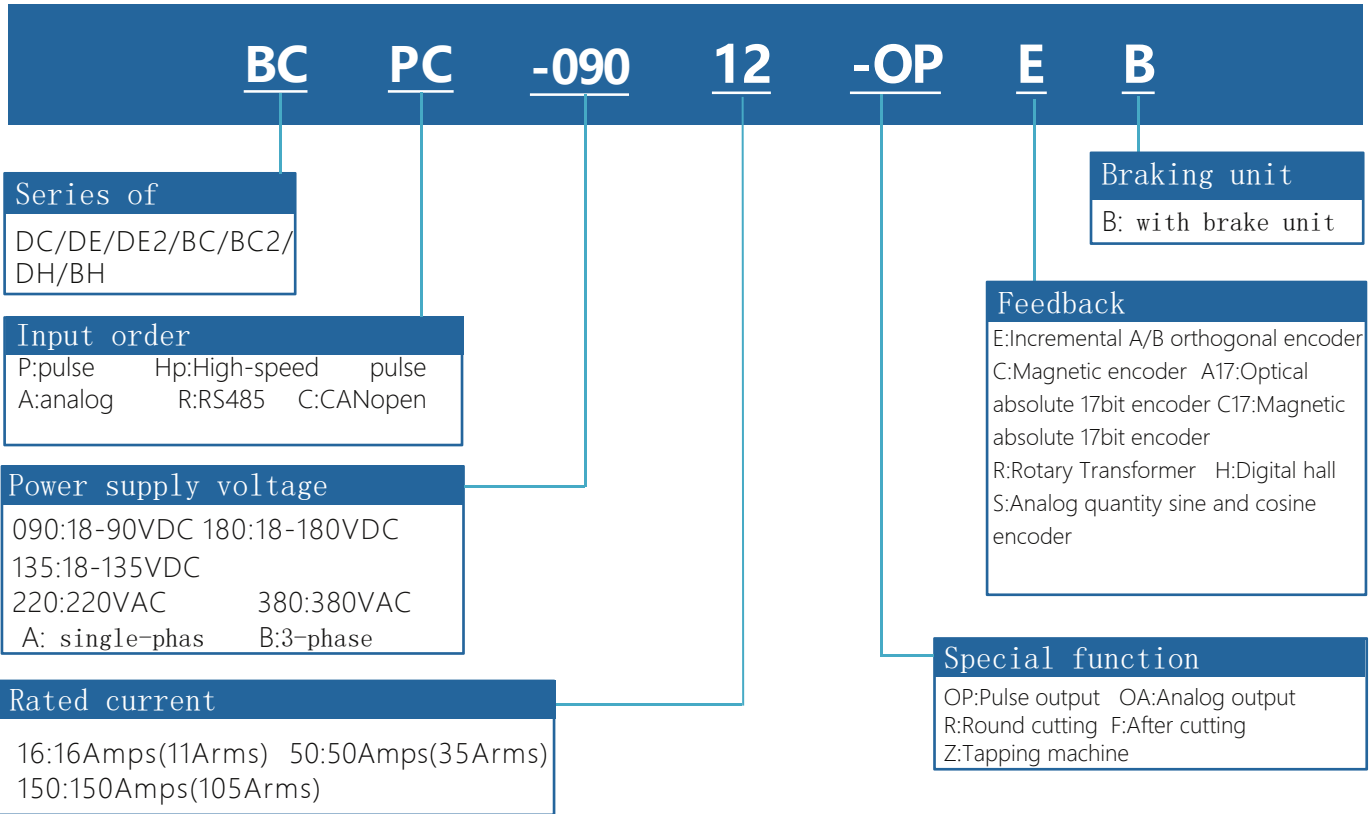


# BC Servo Drive Instruction Manual

with green connectors



# BC Series servo driver model description



Attention to:

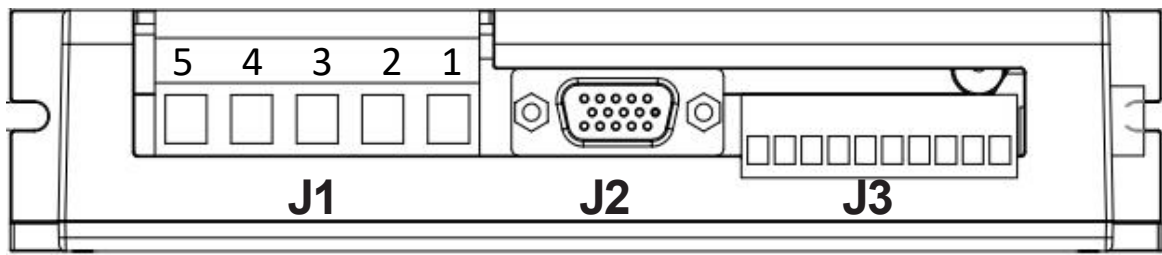
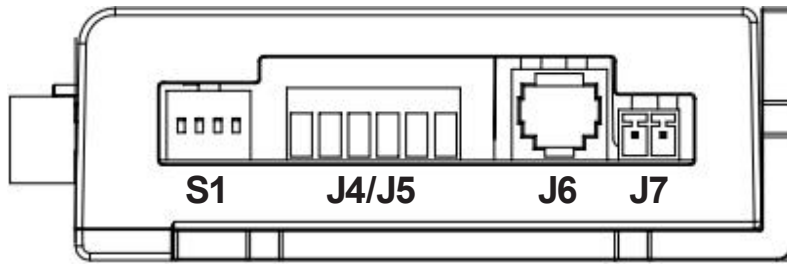
1.The driver supply voltage must be greater than or equal to the rated voltage of the motor

2.The rated current of the driver must be greater than or equal to the rated current of the motor

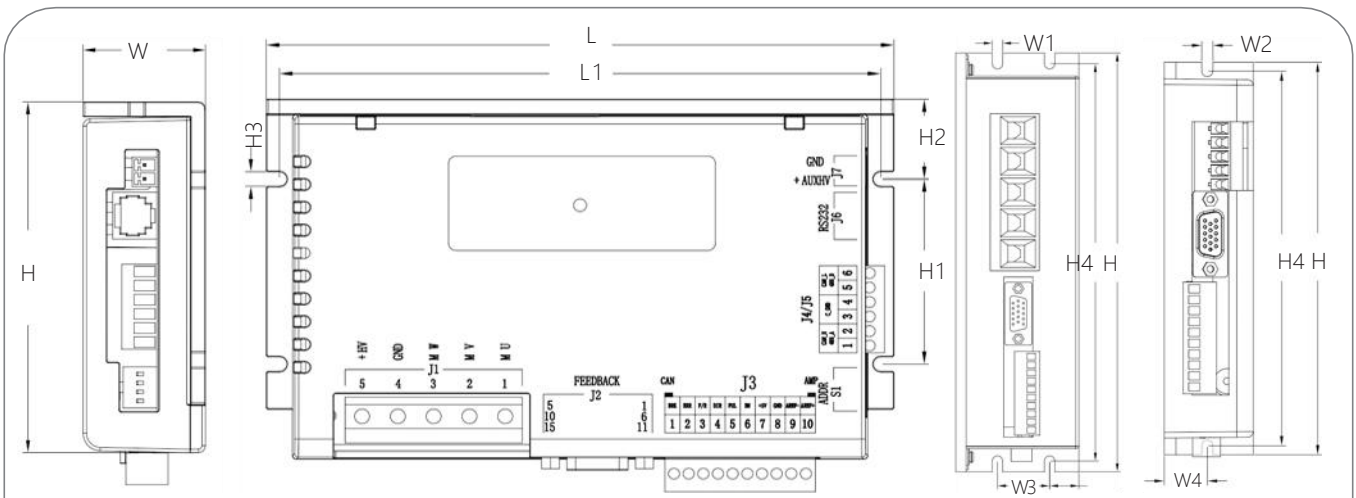
## BC Series driver specifications summary table

Driver model	Supply Voltage	Rated current Arms	Peak current Apk6S rms	Feedback type	Overall dimensions	Weight
BCPC-09010-OPE/A	18~90 VDC	11A	33A	Incremental   Absolute	141*90*32mm	0.35kg
BCPC-09015-OPE/A		16A	40A			
BCPC-09020-OPE/A		21A	60A			
BCPC-09030-OPE/A		30A	60A		167*100*35mm	0.45kg
BCPC-09035-OPE/A		35A	70A			
BCPC-09050-OPE/A		50A	100A			
BCPC-09070-OPE/A		70A	140A		200*114*59mm	1.10kg
BCPC-09085-OPE/A		85A	170A			
BCPC-090100-OPE/A		100A	200A			
BCPC-090140-OPE/A		140A	280A		221*140*59mm	1.45kg
BCPC-090210-OPE/A		210A	300A			
BCPC-090300-OPE/A		300A	450A			
BCPC-18015-OPE/A		18~180 VDC	16A		32A	Incremental   Absolute
BCPC-18025-OPE/A	25A		50A			
BCPC-18035-OPE/A	35A		70A			
BCPC-18050-OPE/A	50A		100A	200*114*59mm	1.10kg	
BCPC-18070-OPE/A	70A		140A			
BCPC-13570-OPE/A	100A		200A			
BCPC-135100-OPE/A	18~135 VDC	100A	200A	221*140*59mm	1.45kg	
BCPC-125140-OPE/A	18~125VDC	140A	200A			221*140*90mm

# BC Serial terminal Definition



# BC Series outline dimension drawing



Model	L	L1	W	W1	W2	W3	W4	H	H1	H2	H3	H4
BCPC-10~15A	141	134	32	/	4.5	/	15.5	90	51	18	4.5	134
BCPC-20~35A	167	160	35	/	2-4.5	/	19.5	100	51	22	4-4.5	160
BCPC-50A~85A	200	190	59	4-5.0	/	25	/	114	60	32.5	4-4.8	190
BCPC-100A	221	211	59	5	/	25	/	140	60	45	4.8	211
BCPC-140A210A	221	211	90	5	/	25	/	140	/	/	/	211
BCPC-300A	265	255	90	5	/	25	/	140	/	/	/	255

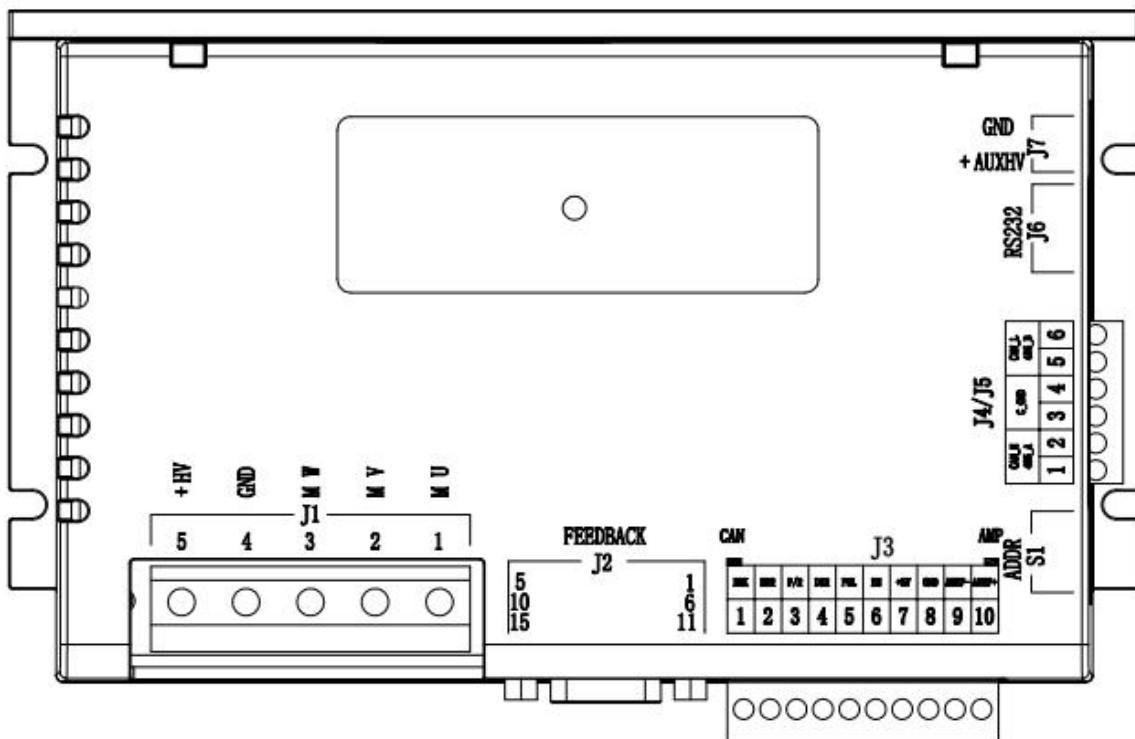
# 1、Product introduction:

## 1. 1 Overview

The BC Series Programmable Intelligent Servo Drives are general-purpose, high-performance, DC-powered, compact, all-digital servo drives. It can be used to control the position, speed and torque of brushless servo motors. It can support incremental encoder, digital Hall feedback; absolute encoder Tamagawa protocol.

## 1. 2 Technical characteristics

- ◆ Control mode: position, speed, torque;
- ◆ Programmable protection: position error, over-current, over-voltage or under-voltage, I<sup>2</sup>t, output short-circuit, overload and other multi-directional protection functions;
- ◆ Drive motor type: brushless motor, servo motor;
- ◆ Position feedback: incremental encoder, digital Hall feedback; absolute encoder Tamagawa protocol.
- ◆ Communication: 1. RS232 serial interface, baud rate up to 115KB; 2. RS485 MODBUS RTU serial interface, baud rate up to 115KB; 3. or CAN communication, compatible with CANopen DS-402, baud rate of up to 1MHz; (RS485 and CAN can only be selected one)
- ◆ Power supply voltage: 18-90(135/180)VDC;



### 1.3 Electrical specifications for servo drivers

Position control	指令控制方式		Pulse、CANopen、RS485 MODBUS RTU	
	Input signal	Pulse instruction	Input pulse pattern	There are three types of commands: "Direction + Pulse", "A and B phase quadrature pulse", and "CW/CCW pulse".
			Signal format	Open collector
			Maximum pulse frequency	Open collector :(Max. 500Kpps)
Speed control	Command control mode		±10V analog、pulse、CANopen、RS485 MODBUS RTU	
	Input signal	analog instruction	Voltage range	Input voltage range ±10V
			Input Impedance	Differential input impedance = 5KΩ
Current control	Command control mode		CANopen、RS485 MODBUS RTU	
	Input signal	analog instruction	Voltage range	Input voltage range ±10V
			Input Impedance	Differential input impedance = 5KΩ
I/O Signal	Digital input IN		Number of ports	12 (IN6、IN7、IN8、IN9、IN10 are high-speed ports, Max voltage: 12V) ,Maximum input voltage for other inputs ports is 24V
			Signal format	NPN,PNP (The software sets the input to be NPN or PNP)
			Settable function	Servo Enable, External Reset, Forward/Reverse Limit, Motor Run Stop, High Speed Pulse Input, etc.
	Digital output OUT		Number of ports	3
			Signal format	NPN (low effective) , Can withstand a maximum current of 300mABC, maximum voltage 30VBC
			Settable function	Fault signal, holding brake control
Function	LED indicator		Drive status indication, communication indication	
	Communication function	RS-232	Baud rate	9600-115200
			Protocol	Full duplex mode, ASCII or binary format
		RS485	Baud rate	9600-115200
			Protocol	MODBUS RTU
		CAN	Baud rate	20kbit/s-1Mbit/s
			Protocol	Canopen application layer DS - 301 V4.02
	Equipment	SP-402 Machine drives and motion control		
Protection function			Overvoltage, overcurrent, undervoltage, overload, overheating, abnormal encoder, too large position tracking error and other protection	
Using environment	Installation location		Non-corrosive gas, flammable gas, etc	
	Altitude		Below 1000m	
	Temperature		0°C~+50°C	
	Humidity		5%~95%RH, No condensation of water droplets	
	Resistance to vibration/impact		less than 4.9m/s <sup>2</sup> /less than 19.6m/s <sup>2</sup>	

## 2. Definition of wiring port

### 2.1 Power input terminal J1

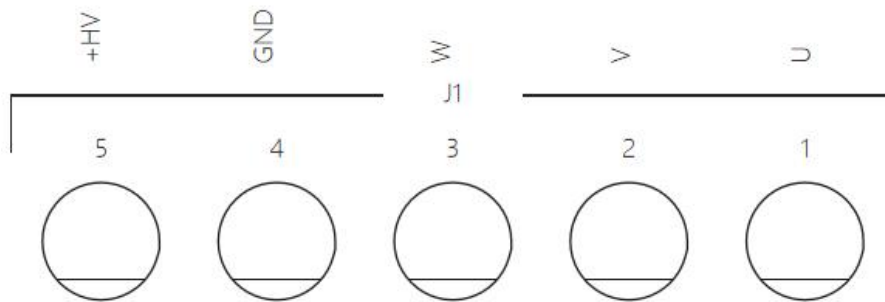


Figure 2.1 European Standard Terminals

No.	Definition	Terminal	Wiring instructions
1	U	Motor power line U phase	Must be connected to the motor one by one according to the label
2	V	Motor power line V phase	
3	W	Motor power line W phase	
4	GND	Input power -	+18~90V DC
5	+HV	Input power +	

### 2.2 Motor encoder input terminal J2

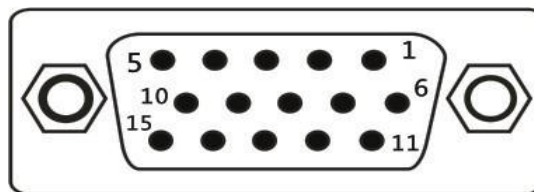


Figure 2.2 three rows of DB15 female socket

Pin	Define	Function	Pin	Define	Function
1			9	W+	Motor encoder W+ input
2			10		
3	U+	Motor encoder U+ input	11	B-	Motor encoder B input
4	+5V	Motor signal line +5V	12	B+	Motor encoder B+ input
5	0V	Motor signal cable GND	13	A-	Motor encoder A input
6	V+	Motor encoder V+ input	14	A+	Motor encoder A+ input
7	Z-	Motor encoder Z- input	15		
8	Z+	Motor encoder Z+ input			

### 2.3 Control signal I/O terminal J3

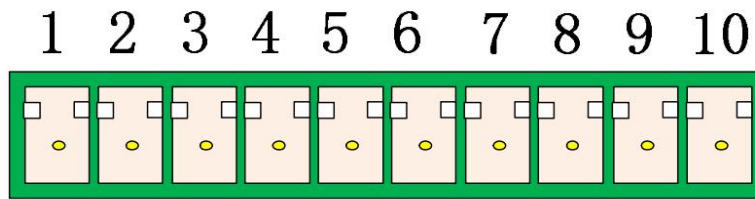


Figure 2.3 Three rows of DB26 female connector

Pin	Define	Description
1	OUT2	Brake output (BRK)
2	OUT1	Error output (ERR)
3	IN2	Single-phase analog direction (F/R)
4	IN10(HS)	PWM DIRECTION (DIR)
5	IN9(HS)	PWM(PUL)
6	IN1	Enable (EN)
7	+5V	5V output (+5V)
8	GND	Gnd
9	AREF-	Analog- (AREF-)
10	AREF+	Analog+ (AREF-)

### 2.4 CAN (RS485) communication terminal J4&J5

There are two types of communication ports for this drive, one is a crystal head, and the other is a 6p terminal block, defined as follows

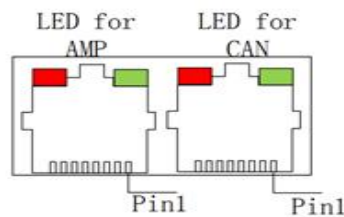
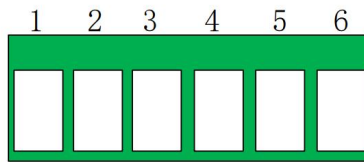


Figure 2.4. RJ45 8-pin crystal socket

RJ45 Definition as follows

Pin	Definition	Function
1	CANH (RS485_A)	CANH signal (RS485_A)
2	CANL(RS485_B)	CANL signal (RS485_B)
3/7	GND	Communication power grounding

Note: The two RJ45 ports in J4/J5 are defined in the same way to facilitate bridging during communication.



6P接线端子

6P terminal block definition

Pin	Definition	Function
1	CANH (RS485_A)	CANH signal (RS485_A)
2	CANH (RS485_A)	CANH signal (RS485_A)
3	C_GND	Communication power grounding
4	C_GND	Communication power grounding
5	CANL(RS485_B)	CANH signal (RS485_B)
6	CANL(RS485_B)	CANH signal (RS485_B)

### 3、 Definition of indicator Status

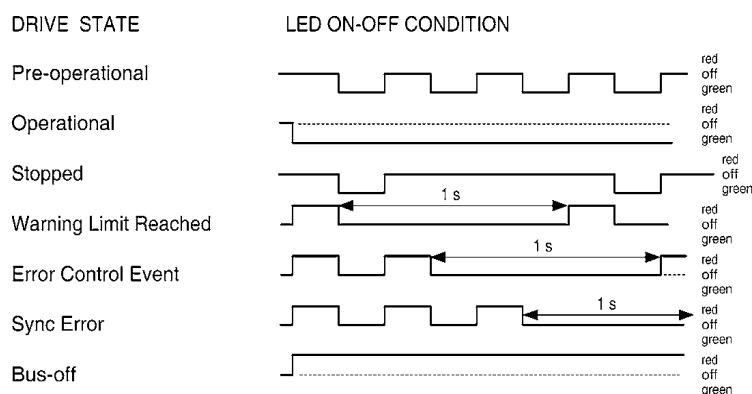
#### 3.1 Drive status indicator (AMP)

Red/green leds tell us the status of the drive by changing color and blinking or not.

Possible scenarios include:

Green/no flash	drive is OK and enabled
Green/Slow blinking	drive is OK but not enabled. After enabled, it can run
Green/Flash	Positive limit switch or negative limit switch is effective, the motor will only move in the <u>direction not prohibited by the limit switch</u>
Red/Fixed	Instantaneous failure, after troubleshooting amplifier restart operation
Red/flashing	Lock the fault and restart the amplifier to resume operation

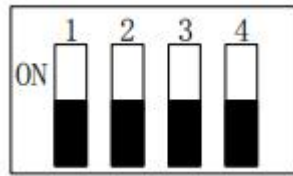
#### 3.2 CAN Communication indicator (CAN)





### 3.3 ADDR S1 dipswitch

This switch is for dialing the communication station number of the driver. The switch is coded according to the BCD code.

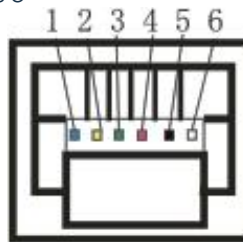


S1 DIP switch corresponding to station number

S1 Switch number	corresponding station number
1	1
2	2
3	4
4	8

For example, to set the station number as 3, S1 switch 1, 2 dialed to ON, the other OFF,  $1 + 2 = 3$ ; if you want to set the station number is 12, S1 switch 3, 4 dialed to ON, the other OFF,  $4 + 8 = 12$

### 3.4 Serial communication terminal J6

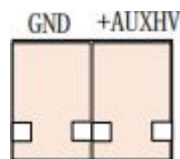


Pin	Definition	Function
2	<b>RXD</b>	RS232 communication receiver
3	<b>GND</b>	Communication power grounding
5	<b>TXD</b>	RS232 communication sender

Figure 3.6 RJ11 6-pin crystal head holder

### 3.5 Auxiliary power supply J7

If there is a driver with J7 socket, this is the auxiliary power port. If necessary, you can connect it. If connected, +HV is disconnected from power and +AUXHV is powered on, but there is no action when issuing commands

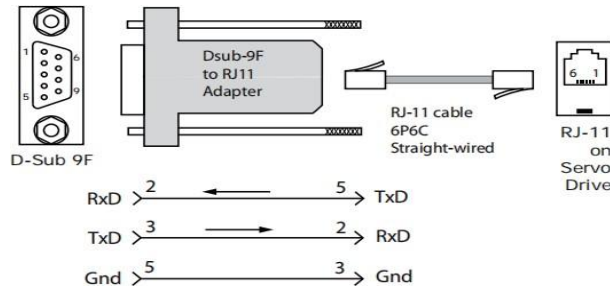


GND	0V
+AUXHV	+24V

#### 4. Control port hardware description

##### 4.1 RS-232 Communications (RXD, TXD, GND)

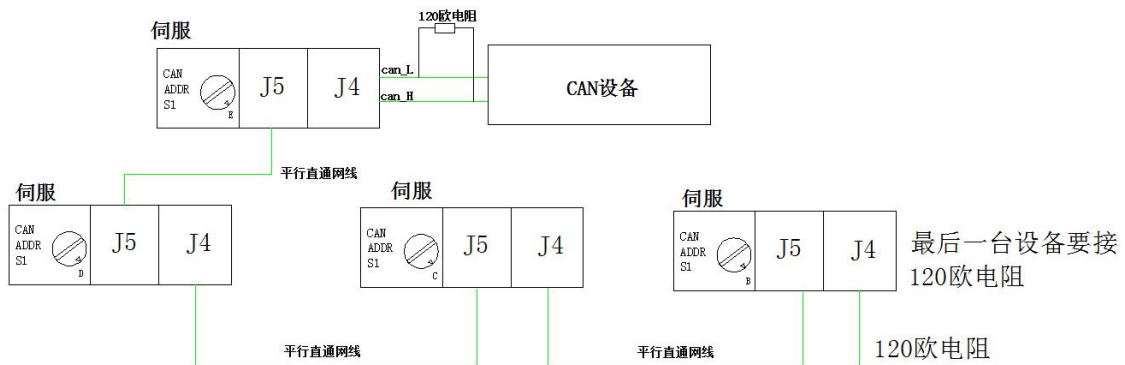
The serial ports are full-duplex and three-wire (RXD, TXD, GND)RS-232, with a baud rate from 9600 to 115200. The wiring terminal is J6 through the debugging software or serial port debugging tool. The debugging cables are shown as follows



##### 4.2 CAN bus (CANH, CANL, GND)

CAN bus is based on CAN V2.0B physical layer. The signals of CAN physical layer include CANH, CANL and GND, and communicate with CANope protocol. Electrical interface uses TJA1051 high speed transceiver. The physical address of the drive CAN communication ranges from 0 to 127. The default address is 0. You can change the rS-232 communication port address, reset or restart the drive to take effect. Through the CAN communication interface, a very effective combination of high data rate and low cost multi-axis motion control system CAN be realized. The wiring terminal is CN5.AN 总线(CANH,CANL,GND)

CAN network CAN be connected as shown below:



注意：CAN网络上总的电阻是60欧，  
如果CAN设备上有电阻的第一台驱动器就不用加电阻

##### 4.3 Analog signal input (Ref+,Ref-)

$\pm 10\text{Vdc}$  differential analog input, maximum input voltage  $\pm 10\text{Vdc}$ , input impedance about 5.36K, resolution 12 bits. The analog signal can be used for torque, speed and position control.

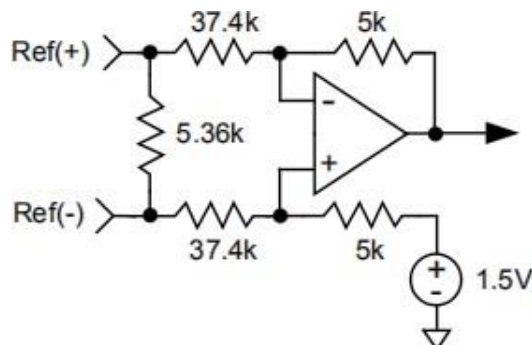


图 4.3.1 模拟量硬件输入电路

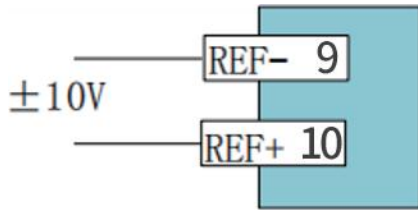


Figure 4.3.2 Analog input wiring of external power supply

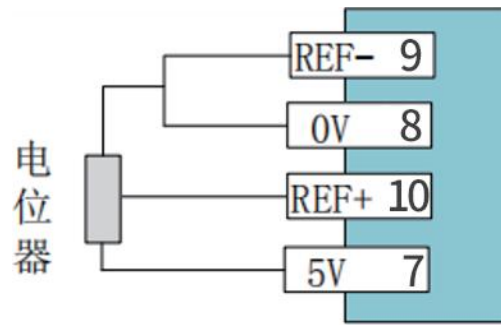


Figure 4.3.3 Analog input wiring of internal power supply

#### 4.4 Digital input signal

BC series servo has 12 digital input ports, 11 have programmable function, drive power PWM output and security enable fixed by IN1 control, through this port can achieve power circuit hardware cut off.

According to the port function of controller and RC filtering time of hardware, the input signal port can be divided into universal input port and high-speed input port, and the function of each port can be changed programmatically

##### 4.4.1 Universal input signal terminal (IN1, IN2, IN3, IN4, IN5)

###### GP INPUTS 1,2,3 24 Vdc max

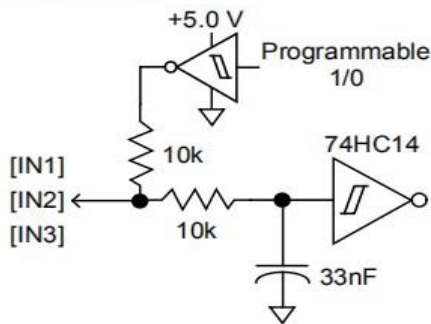


Figure 4.4.1 IN1-IN3 hardware input circuit

###### GP INPUTS 4,5 24 Vdc max

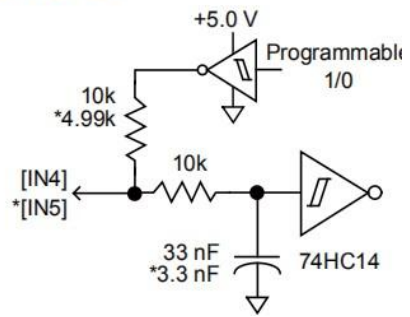


Figure 4.4.2 IN4-IN5 hardware input circuit

IN1, IN2, IN3, IN4, and IN5 are universal input signal terminals. The control logic and function can be set programmatically. IN1 is fixed for driver enable control, IN5 is mainly used for motor temperature protection input, through the software parameter setting high/low level takes effect.

##### 4.4.2 High speed input signal terminal (IN6, IN7, IN8, IN9, IN10)

IN6, IN7, IN8, IN9, IN10 are high-speed input terminals. In addition to being used as general terminals, they can also be used as high speed pulse input. The pulse input port is fixed as (IN9, IN10).

###### HS INPUTS 6,7,8 5 Vdc max

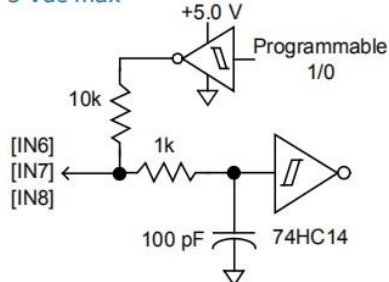


Figure 4.4.3 IN6,7,8 internal hardware diagram

###### HS & GP\* INPUTS 9,10,11,12 5 (\*24) Vdc max

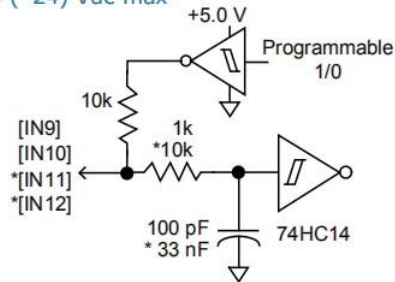


Figure 4.4.4 IN9,10,11,12 internal hardware diagram

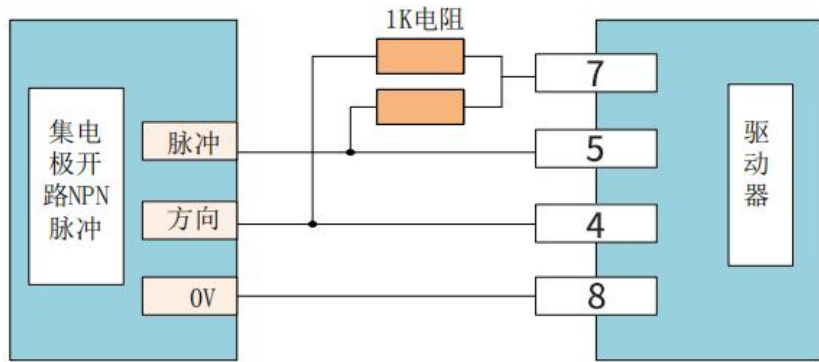


Figure 4.4.5 Open-collector NPN pulse input diagram

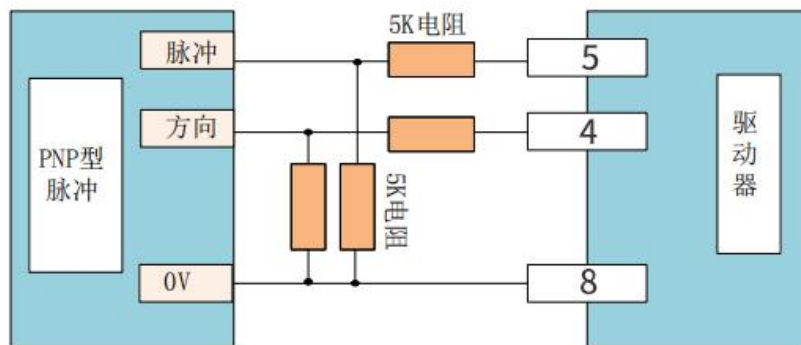


Figure 4.4.6 PNP pulse input diagram

#### 4.5 Digital output signal

The BC series driver has two digital output ports. The digital output IO port is an open-circuit MOSFET output, internally pulled up to 5V by a diode connected in series with a 1k resistor, and the port can withstand voltages up to 24VBC and currents up to 300mADC. The output function of the port can be changed according to the internal programming.

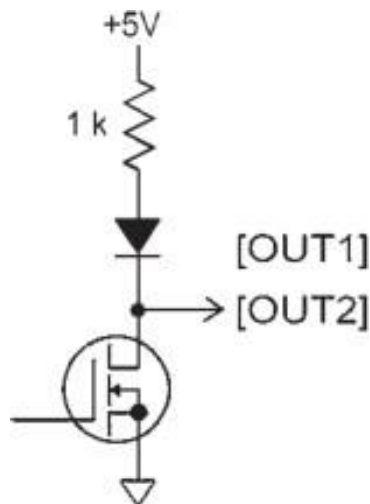


Figure 4.5 Digital output hardware circuit

#### 4.5.1 4.5.1 motor locks the brake

The digital output ports OUT1, OUT2 and OUT3 can all be set as motor lock brake control. In the case of no fault and motor enabling, the brake is energized and the brake is released. In the case of any fault, the brake power is quickly disconnected to stop the motor. Since the motor brake is a perceptual device, the reverse current return diode must be connected in parallel.

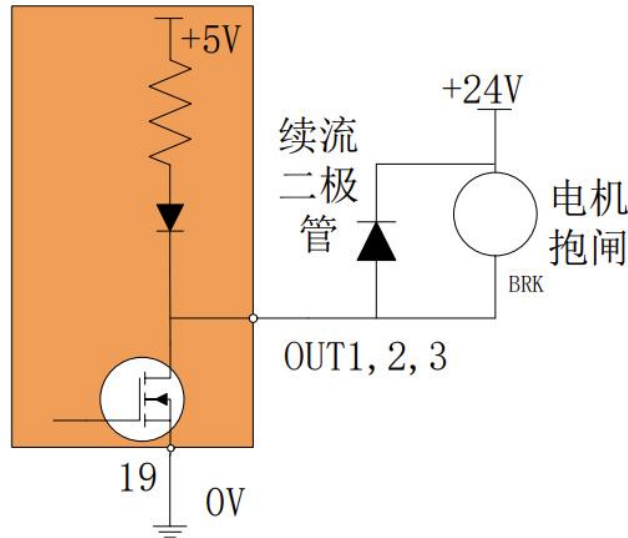
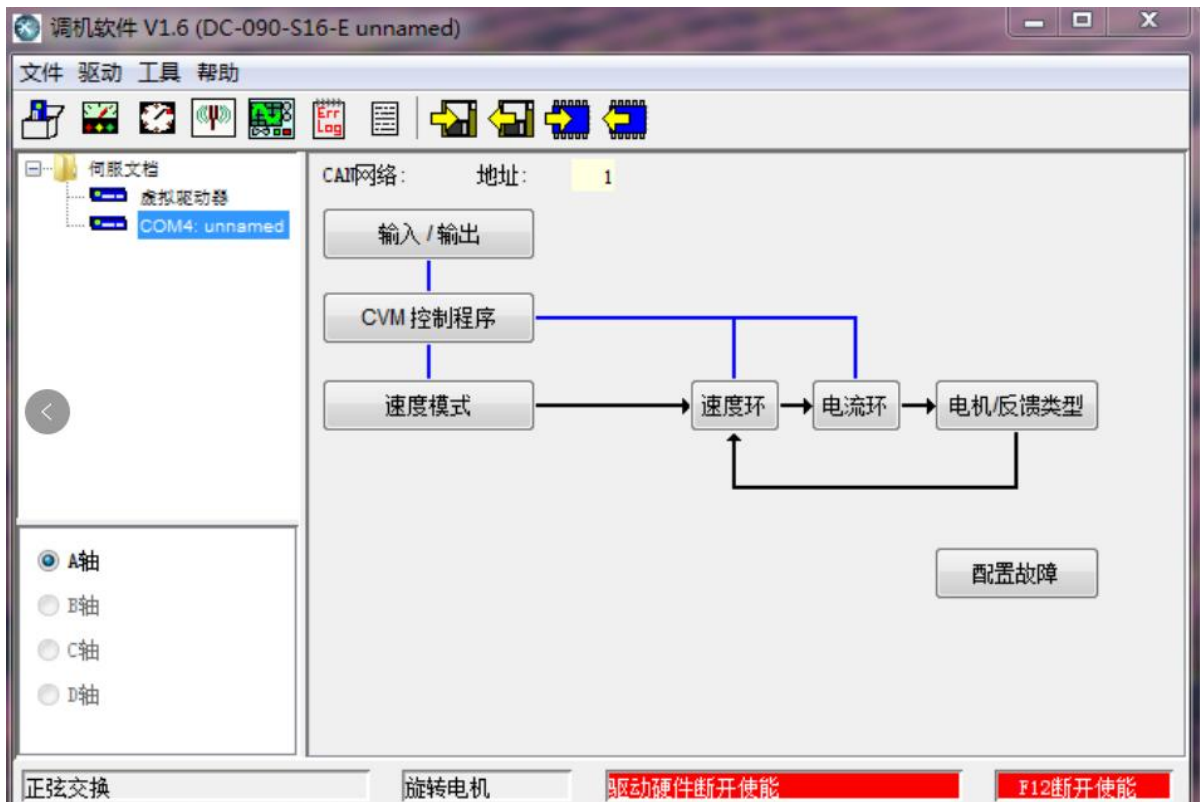


Figure 4.5.1 External circuit of motor brake

5. Drive parameter setting: BC series drives can be through the RS232 serial port, through the DCH tuning software can be parameterized, monitoring motor status, collecting data waveforms and so on. Quickly and intuitively complete the system debugging. Detailed use of the commissioning software, please see the instructions for use.



6、 BC servo System wiring diagram

6.1 Typical wiring diagram

BC系列驱动器典型接线

