



▶ EA-DRVC41-200S2-KR-A



▶ EA-DRVC41-400S2-R-B

C41 Series High-Voltage Sensorless Driver Product Manual

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The following table summarizes changes and updates to this document since the last released v

Version	Date	Revision Content	Modified By
V1.06	2023.12.12	1. Added parameters for 15W, 40W and 120W models 2. Added function codes 3. Marked the 485 setting range 4. Added emphasis on grounding 5. Modified I/O wiring descriptions	Yu Chuang
V1.08	2024.8.5	1. Added matched motor parameters 2. Added function codes 3. Added simple case descriptions	Yu Chuang
V1.09	2025.3.9	1. Added function codes 2. Updated cases	Yu Chuang
V1.10	2025.8.5	1. Added function codes	Yu Chuang

Before Use

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

DANGER 	• Confirm that power is turned off before wiring, installing or servicing the driver. Do not change power wiring while power is on; otherwise electric shock or injury may occur. • Circuit components on the internal PCB are sensitive to static electricity. Do not touch the circuit board by hand unless proper anti-static measures have been taken. • Do not modify internal parts or wiring of the driver by yourself. • Do not use this product in places exposed to water vapor, corrosive gas or flammable gas; otherwise electric shock or fire may occur. • Install the driver and accessories away from heat sources, fire and flammable materials. • Before starting the machine, adjust the user parameters to appropriate values. Incorrect settings may cause loss of control or faults. • Before operation, confirm that the emergency stop device can be activated at any time. • When power is applied, make sure the motor shaft remains stationary and will not rotate due to mechanical inertia or other factors. • The grounding marks of the motor and driver must be grounded together with the power supply equipment; otherwise electric shock or equipment damage may occur.
WARNING 	• Do not connect AC power to the driver I/O terminals. • The rated voltage of the power system for driver installation is AC220V. • Test whether the driver and motor operate normally with no load first, then connect the load to avoid unnecessary danger. • Do not switch power on and off frequently. If continuous power cycling is required, keep it to no more than once per minute. • Do not use for vertical lifting motion of loads. • Only qualified professionals may install, wire and maintain the driver.

Note:

1. To explain product details clearly, some figures in this manual may show the product with the enclosure removed or safety covers disassembled. During operation, always install the enclosure and wire the product correctly according to this manual to ensure safety.
2. The icons and figures in this manual are used for explanation and may differ slightly from the actual product. This does not affect customer rights.

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I. Product Information

1.2 Features

- Only three motor power wires are required. This fundamentally avoids unreliable encoder or Hall signal wiring and signal interference, improving system reliability.
- No motor encoder or Hall sensor is required. A high-performance sensorless solution provides sinusoidal FOC vector control, saving encoder/Hall cables and terminals and reducing total system cost.
- Good low-speed performance: excellent closed-loop speed control, with minimum speed down to 200 rpm.
- Supports loaded start: starts with up to 120% of rated motor load torque. Load capacity is also related to the motor; contact us for product details.
- Supports long-distance motor control: maximum three-phase power cable length is 20 m for low-voltage products and 50 m for high-voltage products.
- Low speed fluctuation: at rated speed, fluctuation is about $\pm 1\%$, meeting most application requirements.
- Supports high-speed motors: maximum motor speed up to 3000 rpm. For higher speeds, contact us for customization.
- High cost performance.

1.3 Electrical Specifications

Voltage Class			AC220V (±10%)		
Rated Power	15W	40W	120W	200W	400W
Output Current	0.3A	0.3A	0.75A	1.2A	2.4A

1.4 General Specifications

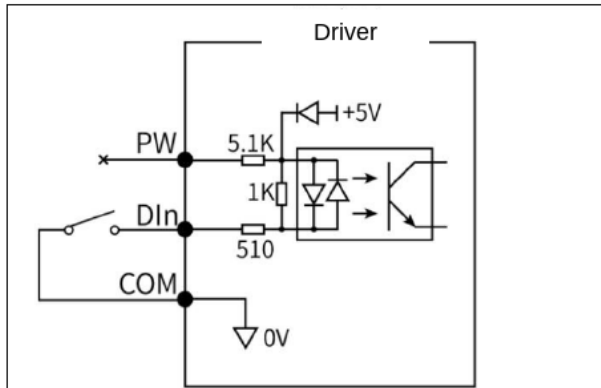
Category	Parameter	C41 Series Sensorless Driver
Power Input	Rated input voltage	AC220V (±10%)
	Rated input frequency	50Hz to 60Hz
Operation Control Performance	Speed control mode	Sensorless vector control
	Speed control accuracy	±1%
	Overload capacity	1.5 times overload
	Motor feedback	Sensorless; encoder and Hall feedback are not required
	Default max. speed	3000 rpm
	Default matched pole pairs	5 pole pairs (other pole pairs can be set through keypad or 485 communication)
	Speed setting	Keypad setting, analog setting, multi-speed operation setting, MODBUS communication setting, etc.
General Function	Digital input	4 channels. Supports NPN and PNP DI signal connection (PW terminal can be customized as required). Low: 0-0.5V; High: 18-30V; input current: 2-5mA; input frequency: <1kHz. Also supports DI signal triggered by pulling COM (0V) low; Low: 0-0.5V; High: 4-5V
	Analog input	1 channel. External analog voltage speed regulation (default 0-5V, adjustable up to 0-10V) / PWM speed regulation (3kHz-10kHz)
	Digital output	1 channel, open-collector output (transistor), switching capacity: 50mA/30V (max)
	Pulse input	1 channel, HDI high-speed pulse input for speed regulation
	Built-in speed knob	Supports analog potentiometer speed regulation (default)
Protection Mechanism	Function	Undervoltage, overvoltage, overload, overcurrent, overtemperature protection, etc.
	Undervoltage protection	Driver undervoltage point: AC150V
	Overvoltage protection	Driver overvoltage point: AC275V
	Overload protection	150% rated current: 14.4s; 180% rated current: 8s; 200% rated current: 6s
	Overcurrent protection (driver)	≤200W: 3.6A; ≤400W: 7.2A
	Overtemperature protection	80°C (driver)

Operating Environment	Operating temperature	Operate at rated current when ambient temperature is -10°C to 40°C. When ambient temp exceeds 40°C, reduce rated current by 2.5% for every 1°C increase. Maximum ambient temperature is 50°C.
	Storage temperature	30°C to 65°C
	Humidity	Below 90%RH, no condensation
	Cooling method	Natural cooling. Auxiliary heat dissipation is required when the motor IS current (F02.04) is 1.6A during operation.
	Protection class	IP20
	Air pressure	86 kPa to 106 kPa
	Altitude	Below 1000 m. When operating above 1000 m, derate by 1.5% for every 100 m increase. Above 2000 m, test and confirm before use.

II. Interface Description

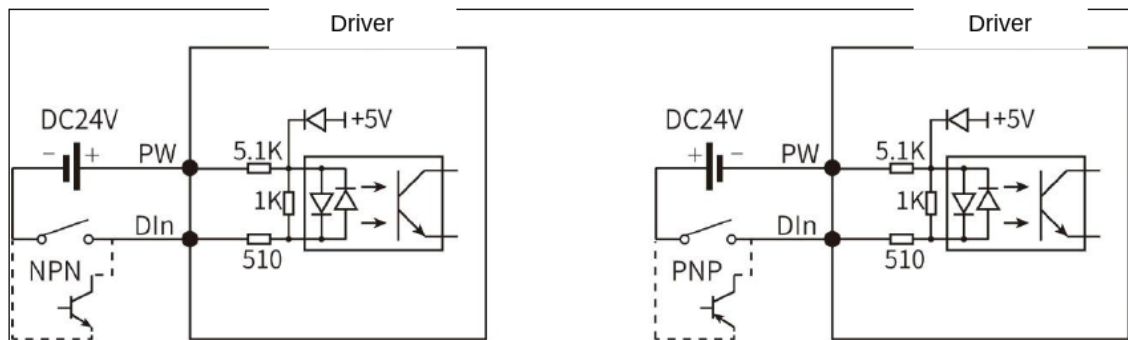
2.1 Digital Input

The C41 series driver provides four general DI inputs: DI1-DI4. Different DI input functions can be selected through the host computer, and DI inputs support PNP, NPN or switch wiring modes. Refer to the wiring diagrams below. The actual quantity should be connected according to the terminal definition of the specified model.



Note:

1. DI represents DI1/DI2/DI3/DI4 pins;
2. Do not connect FWD/DI1 and REV/DI2 terminals at the same time;
3. Avoid switching rotation direction while the motor is running at high speed; it is best to switch after stopping;
4. If the brake function is used, calculate a safe braking speed and ensure the motor speed is below this value during braking;
5. Do not connect a 24V power supply to the COM port.



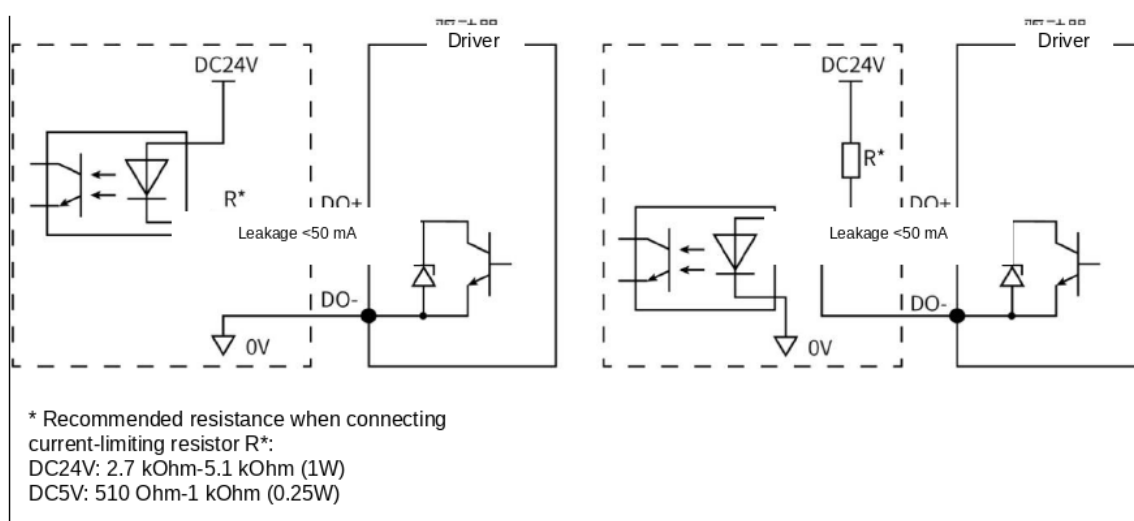
Note:

1. DI represents DI1/DI2/DI3/DI4 pins;
2. DI and PW form a 24V circuit trigger;
3. Do not connect FWD/DI1 and REV/DI2 terminals at the same time;
4. Avoid switching rotation direction while the motor is running at high speed; it is best to switch after stopping;
5. If the brake function is used, calculate a safe braking speed and ensure the motor speed is below this value during braking.

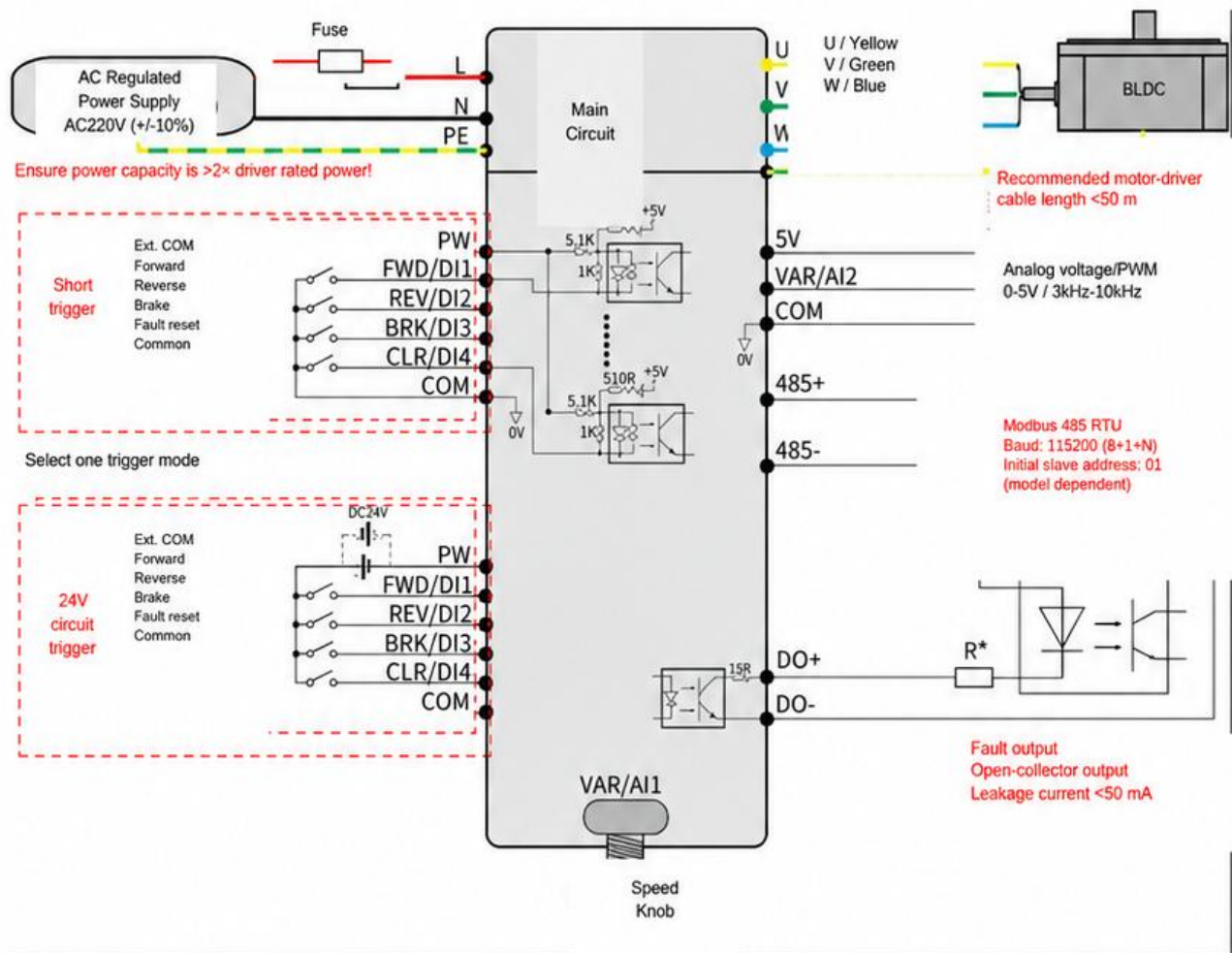
2.2 Digital Output

2.2.1 General DO Output Wiring

- The driver signal output is open-drain output. The signal status does not indicate the signal voltage level; it indicates the on/off state of the internal transistor.
- External power supply: DC 5-30 V, below 50 mA.
- The DO output can be assigned different functions through the host computer. The C41 series driver has one general DO output. Refer to the wiring diagram below:

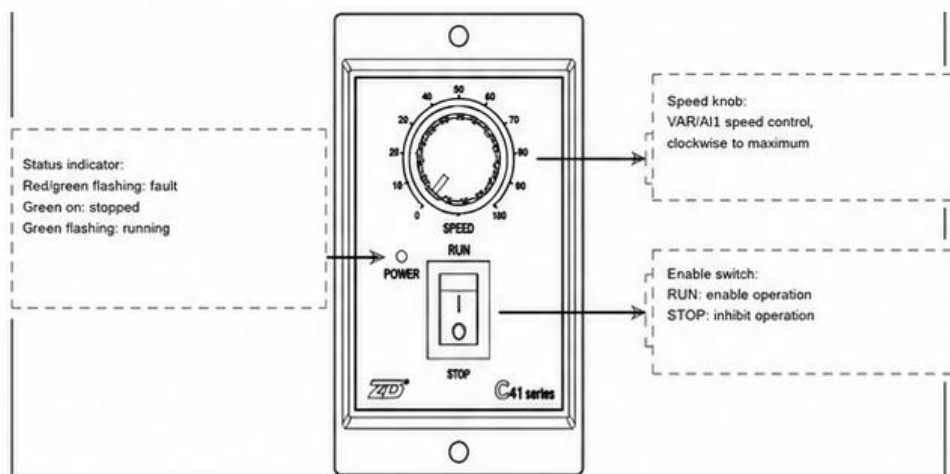


2.3 Wiring Diagram



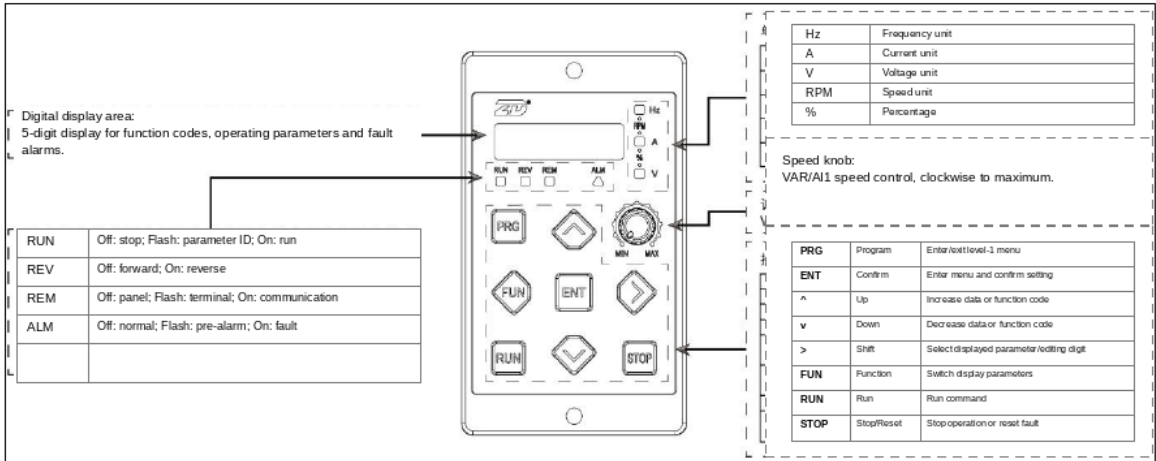
2.4 Panel Function Introduction

2.4.1 EA-DRVC41-200S2-A

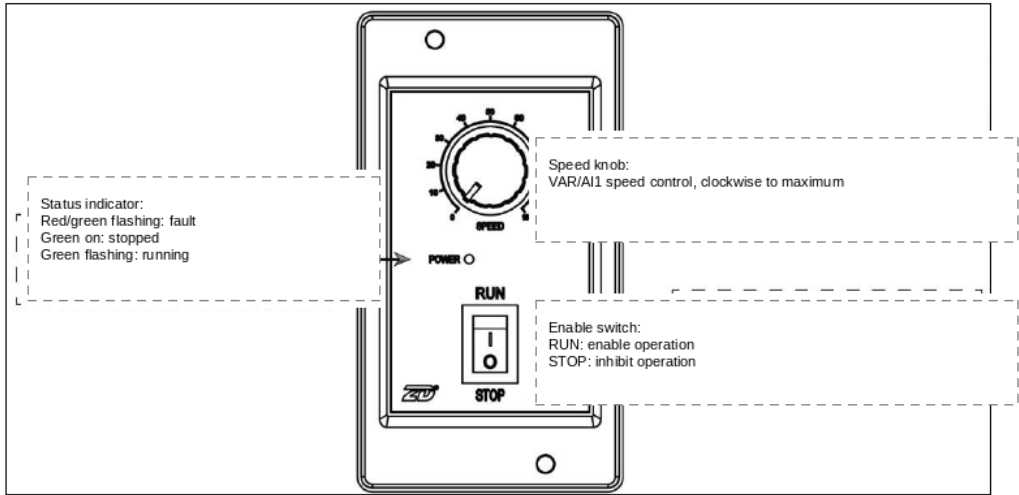


Note: The panel accessories of EA-DRVC41-200S2-A are applicable to EA-DRVC41-15/40/120S2-A.

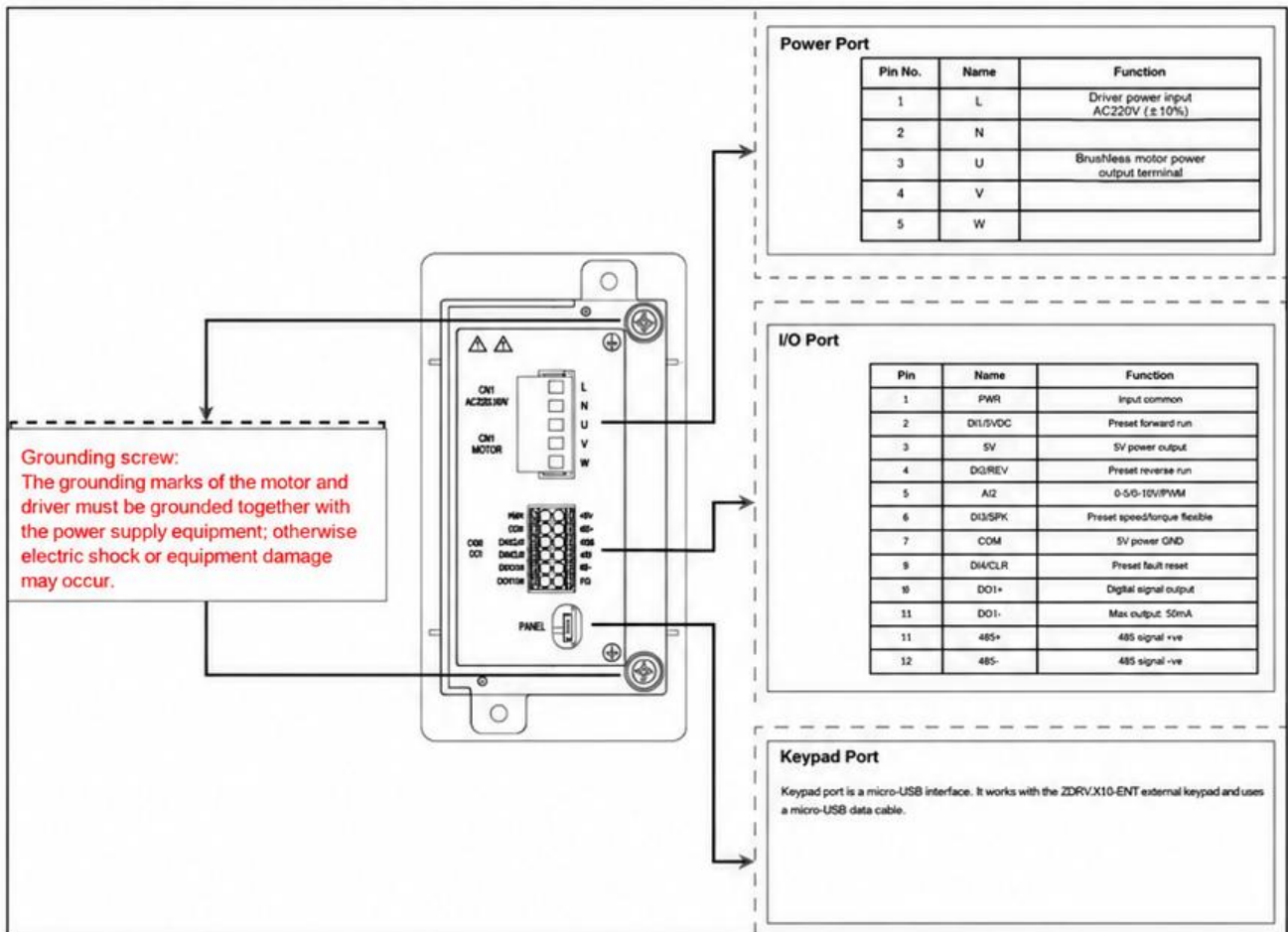
2.4.2 Z EA-DRV41-200-S2-KR-A



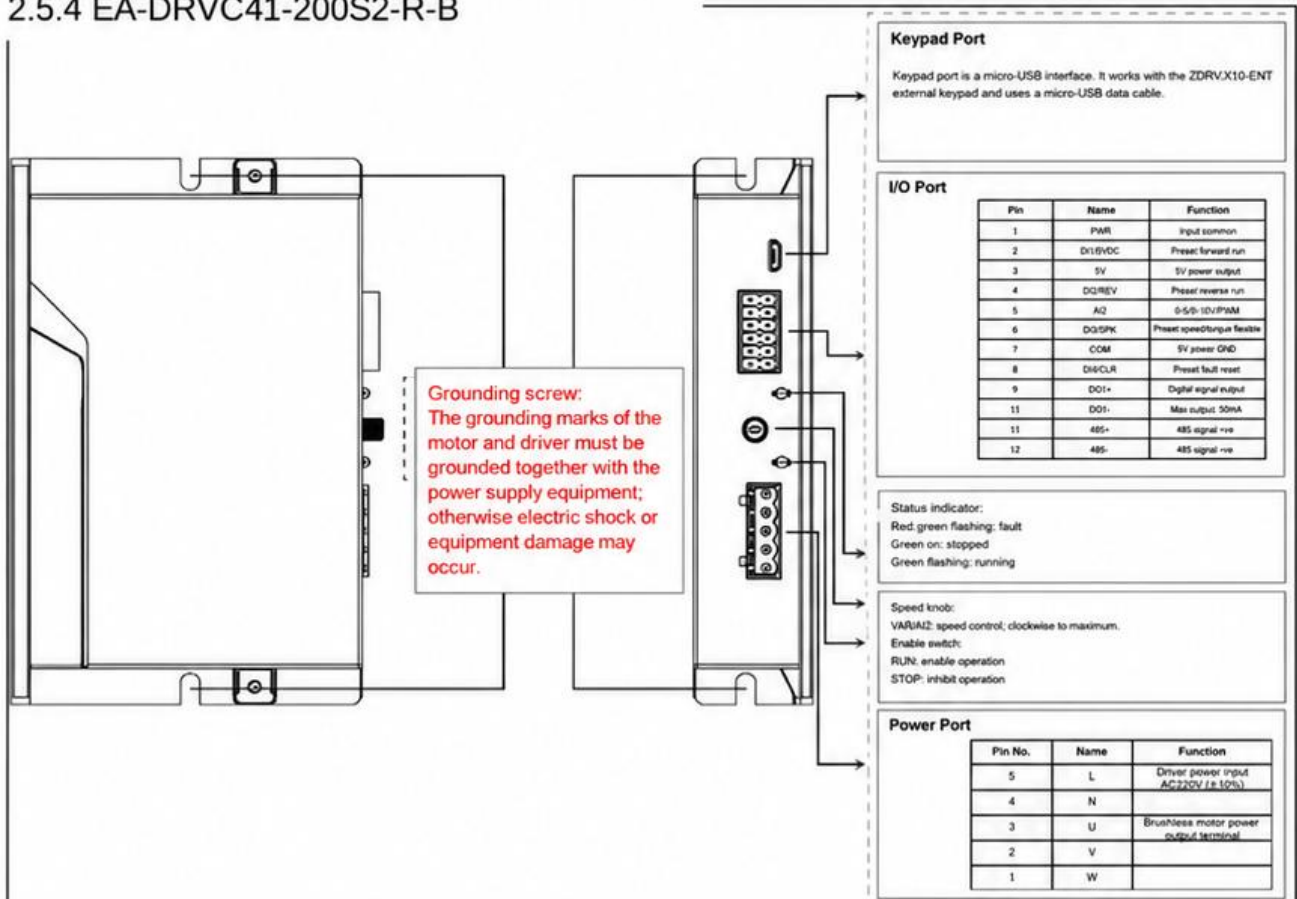
2.4.3 Z EA-DRV41-400-S2-R-A



2.5.3 EA-DRVC41-400S2-R-A

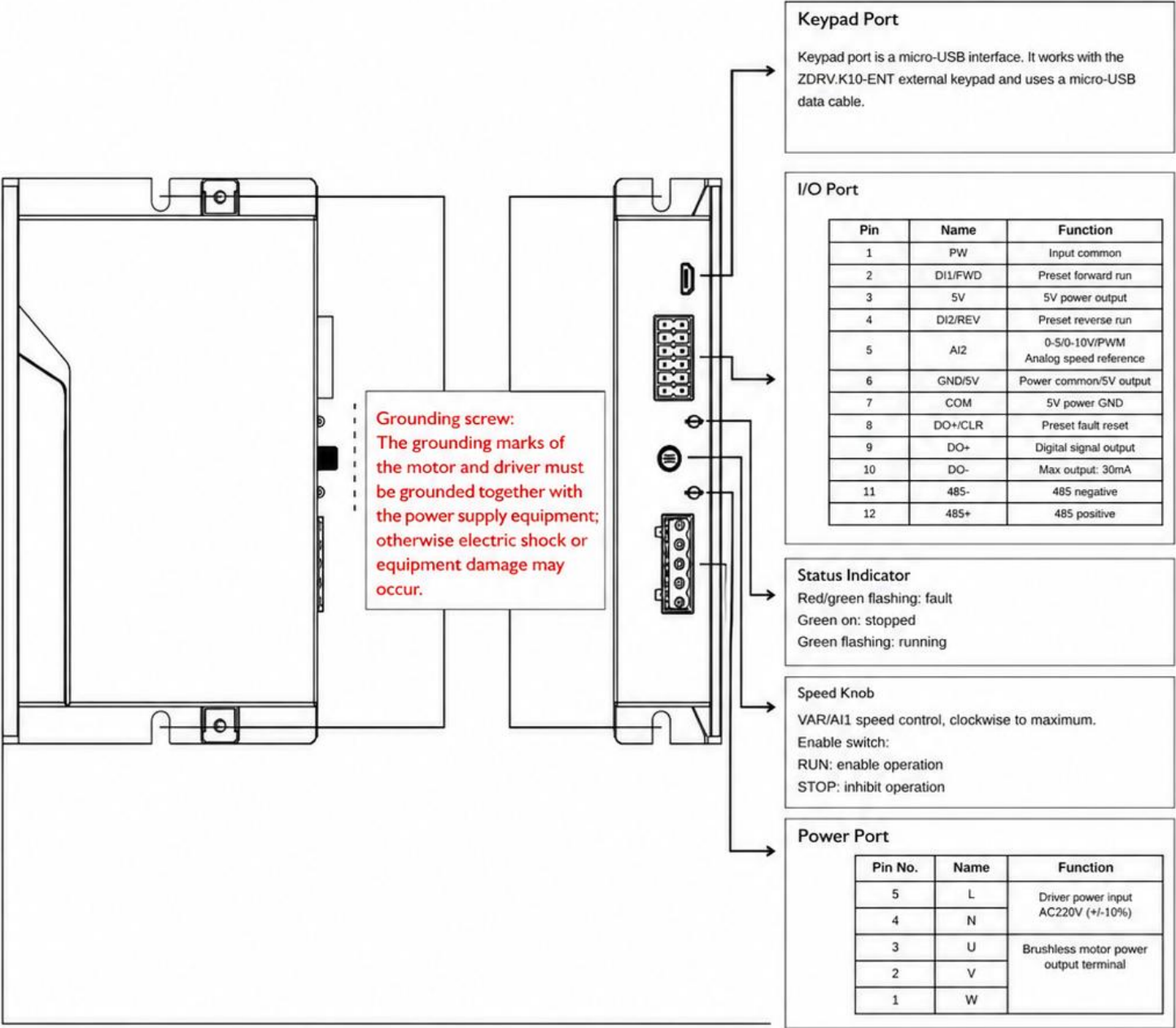


2.5.4 EA-DRVC41-200S2-R-B



Note: The ports of EA-DRVC41-200S2-R-B are applicable to EA-DRVC41-15/40/120S2-R-B.

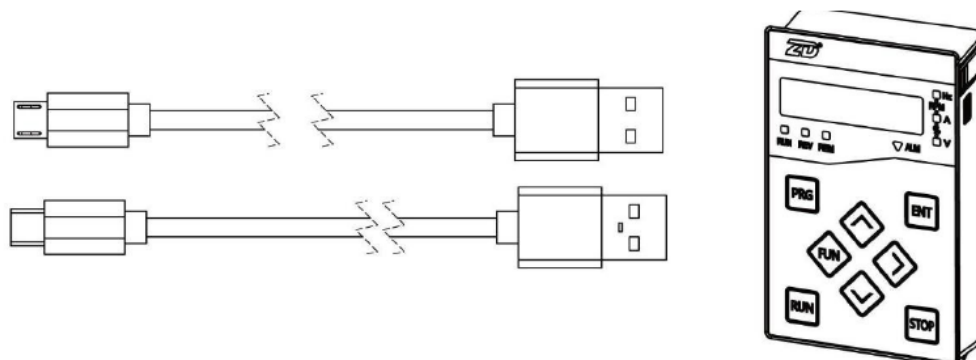
2.5.5 EA-DRVC41-400S2-R-B



III. Function Code

3.1 Keypad Introduction

The ZDRV.K10-ENT external keypad can be used to set driver parameters and read the current driver status.



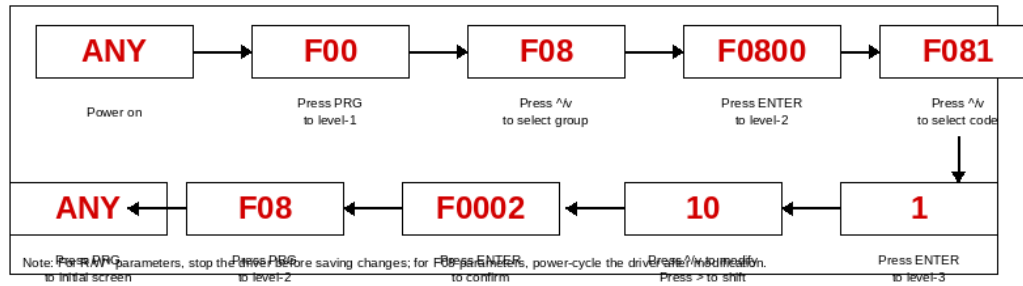
No.	Name	Description
1	Digital Display	5-digit LED display; shows function codes, operating parameters and fault alarms.
2	Status Indicator	RUN: Off = stopped; Flash = parameter identification; On = running REV: Off = forward; On = reverse REM: Off = keypad control; Flash = terminal control; On = communication control ALM: Off = no fault; Flash = pre-alarm; On = fault
3	Unit Indicator	Hz: frequency unit A: current unit V: voltage unit RPM: speed unit %: percentage
4	Key Area	PRG: Program key - enter or exit the level-1 menu ENT: Enter key - enter menus step by step and confirm parameter settings ^: Up key - increase data or function code v: Down key - decrease data or function code >: Shift key - in stop/run display, cycle displayed parameters; while editing, select the digit to modify FUN: Function key - start function operation; default is direction switching, not retained after power-off RUN: Run key - start operation STOP: Stop/Reset key - stop during running; reset during fault state

3.2 Keypad Operation

The driver has a three-level operation menu. The three menu levels are:

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. 50.00 Hz.

Taking modification of the driver address as an example, the operating steps are as follows:



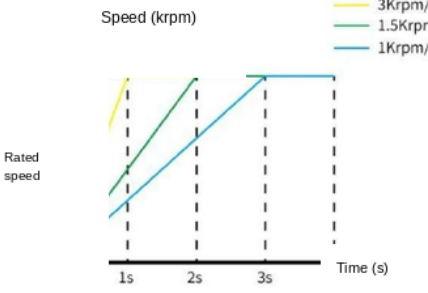
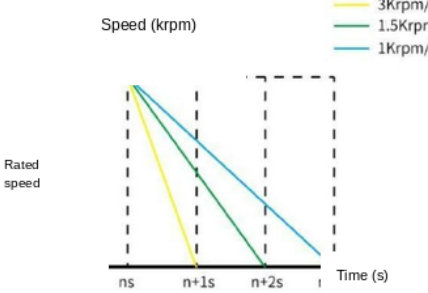
3.3 Function Code

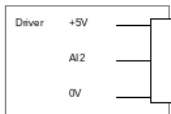
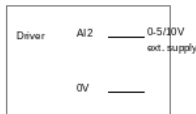
C41 driver parameters are grouped by function. There are 11 groups from F00 to F10, and undisplayed groups are reserved. Each group contains several function codes. This manual supports version 1109.

Attribute description: "R/W" indicates that the parameter can be modified during operation; "R/W*" indicates that the parameter can be modified only when stopped; "R0" indicates read-only.

3.3.1 Control Parameter Group

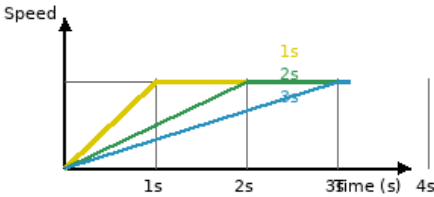
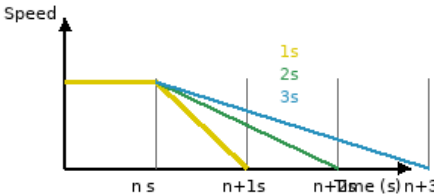
Parameter	Address	Name	Setting Range	Default	Attr.
F00.00	0x2000	Driver Version	0-30000	1110	R0
F00.01	0x2001	Switch Command	0: Stop 1: Run enable ----- Switch command source (F00.05/2005H)=0: monitor status only; =1: switch command. F00.01 can control operation.	0	R/W
F00.02	0x2002	External Set Speed	-6000 rpm to 6000 rpm ----- When speed command source (F00.06/2006H)=2, monitor the set speed; when =2 and external set speed is enabled, F00.02 can write the speed.	0	R/W
F00.03	0x2003	Motor Acceleration Command	0.1 to 20.0 Krpm/s Speed change value from start to rated motor speed.	3.0	R/W

Parameter	Address	Name	Setting Range	Default	Attr.
					
F00.04	0x2004	Motor Deceleration Command	0.1 to 20.0 Krpm/s Speed change value from rated motor speed to stop. Note: If driver version (F00.00/2000H) = 1109, electronic-brake deceleration time is determined by this curve; if version = 1110, it is determined by the electronic-brake deceleration command (F03.11/2126H). 	3.0	R/W
F00.05	0x2005	Switch Command Source	0: Internal enable (I/O enable) Driver control terminal is valid. 1: External enable (host computer or keypad) Host computer (485 communication) or keypad control is valid.	0	R/W*
F00.06	0x2006	Speed Command Source	0: Knob AI1 is the built-in potentiometer and the product default speed setting. Clockwise rotation increases speed; counterclockwise rotation decreases speed. The speed command is determined by the current knob position: motor speed command = current knob percentage x rated motor speed (F01.02). 1: AI2 AI2 is an external analog input. Speed is adjusted by changing the external input voltage (default 0-9.7 V; function codes can modify the voltage range).	0	R/W*

Parameter	Address	Name	Setting Range	Default	Attr.
			If an external potentiometer is connected by the user (recommended value: 10K), two wiring examples are shown below:  Method 1  Method 2 Speed can also be adjusted by PWM. Send a 3 kHz-10 kHz PWM waveform and change its duty cycle to reach the target 0-10 V adjustment voltage. Corresponding speed: 0 to rated motor speed (F01.02). When AI2 voltage value (F02.09) is below the AI2 lower limit (F05.00), the motor speed command = rated speed (F01.02) x AI2 lower-limit setting. When AI2 voltage value is above the AI2 upper limit (F05.02), the command = rated speed (F01.02) x AI2 upper-limit setting. Intermediate values change linearly. See F05.00-F05.05. 2: Host communication or keypad The motor speed command is determined by the value set by host computer (2002H) or keypad (F00.02). Refer to F00.02. 3: Multi-speed Different DI ports are assigned as multi-speed triggers. Different DI combinations (F03.00-F03.03) trigger different statuses corresponding to the multi-speed commands (F07.01-F07.08). The motor speed is determined by the speed command corresponding to the I/O trigger status. 4: HDI The driver supports high-speed pulse input. DI3 can be used as HDI high-speed pulse input. Speed is adjusted by changing the external input frequency (default 0-20K); the user may add a single-ended pulse command externally. See F03.05-F03.10. Note: When DI3 is used as HDI high-speed pulse input, DI3 must be set to no-function mode (0/100) to enable this function. 5: Two-speed With special configuration, the motor speed command is determined by the second speed function configured for DI (F03.00-F03.03). See F07.09-F07.10. 6: PID Output 7: Simple PLC Set the running time and number of cycles for each speed segment. Configure F07 parameters to determine running speed, direction, duration and start mode for each segment. See F07.11-F07.21.		
F00.07	0x2007	Fault Clearing	0: Reserved 1: Clear record	0	R/W*

Param	Address	Name	Setting Range	Default	Attr.
			Clear the current driver alarm status and F02.17 (motor overload auto-recovery stop count), restore normal operation; the keypad no longer shows the fault code and the alarm no longer flashes. New alarm information is stored in F09.00, previous records shift to F09.01 and F09.10, keeping up to 8 records. Note: hardware overcurrent and external input faults cannot be recovered; non-hardware overcurrent alarms can be recovered by power cycling.		
F00.08	0x2008	Enable motor parameter	Reserved	/	/
F00.09	0x2009	Stop mode selection	0: Deceleration stop Gradually reduces running speed to stop according to motor deceleration (F00.04/2004H) or deceleration time (F00.24/2018H). 1: Coast stop After motor power is cut, the motor slows and stops due to inertia and load. 2: Voltage-stabilized deceleration stop 3: Overvoltage stall stop Recommended: normally use deceleration stop. Use coast stop for overvoltage/overcurrent or loaded deceleration cases. If coast stop cannot solve overvoltage, use voltage-stabilized deceleration for sudden load changes, and overvoltage stall stop for dragging loads.	0	R/W*
F00.10	0x200A	Control mode selection	0: Speed control The motor speed command reaches the rated speed. 1: Torque control (reserved)	0	R/W*
F00.11	0x200B	Torque control ID	Reserved	0	RW
F00.12	0x200C	Sub-version No.	0-30000 Current software version date. 10079 means Oct. 7, 9:00.	/	R0
F00.13	0x200D	Driver rated voltage	24-220 V	/	R0
F00.14	0x200E	Driver rated power	0: Reserved 1: 40W 2: 120W 3: 200W 4: 400W	/	R0
F00.15	0x200F	Common motor model selection	0: Reserved 1: Z2BLD15-220K2-20S 2: Z4BLD40-220K2-20S 3: Z5BLD120-220K2-20S 4: Z5BLD200-220K2-20S	/	R/W*

Param	Address	Name	Setting Range	Default	Attr.
			5: Z6BLD200-220K2-20S 6: Z6BLD400-220K2-20S 7: GT50-60W high-voltage roller 8: GT60-60W high-voltage roller 9: GT60-90W high-voltage roller 10: GT76-180W high-voltage roller 11: GT89-300W high-voltage roller 12: GT113-370W high-voltage roller After changing this parameter, save it (F08.04 = 1) and restart power for it to take effect.		
F00.16	0x2010	Clear fault history	0: Reserved On each fault, the fault information is stored in F09.00-F09.07. 1: Clear records Clear F09.00-F09.07 fault information.	0	R/W*
F00.17	0x2011	Speed filter coefficient	0-100.00 % The speed filter coefficient determines response speed and smoothness of the speed signal. A smaller value gives faster response but may introduce more noise and interference. A larger value smooths the signal better and reduces noise, but slows response.	1.00	R/W
F00.18	0x2012	Host deceleration-stop electronic braking mode	0: Disabled No operation when motor speed is zero. 1: Zero-speed shaft lock When speed is zero, lock the motor to hold position. For example, DI1 forward: when the signal is disconnected, speed decelerates to 0 and locks. Note: DI options Electronic brake (decel lock) and Electronic brake (decel no lock) do not take effect; only Run pause is valid. 2: Immediate deceleration and shaft lock Quickly decelerate to zero and lock. 3: Immediate deceleration without shaft lock Quickly decelerate to zero. When switch command source (F00.05/2005H)=1, the driver stop method can be further controlled by switch command (F00.01/2001H), and lock time is determined by F00.25.	0	R/W*
F00.19	0x2013	Electronic brake force command	0-50.0 % Sets electronic brake force. Since inertia may make the motor run some distance after stopping, braking reduces position deviation. Actual braking force depends on motor torque and running speed and is not linear; 20% is generally recommended.	20.0	R/W*

Param	Address	Name	Setting Range	Default	Attr.
			Actual braking force depends on motor torque and running speed and is not linear; 20% is generally...		
F00.20	0x2014	Speed error display setting	0-1000 rpm When speed fluctuation is less than this value, the displayed speed is not updated.	3	R/W
F00.21	0x2015	Default motor model	Reserved	/	/
F00.22	0x2016	Motor acceleration source	0: Accel/decel speed command Controls motor acceleration and deceleration through F00.03 and F00.04. 1: Accel/decel time command Controls motor acceleration and deceleration through F00.23 and F00.24.	0	R/W*
F00.23	0x2017	Acceleration time	0.2-30.0 s Time from start-up to rated motor speed. 	1.0	R/W
F00.24	0x2018	Deceleration time	0.2-30.0 s Time from rated motor speed to stop. Note: when driver version (F00.00/2000H)=1109, electronic brake deceleration time is also determined by this. When version =1110, it is determined by electronic brake deceleration speed command (F03.11/2126H). 	1.0	R/W
F00.25	0x2019	Electronic brake duration	0-100.0 s	1.0	R/W*

Param	Address	Name	Setting Range	Default	Attr.
			When host deceleration-stop electronic braking mode (F00.18/2012H) = 2, this controls the time for applying DC current. Note: 0 means brake torque is held continuously, i.e. unlimited.		
F00.26	0x201A	Auxiliary speed source	0: Knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output	1	R/W*
F00.27	0x201B	Auxiliary speed source maximum output	0: Motor rated speed (RS) 1: Main speed source speed Note: when set to 1, auxiliary speed source output = auxiliary speed source / motor rated speed * main speed source.	1	R/W*
F00.28	0x201C	Composite speed selection	0: Main speed source 1: Auxiliary speed source 2: Main speed source - auxiliary speed source 3: Main speed source + auxiliary speed source	0	R/W*
F00.29	0x201D	Speed switch priority	0: Normal 1: Keypad priority Panel-type drivers include RUN and STOP keys. They provide direct forced start/stop operations in addition to normal equipment control, enabling emergency or immediate intervention of driver status.	0	R/W*

Param	Address	Name	Setting Range	Default	Attr.
F01.00	0x2040	Motor rated current	0.1-300.0 A Motor rated current is the current required under rated operating conditions. In actual applications, select the proper working current according to motor rated conditions and load requirements, and ensure sufficient safety margin. If load current exceeds rated current, overheating, damage or safety hazards may occur.	/	R/W*
F01.01	0x2041	Motor maximum current	0.1-300.0 A Motor maximum current is the maximum current the motor can withstand at rated voltage. It only indicates the maximum load the motor can withstand, not the ideal long-term operating current. In actual applications, select a suitable current according to rated conditions and load requirements.	/	R/W*

Param	Address	Name	Setting Range	Default	Attr.
			Select the appropriate working current according to the motor rated operating conditions and load...		
F01.02	0x2042	Motor rated speed	0-30000 rpm Determined according to motor parameters provided by the motor manufacturer.	/	R/W*
F01.03	0x2043	Motor pole pairs	1-100 Determined according to motor parameters provided by the motor manufacturer.	/	R/W*
F01.04	0x2044	Motor stator resistance	0.01-30.00 Ω Resistance of stator windings, measured at factory according to the matched motor.	/	R/W*
F01.05	0x2045	Motor d-axis inductance	0.01-300.00 mH d-axis inductance, measured at factory according to the matched motor.	/	R/W*
F01.06	0x2046	Motor q-axis inductance	0.01-300.00 mH q-axis inductance, measured at factory according to the matched motor.	/	R/W*
F01.07	0x2047	Motor back EMF coefficient	0.001-10.000 V/Hz Back EMF is induced in the winding when the rotor rotates. Back EMF = back EMF coefficient * motor angular velocity. Measured at factory according to the matched motor.	/	R/W*

3.3.3 Status Parameter Group

Param	Address	Name	Setting Range	Default	Attr.
F02.00	0x2080	Current fault	0-99999 Shows the current fault status of the driver. If the driver is in alarm state, the current fault code is displayed. If running normally, 0 is displayed, indicating no fault. See Faults and Maintenance for alarm information.	/	R0
F02.01	0x2081	Motor actual speed	-15000-15000 rpm Calculated by the driver from the actual speed.	/	R0
F02.02	0x2082	Motor actual frequency	-999.9-999.9 Hz Calculated from electrical frequency converted from actual speed.	/	R0
F02.03	0x2083	Driver bus voltage	0-1000.0 V Calculated by the driver from the current bus voltage.	/	R0
F02.04	0x2084	Motor IS current	0-300.00 A Calculated by the driver from actual motor phase current RMS.	/	R0
F02.05	0x2085	Motor ID current command	-99.99-99.99 A D-axis current target value set by the driver program.	/	R0
F02.06	0x2086	Motor ID current feedback	-99.99-99.99 A Actual D-axis current value of the motor.	/	R0

Param	Address	Name	Setting Range	Default	Attr.
F02.07	0x2087	Motor IQ current command	-99.99-99.99 A Iq target value set by the driver program.	/	R0
F02.08	0x2088	Motor IQ current feedback	-99.99-99.99 A Actual Iq value of the motor.	/	R0
F02.09	0x2089	AI2 voltage value	0-30.000 V Analog voltage input level measured by the driver.	/	R0
F02.10	0x208A	HDI input frequency	Reserved	/	R0
F02.11	0x208B	HDI input speed	0-30000 rpm Calculated from the speed converted from HDI input frequency.	/	R0
F02.12	0x208C	Knob speed	0-30000 rpm Outputs the rated speed percentage corresponding to the current knob position. For example, if the knob is at 60%, the command speed is 60% of rated speed.	/	R0
F02.13	0x208D	AI2 speed	0-30000 rpm Command speed calculated from the current AI2 voltage input.	/	R0
F02.14	0x208E	Driver temperature	-999.9-999.9 °C The internal temperature sensor displays current driver temperature and determines whether normal operation is suitable. In overheated conditions, the driver reports an over-temperature alarm.	/	R0
F02.15	0x208F	Motor overload alarm percentage	0-100 % Determined by rated current and overload running time. Under overload conditions, when the percentage reaches 100, the motor triggers an overload alarm.	/	R0
F02.16	0x2090	Driver overload alarm percentage	0-100 % Determined by factory setting and overload running time. Under overload conditions, when the percentage reaches 100, the driver triggers an overload alarm.	/	R0
F02.17	0x2091	Motor overload auto-recovery stop count	0-10000 Displays the current accumulated motor overload count.	/	R0
F02.18	0x2092	Keypad connection status	Reserved	/	R0
F02.19	0x2093	Driver model	0: Built-in type 1: Panel type	/	R0
F02.20	0x2094	Motor command speed	-6000-6000 rpm	/	R0
F02.21	0x2095	UP/DOWN superimposed speed	-6000-6000 rpm This speed source can be superimposed on other speed sources as a base speed. It can also be used as a single speed source.		R0

Param	Address	Name	Setting Range	Default	Attr.
			Add a pushbutton switch between DI and COM, then set DI functions: 25 Terminal speed UP, 26 Terminal speed DOWN, and 27 UP/DOWN terminal speed clear. The change rate is controlled by F03.12 Terminal UP/DOWN speed change rate.		
F02.22	0x2096	Command torque	Reserved	/	R0

3.3.4 IO Control

Param	Address	Name	Setting Range	Default	Attr.
F03.00	0x2100	DI1 terminal function selection		1	R/W
F03.01	0x2101	DI2 terminal function selection		2	R/W
F03.02	0x2102	DI3 terminal function selection		6	R/W
F03.03	0x2103	DI4 terminal function selection	0: No function The current DI port has no function. 1: Forward run Default DI1 is configured as forward run. 2: Reverse run Default DI2 is configured as reverse run. 3: Forward jog Slow forward running for test operation. 4: Reverse jog Slow reverse running for test operation. 5: Fault reset Default DI4 is fault reset. When DI4 is triggered, the driver clears the current fault. 6: Electronic brake (deceleration + shaft lock) Default DI3 is electronic brake (deceleration + shaft lock). When DI3 triggers, the driver first decelerates to 0 rpm according to electronic brake deceleration command (F00.04/F00.24), then locking torque is determined by electronic brake Uq command (F00.19), and lock duration by F00.25. 7: External fault input If a DI port is configured as external fault input, triggering it stops the driver and generates an alarm. See Faults and Maintenance for details. 8: Electronic brake (deceleration without shaft lock) When DI3 triggers, the driver decelerates to 0 rpm according to F00.04/F00.24. 9: Forward limit When forward limit is enabled, the forward signal is invalid and reverse is valid. If forward run and forward limit work simultaneously, releasing the forward limit allows operation to continue. 10: Reverse limit	5	R/W

Param	Address	Name	Setting Range	Default	Attr.
			For reverse limit, the reverse signal is invalid while the forward signal is valid; after releasing the reverse limit signal, operation can continue. 11: Coast stop After motor power is cut, the motor gradually slows and stops due to inertia and load. 12: PLC state reset Reset to segment 0 and start again, but the run count is not reset. 13: Run pause Pauses motor operation, similar to deceleration stop. The enable signal becomes invalid. Mainly used for F00.18 zero-speed shaft lock and F07.11-F07.21 simple PLC control. 14: Multi-speed select bit 1 For multi-speed, set F07.00 to 1 to control motor run enable and stop. The output multi-speed is jointly determined by multi-speed selection bits 1-4. See the description of multi-speed in F00.06. 15: Multi-speed select bit 2 16: Multi-speed select bit 3 17: Multi-speed select bit 4 18: Two-speed enable Used with Two-speed forward run and Two-speed high speed. Set F07.00 to 1 to control motor run enable and stop. 19: Two-speed forward run Controls two-speed running direction. High level = forward, low level = reverse. 20: Two-speed high speed Controls two-speed high/low speed. High level = high-speed operation, low level = low-speed operation. 21: Motor run enable Can be used with Motor run direction. Run enable controls motor run/stop, direction controls forward/reverse. 22: Motor run direction Can be used with Motor run enable. Run enable controls run/stop, direction controls forward/reverse. 23: Zero-speed shaft lock When enabled, it does not decelerate the motor. It locks only when motor speed is 0. Lock torque is determined by F00.19 and lock duration by F00.25. 24: Reserved		

Param	Address	Name	Setting Range	Default	Attr.
			25: Terminal speed UP After selecting this function, when the DI port is triggered, F02.21 increases according to F03.12. 26: Terminal speed DOWN After selecting this function, when the DI port is triggered, F02.21 decreases according to F03.12. 27: Terminal speed UP/DOWN setting clear After selecting this function, when the DI port is triggered, F02.21 returns to zero. 100: Above functions (level reversal) 101: Forward run (level reversal) 102: Reverse run (level reversal) 103: Forward jog (level reversal) 104: Reverse jog (level reversal) 105: Fault reset (level reversal) 106: Electronic brake lock shaft (level reversal) 107: External fault input (level reversal) 108: Electronic brake no lock (level reversal) 109: Forward limit (level reversal) 110: Reverse limit (level reversal) 111: Coast stop (level reversal) 112: PLC state reset (level reversal) 113: Run pause (level reversal) 114: Multi-speed select bit 1 (level reversal) 115: Multi-speed select bit 2 (level reversal) 116: Multi-speed select bit 3 (level reversal) 117: Multi-speed select bit 4 (level reversal) 118: Two-speed enable (level reversal) 119: Two-speed forward run (level reversal) 120: Two-speed high speed (level reversal) 121: Motor run enable (level reversal) 122: Motor run direction (level reversal) 123: Zero-speed shaft lock (level reversal) 124: Reserved		
F03.04	0x2110	DO1 terminal function selection	0: No function Current DO port has no function. 1: Running When stopped, the DO+ and DO- transistor is off; when running, it is on. 2: Forward running When running forward, DO+ and DO- transistor is on; otherwise off. 3: Reverse running	5	R/W

Param	Address	Name	Setting Range	Default	Attr.
			During reverse running, the DO+ and DO- transistor is on; otherwise it is off. 4: Jog running During jog operation, the DO+ and DO- transistor is on; otherwise it is off. 5: Driver fault When the driver has a fault, the DO+ and DO- transistor is on; otherwise it is off. 6: Low bus voltage When supply voltage is low, DO+ and DO- transistor is on; otherwise it is off. 100: No function (level reversal) 101: Running (level reversal) 102: Forward running (level reversal) 103: Reverse running (level reversal) 104: Jog running (level reversal) 105: Driver fault (level reversal) 106: Low bus voltage (level reversal)		
F03.05	0x2120	HDI lower limit frequency	0-20.00 KHz When DI3 input is pulse, this represents the minimum input pulse frequency.	0.00	R/W
F03.06	0x2121	HDI lower limit corresponding setting	-100.0-100.0 % Speed percentage corresponding to the lower limit frequency.	0.0	R/W
F03.07	0x2122	HDI upper limit frequency	0-20.00 KHz When DI3 input is pulse, this represents the maximum input pulse frequency.	2.0KHz	R/W
F03.08	0x2123	HDI upper limit corresponding setting	-100.0-100.0 % Speed percentage corresponding to the upper limit frequency.	100.0	R/W
F03.09	0x2124	HDI filter coefficient	0-2.000 The HDI filter coefficient determines the response speed and smoothness of the filter to the HDI input signal.	0.100	R/W
F03.10	0x2125	HDI compensation ratio coefficient	0-2.000 Proportionally increases or decreases the input frequency.	1.000	R/W
F03.11	0x2126	Electronic brake deceleration speed command	0-30.0 rpm/s When driver version (F00.00/2000H) = 1109, electronic brake deceleration time is not related to this parameter and is determined by motor deceleration command (F00.04/2004H). When driver version (F00.00/2000H) = 1110, it is determined by electronic brake deceleration speed command (F03.11/2126H).	10.0	R/W
F03.12	0x2127	Terminal UP/DOWN speed change rate	1-3000 rpm/s Determines the speed change rate after the DI port and COM are connected.	200	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
F03.13	0x2128	DI filter time	0~1000 ms The DI filtering time determines the response speed and smoothness of the filter to DI input signals.	0	R/W

3.3.5 IO Status

Param.	Addr.	Name	Setting Range	Default	Attr.
F04.00	0x2140	DI status - all	0~1111 DI4, DI3, DI2 and DI1 are arranged in binary. Triggered = 1; not triggered = 0. Example: 0x0011 = $1 \times 2^1 + 1 \times 2^0 = 3$. If the displayed value is 3, DI1 and DI2 are triggered while DI3 and DI4 are not.	0	R0
F04.01	0x2141	DI1 status	0~1 Triggered = 1; not triggered = 0	0	R0
F04.02	0x2142	DI2 status	0~1 Triggered = 1; not triggered = 0	0	R0
F04.03	0x2143	DI3 status	0~1 Triggered = 1; not triggered = 0	0	R0
F04.04	0x2144	DI4 status	0~1 Triggered = 1; not triggered = 0	0	R0
F04.05	0x2150	DO status - all	0~11 DO2 and DO1 are arranged in binary. Triggered = 1; not triggered = 0. During output, the value is the relative voltage, namely the potential difference between DO+ and DO-.	0	R0
F04.06	0x2151	DO1 status	0~1 Triggered = 1; not triggered = 0. During output, the value is the relative voltage, namely the potential difference between DO+ and DO-.	0	R0

3.3.6 AI Parameter Group

Param.	Addr.	Name	Setting Range	Default	Attr.
F05.00	0x2180	AI2 voltage lower limit	0~10.00 V Minimum detectable voltage at the AI2 port. If the actual AI2 input voltage is lower than this parameter, this value is used as the AI2 analog speed-command voltage.	0.2	R/W
F05.01	0x2181	AI2 lower-limit corresponding setting	-200.0~200.0 % Speed-command value corresponding to the AI2 lower limit (F05.00). The sign indicates positive or negative motor speed.	0.0	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
F05.02	0x2182	AI2 voltage upper limit	0~10.00 V Maximum detectable voltage at the AI2 port. If the actual AI2 input voltage is higher than this parameter, this value is used as the AI2 analog speed-command voltage.	9.70	R/W
F05.03	0x2183	AI2 upper-limit corresponding setting	-200.0~200.0 % Speed-command value corresponding to the AI2 upper limit (F05.02). The sign indicates positive or negative motor speed.	100.0	R/W
F05.04	0x2184	AI2 filter coefficient	0~100.00 % The AI2 filter coefficient determines the response speed and smoothness of the filter to the AI2 input voltage signal.	1.00	R/W
F05.05	0x2185	Minimum knob operating speed	0~5000 rpm If the detected current knob speed is lower than the minimum knob speed, the running speed command is 0 rpm, i.e. no speed.	200	R/W

3.3.7 Motor Control Parameter Group

Param.	Addr.	Name	Setting Range	Default	Attr.
F06.00	0x2200	d-axis current controller Kp	0.001~30.000 Proportional coefficient of the d-axis current PI controller; proportionally reflects the id deviation signal.	3.000	R/W
F06.01	0x2201	d-axis current controller Ki	0.0001~3.0000 Integral coefficient of the d-axis current PI controller.	0.0200	R/W
F06.02	0x2202	q-axis current controller Kp	0.001~30.000 Proportional coefficient of the q-axis current PI controller; proportionally reflects the iq deviation signal.	3.000	R/W
F06.03	0x2203	q-axis current controller Ki	0.0001~3.0000 Integral coefficient of the q-axis current PI controller.	0.0200	R/W
F06.04	0x2204	Speed loop proportional gain 1	0~200 Proportional coefficient of the speed PI controller at low speed.	15	R/W
F06.05	0x2205	Speed loop integral time 1	0~10000 Integral coefficient of the speed PI controller at low speed.	600	R/W
F06.06	0x2206	Speed loop proportional gain 2	0~200 Proportional coefficient of the speed PI controller at high speed.	10	R/W
F06.07	0x2207	Speed loop integral time 2	0~10000 Integral coefficient of the speed PI controller at high speed.	600	R/W
F06.08	0x2208	Switching speed 1	0~3000 rpm One of two switching speeds ensuring smooth transition between low/high-speed PI values. When current speed is below switching speed 1, the first set of PI parameters is used.	200	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
F06.09	0x2209	Switching speed 2	0~3000 rpm One of two switching speeds ensuring smooth transition between low/high-speed PI values. Above switching speed 2, use the second set of PI parameters; below switching speed 1 use F06.04/F06.05; above switching speed 2 use F06.06/F06.07; between them changes linearly.	600	R/W
F06.10	0x220A	Motor overload time	0~3000.0 s Indicates the maximum short-time allowable running time at 2x motor load. If the load is below 2x, the allowable overload time is extended accordingly.	10.0	R/W*
F06.11	0x221B	Synchronous motor voltage compensation selection	0: No compensation 1: Compensation (reserved)	0	R/W*
F06.12	0x222C	Starting torque	Reserved	/	R/W*
F06.13	0x223D	Low-frequency magnetic field compensation	0~500 % D-axis current compensation amplitude. Increasing this value improves low-speed loaded-start capability but increases current. Usually used for low voltage or weak starting; F06.24 must be enabled.	400	R/W*
F06.14	0x224E	Open-loop running time	0~30000 s (reserved)	1	R/W*
F06.15	0x225F	Speed-control torque upper limit setting	0~200.0 Used for weak starting or frequent overvoltage trips. Upper and lower limits change together.	170.0	R/W*
F06.16	0x2210	Speed-control torque lower limit setting	0~200.0 Used for weak starting or frequent overvoltage trips. Upper and lower limits change together.	170.0	R/W*
F06.17	0x2211	id current compensation point 1	0~100.0 % When actual speed is lower than point 1 * rated speed, D-axis compensation current = max current * F06.13/1000. When actual speed is higher than point 2 * rated speed, compensation current = 0. Between the two points, it changes linearly.	10.0	R/W*
F06.18	0x2212	id current compensation point 2	0~100.0 % When actual speed is lower than point 1 * rated speed, D-axis compensation current = max current * F06.13/1000. When actual speed is higher than point 2 * rated speed, compensation current = 0. Between the two points, it changes linearly.	20.0	R/W*
F06.19	0x2213	Closed-loop starting speed	0~5000 rpm During open-loop sensorless startup, the control logic generates a sine-voltage waveform whose amplitude and frequency increase. The faster sine voltage drives the motor until closed-loop operation; this angular frequency is the closed-loop starting frequency.	6	R/W*

Param.	Addr.	Name	Setting Range	Default	Attr.
F06.20	0x2214	Phase-loss protection threshold	0~100.0 % By setting the phase-loss protection threshold, the motor phase power supply can be monitored in real time. If one phase falls below the threshold, the system judges a phase-loss condition and triggers protection such as stopping or alarm, helping prevent motor damage or production impact.	40.0	R/W*
F06.21	0x2215	Motor overload mode selection	0: Normal mode 1: Overload auto-recovery mode	0	R/W*
F06.22	0x2216	Alarm-stop trigger count in motor overload auto-recovery mode	0~1000 Sets the maximum number of allowed recovery triggers for motor overload.	5	R/W*
F06.23	0x2217	Restart time in motor overload auto-recovery mode	0~1000.0 s After motor overload, the motor is allowed to stop and cool down for this time, then it restarts.	10.0	R/W*
F06.24	0x2218	Synchronous motor field-weakening mode	0: Field weakening off 1: Field weakening on Field-weakening switch. F06.24 must be enabled to use F06.13.	0	R/W*
F06.25	0x2219	Field-weakening starting modulation degree	0~200.0 %	92.0	R/W*
F06.26	0x221A	Field-weakening adjustment integral coefficient	0~3.0000	0.0200	R/W
F06.27	0x221B	Field-weakening adjustment proportional coefficient	0~30.000	10.000	R/W

3.3.8 Multi-Speed Control Parameters

Param.	Addr.	Name	Setting Range	Default	Attr.
F07.00	0x2240	Multi-speed enable	0: External enable 1: Enabled by default	0	R/W
F07.01	0x2241	Multi-speed 1	-9999~9999 rpm	300	R/W
F07.02	0x2242	Multi-speed 2	-9999~9999 rpm	600	R/W
F07.03	0x2243	Multi-speed 3	-9999~9999 rpm	900	R/W
F07.04	0x2244	Multi-speed 4	-9999~9999 rpm	1200	R/W
F07.05	0x2245	Multi-speed 5	-9999~9999 rpm	1500	R/W
F07.06	0x2246	Multi-speed 6	-9999~9999 rpm	1800	R/W
F07.07	0x2247	Multi-speed 7	-9999~9999 rpm	2100	R/W
F07.08	0x2248	Multi-speed 8	-9999~9999 rpm	2400	R/W
F07.09	0x2249	Two-speed low speed	-9999~9999 rpm	300	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
F07.10	0x2250	Two-speed high speed	-9999~9999 rpm	2400	R/W
F07.11	0x2251	Simple PLC running mode	0~9999 Note: 0: Stop after single run 1: Hold final value after single run 2: Loop continuously 3~n: Stop after running n-1 cycles; max n = 9999	0	R/W
F07.12	0x2252	PLC restart mode selection	0: Restart from the first segment 1: Continue from the stage frequency at the interruption time	0	R/W
F07.13	0x2253	Simple PLC segment 0 running time	0~3000	2.0	R/W
F07.14	0x2254	Simple PLC segment 1 running time	0~3000	2.0	R/W
F07.15	0x2255	Simple PLC segment 2 running time	0~3000	2.0	R/W
F07.16	0x2256	Simple PLC segment 3 running time	0~3000	2.0	R/W
F07.17	0x2257	Simple PLC segment 4 running time	0~3000	2.0	R/W
F07.18	0x2258	Simple PLC segment 5 running time	0~3000	2.0	R/W
F07.19	0x2259	Simple PLC segment 6 running time	0~3000	2.0	R/W
F07.20	0x225A	Simple PLC segment 7 running time	0~3000	2.0	R/W
F07.21	0x225B	Simple PLC running time unit	0: Unit = seconds 1: Unit = minutes	0	R/W

3.3.9 Other Parameters

Param.	Addr.	Name	Setting Range	Default	Attr.
F08.00	0x2280	MODBUS baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps (default)	7	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
			Sets the baud rate corresponding to the driver.		
F08.01	0x2281	MODBUS communication slave address	1~128 Local slave address.	1	R/W
F08.02	0x2282	Restore factory settings	0: No function No operation 1: Restore factory settings Parameter reset function starts.	0	R/W*
F08.03	0x2283	Parity and stop bits	0: 1 stop bit, no parity 1: 1 stop bit, even parity 2: 1 stop bit, odd parity 3: 2 stop bits, no parity 4: 2 stop bits, even parity 5: 2 stop bits, odd parity	0	R/W
F08.04	0x2284	Parameter save	0: Do not save No operation 1: Save Save all parameters modified during this power-on. Note: Save parameters after changing them.	0	R/W
F08.05	0x2285	MODBUS communication timeout	0~32767 ms Timeout duration without Modbus communication.	30000	R/W
F08.06	0x2286	MODBUS communication timeout function selection	0: No action No operation 1: Disable enable and alarm. A command must be sent within F08.05; otherwise the driver stops and alarms. Clear the fault before running again. 2: Disable enable only. A command must be sent within F08.05; otherwise the driver stops without alarm.	0	R/W
F08.07	0x2287	Handheld keypad communication mode selection	Reserved	/	/
F08.08	0x2288	Keypad FUN key function	0: No function 1: Enable-source switch; not saved, for debugging only 2: Forward/reverse switch; direction not saved, for debugging only 3: Forward jog	2	R/W*

Param.	Addr.	Name	Setting Range	Default	Attr.
			4: Reverse jog		
F08.09	0x2289	Reserved	Reserved	/	/
F08.10	0x228A	Free-stop interval time	0~10000	2000	R/W*
F08.11	0x228B	Power-on resistor self-learning	0: Off 1: On	0	R/W*
F08.12	0x228C	Initial menu return time	10.0~999.9 Menu return time. 10.0 means the menu does not return to the initial menu.	60.0	R/W*

3.3.10 Historical Fault Records

Param.	Addr.	Name	Setting Range	Default	Attr.
F09.00	0x3280	Historical fault 1	-32768~32768 Stores the latest 8 alarm records. Query these records to understand driver alarm information. See Faults and Maintenance for fault meanings.	0x0000	R0
F09.01	0x3281	Historical fault 2		0x0000	R0
F09.02	0x3282	Historical fault 3		0x0000	R0
F09.03	0x3283	Historical fault 4		0x0000	R0
F09.04	0x3284	Historical fault 5		0x0000	R0
F09.05	0x3285	Historical fault 6		0x0000	R0
F09.06	0x3286	Historical fault 7		0x0000	R0
F09.07	0x3287	Historical fault 8		0x0000	R0

3.3.11 Speed Increment PID Parameters

Param.	Addr.	Name	Setting Range	Default	Attr.
F10.00	0x3300	PID setting source	0: AI1 1: AI2 2: PID numerical setting 3: DI3 pulse 4: Multi-speed 5: Two-speed Note: Valid when the main speed source is F00.06 = 6 (PID output).	0	R/W
F10.01	0x3301	PID numerical setting	0-6000 rpm	0	R/W
F10.02	0x3302	PID feedback source	0: AI1 1: AI2 2: AI1-AI2 3: DI3 4: PID numerical setting	1	R/W

Param.	Addr.	Name	Setting Range	Default	Attr.
			5: AI1+AI2 6: MAX(AI1 , AI2) 7: MIN(AI1 , AI2)		
F10.03	0x3303	PID action direction	0-1	0	R/W
F10.04	0x3304	Proportional gain Kp1	0-100.0	20.0	R/W
F10.05	0x3305	Integral time Ti1	0.01-10.00 s	2.00	R/W
F10.06	0x3306	Derivative time Td1	0.001-10.000 s	0.000	R/W
F10.07	0x3307	PID derivative limit	0-100.00%	0.10	R/W
F10.08	0x3308	PID setpoint change time	0~300 s	0.00	R/W
F10.09	0x3309	PID feedback filter time	0~60 s	0.00	R/W
F10.10	0x330A	PID output filter time	0~60 s	0.00	R/W
F10.11	0x330B	Max. deviation between two outputs	0~100%	1.00	R/W

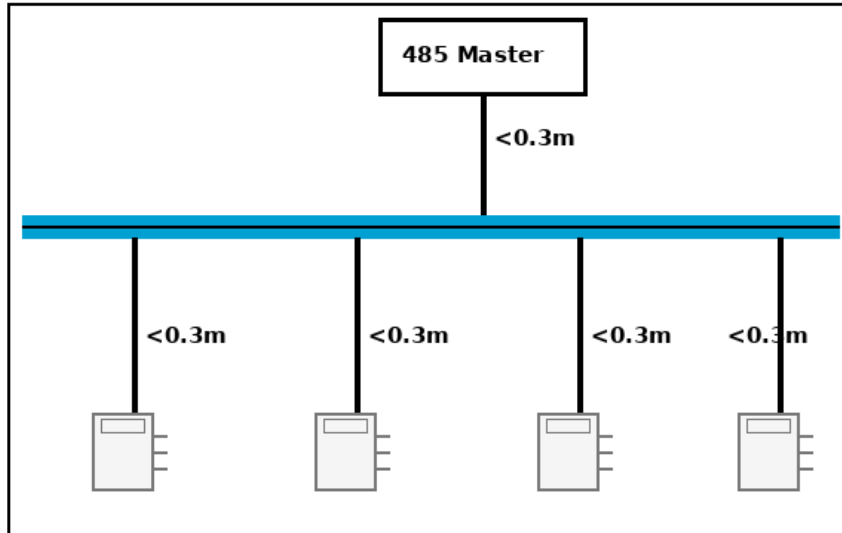
3.3.12 Torque Control Mode Parameters (Reserved)

Param.	Addr.	Name	Setting Range	Default	Attr.
F11.00	0x3380	Torque setting source selection	0: AI1 1: AI2 2: Numerical setting 3: DI3	2	R/W*
F11.01	0x3381	Forward maximum speed in torque control	-6000~6000 rpm	3000	R/W
F11.02	0x3382	Reverse maximum speed in torque control	-6000~6000 rpm	-3000	R/W
F11.03	0x3383	Torque rise filter time	0~30.0 s	3.0	R/W
F11.04	0x3384	Torque fall filter time	0~30.0 s	3.0	R/W

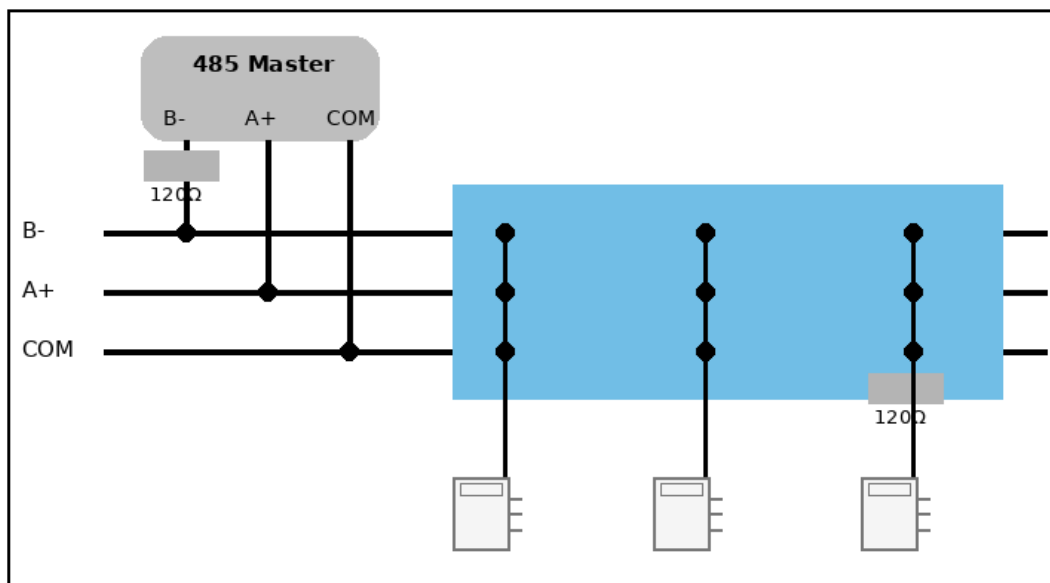
4. 485 Communication

4.1 485 Communication Network

The 485 communication network is connected in a bus topology as shown below:



Each 485 transceiver device is connected to the bus. Each branch length should be no more than 10 m; otherwise reflections may occur and cause communication problems. The wiring diagram is shown below:

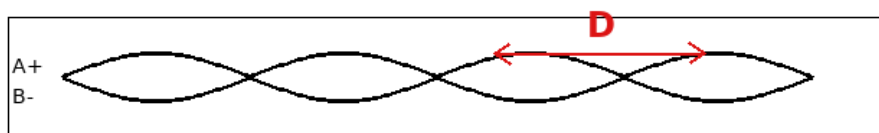


1. Recommended: use shielded twisted-pair cable. Connect two 120 Ω termination resistors at both ends of the bus to prevent signal reflection. The shield is generally grounded reliably at one point.
2. Measure the resistance between A+ and B- with a multimeter to confirm correct field termination. The normal value is about 60 Ω (two resistors in parallel).

3. The maximum number of devices connected to one bus is 32.
4. During long-distance communication between 485 devices, the common ground COM of different 485 circuits must be interconnected.

4.2 485 Communication Cable

Twisted-pair cable is recommended for the 485 communication network. Twisted pair has good resistance to high-frequency magnetic-field noise and can also reduce radiation outside the cable. The following is a twisted-pair schematic:



The twist pitch D of the twisted-pair cable should be less than 2 cm; the smaller the pitch, the better the anti-interference effect.

For short-distance low-speed communication, dual shielded twisted-pair cable may be used to improve anti-interference capability; connect both shield ends to PE.

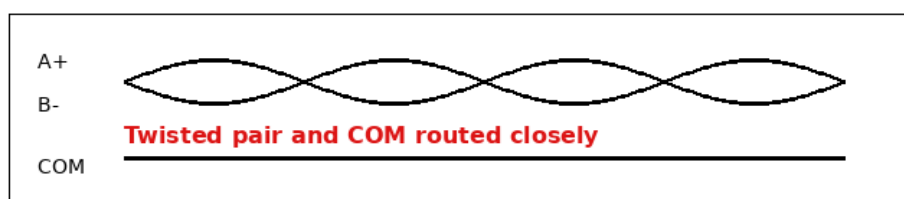
For long-distance high-speed communication, shielded cable is not recommended because the large distributed capacitance between the shield and signal wires may delay the transmission signal.

Recommended bus cable materials:

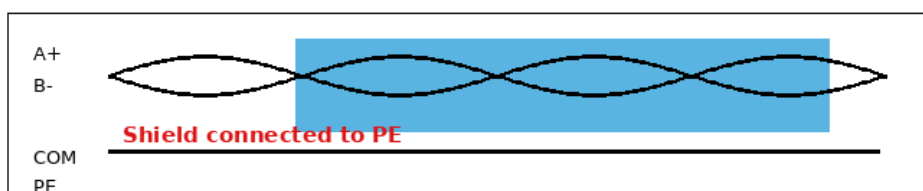
Wiring distance	Signal line
Within 200 m	0.3 mm ² , twisted pair, sheathed cable
200-500 m	0.5 mm ² , twisted pair, sheathed cable
500-1200 m	0.75 mm ² , shielded twisted pair, sheathed cable
Above 1200 m	1.0 mm ² , shielded twisted pair, sheathed cable; add a repeater at 1200 m

4.2.1 Recommended 485 Communication Wiring Methods

Recommended scheme 1



Recommended scheme 2



4.3 System Settings

To enable the C41 series driver to correctly connect to the 485 bus network, set the related function codes as follows:

Address	Name	Setting Range	Default	Attribute
0x2281	485 slave address	1-128; 0 is the broadcast address	1	R/W*
0x2280	485 communication baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps (default)	7	R/W*

Note: Whether or not the current value of address 0x2281 in the C41 driver is the same as the address code ADDR sent by the host, the MODBUS host can read/write address 0x2281 of the C41 driver to obtain the currently set 485 slave address. This is a special setting for convenient electrical-engineering debugging. Therefore, when the host reads/writes address 0x2281 of a C41 driver through MODBUS, only one C41 driver should be connected to the 485 bus.

4.4 Data Frame Format

MODBUS-RTU mode

Address Code ADDR	Function Code CMD	Data DATA	Checksum CRC16_L	Checksum CRC16_H
1 Byte	1 Byte	n Bytes	1 Byte	1 Byte

Baud rate: 115200 (default); start bit: 1 bit; data bits: 8 bits; parity: none; stop bit: 1 bit (8-N-1).

In MODBUS RTU mode, if the sending or receiving interval between any two characters exceeds 1.5 character times, the data is invalid. If the interval exceeds 3.5 character transmission times, the frame is considered complete and a new frame may start.

Notes:

a. Address code: 1 Byte

0x00 (0): broadcast address; the slave does not reply during broadcast, suitable for group control.
0x01 (1)-0x7F (127): slave address.
0x80 (128)-0xFF (255): system reserved; do not use.

b. Function code: 1 Byte

0x03 (3): read register operation.
0x06 (6): write single register operation.
0x10 (16): write multiple registers operation.

c. Data: n Bytes

Different commands have different data formats.

d. Checksum: 2 Bytes

CRC16 check object: address code + function code + data.

CRC16 algorithm: MODBUS ($x^{16} + x^{15} + x^2 + 1$).

For the CRC check code, send the low byte first and the high byte second.

4.4.1 0x03 Read Register Operation

1. Data frame format for 0x03 (read holding register)

Master request

Frame Data	Data Length	Data Content	Description
Address	1 Byte	0x01-0xF7	
Function code	1 Byte	0x03	
Register address	2 Bytes	0x2000-0x30FF	High byte + low byte
Number of registers	2 Bytes	0x0001	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives correctly

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 the data area
Data	2 Bytes	Read data content	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives an exception

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 4.4.4 Exception Codes
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Notes:

- All register addresses are 2 bytes, with the high byte first and the low byte second.
- All register data is 2 bytes, with the high byte first and the low byte second.

2. Example of 0x03 (read holding register)

A) Read register 0x2001 data of slave 0x01

	Address	Function Code	Register Address	Register Count	Checksum
Master	0x01	0x03	High: 0x20 Low: 0x01	High: 0x00 Low: 0x01	Low: CRCL High: CRCH
Slave	0x01	0x03	Byte count: 0x02	Data high: 0x00 Data low: 0x01	CRCL CRCH

B) Exception when reading register 0x2001 data of slave 0x01

	Address	Function Code	Register Address	Register Count / Exception	Checksum
Master	0x01	0x03	High: 0x20 Low: 0x01	High: 0x00 Low: 0x01	Low: CRCL High: CRCH
Slave	0x01	0x83	Exception code	See 4.4.4 Exception Codes	CRCL CRCH

4.4.2 0x06 Write Single Register Operation

1. Data frame format for 0x06 (write single register)

Master request

Frame Data	Data Length	Data Content	Description
Address	1 Byte	0x01-0xF7	
Function code	1 Byte	0x06	
Register address	2 Bytes	0x2000-0x30FF	High byte + low byte
Data	2 Bytes	Written data content	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives correctly

Frame Data	Data Length	Data Content	Description
Address	1 Byte	0x01-0xF7	
Function code	1 Byte	0x06	
Register address	2 Bytes	0x2000-0x30FF	High byte + low byte
Data bytes	2 Bytes	Written data content	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives an exception

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 4.4.4 Exception Codes
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Notes: All register addresses and data are 2 bytes, with the high byte first and the low byte second. This operation can only be performed on R/W or R/W* registers.

2. Example of 0x06 (write single register)

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

	Address	Function Code	Register Address	Data	Checksum
Master	0x01	0x06	High: 0x20 Low: 0x01	High: 0x00 Low: 0x01	Low: CRCL High: CRCH
Slave	0x01	0x06	High: 0x20 Low: 0x01	High: 0x00 Low: 0x01	CRCL CRCH

B) Exception when writing data to register 0x2001 of slave 0x01

	Address	Function Code	Register Address	Data / Exception	Checksum
Master	0x01	0x06	High: 0x20 Low: 0x01	High: 0x00 Low: 0x01	Low: CRCL High: CRCH
Slave	0x01	0x86	Exception code	See 4.4.4 Exception Codes	CRCL CRCH

4.4.3 0x10 Write Multiple Registers Operation

1. Data frame format for 0x10 (write multiple registers)

Master request

Frame Data	Data Length	Data Content	Description
Address	1 Byte	0x00-0xF7	
Function code	1 Byte	0x10	
Starting register address	2 Bytes	0x2000-0x30FF	High byte + low byte
Number of registers	2 Bytes	N	High byte + low byte
Total data bytes	1 Byte	2*N	
Data	2*N Bytes	2*N	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives correctly

Frame Data	Data Length	Data Content	Description
Address	1 Byte	0x01-0xF7	
Function code	1 Byte	0x10	
Starting register address	2 Bytes	0x2000-0x30FF	High byte + low byte
Number of registers	2 Bytes	N	High byte + low byte
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Response after the slave receives an exception

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 4.4.4 Exception Codes
Checksum	2 Bytes	CRC16L + CRC16H	Low byte + high byte

Notes: All register addresses and data are 2 bytes, with the high byte first and the low byte second. This operation can only be performed on R/W or R/W* registers.

2. Example of 0x10 (write multiple registers)

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

	Address	Function Code	Start Register	Register Count	Data Bytes	Register Data	Checksum
Master	0x01	0x10	High: 0x20 Low: 0x00	High: 0x00 Low: 0x02	0x04	Reg.1 high/low Reg.2 high/low	CRCL CRCH
Slave Normal Return	0x01	0x10	High: 0x20 Low: 0x00	High: 0x00 Low: 0x02			CRCL CRCH
Slave Exception Return	0x01	0x90	Exception code	See 4.4.4 Exception Codes			CRCL CRCH

4.4.4 Exception Codes

MODBUS exception codes

Exception Code	Meaning	Example
0x01	Data format error	TX: 01 10 20 01 00 01 03 00 00 00 00 01 02 48 0D RX: 01 90 01 8D C0
0x02	Data value exceeds range or the number of registers exceeds the range (maximum 10).	TX: 01 03 20 01 00 89 DE 6C RX: 01 83 02 C0 F1
0x03	No corresponding data found for the address.	TX: 01 03 88 88 00 01 2F 80 RX: 01 83 03 01 31
0x04	Incorrect function code (only 03, 06 and 10 are supported).	TX: 01 05 20 01 00 00 97 CA RX: 01 85 04 43 53
0x07	The data type is not read/write and cannot be changed.	TX: 01 06 20 81 00 01 13 E2 RX: 01 86 07 03 A2

4.5 Register List

4.5.1 Control Parameters

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2000	Driver version	0-30000	R0	uint_16
0x2001	Switch command	0: Stop 1: Run enable	R/W	uint_16
0x2002	External set speed	-6000 rpm to 6000 rpm	R/W	int_16
0x2003	Motor acceleration command	0.1-20.0 Krpm/s	R/W	uint_16
0x2004	Motor deceleration command	0.1-20.0 Krpm/s	R/W	uint_16
0x2005	Switch command source	0: Internal enable (IO enable) 1: External enable (upper computer or keypad)	R/W*	uint_16
0x2006	Speed command source	0: Knob 1: AI2 2: Upper computer communication or keypad 3: Multi-speed 4: HDI 5: Two-speed 8: PID output 9: Simple PLC	R/W*	uint_16
0x2007	Fault clear	0: Reserved 1: Clear record	R/W*	uint_16
0x2008	Enable motor parameter self-learning	Reserved	/	/
0x2009	Stop mode selection	0: Deceleration stop 1: Free stop 2: Regulated deceleration stop 3: Overvoltage stall stop	R/W*	uint_16
0x200A	Control mode selection	0: Speed control 1: Torque control (reserved)	R/W*	uint_16
0x200B	Torque control ID command	Reserved	/	/
0x200C	Sub-version number	0-30000	R0	uint_16
0x200D	Driver rated voltage	24-220 V	R0	uint_16
0x200E	Driver rated power	0: Reserved 1: 40W 2: 120W 3: 200W 4: 400W	R0	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x200F	Common motor model selection	0: Reserved 1: Z2BLD15-220K2-20S 2: Z4BLD40-220K2-20S 3: Z5BLD120-220K2-20S 4: Z5BLD200-220K2-20S 5: Z6BLD200-220K2-20S 6: Z6BLD400-220K2-20S 7: GT50-60W high-voltage roller 8: GT60-60W high-voltage roller 9: GT60-90W high-voltage roller 10: GT76-180W high-voltage roller 11: GT89-300W high-voltage roller 12: GT113-370W high-voltage roller	R/W*	uint_16
0x2010	Clear historical fault records	0: Reserved 1: Clear record	R/W*	uint_16
0x2011	Speed filter coefficient	0-100.00 %	R/W	uint_16
0x2012	Electronic brake mode selection	0: Disabled 1: Zero-speed shaft lock 2: Immediate deceleration with shaft lock 3: Immediate deceleration without shaft lock	R/W*	uint_16
0x2013	Electronic brake force command	0-50.0 %	R/W*	uint_16
0x2014	Speed error display setting	0-1000 rpm	R/W	uint_16
0x2015	Default motor model	Reserved	/	/
0x2016	Motor acceleration source	0: Accel/decel speed command 1: Accel/decel time command	R/W*	uint_16
0x2017	Acceleration time	0.2-30.0 s	R/W	uint_16
0x2018	Deceleration time	0.2-30.0 s	R/W	uint_16
0x2019	Electronic brake duration	0-100.0 s	R/W*	uint_16
0x201A	Auxiliary speed source	0: Knob 1: AI2 2: Upper computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output	R/W*	uint_16
0x201B	Auxiliary speed source maximum output	0: Motor rated speed (RS) 1: Main speed source speed	R/W*	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x201C	Composite speed selection	0: Main speed source 1: Auxiliary speed source 2: Main speed source - auxiliary speed source 3: Main speed source + auxiliary speed source	R/W*	uint_16
0x201D	Speed switch priority	0: Normal 1: Keypad priority	R/W*	uint_16

4.5.2 Motor Parameters

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2040	Motor rated current	0.1-300.0 A	R/W*	uint_16
0x2041	Motor maximum current	0.1-300.0 A	R/W*	uint_16
0x2042	Motor rated speed	0-30000 rpm	R/W*	uint_16
0x2043	Motor pole pairs	1-100	R/W*	uint_16
0x2044	Motor stator resistance	0.01-30.00 ohm	R/W*	uint_16
0x2045	Motor direct-axis inductance	0.01-300.00 mH	R/W*	uint_16
0x2046	Motor quadrature-axis inductance	0.01-300.00 mH	R/W*	uint_16
0x2047	Motor back EMF coefficient	0.001-10.000 V/Hz	R/W*	uint_16

4.5.3 Status Parameters

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2080	Current fault	0-99999	R0	uint_16
0x2081	Actual motor speed	-15000 to 15000 rpm	R0	int_16
0x2082	Actual motor frequency	-999.9 to 999.9 Hz	R0	int_16
0x2083	Driver bus voltage	0-1000.0 V	R0	uint_16
0x2084	Motor IS current	0-300.00 A	R0	uint_16
0x2085	Motor ID current command	-99.99 to 99.99 A	R0	int_16
0x2086	Motor ID current feedback	-99.99 to 99.99 A	R0	int_16
0x2087	Motor IQ current command	-99.99 to 99.99 A	R0	int_16
0x2088	Motor IQ current feedback	-99.99 to 99.99 A	R0	int_16
0x2089	AI2 voltage value	0-30.000 V	R0	uint_16
0x208A	HDI input frequency	/	R0	uint_16
0x208B	HDI input speed	0-30000 rpm	R0	uint_16
0x208C	Knob speed	0-30000 rpm	R0	uint_16
0x208D	AI2 speed	0-30000 rpm	R0	uint_16
0x208E	Driver temperature	-999.9 to 999.9 deg. C	R0	int_16
0x208F	Motor overload alarm percentage	0-100 %	R0	uint_16
0x2090	Driver overload alarm percentage	0-100 %	R0	uint_16
0x2091	Accumulated stop count for automatic recovery mode of motor overload	0-10000	R0	uint_16
0x2092	Reserved	/	/	/
0x2093	Keypad connection status	0: Built-in type 1: Panel type	R0	uint_16
0x2094	Driver model	-6000 to 6000 rpm	R0	int_16
0x2095	Motor command speed	-6000 to 6000 rpm	R0	int_16
0x2096	UP/DOWN superimposed speed / command torque	Reserved	/	/

4.5.4 IO Control

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2100	DI1 terminal function selection	0: No function 1: Forward run 2: Reverse run 3: Forward jog 4: Reverse jog 5: Fault reset 6: Electronic brake (deceleration with shaft lock) 7: External fault input 8: Electronic brake (deceleration without shaft lock) 9: Forward limit / forward limit enable 10: Reverse limit / reverse limit enable 11: Free stop 12: PLC status reset 13: Run pause 14: Multi-speed bit selection 1 15: Multi-speed bit selection 2 16: Multi-speed bit selection 3 17: Multi-speed bit selection 4 18: Two-speed enable 19: Two-speed forward run 20: Two-speed high speed 21: Motor run enable 22: Motor run direction 23: Zero-speed shaft lock 24: Reserved 25: Terminal speed UP 26: Terminal speed DOWN 27: Clear terminal UP/DOWN setting 100: No function (level inverted) 101: Forward run (level inverted) 102: Reverse run (level inverted) 103: Forward jog (level inverted) 104: Reverse jog (level inverted) 105: Fault reset (level inverted) 106: Electronic brake with shaft lock (level inverted) 107: External fault input (level inverted) 108: Electronic brake without shaft lock (level inverted) 109: Forward limit (level inverted) 110: Reverse limit (level inverted)	R/W	uint_16
0x2101	DI2 terminal function selection	Same as above	R/W	uint_16
0x2102	DI3 terminal function selection	Same as above	R/W	uint_16
0x2103	DI4 terminal function selection	Same as above	R/W	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
		111: Free stop (level inverted) 112: PLC status reset (level inverted) 113: Run pause (level inverted) 114: Multi-speed bit selection 1 (level inverted) 115: Multi-speed bit selection 2 (level inverted) 116: Multi-speed bit selection 3 (level inverted) 117: Multi-speed bit selection 4 (level inverted) 118: Two-speed enable (level inverted) 119: Two-speed forward run (level inverted) 120: Two-speed high speed (level inverted) 121: Motor run enable (level inverted) 122: Motor run direction (level inverted) 123: Zero-speed shaft lock (level inverted) 124: Reserved		
0x2110	DO1 terminal function selection	0: Invalid 1: Running 2: Forward running 3: Reverse running 4: Jog running 5: Driver fault 6: Bus voltage low 10: Invalid (level inverted) 11: Running (level inverted) 12: Forward running (level inverted) 13: Reverse running (level inverted) 14: Jog running (level inverted) 15: Driver fault (level inverted) 16: Bus voltage low (level inverted)	R/W	uint_16
0x2120	HDI lower-limit frequency	0-20.00 KHz	R/W	uint_16
0x2121	HDI lower-limit corresponding setting	-100.0 to 100.0 %	R/W	int_16
0x2122	HDI upper-limit frequency	0-20.00 KHz	R/W	uint_16
0x2123	HDI upper-limit corresponding setting	-100.0 to 100.0 %	R/W	int_16
0x2124	HDI filter coefficient	0-2.000	R/W	uint_16
0x2125	HDI compensation proportional coefficient	0-2.000	R/W	uint_16
0x2126	Electronic brake deceleration command	0-30.0 rpm/s	R/W	uint_16
0x2127	Terminal UP/DOWN speed change rate	1-3000 rpm/s	R/W	uint_16
0x2128	DI filter time	0-1000 ms	R/W	uint_16

4.5.5 IO Status

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2140	DI status all	0-1111	R0	uint_16
0x2141	DI1 status	0-1	R0	uint_16
0x2142	DI2 status	0-1	R0	uint_16
0x2143	DI3 status	0-1	R0	uint_16
0x2144	DI4 status	0-1	R0	uint_16
0x2150	DO status all	0-11	R0	uint_16
0x2151	DO1 status	0-1	R0	uint_16
0x2140	DI status all	0-1111	R0	uint_16

4.5.6 AI Parameters

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2180	AI2 voltage lower-limit value	0-10.00 V	RW	uint_16
0x2181	AI2 lower-limit corresponding setting	-200.0 to 200.0 %	RW	int_16
0x2182	AI2 voltage upper-limit value	0-10.00 V	RW	uint_16
0x2183	AI2 upper-limit corresponding setting	-200.0 to 200.0 %	RW	int_16
0x2184	AI2 filter coefficient	0-100.00 %	RW	uint_16
0x2185	Minimum knob operating speed	0-5000 rpm	RW	uint_16

4.5.7 Motor Control

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2200	d-axis current controller Kp	0.001-30.000	R/W	uint_16
0x2201	d-axis current controller Ki	0.0001-3.0000	R/W	uint_16
0x2202	q-axis current controller Kp	0.001-30.000	R/W	uint_16
0x2203	q-axis current controller Ki	0.0001-3.0000	R/W	uint_16
0x2204	Speed-loop proportional gain 1	0-200	R/W	uint_16
0x2205	Speed-loop integral time 1	0-10000	R/W	uint_16
0x2206	Speed-loop proportional gain 2	0-200	R/W	uint_16
0x2207	Speed-loop integral time 2	0-10000	R/W	uint_16
0x2208	Switching speed 1	0-3000 rpm	R/W	uint_16
0x2209	Switching speed 2	0-3000 rpm	R/W	uint_16
0x220A	Motor overload time	0-3000.0 s	R/W*	uint_16
0x221B	Synchronous motor voltage compensation selection	0: No compensation 1: Compensation (reserved)	R/W*	uint_16
0x222C	Startup torque	Reserved	/	/
0x223D	Low-frequency magnetic field compensation	0-500 per mille	R/W*	uint_16
0x224E	Open-loop running time	0-30000 s (reserved)	R/W*	uint_16
0x225F	Speed-control torque upper-limit setting	0-200.0	R/W*	uint_16
0x2210	Speed-control torque lower-limit setting	0-200.0	R/W*	uint_16
0x2211	id current compensation point 1	0-100.0 %	R/W*	uint_16
0x2212	id current compensation point 2	0-100.0 %	R/W*	uint_16
0x2213	Closed-loop startup speed	0-5000 rpm	R/W*	uint_16
0x2214	Phase-loss protection threshold	0-100.0 %	R/W*	uint_16
0x2215	Motor overload mode selection	0: Normal mode 1: Overload automatic recovery mode	R/W*	uint_16
0x2216	Alarm stop count for motor-overload auto recovery mode	0-1000	R/W*	uint_16
0x2217	Restart time for motor-overload auto recovery mode	0-1000.0 s	R/W*	uint_16
0x2218	Synchronous motor field-weakening mode	0: Field weakening off 1: Field weakening on	R/W*	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2219	Field-weakening start modulation	0-200.0 %	R/W*	uint_16
0x221A	Field-weakening adjustment integral coefficient	0-3.0000	R/W	uint_16
0x221B	Field-weakening adjustment proportional coefficient	0-30.000	R/W	uint_16

4.5.8 Multi-Speed Settings

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2240	Multi-speed enable	0: External enable 1: Enabled by default	R/W	uint_16
0x2241	Multi-speed 1	-9999 to 9999 rpm	R/W	int_16
0x2242	Multi-speed 2	-9999 to 9999 rpm	R/W	int_16
0x2243	Multi-speed 3	-9999 to 9999 rpm	R/W	int_16
0x2244	Multi-speed 4	-9999 to 9999 rpm	R/W	int_16
0x2245	Multi-speed 5	-9999 to 9999 rpm	R/W	int_16
0x2246	Multi-speed 6	-9999 to 9999 rpm	R/W	int_16
0x2247	Multi-speed 7	-9999 to 9999 rpm	R/W	int_16
0x2248	Multi-speed 8	-9999 to 9999 rpm	R/W	int_16
0x2249	Two-speed low speed	-9999 to 9999 rpm	R/W	int_16
0x2250	Two-speed high speed	-9999 to 9999 rpm	R/W	int_16
0x2251	Simple PLC operation mode	0-9999 Note: 0: Stop after one run 1: Hold final value after one run 2: Continuous loop 3-n: Loop n-1 times then stop, max. n = 9999	R/W	uint_16
0x2252	PLC restart mode selection	0: Restart from first segment 1: Continue from interrupted segment frequency	R/W	uint_16
0x2253	Simple PLC segment 0 running time	0-3000	R/W	uint_16
0x2254	Simple PLC segment 1 running time	0-3000	R/W	uint_16
0x2255	Simple PLC segment 2 running time	0-3000	R/W	uint_16
0x2256	Simple PLC segment 3 running time	0-3000	R/W	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
		time		
0x2257	Simple PLC segment 4 running time	0-3000	R/W	uint_16
0x2258	Simple PLC segment 5 running time	0-3000	R/W	uint_16
0x2259	Simple PLC segment 6 running time	0-3000	R/W	uint_16
0x225A	Simple PLC segment 7 running time	0-3000	R/W	uint_16
0x225B	Simple PLC running time unit	0: Unit: seconds 1: Unit: minutes	R/W	uint_16

4.5.9 Other

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2280	MODBUS baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps (default)	R/W	uint_16
0x2281	MODBUS communication axis address	1-128	R/W*	uint_16
0x2282	Restore factory settings	0: No function 1: Restore factory settings	R/W	uint_16
0x2283	Parity and stop bits	0: 1 stop bit, no parity 1: 1 stop bit, even parity 2: 1 stop bit, odd parity 3: 2 stop bits, no parity 4: 2 stop bits, even parity 5: 2 stop bits, odd parity	R/W	uint_16
0x2284	Parameter save	0: Do not save 1: Save	R/W	uint_16
0x2285	MODBUS communication timeout	0-32767 ms	R/W	uint_16
0x2286	MODBUS communication timeout function selection	0: No action	/	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
		time		
0x2257	Simple PLC segment 4 running time	0-3000	R/W	uint_16
0x2258	Simple PLC segment 5 running time	0-3000	R/W	uint_16
0x2259	Simple PLC segment 6 running time	0-3000	R/W	uint_16
0x225A	Simple PLC segment 7 running time	0-3000	R/W	uint_16
0x225B	Simple PLC running time unit	0: Unit: seconds 1: Unit: minutes	R/W	uint_16

4.5.9 Other

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x2280	MODBUS baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps (default)	R/W	uint_16
0x2281	MODBUS communication axis address	1-128	R/W*	uint_16
0x2282	Restore factory settings	0: No function 1: Restore factory settings	R/W	uint_16
0x2283	Parity and stop bits	0: 1 stop bit, no parity 1: 1 stop bit, even parity 2: 1 stop bit, odd parity 3: 2 stop bits, no parity 4: 2 stop bits, even parity 5: 2 stop bits, odd parity	R/W	uint_16
0x2284	Parameter save	0: Do not save 1: Save	R/W	uint_16
0x2285	MODBUS communication timeout	0-32767 ms	R/W	uint_16
0x2286	MODBUS communication timeout function selection	0: No action	/	uint_16

Address	Data Meaning / Description	Setting Range	R/W	Data Type
	selection	1: Disconnect enable and alarm 2: Disconnect enable only		
0x2287	Handheld keypad communication mode selection	Reserved	R/W*	uint_16
0x2288	Keypad FUN key function	0: No function 1: Enable-source switching 2: Forward/reverse switching 3: Forward jog 4: Reverse jog	/	uint_16
0x2289	Reserved	Reserved	R/W*	uint_16
0x228A	Free-stop interval time	0-10000	R/W*	uint_16
0x228B	Power-on resistance self-learning	0: Off 1: On	R/W*	uint_16
0x228C	Initial menu return time	10.0-999.9	R/W*	uint_16

4.5.10 Historical Fault Records

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x3280	Historical fault 1	-32768 to 32768	R0	int_16
0x3281	Historical fault 2	-32768 to 32768	R0	int_16
0x3282	Historical fault 3	-32768 to 32768	R0	int_16
0x3283	Historical fault 4	-32768 to 32768	R0	int_16
0x3284	Historical fault 5	-32768 to 32768	R0	int_16
0x3285	Historical fault 6	-32768 to 32768	R0	int_16
0x3286	Historical fault 7	-32768 to 32768	R0	int_16
0x3287	Historical fault 8	-32768 to 32768	R0	int_16

4.5.11 Speed Increment PID Parameters

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x3300	PID setting source	0: AI1 1: AI2 2: PID numerical setting 3: DI3 pulse 4: Multi-speed 5: Two-speed Note: The F10 group is valid when the main speed source is PID output (F00.06/6).	R/W	uint_16
0x3301	PID numerical setting	0-6000 rpm	R/W	uint_16
0x3302	PID feedback source	0: AI1 1: AI2 2: AI1 - AI2 3: DI3 4: PID numerical setting 5: AI1 + AI2 6: MAX(AI1 , AI2) 7: MIN(AI1 , AI2)	R/W	uint_16
0x3303	PID action direction	0-1	R/W	uint_16
0x3304	Proportional gain Kp1	0-100.0	R/W	uint_16
0x3305	Integral time Ti1	0.01-10.00 s	R/W	uint_16
0x3306	Derivative time Td1	0.001-10.000 s	R/W	uint_16
0x3307	PID derivative limit amplitude	0-100.00 %	R/W	uint_16
0x3308	PID setting change time	0-300 s	R/W	uint_16
0x3309	PID feedback filter time	0-60 s	R/W	uint_16
0x330A	PID output filter time	0-60 s	R/W	uint_16
0x330B	Maximum deviation between two outputs	0-100 %	R/W	uint_16

4.5.12 Torque Control Mode Parameters (Reserved)

Address	Data Meaning / Description	Setting Range	R/W	Data Type
0x3380	Torque setting source selection	0: AI1 1: AI2 2: Numerical setting 3: DI3	R/W*	uint_16
0x3381	Maximum forward speed in torque control	-6000 to 6000 rpm	R/W	int_16
0x3382	Maximum reverse speed in torque control	-6000 to 6000 rpm	R/W	int_16
0x3383	Torque rise filter time	0-30.0 s	R/W	uint_16
0x3384	Torque fall filter time	0-30.0 s	R/W	uint_16

Register parameter attribute description:

Attribute	Description
R/W	The parameter setting can be read/written when the driver is in any state.
R/W*	The parameter setting can be written only when the driver is stopped, and can be read in any state.
R0	The parameter is read-only and cannot be written.

4.6 Common Command Examples

Slave address 0x01, baud rate 115200, 8-N-1.

Operation	Data Frame	Description
Host computer (485) control enable	Send data: 01 06 20 05 00 01 53 CB Response: 01 06 20 05 00 01 53 CB	Write 0x01 to address 2005H Host computer (485) control enable is valid
Host computer (485) speed control	Send data: 01 06 20 06 00 02 E3 CA Response: 01 06 20 06 00 02 E3 CA	Write 0x02 to address 2006H Host computer (485) speed control is valid
Run command	Send data: 01 06 20 01 00 01 12 0A Response: 01 06 20 01 00 01 12 0A	Write 0x01 to address 2001H Enable/start
Motor speed command	Send data: 01 06 20 02 0B B8 24 88 Response: 01 06 20 02 0B B8 24 88	Write 0x0BB8 to address 2002H Set speed to 3000 RPM
Acceleration command	Send data: 01 06 20 03 00 03 32 0B Response: 01 06 20 03 00 03 32 0B	Write 3 to address 2003H Set to 0.3 KRPM/S
Current fault code	Send data: 01 03 20 80 00 01 8E 22 Response: 01 03 02 00 02 39 85	Read data at address 2080H Return 0002 = undervoltage
Motor rated current	Send data: 01 06 20 40 03 E8 83 60 Response: 01 06 20 40 03 E8 83 60	Write 0x03E8 to address 2040H Set rated current to 10.00 A
Parameter save	Send data: 01 06 22 84 00 01 02 5B Response: 01 06 22 84 00 01 02 5B	Write 1 to address 2284H Save all parameters changed before this command

Notes:

1. After writing data via 485, save the parameters; otherwise they will not be retained after power-off and restart.
2. In actual applications, communication data is represented in hexadecimal, which cannot directly represent decimal points. For example, 250.00 Hz cannot be expressed directly in hex, so 250.00 is multiplied by 100 to become integer 25000. It can then be represented by 61A8(H).
3. For writing a value of -100: 100(D) converts to 64(H); 10000(H) minus 64(H) gives FF9C(H). Therefore, writing FF9C via 485 means -100.

4.6 Common Command Examples

Slave address 0x01, baud rate 115200, 8-N-1.

Operation	Data Frame	Description
Host computer (485) control enable	Send data: 01 06 20 05 00 01 53 CB Response data: 01 06 20 05 00 01 53 CB	Write 0x01 to address 2005H. Host computer (485) control enable is valid.
Host computer (485) speed control	Send data: 01 06 20 06 00 02 E3 CA Response data: 01 06 20 06 00 02 E3 CA	Write 0x02 to address 2006H. Host computer (485) speed control is valid.
Run command	Send data: 01 06 20 01 00 01 12 0A Response data: 01 06 20 01 00 01 12 0A	Write 0x01 to address 2001H. Enable operation.
Motor speed command	Send data: 01 06 20 02 0B B8 24 88 Response data: 01 06 20 02 0B B8 24 88	Write 0x0BB8 to address 2002H. Set speed to 3000 RPM.
Acceleration command	Send data: 01 06 20 03 00 03 32 0B Response data: 01 06 20 03 00 03 32 0B	Write 3 to address 2003H. Acceleration = 0.3 KRPM/S.
Current fault code	Send data: 01 03 20 80 00 01 8E 22 Response data: 01 03 02 00 02 39 85	Read address 2080H data. Return 0002 = undervoltage.
Motor rated current	Send data: 01 06 20 40 03 E8 83 60 Response data: 01 06 20 40 03 E8 83 60	Write 0x03E8 to address 2040H. Set rated current to 10.00 A.
Parameter save	Send data: 01 06 22 84 00 01 02 5B Response data: 01 06 22 84 00 01 02 5B	Write 1 to address 2284H. Save all parameters modified before this command.

Notes:

1. After data is written via 485, it must be saved; otherwise it will not be retained after power-off and restart.
2. In actual applications, communication data is expressed in hexadecimal, and hexadecimal cannot represent decimal points. For example, 250.00 Hz cannot be directly expressed in hexadecimal; therefore, 250.00 is multiplied by 100 to become integer 25000, which can be expressed as 61A8(H).
3. For writing a value of -100: 100(D) converted to hexadecimal is 64(H); 10000(H) minus 64(H) gives FF9C(H), so writing FF9C via 485 represents -100.

V. Examples

5.1 DI Control Operation

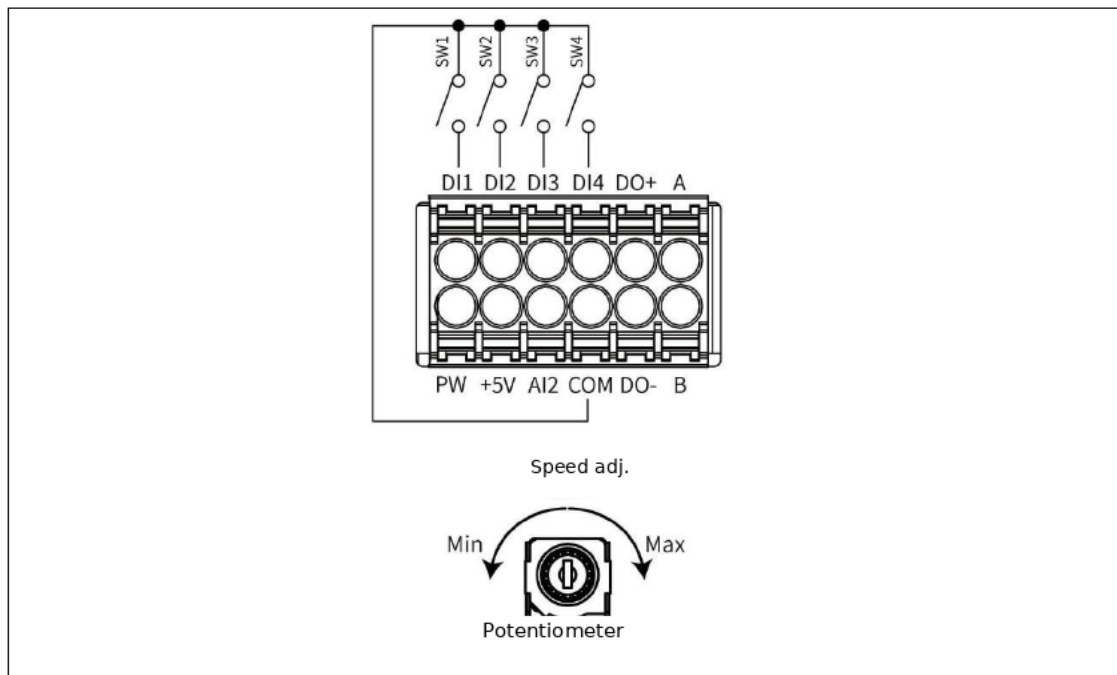
5.1.1 Related Parameters

485 Addr.	Keypad Code	Name	Setting Range	Default
2005H	F00.05	Command source	0: Internal enable (IO function) 1: External enable (host computer or keypad)	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	0
2042H	F01.02	Motor rated speed	0~5000 rpm K2/L2 series motor default 2000 rpm Drum motor default 3000 rpm	/
2100H	F03.00	DI1 terminal function select	0~124 Default: 1 Forward run	1
2101H	F03.01	DI2 terminal function select	0~124 Default: 2 Reverse run	2
2102H	F03.02	DI3 terminal function select	0~124 Default: 6 Electronic brake (shaft lock)	6
2103H	F03.03	DI4 terminal function select	0~124 Default: 5 Fault reset	5
2019H	F00.25	Electronic brake holding time	0.0~30.0 s Default: 0, infinite time	0
2126H	F03.11	Electronic brake deceleration command	0~30.0 rpm/s Driver version (F00.00/2000H)=1109: brake deceleration is decided by F00.04/2004H. Driver version (F00.00/2000H)=1110: brake deceleration is decided by F03.11/2126H.	10.0

Notes:

1. Factory default parameters; no reconfiguration is required. Details are shown above.
2. If the AI1 knob needs a maximum speed of 1500 rpm, set motor rated speed (2042H/F01.02) to 1500 rpm.
3. If the electronic brake only needs to run for a period, adjust F00.25.

Control effect is shown below:



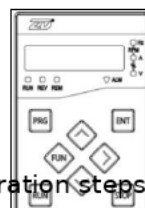
Control effect:

1. When SW1 is closed, turn the knob clockwise and the motor runs forward.
2. When SW2 is closed, turn the knob clockwise and the motor runs in reverse.
3. When SW1 and SW2 are closed together, the driver stops.
4. When SW3 is closed, the driver performs electronic braking (quick stop and torque holding).
5. When SW1 or SW2 is closed together with SW3, electronic braking has priority.
6. When a driver fault occurs, the driver stops and the alarm light flashes or a fault code is displayed. Closing SW4 clears the fault.

5.2 Keypad Parameter Configuration

The driver has three levels of operation menus:

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



Using driver acceleration adjustment as an example, the operation steps are:

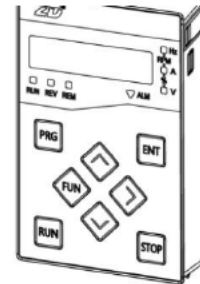
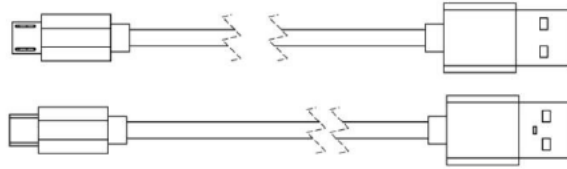
No.	Display	Operation
1	Any	Driver stopped; default display shows speed.
2	F00	Press PRG to enter the level-1 menu; press UP/DOWN to select the group.
3	F00.00	Press ENT to enter the level-2 menu; press UP/DOWN to select the item.
4	F00.03	Select function code F00.03.
5	0.3	Press ENT to enter level-3 menu; press UP/DOWN to edit the parameter.
6	3.0	Change the parameter to 3.0; acceleration is 3.0 Krpm/s.
7	F00.04	Press ENT to save the setting and return to the level-2 menu.
8	F00	Press PRG to return to the level-1 menu.
9	Any	Press PRG again to return to the display screen.

In the level-3 menu, if the parameter digit does not flash, the function code cannot be modified. Possible reasons:

- 1) The function code is read-only (RO), such as running frequency or fault code.
- 2) The function code attribute is R/W*, and can be modified only when stopped (the RUN indicator must be off).

5.3 Keypad Configuration Operation

The keypad interface is a microUSB port. It is used with the ZDRV.K10-ENT external keypad and connected with a microUSB cable.



量如下所示:

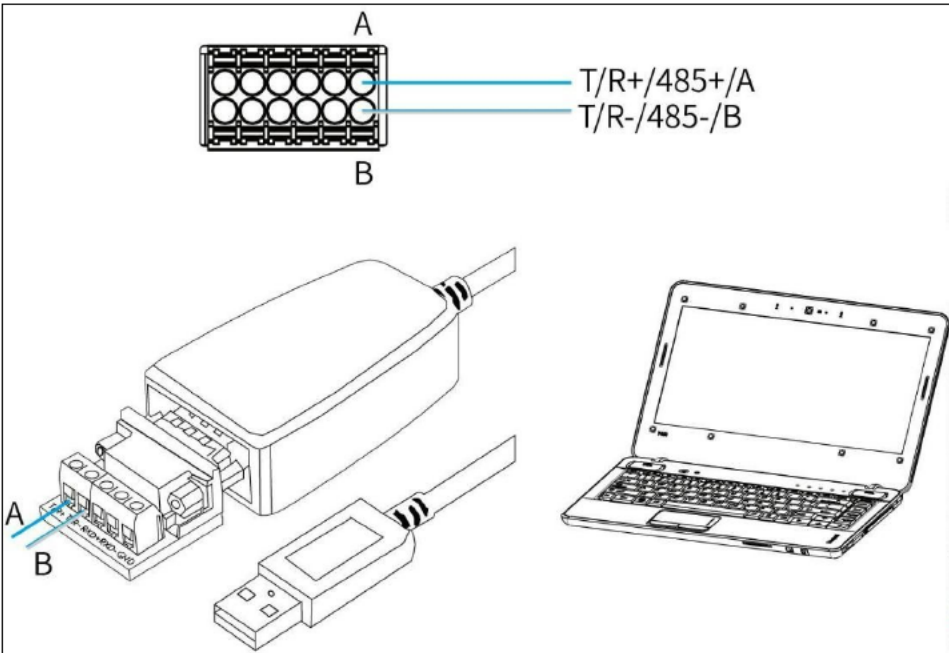
Operation configuration:

1. When the screen displays 00000, it is the initial menu. Press PRG to enter the next level (level-1 menu F00).
2. Use the UP/DOWN keys to change the flashing value to F00.
3. Press ENT to enter the next menu (level-2 menu F00.00).
4. Use the UP/DOWN keys to change the flashing value to F00.02.
5. Press ENT to enter the level-3 menu. Use LEFT/RIGHT to change the edit digit and UP/DOWN to change the flashing value to -3000.
6. Press ENT to save and enter the level-2 menu F00.03.
7. Use the keys to change the flashing value to F00.05.
8. Press ENT to enter the level-3 menu, then use UP/DOWN to set the value to 1.
9. Press ENT to save and enter the level-2 menu F00.06.
10. Press ENT to enter the level-3 menu, then use UP/DOWN to set the value to 2.
11. Press ENT to save and enter the level-2 menu F00.07.
12. Press PRG to return to the level-1 menu F00, then press PRG again to return to the initial menu.
13. Press RUN to start operation; press STOP to stop.

Note: Default 0~3000 is forward rotation; -3000~0 is reverse rotation.

5.4 Host Computer Module Introduction (485)

5.4.1 Open Host Computer Software



Name	Modified Date	Type	Size
Images	2024/1/25 16:15	Folder	
Log	2024/1/25 16:15	Folder	
Paras	2024/1/25 16:15	Folder	
Resource	2024/1/25 16:15	Folder	
Type	2024/1/25 16:15	Folder	
Waveform	2024/1/25 16:15	Folder	
DriverStudio.exe.config	2024/1/25 16:15	Folder	
DriverStudio.pdb	2024/1/25 16:15	Folder	
DriverStudio.exe	2024/1/25 16:15	Application	
FirmwareUpgrade.exe	2024/1/25 16:15	Application	

Select application

Product Type

Product Type

C41-S2

Select C41

Product File

1110.xml

Select file

OK

Click OK

Slave address

1

Baud rate

115200

Parity

None

Serial port

COM1

Connect device

Disconnect device

Search device

Default

USB-to-485 serial port

Serial port closed

Click OK

Parameter Monitoring	Parameter Overview	Motion Control	Device Configuration	Offline
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Parameter Monitoring	Parameter Overview	Motion Control	Device Configuration	Online
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DriverStudio					
Parameter Monitoring	Parameter Overview	Motion Control	Device Configuration	Online	
Control params	Param No.	Address	Parameter Name	Value	Unit
Motor control	F00.00	0x2000	Driver version	1110	\
IO control	F00.01	0x2001	Start/stop command	0	\
AI params	F00.02	0x2002	External speed setpoint	0	rpm
Multi-speed	F00.03	0x2003	Acceleration command	2.0	krpm/s
Other	F00.04	0x2004	Deceleration command	2.0	krpm/s
Fault history	F00.05	0x2005	Command source	0	\
Speed incr. PID	F00.06	0x2006	Speed source	0	\
Torque ctrl	F00.07	0x2007	Clear fault	0	\
	F00.08	0x2008	Motor learning enable	0	\
	F00.09	0x2009	Stop mode select	0	\

DI1 DI2 DI3 DI4

Note: After changing parameters, press the Enter key on the keyboard to apply the change.

5.4.2 Parameter Monitoring

Parameter Monitoring				
Status Params	IO Status			
Parameter No.	Address	Parameter Name	Current Value	Unit
F02.00	0x2080	Current fault		\
F02.01	0x2081	Motor actual speed		rpm
F02.02	0x2082	Motor actual frequency		Hz
F02.03	0x2083	Driver DC bus voltage		V
F02.04	0x2084	Motor Is current		A
F02.05	0x2085	Motor Id current command		A
F02.06	0x2086	Motor Id current feedback		A
F02.07	0x2087	Motor Iq current command		A
F02.08	0x2088	Motor Iq current feedback		A
F02.09	0x2089	AI2 voltage value		V
F02.10	0x208A	HDI frequency		KHz
F02.11	0x208B	HDI speed		RPM
F02.12	0x208C	Knob speed		RPM
F02.13	0x208D	AI2 speed		RPM
F02.14	0x208E	Driver temperature		°C
F02.15	0x208F	Motor overload warning %		%
F02.16	0x2090	Driver overload warning %		%
F02.17	0x2091	Motor overload auto recovery stop		times
F02.18	0x2092	Keypad connection status		\
F02.19	0x2093	Driver model: 0=built-in,1=panel		\
F02.20	0x2094	Motor command speed		rpm
F02.21	0x2095	DI UP/DOWN superimposed speed		rpm
F02.22	0x2096	Command torque		%

5.4.3 Parameter Overview

DriverStudio

Parameter Monitoring

Parameter Overview

Motion Control

Device Configuration

Oscilloscope

Online

Control params

Motor control

IO control

AI params

Multi-speed setting

Other

Fault history

Speed increment PID

Torque control

Param No.	Address	Parameter Name	Value	Unit
F00.00	0x2000	Driver version		
F00.01	0x2001	Start/stop command		
F00.02	0x2002	External speed setpoint		
F00.03	0x2003	Motor acceleration command		
F00.04	0x2004	Motor deceleration command		
F00.05	0x2005	Command source		
F00.06	0x2006	Speed command source		
F00.07	0x2007	Clear fault		
F00.08	0x2008	Motor parameter self-learning		
F00.09	0x2009	Stop mode selection		
F00.10	0x200A	Control mode selection		

5.4.4 Motion Control

DriverStudio

Parameter Monitoring

Parameter Overview

Motion Control

Device Configuration

Oscilloscope

Online

Control params

Motor control

IO control

Param No.	Address	Parameter Name	Value	Unit
F00.05	0x2005	Command source	0	
F00.06	0x2006	Speed source	0	

Real-time speed rpm

Motor speed display

DI1
DI2
DI3
DI4

Show DI trigger status

DO1

Show DO trigger status

Run

485 run enable
F00.05=1

Target speed

485 speed write command
F00.06=2

5.4.5 Device Configuration

DriverStudio

Parameter Monitoring | Parameter Overview | Motion Control | **Device Configuration** | Oscilloscope | Online

Motor parameters
Self-learning params
Save basic motor parameters

Param No.	Address	Parameter Name	Value	Unit
F01.00	0x2040	Motor rated current		A
F01.01	0x2041	Motor maximum current		A
F01.02	0x2042	Motor rated speed		rpm
F01.03	0x2043	Motor pole pairs		\

5.4.6 Oscilloscope

Parameter Monitoring | Parameter Overview | Motion Control | Device Configuration | **Oscilloscope** | Online

Open | Save | Show all data | Zoom In | Zoom Out | Start | Stop

Show all data: during connection, data changes in real time.
Connect: collect current data.
Start: restart data recording each time.
Stop: stop recording.

Save
Samples: 100000
Sampling
Trigger

Channel quantity: 1 Select channel number: command frequency 0xRef Select channel data

5.4.7 Modify Parameters

DriverStudio

Parameter Monitoring | Parameter Overview | Motion Control | **Device Configuration** | Online

Control params
Motor control
IO control
AI params
Multi-speed

Param No.	Address	Parameter Name	Value	Unit
F00.00	0x2000	Version	1110	
F00.01	0x2001	Run command		
F00.02	0x2002	External speed		
F00.03	0x2003	Acceleration command		

Confirm parameter change?
Yes

Press Enter

Note: After changing parameters, parameter saving (F08.04/2284H) must be performed; otherwise, changes will be cleared after power-off and restart.

5.5 Stop Mode

5.5.1 Related Parameters

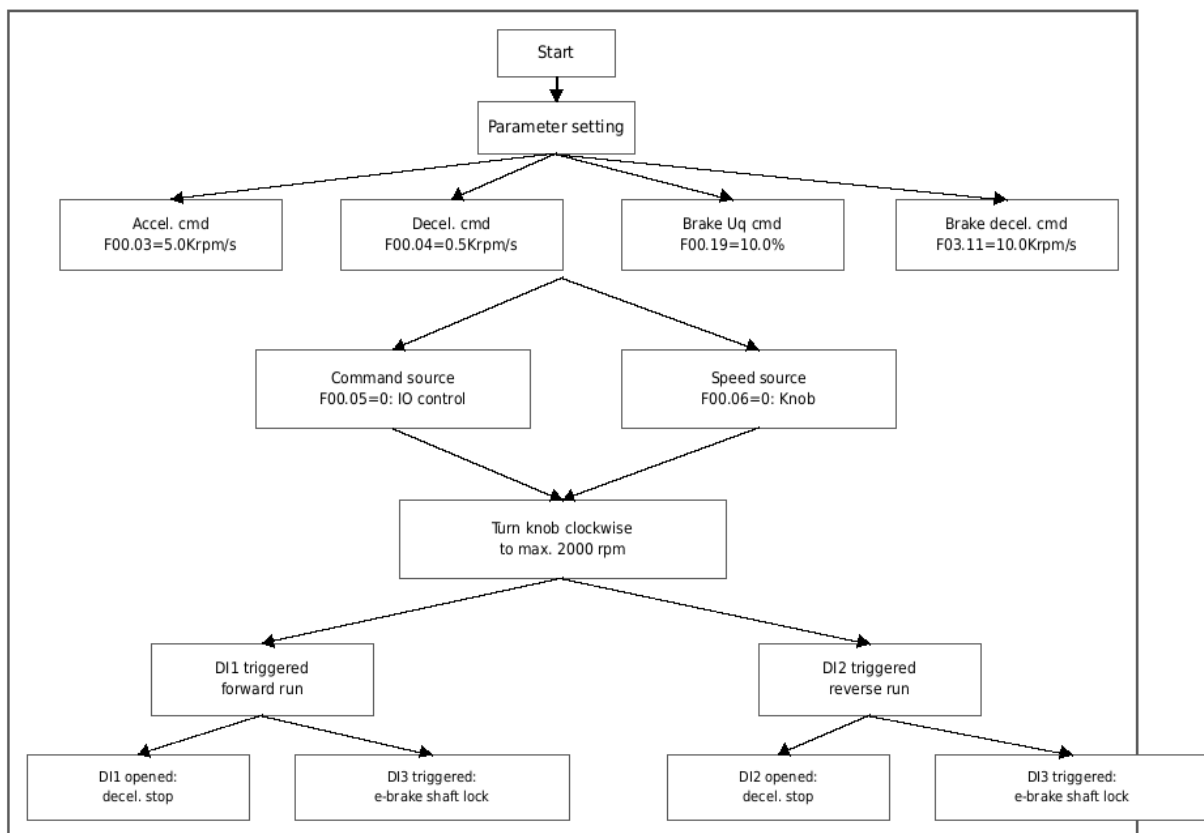
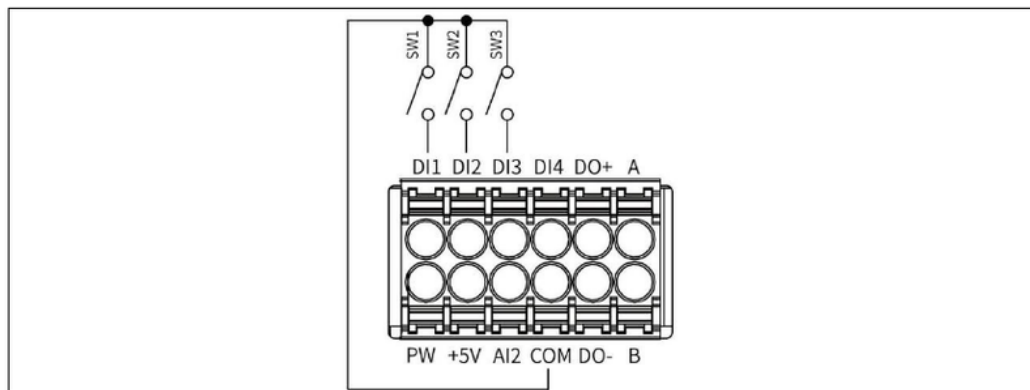
485 Addr.	Keypad Code	Name	Setting Range	Set Value
2001H	F00.01	Start/stop command	0: Stop 1: Run enable	/
2002H	F00.02	External speed setting	-6000~6000 rpm	/
2003H	F00.03	Motor acceleration command	0.1~20.0 Krpm/s	/
2004H	F00.04	Motor deceleration command	0.1~20.0 Krpm/s	/
2005H	F00.05	Start/stop command source	0: IO control 1: Host computer or keypad enable	/
2006H	F00.06	Speed command source	0~7 0: Knob 2: Host computer or keypad	/
2009H	F00.09	Stop mode selection	0~3 0: Deceleration stop This section only describes deceleration stop.	0
2012H	F00.18	Electronic brake mode selection	0: Disabled 1: Zero-speed shaft lock 2: Deceleration shaft lock 3: Deceleration without shaft lock Note: after enabling 2 or 3, another enable signal is invalid. To enable again, reset to 0 or 1.	/
2013H	F00.19	Electronic brake force command	0~100.0 %	/
2019H	F00.25	Electronic brake holding time	0.0~30.0s (default 1.0s)	/
2100H	F03.00	DI1 terminal function select	0~124 1: Forward run	1
2101H	F03.01	DI2 terminal function select	0~124 2: Reverse run	2
2102H	F03.02	DI3 terminal function select	0~124 6: Electronic brake (deceleration shaft lock) (default) 8: Electronic brake (deceleration without shaft lock) 11: Free stop 13: Run pause 23: Zero-speed shaft lock	/
2126H	F03.11	Electronic brake deceleration command	0~30.0 rpm/s Driver version (F00.00/2000H)=1109: brake deceleration is decided by F00.04/2004H. Driver version (F00.00/2000H)=1110: brake deceleration is decided by F03.11/2126H.	/

5.5.2 Common Stop Mode

In general, factory default parameters can realize forward/reverse operation (DI1/DI2) and deceleration stop (F00.09=0). If faster start/stop is required, adjust the motor acceleration/deceleration. Example configuration:

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2003H	F00.03	Motor acceleration command	0.1~20.0 Krpm/s	5.0
2004H	F00.04	Motor deceleration command	0.1~20.0 Krpm/s	0.5
2005H	F00.05	Start/stop command source	0~1 0: IO control	0
2006H	F00.06	Speed command source	0~7 0: Knob	0
2102H	F03.02	DI3 terminal function select	0~124 6: Electronic brake (deceleration shaft lock) (default)	6
2013H	F00.19	Electronic brake Uq command	0~100.0 %	10.0
2126H	F03.11	Electronic brake deceleration command	0~30.0 rpm/s	10.0

Control effect is shown below:

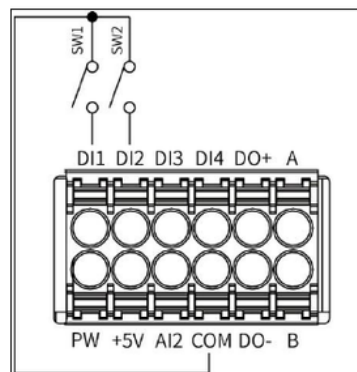


5.5.3 Other Stop Modes

If only a certain shaft-lock time is needed after disconnecting the signal, configure as follows:

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2003H	F00.03	Motor acceleration command	0.1~20.0 Krpm/s	5.0
2004H	F00.04	Motor deceleration command	0.1~20.0 Krpm/s	0.5
2005H	F00.05	Start/stop command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed command source	0~7 0: Knob 2: Host computer or keypad	0
2012H	F00.18	Electronic brake mode selection	0: Disabled 1: Zero-speed shaft lock 2: Deceleration shaft lock 3: Deceleration without shaft lock	1
2013H	F00.19	Electronic brake Uq command	0~100.0 %	10.0
2019H	F00.25	Electronic brake holding time	0.0~30.0s	5.0

Control effect is shown below:



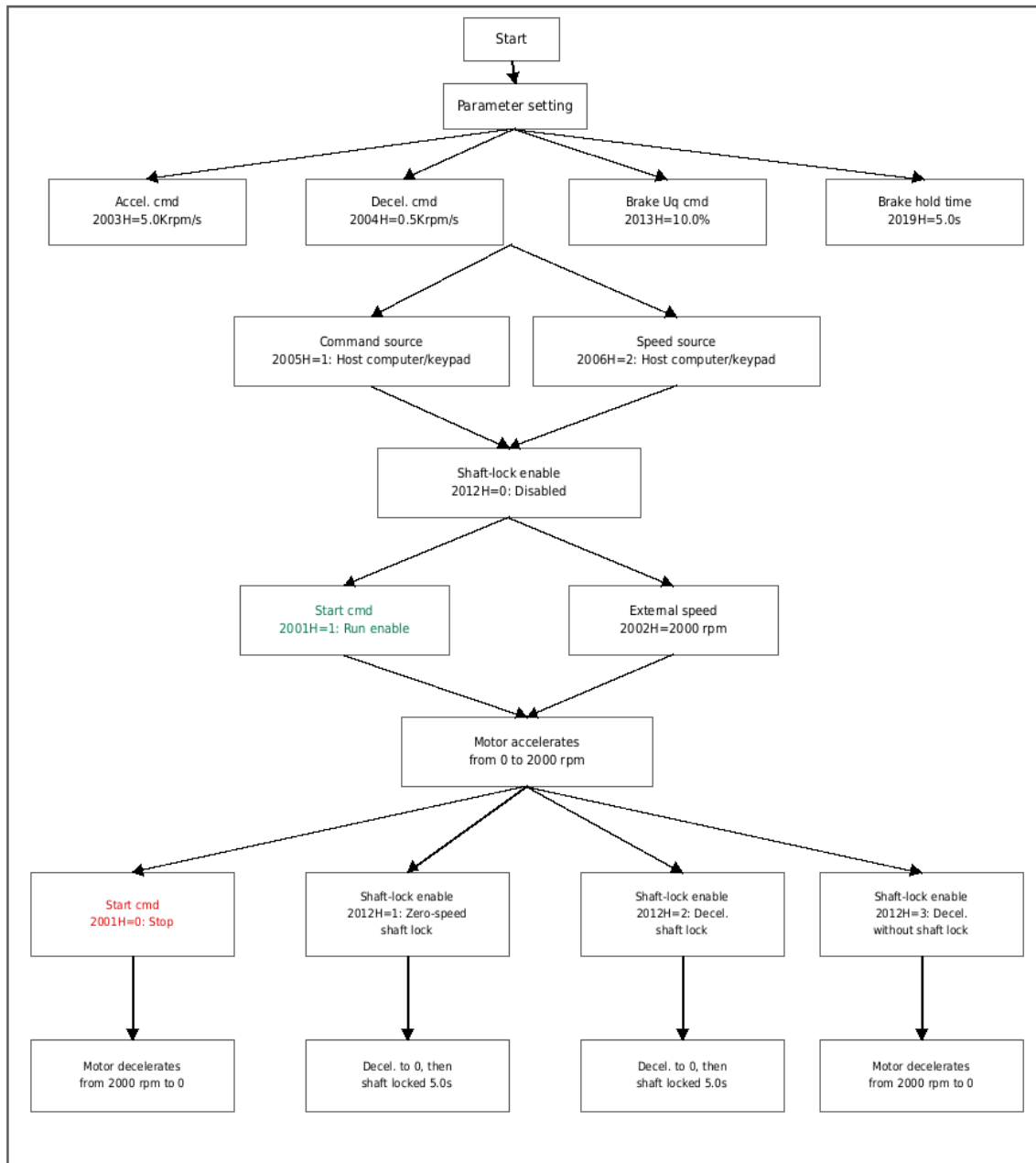
Step 1	Effect 1	Step 2	Effect 2
SW1 closed	Forward run	SW1 opened	After deceleration stop, shaft locked for 5.0s
SW2 closed	Reverse run	SW2 opened	After deceleration stop, shaft locked for 5.0s

5.5.4 Host Computer (485) and Stop Mode

If the host computer (485 communication) is used to control operation, the stop effect after configuration is as follows:

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2001H	F00.01	Start/stop command	0: Stop 1: Run enable	/
2002H	F00.02	External speed setting	-6000~6000 rpm	/
2003H	F00.03	Motor acceleration command	0.1~20.0 Krpm/s	/
2004H	F00.04	Motor deceleration command	0.1~20.0 Krpm/s	/
2005H	F00.05	Start/stop command source	0: IO control 1: Host computer or keypad enable	1
2006H	F00.06	Speed command source	0~7 0: Knob 2: Host computer or keypad	2
2013H	F00.19	Electronic brake Uq command	0~100.0 %	10.0
2019H	F00.25	Electronic brake holding time	0.0~30.0s (default 1.0s)	5.0
2012H	F00.18	Shaft-lock enable	0: Disabled 1: Zero-speed shaft lock 2: Deceleration shaft lock 3: Deceleration without shaft lock	/

Control effect is shown below:

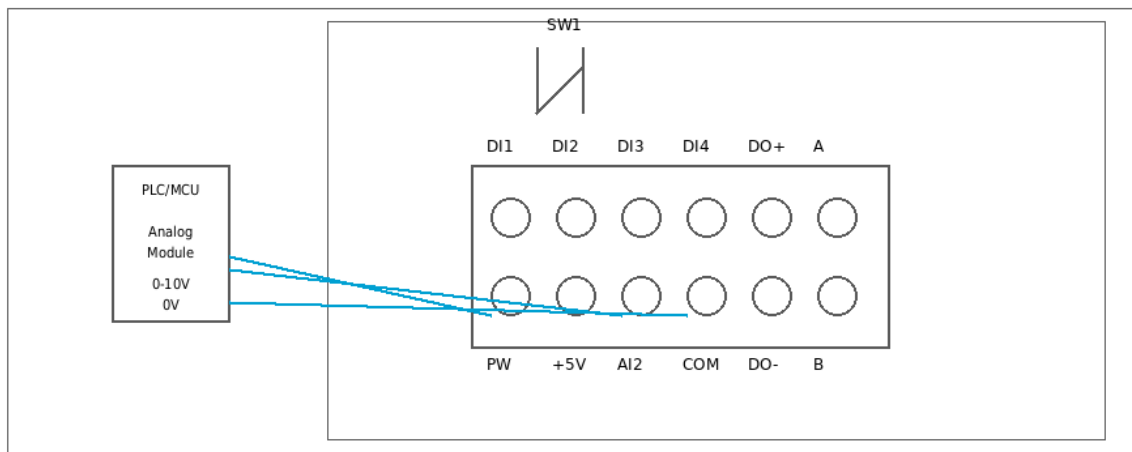


5.6 External Analog Speed Regulation

5.6.1 Related Parameters

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2005H	F00.05	Command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed	1
2042H	F01.02	Motor rated speed	0~30000 rpm	2000
2100H	F03.00	DI1 terminal function select	0~124 1: Forward run	1
2180H	F05.00	AI2 lower-limit value	0~10.00V	0.20
2181H	F05.01	AI2 lower-limit corresponding setting	-200.0~200.0%	0
2182H	F05.02	AI2 upper-limit value	0~10.00V	10.00
2183H	F05.03	AI2 upper-limit corresponding setting	-200.0~200.0%	100.0
2184H	F05.04	AI2 filter coefficient	0~100.00%	1.00

Control effect is shown below:



Control effect:

1. The analog module can adjust speed by changing the input voltage (0~10V corresponds to 0~2000 rpm).
2. When SW1 is closed, the driver runs forward.

5.7 Multi-Speed

Definition of multi-speed:

If the DI port function selection (F03.00-F03.03) contains multi-speed trigger enable bits (14, 15, 16, 17), and DI1-DI4 are assigned to these bits, their binary sequence is DI4, DI3, DI2, DI1. Because each DI state can be 0 (open) or 1 (closed), the following table is obtained:

DI4	DI3	DI2	DI1	Status
0	0	0	1	State 1
0	0	1	0	State 2
0	0	1	1	State 3
0	1	0	0	State 4
0	1	0	1	State 5
0	1	1	0	State 6
0	1	1	1	State 7
1	0	0	0	State 8

With different trigger states, different speeds can be assigned to those states so that different trigger methods correspond to different speeds, as shown below:

DI4	DI3	DI2	DI1	DI trigger corresponding speed
0	0	0	1	Multi-speed 1 (F07.01 / 2241H)
0	0	1	0	Multi-speed 2 (F07.02 / 2242H)
0	0	1	1	Multi-speed 3 (F07.03 / 2243H)
0	1	0	0	Multi-speed 4 (F07.04 / 2244H)
0	1	0	1	Multi-speed 5 (F07.05 / 2245H)
0	1	1	0	Multi-speed 6 (F07.06 / 2246H)
0	1	1	1	Multi-speed 7 (F07.07 / 2247H)
1	0	0	0	Multi-speed 8 (F07.08 / 2248H)

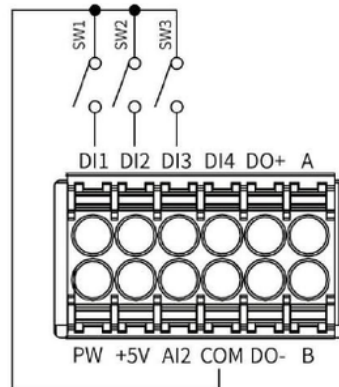
Example: if DI1 and DI3 are triggered at the same time, the corresponding multi-speed value is $0 \times 0101 = 2^0 + 2^2 = 5$. The function code for multi-speed 5 is F07.05 (2245H), so motor speed command = F07.05 (2245H).

Note: Multi-speed 0 is written as 0 rpm by default and cannot be changed.

5.7.1 Related Parameters

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2005H	F00.05	Command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	3
2042H	F01.02	Motor rated speed	0~30000 rpm	2000
2100H	F03.00	DI1 terminal function select	0~124 14: Multi-speed bit selection 1	14
2101H	F03.01	DI2 terminal function select	0~124 15: Multi-speed bit selection 2	15
2102H	F03.02	DI3 terminal function select	0~124 16: Multi-speed bit selection 3	16
2240H	F07.00	Multi-speed enable	0: No function 1: Enable	1
2241H	F07.01	Multi-speed 1	-9999~9999 rpm	500
2242H	F07.02	Multi-speed 2	-9999~9999 rpm	-800
2243H	F07.03	Multi-speed 3	-9999~9999 rpm	1000
2244H	F07.04	Multi-speed 4	-9999~9999 rpm	-2000
2245H	F07.05	Multi-speed 5	-9999~9999 rpm	0
2246H	F07.06	Multi-speed 6	-9999~9999 rpm	0
2247H	F07.07	Multi-speed 7	-9999~9999 rpm	0
2248H	F07.08	Multi-speed 8	-9999~9999 rpm	0

Control effect is shown below:



If SW3, SW2, and SW1 are arranged in binary order, ON means the switch is closed and OFF means the switch is open. The control effect is shown below:

SW3	SW2	SW1	Effect
OFF	OFF	OFF	Stop
OFF	OFF	ON	Forward run 500 rpm
OFF	ON	OFF	Reverse run 800 rpm
OFF	ON	ON	Forward run 1000 rpm
ON	OFF	OFF	Reverse run 2000 rpm
ON	OFF	ON	Stop
ON	ON	OFF	Stop
ON	ON	ON	Stop

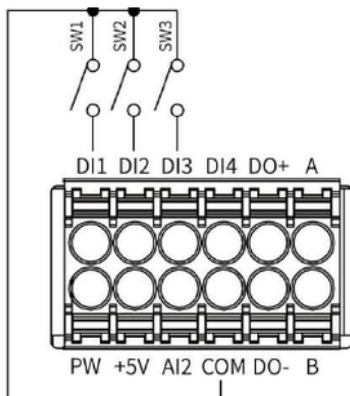
5.8 Two-Speed

Special configuration: the motor speed command is determined by the two-speed high-speed/low-speed functions configured for DI ports (F03.00~F03.03).

5.8.1 Related Parameters

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2005H	F00.05	Command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	5
2042H	F01.02	Motor rated speed	0~5000 rpm	2000
2100H	F03.00	DI1 terminal function selection	0~124 18: Two-speed enable	18
2101H	F03.01	DI2 terminal function selection	0~124 19: Two-speed forward run	19
2102H	F03.02	DI3 terminal function selection	0~124 20: Two-speed high speed	20
2249H	F07.09	Two-speed low speed	-9999~9999 rpm	1000
2250H	F07.10	Two-speed high speed	-9999~9999 rpm	-2000

Control effect is shown below:



If SW3, SW2, and SW1 are arranged in binary order, ON means the switch is closed and OFF means the switch is open. The control effect is shown below:

SW3	SW2	SW1	Effect
OFF	OFF	OFF	Stop
OFF	OFF	ON	Reverse 1000 rpm (reverse run + 1000 rpm)
OFF	ON	OFF	Stop
OFF	ON	ON	Forward 1000 rpm (forward run + 1000 rpm)
ON	OFF	OFF	Stop
ON	OFF	ON	Forward 2000 rpm (reverse run + -2000 rpm)
ON	ON	OFF	Stop
ON	ON	ON	Reverse 2000 rpm (forward run + -2000 rpm)

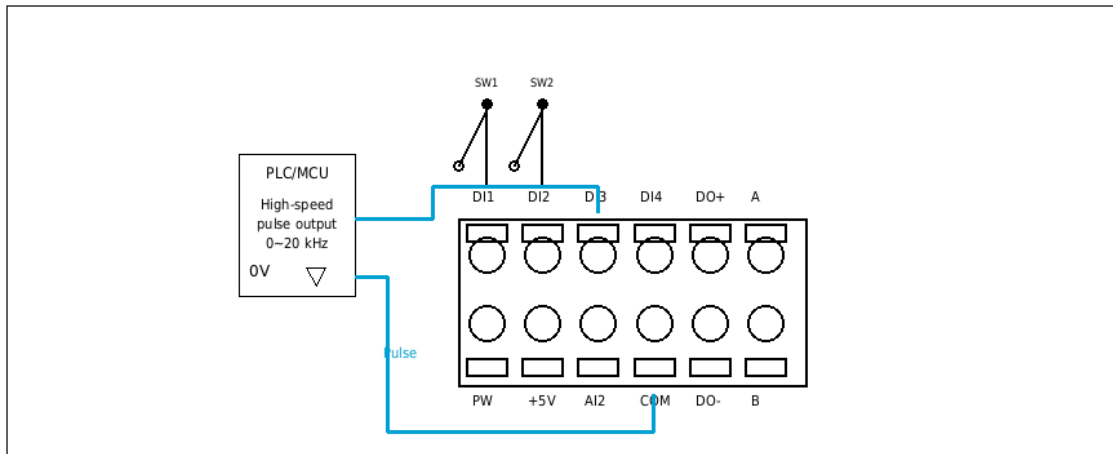
5.9 High-Speed Pulse HDI

The driver supports high-speed pulse input. DI3 can be used as the HDI high-speed pulse input. Speed is adjusted by changing the external input frequency (default 0~20k), corresponding to 0~F01.02. The user can externally connect a single-ended pulse input.

5.9.1 Related Parameters

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2005H	F00.05	Command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	4
2042H	F01.02	Motor rated speed	0~5000 rpm	2000
2100H	F03.00	DI1 terminal function selection	0~124 1: Forward run	1
2101H	F03.01	DI2 terminal function selection	0~124 2: Reverse run	2
2102H	F03.02	DI3 terminal function selection	0~124 0: No function	0
2120H	F03.05	HDI lower-limit frequency	0~20.00	0
2121H	F03.06	HDI lower-limit corresponding setting	-100.0~100.0	0
2122H	F03.07	HDI upper-limit frequency	0~20.00	20.00
2123H	F03.08	HDI upper-limit corresponding setting	-100.0~100.0	100.0
2124H	F03.09	HDI filter coefficient	0~2.000	0.100
2125H	F03.10	HDI compensation ratio coefficient	0~2.000	1.000

Control effect is shown below:



Control effect:

1. The high-speed pulse input can adjust speed by changing the input frequency (0~20 kHz corresponds to 0~2000 rpm);
2. When SW1 is closed, the driver runs forward;
3. When SW2 is closed, the driver runs reverse.

5.10 Simple PLC

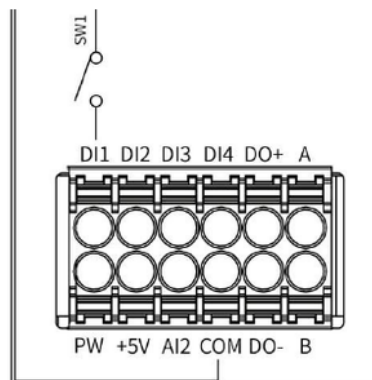
A simple control logic that runs the corresponding speed according to the defined time.

5.10.1 Related Parameters

Configuration is shown below:

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	7
2042H	F01.02	Motor rated speed	0~30000 rpm	2000
2100H	F03.00	DI1 terminal function selection	0~124 1: Forward run	1
2241H	F07.01	Multi-speed 1	-9999~9999 rpm	500
2242H	F07.02	Multi-speed 2	-9999~9999 rpm	-800
2243H	F07.03	Multi-speed 3	-9999~9999 rpm	1000
2244H	F07.04	Multi-speed 4	-9999~9999 rpm	-2000
2250H	F07.11	Simple PLC running mode	0~9999	0
2253H	F07.13	Segment 0 run time	0~3000	2.0
2254H	F07.14	Segment 1 run time	0~3000	3.0
2255H	F07.15	Segment 2 run time	0~3000	0
2256H	F07.16	Segment 3 run time	0~3000	0
2257H	F07.17	Segment 4 run time	0~3000	0
2258H	F07.18	Segment 5 run time	0~3000	0
2259H	F07.19	Segment 6 run time	0~3000	0
225AH	F07.20	Segment 7 run time	0~3000	0
225BH	F07.21	Simple PLC run time unit	0: seconds 1: minutes	0

Control effect is shown below:



Control effect:

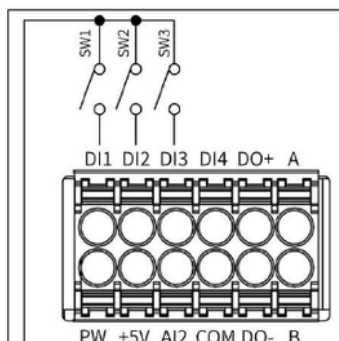
When SW1 is closed, the driver runs forward at 500 rpm for 2.0 s, then runs reverse at 800 rpm for 3.0 s, and finally stops. To trigger again, the signal must be re-applied. Note that the DI1 signal must remain active; if it is disconnected during operation, the driver will stop.

5.11 Speed Increment Control

This is a speed increment control method based on IO port rising/falling edge triggering. The related parameters are as follows:

485 Addr.	Keypad Code	Name	Setting Range	Set Value
2005H	F00.05	Command source	0: IO control 1: Host computer or keypad enable	0
2006H	F00.06	Speed source	0: AI1 knob 1: AI2 2: Host computer or keypad 3: Multi-speed 4: HDI 5: Two-speed 6: PID output 7: Simple PLC	0
2042H	F01.02	Motor rated speed	0~30000 rpm	2000
2100H	F03.00	DI1 terminal function selection	0~124 1: Forward run	1
2101H	F03.01	DI2 terminal function selection	0~124 25: Terminal speed UP	25
2102H	F03.02	DI3 terminal function selection	0~124 26: Terminal speed DOWN	26
0x2127	F03.12	Terminal UP/DOWN speed change rate	1~3000 rpm/s	300

Control effect is shown below:



Control effect:

Turn the AI1 knob counterclockwise to 0 rpm. When SW1 is closed, the driver is enabled. Closing and opening DI2 once makes the driver run forward at 300 rpm; closing and opening DI2 again makes it run forward at 600 rpm. DI2 can continue to be triggered to increase speed until the motor rated speed is reached. Triggering DI3 decreases the set speed in the opposite direction.

VI. Faults and Maintenance

The following table shows the fault indication displayed by LED flashing after the driver detects a fault and stops (faults may be superimposed). Users can troubleshoot according to the fault code. Example: if F09.01 displays 18 (D), it means an undervoltage alarm and hardware overcurrent fault.

Fault No. (H)	Fault No. (D)	Fault Display	Fault Name	Flash Count	Fault Cause	Handling Method
0x0001	1	ErSE	Parameter mismatch	Red 3x Green 3x	1. No suitable motor selected	1. Configure F00.15 according to motor model
0x0002	2	E.UU	Undervoltage fault	Red 5x Green 1x	1. Power voltage too low 2. Acceleration too fast; external power protection 3. Instantaneous power failure 4. Driver hardware abnormal	1. Check power input 2. Reduce acceleration / increase acceleration time 3. Clear the fault 4. Seek technical support
0x0004	4	E.OV	Overvoltage fault	Red 2x Green 1x	1. Input voltage too high 2. Electronic braking force too strong	1. Check input voltage 2. Modify electronic brake parameters
0x0008	8	E.OH	Driver over-temperature fault	Red 1x Green 3x	1. Ambient temperature too high 2. Thermal resistor damaged	1. Lower ambient temperature 2. Replace the unit
0x0010	16	E.OCH	Hardware overcurrent fault	Red 3x Green 0x	1. Acceleration too fast 2. Voltage too low 3. Driver power too small 4. Sudden load 5. Phase-to-ground or phase-to-phase short circuit 6. Strong external interference	1. Reduce acceleration / increase acceleration time 2. Check input power voltage 3. Use a higher-power driver 4. Check if three-phase output is shorted or motor is stalled 5. Check/replace cable or motor 6. Check for strong interference
0x0040	64	E.OCS	Software overcurrent fault	Red 1x Green 1x	1. Acceleration too fast 2. Voltage too low 3. Driver power too small 4. Sudden load 5. Phase-to-ground or phase-to-phase short circuit 6. Strong external interference	1. Reduce acceleration / increase acceleration time 2. Check input power voltage 3. Select a driver with higher power rating 4. Check whether load is shorted or stalled 5. Check/replace cable or motor 6. Check for strong interference
0x0080	128	E.OL2	Driver overload fault	Red 2x Green 2x	1. Acceleration time too short 2. Power voltage too low 3. Load too large	1. Reduce acceleration / increase acceleration time 2. Check input voltage 3. Use a higher-power driver
0x0100	256	E.HLP	Phase-loss fault	Red 3x Green 1x	1. Motor cable not connected properly	1. Check motor connection cable
0x1000	4096	E.485	Communication timeout fault	Red 3x Green 2x	1. Check whether device is offline	1. Check whether device is offline
0x2000	8192	E.OL1	Motor overload fault	Red 1x Green 2x	1. Power voltage too low 2. Motor rated-current setting is unsuitable 3. Motor stall or large load variation	1. Check input voltage 2. Set motor rated current 3. Reduce load and check motor/mechanical condition

Fault No. (H)	Fault No. (D)	Fault Display	Fault Name	Flash Count	Fault Cause	Handling Method
0x8000	32768	E.EF	External fault	Red 5x Green 2x	1. Check whether external fault input exists	1. Check external fault input

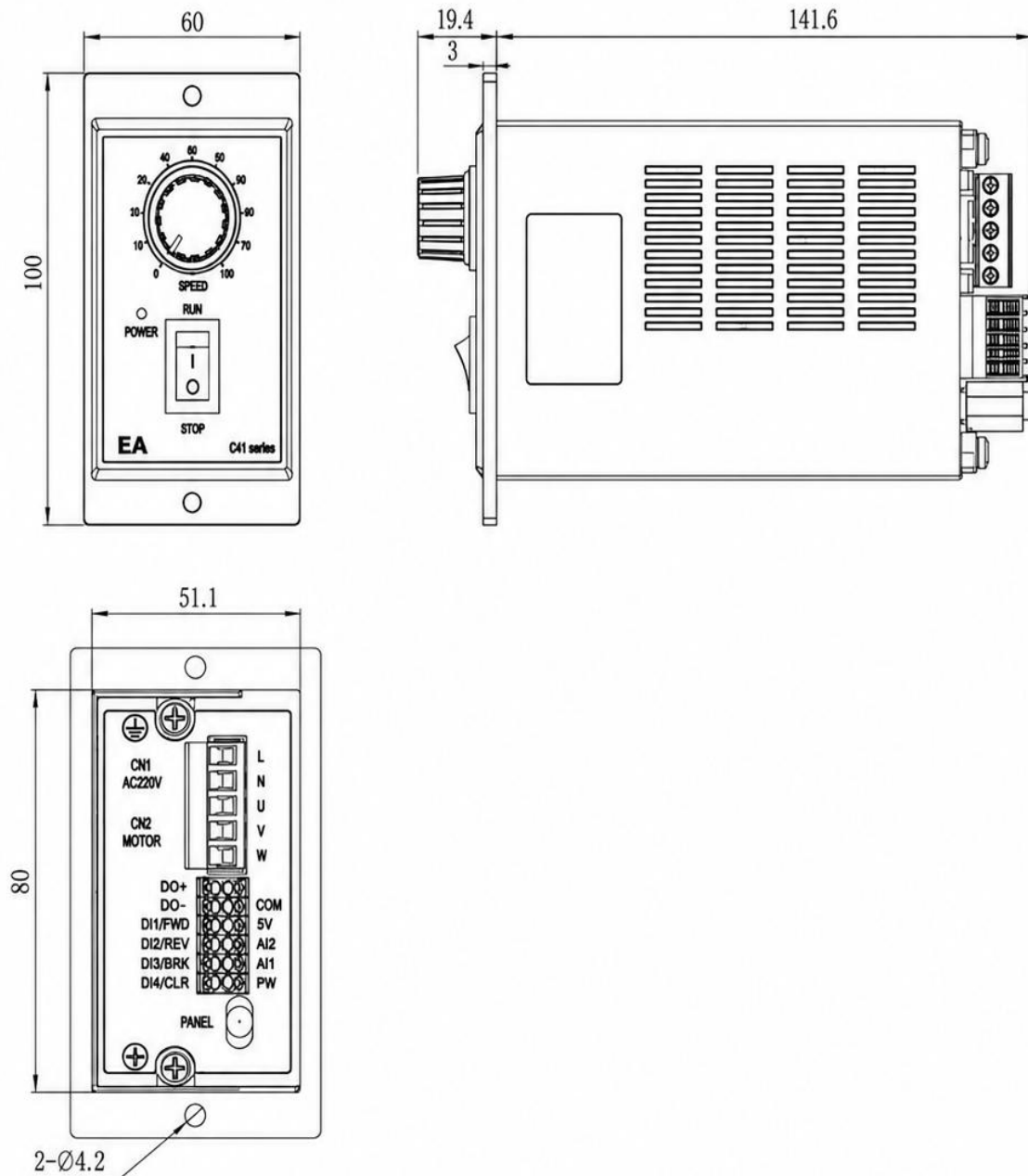
Note:

1. Except for faults that require parameter modification through the keypad, other fault maintenance must be performed with power disconnected;
2. Before use, confirm that the indicator light or keypad can operate normally;
3. Do not move, wire, or maintain the product while the light is on;
4. After the initial troubleshooting is completed, a trial run test is recommended;
5. Basic maintenance should be performed by professionals familiar with this product;
6. If the fault cannot be resolved, do not disassemble the driver housing for maintenance without permission; contact sales or technical support.

VII. Installation

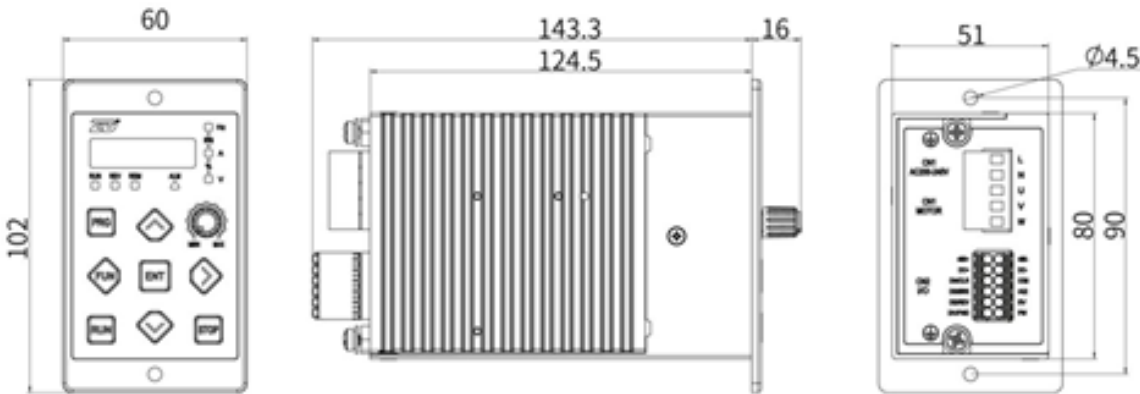
7.1 Installation Dimensions

7.1.1 EA-DRVC41-200S2-A

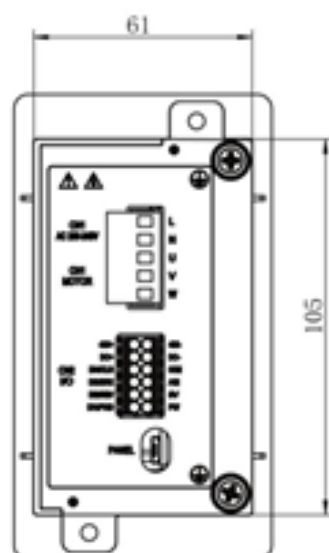
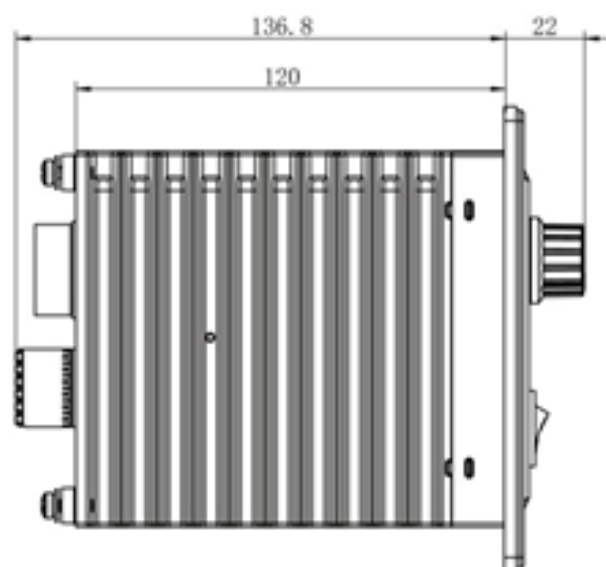
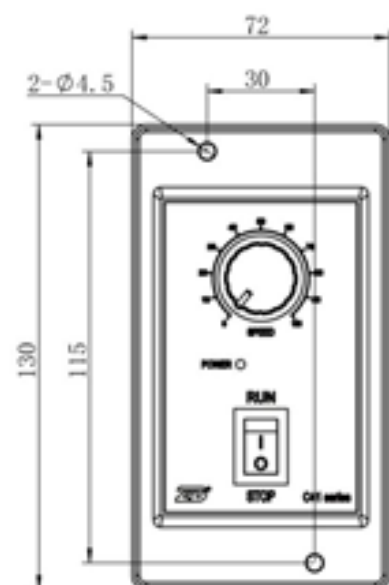


Note: The dimension drawing of EA-DRVC41-200S2-A applies to EA-DRVC41-15/40/120S2-A.

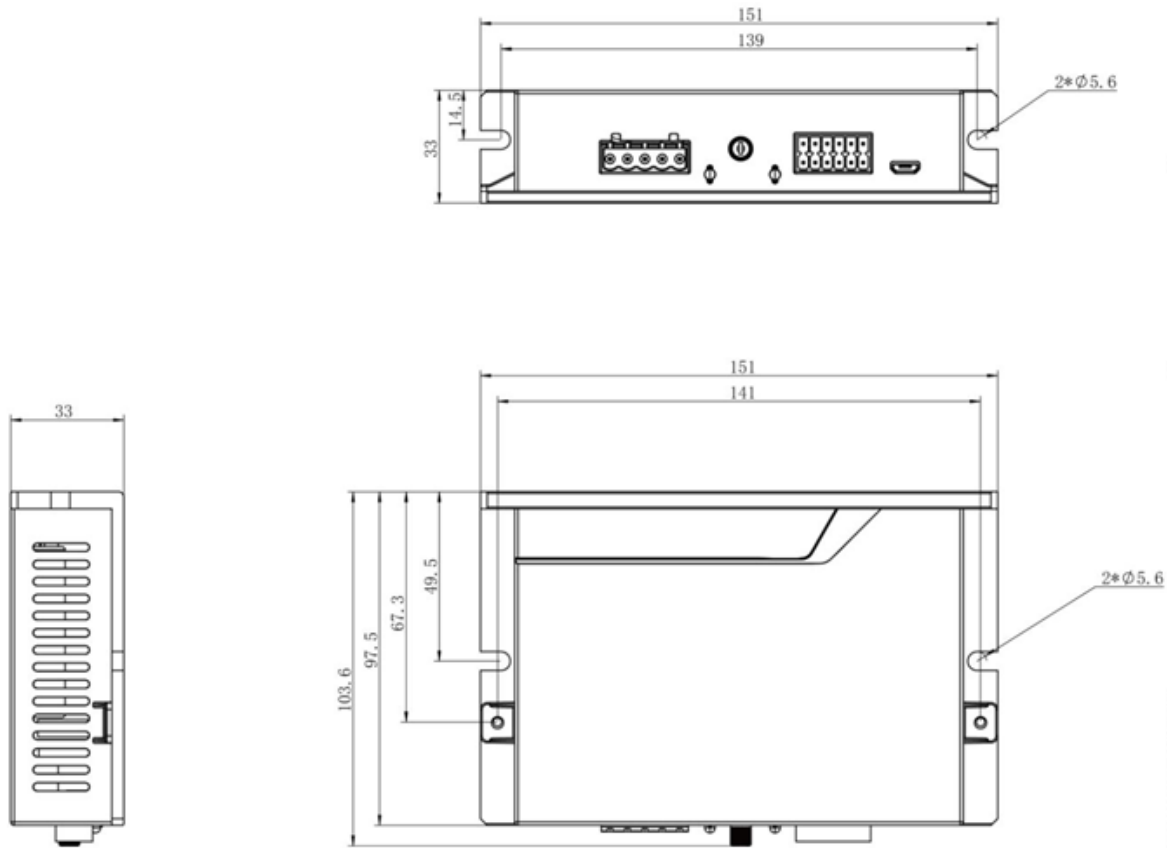
7. 1. 2 EA-DRVCC41-200S2-KR-A



7. 1. 3 EA-DRVC41-400S2-R-A

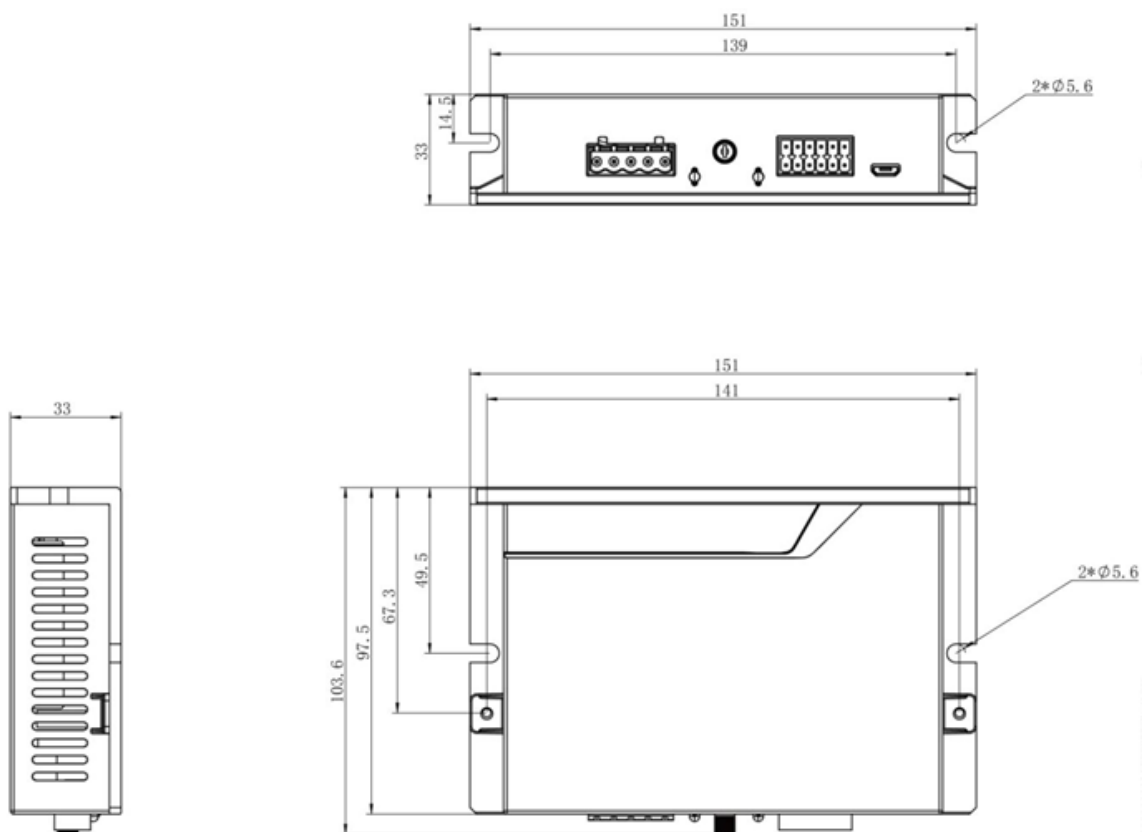


7. 1. 4 EA-DRVC41-200S2-R-B



Note: The dimension drawing of EA-DRVC41-200S2-R-B applies to EA-DRVC41-15/40/120S2-R-B.

7. 1. 5 EA-DRVC41-400S2-R-B



7.2 Environmental Conditions

7.2.1 Operating, Storage, and Transport Environment

The driver must never be exposed to harsh environments such as dust, direct sunlight, corrosive or flammable gases, oil, moisture, water drops, or vibration. The salt content in the air must be kept below 0.01 mg/cm² per year.

Item	Condition	Specification
Protection rating		IP20: protected against solid foreign objects larger than 12 mm; no moisture protection
Environmental characteristics	Ambient temperature - operation	Single installation: -10~40°C; 20~-10°C or 40~50°C requires derating. Side-by-side installation: -10~30°C; -20~-10°C or 30~40°C requires derating.
	Ambient temperature - storage / transport	Storage: -33~65°C; transport: -20~50°C
	Humidity	Non-condensing, non-freezing. Operation: max. 85%; storage/transport: max. 90%; condensation prohibited.
	Atmospheric pressure	Operation: 86~106 kPa; storage/transport: 70~106 kPa
	Altitude	Operable below 1000 m. Above 1000 m, derating is required.
Package drop	Storage / transport	Do not drop from a height; risk of damage.
Vibration	Operation / storage / transport	Do not apply continuous vibration.
Shock	Operation / storage / transport	Do not apply excessive shock.

7.2.2 Storage Environment Conditions

Before installation, keep this product in its packaging. If the device will not be used temporarily, observe the following requirements so that the product remains within the warranty scope and can be maintained later:

1. Store in a dust-free and dry location.
2. The ambient temperature and relative humidity of the storage location must be within the specified range.
3. Avoid storage in an environment containing corrosive gases or liquids.
4. Pack properly and store on a shelf or flat surface.

7.2.3 Operating Environment Conditions

Operating conditions

Ambient temperature limit: when operating at rated current, the ambient temperature must be between -10~40°C. When the ambient temperature exceeds 40°C, reduce the rated current by 2.5% for every 1°C increase. The maximum ambient temperature is 50°C.

High-altitude operation: when the driver is used at an altitude of 0-1000 m, apply normal operating limits. When used at 1000-2000 m, reduce the rated current by 1% or reduce the operating ambient temperature by 0.5°C for every 100 m increase in altitude. For use above 2000 m, contact the manufacturer.

For long-term operation, an ambient temperature below 40°C and good ventilation are recommended to ensure product reliability. At altitudes above 1000 m, thinner air reduces insulation strength and heat dissipation, so derating is required; high-altitude areas are not recommended.

7.3 Installation Location

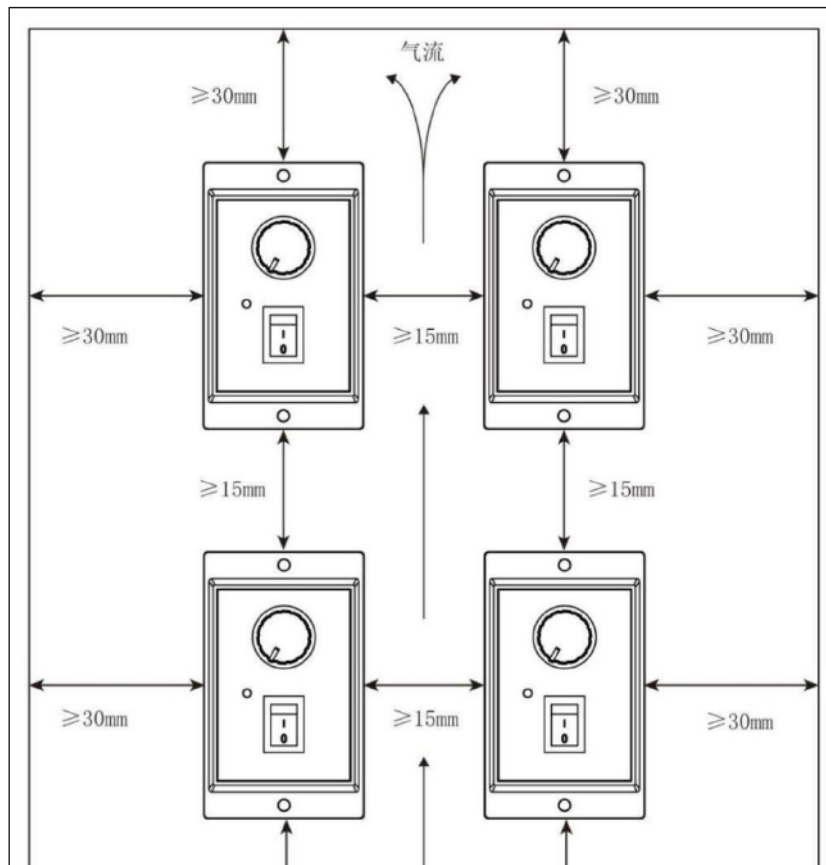
1. No large heat-generating equipment nearby.
2. No water drops, steam, dust, or oily dust.
3. No corrosive or flammable gases/liquids.
4. No floating dust or metal particles.
5. A firm location without vibration.
6. No electromagnetic noise interference.

7.4 Installation Precautions

7.4.1 C41 Panel Type

This product is installed by embedded mounting. It is recommended to install it on a well-ventilated metal mounting surface and ground it properly with the grounding screw; otherwise electric shock may occur. Refer to the panel cutout diagram and fasten it with M4 combination screws.

Recommended driver spacing: when multiple drivers are installed side by side, keep the installation spacing greater than 15 mm to ensure good heat dissipation.



* The installation diagram spacing and text notes are not drawn to scale. Use the text notes as the reference.

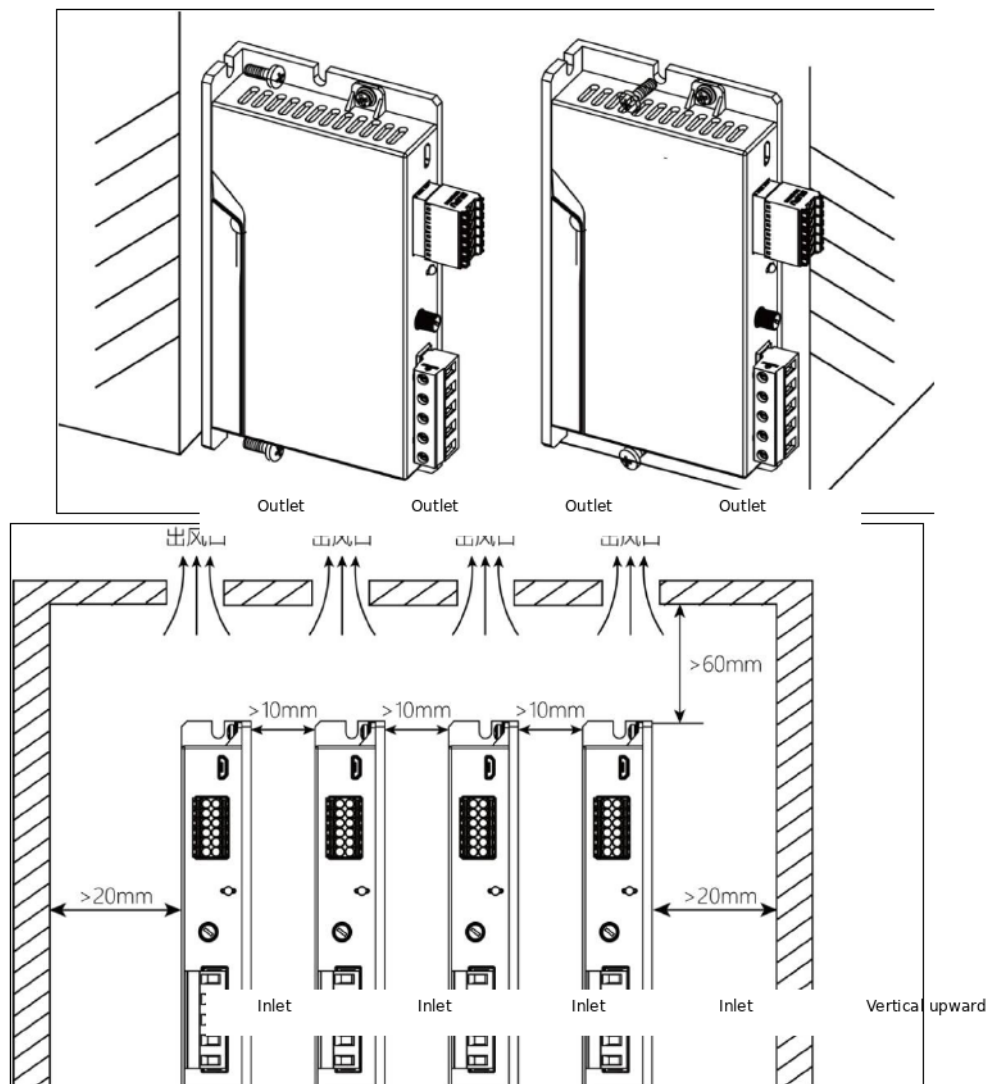
Precautions:

1. The cable between the driver and motor must not be pulled tight, to prevent loosening or disconnection.
2. When fixing the driver, all fixing screws must be tightened.
3. Use M4 combination screws to secure the two mounting holes.
4. Tightening torque: 0.4~0.7 N·m.
5. The motor shaft center must be well aligned with the equipment shaft center.
6. The motor fixing screws must be tightened.

7.4.2 C41 Built-in Type

This product is installed by wall mounting. M4 screws with washers are recommended. Install it on a well-ventilated metal mounting surface and ensure proper grounding; otherwise fire may occur.

Recommended driver spacing: when multiple drivers are installed side by side, keep the installation spacing greater than 50 mm to ensure good heat dissipation. The mounting direction depends on customer requirements.



* The installation diagram spacing and text notes are not drawn to scale. Use the text notes as the reference.

Precautions:

1. The cable between the driver and motor must not be pulled tight, to prevent loosening or disconnection.
2. When fixing the driver, all fixing screws must be tightened.
3. Use M4 combination screws to secure the two mounting holes.
4. Tightening torque: 1.2~1.5 N·m.
5. The motor shaft center must be well aligned with the equipment shaft center.
6. The motor fixing screws must be tightened.

VIII. Basic Inspection and Maintenance

8.1 Basic Inspection

Inspection Item	Inspection Content
General inspection	Periodically check whether screws at the driver mounting area, terminals and wiring, and the motor shaft/mechanical connection are loose. Periodically check and prevent oil, water, metal powder, or other foreign matter from entering the driver. If the driver is installed in a location with harmful gases or heavy dust, prevent their ingress. When changing wiring, confirm that the wiring order is correct; otherwise danger may occur.
Pre-operation inspection (power not supplied)	Perform wiring only after confirming that power is disconnected and the motor has stopped. Insulate the connection parts of wiring terminals. Wiring must be correct to avoid damage or abnormal operation. Check whether conductive objects such as screws or metal pieces, or combustible objects, are inside the driver. Confirm that external control switches are OFF. To avoid electromagnetic-brake failure, check that the emergency stop and power cutoff circuits operate normally. If electronic instruments near the driver are affected by electromagnetic interference, use countermeasures to reduce it. Confirm that the applied voltage level of the driver is correct.
Pre-operation inspection (power supplied)	When the motor is running, check whether the connected cables rub against machine parts or are pulled. If motor vibration caused by the driver or excessive operating noise occurs, contact the manufacturer. Confirm all parameter settings are correct. Depending on the mechanical characteristics, unexpected movement may occur; do not set parameters to extreme values. When resetting parameters, make sure the driver is in STOP status; otherwise a fault may occur. Check whether the LED indicators show any abnormal condition. Check whether the keypad display and command settings are abnormal.

8.2 Maintenance and After-sales Service

Routine maintenance

- Store and use the product under appropriate environmental conditions.
- Clean the exterior of the driver and motor at suitable intervals to prevent dust and dirt buildup.
- Do not disassemble the mechanical parts during cleaning and maintenance.
- Clean the gaps of the keypad housing at suitable intervals to prevent foreign matter from entering.
- Avoid long-term use under extreme environments that may cause keypad failure.
- It is recommended to power off the driver once a month so the internal capacitors can fully charge and discharge.

Service life of components

- Electrolytic capacitor: the service life is mainly affected by ambient temperature and operating conditions. At the maximum operating temperature of 105°C, the service life is about 3000 hours; ideally, for every 10°C decrease in operating temperature, service life doubles.
If an electrolytic capacitor is stored unused for a long time, apply rated voltage periodically to keep the electrolyte active.

Apply rated voltage periodically to maintain electrolyte activity.

- Knob potentiometer: according to the supplier data, total rotation angle is $250^{\circ} \pm 10^{\circ}$; rotational life is 100 cycles; $\Delta R/R \leq \pm(2\Omega+3\%)$.
- Keys: according to the supplier data, operating life is 100,000 cycles.
- MTBF: mean time between failures MTBF > 200,000 h.

After-sales Service

- If you have any usage questions, contact sales or technical support. Technical support contact information is shown at the end of this manual.
- The product warranty period is valid for one year from the shipment date. Free repair service is provided during the warranty period.
- If a fault occurs under normal use in accordance with this manual, contact sales and return the product for repair. For easier maintenance, describe the detailed fault cause or symptom as much as possible.
- The user is responsible in the following cases:
 1. Damage caused by improper use or inappropriate repair/modification;
 2. Damage caused by dropping after delivery or by transportation;
 3. Damage caused by use outside the product specification range;
 4. Damage caused by fire, earthquake, lightning, wind, chloride corrosion, or other natural disasters;
 5. Damage caused by ingress of water, oil, metal fragments, or other foreign matter.

For parts with a stated standard service life, cases exceeding the respective service life are excluded.