Position mode：

Send：03 0D 20 31 00 00 00 00　　（Switch to absolute position mode）

Feedback：7F BA 0D 0B 6C FF 13 01

Send：23 0d 20 01 00 00 00 00　　Enable

Send：23 02 20 01 86 A0 00 01　0x186A0　Forward 10 circles（low digit first, high digit last）

Send：23 02 20 01 27 40 FF 58　0xFF582740　Reverse 1100 circles（low digit first, high digit last）

4.6 Serial port command instruction

4.6.1 General Configuration

Serial port configuration

The serial port communication port of the controller is set as follows:

115200bits/s

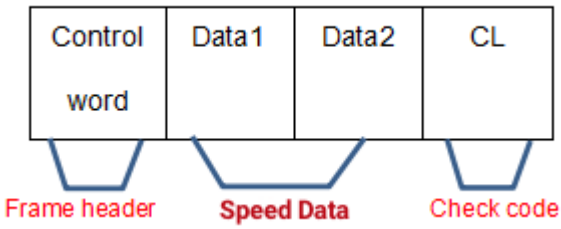
8-digit data

1 starting digit

Check digit: None

Hexadecimal receiving and sending

4.6.2　Control command format



Frame Header

AD: Enable

AC: Disable

Speed Data:

[Data] is the given speed/position command data, high digit goes first and low digit goes after. The speed data range is -1000 ~ +1000, corresponds to - 100rpm ~ 100rpm (factory setting)

Sum check:

The check uses the sum check method, that is, starting from the frame header, accumulating all the bytes, and the low digit of the final result obtained is the check code.

Speed control mode

Example: motor enabled, speed 0rpm

AD 00 00 AD

Example: motor disabled, speed 0rpm

AC 00 00 AC

Example: motor enabled, speed 100rpm （Rated speed 100）

AD 03 E8 98

Example: motor disabled, speed 100rpm（Rated speed 100）

AC 03 E8 97

Example: motor enabled, the given speed -100rpm （Rated speed 100）

AD FC 18 C1

Example: motor enabled, the given speed -100rpm （Rated speed 100）

AD FC 18 54

- **Note：Time interval between two commands when sending commands continuously is 20ms < Time interval < 500ms**

4.6.3 Return information format

Every time the motor controller receives a control command, the controller will return a response data defined as follows: (hexadecimal)

4.6.3.1 Passive feedback after receiving control commands

0xAC	D1	D2	D3	**Check1**	**0xAD**	D6	D7	D8	**Check2**	**0xAE**	D11	D12	D13	**Check3**
Frame Header	Position value			Check	Frame header	Speed	Current	Voltage	Check	Frame header	Failure		Temp.	Check

4.6.3.2 Receive fault check

0xA8	D1	D2	D3	**Check1**	**0xAD**	D6	D7	D8	**Check2**	**0xAE**	D11	D12	D13	**Check3**

Frame header	Position value	Check	Frame header	Speed	Current	Voltage	Check	Frame header	Failure	Temp.	Check

- Check1 = (0xAC + D1 + D2 + D3) & 0xFF
- Check2 = (0xAD + D6 + D7 + D8) & 0xFF
- Check3 = (0xAE + D11 + D12 + D13) & 0xFF
- Position: 10000/circle
- Speed: RPM
- Current: 0.1A
- Voltage: V
- Temperature: ℃
- Failure analysis

D11:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Stall	CAN disconnected	232 disconnected	Current sensing	Hall failure	Idle	Stall	Missing phase

D12:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Mode failure	Overcurrent	None	Less voltage	E2PROM	Hardware protection	Overvoltage	Disabled

4.6.4 Query data format

Send:

Ex	Data1	Data2	check1
Identifier	00	00	Check

Receive:

Ex	Data1	Data2	Data3	check2
Identifier	Data			Check

- Check1 = (Ex + Data1 + Data2) & 0xFF
- Check2 = (Ex + Data1 + Data2 + Data3) & 0xFF
- Identifier: Ex stands for query data commands

Query data identifier description:
0xE0 System control status
0xE1 Electric angle (Internal parameter)
0xE2 Motor speed rpm (with symbol)
0xE3 Motor Amps (A)
0xE5 Power supply voltage (V)
0xE6 Motor/controller temperature (℃)
0xE7 Error code
0xE8 Cumulative position value (10000/circle)
0xEE System version number

Examples: (The numbers marked in yellow are effective)

- E0 00 00 E0 Feedback E0 CB 10 00 BB （Internal parameter,not used ）
- E1 00 00 E1 Feedback E1 02 61 00 44 Analysis: Electrical angle 534 (internal parameter, not used)
- E2 00 00 E2 Feedback E2 00 17 00 F9 Analysis: Speed 23rpm
- E3 00 00 E3 Feedback E3 00 01 00 E6 Analysis: Current 1A
- E5 00 00 E5 Feedback E5 00 0C 00 F1 Analysis: Voltage 12V
- E6 00 00 E6 Feedback E6 22 00 00 08 Analysis: Temperature 34
- E7 00 00 E7 Feedback E7 00 01 00 E8 Analysis: Failure: disabled (same format as return information)
- E8 00 00 E8 Feedback E8 00 1B 2E 31 Analysis：Cumulative position 6958(0.6958 circle)
- EE 00 00 EE Feedback EE 03 86 02 79 Analysis：Version No. 230914

Caution: The data returned by the query is all in hexadecimal, which needs to be converted to decimal for reading.

V. Failure Protection and Reset