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SPECIFICATIONS

Product Name: AC Servo Driver

Product Series Name: MINAS A6S Series for Rotary motor

Product Model Number: Position control type/General-purpose communication type/Multifunction type

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
Sep. 1, 2015	0.0	—	NEWLY ISSUED	—
Nov. 1, 2015	1.0	—	Updated default parameters	—
Sep. 14, 2016	2.0	P1	Updated model symbols	—
		P1	Changed company name	
		P1, P3, P63, P75	Added MEDLT93SF model	
		P4 to 6	Added features	
		P16	Corrected the connector pin No. of RS485 signal	
		P66	Added description of harmonic suppression factor	
		P73 to 75	Corrected inrush current value for control power supply	
Mar. 20, 2019	3.0	—	Added sizes G and H	—
		—	Updated other contents according to the latest Japanese version	
Apr. 7, 2020	4.0	—	Added 400 V model	—
		—	Updated other contents according to the latest Japanese version	
		—	Corrected typographical errors	
Sep. 25, 2020	5.0	—	Added information regarding the attached table, corrected typographical errors	—
		—	Changed the title of this specification to “Standard Specifications”	
Mar. 1, 2021	6.0	—	Added Size D 400 V specification, corrected typographical errors	—
July 5, 2021	7.0	—	Changed name of business unit	—
		—	Changed cover format	
		—	Corrected typographical errors	
		—	Updated default parameters	
Sep. 3, 2021	8.0	—	Corrected typographical errors	—
Nov. 1, 2021	9.0	—	Changed company name	—
		P78, 79	Updated the description of global standards	
		P92	Added a note about network security	
		P93	Added a note about reverse engineering	
		—	Updated the default value of parameters	
Apr. 1, 2022	10.0	—	Changed to our updated format and revised to standardize expressions	—
		—	Changed company name	

Date	Rev.	Page	Description	Signed
Oct. 31, 2022	11.0	—	Changed Compliance with the international standards Corrected typographical errors	—
Jul 16, 2024	12.0	P1	Added a note about OSS note to Precautions	—
		P47	I/O Signal Interface Di-1 (2) Corrected typographical errors	
		P79	Added Compliance with EN61800-5-1:2007/A11:2021	
		P86	Added text to “Load protection and overheating protection” column	
		P100～102	Product number, corrected typographical errors Corrected typo regarding maximum output current (MGDLTC3SF)	
		—	Updated the default value of parameters	
Feb. 21, 2025	13.0	P78	Updated the compliance standards	—
		P90	Added precautions regarding stabilized power supply Added precautions regarding use continues in a warning environment	
Feb. 4, 2026	14.0	P84, 85	Added Peripheral devices	—
Oct. 30, 2026	15.0	—	Change of company name and address	—
		—	Added Size G/H 400 V specification	

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Appendix List of Default Parameters

1 Scope of Application

This specification relates to the MINAS A6S Series for Rotary motor of AC Servo Driver manufactured by 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-DSV03031
Modbus Communication and Block Operation Specification	:	SX-DSV03042

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

■ Precautions

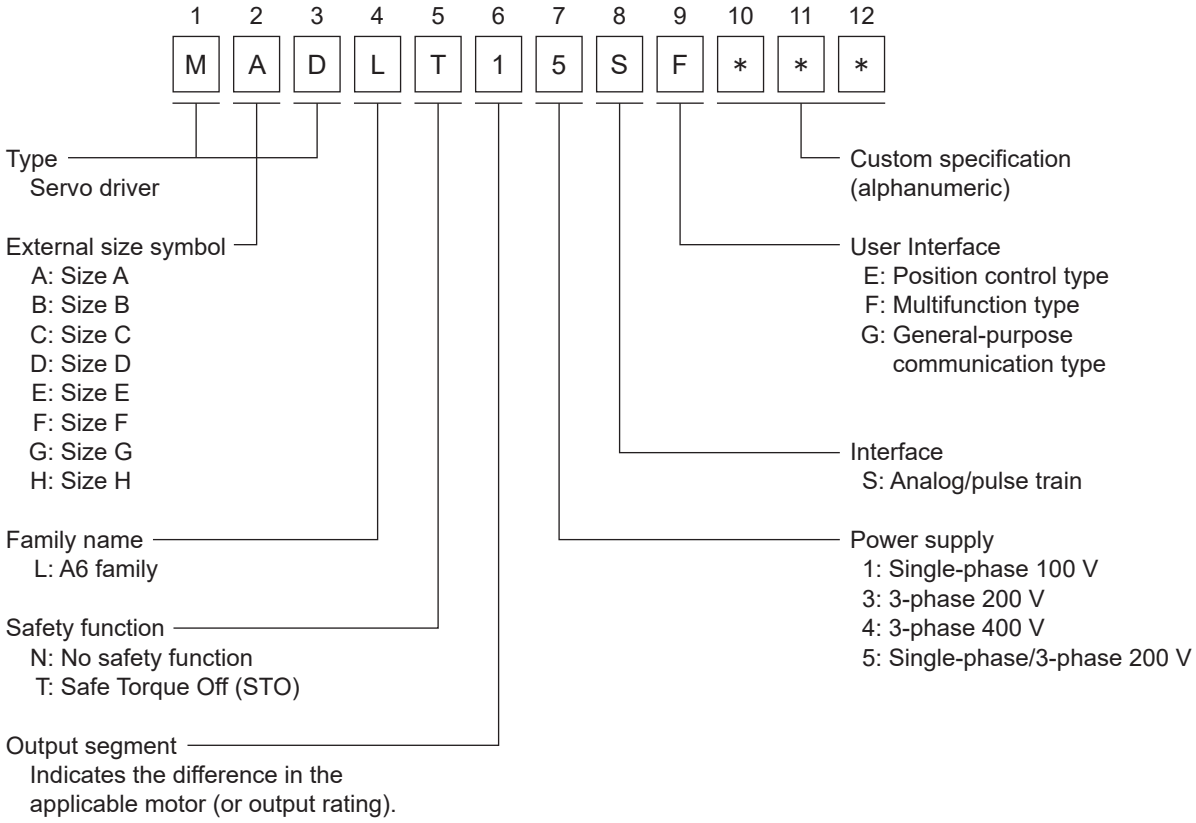
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2 Due to product improvements, this document is subject to change without notice.

3 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 Position control type

Product number	Size symbol	Power supply input	Rated output of applicable motor
MADLN01SE	A	Single-phase AC100-120 V	Max 50 W
MADLN11SE			Max 100 W
MADLN05SE		Single-phase or 3-phase AC200-240 V	Max 100 W
MADLN15SE			Max 200 W
MBDLN21SE	B	Single-phase AC100-120 V	Max 200 W
MBDLN25SE		Single-phase or 3-phase AC200-240 V	Max 400 W
MCDLN31SE	C	Single-phase AC100-120 V	Max 400 W
MCDLN35SE		Single-phase or 3-phase AC200-240 V	Max 750 W
MDDLN45SE	D	Single-phase or 3-phase AC200-240 V	Max 1000 W
MDDLN55SE			Max 1500 W
MEDLN83SE	E	3-phase AC200-240 V	Max 2000 W
MEDLN93SE			Max 2400 W
MFDLNA3SE	F	3-phase AC200-240 V	Max 3000 W
MFDLNB3SE			Max 5000 W

* 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 A6S Series for Rotary motor catalog.

* The position control type is not compatible with size G and size H 400 V models.

3.2 General-purpose communication type

Product number	Size symbol	Power supply input	Rated output of applicable motor
MADLN01SG	A	Single-phase AC100-120 V	Max 50 W
MADLN11SG			Max 100 W
MADLN05SG		Single-phase or 3-phase AC200-240 V	Max 100 W
MADLN15SG			Max 200 W
MBDLN21SG	B	Single-phase AC100-120 V	Max 200 W
MBDLN25SG		Single-phase or 3-phase AC200-240 V	Max 400 W
MCDLN31SG	C	Single-phase AC100-120 V	Max 400 W
MCDLN35SG		Single-phase or 3-phase AC200-240 V	Max 750 W
MDDLN45SG	D	Single-phase or 3-phase AC200-240 V	Max 1000 W
MDDLN55SG			Max 1500 W
MEDLN83SG	E	3-phase AC200-240 V	Max 2000 W
MEDLN93SG			Max 2400 W
MFDLNA3SG	F	3-phase AC200-240 V	Max 3000 W
MFDLNB3SG			Max 5000 W

* 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 A6S Series for Rotary motor catalog.

* The position control type is not compatible with size G and size H 400 V models.

3.3 Multifunction type

Product number	Size symbol	Power supply input	Rated output of applicable motor
MADLT01SF	A	Single-phase AC100-120 V	Max 50 W
MADLT11SF			Max 100 W
MADLT05SF		Single-phase or 3-phase AC200-240 V	Max 100 W
MADLT15SF			Max 200 W
MBDLT21SF	B	Single-phase AC100-120 V	Max 200 W
MBDLT25SF		Single-phase or 3-phase AC200-240 V	Max 400 W
MCDLT31SF	C	Single-phase AC100-120 V	Max 400 W
MCDLT35SF		Single-phase or 3-phase AC200-240 V	Max 750 W
MDDLT45SF	D	Single-phase or 3-phase AC200-240 V	Max 1000 W
MDDLT55SF			Max 1500 W
MEDLT83SF	E	3-phase AC200-240 V	Max 2000 W
MEDLT93SF			Max 2400 W
MFDLTA3SF	F	3-phase AC200-240 V	Max 3000 W
MFDLTB3SF			Max 5000 W
MGDLTC3SF	G	3-phase AC200-240 V	Max 7500 W
MHDLTE3SF	H	3-phase AC200-240 V	Max 15000 W
MHDLTF3SF			Max 22000 W
MDDLT44SF	D	3-phase AC380-480 V (*1)	Max 600 W
MDDLT54SF			Max 1000 W
MDDLT64SF			Max 1500 W
MEDLT84SF	E	3-phase AC380-480 V (*1)	Max 2000 W
MFDLTA4SF	F	3-phase AC380-480 V (*1)	Max 3000 W
MFDLTB4SF			Max 5000 W
MGDLTC4SF	G		Max 7500 W
MHDLTE4SF	H		Max 15000 W
MHDLTF4SF			Max 22000 W

*1 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 A6S Series for Rotary motor 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 or 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 (*2)				A/B phase, homing signal differential input type Panasonic supported serial communication type (*3)
Control signal		Input		10 general inputs Select general input function based on parameters
		Output		6 general outputs Select general input function based on parameters
Analog signal		Input (*2)		Three inputs (one 16-bit A/D input, two 12-bit A/D inputs)
		Output		2 outputs (analog monitor 1, analog monitor 2)
Pulse signal		Input		Two inputs Supports both line driver I/F and open collector I/F via photocoupler input Supports line driver I/F via line receiver input
		Output		Four outputs Line driver output for encoder pulses (A/B/Z signal) or external feedback pulses (EXA/EXB/EXZ signal) open collector output also available for Z or EXZ signal.
Communication function		USB		Connect to a computer for parameter setting or status monitoring, etc.
		RS232 (*4)		1:1 communication
		RS485 (*4)		1:n communication (up to 31 axes)
		Modbus-RTU (*4)		1:1 communication with upper controller (with RS232 connection) 1:N communication (with RS485 connection) is possible

Item	Description
Safety terminal (*2)	Connector for functional safety
Front panel	(1) Five buttons (2) 6-digit LED
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
Control mode	It is possible to switch between the following seven modes using parameters: (1) Position control (2) Internal velocity control (3) Torque control (4) Position/velocity control (5) Position/torque control (6) Velocity/torque control (7) Full-closed control

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

*2 Cannot be used with general-purpose communication type or position control type.

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

*4 Cannot be used with general-purpose communication type or position control type.

* For details of each specification, refer to Technical Reference - Functional Specification -.

* For details of the Modbus communication function and block operation function, refer to technical documentation (Modbus Communication and Block Operation Specification).

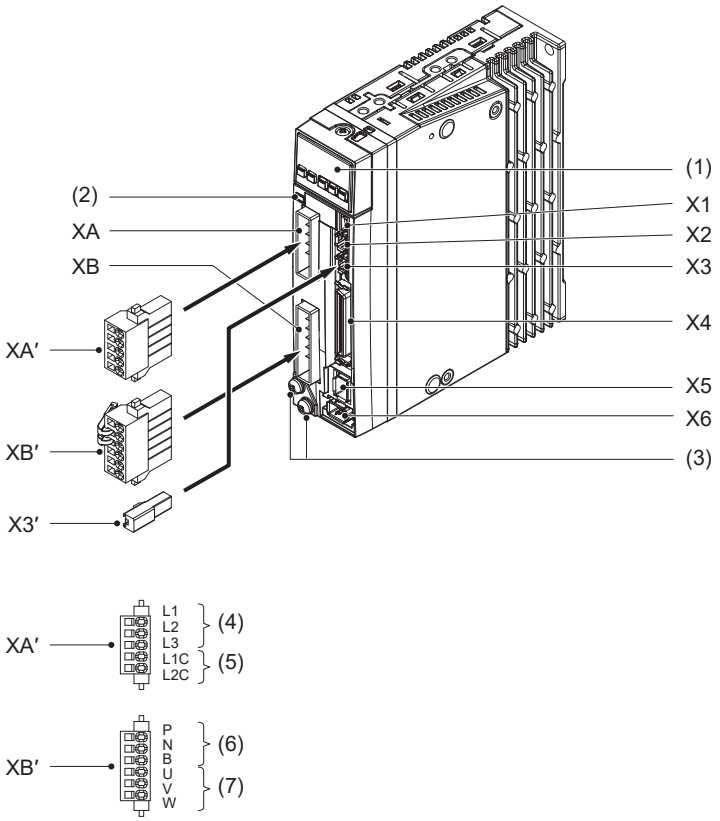
5 Appearance and Part Names

For each size, the figure is of a multifunction type.

The position control type does not have X2 (serial bus connector), X3 (connector for safety functions/safety bypass plug), or X5 (external scale connector).

The general-purpose communication type does not have X3 (connector for safety functions/safety bypass plug) or X5 (external scale connector).

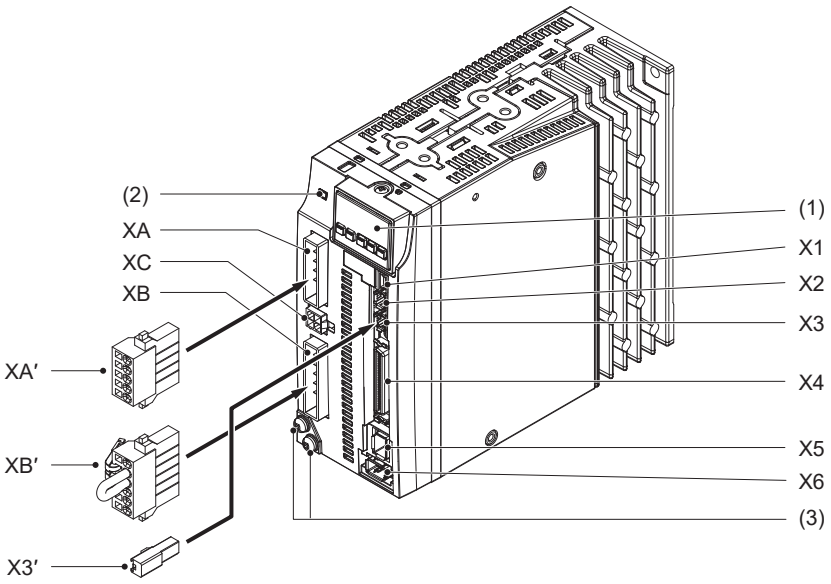
5.1 Size A, B 100 V/200 V

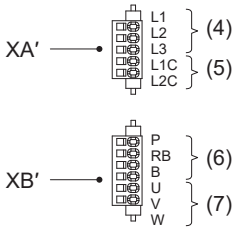


X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R050NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encoder connector 3E106-2230KV (3M) equivalent		
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)	Ground connection screw	(4)	Main power supply input terminal
(5)	Control power supply input terminal	(6)	Regenerative resistor connection terminal
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

5.2 Size C, D 100 V/200 V

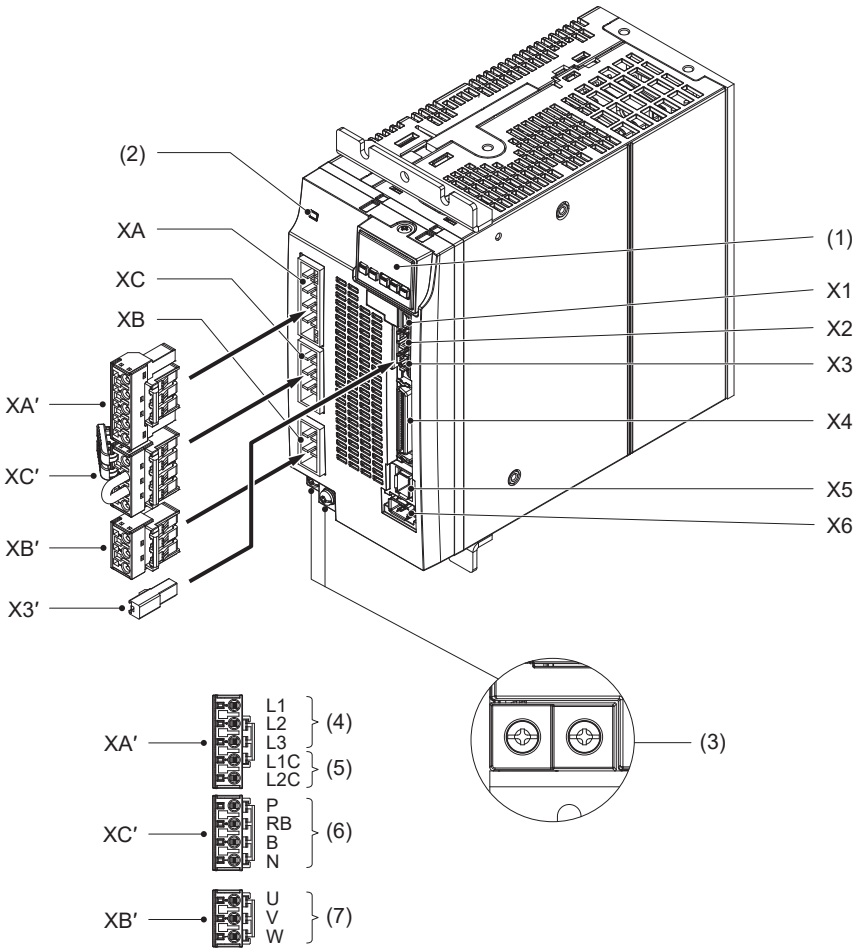




X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST)equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) equivalent
X3	Safety function connector CIF-HS08SK-071-TB (LF) equivalent	X3′	Safety bypass plug CIF-PB08AK-GF1R (JST)
X4	Parallel I/O connector DF02R050NA2 (JAE) equivalent	X5	External scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	Encoder connector 3E106-2230KV (3M) equivalent		
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)	Ground connection screw
(4)	Main power supply input terminal	(5)	Control power supply input terminal
(6)	Regenerative resistor connection terminal	(7)	Motor output terminal

* Remove the safety bypass plug when wiring to X3.

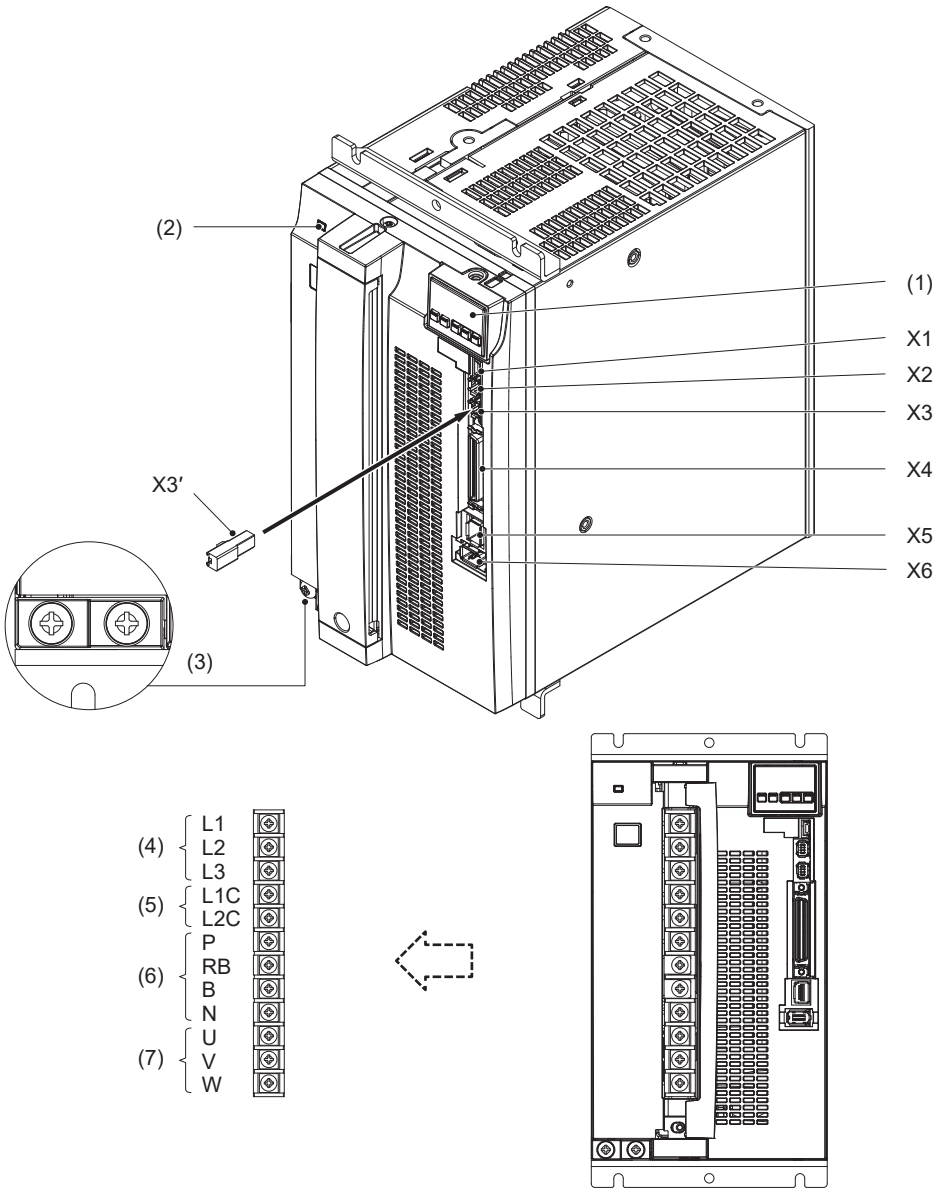
5.3 Size E 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
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-JTSLSS-GSANXR (JST) equivalent	XC′	Regenerative resistor connector 04JFAT-SAXGSA-L (JST) equivalent
(1)	Front panel	(2)	Charge lamp
(3)	Ground connection screw	(4)	Main power supply input terminal
(5)	Control power supply input terminal	(6)	Regenerative resistor connection terminal
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

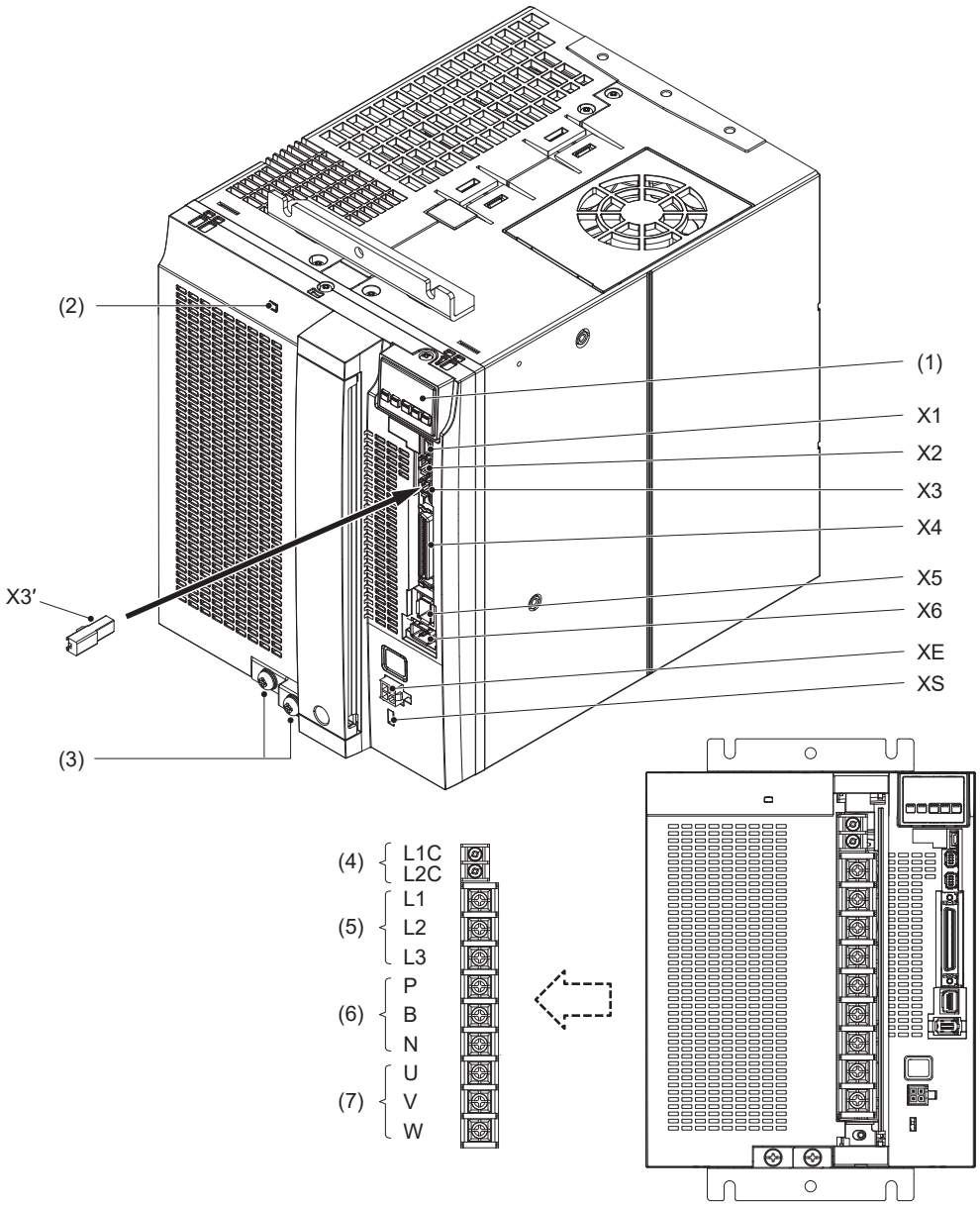
5.4 Size F 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
(1)	Front panel	(2)	Charge lamp
(3)	Ground connection screw	(4)	Main power supply input terminal
(5)	Control power supply input terminal	(6)	Regenerative resistor connection terminal (Normally, short circuit between RB-B)
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

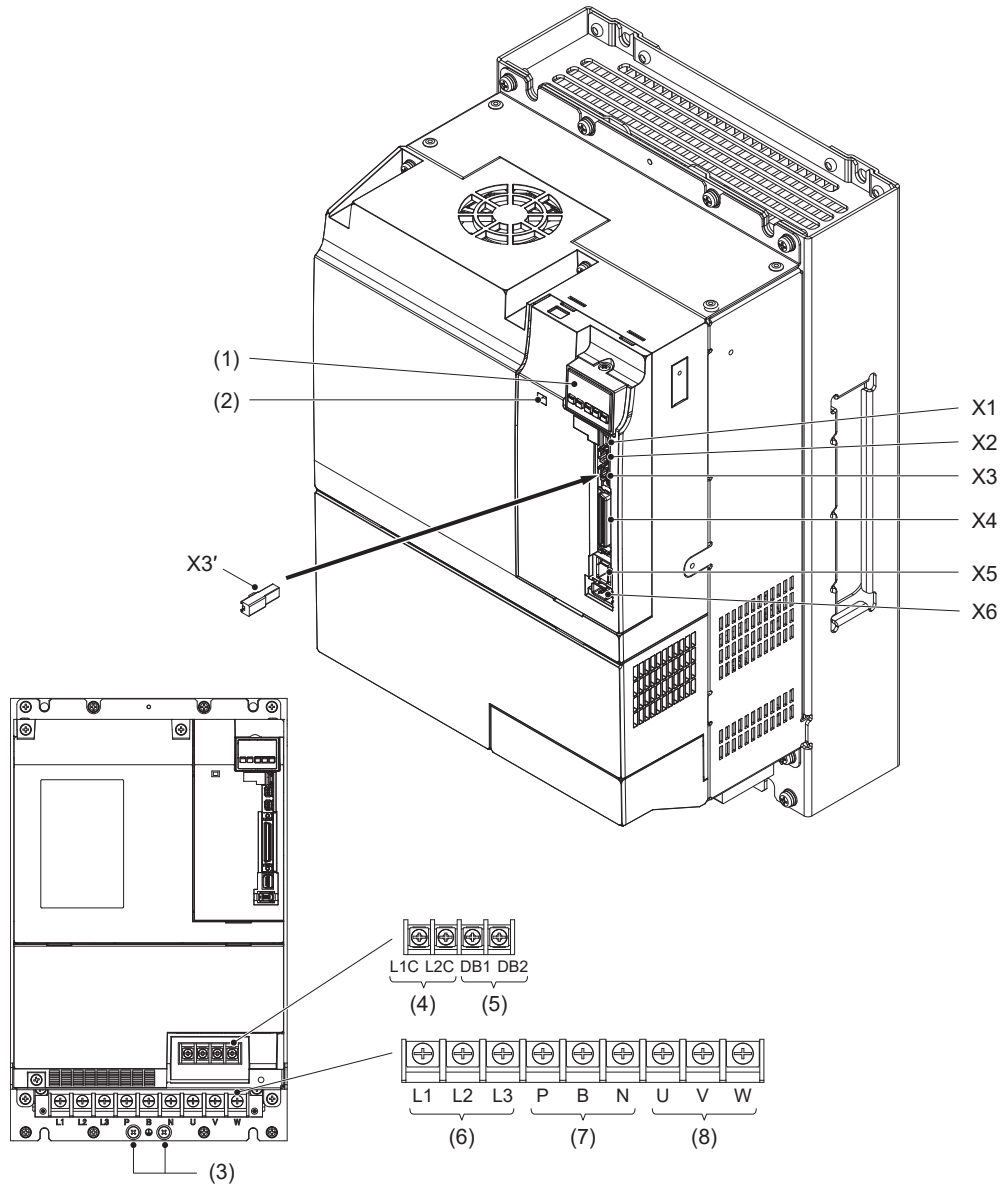
5.5 Size G 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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	XE	External DB signal connector 5569-04A2-210 (MOLEX) equivalent
XS	Internal DB switch	(1)	Front panel
(2)	Charge lamp	(3)	Ground connection screw
(4)	Control power supply input terminal	(5)	Main power supply input terminal
(6)	Regenerative resistor connection terminal	(7)	Motor output terminal

* Remove the safety bypass plug when wiring to X3.

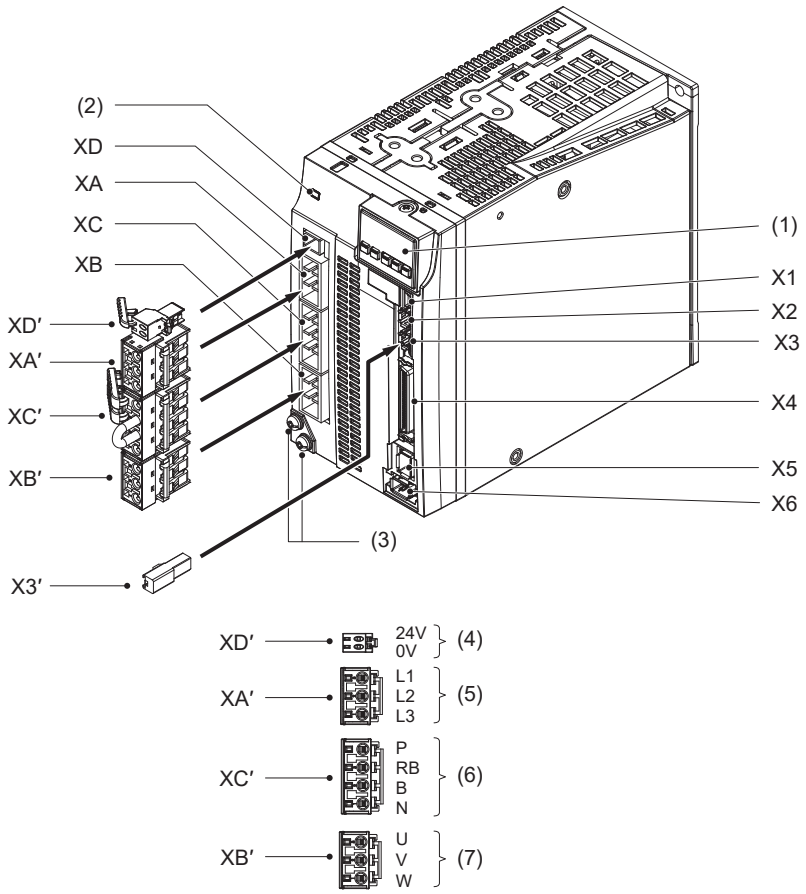
5.6 Size H 200 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
(1)	Front panel	(2)	Charge lamp
(3)	Ground connection screw	(4)	Control power supply input terminal
(5)	External DB control terminal	(6)	Main power supply input terminal
(7)	Regenerative resistor connection terminal	(8)	Motor output terminal

* Remove the safety bypass plug when wiring to X3.

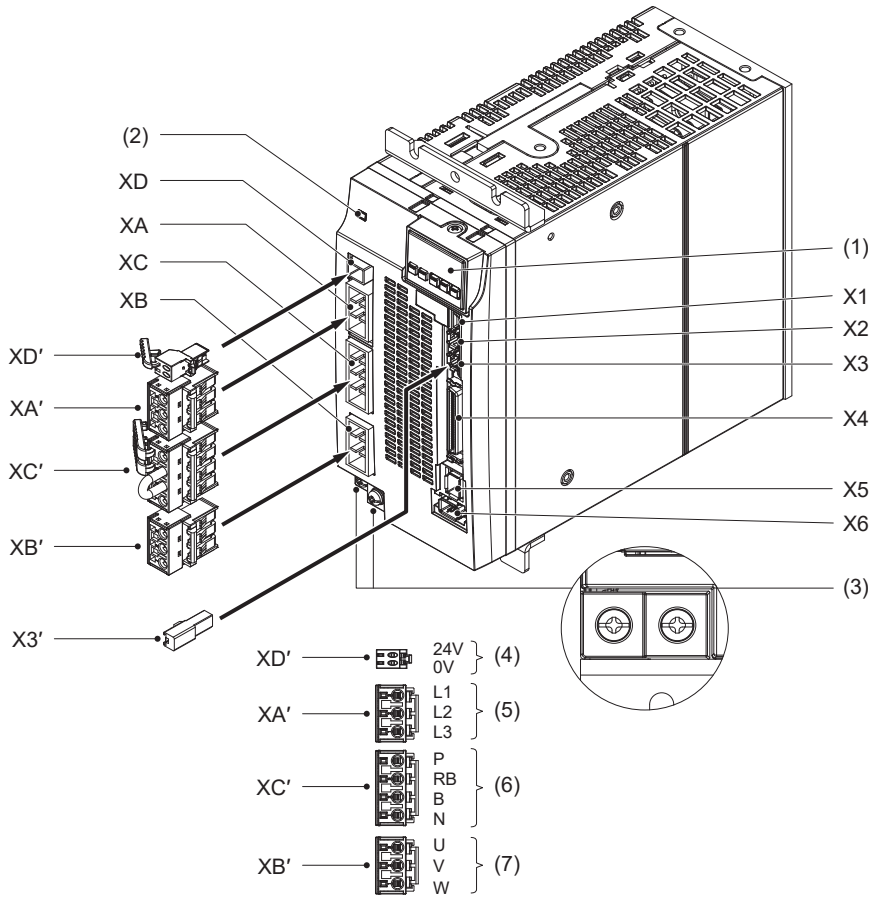
5.7 Size D 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
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)	Ground connection screw	(4)	Control power supply input terminal
(5)	Main power supply input terminal	(6)	Regenerative resistor connection terminal
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

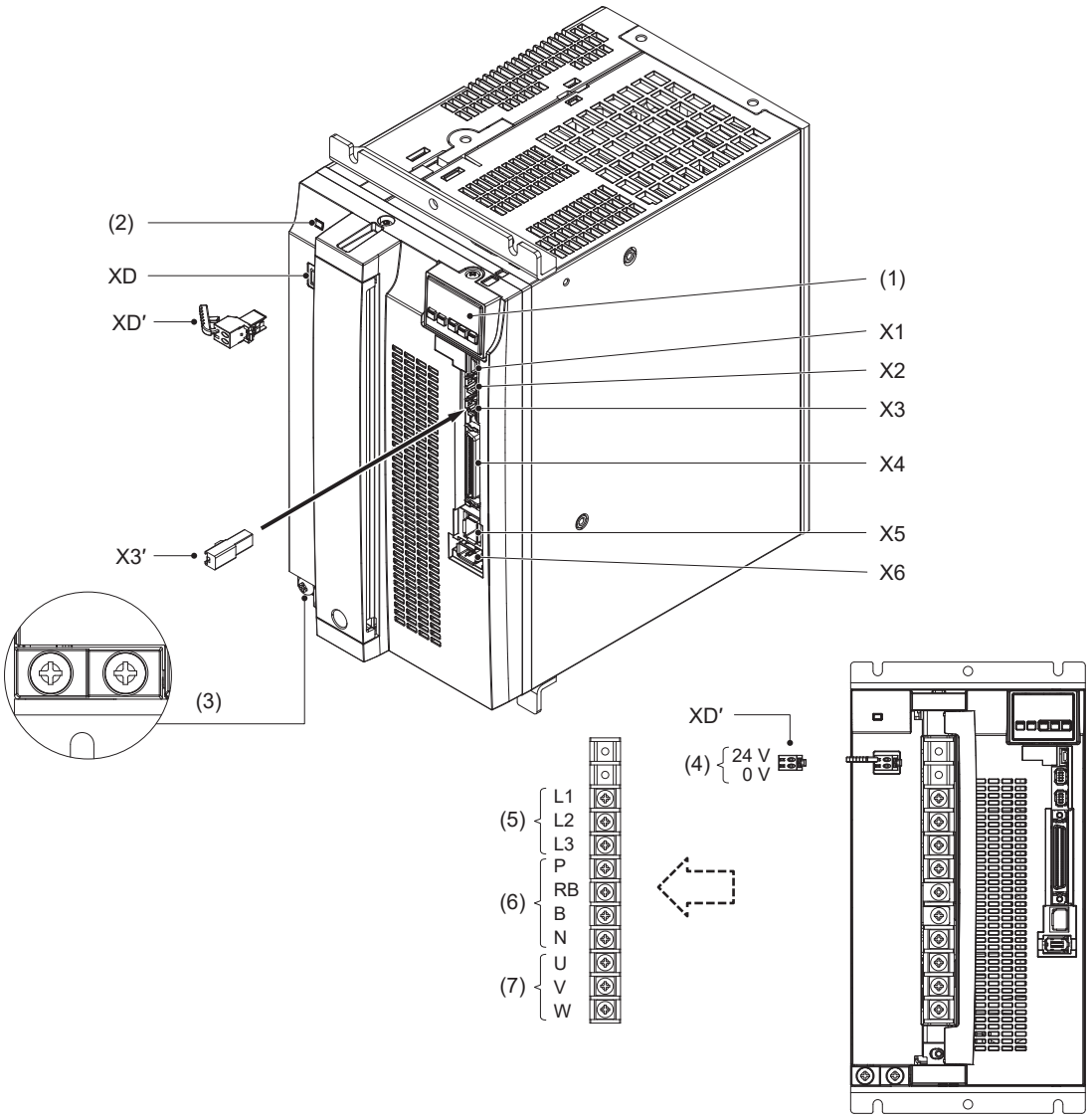
5.8 Size E 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
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)	Ground connection screw	(4)	Control power supply input terminal
(5)	Main power supply input terminal	(6)	Regenerative resistor connection terminal
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

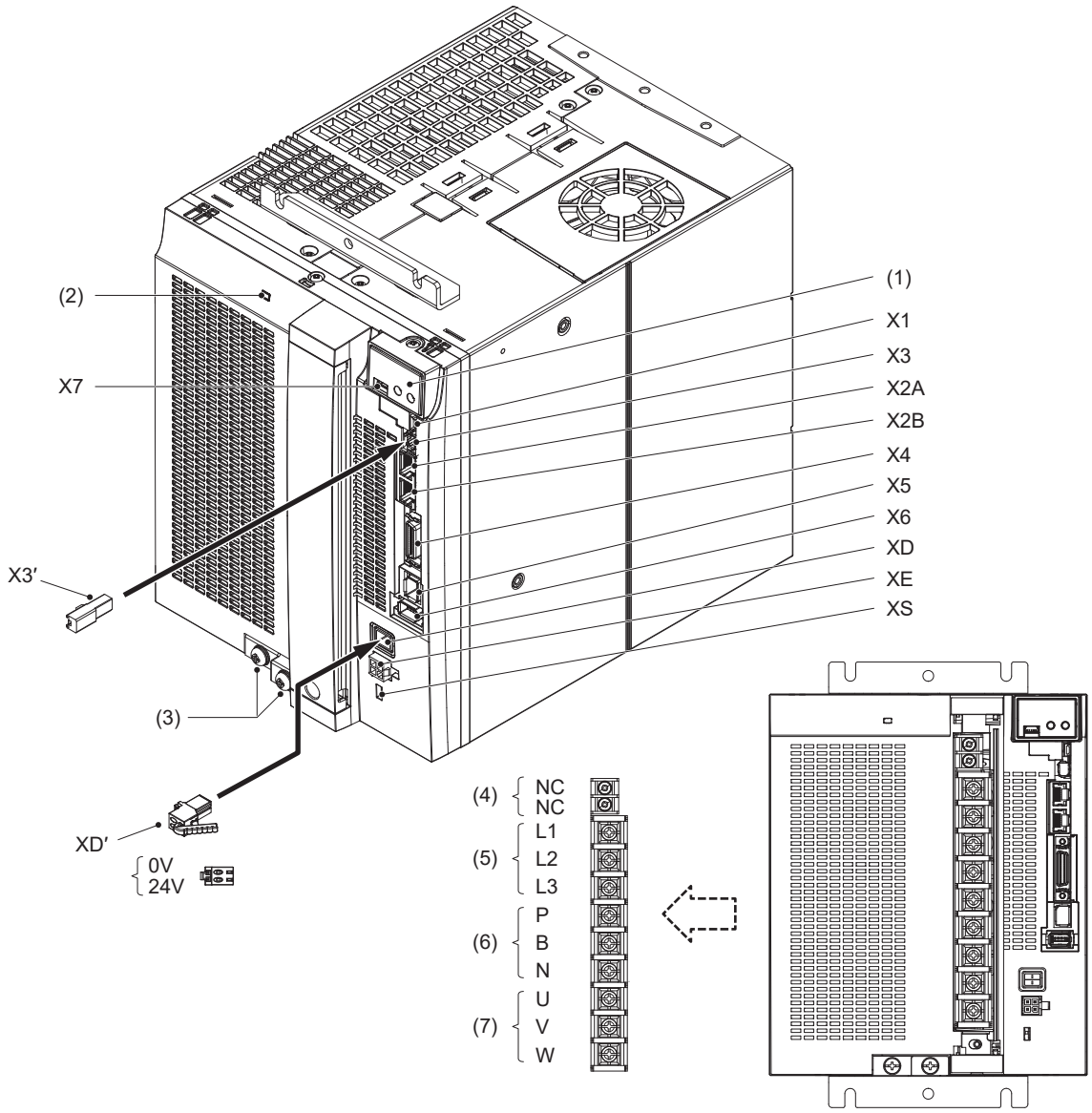
5.9 Size F 400 V



X1	USB connector UB-M5BR-S14-4S (LF) (SN) (JST) equivalent	X2	Serial bus connector CIF-HS08SS-072-TB (LF) (JST) 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		
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)	Ground connection screw	(4)	Control power supply input terminal
(5)	Main power supply input terminal	(6)	Regenerative resistor connection terminal (Normally, short circuit between RB-B)
(7)	Motor output terminal		

* Remove the safety bypass plug when wiring to X3.

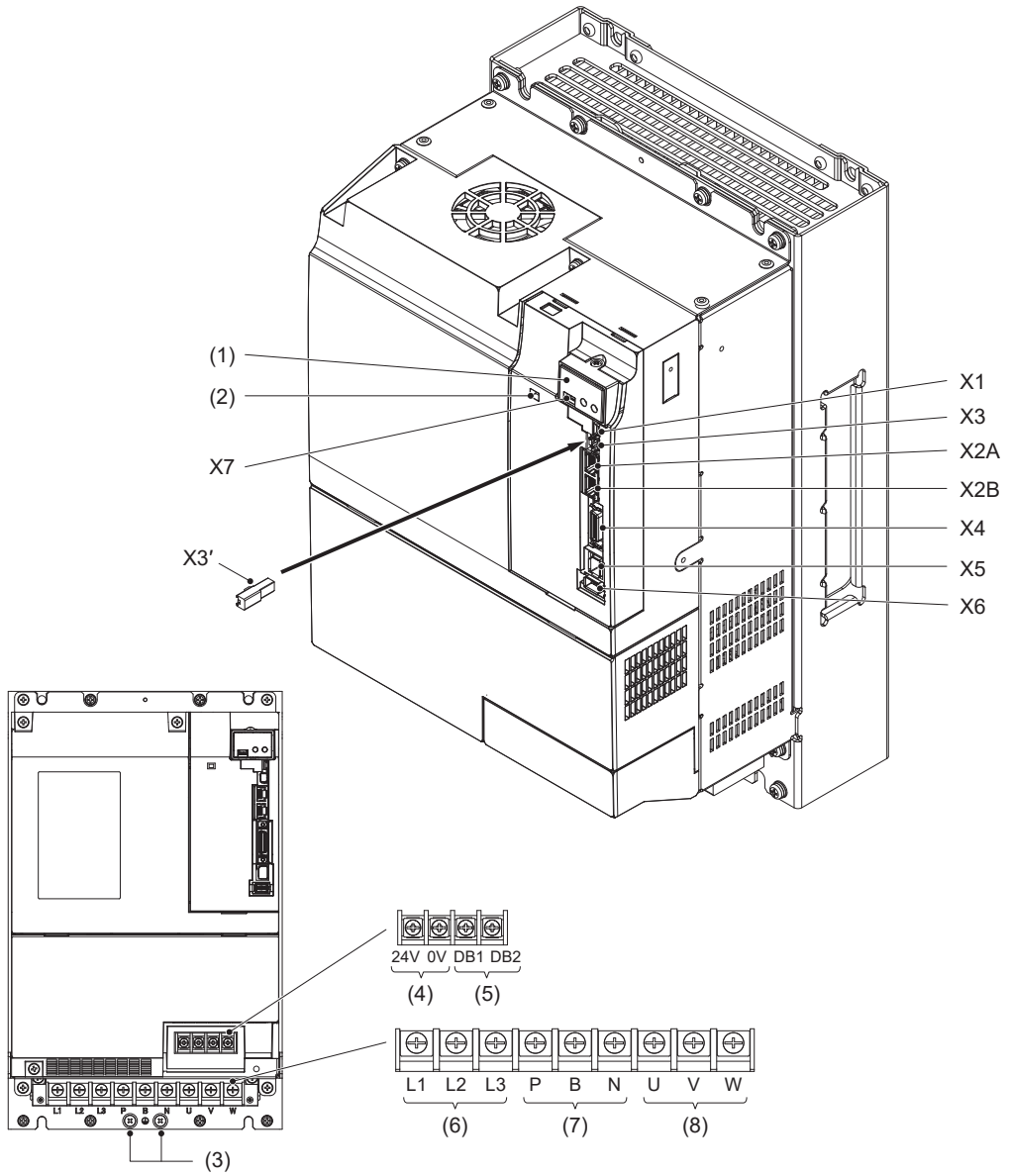
5.10 Size G 400 V



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	Feedback scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	CS signal connector 3E106-2230KV (3M) equivalent	X7	Analog monitor connector 533984005 (Molex) equivalent
XD	Control power supply Input connector SR02B-J25SK-GGR (JST) equivalent	XD′	Control power supply Input connector 02MJFAT-SAGF (JST) 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.

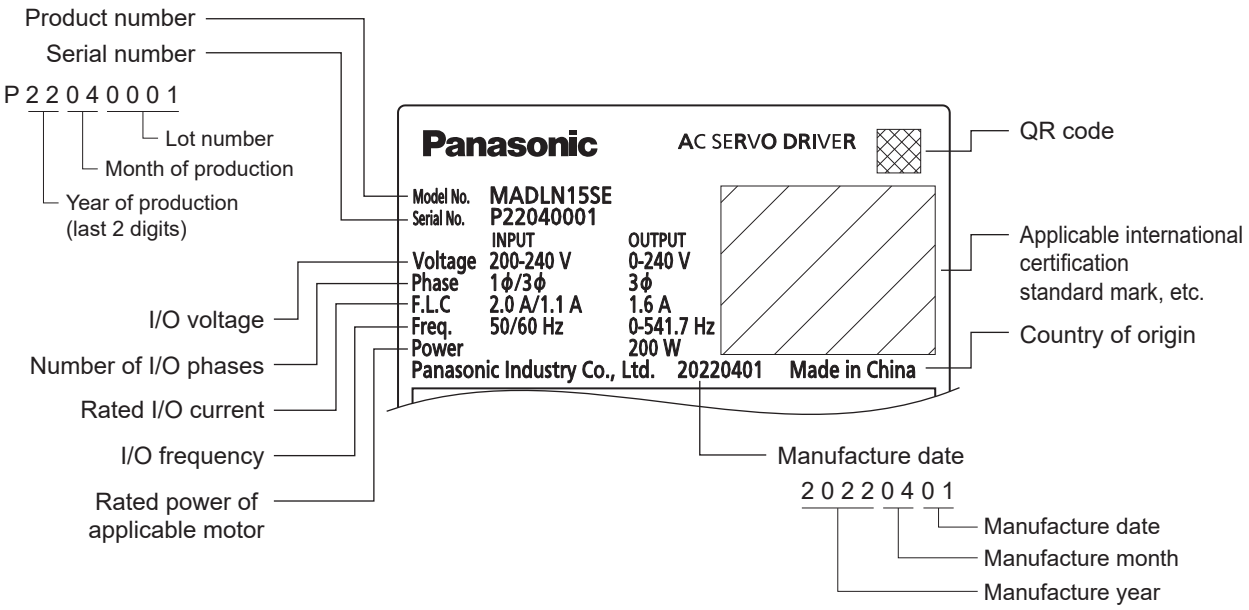
5.11 Size H 400 V



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 DF02R050NA2 (JAE) equivalent	X5	Feedback scale connector MUF-RS10SK-GKX-TB (LF) (JST) equivalent
X6	CS signal 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.

5.12 Example nameplate

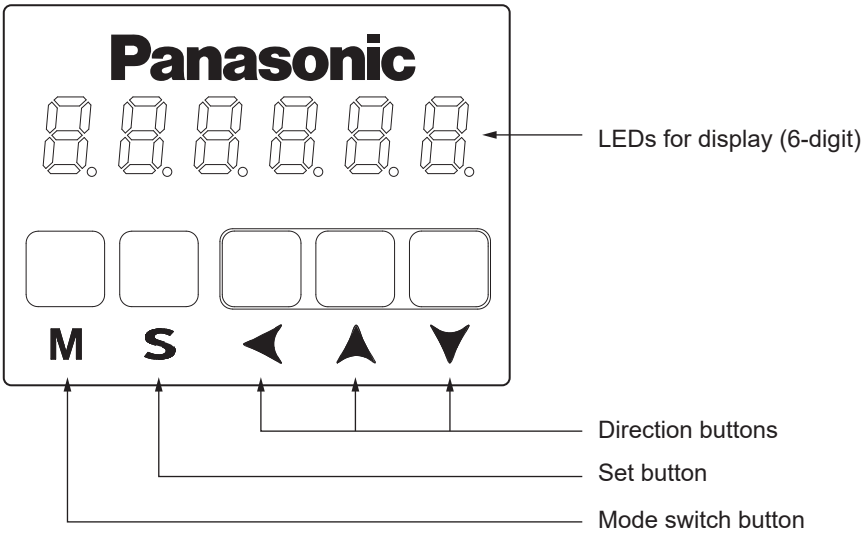


Although serial numbers range from 1 to 33999, they are shown on the name plate in 4-digit format shown as shown below.

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

5.13 Front panel



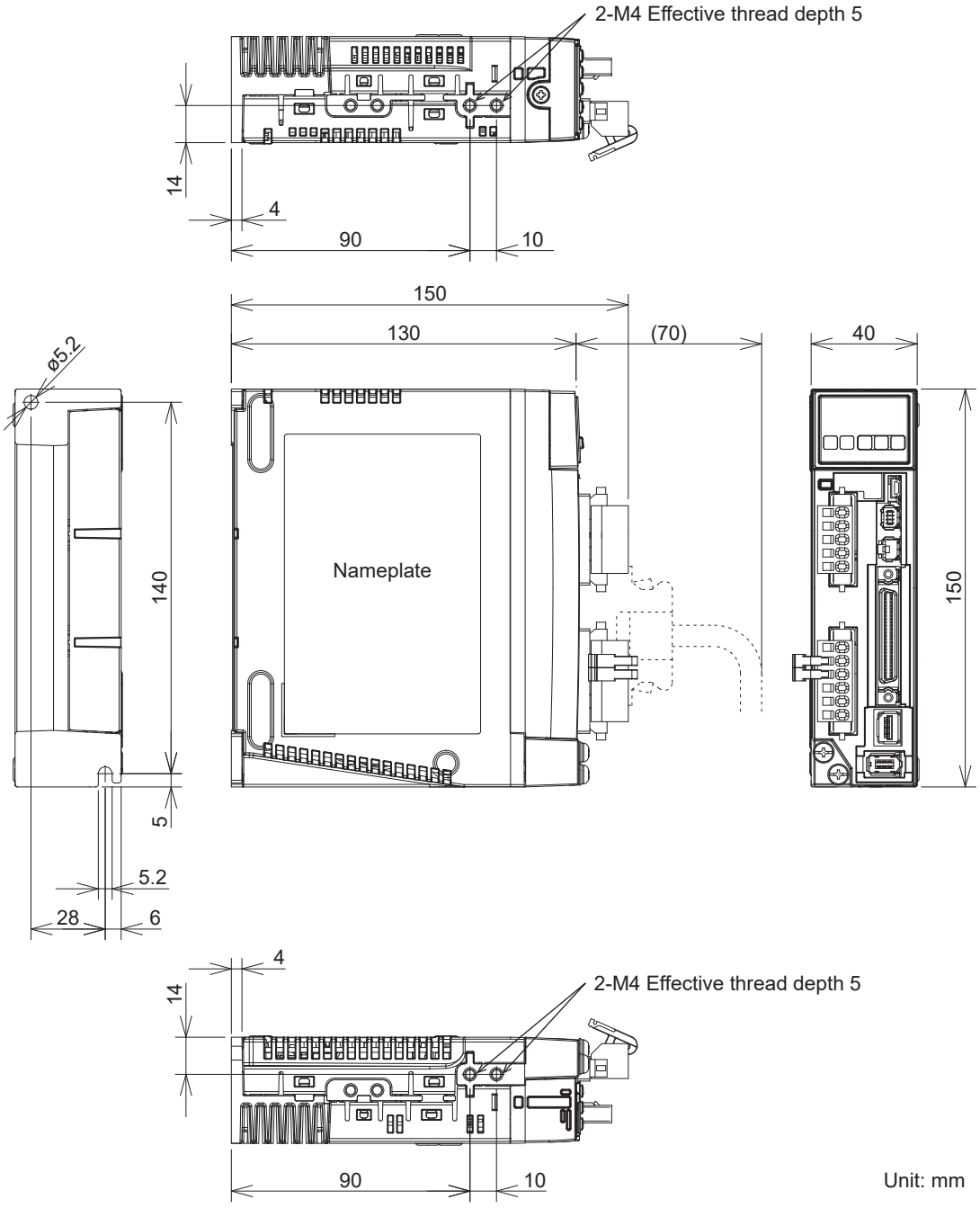
6 Dimensions

External dimensions for each frame are the same for the position control type, general-purpose communication type, and multifunction type (multifunction type shown in figure).

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

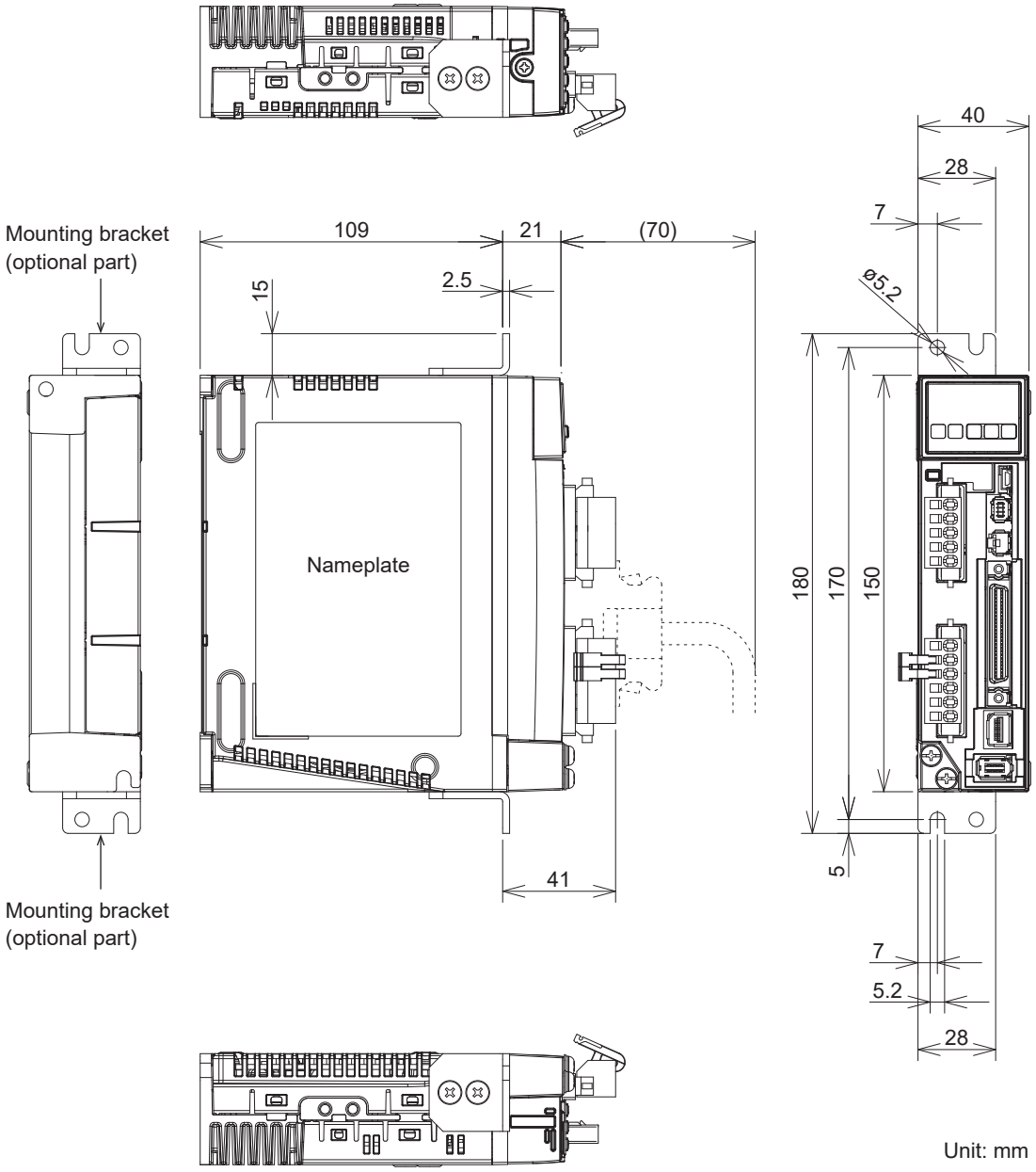
6.1 Size A 100 V/200 V

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)



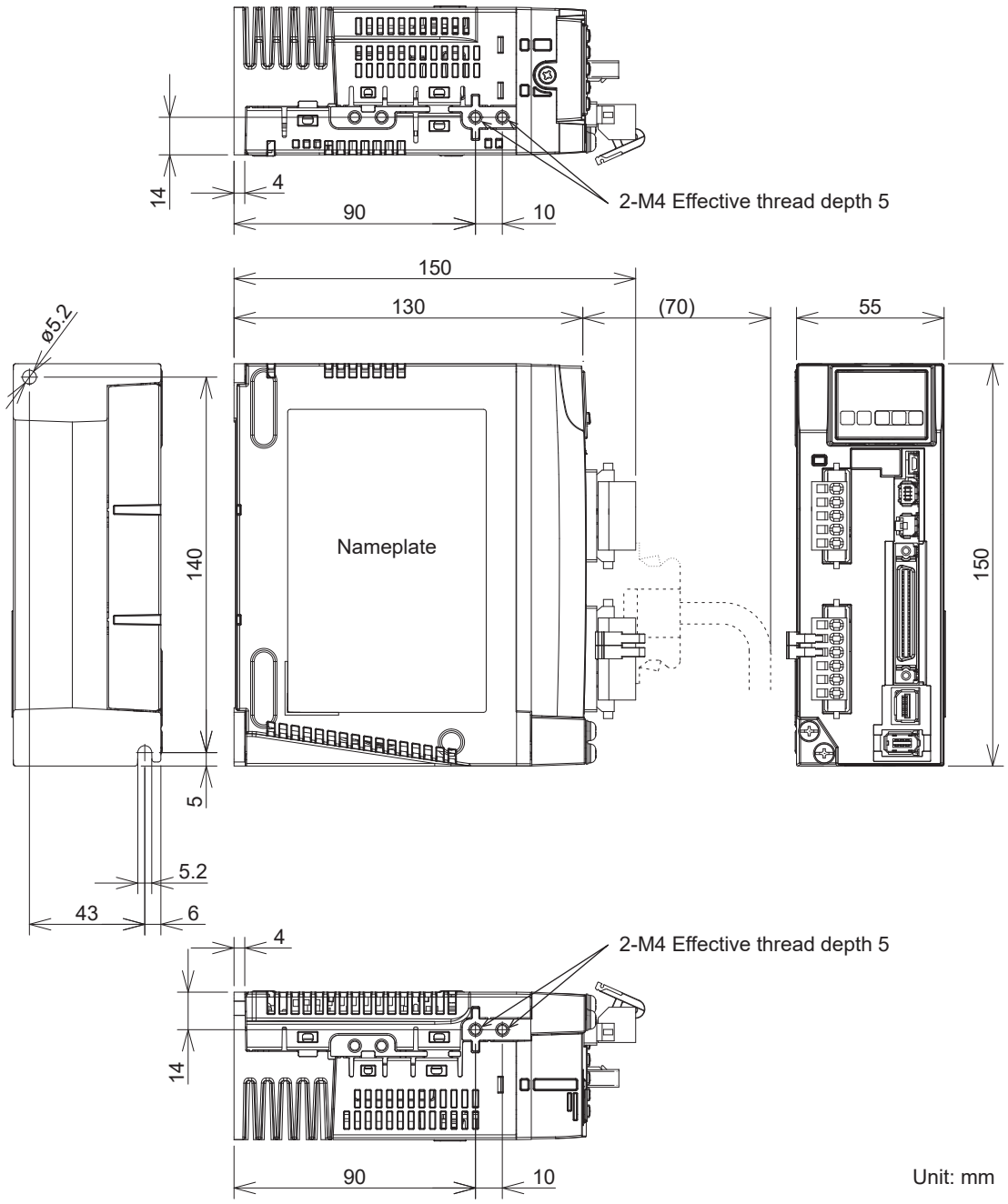
Unit: mm

*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

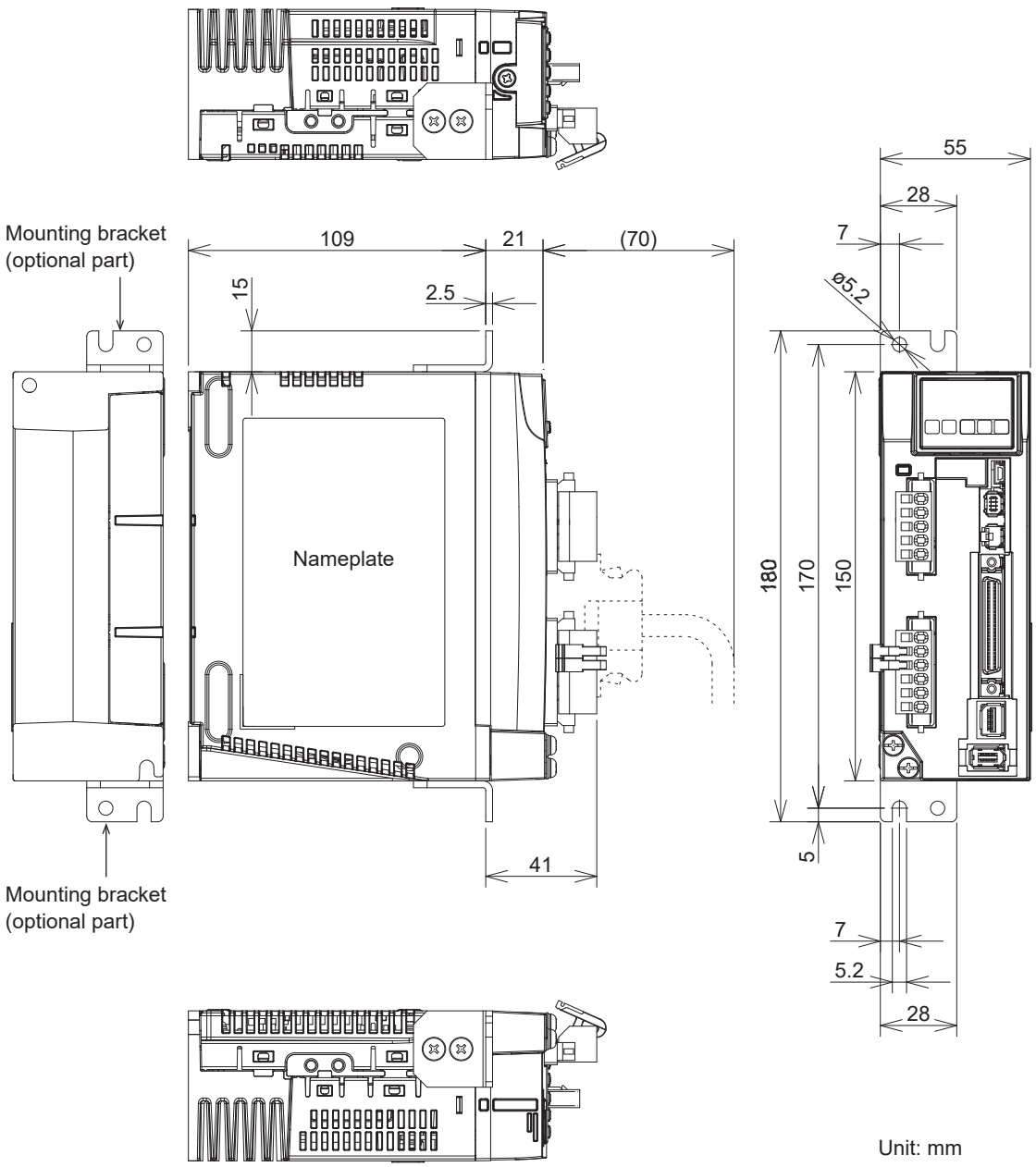
Base-mounted installation (Standard: Rear-mounted)



Unit: mm

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

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



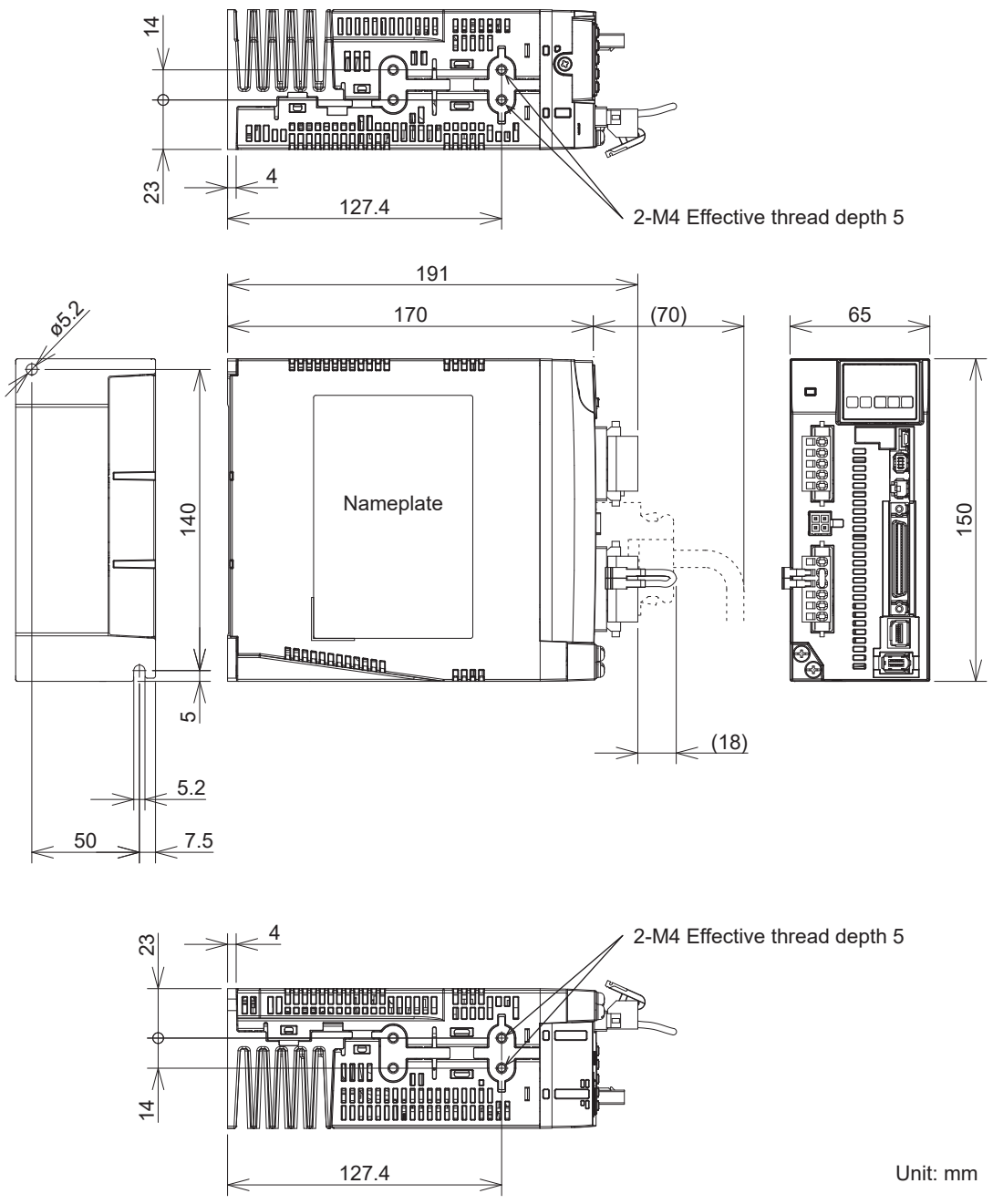
Unit: mm

*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

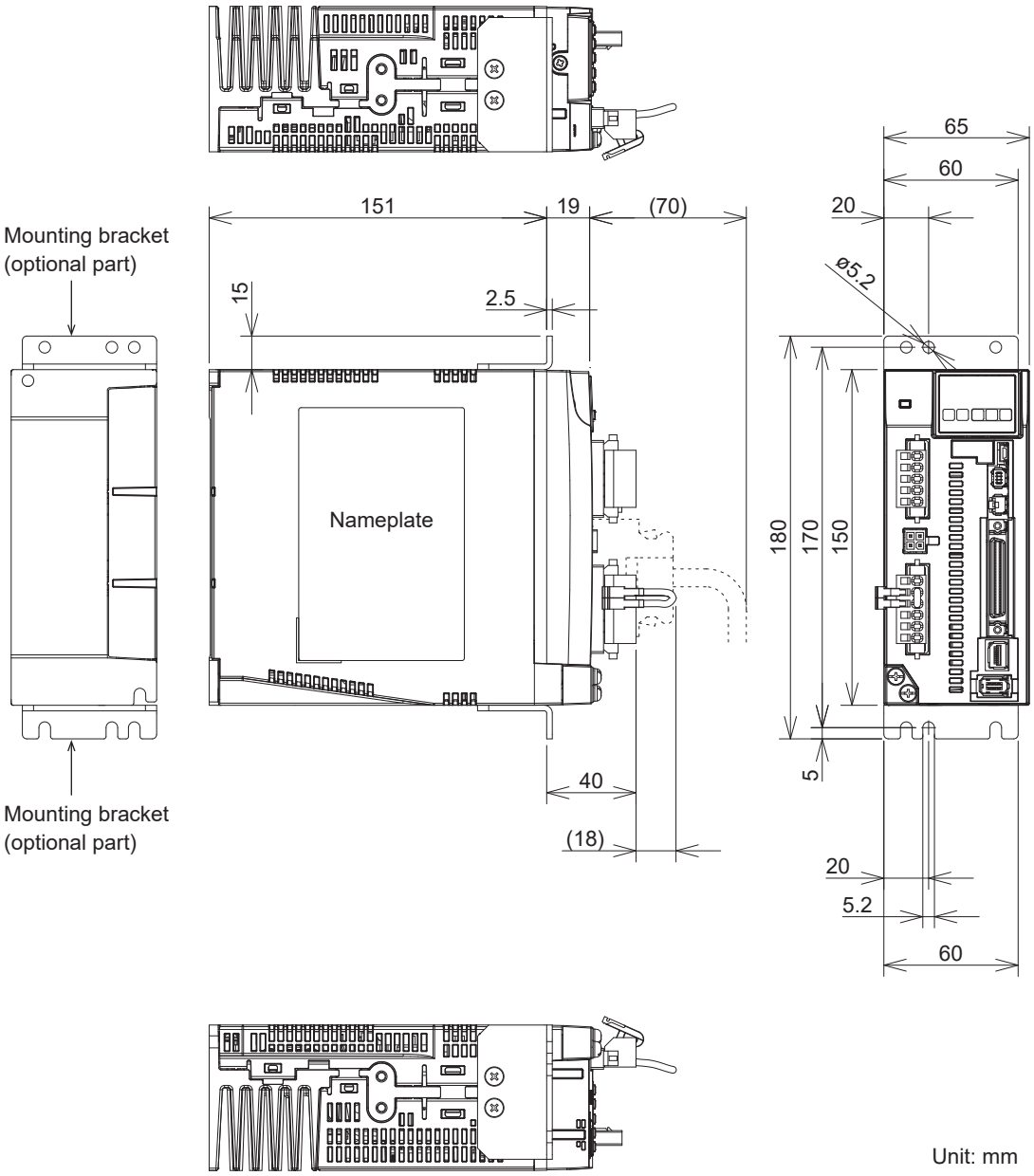
Base-mounted installation (Standard: Rear-mounted)



Unit: mm

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

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



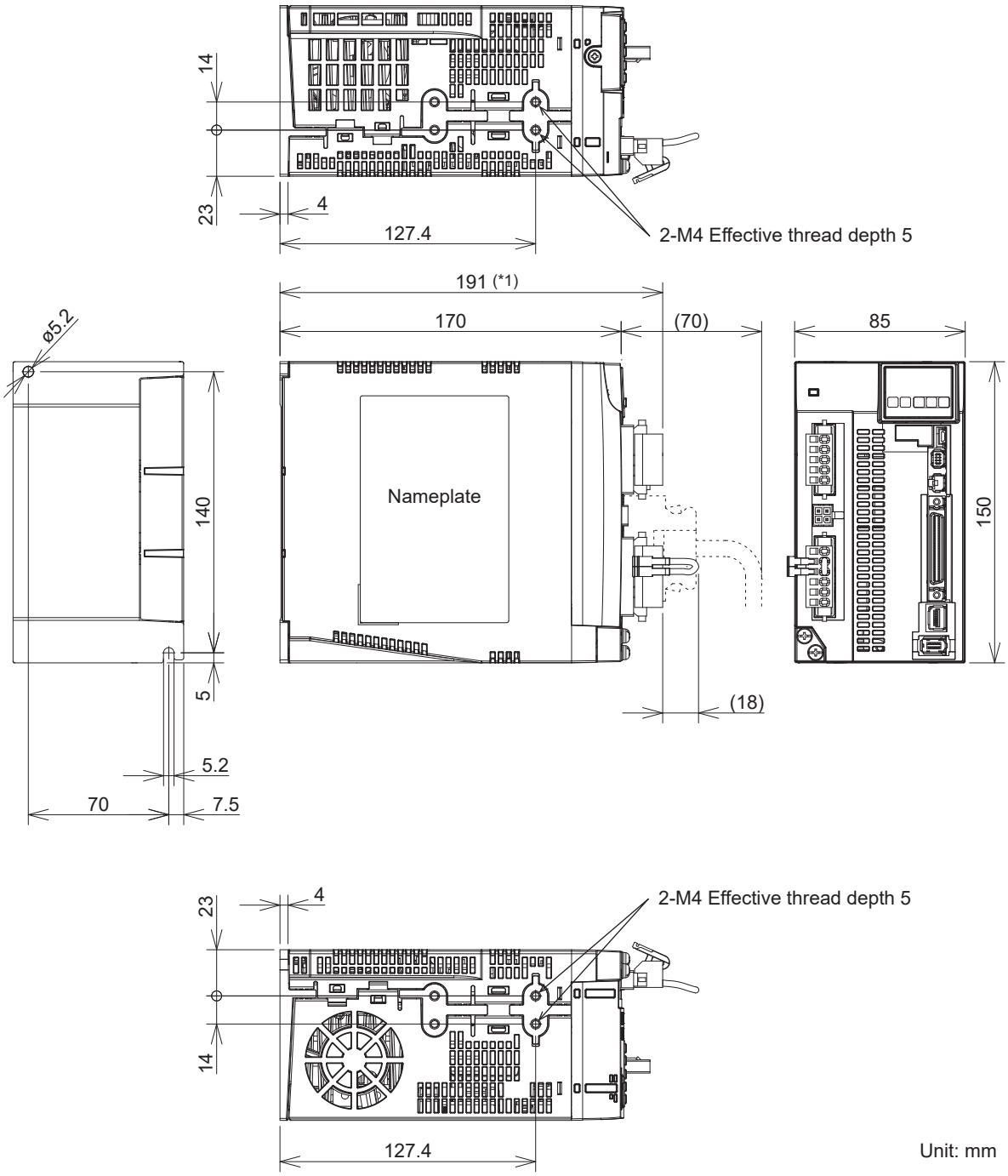
Unit: mm

*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)

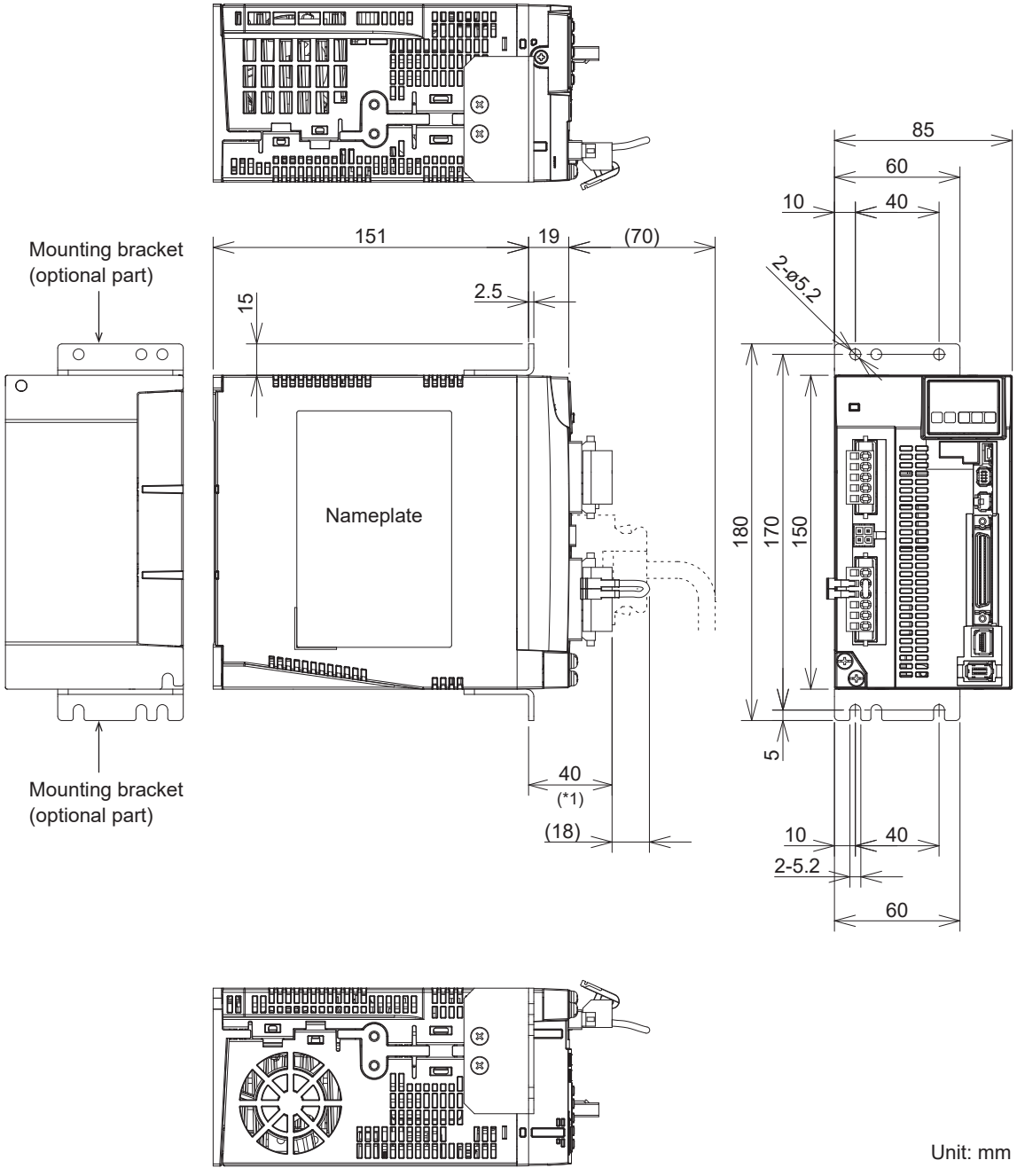


Unit: mm

*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

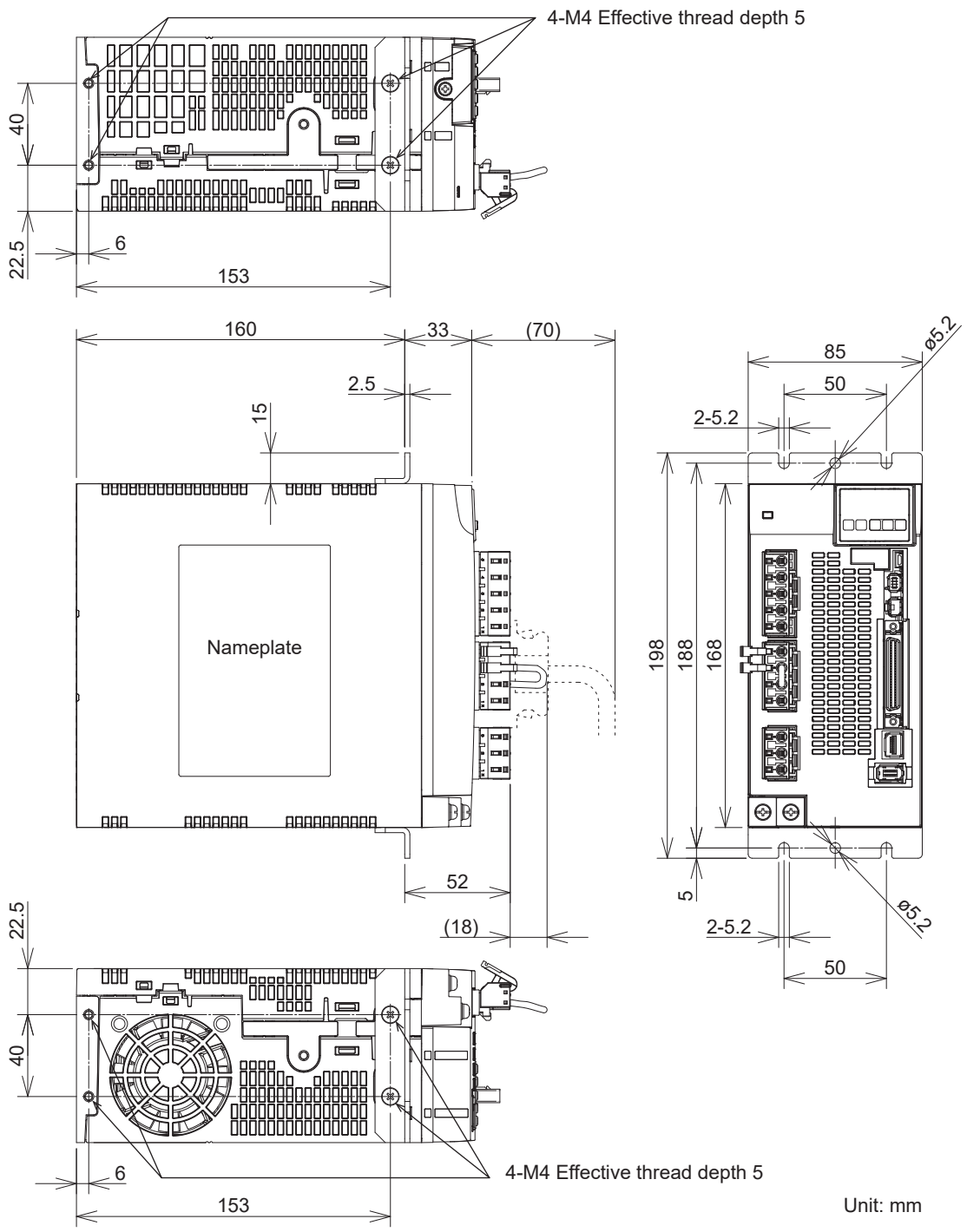
*1 For the 400 V model, this dimension is 37 mm.

*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)

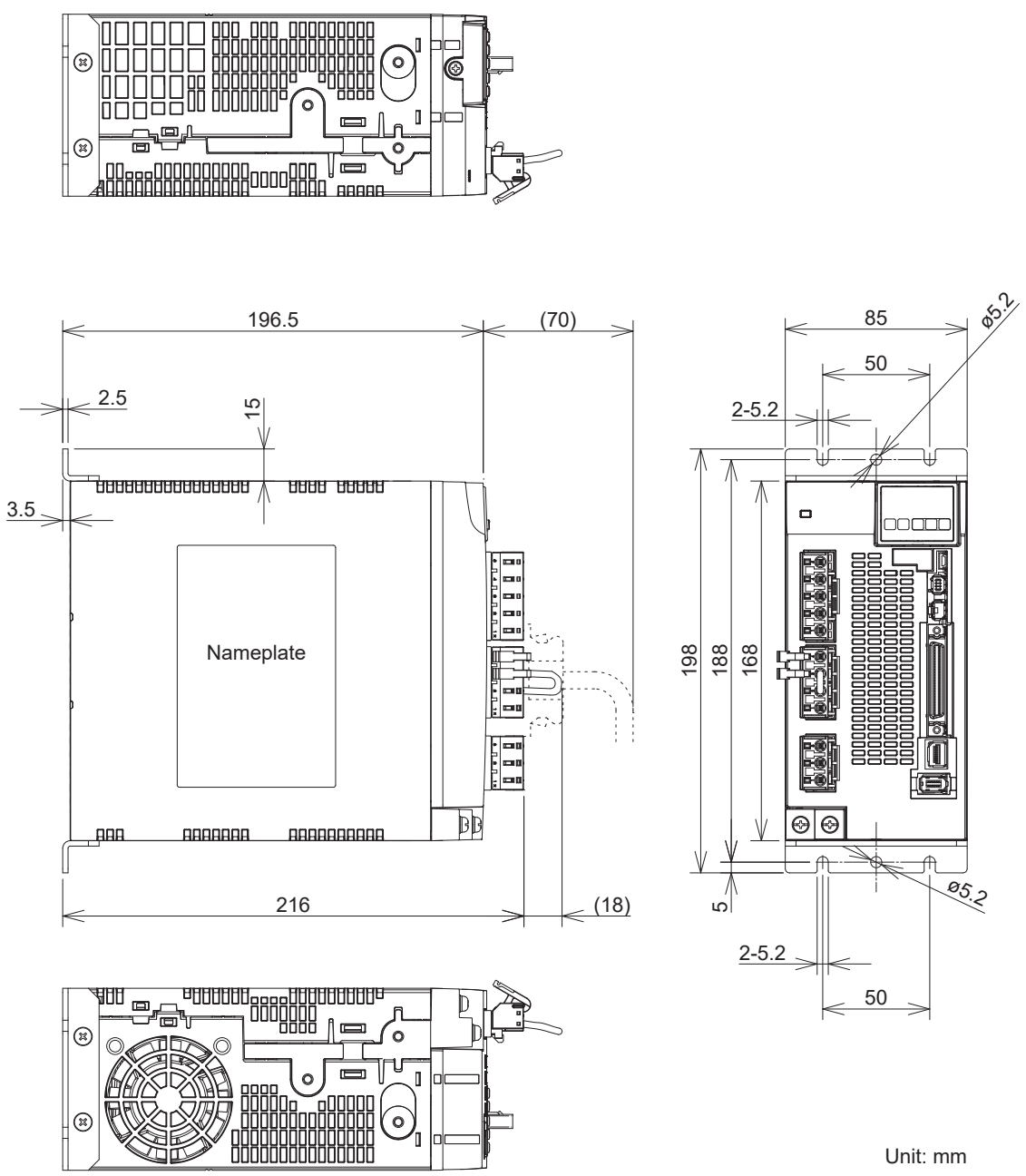


Unit: mm

*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)



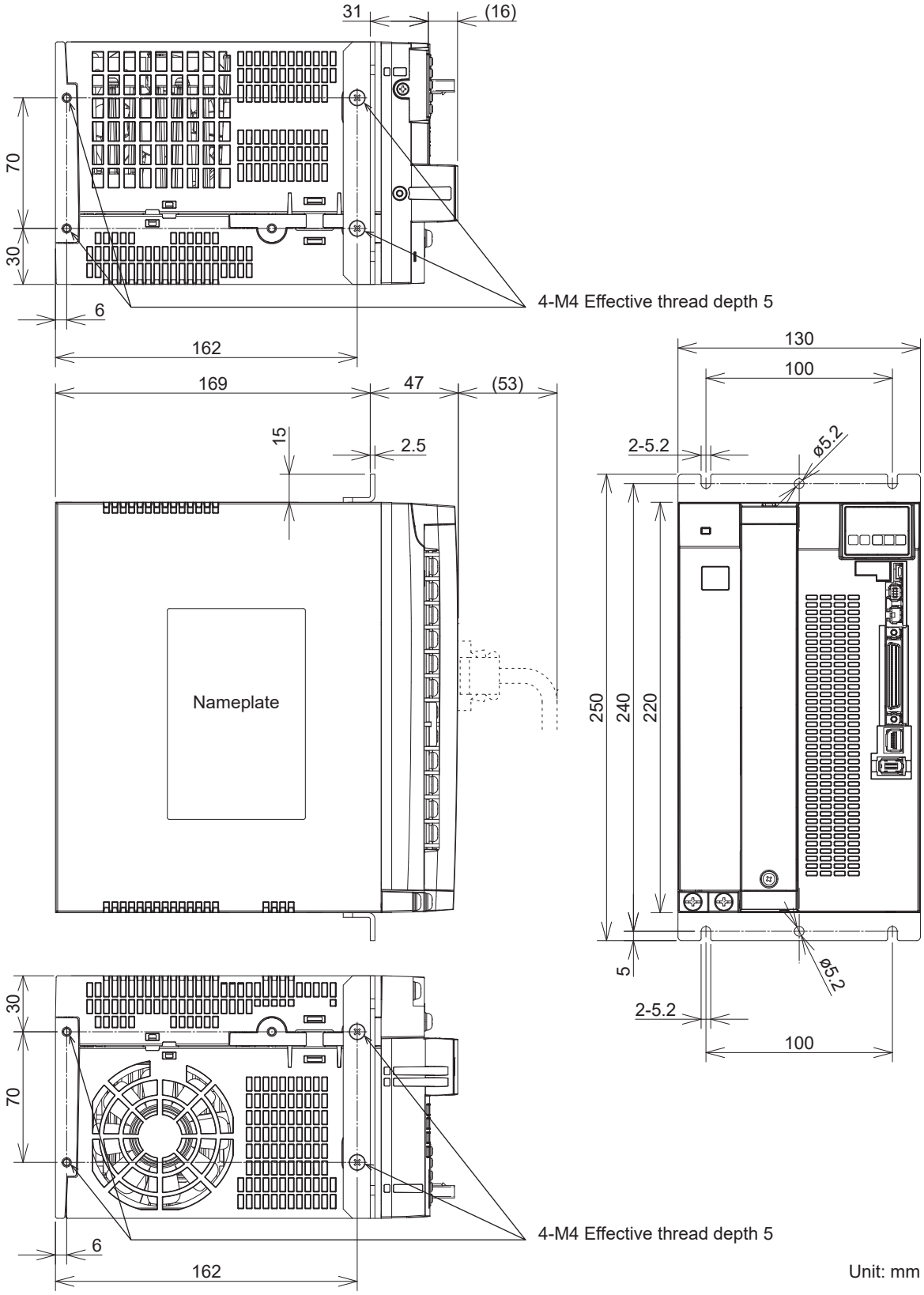
Unit: mm

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

*2 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)

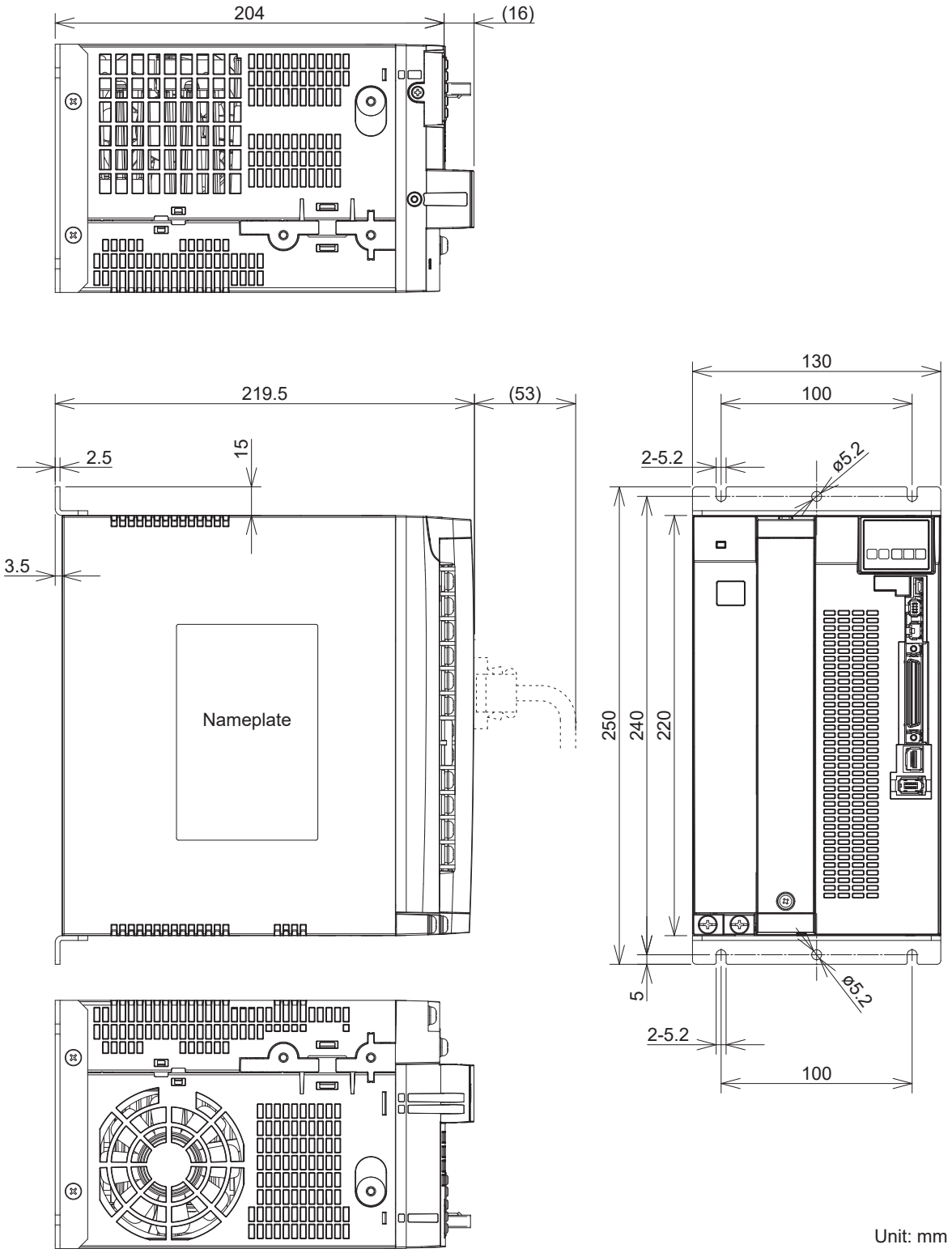


Unit: mm

*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)



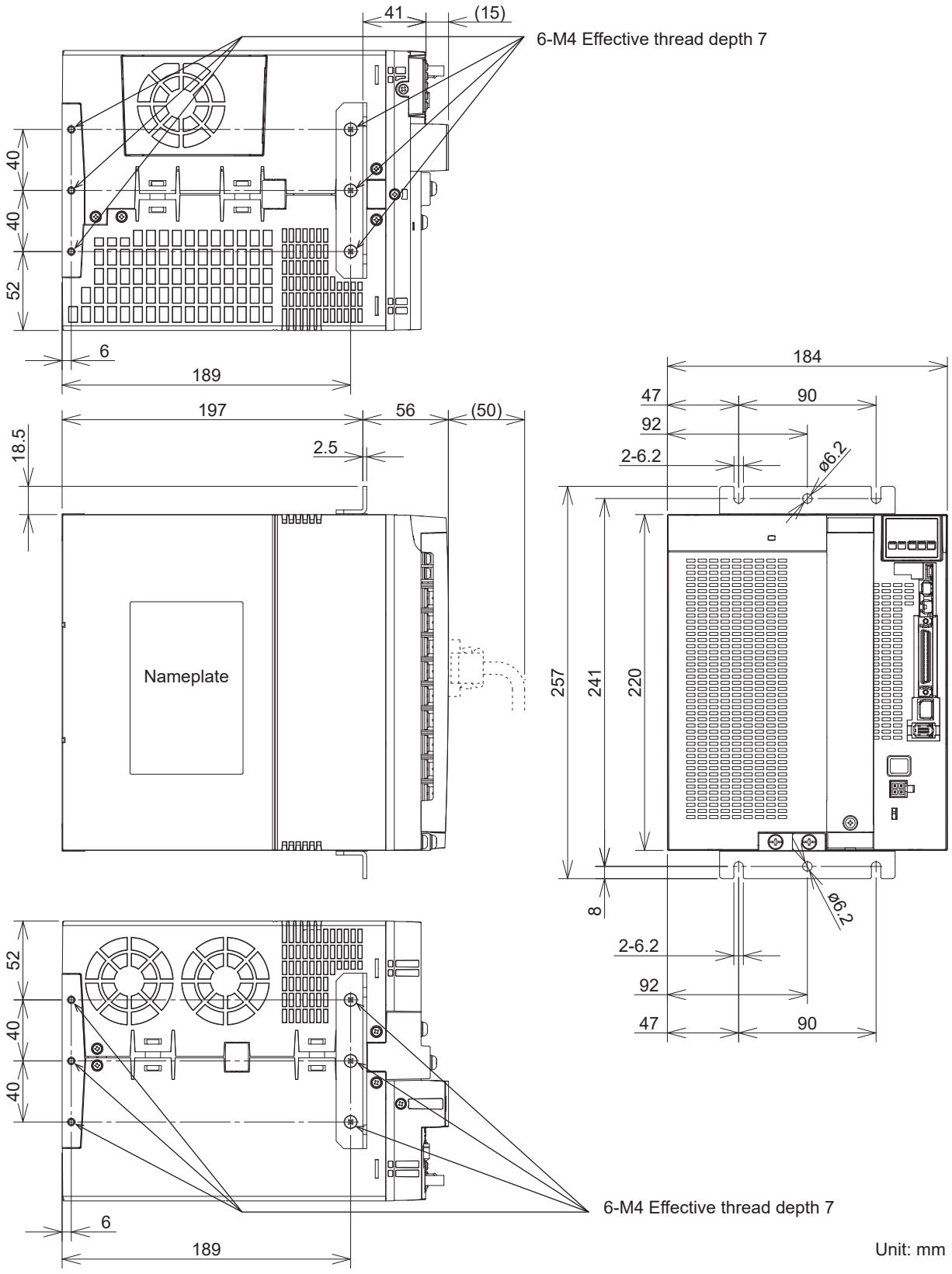
Unit: mm

*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/400 V

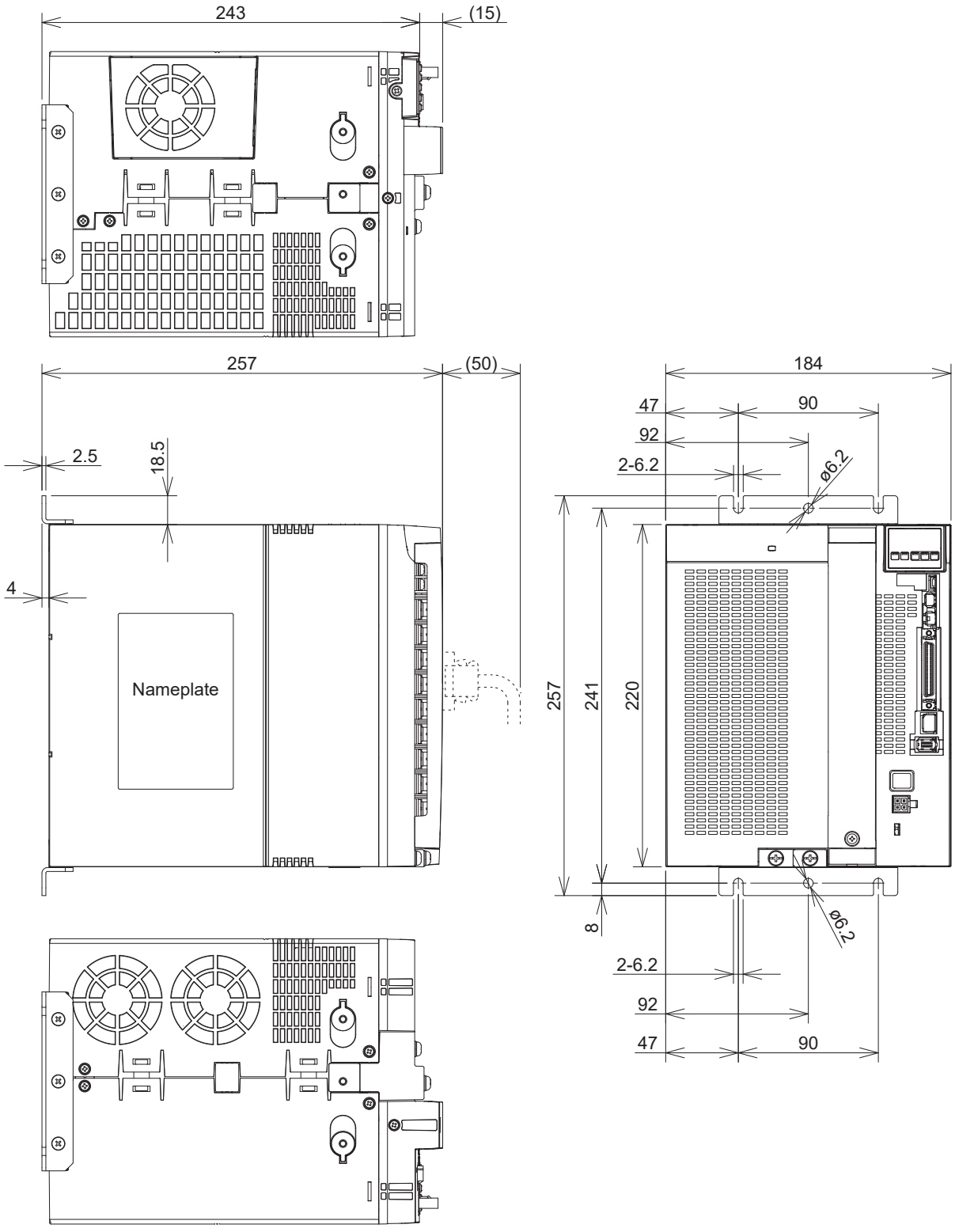
Rack-mounting installation (Standard mounting bracket position: Front-mounted)



*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)



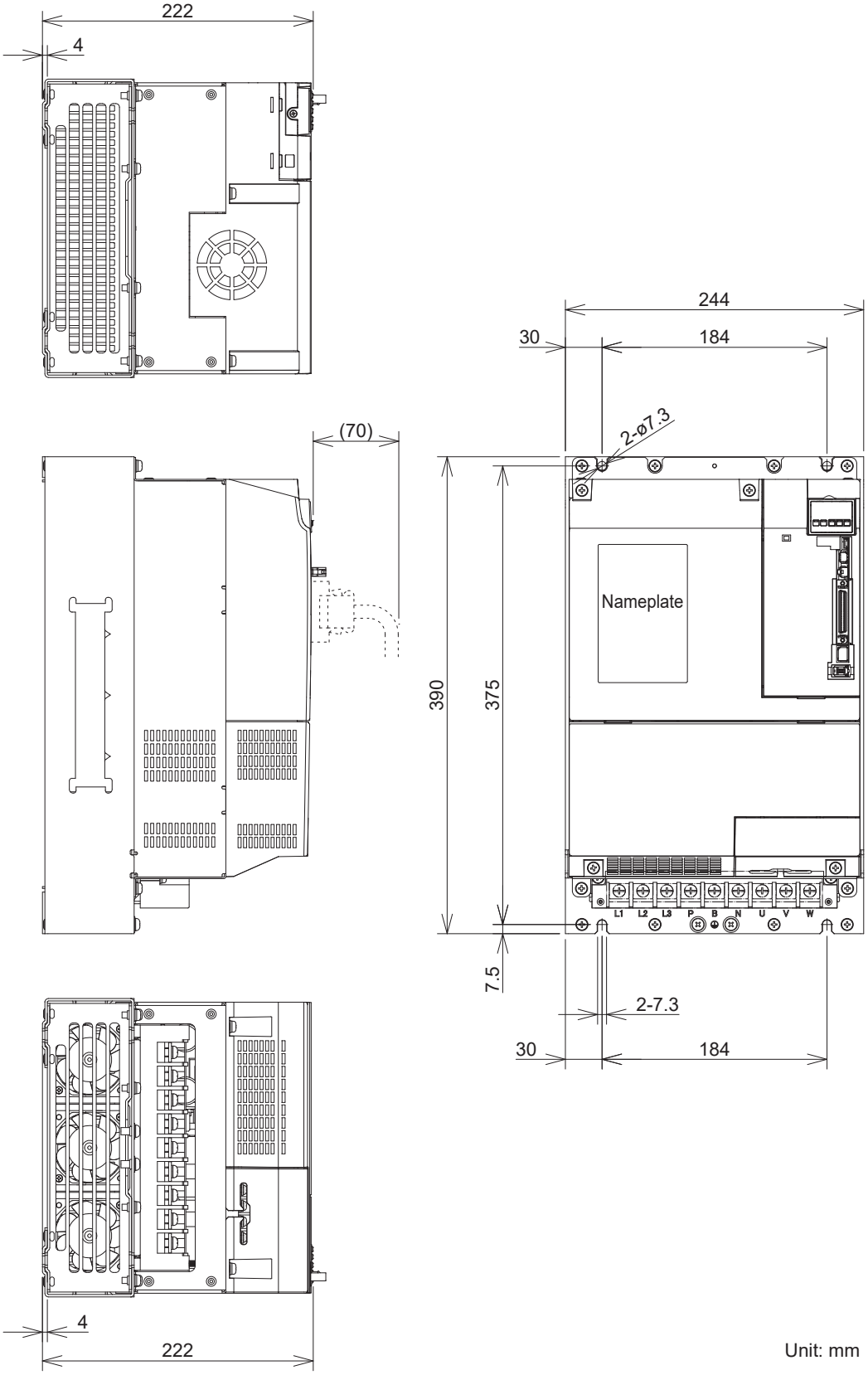
Unit: mm

*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/400 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.

7.1.9 Size G 400 V

Use terminal blocks.

	Terminal block No. (Upper to lower)	Symbol	Name	Description
Upper	1	NC	Free terminals	
	2	NC		
Lower	1	L1	Main power supply input terminal	3-phase 380Y/220-480Y/277 V, -15%～+10%, 50/60 Hz TN (ground the neutral point to earth)
	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
XD	1	24V	Control power supply Input connector	DC 24 V, ±15 %
	2	0V		
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.

7.1.10 Size H 400 V

Use terminal blocks.

	Terminal block No. (Upper to lower)	Symbol	Name	Description
Upper	1	24V	Control power supply input terminal	DC 24 V, ±15 %
	2	0V		
	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 380Y/220-480Y/277 V, -15%～+10%, 50/60 Hz TN (ground the neutral point to earth)
	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.

7.2 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 Serial bus connector X2

This connector is only compatible with the multifunction type and the general-purpose communication type.

Name	Symbol	Pin No.	Description
Signal ground	GND	1	● Signal ground (*1)
NC	—	2	● Do not connect anything
RS232 signal	TXD	3	● Serial bus transmission and reception data (RS232)
	RXD	4	
RS485 signal	485-	5	● Serial bus transmission and reception data (RS485)
		7	
	485+	6	
		8	
Frame ground	FG	Shell	● Frame ground

*1 The signal ground GND is connected with the control circuit ground connected with the connector X4.

7.4 Safety Function Connector X3

This is a connector for functional safety.

This connector is only compatible with the multifunction type.

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 signals (common) and their functions

Name	Symbol	Pin No.	Description	I/O signal interface
General input common	SI-COM	7	● Connect the positive or negative poles of the external DC power supply (12 V–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	8	● 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, a command pulse inhibit input (INH) can only be allocated to SI10.	i-1
General input 2	SI2	9		
General input 3	SI3	26		
General input 4	SI4	27		
General input 5	SI5	28		
General input 6	SI6	29		
General input 7	SI7	30		
General input 8	SI8	31		
General input 9	SI9	32		
General input 10	SI10	33		

7.5.2 Input signals (pulse train commands) and their functions

Depending on the specification of the command pulse, it is possible to select the most suitable of the two interfaces.

■ A. Dedicated pulse train interface for line drivers

Name	Symbol	Pin No.	Description	I/O signal interface
Command pulse input 1	PULSH1	44	● Input terminal for the position command pulse. Can be selected by setting the corresponding parameter. ● Disabled in control modes that do not require position commands, such as velocity control and torque control. ● Maximum allowable input frequency is 8 Mpps.	Di-2
	PULSH2	45		
Command code input 1	SIGNH1	46		
	SIGNH2	47		

■ B. Pulse train interface

Name	Symbol	Pin No.	Description	I/O signal interface
Command pulse input 2	OPC1	1	● Input terminal for the position command pulse. Can be selected by setting the corresponding parameter. ● Disabled in control modes that do not require position commands, such as velocity control and torque control. ● The maximum allowable input frequency is 500 kpps for line driver input and 200 kpps for open collector input.	Di-1
	PULS1	3		
	PULS2	4		
Command code input 2	OPC2	2		
	SIGN1	5		
	SIGN2	6		

7.5.3 Input signals (analog commands) and their functions

Name	Symbol	Pin No.	Description	I/O signal interface
Analog input 1	AI1	14	● Analog input with 16-bit resolution. ● The maximum allowable input voltage is ±10 V. ● The function changes according to the control mode.	Ai-1
Analog input 2	AI2	16	● Analog input with 12-bit resolution. ● The maximum allowable input voltage is ±10 V. ● The function changes according to the control mode.	Ai-2
Analog input 3	AI3	18	● Analog input with 12-bit resolution. ● The maximum allowable input voltage is ±10 V.	

7.5.4 Functions that can be allocated to analog inputs

Analog Input	Name	Symbol	Description
AI1	Velocity command input	SPR	● Velocity command input for velocity control.
	Torque command input	TRQR	● Torque command input for torque control (without control mode switching).
	Velocity limit input	SPL	● Velocity limit input for torque control.
AI2	Positive direction torque limit input	P-ATL	● Positive direction torque limit input.
	Torque command input	TRQR	● Torque command input for torque control in velocity/torque control switching control mode.
AI3	Negative direction torque limit input	N-ATL	● Negative direction torque limit input.

7.5.5 Output signals (common) and their functions

Name	Symbol	Pin No.	Description	I/O signal interface
General-purpose output 1	SO1- SO1+	10 11	● Functions are allocated using parameters. For details, refer to “Technical Reference - Functional Specification -”.	o-1
General-purpose output 2	SO2- SO2+	34 35		
General-purpose output 3	SO3- SO3+	36 37		
General-purpose output 4	SO4- SO4+	38 39		
General-purpose output 5	SO5	12	● Functions are allocated using parameters. For details, refer to “Technical Reference - Functional Specification -”.	o-2
General-purpose output 6	SO6	40		
General-purpose output common	SO-COM	41	● Connect the negative pole of the external DC power supply (12 V–24 V). ● The power supply capacity varies according to the input/output circuit configuration used. ● 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	—

7.5.6 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+	21	● Differential output of divided feedback scale signal (A/B/Z phase). (RS422 equivalent) ● 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-	22		
B-phase output/ position compare output 2	OB+/ OCMP2+	48		
	OB-/ OCMP2-	49		
Z-phase output/ position compare output 3	OZ+/ OCMP3+	23		
	OZ-/ OCMP3-	24		
Z-phase output/ position compare output 4	CZ/ OCMP4	19	● Z-phase signal output via open collector. ● The emitter side of the transistor for the output circuit is connected to the signal ground (GND), and kept non-insulated.	Do-2

7.5.7 Analog monitor signals and their functions

Name	Symbol	Pin No.	Description	I/O signal interface
Analog monitor output	IM	42	● Outputs analog signals for the monitor. ● The meaning of the output signal changes depending on parameter settings.	Ao-1
	SP	43		

7.5.8 Other

Name	Symbol	Pin No.	Description	I/O signal interface
Frame ground	FG	50, Shell	● Connected to the ground terminal inside the servo driver.	—
Signal ground	GND	13, 15, 17, 25	● Signal ground. ● The power supply for control signals (COM-) is isolated inside the servo driver.	—
—	—	20	● Do not connect anything.	—

7.6 External Scale Connector X5

This connector is only compatible with the multifunction type.

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.

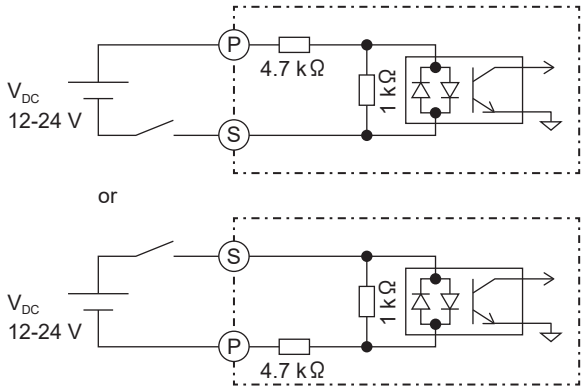
7.7 Encoder Connector X6

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)
—	—	3	● Do not connect anything
	—	4	● Do not connect anything
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.

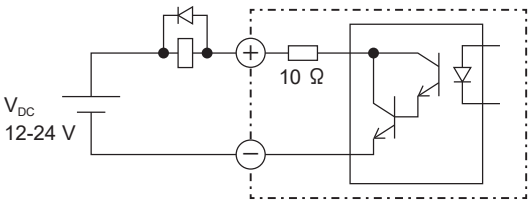
7.8 I/O Signal Interface

i-1



S: [Pins] (X3) 3, 5 / (X4) 8, 9, 26, 27, 28, 29, 30, 31, 32, 33
P: [Pins] (X3) 4, 6 / (X4) 7

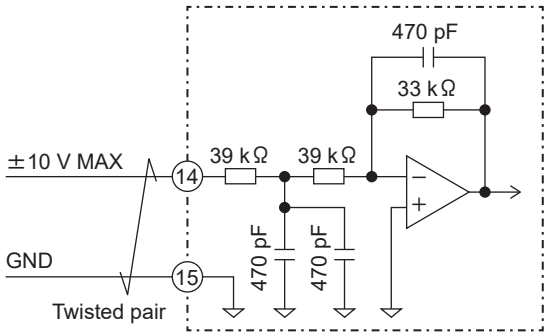
o-1



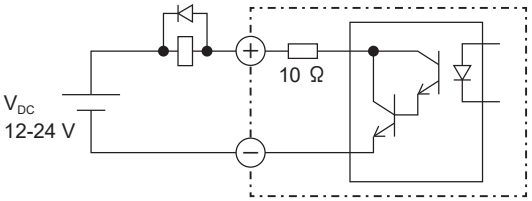
[Pins] ＋: (X3) 8 / (X4) 11, 35, 37, 39
[Pins] －: (X3) 7 / (X4) 10, 34, 36, 38

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

Ai-1



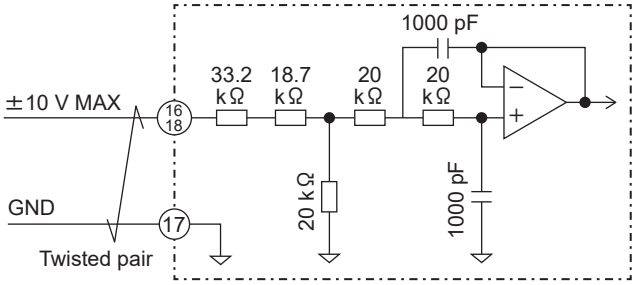
o-2



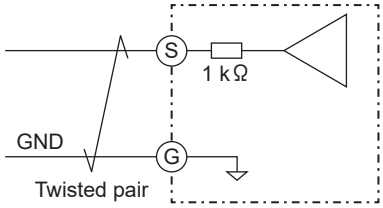
[Pins] ＋ : 40, 12
[Pins] － : 41

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

Ai-2



Ao-1

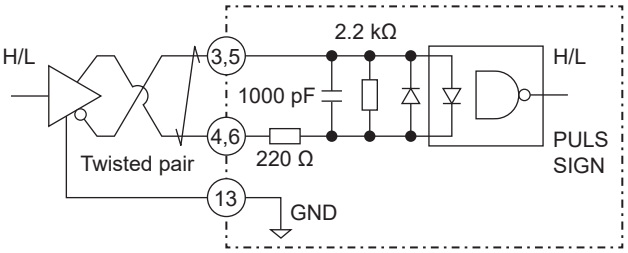


[Pins] S: (X4) 42, 43
[Pins] G: (X4) 13, 17, 25

* The output signal amplitude is ±10 V.

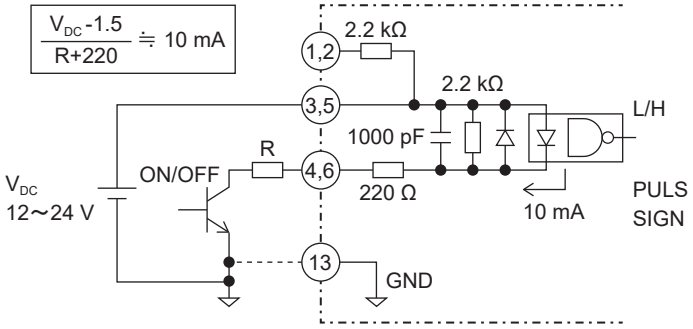
Di-1

< Line Driver >

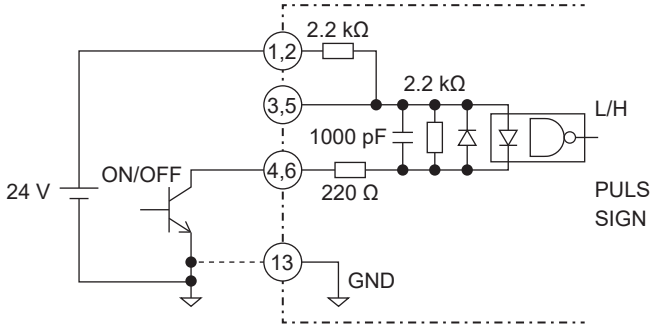


< Open Collector >

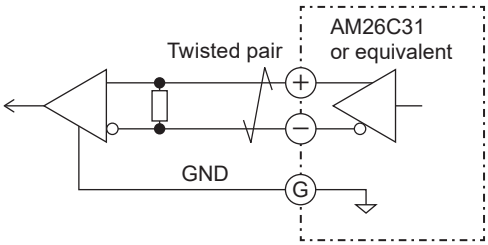
(1) 12～24 V Power supply with external resistor



(2) 24V Power supply without external resistor



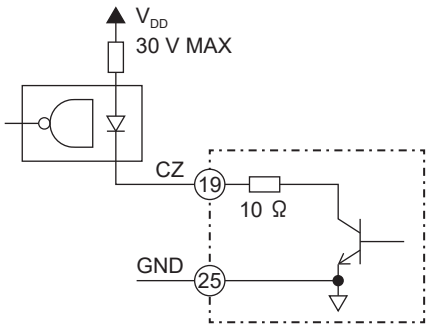
Do-1



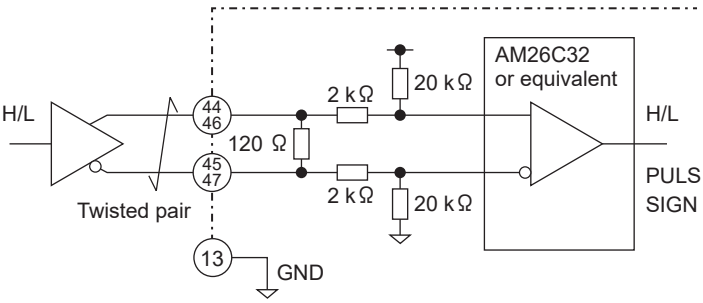
[Pins] ＋: (X4) 21, 23, 48
[Pins] －: (X4) 22, 24, 49
[Pins] G : (X4) 13

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

Do-2



Di-2



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 (*2)	X5	20 m	
Parallel I/O connection	X4	3 m	
Safety connection (*2)	X3	3 m	Core cable: 0.18 mm^2 or more

*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 Only compatible with the multifunction type.

8.2 Cable Side Connectors

Connector symbol	Product Name	Product number	Manufacturer
X2	Connector	2040008-1	TE Connectivity
X3	Connector	2013595-1	
	Safety bypass plug	CIF-PB08AK-GF1R	JST
X4	Solder plug (soldered type)	DF02P050F22A1	Japan Aviation Electronics Industryry, Ltd. (JAE)
	Plug hood	DF02D050B22A	
X5	Connector	MUF-PK10K-X	J.S.T. Mfg. Co., Ltd.
X6	Receptacle	3E206-0100 KV	3M Japan
	Shell kit	3E306-3200-008	
XE (*1)	Connector	5557-04R-210	Molex Japan
	Terminal	5556PBTL	

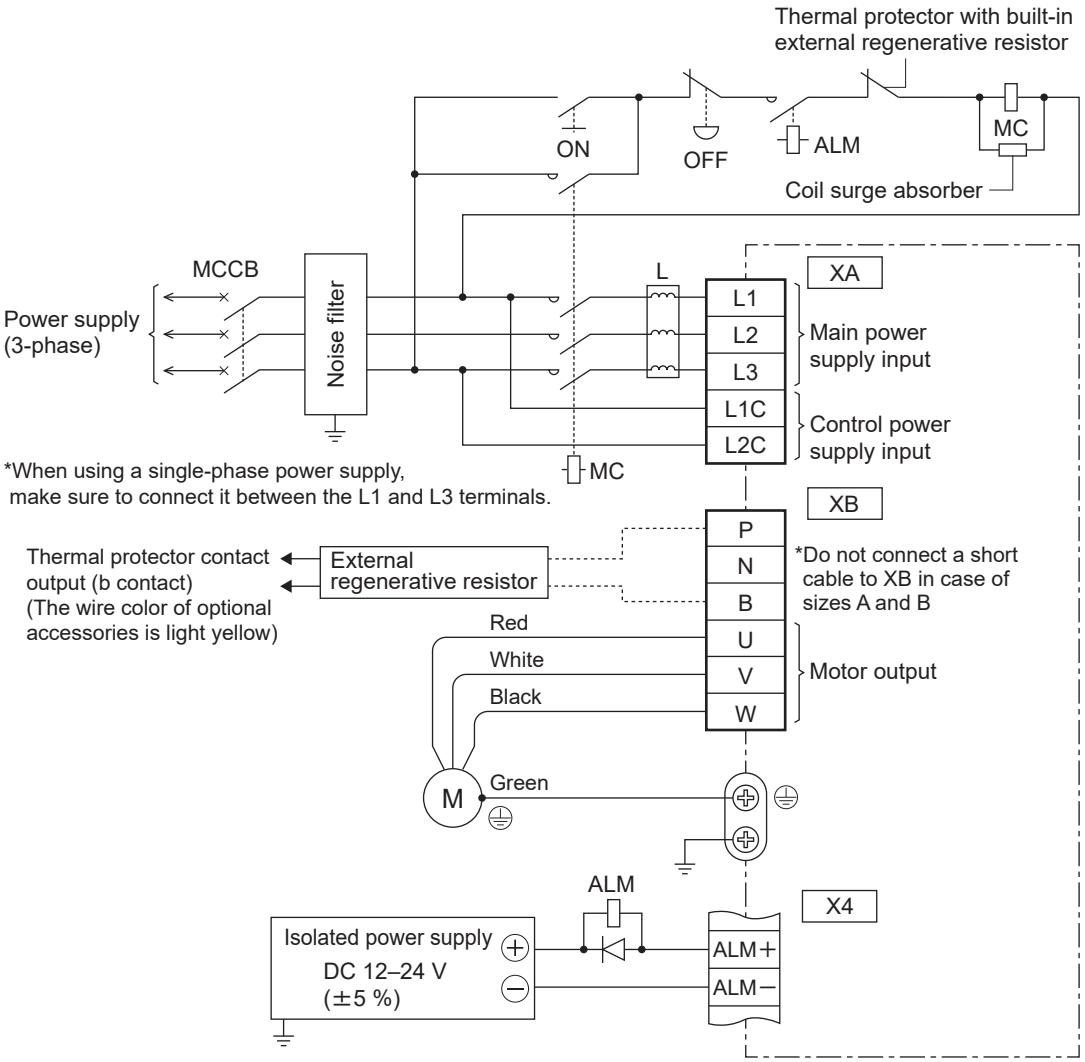
*1 Only size G is supported.

* The above product numbers are examples. An equivalent product can be substituted.

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.

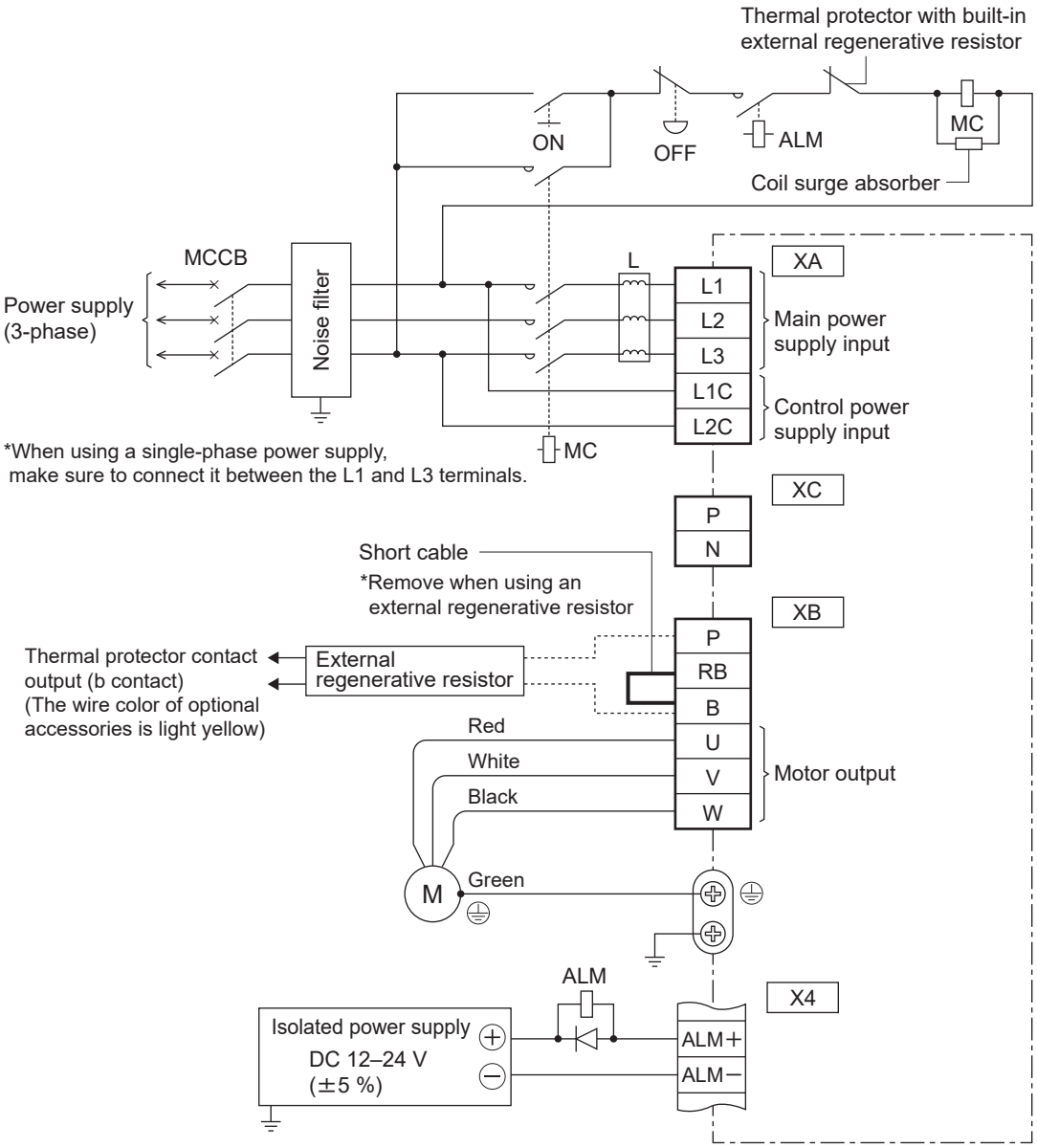
* Connectors X1-X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

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.

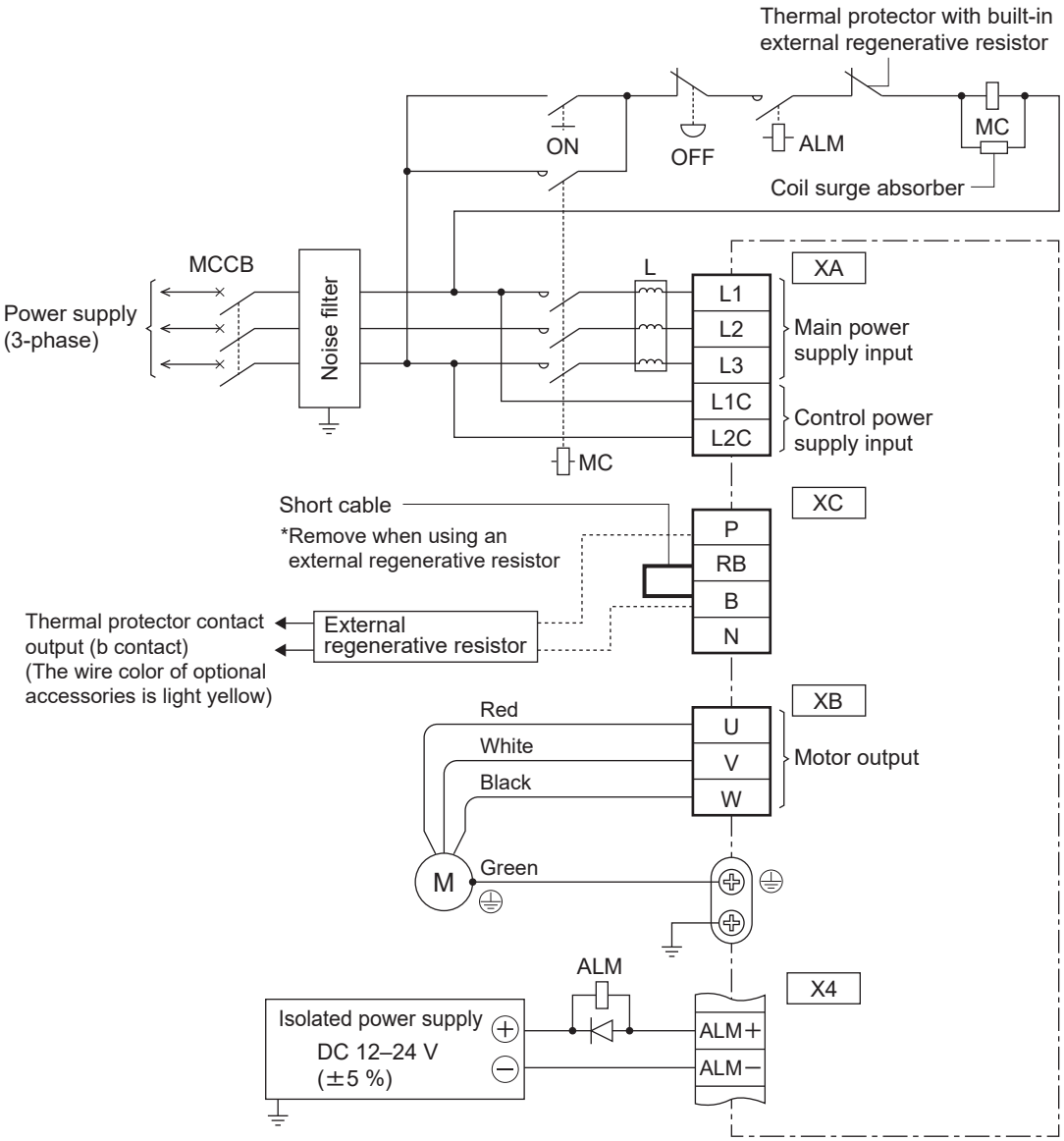
* Connectors X1–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

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.

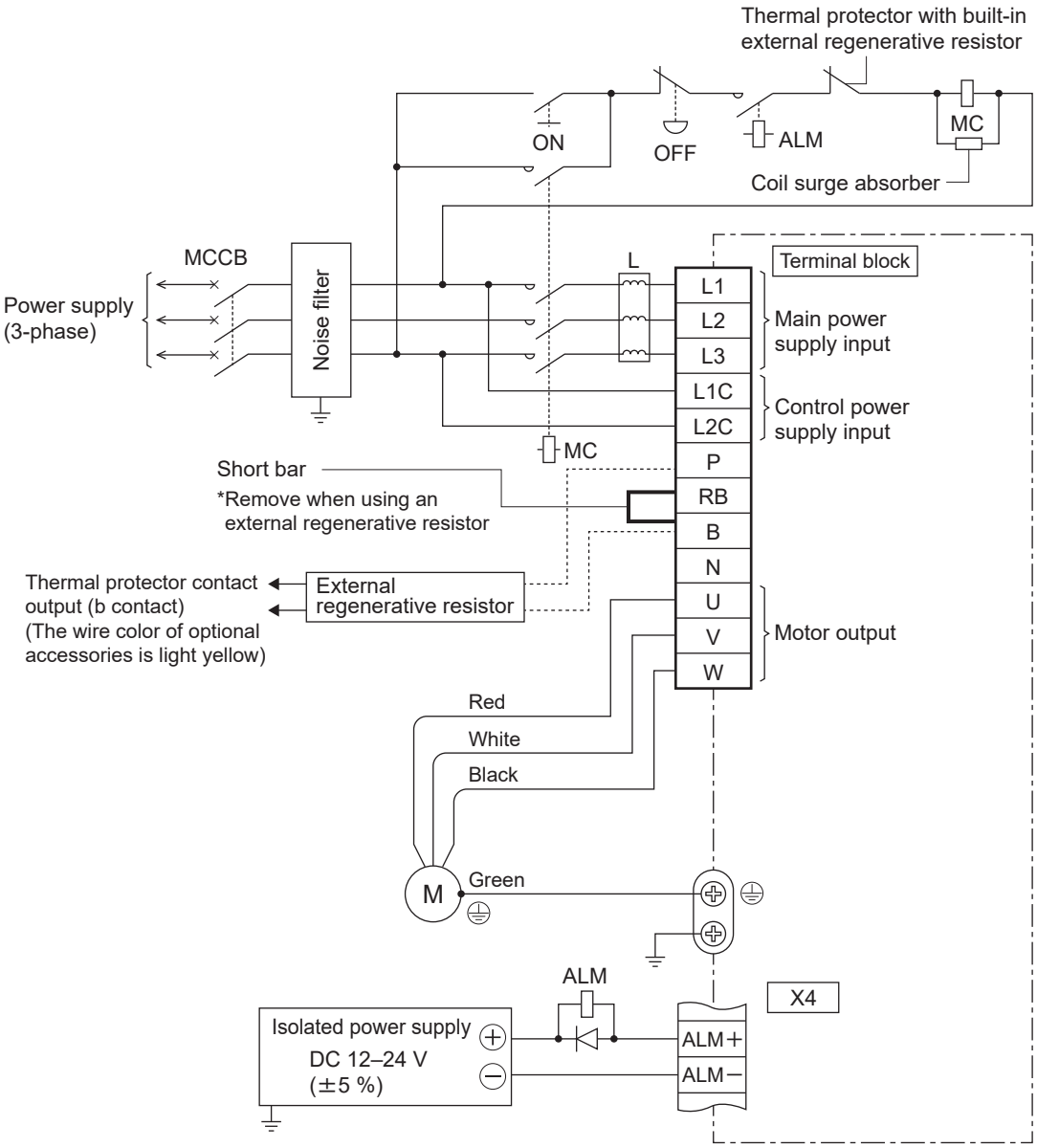
* Connectors X1–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

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–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

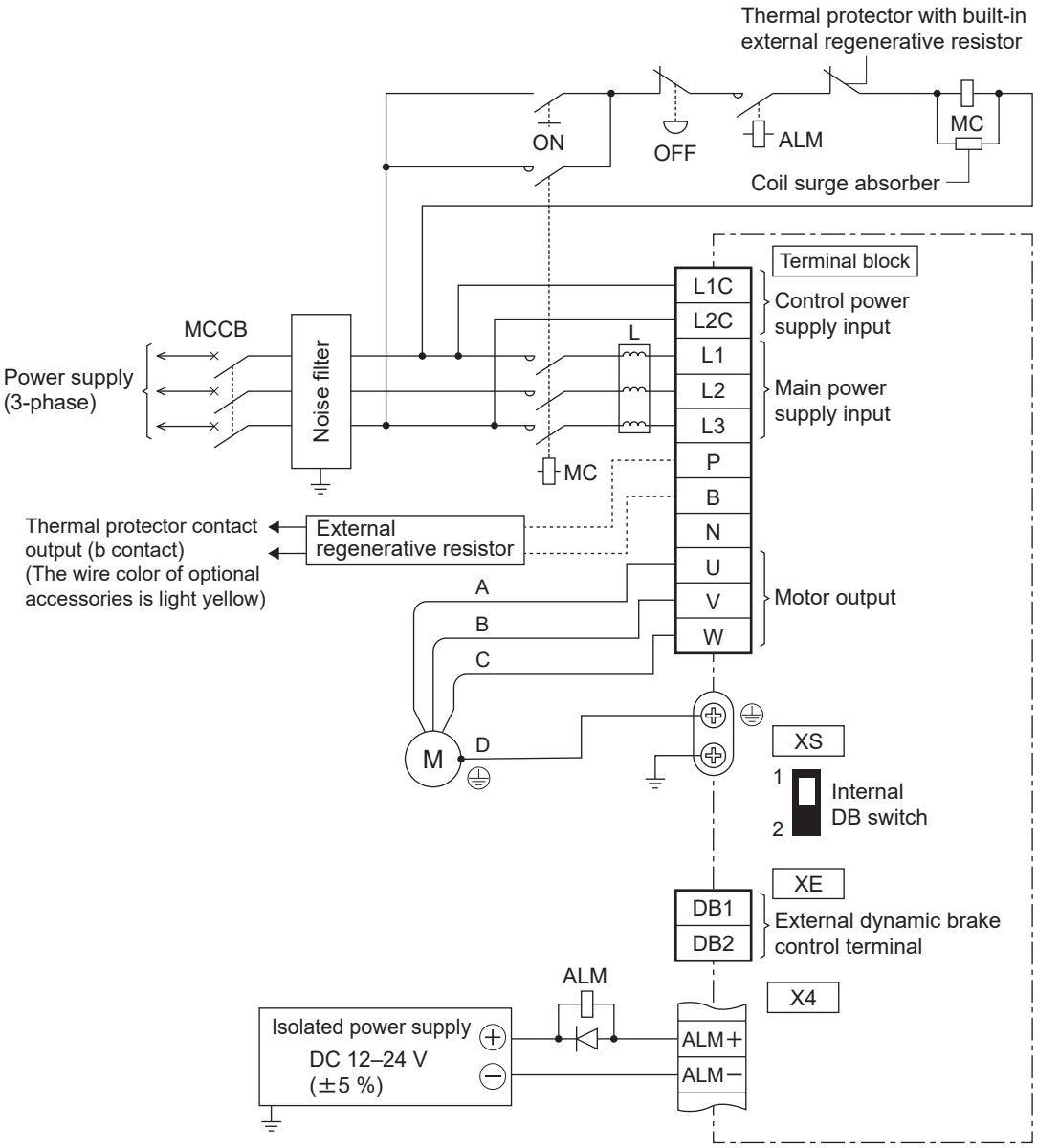
The primary-side power supply (power supply for the motor brake) must be isolated.

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–X6 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.)

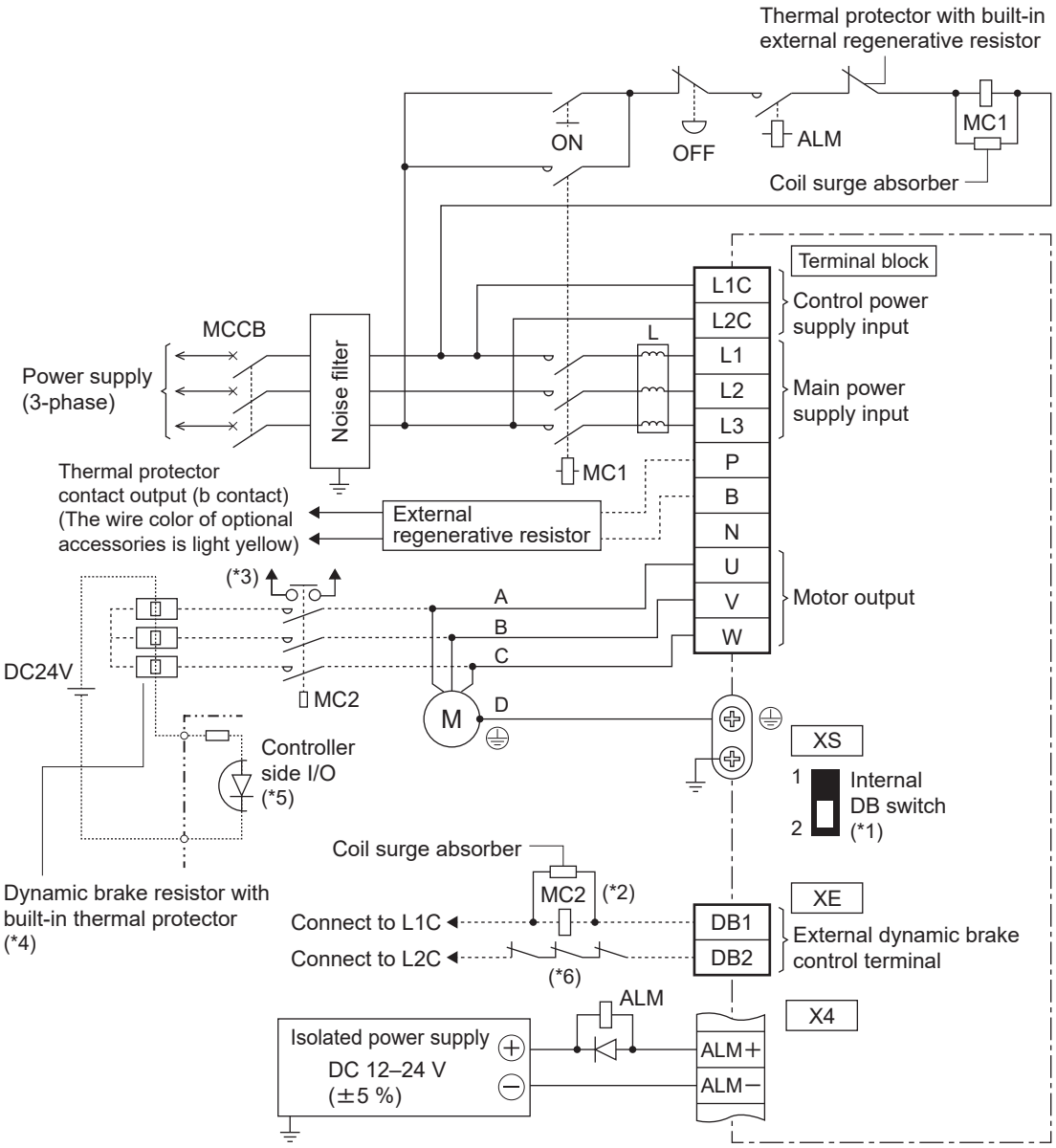
* The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

* 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.

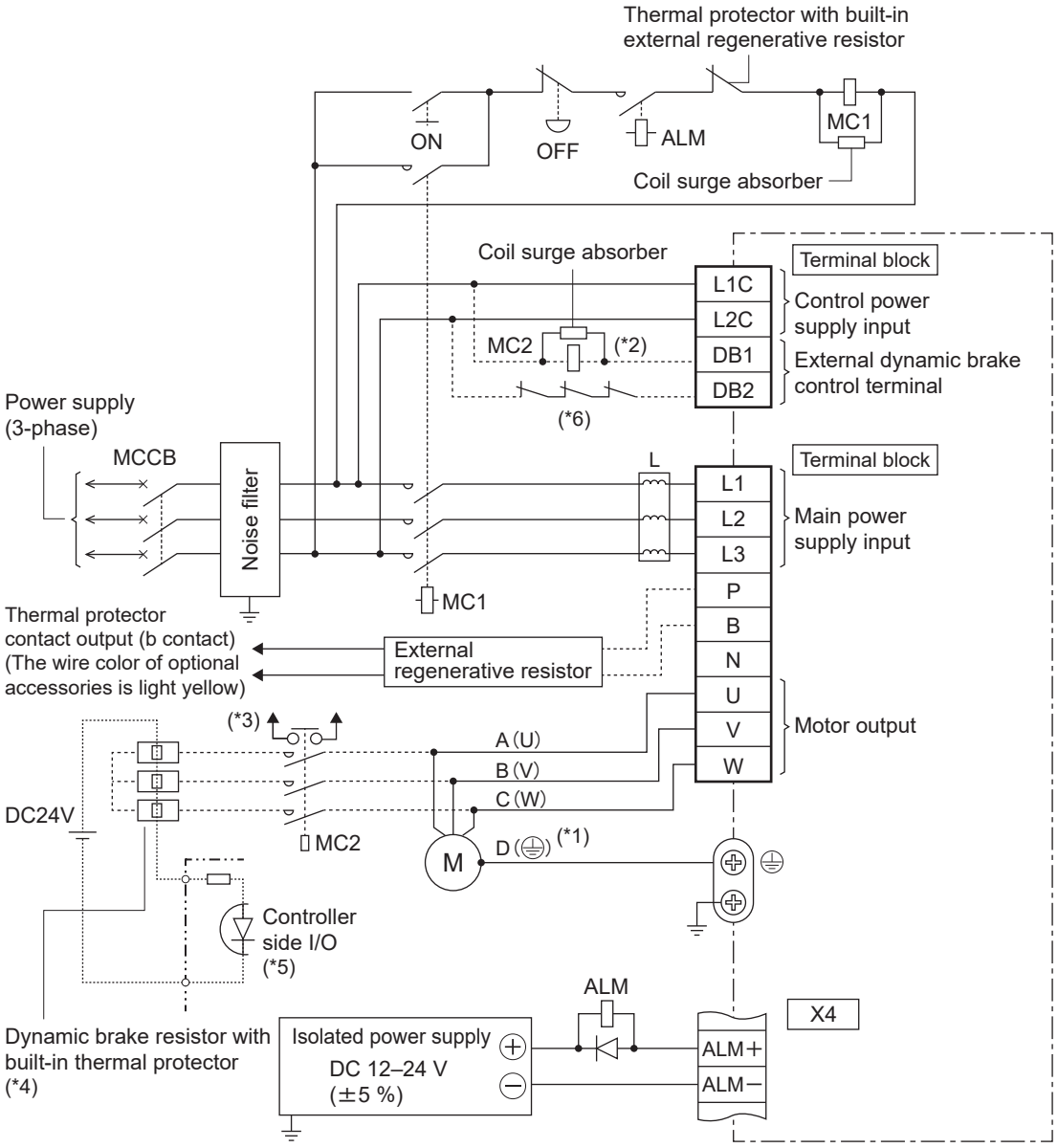
*6 If the thermal protector cannot be monitored by the controller side I/O, input the thermal protector output between L2C and DB2 so that the dynamic brake does not operate when temperature protector operates.

*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–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

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

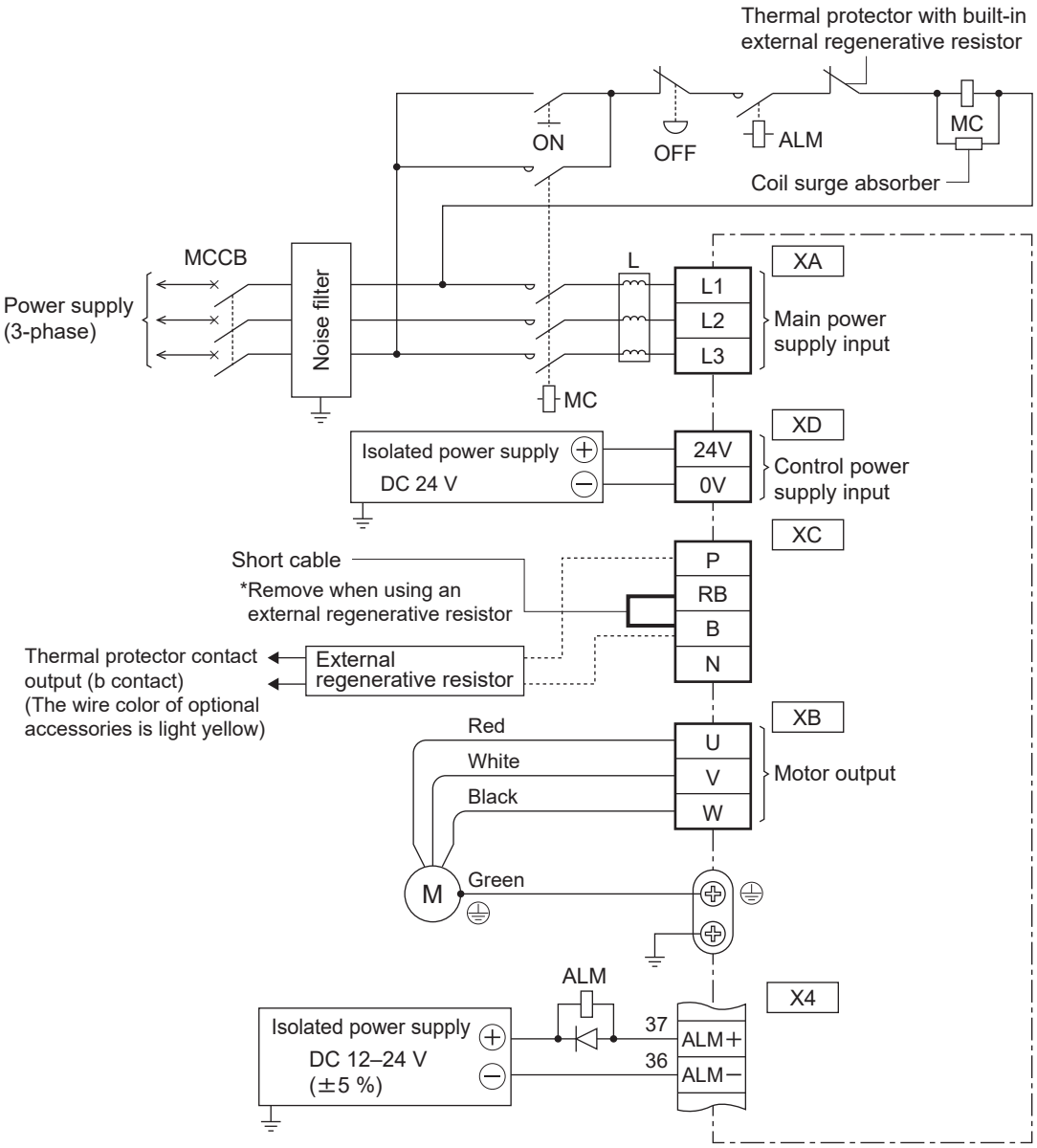
  Do not connect it to the same power supply.

* 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.

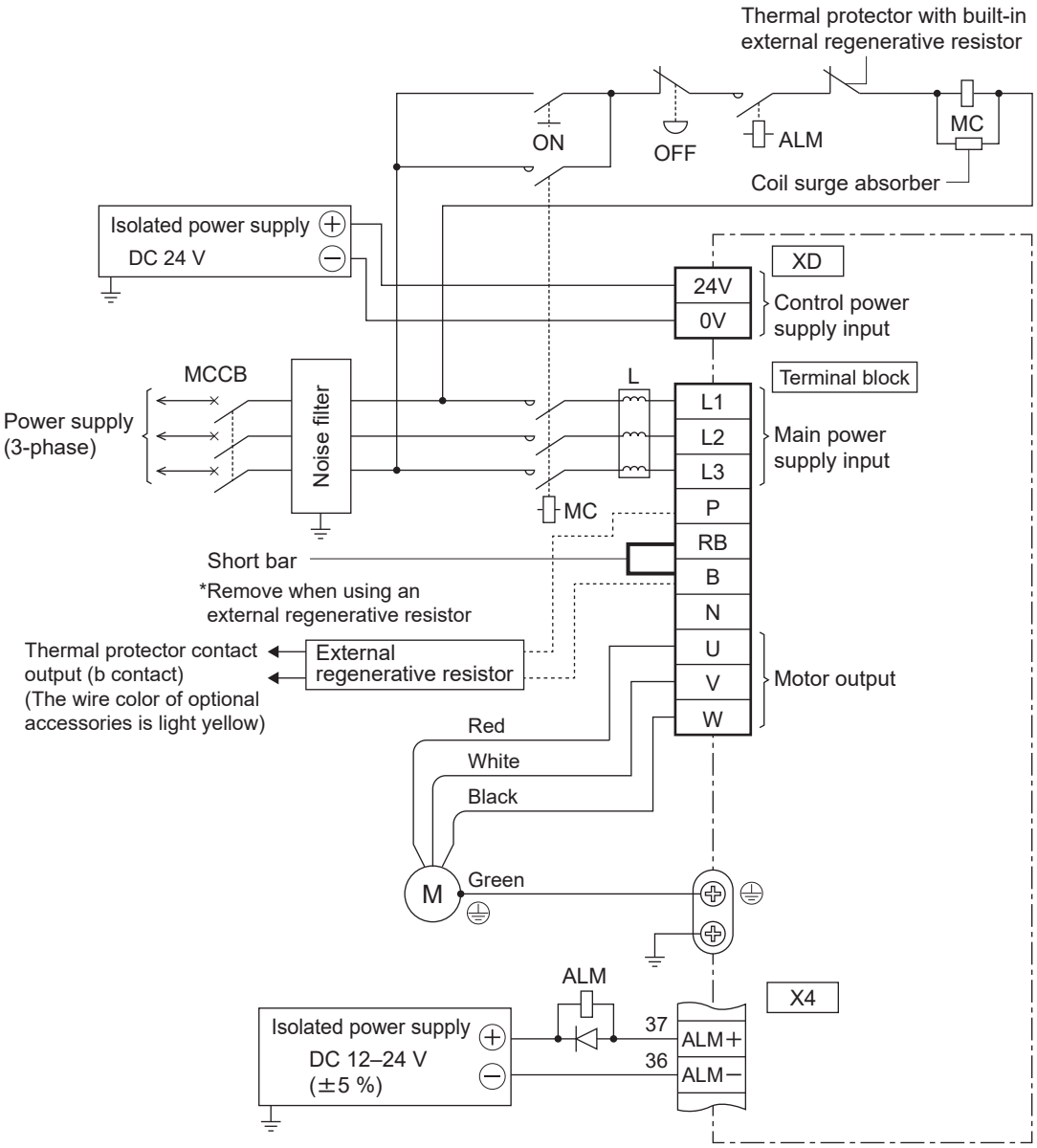
* Connectors X1–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

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–X6 are secondary-side circuits. (See *"5 Appearance and Part Names"*)

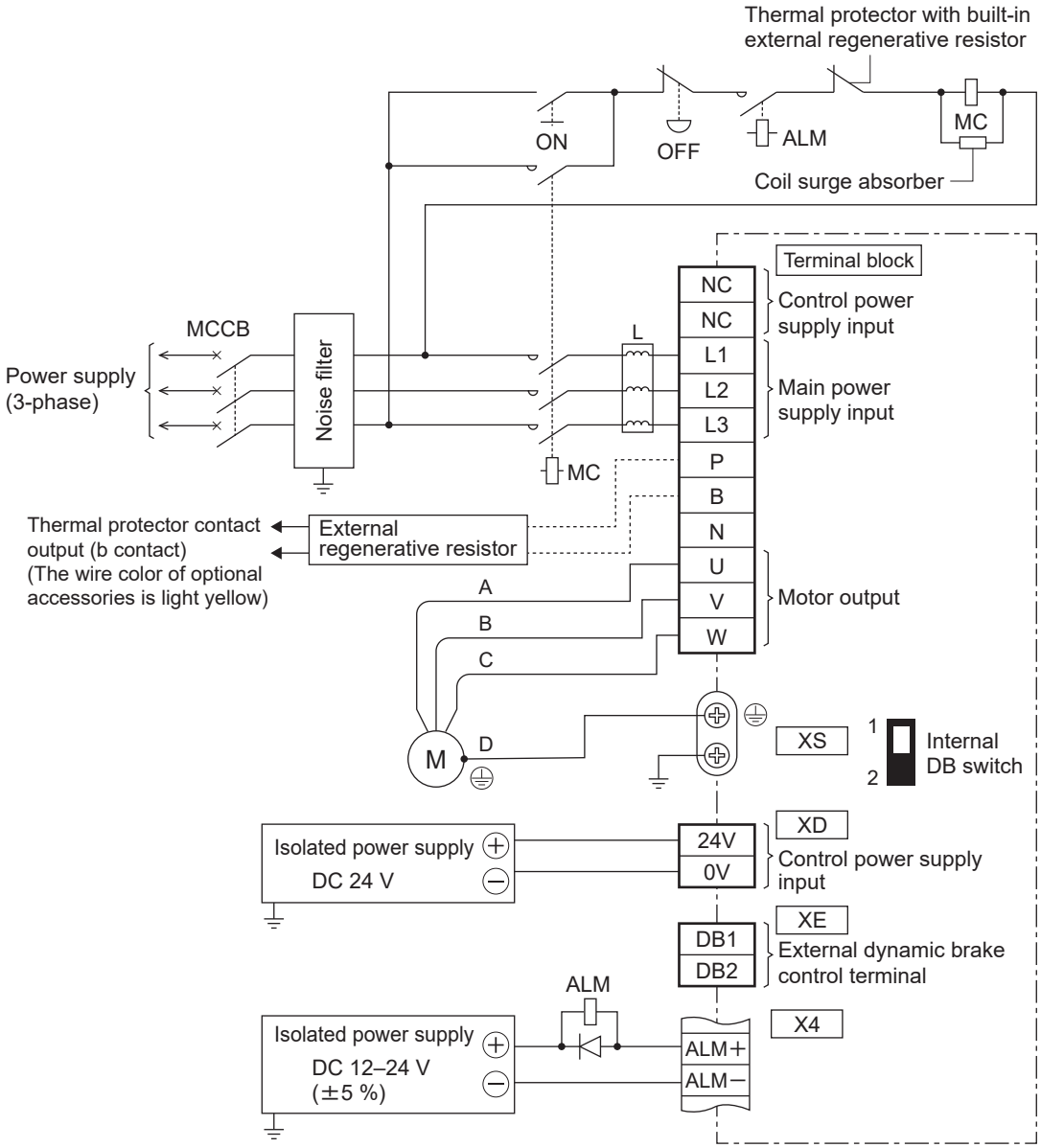
The primary-side power supply (power supply for the motor brake) must be isolated.

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 Size G 400 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.)

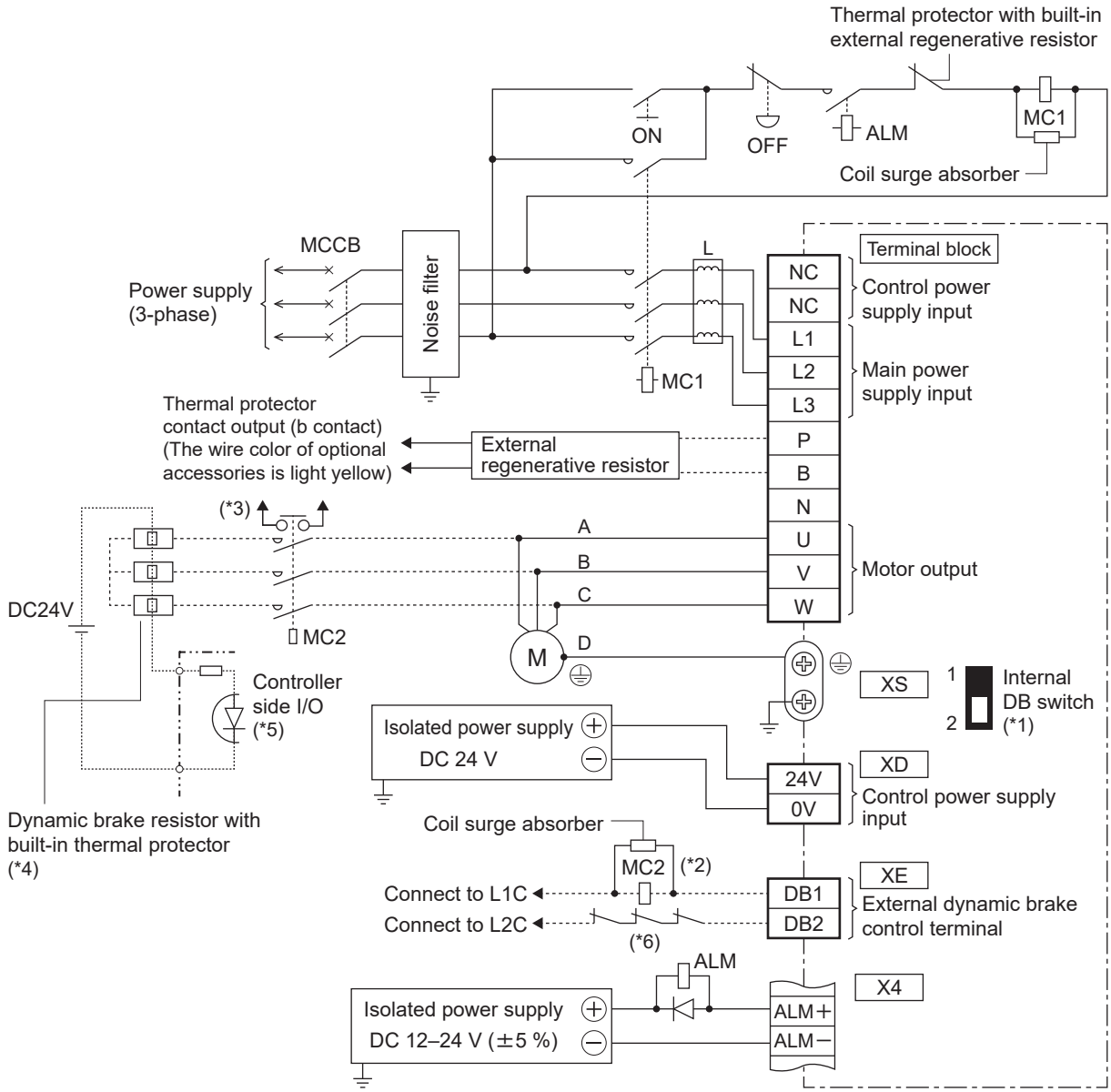
* The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.

* 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 *"7.1.9 Size G 400 V"* .

Connection example for Size G 400 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 4.8 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.

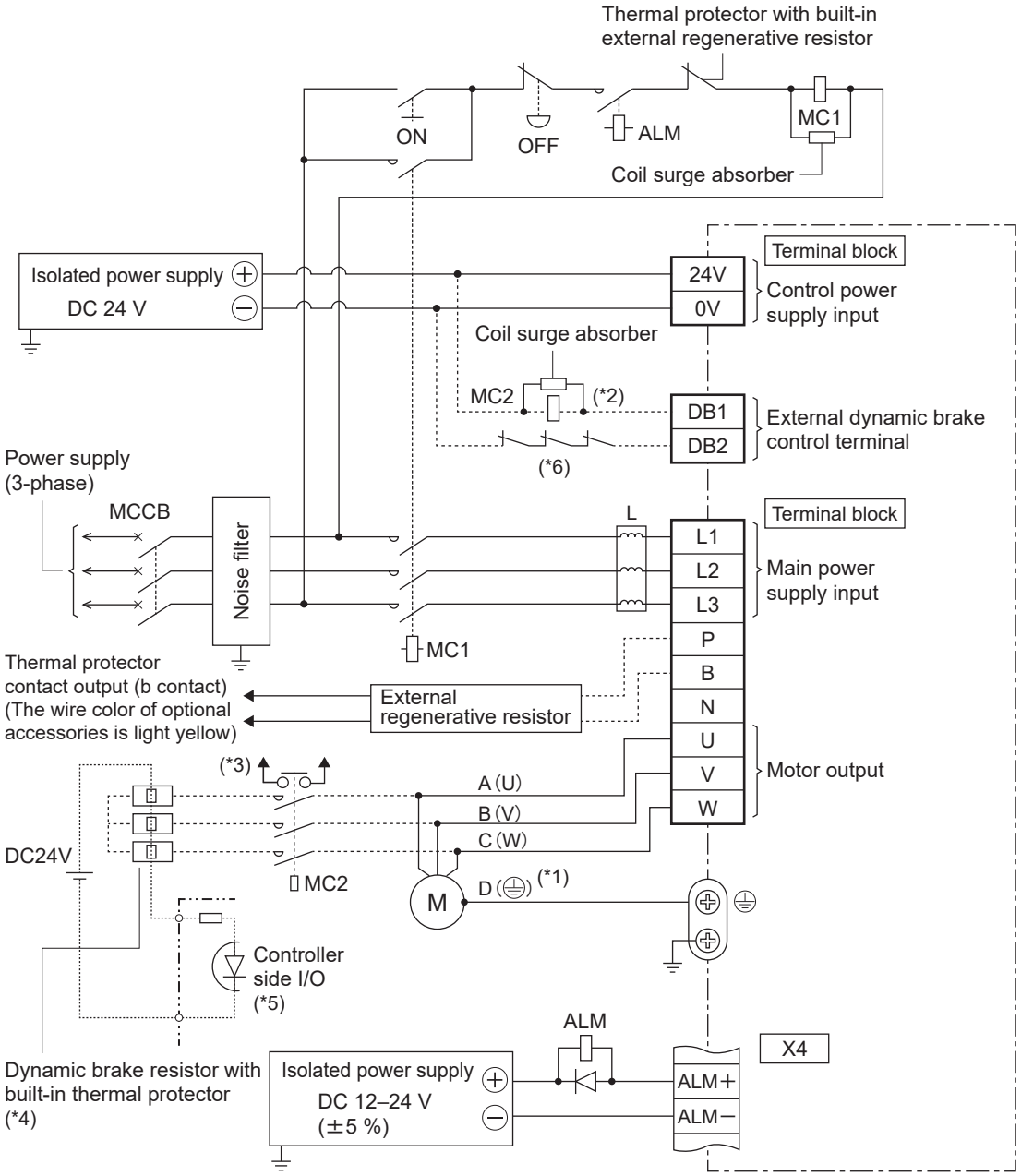
*6 If the thermal protector cannot be monitored by the controller side I/O, input the thermal protector output between L2C and DB2 so that the dynamic brake does not operate when temperature protector operates.

*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 *"7.1.9 Size G 400 V"* .

8.3.1.10 Size H 400 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 4.8 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 *"7.1.10 Size H 400 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.

8.3.1.11 Precautions

1 When the servo driver uses a single-phase power supply for size A–size 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 N·m–0.21 N·m.

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

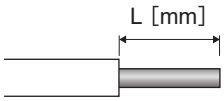
*2 Each regenerative resistor has built-in thermal fuse and thermal protector for safety.

- 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.

8.3.1.12 How to wire to the power connector

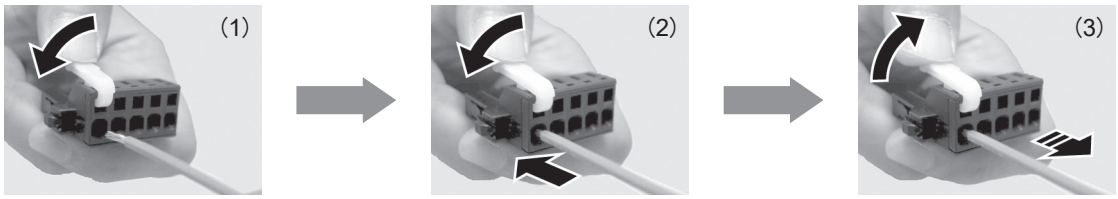
Follow the procedure below to wire to connectors XA, XB, XC and XD .

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



Size	Connector	L [mm]
Size A - Size C, Size D 200 V	XA, XB	10 mm
Size D 400 V, Size E	XA, XB, XC	11 mm
Size D - Size 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 V - 24 V control signal power supply for external control to be connected to between SI-COM and SO-COM.

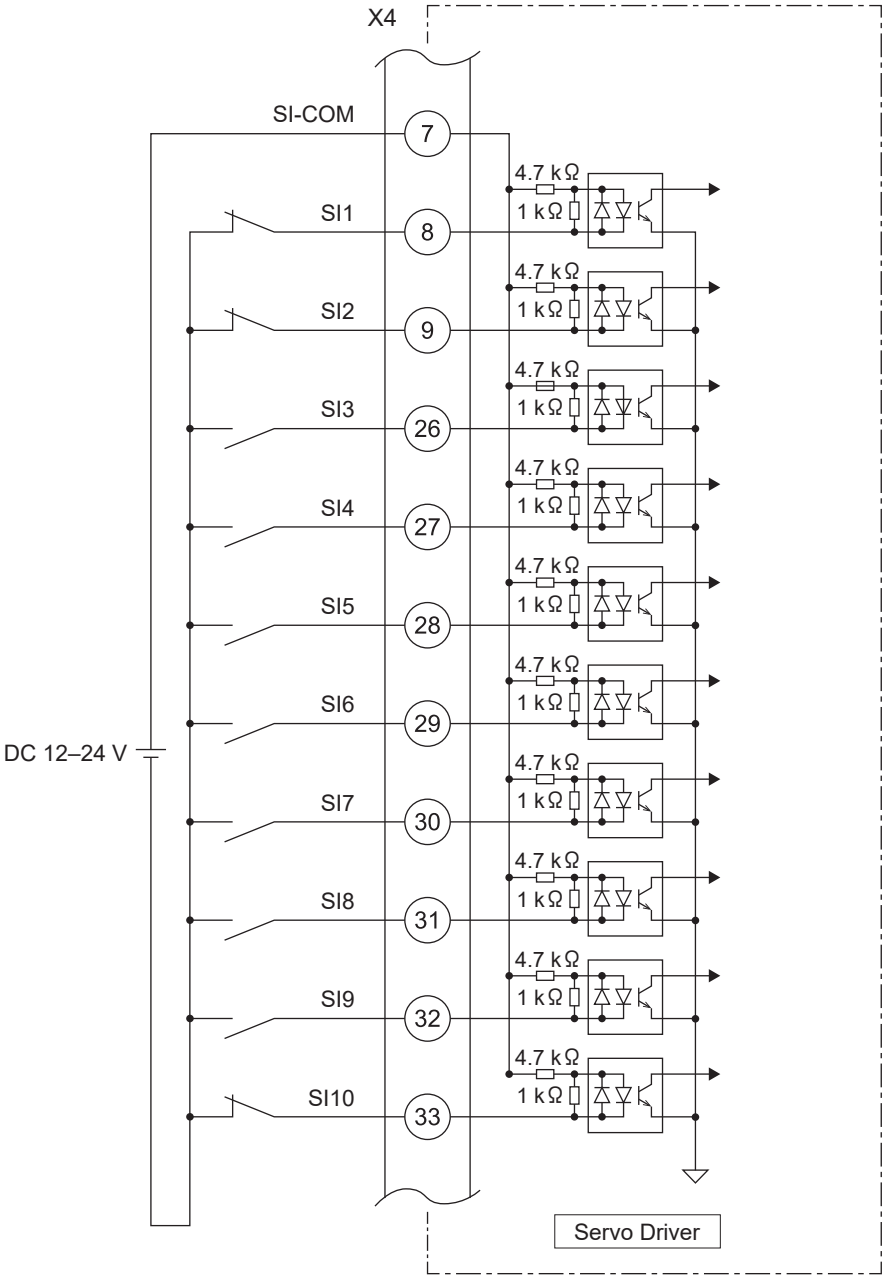
It must be isolated from the primary power supply (motor brake power supply).

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 SI10 are assigned using parameters.

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

8.3.2.2 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.

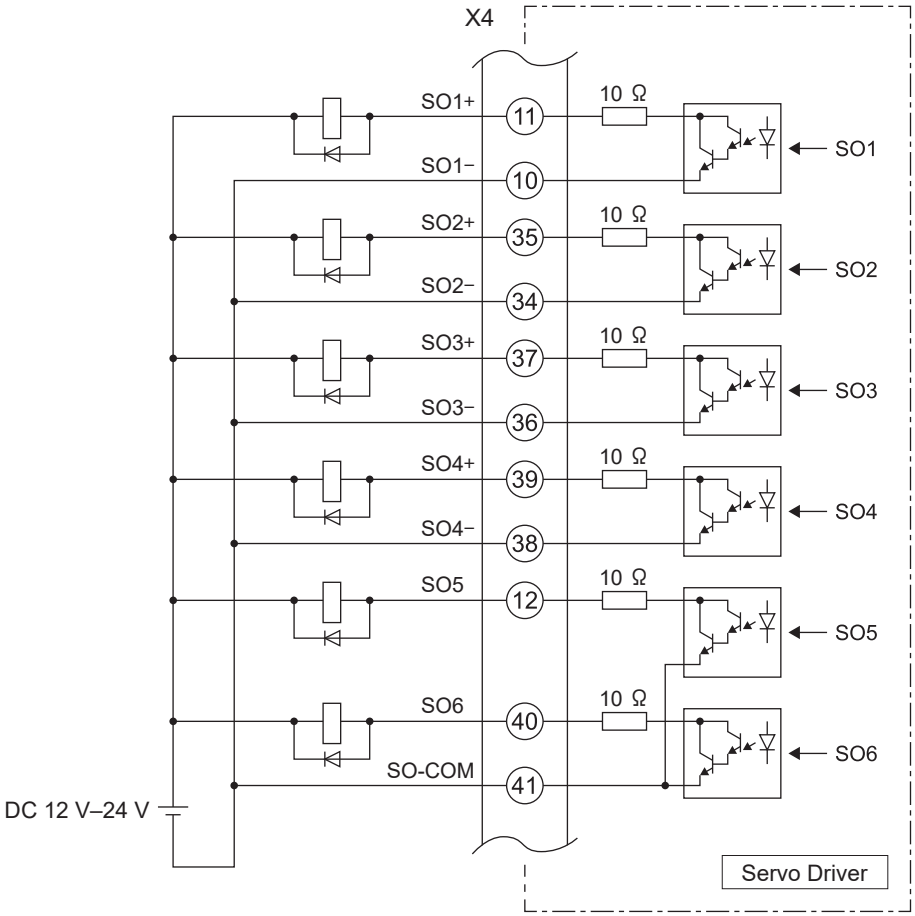
2 If the relay is to be driven directly by the output signal, install a diode in parallel with the relay in the direction shown below. Failure to install a diode or installing it in the opposite direction will damage the servo driver.

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.

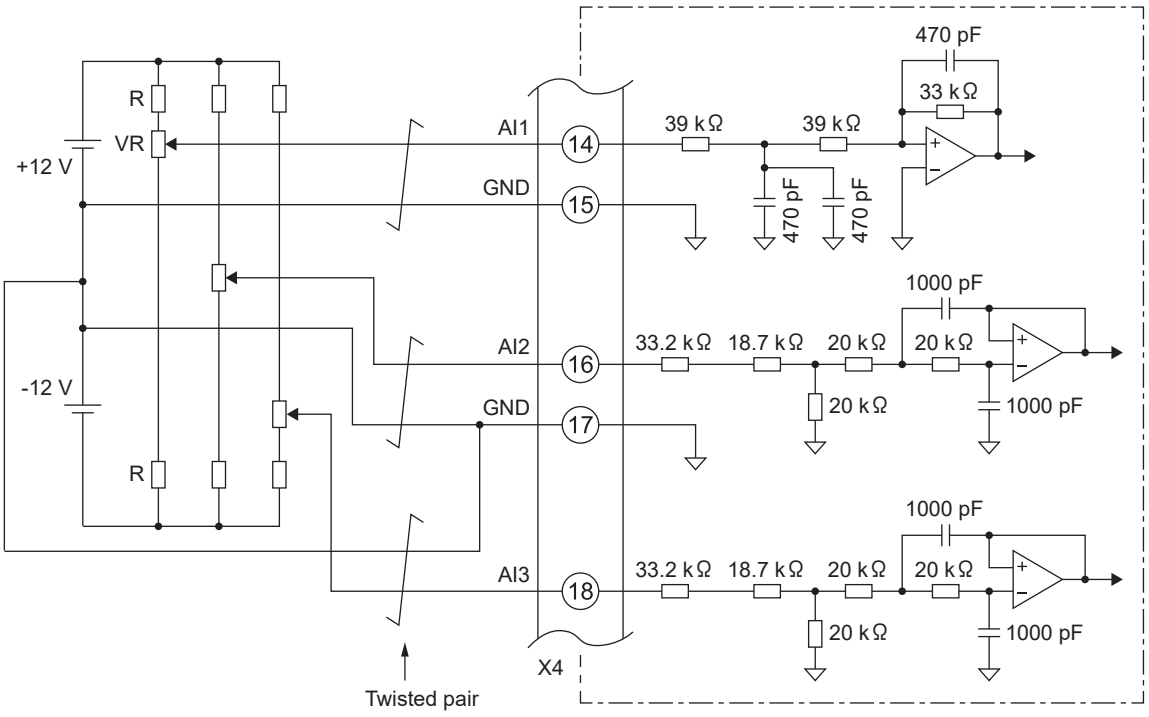


The functions of SO1 to SO6 are assigned using parameters.

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

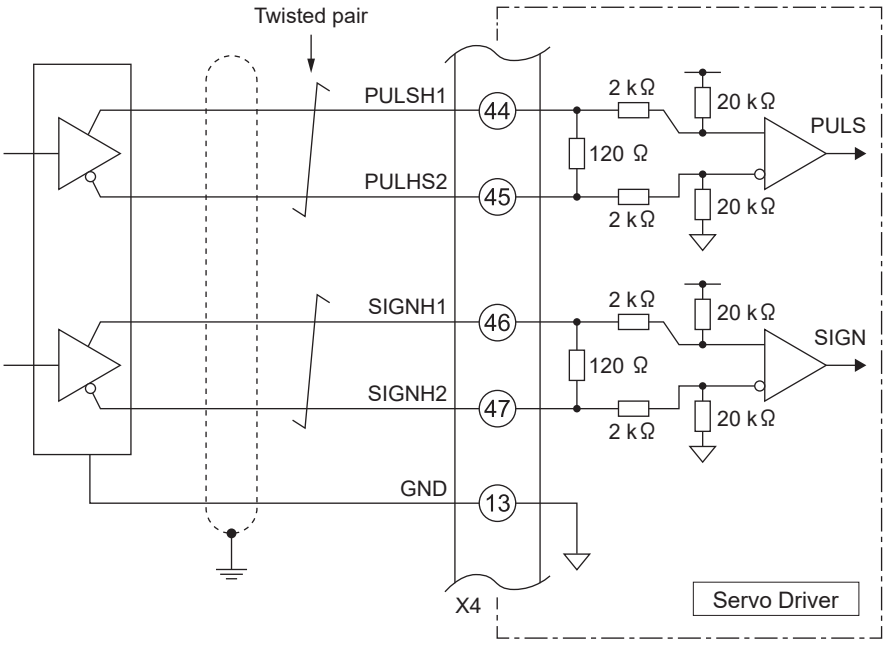
8.3.2.3 Analog Signal Input

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



8.3.2.4 Pulse Train Command

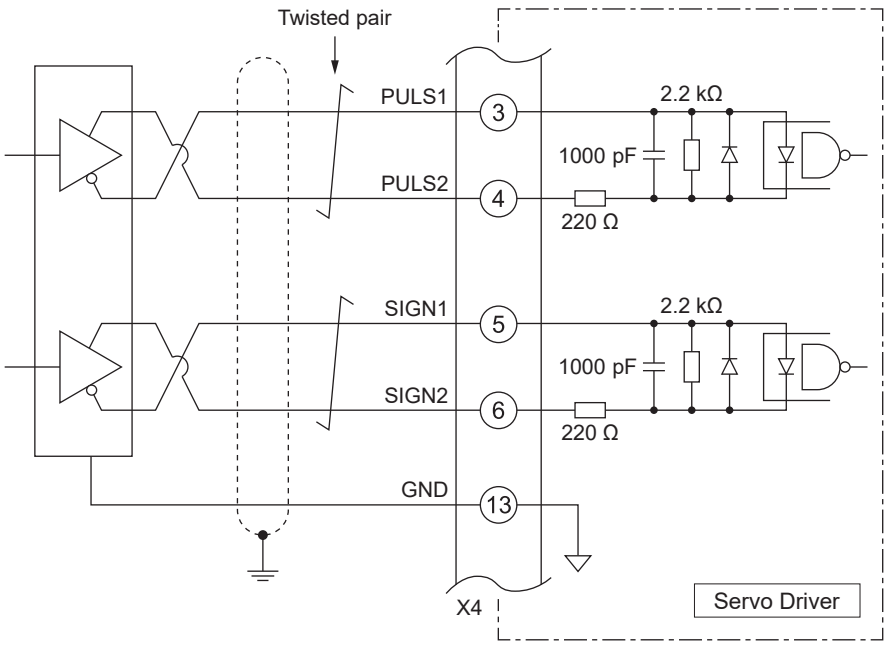
■ **A.Dedicated pulse train interface for line drivers**



■ **B.Pulse train interface**

The pulse train command input supports both line driver and open collector interfaces, but we recommend using a line driver interface as shown in the figure below in order to improve signal transmission reliability.
Be aware that the line driver and open collector interfaces differ in terms of how they are wired to the servo driver.

● Line driver interface



Precautions

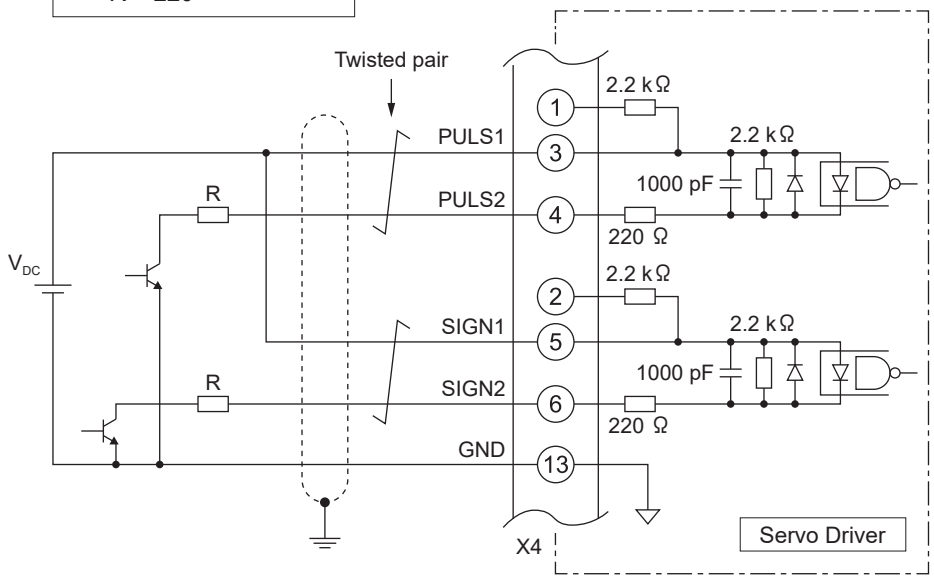
● Line driver allowable output voltage range: 3.1 V ≤ $V_{OH} - V_{OL}$ ≤ 4.7 V

If the above formula is not satisfied, the input signal may be disrupted and the servo motor may operate erratically.

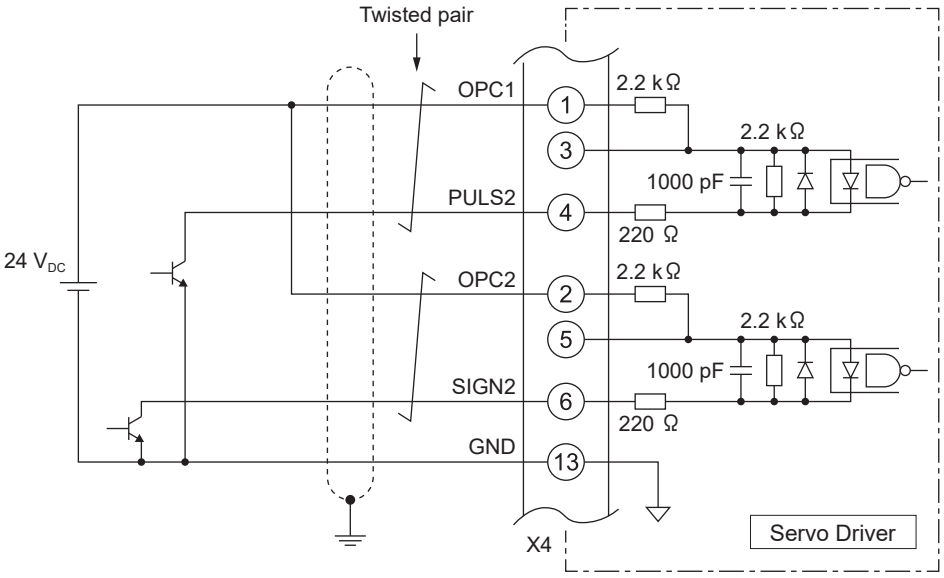
● Open Collector Interface

1 If external resistors are used with a 12 V–24 V power supply

$$\frac{V_{DC} - 1.5}{R + 220} = 10 \text{ mA}$$



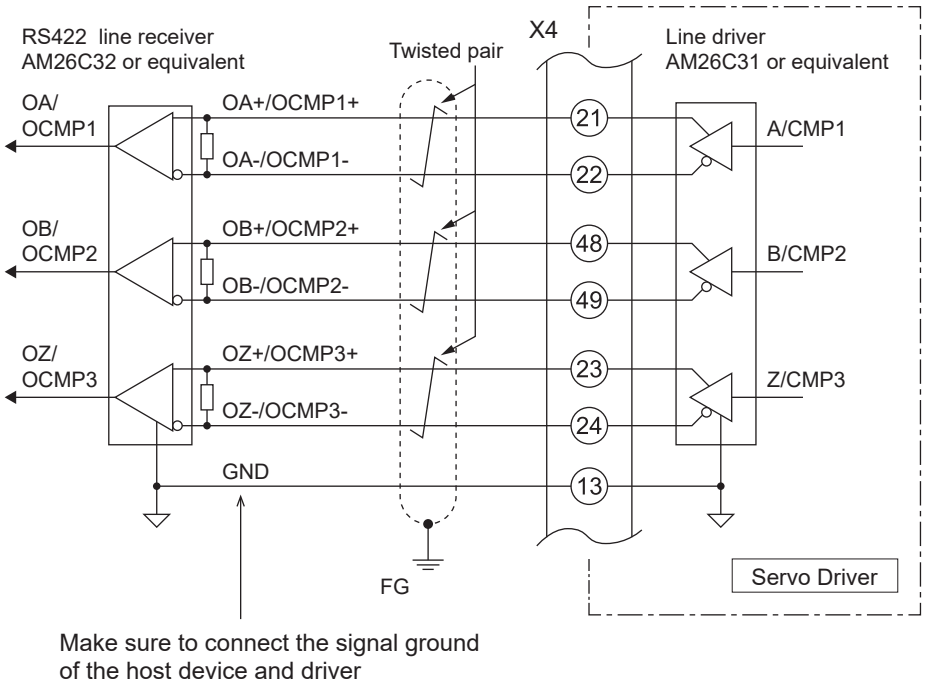
2 If external resistors are not used with a 24 V power supply

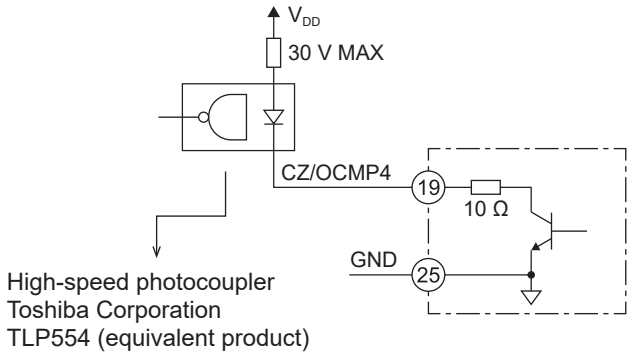


Precautions for setting the command pulse input as an open collector interface

- Use a short wire (1 m or less).
- Be aware that the maximum pulse frequency when set as an open collector interface is 200 kpps, less than that of the line driver interface (500 kpps).

8.3.2.5 Encoder Output Signal/Position Compare Output Signal





Precautions

- Only Z-phase signals are output to pin 19 (CZ) for the open collector as well as being output by the line driver. When using this CZ signal, ensure that it is not affected by noise.
- Use a line receiver (AM26C32 or equivalent) to receive output pulse.

  Ensure that an appropriate terminating resistor is installed between the line receiver inputs.
- Note that in the Z-phase signal output, the logic is inverted for the line driver output (OZ) and the open collector output (CZ).
- Use at a maximum output frequency of 4 Mpps (after being multiplied by 4) or less.

8.3.3 Wiring to Connector X5

1 Only compatible with the multifunction type.

2 Use a commonly shielded twist-pair cable composed of stranded wires with a core of 0.18 mm^2 or more for the external scale cable.

3 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.

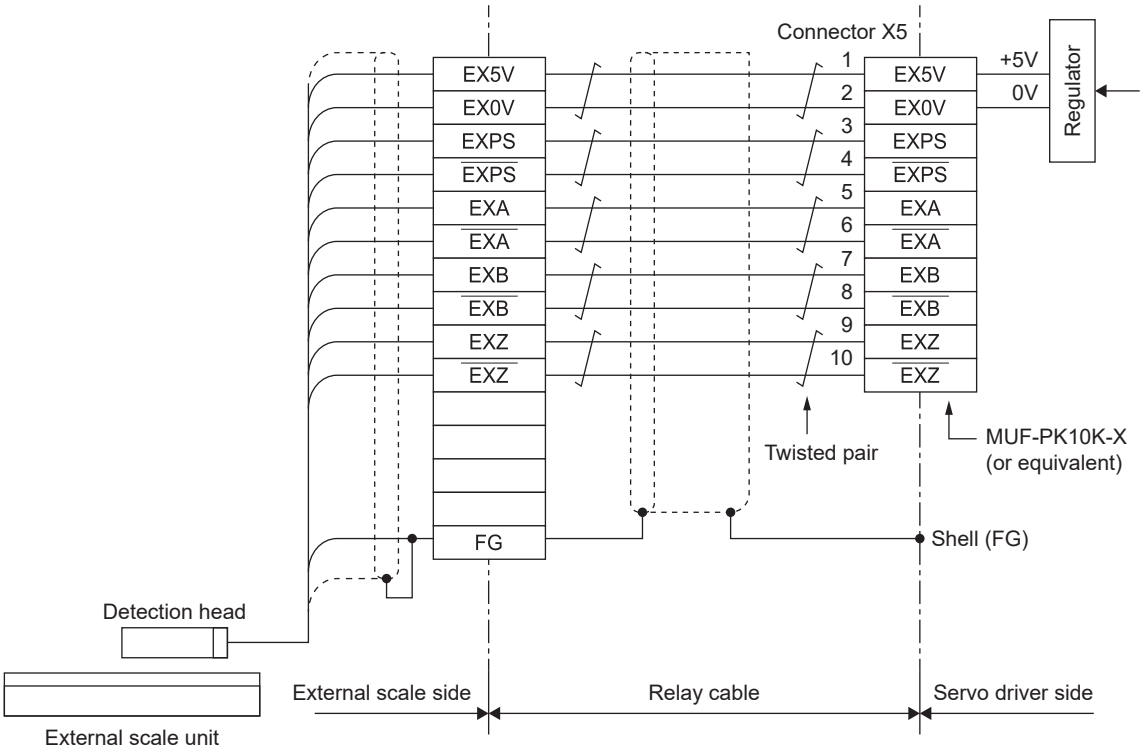
4 Connect the outer sheath of the shielded wire on the motor side to the shield of the shielded wire from the external scale. Make sure to connect the sheath of the shielded wire on the servo driver side to the X5 shell (FG).

5 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.

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

7 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.

8 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 a commonly shielded twist-pair cable composed of stranded wires with a core of 0.18 mm^2 or more for encoder connector cable.

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 encoder.
Make sure to connect the sheath of the shielded wire on the servo driver side to the X6 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 X6.

8.3.4.1 If not using multi-turn data

* When used as an incremental encoder

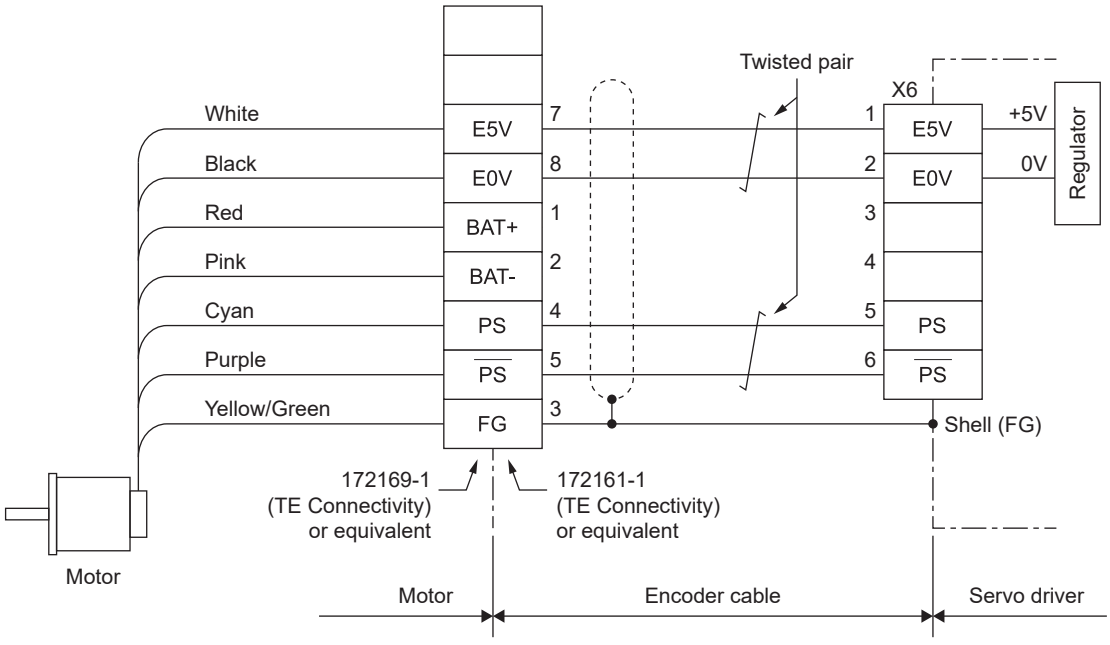
* When used as a single-turn absolute encoder

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

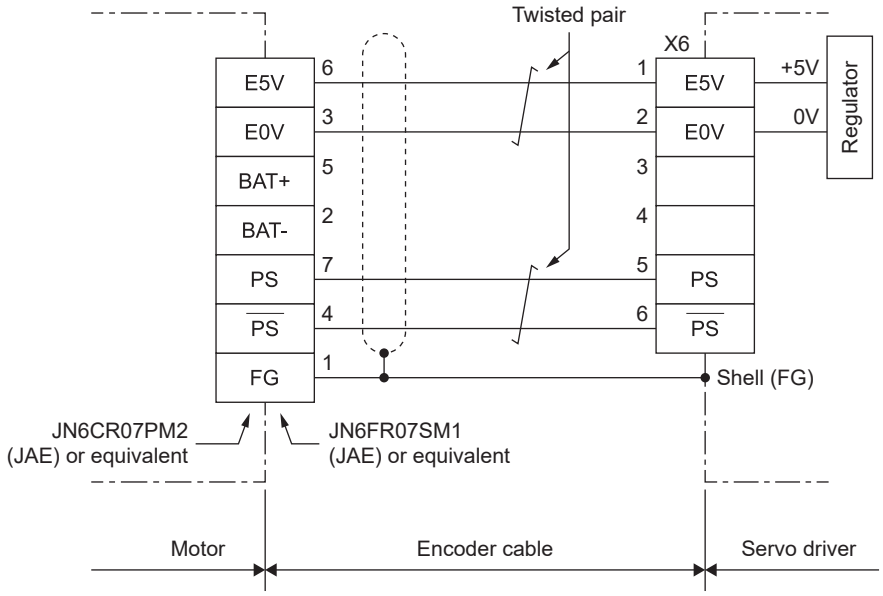


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

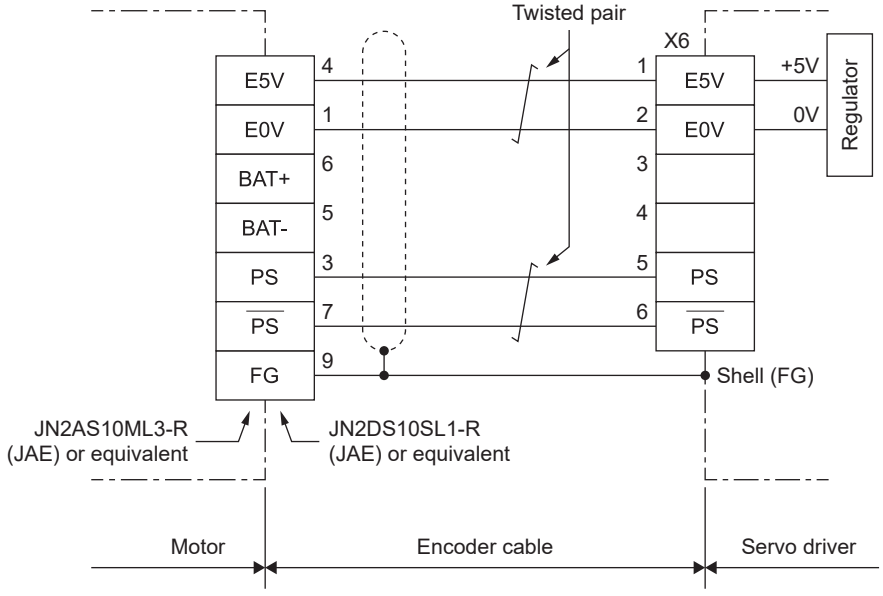


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



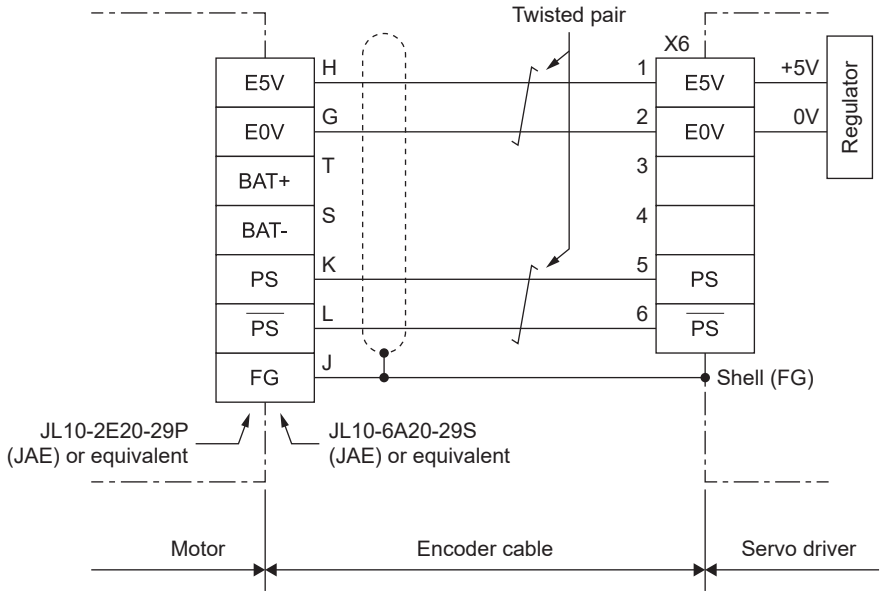
Cannon plug type

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



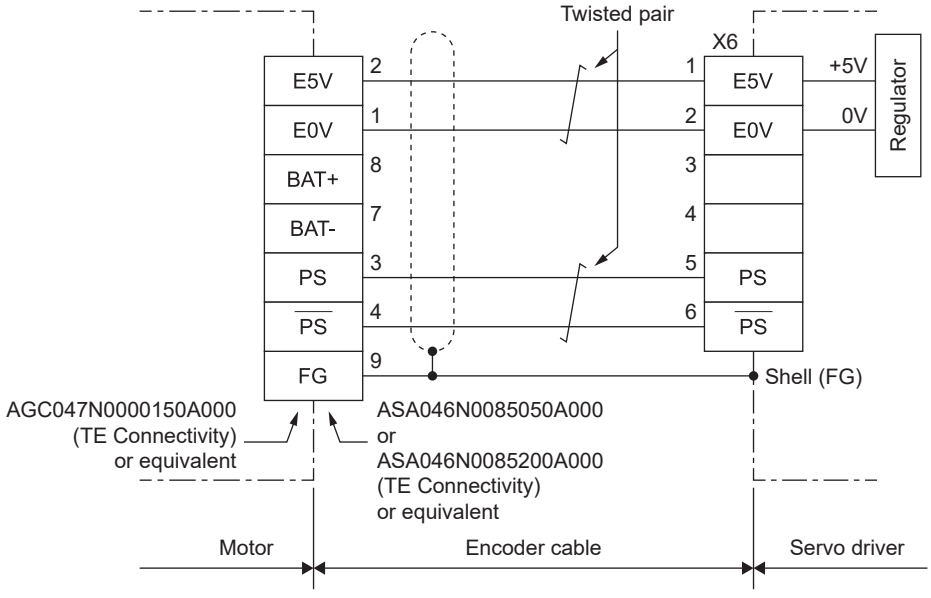
Right-angle cannon plug type

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

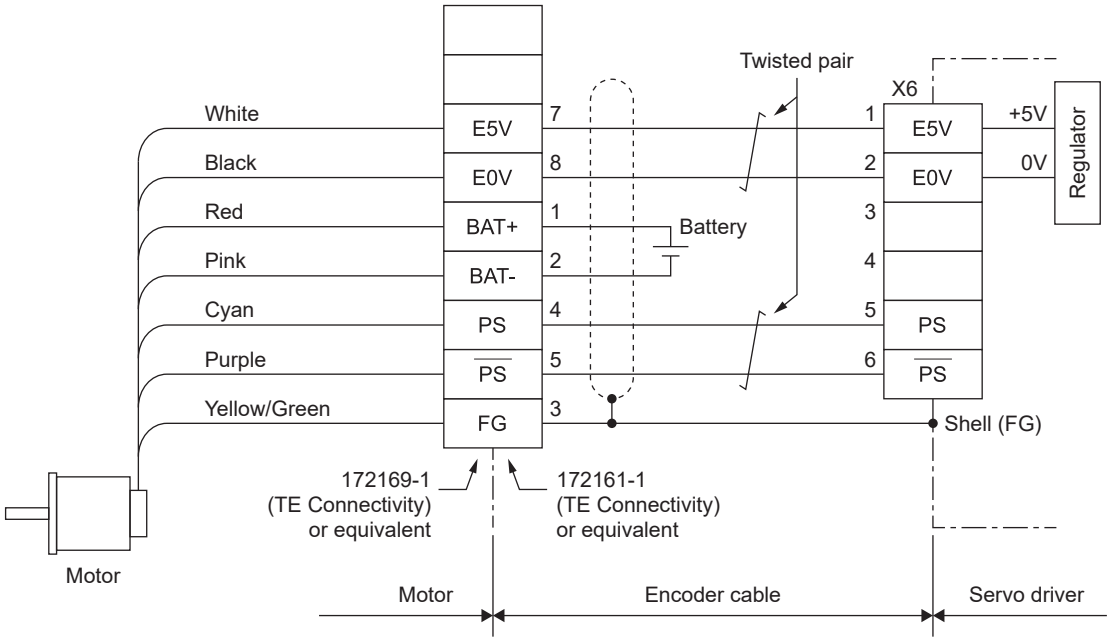
* When building an absolute system

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

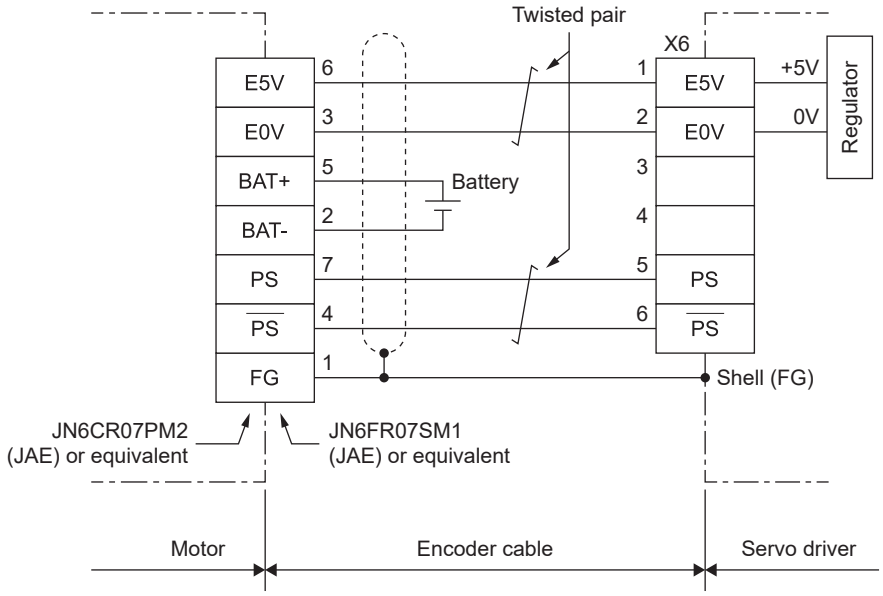


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

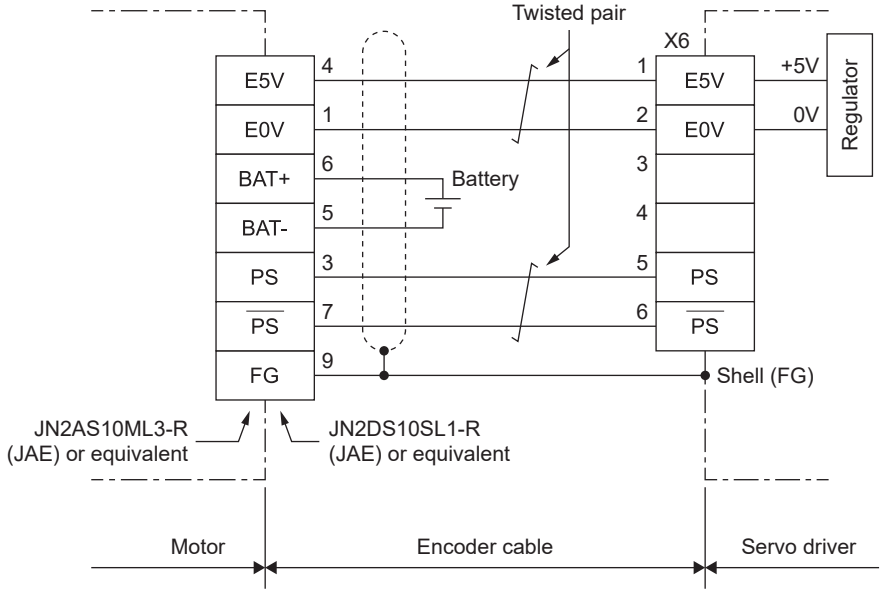


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



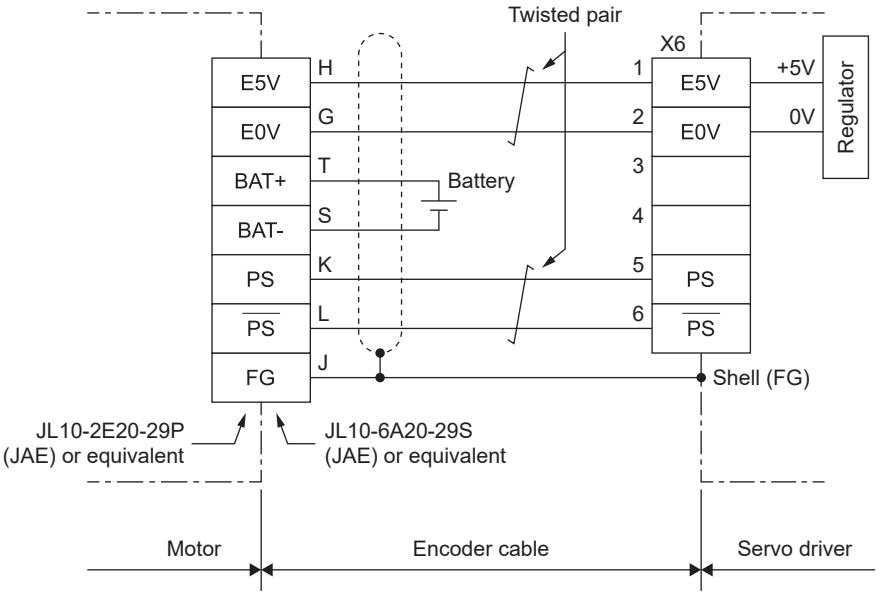
Cannon plug type

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



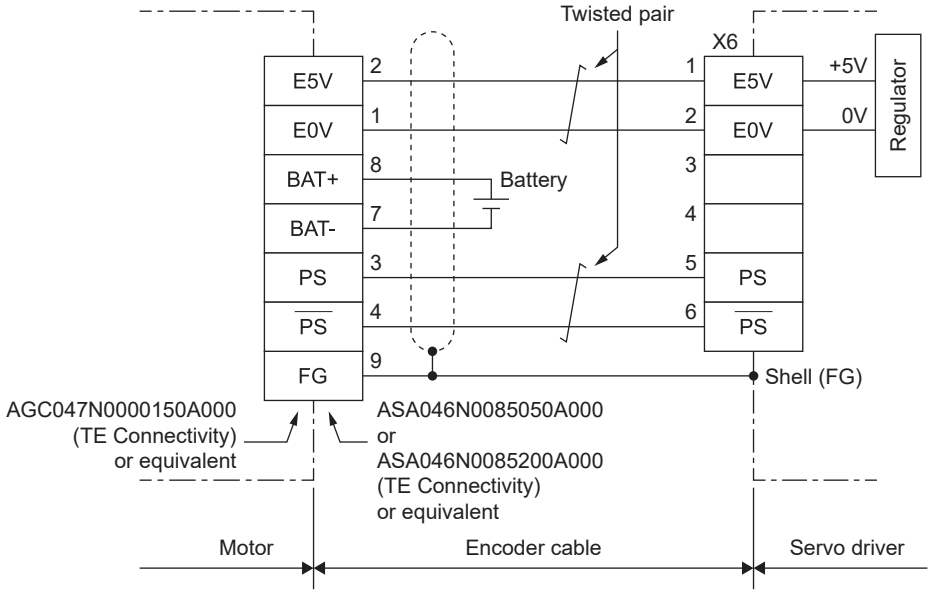
Right-angle cannon plug type

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 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.

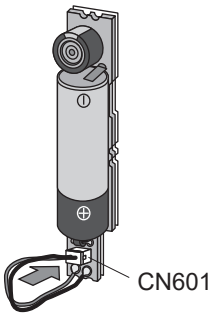
  2 Lithium batteries have a transient minimum voltage (voltage delay) that may temporarily drop when the battery begins to discharge current. For this reason, the battery must be refreshed before being used.

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.

8.4 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"* .

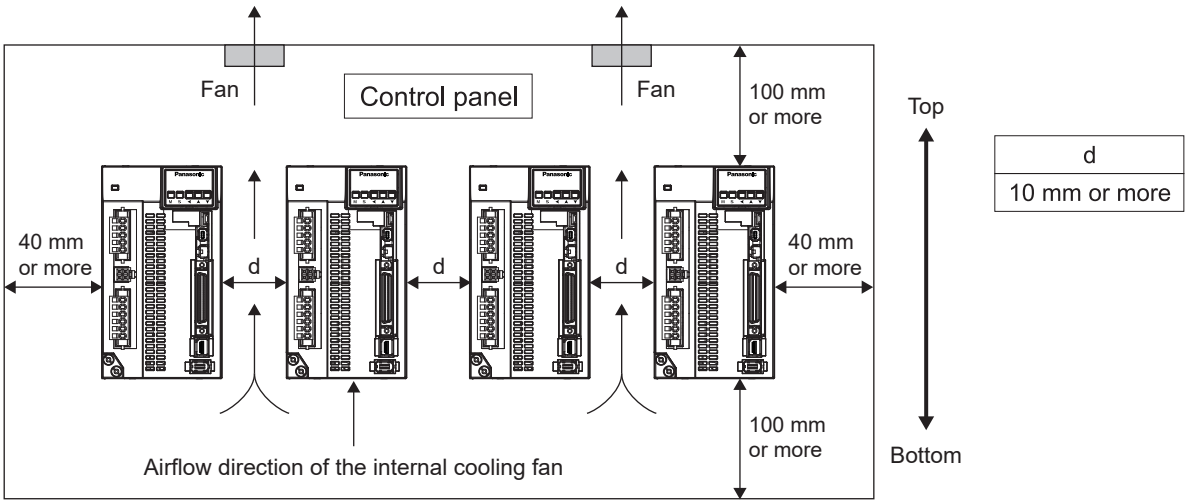
8.5 Mounting Direction and Spacing

- 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	EN 55011:2016/A11:2020 (Group 1, Class A) EN 61000-6-2 EN 61000-6-4 EN 61800-3:2004/A1:2012 (Category C3, Second environment)
	Low voltage	EN 61800-5-1
	Machinery (Functional Safety)	EN ISO 13849-1:2015 EN 61508 EN IEC 62061 EN 61800-5-2 EN 61326-3-1 IEC 60204-1
UL standards		UL 61800-5-1 (File No.E164620)
CSA standards		C22.2 No.274
KC		KN 11 KN 61000-4-2, 3, 4, 5, 6, 8, 11

IEC: International Electrotechnical Commission

EN: Europaischen Norman

EMC: Electromagnetic Compatibility

UL: Under writers Laboratories

CSA: Canadian Standards Association

KC: Radio Waves Act (South Korea)

Safety parameters

	With EDM diagnostic	Without EDM diagnostic
Safety integrity level	EN 61508 (SIL 3) EN IEC 62061 (maximum SIL 3)	EN 61508 (SIL 2) EN IEC 62061 (maximum SIL 2)
Performance level	EN ISO 13849-1 PL e (Cat.3)	EN ISO 13849-1 PL d (Cat.3)
Safety function	EN 61800-5-2 (SIL 3, STO)	EN 61800-5-2 (SIL 2, STO)
Probability of dangerous failure per unit of time	<For size A, B, C, D, E, F> PFH = 1.34 $\times 10^{-8}$ (%SIL3=13.4%) <For size G and H> PFH = 1.78 $\times 10^{-8}$ (%SIL3=17.8%)	<For size A, B, C, D, E, F> PFH = 1.40 $\times 10^{-8}$ (%SIL2=1.40%) <For size G and H> PFH = 1.85 $\times 10^{-8}$ (%SIL2=1.85%)
Mean time to dangerous failure	MTTFd: High (100 years)	MTTFd: High (100 years)
Average self-diagnostic coverage	DC: Medium	DC: Low
Mission time	15 years	15 years

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
MGDL*C4**	30	BW50RAGU	Fuji Electric	219	0.54
MHDL*E4**	60	BW100EAGU	Fuji Electric	219	0.22
MHDL*F4**	100	BW100EAGU	Fuji Electric	219	0.22

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

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

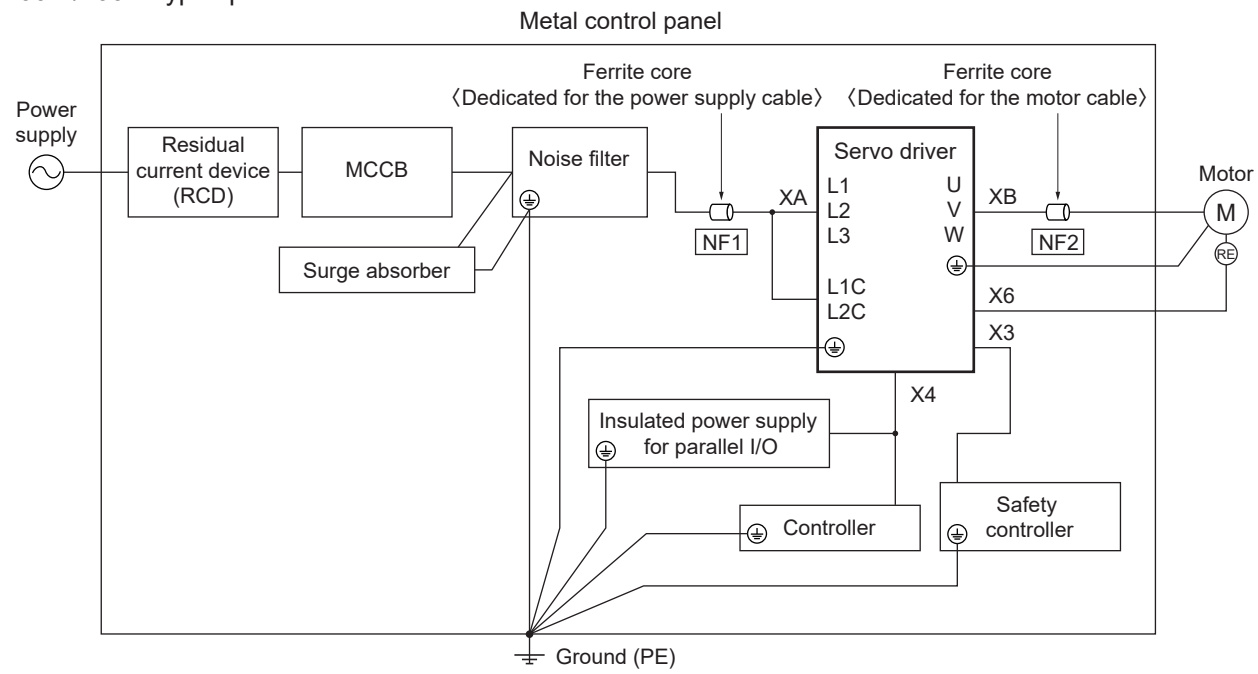
Use in an environment with a pollution degree 2 as stipulated in IEC60664-1.

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

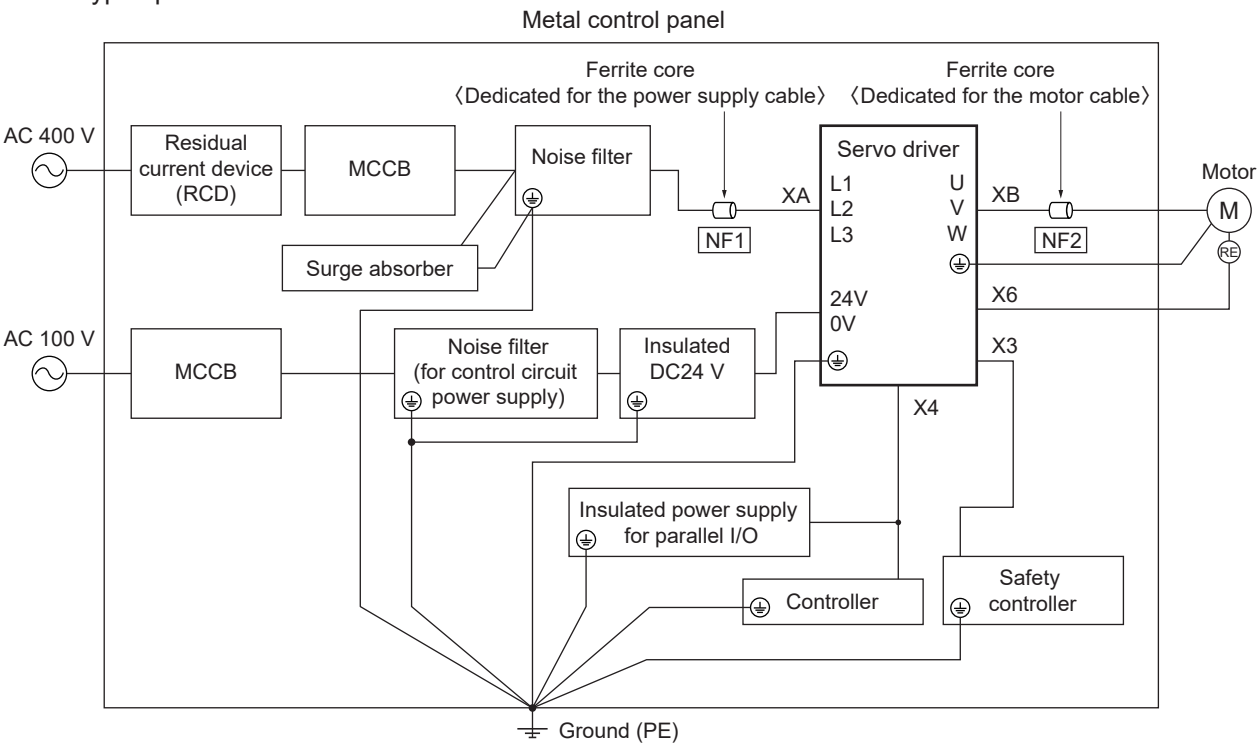
Make sure to connect a molded case circuit breaker (MCCB) or fuse that is compliant with IEC standards or that is UL-approved to the main power supply.

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 (400 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 (400V) 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 (Size A–Size C)	:	Single-phase 100–120 V	+10 % -15 %	50/60 Hz
200 V (Size A–Size D)	:	Single-phase/3-phase 200 V–240 V	+10 % -15 %	50/60 Hz
200 V (Size E–Size H)	:	3-phase 200–240 V	+10 % -15 %	50/60 Hz
400 V (Size D–Size H) 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 (Size D–Size H) 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 V 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 RSPD-250-Q4 (for Single-phase) / DV0P1450 RSPD-250-U4 (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 RSPD-250-U4		
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						
MGDL□C4□□		Approx.11 kVA			HF3040C-SZC	DV0PM20050	DV0P1460 RJ8095	DV0P1460 T400-61D
MHDL□E4□□		Approx.20 kVA	100 A	60 A	HF3080C-SZA			
MHDL□F4□□		Approx.28 kVA		100 A				

* 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.

	Option product number	Manufacturer product number	Manufacturer
Surge absorber	DV0P1450	R·A·V-781BXZ-4	Okaya Electric Industries
	—	RSPD-250-U4	
	DV0P4190	R·A·V-781BWZ-4	
	—	RSPD-250-Q4	
	—	LT-C34G801WS	Soshin Electric
Ferrite core	DV0P1460	ZCAT3035-1330	TDK Corporation
	—	RJ8095	Konno Kogyosho Co., Ltd.
	—	T400-61D	MICROMETALS
Noise filter	DV0P4170	SUP-EK5-ER-6	Okaya Electric Industries
	DV0P4220	3SUP-HU30-ER-6	
	DV0P3410	3SUP-HL50-ER-6B	
	DV0PM20042	3SUP-HU10-ER-6	
	DV0PM20043	3SUP-HU50-ER-6	
	—	HF3080C-SZA	Soshin Electric
	—	HF3100C-SZA	
	—	HF3040C-SZC	
	—	FN3258-16-44	Schaffner EMC
	—	FN3258-30-33	

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.

58 Use a stabilized power supply with reinforced insulation for the DC power supply.

59 If use continues in a warning environment, it may stop, reduce life, or failure due to the protection function of the servo drive. Please do not use until the cause of the warning is ruled out.

- 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.

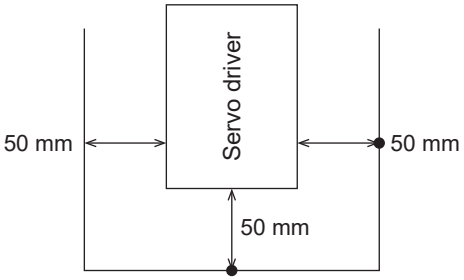
■ Servo Driver Ambient Temperature

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	MADLN01SE MADLN01SG MADLT01SF	MADLN11SE MADLN11SG MADLT11SF	MADLN05SE MADLN05SG MADLT05SF	MADLN15SE MADLN15SG MADLT15SF
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	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF 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	MBDLN21SE MBDLN21SG MBDLT21SF	MBDLN25SE MBDLN25SG MBDLT25SF	MCDLN31SE MCDLN31SG MCDLT31SF	MCDLN35SE MCDLN35SG MCDLT35SF
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	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF 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	MDDLN45SE MDDLN45SG MDDLT45SF	MDDLN55SE MDDLN55SG MDDLT55SF	MEDLN83SE MEDLN83SG MEDLT83SF	MEDLN93SE MEDLN93SG MEDLT93SF
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	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF 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	MFDLNA3SE MFDLNA3SG MFDLTA3SF	MFDLNB3SE MFDLNB3SG MFDLTB3SF
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	A6SE N/A A6SG Available A6SF Available	A6SE N/A A6SG Available A6SF 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	MGDLTC3SF	MHDLTE3SF	MHDLTF3SF
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	None	None
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	MDDLT44SF	MDDLT54SF	MDDLT64SF	MEDLT84SF
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	MFDLTA4SF	MFDLTB4SF
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).

Product number	MGDLTC4SF	MHDLTE4SF	MHDLTF4SF
Power supply input	3-phase 400 V	3-phase 400 V	3-phase 400 V
Maximum output current	83 A	120 A	160 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	None	None
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 5.5 mm^2	HVSF 14 mm^2	HVSF 22 mm^2
	AWG10	AWG6	AWG4
Ground cable	HVSF 5.5 mm^2	HVSF 14 mm^2	HVSF 22 mm^2
	AWG10	AWG6	AWG4
Motor cable	HVSF 5.5 mm^2	HVSF 14 mm^2	HVSF 22 mm^2
	AWG10	AWG6	AWG4
Inrush current (main power supply) (*1)	Max. 32 A	Max. 32 A	Max. 32 A
Inrush current (control power supply) (*1)	Max. 48 A	Max. 48 A	Max. 48 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 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

The following pages show default parameters set when the servo driver is shipped from the factory.

Operation must be confirmed for each customer machine before use and the optimal parameters set.

■Default value of the parameters (1/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
0	0	Rotational direction setup	1
	1	Control mode setup	0
	2	Real time auto gain tuning setup	1
	3	Real-time auto tuning stiffness setup	Size A-C 13 Size D-H 11
	4	Inertia ratio	250
	5	Command pulse input selection	0
	6	Command pulse rotation direction setup	0
	7	Command pulse input mode setup	1
	8	Command pulse counts per one motor revolution	10000
	9	1st command division/multiplication	0
	10	Command division/multiplication	10000
	11	Output pulse counts per one motor revolution	2500
	12	Pulse output logic inversion/output source	0
	13 *2	1st torque limit	500
	14	Position deviation excess setup	100000
	15	Absolute encoder setup	1
	16	External regenerative resistor setup	Size A,B,G,H 3 Size C-F 0
	17	External regenerative resistor selection	0
	18	For manufacturer use	0
	19	No use	-
	20	No use	-
	21	For manufacturer use	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (2/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
1	0 *1	1st position loop gain	Size A-C 48.0 Size D-H 32.0
	1 *1	1st velocity loop gain	Size A-C 27.0 Size D-H 18.0
	2 *1	1st velocity loop integral time constant	Size A-C 21.0 Size D-H 31.0
	3	1st Velocity detection filter	0
	4 *1	1st Torque filter	Size A-C 0.84 Size D-H 1.26
	5 *1	2nd position loop gain	Size A-C 48.0 Size D-H 32.0
	6 *1	2nd velocity loop gain	Size A-C 27.0 Size D-H 18.0
	7 *1	2nd velocity loop integral time constant	Size A-C 21.0 Size D-H 31.0
	8	2nd velocity detection filter	0
	9 *1	2nd 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	0.00
	12 *1	Torque feed forward gain	100.0
	13 *1	Torque feed forward filter	0.00
	14	2nd gain setup	1
	15	Position control switching mode	0
	16 *1	Position control switching delay time	1.0
	17	Position control switching level	0
	18	Position control switching hysteresis	0
	19 *1	Position gain switching time	1.0
	20	Velocity control switching mode	0
	21 *1	Velocity control switching delay time	0.0
	22	Velocity control switching level	0
	23	Velocity control switching hysteresis	0
	24	Torque control switching mode *3	0
	25 *1	Torque control switching delay time *3	0
	26	Torque control switching level*3	0
	27	Torque control switching hysteresis *3	0
	28 *1	For manufacturer use	100.0
	29 *1	For manufacturer use	100.0
	30 *1	For manufacturer use	0
1	31 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	32 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	33 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	34 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	35	For manufacturer use	250
	36 *1	For manufacturer use	100.0
	37 *1	For manufacturer use	100.0
	38 *1	For manufacturer use	0
	39 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	40 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	41 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	42 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	43	For manufacturer use	250
	44 *1	For manufacturer use	100.0
	45 *1	For manufacturer use	100.0
	46 *1	For manufacturer use	0
	47 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	48 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	49 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	50 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	51	For manufacturer use	250
	52 *1	For manufacturer use	100.0
	53 *1	For manufacturer use	100.0
	54 *1	For manufacturer use	0
	55 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	56 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	57 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	58 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	59	For manufacturer use	250
	60 *1	For manufacturer use	100.0
	61 *1	For manufacturer use	100.0
1	62 *1	For manufacturer use	0
	63 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	64 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	65 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	66 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	67	For manufacturer use	250
	68 *1	For manufacturer use	100.0
	69 *1	For manufacturer use	100.0
	70 *1	For manufacturer use	0
	71 *1	For manufacturer use	Size A-C 48.0 Size D-H 32.0
	72 *1	For manufacturer use	Size A-C 27.0 Size D-H 18.0
	73 *1	For manufacturer use	Size A-C 21.0 Size D-H 31.0
	74 *1	For manufacturer use	Size A-C 0.84 Size D-H 1.26
	75	For manufacturer use	250
	76 *1	For manufacturer use	100.0
	77 *1	For manufacturer use	100.0
	78 *1	For manufacturer use	0

Category	Pr.	Parameter	Default value

Category	Pr.	Parameter	Default value

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (3/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
2	0	Adaptation filter mode	[SE][SG] 1 [SF] 0
	1	1st notch frequency	5000
	2	1st notch width	2
	3	1st notch depth	0
	4	2nd notch frequency	5000
	5	2nd notch width	2
	6	2nd notch depth	0
	7	3rd notch frequency	5000
	8	3rd notch width	2
	9	3rd notch depth	0
	10	4th notch frequency	5000
	11	4th notch width	2
	12	4th notch depth	0
	13	Damping filter switching selection	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	2
	26	5th notch depth	0
	27	1st vibration control width setup	0
	28	2nd vibration control width setup	0
	29	3rd vibration control width setup	0
	30	4th vibration control width setup	0
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

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (4/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
3	0	Inside/outside speed setup switching	[SE][SG] 1 [SF] 0
	1	Speed command direction designation selection	0
	2	Speed command input gain *3	500
	3	Speed command input inversion *3	1
	4	Speed setup,1st speed	0
	5	Speed setup,2nd speed	0
	6	Speed setup,3rd speed	0
	7	Speed setup,4th speed	0
	8	Speed setup,5th speed	0
	9	Speed setup,6th speed	0
	10	Speed setup,7th speed	0
	11	Speed setup,8th speed	0
	12	Acceleration time setup	0
	13	Deceleration time setup	0
	14	S-shape acceleration/deceleration setup	0
	15	Speed zero clamp function selection	0
	16	Zero clamp level speed setup	30
	17	Torque command selection *3	0
	18	Torque command direction designation selection *3	0
	19 *1	Torque command input gain *3	3.0
	20	Torque command input inversion *3	0
	21	Speed limit value 1 *3	0
	22	Speed limit value 2 *3	0
	23	External scale selection *3	0
	24	External scale division numerator *3	0
	25	External scale division denominator *3	10000
	26	External scale direction inversion *3	0
	27	Invalidate external scale Z-phase wire disconnection detection *3	0
	28	Hybrid deviation excess setup *3	16000
	29	Hybrid deviation clear setup *3	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (5/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
4	0	SI1 Input selection	8553090
	1	SI2 Input selection	8487297
	2	SI3 Input selection	9539850
	3	SI4 Input selection	394758
	4	SI5 Input selection	4108
	5	SI6 Input selection	197379
	6	SI7 Input selection	3847
	7	SI8 Input selection	263172
	8	SI9 Input selection	328965
	9	SI10 Input selection	3720
	10	SO1 Output selection	197379
	11	SO2 Output selection	131586
	12	SO3 Output selection	65793
	13	SO4 Output selection	328964
	14	SO5 Output selection	460551
	15	SO6 Output selection	394758
	16	Analog monitor 1 type	0
	17	Analog monitor 1 output gain	0
	18	Analog monitor 2 types	4
	19	Analog monitor 2 output gain	0
	20	For manufacturer use	0
	21	Analog monitor output setup	0
	22	Analog input 1 (AI1) offset setup *3	0
	23 *1	Analog input 1 (AI1) filter	0.00
	24 *1	Analog input 1 (AI1) excessive setup *3	0.0
	25	Analog input 2 (AI2) offset setup *3	0
	26 *1	Analog input 2 (AI2) filter setup *3	0.00
	27 *1	Analog input 2 (AI2) excessive setup *3	0.0
	28	Analog input 3 (AI3) offset setup *3	0
	29 *1	Analog input 3 (AI3) filter setup *3	0.00
	30 *1	Analog input 3 (AI3) excessive setup *3	0.0
4	31	Positioning completion range	10
	32	Positioning completion output setup	0
	33	INP hold time	0
	34	Zero speed	50
	35	Speed coincidence width	50
	36	Attainment speed	1000
	37	Mechanical braking setup during no operation	0
	38	Mechanical braking setup during operation	0
	39	Brake release speed setup	30
	40	Warning output selection 1	0
	41	Warning output selection 2	0
	42	Positioning completion range 2	10
	43	For manufacturer use	-
	44 *1	Position compare output pulse width setup	0.0
	45	Position compare output polarity select	0
	46	For manufacturer use	-
	47	Pulse output select	0
	48	Position compare value 1	0
	49	Position compare value 2	0
	50	Position compare value 3	0
	51	Position compare value 4	0
	52	Position compare value 5	0
	53	Position compare value 6	0
	54	Position compare value 7	0
	55	Position compare value 8	0
	56 *1	Position compare output delay compensation amount	0.0
	57	Position compare output assignment setup	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (6/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
5	0	2nd command division/multiplication numerator	0
	1	3rd command division/multiplication numerator	0
	2	4th command division/multiplication numerator	0
	3	Pulse output division denominator	0
	4	Drive prohibition input setup	1
	5	Sequence at drive prohibition	0
	6	Sequence at servo-off	0
	7	Main power supply AC Off sequence	0
	8	LV trip selection with the main power AC OFF	1
	9	Main power supply AC Off detection time	70
	10	Sequence at alarm	0
	11	Immediate stop torque setup	0
	12	Overload level setup	0
	13	Overspeed level setup	0
	14 *1	Allowable motor operating range setup	1.0
	15	Control input signal read setup	0
	16	Alarm clear input (A-CLR) setup	0
	17	Counter clear input (CL) setup	3
	18	Command pulse prohibition input (INH) disable setup	1
	19	Command pulse prohibition input (INH) read setup	0
	20	Position setup unit selection	0
	21	Torque limit selection	1
	22 *2	2nd torque limit	500
	23	Torque limit switch setup 1	0
	24	Torque limit switch setup 2	0
	25 *2	Positive direction torque limit for external input	500
	26 *2	Backward direction torque limit for external input	500
	27 *1	Analog torque limit input gain *3	3.0
	28	LED initial state	1
	29	RS232 communication baud rate setup *4	2
	30	RS485 communication baud rate setup *4	2
5	31	Axis number	1
	32	Command pulse input maximum setup/digital filter setup	4000
	33	Pulse regeneration output limit enable	0
	34	For manufacturer use	4
	35	Front panel lock	0
	36	For manufacturer use	0
	37	Modbus connection setup *4	0
	38	Modbus communication setup *4	0
	39	Modbus response waiting time *4	0
	40	Modbus communication timeout time *4	0
	41	For manufacturer use	0
	42	Modbus broadcast setup *4	0
	43	No use	-
	44	No use	-
	45 *1	Quadrant projection positive direction compensation value	0.0
	46 *1	Quadrant projection negative direction compensation value	0.0
	47	Quadrant projection compensation delay time	0
	48 *1	Quadrant projection compensation filter setup L	0.00
	49 *1	Quadrant projection compensation filter setup H	0.0
	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 setup	0
	57	Slow stop S-shape acceleration and deceleration setup	0
	58	Modbus mirror register setup 1 *4	24591 [SE] 0
	59	Modbus mirror register setup 2 *4	24592 [SE] 0
	60	Modbus mirror register setup 3 *4	16421 [SE] 0
	61	Modbus mirror register setup 4 *4	24613 [SE] 0
5	62	Modbus mirror register setup 5 *4	17429 [SE] 0
	63	Modbus mirror register setup 6 *4	17418 [SE] 0
	64	Modbus mirror register setup 7 *4	17427 [SE] 0
	65	Modbus mirror register setup 8 *4	17419 [SE] 0
	66 *1	Deterioration diagnosis convergence judgment time	0.0
	67	Deterioration diagnosis inertia ratio upper limit	0
	68	Deterioration diagnosis inertia ratio lower limit	0
	69 *1	Deterioration diagnosis unbalanced load upper limit	0.0
	70 *1	Deterioration diagnosis unbalanced load lower limit	0.0
	71 *1	Deterioration diagnosis dynamic friction upper limit	0.0
	72 *1	Deterioration diagnosis dynamic friction lower limit	0.0
	73 *1	Deterioration diagnosis viscous friction upper limit	0.0
	74 *1	Deterioration diagnosis viscous friction lower limit	0.0
	75	Deterioration diagnosis velocity setup	0
	76	Deterioration diagnosis torque average time	0
	77 *1	Deterioration diagnosis torque upper limit	0.0
	78 *1	Deterioration diagnosis torque lower limit	0.0
	79	Modbus mirror register setup 9 *4	17410 [SE] 0
	80	Modbus mirror register setup 10 *4	17411 [SE] 0
	81	Modbus mirror register setup 11 *4	16398 [SE] 0
	82	Modbus mirror register setup 12 *4	16402 [SE] 0
	83	Modbus mirror register setup 13 *4	16411 [SE] 0
	84	Modbus mirror register setup 14 *4	16405 [SE] 0
	85	Modbus mirror register setup 15 *4	16406 [SE] 0
	86	Modbus mirror register setup 16 *4	0
	87	For manufacturer use	0
	88	No use	-
	89	No use	-
	90	No use	-
	91	No use	-
	92	No use	-
5	93	No use	-
	94	Position compare output condition setup	0
	95	No use	-
	96	For manufacturer use	0
	97	For manufacturer use	0
	98	No use	-
	99	No use	-
	100	No use	-
	101	No use	-
	102	For manufacturer use	0
	103	For manufacturer use	0
	104	No use	-
	105	For manufacturer use	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (7/12)

No.SX-DSV03025 Appendix1

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
6	0 *1	Analog torque feed forward gain setup *3	0.0
	1	No use	-
	2	Speed deviation excess setup	0
	3	For manufacturer use	0
	4	JOG trial run command speed	300
	5 *1	Position control 3rd gain effective time	0.0
	6	Position control 3rd gain scale factor	100
	7	Additional value to torque command	0
	8	Torque compensation value in positive direction	0
	9	Torque compensation value in negative direction	0
	10	Function expansion setup	16
	11	Current response setup	100
	12	No use	-
	13	2nd inertia ratio	250
	14	Immediate stop time at the time of alarming	200
	15	2nd overspeed level setup	0
	16	For manufacturer use	0
	17	Front panel parameter writing selection	0
	18 *1	Power turn-on wait time	0.0
	19	Encoder Z-phase setup	0
	20	External scale Z-phase expansion setup *3	0
	21	Serial absolute external scale Z phase setup *3	0
	22	AB-phase output external scale AB phase regeneration method selection *3	0
	23	Load fluctuation correction gain	0
	24 *1	Load fluctuation correction filter	0.53
	25	For manufacturer use	Size A-G 0 Size H 500
	26	For manufacturer use	2
	27	Warning latch time	5
	28	Special function selection	0
	29	No use	-
	30	For manufacturer use	0
6	31	Real time auto-gain tuning estimation speed	1
	32	Real time auto-gain tuning custom setup	0
	33	For manufacturer use	1000
	34 *1	Hybrid vibration suppression gain *3	0.0
	35 *1	Hybrid vibration suppression filter *3	0.10
	36	Dynamic brake operation input	0
	37 *1	Oscillation detection threshold value	0.0
	38	Warning mask setup	4
	39	Warning mask setup 2	0
	40	No use	-
	41	1st damping depth	0
	42 *1	Two-stage torque filter time constant	0.00
	43	Two-stage torque filter damping term	0
	44	No use	-
	45	No use	-
	46	No use	-
	47	Function expansion setups 2	1
	48 *1	Adjustment filter	*5
	49	Command response filter/adjustment filter damping term setup	15
	50 *1	Viscous friction compensation gain	0.0
	51	Immediate stop 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 error protection detection time	0
	58	Serial absolute external scale Z phase shift amount *3	0
	59	For manufacturer use	0
	60	2nd damping depth	0
	61 *1	1st resonance frequency	0.0
6	62	1st resonance damping ratio	0
	63 *1	1st anti-resonance frequency	0.0
	64	1st anti-resonance damping ratio	0
	65 *1	1st response frequency	0.0
	66 *1	2nd resonance frequency	0.0
	67	2nd resonance damping ratio	0
	68 *1	2nd anti-resonance frequency	0.0
	69	2nd anti-resonance damping ratio	0
	70 *1	2nd response frequency	0.0
	71	3rd damping depth	0
	72	4th damping depth	0
	73 *1	Load estimation filter	0.0
	74 *1	Torque compensating frequency 1	0.0
	75 *1	Torque compensating frequency 2	0.0
	76	Load estimation count	0
	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	For manufacturer use	0
	88	Absolute multi-rotation data upper limit	0
	89	No use	-
	90	No use	-
	91	No use	-
	92	No use	-
6	93	No use	-
	94	No use	-
	95	No use	-
	96	No use	-
	97	Function expansion setup 3	0
	98	Function expansion setup 4	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.

* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE]. *5 Size A 1.1 , Size B-C 1.2 , Size D-G 1.7 , Size H E3/E4 1.6 , Size H F3/F4 1.7 , Size V 5B/5C 1.2 , Size V others 1.1

■Default value of the parameters (8/12)

No.SX-DSV03025 Appendix1

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
7	0	For manufacturer use	0
	1	For manufacturer use	0
	2	No use	-
	3	For manufacturer use	0
	4	Backlash correction selection	0
	5	Amount of backlash correction	0
	6 *1	Backlash correction time constant	0.00
	7	For manufacturer use	0
	8	For manufacturer use	0
	9	For manufacturer use	0
	10	For manufacturer use	0
	11	For manufacturer use	0
	12	For manufacturer use	0
	13	For manufacturer use	0
	14	Main power turn-off warning detection time	0
	15	For manufacturer use	0
	16	For manufacturer use	0
	17	No use	-
	18	Backlash compensation value holding range	0
	19	No use	-
	20	For manufacturer use	0
	21	For manufacturer use	1
	22	Special function enhancement setup 1	0
	23	For manufacturer use	0
	24	For manufacturer use	0
	25	For manufacturer use	0
	26	For manufacturer use	0
	27	For manufacturer use	0
	28	For manufacturer use	0
	29	For manufacturer use	0
	30	For manufacturer use	0

Category	Pr.	Parameter	Default value
7	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	No use	-
	41	For manufacturer use	0
	42	No use	-
	43	No use	-
	44	No use	-
	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	-

Category	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	No use	-
	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	For manufacturer use	0
	88	No use	-
	89	No use	-
	90	RS232/RS485/ Modbus communication continuous receive error detection count	0
	91	For manufacturer use	0
	92	For manufacturer use	0

Category	Pr.	Parameter	Default value
7	93	For manufacturer use	0
	94	No use	-
	95	No use	-
	96	No use	-
	97	No use	-
	98	No use	-
	99	No use	-
	100	No use	-
	101	No use	-
	102	No use	-
	103	No use	-
	104	No use	-
	105	No use	-
	106	No use	-
	107	No use	-
	108	No use	-
	109	No use	-
	110	No use	-
	111	No use	-
	112	No use	-
	113	No use	-
	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

Category	Pr.	Parameter	Default value

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (9/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
8	0	For manufacturer use	0
	1	For manufacturer use	100
	2	For manufacturer use	0
	3	For manufacturer use	0
	4	For manufacturer use	100
	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	No use	-
	18	No use	-
	19	For manufacturer use	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (10/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
9	0	For manufacturer use	1
	1	For manufacturer use	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	1
	12	For manufacturer use	80
	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 *1	For manufacturer use	1.00
	29	For manufacturer use	0
	30	For manufacturer use	0
9	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	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 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (11/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
15	0	For manufacturer use	0
	1	No use	-
	2	No use	-
	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	6
15	31	For manufacturer use	5
	32	No use	-
	33	For manufacturer use	0
	34	For manufacturer use	0
	35	For manufacturer use	0

* 1 Parameter with decimal point setup. Describe the decimal point value displayed on Panaterm. When checking the parameter file directly with text etc., the digits are shifted by the digits after the decimal point.
Example) Pr 6.24 Load fluctuation correction filter Panaterm display: 0.53 Parameter file setup value: 53 Shift two decimal place digits * 2 The maximum value of torque limit setup (Pr0.13, Pr 5.22, Pr 5.25, Pr 5.26) varies depending on the applicable motor.
* 3 Can not be used with [A6SE], [A6SG]. * 4 Can not be used with [A6SE].

■Default value of the parameters (12/12)

PARAMETER	MODEL	MINAS A6SE/SG/SF for Rotary motor

Category	Pr.	Parameter	Default value
56	0	Parameters for the block operation	
	～		
	127		
57	0		
	～		
	127		
58	0		
	～		
	127		
59	0		
	～		
	127		
60	0		
	～	For manufacturer use	
61	0		
	～		
62	0		
	～		