure the device is mounted in a manner suitable for the power output and the weight of the unit.

44 Keep the ambient temperature and humidity of the servo driver and motor are within the permitted ambient temperature and humidity ranges.

45 Observe the specified mounting method and orientation.

46 Keep the required distance between the servo driver and the control panel interior or other equipment.

47 If an eyebolt is attached to the motor, it should only be used to transport the motor and not to transport any other equipment. The eyebolt should also not be used if a decelerator, face plate, etc., is attached.

48 Connect the brake control relay in series with the relay that disconnects in the event of an emergency stop.

49 To perform a test run, secure the motor and check its operation with it disconnected from the mechanical system, then mount it onto the machine.

50 Confirm that the input power supply voltage is in line with the servo driver specifications before turning it on and operating.

51 In the event of an alarm, eliminate the cause of the alarm and restart the device.

52 If the motor has a built-in brake, it may not last due to reasons such as its life span or mechanical structure. A stopping device must be installed on the machine side to ensure safety.

53 The motor and servo drive emit heat while the motor is in operation. Ambient temperature may rise abnormally if used in an enclosed area. Take care to ensure that the ambient temperatures of the motor and servo driver are within the operating range.

54 Maintenance and inspections should be performed by a specialist.

55 Make sure to turn off the power supply if the device will not be used for a long period of time.

56 If the dynamic brake built into the servo driver is applied when the device is operating at a high speed, allow a stop time of approximately 10 minutes. Failure to do so may cause the internal circuit to disconnect or the brake to no longer be operable.

57 Secure the cables so that they do not put stress on the connectors, terminal block, or other connections.

- The capacitance of the capacitors of the power supply rectifier circuit will drop over time. To avoid a secondary problem due to a failure, replacement is recommended approx. every five years. Replacement must be carried out by Panasonic or an authorized dealer.
- Be sure to read operating manual (safety guide) included with product before use.

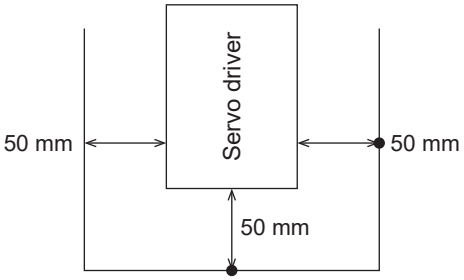
■ Servo Driver Ambient Temperature

The life span of the servo driver is largely dependent on the ambient temperature.

Make sure that the ambient temperature within 50 mm of the servo driver does not exceed the operating temperature range.

If it is not possible to measure the temperature from a distance of 50 mm, instead measure at the midpoint of the gap between the obstacle preventing measurement and the servo driver.

Front view



Operating temperature range: 0–55 °C

11 Life span

(Life span is not guaranteed.)

11.1 Expected Life span of Servo Driver

When used continuously under the following conditions, the expected life span is 28,000 hours.

Definition of life span: "Life span" is defined as the time it takes for the electrolytic capacitor to decrease in capacity by 20% once shipped from the factory.

Condition	Input power supply	:	Single-phase AC 100 V 50/60 Hz, Single-phase/3-phase AC 200 V 50/60 Hz 3-phase AC 400 V 50/60 Hz
	Ambient temperature	:	55 ℃
	Height above sea level	:	100 m or less
	Output torque:	:	Rated torque constant
	Speed	:	Rated speed constant

The life span varies greatly depending on the conditions of use.

11.2 Standard Life span

■ Inrush Current Prevention Circuit

The expected life span of the inrush current prevention circuit is approximately 20,000 cycles. Note that criteria may vary depending on environmental and working conditions.

■ Cooling Fan

The standard replacement time for the cooling fan is approximately 20,000 hours. Note that criteria may vary depending on environmental and working conditions.

12 Warranty

12.1 Warranty Period

The warranty period for the product is one year from the date of purchase or one year and six months from the date the product was manufactured.

However, the warranty will be void in any of the following cases, even within the warranty period:

1 If the issue is due to incorrect use or improper repair/modification

2 If the issue is due to the device being dropped after purchase or damaged during transit

3 If the issue is due to the device being used outside of its specifications

4 If the issue is due to a fire, earthquake, lightning strike, wind/water damage, salt damage, voltage abnormalities, other natural disasters, or natural damage

5 If the issue is due to ingress of water, oil, metal fragments, or other foreign objects

6 If parts with a stated standard life span have exceeded their respective life spans

12.2 Warranty Coverage

If the product fails during the warranty period for reason in which our company is at fault, we will only replace or repair the defective parts of the device that were provided by us. Please note that our above-stated responsibility is limited to the replacement and repair of the equipment provided by us and that we do not accept any responsibility for damage to your company or any third party that may occur in connection with the failure of the equipment provided by us.

We do not accept responsibility for any equipment failures or damage to your company or any third party in the case of any of the exclusions set forth in 12-1 above or in any of the following cases:

1 If the equipment has been incorporated or used in a way that does not conform to the instructions or precautions set forth in this specifications document

2 If the issue is due to a combination of products that incorporate different equipment

3 If you fail to comply with the requests made to your company in this specifications document

4 If the equipment failure is not caused by our company's actions

12.3 Warranty Service

If you require the warranty service (fault cause investigation, repair, etc.), please contact the retailer from which you purchased the product.

If you wish to send it directly to us with the permission of the retailer, please receive a repair/investigation request form from the place of purchase, fill out the necessary information, and send it to our motor service desk along with the product.

As a general rule, you will be responsible for shipping costs.

13 Network Security

As you will use this product connected to a network, your attention is called to the following security risks.

1 Leakage or theft of information through this product

2 Unauthorized operation of this product by a malicious third party.

3 Interference of this product by a malicious third party.

It is the customer's responsibility to ensure that sufficient network security measures are taken, including those listed below.

We are not responsible for any damage caused by insufficient network security.

Precautions

- This product is to be used in an environment where only a limited number of parties are permitted access to the product.
- This product is not to be installed in locations where the product and its accessories, such as cables, can be easily destroyed.
- This product is to be used on a network that is not connected to the Internet.
- If an external device, such as a computer or tablet, is connected to this product, there are concerns about the effects of computer viruses and unauthorized programs.

  Take appropriate security measures with external devices, such as ensuring that they are checked for computer viruses and that regularly cleaning of such viruses is performed before connecting them.
- If the product is to be disposed of, transferred, repaired, or otherwise transferred to a third party, important information may also be recorded on the product.

  At customer's risk, please handle it with care, such as erasing it.

14 Additional Precautions

1 Precautions to be taken when exporting the product or equipment incorporating the product

If the end user or end use of this product is related to the military or weaponry, etc., it may be subject to export restrictions as set forth in the Foreign Exchange and Foreign Trade Act. When exporting, please review and follow the necessary export procedures.

2 This product is designed for general industrial use. This product is not for use in devices critical to human wellbeing or in specialized environments, such as nuclear power control, aerospace equipment, transportation systems, medical equipment, various safety devices, or equipment that requires a high degree of cleanliness.

3 Please ensure that finished equipment complies with standards, laws, and regulations, and confirm that the structure, dimensions, life span, and characteristics of the product match those of your installed equipment and components.

4 Since it is possible, albeit unlikely, that your finished equipment will operate abnormally due to a malfunction of our product (such as due to signal disconnections, signal open phases, or operation performed outside the settings as a result of external noise or static electricity being applied), please put in place failsafes and ensure adequate safety within the operational range of your site.

5 Make sure to follow indications as overloading products can cause loads to collapse.

6 Ensure that the motor shaft is not operated without being electrically grounded, as this may lead to electrolytic corrosion of the motor bearing and increased bearing noise, depending on the machine and the installation environment.

7 A tightening torque appropriate for the product mounting screws should be chosen to avoid loosening or damage, taking into account the strength of the screws used and the material to which they are mounted.

8 Because noise immunity may be affected by wiring conditions (e.g., grounding methods, cable length, signal wire shielding), please confirm the noise immunity of your equipment.

9 When disposing of the servo driver or motor, treat them as industrial waste.

10 When disposing of batteries, insulate them with tape and dispose of them in accordance with local regulations.

11 In order to improve performance, etc., some components of the product might be changed within the acceptable range in the specifications document.

12 Changes to specifications shall be reflected in the specifications document or in a document specified by your company. If this affects the function or characteristics of the product, the specifications will be changed following a test with a prototype.

13 Changes in specifications may affect the price of the product.

14 If you require clarification on something that is not covered by this specifications document, please contact us in advance.

15 In the event of a problem, the two parties shall resolve the issue following consultations as set forth in this specifications document.

16 Depending on the nature of the failure of the product, an amount of smoke equivalent to one cigarette may be emitted.

Please consider these possibilities when using the device in cleanrooms, etc.

17 Do not use detergents containing benzine, thinner, alcohol, acid, or alkaline as this may cause discoloration or damage to the product's exterior.

18 Do not reverse engineer, decompile, or disassemble this product.

19 All motors with input power 400 V drivers and some motors with input power 200 V drivers use a Chinese-made rare earth magnet.

The patent licensor has imposed certain restrictions on the regions in which these magnets can be distributed.

To avoid infringement of the licensing terms, do not carry the motor into Japan or into another country via Japan,either by itself or as part of set.

15 Model Specifications

Product number	MADLT01BU	MADLT11BU	MADLT05BU	MADLT15BU
Power supply input	Single-phase 100 V	Single-phase 100 V	Single-phase/3-phase 200 V	Single-phase/3-phase 200 V
Maximum output current	6 A	8 A	6 A	8 A
Rotary encoder	8388608 resolution	8388608 resolution	8388608 resolution	8388608 resolution
Regenerative resistor	External	External	External	External
Auto-gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system	Available	Available	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2
	AWG18	AWG18	AWG18	AWG18
Main power supply cable	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2
	AWG14-18	AWG14-18	AWG14-18	AWG14-18
Ground cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Motor cable	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2
	AWG14-18	AWG14-18	AWG14-18	AWG14-18
Inrush current (main power supply) (*1)	Max. 7 A	Max. 7 A	Max. 14 A	Max. 14 A
Inrush current (control power supply) (*1)	Max. 7 A	Max. 7 A	Max. 14 A	Max. 14 A
Product weight	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg
External size	size A	size A	size A	size A

*1 When the product power supply input voltage is the 100 V specification, the current is the value calculated with the voltage as 100 V. Likewise, the current is the value calculated with the voltage as 200 V when the product power input voltage is the 200 V specification.

Product number	MBDLT21BU	MBDLT25BU	MCDLT31BU	MCDLT35BU
Power supply input	Single-phase 100 V	Single-phase/3-phase 200 V	Single-phase 100 V	Single-phase/3-phase 200 V
Maximum output current	12 A	12 A	22 A	22 A
Rotary encoder	8388608 resolution	8388608 resolution	8388608 resolution	8388608 resolution
Regenerative resistor	External	External	Built-in	Built-in
Auto-gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system	Available	Available	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2
	AWG18	AWG18	AWG18	AWG18
Main power supply cable	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2
	AWG14-18	AWG14-18	AWG14-18	AWG14-18
Ground cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Motor cable	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2	HVSF 0.75-2.0 mm^2
	AWG14-18	AWG14-18	AWG14-18	AWG14-18
Inrush current (main power supply) (*1)	Max. 7 A	Max. 14 A	Max. 15 A	Max. 29 A
Inrush current (control power supply) (*1)	Max. 7 A	Max. 14 A	Max. 7 A	Max. 14 A
Product weight	Approx. 1.0 kg	Approx. 1.0 kg	Approx. 1.6 kg	Approx. 1.6 kg
External size	size B	size B	size C	size C

*1 When the product power supply input voltage is the 100 V specification, the current is the value calculated with the voltage as 100 V. Likewise, the current is the value calculated with the voltage as 200 V when the product power input voltage is the 200 V specification.

Product number	MDDLT45BU	MDDLT55BU	MEDLT83BU	MEDLT93BU
Power supply input	Single-phase/3-phase 200 V	Single-phase/3-phase 200 V	3-phase 200 V	3-phase 200 V
Maximum output current	24 A	40 A	60 A	80 A
Rotary encoder	8388608 resolution	8388608 resolution	8388608 resolution	8388608 resolution
Regenerative resistor	Built-in	Built-in	Built-in	Built-in
Auto-gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system	Available	Available	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2
	AWG18	AWG18	AWG18	AWG18
Main power supply cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Ground cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Motor cable	HVSF 2.0mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 3.5 mm^2
	AWG14	AWG14	AWG14	AWG12
Inrush current (main power supply) (*1)	Max. 29 A	Max. 29 A	Max. 29 A	Max. 29 A
Inrush current (control power supply) (*1)	Max. 14 A	Max. 14 A	Max. 14 A	Max. 14 A
Product weight	Approx. 2.1 kg	Approx. 2.1 kg	Approx. 2.7 kg	Approx. 2.7 kg
External size	size D	size D	size E	size E

*1 When the product power supply input voltage is the 100 V specification, the current is the value calculated with the voltage as 100 V. Likewise, the current is the value calculated with the voltage as 200 V when the product power input voltage is the 200 V specification.

Product number	MFDLTA3BU	MFDLTB3BU
Power supply input	3-phase 200 V	3-phase 200 V
Maximum output current	100 A	120 A
Rotary encoder	8388608 resolution	8388608 resolution
Regenerative resistor	Built-in	Built-in
Auto-gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.75 mm^2	HVSF 0.75 mm^2
	AWG18	AWG18
Main power supply cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Ground cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Motor cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Inrush current (main power supply) (*1)	Max. 22 A	Max. 22 A
Inrush current (control power supply) (*1)	Max. 14 A	Max. 14 A
Product weight	Approx. 5.2 kg	Approx. 5.2 kg
External size	size F	size F

*1 When the product power supply input voltage is the 100 V specification, the current is the value calculated with the voltage as 100 V. Likewise, the current is the value calculated with the voltage as 200 V when the product power input voltage is the 200 V specification.

Product number	MGDLTC3BU	MHDLTE3BU	MHDLTF3BU
Power supply input	3-phase 200 V	3-phase 200 V	3-phase 200 V
Maximum output current	165 A	240 A	360 A
Rotary encoder	8388608 resolution	8388608 resolution	8388608 resolution
Regenerative resistor	External	External	External
Auto-gain tuning function	Provided	Provided	Provided
Dynamic brake function	Provided	なし	なし
Absolute system	Available	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.75 mm^2	HVSF 0.75 mm^2	HVSF 0.75 mm^2
	AWG18	AWG18	AWG18
Main power supply cable	HVSF 8.0 mm^2	HVSF 22 mm^2	HVSF 38 mm^2
	AWG8	AWG4	AWG2
Ground cable	HVSF 8.0 mm^2	HVSF 22 mm^2	HVSF 38 mm^2
	AWG8	AWG4	AWG2
Motor cable	HVSF 14 mm^2	HVSF 22 mm^2	HVSF 38 mm^2
	AWG6	AWG4	AWG2
Inrush current (main power supply) (*1)	Max. 66 A	Max. 66 A	Max. 66 A
Inrush current (control power supply) (*1)	Max. 15 A	Max. 15 A	Max. 15 A
Product weight	Approx. 8.2 kg	Approx. 14.2 kg	Approx. 15.2 kg
External size	size G	size H	size H

*1 When the product power supply input voltage is the 100 V specification, the current is the value calculated with the voltage as 100 V. Likewise, the current is the value calculated with the voltage as 200 V when the product power input voltage is the 200 V specification.

Product number	MDDLT44BU	MDDLT54BU	MDDLT64BU	MEDLT84BU
Power supply input	3-phase 400 V	3-phase 400 V	3-phase 400 V	3-phase 400 V
Maximum output current	6.5 A	13 A	20 A	28 A
Rotary encoder	8388608 resolution	8388608 resolution	8388608 resolution	8388608 resolution
Regenerative resistor	Built-in	Built-in	Built-in	Built-in
Auto-gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system	Available	Available	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.52 mm^2	HVSF 0.52 mm^2	HVSF 0.52 mm^2	HVSF 0.52 mm^2
	AWG20	AWG20	AWG20	AWG20
Main power supply cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Ground cable	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Motor cable	HVSF 2.0mm^2	HVSF 2.0mm^2	HVSF 2.0 mm^2	HVSF 2.0 mm^2
	AWG14	AWG14	AWG14	AWG14
Inrush current (main power supply) (*1)	Max. 30 A	Max. 30 A	Max. 30 A	Max. 30 A
Inrush current (control power supply) (*1)	Max. 48 A	Max. 48 A	Max. 48 A	Max. 48 A
Product weight	Approx. 2.1 kg	Approx. 2.1 kg	Approx. 2.1 kg	Approx. 2.7 kg
External size	size D	size D	size D	size E

*1 When the product power input voltage is the 400 V specification, the current is the value calculated with the voltage as 400 V (control power supply: DC 24 V).

Product number	MFDLTA4BU	MFDLTB4BU
Power supply input	3-phase 400 V	3-phase 400 V
Maximum output current	40 A	60 A
Rotary encoder	8388608 resolution	8388608 resolution
Regenerative resistor	Built-in	Built-in
Auto-gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system	Available	Available
Operating ambient temperature	0-55 ℃	0-55 ℃
Control power supply cable	HVSF 0.52 mm^2	HVSF 0.52 mm^2
	AWG20	AWG20
Main power supply cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Ground cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Motor cable	HVSF 3.5 mm^2	HVSF 3.5 mm^2
	AWG12	AWG12
Inrush current (main power supply) (*1)	Max. 30 A	Max. 30 A
Inrush current (control power supply) (*1)	Max. 48 A	Max. 48 A
Product weight	Approx. 5.2 kg	Approx. 5.2 kg
External size	size F	size F

*1 When the product power input voltage is the 400 V specification, the current is the value calculated with the voltage as 400 V (control power supply: DC 24 V).

Appendix List of Default Parameters and Objects

The following pages show default parameters and objects for when the servo driver is shipped from the factory.
Operation must be confirmed for each customer machine before use and the optimal parameters set.

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
0	0	For Manufacturer use	1
	1	Control mode setup	0
	2	Real-time auto-gain tuning setup	1
	3	Selection of machine stiffness at real-time auto-gain tuning	Size A-C 13 Size D-H 11
	4	Inertia ratio	250
	5	No use	-
	6	No use	-
	7	No use	-
	8	For Manufacturer use	0
	9	For Manufacturer use	1
	10	For Manufacturer use	1
	11	Output pulse counts per one motor revolution	2500
	12	Reversal of pulse output logic/ Output source selection	0
	13 *2	1st torque limit	500
	14	Position deviation excess setup	83886080
	15	Absolute encoder setup	1
	16	External regenerative resistor setup	Size A,B,G,H 3 Size C-F 0
	17	Load factor of external regenerative resistor selection	0
	18	For Manufacturer use	0
	19	No use	-
	20	No use	-
	21	No use	-
	22	No use	-
	23	Hardware identification information	0

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
1	0 *1	1st gain of position loop	Size A-C 48.0 Size D-H 32.0
	1 *1	1st gain of velocity loop	Size A-C 27.0 Size D-H 18.0
	2 *1	1st time constant of velocity loop integration	Size A-C 21.0 Size D-H 31.0
	3	1st filter of velocity detection	0
	4 *1	1st time constant of torque filter	Size A-C 0.84 Size D-H 1.26
	5 *1	2nd gain of position loop	Size A-C 48.0 Size D-H 32.0
	6 *1	2nd gain of velocity loop	Size A-C 27.0 Size D-H 18.0
	7 *1	2nd time constant of velocity loop integration	Size A-C 21.0 Size D-H 31.0
	8	2nd filter of velocity detection	0
	9 *1	2nd time constant of torque filter	Size A-C 0.84 Size D-H 1.26
	10 *1	Velocity feed forward gain	100.0
	11 *1	Velocity feed forward filter	0
	12 *1	Torque feed forward gain	100.0
	13 *1	Torque feed forward filter	0
	14	2nd gain setup	1
	15	Mode of position control switching	0
	16 *1	Delay time of position control switching	1.0
	17	Level of position control switching	0
	18	Hysteresis at position control switching	0
	19 *1	Position gain switching time	1.0
	20	Mode of velocity control switching	0
	21 *1	Delay time of velocity control switching	0
	22	Level of velocity control switching	0
	23	Hysteresis at velocity control switching	0
	24	Mode of torque control switching	0
	25 *1	Delay time of torque control switching	0
	26	Level of torque control switching	0
	27	Hysteresis at torque control switching	0
	28	For Manufacturer use	0
	29	For Manufacturer use	0
	30	For Manufacturer use	0

Cate	Pr.	Parameter	Default value
1	31	For Manufacturer use	0
	32	For Manufacturer use	0
	33	For Manufacturer use	0
	34	For Manufacturer use	0
	35	For Manufacturer use	0
	36	For Manufacturer use	0
	37	For Manufacturer use	0
	38	For Manufacturer use	0
	39	For Manufacturer use	0
	40	For Manufacturer use	0
	41	For Manufacturer use	0
	42	For Manufacturer use	0
	43	For Manufacturer use	0
	44	For Manufacturer use	0
	45	For Manufacturer use	0
	46	For Manufacturer use	0
	47	For Manufacturer use	0
	48	For Manufacturer use	0
	49	For Manufacturer use	0
	50	For Manufacturer use	0
	51	For Manufacturer use	0
	52	For Manufacturer use	0
	53	For Manufacturer use	0
	54	For Manufacturer use	0
	55	For Manufacturer use	0
	56	For Manufacturer use	0
	57	For Manufacturer use	0
	58	For Manufacturer use	0
	59	For Manufacturer use	0
	60	For Manufacturer use	0
	61	For Manufacturer use	0

Cate	Pr.	Parameter	Default value
1	62	For Manufacturer use	0
	63	For Manufacturer use	0
	64	For Manufacturer use	0
	65	For Manufacturer use	0
	66	For Manufacturer use	0
	67	For Manufacturer use	0
	68	For Manufacturer use	0
	69	For Manufacturer use	0
	70	For Manufacturer use	0
	71	For Manufacturer use	0
	72	For Manufacturer use	0
	73	For Manufacturer use	0
	74	For Manufacturer use	0
	75	For Manufacturer use	0
	76	For Manufacturer use	0
	77	For Manufacturer use	0
	78	For Manufacturer use	0

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
2	0	Adaptive filter mode setup	0
	1	1st notch frequency	5000
	2	1st notchwidth selection	2
	3	1st notch depth selection	0
	4	2nd notch frequency	5000
	5	2nd notch width selection	2
	6	2nd notch depth selection	0
	7	3rd notch frequency	5000
	8	3rd notch width selection	2
	9	3rd notch depth selection	0
	10	4th notch frequency	5000
	11	4th notch width selection	2
	12	4th notch depth selection	0
	13	Selection of damping filter switching	0
	14 *1	1st damping frequency	0.0
	15 *1	1st damping filter setup	0.0
	16 *1	2nd damping frequency	0.0
	17 *1	2nd damping filter setup	0.0
	18 *1	3rd damping frequency	0.0
	19 *1	3rd damping filter setup	0.0
	20 *1	4th damping frequency	0.0
	21 *1	4th damping filter setup	0.0
	22 *1	Command smoothing filter	Size A-C 9.2 Size D-H 13.9
	23 *1	Command FIR filter	1.0
	24	5th notch frequency	5000
	25	5th notch width selection	2
	26	5th notch depth selection	0
	27	1st damping width setting	0
	28	2nd damping width setting	0
	29	3rd damping width setting	0
	30	4th damping width setting	0

Cate	Pr.	Parameter	Default value
2	31	For Manufacturer use	0
	32	For Manufacturer use	0
	33	For Manufacturer use	0
	34	For Manufacturer use	0
	35	For Manufacturer use	0
	36	For Manufacturer use	0
	37	For Manufacturer use	0

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
3	0	No use	-
	1	No use	-
	2	No use	-
	3	No use	-
	4	For Manufacturer use	0
	5	For Manufacturer use	0
	6	No use	-
	7	No use	-
	8	No use	-
	9	No use	-
	10	No use	-
	11	No use	-
	12	Acceleration time setup	0
	13	Deceleration time setup	0
	14	Sigmoid acceleration/ deceleration time setup	0
	15	No use	-
	16	No use	-
	17	Selection of speed limit	2
	18	No use	-
	19	No use	-
	20	No use	-
	21	For Manufacturer use	0
	22	For Manufacturer use	0
	23	External scale selection *3	0
	24	Numerator of external scaledivision *3	0
	25	Denominator of external scaledivision *3	10000
	26	Reversal of direction ofexternal scale *3	0
	27	External scale Z phase disconnection detection disable *3	0
	28	Hybrid deviation excess setup *3	16000
	29	Hybrid deviation clear setup *3	0
	30	No use	-
3	31	No use	-
	32	No use	-
	33	Analog input gain	0
	34	Analog input inversion	0
	35	Analog input integral time constant	0
	36	Analog input integral limit value	0

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
4	0	SI1 input selection	3289650
	1	SI2 input selection	8487297
	2	SI3 input selection	8553090
	3	SI4 input selection	2236962
	4	SI5 input selection	2105376
	5	SI6 input selection	2171169
	6	SI7 input selection	3158064
	7	SI8 input selection	3223857
	8	No use	-
	9	No use	-
	10	SO1 output selection	197379
	11	SO2 output selection	1052688
	12	SO3 output selection	65793
	13	No use	-
	14	No use	-
	15	No use	-
	16	Type of analog monitor 1	0
	17	Analog monitor 1 output gain	0
	18	Type of analog monitor 2	4
	19	Analog monitor 2 output gain	0
	20	No use	-
	21	Analog monitor output setup	0
	22	Analog input 1 (AI1) offset setup	0
	23	Analog input 1 (AI1) filter setup	0
	24	For Manufacturer use	0
	25	No use	-
	26	No use	-
	27	No use	-
	28	No use	-
	29	No use	-
	30	No use	-

Cate	Pr.	Parameter	Default value
4	31	Positioning complete (In-position) range	8400
	32	Positioning complete (In-position) output setup	0
	33	INP hold time	0
	34	Zero-speed	50
	35	Speed coincidence range	50
	36	At-speed (Speed arrival)	1000
	37	Mechanical brake action at stalling setup	0
	38	Mechanical brake action at running setup	0
	39	Brake release speed setup	30
	40	Selection of alarm output 1	0
	41	Selection of alarm output 2	0
	42	2nd Positioning complete (In-position) range	8400
	43	No use	-
	44	Position comparison output pulse width setting	0
	45	Position comparison output polarity selection	0
	46	No use	-
	47	Pulse output selection	0
	48	Position comparison value 1	0
	49	Position comparison value 2	0
	50	Position comparison value 3	0
	51	Position comparison value 4	0
	52	Position comparison value 5	0
	53	Position comparison value 6	0
	54	Position comparison value 7	0
	55	Position comparison value 8	0
	56	Position comparison output delay compensation amount	0
	57	Position comparison output assignment setting	0

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER

MODEL | MINAS A6BU series

Cate	Pr.	Parameter	Default value
5	0	No use	-
	1	No use	-
	2	No use	-
	3	Denominator of pulse outputdivision	0
	4	Over-travel inhibit input setup	1
	5	Sequence at over-travel inhibit	0
	6	Sequence at Servo-off	0
	7	Sequence at main power off	0
	8	LV trip selection at main power off	0
	9	Detection time of main power off	2000
	10	Sequence at alarm	0
	11	Torque setup for emergency stop	0
	12	Over-load level setup	0
	13	Over-speed level setup	0
	14 *1	Motor working range setup	1.0
	15	Control input signal reading setup	0
	16	Alarm clear input(A-CLR) setup	1
	17	No use	-
	18	No use	-
	19	No use	-
	20	Position setup unit select	0
	21	Selection of torque limit	1
	22 *2	2nd torque limit	500
	23	No use	-
	24	No use	-
	25 *2	For Manufacturer use	0
	26 *2	For Manufacturer use	0
	27	No use	-
	28	No use	-
	29	For Manufacturer use	2
	30	No use	-

Cate	Pr.	Parameter	Default value
5	31	USB axis address	1
	32	No use	-
	33	Pulse regenerative output limitsetup	0
	34	For Manufacturer use	4
	35	No use	-
	36	For Manufacturer use	0
	37	No use	-
	38	No use	-
	39	No use	-
	40	No use	-
	41	No use	-
	42	No use	-
	43	No use	-
	44	No use	-
	45	Quadrant glitch positive-direction compensation value	0
	46	Quadrant glitch negative-direction compensation value	0
	47	Quadrant glitch compensation delay time	0
	48	Quadrant glitch compensation filter setting L	0
	49	Quadrant glitch compensation filter setting H	0
	50	For Manufacturer use	0
	51	For Manufacturer use	0
	52	For Manufacturer use	0
	53	For Manufacturer use	0
	54	For Manufacturer use	0
	55	For Manufacturer use	0
	56	Slow stop deceleration time setting	0
	57	Slow stop S-shape acceleration and deceleration setting	0
	58	No use	-
	59	No use	-
	60	No use	-
	61	No use	-

Cate	Pr.	Parameter	Default value
5	62	No use	-
	63	No use	-
	64	No use	-
	65	No use	-
	66 *1	Deterioration diagnosis convergence judgment time	0
	67	Deterioration diagnosis inertia ratio upper limit	0
	68	Deterioration diagnosis inertia ratio lower limit	0
	69 *1	Deterioration diagnosis unbalanced load upper limit	0
	70 *1	Deterioration diagnosis unbalanced load lower limit	0
	71 *1	Deterioration diagnosis dynamic friction upper limit	0
	72 *1	Deterioration diagnosis dynamic friction lower limit	0
	73 *1	Deterioration diagnosis viscous friction upper limit	0
	74 *1	Deterioration diagnosis viscous friction lower limit	0
	75	Deterioration diagnosis velocity setting	0
	76	Deterioration diagnosis torque average time	0
	77 *1	Deterioration diagnosis torque upper limit	0
	78 *1	Deterioration diagnosis torque lower limit	0
	79	No use	-
	80	No use	-
	81	No use	-
	82	No use	-
	83	No use	-
	84	No use	-
	85	No use	-
	86	No use	-
	87	No use	-
	88	No use	-
	89	No use	-
	90	No use	-
	91	No use	-
	92	No use	-

Cate	Pr.	Parameter	Default value
5	93	No use	-
	94	Position compare output condition setup	0
	95	No use	-
	96	For Manufacturer use	0
	97	For Manufacturer use	0

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
6	0	No use	-
	1	No use	-
	2	Velocity deviation excess setup	0
	3	For Manufacturer use	0
	4	No use	-
	5 *1	Position 3rd gain valid time	0
	6	Position 3rd gain scale factor	100
	7	Torque command additional value	0
	8	Positive direction torque compensation value	0
	9	Negative direction torque compensation value	0
	10	Function expansion setup	528
	11	Current response setup	100
	12	No use	-
	13	No use	-
	14	Emergency stop time at alarm	200
	15	2nd over-speed level setup	0
	16	No use	-
	17	No use	-
	18 *1	Power-up wait time	0.0
	19	For Manufacturer use	0
	20	For Manufacturer use	0
	21	For Manufacturer use	0
	22	A,B phase external scale pulse output selection *3	0
	23	Load change compensation gain	0
	24 *1	Load change compensation filter	0.53
	25	For Manufacturer use	Size A-G 0 Size H 500
	26	For Manufacturer use	2
	27	Warning latch state setup	3
	28	No use	-
	29	No use	-
	30	For Manufacturer use	0

Cate	Pr.	Parameter	Default value
6	31	Real time auto tuning estimation speed	1
	32	Real time auto tuning custom setup	0
	33	No use	-
	34 *1	Hybrid vibration suppression gain *3	0
	35 *1	Hybrid vibration suppression filter*3	0.10
	36	Dynamic brake operation input setup	0
	37 *1	Oscillation detecting level	0
	38	Warning mask setup	4
	39	Warning mask setup2	0
	40	No use	-
	41	1st damping depth	0
	42 *1	Two-stage torque filter time constant	0
	43	Two-stage torque filter attenuation term	1000
	44	No use	-
	45	No use	-
	46	No use	-
	47	Function expansion settings 2	1
	48 *1	Adjust filter	Size A 1.1 Size B-C 1.2 Size D-H 1.7
	49	Command / tuning filter damping	15
	50 *1	Viscous friction compensation gain	0.0
	51	Immediate cessation completion wait time	0
	52	For Manufacturer use	0
	53	For Manufacturer use	0
	54	For Manufacturer use	0
	55	No use	-
	56	No use	-
	57	Torque saturation anomaly detection time	0
	58	For Manufacturer use	0
	59	For Manufacturer use	0
	60	2nd damping depth	0
	61 *1	1st resonance frequency	0

Cate	Pr.	Parameter	Default value
6	62	1st resonance attenuation ratio	0
	63 *1	1st anti-resonance frequency	0
	64	1st anti-resonance attenuation ratio	0
	65 *1	1st response frequency	0
	66 *1	2nd resonance frequency	0
	67	2nd resonance attenuation ratio	0
	68 *1	2nd anti-resonance frequency	0
	69	2nd anti-resonance attenuation ratio	0
	70 *1	2nd response frequency	0
	71	3rd damping depth	0
	72	4th damping depth	0
	73 *1	Load estimation filter	0
	74 *1	Torque compensation frequency 1	0
	75 *1	Torque compensation frequency 2	0
	76	Load estimation count	0
	77	No use	-
	78	No use	-
	79	No use	-
	80	No use	-
	81	No use	-
	82	No use	-
	83	No use	-
	84	No use	-
	85	Retracting operation condition setting	0
	86	Retracting operation alarm setting	0
	87	For Manufacturer use	0
	88	Absolute encoder multi-turn data upper-limit value	0
	89	No use	-
	90	No use	-
	91	No use	-
	92	No use	-

Cate	Pr.	Parameter	Default value
6	93	No use	-
	94	No use	-
	95	Overload warning detection level	0
	96	Overload warning release level	0
	97	Function expansion setup 3	0
	98	Function expansion setup 4	0
	99	No use	-
	100	For Manufacturer use	40.00
	101	For Manufacturer use	0
	102	Setting of over-travel inhibition release level	0

PARAMETER

MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
7	0	Display on LED	0
	1	Display time setup upon power-up	0
	2	No use	-
	3	Output setup during torque limit	0
	4	Backlash correction selection	0
	5	Amount of backlash correction	0
	6	Backlash correction time constant	0
	7	For Manufacturer use	0
	8	For Manufacturer use	0
	9	Correction time of latch delay 1	360
	10	For Manufacturer use	3
	11	For Manufacturer use	0
	12	For Manufacturer use	0
	13	For Manufacturer use	0
	14	Main power off warning detection time	0
	15	For Manufacturer use	0
	16	Torque saturation error protection frequency	0
	17	No use	-
	18	Backlash compensation value holding range	0
	19	No use	-
	20	No use	-
	21	No use	-
	22	Communication function expansion settings 1	0
	23	Communication function expansion settings 2	16384
	24	Communication function expansion settings 3	14352
	25	No use	-
	26	No use	-
	27	No use	-
	28	No use	-
	29	No use	-
	30	No use	-

Cate	Pr.	Parameter	Default value
7	31	No use	-
	32	No use	-
	33	No use	-
	34	No use	-
	35	No use	-
	36	No use	-
	37	No use	-
	38	No use	-
	39	For Manufacturer use	0
	40	Station alias setup (for controller)	0
	41	Station alias selection	1
	42	Maximum continuation communication error	-30584
	43	Detection time of lost link	0
	44	Software Ver.	-
	45	No use	-
	46	No use	-
	47	No use	-
	48	No use	-
	49	No use	-
	50	No use	-
	51	No use	-
	52	No use	-
	53	No use	-
	54	No use	-
	55	No use	-
	56	No use	-
	57	No use	-
	58	No use	-
	59	No use	-
	60	No use	-
	61	No use	-

Cate	Pr.	Parameter	Default value
7	62	No use	-
	63	No use	-
	64	No use	-
	65	No use	-
	66	No use	-
	67	No use	-
	68	No use	-
	69	No use	-
	70	No use	-
	71	No use	-
	72	No use	-
	73	No use	-
	74	No use	-
	75	No use	-
	76	No use	-
	77	No use	-
	78	For Manufacturer use	0
	79	For Manufacturer use	0
	80	No use	-
	81	No use	-
	82	No use	-
	83	No use	-
	84	No use	-
	85	No use	-
	86	No use	-
	87	Communication function expansion settings 5	3072
	88	No use	-
	89	No use	-
	90	No use	-
	91	No use	-
	92	Correction time of latch delay 2	0

Cate	Pr.	Parameter	Default value
7	93	Home position return limit speed	0
	94	No use	-
	95	No use	-
	96	No use	-
	97	No use	-
	98	No use	-
	99	Communication function expansion settings 6	0
	100	For Manufacturer use	0
	101	For Manufacturer use	0
	102	For Manufacturer use	0
	103	For Manufacturer use	0
	104	For Manufacturer use	0
	105	No use	-
	106	No use	-
	107	No use	-
	108	For Manufacturer use	7
	109	For Manufacturer use	0
	110	Communication function expansion settings 7	0
	111	No use	-
	112	No use	-
	113	Torque offset filter	0.00
	114	No use	-
	115	No use	-
	116	No use	-
	117	No use	-
	118	No use	-
	119	No use	-
	120	Absolute Scale Offset 1	0
	121	Absolute Scale Offset 2	0

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
8	0	For Manufacturer use	0
	1	Profile linear acceleration constant	1
	2	For Manufacturer use	0
	3	For Manufacturer use	0
	4	Profile linear deceleration constant	1
	5	For Manufacturer use	0
	6	No use	-
	7	No use	-
	8	No use	-
	9	No use	-
	10	For Manufacturer use	0
	11	No use	-
	12	For Manufacturer use	0
	13	For Manufacturer use	0
	14	For Manufacturer use	0
	15	For Manufacturer use	0
	16	No use	-
	17	Relative movement of retracting operation	0
	18	Retracting operation speed	0
	19	For Manufacturer use	0

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
9	0	For Manufacturer use	1
	1	External scale resolution	0
	2	For Manufacturer use	0
	3	For Manufacturer use	0
	4	For Manufacturer use	0
	5	For Manufacturer use	0
	6	For Manufacturer use	0
	7	For Manufacturer use	0
	8	For Manufacturer use	0
	9	For Manufacturer use	0
	10	For Manufacturer use	0
	11	For Manufacturer use	Size A 1 Size B-H 0
	12	For Manufacturer use	Size A 80 Size B-H 40
	13	For Manufacturer use	50
	14	For Manufacturer use	10
	15	No use	-
	16	No use	-
	17	For Manufacturer use	0
	18	For Manufacturer use	0
	19	For Manufacturer use	0
	20	For Manufacturer use	0
	21	For Manufacturer use	0
	22	For Manufacturer use	200
	23	For Manufacturer use	50
	24	For Manufacturer use	100
	25	For Manufacturer use	40
	26	For Manufacturer use	40
	27	For Manufacturer use	1000
	28	For Manufacturer use	100
	29	For Manufacturer use	0
	30	For Manufacturer use	0
	31	For Manufacturer use	0
	32	For Manufacturer use	0
	33	For Manufacturer use	100
	34	For Manufacturer use	0
	35	No use	-
	36	No use	-
	37	No use	-
	38	No use	-
	39	No use	-
	40	No use	-
	41	No use	-
	42	No use	-
	43	No use	-
	44	No use	-
	45	No use	-
	46	No use	-
	47	No use	-
	48	For Manufacturer use	0
	49	For Manufacturer use	0
	50	For Manufacturer use	0

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

PARAMETER	MODEL	MINAS A6BU series

Cate	Pr.	Parameter	Default value
15	0	For Manufacturer use	0
	1	No use	-
	2	For Manufacturer use	0
	3	No use	-
	4	No use	-
	5	No use	-
	6	No use	-
	7	No use	-
	8	No use	-
	9	No use	-
	10	No use	-
	11	No use	-
	12	No use	-
	13	No use	-
	14	No use	-
	15	No use	-
	16	For Manufacturer use	2
	17	For Manufacturer use	4
	18	No use	-
	19	No use	-
	20	No use	-
	21	No use	-
	22	No use	-
	23	No use	-
	24	No use	-
	25	No use	-
	26	No use	-
	27	No use	-
	28	No use	-
	29	No use	-
	30	For Manufacturer use	0

Cate	Pr.	Parameter	Default value
15	31	For Manufacturer use	5
	32	No use	-
	33	For Manufacturer use	0
	34	For Manufacturer use	0
	35	For Manufacturer use	1

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

Cate	Pr.	Parameter	Default value

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ･･･ Value of Panaterm：0.53 / Value of parameter-file：53

*2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.

*3 Can not be used with [A6BE]

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1000h	00h	Device type	Read Only
1001h	00h	Error register	Read Only
1008h	00h	Manufacturer device name	Read Only
1009h	00h	Manufacturer hardware version	Read Only
100Ah	00h	Manufacturer software version	Read Only
1010h	–	Store parameters	—
	00h	Number of entries	Read Only
	01h	Save all parameters	1
1018h	–	Identity object	—
	00h	Number of entries	Read Only
	01h	Vendor ID	Read Only
	02h	Product code	Read Only
	03h	Revision number	Read Only
	04h	Serial number	Read Only
10F3h	–	Diagnosis history	—
	00h	Number of entries	Read Only
	01h	Maximum messages	Read Only
	02h	Newest message	Read Only
	03h	Newest acknowledged message	0
	04h	New messages available	Read Only
	05h	Flags	39
	06h	Diagnosis message 1	Read Only
	07h	Diagnosis message 2	Read Only
	08h	Diagnosis message 3	Read Only
	09h	Diagnosis message 4	Read Only
	0Ah	Diagnosis message 5	Read Only
	0Bh	Diagnosis message 6	Read Only
	0Ch	Diagnosis message 7	Read Only
	0Dh	Diagnosis message 8	Read Only
	0Eh	Diagnosis message 9	Read Only
	0Fh	Diagnosis message 10	Read Only
	10h	Diagnosis message 11	Read Only
	11h	Diagnosis message 12	Read Only
	12h	Diagnosis message 13	Read Only
	13h	Diagnosis message 14	Read Only

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1600h	–	Receive PDO mapping 1	—
	00h	Number of entries	4
	01h	1st receive PDO mapped	1614807056
	02h	2nd receive PDO mapped	1616904200
	03h	3rd receive PDO mapped	1618608160
	04h	4th receive PDO mapped	1622671376
	05h	5th receive PDO mapped	0
	06h	6th receive PDO mapped	0
	07h	7th receive PDO mapped	0
	08h	8th receive PDO mapped	0
	09h	9th receive PDO mapped	0
	0Ah	10th receive PDO mapped	0
	0Bh	11th receive PDO mapped	0
	0Ch	12th receive PDO mapped	0
	0Dh	13th receive PDO mapped	0
	0Eh	14th receive PDO mapped	0
	0Fh	15th receive PDO mapped	0
	10h	16th receive PDO mapped	0
	11h	17th receive PDO mapped	0
	12h	18th receive PDO mapped	0
	13h	19th receive PDO mapped	0
	14h	20th receive PDO mapped	0
	15h	21st receive PDO mapped	0
	16h	22nd receive PDO mapped	0
	17h	23rd receive PDO mapped	0
	18h	24th receive PDO mapped	0
	19h	25th receive PDO mapped	0
	1Ah	26th receive PDO mapped	0
	1Bh	27th receive PDO mapped	0
	1Ch	28th receive PDO mapped	0
	1Dh	29th receive PDO mapped	0
	1Eh	30th receive PDO mapped	0
	1Fh	31st receive PDO mapped	0
	20h	32nd receive PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1601h	–	Receive PDO mapping 2	—
	00h	Number of entries	7
	01h	1st receive PDO mapped	1614807056
	02h	2nd receive PDO mapped	1616904200
	03h	3rd receive PDO mapped	1618018320
	04h	4th receive PDO mapped	1618608160
	05h	5th receive PDO mapped	1619001376
	06h	6th receive PDO mapped	1622671376
	07h	7th receive PDO mapped	1627324448
	08h	8th receive PDO mapped	0
	09h	9th receive PDO mapped	0
	0Ah	10th receive PDO mapped	0
	0Bh	11th receive PDO mapped	0
	0Ch	12th receive PDO mapped	0
	0Dh	13th receive PDO mapped	0
	0Eh	14th receive PDO mapped	0
	0Fh	15th receive PDO mapped	0
	10h	16th receive PDO mapped	0
	11h	17th receive PDO mapped	0
	12h	18th receive PDO mapped	0
	13h	19th receive PDO mapped	0
	14h	20th receive PDO mapped	0
	15h	21st receive PDO mapped	0
	16h	22nd receive PDO mapped	0
	17h	23rd receive PDO mapped	0
	18h	24th receive PDO mapped	0
	19h	25th receive PDO mapped	0
	1Ah	26th receive PDO mapped	0
	1Bh	27th receive PDO mapped	0
	1Ch	28th receive PDO mapped	0
	1Dh	29th receive PDO mapped	0
	1Eh	30th receive PDO mapped	0
	1Fh	31st receive PDO mapped	0
	20h	32nd receive PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1602h	–	Receive PDO mapping 3	—
	00h	Number of entries	6
	01h	1st receive PDO mapped	1614807056
	02h	2nd receive PDO mapped	1616904200
	03h	3rd receive PDO mapped	1618083856
	04h	4th receive PDO mapped	1618608160
	05h	5th receive PDO mapped	1622671376
	06h	6th receive PDO mapped	1627324448
	07h	7th receive PDO mapped	0
	08h	8th receive PDO mapped	0
	09h	9th receive PDO mapped	0
	0Ah	10th receive PDO mapped	0
	0Bh	11th receive PDO mapped	0
	0Ch	12th receive PDO mapped	0
	0Dh	13th receive PDO mapped	0
	0Eh	14th receive PDO mapped	0
	0Fh	15th receive PDO mapped	0
	10h	16th receive PDO mapped	0
	11h	17th receive PDO mapped	0
	12h	18th receive PDO mapped	0
	13h	19th receive PDO mapped	0
	14h	20th receive PDO mapped	0
	15h	21st receive PDO mapped	0
	16h	22nd receive PDO mapped	0
	17h	23rd receive PDO mapped	0
	18h	24th receive PDO mapped	0
	19h	25th receive PDO mapped	0
	1Ah	26th receive PDO mapped	0
	1Bh	27th receive PDO mapped	0
	1Ch	28th receive PDO mapped	0
	1Dh	29th receive PDO mapped	0
	1Eh	30th receive PDO mapped	0
	1Fh	31st receive PDO mapped	0
	20h	32nd receive PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1603h	–	Receive PDO mapping 4	—
	00h	Number of entries	8
	01h	1st receive PDO mapped	1614807056
	02h	2nd receive PDO mapped	1616904200
	03h	3rd receive PDO mapped	1618018320
	04h	4th receive PDO mapped	1618083856
	05h	5th receive PDO mapped	1618608160
	06h	6th receive PDO mapped	1619001376
	07h	7th receive PDO mapped	1622671376
	08h	8th receive PDO mapped	1627324448
	09h	9th receive PDO mapped	0
	0Ah	10th receive PDO mapped	0
	0Bh	11th receive PDO mapped	0
	0Ch	12th receive PDO mapped	0
	0Dh	13th receive PDO mapped	0
	0Eh	14th receive PDO mapped	0
	0Fh	15th receive PDO mapped	0
	10h	16th receive PDO mapped	0
	11h	17th receive PDO mapped	0
	12h	18th receive PDO mapped	0
	13h	19th receive PDO mapped	0
	14h	20th receive PDO mapped	0
	15h	21st receive PDO mapped	0
	16h	22nd receive PDO mapped	0
	17h	23rd receive PDO mapped	0
	18h	24th receive PDO mapped	0
	19h	25th receive PDO mapped	0
	1Ah	26th receive PDO mapped	0
	1Bh	27th receive PDO mapped	0
	1Ch	28th receive PDO mapped	0
	1Dh	29th receive PDO mapped	0
	1Eh	30th receive PDO mapped	0
	1Fh	31st receive PDO mapped	0
	20h	32nd receive PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1A00h	–	Transmit PDO mapping 1	—
	00h	Number of entries	8
	01h	1st transmit PDO mapped	1614741520
	02h	2nd transmit PDO mapped	1614872592
	03h	3rd transmit PDO mapped	1616969736
	04h	4th transmit PDO mapped	1617166368
	05h	5th transmit PDO mapped	1622736912
	06h	6th transmit PDO mapped	1622802464
	07h	7th transmit PDO mapped	1626603552
	08h	8th transmit PDO mapped	1627193376
	09h	9th transmit PDO mapped	0
	0Ah	10th transmit PDO mapped	0
	0Bh	11th transmit PDO mapped	0
	0Ch	12th transmit PDO mapped	0
	0Dh	13th transmit PDO mapped	0
	0Eh	14th transmit PDO mapped	0
	0Fh	15th transmit PDO mapped	0
	10h	16th transmit PDO mapped	0
	11h	17th transmit PDO mapped	0
	12h	18th transmit PDO mapped	0
	13h	19th transmit PDO mapped	0
	14h	20th transmit PDO mapped	0
	15h	21st transmit PDO mapped	0
	16h	22nd transmit PDO mapped	0
	17h	23rd transmit PDO mapped	0
	18h	24th transmit PDO mapped	0
	19h	25th transmit PDO mapped	0
	1Ah	26th transmit PDO mapped	0
	1Bh	27th transmit PDO mapped	0
	1Ch	28th transmit PDO mapped	0
	1Dh	29th transmit PDO mapped	0
	1Eh	30th transmit PDO mapped	0
	1Fh	31st transmit PDO mapped	0
	20h	32nd transmit PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1A01h	–	Transmit PDO mapping 2	—
	00h	Number of entries	9
	01h	1st transmit PDO mapped	1614741520
	02h	2nd transmit PDO mapped	1614872592
	03h	3rd transmit PDO mapped	1616969736
	04h	4th transmit PDO mapped	1617166368
	05h	5th transmit PDO mapped	1617690656
	06h	6th transmit PDO mapped	1618411536
	07h	7th transmit PDO mapped	1622736912
	08h	8th transmit PDO mapped	1622802464
	09h	9th transmit PDO mapped	1627193376
	0Ah	10th transmit PDO mapped	0
	0Bh	11th transmit PDO mapped	0
	0Ch	12th transmit PDO mapped	0
	0Dh	13th transmit PDO mapped	0
	0Eh	14th transmit PDO mapped	0
	0Fh	15th transmit PDO mapped	0
	10h	16th transmit PDO mapped	0
	11h	17th transmit PDO mapped	0
	12h	18th transmit PDO mapped	0
	13h	19th transmit PDO mapped	0
	14h	20th transmit PDO mapped	0
	15h	21st transmit PDO mapped	0
	16h	22nd transmit PDO mapped	0
	17h	23rd transmit PDO mapped	0
	18h	24th transmit PDO mapped	0
	19h	25th transmit PDO mapped	0
	1Ah	26th transmit PDO mapped	0
	1Bh	27th transmit PDO mapped	0
	1Ch	28th transmit PDO mapped	0
	1Dh	29th transmit PDO mapped	0
	1Eh	30th transmit PDO mapped	0
	1Fh	31st transmit PDO mapped	0
	20h	32nd transmit PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1A02h	–	Transmit PDO mapping 3	—
	00h	Number of entries	9
	01h	1st transmit PDO mapped	1614741520
	02h	2nd transmit PDO mapped	1614872592
	03h	3rd transmit PDO mapped	1616969736
	04h	4th transmit PDO mapped	1617166368
	05h	5th transmit PDO mapped	1617690656
	06h	6th transmit PDO mapped	1618411536
	07h	7th transmit PDO mapped	1622736912
	08h	8th transmit PDO mapped	1622802464
	09h	9th transmit PDO mapped	1627193376
	0Ah	10th transmit PDO mapped	0
	0Bh	11th transmit PDO mapped	0
	0Ch	12th transmit PDO mapped	0
	0Dh	13th transmit PDO mapped	0
	0Eh	14th transmit PDO mapped	0
	0Fh	15th transmit PDO mapped	0
	10h	16th transmit PDO mapped	0
	11h	17th transmit PDO mapped	0
	12h	18th transmit PDO mapped	0
	13h	19th transmit PDO mapped	0
	14h	20th transmit PDO mapped	0
	15h	21st transmit PDO mapped	0
	16h	22nd transmit PDO mapped	0
	17h	23rd transmit PDO mapped	0
	18h	24th transmit PDO mapped	0
	19h	25th transmit PDO mapped	0
	1Ah	26th transmit PDO mapped	0
	1Bh	27th transmit PDO mapped	0
	1Ch	28th transmit PDO mapped	0
	1Dh	29th transmit PDO mapped	0
	1Eh	30th transmit PDO mapped	0
	1Fh	31st transmit PDO mapped	0
	20h	32nd transmit PDO mapped	0

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1A03h	–	Transmit PDO mapping 4	—
	00h	Number of entries	9
	01h	1st transmit PDO mapped	1614741520
	02h	2nd transmit PDO mapped	1614872592
	03h	3rd transmit PDO mapped	1616969736
	04h	4th transmit PDO mapped	1617166368
	05h	5th transmit PDO mapped	1617690656
	06h	6th transmit PDO mapped	1618411536
	07h	7th transmit PDO mapped	1622736912
	08h	8th transmit PDO mapped	1622802464
	09h	9th transmit PDO mapped	1627193376
	0Ah	10th transmit PDO mapped	0
	0Bh	11th transmit PDO mapped	0
	0Ch	12th transmit PDO mapped	0
	0Dh	13th transmit PDO mapped	0
	0Eh	14th transmit PDO mapped	0
	0Fh	15th transmit PDO mapped	0
	10h	16th transmit PDO mapped	0
	11h	17th transmit PDO mapped	0
	12h	18th transmit PDO mapped	0
	13h	19th transmit PDO mapped	0
	14h	20th transmit PDO mapped	0
	15h	21st transmit PDO mapped	0
	16h	22nd transmit PDO mapped	0
	17h	23rd transmit PDO mapped	0
	18h	24th transmit PDO mapped	0
	19h	25th transmit PDO mapped	0
	1Ah	26th transmit PDO mapped	0
	1Bh	27th transmit PDO mapped	0
	1Ch	28th transmit PDO mapped	0
	1Dh	29th transmit PDO mapped	0
	1Eh	30th transmit PDO mapped	0
	1Fh	31st transmit PDO mapped	0
	20h	32nd transmit PDO mapped	0
1C00h	–	Sync manager communication type	—
	00h	Number of used sync manager channels	Read Only
	01h	Communication type sync manager 0	Read Only
	02h	Communication type sync manager 1	Read Only
	03h	Communication type sync manager 2	Read Only
	04h	Communication type sync manager 3	Read Only
1C12h	–	Sync manager channel 2	—
	00h	Number of assigned PDOs	1
	01h	PDO mapping object index of assigned RxPDO 1	5632
	02h	PDO mapping object index of assigned RxPDO 2	5633
	03h	PDO mapping object index of assigned RxPDO 3	5634
	04h	PDO mapping object index of assigned RxPDO 4	5635
1C13h	–	Sync manager channel 3	—
	00h	Number of assigned PDOs	1
	01h	PDO mapping object index of assigned TxPDO 1	6656
	02h	PDO mapping object index of assigned TxPDO 2	6657
	03h	PDO mapping object index of assigned TxPDO 3	6658
	04h	PDO mapping object index of assigned TxPDO 4	6659

■EtherCAT Object Initial value

◎ CoE communication profile area (1000h～1FFFh)

Index	Sub-Index	Name	Initial value
1C32h	–	Sync manager 2 synchronization	—
	00h	Number of sub-objects	Read Only
	01h	Sync mode	2
	02h	Cycle time	1000000
	03h	Shift time	Read Only
	04h	Sync modes supported	Read Only
	05h	Minimum cycle time	Read Only
	06h	Calc and copy time	Read Only
	08h	Command	Read Only
	09h	Delay time	Read Only
	0Ah	Sync0 cycle time	Read Only
	0Bh	Cycle time too small	Read Only
	0Ch	SM-event missed	Read Only
	0Dh	Shift time too short	Read Only
	0Eh	RxPDO toggle failed	Read Only
	20h	Sync error	Read Only
1C33h	–	Sync manager 3 synchronization	—
	00h	Number of sub-objects	Read Only
	01h	Sync mode	2
	02h	Cycle time	Read Only
	03h	Shift time	0
	04h	Sync modes supported	Read Only
	05h	Minimum cycle time	Read Only
	06h	Calc and copy time	Read Only
	08h	Command	Read Only
	09h	Delay time	Read Only
	0Ah	Sync0 cycle time	Read Only
	0Bh	Cycle time too small	Read Only
	0Ch	SM-event missed	Read Only
	0Dh	Shift time too short	Read Only
	0Eh	RxPDO toggle failed	Read Only
	20h	Sync error	Read Only

■EtherCAT Object Initial value

◎ Common servo information monitor object area (2000h～2FFFh)

Index	Sub-Index	Name	Initial value
202Fh	00h	Number of axes	Read Only

■EtherCAT Object Initial value

◎ User-specific area (4000h～4FFFh)

Index	Sub-Index	Name	Initial value
4304h	00h	Touch probe function expansion setup	0
4308h	00h	History number	0
4310h	00h	Alarm main no	0
4311h	00h	For manufacturer's use	—
4312h	00h	Velocity control loop torque limit	5000
4314h	00h	Analog input internal offset	0
4315h	00h	Analog deviation limit	0
4316h	00h	Number of entries	Read Only
	01h	Analog input voltage dead zone	0
4320h	00h	Analog monitor output 1	0
4321h	00h	Analog monitor output 2	0
4351h	00h	Analog input function	0
4C00h	00h	Number of entries	Read Only
	01h	Analog input gain	0
	02h	Analog input polarity	0
	03h	Analog input integration time constant	0
	04h	Analog input integration limit	0
	05h	Analog input offset	0
	06h	Analog input filter	0
	07h	Analog input excess setup	0
4D00h	–	Special function start	—
	00h	Number of entries	Read Only
	01h	Special function start flag 1	0
	02h	Special function start flag 2	0
	03h	For manufacturer's use	0
4D01h	00h	Special function setting 9	0
4D10h	–	External scale ID	—
	00h	Number of entries	Read Only
	01h	External scale vendor ID	Read Only
	02h	External scale model ID	Read Only
4D11h	–	For manufacturer's use	—
	00h	Number of entries	—
	01h	For manufacturer's use	—
	02h	For manufacturer's use	—
4D12h	00h	Motor serial number	Read Only
4D13h	00h	For manufacturer's use	—
4D14h	00h	For manufacturer's use	—
4D15h	00h	Drive serial number	Read Only
4D29h	00h	Over load factor	Read Only
4D35h	–	For manufacturer's use	—
	00h	Number of entries	—
	01h	For manufacturer's use	—
	02h	For manufacturer's use	—
4D36h	–	For manufacturer's use	—
	00h	Number of entries	—
	01h	For manufacturer's use	—
	02h	For manufacturer's use	—
4D51h	00h	Analog input status	Read Only
4D52h	00h	For manufacturer's use	—
4D53h	00h	For manufacturer's use	—
4D54h	00h	For manufacturer's use	—
4D55h	00h	For manufacturer's use	—
4D56h	00h	For manufacturer's use	Read Only
	–	Alarm accessory information	—

■EtherCAT Object Initial value

◎ User-specific area (4000h～4FFFh)

Index	Sub-Index	Name	Initial value
4DA0h	00h	Number of entries	Read Only
	01h	History number echo	Read Only
	02h	Alarm code	Read Only
	03h	Control mode	Read Only
	04h	Motor speed	Read Only
	05h	Positional command velocity	Read Only
	06h	Velocity control command	Read Only
	07h	Torque command	Read Only
	08h	Position command deviation	Read Only
	09h	Position actual internal value	Read Only
	0Ah	For manufacturer's use	—
	0Bh	Input port (logic signal)	Read Only
	0Ch	Output port (logic signal)	Read Only
	0Dh	Analog input	Read Only
	0Eh	For manufacturer's use	—
	0Fh	For manufacturer's use	—
	10h	Overload ratio	Read Only
	11h	Regenerative load ratio	Read Only
	12h	Voltage across PN	Read Only
	13h	Temperature of amplifier	Read Only
	14h	Warning flags	Read Only
	15h	Inertia ratio	Read Only
	16h	For manufacturer's use	—
	17h	For manufacturer's use	—
	18h	For manufacturer's use	—
	19h	Temperature of encoder	Read Only
	1Ah	For manufacturer's use	—
	1Bh	For manufacturer's use	—
	1Ch	For manufacturer's use	—
	1Dh	U-phase current detection value	Read Only
	1Eh	W-phase current detection value	Read Only
	1Fh	For manufacturer's use	—
	20h	For manufacturer's use	—
	21h	Encoder single-turn data	Read Only
	22h	Encoder communication error count (accumulated)	Read Only
	23h	External scale communication data error count (accumulated)	Read Only
	24h	For manufacturer's use	—
4DB0h	-	For manufacturer's use	—
	00h	Number of entries	—
	01h	Reserved	—
	02h	For manufacturer's use	—
	03h	Reserved	—
	04h	Reserved	—
	05h	Reserved	—
	06h	Reserved	—
	07h	Reserved	—
	08h	For manufacturer's use	—

■EtherCAT Object Initial value

◎ User-specific area (4000h～4FFFh)

Index	Sub-Index	Name	Initial value
4F01h	00h	Following error actual value (after filtering)	Read Only
4F03h	00h	Analog input internal voltage	Read Only
4F04h	00h	Position command internal value (after filtering)	Read Only
4F0Bh	00h	For manufacturer's use	—
4F0Ch	00h	Velocity command value (after filtering)	Read Only
4F0Dh	00h	External scale position	Read Only
4F11h	00h	Regenerative load ratio	Read Only
4F21h	00h	Logical input signal	Read Only
4F22h	00h	Logical output signal	Read Only
4F23h	00h	Logical input signal (expansion portion)	Read Only
4F24h	00h	For manufacturer's use	—
4F25h	00h	Physical input signal	Read Only
4F26h	00h	Physical output signal	Read Only
4F31h	00h	Inertia ratio	Read Only
4F32h	00h	Motor automatic identification	Read Only
4F33h	00h	Cause of motor no work	Read Only
4F34h	00h	Warning flags	Read Only
4F36h	00h	For manufacturer's use	—
4F37h	–	Multiple alarm/warning information	—
	00h	Number of entries	Read Only
	01h	Multiple alarm information 1	Read Only
	02h	Multiple alarm information 2	Read Only
	03h	Multiple alarm information 3	Read Only
	04h	Multiple alarm information 4	Read Only
	05h	For manufacturer's use	—
	06h	For manufacturer's use	—
	07h	For manufacturer's use	—
	08h	For manufacturer's use	—
	09h	For manufacturer's use	—
	0Ah	For manufacturer's use	—
	0Bh	For manufacturer's use	—
	0Ch	For manufacturer's use	—
	0Dh	For manufacturer's use	—
	0Eh	For manufacturer's use	—
	0Fh	For manufacturer's use	—
	10h	Multiple sub alarm information	Read Only
	11h	Multiple warning information 1	Read Only
	12h	Multiple warning information 2	Read Only
4F41h	–	Motor encoder data	—
	00h	Number of entries	Read Only
	01h	Mechanical angle (Single-turn data)	Read Only
	02h	Multi-turn data	Read Only
4F42h	00h	Electrical angle	Read Only
4F44h	00h	Encoder status	Read Only
4F46h	00h	For manufacturer's use	—
4F48h	00h	External scale pulse total	Read Only
4F49h	00h	External scale absolute position	Read Only
4F4Ah	00h	External scale position deviation	Read Only
4F4Bh	00h	Touch probe external scale pos1 pos value	Read Only
4F4Ch	00h	Touch probe external scale pos1 neg value	Read Only
4F4Dh	00h	Touch probe external scale pos2 pos value	Read Only
4F4Eh	00h	Touch probe external scale pos2 neg value	Read Only
4F4Fh	00h	Analog input value	Read Only
4F51h	00h	For manufacturer's use	—

■EtherCAT Object Initial value

◎ User-specific area (4000h～4FFFh)

Index	Sub-Index	Name	Initial value
4F53h	00h	For manufacturer's use	—
4F61h	00h	Power on cumulative time	Read Only
4F62h	00h	Temperature of amplifier	Read Only
4F63h	00h	Temperature of encoder	Read Only
4F64h	00h	Inrush resistance relay operating count	Read Only
4F65h	00h	Dynamic brake operating count	Read Only
4F66h	00h	Fan operating time	Read Only
4F67h	00h	Fan life expectancy	Read Only
4F68h	00h	Capacitor life expectancy	Read Only
4F6Ah	00h	For manufacturer's use	—
4F6Bh	00h	For manufacturer's use	—
4F6Ch	00h	Motor power consumption	Read Only
4F6Dh	00h	Amount of motor power consumption	Read Only
4F6Eh	00h	Cumulative value of motor power consumption	Read Only
4F72h	00h	For manufacturer's use	—
4F73h	00h	For manufacturer's use	—
4F74h	00h	For manufacturer's use	—
4F77h	00h	Lost link error count	Read Only
4F78h	00h	Synchronization signal error count	Read Only
4F81h	00h	Encoder communication error count (accumulated)	Read Only
4F82h	00h	For manufacturer's use	—
4F83h	00h	External scale communication error count (accumulated)	Read Only
4F84h	00h	External scale communication data error count (accumulated)	Read Only
4F85h	00h	For manufacturer's use	—
4F86h	00h	Hybrid deviation	Read Only
4F87h	00h	External scale data(Higher)	Read Only
4F88h	00h	External scale data(Lower)	Read Only
4F89h	00h	External scale status	Read Only
4F8Ah	00h	External scale Z phase counter	Read Only
4F8Ch	00h	External scale single-turn data	Read Only
4F91h	00h	Estimation accuracy of magnetic pole position	Read Only
4F92h	00h	Execution time of estimation of magnetic pole position	Read Only
4F93h	00h	Maximum travel distance to plus direction when estimating magnetic pole position	Read Only
4F94h	00h	Maximum travel distance to minus direction when estimating magnetic pole position	Read Only
4FA1h	00h	Velocity command value	Read Only
4FA4h	00h	For manufacturer's use	—
4FA5h	00h	Velocity internal position command	Read Only
4FA6h	00h	Velocity error actual value	Read Only
4FA7h	00h	External scale position(Applied polarity)	Read Only
4FA8h	00h	Positive direction torque limit value	Read Only
4FA9h	00h	Negative direction torque limit value	Read Only
4FABh	00h	Gain switching flag	Read Only
4FACh	00h	For manufacturer's use	—
4FAFh	00h	Estimated position for seamless mode change	Read Only
4FB1h	00h	Deterioration diagnosis state	Read Only
4FB2h	00h	Deterioration diagnosis torque command average value	Read Only
4FB3h	00h	Deterioration diagnosis torque command standard value	Read Only
4FB4h	00h	Deterioration diagnosis inertia ratio estimate value	Read Only
4FB5h	00h	Deterioration diagnosis offset load estimate value	Read Only
4FB6h	00h	Deterioration diagnosis dynamic friction estimate value	Read Only
4FB7h	00h	Deterioration diagnosis viscous friction estimate value	Read Only
4FC2h	00h	Analog input voltage	Read Only
4FF5h	00h	For manufacturer's use	—

■EtherCAT Object Initial value

◎ User-specific area (4000h～4FFFh)

Index	Sub-Index	Name	Initial value
4FF6h	00h	For manufacturer's use	—
4FF7h	–	For manufacturer's use	—
	00h	Number of entries	Read Only
	01h	For manufacturer's use	—
	02h	For manufacturer's use	—
4FF8h	–	For manufacturer's use	—
	00h	Number of entries	Read Only
	01h	For manufacturer's use	—
	02h	For manufacturer's use	—
4FFDh	00h	For manufacturer's use	Read Only
4FFFh	00h	Target position echo	Read Only

■EtherCAT Object Initial value

◎ User-specific area (5000h～5FFFh)

Index	Sub-Index	Name	Initial value
5350h	00h	Homing torque limit value	0
5351h	00h	Homing detection time	0
5352h	00h	Homing detection velocity value	0

■EtherCAT Object Initial value

◎ Drive profile area (6000h～6FFFh)

Index	Sub-Index	Name	Initial value
6007h	00h	Abort connection option code	1
603Fh	00h	Error code	Read Only
6040h	00h	Controlword	0
6041h	00h	Statusword	Read Only
605Ah	00h	Quick stop option code	2
605Bh	00h	Shutdown option code	1
605Ch	00h	Disable operation option code	1
605Dh	00h	Halt option code	1
605Eh	00h	Fault reaction option code	2
6060h	00h	Modes of operation	0
6061h	00h	Modes of operation display	Read Only
6062h	00h	Position demand value	Read Only
6063h	00h	Position actual internal value	Read Only
6064h	00h	Position actual value	Read Only
6065h	00h	Following error window	100000
6066h	00h	Following error time out	0
6067h	00h	Position window	10
6068h	00h	Position window time	0
6069h	00h	Velocity sensor actual value	Read Only
606Ah	00h	Sensor selection code	0
606Bh	00h	Velocity demand value	Read Only
606Ch	00h	Velocity actual value	Read Only
606Dh	00h	Velocity window	52429
606Eh	00h	Velocity window time	0
606Fh	00h	Velocity threshold	52429
6070h	00h	Velocity threshold time	0
6071h	00h	Target torque	0
6072h	00h	Max torque	5000
6073h	00h	Max current	Read Only
6074h	00h	Torque demand	Read Only
6075h	00h	Motor rated current	Read Only
6076h	00h	Motor rated torque	Read Only
6077h	00h	Torque actual value	Read Only
6078h	00h	Current actual value	Read Only
6079h	00h	DC link circuit voltage	Read Only
607Ah	00h	Target position	0
607Bh	–	Position range limit	—
	00h	Highest sub-index supported	Read Only
	01h	Min position range limit	-2147483648
	02h	Max position range limit	2147483647
607Ch	00h	Home offset	0
607Dh	–	Software position limit	—
	00h	Number of entries	Read Only
	01h	Min position limit	0
	02h	Max position limit	0
607Eh	00h	Polarity	0
607Fh	00h	Max profile velocity	838860800
6080h	00h	Max motor speed	6500
6081h	00h	Profile velocity	0
6082h	00h	End velocity	0
6083h	00h	Profile acceleration	1000000
6084h	00h	Profile deceleration	1000000
6085h	00h	Quick stop deceleration	1000000
6086h	00h	Motion profile type	0
6087h	00h	Torque slope	1000

■EtherCAT Object Initial value

◎ Drive profile area (6000h～6FFFh)

Index	Sub-Index	Name	Initial value
6088h	00h	Torque profile type	0
608Fh	–	Position encoder resolution	—
	00h	Highest sub-index supported	Read Only
	01h	Encoder increments	Read Only
	02h	Motor revolutions	Read Only
6091h	–	Gear ratio	—
	00h	Number of entries	Read Only
	01h	Motor revolutions	1
	02h	Shaft revolutions	1
6092h	–	Feed constant	—
	00h	Highest sub-index supported	Read Only
	01h	Feed	8388608
	02h	Shaft revolutions	1
6098h	00h	Homing method	0
6099h	–	Homing speeds	—
	00h	Number of entries	Read Only
	01h	Speed during search for switch	873813
	02h	Speed during search for zero	87381
609Ah	00h	Homing acceleration	1000000
60A3h	00h	Profile jerk use	1
60A4h	–	Profile jerk	—
	00h	Highest sub-index supported	Read Only
	01h	Profile jerk1	0
	02h	Profile jerk2	0
60B0h	00h	Position offset	0
60B1h	00h	Velocity offset	0
60B2h	00h	Torque offset	0
60B8h	00h	Touch probe function	0
60B9h	00h	Touch probe status	Read Only
60BAh	00h	Touch probe pos1 pos value	Read Only
60BBh	00h	Touch probe pos1 neg value	Read Only
60BCh	00h	Touch probe pos2 pos value	Read Only
60BDh	00h	Touch probe pos2 neg value	Read Only
60C2h	–	Interpolation time period	—
	00h	Highest sub-index supported	Read Only
	01h	Interpolation time period value	1
	02h	Interpolation time index	-3
60C5h	00h	Max acceleration	4294967295
60C6h	00h	Max deceleration	4294967295
60E0h	00h	Positive torque limit value	5000
60E1h	00h	Negative torque limit value	5000

■EtherCAT Object Initial value

◎ Drive profile area (6000h～6FFFh)

Index	Sub-Index	Name	Initial value
60E3h	–	Supported homing method	—
	00h	Number of entries	Read Only
	01h	1st supported homing method	Read Only
	02h	2nd supported homing method	Read Only
	03h	3rd supported homing method	Read Only
	04h	4th supported homing method	Read Only
	05h	5th supported homing method	Read Only
	06h	6th supported homing method	Read Only
	07h	7th supported homing method	Read Only
	08h	8th supported homing method	Read Only
	09h	9th supported homing method	Read Only
	0Ah	10th supported homing method	Read Only
	0Bh	11th supported homing method	Read Only
	0Ch	12th supported homing method	Read Only
	0Dh	13th supported homing method	Read Only
	0Eh	14th supported homing method	Read Only
	0Fh	15th supported homing method	Read Only
	10h	16th supported homing method	Read Only
	11h	17th supported homing method	Read Only
	12h	18th supported homing method	Read Only
	13h	19th supported homing method	Read Only
	14h	20th supported homing method	Read Only
	15h	21st supported homing method	Read Only
	16h	22nd supported homing method	Read Only
	17h	23rd supported homing method	Read Only
	18h	24th supported homing method	Read Only
	19h	25th supported homing method	Read Only
	1Ah	26th supported homing method	Read Only
	1Bh	27th supported homing method	Read Only
	1Ch	28th supported homing method	Read Only
	1Dh	29th supported homing method	Read Only
	1Eh	30th supported homing method	Read Only
	1Fh	31st supported homing method	Read Only
	20h	32nd supported homing method	Read Only
	21h	33rd supported homing method	Read Only
	22h	34th supported homing method	Read Only
	23h	35th supported homing method	Read Only
	24h	36th supported homing method	Read Only
60E4h	00h	Highest sub-index supported	Read Only
	01h	1st additional position actual value	Read Only
60F2h	00h	Positioning option code	0
60F4h	00h	Following error actual value	Read Only
60FAh	00h	Control effort	Read Only
60FCh	00h	Position demand internal value	Read Only
60FDh	00h	Digital inputs	Read Only
60FEh	–	Digital outputs	—
	00h	Number of entries	Read Only
	01h	Physical outputs	0
	02h	Bit mask	0
60FFh	00h	Target velocity	0
6403h	00h	Motor catalogue number	Read Only
6502h	00h	Supported drive modes	Read Only