

**Low-Voltage Built-in Brushless Driver
EA-BLDC20-800-L-RC 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
V 1.01	2021.03.03	Created	Shen Yangyang
V 1.02	2021.08.10	Modified the description of the pole-pair setting method	Shen Yangyang
V 1.03	2021.09.25	Modified contact information	Hua Rongyu
V 1.04	2022.01.11	Updated PLC wiring diagram	Shen Yangyang

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. ■ Do not expose this product to water vapor, corrosive gas, flammable gas, or similar environments; otherwise electric shock or fire may occur. Install the drive and accessories away from ignition sources, heat-generating objects, and flammable materials. ■ Do not modify any internal parts or circuits of the driver by yourself. ■ The rated voltage of the drive power supply system is DC24V. First test whether the drive and motor operate normally without load, and then connect the load to avoid unnecessary hazards. ■ Install the driver and accessories away from fire sources, heating elements, and flammable materials. ■ Notes To explain product details thoroughly, this manual may show the product with the housing or safety cover removed. During operation, always install the housing properly and wire the product correctly. Operate according to this manual to ensure safety. ■ Before the machine starts operation, confirm that the emergency stop device can be activated at any time. ■ When product documentation is updated or revised, obtain the latest version from the the manufacturer website or the We Chat official account. Updates are subject to change without further notice. ■ For product usage questions, contact drive technical support.
WARNING 	■ Do not input DC power into the driver output I/O terminals. ■ driver install power supply rated voltage DC 24V~48V. ■ 2.1 System Interface 2.2 Interface Definitions ■ 2.4 DIP Switch Description 2.5 Keypad USB Interface Description ■ Do not use for vertical load lifting/lowering. ■ Only qualified professionals may install, wire, and repair it.

Note:

- 1 , manual product, housing safety cover, illustration/text form During operation, install the casing and wire the product correctly as specified, and operate according to this manual to ensure.
2. The icons in this manual are illustrative examples and may differ slightly from the actual product, but this will not affect customer rights.
- 3 , product documents modified content, can the manufacturer official account (see the QR code below). Updates are subject to change without prior notice.
4. For product use questions, consult driver technical support (see the QR code below).

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I. Product Inspection and Description

1.1 Product Inspection

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

- Whether it is the product purchased: check the model on the driver package nameplate; refer to the model description below.
- 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:

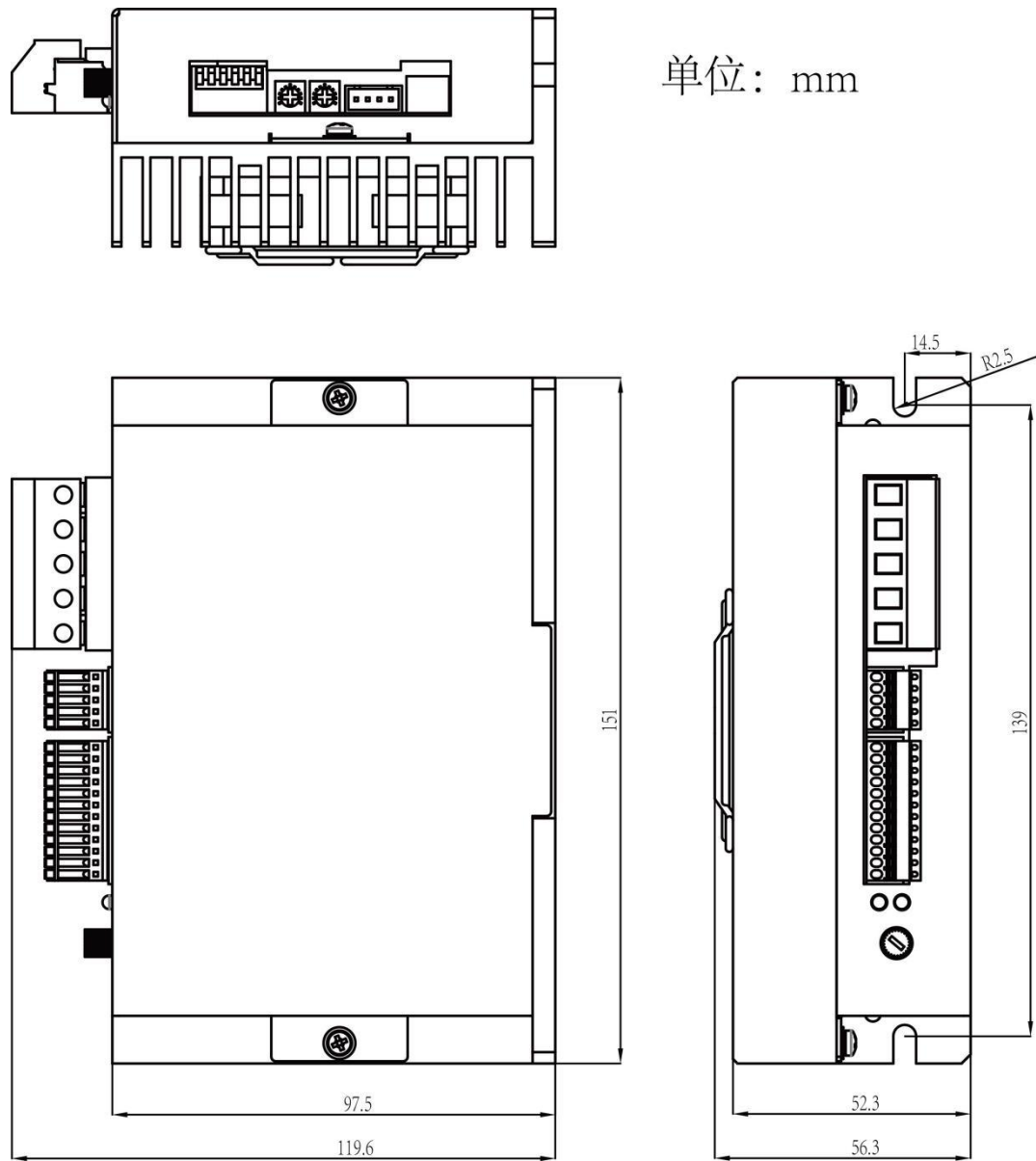
- (1) EA-BLDC20-800-L-RC driver - 1 unit;
- (2) 5 -Pin power supply/Motor phase wires terminal - 1 pc;
- (3) 12 -Pin I/O Terminal - 1 pc;
- (4) 5 -Pin Hall terminal - 1 pc;
- (5) 3 -Pin CAN communication terminal - 1 pc;
- (6) Port connection wire/AWG 24 - 5 pcs.

Model Description	
Input Voltage	DC24V~48V($\pm 10\%$)
Out Curr.	3.0 A~27A(can through Knob adjustment current limit output)
Out Power	DC24V, 400W
	DC48V, 800W
Compatible Motor	DC24V, motor $\leq 400W$
	DC48V, motor $\leq 800W$
Default Speed	3000rpm
Number of Pole Pairs	5 (other pole-pair counts can be set by DIP switch or keypad)
Digital Input	DI1~DI5 NPN/PNP
Digital Output	DO 1 Fault output, DO 2 Speed output
Analog Input	external Analog voltage PWM(0 to 5 V / 10 V)
HDI input	
Knob	Speed adjustment knob, acceleration adjustment Knob, current limit adjustment Knob
Cooling Method	Natural air cooling
Communication	RS485 MODBUS communication: baud rate1200~57600/frame $\geq 30ms$; CAN Modbus, CANopen Communication
Protection Rating	IP 20
Protection Functions	Undervoltage, overvoltage, overcurrent, overload, stall, short circuit, phase loss, overtemperature, etc.
External keypad (optional)	support

Type	Built-in Type
Operating Mode	Open-loop and closed-loop (control accuracy $\pm 0.5\%$)
Brake	electromagnetic braking

II. Product Dimensions, Environmental Conditions, and Installation

2.1 Product Dimensions



2.2 Operation, Storage, Handling Environmental Characteristics

The driver must never be exposed to harsh environments such as dust, sunlight, corrosive or flammable gases, grease, moisture, waterdrops, or vibration.

The salt content in the air must be kept below 0.01 mg/cm² per year.

Protection Rating		IP 20: 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°C or 40 to 50°C (derating required)
			Side-by-side Installation	-10~30°C -20 to -10°C or 30 to 40°C (derating required)
		Storage	-33~65°C	
		Transportation	-20~50°C	
		Non-condensing, non-freezing		
		Rated Humidity	Operation	Max.85%
	Storage / Transportation		Max.90%	
	Condensation prohibited			
	Atmospheric Pressure		Operation	86~106k Pa
		Storage / Transportation	70~106k Pa	
	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/Transport	Continuous vibration prohibited		
Shock	Operation/Storage/Transport	Excessive impact prohibited		

2.2.1 Storage Environmental Conditions

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

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

2.2.2 Operating Environmental Conditions

Operating Conditions	Ambient Temperature Limit
Abnormal Ambient	When operating at rated current, the ambient temperature must be between -10 and

Temperature Operation	40°C. When the ambient temperature exceeds 40°C, for every 1°C increase, reduce the rated current by 2.5%. The maximum ambient temperature is 50 deg C.
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, 100 reduce rated current by 1% or lower the operating ambient temperature by 0.5°C. If use above 2000 m altitude is required, please contact the manufacturer.

For long-term operation, an ambient temperature below 40°C and a well-ventilated location are recommended to ensure product reliability.

At altitudes above 1000 m, thinner air reduces insulation strength and heat dissipation, derating is required; high-altitude areas are not recommended.

In addition, the operating conditions include:

- 1 - A location without large heat-generating equipment;
- 2 - A location without water drops, vapor, dust, or oily dust;
- 3 - A location without corrosive or flammable gases or liquids;
- 4 - A location without floating dust or metal particles;
- 5 - A solid location without vibration;
- 6 - A location without electromagnetic noise interference.

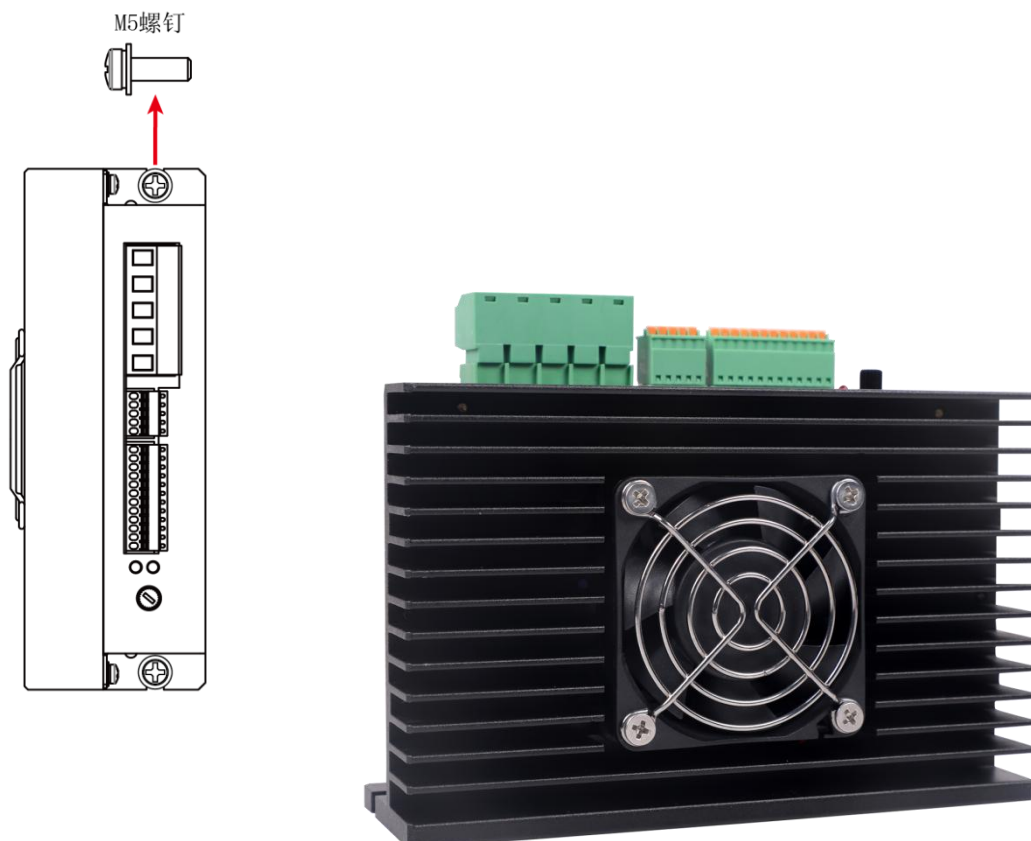
2.3 Installation Instructions

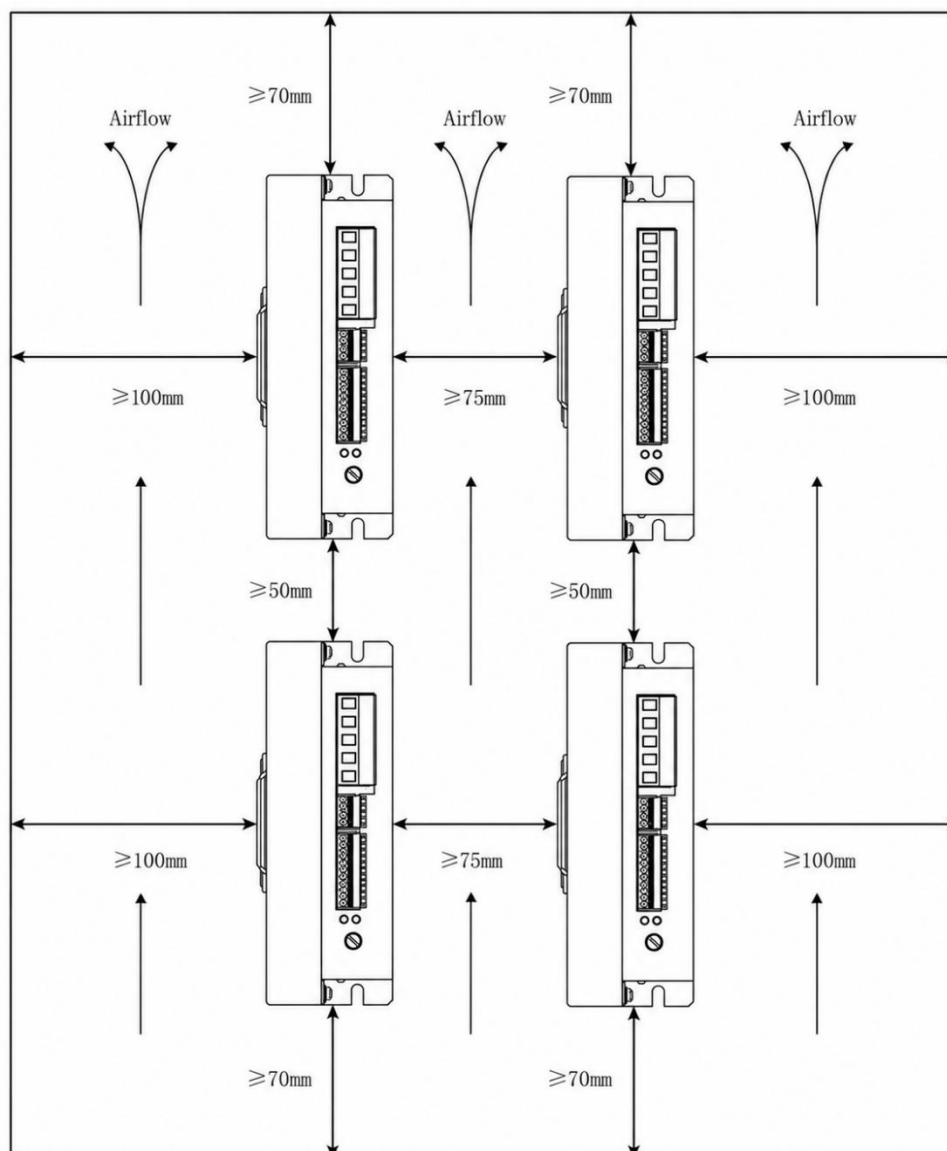
product 7 Wall-mounted installation, wherewith washer fixing(figure below), install reliably heat dissipation mounting surface, mounting surface hole distance 139~141mm, reliably grounding, otherwise fire may occur.

Recommended installation spacing: when multiple drivers are installed side-by-side, keep the spacingkeep 75 mm.product heat dissipation fan, ventilation space.

use 485 communication, CAN communication Port, install distance, Caution cable(see 6.2 chapter section).

The installation diagram and spacing diagram are shown below:





*The spacing distances and text annotations in the installation diagram are not to scale; use the text annotations as the reference.

Precautions

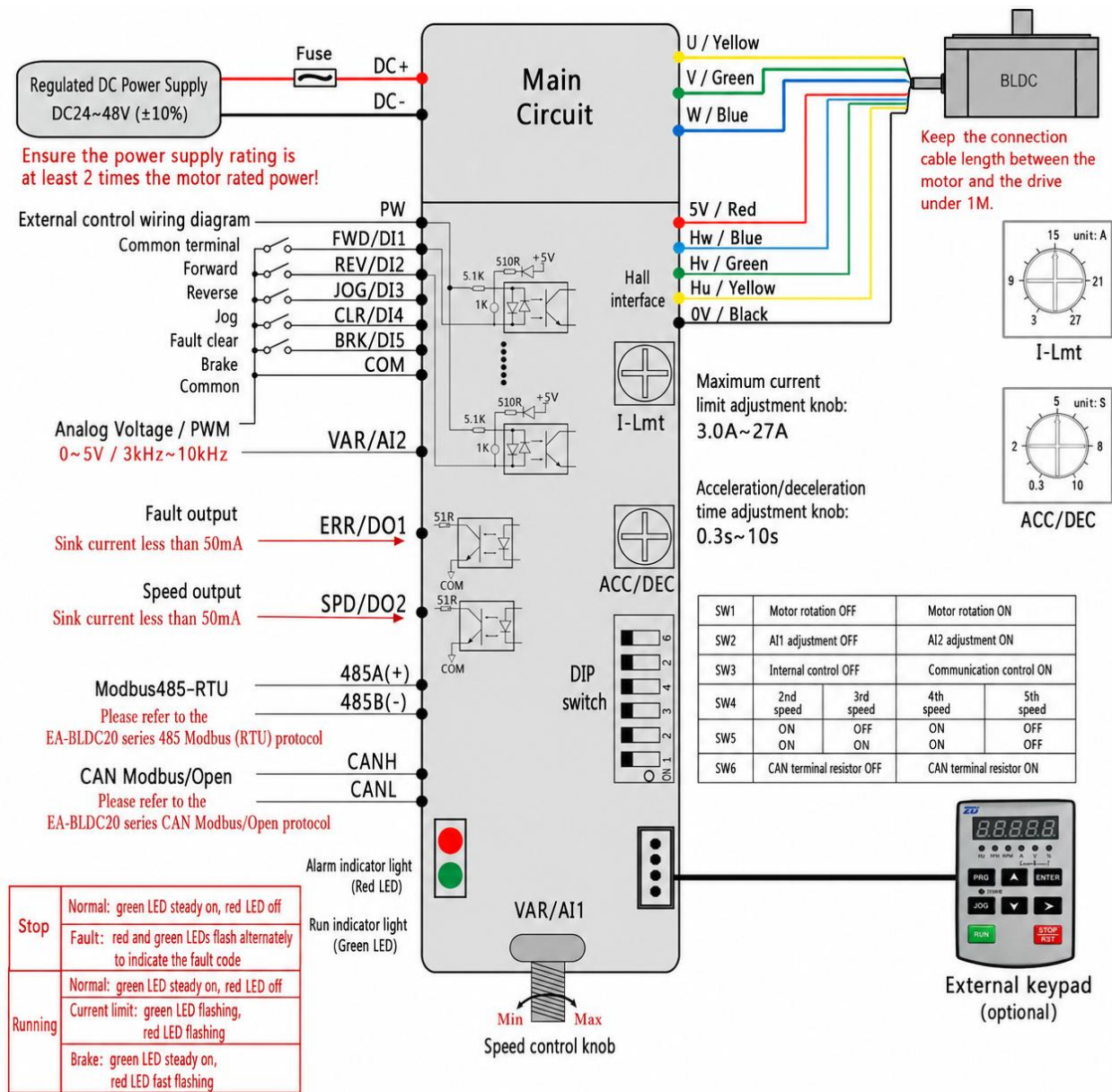
Users should pay special attention to the following:

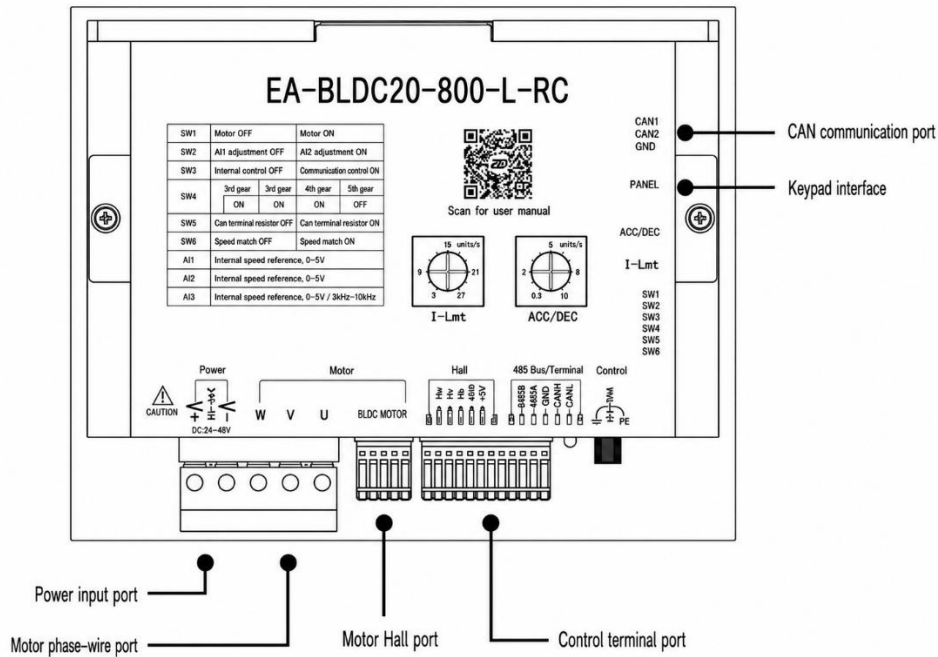
- 1 - Do not tension the connection cable between the driver and motor to prevent loosening or detachment;
- 2 - When fixing the driver, all mounting screws must be tightened;
- 3 - The motor shaft center must be well aligned with the equipment shaft center;
- 4 - The screws used to fix the motor must be tightened.

III. Wiring Method

3.1 Wiring Diagram

The figure below shows the EA-BLD EA-BLDC20-800-L-RC wiring diagram:





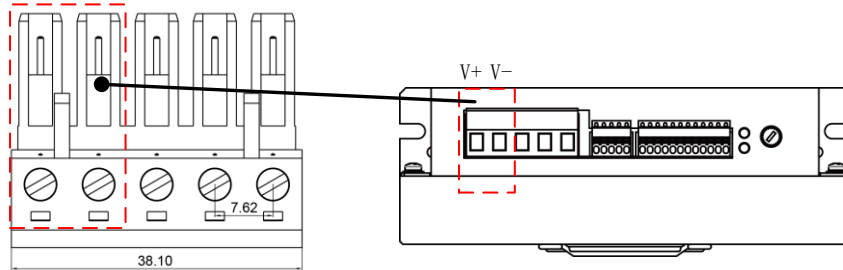
Precautions:

- 1 - Before wiring, turn off the power supply first. Wiring must be performed by professionals to ensure personal safety;
- 2 - Do not connect the power cable to terminals other than the power terminal; otherwise the driver may be damaged;
- 3 - The grounding terminal must be well grounded;
- 4 - Tighten the screws between each terminal and wire securely to prevent loosening due to vibration;
5. Select the wire size according to electrical regulations when wiring;
- 6 - Make sure the power supply capacity is more than twice the rated motor power;
- 7 - It is recommended that the cable between motor and driver be shorter than 1 m;
- 8 - After completing circuit wiring, check the following again:
 - (1) Are all connections correct (pay special attention to whether the power cable is connected incorrectly)?
 - (2) Are any wires missing?
 - (3) Is there any short circuit between terminals and cables or short circuit to ground?

3.2 Port

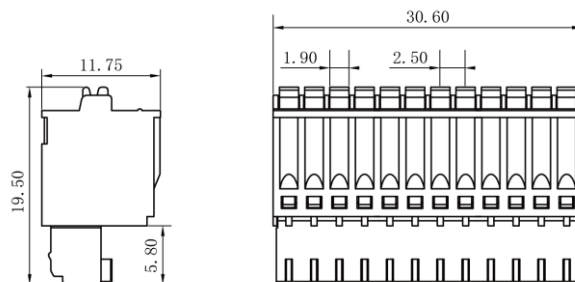
3.2.1 OFF=60W; ON=90W

pluggable terminal block, screw wiring method, use flat-blade screwdriver (tip diameter $\leq 3\text{mm}$).power terminal DC input DC 24 V to 48 V, wire according to the top-cover marking, do not reverse the polarity.



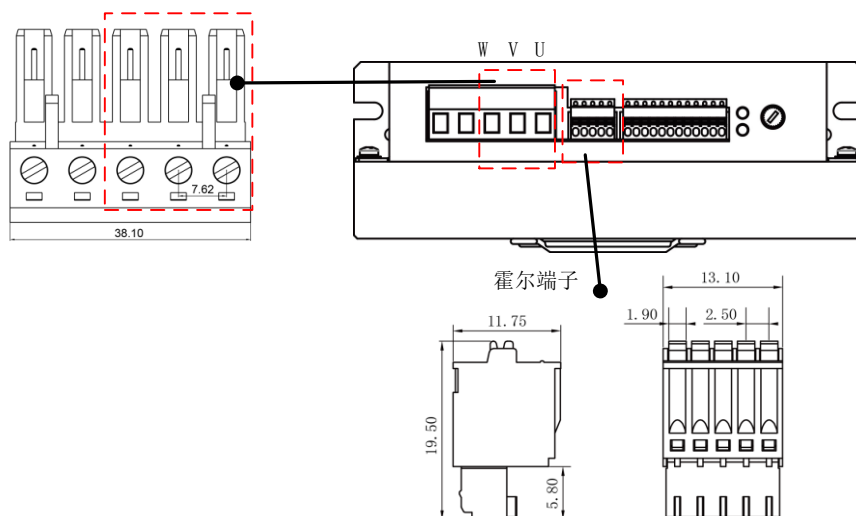
3.2.2 control terminal

Pluggable terminal - 12P, spring wiring, using a flat-blade screwdriver (blade width $\leq 2\text{ mm}$). During use, press the button above the wiring hole, insert the stripped wire, and release it. The wire should not come loose.



3.2.3 SW1(50)

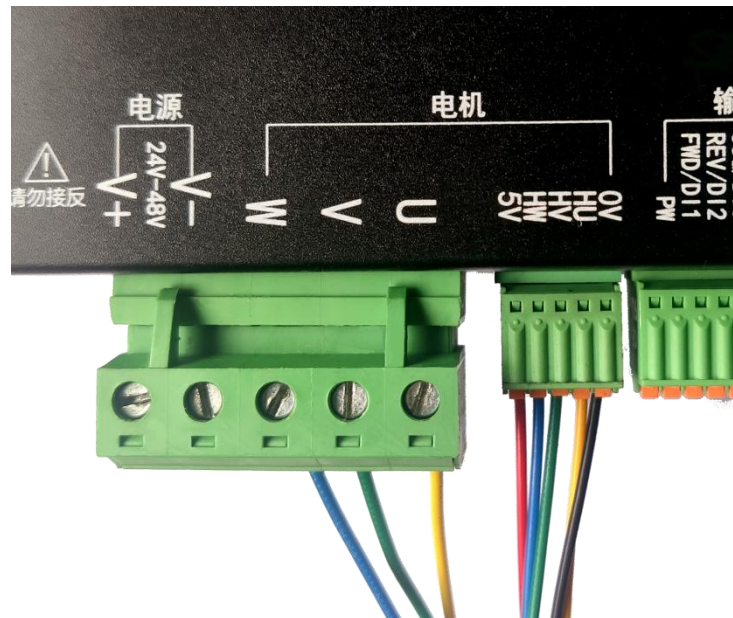
low-voltage Motor phase wires Hall wire separated.Motor phase wires screw wiring method, use flat-blade screwdriver (tip diameter $\leq 3\text{mm}$).Hall terminalspring wiring method, use flat-blade screwdriver (tip width $\leq 2\text{mm}$).



Wiring signal and wire-color correspondence (motor model):

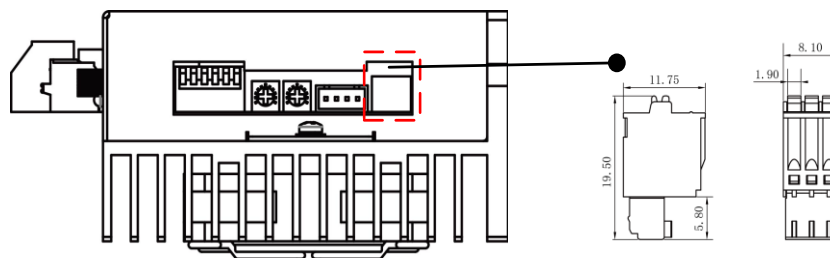
Signal	W	V	U	5V	HW	HV	HU	0V
Wire Color	Thick blue	Thick green	Thick yellow	Red	Blue	Green	Yellow	Black

wiring diagram:



3.2.4 CAN Communication Interface

CAN Communication Interface pluggable terminal block-3P, spring wiring method, use flat-blade screwdriver (tip width $\leq$ 2mm), CAN communication wiring Function use see chapter section.



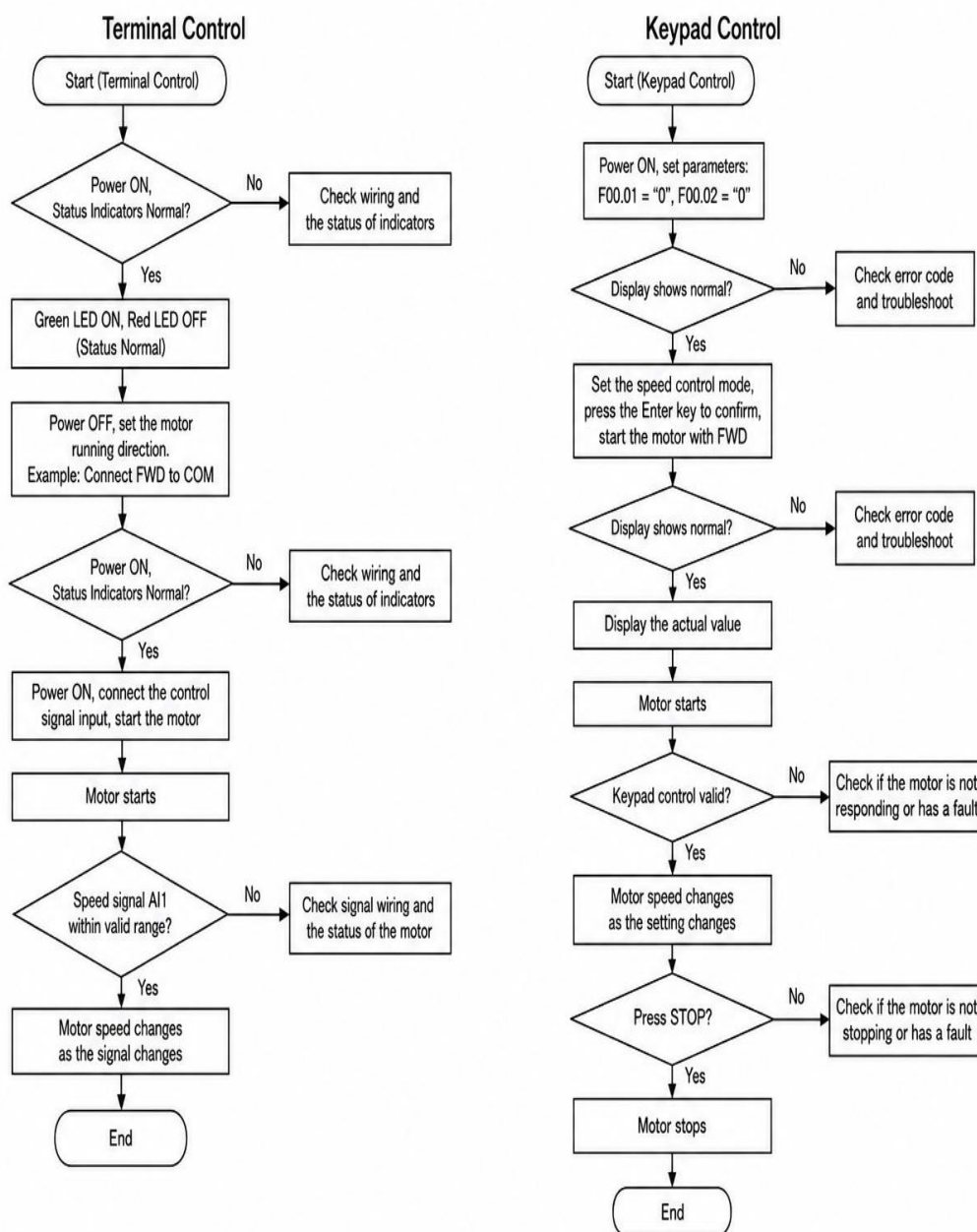
3.2.5 Keypad Interface

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

IV. Operation Instructions

Precautions:

- 1、Product factory default Terminal Control, Keypad Control keypad accessory (EA-BLDC20-KB5T-U);
- 2、manual keypad function code used for EA-BLDC20-800-L-RC product, used for C20 products. For details, see the C20 Series Keypad Function Code User Manual;
- 3、Operation product should qualify personnel;
- 4、use no-load commissioning, figure below no-load commissioning flowchart (: Terminal Control; : control; default factory setting state):



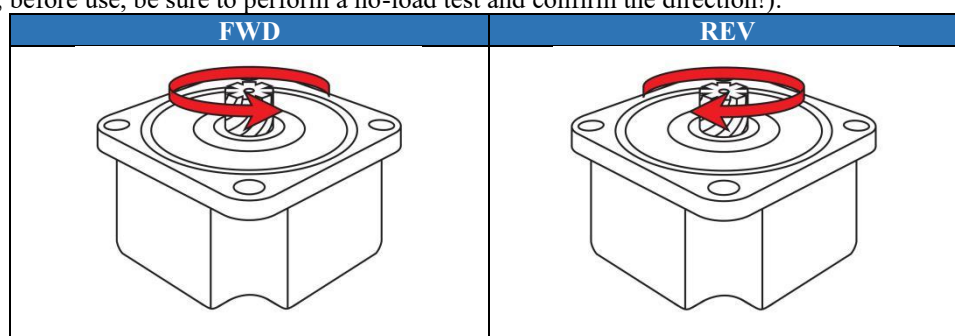
4.1 Terminal Control

4.1.1 Port Overview

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
Common Terminal	PW	used for external power supply NPN/PN Pairing
Input	FWD/DI1	Forward
	REV/DI2	Reverse
	JOG/DI3	Jog
	CLR/DI4	reset
	BRK/DI5	Brake (Electromagnetic Brake)
Common Terminal	COM	
Output	ERR/DO1	Fault Output (Open-collector Output)
	SPD/DO2	Speed output (open-collector output)
Analog	VAR/AI2	Analog voltage/PWM(0 to 5 V / 10 V)
485	A+	RS485+
	B-	RS485-

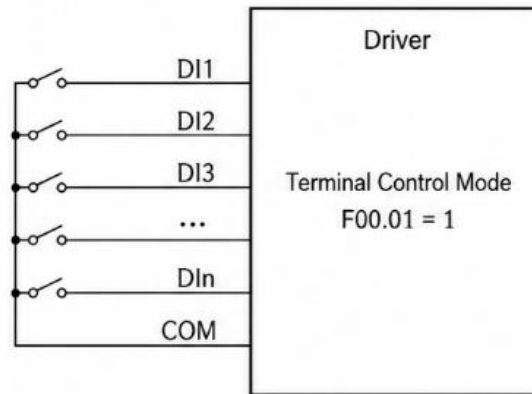
Motor rotation direction under factory default state (motors with different pole pairs may have different default directions; before use, be sure to perform a no-load test and confirm the direction!):



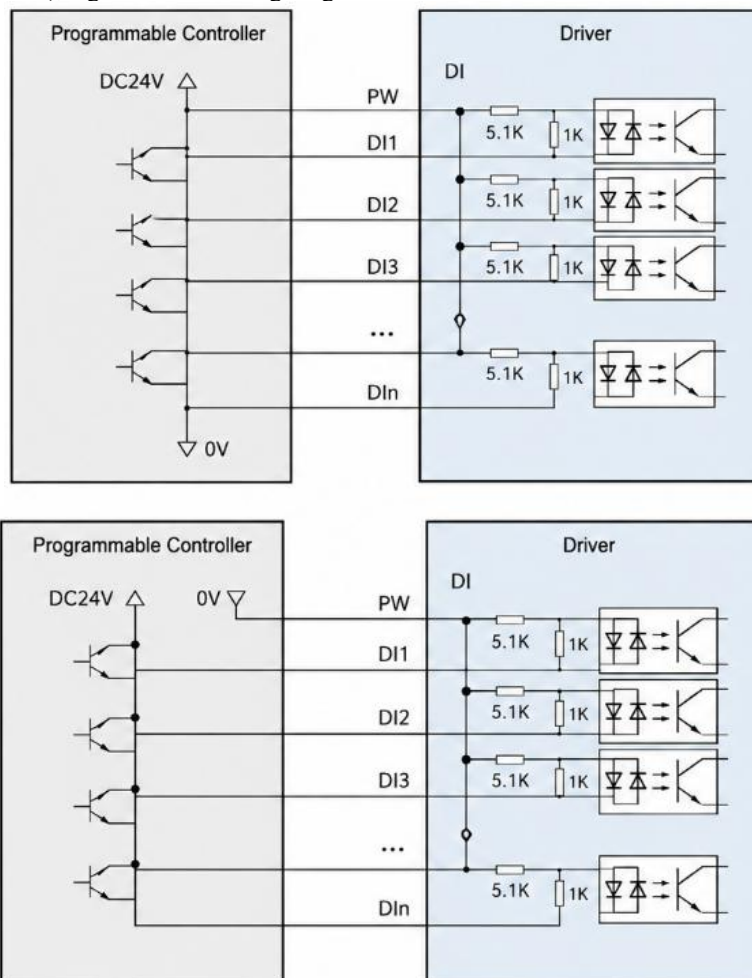
4.1.2 Input Terminals

- In terminal control, directly short the input terminal (FWD) to the common terminal (COM) to run the motor forward;
- short the input terminal (REV) to the common terminal (COM) to run the motor in reverse;
- when the jog terminal (JOG) is connected to the common terminal (COM), jog operation starts and the motor runs slowly;
- when a driver fault occurs, connect reset (CLR) to the common terminal (COM) for reset operation;
- when brake (BRK) is connected to the common terminal (COM) 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 safer range before braking as much as possible.

Users may connect an external switch (relay).



external PLC(NPN/PNP), figure below wiring diagram:



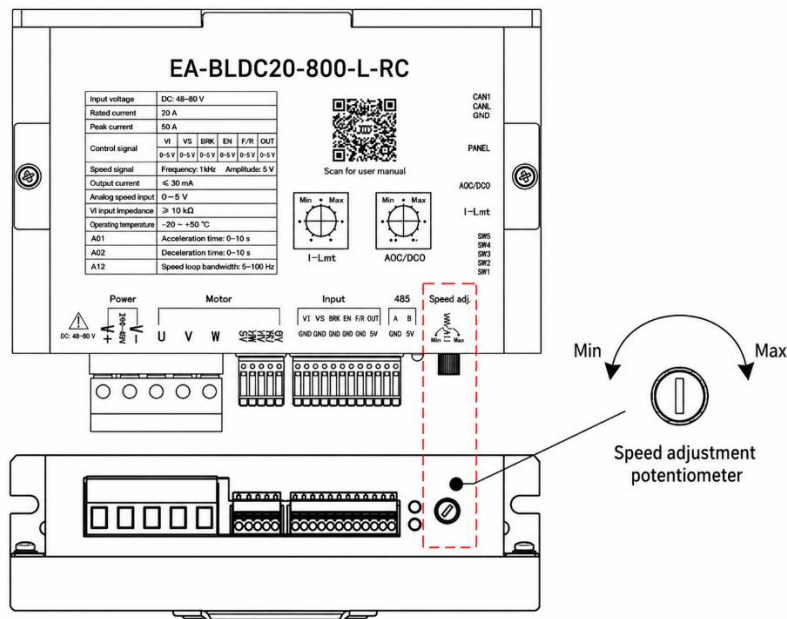
Caution:

- 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.

4.1.3 Analog AI 1 (built-in Knob Potentiometer) speed setting

Analog AI1 (built-in knob potentiometer) speed reference is the factory default speed reference selection for this product. Adjust the knob to adjust the speed.

Adjust by hand or with a flat-blade screwdriver (blade diameter ≤ 3.6 mm). Turn the potentiometer clockwise to increase speed and counterclockwise to decrease speed.



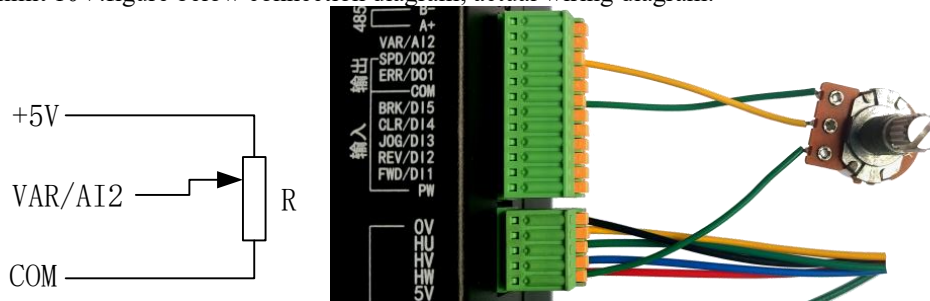
4.1.4 I-Lmt Current-Limit Adjustment Knob

I-Lmt current limit adjustment Knob product factory default current limit adjustment method, use Phillips screwdriver (tip diameter≤3mm) Turn the potentiometer clockwise to increase current and counterclockwise to decrease current. Maximum current-limit adjustment range:3A~15A.

4.1.5 Analog AI 2(external voltage) speed setting

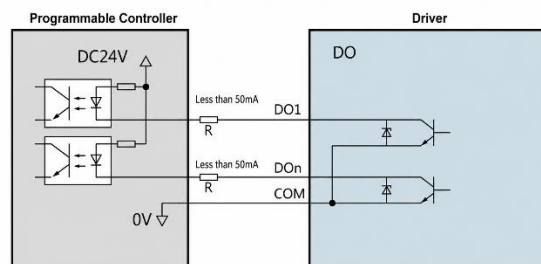
For analog AI2 (external voltage) speed reference, set function code F00.02 to "2" through the keypad. Speed is adjusted by changing the external input voltage (default 0 to 5 V). The user must connect an external potentiometer (recommended resistance: 10 kΩ).

To change to 0 to 10 V external voltage input, set function code F05.39 to "10" through the keypad. The input upper limit 10V.figure below connection diagram; actual wiring diagram.



4.1.6 Output Terminal

Open-collector output, sink current less than 50 mA. DO1 defaults to fault output, and DO2 defaults to speed output. Function codes F06.01 and F06.02 can be modified through the keypad to change output selection. The output terminal can be connected to PLC control. The simplified wiring diagram is shown below:



4.1.7 RS485 Communication Port

This product supports 485 communication control using the MODBUS (RTU) protocol (see Chapter VI).

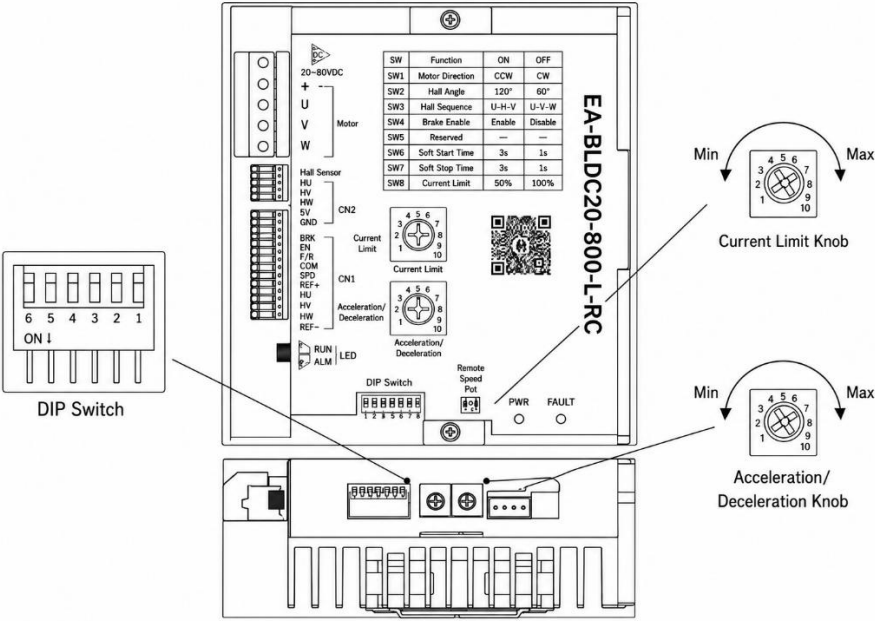
4.1.8 CAN Communication Port

Product support CAN communication control, MODBUS(see chapter section) CANopen (see chapter section).

4.1.9 Analog ACC/DEC (built-in Knob Potentiometer) Acceleration/deceleration time setting

Analog ACC/DEC (built-in Knob Potentiometer) Acceleration/deceleration time setting product factory default Acceleration/deceleration time setting selection, adjustment Knob CAN adjustment Acceleration/deceleration time. Separated setting acceleration time deceleration time, keypad modify Function code F 00.080, setting F 00.11 acceleration time F 00.12 deceleration time.

use Phillips screwdriver (tip diameter≤3mm) adjustment, clockwise to extend acceleration/deceleration time (decrease acceleration), and counterclockwise to shorten acceleration/deceleration time (increase acceleration rate).



4.1.10 DIP switch

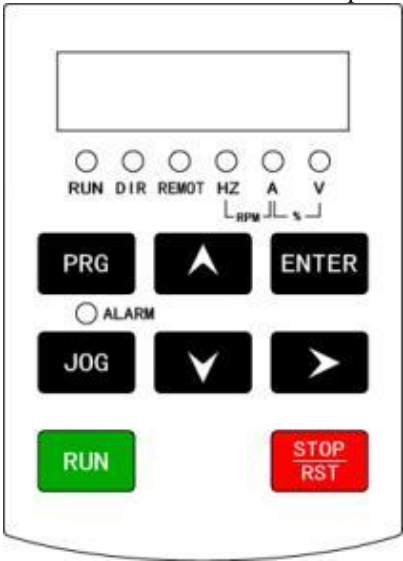
There are six DIP switches, SW1-SW6. The down position is ON and is the factory-default control mode of the driver.

SW1 (Open/Closed-Loop Selection)	Open loop=OFF				Closed loop=ON			
SW2 (Analog Selection)	AI1=OFF				AI2=ON			
SW3 (Control Mode Selection)	Internal=OFF				communication=ON			
SW4 (Motor Pole-Pair Matching)	2 pole pairs	ON	3 pole pairs	OFF	4 pole pairs	ON	5 pole pairs	OFF
SW5 (Motor Pole-Pair Matching)		ON		ON		OFF		OFF
SW6 (connected terminal resistor)	485 terminal resistor connected=ON							

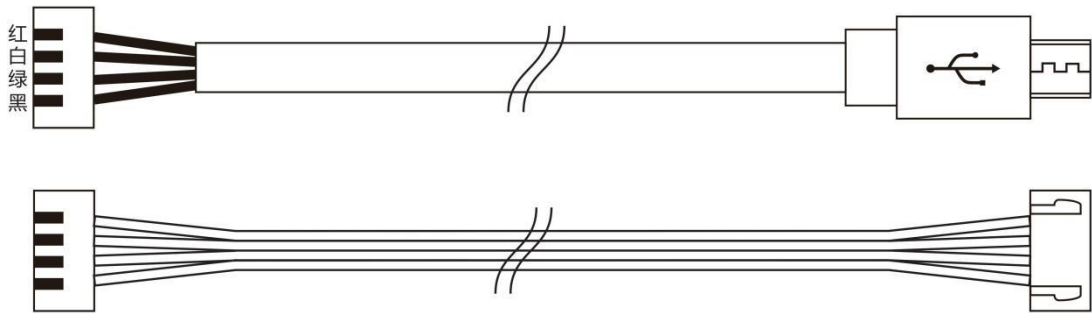
4.2 Keypad Control

4.2.1 Keypad Introduction

The external keypad EA-BLDC20-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.



键盘连接线，长度500mm

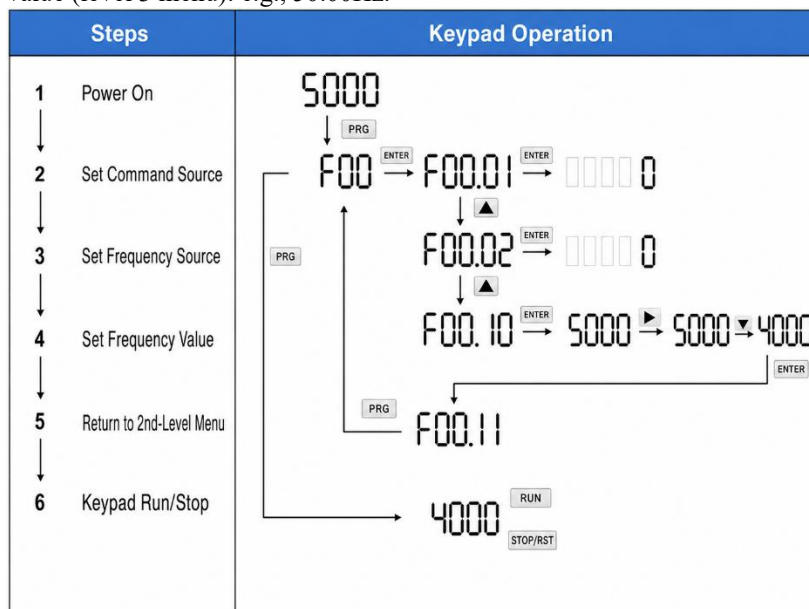
No.	Name	Description		
1	Display	5-digit display, display Function code, operating parameters fault alarm.		
2	Status Indicator	RUN	Off: stopped; flashing: parameter identification; on: running	
		DIR	Off: forward; on: reverse	
		REMOT	Off: keypad control; flashing: terminal control; on: communication 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
		Λ	Increment Key	Increase data or function code
		∇	Decrement Key	Decrease data or function code
		>	Right-shift key	In the stop and run display screens, press right shift to cycle through displayed parameters; when editing parameters, it selects the digit to modify
		JOG	Jog Key	start JOG operation (External Keypad JOG)

No.	Name	Description		
		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

4.2.2 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; F02.05

4.2.3 Function Codes

The C20 driver parameters are grouped by function, with 11 groups from F00 to F10. Other hidden groups are reserved. Each function group includes several 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 3: DIP switch (some models SW 1 valid)	3	R/W*
F00.01	Run Command Selection	0: Keypad run command channel (LED off) 1: Terminal run command channel (LED flashing) 2: Communication run command channel (LED on) 3: DIP switch (some models SW 3 valid)	3	R/W
F00.02	Speed Selection Reference	0: keypad digital setting 1: Analog AI1 setting (knob potentiometer) 2: Analog AI2 setting (external voltage) 3: MODBUS communication setting 4: Multi-step speed setting 5: DIP switch (some models SW 2, SW 3 valid)	5	R/W

Parameter	Name	Setting Range	Default	Attribute
		6 : Simple PLC setting (F04 group) 7 : High-speed pulse input setting (select HDI in F05.00) 8 : CAN communication setting (some models valid)		
F00.03	Running frequency upper limit	F00.04~500.00Hz	250.00Hz	R/W*
F00.04	Running frequency lower limit	0.00Hz~F00.03(Maximum frequency)	5.00Hz	R/W*
F00.05	communication run command Comm. cmd ch. sel.	0 : MODBUS communication 1 : CAN communication channel (valid on some models)	0	R/W*
F00.06	Pole-pair selection setting	0 : function code setting(F02.05) 1 DIP switch setting (valid on some models)	1	R/W*
F00.07	Current selection setting	0 : function code setting(F02.04) 1 Analog setting (valid on some models)	1	R/W*
F00.08	Acceleration/deceleration time setting selection	0: function code setting(F00.11. F00.12) 1: Analog setting (valid for keypad and terminals)	1	R/W*
F00.09	Jog set frequency	0.00Hz~F00.03(Maximum frequency)	10.00Hz	R/W
F00.10	keypad setting frequency	0.00Hz~F00.03(Maximum frequency)	250.00Hz	R/W
F00.11	Acceleration time 1	0.1~600.0s	1.0s	R/W
F00.12	Deceleration time 1	0.1~600.0s	1.0s	R/W
F00.13	Running selection direction	1.73 1: Run in reverse direction 2 : Reverse running prohibited	0	R/W
F00.14	Carrier setting frequency	8.0~20.0kHz	machine model confirm set	R/W*
F00.15	Parameter selection restore	0: No operation 1: Restore default function-code values 2 : recovery CANopen communication Parameter Default Parameter Description / Range	0	R/W*
F01 Start/Stop Control Group				
F01.05	Stop Mode Selection	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 time	0.1~999.9s	5.0s	R/W
F01.10	Stop speed	0.00-50.00 Hz Deceleration stop valid when	0.20Hz	R/W
F01.11	Forward/reverse switching limit freq	0.0-500.0 Hz Deceleration stop valid when	50.0Hz	R/W

Parameter	Name	Setting Range	Default	Attribute
F01.12	Electronic Brake Torque Holding Time	0.1~600.0s	0.0s	R/W
F01.13	Deceleration stop brake enable	0: Disabled 1: Enable brake during deceleration stop(F01.05=0 valid when)	1	R/W
F01.14	Reduction Numerator	1~9999	1	R/W
F01.15	Reduction Denominator	Displayed speed = motor speed / (reduction ratio numerator / reduction ratio denominator)	1	R/W
F02 Motor Parameter Group				
F02.00	motorrateduency	15~2200W	machine model confirm set	R/W*
F02.01	Motor rated frequency	0.01Hz~500Hz	machine model confirm set	R
F02.02	Motor rated speed	1~9999rpm	machine model confirm set	R
F02.03	Motor rated voltage	0~1200V	machine model confirm set	R
F02.04	Motor rated current	0.8~999.9A	machine model confirm set	R/W*
F02.05	Motor pole pairs	1~20	5	R/W*
F02.08	Special settings parameter	Bit 0: 0 =Hall count in default direction 1 =Hall count reversed(F09.29. F09.30) BIT 1: 0 =Speed display actual value 1 =Speed display setting value	0	R/W*
F03 Control Parameter Group				
F03.00 ~ F03.18	Reserved	Reserved	16.0	N
F04 Simple PLC and Multi-Speed Group				
F04.00	Simple PLC	0 : Stop after running once 1 : Keep final value after running once 2 : Cyclic running 3 -n: Cyclic runningn-1 stop, n9999	0	R/W
F04.01	Multi-speed 0	-100.0~100.0%	0.0%	R/W
F04.02	Multi-speed 1	-100.0~100.0%	0.0%	R/W
F04.03	Multi-speed 2	-100.0~100.0%	0.0%	R/W
F04.04	Multi-speed 3	-100.0~100.0%	0.0%	R/W
F04.05	Multi-speed 4	-100.0~100.0%	0.0%	R/W

Parameter	Name	Setting Range	Default	Attribute
F04.06	Multi-speed 5	-100.0~100.0%	0.0%	R/W
F04.07	Multi-speed 6	-100.0~100.0%	0.0%	R/W
F04.08	Multi-speed 7	-100.0~100.0%	0.0%	R/W
F04.09	Multi-speed 8	-100.0~100.0%	0.0%	R/W
F04.10	Multi-speed 9	-100.0~100.0%	0.0%	R/W
F04.11	Multi-speed 10	-100.0~100.0%	0.0%	R/W
F04.12	Multi-speed 11	-100.0~100.0%	0.0%	R/W
F04.13	Multi-speed 12	-100.0~100.0%	0.0%	R/W
F04.14	Multi-speed 13	-100.0~100.0%	0.0%	R/W
F04.15	Multi-speed 14	-100.0~100.0%	0.0%	R/W
F04.16	Multi-speed 15	-100.0~100.0%	0.0%	R/W
F04.17	Segment 0 running time	0.0~999.9s(m)	0.0s	R/W
F04.18	Segment 1 running time	0.0~999.9s(m)	0.0s	R/W
F04.19	Segment 2 running time	0.0~999.9s(m)	0.0s	R/W
F04.20	Segment 3 running time	0.0~999.9s(m)	0.0s	R/W
F04.21	Segment 4 running time	0.0~999.9s(m)	0.0s	R/W
F04.22	Segment 5 running time	0.0~999.9s(m)	0.0s	R/W
F04.23	Segment 6 running time	0.0~999.9s(m)	0.0s	R/W
F04.24	Segment 7 running time	0.0~999.9s(m)	0.0s	R/W
F04.25	Segment 8 running time	0.0~999.9s(m)	0.0s	R/W
F04.26	Segment 9 running time	0.0~999.9s(m)	0.0s	R/W
F04.27	Segment 10 running time	0.0~999.9s(m)	0.0s	R/W
F04.28	Segment 11 running time	0.0~999.9s(m)	0.0s	R/W
F04.29	Segment 12 running time	0.0~999.9s(m)	0.0s	R/W
F04.30	Segment 13 running time	0.0~999.9s(m)	0.0s	R/W
F04.31	Segment 14 running time	0.0~999.9s(m)	0.0s	R/W
F04.32	Segment 15 running time	0.0~999.9s(m)	0.0s	R/W

Parameter	Name	Setting Range	Default	Attribute
F04.33	PLC restart mode selection	0 : Restart from the first segment 1: continue running from the interrupted segment frequency	0	R/W*
F04.34	Multi-segment time unit selection	0: seconds (s) 1: minutes (m)	0	R/W*
F05 Input Terminal Parameter Group				
F05.00	HDI function selection	0:DI 3 as normal IO input 1:DI 3 as HDI high-speed pulse input	0	R/W*
F05.01	DI 1 terminal function selection	0: No function 1: forward running 2: reverse running 3: Three-wire run control 4: Forward jog 5: reverse jog 6: Coast stop 7: Fault reset 8: brake 9: External fault input 10 ~13: Reserved 14: Forward limit 15: Reverse limit 16: Multi-speed 1 17: Multi-step Speed 2 18: Multi-speed 3 19: Multi-speed 4 Other: Reserved	1	R/W*
F05.02	DI 2 terminal function selection		2	R/W*
F05.03	DI3 Terminal Function Selection		4	R/W*
F05.04	DI 4 terminal function selection		7	R/W*
F05.05	DI 5 terminal function selection		0	R/W*
F05.06	DI 6 terminal function selection		0	R/W*
F05.07	DI 7 terminal function selection		0	R/W*
F05.08	DI 8 terminal function selection		0	R/W*
F05.09	Reserved		0	R/W*
F05.10	Input terminal polarity selection	0x000~0x1FF	0x000	R/W
F05.11	Digital input filter time	0.000~1.000s	0.010s	R/W
F05.12	Virtual terminal setting	0 x 000-0 x 10 F(0: disabled,1: enabled) BIT 0: DI1 virtual terminal BIT 1: DI2 virtual terminal BIT 2: DI3 virtual terminal BIT 3: DI4 virtual terminal BIT 4: DI5 virtual terminal BIT 5: DI6 virtual terminal BIT 6: DI7 virtual terminal BIT 7: DI8 virtual terminal	0x000	R/W*
F05.13	Terminal-control run mode	0: two-wire control 1 1: two-wire control 2 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
F05.15	DI1 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.16	DI2 terminal ON delay time	0.000~9.999s	0.000s	R/W

Parameter	Name	Setting Range	Default	Attribute
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	DI4 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.21	DI4 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.22	DI5 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.23	DI5 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.24	DI6 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.25	DI6 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.26	DI7 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.27	DI7 terminal OFF delay time	0.000~9.999s	0.000s	R/W
F05.28	DI8 terminal ON delay time	0.000~9.999s	0.000s	R/W
F05.29	DI8 terminal OFF delay time	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	AI 1 lower limit value	0.00V~F05.34	0.50V	R/W
F05.33	AI 1 lower limit corresponding to setting	-300.0%~300.0%	0.0%	R/W
F05.34	AI 1 upper limit value	F05.32~10.00V	8.50V	R/W
F05.35	AI 1 upper limit corresponding to setting	-300.0%~300.0%	100.0%	R/W
F05.36	AI 1 input filter time	0.000s~9.999s	0.030s	R/W
F05.37	AI 2 lower limit value	0.00V~F05.39	0.20V	R/W
F05.38	AI 2 lower limit corresponding to setting	-300.0%~300.0%	0.0%	R/W
F05.39	AI 2 upper limit value	F05.37~10.00V	4.80V	R/W
F05.40	AI 2 upper limit corresponding to setting	-300.0%~300.0%	100.0%	R/W

Parameter	Name	Setting Range	Default	Attribute
	setting			
F05.41	AI 2 input filter time	0.000s~9.999s	0.030s	R/W
F05.42	AI 3 lower limit value	0.00V~F05.44	0.50V	R/W
F05.43	AI 3 lower limit corresponding to setting	-300.0%~300.0%	0.0%	R/W
F05.44	AI 3 upper limit value	F05.42~10.00V	8.50V	R/W
F05.45	AI 3 upper limit corresponding to setting	-300.0%~300.0%	100.0%	R/W
F05.46	AI 3 input filter time	0.000s~9.999s	0.030s	R/W
F05.47	AI 4 lower limit value	0.00V~F05.49	0.50V	R/W
F05.48	AI 4 lower limit corresponding to setting	-300.0%~300.0%	0.0%	R/W
F05.49	AI 4 upper limit value	F05.47~10.00V	8.50V	R/W
F05.50	AI 4 upper limit corresponding to setting	-300.0%~300.0%	100.0%	R/W
F05.51	AI 4 input filter time	0.000s~9.999s	0.030s	R/W
F05.52	HDI lower limit frequency value	0.00 KHZ~F05.54	0.00 KHZ	R/W
F05.53	HD lower limit corresponding to setting	-100.0%~100.0%	0.0%	R/W
F05.54	HDI upper limit frequency value	F05.52~20.00 KHZ	19.99 KHZ	R/W
F05.55	HD upper limit corresponding to setting	-100.0%~100.0%	100.0%	R/W
F05.56	HDI input filter time	0.000s~9.999s	0.030s	R/W
F06 Output Terminal Parameter Group				
F06.00	Reserved	0~1	0	R/W*
F06.01	DO 1 output selection	0: In valid 1: Running 2: Forward running 3: Reverse running 4 : Jog running 5 : Driver Fault 6 : Overload Warn 7 : Underload Warn 8: communication virtual terminal output 9 : Low Bus Volt. 10 : Speed output(Hall Signal) Other: Reserved	5	R/W
F06.02	DO2 output selection		10	R/W
F06.03	DO3 output selection		0	R/W
F06.04	DO4 output selection		0	R/W
F06.05	Output terminal		00	R/W

Parameter	Name	Setting Range	Default	Attribute
	polarity selection			
F06.06	DO 1 ON delay time	0.000~9.999s	0.000s	R/W
F06.07	DO 1 OFF delay time	0.000~9.999s	0.000s	R/W
F06.08	DO2 ON delay	0.000~9.999s	0.000s	R/W
F06.09	DO2 OFF delay	0.000~9.999s	0.000s	R/W
F06.10	DO3 ON delay	0.000~9.999s	0.000s	R/W
F06.11	DO3 OFF delay	0.000~9.999s	0.000s	R/W
F06.12	DO4 ON delay	0.000~9.999s	0.000s	R/W
F06.13	DO4 OFF delay	0.000~9.999s	0.000s	R/W
F07 Fault and Protection Group				
F07.00	Driver or Motor Over/Underload Pre-alarm Selection	0x000~0x131 LED units 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: driver over/underload fault stop running 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 : not Protection 1: Protection	0	R/W*
F07.06	Motor overload protection factor	20.0%~120.0%	100.0%	R/W
F07.07	MO Senabled	0: Disabled 1 : enabled	0	R/W*
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 count	0 : No auto-reset 1 ~9999: reset count	0	R/W

Parameter	Name	Setting Range	Default	Attribute
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 reference) 1: UP forward jog, DN reverse jog (valid only on keypad stop or run screen)	0	R/W
F07.14	Undervoltage fault detection time	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 ~9999: User password protection enabled	0	R/W
F07.19	Fan control	0 : turn on fan in running state 1 : fan always running		
F08 Communication Group				
F08.00	485 slave address	1-247; 0 is broadcast address	1	R/W*
F08.01	485 communication baud-rate setting	0: 1200 BPS 1: 2400 BPS 2: 4800 BPS 3: 9600 BPS 4: 19200 BPS (default) 5: 38400 BPS 6: 57600 BPS Note: driver Not supported modify baud rate	4	R/W*
F08.02	485 data	0 No parity (N, 8, 1) for RTU 1 Even parity (E, 8, 1) for RTU 2: Odd parity (O, 8, 1) for RTU 3 No parity (N, 8, 2) for RTU Note: driver Not supported modify	0	R/W*
F08.03	485 communication response delay	0~200ms	5	R/W*
F08.04	485 communication timeout fault time	0.0 (in valid), 0.1-60.0s	0.0s	R/W*
F08.05	Reserved		0	R/W*
F08.06	485 communication action selection	0x0~0x1 LED units digit: 0: write operation has response 1: write operation has no response	0x00	R/W*
F08.10	CAN slave address	1~127	1	R/W*
F08.11	CAN baud rate	0 10 kΩ (not supported on some models) 1: 20K 2: 50K 3: 100K 4 125K (default) 5: 250K 6: 500K 7: 1M	4	R/W*

Parameter	Name	Setting Range	Default	Attribute
F08.12	CAN communication response delay	0~200ms	5ms	R/W*
F08.13	CAN communication protocol selection	0: CAN Modbus protocol 1: CANopen protocol (some models)	0	R/W*
F08.14	CAN function setting	CANopen function setting BIT 0-BIT 7: BIT 0: action selection when not Operational during running 0 = stop and report E.CAN 5 fault 1 = keep previous state BIT 1: heartbeat timeout action selection 0 = stop and report E.CAN 4 fault 1 = keep previous state BIT 2: enable CAN receive/send faults 0 = disable E.CAN 2 and E.CAN 3 faults 1 = enable E.CAN 2 and E.CAN 3 faults CAN Modbus function setting BIT 8-BIT 15: BIT 8: CAN Modbus broadcast response selection 0 = no response to broadcast 1 = respond to broadcast	0x00	R/W*
F09 Monitoring Parameter Group				
F09.00	setting frequency	0.00Hz~F00.03	0.00Hz	RO
F09.01	output frequency	0.00Hz~F00.03	0.00Hz	RO
F09.02	Ramp set frequency	0.00Hz~F00.03	0.00Hz	RO
F09.03	output voltage	0.0~1200.0V	0.0V	RO
F09.04	Out Curr.	0.00~100.00A	0.00A	RO
F09.05	setting speed	0~65535 RPM	0 RPM	RO
F09.06	motor speed	0~65535 RPM	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 value	0~7	0	RO
F09.10	Software version number	1.00~99.99	1.00	
F09.11	Current fault type	0: No Fault	0	RO
F09.12	Previous 1 st fault type	1: Hardware acceleration overcurrent (E.OCH 1) 2: Hardware deceleration overcurrent (E.OCH 2)	0	RO
F09.13	Previous 2 nd fault type	3: Hardware constant-speed overcurrent (E.OCH 3) 4: Overcurrent during acceleration (E.OC 1)	0	RO
F09.14	Previous 3 rd fault type	5 : Overcurrent during deceleration (E.OC 2)	0	RO

Parameter	Name	Setting Range	Default	Attribute
F09.15	Previous 4 th fault type	6: Overcurrent at constant speed (E.OC 3) 7: Overvoltage during acceleration (E.OV 1) 8: Overvoltage during deceleration (E.OV 2) 9: Overvoltage at constant speed (E.OV 3) 10 : Bus UV(E.Uv) 11: motor overload (E.OL 1) 12 : Driver OL (E.OL 2) 13 : Hall fault (E.HALL) 14: Stall fault (E.LOC) 15 : overheat (E.OH 1) 16 : inverter module overtemperature fault(E.OH 2) 17 : external fault(E.EF) 18 : 485 communication fault (E.485) 19 : Current detect fault(E.C Ur) 20 : Inverter unit U phase protection(E.O Ut 1) 21: inverter unit V-phase protection (E.O Ut 2) 22 : Inverter unit W phase protection(E.O Ut 3) 23 : overload (E.OL 3) 24 : fault (E.LL) 25 : MOS short-circuit fault(E.Sht) 26 : panel communication error(E.bo Ad) 27 : EEPROM storage fault (E.EEP) 28 : MOS Conduction fault(E.Cnd) 29 : hardware Overcurrent Feedback Fault (E.OCHF) 30 : Output phase loss (E.POUT) 31 : CAN Bus-off fault (E.CAN 1) 32 : CAN send error(E.CAN 2) 33 : CAN receive error(E.CAN 3) 34 : Internal communication fault(E.Conn) 35 : CANopen heartbeat timeout(E.CAN 4) 36 : CANopen NMT operation fault(E.CAN 5)	0	RO
F09.16	Inverter temperature	-20.0~120.0°C	0.0°C	RO
F09.17	switch Input terminal status	0000~1 FF BIT 0: DI 1 terminal BIT 1: DI2 terminal BIT 2: DI3 terminal BIT 3: DI4 terminal BIT 4: DI5 terminal	0	RO
F09.18	switch Output terminal status	0000~000F Bit 0: DO1 Bit 1: DO2	0	RO
F09.19	AI 1 input voltage	0.00~10.00V	0.00V	RO
F09.20	AI 2 input voltage	0.00~10.00V	0.00V	RO
F09.21	AI 3 input voltage	0.00~10.00V	0.00V	RO
F09.22	Peak current	0.00~100.00A	0.00A	RO
F09.23	DIP switch	0x00~0xFF	0x00	RO
F09.24	Rated current setting value	0.00~100.00A	0.00A	RO
F09.25	AI 4 input voltage	0.00~10.00V	0.00V	RO
F09.26	HD Input frequency	0.00~20.00 KHZ	0.00 KHZ	RO
F09.27	Simple PL Cnumber	0~9999	0	RO

Parameter	Name	Setting Range	Default	Attribute
F09.28	Pole-pair setting value	1~20	0	RO
F09.29	Hall count high 16 bits	0~65535	0	RO
F09.30	Hall count low 16 bits	0~65535	0	RO

4.3 Host-Computer Software

4.3.1 Software Introduction

1、Driver Studio Motor driver product Host Computer, support Motor C 20485 communication brushless drivers for online commissioning. Together with our series of brushless drivers, Driver Studio provides the following functions to meet most motion-control application needs: Functions: 1 Parameter configuration and management 2 Motor parameter monitoring 3 Motor motion control 4 User-defined simple PLC and multi-speed 5 Current and historical fault display/monitoring 6 Advanced user operation functions, etc.

4.3.2 How to Obtain the Software

Log in to , click "Product Center -> Driver", find the host-computer software page, and enter the download page.

After downloading and installing the software, click "Help -> Software Help" to view the user documentation.



V. Status Display and Fault Maintenance

Precautions:

- 2、through keypad modify Parameter fault, fault state;
- 3、use F 01.05 keypad;
- 4、Do not , ;
- 5、fault Run test;
- 6、product Operation qualified personnel;
- 7、fault, Do not driver housing, technical support.

5.1 F01.05 fault

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
Run	Normal: green light flashes, red light off
	Current limit: green light flashes, red light flashes
	Brake: green light steady on, red light flashes rapidly

The following table shows fault causes by alternating LED (red/green) flashes after the driver detects a fault and stops. The user can troubleshoot and repair according to the fault code.

One green flash represents 5 1 Fault Code=*5 +

Fault Code	Fault Name	Fault Indication	Fault Cause	Corrective Action
1	Hardware Acceleration Overcurrent	0 green 1 red	1 - Acceleration/deceleration too fast 2. low-voltage 3. Driver power is too small 4, sudden load applied 5 - Inter-phase short circuit 6 , strong external interference source exists	1, increase acceleration/deceleration time 2. Check input voltage 3. Select a higher-power driver 4. Check whether the load is normal 5. Check/replace the cable or motor 6. Check whether a strong interference source exists
2	Hardware Deceleration Overcurrent	0 green 2 red		
3	Hardware Constant-Speed Overcurrent	0 green 3 red		
4	SW OC accel	0 green 4 red		
5	SW OC decel	0 green 5 red		
6	SW OC const	1 green 1 red		
7	Overvoltage during acceleration	1 green 2 red	1. Input voltage too high 2 - Rapid forward/reverse switching 3 , , state	1, check power supply voltage 2. Increase forward/reverse switching time 3 , external
8	Overvoltage during deceleration	1 green 3 red		
9	Overvoltage at constant speed	1 green 4 red		
10	Bus UV	1 green 5 red	1 , power supply voltage low 2 , acceleration, external power supply protection 3 - Supply voltage drop 4 , driver hardware abnormal	1. Check power input 2. Increase acceleration time 3. Fault Reset 4. Seek technical support

Fault Code	Fault Name	Fault Indication	Fault Cause	Corrective Action
11	Motor OL	2 green 1 red	1. Power supply voltage too low 2. Motor power too high 3. , motor stalled or sudden load change	1. Check power input 2. Set motor rated current 3. Reduce the load and check the motor and machinery
12	Driver OL	2 green 2 red	1. Power supply voltage too low 2. , acceleration time 3. Load is too large	1. Check power input 2. Increase acceleration time 3. Replace with a controller one size larger
13	Hall fault	2 green 3 red	1 - Hall wire disconnected 2. Strong external interference source exists	1. Check Hall connection wire 2. Check interference
14	Stall	2 green 4 red	1. Load too large 2 - Motor jammed	1. Check motor mechanical connection 2. Check motor cable
16	Driver Overheat Fault	3 green 1 red	1. Load too large 2. Driver hardware abnormal	1. Cool down 2. Use with derating
19	Current detect fault	3 4	1. Driver hardware damaged	1, replace driver
27	Param storage fault	5 green 2 red	1. Erase/write count reached	1. Power cycle
29	Overcurrent Feedback Fault	5 green 4 red	1. Driver hardware damaged	1, replace driver
30	Output phase loss	5 green 5 red	1. U/V/W Output phase loss 2. , driver hardware damaged	1. Check U/V/W connection 2, replace driver

5.2 Keypad Fault Display

The following table is used with the keypad. After the driver detects a fault and stops, the external keypad displays the fault code; the user can troubleshoot and repair according to the fault code.

fault	Fault Code	Fault Name	Fault Cause Check	Corrective Action
1	E.OCH 1	Hardware Acceleration Overcurrent	1, acceleration/deceleration too fast 2. low-voltage 3. Driver power is too small 4, sudden load applied 5 , short to ground or phase-to-phase short 6 , strong external interference source exists	1, increase acceleration/deceleration time 2. Check input power voltage 3. Select a driver with one higher power rating 4. Check whether the load is short-circuited or stalled 5. Check/replace the cable or motor 6. Check whether strong interference exists
2	E.OCH 2	Hardware Deceleration Overcurrent		
3	E.OCH 3	Hardware Constant-Speed Overcurrent		
4	E.OC 1	SW OC accel		
5	E.OC 2	SW OC decel		
6	E.OC 3	SW OC const		
7	E.OV 1	Acceleration overvoltage	1. Input voltage too high 2. Electronic brake force too strong	1, check power supply voltage 2, modify electronic brake parameters
8	E.OV 2	Deceleration overvoltage		
9	E.OV 3	Constant-speed overvoltage		

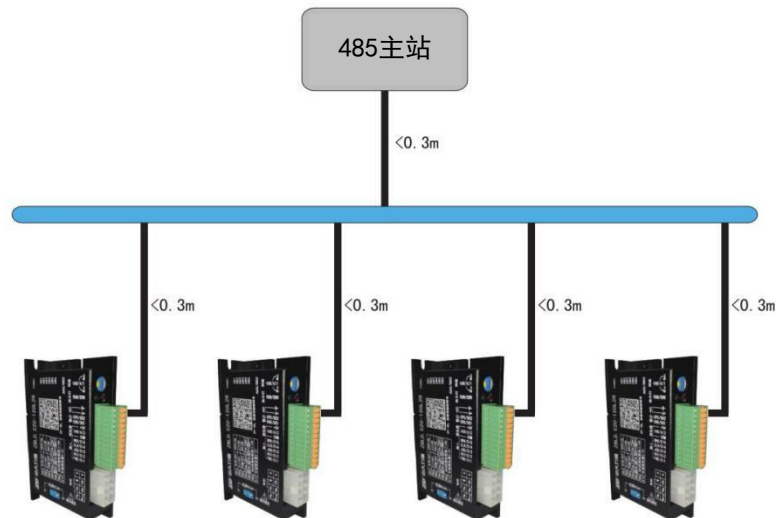
fault	Fault Code	Fault Name	Fault Cause Check	Corrective Action
10	E.UV	Bus UV	1 , power supply voltage low 2 Acceleration is too fast; external power supply protection is active 3 , instantaneous power failure 4 , driver hardware abnormal	1. Check mains input power 2. Increase acceleration time 3. reset fault 4. Seek technical support
11	E.OL 1	Motor OL	1. Power supply voltage too low 2. Motor rated current setting is unsuitable 3. Motor stalled or load changed suddenly and excessively	1, check power supply voltage 2. Set motor rated current 3 . Reduce load; check motor and mechanical
12	E.OL 2	Driver OL	1. Acceleration time too short 2, power supply voltage too low 3. Load is too large	1, increase acceleration time 2, check power supply voltage 3, use a driver one power class larger
13	E.HALL	Hall fault	1. HALL wire disconnected 2. Strong external interference source exists	1. check HAL Lwiring 2. Check whether strong interference exists
14	E.LOC	Stall	1. Load too large 2, motor jammed 3. Motor phase-to-phase short circuit	1, use a driver one power class larger 2, check motor mechanical connection 3, check connect line
15	E.OH 1	Module overheat 1	1. Ambient temperature is too high 2 , thermistor damaged 3 , inverter module damaged	1 , reduce ambient temperature 2 , replace complete unit
16	E.OH 2	Module overheat 2		
17	E.EF	External input fault	external fault input terminal	check terminal input source
18	E.485	485 communication fault	1 - Baud rate or data parity setting is not 2, communication line fault 3 , communication address error 4 , communication subject to strong interference	1 . Check baud-rate parameter settings 2, check communication line 3, check communication address setting 4. Replace with shielded cable to improve interference resistance
19	E.C Ur	Current detect fault	circuit abnormal	replace driver
20	E.OUT 1	Ufault	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
21	E.OUT 2	Vfault		
22	E.OUT 3	Wfault		
23	E.OL 3	Electronic overload fault	overload pre-alarm function is set	check load and overload pre-alarm point
24	E.LL	Electronic underload fault	underload pre-alarm function is set	Check underload value and underload pre-alarm point
25	E.Sht	Short-circuit fault	1. MOS or inverter unit short	1, replace driver

fault	Fault Code	Fault Name	Fault Cause Check	Corrective Action
			circuit 2. Phase wire shorted to ground	2, check connect line
26	E.bo Ad	Keypad communication fault	1. Keypad cable contact is poor or cable is broken 2. Keypad cable is too long and subject to interference	1, check or replace wiring 2. Check the environment and eliminate interference sources
27	E.EEP	Param storage fault	1. EEPROM damaged 2 Single power-on erase/write limit reached	1, reset/clear fault 2. power on again 3, seek technical support
28	E.Cnd	Conduction fault	1. Motor not connected during self-test 2. MOS or inverter unit damaged	1, check motor wiring 2, replace driver
29	E.OCHF	Overcurrent Feedback Fault	driver hardware damaged	replace driver
30	E.POUT	output phase loss	1. U/V/W Output phase loss 2. Driver hardware abnormal	1. Check wiring from driver to motor 2. Seek technical support
31	E.CAN 1	CAN Bus-off	too many errors	check CAN network and reconnect
32	E.CAN 2	CAN send error	too many transmission error frames	Check CAN nodes, wiring, and baud rate
33	E.CAN 3	CAN receive error	too many reception error frames	1 , check baud rate 2 , check for interference sources
34	E.Conn	Internal communication fault	internal hardware damaged	replace driver
35	E.CAN 4	timeout	CANopen slave reaches consumer configuration time	1 , clear fault 2, check whether CAN node is online 3 , check CANopen configuration
36	E.CAN 5	NMT fault	When the motor is running, the CANopen slave receives The CANopen slave receives NMT initialize/stop commands while the motor is running	1 , clear fault 2 , NMT state, the motor stop running

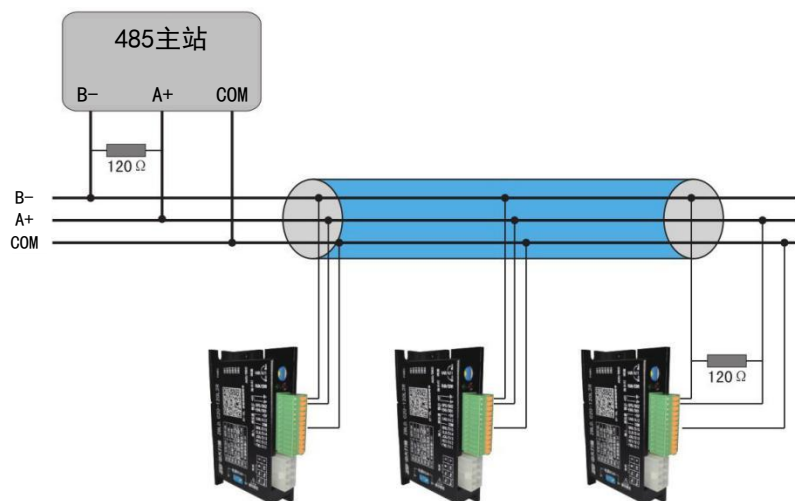
VI. RS485 Communication

6.1 485 communication network

485 communication network connect method bus connect method, figure below.



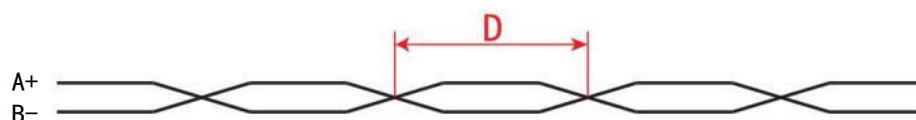
Each RS485 transceiver device is connected to the bus. Each branch length must not exceed 10 m; otherwise reflections may occur and cause communication problems. The following figure is a wiring diagram.



- 1、 use shielded twisted pair connect, busconnectpc120Ωresistance Signal reflections. The shield is generally grounded reliably at a single point.
- 2、 A+B-can resistance correctly, should 6 about 60 ohms (two resistors in parallel).
- 3、 128 pc.
- 4、 485 distance communication, 485 CO Mconnect.

6.2 485 communication cable

485 communication network use twisted pair, twisted pair, reduces radiation from the cable. The following figure shows twisted pair cable.



The twist pitch D of the twisted pair should be less than 2 cm. A smaller pitch provides better interference resistance.

For short-distance low-speed communication, shielded twisted-pair cable can be used to improve interference resistance; connect both ends of the shield to PE.

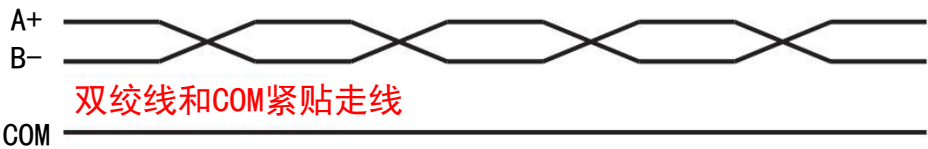
For long-distance high-speed communication, shielded cable is not recommended because large distributed capacitance exists between the shield and signal wires, which causes transmission signal delay.

Recommended bus cable:

Wiring distance	Signal wire
200	0.3 mm 2, twisted pair, sheathed cable
200 -500	0.5 mm 2, twisted pair, sheathed cable
500 -1200	0.75 mm 2, shielded twisted pair, sheathed cable
1200	1.0 mm 2, shielded twisted pair, sheathed cable; add a repeater at 1200 m

6.2.1 Recommended RS485 Communication Wiring

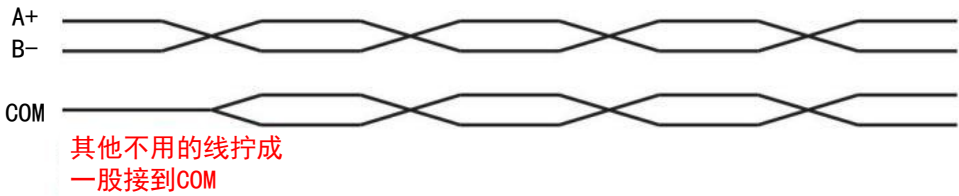
Recommended scheme 1



Recommended scheme 2



Recommended scheme 3



Recommended scheme 4

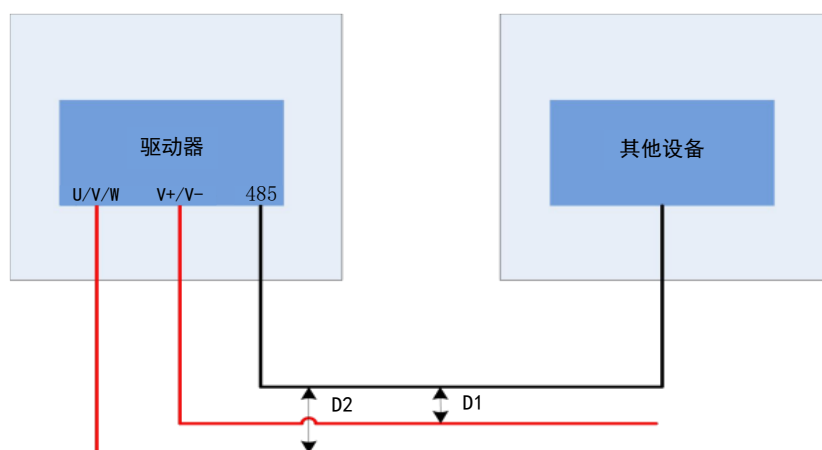


Recommended scheme 5



6.2.2 Recommended RS485 Communication Cable Layout

485 communication, , .method:



Route interference lines and 485 lines as perpendicular as possible. When routed in parallel, the distance between power line and 485 signal line should be $D1 > 10\text{ cm}$, and the distance between U/V/W and 485 signal line should be $D2 > 20\text{ cm}$;

After leaving the cabinet, route the power cable, U/V/W power cable and 485 communication cable separately. If interference lines and 485 communication lines are routed in the same cable tray, the spacing follows the same principles above.

6.3 System Settings

To accurately connect the EA-BLDC20 series driver to the 485 bus network, set the related function codes.

Parameter	Name	Setting Range	Default	Attribute
F00.00	Control Mode	0: Test mode 1: Hall open-loop 2: Hall closed-loop 3: DIP switch (some models SW 1 valid)	3	R/W*
F00.01	Run Command Selection	0: Keypad run command channel (LED off) 1: Terminal run command channel (LED flashing) 2: Communication run command channel (LED on) 3: DIP switch (some models SW 3 valid)	3	R/W
F00.02	Speed Reference Selection	0: keypad digital setting 1: Analog AI1 setting (knob potentiometer) 2: Analog AI2 setting (external voltage) 3: MODBUS communication setting 4: Multi-step speed setting 5: DIP switch (some models SW 2, SW 3 valid) 6: Simple PLC setting (F04 group) 7: High-speed pulse input setting (select HDI in F05.00) 8: CAN communication setting (some models valid)	5	R/W
F00.05	communication run command ch. sel.	0: MODBUS communication 1: CAN communication channel (valid on some models)	0	R/W*
F08.00	485 slave address	1-247; 0 is broadcast address	1	R/W*

Parameter	Name	Setting Range	Default	Attribute
F08.01	485 communication baud-rate setting	0: 1200 BPS 1: 2400 BPS 2: 4800 BPS 3: 9600 BPS 4: 19200 BPS (default) 5: 38400 BPS 6: 57600 BPS Note: driver Not supported modify baud rate	4	R/W*
F08.02	485 data	0 No parity (N, 8, 1) for RTU 1 Even parity (E, 8, 1) for RTU 2: Odd parity (O, 8, 1) for RTU 3 No parity (N, 8, 2) for RTU Note: driver Not supported modify	0	R/W*
F08.03	485 communication response delay	0~200ms	5	R/W*
F08.04	485 communication timeout fault time	0.0 (in valid), 0.1-60.0s	0.0s	R/W*
F08.05	Reserved		0	R/W*
F08.06	485 communication action selection	0 0x0-0x1 LED ones digit: 0: write operation has response 1: write operation has no response	0x00	R/W*

6.4 Data frame

MODBUS--RTU mode				
Address code	Function code	Data	Check code	
ADDR	CMD	DATA	CRC16_L	CRC16_H
1 Byte	1 Byte	n Bytes	1 Byte	1 Byte
Baud rate: 19200 (default); start bit: 1 bit; data bits: 8 bits; parity: none; stop bit: 1 bit				
In MODBUS RTU mode, if the send/receive interval between any two characters exceeds 1.5 character times, the data is in valid; if the interval between two characters exceeds 3.5 character transmission times, one data frame is considered complete and a new frame may begin transmission.				

Note:

- a. Address code: 1 Byte
 - 0 x 00(0) broadcast address, broadcast slave, used for unit;
 - 0 x 01(1)-0x7F(127) slave address;
 - 0 x 80(128)-0xff(255), Do not use;
- b. Function code: 1 Byte
 - 0 x 03(3) Read Register Operation;
 - 0 x 06(6) write single register Operation;
 - 0 x 10(16) write multiple registers Operation;
- c. Data: n Bytes
 - Different commands have different data formats!
- d. Check code: 2 Byte
 - CRC 16 check object: address code + function code + data;
 - CRC 16 algorithm: MODBUS (x 16+x 15+x 2+1);
 - For the CRC check code, send the low byte first and the high byte second.

6.4.1 0x03 Read Register Operation

1. 0x03 (read register) data frame format

Master request			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x03	
Register address	2 Byte	0x2000-0x30ff	High byte + low byte
Register count	2 Byte	0x0001	High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after correct reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x03	
Byte count	1 Byte	0x02	Total bytes in data area
Data	2 Byte	Read data content	High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after abnormal reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x83	Msb=1
Exception code	1 Byte	0x00-0xff	See 6.4.4 Exception Codes
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte

Note:

All register addresses are 2 bytes: high byte first, low byte second;

All register data is 2 bytes: high byte first, low byte second;

This operation can only be performed on W/R, W/R*, or R type registers.

2.2. Example of 0x03 (read holding register)

A) read 0x01 slave 0x0001 register data

Master	Address	Function code	Register address		Register count		Check code	
			High byte	Low byte	High byte	Low byte	Low	High
	0x01	0x03	0x20	0x01	0x00	0X 01	CRCL	CRCH
Slave	Address	Function code	Byte count		Data		Check code	
					High byte	Low byte		
	0x01	0x03	0x02		0x00	0X 01	CRCL	CRCH

B) read 0x01 slave 0x0001 register data

Master	Address	Function code	Register address		Register count		Check code	
			High byte	Low byte	High byte	Low byte	Low	High
	0x01	0x03	0x20	0x01	0x00	0X 01	CRCL	CRCH
Slave	Address	Function code	Exception code				Check code	
	0x01	0x83	See 6.4.4 Exception Codes				CRCL	CRCH

6.4.2 0x06 Write Single Register Operation

1 1. 0x06 (write single register) data frame format

Master request			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x06	
Register address	2 Byte	0x2000-0x30ff	High byte + low byte
Data	2 Byte	Write data content	High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after correct reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x06	
Register address	2 Byte	0x2000-0x30ff	High byte + low byte
Data byte count	2 Byte	Write data content	High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after abnormal reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x86	Msb=1
Exception code	1 Byte	0x00-0xff	See 6.4.4 Exception Codes
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte

Note:

All register addresses are 2 bytes: high byte first, low byte second;

All register data is 2 bytes: high byte first, low byte second;

This operation can only be performed on W/R or W/R* type registers.

2.2. Example of 0x06 (write single register)

A) Write data to register 0x2001 of slave 0x01

Master	Address	Function code	Register address		Data		Check code	
			High byte	Low byte	High byte	Low byte	Low	High
	0x01	0x06	0x20	0x01	0x00	0X 01	CRCL	CRCH
Slave	Address	Function code	Register address		Data		Check code	
			High byte	Low byte	High byte	Low byte		
	0x01	0x06	0x20	0x01	0x00	0X 01	CRCL	CRCH

B) Exception while writing register 0x2001 data to slave 0x01

Master	Address	Function code	Register address		Data		Check code	
			High byte	Low byte	High byte	Low byte	Low	High
	0x01	0x06	0x20	0x01	0x00	0X 01	CRCL	CRCH
Slave	Address	Function code	Exception code				Check code	
			See 6.4.4 Exception Codes				CRCL	CRCH

6.4.3 0x10 Write Multiple Registers Operation

1 1. 0x10 (write multiple registers) data frame format

Master request			
Frame data	Data length	Data content	Description
Address	1 Byte	0x00-0xf7	
Function code	1 Byte	0x10	
Start register address	2 Byte	0x2000-0x30ff	High byte + low byte
Register quantity	2 Byte	N	High byte + low byte
Total data bytes	1 Byte	2*N	
Data	2*N Byte		High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after correct reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x10	
Start register address	2 Byte	0x2000-0x30ff	High byte + low byte
Register quantity	2 Byte	N	High byte + low byte
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte
Slave response after abnormal reception			
Frame data	Data length	Data content	Description
Address	1 Byte	0x01-0xf7	
Function code	1 Byte	0x90	Msb=1
Exception code	1 Byte	0x00-0xff	See 6.4.4 Exception Codes
Check code	2 Byte	CRC 16L+CRC 16H	Low byte + high byte

Note:

All register addresses are 2 bytes: high byte first, low byte second;

All register data is 2 bytes: high byte first, low byte second;

This operation can only be performed on W/R or W/R* type registers.

2.2. Example of 0x10 (write multiple registers)

Write data to registers 0x2000 and 0x2001 of slave 0x01

Master	Address	Function code	Start register address		Register quantity		Total data bytes	
			High byte	Low byte	High byte	Low byte		
	0x01	0x10	0x20	0x00	0x00	0x02	0x04	
	Register 1 data		Register 2 data		Check code			
	High byte	Low byte	High byte	Low byte				
Data 1			Data 2		CRCL	CRCH		
slave	Address	Function code	Start register address		Register quantity		Check code	
			High byte	Low byte	High byte	Low byte		
	0x01	0x10	0x20	0x00	0x00	0x02	CRCL	CRCH
slave Return	Address	Function code	Exception code				Check code	
	0x01	0x90	See 6.4.4 Exception Codes				CRCL	CRCH

6.4.4 Exception Codes

MODBUS exception code		
Exception code	Meaning	Description
0x01	Illegal command	The slave does not support this command or handles this request in an error state.
0x02	Illegal data address	The requested data address from the host computer is out of range.
0x03	Illegal data value	The received data contains a value that is not allowed.
0x04	Operation failed	In parameter write operation, an in valid setting is made for the parameter, such as when writing a function code without enabling write enable (0x200E).
0x05	Password error	The password written to the password verification address is incorrect.
0x06	Data frame error	The data frame length is incorrect or the CRC check bit in RTU format is incorrect.
0x07	Parameter is read-only	The parameter changed by the host computer write operation is read-only.
0x08	Parameter cannot be changed during running	The parameter changed by the host computer write operation cannot be changed during operation.

6.5 Register List

Function description	Address definition	Data meaning description	R/W attribute
Communication control command	2000H	0001 H: Forward running	W/R
		0002 H: Reverse run	
		0003 H: forward jog	
		0004 H: reverse jog	
		0005H: Stop	
		0006 H: (emergency stop)	
		0007 H: Fault reset	
		0008 H: Jog Stop	
		0009 H: Brake	
Communication setting-value address	2001H	Communication set speed (0-3000, unit: 1 RPM)	W/R
	2002H	Motor pole-pair number (1-20)	W/R*
	2003H	Acceleration time (1-6000, unit: 0.1 s)	W/R
	2004H	Deceleration time (1-6000, unit: 0.1 s)	W/R
	2005H	Control mode selection (0-3): 0: Test mode 1: Open loop 2 Closed loop 3 DIP switch setting (SW1 valid), model-dependent	W/R*
	2006H	Run command selection (0-4): F02.14 1: Terminal run command channel 2 : Communication run command channel 3 : DIP switch setting (SW3 valid),	W/R
	2007H	Speed reference selection (0-5): 0: keypad digital setting 1 : Analog AI1 setting (knob potentiometer) 2 : Analog AI2 setting (external voltage) 3 : MODBUS communication setting 4: Multi-step speed setting 5 : DIP switch setting (SW2, SW3 valid), 6 : Simple PLC reference	W/R
	2008H	Local communication address 1-127; 0 is broadcast address	W/R*
	2009H	Communication baud-rate setting (0-6): 0: 1200 BPS 1: 2400 BPS 2: 4800 BPS 3: 9600 BPS 4 19200 BPS (default) 5: 38400 BPS 6: 57600 BPS Note: some models CAN be set	W/R*
	200 AH	Virtual input terminal command, range: 0x000-0x1FF	W/R

Function description	Address definition	Data meaning description	R/W attribute
	200 BH	Virtual output terminal command, range: 0x00-0x0F	W/R
	200 EH	Communication function-code write enable: (for F00-F10 function-code groups) 0: function code cannot be written during communication (default) 1 Function code writable during communication	W/R
	200 FH	Restore default function-code values: 0: No operation 1 Restore default parameters	W/R*
	2010H	Communication position reference: (reserved)	W/R
	2011H	Hall count value operation: (software-version dependent) 0: No operation 1 Clear Hall count to 0	W/R
	2012H	Stop mode selection: (software-version dependent) 0: Deceleration stop 1 : Coast Stop	W/R
Driver status word 1	2100H	0001 H: Fwd Running	R
		0002 H: Rev Running	
		0003 H: driver	
		0004 H: Driver Fault	
		0005 H: driver OF Fstate	
		0006 H: Electronic brake state	
Driver status word 2	2101H	Bit 0: =0: bus voltage not established =1: bus voltage established Bit 4: =0: not overloaded =1: overload Bit 5~Bit 6: =00: keypad control =01: terminal control =10: communication control Bit 7: =0: keypad not connected =1: keypad connected	R
Driver fault code	2102H	See fault type description	R
Driver identification code	2103H	C 20 0x0020	R
setting frequency	3000H	0-Fmax (unit: 0.01Hz)	R
output frequency	3001H	0-Fmax (unit: 0.01Hz)	R
Ramp set frequency	3002H	0-Fmax (unit: 0.01Hz)	R
output voltage	3003H	0.0-2000.0V (unit: 0.1V)	R
Out Curr.	3004H	0.0-300.00A (unit: 0.01A)	R
setting speed	3005H	0-3000 (unit: 1 RPM)	R
Motor output speed	3006H	0-3000 (unit: 1 RPM)	R
Motor output power	3007H	0~2200W	R

Function description	Address definition	Data meaning description	R/W attribute
DC bus voltage	3008H	0.0-2000.0V (unit: 0.1V)	R
Hall value	3009H	0~7	R
Software version number	300 AH	1.00~99.00	R
Most recent fault type	300 BH	See fault type description	R
Inverter temperature	300 CH	-20.0°C to 120°C (supported by some hardware)	R
Input terminal status	300 DH	000~1 FF	R
Output terminal status	300 EH	00~0F	R
Analog 1 input voltage	300 FH	0.00-10.00V (unit: 0.01V)	R
Analog 2 input voltage	3010H	0.00-10.00V (unit: 0.01V)	R
Analog 3 input voltage	3011H	0.00-10.00V (unit: 0.01V)	R
Reserved	3012H	0~65535	R
Hall count high 16 bits	3013H	0-65535 (software-version dependent)	R
Hall count low 16 bits	3014H	0-65535 (software-version dependent)	R

Register parameter attribute description:

Attribute	Description
W/R	Indicates that the set value of this parameter can be read/written in any driver state.
W/R*	Indicates that the set value of this parameter can be written when the driver is stopped and read in any state.
R	Indicates that the parameter is read-only and cannot be written.

6.6 Common Command Examples

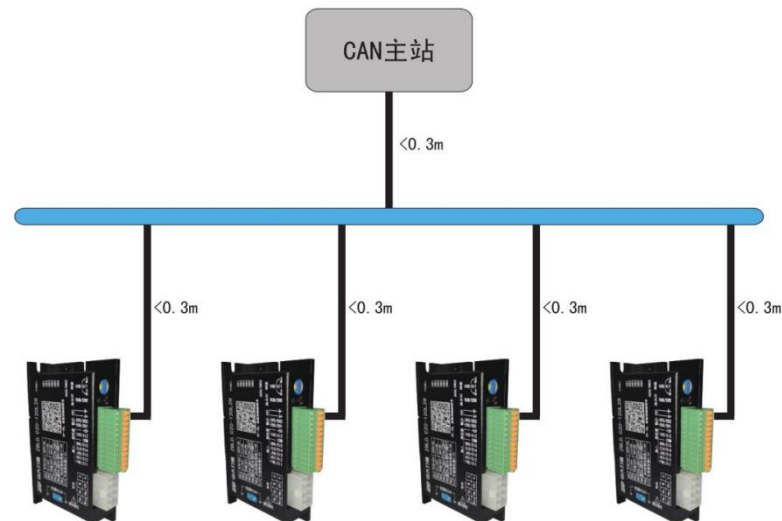
Slave address 0x01, baud rate 19200, N-8-1.

Operation	Data frame	Description
forward running	Send data: 01 06 20 00 00 01 43 CA Response data: 01 06 20 00 00 01 43 CA	Write 0x01 to address 2000H
reverse running	Send data: 01 06 20 00 00 02 03 CB Response data: 01 06 20 00 00 02 03 CB	Write 0x02 to address 2000H
Stopped	Send data: 01 06 20 00 00 05 42 09 Response data: 01 06 20 00 00 05 42 09	Write 0x05 to address 2000H
Fault reset	Send data: 01 06 20 00 00 07 C 3 C 8 Response data: 01 06 20 00 00 07 C 3 C 8	Write 0x07 to address 2000H
setting speed	Send data: 01 06 20 01 0B B 8 D 4 88 Response data: 01 06 20 01 0B B 8 D 4 88	Write 0x0BB8 to address 2001H Set speed to 3000 RPM
Enable function-code write	Transmit data: 01 06 20 0E 00 00 E 3 C 9 Response data: 01 06 20 0E 00 00 E 3 C 9	address 200F Hwrite 0x01
Read function code	Transmit data: 01 03 00 0A 00 01 A 4 08 Response data: 01 03 02 13 88 B 5 12	Read the value of function code F00.10 as 50.00Hz (1388H)
Write function code	Transmit data: 01 06 00 0A 09 C 4 AE 0B Response data: 01 06 00 0A 09 C 4 AE 0B	Write the value of function code F00.10 as 25.00Hz (09C 4H)
Read status word 1	Send data: 01 03 21 00 00 01 8E 36 Response data: 01 03 02 00 05 78 47	Read address 2100H
Read status word 2	Send data: 01 03 21 01 00 01 DF F 6 Response data: 01 03 02 00 41 78 74	Read address 2101H
Read fault code	Send data: 01 03 21 02 00 01 2F F 6 Response data: 01 03 02 00 0A 38 43	Read address 2102H Fault code: 0x0A undervoltage fault
Read failed	Send data: 01 03 00 32 00 01 25 C 5 Response data: 01 83 02 C 0 F 1	Read function code F00.50 failed Address error: 0x02
Write failed	Send data: 01 06 00 00 00 05 49 C 9 Response data: 01 86 03 02 61	Write function code F00.00 value as 5 Data error: 0x03

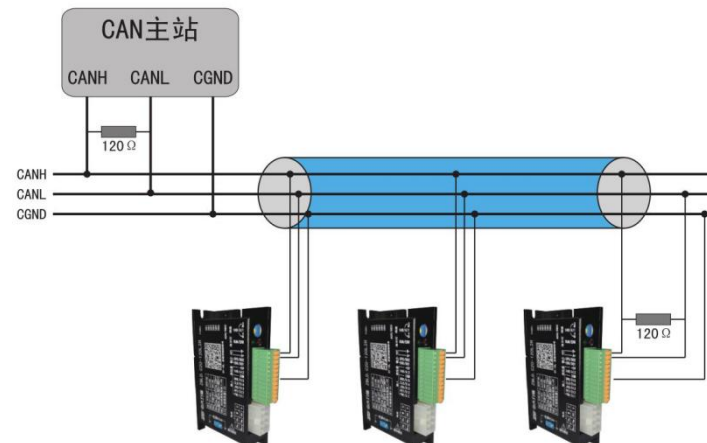
VII. CAN MODBUS communication

7.1 CAN Communication Network

CAN communication network connect method bus connect method, figure below.



pc CAN bus, pc 10m., problems. The following figure is a wiring diagram.



5、 use shielded twisted pair connect, busconnectpc120Ωresistance Signal reflections. The shield is generally grounded reliably at a single point.

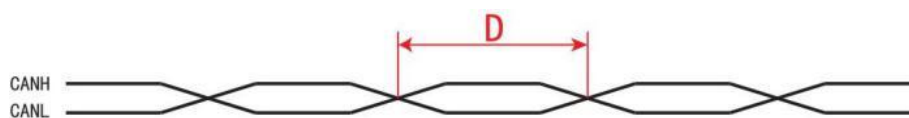
6、 CAN HCAN Lcan resistance correctly, should 6 about 60 ohms (two resistors in parallel).

7、 64 pc.

8、 CAN distance communication, CAN CGN Dconnect, communication.

7.2 CAN Communication Cable

1 , CAN communication network use twisted pair, twisted pair, decrease cable.The twist pitch D of the twisted pair should be less than 2 cm. A smaller pitch provides better interference resistance.figure below twisted pair diagram.



2 For short-distance low-speed communication, shielded twisted-pair cable can be used to improve interference resistance; connect both ends of the shield to PE.

3 , For long-distance high-speed communication, shielded cable is not recommended because large distributed capacitance exists between the shield and signal wires, which causes transmission signal delay.

4 , EA-BLDC20 driver CAN communication Function support baud rate, communication distance baud rate communication.

support baud rate Description:

baud rate (bps)	1M	500K	250K	125K	100K	50K	20K
(m)	25	100	250	500	500	1000	1000

CAN communication transmission distance, , node:

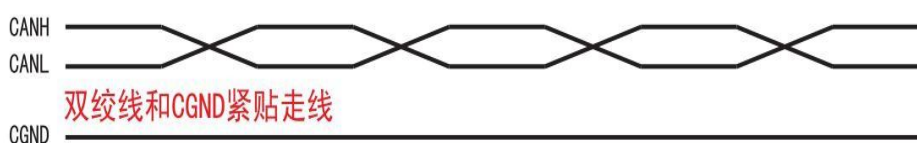
No.	transmission distance		node	
1	25m	1 Mbps	64	0.20 mm ²
2	100m	500 kbps	64	0.35 mm ²
3	550m	100 kbps	64	0.50 mm ²
4	1100m	50 kbps	64	0.75 mm ²

CAN communication, cable transmission distance, .2 node transmission distance:
communication distance:

	500 kbps	1 Mbps
3×0.3 mm ²	95m	30m
3×0.5 mm ²	95m	30m
3×0.75 mm ²	100m	30m

7.2.1 Recommended CAN Communication Wiring Methods

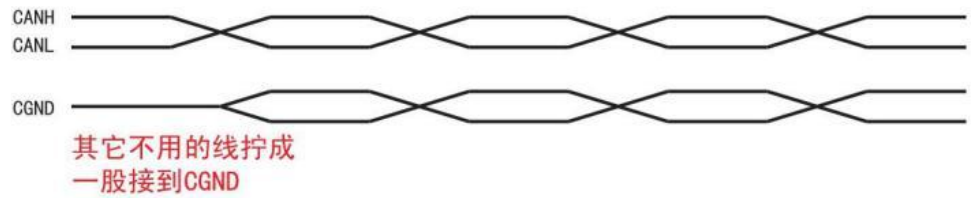
Recommended scheme 1



Recommended scheme 2



Recommended scheme 3



Recommended scheme 4

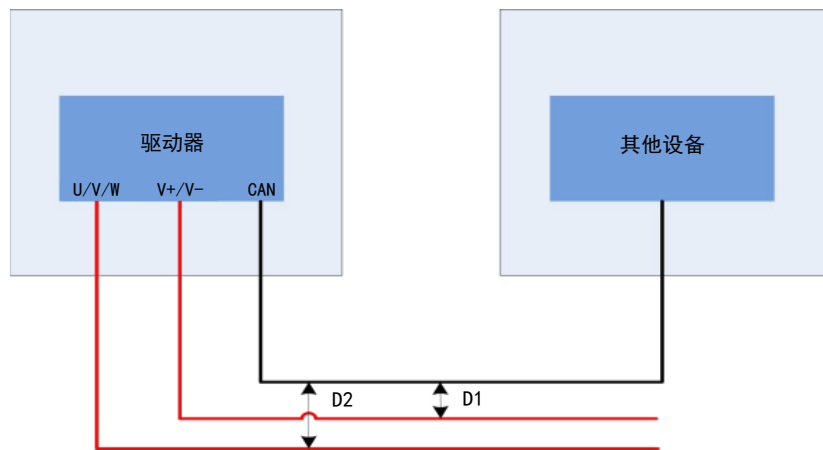


Recommended scheme 5



7.2.2 Recommended CAN Communication Cable Layout

CAN communication, , .method:



CAN direction, , power supply CAN Signal wire distance $D_1 > 10 \text{ cm}$, U/V/W CAN Signal wire distance $D_2 > 20 \text{ cm}$;

, power supply, U/V/W CAN communication, .CAN communication are routed in the same cable tray, the spacing follows the same principles above.

7.3 System Settings

Parameter Description:

	Description
	CAN bus
should	CAN Modbus
CAN-ID Type	11 bit-CAN 2.0A
baud rate	1 M, 500K, 250K, 125K (default), 100K, 50K, 20K
	63 pc
CAN frame	0 ~8 section
should CAN frame Type	Data frame, Not supported frame
resistance	120

EA-BLDC20 driver connected CAN bus network, Function code.

Function code	Name	Setting Range	setting
F00.00	Control Mode selection	0: Test mode 1: Hall open-loop 2 : Hall closed-loop 3 : DIP switch (some models SW1 valid)	2
F00.01	Run Command Selection	0 : keypad run command channel (LED off) 1 : terminal run command channel (LED flashing) 2 : Communication run command channel (LED on) 3 : DIP switch (some models SW3 valid)	2
F00.02	Speed Reference Selection	0: keypad digital setting 1 : analog AI1 setting (Knob Potentiometer) 2 : analog AI2 setting (external voltage) 3 : MODBUS communication setting 4: Multi-step speed setting 5 : DIP switch(SW2~3) 6 : Simple PLC setting (F04 group) 7 : input setting 8 : CAN communication setting	8
F00.05	communication cmd ch. sel.	0 : RS485 MODBUS communication 1 : CAN communication	1
F08.10	CAN slave address	1~127	1
F08.11	CAN baud rate	0 : 10 kΩ(some models valid) 1: 20K 2: 50K 3: 100K 4 125K (default) 5: 250K 6: 500K 7: 1M	4
F08.12	CAN communication response	0~200ms	5
F08.13	CAN communication protocol	0 : CAN Modbus (default) 1 : CANopen	0
F08.14	CAN function setting	CANopen function setting BIT 0-BIT 7: BIT 0: action selection when not Operational during running	0

Function code	Name	Setting Range	setting
		0 = stop and report E.CAN 5 fault 1 = keep previous state BIT 1: heartbeat timeout action selection 0 = stop and report E.CAN 4 fault 1 = keep previous state BIT 2: enable CAN receive/send faults 0 = disable E.CAN 2 and E.CAN 3 faults 1 =E.CAN 2, E.CAN 3 fault CAN Modbus function setting BIT 8-BIT 15: BIT 8: CAN Modbus broadcast response selection 0 = no response to broadcast 1 = respond to broadcast	
F00.15	Parameter recovery	0: No operation 1 : recovery Function code 2 : recovery CANopen communication Parameter 3 : recovery Parameter	0

7.4 CAN Modbus Data Frame Format

Modbus Data frame

CAN ID(11 bit)		Frame data(8 section)	
master address	slave address	Function code	
M_ADDR	S_ADDR	CMD	DATA
3 Bit	8 Bit	1 Byte	7 Bytes
baud rate:125K (default), support frame			

CAN

CAN ID(11 bit)	Parameter Description
master address (BIT 8~BIT 10)	0 ~7: master address
slave address (BIT 0~BIT 7)	0 : Broadcast Communication 1 ~127: slave address Point-to-Point Communication

Note: Point-to-Point Communication, master address;

Function code command

Function code (CMD)	Parameter Description
03h	read command, can read 1~2 pc Parameter
06h	write command, can write 1 pc Parameter
08h	Function, test

7.4.1 Read Register Operation

read register Data frame

Master request			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x03	
Register address	2 Byte	see Register address	High byte + low byte
read Register count	2 Byte	1~2	High byte + low byte
slave receive correctly response			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x03	
Register address	2 Byte	~	master Register address
Byte count	1 Byte	0x02	Total bytes in data area
Data 1	2 Byte	read Data 1	High byte + low byte
Data 2	2 Byte	read Data 2	read 2 PC register data
slave receive response			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x83	response 1
Register address	2 Byte	~	master read Register address
Exception code	1 Byte	0x00-0x08	see 7.4.3 Exception code

Note: Register address data 2 section, High byte, Low byte;

read 2001h~2002 hregisterdata

Master	ID	Function code	Register address		Register count		
			High byte	Low byte	High byte	Low byte	
	0x701	0x03	0x20	0x01	0x00	0x02	
Slave	ID	Function	Register address		Data 1		Data 2

		code	High byte	Low byte	High byte	Low byte	High byte	Low byte
	0x701	0x03	0x20	0x01	0x03	0xE8	0x00	0x05

read register data

Master	ID	Function code	Register address		Register count		
			High byte	Low byte	High byte	Low byte	
	0x701	0x03	0x20	0x30	0x00	0x01	
Slave	ID	Function code	Register address		Exception code		
			High byte	Low byte			
	0x701	0x83	0x20	0x30	see 7.4.3 Exception code		

7.4.2 Write Register Operation

write register Data frame

Master request			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x06	
Register address	2 Byte	see Register address	High byte + low byte
Data	2 Byte	write Data content	High byte + low byte
slave receive correctly response			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x06	
Register address	2 Byte	see Register address	High byte + low byte
Data byte count	2 Byte	Write data content	High byte + low byte
slave receive response			
Frame data	Data length	Data content	Description
Function code	1 Byte	0x86	response 1
Register address	2 Byte	~	master write Register address
Exception code	1 Byte	0x00-0x08	see 7.4.3 Exception code

write 2001 hregisterdata

Master	ID	Function code	Register address		Data	
			High byte	Low byte	High byte	Low byte
	0x701	0x06	0x20	0x01	0x03	0xE8
Slave	ID	Function code	Register address		Data	
			High byte	Low byte	High byte	Low byte
	0x701	0x06	0x20	0x01	0x03	0xE8

write register

Master	ID	Function code	Register address		Data	
			High byte	Low byte	High byte	Low byte
	0x701	0x06	0x20	0x01	0x10	0x00
Slave	ID	Function	Register address		Exception code	

		code	High byte	Low byte	
	0x701	0x86	0x20	0x01	see 7.4.3 Exception code

7.4.3 Communication Exception Codes

Exception code	Meaning	Description
0x01	Illegal command	slave Not supported command;
0x02	Illegal data address	Host Computer data address range;
0x03	Illegal data value	receive data;
0x04	Operation failed	In parameter write operation, an in valid setting is made for the parameter, such as when writing a function code without Write enable(0x200E);
0x05	Password error	address write;
0x06	Data frame error	Data frame correctly correctly;
0x07	Parameter is read-only	Host Computer write operation Parameter is read-only Parameter;
0x08	Parameter Runcan write	Host Computer write operation Parameter Running CAN write Parameter;

7.5 CAN Modbus Register List

Function description	Address definition	Data meaning description	Attribute
Communication control command	2000H	0001 H: Forward running	W/R
		0002 H: Reverse run	
		0003 H: forward jog	
		0004 H: reverse jog	
		0005H: Stop	
		0006 H:	
		0007 H: Fault reset	
		0008 H: Jog Stop	
Communication setting-value address	2001H	Communication set speed (0-3000, unit: 1 RPM)	W/R
	2002H	Motor pole-pair number (1-20)	W/R*
	2003H	Acceleration time (1-6000, unit: 0.1 s)	W/R
	2004H	Deceleration time (1-6000, unit: 0.1 s)	W/R
	2005H	Control mode selection (0-3): 0: Test mode 1: Open loop 2 Closed loop 3 : DIP switch(SW1),	WR*
	2006H	Run command selection (0-4): F02.14 1: Terminal run command channel 2 : Communication run command channel 3 : DIP switch setting (SW3 valid),	W/R
	2007H	Speed reference selection (0-5): 0: keypad digital setting 1 : Analog AI1 setting (knob potentiometer) 2 : Analog AI2 setting (external voltage) 3 : RS485 Communication setting 4: Multi-step speed setting 5 : DIP switch(SW2~3 valid), 6 : Simple PLC reference 7 : input setting 8 : CAN communication setting(some models)	W/R
	2008H	CAN communication slave address 1~247	W/R*

Function description	Address definition	Data meaning description	Attribute
	2009H	CAN communication baud rate(0~7): 0: 10 kΩ 1: 20K 2: 50K 3: 100K 4 125K (default) 5: 250K 6: 500K 7: 1M	W/R*
	200 AH	communication command Comm. cmd ch. sel.: 0 : RS485 Communication (default) 1 : CAN communication	W/R*
	200 EH	communication Function code write operation enable: (F00~10 Function code) 0 : CAN communication Function code CAN write (default) 1 : CAN communication Function code CAN write	W/R
	200 FH	Restore default function-code values: 0: No operation 1 : recovery Function code 2 : recovery CANopen communication Parameter Parameter Description / Range	W/R*
Driver status word 1	2100H	0001 H: Fwd Running	R
		0002 H: Rev Running	
		0003 H: driver	
		0004 H: Driver Fault	
		0005 H: driver OF Fstate	
		0006 H: Electronic brake state	
Driver status word 2	2101H	Bit 0: =0: bus voltage not established =1: bus voltage established Bit 4: =0: overload =1: overload Bit 5~Bit 6: =00: keypad control =01: terminal control =10: communication control	R
driver	2102H	keypad Fault Code (see 5.2 chapter section)	R
Driver identification code	2103H	C20 - 0x0020	R
setting frequency	3000H	0-Fmax (unit: 0.01Hz)	R
output frequency	3001H	0-Fmax (unit: 0.01Hz)	R
Ramp set frequency	3002H	0-Fmax (unit: 0.01Hz)	R
output voltage	3003H	0.0-2000.0V (unit: 0.1V)	R

Function description	Address definition	Data meaning description	Attribute
Out Curr.	3004H	0.0-300.00A (unit: 0.01A)	R
setting speed	3005H	0-3000 (unit: 1 RPM)	R
Motor output speed	3006H	0-3000 (unit: 1 RPM)	R
Motor output power	3007H	0~2200W	R
DC bus voltage	3008H	0.0-2000.0V (unit: 0.1V)	R
Hall value	3009H	0~7	R
Software version number	300 AH	1.00~99.00	R
Current fault type	300 BH	keypad Fault Code (see 5.2 chapter section)	R
Inverter temperature	300 CH	-20.0°C to 120°C (supported by some hardware)	R
Input terminal status	300 DH	000~1 FF	R
Output terminal status	300 EH	00~0F	R
Analog 1 input voltage	300 FH	0.00-10.00V (unit: 0.01V)	R
Analog 2 input voltage	3010H	0.00-10.00V (unit: 0.01V)	R
Analog 3 input voltage	3011H	0.00-10.00V (unit: 0.01V)	R

register Attribute Description

Attribute	Description
W/R	Parameter setting driver state CAN read/write;
W/R*	Parameter setting driver stopped state CAN write, state CAN read;
R	Parameter is read-only, can write;

7.6 CAN Modbus Application Examples

7.6.1 Point-to-Point Communication

master address 0x07, slave address 0x01, baud rate default 125 Kbps.

Point-to-Point Communication

Operation	Data frame	Description
Function	send: ID=0x701, data = 08 00 01 02 03 04 05 response: ID=0x701, data = 08 00 01 02 03 04 05	test CMD=08h
write Forward command	send: ID=0x701, data = 06 20 00 00 01 response: ID=0x701, data = 06 20 00 00 01	Write 0x01 to address 2000H
write Reverse command	send: ID=0x701, data = 06 20 00 00 02 response: ID=0x701, data = 06 20 00 00 02	Write 0x02 to address 2000H
write command	send: ID=0x701, data = 06 20 00 00 05 response: ID=0x701, data = 06 20 00 00 05	Write 0x05 to address 2000H
write Fault reset command	send: ID=0x701, data = 06 20 00 00 07 response: ID=0x701, data = 06 20 00 00 07	Write 0x07 to address 2000H
write setting speed	send: ID=0x701, data = 06 20 01 0B B 8 response: ID=0x701, data = 06 20 01 0B B 8	Write 0x0BB8 to address 2001H Set speed to 3000 RPM
Write function code enable	send: ID=0x701, data = 06 20 0E 00 01 response: ID=0x701, data = 06 20 0E 00 01	address 200F Hwrite 0x01
Read function code	send: ID=0x701, data = 03 00 0A 00 01 response: ID=0x701, data = 03 00 0A 02 13 88	Read the value of function code F00.10 as 50.00Hz (1388H)
Write function code	send: ID=0x701, data = 06 00 0A 09 C 4 response: ID=0x701, data = 06 00 0A 09 C 4	Write the value of function code F00.10 as 25.00Hz (09C 4H)
Read status word 1	send: ID=0x701, data = 03 21 00 00 01 response: ID=0x701, data = 03 21 00 02 00 05	Read address 2100H
Read status word 2	send: ID=0x701, data = 03 21 01 00 01 response: ID=0x701, data = 03 21 01 02 00 41	Read address 2101H
Read fault code	send: ID=0x701, data = 03 21 02 00 01 response: ID=0x701, data = 03 21 02 02 00 0A	Read address 2102H Fault code: 0x0A undervoltage fault
Function	send: ID=0x701, data = 08 00 01 02 03 04 05 response: ID=0x701, data = 08 00 01 02 03 04 05	test CMD=08h
read command	send: ID=0x701, data = 03 00 32 00 01 response: ID=0x701, data = 83 00 32 02	Read function code F00.50 failed Address error: 0x02
write command	send: ID=0x701, data = 06 00 00 00 05 response: ID=0x701, data = 86 00 00 03	Write function code F00.00 value as 5 Data error: 0x03

7.6.2 Broadcast Communication

master address 0x07, address 0x01, baud rate default 125 Kbps;

Function code F 08.14 configuration broadcast command response, BIT 8=0 broadcast response, BIT 8=1 broadcast response.

response communication

Operation	Data frame	Description
Read status word 1(2100h)	send: ID=0x700, data = 03 21 00 00 01 response: ID=0x701, data = 03 21 00 02 00 05	response
Write function code enable(200Eh)	send: ID=0x700, data = 06 20 0E 00 01 response: ID=0x701, data = 06 20 0E 00 01	response
Write function code(F00.10h)	send: ID=0x700, data = 06 00 0A 09 C 4 response: ID=0x701, data = 06 00 0A 09 C 4	response

broadcast response communication

Operation	Data frame	Description
Read status word 1(2100h)	send: ID=0x700, data = 03 21 00 00 01	response
Write function code enable(200Eh)	send: ID=0x700, data = 06 20 0E 00 01	response
Write function code(F00.10h)	send: ID=0x700, data = 06 00 0A 09 C 4	response

7.7 CAN Fault Handling

C20 driver fault, method see chapter section, description communication Fault clear.

communication fault recovery

fault display	Fault Name	Fault Cause	Fault Handling
E.CAN 1	CAN Bus-off fault	too many errors	check CAN network, connect.
E.CAN 2	CAN send error	too many transmission error frames	check CAN node, wiring, baud rate.
E.CAN 3	CAN receive error	too many reception error frames	check baud rate, check.
E.CAN 4	timeout	time	check CAN node, check CANopen configuration, fault.
E.CAN 5	NMT fault	motor Run, receive NMT , and other commands	fault, NMT , the motor stop running.

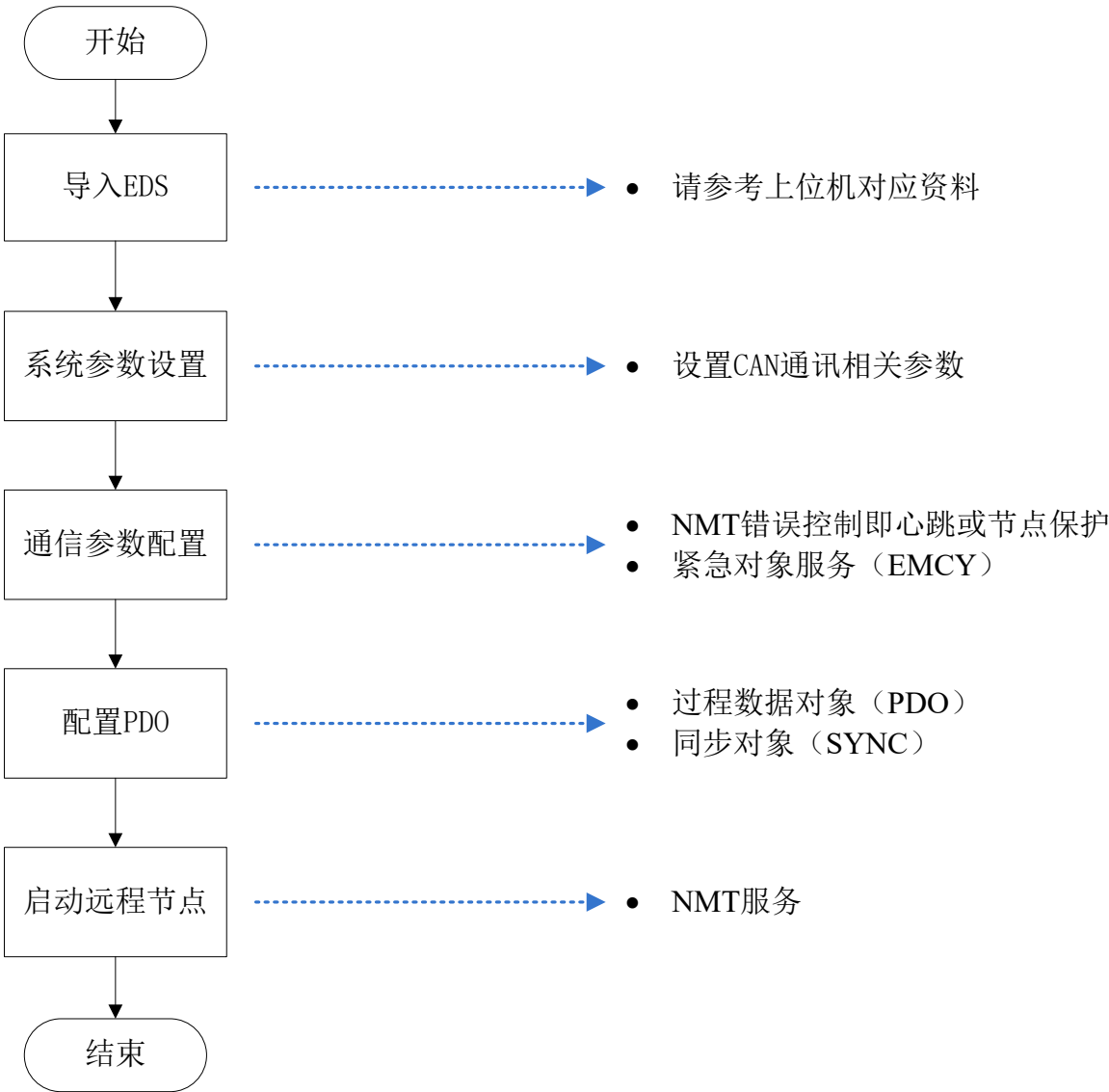
VIII. CANopen Communication

8.1 CANopen Communication Network

CAN Communication Network cable 7.1-7.2 chapter section.

8.2 CANopen Communication Network Configuration

CANopen use:

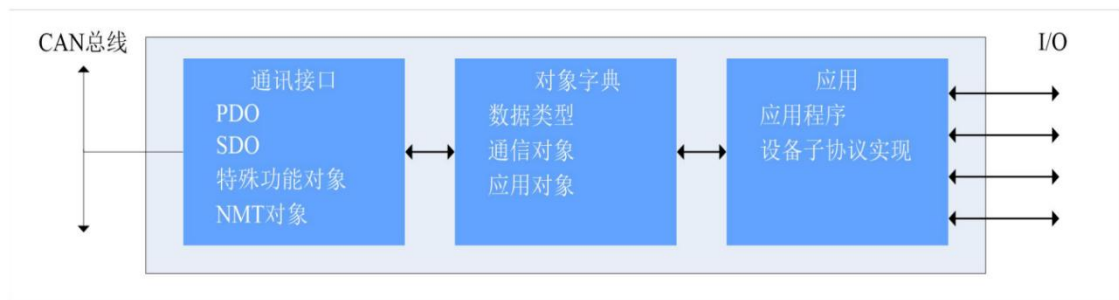


Note 1: SDO use, 8.4.2 chapter section.

8.2.1 CANopen Protocol Overview

CANopen pc CAN bus network transmission should , ISO/OSI.network through Object Dictionary object data, , node CAN through Process Data Object(PDO) Service Data Object(SDO) modify node Object

Dictionary data.CANopen figure below.

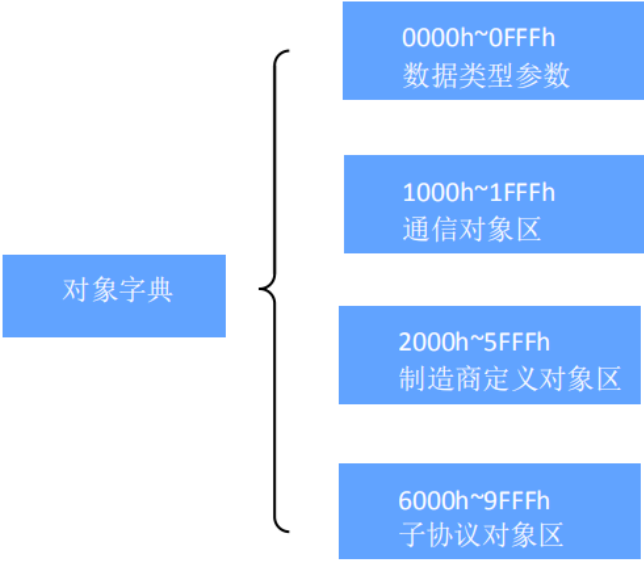


8.2.2 Object Dictionary

Object Dictionary.group parameters, description network state Parameter.through network CAN method object.

CANopen 168 Object Dictionary, Object Dictionary.

	object
000	use
0001h—001Fh	data Type(data Type, Boolean, Integer 16)
0020h—003Fh	data Type(Type PDO, SDO)
0040h—005Fh	specified data Type
0060h—007Fh	specified data Type
0080h—009Fh	specified data Type
00A0h—0FFFh	
1000h—1FFFh	communication (Type, error register, support PDO)
2000h—5FFFh	(Function code)
6000h—9FFFh	(DSP-402)
A000h—FFFFh	



driver Function code Object Dictionary:

$\text{Object Dictionary} = 0x5000 + F02.06$

$\text{Object Dictionary} = F02.06 + 1$

: Function code F01.10 should Object Dictionary object 0x5001-0B.

Object Dictionary PC object description classification description.

:

Object Dictionary motor control object 2000h, description control command Parameter setting, object:

Object Dictionary classification description

		Name	Meaning
2000h	00h	2000 h pc	object data PC,
2000h	01h	Communication control command	Reverse, Fault reset command
2000h	02h	communication setting speed	0~3000rpm
2000h	03h	Motor pole pairs	1 ~20

8.2.3 Common Communication Objects

1 , network management object (NMT)

network management object Boot-up, Heartbeat NMT, communication, NMT used for network PC node,

Functions: node state control, error control node start.

2 Service Data Object (SDO)

- receive SDO (R-SDO) send SDO (T-SDO).
- through use, SDO Object Dictionary.
- SDO through CALCM Subject, data, data 4 PC section PC message.
- service Type, PC PC response.SDO response message 8 PC section.

3 Process Data Object (PDO)

- receive PDO(RPDO) send PDO(TPDO).
- transmission data, data PC PC PC receive.data 18 PC section.
- pc CANopen 8 pc PDO, 4 pc send PDO 4 PC receive PDO.
- PDO synchronization transmission method, PDO should communication Parameter.
- PDO, PDO should Parameter.

4 Synchronization Object (SYNC)

Synchronization Object CANopen broadcast CAN bus message, network Signal, pccan PC configuration, use network synchronization communication.

5 , emergency message (EMCY)

Internal communication fault should fault error send message.

7.2.4 communication object

communication object(COB-ID) communication process object communication object.COB-IDCAN 2.0A 11 frame I Dshould , 11 COB-ID, 4 object Function 7 node address, COB-ID Description:

10	9	8	7	6	5	4	3	2	1	0
Function				node address						

CANopen PC communication object default COB-ID, can through SDO read, can through SDO

modify .object:

communication object	Function	node address	COB-ID	should object
network management	0000b	0	0h	-
Synchronization Object	0001b	0	80h	1005h, 1006h
emergency message object	0001b	1~127	80h + Node ID	1014h
TPDO 1	0011b	1~127	180h + Node ID	1800h
RPDO 1	0100b	1~127	200h + Node ID	1400h
TPDO 2	0101b	1~127	280h + Node ID	1801h
RPDO 2	0110b	1~127	300h + Node ID	1401h
TPDO 3	0111b	1~127	380h + Node ID	1802h
RPDO 3	1000b	1~127	400h + Node ID	1402h
TPDO 4	1001b	1~127	480h + Node ID	1803h
RPDO 4	1010b	1~127	500h + Node ID	1403h
T_SDO	1011b	1~127	580h + Node ID	1200h
R_SDO	1100b	1~127	600h + Node ID	1200h
network management error control	1110b	1~127	700h + Node ID	1016h, 1017h

: 4 TPDO 2 COB-ID 280h + 4 = 284h.

8.3 System Settings

EA-BLDC20 driver connected CANopen bus network, Function code.

System Settings Function code

Function code	Name	Setting Range	setting
F00.00	Control Mode selection	0: Test mode 1: Hall open-loop 2 : Hall closed-loop 3 : DIP switch (some models SW1 valid)	2
F00.01	Run Command Selection	0 : keypad run command channel (LED off) 1 : terminal run command channel (LED flashing) 2 : Communication run command channel (LED on) 3 : DIP switch (some models SW3 valid)	2
F00.02	Speed Reference Selection	0: keypad digital setting 1 : analog AI1 setting (Knob Potentiometer) 2 : analog AI2 setting (external voltage) 3 : MODBUS communication setting 4: Multi-step speed setting 5 : DIP switch(SW2~3) 6 : Simple PLC setting (F04 group) 7 : input setting 8 : CAN communication setting	8
F00.05	communication cmd ch. sel.	0 : RS485 MODBUS communication 1 : CAN communication	1

Function code	Name	Setting Range	setting
F08.10	CAN slave address	1~127	1
F08.11	CAN	0 : 10 kΩ(some models valid) 1: 20K 2: 50K 3: 100K 4 125K (default) 5: 250K 6: 500K 7: 1M	4
F08.12	CAN communication response	0~200ms	5
F08.13	CAN communication protocol	0 : CAN Modbus (default) 1 : CANopen	1
F08.14	CAN function setting	CANopen function setting BIT 0-BIT 7: BIT 0: action selection when not Operational during running 0 = stop and report E.CAN 5 fault 1 = keep previous state BIT 1: heartbeat timeout action selection 0 = stop and report E.CAN 4 fault 1 = keep previous state BIT 2: enable CAN receive/send faults 0 = disable E.CAN 2 and E.CAN 3 faults 1 = E.CAN 2, E.CAN 3 fault CAN Modbus function setting BIT 8-BIT 15: BIT 8: CAN Modbus broadcast response selection 0 = no response to broadcast 1 = respond to broadcast	0
F00.15	Parameter recovery	0: No operation 1 : recovery Function code 2 : recovery CANopen communication Parameter Parameter Description / Range	0

8.4 Communication Objects

8.4.1 Network Management System (NMT)

Network Management System(NMT), start Stop network network, /.
CANOpen network PC NM Tmaster, can configuration CANOpen network.

8.4.1.1 NMT service

CANOpen specified state should ., internal, must NMT master send NM Tmessage, figure below.

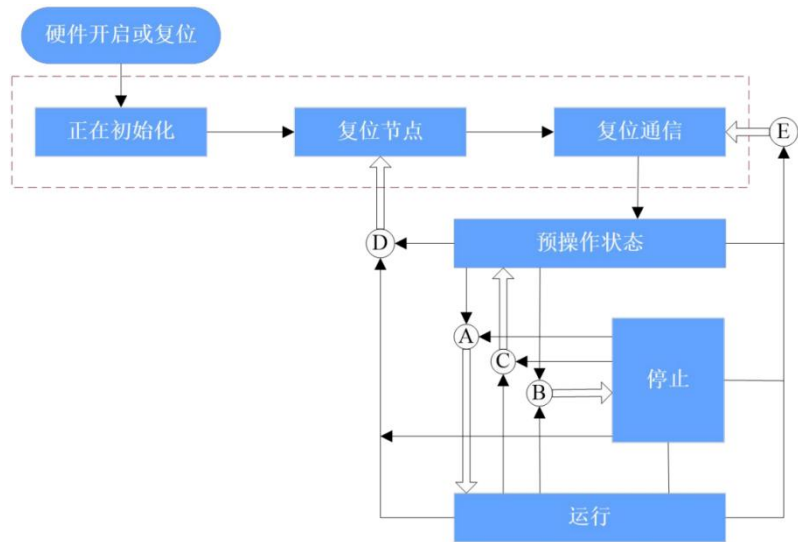


figure above NM Tmessage, NMT master send NM Tcontrolmessage, message.

NMT message

COB-ID	RTR	Data/section	
		0	1
0x000	0	command	Node_ID

NMT message COB-ID fixing"0x000".

data PC section: PC section command, frame control, Description; PC section CANOpen node address, 0 broadcast, network valid.

NMT message command

command		Description
0x01	A	start node command
0x02	B	Stop node command
0x80	C	Operation state command
0x81	D	Reset node command
0x82	E	Reset communication command

state, , Reset node Reset communication.pc Parameter, Reset node Object Dictionary recovery, Reset communication Object Dictionary communication Parameter recovery.

send Boot-up, Operation state, state configuration node state.

configuration, node NM Tmastersend NM Tmessage Operation state.Operation state CANOpen state, PC should .

NMT master send Stop node message, stopped state, CANOpen communication NMT.

NMT state support CANOpen service:

service	Operation	Operation	Stop
---------	-----------	-----------	------

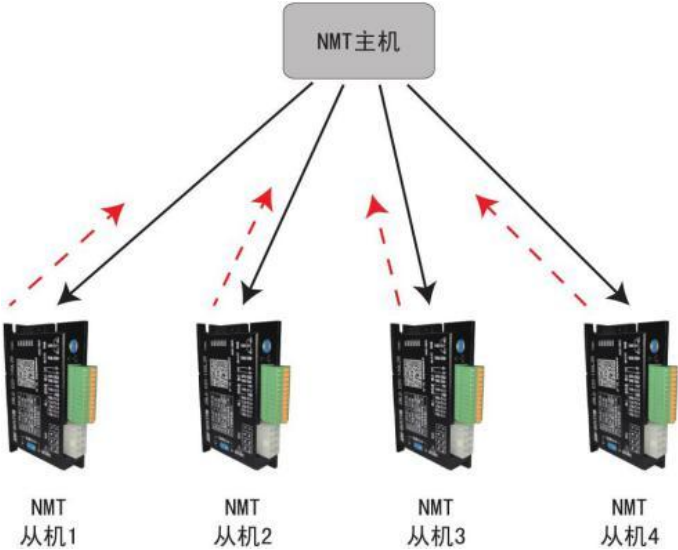
Process Data Object (PDO)			
Service Data Object (SDO)			
Synchronization Object (SYNC)			
emergency message (EMCY)			
Network Management System (NMT)			
error control			

8.4.1.2 NMT Function

NMT used for detection network state.

--CANopen can pcsobject 1017 hsendmessage, unitms.network Function node, pcsobject 1016 htime, time range receive should node, no default.

configuration time 1017h, node Function, message.configuration 1016 hvalid, receive should node frame.



Description diagram

master time send message, master slave 1016 htime, receive message, master.1016 htime≥master time×2, slave master.

slave 1017h time send message, slave master (slave), time receive message, slave.1017h×2 ≤slave master(slave) time, slave.

message, data PC section, fixing"0", node protection response message state.

message

COB-ID	RTR	Data
0x700+Node-ID	0	state

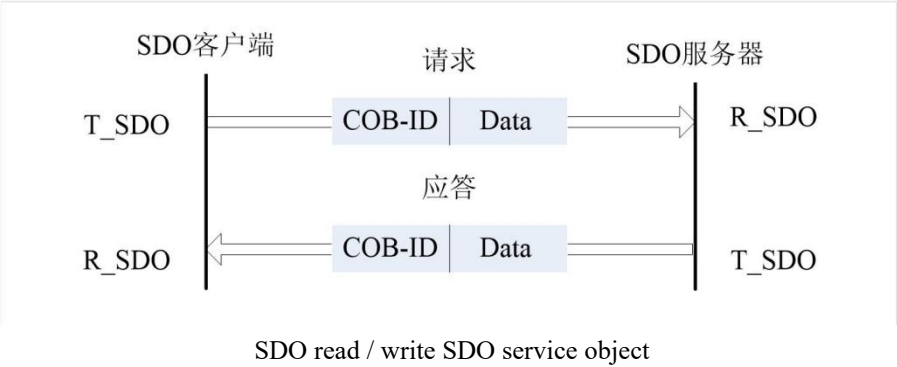
driver, , can 5 pcnode.time 20 ms, time 40 ms, should time 2.

8.4.2 Service Data Object (SDO)

Service Data Object (SDO) through object Object Dictionary, through SDO can read Object Dictionary object, modify object data.

8.4.2.1 SDO transmission

SDO transmission method - service, should method. CAN bus network SDO , SDO service response., SDO datapc CAN message, pc CAN message CAN .SDO transmission figure below.



8.4.2.2 SDO transmission message

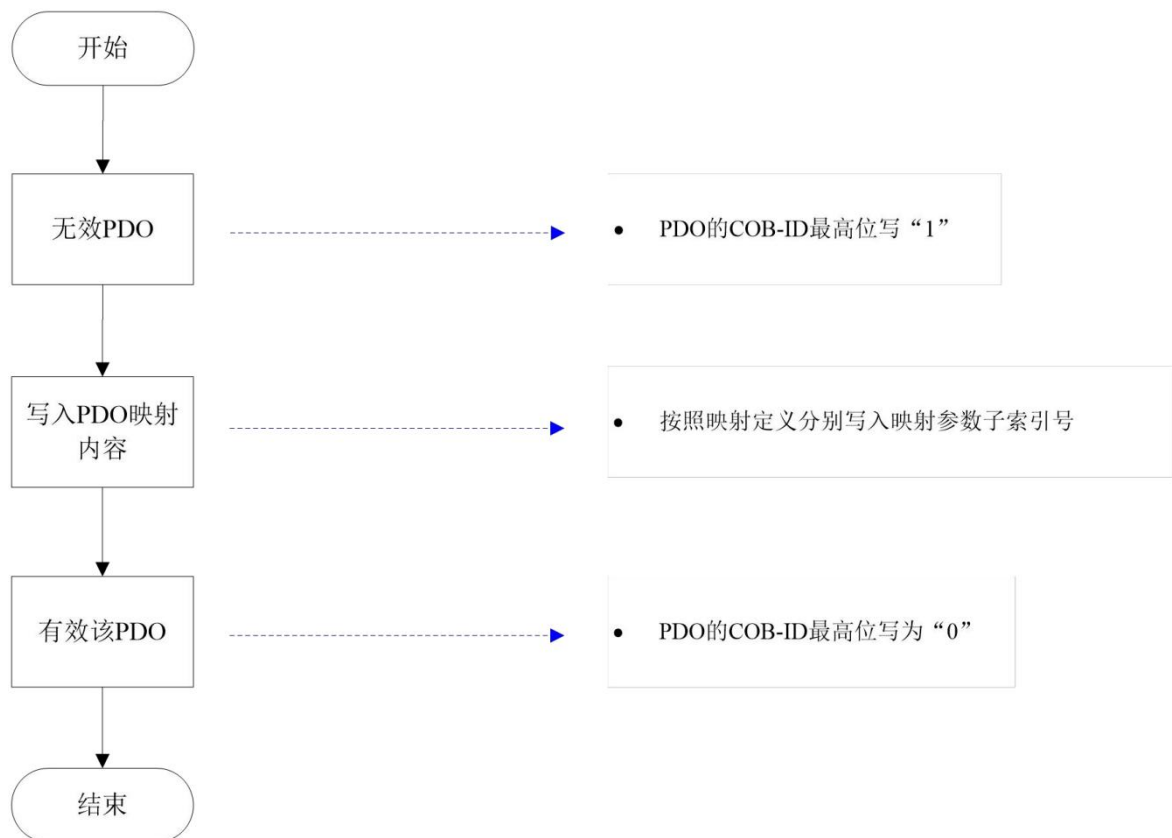
SDO transmission 4 PC section 4 PC section object data transmission.4 PC section acceleration SDO transmission method, 4 PC section transmission transmission method.C20 driver support acceleration SDO transmission transmission.

SDO transmission message COB-ID data.can , T_SDOR_SD Omessage COB-ID.data, , .SDO message data must 8 PC section.SDO transmission message:

COB-ID	Data							
580h+Node_ID/ 600h+Node_ID	0	1	2	3	4	5	6	7
	commands				Data			

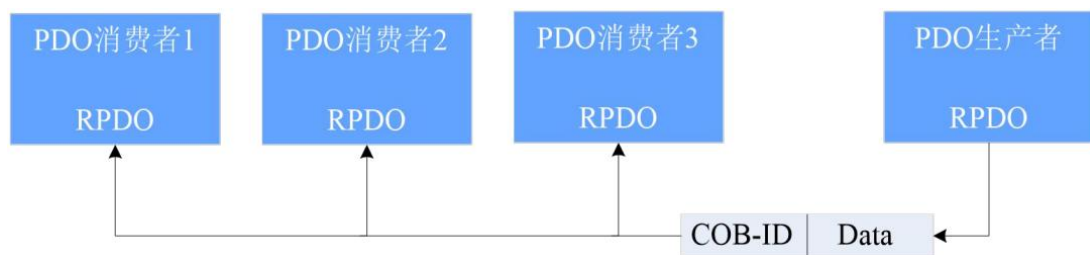
8.4.3 Process Data Object (PDO)

Process Data Object(PDO)transmission data, CANopen data transmission method.PDO transmission response, PDO can 8 PC section, transmission speed.
PDO configuration:



8.4.3.1 PDO transmission

PDO transmission, CAN bus network TPDO can be sent to PC PC RPDO receive transmission figure below., driver CANopen communication support point-to-point PDO transmission method.



8.4.3.2 PDO object

receive send, PDO can RPDO TPDO. PDO communication Parameter Parameter transmission method. C20 driver use 4 pc RPDO 4 pc TPDO PDO transmission, object:

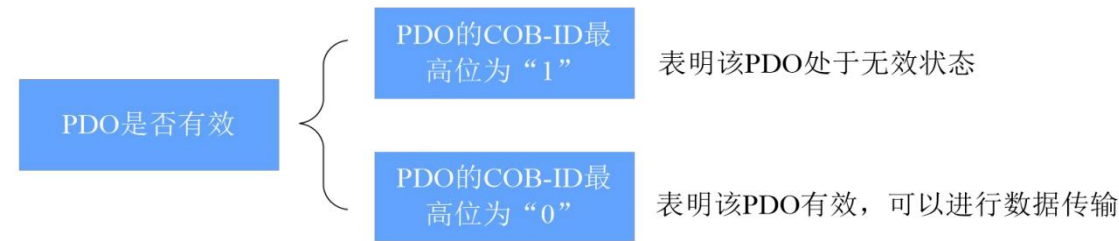
Name		COB-ID	communication object	object	COB-ID
RPDO	1	200h + Node_ID	1400h	1600h	200h + Node_ID
	2	300h + Node_ID	1401h	1601h	300h + Node_ID
	3	400h + Node_ID	1402h	1602h	400h + Node_ID
	4	500h + Node_ID	1403h	1603h	500h + Node_ID

TPDO	1	180h + Node_ID	1800h	1A00h	180h + Node_ID
	2	280h + Node_ID	1801h	1A01h	280h + Node_ID
	3	380h + Node_ID	1802h	1A02h	380h + Node_ID
	4	480h + Node_ID	1803h	1A03h	480h + Node_ID

8.4.3.3 PDO communication Parameter

1 , PDO CAN

PDO CAN PDO COB-ID, control data, PDO bus.COB-ID communication Parameter(RPDO: 1400h~1403h, TPDO: 1800h~1803h)01, PDO valid.



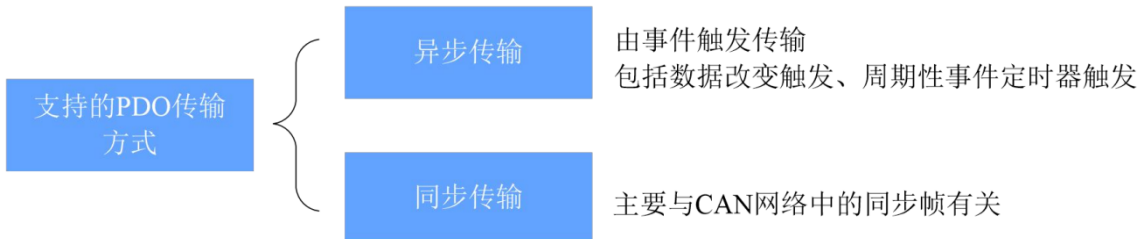
PDO valid Description

driver support point-to-point PDO transmission, COB-ID 7 must node address.

: 4 node, TPDO 3 state COB-ID should "80000384h", COB-ID write"384h", PDO.

2 , PDO transmission Type

PDO transmission Type communication Parameter(RPDO: 1400h~1403h, TPDO: 1800h~1803h) 02, PDO transmission method.



support PDO transmission method

communication Parameter (RPDO: 1400h~1403h, TPDO: 1800h~1803h) 02 transmission Type, TPDO transmission RPDO, should .

PDO

communication Type	synchronization		
0		√	
1~240	√		
241~253	-		
254、255			√

- TPDO transmission Type 0, data, receive PC synchronization frame, send TPDO;

- TPDO transmission Type 1~240, receive should PC synchronization frame, send TPDO.
- TPDO transmission Type 254~255, data send TPDO.
- RPDO transmission Type support 254~255, receive data should .

3 , disable time
 TPDO disable time, communication Parameter(1800h~1803h)03, CAN network PDO.Parameter unit 100 us, , pc TPDO transmission Parameter should time.
 :
 TPDO 2 disable time 300, TPDO transmission 30 ms.

4 ,
 transmission(transmission Type 254~255)TPDO, , communication Parameter(1800h~1803h)05.can , should
 TPDO transmission.Run data, TPDO, Reset.

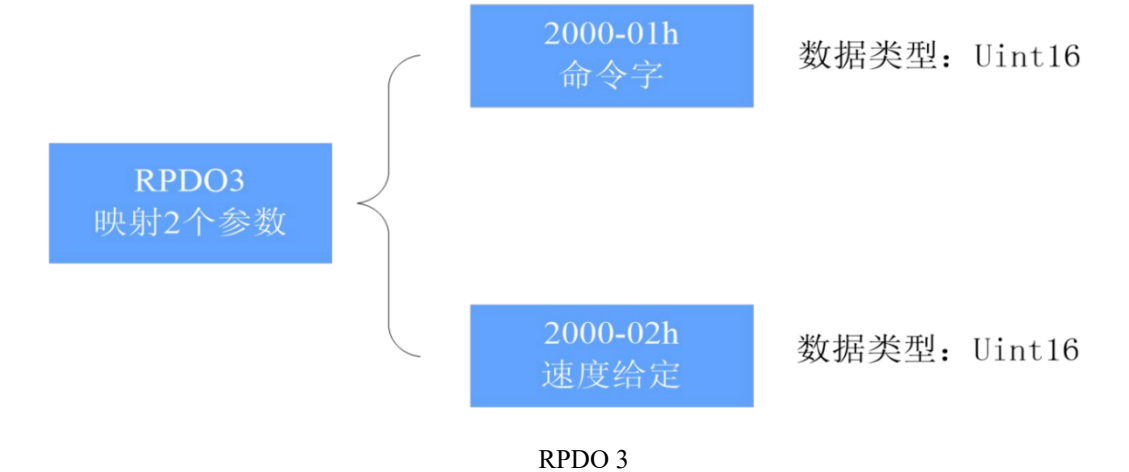
8.4.3.4 PDO Parameter
 PDO Parameter PDO send receive PDO should process data, , object.pc PDO Data length can 8 PC section,
 can PC PC object.0 PDO object PC, 1~8.PDO Parameter:

	31		16	15		8	7		0
Meaning							object		

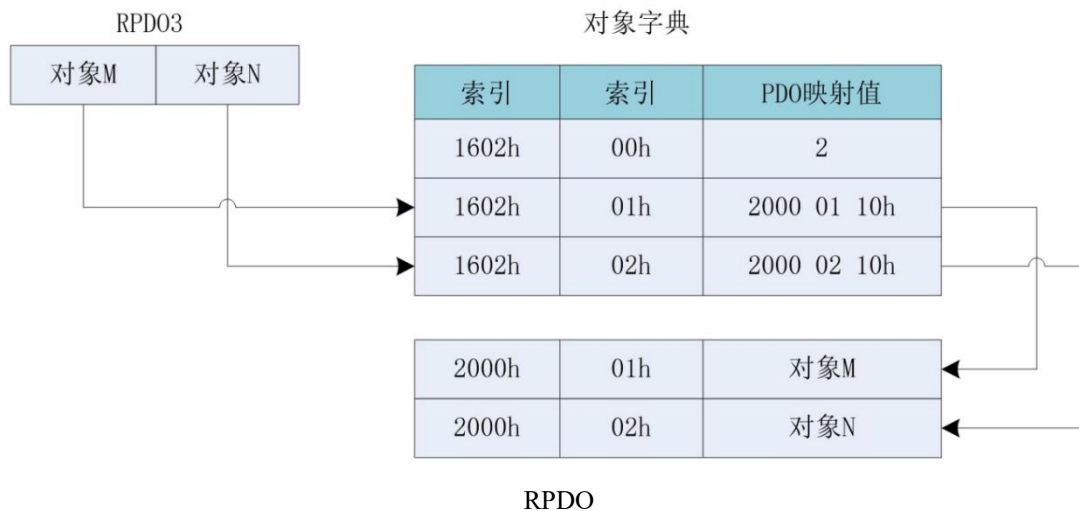
object Object Dictionary, object object, , :
 object object

object	
08h	8
10h	16
20h	32

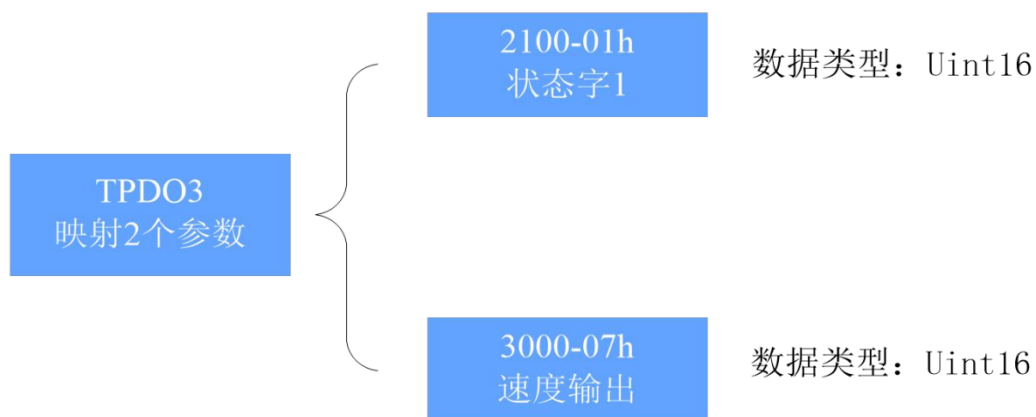
:
 16 command 2000h-01 Parameter 20000110h.
 PDO Description.
 :
 RPDO 3 2 pc Parameter, :



4 PC section(2+2), RPDO 3 transmission process data 4 PC section, .



TPDO method RPDO, direction.RPDO input, TPDO
output.
: TPDO 3 pc Parameter, :



TPDO 3

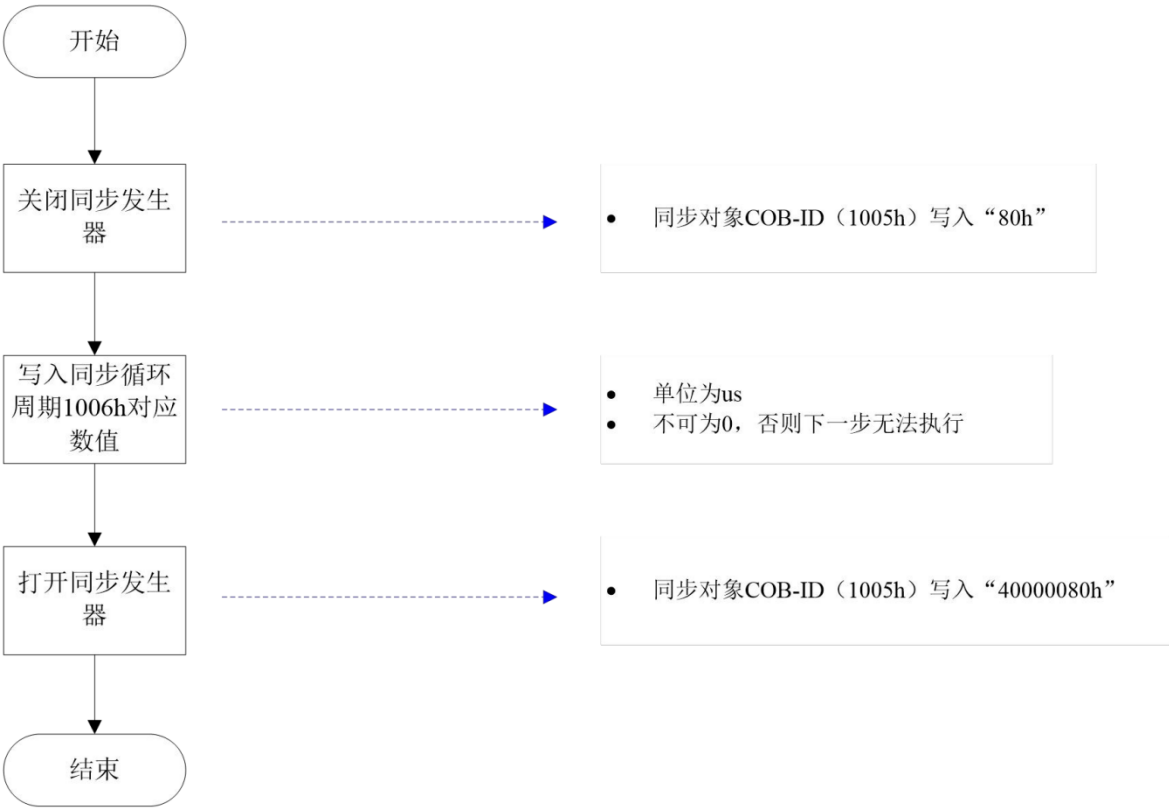
4 PC section(2+2), TPDO 3 transmission process data 4 PC section, .



8.4.4 Synchronization Object (SYNC)

Synchronization Object(SYNC)control PC node send receive synchronization, used for PDO synchronization transmission.

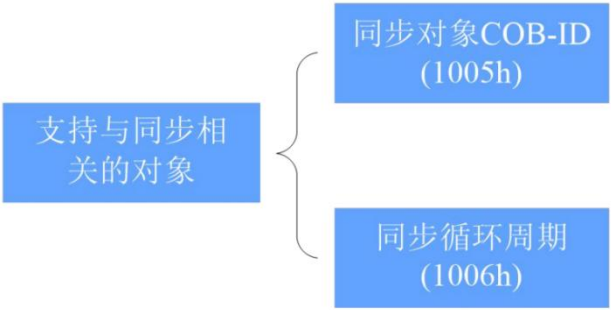
synchronization configuration:



C20 driver use 5 ms synchronization.

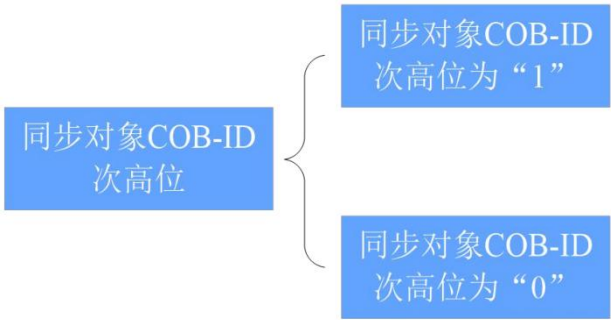
8.4.4.1 synchronization

C20 driver synchronization, can synchronization.support synchronization object Synchronization Object COB-ID(1005h) synchronization(1006h).



support synchronization object Description

Synchronization Object COB-ID synchronization.

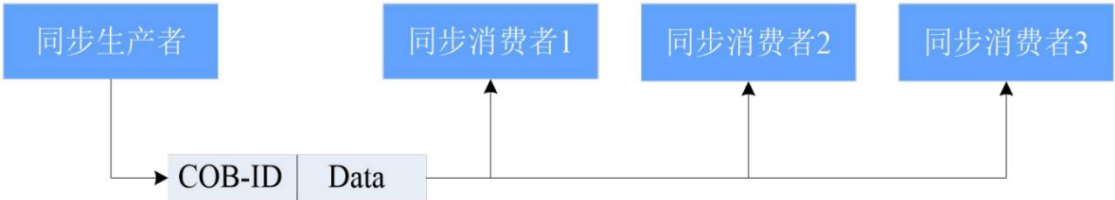


synchronization Description

synchronization, units, node Synchronization Object.

8.4.4.2 Synchronization Object transmission

PDO transmission, Synchronization Object transmission--, synchronization frame, CAN network node CAN receive synchronization frame, .pc CAN network PC synchronization. Synchronization Object transmission.



synchronization transmission

synchronization PDO transmission synchronization frame.

synchronization TPDO, synchronization synchronization.



synchronization TPDO Description

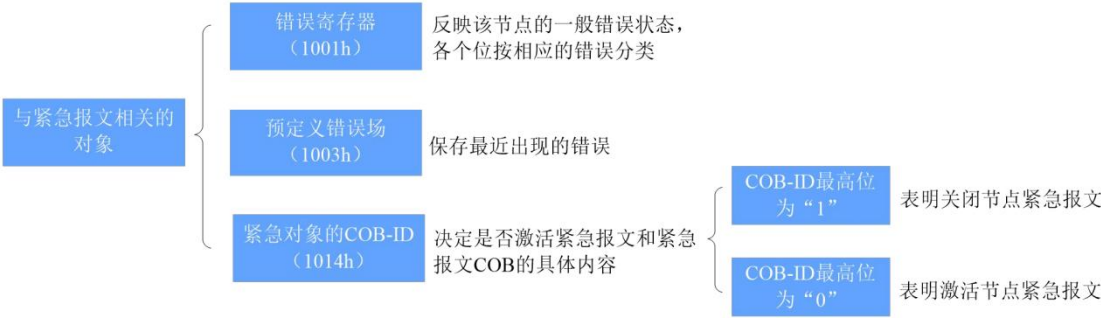
:

TPDO 1 transmission Type 0, TPDO 2 transmission Type 20.

TPDO 1 data, pc SYN Csend TPDO 1, TPDO 220 pc SYNC, data, send PDO.

8.4.5 Emergency Object Service (EMCY)

CANopen node error, , node send frame emergency message.emergency message--, no default, CAN network node CAN selection fault.driver emergency message, node emergency message.



emergency message object Description

no default, emergency object, error register error. Emergency message:

emergency message

COB-ID	0	1	2	3	4	5	6	7
80h+Node_ID	error		error register		section			

error register 1001 hkeep:

- communication, error DS 301 keep, section communication.
- driver user, error 0xFF00, section display user error.error section see 8.5 chapter section.

8.5 Fault Handling

communication driver, C20 driver network send emergency, SDO transmission send abort response. node emergency message node error.

8.5.1 Fault Recovery Methods

C20 driver fault, method see chapter section, description communication Fault clear.

fault display	Fault Name	Fault Cause	Fault Handling
E.CAN 1	CAN Bus-off fault	too many errors	check CAN network and reconnect.
E.CAN 2	CAN send error	too many transmission error frames	Check CAN nodes, wiring, and baud rate.
E.CAN 3	CAN receive error	too many reception error frames	check baud rate, check.
E.CAN 4	timeout	time	check CAN node, check CANopen configuration, fault.
E.CAN 5	NMT fault	motor Run, receive NMT, and other commands	fault, NMT, the motor stop running.

8.5.2 SDO Transfer Abort Codes

abort	Function description
0503 0000	
0504 0000	SDO timeout
0504 0001	/service command
0504 0005	
0601 0000	object Not supported
0601 0001	read write object
0601 0002	write read object
0602 0000	Object Dictionary object
0604 0041	object PDO
0606 0000	hardware error object
0607 0010	data Type, service Parameter
0609 0011	
0609 0030	Parameter range
0609 0031	write Parameter
0609 0032	write Parameter
0800 0000	error
0800 0021	control data should
0800 0022	state data should

8.6 Object Dictionary

8.6.1 Object Classification Description

★

"": PC object Object Dictionary, .

"data Type": see data Type Description:

data Type	range	Data length	DS 301
Int 8	-128~+127	1 section	0002
Int 16	-32768~+32767	2 section	0003
Int 32	-2147483648~+ 2147483647	4 section	0004
Uint 8	0~255	1 section	0005
Uint 16	0~65535	2 section	0006
Uint 32	0~4294967295	4 section	0007
String	ASCII	-	0009

"read/write Type": see read/write Type Description:

read/write Type	Description
RW	can read/write
RW*	can write, can read
WO	write
RO	read
CONST	, read

"object classification": see Object Classification Description:

	Meaning	DS 301
VAR	, data Type Int 8, Uint 16, String	7
ARR	Type data	8
REC	Type data	9

8.6.2 Object Group 1000h Parameters

1000 h Object group CANopen Communication Parameter, communication Parameter CAN PDO.

		Name	Attribute		data Type	Fault time out	Default
1000h	-	Type	RO	NO	Uint 32	VAR	0x00
1001h	-	error register	RO	NO	Uint 8	VAR	0x0
1003h	-	error	RO	NO	Uint 32	ARR	-
	1~4h	error	RW	NO	Uint 32	-	0
1005h	-	synchronization message COB-ID	RW	NO	Uint 32	VAR	0x80
1006h	-	synchronization (unit: us)	RW	NO	Uint 32	VAR	0
1008h	-	Name	CONST	NO	String	VAR	EA-BLDC20
1009h	-	hardware Version	CONST	NO	String	VAR	Vx.xx
100Ah	-	Version	CONST	NO	String	VAR	Vx.xx

		Name	Attribute		data Type	Fault time out	Default
100Ch	-	(Reserved)	RW	NO	Uint 16	VAR	0
100Dh	-	(Reserved)	RW	NO	Uint 8	VAR	0
1010h	-	Parameter"save"	RW	NO	Uint 32	ARR	0
	1h	object Parameter	RW	NO	Uint 32	-	1
	2h	communication object Parameter	RW	NO	Uint 32	-	1
1011h	0h	recovery default Parameter"load"	RW	NO	Uint 32	ARR	-
	1h	recovery object default Parameter	RW	NO	Uint 32	-	1
	2h	recovery communication object default Parameter	RW	NO	Uint 32	-	1
1014h	-	emergency message COB-ID	RW	NO	Uint 32	VAR	0x80+Node_ID
1016h	-	time	RW	NO	Uint 32	ARR	-
	1~5h	time	RW	NO	Uint 32	-	0
1017h	-	time (unit: ms)	RW	NO	Uint 16	VAR	0
1018h	-	object description	RO	NO	/	REC	-
	1h	ID	RO	NO	Uint 32	-	0x2896
	2h		RO	NO	Uint 32	-	0x000C20 xx
	3h	Version	RO	NO	Uint 32	-	0x00000100
1200h	-	SDO service Parameter	RO	NO	SDO Parameter	REC	-
	1h	service COB-ID	RO	NO	Uint 32	-	0x600 +Node_ID
	2h	service COB-ID	RO	NO	Uint 32	-	0x580 +Node_ID
1400h	-	RPDO 1 Parameter	RW	NO	PDO Parameter	REC	-
	1h	RPDO 1 COB-ID	RW	NO	Uint 32	-	0x00000200 +Node_ID
	2h	RPDO 1 transmission Type	RW	NO	Uint 8	-	255
1401h		RPDO 2 Parameter	RW	NO	PDO Parameter	REC	-
	1h	RPDO 2 COB-ID	RW	NO	Uint 32	-	0x00000300 +Node_ID
	2h	RPDO 2 transmission Type	RW	NO	Uint 8	-	255
1402h		RPDO 3 Parameter	RW	NO	PDO Parameter	REC	-
	1h	RPDO 3 COB-ID	RW	NO	Uint 32	-	0x00000400

		Name	Attribute		data Type	Fault time out	Default
							+Node_ID
	2h	RPDO 3 transmission Type	RW	NO	Uint 8	-	255
1403h		RPDO 4 Parameter	RW	NO	PDO Parameter	REC	-
	1h	RPDO 4 COB-ID	RW	-	Uint 32	-	0x00000500 +Node_ID
	2h	RPDO 4 transmission Type	RW	NO	Uint 8	-	255
1600h		RPDO 1 Parameter	RW	NO	RPDO Parameter	REC	-
	1~8h	RPDO 1 object	RW	NO	Uint 32	-	-
1601h		RPDO 2 Parameter	RW	NO	RPDO Parameter	REC	-
	1~8h	RPDO 2 object	RW	NO	Uint 32	-	-
1602h		RPDO 3 Parameter	RW	NO	RPDO Parameter	REC	-
	1~8h	RPDO 3 object	RW	NO	Uint 32	-	-
1603h		RPDO 4 Parameter	RW	NO	RPDO Parameter	REC	-
	1~8h	RPDO 4 object	RW	NO	Uint 32	-	-
1800h	-	TPDO 1 communication Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 1 COB-ID	RW	NO	Uint 32	-	0x40000180 +Node_ID
	2h	TPDO 1 transmission Type	RW	NO	Uint 8	-	255
	3h	disable time	RW	NO	Uint 16	-	-
	5h		RW	NO	Uint 16	-	-
1801h	-	TPDO 2 communication Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 2 COB-ID	RW	NO	Uint 32	-	0xC0000280 +Node_ID
	2h	TPDO 2 transmission Type	RW	NO	Uint 8	-	255
	3h	disable time	RW	NO	Uint 16	-	-
	5h		RW	NO	Uint 16	-	-
1802h	-	TPDO 3 communication Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 3 COB-ID	RW	NO	Uint 32	-	0xC0000380 +Node_ID
	2h	TPDO 3 transmission Type	RW	NO	Uint 8	-	255
	3h	disable time	RW	NO	Uint 16	-	-
	5h		RW	NO	Uint 16	-	-

		Name	Attribute		data Type	Fault time out	Default
1803h	-	TPDO 4 communication Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 4 COB-ID	RW	NO	Uint 32	-	0xC0000480 +Node_ID
	2h	TPDO 4 transmission Type	RW	NO	Uint 8	-	255
	3h	disable time	RW	NO	Uint 16	-	-
	5h		RW	NO	Uint 16	-	-
1A00h	-	TPDO 1 Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 1 object	RW	NO	Uint 32	-	-
1A01h	-	TPDO 2 Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 2 object	RW	NO	Uint 32	-	-
1A02h	-	TPDO 3 Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 3 object	RW	NO	Uint 32	-	-
1A03h	-	TPDO 4 Parameter	RW	NO	PDO Parameter	REC	-
	1h	TPDO 4 object	RW	NO	Uint 32	-	-

8.6.3 Object Group 2000h-3000h Parameters

2000 h~3000h Object group company motor object, Parameter Function code should .object support PDO .

2000 h control Parameter

		Name	Attribute		Type	Fault timeout	Default
2000h	01h	Communication control command: 01 H: Forward running 02 H: Reverse run 03 H: forward jog 04 H: reverse jog 05 H: 06 H: 07 H: Fault reset 08 H: Jog Stop Note: Parameter	W/R	YES	Uint 16	-	0
	02h	communication setting speed: 0~3000 RPM	W/R	YES	Uint 16	-	0

		Name	Attribute		Type	Fault timeout	Default
		Note: Parameter					
	03h	Motor pole pairs: 1~20	W/R*	YES	Uint 16	-	5
	04h	acceleration time: 1 ~6000 (unit: 0.1S)	W/R	YES	Uint 16	-	10
	05h	deceleration time: 1 ~6000 (unit: 0.1S)	W/R	YES	Uint 16	-	10
	06h	Control Mode selection: 0: Test mode 1: Open loop 2 Closed loop 3 : DIP switch(SW1)	W/R*	YES	Uint 16	-	
	07h	Run Command Selection: F02.14 1: Terminal run command channel 2 : Communication run command channel 3 : DIP switch(SW3)	W/R	YES	Uint 16	-	
	08h	Speed Reference Selection: 0: keypad digital setting 1 : Analog AI 1 setting 2 : Analog AI 2 setting 3 : RS485 communication setting 4: Multi-step speed setting 5 : DIP switch(SW2~3) 6 : Simple PLC reference 7 : input setting 8 : CAN communication setting	W/R	YES	Uint 16	-	1
	09h	CAN communication slave address: 1~247	W/R*	YES	Uint 16	-	1
	0 Ah	CAN communication baud rate: 0: 10 kΩ 1: 20K 2: 50K 3: 100K 4 125K (default) 5: 250K 6: 500K 7: 1M Note: some models CAN be set	W/R*	YES	Uint 16	-	4

		Name	Attribute		Type	Fault timeout	Default
		10 kΩ					
	0 Eh	communication command Comm. cmd ch. sel.: 0 : RS485 communication 1 : CAN communication	W/R*	YES	Uint 16	-	
	0 Fh	Function code Write enable: 0 : CAN communication Function code CAN write 1 : CAN communication Function code CAN write Note: Parameter	W/R	YES	Uint 16	-	0
	10H	Parameter recovery: 0: No operation 1 : recovery Function code 2 : recovery CAN communication Parameter Parameter Description / Range	W/R*	YES	Uint 16	-	0

2100 h state Parameter

		Name	Attribute		Type	Fault timeout	Default
2100h	01h	state 1: 01 H: Fwd Running 02 H: Rev Running 03 H: driver 04 H: Driver Fault 05 H: driver OFF state 06 H: Electronic brake state	RO	TPDO	Uint 16	-	0

	02h	state 2: Bit 0: =0: bus voltage =1: bus voltage established Bit 4: =0: overload =1: overload Bit 5~ Bit 6: =00b: Keypad Control =01b: Terminal Control =10b: communication control	RO	TPDO	Uint 16	-	0
	03h	Fault Code: see 5.2 chapter section Fault Code	RO	TPDO	Uint 16	-	0
	04h	driver: 20 h(C20)	RO	TPDO	Uint 16	-	0x20

3000 h state Parameter

		Name	Attribute		Type	Fault timeout	Default
3000h	01h	setting frequency: 0-Fmax (unit: 0.01Hz)	RO	TPDO	Uint 16	-	0
	02h	output frequency: 0-Fmax (unit: 0.01Hz)	RO	TPDO	Int 16	-	0
	03h	Ramp set frequency: 0-Fmax (unit: 0.01Hz)	RO	TPDO	Uint 16	-	0
	04h	output voltage: 0 ~20000 (unit: 0.1V)	RO	TPDO	Uint 16	-	0
	05h	Out Curr.: 0 ~30000 (unit: 0.01A)	RO	TPDO	Uint 16	-	0
	06h	setting speed: 0-3000 (unit: 1 RPM)	RO	TPDO	Uint 16	-	0
	07h	Motor output speed: 0-3000 (unit: 1 RPM)	RO	TPDO	Uint 16	-	0
	08h	Motor output power: 0 ~2200 (unit: W)	RO	TPDO	Uint 16	-	0
	09h	DC bus voltage : 0 ~20000 (unit: 0.1V)	RO	TPDO	Uint 16	-	0
	0 Ah	Hall value:0~7	RO	TPDO	Uint 16	-	0
	0 Bh	Software version number:1.00~99.00	RO	TPDO	Uint 16	-	-
	0 Ch	fault:	RO	TPDO	Uint 16	-	0

		Name	Attribute		Type	Fault timeout	Default
		see 5.2 chapter section fault Description					
	0 Dh	Inverter temperature: -200~1200 (unit: 0.1°C)	RO	TPDO	Uint 16	-	0
	0 Eh	Input terminal status: 00h~1F Fh	RO	TPDO	Uint 16	-	0
	0 Fh	Output terminal status: 00~0F	RO	TPDO	Uint 16	-	0
	10h	Analog 1 input voltage: 0 ~1000 (unit: 0.01V)	RO	TPDO	Uint 16	-	0
	11h	Analog 2 input voltage: 0 ~1000 (unit: 0.01V)	RO	TPDO	Uint 16	-	0
	12h	Analog 3 input voltage: 0 ~1000 (unit: 0.01V)	RO	TPDO	Uint 16	-	0
	13h	Reserved	RO	TPDO	Uint 16	-	0
	14h	Hall count high 16 bits: 0~65535	RO	TPDO	Uint 16	-	0
	15h	Hall count low 16 bits: 0~65535	RO	TPDO	Uint 16	-	0

8.6.4 Detailed Description of Object Dictionary 1000h Group Parameters

1000h	Name	Type (Device Type)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	Uint 32	Default	0x0000
Type Parameter description use should .								

1001h	Name	error register (Error Register)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	Uint 8	Default	0x00

error Type, :

	Meaning		Meaning
0		4	communication
1	current	5	
2	voltage	6	
3		7	

error, error should "1", error, 0 must "1".

1003h	Name	error (Pro-defined Error Field)			data	VAR	data Type	Uint 32								
	Attribute	RO	can	NO	range	-	Default	-								
00h	Name	error PC (Number of Errors)			data	-	data Type	Uint 8								
	Attribute	RW	can	NO	range	0~4	Default	0								
can write 0, error.																
1~4h	Name	error (Standard Error Field)			data	-	data Type	Uint 32								
	Attribute	RW	can	NO	range	Uint 32	Default	0								
0 , can read; error, error:																
<table><tr><td>31</td><td>16</td><td>15</td><td>0</td></tr><tr><td colspan="2">error</td><td colspan="2">error</td></tr></table>									31	16	15	0	error		error	
31	16	15	0													
error		error														
MSB LSB																

1005h	Name	synchronization message-ID (COB-ID SYNC Message)			data	VAR	data type	Uint 32
	Attribute	RW	can	NO	range	Uint 32	Default	0x80
can write 0x80 h 0x40000080 h. write 0x80 h , synchronization; write 0x40000080 h , synchronization. synchronization must configuration synchronization 1006h .								

1006h	Name	synchronization (Communication Cycle Period)			data	VAR	data Type	Uint 32
	Attribute	RW	can	NO	range	Uint 32	Default	0
synchronization, unit us, 5ms .								

1008h	Name	Name (Manufacturer Device Name)			data	VAR	data Type	String
	Attribute	CONST	can	NO	range	String	Default	ZBLD .C20

1009h	Name	hardware Version (Manufacturer Hardware Version)			data	VAR	data Type	String
	Attribute	CONST	can	NO	range	String	Default	Vx.xx

100Ah	Name	Version (Manufacturer Software Version)			data	VAR	data Type	String
	Attribute	CONST	can	NO	range	String	Default	Vx.xx
x.xx: Software version number.								

1010h	Name	Parameter (Store Parameters)			data	VAR	data Type	Uint 32
	Attribute	RW	can	NO	range	Uint 8	Default	0

Parameter EEPROM, EEPROM (, Reset node Reset communication), .Parameter, should , ASCII write"save", write CAN .write should :

MSB LSB

ASCII	e	v	a	s
16	65h	76h	61h	73h

	Meaning
0	Parameter, command Parameter
1	command Parameter,
2	Parameter, receive command Parameter
3	can Parameter, can command Parameter

should read method Parameter.

00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	4	Default	4
01h	Name	object Parameter (Save All Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	1
Object Dictionary Parameter.								

02h	Name	communication object Parameter (Save Communication Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	1
Object group 1000h Parameter.								
03h	Name	object Parameter (Save Application Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	1
Object group 6000h Parameter (Reserved).								
04h	Name	object Parameter(Save Manufacturer Defined Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	2
Object group 2000h~5FFFh Parameter.								

1011h	Name	recovery default Parameter (Restore Default Parameters)			data	VAR	data Type	Uint 32
	Attribute	RW	can	NO	range	-	Default	0

recovery default Parameter default Parameter recovery EEPROM, . EEPROM (, Reset node Reset communication), default (factory).

Recovery default Parameter, recovery should , ASCII write "load", write CAN Default trecovey.write should :

MSB LSB

ASCII	d	a	o	l
16	64h	61h	6 Fh	6 Ch

	Meaning
0	can recovery default Parameter
1	can recovery default Parameter

should read method recovery default Parameter.

00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	4	Default	4
01h	Name	recovery object default Parameter (Restore All Default Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	1
recovery Object Dictionary Parameter.								
02h	Name	communication object Parameter (Restore Communication Parameters)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	1
recovery Object group 1000h Parameter.								

1014h	Name	emergency message COB-ID (COB-ID Emergency Message)			data	VAR	data Type	Uint 32
-------	------	--	--	--	------	-----	-----------	---------

	Attribute	RW	can	NO	range	-	Default	0x80+ Node_ID
emergency message, can write data"0x80+Node_ID", emergency message; write data"0x80000080+Node_ID", emergency message. Emergency message, COB-ID must objectkeep.								

1016h	Name	time (Consumer Heartbeat Time)			data	VAR	data Type	Uint 32												
	Attribute	RW	can	NO	range	-	Default	-												
Parameter node address time, time must should node time (unit: ms).can PC node PC time.Parameter: MSB LSB																				
<table><tr><td>31</td><td>24</td><td>23</td><td>16</td><td>15</td><td>0</td></tr><tr><td colspan="4">address</td><td colspan="2">time</td></tr></table>									31	24	23	16	15	0	address				time	
31	24	23	16	15	0															
address				time																
00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8												
	Attribute	RO	can	NO	range	5	Default	5												
1~5h	Name	time (Consumer Heartbeat Time)			data	-	data Type	Uint 32												
	Attribute	RW	can	NO	range	Uint 32	Default	0												

1017h	Name	time (Producer Heartbeat Time)			data	VAR	data Type	Uint 16
	Attribute	RW	can	NO	range	Uint 16	Default	0
unit ms.								

1018h	Name	object description (Identity Object)			data	REC	data Type	-
	Attribute	RO	can	NO	range	Uint 16	Default	0
00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	4	Default	4
01h	Name	ID (Vendor-ID)			data	-	data Type	Uint 32
	Attribute	RO	can	NO	range	Uint 32	Default	0x2896
02h	Name	(Product Code)			data	-	data Type	Uint 32
	Attribute	RO	can	NO	range	Uint 32	Default	0xC2003
03h	Name	Version (Revision Number)			data	-	data Type	Uint 32
	Attribute	RO	can	NO	range	Uint 32	Default	0x100
04h	Name	Reserved			data	-	data Type	Uint 32
	Attribute	RO	can	NO	range	Uint 32	Default	0

1200h	Name	SDO service Parameter (SDO Server Parameter)			data	REC	data Type	SDO Parameter
	Attribute	RO	can	NO	range	-	Default	0

default SDO , read.								
00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	2	Default	2
01h	Name	service COB-ID (COB-ID Client → Server)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	0x600 + Node_ID
02h	Name	service COB-ID (COB-ID Server → Client)			data	VAR	data Type	Uint 32
	Attribute	RO	can	NO	range	-	Default	0x580 + Node_ID

1400~ 1403h	Name	RPDO communication Parameter (RPDO Communication Parameter)			data	REC	data Type	RPDO Parameter
	Attribute	RW	can	NO	range	-	Default	0
00h	Name	support (Highest Sub-index Supported)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	5	Default	5
01h	Name	RPDO COB-ID (COB-ID Used by RPDO)			data	-	data Type	Uint 32
	Attribute	RW	can	NO	range	-	Default	see

can , "0" PDO valid, "1" PDO .

factory setting:

1400h : 0x00000200 + Node_ID

1401h : 0x00000300 + Node_ID

1402h : 0x00000400 + Node_ID

1403h : 0x00000500 + Node_ID

02h	Name	RPDO transmission Type(Transmission Type)			data	-	data Type	Uint 8
	Attribute	RW	can	NO	range	-	Default	255

can PDO state CAN modify . PDO transmission Type, :

	Meaning
0	synchronization
1~240	synchronization
254,255	

1600~ 1603h	Name	RPDO Parameter (RPDO Mapping Parameter)			data	REC	data Type	RPDO Parameter
	Attribute	RW	can	NO	range	-	Default	0

can PDO state CAN modify object.object 64 , support section, Not supported.

00h	Name	PDO valid object PC (Number of Mapped Application Objects in			data	VAR	data Type	Uint 8
-----	------	---	--	--	------	-----	-----------	--------

		PDO)						
	Attribute	RO	can	NO	range	1~4	Default	-
1~4h	Name	RPDO PC object (Application Object)			data	-	data Type	Uint 32
	Attribute	RW	can	NO	range	-	Default	-

object must Object Dictionary, Attribute CAN write state, can .write should :

MLB LSB	31 16	15 8	7 0
			object

RPDO default

1) RPDO 1: 1600h

		Meaning
0	1	1 PC object
1	0x20000110	command 2000h-sub 1-16 bit

2) RPDO 2: 1601h

		Meaning
0	1	1 PC object
1	0x20000210	speed setting 2000h-sub 2-16 bit

3) RPDO 3: 1602h

		Meaning
0	2	2 PC object
1	0x20000110	command 2000h-sub 1-16 bit
2	0x20000210	speed setting 2000h-sub 2-16 bit

4) RPDO 4: 1603h

		Meaning
0	4	4 PC object
1	0x20000410	acceleration time 2000h-sub 4-16 bit
2	0x20000510	deceleration time 2000h-sub 5-16 bit
3	0x00	Reserved
4	0x00	Reserved

1800~ 1803h	Name	TPDO communication Parameter (TPDO Communication Parameter)			data	REC	data type	TPDO Parameter
	Attribute	RW	can	NO	range	-	Default	0
00h	Name	support (Highest Sub-index Supported)			data	VAR	data type	Uint 8
	Attribute	RO	can	NO	range	-	Default	6
01h	Name	TPDO COB-ID (COB-ID Used by TPDO)			data	-	data type	Uint 32
	Attribute	RW	can	NO	range	-	Default	see

can "0" PDO valid, "1" PDO ; support frame PDO, C20 driver Not supported Function, , write "1" frame PDO.

factory setting:

1800h : 0x40000180 + Node_ID

1801h : 0xC0000280 + Node_ID

1802h : 0xC0000380 + Node_ID

1803h : 0xC0000480 + Node_ID

02h	Name	TPDO transmission Type(Transmission Type)			data	-	data Type	Uint 8
	Attribute	RW	can	NO	range	-	Default	255

can PDO state CAN modify . PDO transmission Type, :

	Meaning
0	synchronization
1~240	synchronization
254,255	

03h	Name	disable time (Inhibit Time)			data	-	data Type	Uint 16
	Attribute	RW	can	NO	range	-	Default	0

can PDO state CAN modify .unit 100 us, "0"disable time.

05h	Name	(Event Timer)			data	-	data Type	Uint 16
	Attribute	RW	can	NO	range	-	Default	0

can PDO state CAN modify .unit 1ms, "0".

1A 00~ 1A03h	Name	TPDO Parameter (TPDO Mapping Parameter)			data	REC	data Type	RPDO Parameter
	Attribute	RW	can	NO	range	-	Default	0

can PDO state can modify object.object 64 , support section, Not supported.

00h	Name	PDO in valid object (Number of Mapped Application Objects in PDO)			data	VAR	data Type	Uint 8
	Attribute	RO	can	NO	range	1~4	Default	-
1~4h	Name	TPDO PC object (Application Object)			data	-	data Type	Uint 32
	Attribute	RW	can	NO	range	-	Default	-

object must Object Dictionary, Attribute CAN write state, can .write should :

31 16	15 8	7 0
		object

MLB LSB

TPDO default

TPDO 1: 1A00h

		Meaning
0	1	1 PC object
1	0x21000110	state 12100h-sub 1-16 bit

TPDO 2: 1A01h

		Meaning
0	1	1 PC object
1	0x30000710	Speed output 3000h-sub 7-16 bit

TPDO 3: 1A02h

		Meaning
0	2	2 PC object
1	0x21000110	state 12100h-sub 1-16 bit
2	0x30000710	Speed output 3000h-sub 7-16 bit

TPDO 4: 1A03h

		Meaning
0	4	4 PC object
1	0x21000110	state 12100h-sub 1-16 bit
2	0x30000710	Speed output 3000h-sub 7-16 bit
3	0x30000510	current output 3000h-sub 5-16 bit
4	0x30000C10	fault 3000h-sub 12-16 bit

IX. Basic Inspection and Maintenance

9.1 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.
Pre-run Inspection (Power supplied)	Make sure the applied voltage level of the driver is correct.
	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.

9.2 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 data, the knob potentiometer has a total rotation angle of $250^{\circ} \pm 10^{\circ}$ and rotation life of 100 cycles/ $R \leq \pm(2\Omega + 3\%)$.

■ Long-shaft knob potentiometer

According to supplier data, the shaft rotates at 600 cycles/hour (one back-and-forth movement counted as one cycle), rotating for 24 hours 5 from 1000 cycles to 8000 cycles; the effective rotation angle exceeds 90%, totaling 10000 cycles ± 200 cycles. Total resistance variation: of the initial value. $\pm 15\%$.

■ 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、 use, ;
 - 2、 , , Transport;
 - 3、 product range use;
 - 4、 fire, , , ;
 - 5、 , , .

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