



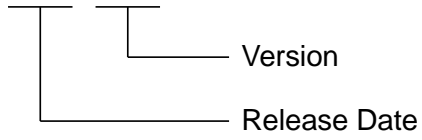
E2 Series Servo Drive

Replacement Guide

Revision History

The version of the manual is also indicated on the bottom of the front cover.

MD34UE01-2304_V1.0



Release Date	Version	Applicable Product	Revision Contents
Apr. 25 th , 2023	1.0	E2 series servo drive	First edition.

Related Documents

The figure and table of the documents related to the product are shown below. Refer to these documents as required.



Product		Doc. Name		Doc. No.	Content
Controller	HIMC Motion Controller	HIMC Installation Guide		MH07UE01-□□□□	Provides detailed information on installing and connecting HIMC motion controller.
		HIMC iA Studio User Guide		MH01UE01-□□□□	Provides detailed information on the human machine interface operation of HIMC motion controller.
		HIMC Modbus TCP User Guide		MH02UE01-□□□□	Provides detailed information on the way Modbus TCP communication protocol applied to HIMC motion controller.
		HIMC HMPL User Guide		MH06UE01-□□□□	Provides detailed information on HMPL library of HIMC motion controller.
		HIMC API Reference Guide		MH05UE01-□□□□	Provides detailed information on API library of HIMC motion controller.
		HIOM Installation Guide		MH03UE01-□□□□	Provides detailed information on installing and connecting HIOM (HIWIN mega-ulink IO module).
		ETA3 Installation Guide		MH09UE01-□□□□	Provides detailed information on installing and connecting ETA3 (HIMC remote module).
Servo Drive	E Series Servo Drive	Technical Manuals	E1 Series Servo Drive User Manual	MD09UE01-□□□□	Provides detailed information on selecting, installing, connecting, setting, performing test run for, tuning, and monitoring E1 series servo drive.
			E2 Series Servo Drive User Manual	MD28UE01-□□□□	Provides detailed information on selecting, installing, connecting, setting, performing test run for, tuning, and monitoring E2 series servo drive.
			E Series Servo Drive Thunder Software Operation Manual	MD12UE01-□□□□	Provides detailed information on the human machine interface operation of E series servo drive.
			E Series Servo Drive Gantry Control System User Manual	MD22UE01-□□□□	Provides detailed information on the usage of E series servo drive gantry control system.
			E Series Servo Drive Electronic Cam Control System User Manual	MD27UE01-□□□□	Provides detailed information on the usage of E series servo drive electronic cam control system.
			E Series Servo Drive Multi-Motion Function User Manual	MD32UE01-□□□□	Provides detailed information on the usage of E series servo drive multi-motion function.
			MPI Library Reference Manual	MD19UE01-□□□□	Provides detailed information on MPI library of E series servo drive and D series servo drive.
			MPI Examples	MD18UE01-□□□□	Provides detailed information on MPI examples of E series servo drive and D series servo drive.
			API Library Reference Manual for Servo Drives	MD23UE01-□□□□	Provides detailed information on API library of E series servo drive and D series servo drive.
			PDL Examples for E Series Servo Drive	MD25UE01-□□□□	Provides detailed information on PDL examples of E series servo drive.
		Communication Manuals	E Series Servo Drive EtherCAT(CoE) Communications Command Manual	MD08UE01-□□□□	Provides detailed information on the way EtherCAT communication protocol applied to E series servo drive.
			E1 Series Servo Drive MECHATROLINK-III Communication Command Manual	MD24UE01-□□□□	Provides detailed information on the way MECHATROLINK-III communication protocol applied to E1 series servo drive.
			E1 Series Servo Drive PROFINET Communication Command Manual	MD02UE01-□□□□	Provides detailed information on the way PROFINET communication protocol applied to E1 series servo drive.

Product		Doc. Name		Doc. No.	Content
		Application Manuals	E2 Series Servo Drive Replacement Guide	MD34UE01-□□□□	Provides detailed information on the way of replacing E1 series servo drive and D1 series servo drive with E2 series servo drive.
			Application Note E1 PROFINET Drive Complete Setup with Siemens TIA Portal	MD30UE01-□□□□	Provides detailed information on the operation of PLC software TIA Portal when E1 PROFINET drive is used with Siemens S7 series PLC.
			Application Note E1 MECHATROLINK-III Drive Complete Setup with YASKAWA MPE720	MD31UE01-□□□□	Provides detailed information on the operation of machine controller software MPE720 when E1 MECHATROLINK-III drive is used with YASKAWA MP3000 series machine controller.
			Function Blocks Application Manual E Series EtherCAT Drive with OMRON Sysmac Studio	MD35UE01-□□□□	Provides detailed information on the usage of application function blocks when E series EtherCAT drive is used with OMRON Sysmac Studio.
			Function Blocks Application Manual E Series EtherCAT Drive with KEYENCE KV STUDIO	MD36UE01-□□□□	Provides detailed information on the usage of application function blocks when E series EtherCAT drive is used with KEYENCE KV STUDIO.
Servo Drive	D Series Servo Drive	D1 Servo Drive User Manual		MD20UE01-□□□□	Provides detailed information on selecting, installing, connecting, setting, performing test run for, tuning, and monitoring D1 servo drive.
		D2 Series Servo Drive User Manual		MD07UE01-□□□□	Provides detailed information on selecting, installing, connecting, setting, performing test run for, tuning, and monitoring D2T servo drive.
		D2T-LM Series Servo Drive User Manual		MD11UE01-□□□□	Provides detailed information on selecting, installing, connecting, setting, performing test run for, tuning, and monitoring D2T-LM servo drive.
		MPI Library Reference Manual		MD19UE01-□□□□	Provides detailed information on MPI library of E series servo drive and D series servo drive.
		MPI Examples		MD18UE01-□□□□	Provides detailed information on MPI examples of E series servo drive and D series servo drive.
		API Library Reference Manual for Servo Drives		MD23UE01-□□□□	Provides detailed information on API library of E series servo drive and D series servo drive.
		PDL Examples for D-series Drives User Manual		MD13UE01-□□□□	Provides detailed information on PDL examples of D series servo drive.
Motor	Linear Motor	Linear Motor User Manual		MP99UE01-□□□□	Provides detailed information on selecting, installing, and connecting linear motor.
	Direct Drive Motor	DMN Series Direct Drive Motor User Manual		MR01UE01-□□□□	Provides detailed information on selecting, installing, and connecting DMN series direct drive motor.
		DMT Series Direct Drive Motor User Manual		MR03UE01-□□□□	Provides detailed information on selecting, installing, and connecting DMT series direct drive motor.
		DMY Series Direct Drive Motor User Manual		MR04UE01-□□□□	Provides detailed information on selecting, installing, and connecting DMY series direct drive motor.
		DMS Series Direct Drive Motor User Manual		MR05UE01-□□□□	Provides detailed information on selecting, installing, and connecting DMS series direct drive motor.
		DMR Series Direct Drive Motor User Manual		MR06UE01-□□□□	Provides detailed information on selecting, installing, and connecting DMR series direct drive motor.

Product		Doc. Name	Doc. No.	Content
	Torque Motor	Torque Motor User Manual	MW99UE01-□□□□	Provides detailed information on selecting, installing, and connecting torque motor.
	AC Servo Motor	AC Servo Motor User Manual	MC03UE01-□□□□	Provides detailed information on selecting, installing, and connecting AC servo motor.
	IM-1 Series Spindle Motor	IM-1 Series Spindle Motor User Manual	MS01UE01-□□□□	Provides detailed information on selecting and installing IM-1 series spindle motor.
Linear Motor Stage	Standard Single-Axis Linear Motor Stage	Standard Single-Axis Linear Motor Stage User Manual	MM06UE01-□□□□	Provides detailed information on selecting, installing, and connecting standard single-axis linear motor stage.
Actuator	Linear Actuator	Linear Actuator User Manual	MA99UE01-□□□□	Provides detailed information on selecting, installing, and connecting linear actuator.

Preface

This manual aims to provide the information needed for replacing HIWIN D1 series servo drive and E1 series servo drive with E2 series servo drive. The contents in this manual, including manual preface, specification comparison, size difference, hardware interface and software interface, are arranged in accordance with the procedure of configuring a machine. Carefully read through this manual to correctly perform the replacement.

General Precautions

This manual provides some specification comparisons with old series products. For detailed application functions, please contact technical service personnel of HIWIN MIKROSYSTEM.

Chapter Overview

Chapter	Title	Contents
1	Replacement of drive specifications	This chapter describes how to replace D1 drive or E1 drive with E2 drive model.
2	Differences in drive dimensions	This chapter introduces the dimension differences after D1 drive or E1 drive is replaced with E2 drive.
3	Differences in drive hardware interfaces	This chapter introduces the hardware interface differences when D1 drive or E1 drive is replaced with E2 drive.
4	Differences in drive software interfaces	This chapter introduces the software/firmware differences when D1 drive or E1 drive is replaced with E2 drive.

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1. Replacement of drive specifications

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1.1 Specification table of drives

1.1.1 E2 drive model

The table below is the specification table for identifying E2 drive model. For detailed drive specifications, refer to “E2 Series Servo Drive User Manual”.

Table 1.1.1.1

Code	1	2	3	4	-	5	6	-	7	8	9	-	10	-	11	-	12	13
Example	E	D	2	S	-	V	0	-	0	0	3	-	1	-	C	-	0	0
1, 2, 3: E2 Series Servo Drive	ED2																	
4: Type	S = Standard									F = Fieldbus								
5, 6: Control Interface	V0 = Voltage command and pulse									E0 = EtherCAT (CoE) H3 = mega-ulink (For HIWIN MoE HIMC motion controller or API/MPI library)								
7, 8, 9: Rated Output	003 = 3 Arms 006 = 6.3 Arms 009 = 9.4 Arms																	
10: AC Phase Input	1 = Single/Three-phase 100~240 Vac (Rated 003, 006, 009) 2 = Three-phase 200~240 Vac (Not supported yet) 3 = Three-phase 380~480 Vac (Not supported yet)																	
11: Function	A = AC B = Basic C = Advanced T = GT																	
12, 13: Reserved	Reserved																	

Explanations are based on each model. The eleventh number is the servo drive's functional code, which shows partial difference in function and performance. Users need to select suitable servo drive according to the usage scenarios. Refer to the table below.

Table 1.1.1.2

Function Model	AC	Basic	Advanced	GT
Supported Motor	AC	LM, DM	AC, LM, DM	AC, LM, DM
Speed Response Bandwidth	3100 Hz	300 Hz	3100 Hz	3100 Hz
Supported Function	<ul style="list-style-type: none"> • Tuneless function of AC motor • Gantry control function • Position trigger 	N/A	<ul style="list-style-type: none"> • Tuneless function of AC motor • Gantry control function • Position trigger 	<ul style="list-style-type: none"> • Tuneless function of AC motor • Gantry control function • Position trigger • 2D error map • Nano-positioning

- **Basic:** It is applicable to application which does not demand high performance, speed response, and settling time. It meets the requirement of speed response bandwidth in most of the automatic usage scenarios and matches the equipment that was previously used with HIWIN D1 series drive.
- **AC:** It is applicable to application which demands high speed and high response, and it is for AC servo motor only. High speed response bandwidth also matches the equipment (for AC only) that was previously used with HIWIN E1 series drive. It does not support linear motors and direct drive motors.
- **Advanced:** It is applicable to application which demands high speed and high response. It supports AC servo motors, linear motors, direct drive motors, and equipment that was previously used with E1 series (full functional) drive.
- **GT:** High performance model, for semiconductor equipment with nano-positioning accuracy. Besides full functions, it can achieve 2D accuracy compensation by using two sets of servo drives.

Note: For GT servo drive, gantry control function will not be supported if users adopt 2D accuracy compensation.

1.1.2 D1 drive model

The table below is the specification table for identifying D1 drive model. For detailed drive specifications, refer to “D1 Servo Drive User Manual”.

Table 1.1.2.1

Code	1	2	-	3	4	-	5	6	-	7	-	8	-	9	10
Example	D	1	-	3	6	-	S	2	-	2	-	0	-	0	0
1, 2: D1 Series Servo Drive	D1														
3, 4: Output Current	36 = Peak current 36 Apk (25.4 Arms)														
5: Control Interface	S = Voltage command and pulse E = EtherCAT (CoE, the 9 th and 10 th bit is 00, for HIWIN CoE HIMC motion controller) E = EtherCAT (MoE, the 9 th and 10 th bit is 51, for HIWIN MoE HIMC motion controller) F = mega-ulink (For API/MPI library)														
6: Encoder Interface	2 = Analog (sin/cos), Digital (without Encoder alarm signal) 3 = Digital (with Encoder alarm signal) 4 = Resolver (Discontinued)														
7: Main Input Power	2 = Single/Three-phase 100~240 Vac														
8: Heat Sink	0 = Without heat sink (Continuous current 5.6 Arms) 1 = With heat sink (Continuous current 8.5 Arms)														
9, 10: Reserved	00 = Standard 51 = Control interface is EtherCAT, for HIWIN MoE HIMC motion controller														

Note:

- (1) CoE is the abbreviation of CANopen over EtherCAT; MoE is the abbreviation of mega-ulink over EtherCAT.
- (2) When API/MPI library is used with servo drive, carefully read through API/MPI library reference manual to check the supported Windows system.

1.1.3 E1 drive model

The table below is the specification table for identifying E1 drive model. For detailed drive specifications, refer to “E1 Series Servo Drive User Manual”.

Table 1.1.3.1

Code	1	2	3	4	-	5	6	-	7	8	9	10	-	11	12	-	13	14
Example	E	D	1	S	-	V	G	-	0	4	2	2	-	0	1	-	0	0
1, 2, 3: E1 Series Servo Drive	ED1																	
4: Type	S = Standard									F = Fieldbus								
5: Control Interface	V = Voltage command and pulse									E = EtherCAT (CoE) H = mega-ulink (For HIWIN MoE HIMC motion controller or API/MPI library) L = MECHATROLINK-III P = PROFINET								
6: Special Function	G = Gantry N = No special function																	
7, 8: Rated Output	04 = 400 W 05 = 500 W 10 = 1 kW 12 = 1.2 kW 20 = 2 kW 40 = 4 kW 50 = 5 kW 75 = 7.5 kW																	
9: AC Phase	2 = Single/Three-phase (For 400 W/500 W/1 kW/1.2 kW model) 3 = Three-phase (For 2 kW/4 kW/5 kW/7.5 kW model)																	
10: AC Power	2 = 110 V/220 V (100 Vac ~ 240 Vac) 3 = 400 V (380 Vac ~ 480 Vac)																	
11: Applicable Category	0 = AC, LM, DM and TM A = AC only T = GT																	
12: Safety Version	1 = STO function security approval																	
13, 14: Reserved	Reserved																	

Note:

- (1) CoE is the abbreviation of CANopen over EtherCAT; MoE is the abbreviation of mega-ulink over EtherCAT.
 - (2) When API/MPI library is used with servo drive, carefully read through API/MPI library reference manual to check
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the supported Windows system.

1.1.4 Power specification comparison of drives

This section provides the power specification comparison of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

1.1.4.1 Power specification difference: D1 drive vs E2 drive

■ D1 drive without heat sink and the corresponding E2 drive

Table1.1.4.1.1

Model		D1-36-□□-2-0-00	ED2□-□□-006-1-□-00
Current Output (Arms)	Continuous Current	5.6	6.3
	Peak Current	25.4	18
Main Input Power		1 Ø or 3 Ø /AC 100~240V	1 Ø or 3 Ø /AC 100~240V
Control Input Power		DC 24V	AC 100~240V
Regenerative Resistor		External	External
Dynamic Brake		No	Built-in
Fan		No	Built-in

■ D1 drive with heat sink and the corresponding E2 drive

Table 1.1.4.1.2

Model		D1-36-□□-2-1-00	ED2□-□□-009-1-□-00
Current Output (Arms)	Continuous Current	8.5	9.4
	Peak Current	25.4	28.3
Main Input Power		1 Ø or 3 Ø /AC 100~240V	1 Ø or 3 Ø /AC 100~240V
Control Input Power		DC 24V	AC 100~240V
Regenerative Resistor		External	External
Dynamic Brake		No	Built-in (with resistor)
Fan		No	Built-in

1.1.4.2 Power specification difference: E1 drive vs E2 drive

■ 400 W, 500 W E1 drive and the corresponding E2 drive

Table 1.1.4.2.1

Model		ED1□-□□-0422-□□-00	ED1□-□□-0522-□□-00	ED2□-□□-003-1-□-00
Current Output (Arms)	Continuous Current	2.5	3	3
	Peak Current	10	10	12
Main Input Power		1 Ø or 3 Ø / AC 100~240V	1 Ø or 3 Ø / AC 100~240V	1 Ø or 3 Ø / AC 100~240V
Control Input Power		AC 100~240V	AC 100~240V	AC 100~240V
Regenerative Resistor		External	External	External
Dynamic Brake		Built-in	Built-in	Built-in
Fan		Built-in	Built-in	No

■ 1 kW E1 drive and the corresponding E2 drive

Table 1.1.4.2.2

Model		ED1□-□□-1022-□□-00	ED2□-□□-006-1-□-00
Current Output (Arms)	Continuous Current	5.6	6.3
	Peak Current	23.3	18
Main Input Power		1 Ø or 3 Ø / AC 100~240V	1 Ø or 3 Ø / AC 100~240V
Control Input Power		AC 100~240V	AC 100~240V
Regenerative Resistor		Built-in or External	External
Dynamic Brake		Built-in (with resistor)	Built-in (with resistor)
Fan		Built-in	Built-in

■ 1.2 kW E1 drive and the corresponding E2 drive

Table 1.1.4.2.3

Model		ED1□-□□-1222-□□-00	ED2□-□□-009-1-□-00
Current Output (Arms)	Continuous Current	9	9.4
	Peak Current	23.3	28.3
Main Input Power		1 Ø or 3 Ø /AC 100~240V	1 Ø or 3 Ø /AC 100~240V
Control Input Power		AC 100~240V	AC 100~240V
Regenerative Resistor		Built-in or External	External
Dynamic Brake		Built-in (with resistor)	Built-in (with resistor)
Fan		Built-in	Built-in

Note: GT servo drive additionally supports DC power input.

1.1.5 Encoder type and interface comparison of drives

This section provides the encoder type and interface comparison of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

1.1.5.1 Encoder type and interface difference: D1 drive vs E2 drive

■ Supported encoder / signal

Table 1.1.5.1.1

		D1 Drive	E2 Drive
Encoder	EnDat	N/A	Built-in
	BiSS-C	N/A	Built-in
	TAMAGAWA	N/A	Built-in
	Digital	Built-in	Built-in
	Analog	Built-in	Built-in
Hall sensor		Built-in	Built-in
PTC thermal sensor		Built-in	Built-in
STO		N/A	Built-in

■ Supported I/O interface

Table 1.1.5.1.2

	D1 Drive		E2 Drive	
	D1-36-S	D1-36-E D1-36-F	ED2S	ED2F
Pulse train	Pulse/Dir, CW/CCW, AqB, PWM	Pulse/Dir, CW/CCW, AqB, PWM	Pulse/Dir, CW/CCW, AqB	N/A
Digital input	10	10	10	8
Digital output	4 [#]	4 [#]	5	5
Analog input	1	1	2	2
Analog output	N/A	N/A	2	2
Encoder output	AqB	AqB	AqB	AqB
Position trigger	N/A	N/A	Built-in*	Built-in*
Gantry interface	N/A	N/A	Built-in*	Built-in*

Note: # 3 sets of digital outputs and 1 set of fixed brake output; * Basic type does not support this item.

1.1.5.2 Encoder type and interface difference: E1 drive vs E2 drive

■ Supported encoder / signal

Table 1.1.5.2.1

		E1 Drive	E2 Drive
Encoder	EnDat	with ESC	Built-in
	BiSS-C	with ESC	Built-in
	TAMAGAWA	Built-in	Built-in
	Digital	Built-in	Built-in
	Analog	with ESC	Built-in
Hall sensor		with ESC	Built-in
PTC thermal sensor		with ESC	Built-in
STO		Built-in	Built-in

■ Supported I/O interface

Table 1.1.5.2.2

	E1 Drive		E2 Drive	
	ED1S	ED1F	ED2S	ED2F
Pulse train	Pulse/Dir, CW/CCW, AqB	N/A	Pulse/Dir, CW/CCW, AqB	N/A
Digital input	10	8	10	8
Digital output	5	5	5	5
Analog input	2	N/A	2	2
Analog output	2	2	2	2
Encoder output	AqB	AqB	AqB	AqB
Position trigger	Built-in	Built-in	Built-in*	Built-in*
Gantry interface	Optional	Optional	Built-in*	Built-in*

Note: * Basic type does not support this item.

1.2 Replace D1 drive with E2 drive

Replace D1 drive with E2 drive according to the recommendations given in the table below.

Table 1.2.1

D1 Drive Model	E2 Drive Model	Description
D1-36-S□-2-0-00	ED2S-V0-006-1-B-00	(1) Pulse and voltage interface.
	ED2S-V0-009-1-B-00	(2) Without heat sink, its continuous current is 5.6 Arms. (3) If peak current exceeds 18 Arms, use the model of 009.
D1-36-E□-2-0-00	ED2F-E0-006-1-B-00	(1) Fieldbus interface, CoE communication.
	ED2F-E0-009-1-B-00	(2) Without heat sink, its continuous current is 5.6 Arms. (3) If peak current exceeds 18 Arms, use the model of 009.
D1-36-F□-2-0-00	ED2F-H3-006-1-B-00	(1) Fieldbus interface, HIWIN mega-ulink communication, used with API/MPI library.
	ED2F-H3-009-1-B-00	(2) Without heat sink, its continuous current is 5.6 Arms. (3) If peak current exceeds 18 Arms, use the model of 009.
D1-36-E□-2-0-51	ED2F-H3-006-1-B-00	(1) Fieldbus interface, used with HIWIN MoE HIMC motion controller.
	ED2F-H3-009-1-B-00	(2) Without heat sink, its continuous current is 5.6 Arms. (3) If peak current exceeds 18 Arms, use the model of 009.
D1-36-S□-2-1-00	ED2S-V0-009-1-B-00	(1) Pulse and voltage interface. (2) With heat sink, its continuous current is 8.5 Arms.
D1-36-E□-2-1-00	ED2F-E0-009-1-B-00	(1) Fieldbus interface, CoE communication. (2) With heat sink, its continuous current is 8.5 Arms.
D1-36-F□-2-1-00	ED2F-H3-009-1-B-00	(1) Fieldbus interface, HIWIN mega-ulink communication, used with API/MPI library. (2) With heat sink, its continuous current is 8.5 Arms.
D1-36-E□-2-1-51	ED2F-H3-009-1-B-00	(1) Fieldbus interface, used with HIWIN MoE HIMC motion controller. (2) With heat sink, its continuous current is 8.5 Arms.

Note: Users can directly select Basic model (the 11th bit is B). To improve performance, select Advanced model (the 11th bit is C).

1.3 Replace E1 drive with E2 drive

Replace 400 W, 500 W E1 drive with E2 drive according to the recommendations given in the table below.

Table 1.3.1

E1 Drive Model	E2 Drive Model	Description
ED1S-V□-0422-A□-00 ED1S-V□-0522-A□-00	ED2S-V0-003-1-A-00	Pulse and voltage interface, for AC servo motor only.
ED1F-E□-0422-A□-00 ED1F-E□-0522-A□-00	ED2F-E0-003-1-A-00	Fieldbus interface, CoE communication, for AC servo motor only.
ED1F-H□-0422-A□-00 ED1F-H□-0522-A□-00	ED2F-H3-003-1-A-00	Fieldbus interface, MoE communication, for AC servo motor only. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-0422-0□-00 ED1S-V□-0522-0□-00	ED2S-V0-003-1-C-00	Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor.
ED1F-E□-0422-0□-00 ED1F-E□-0522-0□-00	ED2F-E0-003-1-C-00	Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor.
ED1F-H□-0422-0□-00 ED1F-H□-0522-0□-00	ED2F-H3-003-1-C-00	Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-0422-T□-00 ED1S-V□-0522-T□-00	ED2S-V0-003-1-T-00	(1) Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-E□-0422-T□-00 ED1F-E□-0522-T□-00	ED2F-E0-003-1-T-00	(1) Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-H□-0422-T□-00 ED1F-H□-0522-T□-00	ED2F-H3-003-1-T-00	(1) Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library. (2) High performance GT model drive.

Replace 1 kW E1 drive with E2 drive according to the recommendations given in the table below.

Table 1.3.2

E1 Drive Model	E2 Drive Model	Description
ED1S-V□-1022-A□-00	ED2S-V0-006-1-A-00	Pulse and voltage interface, for AC servo motor only.
ED1F-E□-1022-A□-00	ED2F-E0-006-1-A-00	Fieldbus interface, CoE communication, for AC servo motor only.
ED1F-H□-1022-A□-00	ED2F-H3-006-1-A-00	Fieldbus interface, MoE communication, for AC servo motor only. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-1022-0□-00	ED2S-V0-006-1-C-00	Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor.
ED1F-E□-1022-0□-00	ED2F-E0-006-1-C-00	Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor.
ED1F-H□-1022-0□-00	ED2F-H3-006-1-C-00	Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-1022-T□-00	ED2S-V0-006-1-T-00	(1) Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-E□-1022-T□-00	ED2F-E0-006-1-T-00	(1) Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-H□-1022-T□-00	ED2F-H3-006-1-T-00	(1) Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library. (2) High performance GT model drive.

Replace 1.2 kW E1 drive with E2 drive according to the recommendations given in the table below.

Table 1.3.3

E1 Drive Model	E2 Drive Model	Description
ED1S-V□-1222-A□-00	ED2S-V0-009-1-A-00	Pulse and voltage interface, for AC servo motor only.
ED1F-E□-1222-A□-00	ED2F-E0-009-1-A-00	Fieldbus interface, CoE communication, for AC servo motor only.
ED1F-H□-1222-A□-00	ED2F-H3-009-1-A-00	Fieldbus interface, MoE communication, for AC servo motor only. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-1222-0□-00	ED2S-V0-009-1-C-00	Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor.
ED1F-E□-1222-0□-00	ED2F-E0-009-1-C-00	Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor.
ED1F-H□-1222-0□-00	ED2F-H3-009-1-C-00	Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library.
ED1S-V□-1222-T□-00	ED2S-V0-009-1-T-00	(1) Pulse and voltage interface, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-E□-1222-T□-00	ED2F-E0-009-1-T-00	(1) Fieldbus interface, CoE communication, support AC servo motor, linear motor, direct drive motor. (2) High performance GT model drive.
ED1F-H□-1222-T□-00	ED2F-H3-009-1-T-00	(1) Fieldbus interface, MoE communication, support AC servo motor, linear motor, direct drive motor. It can be used with HIWIN MoE HIMC motion controller or API/MPI library. (2) High performance GT model drive.

2. Differences in drive dimensions

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2.1 Dimension comparison of drives

This section provides the dimension comparison of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

2.1.1 Dimension difference: D1 drive vs E2 drive

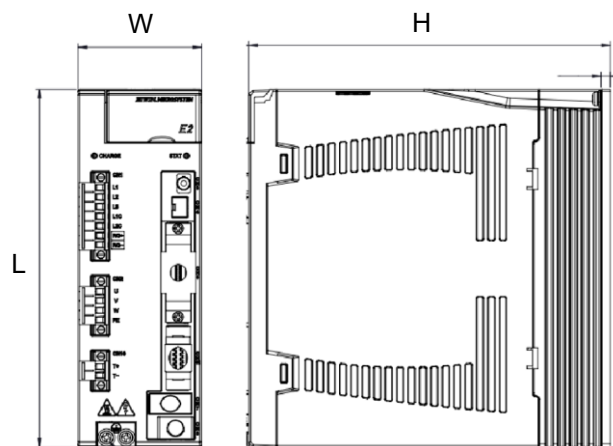


Figure 2.1.1.1 Diagram of dimensions

■ D1 drive without heat sink and the corresponding E2 drive

Table 2.1.1.1

Model Dimension (mm)	D1-36-□□-2-0-00	ED2□-□□-006-1-□-00
L	191.6	188
W	64.8	55
H	139.8	160

■ D1 drive with heat sink and the corresponding E2 drive

Table 2.1.1.2

Model Dimension (mm)	D1-36-□□-2-1-00	ED2□-□□-009-1-□-00
L	191.6	188
W	100	65
H	139.8	190

2.1.2 Dimension difference: E1 drive vs E2 drive

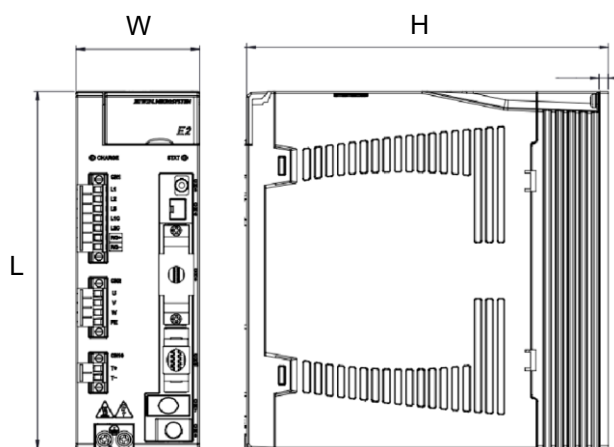


Figure 2.1.2.1 Diagram of dimensions

■ 400 W, 500 W E1 drive and the corresponding E2 drive

Table 2.1.2.1

Model Dimension (mm)	ED1□-□□-0422-□□-00 ED1□-□□-0522-□□-00	ED2□-□□-003-1-□-00
L	168	188
W	50	55
H	160	160

■ 1 kW E1 drive and the corresponding E2 drive

Table 2.1.2.2

Model Dimension (mm)	ED1□-□□-1022-□□-00	ED2□-□□-006-1-□-00
L	168	188
W	60	55
H	190	160

■ 1.2 kW E1 drive and the corresponding E2 drive

Table 2.1.2.3

Model Dimension (mm)	ED1□-□□-1222-□□-00	ED2□-□□-009-1-□-00
L	168	188
W	60	65
H	190	190

3. Differences in drive hardware interfaces

3.	Differences in drive hardware interfaces	3-1
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3.1 Peripheral configuration comparison of drives

This section provides the peripheral configuration comparison of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

3.1.1 Peripheral configuration difference: D1 drive vs E2 drive

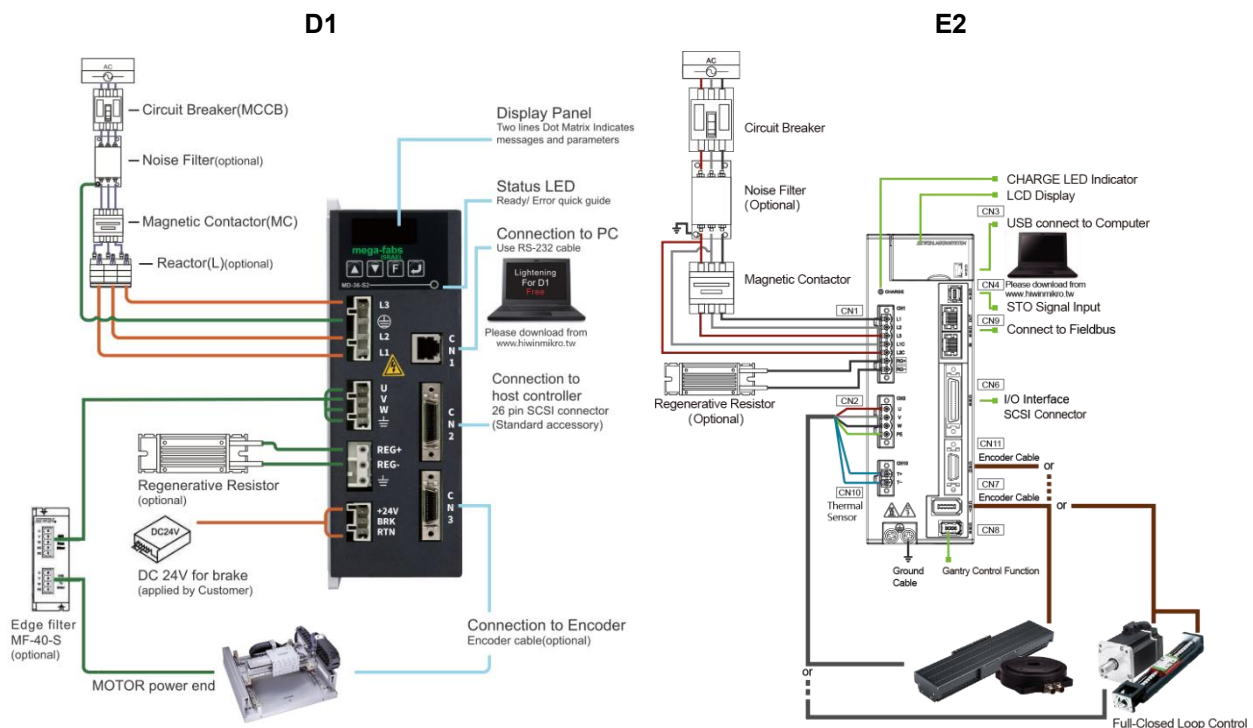


Figure 3.1.1.1

Table 3.1.1.1

	D1 Terminal Symbol	E2 Terminal Symbol	Use Previous Cable	Use Previous Connector	Note
Main input power	L1, L2, \ominus , L3	CN1 (L1, L2, L3)	Yes	No	Use R type terminal to connect to the frame for grounding.
Control input power	+24V, RTN	CN1 (L1C, L2C)	No	No	Different control input power.
Regenerative resistor	REG+, REG-	CN1 (RG+, RG-)	Yes	No	N/A
Motor power supply	U, V, W, \equiv	CN2 (U, V, W, PE)	Yes	No	N/A
PC communication	CN1	CN3	No	No	N/A
Control signal cable	CN2	CN6	No	No	N/A
Encoder signal cable	CN3	CN11	Yes	Yes	Digital, Analog encoder; Hall, PTC signal.
Fieldbus communication	CN4 (IN, OUT)	CN9 (IN, OUT)	Yes	Yes	N/A

3.1.2 Peripheral configuration difference: E1 drive vs E2 drive

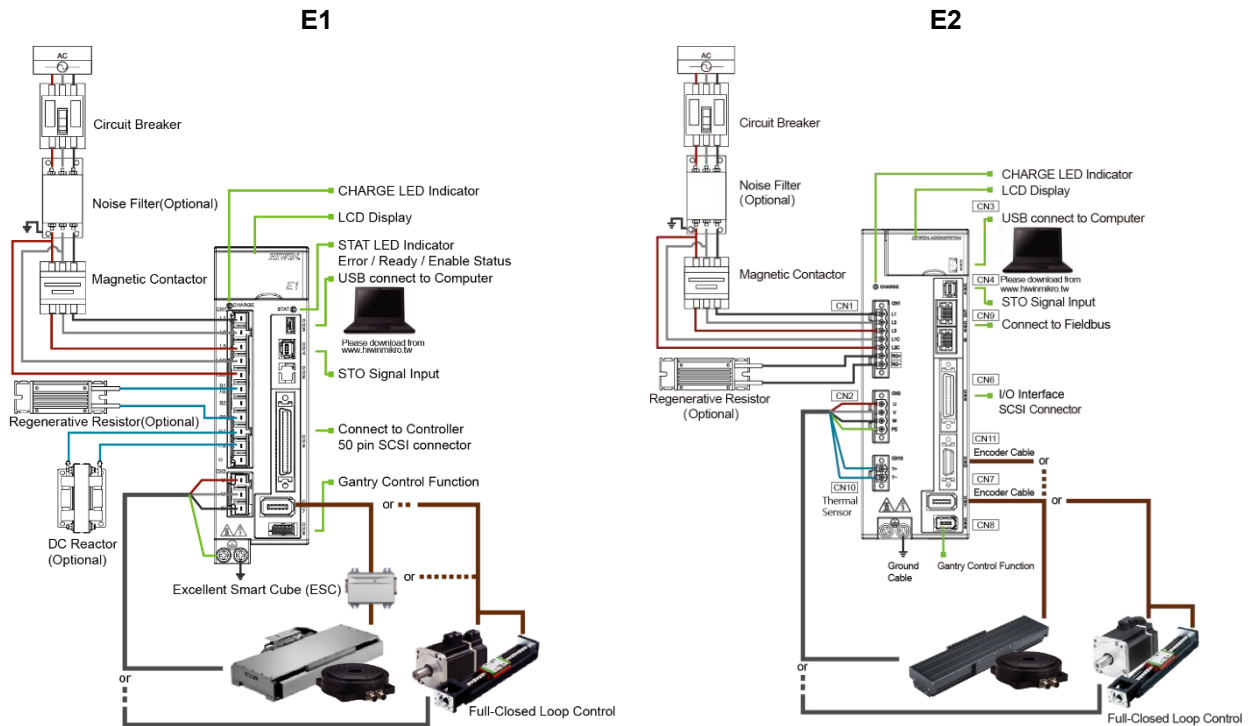


Figure 3.1.2.1

Table 3.1.2.1

	E1 Terminal Symbol	E2 Terminal Symbol	Use Previous Cable	Use Previous Connector	Note
Main input power	CN1 (L1, L2, L3)	CN1 (L1, L2, L3)	Yes	No	Use R type terminal to connect to the frame for grounding.
Control input power	CN1 (L1, L2, L3)	CN1 (L1C, L2C)	Yes	No	N/A
Regenerative resistor	CN1 (B1/⊕, B3)	CN1 (RG+, RG-)	Yes	No	E2 only supports external regenerative resistor.
Motor power supply	CN2 (U, V, W)	CN2 (U, V, W, PE)	Yes	No	Use R type terminal for grounding: connect to the frame Use European terminal for grounding: connect to CN2 (PE)
PC communication	CN3	CN3	No	No	N/A
STO function	CN4	CN4	Yes	Yes	N/A
Control signal cable	CN6	CN6	Yes	Yes	Standard: 50 PIN Fieldbus: 36 PIN
E1 without ESC	CN7	CN7	Yes	Yes	EM1, TAMAGAWA, Digital encoder, Dual-loop (EM1 and Digital encoder) are all suitable.
E1 with ESC: Analog encoder, Hall sensor	ESC: Encoder	CN11	No	No	E2 with Analog encoder, thermal signal (PTC), Hall sensor does not need ESC.
E1 with ESC: BiSS, EnDat encoder	ESC: Encoder	CN7	No	No	E2 with BiSS, EnDat encoder does not need ESC.
E1 with ESC: thermal signal (PTC)	ESC: TS	CN10 (T+, T-)	Yes	No	When encoder signal cable does not contain thermal signal, thermal signal can be externally connected.
Gantry communication	CN8	CN8	No	No	E2 Basic model does not support this item.

	E1 Terminal Symbol	E2 Terminal Symbol	Use Previous Cable	Use Previous Connector	Note
Fieldbus communication	CN9 (IN, OUT)	CN9 (IN, OUT)	Yes	Yes	N/A

3.2 Connector specification

This section provides the connector specification of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

3.2.1 Connector specification of E2 drive

The accessory kit of E2 drive is included when the drive is shipped out. For the contents inside the accessory kit, please refer to the table below.

Table 3.2.1.1

Name	HIWIN Part Number	Description	Qty.
ED2 CK1 accessory kit (003~009 Standard)	180600100007	CN1: AC main input power terminal, control input power terminal and terminal for regenerative resistor (7 pins, DINKLE 2ESSM-07P)	1
		CN2: Motor power connector (4 pins, DINKLE 2ESSM-04P)	1
		CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (50 pins welded type EUMAX XDR-10350AS)	1
		CN10: DINKLE 2ESSM-02P	1
ED2 CK2 accessory kit (003~009 Fieldbus)	180600100008	CN1: AC main input power terminal, control input power terminal and terminal for regenerative resistor (7 pins, DINKLE 2ESSM-07P)	1
		CN2: Motor power connector (4 pins, DINKLE 2ESSM-04P)	1
		CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (36 pins welded type EUMAX XDR-10336AS)	1
		CN10: DINKLE 2ESSM-02P	1

Note: CN4 STO connector has installed on the servo drive.

■ Connector specification of E2 drive

Table 3.2.1.2

Connector (Cable Side)	HIWIN Part Number	Description
Main circuit connector (CN1)	934201900074	2ESSM-07P / one row 7 Port / 5.08mm / cable side / direct plug-in
Connector for motor power cable (CN2)	934201900073	2ESSM-04P / one row 4 Port / 5.08mm / cable side / direct plug-in
Mini USB communication connector (CN3)		USB 2.0 Type A to mini-B 5 Pin (1.8 M) (Shielding)
Safety bypass connector (CN4)	051500400545	INDUSTRIAL MINI I/O BYPASS CONNECTOR TYPE I TE Connectivity 1971153-1
Safety device connector (CN4)	051500400404	INDUSTRIAL MINI I/O PLUG CONNECTOR KIT D-SHAPE TYPE 1 TE Connectivity 2013595-1 Connect to external safety device.
Control signal connector (CN6) (For standard servo drive)	051500100141	50 pins, .050" mini D Ribbon (MDR), standard welding-type connector SCSI 50PIN (male) Wire size: 24-30 AWG
Control signal connector (CN6) (For Fieldbus servo drive)	051500100213	36 pins, .050" mini D Ribbon (MDR), standard welding-type connector SCSI 36PIN (male) Wire size: 24-30 AWG
Encoder connector (CN7)	180600100002	Shielded compact ribbon (SCR) connectors (363 series)
Connector for gantry communication (CN8)		HIWIN standard communication cable
Encoder connector (CN10)	051500400182	10320-52A0-008 / SCSI 20PIN
Encoder connector (CN11)	934201900072	2ESSM-02P / one row 2 Port / 5.08mm / cable side / direct plug-in

3.2.2 Connector specification of D1 drive

The accessory kit of D1 drive is not included when the drive is shipped out, so users need to purchase it additionally. For the contents inside the accessory kit, please refer to the table below.

Table 3.2.2.1

Name	HIWIN Part Number	Description	Qty.
D1 Servo Drive Accessory Pack (With CN3 connector)	051800200064	Connector for AC main power cable; 4 pin, pitch 7.5 mm	1
		Connector for motor power cable; 4 pin, pitch 5 mm	1
		Connector for regenerative resistor; 3 pin, pitch 7.5 mm	1
		Connector for control power; 3 pin, pitch 5 mm	1
		Connector for CN2 (control signal); MDR 26P solder connector	1
		Connector for CN3 (feedback signal); MDR 20P solder connector	1
		Connector tool; Wago 231-131	1

3.2.3 Connector specification of E1 drive

The accessory kit of E1 drive is included when the drive is shipped out. For the contents inside the accessory kit, please refer to the table below.

Table 3.2.3.1

Name	HIWIN Part Number	Description	Qty.
ED1 CK1 accessory kit (400 W~2 kW Standard)	051800200158	CN1: AC main input power terminal, control input power terminal, terminal for regenerative resistor and terminal for DC reactor (11 pins, TE 1-2229794-1-PT1)	1
		CN2: Motor power connector (3 pins, TE 3-2229794-1)	1
		CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (50 pins welded type EUMAX XDR-10350AS)	1
		Headers and wire housings for CN1 and CN2 connectors (TE 1981045-1)	2
ED1 CK2 accessory kit (400 W~2 kW Fieldbus)	051800200159	CN1: AC main input power terminal, control input power terminal, terminal for regenerative resistor and terminal for DC reactor (11 pins, TE 1-2229794-1-PT1)	1
		CN2: Motor power connector (3 pins, TE 3-2229794-1)	1
		CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (36 pins welded type EUMAX XDR-10336AS)	1
		Headers and wire housings for CN1 and CN2 connectors (TE 1981045-1)	2

Name	HIWIN Part Number	Description	Qty.
ED1 CK3 accessory kit (4 kW Standard)	180600100003	CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (50 pins welded type EUMAX XDR-10350AS)	1
ED1 CK4 accessory kit (4 kW Fieldbus)	180600100004	CN4: STO connector (TE 1971153-1)	1
		CN6: Control signal connector (36 pins welded type EUMAX XDR-10336AS)	1

■ Connector specification of E1 drive

Table 3.2.3.2

Connector (Cable Side)	HIWIN Part Number	Description
Main circuit connector (CN1)	051500400681	AC main input power terminal, control input power terminal, terminal for regenerative resistor and terminal for DC reactor D3950 / one row 11 Port / 7.5 mm / cable side / X key TE Connectivity 1-2229794-1
Connector for motor power cable (CN2)	051500400572	D3950 / one row 3 Port / 7.5 mm / cable side / X key TE Connectivity 3-2229794-1
Mini USB communication connector (CN3)		USB 2.0 Type A to mini-B 5 Pin (1.8 M) (Shielding)
Safety bypass connector (CN4)	051500400545	INDUSTRIAL MINI I/O BYPASS CONNECTOR TYPE I TE Connectivity 1971153-1
Safety device connector (CN4)	051500400404	INDUSTRIAL MINI I/O PLUG CONNECTOR KIT D-SHAPE TYPE 1 TE Connectivity 2013595-1 Connect to external safety device.
Control signal connector (CN6) (For standard servo drive)	051500100141	50 pins, .050" mini D Ribbon (MDR), standard welding-type connector SCSI 50PIN (male) Wire size: 24-30 AWG
Control signal connector (CN6) (For Fieldbus servo drive)	051500100213	36 pins, .050" mini D Ribbon (MDR), standard welding-type connector SCSI 36PIN (male) Wire size: 24-30 AWG
Encoder connector (CN7)	180600100002	Shielded compact ribbon (SCR) connectors (363 series)
Connector for gantry communication (CN8)		HIWIN standard communication cable

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4. Differences in drive software interfaces

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4.1 Software/Firmware comparison of drives

This section provides the software/firmware comparison of D1, E1 drive and E2 drive. For detailed specifications, refer to the user manual of each drive.

4.1.1 Software/Firmware difference: D1 drive vs E2 drive

Table 4.1.1.1

	D1 Drive	E2 Drive
Software name	Lightening	Thunder
Supported software version	0.178 or above	1.9.7.0 or above
Supported firmware version	D1: 0.215 or above D1 CoE: 0.305 or above	3.9.0 or above

4.1.2 Software/Firmware difference: E1 drive vs E2 drive

Table 4.1.2.1

	E1 Drive	E2 Drive
Software name	Thunder	Thunder
Supported software version	1.1.6.3 or above	1.9.7.0 or above
Supported firmware version	2.1.8 or above	3.9.0 or above

Note: E2 drive can load E1 drive's parameters.