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Classification: ☐ New ☒ Change

SPECIFICATIONS

Product Name: AC Servo Driver

Product Series Name: MINAS A6B Series for Rotary motor

Product Model Number: Basic Type/Multifunction Type

Motion Control Business Unit, Industrial Device Business Division
Panasonic Industry Co., Ltd.
7-1-1 Morofuku, Daito City, Osaka, 574-0044, Japan

If you have any questions, please contact the sales office or distributor of the product.

Panasonic

REVISIONS

| Date | Rev. | Page | Description | Signed |
|---------------|------|----------|--|--------|
| Feb. 15, 2017 | 0.0 | — | NEWLY ISSUED | — |
| Apr. 28, 2017 | 1.0 | Appendix | Added list of default parameters | — |
| | | P3 | Added Product code, Conformance tested targets | |
| | | — | Corrected typographical errors | |
| Feb. 7, 2018 | 2.0 | — | Added multifunction type | — |
| | | P1 | Added related materials | |
| | | P9 | Added serial number list and name plate example | |
| | | P66 | Added 12-3 Warranty Service | |
| | | — | Corrected typographical errors | |
| Mar. 20, 2019 | 3.0 | — | Added sizes G and H | — |
| | | — | Updated other contents according to the latest Japanese version | |
| Apr. 8, 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 | — |
| Jul. 5, 2021 | 7.0 | — | Changed name of business unit | — |
| | | — | Changed cover format | |
| | | P41 | Added requirement specifications for EtherCAT cables | |
| | | P89 | Added precautions regarding network security | |
| | | — | Corrected typographical errors | |
| Nov. 1, 2021 | 8.0 | — | Changed company name | — |
| | | P75, 76 | Updated the description of global standards | |
| | | P89 | Updated a note about network security | |
| | | P90 | Added a note about reverse engineering | |
| Apr. 1, 2022 | 9.0 | — | Changed to our updated format and revised to standardize expressions | — |
| | | — | Changed company name | |
| May 17, 2022 | 10.0 | Appendix | Updated default parameters and objects values | — |

| Date | Rev. | Page | Description | Signed |
|---------------|------|------------|---|--------|
| Oct. 31, 2022 | 11.0 | — | Changed Compliance with the international standards Corrected typographical errors | — |
| Apr. 27, 2023 | 12.0 | Appendix | Updated default parameters and objects values | — |
| Feb. 1, 2024 | 13.0 | P7 to P15 | Changed product number of X7 analog monitor connector | — |
| | | P46 | Changed the connector and terminal product number of the X7 connector cable | |
| | | P76 to P78 | Added Compliance with EN61800-5-1:2007/A11:2021 | |
| | | P84 | Added text to “Load protection and overheating protection” column | |
| | | P98 | Corrected typo regarding maximum output current (MGDLTC3BF) | |
| | | Appendix | Updated default parameters | |

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1 Scope of Application

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

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

■ Related Materials

Technical Reference Document - Basic Function Specifications - : SX-DSV03241

Technical Reference Document - EtherCAT Communication Specification - : SX-DSV03242

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

■ EtherCAT Overview

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

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

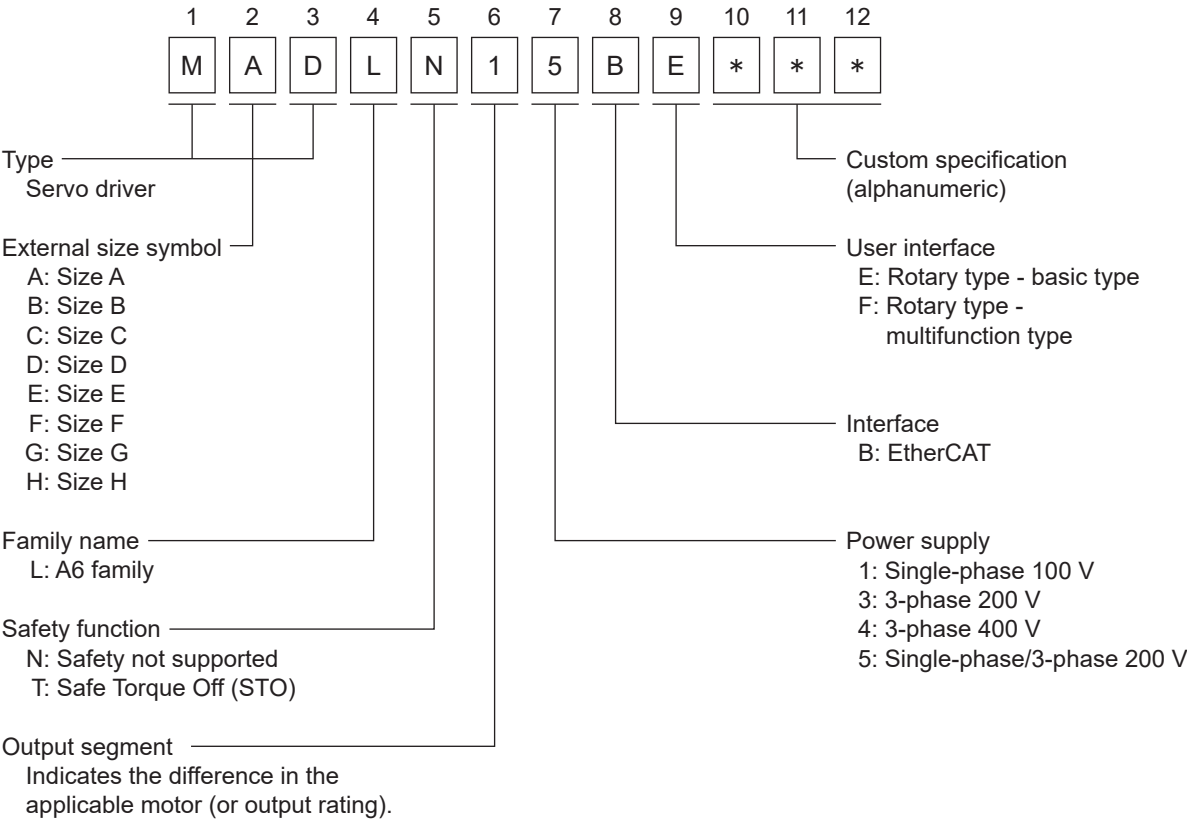


■ Precautions

- 1 Reproduction of the contents of this document in whole or in part is strictly prohibited.
- 2 Due to product improvements, this document is subject to change without notice.
- 3 This product may be upgraded, including revisions to specifications from the ETG.
Please note that we are not responsible for labor and costs associated with the version upgrade.
- 4 This product makes use of open-source software (OSS).
Please refer to the technical documentation for details.
Your company may also have an obligation to use OSS, so please take appropriate measures at your company.

2 How to Read Product Numbers

Product numbers are to be read as follows:



3 Product Line-up

3.1 Basic Type

| Product number | Product Code (*1) | EtherCAT Conformance Tested (*2) | Size symbol | Power supply input | Rated output of applicable motor |
|----------------|-------------------|----------------------------------|-------------|-------------------------------------|----------------------------------|
| MADLN01BE | 60380000 | ○ | A | Single-phase AC100-120 V | Max 50 W |
| MADLN11BE | 60380001 | ○ | | | Max 100 W |
| MADLN05BE | 60380004 | ○ | | Single-phase or 3-phase AC200-240 V | Max 100 W |
| MADLN15BE | 60380005 | ○ | | | Max 200 W |
| MBDLN21BE | 60380002 | ○ | B | Single-phase AC100-120 V | Max 200 W |
| MBDLN25BE | 60380006 | ○ | | Single-phase or 3-phase AC200-240 V | Max 400 W |
| MCDLN31BE | 60380003 | ○ | C | Single-phase AC100-120 V | Max 400 W |
| MCDLN35BE | 60380007 | ○ | | Single-phase or 3-phase AC200-240 V | Max 750 W |
| MDDL45BE | 60380008 | ○ | D | Single-phase or 3-phase AC200-240 V | Max 1000 W |
| MDDL55BE | 60380009 | ○ | | | Max 1500 W |
| MEDLN83BE | 6038000A | ○ | E | 3-phase AC200-240 V | Max 2000 W |
| MEDLN93BE | 6038000B | ○ | | | Max 2400 W |
| MFDLNA3BE | 6038000C | ○ | F | 3-phase AC200-240 V | Max 3000 W |
| MFDLNB3BE | 6038000D | ○ | | | Max 5000 W |

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

*2 Indicates that the product has passed the EtherCAT Conformance Test at the EtherCAT Test Center.

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

The standard type is not compatible with size G and size H 400 V models.

3.2 Multifunction Type

| Product number | Product Code (*1) | EtherCAT Conformance Tested (*2) | Size symbol | Power supply input | Rated output of applicable motor |
|----------------|-------------------|----------------------------------|-------------|-------------------------------------|----------------------------------|
| MADLT01BF | 613C0000 | ○ | A | Single-phase AC100-120 V | Max 50 W |
| MADLT11BF | 613C0001 | ○ | | | Max 100 W |
| MADLT05BF | 613C0004 | ○ | | Single-phase or 3-phase AC200-240 V | Max 100 W |
| MADLT15BF | 613C0005 | ○ | | | Max 200 W |
| MBDLT21BF | 613C0002 | ○ | B | Single-phase AC100-120 V | Max 200 W |
| MBDLT25BF | 613C0006 | ○ | | Single-phase or 3-phase AC200-240 V | Max 400 W |
| MCDLT31BF | 613C0003 | ○ | C | Single-phase AC100-120 V | Max 400 W |
| MCDLT35BF | 613C0007 | ○ | | Single-phase or 3-phase AC200-240 V | Max 750 W |
| MDDLT45BF | 613C0008 | ○ | D | Single-phase or 3-phase AC200-240 V | Max 1000 W |
| MDDLT55BF | 613C0009 | ○ | | | Max 1500 W |
| MEDLT83BF | 613C000A | ○ | E | 3-phase AC200-240 V | Max 2000 W |
| MEDLT93BF | 613C000B | ○ | | | Max 2400 W |
| MFDLTA3BF | 613C000C | ○ | F | 3-phase AC200-240 V | Max 3000 W |
| MFDLTB3BF | 613C000D | ○ | | | Max 5000 W |
| MGDLTC3BF | 613C000E | ○ | G | 3-phase AC200-240 V | Max 7500 W |
| MHDLTE3BF | 613C000F | ○ | H | 3-phase AC200-240 V | Max 15000 W |
| MHDLTF3BF | 613C0010 | ○ | | | Max 22000 W |
| MDDLT44BF | 613C0011 | ○ | D | 3-phase 380Y/220-480Y/277 V (*3) | Max 600 W |
| MDDLT54BF | 613C0012 | ○ | | | Max 1000 W |
| MDDLT64BF | 613C0013 | ○ | | | Max 1500 W |
| MEDLT84BF | 613C0014 | ○ | E | 3-phase 380Y/220-480Y/277 V (*3) | Max 2000 W |
| MFDLTA4BF | 613C0016 | ○ | F | 3-phase 380Y/220-480Y/277 V (*3) | Max 3000 W |
| MFDLTB4BF | 613C0017 | ○ | | | Max 5000 W |

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

*2 Indicates that the product has passed the EtherCAT Conformance Test at the EtherCAT Test Center.

*3 TN (ground the neutral point to earth)

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

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

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

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

4 Specifications

| Item | | | | Description |
|--|------------|------------------------------|-----------|---|
| Input power supply | 100 V type | Main circuit power supply | | Single-phase 100–120 V, -15% to +10%, 50/60 Hz |
| | | Control circuit power supply | | Single-phase 100–120 V, -15% to +10%, 50/60 Hz |
| | 200 V type | Main circuit power supply | Sizes A–D | Single-phase/3-phase 200–240 V, -15% to +10%, 50/60 Hz |
| | | | Sizes E–H | 3-phase 200–240 V, -15% to +10%, 50/60 Hz |
| | | Control circuit power supply | Sizes A–D | Single-phase 200–240 V, -15% to +10%, 50/60 Hz |
| | | | Sizes E–H | Single-phase 200–240 V, -15% to +10%, 50/60 Hz |
| | 400 V type | Main circuit power supply | | 3-phase 380Y/220-480Y/277 V, -15% to +10%, 50/60 Hz TN (ground the neutral point to earth) |
| | | Control circuit power supply | | DC 24 V, ±15 % |
| Ambient operating conditions | | Temperature | | Operating temperature: 0–55°C (no freezing) Storage temperature: -20°C to 65°C (Max. temperature guarantee: 80°C, 72 hours, no condensation ^(*)) |
| | | Humidity | | Operating/storage humidity: 20–85% RH or less (no condensation ^(*)) |
| | | 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 | | 8 general inputs Select general input function based on parameters |
| | | Output | | 3 general outputs Select general output function based on parameters |
| Analog signal | | Output | | 2 outputs (analog monitor 1, analog monitor 2) |
| Pulse signal | | Output | | Output Line driver output for encoder pulses (A/B phase signals) |
| Communication function | | EtherCAT | | Real-time operation command transmission, parameter setting, status monitoring, etc. |
| | | USB | | Connect to a computer for parameter setting or status monitoring, etc. |
| Safety terminal ^(*)2) | | | | Connector for functional safety |
| Front panel | | | | (1) Rotary switch (2) 2-digit, 7-segment LED and 4 lights for status display (3) Analog monitor connector |
| Regeneration | | | | Sizes A, B, G, H: No built-in regenerative resistor (external only) Sizes C–F: Built-in regenerative resistor (external also possible) |
| Dynamic brake | | | | Sizes A–G: Built-in / Size H: External only |

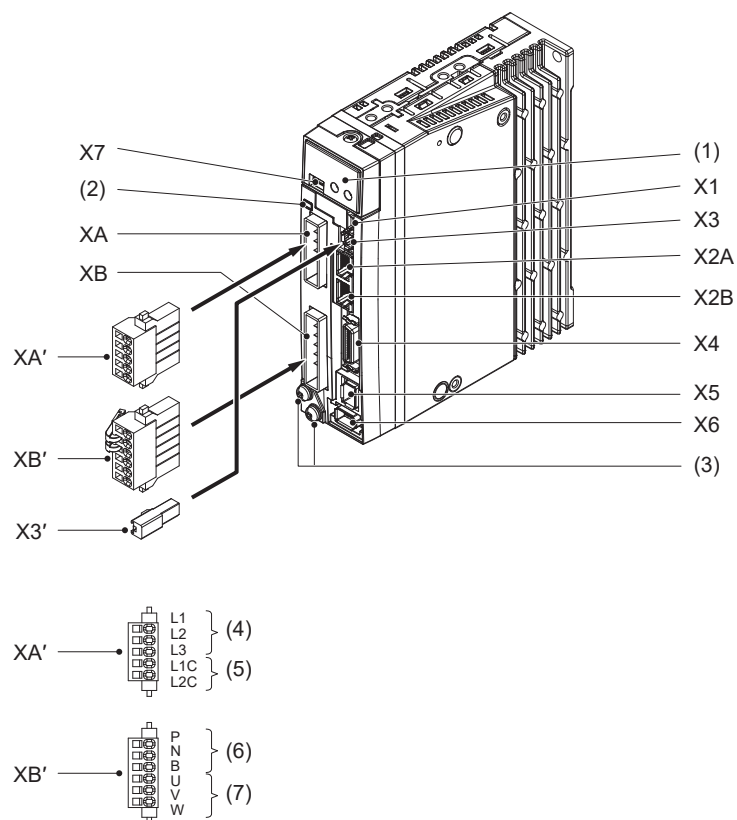
| Item | Description |
|--------------|---|
| Control mode | Position control: profile position control (pp), cyclic position control (csp), home return position control (hm) Velocity control: profile velocity control (pv), cyclic velocity control (csv) Torque control: profile torque control (tq), cyclic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

- *1 Please note that condensation tends occur when the temperature drops.
- *2 Cannot be used with the basic type.
- *3 Please refer to the collaboration catalog for the corresponding scale manufacturer and part number.

5 Appearance and Part Names

For each size, the figure is of a multifunction type. The basic type does not have X3 (safety function connectors/safety bypass plug) or X5 (external scale connector).

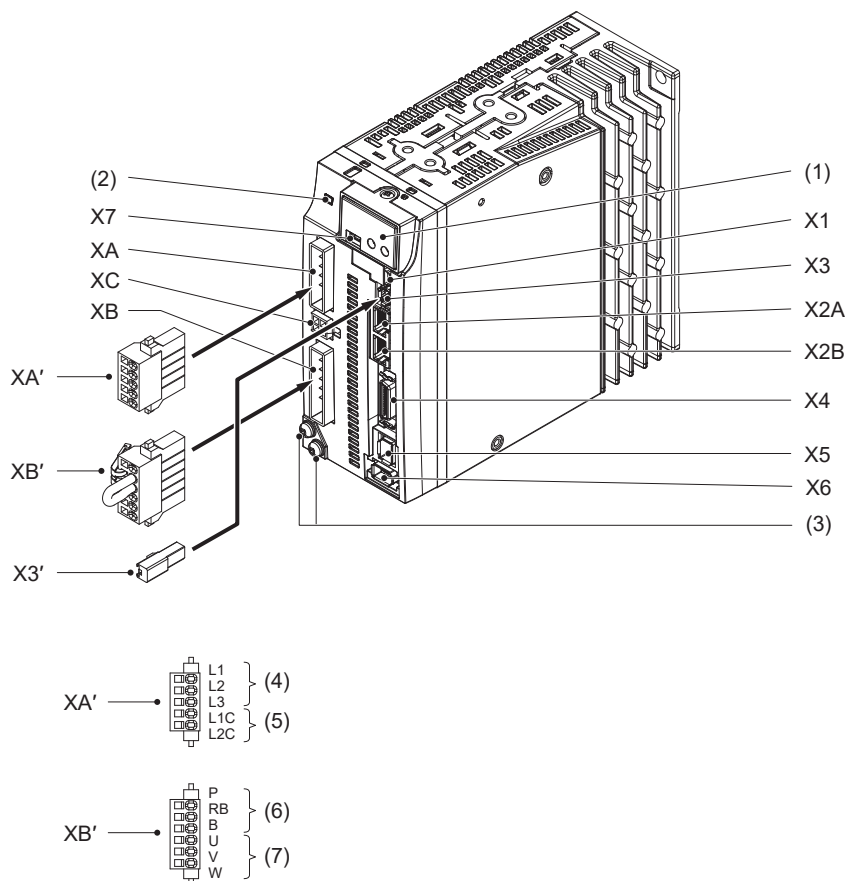
5.1 Size A, B 100 V/200 V



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

* Remove the safety bypass plug when wiring to X3.

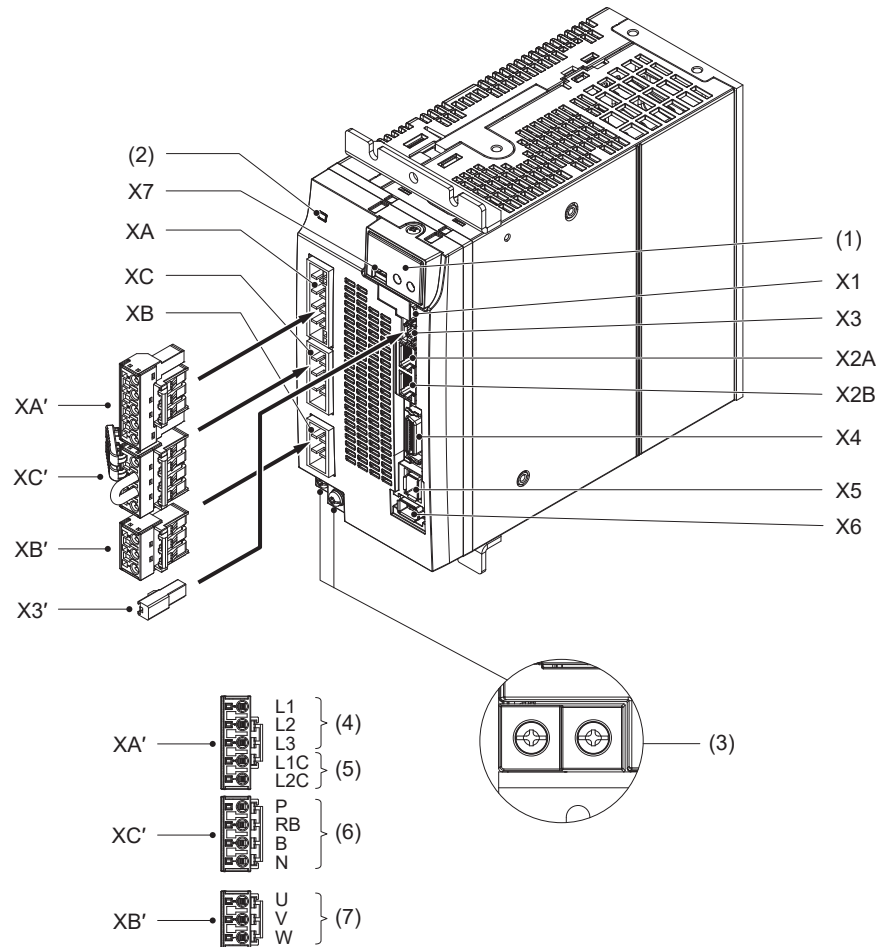
5.2 Size C, D 100 V/200 V



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

* Remove the safety bypass plug when wiring to X3.

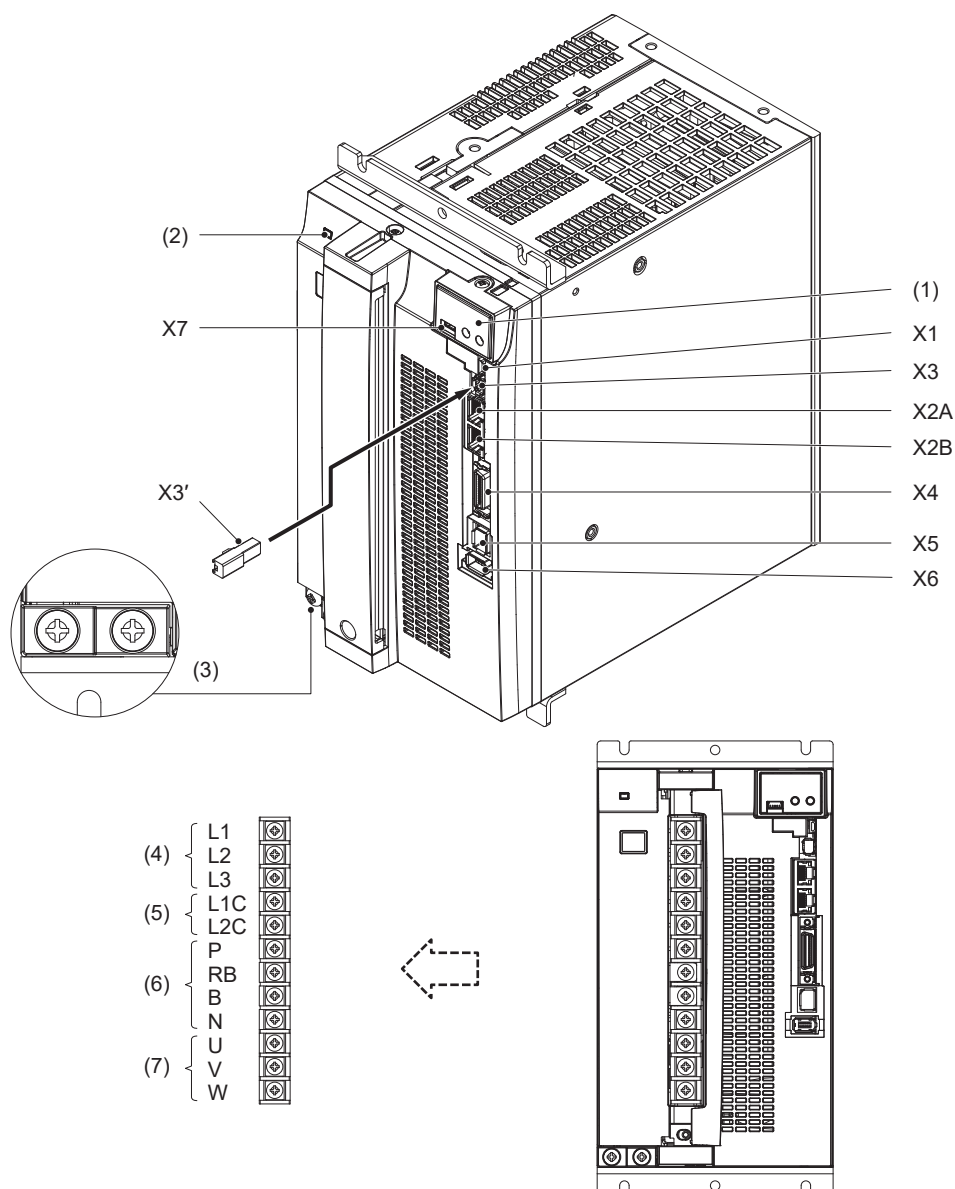
5.3 Size E 200 V



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

* Remove the safety bypass plug when wiring to X3.

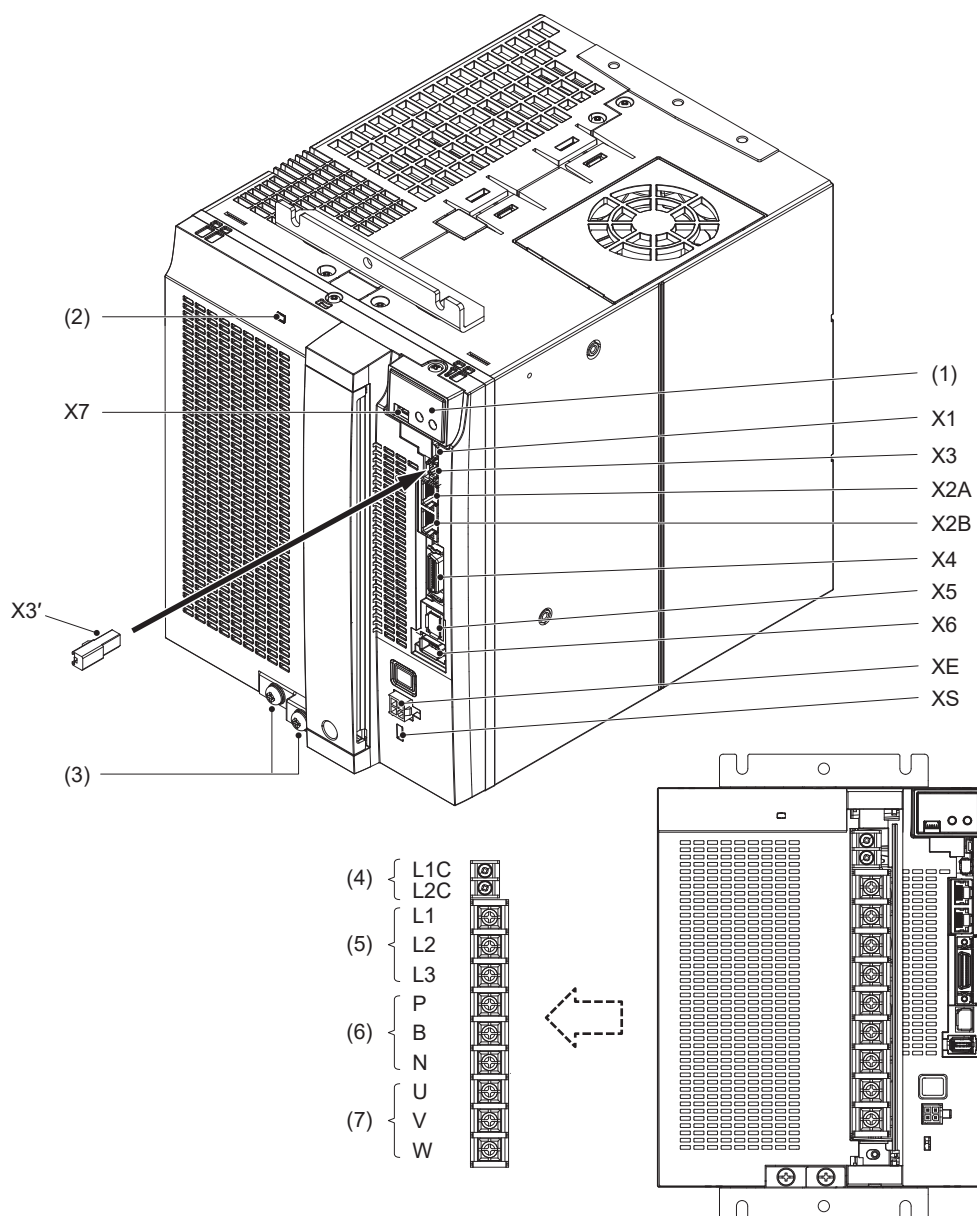
5.4 Size F 200 V



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

* Remove the safety bypass plug when wiring to X3.

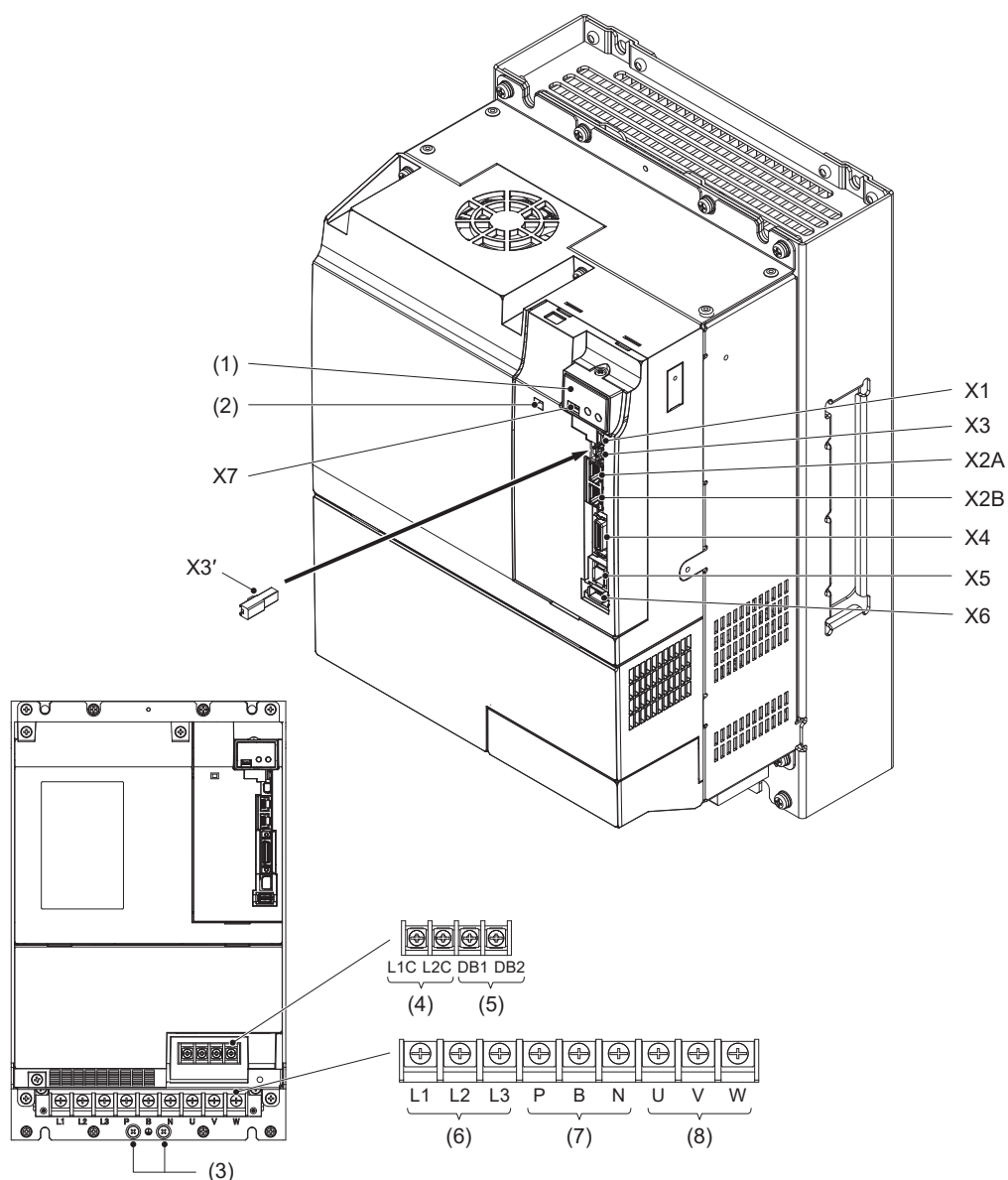
5.5 Size G 200 V



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

* Remove the safety bypass plug when wiring to X3.

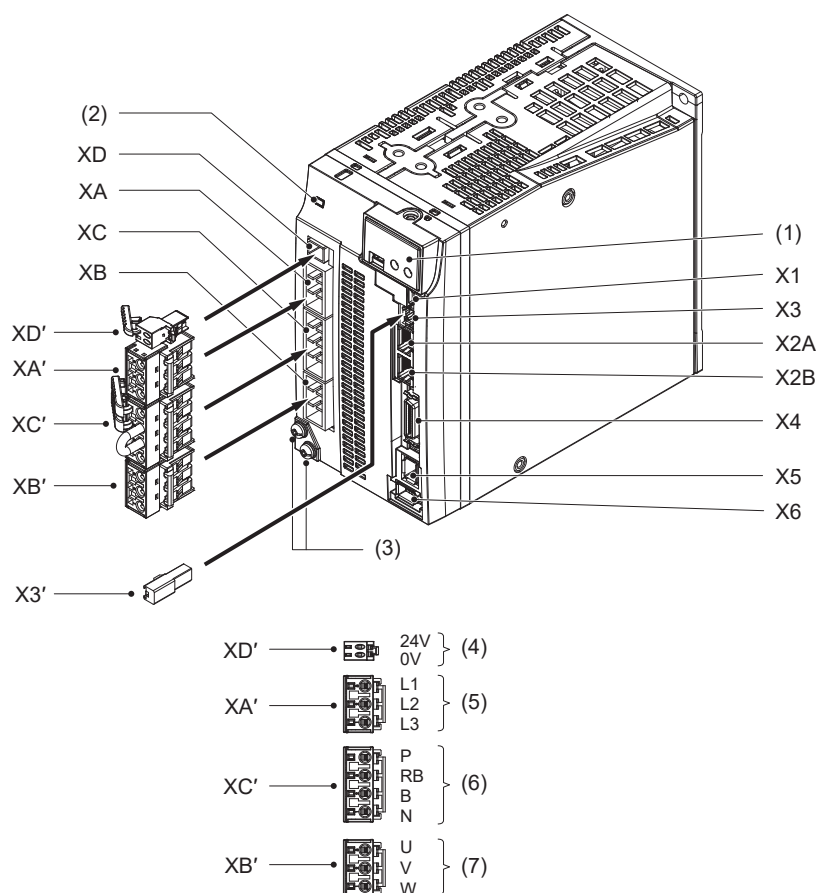
5.6 Size H 200 V



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

* Remove the safety bypass plug when wiring to X3.

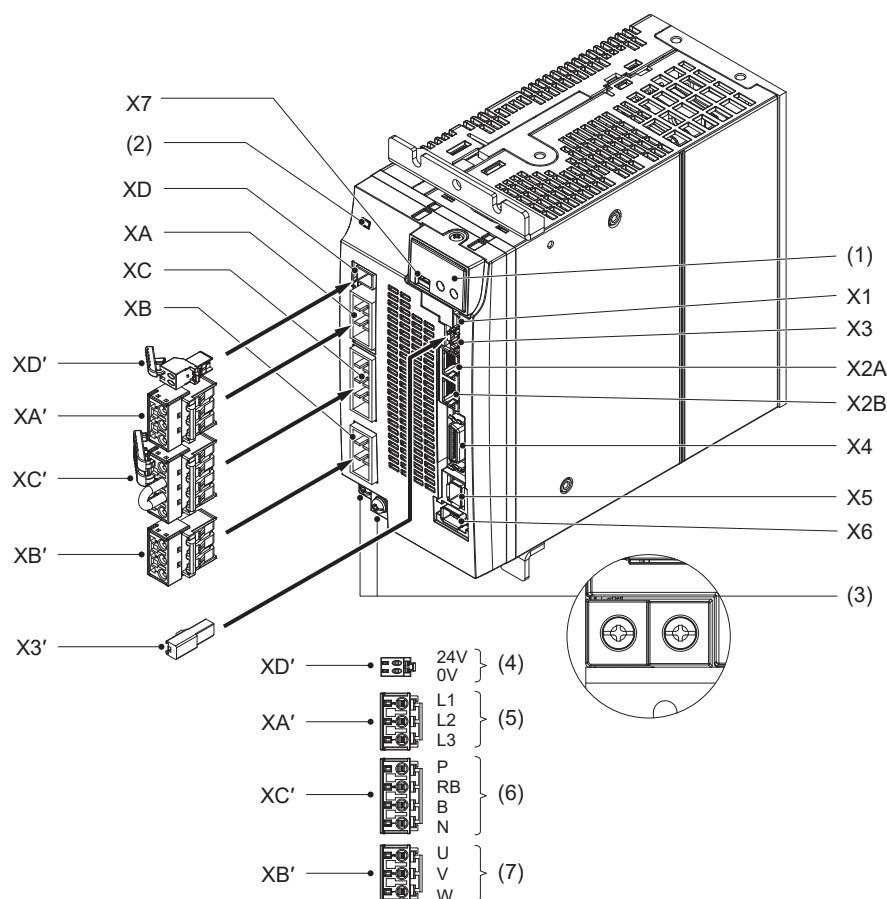
5.7 Size D 400 V



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

* Remove the safety bypass plug when wiring to X3.

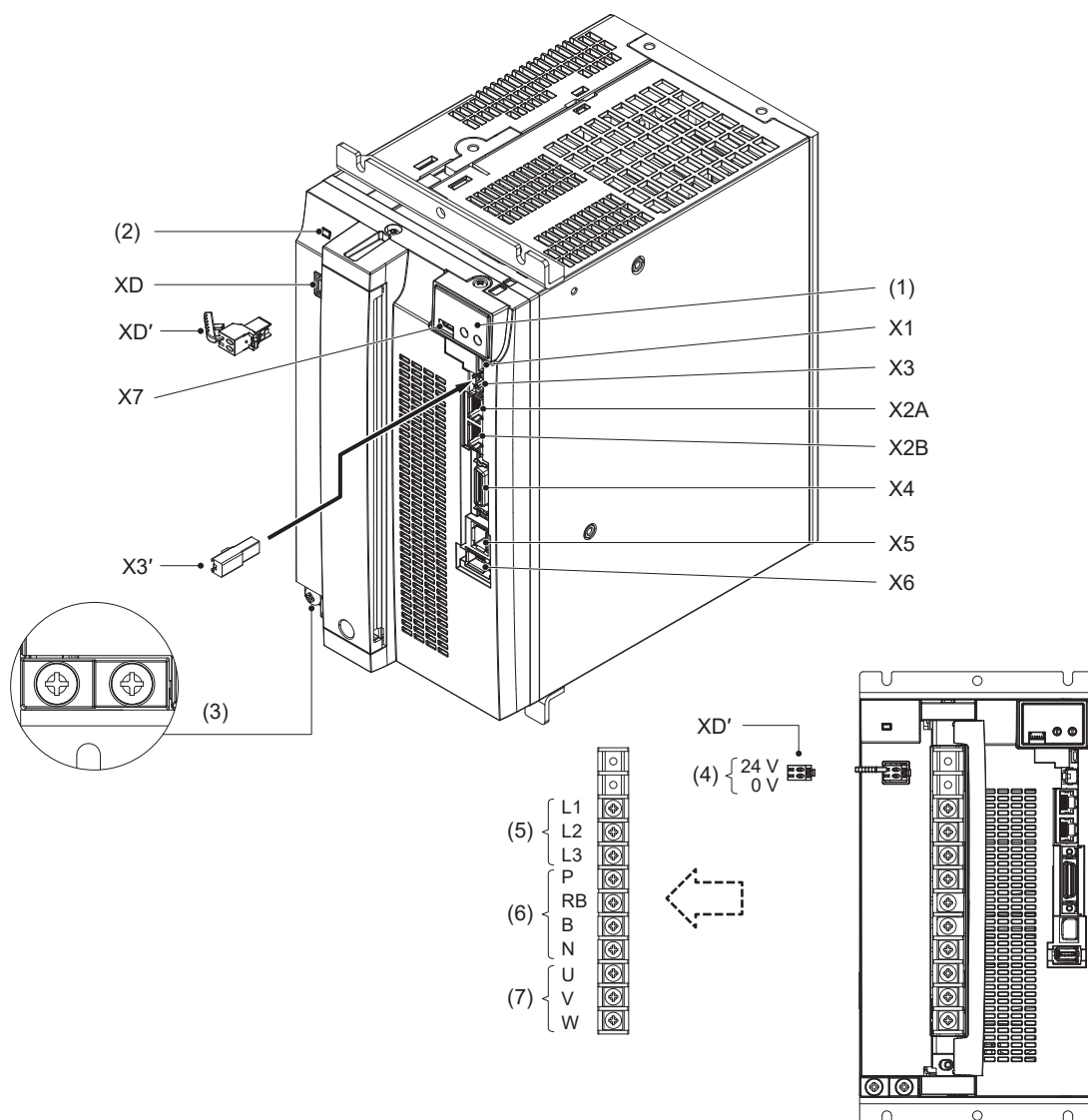
5.8 Size E 400 V



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

* Remove the safety bypass plug when wiring to X3.

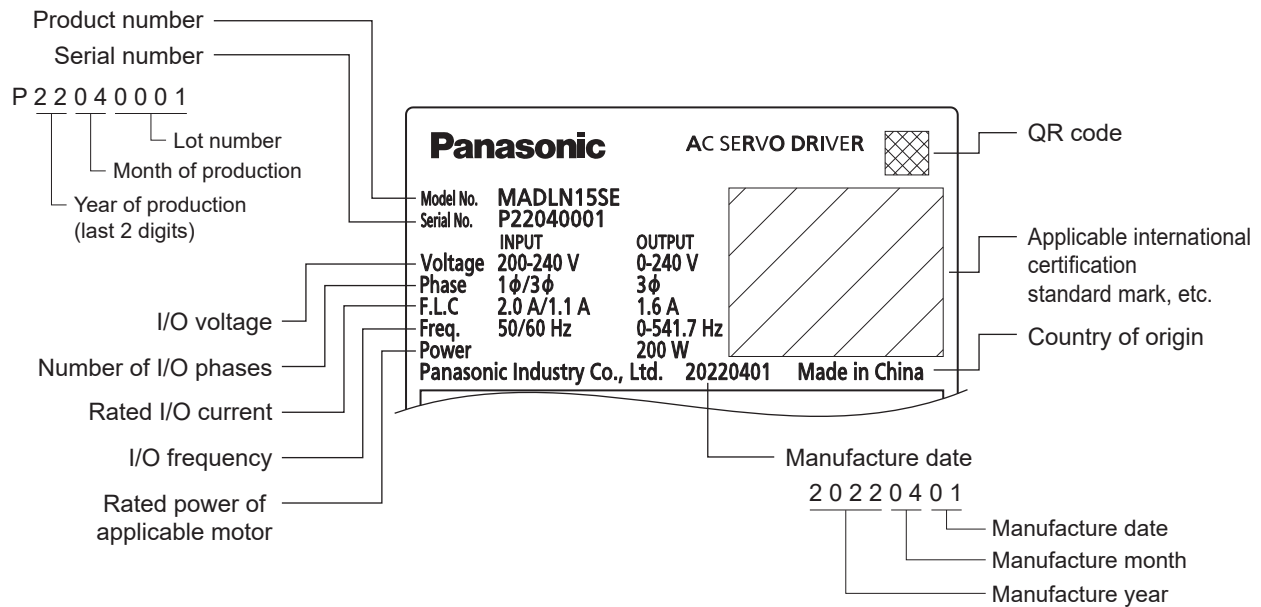
5.9 Size F 400 V



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

* Remove the safety bypass plug when wiring to X3.

5.10 Example nameplate

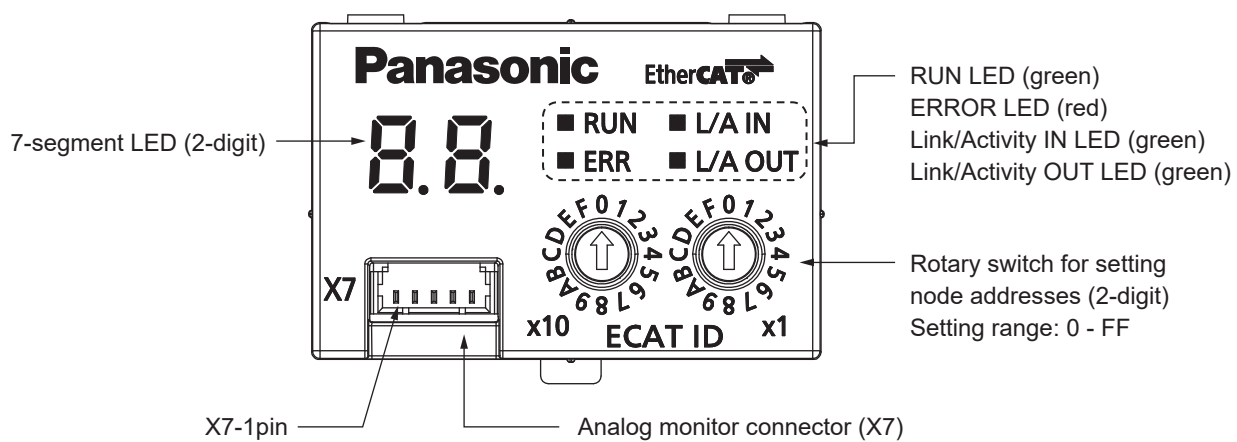


Although serial numbers range from 1 to 33999, they are shown on the name plate in 4-digit format shown as shown below.

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

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

5.11 Front panel



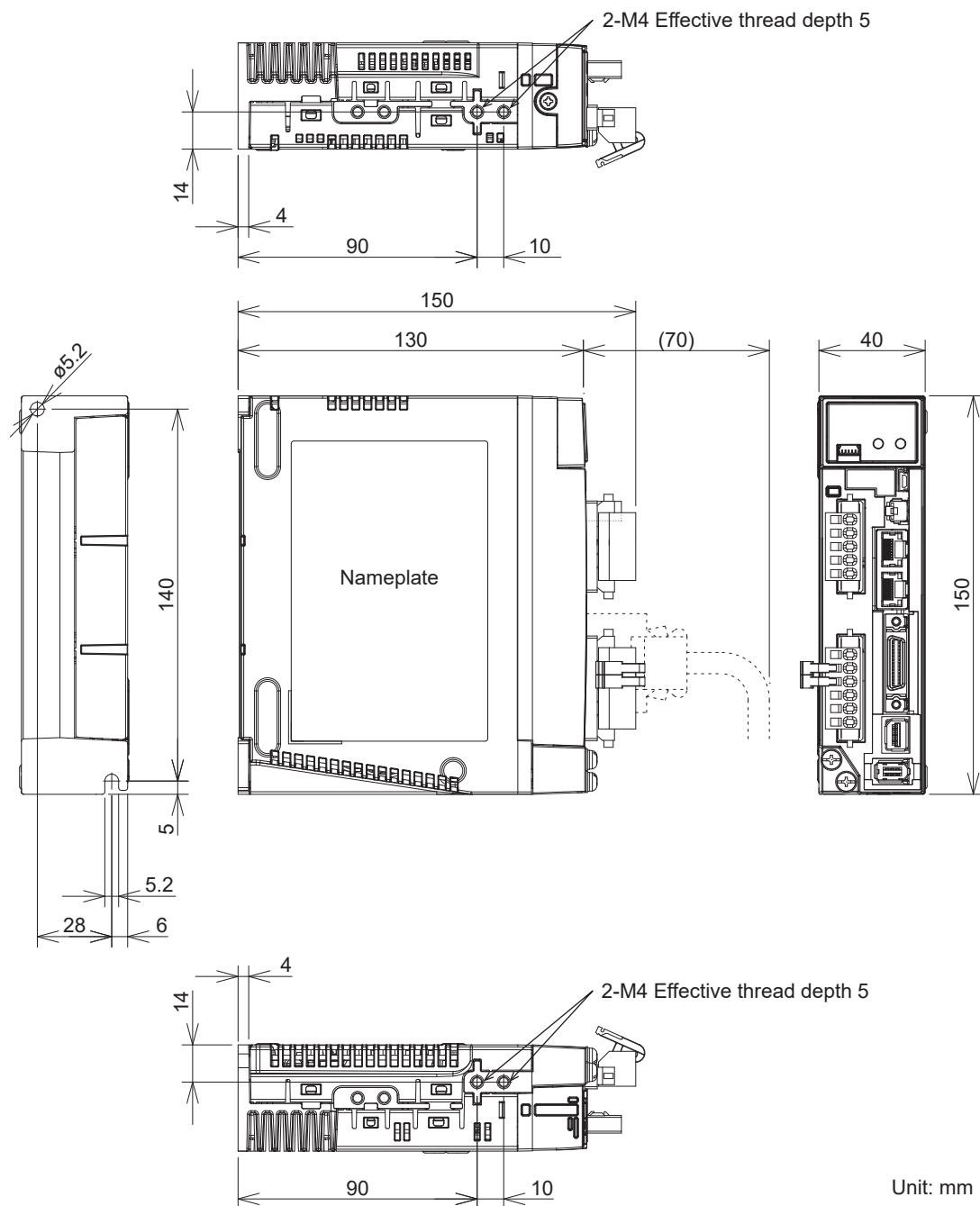
6 Dimensions

Each size has the same external dimensions for the basic and multifunction types (figures show the multifunction type).

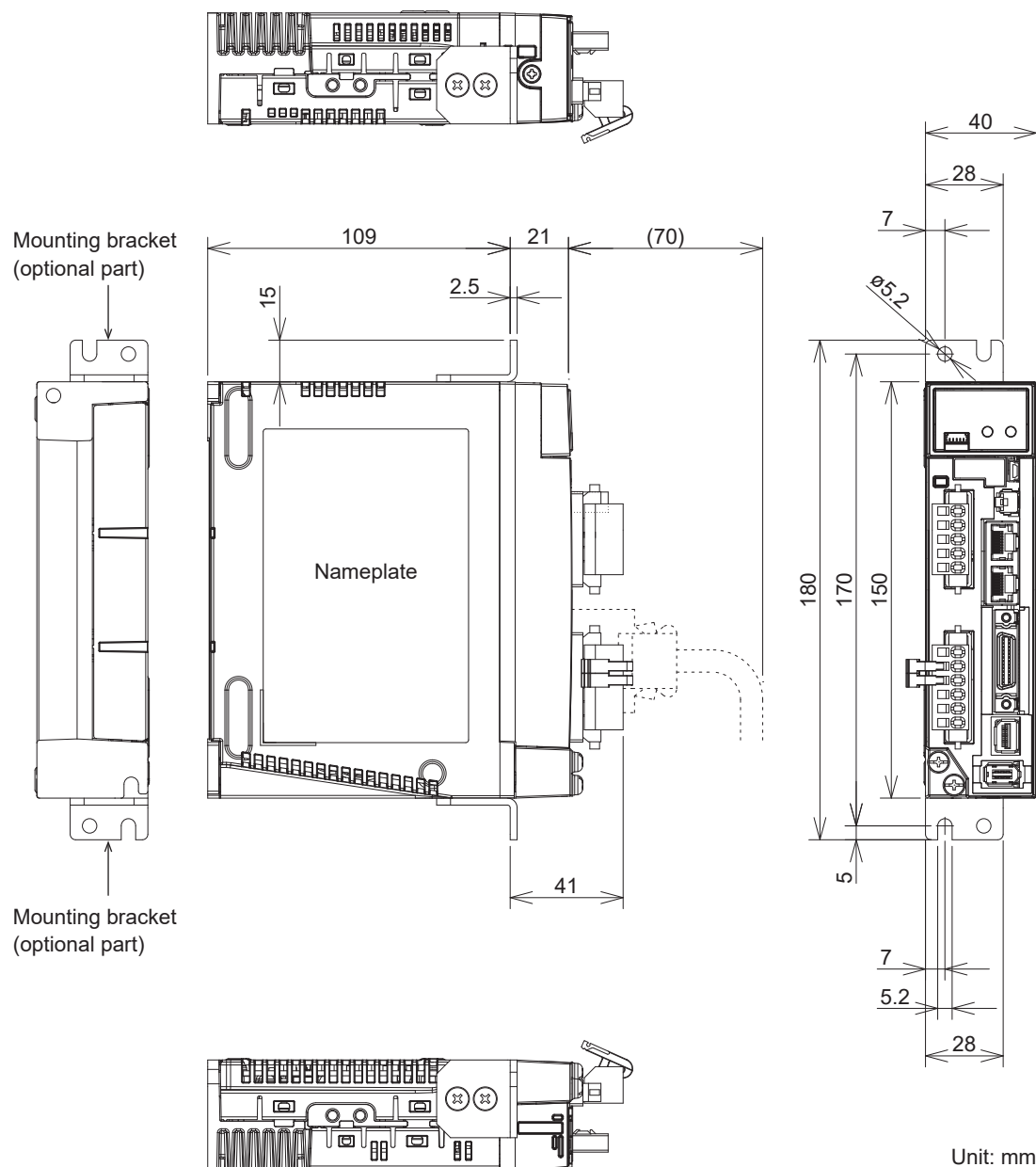
Some dimensions for the 400 V model are different (see note).

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.

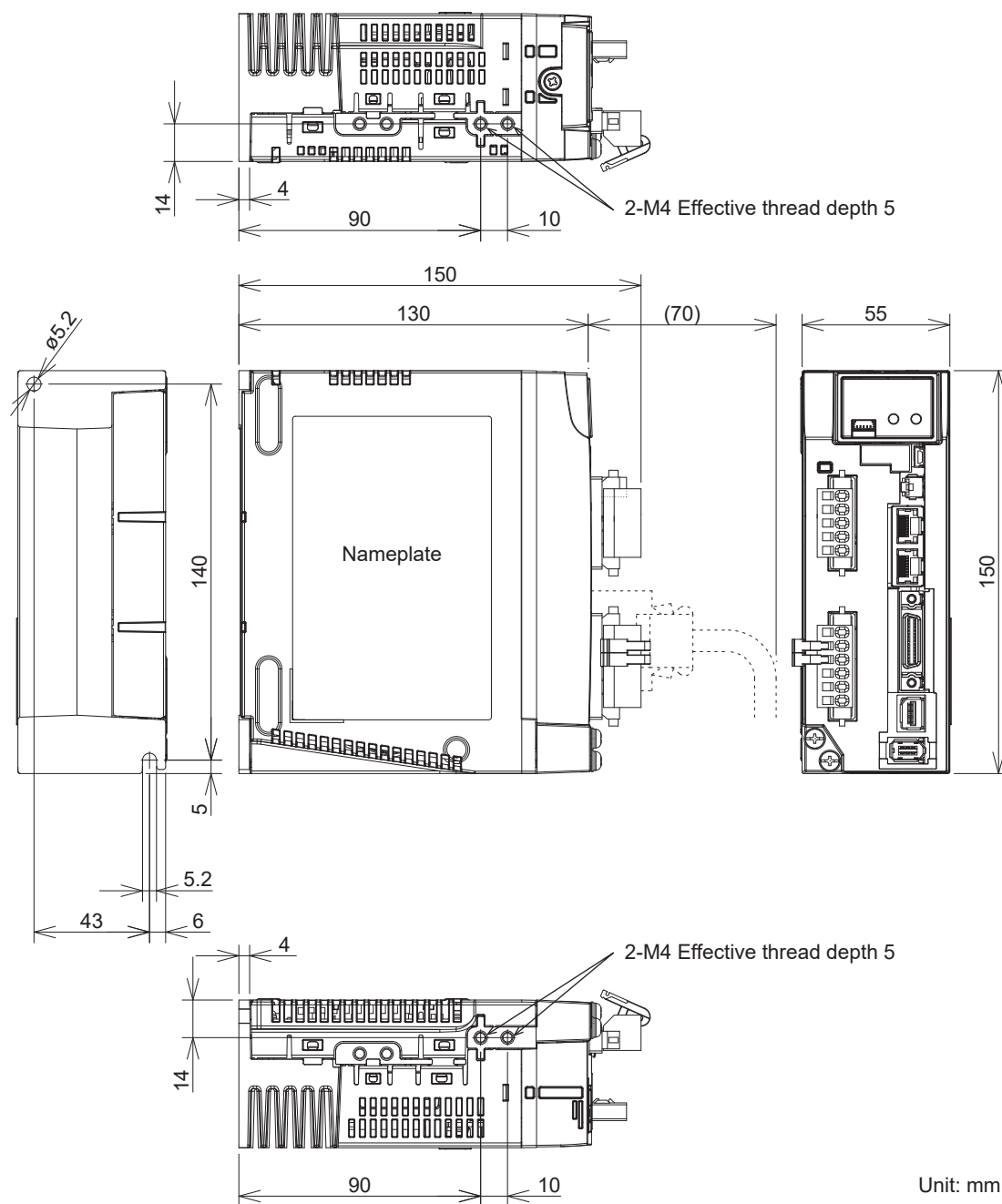
Rack-mounted installation (Using optional parts: Front-mounted)

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

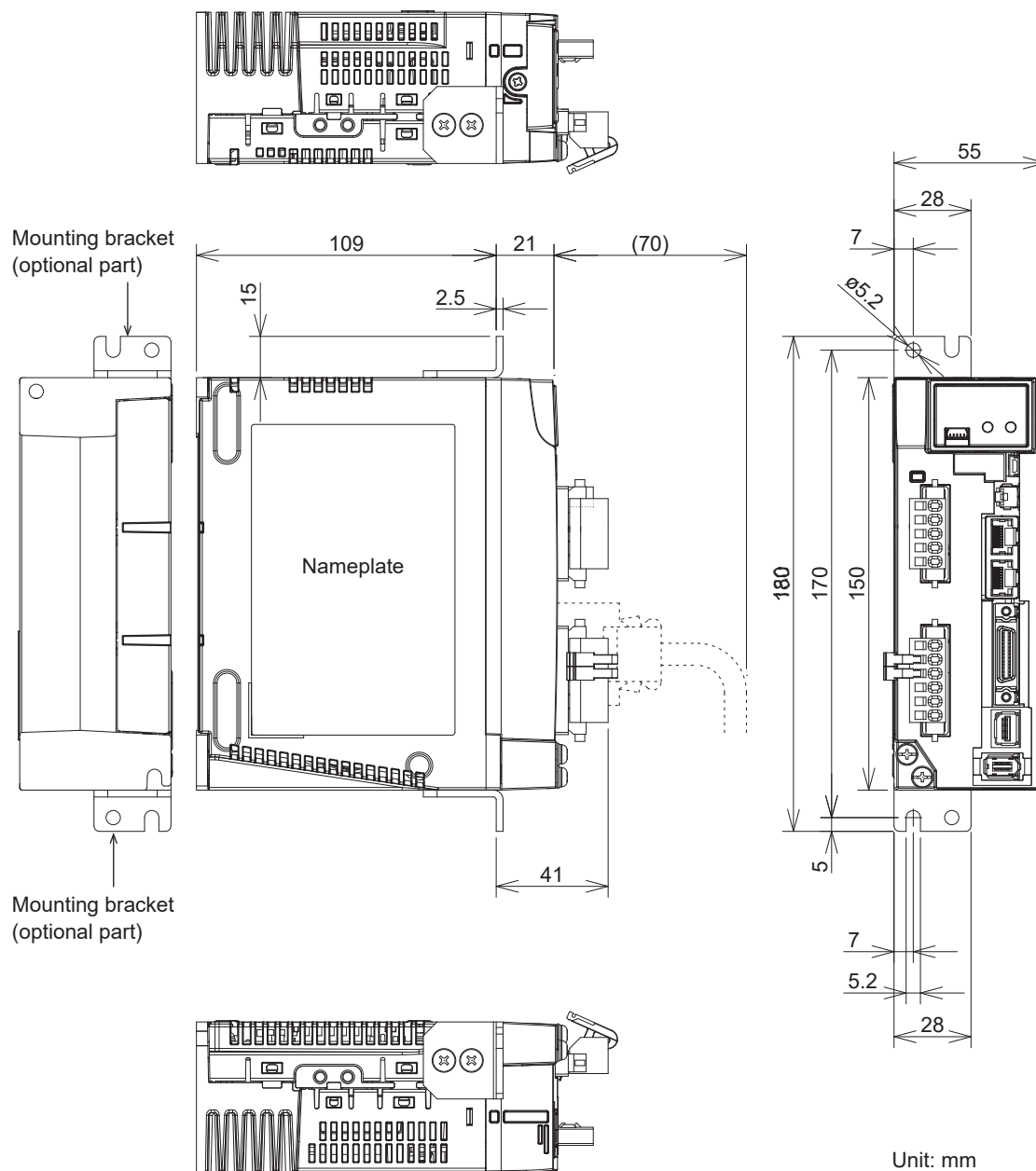
*2 Mounting brackets are optional parts. They are not included with the product.

6.2 Size B 100 V/200 V

Base-mounted installation (Standard: Rear-mounted)



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

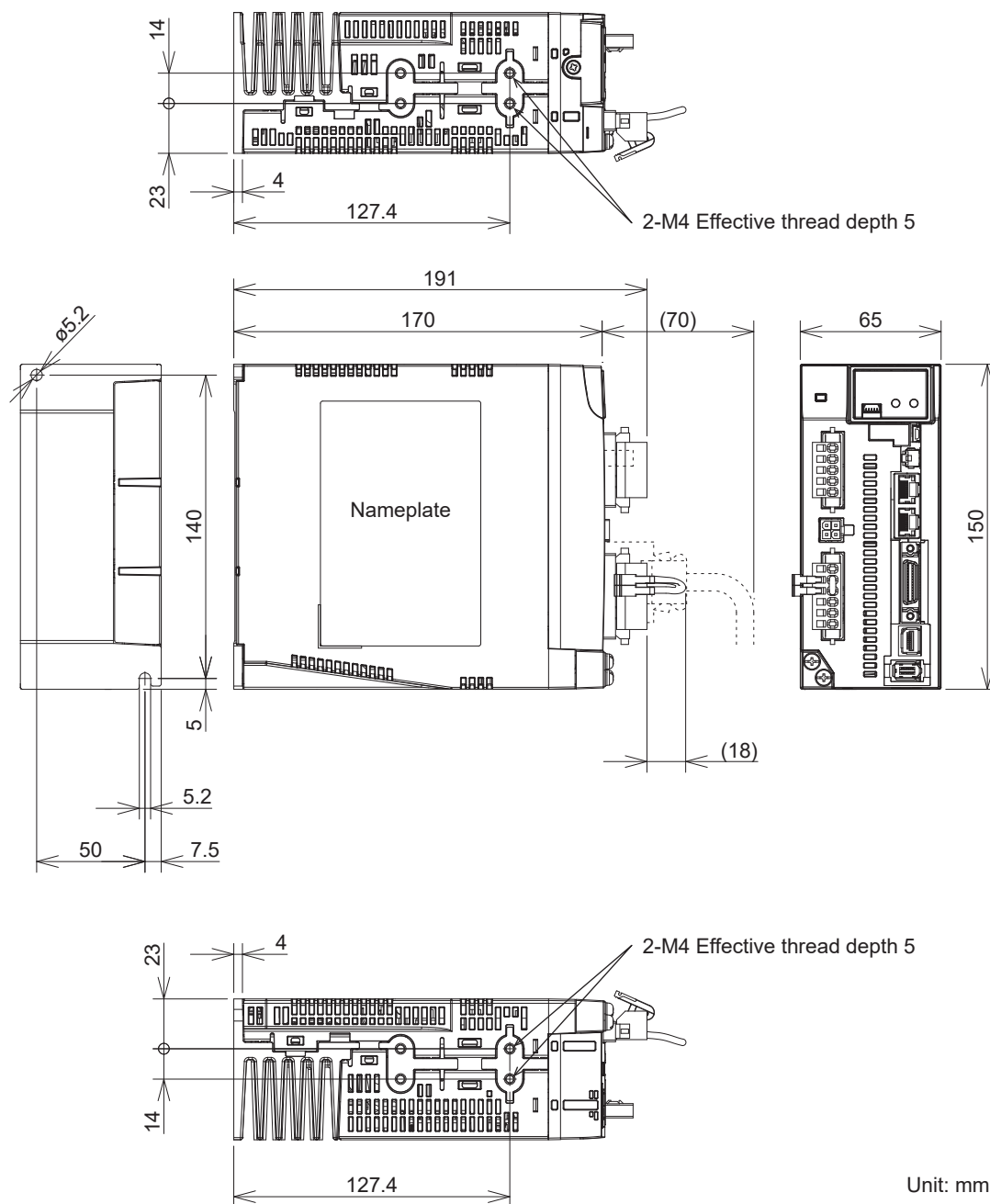
Rack-mounted installation (Using optional parts: Front-mounted)

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

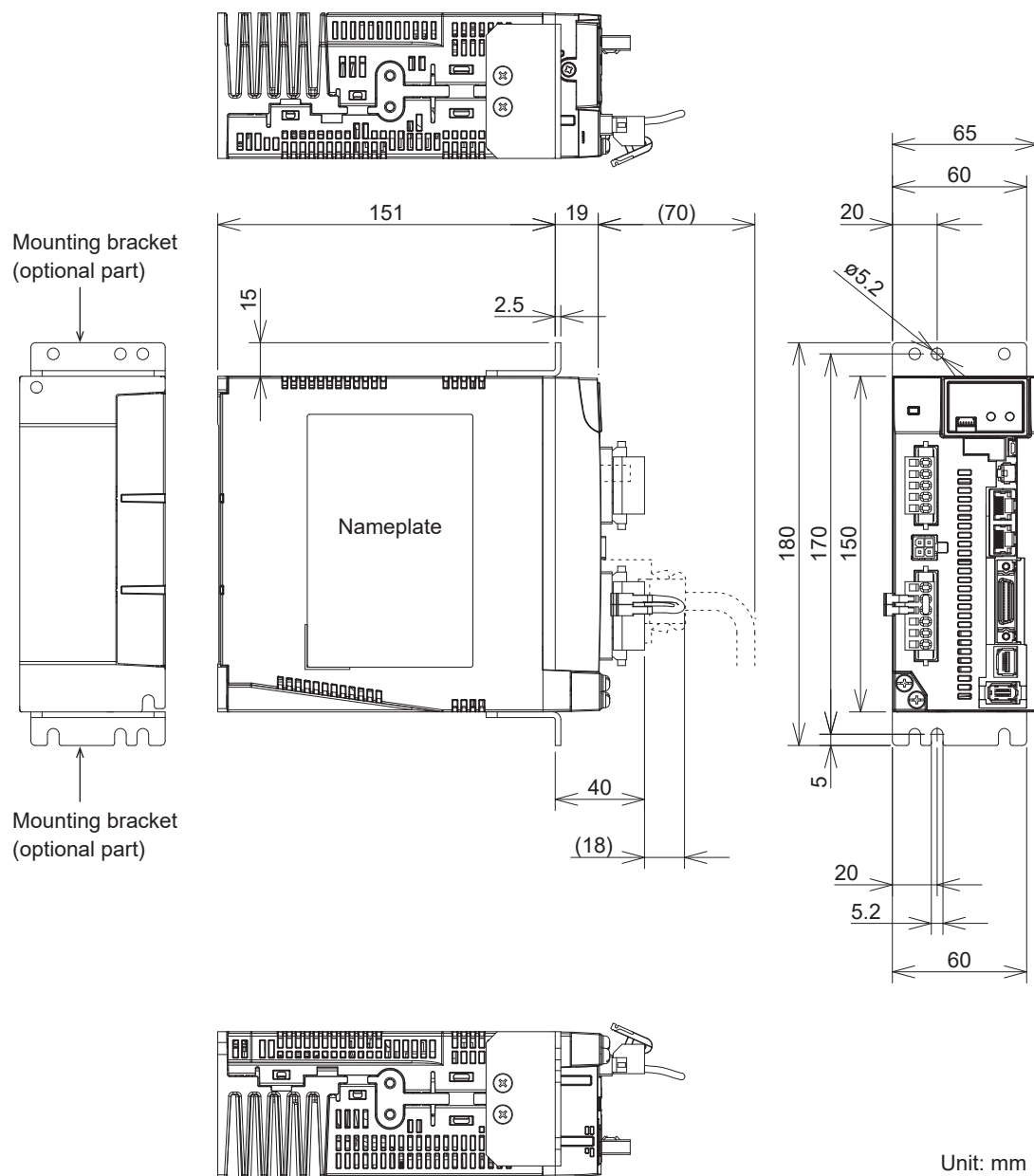
*2 Mounting brackets are optional parts. They are not included with the product.

6.3 Size C 100 V/200 V

Base-mounted installation (Standard: Rear-mounted)



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

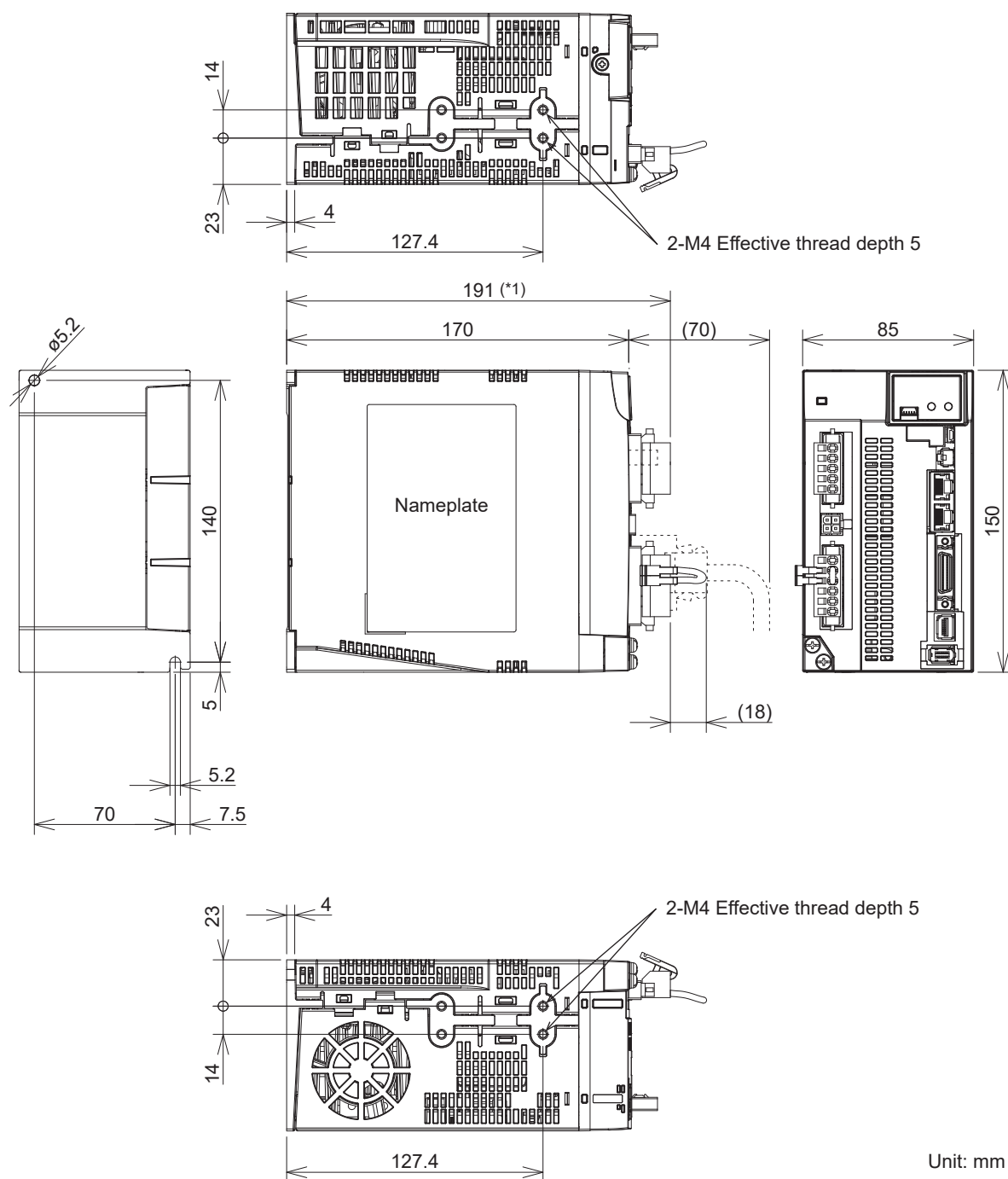
Rack-mounted installation (Using optional parts: Front-mounted)

*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

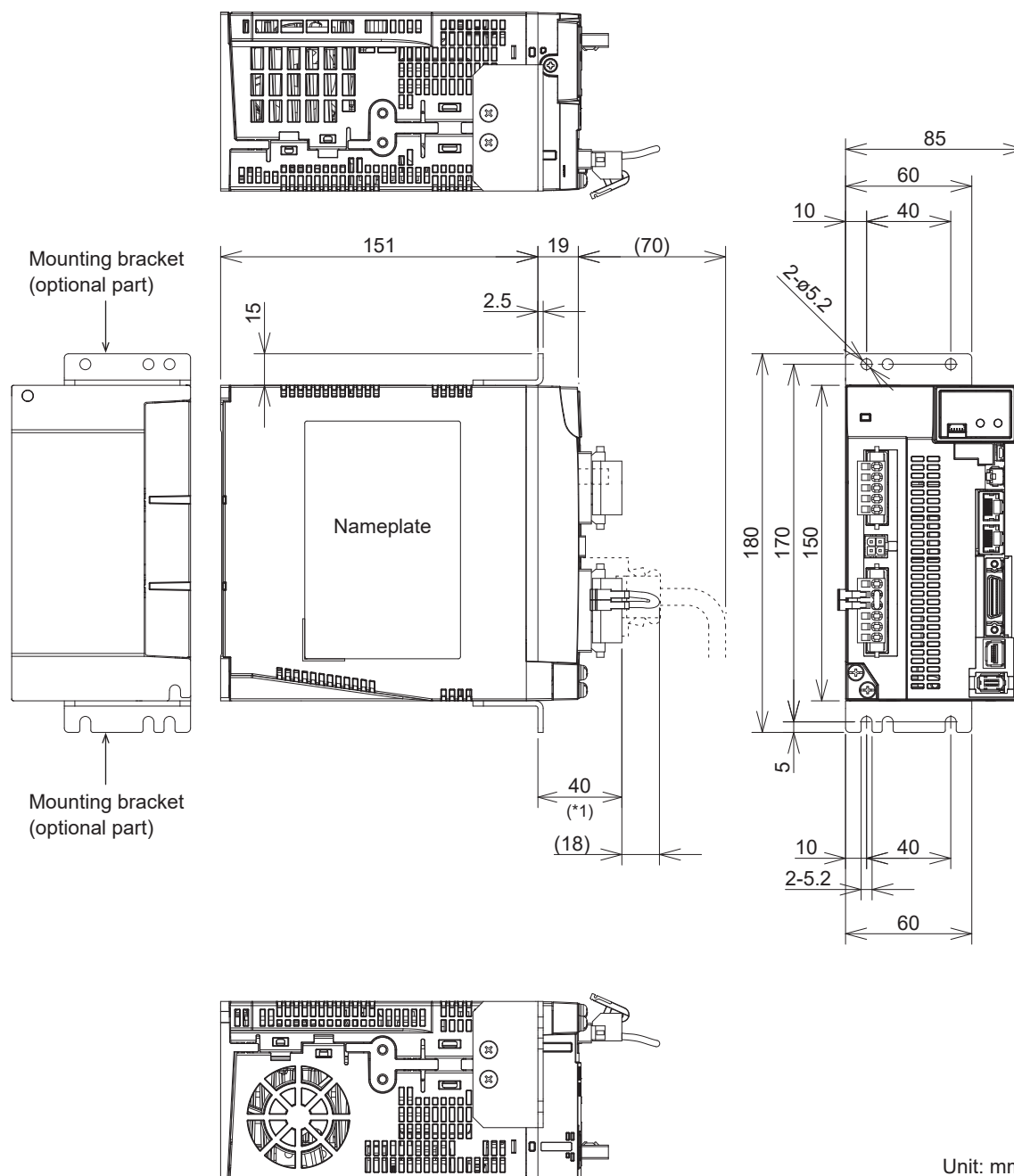
Base-mounted installation (Standard: Rear-mounted)



*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)



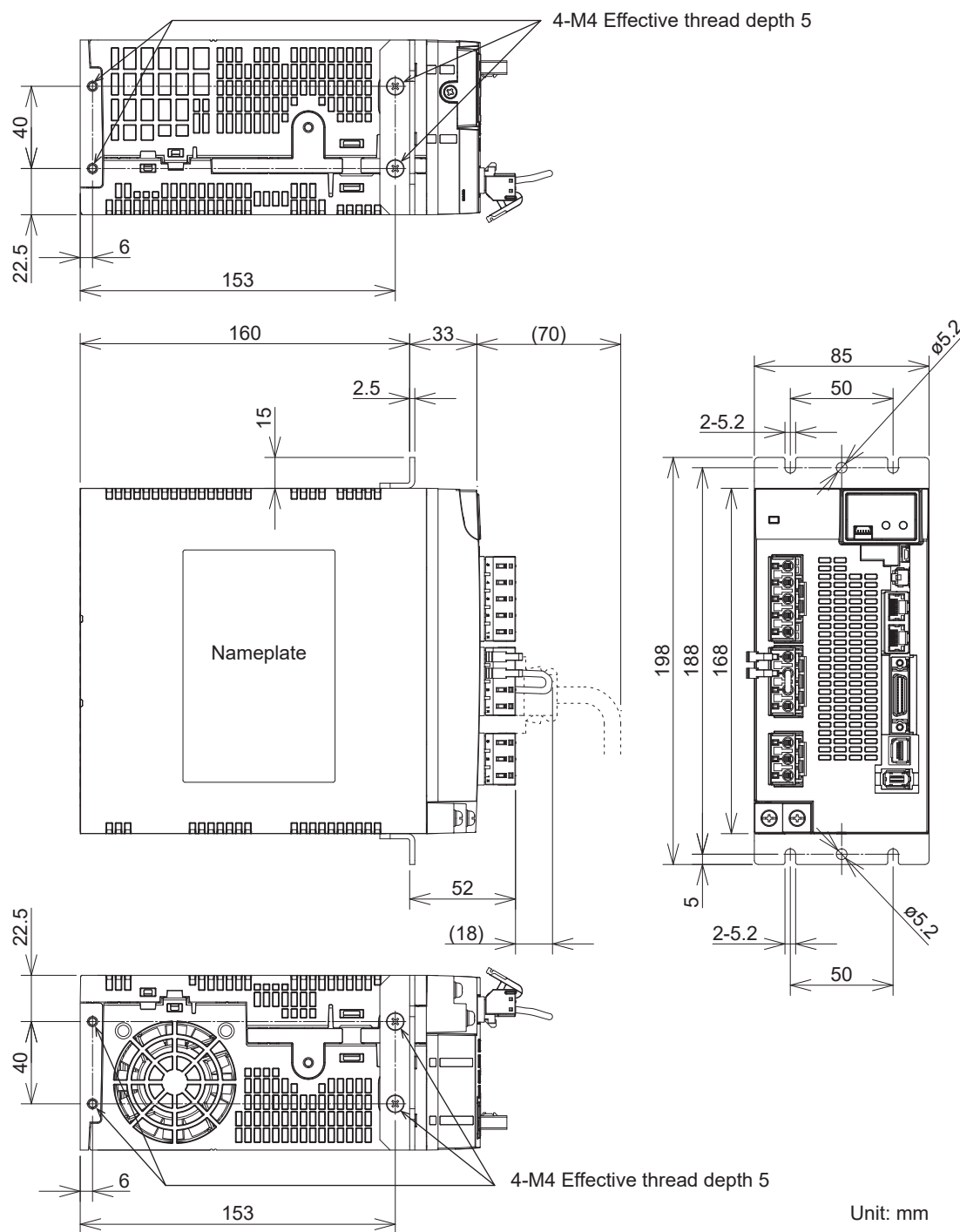
*1 For the 400 V model, this dimension is 37 mm.

*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.

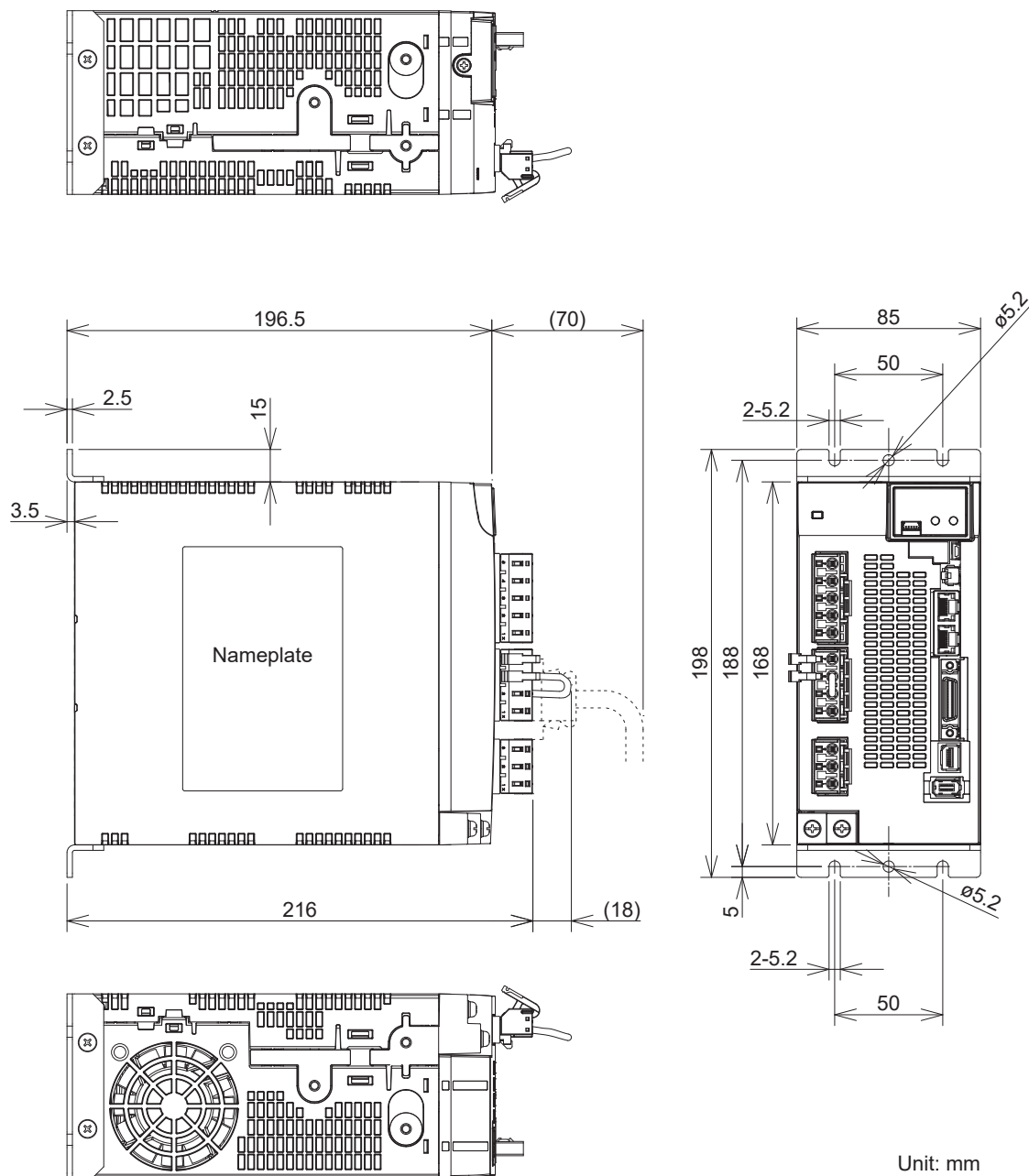
6.5 Size E 200 V/400 V

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



*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.

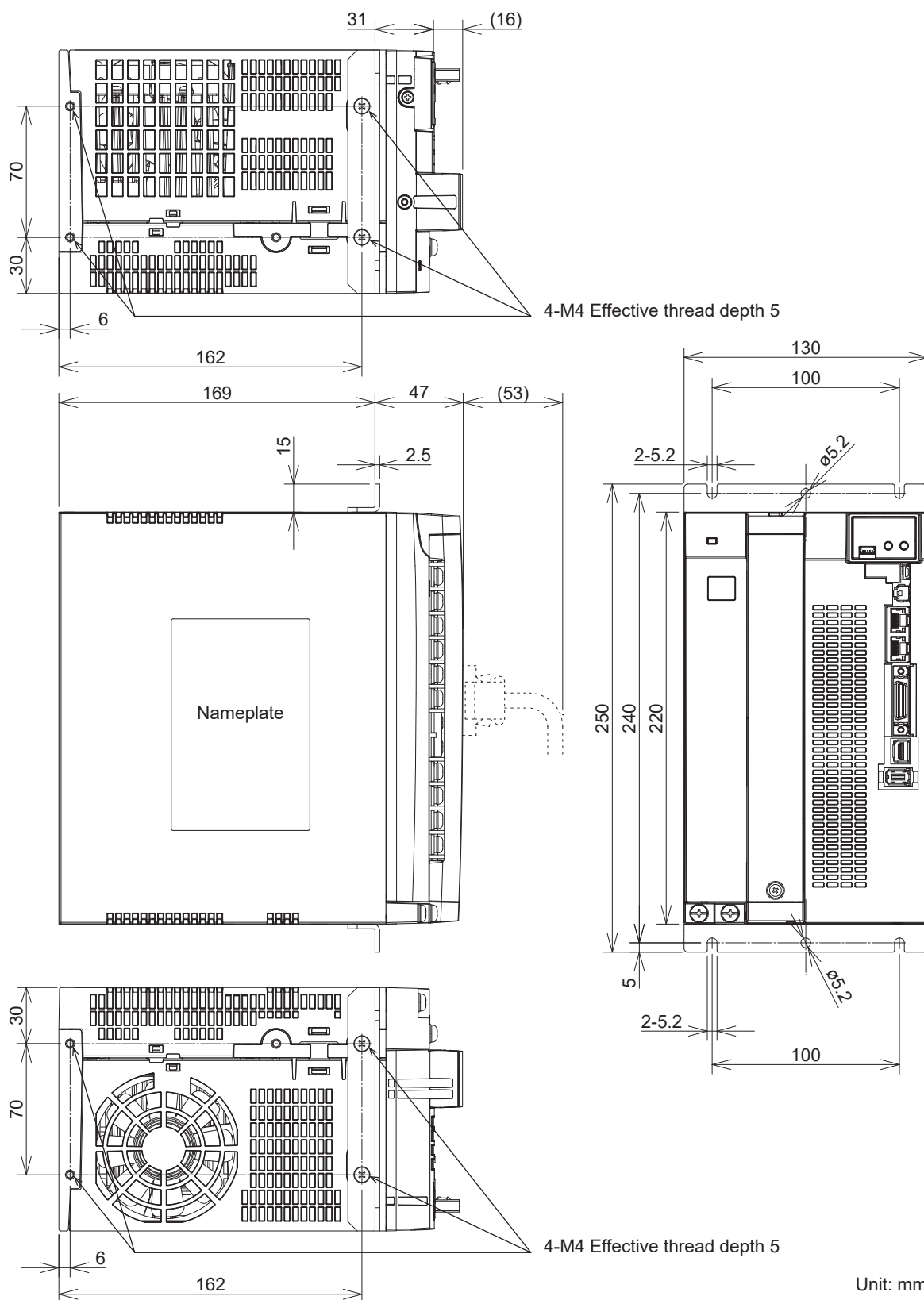
Base-mounted installation (Modified mounting bracket position: Rear-mounted)

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

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

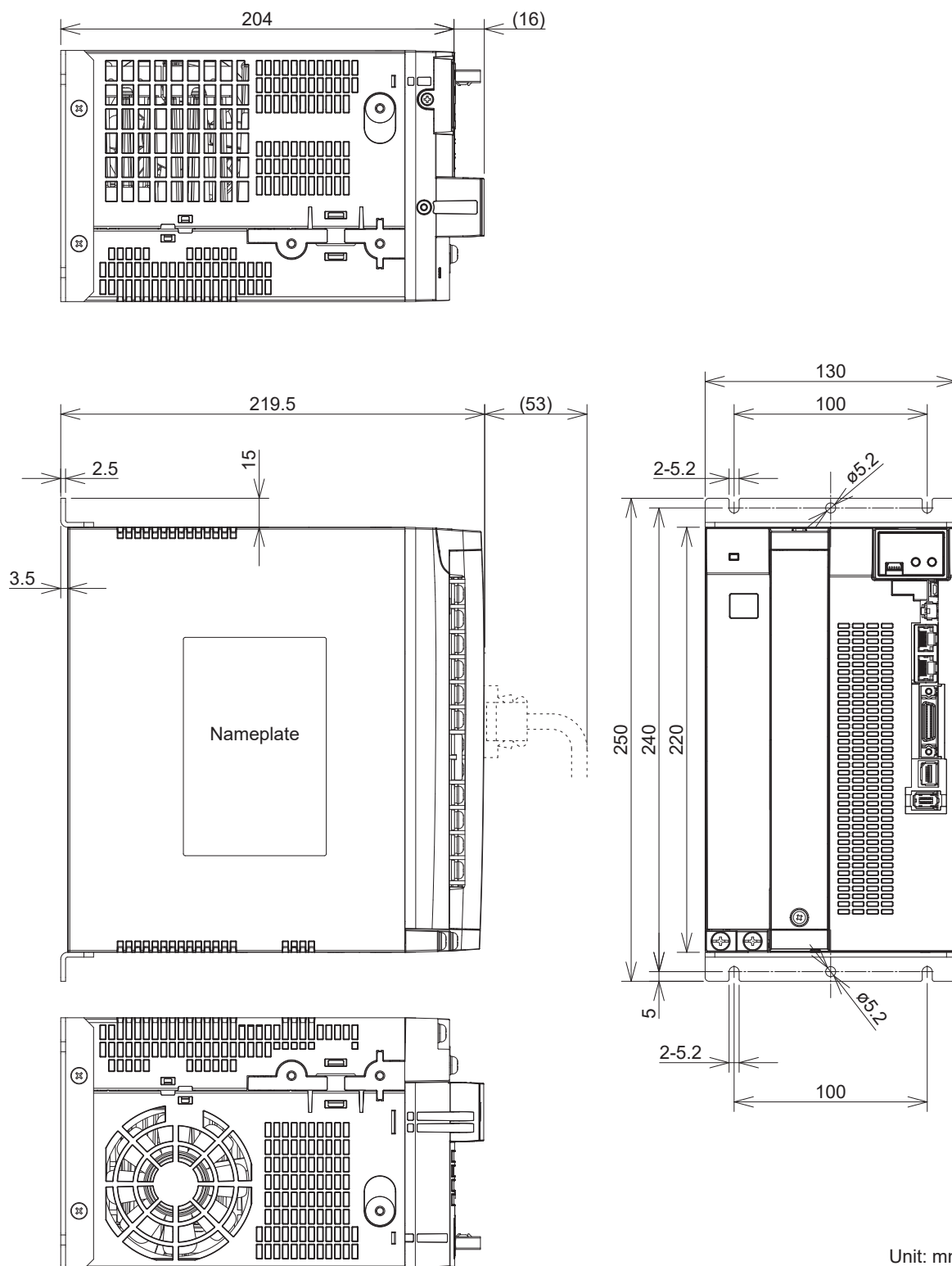
6.6 Size F 200 V/400 V

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



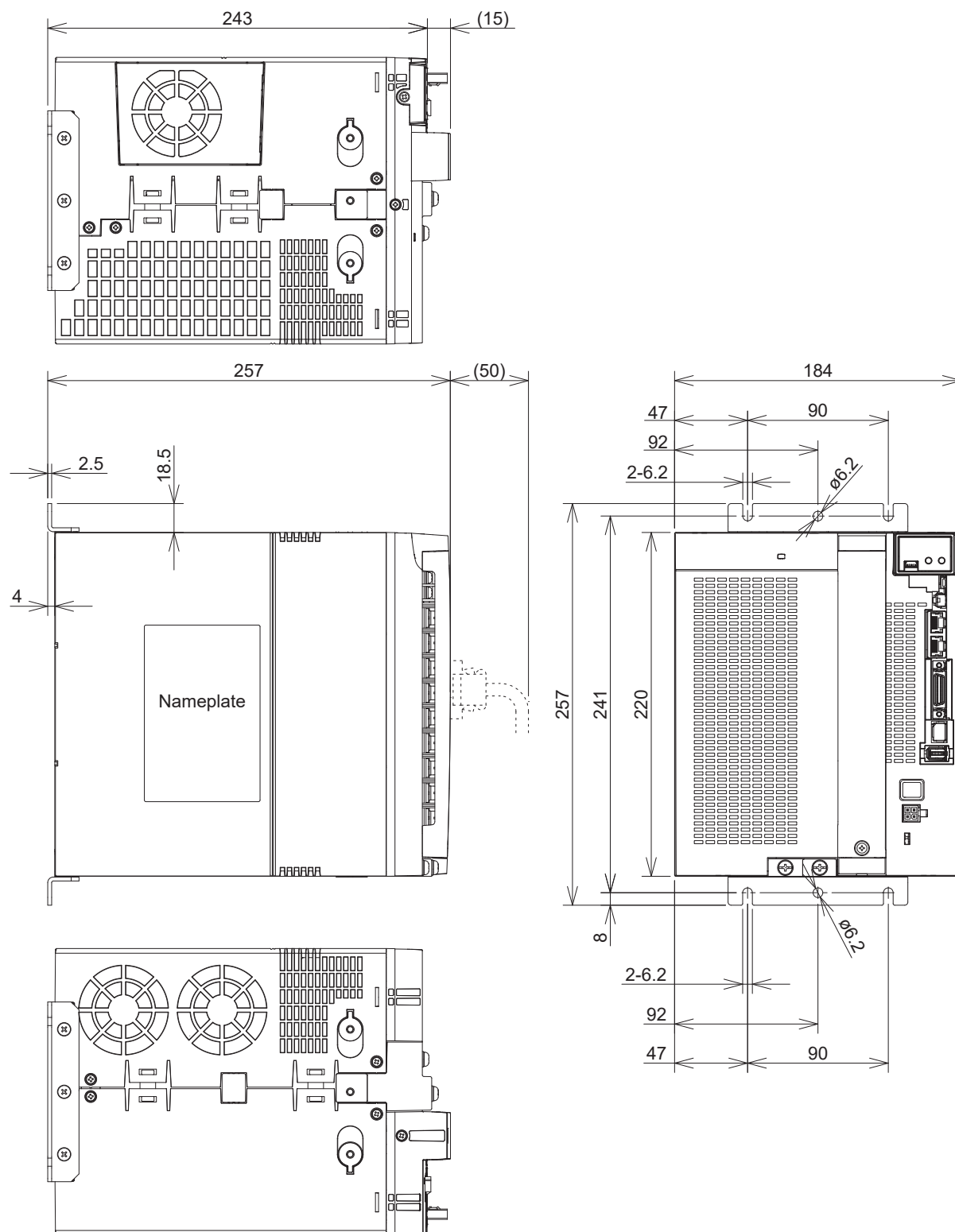
*1 Do not use screw holes for which no dimensions are shown.

*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)

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

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

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

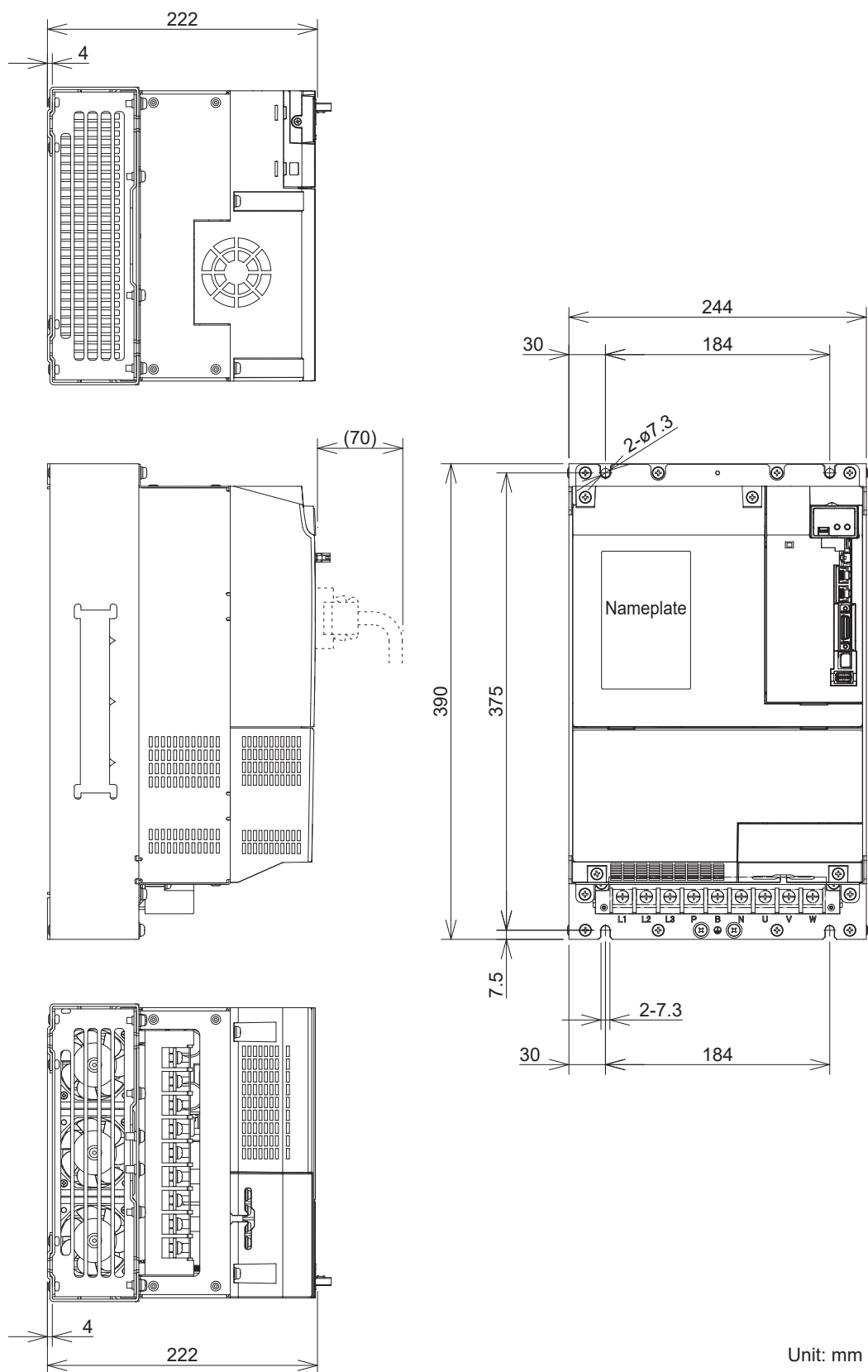
Unit: mm

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

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

6.8 Size H 200 V

Base-mounted installation (Rear-mounted)





*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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase | |
| | 2 | V | | | |
| | 1 | W | | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none">• 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. <p>In addition, parameters must be used for regenerative resistor settings.</p> <p>For details, refer to “Technical Reference - Functional Specification”.</p> <ul style="list-style-type: none">• Do not connect anything to the N terminal. | |
| | 3 | RB | | | |
| | 2 | B | | | |
| | 1 | N | | | |
| XB | 3 | U | Motor output terminal | <ul style="list-style-type: none">• Connect each phase of the motor winding. <p>U: U phase, V: V phase, W: W phase</p> | |
| | 2 | V | | | |
| | 1 | W | | | |
| |  |  | Ground terminal | <ul style="list-style-type: none">• 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 | <ul style="list-style-type: none"> 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”. |
| | 7 | RB | | |
| | 8 | B | | |
| | 9 | N | | |
| | 10 | U | Motor output terminal | <ul style="list-style-type: none"> Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase |
| | 11 | V | | |
| | 12 | W | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase |
| | 8 | V | | |
| | 9 | W | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> Connect with the motor E terminal to ground to earth. |



Connector

| | Pin No. | Symbol | Name | Description |
|----|---------|--------|---|--|
| XE | 1 | DB1 | External dynamic brake control terminal | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase |
| | 8 | V | | |
| | 9 | W | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> 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, $\pm 15\%$ |
| | 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 | <ul style="list-style-type: none"> 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". <ul style="list-style-type: none"> Do not connect anything to the N terminal. |
| | 3 | RB | | |
| | 2 | B | | |
| | 1 | N | | |
| XB | 3 | U | Motor output terminal | <ul style="list-style-type: none"> Connect each phase of the motor winding. U: U phase, V: V phase, W: W phase |
| | 2 | V | | |
| | 1 | W | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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. <p>In addition, parameters must be used for regenerative resistor settings.</p> <p>For details, refer to "Technical Reference - Functional Specification".</p> <ul style="list-style-type: none"> Do not connect anything to the N terminal. |
| | 7 | RB | | |
| | 8 | B | | |
| | 9 | N | Motor output terminal | <ul style="list-style-type: none"> Connect each phase of the motor winding. <p>U: U phase, V: V phase, W: W phase</p> |
| | 10 | U | | |
| | 11 | V | | |
| | 12 | W | | |
| |  |  | Ground terminal | <ul style="list-style-type: none"> 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, $\pm 15\%$ |
| | 2 | 0V | | |

- * Tighten the M5 grounding screw to a torque of 1.8–2.0 N·m.
- * Tighten the M5 terminal block screw to a torque of 1.8–2.0 N·m.
- * Tighten the M3 screw for securing the terminal block cover to a torque of 0.19–0.21 N·m.
- * Exceeding the maximum tightening torque may cause damage.

7.2 USB Connector X1

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

| Name | Symbol | Pin No. | Description |
|----------------------|--------|---------|--|
| USB signal connector | VBUS | 1 | <ul style="list-style-type: none"> Used for communication with computers or NC controllers. |
| | D- | 2 | |
| | D+ | 3 | |
| For manufacturer use | — | 4 | <ul style="list-style-type: none"> Do not connect anything |
| Signal ground | GND | 5 | <ul style="list-style-type: none"> Signal ground |

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

7.3 EtherCATconnectors X2A, X2B

This is an RJ45 connector for use with EtherCAT.

[X2A]/[X2B]

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

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

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

7.4 Safety Function Connector X3

This is a connector for functional safety.

This connector is only compatible with the multifunction type.

| Name | Symbol | Pin No. | Description | I/O signal interface |
|----------------|--------|---------|---|----------------------|
| Reserved | — | 1 | <ul style="list-style-type: none"> Do not connect anything | — |
| | — | 2 | | — |
| Safety input 1 | SF1- | 3 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Monitor output for monitoring safety function faults. | o-1 |
| | EDM+ | 8 | | |
| Frame ground | FG | Shell | <ul style="list-style-type: none"> Connected to the ground terminal inside the servo driver. | — |

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

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

7.5 Parallel I/O connector X4

7.5.1 Input signal

| Name | Symbol | Pin No. | Description | I/O signal interface |
|----------------------|--------|---------|--|----------------------|
| General input common | SI-COM | 6 | <ul style="list-style-type: none"> Connect the positive or negative poles of the external DC power supply (12–24 V). Use a power supply of 12 V\pm5% – 24 V\pm5%. This must be isolated from the primary power supply. Do not connect it to the same power supply. Primary power supply: Power supply for motor brake | — |
| General input 1 | SI1 | 5 | <ul style="list-style-type: none"> Functions are assigned using parameters. For details, refer to “Technical Reference - Functional Specification”. Be aware that there are restrictions on the assignment of functions. For example, in the case of external latch inputs, EXT1 can only be assigned to SI5, EXT2 to SI6, and EXT3 to SI7. | i-1 |
| General input 2 | SI2 | 7 | | |
| General input 3 | SI3 | 8 | | |
| General input 4 | SI4 | 9 | | |
| General input 5 | SI5 | 10 | | |
| General input 6 | SI6 | 11 | | |
| General input 7 | SI7 | 12 | | |
| General input 8 | SI8 | 13 | | |

7.5.2 Output signal

| Name | Symbol | Pin No. | Description | I/O signal interface |
|------------------|--------------|----------|--|----------------------|
| General output 1 | SO1+ SO1- | 1 2 | <ul style="list-style-type: none"> Functions are assigned using parameters. For details, refer to “Technical Reference - Functional Specification”. | o-1 |
| General output 2 | SO2+ SO2- | 25 26 | | |
| General output 4 | SO3+ SO3- | 3 4 | | |

7.5.3 Encoder output signal/position compare output signal

| Name | Symbol | Pin No. | Description | I/O signal interface |
|--|------------|---------|---|----------------------|
| A-phase output/position compare output 1 | OA+/OCMP1+ | 17 | <ul style="list-style-type: none"> Differential output of divided feedback scale signal (A/B phase). (RS422 compatible) The division ratio can be set by the parameters. The ground of the line driver for the output circuit is connected to the signal ground (GND), and kept non-insulated. Maximum output frequency is 4 Mpps (after being multiplied by 4). It can be used as position compare output by setting parameters. For details, refer to "Technical Reference - Functional Specification". This differential signal should be received by a line receiver (AM26C32 or equivalent), and a terminating resistor (approx. 330 Ω) should be connected between the line receiver inputs. Use shielded twisted-pair cables for wiring, and connect the shielded wires to the connector shell. | Do-1 |
| | OA-/OCMP1- | 18 | | |
| B-phase output/position compare output 2 | OB+/OCMP2+ | 20 | | |
| | OB-/OCMP2- | 19 | | |
| Position compare output 3 | OCMP3+ | 21 | | |
| | OCMP3- | 22 | | |
| Signal ground | GND | 16 | <ul style="list-style-type: none"> Signal ground. Always connect the line receiver ground to this terminal. | — |

7.5.4 Battery input for encoder backup

| Name | Symbol | Pin No. | Description | I/O signal interface |
|------------------------------------|--------|---------|--|----------------------|
| Battery input for absolute encoder | BTP-I | 14 | <ul style="list-style-type: none"> Connect the absolute encoder battery. For details, refer to "8.3.4 Wiring to Connector X6". BTP-I: positive pole, BTN-I: negative pole This provides power to the absolute encoder for multi-turn data storage via the BTP-O (3-pin) and BTN-O (4-pin) of encoder connector X6. Connect the absolute encoder battery using one of the following methods: <ol style="list-style-type: none"> Direct connection to the motor side Connect to the encoder cable Connect to this connector | — |
| | BTN-I | 15 | | — |

7.5.5 Other

| Name | Symbol | Pin No. | Description | I/O signal interface |
|--------------|--------|---------|---|----------------------|
| Reserved | — | 23, 24 | <ul style="list-style-type: none"> Do not connect anything. | — |
| Frame ground | FG | Shell | <ul style="list-style-type: none"> Connected to the ground terminal inside the servo driver. | — |

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 \pm 5%, 250 mA max.

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

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

For details, refer to "Technical Reference - Functional Specification".

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

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

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

7.7 Encoder Connector X6

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

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

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

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

7.8 Analog Monitor Connector X7



| Name | Symbol | Pin No. | Description | I/O signal interface |
|-------------------------|--------|---------|---|----------------------|
| Analog monitor output 1 | AM1 | 1 | <ul style="list-style-type: none">Outputs analog signals for the monitor.The meaning of the output signal changes depending on parameter settings. | Ao-1 |
| Analog monitor output 2 | AM2 | 2 | | |
| Signal ground | GND | 3 | <ul style="list-style-type: none">Signal ground | — |
| Reserved | — | 4,5 | <ul style="list-style-type: none">Do not connect anything | — |

7.9 I/O Signal Interface

| | |
|---|---|
| <p>i-1</p> <p>or</p> <p>S: [Pins] (X3) 3, 5 / (X4) 5, 7, 8, 9, 10, 11, 12, 13 P: [Pins] (X3) 4, 6 / (X4) 6</p> | <p>o-1</p> <p>[Pins] +: (X3) 8 / (X4) 1, 3, 25 [Pins] -: (X3) 7 / (X4) 2, 4, 26</p> <p>* If the relay is to be driven directly, install a diode in parallel with the relay in the direction shown above.</p> |
| <p>Ao-1</p> <p>[Pins] S: (X7) 1, 2 [Pins] G: (X7) 3</p> <p>* The output signal amplitude is ±10 V.</p> | <p>Do-1</p> <p>[Pins] +: (X4) 17,20,21 [Pins] -: (X4) 18,19,22 [Pins] G : (X4) 16</p> <p>* Connect a terminating resistor (approx. 330 Ω) between the line receiver inputs.</p> |

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 (*3) | X5 | 20 m | |
| Parallel I/O connection | X4 | 3 m | |
| Safety connection (*3) | X3 | 3 m | Core cable: 0.18 mm ² or more |
| EtherCAT connection | X2A, X2B | 100 m (*2) | TIA/EIA-568 CAT5e STP |

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

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

*3 Only compatible with the multifunction type.

8.2 Cable Side Connectors

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

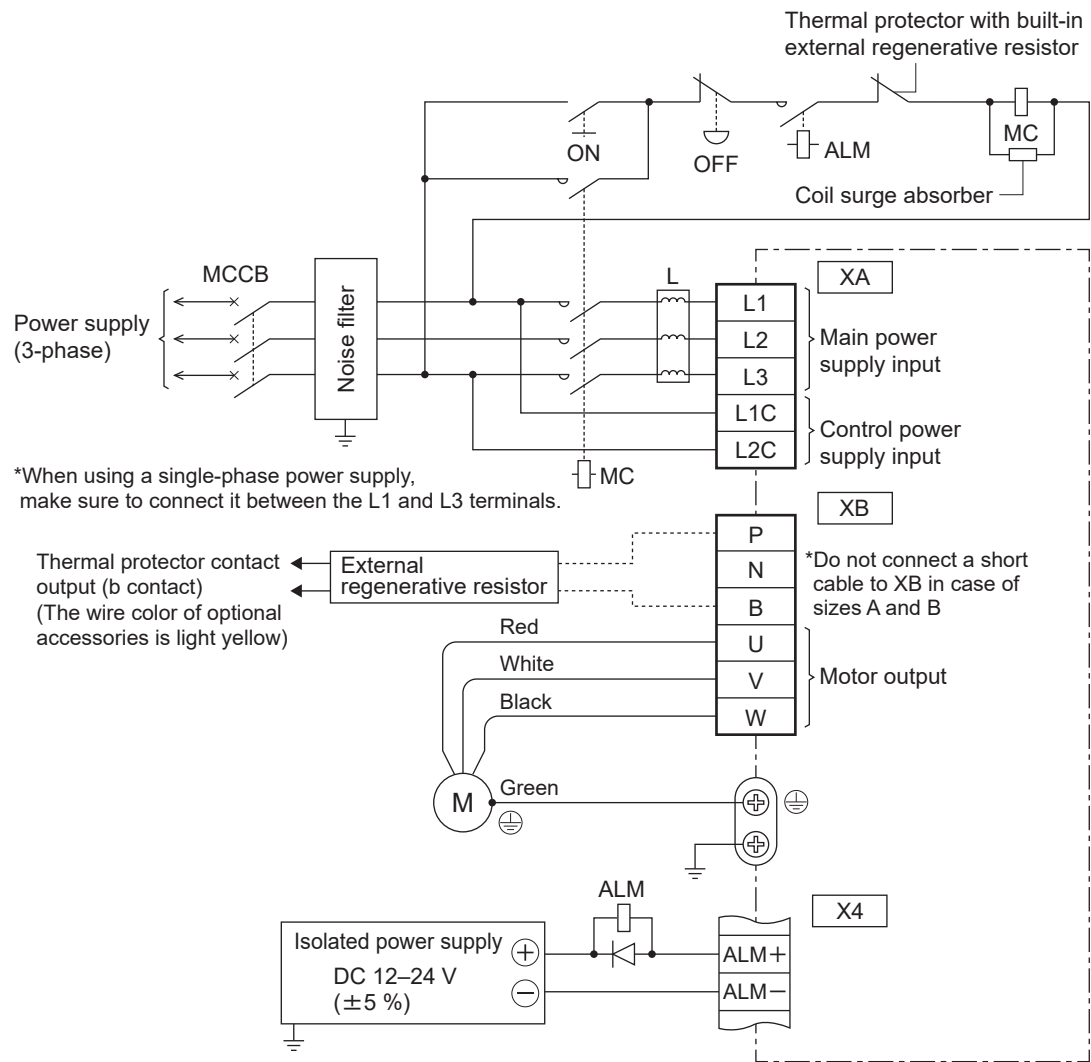
*1 Only size G is supported.

* Use the connectors above or an equivalent.

8.3 Precautions for Wiring

8.3.1 Wiring to Power Connectors and Terminal Blocks

8.3.1.1 Size A, B 100 V/200 V



Regenerative resistor connection

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

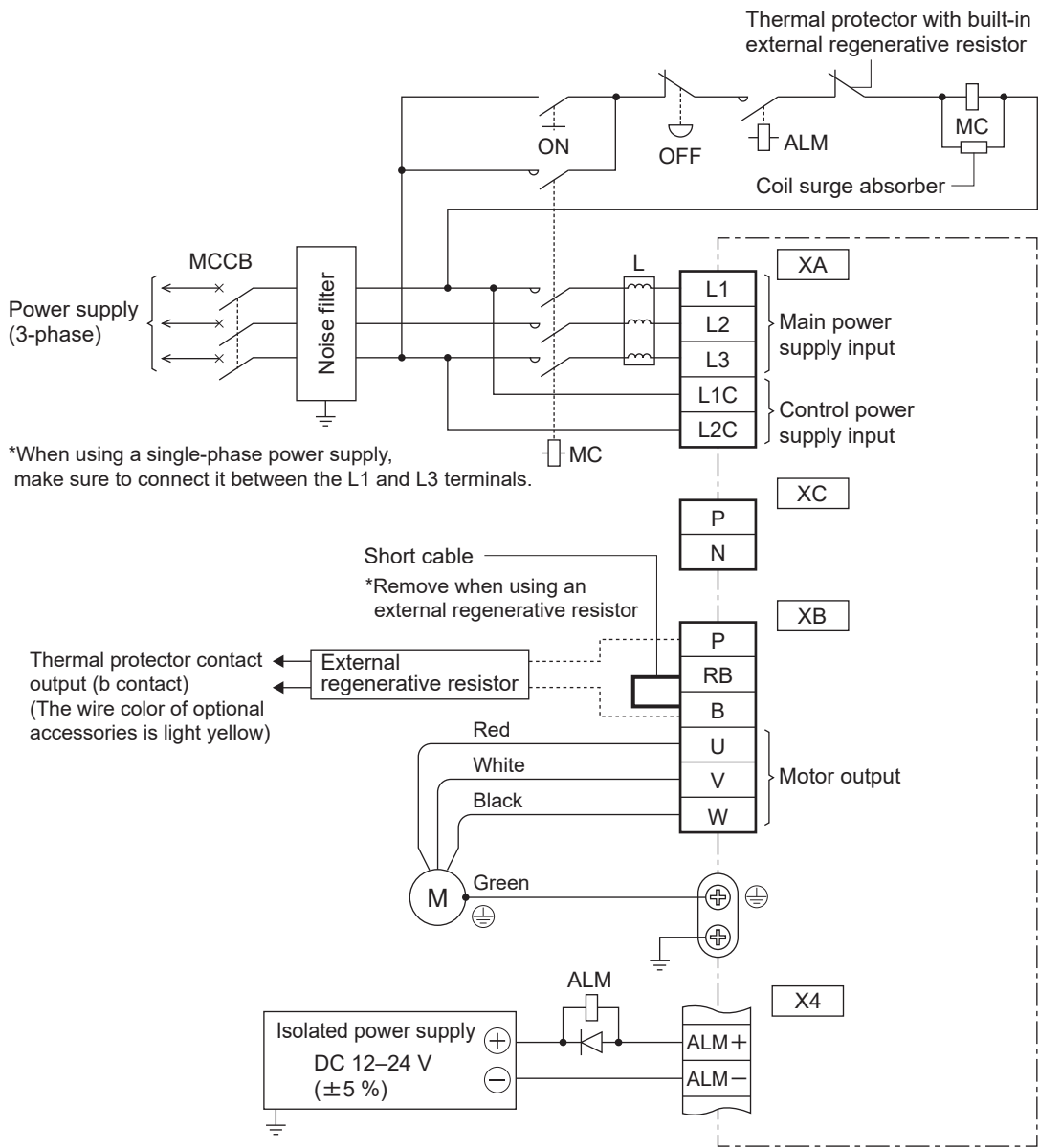
* Connectors X1–X7 are secondary-side circuits. (See “5 Appearance and Part Names”)

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

Do not connect it to the same power supply.

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

8.3.1.2 Size C, D 100 V/200 V

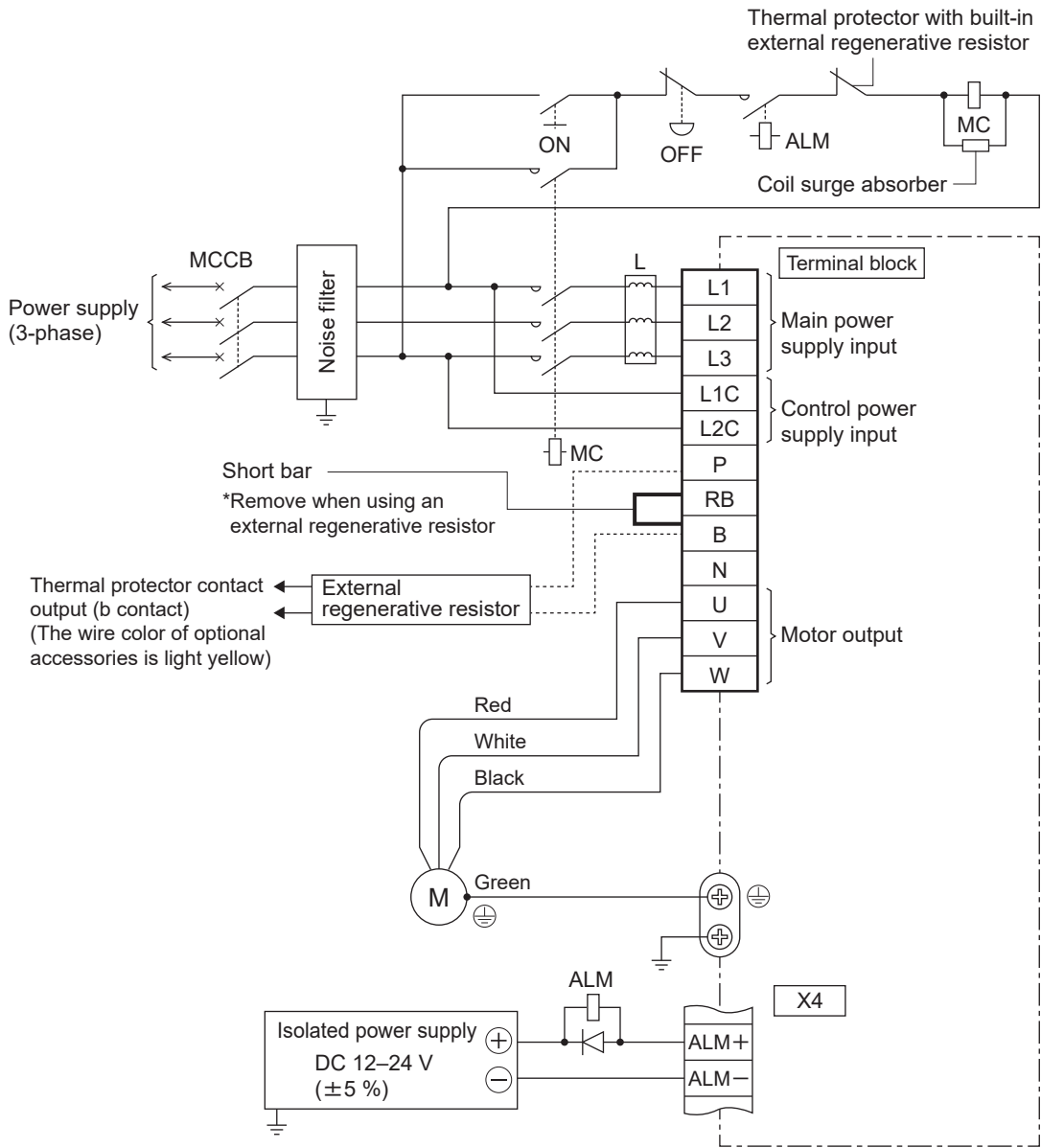


Regenerative resistor connection

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

- * Connectors X1–X7 are secondary-side circuits. (See “5 Appearance and Part Names”)
- The primary-side power supply (power supply for the motor brake) must be isolated.
- Do not connect it to the same power supply.
- * For details, refer to the table in “7.1.2 Size C, D 100 V/200 V” .

8.3.1.4 Size F 200 V



Regenerative resistor connection

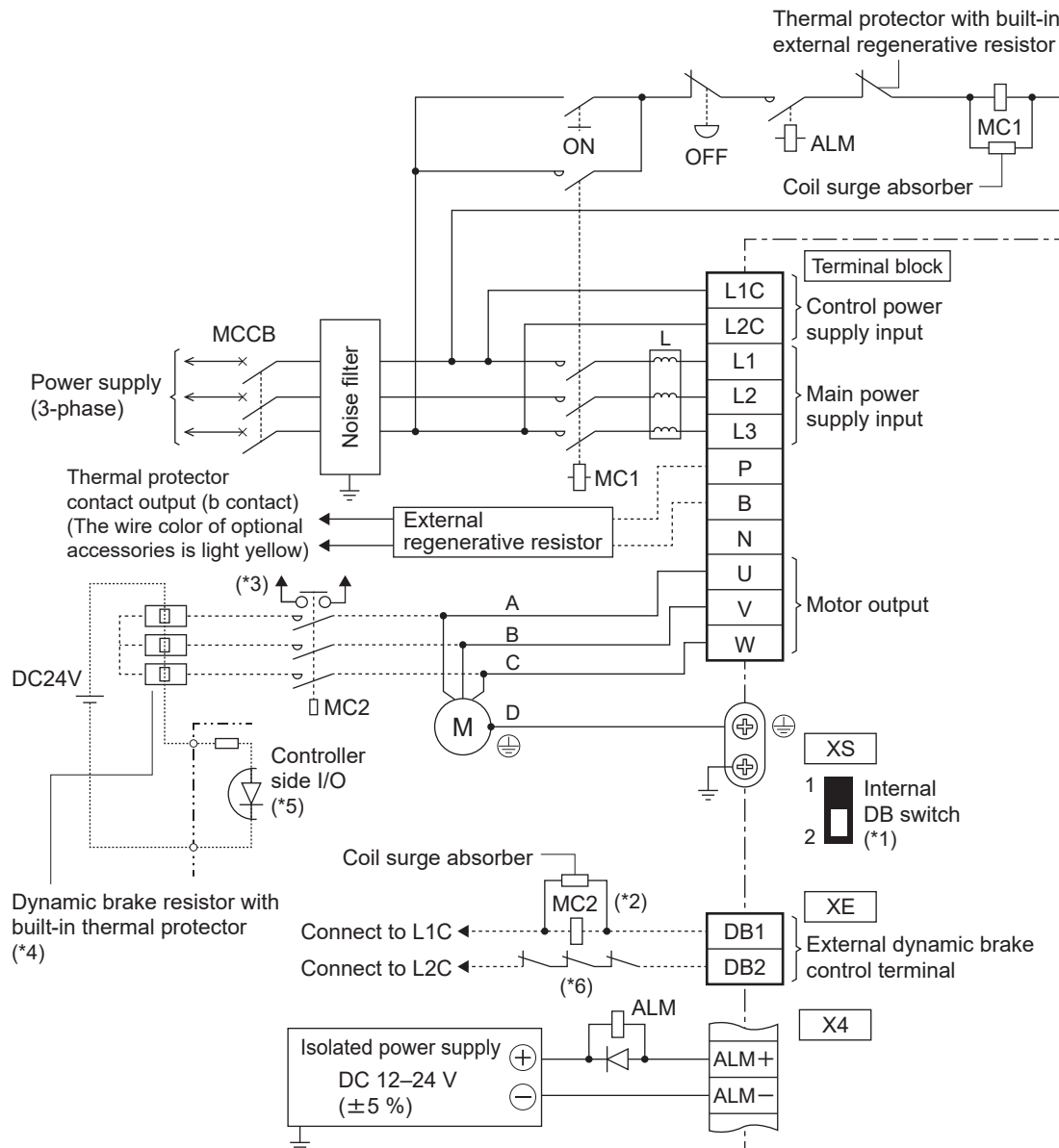
| Size | Short bar (accessory) | Built-in regenerative resistor | Terminal block connection | |
|--------|-----------------------|--------------------------------|---|---|
| | | | When using an external regenerative resistor | When not using an external regenerative resistor |
| Size F | Provided | Provided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

- * Connectors X1–X7 are secondary-side circuits. (See “5 Appearance and Part Names”)
The primary-side power supply (power supply for the motor brake) must be isolated.
Do not connect it to the same power supply.
- * The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.
- * For details, refer to the table in “7.1.4 Size F 200 V”.

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



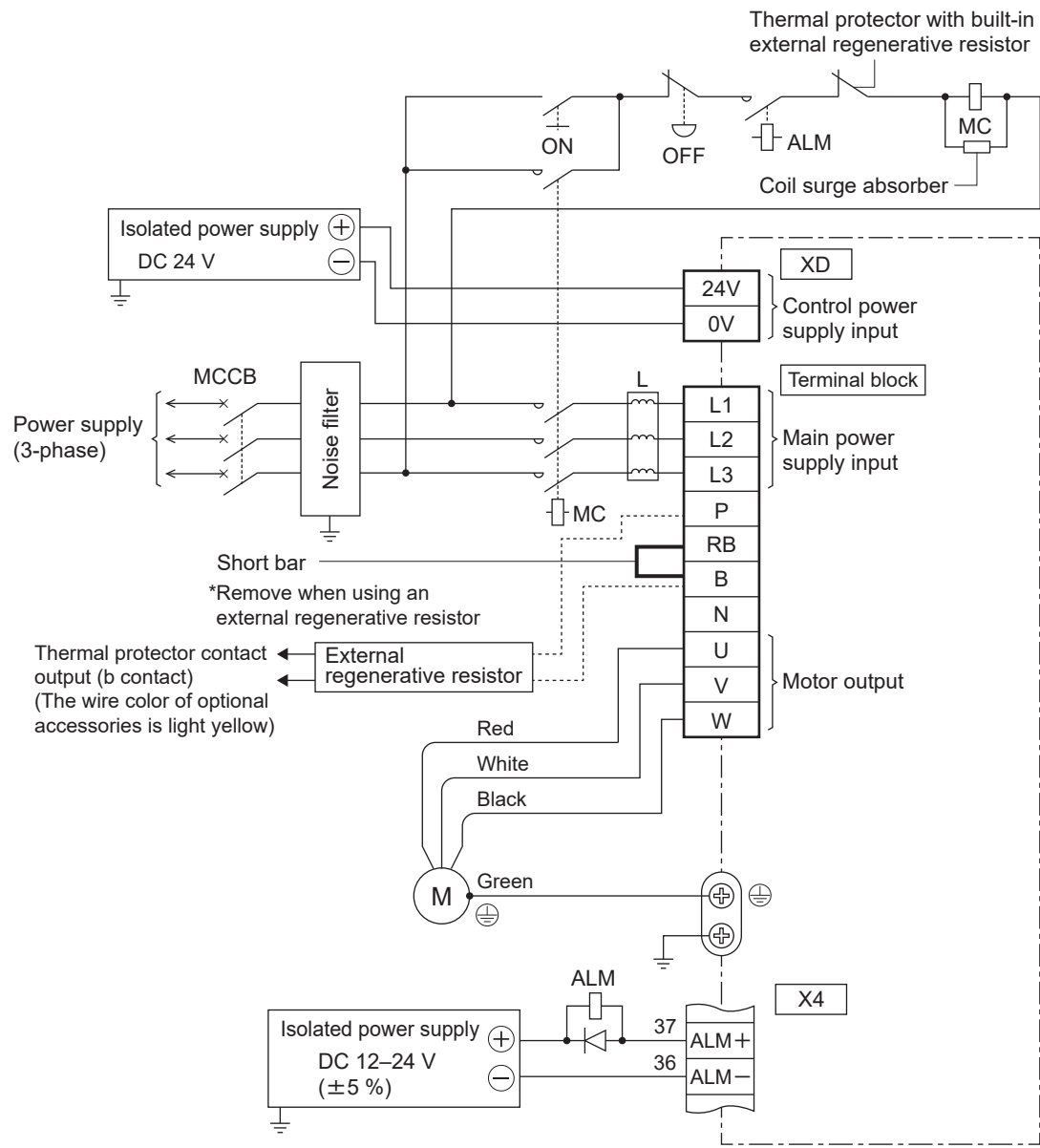
- *1 If using the external dynamic brake resistor, set switch XS to "2".
- *2 The electromagnetic contactor (MC2) must be the same as the electromagnetic contactor (MC1) of the main circuit.
- *3 If an auxiliary contact is established and the main contact is welded together, configure protection so that 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".

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.

8.3.1.8 Size F 400 V



Regenerative resistor connection

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

- * Connectors X1–X7 are secondary-side circuits. (See “5 Appearance and Part Names”)
The primary-side power supply (power supply for the motor brake) must be isolated.
Do not connect it to the same power supply.
- * The capability of the built-in dynamic brake resistor is roughly the maximum allowable inertia when stopped three times consecutively from the rated speed. Failure to do so may cause the resistor to disconnect or the dynamic brake to no longer be operable.
- * For details, refer to the table in “7.1.8 Size F 400 V”.

8.3.1.9 Precautions

- 1 When the servo driver uses a single-phase power supply for sizes A–D, connect the servo driver to main power supply input terminals L1 and L3. Do not connect anything to the terminal L2.
- 2 Insert the connector securely until it is locked.
- 3 Make sure to use an insulation coated crimp terminal when connecting to each terminal on the terminal block. (size F, G, H)
- 4 For models with terminal block covers, the terminal block cover is screwed on.
When wiring to the terminal block, unscrew these screws to open the cover.
Tighten the cover fixing screw to 0.19–0.21 N·m.
Only tighten the terminal block cover 2 (black) of size H to less than 2.0–2.5 N·m of torque.
- 5 Apply the power supply of the voltage indicated on the nameplate.
- 6 Do not reverse-connect the power supply input terminals (L1, L2, and L3) and the motor output terminals (U, V, and W).
- 7 Do not connect the motor output terminals (U, V, and W) to ground or short circuit them.
- 8 Power connectors XA, XB, XC, XD, and the terminal block are supplied with voltage, so do not touch them.
There is a danger of electric shock.
- 9 The short-circuit current of the power supply used should be capable of not more than 5,000 Arms symmetrical amperes, below the maximum input voltage of the product.
If the short-circuit current of the power supply exceeds this, limit the short-circuit current by using a currentlimiting device (such as a current-limiting fuse, current-limiting breaker, transformer).
- 10 Unlike an induction motor, an AC servo motor cannot change the rotation direction by exchanging three phases. Make sure to match the motor output terminals (U, V, and W) of the servo driver with the colors (pin number for cannon plugs) of the motor output cables.
- 11 Make sure to connect the grounding terminal of the motor to the grounding terminal of the servo driver and ground it together with the ground terminal of the noise filter. Also ground the machine body. Use a D model ground (grounding resistance: 100 Ω or less). Tighten the servo driver's ground screw with the appropriate torque specified for each size.
Use a ground cable with a wire diameter equal to or larger than the wire diameter specified in “Model Specifications”.
Also, avoid direct contact between aluminum and copper to avoid the effects of electrolytic corrosion.
- 12 Insert surge absorbing circuits for preventing noise to electromagnetic contactors placed around the servo driver, to coils between relay contact points, and to the brake windings of motors with a brake.
- 13 Install a molded case circuit breaker (MCCB) and make sure to shut off the power supply from outside the servo driver in case of an emergency.
When using a residual current device, use one with countermeasures for high frequencies.
- 14 Install a noise filter to reduce terminal noise voltage.
- 15 The power supply for the brake of motors with a brake must be supplied by the customer.
- 16 Ensure that voltage is applied to the power supply only after wiring has been completed.
- 17 Regarding external regenerative resistors:
 - Sizes A, B, G and H do not have built-in regenerative resistors.
 - Sizes C, D, E, and F have built-in regenerative resistors which are activated by shorting between RB and B.
 - If tripping occurs due to a regenerative overload protection error (Err18.0), an external regenerative resistor must be installed. For external regenerative resistors, remove the short cable or short bar between RB and B and connect it between the P and B terminals. In addition, parameters must be used for regenerative resistor settings.

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

- The following resistors are recommended as external regenerative resistors:

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

* Manufacturer: Iwaki Musen Kenkyusho

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

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

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

- When using a thermal protector, configure the circuit to turn off the power supply.

(See "8 Wiring and System Configuration")

- The built-in thermal fuse may break due to heat dissipation conditions, operating temperature range, power supply voltage, or load fluctuation.

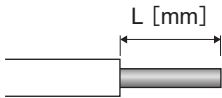
When operating in conditions where the regenerative resistor is likely to generate heat (e.g., when the power supply voltage is high, when load inertia is large, when deceleration times are short), incorporate it into the device to ensure that the surface temperature of the regenerative resistor remains at 100°C or less and confirm the operation thereof.

- Install the regenerative resistor to nonflammable materials such as metal.
- Install the regenerative resistor so that it cannot be touched directly, such as by covering it with non-combustible material.
- Sections which can be touched directly should be kept to less than 70°C .

8.3.1.10 How to wire to the power connector

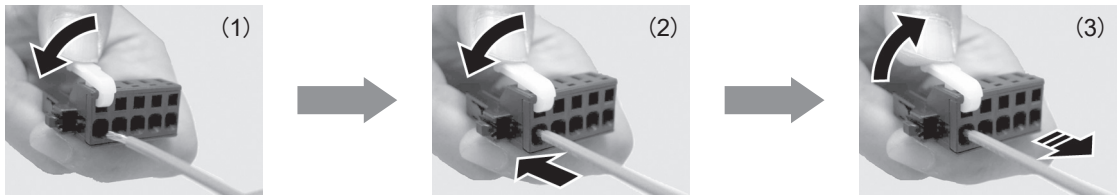
Follow the procedure below to wire to connectors XA, XB, XC and XD .

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



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

- 2 Insert the wire into the connector.



- (1) Push down the spring by pushing the control lever attached to the upper operating slot with your fingers.
- (2) Insert the wire while pressing the control lever.
* Ensure that all strands are inserted into the spring opening.
- (3) Wire it by releasing the control lever. Pull the wire lightly to make sure that the wire is securely connected.

Precautions

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

8.3.2 Wiring to Connector X4

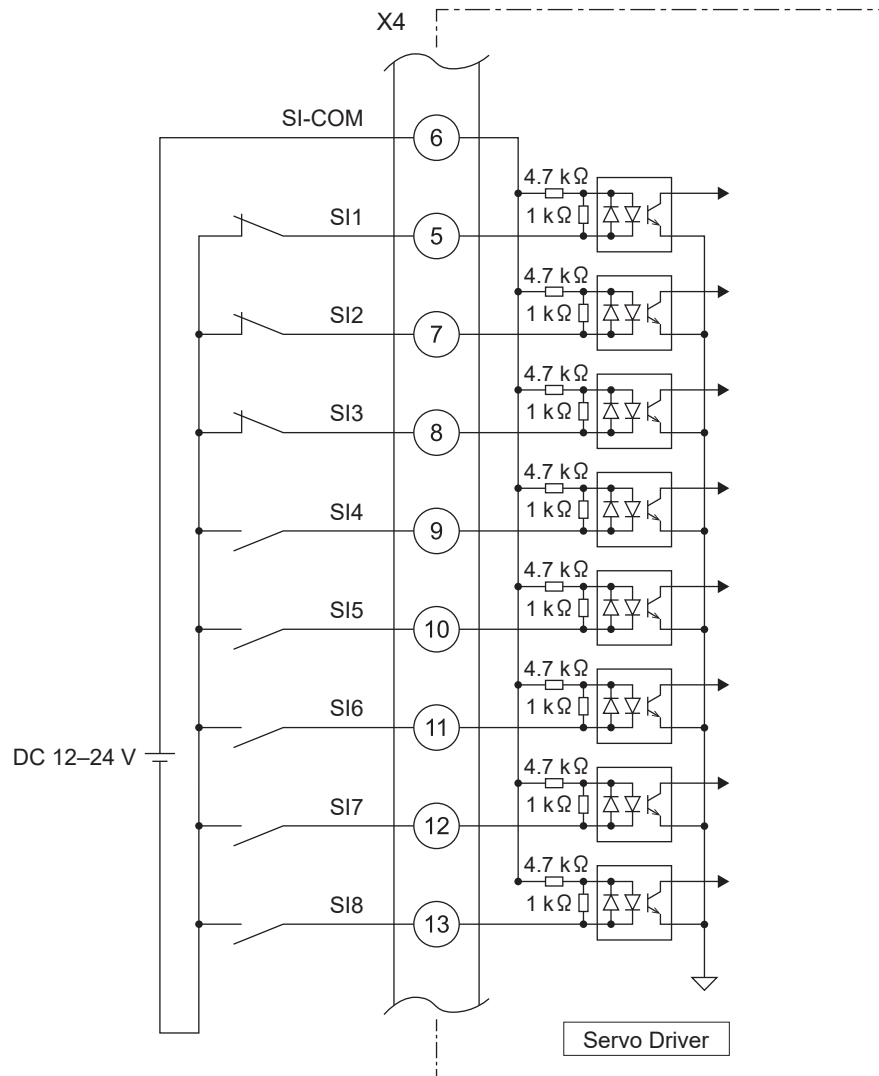
- 1 The customer is required to prepare provide a DC 12 - 24 V control signal power supply for external control to be connected to SI-COM.

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

Do not connect it to the same power supply.

- 2 Install peripheral devices as close to the servo driver as possible to minimize the wiring length (within 3 m).
- 3 Keep the cables as far away from the wiring of the power lines (L1, L2, L3, L1C, L2C, U, V, W, \oplus) as possible (at least 30 cm). Do not put them in the same duct or bind them together.

8.3.2.1 Control input



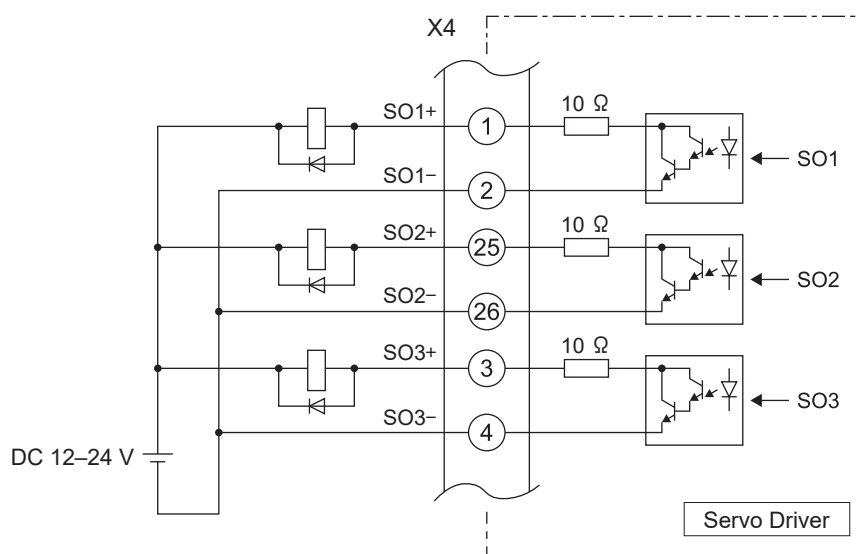
The functions of SI1 to SI8 are assigned using parameters.

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

8.3.2.2 Control output

- 1 Be aware of the polarity of the power supply for control signals. Polarity connections contrary to the figure shown above can damage the servo driver.
- 2 If the relay is to be driven directly by the output signal, install a diode in parallel with the relay in the direction shown below. Failure to install a diode or installing it in the opposite direction will damage the servo driver.
- 3 When each output signal is received by a logic circuit such as a gate, ensure that it is not affected by noise.
- 4 The current to be passed through each output must not exceed a rated current of 40 mA, a maximum current of 50 mA, or an inrush current of 90 mA.
- 5 The output circuit is equipped with a limiting resistor (10 Ω).

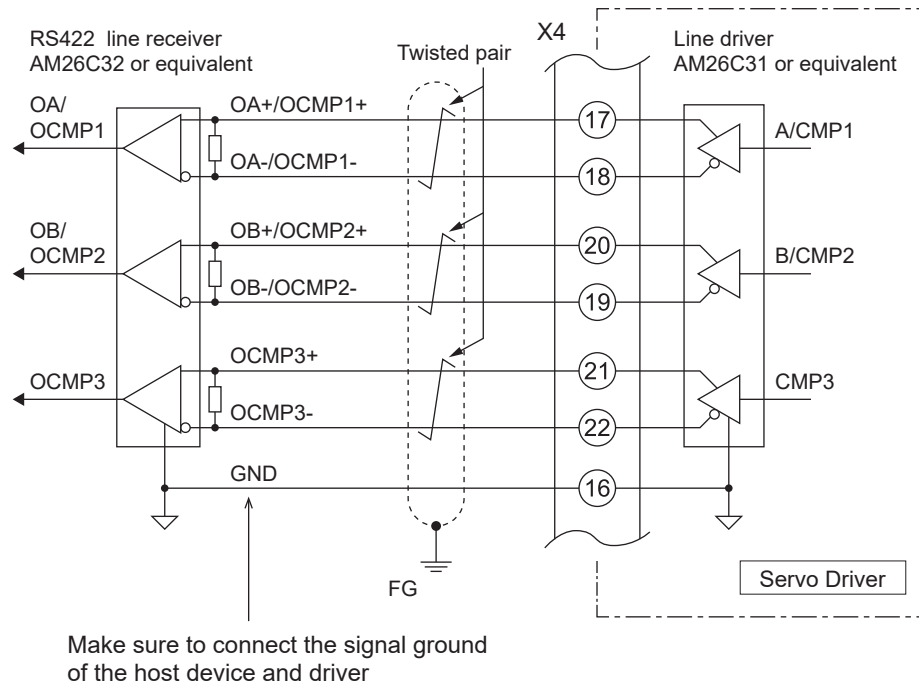
Also, because the output transistor is a Darlington connection, voltage $V_{CE(SAT)}$ is approx. 1 V between the collector and emitter when the transistor is on, meaning that direct connections are not possible due to the fact that V_{IL} cannot be satisfied with a normal TTL IC.



The functions of SO1 to SO3 are assigned using parameters.

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

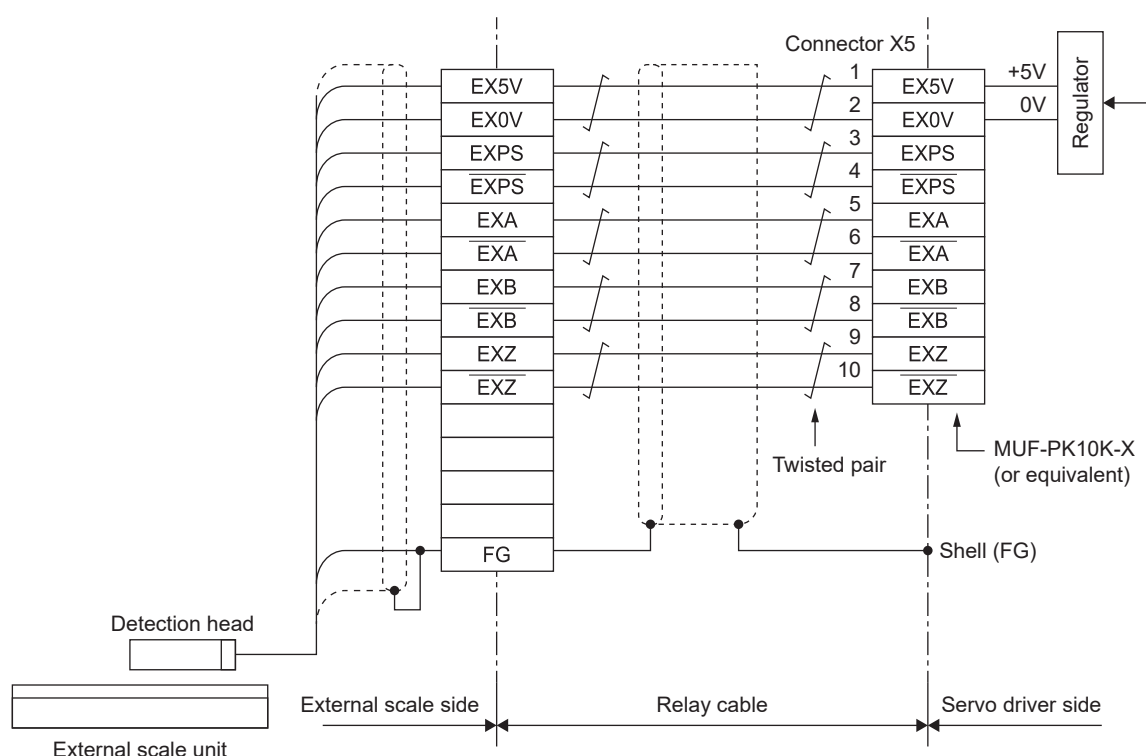
8.3.2.3 Encoder output signal/position compare signal output



- 1 Use an RS422 line receiver (AM26C32 or equivalent) to receive output pulses. Ensure that an appropriate terminating resistor (approx. 330 Ω) is installed between the line receiver inputs.
- 2 Use at a maximum output frequency of 4 Mpps (after being multiplied by 4) or less.

8.3.3 Wiring to Connector X5

- 1 Only compatible with the multifunction type.
- 2 The core cable of the external scale cable should be a strand wire of 0.18 mm^2 or more. Use a common shielded twisted-pair wire.
- 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, \oplus) 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 $5 \text{ V} \pm 5\%$ 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 an encoder cable in which the strands are common shielded twisted-pair wires whose core is 0.18 mm² or more.
- 2 The maximum cable length is 20 m. For long wiring lengths, double wiring is recommended for the 5 V power supply to reduce the effects of voltage drops.
- 3 Ensure that the shielded wire of the encoder cable is connected to the FG terminal on the motor side and to the shell (FG) of X6 on the servo driver side.
- 4 Keep the cables as far away from the wiring of the power lines (L1, L2, L3, L1C, L2C, U, V, W, \oplus) as possible (at least 30 cm). Do not put them in the same duct or bind them together.

8.3.4.1 If not using multi-turn data

*When used as an incremental encoder

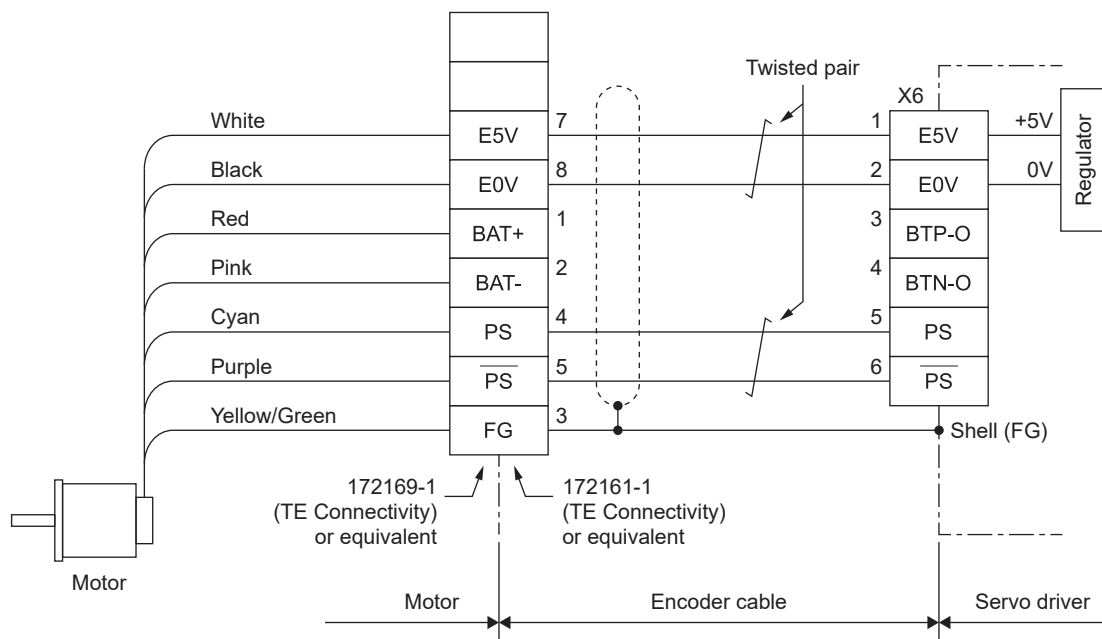
*When used as a single-turn absolute encoder

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

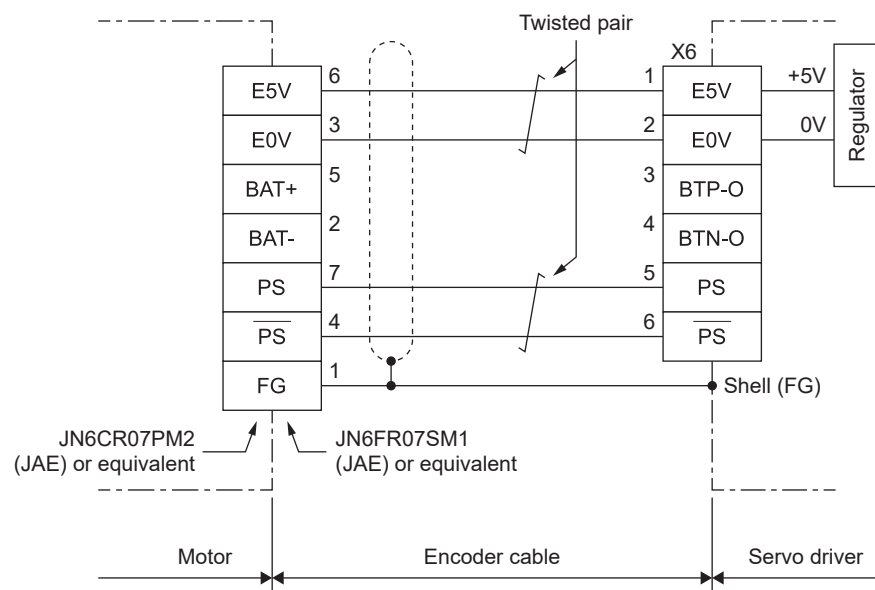


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

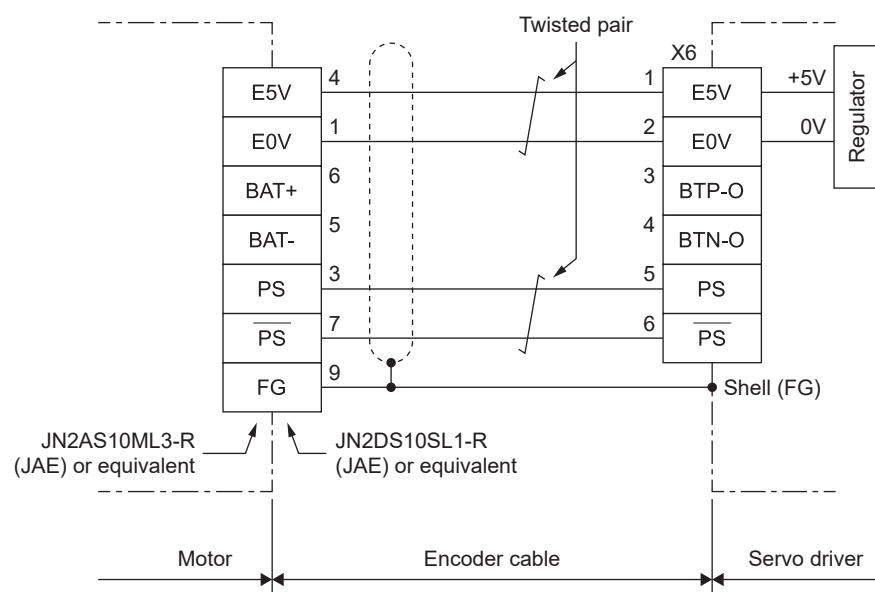


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



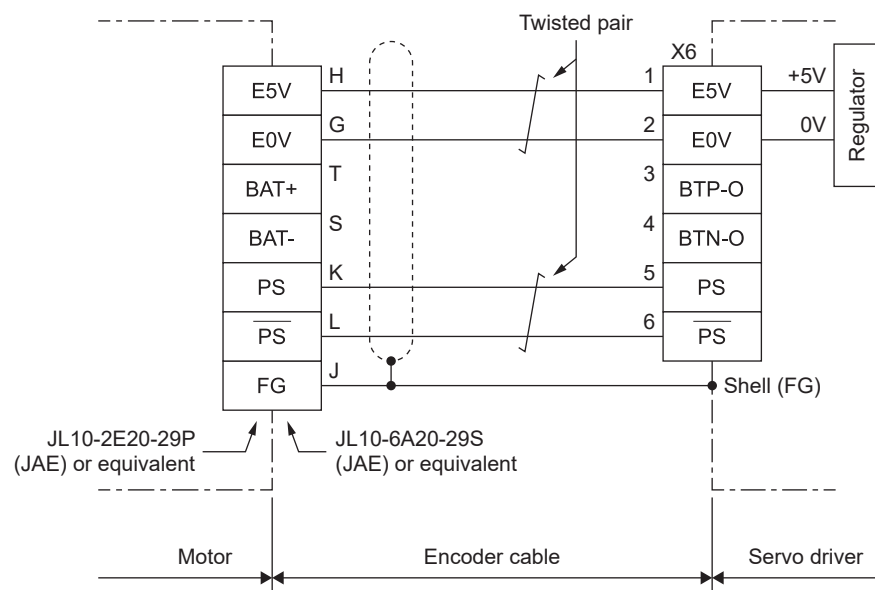
Cannon plug type

MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 7.5 kW

MDMF 1.0 kW - 22.0 kW

MGMF 0.85 kW - 5.5 kW

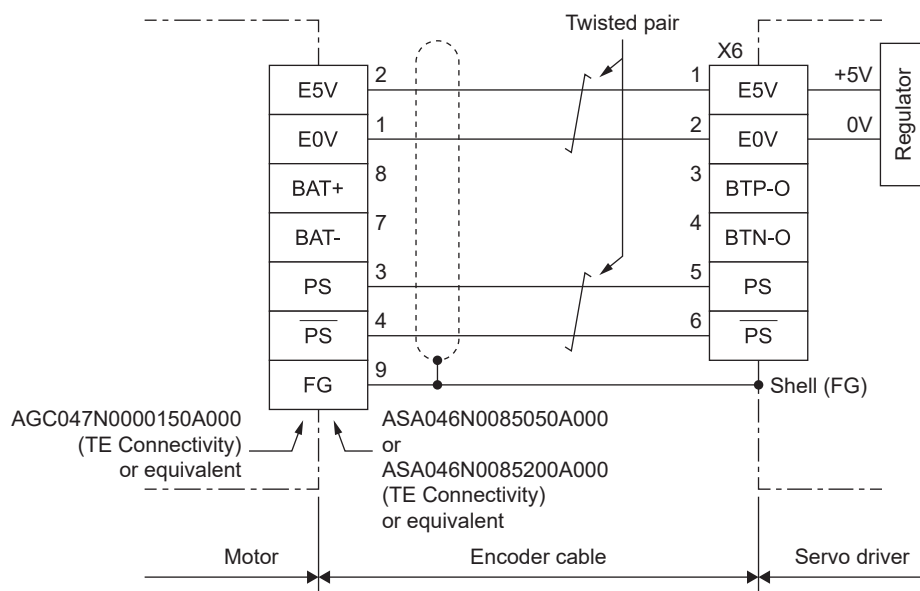
**Right-angle cannon plug type**

MSMF 1.0 kW - 5.0 kW (400 V)

MHMF 1.0 kW - 5.0 kW (400 V)

MDMF 1.0 kW - 5.0 kW (400 V)

MGMF 0.85 kW - 4.4 kW (400 V)



8.3.4.2 Using multi-turn data

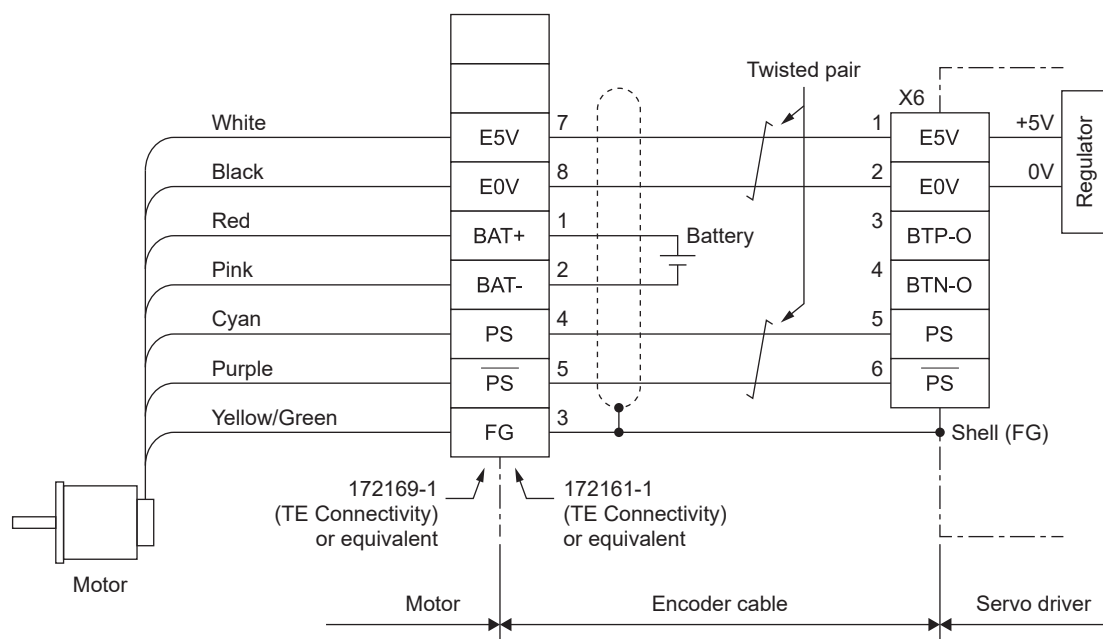
*When building an absolute system

Lead wire type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

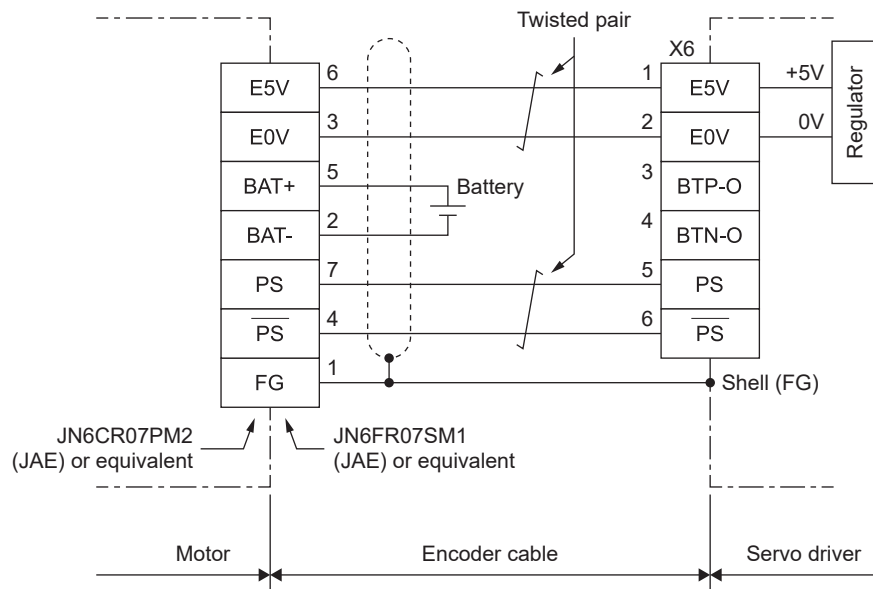


Connector type

MSMF 50 W - 1000 W

MHMF 50 W - 1000 W

MQMF 100 W - 400 W

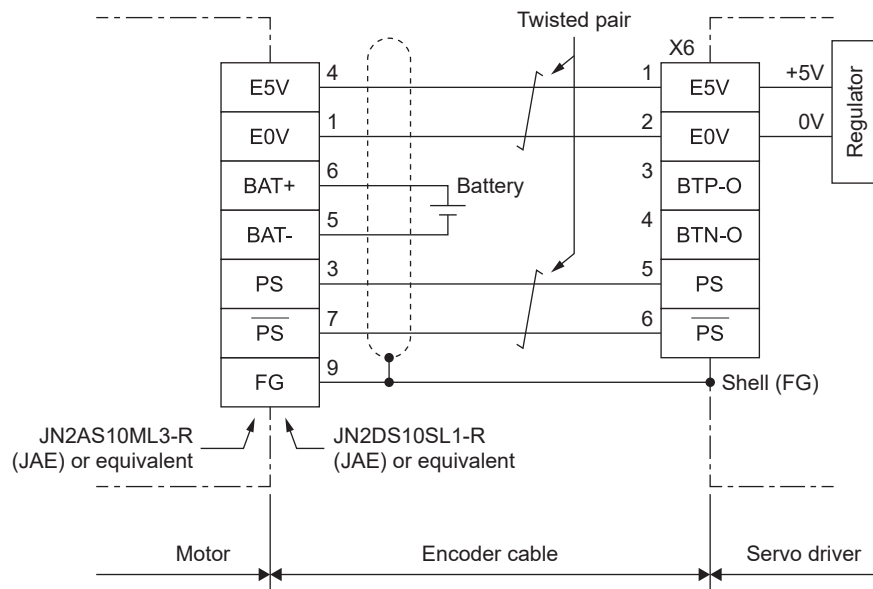


MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 5.0 kW

MDMF 1.0 kW - 5.0 kW

MGMF 0.85 kW - 4.4 kW



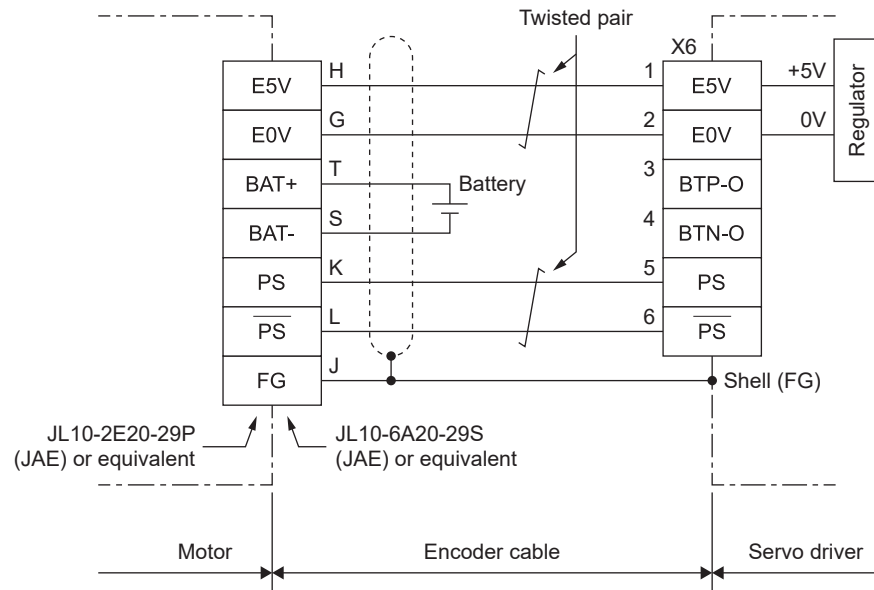
Cannon plug type

MSMF 1.0 kW - 5.0 kW

MHMF 1.0 kW - 7.5 kW

MDMF 1.0 kW - 22.0 kW

MGMF 0.85 kW - 5.5 kW

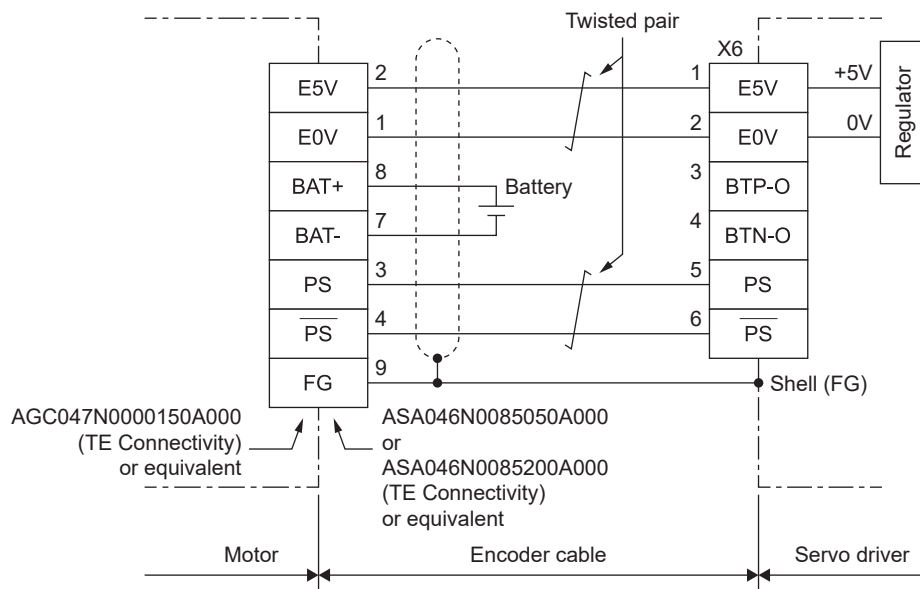
**Right-angle cannon plug type**

MSMF 1.0 kW - 5.0 kW (400 V)

MHMF 1.0 kW - 5.0 kW (400 V)

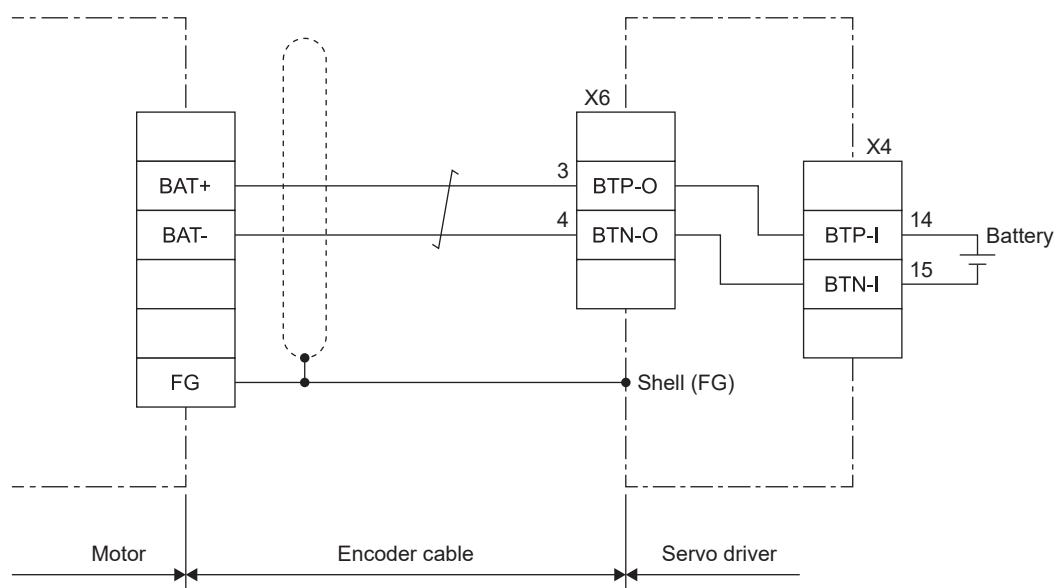
MDMF 1.0 kW - 5.0 kW (400 V)

MGMF 0.85 kW - 4.4 kW (400 V)



8.3.4.3 Connecting the absolute encoder battery

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



Precautions

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

8.3.4.4 Precautions for absolute encoder battery usage

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

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

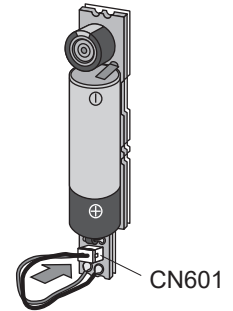
- 1 Be aware that battery life span may be reduced due to surrounding environmental conditions.
- 2 Lithium batteries have a transient minimum voltage (voltage delay) that may temporarily drop when the battery begins to discharge current. For this reason, the battery must be refreshed before being used.

When using the battery for the first time

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

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

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



After installing the battery unit

- We recommend turning the control power supply on and off approximately once a day.
- Using batteries incorrectly may result in product damage due to battery leakage and in damage to the battery. Make sure to observe the following:
 - 1 The positive and negative poles must be oriented correctly.
 - 2 Because leaving batteries that have been used for long periods of time or that are no longer usable inside the device may cause problems such as leaks, replace them immediately. (Replacement is recommended roughly every two years.)
 - The electrolytic solution in the battery is highly corrosive and can corrode peripheral parts. It is also conductive and can cause issues such as short circuits. Make sure to replace the battery periodically.
 - 3 Do not attempt to disassemble the battery or subject it to fire.
 - Do not attempt to disassemble the battery due to the extreme risks presented were its contents to spray out and get into eyes. It may explode if subjected to fire or heated.
 - 4 Do not attempt to short circuit the battery or remove its tube.
 - If metal or other such materials were come in contact with the positive or negative pole terminals of the battery, a large current would flow all at once, which would not only weaken the battery, but also generate severe heat and possibly cause the battery to rupture.
 - 5 This battery cannot be charged. Do not attempt to charge it.
 - Because the disposal of used batteries is regulated by municipalities, please dispose of the battery in accordance with the regulations of your municipality.
 - Air transportation

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

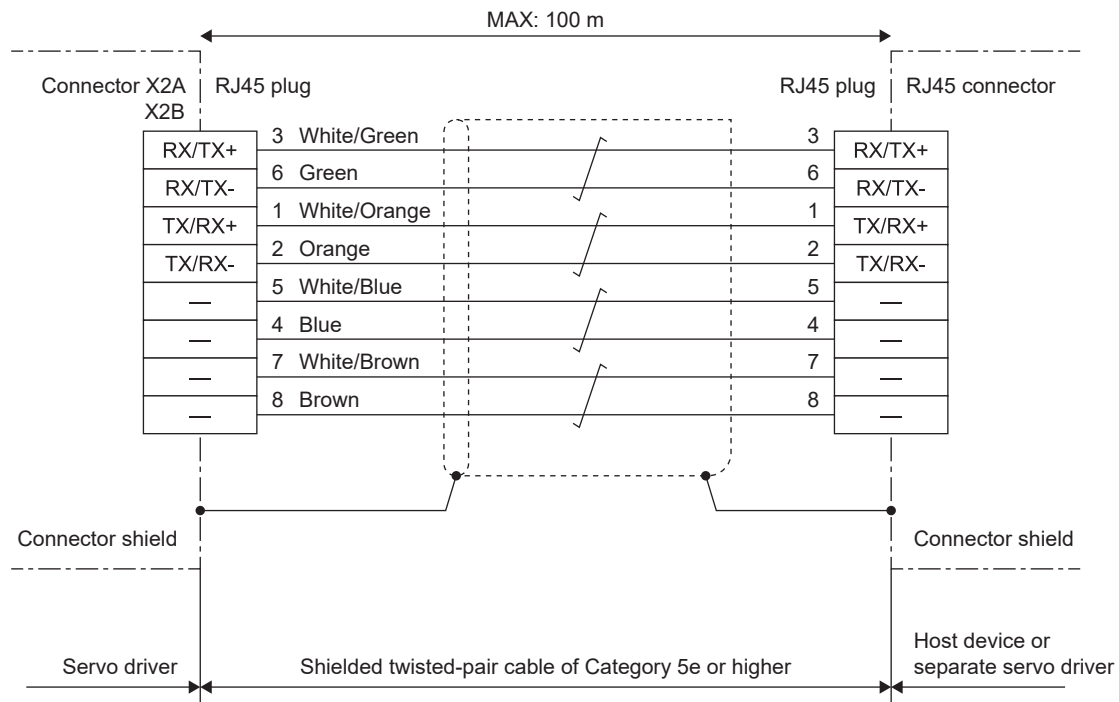
When requesting air transportation, air transport carriers will require the submission of the necessary documents (parameter sheets, SDS, etc.). These can be obtained from your distributor.
 - UN packaging

Please contact your air transport carrier.

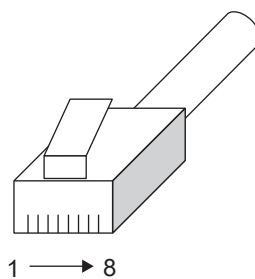
8.3.5 Wiring to Connectors X2A, X2B

- 1 Use shielded twisted pair (STP) cables of Category 5e or higher.
- 2 If both ends of the shield are not grounded, EMC properties will degrade.
When attaching the connector plug to each end of the cable, ensure that the shielded wire of the cable is connected to the metal shell of the plug.
- 3 The lead wire color and connector terminal must be in accordance with TIA/EIA-568B (see [“8.3.5.1 X2A/X2B connection”](#)).
The two pairs of pins 1-2 and 3-6 are for signal wire. Make sure that the two pairs of unused pins 4-5 and 7-8 are also connected to the connector.
- 4 The wiring length of the communication cable must be within a range that meets the following conditions.
 - The length between each node must not exceed 100 m.
- 5 Cable specifications, such as bending properties, temperature ranges, covering materials, will vary by manufacturer.
Select a cable that meets the usage conditions at your company.
Also select a movable cable that meets the usage conditions at your company.

8.3.5.1 X2A/X2B connection



8.3.5.2 RJ45 plug pin configuration



8.4 Dynamic Brake

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

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

The dynamic brake can be activated when the:

- 1 main power supply is off;
- 2 servo is off;
- 3 protection function is activated;
- 4 over-travel inhibit inputs (POT, NOT) of connector X4 are operated.

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

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

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

- 1 Do not start or stop the device by turning the servo-on signal (SRV-ON) on or off.
This may damage the dynamic braking circuit incorporated into the servo drive.
- 2 Do not run the motor using an external power source.
If the motor is run externally, it will start acting as an electricity generator. This may cause it to short-circuit during operation of the dynamic brake, resulting in smoke or fire.
Doing so may also cause the dynamic brake to become disconnected, preventing it from functioning.
- 3 If the dynamic brake is applied when the device is operating at a high speed, allow a stop time of approximately 10 minutes.
Failure to do so may cause the dynamic brake to disconnect or the brake to no longer be operable.

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

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

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

8.5 Mounting Direction and Spacing

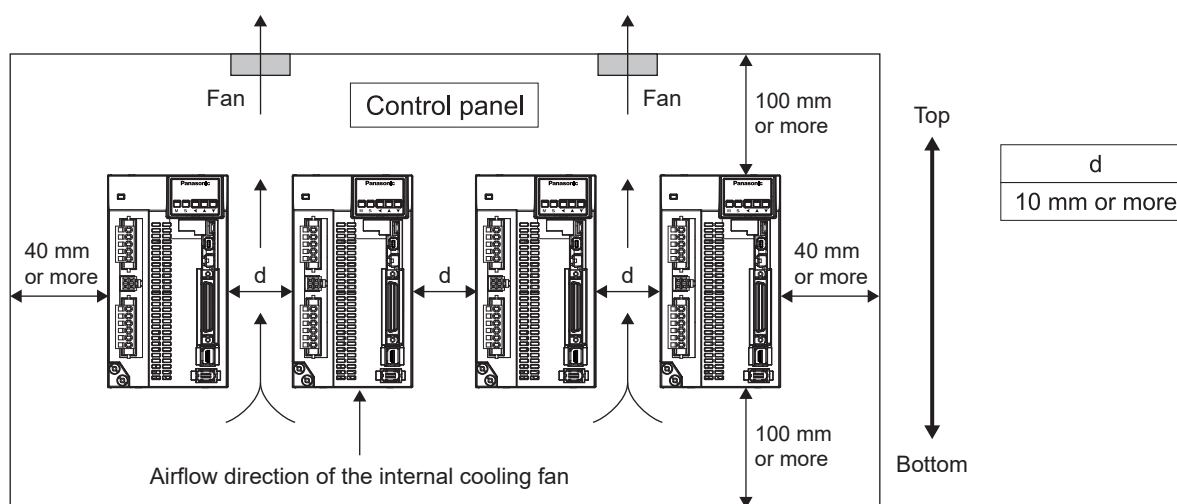
- The servo driver is a vertically mounted type. Ensure that it is mounted vertically.
- Servo driver sizes A–D and H come standard as base-mounted types (rear-mounted).
- If changing the mounting surface of servo driver sizes A–D, use a separately sold mounting bracket.
- Select a tightening torque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

Example: Mounting to steel with steel screws

Sizes A–G: M5 2.7–3.3 N·m; H: M6 4.7–5.7 N·m

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

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



9 Compliance with International Standards

9.1 List of Compliance Standards for Servo Drivers

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

9.2 EU directives and UK regulations

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

9.2.1 Compliance with the EU EMC directive/UK EMC regulation

EN 55011

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

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

EN 61800-3

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

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

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

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

1 Earth fault protection

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

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

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

For TN system

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

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

For TT system

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

2 Over heat protection/Over load protection

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

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

9.3 Configuration of Peripheral Devices

9.3.1 Installation Environment

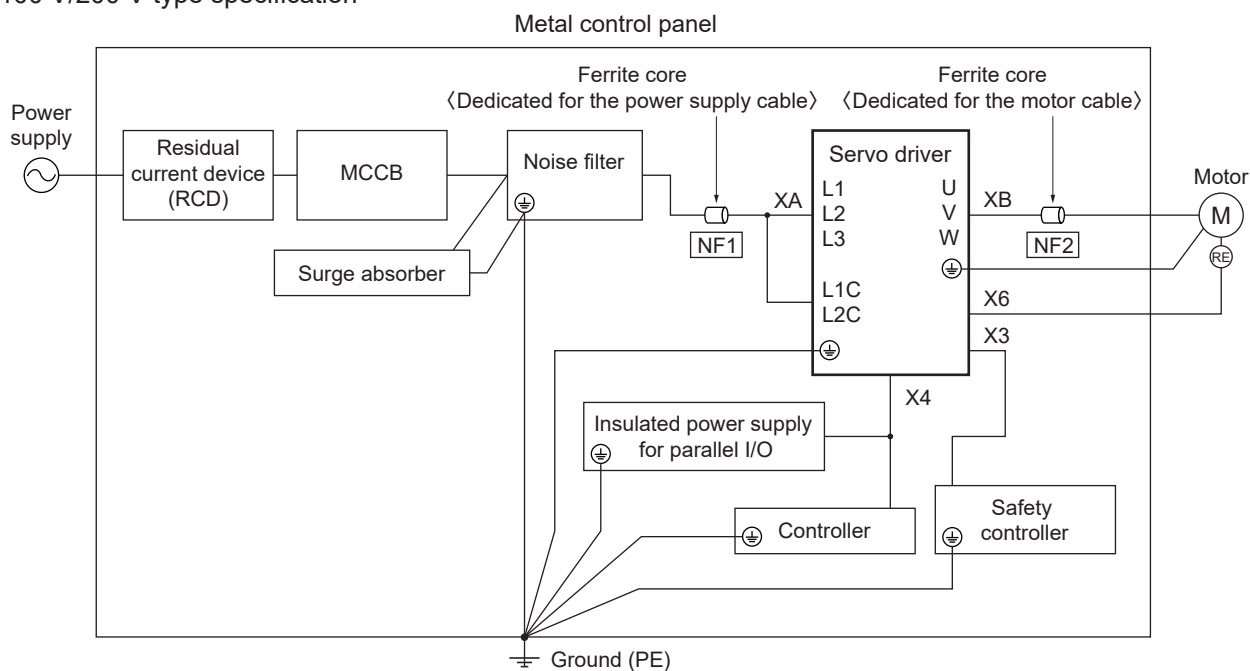
Use in an environment with a pollution degree 2 as stipulated in IEC60664-1.

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

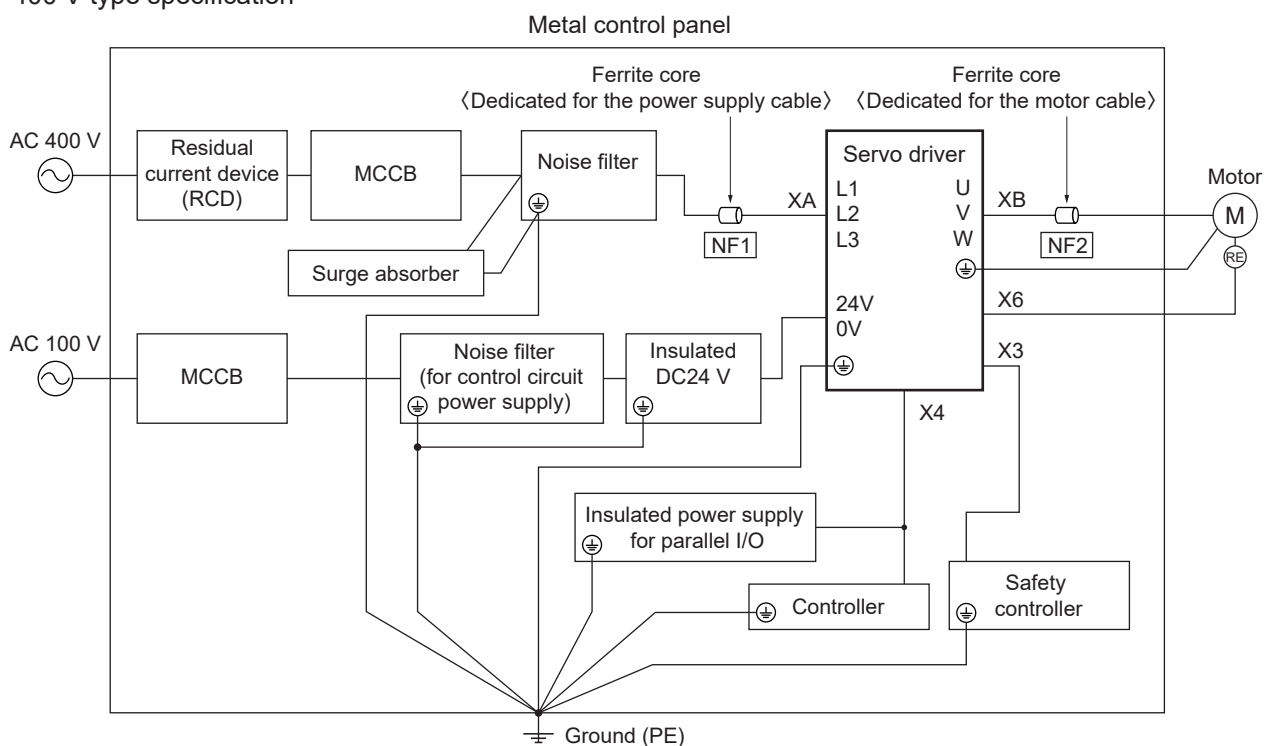
Make sure to connect a molded case circuit breaker (MCCB) or fuse that is compliant with IEC standards or that is UL-approved to the main power supply.

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

100 V/200 V type specification



400 V type specification



Ferrite core installation status during EMC certification test

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


- *1 Power supply cables (L1, L2, L3) should be wound together for one circle. Motor cables (U, V, W) should also be wound together for one circle. One circle (bypass one line).
- *2 Power supply cables (L1, L2, L3) should be wound individually for one circle. Motor cables (U, V, W) should also be wound individually for one circle. One circle (bypass one line).
- *3 Power supply cables (L1, L2, L3) should be wound together for four circles. Motor cables (U, V, W) should also be wound together for four circles. If four turns is difficult, use two identical ferrite cores and make two turns for each.
- *4 Combine motor wires (U, V, W) and attach two ferrite cores in series. One circle (bypass one line).

9.3.2 Power Supply

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

- 1 Use in an OVC III environment as stipulated in IEC60664-1.
- 2 Use an insulated DC 12 to 24 V parallel I/O power supply that is in compliance with the CE marking or the EN standard (EN60950).

9.3.3 Molded Case Circuit Breaker (MCCB)

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

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

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

9.3.4 Noise Filter

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

9.3.5 Surge Absorber

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



Caution

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

9.3.6 Ferrite Core

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

9.3.7 Grounding

- 1 To prevent electric shock, make sure to connect the protective ground terminal () of the servo driver with the protective ground (PE) of the control panel.
- 2 Do not tighten the connection to the protective ground terminal (). There are two protective ground terminals.

9.4 List of Peripheral Devices Applicable to the Servo Driver

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

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

Notes

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

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

If the tightening torque of the screws exceeds the maximum value (see the terminal block description page), the terminal block may be damaged.

- The wire diameter of the ground cable must be 2.0 mm² (AWG 14) or more for outputs between 50 W–2.5 kW, 3.5 mm² (AWG 12) or more for outputs between 3.0 kW–5.0 kW, 8.0 mm² (AWG 8) or more for an output of 7.5 kW, 22 mm² (AWG 4) or more for an output of 15.0 kW, and 38 mm² (AWG 2) or more for an output of 22.0 kW.
- For sizes A–E, use the included dedicated connectors.
- The tightening torque of the screw used for connecting connector (X4) to the host controller should be between 0.2 ± 0.05 N·m.

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

9.5 Compliance with UL Standards

1 Installation environment

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

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

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

2 Short circuit current rating (SCCR)

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

3 Branch circuit protection

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

4 Load protection and overheating protection

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

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

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

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

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

9.6 Radio Waves Act (South Korea)

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

The user and distributor should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)

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

(대상기종 : **Servo Driver**)

[Reference translation]

Class A device (broadcast communication device for business use)

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

The user and distributor should be aware of this fact.

(Applicable model: Servo Driver)

9.7 Compliance with the SEMI F47 Standard

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

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

Precautions

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

9.8 Harmonic Suppression Measures

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



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

10 SAFETY PRECAUTIONS



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

SAFETY PRECAUTIONS

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

| | |
|--|---|
|  DANGER | This indicates "a significant risk of death or serious injury". |
|  CAUTION | This indicates "a risk of minor injury or damage to property". |

The following symbols indicate how to comply with safety precautions.

| | |
|---|---------------------------------|
|  | Something that you must not do. |
|  | Something you must do. |

DANGER



- 1 Ensure that the product is used in an environment of pollution degree 2 (places free from dust, metal powders, oil mists, and other foreign objects, as well as liquids such as water, oil, or grinding fluids). Do not store or use near combustible materials or in an environment containing corrosive gases (H₂S, SO₂, NO₂, Cl₂, etc.), flammable gases, helium gases, or other gases with low molecular weight.
- 2 Do not place flammable materials near the motor, servo driver, or regenerative resistor.
- 3 Do not run the motor using an external power source. If the motor is run externally, it will start acting as an electricity generator. This may cause it to short-circuit during operation of the dynamic brake, which is integrated into the servo driver, resulting in smoke and dust being emitted. Doing so may also cause the dynamic brake to become disconnected, preventing it from functioning.
- 4 Do not damage the cable, apply undue stress to it, place heavy objects on it, or pinch it.
- 5 Do not use with the cable submerged in oil or water.
- 6 Do not install the product next to heating elements such as heaters or large winding resistors. (Protection such as heat shields should be used to protect the product from heating elements.)
- 7 Do not connect a commercial power supply directly to the motor.
- 8 Do not use in places susceptible to strong vibrations or impacts. If installing a servo driver near a source of vibration, attach a vibration dampening device to the servo driver mounting surface.
- 9 Do not touch the rotating parts of the motor during operation.
- 10 Do not touch the keyway of the motor output shaft with bare hands.
- 11 Do not put hands inside the servo driver.
- 12 Do not touch the heat sink and peripheral devices of the motor or servo driver, as they can get very hot.
- 13 Do not performing wiring or operate the product with wet hands.

DANGER



- 14 Wiring work should be carried out by an electrical engineer.
- 15 Motors other than that specified do not include protective devices. Protect them using overcurrent protection devices, ground-fault circuit interrupters, overheating prevention devices, emergency stop devices, etc.
- 16 Before operating the servo driver following an earthquake, ensure that the servo driver and motor are properly installed and that the machine is safe.
- 17 After the power supply is switched off, the internal circuit will be charged at high voltage for a period of time. When relocating, wiring, or inspecting the driver, ensure that the power supply input is completely disconnected on the outside of the servo driver and wait at least 15 minutes before carrying out any work.
- 18 Install and set up the product so that it does not cause fire or personal injury in the event of an earthquake.
- 19 Install an external emergency stop circuit must be installed to enable the power supply to be immediately disconnected in the event of an emergency.
- 20 Install the motor, servo driver, and peripheral devices to nonflammable materials such as metal.
- 21 Ensure that the product is wired correctly and securely. Insecure or incorrect wiring may cause the motor to malfunction or lead to thermal damage. Also, do not allow any conductive materials such as wire debris to enter the servo driver during installation and wiring.
- 22 Ensure that the cables are securely connected and that energized parts are insulated.
- 23 Binding and inserting wires into a metal duct will cause the temperature to increase, which will result in reduced wire current capacity and possibly lead to thermal damage. Please consider the current reduction coefficient before deciding on how to wire the product.
- 24 Make sure to install a molded case circuit breaker (MCCB) to the power supply. Also, make sure to ground the ground terminal or ground wire.
- 25 Securely tighten the screws for connecting the terminal block, as well as the grounding screw, using the torque indicated in the specification sheet.
- 26 When constructing a system using safety features, make sure you understand and comply with the relevant safety standards as well as the information in our user manuals or technical reference documents.

CAUTION



- 27 When transporting the product, do not hold it by the cable or motor shaft.
- 28 When adjusting the parameters of the servo driver, do not set the gain too high or make extreme modifications to settings simultaneously, as doing so may result in unstable operation.
- 29 Following a power outage, do not get close to the machine once power is restored, as it may restart suddenly. Settings must be made to ensure personal safety even in event the machine restarts suddenly.
- 30 Do not approach the motor or the machine when it is running during power-up to ensure safety in the event of an unexpected malfunction.
- 31 Do not subject the motor shaft to strong shock.
- 32 Do not turn the servo driver main power supply on and off more frequently than necessary.
- 33 Do not use the electromagnetic contactor installed on the main power supply side to start or stop the motor.
- 34 If the motor has a built-in brake, it is for maintenance purposes and should not be used as a stopping (braking) device in order to ensure machine safety.
- 35 Do not drop or tip over the product during transportation or installation.
- 36 Do not climb on the motor or place heavy objects on it.
- 37 Do not cover the servo driver louver or allow any foreign objects to enter.
- 38 Do not expose the product to direct sunlight. When storing the product, keep it away direct sunlight and store at temperatures and humidity within the specified ranges.
- 39 Do not attempt to overhaul or modify the motor. Overhauls must be carried out by Panasonic or an authorized dealer.
- 40 Do not start or stop the device by turning the servo-on command (SRV-ON) on or off as this may damage the dynamic braking circuit incorporated into the servo drive.

CAUTION



- 41 Use the motor and servo driver in the combination specified by Panasonic. If combining the motor with a different servo driver, make sure to confirm its performance and safety.
- 42 Failure of the motor or the servo driver it is combined with may result in thermal damage to the motor and may cause smoke and dust to be emitted. Please consider these possibilities when using the device in cleanrooms, etc.
- 43 Make sure the device is mounted in a manner suitable for the power output and the weight of the unit.
- 44 Keep the ambient temperature and humidity of the servo driver and motor are within the permitted ambient temperature and humidity ranges.
- 45 Observe the specified mounting method and orientation.
- 46 Keep the required distance between the servo driver and the control panel interior or other equipment.
- 47 If an eyebolt is attached to the motor, it should only be used to transport the motor and not to transport any other equipment. The eyebolt should also not be used if a decelerator, face plate, etc., is attached.
- 48 Connect the brake control relay in series with the relay that disconnects in the event of an emergency stop.
- 49 To perform a test run, secure the motor and check its operation with it disconnected from the mechanical system, then mount it onto the machine.
- 50 Confirm that the input power supply voltage is in line with the servo driver specifications before turning it on and operating.
- 51 In the event of an alarm, eliminate the cause of the alarm and restart the device.
- 52 If the motor has a built-in brake, it may not last due to reasons such as its life span or mechanical structure. A stopping device must be installed on the machine side to ensure safety.
- 53 The motor and servo drive emit heat while the motor is in operation. Ambient temperature may rise abnormally if used in an enclosed area. Take care to ensure that the ambient temperatures of the motor and servo driver are within the operating range.
- 54 Maintenance and inspections should be performed by a specialist.
- 55 Make sure to turn off the power supply if the device will not be used for a long period of time.
- 56 If the dynamic brake built into the servo driver is applied when the device is operating at a high speed, allow a stop time of approximately 10 minutes. Failure to do so may cause the internal circuit to disconnect or the brake to no longer be operable.
- 57 Secure the cables so that they do not put stress on the connectors, terminal block, or other connections.

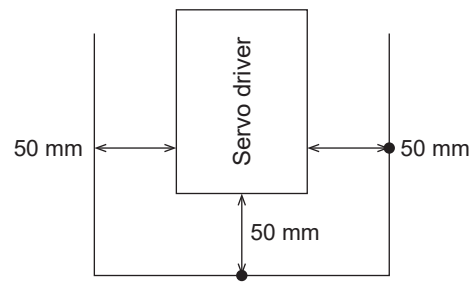
- The capacitance of the capacitors of the power supply rectifier circuit will drop over time. To avoid a secondary problem due to a failure, replacement is recommended approx. every five years. Replacement must be carried out by Panasonic or an authorized dealer.
- Be sure to read operating manual (safety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

Servo Driver Ambient Temperature

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

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

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

Front view

Operating temperature range: 0–55 °C

11 Life span

(Life span is not guaranteed.)

11.1 Expected Life span of Servo Driver

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

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

| | | |
|-----------|------------------------|--|
| Condition | Input power supply | : Single-phase AC 100 V 50/60 Hz, Single-phase/3-phase AC 200 V 50/60 Hz 3-phase AC 400 V 50/60 Hz |
| | Ambient temperature | : 55 °C |
| | 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 benzene, 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 | MADLN01BE MADLT01BF | MADLN11BE MADLT11BF | MADLN05BE MADLT05BF | MADLN15BE MADLT15BF |
| Power supply input | Single-phase 100 V | Single-phase 100 V | Single-phase/3-phase 200 V | Single-phase/3-phase 200 V |
| Maximum output current | 6 A | 8 A | 6 A | 8 A |
| Rotary encoder | 8388608 resolution | 8388608 resolution | 8388608 resolution | 8388608 resolution |
| Regenerative resistor | External | External | External | External |
| Auto-gain tuning function | Provided | Provided | Provided | Provided |
| Dynamic brake function | Provided | Provided | Provided | Provided |
| Absolute system | Available | Available | Available | Available |
| Operating ambient temperature | 0-55 °C | 0-55 °C | 0-55 °C | 0-55 °C |
| 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 | MBDLN21BE MBDLT21BF | MBDLN25BE MBDLT25BF | MCDLN31BE MCDLT31BF | MCDLN35BE MCDLT35BF |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Power supply input | Single-phase 100 V | Single-phase/3-phase 200 V | Single-phase 100 V | Single-phase/3-phase 200 V |
| Maximum output current | 12 A | 12 A | 22 A | 22 A |
| Rotary encoder | 8388608 resolution | 8388608 resolution | 8388608 resolution | 8388608 resolution |
| Regenerative resistor | External | External | Built-in | Built-in |
| Auto-gain tuning function | Provided | Provided | Provided | Provided |
| Dynamic brake function | Provided | Provided | Provided | Provided |
| Absolute system | Available | Available | Available | Available |
| Operating ambient temperature | 0-55 °C | 0-55 °C | 0-55 °C | 0-55 °C |
| 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 | MDDLN45BE MDDLT45BF | MDDLN55BE MDDLT55BF | MEDLN83BE MEDLT83BF | MEDLN93BE MEDLT93BF |
| Power supply input | Single-phase/3-phase 200 V | Single-phase/3-phase 200 V | 3-phase 200 V | 3-phase 200 V |
| Maximum output current | 24 A | 40 A | 60 A | 80 A |
| Rotary encoder | 8388608 resolution | 8388608 resolution | 8388608 resolution | 8388608 resolution |
| Regenerative resistor | Built-in | Built-in | Built-in | Built-in |
| Auto-gain tuning function | Provided | Provided | Provided | Provided |
| Dynamic brake function | Provided | Provided | Provided | Provided |
| Absolute system | Available | Available | Available | Available |
| Operating ambient temperature | 0-55 °C | 0-55 °C | 0-55 °C | 0-55 °C |
| 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 | MFDLNA3BE MFDLTA3BF | MFDLNB3BE MFDLTB3BF |
| Power supply input | 3-phase 200 V | 3-phase 200 V |
| Maximum output current | 100 A | 120 A |
| Rotary encoder | 8388608 resolution | 8388608 resolution |
| Regenerative resistor | Built-in | Built-in |
| Auto-gain tuning function | Provided | Provided |
| Dynamic brake function | Provided | Provided |
| Absolute system | Available | Available |
| Operating ambient temperature | 0-55 °C | 0-55 °C |
| 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 | MGDLTC3BF | MHDLTE3BF | MHDLTF3BF |
| Power supply input | 3-phase 200 V | 3-phase 200 V | 3-phase 200 V |
| Maximum output current | 165 A | 240 A | 360 A |
| Rotary encoder | 8388608 resolution | 8388608 resolution | 8388608 resolution |
| Regenerative resistor | External | External | External |
| Auto-gain tuning function | Provided | Provided | Provided |
| Dynamic brake function | Provided | なし | なし |
| Absolute system | Available | Available | Available |
| Operating ambient temperature | 0-55 °C | 0-55 °C | 0-55 °C |
| 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 | MDDLT44BF | MDDLT54BF | MDDLT64BF | MEDLT84BF |
| 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 °C | 0-55 °C | 0-55 °C | 0-55 °C |
| 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 | MFDLTA4BF | MFDLTB4BF |
| 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 °C | 0-55 °C |
| Control power supply cable | HVSF 0.52 mm ² | HVSF 0.52 mm ² |
| | AWG20 | AWG20 |
| Main power supply cable | HVSF 3.5 mm ² | HVSF 3.5 mm ² |
| | AWG12 | AWG12 |
| Ground cable | HVSF 3.5 mm ² | HVSF 3.5 mm ² |
| | AWG12 | AWG12 |
| Motor cable | HVSF 3.5 mm ² | HVSF 3.5 mm ² |
| | AWG12 | AWG12 |
| Inrush current (main power supply) (*1) | Max. 30 A | Max. 30 A |
| Inrush current (control power supply) (*1) | Max. 48 A | Max. 48 A |
| Product weight | Approx. 5.2 kg | Approx. 5.2 kg |
| External size | size F | size F |

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

Appendix List of Default Parameters and Objects

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

| | | |
|-----------|-------|-------------------------|
| PARAMETER | MODEL | MINAS A6B(BE/BF) series |
|-----------|-------|-------------------------|

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ... Value of Panaterm : 0.53 / Value of parameter-file : 53
 *2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.
 *3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|-------|-----|--|--------------------------------|-------|-----|----------------------|---------------|-------|-----|----------------------|---------------|-------|-----|-----------|---------------|-------|-----|-----------|---------------|
| 1 | 0 | 1st gain of position loop | Size A-C 48.0 Size D-H 32.0 | 1 | 31 | For Manufacturer use | 0 | 1 | 62 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | 1st gain of velocity loop | Size A-C 27.0 Size D-H 18.0 | | 32 | For Manufacturer use | 0 | | 63 | For Manufacturer use | 0 | | | | | | | | |
| | 2 | 1st time constant of velocity loop integration | Size A-C 21.0 Size D-H 31.0 | | 33 | For Manufacturer use | 0 | | 64 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | 1st filter of velocity detection | 0 | | 34 | For Manufacturer use | 0 | | 65 | For Manufacturer use | 0 | | | | | | | | |
| | 3 | 1st time constant of torque filter | Size A-C 0.84 Size D-H 1.26 | | 35 | For Manufacturer use | 0 | | 66 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | 2nd gain of position loop | Size A-C 48.0 Size D-H 32.0 | | 36 | For Manufacturer use | 0 | | 67 | For Manufacturer use | 0 | | | | | | | | |
| | 5 | 2nd gain of velocity loop | Size A-C 27.0 Size D-H 18.0 | | 37 | For Manufacturer use | 0 | | 68 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | 2nd time constant of velocity loop integration | Size A-C 21.0 Size D-H 31.0 | | 38 | For Manufacturer use | 0 | | 69 | For Manufacturer use | 0 | | | | | | | | |
| | 7 | 2nd filter of velocity detection | 0 | | 39 | For Manufacturer use | 0 | | 70 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | 2nd time constant of torque filter | Size A-C 0.84 Size D-H 1.26 | | 40 | For Manufacturer use | 0 | | 71 | For Manufacturer use | 0 | | | | | | | | |
| | 9 | Velocity feed forward gain | 100.0 | | 41 | For Manufacturer use | 0 | | 72 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | Velocity feed forward filter | 0 | | 42 | For Manufacturer use | 0 | | 73 | For Manufacturer use | 0 | | | | | | | | |
| | 10 | Torque feed forward gain | 100.0 | | 43 | For Manufacturer use | 0 | | 74 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | Torque feed forward filter | 0 | | 44 | For Manufacturer use | 0 | | 75 | For Manufacturer use | 0 | | | | | | | | |
| | 11 | 2nd gain setup | 1 | | 45 | For Manufacturer use | 0 | | 76 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | Mode of position control switching | 0 | | 46 | For Manufacturer use | 0 | | 77 | For Manufacturer use | 0 | | | | | | | | |
| | 12 | Delay time of position control switching | 1.0 | | 47 | For Manufacturer use | 0 | | 78 | For Manufacturer use | 0 | | | | | | | | |
| | *1 | Level of position control switching | 0 | | 48 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 13 | Hysteresis at position control switching | 0 | | 49 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | Position gain switching time | 1.0 | | 50 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 14 | Mode of velocity control switching | 0 | | 51 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | Delay time of velocity control switching | 0 | | 52 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 15 | Level of velocity control switching | 0 | | 53 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | Hysteresis at velocity control switching | 0 | | 54 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 16 | Mode of torque control switching | 0 | | 55 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | Delay time of torque control switching | 0 | | 56 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 17 | Level of torque control switching | 0 | | 57 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | Hysteresis at torque control switching | 0 | | 58 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 18 | For Manufacturer use | 0 | | 59 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | For Manufacturer use | 0 | | 60 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 19 | For Manufacturer use | 0 | | 61 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | *1 | For Manufacturer use | 0 | | | | | | | | | | | | | | | | |

*1 When checking directly value of parameter-file with a text data etc., it does not show the decimal point. Ex) Pr6.24 Load change compensation filter ... Value of Panatorm : 0.53 / Value of parameter-file : 53
 *2 The maximum torque limit value (Pr.0.13,Pr.5.22) varies by the applicable motor.
 *3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|----------|-----|--|-------------------------------|----------|-----|----------------------|------------------|----------|-----|-----------|------------------|----------|-----|-----------|------------------|
| 2 | 0 | Adaptive filter mode setup | 0 | 2 | 31 | For Manufacturer use | 0 | | | | | | | | |
| | 1 | 1st notch frequency | 5000 | | 32 | For Manufacturer use | 0 | | | | | | | | |
| | 2 | 1st notchwidth selection | 2 | | 33 | For Manufacturer use | 0 | | | | | | | | |
| | 3 | 1st notch depth selection | 0 | | 34 | For Manufacturer use | 0 | | | | | | | | |
| | 4 | 2nd notch frequency | 5000 | | 35 | For Manufacturer use | 0 | | | | | | | | |
| | 5 | 2nd notch width selection | 2 | | 36 | For Manufacturer use | 0 | | | | | | | | |
| | 6 | 2nd notch depth selection | 0 | | 37 | For Manufacturer use | 0 | | | | | | | | |
| | 7 | 3rd notch frequency | 5000 | | | | | | | | | | | | |
| | 8 | 3rd notch width selection | 2 | | | | | | | | | | | | |
| | 9 | 3rd notch depth selection | 0 | | | | | | | | | | | | |
| | 10 | 4th notch frequency | 5000 | | | | | | | | | | | | |
| | 11 | 4th notch width selection | 2 | | | | | | | | | | | | |
| | 12 | 4th notch depth selection | 0 | | | | | | | | | | | | |
| | 13 | Selection of damping filter switching | 0 | | | | | | | | | | | | |
| | 14 | 1st damping frequency | 0.0 | | | | | | | | | | | | |
| *1 | 15 | 1st damping filter setup | 0.0 | | | | | | | | | | | | |
| *1 | 16 | 2nd damping frequency | 0.0 | | | | | | | | | | | | |
| *1 | 17 | 2nd damping filter setup | 0.0 | | | | | | | | | | | | |
| *1 | 18 | 3rd damping frequency | 0.0 | | | | | | | | | | | | |
| *1 | 19 | 3rd damping filter setup | 0.0 | | | | | | | | | | | | |
| *1 | 20 | 4th damping frequency | 0.0 | | | | | | | | | | | | |
| *1 | 21 | 4th damping filter setup | 0.0 | | | | | | | | | | | | |
| | 22 | Command smoothing filter | Size A-C 9.2 Size D-H 13.9 | | | | | | | | | | | | |
| *1 | 23 | Command FIR filter | 1.0 | | | | | | | | | | | | |
| | 24 | 5th notch frequency | 5000 | | | | | | | | | | | | |
| | 25 | 5th notch width selection | 2 | | | | | | | | | | | | |
| | 26 | 5th notch depth selection | 0 | | | | | | | | | | | | |
| | 27 | 1st damping width setting | 0 | | | | | | | | | | | | |
| | 28 | 2nd damping width setting | 0 | | | | | | | | | | | | |
| | 29 | 3rd damping width setting | 0 | | | | | | | | | | | | |
| | 30 | 4th damping width setting | 0 | | | | | | | | | | | | |

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

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|----------|-----|--|------------------|----------|-----|----------------------|------------------|----------|-----|-----------|------------------|----------|-----|-----------|------------------|----------|-----|-----------|------------------|
| 3 | 0 | No use | - | 3 | 31 | No use | - | | | | | | | | | | | | |
| | 1 | No use | - | | 32 | No use | - | | | | | | | | | | | | |
| | 2 | No use | - | | 33 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 3 | No use | - | | 34 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 4 | For Manufacturer use | 0 | | 35 | For Manufacturer use | 0.00 | | | | | | | | | | | | |
| | 5 | For Manufacturer use | 0 | | 36 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 6 | No use | - | | | | | | | | | | | | | | | | |
| | 7 | No use | - | | | | | | | | | | | | | | | | |
| | 8 | No use | - | | | | | | | | | | | | | | | | |
| | 9 | No use | - | | | | | | | | | | | | | | | | |
| | 10 | No use | - | | | | | | | | | | | | | | | | |
| | 11 | No use | - | | | | | | | | | | | | | | | | |
| | 12 | Acceleration time setup | 0 | | | | | | | | | | | | | | | | |
| | 13 | Deceleration time setup | 0 | | | | | | | | | | | | | | | | |
| | 14 | Sigmoid acceleration/ deceleration time setup | 0 | | | | | | | | | | | | | | | | |
| | 15 | No use | - | | | | | | | | | | | | | | | | |
| | 16 | No use | - | | | | | | | | | | | | | | | | |
| | 17 | Selection of speed limit | 2 | | | | | | | | | | | | | | | | |
| | 18 | No use | - | | | | | | | | | | | | | | | | |
| | 19 | No use | - | | | | | | | | | | | | | | | | |
| | 20 | No use | - | | | | | | | | | | | | | | | | |
| | 21 | For Manufacturer use | 0 | | | | | | | | | | | | | | | | |
| | 22 | For Manufacturer use | 0 | | | | | | | | | | | | | | | | |
| | 23 | External scale selection *3 | 0 | | | | | | | | | | | | | | | | |
| | 24 | Numerator of external scaledivision *3 | 0 | | | | | | | | | | | | | | | | |
| | 25 | Denominator of external scaledivision *3 | 10000 | | | | | | | | | | | | | | | | |
| | 26 | Reversal of direction ofexternal scale *3 | 0 | | | | | | | | | | | | | | | | |
| | 27 | External scale Z phase disconnection detection disable *3 | 0 | | | | | | | | | | | | | | | | |
| | 28 | Hybrid deviation excess setup *3 | 16000 | | | | | | | | | | | | | | | | |
| | 29 | Hybrid deviation clear setup *3 | 0 | | | | | | | | | | | | | | | | |
| | 30 | No use | - | | | | | | | | | | | | | | | | |

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

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|-------|-----|------------------------------|---------------|-------|-----|--|---------------|-------|-----|-----------|---------------|-------|-----|-----------|---------------|-------|-----|-----------|---------------|
| 4 | 0 | SI1 input selection | 3289650 | 4 | 31 | Positioning complete (In-position) range | 8400 | | | | | | | | | | | | |
| | 1 | SI2 input selection | 8487297 | | 32 | Positioning complete (In-position) output setup | 0 | | | | | | | | | | | | |
| | 2 | SI3 input selection | 8553090 | | 33 | INP hold time | 0 | | | | | | | | | | | | |
| | 3 | SI4 input selection | 2236962 | | 34 | Zero-speed | 50 | | | | | | | | | | | | |
| | 4 | SI5 input selection | 2105376 | | 35 | Speed coincidence range | 50 | | | | | | | | | | | | |
| | 5 | SI6 input selection | 2171169 | | 36 | At-speed (Speed arrival) | 1000 | | | | | | | | | | | | |
| | 6 | SI7 input selection | 3158064 | | 37 | Mechanical brake action at stalling setup | 0 | | | | | | | | | | | | |
| | 7 | SI8 input selection | 3223857 | | 38 | Mechanical brake action at running setup | 0 | | | | | | | | | | | | |
| | 8 | No use | - | | 39 | Brake release speed setup | 30 | | | | | | | | | | | | |
| | 9 | No use | - | | 40 | Selection of alarm output 1 | 0 | | | | | | | | | | | | |
| | 10 | SO1 output selection | 197379 | | 41 | Selection of alarm output 2 | 0 | | | | | | | | | | | | |
| | 11 | SO2 output selection | 1052688 | | 42 | 2nd Positioning complete (In-position) range | 8400 | | | | | | | | | | | | |
| | 12 | SO3 output selection | 65793 | | 43 | No use | - | | | | | | | | | | | | |
| | 13 | No use | - | | 44 | Position comparison output pulse width setting | 0 | | | | | | | | | | | | |
| | 14 | No use | - | | 45 | Position comparison output polarity selection | 0 | | | | | | | | | | | | |
| | 15 | No use | - | | 46 | No use | - | | | | | | | | | | | | |
| | 16 | Type of analog monitor 1 | 0 | | 47 | Pulse output selection | 0 | | | | | | | | | | | | |
| | 17 | Analog monitor 1 output gain | 0 | | 48 | Position comparison value 1 | 0 | | | | | | | | | | | | |
| | 18 | Type of analog monitor 2 | 4 | | 49 | Position comparison value 2 | 0 | | | | | | | | | | | | |
| | 19 | Analog monitor 2 output gain | 0 | | 50 | Position comparison value 3 | 0 | | | | | | | | | | | | |
| | 20 | No use | - | | 51 | Position comparison value 4 | 0 | | | | | | | | | | | | |
| | 21 | Analog monitor output setup | 0 | | 52 | Position comparison value 5 | 0 | | | | | | | | | | | | |
| | 22 | For Manufacturer use | 0 | | 53 | Position comparison value 6 | 0 | | | | | | | | | | | | |
| | 23 | For Manufacturer use | 0 | | 54 | Position comparison value 7 | 0 | | | | | | | | | | | | |
| | 24 | For Manufacturer use | 0 | | 55 | Position comparison value 8 | 0 | | | | | | | | | | | | |
| | 25 | No use | - | | 56 | Position comparison output delay compensation amount | 0 | | | | | | | | | | | | |
| | 26 | No use | - | | 57 | Position comparison output assignment setting | 0 | | | | | | | | | | | | |
| | 27 | No use | - | | | | | | | | | | | | | | | | |
| | 28 | No use | - | | | | | | | | | | | | | | | | |
| | 29 | No use | - | | | | | | | | | | | | | | | | |
| | 30 | No use | - | | | | | | | | | | | | | | | | |

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

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|-------|-----|-------------------------------------|---------------|-------|-----|---|---------------|-------|-----|--|---------------|-------|-----|--|---------------|-------|-----|-----------|---------------|
| 5 | 0 | No use | - | 5 | 31 | USB axis address | 1 | 5 | 62 | No use | - | 5 | 93 | No use | - | | | | |
| | 1 | No use | - | | 32 | No use | - | | 63 | No use | - | | 94 | Position comparison Output condition setting | 0 | | | | |
| | 2 | No use | - | | 33 | Pulse regenerative output limitsetup | 0 | | 64 | No use | - | | 95 | No use | - | | | | |
| | 3 | Denominator of pulse outputdivision | 0 | | 34 | For Manufacturer use | 4 | | 65 | No use | - | | 96 | For Manufacturer use | 0 | | | | |
| | 4 | Over-travel inhibit input setup | 1 | | 35 | No use | - | | 66 | Deterioration diagnosis convergence judgment time | 0 | | 97 | For Manufacturer use | 0 | | | | |
| | 5 | Sequence at over-travel inhibit | 0 | | 36 | For Manufacturer use | 0 | | 67 | Deterioration diagnosis inertia ratio upper limit | 0 | | | | | | | | |
| | 6 | Sequence at Servo-off | 0 | | 37 | No use | - | | 68 | Deterioration diagnosis inertia ratio lower limit | 0 | | | | | | | | |
| | 7 | Sequence at main power off | 0 | | 38 | No use | - | | 69 | Deterioration diagnosis unbalanced load upper limit | 0 | | | | | | | | |
| | 8 | LV trip selection at main power off | 0 | | 39 | No use | - | | 70 | Deterioration diagnosis unbalanced load lower limit | 0 | | | | | | | | |
| | 9 | Detection time of main power off | 2000 | | 40 | No use | - | | 71 | Deterioration diagnosis dynamic friction upper limit | 0 | | | | | | | | |
| | 10 | Sequence at alarm | 0 | | 41 | No use | - | | 72 | Deterioration diagnosis dynamic friction lower limit | 0 | | | | | | | | |
| | 11 | Torque setup for emergency stop | 0 | | 42 | No use | - | | 73 | Deterioration diagnosis viscous friction upper limit | 0 | | | | | | | | |
| | 12 | Over-load level setup | 0 | | 43 | No use | - | | 74 | Deterioration diagnosis viscous friction lower limit | 0 | | | | | | | | |
| | 13 | Over-speed level setup | 0 | | 44 | No use | - | | 75 | Deterioration diagnosis velocity setting | 0 | | | | | | | | |
| | 14 | Motor working range setup | 1.0 | | 45 | Quadrant glitch positive-direction compensation value | 0 | | 76 | Deterioration diagnosis torque average time | 0 | | | | | | | | |
| | 15 | Control input signal reading setup | 0 | | 46 | Quadrant glitch negative-direction compensation value | 0 | | 77 | Deterioration diagnosis torque upper limit | 0 | | | | | | | | |
| | 16 | Alarm clear input(A-CLR) setup | 1 | | 47 | Quadrant glitch compensation delay time | 0 | | 78 | Deterioration diagnosis torque lower limit | 0 | | | | | | | | |
| | 17 | No use | - | | 48 | Quadrant glitch compensation filter setting L | 0 | | 79 | No use | - | | | | | | | | |
| | 18 | No use | - | | 49 | Quadrant glitch compensation filter setting H | 0 | | 80 | No use | - | | | | | | | | |
| | 19 | No use | - | | 50 | For Manufacturer use | 0 | | 81 | No use | - | | | | | | | | |
| | 20 | Position setup unit select | 0 | | 51 | For Manufacturer use | 0 | | 82 | No use | - | | | | | | | | |
| | 21 | Selection of torque limit | 1 | | 52 | For Manufacturer use | 0 | | 83 | No use | - | | | | | | | | |
| | 22 | 2nd torque limit | 500 | | 53 | For Manufacturer use | 0 | | 84 | No use | - | | | | | | | | |
| | 23 | No use | - | | 54 | For Manufacturer use | 0 | | 85 | No use | - | | | | | | | | |
| | 24 | No use | - | | 55 | For Manufacturer use | 0 | | 86 | No use | - | | | | | | | | |
| | 25 | For Manufacturer use | 0 | | 56 | Slow stop deceleration time setting | 0 | | 87 | No use | - | | | | | | | | |
| | 26 | For Manufacturer use | 0 | | 57 | Slow stop S-shape acceleration and deceleration setting | 0 | | 88 | No use | - | | | | | | | | |
| | 27 | No use | - | | 58 | No use | - | | 89 | No use | - | | | | | | | | |
| | 28 | No use | - | | 59 | No use | - | | 90 | No use | - | | | | | | | | |
| | 29 | For Manufacturer use | 2 | | 60 | No use | - | | 91 | No use | - | | | | | | | | |
| | 30 | No use | - | | 61 | No use | - | | 92 | No use | - | | | | | | | | |

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

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|-------|-------|--|--------------------------|-------|-------|--|--|-------|-------|--|---------------|-------|-----|---|---------------|-------|-----|-----------|---------------|
| 6 | 0 | No use | - | 6 | 31 | Real time auto tuning estimation speed | 1 | 6 | 62 | 1st resonance attenuation ratio | 0 | 6 | 93 | No use | - | | | | |
| | 1 | No use | - | | 32 | Real time auto tuning custom setup | 0 | | 63 *1 | 1st anti-resonance frequency | 0 | | 94 | No use | - | | | | |
| | 2 | Velocity deviation excess setup | 0 | | 33 | No use | - | | 64 | 1st anti-resonance attenuation ratio | 0 | | 95 | Overload warning detection level | 0 | | | | |
| | 3 | For Manufacturer use | 0 | | 34 *1 | Hybrid vibration suppression gain *3 | 0 | | 65 *1 | 1st response frequency | 0 | | 96 | Overload warning release level | 0 | | | | |
| | 4 | No use | - | | 35 *1 | Hybrid vibration suppression filter*3 | 0.10 | | 66 *1 | 2nd resonance frequency | 0 | | 97 | Function expansion setup 3 | 0 | | | | |
| | 5 *1 | Position 3rd gain valid time | 0 | | 36 | Dynamic brake operation input setup | 0 | | 67 | 2nd resonance attenuation ratio | 0 | | 98 | Function expansion setup 4 | 0 | | | | |
| | 6 | Position 3rd gain scale factor | 100 | | 37 *1 | Oscillation detecting level | 0 | | 68 *1 | 2nd anti-resonance frequency | 0 | | 99 | No use | - | | | | |
| | 7 | Torque command additional value | 0 | | 38 | Warning mask setup | 4 | | 69 | 2nd anti-resonance attenuation ratio | 0 | | 100 | For Manufacturer use | 40.00 | | | | |
| | 8 | Positive direction torque compensation value | 0 | | 39 | Warning mask setup2 | 0 | | 70 *1 | 2nd response frequency | 0 | | 101 | For Manufacturer use | 0 | | | | |
| | 9 | Negative direction torque compensation value | 0 | | 40 | No use | - | | 71 | 3rd damping depth | 0 | | 102 | Setting of over-travel inhibition release level | 0 | | | | |
| | 10 | Function expansion setup | 528 | | 41 | 1st damping depth | 0 | | 72 | 4th damping depth | 0 | | | | | | | | |
| | 11 | Current response setup | 100 | | 42 *1 | Two-stage torque filter time constant | 0 | | 73 *1 | Load estimation filter | 0 | | | | | | | | |
| | 12 | No use | - | | 43 | Two-stage torque filter attenuation term | 1000 | | 74 *1 | Torque compensation frequency 1 | 0 | | | | | | | | |
| | 13 | No use | - | | 44 | No use | - | | 75 *1 | Torque compensation frequency 2 | 0 | | | | | | | | |
| | 14 | Emergency stop time at alarm | 200 | | 45 | No use | - | | 76 | Load estimation count | 0 | | | | | | | | |
| | 15 | 2nd over-speed level setup | 0 | | 46 | No use | - | | 77 | No use | - | | | | | | | | |
| | 16 | No use | - | | 47 | Function expansion settings 2 | 1 | | 78 | No use | - | | | | | | | | |
| | 17 | No use | - | | 48 *1 | Adjust filter | Size A 1.1 Size B-C 1.2 Size D-H 1.7 | | 79 | No use | - | | | | | | | | |
| | 18 *1 | Power-up wait time | 0.0 | | 49 | Command / tuning filter damping | 15 | | 80 | No use | - | | | | | | | | |
| | 19 | For Manufacturer use | 0 | | 50 *1 | Viscous friction compensation gain | 0.0 | | 81 | No use | - | | | | | | | | |
| | 20 | For Manufacturer use | 0 | | 51 | Immediate cessation completion wait time | 0 | | 82 | No use | - | | | | | | | | |
| | 21 | For Manufacturer use | 0 | | 52 | For Manufacturer use | 0 | | 83 | No use | - | | | | | | | | |
| | 22 | A,B phase external scale pulse output selection *3 | 0 | | 53 | For Manufacturer use | 0 | | 84 | No use | - | | | | | | | | |
| | 23 | Load change compensation gain | 0 | | 54 | For Manufacturer use | 0 | | 85 | Retracting operation condition setting | 0 | | | | | | | | |
| | 24 *1 | Load change compensation filter | 0.53 | | 55 | No use | - | | 86 | Retracting operation alarm setting | 0 | | | | | | | | |
| | 25 | For Manufacturer use | Size A-G 0 Size H 500 | | 56 | No use | - | | 87 | For Manufacturer use | 0 | | | | | | | | |
| | 26 | For Manufacturer use | 2 | | 57 | Torque saturation anomaly detection time | 0 | | 88 | Absolute encoder multi-turn data upper-limit value | 0 | | | | | | | | |
| | 27 | Warning latch state setup | 3 | | 58 | For Manufacturer use | 0 | | 89 | No use | - | | | | | | | | |
| | 28 | No use | - | | 59 | For Manufacturer use | 0 | | 90 | No use | - | | | | | | | | |
| | 29 | No use | - | | 60 | 2nd damping depth | 0 | | 91 | No use | - | | | | | | | | |
| | 30 | For Manufacturer use | 0 | | 61 *1 | 1st resonance frequency | 0 | | 92 | No use | - | | | | | | | | |

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|-------|-----|--|---------------|-------|-----|--|---------------|-------|-----|---|---------------|-------|-----|---|---------------|-------|-----|-----------|---------------|
| 7 | 0 | Display on LED | 0 | 7 | 31 | No use | - | 7 | 62 | No use | - | 7 | 93 | Home position return limit speed | 0 | | | | |
| | 1 | Display time setup upon power-up | 0 | | 32 | No use | - | | 63 | No use | - | | 94 | No use | - | | | | |
| | 2 | No use | - | | 33 | No use | - | | 64 | No use | - | | 95 | No use | - | | | | |
| | 3 | Output setup during torque limit | 0 | | 34 | No use | - | | 65 | No use | - | | 96 | No use | - | | | | |
| | 4 | Backlash correction selection | 0 | | 35 | No use | - | | 66 | No use | - | | 97 | No use | - | | | | |
| | 5 | Amount of backlash correction | 0 | | 36 | No use | - | | 67 | No use | - | | 98 | No use | - | | | | |
| | 6 | Backlash correction time constant | 0 | | 37 | No use | - | | 68 | No use | - | | 99 | Communication function expansion settings 6 | 0 | | | | |
| | 7 | For Manufacturer use | 0 | | 38 | No use | - | | 69 | No use | - | | 100 | For Manufacturer use | 0 | | | | |
| | 8 | For Manufacturer use | 0 | | 39 | For Manufacturer use | 0 | | 70 | No use | - | | 101 | For Manufacturer use | 0 | | | | |
| | 9 | Correction time of latch delay 1 | 360 | | 40 | Station alias setup (for controller) | 0 | | 71 | No use | - | | 102 | For Manufacturer use | 0 | | | | |
| | 10 | For Manufacturer use | 3 | | 41 | Station alias selection | 1 | | 72 | No use | - | | 103 | For Manufacturer use | 0 | | | | |
| | 11 | For Manufacturer use | 0 | | 42 | Maximum continuation communication error | -30584 | | 73 | No use | - | | 104 | For Manufacturer use | 0 | | | | |
| | 12 | For Manufacturer use | 0 | | 43 | Detection time of lost link | 0 | | 74 | No use | - | | 105 | No use | - | | | | |
| | 13 | For Manufacturer use | 0 | | 44 | Software Ver. | - | | 75 | No use | - | | 106 | No use | - | | | | |
| | 14 | Main power off warning detection time | 0 | | 45 | No use | - | | 76 | No use | - | | 107 | No use | - | | | | |
| | 15 | For Manufacturer use | 0 | | 46 | No use | - | | 77 | No use | - | | 108 | For Manufacturer use | 7 | | | | |
| | 16 | Torque saturation error protection frequency | 0 | | 47 | No use | - | | 78 | For Manufacturer use | 0 | | 109 | For Manufacturer use | 0 | | | | |
| | 17 | No use | - | | 48 | No use | - | | 79 | For Manufacturer use | 0 | | 110 | Communication function expansion settings 7 | 0 | | | | |
| | 18 | Backlash compensation value holding range | 0 | | 49 | No use | - | | 80 | Communication function expansion settings 8 | 0 | | 111 | No use | - | | | | |
| | 19 | No use | - | | 50 | No use | - | | 81 | No use | - | | 112 | No use | - | | | | |
| | 20 | No use | - | | 51 | No use | - | | 82 | No use | - | | 113 | Torque offset filter | 0.00 | | | | |
| | 21 | No use | - | | 52 | No use | - | | 83 | No use | - | | 114 | No use | - | | | | |
| | 22 | Communication function expansion settings 1 | 0 | | 53 | No use | - | | 84 | No use | - | | 115 | No use | - | | | | |
| | 23 | Communication function expansion settings 2 | 16384 | | 54 | No use | - | | 85 | No use | - | | 116 | No use | - | | | | |
| | 24 | Communication function expansion settings 3 | 14352 | | 55 | No use | - | | 86 | No use | - | | 117 | No use | - | | | | |
| | 25 | No use | - | | 56 | No use | - | | 87 | Communication function expansion settings 5 | 3072 | | 118 | No use | - | | | | |
| | 26 | No use | - | | 57 | No use | - | | 88 | No use | - | | 119 | No use | - | | | | |
| | 27 | No use | - | | 58 | No use | - | | 89 | No use | - | | 120 | Absolute Scale Offset 1 | 0 | | | | |
| | 28 | No use | - | | 59 | No use | - | | 90 | No use | - | | 121 | Absolute Scale Offset 2 | 0 | | | | |
| | 29 | No use | - | | 60 | No use | - | | 91 | No use | - | | | | | | | | |
| | 30 | No use | - | | 61 | No use | - | | 92 | Correction time of latch delay 2 | 0 | | | | | | | | |

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

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

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

*3 Can not be used with [A6BE]

PARAMETER

MODEL

MINAS A6B(BE/BF) series

| Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value | Cat e | Pr. | Parameter | Default value |
|----------|-----|----------------------|------------------|----------|-----|----------------------|------------------|----------|-----|-----------|------------------|----------|-----|-----------|------------------|----------|-----|-----------|------------------|
| 15 | 0 | For Manufacturer use | 0 | 15 | 31 | For Manufacturer use | 5 | | | | | | | | | | | | |
| | 1 | No use | - | | 32 | No use | - | | | | | | | | | | | | |
| | 2 | For Manufacturer use | 0 | | 33 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 3 | No use | - | | 34 | For Manufacturer use | 0 | | | | | | | | | | | | |
| | 4 | No use | - | | 35 | For Manufacturer use | 1 | | | | | | | | | | | | |
| | 5 | No use | - | | | | | | | | | | | | | | | | |
| | 6 | No use | - | | | | | | | | | | | | | | | | |
| | 7 | No use | - | | | | | | | | | | | | | | | | |
| | 8 | No use | - | | | | | | | | | | | | | | | | |
| | 9 | No use | - | | | | | | | | | | | | | | | | |
| | 10 | No use | - | | | | | | | | | | | | | | | | |
| | 11 | No use | - | | | | | | | | | | | | | | | | |
| | 12 | No use | - | | | | | | | | | | | | | | | | |
| | 13 | No use | - | | | | | | | | | | | | | | | | |
| | 14 | No use | - | | | | | | | | | | | | | | | | |
| | 15 | No use | - | | | | | | | | | | | | | | | | |
| | 16 | For Manufacturer use | 2 | | | | | | | | | | | | | | | | |
| | 17 | For Manufacturer use | 4 | | | | | | | | | | | | | | | | |
| | 18 | No use | - | | | | | | | | | | | | | | | | |
| | 19 | No use | - | | | | | | | | | | | | | | | | |
| | 20 | No use | - | | | | | | | | | | | | | | | | |
| | 21 | No use | - | | | | | | | | | | | | | | | | |
| | 22 | No use | - | | | | | | | | | | | | | | | | |
| | 23 | No use | - | | | | | | | | | | | | | | | | |
| | 24 | No use | - | | | | | | | | | | | | | | | | |
| | 25 | No use | - | | | | | | | | | | | | | | | | |
| | 26 | No use | - | | | | | | | | | | | | | | | | |
| | 27 | No use | - | | | | | | | | | | | | | | | | |
| | 28 | No use | - | | | | | | | | | | | | | | | | |
| | 29 | No use | - | | | | | | | | | | | | | | | | |
| | 30 | For Manufacturer use | 0 | | | | | | | | | | | | | | | | |

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

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

*3 Can not be used with [A6BE]

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

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

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

■EtherCAT Object Initial value

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

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

■ EtherCAT Object Initial value

© User-specific area (4000h~4FFFh)

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

■ EtherCAT Object Initial value

© User-specific area (4000h~4FFFh)

| Index | Sub-Index | Name | Initial value |
|-------|-----------|---|---------------|
| 4D57h | — | Position comparison range | — |
| | 00h | Highest sub-index supported | Read Only |
| | 01h | Min position comparison range | Read Only |
| | 02h | Max position comparison range | Read Only |
| 4DA0h | — | Alarm accessory information | — |
| | 00h | Number of entries | Read Only |
| | 01h | History number echo | Read Only |
| | 02h | Alarm code | Read Only |
| | 03h | Control mode | Read Only |
| | 04h | Motor speed | Read Only |
| | 05h | Positional command velocity | Read Only |
| | 06h | Velocity control command | Read Only |
| | 07h | Torque command | Read Only |
| | 08h | Position command deviation | Read Only |
| | 09h | Position actual internal value | Read Only |
| | 0Ah | For manufacturer's use | — |
| | 0Bh | Input port (logic signal) | Read Only |
| | 0Ch | Output port (logic signal) | Read Only |
| | 0Dh | Analog input | Read Only |
| | 0Eh | For manufacturer's use | — |
| | 0Fh | For manufacturer's use | — |
| | 10h | Overload ratio | Read Only |
| | 11h | Regenerative load ratio | Read Only |
| | 12h | Voltage across PN | Read Only |
| | 13h | Temperature of amplifier | Read Only |
| | 14h | Warning flags | Read Only |
| | 15h | Inertia ratio | Read Only |
| | 16h | For manufacturer's use | — |
| | 17h | For manufacturer's use | — |
| | 18h | For manufacturer's use | — |
| | 19h | Temperature of encoder | Read Only |
| | 1Ah | For manufacturer's use | — |
| | 1Bh | For manufacturer's use | — |
| | 1Ch | For manufacturer's use | — |
| | 1Dh | U-phase current detection value | Read Only |
| | 1Eh | W-phase current detection value | Read Only |
| | 1Fh | For manufacturer's use | — |
| | 20h | For manufacturer's use | — |
| | 21h | Encoder single-turn data | Read Only |
| | 22h | Encoder communication error count (accumulated) | Read Only |
| | 23h | External scale communication data error count (accumulated) | Read Only |
| | 24h | For manufacturer's use | — |
| 4DB0h | — | For manufacturer's use | — |
| | 00h | Number of entries | — |
| | 01h | Reserved | — |
| | 02h | For manufacturer's use | — |
| | 03h | Reserved | — |
| | 04h | Reserved | — |
| | 05h | Reserved | — |
| | 06h | Reserved | — |
| | 07h | Reserved | — |
| | 08h | For manufacturer's use | — |

■ EtherCAT Object Initial value

◎ User-specific area (4000h~4FFFh)

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

■ EtherCAT Object Initial value

© User-specific area (4000h~4FFFh)

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

■ EtherCAT Object Initial value

◎ User-specific area (4000h~4FFFh)

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

■ EtherCAT Object Initial value

◎ Drive profile area (5000h~5FFFh)

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

■ EtherCAT Object Initial value

© Drive profile area (6000h~6FFFh)

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

■ EtherCAT Object Initial value

© Drive profile area (6000h~6FFFh)

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

■ EtherCAT Object Initial value

© Drive profile area (6000h~6FFFh)

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