

Low-Voltage Built-in Brushless Driver

EA-DRVC10-400-L User Manual



Update Summary

The following table summarizes the changes and updates made to this document since the previous version:

Version	Date	Revision Content	Revised by
V1.01	2022.05.25	Created	Shen Yangyang
V1.02	2023.04.08	Modified the output-current description in the model description	Shen Yangyang
V1.03	2024.03.13	Document format modified	Yu Chuang

Before Use

Before operating this product, read this manual carefully and observe the relevant safety information to ensure personal and product safety.

DANGER 	□ Before wiring or installing the driver, make sure the power supply is turned off. □ The circuit components on the internal circuit board of the driver are easily damaged by static electricity. Before proper anti-static measures are taken, do not touch the circuit board by hand. □ Do not modify any internal parts or circuits of the driver by yourself. □ Do not use this product in places exposed to moisture, corrosive gas, flammable gas, or similar substances, otherwise electric shock or fire may occur. □ Install the driver and accessories away from fire sources, heating elements, and flammable materials. □ Before the mechanical equipment starts operation, adjust the settings according to its user parameters. If the settings are not adjusted to the corresponding correct values, the equipment may lose control during operation or a fault may occur. □ Before the machine starts operation, confirm that the emergency stop device can be activated at any time. □ When powering on, make sure the motor shaft remains stationary and will not rotate due to mechanical inertia or other factors. rotate. □ Do not change wiring while the power is on; otherwise electric shock or personal injury may occur.
WARNING 	□ Do not input DC power into the driver output I/O terminals. □ The rated voltage of the driver power system must match the motor and must not exceed DC24V-48V. □ First test whether the driver and motor operate normally under no-load conditions, and then connect the load to avoid unnecessary danger. □ Do not switch the power supply on and off frequently. If continuous switching is required, keep it to no more than once per minute. □ Do not use this product for vertical lifting motion or rapid deceleration motion control systems. □ Only qualified professionals may install, wire, and repair it.

Note:

1. To explain product details thoroughly, the casing may be removed or safety covers disassembled for illustration.

During operation, install the casing and wire the product correctly as specified, and operate according to this manual to ensure safety.

2. The icons in this manual are for illustrative examples and may differ slightly from the actual product, but this will not affect customer rights.

3. When product documents are updated or revised, get the latest version from the ZD Motor official website (www.zd-motor.com) or WeChat official account (see the QR code below). No separate notice will be given.

4. For product use questions, consult driver technical support (see the QR code below).



ZD Official Account



Driver Tech Support

Contents

I. Product Inspection and Description.....	1
1.1 Product Inspection.....	1
1.2 Nameplate/Model Description.....	1
1.3 Specifications.....	2
II. Product Dimensions, Installation, and Environmental Conditions	3
2 2.1 Product Dimensions and Installation Instructions	3
2 2.2 Operating, Storage, and Transport Environmental Characteristics	5
III. System Interfaces and Wiring	6
3.1 Names of Driver Parts	6
3.2 Ports	7
3.3 System Wiring Diagram	9
IV. Operating Instructions.....	10
4.1 Terminal Control.....	12
4.1.1 Port Introduction.....	12
4.1.2 Input Terminal.....	12
4.1.3 Analog Speed Reference	13
4.1.4 Output Terminal	14
4.2 Keypad Control.....	15
4.2.1 Keypad Introduction.....	15
4.2.2 Keypad Operation.....	16
4.2.3 Function Codes.....	16
V. Status Display and Fault Maintenance	23
5 5.1 Fault Indication by Indicator Lamps	23
VI. Application Examples	26
6.1 Input/Output Wiring Using an Intermediate Relay	26
6 6.1.1 Input-Side Wiring	26
6 6.1.2 Output-Side Wiring	26
6.2 Electronic Brake	27
VII. Basic Inspection and Maintenance	28
7 7.1 Basic Inspection	28
7 7.2 Maintenance and After-Sales Service	28

I. Product Inspection and Description

1 1.1 Product Inspection

To prevent omissions during purchase and transportation, carefully check the items listed below:

- Whether it is the product you purchased: check the product model on the driver package nameplate; refer to the model description in the next section.
- Appearance damage: visually check whether there is any external damage or scratch.
- Loose screws: check whether any screws are not tightened or have fallen off.
- Missing accessories: check against the complete component list below.

If any of the above conditions occur, promptly contact the company or its agent for a proper solution.

A complete operable driver package should include:

- (1) EA-DRVC10-400-L driver - 1 unit;
- (2) 5-Pin 2.5 mm HALL terminal - 1 pc;
- (3) 7-Pin 2.5 mm I/O terminal - 1 pc;

1 1.2 Nameplate/ Model Description

1 1.3 Specifications

Model		EA-DRVC10-400-L
Power Input	Rated Input Volt.	DC24~48V($\pm 10\%$)
Output Parameters	Out Curr.	15A (adjustable via keypad)
	Out Power	DC24V, 200W
		DC48V, 400W
Control Performance	Speed Control Accuracy	Closed-loop speed control (control accuracy $\pm 0.5\%$)
	Overload Capacity	1.5x overload
	Default Maximum Speed	3000rpm
	Default Matching Pole Pairs	5 pole pairs (other pole pairs can be set through the keypad)
	Speed Setting	Default AI1 Knob The setting channel can be switched using an external keypad.
General Functions	Digital Input	3 channels; supports NPN DI signal connection; ports can be customized as needed
	Digital Output	1 channel, open-collector output (transistor), switching capacity: 50mA/30V (max)
	Built-in Speed Knob	Supports analog potentiometer speed regulation (default AI1 knob)
	Analog Input	1 1 channel, external analog voltage speed regulation (0-5/10V) / PWM speed regulation (3KHz-10KHz) Note: this function must be enabled through keypad settings before use
Bus Control	Modbus/RS485	Not supported
Accessories	Host Computer	Not supported
	Operating Panel	Optional C20 series handheld keypad can be used to set parameters and read data
Protection Mechanism	Fault Protection Functions	Undervoltage, overvoltage, overcurrent, overload, stall, short circuit, phase loss, overtemperature, etc.
	Undervoltage Alarm Protection	Driver undervoltage point: 15V
	Overvoltage Alarm Protection	Driver overvoltage point: 60V
Application Environment	Operating Temperature	When operating at rated current, the ambient temperature must be between -10°C and 40°C . When the ambient temperature exceeds 40°C , reduce the rated current by 2.5% for each 1°C increase. The maximum ambient temperature is 50°C .
	Storage Temperature	$30\sim 65^{\circ}\text{C}$
	Humidity	Below 90% RH, no condensation
	Cooling Method	Natural cooling (auxiliary heat dissipation is required at full-power operation)
	Protection Rating	IP20
	Installation Type	Built-in Type

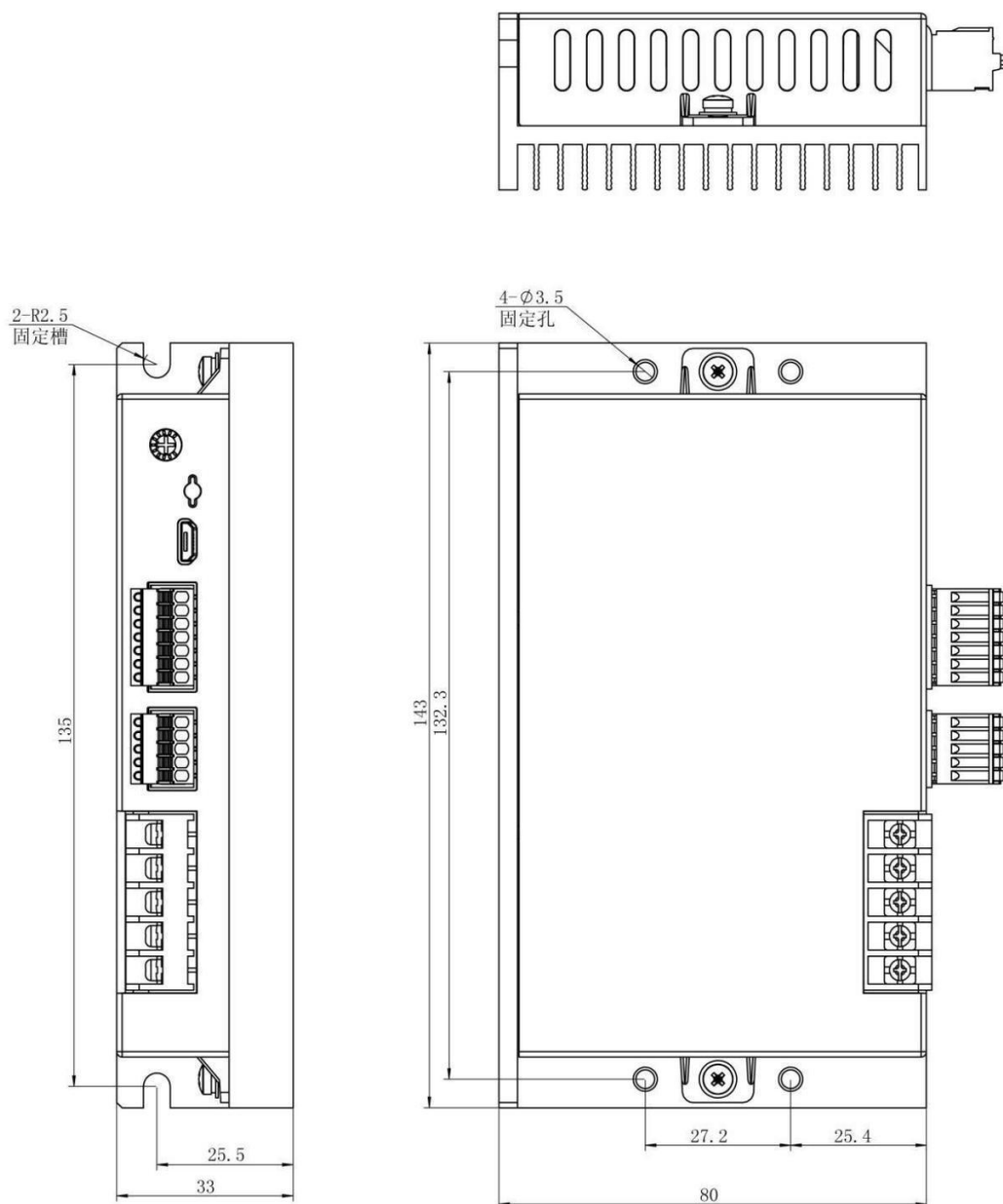
II. Product Dimensions, Installation, and Environmental Conditions

2 2.1 Product Dimensions and Installation

Instructions

Product Dimensions

Unit: mm

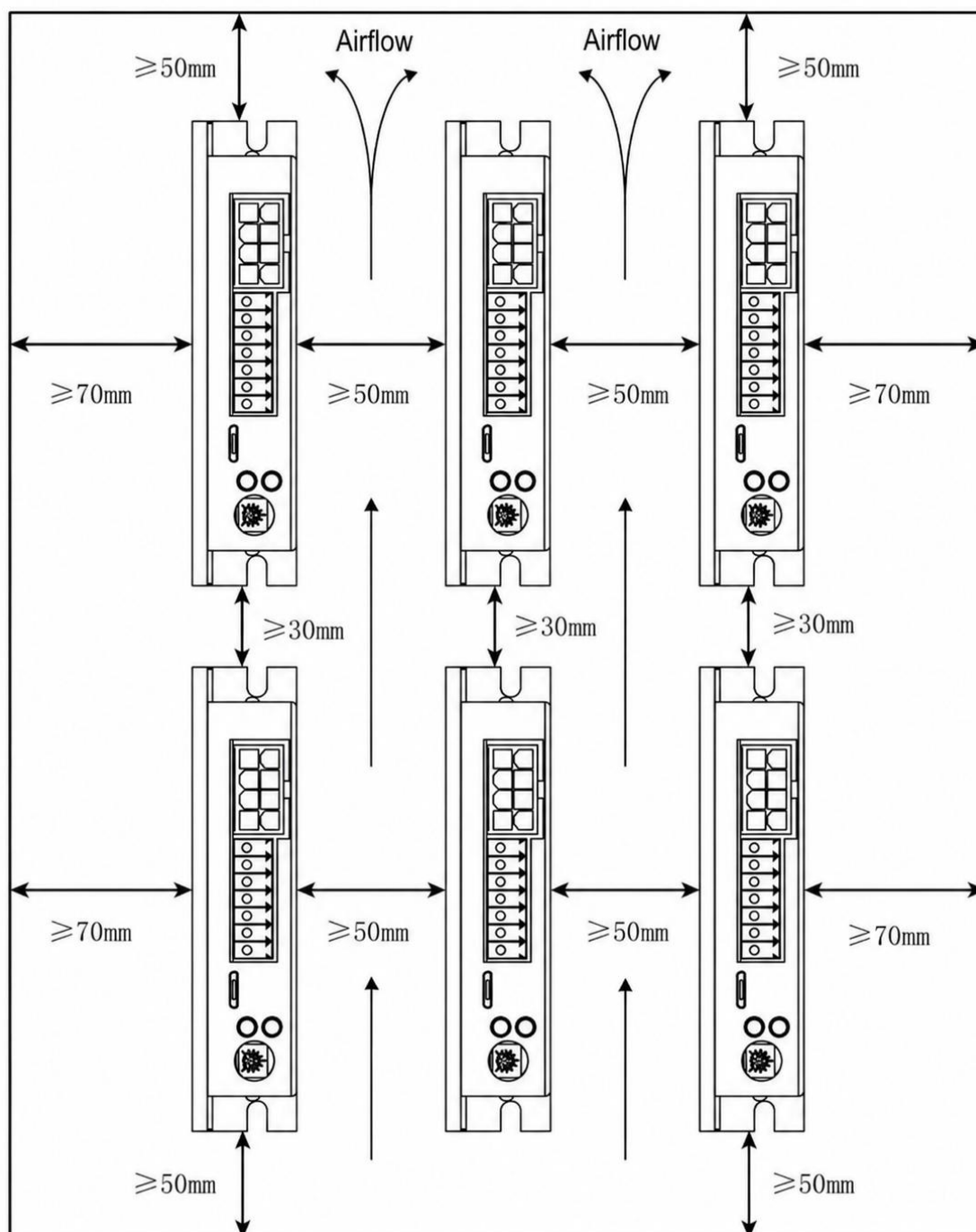


Installation Instructions

Installation Method	Wall-mounted installation
Fastener Selection	Side fixing: M4 combination screws
	Bottom fixing: M3 combination screws
Tightening torque:	Tightening torque: 1.2-1.5 N.m;
Side-by-Side Installation	70 mm or more; increase the spacing appropriately in high-temperature environments
Spacing	Stable, well ventilated, and away from flammable materials (see Section 2.2)

The installation diagram and spacing diagram are shown below:

* The driver spacing in the figure is not to scale with the text annotation; refer to the text annotation.



2 2.2 Operating, Storage, and Transport Environmental

Characteristics

The driver must never be exposed to harsh environments such as dust, sunlight, corrosive or flammable gases, oil, humidity, water drops, vibration, or electromagnetic noise interference.				
The salt content in the air must be kept below 0.01 mg/cm2 per year.				
Protection Rating		IP20: protects against solid foreign objects larger than 12 mm in diameter; no moisture protection		
Environmental Characteristics	Ambient Temperature	Operation	Standalone Installation	- 10~40°C -20 to -10 deg C or 40 to 50 deg C (derating required)
			Side-by-side Installation	- 10~30°C -20 to -10 deg C or 30 to 40 deg C (derating required)
		Storage	-33~55°C	
		Transportation	-20~50°C	
		Non-condensing, non-freezing		
		Rated Humidity	Operation	Max.85%
	Storage / transportation Max. 90%			
	Condensation prohibited			
	Atmospheric Pressure	Operation	86~106kPa	
		Storage / transportation: 70-106 kPa		
	Altitude		Operable below an altitude of 1000 m (derating is required above 1000 m; see Section 2.2.2)	
Package drop: storage /transportation		Do not drop from a height; risk of damage		
Vibration	Operation/storage/transportation: continuous vibration is prohibited			
Shock	Operation/storage/transportation: excessive impact is prohibited			

Special Environmental

Conditions

Operating Conditions	Ambient Temperature Limit
Abnormal Ambient Temperature Operation	When operating at rated current, the ambient temperature must be between -10°C and 40°C. When it exceeds 40°C, for each increase of 1 deg C increase, reduce the rated current by 2.5%. Maximum ambient temperature is 50 deg C. For long-term operation in high-temperature environments, place the product in a well-ventilated location to ensure reliability.
High-Altitude Operation	When the driver is used at an altitude of 0-1000 m, apply the general operating limits. When used at an altitude of 1000-2000 m, thin air reduces insulation strength and heat dissipation performance; for every 100 m increase in altitude, reduce rated current by 1% or lower the operating ambient temperature by 0.5 deg C. If use above 2000 m altitude is required, please contact the manufacturer.

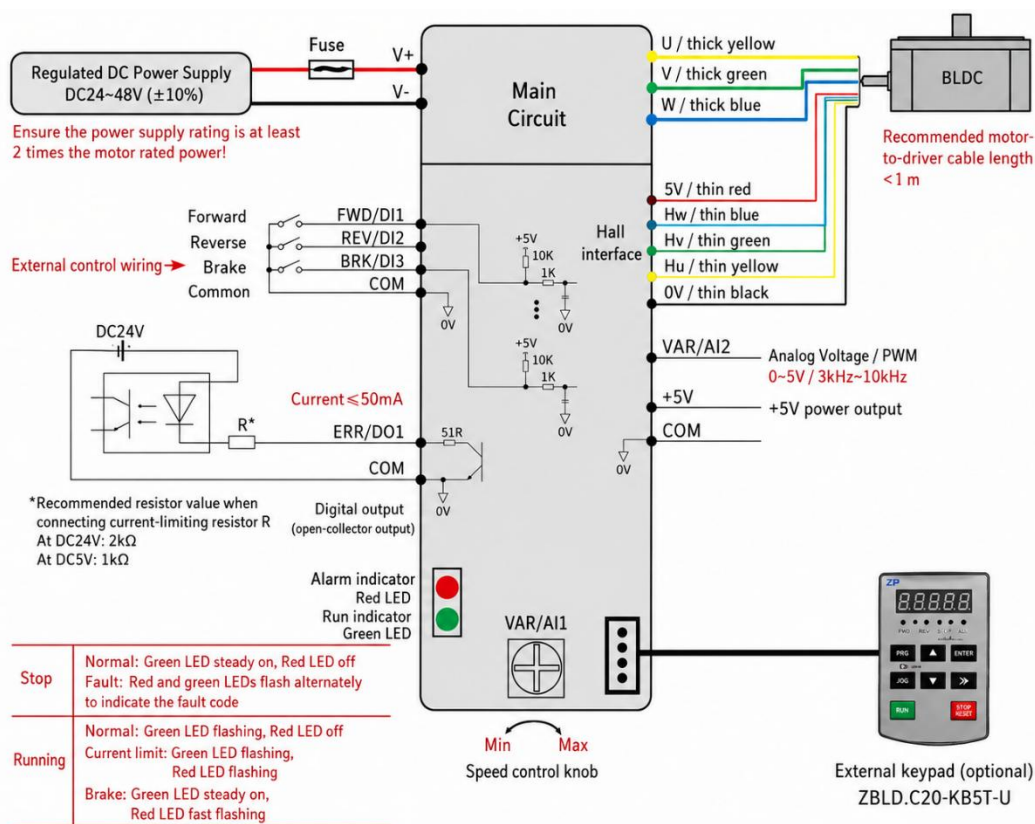
Storage Environmental

Conditions

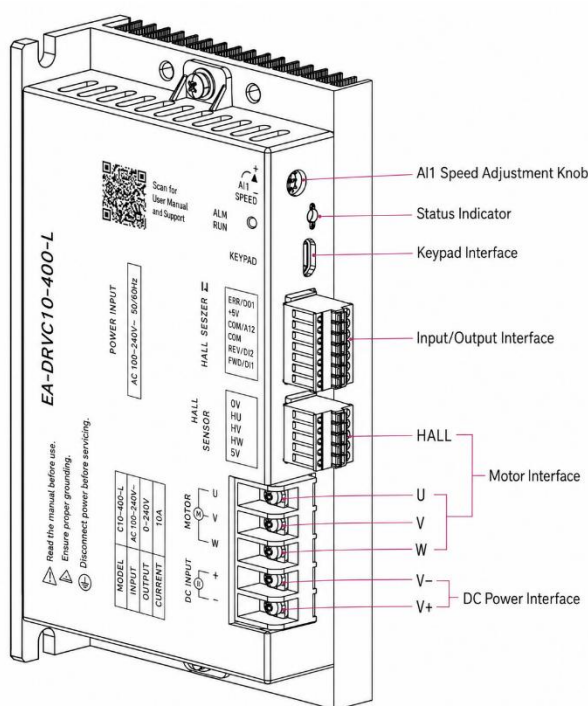
Before installation, this product must be kept in its packaging. If it will not be used temporarily, to keep it within the company warranty scope and facilitate future maintenance, observe the following storage requirements:

- 1 - The ambient temperature and relative humidity of the storage location must be within the required range;
- 1 Store in a dry, dust-free place, away from corrosive gases or liquids;
- 2 - Preferably keep it properly packaged on a rack or flat surface.

III. System Interfaces and Wiring



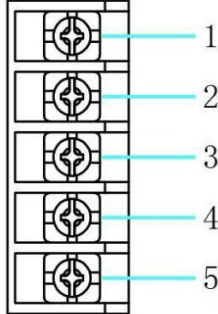
3 3.1 Names of Driver Parts



3 3.2 Ports

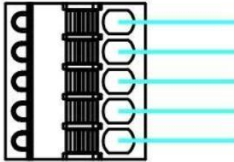
Power and Motor Terminals

Barrier terminal block 6.35-2P, screw wiring type; use a Phillips screwdriver with tip diameter ≤ 5 mm. The power input terminal accepts DC24-48V. Wire according to the markings on the top cover. Do not reverse polarity.

	Pin No.	Pin Name	Pin Function
	1	U	Brushless motor power output terminal
	2	V	
	3	W	
	4	V-	Driver power input negative terminal
	5	V+	Driver power input positive terminal

Motor Hall Interface

Pluggable terminal block 2.5-5P, push-spring wiring.

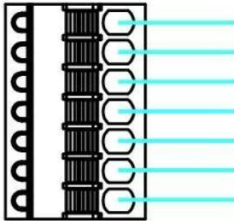
	Pin No.	Pin Name	Pin Function
	1	0V	Ground terminal
	2	HU	Hall signal line
	3	HV	
	4	HW	
	5	5V	DC +5V output

Description of low-voltage motor socket signals and corresponding wire colors (Zhongda motor type):

Signal	W	V	U	+5V	HW	HV	HU	GND
Wire Color	Thick blue	Thick green	Thick yellow	Red	Blue	Green	Yellow	Black

I/O Control Terminal

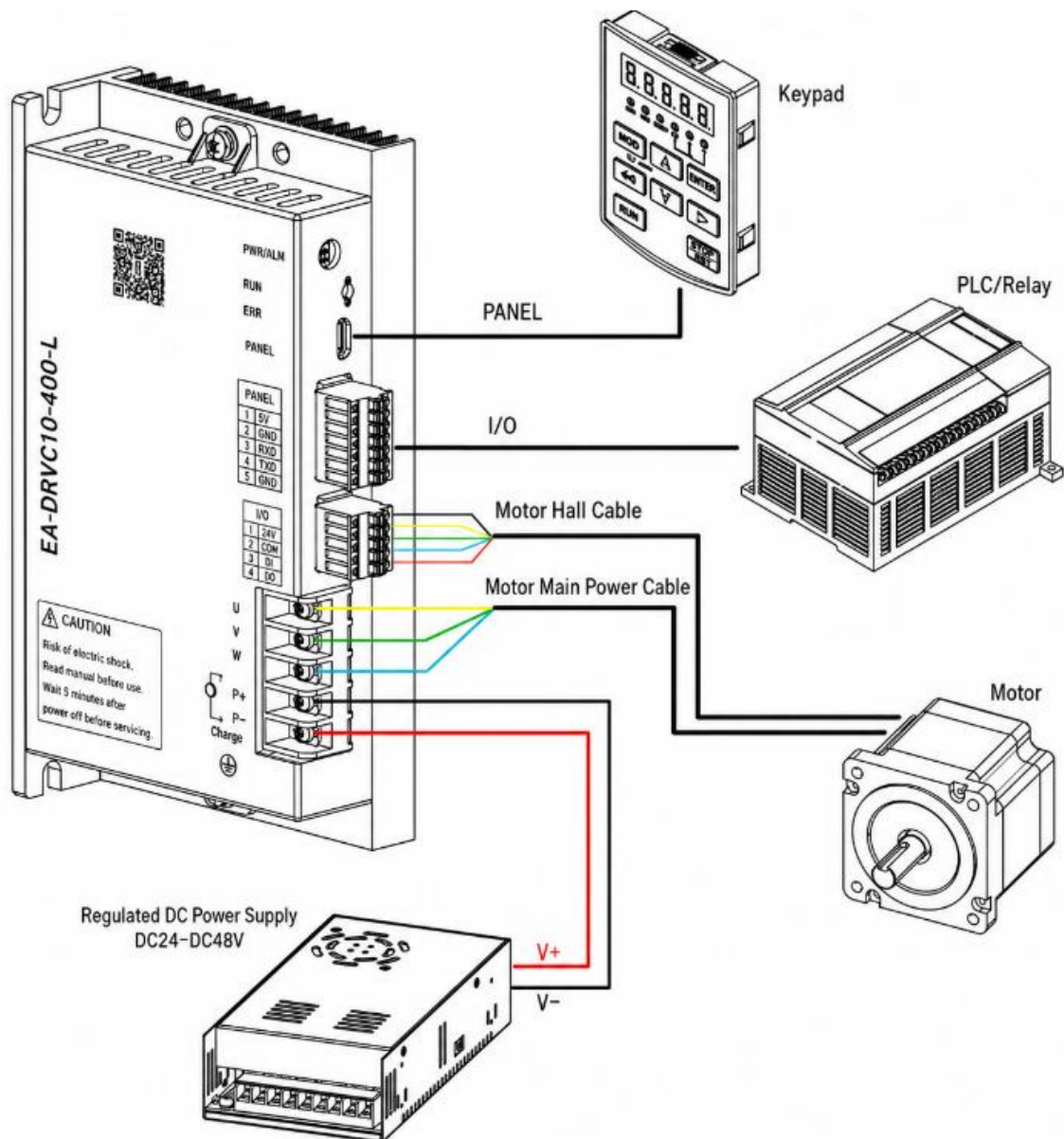
Pluggable terminal block 2.5-7P, push-spring wiring.

	Pin No.	Pin Name	Pin Function
	1	DO1	Digital signal output: fault
	2	+5V	DC +5V output
	3	AI2	Analog voltage (0-5/10V) / PWM (3k-10kHz)
	4	COM	Common Terminal
	5	DI3	Digital signal input: brake
	6	DI2	Digital signal input: reverse
	7	DI1	Digital signal input: forward

Keypad Interface

The keypad interface is a USB interface. The keypad cable is a purchased keypad accessory (see Section 4.2.1).

3 3.3 System Wiring Diagram



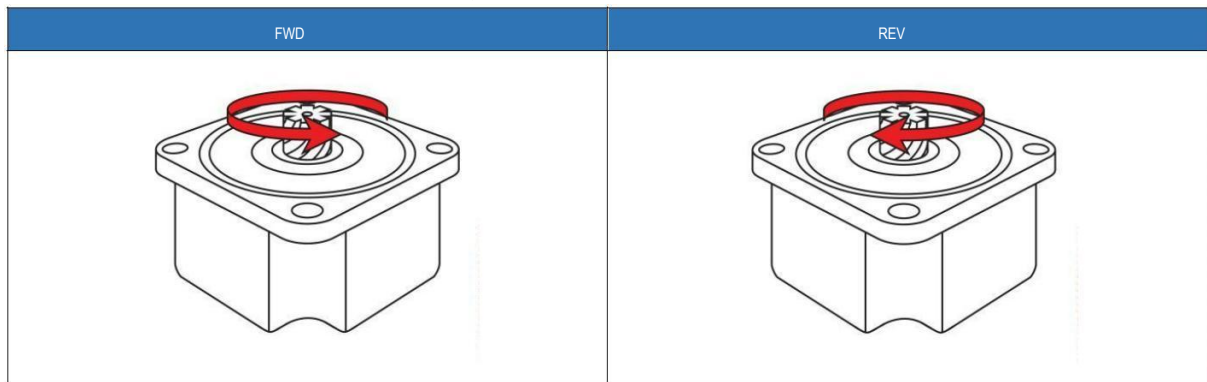
Precautions:

- 1 When wiring, turn off the power first. Wiring must be performed by professionals, and must follow this manual and the required functions to ensure safe use;
- 2 - Do not connect the power cable to terminals other than the power terminal; otherwise the driver may be damaged;
- 3 Select wire size according to electrical regulations;
- 4 The grounding terminal must be properly grounded. Tighten the screws between each terminal and wire to prevent loosening due to vibration;
- 5 - Make sure the power supply capacity is more than twice the rated motor power;
- 6 It is recommended that the cable length between the motor and driver be less than 1 m.

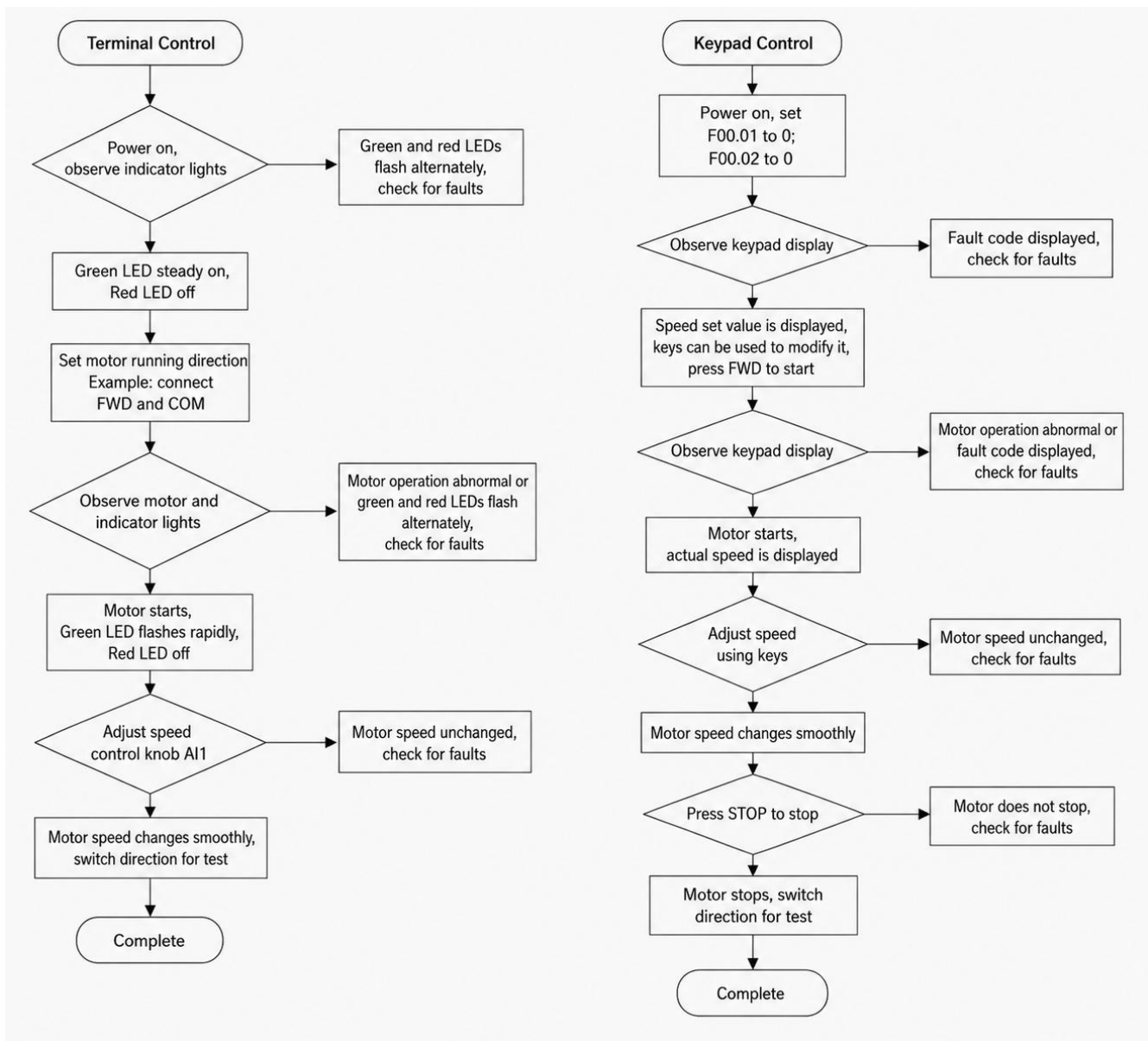
IV. Operating Instructions

Precautions:

- 1 Unless otherwise specified, this product is set to terminal control by default at the factory. Keypad control requires purchasing the keypad accessory (ZBLD.C20-KB5T-U) ;
- 2 The keypad function codes listed in this manual apply to the EA-DRVC10-400-L product and do not apply to other products. For details, refer to the C20 series keypad function code user manual;
- 3 - Before operation, users must have a basic understanding of this product; operation should be performed by professionals;
- 4 For motors with different pole-pair numbers, the default direction may differ. Before use, perform a no-load test and confirm the direction!



- 5 - Before formal use, perform no-load debugging. The following figure shows the no-load debugging flowchart (left: terminal control; right: keypad control; default factory setting state):



4 4.1 Terminal Control

4.1.1 Port Introduction

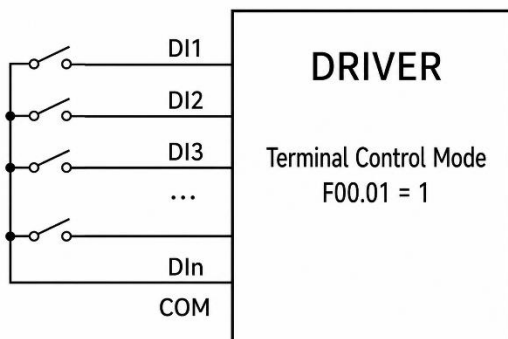
Users who have not purchased a keypad can refer to the default values of keypad function codes to understand specific product parameters (see Section 4.2.3).

Port	Name	Function
Input	FWD/DI1	Forward
	REV/DI2	Reverse
	BRK/DI3	Brake (Electromagnetic Brake)
Common Terminal	COM	0V
Analog	VAR/AI2	Analog voltage (0-5V/10V) / PWM (3KHz-10KHz)
	+ 5V	+5V power output (only for external potentiometer; strictly prohibited for powering other devices)
Output	ERR/DO1	Fault Output (Open-collector Output)

4 4.1.2 Input Terminal

- For terminal control, directly short the input terminal (FWD) and common terminal (COM) to run the motor forward;
- Short the input terminal (REV) and common terminal (COM) to run the motor in reverse;
- When brake (BRK) and common terminal (COM) are connected during operation, the motor enters braking state. Except for safe emergency braking, avoid braking when the motor is running at high speed or when load inertia is large. To reduce action time, reduce the speed to a relatively safe range before braking as much as possible.

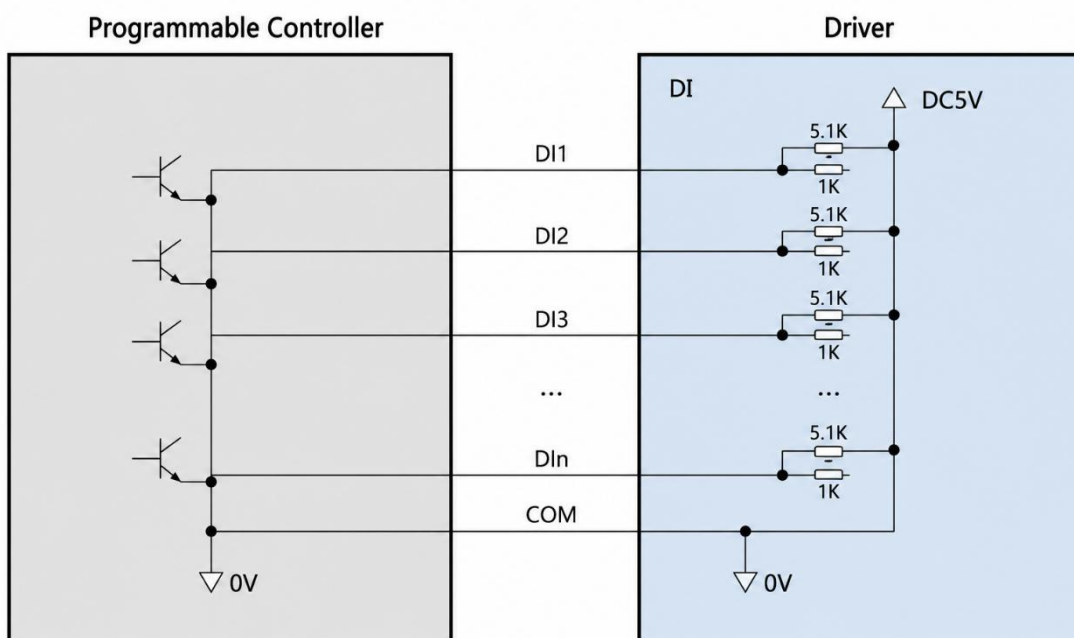
Users may connect an external switch (relay).



Caution:

- 1 - Do not connect FWD and REV terminals at the same time;
- 2 - Avoid switching motor rotation direction at high speed; it is best to switch after stopping;
- 3 - If the brake function is used, calculate the safe braking speed and ensure the motor speed is below that speed when braking.

External PLC (NPN) control; the following figure shows the wiring diagram:



4 4.1.3 Analog Speed Reference

□ Analog AI1 (built-in knob potentiometer) speed reference:

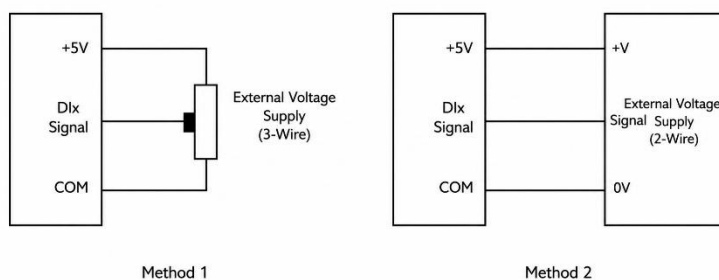
The default speed reference method (valid when function code F00.02 is set to 1). Adjust the internal knob of the driver to adjust speed. Use a Phillips screwdriver (tip diameter ≤ 3 mm). Rotate the potentiometer clockwise to increase speed, and counterclockwise to decrease speed.

□ Analog AI2 (external voltage/PWM) speed reference:

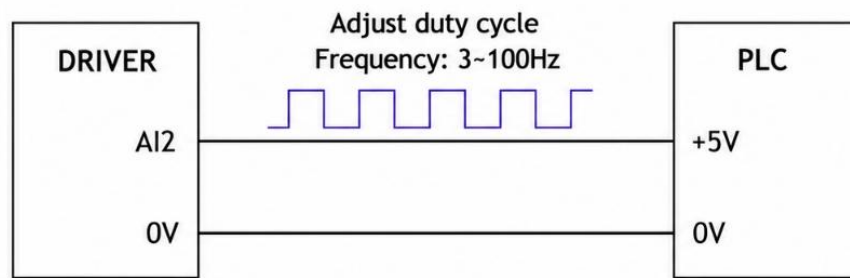
Requires keypad setting (valid when function code F00.02 is set to 2).

1 Adjust speed by changing the external input voltage (default 0-5V; modify function codes F05.37 and F05.39 to change the voltage range, with an upper limit of 10V). An external potentiometer must be connected by the user (recommended resistance: 10K).

The following figure shows two wiring diagrams:



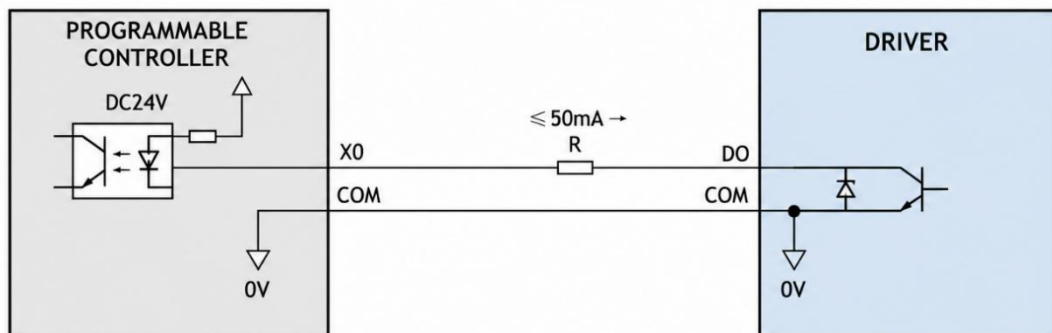
2 Speed can also be adjusted by regulating the PWM wave. Send a 3KHz-10KHz PWM signal and adjust the duty cycle to adjust the voltage from 0.2 to 4.8V, corresponding to a speed of 0-3000 rpm.



4 4.1.4 Output Terminal

Open-collector output, sink current less than 50mA. The default port function is fault output. It can be changed through the keypad by modifying function code F06.01 to change the output selection.

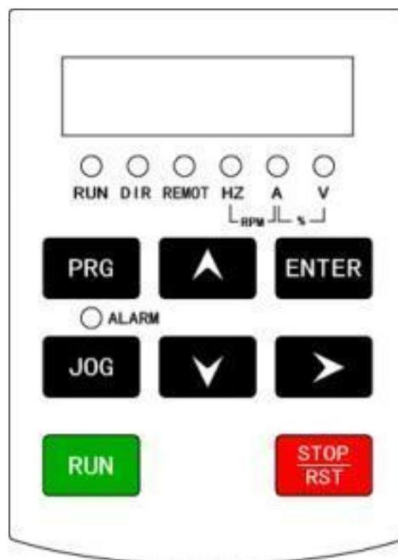
The output terminal can be connected to PLC control, as shown below:



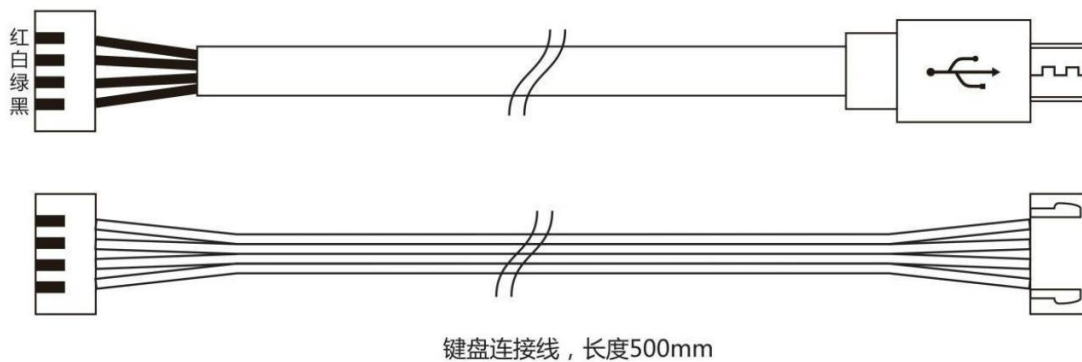
4 4.2 Keypad Control

4 4.2.1 Keypad Introduction

The external keypad ZBLD.C20-KB5T-U can be used to set driver parameters and read driver status.



Select the appropriate keypad cable according to the keypad interface type of the driver.



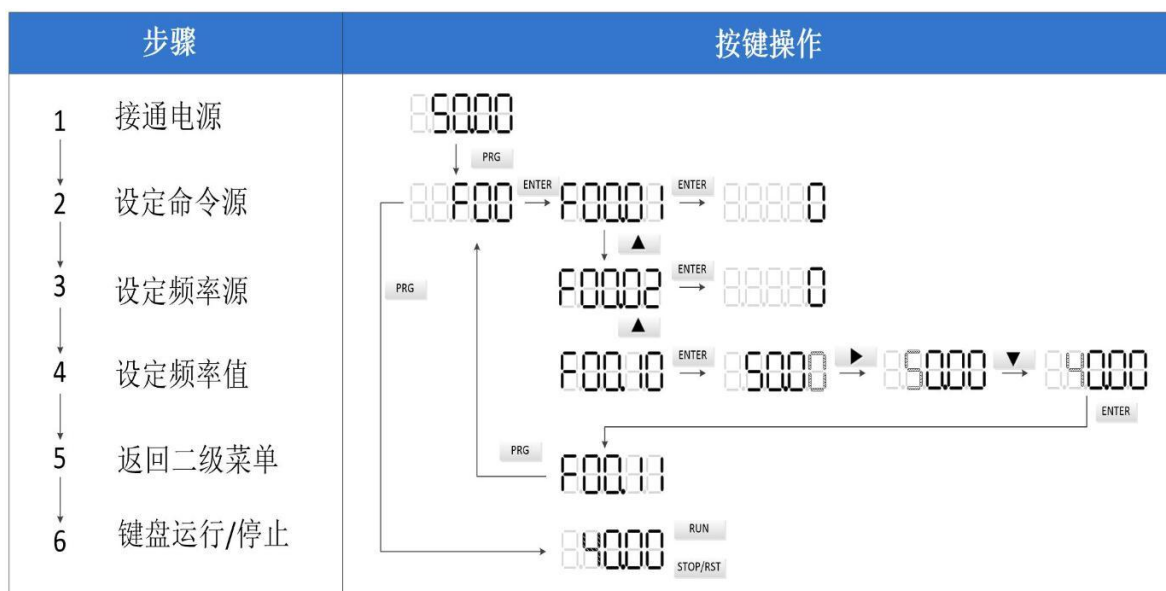
No.	Name	Description		
1	Digital display area: 5-digit LED display for function codes, operating parameters, fault alarms, etc.			
2	Status Indicator	RUN	Off: stopped; flashing: parameter identification; on: running	
		DIR	Off: forward; on: reverse	
		REMOT	Off: keypad control; flashing: terminal control; on: communication control	
		ALARM	Off: no fault; flashing: pre-alarm; on: fault	
3	Unit Indicator	Hz	Frequency Unit	
		A	Current Unit	
		V	Voltage Unit	
		RPM	Speed Unit	
		%	Percentage	
4	Button Area	PRG	Programming Key	Enter or exit the first-level menu
		ENTER	Enter Key	Enter menu screens level by level and confirm set parameters
		∧	Increment Key	Increase data or function code
		∨	Decrement Key	Decrease data or function code
		>	Right shift key: in stop and run display screens, cyclically shift right to select the display	

No.	Name	Description		
				parameters; when modifying parameters, select the digit to be modified
	JOG	Jog Key		Start jog operation (JOG key is available only on external keypad)
	RUN	Run Key		Start run operation
	STOP/RST	Stop/Reset Key		In running state, used for stop operation In fault state, used for reset operation

4 4.2.2 Keypad Operation

The driver has a three-level operation menu, as follows:

- 1 - Function code group number (level 1 menu): e.g., F00;
- 2 - Function code number (level 2 menu): e.g., F00.00;
- 3 - Function code value (level 3 menu): e.g., 50.00Hz.



In the level 3 menu, if no digit of the parameter flashes, the function code cannot be modified. Possible reasons are:

- 1) The function code is read-only, such as running frequency or fault code;
- 2) The function code is writable only when stopped, and must be modified after stopping.

4 4.2.3 Function Codes

The parameters of the EA-DRVC10-400-L driver are grouped by function. There are 11 groups from F00 to F10; groups F00-F09 are open to users, and other hidden groups are reserved and do not affect normal use. Each function group contains multiple function codes.

Attribute description: "R/W" readable/writable; "R/W*" readable/writable only when stopped; "RO" read-only; "N" reserved.

Parameter	Name	Setting Range	Default	Attribute
F00 Basic Function Group				
F00.00 Control Mode		0: Test mode 1: Hall open-loop 2: Hall closed-loop	2	R/W*
F00.01 Run Cmd Source		0: keypad run command channel(LED off) 1: terminal run command channel(LED flashing)	1	R/W
F00.02 Speed Reference Selection	0: Keypad digital setting		1	R/W

Parameter	Name	Setting Range	Default	Attribute
		1 : analog AI1 setting(Knob Potentiometer) 2 : analog AI2 setting(external voltage)		
F00.03 Running	Frequency Upper Limit F00.04-500.00Hz	0.00Hz	250.00Hz R/W*	
F00.04 Running	Frequency Lower Limit 0.00Hz-F00.03 (maximum frequency)	5.00Hz		R/W*
F00.05 Reserved		Reserved	0	R/W*
F00.06 Reserved		Reserved	0	R/W*
F00.07 Reserved		Reserved	0	R/W*
F00.08 Reserved		Reserved	1	R/W*
F00.09 Jog Set	Frequency 0.00Hz-F00.03 (maximum frequency)		10.00Hz	R/W
F00.10 Keypad Set	Frequency 0.00Hz-F00.03 (maximum frequency)		250.00Hz	R/W
F00.11 Accel. Time 1		0.1~600.0s	1.0s	R/W
F00.12 Decel. Time 1		0.1~600.0s	1.0s	R/W
F00.13 Running	Direction Selection 1: Run in reverse direction 2 : Reverse running prohibited	0 : Run in default direction	0	R/W
F00.14 Carrier Frequency	Frequency Setting 8.0-20.0kHz		machine model confirmed	set R/W*
F00.15 Param. Restore		0 : No operation 1: Restore default function-code values	0	R/W*
F01 Start/Stop Control Group				
F01.05 Stop Mode		0 : Deceleration Stop 1 : Coast Stop	1	R/W
F01.06	Forward/Reverse dead zone time	0.000~9.999s	0.200s	R/W
F01.07 Reserved		0~1	0	R/W*
F01.08	Electronic brake current-limit point	0.1%~200.0%	5.0%	R/W
F01.09	Electronic brake adjustment	0.1~999.9s	5.0s	R/W
F01.10 Stop Speed	time	0.00~50.00Hz Valid during deceleration stop	0.20Hz	R/W
F01.11	Forward/reverse switching limit frequency	0.0-500.0Hz, valid during deceleration stop	50.0Hz	R/W
F01.12	Electronic brake torque	0.1~600.0s	0.0s	R/W
F01.13	holding time Deceleration-stop brake	0: Disabled Enable 1: Enable braking during deceleration stop (valid when F01.05=0)	1	R/W
F01.14 Reduction Numerator		1~9999	1	R/W
F01.15 Reduction Denominator		Displayed speed=Motor speed+ $\frac{\text{Reduction Numerator}}{\text{Reduction Denominator}}$	1	R/W
F02 Motor Parameter Group				
F02.00 Motor Rated Power	15-2200W		machine model confirmed	set R/W*
F02.01 Motor Rated Frequency	0.01Hz-500Hz		machine model confirmed	set R
F02.02 Motor Rated Speed	1-9999rpm		t	R

machine model confirmed
t

Parameter	Name	Setting Range	Default	Attribute
F02.03 Motor Rated Voltage	0-1200V		machinemodelconfirmse	R
F02.04 Motor Rated Current	0.8-999.9A		t machinemodelconfirmset	R/W*
F02.05 Pole Pairs		1~20	5	R/W*
F02.08 Special Param.		0 : speed display actual value 1 : speed display set value	0	R/W*
F03 Control Parameter Group				
F03.00 ~ F03.18	Reserved	Reserved	16.0	N
F05 Input Terminal Parameter Group				
F05.00 Reserved		Reserved	0	R/W*
F05.01	DI1 terminal function selection	0: No function 1: Forward Run	1	R/W*
F05.02	DI2 terminal function selection	2: Reverse run 3: Three-wire run control	2	R/W*
F05.03	DI3 terminal function selection	4 : forward jog 5 : reverse jog 6 : Coast stop 7: Fault reset 8: Electronic brake 9: External fault input Other: Reserved	8	R/W*
F05.04 Reserved		Reserved		R/W*
F05.05 Reserved		Reserved		R/W*
F05.06 Reserved		Reserved		R/W*
F05.07 Reserved		Reserved		R/W*
F05.08 Reserved		Reserved		R/W*
F05.09 Reserved		Reserved	0	R/W*
F05.10	Input terminal polarity selection	0x000~0x1FF	0x000	R/W
F05.11	Digital filter Time	0.000~1.000s	0.010s	R/W
F05.12 Virtual Terminal		0 x000~0x00F(0: disabled, 1: enabled) BIT0: DI1 Virtual Terminal BIT1: DI2 Virtual Terminal BIT2: DI3 Virtual Terminal	0x000	R/W*
F05.13	Terminal-control run control 2 mode	0: Two-wire control 1 mode 1: Two-wire 2: Three-wire control 1 3: Three-wire control 2	0	R/W*
F05.14	DI1 terminal ON delay time	0.000~9.999s	0.000s	R/W

Parameter	Name	Setting Range	Default	Attribute
F05.15 DI1 terminal	OFF delay 0.000-9.999s		0.000s	R/W
F05.16	DI2 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.17	DI2 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.18	DI3 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.19	DI3 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.20 Reserved		0.000~9.999s	0.000s	R/W
F05.21 Reserved		0.000~9.999s	0.000s	R/W
F05.22 Reserved		0.000~9.999s	0.000s	R/W
F05.23 Reserved		0.000~9.999s	0.000s	R/W
F05.24 Reserved		0.000~9.999s	0.000s	R/W
F05.25 Reserved		0.000~9.999s	0.000s	R/W
F05.26 Reserved		0.000~9.999s	0.000s	R/W
F05.27 Reserved		0.000~9.999s	0.000s	R/W
F05.28 Reserved		0.000~9.999s	0.000s	R/W
F05.29 Reserved		0.000~9.999s	0.000s	R/W
F05.30 Reserved		0.000~9.999s	0.000s	R/W
F05.31 Reserved		0.000~9.999s	0.000s	R/W
F05.32 AI1 Lower Lim.		0.00V~F05.34	0.50V	R/W
F05.33	AI1 lower-limit corresponding setting setting	-300.0%~300.0%	0.0%	R/W
F05.34 AI1 Upper Lim.		F05.32~10.00V	8.50V	R/W
F05.35	AI1 upper-limit corresponding setting setting	-300.0%~300.0%	100.0%	R/W
F05.36	AI1 input filter time Time	0.000s~9.999s	0.030s	R/W
F05.37 AI2 Lower Lim.		0.00V~F05.39	0.20V	R/W
F05.38	AI2 lower-limit corresponding setting setting	-300.0%~300.0%	0.0%	R/W
F05.39 AI2 Upper Lim.		F05.37~10.00V	4.80V	R/W
F05.40	AI2 upper-limit corresponding setting setting	-300.0%~300.0%	100.0%	R/W
F05.41	AI2 input filter time Time	0.000s~9.999s	0.030s	R/W
F06 Output Terminal Parameter Group				
F06.00 Reserved		0~1	0	R/W*
F06.01 DO1 Output Select		0: Invalid 1: Running 2: Forward running	5	R/W

Parameter	Name	Setting Range	Default	Attribute
		3 : Rev Running 4 : Jog Running 5 : Driver Fault 6 : Overload Warn 7 : Underload Warn 9 : Low Bus Volt. 1 0: Speed Out Other: Reserved		
F06.02 Reserved		Reserved	0	R/W
F06.03 Reserved		Reserved	0	R/W
F06.04 Reserved		Reserved	0	R/W
F06.05 Reserved		Reserved		R/W
F06.06	DO1 ON delay time Time	0.000~9.999s	0.000s	R/W
F06.07	DO1 OFF delay time Time	0.000~9.999s	0.000s	R/W
F07 Fault and Protection Group				
F07.00 overload	Driver or motor underload pre-alarm selection	0 x000~0x131 LED ones digit: 0 : Motor OL/UL pre-alarm, relative to the motor rated current 1 : Driver overload/underload pre-alarm, relative to driver rated current LED tens digit: 0 : Continue running after driver OL/UL alarm 1 : Continue running after underload alarm; stop after overload fault 2 : Continue running after overload alarm; stop after underload fault 3 : Stop after driver reports OL/UL fault LED hundreds digit: 0: Always detect 1: Detect during constant-speed running	0x000	R/W
F07.01	Overload pre-alarm detection level	F07.03~200%	140%	R/W
F07.02	Overload pre-alarm detection time	0.1~999.9s	1.0s	R/W
F07.03	Underload pre-alarm detection level	0%~F07.01	50%	R/W
F07.04	Underload pre-alarm detection time	0.1~999.9s	1.0s	R/W
F07.05	Motor overload protection selection	0: No 1: Protection	0	R/W*
F07.06	Motor overload protection coefficient	20.0%~120.0%	100.0%	R/W
F07.07 Reserved			0	R/W*

Parameter	Name	Setting Range	Default	Attribute
F07.08 Automatic	Current-Limit Level 10.0%-420.0% (relative to driver)		260.0%	R/W*
F07.09	Fault auto reset time	0.0-999.9s: auto reset time	5.0s	R/W
F07.10	Fault auto reset 0: count 1-9999: reset count	No auto reset	0	R/W
F07.11 Stall Detection	Time 0.0-999.9s: stall detection		3.0s	R/W*
F07.12 Stall Limit	Current 1.0%-200.0% (relative to driver rated current)		70.0%	R/W*
F07.13	UP/DN keypad function setting	0 : Set-speed fine adjustment (valid only for keypad speed setting) 1: UP forward jog, DN reverse jog (valid only in keypad stop or run screen)	0	R/W
F07.14	Undervoltage fault detection	0~9.999s	1.0s	R/W
F07.15 Phase-Loss	Detection Time 0-999.9s		3.0s	R/W
F07.16 User Password		0: Clear user password 1 1-9999: user password protection enabled	0	R/W
F09 Monitoring Parameter Group				
F09.00 Set Freq.		0.00Hz~F00.03	0.00Hz	RO
F09.01 Out Freq.		0.00Hz~F00.03	0.00Hz	RO
F09.02 Ramp Set	Frequency 0.00Hz-F00.03		0.00Hz	RO
F09.03 Out Volt.		0.0~1200.0V	0.0V	RO
F09.04 Out Curr.		0.00~100.00A	0.00A	RO
F09.05 Set Speed		0~65535RPM	0 RPM	RO
F09.06 Motor speed		0~65535RPM	0 RPM	RO
F09.07 Out Power		0~2200W	0W	RO
F09.08 DC Bus Voltage	0.0-2000.0V		0V	RO
F09.09 Hall Val.		0~7	0	RO
F09.10 SW Ver.		1.00~99.99	1.00	
F09.11 Current	Fault Type 0: No fault		0	RO
F09.12	Previous 1st fault type 1: hardware overcurrent during acceleration (E.OCH1)		0	RO
F09.13	Previous 2nd fault type 3: Hardware overcurrent at constant speed (E.OCH3)		0	RO
F09.14	Previous 3rd fault type 5: Overcurrent during deceleration (E.OC2)		0	RO
F09.15	Previous 4th fault type 10: Bus undervoltage fault (E.Uv)		0	RO

Parameter	Name	Setting Range	Default	Attribute
		1 5: Rectifier module overtemperature(E.OH1) 1 6: Inverter module overtemperature fault(E.OH2) 1 7: External fault(E.EF) 1 9: Current detection fault(E.CUr) 2 0: Inverter unit U-phase protection(E.OUt1) 2 1: Inverter unit V-phase protection(E.OUt2) 2 2: Inverter unit W-phase protection(E.OUt3) 2 3: Electronic overload(E.OL3) 2 4: Underload fault(E.LL) 2 6: Panel communication error(E.boAd) 2 7: EEPROM storage fault(E.EEP) 2 9: Hardware overcurrent feedback fault(E.OCHF) 3 0: Output phase loss fault(E.POUT)		
F09.16 Inverter	Temperature	-20.0~120.0°C	0.0°C	RO
F09.17	Digital input terminal status	0 000~1FF BIT0: DI1 terminal BIT1: DI2 terminal BIT2: DI3 terminal	0	RO
F09.18	Digital output terminal status	0 000~000F Bit0: DO1 Bit1: DO2	0	RO
F09.19 AI1 Input	Voltage	0.00-10.00V	0.00V	RO
F09.20 AI2 Input	Voltage	0.00-10.00V	0.00V	RO
F09.21 Reserved				RO
F09.22 Peak Current		0.00~100.00A	0.00A	RO
F09.23 Reserved		Reserved	0x00	RO
F09.24	Rated current setting value	0.00~100.00A	0.00A	RO
F09.25 Reserved		Reserved	0	RO
F09.26 Reserved		Reserved	0.00	RO
F09.27 Reserved		Reserved	0	RO
F09.28 Pole-Pair	Setting Value	1-20	0	RO

V. Status Display and Fault Maintenance

Precautions:

- 1 - Except for faults that require changing parameters through the keypad, all other fault maintenance must be performed with power off;
- 2 - Before use, confirm that the indicator lights or keypad work normally;
- 3 - Do not move, wire, or maintain the product while the indicator is on;
- 4 - After preliminary troubleshooting, a trial run test is recommended;
- 5 - Basic maintenance must be performed by professionals familiar with this product;
- 6 - If the fault cannot be solved, do not disassemble the driver housing for repair without authorization. Contact sales or technical support.

5.1 Fault Indication by Indicator

Lamps

The table below shows indicator display modes for different driver states when the indicators work normally. Refer to the table to confirm the driver current working state.

Stopped	Normal: green light steady on, red light off
	Fault: red and green lights flash alternately to indicate the fault code
running	Normal: green light flashes, red light off
	Current limit: green light flashing, red light flashing
	Brake: green light steady on, red light flashes rapidly

When the driver detects a stop, the following table shows how LED (red/green) alternating flashes or keypad fault code display indicate the cause of the fault. Users can troubleshoot and repair according to the fault code.

One green flash represents 5 One red flash represents 1. Fault code = green flashes x 5 + red flashes

No.	Fault Code	Fault Name	Fault Indication	Fault Cause Check	Corrective Action
1	E.OCH1	Hardware			1, increase acceleration/deceleration time
2	E.OCH2	Hardware		1, acceleration/deceleration too fast	2, check input power voltage
3	E.OCH3	Hardware		2, voltage too low	3, select a driver one power class larger
4	E.OC1	Software		3, driver power too small	driver
5	E.OC2	Software		4, sudden load applied	4, check whether the load is short-circuited or stalled
6	E.OC3	Software		5, short to ground or phase-to-phase short	5, check/replace cable or motor
7	E.OV1	Overvoltage	1 green 2 red	6, strong external interference source exists	6, check for strong interference phenomenon
8	E.OV2	Overvoltage	1 green 3 red		
9	E.OV3	Overvoltage	1 green 4 red		

No. Fault Code	Fault Name	Fault Indication	Fault Cause Check	Corrective Action
1 0	E.UV	Bus undervoltage fault 1 green 5 red	1 , power supply voltage low 2 , acceleration too fast, external power supply Protection 3 , instantaneous power failure 4 , driver hardware abnormal	1 , check grid input power supply 2 , increase acceleration time 3 , reset fault 4 , seek technical support
1 1	E.OL1 Motor over	2 green 1 red	1 , power supply voltage too low 2 , motor rated current setting not appropriate 3 , motor stalled or sudden load change too large	1 , check power supply voltage 2 , set motor rated current 3 , reduce load and check motor and mechanical condition
1 2	E.OL2 Driver over	2 green 2 red	1 , acceleration time too short 2 , power supply voltage too low 3 , load too large	1 , increase acceleration time 2 , check power supply voltage 3 , use a driver one power class larger
1 3	E.HALL Hall fault	2 green 3 red	1 , HALL wire disconnected 2 , strong external interference source exists	1 , check HALL wiring 2 , check for strong interference phenomenon
1 4	E.LOC Stall fault	2 green 4 red	1 , load too large 2 , motor jammed 3 , motor phase-to-phase short	1 , use a driver one power class larger 2 , check motor mechanical connection 3 , check connection line
1 5	E.OH1 Rectifier m		1 , ambient temperature too high	1 , reduce ambient temperature
1 6	E.OH2 inverter module overtemperature Fault	3 green 1 red	2 , thermistor damaged 3 , inverter module damaged	2 , replace complete unit
1 7	E.EF	External input fault 3 green 2 red	external fault input terminal	check terminal input source
1 8	E.485	485 communication fault 3 green 3 red	1 , baud rate/data check setting 1, check baud rate parameter setting incorrect 2 , communication line fault 3 , communication address error 4 , communication subject to strong interference	2 , check communication line 3 , check communication address setting 4 , replace shielded cable to improve anti-interference capability
1 9	E.CUr Current de		circuit abnormal	replace driver
2 0	E.OUT1 Inverter unit U phase Protection	3 green 5 red		
2 1	E.OUT2 Inverter unit V phase Protection	4 green 1 red	1 , acceleration too fast 2 , inverter circuit damaged 3 , malfunction caused by interference	1 , increase acceleration time 2 , replace power device 3 , check for strong interference source
2 2	E.OUT3 Inverter unit W phase Protection	4 green 2 red		
2 3	E.OL3 Electronic		overload pre-alarm function is set	check load and overload pre-alarm point
2 4	E.LL Electronic		underload pre-alarm function is set	check underload value and underload pre-alarm

No. Fault Code		Fault Name	Fault Indication	Fault Cause Check	Corrective Action
					point
2 5	E.Sht	MOS short-circuit fault	4 green 5 red	1 , MOSorinverter unit short circuit 2 , phase line short to ground	1, replace driver 2, checkconnectline
2 6	E.boAd Keypad cc			1 , keypad cable contact poor or disconnected line 2 , keypad cable too long and subject to inter- 2, check environment and eliminate interference source ference	1, check or replace wiring
2 7	E.EEP	EEPROM storage fault fault	5 green 2 red	1 , EEPROM damaged 2, single power-on erase/write limit reached 2, power on again limit	1, reset/clear fault 3, seek technical support
2 8	E.Cnd MOS cond		5 green 3 red	1 , motor not connected during self-check 2 , MOS or inverter unit damaged	1, check motor wiring 2, replace driver
2 9	E.OCHF	Hardware overcurrent feedback Fault	5 green 4 red	driver hardware damaged	replace driver
3 0	E.POUT Output pha			1 , U/V/W output phase loss 2 , driver hardware abnormal	1 , check connection from driver to motor line 2 , seek technical support
3 1	E.CAN1	CANBus-off fault fault	6 green 1 red	too many errors	check CAN network and reconnect
3 2	E.CAN2 CAN trans		6 green 2 red	too many transmission error frames	check CAN nodes, wiring, and baud rate
3 3	E.CAN3 CAN recep		6 green 3 red	too many reception error frames	1 , check baud rate 2 , check for interference sources
3 4	E.Conn Internal co			internal hardware damaged	replace driver
3 5	E.CAN4	CANOpen heartbeat timeout	6 green 5 red	CANOpen slave reaches consumer configured time	1 , clear fault 2, check whether CAN node is online 3 , check CANopen configuration
3 6	E.CAN5	CANOpen NMT operation fault	7 green 1 red	when the motor is running, the CANOpen slave 1, clear fault receives NMT initialization/stop 2, when changing NMT state, first let and other commands	the motor stop running

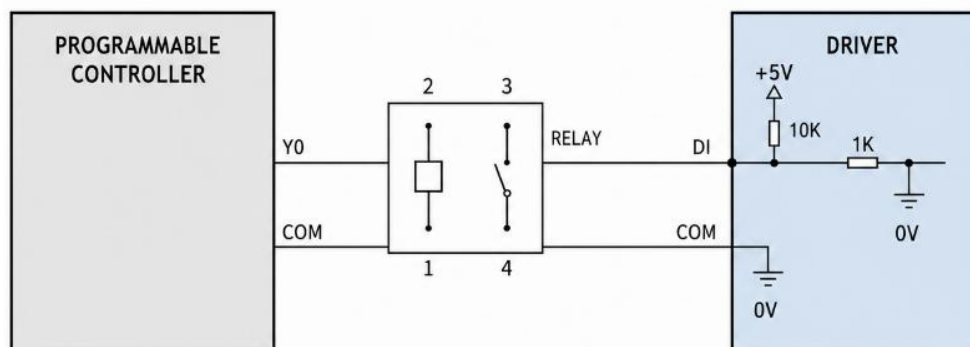
VI. Application Examples

6.1 Input/Output Wiring Using an Intermediate Relay

6.1.1 Input-Side Wiring

Connect the driver input terminal and PLC output terminal through an intermediate relay to adapt to different PLC models

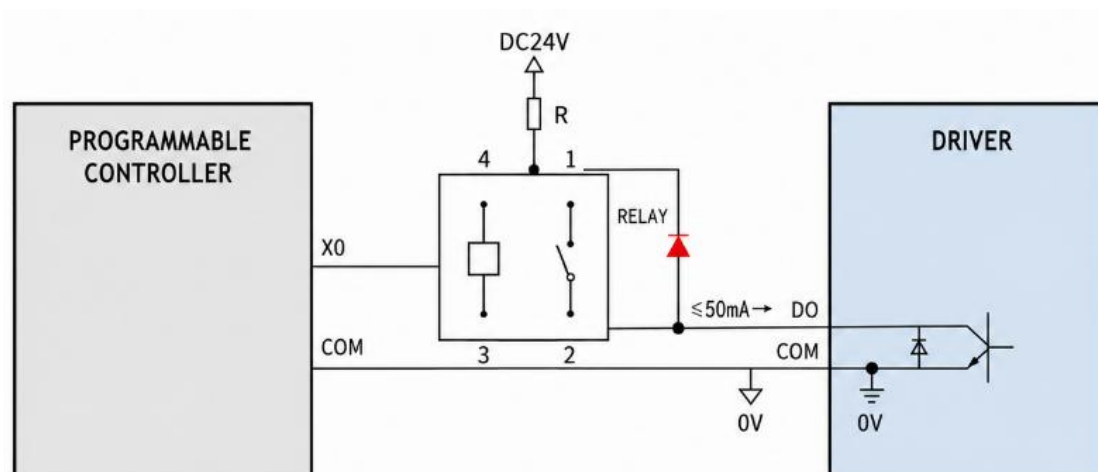
(wire the PLC according to the PLC manual).



6.1.2 Output-Side Wiring

Connect the driver output terminal and PLC input terminal through an intermediate relay to adapt to different PLC models

(wire the PLC according to the PLC manual).



6 6.2 Electronic Brake

1 Engineering description

The electronic brake generates a large current through back EMF, producing torque that resists motor rotation.

Applicable conditions: horizontal low-speed operation, small load inertia, and short braking time. It cannot be used for vertical lifting movement,

high-speed operation, or applications with large load inertia.

2 Parameter setting

Use the keypad to modify function codes while stopped. DI3 is electronic brake by default. Ordinary braking (shorting

DI3 and COM) does not have torque holding; set F01.12 (electronic brake torque holding time) and F01.08

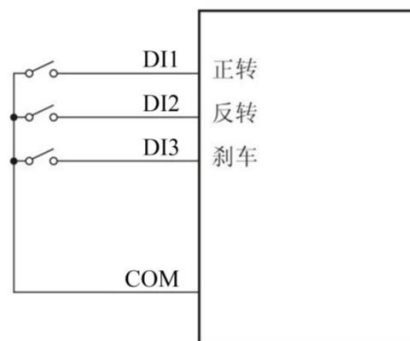
(electronic brake current-limit point). To maintain braking torque when stopped, set F01.05 to 1 (deceleration stop)

and F01.13 to 1 (enable deceleration-stop brake).

Related function codes:

Parameter	Name	Setting Range	Default	Attribute
F05.03	DI3 Terminal Function Selection	0 : Electronic brake < See keypad function codes for details	--	R/W*
F01.12	Electronic brake torque holding time 0.1-600.0s		0.0s	R/W
F01.08	Electronic brake current-limit point	0.1%-200.0%	5.0%	R/W
F01.05	Stop Mode Selection	0 : Deceleration Stop 1 : Coast Stop	1	R/W
F01.13	Deceleration stop Brake enable	0 : Disabled 1: Enable braking during deceleration stop (valid when F01.05=0 valid)	1	R/W

3 Wiring and commissioning



- Enter parameter F01.12 and modify the holding time after braking stops as needed (for example, set F01.12 to 5)
- Enter parameter F01.08 and adjust the braking force as needed (for example, set F01.08 to 10)
- Enter parameter F01.05 and select 0 deceleration stop (for example, set F01.05 to 0)
- Enter parameter F01.13 and select 1 (for example, set F01.13 to 1)

According to the example settings above, short DI1 and COM to run the motor, then short DI3 and COM to

stop immediately and hold strong braking torque for 5 seconds; the same strong braking torque is held for 5 seconds when stopped.

VII. Basic Inspection and Maintenance

7.1 Basic Inspection

Inspection Item	Inspection Content
General Inspection	Periodically check whether the screws at the driver mounting position, terminals and wiring, and the connection between the motor shaft center and the mechanism are loose.
	Check regularly to prevent oil, water, metal powder, and other foreign objects from entering the driver.
	If the driver is installed in a place with harmful gas or heavy dust, prevent harmful gas and dust from entering.
	When changing wiring, pay attention to the wiring sequence; incorrect wiring may cause danger.
Pre-operation Inspection (Power not supplied)	Before wiring, make sure the power is off and the motor has stopped.
	Insulate the connection parts of wiring terminals.
	Wiring should be correct to avoid damage or abnormal operation.
	Check whether conductive objects such as screws or metal pieces, or flammable objects, are inside the driver.
	Check whether the external control switch is in the OFF state.
	To avoid electromagnetic brake failure, check whether the circuit for immediate stop and power cutoff is normal.
	If electronic instruments near the driver are affected by electromagnetic interference, use appropriate equipment to reduce the interference.
	Make sure the applied voltage level of the driver is correct.
Pre-run Inspection (Power supplied)	When the motor is running, check whether the connection cable contacts mechanical parts and causes wear, or is pulled phenomenon.
	If the motor vibrates due to the driver or has excessive operating noise, contact the manufacturer.
	Confirm that all parameter settings are correct. Depending on mechanical characteristics, unexpected actions may occur.
	Do not adjust parameters to excessive extremes.
	When resetting parameters, make sure the driver is in STOP state; otherwise it may cause faults.
	Check whether the LED indicator display is abnormal.
	Check whether the keypad display and command settings are abnormal.

7 7.2 Maintenance and After-Sales

Service

Routine Maintenance

- Store and use under appropriate environmental conditions.
- Clean the exterior of the driver and motor in time to prevent dust and dirt accumulation.
- Do not disassemble mechanical parts during wiping and maintenance.
- Clean gaps in the driver housing in time to prevent foreign objects from entering.
- Avoid using the driver in extreme environments for long periods, which may cause driver failure.

Component Service Life

□ Electrolytic Capacitor

The service life of electrolytic capacitors is mainly affected by ambient temperature and use conditions. According to supplier specifications, under the limiting condition of maximum operating temperature 105°C, the service life is 7000 hours. Ideally, for every 10°C decrease in operating temperature, the service life doubles.

If electrolytic capacitors are stored for a long time without use, the electrolyte gradually loses activity and rated voltage must be applied periodically for excitation to maintain electrolyte activity.

□ Knob Potentiometer

According to supplier specifications, the full rotation angle of the knob potentiometer is 250° $\pm$ 10°; rotational life:

1 00cycles, $\Delta R/R \leq \pm (2\Omega + 3\%)$ 。

□ MTBF

Mean time between failures: MTBF > 500000 h.

After-Sales Service

- For usage questions, contact sales or technical support. Technical support contact information is shown on the last page of this manual.
- The warranty period of this product is valid for one year from the shipment date. Free repair service is provided within the warranty period.
- If a fault occurs when the product is used normally according to this manual, contact sales to return it for repair.
To facilitate inspection and repair, please describe the fault cause or phenomenon in detail as much as possible.
- In the following cases, the user is responsible:
 - 1 - Damage caused by improper use, improper repair, or modification;
 - 2 - Damage caused by falling or transportation after delivery;
 - 3 - Damage caused by use outside the product specification requirements;
 - 4 - Damage caused by fire, earthquake, lightning, wind disaster, chloride corrosion, or other natural disasters;
 - 5 - Damage caused by intrusion of water, oil, metal fragments, or other foreign objects.

For parts with a stated standard service life, conditions beyond their respective service life are excluded.

