

ZeroErr

eRunner User Manual

Version 1.7



Build Robot Fast

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<https://www.zeroerr.com>

What's New

0.1 eRunner User Manual Version 1.7 Update


0.1.1 Content Enhancement

- (1) ENHANCED Section 7.5.1 Parameter and Variable Address Table;
- (2) ENHANCED Section 7.5.3 eRob Information Explanation Table.

Content Modification Markings

0.2 New Content


Example:

 Thank you for choosing ZeroErr's eRob series rotary actuator module. We appreciate your trust and confidence in our product. To ensure your satisfaction and enhance your user experience, we have carefully designed this user manual to provide you with all the necessary information for operating and maintaining your eRob rotary actuator module.

0.3 Enhanced Content

The enhanced content in document of the current version is marked with a green strip and Δ symbol.

Example:

 Δ If you have any questions or encounter any issues while using eRob rotary actuator module, please do not hesitate to reach out to our customer support team. We are here to assist you and provide timely assistance to ensure that you have a smooth and enjoyable experience.

Record of Revisions

Version	Iteration	Description	Date
1.4	1	Applied the new standard English format, enhanced table & graphic layout & quality, enhanced word choices for certain content, relocated certain content, added new error code explanation in appendix A.	2024-01-10
1.5	2	Added parameters for hardware version, firmware version, eRob serial number, model, and version in 7.5.1 Parameter and Variable Address Table, and introduced 7.5.3 eRob Information Explanaton to detail eRob serial number composition, improving clarity and usability.	2025-06-14
1.6	3	Refined the parameters for hardware version, firmware version, eRob serial number, model, and version in 7.5.1 Parameter and Variable Address Table, and refined 7.5.3 eRob Information Explanaton to detail eRob serial number composition, improving clarity and usability.	2025-06-17
1.7	4	Refined the parameters for hardware version, firmware version, eRob serial number, model, and version in 7.5.1 Parameter and Variable Address Table, and refined 7.5.3 eRob Information Explanaton to detail eRob serial number composition, improving clarity and usability.	2025-06-30

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Symbols and Abbreviations

0.4 Abbreviations

Abbreviation	Definition
e.g.	for example
etc.	and so forth
ACC	acceleration
COB	communication object
DEC	deceleration
HEX	hexadecimal
ID	identifier
MAX	maximum
MIN	minimum
RO	read only
RW	read & write

Chapter 1 eRunner Introduction

1.1 About eRunner

eRunner is a PC software that combines support for multiple communication protocols, communication message monitoring functions, and enables motion control of eRob rotary actuators.

1.2 About the Manual

This manual introduces the application methods and safety attentions of eRunner developed by ZeroErr. Please read the manual carefully before performing any operation.

Chapter 2 Function Introduction

Open eRunner program and enter the main interface (as shown in [Figure 2-1](#)).

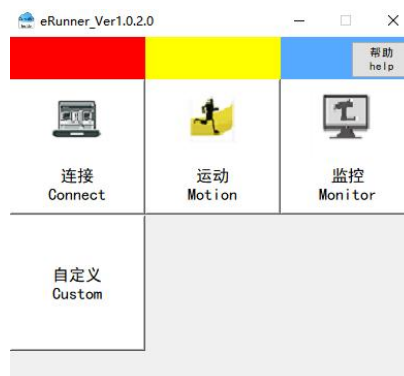


Figure 2-1 Main Interface

- "Connect" Opens the "Device Connection" interface, which handles the initialization and scanning of device nodes for the USBCAN device.

After establishing a connection:

- "Motion" Opens either the "CAN Motion Control" or "CANopen Motion Control" interface. These interfaces offer various motion control modes based on CAN custom/CANopen communication protocols.
- "Monitor" Opens the instruction monitoring interface, where you can monitor motion control-related message data.
- "Customize" Opens the custom data transmission and reception interface, allowing you to independently edit frame IDs and data for transmission.
- "Help" Opens the instruction document, providing explanations for operating instructions and precautions.

Chapter 3 Connection Settings

Connect to the device first after entering the PC software interface, otherwise the related tests can not be implemented. Following are the connection steps.

- (1) Click “Connect” and the “Connection Settings” interface pops up.

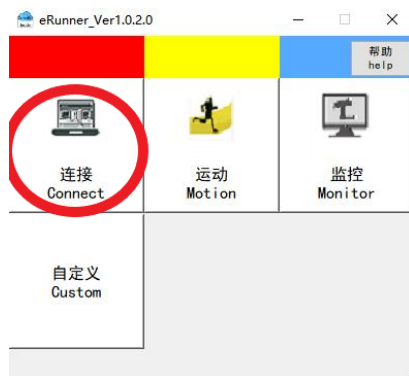


Figure 3-1 Open “Connection Settings” interface

- (2) Open “Connection Settings” interface (as shown in Figure 3-2a). Select “CAN-custom” or “CANopen” in “Communication Protocol” according to the demand.
- (3) Set the default “ID Range” to “1-64”. The “ID Range” can be modified according to user’s demand. Click “Scanning” (as shown in Figure 3-2b).
- (4) After scanning is completed, the scanned node ID will be displayed in the window list (as shown in Figure 3-2c).



(a) Step 2: Select communication protocol

(b) Step 3: Scan nodes

(c) Step 4: Scanning is completed

Figure 3-2 Illustration for Steps 2 ~ 4

- (5) Selecting the node to be connected and click “Connect” (as shown in [Figure 3-3a](#)). The background color of the corresponding node will become green after connection is completed. The firmware version will be acquired automatically and displayed in “Connection Settings” interface (as shown in [Figure 3-3b](#)). The “Communication Cyclic” is CANopen protocol control parameters and the default setting value is 1000 μ s. It can be modified according to demand.

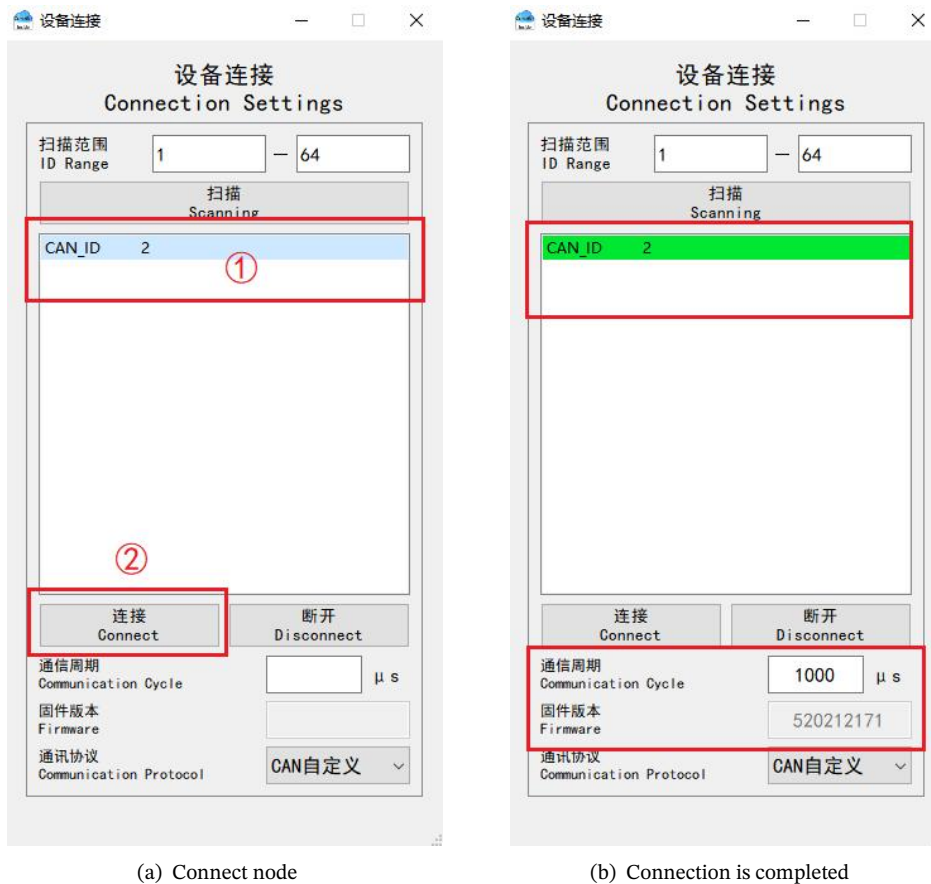


Figure 3-3 Illustration for Steps 5

- (6) After connection is completed, click “Motion” to open “Motion” interface (as shown in [Figure 3-4a](#)). Click “Monitor” to open “Monitor” interface (as shown in [Figure 3-4b](#)).

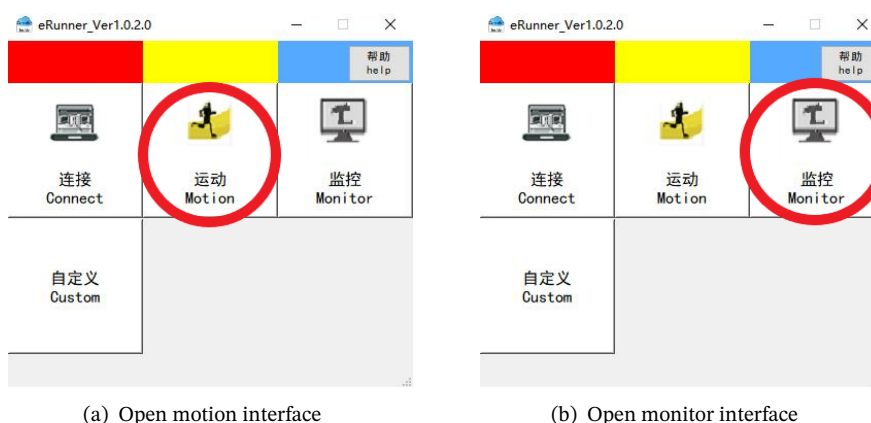


Figure 3-4 Illustration for Steps 6

Chapter 4 CAN-Custom Protocol Control

Select “CAN-custom” in “Communication Protocol” of “Connection Settings” interface to open “CAN-custom protocol control” interface (as shown in Figure 4-1a). Open the “Monitor” interface (as shown in Figure 4-1b).

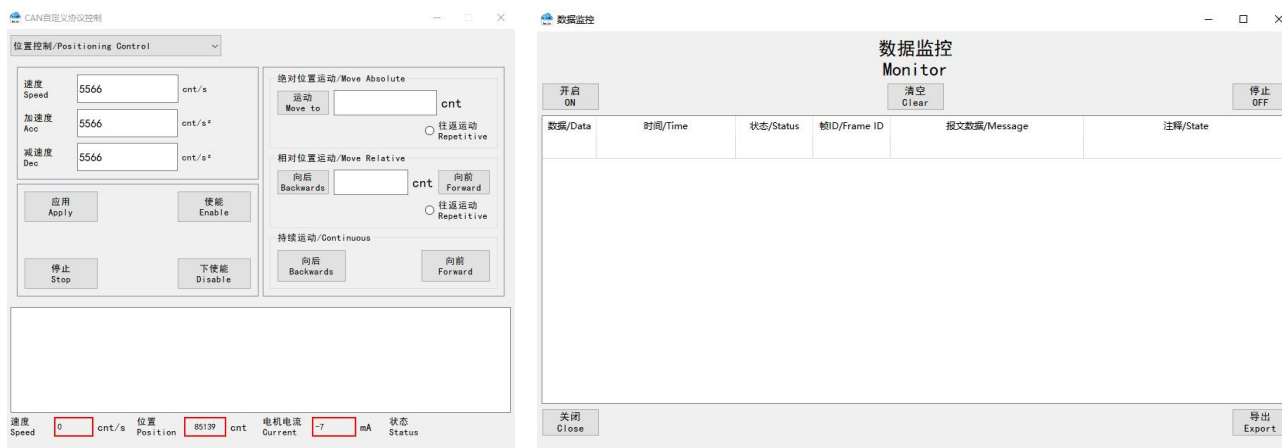


Figure 4-1 Interface Illustrations

4.1 Positioning Control

(1) Select “Positioning Control” mode (as shown in Figure 4-2a).

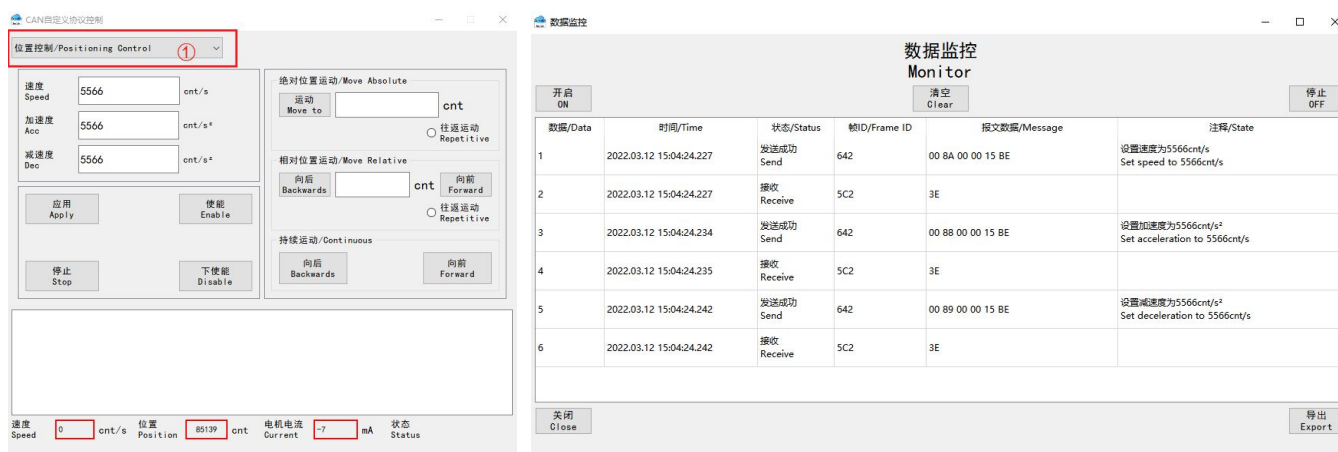


Figure 4-2 Interface Illustration

(2) Click “Apply”. Set “speed”, “acceleration” and “deceleration”. The monitoring messages in “Monitor” interface are as shown in Figure 4-2b.

- (3) Click “Enable”. The motor is enabled. The monitoring messages in “Monitor” interface are as shown in Figure 4-3.



Figure 4-3 Monitoring Messages of “Enable”

- (4) Click “Stop”. The current motion is stopped. The monitoring messages in “Monitor” interface are as shown in Figure 4-4.



Figure 4-4 Monitoring Messages of “Stop”

- (5) Click “Disable”. The motor is disabled. The monitoring messages in “Monitor” interface are as shown in Figure 4-5.



Figure 4-5 Monitoring Messages of “Disable”

NOTE: The motion mode under “Positioning Control” mode is divided into “Move Absolute”, “Move Absolute-Repetitive”, “Move Relative”, “Move Relative-Repetitive”, “Continuous-Backwards” and “Continuous-Forward”. Before switching the motion mode, if the motor is in motion, click the “Stop” button to stop the motor.

4.1.1 Move Absolute

- (1) As shown in Figure 4-6, enter the target position at ① after the motor is enabled. Tick or untick “Repetitive” according to demand.

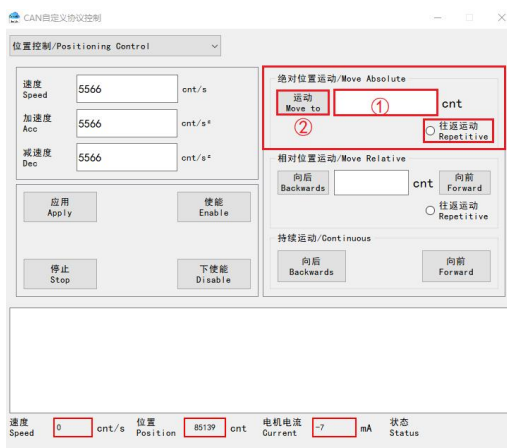


Figure 4-6 Positioning control - Move Absolute

- (2) Take target position as “0” as an example, click “Move to” at ②. The motor starts rotating. The monitoring messages in “Monitor” interface after ticking “Repetitive” are as shown in Figure 4-7, and the monitoring messages in “Monitor” interface without ticking “Repetitive” are as shown in Figure 4-8.

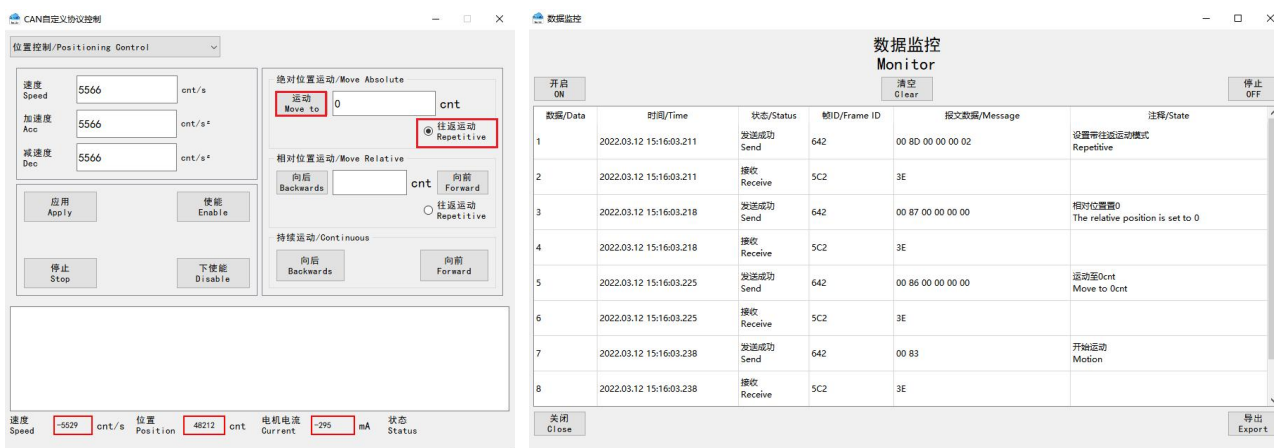


Figure 4-7 Monitoring messages of “Move Absolute-Repetitive”

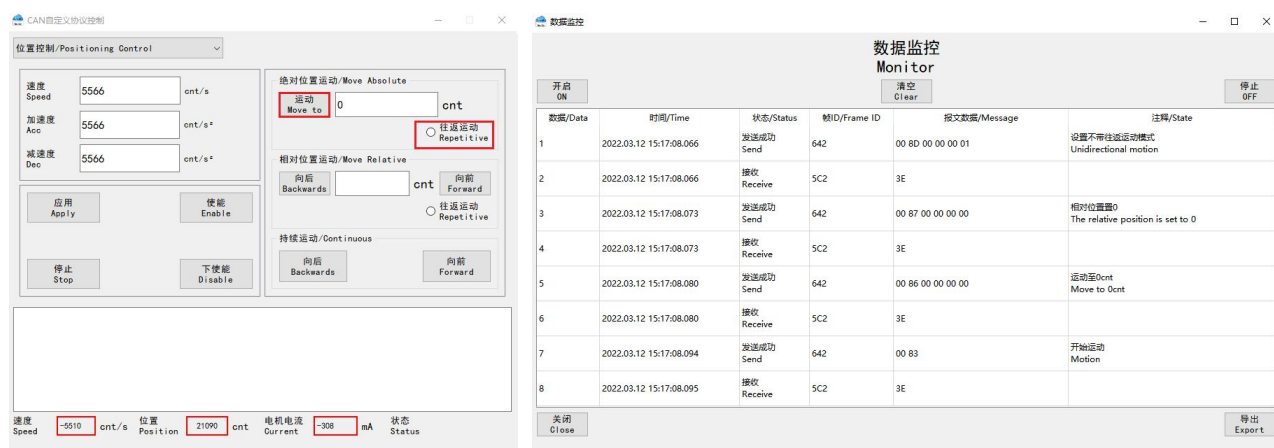


Figure 4-8 Monitoring messages of “Move Absolute” without “Repetitive”

4.1.2 Move Relative

- (1) As shown in Figure 4-9, enter relative displacement distance at ① after the motor is enabled. Tick or untick “Repetitive” according to demand.

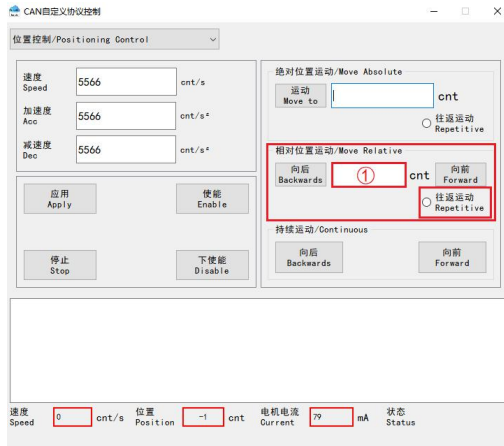


Figure 4-9 Move Relative

- (2) Tick “Repetitive” and click “Forward”. The monitoring messages in “Monitor” interface are as shown in Figure 4-10.

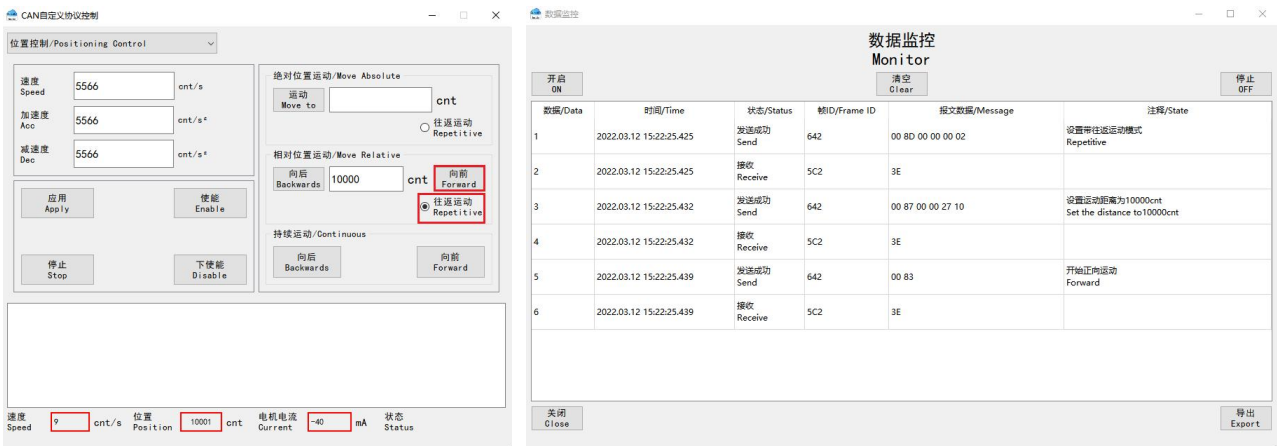


Figure 4-10 Move relative with “Repetitive” - “Forward”

- (3) Tick “Repetitive” and click “Backwards”. The monitoring messages in “Monitor” interface are as shown in Figure 4-11.

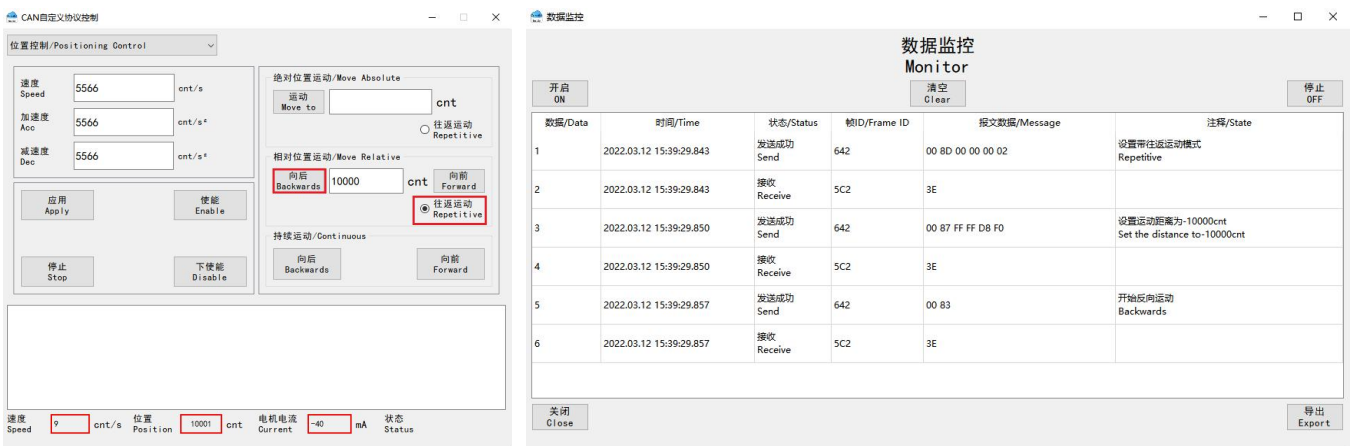


Figure 4-11 Move relative with “Repetitive” - “Backwards”

(4) Untick “Repetitive” and click “Forward”. The monitoring messages in “Monitor” interface are as shown in Figure 4-12.

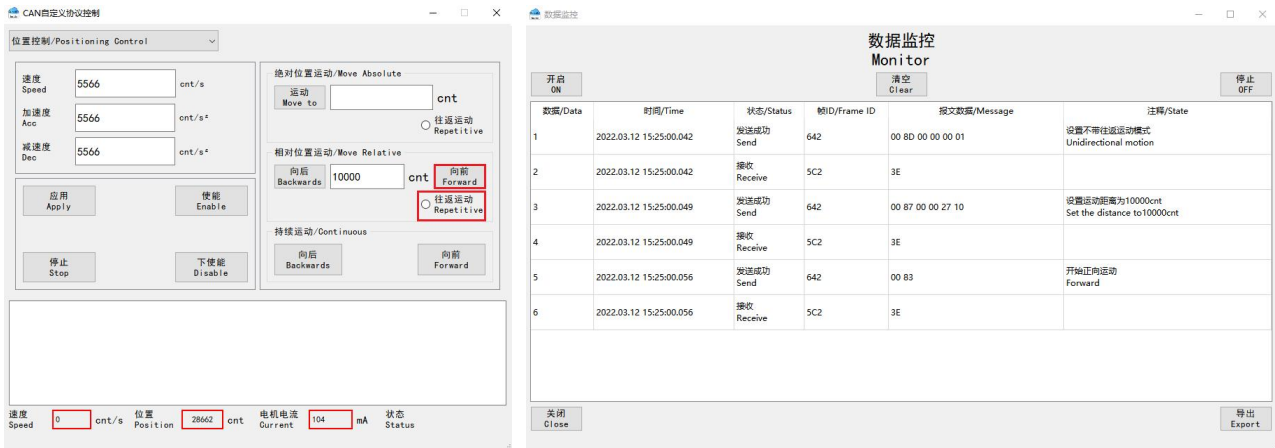


Figure 4-12 Move relative without “Repetitive” - “Forward”

(5) Untick “Repetitive” and click “Backwards”. The monitoring messages in “Monitor” interface are as shown in Figure 4-13.

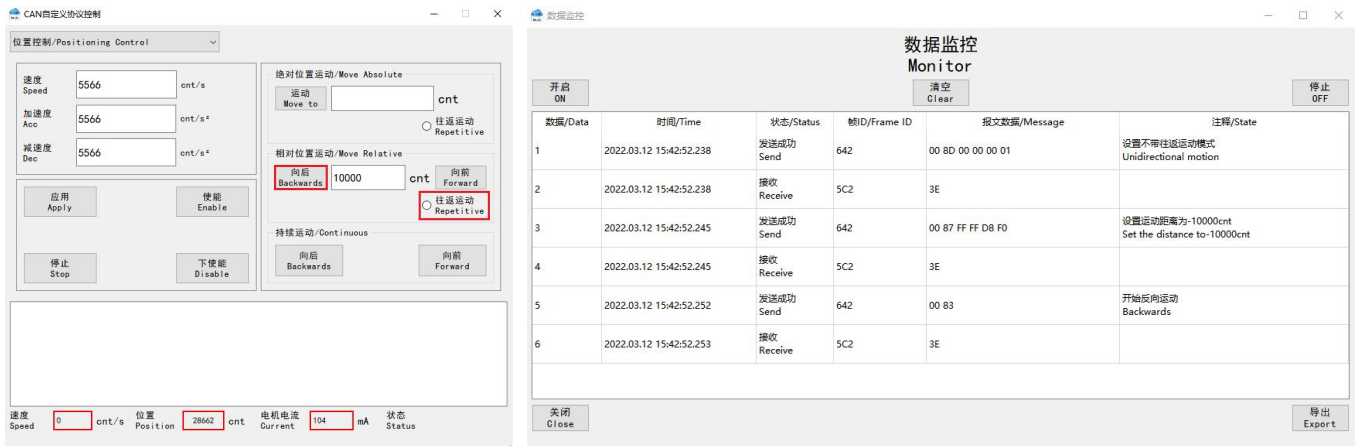


Figure 4-13 Move relative without “Repetitive” - “Backwards”

4.1.3 Move Continuous

(1) Click “Forward”. The monitoring messages in “Monitor” interface are as shown in Figure 4-14.

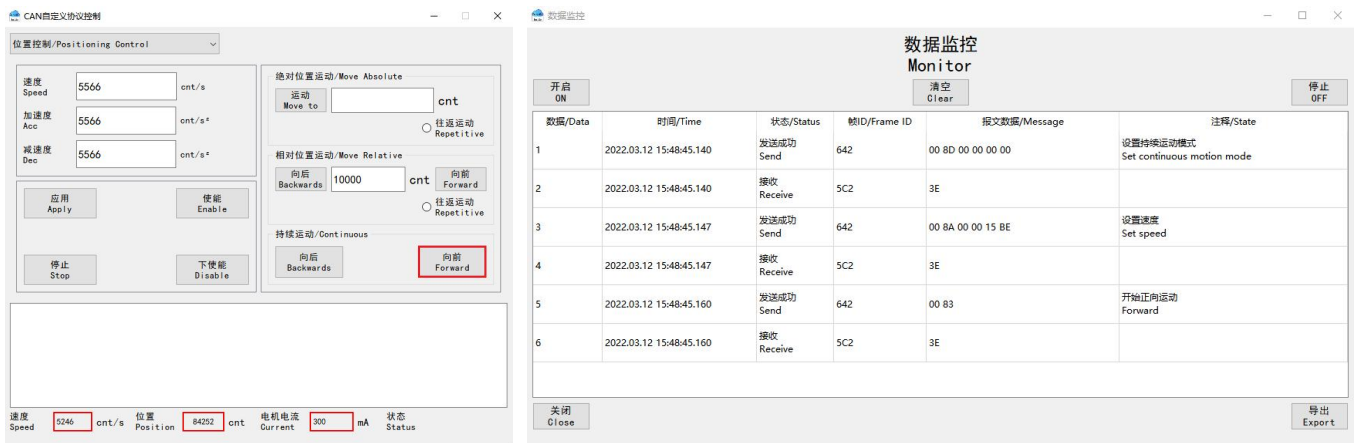


Figure 4-14 Move continuous - “Forward”

(2) Click “Backwards”. The monitoring messages in “Monitor” interface are as shown in [Figure 4-15](#).

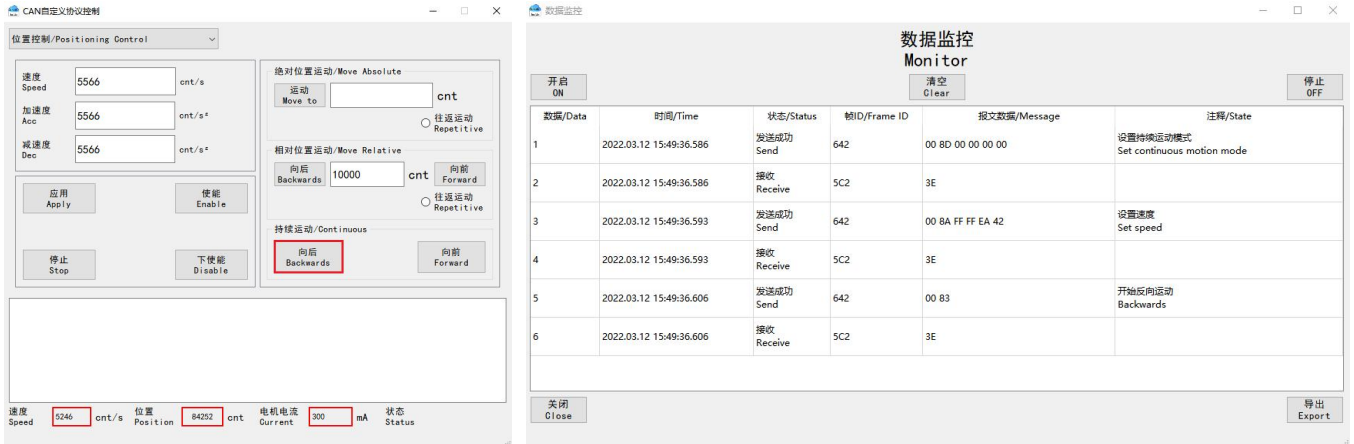
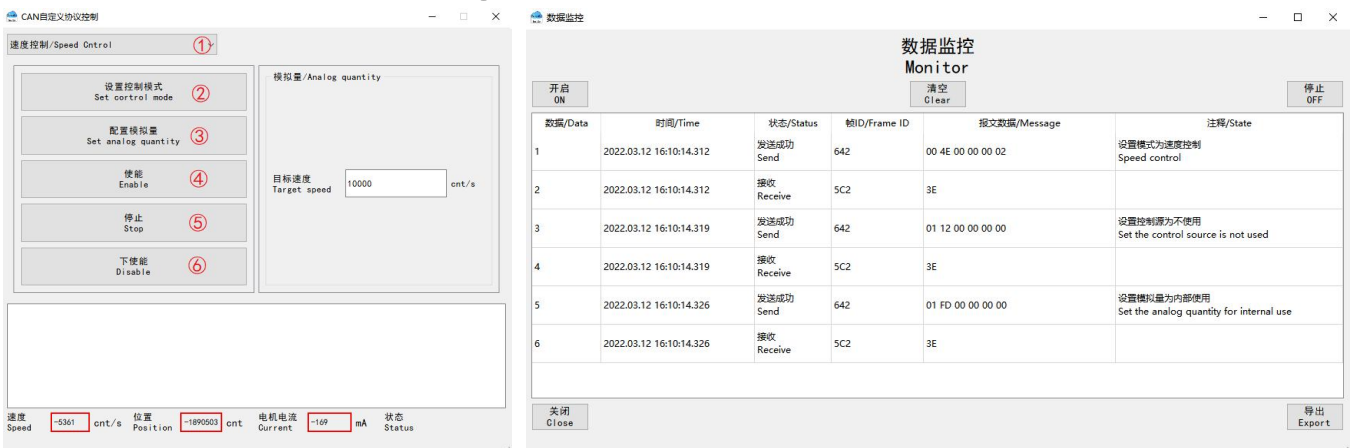


Figure 4-15 Move continuous - “Backwards”

4.2 Speed Control

(1) Select “Speed Control” mode at ①, as shown in [Figure 4-16a](#).



(a) Monitoring messages of “Speed control mode”

(b) Monitoring messages of “Set control mode”

Figure 4-16 Monitoring Messages

(2) Click “Set control mode” and set control mode to “Speed control”. The monitoring messages in “Monitor” interface are as shown in [Figure 4-16b](#).

(3) Click “set analog quantity” to set “analog quantity” on the right. Under this mode, the “analog quantity” is the “target speed”. The monitoring messages in “Monitor” interface are as shown in [Figure 4-17](#).



Figure 4-17 Monitoring messages of “Set analog quantity”

- (4) Click “Enable”. The motor is enabled and starts rotating at the target speed. The monitoring messages in “Monitor” interface are as shown in [Figure 4-18](#).



Figure 4-18 Monitoring messages of “Enable”

- (5) Click “Stop”. The current motion is stopped (set “analog quantity” to “0”). The monitoring messages in “Monitor” interface are as shown in [Figure 4-19](#). Reset Step 3 to set the “analog quantity” when restart.



Figure 4-19 Monitoring messages of “Stop”

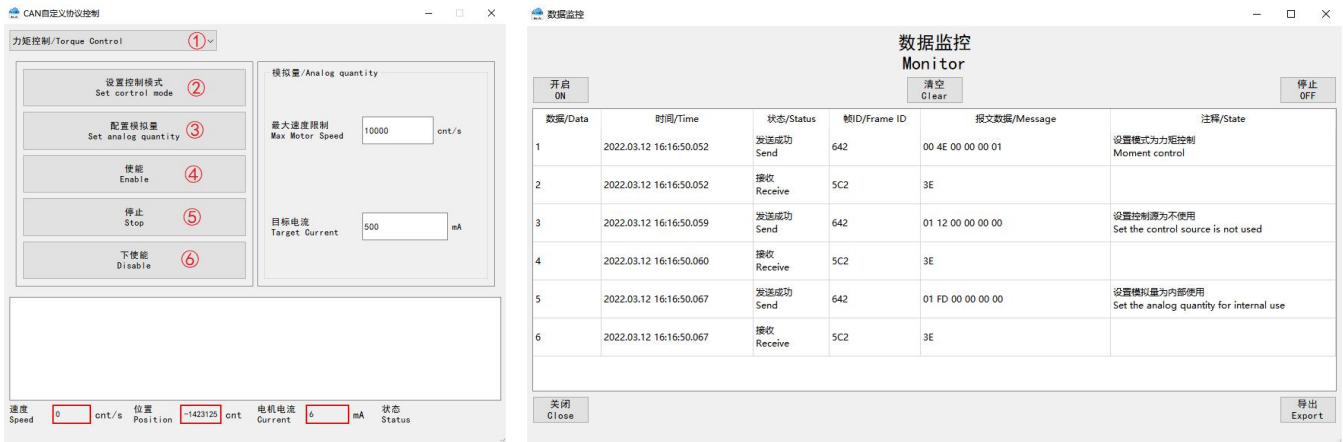
- (6) Click “Disable”. The motor is disabled. The monitoring messages in “Monitor” interface are as shown in [Figure 4-20](#). Disable the motor first before switching the control mode.



Figure 4-20 Monitoring messages of “Disable”

4.3 Torque Control

(1) Select “Torque Control” mode at ①, ss shown in Figure 4-21a.



(a) Torque control mode

(b) Monitoring messages of “Set control mode”

Figure 4-21 Interface Illustration

- (2) Click “Set control mode” and set control mode to “Torque control”. The monitoring messages in “Monitor” interface are as shown in Figure 4-21b.
- (3) Click “set analog quantity” to set “analog quantity” on the right and set the “maximum speed limit”. Under this mode, the “analog quantity” is the “target current”.The monitoring messages in “Monitor” interface are as shown in Figure 4-22.



Figure 4-22 Monitoring messages of “Set analog quantity”

- (4) Click “Enable”. The motor is enabled and starts to rotate. The monitoring messages in “Monitor” interface are as shown in Figure 4-23.



Figure 4-23 Monitoring messages of “Enable”

- (5) Click “Stop”. The current motion is stopped (set “analog quantity” to “0”). The monitoring messages in “Monitor” interface are as shown in [Figure 4-24](#). Reset Step 3 to set the “analog quantity” when restart.



The screenshot shows the '数据监控 Monitor' window with a table of monitoring messages. The table has columns for '数据/Data', '时间/Time', '状态/Status', '帧ID/Frame ID', '报文数据/Message', and '注释/State'. The first row shows a 'Send' message at 2022.03.12 16:13:29.720 with status '发送成功' and message '01 FE 00 00 00 00', with a note '停止 Stop'. The second row shows a 'Receive' message at the same time with status '接收' and message '3E'.

数据/Data	时间/Time	状态/Status	帧ID/Frame ID	报文数据/Message	注释/State
1	2022.03.12 16:13:29.720	发送成功 Send	642	01 FE 00 00 00 00	停止 Stop
2	2022.03.12 16:13:29.720	接收 Receive	5C2	3E	

Figure 4-24 Monitoring messages of “Stop”

- (6) Click “Disable”. The motor is disabled. The monitoring messages in “Monitor” interface are as shown in [Figure 4-25](#). Disable the motor first before switching the control mode.



The screenshot shows the '数据监控 Monitor' window with a table of monitoring messages. The table has columns for '数据/Data', '时间/Time', '状态/Status', '帧ID/Frame ID', '报文数据/Message', and '注释/State'. The first row shows a 'Send' message at 2022.03.12 15:57:03.496 with status '发送成功' and message '01 00 00 00 00 00', with a note '失能 Disable'. The second row shows a 'Receive' message at the same time with status '接收' and message '3E'.

数据/Data	时间/Time	状态/Status	帧ID/Frame ID	报文数据/Message	注释/State
1	2022.03.12 15:57:03.496	发送成功 Send	642	01 00 00 00 00 00	失能 Disable
2	2022.03.12 15:57:03.496	接收 Receive	5C2	3E	

Figure 4-25 Monitoring messages of “Disable”

Chapter 5 CANopen Protocol Control

Select “CANopen” in “Communication Protocol” of “Connection Settings” interface to open “CAN Motion Control” interface (as shown in Figure 5-1a). The “Monitor” interface is as shown in Figure 5-1b.

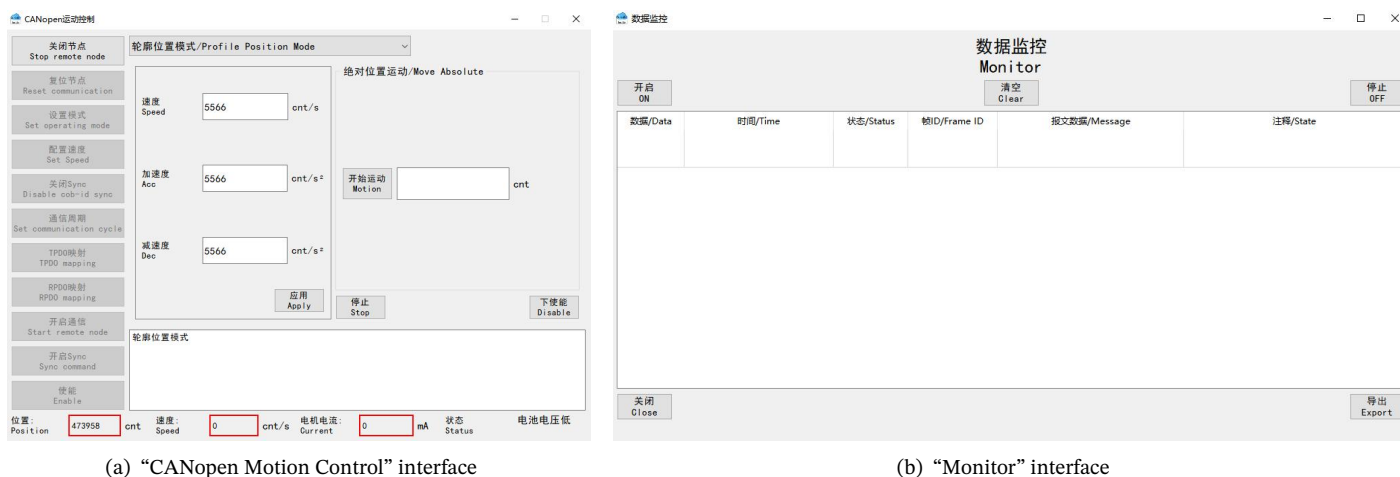


Figure 5-1 Interface Illustration

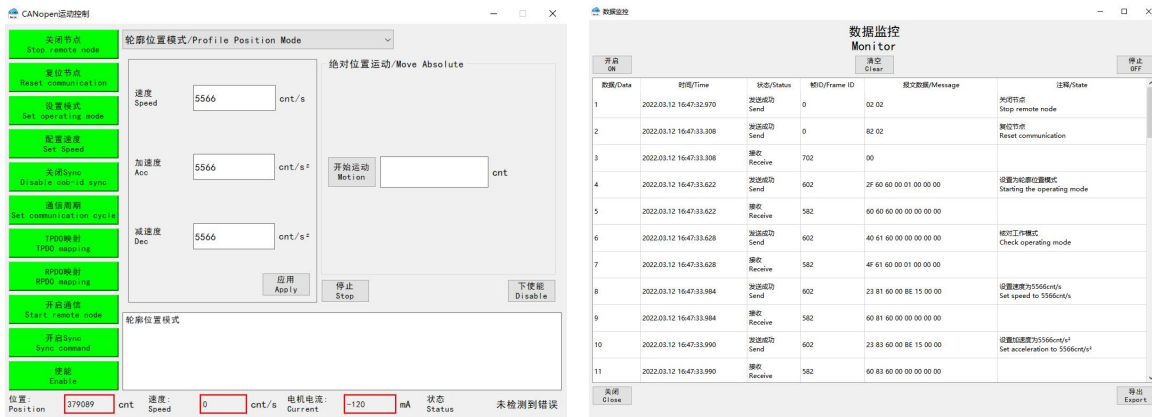
5.1 Profile Position Mode

(1) As shown in Figure 5-2, select “Profile Position Mode” at ①.



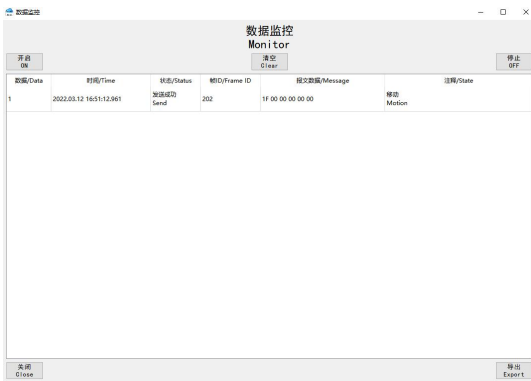
Figure 5-2 Profile position mode

(2) Complete related setting at ②. As shown in Figure 5-3a, the setting is completed. The “Monitor” interface is as shown in Figure 5-3b.



(a) Parameter setting (b) Monitoring messages under profile position mode
Figure 5-3 Interface Illustration

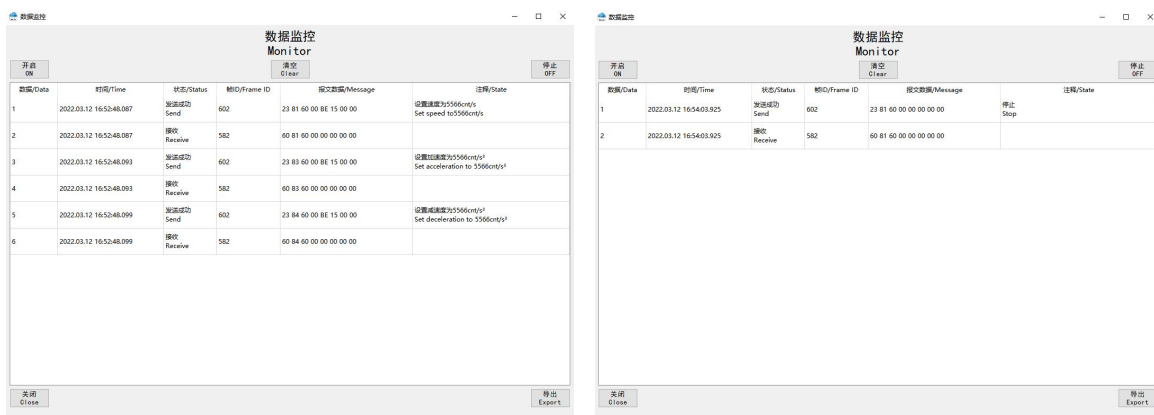
(3) Enter the target position at ③ in Figure 5-2. Take target position as “0” as an example.
 (4) Click “Motion”. The motor moves to the target position absolutely. The monitoring messages in “Monitor” interface are as shown in Figure 5-4.



NOTE: Repeat Step 3 and Step 4 can make the motor move to the new target position.

Figure 5-4 Monitoring messages of “Motion” under profile position mode

(5) Click “Apply”. Set the “speed”, “acceleration” and “deceleration”. The monitoring messages in “Monitor” interface are as shown in Figure 5-5a.



(a) Monitoring messages of “Apply” (b) Monitoring messages of “Stop”
Figure 5-5 Monitoring messages under profile position mode

(6) Click “Stop”. Set “speed” to “0” to stop rotating. The monitoring messages in “Monitor” interface are as shown in Figure 5-5b. Reset “speed” when restart.

- (7) Click “Disable”. The motor is disabled. The monitoring messages in “Monitor” interface are as shown in Figure 5-6. Disable the motor first and then proceed to Step 2 before switching motion modes.



Figure 5-6 Monitoring messages of “Disable”

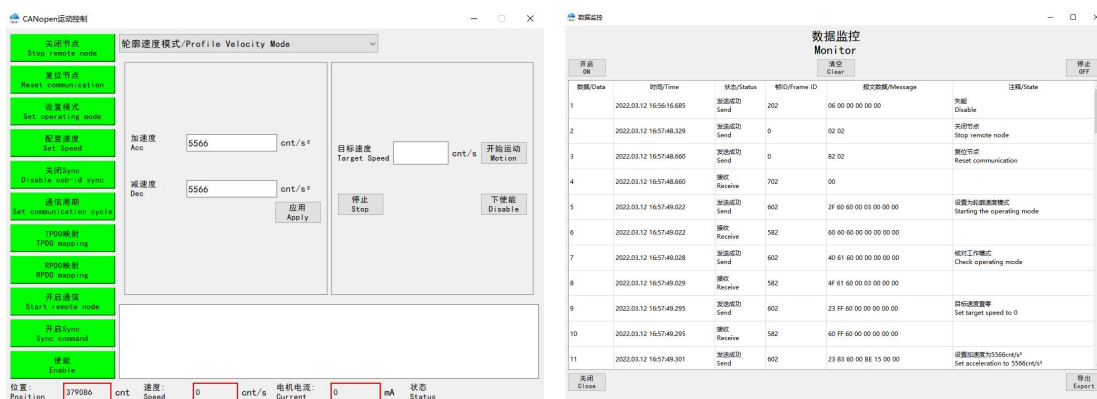
5.2 Profile Velocity Mode

- (1) As shown in Figure 5-7, select “Profile Velocity Mode” at ①.



Figure 5-7 Profile velocity mode

- (2) Complete related setting at ②. As shown in Figure 5-8a, the setting is completed. The “Monitor” interface is as shown in Figure 5-8b.



(a) Parameter setting

(b) Monitoring messages under profile velocity mode

Figure 5-8 Interface Illustration

- (3) Enter a decimal target speed at ③ in Figure 5-7. Take “5566” as an example.

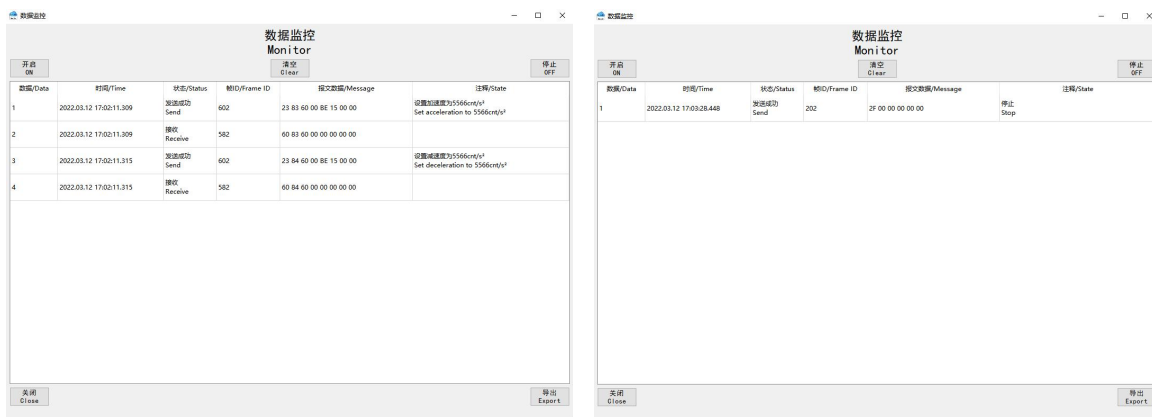
- (4) Click “Motion”. The motor starts to rotate at the target speed. The monitoring messages in “Monitor” interface are as shown in [Figure 5-9](#).



NOTE: Repeat Step 3 and Step 4 can make the motor move to the new target position.

Figure 5-9 Monitoring messages of “Motion” under profile velocity mode

- (5) Click “Apply”. Set “acceleration” and “deceleration”. The monitoring messages are as shown in [Figure 5-10a](#).
- (6) Click “Stop”. Set “target speed” to “0”. The monitoring messages in “Monitor” interface are as shown in [Figure 5-10b](#).



(a) Monitoring messages of “Apply”

(b) Monitoring messages of “Stop”

Figure 5-10 Monitoring messages under profile velocity mode

5.3 Profile Torque Mode

- (1) As shown in [Figure 5-11](#), select “Profile Torque Mode” at ①.



Figure 5-11 Profile torque mode

(2) Complete related setting at ②. As shown in Figure 5-12a, the setting is completed. The “Monitor” interface is as shown in Figure 5-12b.



(a) Parameter setting



(b) Monitoring messages under profile torque mode

Figure 5-12 Interface Illustration

(3) Enter target torque at ① in Figure 5-11. Take “40” as an example.
 (4) Click “Apply”. Apply the target torque and the motor starts to rotate. The monitoring messages in “Monitor” interface are as shown in Figure 5-13a.



(a) Monitoring messages of “Apply”



(b) Monitoring messages of “Stop”

Figure 5-13 Monitoring messages under profile torque mode

(5) Click “Stop”. Set “target torque” to “0”. The monitoring messages in “Monitor” interface are as shown in Figure 5-13b.

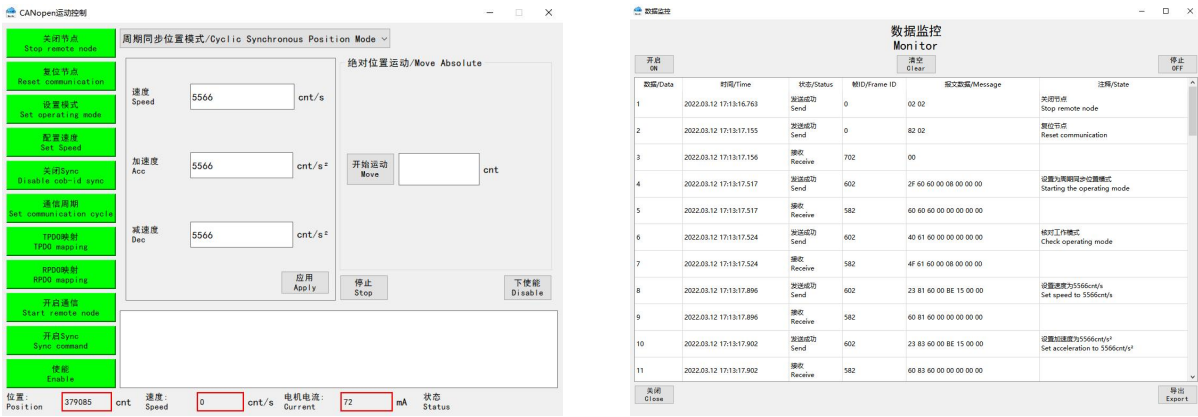
5.4 Cyclic Synchronous Position Mode

(1) As shown in Figure 5-14, select “Cyclic Synchronous Position Mode” at ①.



Figure 5-14 Cyclic synchronous position mode

- (2) Complete related setting at ②. As shown in Figure 5-15a, the setting is completed. The “Monitor” interface is as shown in Figure 5-15b.



(a) Parameter setting (b) Monitoring messages under cyclic synchronous position mode

Figure 5-15 Interface Illustration

- (3) Enter target position at ③ in Figure 5-14. Since the PC has not planned the trajectory of the position, the given position value should not be set too large. It is recommended to set it to “actual position ±1000 count” for testing.
- (4) Click “Motion”. The motor moves to the target position. The monitoring messages in “Monitor” interface are as shown in Figure 5-16.



Figure 5-16 Monitoring messages of “Motion” under cyclic synchronous position mode

5.5 Cyclic Synchronous Velocity Mode

- (1) As shown in Figure 5-17, select “Cyclic Synchronous Velocity Mode” at ①.



Figure 5-17 Cyclic synchronous velocity mode

(2) Complete related setting at (2). As shown in Figure 5-18a, the setting is completed. The “Monitor” interface is as shown in Figure 5-18b.

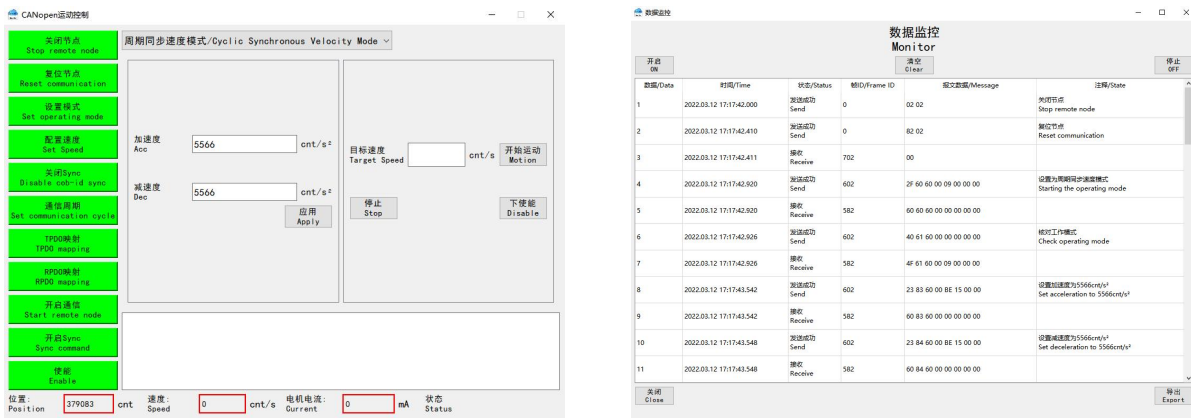


Figure 5-18 Interface Illustration

(3) Enter target velocity at (3) in Figure 5-17. Take “5566” as an example.
 (4) Click “Motion”. The motor rotates at the target speed. The monitoring messages in “Monitor” interface are as shown in Figure 5-19a.

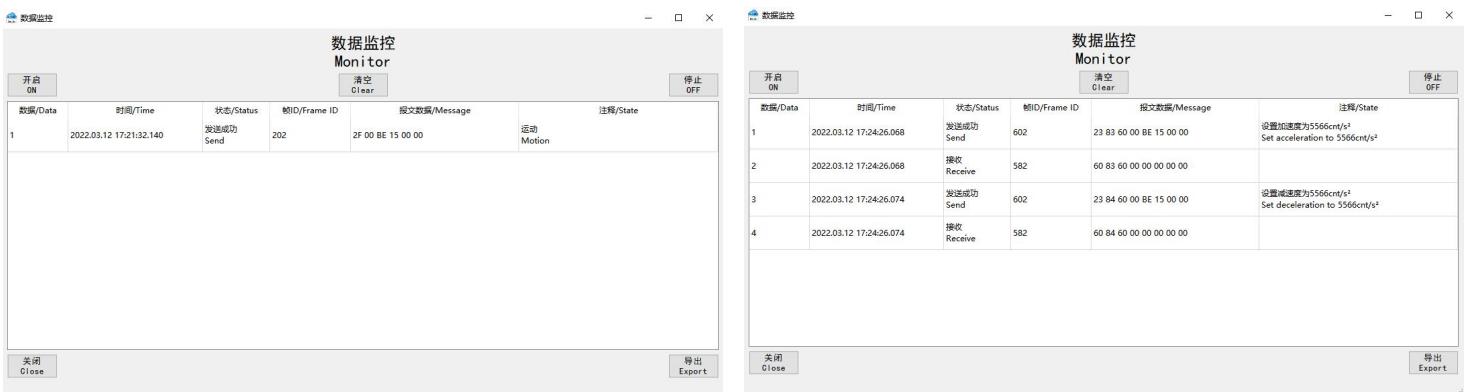


Figure 5-19 Monitoring messages under cyclic synchronous velocity mode

(5) Click “Apply”. Set “acceleration” and “deceleration”. The monitoring messages in “Monitor” interface are as shown in Figure 5-19b.
 (6) Click “Stop”. Set “target speed” to “0” to stop rotating. The monitoring messages in “Monitor” interface are as shown in Figure 5-20.

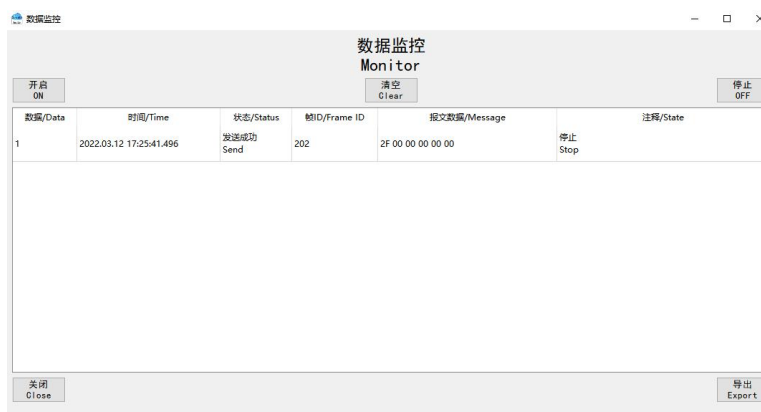


Figure 5-20 Monitoring messages of “Stop” under cyclic synchronous velocity mode

5.6 Cyclic Synchronous Torque Mode

(1) As shown in [Figure 5-21](#), select “Cyclic Synchronous Torque Mode” at ①.



Figure 5-21 Cyclic synchronous torque mode

(2) Complete related setting at ②. As shown in [Figure 5-22a](#), the setting is completed. The “Monitor” interface is as shown in [Figure 5-22b](#). This mode does not need to set “speed”.



(a) Parameter setting

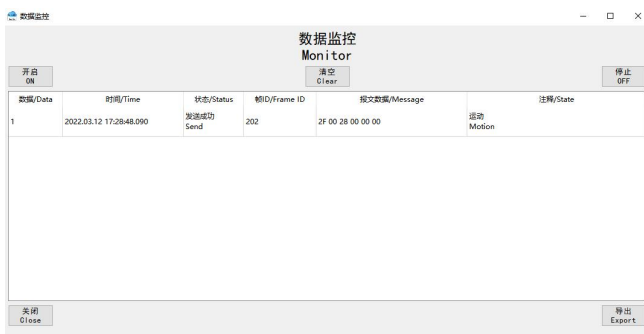


(b) Monitoring messages under cyclic synchronous torque mode

Figure 5-22 Interface Illustration

(3) Enter target torque at ③ in [Figure 5-21](#). Take “40” as an example.

(4) Click “Apply”. Apply the target torque and the motor rotates. The monitoring messages in “Monitor” interface are as shown in [Figure 5-23a](#).



(a) Monitoring messages of “Apply”



(b) Monitoring messages of “Stop”

Figure 5-23 Monitoring messages under cyclic synchronous torque mode

(5) Click “Stop”. Set “target torque” to “0” to stop the current motion. The monitoring messages in “Monitor” interface are as shown in [Figure 5-23b](#).

5.7 Interpolation Position Mode

(1) As shown in Figure 5-24, select “Interpolation Position Mode” at ①.

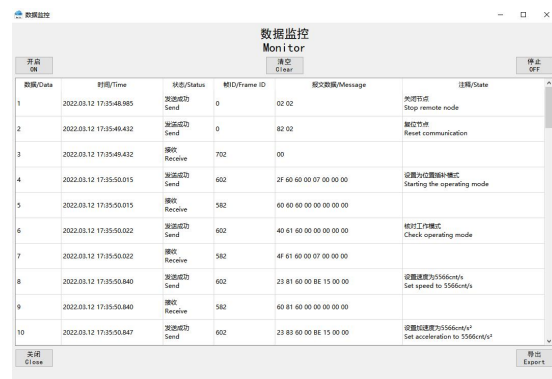


Figure 5-24 Interpolation position mode

(2) Complete related setting at ②. As shown in Figure 5-25a, the setting is completed. The “Monitor” interface is as shown in Figure 5-25b.



(a) Parameter setting



(b) Monitoring messages under interpolation position mode

Figure 5-25 Interface Illustration

(3) Enter target torque at ③ in Figure 5-24. Take “0” as an example.

(4) Click “Motion”. The motor moves to the interpolation position absolutely. The monitoring messages in “Monitor” interface are as shown in Figure 5-26a.

NOTE: Repeat Step 3 and Step 4 can change the PDO entered value.



(a) Monitoring messages of “Motion”



(b) Monitoring messages of “Stop”

Figure 5-26 Monitoring messages under interpolation position mode

(5) Click “Stop”. Set “speed” to “0” to stop rotating. The monitoring messages in “Monitor” interface are as shown in Figure 5-26b. Reset the “speed” when restart.

Chapter 6 Receive / Send Custom Data

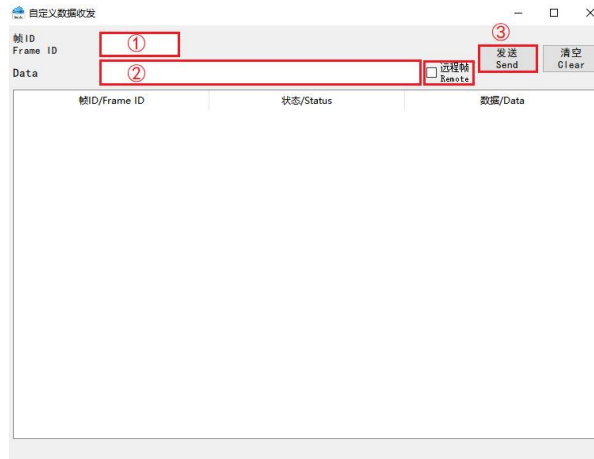


Figure 6-1 Custom data

- (1) Enter a hex frame ID at ① in Figure 6-1.
- (2) Enter message at ② in Figure 6-1. The message format should conform to the format in the “Monitor” interface.
- (3) Remote frame needs to tick “Remote”. Data frame does not need to tick “Remote”. The messages related to eRunner are data frames, except for “Heartbeats”.
- (4) Click “send” to send the data.

Note: do not use this interface to modify key parameters of the device.

Chapter 7 CAN Custom Protocol Instruction

7.1 Read Data

7.1.1 Send “read data” command

Table 7-1 Send “read data” command (without sub-index)

COB-ID	CAN Data Frame	
640 + Drive ID	CAN Command Index (2Byte)	
	High 8 Bits	Low 8 Bits
0x640 + ID	0xXX	0xXX

Table 7-2 Send “read data” command (with sub-index)

COB-ID	CAN Data Frame			
640 + Drive ID	CAN Command Index (2 Bytes)		CAN Sub-Index (2 Bytes)	
	High 8 bits	Low 8 bits	High 8 bits	Low 8 bits
0x64 + ID	0xXX	0xXX	0xXX	0xXX

7.1.2 Receive “read data” message

The return results of normal “read data” command are as shown in [Table 7-3](#).

Table 7-3 Receive “read data” message

COB-ID	CAN Data Frame				
5C0 + Drive ID	Value				End Delimiter
	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4
0x5C0 + ID	0xXX	0xXX	0xXX	0xXX	0x3E

End delimiter 3E indicates the returned data is successful. When the returned data is abnormal, the end delimiter is 0x80. The result is as shown in [Table 7-4](#):

Table 7-4 Messages of abnormal returning data

COB ID	CAN Data Frame
5C0 + Drive ID	End Delimiter
0x5C0 + ID	0x80

7.2 Write Data

7.2.1 Send “write data” command

Table 7-5 Send “write data” command (without sub-index)

COB-ID	CAN Data Frame					
640 + Drive ID	CAN Command Index		Value			
	Byte 0	Byte 1	Byte 3	Byte 4	Byte 5	Byte 6
0x640 + ID	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX

Table 7-6 Send “write data” command (with sub-index)

COB-ID	CAN Data Frame							
640 + Drive ID	CAN Command Index		CAN Sub-Index		Value			
	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x640 + ID	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX

7.2.2 Receive “write data” message

Table 7-7 Receive “write data” message

COB ID	CAN Data Frame
5C0 + Drive ID	End Delimiter
0x5C0 + ID	0x3E

Table 7-8 Return abnormal message

COB-ID	CAN Data Frame				
5C0 + Drive ID	Value				End Delimiter
	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4
0x5C0 + ID	0xXX	0xXX	0xXX	0xXX	0x3E

7.3 Write Command

7.3.1 Send “write command” command

Table 7-9 Send “write command” command (without parameters)

COB-ID	CAN Data Frame	
640 + Drive ID	CAN Command Index	
	Byte 0	Byte 1
0x640 + ID	0xXX	0xXX

For example, the process of writing a save command for a module with Node ID: 1 is:

- Message for sending the save command: 641 00 E8
- Message received after sending the save command: 5C1 3E

Table 7-10 Send “write command” command (with parameters)

COB-ID	CAN Data Frame					
640 + Drive ID	CAN Command Index		Value			
	Byte 0	Byte 1	Byte 3	Byte 4	Byte 5	Byte 6
0x640 + ID	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX

For example, the process of writing an enable and disable command for a module with Node ID: 1 is:

- Message for sending the enable command: 641 01 00 00 00 00 01
- Message received after sending the enable command: 5C1 3E
- Message for sending the disable command: 641 01 00 00 00 00 00
- Message received after sending the disable command: 5C1 3E

7.3.2 Receive “write command” message

Table 7-11 Receive “write command” message

COB ID	CAN Data Frame
5C0 + Drive ID	End Delimiter
0x5C0 + ID	0x3E

Table 7-12 Return abnormal message

COB-ID	CAN Data Frame				
5C0 + Drive ID	Value				End Delimiter
	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4
0x5C0 + ID	0xXX	0xXX	0xXX	0xXX	0x3E

7.4 CAN-custom protocol control message

7.4.1 Move Absolute (Take servo ID=1 as an example)

Steps	COB-ID	Message	Comment
1	641	00 4E 00 00 00 03	Set control mode to “Positioning control”
	5C1	3E	
2	641	00 8D 00 00 00 01	Set motion mode to “Move absolute”
	5C1	3E	
3	641	00 88 00 00 27 10	Set acceleration to “10000 count/s ² ”
	5C1	3E	
4	641	00 89 00 00 27 10	Set deceleration to “10000 count/s ² ”
	5C1	3E	
5	641	00 8A 00 00 27 10	Set “target speed” to “10000 count/s”
	5C1	3E	
6	641	01 00 00 00 00 01	The motor is enabled
	5C1	3E	
7	641	00 87 00 00 00 00	Set relative position to “0 count”
	5C1	3E	
8	641	00 86 00 04 00 00	Set target absolute position to “262144 count”, and the motion direction depends on whether the target position is incremented (forward movement) or decremented (backward movement) relative to the current position. (Note: eRobxx-xxxI-BS is eRob with singleturn encoder. It is suitable for motion position range of 0~360°, and corresponds to the encoder value range of 0~524287 count. That is, the actual position can exceed 1 turn, but the multiturn value will not be saved after power-off and restart.)
	5C1	3E	

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Steps	COB-ID	Message	Comment
9	641	00 83	Start movement
	5C1	3E	
10	641	00 05 00 01	Read actual speed
	5C1	00 00 27 30 3E	
11	641	00 02	Read current position
	5C1	00 6F 36 47	
12	641	00 08	Read current motor current
	5C1	00 00 02 E3 3E	
13	641	00 84	Stop movement
	5C1	3E	
14	641	01 00 00 00 00 00	The motor is disabled
	5C1	3E	

7.4.2 Move Relative (Take servo ID=1 as an example)

Steps	COB-ID	Message	Comment
1	641	00 4E 00 00 00 03	Set control mode to “Positioning control”
	5C1	3E	
2	641	00 8D 00 00 00 01	Set motion mode to “Move absolute”
	5C1	3E	
3	641	00 88 00 00 27 10	Set acceleration to “10000 count/s ² ”
	5C1	3E	
4	641	00 89 00 00 27 10	Set deceleration to “10000 count/s ² ”
	5C1	3E	
5	641	00 8A 00 00 27 10	Set “target speed” to “10000 count/s”
	5C1	3E	
6	641	01 00 00 00 00 01	The motor is enabled
	5C1	3E	
7	641	00 87 00 00 27 10	Set the relative motion position, such as “10000 count”. The motion direction depends on the positive or negative of the relative position value. The positive value moves forward, and the negative value moves backward.
	5C1	3E	
8	641	00 83	Start movement
	5C1	3E	
9	641	00 05 00 01	Read actual speed
	5C1	00 00 27 44 3E	
10	641	00 02	Read current position
	5C1	00 77 AA C1 3E	
11	641	00 84	Stop movement
	5C1	3E	
12	641	01 00 00 00 00 00	The motor is disabled
	5C1	3E	

7.4.3 Move Continuous (Take servo ID=1 as an example)

Steps	COB-ID	Message	Comment
1	641	00 4E 00 00 00 03	Set control mode to “Positioning control”
	5C1	3E	
2	641	00 8D 00 00 00 00	Set motion mode to “Move continuous” (equivalent to velocity mode, running continuously at the set speed.)
	5C1	3E	
3	641	00 88 00 00 75 30	Set acceleration to “30000 count/s ² ” (The MAX acceleration is 3 times of the set speed value.)
	5C1	3E	
4	641	00 89 00 00 75 30	Set deceleration to “30000 count/s ² ” (The MAX deceleration is 3 times of the set speed value.)
	5C1	3E	
5	641	00 8A 00 00 27 10	Set speed to “10000 count/s” (The rated speed refers to Chapter 12 in eRob Rotary Actuator User Manual). The speed can be modified in real time during movement and the motion direction depends on the positive or negative of the speed value.
	5C1	3E	
6	641	01 00 00 00 00 01	The motor is enabled
	5C1	3E	
7	641	00 83	Start movement
	5C1	3E	
8	641	00 05 00 01	Read actual speed
	5C1	00 00 75 CA 3E	
9	641	00 02	Read current position
	5C1	00 8D CA DE 3E	
10	641	00 84	Stop movement
	5C1	3E	
11	641	01 00 00 00 00 00	The motor is disabled
	5C1	3E	

7.4.4 Velocity Mode (Take servo ID=1 as an example)

Steps	COB-ID	Message	Comment
1	641	00 4E 00 00 00 02	Set control mode to “Velocity control”
	5C1	3E	
2	641	01 12 00 00 00 00	Set the control source to not use
	5C1	3E	
3	641	01 FD 00 00 00 00	Set the analog quantity to internal use
	5C1	3E	
4	641	00 88 00 00 75 30	Set acceleration to “30000 count/s ² ” (The MAX acceleration is 3 times of the set speed value.)
	5C1	3E	
5	641	00 89 00 00 75 30	Set deceleration to “30000 count/s ² ” (The MAX deceleration is 3 times of the set speed value.)
	5C1	3E	
6	641	01 FE 00 00 27 10	Set analog quantity to “10000 count/s” (The analog quantity is the target speed under this mode.)
	5C1	3E	

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Steps	COB-ID	Message	Comment
7	641	01 00 00 00 00 01	The motor is enabled
	5C1	3E	
8	641	00 08	Read current motor current
	5C1	00 00 02 E9 3E	
9	641	00 05 00 01	Read actual speed
	5C1	00 00 25 FE 3E	
10	641	00 02	Read current position
	5C1	00 9D 1F A2 3E	
11	641	01 00 00 00 00 00	The motor is disabled
	5C1	3E	

7.4.5 Torque Mode (Take servo ID=1 as an example)

Steps	COB-ID	Message	Comment
1	641	00 4E 00 00 00 01	Set control mode to “Torque control”
	5C1	3E	
2	641	01 12 00 00 00 00	Set the control source to not use
	5C1	3E	
3	641	01 FD 00 00 00 00	Set the analog quantity to internal use
	5C1	3E	
4	641	01 FE 00 00 03 E8	Set analog quantity to “1000 mA” (The analog quantity is the target current under this mode.)
	5C1	3E	
5	641	02 04 00 00 27 10	Set MAX speed limit to “10000 count/s”, and the parameter can only be modified under enabled state.
	5C1	3E	
6	641	01 00 00 00 00 01	The motor is enabled
	5C1	3E	
7	641	00 08	Read current motor current
	5C1	00 00 02 16 3E	
8	641	00 05 00 01	Read actual speed
	5C1	00 00 18 8A 3E	
9	641	00 05 00 01	Read current position
	5C1	00 A0 4E 7D 3E	
10	641	01 00 00 00 00 00	The motor is disabled
	5C1	3E	

7.5 Address Tables

7.5.1 Parameter and Variable Address Table

Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
1	3	Hardware Version	RO	—	The hardware version of eRob, in decimal.
1	4	Firmware Version	RO	—	The firmware version of eRob, in decimal.
2	—	Actual Position	RO	count	Output shaft actual position
5	1	Actual Speed	RO	count/s	Output shaft actual speed
8	—	Actual Motor Current	RO	mA	Real-Time Motor Current
9	—	U-Phase Current	RO	mA	Motor U-Phase Current
A	—	V-Phase Current	RO	mA	Motor V-Phase Current
D	—	U-Phase Voltage	RO	mV	Motor U-Phase Voltage
E	—	V-Phase Voltage	RO	mV	Motor V-Phase Voltage
F	—	W-Phase Voltage	RO	mV	Motor W-Phase Voltage
1F	—	Error Codes	RO	—	The real-time motor state value corresponds to: 0: No error; Error codes: Please refer to Section 7.2 in “eRob CANopen and EtherCAT User Manual” for more details.
20	—	Operation State	RO	—	0: Stop motion; 1: In motion; 3: Repeat stop.
22	—	Digital Quantity Input	RO	—	Read the external input state. Bit 0~5 correspond to IN1~6 respectively, and each bit state value corresponds to: 0-Switched OFF (logic input state OFF); 1-Switched ON (logic input state ON). The eRob rotary actuator only corresponds to IN1~2.
23	—	Analog Quantity Input	RO	mV	Read external analog quantity input
24	—	DC Bus Voltage	RO	mV	Read power input voltage
26	—	Power Temperature	RO	°C	Read drive power temperature
33	—	Continuous Current	RO	mA	Corresponding to the “Continuous current” in eTunner “Safe Power” interface .

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
34	—	Peak Current	RO	mA	Corresponding to the “Peak current” in eTunner “Safe Power” interface.
35	—	Peak Current Duration	RO	ms	Limit the peak current duration of the output motor.
43	—	CAN Address	RW	—	The CAN_ID number of eRob
44	—	CAN Baud Rate	RO	bps	The baud rate indicates the number of transmitted symbols per second, and is an index to measure the data transmission rate. It is expressed by the times that the carrier modulation state changes per unit time. It is set to 1 Mbps currently and cannot be changed.
4E	—	Operation Mode	RW	—	1: Torque control; 2: Velocity control; 3: Position control.
50	—	MAX Speed	RW	count/s	It is subject to the factory default setting.
52	—	Position Limit (MIN)	RW	count	The MIN position that the motor is allowed to move.
53	—	Position Limit (MAX)	RW	count	The MAX position that the motor is allowed to move
54	—	Permissible MAX Position Error	RW	count	The maximum permissible error value between the target position and the actual position of the motor. If the error exceeds this value, there will be an error report. The factory setting range of each eRob model: <ul style="list-style-type: none"> eRob70/eRob80/eRob90/eRob110: 5242~10484; eRob142: 1800~4320. This protection parameter can be adjusted according to the actual test of the application scenario.

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
55	—	Permissible MAX speed error	RW	count/s	<p>The maximum permissible error value between the target position and the actual speed of the motor. If the error exceeds this value, there will be an error report.</p> <p>The factory setting range of each eRob model:</p> <ul style="list-style-type: none"> eRob70/eRob80/eRob90/eRob110/eRob142: 42000~84000. <p>This protection parameter can be adjusted according to the actual speed error of the application scenario.</p>
56	—	Struck current	RW	mA	<p>This parameter is set according to the percentage of continuous current, and the factory setting of each eRob model corresponds to:</p> <ul style="list-style-type: none"> eRob70/eRob80/eRob90: 120% continuous current; eRob110/eRob142: 110% continuous current.
57	—	Struck speed	RW	count/s	<p>When the motor current is greater than the struck current and the motor speed is lower than the struck speed, and this condition persists for longer than the struck time. Motor struck error is triggered, and the motor current output is cut off.</p>
58	—	Struck time	RW	ms	The struck duration.
62	—	MAX phase current	RW	mA	Corresponding to the “Max Phase Current” in “Safe Power” interface in eTunner Software.
63	—	MAX Motor Current	RW	mA	Corresponding to the “Max motor current” in “Safe Power” interface in eTunner.
64	—	Position Loop Gain	RW	—	<p>The factory settings can be adapted to over 85% of the application scenarios. If manual adjustment is required, you can use the “Oscilloscope” in the eTunner to collect the corresponding target instructions and feedback instructions for fine-tuning.</p>
66	—	Speed Loop Gain	RW	—	
67	—	Speed Loop Integral	RW	—	
86	—	Target Absolute Position	RW	count	Set the target position to which the motor moves.

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
87	—	Relative Position	RW	count	Set this value to “0” before moving to the absolute target position.
88	—	Profile Acceleration	RW	count/s ²	The maximum recommended profile acceleration value is 3 times of the set profile speed value.
89	—	Profile Deceleration	RW	count/s ²	The recommended maximum profile deceleration value is 3 times of the set profile speed value.
8A	—	Profile Speed	RW	count/s	Please refer to Chapter 2 in “eRob Rotary Actuator User Manual”. The set profile speed does not exceed the maximum output rotational speed.
8B	—	Jerk Setting	RW	μs	This value corresponds to: 0: 50 μs ; 1: 100 μs ; 2: 200 μs ; 3: 400 μs ; 4: 800 μs ; 5: 1600 μs ; 6: 3200 μs ; 7: 6400 μs ; 8: 12800 μs ; 9: 25600 μs .
8C	—	Emergency Stop deceleration	RW	count/s ²	The motor emergency stop deceleration when a temperature alarm occurs or the limit is reached.
8D	—	Motion Mode	RW	—	The corresponding value of the motion mode : 0: Move continuous (equivalent to velocity mode, running continuously at the set speed); 1: Target position mode; 2: Move repetitive mode.
93	—	Stop Time	RW	ms	The rotating stop time under move repetitive mode.
9C	—	Motor Angle	RO	count	The encoder position when the motor rotates.
9E	—	Limit Move (ACC, DEC)	RW	—	0: The motion is only limited by the permissible maximum speed; 1: The motion is limited by acceleration and deceleration.

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
9F	—	Load Angle	RO	count	The encoder singleturn value (0°~ 360°) when the load end rotates.
FD	—	The error in the sum of the three-phase currents	RW	mA	The error of the U/V/W-phase current sum of the motor.
FE	—	W-Phase Current	RO	mA	Motor W-phase current.
FF	—	COM No.	RW	—	The ID of RS485 COM interface
109	—	Positioning Completion Threshold	RW	count	When the position following error is less than the setting value of the <i>positioning completion threshold</i> , and the duration exceeds the <i>judgment time of positioning completion</i> , the positioning is considered to be completed.
10A	—	Judgment time of positioning completion	RW	ms	
10C	—	State of achieving the target	RO	—	<ul style="list-style-type: none"> • 0: Power OFF the motor; • 1: Power ON the motor; • 2: In motion; • 3: Wait for the positioning time to be cleared; • 4: Achieve the target.
112	—	Control Source	RW	—	<ul style="list-style-type: none"> • 0: Do not use; • 1: EtherCAT; • 16: Screw driver.
114	—	Reset the load end encoder	—	—	When multiturn battery related alarm occurs (singleturn rotary actuators do not have this alarm), after troubleshooting, write 1 to reset the load end encoder and clear the alarm. Note: If sends this command in other cases, the encoder multiturn value will be cleared. Please refer to Section 9.4 Position and cautions of rotary actuator with multi-turn function in “eRob Rotary Actuator User Manual”.

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
124	—	Use bus to adjust PID	RW	—	Whether the position loop and speed loop parameters can be modified through ECAT depends on this parameter value: <ul style="list-style-type: none"> • 0: NO; • 1: YES.
129	—	MAX Torque Output	RW	0.10%	Set the peak current based on this value in thousandths of the continuous current
204	—	MAX Speed Limit	RW	count/s	This parameter is the speed limit under the torque control mode. It can only be modified when the motor is disabled.
20D	—	Actual Torque	RO	mNm	Only supported by eRob with torque sensors (eRobxxxxxxxx-xx-18xT)
Note: Parameter index 232 is compatible only with eRob firmware version X5061715X or newer.					
232	1	eRob Sequence Number	RO	—	Record the eRob's sequence number in decimal format.
232	2	eRob Model Information	RO	—	Record the eRob model-related information. Every 4-bit segment represents a specific type of information in HEX format: <ul style="list-style-type: none"> • bit0~bit3: Housing Type • bit4~bit7: Motor Type • bit8~bit11: Mounting Type • bit12~bit15: Gear Ratio • bit16~bit19: eRob Outer Diameter(OD)
232	5	eRob Model Information	RO	—	Record the eRob model-related information. Each 4-bit segment represents a specific type of information in HEX format: <ul style="list-style-type: none"> • bit0~bit3: Output Encoder Configuration • bit4~bit7: Torque Sensor Presence (Yes/No) • bit8~bit11: Communication Type • bit12~bit15: Through Hole Diameter • bit16~bit19: Brake Presence (Yes/No) • Bit20~Bit23: SWG Type • Bit24~Bit27: Mounting Type

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
232	6	eRob Hardware Change Information	RO	—	Record hardware changes in decimal format.
232	7	eRob I/O Functionality Information	RO	—	Record whether the CANOpen version of the eRob's PCBA board includes I/O functionality. The corresponding values are: <ul style="list-style-type: none"> • 0: Without IO functionality • 1: With IO functionality Note: The EtherCAT version of the eRob always includes I/O functionality, and this parameter is set to 0.
232	8	eRob Part Number	RO	—	Record eRob part number. Each 4-bit group in the 16-bit HEX represents specific information: <ul style="list-style-type: none"> • bit0~bit3: Motor version • bit4~bit7: Motor housing version • bit8~bit11: Mechanical version (visible) • bit12~bit15: SWG model number • bit16~bit19: Driver version • bit20~bit23: Mechanical version (non-visible) • bit24~bit31: Reserved
Note: Parameter index 232 is compatible only with eRob firmware version X5061715X or newer.					

7.5.2 Command Address

Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
83	—	Start Motion	—	—	When the servo receives this command, the motor starts to operate at the set acceleration and speed.
84	—	Stop Motion	—	—	When the servo receives this command, the motor decelerates and stops at the set deceleration.
E8	—	Save	—	—	Save the parameters. Enter the parameter and wait for 3s. Do not power off or restart until the save is completed.

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Index (HEX)	Sub-Index (HEX)	Definition	Attribute	Unit	Description
100	—	Enabled Motor	RW	—	Control the motor to be enabled or disabled: <ul style="list-style-type: none"> • 0: disabled (the motor is disabled and the brake is engaged); • 1: enabled (the motor is enabled and the brake is disengaged).
14F	—	Disengage Brake	—	—	Please refer to Section 7.3 in “eRob Rotary Actuator User Manual”.

7.5.3 eRob Information Construction

7.5.3.1 eRob Serial Number Construction

The eRob serial number is constructed using the following equation:

$$\text{Serial Number} = \underbrace{\text{eRob Outer Diameter Code}}_{3 \text{ digits}} + \underbrace{\text{eRob Sequence Number}}_{8 \text{ digits}} \quad (7.1)$$

Definition	Index (HEX)	Sub-Index (HEX)	Bit	Description	
eRob Sequence Number	232	1	—	It is a decimal value that must be converted to an 8-bit binary string. If the binary result contains fewer than 8 digits, leading zeros should be added to ensure it is exactly 8 digits long.	
eRob Outer Diameter Code	232	2	bit16-bit19	Value	eRob OD Code
				1, 7, 8	070
				2	080
				3	090
				4	110
				5	142
				6	170

EXAMPLE eRob Outer Diameter Code has a value of 1, the eRob Sequence Number is 1111.

SOLUTION Referring to the table above, the resulting eRob OD Code is 070, the eRob Sequence Number’s 8-bit binary representation is 00001111.

$$\left. \begin{array}{l} \text{eRob Outer Diameter Code} = 070 \\ \text{eRob Sequence Number} = 00001111 \end{array} \right\} \Rightarrow 0700001111$$

7.5.3.2 eRob Model Code Construction

The eRob Model Code is constructed using the following equation:

$$\text{eRob Model} = \text{"eRob"} + \underbrace{\text{OD}}_{2-3 \text{ digits}} + \underbrace{\text{SWG}}_{1 \text{ digit}} + \underbrace{\text{GR}}_{2-3 \text{ digits}} + \underbrace{\text{FF}}_{2-3 \text{ digits}} + \text{"-"} + \underbrace{\text{BK}}_{1 \text{ digit}} + \underbrace{\text{ENC}}_{1-2 \text{ digit}} + \text{"-18"} + \underbrace{\text{COM}}_{1 \text{ digit}} + \underbrace{\text{VTS}}_{1 \text{ digit}} \quad (7.2)$$

Code	Definition	Index (HEX)	Sub-Index (HEX)	Bit	Description
OD	eRob Outer Diameter	232	2	bit16-bit19	Value eRob OD
					1, 7, 8 70
					2 80
					3 90
					4 110
					5 142
SWG	eRob Strain Wave Gearbox Type	232	5	bit20-bit23	Value eRob SWG Type
					1 F
GR	eRob Gear Ratio	232	2	bit12-bit15	Value eRob GR
					1 50
					2 80
					3 100
					4 120
FF	eRob Form Factor	232	5	bit24-bit27	Value eRob FF
					1 I
					2 T
					3 BI
BK	eRob Brake	232	5	bit16-bit19	Value eRob Brake
					1 F
ENC	eRob Encoder Type	232	5	bit0-bit3	Value eRob Output Encoder
					1 S
					2 M
					3 HS
COM	eRob Communication Type	232	5	bit8-bit11	Value eRob Communication Type
					1 E
VTS	eRob Virtual Torque Sensor	232	5	bit4-bit7	Value eRob Virtual Torque Sensor
					1 N
					2 T



EXAMPLE An eRob returns the following value:

Parameter	Value
OD	1
SWG	1
GR	1
FF	1
BK	1
ENC	1
COM	1
VTS	1

SOLUTION Referring to the table above, the results are:

Parameter	Value	Actual Value
OD	1	70
SWG	1	F
GR	1	50
FF	1	I
BK	1	F
ENC	1	S
COM	1	E
VTS	1	N



$$\text{eRob Model} = \text{"eRob"} + \underbrace{\text{OD}}_{2-3 \text{ digits}} + \underbrace{\text{SWG}}_{1 \text{ digit}} + \underbrace{\text{GR}}_{2-3 \text{ digits}} + \underbrace{\text{FF}}_{2-3 \text{ digits}} + \text{"-"} + \underbrace{\text{BK}}_{1 \text{ digit}} + \underbrace{\text{ENC}}_{1-2 \text{ digit}} + \text{"-18"} + \underbrace{\text{COM}}_{1 \text{ digit}} + \underbrace{\text{VTS}}_{1 \text{ digit}}$$

$$\text{eRob Model} = \text{"eRob"} + \underbrace{70}_{\text{OD}} + \underbrace{F}_{\text{SWG}} + \underbrace{50}_{\text{GR}} + \underbrace{I}_{\text{FF}} + \text{"-"} + \underbrace{F}_{\text{BK}} + \underbrace{S}_{\text{ENC}} + \text{"-18"} + \underbrace{E}_{\text{COM}} + \underbrace{N}_{\text{VTS}}$$

$$\text{eRob Model} = \text{eRob70F50I-FS-18EN}$$

7.5.3.3 eRob Hardware Information Construction

The eRob Hardware Information is constructed using the following equation:

$$\text{Hardware Information} = \underbrace{\text{HV}}_{4 \text{ digits}} + \text{"_"} + \underbrace{\text{HCI}}_{1 \text{ digit}} + \text{"_"} + \underbrace{\text{CSI}}_{1 \text{ digit}} \quad (7.3)$$

Code	Definition	Index (HEX)	Sub-Index (HEX)	Bit	Description
HV	eRob Hardware Version	1	3	—	4 digits hardware version of eRob identification code.
HCI	eRob Hardware Change Identification Code	232	6	—	1 digit hardware change of eRob identification code.
CSI	eRob CANopen Version IO Support Identification Code	232	7	—	1 digit CANopen type eRob IO support capability identification code.



EXAMPLE An eRob returns the following value:

Parameter	Value
HV	1005
HCI	1
CSI	1

SOLUTION Referring to the table above, the results are:

$$\text{Hardware Information} = \underbrace{\text{HV}}_{4 \text{ digits}} + \text{"_"} + \underbrace{\text{HCI}}_{1 \text{ digit}} + \text{"_"} + \underbrace{\text{CSI}}_{1 \text{ digit}}$$

$$\text{Hardware Information} = \underbrace{1005}_{\text{HV}} + \text{"_"} + \underbrace{1}_{\text{HCI}} + \text{"_"} + \underbrace{1}_{\text{CSI}}$$

$$\text{Hardware Information} = 1005_1_1$$

7.5.3.4 eRob Part Number Information Construction

The eRob Part Number Information is constructed using the following equation:

$$\text{Part Number} = \text{"MC"} + \underset{1 \text{ digit}}{\text{MV}} + \underset{1 \text{ digit}}{\text{eRobV}} + \text{"."} + \underset{1 \text{ digit}}{\text{FFV}} + \underset{1 \text{ digit}}{\text{SWG}} + \text{"."} + \underset{1 \text{ digit}}{\text{DV}} + \underset{1 \text{ digit}}{\text{NVMV}} \quad (7.4)$$

Code	Definition	Index (HEX)	Sub-Index (HEX)	Bit	Description		
MV	eRob Motor Version	232	8	bit0-bit3	Value	eRob Motor Version	
					1	1	
					2	2	
eRobV	eRob Version	232	8	bit4-bit7	Value	eRob Version	
					A	V3	
					B	V4	
					C	N/A	
					D	V5	
FFV	eRob Form Factor Verison	232	8	bit8-bit11	Value	Descriptions	
					1~8	N/A	
					9	Original back cover.	
					A	Added 4 threded holes.	
					B	Added dust-proofing structure.	
					C	Added dust-proofing structure.	
					D	Added output flange mounting screws.	
E	Added CE marking.						
★ SWG	eRob SWG Verison	232	8	bit12-bit15	Value	eRob SWG Version	<ul style="list-style-type: none"> • Uppercase Ver. Code: Normal Grease • Lowercase Ver. Code: Low-Temp Grease
					1	A	
					2	B	
					3	C	
					4	c	
					5	D	
					6	d	
					7	E	
8	e						
DV	eRob Driver Verison	232	8	bit16-bit19	Value	eRob Driver Version	
					1~E	1~E	
NVMV	eRob Non-Visible Mechanical Verison	232	8	bit20-bit23	Value	eRob Non-Visible Mechanical Verison	
					1	A	
					2	B	
					3	C	
					4	D	
5	E						

EXAMPLE An eRob returns the following value:

Parameter	Value
MV	2
eRobV	A
FFV	B
SWG	3
DV	D
NVMV	5

SOLUTION Referring to the table above, the results are:

Parameter	Value	Code
MV	2	2
eRobV	A	A
FFV	B	B
SWG	3	C
DV	D	D
NVMV	5	E

$$\text{Part Number} = \text{"MC"} + \underbrace{\text{MV}}_{1 \text{ digit}} + \underbrace{\text{eRobV}}_{1 \text{ digit}} + \text{"."} + \underbrace{\text{FFV}}_{1 \text{ digit}} + \underbrace{\text{SWG}}_{1 \text{ digit}} + \text{"."} + \underbrace{\text{DV}}_{1 \text{ digit}} + \underbrace{\text{NVMV}}_{1 \text{ digit}}$$

$$\text{Part Number} = \text{"MC"} + \underbrace{\text{2}}_{\text{MV}} + \underbrace{\text{A}}_{\text{eRobV}} + \text{"."} + \underbrace{\text{B}}_{\text{FFV}} + \underbrace{\text{C}}_{\text{SWG}} + \text{"."} + \underbrace{\text{D}}_{\text{DV}} + \underbrace{\text{E}}_{\text{NVMV}}$$

$$\text{Part Number} = \text{MC2A.BC.DE}$$



Appendix A CAN-Custom Communication Protocol Error Code List

#	Error Code (HEX)	Error Definition	Troubleshooting Suggestions
1	0x0015	The parameter assignment or function call are not valid during motion	Please check if there are any parameters or commands that are not supported for modification during the enablement and motion process.
2	0x0016	The parameter assignment or function call are not valid with motor ON	
3	0x001F	Can't do motor on if commutation was not found yet	Please refer to Section 5.1.1 in the "eRob CANopen and EtherCAT User Manual". Ensure that after the eRob module is powered on, the master controller should wait for a minimum delay of 8 seconds before sending commands to the eRob module.
4	0x0027	Can't start motion if motor is OFF	Please check that the " Enable Motor " command is sent before sending the " Start Motion " command. If an error occurs after enabling the motor, please first troubleshoot the issue, clear the error, and then send the " Enable Motor " and " Start Motion " commands again.
5	0x0030	Attempting to start motion with an invalid motion mode value	Please check the setting of the " Operation Mode " to ensure its accuracy. This error can occur if it is set to -1.
6	0x0032	This function requires a parameter	Please refer to Section 7.3 for the correct message format to send a write command.
7	0x0033	This function does not require any parameters	Please refer to Section 7.3 for the correct message format to send a write command.
8	0x0056	If the relay is not activated, the motor cannot be enabled	Please ensure that after the eRob module is powered ON, the master controller waits for a minimum delay of 8 seconds before sending commands to the eRob module.
9	0x014A	Brake control is not being used	Please check the "Brake Type" setting in the "Motor" interface of the eTunner PC software. Ensure that it is configured as "Electromagnetic". If it is set to "Not Used," sending brake control commands will result in this error.

Declaration

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ZEROERR CONTROL CO.,LTD

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