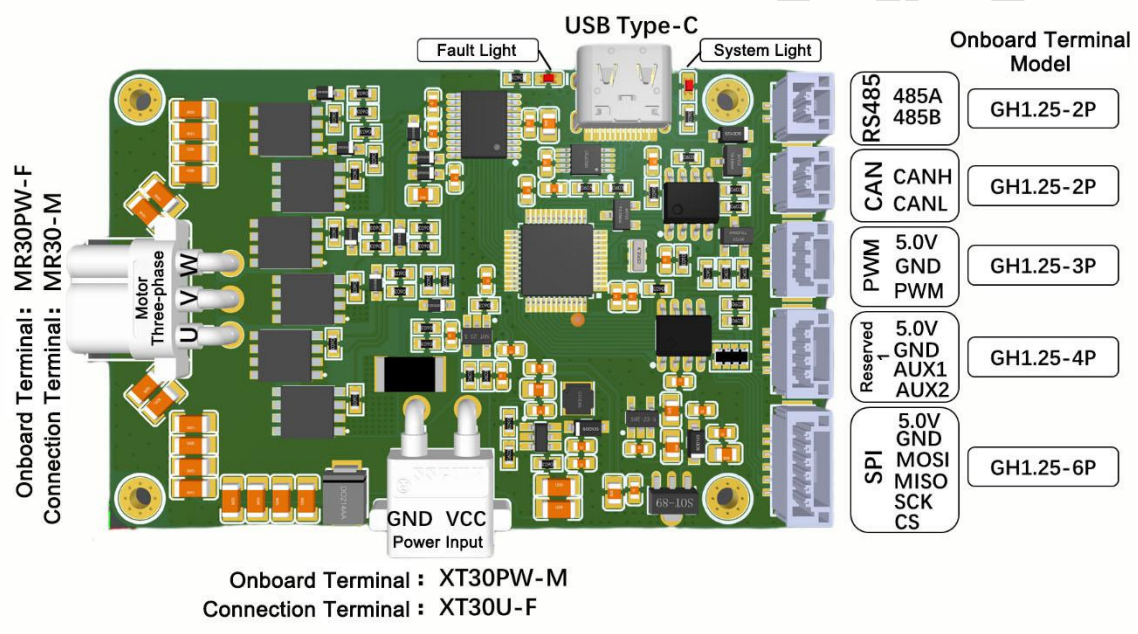
SDC200 External Drive Product Instructions V1.3



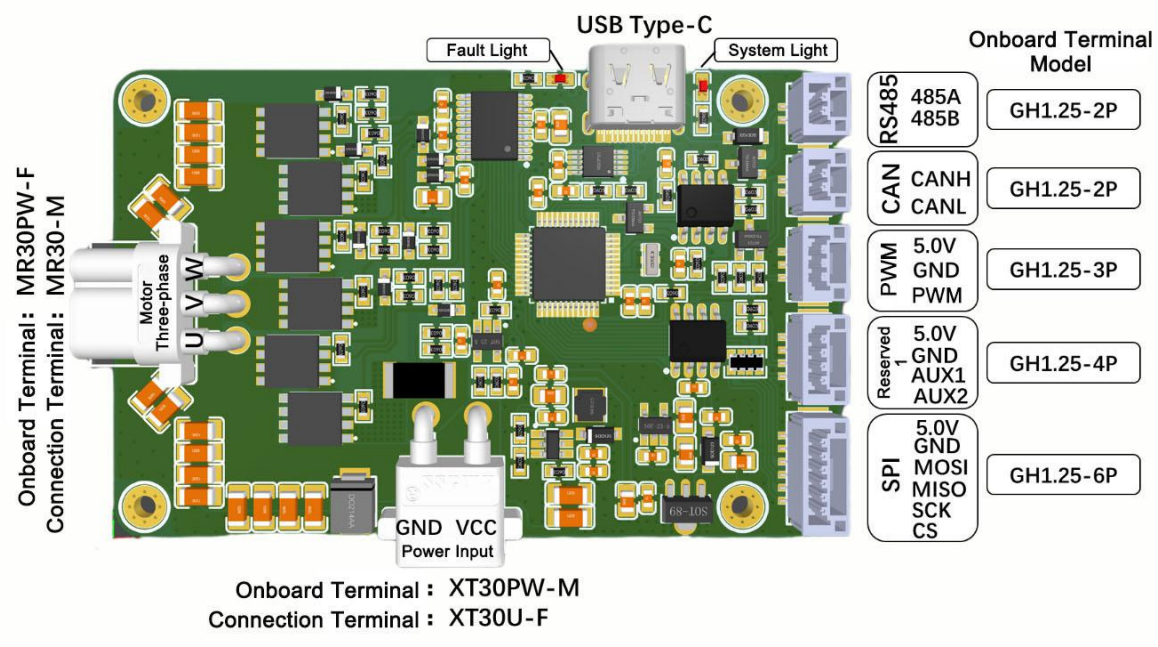
1. 📖 Overview

SDC200 is a brushless motor controller uses a FOC algorithm, which is suitable for the control of brushless gimbal motors. With a high-precision angle sensor, position and speed control can be realized.

2. 🎁 Product Characteristics

- Wide range of voltage input, 12V~36V working voltage (maximum support 48V)
- All signal terminals adopt GH1.25 terminal to ensure the reliability of signal connection
- The driver board integrates a USB interface, which is convenient to connect to the upper computer for parameter debugging
- Support RS485 and CAN bus interface
- The baud rate of RS485 and CAN interface can be both configured by the upper computer
- The device address of the driver board can be configured by the upper computer
- Provide upper computer parameter adjustment software for free
- The working temperature of drive board is -40~85℃
- Multiple protection functions, overvoltage / overcurrent
- Used in medium and low speed, high torque precision servo control occasions, such as high-tech robots/lidar/education and scientific research unit experimental device test equipment/security inspection/survey and exploration equipment

3. Interface Specification



- RS485 interface (onboard terminal model: GH1.25-2P), which can communicate with the upper computer or RS485 main controller for parameter configuration of the driver board and motor operation control. (RS485 communication protocol is included in the file package).

- CAN interface (onboard terminal model: GH1.25-2P), which can communicate with the upper computer or CAN main controller for parameter configuration of the driver board and motor operation control. (CAN communication protocol is included in the file package).

- PWM interface (onboard terminal model: GH1.25-3P), which is used to connect AS5048 encoder PWM interface.

- Reserved interface 1 (onboard terminal model: GH1.25-4P), reserved interface, functions to be added...

- SPI interface (onboard terminal model: GH1.25-6P), which is used to connect AS5048 encoder SPI interface.

- Power interface (onboard terminal model: XT30PW-M, connected to the terminal model: XT30U-F), the voltage range is 12V~36V (maximum support 48V).

- Motor three-phase interface (onboard terminal model: MR30PW-F, connected to the terminal model: MR30-M), connected to the motor three-phase line interface, there is no order requirement.

- The USB interface is equipped with a USB to TTL circuit, which uses the CH340x solution. If you need to install the driver, please click CH34x driver to download. Attention: The serial port connected to the USB interface and RS485 interface is the same one serial port. The USB interface and RS485 interface cannot be used at one time.

- System status light indicates the system operation with flashing periodically, and can indicate the current device address.

- The fault indicator LED indicates a system fault. When the system has no fault, the LED light is in the off state. The corresponding relationship between the red light flashing state and the fault code is as follows: (The motor connected to the upper computer through the USB interface or RS485 can obtain the fault type more intuitively).

Red LED status	Fault type
Off	Normal System Operating
Flashes 1 time in a cycle	Voltage Fault
Flashes 2 times in a cycle	Current Fault

4. 🔨 Instructions

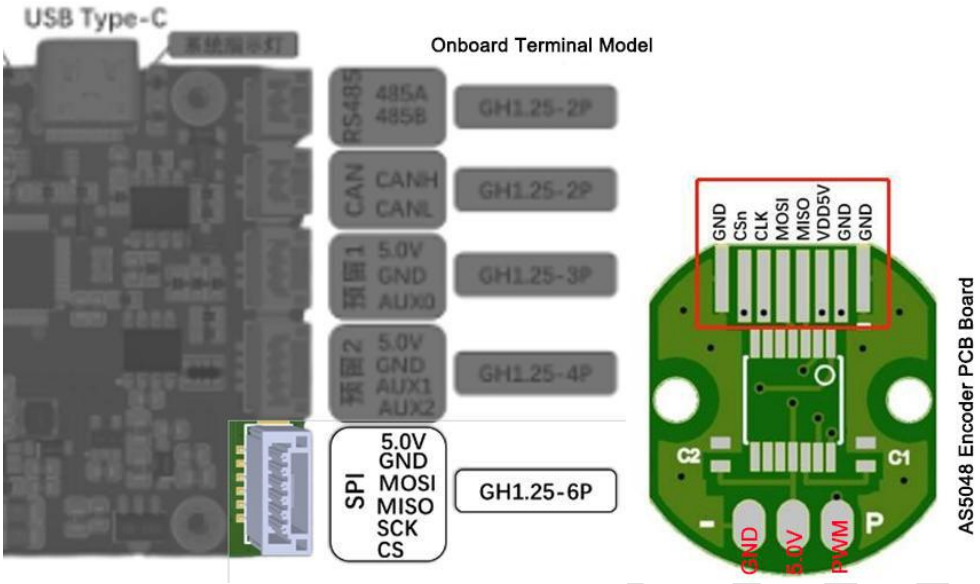
4.1 Hardware connection

The hardware connection must be correctly performed before motor control.

4.1.1 The three-phase wire of the motor is connected to the three-phase interface of the drive board through the MR30-M terminal line. There is no requirement for the line sequence of three-phase line connection.

4.1.2 The default encoder model of the driver board is AS5048A_SPI interface. If you need to use AS5048A's three-wire PWM interface to connect to the driver board, you can configure it through the upper computer. After the configuration is completed, the driver board needs to be powered off for the configuration to take effect.

- Use AS5048A SPI interface: According to the label of the SPI interface of the driver board, correctly solder or connect the GH1.25-6P line to the SPI interface of the AS5048 encoder PCB. In order to ensure the normal data communication between the drive board and the encoder board, the length of the connection line should be less than 15cm. (The correspondence of line connection between the driver board and encoder board: 5.0V—VDD5V, GND—GND, MOSI—MOSI, MISO—MISO, SCK—CLK, CS—CSn)



- Use AS5048A PWM interface: According to the label of the PWM interface of the drive board, correctly connect the GH1.25-3P line to the corresponding interface of the AS5048 encoder PCB.

4.1.3 The encoder PCB board is fixed to the motor back cover with silicone or other glue. After the silicone or glue is completely solidified, install the motor back cover with the encoder PCB board to the motor, and make sure the screws fixing the back cover are tightened.

4.1.4 According to the rated working voltage of the motor, the 12V-36V DC power supply is provided to the drive board through the power interface of the drive board. When the positive and negative poles of the power supply are connected correctly, the system status light will flash normally and periodically. If the drive board system status light does not light up, please check the wiring sequence. After confirming the line sequence of input DC power is correct, unplug the DC power supply and proceed to the next step.

4.2 Connect the Drive Board to the Upper Computer

4.2.1 Connect the motor three-phase wire and encoder wire to the drive board correctly.

4.2.2 Connect the drive board to computer via a data cable. If the data cable is connected normally, the system status light will flash normally and periodically.

4.2.3 Open the upper computer software and click the drop-down bar of serial port number on the upper computer. If the serial port number can be detected correctly, click "Connect" to connect (The default device address of the drive board is 1, and the default baud rate is 115200). If the upper computer cannot detect the serial port number of the current USB device, please click CH34x driver to download and install the driver.

4.2.4 When the driver board is successfully connected to the upper computer, the upper computer will display the version information of the current driver board, as shown in the figure:

4.2.5 After successfully connecting to the upper computer, turn the motor by hand. If the circular instrument panel of the upper computer rotates with the rotation of the motor, it means the encoder and the drive board are connected normally. If not, please check the wiring sequence of the connection between the driver board and the encoder, or check whether the encoder model selected by the upper computer corresponds to the connected interface.

4.3 Motor Encoder Calibration

4.3.1 Make sure the encoder and the drive board are connected normally, then provide 12V-36V DC power to the drive board through the power interface of the drive board. If the red LED on the driver board is flashing, click the "清除故障信息" button on the upper computer to clear the current fault.

4.3.2 The condition for the angle calibration of the motor encoder is met only when above steps are all OK. When calibrating the motor encoder, the motor must be without load and ensure that there is no interference from any external force during the rotation of the motor. Click the "电机编码器角度校准" button on the upper computer, then the motor begins the encoder calibration. At this time, the upper computer and the motor do not communicate with each other with all data on the interface not refreshed, and the motor starts to rotate. After 30 to 60 seconds of calibration, the motor stops rotating, and the upper computer interface data is refreshed normally.

4.3.3 In order to verify whether the motor encoder angle calibration is successful, click the “最短距离回原点” button in the lower right corner of the upper computer. If the motor rotates to an angle and keeps the current position and at the same time the upper computer instrument panel indicates the 0° position, means that the motor calibration is successful.

4.4 Motor Parameter Adjustment (Supporting upper computer instruction document)

4.4.1 The drive board defaults the PID parameter is no-load default parameter. After adding the load, the parameters need to be adjusted according to the actual load.

4.4.2 If you need to change the speed during position closed-loop control, you can modify the parameter "位置闭环目标速度".

5. ⚠ Attention

- Please use the motor driver strictly in accordance with the regulations in this document.
- When calibrating the motor encoder, the motor must be without load and ensure that there is no interference from any external force during the rotation of the motor.

- If you remove or replace the encoder back cover, or replace the motor, you need to strictly follow the instructions steps to re-calibrate the motor encoder.
- The serial port connected to the USB interface and RS485 interface is the same one serial port. The USB interface and RS485 interface cannot be used at one time.
- Please make sure the wiring is correct before use. (Especially power wire and encoder wire)
- Please make sure the encoder PCB is installed correctly and firmly before use.
- Please make sure the motor is installed correctly and firmly before use.
- Please avoid damaging the wire during use to avoid abnormal operation of the motor.
- Do not touch the rotor part of the motor during use to avoid cuts.
- When the motor has a large torque output, it will generate heat, please pay attention to avoid burns.