

Integrated Door Motor Controller User Manual

BL6-DU20PX Series

Ver. 1.7

Shenyang Bluelight Automatic Technology Co., Ltd.

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Foreword

Thank you for using the BL6-DU20PX series integrated door motor controller (hereinafter referred to as door motor controller). The integrated door motor controller is a new generation of intelligent elevator door control system. The product uses high performance inverter module and advanced SVPWM control technology, achieving excellent door control performance, and integrated with the SYLG car roof control board, using a controller to realize car communication signal, load information collection, car door signal collection, door motor control and other functions, improving the system integration degree, reduce the cost and fault risks. The main features of the integrated door motor controller are as follows:

- ◆ Apply advanced vector control technology to achieve precise control of motor running. Running smoothly.
- ◆ The perfect protection function and intelligent processing system, to ensure the safety of operation, reduce the maintenance cost.
- ◆ Supports asynchronous door motor without encoder running, reduce the cost and fault risk of system.
- ◆ Configurable input and output terminals function improve the flexibility to use.
- ◆ Flexible external terminal wiring and high compatible, as the independent door motor controller when used alone.
- ◆ When used in conjunction with the SYLG control system, integrated door motor controller can realize the car roof control board and door motor control function at the same time, eliminating the installation of car roof part of separated type COP control board.
- ◆ The LED keypress and the digital operator and other debugging mode, convenient debugging and use.

This manual introduces how to properly use the BL6-DU20PX series door motor controller. Before use (installation, operation, maintenance, etc.), be sure to read this instruction manual carefully. At the same time, please use this product after understanding the safety precautions of this product.

This manual is for lift control designers, installation operators and maintenance personnel. Installation, commissioning and maintenance must be performed by trained and qualified personnel.

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1 Safety Information

1.1 Label Description

The following conventions are used to indicate precautions in this user guide. Failure to notice the precautions provided in this user guide can result in serious or even fatal injury to damage to the products or to related equipment and systems.



Indicates precautions that if not heeded could possibly result in loss of life or serious injury.



Indicates precautions that if not heeded could result in relatively serious or minor injury to the operator and damage to the product. Also, it should be noted that even for precautions, in certain situations could result in serious accident.



Indicate important information that should be memorized.

1.2 Safety Precautions

- Confirmation upon Delivery

 CAUTION
<p>✧ Never install an integrated controller that is damaged or missing components. Doing so can result in injury.</p>

- Installation

 CAUTION
<p>✧ Always hold the case when carrying the integrated controller Otherwise the integrated controller may drop and damage.</p> <p>✧ Please install the device to a metal surface or other non-flammable objects Otherwise there is a fire-hazard potential.</p> <p>✧ Please mount the device to an object that is strong enough. Otherwise the integrated controller may drop and damage.</p> <p>✧ Please install the device in a dry place where water or rain could not get into. Otherwise the integrated controller could get damaged.</p> <p>✧ Do not install the device in the environment containing flammable, explosive gas or nearby. Otherwise there is risk of fire or explosion.</p> <p>✧ Do not leave any metallic objects inside the integrated controller Otherwise it may damage the device and has fire-hazard potential.</p>

- Wiring

 WARNING
<ul style="list-style-type: none"> ✧ Always turn OFF the input power supply before wiring terminals. Otherwise, an electric shock or fire can occur. ✧ Wiring must be performed by an authorized person qualified in electrical work. Otherwise, an electric shock or fire can occur. ✧ Be sure to ground the ground terminal. (200 V Class: Ground to 100 Ω or less, 400 V Class: Ground to 10 Ω or less) Otherwise, an electric shock or fire can occur. ✧ Always check the operation of any Emergency stop circuits after they are wired. Otherwise, there is the possibility of injury. (Wiring is the responsibility of the user.) ✧ Never touch the output terminals directly with your hands or allow the output lines to come into contact with the Controller case. Never short the output circuits. Otherwise, an electric shock or ground short can occur.

 CAUTION
<ul style="list-style-type: none"> ✧ Check to be sure that the voltage of the main AC power supply satisfies the rated voltage of the Controller. Injury or fire can occur if the voltage is not correct. ✧ Do not perform voltage withstand tests on the Controller. Otherwise, semiconductor elements and other devices can be damaged. ✧ Connect braking resistors, Braking Resistor Units, and Braking Units as shown in the I/O wiring examples. Otherwise, a fire can occur and the Controller braking resistors, Braking Resistor Units, and Braking Units can be damaged. ✧ Tighten all terminal screws to the specified tightening torque. Otherwise, a fire may occur.

- Trial Operation

 WARNING
<ul style="list-style-type: none"> ✧ Check to be sure that the front cover is attached before turning ON the power supply. Otherwise, an electric shock may occur. ✧ Do not get close to machine and related objects when choosing the error auto reset function, as the drive will automatically restart after warning reset. Otherwise, an injury may occur. ✧ Provide a separate fast stop switch; the Digital Operator STOP Key is valid only when its function is set. Otherwise, an Injury may occur. ✧ Reset alarms only after confirming that the RUN signal is OFF. Otherwise, an Injury may occur. ✧ Do not perform fault operation and signal checking while the drive is running. Otherwise an injury may occur, and the drive may get damaged.



- ◇ **Do not touch the radiation fins (heat sink), braking resistor, or Braking Resistor Unit. These can become very hot. Otherwise, a burn injury may occur.**
- ◇ **Do not touch the braking resistor. Doing so can result in electric shock.**
- ◇ **Be careful when changing Controller settings. The Controller is factory set to suitable settings. Otherwise, the equipment may be damaged.**

- Maintenance and Inspection



- ◇ **Do not touch the Controller terminals. Some of the terminals carry high voltages and are extremely dangerous.**
Doing so can result in electric shock.
- ◇ **Always have the protective cover in place when power is being supplied to the Controller.** When attaching the cover, always turn OFF power to the Controller through the MCCB.
Doing so can result in electric shock.
- ◇ **After turning OFF the main circuit power supply, wait for the time indicated on the front cover, and make sure the CHARGE indicator light has gone out, and then perform maintenance and inspection.**
The capacitor will remain charged and is dangerous.
- ◇ **Maintenance, inspection, and replacement of parts must be performed only by authorized personnel. Remove all metal objects, such as watches and rings, before starting work. Always use grounded tools.**
Failure to heed these warning can result in electric shock.
- ◇ **Do not change the wiring, or remove connectors or terminal, during power on period.**
Otherwise, an electric shock may occur.



- ◇ **A CMOS IC is used in the control board. Handle the control board and CMOS IC carefully.**
The CMOS IC can be destroyed by static electricity if touched directly.

- Other



- ◇ **Do not attempt to modify or alter the Door Motor Controller.**
Doing so can result in electrical shock or injury.

2 Introduction

This chapter introduces models, specifications, product appearance, size, and product function of the BL6-DU20PX series integrated door motor controller, and describes the checks required upon receiving or installing a door motor controller.

2.1 Model Description

The model of the integrated door motor controller on the nameplate indicates the specification, voltage level, and maximum motor capacity of the controller in alphanumeric codes. Refer to figure 2.1 for example (400w).

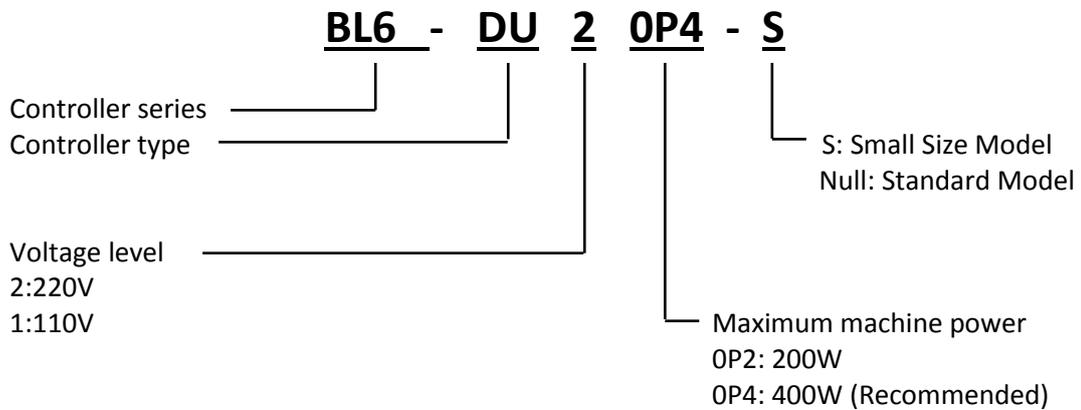


FIGURE 2.1 MODEL DESCRIPTION DIAGRAM

2.2 Nameplate Information

Nameplate information is shown in figure 2.2 below.

Nameplate attached to the right side of BL6-DU series door motor controller describes the model, power, input, output, serial number, and other information about the controller.

Example: A standard nameplate for BL6-DU series door motor controller.

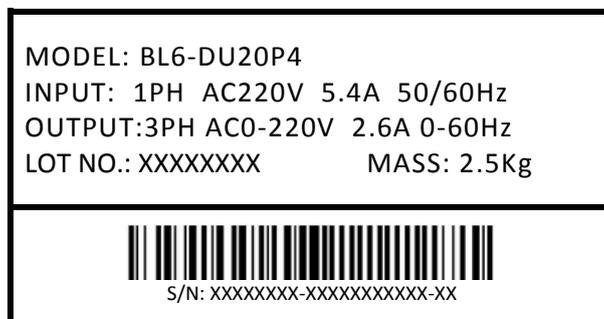


FIGURE 2.2 NAMEPLATE INFORMATION

2.3 Specifications

Specifications of BL6-DU Series Integrated Door motor controller in chart 2.1.

Note: For the following specifications have no special clarification, small size model (S) and standard model are assumed to be identical.

CHART 2.1 SPECIFICATIONS

MODEL BL6-DU20P□		20P4	20P2
MAX MOTOR POWER(KW)		400	200
OUTPUT	RATED OUTPUT CAPACITY(KVA)	0.6	0.3
	RATED OUTPUT CURRENT(A)	2.6	1.3
INPUT	GRID VOLTAGE(V)	1-PHASE, AC220, -15%-20%	
	GRID FREQUENCY(Hz)	50Hz±3Hz	
DRIVE FEATURES	MAX OUTPUT FREQUENCY(Hz)	99.00Hz	
	SPEED RANGE	1:50(OPEN LOOP V/F CONTROL); 1:1000(CLOSED LOOP VECTOR CONTROL)	
	STEADY SPEED ACCURACY	±0.5% (OPEN LOOP V/F CONTROL); ±0.05% (CLOSED LOOP VECTOR CONTROL)	
	STARTING TORQUE	0Hz-180% (CLOSED LOOP VECTOR CONTROL); 1Hz-150% (OPEN LOOP V/F CONTROL)	
	FREQUENCY RESOLUTION	0.01Hz	
	CURRENT RESOLUTION	0.01A	
	CARRIER FREQUENCY	2KHz-16KHz	
MAIN FUNCTION	FOR ASYNCHRONOUS MOTOR, SUPPORT RUN DIRECTLY WITHOUT ENCODER AFTER FILLING MOTOR BASIC PARAMETERS; FOR SYNCHRONOUS MOTOR, SUPPORT TUNE MOTOR PARAMETERS AND ENCODER ZERO POSITION WITH LOAD OR WITHOUT LOAD.		
	SUPPORT AC PMSM (PERMANENT MAGNET SYNCHRONOUS MACHINE) CLOSED LOOP VECTOR CONTROL WITH NORMAL ABZ ENCODER, ENCODER OPEN LOOP COLLECTOR OUTPUT OR PUSH-PULL OUTPUT MODE		
	SUPPORT PROMOTE TORQUE AUTOMATICALLY OR MANUALLY WITH OPEN LOOP V/F CONTROL MODE		
	INTEGRATED THE FUNCTION OF DOOR CONTROL BOARD ON CAR ROOF. WHEN WORK WITH SYLG ELEVATOR CONTROL SYSTEM, THE DOOR CONTROL BOARD ON CAR ROOF CAN BE OMITTED. (S TYPE DOES NOT SUPPORT THIS FUNCTION.)		
	SUPPORT DOOR WIDTH SELF-LEARNING FUNCTION.		
	SUPPORT AUTO-DEMONSTRATING FUNCTION		
PROTECTION	OVERLOAD PROTECTION	STOP AT 150% RATED CURRENT 60s/200% RATED CURRENT 1s	
	SUPPORT CONTROLLER OVER VOLTAGE PROTECTION, UNDER-VOLTAGE PROTECTION, OVER CURRENT PROTECTION, OPEN-PHASE PROTECTION, INTER PHASE SHORT-CIRCUIT PROTECTION AND OTHER FUNCTIONS.		
I/O	RELAY OUTPUT	Standard Type	3 OUTPUTS: 2 SPDTs (SINGLE-POLE DOUBLE-THROW), 3A/30VDC; 1 NORMALLY CLOSED CONTACT, 16A/250VAC
		S Type	3 OUTPUTS: 3 SPDTs (SINGLE-POLE DOUBLE-THROW), 3A/30VDC
OPTICAL ISOLATION INPUT		8 INPUTS WITH BUILT-IN CURRENT LIMITING RESISTOR, EXTERNAL DC 24V POWER SUPPLY, DISTINGUISH POLARITY, AND CONFIGURABLE BY SOFTWARE.	
USING AMBIENCE	COOLING	NATURAL COOLING	
	PROTECTION DEGREE	IP20	
	AMBIENT TEMPERATURE HUMIDITY	-10°C - +40°C, 5~95% RH, NON-CONDENSING	
	VIBRATION	>1G LOWER THAN 20HZ	
	APPLICATION SITUATION	INDOORS, WITHOUT DIRECT SUNLIGHT, DUST, CORROSIVE/EXPLOSIVE GASES	
	STORAGE SITUATION	CLEAN/DRY/INDOORS	
ALTITUDE		<1000M	

2.4 Product Appearance

Refer to figure 2.3 for the appearance of BL6-DU series integrated door motor controller.

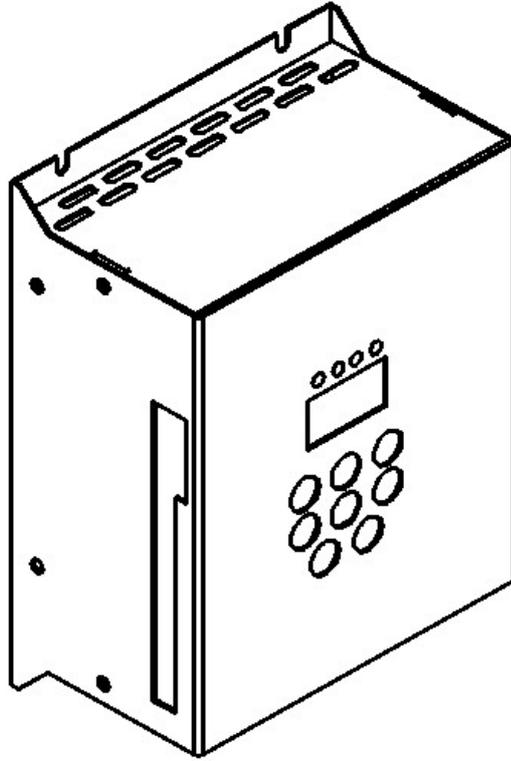


FIGURE 2.3 APPEARANCES OF STANDARD TYPE

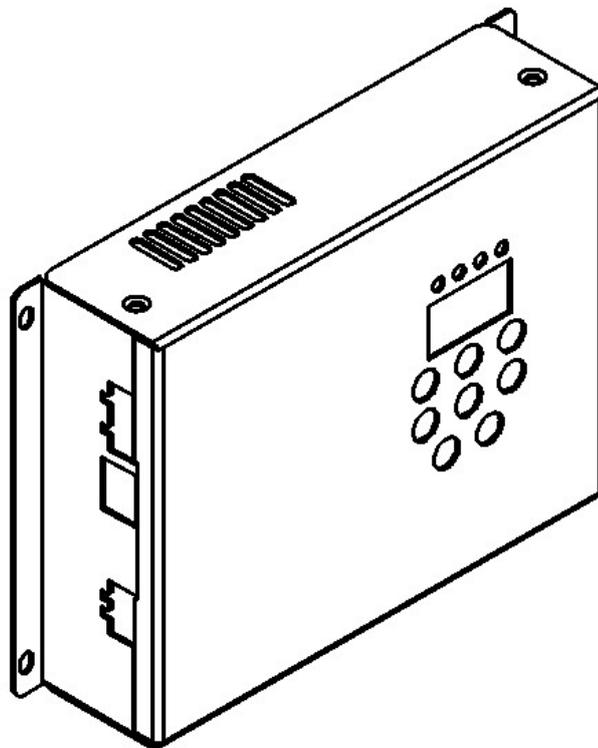


FIGURE 2.4 APPEARANCES OF S TYPE

2.5 Exterior Dimension

Refer to figure 2.4 and chart 2.2 for the exterior dimension of BL6-DU series integrated door motor controller. (Unit: mm)

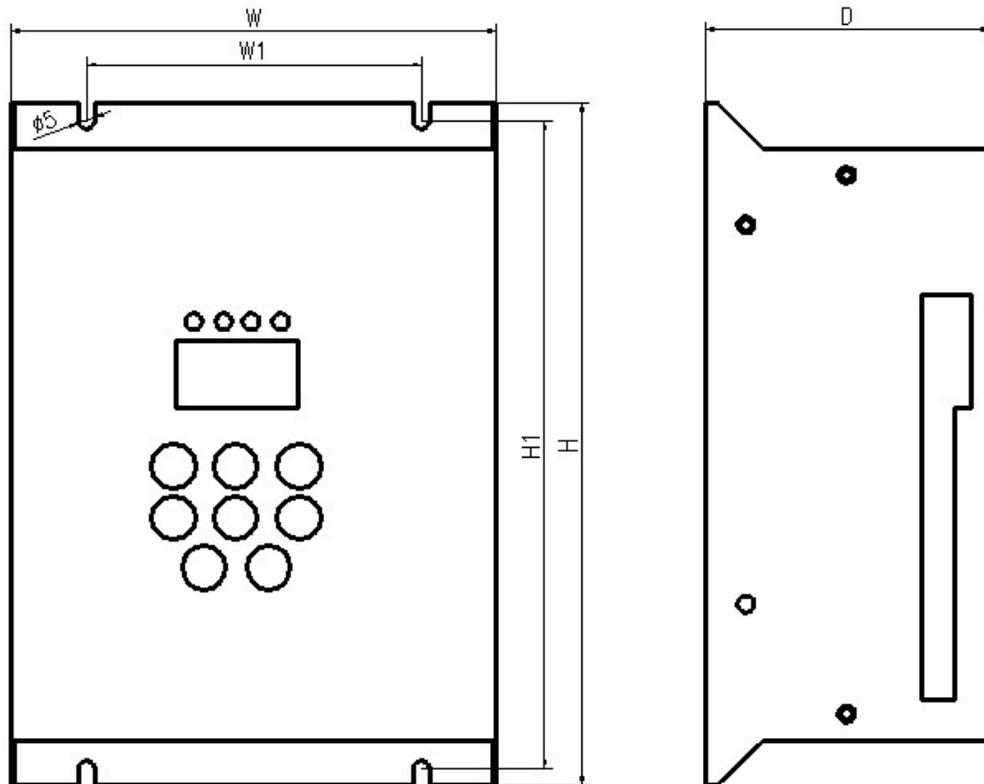


FIGURE 2.5 EXTERIOR DIMENSIONS OF STANDARD TYPE

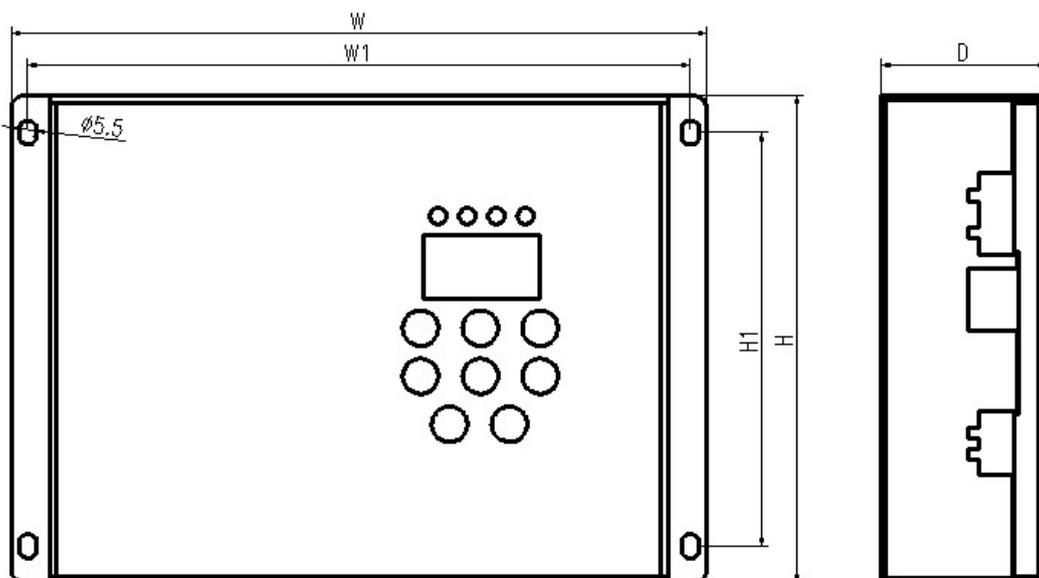


FIGURE 2.6 EXTERIOR DIMENSIONS OF S TYPE

CHART 2.2 EXTERIOR DIMENSIONS

Voltage Level	Max Motor Power (KW)	Controller Model	Figure	Exterior Dimension					Weight Kg
				W	H	D	W1	H1	
200V (1-phase)	200	BL6-DU20P2	Figure 2.5	145	205	85	100	195	2.5
	400	BL6-DU20P4							
	200	BL6-DU20P2-S	Figure 2.6	215	152	51	205	129	
	400	BL6-DU20P4-S							

2.6 Confirmation upon Delivery

Check below items when receiving the products.

CHART 2.3 THINGS TO CHECK UPON DELIVERY

NOTES	METHOD
Check if product model is correct.	Check the model on the nameplate.
Check if product is broken.	Check exterior for any damage caused by shipment.
Check if mounting structure is loose.	Check mounting structure. Tighten the loose components with a screwdriver, if required.
Check if main control board is loose.	Remove the front cover and check mounting structure. Tighten the loose components with a screwdriver, if required.

With any abnormalities above, please contact the company or regional office.

3 Installation and wiring

This chapter introduces all input/output terminals position and wiring mode of the BL6-DU20PX series integrated door motor controller.

3.1 Installation environment

3.1.1 Installation site requirement

Install BL6-DU series integrated door motor controller in an area that meets the requirements listed in chart 3.1.

CHART 3.1 INSTALLATION ENVIRONMENT REQUIREMENTS

Type	Mounting Mode	Ambient Temperature	Ambient Humidity
Close	Wall Mounting	-10°C~+40°C	5~95%RH (No condensation)

Installation of controller should note the following:

- 1 Install the controller in a clean location which is free from oil mist and dust, or in a fully closed control cabinet which is completely shielded from floating dust.
- 2 Install the controller in a place which metal powder, oil, water, and other foreign bodies cannot enter.
- 3 Do not install the controller in or nearby wood and other combustibles.
- 4 Install the controller in a place without radioactive substances.
- 5 Install the controller in a place without harmful gas and liquid.
- 6 Install the controller in a place without vibration.
- 7 Install the controller in a place without chlorides.
- 8 Install the controller in a place without direct sunlight.
- 9 Temperature Requirement: To enhance the reliability, the controller should be installed in an environment temperature is not easy to rise. When installed in a cabinet, cooling fans or air conditioner are required to keep air temperature of cabinet in range (-10℃~45℃).
- 10 If controller is installed on surface of flame retardant, it should have enough space around it for heat dissipation. Because controller will create lot of heat during working. Controller should be fastened on installation support vertically by screw.

3.1.2 Protect the controller from Foreign Object

Place a cover over the controller during installation to shield it from metal powder produced by drilling. Be sure to remove the cover from the controller after the completion of installation. Otherwise, ventilation will be reduced, causing the controller to overheat.

3.2 Electrical installation

CHART 3.2 PERIPHERAL ELECTRICAL COMPONENTS MODEL SELECTION GUIDE

Controller Model	Air-switch	Contactora (A)	Main Circuit Wire (mm)
BL6-DU20P2/-S	4	10	2.5
BL6-DU20P4/-S	6	10	2.5

3.3 Wiring Terminal Description

3.3.1 Terminal Arrangements for Control Circuit

Standard Type:

DB9	USART	MP24	MCOM	485+	485-	CAN+	CAN-
-----	-------	------	------	------	------	------	------

COM	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	COM
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

	+24V	PGA	PGB	PGZ	COM
---	------	-----	-----	-----	-----

TA1	TB1	TC1	TA2	TB2	TB3	TA3	TB3
-----	-----	-----	-----	-----	-----	-----	-----

S Type:

USART	TA1	TB1	TC1	TA2	TB2	TB3	TA3	TB3	
-------	-----	-----	-----	-----	-----	-----	-----	-----	---

+24V	PGA	PGB	PGZ	COM
------	-----	-----	-----	-----

COM	X0	X1	X2	X3	COM	X4	X5	X6	X7	COM	+24V
-----	----	----	----	----	-----	----	----	----	----	-----	------

3.3.2 Terminal Arrangements for Drive Circuit**Standard Type:**

U	V	W	P	PB
---	---	---	---	----

L1	L2	/	
----	----	---	---

S Type:

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

	L1	L2
---	----	----

3.3.3 Terminal Description for Control Circuit**CHART 3.3 CONTROL CIRCUIT TERMINAL DEFINITION (STANDARD TYPE)**

Category	Terminal Symbol	Function Description	Technical Specification	
Community	485+	MODBUS differential signal +	Standard communication Shielded cable with twisted pair is recommended	MODBUS connection.
	485-	MODBUS differential signal-		
	CAN+	CAN bus differential signal +		
	CAN-	CAN bus differential signal-		
Digital Input	DI1~DI8	Digital data input	Optical coupler isolated input. Active low. Input voltage range: DC 0~30V Input impedance: 3.3K	
Internal Power Supply 24v	+24V	DC 24V output	Isolated from internal GND.	
	COM	Power 24V common terminal		
Encoder Input	PGA	Encoder phase A	Open collector output or push-pull output	
	PGB	Encoder phase B		
	PGZ	Encoder phase Z		
External Power Supply 24V	MP24	External power supply 24V input	External switch power supply for communication	
	MCOM	Power 24V common terminal		
Relay Output and Shield Earth	TA1/TB1/TC1	Relay output	Contactor capacity: 250V AC/3A 30V DC/3A	TA-TB: Normal closed.
	TA2/TB2/TC2			TA-TC: Normal open
	TA3/TB3	Relay output	Contactor capacity: 250V AC/16A	Contactors and control circuit insulation voltage: 2.5kV AC

Note: 16A big capacity relays are applied for TA3/TB3 terminals, which can be used as car light switch.

CHART 3.4 CONTROL CIRCUIT TERMINAL DEFINITION (S TYPE SMALL SIZE MODEL)

Category	Terminal Symbol	Function Description	Technical Specification
Digital Input	X0~X7 (DI1~DI8)	Digital data input	Optical coupler isolated input. Active low. Input voltage range: DC 0~30V Input impedance: 3.3K
Internal Power Supply 24v	+24V	DC 24V output	Power supply for encoder, maximum output current 500mA.
	COM	Power 24V common terminal	
Encoder Input	PGA	Encoder phase A	Open collector output or push-pull output
	PGB	Encoder phase B	
	PGZ	Encoder phase Z	
	MCOM	Power 24V common terminal	
Relay Output and Shield Earth	TA1/TB1/TC1	Relay output	Contactor capacity: 250V AC/3A 30V DC/3A TA-TB: Normal closed. TA-TC: Normal open Contactors and control circuit insulation voltage: 2.5kV AC
	TA2/TB2/TC2		
	TA3/TB3		

3.3.4 Terminal Description for Drive Circuit

CHART 3.5 DRIVE CIRCUIT TERMINAL DEFINITION (STANDARD TYPE)

Terminal Symbol	Terminal Definition	Terminal Description
L1, L2	1-phase power supply input	AC 1-phase 220V power supply input terminals
P, PB	Braking resistor connection	Connect to braking resistor of the controller
U, V, W	Controller output drive	Connect to 3-phase motor
	Earth	Connect to the ground

CHART 3.6 DRIVE CIRCUIT TERMINAL DEFINITION (S TYPE SMALL SIZE MODEL)

Terminal Symbol	Terminal Definition	Terminal Description
L1, L2	1-phase power supply input	AC 1-phase 220V power supply input terminals
U, V, W	Controller output drive	Connect to 3-phase motor
	Earth	Connect to the ground

3.3.5 Other Terminals

CHART 3.7 OTHER TERMINAL DEFINITIONS

Terminal Symbol	Terminal Definition	Terminal Description
USART	Serial communication terminal	Connect to host computer software or digital operator

4 Control Panel

4.1 Structure and functions

User can modify controller's function parameters, monitor its working status and perform control actions (run or stop) with the help of control panel.

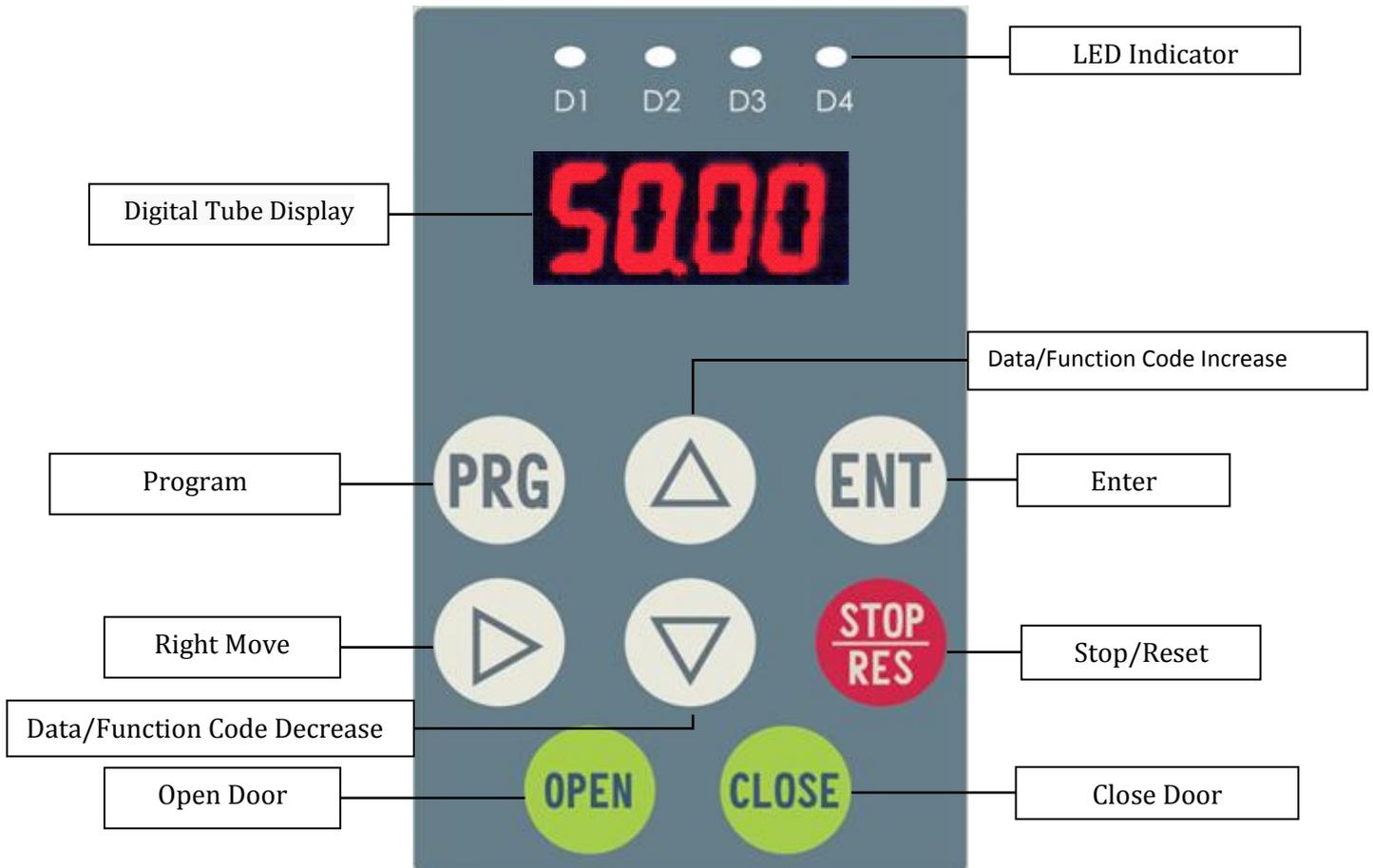


FIGURE 4.1 CONTROL PANEL

Refer to Chapter 7 for detail description for indicators.

CHART 4.1 LED INDICATORS DEFINITION

Indicator Symbol	LED Definition when Stop		LED Definition when Run
	Speed Control	Distance Control	
D1	D11 signal is efficient	D11 signal is efficient	Close-door command is efficient
D2	D12 signal is efficient	Phase-A,B signals is correct	Closing
D3	D13 signal is efficient	Phase-Z signals is correct	Opening
D4	D14 signal is efficient	D14 signal is efficient	Open-door command is efficient

CHART 4.2 KEY FUNCTION DESCRIPTIONS

Key	Name	Function
PRG	Program	Enter function group menu or back to main menu
ENT	Enter	Enter function code menu/parameter saving menu, or save setting parameters
STOP/RES	Stop/Reset	In running status, press this key to stop running; In fault status, press this key to reset fault.
	Right move	In main menu, show parameter; In parameter menu, move cursor.
	Increase	Data or function codes increase.
	Decrease	Data or function codes decrease.
OPEN	Open Door	Operation on panel when F002=1, open the door.
CLOSE	Close Door	Operation on panel when F002=1, close the door.

4.2 Operation

4.2.1 Menu Operation Process

The menu structure of BL6-DU20PX series integrated door motor controller operation panel, has been divided to several group according to function. Each group includes several function codes. Enter each function code, then check or modify parameter setting. The operation process is show in figure 4.2.

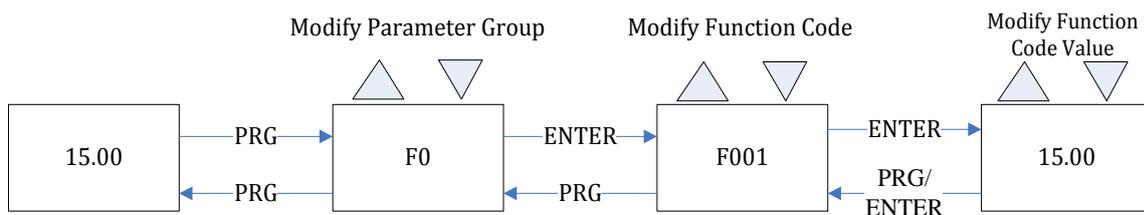


FIGURE 4.2 MENU OPERATION PROCESS

Note: When operating parameter modification, press ENTER to save and switch to next function code; Pressing PRG will not save parameter and will directly return to parameter group menu.

For example, modify the function code F005 from 0 to 34. (The bit in bold type is modifiable.)

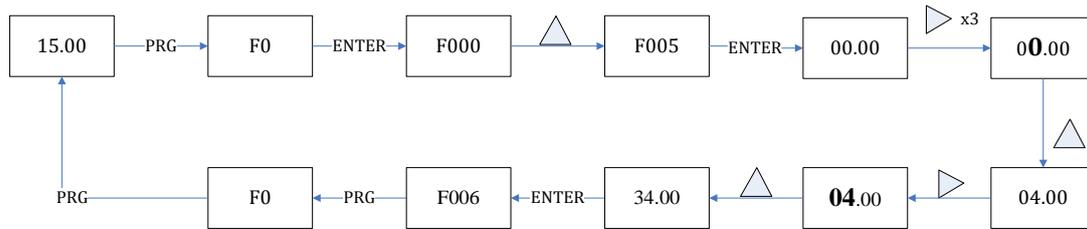


FIGURE 4.3 PARAMETER MODIFY OPERATION PROCESS EXAMPLE

Note:

1. System is running, or this function code is unmodified parameter. Parameter modification menu has no flicker.
2. Only when parameter has flicker, it can be modified.
3. After entering to parameter modification menu, need to press “Right Move” for one time, then parameter start to flicker and become modifiable, Press “Right Move” again to move cursor.

4.2.2 Read Fault Information

When fault appears, a fault information code will be displayed on the panel. Fault information code will help to determine the cause of the fault and remove it as soon as possible. After the recovery from the fault, fault code will be automatically cleared, and the last five faults can be saved in controller.

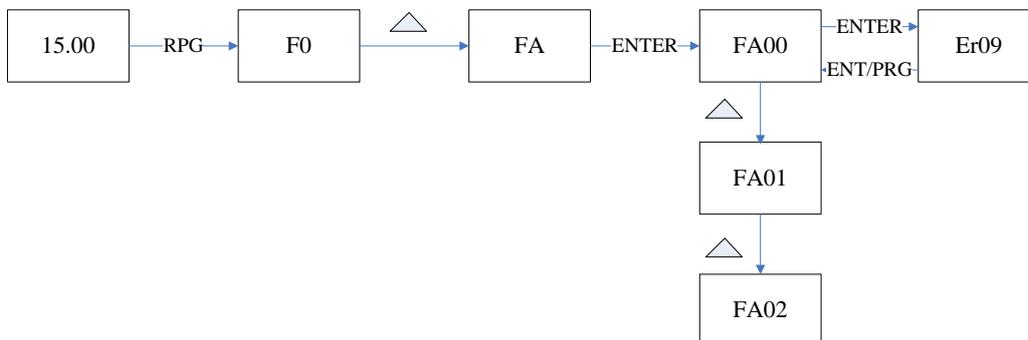


FIGURE 4.4 CHECK FAULT INFORMATION

4.2.3 Check Run/Stop Display Information

In run/stop status, with no controller fault, press Right Move key to browse run/stop parameters.

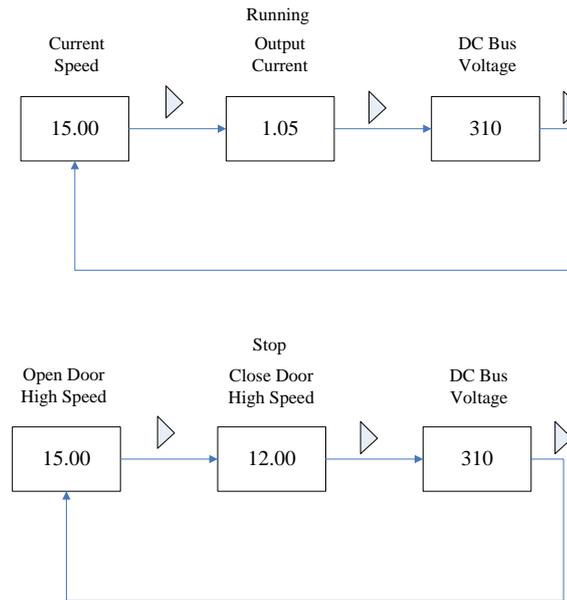


FIGURE 4.5 CHECK RUN/STOP DISPLAY INFORMATION

5 Parameters

This chapter list all controller functions and related information for enquiry.

5.1 Parameters Menu Structure

Function parameters of BL6-DU20PX series integrated door motor controller are divided into groups according different function. F0-F9, total ten groups parameters. Each group has many function codes. Each function code can be entered and check or set parameter

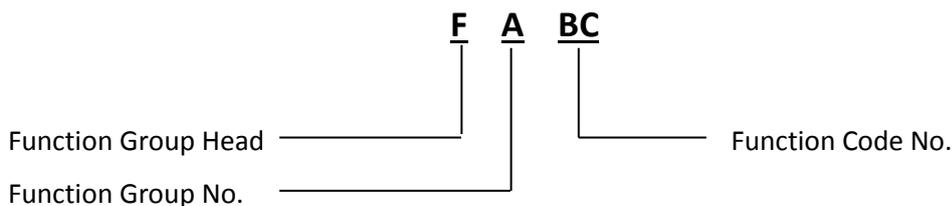


FIGURE 5.1 SCHEMATIC DIAGRAM OF PARAMETER MENU STRUCTURE

For example, “F613” means Function code 13 in F6 group.

Note: All the modification of parameters must be operated when the controller stops running, or else the parameter cannot be modified.

5.2 Function Parameter explanation

5.2.1 Function List group

Press PRG key, then press UP/DOWN key to roll all function group, the detail information is shown as follow.

Chart 5.1 Function Group List

Function Group No.	Name
F0	Basic Function Parameters
F1	Motor Parameters
F2	Performance Control Parameters
F3	Door-open Running Parameters
F4	Door-close Running Parameters
F5	Door -control Auxiliary Parameters
F6	Distance Control Parameters
F7	I/O Terminal Function Parameters
F8	Car Top Board Function Parameters
F9	Demonstrates Running Parameters
FA	Fault Display Parameters

5.2.2 Function Detail List

Note: For synchronous motor application, partial factory default setting of function codes is different from the factory default setting list below.

CHART 5.2 FUNCTION DETAIL LIST

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F0 Basic Function Parameters				
F000	Control Mode	0: Close-loop Vector Control 1:V/F Open loop Running	1	1
F001	Door-control Mode	0: Motor Continuous Duty 1: Speed Control Mode 2: Distance Control Mode	1	1
F002	Instruction Source	0: Door Motor Controller Terminal Control Mode 1: Operation Panel Control Mode 2: SYLG Integrated Control Mode (not available for S type) 3: Door Motor Controller Automatic Demonstration Mode	1	0
F003	Panel Speed Slope	0.00Hz~F104	0.01Hz	0.50Hz
F004	Low-speed Setting	0.00Hz~20.00Hz	0.01Hz	1.00Hz
F005	Carrier Frequency	5.00Hz~12.0kHz	0.1kHz	8.0kHz

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F1 Motor Parameters				
F100	Motor Type	1: Asynchronous 0: Synchronous	1	1
F101	Motor Pole	0~100	1	0
F102	Motor Rated Frequency	0~99.99Hz	0.01Hz	50.00Hz
F103	Motor Rated Power	0~750W	1W	500W
F104	Motor Rated Speed	0~9999rpm	1	940rpm
F105	Motor Back EMF	0~999V	1	280V
F106	Motor Phase Inductance	0.00~99.99mH	0.01	16.1mH
F107	Motor Phase resistance	0.00~99.99mΩ	0.01	2.4mΩ
F108	Motor Rated Current	0.000~9.999A	0.001A	1.0A
F109	No-load Current	0.000~9.999A	0.001A	0.6A
F110	Slip Frequency	0.000~9.999Hz	0.001Hz	3.000Hz
F111	Motor Rated Voltage	0~220V	1V	50V
Group F2 Performance Control Parameters				
F200	Speed Loop K_p	0~9999	1	1000
F201	Speed Loop K_i	0~9999	1	600
F202	Current Loop K_p	0~9999	1	6000
F203	Current Loop K_i	0~9999	1	3000
F204	Speed Filter Grade	0~9999	1	10
F205	Encoder Pulses	0~9999	1	600
F206	Door-open Torque Promotion	0~30% (Motor Rated Torque)	0.1%	0.0%
Group F3 Door-open Running Parameters				
F300	Door-open Start Low-speed	0~F303	0.01Hz	3.00Hz
F301	Door-open Start Acceleration Time	0~999.9s	0.1s	0.4s
F302	Door-open Low-speed Running Time	0~999.9s	0.1s	0.4s
F303	Door-open High Speed	0~F102	0.01Hz	15.00Hz
F304	Door-open Acceleration Time	0~999.9s	0.1s	0.4s
F305	Door-open End Low-speed	0~F303	0.01Hz	3.00Hz
F306	Door-open Deceleration Time	0~999.9S	0.1s	0.4s
F307	Door-open Torque Switchover Point	0~300.0% Motor Rated Torque	0.1%	50.0%
F308	Door-open Run Torque	0~150.0% Motor Rated Torque	0.1%	80.0%
F309	Door-open Block Torque	0~350.0% Motor Rated Torque	0.1%	120.0%
F310	Door-open Start Torque	0~200.0% Motor Rated Torque	0.1%	80.0%
F311	Door-open to the point Low-speed	0~F303	0.01Hz	3.00Hz

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F4 Door-close Operating Parameters				
F400	Door-close Start Low-speed	0~F403	0.01Hz	3.00Hz
F401	Door-close Start Acceleration Time	0~999.9s	0.1s	0.4s
F402	Door-close Low-speed Running Time	0~999.9s	0.1s	0.4s
F403	Door-close High Speed	0~F102	0.01Hz	12.00Hz
F404	Door-close Acceleration Time	0~999.9s	0.1s	0.4s
F405	Door-close End Low-speed	0~F403	0.01Hz	3.00Hz
F406	Door-close Deceleration Time	0~999.9s	0.1s	0.4s
F407	Door-close Low-speed	0~F403	0.01Hz	1.00Hz
F408	Door-close Low-speed Running Time	0~9999ms	1ms	400ms
F409	Skate Withdraw Speed	0~F403	0.01Hz	1.00Hz
F410	Skate Withdraw Time	0~9999ms	1ms	600ms
F411	Door-close Torque Switchover Point	0~300.0% Motor Rated Torque	0.1%	50.0%
F412	Door-close Run Torque	0~300.0% Motor Rated Torque	0.1%	80.0%
F413	Door-close Block Torque	0~350.0% Motor Rated Torque	0.1%	150.0%
F414	Door-close Block Work Mode	0: Re-open Door when Door-close Block Happening 1: Stop closing and Keep the Torque when Door-close Block Happening 2: Shutdown when Door-close Block Happening	1	0
F415	Door-close Block Judging Time	0~9999ms	1ms	200ms
F416	Fire Service Door-close High Speed	0~F102	0.01Hz	20.00Hz
F417	Door-close Block High-speed Setting	F418~F102	0.01Hz	0.00Hz
F418	Door-close Block Low-speed Setting	0~F102	0.01Hz	0.00Hz
F419	Door-close Block High-speed Torque	0~300.0% Motor Rated Torque	0.1%	0.0%
F420	Door-close Block Low-speed Torque	0~300.0% Motor Rated Torque	0.1%	0.0%

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F5 Door Control Auxiliary Parameters				
F500	Abnormal Deceleration Time	0~5.0s	0.1s	0.2s
F501	Door Open Time Limit	0~999.9s	0.1s	30.0s
F502	Door Close Time Limit	0~999.9s	0.1s	30.0s
F503	Low speed Running Time Limit	0~999.9s	0.1s	50.0s
F504	External Door-open Instruction Delay	0~999.9s	0.1s	15.0s
F505	External Door-close Instruction Delay	0~999.9s	0.1s	15.0s
F506	Speed Deviation Setting	0~80.0%	0.1%	30.0%
F507	Large Speed Deviation Determination Time	0~5000ms	1ms	100ms
F508	Door-close Stable Speed Delay	0~9999ms	1ms	200ms
F509	Door-open S Curve Select	0: Straight Line 1: S Curve	0	1
F510	Door-close S Curve Select	0: Straight Line 1: S Curve	0	1
F511	Door-open Acceleration S Curve Start Time	10.0%~40.0%	0.1%	20.0%
F512	Door-open Acceleration S Curve End Time	10.0%~40.0%	0.1%	20.0%
F513	Door-open Deceleration S Curve Start Time	10.0%~40.0%	0.1%	20.0%
F514	Door-open Deceleration S Curve End Time	10.0%~40.0%	0.1%	20.0%
F515	Door-close Acceleration S Curve Start Time	10.0%~40.0%	0.1%	20.0%
F516	Door-close Acceleration S Curve End Time	10.0%~40.0%	0.1%	20.0%
F517	Door-close Deceleration S Curve Start Time	10.0%~40.0%	0.1%	20.0%
F518	Door-close Deceleration S Curve End Time	10.0%~40.0%	0.1%	20.0%
F519	Motor Self-tune Torque	0.0%~20.0%	0.1%	1.0%
F520	Motor Angle Self-tune	0~1	1	0

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F6 Distance Control Parameters				
F600	Door Width Self-Tune Function Select	0: Invalid 1: Door Width Measurement, Valid in Manual Mode of Door Motor Controller	1	0
F601	Door Width Self-Tune Speed	0~20.00Hz	0.01Hz	3.00Hz
F602	Door Width Pulses Low Bits	0~9999	1	0
F603	Door Width Pulses High Bits	0~9999	1	0
F604	Distance Control Door-open Start Low-speed Running Distance	0~30.0%(Door Width)	0.1%	10.0%
F605	Distance Control Door-open Deceleration Point	60.0%~90.0%(Door Width)	0.1%	70.0%
F606	Distance Control Door-open Limit Point	80.0%~99.0% (Door Width)	0.1%	96.0%
F607	Distance Control Door-close Start Low-speed Running Distance	0%~30.0% (Door Width)	0.1%	10.0%
F608	Distance Control Door-close Deceleration Position	60.0%~90.0%(Door Width)	0.1%	70.0%
F609	Distance Control Door-close Limit Position	80.0%~99.0% (Door Width)	0.1%	93.0%
F610	Door-open Limit Switch Position Low Bits	0~9999	1	0
F611	Door-open Limit Switch Position High Bits	0~9999	1	0
F612	Door-close Limit Switch Position	0~9999	1	0
F613	Door Width Self-tune & Initial Running Torque	0~300.0%	0.1%	120.0%
F614	Door-open Deceleration Point Pulses Low Bits	0~9999	1	0
F615	Door-open Deceleration Point Pulses High Bits	0~9999	1	0
F616	Door-close Deceleration Point Pulses Low Bits	0~9999	1	0
F617	Door-close Deceleration Point Pulses High Bits	0~9999	1	0
F618	Door Open to the Limit Output Door Width	0~99.99%	0.1%	96.0%
F619	Door Close to the Limit Output Door Width	0~99.99%	0.1%	6.0%
F620	Door Position Feedback Pulses	0~99.99%	0.1%	6.0%

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F7 I/O Parameters				
F700	Switching Value Input Terminal DI1	0: Invalid 1: Door-open Deceleration Normal Open Input 2: Door-open Deceleration Normal Close Input 3: Door-open Limit Normal Open Input 4: Door-open Limit Normal Close Input 5: Door-close Deceleration Normal Open Input 6: Door-close Deceleration Normal Close Input 7: Door-close Limit Normal Open Input 8: Door-close Limit Normal Close Input 9: Door-open Signal Normal Open Input 10: Door-open Signal Normal Close Input 11: Door-close Signal Normal Open Input 12: Door-close Signal Normal Close Input 13: Overload Signal Normal Open Input 14: Full-load Signal Normal Open Input 15: Half-load Signal Normal Open Input 16: Light-load Signal Normal Open Input 17: Light Curtain Signal Normal Close Input 18: Light Curtain Signal Normal Open Input 19: Safe Panel Signal Normal Close Input 20: Safe Panel Signal Normal Open Input 21: Low Speed Signal Normal Open Input 22: Door Lock Signal Normal Open Input 23: Fire Service Signal Normal Open Input	1	2
F701	Switching Value Input Terminal DI2		1	4
F702	Switching Value Input Terminal DI3		1	6
F703	Switching Value Input Terminal DI4		1	8
F704	Switching Value Input Terminal DI5		1	9
F705	Switching Value Input Terminal DI6		1	11
F706	Switching Value Input Terminal DI7		1	0
F707	Switching Value Input Terminal DI8		1	0
F708	Programmable Relay Output TA1/TB1/TC1	0: Invalid 1: Bypass Alarm Signal Valid, Relay Action 2: Bypass Alarm Signal Invalid, Relay Action 3: Arrival Gong Signal Valid, Relay Action 4: Arrival Gong Signal Invalid, Relay Action	1	0
F709	Programmable Relay Output TA2/TB2/TC2	5: Door Arrival to the Open limit Signal Invalid, Relay Action 6: Door Arrival to the Close limit Signal invalid, Relay Action	1	0
F710	Standard Type	Programmable Relay Output TA3/TB3 0: Invalid 1: Car Light Signal Valid, Relay Action 2: Car Light Signal Invalid, Relay Action	1	0
	S Type	Programmable Relay Output TA3/TB3/TC3 0: Invalid 1: Bypass Alarm Signal Valid, Relay Action 2: Bypass Alarm Signal Invalid, Relay Action 3: Arrival Gong Signal Valid, Relay Action 4: Arrival Gong Signal Invalid, Relay Action 5: Door Arrival to the Open limit Signal Invalid, Relay Action 6: Door Arrival to the Close limit Signal invalid, Relay Action	1	0
F711	Terminal Filter Time	0~99ms	1ms	60ms

Chart 5.2 Function Detail List (Cont'd)

Function Code	Name	Setting Range	Min Unit	Factory Default Setting
Group F8 SYLG Car Roof Board Parameters (not available for S type)				
F800	Basic Software ID	Read-only		According to Product Model
F801	User ID			
F802	Logic Software No.0			
F803	Logic Software No.1	Read-only		According to Product Model
F804	Logic Software No.2			
F805	Drive Software No.0			
F806	Drive Software No.1			
F807	Drive Software No.2			
F808	Door Motor Type	0: Main 1: Auxiliary	1	0
F809	Instruction Board Type	0: Instruction Board 1: CAN Instruction Board	1	0
F810	Parameter Monitoring Enable	0: Disable 1: Enable	1	0
F811	Auxiliary Door Mode	0: None 1: Normal 2: Through Door	1	0
Group F9 Demonstration Running Parameters				
F900	Demonstration Delay	0~99	1	5
F901	Demonstration Automatic Running	0: Disable 1: Enable	1	0
Group FA Fault Parameters				
FA00	1st Fault Type	01: System Fault 04: Over-current 07: Over-voltage 09: Under-voltage 10: System Over-load 11: Motor Over-load 13: Output Phase Loss 14: Module Over-heat 16: EEPROM Fault 18: Current Detection Fault 20: Encoder Fault 25: Over-speed Fault 26: Parameter Setting Fault 27: Door Width Self-Tune Fault 28: Door Open Over-time 29: Door Close Over-time 31: Door Open Block Protection 32: Speed Deviation Protection 33: Instruction Error 34: Door Motor Controller Communication Error 35: Synchronous angle self-tune failed	1	
FA01	1st Fault Information		1	
FA02	2nd Fault Type		1	
FA03	2nd Fault Information		1	
FA04	3rd Fault Type		1	
FA05	3rd Fault Information		1	
FA06	4th Fault Type		1	
FA07	4th Fault Information		1	
FA08	5th Fault Type		1	
FA09	5th Fault Information		1	

6 Detail Function Description

6.1 F0 Basic Function Parameter

Chart 6.1 F0 Basic Function Parameter

Para	Name	Range	Default	Min Unit	Description
F000	Control Mode	0~1	0	1	<p>0: Close Loop Vector Control</p> <p>As encoder feeds back motor speed, the controller run the motor in speed sensor vector control mode. The encoder must be coaxially connected to the motor and the encoder lines must be set correctly.</p> <p>1: V/F Open Loop Control</p> <p>The mode is suitable for common application occasions, and the motor does not need to be provided with an encoder, and the control effect is slightly worse than the vector control. The V/F open loop control mode cannot be used in permanent magnet synchronous motor drive.</p>
F001	Door-control Mode	0~2	1	1	<p>0: Motor Continuous Duty Mode</p> <p>This mode is applicable to test motor and controller. With this function, motor can continuously run at set speed. This function acquires instruction source must be penal control mode and the motor must be unloaded. When the above conditions are satisfied, press the "OPEN" or "CLOSE" on penal to start the motor, press "UP" and "DOWN" to change motor speed, and press "STOP" to stop the motor.</p> <p>1: Speed Control Mode</p> <p>In this mode, four travel switches should be installed on the door. Judge the door moving to limit position or not by the signals from limit switches.</p> <p>2: Distance Control Mode</p> <p>In this mode, door width pulses should be tuned correctly. With setting some door run curve parameters, decelerate at decelerate point and stop the door at the limit position.(If set a limit signal in I/O terminal function selection parameters (F7), system will stop the door at limit position by judging the limit signal.)</p>

Chart 6.1 F0 Basic Function Parameter (Cont'd)

Para	Name	Range	Default	Min Unit	Description															
F002	Instruction Source	0~3	0	1	<p>0: Door Motor Controller Terminal Control Mode Controller open or close the door according to open or close instruction issued by control system.</p> <table border="1"> <thead> <tr> <th>Open Door Instruction</th> <th>Close Door Instruction</th> <th>Running Status</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Stop</td> </tr> <tr> <td>0</td> <td>1</td> <td>Close</td> </tr> <tr> <td>1</td> <td>0</td> <td>Open</td> </tr> <tr> <td>1</td> <td>1</td> <td>Invalid</td> </tr> </tbody> </table> <p>1: Operation Panel Control Mode Run or stop by the controller panel. Press the OPEN button to open the door and press Close button to close the door. In this mode, door motor run according to the open/close door curve.</p> <p>2: SYLG Integrated Control Mode (not available for S type) This mode must be work with SYLG elevator control system. Get an open or close door control signal from CAN Bus to open or close door.</p> <p>3: Door Motor Controller Automatic Demonstration Mode This mode should be used for door motor demonstration and trial run in factory. To set door motor controller automatic demonstration Mode, the door motor running curve must be set in operation panel control mode before. Press "OPEN" or "CLOSE" to start the demonstration of door controlling. 4-bit LEDs show the single digit of the number of opening and closing times, which is displayed in binary format (Light on is 1 and light off is 0). And digital blocks display the ten to ten thousand bits of the running times. Note: Door width self-learning function is valid in Operation Panel Control Mode.</p>	Open Door Instruction	Close Door Instruction	Running Status	0	0	Stop	0	1	Close	1	0	Open	1	1	Invalid
Open Door Instruction	Close Door Instruction	Running Status																		
0	0	Stop																		
0	1	Close																		
1	0	Open																		
1	1	Invalid																		

Chart 6.1 F0 Basic Function Parameter (Cont'd)

Para	Name	Range	Default	Min Unit	Description
F003	Panel Running Speed Slope	0~F104	0.5Hz	0.01 Hz	In panel control mode, press" UP" or "Down" to increase or decrease the motor speed frequency.
F004	Low Speed Setting	0~F104	4.00Hz	0.01 Hz	Speed to set when slow speed close door function is valid.
F005	Carrier Frequency	5.0kHz ~12.0k Hz	8.0kHz	0.1Hz	Adjust the carrier frequency to reduce the motor noise, keep away from the resonance points in the mechanical system, and reduce the leakage current in circuits and interference generated by the controller. Lower carrier frequency leads to high secondary harmonic component, more motor loss, and higher motor temperature. Higher carrier frequency makes lower motor loss and lower motor temperature, but higher controller loss and higher controller temperature.

6.2 F1 Motor Parameter

Chart 6.2 F1 Motor Parameter

Function Code	Name	Setting Range	Min Unit	Factory Setting	Default
F100	Motor Type	1: Asynchronous 0: Synchronous	1	1	
F101	Motor Pole	0~100	1	6	
F102	Motor Rated Frequency	0~99.99Hz	0.01Hz	50.00Hz	
F103	Motor Rated Power	0~750W	1W	500W	
F104	Motor Rated Speed	0~9999rpm	1	940rpm	
F105	Motor Back EMF	0~999V	1	280V	
F106	Motor Phase Inductance	0.00~99.99mH	0.01	16.1mH	
F107	Motor Phase resistance	0.00~99.99mΩ	0.01	2.4mΩ	
F108	Motor Rated Current	0.000~9.999A	0.001A	1A	
F109	No-load Current	0.000~9.999A	0.001A	0.6A	
F110	Slip Frequency	0.000~9.999Hz	0.001Hz	3.000Hz	
F111	Motor Rated Voltage	0~220V	1V	50V	

Note:

1. Please set the parameters according to the nameplate.
2. Please select the proper motor according to the system for higher performances. If the difference between motor power and the standard adaptive motor is too large, the system control

performances may go down.

3. For asynchronous motor, the integrated controller does not require further tune, but set the basic parameters. Trial run is ready.

6.3 F2 Performances Parameter

Chart 6.3 F2 Performances Parameter

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F200	Speed Loop K_P	0~9999	1000	1	The speed dynamic response performance with vector control can be regulated by setting the K_P and K_I of the Speed Regulator. Larger K_P or smaller K_I make a faster speed loop dynamic response. Too large K_P or too small K_I may produce a system oscillation. Usually, the default factory parameters can make good performance. If not, tune the factory value slightly, enlarge the K_P and keeping the system out of oscillation, and then decrease the K_I to get a faster response and a smaller overshoot. The current loop parameters generally do not need to be adjusted. But if it's needed, please tune as the speed loop parameters. Note: Improper PI parameters may produce a too big overshoot and even produce an over-voltage fault as the overshoot goes down.
F201	Speed Loop K_I	0~9999	600	1	
F202	Current Loop K_P	0~9999	6000	1	
F203	Current Loop K_I	0~9999	3000	1	
F204	Speed Filter Grade	0~9999	10	1	This parameter is for the filtering level of encoder feedback speed. No need to adjust normally. In the case of severe interference or very few encoder lines, the closed loop vector control mode should be used. The filtering level of the feedback speed can be increased appropriately so that the motor can run more smoothly. Note: In the situation of small inertia of the motor and load, too large parameter may produce badly motor overshoot or motor oscillation.
F205	Encoder Pulses	0~9999	600	1	The pulse encoder parameters should be set appropriately for door motor controller closed-loop vector running.
F206	Door-open Torque Promotion	0~30% (Motor Rated Torque)	5.0%	0.1%	If the load of door motor controller is too heavy, and the door cannot open, increases this parameter to raise the torque output as the motor opening the door. Over-raised torque may cause the motor too hot, and the controller over-current.

6.4 F3 Door-open Running Parameters

In speed control mode, all kinds of signals (travel switches) installation positions in door motor system are shown in Figure 6.1.

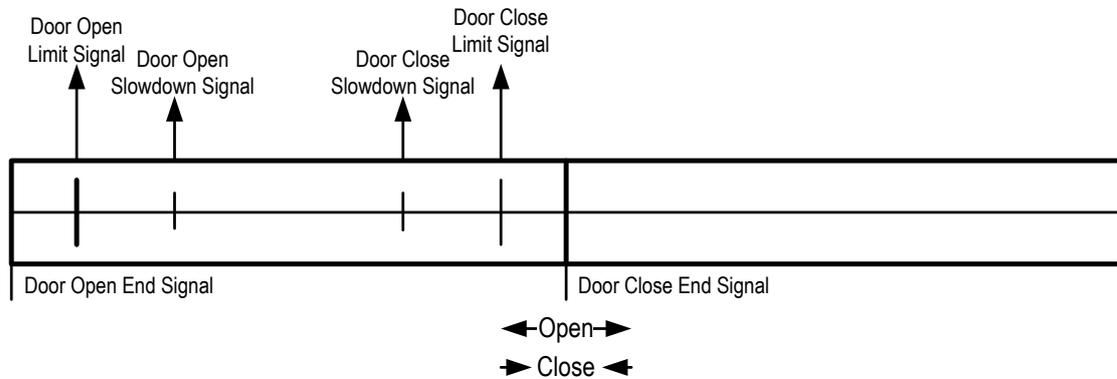


FIGURE 6.1 SPEED CONTROL SWITCHES INSTALLATION DIAGRAM

The Group F3 parameters and speed control related parameters should be set properly. Slowdown switches and limit switches should be installed also. The door open running curve is shown in Figure 6.2.

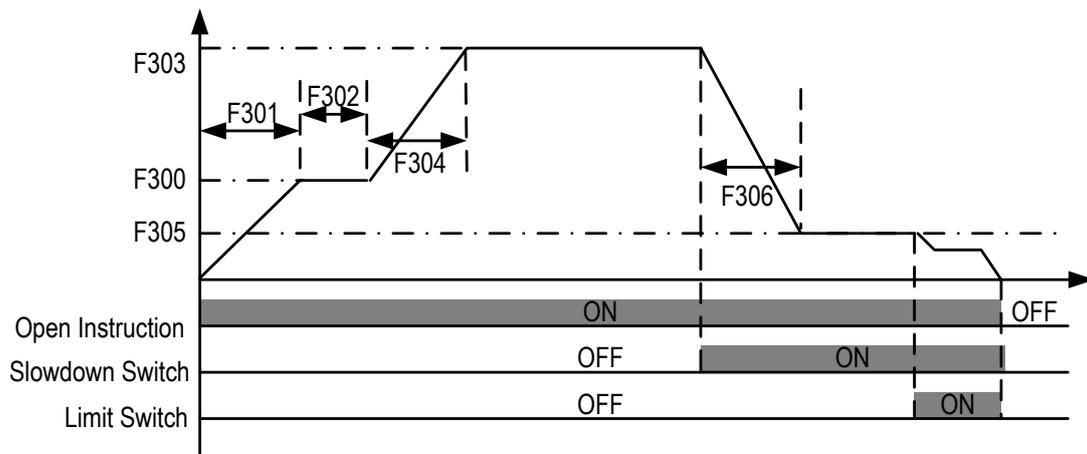


FIGURE 6.2 DOOR OPEN RUNNING CURVE DIAGRAM SPEED CONTROL MODE

Door open process description in travel switch mode:

1. When the open instruction is valid, door motor raise the speed to the value of F300 in the time F301 defined.
2. Low speed opening for F302, door motor raises the speed to a high speed defined by F303, the raise time is F304.
3. Door open slowdown signal is valid, and the door motor slow down to the creep speed defined by F305. The slowdown time is F306.

4. After the door open end signal is valid, door motor slowdown to F311, and the controller enter the open hold status, and the hold torque is F308. If the torque-hold time increases, the F504 value should be enlarged.

Group F6 parameters should be set properly. The door open running speed curve is shown in Figure 6.3.

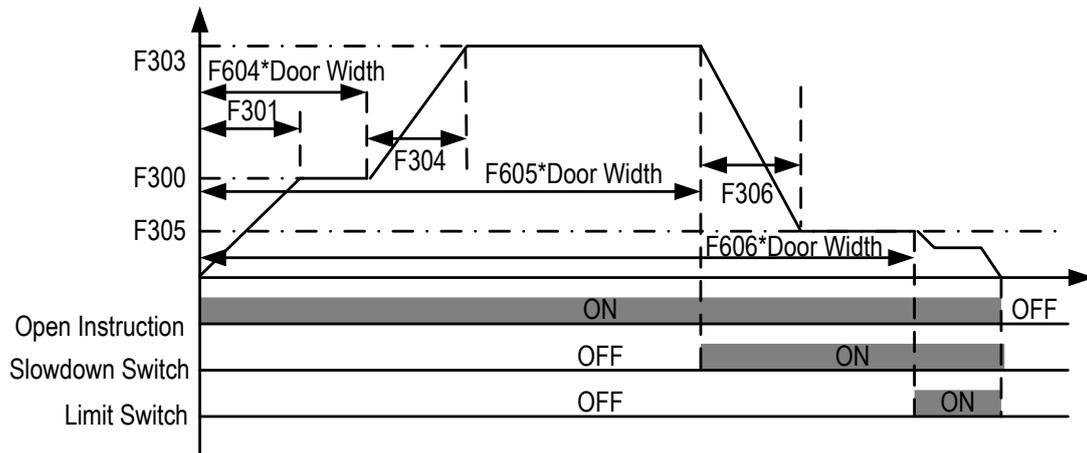


FIGURE 6.3 DOOR OPEN RUNNING CURVE DIAGRAM IN DISTANCE CONTROL

Door open process description in distance-control mode:

1. When the door open instruction is valid, door motor raise the speed to the value F300 defined in a period defined by F301.
2. When the door moves to the position of F604* Door Width, the door motor raise the speed to the value defined by F303 in a period defined by F304.
3. When the door opens to the position of F605* Door Width, the door motor slowdown to the creeping speed F305, the slowdown time is F306.
4. When the door opens to the position of F606* Door Width, the door motor enters the door open torque hold status at the speed of F312, and the hold torque is F308, the door position reset to 100% at this moment.
5. Open instruction has been removed; the torque hold ends. If the torque needs to be held go on, the delay time F504 should be enlarged.

Chart 6.4 F3 Open Door Parameter

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F300	Open Door Start Speed	0~F303	3.00Hz	0.01Hz	Refer to Figure 6.2 and Figure 6.3 description.
F301	Open Door Start Accel Time	0~999.9s	0.4s	0.1s	
F302	Open Door Low Speed Time	0~999.9s	0.4s	0.1s	
F303	Open Door High Speed	0~F102	15.00Hz	0.01Hz	
F304	Open Door Accel Time	0~999.9s	0.4s	0.1s	
F305	Open Door End Speed	0~F303	3.00Hz	0.01Hz	
F306	Open Door Decel Time	0~999.9s	0.4s	0.1s	
F307	Door-open Torque Switchover Point	0~300.0% Motor Rated Torque	50.0%	0.1%	These function codes are valid only in distance control mode. Door open to the end position, if the output torque is larger than the F307 value, the door width will be reset to 100%. At the same times, the door motor enters the door open end torque hold status. If the block output torque is not larger than F307, the F307 value should be reduced smoothly (After blocking, the F307 value is less than the output torque at this time) to ensure the door width can be reset.
F308	Door-open Run Torque	0~150.0% Motor Rated Torque	80%	0.1%	This parameter is for setting the holding torque after the door open to the position. Torque is product of this value and motor rated torque.
F309	Door-open Block Torque	0~350.0% Motor Rated Torque	120%	0.1%	Door open block torque in opening process. The door open torque's up limit is the block torque and additional 10.0%.
F310	Door-open Start Torque	0~200.0% Motor Rated Torque	80%	0.1%	This function code is used to set the start torque at the opening start to ensure good performance as the door motor starts. The torque is the product of this parameter value and the motor rated torque.
F311	Door-open to the point Low-speed	0~F303	3.0Hz	0.01Hz	The door motor hold speed after the door opens to the point. When the hold time is up to F504, this speed will be cancelled.

6.5 F4 Door-close Running Parameters

Group F4 parameters and speed control related parameters should be set properly, and the slowdown point and limit signal should be defined correctly. The door close running speed curve is shown as Figure 6.4.

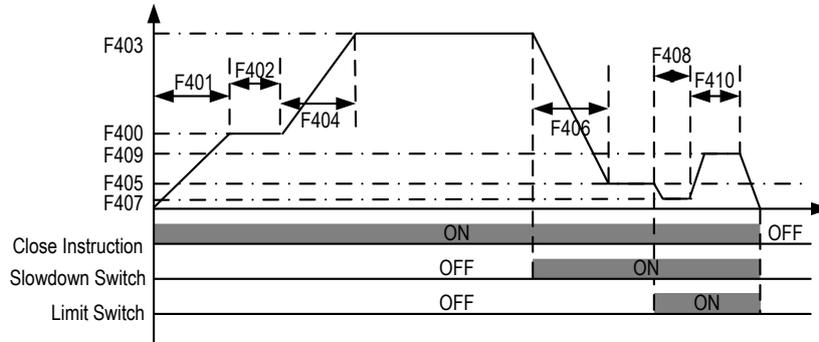


FIGURE 6.4 DOOR CLOSE RUNNING CURVE DIAGRAM IN SPEED CONTROL MODE

Door close process description in travel switch mode:

1. When the close instruction is valid, door motor raise the speed to the value of F400 in the time F401 defined.
2. Low speed closing for F402, door motor raises the speed to a high speed defined by F403, the raise time is F404.
3. Door close slowdown signal is valid, and the door motor slow down to the creep speed defined by F405. The slowdown time is F406.
4. After the door limit signal is valid, door motor slowdown to door close end low speed defined by F407. After a period (F408), the skates withdraw.
5. As the skates withdrawing, the speed is changed to skate withdraw speed (F409). The last time is F410, then the closing action finishes.

Note that, if the skate set is synchronous, the skate withdraw speed F409 should be set to the same as F407.

Group F6 parameters and distance control related parameters should be set properly. The door close running speed curve is shown in Figure 6.4

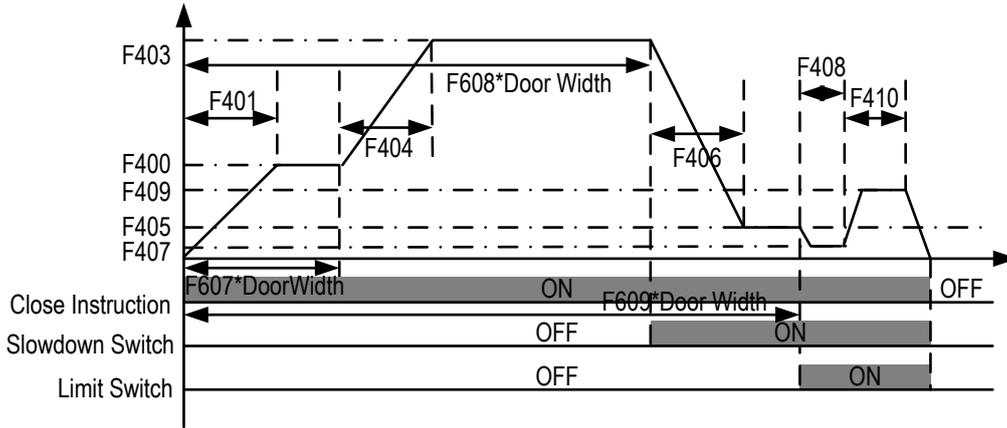


FIGURE 6.5 DOOR CLOSE RUNNING CURVE DIAGRAM IN DISTANCE CONTROL MODE

Door close process description in distance-control mode:

1. When the door close instruction is valid, door motor raise the speed to the value F400 defined in a period defined by F401.
2. When the door moves to the position of F607* Door Width, the door motor raise the speed to the value defined by F403 in a period defined by F404.
3. When the door close to the position of F608* Door Width, the door motor slowdown to the creeping speed F405, the slowdown time is F406.
4. When the door close to the position of F609* Door Width, the door motor slowdowns to F407. Recommended $F609 \geq 96.0\%$ of the door width. If some pulses are lost in the closing process, the F609 value should be reduced. Set the skate withdraw related action by F409.
5. When the skate withdraw finishes and the door is blocked, the door motor enter the torque holding stage, and the speed is F407 at this moment, and the holding torque is F412, the door position is reset to zero now.
6. Close instruction has been removed; the torque hold ends. If the torque needs to be held go on, the delay time F505 should be enlarged.

Chart 6.5 F4 Close Door Parameter

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F400	Close Door Start Speed	0~F403	3.00Hz	0.01Hz	Refer to Figure 6.4 and Figure 6.5 description.
F401	Close Door Start Accel Time	0~999.9s	0.4s	0.1s	
F402	Close Door Low Speed Time	0~999.9s	0.4s	0.1s	
F403	Close Door High Speed	0~F102	12.00Hz	0.01Hz	

Chart 6.5 F4 Close Door Parameter (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F404	Close Door Accel Time	0~999.9s	0.4s	0.1s	Refer to Figure 6.4 and Figure 6.5 description.
F405	Close Door End Speed	0~F403	3.00Hz	0.01Hz	
F406	Close Door Decel Time	0~999.9s	0.4s	0.1s	
F407	Door-close Low Speed	0~F403	1.00Hz	0.01Hz	Door motor running target frequency when received the door close limit signal in door closing process or pulses meet the door closing arrival require.
F408	Door-close Low Speed Running Time	0~9999ms	200ms	1ms	Door motor runs at low speed (F407) when received door close arrival position signal. If the running time is longer than the setting running time(F408), door motor enters the skate withdraw stage
F409	Skate Withdraw Speed	0~F403	2.00Hz	0.01Hz	The door motor running speed in skate-withdraw stage of closing process.
F410	Door-close Skate Withdraw Running Time	0~9999ms	200ms	1ms	If the skate withdraw running time is longer than F410, the door motor slowdown again.
F411	Door-close Torque Switchover Point	0~150%	50.0%	0.1%	This group function code is only valid in distance control mode. The skate withdraw finishes, if the controller output torque is larger than the value defined by F411, the door width is reset to 0%. At the same times, door motor enters the closing torque holding stage.
F412	Door-close Holding Torque	0~150.0%	60.0%	0.1%	This parameter is used to set the holding torque after door closing arrival.
F413	Door-close Block Torque	0~150.0%	90.0%	0.1%	This parameter is used to set the torque limit when the door is blocked.
F414	Door-close Block Work Mode	0~2	0	1	0: Re-open the door as the door is blocked. In the re-open period, the controller does not respond external closing instruction. 1: Stop the closing action and hold the output torque when the door is blocked. 2: Shutdown when the door is blocked: Stop the closing action, and shutdown, the torque does not output. In the closing process, the controller will work in closing block status if output torque is bigger than the block torque
F415	Door-close Block Judging Time	0~9999	300ms	1ms	The filter time when door is blocked from closing. When this parameter is set to 0, no door blocked judgement.

Chart 6.5 F4 Close Door Parameter (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F416	Fire Service Door Close High Speed	5.00~F104	10.00Hz	0.01 Hz	If the fire service input function is valid, the door motor high speed as closing
F417	Door-close Skate Withdraw Running Time	0~9999ms	200ms	1ms	
F418	Door-close Torque Switchover Point	0~150%	50.0%	0.1%	
F419	Door-close Holding Torque	0~150.0%	60.0%	0.1%	
F420	Door-close Block Torque	0~150.0%	90.0%	0.1%	

6.6 F5 Door -control Auxiliary Parameters

Chart 6.6 F5 Door –control Auxiliary Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F500	Abnormal Slowdown Time	0.1s~5.0s	0.5s	0.1s	This parameter is used to set the time from the current closing speed to the zero speed when the block happens. This parameter should be set as small as possible without over-current in the slowdown process.
F501	Door Open Time Limit	0~9999s	30.0s	1s	In the opening process, if the door open limit signal did not been received in a setting time limit (Which is shown as pulses lost in distance control mode), open overtime protection (E28) will be triggered. Set as 0, this function is invalid.
F502	Door Close Time Limit	0~9999s	30.0s	1s	In the closing process, if the door arrival limit signal did not been received in a setting time limit, the controller will judge the door is blocked or not according to the value of F414. Set as 0, this function is invalid.

Chart 6.6 F5 Door - control Auxiliary Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F503	Low Speed Running Time	0~9999s	0s	1s	Max time of the low speed door running with the low speed running enable signal is valid. User can set the parameter as their actual situation. The setting value must be not less than the plus of all door open and close time. Otherwise, the parameter setting error (E26) will be produced. Set this function parameter properly can provide an abnormal protection for door running at low speed. Normal running time will not exceed the parameter defined, but if the open and close limit is invalid, the door open/close cannot be finished, the running time beyond the parameter defined, the low speed running error will be produced. Set as zero, this function is invalid.
F504	External Door-open Instruction Delay	0 ~ 9999s	0s	1s	This code is used to set the torque hold time when the door arrivals at the open limit. With the signal of the door arrival limit is valid and open-door command is invalid, the open status holding time. The holding time is not less than the function code value, and controller cancel the arrival open limit low speed. In the opening process but not yet arrival the limit, if the open command is cancelled, the controller stops the open action right now, and stop at current position, the delay function is invalid this moment. With the parameter being set to 9999, external open delay command is always valid.
F505	External Door-close Instruction Delay	0 ~ 9999s	0s	1s	This code is used to set the torque hold time when the door arrivals at the close limit. With the signal of the door arrival close limit is valid and close door command is invalid, the close status holding time. The holding time is not less than the function code value, and controller cancel the arrival close limit low speed. In the closing process but not yet arrival the limit, if the close command is cancelled, the controller stops the close action right now, and stop at current position, the delay function is invalid this moment. With the parameter being set to 9999, external close delay command is always valid.

Chart 6.6 F5 Door –control Auxiliary Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F506	Speed Deviation Setting	0~80.0%	50.0%	0.1%	The speed deviation detection function of integrated door motor controller is only valid in close loop vector control mode. Judge the deviation of current running frequency and given frequency is too large or not by the setting value of F506. If the large deviation time is longer than F507 value, the Fault Er23 will be produced.
F507	Large Speed Deviation Determination Time	0~5000ms	500ms	1ms	
F508	Door-close Stable Speed Delay	0~9999ms	200ms	1ms	Door close running at high speed, through a stable delay defined by F508, starts to judge the door is blocked or not.
F509	Door-open S Curve Selection	0~1	1	1	This parameter is used to select the door motor running curve in door open and close process. 0: Linear acceleration and deceleration 1: S curve acceleration and deceleration
F510	Door-close S Curve Selection	0~1	1	1	
F511	Door-open Acceleration S Curve Start Time	10.0%~40.0%	20.0%	0.1%	10.0%~50.0%(up time), Start stage +up stage <90.0%
F512	Door-open Acceleration S Curve Up Time	10.0%~40.0%	20.0%	0.1%	10.0%~80.0%(up time), Start stage +up stage <90.0%
F513	Door-open Deceleration S Curve Start Time	10.0%~40.0%	20.0%	0.1%	10.0%~50.0%(down time), Start stage +up stage <90.0%
F514	Door-open Deceleration S Curve Down Time	10.0%~40.0%	20.0%	0.1%	10.0%~80.0%(down time), Start stage +up stage <90.0%
F515	Door-close Acceleration S Curve Start Time	10.0%~40.0%	20.0%	0.1%	10.0%~50.0%(up time), Start stage +up stage <90.0%
F516	Door-close Acceleration S Curve Up Time	10.0%~40.0%	20.0%	0.1%	10.0%~80.0%(up time), Start stage +up stage <90.0%
F517	Door-close Deceleration S Curve Start Time	10.0%~40.0%	20.0%	0.1%	10.0%~50.0%(up time), Start stage +up stage <90.0%
F518	Door-close Deceleration S Curve Down Time	10.0%~40.0%	20.0%	0.1%	10.0%~80.0%(up time), Start stage +up stage <90.0%

Chart 6.6 F5 Door –control Auxiliary Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F519	Motor Self-tune Torque	1% ~ 17%	15.0%	1%	This parameter is used to set the torque of synchronous motor angel tune and initial position tune. Normally, the parameter does not need to be adjusted. If the tune failed, adjust this parameter to finish the tune process.
F520	Motor Angle Self-tune	0~1	0	1	With this parameter being set to 1, the LEDs display AL00, motor angle tune starts at this moment. If the tune is failed, LEDs will display Er35; If the tune is success, the LEDs will display menu interface. During angle tune process, motor will run some distance as door open direction, so ensure the car door is in close status before starting tune.

Note:

These eight acceleration and deceleration time period are used to set every stage speed S curve feature of the controller running process.

The control modes of the S curve are shown in below figure. In Figure 6.6, T1, T2, T3,T4 are respectively represent the setting time defined by F511~F514; In the period T1 and T4, the change rate of output frequency increases gradually; In the period T2 and T3, the change rate of output frequency decreases gradually; In the period of T1+T2 and T3+T4, the change rate of output frequency remains constant.

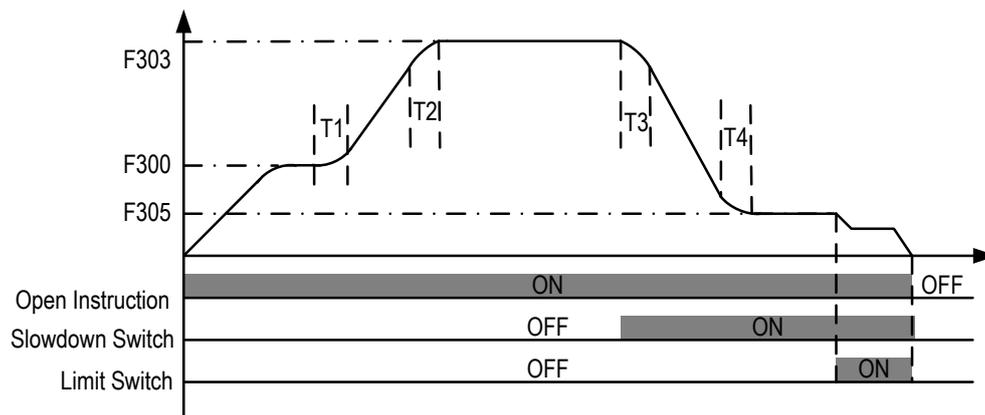


FIGURE 6.6 S CURVE ACCELERATION AND DECELERATION TIME PERIODS

6.7 F6 Distance Control Parameters

Chart 6.7 F6 Distance Control Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F600	Door Width Self-tune	0~1	0	1	Set F002=1, if the parameter F600 value changes from 0 to 1, the door width self-tune function enabled, press open button or close button to start the self-tuning. Doors will run as open (close) -> close (open) ->open (close) logic. As tune finished, the door width will be saved. Refer to Chapter 7 for details.
F601	Door Width Self-Tune Speed	0~9999	0	1	This parameter is used to set the door motor running frequency in door width self-tune process.
F602	Door Width Pulses Low Bits	0~9999	0	1	Door width computing method: Door Width= F603*10000+F602. The door width pulse number get from tuning can be modified properly by key panel
F603	Door Width Pulses High Bits	0~9999	0	1	
F604	Door Width Self-Tune Speed	0 ~ 30.0%	10.0%	0.1%	In the process of opening under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F604, door motor switches the speed from door-open low speed (F300) to door-open high speed (F303).
F605	Distance Control Door-open Deceleration Point	60.0%~ 90.0%	70.0%	0.1%	In the process of opening under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F605, door motor switches the speed from door-open low speed (F303) to door-open high speed (F305).
F606	Distance Control Door-open Limit Point	80.0%~ 99.0%	96.0%	0.1%	In the process of opening under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F606, door arrival at opening limit related management will start.
F607	Distance Control Door-close Start Low Speed	0% ~ 30.0%	10.0%	0.1%	In the process of closing under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F607, door motor changes speed from Close Start Low Speed (F400) to Close High Speed (F403).
F608	Distance Control Door-close Deceleration Position	60.0% ~ 90.0%	70.0%	0.1%	In the process of closing under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F608, door motor changes speed from Door-close High Speed (F403) to Door-close End Low Speed (F405).
F609	Distance Control Door-close Limit Position	80.0% ~ 99.0%	90.0%	0.1%	In the process of closing under distance control, the running pulses will be real-time recorded. If the pulses are not less than door width *F609, door arrival at closing limit related management will start.

Chart 6.7 F6 Distance Control Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F610	Door-open Limit Switch Position Low Bits	0 ~ 9999	0	1	These 3 function codes are used to record the opening and closing limit positions learned in door width tuning process. In normal running process, as the door opening limit signal is valid, the door position will be reset to $F611*10000+F610$; As the door closing limit signal is valid the door position will be reset to F612.
F611	Door-open Limit Switch Position High Bits	0 ~ 9999	0	1	
F612	Door-close Limit Switch Position	0 ~ 9999	0	1	
F613	Door Width Self-tune and Initial Running Torque	0.0% ~ 150.0%	120.0%	0.1%	This parameter is only valid in distance control mode and is used to set door width self-tune and the torque judgement level as the first power-on running. Refer to Chapter 7 of Application & Adjustment for detailed.
F614	Door-open Deceleration Position Pulses Low Bits	0 ~ 9999	0	1	These 4 parameters are used to set deceleration position. The setting of deceleration position is not in door width per cent form but pulses number form. The door opening deceleration position is $F615*10000+F614$, and the door closing deceleration position is $F617*10000+F616$.
F615	Door-open Deceleration Position Pulses High Bits	0 ~ 9999	0	1	
F616	Door-close Deceleration Position Pulses Low Bits	0 ~ 9999	0	1	
F617	Door-close Deceleration Position Pulses High Bits	0 ~ 9999	0	1	
F618	Door Open to the Limit Output Door Width	0.0% ~ 99.0%	96.0%	0.1%	This parameter is only valid in distance control mode, and if the parameter is not 0, door width pulses is more than F618, controller out put the arriving to the opening limit signal. If the parameter is 0, the door width position should be more than F606, and the output torque is more than the arriving opening limit change speed position, the arriving to limit signal will be output. Note: if there is a limit signal input in the input terminals, the arriving to limit signal output is based on the limit signal input

Chart 6.7 F6 Distance Control Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F619	Door Close to the Limit Output Door Width	0.0% ~ 99.0%	6.0%	0.1%	This parameter is only valid in distance control mode, and if the parameter is not 0, door width pulses is less than F619, the door-close arriving to the limit signal outputs. If the parameter is 0, the door width position should be more than F609, and the output torque is more than arriving to closing limit speed-change position torque, the arriving to closing limit signal will be output. Note that, if there is a limit signal input in the input terminals, the arriving to limit signal output is based on the limit signal input.
F620	Door Position Feedback Pulses	0.0% ~ 99.0%	33.0%	0.1%	This parameter is only valid in distance control mode, if the door width is more than F620, the door position feedback signal will be output.

6.8 F7 I/O Parameters

Chart 6.8 F7 I/O Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F700	Switching Value Input DI1	0~23	2	1	0: Invalid 1: Door-open Deceleration Normal Open Input 2: Door-open Deceleration Normal Close Input 3: Door-open Limit Normal Open Input 4: Door-open Limit Normal Close Input 5: Door-close Deceleration Normal Open Input 6: Door-close Deceleration Normal Close Input 7: Door-close Limit Normal Open Input 8: Door-close Limit Normal Close Input 9: Door-open Signal Normal Open Input 10: Door-open Signal Normal Close Input 11: Door-close Signal Normal Open Input 12: Door-close Signal Normal Close Input 13: Overload Signal Normal Open Input 14: Full-load Signal Normal Open Input 15: Half-load Signal Normal Open Input 16: Light-load Signal Normal Open Input 17: Light Curtain Signal Normal Close Input 18: Light Curtain Signal Normal Open Input 19: Safe Panel Signal Normal Close Input 20: Safe Panel Signal Normal Open Input 21: Low Speed Signal Normal Open Input 22: Door Lock Signal Normal Open Input 23: Fire Service Signal Normal Open Input Note that, if it is in all pulses control mode, please cancel the arriving to opening/closing limit input terminal setting. Or else, it will impact the arriving signal output.
F701	Switching Value Input DI2		4		
F702	Switching Value Input DI3		6		
F703	Switching Value Input DI4		8		
F704	Switching Value Input DI5		9		
F705	Switching Value Input DI6		11		
F706	Switching Value Input DI7		0		
F707	Switching Value Input DI8		0		

Chart 6.8 F7 I/O Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description	
F708	Programmable Relay output Terminal	0~6	-	1	0: Invalid 1: Bypass Alarm Signal Valid, Relay Action 2: Bypass Alarm Signal Invalid, Relay Action 3: Arrival Gong Signal Valid, Relay Action 4: Arrival Gong Signal Invalid, Relay Action 5: Door Arrival to the Open limit Signal Invalid, Relay Action 6: Door Arrival to the Close limit Signal Invalid, Relay Action	
F709						
F710	Relay output Terminal	Standard Type	0~2	0	1	0: Invalid 1: Car Light Signal Valid, Relay Action 2: Car Light Signal Invalid, Relay Action
		S Type	0~6	0	1	0: Invalid 1: Bypass Alarm Signal Valid, Relay Action 2: Bypass Alarm Signal Invalid, Relay Action 3: Arrival Gong Signal Valid, Relay Action 4: Arrival Gong Signal Invalid, Relay Action 5: Door Arrival to the Open limit Signal Invalid, Relay Action 6: Door Arrival to the Close limit Signal Invalid, Relay Action
F711	Terminal Filter Time	0~99ms	20ms	1ms	This parameter is used to set input terminals' sensitivity. If digital input terminal is prone to interference and cause malfunction, this parameter should be increased to enhance the anti-interference ability, but it will reduce the sensitivity of the input terminal.	

6.9 F8 SYLG Car Top Board Parameters

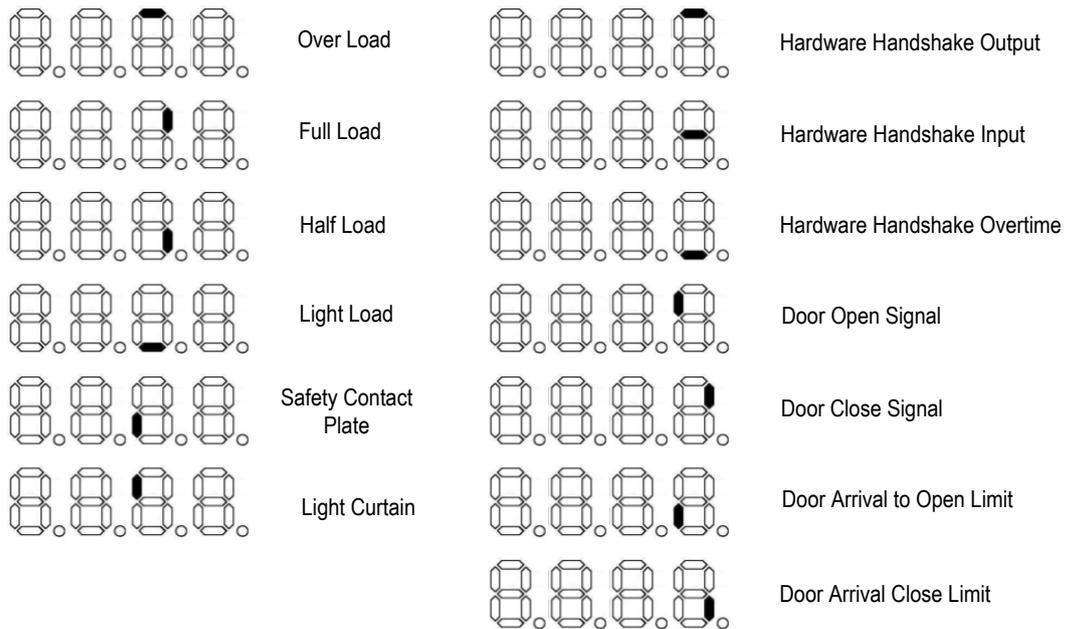
This group of parameters are used in Bluelight integrated control system. (Not available for S type)Chart 6.9 F8 SYLG Car Top Board Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F800	Basic Software ID	Read Only	Depends on the product	0	Basic Software version of Car Roof Board.
F801	User ID	Read Only	Depends on the product	0	User ID of Car Roof Board
F802 ~ F804	Logic Software No. 0 ~ 2	Read Only	Depend on the product	0	Software No. of Car Top Board composed of No. 0 & No. 1 & No. 2.

Chart 6.9 F8 SYLG Car Top Board Parameters (Cont'd)

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F805 ~ F807	Drive Software No.0~2	Read Only	Depend on the product	0	Software No. of Main Board composed of No.0 & No.1 & No.2.
F808	Door Motor Type	0~1	0	1	Door motor type setting: 0: main; 1: Auxiliary Note that, an integrated door motor controller must be set to main controller; in the use of through door, the other integrated door machine controller should be set to auxiliary type.
F809	Instruction Board Type	0~1	0	1	Instruction board type setting: 0: Instruction Board; 1: CAN Communication COP. Set according to the practical instruction board type used in car.
F810	Parameter Monitoring Enable	0~1	0	1	Parameter monitor function: 0: Disable parameter monitor function; 1: Enable parameter monitor function The function enabled, corresponding segment code lights or not mains signal led, or non-signal led.
F811	Auxiliary Door Motor Type	0~2	0	1	0: None; 1: Normal Auxiliary Door Motor; 2: Through Auxiliary Door Motor If there is only one door in the car and only one set of COP, this parameter should be set to 0. If there is only one door in the car and two sets of COP (Additional appropriate COP is needed in Car), this parameter should be set to 1. If the car has two doors, the parameter should be set to 2. Note: 1. This parameter should be set for both main door motor and auxiliary door motor. 2. In normal auxiliary door motor type mode, system can support a total floor of 64. 3. In through door mode, refer to the through door section of the BL6-U serial controller manual for the detailed description of the mode of through door and the total floor supported by the system.

Note: The segment display of F810 Parameter is shown in following figure:



6.10 F9 Demonstration Running Parameters

Chart 6.10 F9 Demonstration Running Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
F900	Demonstration Delay	0~99s	5s	1s	This parameter is only valid in demonstration running mode. It is the time interval between torque holding stage after door arriving to opening or closing limit and reverse to open or close time. It should be set according to practical situation.
F901	Demonstration Automatic Running	0~1	0	1	This parameter is used to set controller whether starts to demonstration running in demonstration running mode. 0: Disable the auto demonstration running. As power on, an open or close instruction starts the demonstration running. 1: Enable the auto demonstration running. As power on, the demonstration running automatically starts.

6.11 FA Fault Parameters

Chart 6.11 FA Fault Parameters

Function Code	Name	Setting Range	Factory Default Setting	Min Unit	Description
FA00	1 st Fault Type	Read Only	0	0	01: System Fault 04: Over-current 07: Over-voltage 09: Under-voltage 10: System Over-load 11: Motor Over-load 13: Output Phase Loss 14: Module Over-heat 16: EEPROM Fault 18: Current Detection Fault 20: Encoder Fault 25: Over-speed Fault 26: Parameter Setting Fault 27: Door Width Self-Tune Fault 28: Door Open Over-time 29: Door Close Over-time 31: Door Open Block Protection 32: Speed Deviation Protection 33: Instruction Error 34: Door Motor Controller Communication Error 35: Synchronous angle self-tune failed
FA01	1 st Fault Information	Read Only	0	0	
FA02	2 nd Fault Type	Read Only	0	0	
FA03	2 nd Fault Information	Read Only	0	0	
FA04	3 rd Fault Type	Read Only	0	0	
FA05	3 rd Fault Information	Read Only	0	0	
FA06	4 th Fault Type	Read Only	0	0	
FA07	4 th Fault Information	Read Only	0	0	
FA08	5 th Fault Type	Read Only	0	0	
FA09	5 th Fault Information	Read Only	0	0	

7 Application and Adjustment

This chapter detailed describes the steps of system design and function parameter setting method when applying Integrated Door Motor Controller. The following descriptions are separately for speed control application and distance control application.

7.1 Door Motor Controller Adjustment

7.1.1 Adjustment Process

To adjust the door motor controller conveniently, this section lists the parameters setting sequence. If the external circuits and mechanical installation are all well, the adjustment can start. The adjust process is shown in Figure 7.1.

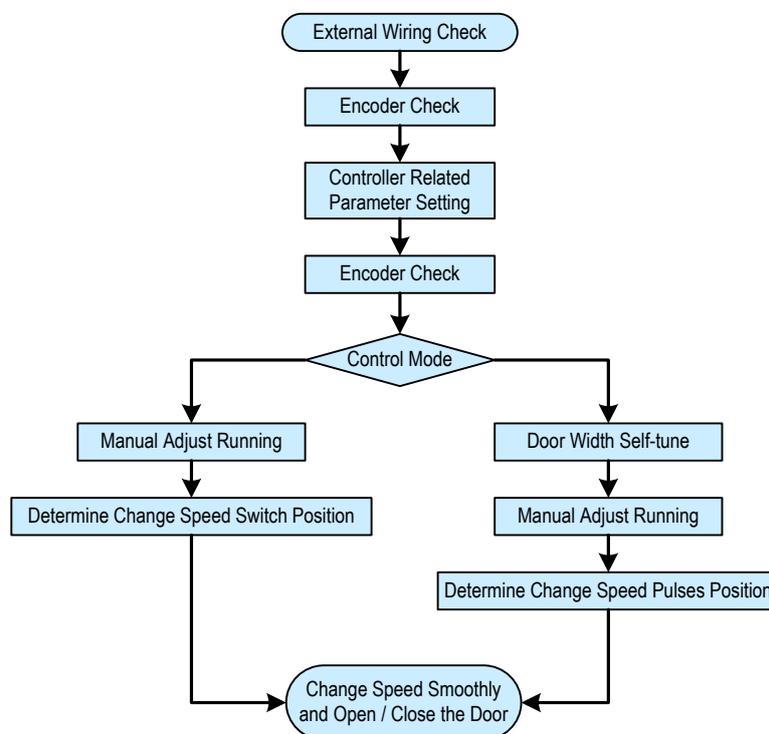


FIGURE 7.1 BASIC DEBUGGING PROCESS OF DOOR MOTOR CONTROLLER

7.1.2 Check Wiring

Before power on, external wiring should be checked to ensure the element and human safety.

- 1) Wiring according to the factory diagram;
- 2) Each switch works gradually and acts reliably;
- 3) Check the inter-phase resistances value of main circuit, and check for short circuit to ground;
- 4) Install each element firmly, and not cause equipment damage and personal injury.

7.1.3 Encoder Check

The pulse signal feedback from encoder is important for system to control precisely.

- 1) Install encoder firmly and wiring reliably.

2) Encoder signal lines should be placed separately from high voltage circuits to avoid interference.

3) Encoder cable should better be directly connected to controller. If the cable is not long enough and an extension cable is needed, the extension part should also be shielded and welded to the original line of the encoder with soldering iron.

4) Encoder shielded layer should be well grounded in the controller side.

7.1.4 Grounding Check

Check the resistance between below terminals and PE terminal is infinite or not. If it is too small, please check below immediately:

a) Between L1, L2 and PE;

b) Between U, V, W and PE;

c) Between 24V, PGA, PGB, PGZ, COM of encoder and PE.

7.1.5 Check Signal Lines by Indicator Light

CHART 7.1 THE INDICATOR LIGHT MEANS AT STOP OR RUNNING STATUS

Light Symbols	LED light means When stop		LED light means when running
	Speed Control	Distance Control (with Limit Switch)	
D1	DI1 signal is valid	DI1 is valid	Open instruction is valid
D2	DI2 signal is valid	A/B phase signal correct	Opening
D3	DI3 signal is valid	Z phase signal correct	Closing
D4	DI4 signal is valid	DI4 signal is valid	Close instruction is valid

a) In speed control mode, decreasing speed signal check.

Note: Recommended wiring: Connect DI1 to door-open slow down signal; Connect DI2 to door-open limit signal; Connect DI3 to door-close slow down signal; Connect DI4 to door-close limit signal.

Pull the door with hand, according to former chart, the correction of related signals can be judged by corresponding LED status.

b) In distance mode:

Note: Recommended wiring for using limit switches. Connect DI1 to door-open limit signal; connect DI4 to door-close limit signal.

Pull the door with hand in the direction of opening, if D2 is on, the phase-A & B signals are normal, or else abnormal. Please exchange the A and B signal cables. Pull the door with hand in the direction of closing, if the D2 is normal OFF, the phase-A & B signals are normal.

During the pulling process, if a Z signal has been received, D3 will change status once; If D3 signal is always OFF, the signal Z is abnormal.

c) Running

D1 is ON, which means the external open instruction is valid; D2 is ON, which means the door motor running in open mode.

D4 is ON, which means the external close instruction is valid; D3 is ON, which means the door motor running in close mode.

7.1.6 Door Width Self-tune

For asynchronous motor in distance control mode, A and B signals of encoder should be correct wiring before door width self-tune. In the process of self-tune, the doors' running direction will be changed automatically, so please concern the human security, and then start the tune, otherwise, it may cause human injury.

Make sure no blocks on the way of doors' action, and then start the door width self-tune. If there are some blocks on the way, it might be thought the door arrives at limit. And the door width self-tune result will be incorrect.

7.1.7 Trial Running

Trial running is mainly for distance control mode using encoder. The mode of trial running is recommended to apply all-purpose control panel mode, F001 is set to 0, and F002 is set to 1, at this moment, the motor should be disconnected to load, and could run freely.

Two points should be concerned in trial running process:

1) The running direction of motor is accordant to facts (open or close status) or not? If not, the wiring of door motor controller output and the motor should be adjusted.

2) Motor forward or reverse rotation is stable and no noise or not. As no load, the current of controller should be very small.

7.2 Typical Applications

7.2.1 Speed Control Mode

For speed control mode, decelerate by deceleration point. Judge the arrival to limit by limit signal. As the all-purpose door motor controller, the wiring of system in speed control mode is shown as Figure 7.2.

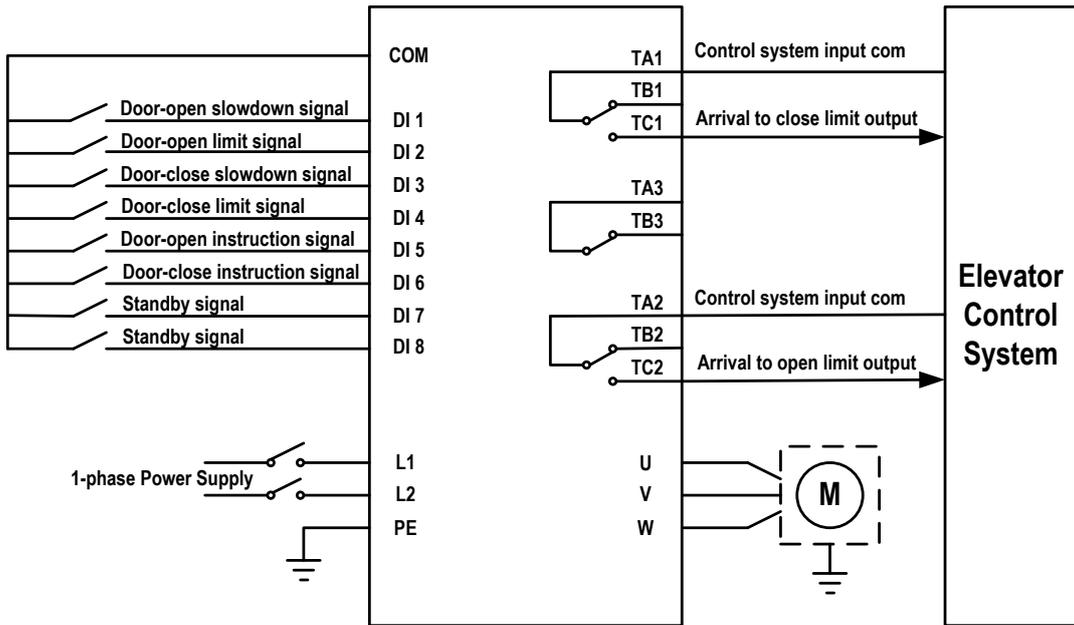


FIGURE 7.2 SPEED CONTROL SYSTEM TYPICAL APPLICATION WIRING DIAGRAM

As an integrated door motor controller, wiring diagram of system in speed control mode is shown as Figure 7.3.

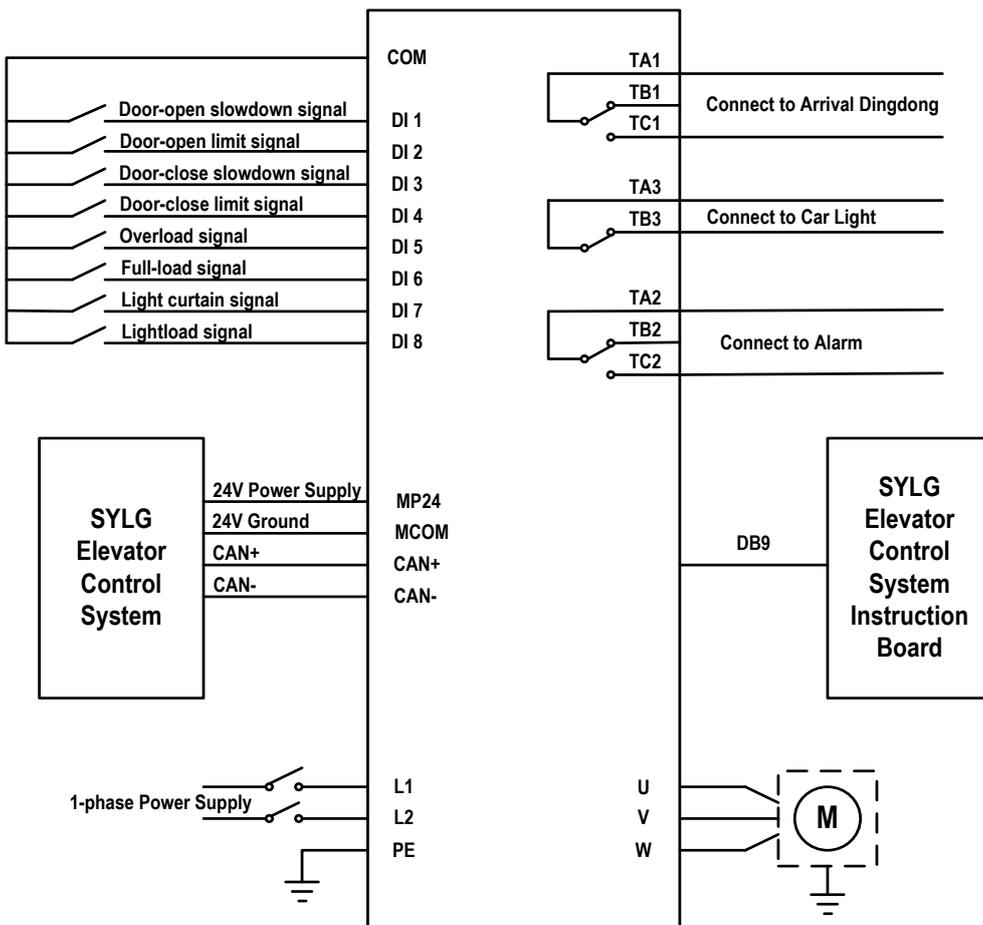


FIGURE 7.3 INTEGRATED SPEED CONTROL SYSTEM TYPICAL APPLICATION WIRING DIAGRAM

7.2.2 Distance Control Mode

A. As an all-purpose door motor controller, pulse and limit switch mode application wiring diagram.

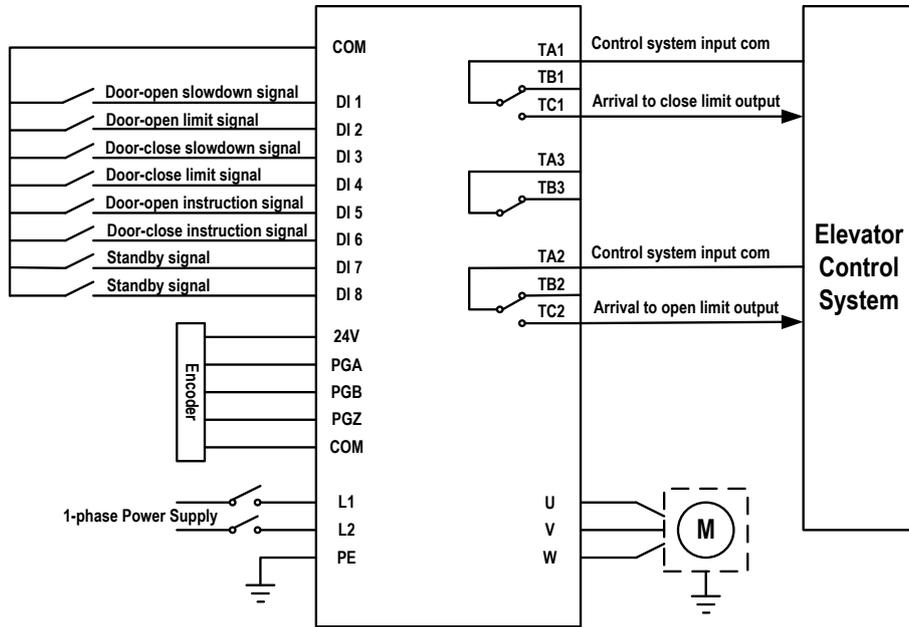


FIGURE 7.4 DISTANCE CONTROL MODE (PULSE + LIMIT SWITCH) APPLICATION WIRING DIAGRAM

In this work mode, if the limit switch is valid, the arrival to open or close limit output is valid, and not dependent on pulses. Using limit signal should be set in input terminal type.

B. As an all-purpose door motor controller, all-pulse mode application wiring diagram

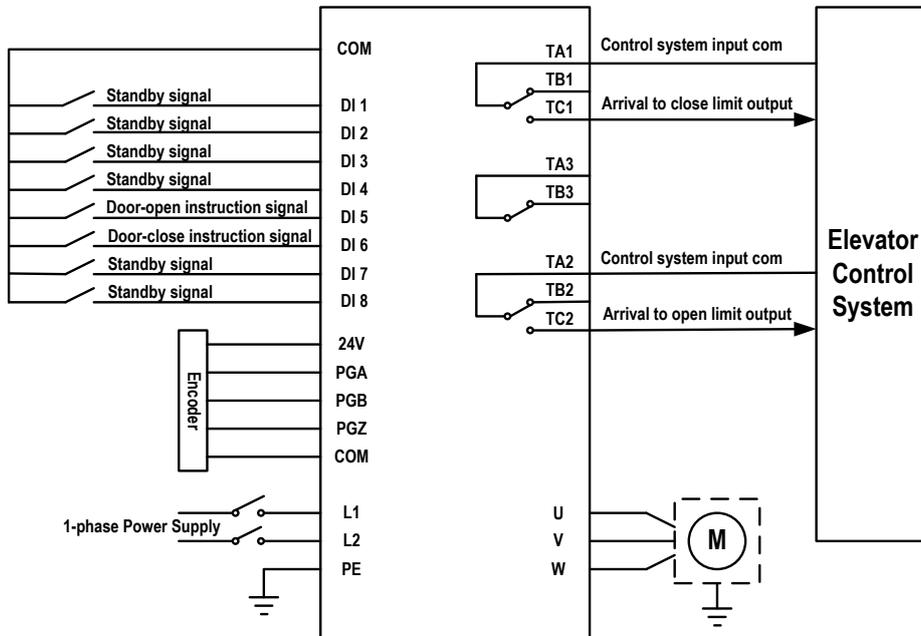


FIGURE 7.5 FULL-PULSES MODE APPLICATION WIRING DIAGRAM

Note: In this work mode, all switch signals are produced by pulse counter, and no limit signal should be set in input terminal type.

C. As integrate door motor controller, pulse-plus-limit-switch mode application wiring diagram.

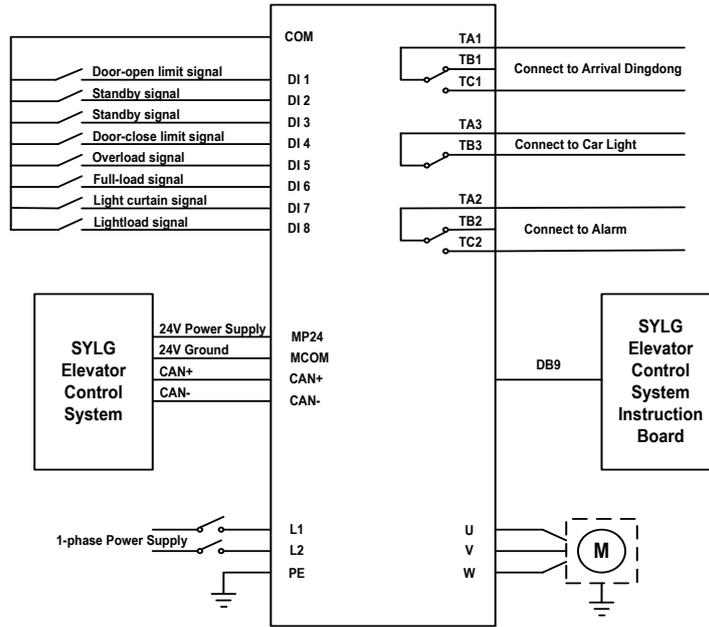


Figure 7.6 Integrated distance control mode (pulse + limit switch) application wiring diagram

In this work mode, if limit switch signal is valid, the output of arrival to open and close limit is valid, not depending on pulse.

D. As integrated door motor controller, all-pulse mode application wiring diagram

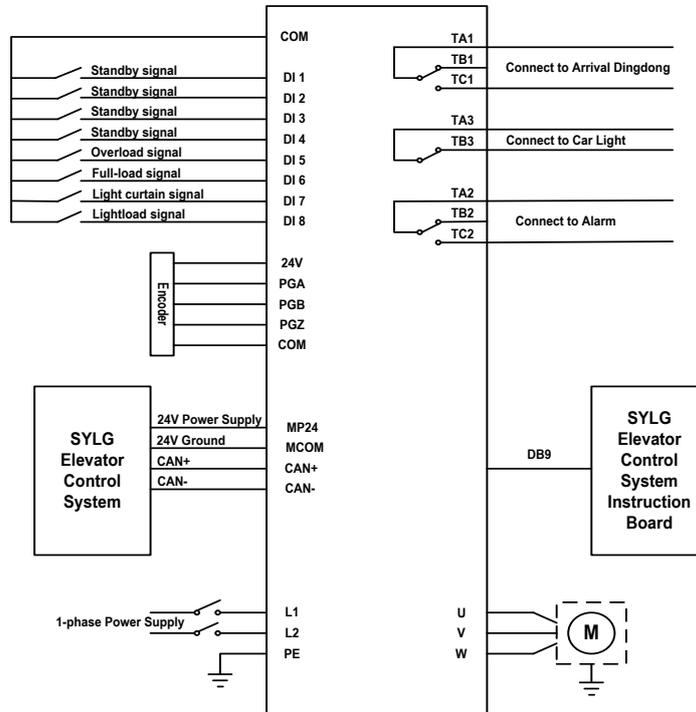


FIGURE 7.7 INTEGRATED FULL-PULSE MODE APPLICATION WIRING DIAGRAM

Note: I/O port function of integrated controller can be configured freely. Above is recommended wiring. User can verify the wiring port according to actual situation and adjust the port setting for specific function.

8 System Fault and Analysis

The door motor controller has nearly 32 warning messages or protection functions. The controller monitors all kinds of input signals, operating conditions and external feedback information at any time. Once an exception occurs, the corresponding protection function acts and displays the fault code.

Chart 8.1 System Fault List

Fault Display	Fault Description	Fault Cause	Resolve Method	Remarks
Er01	System Fault	System work abnormally	Contact factory	
Er04	System Over-current	<ol style="list-style-type: none"> 1. Main circuit output is connected to ground or short-circuited. 2. Did/not did motor self-tune. 3. Too heavy load. 4. Too big encoder interference. 5. Too large slope of acceleration/deceleration S curve. 	<ol style="list-style-type: none"> 1. Eliminate external problems of wiring; 2. Do motor parameters self-tune; 3. Sudden load relief; 4. Adjust S curve parameters 	
Er07	System Over-voltage	<ol style="list-style-type: none"> 1. Too high input voltage; 2. Too lager braking resistance; 3. Too steep speed S curve 	<ol style="list-style-type: none"> 1. Adjust input voltage; 2. Chose an appropriate resistance value 	
Er09	System Lack-voltage	<ol style="list-style-type: none"> 1. Input power supply sudden power down 2. Too low input voltage 3. Abnormal control board 	<ol style="list-style-type: none"> 1. Eliminate external problems of power supply 2. Contact to agency or factory 	Restore as the voltage is normal
Er10	System Over-load	<ol style="list-style-type: none"> 1. Blocked by foreign object in door rail 2. Too heavy load 	<ol style="list-style-type: none"> 1. Check the lift door rail 2. Reduce the load 	
Er11	Motor Over-load	<ol style="list-style-type: none"> 1. Blocked by foreign object in door rail 2. Abnormal motor parameter 3. Too heavy load 	<ol style="list-style-type: none"> 1. Check the lift door rail 2. Check the motor parameter 3. Reduce the load 4. Enlarge motor rated current (F108) 	

Chart 8.1 System Fault List (cont'd)

Fault Display	Fault Description	Fault Cause	Resolve Method	Remarks
Er13	Lack phase of output side	1. Loose wiring of main loop output 2. Motor damage	1. Check the wiring 2. Eliminate motor fault	
Er14	Over-heat Module	1. Too high ambient temperature 2. Too closed surrounding	1. Reduce the ambient temperature 2. Clean up the surrounding items	
Er16	EEPROM Fault	EEPROM read or write abnormal	Contact agency or factory	
Er18	Current Detection Fault	Abnormal control board	Check the parameter and contact factory	
Er20	Encoder Fault	1. Encoder model is matched or not 2. Incorrect encoder wiring	1. Check the OC type ABZ rotary encoder 2. Check the encoder wiring	
Er25	Over-speed Fault	Opening and closing running high speed is higher than 20% of setting speed last for 50 sec.	Check the encoder wiring	
Er26	Parameter Setting Prompt	Some parameters abnormal setting	Check the parameter setting	
Er27	Door Width Self-tune	1. Door width learned by self-tune is less than 20 2. Running in distance control mode before door width self-tune	1. Check the encoder wiring 2. Check the door motor mechanical part 3. Self-tune the door width before running the motor in distance control mode	
Er28	Opening Overtime	1. Opening limit signal fault or setting error 2. Pulse encoder disconnection	1. Check the opening limit signal 2. Check the encoder wiring	
Er29	Closing Overtime	1. Motor running direction is reverse to the definition of closing 2. Closing limit signal fault or setting error 3. Pulse encoder disconnection	1. Change the motor phase order 2. Check the closing limit signal 3. Check the wiring of encoder	

Chart 8.1 System Fault List (Cont'd)

Fault Display	Fault Description	Fault Cause	Resolve Method	Remarks
Er31	Opening or Closing Blocked Protection	<ol style="list-style-type: none"> Foreign object in door rail. Some opening and closing blocked parameters setting error. 	<ol style="list-style-type: none"> Clean up the foreign object in door rail Check the rationality of opening and closing blocked torque up limit 	
Er32	Speed Offset Protection	<ol style="list-style-type: none"> Too fast acceleration or deceleration Angel self-tune fault and motor lost control Speed offset setting is too small, and acceleration & deceleration time is too short. 	<ol style="list-style-type: none"> Enlarge the acceleration and deceleration time Adjust the value of F506 and F507 	
Er33	Abnormal Instruction	<ol style="list-style-type: none"> Press the RUN or CLOSE on penal in non-panel mode In internal communication mode, communication instruction is abnormal 	<ol style="list-style-type: none"> Check the value of F002 Check the internal communication 	Can press RES/STOP to restore
Er34	Internal Communication Overtime	Drive and Logic side communication overtime	<ol style="list-style-type: none"> Check the LED keypress connecting firmly or not Contact agency or factory 	
Er35	Synchronous Motor Self-Tune Fault	Synchronous motor angel self-tune failed	<ol style="list-style-type: none"> Check the self-tune related parameters Contact agency or factory 	