

LD5 Direct Drive Series AC Servo Drives

Empowering the Upgrade of
Industrial Automation Industry



Limon

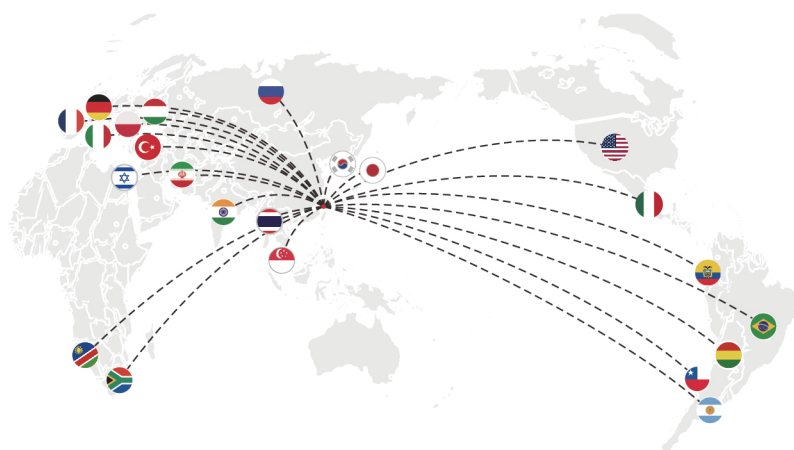
Pioneering Smart Manufacturing in China



Established in 2013, Limon headquartered in the port city of Ningbo, China, specializes in smart manufacturing. With robust independent research and development capabilities, Limon has successfully introduced automation system solutions widely applied in key sectors such as new energy batteries, new energy vehicles, photovoltaics, 3C electronics, semiconductors, LCD panels, biomedicine, and engineering machinery, demonstrating strong market competitiveness.

Global Business Deployment

Limon adheres to a customer-centric service philosophy, establishing service points nationwide to provide customers with prompt and professional technical support and services. Moreover, Limon actively expands into international markets, with business operations covering over 30 countries and regions globally, delivering more than 2300 innovative solutions to customers worldwide and earning extensive international acclaim.



Gathering Elite Talent in the Intelligent Equipment Industry

Driven by innovation, Limon has assembled a core technical team composed of renowned experts from both domestic and international arenas, focusing on underlying automation technologies, continually innovating and iterating to deliver products with outstanding performance, excellent quality, and high cost-effectiveness to customers.



"Full-Cycle, Full-Process, All-Around" Service

○ Project Manager Service System

Limon implements a project manager service system, taking full responsibility for pre-sales consultations, product selection, order processing, logistics, and other aspects to ensure on-time delivery.

○ Professional After-Sales Customer Service Team

Limon boasts a professional customer service team, promptly responding to customers' after-sales needs to ensure efficient and high-quality service.

○ 30-Day Free Sample Loan

Customers interested in showcasing and testing products can consult Limon's sales engineers for complimentary sample loans.

○ Exhibitions/Networking Events

Limon regularly participates in industry exhibitions and hosts peer networking events, actively engaging in industry technical discussions and knowledge sharing.

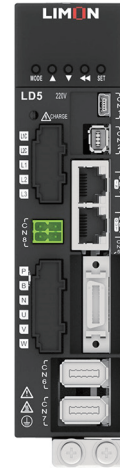


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One、 Basic Features of Servo drives

1、 Product Introduction

The new generation of high-performance AC servo drives is specially designed for the direct drive industry, significantly enhancing the precision, speed, efficiency, and stability of industrial automation equipment. It features universalization and platformization, supporting communications such as RS485, CANopen, EtherCAT, PROFINET, etc. The current range covers from 1.5A to 30.0A.



2、 Typical Application Scenarios

Widely used in industrial automation scenarios such as laser, printing, and semiconductor industries.



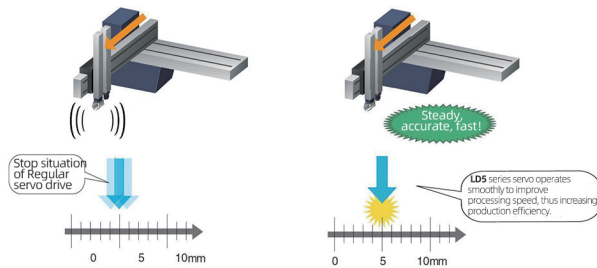
AC servo application scenario one:
Laser cutting



AC servo application scenario two:
Printing equipment

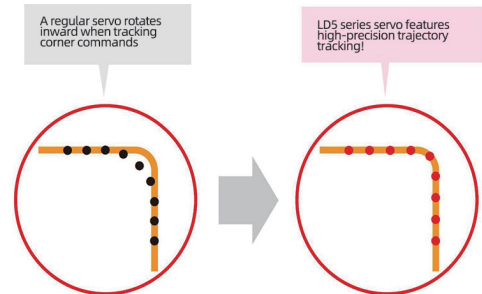
3、Key Advantages

(1) High Speed



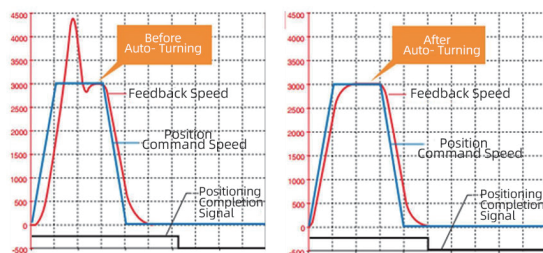
Current loop response bandwidth up to 3kHz, with smaller control delay and faster command following, effectively reducing position setting time.

(2) High Precision



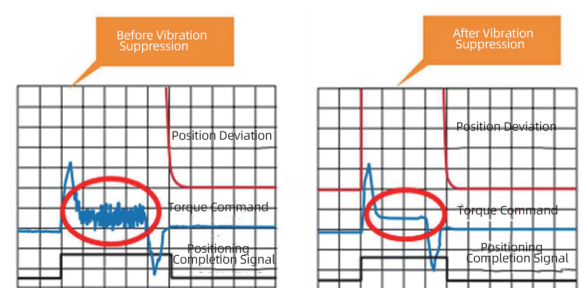
Built-in 2000-point precision compensation algorithm greatly enhances trajectory tracking performance, capable of precisely controlling equipment positioning accuracy within 0.2 microns.

(3) One-key auto-tuning



Equipped with two automatic tuning loop parameter functions, "Single Parameter" and "Auto- Turning ", greatly reducing servo tuning time and significantly improving usability.

(4) Enhanced vibration suppression



Equipped with enhanced vibration suppression function, incorporating four resonance suppression filters, second-order torque low-pass filters, input shaping filters, and position notch filters, capable of perfectly addressing vibration issues across low-frequency, mid-frequency, and high-frequency bands.

Two、Specifications of Servo drives

1、Naming Rules

LD5	003	S2	L	E	SG
Product Series Number LD5 Series Servo Drives	Rated Current Single-phase/ Three-phase 220V model 003:3.0A 006:6.0A 010:10.0A Three phase 220V model 013:13.0A	Rated Voltage S2: Single-phase/ Three-phase 220V T2:Three-phase 220V T3:Three-phase 380V	Motor Type L:Direct drive motor	Command Type P: Pulse/Analog E:EtherCAT	Configuration No code: standard configuration SG:Gantry model

2、Electrical Specifications

220V model servo drive electrical specifications

Structure	Dimension	SIZE- A TYPE	SIZE- B TYPE	SIZE- C TYPE	
Drive specification		LD5-003S2XXXX	LD5-006S2XXXX	LD5-010S2XXXX	LD5-013T2XXXX
Rated output current (Arms)		3	6	10	13
Maximum output current (Arms)		9	18	28	28
Rated input current (Arms)		Single-phase 5.0/ Three-phase 2.4	Single-phase 10.0/ Three-phase 5.8	Single-phase 17.2 Three-phase 10.0	Three-phase 10.0
Internal regenerative ¹ resistor specifications		No internal regenerative resistor	50Ω/50W	25Ω/80W	
Control circuit power supply	Single-phase AC200V~240V,-10~+10,50/60HZ				
Main circuit power supply	Single-phase/Three phase AC200V~240V,-10~+10,50/60HZ				Three phase AC200V~240V,-10~+10,50/60HZ

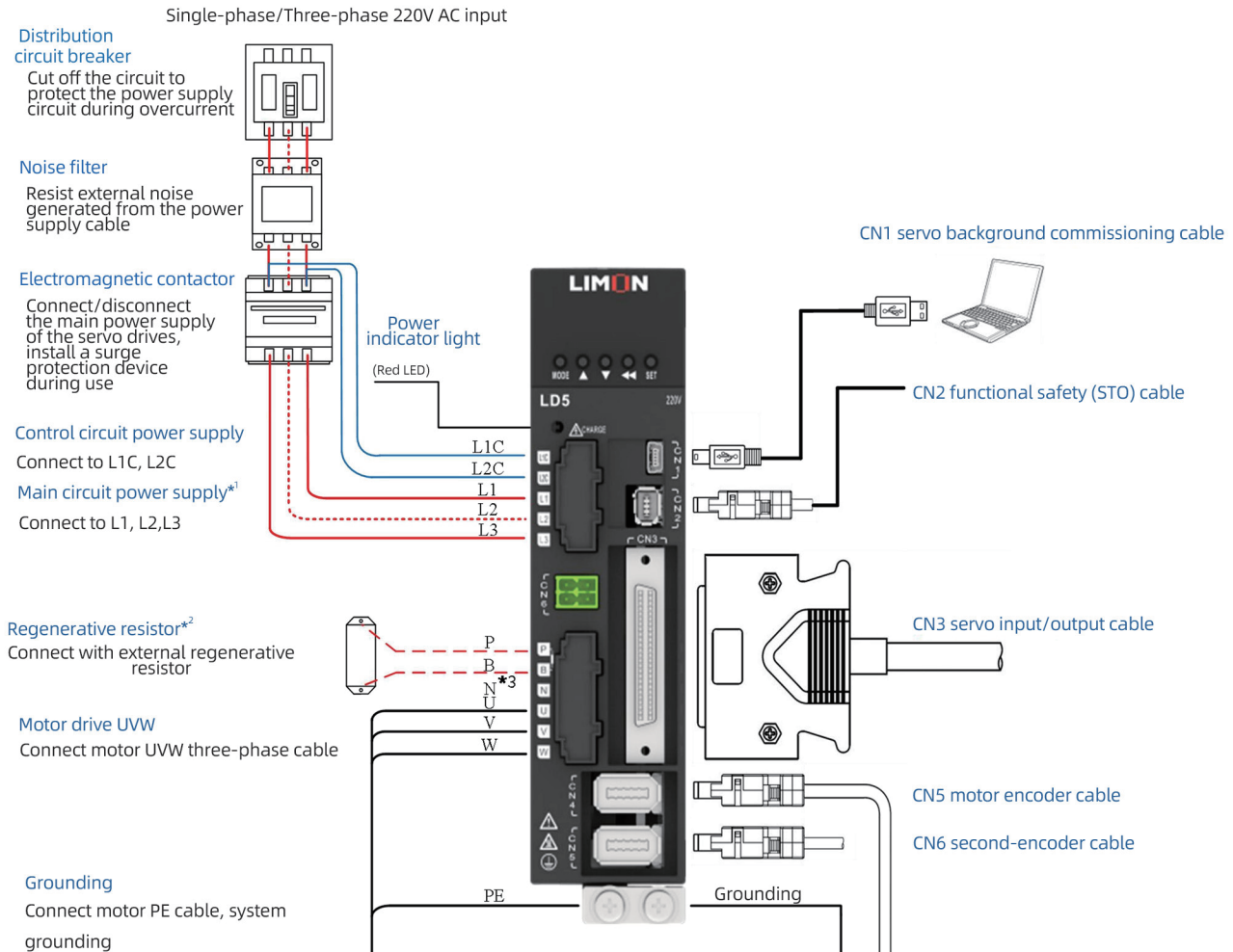
Note 1: All models support to connect with external regenerative resistor

3、General Specifications

Item			Description	
Basic specifications	Control mode		IGBT SVPWM Control, sine wave current drive mode 220V,380V: Single-phase full bridge rectification.	
	Operating Conditions	Operating/Storage Temperature ^{Note1}	0~+40°C/-20~+70°C	
		Operating/Storage Humidity	Below 90% RH (non-condensing)	
		Vibration/Impact Resistance	4.9m/s ² /19.6m/s ²	
		IP rating	IP20	
		Pollution Level	PD2 grade	
		Altitude	Up to 5000m. 1000m and below: No derating.Above 1000 m: derate 1% for every additional 100 m. Above 2000 m: contact LIMON.	
Position Control Mode	Performance	Feedforward Compensation	Supports speed feedforward (0~100.0%) setting to eliminate tracking deviation	
		Instruction Shaping	Position command low-pass filtering, averaging filtering.	
	Frequency Division Output	Output Form	Phase A, Phase B, Phase Z: Differential output.	
		Frequency Range	DDL TYPE	Motor operates at one pole pitch, capable of outputting any pulse within the range of 140 to P0105[Pole pitch pulse count (N-N)]
Speed/torque control mode	Performance	Current Loop Dynamic Characteristics	DDL TYPE	Step response: 125us (0-100%); Frequency response: -3dB amplitude attenuation bandwidth, 4000Hz (Command signal: ±15%); -90° phase shift bandwidth, 8000Hz (Command signal: ±15%).
		Speed Loop Dynamic Characteristics	DDL TYPE	Step response: 10ms (0~1000mm/s); Frequency response: -3dB amplitude attenuation bandwidth, 1500Hz (Command signal: ±50mm/s); -90° phase shift bandwidth, 800Hz (Command signal: ±50mm/s).
NOTE				
Note 1: Please install or store the servo drives within this temperature range.				

Three、Wiring and Port Definition of Servo drives

1、Wiring for Pulse-Type



Note 1: This diagram is for single-phase/three-phase 220V SIZE-A models.

For three-phase 380V drives, the main power terminal marking are R, S, T.

Note 2: SIZE-A has no built-in regenerative resistor.

When the bus capacitor is insufficient, connect an external regenerative resistor between terminals P and B.

For SIZE-B/C/D, the regenerative resistor connection terminal marking are P, RB, B.

Internal regenerative resistor connection method:

P and RB are externally short-circuited by default.

External regenerative resistor connection method:

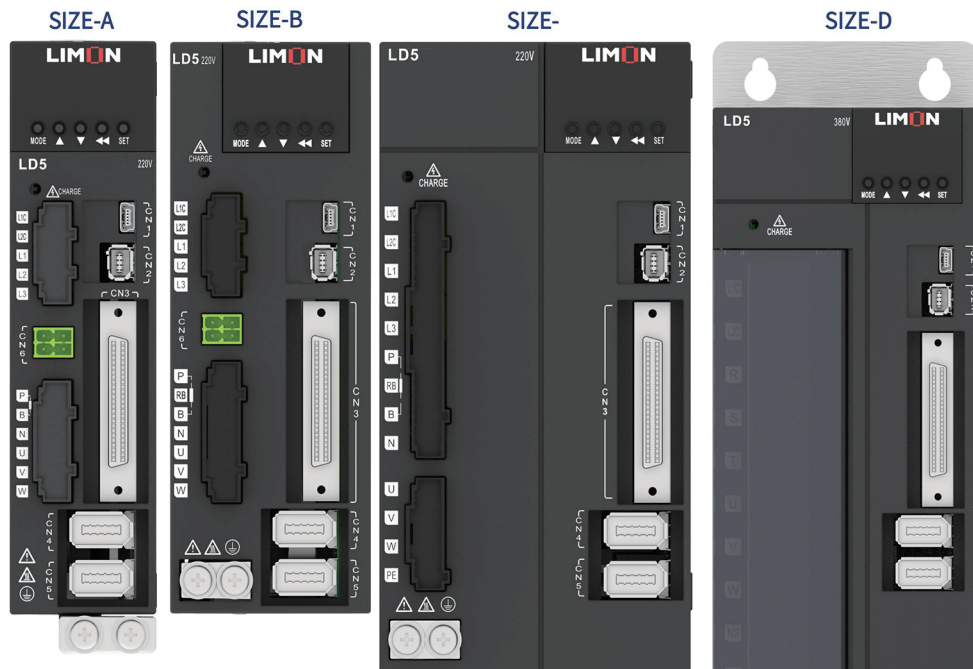
Remove the short circuit between P and RB, and connect the resistor between P and B.

Note 3: For SIZE-A/B/C servo bus terminals, connect to P, N. For SIZE-D servo bus terminals, connect to P, N2. N1 and N2 are short-circuited by default. When using an external reactance resistor, remove the shorting piece and connect the resistor between N1 and N2.

DDL motor

DDR motor

2、Port Definitions for Pulse-Type



Power terminal names	Terminal marking			
	SIZE-A	SIZE-B	SIZE-C	SIZE-D
Control circuit power supply input terminal	L1C, L2C			
Main circuit power supply input terminal	L1, L2, L3			R, S, T
Bus servo terminal	P, N			P, N2
External regenerative resistor connection terminal	P, B	P, RB, B		
Servo motor connection terminal	U, V, W		U, V, W, PE	U, V, W
External reactor connection terminal	/			N2, N1

CN1	pin number	signal name
MINI USB	1	VBUS
	2	D-
	3	D+
	4	-
	5	GND

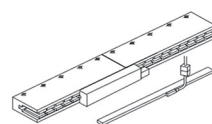
CN2	pin number	signal name
STO connector TE: 2013595-1	1	Internal power supply negative
	2	Internal power supply positive
	3	STO1-
	4	STO1+
	5	STO2-
	6	STO2+
	7	STO_OUT-
	8	STO_OUT+

CN3	pin number	signal name	pin number	signal name	pin number	signal name	pin number	signal name
IO connector SCSI-50P	1	DI1	12	DO1+	28	PBO-	39	GND
	2	DI2	13	DO2-	29	PBO+	40	HPULSE+
	3	DI3	14	DO2+	30	PAO-	41	HPULSE-
	4	DI_COM	15	DO3-	31	PAO+	42	HSIGN+
	5	DI4	16	DO3+	32	OCZ	43	HSIGN-
	6	DI5	17	DO4-	33	GND	44	GND
	7	DI6	18	DO4+	34	PULSE+	45	AI1
	8	DI7	19	DO5-	35	PULSE-	46	AI2
	9	HDI1	20	DO5+	36	SIGN+	47	AO2
	10	HDI2	26	PZO-	37	SIGN-	48	AO1
	11	DO1-	27	PZO+	38	PULLHI	49	GND

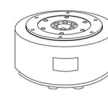
Pulse type DDL/DDR signal ports CN1, CN2, CN3 pin definitions are consistent.

CN4	pin number	signal name	
		ABZ	BISS-C
Motor encoder connector 1394-10P	1	5V	5V
	2	GND	GND
	3	A+	-
	4	A-	-
	5	B+	-
	6	B-	-
	7	Z+	CLK+
	8	Z-	CLK-
	9	-	DATA+
	10	-	DATA-

CN5	pin number	signal name
Second encoder connector 1394-10P	1	5V
	2	GND
	3	RS485A+
	4	RS485A-
	5	RS485B+
	6	RS485B-
	7	HALL_U
	8	HALL_V
	9	HALL_W
	10	MTR_TEMP

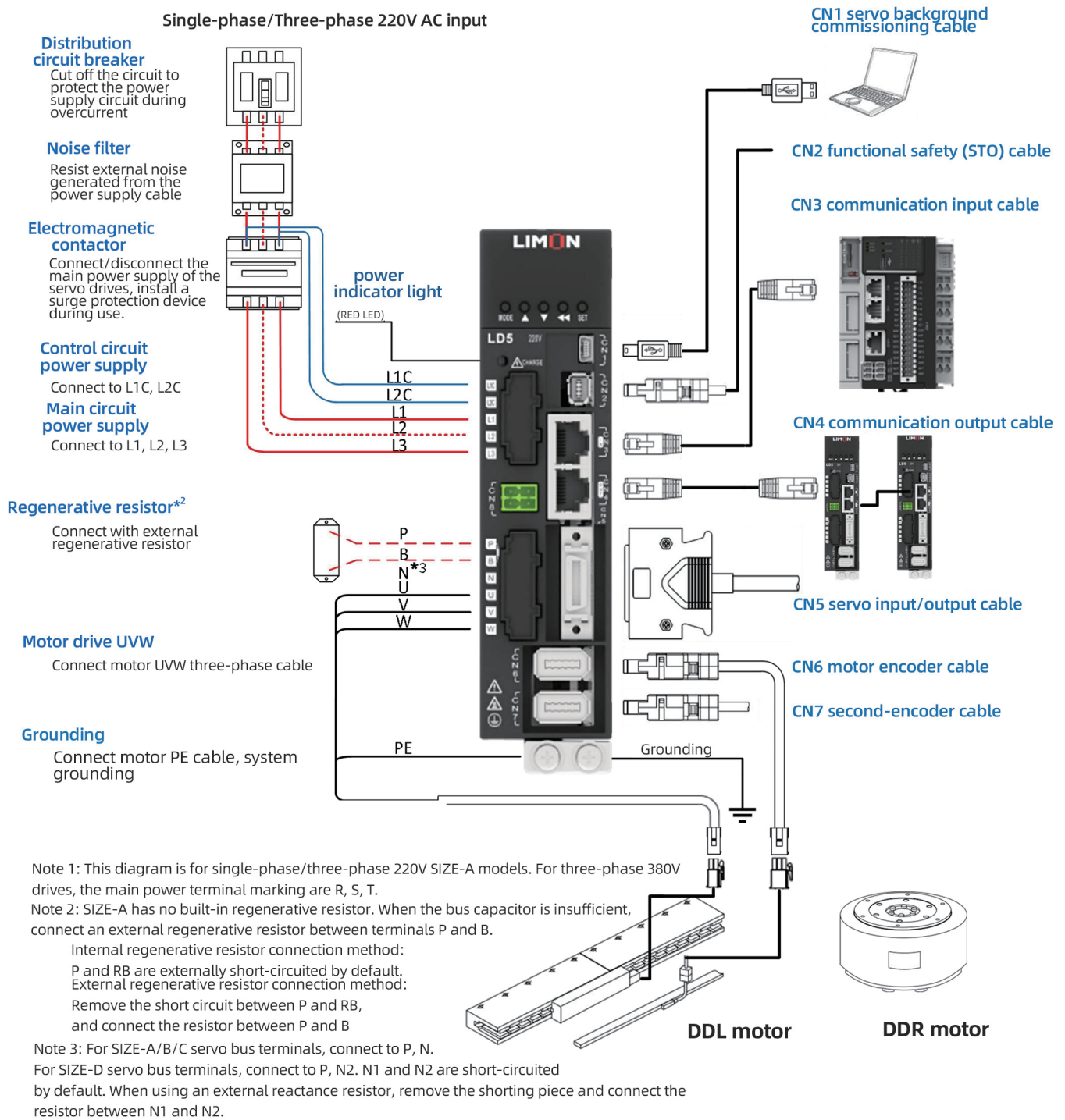


DDL motor



DDR motor

3、Wiring for EtherCAT-Type



4、Port Definitions for EtherCAT-Type

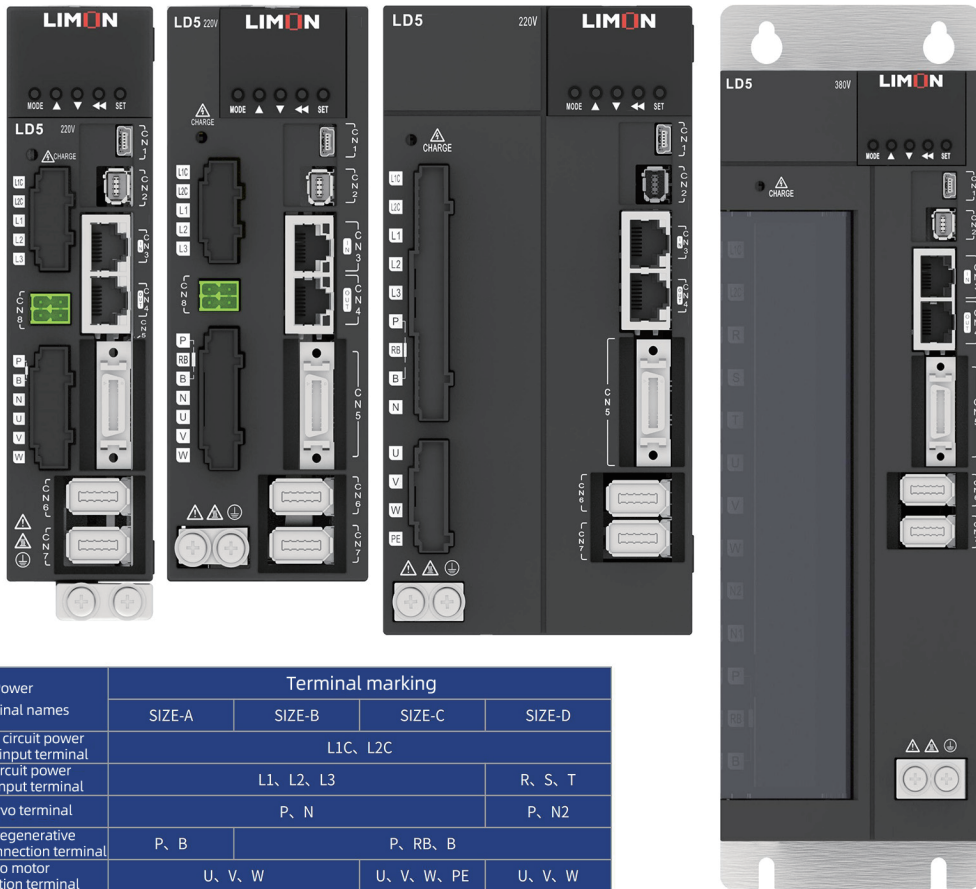


SIZE-A

SIZE-B

SIZE-C

SIZE-D



Power terminal names	Terminal marking			
	SIZE-A	SIZE-B	SIZE-C	SIZE-D
Control circuit power supply input terminal	L1C, L2C			
Main circuit power supply input terminal	L1, L2, L3			R, S, T
Bus servo terminal	P, N			P, N2
External regenerative resistor connection terminal	P, B	P, RB, B		
Servo motor connection terminal	U, V, W		U, V, W, PE	U, V, W
External reactor connection terminal	/			N2, N1

CN1	pin number	signal name
MINI USB	1	VBUS
	2	D-
	3	D+
	4	-
	5	GND

CN2	pin number	signal name
Analog connector TE: 2013595-1	1	Internal power supply negative
	2	Internal power supply positive
	3	STO1-
	4	STO1+
	5	STO2-
	6	STO2+
	7	STO_OUT-
	8	STO_OUT+

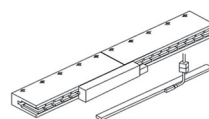
CN3(IN) CN4(OUT)	pin number	signal name
EtherCAT Communication Terminal	1	TX+
	2	TX-
	3	RX+
	4	-
	5	-
	6	RX-
	7	-
	8	-

CN5	pin number	signal name	pin number	signal name
IO Connector SCSI-20P	1	DO1+	11	DI6
	2	DO1-	12	HDI1
	3	DO3+	13	HDI2
	4	DO3-	14	DO2+
	5	DI1	15	DO2-
	6	DI_COM	16	GND
	7	DI2	17	PAO+
	8	DI3	18	PAO-
	9	DI4	19	PBO+
	10	DI5	20	PBO-

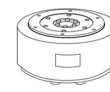
EtherCAT type DDL/DDR signal ports CN1, CN2, CN3, CN4, CN5 pin definitions are consistent.

CN6	pin number	signal name	
		ABZ	BISS-C
Motor encoder connector 1394-10P	1	5V	5V
	2	GND	GND
	3	A+	-
	4	A-	-
	5	B+	-
	6	B-	-
	7	Z+	CLK+
	8	Z-	CLK-
	9	-	DATA+
	10	-	DATA-

CN7	pin number	signal name
Second encoder connector 1394-10P	1	5V
	2	GND
	3	RS485A+
	4	RS485A-
	5	RS485B+
	6	RS485B-
	7	HALL_U
	8	HALL_V
	9	HALL_W
	10	MTR_TEMP



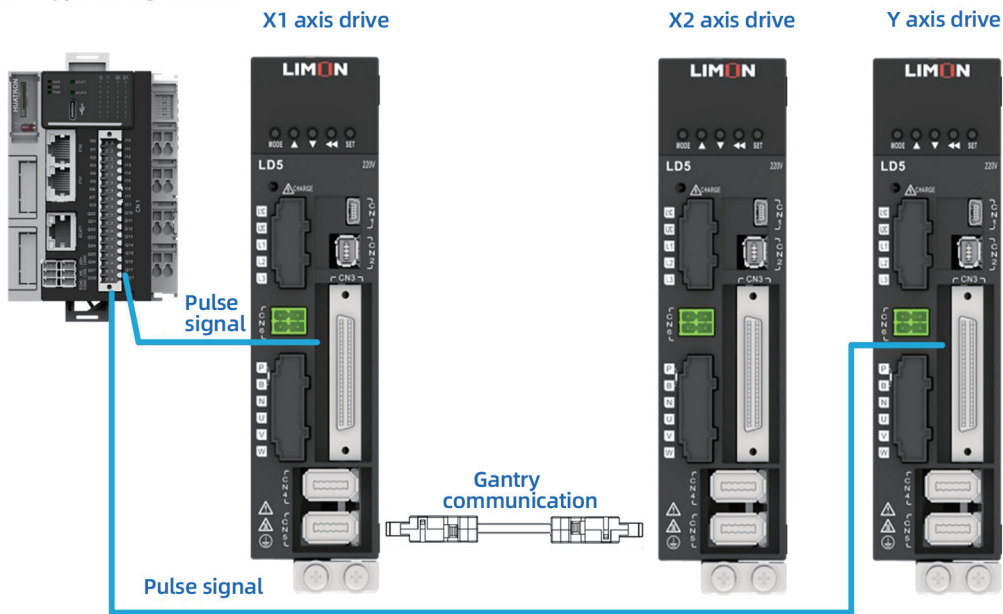
DDL motor



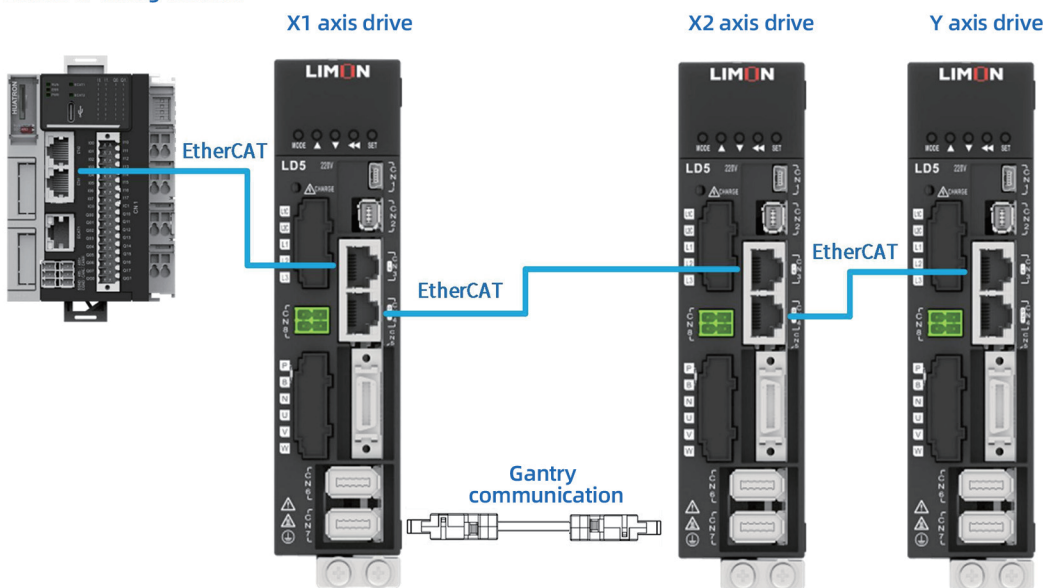
DDR motor

5、Wiring diagram for linear dual-drive gantry servo drives

Pulse-type wiring method



EtherCAT wiring method



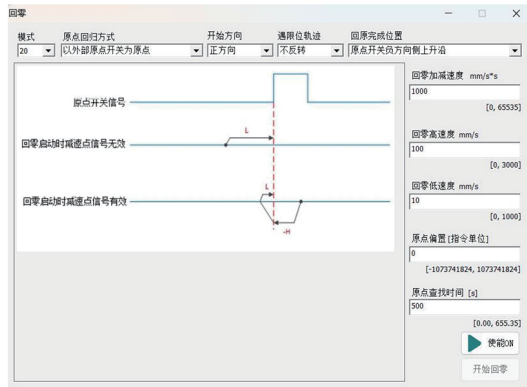
Gantry communication cable

	CN7 pin number	Signal name
X1 axis drive (X2 axis same)	2	GND
	3	RS485A+
	4	RS485A-
	5	RS485B+
	6	RS485B-

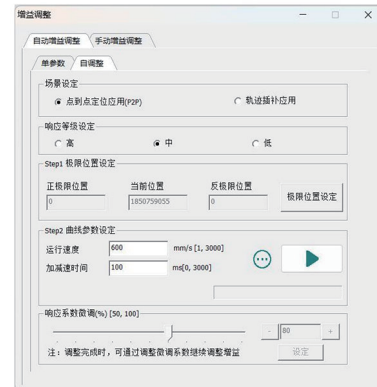
Wiring method:
Connect the corresponding pins of X1 axis and X2 axis drives together.

Four、Commissioning Software

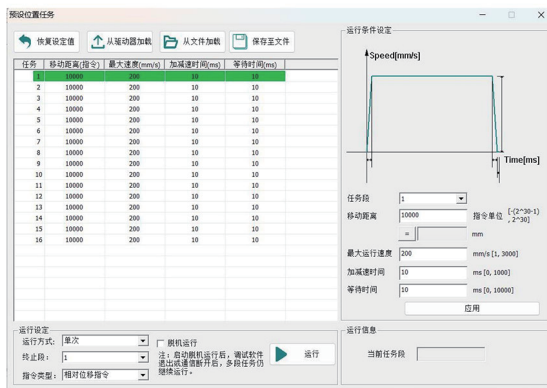
(1) Visualization



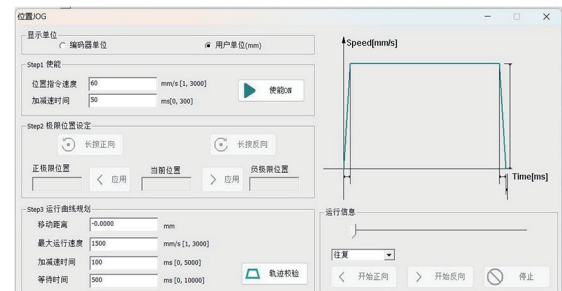
Configurable homing trajectory



Tuning scene matching



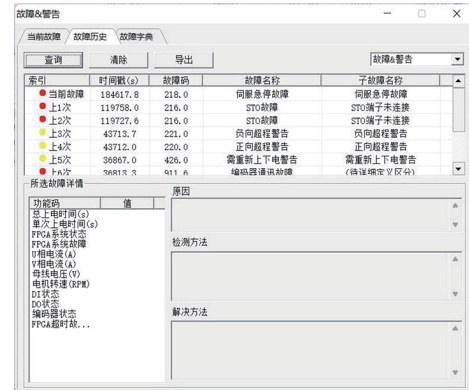
Preset trajectory planning



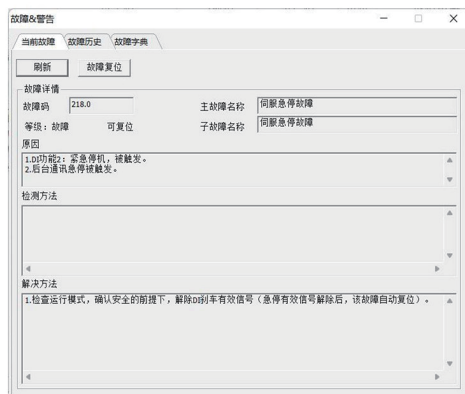
Position JOG visualization

(2) Fault diagnosis

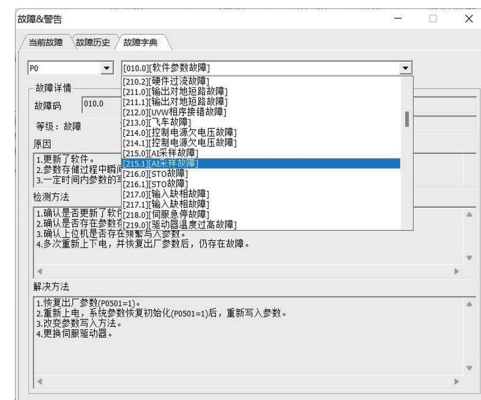
Real-time alert of fault information, and provide troubleshooting methods. Historical fault tracing, supports viewing parameter information from up to 10 past fault occurrences, to help locate faults. Fault dictionary covering all LD5 series fault information, enabling quick fault queries.



Historical fault tracing



Real-time fault diagnosis



Fault dictionary query

(3) Multi-axis recipes

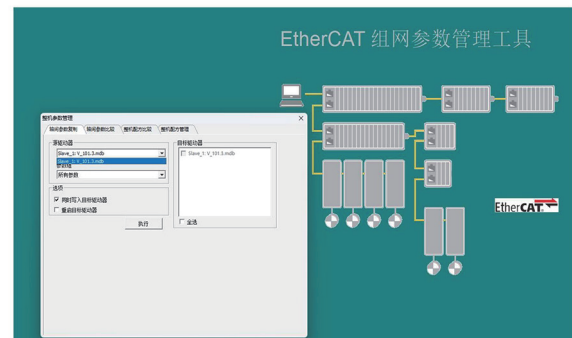
In the context of multi-axis EtherCAT servo networking:

Support multi-axis parameter modification

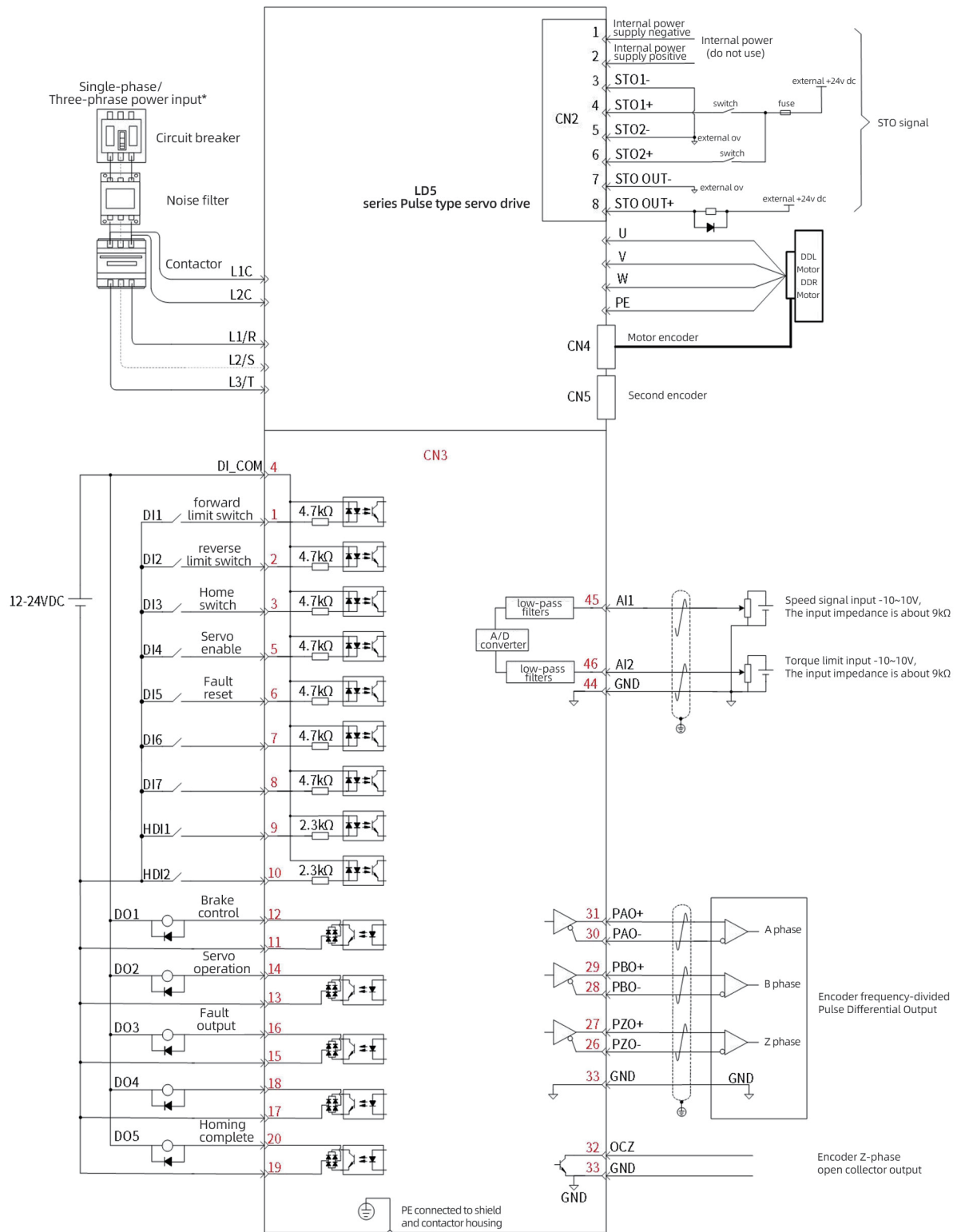
Multi-axis recipe saving.

Axis parameter comparison

Axis parameter copying.

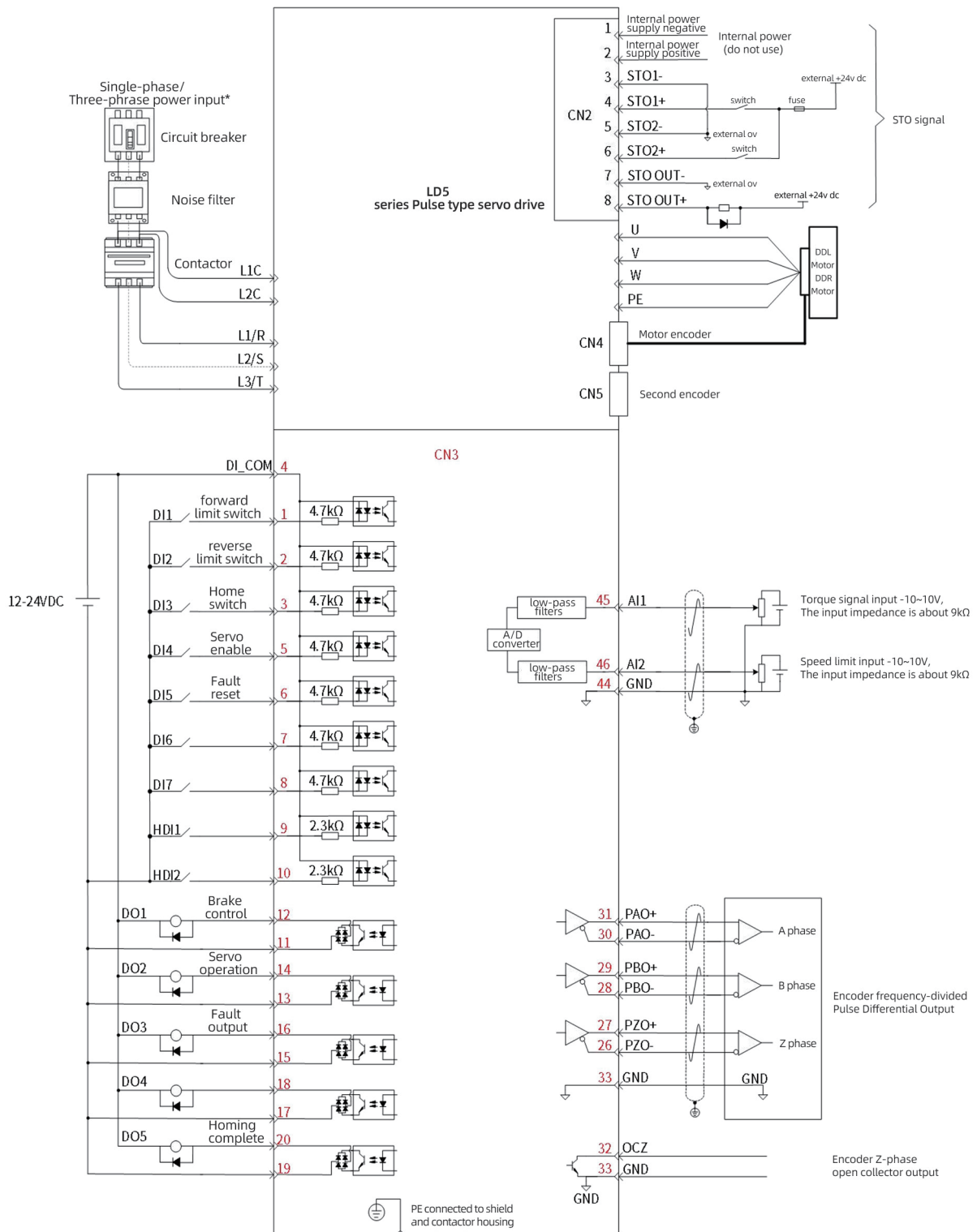


2、Wiring Diagram for Speed Control Mode



*Control circuit power terminal marking are L1C, L2C;
Main circuit power terminals: single/three-phase 220V terminal marking are L1, L2, L3;
Three-phase 380V terminal marking are R, S, T

3、Wiring Diagram for Torque Control Mode

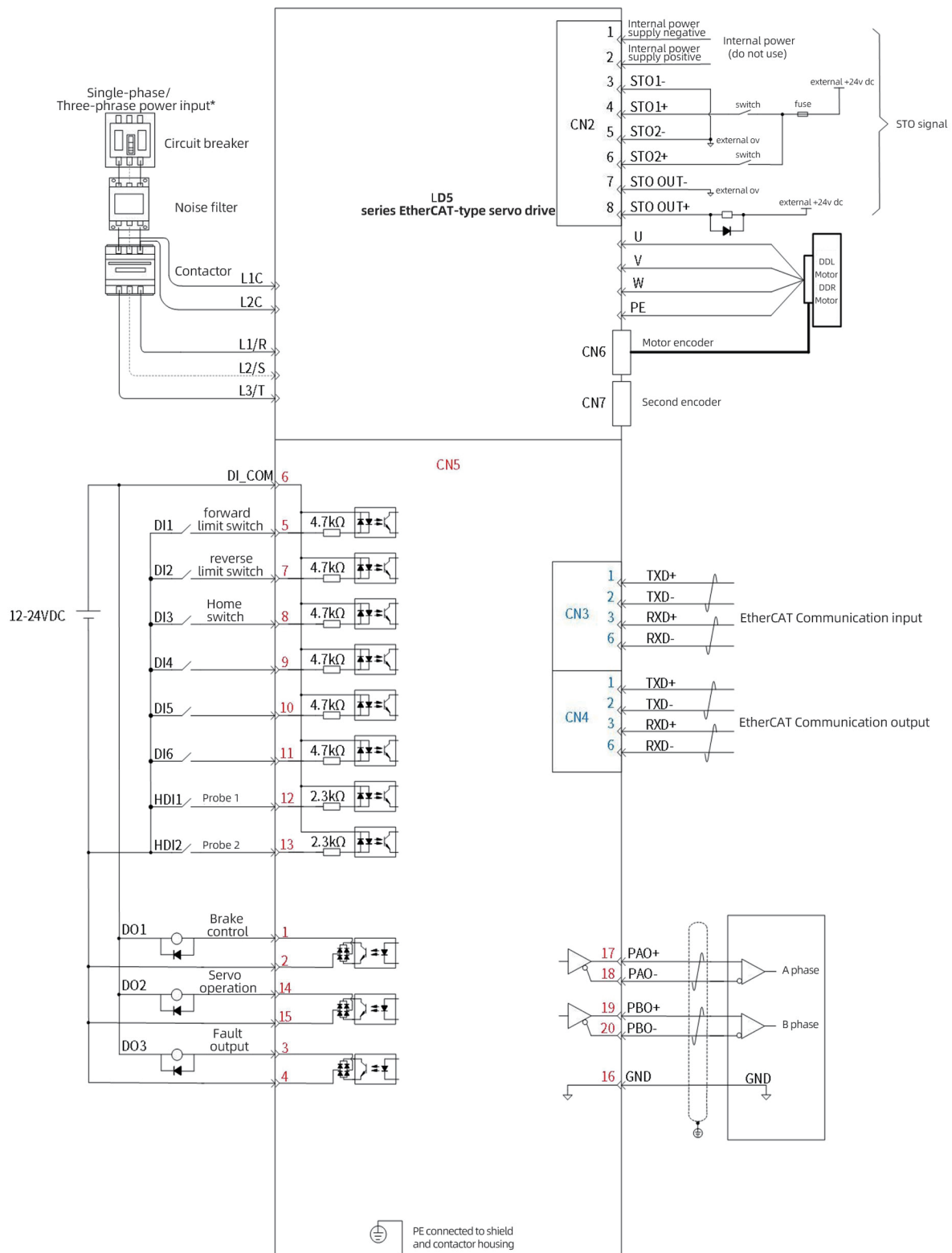


*Control circuit power terminal marking are L1C, L2C;

Main circuit power terminals: single/three-phase 220V terminal marking are L1, L2, L3;

Three-phase 380V terminal marking are R, S, T

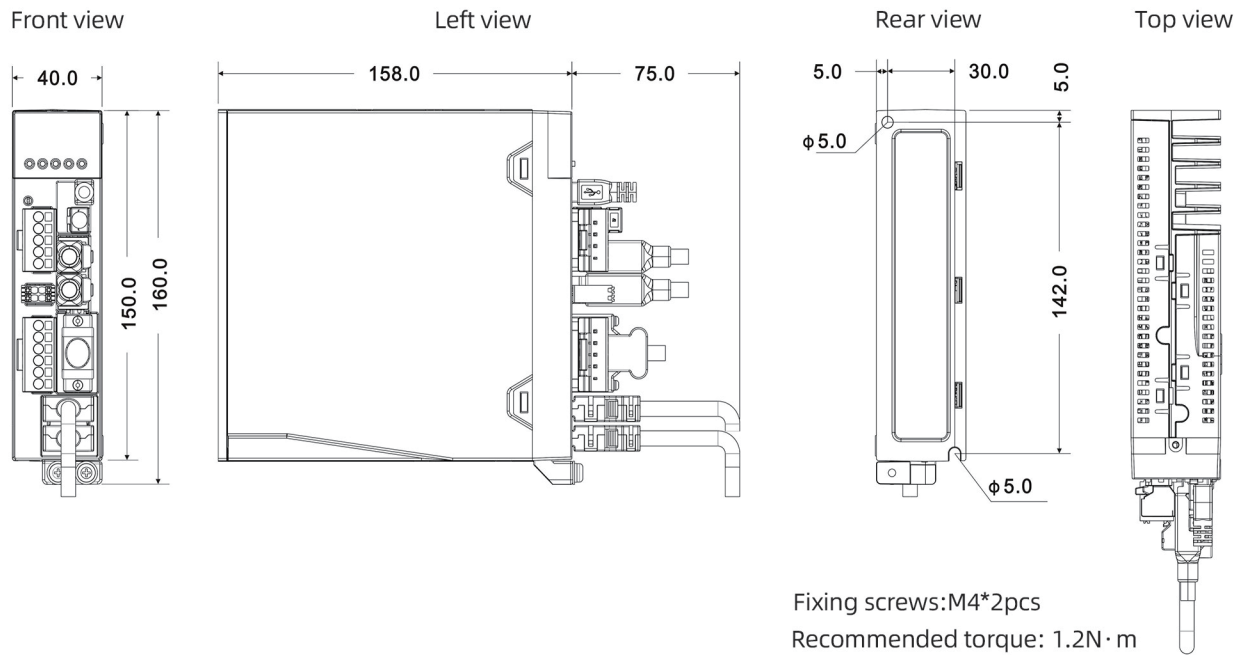
4、Wiring Diagram for EtherCAT type Control



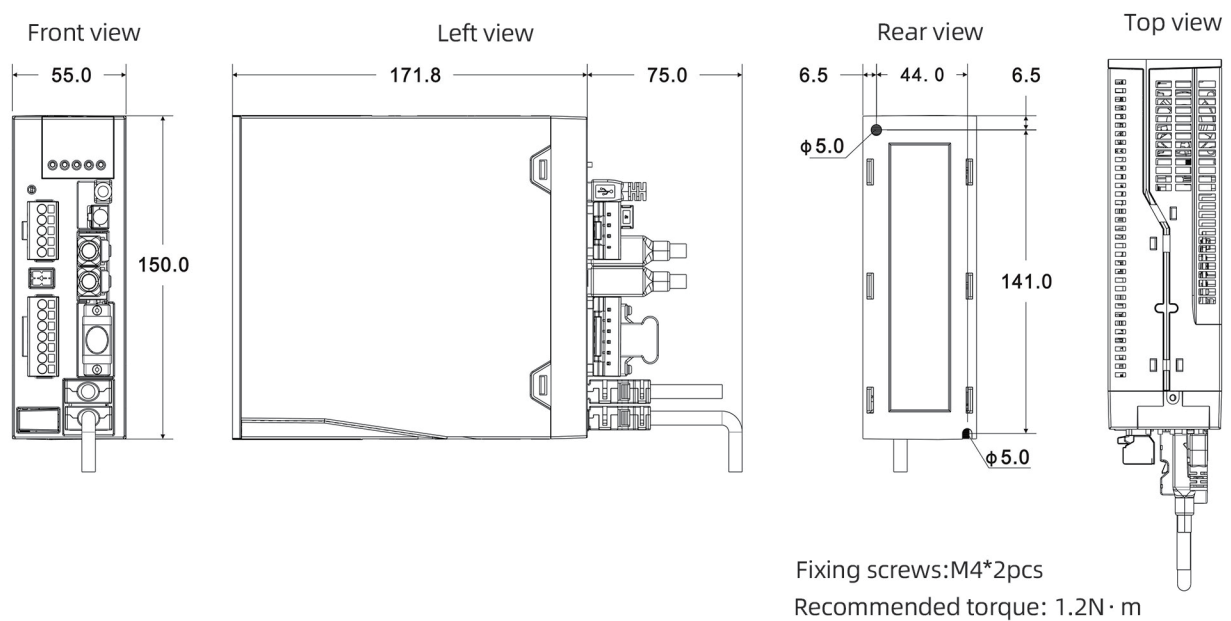
*Control circuit power terminal marking are L1C, L2C;
Main circuit power terminals: single/three-phase 220V terminal marking are L1, L2, L3;
Three-phase 380V terminal marking are R, S, T

Six、Installation Dimensions of Servo drives

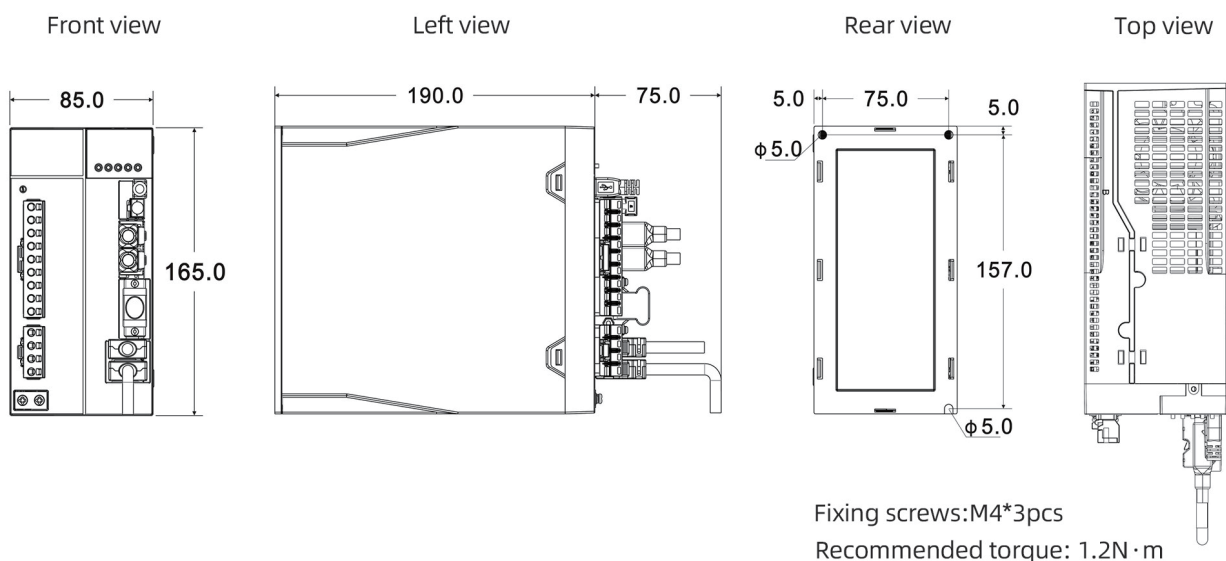
● SIZE-A



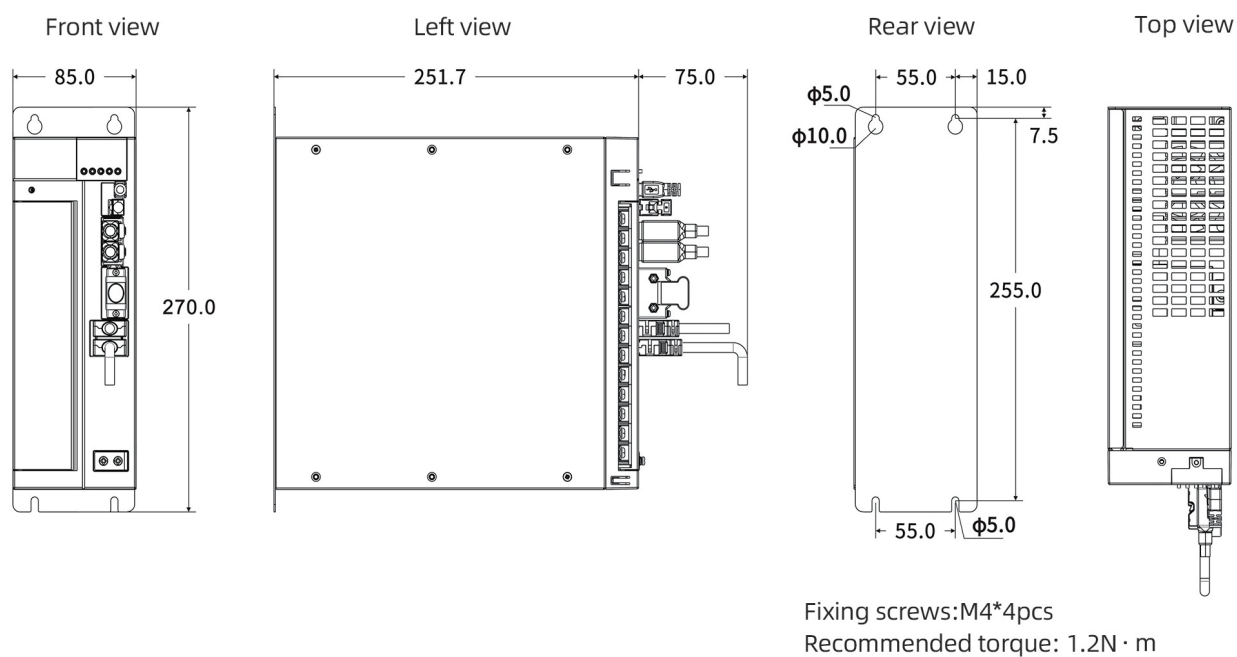
● SIZE-B



● SIZE-C



● SIZE-D



Seven、Wiring Diagrams for Servo Drives Control Mode

1、Pulse-type model list

Standard model	Gantry model	Rated Current	Maximum Current	Supply Voltage	SIZE
LD5-003S2LP	LD5-003S2LPSPG	3.0A	9.0A	Single-phase 220V	A
LD5-006S2LP	LD5-006S2LPSPG	6.0A	18.0A	Single-phase 220V	B
LD5-010S2LP	LD5-010S2LPSPG	10.0A	28.0A	Single-phase 220V	C
LD5-013T2LP	LD5-013T2LPSPG	13.0A	28.0A	Three-phase 220v	C

2、EtherCAT-type model list

Standard model	Gantry model	Rated Current	Maximum Current	Supply Voltage	SIZE
LD5-003S2LE	LD5-003S2LESG	3.0A	9.0A	Single-phase 220V	A
LD5-006S2LE	LD5-006S2LESG	6.0A	18.0A	Single-phase 220V	B
LD5-010S2LE	LD5-010S2LESG	10.0A	28.0A	Single-phase 220V	C
LD5-013T2LE	LD5-013T2LESG	13.0A	28.0A	Three-phase 220v	C

LIMON in P.R.China

ADD: Building D8&D9, Zhizao Port, Lane 215, Qingyi Road, High-tech Zone, Ningbo City, Zhejiang Province

TEL : 0574-8751 5351



English Website

LIMON AUTO TECH CO., LTD.

CAT F.401