RS485 Communication Protocol_V2.3

Jul 2021

The default communication baud rate of RS485 interface is 115200 (data bit: 8, parity bit: 0, stop bit: 1). The upper computer can configure the following baud rate:

115200，57600，38400，19200，9600. All bytes are in little-endian byte order. The default device address of the motor shipment is 0x01. Please refer to the following instructions for obtaining the device address:

The device address can be configured by the upper computer, and the configurable range of the address is 1-32. The current address of the device can be obtained according to the flashing status of the green LED on the driver board.

The corresponding relationship between the flashing of the LED light and the device address is as follows：

Device address1 Device address 1: [__ -__-__]
Device address2 Device address 2: [__-_-__-_-__]
Device address3 Device address 3: [__-_-_-__-_-_-__]
Other device addresses, and so on

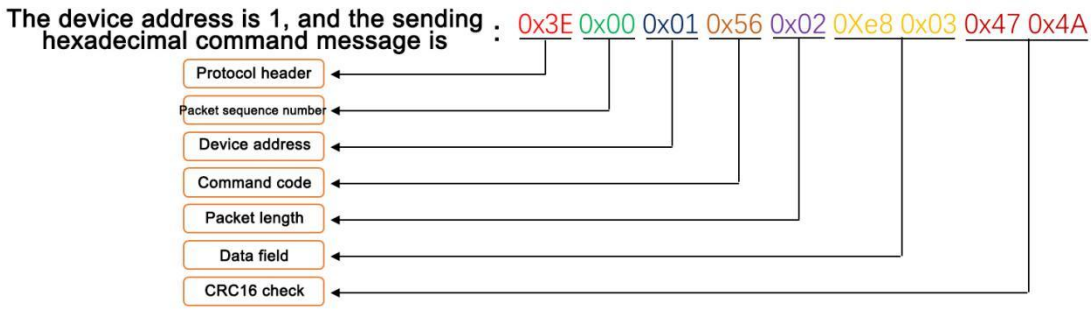
The command format of the RS485_V2.x version communication protocol is as follows:

Field Name	Byte Count	Instructions
Protocol header	1Byte	The protocol header sent by the host is 0x3E, and the protocol header respond by the slave is 0x3C
Packet sequence number	1Byte	The package sequence number respond by the motor is the same as the main controller send to the motor
Device address	1Byte	
Command code	1Byte	Different commands have different command codes, which are used to distinguish command types
Packet length	1Byte	Number of data field bytes（The number of bytes

		in the data field can be zero)
Data field	0-60(Bytes)	Data attached to the command code
CRC16 check	2Bytes	**CRC16_MODBUS** check the bytes of [Protocol header] to [data field]

Example of communication commands:

The relative position of the motor is controlled to rotate 1000Count



RS485_2.x Version Protocol Custom Control Command List

CATEGORY	COMMAND CODE	COMMAND FUNCTION DESCRIPTION
System	0x0A	Obtain information such as motor model, software version, hardware version, etc.
	0x0B	Read real-time data of motor system
	0x0C	Read the system parameters saved by the motor (the parameters read are the parameters permanently saved by the motor)
	0x0D	Write the system parameters to the motor (the motor receives the parameters, but it is not saved when the power is turned off)
	0x0E	Save the system parameters to the motor (the motor receives the parameters, and the parameters are permanently saved when the power is turned off)
	0x0F	Restore the motor parameters to factory settings
Encoder	0x20	Motor encoder calibration (the motor has been calibrated before the factory)
	0x21	Set the current position of the motor as the origin
	0x2F	Read encoder real-time data
Motor Running Status	0x40	Read motor status information (voltage, current, temperature, fault code)
	0x41	Clear motor fault code
Motor Control	0x50	After turning off the motor, the motor enters a free state and is not controlled (the motor is in this state after it is powered on)
	0x51	The motor returns to the set origin according to the multi-turn absolute angle
	0x52	The motor returns to the set origin according to the shortest distance, and the rotation angle is not more than 180°
	0x53	Motor open-loop control
	0x54	Motor speed closed-loop control
	0x55	Motor absolute position closed-loop control
	0x56	Motor relative position closed-loop control
	0x57	Read and configure position closed-loop target speed

Single motor Command description

- Obtain information such as motor model, software version, hardware version【**0x0A**】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0A**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

  - The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0A**
DATA[4]	Packet length	1	0x14
DATA[5]	Motor model low byte	2	Motor model
DATA[6]	Motor model high byte		
DATA[7]	Hardware version number	1	**[Bit4:0]:** Hardware minor version number **[Bit7:5]:** Hardware major version number
DATA[8]	Hardware configuration information	1	**[Bit0]:** (0 The device address cannot be configured by software (1 Device address can be configured by software **[Bit1]:** (0 No CAN interface) (1 With CAN interface) **[Bit7:5]:** (000 Regular version) (001 Medium hole version) (010 Extended version) (01 1H version)

DATA[9]	Software version number low byte	2	Software version number
DATA[10]	Software version number high byte		
DATA[11]-DATA[22]	MCU unique ID	12	
DATA[23]	RS485 protocol version number	1	**[Bit3:0]:** RS485 protocol minor version number **[Bit7:4]:** RS485 protocol major version number
DATA[24]	CAN protocol version number	1	**[Bit3:0]:** CAN protocol minor version number **[Bit7:4]:** CAN protocol major version number
DATA[25]	CRC16 check low byte	2	DATA[0]~DATA[24] byte CRC16 check
DATA[26]	CRC16 check high byte		

➢ Read real-time data of motor system【0x0B】

Current single-turn absolute angle, current multi-turn absolute angle, current speed, current power supply voltage, current system current, current system temperature, system fault code.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0B**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20

DATA[3]	Command code	1	**0x0B**
DATA[4]	Packet length	1	0x0D
DATA[5]	Single-turn absolute low byte	2	Motor single-turn absolute angle （uint16_t） Angle° = val*(360/16384)
DATA[6]	Single-turn absolute high byte		
DATA[7]	Multi-turn absolute low byte 1	4	Motor multi-turn absolute angle(int32_t) Total Angle° = val*(360/16384)
DATA[8]	Multi-turn absolute byte 2		
DATA[9]	Multi-turn absolute byte 3		
DATA[10]	Multi-turn absolute high byte 4		
DATA[11]	Mechanical speed low byte	2	Motor speed （int16_t） Unit: 0.1Rpm
DATA[12]	Mechanical speed high byte		
DATA[13]	Voltage	1	Voltage = val*0.2(V)
DATA[14]	System current	1	System current = val*0.03(A)
DATA[15]	System temperature	1	System temperature = val*0.4(℃)
DATA[16]	System fault code	1	[Bit0]: Voltage fault [Bit1]: Current fault [Bit2]: Temperature fault
DATA[17]	Motor operating status	1	0：Closed state 1：Open-loop mode 3：Speed mode 5：Position mode
DATA[18]	CRC16 check low byte	2	DATA[0]~DATA[17] byte CRC16 check
DATA[19]	CRC16 check high byte		

- Read the system parameters saved in the motor【**0x0C**】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0C**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0C**
DATA[4]	Packet length	1	0x1A
DATA[5]	Device address	1	For product with a non-configurable address, the parameter is invalid
DATA[6]	Current threshold	1	When the current during motor operation is greater than the current threshold, the system will report a current fault Hexadecimal value = current threshold/0.03
DATA[7]	Voltage threshold	1	When the power supply voltage of the motor system is greater than the maximum voltage threshold, the system will report a voltage failure Hexadecimal value = voltage value/0.2;
DATA[8]	RS485 interface baud rate	1	Lower 4 bits of byte 0: Indicates the baud rate is 115200 1: Indicates the baud rate is 57600 2: Indicates the baud rate is 38400

			3: Indicates the baud rate is 19200 4: Indicates the baud rate is 9600
	CAN interface baud rate		Upper 4 bits of byte This parameter is valid for product configuration with CAN interface 0: Indicates the baud rate is 1MHz 1: Indicates the baud rate is 500KHz 2: Indicates the baud rate is 250KHz 3: Indicates the baud rate is 125KHz 4: Indicates the baud rate is 100KHz
DATA[9] DATA[10] DATA[11] DATA[12]	Position loop proportional term Kp	4	Data type: Float
DATA[13] DATA[14] DATA[15] DATA[16]	Position closed-loop target speed	4	Data type: Float Unit: 0.1RPM 0X57 command can read and configure this parameter separately
DATA[17] DATA[18] DATA[19] DATA[20]	Speed loop proportional term Kp	4	Data type: Float
DATA[21] DATA[22] DATA[23] DATA[24]	Speed loop integral term Ki	4	Data type: Float
DATA[25] DATA[26] DATA[27] DATA[28]	Reserved	4	Data type: Float
DATA[29]	Speed filter coefficient	1	Speed low-pass filter coefficient: hexadecimal value = val*100
DATA[30]	Motor power percentage	1	Value range 1~100, default 92
DATA[31]	CRC16 check low byte	2	DATA[0]~DATA[30] byte CRC16 check

DATA[32]	CRC16 check high byte		

➢ Write system parameters to the motor 【0x0D】

The motor receives the parameters, but it is not saved when the power is turned off. This command is mainly used to debug PID parameters. In the process of PID debugging, parameters are sent to the motor through this command. When the PID is debugged to the ideal state, the parameters an be permanently saved to the motor through the 0x0E command.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0D**
DATA[4]	Packet length	1	0x1A
DATA[5]	Device address	1	For product with a non-configurable address, this parameter is invalid. **After saving, need to re-power on the motor to take effect**
DATA[6]	Current threshold	1	When the current during motor operation is greater than the current threshold, the system will report a current fault Hexadecimal value = current threshold/0.03 **After saving, need to re-power on the motor to take effect**
DATA[7]	Voltage threshold	1	When the power supply voltage of the motor system is greater than the maximum voltage threshold, the system will report a voltage failure Hexadecimal value = voltage value/0.2; **After saving, need to re-power on the motor to take effect**

DATA[8]	RS485 interface baud rate	1	Lower 4 bits of byte 0: Indicates the baud rate is 115200 1: Indicates the baud rate is 57600 2: Indicates the baud rate is 38400 3: Indicates the baud rate is 19200 4: Indicates the baud rate is 9600 **After saving, need to re-power on the motor to take effect**
	CAN interface baud rate		Upper 4 bits of byte This parameter is valid for product configuration with CAN interface 0: Indicates the baud rate is 1MHz 1: Indicates the baud rate is 500KHz 2: Indicates the baud rate is 250KHz 3: Indicates the baud rate is 125KHz 4: Indicates the baud rate is 100KHz **After saving, need to re-power on the motor to take effect**
DATA[9] DATA[10] DATA[11] DATA[12]	Position loop proportional term Kp	4	Data type: Float
DATA[13] DATA[14] DATA[15] DATA[16]	Position closed-loop target speed	4	Data type: Float Unit: 0.1RPM 0X57 command can read and configure this parameter separately
DATA[17] DATA[18] DATA[19] DATA[20]	Speed loop proportional term Kp	4	Data type: Float
DATA[21] DATA[22] DATA[23] DATA[24]	Speed loop integral term Ki	4	Data type: Float

DATA[25]	Reserved	4	Data type: Float
DATA[26]			
DATA[27]			
DATA[28]			
DATA[29]	Speed filter coefficient	1	Speed low-pass filter coefficient: hexadecimal value = val*100
DATA[30]	Motor power percentage	1	Value range 1~100, default 92
DATA[31]	CRC16 check low byte	2	DATA[0]~DATA[30] byte CRC16 check
DATA[32]	CRC16 check high byte		

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x0C command code

➢ Save the system parameters to the motor 【0x0E】

The motor receives the parameters and saves them permanently in the Flash. Note: **except saving the parameters of motor closed loop control will take effect immediately, other parameters will take effect only after turning off the power to restart the motor.**

- The host sends to the motor

  Except for the different sent command code, the content that the host sends to the motor is the same with the content of 0x0D command code.

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x0C command code.

➢ Restore the motor parameters to factory settings 【0x0F】

Executing this command, except the device address and motor encoder calibration data are not initialized, other parameters are reset to the system default values. After

the motor receives this command, the motor will switch to off mode.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x0F**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x0C command code.

➢ Motor encoder calibration【0x20】

The encoder has been calibrated before the motor leaves the factory. If the user disassembles the motor drive board, he/she needs to execute this command to re-calibrate the motor encoder. Note: When calibrating the motor encoder, please make sure that the motor is in no-load state, and at the same time, do not interfere with the motor rotation during the calibration process. The calibration process takes 40~90 seconds.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x20**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

  Except for the protocol header of the returned data packet (the protocol header of the motor responds to the host is 0x3C), the rest of the data remains unchanged.

➢ Set the current position of motor as the origin【0x21】

After the motor receives the command, set the current position of motor as the origin and switch the motor operation mode to off mode

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x21**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x21**
DATA[4]	Packet length	1	0x03
DATA[5]	Low byte of the encoder original value	2	Read the original angle of the encoder
DATA[6]	High byte of the encoder original value		
DATA[7]	Configuration success sign	1	【0x00:failure】【0x01:success】
DATA[8]	CRC16 check low byte	2	DATA[0]~DATA[7] byte CRC16 check
DATA[9]	CRC16 check high byte		

➢ Read the encoder single-turn absolute angle value, multi-turn

absolute angle value and mechanical speed【0x2F】

The range of single-turn absolute is 0x00-0X3FFF (that is, 0~16383).

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x2F**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x2F**
DATA[4]	Packet length	1	0x08
DATA[5]	Single-turn absolute angle low byte	2	Motor single-turn absolute angle （uint16_t） Angle° = val*(360/16384)
DATA[6]	Single-turn absolute angle high byte		
DATA[7]	Multi-turn absolute angle low byte 1	4	Motor multi-turn absolute angle(int32_t) Total Angle° = val*(360/16384)
DATA[8]	Multi-turn absolute angle byte 2		
DATA[9]	Multi-turn absolute angle byte 3		
DATA[10]	Multi-turn absolute angle high byte 4		
DATA[11]	Mechanical speed low byte	2	Motor speed （int16_t） Unit: 0.1Rpm
DATA[12]	Mechanical speed high byte		

DATA[13]	CRC16 check low byte	2	DATA[0]~DATA[12] byte CRC16 check
DATA[14]	CRC16 check high byte		

➢ Read the real-time status information of the motor 【0x40】

Real-time voltage, real-time current, real-time temperature, fault code

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x40**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x40**
DATA[4]	Packet length	1	0x05
DATA[5]	Voltage	2	Voltage = val*0.2(V)
DATA[6]	System current	2	System current = val*0.03(A)
DATA[7]	System temperature	2	System temperature= val*0.4(℃)
DATA[8]	Fault code	1	[Bit0]: Voltage fault [Bit1]: Current fault [Bit2]: Temperature fault
DATA[9]	Motor operating status	1	0：Closed state 1：Open-loop mode 3：Speed mode 5：Position mode
DATA[10]	CRC16 check low byte	2	DATA[0]~DATA[9] byte CRC16 check
DATA[11]	CRC16 check high byte		

- Clear current system faults (voltage fault, current fault, temperature fault, acceleration fault)【0x41】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x41**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

  - The motor responds to the host

    Except for the different response command code, the content that motor responses to the host is the same with the content of 0x40 command code.

- Turn off the motor, it enters the off mode, and is in a free state uncontrolled. The motor is in this mode after powered on.【0x50】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x50**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

  - The motor responds to the host

    Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

- The motor returns to the set origin according to the current multi-turn absolute angle【0x51】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x51**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

  - The motor responds to the host

    Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

- The motor returns to the set origin with the shortest distance, and the rotation angle is not more than 180°【0x52】

  - The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x52**
DATA[4]	Packet length	1	0x00
DATA[5]	CRC16 check low byte	2	DATA[0]~DATA[4] byte CRC16 check
DATA[6]	CRC16 check high byte		

  - The motor responds to the host

    Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

➢ Motor open-loop control【0x53】

The type of input parameter is int16_t, and the value range is -32768~32767. When the parameter value is a negative number, it means that the motor is in reversion. The greater the Power value, the greater the output power.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x53**
DATA[4]	Packet length	1	0x02
DATA[5]	Power value low byte	2	The data type of output power is int16_t
DATA[6]	Power value high byte		
DATA[7]	CRC16 check low byte	2	DATA[0]~DATA[6] byte CRC16 check
DATA[8]	CRC16 check high byte		

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

➢ Motor speed closed-loop control【0x54】

The parameter type is int16_t, and the value range is -32768~32767. When the parameter value is a negative number, it means that the motor is in reversion.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x54**
DATA[4]	Packet length	1	0x02
DATA[5]	Target speed low byte	2	Target speed, unit: 0.1RPM

DATA[6]	Target speed high byte		Data type: int16_t
DATA[7]	CRC16 check low byte	2	DATA[0]~DATA[6] byte CRC16 check
DATA[8]	CRC16 check high byte		

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

➢ Motor absolute position closed-loop control【0x55】

In the position control mode, the motor will use the speed set by the parameter "position closed loop target speed" as the maximum running speed.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x55**
DATA[4]	Packet length	1	0x04
DATA[5]	Target position low byte 1	4	Target absolute position Count value Data type: uint32_t The Count value of one rotation of the motor is 16384
DATA[6]	Target position byte 2		
DATA[7]	Target position byte 3		
DATA[8]	Target position high byte 4		
DATA[9]	CRC16 check low byte	2	DATA[0]~DATA[8] byte CRC16 check
DATA[10]	CRC16 check high byte		

- The motor responds to the host

  Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

➢ Motor relative position closed-loop control【0x56】

The relative movement angle of the motor based on the current position. The data type of the input parameter is int16_t, and the value range is -32768~32767. When the parameter value is a negative number, it means that the motor is in reversion. In the position control mode, the motor will use the speed set by the parameter "position closed loop target speed" as the maximum running speed.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x56**
DATA[4]	Packet length	1	0x02
DATA[5]	Relative position low byte	2	Count value of relative movement Data type: int16_t The Count value of one rotation of the motor is 16384
DATA[6]	Relative position high byte		
DATA[7]	CRC16 check low byte	2	DATA[0]~DATA[6] byte CRC16 check
DATA[8]	CRC16 check high byte		

- The motor responds to the host

Except for the different response command code, the content that motor responses to the host is the same with the content of 0x2F command code.

➢ Read and configure position closed-loop target speed【0x57】

Read the current configured position closed-loop target speed of motor, or configure position closed-loop target speed parameter to the motor. After the motor is powered on, the default value of position closed-loop target speed is the value saved to the motor through 0x0E command. The position closed-loop target speed written by current command is just written to the motor, it won't be saved after the power turns off. The motor will move at the configured speed in the absolute position or relative position closed-loop mode after written successfully.

- The host sends to the motor

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3E
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x57**
DATA[4]	Packet length	1	0x03
DATA[5]	Read and write parameter sign	1	0x00：Read position closed-loop target speed 0x01: Configure position closed-loop target speed
DATA[6]	Target speed low byte	2	When DATA[5] is 0x00, read the position closed-loop target speed, this field can be any value When DATA[5] is 0x01, configure the position closed-loop target speed, this field is the target speed value that needs to be configured. The data type is int16_t, and the unit is 0.1RPM
DATA[7]	Target speed high byte		
DATA[8]	CRC16 check low byte	2	DATA[0]~DATA[7] byte CRC16 check
DATA[9]	CRC16 check high byte		

- The motor responds to the host

SN	Field Name	Byte	Content Description (data)
DATA[0]	Protocol header	1	0x3C
DATA[1]	Packet sequence number	1	0x00-0x0FF
DATA[2]	Device address	1	0x01~0x20
DATA[3]	Command code	1	**0x57**
DATA[4]	Packet length	1	0x02
DATA[5]	Target speed low byte	2	The data type of the target speed in the position closed loop mode of the motor feedback is int16_t, and the unit is 0.1RPM
DATA[6]	Target speed high byte		
DATA[7]	CRC16 check low byte	2	DATA[0]~DATA[6] byte CRC16 check
DATA[8]	CRC16 check high byte		

Attachment: Protocol update log

Protocol version V2.3

1. Add the current RS485 protocol version number and CAN protocol version number to the response content of the 0x0A command
2. Modify the content form and structure of the PID parameter field in the 0x0C, 0x0D, and 0x0E commands
3. Modify the 0x54 speed closed-loop control command to support lower speed control, and the speed unit is 0.1RPM
4. Add the current motor running mode field to the response content of 0x40, 0x41 commands
5. Add 0x57 command to read or configure the operating speed of the motor position closed-loop control mode