
REFERENCE SPECIFICATIONS

MODEL

Product Name : AC servo driver

Part Number : MINAS-A5BA1, A5B01 Series

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	28		Delete Note 1 of External Scale Connector X5	
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1. Scope

The specifications are for AC servo driver MINAS-A5B Series standard models and MINAS-A5B01 Series made by Motor Business Unit, Panasonic Corporation.

<Software version>

This technical reference applies to the servo drivers compatible with software of the following version:

Version 1:Ver3.04

Version 2:Ver3.04

Version 3:Ver1.00

For the software version, confirm it by the setup support software PANATERM or other function.

<Related documents>

SX-DSV02472: Technical document - Functional specification -

SX-DSV02473: Technical document - EtherCAT communication specification -

< Summary of EtherCAT >

EtherCAT is an abbreviated designation of Ethernet for Control Automation Technology and is open network communication between a master and slaves using real-time ethernet developed in Beckhoff Automation GmbH and is managed in ETG (EtherCAT Technology Group).

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

EtherCAT®
Conformance tested

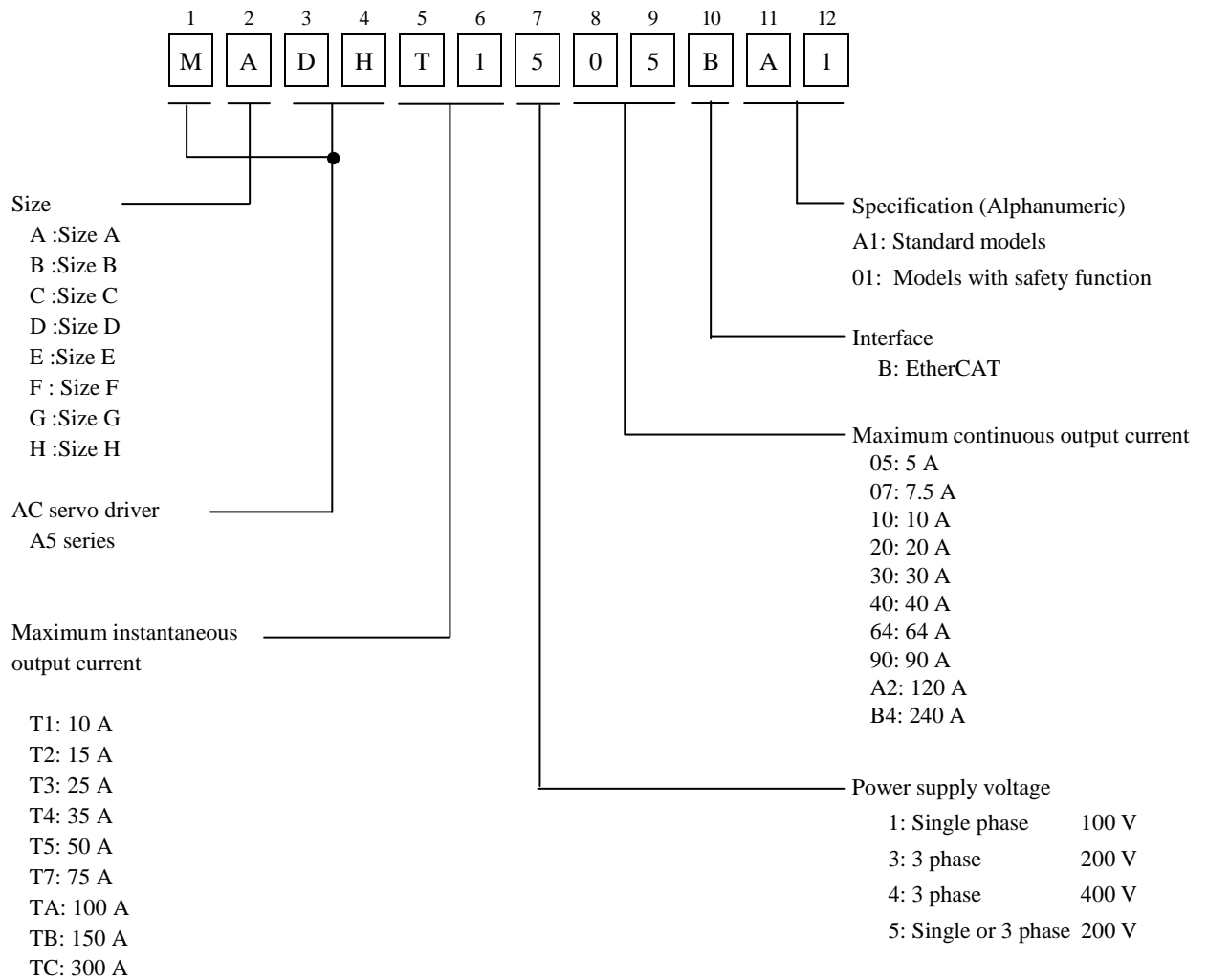


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- Motor Business Unit, Panasonic Corporation reserves the right to make modifications and improvements to its products and/or documentation, including specifications and software, without prior notice.
- This product might be forced to upgrade according to the specifications change by ETG.
We do not have liability for expenses of such upgrades.

2. Product number

The following shows how to interpret a product number.



3. Product Line-up

3-1 Amplifier model

Model No. (Note 1)		Size	Power supply voltage	Rated output of applicable motor
MINAS-A5B Series (Standard models)	MINAS-A5B01 Series (With the safety function)			
MADHT1105BA1	MADHT1105B01	A	Single-phase AC100–120 V	Max 50 W
MADHT1107BA1	MADHT1107B01			Max 100 W
MADHT1505BA1	MADHT1505B01		Single/3-phase AC 200–240 V	Max 100 W
MADHT1507BA1	MADHT1507B01			Max 200 W
MBDHT2110BA1	MBDHT2110B01	B	Single-phase AC100–120 V	Max 200 W
MBDHT2510BA1	MBDHT2510B01		Single/3-phase AC 200–240 V	Max 400 W
MCDHT3120BA1	MCDHT3120B01	C	Single-phase AC100–120 V	Max 400 W
MCDHT3520BA1	MCDHT3520B01		Single/3-phase AC 200–240 V	Max 750 W
MDDHT3530BA1	MDDHT3530B01	D	Single/3-phase AC 200–240 V	Max 1,000 W
MDDHT5540BA1	MDDHT5540B01			Max 1,500 W
MDDHT2407BA1	MDDHT2407B01		3-phase AC 380–480 V	Max 600 W
MDDHT2412BA1	MDDHT2412B01			Max 1,000 W
MDDHT3420BA1	MDDHT3420B01			Max 1,500 W
MEDHT7364BA1	MEDHT7364B01	E	3-phase AC 200–230 V	Max 2,500 W
MEDHT4430BA1	MEDHT4430B01		3-phase AC 380–480 V	Max 2,500 W
MFDHTA390BA1	MFDHTA390B01	F	3-phase AC 200–230 V	Max 3,000 W
MFDHTB3A2BA1	MFDHTB3A2B01			Max 5,000 W
MFDHT5440BA1	MFDHT5440B01		3-phase AC 380–480 V	Max 3,000 W
MFDHTA464BA1	MFDHTA464B01			Max 5,000 W
-	MGDHTC3B4B01	G	3-phase AC 200–230 V	Max 7,500 W
-	MGDHTB4A2B01		3-phase AC 380–480 V	Max 7,500 W
-	MHDHTC3B4B01	H	3-phase AC 200–230 V	Max 15,000 W
-	MHDHTB4A2B01		3-phase AC 380–480 V	Max 15,000 W

(Note 1) MINAS-A5B01 Series are the models which are added the safety function to MINAS-A5B series standard models.

3-2 Combination of Servo Amplifier and Applicable Motor

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MADHT1105B**	A	Single 100 V	MSME5AZG**	100 V	50 W	3000 r/min	5 cores, 20 bits
			MSME5AZS**	100 V	50 W	3000 r/min	7 cores, 17 bits
			MSME5AZF**	100 V	50 W	3000 r/min	7 cores, 20 bits
MADHT1107B**	A	Single 100 V	MSME011G**	100 V	100 W	3000 r/min	5 cores, 20 bits
			MSME011S**	100 V	100 W	3000 r/min	7 cores, 17 bits
			MSME011F**	100 V	100 W	3000 r/min	7 cores, 20 bits
MADHT1505B**	A	Single/ 3 phase 200 V	MSME5AZG**	200 V	50 W	3000 r/min	5 cores, 20 bits
			MSME5AZS**	200 V	50 W	3000 r/min	7 cores, 17 bits
			MSME5AZF**	200 V	50 W	3000 r/min	7 cores, 20 bits
			MSME012G**	200 V	100 W	3000 r/min	5 cores, 20 bits
			MSME012S**	200 V	100 W	3000 r/min	7 cores, 17 bits
			MSME012F**	200 V	100 W	3000 r/min	7 cores, 20 bits
MADHT1507B**	A	Single/3 phase 200 V	MSME022G**	200 V	200 W	3000 r/min	5 cores, 20 bits
			MSME022S**	200 V	200 W	3000 r/min	7 cores, 17 bits
			MSME022F**	200 V	200 W	3000 r/min	7 cores, 20 bits
MBDHT2110B**	B	Single 100 V	MSME021G**	100 V	200 W	3000 r/min	5 cores, 20 bits
			MSME021S**	100 V	200 W	3000 r/min	7 cores, 17 bits
			MSME021F**	100 V	200 W	3000 r/min	7 cores, 20 bits
MBDHT2510B**	B	Single/3 phase 200 V	MSME042G**	200 V	400 W	3000 r/min	5 cores, 20 bits
			MSME042S**	200 V	400 W	3000 r/min	7 cores, 17 bits
			MSME042F**	200 V	400 W	3000 r/min	7 cores, 20 bits
MCDHT3120B**	C	Single 100 V	MSME041G**	100 V	400 W	3000 r/min	5 cores, 20 bits
			MSME041S**	100 V	400 W	3000 r/min	7 cores, 17 bits
			MSME041F**	100 V	400 W	3000 r/min	7 cores, 20 bits
MCDHT3520B**	C	Single/3 phase 200 V	MSME082G**	200 V	750 W	3000 r/min	5 cores, 20 bits
			MSME082S**	200 V	750 W	3000 r/min	7 cores, 17 bits
			MSME082F**	200 V	750 W	3000 r/min	7 cores, 20 bits
MDDHT3530B**	D	Single/3 phase 200 V	MDME102G**	200 V	1.0 kW	2000 r/min	5 cores, 20 bits
			MDME102S**	200 V	1.0 kW	2000 r/min	7 cores, 17 bits
			MDME102F**	200 V	1.0 kW	2000 r/min	7 cores, 20 bits
			MHME102G**	200 V	1.0 kW	2000 r/min	5 cores, 20 bits
			MHME102S**	200 V	1.0 kW	2000 r/min	7 cores, 17 bits
			MHME102F**	200 V	1.0 kW	2000 r/min	7 cores, 20 bits

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MDDHT5540B**	D	Single/3 phase 200 V	MGME092G**	200 V	900 W	1000 r/min	5 cores, 20 bits
			MGME092S**	200 V	900 W	1000 r/min	7 cores, 17 bits
			MGME092F**	200 V	900 W	1000 r/min	7 cores, 20 bits
			MSME102G**	200 V	1.0 kW	3000 r/min	5 cores, 20 bits
			MSME102S**	200 V	1.0 kW	3000 r/min	7 cores, 17 bits
			MSME102F**	200 V	1.0 kW	3000 r/min	7 cores, 20 bits
			MDME152G**	200 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MDME152S**	200 V	1.5 kW	2000 r/min	7 cores, 17 bits
			MDME152F**	200 V	1.5 kW	2000 r/min	7 cores, 20 bits
			MSME152G**	200 V	1.5 kW	3000 r/min	5 cores, 20 bits
			MSME152S**	200 V	1.5 kW	3000 r/min	7 cores, 17 bits
			MSME152F**	200 V	1.5 kW	3000 r/min	7 cores, 20 bits
			MHME152G**	200 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MHME152S**	200 V	1.5 kW	2000 r/min	7 cores, 17 bits
			MHME152F**	200 V	1.5 kW	2000 r/min	7 cores, 20 bits
			MFME152G**	200 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MFME152S**	200 V	1.5 kW	2000 r/min	7 cores, 17 bits
MFME152F**	200 V	1.5 kW	2000 r/min	7 cores, 20 bits			
MEDHT7364B**	E	3 phase 200 V	MDME202G**	200 V	2.0 kW	2000 r/min	5 cores, 20 bits
			MDME202S**	200 V	2.0 kW	2000 r/min	7 cores, 17 bits
			MDME202F**	200 V	2.0 kW	2000 r/min	7 cores, 20 bits
			MSME202G**	200 V	2.0 kW	3000 r/min	5 cores, 20 bits
			MSME202S**	200 V	2.0 kW	3000 r/min	7 cores, 17 bits
			MSME202F**	200 V	2.0 kW	3000 r/min	7 cores, 20 bits
			MHME202G**	200 V	2.0 kW	2000 r/min	5 cores, 20 bits
			MHME202S**	200 V	2.0 kW	2000 r/min	7 cores, 17 bits
			MHME202F**	200 V	2.0 kW	2000 r/min	7 cores, 20 bits
			MFME252G**	200 V	2.5 kW	2000 r/min	5 cores, 20 bits
			MFME252S**	200 V	2.5 kW	2000 r/min	7 cores, 17 bits
			MFME252F**	200 V	2.5 kW	2000 r/min	7 cores, 20 bits
MFDHTA390B**	F	3 phase 200 V	MGME202G**	200 V	2.0 kW	1000r/min	5 cores, 20 bits
			MGME202S**	200 V	2.0 kW	1000r/min	7 cores, 17 bits
			MGME202F**	200 V	2.0 kW	1000r/min	7 cores, 20 bits
			MDME302G**	200 V	3.0 kW	2000r/min	5 cores, 20 bits
			MDME302S**	200 V	3.0 kW	2000r/min	7 cores, 17 bits
			MDME302F**	200 V	3.0 kW	2000r/min	7 cores, 20 bits
			MHME302G**	200 V	3.0 kW	2000r/min	5 cores, 20 bits
			MHME302S**	200 V	3.0 kW	2000r/min	7 cores, 17 bits
			MHME302F**	200 V	3.0 kW	2000r/min	7 cores, 20 bits
			MSME302G**	200 V	3.0 kW	3000r/min	5 cores, 20 bits
			MSME302S**	200 V	3.0 kW	3000r/min	7 cores, 17 bits
			MSME302F**	200 V	3.0 kW	3000r/min	7 cores, 20 bits

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MFDHTB3A2B**	F	3 phase 200 V	MGME302G**	200 V	3.0 kW	1000r/min	5 cores, 20 bits
			MGME302S**	200 V	3.0 kW	1000r/min	7 cores, 17 bits
			MGME302F**	200 V	3.0 kW	1000r/min	7 cores, 20 bits
			MDME402G**	200 V	4.0 kW	2000r/min	5 cores, 20 bits
			MDME402S**	200 V	4.0 kW	2000r/min	7 cores, 17 bits
			MDME402F**	200 V	4.0 kW	2000r/min	7 cores, 20 bits
			MHME402G**	200 V	4.0 kW	2000r/min	5 cores, 20 bits
			MHME402S**	200 V	4.0 kW	2000r/min	7 cores, 17 bits
			MHME402F**	200 V	4.0 kW	2000r/min	7 cores, 20 bits
			MSME402G**	200 V	4.0 kW	3000r/min	5 cores, 20 bits
			MSME402S**	200 V	4.0 kW	3000r/min	7 cores, 17 bits
			MSME402F**	200 V	4.0 kW	3000r/min	7 cores, 20 bits
			MGME452G**	200 V	4.5 kW	1000r/min	5 cores, 20 bits
			MGME452S**	200 V	4.5 kW	1000r/min	7 cores, 17 bits
			MGME452F**	200 V	4.5 kW	1000r/min	7 cores, 20 bits
			MFME452G**	200 V	4.5 kW	2000r/min	5 cores, 20 bits
			MFME452S**	200 V	4.5 kW	2000r/min	7 cores, 17 bits
			MFME452F**	200 V	4.5 kW	2000r/min	7 cores, 20 bits
			MDME502G**	200 V	5.0 kW	2000r/min	5 cores, 20 bits
			MDME502S**	200 V	5.0 kW	2000r/min	7 cores, 17 bits
			MDME502F**	200 V	5.0 kW	2000r/min	7 cores, 20 bits
			MHME502G**	200 V	5.0 kW	2000r/min	5 cores, 20 bits
			MHME502S**	200 V	5.0 kW	2000r/min	7 cores, 17 bits
			MHME502F**	200 V	5.0 kW	2000r/min	7 cores, 20 bits
			MSME502G**	200 V	5.0 kW	3000r/min	5 cores, 20 bits
			MSME502S**	200 V	5.0 kW	3000r/min	7 cores, 17 bits
MSME502F**	200 V	5.0 kW	3000r/min	7 cores, 20 bits			
MGDHTC3B4B**	G	3 phase 200 V	MGME602G**	200 V	6.0 kW	1000 r/min	5 cores, 20 bits
			MGME602S**	200 V	6.0 kW	1000 r/min	7 cores, 17 bits
			MGME602F**	200 V	6.0 kW	1000 r/min	7 cores, 20 bits
			MDME752G**	200 V	7.5 kW	1500 r/min	5 cores, 20 bits
			MDME752S**	200 V	7.5 kW	1500 r/min	7 cores, 17 bits
			MDME752F**	200 V	7.5 kW	1500 r/min	7 cores, 20 bits
			MHME752G**	200 V	7.5 kW	1500 r/min	5 cores, 20 bits
			MHME752S**	200 V	7.5 kW	1500 r/min	7 cores, 17 bits
			MHME752F**	200 V	7.5 kW	1500 r/min	7 cores, 20 bits
MHDHTC3B4B**	H	3 phase 200 V	MDMEC12G**	200 V	11.0 kW	1500 r/min	5 cores, 20 bits
			MDMEC12S**	200 V	11.0 kW	1500 r/min	7 cores, 17 bits
			MDMEC12F**	200 V	11.0 kW	1500 r/min	7 cores, 20 bits
			MHMEC52G**	200 V	15.0 kW	1500 r/min	5 cores, 20 bits
			MHMEC52S**	200 V	15.0 kW	1500 r/min	7 cores, 17 bits
			MHMEC52F**	200 V	15.0 kW	1500 r/min	7 cores, 20 bits

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MDDHT2407B**	D	3 phase 400 V	MDME044G**	400 V	400 W	2000 r/min	5 cores, 20 bits
			MDME044S**	400 V	400 W	2000 r/min	7 cores, 17 bits
			MDME044F**	400 V	400 W	2000 r/min	7 cores, 20 bits
			MDME064G**	400 V	600 W	2000 r/min	5 cores, 20 bits
			MDME064S**	400 V	600 W	2000 r/min	7 cores, 17 bits
			MDME064F**	400 V	600 W	2000 r/min	7 cores, 20 bits
MDDHT2412B**	D	3 phase 400 V	MSME084G**	400 V	750 W	3000 r/min	5 cores, 20 bits
			MSME084S**	400 V	750 W	3000 r/min	7 cores, 17 bits
			MSME084F**	400 V	750 W	3000 r/min	7 cores, 20 bits
			MDME104G**	400 V	1.0 kW	2000 r/min	5 cores, 20 bits
			MDME104S**	400 V	1.0 kW	2000 r/min	7 cores, 17 bits
			MDME104F**	400 V	1.0 kW	2000 r/min	7 cores, 20 bits
			MHME104G**	400 V	1.0 kW	2000 r/min	5 cores, 20 bits
			MHME104S**	400 V	1.0 kW	2000 r/min	7 cores, 17 bits
			MHME104F**	400 V	1.0 kW	2000 r/min	7 cores, 20 bits
MDDHT3420B**	D	3 phase 400 V	MGME094G**	400 V	900 W	1000 r/min	5 cores, 20 bits
			MGME094S**	400 V	900 W	1000 r/min	7 cores, 17 bits
			MGME094F**	400 V	900 W	1000 r/min	7 cores, 20 bits
			MSME104G**	400 V	1.0 kW	3000 r/min	5 cores, 20 bits
			MSME104S**	400 V	1.0 kW	3000 r/min	7 cores, 17 bits
			MSME104F**	400 V	1.0 kW	3000 r/min	7 cores, 20 bits
			MDME154G**	400 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MDME154S**	400 V	1.5 kW	2000 r/min	7 cores, 17 bits
			MDME154F**	400 V	1.5 kW	2000 r/min	7 cores, 20 bits
			MHME154G**	400 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MHME154S**	400 V	1.5 kW	2000 r/min	7 cores, 17 bits
			MHME154F**	400 V	1.5 kW	2000 r/min	7 cores, 20 bits
			MSME154G**	400 V	1.5 kW	3000 r/min	5 cores, 20 bits
			MSME154S**	400 V	1.5 kW	3000 r/min	7 cores, 17 bits
			MSME154F**	400 V	1.5 kW	3000 r/min	7 cores, 20 bits
			MFME154G**	400 V	1.5 kW	2000 r/min	5 cores, 20 bits
			MFME154S**	400 V	1.5 kW	2000 r/min	7 cores, 17 bits
			MFME154F**	400 V	1.5 kW	2000 r/min	7 cores, 20 bits

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MEDHT4430B**	E	3 phase 400V	MSME204G**	400 V	2.0 kW	3000 r/min	5 cores, 20 bits
			MSME204S**	400 V	2.0 kW	3000 r/min	7 cores, 17 bits
			MSME204F**	400 V	2.0 kW	3000 r/min	7 cores, 20 bits
			MDME204G**	400 V	2.0 kW	2000 r/min	5 cores, 20 bits
			MDME204S**	400 V	2.0 kW	2000 r/min	7 cores, 17 bits
			MDME204F**	400 V	2.0 kW	2000 r/min	7 cores, 20 bits
			MHME204G**	400 V	2.0 kW	2000 r/min	5 cores, 20 bits
			MHME204S**	400 V	2.0 kW	2000 r/min	7 cores, 17 bits
			MHME204F**	400 V	2.0 kW	2000 r/min	7 cores, 20 bits
			MFME254G**	400 V	2.5 kW	2000 r/min	5 cores, 20 bits
			MFME254S**	400 V	2.5 kW	2000 r/min	7 cores, 17 bits
			MFME254F**	400 V	2.5 kW	2000 r/min	7 cores, 20 bits
MFDHT5440B**	F	3 phase 400 V	MGME204G**	400 V	2.0 kW	1000 r/min	5 cores, 20 bits
			MGME204S**	400 V	2.0 kW	1000 r/min	7 cores, 17 bits
			MGME204F**	400 V	2.0 kW	1000 r/min	7 cores, 20 bits
			MSME304G**	400 V	3.0 kW	3000 r/min	5 cores, 20 bits
			MSME304S**	400 V	3.0 kW	3000 r/min	7 cores, 17 bits
			MSME304F**	400 V	3.0 kW	3000 r/min	7 cores, 20 bits
			MDME304G**	400 V	3.0 kW	2000 r/min	5 cores, 20 bits
			MDME304S**	400 V	3.0 kW	2000 r/min	7 cores, 17 bits
			MDME304F**	400 V	3.0 kW	2000 r/min	7 cores, 20 bits
			MHME304G**	400 V	3.0 kW	2000 r/min	5 cores, 20 bits
			MHME304S**	400 V	3.0 kW	2000 r/min	7 cores, 17 bits
			MHME304F**	400 V	3.0 kW	2000 r/min	7 cores, 20 bits

Servo Amplifier			Applicable Motor				
Model	Size	Power supply input	Model	Voltage specification	Rated Output	Rated speed	Encoder specification
MFDHTA464B**	F	3 phase 400 V	MGME304G**	400 V	3.0 kW	1000 r/min	5 cores, 20 bits
			MGME304S**	400 V	3.0 kW	1000 r/min	7 cores, 17 bits
			MGME304F**	400 V	3.0 kW	1000 r/min	7 cores, 20 bits
			MSME404G**	400 V	4.0 kW	3000 r/min	5 cores, 20 bits
			MSME404S**	400 V	4.0 kW	3000 r/min	7 cores, 17 bits
			MSME404F**	400 V	4.0 kW	3000 r/min	7 cores, 20 bits
			MDME404G**	400 V	4.0 kW	2000 r/min	5 cores, 20 bits
			MDME404S**	400 V	4.0 kW	2000 r/min	7 cores, 17 bits
			MDME404F**	400 V	4.0 kW	2000 r/min	7 cores, 20 bits
			MHME404G**	400 V	4.0 kW	2000 r/min	5 cores, 20 bits
			MHME404S**	400 V	4.0 kW	2000 r/min	7 cores, 17 bits
			MHME404F**	400 V	4.0 kW	2000 r/min	7 cores, 20 bits
			MGME454G**	400 V	4.5 kW	1000 r/min	5 cores, 20 bits
			MGME454S**	400 V	4.5 kW	1000 r/min	7 cores, 17 bits
			MGME454F**	400 V	4.5 kW	1000 r/min	7 cores, 20 bits
			MFME454G**	400 V	4.5 kW	2000 r/min	5 cores, 20 bits
			MFME454S**	400 V	4.5 kW	2000 r/min	7 cores, 17 bits
			MFME454F**	400 V	4.5 kW	2000 r/min	7 cores, 20 bits
			MSME504G**	400 V	5.0 kW	3000 r/min	5 cores, 20 bits
			MSME504S**	400 V	5.0 kW	3000 r/min	7 cores, 17 bits
			MSME504F**	400 V	5.0 kW	3000 r/min	7 cores, 20 bits
			MDME504G**	400 V	5.0 kW	2000 r/min	5 cores, 20 bits
			MDME504S**	400 V	5.0 kW	2000 r/min	7 cores, 17 bits
			MSME504F**	400 V	5.0 kW	3000 r/min	7 cores, 20 bits
MHME504G**	400 V	5.0 kW	2000 r/min	5 cores, 20 bits			
MHME504S**	400 V	5.0 kW	2000 r/min	7 cores, 17 bits			
MHME504F**	400 V	5.0 kW	2000 r/min	7 cores, 20 bits			
MGDHTB4A2B**	G	3 phase 400 V	MGME604G**	400 V	6.0 kW	1000 r/min	5 cores, 20 bits
			MGME604S**	400 V	6.0 kW	1000 r/min	7 cores, 17 bits
			MGME604F**	400 V	6.0 kW	1000 r/min	7 cores, 20 bits
			MDME754G**	400 V	7.5 kW	1500 r/min	5 cores, 20 bits
			MDME754S**	400 V	7.5 kW	1500 r/min	7 cores, 17 bits
			MDME754F**	400 V	7.5 kW	1500 r/min	7 cores, 20 bits
			MHME754G**	400 V	7.5 kW	1500 r/min	5 cores, 20 bits
			MHME754S**	400 V	7.5 kW	1500 r/min	7 cores, 17 bits
			MHME754F**	400 V	7.5 kW	1500 r/min	7 cores, 20 bits
MHDHTB4A2B**	H	3 phase 400 V	MDMEC14G**	400 V	11.0 kW	1500 r/min	5 cores, 20 bits
			MDMEC14S**	400 V	11.0 kW	1500 r/min	7 cores, 17 bits
			MDMEC14F**	400 V	11.0 kW	1500 r/min	7 cores, 20 bits
			MHMEC54G**	400 V	15.0 kW	1500 r/min	5 cores, 20 bits
			MHMEC54S**	400 V	15.0 kW	1500 r/min	7 cores, 17 bits
			MHMEC54F**	400 V	15.0 kW	1500 r/min	7 cores, 20 bits

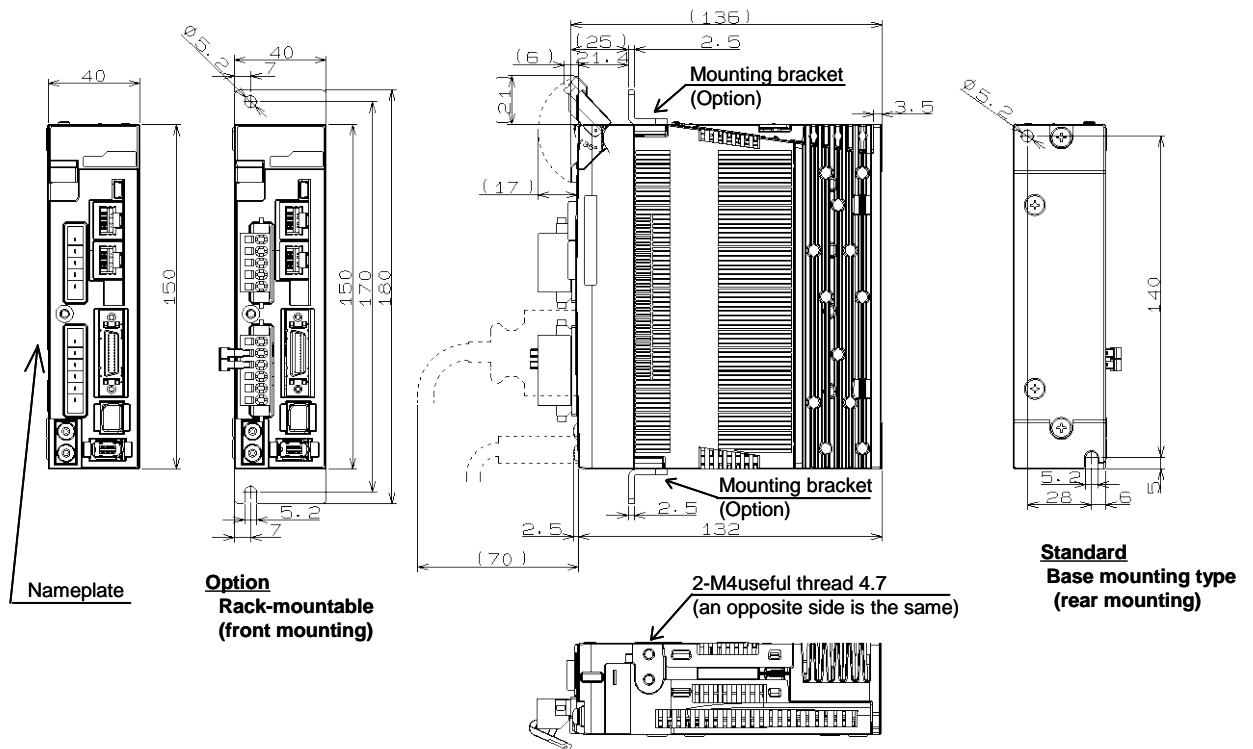
4. Specifications

Item			Description		
Input power supply	100 V	Main circuit power	Single phase 100–120 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz		
		Control circuit power	Single phase 100–120 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz		
	200 V	Main circuit power	A–D	Single/3 phase 200–240 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz	
			E–H	3 phase 200–230 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz	
		Control circuit power	A–D	Single phase 200–240 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz	
			E–H	Single phase 200–230 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz	
	400 V	Main circuit power	D–H	3 phase 380–480 V ac $\begin{matrix} + 10\% \\ - 15\% \end{matrix}$ 50/60 Hz	
		Control circuit power		24 V dc +/- 15%	
Insulation voltage			Resistant to 1,500 V AC between primary power supply and ground for a minute (Sensed current: 20 mA) * Excluding control circuit power supply part (24 V dc) of 400 V models.		
Operation conditions	Temperature		Operation temperature: 0–55 degrees C Storage temperature: -20–65 degrees C		
	Humidity		Operation and storage humidity 90%RH or less (no condensation)		
	Height above the sea		Height above the sea level: 1,000 meters or less		
	Vibration		5. 88 m/s ² or less, 10–60 Hz (Continuous operation at resonance point is not allowed)		

5. Dimensions

- MINAS-A5B and A5B01 Series

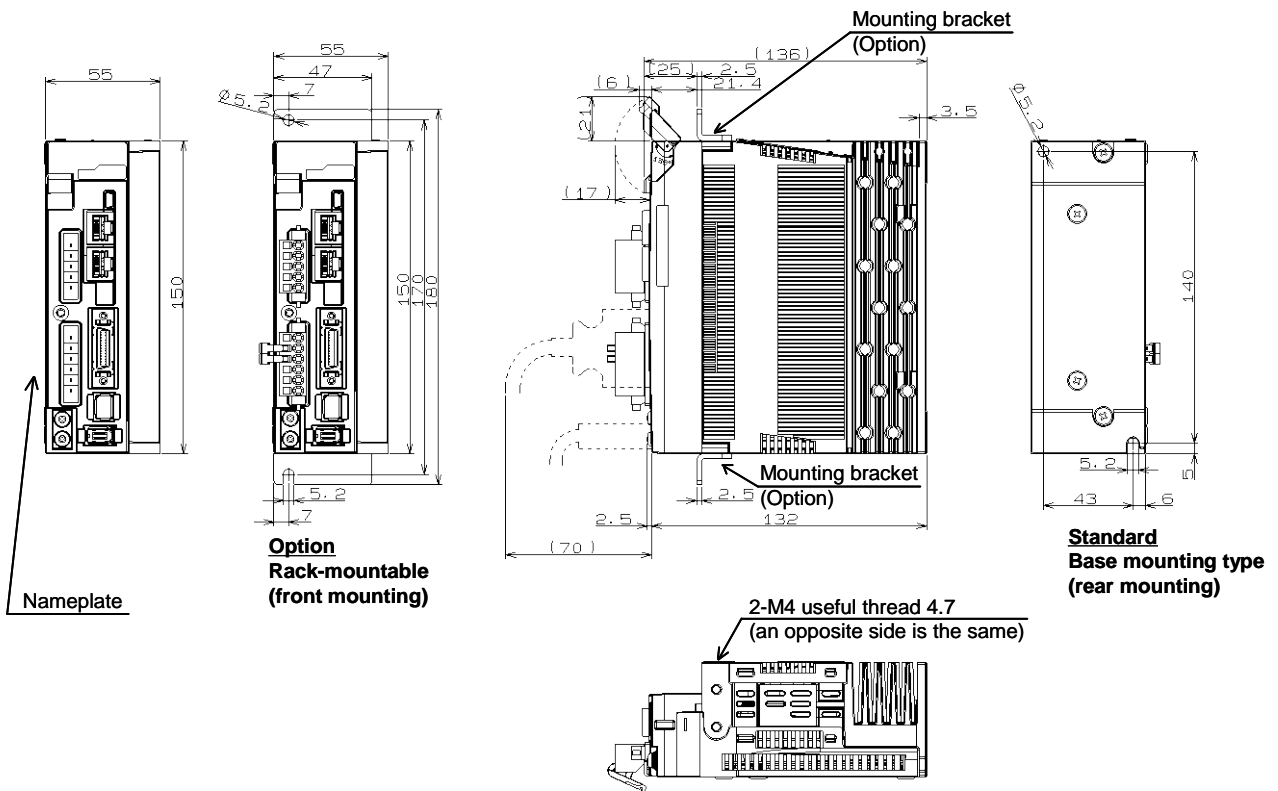
Size A 100 V/200 V



[Front mounting bracket Optional part number]

	Part number
For size A	DV0PM20027

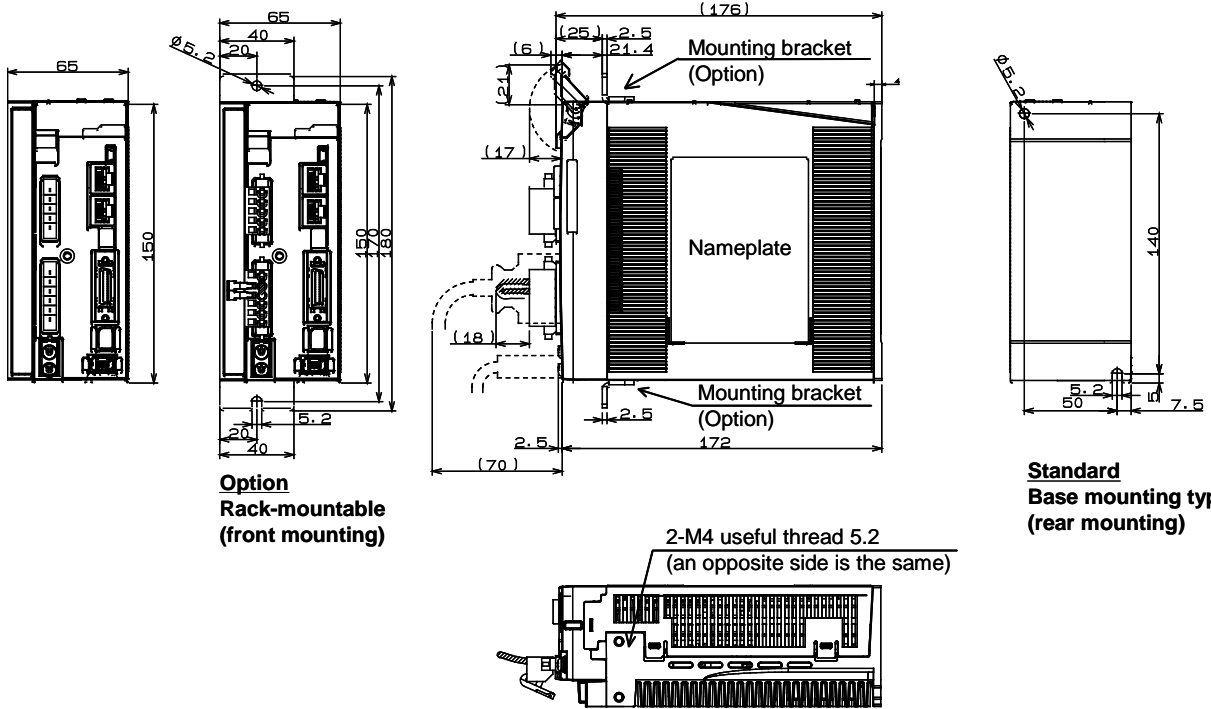
Size B 100 V/200 V



[Front mounting bracket Optional part number]

	Part number
For size B	DV0PM20028

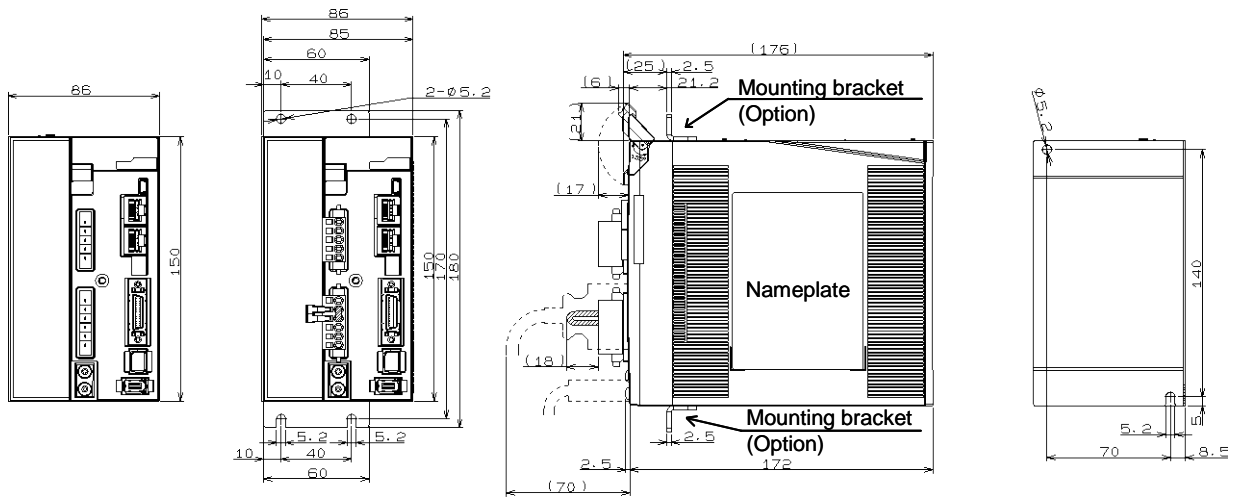
Size C 100 V/200 V



[Front mounting bracket Optional part number]

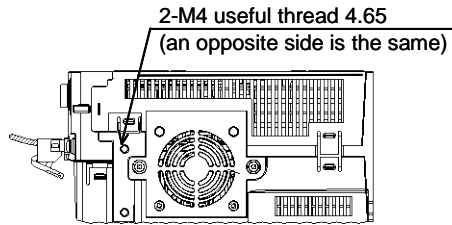
	Part number
For size C	DV0PM20029

Size D 200 V

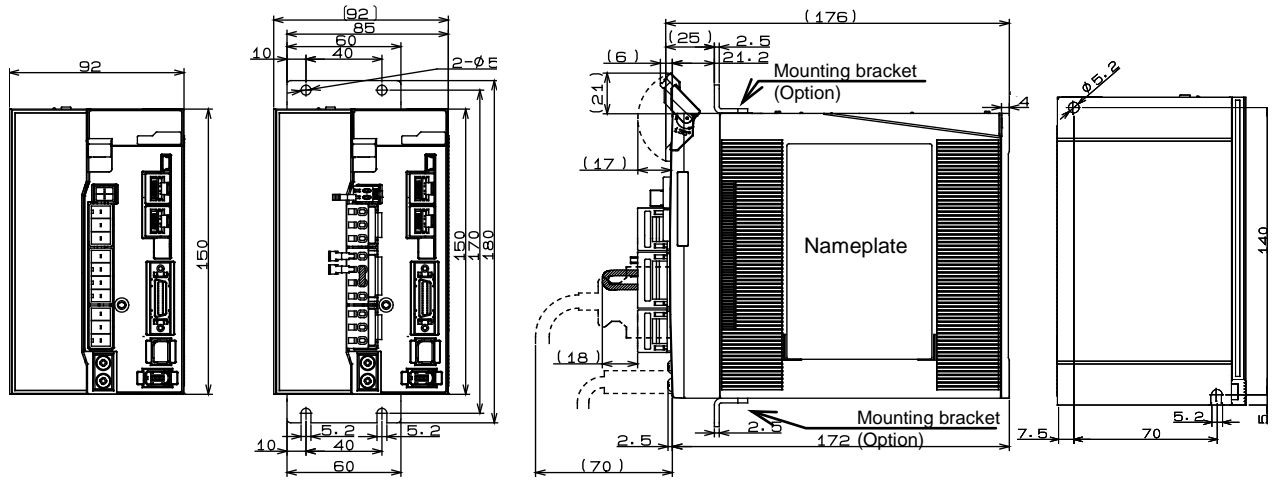


Option
Rack-mountable
(front mounting)

Standard
Base mounting type
(rear mounting)

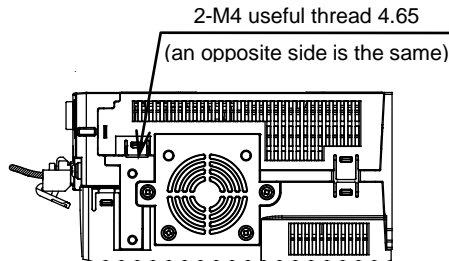


Size D 400 V



Option
Rack-mountable
(front mounting)

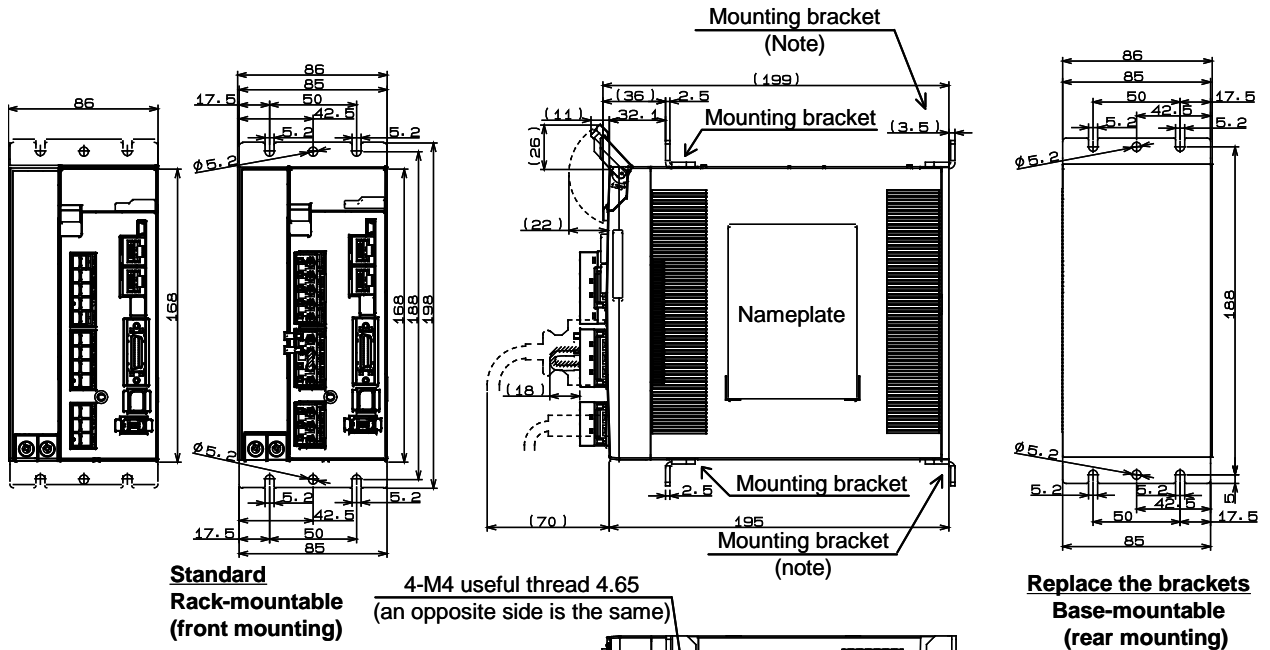
Standard
Base mounting type
(rear mounting)



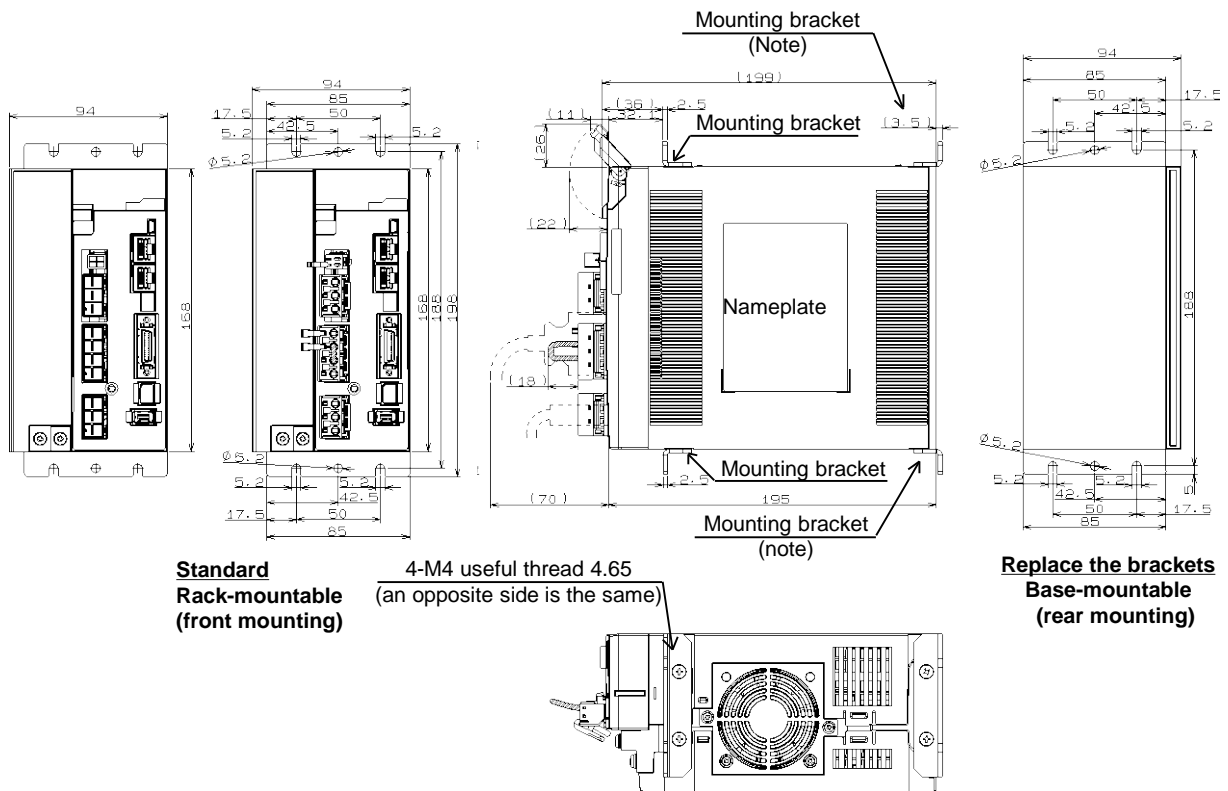
[Front mounting bracket Optional part number]

	Part number
For size D	DV0PM20030

Size E 200 V

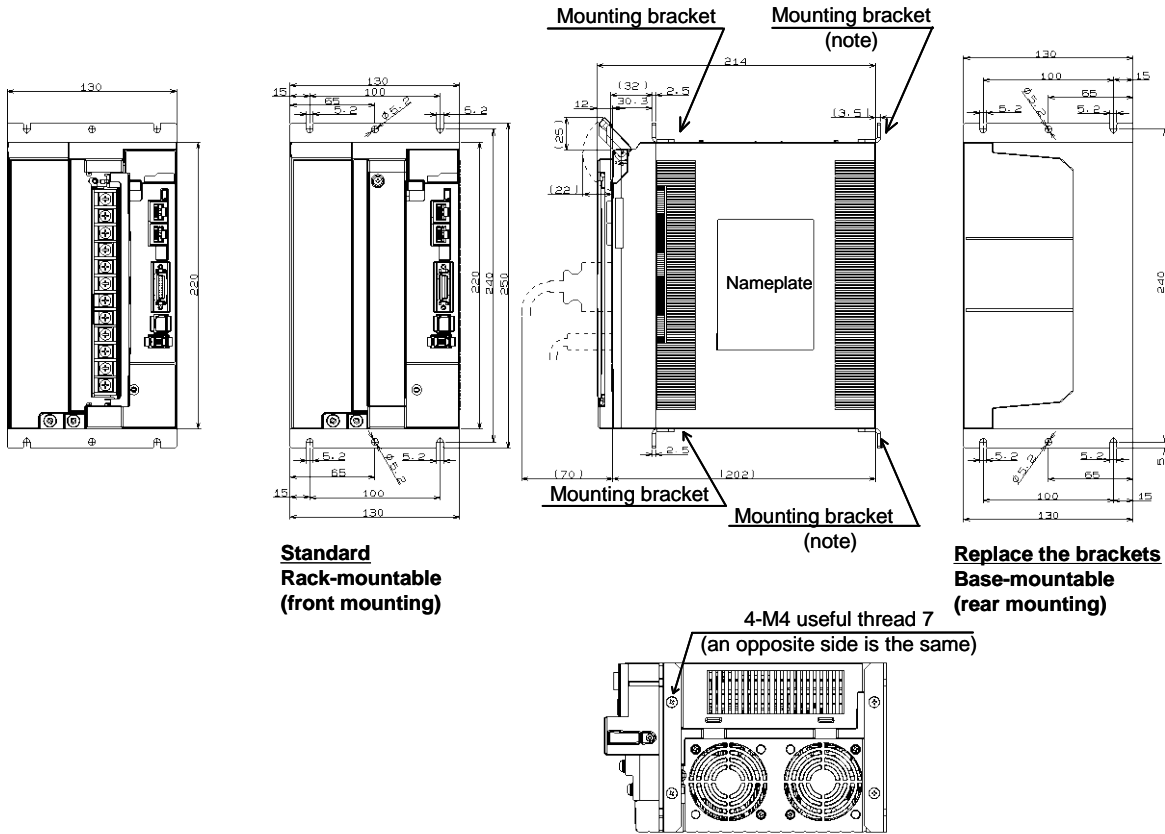


Size E 400 V



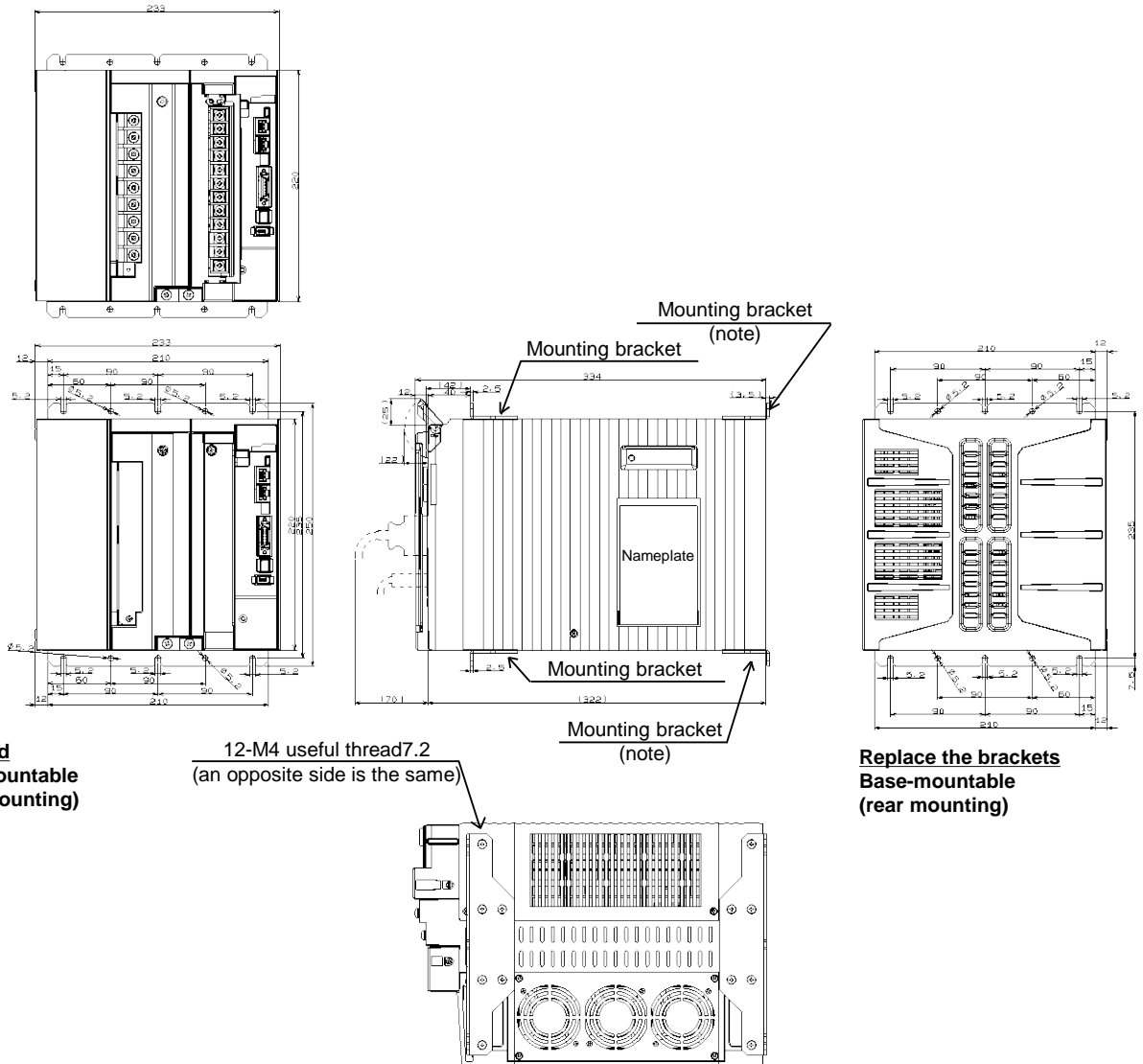
Note: For base mounting type (rear mounting type), attach the mounting bracket to the rear surface. Although the above figure shows brackets attached to both the front and rear surfaces, the unit is shipped out with the bracket attached to only the front.

Size F 200 V/400 V



Note: For base mounting type (rear mounting type), attach the mounting bracket to the rear surface. Although the above figure shows brackets attached to both the front and rear surfaces, the unit is shipped out with the bracket attached to only the front.

Size G 200 V/400 V



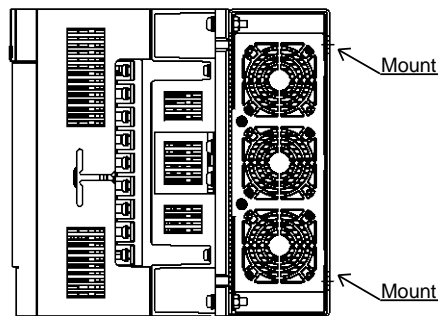
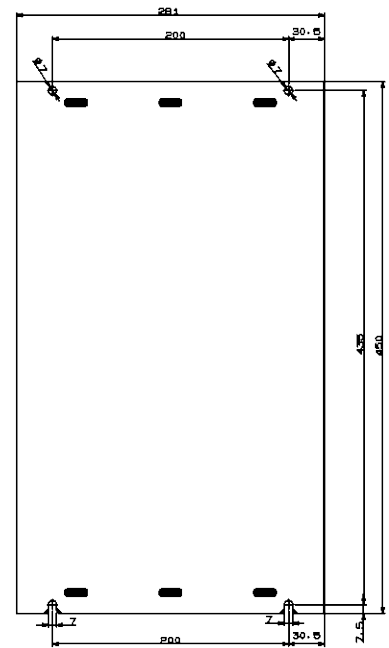
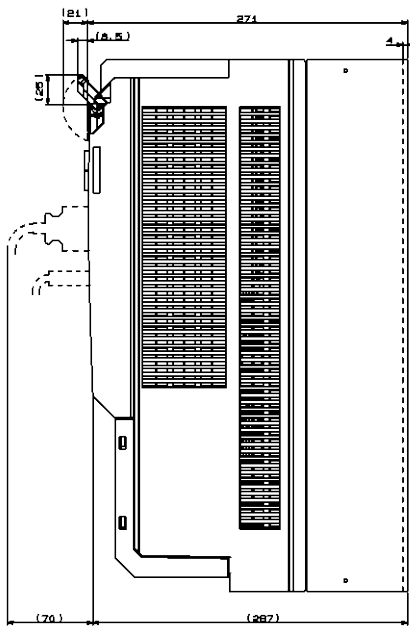
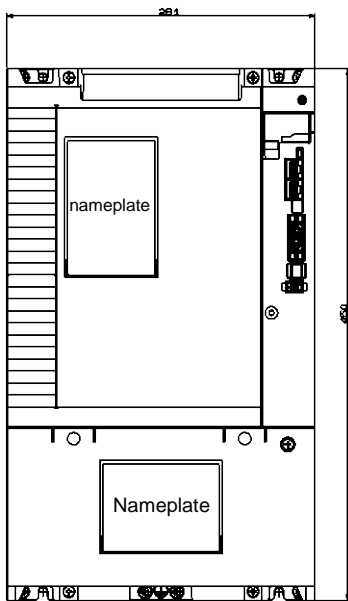
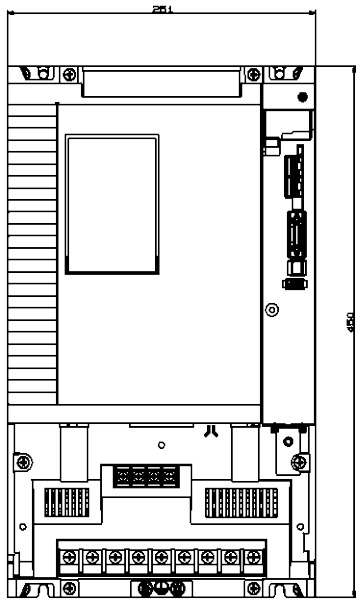
**Standard
Rack mountable
(front mounting)**

12-M4 useful thread 7.2
(an opposite side is the same)

**Replace the brackets
Base-mountable
(rear mounting)**

Note: For base mounting type (rear mounting type), attach the mounting bracket to the rear surface. Although the above figure shows brackets attached to both the front and rear surfaces, the unit is shipped out with the bracket attached to only the front.

Size H 200 V/400 V

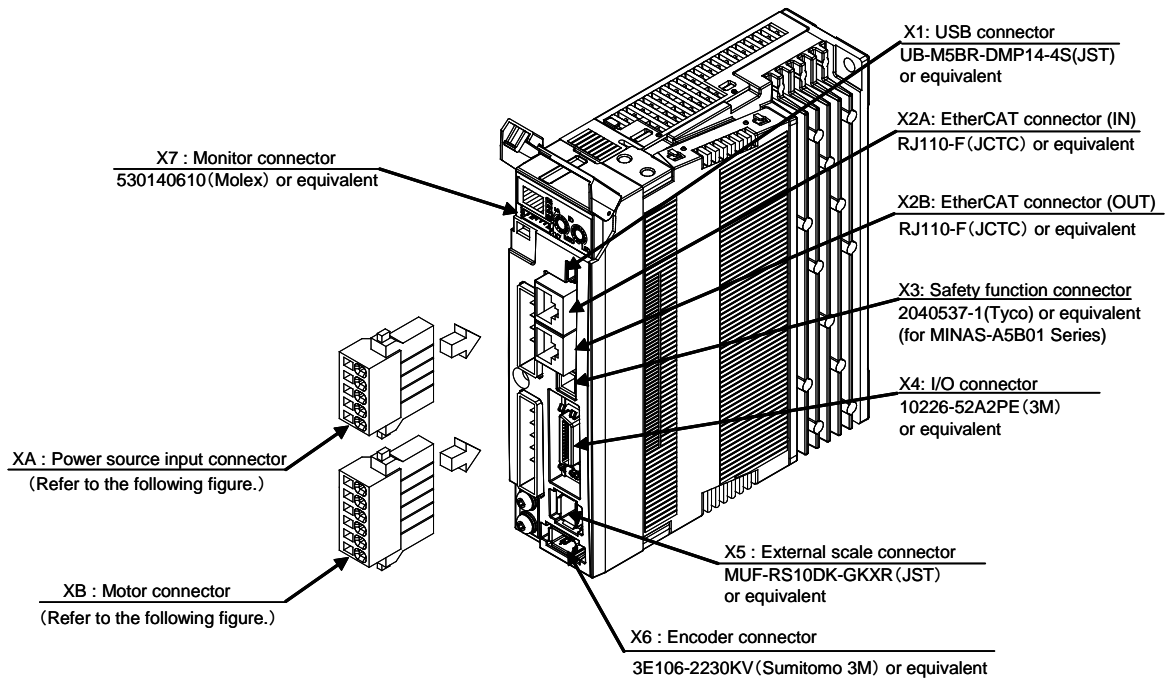


Base mounting type (rear mounting)

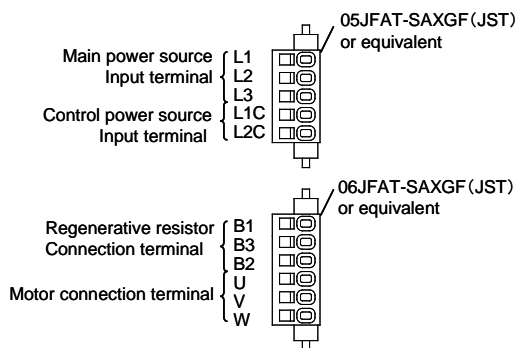
Note: For base mounting type (rear mounting type), attach the mounting bracket to the rear surface. Although the above figure shows brackets attached to both the front and rear surfaces, the unit is shipped out with the bracket attached to only the front.

6. Appearance and Part Names

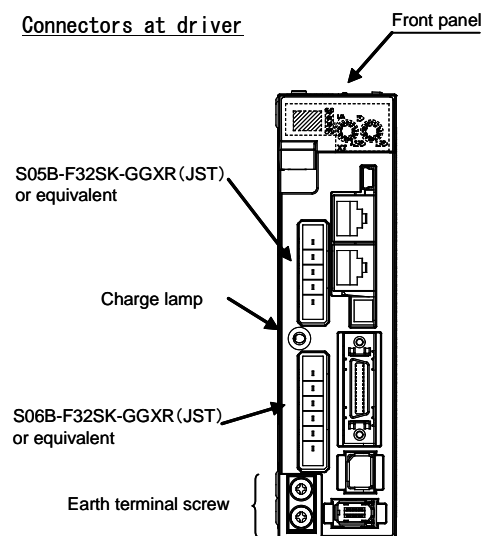
Size A, B 100 V/200 V



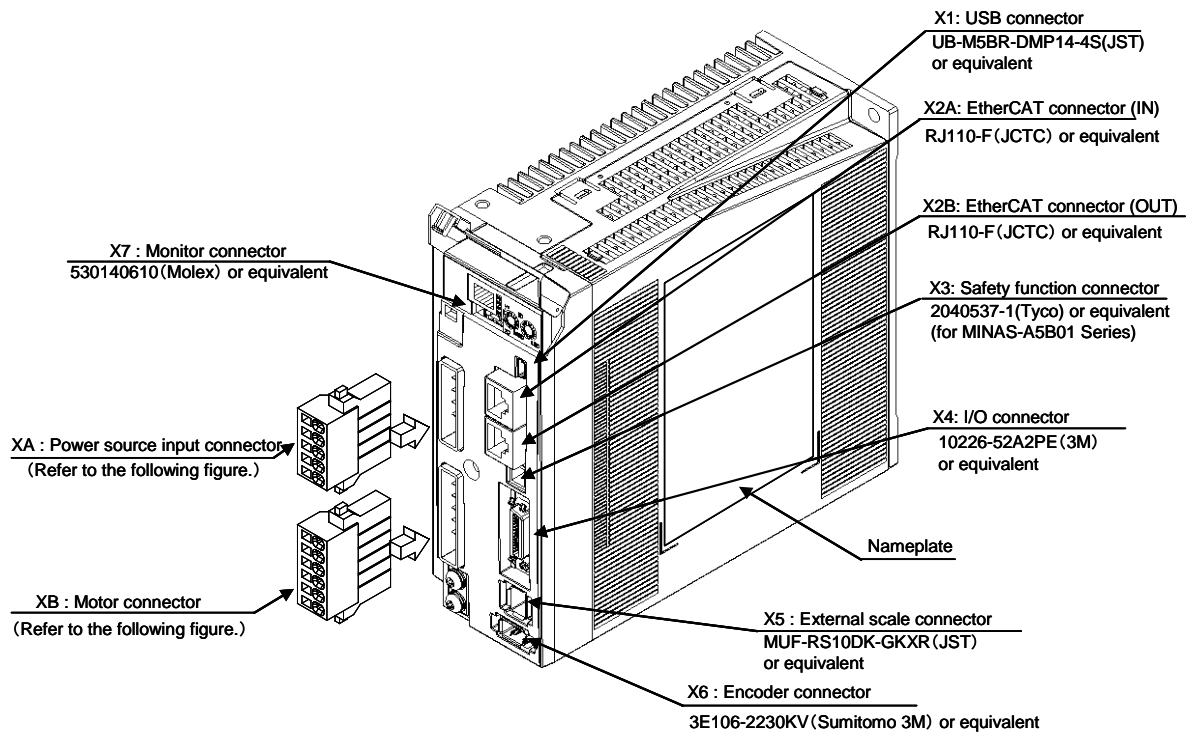
Cable side connectors



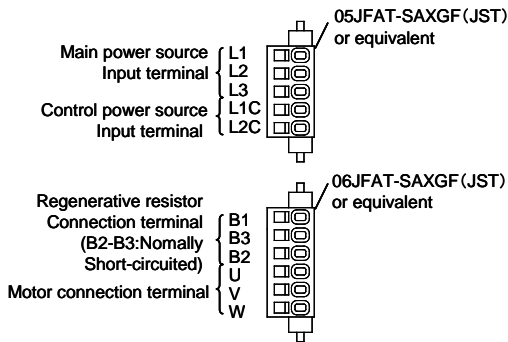
Connectors at driver



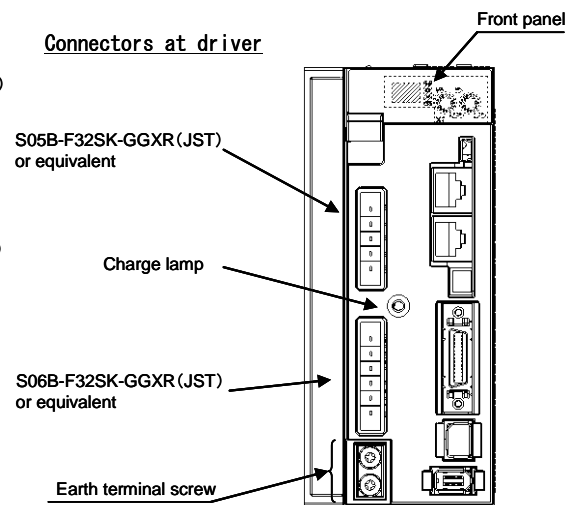
Size C, D 100 V/200 V



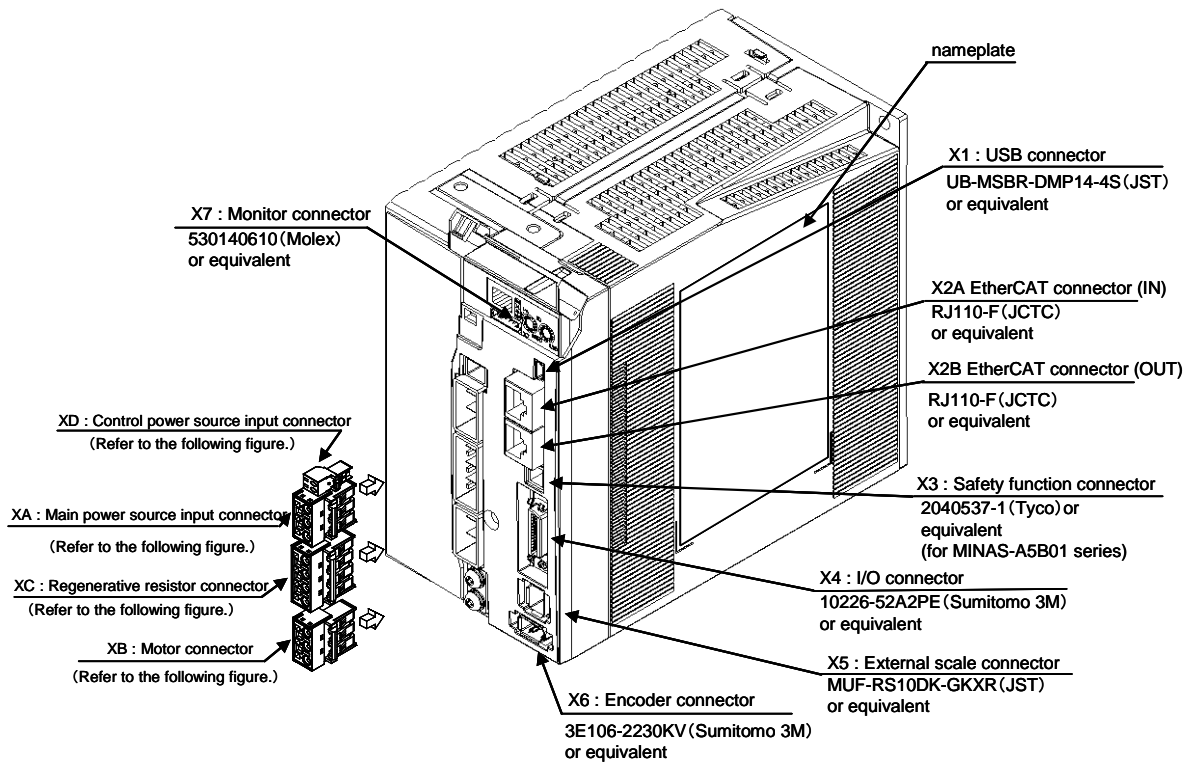
Cable side connectors



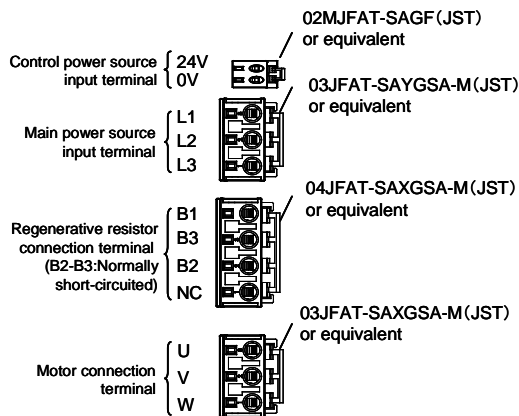
Connectors at driver



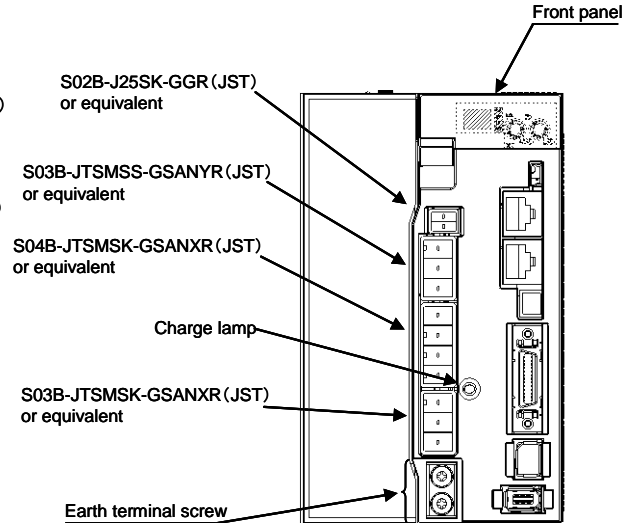
Size D 400 V



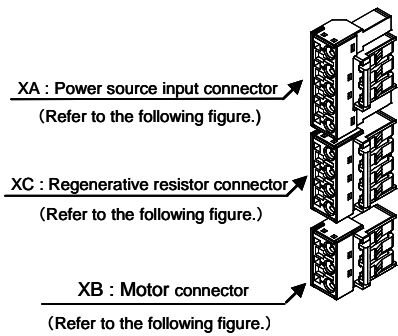
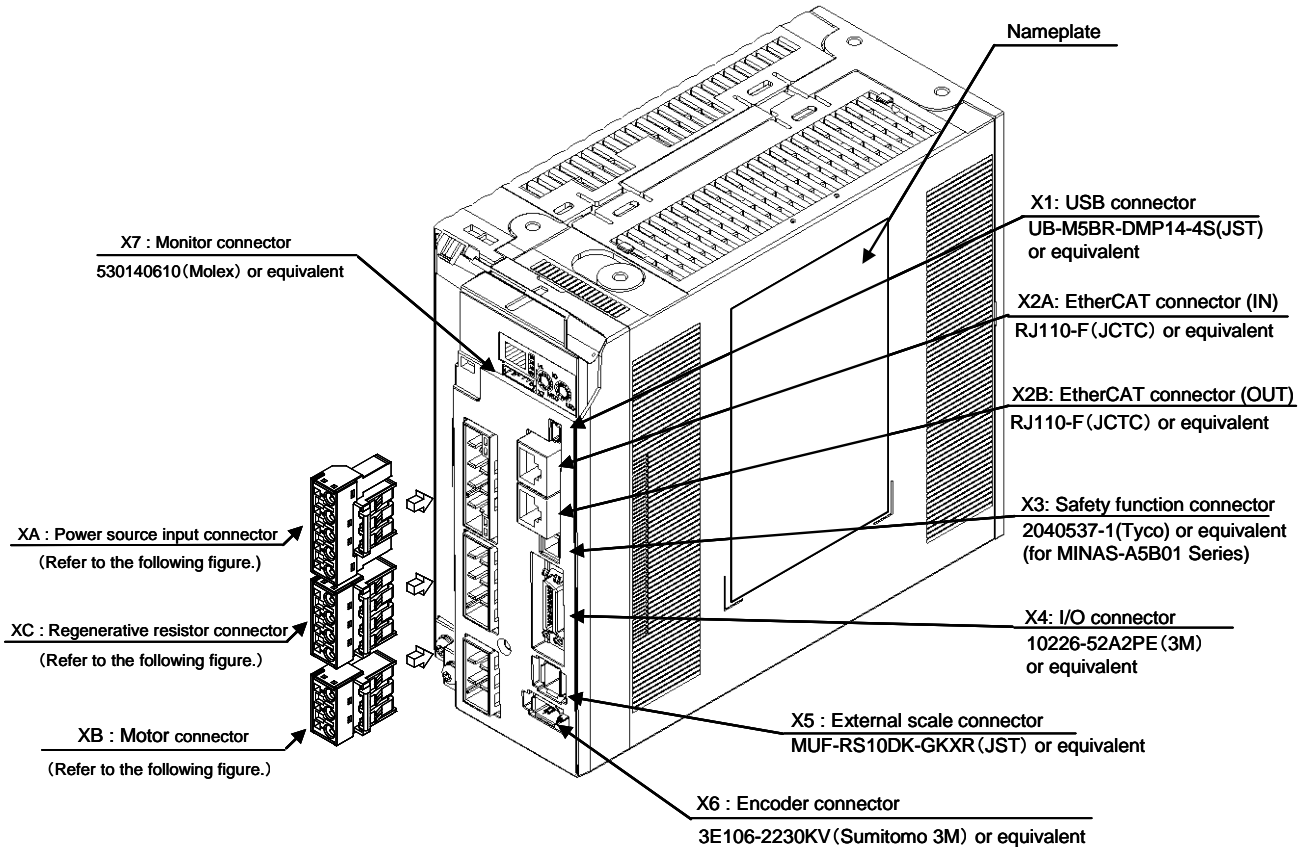
Cable side connector



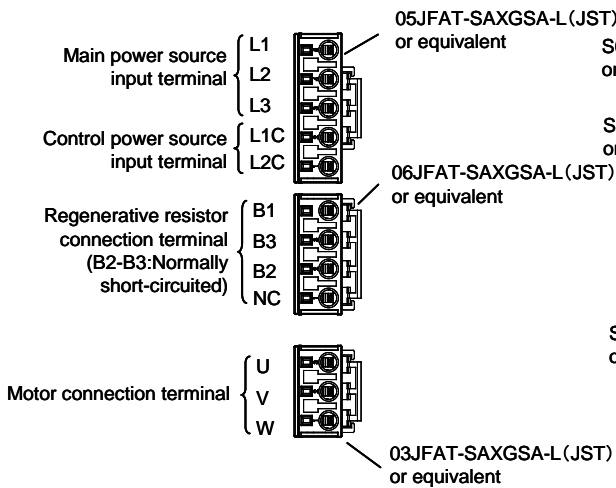
Cable side connector



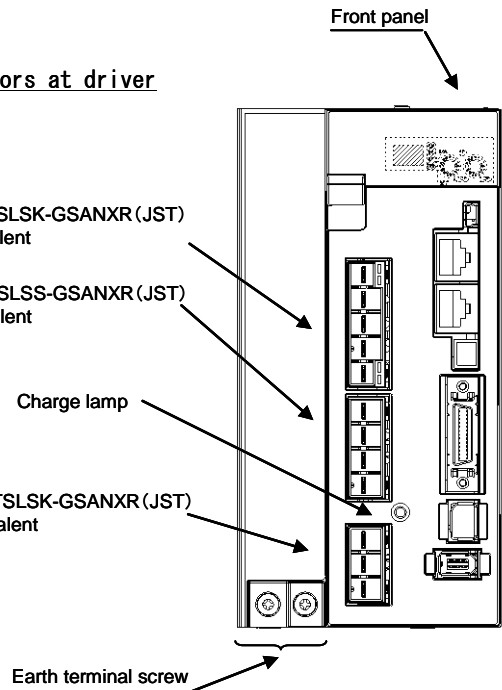
Size E 200 V



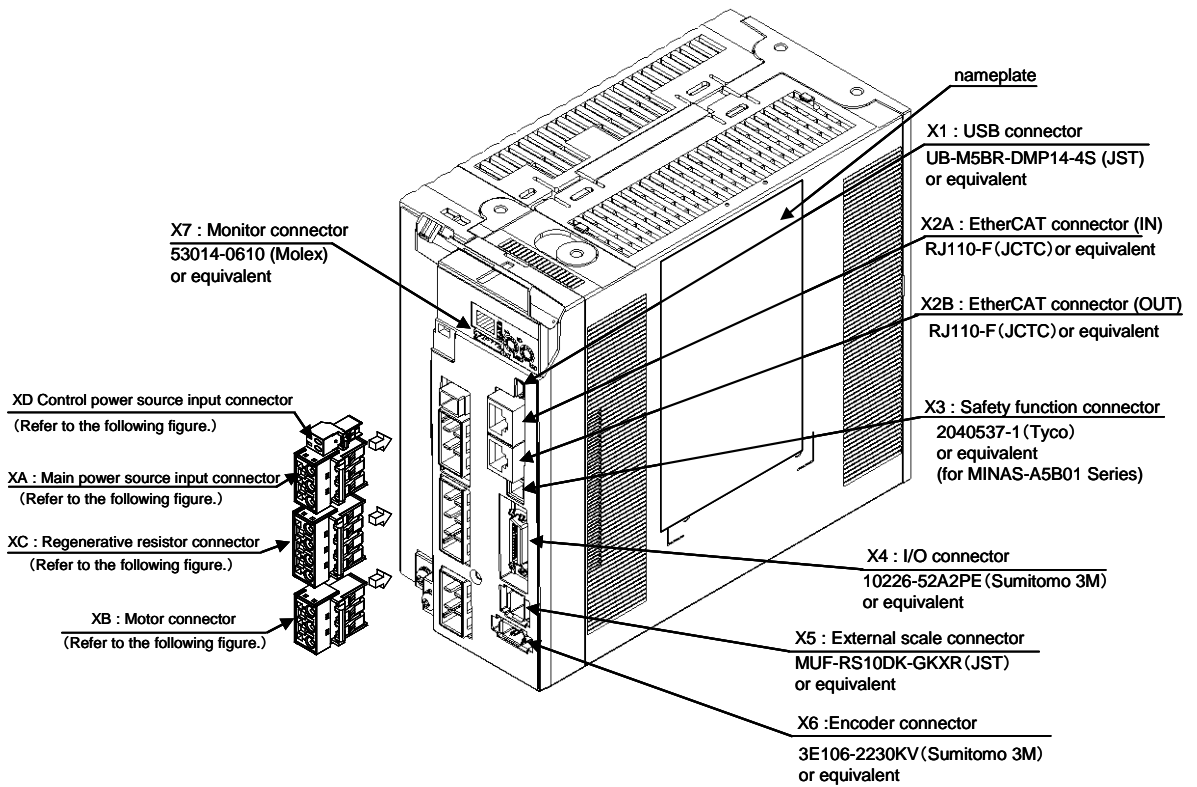
Cable side connector



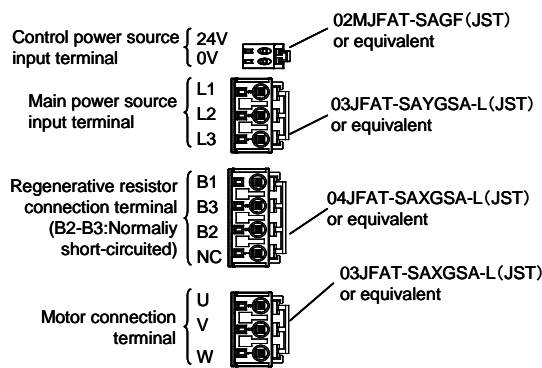
Connectors at driver



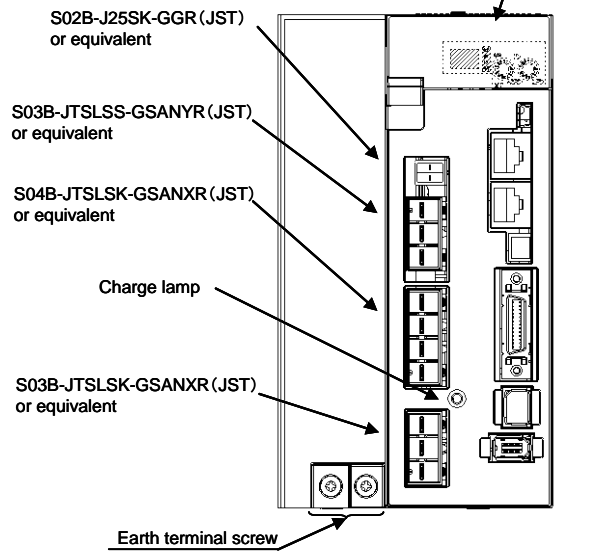
Size E 400 V



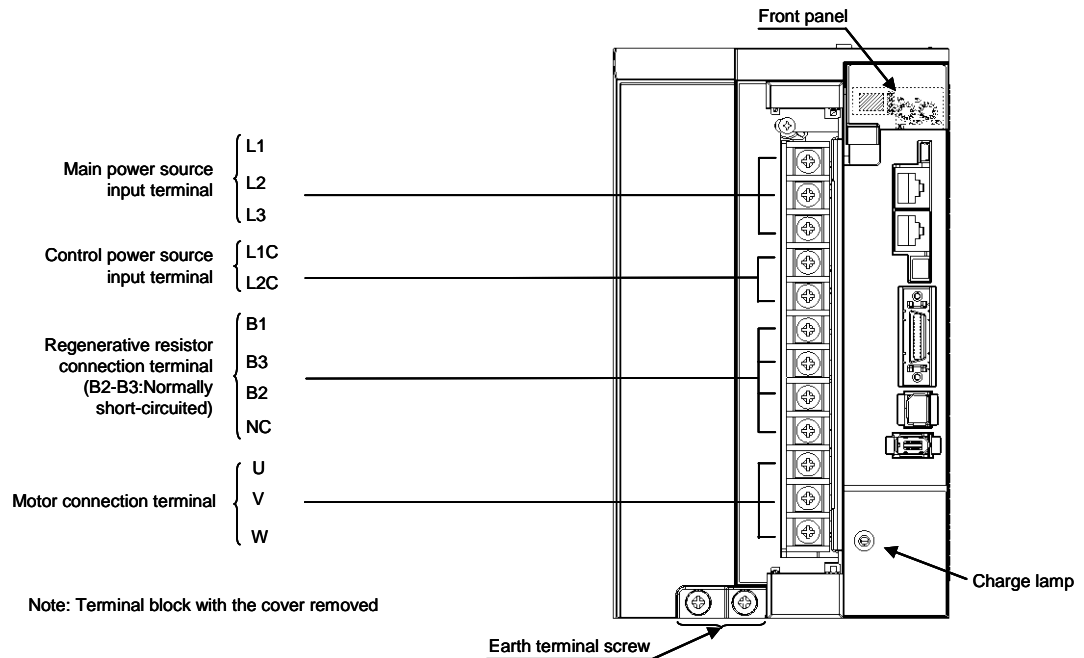
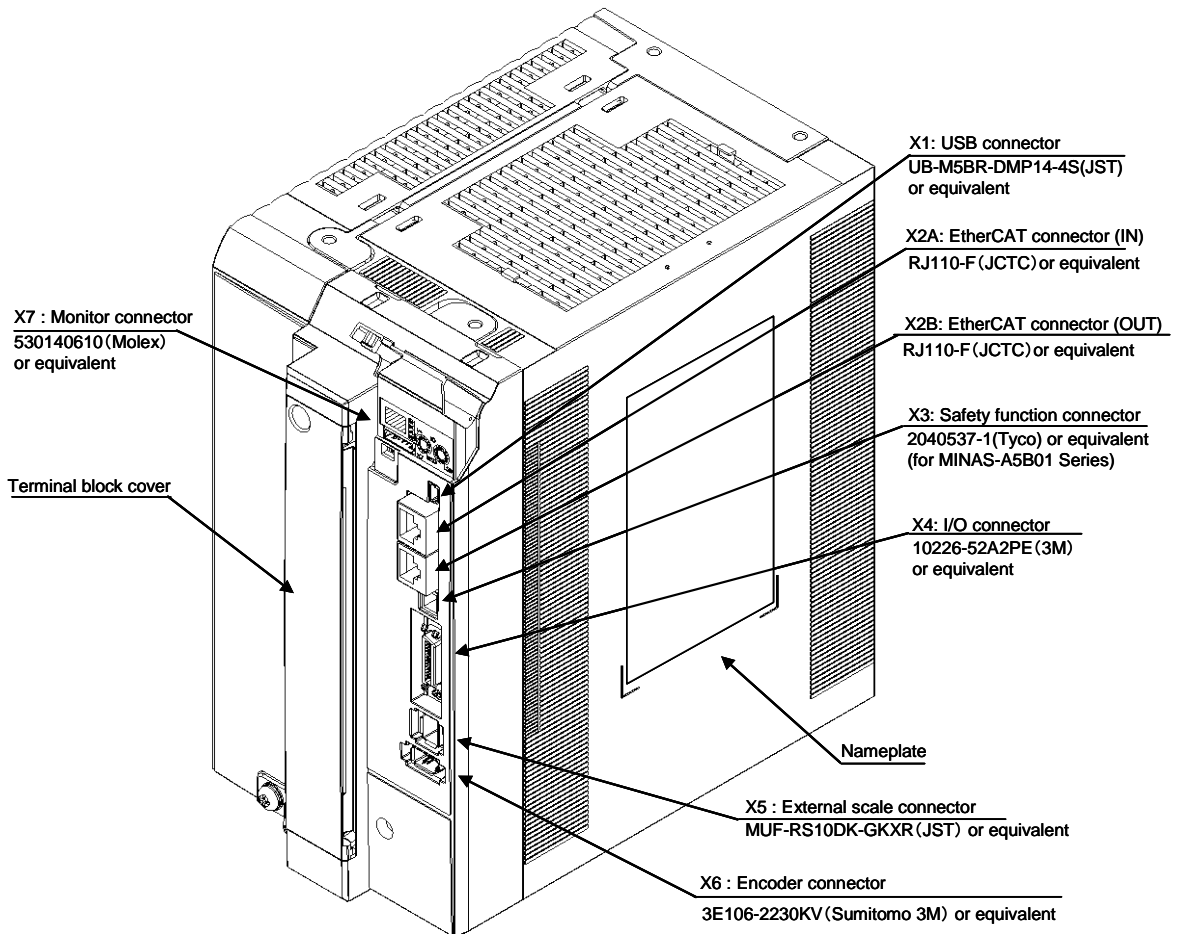
Cable side connector



Cable side connector



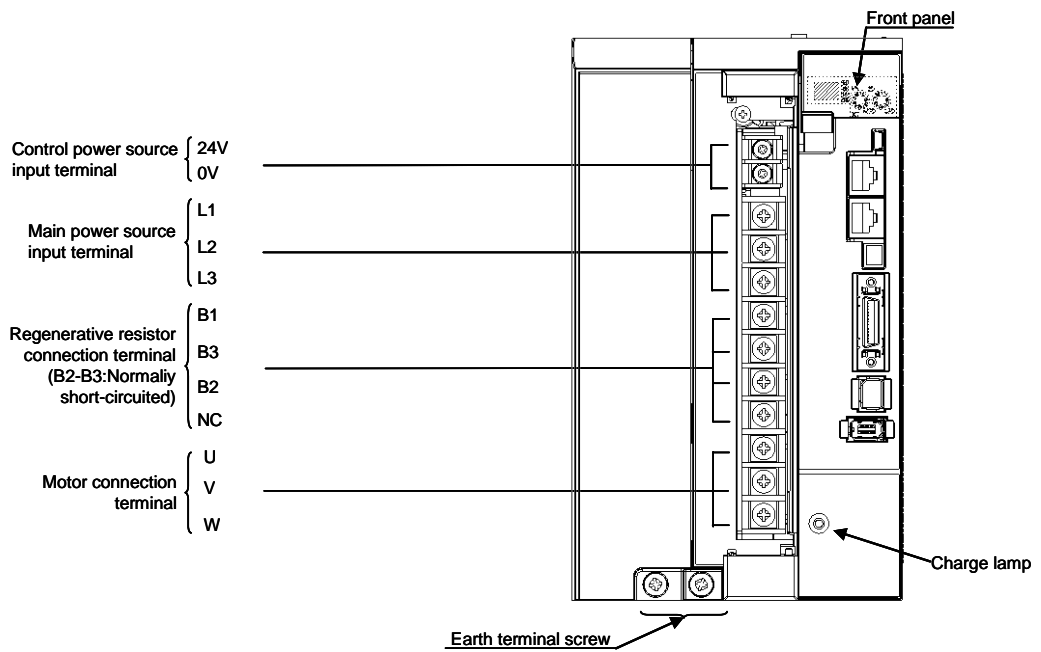
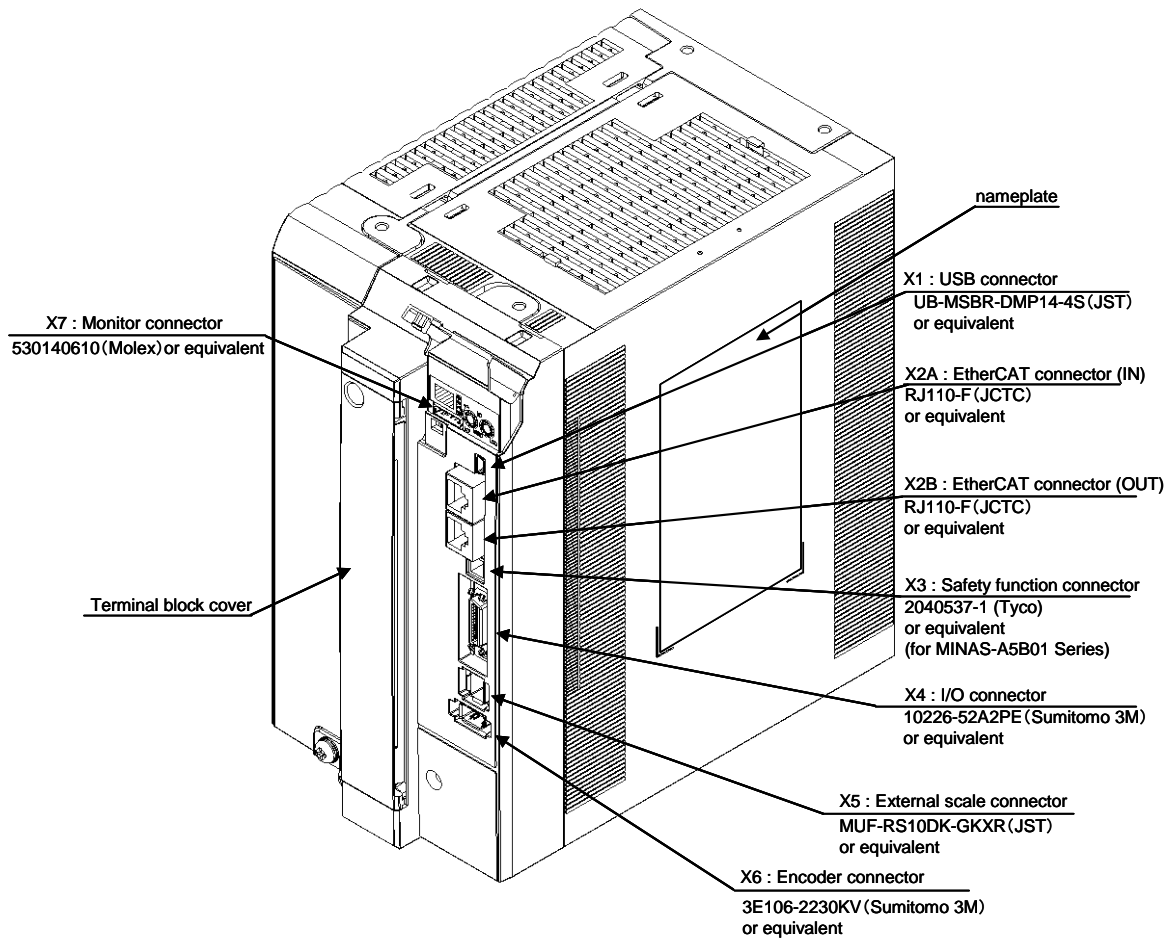
Size F 200 V



Note: Terminal block with the cover removed

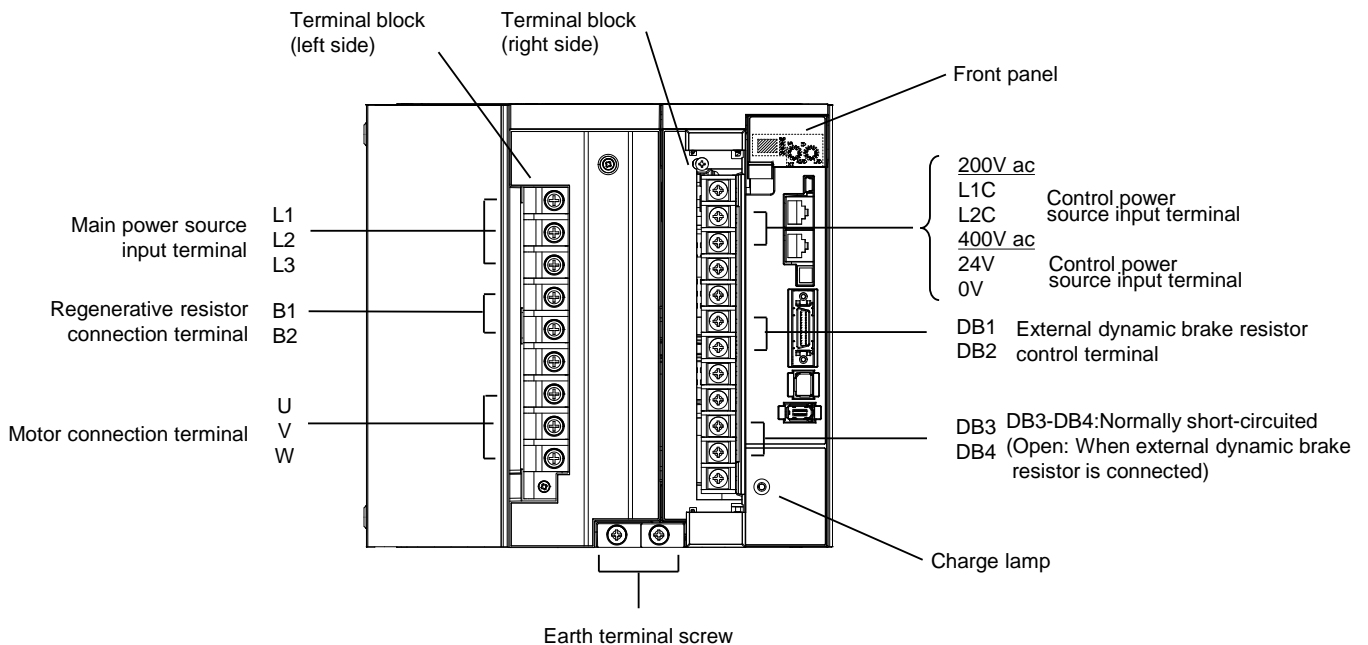
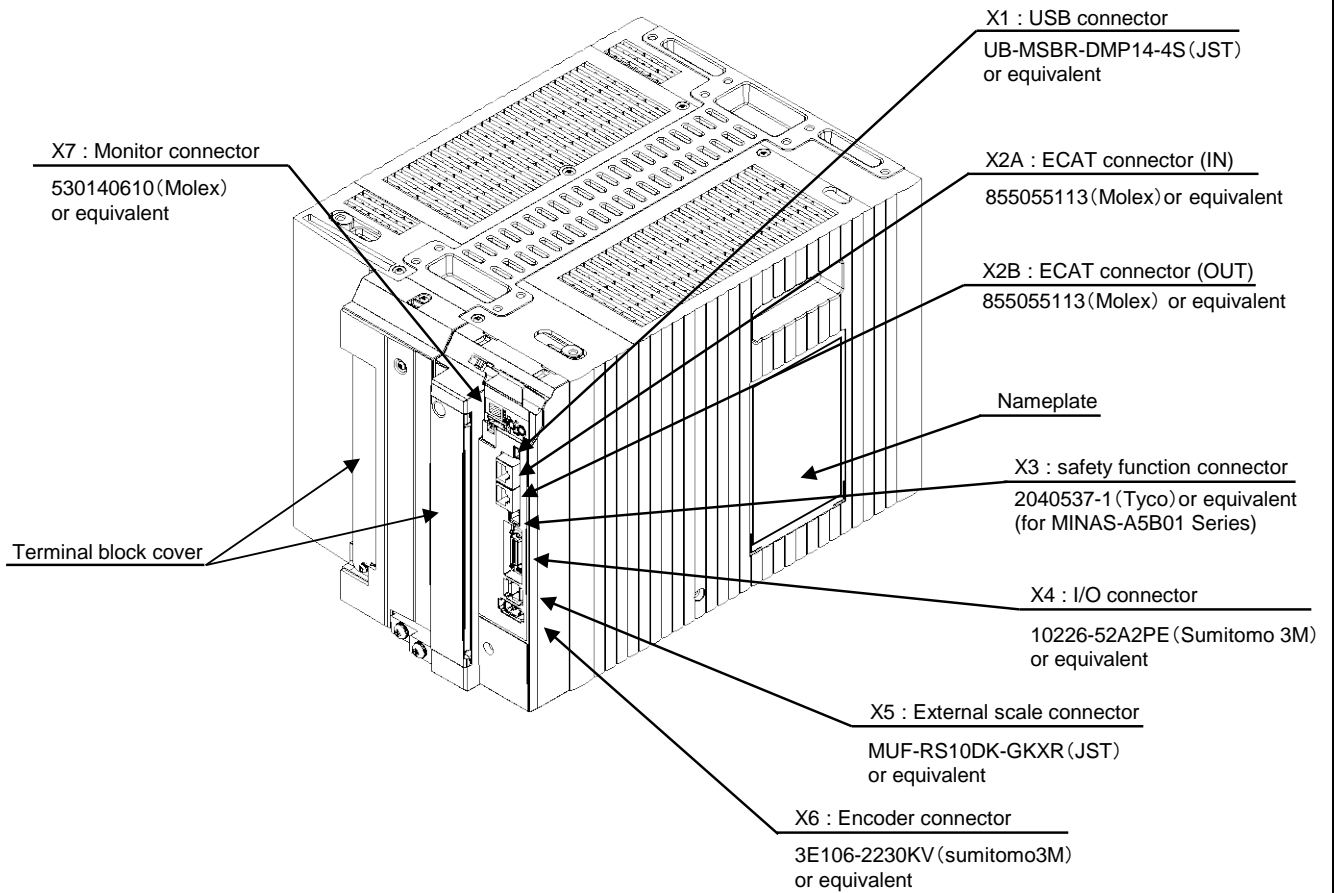
Note: Terminal block with the cover removed

Size F 400 V



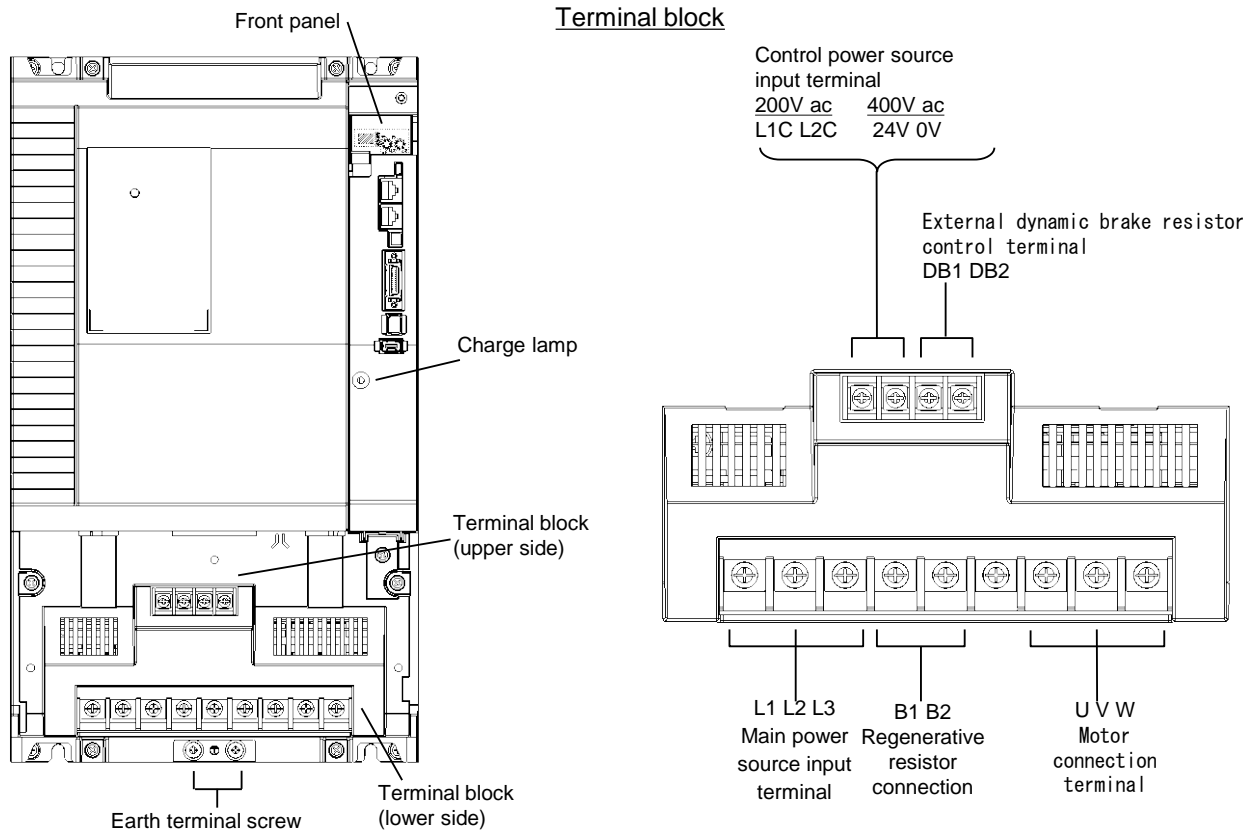
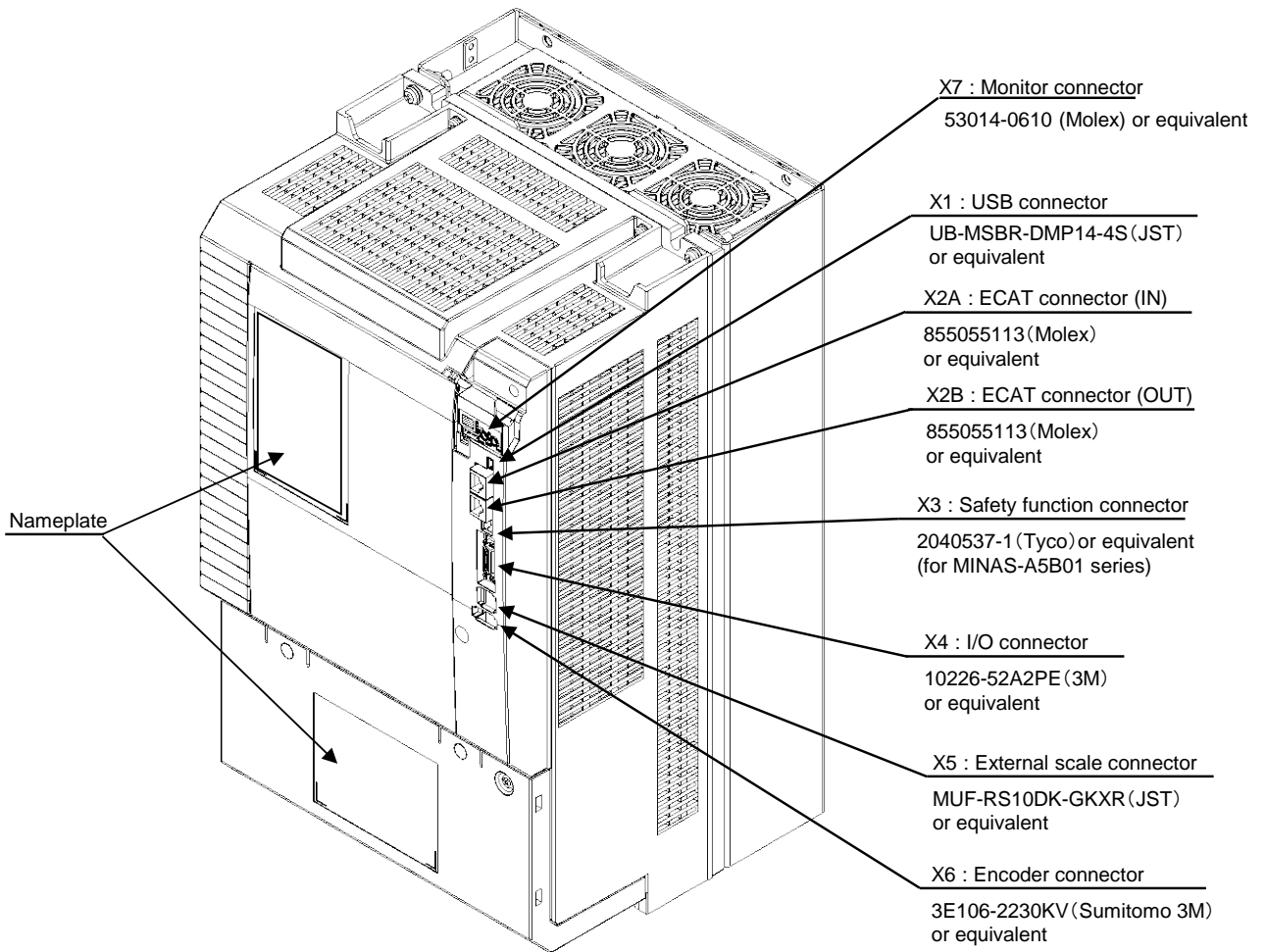
Note: Terminal block with the cover removed

Size G 200 V/400 V



Note: Terminal block with the cover removed

Size H 200 V/400 V




Note: Terminal block with the cover removed

7. Configuration of Connectors and Terminal Blocks


7-1 Power Connector **XA**, **XB**, **XC**, **XD** and Terminal Block

[1] Sizes A, B, C and D of 100 V and 200 V System

Name	Terminal symbol	Connector pin no.	Description		
XA	Main power supply input	L1	5	100 V	Single phase 100–120 V $+10\%$ -15% 50/60 Hz input Use L1 and L3 terminal.
		L2	4	200 V	Single or 3 phase 200–240 V $+10\%$ -15% 50/60 Hz input Use L1 and L3 terminal for single phase input
		L3	3		
	Control power supply input	L1C	2	100 V	Single phase 100–120 V $+10\%$ -15% 50/60 Hz input
		L2C	1	200 V	Single phase 200–240 V $+10\%$ -15% 50/60 Hz input
XB	Regen resistor connection	B1	6	<ul style="list-style-type: none"> Normally, open the circuit between B2 and B3. (Sizes A, B) Normally, short out the circuit between B2 and B3. (Sizes C, D) When a trip happens due to a regenerative load protection error, connect an external regenerative resistor (prepared by customer) between B1 and B2. 	
		B3	5		
		B2	4		
	Motor connection	U	3		Connect each phase of the motor winding. U: U phase V: V phase W: W phase
		V	2		
		W	1		
Earth		–	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.		


- Refer to section 9-3 for the tightening torque of the screw.

[2] Size E of 200 V System

Name	Terminal symbol	Connector pin no.	Description		
XA	Main power supply input	L1	5	200 V	3 phase 200–230 V $+10\%$ -15% 50/60 Hz input
		L2	4		
		L3	3		
	Control power supply input	L1C	2	200 V	Single phase 200–230 V $+10\%$ -15% 50/60 Hz input
		L2C	1		
XC	Regen resistor connection	B1	4	Normally, short out the circuit between B2 and B3. When a trip happens due to a regenerative load protection error, connect an external regenerative resistor (prepared by customer) between B1 and B2. Note: Keep NC terminal unconnected.	
		B3	3		
		B2	2		
		NC	1		
XB	Motor connection	U	3	Connect each phase of the motor winding. U: U phase V: V phase W: W phase	
		V	2		
		W	1		
Earth		–	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.		


- Refer to section 9-3 for the tightening torque of the screw.

[3] Size D and E of 400 V System

	Name	Terminal symbol	Connector pin no.	Description
XA	Main power supply input	L1	3	3 phase 380–480 V + 10% 50/60 Hz input - 15%
		L2	2	
		L3	1	
XD	Control power supply input	24V	1	24 V dc +/- 15%
		0V	2	
XC	Regen resistor connection	B1	4	Normally, short out the circuit between B2 and B3. When a trip happens due to a regenerative load protection error, connect an external regenerative resistor (prepared by customer) between B1 and B2. Note: Keep NC terminal unconnected.
		B3	3	
		B2	2	
		NC	1	
XB	Motor connection	U	3	Connect each phase of the motor winding. U: U phase V: V phase W: W phase
		V	2	
		W	1	
	Earth		–	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.


- Refer to section 9-3 for the tightening torque of the screw.

[4] Size F of 200 V System

	Name	Terminal symbol	Terminal no. (upper to bottom)	Description
	Main power supply input	L1	1	3 phase 200–230 V + 10% 50/60 Hz input - 15%
		L2	2	
		L3	3	
Terminal block	Control power supply input	L1C	4	Single phase 200–230 V + 10% 50/60 Hz input - 15%
		L2C	5	
Terminal block	Regen resistor connection	B1	6	Normally, short out the circuit between B2 and B3. When a trip happens due to a regenerative load protection error, open the circuit between B2 and B3 and connect an external regenerative resistor (prepared by customer) between B1 and B2. Note: Keep NC terminal unconnected.
		B3	7	
		B2	8	
		NC	9	
Terminal block	Motor connection	U	10	Connect each phase of the motor winding. U: U phase V: V phase W: W phase
		V	11	
		W	12	
	Earth		–	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.


- Refer to section 9-3 for the tightening torque of the screw.
- Tighten the fixing screw of the terminal block cover with a torque 0.2 N•m or lower.

[5] Size F of 400 V System

	Name	Terminal symbol	Terminal no. (upper to bottom)	Description
Terminal block	Control power supply input	24V	1	24 V dc +/- 15%
		0V	2	
Terminal block	Main power supply input	L1	1	3 phase 380–480 V + 10% 50/60 Hz input - 15%
		L2	2	
		L3	3	
	Regen resistor connection	B1	4	Normally, short out the circuit between B2 and B3. When a trip happens due to a regenerative load protection error, open the circuit between B2 and B3 and connect an external regenerative resistor (prepared by customer) between B1 and B2. Note: Keep NC terminal unconnected.
		B3	5	
		B2	6	
		NC	7	
Motor connection	U	8	Connect each phase of the motor winding. U: U phase V: V phase W: W phase	
	V	9		
	W	10		
	Earth		—	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.


- Refer to section 9-3 for the tightening torque of the screw.
- Tighten the fixing screw of the terminal block cover with a torque 0.2 N•m or lower.

[6] Size G of 200 V and 400 V System

	Name	Terminal symbol		Terminal no. (upper to bottom)	Description
		200 V	400 V		
Terminal block (left side)	Main power supply input	L1	L1	1	200 V : 3 phase 200–230 V + 10% - 15% 50/60 Hz input
		L2	L2	2	
		L3	L3	3	
	Regenerative resistor connection	B1	B1	4	• When tripped by a regenerative load protect error, connect an external regenerative resistor (the value set by parameter Pr0.16 and prepared by the user) across B1 and B2. Note: Keep NC terminal unconnected.
		B2	B2	5	
		NC	NC	6	
	Motor connection	U	U	7	• Connect each phase of the motor winding. U: U phase V: V phase W: W phase
		V	V	8	
		W	W	9	
Terminal block (right side)		NC	NC	1	• Leave this terminal unconnected.
	Control power supply input	L1C	24V	2	200 V : Single phase 200–230 V + 10% - 15% 50/60 Hz input
		L2C	0V	3	
		NC	NC	4	• Leave this terminal unconnected.
		NC	NC	5	
	Dynamic brake resistor control terminal	DB1	DB1	6	• Connect when it is necessary to control the MC for external dynamic brake resistor (prepared by the user). • Impress the voltage AC300V or less or DC100V or less between DB1 and DB2.
		DB2	DB2	7	
		NC	NC	8	• Leave this terminal unconnected.
		NC	NC	9	
	Dynamic brake resistor control terminal	DB3	DB3	10	• Be short-circuited usually between DB3 and DB4. Remove the short bar when you use the external dynamic brake resistor.
		DB4	DB4	11	
	NC	NC	12		
	Earth		—	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.	

- Refer to section 9-3 for the tightening torque of the screw.
- Tighten M3 terminal block cover fixing screw with the 0.2 N•m torque.

[7] Size H of 200 V and 400 V System

	Name	Terminal symbol		Terminal no. (left to right)	Description
		200 V	400 V		
Terminal block (upper side)	Control power supply input	L1C	24V	1	200 V : Single phase 200–230 V + 10% - 15% 50/60 Hz input
		L2C	0V	2	400 V : 24 V dc +/- 15%
	Dynamic brake resistor control terminal	DB1	DB1	3	<ul style="list-style-type: none"> • Connect when it is necessary to control the MC for external dynamic brake resistor (prepared by the user). • Impress the voltage AC300V or less or DC100V or less between DB1 and DB2.
		DB2	DB2	4	
Terminal block (lower side)	Main power supply input	L1	L1	1	200 V : 3 phase 200–230 V + 10% - 15% 50/60 Hz input
		L2	L2	2	
		L3	L3	3	
	Regenerative resistor connection	B1	B1	4	<ul style="list-style-type: none"> • When tripped by a regenerative load protect error, connect an external regenerative resistor (the value set by parameter Pr0.16 and prepared by the user) across B1 and B2. Note) Do not connect any wire to the NC terminal.
		B2	B2	5	
		NC	NC	6	
	Motor connection	U	U	7	Connect each phase of the motor winding. U: U phase V: V phase W: W phase
		V	V	8	
		W	W	9	
Earth			–	There are 2 grounding terminals. Connect the one terminal to ground, and the other to the E terminal of a motor. Do not connect more than one wire to a grounding terminal.	

- Refer to section 9-3 for the tightening torque of the screw.
- Tighten M5 terminal block cover fixing screw with the 0.4 N•m torque.

7-2 USB Connector X1

By connecting to the PC through USB interface, various operations such as setting/changing of parameters, monitoring of control state, referencing of error/history, and saving/loading of parameters can be performed.

Name	Symbol	Connector pin no.	Description
USB signal	VBUS	1	<ul style="list-style-type: none"> • Communicate with a computer
	D-	2	
	D+	3	
For manufacturer use	–	4	<ul style="list-style-type: none"> • Do not connect
Signal ground	GND	5	<ul style="list-style-type: none"> • Signal ground

7-3 EtherCAT (ECAT) connectors **X2A** and **X2B**

For EtherCAT, use RJ45 connector.

Name	Symbol	Connector pin no.	Description
Transmit/Receive +	TX/RX+	1	Connect to pin 1 on the RJ45 connector of communicating node
Transmit/Receive -	TX/RX-	2	Connect to pin 2 on the RJ45 connector of communicating node
Receive/Transmit +	RX/TX+	3	Connect to pin 3 on the RJ45 connector of communicating node
Not used	-	4	Connect to pin 4 on the RJ45 connector of communicating node
Not used	-	5	Connect to pin 5 on the RJ45 connector of communicating node
Receive/Transmit -	RX/TX-	6	Connect to pin 6 on the RJ45 connector of communicating node
Not used	-	7	Connect to pin 7 on the RJ45 connector of communicating node
Not used	-	8	Connect to pin 8 on the RJ45 connector of communicating node
Frame ground	FG	Shell	Connect to shield of cable.

- Be sure to use shielded twisted pair (STP) compatible with 5e of TIA/EIA-568 or higher category.
- The final pin function for pins 1, 2, 3, and 6 are determined by Auto MDI-X.

7-4 Safety function connector **X3** (for MINAS-A5B01 Series)

For the safety function connector.

Name	Symbol	Connector pin no.	Description	I/O type
Reserved	—	1	Do not connect.	—
	—	2		—
Safety input 1	SF1-	3	These are two independent circuits that turn off the operation signal to the power module to shut off the motor current.	i-1
	SF1+	4		
Safety input 2	SF2-	5		
	SF2+	6		
EDM output	EDM-	7	This is an output for monitoring the failure of the safety function.	o-2
	EDM+	8		
Frame ground	FG	Shell	Connected with protective earth terminal in the servo driver.	—

Refer to the technical document SX-DSV02472 for the safety function.

7-5 I/O Connector **X4****Input signal**

Name	Symbol	Connector pin no.	Description	I/O type
Control signal power source	I-COM	6	<ul style="list-style-type: none"> Connect to positive/negative polarity of the external power supply. Use power supply: 12 V +/-5% to 24 V +/-5% 	—
Input 1	SI1	5	<ul style="list-style-type: none"> Assign functions using parameters. For details, refer to the technical data – Basic function specification – SX-DSV02472. Range of available functions is limited. For example, external latch input EXT1 can be allocated only to SI5, EXT2 to SI6 and EXT3 to SI7. For factory default function assignment, refer to appendix “Specification for Each Model”. 	i-1
Input 2	SI2	7		i-1
Input 3	SI3	8		i-1
Input 4	SI4	9		i-1
Input 5	SI5	10		i-1
Input 6	SI6	11		i-1
Input 7	SI7	12		i-1
Input 8	SI8	13		i-1

Output signal

Name	Symbol	Connector pin no.	Description	I/O type
Output 1	SO1+	1	<ul style="list-style-type: none"> Assign functions using parameters. For details, refer to the technical data—Basic function specification— SX-DSV02472. For factory default function assignment, refer to appendix “Specification for Each Model”. 	o-1
	SO1-	2		
Output 2	SO2+	25		
	SO2-	26		
Output 3	SO3+	3		
	SO3-	4		

Encoder backup power input

Name	Symbol	Connector pin no.	Description	I/O type
Battery input to absolute encoder	BTP-I	14	<ul style="list-style-type: none"> Connect to the absolute encoder backup battery (recommended battery: Toshiba ER6V 3.6 V) BTP-I: positive, BTN-I: negative The power necessary to store multi-turn data is supplied to the absolute encoder via BTP-0 (pin 3) and BTN-0 (pin 4) of encoder connector (X6). Use any of the following methods to connect the battery for absolute encoder. <ol style="list-style-type: none"> Directly connected to the motor. Connected to the encoder cable. Connected to this connector. 	—
	BTN-I	15		

Other

Name	Symbol	Connector pin no.	Description	I/O type
Reserved	—	16 17 18 19 20 21 22 23 24	<ul style="list-style-type: none"> Do not connect 	—
Frame ground	FG	Shell	<ul style="list-style-type: none"> Connected to the earth terminal in the servo driver. 	—

7-6 External Scale Connector **X5** (Not supported)

Name	Connector pin no.	Description
Power supply output for external scale	1	EX5V (Note 2) (Note 3)
	2	EX0V (Note 1)
External scale signal input / output (serial signal)	3	EXPS
	4	/EXPS
External scale signal input (A / B / Z phase signal)	5	EXA
	6	/EXA
	7	EXB
	8	/EXB
	9	EXZ
	10	/EXZ
Frame ground	Shell	FG

Note 1: EX5V power supply output for external scale is rated at 5.2 V \pm 5% and 300 mA at maximum. To use an external scale with a current consumption higher than that, a preparation of an external power supply is required. Some external scales may take longer time in initialization after turning on the power.

Note 2: In case an external power supply is used for the external scale, make sure that the EX5V pin is open and no external power is supplied to the EX5V pin.

7-7 Encoder Connector **X6**

Name	Connector pin no.	Description
Encoder power supply output	1	E5V
	2	E0V (Note 1)
Absolute encoder battery backup output (Note 2)	3	BTP-O
	4	BTN-O
Encoder signal I/O (serial signal)	5	PS
	6	/PS
Frame ground	Shell	FG

Note 1: Connected to the absolute encoder battery input terminals BTP-I and BTN-I of X4 connector in the servo driver. When connecting the battery directly to the encoder connection cable, leave these pins unconnected.

7-8 Monitor Connector **X7**

Name	Symbol	Connector pin no.	Description	I/O signal interface
Analog monitor output 1	AM1	1	• Analog signal output for monitoring • Monitoring object changes according to the parameter setting.	Ao-1
Analog monitor output 2	AM2	2	• For details, refer to the technical data—Basic function specification—SX-DSV02472.	
Signal ground	GND	3	• Signal ground	—
Reserved	—	4	• Do not connect	—
Reserved	—	5	• Do not connect	—
Reserved	—	6	• Do not connect	—

I/O signal interface

i-1

or

o-1

Note: To directly run the relay, attach a diode in parallel with the relay and in the direction shown in the figure above.
VCE sat = 1.2 V

o-2

or



Note: To directly run the relay, attach a diode in parallel with the relay and in the direction shown in the figure above.
VCE sat = 1.2 V

Ao-1

Output signal amplitude is ±10V

8. Wiring

8-1 Used Cables and Maximum Cable Lengths

Name	Symbol	Maximum cable length	Used cable
Main power supply	L1, L2, L3	—	Refer to the associated specification available separately.
Control power supply	L1C, L2C	—	HVSF 0.75 mm ²
Motor connection	U, V, W, 	20 m	Refer to the associated specification available separately. (Note 1)
Earth cable		1 m	Refer to the associated specification available separately.
Encoder connection	X6	20 m	Overall twisted shielded pair Core wire: 0.18 mm ² or larger
I/O connection	X4	3 m	
ECAT connection	X2A/X2B	100 m (Note 2)	Twisted shielded pair (STP) cable of category 5e or better

Note 1: When using Tyco Electronics AMP connectors (172167-1, 172189-1) as motor junction connector, maximum applicable conductor size is 1.3 mm².

Note 2: Refer to 8.3 (5) Connection to connectors **X2A** and **X2B**.

8-2 Cable Side Connector

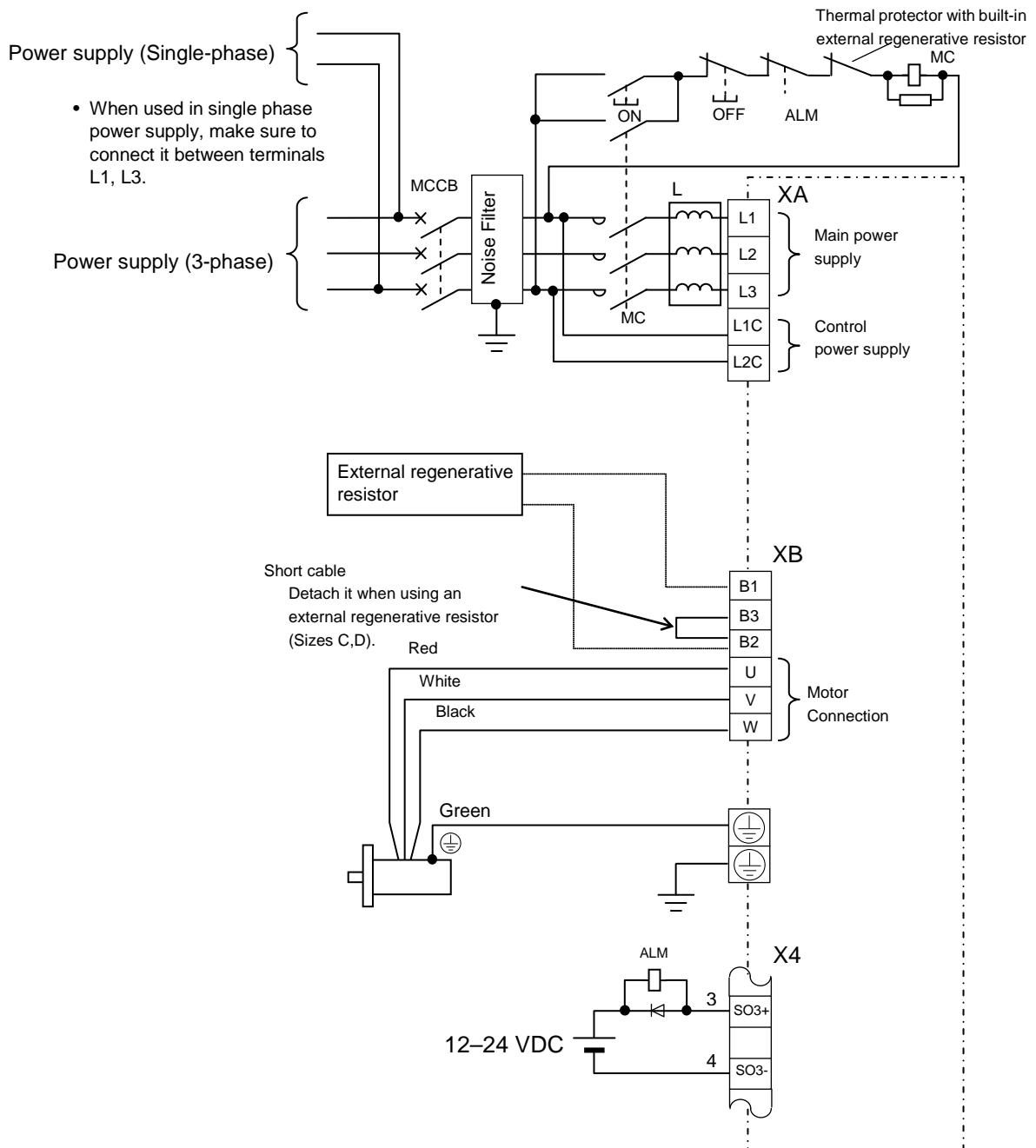
Connector symbol	Part name	Part number	Manufacturer
X3	Connector	2013595-1	Tyco Electronics
X4	Solder plug (soldering type)	10126-3000PE	Sumitomo 3M
	Shell kit	10326-52A0-008	
X5	Connector	MUF-PK10K-X	J. S. T. Mfg
X6	Connector	3E206-0100KV	Sumitomo 3M
		3E306-3200-008	
X7	Connector	51004-0600	Molex
	Connector pin	50011-8100	

Use connectors listed above or equivalents.

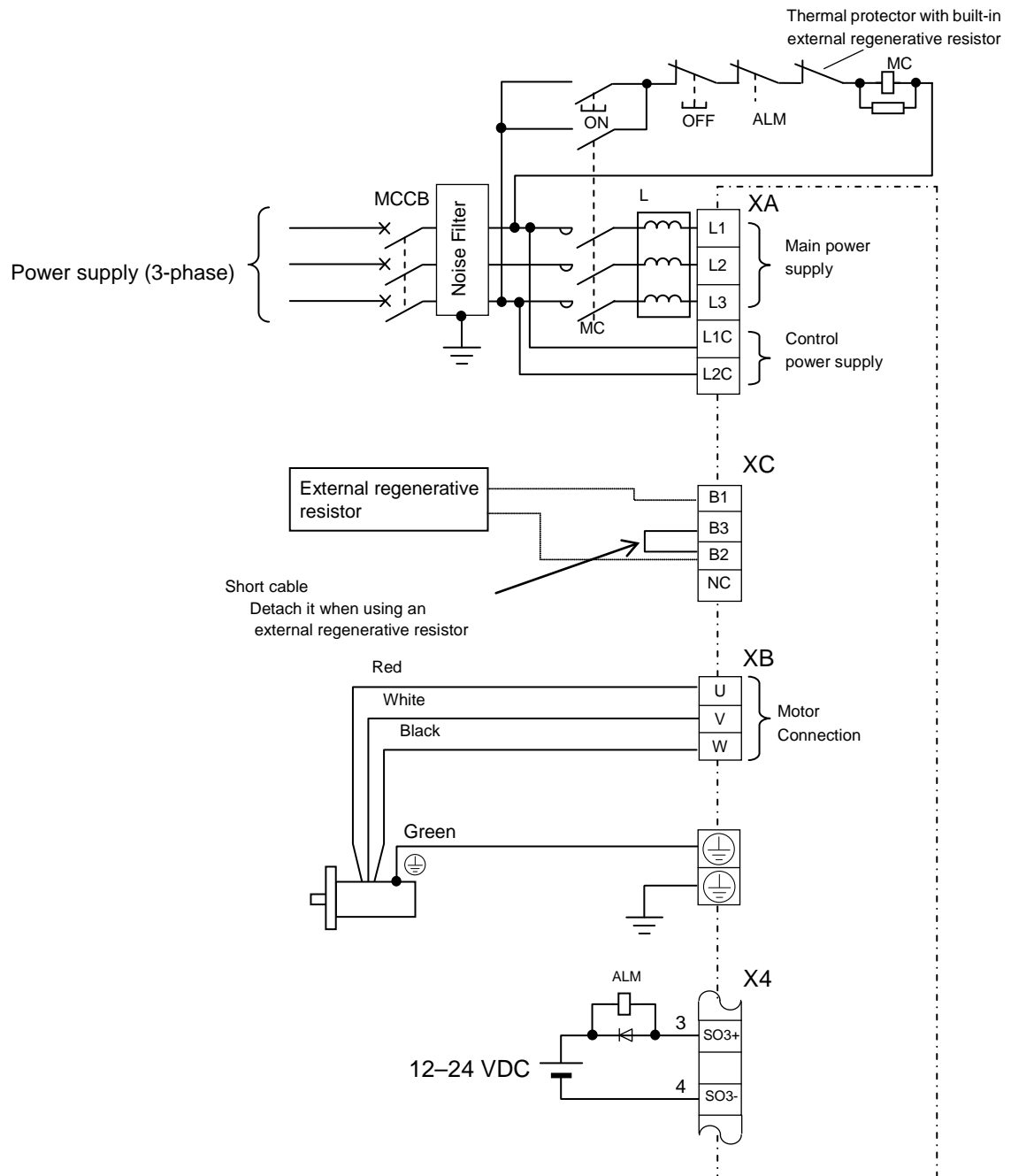
8-3 Precautions for Wiring

(1) Wiring to power connector and terminal block

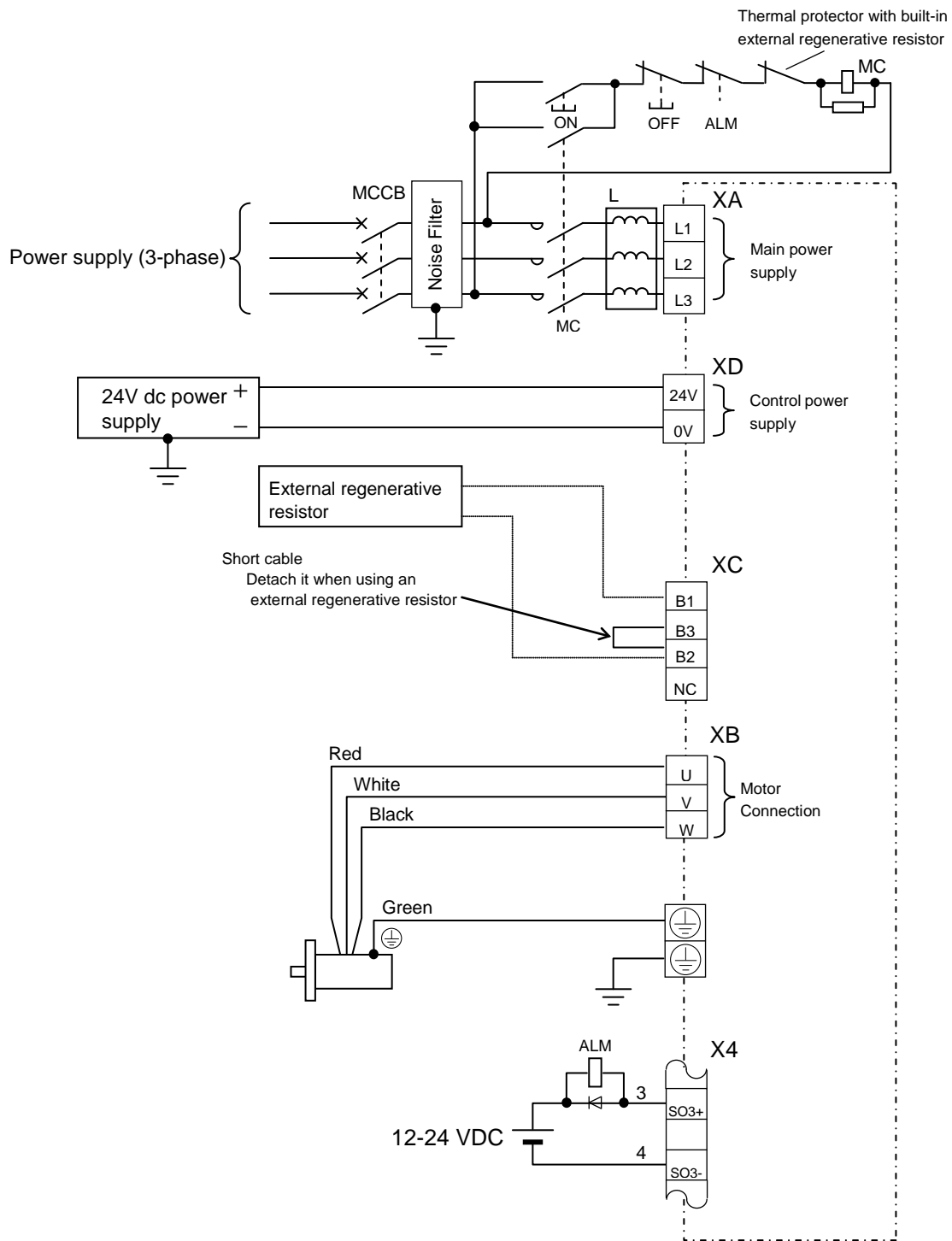
100/200 V Sizes A-D:



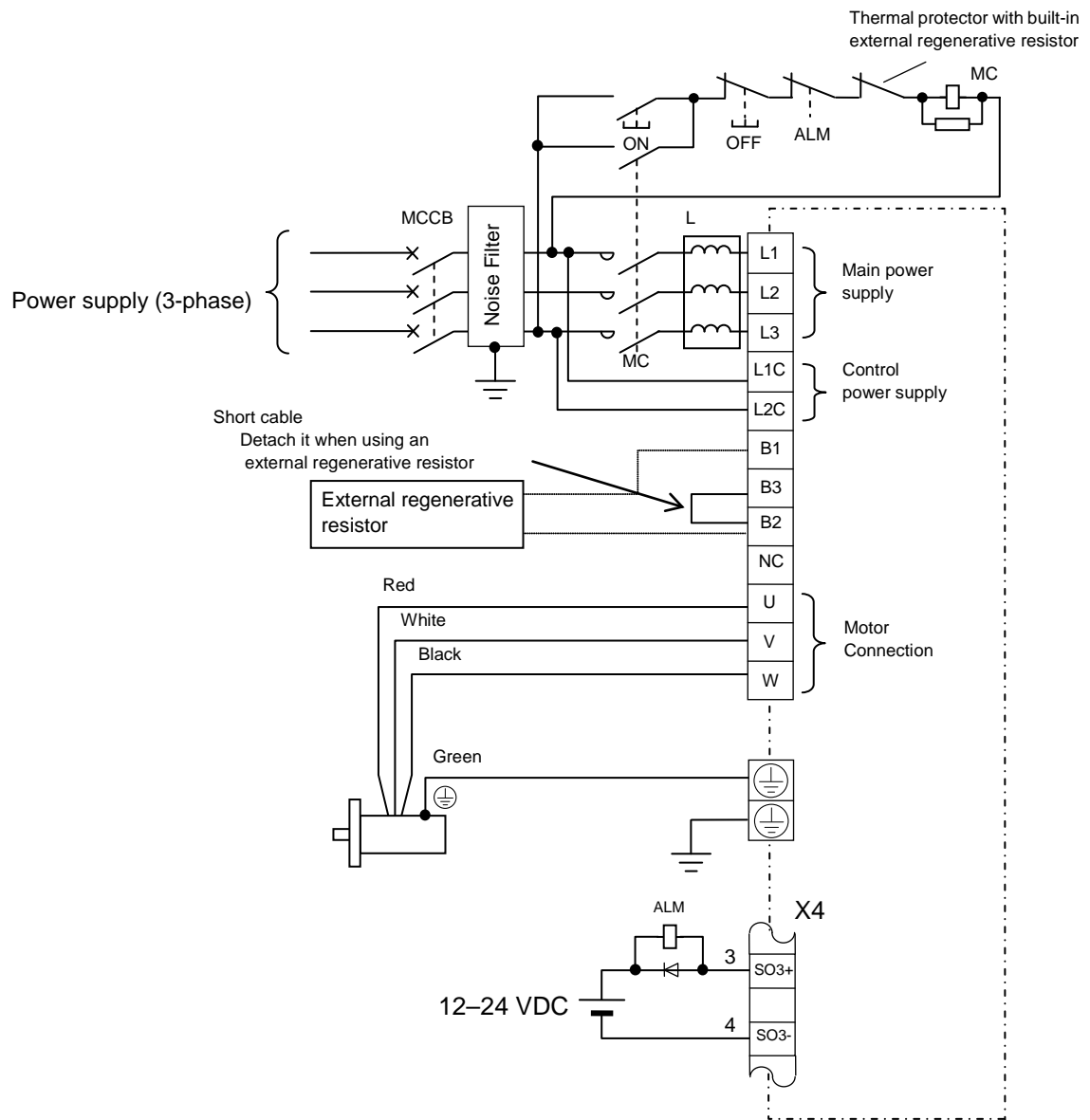
200 V Size E



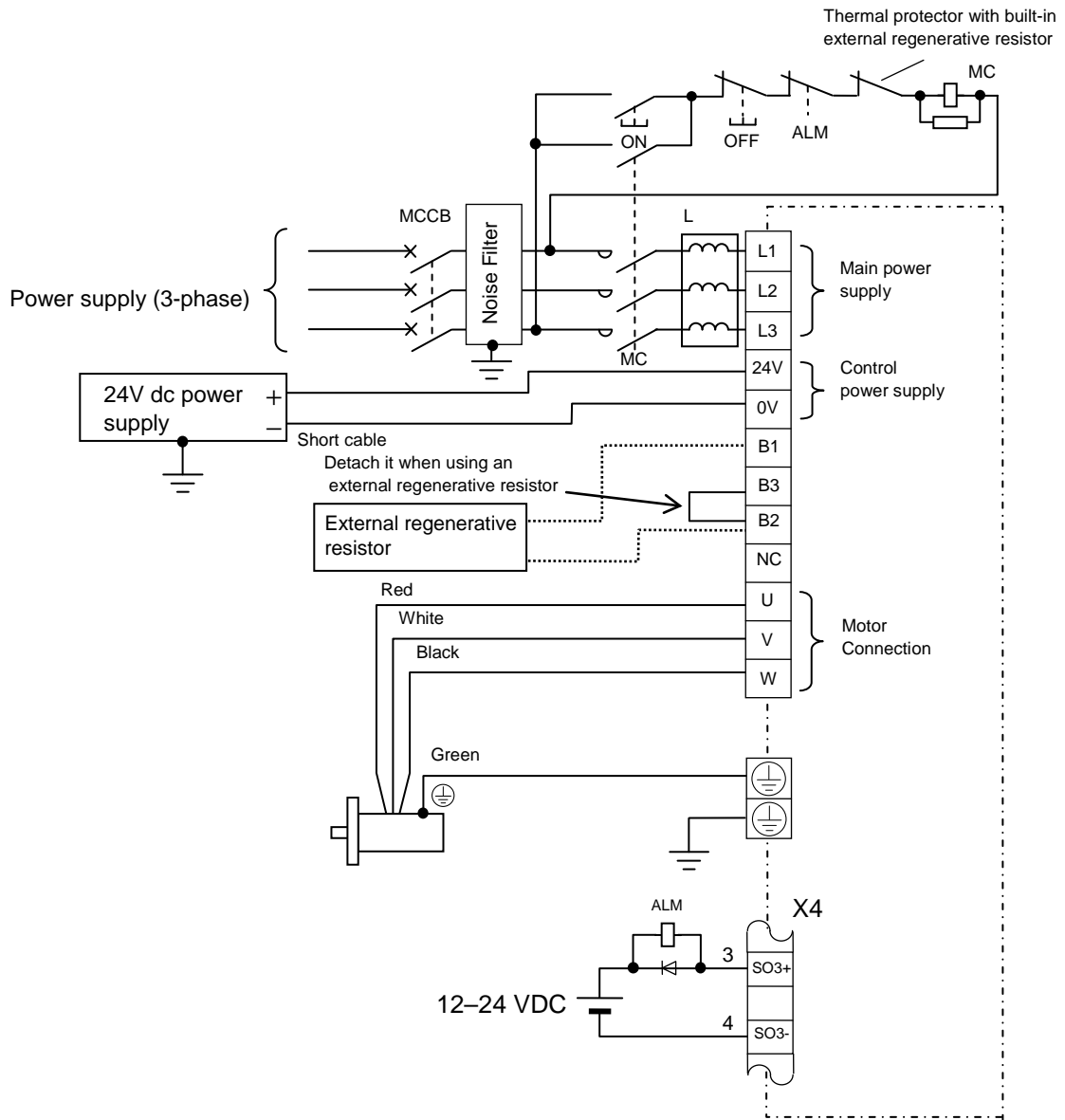
400 V Sizes D and E



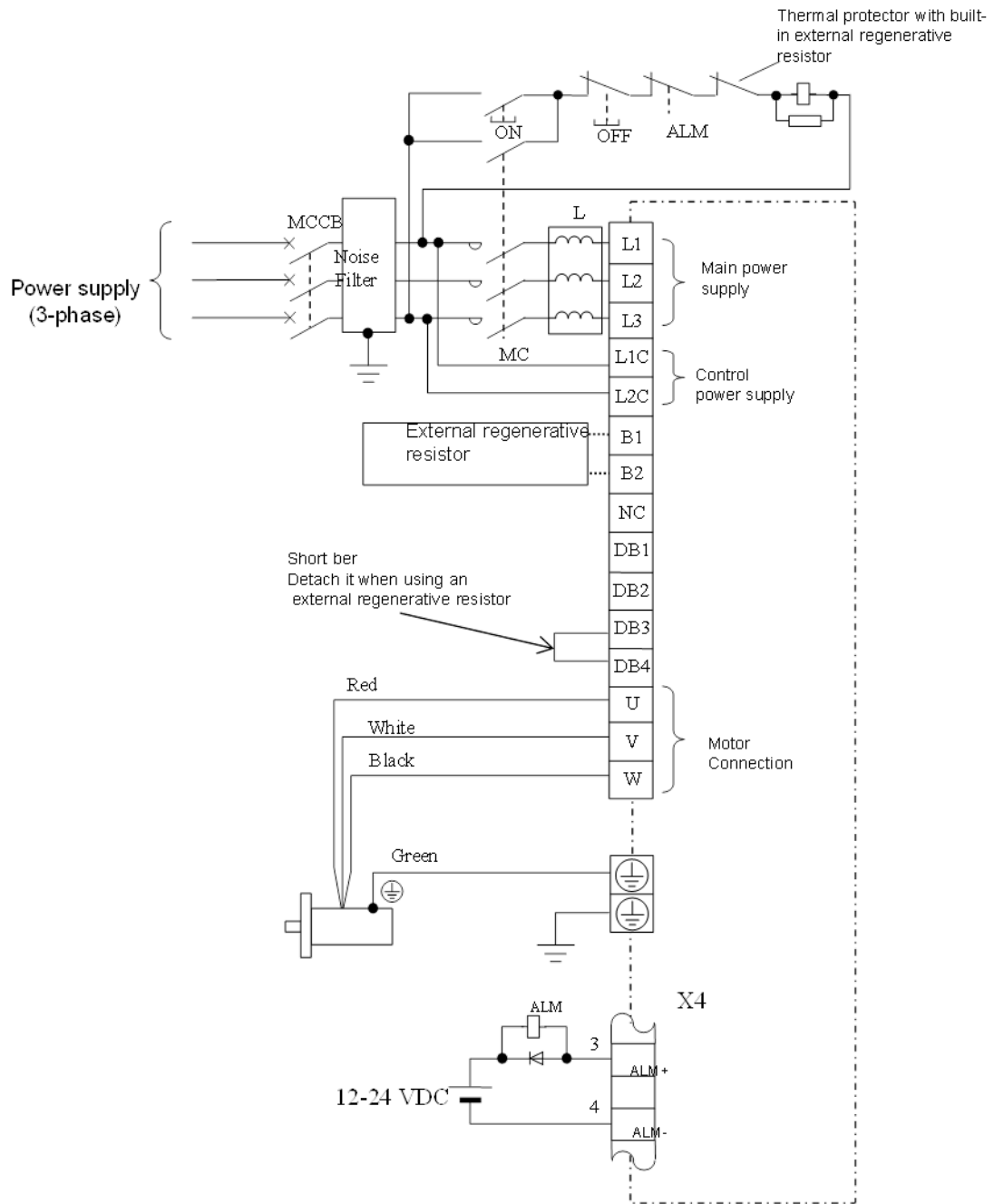
200 V Size F



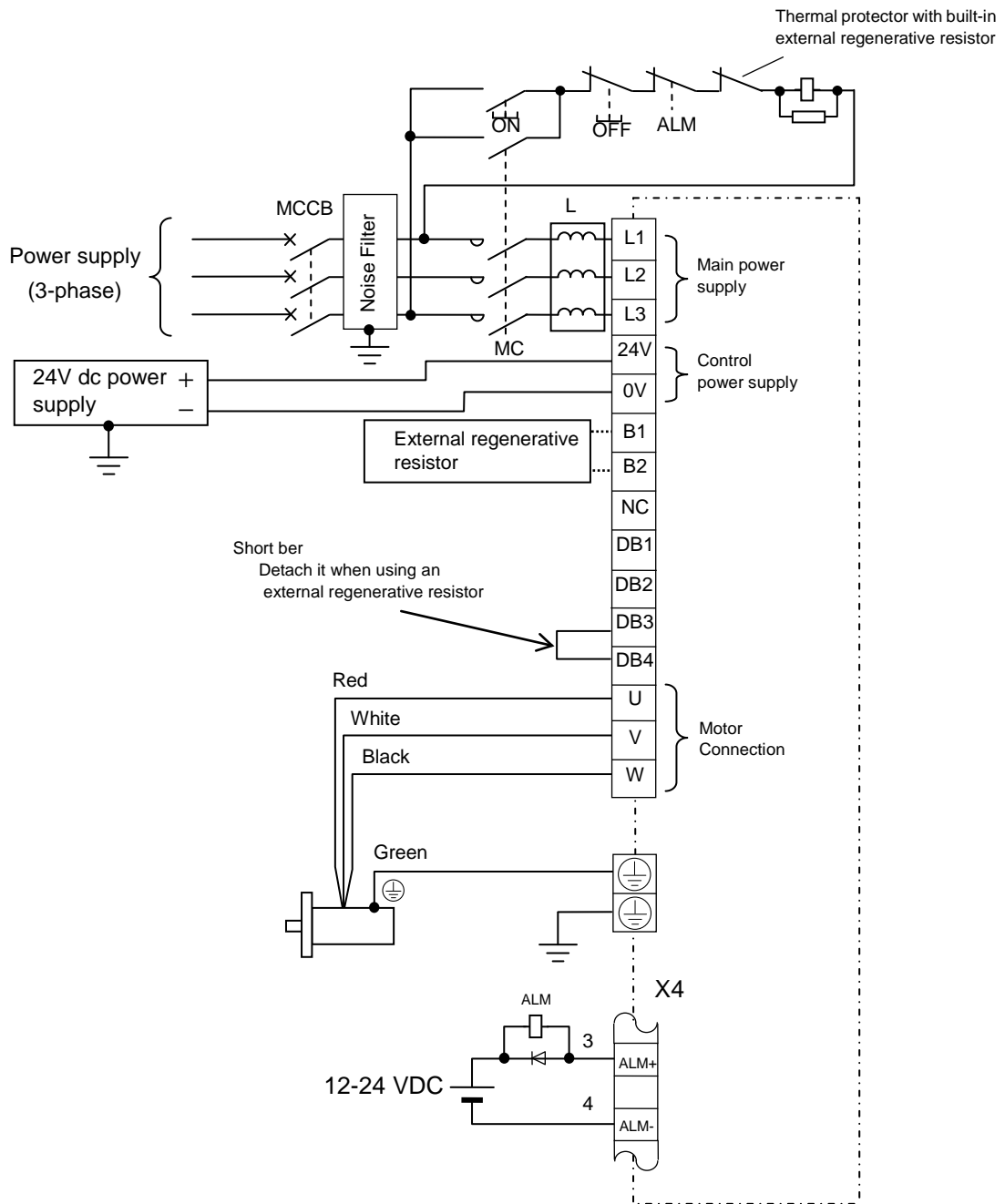
400 V Size F



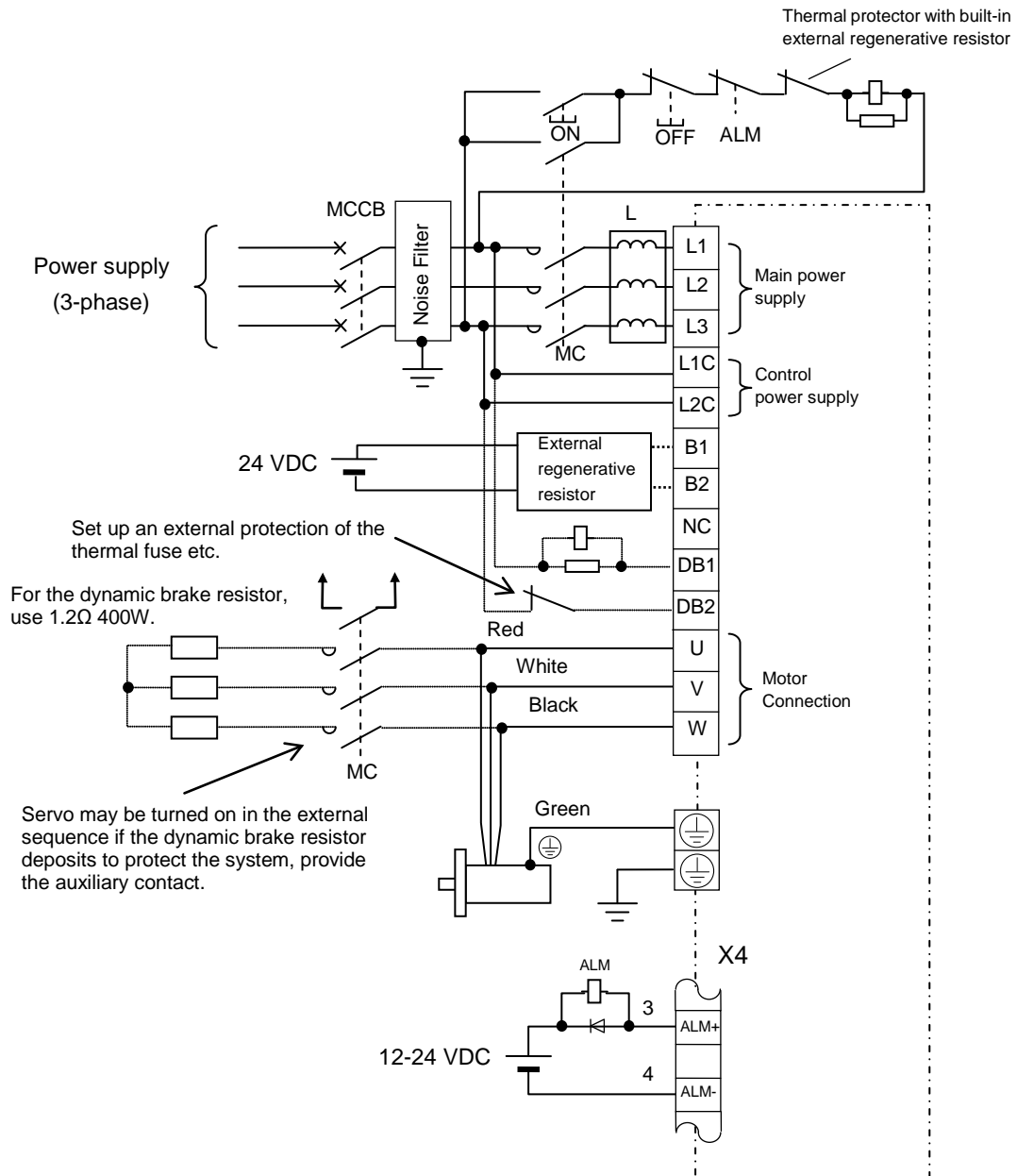
200 V Size G



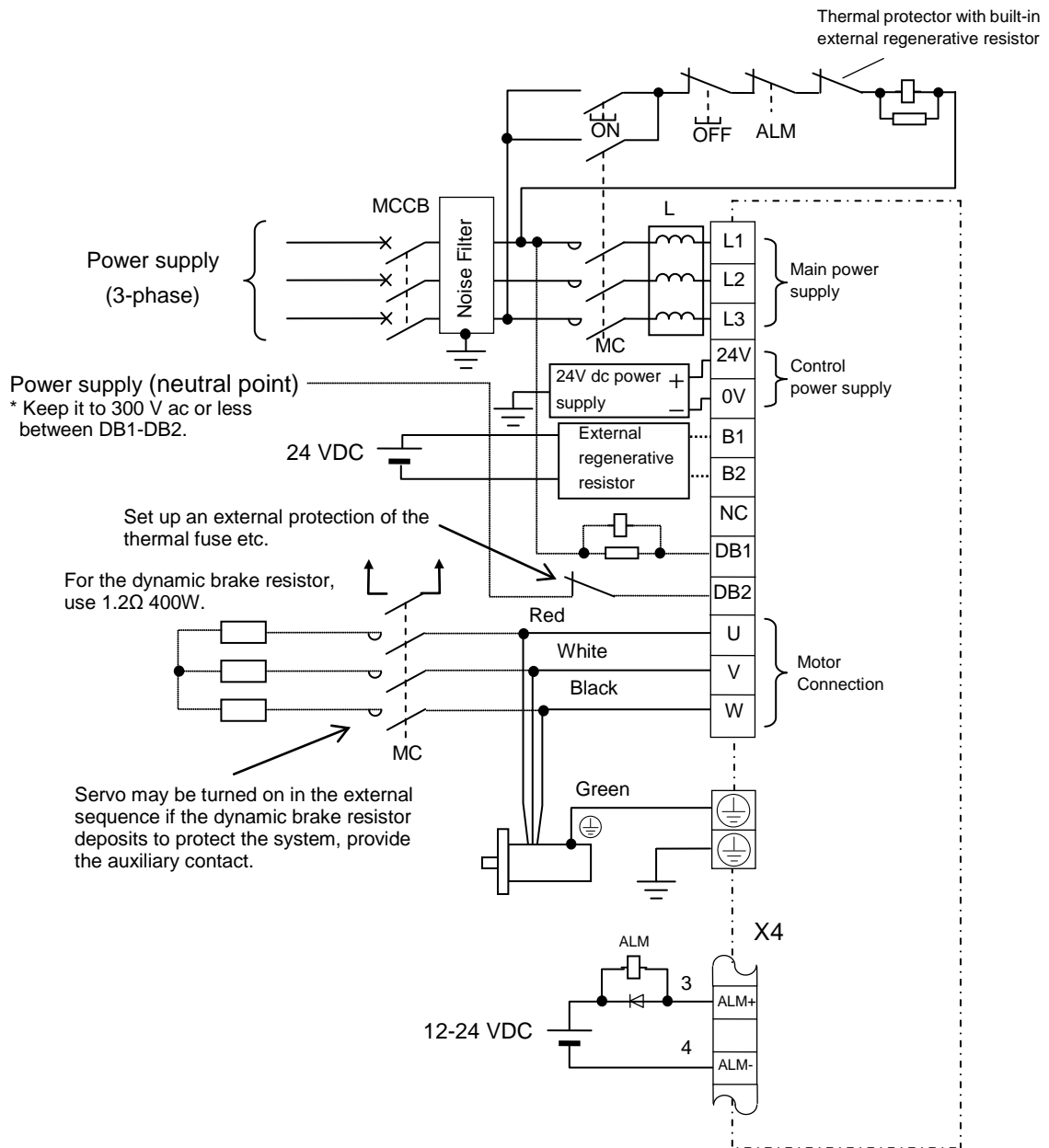
400 V Size G



200 V Size H



400 V Size H



- [1] When the servo driver uses single phase power supply for sizes A–D, connect the servo driver to the terminals L1, L3 of main power supply input. Do not connect anything to the terminal L2.
- [2] Surely insert the connector into place until it clicks.
- [3] Make sure to use an insulation coated crimp terminal when connecting to each terminal on the terminal block.
- [4] Terminal block cover is fixed with screws. When wiring to the terminal block, unscrew these screws to uncover the cover. Tighten the cover fixing screw with the torque of 0.2 N•m or less.
- [5] Apply the power supply of the voltage indicated on the nameplate.
- [6] Do not reverse-connect the power 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 out them.
- [8] Because high voltage is applied to the power connectors **XA**, **XB**, **XC**, **XD** and the terminal block, never touch them on any account. It may cause electric shock.
- [9] For 750 W or higher models: When the installation is protected through the circuit breaker up to 20 A capacity, the maximum power available to the circuit is 5,000 Arms at 240 V. Do not overload the system.
- [10] An AC servomotor, unlike an induction motor, cannot change the rotation direction by exchanging three phases. Make sure to coincide 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] Surely connect the ground terminals of the motor and the servo driver and earth the ground terminal as well as that of the noise filter. In addition, earth the equipment unit. To earth them, use the earth type D (ground resistance: 100 ohm or less) for grounding. (In order to avoid the impact of electrolytic corrosion, do not immediately have any contact between aluminum and copper.)
- [12] Attach the surge absorbing circuits for preventing noises to an electromagnetic contactor placed around the servo driver, a coil between relay contact points, and a brake winding of motor with a brake.
- [13] Attach the MCCB. In case of emergency, make sure to power off outside the servo driver. To use an earth leakage circuit breaker, use that in which a high frequency wave countermeasure is taken.
- [14] In order to reduce the terminal noise voltage, install a noise filter.
- [15] Customer is responsible for the power supply of the brake attached to a motor.
- [16] Turn ON the power after the wiring was finished.

[17] About the regenerative resistor,

- The regenerative resistor is not built into size A, B, G and H.
- The regenerative resistor is built into F frame. The regenerative resistor becomes effective when the short-circuited between the terminal B2 and B3. Use it usually under such a condition.

(When shipping it, between the terminal B2 and B3 of size A, B, G and H is opened because the regenerative resistor is not built-in.)

When a trip occurs due to the regenerative load protection error, externally install a regenerative resistor.

To externally install a regenerative resistor, remove a connection cable between terminals B2 and B3 and then connect the regenerative resistor between terminals B1 and B2.

To use an external regenerative resistor, set Pr0.16 (external regenerative resistor selection) to 1 or 2.

- As for external regenerative resistor, we recommend the resistors below:

Size	Input power voltage		
	Single phase 100 V	Single/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		DV0P4284 x 2 in parallel or DV0P4285 x 1	DV0PM20049
F	-	DV0P4285 x 2 in parallel	DV0PM20049 x 2 in parallel
G		DV0P4285 x 3 in parallel	DV0PM20049 x 3 in parallel
H		DV0P4285 x 6 in parallel or DV0PM20058	DV0PM20049 x 6 in parallel or DV0PM20059

Manufacturer by Iwaki Musen Kenkyusho Co.,Ltd.

Our part number	Manufacturer part number	Specification			Built-in thermal protector operational temperature
		Resistance value [Ω]	Rated power (for reference) *		
			Free air [W]	Fan used [W] (1 m/s)	
DV0P4280	RF70M	50	10	25	140 ± 5 deg. Celsius Contact point B Open/close capacity (resistance load) 1A 125VAC, 6000 times 0.5A 250VAC, 10000 times
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	RF240	120	35	80	
DV0PM20049	RH450F	80	65	190	
DV0PM20058	-	3.3	-	780	
DV0PM20059	-	13.33	-	1140	

* Electric power available without running the built-in thermal protector.

For safety, a temperature fuse and a thermal protector are built in.

- Configure the circuit so as to turn off the power supply when the thermal protector is running.
- The built-in temperature fuse can break according to the radiation condition, the used temperature range, the power supply voltage, and the load change.

Install a thermal fuse so that the surface temperature of the regeneration resistor does not exceed 100°C in a condition in which regeneration occurs easily (power supply voltage is high, load inertia is large, and deceleration time is short etc.) and perform an operation check.

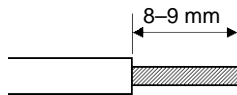
- Attach the regenerative resistor on the incombustibles such as metal.
- Install the regenerative resistor so that people cannot directly touch it, such as the incombustible to cover it.
- Keep the temperature of places, which people can directly touch, below 70 deg. Celsius.

Method for connection to power connector

Use the following procedure for connection to connectors **XA**, **XB**, **XC** and **XD**.

<Method for connection>

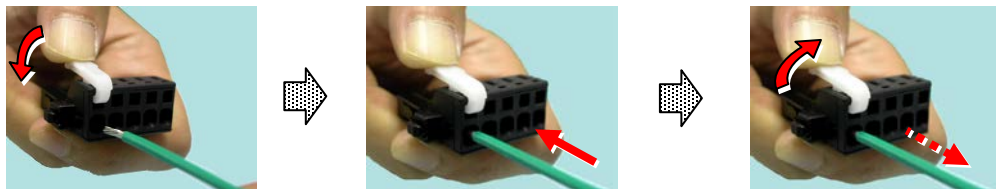
1. Strip off the insulation of the wire



2. Insert a wire into the connector. The following 2 methods can be used to insert the wire.

- (a) Insert a wire using the lever attached.
- (b) Use a flat-head (-) screwdriver (with a tip width 3.0–3.5 mm).

(a) Using the lever

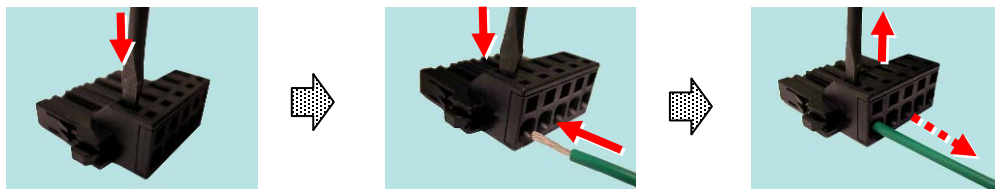


[1] Press the lever attached above the upper slot with a finger to push down the spring.

[2] While pressing down the lever, insert a wire into the insertion opening (round hole) until it stops.

[3] Release the lever to connect the wire.

(b) Using a screwdriver, Part 2



[1] Placing a dedicated screwdriver on the upper slot, press down the spring.

[2] Insert a wire, with the insulation stripped off correctly, into the wire insertion opening until it stops.

[3] Release the screwdriver to connect the wire.

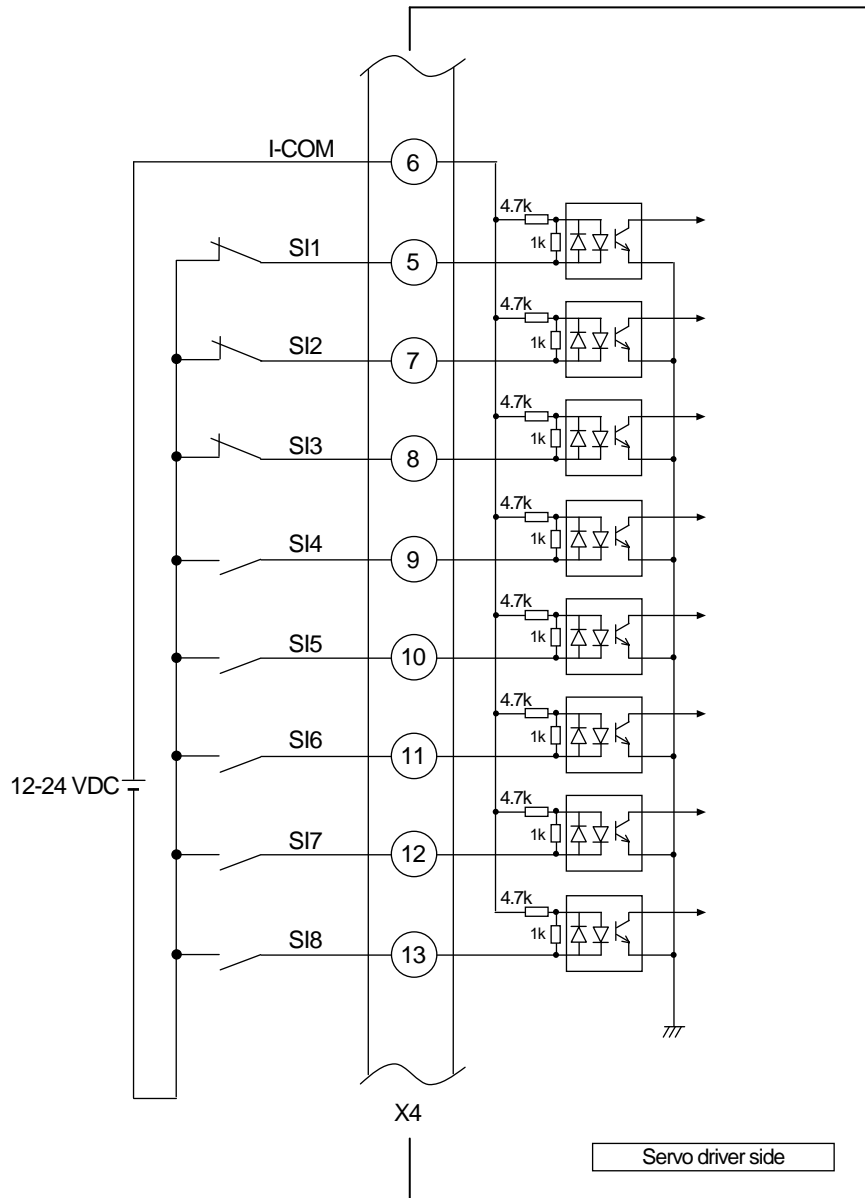
<Precautions>

- Strip off correct length of insulation of a wire.
- When connecting a wire to the connector, be sure to disconnect the connector from the servo driver in advance.
- Insert only 1 wire into a wire insertion opening.
- Connected wire can be removed in the same way as it is inserted.
- Be careful not to be injured when using a screwdriver.

(2) Wiring to connector **X4**

- [1] The 12–24 VDC power supply for the external control signal connected to the I-COM should be prepared by the customer.
- [2] Place the servo driver and its peripheral device as nearly as possible (up to 3 m) so as to shorten the wiring.
- [3] Wire the wiring as far away as possible (30 cm or more) from the power lines (L1, L2, L3, L1C, L2C, U, V, W, \ominus).

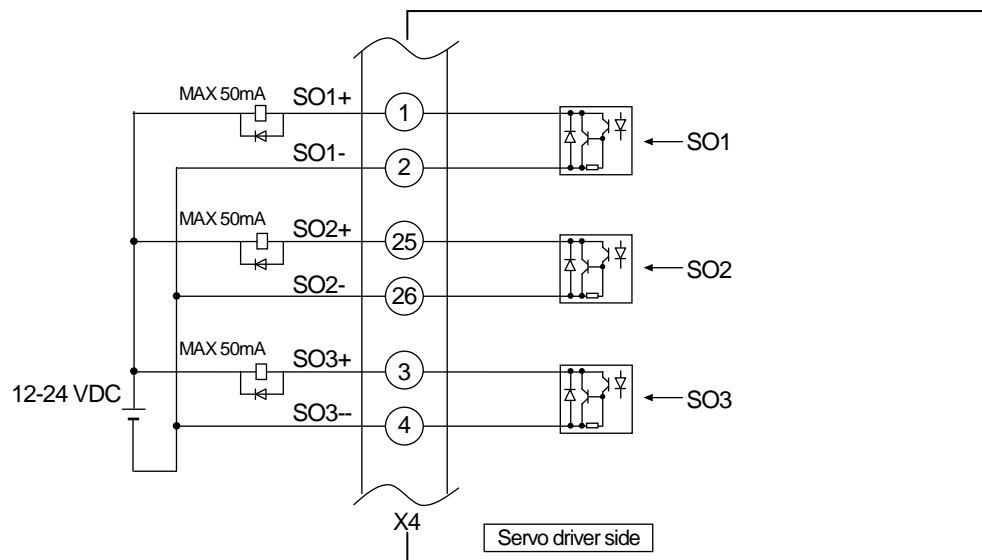
Do not put them in the same duct or bind them together.

Digital Input

The functions of the pins SI1-SI8 are assigned by parameters. For factory default settings, refer to Appendix “Specification for Each Model”.

Digital Output

- [4] Be aware of the polarity of the power supply for control signals. The polarity connection contrary to the figure shown above can damage the servo driver.
- [5] To directly drive the relay with each output signal, make sure to attach a diode in parallel to the relay and in the direction as shown in the figure below. The servo driver can be damaged if the diode is not attached or the diode is attached in the reverse direction.
- [6] When a logic circuit such as a gate receives each output signal, take care so that a noise does not impact on the circuit.
- [7] Apply 50 mA or less of current to each output.



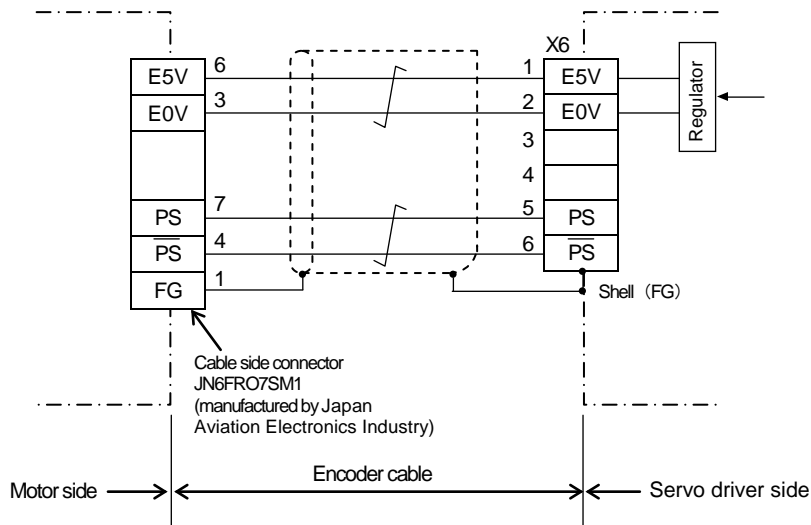
The functions of the pins S01-S03 are assigned by parameters. For factory default settings, refer to Appendix “Specification for Each Model”.

(3) Wiring to connector **X6**

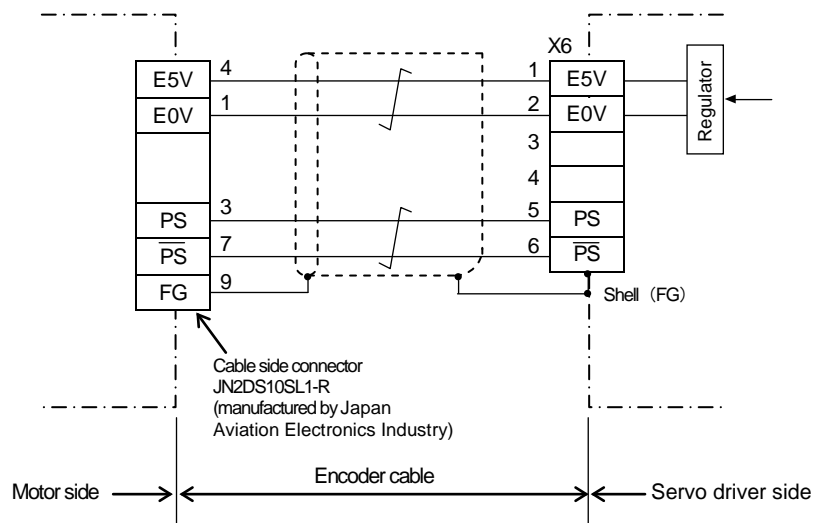
- [1] As for the encoder cable, use the batch shielded twisted wire pairs whose core is 0.18 mm² or more.
- [2] The cable length should be up to 20 m. When the wiring is long, we recommend you to use the double wiring for the 5 V power supply in order to reduce the impact of voltage drop.
- [3] Connect the coat of shielded cable at the motor side to the shield of shielded cable from the encoder.
Make sure to connect the coat of shielded cable at the servo driver side to the shell (FG) of **X6**.
- [4] Wire the wiring as far away as possible (30 cm or more) from the power lines (L1, L2, L3, L1C, L2C, U, V, W, ⊕).
- Do not put them in the same duct or bind them together.
- [5] Do not connect anything to the empty pins of **X6**.

5 wires incremental encoder

- MSME 50W - 750W

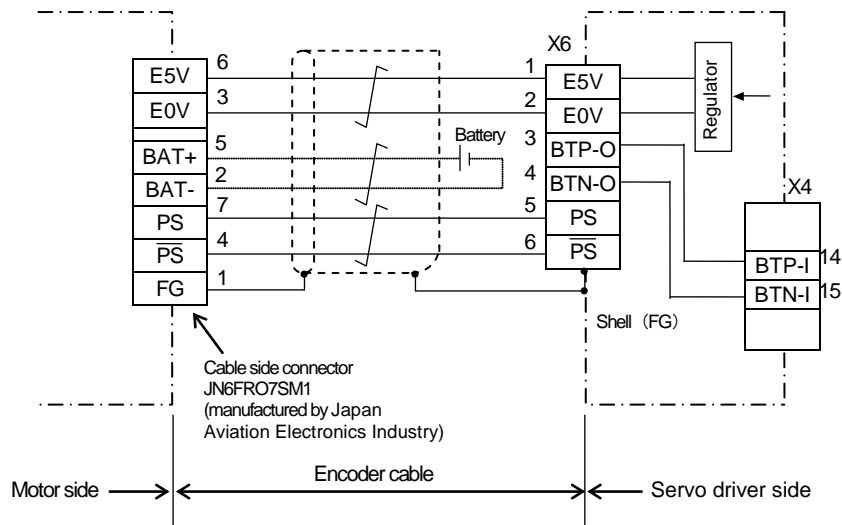


- MSME 1.0 kW – 5.0 kW
- MDME 1.0 kW – 5.0 kW
- MHME 1.0 kW – 5.0 kW
- MGME 0.9 kW – 3.0 kW

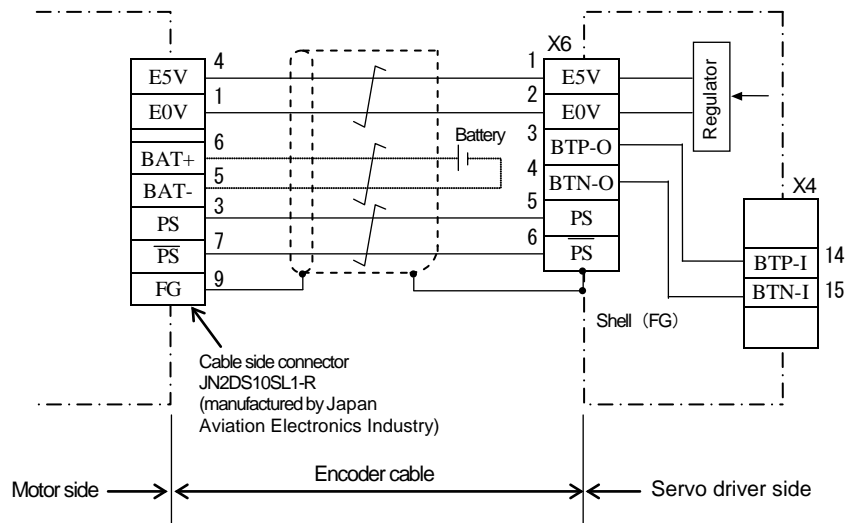


7 wires absolute encoder:

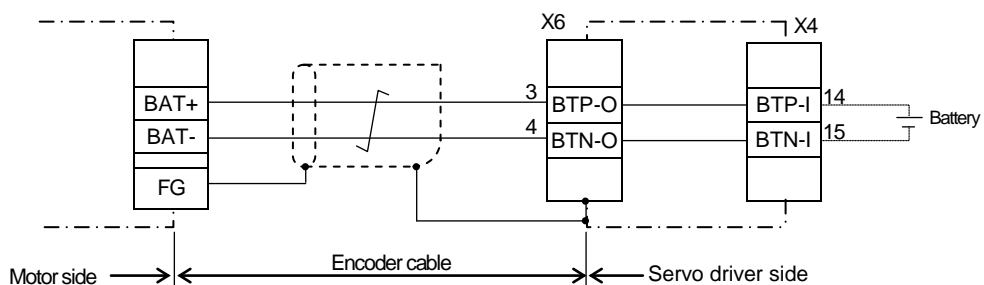
- MSME 50W - 750W



- MSME 1.0 kW - 5.0 kW
- MDME 1.0 kW - 5.0 kW
- MHME 1.0 kW - 5.0 kW
- MGME 0.9 kW - 3.0 kW



Connect the absolute encoder battery directly to the BAT+ and BAT- connectors of the encoder at the motor. Or, it is also possible to connect the battery to the 14 and 15 pins of the **X4**, and then connect through the pins 3 and 4 of the **X6**.



Note: If the battery is directly connected to the encoder connectors at the motor, do not connect any wire to the pins 3 and 4 of the **X6**.

Precautions in using a battery for absolute encoder

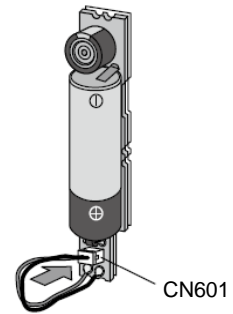
An error arises from the absolute encoder when a battery voltage drop occurs.
The voltage drop occurs due to the life span of a battery or voltage delay.

- (1) The life span of a battery may become short depending on ambient environment.
- (2) Lithium batteries have a transient minimum voltage effect (voltage delay phenomenon), in which a voltage drop may occur temporarily when discharge starts. For this reason, the batteries should be refreshed when used.

<When a battery is used for the first time>

Before using our optional battery unit DV0P2990, connect the connector with lead wires to the battery as shown in the right figure and leave it for about 5 minutes.
And then disconnect the connector from the CN601, and install it to the servo driver.

If using another battery, we recommend that you also refresh the battery. For refreshing a battery, consult with the manufacturer of the battery.



<After installing battery>

We recommend that control power be turned on/off once a day.

Other precautions

- If used incorrectly, batteries may cause troubles such as corrosion due to leakage and hazards such as explosion. So, observe the following rules:
 - [1] Insert a battery correctly without confusing + and - terminals.
 - [2] If a battery used for a long time or no longer used is left inside equipment, a trouble such as leakage may occur. Replace such a battery as soon as possible. (As a standard, we recommend replacing batteries every 2 years.)
 - The battery electrolyte is highly corrosive. It not only corrodes surrounding parts, but it also causes hazards such as a short-circuit due to its conductivity. Replace batteries periodically.
 - [3] Do not disassemble batteries or throw them into fire.
 - Do not disassemble the battery because it is very dangerous if a splash of the contents comes into an eye. Also, do not throw the battery into fire or heat it because it may burst, causing hazards.
 - [4] Do not short-circuit the battery or remove its tube.
 - If the battery + and - terminals are connected together with a conductive material such as a metal, a large current flows, not only weakening the battery, but also generating excessive heat, resulting in a burst to cause hazards.
 - [5] Never attempt to charge the battery because it is not rechargeable.
- Disposal of old batteries after replacement may be restricted by local governments. Dispose of batteries following such a restriction.
- Air transportation

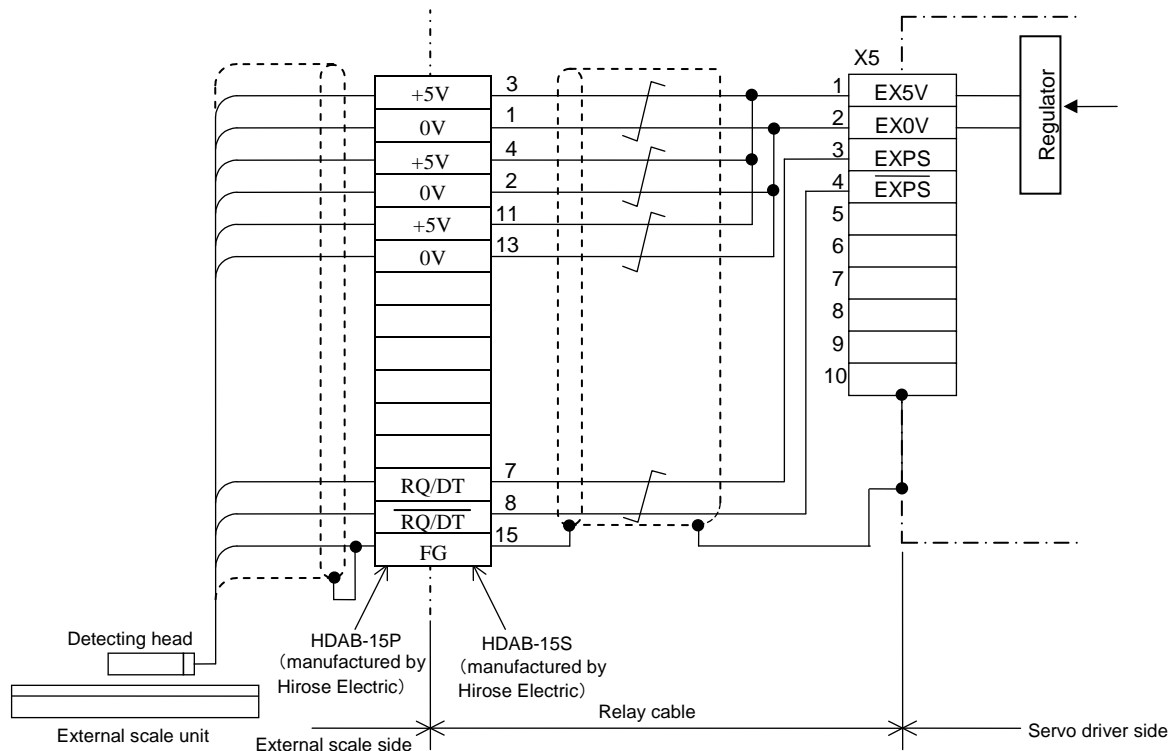
Application for approval of hazardous material air transportation is required (for both passenger and cargo airplanes). (UN packing is required.)

When you ask for air transportation, you are requested to submit necessary documents (parameter sheets and MSDS etc.). In this case, make a request to us through a dealer you purchased from.
- UN packing

Consult with your transport company.

(4) Wiring to connector X5 (Not supported)

- [1] As for the external scale cable, use the batch shielded twisted wire pairs whose core is 0.18 mm² or more.
- [2] The cable length should be up to 20 m. When the wiring is long, we recommend you to use the double wiring for the 5 V power supply in order to reduce the impact of voltage drop.
- [3] Connect the coat of shielded cable at the motor side to the shield of shielded cable from the external scale. Make sure to connect the coat of shielded cable at the servo driver side to the shell (FG) of X5.
- [4] Wire the wiring as far away as possible (30 cm or more) from the power lines (L1, L2, L3, L1C, L2C, U, V, W, \oplus). Do not put them in the same duct or bind them together.
- [5] Do not connect anything to the empty pins of X5.
- [6] X5 is capable to supply up to 5.2 V \pm 5% 300mA power supply. When using an external scale at more consumption current than this, customer is responsible for the power supply. Some external scales may take longer time in initialization after turning on the power. Design the power supply so as to meet the running timing after power-on which is described in “Basic function specifications.”



(5) Wiring to connector **X2A**, **X2B**

[1] Use straight type of 8core 4pairs shielded twisted pair (STP) compatible with category 5e of TIA/EIA-568 or higher specifications.

When installing connector plug on both ends of shielded cable, positively connect the shield to the metallic plug shell. If connection is not proper, EMC characteristic could degrade.

For colors of wire and matching connector pins, refer to TIA/EIA568B (see figure below).

Connect a cable before supplying the power to the amplifier. Do not pull or insert a cable after supplying the power to the amplifier.

PIN 1, 2, 3 and 6 are signal lines. The unused PIN 4, 5, 7 and 8 also need to be connected.

[2] Length of communication cable

Between 2 nodes: max. 100 m

Because specifications such as flexural characteristic, temperature range and insulation material differ from manufacturer to manufacturer, select the cable best suitable for your application.

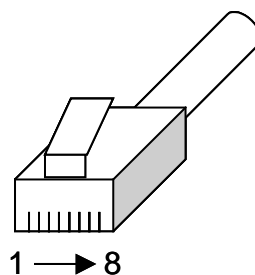
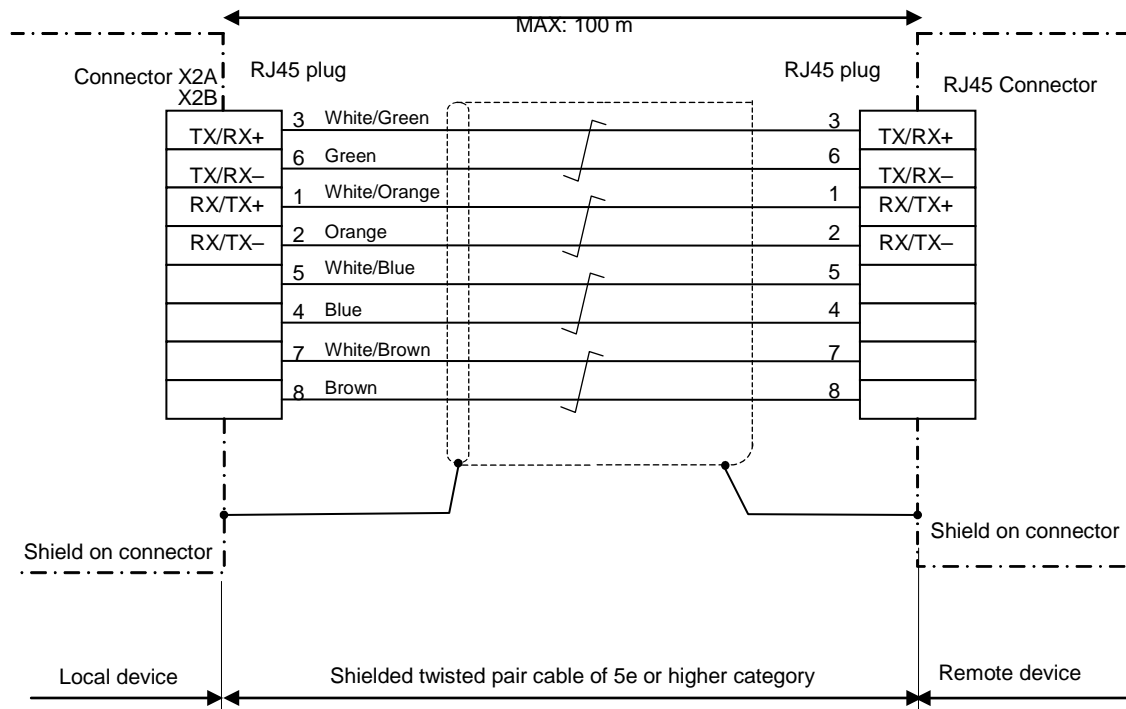
Select the cable for movable application according to your operating condition.

<Communication cable used in our evaluation>

Manufacturer: Sanwa Supply Inc.

Part No.: KB-STP-*K, Category: 5e, STP

Connection to X2A / X2B



Pins on RJ45 plug

9. Compliance with European EC Directive/UL Standard

9-1 European EC Directive

European EC directive is applied to all electronic products that are exported to EU, have the inherent functions, and are directly sold to the consuming public. These products are obliged to be compliant with the unified EU safety standard and paste the CE marking indicating the compliance to the products.

Our products, in order to make it easy for the embedded equipment and devices to be compliant with EC directive, provide the compliance with the standards associated with low voltage directive.

9-1-1 Compliance with EMC Directive

Our servo system determines the model (conditions) such as the installed distance and the wiring of the servo driver and the servo motor and makes the model compliant with the standards associated with EMC directive. When equipment and devices are embedded in practice, wiring and grounding conditions, etc. may be not the same as the model. Thus, it is necessary to measure how the final equipment and devices where the servo driver and the servo motor are embedded are compliant (especially unnecessary radiation noise, noise terminal voltage) with EMC directive.

9-1-2 Conforming Standards

		Servo driver	Motor
European EC directive	EMC directive	EN55011 EN61000-6-2 EN61800-3	
	Low voltage directive	EN61800-5-1	IEC60034-1 IEC60034-5
	Machinery Directives Functional safety	ISO13849-1 (Cat. 3, PL d) EN61508 (SIL 2) EN62061 (SIL CL 2) EN61800-5-2 IEC61326-3-1	
UL standard		UL508C (File No. E164620)	UL1004 (File No. E166557)
CSA standard		C22. 2 No. 14	C22. 2 No. 100
KC Mark		KN11 , KN61000-4-2,34,5,6,8,11	

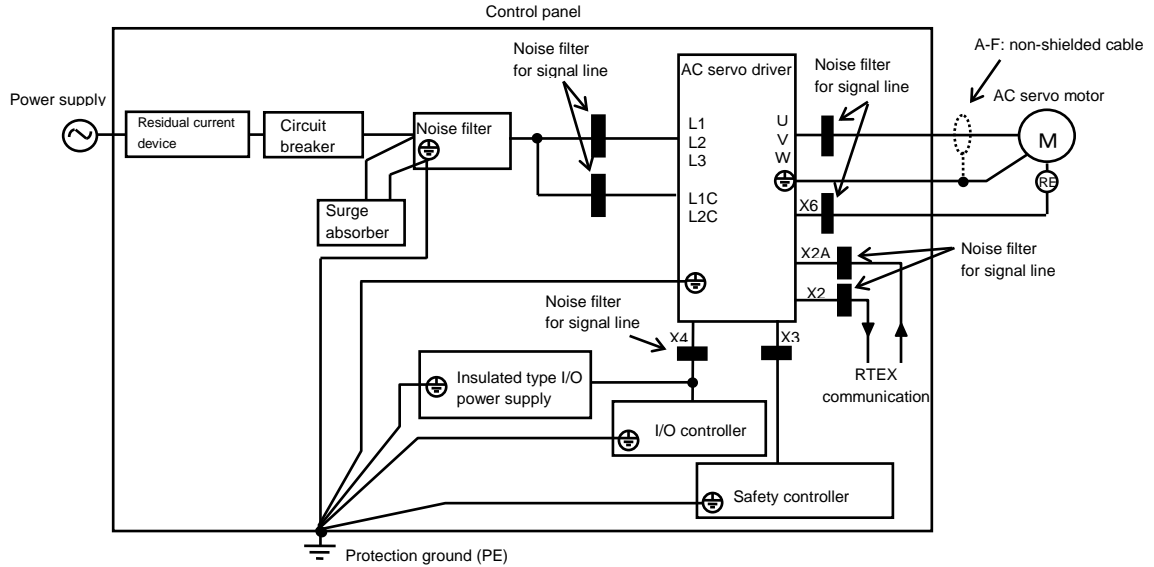
IEC : International Electrotechnical Commission
 EN : Europaischen Norman
 EMC : Electromagnetic Compatibility
 UL : Under writers Laboratoris
 CSA : Canadian Standards Association
 ISO : International Organization for Standardization

9-2 Peripheral Device Configuration

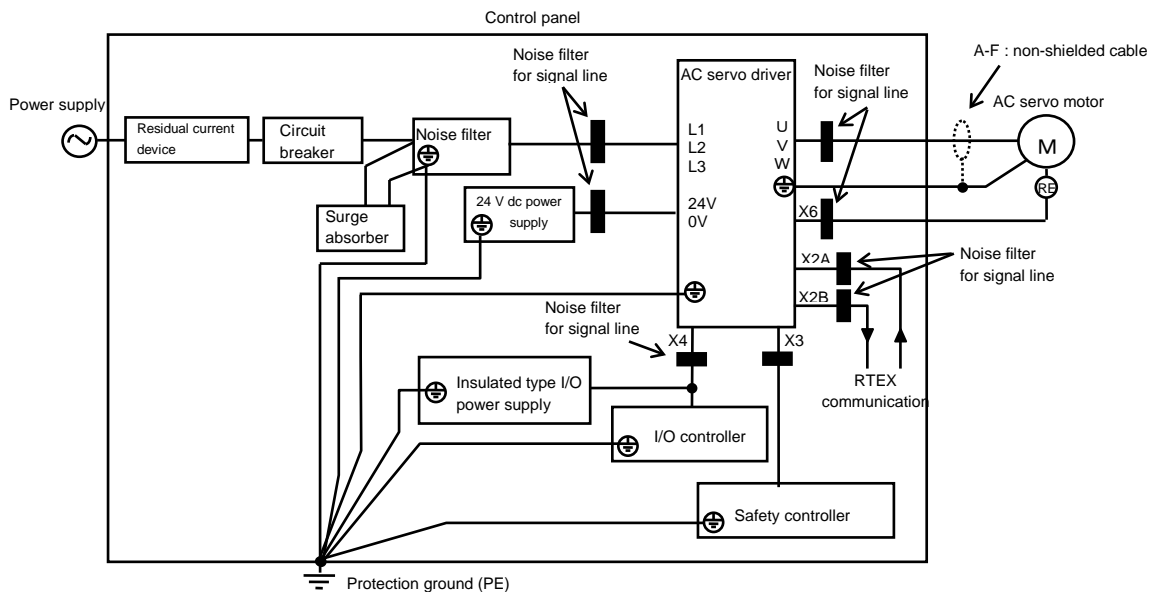
9-2-1 Installation Environment

Use the servo driver under the environment of pollution level 2 or 1 defined in IEC60664-1.
(Example: Installed in the IP54 control panel.)

- 100 V/200 V system



- 400 V system



9-2-2 Power Supply

100 V system: Single phase 100 V – 120 V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ 50/60 Hz

200 V system (Sizes A–D): Single/ 3 phase 200 V – 240 V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ 50/60 Hz


200 V system (Sizes E, F): 3 phase 200 V – 230 V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ 50/60 Hz

400 V system (Sizes D–F): 3 phase 380 V – 480 V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ 50/60 Hz

Control power supply 24 V dc +/- 15%

- (1) Use it under the environment of overvoltage category II defined in IEC60664-1.
- (2) As for the interface power supply, use the CE marking conforming product or the 12–24 VDC power supply of insulation type compliant with EN standard (EN60950).

9-2-3 Circuit Breaker

Make sure to connect a circuit breaker compliant with IEC standard and UL certification (marked with LISTED, ) between the power supply and the noise filter.

9-2-4 Noise Filter

To install one noise filter as a whole in the power unit when multiple servo drivers are used, consult the noise filter manufacturer.

9-2-5 Surge Absorber

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

Please!

To carry out a pressure test of equipment and devices, make sure to detach the surge absorber.



Otherwise, the surge absorber can be damaged.

9-2-6 Noise Filter for Signal Line

Install the noise filters for signal lines in all cables (power supply, motor, encoder, and interface cables).

For size D, install three noise filters in the power supply cable.

9-2-7 Grounding

- (1) In order to avoid an electric shock, make sure to connect a protection Earth terminal () of the servo driver and the protection ground (PE) of the control panel.
- (2) Do not tighten the connection to the Earth terminal () along with other parts. The servo driver has two ground terminals.

9-3 List of Peripheral Devices Applicable to Servo Driver

Servo Amp.	Motor Used	Voltage Spec.	Rated Output	Power Capacity (Rated Current)	Circuit Breaker (Rated Current)	Noise Filter	Serge Absorber	Noise Filter for Signals	Electromagnetic Contactor (Rated Current/ Released Heat Current)	Main Circuit Cable Dia.	Control Power Cable Dia.	Terminal Block Crimp Terminal
MADH	MSME	Single phase 100V	50W 100W	Approx. 0.4kVA	10A	DV0P4170	DV0P4190	DV0P1460	20A		0.75mm ² AWG18	Conne- -tion to the dedicated connector
	MSME	Single/ 3 phase 200V	50W - 200W	Approx. 0.5kVA								
MBDH	MSME	Single phase 100V	200W	Approx. 0.5kVA			DV0P4190		0.75- 2.0mm ²	AWG14		
	MSME	Single/ 3 phase 200V	400W	Approx. 0.9kVA								
MCDH	MSME	Single phase 100V	400W	Approx. 0.9kVA	15A	DV0PM 20042	DV0P4190					
	MSME	Single/ 3 phase 200V	750W	Approx. 1.3kVA								
MDDH	MDME	Single/ 3 phase 200V	1.0kW	Approx. 1.8kVA	20A	DV0P4220			30A	2.0mm ² AWG14		
	MGME		900W									
	MSME		1.0kW									
	MDME		1.5kW	Approx. 2.3kVA								
	MSME											
	MFME											
	MDME	3 phase 400V	400W	Approx. 0.9kVA	10A	FN258L-1 6-07	DV0PM 20050		20A	2.0mm ² AWG14	0.5mm ² AWG20	
	MDME		600W	Approx. 1.2kVA								
	MSME		750W	Approx. 1.6kVA								
	MGME		900W	Approx. 1.8kVA								
	MDME		1.0kW	Approx. 1.8kVA								
	MSME											
	MDME		1.5kW	Approx. 2.3kVA								
MSME												
MFME												
MEDH	MDME	3 phase 200V	2.0kW	Approx. 3.3kVA	30A	DV0PM 20043	DV0P1450	DV0P1460 RJ8035	60A	2.0mm ² AWG14	0.75mm ² AWG18	
	MSME											
	MFME		2.5kW	Approx. 3.8kVA								
	MDME	3 phase 400V	2.0kW	Approx. 3.3kVA	15A	FN258L-1 6-07	DV0PM 20050	DV0P1460	30A	2.0mm ² AWG14	0.5mm ² AWG20	
	MSME											
MFME		2.5kW	Approx. 3.8kVA									

Servo Amp.	Motor Used	Voltage Spec.	Rated Output	Power Capacity (Rated Current)	Circuit Breaker (Rated Current)	Noise Filter	Serge Absorber	Noise Filter for Signals	Electromagnetic Contactor (Rated Current/ Released Heat Current)	Main Circuit Cable Dia.	Control Power Cable Dia.	Terminal Block Crimp Terminal
MFDH	MGME	3 phase 200V	2.0kW	Approx. 3.8kVA	50A	DV0P3410	DV0P1450	DV0P1460	100A	3.5mm ²	0.75mm ²	Terminal Block M5
	MDME		3.0kW	Approx. 4.5kVA								
	MHME											
	MSME											
	MGME											
	MDME		4.0kW	Approx. 6kVA								
	MHME											
	MSME											
	MGME		4.5kW	Approx. 7.5kVA								
	MFME											
	MDME		5.0kW									
	MHME											
	MSME											
	MGME	3 phase 400V	2.0kW	Approx. 3.8kVA	30A	FN258L-3 0-07	DV0PM 20050	DV0P1460	60A			
	MDME		3.0kW	Approx. 4.5kVA								
	MHME											
	MSME											
	MGME											
	MDME		4.0kW	Approx. 6kVA								
	MHME											
	MSME											
	MGME		4.5kW									
	MFME											
	MDME		5.0kW	Approx. 7.5kVA								
MHME												
MSME												
MGDH	MGME	3 phase 200V	6.0kW	Approx. 9.0kVA	60A	FS5559 -60-34	DV0P1450	DV0P1460 RJ8095 T400-61D	100A	5.3mm ² AWG10		Terminal Block M5
	MDME		7.5kW	Approx. 11kVA								
	MHME											
	MGME	3 phase 400V	6.0kW	Approx. 9.0kVA	30A	FN258 -42-07	DV0PM 20050		60A			
	MDME		7.5kW	Approx. 11kVA								
	MHME											
MHDH	MDME	3 phase 200V	11.0kW	Approx. 17kVA	100A	FS5559 -80-34	DV0P1450	150A	13.3mm ² AWG6		Terminal Block M6	
	MDME		15.0kW	Approx. 22kVA	125A							
	MDME	3 phase 400V	11.0kW	Approx. 17kVA	50A	FN258 -42-07	DV0PM 20050	100A				
	MDME		15.0kW	Approx. 22kVA	60A							

- Select the specification common to single/3 phase 200 V according to the power supply.
- To become compliant with European EC directive, make sure to connect a circuit breaker compliant with IEC standard and UL certification (marked with LISTED) between the power supply and the noise filter.

Please!

- Select a circuit breaker and a noise filter with the capacity comparable to the power capacity (by taking into account the load condition).
- Terminal block and earth terminal

For wiring, use the copper conductor cable of the temperature rating 75 deg. Celsius or more.

- Tightening torque view (Terminal block and terminal cover)

Driver		Terminal screw		Terminal cover fixing screw	
Frame	Terminal Symbol	Nominal designation	Tightening torque (Nm)	Nominal designation	Tightening torque (Nm)
F 200 V	L1,L2,L3,L1C,L2C,B1,B2,B3,NC,U,V,W	M5	1.0-1.7	M3	0.19-0.21
F 400 V	24V,0V	M3	0.4-0.6		
	L1,L2,L3,B1,B2,B3,NC,U,V,W	M4	0.7-1.0		
G	L1C,L2C,24V,0V,DB1,DB2,DB3,DB4,NC	M5	1.0~1.7	M3	0.3~0.5
	L1,L2,L3,B1,B2,NC,U,V,W	M5	2.0~2.4		
H	L1C,L2C,24V,0V,DB1,DB2	M4	0.7~1.0	M5	2.0~2.5
	L1,L2,L3,B1,B2,NC,U,V,W	M6	2.2~2.5		

- Tightening torque view (Earth terminal and I/O connector X4)

Driver		Earth terminal		I/O connector X4	
Frame		Nominal designation	Tightening torque (Nm)	Nominal designation	Tightening torque (Nm)
A-E		M4	0.7-0.8	M2.6	0.3-0.35
F,G		M5	1.4-1.6		
H		M6	2.4~2.6		

- The terminal block can be damaged if the screw tightening torque exceeds the maximum value.
- For the earth wire dia. and dynamic brake resistor wire dia., use more than the motor wire diameter.
- For Sizes A–E, use the dedicated connector which came with the product.

In this case, the stripped cable length should be 8–9 mm.

	Optional Part Number	Part Number of Manufacturer	Manufacturer
Surge absorber	DV0P1450	R•A•V-781BXZ-4	Okaya Electric Industries
	DV0P4190	R•A•V-781BWZ-4	
	DV0PM20050	R•A•V-801BXZ-4	
Noise filter for signal line	DV0P1460	ZCAT3035-1330	TDK
	—	RJ8035	Konno Kogyousho
	—	RJ8095	
	—	T400-61D	MICROMETALS
Noise filter	DV0P4170	SUP-EK5-ER-6	Okaya Electric Industries
	DV0P4180	3SUP-HQ10-ER-6	
	DV0P4220	3SUP-HU30-ER-6	
	DV0P3410	3SUP-HL50-ER-6B	
	DV0PM20042	3SUP-HU10-ER-6	
	DV0PM20043	3SUP-HU50-ER-6	
	—	FN258L-16-07	Schaffner
—	FN258L-30-07		

9-4 Compliance with UL Standard

Certified by the UL508C (file No. E164620) standard by observing the installation conditions [1], [2] below.

[1] Use the servo driver under the environment of pollution level 2 or 1 defined in IEC60664-1. (Example: Installed in the IP54 control panel.)

[2] Make sure to connect a circuit breaker or fuse compliant with UL certification (marked with LISTED, UL) between the power supply and the noise filter.

For information about rated current of the circuit breaker/ fuse, refer to “9-3 List of Peripheral Devices Applicable to Servo Driver”.

For wiring, use the copper conductor cable of the temperature rating 60 deg. Celsius or more.

The terminal block can be damaged if the screw tightening torque exceeds the maximum value (M4: 1.2 N•m, M5: 2.0 N•m.).

[3] Overload protection level

The overload protection function of the servo driver works when the effective current will be 115% or more of the rated current based on the time property. Check that effective current of the servo driver does not exceed the rated current by monitoring the load factor using PANATERM or by other methods. Set up the maximum instantaneous allowable current at the Pr 0.13 (first torque limit) and Pr 5.22 (second torque limit).

[4] The servo driver will comply with UL in the power supply environment of 5,000 Arms or lower.

[5] Motor over-temperature protection is not provided. Motor over-load-temperature protection shall be provided at the final installation upon required by the NEC (National Electric Code).

9-5 Compliance with KC mark

Conformity of Korea Certification mark is registered by suiting EMC directive.

Registration No. KCC-REM-FAN-M-D

10. Compliance with SEMI F47 Voltage Sag Immunity Standard

- This function corresponds to the F47 voltage sag immunity standard in the SEMI standard during no/ light load condition.
- Useful when used in the semiconductor manufacturing equipment.

Warning:

- [1] Not applicable to the servo driver which has a single phase 100 V specification and a 24 VDC specification for control power input.
- [2] Make sure to evaluate and confirm the compliance with F47 voltage sag immunity standard with an actual device.



SAFETY PRECAUTIONS

11. Safety Precautions

- Danger and damage caused when the safety precautions are ignored are described in the following categories and signs:

DANGER	Description of this sign indicates “urgent danger that may cause death or serious injury.”
CAUTION	Description of this sign indicates “danger that may cause injury or property damage.”

- Rules to keep are categorized and described with the following graphics.

	This graphic indicates “Prohibited” acts that are not permitted.
	This graphic indicates “Mandatory” acts that must be performed forcibly.



DANGER



- (1) Be sure not to store or use the equipment under conditions subjected to vibrations (5.88 m/s² or heavier) or an impact shock, foreign matters such as dust, metal particles oil mist, liquids such as water, oil and polishing liquid, near flammable objects, in an atmosphere of corrosive gas (such as H₂S, SO₂, NO₂, Cl₂), or in an atmosphere of flammable gas.
- (2) Do not place any flammable objects near a motor, a servo driver, or a regenerative resistor.
- (3) Do not drive the motor with an external force.
- (4) Do not damage or strain the cable, or do not apply excessive stress. Do not place a heavy item on the cable or do not pinch the cable.
- (5) Do not use the equipment with the cable soaked in oil or water.
- (6) Do not install the equipment near a heating object such as a heater or a large wire-wound resistor. (Install a thermal shield, etc. to avoid the influences of heating object.)
- (7) Do not connect the motor directly with a commercial power.
- (8) Do not use the equipment under conditions subject to strong vibrations or an impact shock.
- (9) Be sure not to touch a rotating part of a motor during operation.
- (10) Do not touch the key flutes of motor output shaft with bare hands.
- (11) Be sure not to touch inside a servo driver.
- (12) Motor servo driver heat sink and peripheral device become very hot. Do not touch them.
- (13) Do not carry out wiring or do not operate the equipment with wet hands.
- (14) Wiring work is strictly allowed only for an engineer specializing electrical work.



SAFETY PRECAUTIONS



- (15) A motor other than specified is not provided with a protection device. Protect a motor with an overcurrent protection device, a ground-fault interrupter, overheating protection device, and emergency stop device, etc.
- (16) When operating the servo driver after an earthquake, inspect installation conditions of the servo driver and the motor and safety of the equipment to make sure that no fault exists.
- (17) After turning off the power, the inside circuit remains charged at a high voltage for a while. When moving, wiring or inspection the equipment, completely shut off the power supply input outside the servo driver and leave for 15 minutes or longer before working.
- (18) Install and mount the equipment securely to prevent personal injury caused by poor installation or mounting on an earthquake.
- (19) Install an external emergency shutoff circuit to stop operation and interrupt power immediately upon emergency.
Emission of smoke or dust may occur due to a fault of a motor or a servo driver used in combination. For example, if the system is energized with the regenerative control power transistor shorted by failure, overheating of a regenerative resistor installed outside the servo driver may occur and it may emit smoke and dust. If a regenerative resistor is connected outside a servo driver, provide a means of detecting overheating such as a thermal protector to shut off power upon detecting abnormal heating.
- (20) Mount the motor, the servo driver and the peripheral devices on a noncombustible material such as metal.
- (21) Provide correct and secure wiring. Insecure wiring or incorrect wiring may cause runaway or burning of a motor. During wiring work, avoid entry of conductive dust such as wire chippings in a servo driver.
- (22) Connect cables securely and provide secure insulation on current-carrying parts using insulation material.
- (23) Be sure to install MCCB in a power supply. Be sure to connect grounding terminals and grounding wires. To prevent an electric shock and malfunction, Class D grounding (grounding resistance at 100 Ω or lower) or higher grade is recommended.



CAUTION



- (24) Do not hold cables or motor shaft when carrying the equipment.
- (25) Do not adjust or change servo driver gains extremely, and do not make operations of the machine instable.
- (26) The equipment may suddenly restart after recovery from shutdown upon a power failure. Keep away from the equipment.
Specify settings of the equipment to secure safety for human against such restart operations.
- (27) When the equipment is energized, keep away from the motor and mechanism driven by the motor in case of malfunction.
- (28) Avoid a strong shock to the motor shaft.
- (29) Avoid a strong shock to the product.
- (30) Be sure not to use the electromagnetic contactor installed on the main power supply to start or stop the motor.
- (31) Avoid frequent switching on and off the main power supply of the servo driver.
- (32) The built-in brake of the motor is used for holding only. Do not use the brake to stop (braking) for securing safety of the equipment.



SAFETY PRECAUTIONS



CAUTION



- (33) Do not fall or topple over the equipment when carrying or installing.
- (34) Do not climb the motor or do not place a heavy item on the motor.
- (35) Do not block radiation slits of the servo driver and do not put a foreign matter into the servo driver.
- (36) Do not use the equipment under direct sunlight. When storing the equipment, avoid direct sunlight and store under conditions of operating temperatures and humidity.
- (37) Be sure not to disassemble or modify the equipment.
Disassembling and repair is allowed only for the manufacturer or sales agency authorized by the manufacturer.



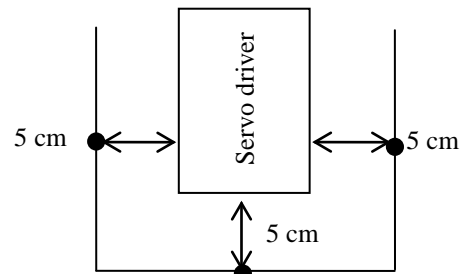
- (38) Use a motor and a servo driver in combination specified by the manufacturer. A customer shall be responsible for verifying performances and safety of combination with other servo driver.
- (39) A failure of a motor or a combined servo driver may cause burning of motor, or emission of smoke and dust. Take this into consideration when the application of the machine is clean room related.
- (40) Install the equipment adequately in consideration of output and main unit weight.
- (41) Keep the ambient conditions of an installed motor within a range of allowable ambient temperatures and of allowable humidity.
- (42) Install the equipment by specified procedures and in specified orientation.
- (43) Install the devices by keeping specified distances between a servo driver and inside control panel or other devices.
- (44) If a motor has an eyebolt, use the eyebolt to carry the motor only. Do not use the eyebolt to carry equipment.
- (45) Connect a relay breaking upon emergency stop in series with a brake control relay.
- (46) For a test run, hold down a motor and disconnect from a mechanical system to verify operations before installing on the equipment.
(A motor must run smoothly at 30 r/min driven with a servo driver.)
- (47) Verify that an input power supply voltage satisfies the servo driver specifications before turning on the power and start operation.
An input voltage higher than rated may cause ignition and smoking in the servo driver, which may cause runaway or burning of a motor in some cases.
- (48) When an alarm status occurs, remove a cause of the problem before restarting.
Careless restarting without removing a cause of problem may cause malfunction or burning of a motor.
- (49) The built-in brake of the motor may not be able to hold due to expiring useful life or a mechanical structure.
Install a braking device on the equipment to secure safety.
- (50) Pay attention to heat radiation. The servo driver generates heat by operating a motor. A servo driver used in a sealed control box may cause an extreme rise of temperature.
Consider cooling so that an ambient temperature around the servo driver satisfies an operating range.
- (51) Maintenance and inspection is allowed only for a specializing person.
- (52) Turn off the power when the equipment is not used for a long term.

- Capacitance of the capacitors of power supply rectifier circuit drops over time. To avoid a secondary problem due to a failure, replacement of capacitors is recommended at an interval of approximately 5 years. Commission the manufacturer or sales agency authorized by the manufacturer to replace the parts.
- Be sure to read the operating manual (safety book) before use.

SAFETY PRECAUTIONS

Servo driver's ambient temperature

The driver's service life significantly depends on the ambient temperature. Make sure that the servo driver's ambient temperature (at 5 cm distant from the servo driver) does not exceed the operating temperature range.



Operating temperature range: 0 to 55°C

We have made the best efforts to ensure quality of this product. However, application of external noise (include radiation) or static electricity, or a defect of the input power supply, wiring or components may cause the servo driver to operate beyond the preset conditions. Therefore, you should exercise thorough caution to ensure safety against an unexpected operation.

The direction of the installation and the interval.

- Reserve enough surrounding space for effective cooling.
- Install fans to provide uniform distribution of temperature in the control panel.
- D - H frame is provided with a cooling fan at the bottom. (On the H-frame, the cooling fan is also installed on the upper side.)
- Observe the environmental conditions of the control panel described in the previous page.
- It is recommended to use the conductive paint when you make your own mounting bracket, or repaint after peeling off the paint on the machine for installing the products, in order to make noise countermeasure.

12. Life and Warranty

12-1 Life Expectancy of the Driver

The Servo driver has 28,000 hours of life expectancy when used continuously under the following conditions.

Definition of the life Life end shall be defined as the capacitance of the electrolytic capacitor is reduced by 20% from the ex-factory status.

Condition	Input power source: 100 VAC, single phase, 50/60 Hz 200 VAC single/three phase, 50/60 Hz, 400 VAC single/three phase, 50/60 Hz
	Ambient temperature: 55°C
	Output torque: Rated constant value
	No. of revolutions: Rated constant No. of revolutions

Note that the life varies due to the working conditions.

12-2 Typical Life

[1] In-rush current prevention relay

Replace the in-rush current prevention relay when it is activated typically 20,000 times. Note that the criteria may vary depending on the environmental and working condition.

[2] Cooling fan

Replace the cooling fan in 10,000 to 30,000 hours. Note that the criteria may vary depending on the environmental and working condition.

12-3 Warranty Period

(1) Warranty period

For a period of 12 months from the date of delivery or 18 months from the manufacturing month, whichever is shorter.

This warranty shall be exempted in the following cases,

- [1] defects resulting from misuse and/or repair or modification by the customer
- [2] defects resulting from drop of the product or damage during transportation
- [3] defects resulting from improper usage of the product beyond the specifications
- [4] defects resulting from fire, earthquake, lightning, flood, damage from salt, abnormal voltage or other act of God, or other disaster.
- [5] defects resulting from the intrusion of foreign material to the product, such as water, oil or metallic particles.

This warranty shall be exempted when the life of component exceeds its rated standard life.

(2) Warranty scope

Panasonic warrants the replacement of the defected parts of the product or repair of them when the defects of the product occur during the warranty period, and when the defects are under Panasonic responsibility. This warranty only covers the product itself and does not cover any damage incurred by such defects.

13. Others

- Precautions for export of this product and the equipment incorporating this product
If the end user or end purpose of this product relates to military affairs, armament and so on, this product may be subject to the export regulations prescribed in “Foreign Exchange and Foreign Trade Control Law”. To export this product, take thorough examination, and follow the required export procedure.
- We cannot warrant this product, if it is used beyond the specified operating conditions.
- Compliance with the relevant standards should be considered by the user.
- The final decision on the compatibility with the installations and components at the user’s site, in terms of structure, dimensions, characteristics and other conditions, should be made by the user.
- When using this product in your equipment, be careful about the compatibility with the servo motor and the servo driver to be used together.
- For performance improvement or other reasons, some components of this product may be modified in a range that satisfies the specifications given in this document.
- Any specification change shall be based on our authorized specifications or the documents presented by the user. If a specification change may affect the functions and characteristics of this product, we will produce a trial product, and conduct examination in advance.
Note that the produce price may be changed with a change in its specifications.
- We have made the best efforts to ensure the product quality. However, complete equipment at customer’s site may malfunction due to a failure of this product. Therefore, take precautions by providing fail-safe design at customer’s site, and ensure safety within the operating range of the work place.
- Failure of this product depending on its content, may generate smoke of about one cigarette.
Take this into consideration when the application of the machine is clean room related.
- When the equipment runs without connecting the servomotor’s shaft electrically to ground, electrolytic corrosion may occur on the motor bearing and the bearing noise may get louder depending on the equipment and installing environment. So, customer is responsible to check and verify it.
- A customer must verify and inspect the equipment. Please be careful when using in an environment with high concentrations of sulphur or sulphuric gases, as sulphuration can lead to disconnection from the chip resistor or a poor contact connection.
- Take care to avoid inputting a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may result in damage to the internal parts, causing smoking and/or a fire and other trouble.
- When discard batteries, provide insulation using a tape etc. and discard the batteries abiding by a municipal law.
- When discarding the equipment, process the item as an industrial waste.

Specification for Each Model

● MINAS-A5B Series standard models

- Size A 100 V and 200 V

Model	MADHT1105BA1	MADHT1107BA1	MADHT1505BA1	MADHT1507BA1
Power supply input	Single phase 100 V	Single phase 100 V	Single phase/ 3 phase 200 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	10 A	10 A	10 A	10 A
Maximum continuous output current	5 A	7.5 A	5 A	7.5 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Externally connected	Externally connected	Externally connected	Externally connected
Auto gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm 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) ^{*2}	Max. 7 A	Max. 7 A	Max. 14 A	Max. 14 A
Inrush Current (Control Power Supply) ^{*2}	Max. 14 A	Max. 14 A	Max. 28 A	Max. 28 A
Weight	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg
Dimensions	Size A	Size A	Size A	Size A

^{*1} When using an encoder with the specification of 17-bit incremental/absolute.

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B Series standard models

- Size B 100 V and 200 V

Model	MBDHT2110BA1	MBDHT2510BA1
Power supply input	Single phase 100 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	15 A	15 A
Maximum continuous output current	10 A	10 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Externally connected	Externally connected
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²
	AWG18	AWG18
Main power supply cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Ground cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Motor cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Inrush current (Main power supply) ^{*2}	Max. 7 A	Max. 14 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 28 A
Weight	Approx. 1.0 kg	Approx. 1.0 kg
Dimensions	Size B	Size B

^{*1} When using an encoder with the specification of 17-bit incremental/absolute.

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B Series standard models

- Size C 100 V and 200 V

Model	MCDHT3120BA1	MCDHT3520BA1
Power supply input	Single phase 100 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	30 A	30 A
Maximum continuous output current	20 A	20 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Built-in	Built-in
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²
	AWG18	AWG18
Main power supply cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Ground cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Motor cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Inrush current (Main power supply) ^{*2}	Max. 15 A	Max. 29 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 28 A
Weight	Approx.1.6 kg	Approx.1.6 kg
Dimensions	Size C	Size C

^{*1} When using an encoder with the specification of 17-bit incremental/absolute.

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B Series standard models

- Size D 200 V and 400 V

Model	MDDHT3530BA1	MDDHT5540BA1	MDDHT2407BA1	MDDHT2412BA1	MDDHT3420BA1
Power supply input	Single phase/ 3 phase 200 V	Single phase/ 3 phase 200 V	3 phase 400 V	3 phase 400 V	3 phase 400 V
Max. instantaneous output current	50 A	50 A	15 A	15 A	30 A
Max. continuous output current	30 A	40 A	7.5 A	12 A	20 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Built-in	Built-in	Built-in	Built-in	Built-in
Auto gain tuning function	Provided	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided	Provided
Absolute system *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided	Unprovided	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ² AWG18	HVSF 0.75mm ² AWG18	HVSF 0.5mm ² AWG20	HVSF 0.5mm ² AWG20	HVSF 0.5mm ² AWG20
	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
Main power supply cable	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
Ground cable	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
Motor cable	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14	HVSF 2.0 mm ² AWG14
Inrush current (Main power supply) *2	Max. 29 A	Max. 29 A	Max. 28 A	Max. 28 A	Max. 28 A
Inrush current (Control power supply) *2	Max. 28 A	Max. 28 A	Max. 48 A	Max. 48 A	Max. 48 A
Weight	Approx. 1.8 kg	Approx. 1.8 kg	Approx. 1.9 kg	Approx. 1.9 kg	Approx. 1.9 kg
Dimensions	Size D	Size D	Size D	Size D	Size D

*1 When using Encoder Specifications: 17 bit incremental/absolute

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B Series standard models

- Size E 200 V and 400 V

Model	MEDHT7364BA1	MEDHT4430BA1
Power supply input	3 phase 200 V	3 phase 400 V
Maximum instantaneous output current	75 A	35 A
Maximum continuous output current	64 A	30 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Built-in	Built-in
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.5mm ²
	AWG18	AWG20
Main power supply cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Ground cable	HVSF 3.5 mm ²	HVSF 2.0 mm ²
	AWG12	AWG14
Motor cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Inrush current (Main power supply) ^{*2}	Max. 29 A	Max. 32 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 48 A
Weight	Approx. 2.7 kg	Approx. 2.7 kg
Dimensions	Size E	Size E

^{*1} When using Encoder Specifications: 17 bit incremental/absolute

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B Series standard models

- Size F 200 V and 400 V

Model	MFDHTA390BA1	MFDHTB3A2BA1	MFDHT5440BA1	MFDHTA464BA1
Power supply input	3 phase 200 V	3 phase 200 V	3 phase 400 V	3 phase 400 V
Maximum instantaneous output current	100 A	150 A	50 A	100 A
Maximum continuous output current	90 A	120 A	40 A	64 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge 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 *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Unprovided	Unprovided	Unprovided	Unprovided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm ²
	AWG18	AWG18	AWG18	AWG18
Main power supply cable	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²
	AWG12	AWG12	AWG12	AWG12
Ground cable	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²
	AWG12	AWG12	AWG12	AWG12
Motor cable	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²	HVSF 3.5 mm ²
	AWG12	AWG12	AWG12	AWG12
Inrush current (Main power supply) *2	Max. 22 A	Max. 22 A	Max. 32 A	Max. 32 A
Inrush current (Control power supply) *2	Max. 14 A	Max. 14 A	Max. 48 A	Max. 48 A
Weight	Approx. 4.8 kg	Approx. 4.8 kg	Approx. 4.7 kg	Approx. 4.7 kg
Dimensions	Size F	Size F	Size F	Size F

*1 When using Encoder Specifications: 17 bit incremental/absolute

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series

- Size A 100 V and 200 V

Model	MADHT1105B01	MADHT1107B01	MADHT1505B01	MADHT1507B01
Power supply input	Single phase 100 V	Single phase 100 V	Single phase/ 3 phase 200 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	10 A	10 A	10 A	10 A
Maximum continuous output current	5 A	7.5 A	5 A	7.5 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Externally connected	Externally connected	Externally connected	Externally connected
Auto gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided	Provided	Provided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.75mm 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) *2	Max. 7 A	Max. 7 A	Max. 14 A	Max. 14 A
Inrush Current (Control Power Supply) *2	Max. 14 A	Max. 14 A	Max. 28 A	Max. 28 A
Weight	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg	Approx. 0.8 kg
Dimensions	Size A	Size A	Size A	Size A

*1 When using an encoder with the specification of 17-bit incremental/absolute.

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series

- Size B 100 V and 200 V

Model	MBDHT2110B01	MBDHT2510B01
Power supply input	Single phase 100 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	15 A	15 A
Maximum continuous output current	10 A	10 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Externally connected	Externally connected
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²
	AWG18	AWG18
Main power supply cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Ground cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Motor cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Inrush current (Main power supply) ^{*2}	Max. 7 A	Max. 14 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 28 A
Weight	Approx. 1.0 kg	Approx. 1.0 kg
Dimensions	Size B	Size B

^{*1} When using an encoder with the specification of 17-bit incremental/absolute.

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

- MINAS-A5B01 Series
- Size C 100 V and 200 V

Model	MCDHT3120B01	MCDHT3520B01
Power supply input	Single phase 100 V	Single phase/ 3 phase 200 V
Maximum instantaneous output current	30 A	30 A
Maximum continuous output current	20 A	20 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Built-in	Built-in
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²
	AWG18	AWG18
Main power supply cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Ground cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Motor cable	HVSF 0.75–2.0 mm ²	HVSF 0.75–2.0 mm ²
	AWG14–18	AWG14–18
Inrush current (Main power supply) ^{*2}	Max. 15 A	Max. 29 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 28 A
Weight	Approx.1.6 kg	Approx.1.6 kg
Dimensions	Size C	Size C

^{*1} When using an encoder with the specification of 17-bit incremental/absolute.

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 100 V or 200 V.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series
 • Size D 200 V and 400 V

Model	MDDHT3530B01	MDDHT5540B01	MDDHT2407B01	MDDHT2412B01	MDDHT3420B01
Power supply input	Single phase/ 3 phase 200 V	Single phase/ 3 phase 200 V	3 phase 400 V	3 phase 400 V	3 phase 400 V
Max. instantaneous output current	50 A	50 A	15 A	15 A	30 A
Max. continuous output current	30 A	40 A	7.5 A	12 A	20 A
Rotary encoder feedback signal	Resolution: 1048576P/r	Resolution: 1048576P/r	Resolution: 1048576P/r	Resolution: 1048576P/r	Resolution: 1048576P/r
	Resolution: 131072P/r	Resolution: 131072P/r	Resolution: 131072P/r	Resolution: 131072P/r	Resolution: 131072P/r
Regenerative discharge resistor	Built-in	Built-in	Built-in	Built-in	Built-in
Auto gain tuning function	Provided	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided	Provided
Absolute system *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided	Provided	Provided	Provided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.75mm ²	HVSF 0.5mm ²	HVSF 0.5mm ²	HVSF 0.5mm ²
	AWG18	AWG18	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	HVSF 2.0 mm ²
	AWG14	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	HVSF 2.0 mm ²
	AWG14	AWG14	AWG14	AWG14	AWG14
Motor cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²	HVSF 2.0 mm ²	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14	AWG14	AWG14	AWG14
Inrush current (Main power supply) *2	Max. 29 A	Max. 29 A	Max. 28 A	Max. 28 A	Max. 28 A
Inrush current (Control power supply) *2	Max. 28 A	Max. 28 A	Max. 48 A	Max. 48 A	Max. 48 A
Weight	Approx. 1.8 kg	Approx. 1.8 kg	Approx. 1.9 kg	Approx. 1.9 kg	Approx. 1.9 kg
Dimensions	Size D	Size D	Size D	Size D	Size D

*1 When using Encoder Specifications: 17 bit incremental/absolute

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series

- Size E 200 V and 400 V

Model	MEDHT7364B01	MEDHT4430B01
Power supply input	3 phase 200 V	3 phase 400 V
Maximum instantaneous output current	75 A	35 A
Maximum continuous output current	64 A	30 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Built-in	Built-in
Auto gain tuning function	Provided	Provided
Dynamic brake function	Provided	Provided
Absolute system ^{*1}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided
Ambient temperature	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ²	HVSF 0.5mm ²
	AWG18	AWG20
Main power supply cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Ground cable	HVSF 3.5 mm ²	HVSF 2.0 mm ²
	AWG12	AWG14
Motor cable	HVSF 2.0 mm ²	HVSF 2.0 mm ²
	AWG14	AWG14
Inrush current (Main power supply) ^{*2}	Max. 29 A	Max. 32 A
Inrush current (Control power supply) ^{*2}	Max. 14 A	Max. 48 A
Weight	Approx. 2.7 kg	Approx. 2.7 kg
Dimensions	Size E	Size E

^{*1} When using Encoder Specifications: 17 bit incremental/absolute

^{*2} Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series
 • Size F 200 V and 400 V

Model	MFDHTA390B01	MFDHTB3A2B01	MFDHT5440B01	MFDHTA464B01
Power supply input	3 phase 200 V	3 phase 200 V	3 phase 400 V	3 phase 400 V
Maximum instantaneous output current	100 A	150 A	50 A	100 A
Maximum continuous output current	90 A	120 A	40 A	64 A
Rotary encoder feedback signal	Resolution: 1048576 P/r Resolution: 131072 P/r	Resolution: 1048576 P/r Resolution: 131072 P/r	Resolution: 1048576 P/r Resolution: 131072 P/r	Resolution: 1048576 P/r Resolution: 131072 P/r
Regenerative discharge 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 *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided	Provided	Provided
Ambient temperature	0–55°C	0–55°C	0–55°C	0–55°C
Control power supply cable	HVSF 0.75mm ² AWG18	HVSF 0.75mm ² AWG18	HVSF 0.75mm ² AWG18	HVSF 0.75mm ² AWG18
Main power supply cable	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12
Ground cable	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12
Motor cable	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12	HVSF 3.5 mm ² AWG12
Inrush current (Main power supply) *2	Max. 22 A	Max. 22 A	Max. 32 A	Max. 32 A
Inrush current (Control power supply) *2	Max. 14 A	Max. 14 A	Max. 48 A	Max. 48 A
Weight	Approx. 4.8 kg	Approx. 4.8 kg	Approx. 4.7 kg	Approx. 4.7 kg
Dimensions	Size F	Size F	Size F	Size F

*1 When using Encoder Specifications: 17 bit incremental/absolute

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400 V or 24 V dc.

Note: The absolute encoder backup battery is externally connected.

● MINAS-A5B01 Series

- Sizes G/H 200 V and 400 V

Model	MGDHTC3B4B01	MGDHTB4A2B01	MHDHTC3B4B01	MHDHTB4A2B01
Power supply input	3 phase 200 V	3 phase 400 V	3 phase 200 V	3 phase 400 V
Maximum instantaneous output current	300 A	150 A	300 A	150 A
Maximum continuous output current	240 A	120 A	240 A	120 A
Rotary encoder feedback signal	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r	Resolution: 1048576 P/r
	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r	Resolution: 131072 P/r
Regenerative discharge resistor	Externally connected	Externally connected	Externally connected	Externally connected
Auto gain tuning function	Provided	Provided	Provided	Provided
Dynamic brake function	Provided	Provided	Provided	Provided
Absolute system *1	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}	Available ^{NOTE}
Safety function	Provided	Provided	Provided	Provided
Ambient temperature	0-55°C	0-55°C	0-55°C	0-55°C
Control power cable	HVSF 0.75 mm ²	HVSF 0.75mm ²	HVSF 0.75 mm ²	HVSF 0.75 mm ²
	AWG18	AWG18	AWG18	AWG18
Main power supply cable	HVSF 5.3 mm ²	HVSF 5.3mm ²	HVSF 13.3 mm ²	HVSF 13.3 mm ²
	AWG10	AWG10	AWG6	AWG6
Ground cable	HVSF 13.3 mm ²	HVSF 13.3 mm ²	HVSF 21.1 mm ²	HVSF 21.1 mm ²
	AWG6	AWG6	AWG4	AWG4
Motor cable	HVSF 13.3 mm ²	HVSF 13.3 mm ²	HVSF 21.1 mm ²	HVSF 21.1 mm ²
	AWG6	AWG6	AWG4	AWG4
Inrush current (Main power supply) *2	Max. 66 A	Max. 32 A	Max. 66 A	Max. 32 A
Inrush current (Control power supply) *2	Max. 15 A	Max. 48 A	Max. 15 A	Max. 48 A
Weight	Approx. 13.5 kg	Approx. 13.5 kg	Approx. 21 kg	Approx. 21 kg
Dimensions	Size G	Size G	Size H	Size H

*1 When using Encoder Specifications: 17 bit incremental/absolute

*2 Current values were calculated on the basis of the power supply input described above, assuming a voltage of 200 V, 400V and 24 V dc.

Note: The absolute encoder backup battery is externally connected.

I/O connector (X4) default function allocation

X4 connector		Default function		
Name	Pin number	Signal name	Symbol	Logic
SI1	5	General monitor input 5	SI-MON5	NO contact
SI2	7	CW drive inhibit input	POT	NC contact
SI3	8	CCW drive inhibit input	NOT	NC contact
SI4	9	Near origin input	HOME	NO contact
SI5	10	External latch input 1	EXT1	NO contact
SI6	11	External latch input 2	EXT2	NO contact
SI7	12	General monitor input 3	SI-MON3	NO contact
SI8	13	General monitor input 4	SI-MON4	NO contact
SO1	1,2	External brake release signal	BRK-OFF	NO contact
SO2	25,26	ECAT operation output 1	EX-OUT1	NO contact
SO3	3,4	Alarm output	ALM	NC contact