iAStar Series

Inverter for Elevator Door Machine

Instruction Manual

Edition ： Standard

Version ： 2.06

Preface

Thanks for using our products.

The iAStar Series of Inverters for Elevator Door Machine is a new type Inverter which is researched and developed for China market by Sigriner Elektronik GmbH, Germany. Shanghai STEP Electric Co., Ltd is accredited by Sigriner Elektronik GmbH, Germany to assemble and sell the product only in the area of China.

This product is designed for elevator door machine based on V/F controlling, which is mainly used in the controlling of elevator automatic door and other kinds of automatic doors.

Outline

The introduction manual describes installation,handling,function constants setting, maintenance and trouble processing of the iAStar Inverters.The manual can be the reference for designing the elevator control system by using the iAStar Inverters.It also can be the reference of installation,debugging and maintenancing of elevator.

Please read the manual carefully before operated the Inverter for installing and operating correctly.

Reader

User

Designer of elevator control system

Project maintanence engineer

Technical support engineer

Safety Information

The following conventions are used to indicate precautions in this manual.Failure to heed precautions provided in the manual can result in serious or possibly even fatal injury or damage to the products or ralated 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 possibly result in loss of life or serious injury.

Indicates precautions that, if not heeded, could possibly result in relatively serious or minor injury,damage to the product,or faulty operatioin.

Indicates important information that should be memorized

safety Notice

● carrying

CAUTION
◎ Holding and putting softly when carrying the Inverter. Otherwise, Inverter can be damaged ◎ Don't put heavy load on the inverter

● installing

WARNING
◎ Attach the Inverter to a metal or other noncombustible material. Fire can result if the Inverter is attached to a combustible material. ◎ Don't place combustible material nearby. Fire can result. ◎ Don't attach the Inverter in the environment of explosive gas. Explosion can result. ◎ Don't dismantle the inverter unless wiring or maintaining. Dismantling may probably damage components of the inverter. ◎ Never install the Inverter if the shell is damaged or missing components Fire or electric shock can result.

CAUTION

◎ Install following the User's Manual
◎ Don't push the panel or cover when installing.
Inverter may be damaged.
◎ When installing the Inverter, always take special care so that water will not get into the Inverter.
Otherwise, the Inverter may be damaged.
◎ When installing or operating the Inverter, always take special care so that screw, metal gasket, metal stick and other foreign matter do not fall into the Inverter.
Otherwise ,the Inverter may be damaged or explode

● wiring

WARNING

◎ Wiring must be performed by an authorized person qualified in electrical work.
Otherwise, an electric shock can occur.
◎ Always turn OFF the powewr supply and check the voltage discharge before wiring terminals.
Otherwise,an electric shock can occur.
◎ Be sure to ground the ground terminal correctly.
Otherwise, the Inverter may be damaged.

CAUTION
◎ power supply terminals and wire terminals must be connected firm ◎ Otherwise, the Inverter may be damaged

● Operating

WARNING
◎ Don’t touch the terminals of the inverter when power is on Otherwise, the Inverter may be damaged, and an electric shock can occur.

CAUTION
◎ Check the parameter settings before operating. Otherwise, the Inverter may be damaged ◎ Never operate the Inverter when the hand is wet. Otherwise, the Inverter may be damaged, and an electric shock or explosion can occur.

● debugging and maintenance

WARNING

◎ Always turn OFF the powewr supply and check the voltage discharge before maintaining.

Otherwise, the Inverter may be damaged, and an electric shock or explosion can occur.

◎ Changing components must be performed by an authorized person qualified in electrical work. Take special care so that screw, metal gasket, metal stick will not fall into the Inverter.

Otherwise, the Inverter may be damaged, and fire or an electric shock can occur.

◎ Do not rebuild the inverter without permission

Otherwise, the injury of people and the damage to Inverter can result

CAUTION

◎ Always modify the parameters when inverter is changed

Otherwise, it may results an elevater door failure

Always turn OFF the input powewr supply before removing or plugging plugs.

Otherwise, the Inverter may be damaged, and an electric shock or explosion can occur.

◎ Don't touch the components of the control board directly when maintaining

Otherwise, the control board may be damaged

Contents

1 POINTS OF ATTENTION

1.1 Application area and features of inverter

iAstar Inverter (registered trade mark AS) is the latest product introduced from STEP Sigriner Elektronik GmbH by Shanghai STEP Electric Co., Ltd.， which is designed for elevator door Machine based on V/F controlling, which is mainly used in the controlling of elevator automatic door and other kinds of automatic doors. Its main features：

★ Intelligent Power Module（IPM）hardware design together with advanced control technique enables the inverter work more steadily and reliably.

★ According to the requirements of elevator door control, V/F control method is applied, with PID regulation function, the accuracy of frequency can reach 0.01 Hz, with which the speed control and position control is improved

★ Wide voltage input range and automatic voltage adjustment function enable the inverter fit all kinds of bad circumstance.

★ Possess the capability of torque compensation, suitable for door with different weight, the process of door open and door close is quite smooth, which ensures that the passenger can go through the door safely

★ There are 60 parameters, which include function set-up, motor specification parameter, curve for door open and close, PID parameter, control parameter and error query etc.

★ There are 6 parameters which are applied for adjusting the speed curve of door open and close, with which the speed curve can be optimized, and ensure the operation of door smoothly and with low noise, reduce maintenance fee.

★ Torque holding for door open and close can be set up individually, PID regulation makes door to drive more correctly in position

★ Special door machine running curve parameter improves the inverter control.

★ Suitable for control method with encoder，compatible with encoder of OCT, Pull/Push type

★ Abundant safety functions: protection from clamping, door machine blocking up protection, parameter self-resetting, etc.

★ CAN communication guarantees the high speed, secure and reliable data transmission.

★ With strong and advanced operating functions, the inverter is designed to cover

various needs of users and aims at safety and practicality, with clear menu of LCD easy it is easyto set parameter and to understand the operation procedure, keyboard operation convenient, parameter monitoring reliable, which facilities user's spot debugging.

★ Compact, easy for wiring, and convenient for commissioning

1.2 Service ambient of the invert

CAUTION
◎ ambient temperature：-10℃～+50℃ ◎ temperature for keeping：-20℃～+70℃ ◎ ambient humidity：Maximum 95 % RH (no dew) ◎ altitude height：Below 1,000 m ◎ vibration：Below 5.9m/s2(=0.6g) ◎ service place：Be away from corrosive gas, inflammable gas, oil mist or dust.

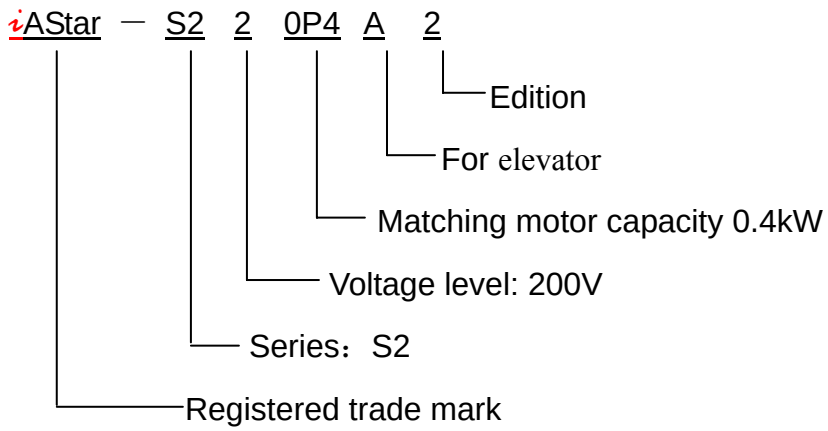
1.3 Points of attention on inverter discarding

When dealing with discarded inverter, please pay attention to:

CAUTION
Explosion of electrolysis condenser：The electrolysis condenser on PCB may explode under fire treatment：Please treat it as industrial waste.

1 Introduction of products

1.1 Model Instruction



2.2 Technical criterion

Table 2-1 Technical criterion of iAstar—S2 inverter

Contents		Specification
Motor capacity	HP	0.5
	kW	0.4 kW
Output	Capacitance [kVA]	1.0 kVA
	Output current [A]	2.0 A
	Frequency	0 ~ 50Hz
	Voltage	0 ~ 220VAC
Input	Voltage	Single phase，220VAC(±10%)
	Frequency	50 ~ 60Hz (±5%)
Weight		1.5kg

Table 2-1 Technical criterion of iAstar－S2 inverter

Contents			Specification
Control	Control method		Vector control，v/f control
	Resolving accuracy		digital： 0.01 % of the max output frequency
	Overload capacity		Rating current 150 % -1 minute, Rating current 200% - 0.5 second。（characteristic and time acts as inverse ratio）
	Torque compensating		Manual torque compensating (0 ~ 20 %)
Running	Running Function	Running command	Keyboard / terminal / CANBus protocol
		Parameter settings	Keyboard / terminal / CANBus protocol
		Starting signal	Positive swing，negative swing
	Fault	Fault reset	Can reset the fault under protection function
	Output signal	Output in running	Door -openning fault, door-closing fault, correct openning, fault signal
Input terminal	Open the door		Optical relay inupt
	Close the door		
	Close the door in slow		
	Door open limit（only for Type A2/A3）		
	Door close limit（only for Type A2/A3）		
	open the door in slow（only for Type A2/A3）		
	Close the door in slow（only for Type A2/A3）		
	Spare（only for Type A2/A3）		
Output terminal	Relay1		Output relay，5A 250VAC / 3A 30VDC
	Relay2		
	Relay3		
	Relay4		
Encoder 1	A，B，0V， ＋24V(For Type A2) ＋12V(For Type A3)		Pull/push type or Oct type

Table 2-1 Technical criterion of iAstar－S2 inverter

Contents		Specification
Encoder 2	A+，A-，B+，B-， 0V，＋5V （only for Type A1）	Differential type
Communication interface		CAN communication interface
Protective function	Inverter protection	Over voltage, under voltage, over current, fuse blown, inverter overheated, phase error，overload protection, IPM hardware fault. etc.
	Transient de-energized	Less than15 millisecond：Continuous running
Display	Running information	Output current，volts D.C.，door position，output interface status
	Fault information	Inverter fault information displayed under protection function.
Cooling method		Natural cooling

3 INSTALLATION & WIRING INSTRUCTION

3.1 Box-openning inspection

Please check carefully on openning the box：whether there is broken in transportation ; whether the model and specification of the inverter is consistent with the requirements on your order.

If there is any missing and unconformity, please contact with us or with the suppler as soon as possible.

3.2 outline dimensions

Standard illustration of the inverter is shown as followings.

Fig 3-1 Front view of Type A1

Fig 3-2 Front view of Type A2/A3

Outer structure and size of the inverter are shown as followings.:（Type A1 as the example）

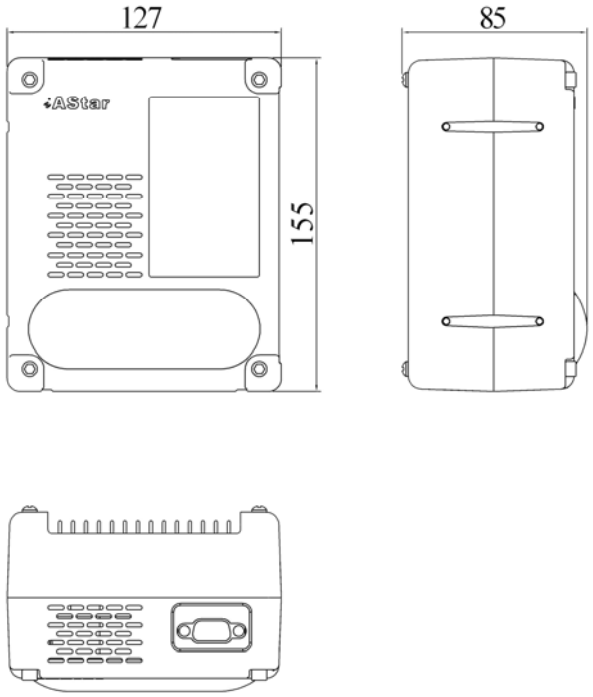


Fig 3-3(a)　Outline Dimensions（unit: mm）

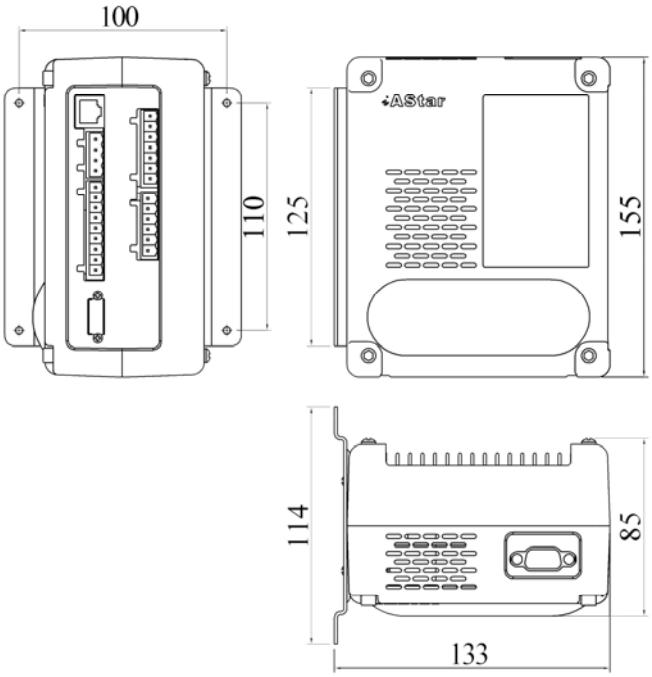


Fig 3-3(b) dimension of side installation（unit: mm）

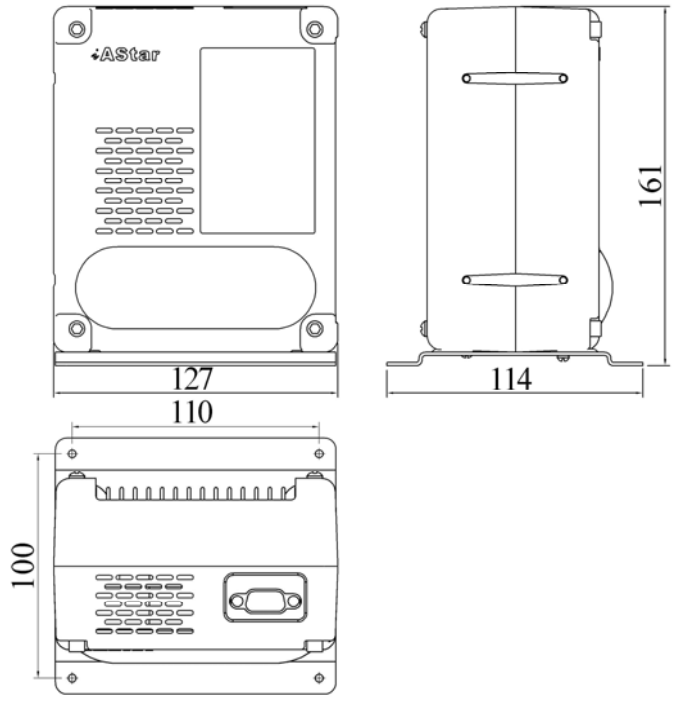


图3-3(c)　dimension of upright installation（unit: mm）

3.3 Installation specification

The door inverter is to be installed horizontally and can be installed on the top of the car when used in elevator door machine control. In order to ensure the good heatrelease of the inverter，please leave enough installation space around the inverter.

Fig 3-4　installation space

Important: Besides the points of attention above, please pay attention to the followings.

a) Ensure the ambient safety of the inverter installation

b) Installing the inverter according to the correct direction

c) Using suitable bolts to fix up the inverter

3.4 Definitions of the terminals

3.4.1 Definitions of the main loop terminals

⏚	⏚	NC	L	NC	N	W	NC	V	U	NC	⏚	⏚

图3-5 sketch map of main loop terminals

Specification of main loop terminals：

Table 3-1 Specification of main loop terminals

Tab	name	Specification of terminal function
L, N	Single phase AC power supply input terminals	Connecting single phase input power supply 200 ~ 250V,50/60Hz
U, V, W	Inverter output terminals	Connecting three phase Asynchronous motor
⏚	Safety grounding terminals	Safety grounding conductor for inverter
NC	Not connected	Spare

3.4.2 Definitions of control terminals

3.4.2.1 Definitions of control terminals of Type A1

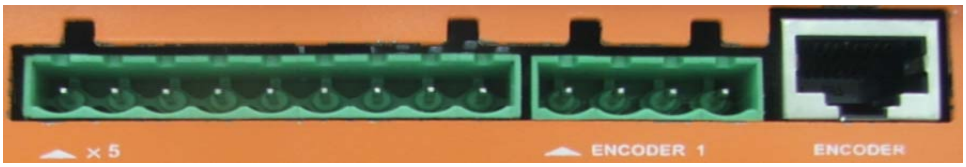


Fig 3-6 sketch map of control terminals of Type A1

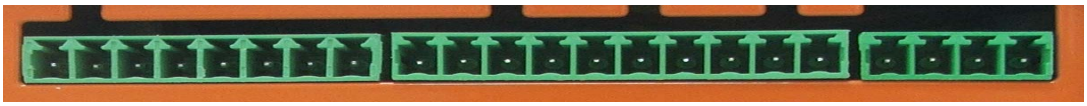
Specification of control terminals：

Table 3-2 Specification of control terminals of Type A1

Name	Number	Function	Instruction	Signal level
Output terminals	1	VCOM	The jumper is 24V or 24V GND	24V,300mA
	5	OUTPUT2	Fault closing signal output terminal	Relay output
	6	OUTPUT0	Signal output terminal of door open limit	
	7	OUTPUT1	Signal output terminal of door close limit	
	8	OUTPUT3	Fault signal output terminal	
Input terminals	2	COM	The jumper is 24VGND or 24V	24V,300mA
	3	Open the door	Openning signal input terminal	Optical isolation input
	4	Close the door	Closing signal input terminal	
	9	Close the door in ow speed	Closing in low speed signal input terminal	
Encoder 1	10	PA	OCT , Push / Pull encoder PA	24V,300mA
	11	PB	OCT , Push / Pull encoder PB	
	12	+24V GND	+24V GND	
	13	+24V	+24V power supply	
Encoder 2	15	＋5V	+5V power supply	
	16	+5V GND	+5V GND	
	17	A+	Differential encoder A+	

	18	A-	Differential encoder A-	
	19	B+	Differential encoder B+	
	20	B-	Differential encoder B-	
	14/		Not connected	

3.4.2.2 Definitions of control terminals of Type A2/A3



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Fig 3-7 sketch map of control terminals of Type A2/A3

Specification of control terminals:

Table 3-3 Specification of control terminals of Type A2/A3

name	nunber	function	Instruction	Signal level
Output terminals	1	OUTPUT0A	Signal output terminal of door open limit A	Relay output
	2	OUTPUT0B	Signal output terminal of door open limit B	
	3	OUTPUT1A	Signal output terminal of door close limit A	
	4	OUTPUT1B	Signal output terminal of door close limit B	
	5	OUTPUT2A	Signal output terminal of closing-blocked A	
	6	OUTPUT2B	Signal output terminal of closing-blocked B	
	7	OUTPUT3A	Fault signal output terminal A	
	8	OUTPUT3B	Fault signal output terminal B	
Input terminals	9	COM	Input public terminal	Optical isolation input
	10	Open the door	Openning signal input terminal	
	11	Close the door	Closing signal input terminal	
	12	Close the door in low speed	Closing in low speed signal input terminal	
	13	Door open limit	Signal input terminal of door open limit	
	14	Door close limit	Signal input terminal of door close limit	
	15	Deceleration position of openning	Signal input terminal of Deceleration position of openning	

	16	Deceleration position of closing	Signal input terminal of Deceleration position of closing	
	17	spare		
	18	COM	Input public terminal	
edcoder	19	PA	OCT，Push / Pull encoder PA	+24V for A2 +12V for A3
	20	PB	OCT，Push / Pull encoder PB	
	21	+24VGND	+24V GND	
	22	VCC	+12/+24V power supply	

Important：

Points of attention on main loop wiring：

1. Specification of wiring should be consistent with the rules of electrician standards.
2. Inverter earth contact G is better to use special grounding pole, with grounding resistance below 10Ω.
3. Grounding cable should be as short as possible.

Points of attention on control terminal wiring:

1. In order not to be influenced by noise, the control wire should be less than 50m in length.
2. Main loop and control loop must be separately jointed, with enough space between them, so as to avoid incorrect operation; both cables should cross over one with the other vertically if necessary.

3.5 Basic diagram of inverter wiring

3.5.1 Basic diagram of inverter wiring for Type A1

3.5.1.1 Wiring diagram of main loop and control terminals for Type A1

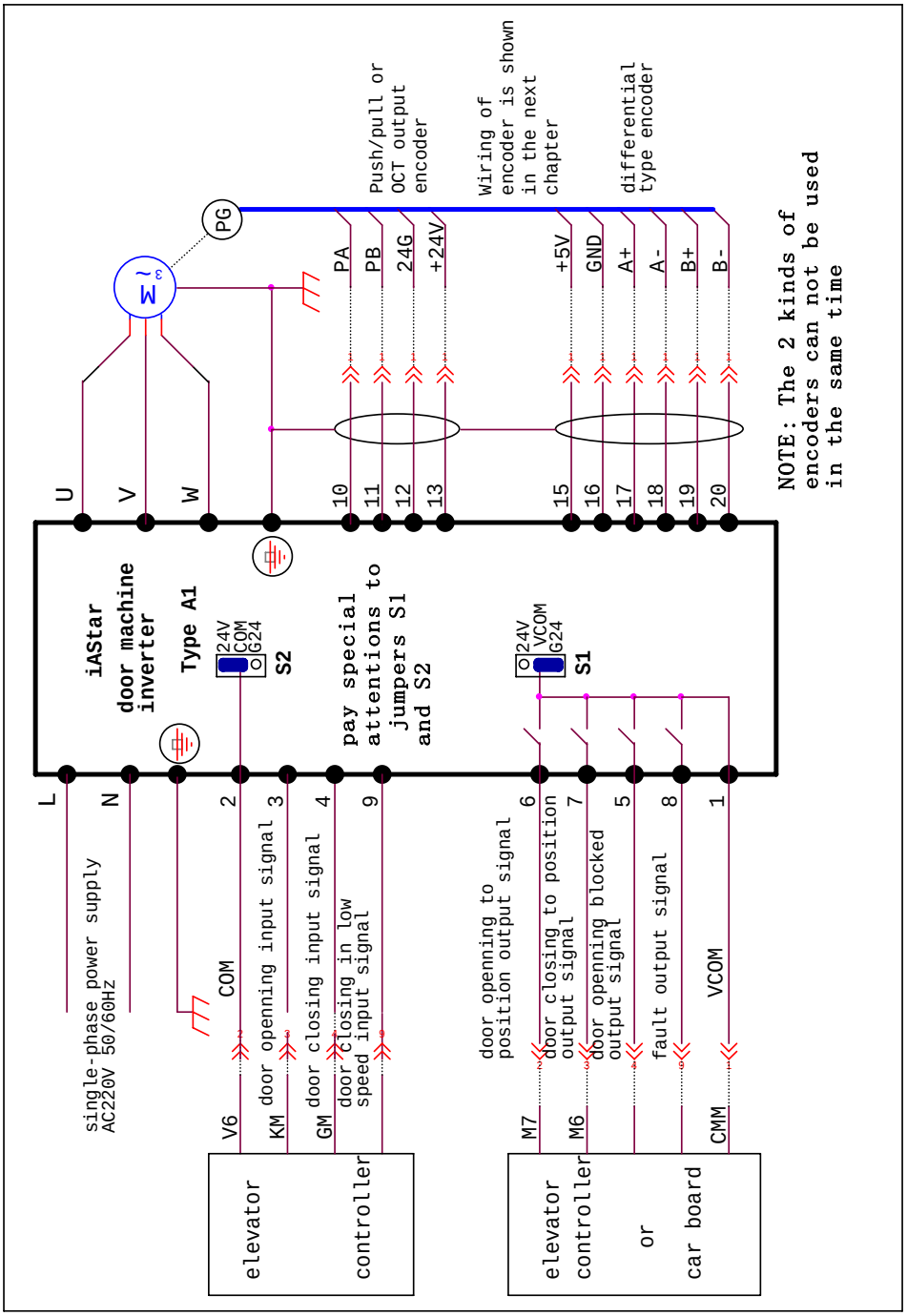


Fig 3-8 Basic diagram of inverter wiring for type A1

3.5.1.2 Wiring specifications of encoder

There are three kinds of encoder input signals for door inverter——encoder of Push/pull, OCT or differential type. Please choose the encoder below 1024 pulse and using 24V power supply.

1） Push/pull or OCT output encoder wiring

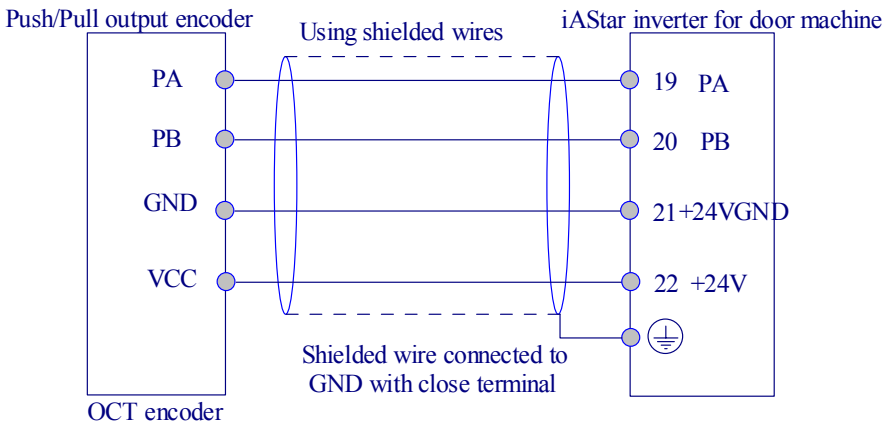


Fig 3-9 diagram of Push/pull or OCT output encoder wiring for Type A1

On the wiring of push/pull or OCT output encoder, the power of encoder should be jointed at +24V terminal, the encoder ground at +24V GND terminal, PA and PB of encoder at PA and PB of inverter, and the close terminal of shielded wire at GND terminal of inverter.⏚。

2） differential type encoder wiring

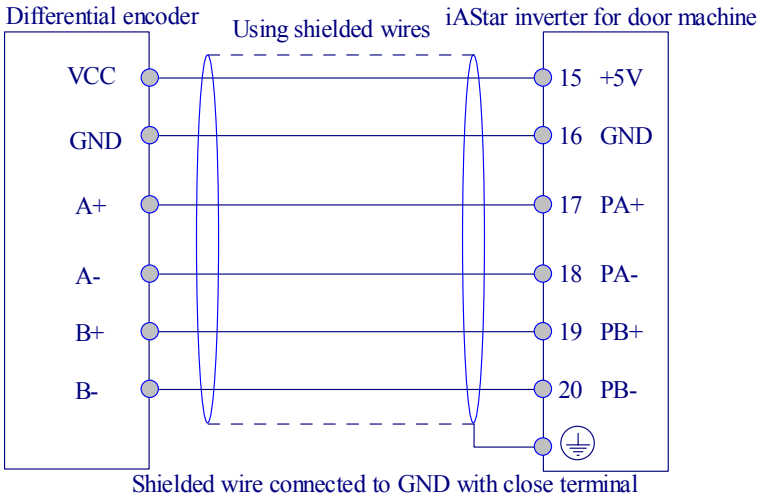


Fig 3-10 diagram of differential type encoder wiring for Type A1

On the wiring of differential encoder, the power of encoder should be jointed at +5V terminal,the encoder ground at +5V GND terminal, A+, A-,B+, B- of encoder at PA+、PA-、PB+、PB of inverter, and the close terminal of shielded wire at GND terminal of inverter.⏚。

3.5.1.3 Description of connection of CAN communication

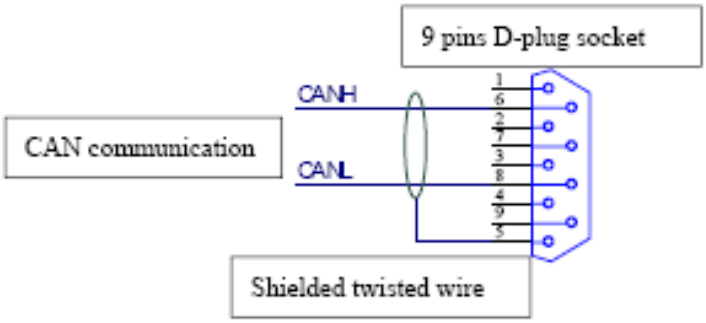


Fig 3-11 diagram of connection of CAN communication for type A1

The communication interface of CAN is at the right side of inverter. The socket is a D type 9 pin. Corresponding wire is a D type 9 bore. Connecting method see the diagram above.

3.5.2 Basic diagram of inverter wiring for Type A2/A3

3.5.2.1 Wiring diagram of main loop and control terminals for Type A2/A3

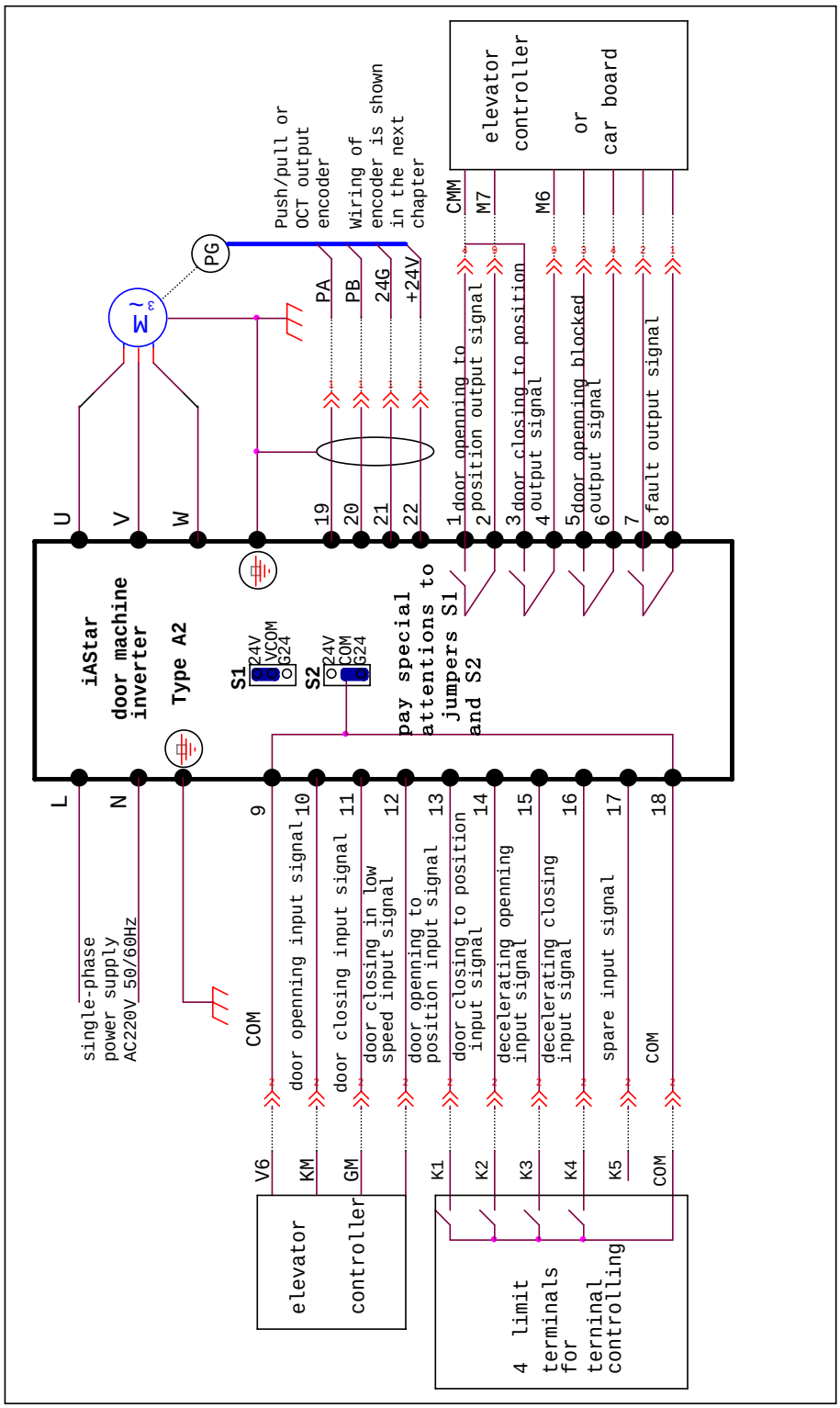


图 3-12 Basic diagram of inverter wiring for type A2/A3

3.5.2.2 Wiring specifications of encoder

There are 2 kinds of encoder input signals for door inverter——encoder of Push/pull or OCT type. Please choose the encoder below 1024 pulse and using 24V power supply.

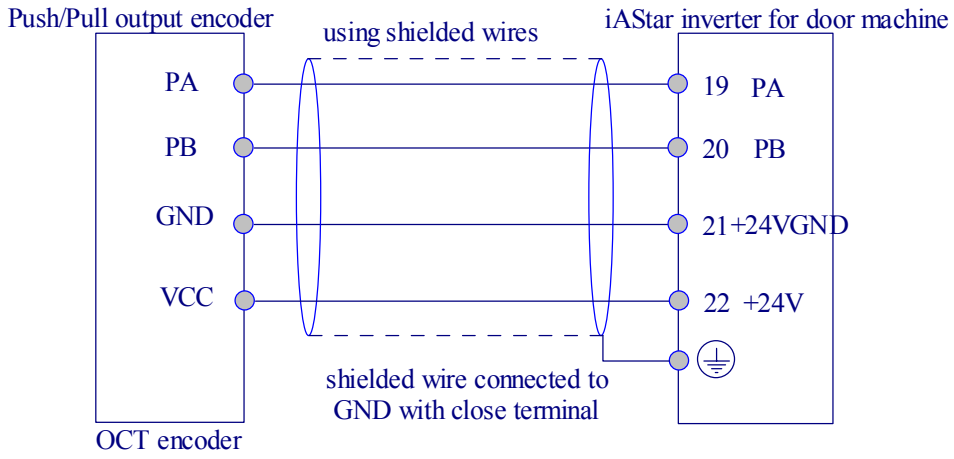


Fig 3-13 diagram of Push/pull or OCT output encoder wiring for Type A2/A3

On the wiring of push/pull or OCT output encoder, the power of encoder should be jointed at +24V terminal, the encoder ground at +24V GND terminal, PA and PB of encoder at PA and PB of inverter, and the close terminal of shielded wire at GND terminal of inverter.⏚。

3.5.2.3 Specification of terminals swich Wiring

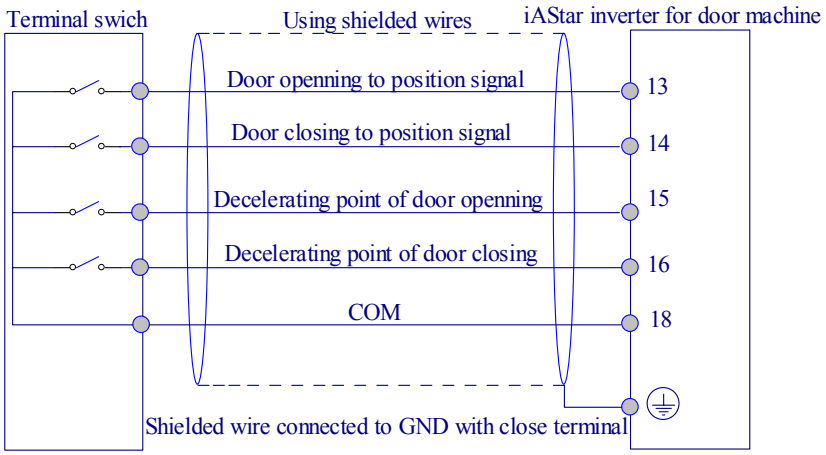


Fig 3-14 diagram of terminals swich Wiring for type A2/A3

The 4 swiches ,door open limit swich,door close limit swich, Deceleration position of openning swich and Deceleration position of closing swich, should be jointed at terminal 13、14、15、16 ,and the other side should be jointed at terminal 18. and the close terminal of shielded wire at GND terminal of inverter.⏚.

3.5.2.4 Description of connection of CAN communication

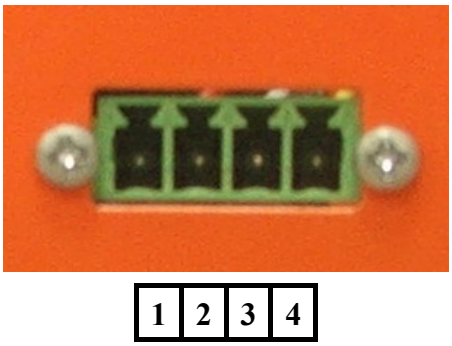


Fig 3-15 diagram of connection of CAN communication for type A2/A3

Table 3-4 Specification of CAN BUS terminals

name	number	Function	Instruction	Signal level
CAN Bus	1	GND	ground	
	2	CANH	High level of CAN BUS input/output	
	3	CANL	low level of CAN BUS input/output	
	4	spare		

The socket of CAN communication is 4 pin. Corresponding wire is 4 bore.Connecting methods see the diagram above.

3.6 Wiring of jumpers

The input signal mode can be changed between common emitter mode (G24 is the common point) and common collector mode (24V is the common point). Picture shows as follows:

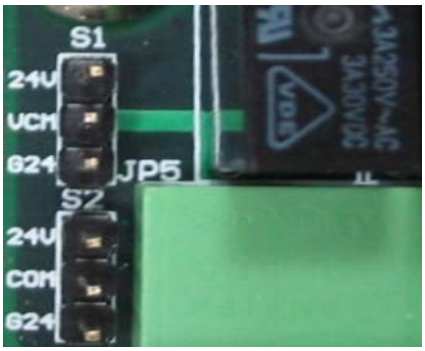


Fig 3-16 diagram of Wiring of S1、S2 jumpers（Type A1）

The functions of jumper S1 and S2 are described below:

Table 3-5 Specification of functions of jumper S1 and S2

name	Terminal mark		
S1	24V	VCM	G24
S2	24V	COM	G24

The power of digital input and relay output signal of the inverter is used interior 24V power supply,and there are two types of setting jumpers according to the different common level (high or low) of terminal COM, and the other ways setting jumpers will lead to the abnormal operation of the circuit.

a) ： Common emitter mode (G24 is the common point), common low level of terminal COM, jumper S1 set to 24V-VCM, and jumper S2 set to COM- G24, the position of the jumper and input schematic drawing shows below:

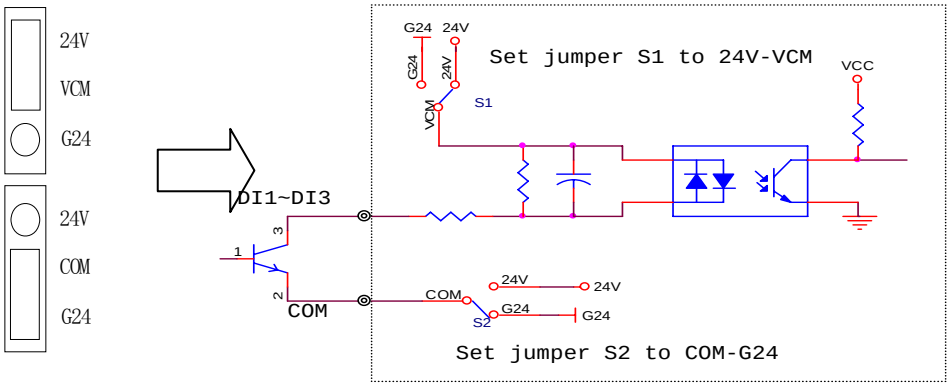


Fig 3-17 Common low-level input of terminal COM

b) ： Common collector mode (24V is the common point), common high level of terminal COM, jumper S1 set to VCM- G24, and jumper S2 set to COM- 24V, the position of the jumper and input schematic drawing shows below

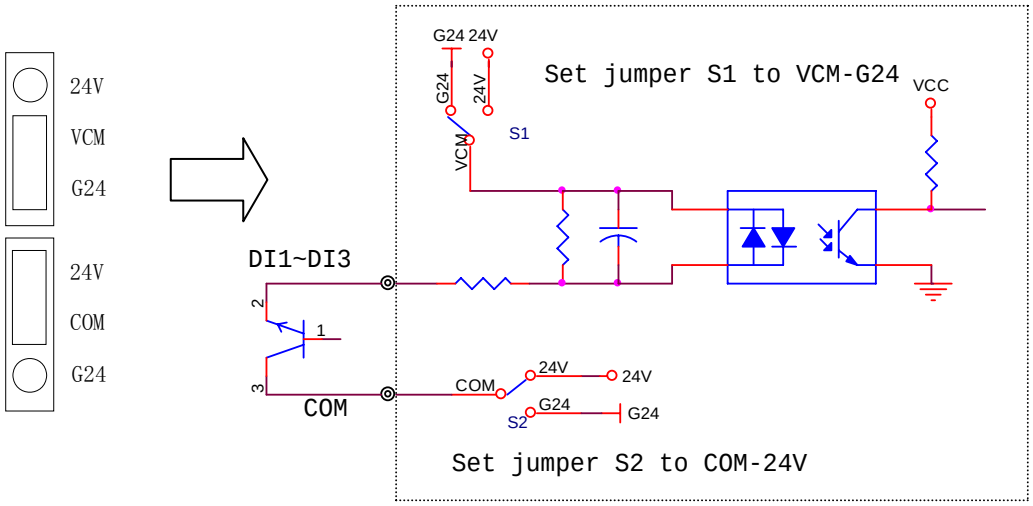


Fig 3-18 Common high-level input of terminal COM

The power of digital input and relay output signal is used exterior 24V power supply: jumper S1 and S2 don't set, and connect 24V to terminal VCM and G24 to terminal COM.

4 Function parameter list

4.1 Function parameter list

Detailed function, parameter range and pre configured parameters are shown in the following form.

Table 4-1 FUNCTION PARAMETER LIST

Function code	Names of parameter	Parameter range	Unit	Factory setting
F00	Version No.&function setting	1/199 / 9999	×	25015
F01	Language selection	0 / 1	×	1
F02	Input mode selection	0 / 1 / 2 / 4 / 99	×	0
F03	Control mode selection	0 / 1 / 2 / 3	×	1
F04	Door width	0 ~ 60000	×	16000
F05	Percentage of door openning	0 ~ 100	%	100
F06	Adjustment of door open limit	0 ~ 400	×	180
F07	Permillage of door open limit	0.0 ~ 100.0	%	99.0
F08	Permillage of door close limit	0.0 ~ 100.0	%	1.0
F09	Not used	×	×	0
F10	Frequency switching point	0 ~ 10.00	Hz	2.00
F11	Low speed of starting to open	0 ~ 300	rpm	70
F12	Low speed of starting to close	0 ~ 300	rpm	60
F13	High speed of openning	0 ~ 1500	rpm	500
F14	High speed of closing	0 ~ 1500	rpm	400
F15	Low speed of stopping to open	0 ~ 300	rpm	30
F16	Low speed of stopping to close	0 ~ 300	rpm	20

Table 4-1 FUNCTION PARAMETER LIST

Function code	Names of parameter	Parameter range	Unit	Factory setting
F17	Acceleration of openning	1 ~ 30	×	6
F18	Deceleration of closing	1 ~ 30	×	4
F19	Acceleration of closing	1 ~ 30	×	4
F20	Deceleration of closing	1 ~ 30	×	4
F21	Deceleration of crash-stop	1 ~ 50	×	10
F22	Crawl distance of openning	1 ~ 30	%	4
F23	Crawl distance of closing	1 ~ 30	%	4
F24	Deceleration point of openning	50 ~ 100	%	67
F25	Deceleration point of closing	1 ~ 50	%	40
F26	Close delay	0 ~ 30000	ms	0
F27	Open delay	0 ~ 30.000	S	0
F28	Speed of closing retiring cam	0 ~ 300	rpm	30
F29	torque limit of closing	1 ~ 300	%	200
F30	Holding torque of openning	0 ~ 30	×	0
F31	Holding torque of closing	0 ~ 30	×	0
F32	Torque boost	0 ~ 30	%	20
F33	Speed of Holding torque	0 ~ 90	rpm	60
F34	V/F low-speed compensating torque	0 ~ 40	%	20
F35	Process of door-blocked	0 / 1 / 2 / 3 / 4 / 5	×	0

Table 4-1 FUNCTION PARAMETER LIST

Function code	Names of parameter	Parameter range	unit	Factory setting
F36	Set Input mode	00000000~ 11111111	×	00000000
F37	Set output mode	0000 ~ 1111	×	1111
F38	Signal enable	0 / 1/ 2 / 3	×	3
F39	Duration of no instruction	0 ~ 600.00	s	0.00
F40	Protecting time of closing-blocked	0.50 ~ 5.00	s	2.00
F41	Terminals protect function	0 / 1	×	0
F42	Gain P at low speed openning	1 ~ 30000	×	10000
F43	Setting of parameter P	1 ~ 30000	×	10000
F44	Setting of parameter I	1 ~ 30000	×	13000
F45	Setting of parameter D	1 ~ 30000	×	819
F46	Carrying frequency	4 ~ 12	kHz	8
F47	Poles of motor	2 ~ 12	pole	4
F48	Rated voltage	200 ~ 250	V	220
F49	Rated speed	0 ~ 3000	rpm	1460
F50	Rated current	0.00 ~ 2.00	A	1.00
F51	Rated output torque	0.00 ~ 2.00	%	1.00
F52	Not used	×	×	0
F53	Direction of encoder	0 / 1	×	0
F54	Pulses of encoder	4 ~ 1023	ppr	500
F55	Motor slip frequency	0.00 ~ 6.00	Hz	3.00
F56	Debug in factory	0 / 1	×	0
F57	Debug in factory	0 / 1	×	0
F58	Debug in factory	0 ~ 3000		0
F59	Not used	0/1	×	0
F60	Not used	×	×	0
F61	Debug in factory			

Table 4-1 FUNCTION PARAMETER LIST

Function code	Names of parameter	Parameter range	unit	Factory setting
F62	Debug in factory			
F63	Not used			
F64	torque compensate Enable	0 / 99	×	0
F65	compensating torque coefficient 1(<2Hz)	10 ~ 50	%	25
F66	compensating torque coefficient 2(<4Hz)	10 ~ 50	%	30
F67	compensating torque coefficient 3(<6Hz)	10 ~ 50	%	20
F68	compensating torque coefficient 4(<8Hz)	10 ~ 50	%	25
F69	compensating torque coefficient 5(<10Hz)	20 ~ 60	%	30
F70	compensating torque coefficient 6(<30Hz)	20 ~ 60	%	35
F71	compensating torque coefficient7(<＝50Hz)	20 ~ 60	%	40
F72~F90	Not used	×	×	0
F91	Default parameter selection	0 ~ 255	×	1
F92~F97	spare	×	×	0
E01~E20	fault1~fault20	0 ~ 9	×	0
P00	Modifying password parameter	0000~9999	×	×

4.2 monitor parameter list

Detailed function of monitor PARAMETER LIST are shown in table 4-2

Tables 4-2 monitor PARAMETER LIST

Function code	Name of parameters	unit
U00	Feedback speed	rpm
U01	Preset speed	rpm
U02	Temperature of radiator	℃
U03	Speed difference	rpm
U04	Output current	A
U05	Torque difference	%
U06	Output Torque	%
U07	Voltage of DC main loop	V
U08	Door width of real time running	p
U09	Current position of door	p
U10	Percentage of openning	%
U11	Input signal	×
U12	Output relay	×
U13	spare	
U14	spare	
U15	spare	
L00	Log in input parameter	×

5 specifications of function parameters

Detailed specifications of function code and parameter setting:

F00 Version display Range：1/199/9999

Display the soft version of inverter.

F00 = 1，clera current torque holding.

F00 = 199，parameter saving, set F00=199 to save parameters each time after you change them, otherwise the parameters will return to the original value before your changing after the power is off. The soft version will display after your setting.

F00 = 9999，all parameters resets to factory setting. Then function parameter resets to display the soft version.

F01 Language selection range：0/1

F01 = 0，English

F01 = 1，Chinese

F02 Input mode selection range：0/1/2/4/99

F02 = 0，Input running signals from external terminals

F02 = 1，Input running signals from CAN BUS

F02 = 2，nput running signals from operator panel

F02 = 4，automatic run（only for factory test）

F02 = 99，Self-learning width of door

Note：When F03 = 0 / 1 / 2，set F02=99 to start self-leaning；If F03 = 3，self-leaning will not proceed. Set F00=199 after self-leaning to save the parameters.

F03 Control mode selection range：0/1/2/3

F03 = 0，encoder vevtor control mode，encoder pulses≧200ppr

F03 = 1，encoder V/F control mode, excluding openning or door close limit signals, encoder pulses≧20ppr

F03 = 2，encoder V/F control mode, including openning and door close limit signals, encoder pulses≦20ppr

F03 = 3，terminals V/F control mode, including 4 swiches（limit position of door openning and closing, decelerating of door openning and closing）

F04 Door width range：0-60000

Served in pulse parameter setting matching door-width obtained in self-learning.

F05 Percentage of door openning range：0-100

Percentage of door openning distance in door width.

F06 Adjustment of door open limit range：0-400

0 ≦F06 < 200，door-openning position<learnt door width

F06= 200，door-openning position= learnt door width

200 < F06 ≦ 400，door-openning position>learnt door width

F07 Percentage of door open limit range：0-100.0

When door opening to door width F07, Relay of door open limit will work, and the door continues opening to real point of opening to position.

F08 Percentage of door door close limit range：0-100.0

When door closinging to door width F08, Relay of door door close limit will work, and the door continues closing to real point of door close limit.

F09 Spare

F10 Frequency changing point range：0-10.00

changing point of low speed and high speed Frequency in Closed loop control。

F11 Low speed when door starts to open range：0-300

The rotary speed of motor when door starts to open at a low speed

F12 Low speed when door starts to close range：0-300

The rotary speed of motor when door starts to close at a low speed

F13 High speed when door starts to open range：0-1500

The rotary speed of motor when opening door at a high speed

F14 High speed of closing door Setting range: 0-1500

The rotary speed of motor when closing door at a high speed.

F15 Low speed of stopping to open the door(the speed of opening door at a low speed after energized) range：0-300

The rotary speed of motor to open the door at a low speed when the door-opening deceleration signal is effective in the door-opening course.

F16 Low speed of stopping to close the door(the speed of forcing closing door at a low speed range：0-300

The rotary speed of motor to close the door at a low speed when the door-closing deceleration signal is effective in the door-closing course.

F17 Acceleration of opening door range：1-30

Acceleration of rising segment in the door-opening curve when door is opening.

F18 Deceleration of opening door range：1-30

Deceleration of declining segment in the door-opening curve when door is opening.

F19 Acceleration of closing door range：1-30

Acceleration of rising segment in the door- closing curve when door is closing.

F20 Deceleration of closing door range：1-30

Deceleration of declining segment in the door-closing curve when door is closing.

F21 Deceleration of crash-stop range：1-50

Deceleration of declining segment in the door-closing and door-opening curve when door is closing and opening.

F22 Crawl distance of opening door range：1-30

The percentage of the starting segment indoor-opening curve and door width.

F23 Crawl distance of closing door range：1-30

The percentage of the starting segment indoor-closing curve and door width.

F24 Deceleration position of door openning range：50-100

The percentage of the declining segment in door-opening curve and door width.

F25 Deceleration position of door closing range：1-50

The percentage of the declining segment in door-closing curve and door width.

F26 Close delay range：0-30000

If the Colse signal is issue，The door will close after F26.

F27 Open delay range：0-300.00

If the Open signal is issue，The door will open after F26.

F28 Speed of closing retiring cam range：0-300

Rotate speed of closing retiring cam when the signal of door open limit is given

F29 Limit Torque of door closing range：1-300

In the case of Door-blocked or person-nipped, the inverter will open the door first then close the door. The smaller you set to the parameter of limit Torque of door closing , the more sensitive protect will be.But if the parameter was set too small, Door-blocked protect would work frequently

F30 Holding Torque of door opening range：0-30

To setting the value of holding torque of door opening, the bigger the value is, the bigger the holding torque is.

F30 = 0，Opening door without holding torque. The inverter stops after the door opens to position.

F30 = 1～30%，The inverter continues to open the door at the door-opening speed, until there is a closing signal.

F31 Holding Torque of door closing range：0-30

To setting the value of holding torque of door closing, the bigger the value is, the bigger the holding torque is.

F31 = 0，Closing door without holding torque. The inverter stops after the door

closes to position.

F31 = 1～30%, The inverter continues to close the door at the door-closing speed, until there is a opening signal.

F32 Torque boost range：0-30

Inverter torque setting, compensating torque at lower frequency（less than10Hz）

Note：F31 and F32 are set based on the holding torque and rated current of motor. If lasting too long, motor may burn out.

F33 Speed of holding Torque of door closing and openning range：0-90

Set the speed when holding Torque of door closing and openning；Factory setting is 60，Do not change it unless it is needed

F34 v/f compensating torque at low speed range：0-30

compensating torque at low speed in mode v/f

Note：F4 is set based on the holding torque and rated current of motor. If it is set too big , Noise of motor may occur,and if it is set too small, High speed can not be pulled up.

F35 Set of solutuio for door-blocked range：0/1/2/3/4/5

When door is blocked, inverter will work as following:

F35 = 0：stop output，closing door is forbidden，shield the closing instruction of PC

F35 = 1：shield the closing instruction of PC for 3 seconds, then respond it

F35 = 2：shield the closing instruction of PC for 5 seconds, then respond it

F35 = 3：shield the closing instruction of PC for 10 seconds, then respond it

F35 = 4：shield the closing instruction of PC for 20 seconds, then respond it

F35 = 5：shield the closing and opening instruction of PC, then execute the openningaction in reverse automatically

Note：inverter will respond the opening instruction of PC immediately whatever F35 is.

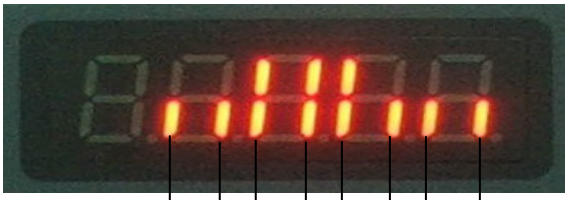
F36 Set input mode range：00000000~11111111

Parameter F36 is binary，the 0～7 digit and input point INPUT0~INPUT7 correspond，setting 0（short upright）means NO input point，setting1（long upright）means NC input point.

***Note：If the control mode of inverter is* V/F，Please set parameter F36 first.**

For Type A1, parameters F36.0 ~ F36.2are available，others are void

For Type A2/A3, parameters F36.0 ~ F36.7are available，others are void



F36.0：openning door input signal

F36.1：closing door input signal

F36.2：closing door in slow input signal

F36.3：door open limit signal

F36.4：door close limit signal

F36.5：decelerating opening signal

F36.6：decelerating closing signal

F36.7：spare

F37 **S**et output mode range：0000～1111

Parameter F37 is binary，the 0～3 digit and relay output INPUT0~INPUT7 correspond，setting 0（short upright）means NO relay output，setting1（long upright）means NC relay output.

F37.0：door open limit relay output

F37.1：door close limit relay output

F37.2：closing-blocked relay output

F37.3：fault relay output

F38 **T**erminal spare signal range：0-255

F38 = 0：terminal spare is forbidden

F38 = 1：terminal spare is used as floor input

F38 = 2：terminal spare is used as later door input

F38 = 3：if terminal spare has signals, output of inverter is forbidden

This setting can be used for testing. Input INPUT8（connect 17 and 18）then modify the parameter,save it. Disconnect 17 and 18, then inverter will work normally

F39 **D**uration of No instruction range：0-600.00

No instruction：means that inverter receives no input signals

F39 = 0，duration of No instruction is limitless；

F39 = 0.01 ~ 600.00，duration of No instruction reaches the set value，close tahe door in low speed automatically。

F40 Protecting time of closing-blocked range：0.50-5.00

If F40 was set too small, door closing-blocked protect would work frequently,on the contrary, door closing-blocked protect will not work

F41 Ternimals protect function range：0/1

F41 = 0 terminals protect function is available，F41 = 1 terminals protect function is void。

F42 Gain P at low speed openning range：0-30000

Setting parameter P of door opening in low speed proportion gain in PID control

F43 Setting of parameter P range：0-30000

Setting parameter P of proportion gain in PID control

F44 Setting of parameter **I** range：0-30000

Setting parameter I of integral gain in PID control

F45 Setting of parameter **D** range：0-30000

Setting parameter D of differential time in PID control

F46 Carrying frequency range：4-12

PWM Frequency setting, the higher the PWM Frequency is, the less the inverter noise and the better the current waving will be, but waste will go up. It can be set according to the user's needs.

F47 Motor poles range：2-12

Driving motor rated voltage, please set according to the nameplate parameters of the driving motor.

F48 Rated Voltage range：200-250

Driving motor rated voltage, please set according to the nameplate parameters of the driving motor.

F49 Motor rated speed Range range：0-3000

Driving motor rated speed, please set according to the nameplate parameters of the driving motor.

F50 Rated current range：0.00-2.00

Driving motor rated current, please set according to the nameplate parameters of the driving motor.

F51 Rated output torque range：0.00 ~ 3.00

Set rated output torqueof motor.

F52 Spare

F53 **D**irection of encoder range：0 / 1

F53 = 0，same as the motor running direction

F53 = 1，opposite to the motor running direction

F54 **E**ncoder pulse range：4-1023

Encoder setting, number of pulse per rotate of the encoder. Encoder parameters must be correctly set in order to guarantee the good performance of the inverter.

F55 **M**otor slip frequency range：0.00-6.00

Motor slip frequency caculated acoording to the nameplate parameters of the driving motor.

Synchronous rotate speed of motor：

pole	2	4	6	8	10	12
Synchronous rotate speed /Hz(rpm)	60	30	20	15	12	10

example：shown on the nameplate of motor：20Hz / 530rpm

real rotate speed of motor is 530/20=26.5rpm。according to the table above, choose value that close to the caculates value , calculate as the following:

pole of moter is 4，real Synchronous rotate speed of motor is 30rpm，rotate differences of motor is 20×30－530＝70rpm，so the rotate differences frequency of motor is 70/30=2.33Hz。

F56 **D**ebugging select (factory set)

F57 **D**ebugging running direction (factory set)

F58 **D**ebugging running speed(factory set)

F59 **T**est method(factory set)

F64 **E**nable compensating torque range：0/99

F64=0： F65~F69 void；

F64=99：F65~F69 vailable。

F65 **C**ompensating torque coefficient 1 range：10~50

compensating torque in low speed（<2Hz） in mode V/F

F66 **C**ompensating torque coefficient **2** range：10~50

compensating torque in low speed（<4Hz） in mode V/F。

F67 **C**compensating torque coefficient **3** range：10~50

compensating torque in low speed（<6Hz） in mode V/F。

F68 **C**ompensating torque coefficient **4** range：10~50

compensating torque in low speed（<8Hz） in mode V/F。

F69 **C**ompensating torque coefficient **5** range：20~60

compensating torque in low speed（<10Hz） in mode V/F。

F70 **C**ompensating torque coefficient **6** range：20~60

compensating torque（<30Hz） in mode V/F

F71 **C**ompensating torque coefficient **7** range：20~60

compensating torque（≦50Hz） in mode V/F

parameter F64 ~ F71 needn't to be modified commonly，in the case of F03 = 1/2/3，if door shakes badly,modify F64 ~ F71 in order to reduce shake。

F91 **R**eset parameters select range：0~255

For some type of the door system, you can set F91 to suit the parameters to your system.This can reduce the difficulties，sometimes can realize free of debugging indeed，Make users feel convenient.

example:

F91 = 0：reset parameters to test system

F91 = 1：reset parameters to lab system

Set as the followings ：

(a) Turn on the power，set F91 ＝ x according to different systems；

(b) Set F00 = 199 and save it；

(c) Set F00 = 9999 to reset parameters；

Then the parameters are reset to your need. Operating by the parameters, free of debugging, You will have the perfect performance.You can also adjust the parameters if needed

P00 **M**odifying password parameter range：0000-9999

Modifying your login password, Please fix your password after modifying

6 Hand-held operator

6.1 Introductions

The Hand-held operator suits Type **A1** only。

The Hand-held operator can be used to set parameters of the inverter,display door machine status and function the parameters. It is a basic tool to operate inverter. Basic operation of The Hand-held operator is fully described in this chapter

6.1.1 Outline drawings of Hand-held operator

Fig 6-1 outline drawings of Hand-held operator

▼ LED indicator

There are 4 LED indicators on the upside of the operator, running indicator, door-openning indicator, door-closing indicator and fault indicator. Indication of the elevator status are shown in Table 6-1

Table 6-1 indication of the elevator status

Elevator status	running indicator	door-openning indicator	door-closing indicator	fault indicator
Door openning	on	on	off	off
Door closing	on	off	on	off
fault	off	off	off	blink

“fault indicator”has the function of lock, only after fault was clear

▼ LED nixie tube

There are 4 LED nixie tube on the upside of the operator, displaying the current rotate speed of the inverter.

▼ LCD monitor

Middle part of the operator is a LCD monitor, being used to set parameters and display the running parameters

▼ Keyboard

There are 9 keyss on the operator 。functions are shown in table 6-2。

Table 6-2 key functions

key	name	function
>	right	In mode 【running state】，5 is increment function select code；in mode 【Function Select】，10 is increment function select code；in mode 【Para Revises】，move cursor to the right bit。
<	left	In mode【running state】，5 is decrement function select code；In mode【Function Select】时，10 is dencrement function select code；In mode【Para Revises】，move cursor to the left bit。
^	up	In mode【Function Select】，Used to select the previous function code；In mode【Para Revises】，Used to add the value of the selected parameter。
v	down	In mode【Function Select】，Used to select the next function code；In mode【Para Revises】，Used to decrease the value of the selected parameter.
ENTER	enter	Used to enter【Function Select】mode from【Run State】mode or enter【Para Revises】mode from【Function Select】mode; Used to validate the modification in 【Para Revises】 mode.
ESC	esc	Used to return to【Run State】mode from【Function Select】mode or return to【Function Select】mode from【Para Revises】 mode.
F1	F1	In mode 【Function Select】 used to select password available or not。When password enabled， it needn't to be keyed from mode【running state】to mode 【Function Select】; When password disabled， it needn to be keyed from mode【running state】to mode【Function Select】;（void operating after power off）
F2	F2	Used to adjust the LCD brightness in【Run State】mode.

F3	F3	Changing password in mode 【Function Select】,press F3 to enter interface of password modifying
		Key your new password, then press enter to confirm，modifying succeed will appear. Available password range is **0～9999**。

6.1.2 Operation

The digital operator displays【software version of operator】, 【Init Menu】a few seconds after power on

▼ **Power** On and Initialization

The process of initialization will last about 5 seconds after power on. After initialization , the digital operator enters【Run State】mode.

▼ **Operation Mode**

Besides【Init Menu】, the digital operator provides three operation modes of 【Run State】, 【Function Select】and【Para Revises】.

▼ 【running state】

【Run State】mode is used to display 16 real-time parameters of inverter. Pay attention that those parameters cannot be modified but displayed. Table 6.3 describes the function codes and names of those parameters.

Table 6-3 parameter names and function codes

Function Code	Function Name	Instruction	Unit	Factory setting
U00	Feedback Speed	Monitor of the motor feedback speed	rpm	×
U01	Reference Speed 0	Speed setting values instruction 0	rpm	×
U02	Temperature of radiator	Monitor Temperature of radiator	℃	×
U03	Speed deviate	Deviation between the Feedback Speed and Reference Speed Values	rpm	×
U04	Output Current	Monitor of the output current	A	×
U05	Torque offset		×	×
U06	Output Torque	Monitor of the output torque of vector control	%	×

U07	DC BUS Voltage	Monitor of the DC voltage of inverter interior main loop	V	×
U08	Door width of real time running	Door width of real time running	P	×
U09	Current position of door	Current position of door	P	×
U10	Percentage of openning	Percentage of openning	%	×
U11	Input DI1- DI12	Confirm input status of terminals DI1- DI8 U11 = 00000000 DI1：input signal of door openning DI2：input signal of door closing DI3：signal of door closing in low speed DI4：signal of door open limit DI5：signal of door door close limit DI6：signal of decelerating openning DI7：signal of decelerating closing DI8：spare	×	×
U12	Output DO1-DO6	Confirm output status of terminals DO1- DO4 U12＝000000 DO1：door door open limit DO2：door door close limit DO3：door closing blocked DO4：fault signals	×	×
U13	spare		×	×
U14	spare		×	×
U15	spare		×	×

▼ As shown in the following Fig, In【Run State】mode LCD will display "Run State "in the first line, function register in the second line, parameter function codes and value in the third line and parameter names in the fourth line.

Running state =F2 adjust constrast= U00= 0.0 rpm Feedback speed	line 1: display current state line 2: display function register line 3: display function code and value line 4: display function name

1）press "  "or"  "to select parameters to be displayed。

2）press "  " to enter interface of password modifying，initializationpassword is：**1234**

In the interface of password login, if password is correct, you will enter the menu of door machine inverter

note：please fix your password。

▼ The【Function Select】mode is used to choose function code. Operator provides 117 function codes. Function codes are described in chapter 5.

Under【Function Select】mode, LCD displays menu name in the first line, function register in the second line, parameter function codes and value in the third line and parameter names in the fourth line.

Press "RIGHT" key or "LEFT" key to choose function code

Under【Function Select】mode, press "ESC" key to return to【Run State】mode, or press "ENTER" key to enter【Para Revises】mode.

▼ 【Para Revises】

The【Para Revises】mode is used to modify the selected parameter. The setting range of each parameter will be described in detail in chapter 8. In【Para revises】mode, the displaying in LCD is the same with【Function Select】mode, but please note that in this mode a cursor will occur underneath the displayed parameter values to indicate which bit to be modified.

Please move the cursor by pressing the key of "RIGHT" or "LEFT" to select the bit to be revised;

Press the key of "+"or "-" to increase or decrease the selected bit respectively;

Press "ESC" key to return to【Function Select】mode.

Please note that you should validate your modification valid by pressing "ENTER" key, otherwise your modification will be ineffective.

6.1.3 Fault Indication

When fault occurs in inverter, the “fault” indicating lamp will blink and the fault code and type will be displayed in LCD. Fault codes and types are shown in Table 6-4.

Table 6-4 Fault code and name

Function code	Fault Type	content
E01 ～E20	1 ～ 8	Shown in table 8-1

6.2 panel operator

6.2.1 Outline drawing of panel operator

The panel operator suits Type A2/A3 only。

outline drawing of panel operator is shown as fig 6-2, including a 5 digits 7 codes nixie tube and 6 keys。

Fig 6-2 **outline drawing of panel operator**

6.2.2 Keyboard of panel operator

6.2.2.1 Keyboard

The keyboard of **panel operator is shown as** fig 6-3

The keyboard contains 4 direction key and 1 ESC key, 1 ENTER key

The following functions can be realized through the 6 keys

Browse parameter U；

- Function of System password login function：input correcte password in parameter L, enter parameter F to parameter browses and Para Revises。

  initialization **password：1234**

- Function of browsing fault；
- Display fault in real time；
- Function of opening and stop openning；

- Function of closing and stop closing；

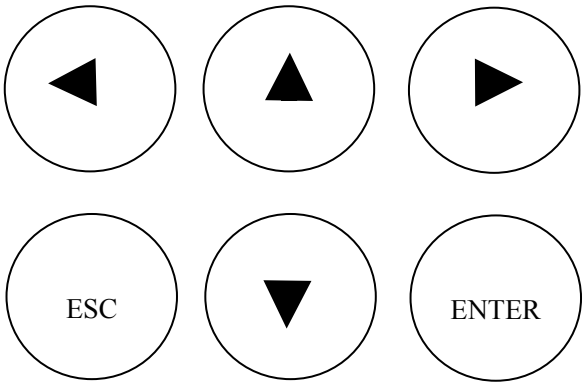


Fig 6-3 key distribution

6.2.2.2 Key functions

the panel operator provides three operation modes of【Para browse】,【value display】 and【Para Revises】.

function of keys is shown as following：

- ENTER：

In interface【Para browse】 of parameter U，press ENTER to display function code and the corresponding function value；

In interface【Para browse】of parameter L，press ENTER to enter input password interface；

In interface 【Para browse】of parameter P，press ENTER to enter modifying password interface；

In interface 【Para browse】 of parameter F，press ENTER to enter interface of 【Para browse】 of parameter F；

In interface【Para browse】 of parameter F，press ENTER to enter interface of 【Para Revises】 of parameter F；

In interface 【Para browse】of parameter F，press ENTER to confirm the modification

- ESC：

In interface of 【Para Revises】, press ESC to abort modifying and return to interface of 【value display】

In interface of 【value display】，press ESC to return to 【Para browse】

In interface of【Para browse】press ESC to return to interface U0000。

♦ up/down ：

In interface of【Para browse】, used to swich the parameter code , press up Increase 1, press down decrease 1

In interface of 【Para Revises】, used to modifying parameter value press up Increase 1, press down decrease 1

Left / right ：

In interface of【Para browse】and F02≠2，press right Increase 10, press left decrease 10

In interface【Para browse】of parameter U and F02＝2, input running medetooperator panel，long-pressing right means door closing, long-pressing left means door opening, releasing key means stopping

In interface of 【Para Revises】 pressing right means Moving right by one item, pressing left means Moving left by one item.

6.2.2.3 Display of panel operator

Panel operator will debug fault information and display it in real time,

In interface of 【Para Revises】，value being modifying is blink

Information is shown as following：

1、display fault code

Display form：E xxxx

E：fault

xxxx： fault number（1~20）

parameter information of fault：xxxx（fault code）

2、display monitor state

display form：Uxxxx

xxxx: state code（0~15）

parameter display form：xxxxx

value of U11，U12 is binary，display form：xxxxxxxx

long upright means 1，short upright means 0

3、display code parameter L

display form：L0000

4、browse and steup of parameter F

display form：Fxxxx

xxxx:code number（0~97）

parameter display form：xxxxx

value of F36，F37 is binary，display form：xxxxxxxx

long upright means 1，short upright means 0

5、display code parameter P

display form：P0000

6、state of opening and closing

display form：CL xxx:

CL：closing

parameter display form：xxx: percentage of closing（0~99）

display form：OP xxx:

OP：openning

parameter display form：xxx: percentage of openning（0~99）

ps：

L： Login

P： Password

E： fault mark

U： monitor state mark

F： F parameter mark

CL：Mark of closing

OP：Mark of openning

6.2.3 List of parameter U of panel operator

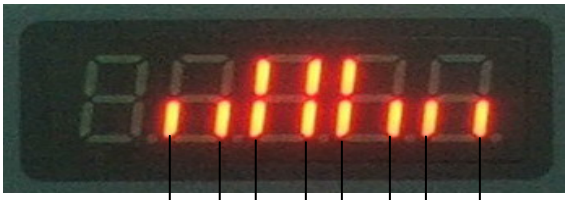
Parameter U is used to display 16 real-time parameters of inverter. Pay attention that those parameters cannot be modified but displayed. Table 6.5 describes the function codes and names of those parameters.

表 6-5 list of parameter U

Function Code	Function Name	Instruction	Unit	Factory setting
U00	Feedback Speed	Monitor of the motor feedback speed	rpm	×
U01	Reference Speed	Speed setting values instruction 0	rpm	×
U02	Temperature of radiator	Monitor Temperature of radiator	℃	×
U03	Speed deviate	Deviation between the Feedback Speed and Reference Speed Values	rpm	×
U04	Output Current	Monitor of the output current	A	×
U05	Torque offset		×	×
U06	Output Torque	Monitor of the output torque of vector control	%	×
U07	DC BUS Voltage	Monitor of the DC voltage of inverter interior main loop	V	×
U08	Door width of real time running	Door width of real time running	P	×
U09	Current position of door	Current position of door	P	×
U10	Percentage of openning	Percentage of openning	%	×
U11	Input signal	Next page	×	×
U12	output signal	Next page	×	×
U13	spare		×	×
U14	spare		×	×
U15	spare		×	×

U11 display monitor of input signals

U11 **monitor the state of input signals**， U11 = 00000000。the 0～7 digit and input point INPUT0~INPUT7 correspond， 0（short upright）means no input point，1（long upright）means having input point.



INPUT 0：Openning door input signal

INPUT 1：Closing door input signal

INPUT2：Closing door in slow input signal

INPUT 3：Door open limit signal

INPUT 4：Door close limit signal

INPUT 5：Decelerating opening signal

INPUT 6：Decelerating closing signal

INPUT7：Spare

U12 display monitor relay output

monitor state of relay output，using binary，U12＝0000。the 0～3 digit and input point INPUT0~INPUT3 correspond， 0（short upright）means no relay output，1（long upright）means having relay output.

OUTPUT0：Door open limit relay output

OUTPUT 1：Door close limit relay output

OUTPUT 2：Closing-blocked relay output

OUTPUT 3：Fault relay output

6.2.2.4 Example of Setting Parameter

This section describes the method of operation of password login and password modifying. The initialization password is **1234.** after Power On and Initialization , The inverter displays parameter U0000, press down key to turn to parameter L , Press enter key to enter password login L0000. input correct password to enter interface F0000。If there is on operation over 15 minutes, enter parameter F,password will be needed.

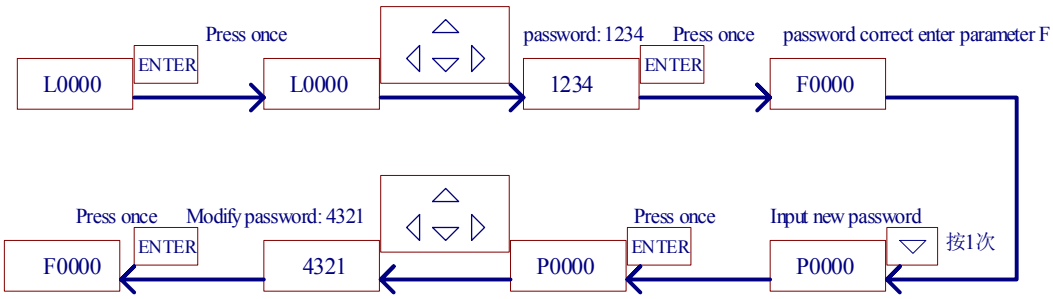


Fig 6-4 Flow chart of password log in and modifying

Setting selection of input mode and operating door closing and opening by keys are shown in fig 6-5。

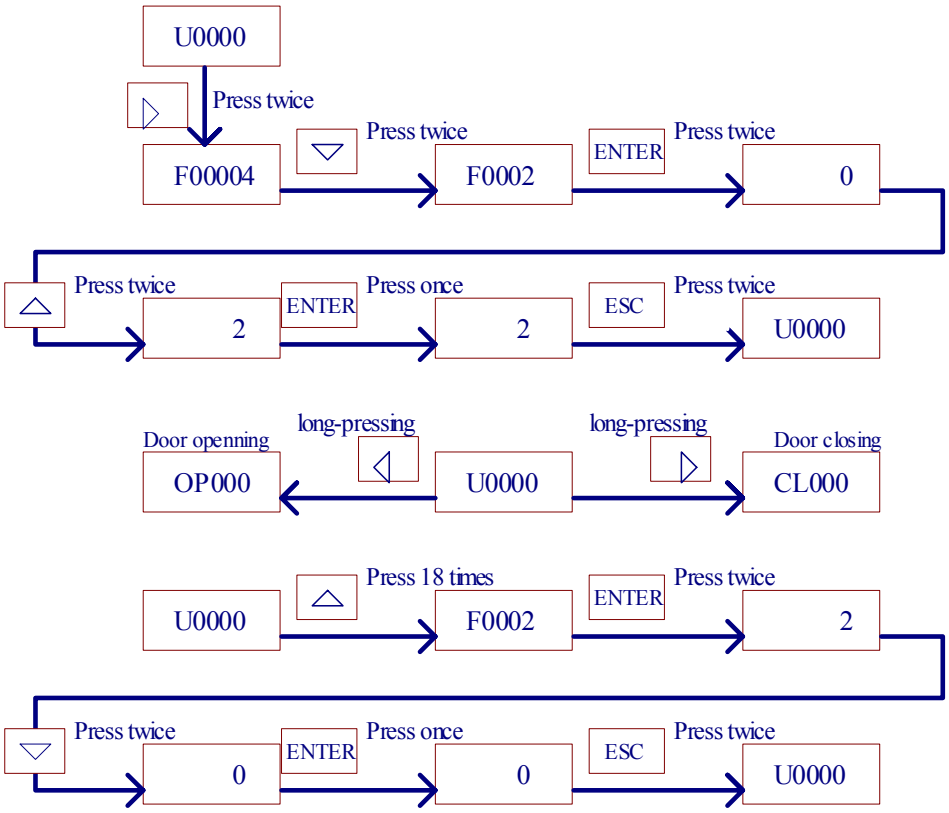


Fig 6-5 Flow chart of parameter setting and operation

6.3 Using of PC software

The software is mainly used to set the parameters of door machine.Type A1

Connect door machine inverter (port 232) with PC (port 232)

a)Run SESCS_Door.exe and go into the main interface, showing as follows:

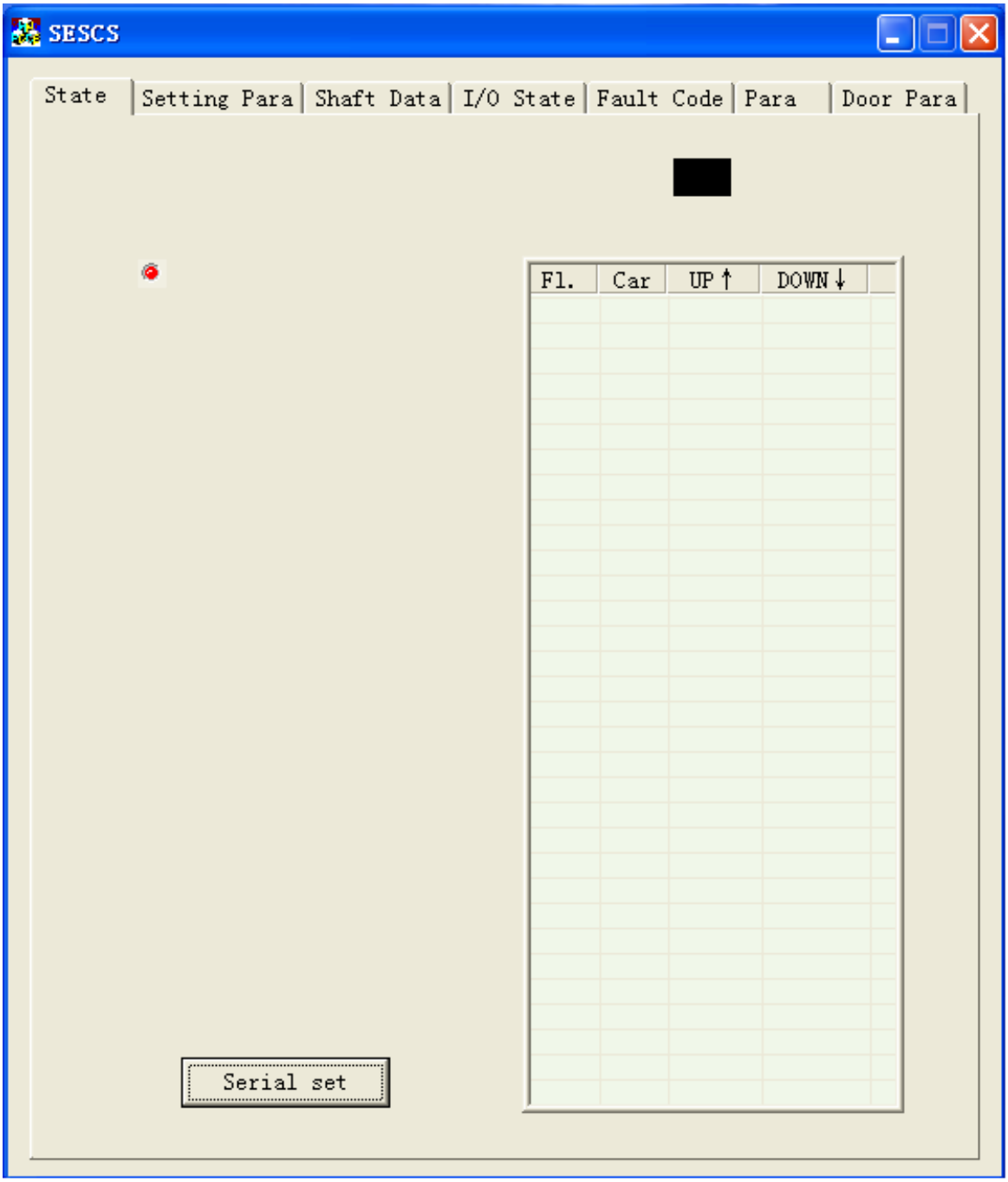


Fig 6-6 main interface of software

b) Click ‘serial port and special code set’, go into the serial port setting interface, showing as follows:

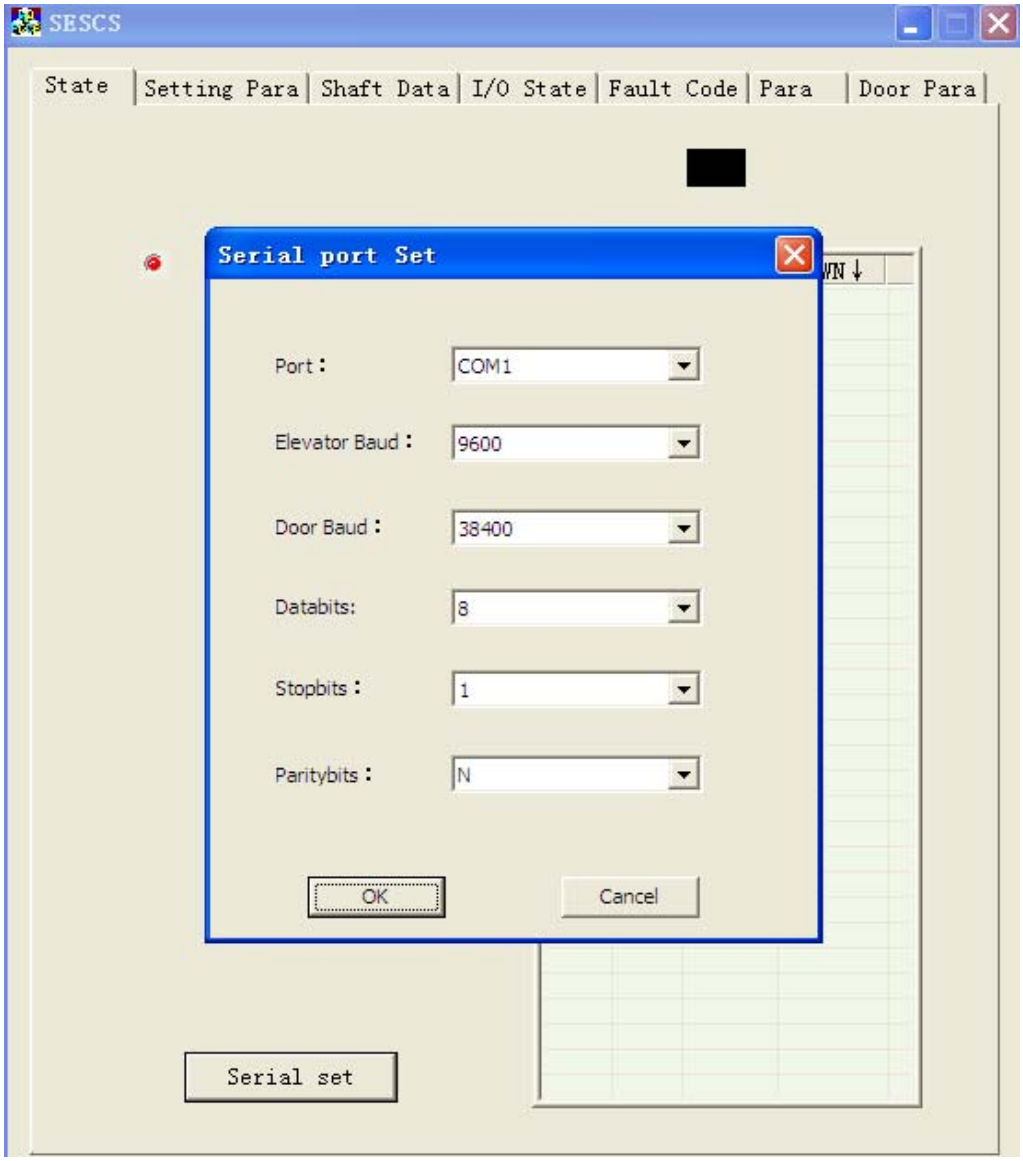


Fig 6-7 communication parameter setting interface of software

port:：according to your PC

elevator baud rate：default： 9600；

door machine baud rate：default 38400；

digital bit：8；

stop bit：1；

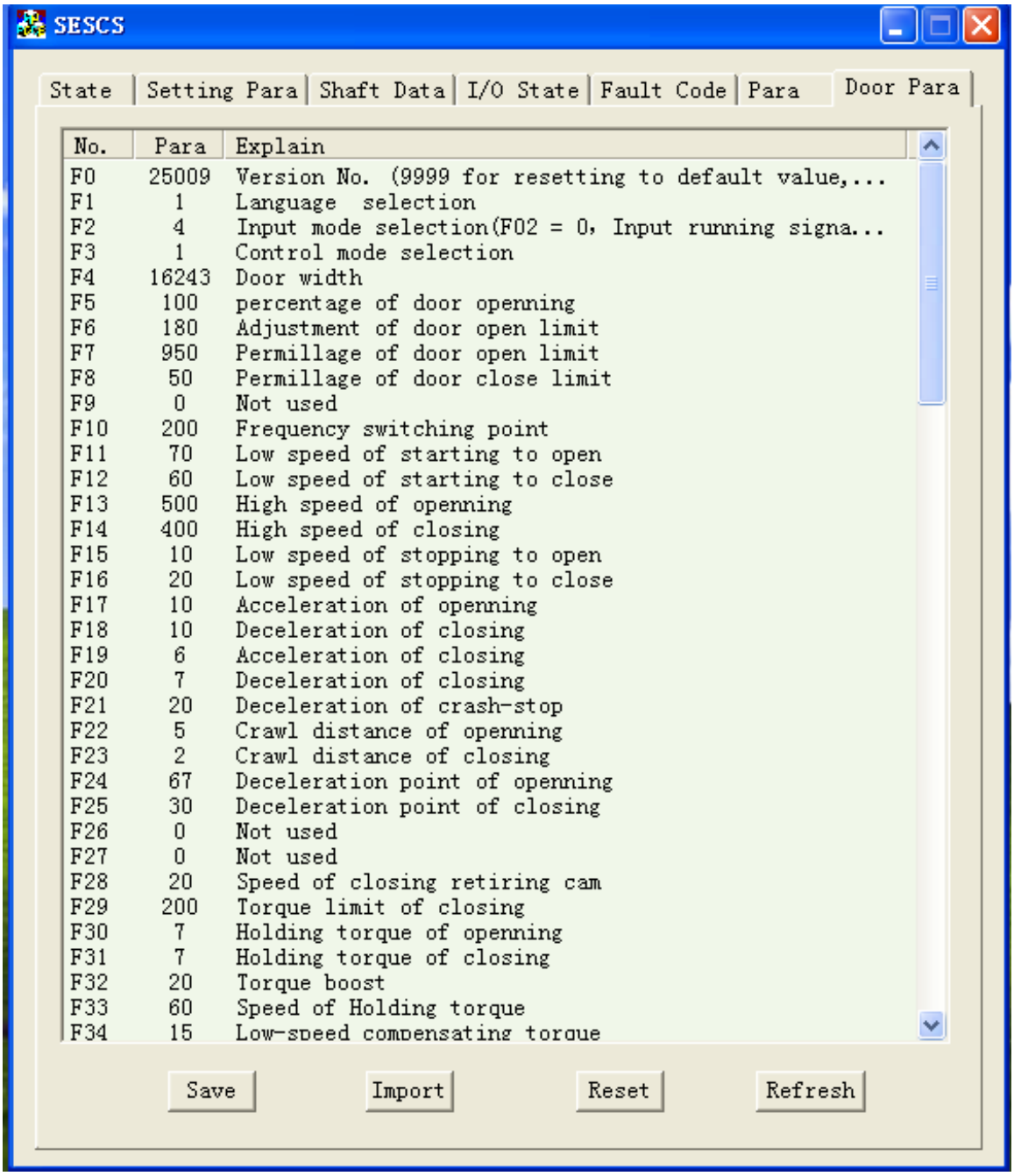
verifying bit ：none；

special code ：choose one at will。

Setting finished, click ‘submit’.。

a) Click ‘door machine parameter’ on the right up corner, go into the machine parameter

setting interface, showing as follows



No.	Para	Explain
F0	25009	Version No. (9999 for resetting to default value,...
F1	1	Language selection
F2	4	Input mode selection(F02 = 0, Input running signa...
F3	1	Control mode selection
F4	16243	Door width
F5	100	percentage of door openning
F6	180	Adjustment of door open limit
F7	950	Permillage of door open limit
F8	50	Permillage of door close limit
F9	0	Not used
F10	200	Frequency switching point
F11	70	Low speed of starting to open
F12	60	Low speed of starting to close
F13	500	High speed of openning
F14	400	High speed of closing
F15	10	Low speed of stopping to open
F16	20	Low speed of stopping to close
F17	10	Acceleration of openning
F18	10	Deceleration of closing
F19	6	Acceleration of closing
F20	7	Deceleration of closing
F21	20	Deceleration of crash-stop
F22	5	Crawl distance of openning
F23	2	Crawl distance of closing
F24	67	Deceleration point of openning
F25	30	Deceleration point of closing
F26	0	Not used
F27	0	Not used
F28	20	Speed of closing retiring cam
F29	200	Torque limit of closing
F30	7	Holding torque of openning
F31	7	Holding torque of closing
F32	20	Torque boost
F33	60	Speed of Holding torque
F34	15	Low-speed compensating torque

Fig 6-8 parameter setting interface

Refer to chapter 4 <function and parameter list> about the parameters and fuctions.

Click the parameter you want to modified, for example, click ‘F25’, the go into the interface of ‘torque holding of opening door’, showing as follows:

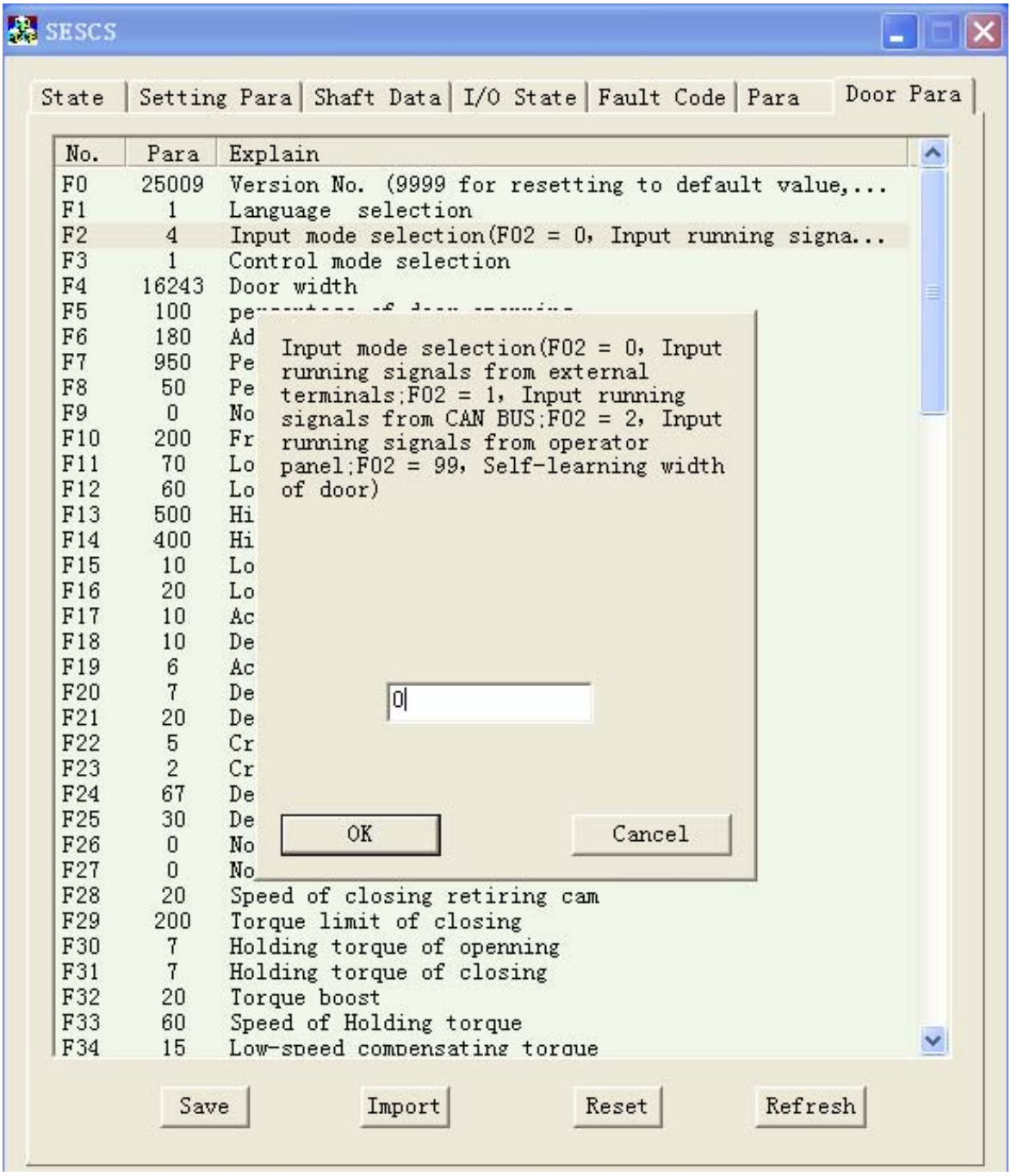


Fig 6-9 Para Revises interface

after modified the value, click ‘submit’.

7 System Adjustment

important:

If you can not modify parameters when door opening or door close limit, set F00 = 1 to cancel the current torque holding to modify your parameters.

F00 = 199 before saving parameters，you must set F00 = 1 to cancel the current torque holding.

7.1 debugging Encoder control

The count number for door width self-learning is 0~60000, if the count number is more than 60000 when finishing the width learning process, a fault will occur, which leads to that the inverter can not work properly. On the other hand, if the count number is too low, which will also influence the accuracy of inverter, so application of suitable encode can optimize the control character of door machine, we suggest that the count number is between 10000 and 35000 The count number = turns of motor X 4 X pulse of encoder

Note: turns of motor means that how many times the motor rotates when the door moves from close to open

7.1.1 Encoder wiring

Details shown in chapter 3

7.1.2 Debugging steps

1、confirm wiring is correct, turn on the power

2、set parameters，shown in table7-1 and 7-2，save parameters（set F00 = 199 to save）;

Table 7-1 Referenced value of the running mode parameters

Function code	Name of parameters	reference
F02	Input mode selection	0
F03	Control mode selection	1
F36	Set Input mode	00000000
F37	Set output mode	0000

Table 7-2 motor parameters（according to the nameplate parameters of motor）

Function code	Name of parameters	Referenced vlue
F46	Carrying frequency	8
F47	Poles of motor	4
F48	Rated Voltage	220
F49	Rated speed	1460
F50	Rated current	1.00
F51	rated output torque	1.00
F54	Pulses of encoder	500
F55	Motor slip frequency	3.00

Table 7-3 Referenced value of torque and PID parameters

Function code	Name of parameters	Referenced value
F29	torque limit of closing（available when F03=0）	200
F32	Torque boost	20
F33	Speed of Holding torque	60
F34	V/F low-speed compensating torque（available when F03=1/2/3）	17
F42	Gain P at low speed openning（F03=0）	10000
F43	Setting of parameter P（available when F03=0）	10000
F44	Setting of parameter I（available when F03=0）	13000
F45	Setting of parameter D（available when F03=0）	819

3、Turn on the inverter, monitor parameter U9，During opening period see if U9 increases. if it does，exchange edcoder phase A and B

4、capture door width data and save

You can get door width data through following method

(a) run self-learning of door width

(b) Cut the power, close the door to position, then turn on the power, open the door to position, the data of parameter U9 is the door width data

(c) run the door from state of door close limit to state of door open limit,see how

many circles encoder turns,then caculate：

The count number = turns of motor x 4 x pulse of encoder

important:

Parameter F03 needs to be reset after self-learning

For some reason as strap slips, door width data from self-learning coule be different from real door width data. So ,the data should be confirmed though step(b) or (c), otherwise, the door may ram

5、set torque and PID parameters shown in table 7-3；

6、debugging door running curve parameters are shown in table 7-4

(a) input the door-opening or door-closing signal, and then the door will close or open at a low speed, until the door door close limit or opening to position, and only after the relay of door close limit or opening to position signal is given, inverter can run normally. Input door-opening or door-closing signal, the door will run normally.

(b) set the top speed of door-opening and door-closing

If transmit proportion is 1:1，top speed is about 200rpm

If transmit proportion is（4～6）:1，top speed is 500～600rpm。

(c) input closing signals：

If Door rammed, increase deceleration of closing F20 or increase decelerating point of closing F25.

If crawling distance is too long or door can not close completely，decrease deceleration of closing F20 or decrease decelerating point of closing F25

If door blade was net fraped, increase low speed of closing-stopped F16。

Increasing acceleration of closing F19 will accelerate door-closing

(d) input openning signals：

If Door rammed, increase deceleration of openning F18 or decrease decelerating point of openning F24.

If crawling distance is too long or accelerateing process happen after decelerating closing，decrease deceleration of openning F18 or increase decelerating point of openning F24

If door shaked when opening，increase Gain P at low speed openning F42；

If door didn’t shake when openning, set F42 same as F43

If door blade rammed，increase Crawl distance of openningf F22；

Increasing acceleration of openning F17 will accelerate door-openning

(e) through modifying F30、F31、F33, holding torque of closing and openning can be realized.

(f) modifying F06 will adjust the position of opening door, and the adjustment of opening door ‘s percentage can be realized by modifying F05

(g) modifying F07、F08 will adjust the relay out put point of door opening toposition and door close limit. (percentage of position)

(h) if door was blocked at the first running, cut the power and check if the door is locked by something

Table 7-4 Referenced value of parameters

Function code	Name of parameters	Referenced value
F04	Door width	20000
F05	Percentage of door openning	100
F06	Adjustment of door open limit	200
F07	Permillage of door open limit	99.5
F08	Permillage of door close limit	0.5
F11	Low speed of starting to open	70
F12	Low speed of starting to close	60
F13	High speed of openning	300
F14	High speed of closing	200
F15	Low speed of stopping to open	50
F16	Low speed of stopping to close	30
F17	Acceleration of openning	6
F18	Deceleration of closing	6
F19	Acceleration of closing	5
F20	Deceleration of closing	5
F22	Crawl distance of openning	4
F23	Crawl distance of closing	2
F24	Deceleration point of openning（void when F03=3）	60
F25	Deceleration point of closing（void when F03=3）	40
F30	Holding torque of openning	7
F31	torque limit of closing	7

7.2 debugging of control terminals

7.2.1 Wiring of control terminals

Details shown in chapter 3

7.2.2 Debugging steps

1、confirm wiring is correct, turn on the power

2、set parameters，shown in table7-1 and 7-2，save parameters（set F00 = 199 to save）;

3、set torque and PID parameters shown in table 7-3;

4、debugging door running curve parameters are shown in table 7-4

(a) turn on the power, push the door from position of door open limit of closing door (or from position of door close limit of openning door) check input of U11, if no signals, check input limit swich or set F36

(b) input the door-opening or door-closing signal, and then the door will close or open at a low speed, until the door door close limit or opening limit, and only after the relay of door close limit or opening limit signal is given, inverter can run normally. Input door-opening or door-closing signal, the door will run normally.

(c) set the top speed of door-opening and door-closing

If transmit proportion is 1:1，top speed is about 200rpm

If transmit proportion is（4～6）:1，top speed is 500～600rpm。

(d) input closing signals：

If Door rammed, increase deceleration of closing F20

If crawling distance is too long or door can not close completely，decrease deceleration of closing F20

If door blade was net fraped, increase low speed of closing-stopped F16。

Increasing acceleration of closing F19 will accelerate door-closing

(e) input openning signals：

If Door rammed, increase deceleration of openning F18

If crawling distance is too long or accelerateing process happen after decelerating closing，decrease deceleration of openning F18

Increasing acceleration of openning F17 will accelerate door-openning

(e) through modifying F30、F31、F33, holding torque of closing and openning can be realized.

(f) modifying F06 will adjust the position of opening door, and the adjustment of opening door ‘s percentage can be realized by modifying F05

(g) There is no door-blocked protecting at the first twice closing

(h) if door was blocked at the first running, cut the power and check if door was locked by something

7.3 Door- opening and closing course specification

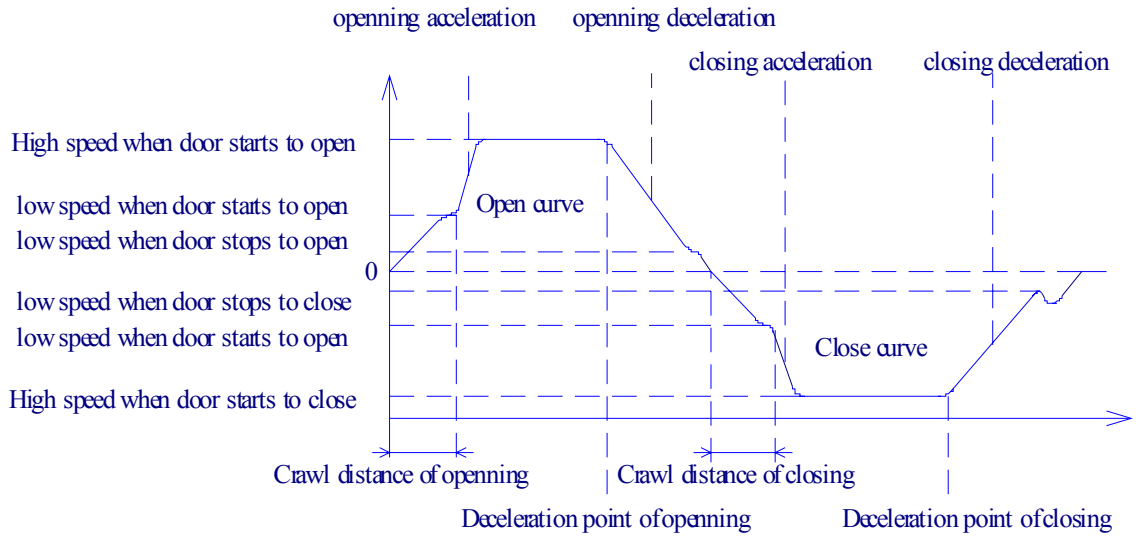


Table 7-1 curve of door running controlled by encoder

Door- opening course specification：

a) With the door-opening command, it accelerates to F11 according to one constant acceleration and keeps constant running at door-opening starting low speed (F11).

b) When the inverter detects that the current door position is over the crawl distance of door opening (F22), it will accelerate to high speed of door opening (F13) according to the acceleration of door opening (F17), and then keeps the constant high speed (F13).

c) When the inverter detects that the current door position is over the deceleration point of door opening (F24), it will decelerate according to the deceleration of door opening (F18), and then keeps the constant low speed of stopping to open door (F15).when realdoor width > F7, opening limit signal is given , and lock openning input signal at the same time

d) When the door position is over to door-width by 99.5%, door machine decelerates at a constant deceleration. If door-opening torque-keeping function（F25）is valid, no matter the opening command is valid or not, door machine keeps torque; Otherwise, door machine stops running and the door-opening course ends.

Door-closing course specification：

a) With the door-closing command, it accelerates to F12 according to one constant acceleration and keeps constant running at door-closing starting low speed (F12).

b) When the inverter detects that the current door position is over the crawl distance of door closing (F23), it will accelerate to high speed of door closing (F14) according

to the acceleration of door closing (F19), and then keeps the constant high speed (F14).

c) When the inverter detects that the current door position is less than deceleration point of door closing (F25), it will decelerate according to the deceleration of door closing (F20), and then keeps the constant low speed of stopping to close door (F16). when realdoor width < F8, door close limit signal is given , and lock closing input signal at the same time

d) When the door position is less than door-width by 0.2%, door machine decelerates at a constant deceleration. If door-closing torque-keeping function（F26）is valid, no matter the closing command is valid or not, door machine keeps torque; Otherwise, door machine stops running and the door-closing course ends.

important:

a) when controlled by encoder, **The door-opening or door-closing signal must be given when the inverter is re-energized, and then the door will close or open at a low speed, until the signal of door close limit or opening limit is given, and only after the door close limit signal is given, it can run normally. If limit terminal exists, signal of door close limit or opening limit is given if only door were in position, then come into normal state**

b) **The input signal must be kept to the output signal of opening or door close limit in normal running status (opening door, closing door, closing door at a low speed) and re-energized running status (opening or closing door with the inverter energized).**

c) **If you want to close door at a low speed, and then the input signal of door-closing and door-closing of low speed must be given.**

d) There is no terque limit during the first 10％ door width and the last 5cm of closing process,

e) There is no terque limit during opening process

8 fault & solutions

8.1 instruction of fault code

There are 10 fault codes of door inverter, which can be displayed on PC. inverter fault code form to analyze the cause of fault and then solve the problem.

Display form：E xxxx

E：means fault

xxxx： fault number（1~20）

Users can consult fault code form to analyze causes and solve troubles.

Table 8-1 fault code

Fault code	Name	instructions
Faultcode1	IPM Fault	IPM protection due to over current
Faultcode2	ADC	fault when AD of inverter conversing
Faultcode3	Over Voltage	When the voltage at the DC side exceeds the setting, fault occurs and inverter shut off output.
Faultcode4	Under Voltage	When inverter input voltage is below the setting level, lower torque or overheated will occur, and then fault occurs and inverter stops output.
Faultcode5	Over Heat	Inverter shut off output due to heat releasing fault, high ambient temperature IPM fault or overheated, and it won't work until it cools down.
Faultcode6	Over Current	Cut the output of inverter when output current is overflow
Faultcode7	Over Load	Cut the output of inverter when current of motor is overflow, exceeding overload protect value.
Faultcode8	Encoder Err	Encoder disconnected, encoder phase-lack.encoder broken. When Encoder Error is output, door closing and opening in low speed, and there is no opening and door close limit output.
Faultcode9	Eerom Err	Read-write error fault, door machine stopped

Faultcode 10	X Err	Fault of limit terminals or door opening blocked Door machine will keep running slowly, power must be cut and reset

8.2 solutions

Fault identification and treatment：

1) IPM fault

Possible causes: inverter over current

Inverter fault

Solutions: check load of door machine

Change inverter

2) ADC fault

Possible causes：The base voltage is over or low when AD of inverter converses.

solutions：Check the base voltage of inverter's ADC and ADC conversion of DSP

3) Over voltage

Possible causes：Network power is not correct

Time of acceleration or deceleration is too short

When over voltage during deceleration, properly the load inertia is too big

solutions：check the main power voltage, check if the power switch turns on or off too frequently

Adjust Acc/Dec time, increase the Acc/Dec time properly

Check the load, if necessary to install a brake resistance

4) Under voltage

Possible causes：ventilation channel is blocked

IPM works improperly

Environment temperature is too high

solutions：check if the voltage of main power is correct

Check the wiring of inline of inverter

5) Overheat

Possible causes：ventilation channel is blocked

IPM works improperly

Environment temperature is too high

solutions：clear the ventilation channel

6) Over Current

Possible causes：accelerating or decelerating time was set too short

Load is aberrant;

solutions：adjust accelerating or decelerating time, adjust PIparameters，check the load

7) Overload

Possible causes：load too heavy。

solutions：check the load, and reduce it

increase capacitance of the inverter。

8) Encoder error

Possible causes：encoder is broken。

Wiring looses。

solutions：check the encoder and wiring。

9) Eerom error

Possible causes：Eeromis broken。

solutions：re-electrifying，try more times，confirm that Eerom is broken or not。

If it is broken, inverter shall be sent to factory to be fixed

10) Terminals or door opening blocked fault

Possible causes：limit terminals brokenor stumbling block exists in track

solutions：check limit terminals, replacing broken terminals, check the track and clear stumbling block away, re-electrifying

9 INVERTER MAINTENANCE

INVERTER MAINTENANCE includes daily maintenance and regular maintenance

9.1 Daily maintenance

Good daily maintenance should be done through guaranteeing good running ambient, recording daily running data, parameter setting, recording data parameter modification and establishing & improving inverter service file. Through daily maintenance and inspection, we can find various abnormity and resolve fault as soon as possible so as to guarantee the normal running of the inverter and extend the service time.

 **important:** Besides the points of attention above, users should pay attention to：

a) Notice whether the inverter heat releasing is normal

b) Notice whether the installing ambient is proper

c) Notice whether there is noise when the inverter is working

9.2 Regular maintenance

Please observe the user's manual in inverter operation and guarantee regular inverter maintenance（12 months） in order to keep the inverter running reliably.

 **Important:** Contents of maintenance：

a) Check whether the bolts on the terminal are loose or rusty and whether the terminals are badly wired.

b) Clean up the dust in the inverter regularly

c) Check whether there is eyewinker in the inverter. Please do not touch the internal circuit board with hands.

d) 4.Do not rebuilds the inverter without permission, or there will be possibility of damaging the inverter and threatening the safety of men.

appendix 1：

Available range of parameters

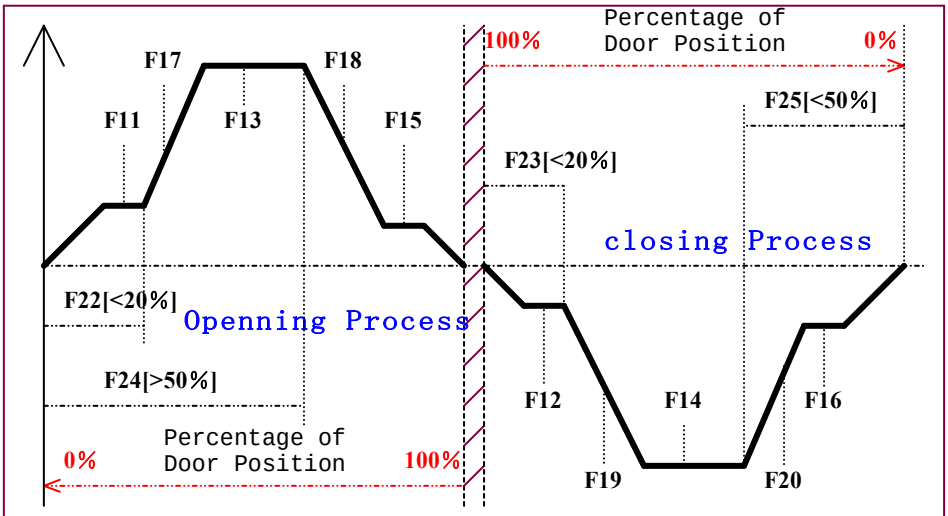
Fxx	*Running mode setup F03 = 0 / 1 / 2 / 3*				*Fxx*	*Running mode setup F03 = 0 / 1 / 2 / 3*			
	0	***1***	***2***	***3***		***0***	***1***	***2***	***3***
F00	√	√	√	√	F36	√	√	√	√
F01	√	√	√	√	F37	√	√	√	√
F02	√	√	√	√	F38	√	√	√	√
F03	√	√	√	√	F39	√	√	√	√
F04	√	√	√	×	F40	×	×	×	√
F05	√	√	√	×	F41	×	×	×	√
F06	√	√	√	×	F42	√	×	×	×
F07	√	√	√	×	F43	√	×	×	×
F08	√	√	√	×	F44	√	×	×	×
F09	×	×	×	×	F45	√	×	×	×
F10	√	×	×	×	F46	√	√	√	√
F11	√	√	√	√	F47	√	√	√	√
F12	√	√	√	√	F48	√	√	√	√
F13	√	√	√	√	F49	√	√	√	√
F14	√	√	√	√	F50	√	√	√	√
F15	√	√	√	√	F51	√	×	×	×
F16	√	√	√	√	F52	×	×	×	×
F17	√	√	√	√	F53	√	√	√	×
F18	√	√	√	√	F54	√	√	√	×
F19	√	√	√	√	F55	√	×	×	×
F20	√	√	√	√	F64	×	√	√	√
F21	√	√	√	√	F65	×	√	√	√
F22	√	√	√	×	F66	×	√	√	√
F23	√	√	√	×	F67	×	√	√	√
F24	√	√	√	×	F68	×	√	√	√
F25	√	√	√	×	F69	×	√	√	√
F26	×	×	×	×	F70	×	√	√	√
F27	×	×	×	×	F71	×	√	√	√
F28	×	×	×	×	F91	√	√	√	√
F29	√	×	×	×					

F30	√	√	√	√					
F31	√	√	√	√					
F32	√	√	√	√					
F33	√	√	√	√					
F34	×	√	√	√					
F35	√	√	√	√					

instructions：‘√’---- available in current mode ‘×’---- void in current mode

appendix 2：

compact debugging curve of inverter (This figure can be cut and pasted on the installation location of door, easy to debug)



F11～F16 unit:rpm; F17～F20 unit:r/10ms; F22～F25 unit:%

F03=0: adjustment of F42 can reduce noise when door openning. adjustment of F51 can adjust output torque

F03=1/2/3: adjustment of F34 can adjust output torque

curve of door openning and closing:when F03=0/1/2, adjust F11～F25; whenF03=3, adjust F11～F20

adjustment of F33 can adjust the speed of holding door openning and closing. adjustment of F30 and F31 can adjust the touque of holding door openning and closing.

For type A2, after setting F38=3, parameters canbe modified and saved by connect 17(INPUT8) and 18(COM)