

## Easy to use flowchart



Send One Frame   
  Send   
  Frames   
 Increase Frame ID

Frame ID(HEX):    
 Data(HEX):

Send Times:    
 Send Interval(ms):

Send One Frame   
  Send   
  Frames   
 Increase Frame ID

Frame ID(HEX):    
 Data(HEX):

Send Times:    
 Send Interval(ms):

Send One Frame   
  Send   
  Frames   
 Increase Frame ID

Frame ID(HEX):    
 Data(HEX):

Send Times:    
 Send Interval(ms):

Position Data                      Speed Data

# 1. Analysis of motor command format

## 1.1. Message format analysis

As shown in the figure, we first conduct a simple analysis of the message format.

```

Identifier: start frame: 0
Device address: 00000~11110 Broadcast address: 11111 (Default device address is: 00001)
Instruction address: 00000~11111
Reply flag: 0: No reply required, 1: Reply required
Example: When the ID is 1, 0 00001 00000 1 is converted into hexadecimal 0x41.
Start frame device address command address reply flag
Frame format: data frame
Frame type: standard frame
  
```

Based on the device address range, it can be concluded that the command can simultaneously control up to thirty motors, and the conversion process is as follows:

### Online base conversion

Support arbitrary conversion between 2~36 decimal systems:

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Binary ▼

Convert numbers:

Fill in the value you want here, usually choose the decimal system

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Base 10 ▼

Convert the results:

## 1.2. Motor instruction ID range

Based on the example of ID conversion, it can be concluded that the current valid instruction ID range for motor 1 is 41-69. The conversion process is as follows:

## Online base conversion

Support arbitrary conversion between 2~36 decimal systems

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Binary

Convert numbers

Fill in the value you want here, usually choose the decimal system

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Hexadecim

Convert the results

Here is the result of the conversion of the values filled in above, and the hexadecimal system is generally selected X's in the code, and if the number of digits is insufficient, it is generally necessary to fill in the corresponding number of digits by filling in

Emergency stop instruction address: 00000 Instruction ID is 41.

## Online base conversion

Support arbitrary conversion between 2~36 decimal systems

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Binary

Convert numbers

Fill in the value you want here, usually choose the decimal system

Binary
  Baseling
  Baseling
  Base 10
  Hexadecim
  32 base
 Hexadecim

Convert the results

Here is the result of the conversion of the values filled in above, and the hexadecimal system is generally selected X's in the code, and if the number of digits is insufficient, it is generally necessary to fill in the corresponding number of digits by filling in

Start OTA service instruction address: 10100 Instruction ID is 69.

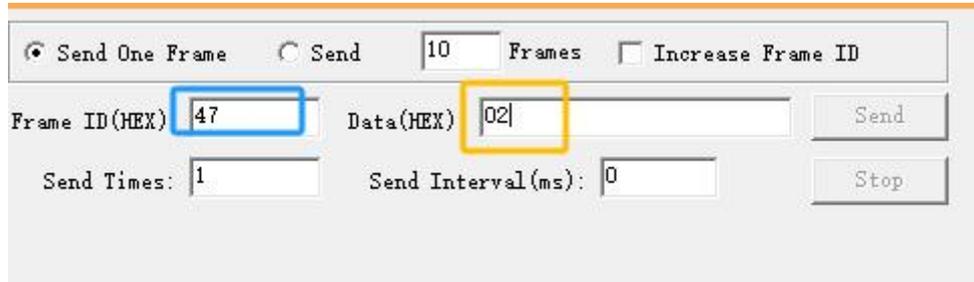
From this, we can determine the ID range for motors with different serial numbers:

Motor Number	Frame ID(HEX)	Range
1	41-69	
2	81-A9	
3	C1-E9	
.	.	
.	.	
.	.	
30	781-7A5	

## 2. The use of a single motor

### 2.1. Set motor operation mode

After powering the motor and connecting CANTest, the first step is to set the motor's operating mode (default to position mode, motor 1), as shown in the following command:



The screenshot shows the CANTest software interface. The 'Send One Frame' radio button is selected. The 'Frames' field is set to 10, and the 'Increase Frame ID' checkbox is unchecked. The 'Frame ID (HEX)' field contains the value 47, and the 'Data (HEX)' field contains the value 02. The 'Send Times' field is set to 1, and the 'Send Interval (ms)' field is set to 0. There are 'Send' and 'Stop' buttons.

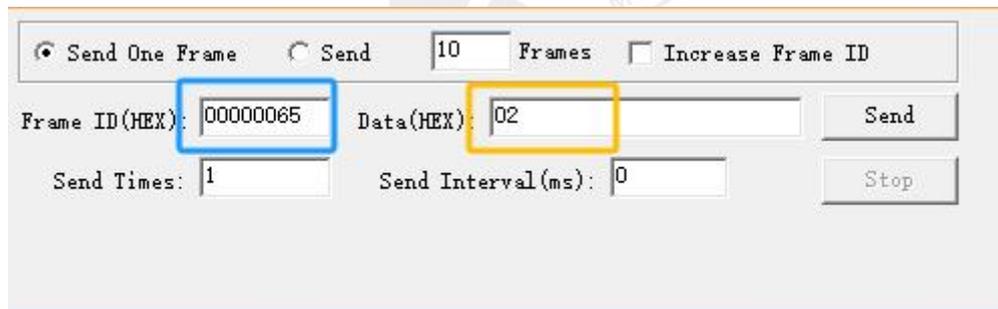
00 is set to torque mode, 01 is set to speed mode, here we send 02 to position mode.

Index	Direction	Time Sta...	Frame ID	Format	Type	Data Leng...	Data(HEX)
00000000	Send	10:53:38.3...	0x00000047	Data	Standard	0x01	02
00000001	Receive	10:53:38.3...	0x00000047	Data	Standard	0x00	

If the response is 47, it indicates success.

### 2.2. Set motor ID

Then we can set the ID of the motor as needed, as shown in the following figure:



The screenshot shows the CANTest software interface. The 'Send One Frame' radio button is selected. The 'Frames' field is set to 10, and the 'Increase Frame ID' checkbox is unchecked. The 'Frame ID (HEX)' field contains the value 00000065, and the 'Data (HEX)' field contains the value 02. The 'Send Times' field is set to 1, and the 'Send Interval (ms)' field is set to 0. There are 'Send' and 'Stop' buttons.

We will set the motor as motor number 2 here.

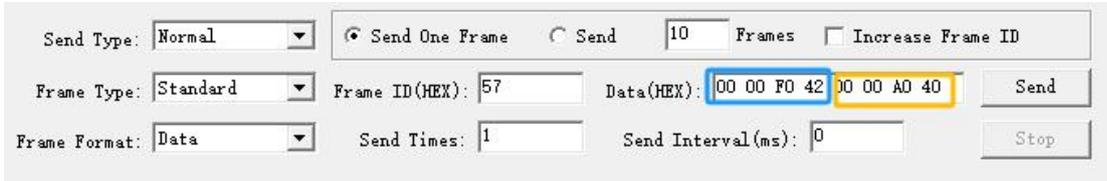
00000002	Send	10:55:25.3...	0x00000065	Data	Standard	0x01	02
00000003	Receive	10:55:25.4...	0x000000a5	Data	Standard	0x01	02

You can see that the response here is A3, which is the instruction to set the ID corresponding to motor 2, indicating that we have successfully set it up

(It is recommended to set the motor mode first and then change the ID, so that the 47 command can be used to set the mode uniformly, and the 63 command can be used to change the ID. Otherwise, after the change is completed, setting the running mode again will require the corresponding command, such as 87 for number 2 and c7 for number 3.).

### 2.3. Run motor

For example, in position mode, when the motor needs to be moved 120 ° at a speed of 5RPM, The input command is shown in the following figure:



The conversion method is shown in the following figure:

For positional data, the unit of decimal data is degrees ( ° )

For speed data, the units of decimal data are RPM

IEEE 754 floating-point hexadecimal conversion to each other  
32-bit four-byte single-precision

Base 10: 120

Fill in the value you want here, and click the hexadecimal button below to convert

Hexadecimal: 42 F0 00 00

HIGH ← LOW This is the result of the conversion of the above values  
Note that there will be spaces in the middle of each byte and be removed when filling in the code

IEEE 754 floating-point hexadecimal conversion to each other  
32-bit four-byte single-precision

Base 10: 5

Fill in the value you want here, and click the hexadecimal button below to convert

Hexadecimal: 40 A0 00 00

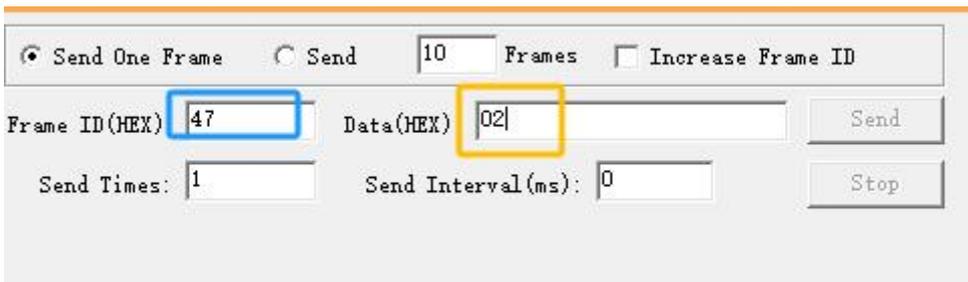
HIGH ← LOW This is the result of the conversion of the above values  
Note that there will be spaces in the middle of each byte and be removed when filling in the code

Therefore, the final instruction data sent is 00 00 F0 42 00 00 A0 40

## 3. Use of multiple motors

### 3.1. Set motor operation mode

After powering the motor and connecting CANTest, the first step is to set the operating mode of each motor (default to position mode, motor 1), as shown in the following command:



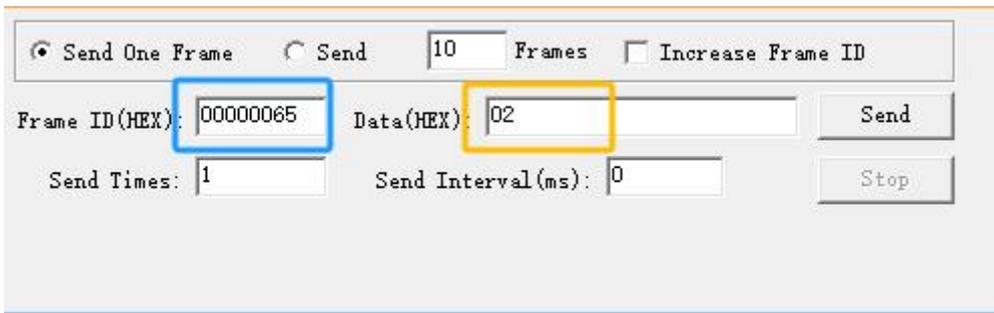
00 is set to torque mode, 01 is set to speed mode, here we send 02 to position mode.

Index	Direction	Time Sta...	Frame ID	Format	Type	Data Leng...	Data(HEX)
00000000	Send	10:53:38.3...	0x00000047	Data	Standard	0x01	02
00000001	Receive	10:53:38.3...	0x00000047	Data	Standard	0x00	

If the response is 47, it indicates success.

### 3.2. Set motor ID

Then we can set the ID of the motor as needed, as shown in the following figure:



We will set the motor as motor number 2 here.

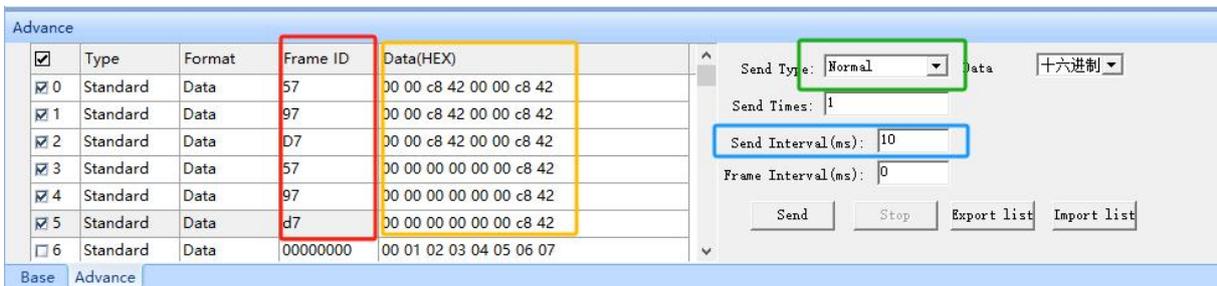
00000002	Send	10:55:25.3...	0x00000065	Data	Standard	0x01	02
00000003	Receive	10:55:25.4...	0x000000a5	Data	Standard	0x01	02

You can see that the response here is A3, which is the instruction to set the ID corresponding to motor 2, indicating that we have successfully set it up

(It is recommended to set the motor mode first and then change the ID, so that the 47 command can be used to set the mode uniformly, and the 63 command can be used to change the ID. Otherwise, after the change is completed, setting the running mode again will require the corresponding command, such as 87 for number 2 and c7 for number 3.).

### 3.3. Run motor

The command for running multiple motors needs to be carried out during the task operation, and the interface is shown in the following figure:



- ① Firstly, add a task operation by issuing a few commands.
- ② Then write the motor ID, if you want the first motor to move, write 57, and the second motor write 97,

each of which is equivalent to a single motor operation command.

- ③ Write the corresponding single motor operation data, please refer to the example of a single motor for details
- ④ Set the sending interval, which is the time difference between sending the instruction and sending the next instruction, in milliseconds (ms). If there is no need for a long delay, it is also best to add 10 milliseconds to avoid packet loss caused by encountering the next instruction during transmission and reception.
- ⑤ Set the sending method. Sequential sending is to send all the instructions in the list in order once and then end. Loop sending is to send the instructions in the list from beginning to end, and then loop from beginning to end.
- ⑥ After setting up all the above processes, click to send the run command.

