

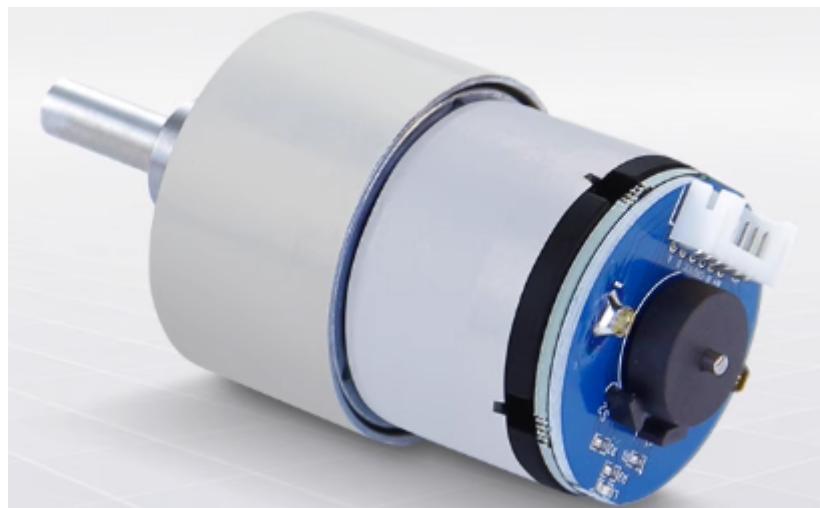
Motor introduction and usage

This course is used to explain the parameters of the motor, the recommended supply voltage, and the recommended wiring method for connecting the motor to the 4-channel motor driver board.

[Motor introduction and usage](#)

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1. 520 motor



Parameter	MD520Z19_12V	MD520Z30_12V	MD520Z56_12V
Rated voltage	12V	12V	12V
Motor type	Permanent magnet brush	Permanent magnet brush	Permanent magnet brush
Output shaft	6mm diameter D-type eccentric shaft	6mm diameter D-type eccentric shaft	6mm diameter D-type eccentric shaft
Stall torque	3.1kg·cm	4.8kg·cm	8.3kg·cm
Rated torque	2.2kg·cm	3.3kg·cm	6.5kg·cm
Speed before deceleration	11000rpm	11000rpm	12000rpm
Speed after deceleration	550±10rpm	333±10rpm	205±10rpm
Rated power	≤4W	≤4W	≤4W
Stall current	3A	3A	4A
Rated current	0.3A	0.3A	0.3A
Gear set reduction ratio	1:19	1:30	1:56

Parameter	MD520Z19_12V	MD520Z30_12V	MD520Z56_12V
Encoder type	AB phase incremental Hall encoder	AB phase incremental Hall encoder	AB phase incremental Hall encoder
Encoder supply voltage	3.3-5V	3.3-5V	3.3-5V
Magnetic loop number	11 line	11 line	11 line
Interface type	PH2.0 6Pin	PH2.0 6Pin	PH2.0 6Pin
Function	With built-in pull-up shaping, the MCU can directly read the signal pulse	With built-in pull-up shaping, the MCU can directly read the signal pulse	With built-in pull-up shaping, the MCU can directly read the signal pulse
Single motor weight	150g±1g	150g±1g	150g±1g

Recommended power supply: **12V**.

There are three types of 520 motors, and their rated voltage is **12V**. When we drive the 520 motor, we can connect a voltage between 11 and 16V, and it is recommended to use a 12V voltage supply**.

If you want to distinguish the model of the 520 motor you bought, you can directly look at the label printed on the 520 motor. There is a text printed on it called RPM, and the number in front of RPM corresponds to the **speed after deceleration** number in the parameter table.

For example, the label of the 520 motor in my hand says 333RPM, so you should pay attention to the parameters in the **MD520Z30_12V** column.

In particular, the two parameters of **reduction ratio and number of magnetic ring lines** may be modified when using a 4-channel motor driver board.



Recommended wiring:

The 520 motor you purchased will come with two types of cables. Here we recommend that you choose the black PH2.0-6PIN double-ended cable, one end connected to the motor, and the other end directly connected to the PH2.0-6PIN encoder motor interface on the four-way motor driver board.

We can find that the A on the motor corresponds to the B phase of the four-way motor driver board.

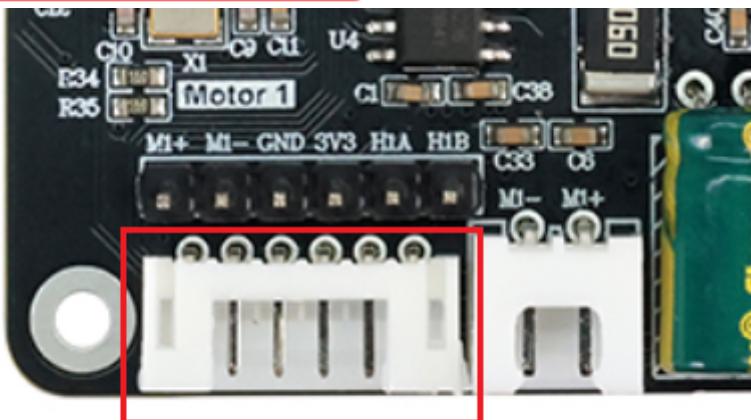
So when configuring the motor type on the four-way motor driver board, you should choose `$mtype:1#`, the model of the 520 motor.



PH2.0-6pin
double head cable



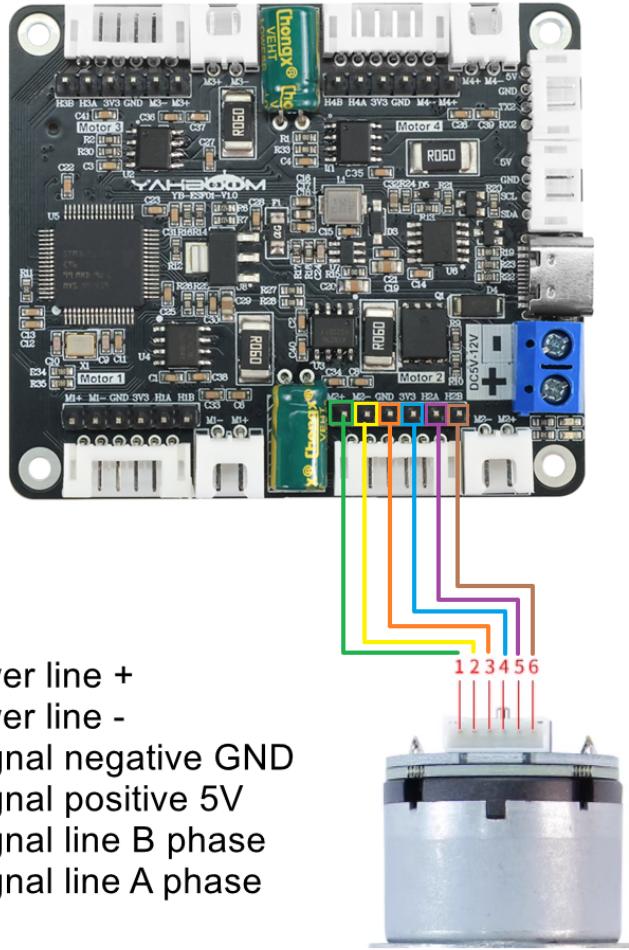
PH2.0-6pin
single head cable



520 motor wiring instructions:

If you use PH2.0-6PIN to Dupont line connection, you can connect according to the picture below. With this connection, the motor phase A will be connected to the four-way motor driver board phase A, and phase B will be connected to phase B.

However, when configuring the motor type, you should select `$mtype:2#`, the model of the 310 motor.



2. 310 motor



Parameter	Value/description
Motor name	MD310Z20_7.4V
Stall current	≤1.4A
Motor rated voltage	7.4V
Rated current	≤0.65A
Motor type	Permanent magnet brush
Gear set reduction ratio	1:20
Output shaft	3mm diameter D-type eccentric shaft
Encoder type	AB phase incremental Hall encoder
Stall torque	≥1.0kg·cm
Encoder supply voltage	3.3-5V
Rated torque	0.4kg·cm
Magnetic loop number	13 line
Speed before deceleration	9000rpm
Interface type	PH2.0 6Pin
Functions	With built-in pull-up shaping, the MCU can directly read the signal pulse
Speed after deceleration	450±10rpm
Rated power	4.8W
Single motor weight	70g

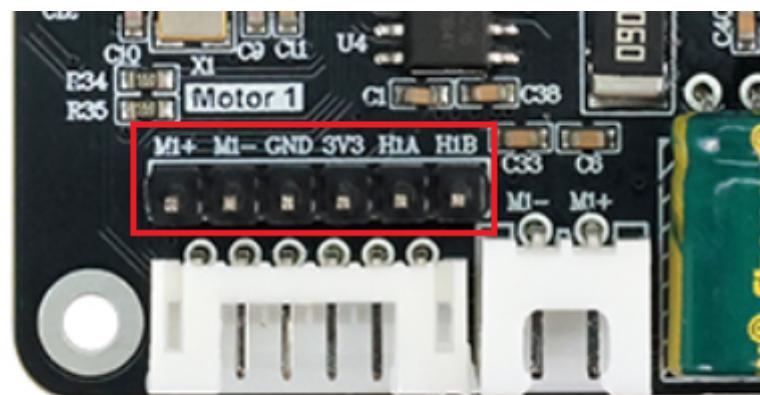
Recommended power supply: **7.4V**. It can be connected to a voltage between 4.2~8.4V, **recommended to use a voltage of 7.4V**.

The two parameters **reduction ratio and number of magnetic ring lines** in the main parameter table are required. These two parameters may be modified when using a four-way motor driver board.

If you buy a 310 motor alone, you will receive a PH2.0-6PIN to DuPont cable. When connecting a 4-channel driver board, connect it to its IO socket.

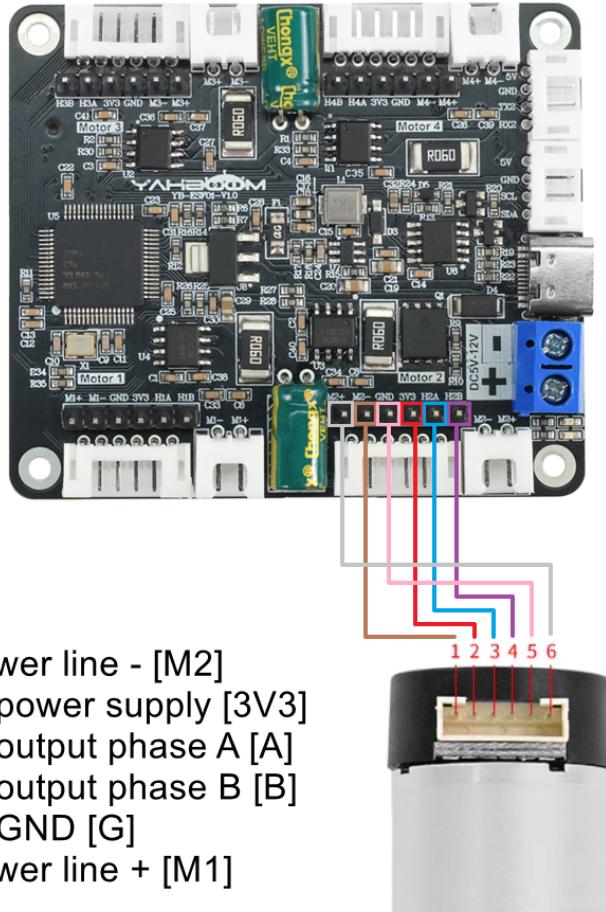


PH2.0-6pin cable



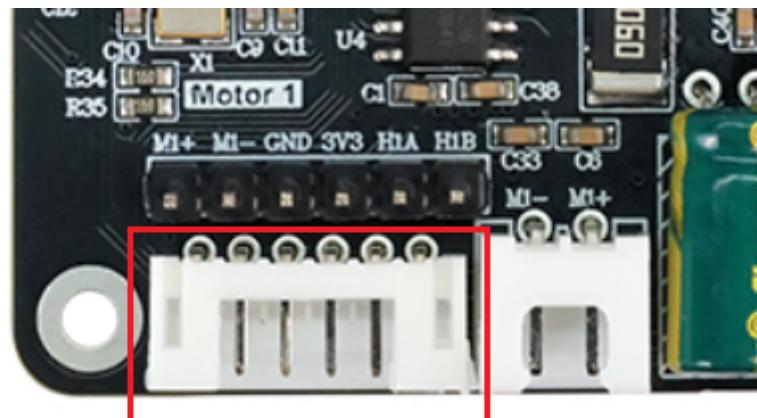
310 motor wiring instructions:

When the A phase of the 310 motor is connected to the A phase of the 4-channel motor driver board, and the B phase is connected to the B phase, then when configuring the motor type, you should select `$mtype:2#`, the model of the 310 motor.

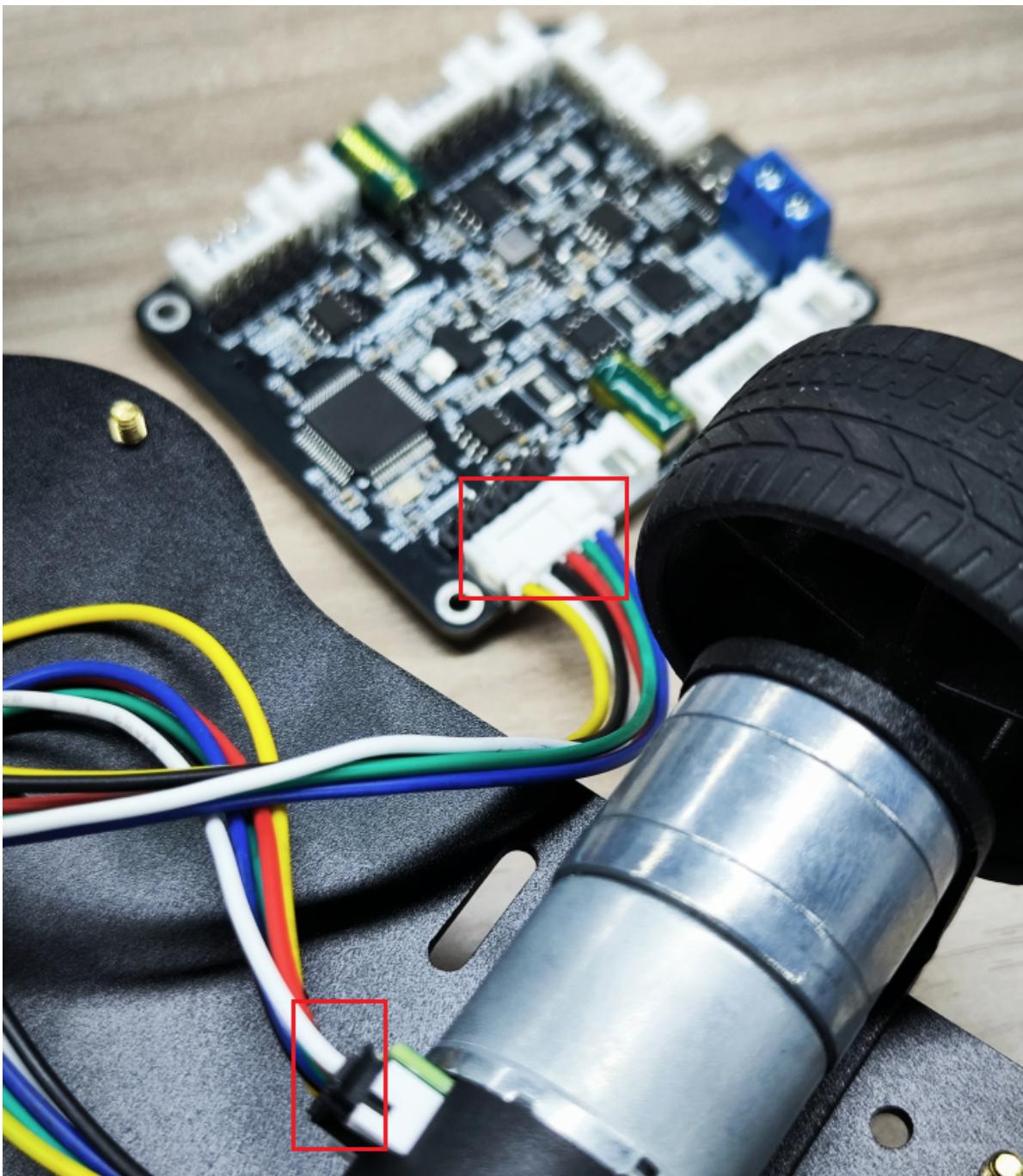


If you purchased the 310 motor in the chassis kit, it has a PH2.0-6PIN double-ended cable. You can connect the black end to the 310 motor and the white end to the PH2.0-6PIN encoder motor interface on the 4-channel motor driver board.

At this time, select `$mtype:2#` to configure the motor type, which is the model of the 310 motor.







3. DC TT Motor

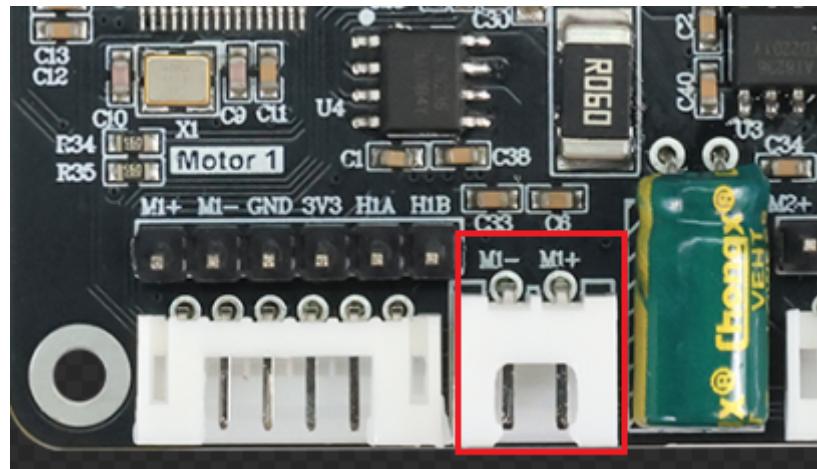


Parameter	Value/Description
Model	TT gear motor
Brush material	Carbon brush
Reduction ratio	1:48
Rated voltage	6V
Idle current	200MA
Stall current	1.5A
Torque	0.8N.m
Speed before deceleration	12000±10%rpm
Speed after deceleration	245±10%rpm

Recommended power supply: **7.4V**

This motor has no encoder, so you only need to modify **motor type** and **reduction ratio** in the four-way motor driver board. When configuring the motor type, select `$mtype:4#`, the TT motor model without encoder.

Recommended wiring: Connect the XH2.54-2PIN interface on the TT motor directly to the XH2.54-2PIN socket on the 4-channel motor driver board.



4. TT motor with encoder speed measurement



Parameter	Value/Description
Model	13-wire metal single-axis TT motor
Motor type	130 Motor
Motor type/brush material	Copper brush
Reduction ratio	1:45
Rated voltage	6V
No-load current	0.08A
Rated current	0.3A
Stall current	1.1A
Torque	1.2N.m
Speed before deceleration	16000±5%rpm
Speed after deceleration	355±5%rpm
Encoder type	Hall AB phase encoder
Encoder power supply	3.3-5V
Encoder line number	13 line
Maximum count per wheel revolution	2340
Features	With built-in pull-up shaping, the MCU can read directly

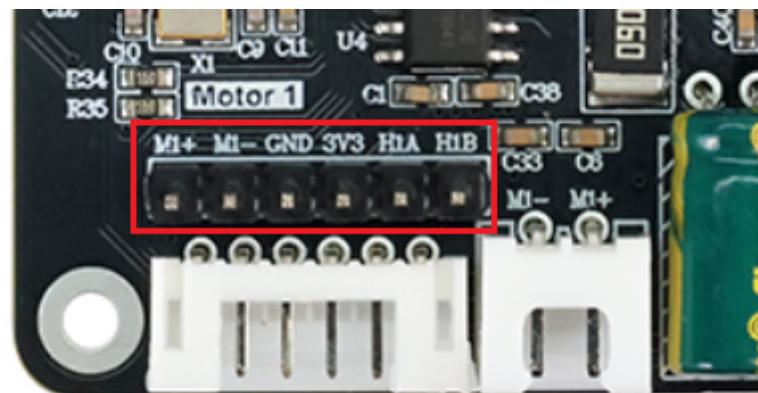
Recommended power supply: **7.4V**. It can be connected to 5~13V, **recommended to use 7.4V voltage power supply.**

The two parameters **reduction ratio and encoder line number** in the main parameter table are required. These two parameters may be modified when using the 4-channel motor driver board.

Recommended wiring: Use the PH2.0-6PIN to DuPont line cable and connect it to the IO socket of the 4-channel motor driver board.



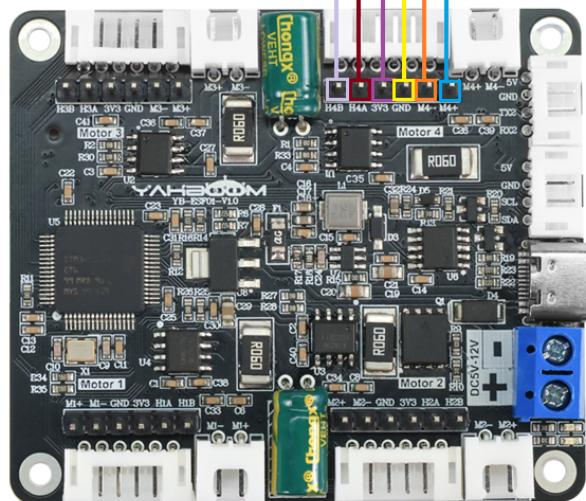
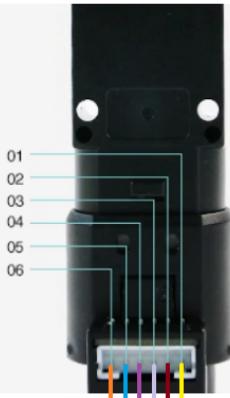
PH2.0-6pin cable



Wiring instructions for encoder speed measurement TT motor:

When the A phase of the encoder TT motor is connected to the A phase of the four-way motor driver board, and the B phase is connected to the B phase, then when configuring the motor type, you should select `$mtype:3#`, the model of the TT motor with encoder.

- 01--Encoder GND
- 02--Encoder output phase A
- 03--Encoder output phase B
- 04--Encoder power supply
- 05--Motor line +
- 06--Motor line -



5. L-type 520 motor



Parameter	Value/Description
Model	L-type 520 motor
Starting voltage	6V
Rated voltage	12V
Reduction ratio	1:40
Magnetic loop number	11线
No-load current	≥450mA
No-load speed	300r/min±5%
Rated torque	4.4KG.CM
Rated speed	150r/min
Stall torque	10KG.CM
Stall current	4A

Recommended power supply: **12V**.

The two parameters **reduction ratio and encoder line number** in the main parameter table are required. These two parameters may be modified when using the 4-channel motor driver board.

Recommended wiring: The purchased L-type 520 motor will come with two types of wires. Here we recommend that you choose the black PH2.0-6PIN double-headed cable, one end is connected to the motor, and the other end is directly connected to the PH2.0-6PIN encoder motor interface on the 4-channel motor driver board.

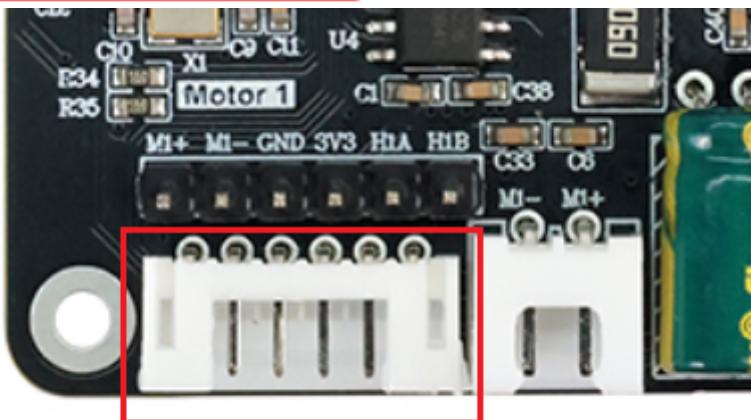
This wiring is the most convenient, but it can be found that the A on the motor corresponds to the B phase of the 4-channel motor driver board. Therefore, when configuring the motor type on the 4-channel motor driver board, you should choose `$mtype:1#`, the model of the 520 motor.



PH2.0-6pin
double head cable



PH2.0-6pin
single head cable



L-type 520 motor wiring instructions:

If you use PH2.0-6PIN to Dupont line connection, you can connect according to the picture below. With this connection, the motor's A phase will be connected to the 4-channel motor driver board A phase, and B phase will be connected to B phase.

However, when configuring the motor type, you should select `$mtype:2#`, the model of the 310 motor.

