



NICE900 Synchronous Motor Distance Control Mode

User Manual

MON-CM-B01-2025-0009

Preface

The NICE900 series integrated door machine product is a variable controller specialized for driving the door machine systems such as elevator doors, cold storage doors, and subway doors. It integrates the 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, namely, speed control and distance control. Applicable to various applications, it can meet drive and control requirements of most door systems.

The *NICE900 Integrated Door Machine Controller User Manual* is refined according to different user comments and application modes. This document describes only the application scheme of the synchronous motor in distance control mode.

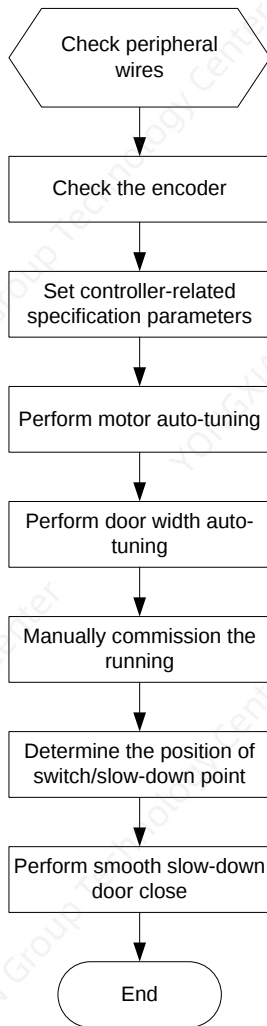
If you have any questions, please call us.

[!] The commissioning, maintenance, or check on the controller must be performed by qualified persons under the guidance of this document. Otherwise, unexpected danger may occur and cause human injuries and device damages.

[Note] This document is applicable to the door machine controller in version 1.07 or later.

★ The door machine controller has been commissioned according to the following steps before delivery. It can perform door open or close operations after you correctly connect the cables.

[Note] To ensure successfully commissioning of the door machine controller, perform the operations according to the following steps:

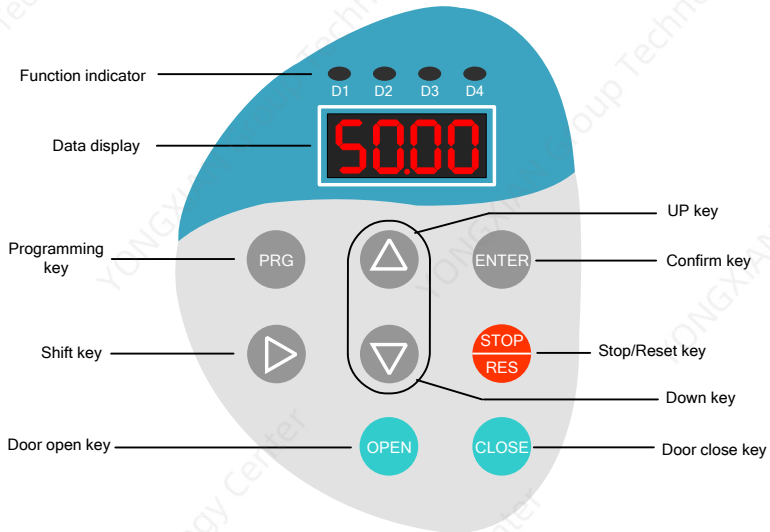


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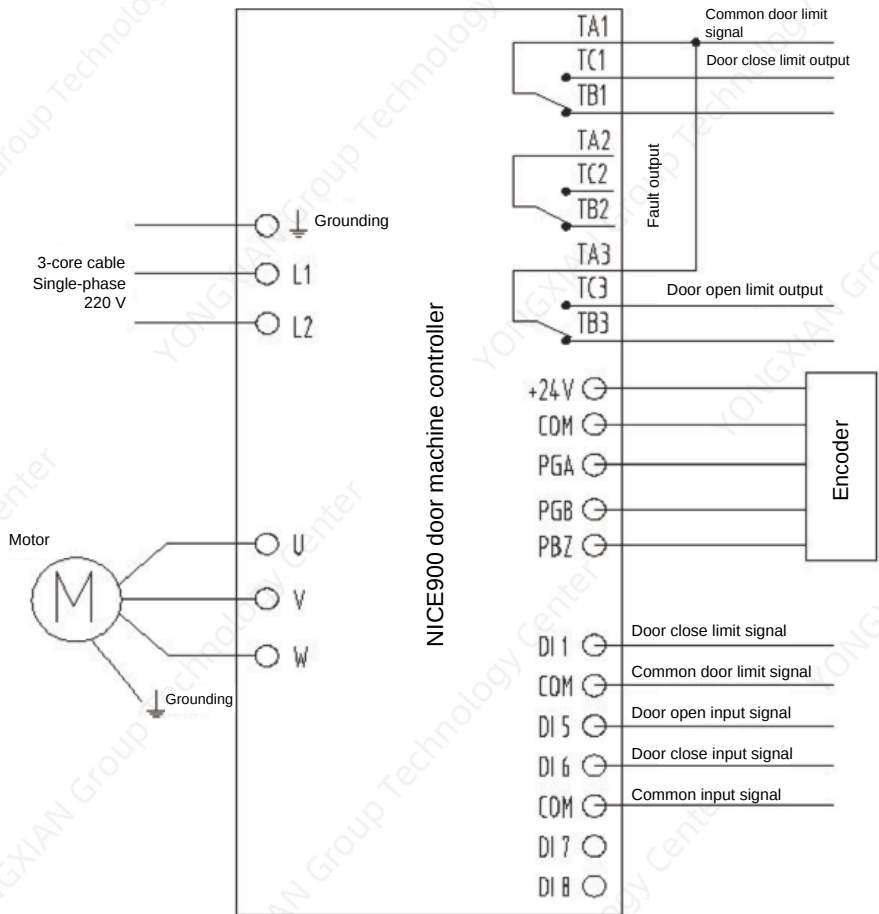
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1. Operation and Display

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



2. Typical Application (Distance Control Pulse + Limit Switch)



★ [Note] Among the relay output terminals, TA/TB is normally open (NO), and TA/TC is normally closed (NC).

If the controller displays fault code Er33, check the limit switch.

3. Cable Connection Check and Motor Auto-tuning

[Note] Before motor auto-tuning, check whether the ABZ signal of the encoder is correct.

3.1 Checking the Encoder Signal (Ensuring F000 = 1 and F001 = 1)

1) AB phase signal detection

When you manually pull to open the door, the D2 indicator is steady on, indicating that the AB signal access is correct. Otherwise, AB phase signals are switched.

2) Z phase signal detection

When you manually pull to open the door, the D3 indicator blinks, indicating that the D3 signal access is correct.

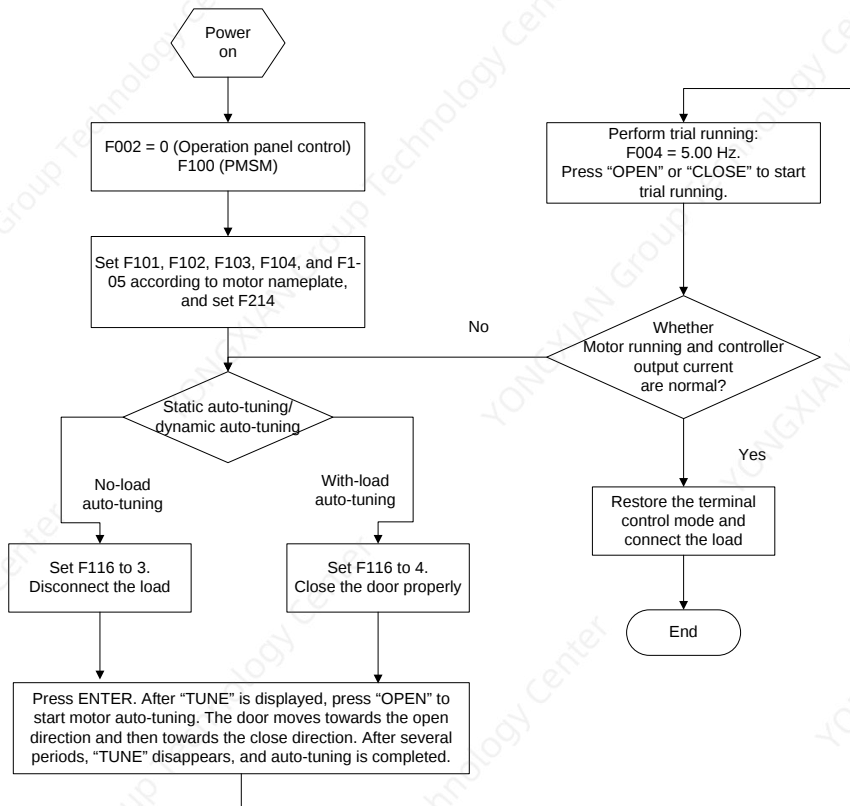
3.2 UVW Output Cable Detection

After the cable connection check for the encoder is complete, enter the motor parameters (F100-F105) and encoder PPR (F214) to perform motor auto-tuning.

(The panel displays "TUNE". You can press  to enable motor auto-tuning when the door close limit is reached.)

- 1) If the rotor of the motor is locked constantly, replace any two phases of the UVW to perform motor auto-tuning again.
- 2) The motor travels towards the door open direction for a certain distance and then travels towards the door close direction for a certain distance. After three times of travelling, "TUNE" disappears and the tuning is complete.

3.3 Tuning Procedure

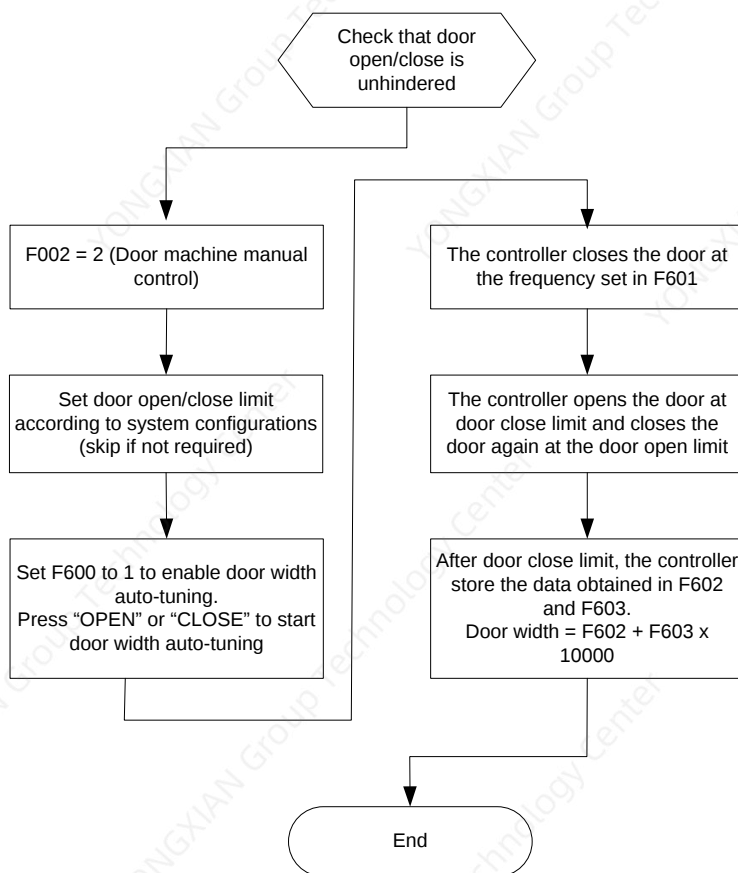


[Note]

1. Before motor auto-tuning, ensure that the operators and devices are in safe conditions.
2. The no-load tuning has a better effect than the load tuning. Therefore, no-load tuning is recommended.

4. Door Width Auto-tuning

[Note] F614 is used for torque setting for door width auto-tuning. If the auto-tuning cannot be performed or door close limit cannot be reached, increase the value of F614. If the belt is slipped after the door close limit is reached, decrease the value of F614.



After the door width auto-tuning is complete, set F002 to 1, indicating the terminal control mode of the door machine controller.

5. Setting the Input and Output Signals

Parameters of the input signals:

Function Code	Parameter Name	Range	Value
F901	Input terminal of the door close limit DI 1	1–116	113 (door close limit)
F905	Input terminal of the door open signal DI 5	1–116	1 (door open command)
F906	Input terminal of the door close signal DI 6	1–116	2 (door close command)

Parameters of the output signals:

Function Code	Parameter Name	Range	Value
F909	Relay output TA1\TB1\TC1	1–11	2 (door close limit output)
F911	Relay output TA3\TB3\TC3	1–11	1 (door open limit output)
F910	Relay output TA2\TB2\TC2	1–11	5 (fault output)

6. Faults and Parameter Setting

1) Door Failed to Be Opened or Opened to the Limit

The door cannot be opened.

F210	Torque boost	0–30.0%	12.0%	☆
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Slightly increase the value of this parameter.

The door cannot be opened to the limit due to insufficient force.

F307	Torque switchover threshold at door open limit	0.0% to 150.0% of the rated torque of the motor	50.0%	☆
F308	Door open limit holding torque	0.0% to 100.0%	80.0%	☆

Properly increase the values of these parameters.

2) Asynchronous Door Vane Retraction

Modify the parameters according to the following table:

F408	Low speed running time at door close limit	1–9999 ms	300ms	☆
F409	Door vane retraction speed	0.00 Hz to F403	2.00Hz	☆
F410	Door vane retraction running time	1–9999 ms	500ms	☆
F620	Pulse at door close limit output	0%–99.9%	0.0	☆

3) Door Close Hindered Commissioning

Commissioning based on time (recommended)

F502	Door close time limit	0.00–999.9s	0s	☆
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When F502 is set to 0, no door close time limit is set. The value of F502 should be greater than the required door close time.

Commissioning based on torque

F417	High speed at door close hindered	F418 to F104	12.00 Hz	☆
F418	Low speed at door close hindered	0.00 Hz to F104	2.00 Hz	☆
F419	High speed torque	0.00%–150.0%	100.0%	☆
F420	Low speed torque	0.00%–150.0%	100.0%	☆

It is suggested not to set F419 and F420 to smaller value. Otherwise, malfunction may be caused.

These parameters can be set according to the output torque at the door limit. The values can be slightly lower than the output torque. If the values are too small, malfunction may be caused.

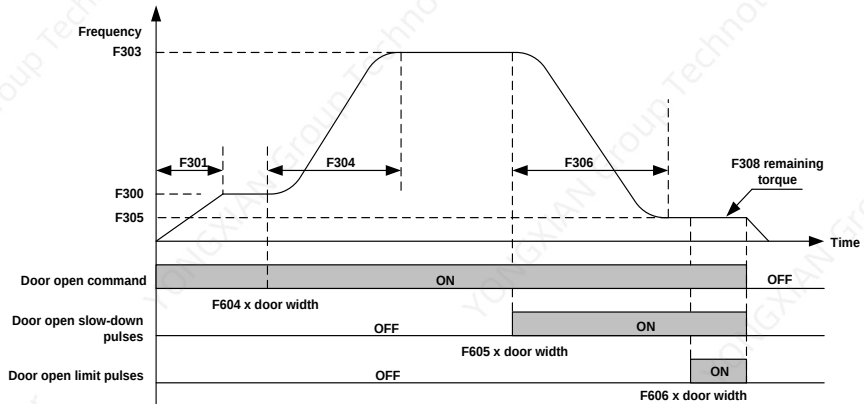
4) Torque Holding Settings

F504	Delay of external door open command	0–999.9s	999.9s	☆
F505	Delay of external door close command	0–999.9s	999.9s	☆

[Note] At the door open limit or door close limit, if the torque holding function is required, properly increase the values of these parameters. When the values are set to 999.9s, the delay is unlimited.

7. Curve Commissioning

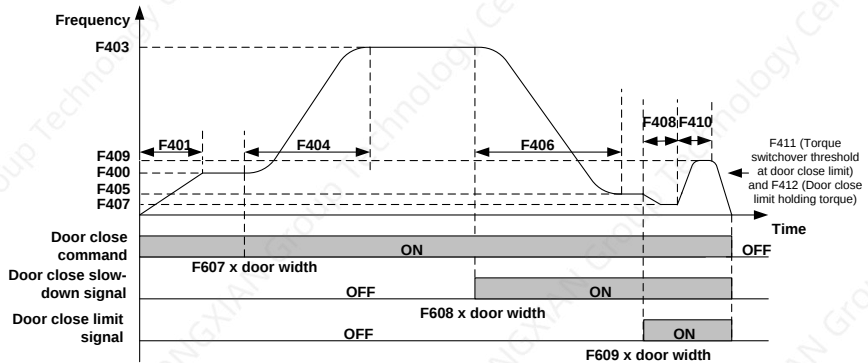
7.1 Door Open Curve Commissioning



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 F300 within the acceleration time set in F301.
2. When the door open position reaches F606 x door width, the door machine accelerates to the speed set in F303 within the acceleration time set in F304.
3. When the door open position reaches F605 x door width, the door machine decelerates to creep, with the speed being set in F305 and deceleration time set in F306.
4. When the door open position reaches F606 x door width, the door machine continues low speed creeping, and then enters the door open holding state, with the holding torque set in F308. 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 F504.

7.2 Door Close Curve Commissioning



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 F400 within the acceleration time set in F401.
2. When the door close position reaches F607 x door width, the door machine accelerates to the speed set in F403 within the acceleration time set in F404.
3. When the door close position reaches F608 x door width, the door machine decelerates to the speed set in F405 within the acceleration time set in F406.
4. After the door close position reaches F609 x door width, the door machine decelerates again to the speed set in F407. It is suggested to set the value of F609 equal to or larger than 95.0%. If pulse is lost during door open or door close, decrease the value of F609. Set the threshold for retracting the door vane in F620.
5. After the door is retracted and door limit is reached, the door machine enters the torque holding state, with the speed set in F407, and holding torque set in F412. The door position is reset to 0.
6. After the door close command is cancelled, the torque holding state ends. If torque holding needs to continue, increase the delay time set in F505.

8. Common Parameters

[Note]

★ The parameters cannot be modified during the running of door machine.

☆ The parameters can be modified when the system is stopped or running.

8.1 Control Mode Parameters and Motor Parameters

Function Code	Name	Range	Value	Property
F000	Control mode	0: Sensorless vector control (SVC) 1: Closed-loop vector control (SVC)	1	★
F001	Door open/close mode selection	0: Speed control 1: Distance control	1	★
F002	Command source selection	0: Operation panel control 1: Door machine terminal control 2: Door machine manual control 3: Door machine auto demonstration	1	★
F007	Carrier frequency	2.0 kHz to 16.0 kHz	12.5	☆
F100	Motor type	0: Asynchronous motor 1: PMSM	1	★
F101	Rated motor power	0–750 W	50 (motor dependent)	★
F102	Rated motor voltage	0–250 V	50 (motor	★

Function Code	Name	Range	Value	Property
			dependent)	
F103	Rated motor current	0.001–9.900 A	1.10 (motor dependent)	★
F104	Rated motor frequency	1.00 Hz to 99.00 Hz	24 (motor dependent)	★
F105	Rated motor speed	1–9999 RPM	180 (motor dependent)	★
F214	Encoder PPR	1–9999	1024 (Encoder dependent)	★
F210	Torque boost	0%–30.0%	12.0%	☆

8.2 Door Open Speed Parameters

Function Code	Name	Range	Value	Property
F300	Door open startup low speed	0.00 Hz to F303	3.00 Hz	☆
F301	Door open startup acceleration time	0.1–999.9s	0.8s	☆
F302	Low speed running time for door open startup in speed control	0.1–999.9s	0.8s	☆
F303	Door open high speed	0.00 Hz to F104	18.00 Hz	☆
F304	Door open acceleration time	0.1–999.9s	1.0s	☆
F305	Door open ending low	0.00 Hz to F303	2.00 Hz	☆

Function Code	Name	Range	Value	Property
	speed			
F306	Door open deceleration time	0.1–999.9s	1.0s	☆
F307	Torque switchover threshold at door open limit	0.0%–150.0%	50.0%	☆
F308	Door open limit holding torque	0.0%–100.0%	80.0%	☆

8.3 Door Close Speed and Hindered Parameters

Function Code	Name	Range	Value	Property
F400	Door close startup low speed	0.00 Hz to F403	4.00 Hz	☆
F401	Door close startup acceleration time	0.1–999.9s	0.8s	☆
F402	Low speed running time for door close startup in speed control	0.1–999.9s	0.1s	☆
F403	Door close high speed	0.00 Hz to F104	15.50 Hz	☆
F404	Door close acceleration time	0.1–999.9s	2.0s	☆
F405	Door close ending low speed	0.00 Hz to F403	2.00 Hz	☆
F406	Door close deceleration time	0.1–999.9s	1.1s	☆
F407	Door close limit low speed	0.00 Hz to F403	1.5 Hz	☆
F408	Low speed running time at door close limit	1–9999 ms	300 ms	☆

Function Code	Name	Range	Value	Property
F409	Door vane retraction speed	0.00 Hz to F403	2.00 Hz	☆
F410	Door vane retraction running time	1–9999 ms	500 ms	☆
F411	Torque switchover threshold at door close limit	0.0%–150.0%	50.0%	☆
F412	Door close limit holding torque	0.0%–60.0%	40.0%	☆
F415	Door close hindered judging time	0–9999 ms	500 ms	☆
F421	Extensive amount at door close limit	0.0%–10.0%	4.0%	☆

8.4 Distance Control Parameters

Function Code	Name	Range	Value	Property
F604	Low speed running distance of door open startup in distance control	0.0%–30.0%	10.0%	☆
F605	Door open slow-down point in distance control	60.0%–90.0%	70.0%	☆
F606	Door open limit point in distance control	80.0%–99.0%	96.0%	☆
F607	Low speed running distance of door close startup in distance control	0.0%–30.0%	8.0%	☆
F608	Door close slow-down point in distance control	60.0%–90.0%	70.0%	☆
F609	Door close limit point in distance control	80.0%–99.0%	95.0%	☆

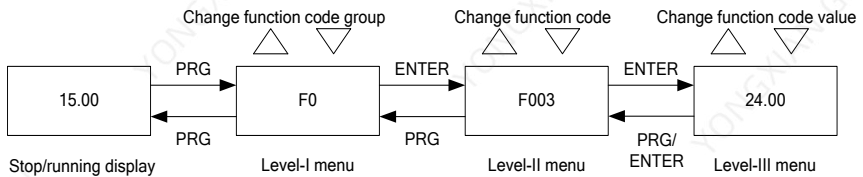
9. Basic Operation and Troubleshooting

9.1 Operation Methods of Operation Panel

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

a. Three-level menu

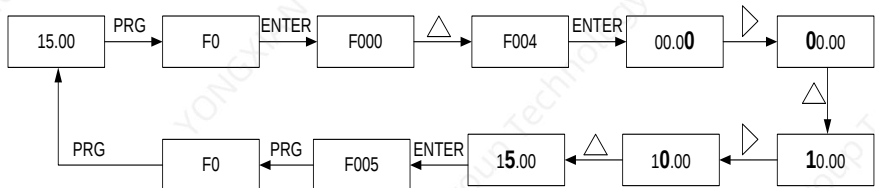
The three-level menu consists of function parameter group (level I), function code (level II), and function code setting value (level III). The following figure shows the operation procedure on the operation panel.



You can return to level II from level III by pressing **PRG** or **ENTER**. After you press **ENTER**, the system saves parameter setting first, and then goes back to level II

and shifts to the next function code; after you press **PRG**, the system does not save parameter setting, but directly returns to level II and remains at the current function code.

b. Example of changing the value of F004 to 15.00 Hz (characters **bolded** indicating the blinking digits)



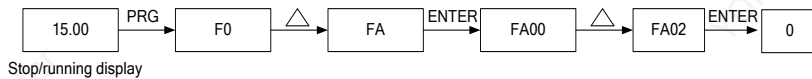
In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

- 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.

c. Viewing fault information

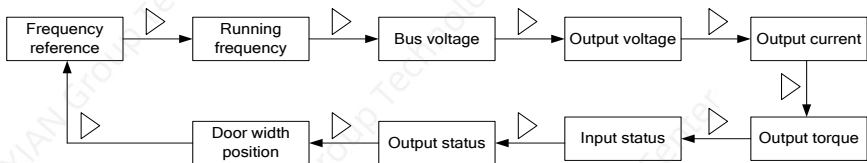
When a fault occurs on the controller, the operation panel displays the fault code, based on which, you can find the cause of the fault and rectify the fault quickly.

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



d. Viewing display at running or stop

In the stop/running state without fault, you can view the parameters circularly by pressing the  key. The parameters to be displayed are set in by setting FA00 and FA01.

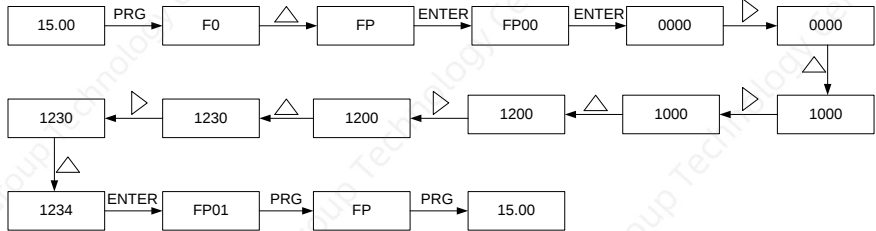


e. Setting user passwords

To effectively protect parameters, the NICE900 series door machine controller provides the password protection function.

The following figure shows the process for changing the password to 1234

(characters bolded indicating the blinking digits).



After the user password (that is, the user password FP00 is not set to 0) is set, when

you press  to enter the edit mode of the function code, the system verifies the user password first, displaying "- - -". You can enter the edit mode only after correctly entering the password. For the factory-setting parameter areas, you also need to enter the correct password to access. (Do not attempt to modify the factory-setting parameters. If the parameters are improperly configured, the system may be instable or abnormal.)

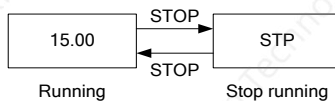
You can modify the user password when the password protection is unlocked, and the final password is subject to the last entered password. To cancel the password protection function, enter the password and set FP00 to 0. Upon powering up, if FP00 is not 0, the parameters are protected by password.

f. Setting the pause function

In the terminal control mode (F002 is set to 1), during the door open or door close

running process, you can press the  button to pause the running. At this time,

the panel of the door machine displays "STP". If you press  again, the running status is resumed.



9.2 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 the corresponding protection function and displays the fault code.

If a fault occurs, the controller performs the 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 faults 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	1. Eliminate external faults such as wiring error. 2. Perform motor	

Fault Code	Description	Cause	Troubleshooting	Remarks
		auto-tuning is performed improperly. 3. The load is too heavy. 4. Strong interference exists on the encoder.	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.	1. Eliminate external power supply issues. 2. Contact the agent or the	The controller resets automatically after the voltage becomes

Fault Code	Description	Cause	Troubleshooting	Remarks
		2. The input voltage is too low. 3. The control board is abnormal.	vendor.	normal.
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.	
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 stop.
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. Clear the air filter. 3. Replace the fan.	The controller automatically resets.
Er16	EEPROM fault	An EEPROM reading or writing abnormality occurs.	Contact the agent or the vendor.	
Er18	Current detection fault	The control board is abnormal.	Contact the agent or the vendor.	
Er19	Motor auto-turning timeout	1. The motor parameters are incorrectly set. 2. The parameter identification	1. Enter the motor parameters correctly. 2. Check the lead wire of the	

Fault Code	Description	Cause	Troubleshooting	Remarks
		times out. 3. The encoder for the PMSM is abnormal.	motor. 3. Check wiring of the encoder and ensure that the PPR is set correctly.	
Er20	Encoder fault	1. The encoder model is improper. 2. Wiring of the encoder is incorrect.	1. Use an open-collector ABZ phase encoder. 2. Eliminate wiring issues.	
Er21	Initial position detection fault	The motor parameters are not properly configured.	Properly configure the motor parameters.	
Er25	Overspeed	1. The door open and close running speed is 20% higher than the preset speed for 50 ms.	1. Check the wiring of the encoder.	
Er26	Parameter setting error	1. During door width auto-tuning, F002 (Command source selection) is not set to 2 (Door machine manual control), or F001 (Door open/close control mode) is not set to 1 (Distance control). 2. F000 (Control mode) is set to 0	1. During door width auto-tuning, set F002 (Command source selection) to 2 (Door machine manual control), or F001 (Door open/close control mode) to 1 (Distance control). 2. Set F002 to 2 or F001 to 1	It is only a prompt, and not recorded as a fault.

Fault Code	Description	Cause	Troubleshooting	Remarks
		(SVC) when the controller drives a PMSM.	during door width auto-tuning.	
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. 2. The wire to the pulse encoder is broken.	1. Check the door open limit signal. 2. Check the wiring of the encoder.	The controller automatically resets.
Er29	Door close timeout	1. The motor running direction is opposite to the door open definition. 2. The door close limit signal is abnormal or incorrectly set. 3. The wire to the pulse encoder is broken.	1. Set F004 to 1. 2. Check the door close limit signal. 3. Check the wiring of the encoder.	The controller automatically resets.
Er30	Low speed	1. The door	1. Check the door	The controller

Fault Code	Description	Cause	Troubleshooting	Remarks
	door open/close timeout	open/close limit signal is abnormal or incorrectly set. 2. The wire to the pulse encoder is broken.	close limit signal. 2. Check the wiring of the encoder.	automatically resets.
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 configured.	1. Clear the stuff in the guide rail. 2. Set the upper limit of door open torque to a proper value. 3. Set F311 (Door open hindered judging time) to a proper value.	The controller automatically resets.
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 F516 and F517 to 0.	
Er33	Door limit switch abnormal	The door limit switch is abnormal or damaged.	Replace the door limit switch.	



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