

Preface

Thank you for purchasing NICE900 Door machine controller.

This instruction manual describes how to properly use NICE900 Door machine controller. Please read the instruction manual carefully before using (Before installation, operation, maintenance and inspection). Besides, please use the product after understanding the safety precautions.

| Precautions |
|--|
| <ul style="list-style-type: none">● The drawings presented in this instructions are sometimes shown without covers or protective guards. Always replace the equipment's cover or protective guard as specified first, and then operate the products in accordance with the instructions.● The drawings presented in the instructions are typical examples and may not match the product you received.● These instructions are subject to change due to product improvement, specification modification, specification modification.● If you want to order the manual due to loss or damage, please contact our company agents in each region or our company customer service center directly.● If there is still any problem during using the product, please contact our company customer service center directly.● Our Service Hotline: 400-777-1260. |

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1

Safety and Precautions

Chapter 1 Safety and Precautions

Safety definition:

There are two kinds of safety items in this manual:



Failure to follow the instructions will result in death or serious injury.



Failure to follow these instructions can result in medium hurt or equipment damage.

Please read this manual carefully and operate strictly according to the safety tips while installing, debugging, maintaining the system. MONARCH company is free of charge to any damage or loss caused by any operations that not performed according to the requirements.

1.1 Safety Items

1.1.1 Before Installation



Danger

- Do not install in the condition of water seepage in the control system, components scarcity or damage while opening the case!
- Do not install while the packing list is not in the accordance with the products!



Note

- Please uplift and drop gently in the portage otherwise the equipment will be damaged!
- Do not touch the elements of the controller with your hands, otherwise the static electricity hurt may be caused!

1.1.2 During Installation



Danger

- Please mount the controller on incombustible surface like metal, and keep away from flammable substances! Otherwise it may cause fire!
- Do not twist the fixing bolts of the components, especially the bolts with red marks!

**Note**

- Do not let wiring terminal or screw enter the controller, otherwise the controller will be damaged!
- Install the controller where there's less shaking and no direct sunshine.

1.1.3 Wiring**Danger**

- Only the qualified electrical engineer can perform the wiring, otherwise there will be danger of electric shock.
- A circuit breaker must be installed between the power supply and the controller; otherwise there will be danger of fire.
- Please connect the controller to the ground according to the requirements, otherwise it will be dangerous

**Danger**

- Do not connect the input current with the controller's output terminals (U, V, W). Please note the marks and do not connect the wrong wires otherwise the controller may be damaged!
- Ensure the wiring meet the EMC requirements and the local safety standard. The wire size shall be determined according to the manual, otherwise accidents may occur!
- Encode connection must use Shielded line, shielding layer must be one side connected to earth reliably!
- Communication wires must use STP with the lay of 20mm~30mm, shielding layer must be connected to earth!

1.1.4 Before Power-on



Note

- Please confirm the mains voltage level is consistent with that of the controller ;the input (L1,L2) and output (U,V,W) wirings are correct; and check if there is any short circuit in peripheral circuit and if the wiring is fixed and fasten; otherwise the controller may be damaged!
- Please do the motor parameter tuning before first running. Otherwise there will be danger of reveling over-speed.
- No part of controller needs further withstand voltage testing since it has been done in the factory; Otherwise accidents will occur!



Danger

- Mount the cover plate properly before power-on the controller; otherwise there will be danger of electric shock!
- All the external parts wirings must be connected according to the instruction of this manual, otherwise accidents may occur!

1.1.5 After Power-on



Danger

- Do not open the cover of the controller after power-on, otherwise there will be danger of electric shock!
- Do not touch the controller terminals; otherwise there will be danger of electric shock.



Danger

- If parameter identification is required, please pay attention that the rotating motor may injure people, otherwise accident may occur!
- Do not change the factory settings; otherwise the equipment may be damaged!

1.1.6 Running



Danger

- Do not touch the fan and the discharging resistor to check the temperature, otherwise burning will occur!
- Only the qualified technician can check the signal while it's running. Otherwise there will be danger of personal injury or equipment damage!



Note

- Do not let objects fall in a running controller; otherwise the controller may be damaged!
- Do not start and stop the controller by on/off of the contactor, otherwise the controller may be dangerous.

1.1.7 Maintenance



Danger

- Please do not repair or maintain the controllers with power on, otherwise there will be danger of electric shock!
- Only qualified electrical engineer can repair or maintain the controller, otherwise there will be danger of human injury or damaging the equipment.
- Reset the parameters after changing the controller; all the insets must be unplugged while the power is switch-off!

1.2 Attention Items

1.2.1 Motor insulation check

When the motor is used for the first time, or reused after storing for a long time, or in a regular checkup, the user must check the insulation of the motor to prevent the poor insulation of the windings of motor from damaging the controller. The motor connection must be divided from the controller during the insulation check. It is recommended to use a 500V Mega-Ohm-Meter to check and the insulation resistance shall not be less than 5MΩ.

1.2.2 Motor Heat and Noise

Since the output voltage of the controller is in PWM wave with some harmonic wave, the temperature may raise, the noise and vibration may increase compared with the controller running at main frequency.

1.2.3 Pressure-sensitive Device or Capacitor at the Output Side of the Controller

Because the controller outputs PWM wave, the capacitor used for improving power factor and pressure-sensitive resistor used for lightening-proof shouldn't be installed at the output side of the controller. Otherwise the controller may have transient over-current and may be damaged.

1.2.4 Usage out of the Range of Rated Voltage

The NICE1000 controller shall not be used out of the specified range of operation voltage. Otherwise the internal components of the controller may be damaged. If needed, please use corresponding voltage regulation device to change the voltage.

1.2.5 Lightning Strike Protection

There are lightning protection devices inside the controller, but the user should install other lightning protection device at the front end of the controller if lightning strike occurs frequently.

1.2.6 Altitude and De-rating

When the altitude is higher than 1000m, the cooling effect of consult is deteriorated because of the rarefaction of air, then it is a necessity to derate the use of controller and please contact our company for detailed technical support in this circumstance.

1.2.7 Cautions for Scrap of controller

The electrolytic capacitors in the main circuits and PCB may explode when they are burned and poisonous gas may be generated when the plastic parts are burned. Please dispose the controller as industrial rubbish.

1.2.8 About Applicable Motor

- 1) The controller is applicable to squirrel-cage Asynchronous motor and AC permanent-magnet Synchronous motor. Please be sure to select the applicable controller according to the Data plate of the motor.
- 2) The controller has already been configured with default parameters which is applicable to squirrel-cage Asynchronous motor. To perform the motor parameter identification according to the actual conditions will promote the operation effect. Synchronous motor must carry out parameter tuning.
- 3) The output part of controller should not be short. Otherwise the controller may alarm or be damaged. Therefore, before Power-on, we must execute short-circuit-test for new elevator. Please make sure that the controller be cut from the testing parts when the testing is undergoing.



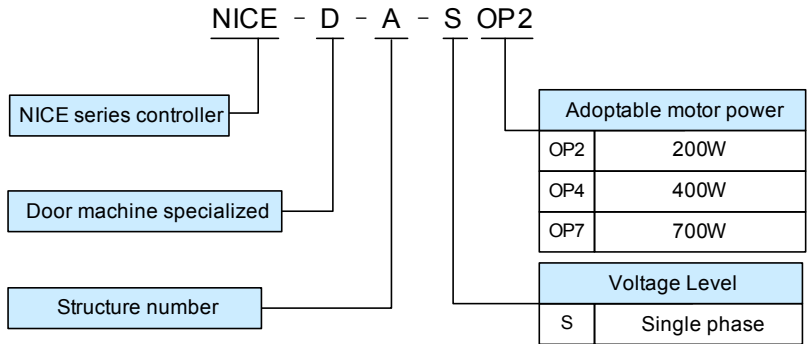
2

Product information

Chapter 2 Product information

2.1 Name designation & nameplate

2.1.1 Name designation



| Model | Input voltage | Power capacity (kVA) | Input current (A) | Output current (A) | Adoptable motor (W) |
|---------------|---------------------|----------------------|-------------------|--------------------|---------------------|
| NICE-D-A-S0P2 | 1 phase 187~264V | 0.5 | 2.7 | 1.3 | 200 |
| NICE-D-A-S0P4 | | 1.0 | 5.4 | 2.3 | 400 |
| NICE-D-A-S0P7 | | 1.5 | 8.2 | 4.0 | 750 |

2.1.2 Nameplate

| | |
|---------------|-----------------------------|
| MODEL | NICE-D-A-S0P2 |
| POWER | 200W |
| INPUT | 1PH AC220V 2.7A 50Hz/60Hz |
| OUTPUT | 3PH AC0V~220V 1.3A 0Hz~99Hz |
| S/N | |

2.2 Technical specification

Table 2-1

| Item | Sub-item | Technical specification |
|----------------------------|---|--|
| Performance control | Max. output freq. | 99.00Hz |
| | Speed range | 1:50 (magnetic flux vector control) , 1:1000 (close-loop vector control) |
| | Speed precision | ±0.5% (magnetic flux vector control) , ±0.05% (close-loop vector control) |
| | Starting torque | 0Hz 180% (close-loop vector control) 1Hz 150% (magnetic flux vector control) |
| | Freq. resolution ratio | 0.01Hz |
| | Current resolution ratio | 0.01A |
| | Carrier wave freq. | 2K~16K |
| Main functions | Asynchronous motor : static/dynamic motor tuning Sync motor: non-load, loaded motor tuning and coder zero position | |
| | Sync motor: general AB2 coder, open-circuit collector output or push-pull output | |
| | Magnetic flux vector control mode: auto torque hoist, manual torque hoist, over-excitation. | |
| | Distance control, support direct stop. | |
| | Door width auto-tuning is available. | |
| | Auto demonstrating function is available | |
| | Obstacle auto- identification function is available | |
| Protection | Overload protection, rated current 150% 1 minute protection, 180% 1 s protection. | |
| Environmental requirements | Suitable environment | Inside of a room no direct sunlight, no dust, no corrosive gases, no combustible gases, oil dust, no reek, salt etc. |
| | altitude | Normally lower than 1000m. Please de-rate the use if higher than 1000m. |
| | Ambient temperature | -10℃~+40℃ (de-rate in 40℃~50℃,) |
| | humidity | < 95%RH, no bead |
| | Vibration | < 5.9m/s ² (0.6g) |
| | Storage temperature | -20℃~+60℃ |
| | Cooling method | 0.2kW self-cooling, 0.4kW and 0.75kW air-cooling |
| | Protection level | IP21 |
| | Store place | Stored in dry and clean place. |
| | Conveyance | Can be transported by car , train , plane , ship in a standard packing box. |
| | Convey vibration | When sin vibration is 9- 200 Hz, 15m/s ² (1.5g) |

2.3 Product appearance and install hole dimension.

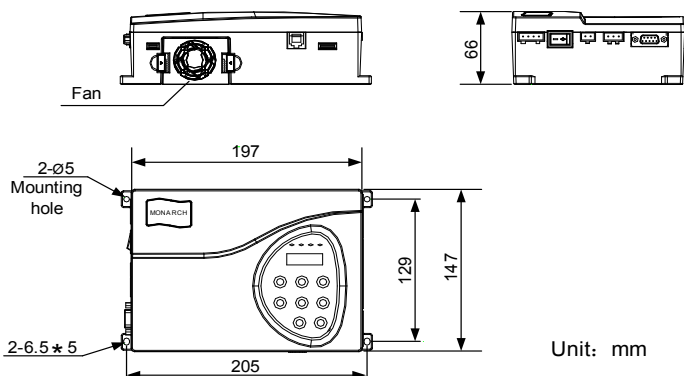


Fig 2-3 Product appearance

2.4 Daily maintenance

2.4.1 Daily maintenance

Since the influence of ambient temperature, humidity, dust, and vibration, the components in controller may become aging and wearing, which will give rise to the occurrence of potential faults and reduce the life of controller. Therefore, it is quite necessary to do the work of daily maintenance of controller.



Danger

The filter capacitor still has high voltage after the power supply to the controller is switched off, so do not maintain or repair the controller until the bus voltage measured after 10 minutes with the multi-meter. The voltage must be lower than 36V.

4) Daily checking items:

- a) Check if there is any abnormal noise during the running of motor;
- b) Check if there is any vibration of motor ;
- c) Check if the installation environment of controller changes ;
- d) Check if the cooling fan of controller works normally ;
- e) Check if the controller is over heated.

5) Daily Cleaning:

- a) Keep the controller in a clean status;
- b) Clean the dust from the controller and prevent the dust especially the metal powder

from entering the controller;

- c) Clean the oil dirt in the cooling fan of the controller.

2.4.2 Periodical Checking

Periodically check the places that are hardly checked during the running.

1) Periodical Checking Items

- a) Check the ventilation channels and clean them periodically;
- b) Check if the screws are loose;
- c) Check if the controller is rusted;
- d) Check if the input / output terminals has scratch marks;
- e) Check the insulating in main circuit.

Note: Insulation test (use 500V Mega-Ohm-Meter) should be done separately after disconnecting the input power cables from the controller; or else, the controller will be damaged. Do not use the Mega-Ohm-Meter to test the insulation of control circuits. Dielectric strength test had been done at factory. Therefore, user need not do this test again.

2) Replacement of Wearing Parts

The wearing parts of controller mainly include the cooling fan and filtering electrolytic capacitor. Their lifetime is closely related to the operating environment and maintenance.

General lifetime as follows:

| Component | Lifetime |
|------------------------|-------------|
| Fan | 2 ~ 3 years |
| Electrolytic capacitor | 4 ~ 5 years |

Uses could determine when to replace them according to their work time.

3) Cooling fan

Possible damage causes: shaft bearing attrition and blade aging.

Criteria: no crack on fan blade, no abnormal vibration noise at start.

4) Filtering electrolytic capacitor

Possible damage causes: high ambient temperature, big pulsating current due to frequent load fluctuation, electrolyte aging.

Criteria: no liquid leak, no protrusion of safety valve, electrostatic capacitance measurement, and insulation resistance measurement.

2.4.3 Controller Storage

The following points must be noticed in controller storage:

- 5) It is recommended to store the controller in its original packing box.
- 6) Long-term storage will cause deterioration of electrolytic capacitor. Therefore, controllers not in service for a long time must be powered for at least once within 2 years for testing purpose, at least for 5 hours ; in the test , the input voltage must be boosted gradually with voltage regulator to the rated value.

2.5 option units – brake unit model

| Controller model | Recommended power | Recommended resistance |
|------------------|-------------------|------------------------|
| NICE-D-A-S0P2 | 80W | $\geq 250\Omega$ |
| NICE-D-A-SOP4 | 80W | $\geq 200\Omega$ |
| NICE-D-A-SOP7 | 80W | $\geq 150\Omega$ |



3

Electric installation

Chapter 3 Electric installation

This chapter will give the introduction of setting, specification, wiring of different I/O terminals.

3.1 Installing environment

- 1) Temperature: The ambient temperature will bring great affect to the life of controller. The allowable extent is $-10^{\circ}\text{C}\sim+50^{\circ}\text{C}$.
- 2) Mount the controller on incombustible surface (such as metal) with enough space to spread heat. And use screw to mount it vertically on the bracket.
- 3) Avoid places with direct sunshine or dampness.
- 4) Avoid place with corrosive, flammable, explosive gas
- 5) Avoid places with oil dirt, dust or metal powder.

3.2 Electric installation

3.2.1 Model Selection of Peripheral Electrical Components


| Controller Model | Circuit Breaker (A) | Contactor (A) | Conducting Wire of Main Circuit (mm) |
|------------------|---------------------|---------------|--------------------------------------|
| NICE-D-A-S0P2 | 10 | 10 | 2.5 |
| NICE-D-A-SOP4 | 16 | 10 | 2.5 |
| NICE-D-A-SOP7 | 16 | 10 | 2.5 |

3.2.2 Periphery electric unit instruction

| Unit name | position | Function details |
|--------------------|--|--|
| Air breaker switch | The most front-end of controller drive power input | Cut off the power and provide short protection. This switch is essential. |
| AC input reactor | System input side | 1) Improve input power factor; 2) Eliminate high-frequency harmonics in input side; protect the rectifier bridge. 3) Eliminate current unbalance due to input phase unbalance; |
| AC output reactor | Between output side of controller and motor, and near controller | Add AC output reactor if the distance between vector driver and motor is bigger than 100m . |

3.3 Wiring terminal introduction


3.3.1 Control loop terminal layout shown below:

| | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|  | PGA | PGB | PGZ | COM | DI1 | DI2 | DI3 | DI4 | COM | DI5 | DI6 | DI7 | DI8 | COM | +24V |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|

| | | | | | | | |
|------|------|------|------|------|------|------|-----|
| MP24 | MCOM | CAN+ | CAN- | 485+ | 485- | CZA1 | GND |
|------|------|------|------|------|------|------|-----|

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| TA1 | TC1 | TB1 | TA2 | TC2 | TB2 | TA3 | TC3 | TB3 | \ |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|

3.3.2 Drive loop terminal layout shown below:

| | | | |
|---|---|----|----|
|  | \ | L1 | L2 |
|---|---|----|----|

| | |
|---|----|
| P | PB |
|---|----|


| | | |
|---|---|---|
| U | V | W |
|---|---|---|

3.3.3 Control loop terminal description

| Sort | Terminal label | Terminal function description | Technical specification |
|------------------------------------|----------------|--|--|
| Communication (under research) | 485+ | MODBUS differential signal positive end | standard MODBUS communication interface STP recommended |
| | 485- | MODBUS differential signal negative end | |
| | CAN+ | CAN bus differential signal positive end | CAN bus communication interface STP recommended |
| | CAN- | CAN bus differential signal negative end | |
| Digit input | DI1~DI8 | Digit signal input | 1) Optocoupler isolation input. Low level valid 2) Input voltage range:DC9V~30V 3) Input impedance:3.3K |
| Inside 24V power | +24V | Outside connect 24V | 1) Power supply of no-contact switch or coder disc 2) Max. output current 200mA |
| | COM | 24V power common end | Isolated from inner GND |
| Encoder input | PGA | Encoder A phase | support collector open-loop output or push-pull output |
| | PGB | Encoder B phase | |
| | PGZ | Encoder Z signal | |

| Sort | Terminal label | Terminal function description | Technical specification |
|--------------------------------|---|-------------------------------|--|
| Analog input | CZA1 | Weighing analog input | Input voltage range DC0V~10V |
| | GND | | |
| External 24V power | MP24 | External 24 v power supply | External power supply for communication and analog use |
| | MCOM | External power common end | |
| Relay output & shield grounded | TA1/TB1/TC1 TA2/TB2/TC2 TA3/TB3/TC3 | Relay output | 1) TA-TB:N.C;TA-TC:N.O.,Contact capability:250VAC/3A DC30V/1A 2) Contacts and control loop insulate voltage level:2.5kVAC |

3.3.4 drive loop terminal description

| Mark | Name | description |
|---|-----------------------------------|--|
| L1.L2 | Single phase power input terminal | AC single phase 220Vinput terminal |
| P.PB | brake resistance connect terminal | brake resistance connection terminal of the controller |
| U.V.W | controller output drive terminal | Connect 3-phases motor |
|  | GND terminal | GND terminal |

3.4 Other interfaces

- 1) DB 9: Connect the inside car command board

Inside car command board is the accessory product of NICE series elevator controller; this function is under research now.

- 2) RJ 45: parameter copy and software maintaining

This function is still under research.



4

Door machine controller & Trial run

Chapter 4 Door machine controller & Trial run

4.1 Operation & display

Users can modify the function parameter, monitor the working state and control the operation panel running by the operation panel.

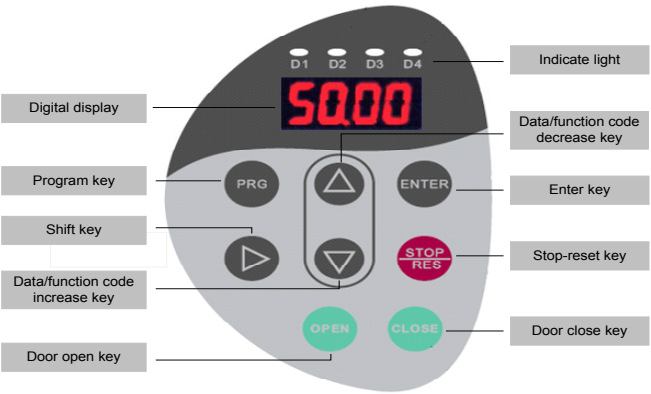


Fig 4-1 Operation panel display

| Key | Name | Function |
|----------|-----------------|--|
| PRG | Program keys | The enter /out of 1st level menu ,quick parameter delete |
| ENTER | Enter key | Enter the menu by level ,parameter setting affirm |
| STOP/RES | Stop/reset | Running state :used for stop running Error alarm state: used for resetting. |
| ▶ | Shift | stop/run state: Cyclical selection of LED display parameter. (the modifying bit can be selected) |
| ▲ | Incremental key | The increase of data and parameter code |
| ▼ | Decrease key | Decrease of data and parameter code |
| OPEN | Open key | Open the door in panel operation mode. |
| CLOSE | Close key | Close the door in the panel operation mode. |

4.2 The basic operation of controller.

4.2.1 Operation flow of 3-level menu.

NICE900 adopts 3-level menu to conduct the parameter setting. It's convenient to query and modify function code and parameter.

3-level menu include: function parameter group (first level)→function code (second level)→function code setting (third level). You can refer to operation flow chart Fig4-2.

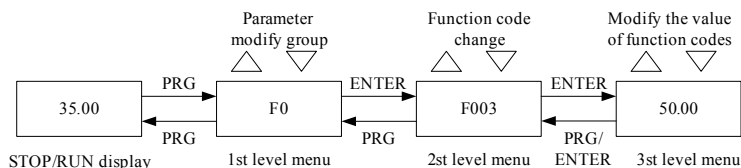


Fig 4-2 operation flow chart of 3level menu

Note: when in 3rd menu, system can be backed to 2nd menu by pressing “PRG” or “ENTER”. The difference between them: it goes back to 2th menu with parameter saved when pressing “ENTER”, then jump to next function code automatically; while it back to the 2nd menu with the parameter unsaved and it will stay in the current function code.

Example: change F0-04 from 00.00Hz to 15.00Hz (boldfaced words means flash bit)

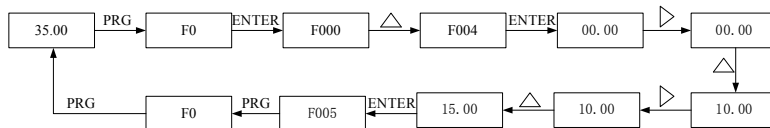


Fig 4-3 parameter editing operation process

In 3-level menu, if the parameter has no flash bit, it means the function code cannot be changed and the possible reasons are:

- 1) This function code is un-revisable, such as the actual examine parameter and running record parameter..
- 2) This function code cannot be changed in operating state and can only be changed when the controller is stopped.

4.2.2 Error information reading

When error occurs, the error code will be displayed on panel. It is convenient to find reason of error and get rid of the error as soon as possible.

NICE2000 controller can save the previous 4 error codes and record the last error frequency, current, bus voltage, digit input terminal state and digit output terminal state. The relative sketch map is listed below:

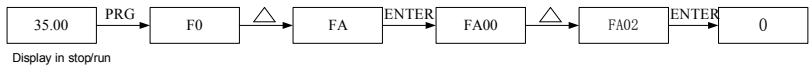


Fig 4-4 error information reading

4.2.3 Examine the run/stop display information

If the controller is in run/stop state and no error occurs, the run/stop display parameter can be examined by the setting of FA00/FA01 and shift key.

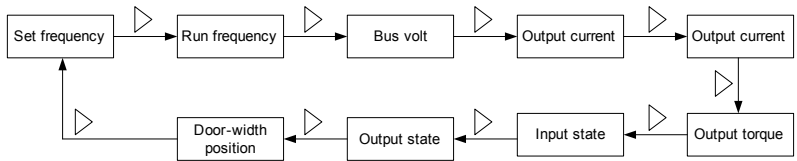


Fig 4-5 Run parameter display

4.2.4 Password setting

In order to protect the parameter more effectively, NICE900 provides the password protection. The figure below shows how to set the password to 12345.

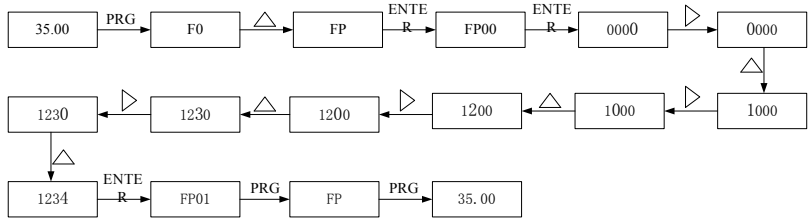


Fig 4-6 process of password setting

After setting the function password (parameter FP.00 is not zero), if the user presses “PRG”, the controller will enter into password validate state first and display “-----”. User can only enter the menu after inputting the user password. For factory setting parameters editing, the user still need to input the factory password. (Warning: do not change the factory setting parameter; if the parameter values are wrong, the controller will work abnormally, even be damaged.)

When the password protection is unlocked, user can change the password freely, and the last input will be the user password.

If the user wants to cancel the password protection function, enter after inputting the password and setting FP.00 as 0; if FP.00 is not zero, the parameter is password protected.



5

Function parameter table

Chapter 5 Function parameter table

5.1 function parameter table

Function parameters are classified into 13 groups. Each group has several function codes. The function code uses 3-level menu with the format "F X-XX", which means "No. XX function code in group X". For example, F 3-02 means the No.2 function code in group F3.

In order to make functional code setting convenient, the function group number corresponds to first level menu, the function code number corresponds to second level menu, and function code parameters correspond to third level menu.

The contents of function codes:

Column 1"function code", means the serial number for function parameter group and parameter;

Column 2"name", means the complete name of the function parameter;

Column 3"setting range", means the parameter setting range;

Column 4"minimum unit", means the minimum unit of the parameter setting;

Column 5"factory setting", means the original default;

Column 6"operation", means the modification attributes of the parameters (whether to enable the modification and the modification requirements).

Instructions are listed below:

☆: the parameter can be modified while the controller is running or stopping;

★: the parameter can not be modified while the controller is running;

●: the parameter cannot be modified for it is actually measured and recorded.

"Factory Default" means the numeric value after the function code parameter is refreshed when recovering the default parameter, but the actually measured value or recorded value will not be refreshed.

The controller provides password protection of function code to protect the parameters effectively (detailed in Chapter 4).

5.2 function table

Press PRG buttons and then UP/DOWN button, all of the displays are first level menu, which are group of function. Details as follows:

5.2.1 Grouped into menus

F0- Basic function parameter

F1- Motor parameter

F2- Performance control parameter

F3- Open door run parameter

F4- Close door run parameter

F5- Open/Close door auxiliary parameter

F6- Distance control parameter

F7- Demonstrating function parameter

F8- Auxiliary parameter

F9- I/O terminal function parameter

FA- Display & Error parameter

FF- Factory parameter

FP- User parameter

5.2.2 Function specification

Notice: The default parameter of some sync motor may different from the table listed below, please so details in the end of chapter 5.

| Function code | Name | Setting range | Min.unit | default | Change properties |
|------------------------------|--------------------------------|--|----------|---------|-------------------|
| F0- basic function parameter | | | | | |
| F000 | Control mode | 0:Magnetic flux vector control 1:close-loop vector control | 1 | 0 | ★ |
| F001 | Open/close door mode selection | 0:speed control 1:distance control | 1 | 0 | ★ |
| F002 | Command source selection | 0:operation panel control mode 1:door machine terminal control mode 2:door machine manual adjusting mode 3:door machine auto demonstrating mode | 1 | 0 | ★ |
| F003 | Max. freq | 20.00Hz~99.00Hz | 0.01Hz | 50.00Hz | ★ |
| F004 | Panel setting freq. | 0.00Hz~F003 | 0.01Hz | 5.00Hz | ☆ |
| F005 | Operation direction setting | 0:same as set direction 1:opposite to set direction | 1 | 0 | ★ |
| F006 | Slow walking speed setting | 0.00~20.00Hz | 0.01Hz | 4.00Hz | ★ |
| F007 | Carrier wave freq. setting | 2.0kHz~16.0kHz | 0.1kHz | 8.0kHz | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------------|--|--------------------------------------|----------|------------------|-------------------|
| F1- motor parameter | | | | | |
| F100 | Motor type selection | 0:asynchronous motor 1:sync motor | 1 | 0 | ★ |
| F101 | Motor rated power | 0~750W | 1W | Model determined | ★ |
| F102 | Motor rated voltage | 0~250V | 1V | Model determined | ★ |
| F103 | Motor rated current | 0.10A~99.00A | 0.01A | | ★ |
| F104 | Motor rated freq. | 1.00Hz~99.00Hz | 0.01Hz | Model determined | ★ |
| F105 | Motor rated rotation speed | 1~9999rpm | 1rpm | Model determined | ★ |
| F106 | Stator phase resistance | 00.00~99.99Ω | 0.01 | Model determined | ★ |
| F107 | Asynchronous motor rotor phase resistance | 00.00~99.99Ω | 0.01 | Model determined | ★ |
| F108 | Asynchronous motor leakage inductance | 0~99.99mH | 0.01mH | Model determined | ★ |
| F109 | Asynchronous motor mutual inductance | 0~999.9mH | 0.1mH | Model determined | ★ |
| F110 | Asynchronous motor non-load excitation current | 0.00~99.99A | 0.01A | Model determined | ★ |
| F111 | Sync motor D-axis inductance | 0~999.9mH | 0.1mH | Model determined | ★ |
| F112 | Sync motor Q-axis inductance | 0~999.9mH | 0.1mH | Model determined | ★ |
| F113 | Sync motor inverse-EMF coefficient | 0~250 | 1 | Model determined | ★ |
| F114 | sync motor coder zero position | 0~359.9 | 0.1 | Model determined | ★ |
| F115 | Actual angle of sync motor | 0~359.9 | 0.1 | Model determined | ● |
| F116 | Motor auto-tuning | 0~5 | 1 | 0 | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|-----------------------------------|---|-------------------------|----------|---------|-------------------|
| F2- performance control parameter | | | | | |
| F200 | Speed loop proportional gain 1 | 0~100 | 1 | 30 | ☆ |
| F201 | Speed loop integration time 1 | 0.01~10.00s | 0.01s | 0.50s | ☆ |
| F202 | Switching freq.1 | 0.00~F205 | 0.01Hz | 5.00Hz | ☆ |
| F203 | Speed loop proportional gain 2 | 0~100 | 1 | 20 | ☆ |
| F204 | Speed loop integration time 2 | 0.01~10.00s | 0.01s | 1.00s | ☆ |
| F205 | Switching freq.2 | F202~F003 | 0.01Hz | 10.00Hz | ☆ |
| F206 | Current loop proportional gain | 10~500 | 1 | 60 | ☆ |
| F207 | Current loop integral gain | 10~500 | 1 | 30 | ☆ |
| F208 | Slip compensation coefficient | 50%~200% | 1% | 100% | ☆ |
| F209 | Torque hoist | 0~30.0% | 0.1% | 1.0% | ☆ |
| F210 | Over-excitation gain | 0~200 | 1 | 64 | ☆ |
| F211 | Sync machine initial position interference mode | 0~2 | 1 | 1 | ★ |
| F212 | Speed feedback filtering level | 0~20 | 1 | 0 | ☆ |
| F213 | Pulse encoder pulse setting | 1~9999 | 1 | 2048 | ★ |
| F214 | Pulse encoder direction selection | 0:forward 1:reversal | 1 | 0 | ★ |
| F215 | Pulse encoder direction selection | 0:forward 1:reversal | 1 | 0 | ★ |
| F3- open-door run parameter | | | | | |
| F300 | Open door startup low speed setting | 0.00~F303 | 0.01Hz | 6.00Hz | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|-----------------------------|---|--------------------------------|----------|---------|-------------------|
| F301 | Open door startup acceleration time | 0.1~999.9s | 0.1s | 1.0s | ☆ |
| F302 | Speed control open door startup low speed run time | 0.1~999.9s | 0.1s | 1.0s | ☆ |
| F303 | Open door freq. setting | 0.00Hz~F003 | 0.01Hz | 25.00Hz | ☆ |
| F304 | Open door acceleration time | 0.1~999.9s | 0.1s | 2.0s | ☆ |
| F305 | Open door end low speed setting | 0.00~F303 | 0.01Hz | 3.00Hz | ☆ |
| F306 | Open door deceleration time | 0.1~999.9s | 0.1s | 2.0s | ☆ |
| F307 | Open door locked-rotor to torque holding switch point setting | 0.0%~150.0% motor rated torque | 0.1% | 50.0% | ★ |
| F308 | Open door arrival torque holding | 0.0%~F307 | 0.1% | 50.0% | ★ |
| F309 | Door-open blocked torque | 0.0%~150.0% rated torque | 0.1% | 80.0% | ☆ |
| F310 | Door-open startup torque | 0.0%~150.0% rated torque | 0.1% | 0.0% | ★ |
| F311 | Door-open blocked judging time | 0~9999ms | 1ms | 0ms | ☆ |
| F4-close-door run parameter | | | | | |
| F400 | Close-door startup low speed setting | 0.00Hz~F403 | 0.01Hz | 4.00Hz | ☆ |
| F401 | Door-closing start acceleration time | 0.1~999.9s | 0.1s | 1.0s | ☆ |
| F402 | Speed control door-closing start low-speed run time | 0.1~999.9s | 0.1s | 1.0s | ☆ |
| F403 | Door-closing high-speed setting | 0.00Hz~F104 | 0.01Hz | 12.00Hz | ☆ |
| F404 | Door-closing acceleration time | 0.1~999.9s | 0.1s | 2.0s | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------|---|---|----------|---------|-------------------|
| F405 | Door-closing end low-speed setting | 0.00Hz~F403 | 0.01Hz | 2.00Hz | ☆ |
| F406 | Door-closing deceleration time | 0.1~999.9s | 0.1s | 1.5s | ☆ |
| F407 | Door-closing low-speed setting | 0.00Hz~F403 | 0.01Hz | 1.00Hz | ☆ |
| F408 | Door-closing low-speed run time | 1~9999ms | 1ms | 300ms | ☆ |
| F409 | Skate withdraw speed setting | 0.00Hz~F403 | 0.01Hz | 2.00Hz | ☆ |
| F410 | Skate withdraw run time | 1~9999ms | 1ms | 500ms | ☆ |
| F411 | Door-closing torque switching-point setting | 0.0%~150.0% rated torque | 0.1% | 50.0% | ☆ |
| F412 | Close door arrival torque holding | 0.0%~F411 | 0.1% | 30.0% | ☆ |
| F413 | Door-closing blocked torque | 0.0~150.0% | 0.1 | 100.0 | ★ |
| F414 | closed blocked working mode | 0~1 0:stop when blocked in door-closing 1:re-start when blocked in door-closing | 1 | 1 | ★ |
| F415 | Door-closing blocked judging time | 0~9999ms | 1ms | 500ms | ☆ |
| F416 | Fire emergency closing high speed setting | 5.00Hz~F104 | 0.01Hz | 10.00Hz | ☆ |
| F417 | Door-close hi-speed setting | F418~F104 | 0.01Hz | 12.00Hz | ☆ |
| F419 | Door-close blocked low-speed setting | 0.00Hz~F104 | 0.01Hz | 2.00Hz | ☆ |
| F419 | High-speed blocked torque setting | 0.0%~150.0% | 0.1% | 100.0% | ☆ |
| F420 | Low-speed blocked torque setting | 0.0%~150.0% | 0.1% | 100.0% | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|--|---|---|----------|---------|-------------------|
| F5-open/close door auxiliary parameter | | | | | |
| F500 | Abnormal deceleration time | 0.1~5.0s | 0.1 | 0.3s | ☆ |
| F501 | Door open time limit | 0~999.9s | 0.1s | 0.0s | ☆ |
| F502 | Door closing time limit | 0~999.9s | 0.1s | 0.0s | ☆ |
| F503 | Slow speed run time limit | 0~999.9s | 0.1s | 0.0s | ☆ |
| F504 | External open command delay time | 0~999.9s | 0.1s | 0.0s | ☆ |
| F505 | External close command delay time | 0~999.9s | 0.1s | 0.0s | ☆ |
| F506 | Door-open curve selection | 0~1 0:straight line acceleration/ deceleration 1:S curve acceleration/ deceleration | 1 | 1 | ★ |
| F507 | Open-door acceleration S curve initial time | 10.0%~50.0% (acceleration/ deceleration time) (initial stage+ascend stage≤90%) | 0.1% | 20.0% | ★ |
| F508 | Open-door acceleration S curve hoist time | 10.0%~80.0% (acceleration/ deceleration time) (initial stage+ascend stage≤90.0%) | 0.1% | 60.0% | ★ |
| F509 | Open-door deceleration S curve initial stage time | 10.0%~50.0% (acceleration/ deceleration time) (initial stage+ascend stage≤90%) | 0.1% | 20.0% | ★ |
| F510 | Open-door deceleration S curve descend stage time | 10.0%~80.0% (acceleration/ deceleration time) (initial stage+descend stage≤90%) | 0.1% | 60.0% | ★ |
| F511 | Close door curve selection | 0~1 0:straight line 1:S curve acceleration/ deceleration | 1 | 1 | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|-------------------------------|--|--|----------|---------|-------------------|
| F512 | Close door acceleration S curve initial stage time | 10.0%~50.0% (acceleration/ deceleration time) initial stage+ascend stage 90% | 0.1% | 20.0% | ★ |
| F513 | close door acceleration S curve ascend stage time | 10.0%~80.0% (acceleration/ deceleration time) initial stage+ascend stage 90% | 0.1% | 60.0% | ★ |
| F514 | close door deceleration S curve initial stage time | 10.0%~50.0% (acceleration/ deceleration time) initial stage+descend stage 90% | 0.1% | 20.0% | ★ |
| F515 | close door deceleration S curve descend stage time | 10.0%~80.0% (acceleration/ deceleration time) initial stage+descend stage 90% | 0.1% | 60.0% | ★ |
| F516 | Speed bias setting | 0~80% | 1% | 50% | ☆ |
| F517 | Judging time when the speed bias is huge | 0~5000ms | 1ms | 400ms | ☆ |
| F518 | Door-closing constant speed delay time | 0~9999ms | 1ms | 200ms | ★ |
| F6-distance control parameter | | | | | |
| F600 | Door width auto-tuning function selection | 0~1 0:invalid 1:door width measuring,, valid only in manual adjusting mode | 1 | 0 | ★ |
| F601 | Door width auto-tuning speed | 0~20.00Hz | 0.01Hz | 3.00Hz | ★ |
| F602 | Door width pulse amount low bit | 0~9999 | 1 | 0 | ★ |
| F603 | Door width pulse amount high bit | 0~9999 | 1 | 0 | ★ |
| F604 | Distance control open startup low speed run | 0~30.0% door width | 0.0% | 15.0% | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------|--|--------------------------|----------|---------|-------------------|
| F605 | Distance control open-door deceleration point setting | 60.0%~90.0% (door width) | 0.1% | 70.0% | ☆ |
| F606 | distance control open-door limit point setting | 80.0%~99.0% (door-width) | 0.1% | 96.0% | ☆ |
| F607 | Distance control close-door startup low speed run distance | 0.0%~30.0% (width) | 0.1% | 10.0% | ☆ |
| F608 | Distance control close-door deceleration point setting | 60.0%~90.0% (width) | 0.1% | 70.0% | ☆ |
| F609 | Distance control close-door limit point setting | 80.0%~99.0% (width) | 0.1% | 96.0% | ☆ |
| F611 | Low-bit of door-open limit switch | 0~9999 | 0 | 0 | ★ |
| F612 | Low-bit of door-open limit switch | 0~9999 | 0 | 0 | ★ |
| F613 | Swotch position of the door-closing | 0~9999 | 0 | 0 | ★ |
| F614 | Door-width auto-tuning and initialation run torque setting | 0.0~150.0% | 0.1% | 80.0% | ★ |
| F615 | Pulse low-bit of the door-open deceleration point | 0~9999 | 0 | 0 | ★ |
| F616 | Pulse high-bit of the door-open deceleration point | 0~9999 | 0 | 0 | ★ |
| F617 | Pulse low-bit of the door-closing deceleration point | 0~9999 | 0 | 0 | ★ |
| F618 | Pulse high-bit of the door-closing deceleration point | 0~9999 | 0 | 0 | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|-------------------------------------|--|--|----------|---------|-------------------|
| F619 | Door-width setting when door-open limit | 0~99.9% | 0.1% | 0 | ☆ |
| F620 | Door-width setting when door-closing limit | 0~99.9% | 0.1% | 0 | ☆ |
| F7-Demonstrating function parameter | | | | | |
| F700 | Demonstrate open arrival holding time | 1.0~999.9s | 0.1s | 2.0s | ☆ |
| F701 | Demonstrate close arrival holding time | 1.0~999.9s | 0.1s | 2.0s | ☆ |
| F702 | Demonstrate close/open times record. | 0~9999 | 1 | 0 | ★ |
| F703 | Demonstrate open/close specify run times | 0~9999 | 1 | 0 | ★ |
| F8-auxiliary parameter | | | | | |
| F800 | Software version number | 0.00~99.00 | 0.01 | 1.00 | ● |
| F801 | Module temperature | 0~100℃ | 1℃ | 0 | ● |
| F802 | Error auto reset times | 0~100 0 no auto reset function (gap is 2s), circulation is 1 hour | 1 | 0 | ★ |
| F803 | Brake utilization ratio | 0~100% | 1 | 100 | ☆ |
| F804 | Accumulative working time | 0~9999 hours | 1 | 0 | ★ |
| F805 | reserved (minute) | 0 | 1 | 0 | ★ |
| F806 | Accumulative run time | 0~9999 hours | 1 | 0 | ★ |
| F807 | Reserved (minute) | 0 | 1 | 0 | ★ |
| F808 | Accumulative run time setting | 0~9999 hours | 1 | 0 | ★ |
| F809 | Accumulative run time setting | 0~9999 hours | 1 | 0 | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------------------|--------------------------|---------------|----------|---------|-------------------|
| F810 | Error function selection | 0~9999 | 1 | 0 | ☆ |
| F811 | Error function select | 0~9999 | 1 | 0 | ★ |
| F812 | Drive function select | 0~9999 | 1 | 0 | ★ |
| F814 | Overload factor | 0~10.00 | 0.01 | 1.00 | ☆ |
| F816 | Door-operator amount | 1~2 | 1 | 1 | ★ |
| F9-I/O function parameter | | | | | |
| F900 | terminal filtering time | 0~100ms | 1ms | 20ms | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------|---------------------------|--|----------|---------|-------------------|
| F901 | Switch input terminal DI1 | 0 no function can be re-selected 1 open command | 1 | 0 | ★ |
| F902 | Switch input terminal DI2 | 2 close command 3 external RESET input 4 open forbidden terminal input | 1 | 0 | ★ |
| F903 | Switch input terminal DI3 | 5 torque holding forbid terminal input | 1 | 0 | ★ |
| F904 | Switch input terminal DI4 | 6 low speed open/close enable input 7 fire input 8~9 reserved | 1 | 0 | ★ |
| F905 | Switch input terminal DI5 | 10 light curtain N.O input 11 touch-pad signal N.O input | 1 | 0 | ★ |
| F906 | Switch input terminal DI6 | 12 open limit signal N.O. input 13 close limit signal N.O. input | 1 | 0 | ★ |
| F907 | Switch input terminal DI7 | 14 open-door deceleration point N.O input | 1 | 0 | ★ |
| F908 | Switch input terminal DI8 | 15 close-door deceleration point N.O input 16 door lock signal N.O input 17~109 reserved 110 light curtain N.C input 111 touch pad signal N.C input 112 open limit signal N.C input 113 close limit signal N.C input 114 open-door deceleration point N.C input 115 close-door deceleration N.C input 116 door lock signal N.C input | 1 | 0 | ★ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|------------------------------|---------------------------------------|---|----------|---------|-------------------|
| F909 | Programmable relay output TA1/TB1/TC1 | 0 no function 1 open arrival signal output 0 2 close arrival signal output 0 | 1 | 4 | ★ |
| F910 | Programmable relay output TA2/TB2/TC2 | 3 open arrival signal output 1 4 close arrival signal output 1 | 1 | 0 | ★ |
| F911 | Programmable relay output TA3/TB3/TC3 | 5 error relay signal output1 6 reserved 7 open arrival signal output 2 8 close arrival signal output 2 9 door lock signal output 10 re-open door signal output 11 blocked signal output | 1 | 3 | ★ |
| FA-display & error parameter | | | | | |
| FA00 | LED run display parameter selection | Adopt binary code =1 select BIT0 freq. setting Hz BIT1 run freq. Hz BIT2 Dc bus voltage V BIT3 output voltage V BIT4 output current A BIT5 output torque % BIT6 switch input terminal state BIT7 switch output terminal state BIT8 door width pulse percentage Remark: every monitor amount that selected by FA00 can be displayed during operation and switched by SHIFT key. 1~511 | 1 | 319 | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------|--|--|----------|---------|-------------------|
| FA01 | LED machine-stop display parameter selection | 0 open-door setting freq. Hz 1 close-door setting freq. Hz 2 DC bus voltage V 3 switch input terminal state 4 switch output terminal state 4 door width pulse percentage Remark: every monitor amount that selected by FA01 can be displayed during operation and switched by SHIFT key. 1~63 | 1 | 39 | ☆ |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------|------------------------|---|----------|---------|-------------------|
| FA02 | First error type | 0 no abnormal record clear | 1 | 0 | ● |
| FA03 | First error reminding | abnormal record 1 reserved | 1 | 0 | ● |
| FA04 | Second error type | 2 acceleration running over-current Er02 | 1 | 0 | ● |
| FA05 | Second error reminding | 3 deceleration running over-current Er03 | 1 | 0 | ● |
| FA06 | Third error type | 4 constant speed running over-current Er04 | 1 | 0 | ● |
| FA07 | Third error reminding | 5 acceleration running over-voltage Er05 | 1 | 0 | ● |
| FA08 | 4th error type | 6 deceleration running over-voltage Er06 | 1 | 0 | ● |
| FA09 | 4th error reminding | 7 constant speed running over-voltage Er07 | 1 | 0 | ● |
| FA10 | Last error type | 8~9 reserved 10 controller overload Er10 | 1 | 0 | ● |
| FA11 | 5th error reminding | 11~12 reserved 13 output phase-failure Er13 14 radiator overheated Er14 15 reserved 16 EEPROM read-write errorsEr16 17 reserved 18 current check circuit error Er18 19 tuning overtime error Er19 20 speed feedback error Er20 21 initial position check error Er21 22~24 reserved 25 over-speed error Er25 26 parameter setting error reminding Er26 27 door width auto-tuning error Er27 28 open overtime Er28 29 close overtime Er29 30 low speed open/close overtime error Er30 | 1 | 0 | ● |

| Function code | Name | Setting range | Min.unit | default | Change properties |
|---------------------------------|----------------------------------|--|----------|---------|-------------------|
| FA12 | Last error bus voltage | 0~999.9V | 0.1V | 0.0V | ● |
| FA13 | Last error output current | 0.00~99.99A | 0.01A | 0.00A | ● |
| FA14 | Last error run freq. | 0.00Hz~99.00Hz | 0.01Hz | 0.00Hz | ● |
| FA15 | Last error output torque | 0.0~180.0% | 0.1% | 0.0% | ● |
| FA16 | Last error input terminal state | 0~1023 0:OFF 1:ON DI8/DI7/DI6/DI5/DI4/DI3/DI2/DI1 | 1 | 0 | ● |
| FA17 | Last error output terminal state | 0~15 0:OFF 1:ON T1/T2/T3 | 1 | 0 | ● |
| FA18 | Terminal state query | * | * | * | ● |
| FA19 | Function input state query | * | * | * | ● |
| FA20 | Function output state query | * | * | * | ● |
| FA21 | Display switch control | 0~9999 | 1 | 0 | ☆ |
| FA22 | Display 1 | 0~9999 | 1 | 0 | ● |
| FA23 | Display 2 | 0~9999 | 1 | 0 | ● |
| FA24 | Analog voltage display | 0.00~10.10V | 0.01V | 0.00V | ● |
| FF-factory parameter (reserved) | | | | | |
| FF-00 | reserved | 0 | 1 | 0 | ● |
| FP- user parameter | | | | | |
| FP-00 | User password | 0~9999 (0 means no password) | 1 | 0 | ☆ |
| FP-01 | Parameter update | 0:non 1:to restore the factory parameter 2:delete memory information | 1 | 0 | ★ |

Remark : The different parameter are listed below:

| Function code | Name | Setting range | Min. unit | default | Change properties |
|-----------------------------|--------------------------------------|---|-----------|---------|-------------------|
| F0- basic parameter | | | | | |
| F000 | Control mode | 0:magnetic flux vector control 1:close-loop vector control | 1 | 1 | ★ |
| F001 | Open/close mode selection | 0:speed control mode 1:distance control mode | 1 | 1 | ★ |
| F003 | Max. freq. | 20.00Hz~99.00Hz | 0.01Hz | 24.00Hz | ★ |
| F3-open-door run parameter | | | | | |
| F300 | open-door startup low speed setting | 0.00~F303 | 0.01Hz | 5.00Hz | ☆ |
| F303 | open door freq. setting | 0.00~F003 | 0.01Hz | 15.00Hz | ☆ |
| F4-close-door run parameter | | | | | |
| F400 | Door-close startup low speed setting | 0.00~F403 | 0.01Hz | 4.00Hz | ☆ |
| F403 | Door-close freq. setting | 0.00~F003 | 0.01Hz | 12.00Hz | ☆ |



6

Function parameter specification

Chapter 6 Function parameter specification

6.1 F0 Basic function parameter

| | | | | | |
|-------------|---------------------|---------|---|-----------|---|
| F000 | Control mode | default | 0 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

0: optimizing V/F control

It is suitable for the general application case, in which the motor do not need to be connected to the rotating coder. The control effect will be a little bit worse than vector control. The magnetic flux vector control can never be applied to the case of permanent magnetism sync motor drive.

1: close-loop vector control

Feedback the motor speed signal by the encoder, the controller will run with vector mode. The encoder and motor must be connected with the same axis and the encoder wire amount must be correctly set.

| | | | | | |
|-------------|----------------------------------|---------|---|-----------|---|
| F001 | Close/open mode selection | Default | 0 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

0:Speed control mode

This mode need to install 4 switches on the door, and slowdown by the deceleration point, disposal the arrival by the limit switch signal.

1: Distance control mode

In this mode, the door width pulse auto-tuning must be correct. By setting the open/close curve parameter to slowdown or reach arrival (if the limit signal has been set at the F9 input terminal function selection part, then it will dispose the arrival by the limit signal.)

| | | | | | |
|-------------|---------------------------------|---------|---|-----------|---|
| F002 | Command source selection | Default | 0 | Min. unit | 1 |
| | Setting range | 0~3 | | | |

0: Operation panel control mode

Control running /stop by the operation panel, co-rotation by pressing the OPEN key, inversion by pressing the CLOSE key, and stop by pressing the STOP/RESET keys. In this mode, the controller will not operate door-machine special logic flow.

1: Door-machine terminal control mode

The controller manages the door open/close by the system signal. The operation logic is listed below:

| Open command | Close command | Operation state |
|--------------|---------------|-----------------|
| 0 | 0 | Stop |
| 0 | 1 | Close |

| Open command | Close command | Operation state |
|--------------|---------------|-----------------|
| 1 | 0 | Open |
| 1 | 1 | Open |

Table 6-1The logic table

2: Door machine manual adjusting mode

Control running /stop by the operation panel, door open by pressing the OPEN key, door closed by pressing the CLOSE key, and stop by pressing the STOP/RESET keys

3: Door machine auto-demonstrating mode

This mode is applied to door-machine demonstrating or factory trial run which need no control system's participation. The mode can be set after adjusting the door machine running curve. The demonstrating of open/close can be repeat by pressing OPEN or CLOSE key. The time gap can be modified by F7 parameters, the machine stop by pressing STOP/RESET key.

Remark:

- 1) Door width auto-tuning only valid in the door machine manual adjusting mode.
- 2) Motor tuning only valid in the panel control mode.

| | | | | | |
|-------------|-------------------|---------------|---------|-----------|--------|
| F003 | Max. freq. | Default | 50.00Hz | Min. unit | 0.01Hz |
| | Setting range | 20.00~99.00Hz | | | |

Used to set the controller Max. freq.

| | | | | | |
|-------------|------------------------|------------------------|--------|-----------|--------|
| F004 | Panel run freq. | Default | 0.00Hz | Min. unit | 0.01Hz |
| | Setting range | 0.00~max. freq. (F002) | | | |

Speed setting mode adopts the running target freq. in the panel control mode.

| | | | | | |
|-------------|------------------------------|---------|---|-----------|---|
| F005 | Run direction setting | Default | 0 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

By changing this function code, the tractor running direction can be altered without the change of wiring.

P.S.: parameter initialization will make the motor run direction w back to the original state .user must cautious about this parameter.

| | | | | | |
|-------------|-----------------------------------|---------|--------|-----------|--------|
| F006 | Slow walking speed setting | Default | 4.00Hz | Min. unit | 0.01Hz |
| | setting range | 0~1 | | | |

Door-open mode selection (F001) is the first run freq. of the distance control and door walking speed when the slow open/close signal enable is valid.

| | | | | | |
|-------------|---------------------------|-------------|--------|-----------|--------|
| F007 | Carrier wave freq. | Default | 8.0kHz | Min. unit | 0.1kHz |
| | Setting range | 2.0~16.0kHz | | | |

This function adjusts inverter carrier wave freq. to reduce the motor noise, the current leakage and inverter interference.

When the carrier frequency is low, the output current higher-harmonic component increases, the consumption and temperature rise of the motor increase as well.

When the carrier frequency is high, the motor consumption declines and the motor temperature rise reduces, but the consumption, temperature rise and interference of the system increase.

| | |
|---------------------------------|-------------|
| Carrier wave freq. | low ~ high |
| Motor noise | big ~ small |
| Output current wave | Bad ~ good |
| Motor temperature rise | high ~ low |
| Inverter temperature rise | low ~ high |
| Leakage current | Small ~ big |
| External radiation interference | Small ~ big |

Table 6-2 Relevant parameter of carrier wave freq.

6.2 F1- motor parameter

| Function code | Name | Default | Min. unit | Setting range |
|---------------|----------------------|---------------------|-----------|---------------|
| F100 | Motor type selection | 0 | 1 | 0~2 |
| F101 | Rated power | Models to determine | 1W | 0~750W |
| F102 | Rated voltage | 220V | 1V | 0~250V |
| F103 | Rated current | Models to determine | 0.01A | 0.10~9.90A |
| F104 | Rated freq. | 50.00Hz | 0.01Hz | 1.00~99.00Hz |
| F105 | Rated rotation rate | 1460rpm | 1rpm | 0~9999rpm |

Please set the parameter according to the motor nameplate

| Function code | Name | Default | Min. unit | Setting range |
|---------------|--------------------|---------------------|-----------|---------------|
| F106 | Stator resistance | Models to determine | 0.01Ω | 0.00~99.99Ω |
| F107 | Rotor resistance | Models to determine | 0.01Ω | 0.00~99.99Ω |
| F108 | Leakage inductance | Models to determine | 0.01mH | 0.0~99.99mH |

| Function code | Name | Default | Min. unit | Setting range |
|---------------|------------------------------|---------------------|-----------|---------------|
| F109 | Mutual inductance | Models to determine | 0.1mH | 0~999.9mH |
| F110 | Non-load current | Models to determine | 0.01A | 0.01~99.99A |
| F111 | D-axis inductance | Models to determine | 0.1mH | 0.0~999.9mH |
| F112 | Q-axis inductance | Models to determine | 0.1mH | 0.0~999.9mH |
| F113 | Opposing electromotive force | Models to determine | 1V | 0~250V |
| F114 | Encoder zero position | Models to determine | 0.1 | 0.0~359.9 |
| F115 | Actual angle of sync motor | Models to determine | 0.1 | 0.0~359.9 |

F106~ F110 will update automatically after the motor auto-tuning.

About asynchronous machine; the NICE 900 controller can obtain the above parameters through the complete tuning or static tuning. If the spot tuning can not be done, users can manually input it (refers to the same nameplate parameter). The system will resume the standard motor parameter of F106-F110, every time after modification of rated power F101.

Applied to permanent-magnet sync motor: The system can obtain parameter of F106, F111, F112, F113, F114. The corresponding parameter will not be updated after the modification of rated power F101.

| | | | | | |
|------|---------------|---------------------------------------|---|-----------|---|
| F116 | Motor tuning | Default | 0 | Min. unit | 1 |
| | Setting range | 0~5 (asynchronous :1.2.5 sync :3.4.5) | | | |

The motor tuning must in the panel control mode (F002 = 0). Before the tuning, motor rated parameter (F100 – F105) and encoder wiring parameter F6-00.

0: Non

1: Asynchronous motor static tuning

Applied when the complete tuning can not be down to tune the stator resistance, rotor resistance and leakage inductance parameter (non-load current and mutual inductance should be calculated)

2: Asynchronous machine complete tuning

in order to assure the controller dynamic control performance, please select the complete tuning. The motor must be in non-load state in complete tuning.

After select complete tuning, controller do the static tuning first, then the motor will accelerate to the 80% of the rated freq with the default time 2s. then hold on for a period, then decelerate to zero with the rated slowdown time 2s. to over the complete tuning process.

3: permanent magnet sync motor non-load tuning.

Including: encoder zero compensation angle (F114), stator resistance (F106), dq –axis inductance (F110.F111) e.g. The motor must in non-load state to assure the control performance.

4: permanent magnet sync motor loaded tuning

Including: encoder zero compensation angle (F114), stator resistance (F106), dq –axis inductance (F110.F111) e.g.. please manage to use non-load tuning to assure the accuracy

5: Inertia tuning (under research)

Tuning operation:

Pressing ENTER key after setting F116, then the “TUNE” displayed and flash, pressing “CLOSE” or “OPEN” to start parameter tuning ,the “TUNE” will stop flash. The tuning can also be stopped by pressing STOP key.

The F116 will resume to 0 when the tuning is over.

Remark: please do the motor tuning before the 1st run of the permanent magnet sync motor, pay attentions to the blocked-rotor to assure the success of the tuning.

Please refer to chapter 7 for the use of permanent magnet sync motor.

6.3 F2 Performance control parameter

| | | | | | |
|------|--------------------------------|--|--------|-----------|--------|
| F200 | Speed-loop proportional gain 1 | Default | 30 | Min. unit | 1 |
| | Setting range | 0~100 | | | |
| F201 | Speed-loop integral time 1 | Default | 0.50s | Min. unit | 0.01s |
| | Setting range | 0.01~10.00s | | | |
| F202 | Switch freq. 1 | Default | 5.00Hz | Min. unit | 0.01Hz |
| | Setting range | 0.00~F205 (switch freq. 2) | | | |
| F203 | Speed-loop proportional gain 2 | Default | 20 | Min. unit | 1 |
| | Setting range | 0~100 | | | |
| F204 | Speed-loop integral time 2 | Default | 1.00s | Min. unit | 0.01s |
| | Setting range | 0.01~10.00s | | | |
| F205 | Switch freq. 2 | Default | 30 | Min. unit | 1 |
| | Setting range | F202 (switch freq. 1) ~F003 (max. freq) | | | |

F200 and F201 are PI adjusting parameter when the running freq. is smaller than switch freq.; F203 and F204 are PI adjusting parameter when the running freq. is bigger than switch freq. The PI adjusting parameter between switch freq. 1 and 2 is the weighted average of

F200, F201 and F203, F204. See the fig below for details.

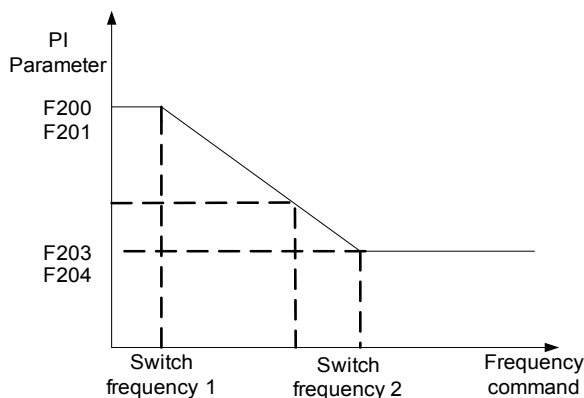


Fig 6-1 PI parameter

The vector control speed dynamic response characteristic can be adjusted by the means of adjusting proportional coefficient and integral time of speed adjustor. Increase of proportional gain and decrease of integral time both can quicken speed-loop dynamic response. The over-increase of proportional gain or over-small of integral time may cause surge of system.

Recommended adjusting method:

fine tune the default parameter if it is not suitable for the application: increase the proportional gain to avoid system surge then decrease the integral time to insure the quick response of system.

If both the switch freq. 1 and 2 are zero, only the F203 and F204 are valid.

Remark: The inappropriate setting of PI parameter may cause overshoot of speed, even over-voltage error.

| | | | | | |
|------|--------------------------------|---------|----|-----------|---|
| F206 | Current-loop proportional gain | Default | 60 | Min. unit | 1 |
| | Setting range | 10~500 | | | |
| F207 | Current-loop integral gain | Default | 30 | Min. unit | 1 |
| | Setting range | 10~500 | | | |

F206 F207 are current-loop adjusting parameter in the vector control arithmetic, generally need no adjusting. Please refer to the speed-loop adjustor if adjusting is needed.

| | | | | | |
|------|-------------------------------|---------|------|-----------|----|
| F208 | slip compensation coefficient | Default | 100% | Min. unit | 1% |
| | Setting range | 50~200% | | | |

This parameter influence the dynamic performance and load current of motor and it only be used when there is speed sensor vector control. Generally, it need no adjusting.

| | | | | | |
|------|----------------------|-----------|------|-----------|------|
| F209 | Torque magnification | Default | 1.0% | Min. unit | 0.1% |
| | Setting range | 0.0~30.0% | | | |

In order to compensate the V/F control low frequency torque characteristic, some lifting compensation of the inverter output current are added.

If torque hoist is set too large, it may cause over-heated motor and over-current. Normally, do not set torque lifting over 8%

To adjust this parameter effectively can avoid over-current at startup of motor. As to the situation of over-load, it is recommended to increase this parameter; vice versa.

When the torque hoist is set to 0, controller become automatic torque rising

| | | | | | |
|------|----------------------|---------|----|-----------|---|
| F210 | over-excitation gain | Default | 64 | Min. unit | 1 |
| | Setting range | 0~200 | | | |

The function of over-excitation gain is to restrain the bus voltage rising in the process of inverter deceleration. The bigger the over-excitation is the strong restrain effect will be.

- 1) Set as zero in small inertia condition, and set it bigger when inertia becomes bigger.
- 2) Remember to set it as zero in the case of brake resistance.

| | | | | | |
|------|-----------------------------------|---------|---|-----------|---|
| F211 | Initial position inference method | Default | 1 | Min. unit | 1 |
| | Setting range | 0~2 | | | |

1:Magnetic pole initial position inference method of permanent magnet sync motor which adopts pulse mode

2:Magnetic pole initial position inference method of permanent magnet sync motor which adopts other mode (under research)

| | | | | | |
|------|--------------------------------|---------|---|-----------|---|
| F212 | Feedback speed filtering level | Default | 0 | Min. unit | 1 |
| | Setting range | 0~20 | | | |

This parameter set the encoder feedback speed filtering level. Generally, it needs no adjusting.

In the case of serious interference or very little encoder lines, if adopt close-loop vector control mode, the feedback speed filtering level should be added to insure the smooth run of motor.

Remark: in the case of small load, too big parameter setting may cause serious motor overshoot or surge.

| | | | | | |
|------|-----------------------|---------|------|-----------|---|
| F213 | Encoder pulse setting | Default | 2048 | Min. unit | 1 |
| | Setting range | 1~9999 | | | |

If the NICE 900 controller need to close-loop vector run, the encoder parameter must be correctly set. In the door machine distance control mode, the encoder parameters are also need to be correctly set to insure the good effect of distance control.

| | | | | | |
|------|-----------------------------|---------|---|-----------|---|
| F314 | Encoder direction selection | Default | 0 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

This parameter will back to zero when restore factory setting, please cautious about this function.

6.4 F3 – open-door run parameter.

In the speed-control mode, door machine signal contacts (travel switch) install position show below:

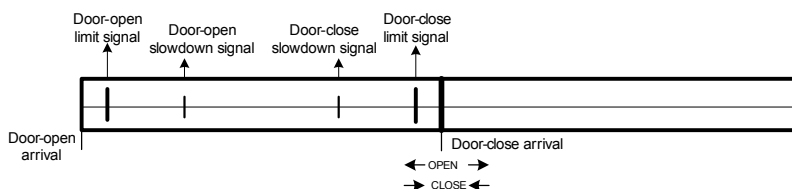


Fig 6-2 speed control switch install sketch

Correctly set the parameter in F3 group which related to speed control, precisely set slowdown signal switch and limit signal switch, open-door run speed curve can be detailed as fig 6-3.

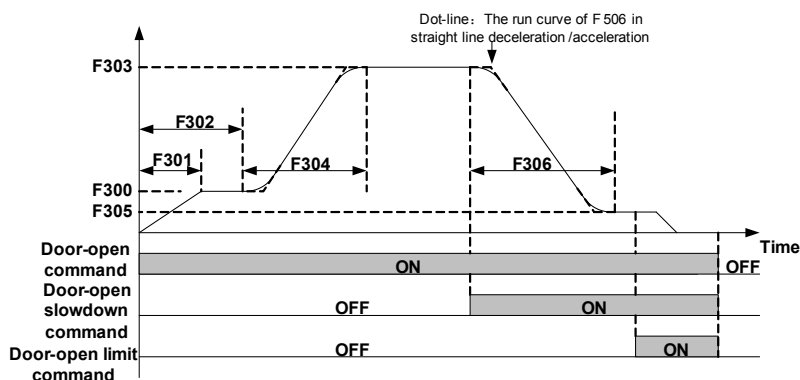


Fig 6-3 Speed control open-door curve sketch

Speed control door opening process:

- 1) When the door opening command is valid, door machine accelerate to F300 creeping speed then run at constant speed in the door open low speed stage.
- 2) Time from door open starting, when the time reaches low speed run time (F302), then door machine switch to high speed (F303), and speedup at F304 time, then constant run in the high speed stage.
- 3) When the door open signal is valid, door machine set F305 as target speed, slowdown

with F306 time, when the deceleration is over then run at constant speed in the door open finish low speed stage.

- 4) When the door open limit signal is valid, door machine continue to creeping at door open finish low speed, after locked-rotor, entering door opening torque holding state, holding torque as F308,a complete door open process is over.
- 5) When the open command is invalid, open torque holding is over.
- 6) Dotted line display: running curve When the door opening curve selection (F506) is straight line acceleration/slowdown.

Correctly set parameter in F3 group which related to distance control, set relevant pulses, the door opening speed curve can be detailed as fig 6-4.

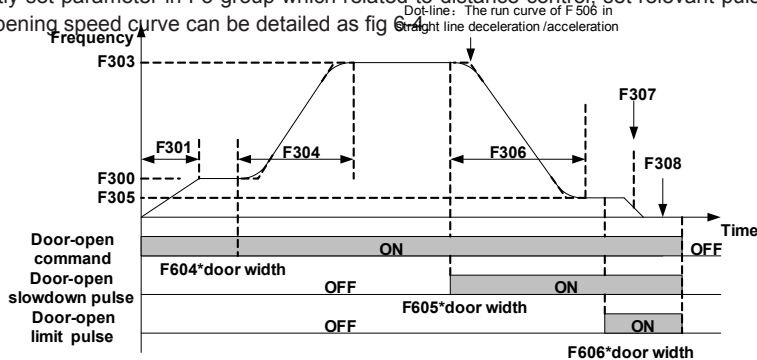


Fig 6-4 Distance control open-door curve sketch

Distance control door opening process:

- 1) When the door opening command is valid, door machine accelerate to F300 creeping speed then run at constant speed in the door open low speed stage.
- 2) When the door-opening distance reaches F604*door width,then door machine switch to high speed (F303), and speedup at F304 time, then constant run in the high speed stage.
- 3) When the door-opening distance reaches F605*door width,door machine set F305 as target speed, slowdown with F306 time, when the deceleration is over then run at constant speed in the door open finish low speed stage.
- 4) When door opening distance pulse reaches (door width-F606),door machine continue to creeping at door open finish low speed, after locked-rotor, entering door opening torque holding state, holding torque as F308,a complete door open process is over.
- 5) When the open command is invalid, open torque holding is over.
- 6) Dotted line display: running curve when the door opening curve selection (F506) is straight line acceleration/slowdown.

| | | | | | |
|------|---|------------|-------|----------|------|
| F307 | Open door locked-rotor to torque holding switch point setting | Default | 50.0% | Min.unit | 0.1% |
| | Setting range | 0.0~150.0% | | | |

This group of parameters are valid only on the distance control mode, when door-open run to the set door-open limit position, if the output torque bigger than the F307, then the door-width pulse will be reset as 100%, and into the torque holding state; if the output torque not exceeds the F307 after locked-rotor, then decrease the F307 slightly to make sure that the door-width pulse can be reset.

| | | | | | |
|------|----------------------------------|------------|-------|----------|------|
| F308 | Open door arrival torque holding | Default | 50.0% | Min.unit | 0.1% |
| | Setting range | 0.0~150.0% | | | |

This parameter is used to set the holding torque after the door-open limit.

| | | | | | |
|------|--------------------------|------------|-------|----------|------|
| F309 | Door-open blocked torque | Default | 80.0% | Min.unit | 0.1% |
| | Setting range | 0.0~150.0% | | | |

Set the door-open blocked torque, the up limit of door-open torque is 110%of the blocked torque.

| | | | | | |
|------|--------------------------|-----------|------|----------|------|
| F310 | Door-open startup torque | Default | 0.0% | Min.unit | 0.1% |
| | Setting range | 0.0%~F309 | | | |

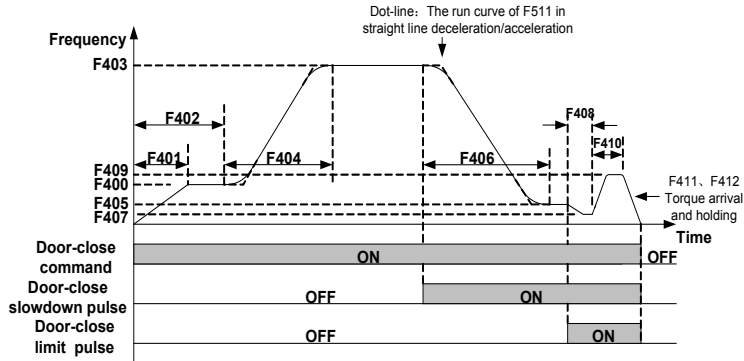
This parameter is used to set the start torque when door-open start to make sure the effect of door-machine start. The torque is the product of this function code and the motor rated torque.

| | | | | | |
|------|--------------------------------|----------|-----|----------|-----|
| F311 | Door-open blocked judging time | Default | 0ms | Min.unit | 1ms |
| | Setting range | 0~9999ms | | | |

This is the filtering time when door-open blocked, no detection for door-open blocking when this parameter is set as 0.

6.5 F4- Door closing run curve

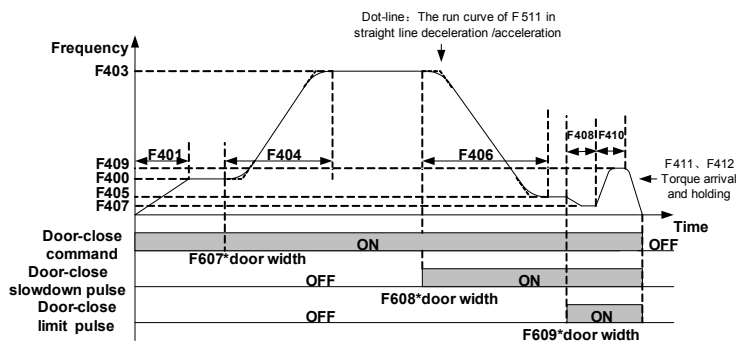
Correctly set the parameter in F4 group which related to speed control, precisely set slowdown signal switch and limit signal switch, open-door run speed curve can be detailed as fig6-5.



Speed control door closing process:

- 1) When the door closing command is valid, door machine accelerate to F401 speed then run at constant speed in the door closing low speed stage.
- 2) Time from door closing starting, when the time reaches low speed run time (F402), then door machine switch to high speed (F403), and speedup at F404 time, then constant run in the high speed stage.
- 3) When the door closing signal is valid, door machine set F405 as target speed, slowdown with F406 time, when the deceleration is over then run at constant speed in the door closing finish low speed stage.
- 4) When the door closing limit signal is valid, door machine continue to creeping at door open finish low speed, after locked-rotor, entering door closing torque holding state, holding torque as F408, a complete door closing process is over.
- 5) When the closing command is invalid, open torque holding is over.
- 6) Dotted line display: running curve When the door closing curve selection (F511) is straight line acceleration/slowdown.

Correctly set parameter in F4 group which related to distance control, set relevant pulses, the door opening speed curve can be detailed as fig 6-6.



Distance control door closing process:

- 1) When the door closing command is valid, door machine accelerate to F400 creeping speed then run at constant speed in the door closing low speed stage.
- 2) When the door-closing distance reaches F607*door width, then door machine switch to high speed (F403), and speedup at F404 time, then constant run in the high speed stage.
- 3) When the door-opening distance reaches F608*door width, door machine set F405 as target speed, slowdown with F406 time, when the deceleration is over then run at constant speed in the door closing finish low speed stage.
- 4) When door opening distance pulse reaches F609, door machine continue to creeping at door closing finish low speed, after locked-rotor, entering door opening torque holding state, holding torque as F408, a complete door open process is over.
- 5) When the closing command is invalid, open torque holding is over.
- 6) Dotted line display: running curve when the door closing curve selection (F511) is straight line acceleration/slowdown.

| | | | | | |
|------|------------------------------|-----------|--------|-----------|---------|
| F409 | Skate withdraw speed setting | Default | 2.0 hz | Min. unit | 0.01 hz |
| | Setting range | 0.00~F403 | | | |

This is the running speed when the door-machine skate withdraw during door-closing

| | | | | | |
|------|-------------------------|----------|-------|-----------|-----|
| F410 | Skate withdraw run time | Default | 500MS | Min. unit | 1MS |
| | Setting range | 0~9999MS | | | |

The door-machine will run again, when the skate-withdraw time exceeds the F410.

| | | | | | |
|------|---|------------|-------|-----------|------|
| F411 | Door-closing limit torque switching point setting | Default | 50.0% | Min. unit | 0.1% |
| | Setting range | 0.0-150.0% | | | |

This function only valid on the distance control mode, when the door-close skate withdraw run finished, if the controller output torque exceeds the F411, door-width reset to 0% and enter the door-close limit torque holding state.

| | | | | | |
|------|---|--------------|---------|-----------|--------|
| F412 | Door-closing torque switching-point setting | Default | 10.00Hz | Min. unit | 0.01Hz |
| | Setting range | 5.00~30.00Hz | | | |
| F414 | Close door arrival torque holding | Default | 1 | Min. unit | 1 |
| | Setting range | 0-1 | | | |

0: stop when door-closing blocked, close when the open command given after or within 10s; respond to the closing call when the run command off

1: re-open when door-closing blocked, no response to the outside door orders during re-opening.

A: light-curtain/touch plate signal valid during door-closing running

B: the output torque exceeds the block torque during door-closing running

When the fire emergency input function is valid, door closing high speed running.

| | | | | | |
|------|---------------------------------|----------|-------|-----------|-----|
| F415 | Door-close blocked judging time | Default | 500ms | Min. unit | 1ms |
| | Setting range | 0~9999ms | | | |

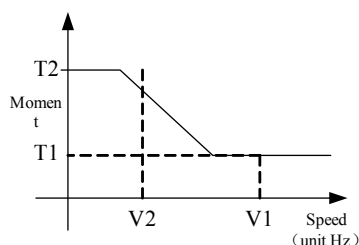
This is the filtering time when door-close blocked, no judgement for the door-close when set this parameter as 0.

| | | | | | |
|------|---|-----------|---------|-----------|--------|
| F416 | Fire emergency closing high speed setting | Default | 10.00Hz | Min. unit | 0.01Hz |
| | Setting range | 5.00~F104 | | | |

This is the run speed of door-machine closing when the fire-emergency input function is valid.

| | | | | | |
|------|--------------------------------------|-------------|---------|-----------|--------|
| F417 | Door-close blocked hi-speed setting | Default | 12.00Hz | Min. unit | 0.01Hz |
| | Setting range | F418~F104 | | | |
| F418 | Door-close blocked low-speed setting | Default | 2.00Hz | Min. unit | 0.01Hz |
| | Setting range | 0.00Hz~F104 | | | |
| F419 | High-speed blocked torque setting | Default | 100.0% | Min. unit | 0.1% |
| | Setting range | 0.00~150.0% | | | |
| F420 | Low-speed blocked torque setting | Default | 100.0% | Min. unit | 0.1% |
| | Setting range | 0.00~150.0% | | | |

These 4 parameters are used to judge the door-close blocked solutions:



- 7) V1 stands for the F417, V2 stands for F418, T1 stands for the F419, T2 stands for F420, make sure $F417 \geq F418$, $F419 \leq F420$. When the frequency exceeds V1 on door-closing run, then the torque percentage of blocking judging is T1; when the frequency exceeds V2 on door-closing run, then the torque percentage of blocking judging is T2. When the run frequency is between V2 and V1, then the percentage is shown as the slant part as the diagram.

6.6 F5-Door auxiliary parameter

| | | | | | |
|------|----------------------------|----------|------|-----------|------|
| F500 | Abnormal deceleration time | Default | 0.3s | Min. unit | 0.1s |
| | Setting range | 0.1~5.0s | | | |

When the door closing was blocked, slowdown from current closing speed to zero, the parameter should be set as small as possible in the condition of no over-current when slowdown.

| | | | | | |
|------|----------------------|---------|----|-----------|----|
| F501 | Door open time limit | Default | 0s | Min. unit | 1s |
| | Setting range | 0~9999s | | | |

The max. door opening time, users can set this parameter bases on the actual condition. The set value should not be smaller than the totality of all the door opening time (door opening run curve parameter group), otherwise parameter setting error (Er26) will occurs. Correctly set this parameter can realize the door machine abnormal protection. If the door opening limit lose effect, and running time exceeds the setting range will give rise to door opening error protection (Er28). Set as zero, this function is invalid.

| | | | | | |
|------|-------------------------|---------|----|-----------|----|
| F502 | Door closing time limit | Default | 0s | Min. unit | 1s |
| | Setting range | 0~9999s | | | |

The max. door closing time, users can set this parameter bases on the actual condition. The set value should not be smaller than the totality of all the door closing time (door closing run curve parameter group), otherwise parameter setting error (Er26) will occurs. Correctly set this parameter can realize the door machine abnormal protection. If the door closing limit lose effect, and running time exceeds the setting range will give rise to door closing error protection (Er29). Set as zero, this function is invalid.

| | | | | | |
|------|--------------------------|---------|----|-----------|----|
| F503 | low speed run time limit | Default | 0s | Min. unit | 1s |
| | Setting range | 0~9999s | | | |

The max. low speed run time when the low speed run signal is valid, users can set this parameter bases on the actual condition. The set value should not be smaller than the totality of all the door open/ closing time (door open/closing curve parameter group), otherwise parameter setting error (Er26) will occurs. Correctly set this parameter can realize the door machine low speed run abnormal protection. If the door open/ closing limit lose effect, and running time exceeds the setting range will give rise to low speed door open/closing error protection (Er30). Set as zero, this function is invalid.

| | | | | | |
|------|--|---------|----|-----------|----|
| F504 | External door opening command delayed time | Default | 0s | Min. unit | 1s |
| | Setting range | 0~9999s | | | |

Within the door open arrival holding time, when the run command of door open terminal is invalid, the holding time should not be smaller than the function parameter, the controller stop. Before door open arrival, if the open command was cancelled, the controller will immediately stop, and the time-delay function will be invalid.

| | | | | | |
|------|--|-----------------|----|-----------|----|
| F505 | External door closing command delayed time | Factory default | 0s | Min. unit | 1s |
| | Setting range | 0~9999s | | | |

Within the door closing arriving holding time, when the run command of door closing terminal is invalid, the holding time should not be smaller than the function parameter, the controller stop. Before door closing arrival, if the closing command was cancelled, the controller will immediately stop, and the time-delay function will be invalid. This function code used to set the torque holding time of door-open limit.

| | | | | | |
|------|-----------------|---------|---|-----------|---|
| F506 | Door-open curve | Default | 1 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

This parameter used to set the door-machine run curve when door-open run

0:straight line accelaration/deceleration;

1:S curve acceleration;

| | | | | | |
|------|-------------------------|---------|---|-----------|---|
| F511 | Door-close curve select | Default | 1 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

This parameter used to set the door-machine run curve when door-close run

0:straight line accelaration/deceleration;

1:S curve acceleration;

| | | | | | |
|------|---|---|-------|-----------|------|
| F507 | Open-door acceleration S curve initial time | Default | 20.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~50.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |

| | | | | | |
|------|--|---|-------|-----------|------|
| F508 | Open-door acceleration S curve hoist time | Default | 60.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~80.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F509 | Open-door deceleration S curve initial stage time | Default | 20.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~50.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F510 | Open-door deceleration S curve descend stage time | Default | 60.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~80.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F512 | Close door acceleration S curve initial stage time | Default | 20.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~50.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F513 | close door acceleration S curve ascend stage time | Default | 60.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~80.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F514 | close door deceleration S curve initial stage time | Default | 20.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~50.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |
| F515 | close door deceleration S curve descend stage time | Default | 60.0% | Min. unit | 0.1% |
| | Setting range | 10.0%~80.0% (acceleration/deceleration time) (initial stage+ascend stage≤90%) | | | |

T1 is the F507 parameter, and the slope of output frequency within this period is gradually increasing (the percentage speed variation, same below), T2 is the time defined by the F508, the slope within this period is gradually change to low-speed frequency. The slope of output frequency is fixed within the time of T1 and T2.

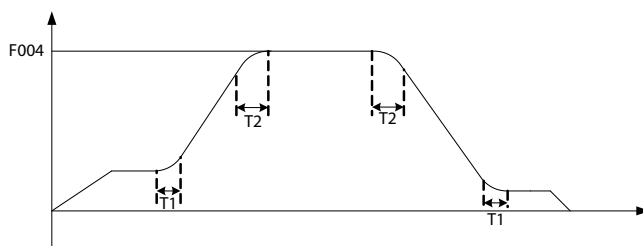


Figure 6-7 Speed-up/down Curve

| | | | | | |
|------|-------------------------|----------|-------|-----------|-----|
| F516 | Speed bias setting | Default | 50% | Min. unit | 0% |
| | Setting range | 0%~80% | | | |
| F517 | speed bias judging time | Default | 400ms | Min. unit | 1ms |
| | Setting range | 0~5000ms | | | |

The speed bias detection is only valid on the close-loop vector control mode. Detect whether the bias is oversize according to the F516, Err 32 will occurs if the bias accumulate time exceeds F517.

No detection when the F516 set as 0.

| | | | | | |
|------|---------------------------------|----------|-------|-----------|-----|
| F518 | Door-close constant speed delay | Default | 200ms | Min. unit | 1ms |
| | Setting range | 0~9999ms | | | |

When the door-closing enter the high-speed state, close the door after the constant speed delay of F518.

6.7 F6-Distance control parameter

| | | | | | |
|------|---|---------|---|-----------|---|
| F600 | Door width auto-tuning function selection | Default | 0 | Min. unit | 1 |
| | Setting range | 0~1 | | | |

When this function parameter change from 0 to 1, pressing OPEN or CLOSE key to start door width auto-tuning, run with the logic of CLOSE-> OPEN-> CLOSE, when door opening arrival locked-rotor occurs, store door width, the door width auto-tuning is only valid in door machine manual adjusting mode , please refers to CHAPTER 7 for details.

| | | | | | |
|------|------------------------------|---------------------|--------|-----------|--------|
| F601 | Door width auto-tuning speed | Factory default | 4.00Hz | Min. unit | 0.01Hz |
| | Setting range | 0~F002 (Max. freq.) | | | |
| F602 | Door- width pulse low bit | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F603 | Door-width pulse high bit | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

Door width measure method: door width=F603×10000+F602. Door width pulse number which obtained by auto-tuning can be modified by keyboard.

| | | | | | |
|------|--|-----------|-------|-----------|------|
| F604 | Distance control open startup low speed run distance | Default | 10.05 | Min. unit | 0.1% |
| | Setting range | 0.0-30.0% | | | |

In the process of distance control door-opening, record the real time walking pulses. The door machine shift from the door-opening start low speed (F300) to the high speed (F303) when the pulse is not smaller than the door width * F604.

| | | | | | |
|------|--|---------------|--------|-----------|------|
| F605 | Distance control door-opening slowdown point setting | Default | 70.00% | Min. unit | 0.1% |
| | Setting range | 60.00%-90.00% | | | |

In the process of distance control door-opening, record the real time walking pulses. The door machine shift from the door-opening start high speed (F303) to the low speed (F305) when the pulse is not smaller than the door width * F605.

| | | | | | |
|------|---|---------------|-------|-----------|------|
| F606 | Distance control door-opening limit point setting | Default | 96.0% | Min. unit | 0.1% |
| | Setting range | 80.00%-99.00% | | | |

In the process of distance control door-opening, record the real time walking pulses. Operates the door-opening arrival relative process when the pulse is not smaller than the door width * F606

| | | | | | |
|------|---|-----------|-------|-----------|------|
| F607 | Distance control close startup low speed run distance | Default | 10.0% | Min. unit | 0.1% |
| | Setting range | 0.0-30.0% | | | |

In the process of distance control door-opening, record the real time walking pulses. The door machine shift from the door-closing start low speed (F300) to the high speed (F303) when the pulse is not bigger than the door width * (100%-F607)

| | | | | | |
|------|--|--------------|-------|-----------|------|
| F608 | Distance control door-close slowdown point setting | Default | 70.0% | Min. unit | 0.1% |
| | Setting range | 60.00%-99.0% | | | |

In the process of distance control door-opening, record the real time walking pulses. The door machine shift from the door-closing start high speed (F303) to the low speed (F305) when the pulse is not bigger then the door width * (100%-F608)

| | | | | | |
|------|---|-------------|-------|-----------|------|
| F609 | Distance control door-closing limit point setting | Default | 96.0% | Min. unit | 0.1% |
| | Setting range | 80.0%-99.0% | | | |

In the process of distance control door-opening, record the real time walking pulses. Operates the door-closing arrival relative process when the pulse is not bigger than the door width*(100%-F609)

| | | | | | |
|------|-------------------------------------|---------|---|-----------|---|
| F611 | Low-bit of door-open limit switch | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F612 | High-bit of door-open limit switch | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F613 | Swotch position of the door-closing | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

During normal run, when the door-open limit is valid, the door position is F612*10000+F611; while the door-close limit is valid, the door position is F613.

| | | | | | |
|------|---|------------|-------|-----------|------|
| F614 | Door-width auto-tuning and initial run torque setting | Default | 80.0% | Min. unit | 0.1% |
| | Setting range | 0.0~150.0% | | | |

This parameter valid only on the distance control mode, used to set the door-width auto-tuning and torque judgment level of 1st power on.

| | | | | | |
|------|---|---------|---|-----------|---|
| F615 | Pulse low-bit of the door-open deceleration point | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F616 | Pulse high-bit of the door-open deceleration point | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F617 | Pulse low-bit of the door-closing deceleration point | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |
| F618 | Pulse high-bit of the door-closing deceleration point | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

Door-open deceleration point is $F616 \times 10000 + F615$; while the door-close deceleration point is $F618 \times 10000 + F617$;

| | | | | | |
|------|---|-----------|-----|-----------|-----|
| F619 | Door-width setting when door-open limit | Default | 0.0 | Min. unit | 0.1 |
| | Setting range | 0.0~99.9% | | | |

This parameter is valid on the distance control mode.

When the door-width position exceeds F619 to output door-open limit signal, then the door-width will not be reset as 100% even if the output torque exceeds the door-open limit switch point torque, only when it exceeds F606, and also the output torque exceeds door-open limit switch point torque, the door-width will reset as 100%.

When the F619 is 0, judge whether to output door-open limit signal based on the F606.

| | | | | | |
|------|--|-----------|-----|-----------|-----|
| F620 | Door-width setting when door-closing limit | Default | 0.0 | Min. unit | 0.1 |
| | Setting range | 0.0~99.9% | | | |

This parameter is valid on the distance control mode. ;

When the door-width position exceeds F620 to output door-close limit signal and skate withdraw. Then the door-width will not be reset as 0% even if the output torque exceeds the door-close limit switch point torque. The door-width will be reset as 0% only when the door position exceeds F609 and also the output torque exceeds the door-close limit torque too.

When the F620 is 0, judge whether to output door-open limit signal based on the F609.

6.8 F7-Demonstrating function parameter

| | | | | | |
|------|---|-----------------|------|-----------|------|
| F700 | Demonstrate door opening arrival holding time | Factory default | 2.0s | Min. unit | 0.1s |
| | Setting range | 0.5~999.9s | | | |

Demonstrate door opening arrival holding time means in the demonstrating mode, the time gap between opening arrival stop and opposite door closing, set it according to actual condition.

| | | | | | |
|------|---|-----------------|------|-----------|------|
| F701 | Demonstrate door closing arrival holding time | Factory default | 2.0s | Min. unit | 0.1s |
| | Setting range | 0.5~999.9s | | | |

Demonstrate door closing arrival holding time means in the demonstrating mode, the time gap between closing arrival stop and forward direction door opening, set it according to actual condition.

| | | | | | |
|------|---|-----------------|---|-----------|---|
| F702 | Demonstrate door operation times record | Factory default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

Record parameter for demonstrate run times, auto saved when power removal, the value of this parameter will be added after re-powered. Add 1 each times after door opening, and closing. The demonstrating mode is an auto cycle run process, pressing OPEN or CLOSE key to start demonstration run, after starting, the machine close the door with low speed, and operate the door-opening run after closing limit, timing from opening arrival, operate auto door-closing run when the time reaches F700's setting value. When the closing time reaches F701's setting value, the machine open the door again, vice versa. Until pressing the STOP/RESET key to stop the machine. The demonstration run can be distance control or speed control. The demonstration mode can be applied to demonstrating and aging test.

| | | | | | |
|------|--|---------|---|-----------|---|
| F703 | Demonstrate door operation times setting | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

It used for setting demonstrating operation times, when the actual demonstrating operation door times are more than this function parameter, demonstrating operation automatically over.

6.9 F8-Auxiliary parameter

| | | | | | |
|------|------------------|------------|------|-----------|------|
| F800 | Software version | Default | 1.00 | Min. unit | 0.01 |
| | Setting range | 0.00~99.99 | | | |

Display the current software version of controller, for factory maintenance.

| | | | | | |
|------|--------------------|---------|----|-----------|----|
| F801 | Module temperature | Default | 0℃ | Min. unit | 1℃ |
| | Setting range | 0~100℃ | | | |

Update the bottom module temperature of controller at anytime.

| | | | | | |
|------|-------------------------------------|---------|---|-----------|---|
| F802 | The number of automatic error reset | Default | 0 | Min. unit | 1 |
| | Setting range | 0~100 | | | |

When the error occurs during running, controller stops and reset automatically to continue the running. No auto reset function (only manual reset) when set error reset times as 0. If no error during 1 hour or manual resetting occurs, the machine will reset the finished reset times as zero.

Remark: errors that can not be reset automatically:Er19- motor tuning error Er28-parameter setting error indicator, Er 27- door width auto tuning error.

| | | | | | |
|------|-------------------------|---------|------|-----------|----|
| F803 | Brake utilization ratio | Default | 100% | Min. unit | 1% |
| | Setting range | 0~100% | | | |

It is valid to inverter of inside brake unit, can adjust the braking effect of brake unit.

| | | | | | |
|------|---------------------------|---------|---|-----------|---|
| F804 | accumulative working time | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

Controller accumulative power applied working time (hour). The max. Value is 9999 hours, re-accumulate when over 9999 hours.

| | | | | | |
|------|---------------------------|---------|---|-----------|---|
| F806 | Accumulative running time | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

Controller accumulates power applied working time (hour). The max. value is 9999 hours, re-accumulate when over 9999 hours.

| | | | | | |
|------|---------------------------|---------|----|-----------|---|
| F810 | Auxiliary function select | Default | 12 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

| BIT | Function | Default |
|------|--|---------|
| BIT0 | 1:triggering door command 0:no-triggering command | 0 |
| BIT1 | 1:no reset pulse when the initial run torque arrive 0:pulse reset when torque arrive | 0 |
| BIT2 | 1:learn the limit switch position when door-width auto-learning, and reset the pulse signal when the limit switch valid 0:No; | 1 |
| BIT3 | Flux vector.distance control mode: 1:Judge the door-width aito-learning, initial run with the torque and judge the blocking.; 0: judge as auto-learning finish, initial run limit or door-close blocked if no pulse within 2 s.; | 1 |
| BIT4 | 1:door-close proor 0:door-open prior | 0 |

| | | |
|------|--|---|
| BIT5 | Terminal control mode: 1:the controller still wirking when pressing STOP 0: the controller pause and display STP when pressing STOP, back to normal when pressing again. | 0 |
| BIT6 | Blocking mode 1:judge the blocking torque based on F413.; 0:seperately detect for high/low speed; | 0 |
| BIT7 | DEMO run: 1:Enter demo when power on automatically; 0:manually start demo when power on; | 0 |
| BIT8 | Current removal: 0:current removal when command removal; 1:stop run when command removal; | 0 |

| | | | | | |
|------|-----------------------|---------|---|-----------|---|
| F812 | Drive function select | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | |

BIT0:0:7 stage modulation(reduce noise);1:Auto change of 7 stage/5 stage during running;

| | | | | | |
|------|-----------------|---------|------|-----------|------|
| F814 | Overload factor | Default | 1.00 | Min. unit | 0.01 |
| | Setting range | 0~10.00 | | | |

It is used for the motor overload protection

| | | | | | |
|------|---------------------|---------|---|-----------|---|
| F816 | Door-machine amount | Default | 1 | Min. unit | 1 |
| | Setting range | 1~2 | | | |

When select the communication protection, please set the front door F816 as 1, back door F818 as 2.

6.10 F9-I/O function parameter

| | | | | | |
|------|-----------------|---------|------|-----------|-----|
| F900 | Filitering time | Default | 20ms | Min. unit | 1ms |
| | Setting range | 0~100ms | | | |

Setting the sensitivity of input terminal, if the digital input terminal is likely to be interfered, please set this parameter bigger to avoid interfece,but the sensitivity will be reduced.

| | | | | | | |
|------|------------------|-----------------------------|---------|---|-----------|---|
| F901 | digital quantity | input terminal | Default | 0 | Min. unit | 1 |
| F908 | Setting range | 0~116(no repeat selection) | | | | |

0: Non;

1: Door opening command, door opening command signal;

2: Door closing command, door closing signal;

3: External RESET input, external error reset terminal signal;

4: Door opening forbidden terminal input, controller give no response to external door-opening command;

5: Torque holding forbid terminal input, during the door opening/closing arrival torque holding, holding the torque as zero when the signal is valid.;

6: Low speed door enable input, the system run with low speed freq. (F006) when the signal is valid.;

7: Fire emergency input, close the door with fire emergency high speed freq. (F 419) when the signal is valid.;

8~109:reserved

10/110:Light beam curtain signal N.O/N.C. input, during door closing process, if the signal terminal is valid, the door-closing blocked protection will be operated. No response to door-closing will be given during re-opening process, if the door closing limit position was reached, the protect signal will ne invalid.

11/111:Touch plate signal N.O/N.C. input, during door closing process, if the signal terminal is valid, the door-closing blocked protection will be operated. No response to door-closing will be given during re-opening process, if the door closing limit position was reached, the protect signal will ne invalid.

12/112: Door opening limit signal N.O/N.C. input.

13/113:Door opening limit signal N.O/N.C. input.

14/114 Door opening slowdown signal N.O/N.C. input. In the speed control door opening process, when the signal is valid, switch to low speed running.

15/115:Door closing slowdown signal N.O/N.C. input. In the speed control door closing process, when the signal is valid, switch to low speed running.

16/116:Door lock signal N.O/N.C input, receiving the relevant information of door lock.

| | | | | | |
|------|------------------------------------|---------|---|-----------|---|
| F909 | relay output selection TA1/TB1/TC1 | Default | 4 | Min. unit | 1 |
| | setting range | 0~11 | | | |
| F910 | Relay output selection TA2/TB2/TC2 | Default | 0 | Min. unit | 1 |
| | Setting range | 0~11 | | | |
| F911 | relay output selection TA3/TB3/TC3 | Default | 3 | Min. unit | 1 |
| | setting range | 0~11 | | | |

0:non;

1: Door opening arrival signal output 0, in the opening process, when the controller receive door opening limit signal or the pulses reaches the set value, then output door opening arrival signal 0.

2:Door closing arrival signal output 0, in the closing process, when the controller receive door closing limit signal or the pulses reaches the set value, then output door closing arrival signal 0.

3:Door opening arrival signal output 1, in the opening process, when the controller receive door opening limit signal or the pulses reaches the set value, and locked-rotor torque reaches

F316 set value, then output door opening arrival signal 1.

4: Door closing arrival signal output 1, in the closing process, when the controller receive door closing limit signal or the pulses reaches the set value, and the ratio of locked-rotor torque and rated torque reaches F417 set value, then output door closing arrival signal 1.

5:error signal output 1 (Er26 is just reminding information, not error) .

6:reserved.

7:Door opening arrival signal output 2, in the opening process, when the controller receive door opening limit signal or the pulses reaches the set value, door lock signal is invalid and the ratio of locked-rotor torque and rated torque reaches F316 set value, then output door opening arrival signal 2.

8:Door closing arrival signal output 2, in the closing process, when the controller receive door closing limit signal or the pulses reaches the set value, and the ratio of locked-rotor torque and rated torque reaches F417 set value, then output door closing arrival signal 2.

9:Door lock signal output, the synchronously I/O door lock signal.

10:Re-opening signal output, output re-opening state signal.

11:Blocked signal output, in the closing process, when blocked then output signal.

6.11 FA-Display & Error parameter

| | | | | | |
|------|-------------------------------------|---------|-----|-----------|---|
| FA00 | LED run parameter display selection | Default | 319 | Min. unit | 1 |
| | Setting range | 1~511 | | | |

This group controls 9 state parameter display, every parameter was controlled by a binary code, "1" means display the parameter, "2" means do not display the parameter. In the control system run state, change the parameter display state by the SHIFT key.

| | | | | | |
|------|-------------------------------------|---------|----|-----------|---|
| FA01 | LED off parameter display selection | Default | 39 | Min. unit | 1 |
| | Setting range | 1~63 | | | |

This group controls 6 state parameter display, every parameter was controlled by a binary code, "1" means display the parameter, "2" means do not display the parameter. In the control system run state, change the parameter display state by the SHIFT key.

| | | | | | |
|------|------------------------------------|-----------|--------|-----------|--------|
| FA02 | 1st error category | Default | 0 | Min. unit | 1 |
| | Setting range | 0~30 | | | |
| FA03 | 1st error remark | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9 | | | |
| FA04 | 2nd error category | Default | 0 | Min. unit | 1 |
| | Setting range | 0~30 | | | |
| FA05 | 2nd error remark | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9 | | | |
| FA06 | 3rd error category | Default | 0 | Min. unit | 1 |
| | Setting range | 0~30 | | | |
| FA07 | 3rd error remark | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9 | | | |
| FA08 | 4th error category | Default | 0 | Min. unit | 1 |
| | Setting range | 0~30 | | | |
| FA09 | 4th error remark | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9 | | | |
| FA10 | 5th error category | Default | 0 | Min. unit | 1 |
| | Setting range | 0~30 | | | |
| FA11 | 5th error remark | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9 | | | |
| FA12 | Bus voltage in the latest error | Default | 0V | Min. unit | 0.1V |
| | Setting range | 0~999.9V | | | |
| FA13 | Output current in the latest error | Default | 0.00A | Min. unit | 0.01A |
| | Setting range | 0~99.99A | | | |
| FA14 | Run freq. in the latest error | Default | 0.00Hz | Min. unit | 0.01Hz |
| | Setting range | 0~99.00Hz | | | |

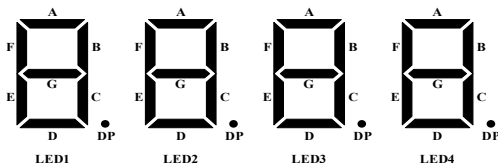
| | | | | | |
|------|---|---|------|-----------|------|
| FA15 | Output torque in the latest error | Default | 0.0% | Min. unit | 0.1% |
| | Setting range | 0.0~180.0% (the percentage between output torque and rated torque) | | | |
| FA16 | Input terminal state in the latest error | Default | 0 | Min. unit | 1 |
| | Setting range | 0~1023 | | | |
| FA17 | Output terminal state in the latest error | Default | 0 | Min. unit | 1 |
| | Setting range | 0~15 | | | |

This group of parameter record the controller last 5 errors and the latest error details, please refer to chapter 8 for details.

Remark: Er26 is just the reminding information of parameter setting error, do not saved in error record.

| | | | | | |
|------|----------------------|---------|---|-----------|---|
| FA18 | Terminal state query | Default | * | Min. unit | * |
| | Setting range | * | | | |

This parameter is corresponding to the input/ output display of terminal side. When the input/ output function is valid, the corresponding LED segment is lighting. From left to right, there is LED1, LED2, LED3, LED4.

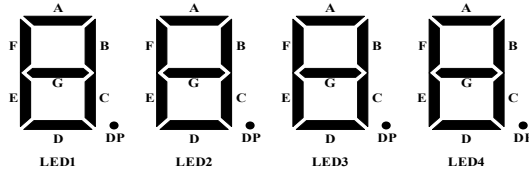


LED segment meaning as the following:

| LED1 segments | "light" meaning | LED2~LED3 segments | "light" meaning | LED4 segment | "light" meaning |
|---------------|-----------------|--------------------|-----------------|--------------|-----------------|
| A | DI1 input valid | Reserved | Reserved | A | A1.C1 connected |
| B | DI2 input valid | | | B | A2.C2 connected |
| C | DI3 input valid | | | C | A3.C3 connected |
| D | DI4 input valid | | | D | Reserved |
| E | DI5 input valid | | | E | |
| F | DI6 input valid | | | F | |
| G | DI7 input valid | | | G | |
| DP | DI8 input valid | | | DP | |

| | | | | | | |
|------|---------------------------|---|---------|---|-----------|---|
| FA19 | Fuction input state query | | Default | * | Min. unit | * |
| | Setting range | * | | | | |

This parameter is corresponding to the input display of function part. When the input function is valid, the corresponding LED segment is lighting. From left to right, there is LED1, LED2, LED3, LED4.

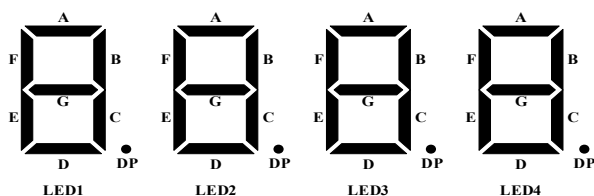


LED segments meaning as the following:

| LED1 segments | "light" meaning | LED2 segments | "light" meaning | LED3~LED4 segments | "light" meaning |
|---------------|---|---------------|---------------------------------------|--------------------|-----------------|
| A | Door opening command is valid | A | Reserved | Reserved | Reserved |
| B | Door closing command is valid | B | Light beam curtain signal is valid | | |
| C | External reset is valid | C | Touch plate signal is valid | | |
| D | Door opening forbidden is valid | D | Door opening limit signal is valid | | |
| E | Torque holding forbidden input is valid | E | Door closing limit signal is valid | | |
| F | Low speed opening input is valid | F | Door opening slowdown signal is valid | | |
| G | Fire emergency input is valid | G | Door closing slowdown signal is valid | | |
| DP | Reserved | DP | Door lock signal is valid | | |

| | | | | | | |
|------|-----------------------------|---|---------|---|-----------|---|
| FA20 | Function output state query | | Default | * | Min. unit | * |
| | Setting range | * | | | | |

This parameter is corresponding to the output display of function part. When the output function is valid, the corresponding LED segment is lighting. From left to right, there is LED1, LED2, LED3, LED4.



LED segments meaning :

| LED1 segments | “light” meaning | LED2 segment | “light” meaning | LED3~LED4 segment | “light” meaning |
|---------------|--------------------------------------|--------------|-------------------------------|-------------------|-----------------|
| A | Door opening arrival signal output 0 | A | Door lock signal output | Reserved | Reserved |
| B | Door closing arrival signal output 0 | B | Door re-opening signal output | | |
| C | Door opening arrival signal output 1 | C | blocked signal output | | |
| D | Door closing arrival signal output 1 | D | Reserved | | |
| E | Error signal output 1 | E | | | |
| F | Reserved | F | | | |
| G | door opening arrival signal output 2 | G | | | |
| DP | Door closing arrival signal output 2 | DP | | | |

| | | | | | | |
|------|------------------------|--------|---------|---|-----------|---|
| FA21 | Display switch control | | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | | |

This parameter is applied to set the actual display of FA 22 and FA23, adopts for spot error identification and adjusting.:

| Set value | FA22 display | FA23 display |
|-----------|--|--|
| 1 | Average speed within 1s (Hz) | speed fluctuate average within 1s (Hz) |
| 2 | max. speed within 1s (Hz) | Min. speed within 1s (Hz) |
| 3 | Slip freq. (Hz) | Actual feedback freq. (Hz) |
| 4 | Excitation current component (A) | Torque current compenent (A) |
| Others | Receicing encoder pulses within 1s (high bit) | Receiving encoder pulse within 1s (low bit) |

| | | | | | | |
|------|---------------|--------|---------|---|-----------|---|
| FA22 | Display 1 | | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | | |
| FA23 | Display 2 | | Default | 0 | Min. unit | 1 |
| | Setting range | 0~9999 | | | | |

| | | | | | |
|------|------------------------|-------------|-------|-----------|-------|
| FA24 | analog voltage display | Default | 0.00V | Min. unit | 0.01V |
| | Setting range | 0.00~10.10V | | | |

Display the current part analog sampling voltage

6.12 FP-user parameter

| | | | | | |
|------|---------------|---------|---|-----------|---|
| FP00 | User password | Default | 0 | Min. unit | 1 |
| | setting range | 0~9999 | | | |

Set it as any number except zero so that the password protection function is valid.

00000: eliminate the former user's password value and make password protect function invalid.

When user password is set and become effective,

Please fix your password. If mis-setting or forget, please contact with factory.

| | | | | | |
|------|------------------|---------|---|-----------|---|
| FP01 | Parameter update | Default | 0 | Min. unit | 1 |
| | Setting range | 0~2 | | | |

0:non;

1:restore factory setting;

2:clean error record and time.;



Application and adjustment

Chapter 7 Application and adjustment

This chapter introduces in details the basic procedures of system design and function parameter setting method when NICE900 controller is used to form door machine application system. The following is the respective application of speed control and distance control.

7.1 Door machine controller adjustment

7.1.1 Adjustment flow

To make door machine controller adjustment convenient, this chapter lists common setting order of the parameters of the controller. When external circuit and mechanical installation are ready, basic adjustment of door machine controller can be completed. Adjustment flow refers to Fig7-1:

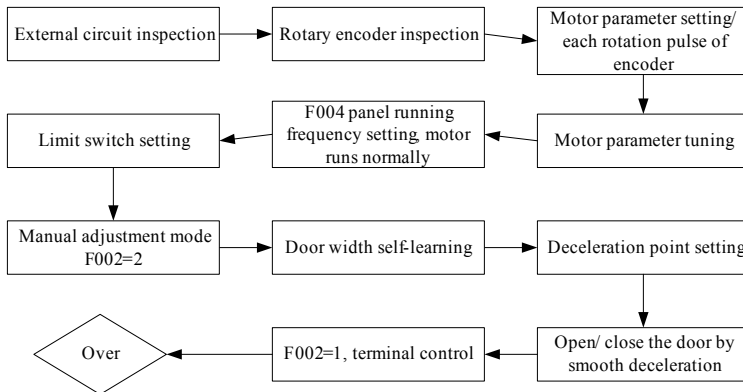


Fig 7-1 Basic adjustment flow of Door machine

7.1.2 Wiring inspection

Before power-on external wiring should be inspected to ensure the security of parts and people.

- 1) Wire correctly according to the drawing provided by manufacturer;
- 2) Every switch works normally, action is reliable;
- 3) Inspect inter phase resistance of the main circuit, check if there's short to ground;
- 4) Make sure mechanical installation is OK, it will not bring equipment damage or personal injury;

7.1.3 Encoder inspection

Pulse signal given out by encoder is the guarantee for the system to realize precise control, it must be checked before adjustment.

- 1) The encoder should be mounted steady, and grounded well.

- 2) Signal wire of the encoder and heavy current circuit should be placed in different slots to avoid interference.
- 3) It's better to introduce the wire of encoder to controller directly. If the wire is not long enough, the added part should be shielded wire, and it's better to connect it with original wire by welding with soldering iron.
- 4) Sheilded layer of encoder should be grounded at the side of the controller.

7.1.4 Grounding inspection

Check if the resistance between the following terminals and grounding terminal PE is boundless, inspect at once if it's not big enough.

- 1) L.N and PE;
- 2) U.V.W and PE;
- 3) Encoder 24V.PGA.PGB.PGZ.COM and PE;

7.1.5 Application of synchronous motor

Before the first use of permanent-magnet motor, magnetic pole position must be identified, otherwise, it cannot be normally used. When motor wiring, encoder or encoder wiring is changed, encoder position must be identified again. As a result, it must be ensured that the wiring of magnetic position identification and that of motor normal running are completely the same. In the process of identification motor may rotate, so please check it's safe before tuning. Tuning flow refers to Fig 7-2:

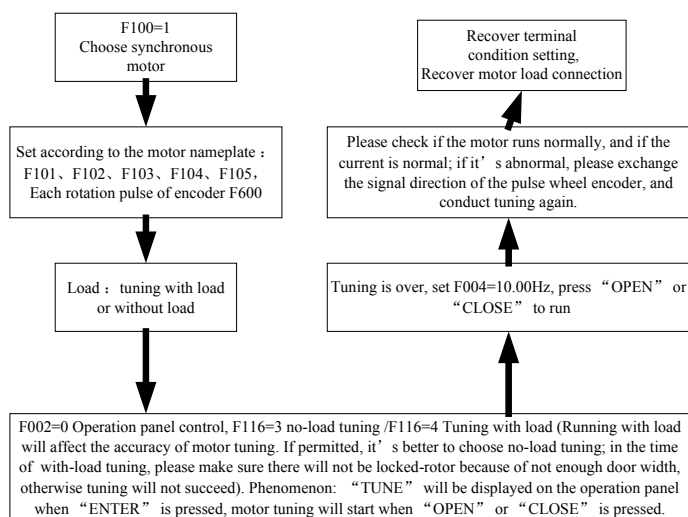


Fig 7- Tuning flow of sync motor

Before identification F1 Group motor nameplate parameters should be input correctly, including rated power, rated voltage, rated frequency, rated speed, rated current, and pulse of the encoder (F600) should be set correctly (F600). And then set F116 to 3 or 4, press "ENTER", inverter will display "TUNE". The controller start to identify the parameters when "OPEN" or "CLOSE" is pressed. During the process of identification the inverter will display "TUNE" all the time, the identification finishes when "TUNE" disappears.

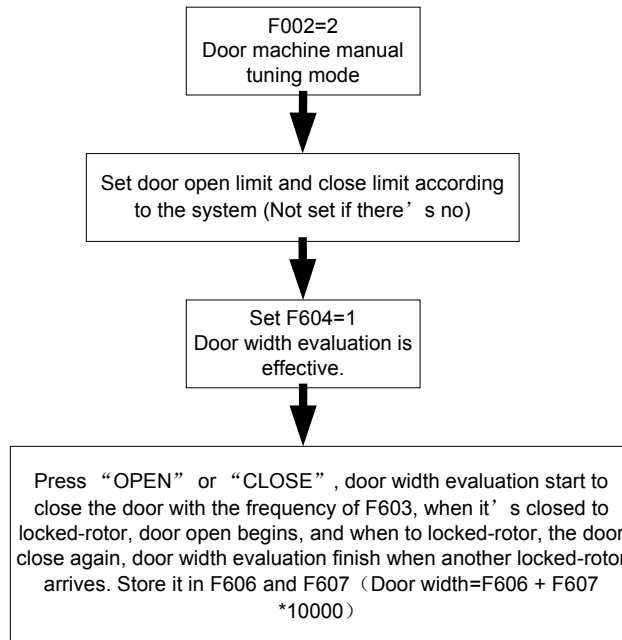
The result of identification is the mount position angle of the encoder, it will be put in F114, and it can be checked and changed, but after position identification it cannot be changed again, or the controller may fail to work normally.

If Er19 appears in the process of encoder position identification, please check if the wiring is right. the inverter is under with-sensor vector control mode (make sure control mode F000 is set to 1).

7.1.6 Door width self-learning

In the process of door width self-learning, action direction of the door can changed automatically, so it should be done in the condition that personal safety is ensured.

It must be made sure that there's no obstacle in the way of door action before door width evaluation. If there's obstacle, it should be judged as arrival, in this condition door width cannot be evaluated correctly. Time order of door width evaluation refers to Fig7-3:



7.1.6 est run

After encoder position identification, please do test run before the elevator is loaded. It is suggested that test run applies inverter panel control mode.

The following two points should be paid attention to in test run:

- 1) Whether the motor running direction is in accordance with the actual situation (door open, door close). If not, the wiring of controller output side to motor should be adjusted, and encoder position identification should be done once again.
- 2) Whether forward and reverse running of the motor are stable, without noise. As there's no load, the current in controller is very small.

When the above two points are made sure, door machine controller has recorded accurate position of the motor and the encoder in F114 (Users can take them down for later use), at this time normal control of the motor can be conducted. As asynchronous motor and synchronous motor are different, users can reduce the gain of F2 Group speed loop PI Properly.

7.2 Typical application

7.2.1 Speed control mode

The speed control slowdown through the deceleration point. The limit signal will realize the arrival judgment and treatment. System wiring of speed control refers to Fig 7-1:

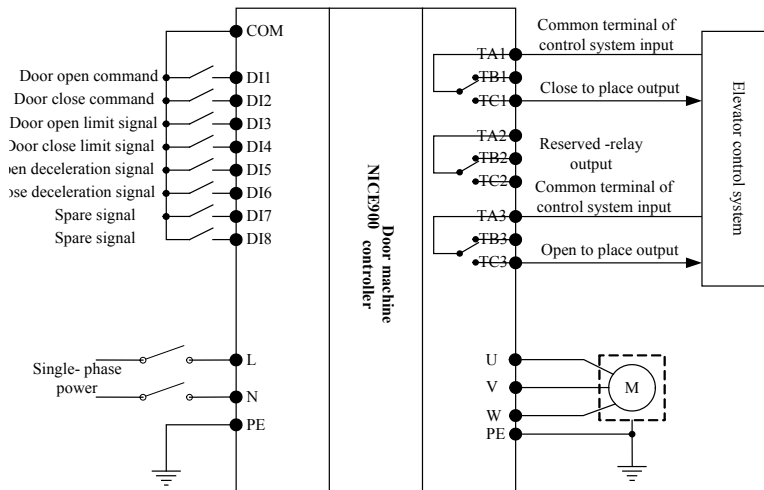


Fig 7-3 Wiring of typical application of speed control system

Effective curve of door open command in the process door close refers to Fig 7-2:

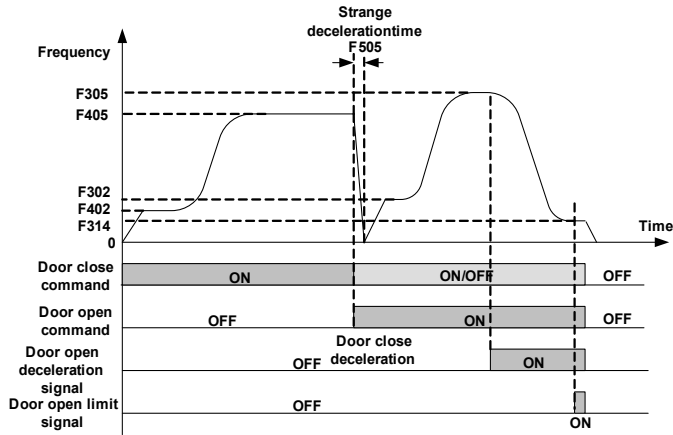


Fig 7-2 ffective curve of door open command in the process door close

In the process of door close, the elevator decelerates to stall when it is blocked, deceleration time is F505 (strange deceleration time). When reopening the door, the elevator start up and run at a low speed during low-speed running time (F303) and then run at a high speed. After door open deceleration signal is effective, it start to run at a low speed until door open to place, outputting door open to place signal.

7.2.2 Distance control mode

1) Wiring of Pulse + limit switch mode

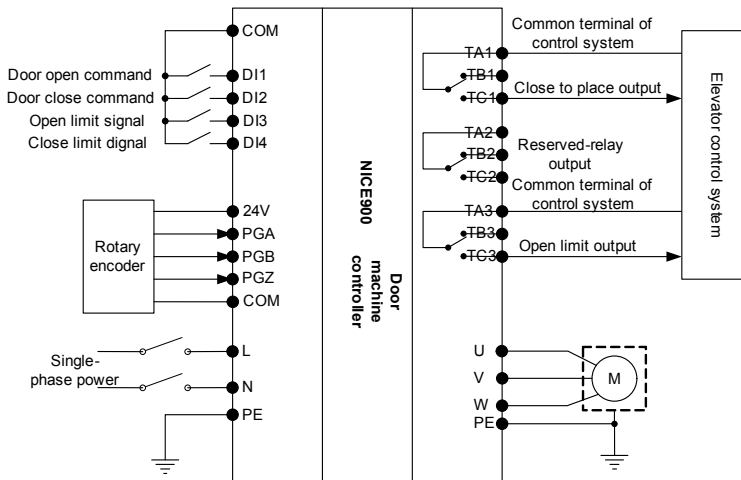


Fig 7-3 istance control mode (Pulse+limit switch) wiring

2) Full pulse mode

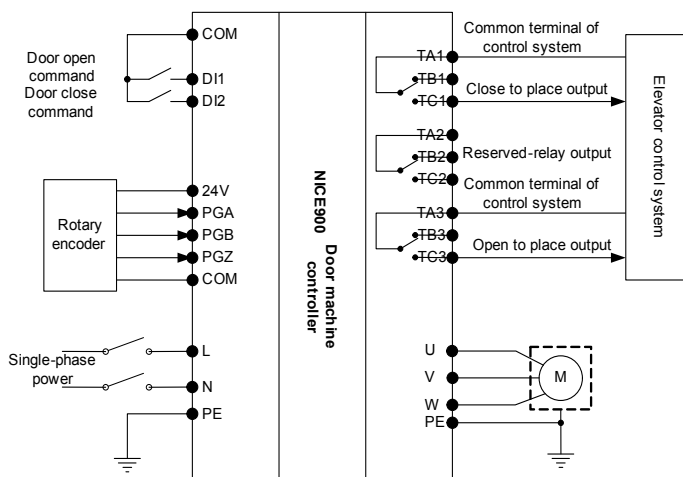


Fig 7-4 istance control mode(Full pulse) wiring

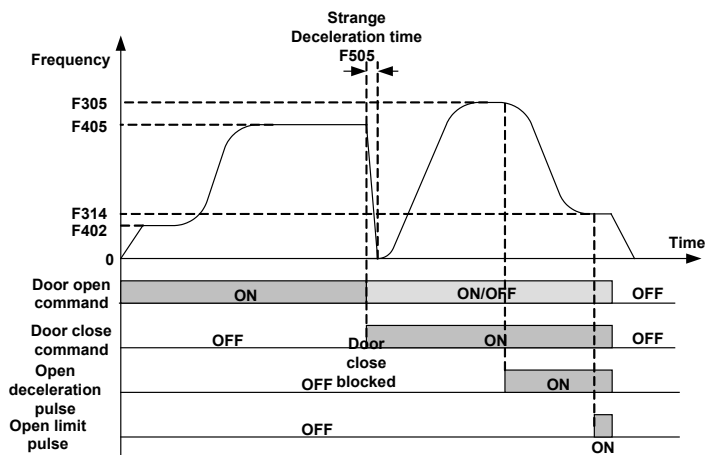


Fig 7-5



8

Fault Diagnosis and Countermeasures

Chapter 8 Fault Diagnosis and Countermeasures

Door machine controller has almost 30 pieces of alarm information and protection functions. The controller monitors all kinds of input signals, running conditions, external feedback and so on. As soon as there's abnormality appears, corresponding protection function will act and display error code at the same time.

If door machine controller displays fault alarm information, it can be handled according to different fault type. At this time, users can analyse the fault, identify the cause and find remedies taking the content of this chapter as a reference.

| Fault display | Description | Possible causes | Remedy |
|---------------|-----------------------------|--|--|
| Er02 | Accelerated over-current | 1.Main circuit output is grounded or short wired; 2.If the motor has done parameter tuning; 3.Load is too heavy; | 1.Obviate exterior problems such as connection; 2.Tune motor parameters; 3,Lighten suddenly added load; |
| Er03 | Deceleration over-current | 1.Main circuit output is grounded or short wired; 2.If the motor has done parameter tuning; 3.Load is too heavy; 4. Deceleration curve is too steep; | 1.Obviate exterior problems such as connection; 2.Tune motor parameters; 3,Lighten suddenly added load; 4.Adjust curve parameters; |
| Er04 | Constant speed over-current | 1.Main circuit output is grounded or short wired; 2.If the motor has done parameter tuning; 3.Load is too heavy; 4.Rotary encoder interference is too strong; | 1.Obviate exterior problems such as connection; 2.Tune motor parameters; 3,Lighten suddenly added load; 4.Select proper rotary encoder, and adopt shielded cable; |
| Er05 | Acceleration over-voltage | 1.Input voltage is too high; 2.Brake resistance is too large, 3. Acceleration curve is too steep; | 1.Adjust input voltage; 2. Select proper brake resistance; 3.Adjust curve parameter; |
| Er06 | Deceleration Over-voltage | 1.Input voltage is too high; 2.Brake resistance is too large; 3.Deceleration curve is too steep; | 1.Adjust input voltage; 2.Select proper brake resistance; 3.Adjust curve parameter; |
| Er07 | Constant speed over-voltage | 1.Input voltage is too high; 2.Brake resistance is too large, or brake unit is abnormal; | 1.Adjust input voltage; 2.Select proper brake resistance; |
| Er10 | System overload | 1. no blocking in the elevator door guild rail. 2.Load is too heavy; | 1 Check the track to the elevator door 2 reduce the load; |
| Er13 | Output phase-failure | 1.The connections of main circuit output become loose; 2.Motor is broken; | 1.Inspect connection; 2.Obviate motor fault; |

| Fault display | Description | Possible causes | Remedy |
|---------------|----------------------------------|---|---|
| Er14 | Module over-heated | 1.Environmental temperature is too high; 2.The fan is broken; 3.The wind channel is blocked; | 1.Reduce the environmental temperature; 2.Clear the wind channel; 3.Change the fan; |
| Er16 | EEPROM Fault | EEPROM read-write is abnormal | Please contact with agent or factory; |
| Er18 | Current inspection fault | Drive control panel is abnormal; | Please contact with agent or factory; |
| Er19 | Motor tuning overtime | 1.Motor parameter setting is incorrect; 2.Parameter tuning is overtime; 3.Rotary encoder of synchronous motor is abnormal; | 1.Input the right motor parameter; 2.Detect motor lead wire; 3.Detect the wiring of rotary encoder, make surpulse of each rotation is set right; |
| Er20 | Rotary encoder fault | 1. If the model of rotary encoder matches; 2. Wiring of rotary encoder is not right; | 1. Choose ABZ-phase rotary encoder of open collector type.; 2. Obviate wiring problem; |
| Er21 | Initial position detection fault | | |
| Er25 | Over-speed fault | 1.The speed of fast running during door open and close is bigger than 20% of the setting speed for 50ms. | 1.Detect the wiring of encoder. |
| Er26 | Parameter setting warning | 1. Door open time (F500) is less than the total door open time; 2.Door close time (F501) is less than total door close time; 3.Command source (F002) is not in manual adjustment mode during door width self-learning, or door open and close mode selection (F001) is not in distance control mode; 4.when driving sync motor control mode (F000) choose magnetic flux vector control mode; | 1.Set door open time limit bigger to ensure F500 is bigger than the sum of all the door open time parameters; 2.Set door open time bigger to ensure F500 is bigger than the sum of all the door open time parameters; 3.Command source (F002) is in manual adjustment mode or door open and close (F001) choose distance control mode at the time of door width self-learning; 4.When controlling synchronous motor (F100) , control mode should be (F000) vector control; |
| Er27 | Door width self-learning fault | 1.Door width got in self-learning should be less than 50; 2.Before self-learning, the running should be in distance control mode; | 1.Inspect the wiring of the encoder and relative parameters; 2.Inspect the mechanical system of door machine; 3.Conduct door width pulse self-learning before distance control running; |

| Fault display | Description | Possible causes | Remedy |
|---------------|--|--|--|
| Er28 | Door open overtime | 1.Motor running direction is opposite with that set in door open; 2.Signal fault or wrong setting door open limit; 3.Pulse encoder is disconnected; | 1.Exchange phases of motor wiring or set F004=1; 2.Inspect door open limit signal; 3.Inspect the wiring of encoder; |
| Er29 | Door close overtime | 1.Motor running direction is opposite with that set in door open; 2.Signal fault or wrong setting door close limit; 3.Pulse encoder is disconnected; | 1.Exchange phases of motor wiring or set F004=1; 2.Inspect door close limit signal; 3.Inspect the wiring of encoder; |
| Er30 | Low-speed door open and close overtime | 1.Signal fault or wrong setting door open limit; 2.Pulse encoder is disconnected; | 1.Inspect door close limit signal; 2.Inspect the wiring of encoder; |



9

ISMD1-5B0180A-I120XP PMSM specification

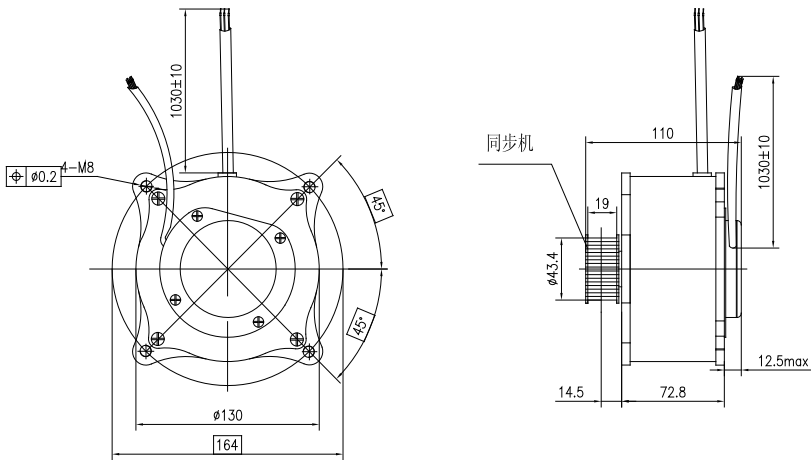
Chapter 9 ISMD1-5B0180A-I120XP PMSM specification

9.1 Motor parameter and size

9.1.1 Motor parameter

| ISMD1-5B0180A-I120X PMSM | | | |
|------------------------------|----------------|---------------------------|------------|
| Rated current: | 0.49A | Rated torque : | 2.7Nm |
| Rated voltage : | 100V | Rated frequency : | 24.00Hz |
| Rated rotary: | 180r/min | Rated power: | 50W |
| DC line resistance (20℃) : | 72±3.6 Ω | Linair inductance (20℃) : | 240±20% mH |
| Linair counter emf constant: | 9.55±1 V/rad/s | Pole: | 8 |
| Working system: | S4 | Ambient: | 0℃~40℃ |
| Shield level: | B | IP level: | IP44 |

9.1.2 specification and size



9.1.3 Power line of the motor

| | | |
|------|--------|-------|
| blue | Yellow | Brown |
| U | V | W |

9.2 encoder parameter

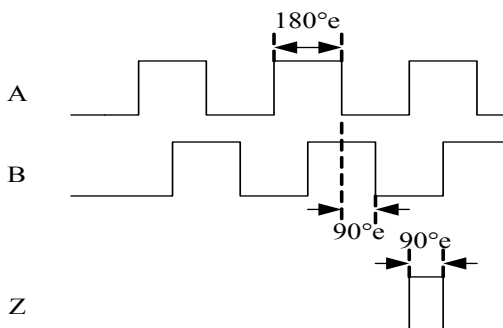
ISMD1-5B0180A-I120X PMSM default with the encoder when manufactured,the details and wiring of the encoder are as the following:

| Encoder | |
|-----------------------|------------------------|
| Line: | 1000 |
| Input voltage: | 100mA,range:DC 24V±10% |
| Responding frequency: | 0~100kHz |
| Terminal type: | 72Ω±3.6 Ω |
| Lead parameter: | 9.55±1 V/rad/s |
| Working temperature: | 0℃~70℃ |
| Storage heat: | -40℃~80℃ |
| Humidity: | 90% |

Encoder wiring:

| | | | | |
|-----|-------|-------|--------|-------|
| Red | Black | Green | Orange | White |
| VCC | GND | A | B | Z |

The output pulse of the encoder:



9.3 Motor torque calculation and motor selection instruction.

According to the torque balance formula:

$$T = F \times R$$

T is the torque,unit is NM

F is the force than needed to open/close the elevator door,unit is N

R is the diameter of the synchronous wheel,unit is M

Take ISMD1-5B0180A-I20X as instance,the rated load capacity for the motor is:

$$F = T / R$$

$$= 2.7 / 0.02$$

$$= 135 \text{ N}$$

Motor configuration basis:

- 1) Calculate the force that needed to open/close the door according to the actual load, take the max. Value
- 2) Measure the diameter of the synchronous wheel
- 3) Calculate the motor torque accoding the formula.

NOTE:

| Function code | Setting value | Function code | Setting value | Function code | Setting value | Function code | Setting value |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| F - | | F - | | F - | | F - | |
| F - | | F - | | F - | | F - | |
| F - | | F - | | F - | | F - | |
| F - | | F - | | F - | | F - | |
| F - | | F - | | F - | | F - | |

Date Month Year

Location:

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