



User Guide

NICE900 Series

Integrated Door Operator Controller



Preface

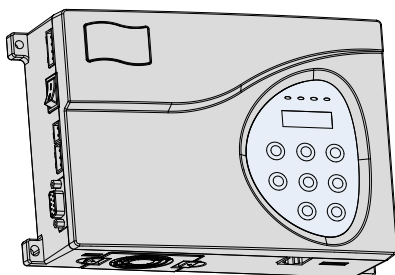
Thank you for purchasing the NICE900 series integrated door machine controller.

The NICE900 series integrated door machine controller (shorted as "the NICE900" or "the controller" hereinafter) is a variable frequency controller specialized for driving the door machine system such as elevator door, cold storage door, and subway door.

It integrates door open/close logic control and motor drive, and implements control on the entire door system with door open/close commands from the external system. The NICE900 can drive the AC asynchronous motor and permanent synchronous motor (PMSM), and supports two control modes, speed control and distance control. Applicable to various applications, it can meet drive and control requirements of most door systems.

This manual describes correct use of the NICE900, including product features, safety information and precautions, installation, parameter setting, commissioning, and troubleshooting. Read and understand the manual before using the product, and keep it carefully for reference to future maintenance.

Notes
• The drawings in the manual are sometimes shown without cover or protective guard. Remember to install the cover or protective guard as specified first, and then perform operations in accordance with the instructions. • The drawings in the manual are shown for description only and may not match the product that you have purchased. • The instructions are subject to change due to product upgrade, specification modification, as well as the efforts to increase the accuracy and convenience of the manual. • Contact our regional agent or customer service center if the manual delivered is lost or damaged. • Contact our customer service center if you have problems during the use.



Approvals

Certification marks on the product nameplate indicate compliance with the corresponding certificates and standards.

Certification	Mark	Directives		Standard
CE		EMC directives	2014/30/EU	EN 12015 EN 12016
		LVD directives	2014/35/EU	EN 61800-5-1
		RoHS directives	2011/65/EU	EN 50581
TUV		-		EN 61800-5-1
UL		-		UL61800-5-1 C22.2 No.14-13

Note

- The above EMC directives are complied with only when the EMC electric installation requirements are strictly observed.
- Machines and devices used in combination with this drive must also be CE certified and marked. The integrator who integrates the drive with the CE mark into other devices has the responsibility of ensuring compliance with CE standards and verifying that conditions meet European standards.
- The installer of the drive is responsible for complying with all relevant regulations for wiring, circuit fuse protection, earthing, accident prevention and electromagnetic (EMC regulations). In particular fault discrimination for preventing fire risk and solid earthing practices must be adhered to for electrical safety (also for good EMC practice).
- For more information on certification, consult our distributor or sales representative.

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1

Safety Information and Precautions

Chapter 1 Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

-  **DANGER** indicates that severe personal injury or even death may result due to improper operation.
-  **CAUTION** indicates that personal injury or equipment damage may result due to improper operation.

Read the following safety notices carefully so that you understand how to install, commission, operate and maintain the equipment. Inovance assumes no liability or responsibility for any injury or loss caused by improper operation of the equipment described in the manual.

1.1 Safety Information

■ Before Installation

 DANGER
• Do not install the equipment if you find the controller damaged upon unpacking. • Do not install the equipment if the packing list does not conform to the product you receive.
 CAUTION
• Handle the equipment with care during transportation. Otherwise, the equipment may be damaged. • Do not touch the components with your hands. Failure to comply will result in static electricity damage.

■ During Installation

 DANGER
• Mount the controller on incombustible surface such as metal. Keep it far away from flammable materials. Failure to comply may result in a fire. • Do not loosen the fixed screws of the components, especially the screws with red mark.
 CAUTION
• Do not drop wire end or screw into the controller. Otherwise, the controller may be damaged. • Install the controller in places free of vibration and direct sunlight.

■ At Wiring



- Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents.
- A circuit breaker must be used to isolate the power supply and the controller. Failure to comply may result in a fire.
- Tie the controller to ground properly according to the standard. Failure to comply may result in electric shock.



- Never connect the power cables to the output terminals (U, V, W) of the controller. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the controller.
- Ensure that the cabling satisfies the EMC requirements and the local codes. Use wire sizes recommended in the manual. Failure to comply may result in accidents.
- Use the shielded cable for the encoder, and ensure that the shield is reliably grounded at one end.
- Use a twisted cable with twisted distance of 20—30 mm as the communication cable, and ensure that the shield is reliably grounded.

■ Before Power-On



- Check that the following requirements are met:
 The voltage class of the power supply is consistent with the rated voltage class of the controller.
 The input terminals (L, N) and output terminals (U, V, W) are correctly connected.
 No short circuit exists in the peripheral circuit.
 The wiring is secured.
 Failure to comply will result in damage to the controller.
- For the PMSM, ensure that motor auto-tuning is performed before running for the first time. Failure to comply may result in motor runaway.
- Do not perform the voltage resistance test on any part of the controller because such test has been done in the factory. Failure to comply will result in accidents.



- Cover the controller properly before power-on to prevent electric shock.
- All peripheral parts must be connected correctly under the instructions described in this manual. Failure to comply may result in accidents.

■ **After Power-On**

 DANGER

- Do not open the cover of the controller after power-on. Failure to comply may result in electric shock.
- Do not touch any input or output terminal of the controller with hands. Failure to comply may result in electric shock.

 DANGER

- Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply may result in personal injury.
- Do not change the factory parameters. Otherwise, the equipment may be damaged.

■ **During Running**

 DANGER

- Do not touch the fan or the discharging resistor to check the temperature. Otherwise, you may get burnt.
- Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the controller.

 CAUTION

- Avoid objects falling into the controller when it is running. Failure to comply will result in damage to the controller.
- Do not start/stop the controller by opening or closing the contactor. Failure to comply will result in damage to the controller.

■ **During Maintenance**

 DANGER

- Do not repair or maintain the controller at power-on. Failure to comply will result in electric shock.
- Repair or maintenance of the controller must be performed only by qualified personnel. Otherwise, personal injury or equipment damage may result.
- Set the parameters again after the controller is replaced. All the pluggable components must be plugged or removed only after power-off.

1.2 Precautions

1. Motor Insulation Test

Perform an insulation test on the motor under the following conditions:

- Before the motor is used for the first time
- When the motor is reused after being stored for a long time
- During periodic inspection

This is to prevent the poor insulation of motor windings from damaging the controller. The motor must be disconnected from the controller during the insulation test. A 500-volt megameter is recommended for this test, and the insulation resistance must not be less than 5 MΩ.

2. Motor Heat and Noise

The output of the controller is pulse width modulation (PWM) wave with certain harmonic wave, and therefore, the motor temperature rise, noise, and vibration are slightly greater than those at running with the mains frequency.

3. Voltage-sensitive device or capacitor on the output side of the controller

The controller outputs PWM waves, and therefore, do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the controller. Otherwise, the controller may suffer transient overcurrent or even be damaged.

4. Use outside the rated voltage

The controller must not be used outside the allowable voltage range specified in this manual. Otherwise, components inside the controller may be damaged. If required, use a corresponding voltage step-up or step-down device to match the power voltage to the rated voltage range for the controller.

5. Surge Suppressor

The controller has a built-in varistor for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the controller are switched on or off. If the inductive loads generate very high surge voltage, use a surge suppressor for

the inductive load or use a surge suppressor together with a diode.

Note

Do not connect the surge suppressor to the output side of the controller.

6. Altitude and De-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the controller. Contact Inovance for technical support.

7. Disposal

The electrolytic capacitors in the main circuit and PCB board may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

8. Adaptable Motor

- The standard adaptable motor is an adaptable four-pole squirrelcage asynchronous induction motor and AC PMSM. Select the proper controller model according to the motor ratings.
- To reach better control result, perform motor auto-tuning based on actual conditions. For a PMSM, motor auto-tuning is mandatory.
- The controller might alarm or be damaged when a short circuit exists on cables or inside the motor. Therefore, perform the insulation short circuit test when the motor and cables are newly installed or during routine maintenance. During the test, disconnect the controller from the tested parts

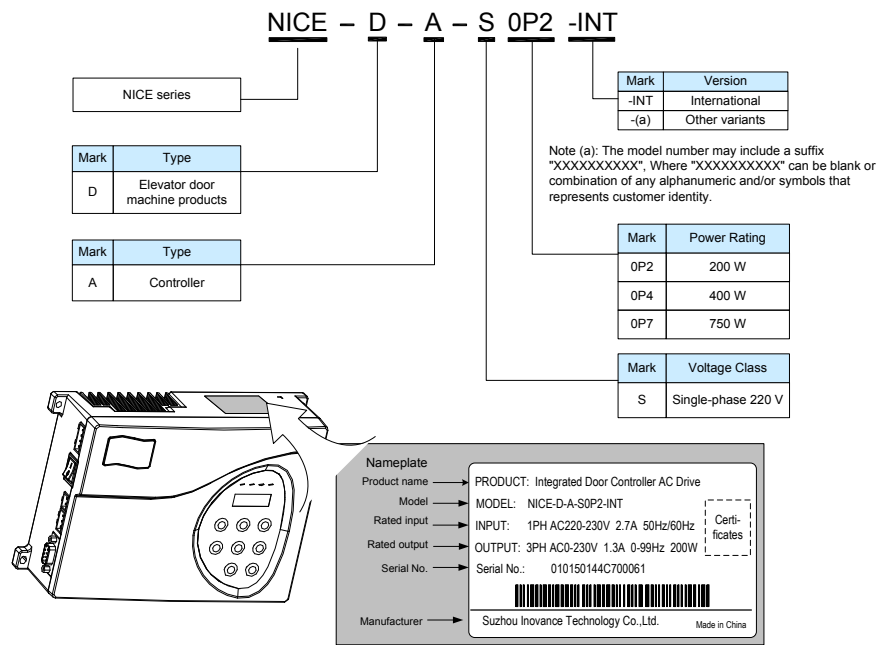


Product Information

Chapter 2 Product Information

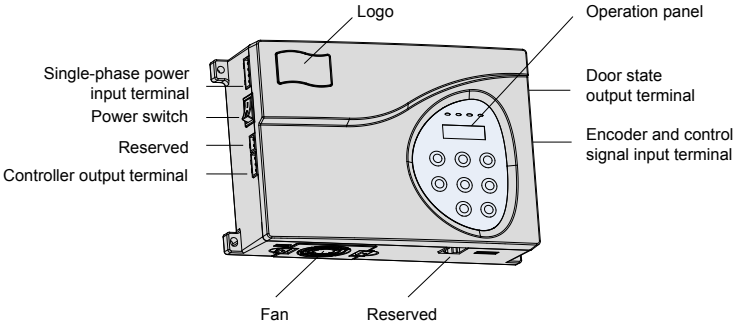
2.1 Designation Rules and Nameplate

Figure 2-1 Designation rules and nameplate of the NICE900



2.2 Structure

Figure 2-2 Structure of the NICE900



2.3 NICE900 Models

Table 2-1 NICE900 models

Model	Input Voltage	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Adaptable Motor (W)
NICE-D-A-S0P2	Single-phase 220 V (-15% to 20%)	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

2.4 General Specifications

Item		Specifications
Basic specifications	Maximum output frequency	99.00 Hz
	Speed range	1:50 (SVC) 1:1000 (CLVC) SVC: sensorless vector control CLVC: closed-loop vector control
	Speed stability	±0.5% (SVC) ±0.05% (CLVC)
	Startup torque	1 Hz/150% (SVC) 0 Hz/180% (CLVC)
	Frequency resolution	0.01 Hz
	Current resolution	0.01 A
	Carrier frequency	2–16 kHz
Major functions		Two auto-tuning modes are supported, with-load auto-tuning and no-load auto-tuning.
		For CLVC on the AC PMSM using a common ABZ encoder, open-collector output or push-pull output is supported.
		For SVC, functions such as fixed torque boost, customized torque boost and over-excitation are supported.
		Door width auto-tuning is supported.
		Automatic demonstration is supported.
		Automatic identification upon hindering is supported.
Protection functions		Controller overload protection (1 minute for 150% of rated current , 1 second for 180% of rated current) is supported.
		Protections on overvoltage, undervoltage, overcurrent, output phase loss and inter-phase short circuit are supported.

Item		Specifications
Environment	Installation location	Indoors Free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, vapor, drip and salt
	Altitude	Lower than 1000 m Derated if the altitude is above 1000 m
	Ambient temperature	-10°C to +40°C Derated if ambient temperature is within 45–50°C
	Humidity	Less than 95% RH, non-condensing
	Vibration	< 5.9 m/s ² (0.6 g)
	Storage temperature	-20°C to +60°C
	Cooling method	Natural cooling for 0.2 kW Forced air cooling for 0.4 kW and 0.75 kW
	Ingress protection	IP20
	Storage location	Indoors, clean and dry
	Transportation	Packed in standard box and transported by coach, train, aircraft or ship.
	Vibration during transportation	15 m/s ² (1.5 g) when SIN vibration is 9–200 Hz



3

Mechanical and Electrical Installation

Chapter 3 Mechanical and Electrical Installation

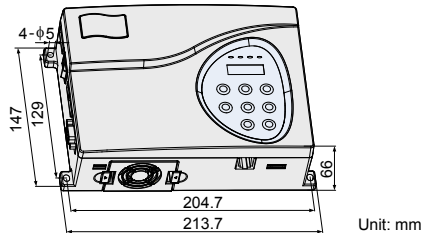
3.1 Mechanical Installation

3.1.1 Installation Environment

Item	Requirement
Ambient temperature	-10°C to 50°C
Heat dissipation	Mount the controller on the surface of incombustible objects with sufficient room for heat dissipation. Install the controller on the base with screws vertically.
Mounting location	Free from direct sunlight, high humidity and condensation
	Free from corrosive, explosive and combustible gas
	Free from oil dirt, dust and metal powder

3.1.2 Physical Dimensions

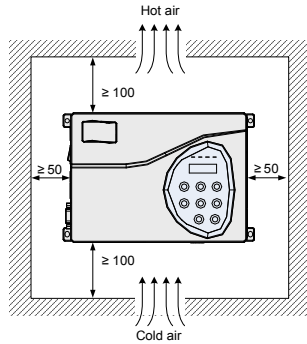
Figure 3-1 Physical Dimensions of the NICE900



3.1.3 Mounting Clearance

The clearance that needs to be reserved varies with the power rating of the NICE900. The following figure shows the clearance that needs to be reserved for mounting.

Figure 3-2 Clearance around the NICE900 for mounting

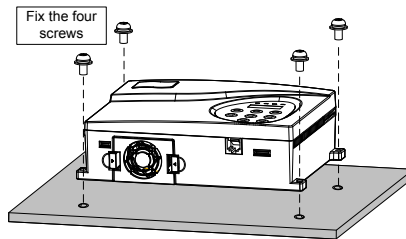


3.1.4 Mounting Orientation

Use 4 M4x15 screws (with elastic flat washer) with the tightening torque of 1.2 N.m during installation.

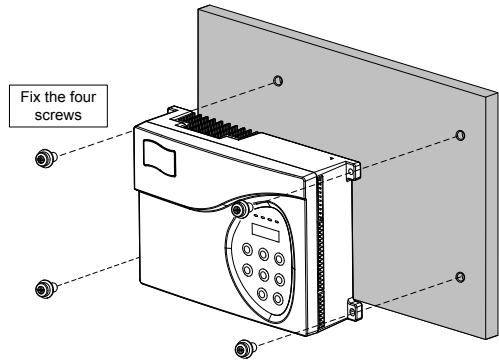
a) Horizontal installation

Figure 3-3 Horizontal installation diagram



b) Vertical installation

Figure 3-4 Vertical installation diagram



3.2 Electrical Installation

3.2.1 Wiring and Description of Main Circuit Terminals

Figure 3-5 Main circuit terminal arrangement

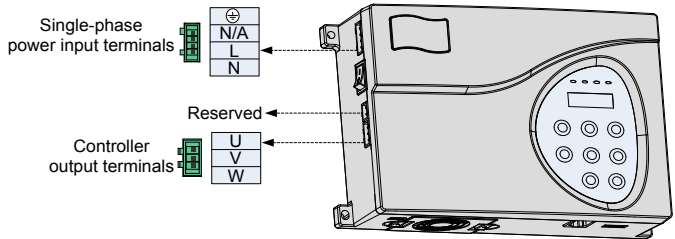
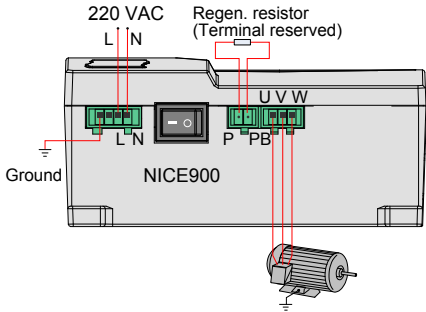


Table 3-1 Main circuit terminal description

Terminal	Name	Description
L, N	Single-phase power input terminals	Provide single-phase 220 VAC power supply.
P, PB	Reserved	These terminal are generally reserved, but they can be connected with the external regen. resistor if required.
U, V, W	Controller output terminals	Connect the three-phase motor.
	Grounding terminal	Must be grounded.

Figure 3-6 Main circuit wiring example



In the applications with large inertia such as the cold storage door, a regen. resistor is required. Select a proper one according to the recommended models listed in the following table.

Table 3-2 Recommended regen. resistor models

Controller Model	Power of Regen. Resistor (W)	Resistance of Regen. Resistor (Ω)
NICE-D-A-S0P2	80 W	$\geq 250 \Omega$
NICE-D-A-S0P4	80 W	$\geq 200 \Omega$
NICE-D-A-S0P7	80 W	$\geq 150 \Omega$

3.2.2 Wiring and Description of Control Circuit Terminals

Figure 3-7 Control circuit terminal arrangement

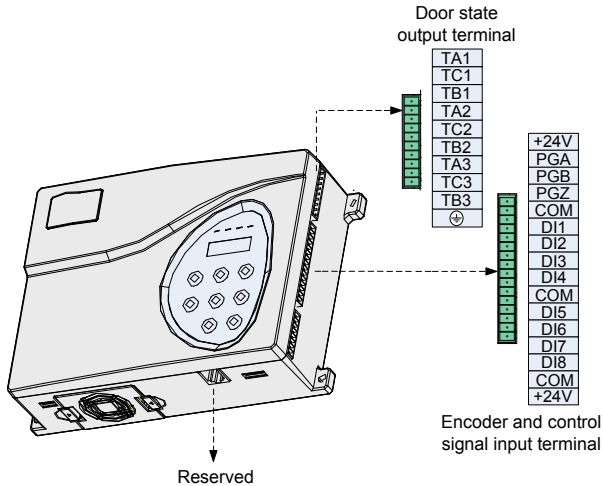


Table 3-3 Control circuit terminal description

Name	Type	Mark	Function Description	Remarks
Door state output terminal	Relay output and grounding	TA1/TB1/TC1 TA2/TB2/TC2 TA3/TB3/TC3	Relay output	1. TA-TB: normally closed (NC) TA-TC: normally open (NO) Contact capacity: 250 ACV, 3A; 30 VDC, 1 A 2. Insulation voltage class between contact and control circuit: 2.5 kVAC
Encoder and control signal input terminal	Internal 24 V power supply	+24V	24 VDC power supply	Used as the non-contact switch or power supply for the encoder. Maximum output current: 200 mA
		COM	24 V power common	Isolated with the internal 24 V power common terminal of the controller
	Encoder input	PGA	Encoder phase A	Open-collector output or push-pull output
		PGB	Encoder phase B	
		PGZ	Encoder phase Z	
	Digital input	DI1 to DI8	Digital signal input	Optocoupler isolation, low level active Input voltage range: 0–30 VDC Input impedance: 3.3 kΩ
Reserved	Software burning interface	RJ45	Software burning interface	-

Check the peripheral wiring before power-on to ensure device and personal safety:

1. The wiring is performed according to the instructions.
2. All switches act reliably.
3. Check the inter-phase resistance of the main circuit to ensure that there is no short circuit to ground.
4. The mechanical installation is proper.
5. Check that the resistance between the following points and the ground is close to infinity.
 - L, N and PE
 - U, V, W and PE
 - Encoder 24V, PGA, PGB, PGZ, COM and PE

3.3 Peripheral Electrical Devices

3.3.1 Selection of Peripheral Electrical Devices

Controller Model	Air Switch (A)	Contactor (A)	Main Circuit Conducting Cable (mm ²)
NICE-D-A-S0P2	10	10	2.5
NICE-D-A-S0P4	16	10	2.5
NICE-D-A-S0P7	16	10	2.5

3.3.2 Description of Peripheral Electrical Devices

Electrical Device	Mounting Location	Function Description
Air switch	Power input side	It is used to cut off the controller's power supply and provide short circuit protection.
AC input reactor	Controller input side	· Improve the power factor of the input side. · Eliminate the higher harmonics of the input side effectively, · Protect the rectifier bridge effectively. · Eliminate the input current unbalance caused by inter-phase unbalance.
AC output reactor	Between the controller output side and the motor, close to the controller	If the controller is more than 100 m far away from the motor, install the AC output reactor.



4

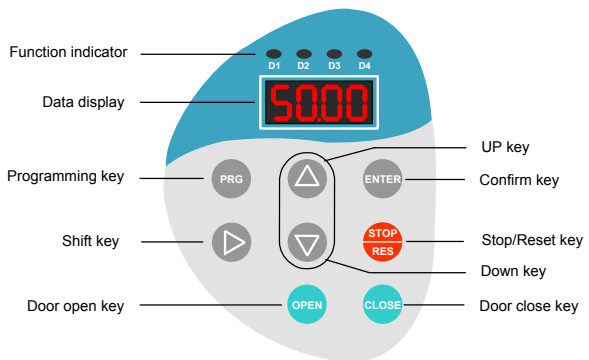
Operation and Trial Running

Chapter 4 Operation and Trial Running

4.1 Operation Panel

You can modify the parameters, monitor the working status and run or stop the controller by operating the operation panel shown as below:

Figure 4-1 Operation panel diagram



1. Indicator Descriptions

Table 4-1 Indicator descriptions

Indicator	Meaning of ON at Stop		Meaning of ON During Running
	Speed Control	Distance Control	
D1	DI1 signal active	DI1 signal active	External door close command
D2	DI2 signal active	Phase A and B signal correct	During door close
D3	DI3 signal active	Phase Z signal active	During door open
D4	DI4 signal active	DI4 signal active	External door open command

2. Description of Keys on the Operation Panel

Table 4-2 Description of keys on the operation panel

Key	Name	Function
	Programming	Enter or exit Level I menu.
	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.
	Stop/Reset	Stop the running in the running state and reset the operation in the fault state.

Key	Name	Function
	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
	Up	Increase data or function code.
	Down	Decrease data or function code.
	Door open	Open the door in the operation panel operation mode.
	Door close	Close the door in the operation panel operation mode.

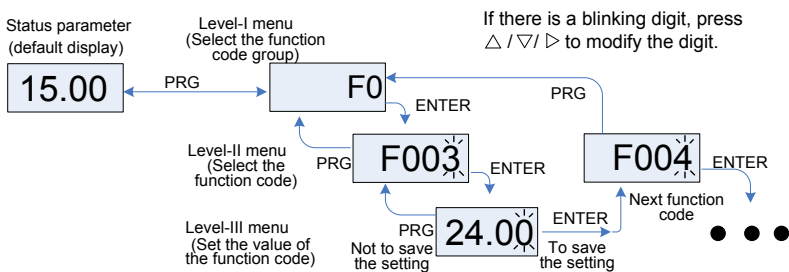
4.2 Basic Operations

4.2.1 Operation Procedure of the Operation Panel

The operation panel of the NICE900 adopts three-level menu, convenient for quick querying and modification of parameters.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

Figure 4-2 Operation procedure on the operation panel

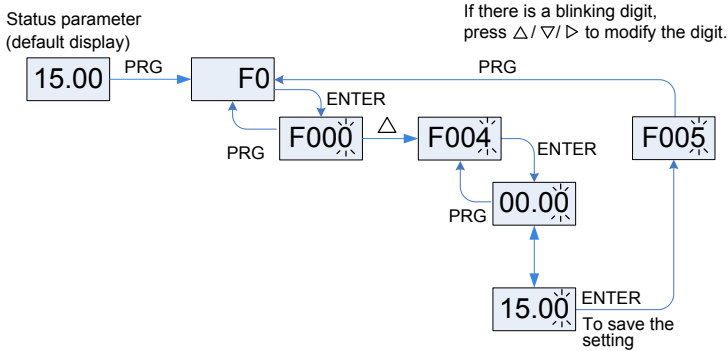


You can return to Level II from Level III by pressing or .

- After you press , the system saves parameter setting first, and then goes back to Level II and shifts to the next function code.
- After you press , the system does not save parameter setting, but directly returns to Level II and remains at the current function code.

Here is an example of changing the value of F0-04 to 15.00 Hz.

Figure 4-3 Example of editing function code



In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

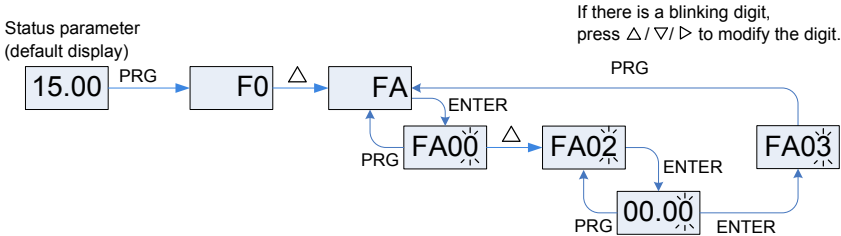
- Such a function code is only readable, such as actually detected parameter and running record parameter.
- Such a function code cannot be modified in the running state and can only be changed at stop.

4.2.2 Viewing Fault Information

When a fault occurs on the controller, the operation panel displays the fault code, based on which, you can find the cause of the fault and rectify the fault quickly.

The controller saves the last four fault codes, and details of the frequency, current, bus voltage and DI/DO status at the latest fault are recorded.

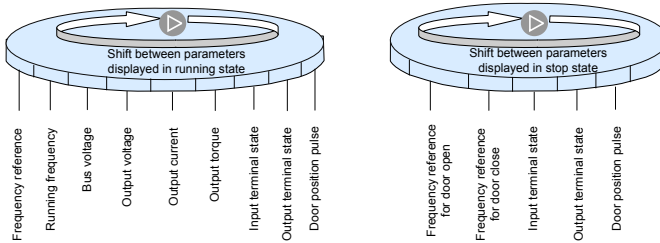
Figure 4-4 Viewing fault information



4.2.3 Viewing Display at Running or Stop

In the stop/running state without fault, you can view the parameters circularly by pressing . The parameters to be displayed are set in by setting FA-00 and FA-01.

Figure 4-5 Shift between parameters displayed in the running/stop state

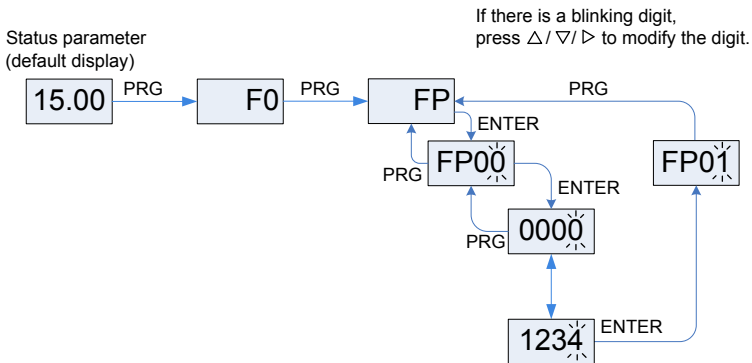


4.2.4 Setting the Password

To protect the parameters more effectively, the NICE900 provides the user password protection function. To cancel the password protection function, enter the password and set FP-00 to 0.

The following figure shows an example of changing the password to 1234.

Figure 4-6 Changing the password



4.3 Command Source and Motor Auto-tuning

4.3.1 Command Source

The NICE900 supports four command sources, as described in the following table.

Function Code	Value	Description
F0-02	0 (Default)	Operation panel control It is mainly used in motor auto-tuning. The door machine runs at the frequency set in F0-04. You can control door open or close by pressing  or , and stop the door machine by pressing  on the operation panel.
	1	Door machine terminal control Door open and close commands are input via DI terminal. It is used in normal running state.
	2	Door machine manual control It is used in door width auto-tuning, during which the door machine accelerates and decelerates. The running and stop of the door machine are controlled by using the operation panel.
	3	Door machine auto demonstration It is used in the door machine demonstration and trial running in the factory. After door width auto-tuning is completed in distance control or peripheral signals are connected properly in speed control, set the door machine auto demonstration mode to start automatic running of the door machine. Start demonstration by pressing  or , and stop demonstration by pressing  on the operation panel. The demonstration time interval and times are set in group F7 parameters.

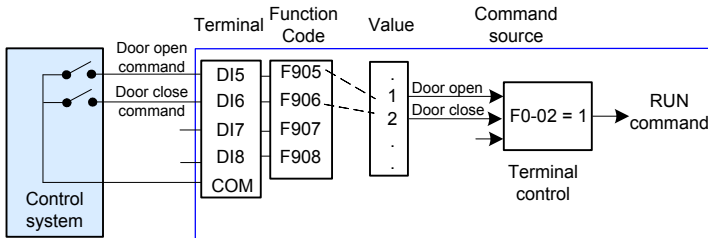
■ Door machine manual control (F0-02 = 1)

In this mode, the door open/close commands are given by DI terminal.

You can allocate the DI terminals with relevant signals in F9-01 to F9-08.

For example, connect the door open and close signals respectively to DI5 and DI6, as shown in the following figure.

Figure 4-7 Door open/close control by DI terminal



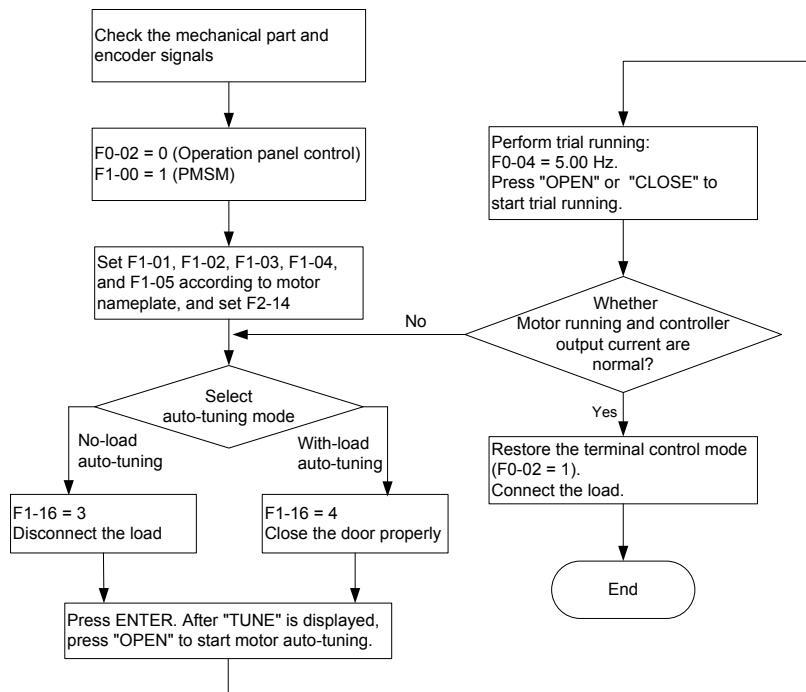
4.3.2 Motor Auto-tuning

The following part takes the PMSM as an example to describe motor auto-tuning.

Follow the precautions for motor auto-tuning:

- The magnetic pole position must be identified before first-time running of the PMSM. Otherwise, the PMSM cannot be used properly.
- After you change motor wiring or encoder wiring, or replace the encoder, the encoder position angle must be identified again. Ensure that the magnetic position is consistent with motor wiring during normal running.
- The motor rotates during auto-tuning. Ensure safety before starting motor auto-tuning.

Figure 4-8 Motor auto-tuning flowchart (PMSM)



More descriptions about motor auto-tuning are as follows:

1. Before starting motor auto-tuning, ensure that the encoder signals are normal. If the door closes and motor locked-rotor occurs after you start auto-tuning, it indicates that the motor running direction is abnormal. You need to change the motor wiring or encoder wiring.

2. During no-load auto-tuning, the controller executes the forward or reverse running command, and runs in the opposite direction after a period of time.

After several cycles of forward and reverse running, the controller calculates all parameters and completes no-load auto-tuning. If Er20 is reported during auto-tuning, replace any two of UVW phases and perform motor auto-tuning again.

3. During with-load auto-tuning, ensure that the door is fully closed. Press **OPEN** to make the motor slowly open the door at 25% of the rated speed and press **CLOSE** to make the motor close the door after the door opens to a certain distance.

After three times of such operations, the controller calculates all parameters and completes with-load auto-tuning.

4. During with-load auto-tuning, if the motor does not run or the running direction is

inconsistent with the actual door open/close command, it indicates that motor wiring is incorrect. You need to replace any two of UVW phases and perform motor auto-tuning again.

5. The identified encoder zero position angle is viewed or modified in F1-14. This parameter must not be modified after motor auto-tuning; otherwise, the controller may not run properly.

This parameter obtained through with-load auto-tuning is not so accurate as that obtained through no-load auto-tuning. Perform no-load auto-tuning if conditions are allowed.

6. If Er19 is reported during identification of the encoder zero position angle, check whether encoder wiring is correct.

4.4 Door Open/Close Control Mode

The NICE900 supports two door open/close control modes, speed control and distance control.

In speed control, the controller instructs deceleration at slow-down point and judge door open/close limit based on the door open/close limit signal.

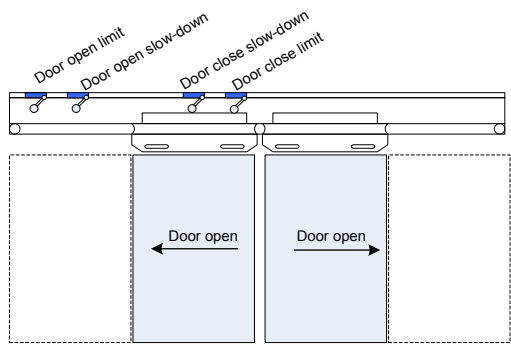
In distance control, the controller needs to identify the door width pulses correctly, and instructs deceleration and judge door open/close limit based on the door open/close curve.

4.4.1 Speed Control Mode

1. Four travel switches need to be installed on the door for this mode. The controller decelerates at the slow-down point and judges door open/close limit based on the door open/close limit signal.

The following figure shows the installation positions of relevant signals (travel switch) of the door machine system in speed control mode.

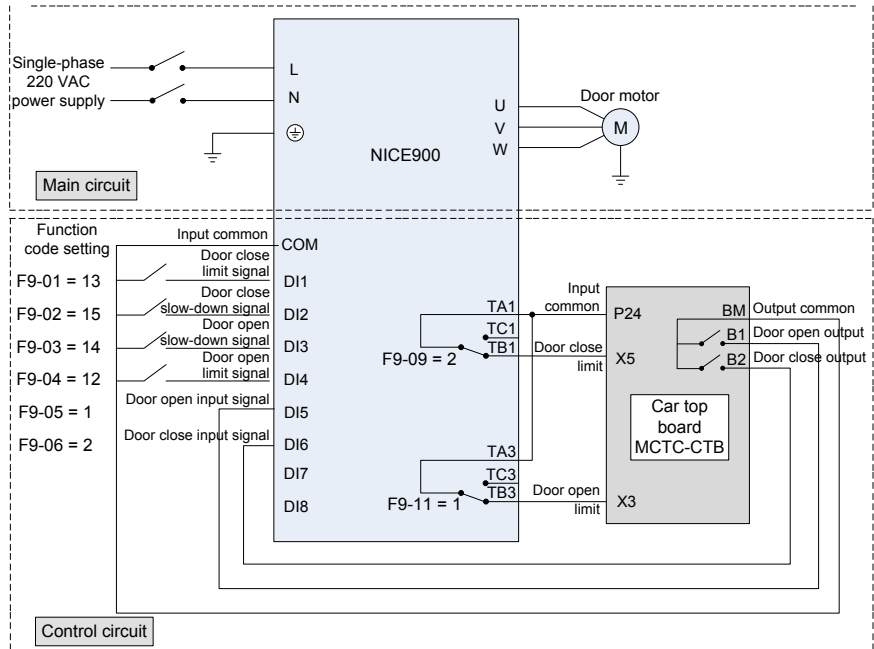
Figure 4-9 Installation position of signals of the door machine system



2. Check wiring of the door open/close signals for speed control.

The following figure takes Inovance elevator control system to describe wiring of the relevant signals.

Figure 4-10 Typical system wiring for speed control

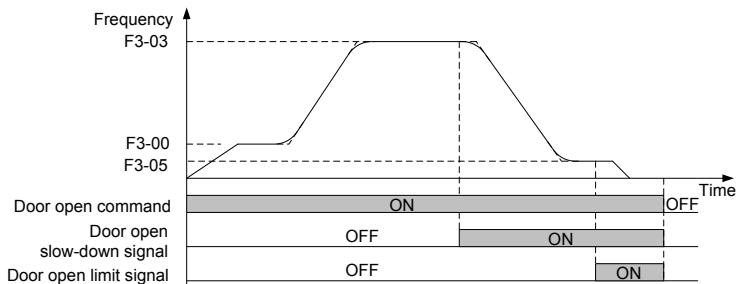


3. Related parameter setting

Function Code	Parameter Name	Value
F0-01	Door open/close control mode	0: Speed control
F0-02	Command source selection	1: Door machine terminal control
F9-01	DI1 function selection	13: Door close limit signal NO
F9-02	DI2 function selection	15: Door close slow-down point signal NO
F9-03	DI3 function selection	14: Door open slow-down point signal NO
F9-04	DI4 function selection	12: Door open limit signal NO
F9-05	DI5 function selection	1: Door open command
F9-06	DI6 function selection	2: Door close command

4. Door open/close running curve in speed control

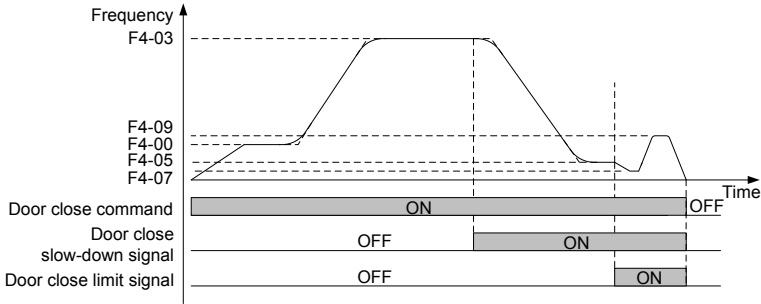
Figure 4-11 Door open running curve in speed control



When the door open command is active, the door machine accelerates to the speed set in F3-00. After the low speed door open time reaches the setting of F3-02, the door machine accelerates to normal speed set in F3-03.

After the door open slow-down signal is active, the door machine decelerates to the speed set in F3-05. After the door open limit signal is active, the door machine enters the door open holding state with the holding torque set in F3-08.

Figure 4-12 Door close running curve in speed control



When the door close command is active, the door machine accelerates to the speed set in F4-00. When the low speed door close time reaches the setting of F4-02, the door machine accelerates to normal speed set in F4-03.

When the door close slow-down signal is active, the door machine decelerates to the speed set in F4-05. When the door close limit signal is active, the door machine enters the door close holding state:

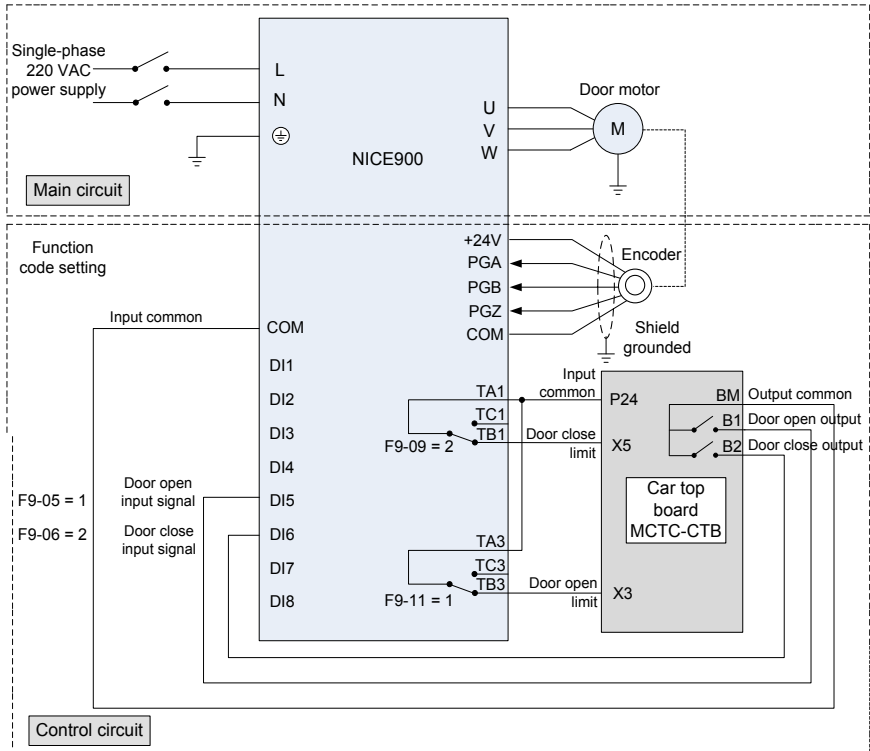
- Holding speed: F4-07
- Holding time: F4-08
- Holding torque: F4-12
- Door vane retraction speed and time: F4-09 and F4-10

4.4.2 Distance Control Mode

1. The encoder needs to be installed for this mode. The controller judges the door position based on the encoder signals. The door width pulses need to be identified at first-time running. The controller decelerates and judges door open/close limit based on the door open/close curve.

The following figure takes Inovance elevator control system to describe wiring of the relevant signals.

Figure 4-13 Typical system wiring for distance control



2. Check the encoder.

The pulse signal from the encoder is critical to accurate control of the system. Before commissioning, check the following items carefully:

- 1) The encoder is installed reliably with correct wiring.
- 2) The signal cable and strong-current circuit of the encoder are laid in different ducts to prevent interference.
- 3) The encoder cable is preferably directly connected to the controller. If the cable is not long enough and an extension cable is required, the extension cable must be a shielded cable and preferably welded to the original encoder cable by using the soldering iron.
- 4) The shield of the encoder cable is grounded on the end connected to the controller (only one end is grounded to prevent interference).

3. Related parameter setting

Function Code	Parameter Name	Value
F0-01	Door open/close control mode	1: Distance control
F0-02	Command source selection	1: Door machine terminal control
F9-05	DI5 function selection	1: Door open command
F9-06	DI6 function selection	2: Door close command

4. Door width auto-tuning

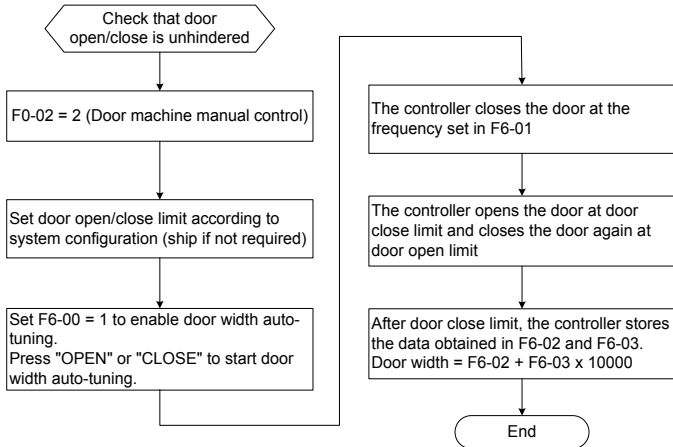
Door width auto-tuning is required before running in distance control. During door open/close, the controller records the pulses of door movement in real time, and judges door open/close limit based on the door width pulses.

Pay attentions to the following precautions:

- Before performing door width auto-tuning in distance control for asynchronous motor, check that the AB phase cables of the encoder are connected correctly.
- During door width auto-tuning, the door acting direction changes automatically; guarantee personal safety before starting the operation.
- Check that there is no obstacle in the running track of the door before starting door width auto-tuning. If the door is hindered by an obstacle, the controller considers that door open/close limit is reached, resulting in incorrect auto-tuning data.

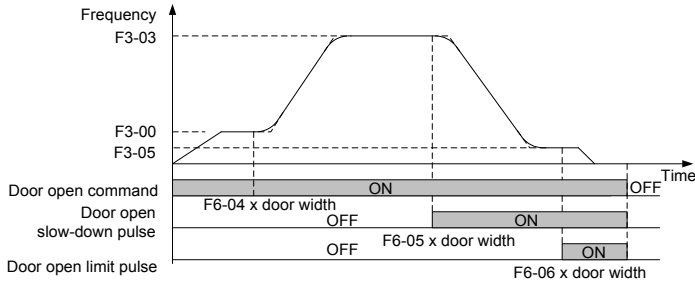
The following figure shows the door width auto-tuning flowchart.

Figure 4-14 Door width auto-tuning flowchart



5. Door open/close running curve in distance control mode

Figure 4-15 Door open running curve in distance control mode



When the door open command is active, the door machine accelerates to the speed set in F3-00.

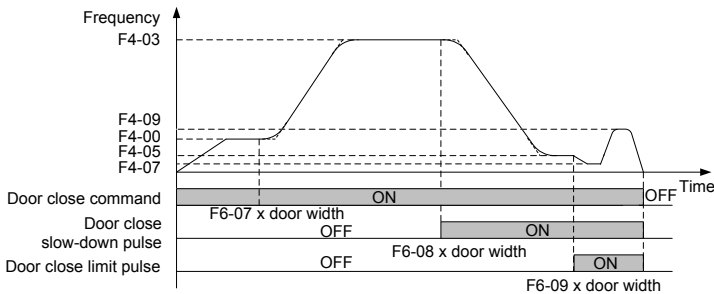
When the door open position reaches (F6-04 x door width), the door machine accelerates to the speed set in F3-03.

When the door open position reaches (F6-05 x door width), the door machine enters the deceleration and creeping state with the speed set in F3-05 and deceleration time set in F3-06.

When the door open position reaches (F6-06 x door width), the door machine continues low speed creeping, and then enters the door open holding state, with the holding torque set in F3-08. The door position is reset to 100%.

After the door open command is cancelled, the torque holding state ends.

Figure 4-16 Door close running curve in distance control mode



When the door close command is active, the door machine accelerates to the speed set in F4-00.

When the door close position reaches (F6-07 x door width), the door machine accelerates to the speed set in F4-03.

When the door close position reaches (F6-08 x door width), the door machine decelerates to the speed set in F4-05.

When the door close position reaches (F6-09 x door width), the door machine decelerates again to the speed set in F4-07. It is recommended that $F6-09 \geq 96.0\%$; reduce F6-09 if there is pulse loss during door open/close.

Set the threshold for retracting the door vane in F6-20. After the door vane is retracted and door limit is reached, the door machine enters the torque holding state, with the speed set in F4-07 and holding torque set in F4-12. The door position is reset to 0.

After the door close command is cancelled, the torque holding state ends.

4.4.3 Door Close Hindered

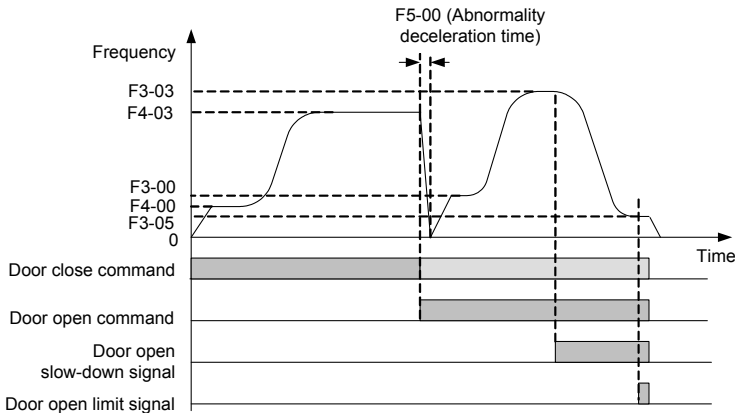
Door close hindered means that one of the following conditions occur during door close:

- Light curtain/safety edge signal active
- Output torque larger than the door close hindered torque
- Door open command active

If door close hindered occurs, the NICE900 processes this abnormality in two ways: decelerate to stop or re-open the door, selected in F4-14. This abnormality is judged based on the time or torque.

1. Running curve of door open command active during door close in speed control mode

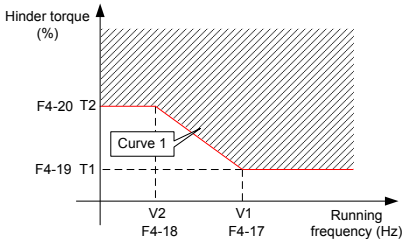
Figure 4-17 Running curve of door open command active during door close in speed control mode



After the time reaches the deceleration time in F5-00, the controller re-opens the door at low speed, and enters normal speed running state after the time set in F3-02.

After the door open slow-down signal is active, the controller enters the low speed running state and opens the door to the open limit position, and then outputs the door open limit signal.

2. Related parameter setting

Function Code	Parameter Name	Setting	Description
F4-14	Working mode upon door close hindered	0: Reserved 1: Output door close hindered signal 2: Immediate stop 3: Door re-open	F4-14 = 2 Upon door close hindered, the controller stops immediately, outputs the door close hindered signal, and does not respond to the door close command within 10s. However, if the controller receives the door close or RUN (door open/close) cancellation command within the time, it executes door close immediately rather than restricted by the 10s time counting. F4-14 = 3 The controller re-opens the door upon door close hindered, and does not respond to the external door open/close commands during door re-open. Door close hindered occurs on one of the following conditions during door close: · The light curtain/safety edge signal is active. · The output torque is larger than the door close hindered torque. · The door close time exceeds the value of F5-02.
F4-15	Door close hindered judging time	0~9999 ms	It is used to set the filter time when door close is hindered. If it is set to 0, door close hindered is not detected.
F4-17	Normal speed at door close hindered	F4-18 to F1-04 12.00 Hz	 F4-17 to F4-20 are used to judge door close hindered. Set them according to the requirement: $V1 (F4-17) \geq V2 (F4-18)$, $T1 (F4-19) \leq T2 (F4-20)$ The torque threshold for judging door close hindered is curve 1 shown in the figure. The shadow part shows that door close hindered occurs.
F4-18	Low speed at door close hindered	0.00 Hz to F1-04 2.00 Hz	
F4-19	Normal speed torque	0.00~150.0% 100.0%	
F4-20	Low speed torque	0.00~150.0% 100.0%	
F5-00	Abnormality deceleration time	0.1~5.0s	



Function Code Table

Function Code	Parameter Name	Setting	Description
F5-02	Door close time limit	0-9999s	It is used to limit the door close time. If the controller does not receive the door close limit signal within the time, it determines that door close is hindered, and performs door re-open or zero speed holding based on the setting of F4-14. This parameter is invalid when it is set to 0.

Chapter 5 Function Code Table

5.1 Description of Function Codes

The NICE900 series door machine controller has a total of 13 groups of function codes, namely, F0 to F9, FA, FF and FP. FX-YZ in this manual indicates the function code whose function code group is "X" and whose function code is "YZ". For example, F3-02 indicates function code "2" in group F3.

To facilitate the setting of the function codes, the operation panel adopts three-level menu. The function code group is Level-I menu, function code is Level-II menu, and the setting value corresponds to Level-III menu.

The meaning of each column in the function code table is as follows:

Function Code	Indicates the function code number.
Parameter Name	Indicates the parameter name of the function code.
Setting Range	Indicates the setting range of the parameter.
Default	Indicates the default setting of the parameter at factory.
Unit	Indicates the measurement unit of the parameter.
Property	Indicates whether the parameter can be modified (including the modification conditions)

The symbols in the function code table are described as follows:

"☆": The parameter can be modified when the NICE900 is in either stop or running state.

"★": The parameter cannot be modified when the NICE900 is in the running state.

"●": The parameter is the actually measured value and cannot be modified.

"*": The parameter is factory parameter and can be set only by the manufacturer.

The system automatically restricts the modification property of all parameters to prevent mal-function.

"Default Value" indicates the value after parameter update when you restore factory settings, but the actually detected parameter values or recorded values are not updated.

To protect the parameters more effectively, the NICE900 provides the password protection.

5.2 Function Code Table

After pressing  key and then  or  key, the Level-I menu is displayed, corresponding to the following function code groups:

Group F0: Basic Parameters	Group F7: Distance Control Parameters
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Group F1: Motor Parameters	Group F8: Auxiliary Parameters
Group F2: Performance Control Parameters	Group F9: Input and Output Function Parameters
Group F3: Door Open Running Curve Parameters	Group FA: Display and Fault Parameters
Group F4: Door Close Running Curve Parameters	Group FF: Factory Parameters (Reserved)
Group F5: Door Open/Close Auxiliary Parameters	Group FP: User Parameters
Group F6: Distance Control Parameters	

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
Group F0: Basic Parameters					
F0-00	Control mode	0: Sensorless vector control (SVC) 1: Closed-loop vector control (CLVC)	1	1	★
F0-01	Door open/close mode selection	0: Speed control 1: Distance control	1	1	★
F0-02	Command source selection	0: Operation panel control 1: Door machine terminal control 2: Door machine manual control 3: Door machine auto demonstration	0	1	★
F0-04	Running frequency under operation panel control	0.00 to F1-04	5.00 Hz	0.01 Hz	☆
F0-05	Input signal quick setting	0–2	1	1	★
F0-06	Speed at low speed running	0.00 to F1-04	4.00 Hz	0.01 Hz	☆
F0-07	Carrier frequency	2.0–16.0 kHz	8.0 kHz	0.1 kHz	☆
Group F1: Motor Parameters					
F1-00	Motor type	0: Asynchronous motor 1: PMSM	8.0 kHz	0.1 kHz	★
F1-01	Rated motor power	0–750 W	1	1	★
F1-02	Rated motor voltage	0–250 V	Model dependent	1 V	★
F1-03	Rated motor current	0.001–9.900 A	100 V	1 V	★
F1-04	Rated motor frequency	1.00–99.00 Hz	Model dependent	0.001 A	★
F1-05	Rated motor speed	0–9999 RPM	24.00 Hz	0.01 Hz	★

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F1-06	Stator phase resistance of PMSM	0.00–99.99 Ω	Model dependent	0.01 Ω	★
F1-07	Rotor phase resistance of asynchronous motor	0.00–99.99 Ω	Model dependent	0.01 Ω	★
F1-08	Leakage inductance of asynchronous motor	0.0–99.99 mH	Model dependent	0.01 mH	★
F1-09	Mutual inductance of asynchronous motor	0–999.9 mH	Model dependent	0.1 mH	★
F1-10	Magnetizing current of asynchronous motor	0.001–9.900 A	Model dependent	0.001 A	★
F1-11	Shaft D inductance of PMSM	0.0–999.9 mH	Model dependent	0.1 mH	★
F1-12	Shaft Q inductance of PMSM	0.0–999.9 mH	Model dependent	0.1 mH	★
F1-13	Back EMF of PMSM	0–250	Model dependent	1	★
F1-14	Encoder zero position angle of PMSM	0.0–359.9°	Model dependent	0.1°	★
F1-15	Real-time angle of PMSM	0.0–359.9°	Model dependent	0.1°	●
F1-16	Motor auto-tuning mode	0: No auto-tuning 1: Static auto-tuning for asynchronous motor 2: Complete auto-tuning for asynchronous motor 3: No-load auto-tuning for PMSM 4: With-load auto-tuning for PMSM	0	1	★
Group F2: Performance Control Parameters					
F2-00	Speed loop proportional gain 1	0–100	15	1	☆
F2-01	Speed loop integral time 1	0.01–10.00s	1.00s	0.01s	☆
F2-02	Switchover frequency 1	0.00 to F2-05	5.00 Hz	0.01 Hz	☆
F2-03	Speed loop proportional gain 2	0–100	15	1	☆
F2-04	Speed loop integral time 2	0.01–10.00s	1.00s	0.01s	☆
F2-05	Switchover frequency 2	F2-02 to F1-04	30	1	☆
F2-06	Current loop proportional gain	10–500	120	1	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F2-07	Current loop integral gain	10–500	50	1	☆
F2-08	Slip compensation coefficient	50%–200%	100%	1%	☆
F2-09	Inertia compensation	0–9999	0	1	★
F2-10	Torque boost	0.0%–30.0%	8.0%	0.1%	☆
F2-11	Over-excitation gain	0–200	64	1	☆
F2-12	Initial position judging method	1: Based on pulses 2: Using data of other tested PMSM	1	1	★
F2-13	Feedback speed filter level	0–20	0	1	☆
F2-14	Encoder PPR	1–9999	2048	1	★
F2-15	Encoder direction selection	0: Forward direction 1: Reverse direction	1	1	★
Group F3: Door Open Running Curve Parameters					
F3-00	Door open startup low speed	0.00 Hz to F3-03	5.00 Hz	0.01 Hz	☆
F3-01	Door open startup acceleration time	0.1–999.9s	1.0s	0.1s	☆
F3-02	Low speed running time for door open startup in speed control	0.1–999.9s	1.0s	0.1s	☆
F3-03	Door open normal speed	0.00 Hz to F1-04	15.00 Hz	0.01 Hz	☆
F3-04	Door open acceleration time	0.1–999.9s	2.0s	0.1s	☆
F3-05	Door open ending low speed	0.00 Hz to F3-03	3.00Hz	0.01 Hz	☆
F3-06	Door open deceleration time	0.1–999.9s	1.5s	0.1s	☆
F3-07	Torque switchover threshold at door open limit	0.0%–150.0%	50.0%	0.1%	☆
F3-08	Door open limit holding torque	0.0%–150.0%	50.0%	0.1%	☆
F3-09	Door open hindered torque	0.0%–150.0%	80.0%	0.1%	☆
F3-10	Door open startup torque	0.0% to F3-09	0.0%	0.1%	★
F3-11	Door open hindered judging time	0–9999 ms	0ms	1 ms	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F3-12	Door open limit low speed	0.00 Hz to F3-03	3 Hz	0.01 Hz	☆
F3-13	Door re-open speed	0.00 Hz to F3-03	0 Hz	0.01 Hz	☆
Group F4: Door Close Running Curve Parameters					
F4-00	Door close startup low speed	0.00 Hz to F4-03	4.00 Hz	0.01 Hz	☆
F4-01	Door close startup acceleration time	0.1–999.9s	1.0s	0.1s	☆
F4-02	Low speed running time for door close startup in speed control	0.1–999.9s	1.0s	0.1s	☆
F4-03	Door close normal speed	0.00 Hz to F1-04	12.00 Hz	0.01 Hz	☆
F4-04	Door close acceleration time	0.1–999.9s	2.0s	0.1s	☆
F4-05	Door close ending low speed	0.00 Hz to F4-03	2.00 Hz	0.01 Hz	☆
F4-06	Door close deceleration time	0.1–999.9s	1.5s	0.1s	☆
F4-07	Door close limit low speed	0.00 Hz to F4-03	1.00 Hz	0.01 Hz	☆
F4-08	Low speed running time at door close limit	0–9999 ms	300 ms	1 ms	☆
F4-09	Door vane retraction speed	0.00 to F4-03	2.00 Hz	0.01 Hz	☆
F4-10	Door vane retraction running time	0–9999 ms	500 ms	1 ms	☆
F4-11	Torque switchover threshold at door close limit	0.0%–150.0%	50.0%	0.1%	☆
F4-12	Door close limit holding torque	0.0%–150.0%	30.0%	0.1%	☆
F4-13	Door close hindered torque	0.0%–150.0%	100.0%	0.1	★
F4-14	Working mode upon door close hindered	0: Reserved 1: Output door close hindered signal 2: Immediate stop 3: Door re-open	1	1	★
F4-15	Door close hindered judging time	0–9999 ms	500 ms	1 ms	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F4-16	Door close normal speed at fire emergency	5.00 to F1-04	10.00 Hz	0.01 Hz	☆
F4-17	Normal speed at door close hindered	F4-18 to F1-04	12.00 Hz	0.01 Hz	☆
F4-18	Low speed at door close hindered	0.00 Hz to F1-04	2.00 Hz	0.01 Hz	☆
F4-19	Normal speed torque	0.00%–150.0%	100.0%	0.1%	☆
F4-20	Low speed torque	0.00%–150.0%	100.0%	0.1%	☆
Group F5: Door Open/Close Auxiliary Parameters					
F5-00	Abnormality deceleration time	0.1–5.0s	0.3s	0.1	☆
F5-01	Door open time limit	0–999.9s	30.0s	1s	☆
F5-02	Door close time limit	0–999.9s	0s	1s	☆
F5-03	Low speed running time limit	0–999.9s	0s	1s	☆
F5-04	Delay of external door open command	0–999.9s	60.0s	1s	☆
F5-05	Delay of external door close command	0–999.9s	60.0s	1s	☆
F5-06	Door open curve	0, 1	1	1	★
F5-07	Start segment time of door open acceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + rising segment ≤ 90%)	20.0%	0.1%	★
F5-08	Rising segment time of door open acceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + rising segment ≤ 90%)	60.0%	0.1%	★
F5-09	Start segment time of door open deceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + falling segment ≤ 90%)	20.0%	0.1%	★
F5-10	Falling segment time of door open deceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + falling segment ≤ 90%)	60.0%	0.1%	★
F5-11	Start segment time of door close acceleration S curve	0, 1	1	1	★
F5-12	Rising segment time of door close acceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + rising segment ≤ 90%)	20.0%	0.1%	★

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F5-13	Start segment time of door close deceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + rising segment $\leq 90\%$)	60.0%	0.1%	★
F5-14	Falling segment time of door close deceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	20.0%	0.1%	★
F5-15	Start segment time of door open acceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	60.0%	0.1%	★
F5-16	Speed deviation threshold	0%–80%	50%	0%	☆
F5-17	Time for determining speed deviation too large	0–5000 ms	400 ms	1 ms	☆
F5-18	Door close steady speed delay	0–9999 ms	200 ms	1 ms	★
F5-19	Fault braking current	0.1%–150.0%	100%	0.1%	★
Group F6: Distance Control Parameters					
F6-00	Door width auto-tuning function	0: Disabled 1: Enabled	0	1	★
F6-01	Door width auto-tuning speed	0 to F6-04	3.00 Hz	0.01 Hz	☆
F6-02	Low bits of door width pulse	0–9999	0	1	★
F6-03	High bits of door width pulse	0–9999	0	1	★
F6-04	Low speed running distance of door open startup in distance control	0.0%–30.0%	10.0%	0.1%	☆
F6-05	Door open slow-down point in distance control	60.0%–90.0%	70.0%	0.1%	☆
F6-06	Door open limit point in distance control	80.0%–99.0%	96.0%	0.1%	☆
F6-07	Low speed running distance of door close startup in distance control	0.0%–30.0%	10.0%	0.1%	☆
F6-08	Door close slow-down point in distance control	60.0%–90.0%	70.0%	0.1%	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F6-09	Door close limit point in distance control	80.0%–99.0%	96.0%	0.1%	☆
F6-10	Output torque display	0.0–1–80.0%	0.0%	0.1%	☆
F6-11	Low bits of the door open limit switch position	0–9999	0	1	★
F6-12	High bits of the door open limit switch position	0–9999	0	1	★
F6-13	Position of the door close limit switch	0–9999	0	1	★
F6-14	Torque setting for door width auto-tuning or initial running	0.0%–150.0%	80.0%	0.1%	★
F6-15	Low bits of the pulse of door open slow-down point	0–9999	0	1	★
F6-16	High bits of the pulse of door open slow-down point	0–9999	0	1	★
F6-17	Low bits of the pulse of door close slow-down point	0–9999	0	1	★
F6-18	High bits of the pulse of door close slow-down point	0–9999	0	1	★
F6-19	Pulse at door open limit output	0.0%–99.9%	0.0%	0.1%	☆
F6-20	Pulse at door close limit output	0.0%–99.9%	0.0%	0.1%	☆
F6-21	Door position feedback pulse	0.0%–99.9%	33.0%	0.1%	☆
Group F7: Distance Control Parameters					
F7-00	Door open limit holding time in demonstration mode	1.0–999.9s	0.1s	2.0s	★
F7-01	Door close limit holding time in demonstration mode	1.0–999.9s	0.1s	2.0s	★
F7-02	Actual door open and close times in demonstration mode	0–9999	0	1	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F7-03	Limit of door open and close times in demonstration mode	0-9999	0	1	☆
Group F8: Auxiliary Parameters					
F8-00	Software version	0.00-99.99	1.00	0.01	●
F8-01	Module temperature	0-100°C	0°C	1°C	●
F8-02	Fault auto reset times	0-100	0	1	★
F8-03	Brake use ratio	0-100%	100%	1%	☆
F8-04	Accumulative power-on time	0-9999 h	0	1	★
F8-05	Reserved (working time: minutes)	0	0	1	★
F8-06	Accumulative running time	0-9999 h	0	1	★
F8-07	Reserved (working time: minutes)	0	0	1	★
F8-08	Accumulative working time setting	0-9999 h	0	1	★
F8-09	Accumulative operation time setting	0-9999 h	0	1	★
F8-10	Auxiliary function selection	0-9999	12	1	★
F8-12	Drive function selection	0-9999	0	1	★
F8-14	Overload coefficient	0-10.00	2.00	0.01	☆
Group F9: Auxiliary Parameters					
F9-00	Terminal filter time	0-100 ms	20 ms	1 ms	☆

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
F9-01	DI1 function selection	0: Invalid 1: Door open command 2: Door close command	0	1	★
F9-02	DI2 function selection	3: External reset signal 4: Forbid terminal input during door open	0	1	★
F9-03	DI3 function selection	5: Forbid terminal input during torque holding 6: Low speed door close command	0	1	★
F9-04	DI4 function selection	7: Fire emergency input 8 to 109: Reserved	0	1	★
F9-05	DI5 function selection	10/110: Light curtain signal NO/NC 11/111: Safety edge signal NO/NC	1	1	★
F9-06	DI6 function selection	12/112: Door open limit signal NO/NC 13/113: Door close limit signal NO/NC	2	1	★
F9-07	DI7 function selection	14/114: Door open slow-down signal NO/NC 15/115: Door close slow-down signal NO/NC	10	1	★
F9-08	DI8 function selection	16/116: Door lock signal NO/NC	6	1	★
F9-09	Relay output selection (TA1/TB1/TC1)	0: Invalid 1: Door open limit signal output 0 2: Door close limit signal output 0 3: Door open limit signal output 1	2	1	★
F9-10	Relay output selection (TA2/TB2/TC2)	4: Door close limit signal output 1 5: Fault signal output 1 6: Reserved 7: Door open limit signal output 2 8: Door close limit signal output 2	5	1	★
F9-11	Relay output selection (TA3/TB3/TC3)	9: Door lock signal output 10: Door re-open signal output 11: Hindering signal output 12: Door position feedback output	1	1	★



Description of Function Codes

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
Group FA: Display and Fault Parameters					
FA-00	Display in running state	1-511	319	1	☆
FA-01	Display in stop state	1-63	39	1	☆
FA-02	1st fault type	0-30	0	1	●
FA-03	1st fault prompt	0-9	0	1	●
FA-04	2nd fault type	0-30	0	1	●
FA-05	2nd fault prompt	0-9	0	1	●
FA-06	3rd fault type	0-30	0	1	●
FA-07	3rd fault prompt	0-9	0	1	●
FA-08	4th fault type	0-30	0	1	●
FA-09	4th fault prompt	0-9	0	1	●
FA-10	5th fault type	0-30	0	1	●
FA-11	5th fault prompt	0-9	0	1	●
FA-12	Bus voltage upon latest fault	0-999.9 V	0 V	0.1 V	●
FA-13	Output current upon latest fault	0-99.00 A	0.00 A	0.01 A	●
FA-14	Running frequency upon latest fault	0-99.00 Hz	0.00 Hz	0.01 Hz	●
FA-15	Output torque upon latest fault	0.0-180.0% (percentage of output torque to rated torque)	0.0%	0.1%	●
FA-16	Input terminal status upon latest fault	0-1023	0	1	●
FA-17	Output terminal status upon latest fault	0-15	0	1	●
FA-18	Terminal state display	*	*	*	●
FA-19	Input signal display	*	*	*	●
FA-20	Output signal display	*	*	*	●
FA-21	Parameter display selection	0-9999	0	1	☆
FA-22	Display 1	0-9999	0	1	●
FA-23	Display 2	0-9999	0	1	●
FA-24	Analog voltage display	0.00-10.10 V	0.00 V	0.01 V	●
FA-25	Low bit of current door position	0-9999	0	1	●
FA-26	High bit of current door position	0-9999	0	1	●

Function Code	Parameter Name	Setting Range	Default	Min. Unit	Property
FA-27	Door machine state display	0-9999	0	1	●
FA-28	Door direction judgment	*	*	*	●
Group FF: Factory Parameters (Reserved)					
FF-00	Reserved	-	-	-	●
Group FP: Display and Fault Parameters					
FP-00	User password	0-9999	0	1	☆
FP-01	Parameter update	0: No function 1: Restore the default setting 2: Clear fault records and time	0	1	★

Chapter 6 Description of Function Codes

Group F0: Basic Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-00	Control mode	0, 1	1	1

- 0: Sensorless vector control (SVC)

It applies to common applications except for the permanent magnet synchronous motor (PMSM).

- 1: Closed-loop vector control (CLVC)

It is used only for the PMSM in distance control mode.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-01	Door open/close control mode	0, 1	1	1

- 0: Speed control

In this mode, four travel switches need to be installed on the door. They are door open deceleration switch, door open limit switch, door close deceleration switch and door close limit switch.

The controller instructs deceleration at the slow-down point and judges door open/close limit based on signals from the limit switches.

- 1: Distance control

In the distance control mode, door width pulses must be obtained through auto-tuning. After relevant door open/close curve parameters are set, the controller instructs deceleration and judges door open/close limit.

If a DI is allocated with door open/close limit signal in group F9, the controller judges door open/close limit based on the related limit signal from the DI.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-02	Command source selection	0, 1, 2, 3	0	1

- 0: Operation panel control

It is used mainly for motor auto-tuning.

RUN or stop of the door machine is controlled by using the operation panel. Press  to

instruct forward rotation, press  to instruct reverse rotation, and press  to stop the door machine.

In such control mode, the controller runs as a general controller and does not execute the special door machine logics.

· 1: Door machine terminal control

Door open/close is controlled by status combination of DI terminals of the controller.

DI with Signal "Door Open Command"	DI with Signal "Door Close Command"	Running State
0	0	Stop
0	1	Door close
1	0	Door open
1	1	Door open

· 2: Door machine manual control

It is used for door width auto-tuning. RUN or stop of the door machine is controlled by using the operation panel. Press  to instruct forward rotation, press  to instruct reverse rotation, and press  to stop the door machine.

During the process, the door machine accelerates and decelerates.

· 3: Door machine auto demonstration

It applies to the demonstration of door machine and factory trial running without use of the controller. Set this mode after you finish commissioning the door machine running curve in operation panel control mode.

Press  or  to repeat door open/close demonstration. The time interval and times of door open/close demonstration are set in group F7.

Press  to stop the door machine.

Note

- Door width auto-tuning is valid only in the door machine manual control mode (F0-02 = 2).
- Motor auto-tuning is valid only in the operation panel control mode (F0-02 = 0).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-04	Running frequency under operation panel control	0.00 to F1-04	5.00 Hz	0.01 Hz

It is used to set the running frequency when the speed is input via operation panel.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-05	Input signal quick setting	0-2	0	1

It is used to quickly set the NO/NC feature of signals input from the limit switches and slow-

down switches in the speed control mode (F0-01 = 0). When F0-05 is set to a non-zero value, the NO/NC feature of the corresponding input signals are as follows:

F0-05 = 1	F0-05 = 2
F9-01 = 13 (Door close limit NO)	F9-01 = 113 (Door close limit NC)
F9-02 = 15 (Door close deceleration NO)	F9-02 = 115 (Door close deceleration NC)
F9-03 = 14 (Door open deceleration NO)	F9-01 = 114 (Door open deceleration NC)
F9-04 = 12 (Door open limit NO)	F9-01 = 112 (Door open limit NC)

Changing F9-01 to F9-04 is allowed only when F0-05 = 0.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-06	Speed at low speed running	0–20.00 Hz	4.00 Hz	0.01 Hz

It is used to set the speed at first-time running after power-on or inspection when the distance control mode is used or the low speed door close input is active.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F0-07	Carrier frequency	2.0–16.0 kHz	8.0 kHz	0.1 kHz

It is used to adjust the carrier frequency of the controller, aiming to reduce motor noise, avoid resonance of the mechanical system, and reduce the leakage current to the earth and interference generated by the controller.

If the carrier frequency is low, output current has high harmonics, and the power loss and temperature rise of the motor increase.

If the carrier frequency is high, power loss and temperature rise of the motor declines. However, the system has an increase in power loss, temperature rise and interference.

Adjusting the carrier frequency will exert influences on the aspects listed in the following table.

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
Controller temperature rise	Low	High
Leakage current	Small	Large
External radiation interference	Small	Large

Group F1: Motor Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F1-00	Motor type	0: Asynchronous motor 1: PMSM	1	1
F1-01	Rated motor power	0–750 W	Model dependent	1 W
F1-02	Rated motor voltage	0–250 V	100 V	1 V
F1-03	Rated motor current	0.001–9.900 A	Model dependent	0.001 A
F1-04	Rated motor frequency	1.00–99.00 Hz	24.00 Hz	0.01 Hz
F1-05	Rated motor speed	0–9999 RPM	180 RPM	1 RPM

Set the parameters according to the motor nameplate. Ensure that these motor parameters are set correctly. Incorrect setting affects the motor auto-tuning and the vector control effect.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F1-06	Stator phase resistance of PMSM	0.00–99.99 Ω	Model dependent	0.01 Ω
F1-07	Rotor phase resistance of asynchronous motor	0.00–99.99 Ω	Model dependent	0.01 Ω
F1-08	Leakage inductance of asynchronous motor	0.0–99.99 mH	Model dependent	0.01 mH
F1-09	Mutual inductance of asynchronous motor	0–999.9 mH	Model dependent	0.1 mH
F1-10	Magnetizing current of asynchronous motor	0.001–9.900 A	Model dependent	0.001 A
F1-11	Shaft D inductance of PMSM	0.0–999.9 mH	Model dependent	0.1 mH
F1-12	Shaft Q inductance of PMSM	0.0–999.9 mH	Model dependent	0.1 mH
F1-13	Back EMF of PMSM	0–250	Model dependent	1
F1-14	Encoder zero position angle of PMSM	0.0–359.9°	Model dependent	0.1°
F1-15	Real-time angle of PMSM	0.0–359.9°	Model dependent	0.1°

Select a proper motor model according to the adaptable motor power. If there is a great difference between the actual motor power and the adaptable motor power, the system control performance will degrade.

F1-06 to F1-14 are updated automatically after motor auto-tuning is completed successfully.

For an asynchronous motor, the NICE900 obtains the corresponding parameters through complete auto-tuning or static auto-tuning. If the onsite conditions does not allow motor auto-tuning, manually input the value of these parameters by referring to data of the motor with the same nameplate parameters.

Each time F1-01(Rated motor power) is changed, the controller automatically resumes parameters F1-06 to F1-10 to the default values.

For a PMSM, the NICE900 can obtain F1-06 and F1-11 to F1-14 through complete auto-tuning. After F1-01 is changed, the related parameters will not update.

F1-15 is used to display the magnetic pole position of the motor in real time.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F1-16	Motor auto-tuning mode	0–4	0	1

Note

Motor auto-tuning can be performed only in the operation panel control mode (F0-02 = 0). Before motor auto-tuning, set motor ratings (F1-00 to F1-05) and PPR of the encoder (F2-14) correctly.

If a PMSM is used, motor auto-tuning is mandatory in one of the following conditions:

- Before first-time running
- When the motor/encoder is replaced
- When wiring of the encoder is changed

PMSM running is prohibited before motor auto-tuning succeeds, because it may result in runaway. If locked-rotor occurs, it indicates that motor auto-tuning fails.

The auto-tuning procedure is as follows:

1. After setting F1-16, press . Then "TUNE" is displayed and blinks.
2. Press the  or  to start auto-tuning, and "TUNE" stops blinking. The auto-tuning process can be stopped by pressing .
3. After the auto-tuning ends, the operation panel restores to the display at stop state. F1-16 resumes to 0 automatically.

The values of F1-16 are described as follows:

- 0: No auto-tuning
- 1: Static auto-tuning for asynchronous motor

It applies to the applications where complete auto-tuning cannot be performed because the asynchronous motor must be connected with the load. The stator resistance, rotor resistance and leakage inductance are obtained from auto-tuning. The magnetizing current and mutual inductance can be calculated.

- 2: Complete auto-tuning for asynchronous motor

Complete auto-tuning is preferred to ensure dynamic control performance of the controller. This mode requires the motor to be disconnected from the load.

The controller performs static auto-tuning first. Then according to the default system setting, the controller accelerates to 80% of the rated motor frequency within 2s, keeps the frequency for a certain period and then decelerates to zero speed within 2s.

- 3: No-load auto-tuning for PMSM

The following parameters are obtained by auto-tuning:

- F1-14 (Encoder zero position angle of PMSM)
- F1-06 (Stator phase resistance of PMSM)
- F1-11 (Shaft D inductance of PMSM)
- F1-12 (Shaft Q inductance of PMSM)

For no-load auto-tuning, the PMSM must be disconnected from the load. If not, F1-14 is not accurate, which affects motor control performance.

During auto-tuning, the controller opens or closes the door slowly after receiving the door open/close command, and instructs reverse running after a distance. Then, the controller calculates all related parameters and completes no-load auto-tuning.

If fault Er20 occurs during auto-tuning, the encoder input direction may be incorrect. Exchange phases A and B of the encoder or the motor wiring. and perform motor auto-tuning again.

4: With-load auto-tuning for PMSM

The following parameters are obtained by auto-tuning:

- F1-14 (Encoder zero position angle of PMSM)
- F1-06 (Stator phase resistance of PMSM)
- F1-11 (Shaft D inductance of PMSM)
- F1-12 (Shaft Q inductance of PMSM)

F1-14 obtained by this mode is less accurate than that by no-load auto-tuning. Therefore, perform no-load auto-tuning for PMSM if possible.

If the door is in the close state, press  to start auto-tuning. If the door is in the completely open state, press  to start auto-tuning. The controller opens or closes the door slowly at 25% of the rated motor frequency, repeats the action and instructs reverse running. After three times of auto-tuning, the controller calculates all related parameters and completes with-load auto-tuning.

If locked-rotor occurs during door open or close after you press  or , motor wiring or encoder wiring is incorrect. Correct the wiring and perform motor auto-tuning again.

For more details on auto-tuning, refer to section 4.3.

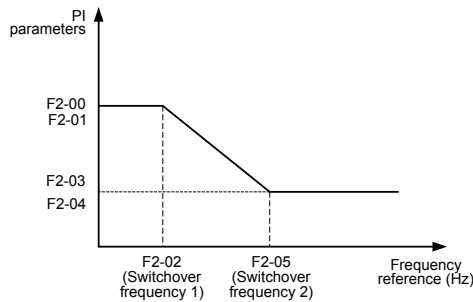
Group F2: Performance Control Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-00	Speed loop proportional gain 1	0-100	15	1
F2-01	Speed loop integral time 1	0.01-10.00s	1.00s	0.01s
F2-02	Switchover frequency 1	0.00 to F2-05	5.00 Hz	0.01 Hz

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-03	Speed loop proportional gain 2	0-100	15	1
F2-04	Speed loop integral time 2	0.01-10.00s	1.00s	0.01s
F2-05	Switchover frequency 2	F2-02 to F1-04	30	1

- F2-00 and F2-01 are PI regulation parameters when the running frequency is smaller than the value of F2-02 (Switchover frequency 1).
- F2-03 and F2-04 are PI regulation parameters when the running frequency is larger than the value of F2-05 (Switchover frequency 2).
- If the running frequency is between F2-02 and F2-05, the speed loop PI parameters are obtained from the weighted average value of the two groups of PI parameters (F2-00, F2-01 and F2-03, F2-04), as shown in the following figure.

Figure 6-1 Relationship between running frequencies and PI parameters



The speed dynamic response characteristics in vector control can be adjusted by setting the proportional gain and integral time of the speed regulator.

To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that this may lead to system oscillation.

The recommended adjustment method is as follows:

If the default setting cannot meet the requirements, make proper adjustment. Increase the proportional gain first to ensure that the system does not oscillate, and then reduce the integral time to ensure that the system has quick response and small overshoot.

If both F2-02 (Switchover frequency 1) and F2-05 (Switchover frequency 2) are 0, only F2-03 and F2-04 are valid.

Note

Improper PI parameter setting may cause too large speed overshoot and even overvoltage when overshoot drops.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
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F2-06	Current loop proportional gain	10–500	120	1
F2-07	Current loop integral gain	10–500	50	1

F2-06 and F2-07 are current loop adjusting parameters in vector control. Generally, you need not adjust these two parameters because the required control performance can be achieved with their default values.

They are adjusted in the same way as PI parameters.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-08	Slip compensation coefficient	50%–200%	100%	1%

It is used only in CLVC mode. It affects the dynamic performance and load current of the motor and requires no adjustment generally.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-09	Inertia compensation	0–9999	0	1

It increases the system dynamic performance in CLVC mode.

Inertia compensation torque = System inertia x Acceleration rate. You need not modify it generally. Increase it properly when the door is too heavy.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-10	Torque boost	0.0%–30.0%	8.0%	0.1%

This parameter compensates for insufficient torque production by boosting output voltage of the controller. But very large setting will result in motor overheat and controller overcurrent.

Increase this parameter when a heavy load is applied but the startup torque of the motor is insufficient.

If it is set to 0.0%, fixed torque boost is enabled.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-11	Over-excitation gain	0–200	64	1

The over-excitation gain restrains rise of bus voltage to avoid overvoltage during deceleration. The larger the over-excitation gain is, the better the restraining result will be.

Set this parameter to 0 in the applications where the inertia is small or where there is regen. resistor.

Increase this parameter properly in the applications where the inertia is large.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-12	Initial position judging method	0–2	1	1

It is used to judge the magnetic pole initial position of the PMSM.

- 1: Based on pulses

- 2: Using data of other tested PMSM

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-13	Feedback speed filter level	0-20	0	1

It is used to set the filter level of the encoder feedback speed. You need not modify it generally.

In the applications where interference is serious or the encoder PPR is small but CLVC is adopted, increase this parameter properly to stabilize motor running.

Note

In the applications where the motor is of small power or the load inertia is small, a large value of this parameter may result in serious motor overshoot or oscillation.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-14	Encoder PPR	1-9999	2048	1

This parameter must be set correctly in the CLVC mode.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F2-15	Encoder direction selection	0: Forward direction 1: Reverse direction	1	1

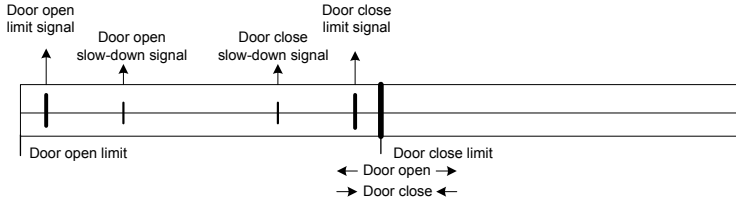
Be cautious that it will resume to 0 when the default settings are restored.

Group F3: Door Open Running Curve Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-00	Door open startup low speed	0.00 Hz to F3-03	5.00 Hz	0.01 Hz
F3-01	Door open startup acceleration time	0.1-999.9s	1.0s	0.1s
F3-02	Low speed running time for door open startup in speed control	0.1-999.9s	1.0s	0.1s
F3-03	Door open normal speed	0.00 Hz to F1-04	15.00 Hz	0.01 Hz
F3-04	Door open acceleration time	0.1-999.9s	2.0s	0.1s
F3-05	Door open ending low speed	0.00Hz to F3-03	3.00Hz	0.01 Hz
F3-06	Door open deceleration time	0.1-999.9s	1.5s	0.1s

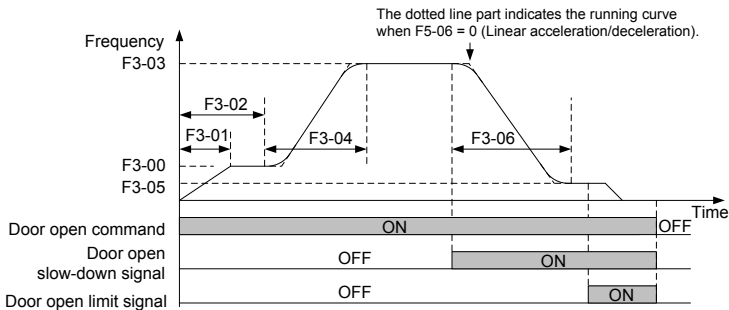
The travel switches of the door machine in the speed control mode are installed according to the following figure.

Figure 6-2 Installation of travel switches in speed control mode



Set the parameters in group F3 related to speed control correctly. Set the deceleration switches and limit switches properly. The door open running curve in speed control is shown in the following figure.

Figure 6-3 Door open running curve in speed control mode

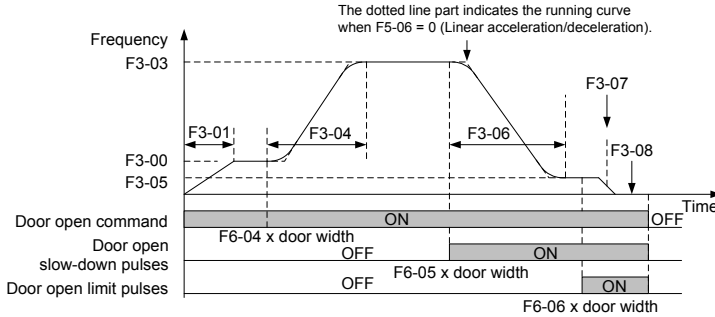


The door open process in speed control is as follows:

1. When the door open command becomes active, the door machine accelerates to the speed set in F3-00 within the acceleration time set in F3-01.
2. After the low speed door open running time reaches the value set in F3-02, the door machine accelerates to the speed set in F3-03 within the acceleration time set in F3-04.
3. After the door open slow-down signal becomes active, the door machine decelerates to the creeping speed set in F3-05 within the deceleration time set in F3-06.
4. After the door open limit signal becomes active, the door machine enters door open holding state, with the holding torque set in F3-08.
5. If the torque is required to keep up, increase F5-04.
6. The dotted line part in the figure indicates the running curve when F5-06 (Door open curve) = 0 (Linear acceleration/deceleration).

Set the parameters in group F6 related to distance control correctly. The door open running curve in distance control is shown in the following figure.

Figure 6-4 Door open running curve in distance control mode



The door open process in distance control is as follows:

1. After the door open command becomes active, the door machine accelerates to the speed set in F3-00 within the acceleration time set in F3-01.
2. When the door open position reaches (F6-04 x door width), the door machine accelerates to the speed set in F3-03 within the acceleration time set in F3-04.
3. When the door open position reaches (F6-05 x door width), the door machine decelerates to creep, with the speed = set in F3-05 and deceleration time set in F3-06.
4. When the door open position reaches (F6-06 x door width), the door machine continues low speed creeping, and then enters the door open holding state, with the holding torque set in F3-08. The door position is reset to 100%.
5. After the command is cancelled, the torque holding state ends. If torque holding needs to continue, increase the delay time set in F5-04.
6. The dotted line part in the figure indicates the running curve when F5-06 (Door open curve) = 0 (Linear acceleration/deceleration).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-07	Torque switchover threshold at door open limit	0.0%–150.0%	50.0%	0.1%

It is valid only in distance control. After the door reaches the set door open limit position, if the output torque is greater than F3-07, the door controller resets the width pulses to 100% and enters the door open limit torque holding state.

If the output torque is not greater than F3-07 after locked-rotor occurs, decrease F3-07 slightly to smaller than the output torque), ensuring that the door width pulses can be reset.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-08	Door open limit holding torque	0.0%–150.0%	50.0%	0.1%

It is used to set the holding torque after the door open limit position is reached.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-09	Door open hindered torque	0.0%–150.0%	80.0%	0.1%

It is used to set the door open hindered torque during door open.

Upper limit of door open torque = F3-09 + 10.0%

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-10	Door open startup torque	0.0% to F3-09	0.0%	0.1%

It is used to set the torque at startup of door open to ensure the good startup result of the door machine.

Actual startup torque = F3-10 x Rated motor torque

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-11	Door open hindered judging time	0-9999 ms	0 ms	1 ms

It is used to set the filter time when the door open is hindered. If it is set to 0, door open hindered is not detected.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-12	Door open limit low speed	0.00 Hz to F3-03	3 Hz	0.01 Hz

It is used to set the target frequency at which the door machine runs when the door open limit signal is received or the pulses reach the door open limit requirement during open.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F3-13	Door re-open speed	0.00 Hz to F3-03	0 Hz	0.01 Hz

At door close hindered during door open deceleration or door open due to light curtain hindered, the door machine re-opens the door at the speed set in this parameter. After door open limit, the controller decelerates to the speed set in F3-12.

If this parameter is set to 0, this function is invalid.

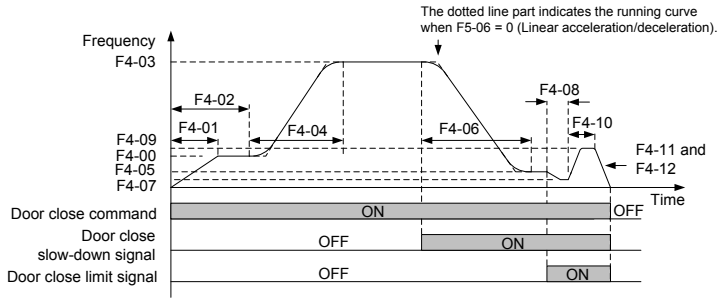
Group F4: Door Close Running Curve Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-00	Door close startup low speed	0.00 Hz to F4-03	4.00 Hz	0.01 Hz
F4-01	Door close startup acceleration time	0.1-999.9s	1.0s	0.1s
F4-02	Low speed running time for door close startup in speed control	0.1-999.9s	1.0s	0.1s
F4-03	Door close normal speed	0.00 Hz to F1-04	12.00 Hz	0.01 Hz
F4-04	Door close acceleration time	0.1-999.9s	2.0s	0.1s
F4-05	Door close ending low speed	0.00 Hz to F4-03	2.00 Hz	0.01 Hz
F4-06	Door close deceleration time	0.1-999.9s	1.5s	0.1s

Set the parameters in group F4 related to speed control correctly, and define the slow-

down switches and limit switches properly. The door close running curve in speed control is shown in the following figure.

Figure 6-5 Door close running curve in speed control mode



The door close process in speed control is as follows:

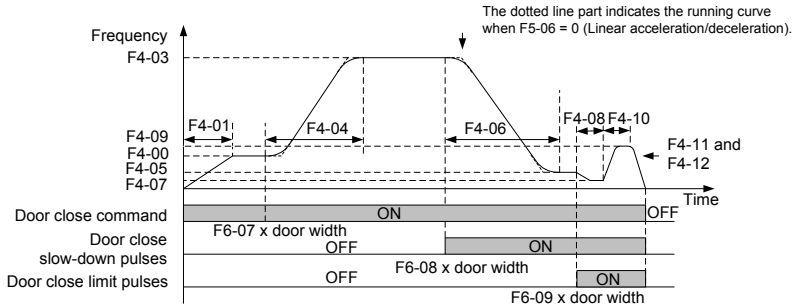
1. After the door close command becomes active, the door machine accelerates to the speed set in F4-00 within the acceleration time set in F4-01.
2. After the low speed door close running time reaches the value set in F4-02, the door machine accelerates to the speed set in F4-03 within the acceleration time set in F4-04.
3. After the door close slow-down signal becomes active, the door machine decelerates to the speed set in F4-05 within the deceleration time set in F4-06.
4. After the door close limit signal becomes active, the door machine enters the door close holding state, with the holding torque set in F4-12.
5. If torque is required to keep up, increase F5-05.
6. The dotted line part in the figure indicates the door close running curve when F5-06 (Door open curve) = 0 (Linear acceleration/deceleration)..

Note

For synchronous door vane, set F4-09 and F4-07 to the same value.

Set the parameters in group F6 related to distance control correctly. The door close running curve in distance control is shown in the following figure

Figure 6-6 Door close running curve in distance control mode



The door close process in distance control is as follows:

1. After the door close command becomes active, the door machine accelerates to the speed set in F4-00 within the acceleration time set in F4-01.
2. When the door close position reaches (F6-07 x door width), the door machine accelerates to the value set in F4-03 within the acceleration time set in F4-04.
3. When the door close position reaches (F6-08 x door width), the door machine decelerates to the speed set in F4-05 within the deceleration time set in F4-06.
4. When the door open position reaches (F6-09 x door width), the door machine decelerates again to the speed set in F4-07. It is recommended that $F6-09 \geq 96.0\%$. If pulse loss occurs during door close, decrease F6-09. Set F6-20 to specify the door vane retraction action.
5. After door vane retraction is completed and the rotor is locked, the door machine enters the torque holding state at the speed set in F4-07 and holding torque set in F4-12. The door width is reset to 0.
6. After the door close command becomes inactive, the torque holding state ends. If torque holding needs to continue, decrease the delay time in F5-05.
7. The dotted line part in the figure indicates the door close running curve when F5-06 (Door open curve) = 0 (Linear acceleration/deceleration).

Note

For synchronous door vane, set F4-09 and F4-07 to the same value.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-07	Door close limit low speed	0.0 to F4-03	1.00 Hz	0.01 Hz

It is used to set the target frequency at which the door machine runs when the controller receives the door close limit signal or the pulses reach the door close limit requirement during door close.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-08	Low speed running time at door close limit	0-9999 ms	300 ms	1 ms

The door machine runs at the low speed set in F4-07 after receiving the door close limit signal. When the running time is equal to or larger than F4-08, the door machine enters the door vane retraction stage.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-09	Door vane retraction speed	0.00 to F4-03	2.00 Hz	0.01 Hz

It is used to set the running speed at the door vane retraction stage during door close.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-10	Door vane retraction running time	0-9999 ms	500 ms	1 ms

If the door vane retraction running time is equal to or larger than F4-10, the door machine decelerates again.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-11	Torque switchover threshold at door close limit	0.0%–150.0%	50.0%	0.1%

It is valid only in distance control. After the door vane is retracted, if the controller output torque is greater than F4-11, the controller resets the door width to 0 and enters the door close limit torque holding state.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-12	Door close limit holding torque	0.0%–150.0%	30.0%	0.1%

It is used to set the door close holding torque after the door close limit is reached.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-14	Working mode upon door close hindered	0–3	1	1

- 0: Reserved
- 1: Output door close hindered signal

After door close hindered occurs, the relay with this function outputs a corresponding signal.

- 2: Immediate stop

The controller stops immediately and outputs the door close hindered signal. It does not respond to any door close command 10s after this fault occurs. It executes the door close command again immediately after a door close command is given again or the RUN command is cancelled.

· 3: Door re-open

The controller does not respond to the external door open/close commands during the door re-open.

Door close hindered means that the output torque is greater than the door close hindered torque during door close.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-15	Door close hindered judging time	0-9999 ms	500 ms	1 ms

It is used to set the filter time when door close is hindered. If it is set to 0, door close hindered is not detected.

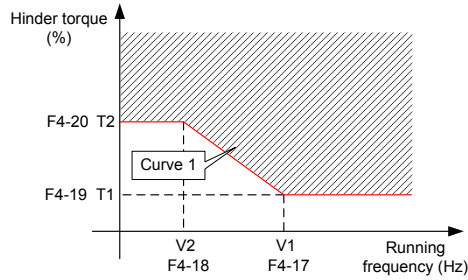
Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-16	Door close normal speed at fire emergency	5.00 to F1-04	10.00Hz	0.01Hz

It is used to set the normal-speed running speed at door close when the fire emergency input signal is active.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F4-17	Normal speed at door close hindered	F4-18 to F1-04	12.00 Hz	0.01 Hz
F4-18	Low speed at door close hindered	0.00 Hz to F1-04	2.00 Hz	0.01 Hz
F4-19	Normal speed torque	0.00%-150.0%	100.0%	0.1%
F4-20	Low speed torque	0.00%-150.0%	100.0%	0.1%

These four parameters are used to judge how to handle door close hindered.

Figure 6-7 Door close hindered judgment



1. According to the preceding figure, set these parameters according to the requirement:

$V1 (F4-17) \geq V2 (F4-18)$, $T1 (F4-19) \leq T2 (F4-20)$

2. The torque threshold for judging door close hindered is curve 1 shown in the figure. The shadow part shows that door close hindered occurs.

Group F5: Door Open/Close Auxiliary Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-00	Abnormality deceleration time	0.1–5.0s	0.3s	0.1s

It is used to set the time for the system to decelerate from the door close speed to zero speed when door close is hindered. Set this parameter to the minimum value as possible when ensuring that overcurrent does not occur during deceleration.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-01	Door open time limit	0–999.9s	30.0s	1s

It is used to limit the door open time. If the controller does not receive the door open limit signal (pulse loss occurs in distance control mode) within the time, it performs door open timeout protection (Er28).

This parameter is invalid when it is set to 0.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-02	Door close time limit	0–999.9s	0s	1s

It is used to limit the door close time. If the controller does not receive the door close limit signal within the time, it determines that door close is hindered, and performs door re-open or zero speed holding based on the setting of F4-14.

This parameter is invalid when it is set to 0.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-03	Low speed running time limit	0–999.9s	0s	1s

It is used to set the maximum running time of low speed door open and close when the

low speed running signal is enabled. Set this parameter based on the actual situation. The value must be equal to or greater than the sum of the door open and door close time setting (parameter group of door open and close running curve); otherwise, Er26 is reported, indicating that the parameter setting is incorrect. The correct setting implements protection of the door machine in low speed running state in the case of abnormalities.

The normal running time does not exceed the setting of this parameter. When the door open limit switch and door close limit switch fail, and an abnormality occurs (for example, the controller cannot determine whether door open/close reaches the limit switch), the running time exceeds the setting. In this case, Er30 is reported, indicating a door open/close operation error in low speed running.

This parameter is invalid when it is set to 0.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-04	Delay of external door open command	0-999.9s	60.0s	1s

It is used to set the torque holding time upon door open limit, that is, the holding time of the door open running state when the door open limit signal is active but the door open command from the terminal becomes inactive.

If the actual holding time exceeds the value of this parameter, the controller stops. If the door open command is cancelled when door open limit is not reached, the controller stops immediately. At this moment, the delay function is invalid.

When it is set to 9999s, the delay of external door open command remains valid.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-05	Delay of external door close command	0-999.9s	60.0s	1s

It is used to set the torque holding time upon door close limit, that is, the holding time of the door close running state when the door close limit signal is active but the door close command from the terminal becomes inactive.

If the actual holding time exceeds the value of this parameter, the controller stops. If the door close command is cancelled when door close limit is not reached, the controller stops immediately. At this moment, the delay function is invalid.

When it is set to 9999s, the delay of external door close command remains valid.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-06	Door open curve	0, 1	1	1

It is used to set the running curve of the door machine during door open.

- 0: Linear acceleration/deceleration
- 1: S curve acceleration/deceleration

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-11	Door close curve selection	0, 1	1	1

It is used to set the running curve of the door machine during door close.

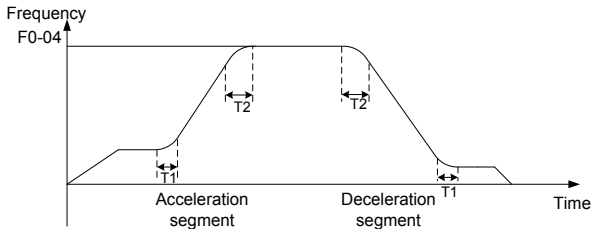
- 0: Linear acceleration/deceleration
- 1: S curve acceleration/deceleration

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-07	Start segment time of door open acceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + rising segment $\leq 90\%$)	20.0%	0.1%
F5-08	Rising segment time of door open acceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + rising segment $\leq 90\%$)	60.0%	0.1%
F5-09	Start segment time of door open deceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	20.0%	0.1%
F5-10	Falling segment time of door open deceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	60.0%	0.1%
F5-12	Start segment time of door close acceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + rising segment $\leq 90\%$)	20.0%	0.1%
F5-13	Rising segment time of door close acceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + rising segment $\leq 90\%$)	60.0%	0.1%
F5-14	Start segment time of door close deceleration S curve	10.0%–50.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	20.0%	0.1%
F5-15	Falling segment time of door close deceleration S curve	10.0%–80.0% (acceleration/ deceleration time, start segment + falling segment $\leq 90\%$)	60.0%	0.1%

These eight parameters are used to define the S curve features of each segment speed during running of the controller.

Each curve that combines the acceleration segment and deceleration segment is symmetric. Take acceleration of S curve 1 in the following figure as an example.

Figure 6-8 S curve acceleration/deceleration diagram



T1 stands for F5-07, during which the output frequency change slope (that is, speed change

rate) increases gradually. T2 stands for F5-08, during which the output frequency change slope reduces gradually to low speed frequency. Between T1 and T2, the output frequency change slope keeps unchanged.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-16	Speed deviation threshold	0%~80%	50%	0%
F5-17	Time for determining speed deviation too large	0~5000 ms	400 ms	1 ms

The speed deviation detection function of the NICE900 is effective only in the CLVC mode. The controller determines whether the deviation between the running frequency and the frequency reference is too large based on the value of F5-16. If the deviation remains too large for more than the time set in F5-17, the controller reports Er32 and performs protection for too large speed deviation.

When F5-16 is set to 0, the controller does not detect speed deviation.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-18	Door close steady speed delay	0~9999 ms	200 ms	1 ms

It is used to set the steady speed delay at door close. The controller determines whether door close is hindered only after the steady speed delay in F5-18.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F5-19	Fault braking current	0.1%~150.0%	100%	0.1%

After detecting overspeed, reversal or encoder signal abnormality, the controller performs braking with the current set in this parameter and reports the fault after completion of braking.

If this parameter is set to 0, this function is invalid.

Group F6: Distance Control Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-00	Door width auto-tuning function	0, 1	0	1

It is used to enable or disable the door width auto-tuning function.

- 0: Disabled
- 1: Enabled

F6-00 = 1 in the prerequisite of F0-02 = 2.

After you press  or , door width auto-tuning is started. The door machine runs with the close-open-close logic, and stores the door width upon door open limit and locked-rotor. For details on the operation, see Chapter 4.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-01	Door width auto-tuning speed	0 to F0-04 (Running frequency under operation panel control)	3.00 Hz	0.01 Hz

It is used to set the running frequency during door width auto-tuning.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-02	Low bits of door width pulse	0–9999	0	1
F6-03	High bits of door width pulse	0–9999	0	1

The door width is calculated using the formula:

$$\text{Door width} = \text{F6-03} \times 10000 + \text{F6-02}$$

The obtained door width pulses can be modified on the operation panel.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-04	Low speed running distance of door open startup in distance control	0.0%–30.0%	10.0%	0.1%

It records the number of pulses in real time during door open in distance control. When the number of pulses is equal to or greater than the value (door width x F6-04), the door machine switches over from door open startup low speed (F3-00) to door open normal speed (F3-03).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-05	Door open slow-down point in distance control	60.0%–90.0%	70.0%	0.1%

It records the number of pulses in real time during door open in distance control. When the number of pulses is equal to or greater than the value (door width x F6-05), the door machine switches over from door open startup normal speed (F3-03) to door open ending low speed (F3-05).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-06	Door open limit point in distance control	80.0%–99.0%	96.0%	0.1%

It records the number of pulses in real time during door open in distance control. When the number of pulses is equal to or greater than the value (door width x F6-06), the door machine performs related processing of door open limit.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-07	Low speed running distance of door close startup in distance control	0.0%–30.0%	10.0%	0.1%

It records the number of pulses in real time during door close in distance control. When

the number of pulses is equal to or less than value (door width x (100% – F6-07)), the door machine switches over from door open startup low speed (F3-00) to door open normal speed (F3-03).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-08	Door close slow-down point in distance control	60.0%–90.0%	70.0%	0.1%

It records the number of pulses in real time during door close in distance control. When the number of pulses is equal to or less than the value (door width x (100% – F6-08)), the door machine switches over from door close startup low speed (F4-03) to door close ending low speed (F4-05).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-09	Door close limit point in distance control	80.0%–99.0%	96.0%	0.1%

It records the number of pulses in real time during door close in distance control. When the number of pulses is equal to or less than the value (door width x (100% – F6-09)), the door machine performs related processing of door close limit.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-10	Output torque display	0.0%–180.0%	0.0%	0.1%

It facilitates the torque setting for door width auto-tuning or initial running (F6-14) at door width auto-tuning for asynchronous motor. After the door width auto-tuning is complete and the rotor is locked, ensure that F6-14 is slightly smaller than F6-10.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-11	Low bits of the door open limit switch position	0–9999	0	1
F6-12	High bits of the door open limit switch position	0–9999	0	1
F6-13	Position of the door close limit switch	0–9999	0	1

The three parameters are used to record the positions of the limit switches obtained during door width auto-tuning. During normal running, when the door open limit switch is valid, the door position is restored to: $F6-12 \times 10000 + F6-11$. When the door close limit switch is valid, the door position is restored to the setting of F6-13.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-14	Torque setting for door width auto-tuning or initial running	0.0%–150.0%	80.0%	0.1%

It is used to set the torque upper limit during door width auto-tuning and first power-on running. This parameter is valid only in distance control. For details, see Chapter 4.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-15	Low bits of the pulse of door open slow-down point	0-9999	0	1
F6-16	High bits of the pulse of door open slow-down point	0-9999	0	1
F6-17	Low bits of the pulse of door close slow-down point	0-9999	0	1
F6-18	High bits of the pulse of door close slow-down point	0-9999	0	1

The four parameters are used to set the positions of the slow-down points.

The slow-down point is set based on the number of pulses rather than a percentage of the door width.

Position of the door open slow-down point = $F6-16 \times 10000 + F6-15$

Position of the door close slow-down point = $F6-18 \times 10000 + F6-17$

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-19	Pulse at door open limit output	0.0%-99.9%	0.0%	0.1%

It is valid only in distance control.

When the door width position is larger than F6-19, the door open limit signal is output. At this moment, even if the output torque is larger than F3-07, the door position is not restored to 100%. The door position is restored to 100% only when the door position is larger than F6-06 and the output torque is larger than F3-07.

When F6-19 is set to 0, the controller determines whether to output the door open limit signal based on the value of F6-06.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-20	Pulse at door close limit output	0.0%-99.9%	0.0%	0.1%

It is valid only in distance control.

When the door position is larger than F6-20, the door close limit signal is output, and the door vane is retracted. At this moment, even if the output torque is larger than F4-11, the door position is not restored to 100%. The door position is restored to 100% only when the door position is larger than F6-09 and the output torque is larger than F4-11.

When F6-20 is set to 0, the controller determines whether to output the door close limit signal based on the value of F6-09.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F6-21	Door position pulse feedback	0.0%-99.9%	33.0%	0.1%

It is valid only in distance control. When the door width position is larger than F6-21, the door position feedback signal is output. It is used together with F9-12 (Door position feedback signal output).

Group F7: Demonstration Function Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F7-00	Door open limit holding time in demonstration mode	1.0-999.9s	2.0s	0.1s

It is used to set the time from torque holding upon door open limit to reverse door close in demonstration mode. Set this parameter based on actual demonstration requirements.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F7-01	Door close limit holding time in demonstration mode	1.0-999.9s	2.0s	0.1s

It is used to set the time from torque holding upon door close limit to forward door open in demonstration mode. Set this parameter based on actual demonstration requirements.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F7-02	Actual door open and close times in demonstration mode	0-9999	0	1

It is used to record the times of door open and close for demonstration. The parameter value is stored automatically at power failure. Upon door open/close limit after power-on again, the value is calculated by adding 1 for each door open/close to the original value.

The demonstration mode is an automatically cyclic running process, described as follows:

1. After you press  or , demonstration running is started.
2. The door machine closes the door at a low speed, and opens the door based on the running curve upon door close limit.
3. The door machine starts timing upon door open limit, and automatically performs reverse door close after the time reaches the value set in F7-00.
4. The door machine starts timing upon door close limit, and performs reverse door open after the time reaches the value set in F7-01.
5. This process is repeated until you press  to stop the controller. Then the demonstration process ends.

Demonstration running can be performed in speed control or distance control mode. It applies to demonstration and aging test.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F7-03	Limit of door open and close times in demonstration mode	0-9999	0	1

It is used to set the limit of door open and close times in demonstration mode. When the actual door open and close times in demonstration mode is equal to or greater than F7-03, demonstration running ends automatically. When F7-03 is set to 0, this function is invalid, and demonstration running does not end automatically.

Group F8: Auxiliary Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-00	Software version	0.00–99.99	1.00	0.01

It is used to indicate the current software version of the controller.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-01	Module temperature	0–100°C	0°C	1°C

It is used to record the temperature of the bottom-level module in the controller.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-02	Fault auto reset times	0–100	0	1

The controller stops running after a fault occurs, and automatically resets and continues running after an interval of 2s.

If this parameter is set to 0, the automatic reset function is disabled, and faults must be reset manually. If no fault occurs or manual reset is performed within an hour, the controller automatically clears the reset times.

Note

The controller does not automatically reset faults Er19 (Motor auto-tuning fault), Er26 (Prompt of incorrect parameter setting), and Er27 (Door width auto-tuning fault).

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-03	Brake use ratio	0–100%	100%	1%

It is valid for the controller with a built-in braking unit and used to adjust the braking effect of the brake unit.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-04	Accumulative power-on time	0–9999 h	0	1

It is used to record the actual accumulative power-on operation time (hour) of the controller. After the value exceeds the maximum value 9999 hours, the controller starts a new round of counting.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-06	Accumulative running time	0–9999 h	0	1

It is used to record the accumulative running time (hour). After the value exceeds the maximum value 9999 hours, the controller starts a new round of counting.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-10	Auxiliary function selection	0–9999	12	1

It is used to select the required function.

Bit	Function	Default
Bit0	1: Trigger door open/close command 0: Non-trigger door open/close command	0
Bit1	1: Not reset pulses upon reaching the initial running torque 0: Reset pulses upon reaching the initial running torque	0
Bit2	1: Learn positions of limit switches during door width auto-tuning. Reset the pulse signal when limit switches are valid 0: Not learn positions of limit switches	1
Bit3	In the SVC mode (F0-00 = 0) with distance control (F0-01 = 1): 1: Judge door open/close limit during door width auto-tuning and initial running, and door close hindered based on the torque 0: Judge door width auto-tuning, initial running, door open/close limit and door close hindered if there is no pulse signal within a certain time (2s)	1
Bit4	Door processing when both door open and close commands are active: 1: Door close preferred 0: Door open preferred	0
Bit5	In door machine terminal control mode (F0-02 = 1): 1: The controller runs properly when you press  during running. 0: The controller suspends and displays "STP" when you press  during running, and restores normal running when you press  again.	0
Bit6	Hinder detection mode: 1: Detect hindered torque based on F4-13 0: Detect hindering separately for normal speed running and low speed running	0
Bit7	Demonstration running: 1: Start demonstration running automatically upon power-on 0: Start demonstration running manually upon power-on	0
Bit8	Current cancelling: 0: Cancel current when the command is cancelled 1: Stop immediately when the command is cancelled	0
Bit9	0: Enter standby state when the command is cancelled 1: Stop when the command is cancelled	0
Bit10	Used together with Bit4 0: Keep present door processing (open or close) state when both door open and close commands are active 1: Act according to the setting of F8-10 Bit4	

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-12	Drive function selection	0-9999	0	1

Bit0 = 0: Overall 7-segment modulation (reduce the noise)

Bit0 = 1: 7-segment/5-segment automatic switchover during running

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F8-14	Overload coefficient	0–10.00	2.00	0.01

If the output current exceeds the value (rated motor current x F8-14), the controller reports fault Er11, indicating motor overload.

Group F9: Input and Output Function Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F9-00	Terminal filter time	0–100 ms	20 ms	1 ms

It is used to set the terminal sensitivity. If DI terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of DI filter time will reduce response of DI terminals.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F9-01	DI1 function selection	0–127	0	-
F9-02	DI2 function selection		0	-
F9-03	DI3 function selection		0	-
F9-04	DI4 function selection		0	...
F9-05	DI5 function selection		1	
F9-06	DI6 function selection		2	
F9-07	DI7 function selection		10	
F9-08	DI8 function selection		6	-

These parameters are used to set the functions of DI terminals DI1 to DI8. Note that the same signal (except the value "0") must not be repeatedly allocated to different DIs.

- 0: Invalid
- 1: Door open command
- 2: Door close command
- 3: External reset signal

It is allocated to the external fault reset terminal.

- 4: Forbid terminal input during door open

When this signal is active, the controller does not respond to external door open commands.

- 5: Forbid terminal input during torque holding

During torque holding upon door open/close limit, zero torque holding is performed if this signal is active.

- 6: Low speed door close command

When this signal is active, the door closes at a low speed frequency (F0-06).

- 7: Fire emergency input

When this signal is active, the door closes in the fire emergency normal speed (F4-16).

- 8 to 109: Reserved
- 10/110: Light curtain signal NO/NC

If this signal is active during door close, the system outputs the door close hindered signal and performs processing according to the setting of F4-14.

- 11/111: Safety edge signal NO/NC

If this signal is active during door close, the system outputs the door close hindered signal and performs processing according to the setting of F4-14.

- 12/112: Door open limit signal NO/NC

When this signal is active, the controller performs door open limit processing.

- 13/113: Door close limit signal NO/NC

When this signal is active, the controller performs door close limit processing.

- 14/114: Door open slow-down signal NO/NC

During door open in speed control, the system switches to low speed running of the end segment after this signal becomes active.

- 15/115: Door close slow-down signal NO/NC

During door close in speed control, the system switches to low speed running of the end segment after this signal becomes active.

- 16/116: Door lock signal NO/NC

The controller receives information related to door lock.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
F9-09	Relay output selection (TA1/TB1/TC1)	0-12	2	1
F9-10	Relay output selection (TA2/TB2/TC2)	0-12	5	1
F9-11	Relay output selection (TA3/TB3/TC3)	0-12	1	1

- 0: Invalid
- 1: Door open limit signal output 0

During door open, the controller outputs this signal after the controller receives the door open limit signal or the counting pulses reach the value for door open limit.

- 2: Door close limit signal output 0

During door close, the controller outputs this signal after the controller receives the door close limit signal or the counting pulses reach the value for door close limit.

- 3: Door open limit signal output 1

During door open, the controller outputs this signal after the controller receives the door open limit signal or the counting pulses reach the value for door open limit, and the hindered torque reaches the value set in F3-07.

- 4: Door close limit signal output 1

During door close, the controller outputs this signal after the controller receives the door close limit signal or the counting pulses reach the value for door close limit, and the ratio of the hindered torque to the rated torque reaches the value set in F4-11.

- 5: Fault signal output 1

Er26 is only a prompt rather than a fault.

- 6: Reserved

- 7: Door open limit signal output 2

During door open, the controller outputs this signal after the controller receives the door open limit signal or the counting pulses reach the value for door open limit, the door lock signal becomes inactive, and the ratio of the hindered torque to the rated torque reaches the value set in F3-07.

- 8: Door close limit signal output 2

During door close, the controller outputs this signal after the controller receives the door close limit signal or the counting pulses reach the value at door close limit, the door lock signal becomes inactive, and the ratio of the hindered torque to the rated torque reaches the value set in F4-11.

- 9: Door lock signal output

It is simultaneous with the door lock signal input.

- 10: Door re-open signal output

This signal is output during door re-open.

- 11: Hindering signal output

This signal is output when door close is hindered.

- 12: Door position feedback output

When the door width position is greater than F6-21, the door position feedback signal is output.

Group FA: Display and Fault Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-00	Display in running state	1-511	319	1

It is used to set the parameters displayed on the operation panel when the door machine is in the running state.

FA-00 includes 9 binary bits, each defining a parameter. A total of 9 parameters can be displayed during running.

The 9 binary bits correspond to the running parameters listed in the following table.

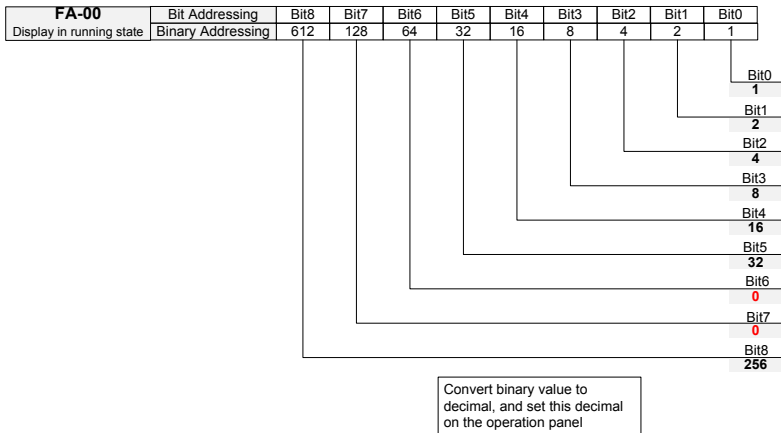
Bit	Parameter Name	Default
Bit0	Frequency reference	1
Bit1	Running frequency	1
Bit2	Bus voltage	1
Bit3	Output voltage	1
Bit4	Output current	1
Bit5	Output torque	1
Bit6	Input terminal state	0
Bit7	Output terminal state	0
Bit8	Door position pulse	1

The method of setting FA-00 is as follows:

If a bit is set to 1, the parameter indicated by this bit is displayed; if this bit is set to 0, the parameter is not displayed.

Convert the sum of binary values of all 9 bits to decimal, and then set the decimal on the operation panel.

Figure 6-9 Converting binary value of FA-00 to decimal



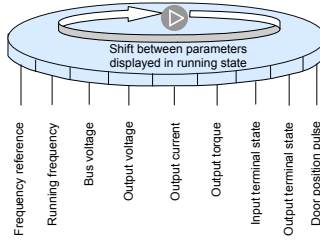
By default, all 16 parameters are displayed; therefore, the value set on the operation panel is:

$$1 + 2 + 4 + 8 + 16 + 32 + 0 + 0 + 256 = 319$$

The method of viewing FA-00 is as follows:

In the running state, the display of FA-00 is a decimal value. You can press  to view the parameter indicated by each bit circularly.

Figure 6-10 Shift between parameters displayed in the running state



Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-01	Display in stop state	1-63	39	1

It is used to set the parameters displayed on the operation panel when the door machine is in the running state.

FA-00 includes 6 binary bits, each defining a parameter. A total of 6 parameters can be displayed during running.

The 6 binary bits correspond to the running parameters listed in the following table.

Bit	Parameter Name	Default
Bit0	Frequency reference for door open	1
Bit1	Frequency reference for door close	1
Bit2	Bus voltage	1
Bit3	Input terminal state	0
Bit4	Output terminal state	0
Bit5	Door position pulse	1

The method of viewing and setting FA-01 is the same as that of FA-00.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-02	1st fault type	0-30	0	1
FA-03	1st fault prompt	0-9	0	1
FA-04	2nd fault type	0-30	0	1
FA-05	2nd fault prompt	0-9	0	1
FA-06	3rd fault type	0-30	0	1
FA-07	3rd fault prompt	0-9	0	1
FA-08	4th fault type	0-30	0	1
FA-09	4th fault prompt	0-9	0	1
FA-10	5th fault type	0-30	0	1
FA-11	5th fault prompt	0-9	0	1

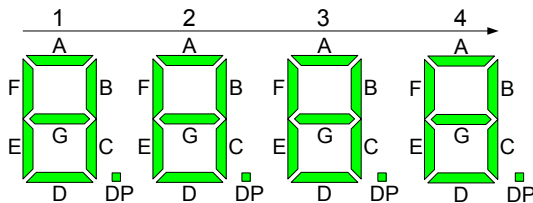
Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-12	Bus voltage upon latest fault	0–999.9 V	0 V	0.1 V
FA-13	Output current upon latest fault	0–99.00 A	0.00 A	0.01 A
FA-14	Running frequency upon latest fault	0–99.00 Hz	0.00 Hz	0.01 Hz
FA-15	Output torque upon latest fault	0.0–180.0% (percentage of output torque to rated torque)	0.0%	0.1%
FA-16	Input terminal status upon latest fault	0–1023	0	1
FA-17	Output terminal status upon latest fault	0–15	0	1

These parameters record the latest five faults and detailed information about the latest fault. For details, see Chapter 4.

Note that Er26 is only a message prompting that the parameter setting is incorrect, and is not stored in the fault record.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-18	Terminal state display	*	*	*

It is used to view the states of the corresponding input and output terminals. When the terminal is input active or output active, the corresponding LED segment is ON. The LEDs are arranged as 1, 2, 3, and 4 from left to right.



The meaning of each segment is defined in the following table.

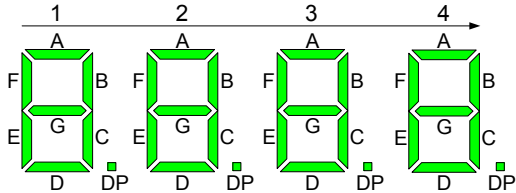


Maintenance and Troubleshooting

Segment (LED1)	Meaning of ON	LED2	LED3	Segment (LED4)	Meaning of ON
A	DI1 input active	Door open running procedure (for viewing and commissioning)	Door close running procedure (for viewing and commissioning)	A	TA1 and TC1 ON
B	DI2 input active			B	TA2 and TC2 ON
C	DI3 input active			C	TA3 and TC3 ON
D	DI4 input active			D	Reserved
E	DI5 input active			E	
F	DI6 input active			F	
G	DI7 input active			G	
DP	DI8 input active			DP	Blink, indicating normal RS485 communication

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-19	Input signal display	*	*	*

It is used to view the input signal state. When an input signal is active, the corresponding LED is ON. The LEDs are arranged as 1, 2, 3, and 4 from left to right.

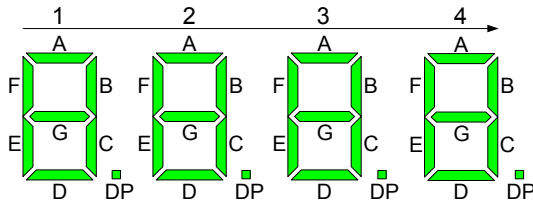


The meaning of each segment is defined in the following table.

Segment (LED1)	Meaning of ON	Segment (LED2)	Meaning of ON	Segment (LED3 & LED4)	Meaning of ON
A	Door open command active	A	Reserved	Reserved	Reserved
B	Door close command active	B	Light curtain signal active		
C	External reset signal active	C	Safety edge signal active		
D	Forbid terminal input during door open active	D	Door open limit signal active		
E	Forbid terminal input during torque holding active	E	Door close limit signal active		
F	Low speed door open input active	F	Door open slow-down signal active		
G	Fire emergency input active	G	Door close slow-down signal active		
DP	Reserved	DP	Door lock signal active		

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-20	Output signal display	*	*	*

It is used to view the output signal state. When an input signal is active, the corresponding LED is ON. The LEDs are arranged as 1, 2, 3, and 4 from left to right.



The meaning of each segment is defined in the following table.

Segment (LED1)	Meaning of ON	Segment (LED2)	Meaning of ON	Segment (LED3 & LED4)	Meaning of ON
A	Door open limit signal output 0	A	Door lock signal output	Reserved	Reserved
B	Door close limit signal output 0	B	Door re-open signal output		
C	Door open limit signal output 1	C	Hindering signal output		
D	Door close limit signal output 1	D	Reserved		
E	Fault signal output 1	E			
F	Reserved	F			
G	Door open limit signal output 2	G			
DP	Door close limit signal output 2	DP			

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-21	Parameter display selection	0-9999	0	1
FA-22	Display 1	0-9999	0	1
FA-23	Display 2	0-9999	0	1

FA-21 is used to set the actually displayed content of FA-22 and FA-23 for fault identification and commissioning onsite. The meanings of values are as follows:

Value	Displayed Content of FA-22	Displayed Content of FA-23
1	Average speed within 1s (Hz)	Average value of speed fluctuation within 1s (Hz)
2	Maximum speed within 1s (Hz)	Minimum speed within 1s (Hz)
3	Slip frequency (Hz)	Actual feedback frequency (Hz)
4	Excitation current component (A)	Torque current component (A)
Other	Number of pulses received from the encoder within 1s (high bit)	Number of pulses received from the encoder within 1s (low bit)

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-24	Analog voltage display	0.00-10.10 V	0.00 V	0.01 V

It is used to display the sampled analog voltage in real time.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-25	Low bits of current door position	0-9999	0	1
FA-26	High bits of current door position	0-9999	0	1

The two parameters record the current door position.

Current door position = FA-26 x 10000 + FA-25

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-27	Door machine state display	0-9999	0	1

It is used to view the state of the door machine, such as door open, door close, or running.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FA-28	Door direction judgment	*	*	*

It is used to detect the signal wiring of the encoder AB phase.

- If "OPEN" is displayed when you manually pull the door to the open direction, it indicates that the AB phase signal wiring is correct. Otherwise, the AB phase signal is abnormal.
- If "CLOSE" is displayed when you manually pull the door to the close direction, it indicates that the AB phase signal wiring is correct. Otherwise, the AB phase signal is abnormal.

Group FP: User Parameters

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FP-00	User password	0-9999	0	1

It is used to set the user password.

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in order to enter the menu. If the entered password is incorrect, you cannot view or modify parameters.

If FP-00 is set to 00000, the previously set user password is cleared, and the password protection function is disabled.

Remember the password that you set. If the password is set incorrectly or forgotten, contact Inovance to replace the control board.

Function Code	Parameter Name	Setting Range	Default	Min. Unit
FP-01	Parameter update	0-2	0	1

- 0: No function
- 1: Restore the default setting
- 2: Clear fault records and time

Chapter 7 Maintenance and Troubleshooting

7.1 Maintenance

7.1.1 Routine Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the components inside the controller, which may cause potential faults or reduce the service life of the controller. Therefore, it is necessary to carry out routine and periodic maintenance.



The filter capacitor still has residual voltage after the power supply is cut off. Thus, do not repair or maintain the controller immediately. Wait at least 10 minutes and ensure that the bus voltage measured by multimeter is not higher than 36 V.

Routine maintenance involves checking:

- Whether abnormal noise exists during motor running
- Whether the motor vibrates excessively
- Whether the installation environment of the controller changes
- Whether the cooling fan works properly
- Whether the controller overheats

Routine cleaning involves:

- Keep the controller clean all the time.
- Remove the dust, especially metal powder on the surface of the controller, to prevent the dust from entering the controller.
- Clear the oil stain on the cooling fan of the controller.

7.1.2 Periodic Inspection

Perform periodic inspection on the items that are difficult to check during running. Periodic inspection involves:

- Check and clean the air filter periodically.
- Check whether the screws become loose.
- Check whether the controller is corroded.
- Check whether the wiring terminals have arc signs.
- Carry out the main circuit insulation test.

Note

Before measuring the insulating resistance with megameter (500 VDC megameter

recommended), disconnect the main circuit from the controller. Do not use the insulating resistance meter to test the insulation of the control circuit. The high voltage test need not be performed again because it has been completed before delivery.

7.1.3 Replacement of Vulnerable Components

Vulnerable components of the controller include the cooling fan and filter electrolytic capacitor. Their service life is related to the operating environment and maintenance.

The service life of the two components is listed in the following table.

Table 7-1 Service life of cooling fan and filter electrolytic capacitor

Component	Service Life	Possible Damage Cause	Judging Criteria
Fan	2 to 3 years	· Bearing worn · Blade aging	· Check whether there is crack on the blade. · Check whether there is abnormal vibration noise upon startup.
Electrolytic capacitor	4 to 5 years	· Input power supply in poor quality · High ambient temperature · Frequent load jumping · Electrolytic aging	· Check whether there is liquid leakage. · Check whether the safety valve has projected. · Measure the static capacitance. · Measure the insulating resistance.

7.1.4 Storage of the Controller

For storage of the controller, pay attention to the following two aspects:

1. Pack the controller with the original packing box provided by Inovance.
2. Long-term storage degrades the electrolytic capacitor. Thus, the controller must be energized once every 2 years, each time lasting at least 5 hours. The input voltage must be increased slowly to the rated value with the regulator.

7.2 Fault Information and Troubleshooting

The controller provides almost 32 pieces of alarm information and corresponding protection functions. It monitors all types of input signals, running conditions and external feedback. If any abnormality occurs, the controller implements corresponding protection function and displays the fault code.

If a fault occurs, the controller performs corresponding processing based on the error code. You can analyze the fault based on the information provided in the following table, find out the causes, and rectify the fault.

Fault Code	Description	Cause	Troubleshooting	Remarks
Er02	Overcurrent during acceleration	1. The main circuit output is grounded or short-circuited. 2. Motor auto-tuning is performed improperly. 3. The load is too heavy.	1. Eliminate external faults such as wiring error. 2. Perform motor auto-tuning again. 3. Reduce the burst load.	
Er03	Overcurrent during deceleration	1. The main circuit output is grounded or short-circuited. 2. Motor auto-tuning is performed improperly. 3. The load is too heavy. 4. The deceleration rate is too short.	1. Eliminate external problems such as wiring error. 2. Perform motor auto-tuning again. 3. Reduce the burst load. 4. Modify the related parameters.	
Er04	Overcurrent at constant speed	1. The main circuit output is grounded or short-circuited. 2. Motor auto-tuning is performed improperly. 3. The load is too heavy. 4. Strong interference exists on the encoder.	1. Eliminate external problems such as wiring error. 2. Perform motor auto-tuning again. 3. Reduce the burst load. 4. Choose a proper encoder and uses a shielded cable for the encoder.	
Er05	Overvoltage during acceleration	1. The input voltage is too high. 2. The braking resistance is too large. 3. The acceleration rate is too short.	1. Reduce the input voltage. 2. Choose a proper brake resistor. 3. Modify the related parameters.	
Er06	Overvoltage during deceleration	1. The input voltage is too high. 2. The braking resistance is too large. 3. The deceleration rate is too short.	1. Reduce the input voltage. 2. Choose a proper brake resistor. 3. Modify the related parameters.	
Er07	Overvoltage at constant speed	1. The input voltage is too high. 2. The braking resistance is too large.	1. Reduce the input voltage. 2. Choose a proper brake resistor.	
Er09	Undervoltage protection	1. Instantaneous power failure occurs on the input power supply. 2. The input voltage is too low. 3. The control board is abnormal.	1. Eliminate external power supply problems. 2. Contact the agent or the vendor.	The controller resets automatically after the voltage becomes normal.

Fault Code	Description	Cause	Troubleshooting	Remarks
Er10	System overloaded	1. The guide rail of the elevator door is blocked by stuff. 2. The load is too heavy.	1. Check the guide rail of the elevator door. 2. Reduce the load.	
Er11	Motor overload	1. The guide rail of the elevator door is blocked by stuff. 2. The load is too heavy. 3. The value of F8-14 is too small.	1. Check the guide rail of the elevator door. 2. Reduce the load. 3. Set F8-14 to a proper value.	A large setting of F8-14 may cause motor overheat. Use the default value.
Er13	Power output phase loss	1. The wiring of the main circuit is loose on the output side. 2. The motor is damaged.	1. Check the wiring. 2. Rectify faults of the motor.	The controller decelerates and stops.
Er14	Module overheat	1. The ambient temperature is too high. 2. The fan is damaged. 3. The air filter is blocked.	1. Reduce the ambient temperature. 2. Replace the fan. 3. Clear the air filter.	The controller decelerates and stops, and automatically resets after the temperature becomes normal.
Er16	EEPROM fault	An EEPROM reading or writing abnormality occurs.	Contact the agent or vendor.	
Er18	Current detection fault	The control board is abnormal.	Contact the agent or vendor.	
Er19	Motor auto-tuning timeout	1. The motor parameters are incorrectly set. 2. Parameter identification times out. 2. The encoder for the PMSM is abnormal.	1. Enter the motor parameters correctly. 2. Check the lead wire of the motor. 3. Check wiring of the encoder and ensure the PPR is set correctly.	
Er20	Encoder fault	1. The encoder model is improper. 2. Wiring of the resolver is incorrect.	1. Use an open-collector ABZ phase resolver. 2. Eliminate wiring problems.	

Fault Code	Description	Cause	Troubleshooting	Remarks
Er26	Parameter setting incorrect	1. F5-01 (Door open time limit) is smaller than the total door open time. 2. F5-02 (Door close time limit) is smaller than the total door close time. 3. During door width auto-tuning, F0-02 (Command source selection) is not set to 2 (Door machine manual control), or F0-01 (Door open/close control mode) is not set to 1 (Distance control). 4. F0-00 (Control mode) is set to 0 (SVC).	1. Set F5-01 to larger than the total door open time. 2. Set F5-02 to larger than the total door close time. 3. Set F0-02 to 2 or F0-01 to 1 during door width auto-tuning. 4. When F1-00 (Motor type selection) is set to 1 (PMSM), set F0-00 (Control mode) to 1 (CLVC).	It is only a prompt, and not recorded as a fault.
Er27	Door width auto-tuning fault	1. The door width obtained through door width auto-tuning is smaller than 20 pulses. 2. Distance control running is performed before door width auto-tuning.	1. Check wiring of the encoder and related parameters. 2. Check the mechanical system of the door machine. 3. Perform door width auto-tuning before starting distance control running.	
Er28	Door open timeout	1. The door open limit signal is abnormal or incorrectly set. 3. The wire to the pulse encoder is broken.	1. Check the door open limit signal. 2. Check wiring of the encoder.	The controller can reset automatically.
Er30	Low speed door open/close timeout	1. The door open/close limit signal is abnormal or incorrectly set. 2. The wire of the pulse encoder is broken.	1. Check the door close limit signal. 2. Check wiring of the encoder.	The controller can reset automatically.
Er31	Door open hindered protection	1. The guide rail of the elevator door is blocked by stuff. 2. The door open hindering parameters are incorrectly set.	1. Clear the stuff in the guide rail. 2. Set the upper limit of door open torque to a proper value. 3. Set F3-11 (Door open hindered judging time) to a proper value.	The controller can reset automatically.

Fault Code	Description	Cause	Troubleshooting	Remarks
Er32	Speed deviation protection	1. Acceleration or deceleration is too abrupt. 2. The motor angle obtained through auto-tuning is incorrect, causing runaway. 3. The speed deviation setting and time are too small.	1. Increase the acceleration or deceleration time. 2. Perform angle auto-tuning again. 3. Change the value of F5-16 and F5-17.	
Er33	Door close limit switch abnormal	This signal is not detected during door close when the limit switch is used in distance control mode.	1. Check whether this switch is installed. If not, cancel the input signal setting. 2. Check whether wiring of the switch is correct. 3. Check whether the switch is damaged	The controller can run properly based on the encoder signals. The controller can reset automatically if the switch becomes normal.

Revision History

Date	Version	Change Description
Jan 2015	V0.0	First issue.
Dec 2016	A01	Modified product name, designation rule and nameplate.
Dec 2018	A02	Updated logo.
Sep 2020	A03	Made minor corrections.

INOVANCE Warranty Agreement

- 1) Inovance provides an 18-month free warranty to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.
- 2) Within the warranty period, maintenance will be charged for the damage caused by the following reasons:
 - a. Improper use or repair/modification without prior permission
 - b. Fire, flood, abnormal voltage, natural disasters and secondary disasters
 - c. Hardware damage caused by dropping or transportation after procurement
 - d. Operations not following the user instructions
 - e. Damage out of the equipment (for example, external device factors)
- 3) The maintenance fee is charged according to the latest Maintenance Price List of Inovance.
- 4) If there is any problem during the service, contact Inovance's agent or Inovance directly.
- 5) Inovance reserves the rights for explanation of this agreement.

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一体化控制器用户手册



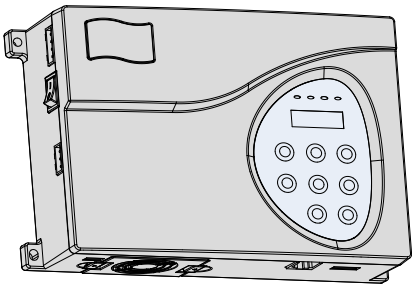
前言

感谢您购买和使用 NICE900 系列门机一体化控制器！

NICE900 系列门机控制器是针对电梯门、冷库门、地铁门等门系统的一款专用变频门驱动控制器，它集成了开关门逻辑控制与电机驱动控制，外部系统只需给出开关门指令，即可实现对整个门系统的控制。该控制器可驱动交流异步电机与永磁同步电机，并支持速度控制与距离控制两种模式。产品应用范围广泛，可以满足大部分门系统的控制驱动需求。

本手册介绍了 NICE900 系列门机一体化控制器的功能特性及使用方法。在使用（安装、运行、维护、检查等）前，请务必认真阅读本使用说明书。

请在理解产品的安全注意事项后再使用该产品。



注意事项

- ◆ 为了说明产品的细节部分，本说明书中的图例有时为卸下外罩或安全遮盖物的状态。使用本产品时，请务必按规定装好外壳或遮盖物，并按照说明书的内容进行操作。
- ◆ 本使用说明书中的图例仅为了说明，可能会与您订购的产品有所不同。
- ◆ 由于产品升级或规格变更，以及为了提高说明书的便利性和准确性，本说明书的内容会及时进行变更。
- ◆ 由于损坏或遗失而需要订购使用说明书时，请与本公司各区域代理商联系，或直接与本公司客户服务中心联系。
- ◆ 如果您使用中仍有一些使用问题不明，请与本公司客户服务中心联系。

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第 1 章 安全信息及注意事项

1

安全定义：

在本手册中，安全注意事项分以下两类：

 **危险：** 由于没有按要求操作造成的危险，可能导致重伤，甚至死亡的情况。

 **注意：** 由于没有按要求操作造成的危险，可能导致中度伤害或轻伤，及设备损坏的情况。

请用户在安装、调试和维修本系统时，仔细阅读本章，务必按照本章内容所要求的安全注意事项进行操作。如出现因违规操作而造成的任何伤害和损失均与本公司无关。

1.1 安全事项

1.1.1 安装前

 **危险**

- ◆ 开箱时发现控制器破损时，请不要安装！
- ◆ 装箱单与实物名称不符时，请不要安装！

 **注意**

- ◆ 搬运时应该轻拿轻放，否则有损害设备的危险！
- ◆ 不要用手触及控制器的元器件，否则有静电损坏的危险！

1.1.2 安装时

 **危险**

- ◆ 请安装在金属等阻燃的物体上；远离可燃物。否则可能引起火警！
- ◆ 不可随意拧动设备元件的固定螺丝，特别是带有红色标记的螺丝！

 **注意**

- ◆ 不能让导线头或螺钉掉入其中。否则引起控制器损坏！
- ◆ 请将控制器安装在震动少，避免阳光直射的地方。

1.1.3 配线时

 **危险**

- ◆ 必须遵守本手册的指导，由专业电气工程人员施工，否则会出现意想不到的危险！
- ◆ 控制器和电源之间必须有断路器隔开，否则可能发生火警！
- ◆ 请按标准对控制器进行正确规范接地，否则有触电危险！

 危险

- ◆ 绝不能将输入电源连接到控制器的输出端子 (U、V、W) 上。注意接线端子的标记，不要接错线！否则引起控制器损坏！
- ◆ 确保所配线路符合 EMC 要求及所在区域的安全标准。所用导线线径请参考手册的建议。否则可能发生事故！

 危险

- ◆ 编码器必须使用屏蔽线，且屏蔽层必须保证单端可靠接地！
- ◆ 通讯线必须使用绞线绞距 20 ~ 30mm 的屏蔽双绞线，并且屏蔽层接地！

1.1.4 上电前

 注意

- ◆ 请确认输入电源的电压等级是否和控制器的额定电压等级一致；电源输入端子 (L、N) 和输出端子 (U、V、W) 上的接线位置是否正确；并注意检查与控制器相连接的外围电路中是否有短路现象；所连线路是否紧固。否则引起控制器损坏！
- ◆ 控制同步机的场合，请确保第一次运行前进行电机参数调谐，否则电机有飞车危险。
- ◆ 控制器的任何部分无须进行耐压试验，出厂时产品已作过此项测试。否则引起事故！

 危险

- ◆ 控制器必须盖好盖板后才能上电。否则可能引起触电！
- ◆ 所有外围配件的接线必须遵守本手册的指导，按照本手册所提供电路连接方法正确接线。否则引起事故！

1.1.5 上电后

 危险

- ◆ 上电后不要打开盖板。否则有触电的危险！
- ◆ 不要触摸控制器的任何输入输出端子。否则有触电危险！

 危险

- ◆ 若需要进行参数辨识，请注意电机旋转中伤人的危险。否则可能引起事故！
- ◆ 请勿随意更改控制器厂家参数。否则可能造成设备的损害！

1.1.6 运行中

 危险

- ◆ 请勿触摸散热风扇及制动电阻以试探温度。否则可能引起伤害！
- ◆ 非专业技术人员请勿在运行中检测信号。否则可能引起人身伤害或设备损坏！

1.1.7 保养时



危险

- ◆ 请勿带电对设备进行维修及保养。否则有触电危险！
- ◆ 没有经过专业培训的人员请勿对控制器实施维修及保养。否则造成人身伤害或设备损坏！
- ◆ 更换控制器后必须进行参数的设置，所有可插拔插件必须在断电情况下插拔！

1.2 注意事项

1.2.1 电机绝缘检查

电机在首次使用、长时间放置后再使用以及定期检查时，应做电机绝缘检查，防止因电机绕组的绝缘失效而损坏控制器。绝缘检查时一定要将电机连线从控制器分开，建议采用 500V 电压型兆欧表，应保证测得绝缘电阻不小于 5MΩ。

1.2.2 关于电动机发热及噪声

因控制器输出电压是 PWM 波，含有一定的谐波，因此电机的温升、噪声和振动同工频运行相比会略有增加。

1.2.3 输出侧有压敏器件或改善功率因数的电容的情况

控制器的输出是 PWM 波，输出侧如安装有改善功率因数的电容或防雷用压敏电阻等，易引发控制器瞬间过电流甚至损坏控制器。请不要使用。

1.2.4 额定电压值以外的使用

如果外部电压不是在手册所规定的允许工作电压范围之内时，使用该控制器，易造成控制器器件损坏。如果需要，请使用相应的升压或降压装置进行变压处理。

1.2.5 浪涌抑制器

驱动器内部安装有压敏电阻，可以抑制变频器周围的感性负载开 / 关时产生的浪涌电压。当感性负载产生的浪涌电压能量较大时，请务必在感性负载上使用浪涌抑制器或同时使用二极管。

注：请勿将浪涌抑制器连接到变频器的输出侧。

1.2.6 海拔高度与降额使用

在海拔高度超过 1000 米的地区，由于空气稀薄造成控制器的散热效果变差，有必要降额使用，此情况请向我公司进行技术咨询。

1.2.7 控制器的报废时注意

主回路的电解电容和印制板上电解电容焚烧时可能发生爆炸。塑胶件焚烧时会产生有毒气体。请作为工业垃圾进行处理。

1.2.8 关于适配电机

- 1) 本控制器适配鼠笼式异步电动机和交流永磁同步电机，请一定按电机铭牌选配控制器。
- 2) 为了到达更好的控制效果，需要根据实际电机情况进行电机参数辨识。同步电机必须进行电机参数辨识。
- 3) 由于电缆或电机内部出现短路会造成控制器报警，甚至损坏。因此，请首先对初始安装的电机及电缆进行绝缘短路测试，日常维护中也需经常进行此测试。注意，做这种测试时务必将控制器与被测试部分全部断开。

第 2 章 产品信息

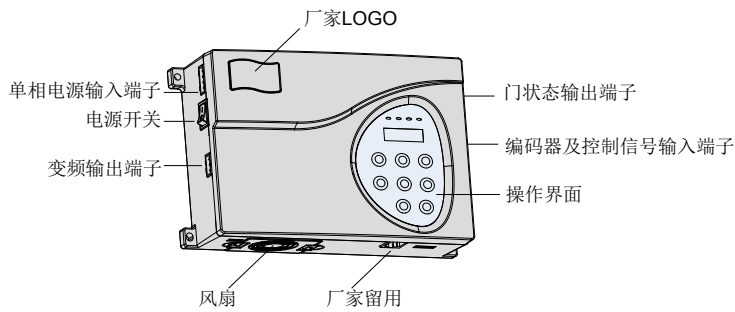


图 2-1 产品外观图

2.1 命名规则及铭牌

2.1.1 命名规则：

NICE - D - A - S 0P2

NICE系列
电梯控制器

标识	控制器类型
D	电梯门机专用

标识	控制器类型
A	门机控制器

标识	功率等级
0P2	200W
0P4	400W
0P7	750W

标识	电压等级
S	单相220V

系统型号	输入电压	电源容量 (kVA)	输入电流 (A)	输出电流 (A)	适配电机 (W)
NICE-D-A-S0P2	单相 220V -15% ~ 20%	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 铭牌举例

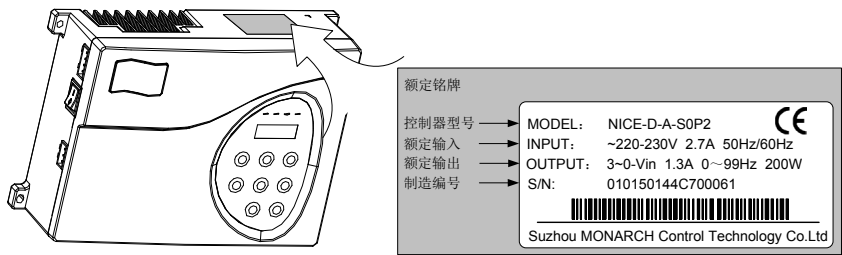


图 2-2 铭牌举例

2.2 技术指标

表 2-1 技术指标

项目	子项目	技术指标
性能控制	最大输出频率	99.00Hz
	调速范围	1: 50 (磁通矢量控制); 1: 1000(闭环矢量控制)
	稳速精度	±0.5%(磁通矢量控制); ±0.05%(闭环矢量控制)
	起动转矩	0Hz - 180% (闭环矢量控制); 1Hz - 150% (磁通矢量控制)
	频率分辨率	0.01Hz
	电流分辨率	0.01A
	载波频率	2.0kHz ~ 16.0kHz
主要功能	交流异步机下，支持静态和动态方式调谐电机参数； 交流永磁同步机下，支持空载和带载方式调谐电机参数和编码器零点位置。	
	支持普通 ABZ 编码器方式下的交流永磁同步机闭环矢量控制，编码器开路集电极输出或推挽输出方式	
	磁通矢量控制下支持自动转矩提升、手动转矩提升、过励磁等功能	
	支持门宽自学习功能	
	支持自动演示功能	
	支持遇阻自动识别功能	
	支持一键调试功能	
保护功能	控制器过载保护：额定电流 150% 1 分钟保护、180% 1 秒钟保护	
	支持控制器过压保护、欠压保护、过流保护、输出缺相保护、相间短路保护、断电防夹人保护等保护功能	
环境要求	安装环境	室内，不受阳光直晒，无尘埃、腐蚀性气体、可燃性气体、油雾、水蒸汽、盐份等
	海拔高度	低于 1000m，高于 1000m 请降额使用
	环境温度	-10℃~+ 40℃ (环境温度在 40℃~ 50℃，请降额使用)
	湿度	小于 95%RH，无水珠凝结
	振动	小于 5.9m/s ² (0.6g)
	存储温度	-20℃~+ 60℃
	冷却方式	0.2kW 采用自冷方式、0.4kW 和 0.75kW 采用风冷的方式
	防护等级	IP20
	储存场所	存放在干净、干燥的室内场所
	运输工具	在标准包装箱中，可采用汽车、火车、飞机、轮船等相近的工具运输
	运输振动	正弦振动 9 ~ 200Hz 时：15m/s ² (1.5g)

2.3 机械安装

2.3.1 安装环境

- 1) 环境温度：周围环境对控制器寿命有很大影响，不允许控制器所处的环境超过允许范围 ($-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$)。
- 2) 将控制器装于阻燃物体的表面，周围要有足够空间散热。控制器工作时易产生大量热量。并用螺丝垂直安装在安装支座上。
- 3) 避免装于阳光直射、潮湿、有水珠的地方。
- 4) 避免装于空气中有腐蚀性、易燃性、易爆性气体的场所。
- 5) 避免装在有油污、多灰尘、多金属粉尘的场所。

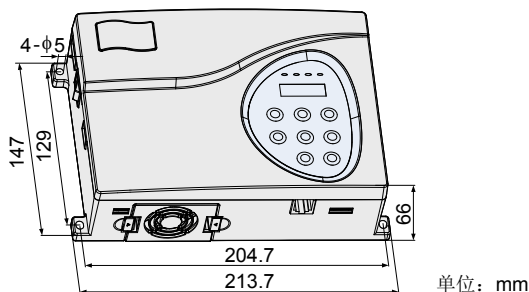


图 2-3 产品外型尺寸图

2.3.2 推荐预留安装距离及通风口

将门机控制器安装于密闭空间时，请参考图 2-4 所示，保留相应的空间距离。

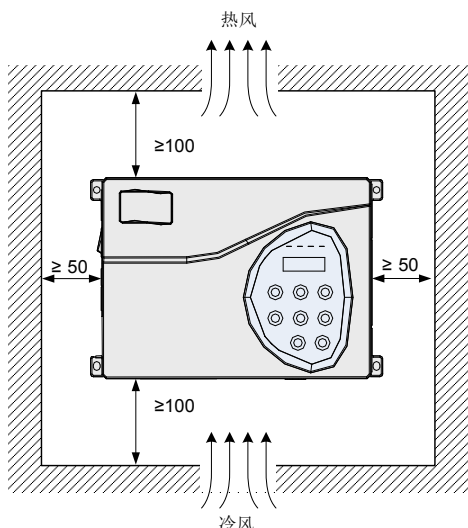


图 2-4 预留安装距离示例图

2.3.3 推荐安装方向

a) 水平安装

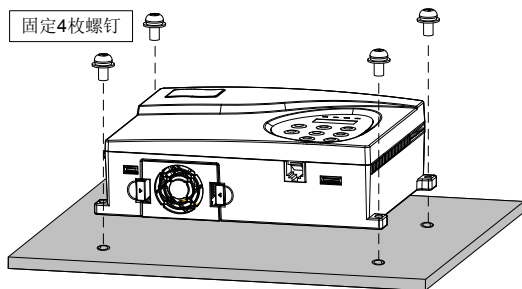


图 2-5 水平安装示例图

b) 竖直安装

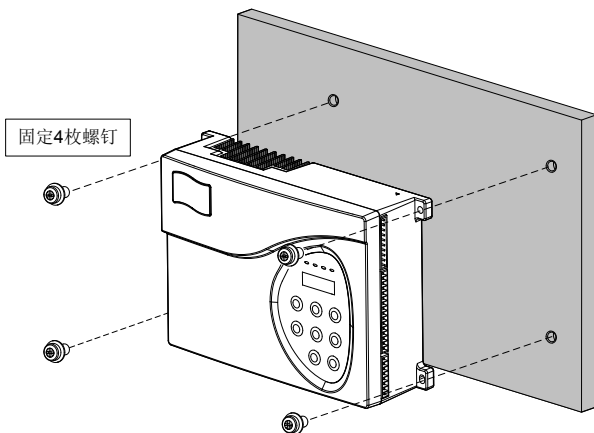


图 2-6 竖直安装示例图

注：螺钉要求：(4-M4X15 螺钉 (带弹平垫) 紧固力矩：1.2N·m)

2.4 门机控制器的日常保养与维护

2.4.1 日常保养

由于环境的温度、湿度、粉尘及振动的影响，会导致控制器内部的器件老化，有可能引起控制器潜在的故障发生或降低了控制器的使用寿命。因此，有必要对控制器实施日常和定期的保养及维护。



注意

断开电源后因滤波电容上仍然有高压，所以不能马上对控制器进行维修或保养，需等操作器屏幕不再有显示后方可进行。

- 1) 日常检查项目:
1. 电机运行中声音是否发生异常变化;

2. 电机运行中是否产生了振动;

3. 控制器安装环境是否发生变化;

4. 控制器散热风扇是否正常工作;

5. 控制器是否过热。
- 2) 日常清洁:
1. 应始终保持控制器处于清洁状态;

2. 有效清除控制器上表面积尘, 防止积尘进入控制器内部。特别是金属粉尘;

3. 有效清除控制器散热风扇的油污。

2.4.2 定期保养

请定期对控制器运行过程中难以检查的地方检查。

- 1) 定期检查项目:
1. 检查风道, 并定期清洁

2. 检查螺丝是否有松动

3. 检查控制器受到腐蚀

4. 检查接线端子是否有拉弧痕迹

5. 主回路绝缘测试
- 注意: 在用兆欧表 (请用直流 500V 兆欧表) 测量绝缘电阻时, 要将主回路线与控制器脱开。不要用绝缘电阻表测试控制回路绝缘。不必进行高压测试 (出厂时已完成)。
- 2) 控制器易损件更换:
- 控制器易损件主要有冷却风扇和滤波用电解电容器, 其寿命与使用的环境及保养状况密切相关。一般寿命时间为:

表 2-2 易损件寿命时间

器件名称	寿命时间	可能损坏的原因	判别标准
风扇	2 ~ 3 年	轴承磨损, 叶片老化。	风扇叶片等是否有裂缝, 开机时声音是否有异常振动声。
电解电容	4 ~ 5 年	输入电源品质差、环境温度较高, 频繁的负载跳变、电解质老化。	有无液体漏出、安全阀是否已凸出, 静电电容的测定, 绝缘电阻的测定。

2.4.3 控制器存贮

用户购买控制器后, 存贮时必须注意以下几点:

1. 存贮时尽量将产品装入本公司的原包装箱内;

2. 长时间存放会导致电解电容的劣化, 必须保证在 2 年之内通一次电, 通电时间至少 5 小时, 输入电压必须用调压器缓缓升高至额定值。

第 3 章 电气安装

3.1 电气安装

3.1.1 外围电气元件选型指导

表 3-1 外围元件选型

控制器型号	空开 (A)	接触器 (A)	主回路导线 (mm ²)
NICE-D-A-S0P2	10	10	2.5
NICE-D-A-S0P4	16	10	2.5
NICE-D-A-S0P7	16	10	2.5

3.1.2 外围可选加电气元件使用说明

表 3-2 外围元件使用说明

配件名称	安装位置	功能说明
空气开关	控制器驱动电源输入最前端	方便切断控制器电源并提供短路保护。
交流输入电抗器	系统的输入侧	提高输入侧的功率因数；有效消除输入侧的高次谐波，有效保护整流桥；消除电源相间不平衡引起的输入电流不平衡。
交流输出电抗器	在控制器驱动输出侧和电机之间靠近控制器一侧安装	一般矢量驱动器和电机距离超过 100 米时加装输出交流电抗器。

3.2 接线端子说明

3.2.1 驱动回路端子分布与配线

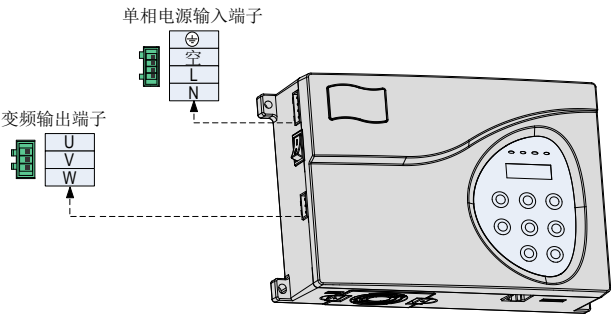


图 3-1 驱动回路端子分布图

表 3-3 驱动回路端子描述

标号	名称	说明
L、N	单相电源输入端子	交流单相 220V 电源输入端子
U、V、W	变频输出端子	连接三相电动机
	接地端子	接地端子

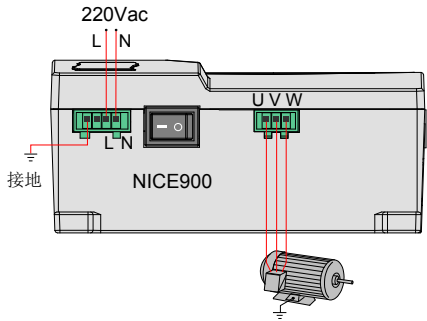


图 3-2 驱动回路配线示例图

在冷库门控制等大惯性应用场合的情况下，需要选择制动电阻，请参考表 3-4。在电梯门控制场合则不需要使用制动电阻。

表 3-4 制动电阻相关参数

控制器型号	制动电阻推荐功率	制动电阻推荐阻值
NICE-D-A-S0P2	80W	$\geq 250\Omega$
NICE-D-A-SOP4	80W	$\geq 200\Omega$
NICE-D-A-SOP7	80W	$\geq 150\Omega$

3.2.2 控制回路端子分布与配线

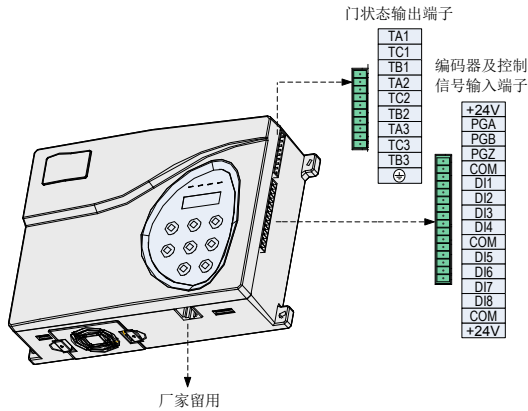


图 3-3 控制回路端子分布图

表 3-5 控制回路端子描述

端子名称	分类	端子标号	端子功能说明	技术规格
门状态输出端子	继电器输出及屏蔽接地	TA1/TB1/TC1 TA2/TB2/TC2 TA3/TB3/TC3	继电器输出	1.TA-TB：常闭； TA-TC：常开； 触点容量： AC250V/3A；DC30V/1A。 2. 触点与控制回路绝缘电压等级：2.5kVAC。
编码器及控制信号输入端子	内部 24V 电源	+24V	外接 24V	作为无触点开关或码盘的电源使用，最大输出电流 200mA。
		COM	24V 电源公共端	与内部 GND 隔离。
	编码器输入	PGA	编码器 A 相	集电极开路输出或推挽输出。
		PGB	编码器 B 相	
		PGZ	编码器 Z 信号	
	数字输入	DI1 ~ DI8	数字量信号输入	光耦隔离输入，低电平有效。 输入电压范围： 0Vdc ~ 30Vdc； 输入阻抗：3.3kΩ。
厂家用端子	软件烧录端口	RJ45	软件烧录端口	-

在系统上电之前要进行外围接线的检查，确保部件及人身安全。

1. 按照厂家图纸正确接线；
2. 每个开关工作正常，动作可靠；
3. 检查主回路相间阻值，检查是否存在对地短路现象；
4. 机械部分安装到位，不会造成设备损坏或人身伤害。

检查下列端子与接地端子 PE 之间的电阻是否无穷大，如果偏小请立即检查：

1. L、N 与 PE 之间；
2. U、V、W 与 PE 之间；
3. 编码器 24V、PGA、PGB、PGZ、COM 与 PE 之间。

第 4 章 操作显示与应用

4.1 操作与显示界面

用户通过操作面板可以对 NICE900 系列门机控制器进行功能参数修改、工作状态监控和操作面板运行时的控制（启动和停车）等操作。

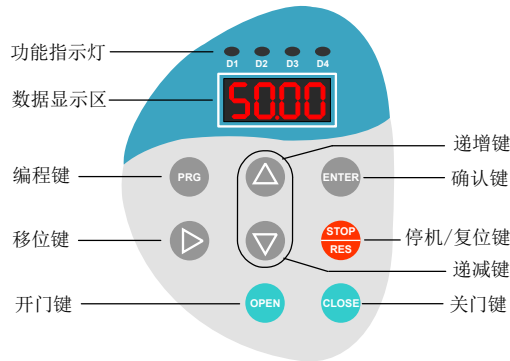


图 4-1 操作面板界面

1) 指示灯说明

表 4-1 指示灯说明

指示灯	停止时各 LED 灯亮代表含义		运行时各 LED 灯亮代表含义
	速度控制	距离控制	
 D1	DI1 信号有效	DI1 信号有效	外部关门命令
 D2	DI2 信号有效	AB 相信号正确	关门过程中
 D3	DI3 信号有效	Z 相信号	开门过程中
 D4	DI4 信号有效	DI4 信号有效	外部开门命令

2) 操作面板键盘按钮说明

表 4-2 操作面板按钮说明

按键	名称	功能
	编程键	一级菜单的进入和退出。
	确认键	逐级进入菜单画面、设定参数确认。
	停止 / 复位	运行状态时，按此键可停止运行；故障报警状态时，可用来复位操作。

按键	名称	功能
	移位键	在停机状态和运行状态时，可以循环选择 LED 的显示参数；在修改参数时，可以选择参数的修改位。
	递增键	数据或功能码的递增。
	递减键	数据或功能码的递减。
	开门键	在面板操作方式下，用于开门操作。
	关门键	在面板操作方式下，用于关门操作。

4

4.2 操作面板的基本设置

4.2.1 三级菜单操作流程:

NICE900 系列控制器的操作面板参数设置方法，采用三级菜单结构形式，可方便快捷地查询、修改功能码及参数。

三级菜单分别为：功能参数组（一级菜单）→功能码（二级菜单）→功能码设定值（三级菜单）。操作流程如图 4-2 所示。

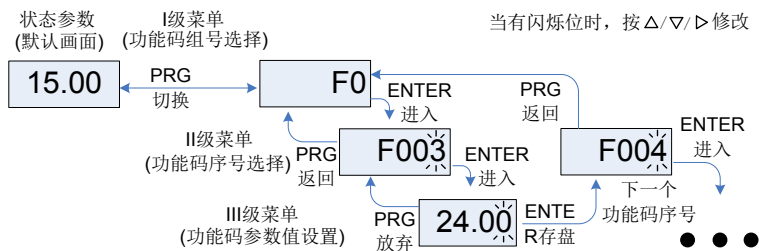


图 4-2 三级菜单操作流程示意图

在三级菜单操作时，可按 PRG 键或 ENTER 键返回二级菜单。两者的区别是：按 ENTER 键将设定参数保存后然后再返回二级菜单，并自动转移到下一个功能码；按 PRG 键则直接返回二级菜单，不存储参数，并保持停留在当前功能码。

举例：将功能码 F004 从 0.00Hz 更改设定为 15.00Hz 的示例 ( 表示闪烁位)。

状态参数
(默认画面)

当有闪烁位时，按 Δ / ∇ / $\triangleright$ 修改

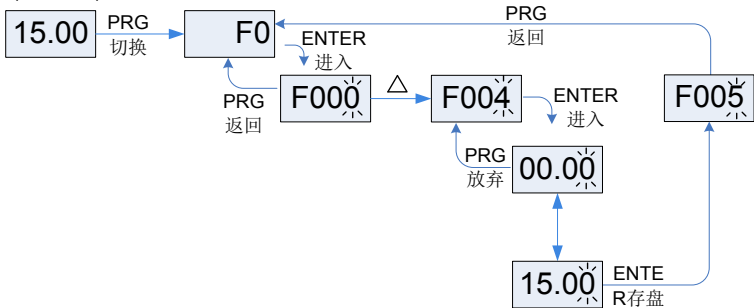


图 4-3 参数编辑操作示例

在三级菜单状态下，若参数没有闪烁位，表示该功能码不能修改，可能原因有：

1. 该功能码为不可修改参数。如实际检测参数、运行记录参数等。
2. 该功能码在运行状态下不可修改，需停机后才能进行修改。

4.2.2 故障信息读取

当控制器出现故障时，面板上会显示出故障信息代码。通过故障代码，便于判断故障的原因，尽快排除故障。

控制器内部可保存前 4 次的故障代码，并记录最近一次故障时频率、电流、母线电压、数字输入端子状态及数字输出端子状态。

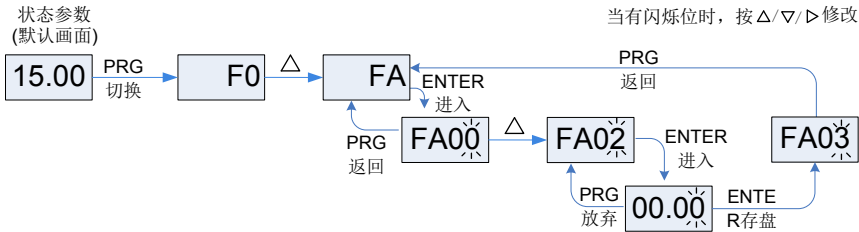


图 4-4 查看故障信息

4.2.3 查看运行 / 停机显示信息

在运行 / 停机状态下，且控制器无故障时，通过 FA00/FA01 设定及移位键即可查看运行 / 停机显示参数。

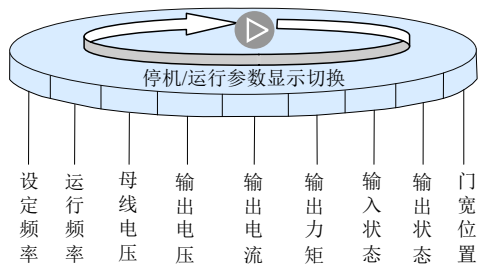


图 4-5 运行参数显示

4.2.4 用户密码设置

为了更有效地进行参数保护，NICE900 系列门机控制器提供了密码保护功能。取消密码保护，请通过密码进入，并将 FP00 设定为 0。

下面示例是将密码更改为 1234 的过程。( 表示闪烁位)

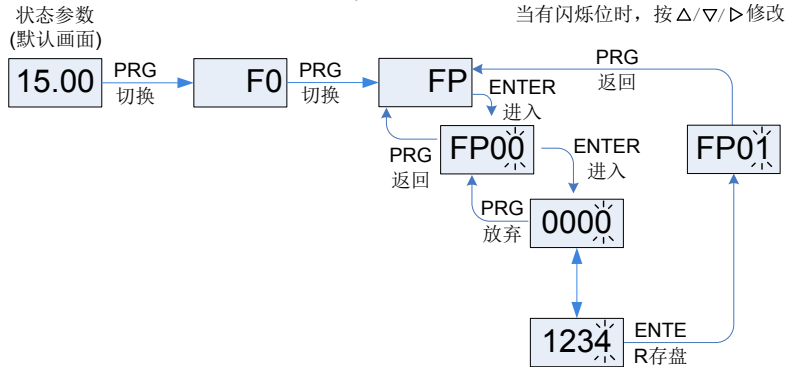


图 4-6 用户密码设置

4.3 门机控制器应用举例

4.3.1 运行模式

控制器的起停控制命令有 4 个来源，分别是操作面板控制模式、门机端子控制模式、门机手动调试模式，门机自动演示模式。通过功能参数 F002 选择。

表 4-3 起停命令源设置功能码

功能码	命令源选择	出厂值：0	说明
F002	设定范围	0 操作面板控制模式	主要用于电机调谐，此时门电机以 F004 设定频率运行。通过操作面板上的“OPEN”或“CLOSE”控制门电机的开关，“STOP/RES”键停止运行。
		1 门机端子控制模式	通过 DI 端子输入开门或关门命令，实现对门机的控制，一般应用于正常工作情况。

功能码	命令源选择	出厂值：0	说明
F002	设定范围	2 门机手动学习模式	进行门宽自学习前，请设置此模式，此时门电机运行有加减速过程。门电机的运行、停机控制方法同操作面板控制模式。
		3 门机自动演示模式	用于门机的演示及厂内试运行。距离控制完成门宽自学习后或速度控制外围信号接好后，可设置此模式使门机自动运行。“OPEN”或“CLOSE”键启动演示，“STOP/RES”键停止演示。演示时间间隔和演示次数由 F7 组参数设定。

4.3.2 DI 端子控制开关门

控制系统发出的开门关门运行命令通过 DI 端子实现对电梯门的开关控制。

NICE900 控制器提供了多种端子控制方式，通过功能码 F901—F908 确定控制信号的输入端口和开关信号模式。具体设定方法，请参阅 F901—F908 等功能码的详细解释。

例：要求将控制系统的开门运行命令接入到 NICE900 控制器的 DI5 端口、关门运行信号接 DI6 端口，使用与设置方法如图 4-7 所示。

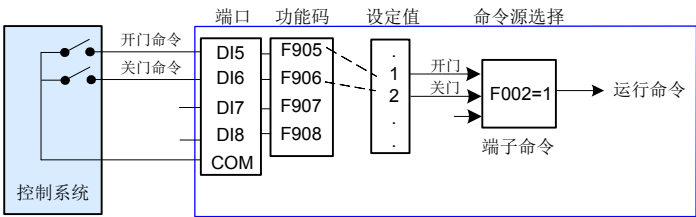


图 4-7 门机 DI 端子起停控制举例

4.3.3 电机参数调谐

以交流永磁同步机辨识调谐为例进行说明。

交流永磁同步电机第一次运行前须进行磁极位置辨识，否则不能正常使用。在更改了电机接线、更换了编码器或者更改了编码器接线的情况下，必须再次辨识码盘位置角。因此，需要保证辨识磁极位置和电机正常运行时的电机接线完全一致。辨识过程中电机可能会转动运行，调谐前请确保安全。调谐流程如图 4-8 所示：

注：

1. 调谐前请确认编码器信号正常，若启动调谐时候，门往关门方向运行且堵转，则说明电机运行方向异常，则进行调换电机接线或编码器接线。
2. 空载调谐的时候，首先会按照正转调谐命令或反转调谐命令执行，运行一段时间后会往相反方向运行，几个正、反循环后，最后执行所有参数计算，完成空载调谐过程。调谐过程中若出现 Err20 故障，请调换 UVW 中的任两相，重新调谐。
3. 带负载调谐的时候，让门处于完全完全关闭状态，然后按下“OPEN”键电机以额定转速 25% 缓慢执行开门操作，运行一定距离后进行关门运转，开、关调谐运行 3 次后，最后完成所有参数计算，完成带负载调谐过程。



NOTE

◆ 软件版本高于 V14.03 默认来回调谐一次即可。

4. 带负载调谐过程中，若电机不运行或者运行方向与开关门命令相反，则电机接线不正确，请把电机接线任两相调换后，再次调谐。
5. 辨识的编码器的零点补偿位置角，可以通过功能码 F114 进行查看或修改，在位置辨识后则不允许更改该参数，否则控制器可能无法正常运行。带载调谐比空载调谐得到的编码器零点补偿位置角的精度稍低，条件允许请尽量选择空载调谐。
6. 编码器位置辨识过程中如果出现 Err19 告警错误，请检查是否正确接线。

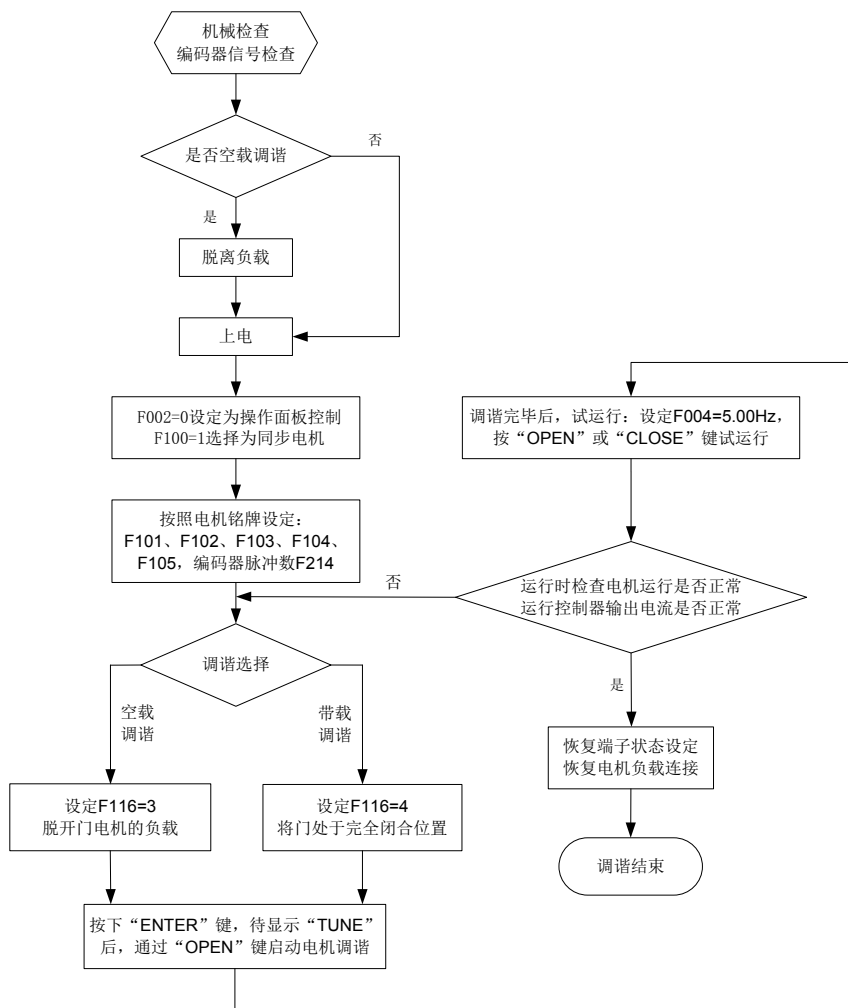


图 4-8 交流永磁同步电机调谐流程图

4.3.4 一键调试功能

应用条件：

- 1) 本功能用于简化距离控制模式的调试过程。因此对于没有编码器的门机系统请不要使用此功能；
- 2) 使用此功能前请正确设定电机类型、电机参数及编码器脉冲数。

操作过程：

- 1) 在停机状态下同时按下 OPEN 和 CLOSE 键持续 3 秒，将启动一键调试功能；如果门机控制器正在运行，请先使其停机；
- 2) 启动一键调试功能之后，门机控制器先进行电机调谐，然后进行门宽自学习。在此期间可以按 STOP 键停止调试；
- 3) 电机调谐时，显示 TUNE；门宽自学习过程中显示运行速度（不闪烁）；停机后，显示设定的速度（闪烁）。
- 4) 所有调试完成后，控制器进入外部命令控制模式，可以直接投入使用。

注意事项：

- 1) 一键调试期间，门机控制器会自动修改 F000、F001、F002 以及门宽数据等参数，如果中途停止调试，请注意这些参数的值；
- 2) 对于异步电机，将采用静止调谐；对于同步电机，将采用带载调谐。

4.3.5 断电防夹人功能

运行时，门机控制器会检测输入电源的电压，当电压低于 175VAC 时，门机控制器会自动控制门进行关门。此时消耗门机内部电容做存储的电能，在电能消耗完之前，门可以到接近关闭的位置；

在停机状态下断电，门机不会启动任何动作。

4.4 典型应用

NICE900 系列门机控制器可以采用速度控制和距离控制两种方式对门机系统进行控制。

速度控制方式是利用减速点减速，到位信号实现到位的判断处理；距离控制方式须正确学习门宽脉冲数，通过设置开、关门曲线部分参数实现减速点减速和到位的处理。

4.4.1 速度控制方式

1. 采用速度控制方式时门上需要安装四个行程开关，通过减速点进行减速处理，通过判断限位开关的信号来进行限位的处理。

速度控制方式下门机系统中各种信号接点（行程开关）的安装位置如图 4-9 所示。

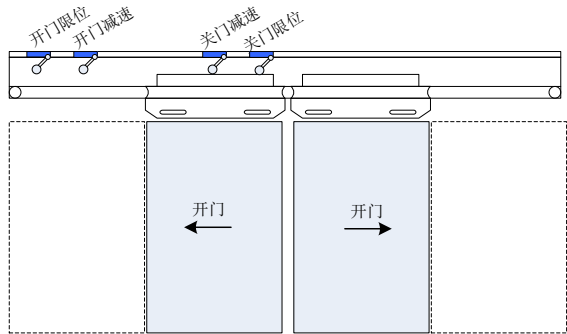


图 4-9 门机装置检测开关安装示意图

2. 速度控制模式下，开关门减速信号线检查

以本公司电梯控制系统为例说明门机控制器相关信号配线。

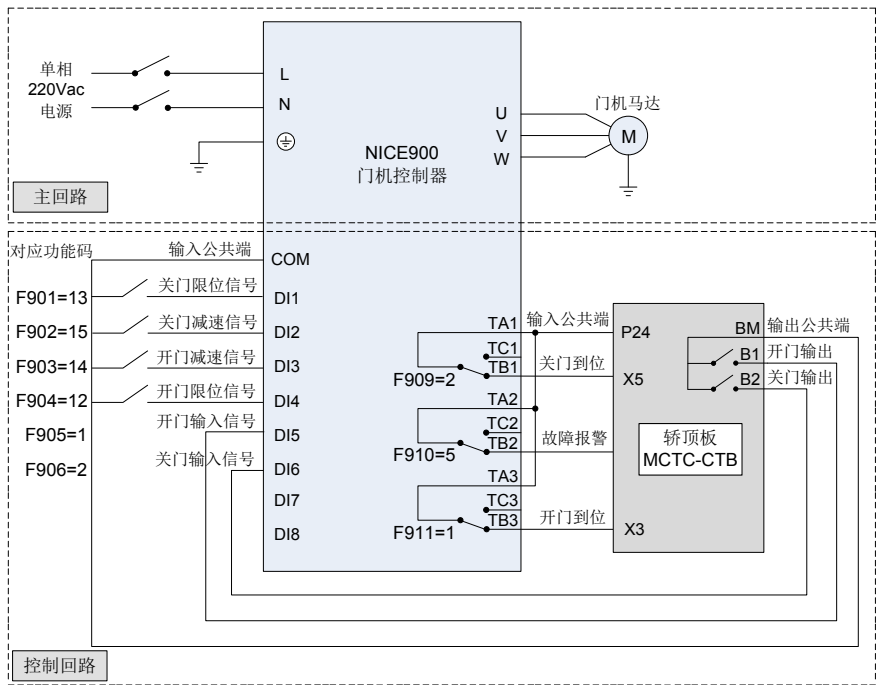


图 4-10 速度控制系统典型应用接线图相关功能码设定

功能码	命称	设定值
F001	开关门方式选择	0: 速度控制方式
F002	命令源选择	1: 门机端子控制模式
F901	开关量输入端子 DI1	13: 关门限位信号常开输入
F902	开关量输入端子 DI2	15: 关门减速点常开输入
F903	开关量输入端子 DI3	14: 开门减速点常开输入
F904	开关量输入端子 DI4	12: 开门限位信号常开输入
F905	开关量输入端子 DI5	1: 开门命令
F906	开关量输入端子 DI6	2: 关门命令

3. 速度控制模式下开关门运行曲线

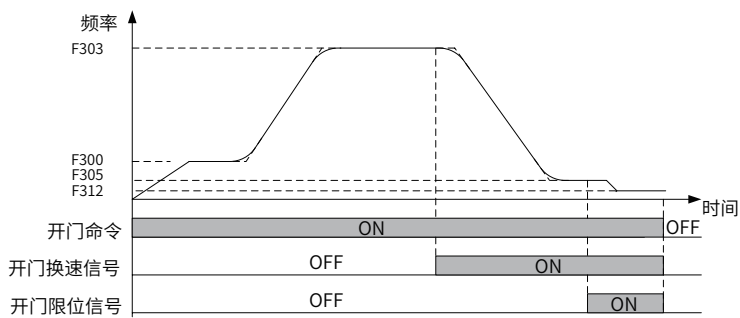


图 4-11 速度控制开门曲线示意图

当开门命令有效时，门机加速至 F300 速度运行。低速开门运行时间到达 F302 后，门机加速至开门高速 (F303)。开门减速信号有效后，门机减速至 F305。当开门到位信号有效后，门机减速至 F312 速度爬行，进行开门保持状态，开门保持力矩为 F308。

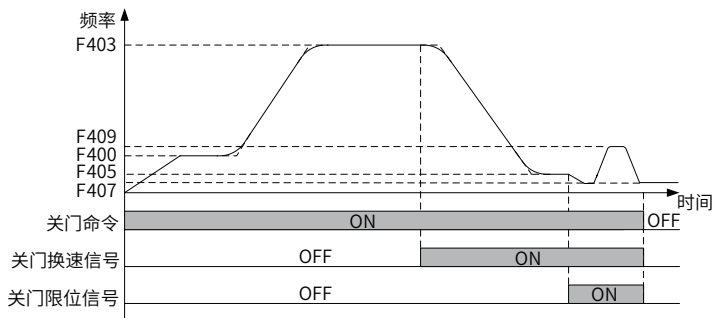


图 4-12 速度控制关门曲线示意图

当关门命令有效时，门机加速至 F400 速度运行。低速关门运行时间到达 F402 后，门机加速至关门高速 (F403)。关门减速信号有效后，门机减速至 F405 速度爬行。当关门到位信号有效后，进入关门保持状态，此时维持低速速度 F4-07，维持时间为 F408，关门到位保持力矩为 F412。

收刀速度及时间为 F409 和 F410。

4.4.2 距离控制模式

1. 距离控制方式需要在门机上加装编码器，控制器通过编码器判断门的位置。距离控制模式在首次运行时须正确学习门宽脉冲数，通过设置开、关门曲线部分参数实现减速点减速和到位的处理。

以本公司电梯控制系统为例说明门机控制器相关信号配线。

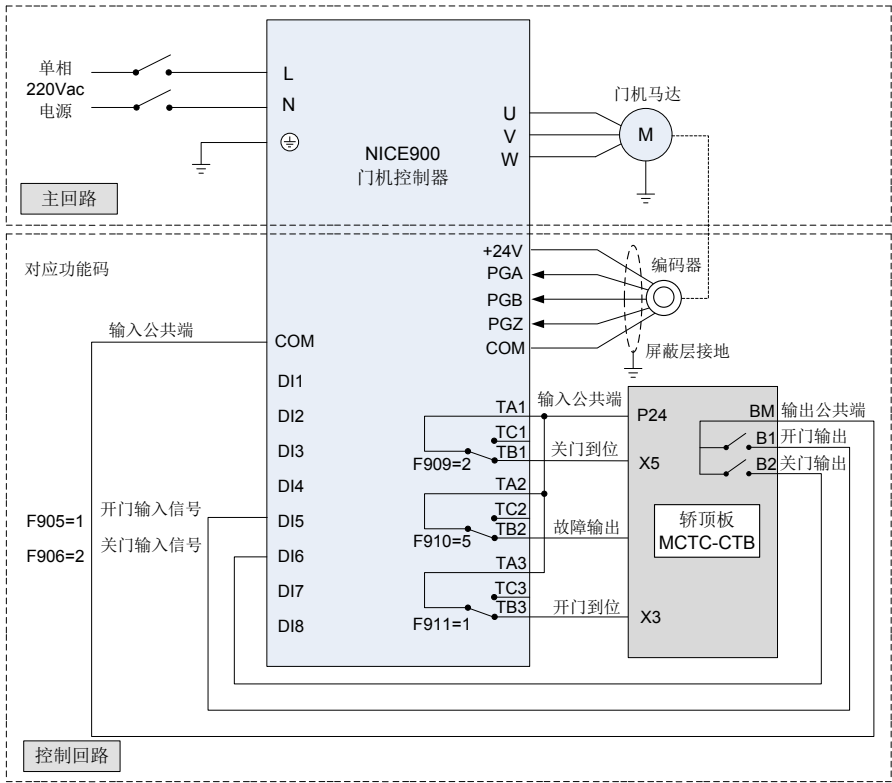


图 4-13 距离控制方式应用接线方式

2. 编码器检查

编码器反馈的脉冲信号是系统实现精准控制的重要保证，调试之前要着重检查。

- 编码器安装稳固，接线可靠。
- 编码器信号线与强电回路分槽布置，防止干扰。
- 编码器连线最好直接从编码器引入控制器，若连线不够长，需要接线，则延长部分也应该用屏蔽线，并且与编码器原线的连接最好用烙铁焊接。
- 编码器屏蔽层要求在控制器一端接地可靠。

3. 相关功能码设定

功能码	名称	设定值
F001	开关门方式选择	1: 距离控制方式
F002	命令源选择	1: 门机端子控制模式
F905	开关量输入端子 DI5	1: 开门命令
F906	开关量输入端子 DI6	2: 关门命令

4. 门宽自学习

距离控制方式需要在运行前进行门宽自学习，在距离控制的开关门过程中，实时记录行走的脉冲数，结合门宽脉冲数的数据进行开关门到位的控制和判断处理。

异步机距离控制方式下，门宽自学习之前需先确认编码器 AB 相信号接线正常。在门宽自学习过程中，门的动作方向会自动地改变，因此请在确保人身安全后再进行操作，否则可能造成人员的伤害。

务必确认门的动作途中无障碍物后方可进行门宽测定，若动作途中有障碍物等，则判定为到达，不能正确进行门宽测定。门宽测定流程如图 4-14 所示：

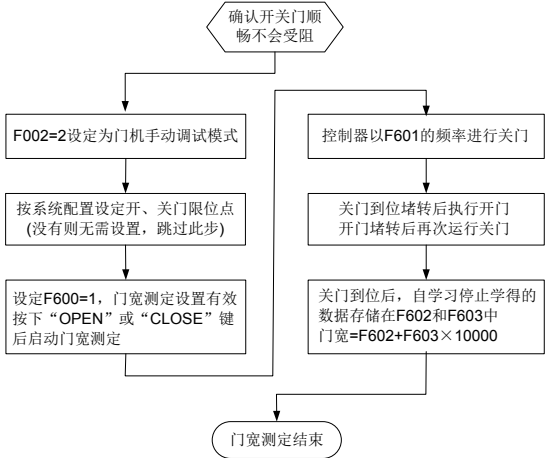


图 4-14 门宽测定流程图

5. 距离控制模式下开关门运行曲线

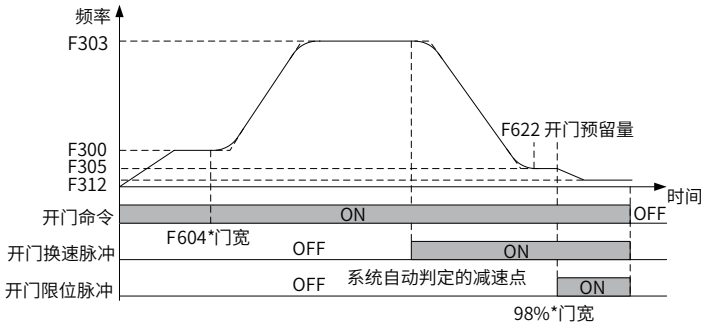


图 4-15 距离控制开门曲线示意图

当开门命令有效时，门机加速至 F300 速度运行。当开门位置达到 F604* 门宽后，门机开始加速，开门最大速度由系统自动规划，保证不超过 F303 设定值。接着自动系统判定剩余距离，在合适的位置开始减速爬行，爬行速度为 F305，减速时间为 F306。当开门位置到达 98% 门宽时，门机进入到位低速爬行阶段，速度为 F312，接着进入开门力矩保持状态，保持力矩大小为 F308 决定，此时门位置为 100%。

命令撤除后，力矩保持结束。

F622 开门预留量脉冲设定

当开门撞门时，可适当增加此值；当开门爬行过多，可适当减小此值；此值默认为 1% 的门宽脉冲，每次门宽自学习之后自动更新。
如果反复调整 F622 还是达不到合理的效果，可适当减小 F305 关门到位低速设定，可调整至 2~3HZ。

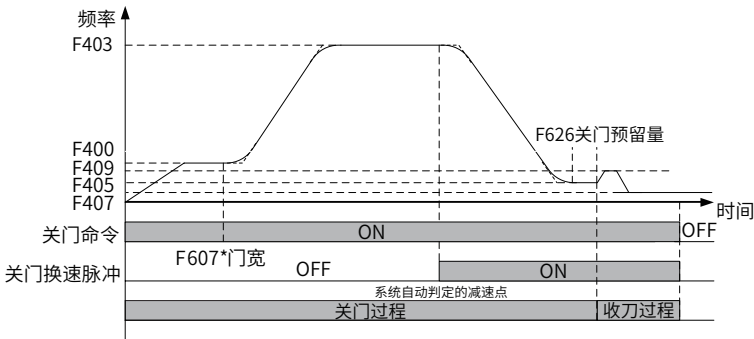


图 4-16 距离控制关门曲线示意图

当关门命令有效时，门机加速至 F400 速度运行。当关门位置达到 F607* 门宽后，门机开始加速，关门最大速度由系统自动规划，保证不超过 F403 设定。接着自动系统判定剩余距离，在合适的位置开始减速至 F405 速度运行，减速时间为 F406。当关门位置进入门刀区域时，进入收刀曲线，系统自动规划收刀曲线，速度由 F409 设定。当关门位置到达 2% 门宽时，门机进入低速爬行阶段，速度为 F407。当门堵转后，进入力矩保持阶段，此时的保持速度为 F407、保持力矩为 F412，门位置此时复位为 0。

关门命令无效时，力矩保持结束。

F623 门刀脉冲长度自学习

门刀长度会在门宽自学习过程中学出，针对不同的机械结构，可能会学不准门刀长度，下面提供一种手动学习门刀长度的方式：

先把门拉开，在慢慢的把门板闭合，当门板刚闭合的时候，读取系统当前脉冲值低位 FA25，门刀长度脉冲值可依据此值作为参考，并输入到 F623 功能码中。不合理的门刀长度会导致曲线撞门或者爬行过多，所以在关门效果不好的时候第一是调整 F623，待 F623 调整到合理之后再调整 F626。

F626 关门预留量脉冲设定

当关门撞门时，可适当增加此值，当关门爬行过多，可适当减小此值；此值默认为 2% 的门宽脉冲，

每次门宽自学习之后自动更新。

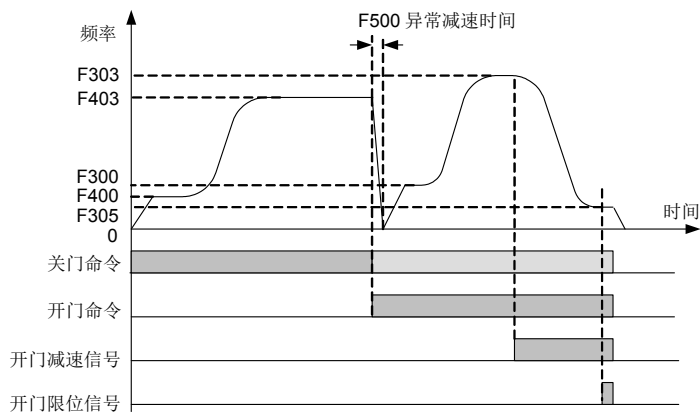
完整的开关门调试步骤如下：

正常调试步骤	
● 上电以后进行电机调谐和门宽自学习（在停机状态下同时按下 OPEN 和 CLOSE 键持续 3 秒，将启动一键调试功能。） 注：14.03 及以后版程序电机调谐优化，门电机开关运行一次即可。 ● 确认所学门刀长度 F623 是否合理，一般同步门刀的 lengths 在 2000 个脉冲左右。 ● 正常情况下不需要调整开关门预留量，进行开关门测试即可 ● 在比较追求开关门效果的现场可以手动调整开关门预留量，具体见下方 ● 如果调整了预留量效果还不是很很好，需要对门刀长度进行确认，具体见下方	
开关门到位给出调整	
● 调整开门到位给出：根据 F606（开门到位点）设置 ● 调整关门到位给出：根据 F609（关门到位点）设置	
开关门预留量调整	
每次门宽自学习之后开关门预留量系统会自动算出，单位是脉冲，现场开关门效果可按照如下进行调整： 开门撞门：手动加大 F622 开门预留量 开门爬行：手动减小 F622 开门预留量 关门撞门：手动加大 F626 关门预留量 关门爬行：手动减小 F626 关门预留量	
门刀长度调整	
● 收刀速度：手动修改 F409 收刀速度，默认 4HZ ● 门刀长度 可以通过功能码 F623 查看门宽自学习学出的门刀长度，单位脉冲 在比较清楚门刀长度的时候可以手动修改 ● 个别现场因门刀结构特殊，需要手动学习门刀长度： 门宽自学习之后，按下面板上的“stop”按钮，使门机停机，接着手动把门拉开，慢慢的把门板往关门方向闭合，当门板刚好接触的那一刻，手动查看功能码 FA-25（当前脉冲低位）。例如此时 FA-25 为 2200，那么门刀长度大概为 2200 个脉冲，把功能码 F6-23 改成 2200 即可。	

4.4.3 关门受阻

关门遇阻通常是指在关门运行过程中出现有以下几种状态，如光幕 / 触板信号有效、输出力矩大于关门遇阻力矩、开门命令等，NICE900 系列控制器关门受阻后的工作方式有减速停车或重开门两种，可通过功能码 F414 进行选择。关门受阻的判定方式有多重选择，可从时间和力矩两方面进行判定。

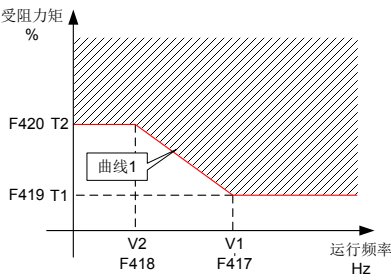
1. 速度控制方式，在关门过程中开门命令有效曲线如图 4-17 所示：



减速时间为 F500(异常减速时间)，重新开门时，以开门低速启动，经过速度控制开门启动低速运行时间 (F302) 后高速运行。开门减速信号有效后，转低速运行至开门到位，输出开门到位信号。

2. 相关功能码设定

功能码	名称	设定范围	备注
F414	关门受阻工作方式	0: 保留 1: 关门受阻后输出受阻信号 2: 关门受阻后立即停车 3: 关门受阻后重开门	2: 关门受阻立即停车，同时输出关门受阻信号。10s 内不响应关门命令，接收到开门命令或撤销运行命令后可立即响应关门。 3: 关门受阻后重开门，重开门期间不响应外部开关门命令。 关门遇阻包括以下几种状态： ◆ 关门运行过程中，光幕 / 触板信号有效； ◆ 关门运行过程中，输出力矩大于关门遇阻力矩； ◆ 关门运行过程中，关门时间超过 F502 设置值。
F415	关门受阻判定时间	0 ~ 9999ms	关门受阻时的滤波时间。当此参数设定为 0 时，不进行关门受阻判断。

功能码	名称	设定范围	备注
F417	关门受阻高速设定	F418 ~ F104, 12.00Hz	 关门受阻判断示意图 此四个功能码用于判断关门受阻处理； ◆ 如上图所示，该 4 个功能码值需按 $V1(F417) \geq V2(F418)$，$T1(F419) \leq T2(F420)$ 的要求设定。 ◆ 关门受阻判断的力矩百分比如图中曲线 1 所示，图中阴影部分则判断为关门受阻。
F418	关门受阻低速设定	0.00Hz ~ F104, 2.00Hz	
F419	高速力矩设定	0.00 ~ 150.0%, 100.0%	
F420	低速力矩设定	0.00 ~ 150.0%, 100.0%	
F500	异常减速时间	0.1 ~ 5.0s	
F502	关门时间限定	0 ~ 9999s	关门运行过程中，在设定时间内无法收到关门到位信号，则认为关门受阻，会根据 F414 的设定进行重开门处理或零速保持处理；该功能值设为 0 时无效。

第 5 章 功能参数表

5.1 功能码参数表使用说明

NICE900 系列门机控制器的功能参数按功能分组，有 F0 ~ F9、FA、FF、FP 等 13 组，每个功能组内包括若干功能码。功能码采用三级菜单，本手册其他内容中出现的 FXYZ 字样，含义是功能表中第“X”组中第“YZ”号功能码，如“F302”表示第 F3 组功能的第 2 号功能码。

为了便于功能码的设定，在使用操作面板进行操作时，功能组号对应一级菜单，功能码号对应二级菜单，功能码参数对应三级菜单。

功能表的列内容说明

第 1 列“功能码”：为功能参数组及参数的编号；第 2 列“名称”：为功能参数的完整名称；第 3 列“设定范围”：为功能参数的有效设定值范围；第 4 列“最小单位”：为功能参数设定值的最小单位；第 5 列“出厂设定值”：为功能参数的出厂原始设定值；第 6 列“更改”：为功能参数的更改属性（即是否允许更改和更改条件），说明如下：

“☆”：表示该参数的设定值在控制器、处于停机、运行状态中均可修改；

“★”：表示该参数的设定值在控制器、处于运行状态时不可修改；

“●”：表示该参数的数值是实际检测而记录值，不可修改；

（控制器已对各参数的修改属性作了自动检查约束，可帮助用户避免误操作）

“出厂设定值”表明当进行恢复出厂参数操作时，功能码参数被刷新后的数值；但实际检测的参数值或记录值，则不会被刷新。

为了更有效地进行参数保护，控制器对功能码提供了密码保护。

5.2 功能码参数表

按 PRG 键后，按 UP/DOWN 键所显示的，所有的一级菜单，即为功能组的分类。详细列表如下。

5.2.1 功能表分组

F0——基本功能参数	F7——演示功能参数
F1——电机参数	F8——辅助参数
F2——性能控制参数	F9——输入输出端子功能参数
F3——开门运行参数	FA——显示与故障参数
F4——关门运行参数	FF——厂家参数
F5——开关门辅助参数	FP——用户参数
F6——距离控制参数	

5.2.2 基本功能参数简表

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F0 组 基本功能参数					
F000	控制方式	0: 磁通矢量控制 1: 闭环矢量控制	1	1	★
F001	开关门方式选择	0: 速度控制方式 1: 距离控制方式	1	1	★
F002	命令源选择	0: 操作面板控制模式 1: 门机端子控制模式 2: 门机手动调试模式 3: 门机自动演示模式	1	0	★
F004	面板设定频率	0.00Hz ~ F104	0.01Hz	5.00Hz	☆
F005	输入点快捷设置	0 ~ 2	1	1	★
F006	慢速行走速度设定	0.00 ~ 20.00Hz	0.01Hz	4.00Hz	☆
F007	载波频率调节	2.0kHz ~ 16.0kHz	0.1kHz	8.0kHz	☆
F010	面板运行转矩上限	0.0 ~ 250.0%	0.1%	180.0%	☆
F1 组 电机参数					
F100	电机类型选择	0: 异步电机 1: 同步电机	1	1	★
F101	电机额定功率	0 ~ 750W	1W	机型确定	★
F102	电机额定电压	0 ~ 250V	1V	机型确定	★
F103	电机额定电流	0.001A ~ 9.900A	0.01A	机型确定	★
F104	电机额定频率	1.00Hz ~ 99.00Hz	0.01Hz	机型确定	★
F105	电机额定转速	1 ~ 9999rpm	1rpm	机型确定	★
F106	电机定子相电阻	00.00 ~ 99.99Ω	0.01	机型确定	★
F107	异步机转子相电阻	00.00 ~ 99.99Ω	0.01	机型确定	★
F108	异步机漏感抗	0 ~ 99.99mH	0.01mH	机型确定	★
F109	异步机互感	0 ~ 999.9mH	0.1mH	机型确定	★
F110	异步机空载激磁电流	0.000 ~ 9.900A	0.01A	机型确定	★

5

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F111	同步机 D 轴电感	0 ~ 999.9mH	0.1mH	机型确定	★
F112	同步机 Q 轴电感	0 ~ 999.9mH	0.1mH	机型确定	★
F113	磁极位置辨识脉宽	0 ~ 655	1	0	★
F114	同步机编码器零点位置	0 ~ 359.9	0.1	机型确定	★
F115	同步机实时角度	0 ~ 359.9	0.1	机型确定	●
F116	电机自动调谐进行	0: 无操作 1: 异步机带载调谐 2: 异步机空载调谐 3: 同步机空载调谐 4: 同步机带载调谐	1	0	★
F2 组 性能控制参数					
F200	速度环比例增益 1	0 ~ 100	1	15	☆
F201	速度环积分时间 1	0.01 ~ 10.00s	0.01s	0.50s	☆
F202	切换频率 1	0.00 ~ F205	0.01Hz	5.00Hz	☆
F203	速度环比例增益 2	0 ~ 100	1	15	☆
F204	速度环积分时间 2	0.01 ~ 10.00s	0.01s	1.00s	☆
F205	切换频率 2	F202 ~ F104	0.01Hz	10.00Hz	☆
F206	电流环比例增益	10 ~ 500	1	120	☆
F207	电流环积分增益	10 ~ 500	1	50	☆
F208	转差补偿系数	0% ~ 200%	1%	0%	☆
F209	惯量补偿	0 ~ 9999	1	0	★
F210	转矩提升	0 ~ 30.0%	0.1%	8.0%	☆
F211	过励磁增益	0 ~ 200	1	64	☆
F212	同步机初始位置推断方式	0 ~ 2	1	1	★
F213	速度反馈滤波级别	0 ~ 20	1	4	☆
F214	编码器脉冲数设定	1 ~ 9999	1	1000	★
F215	编码器脉冲方向选择	0: 正向 1: 反向	1	0	★
F216	自闭力系数	0~9999	1	0	☆
F217	自闭力初始值	0~9999	1	0	☆
F218	摩擦力	0~9999	1	0	☆
F219	门机惯量	0~9999	1	0	☆
F3 组 开门运行参数					
F300	开门启动低速设定	0.00Hz ~ F303	0.01Hz	5.00Hz	☆

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F301	开门启动加速时间	0.1 ~ 999.9s	0.1s	1.0s	☆
F302	速度控制开门启动低速运行时间	0.1 ~ 999.9s	0.1s	1.0s	☆
F303	开门高速设定	0.00Hz ~ F104	0.01Hz	20.00Hz	☆
F304	开门加速时间	0.1 ~ 999.9s	0.1s	1.5s	☆
F305	开门结束低速设定	0.00Hz ~ F303	0.01Hz	3.00Hz	☆
F306	开门减速时间	0.1 ~ 999.9s	0.1s	1.5s	☆
F307	开门到位力矩切换点设置	0.0% ~ 150.0% 电机额定转矩	0.1%	80.0%	☆
F308	开门到位保持力矩	0.0% ~ 180.0%	0.1%	80.0%	☆
F309	开门受阻力矩	0.0% ~ 150.0% 电机额定转矩	0.1%	100.0%	☆
F310	开门启动力矩	0.0% ~ 150.0% 电机额定转矩	0.1%	0.0%	★
F311	开门受阻判定时间	0 ~ 9999ms	1ms	0ms	☆
F312	开门到位低速设定	0.00 ~ F303	0.01Hz	3Hz	☆
F313	重开门低速设定	0.00Hz ~ F303	0.01Hz	0.00Hz	☆
F4 组 关门运行参数					
F400	关门启动低速设定	0.00Hz ~ F403	0.01Hz	4.00Hz	☆
F401	关门启动加速时间	0.1 ~ 999.9s	0.1s	1.0s	☆
F402	速度控制关门启动低速运行时间	0.1 ~ 999.9s	0.1s	1.0s	☆
F403	关门高速设定	0.00Hz ~ F104	0.01Hz	20.00Hz	☆
F404	关门加速时间	0.1 ~ 999.9s	0.1s	1.5s	☆
F405	关门结束低速设定	0.00Hz ~ F403	0.01Hz	2.00Hz	☆
F406	关门减速时间	0.1 ~ 999.9s	0.1s	1.5s	☆
F407	关门到位低速设定	0.00Hz ~ F403	0.01Hz	1.00Hz	☆
F408	关门到位低速运行时间	1 ~ 9999ms	1ms	300ms	☆
F409	收刀速度设定	0.00Hz ~ F403	0.01Hz	4.00Hz	☆
F410	收刀运行时间	1 ~ 9999ms	1ms	500ms	☆
F411	关门到位力矩切换点设置	0.0% ~ 150.0% 电机额定力矩	0.1%	80.0%	☆
F412	关门到位保持力矩	0.0% ~ F411	0.1%	30.0%	☆
F413	关门受阻力矩	0.0 ~ 150.0%	0.1	100.0	★
F414	关门受阻工作方式	0: 保留 1: 关门受阻仅输出受阻信号 2: 关门受阻立即停车 3: 关门受阻重新开门	1	1	★
F415	关门受阻判定时间	0 ~ 9999ms	1ms	500ms	☆
F416	消防关门高速设定	5.00Hz ~ F104	0.01Hz	10.00Hz	☆

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F417	关门受阻高速设定	F418 ~ F104	0.01Hz	12.00Hz	☆
F418	关门受阻低速设定	0.00Hz ~ F104	0.01Hz	2.00Hz	☆
F419	高速受阻力矩设定	0.0% ~ 150.0%	0.1%	100.0%	☆
F420	低速受阻力矩设定	0.0% ~ 150.0%	0.1%	100.0%	☆
F421	关门限位点前移量	0.0 ~ 10.0%	0.1%	4.0%	☆
F422	掉电关门时候脉冲预留量	0-5000	1	500	☆
F423	掉电时开始减速电压设定	150.0-310.0	0.1	200.0	★
F5 组 开关门辅助参数					
F500	异常减速时间	0.1 ~ 5.0s	0.1	0.3s	☆
F501	开门时间限定	0 ~ 999.9s	0.1s	30.0s	☆
F503	慢速运行时间限定	0 ~ 999.9s	0.1s	0.0s	☆
F504	外部开门命令延时时间	0 ~ 999.9s	0.1s	60.0s	☆
F505	外部关门命令延时时间	0 ~ 999.9s	0.1s	60.0s	☆
F506	开门曲线选择	0: 直线加减速 1: S 曲线加减速	1	1	★
F507	开门加速 S 曲线起始段时间	10.0%~ 50.0% (加减速时间)(起始段+上升段≤ 90%)	0.1%	20.0%	★
F508	开门加速 S 曲线上升段时间	10.0%~ 80.0% (加减速时间)(起始段+上升段≤ 90.0%)	0.1%	60.0%	★
F509	开门减速 S 曲线起始段时间	10.0%~ 50.0% (加减速时间)(起始段+上升段≤ 90%)	0.1%	20.0%	★
F510	开门减速 S 曲线下降段时间	10.0%~ 80.0% (加减速时间)(起始段+下降段≤ 90%)	0.1%	60.0%	★
F511	关门曲线选择	0: 直线加减速 1: S 曲线加减速	1	1	★
F512	关门加速 S 曲线起始段时间	10.0% ~ 50.0%(加减速时间) 起始段+上升段 90%	0.1%	20.0%	★
F513	关门加速 S 曲线上升段时间	10.0% ~ 80.0%(加减速时间) 起始段+上升段 90%	0.1%	60.0%	★
F514	关门减速 S 曲线起始段时间	10.0% ~ 50.0%(加减速时间) 起始段+下降段 90%	0.1%	20.0%	★
F515	关门减速 S 曲线下降段时间	10.0% ~ 80.0%(加减速时间) 起始段+下降段 90%	0.1%	60.0%	★
F516	速度偏差设定	0 ~ 80%	1%	50%	☆
F517	速度偏差过大判定时间	0 ~ 5000ms	1ms	400ms	☆
F518	关门稳速延时	0 ~ 9999ms	1ms	200ms	★
F519	故障制动电流	0.1 ~ 150.0	0.10%	100	☆
F520	撤电流速率	1~1000ms	1ms	2ms	☆

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F521	换向减速时间	0.1~5.0s	0.1s	2.0s	☆
F522	功能选择开关	0~9999	1	0	★
F523	功能选择开关	0~9999	1	128	☆
F524	功能选择开关	0~9999	1	78	☆
F6 组 距离控制参数					
F600	门宽自学习功能选择	0: 无效 1: 门宽测定, 门机手动调试模式下有效	1	0	★
F601	门宽自学习速度	2.0 ~ 20.0Hz	0.01Hz	3.00Hz	☆
F602	门宽脉冲数低位	0 ~ 9999	1	0	★
F603	门宽脉冲数高位	0 ~ 9999	1	0	★
F604	距离控制开门启动低速运行距离	0.0% ~ 30.0%(门宽)	0.0%	10.0%	☆
F605	距离控制开门减速点设定 注: 软件版本高于 V14.03 的曲线规划不在需要设置开门减速点, 系统自动规划减速曲线。	60.0% ~ 90.0%(门宽)	0.1%	70.0%	☆
F606	距离控制开门限位点设定 注: 软件版本高于 V14.03 的曲线规划不在使用此功能码进行开门到位曲线规划, 此功能码只是作为开门到位信号何时输出的判定条件。	80.0% ~ 99.0%(门宽)	0.1%	96.0%	☆
F607	距离控制关门启动低速运行距离	0.0% ~ 30.0%(门宽)	0.1%	10.0%	☆
F608	距离控制关门减速点设定 注: 软件版本高于 V14.03 的曲线规划不再需要设置关门减速点, 系统自动规划减速曲线。	60.0% ~ 90.0%(门宽)	0.1%	70.0%	☆
F609	距离控制关门限位点设定 注: 软件版本高于 V14.03 的曲线规划不在使用此功能码进行关门到位曲线规划, 此功能码只是作为关门到位信号何时输出的判定条件。	80.0% ~ 99.0%(门宽)	0.1%	96.0%	☆
F610	输出力矩显示	0.0 ~ 180.0%	0.1%	0.0%	☆
F611	开门限位开关位置低位	0 ~ 9999	0	0	★
F612	开门限位开关位置高位	0 ~ 9999	0	0	★
F613	关门限位开关位置	0 ~ 9999	0	0	★
F614	门宽自学习及初始运行力矩设定	0.0 ~ 150.0%	0.1%	80.0%	★

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F615	开门减速点脉冲低位	0 ~ 9999	0	0	★
F616	开门减速点脉冲高位	0 ~ 9999	0	0	★
F617	关门减速点脉冲低位	0 ~ 9999	0	0	★
F618	关门减速点脉冲高位	0 ~ 9999	0	0	★
F619	开门到位输出时的门宽设定	0 ~ 99.9%	0.1%	0	☆
F620	关门到位输出时的门宽设定	0 ~ 99.9%	0.1%	0	☆
F621	门位置脉冲反馈	0 ~ 99.9%	0.1%	33%	☆
F622	开门预存量脉冲设定	0~9999	1	0	☆
F623	门刀长度设定	0~9999	1	0	☆
F626	关门预存量脉冲设定	0~9999	1	0	☆
F629	异步机传动比	0.0~100.0	0.1	0.0	☆
F7 组 演示功能参数					
F700	演示开门到位保持时间	1.0 ~ 999.9s	0.1s	2.0s	☆
F701	演示关门到位保持时间	1.0 ~ 999.9s	0.1s	2.0s	☆
F702	演示开关门运行次数记录	0 ~ 9999	1	0	★
F703	演示开关门指定运行次数	0 ~ 9999	1	0	★
F8 组 辅助参数					
F800	软件版本号	0.00 ~ 99.00	0.01	1.00	●
F801	模块温度	0 ~ 100℃	1℃	0	●
F802	故障自动复位次数	0 ~ 100 0 表示无自动复位功能 (复位间隔为 2s), 循环时间 1 小时	1	0	★
F803	制动使用率	0 ~ 100%	1	100%	☆
F804	工作时间累计	0 ~ 9999 小时	1	0	★
F805	保留 (工作时间分钟)	0	1	0	★
F806	运行时间累计	0 ~ 9999 小时	1	0	★
F807	保留 (运行时间分钟)	0	1	0	★
F808	工作时间累计设定	0 ~ 9999 小时	1	0	★
F809	运行时间累计设定	0 ~ 9999 小时	1	0	★
F810	辅助功能选择	0 ~ 9999	1	12	★
F811	故障功能选择	0 ~ 9999	1	0	★
F812	驱动功能选择	0 ~ 9999	1	0	★
F814	过载系数	0 ~ 10.00	0.01	2.00	☆
F817	辅助功能选择 2	0 ~ 9999	1	12	★
F9 组 输入输出功能参数					
F900	端子滤波时间	0 ~ 100ms	1ms	20ms	☆

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
F901	开关量输入端子 DI1	0: 无功能可以复选 1: 开门命令 2: 关门命令	1	0	★
F902	开关量输入端子 DI2	3: 外部复位 RESET 输入 4: 开门禁止端子输入 5: 力矩保持禁止端子输入 6: 慢速关门使能输入	1	0	★
F903	开关量输入端子 DI3	7: 消防输入 8 ~ 9: 保留	1	0	★
F904	开关量输入端子 DI4	10: 光幕信号常开输入 11: 触板信号常开输入 12: 开门限位信号常开输入	1	0	★
F905	开关量输入端子 DI5	13: 关门限位信号常开输入 14: 开门减速点常开输入 15: 关门减速点常开输入	1	1	★
F906	开关量输入端子 DI6	16: 门锁信号常开输入 17 ~ 109: 保留 110: 光幕信号常闭输入	1	2	★
F907	开关量输入端子 DI7	111: 触板信号常闭输入 112: 开门限位信号常闭输入 113: 关门限位信号常闭输入	1	10	★
F908	开关量输入端子 DI8	114: 开门减速点常闭输入 115: 关门减速点常闭输入 116: 门锁信号常闭输入	1	6	★
F909	可编程继电器输出 TA1/TB1/TC1	0: 无功能 1: 开门到位信号输出 0 2: 关门到位信号输出 0 3: 开门到位信号输出 1	1	2	★
F910	可编程继电器输出 TA2/TB2/TC2	4: 关门到位信号输出 1 5: 故障继电器信号输出 1 6: 保留 7: 开门到位信号输出 2 8: 关门到位信号输出 2	1	5	★
F911	可编程继电器输出 TA3/TB3/TC3	9: 门锁信号输出 10: 重开门信号输出 11: 受阻信号输出 12: 门位置反馈输出 13: 门机就绪输出	1	1	★

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
FA 组 显示与故障参数					
FA00	LED 运行显示参数选择	采用二进制码来选择该位 =1 选择 显示具体说明如下： BIT0: 设定频率 Hz BIT1: 运行频率 Hz BIT2: 直流母线电压 V BIT3: 输出电压 V BIT4: 输出电流 A	1	319	☆
FA00	LED 运行显示参数选择	BIT5: 输出力矩 % BIT6: 开关量输入端子状态 BIT7: 开关量输出端子状态 BIT8: 门宽脉冲百分比 注 FA00 所选定的各个监视量在运行过程中均可显示并通过移位键切换显示 1 ~ 511	1	319	☆
FA01	LED 停机显示参数选择	0: 开门设定频率 Hz 1: 关门设定频率 Hz 2: 直流母线电压 V 3: 开关量输入端子状态 4: 开关量输出端子状态 5: 门宽脉冲百分比 注 FA01 所选定的各个监视量在停机过程中均可显示并通过移位键切换显示 1 ~ 63	1	39	☆
FA02	第 1 次故障类型	故障类型设定范围: 0~30 故障提示范围: 0~9	1	0	●
FA03	第 1 次故障提示		1	0	●
FA04	第 2 次故障类型		1	0	●
FA05	第 2 次故障提示		1	0	●
FA06	第 3 次故障类型		1	0	●
FA07	第 3 次故障提示		1	0	●
FA08	第 4 次故障类型		1	0	●
FA09	第 4 次故障提示		1	0	●
FA10	最近次故障类型		1	0	●
FA11	第五次故障提示		1	0	●
FA12	最后一次故障时刻母线电压	0 ~ 999.9V	0.1V	0.0V	●
FA13	最后一次故障时刻输出电流	0.000 ~ 9.900A	0.001A	0.000A	●
FA14	最后一次故障时刻运行频率	0.00Hz ~ 99.00Hz	0.01Hz	0.00Hz	●
FA15	最后一次故障时刻输出力矩	0.0 ~ 180.0%	0.1%	0.0%	●

功能码	名称	设定范围	最小单位	出厂设定值	更改属性
FA16	最后一次故障时刻输入端子状态	0 ~ 1023 0: OFF 1: ON DI8/DI7/DI6/DI5/DI4/DI3/DI2/DI1	1	0	●
FA17	最后一次故障时刻输出端子状态	0 ~ 15 0: OFF; 1: ON; T1/T2/T3	1	0	●
FA18	端子状态查询	*	*	*	●
FA19	功能输入状态查询	*	*	*	●
FA20	功能输出状态查询	*	*	*	●
FA21	显示开关控制	0 ~ 9999	1	0	☆
FA22	显示 1	0 ~ 9999	1	0	●
FA23	显示 2	0 ~ 9999	1	0	●
FA24	模拟量电压显示	0.00 ~ 10.10V	0.01V	0.00V	●
FA25	门当前位置低位	0 ~ 9999	1	0	●
FA26	门当前位置高位	0 ~ 9999	1	0	●
FA27	运行状态查看	0 ~ 9999	1	0	●
FA28	门方向判断	*	*	*	●
FA29	门位置百分比	0.0 ~ 100.0%	0.1%	0.0%	●
FA30	设定频率	0.00 ~ 99.99Hz	0.01Hz	00.00Hz	●
FA31	反馈频率	0.00 ~ 99.99Hz	0.01Hz	00.00Hz	●
FA32	母线电压	0.0 ~ 999.9V	0.1V	0.0V	●
FA33	输出电压	0 ~ 9999V	1V	0V	●
FA34	输出电流	0.00 ~ 99.99A	0.01A	0.00A	●
FA35	输出转矩	0.0 ~ 999.9%	0.1%	0.0%	●
FF 组 厂家参数 (保留)					
FP 组 用户参数					
FP00	用户密码	0 ~ 9999 (0 表示无密码)	1	0	☆
FP01	参数更新	0: 无 1: 恢复出厂参数 2: 清除记忆信息	1	0	★
FP02	用户设定检查	0 ~ 1	1	0	☆

第 6 章 功能参数说明

6.1 F0 组 基本功能参数

F000	控制方式	出厂设定	1	最小单位	1
	设定范围	0 ~ 1			

0：磁通矢量控制：同步机以外的所有应用均使用此种控制方式。

1：闭环矢量控制：仅同步机距离控制使用此种控制方式。

F001	开关门方式选择	出厂设定	1	最小单位	1
	设定范围	0 ~ 1			

0：速度控制方式

此种方式下，门上需要安装四个行程开关，通过减速点进行减速处理，通过判断限位开关的信号来进行到位的处理。

1：距离控制方式

此种方式必须正确学习门宽脉冲数，通过设置开、关门曲线部分参数实现减速点减速和到位的处理。（若在 F9 输入端子功能选择部分设置了限位信号，则会通过判断限位信号进行到位处理）

F002	命令源选择	出厂设定	0	最小单位	1
	设定范围	0 ~ 3			

0：操作面板控制模式

通过控制器操作面板控制门电机运行和停止，此时门电机以 F004 设定频率运行。即：按下“OPEN”键执行正转，按下“CLOSE”键执行反转，按下“STOP/RES”键停机。在这种控制方式下，控制器按照通用控制器的功能运行，不执行门机特殊逻辑流程。此控制模式主要用于电机调谐。

1：门机端子控制模式

控制器 DI 端子接收控制系统发出的开门、关门运行命令，实现门的开关控制。运行逻辑如下：

开门命令	关门命令	运行状态
0	0	停止
0	1	关门
1	0	开门
1	1	保持运行状态

2：门机手动调试模式

进行门宽自学习之前请先设置此模式。此模式下，可通过控制器操作面板控制运行和停车，即：按下“OPEN”键执行开门，按下“CLOSE”键执行关门，按下“STOP/RES”键停机。此时门电机运行有加减速过程。

3：门机自动演示模式

门机自动演示模式用于门机的演示和厂内试运行，不需要控制系统的控制。在门机面板控制模式下完成对门机运行曲线的调试后，即可设置进入自动演示模式。按下“OPEN”或“CLOSE”键启动反复开关门演示，开、关门演示的间隔时间和次数可通过 F7 组演示功能参数设定，按下“STOP/RES”键停机。

注：

- 1. 门宽自学习只在门机手动调试模式下有效。
- 2. 电机调谐仅在面板控制模式下有效。

F004	面板运行频率	出厂设定	5.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ F104			

门机控制器的速度设定方式采用面板控制模式时的运行目标频率。

F005	输入点快捷设置	出厂设定	0	最小单位	1
	设定范围	0 ~ 2			

在速度控制方式 (F001=0) 下，用于快速设定限位开关及减速开关的信号特性。当 F005 为非零时，对应输入点类型如下：

F005=1	F005=2
F901=13(关门到位常开输入)	F901=113(关门到位常闭输入)
F902=15(关门减速常开输入)	F902=115(关门减速常闭输入)
F903=14(开门减速常开输入)	F903=114(开门减速常闭输入)
F904=12(开门到位常开输入)	F904=112(开门到位常闭输入)

注：只有当 F005=0 时，可以手动更改 F901 ~ F904；否则无法更改 F901 ~ F904。

F006	慢速行走速度设定	出厂设定	4.00Hz	最小单位	0.01Hz
	设定范围	0 ~ 1			

慢速关门输入功能有效，或距离控制方式时上电后的第一次运行，或检修输入有效时的设定速度。

F007	载波频率	出厂设定	8.0kHz	最小单位	0.1kHz
	设定范围	2.0 ~ 16.0kHz			

此功能调节控制器的载波频率。通过调整载波频率可以降低电机噪声，避开机械系统的共振点，减小线路对地漏电流及减小控制器产生的干扰。

当载波频率低时，输出电流高次谐波分量增加，电机损耗增加，电机温升增加。

当载波频率高时，电机损耗降低，电机温升减小，但控制器损耗增加，控制器温升增加，干扰增加。

载波频率	低	~	高
电机噪音	大	~	小
输出电流波形	差	~	好

电机温升	高	~	低
控制器温升	低	~	高
漏电流	小	~	大
对外辐射干扰	小	~	大

F010	面板运行转矩上限	出厂设定	180.0%	最小单位	0.1%
	设定范围	0.0 ~ 250.0%			

用来设定变频器在操作面板控制模式时的最高输出转矩。100.0% 对应额定转矩。

6.2 F1 组 电机参数

功能码	名称	出厂设定	最小单位	设定范围
F100	电机类型选择	1	1	0 ~ 2
F101	额定功率	机型确定	1W	0 ~ 750W
F102	额定电压	100V	1V	0 ~ 250V
F103	额定电流	机型确定	0.001A	0.001 ~ 9.900A
F104	额定频率	24.00Hz	0.01Hz	1.00 ~ 99.00Hz
F105	额定转速	180rpm	1rpm	0 ~ 9999rpm

请按照电机的铭牌参数进行设置。

实现矢量控制的优良控制性能，需要准确的电机参数。系统提供参数自动辨识功能。准确的参数辨识需要正确设置电机的铭牌参数。

功能码	名称	出厂设定	最小单位	设定范围
F106	电机定子相电阻	机型确定	0.01Ω	0.00 ~ 99.99Ω
F107	异步机转子相电阻	机型确定	0.01Ω	0.00 ~ 99.99Ω
F108	异步机漏感抗	机型确定	0.01mH	0.0 ~ 99.99mH
F109	异步机互感	机型确定	0.1mH	0 ~ 999.9mH
F110	异步机空载励磁电流	机型确定	0.001A	0.001 ~ 9.900A
F111	同步机 D 轴电感	机型确定	0.1mH	0.0 ~ 999.9mH
F112	同步机 Q 轴电感	机型确定	0.1mH	0.0 ~ 999.9mH
F113	磁极位置辨识脉宽	0	1	0 ~ 655
F114	同步机编码器零点位置	机型确定	0.1	0.0 ~ 359.9
F115	同步机实时角度	机型确定	0.1	0.0 ~ 359.9

为了保证控制性能，请按系统标准适配电机进行电机配置，若电机功率与标准适配电机差距过大，系统的控制性能将可能下降。

电机自动调谐正常结束后，F106 ~ F114 的设定值自动更新。（异步机和同步机辨识结束后更新对应的参数）

对于异步电机：NICE900 系列控制器可通过完整调谐或静止调谐获得以上参数。如果现场无法

对电机进行调谐，可以参考同类铭牌参数相同电机的已知参数手工输入。异步机型每次更改电机额定功率 F101 后，系统将 F106 ～ F110 参数值将自动恢复缺省的标准电机参数。

NICE900 应用于永磁同步电机：可通过完全调谐获得 F106、F111、F112、F113、F114 参数。在更改电机额定功率 F101 后，不会更新对应参数。

F115 参数用于实时显示同步机当前的磁极位置。

F116	电机调谐	出厂设定	0	最小单位	1
	设定范围	0 ～ 5(异步机: 1、2、5 同步机: 3、4、5)			

注：

- 1. 电机调谐必需在面板控制模式 (即 F002 = 0) 下进行，进行调谐前，必须设置正确的电机额定参数 (F100 — F105) 和编码器线数参数 F214。
- 2. 如果使用永磁同步电动机，第一次运行前，更换了电机、编码器或者变更了编码器的安装后，必须进行电机调谐。没有成功调谐前禁止运行永磁同步电动机，否则有飞车危险。调谐过程中，应注意避免堵转，若堵转则调谐不成功。

调谐操作：

当 F116 设定后然后按 ENTER 键，此时显示 “TUNE” 并闪烁，然后按 “OPEN” 或 “CLOSE” 键开始进行参数调谐，此时显示的 “TUNE” 停止闪烁。当调谐结束后，显示回到停机状态界面。在调谐过程中也可以按 “STOP” 键中止调谐。当调谐完成后，F116 的值自动恢复为 0。

调谐功能选择：

0：无操作

1：异步机静止调谐

适用于负载不易脱开而不能进行完整调谐的场合，调谐定子电阻、转子电阻和漏感参数。(空载电流和互感应该计算出来)

2：异步机完整调谐

为保证控制器的动态控制性能，请选择电机完整调谐，完整调谐时电机必须和负载脱开 (空载)。需要电机和负载完全脱开。

选择完整调谐后，控制器先进行静止调谐，静止调谐结束后，异步电机将按照系统设定默认的加速时间 2s 加速到电机额定频率的 80%，并保持一段时间，然后按照减速时间 2s 减速到零速，完整调谐结束。

3：永磁同步电机空载调谐

调谐内容包括：编码器零点补偿角 (F114)、永磁同步机定子相电阻 (F106)、永磁同步机 (隐极电机)dq 轴电感 (F110、F111) 等。要求电机和负载完全脱开，有负载情况下调谐的编码器零点补偿角将不准确，会影响电机控制性能。

调谐的时候，首先会按照开门调谐命令还是关门调谐命令，缓慢执行开门或者关门操作，一段距离后再反方向运行，最后执行所有参数计算，完成空载调谐过程。

调谐过程中如果出现 20 号故障，可能是编码器输入方向不正确，请把编码器 AB 相或电机接线互换一下，再次调谐。

4：永磁同步电机带负载调谐

调谐内容包括：编码器零点补偿角 (F114)、永磁同步机定子相电阻 (F106)、永磁同步机 (隐极电机)

dq 轴电感 (F110、F111)。该方式下调谐永磁同步电机的参数和编码器零点位置可以带负载执行，相对于空载调谐，调谐的编码器零点位置角更不精确。请尽量选择空载调谐。

带负载调谐的时候，当门处于闭合状态时，按下开门键执行调谐操作；当门处于完全打开状态时，则按下关键执行调谐操作，以电机额定频率 25% 为目标速度缓慢执行开关门 / 关门操作，重复一次操作后再反方向运行，往返运行一共调谐 3 次，最后完成所有参数计算，完成带负载调谐过程。若按下开门键 / 关键后门机执行关门 / 开门且堵转，则电机接线或编码器接线出现异常，调谐后重新进行电机调谐。



NOTE

◆ 软件版本高于 V14.03 只需要来回调谐一次即可。

5：具体调谐说明可参考第四章操作显示与应用。

6.3 F2 组 性能控制参数

F200	速度环比例增益 1	出厂设定	15	最小单位	1
	设定范围	0 ~ 100			
F201	速度环积分时间 1	出厂设定	0.50s	最小单位	0.01s
	设定范围	0.01 ~ 10.00s			
F202	切换频率 1	出厂设定	5.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ F205(切换频率 2)			
F203	速度环比例增益 2	出厂设定	15	最小单位	1
	设定范围	0 ~ 100			
F204	速度环积分时间 2	出厂设定	1.00s	最小单位	0.01s
	设定范围	0.01 ~ 10.00s			
F205	切换频率 2	出厂设定	10.00HZ	最小单位	1Hz
	设定范围	F202(切换频率 1) ~ F104			

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F200 和 F201 为运行频率小于切换频率 1(F202) 时的 PI 调节参数；F203 和 F204 为运行频率大于切换频率 2(F205) 时的 PI 调节参数。处于切换频率 1 和切换频率 2 之间 PI 调节参数，为 F200、F201 和 F203、F204 的加权平均值。如下图所示：

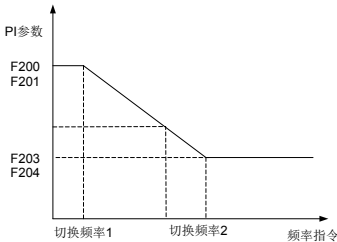


图 6-1 PI 参数示意图

通过设定速度调节器的比例系数和积分时间，可以调节矢量控制的速度动态响应特性。增加比例增益，减小积分时间，均可加快速度环的动态响应。比例增益过大或积分时间过小均可能使系统产生振荡。

建议调节方法：

如果出厂参数不能满足要求，则在出厂值参数基础上进行微调：先增大比例增益，保证系统不振荡；然后减小积分时间，使系统既有较快的响应特性，超调又较小。

如果切换频率 1、切换频率 2 同时为 0，则只有 F203，F204 有效。

注：PI 参数设置不当可能会导致速度超调过大。甚至在超调回落时产生过电压故障。

F206	电流环比例增益	出厂设定	120	最小单位	1
	设定范围	10 ~ 500			
F207	电流环积分增益	出厂设定	50	最小单位	1
	设定范围	10 ~ 500			

F206、F207 为矢量控制算法中，电流环调节参数。客户一般不需要调整该参数，一般情况下默认参数能够达到相当的控制性能。如果需要调整，请参照速度环调节器的方式调整。

F208	转差补偿系数	出厂设定	0%	最小单位	1%
	设定范围	0 ~ 200%			

仅在磁通矢量控制下使用，该参数影响电机的动态性能和负载电流，一般不要求调整。

F209	惯量补偿	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

闭环矢量控制下，提高系统动态性能的参数，惯量补偿力矩的大小等于系统惯量乘以加速度；一般情况下不需要修改该参数，仅在门非常重的场合下适当增加该参数。

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F210	转矩提升	出厂设定	8.0%	最小单位	0.1%
	设定范围	0.0 ~ 30.0%			

为了补偿磁通矢量控制低频转矩特性，对低频时控制器输出电压做出一些提升补偿。转矩提升设置过大，电机容易过热，控制器容易过流。有效调整此参数，可避免启动时过流情况。对于较大负载，可增大此参数设置。

当转矩提升设置为 0 时，控制器为自动转矩提升。

F211	过励磁增益	出厂设定	64	最小单位	1
	设定范围	0 ~ 200			

过励磁增益的作用是在控制器减速过程中抑制母线电压上升，避免母线电压超过过压保护限定值而出现过压故障。过励磁增益越大，抑制效果越强。设置说明如下：

1. 惯性很小的场合，设置过励磁增益为 0，惯性大的场合，应当适当提高过励磁增益。
2. 有制动电阻场合，过励磁增益一定要设置为 0。

F212	初始位置推断方式	出厂设定	1	最小单位	1
	设定范围	0 ~ 2			

1. 采用脉冲方式的永磁同步电机磁极初始位置推断方式。
2. 采用其它测试的永磁同步电机磁极初始位置推断方式。

F213	反馈速度滤波级别	出厂设定	4	最小单位	1
	设定范围	0 ~ 20			

该参数设置对编码器反馈速度的滤波程度，一般不需要调整。在现场干扰严重或者编码器线数非常少的情况下，如果采用闭环矢量方式控制，可以适当加大反馈速度的滤波级别，以使得电机运行更平稳。

注：电机和负载惯量很小的场合，该参数设置过大，可能导致电机超调严重或引起电机振荡。

F214	编码器脉冲数设定	出厂设定	1000	最小单位	1
	设定范围	1 ~ 9999			

NICE900 门机控制器的闭环矢量运行，必须正确设置脉冲编码器的相关参数。

F215	编码器方向选择	出厂设定	0	最小单位	1
	设定范围	0 ~ 1			

恢复出厂参数时，此参数会恢复为 0，慎用此功能。

F216	自闭力系数	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

F217	自闭力初始值	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

F218	摩擦力	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

F219	门机惯量	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

门机每次自学习之后，可以学出门机的惯量，门板自闭力及摩擦力，参数用于正常运行时的补偿计算。

6.4 F3 组 开门运行参数

速度控制方式下门机系统中各种信号接点 (行程开关) 的安装位置如图 6-2 所示。

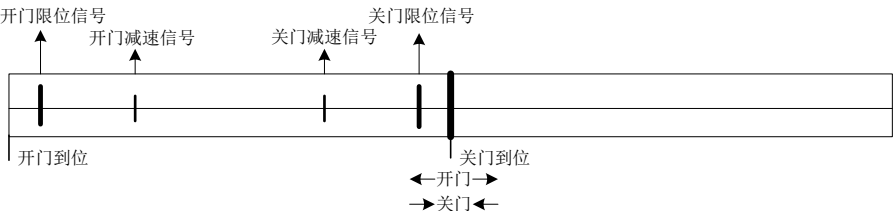


图 6-2 速度控制各开关安装示意图

正确设置 F3 组与速度控制有关的功能参数，准确设置减速信号开关和限位信号开关。开门运行速度曲线可以用图 6-3 来说明。

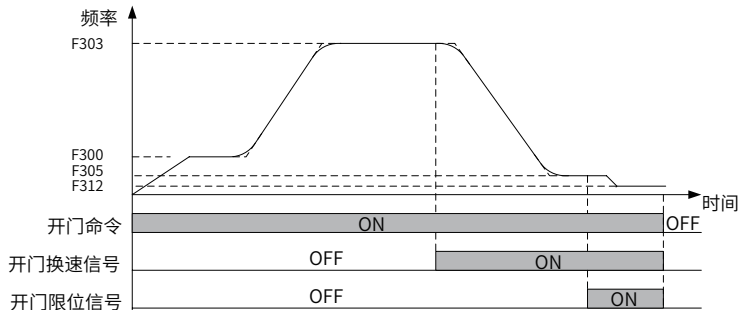


图 6-3 速度控制开门曲线示意图

行程开关方式，开门过程说明：

- 6
1. 当开门命令有效时，门机经 F301 的时间加速到 F300 设定的速度运行。
 2. 低速开门运行时间到达 F302 后，门机加速到开门高速 (F303) 运行，加速时间为 F304。
 3. 开门减速信号有效后，门机减速到 F305 的速度爬行，减速时间为 F306。
 4. 当开门限位信号有效后，进入开门保持状态，速度为 F312, 开门保持力矩为 F308。
 5. 需要力矩维持时，增大 F504。
 6. 运行曲线中虚线部分表示：当开门曲线选择 (F506) 为直线加减速时的运行曲线。

距离控制方式下，请正确设置 F6 组与距离控制有关的功能参数，开门运行速度曲线可以用图 6-4 来说明。

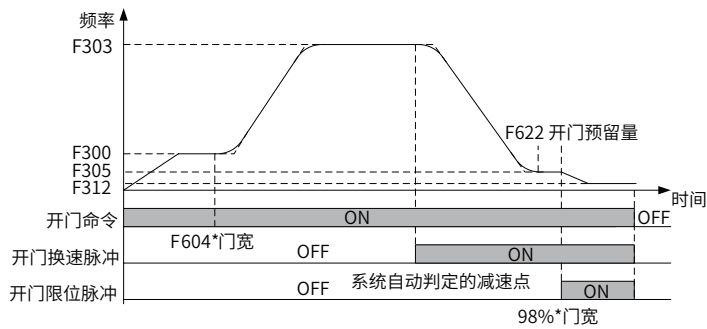


图 6-4 距离控制开门曲线示意图

距离控制开门过程说明：

- 1. 当开门命令有效时，门机以 F301 的加速时间加速到 F300 的设定速度运行。
- 2. 当开门位置达到 F604* 门宽后，门机以 F304 的加速时间加速到系统规划的最大运行速度，速度以 F303 设定为上限。
- 3. 当开门运行到合理的位置时，门机进入减速爬行阶段，爬行速度为 F305，减速时间为 F306。
- 4. 当开门位置达到 98%* 门宽后，门机继续以开门结束低速爬行，并进入开门力矩保持状态，保持力矩大小为 F308 决定，此时门位置复位为 100%。
- 5. 命令撤除后，力矩保持结束。如果需要力矩继续维持，增大 F504 的延时时间即可。
- 6. 运行曲线中虚线部分表示：当开门曲线选择 (F506) 为直线加减速时的运行曲线。

F307	开门到位力矩切换点设置	出厂设定	80.0%	最小单位	0.1%
	设定范围	0.0 ~ 150.0%			

此组功能码仅在距离控制方式下有效，开门运行到达设定的开门到位位置之后，如果输出力矩大于 F307 的值，此时会把门宽脉冲复位为 100%，同时转入开门到位力矩保持阶段；如果堵转后输出力矩也没有大于 F307，应当稍微减小 F307 的值（堵转后 F307 的值小于此时的输出力矩即可），确保门宽脉冲可以复位。

F308	开门到位保持力矩	出厂设定	80.0%	最小单位	0.1%
	设定范围	0.0 ~ 150.0%			

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用于设定开门运行到位后的保持力矩。

F309	开门受阻力矩	出厂设定	100.0%	最小单位	0.1%
	设定范围	0.0 ~ 150.0%			

开门运行过程中，设定的开门受阻力矩，开门力矩上限为开门受阻力矩加上 10.0%。

F310	开门启动力矩	出厂设定	0.0%	最小单位	0.1%
	设定范围	0.0% ~ F309			

此功能码用以设定开门启动时的启动力矩，以保证门机启动时的良好效果。力矩大小为此功能码与电机额定转矩的乘积。

F311	开门受阻判定时间	出厂设定	0ms	最小单位	1ms
	设定范围	0 ~ 9999ms			

开门受阻时的滤波时间。当此参数设置为 0 时，不检测开门受阻。

F312	开门到位低速设定	出厂设定	3Hz	最小单位	0.01Hz
	设定范围	0. 00 ~ F303Hz			

开门运行过程中收到开门限位信号或者脉冲达到开门到位要求时，门机运行的目标频率。

F313	重开门低速设定	出厂设定	0.00Hz	最小单位	0.01Hz
	设定范围	0.00Hz ~ F303			

对于关门过程中挡光幕、或者关门受阻等原因导致的重开门情况，如果存在重开门速度较慢或者重开门不能到达开门到位位置的情况，可以适当加大此参数的值。
此参数设置为 0 时不起作用。

6.5 F4 组 关门运行曲线

正确设置 F4 组与速度控制有关的功能参数，准确定义减速点和限位信号。关门运行速度曲线可以用图 6-5 来说明。

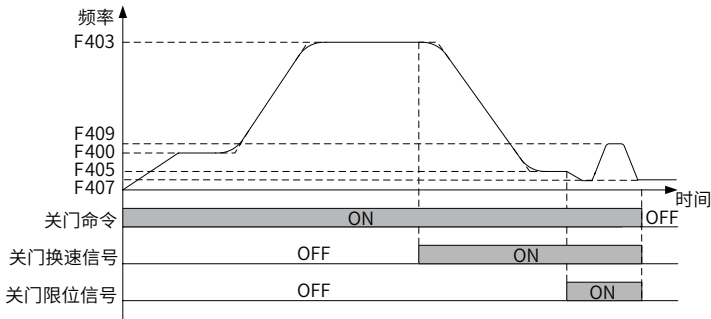


图 6-5 速度控制关门曲线示意图

行程开关方式，开门过程说明：

- 1. 当关门命令有效时，门机经 F401 的时间加速到 F400 设定的速度运行。
- 2. 低速关门运行时间到达 F402 后，门机加速到关门高速 (F403) 运行，加速时间为 F404。
- 3. 关门减速信号有效后，门机减速到 F405 的速度爬行，减速时间为 F406。
- 4. 当关门限位信号有效后，进入开门保持状态，此时维持低速速度 F4-07，维持时间为 F408，关门到位保持力矩为 F412。
- 5. 收刀速度及时间为 F409 和 F410。
- 6. 需要力矩维持时，增大 F504。
- 7. 运行曲线中虚线部分表示：当关门曲线选择 (F511) 为直线加减速时的运行曲线。

正确设置 F6 组与距离控制有关的功能参数。关门运行速度曲线可以用图 6-6 来说明。

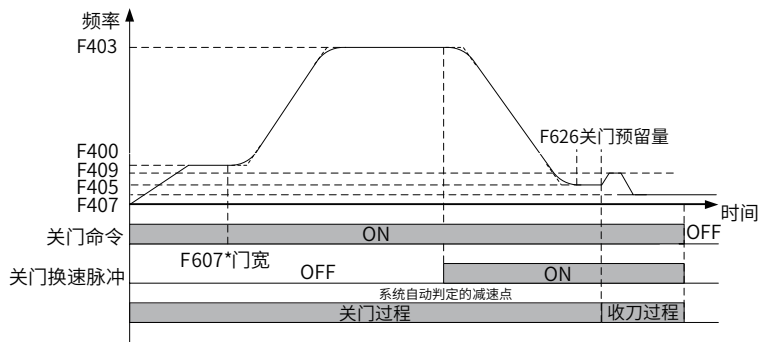


图 6-6 距离控制关门曲线示意图

距离控制关门过程说明：

- 1. 当关门命令有效时，门机以 F401 的加速时间加速到 F400 的速度运行。
- 2. 当关门位置达到 F607* 门宽后，门机以 F404 的加速时间加速到系统规划的最大关门速度，速度上限 F403。
- 3. 当关门运行到合理的位置后，门机开始减速运行，以 F406 的减速时间减到 F405 的速度运行。
- 4. 当关门位置进入到门刀区域后，门机开始以 F409 的速度收刀。收刀时间由门刀长度决定。
- 5. 当关门位置到达 2%* 门宽时，门机减速至 F407，运行时间为 F408，门堵转后，进入力矩保持阶段，保持力矩为 F412，门位置此时复位为 0。
- 6. 关门命令无效时，力矩保持结束。如果需要力矩继续维持，增大 F505 的延时时间即可。
- 7. 运行曲线中虚线部分表示：当关门曲线选择 (F511) 为直线加减速时的运行曲线。

F407	关门到位低速设定	出厂设定	1.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ F403			

关门运行过程中，系统收刀之后且门处于 2%* 门宽以内时，门机运行的目标频率。

F408	关门到位低速运行时间	出厂设定	300ms	最小单位	1ms
	设定范围	0 ~ 9999ms			

门机收刀完成之后，关门到位之后低速运行时间，当运行时间大于等于 F408 所设定的运行运行时间后，门机进入力矩切换阶段。

F409	收刀速度设定	出厂设定	4.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ F403			

关门过程中，当门机处于收刀运行阶段时的运行速度。

F410	关门收刀运行时间	出厂设定	500ms	最小单位	1ms
	设定范围	0 ~ 9999ms			

当门机收刀运行时间大于等于 F410 设定的时间后，门机再次减速运行。



◆ 软件版本高于 V14.03 的收刀运行时间根据门刀长度决定，不再根据此功能码设定。

F411	关门到位力矩切换点设置	出厂设定	80.0%	最小单位	0.1%
	设定范围	0.0 ~ 150.0%			

此组功能码仅在距离控制方式下有效，关门收刀运行结束后，如控制器输出力矩大于 F411 设定的值后，门宽位置复位为 0%，同时转入关门到位力矩保持阶段。

F412	关门到位保持力矩	出厂设定	30.0%	最小单位	0.1%
	设定范围	0.0% ~ 150.0%			

用于设定关门到位后的力矩保持大小。

F414	关门受阻工作方式	出厂设定	1	最小单位	1
	设定范围	0 ~ 3			

0：保留。

- 1：关门受阻后，产生关门受阻信号，当某个继电器输出功能设置为受阻信号时，则输出此信号。
- 2：关门受阻立即停车，同时产生关门受阻信号。受阻后 10s 内不响应关门命令，给一次开门命令、或撤销一次运行命令之后，可立即响应关门命令。
- 3：关门受阻后重开门，重开门期间不响应开关门命令。

关门遇阻是指：关门过程中，输出力矩大于关门遇阻力矩。

F415	关门受阻判定时间	出厂设定	500ms	最小单位	1ms
	设定范围	0 ~ 9999ms			

关门受阻时的滤波时间。当此参数设定为 0 时，不进行关门受阻判断。

F416	消防关门高速设定	出厂设定	10.00Hz	最小单位	0.01Hz
	设定范围	5.00 ~ F104			

当消防输入功能有效时，门机关门时高速运行速度。

F417	关门受阻高速设定	出厂设定	12.00Hz	最小单位	0.01Hz
	设定范围	F418 ~ F104			
F418	关门受阻低速设定	出厂设定	2.00Hz	最小单位	0.01Hz
	设定范围	0.00Hz ~ F104			
F419	高速力矩设定	出厂设定	100.0%	最小单位	0.1%
	设定范围	0.00 ~ 150.0%			
F420	低速力矩设定	出厂设定	100.0%	最小单位	0.1%
	设定范围	0.00 ~ 150.0%			

此四个功能码用于判断关门受阻处理；

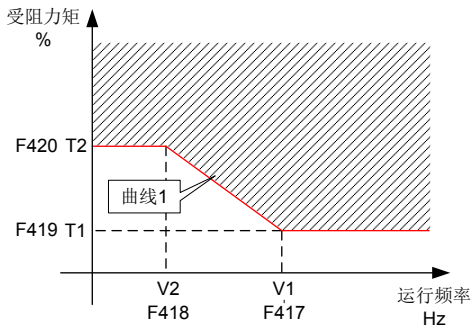


图 6-7 关门受阻判断示意图

- 注：
- 1. 如上图所示，该 4 个功能码值需按 $V1(F417) \geq V2(F418)$ 、 $T1(F419) \leq T2(F420)$ 的要求设定；
 - 2. 关门受阻判断的力矩百分比如图中曲线 1 所示，图中阴影部分则判断为关门受阻。

F421	关门限位点前移量	出厂设定	4.0%	最小单位	0.1%
	设定范围	0.0 ~ 10.0%			

对于使用距离控制且安装了关门限位开关的门系统。当门机控制器检测到关门限位开关信号异常后，会自动将关门限位点设定值（F609）减小此参数所设置的值，以保证门机控制器能更可靠的进入关门到位状态。此参数一般不需调整。

F422	掉电关门预留量设定	出厂设定	500	最小单位	1
	设定范围	0-500			

电网掉电时，系统开始关门，为减小异常电网对于性能跟踪的影响，可通过设置关门预留量，默认 500 个脉冲。

F423	掉电关门开始减速电压	出厂设定	200.0	最小单位	0.1
	设定范围	150.0-310.0			

电网掉电时，系统开始快速关门，如果母线电压下降过快，需要尽快减速，此功能码就用于设定开始减速电压，当母线电压低于此功能码值必须开始减速，否则减速标记以系统为准。

6.6 F5 组 开关门辅助参数

F500	异常减速时间	出厂设定	0.3s	最小单位	0.1s
	设定范围	0.1 ~ 5.0s			

关门受阻发生时，从当前的关门速度减速到零速的时间。在保证减速不过流的情况下，该参数要设置得尽量小。

F501	开门时间限定	出厂设定	30.0s	最小单位	1s
	设定范围	0 ~ 9999s			

开门运行过程中，在设定时间内没有收到开门限位信号（距离控制方式下体现为脉冲丢失），就会进行开门操作超时保护（Er28）。该功能值设为 0 时无效。

F502	关门时间限定	出厂设定	0s	最小单位	1s
	设定范围	0 ~ 9999s			

关门运行过程中，在设定时间内无法收到关门到位信号，则认为关门受阻，会根据 F414 的设定进行重新开门处理或零速保持处理；该功能值设为 0 时无效。

F504	外部开门命令延时时间	出厂设定	60s	最小单位	1s
	设定范围	0 ~ 9999s			

此组功能码用于设定开门到位力矩维持时间；

开门到位信号有效，而开门命令端子无效后的开门运行状态的保持时间。保持时间大于等于该功能参数的值，控制器停机。开门还没到位的过程中，如果撤消开门命令，控制器立刻停机，此时延时功能无效。

当此参数设定为 9999 时，外部开门命令延时一直有效。

F505	外部关门命令延时时间	出厂设定	60s	最小单位	1s
	设定范围	0 ~ 9999s			

此组功能码用于设定关门到位力矩维持时间；

关门到位信号有效，而关门命令端子无效后的关门运行状态的保持时间。保持时间大于等于该功能参数的值，控制器停机。关门还没到位的过程中，如果撤消关门命令，控制器立刻停机，此时延时功能无效。

当此参数设定为 9999 时，外部关门命令延时一直有效。

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F506	开门曲线选择	出厂设定	1	最小单位	1
	设定范围	0 ~ 1			

此参数用以选定开门运行时，门机运行曲线：

0：直线加减速；1：S 曲线加减速。

F511	关门曲线选择	出厂设定	1	最小单位	1
	设定范围	0 ~ 1			

此参数用以选定关门运行时，门机运行曲线：

0：直线加减速；1：S 曲线加减速。

F507	开门加速 S 曲线起始段时间	出厂设定	20.0%	最小单位	0.1%
	设定范围	10.0% ~ 50.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			

F508	开门加速 S 曲线上升段时间	出厂设定	60.0%	最小单位	0.1%
	设定范围	10.0% ~ 80.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F509	开门减速 S 曲线起始段时间	出厂设定	20.0%	最小单位	0.1%
	设定范围	10.0% ~ 50.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F510	开门减速 S 曲线下降段时间	出厂设定	60.0%	最小单位	0.1%
	设定范围	10.0% ~ 80.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F512	关门加速 S 曲线起始段时间	出厂设定	20.0%	最小单位	0.1%
	设定范围	10.0% ~ 50.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F513	关门加速 S 曲线上升段时间	出厂设定	60.0%	最小单位	0.1%
	设定范围	10.0% ~ 80.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F514	关门减速 S 曲线起始段时间	出厂设定	20.0%	最小单位	0.1%
	设定范围	10.0% ~ 50.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			
F515	关门减速 S 曲线下降段时间	出厂设定	60.0%	最小单位	0.1%
	设定范围	10.0% ~ 80.0%(加减速时间)(起始段 + 上升段 ≤ 90%)			

这八组加减速时间段用来选择控制器运行过程每段速度的加 S 曲线特征。

控制器每一组中加速与减速的组合是对称的，如下图中以 S 曲线 1 的加速为例：T1 即为参数 F507 定义的参数，在此段时间内输出频率变化斜率（即速度变化率，下同）逐渐增大。T2 即为参数 F508 定义的时间，在此时间段内输出频率变化的斜率逐渐变化到低速频率。在 T1 和 T2 之间的时间内，输出频率变化的斜率是固定的。

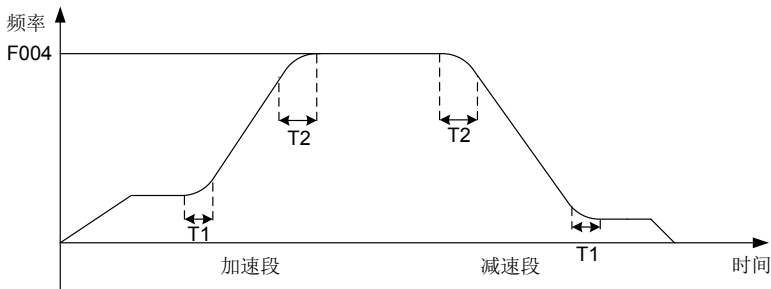


图 6-8 S 曲线加减速示意图

F516	速度偏差设定	出厂设定	50%	最小单位	0%
	设定范围	0% ~ 80%			
F517	速度偏差过大判断时间	出厂设定	400ms	最小单位	1ms
	设定范围	0 ~ 5000ms			

NICE900 具有速度偏差检测功能，仅在闭环矢量控制方式下有效。根据 F516 的设定值来判断当前运行频率与给定频率是否偏差过大，如果偏差过大累计时间大于 F517，则会报 Er32 速度偏差过大故障保护。

F516 设定为 0，不进行速度偏差判断。

F518	关门稳速延时	出厂设定	200ms	最小单位	1ms
	设定范围	0 ~ 9999ms			

关门运行到高速状态，经过 F518 的稳速延时之后，进行关门受阻判断。

F519	故障制动电流	出厂设定	100	最小单位	0.10%
	设定范围	0.1 ~ 150.0			

在检测到超速、逆转或者编码器信号异常等情况时，先以此参数设置的电流值进行制动，制动完成后，在设置为 0 时，此功能不起作用。

F520	撤电流速率	出厂设定	2	最小单位	1
	设定范围	1-1000			

用于设定力矩撤销速度，对应单位指的是每 2ms 撤销的力矩。

F521	换向减速时间	出厂设定	2.0s	最小单位	0.1s
	设定范围	0.1~5.0s			

用于设定门机换向时减速时间。

F523	功能选择开关	出厂设定	128	最小单位	1
	设定范围	0~9999			

设定不同的 BIT 位开启不同的功能，具体定义如下：

Bit 位	功能	默认
Bit0~Bit5	功能优化开关，默认不修改	0
Bit6	自动曲线开关 0：开启 1：关闭 开启此功能后，无需设置 F605、F608 开关门减速点，系统自动判定并计算减速。	0
Bit7	开门力矩自适应 0：关闭 1：开启 开启此功能后，开门到位后，系统调整合适的开门保持力矩，以此节省反向关门时间。现场效果不好的时候可关闭此功能。	1
Bit8	关门力矩自适应 0：关闭 1：开启 关门到位涉及跑梯及门锁相关问题，不建议开启此功能。	0
Bit9~Bit11	脉冲复位相关功能优化，默认开启	0

F524	功能选择开关	出厂设定	78	最小单位	1
	设定范围	0~9999			

设定不同的 BIT 位开启不同的功能，具体定义如下：

Bit 位	功能	默认
Bit0	门刀长度自学习功能开启 0：开启 1：关闭 注：每次门宽自学习之后会自动更新门刀长度，即功能码 F623 的值，如果现场不想自动学习，可将此 BIT 位置为 1，同时手动更改 F623 的值，关于门刀长度如何学习可参见 F623 功能码介绍。	0
Bit1-Bit3	功能性补偿优化开关，默认不修改	1
Bit4-Bit5	功能优化开关，默认不修改	0
Bit6	收刀曲线优化 0：关闭 1：开启 开启此功能后，会对关门收刀曲线进行优化，收刀速度由 F409 设定，收刀时间系统自动控制，针对异步门刀默认开启此功能也无影响。	1

6.7 F6 组 距离控制参数

F600	门宽自学习功能选择	出厂设定	0	最小单位	1
	设定范围	0 ~ 1			

设定 F002=2，当 F600 参数由 0 变为 1 时使能门宽自学习功能，按下开门键或关门键即开始门宽自学习，以关门->开门->关门的逻辑运行，开门到位堵转时，存储门宽。具体操作参考第五章。

F601	门宽自学习速度	出厂设定	3.00Hz	最小单位	0.01Hz
	设定范围	2.00-20.00			

门宽自学习速度定义了门机进行门宽自学习时的运行频率。

F602	门宽脉冲低位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F603	门宽脉冲高位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

门宽计算方法：门宽 =F603*10000+F602。学习得到的门宽脉冲数可以通过键盘进行适当修改。

F604	距离控制开门启动低速运行距离	出厂设定	10.0%	最小单位	0.1%
	设定范围	0.0 ~ 30.0%			

在距离控制开门过程中，实时记录行走的脉冲数，当脉冲数大于等于门宽 * F604 时，门机由开门启动低速 (F300) 切换到开门高速 (F303) 运行。

F605	距离控制开门减速点设定	出厂设定	70.0%	最小单位	0.1%
	设定范围	60.0% ~ 90.0%			

在距离控制开门过程中，实时记录行走的脉冲数，当脉冲数大于等于门宽 * F605 时，门机由开

门高速 (F303) 切换到开门结束低速 (F305) 运行。



◆ 软件版本高于 V14.03 的曲线规划不在需要设置开门减速点，系统自动规划减速曲线。

F606	距离控制开门限位点设定	出厂设定	96.0%	最小单位	0.1%
	设定范围	80.0% ~ 99.0%			

在距离控制开门过程中，实时记录行走的脉冲数，当脉冲数大于等于门宽 * F606 时，执行开门到位的相关处理。



◆ 软件版本高于 V14.03 的曲线规划不在使用此功能码进行开门到位曲线规划，此功能码只是作为开门到位信号何时输出的判定条件。

F607	距离控制关门启动低速运行距离	出厂设定	10.0%	最小单位	0.1%
	设定范围	0.0% ~ 30.0%			

在距离控制关门过程中，实时记录行走的脉冲数，当脉冲数小于等于门宽 * (100.0% - F607) 时，门机由关门启动低速 (F300) 切换到关门高速 (F303) 运行。

F608	距离控制关门减速点设定	出厂设定	70.0%	最小单位	0.1%
	设定范围	60.0% ~ 90.0%			

在距离控制关门过程中，实时记录行走的脉冲数，当脉冲数小于等于门宽 * (100% - F608) 时，门机由关门高速 (F303) 切换到关门结束低速 (F305) 运行。

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◆ 软件版本高于 V14.03 的曲线规划不再需要设置关门减速点，系统自动规划减速曲线。

F609	距离控制关门限位点设定	出厂设定	96.0%	最小单位	0.1%
	设定范围	80.0% ~ 99.0%			

在距离控制关门过程中，实时记录行走的脉冲数，当脉冲数小于等于门宽 * (100% - F609) 时，执行关门到位的相关处理。



◆ 软件版本高于 V14.03 的曲线规划不在使用此功能码进行关门到位曲线规划，此功能码只是作为关门到位信号何时输出的判定条件。

F610	输出力矩显示	出厂设定	0.0%	最小单位	0.1%
	设定范围	0.0% ~ 180.0%			

用于方便调测异步机门宽自学习时的力矩设定 (方便设定 F614)，门宽自学习堵转后，保证 F614 的值略小于 F610 即可。

F611	开门限位开关位置低位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F612	开门限位开关位置高位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F613	关门限位开关位置	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

此三组功能码用以记录门宽自学习时学习到的限位关门位置。正常运行过程中，当开门限位开关有效时，恢复门位置为 F612*10000+F611；当关门限位开关有效时，恢复门位置为 F613。

F614	门宽自学习及初始运行力矩设定	出厂设定	80.0%	最小单位	0.1%
	设定范围	0.0 ~ 150.0%			

此组功能码仅在距离控制方式下有效，用以设定门宽自学习及上电第一次运行时的力矩判定水平。详情见第五章的应用与调试。

F615	开门减速点脉冲低位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F616	开门减速点脉冲高位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F617	关门减速点脉冲低位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
F618	关门减速点脉冲高位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

此四组的功能码用以设定减速点位置。

通过脉冲个数设定减速点：(不是采用门宽百分比的方式)

开门减速点为 F616*10000+F615；关门减速点为 F618*10000+F617。

F619	开门到位输出时的脉冲设定	出厂设定	0.0	最小单位	0.1
	设定范围	0.0 ~ 99.9%			

此组功能码仅在距离控制方式下有效。

当门宽位置大于 F619 时，即输出开门到位信号，此时即使输出力矩大于开门到位切换点力矩，门位置也不会复位为 100%；仅当门位置大于 F606，且输出力矩大于开门到位切换点力矩，门位置复位为 100%。

当 F619 为 0 时，根据 F606 的值决定是否输出开门到位信号。

F620	关门到位输出时的脉冲设定	出厂设定	0.0	最小单位	0.1
	设定范围	0.0 ~ 99.9%			

此组功能码仅在距离控制方式下有效。

当门宽位置大于 F620 时，即输出关门到位信号，且同时进行收刀动作，此时即使输出力矩大于关门到位切换点力矩，门位置也不会复位为 0%；仅当门位置大于 F609，且输出力矩大于关门到位切换点力矩，门位置复位为 0%。

当 F620 为 0 时，根据 F609 的值决定是否输出开门到位信号。

F621	门位置反馈脉冲	出厂设定	33.0%	最小单位	0.1
	设定范围	0.0 ~ 99.9%			

此组功能码仅在距离控制方式下有效，当门宽位置大于 F621 时，即输出门位置反馈信号。与 F912 输出功能码（门位置反馈信号输出）配合使用。

F622	开门预留量脉冲设定	出厂设定	0	最小单位	1
	设定范围	0~9999			

当开门撞门时，可适当增加此值；当开门爬行过多，可适当减小此值；此值默认为 1% 的门宽脉冲，每次门宽自学习之后自动更新。

如果反复调整 F622 还是达不到合理的效果，可适当减小 F305 关门到位低速设定，可调整至 2~3HZ。

F623	门刀脉冲长度设定	出厂设定	0	最小单位	1
	设定范围	0~9999			

此功能码用于设定门刀长度，默认每次门宽自学习之后自动更新。如果现场发现学出的门刀长度不准，可手动修改 F623，同时设置功能码 F523 BIT0=1，表示关闭门刀长度自学习功能，以后每次自学习之后就不会自动更新 F623。

F626	关门预留量脉冲设定	出厂设定	0	最小单位	1
	设定范围	0~9999			

当关门撞门时，可适当增加此值，当关门爬行过多，可适当减小此值；此值默认为 2% 的门宽脉冲，每次门宽自学习之后自动更新。如果反复调整 F626 都达不到合理的关门效果，可排查 F623 门刀长度设置是否合理。

F629	异步机传动比设定	出厂设定	0.0	最小单位	0.1
	设定范围	0.0-100.0			

当现场是异步机带编码器工作方式时，需要设定传动比，例如传动比为 1：3，则设置 3.0

6.8 F7 组 演示功能参数

F700	演示开门到位保持时间	出厂设定	2.0s	最小单位	0.1s
	设定范围	0.5 ~ 999.9s			

演示开门到位保持时间是指在演示模式下，开门到位后力矩保持阶段至反向关门的时间间隔，可根据演示的实际需要合理设置。

F701	演示关门到位保持时间	出厂设定	2.0s	最小单位	0.1s
	设定范围	0.5 ~ 999.9s			

演示关门到位保持时间是指在演示模式下，关门到位后力矩保持阶段至正向开门的时间间隔，可根据演示的实际需要合理设置。

F702	演示开关门运行次数记录	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

演示运行次数的记录参数。该参数掉电自动存储，再次上电运行到位后，此组功能码的值在原基础上进行加计数，开门一次计数值加一，关门一次计数值加一。演示模式是一个自动循环的运行过程，按下开门键或关门键启动演示运行，启动后门机以慢速关门，关门到位后按照运行曲线执行开门运行，开门到位后开始计时，时间达到 F700 设定的演示开门到位保持时间后，自动反向关门运行，关门到位后开始计时，时间达到 F701 设定的演示关门到位保持时间后，门机再次正向开门，如此往复运行，直到按下停机 / 故障复位键控制器停机，演示运行结束。演示运行可以是速度控制，也可以是距离控制。演示模式可用于演示和老化测试。

F703	演示开关门运行次数设定	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

用来设置需要演示运行的次数，当实际的演示运行开关门次数大于等于该功能参数的值后，自动结束演示运行。F703=0 时，该功能无效，演示运行不会自动停止。

6.9 F8 组 辅助参数

F800	软件版本号	出厂设定	1.00	最小单位	0.01
	设定范围	0.00 ~ 99.99			

显示控制器当前软件的版本号，方便厂家维护。

F801	模块温度	出厂设定	0℃	最小单位	1℃
	设定范围	0 ~ 100℃			

随时更新控制器底层模块温度。

F802	故障自动复位次数	出厂设定	0	最小单位	1
	设定范围	0 ~ 100			

在运行过程中出现故障后，控制器停止运行，经过 2s 复位间隔时间后，控制器自动复位并继续运行。故障复位次数设置为 0 时，无自动复位功能，只能手动复位。一个小时无故障或出现手动复位时，门机控制器自动把已复位次数清零。

注意：不会自动复位的故障有：Er19、Er26、Er27；Er26 参数设定错误提示、Er19 为电机调谐故障，Er27 为门宽自学习故障。

F803	制动使用率	出厂设定	100%	最小单位	1%
	设定范围	0 ~ 100%			

对内置制动单元的控制器有效。可调整制动单元的制动效果。

F804	工作时间累计	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

控制器实际累计上电工作时间 (小时)，最大计数值 9999 小时，超过 9999 小时后重新计数。

F806	运行时间累计	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

控制器实际累计运行工作时间 (小时)，最大计数值 9999 小时，超过 9999 小时后重新计数。

F810	辅助功能选择	出厂设定	12	最小单位	1
	设定范围	0 ~ 9999			

更改不同的值用以完成所需求的功能：

Bit 位	功能	默认
Bit0	1: 触发式开关门命令； 0: 非触发式命令。	0
Bit1	1: 初始运行力矩到达后不复位脉冲； 0: 初始运行力矩到达后复位脉冲。	0
Bit2	1: 门宽自学习时学习限位开关位置，限位开关有效时复位脉冲信号； 0: 不学习限位开关位置。	1
Bit3	磁通矢量、距离控制方式下： 1: 根据力矩判断门宽自学习、初始运行及是否到位以及利用力矩进行受阻判断； 0: 一定的时间内 (2s) 无脉冲信号，认为自学习到位或初始运行到位或关门受阻。	1
Bit4	1: 关门优先； 0: 开门优先。	0
Bit5	端子控制方式下： 1: 运行中按 “STOP” 按键，控制器仍正常工作； 0: 运行中按 “STOP” 按键，控制器属于暂停工作，显示 “STP”，再按下一次 “STOP” 后，恢复正常。	0
Bit6	受阻方式： 1: 根据 F413 进行受阻力矩判断； 0: 高速、低速运行分开检测受阻。	0
Bit7	演示运行： 1: 上电无需操作即演示运行； 0: 上电后需要人为启动演示运行。	0

Bit 位	功能	默认
Bit8	撤电流处理： 0：命令撤除时有撤电流处理； 1：命令撤除时立即停机；	0
Bit9	0：运行中撤销命令后处于待机状态，未停止运行。 1：撤销命令后处于停机状态，停止运行。	0
Bit10	0：开关门命令同时有效时，默认保持当前状态； 1：按 F810bit4 设定的优先级处理。	0
Bit11	0：有关门限位开关时初始运行不判断关门受阻 1：有关门限位开关时初始运行判断关门受阻	0

F811	故障功能选择	出厂设定	12	最小单位	1
	设定范围	0 ~ 9999			

更改不同的值用以完成所需求的功能：

Bit 位	功能	默认
Bit1	0：开启磁极位置自动检测功能 1：关闭磁极位置自动检测功能	0

个别现场由于 Z 信号有干扰，门机判断磁极位置出现偏差，在下次启动时自动进行磁极位置辨识，导致开关门启动时有“哽”的一声，可以通过此功能码取消磁极位置自动检测。

F812	驱动功能选择	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

BIT0：0：全程七段调制（可降低噪音）；1：运行过程中七段 / 五段自动切换。

F814	过载系数	出厂设定	2.00	最小单位	0.01
	设定范围	0 ~ 10.00			

F817	辅助功能选择 2	出厂设定	12	最小单位	1
	设定范围	0 ~ 9999			

bit0：保留

bit1：0：开门到位后不复位脉冲；1：开门到位后复位脉冲

bit2：485 通讯波特率选择，0：9600；1：38400

bit3、bit4：保留

bit5：0：开门到位输出只由门位置决定

1：有关门命令后就撤销开门到位输出

bit6：0：距离控制时根据编码器或开关门限位开关判断是否开关门到位

1：距离控制时只根据开关门限位开关判断是否开关门到位

6.10 F9 组 输入输出功能参数

F900	端子滤波时间	出厂设定	20ms	最小单位	1ms
	设定范围	0 ~ 100ms			

设置输入端子灵敏度。若遇数字输入端易受到干扰而引起误动作，可将此参数增大，以增强抗干扰能力，但会引起输入端子灵敏度降低。

F901~F908	数字量输入端子	出厂设定	(见第五章)	最小单位	1
	设定范围	0 ~ 116(不可重复选择)			

- 0: 无功能;
- 1: 开门命令，系统给出的开门指令信号;
- 2: 关门命令，系统给出的关门指令信号;
- 3: 外部复位 RESET 输入，外部的故障复位端子信号;
- 4: 开门禁止端子输入，此信号有效时，控制器不响应外部开门命令;
- 5: 力矩保持禁止端子输入，在开关门到位力矩保持过程中，此信号有效时，以零力矩保持;
- 6: 慢速关门使能输入，此信号有效时，系统以慢速频率 (F006) 关门;
- 7: 消防输入，此信号有效时，高速运行时以消防高速 (F416) 的频率关门;
- 8 ~ 109: 保留;
- 010/110: 光幕信号常开 / 常闭输入，如果该信号有效，将输出受阻信号，并按 F414 设置进行相应受阻处理;
- 011/111: 触板信号常开 / 常闭输入，如果该信号有效，将输出受阻信号，并按 F414 设置进行相应受阻处理;
- 012/112: 开门限位信号常开 / 常闭输入，该信号有效后，进行开门限位的相关处理;
- 013/113: 关门限位信号常开 / 常闭输入，该信号有效后，进行关门限位的相关处理;
- 014/114: 开门减速信号常开 / 常闭输入，在速度控制的开门过程中，开门减速信号常开 / 闭输入有效后，切换到结束段低速运行;
- 015/115: 关门减速信号常开 / 常闭输入，在速度控制的关门过程中，关门减速信号常开 / 闭输入有效后，切换到结束段低速运行;
- 016/116: 门锁信号常开 / 常闭输入，接收门锁的相关信息。

F909	继电器输出选择 TA1/TB1/TC1	出厂设定	2	最小单位	1
	设定范围	0 ~ 12			
F910	继电器输出选择 TA2/TB2/TC2	出厂设定	5	最小单位	1
	设定范围	0 ~ 12			
F911	继电器输出选择 TA3/TB3/TC3	出厂设定	1	最小单位	1
	设定范围	0 ~ 12			

- 0: 无功能。

- 1: 开门到位信号输出 0, 在开门过程中, 门机控制器接收到开门限位信号或者脉冲计数到达开门限位设定值, 输出开门到位信号 0。
- 2: 关门到位信号输出 0, 在关门过程中, 门机控制器接收到关门限位信号或者脉冲计数到达关门限位设定值, 输出关门到位信号 0。
- 3: 开门到位信号输出 1, 在开门过程中, 门机控制器接收到开门限位信号或者脉冲计数到达开门限位设定值, 同时堵转力矩达到 F316 设定的值后, 输出开门到位信号 1。
- 4: 关门到位信号输出 1, 在关门过程中, 门机控制器接收到关门限位信号或者脉冲计数到达关门限位设定值, 同时堵转力矩与额定力矩比值达到 F417 设定的值后, 输出关门到位信号 1。
- 5: 故障信号输出 1(Er26 仅为提示信息, 非故障)。
- 6: 关门到位信号输出 3, 如果 F9 设置低压输入点 13/113, 那么关门到位 3 输出的条件是关门限位信号有效, 且脉冲计数到达关门限位设定值; 如果没有设置低压输入点 13/113, 关门到位 3 输出逻辑跟关门到位信号 0 一致。
- 7: 开门到位信号输出 2, 在开门过程中, 门机控制器接收到开门限位信号或者脉冲计数到达开门限位设定值, 门锁信号无效, 同时堵转力矩与额定力矩比值达到 F316 设定的值后, 输出开门到位信号 2。
- 8: 关门到位信号输出 2, 在关门过程中, 门机控制器接收到关门限位信号或者脉冲计数到达关门限位设定值, 门锁信号有效, 同时堵转力矩与额定力矩比值达到 F417 设定的值后, 输出关门到位信号 2。
- 9: 门锁信号输出, 同步输出输入的门锁信号。
- 10: 重开门信号输出, 重开门过程中, 输出重开门状态信号。
- 11: 受阻信号输出, 在关门过程中, 当受阻发生时, 输出受阻信号。
- 12: 门位置反馈信号输出, 当门宽位置大于 F621 时, 输出门位置反馈信号。
- 13: 门机就绪输出, 门机控制器可以响应外部开关门命令时输出此信号。

6.11 FA 组 显示与故障参数

FA00	LED 运行参数显示选择	出厂设定	319	最小单位	1
	设定范围	1 ~ 511			

此组参数控制 9 种状态参数显示, 每个参数由一位二进制码控制, “1”表示显示此参数, “0”表示不显示此参数。在控制系统运行状态下通过键盘的移位键进行参数显示切换。

FA01	LED 停机参数显示选择	出厂设定	39	最小单位	1
	设定范围	1 ~ 63			

此组参数控制 6 种状态参数显示, 每个参数由一位二进制码控制, “1”表示显示此参数, “0”表示不显示此参数。在控制系统停机状态下通过键盘的移位键进行参数显示切换。

FA02	第 1 次故障类型	出厂设定	0	最小单位	1
	设定范围	0 ~ 30			
FA03	第 1 次故障提示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9			

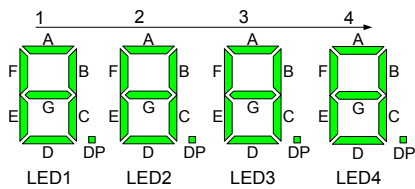
FA04	第 2 次故障类型	出厂设定	0	最小单位	1
	设定范围	0 ~ 30			
FA05	第 2 次故障提示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9			
FA06	第 3 次故障类型	出厂设定	0	最小单位	1
	设定范围	0 ~ 30			
FA07	第 3 次故障提示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9			
FA08	第 4 次故障类型	出厂设定	0	最小单位	1
	设定范围	0 ~ 30			
FA09	第 4 次故障提示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9			
FA10	最 5 次故障类型	出厂设定	0	最小单位	1
	设定范围	0 ~ 30			
FA11	第 5 次故障提示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9			
FA12	最近次故障时母线电压	出厂设定	0V	最小单位	0.1V
	设定范围	0 ~ 999.9V			
FA13	最近次故障时输出电流	出厂设定	0.00A	最小单位	0.01A
	设定范围	0 ~ 99.99A			
FA14	最近次故障时运行频率	出厂设定	0.00Hz	最小单位	0.01Hz
	设定范围	0 ~ 99.00Hz			
FA15	最近次故障时输出力矩	出厂设定	0.0%	最小单位	0.1%
	设定范围	0.0 ~ 180.0%(输出力矩与额定力矩的百分比)			
FA16	最近次故障输入端子状态	出厂设定	0	最小单位	1
	设定范围	0 ~ 1023			
FA17	最近次故障输出端子状态	出厂设定	0	最小单位	1
	设定范围	0 ~ 15			

此组参数记录控制器近 5 次故障及最近次故障详细信息，详细故障内容参考第八章。

注：Er26 仅为参数设定错误提示信息，不保存在故障记录中。

FA18	端子状态查询	出厂设定	*	最小单位	*
	设定范围	*			

此组参数对应端子侧输入及输出是否有效显示。端子输入有效或输出有效时，相应的数码管的某段置亮，从左至右定义数码管为 LED1、LED2、LED3、LED4：

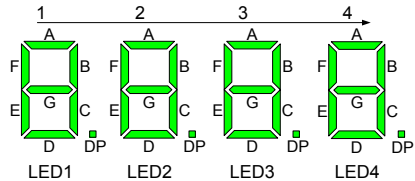


每个数码管各段代表的含义如下：

LED1 各段	段“亮”含义	LED2	LED3	LED4 各段	段“亮”含义
A	DI1 输入有效	开门运行步骤 (用以调试查看)	关门运行步骤 (用以调试查看)	A	TA1、TC1 接通
B	DI2 输入有效			B	TA2、TC2 接通
C	DI3 输入有效			C	TA3、TC3 接通
D	DI4 输入有效			D	保留
E	DI5 输入有效			E	
F	DI6 输入有效			F	
G	DI7 输入有效			G	CAN 通讯正常闪烁
DP	DI8 输入有效			DP	485 通讯正常闪烁

FA19	功能输入状态查询	出厂设定	*	最小单位	*
	设定范围	*			

此组参数对应功能部分的输入显示。输入功能有效时，相应的数码管的某段置亮。相应的数码管的某段置亮，从左至右定义数码管为 LED1、LED2、LED3、LED4：

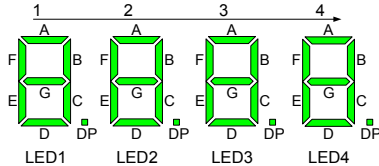


每个数码管各段代表的含义如下：

LED1 各段	段“亮”含义	LED2 各段	段“亮”含义	LED3 ~ LED4 各段	段“亮”含义
A	开门命令有效	A	保留	保留	保留
B	关门命令有效	B	光幕信号有效		
C	外部复位有效	C	触板信号有效		
D	开门禁止输入有效	D	开门限位信号有效		
E	力矩保持禁止输入有效	E	关门限位信号有效		
F	慢速开门输入有效	F	开门减速信号有效		
G	消防输入有效	G	关门减速信号有效		
DP	保留	DP	门锁信号有效		

FA20	功能输出状态查询	出厂设定	*	最小单位	*
	设定范围	*			

此组参数对应功能部分的输出显示。输出功能有效时，相应的数码管的某段置亮。，从左至右定义数码管为 LED1、LED2、LED3、LED4：



每个数码管各段代表的含义如下：

LED1 各段	段“亮”含义	LED2 各段	段“亮”含义	LED3 ～ LED4 各段	段“亮”含义
A	开门到位信号输出 0	A	门锁信号输出	保留	保留
B	关门到位信号输出 0	B	重开门信号输出		
C	开门到位信号输出 1	C	受阻信号输出		
D	关门到位信号输出 1	D	门位置反馈输出		
E	故障信号输出 1	E	门机准备就绪 输出		
F	保留	F	保留		
G	开门到位信号输出 2	G			
DP	关门到位信号输出 2	DP			

FA21	显示开关控制	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

该参数用于设定参数 FA22 和 FA23 的实际显示内容，用于现场故障识别和调试。含义如下：

设定值	FA22 显示内容	FA23 显示内容
1	1 秒钟内平均速度 (Hz)	1 秒钟内速度波动平均值 (Hz)
2	1 秒钟内最大速度 (Hz)	1 秒钟内最小速度 (Hz)
3	转差频率 (Hz)	实际反馈频率 (Hz)
4	励磁电流量 (A)	转矩电流量 (A)
其它	1 秒钟接收编码器脉冲数 (高位)	1 秒钟接收编码器脉冲数 (低位)

FA22	显示 1	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
FA23	显示 2	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

FA24	模拟量电压显示	出厂设定	0.00V	最小单位	0.01V
	设定范围	0.00 ~ 10.10V			

实时显示模拟量部分采样的电压值。

FA25	门当前位置低位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			
FA26	门当前位置高位	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

此 2 组功能码用以记录门的当前位置。门当前位置 = FA26 * 10000 + FA25。

FA27	运行状态显示	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

此功能码用以查看门机的开门、关门、运行等相关状态。

FA28	门方向判断	出厂设定	*	最小单位	*
	设定范围	*			

此功能码用以检测编码器 AB 相信号接线：

手动往开门方向拉门时，此组功能码显示“OPEN”则 AB 相信号接线正确，否则 AB 相信号异常；
手动往关门方向拉门时，此组功能码显示“CLOS”则 AB 相信号接线正确，否则 AB 相信号异常。

FA29	门位置百分比	出厂设定	0.0%	最小单位	0.1%
	设定范围	0.0 ~ 100.0%			
FA30	设定频率	出厂设定	00.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ 99.99Hz			
FA31	反馈频率	出厂设定	00.00Hz	最小单位	0.01Hz
	设定范围	0.00 ~ 99.99Hz			
FA32	母线电压	出厂设定	0.0V	最小单位	0.1V
	设定范围	0.0 ~ 999.9V			
FA33	输出电压	出厂设定	0V	最小单位	1V
	设定范围	0 ~ 9999V			
FA34	输出电流	出厂设定	0.00A	最小单位	0.01A
	设定范围	0.00 ~ 99.99A			
FA35	输出转矩	出厂设定	0.0%	最小单位	0.1%
	设定范围	0.0 ~ 999.9%			

FA29-FA35 功能码分别显示门机控制器当前的状态参数。

6.12 FP 组 用户参数

FP00	用户密码	出厂设定	0	最小单位	1
	设定范围	0 ~ 9999			

设定为任意一个非零的数字，密码保护功能生效。

0000：清除以前用户设置的密码值，并使密码保护功能无效。

当用户密码设置并生效后，再次进入参数设置状态时，如果密码不正确，不能查看参数，不能修改。请牢记您所设置的密码，如果不慎误设或忘记请与厂家联系。

FP01	参数更新	出厂设定	0	最小单位	1
	设定范围	0 ~ 2			

0：无功能；

1：恢复出厂参数；

2：清除故障记录及时间信息。

FP02	参数更新	出厂设定	0	最小单位	1
	用户设定检查	0 ~ 1			

0：无效

1：有效，此时仅显示与出厂设定值不同的参数。

第 7 章 故障诊断及对策

控制器时刻监视着各种输入信号、运行条件、外部反馈信息等，一旦异常发生，相应的保护功能动作并显示故障代码。门机控制器出现故障报警信息时，用户可根据本节提示进行故障分析，确定故障原因，找出解决方法。

表 7-1 故障诊断及对策

故障显示	故障描述	故障原因	处理方法	备注
Er02	加速过电流	1. 主回路输出接地或短路； 2. 电机是否进行了参数调谐； 3. 负载太大。	1. 排除接线等外部问题； 2. 电机参数调谐； 3. 减轻突加负载。	
Er03	减速过电流	1. 主回路输出接地或短路； 2. 电机是否进行了参数调谐； 3. 负载太大； 4. 减速曲线太陡。	1. 排除接线等外部问题； 2. 电机参数调谐； 3. 减轻突加负载； 4. 调节曲线参数。	
Er04	恒速过电流	1. 主回路输出接地或短路； 2. 电机是否进行了参数调谐； 3. 负载太大； 4. 旋转编码器干扰大。	1. 排除接线等外部问题； 2. 电机参数调谐； 3. 减轻突加负载； 4. 选择合适旋转编码器， 采用屏蔽旋转编码器线。	
Er05	加速过电压	1. 输入电压过高； 2. 制动电阻选择偏大； 3. 加速曲线太陡。	1. 调整输入电压； 2. 选择合适制动电阻； 3. 调整曲线参数。	
Er06	减速过电压	1. 输入电压过高； 2. 制动电阻选择偏大； 3. 减速曲线太陡。	1. 调整输入电压； 2. 选择合适制动电阻； 3. 调整曲线参数。	
Er07	恒速过电压	1. 输入电压过高； 2. 制动电阻选择偏大。	1. 调整输入电压； 2. 选择合适制动电阻。	
Er09	欠压保护	1. 输入电源瞬间停电； 2. 输入电压过低； 3. 控制板异常。	1. 排除外部电源问题； 2. 请与代理商或厂家联系。	电压正常后 自动复位
Er10	系统过载	1. 电梯门导轨内无杂物阻挡； 2. 负载过大。	1. 检查电梯门导轨； 2. 减小负载。	
Er11	电机过载	1.F814 设定不当； 2. 负载过大； 3. 门系统机械故障。	1. 调整参数，可设定 F814 为默认值； 2. 减小负载； 3. 检查电梯门导轨等结构 是否正常。	
Er13	输出侧缺相	1. 主回路输出接线松动； 2. 电机损坏。	1. 检查连线； 2. 排除电机故障。	减速 停车
Er14	模块过热	1. 环境温度过高； 2. 风扇损坏； 3. 风道堵塞。	1. 降低环境温度； 2. 清理风道； 3. 更换风扇。	减速停车， 温度正常后 可自动复位
Er16	EEPROM 故障	EEPROM 读写异常。	请与代理商或厂家联系。	

故障显示	故障描述	故障原因	处理方法	备注
Er18	电流检测故障	驱动控制板异常。	请与代理商或厂家联系。	
Er19	电机调谐超时	1. 电机参数设定不对; 2. 参数调谐超时; 3. 同步机旋转编码器异常。	1. 正确输入电机参数; 2. 检查电机引线; 3. 检查旋转编码器接线, 确认每转脉冲数设置正确。	
Er20	旋转编码器故障	1. 旋转编码器型号是否匹配; 2. 旋转编码器连线错误。	1. 选择开路集电极类型的 ABZ 相旋转编码器; 2. 排除接线问题。	
Er26	参数设定提示	1. 开门时间限定 (F500) 小于总开门时间; 2. 关门时间限定 (F501) 小于总关门时间; 3. 门宽自学习时, 命令源 (F002) 不是手动调试模式, 或者开关门方式选择 (F001) 不是距离控制方式; 4. 驱动同步机时控制方式 (F000) 选择磁通矢量控制方式。	1. 设置较大的开门时间限定, 保证 F500 大于所有开门时间参数的总和; 2. 设置较大的关门操作时间, 保证 F501 大于所有关门时间参数的总和; 3. 门宽自学习时, 命令源 (F002) 为手动调试模式, 或者开关门方式选择 (F001) 距离控制方式; 4. 控制同步机 (F100) 时, 选择矢量控制方式 (F000)。	仅为提示, 无故障记录
Er27	门宽自学习故障	1. 门宽自学习学到的门宽数据小于 20; 2. 没有门宽自学习前, 进行距离控制运行。	1. 检查编码器接线和相关参数; 2. 检查门机机械系统; 3. 距离控制运行前, 进行门宽脉冲自学习。	
Er28	开门超时	1. 开门限位信号故障或设置错误; 2. 脉冲编码器断线。	1. 检查开门限位信号; 2. 检查编码器接线。	可自动复位
Er30	慢速开关门超时	1. 开关门限位信号故障或设置错误; 2. 脉冲编码器断线。	1. 检查关门限位信号; 2. 检查编码器接线。	可自动复位
Er31	开门受阻保护	1. 轨道内有杂物; 2. 开门受阻部分参数设置不合理。	1. 检查轨道内是否有杂物; 2. 检查开门力矩上限是否合理; 3. 检查开门遇阻判定时间是否合理。	可自动复位
Er32	速度偏差保护	1. 加减速过急; 2. 电机角度学习错误出现飞车; 3. 速度偏差设定偏小、时间偏短。	1. 把加减速时间加大; 2. 重新进行角度自学习; 3. 更改 F516、F517 的值。	
Er33	关门限位开关异常	距离控制模式且使用限位开关时, 关门过程中未检测到此开关信号。	1. 检查是否安装关门限位开关, 如未安装请取消相应的输入点设置; 2. 检查关门限位开关接线是否正确; 3. 检查关门限位开关是否损坏。	此时门机可根据编码器信号正常运行, 关门限位开关正常后此故障自动复位。

附录 版本变更记录

日期	变更后版本	变更内容
2009年05月	V0.0	第一版发行
2010年11月	V1.0	软件升级
2013年01月	V1.1	前言内容更新
		第2章更新机械安装说明
		第3章更新电气安装说明
		第4章更新操作器使用与应用举例
		第5章软件升级到V1.08，更新F6组及F9组等功能码
2015年07月	V1.2	第 2 章更新技术指标表
		第 2 章更新产品外观图及相关图形
		第 3 章更新控制回路端子分布与配线通讯端子
		第 4 章增加一键调试功能和断电防夹人功能介绍
		部分功能码变更： 新增功能码F010、F313、F421、F519、F810的BIT11、F817、 (F909、F910、F911功能值)，修改F113，增加监控参数 FA29~FA35、FP02； 新增故障码Er11，删除Er29。
2020年10月	B04	细小勘误
2021年2月	B05	部分功能码变更： 新增功能码F216~F219、F409、F422、F423、F520~F524、 F622~F629 修改图4-15和图4-16

保修协议

- 1) 本产品保修期为十八个月（以机身条型码信息为准），保修期内按照使用说明书正常使用情况下，产品发生故障或损坏，我公司负责免费维修。
- 2) 保修期内，因以下原因导致损坏，将收取一定的维修费用：
 - A、因使用上的错误及自行擅自修理、改造而导致的机器损坏；
 - B、由于火灾、水灾、电压异常、其它天灾及二次灾害等造成的机器损坏；
 - C、购买后由于人为摔落及运输导致的硬件损坏；
 - D、不按我司提供的用户手册操作导致的机器损坏；
 - E、因机器以外的障碍（如外部设备因素）而导致的故障及损坏；
- 3) 产品发生故障或损坏时，请您正确、详细的填写《产品保修卡》中的各项内容。
- 4) 维修费用的收取，一律按照我公司最新调整的《维修价目表》为准。
- 5) 本保修卡在一般情况下不予补发，诚请您务必保留此卡，并在保修时出示给维修人员。
- 6) 在服务过程中如有问题，请及时与我司代理商或我公司联系。
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	维修人：	



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