BLDC Control Unit User Instruction

(SERVO1.0/SERVO1.1)
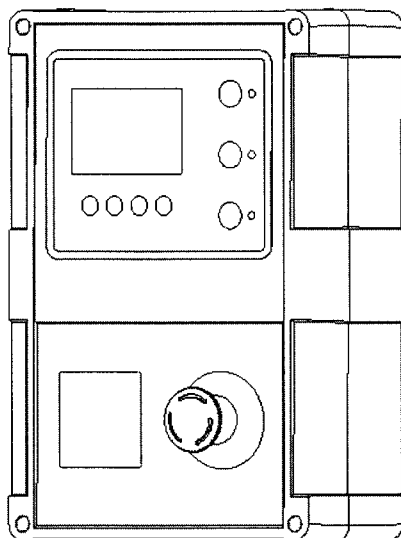
Table of Content

★Security Tips:

1. The installation of control unit must be carried out by professionals, or it may cause injury and property losses.
2. In order to avoid any unnecessary damages caused by improper installation, please read this instruction carefully before installation.
3. Control unit should be installed in the wall or column of 1.4 meters away from the ground to prevent children from inadvertently touching. Please keep the paired remote controls properly, children are not allowed to touch or play it in case of any danger. Do not use the remote control when the operation of the door cannot be observed.
4. Please make sure to cut off the power supply before internal wiring for the system.
5. Before connecting the power supply, please make sure that the supply voltage is the rated voltage of the controller and the grounding terminal is securely connected to the grounding wire.
6. The internal electronic components of the system are very sensitive to the static, so please keep every object away from the terminal connections of the motor driver, electronic components and main circuit of the display screen.
7. Please do not tough the terminal connections and electronic components after cutting off the power supply but before turning off the display, there is still remaining high voltage in the circuit.
8. To ensure the safety of pedestrian and vehicles, please install the infrared protection device and airbag protection device.
9. The repairing for this product must be carried out by professionals, before which please cut off the power supply.

★Packing List

All products have been strictly inspected before delivery. Please check against the packing list and make sure there is no errors or omissions, no damages and the product level is to your fully requirement after unpacking. If there is any discrepancy, please contact the supplier.

Control Unit Packing List（SERVO1.0/SERVO1.1）		
Name	Quantity	Note
Control Unit	1 PC	
Remote Control	2 PCS	
User Manual	1 PC	

Control Unit Technical Parameters

Model	SERVO1.0	SERVO1.1
Power Supply	AC220V±10%	AC220V±10%
Rated Power	500W	1000W
Control Type	Closed-Loop Speed Control	
Travel Setting	Screen Menu	
Parameter Setup	Screen Menu	
Operation Condition	Screen Display	
Failure Output	Screen Display	
Opening Action Type	Menu Select(inch/manual/auto)	
Interface between Machine and Control Unit	Quick Connector	
Security Interface	Alarm Lamp, Infrared Sensor, Radar, Loop Detector, Airbag Protection Device	
Security Interface Type	Menu Select(NO/NC)	
Relay Signal Output 1	Menu Option Selected Output(Opening in Position/Closing in Position/in Operation/in Trouble/Not UP Limit/Not DOWN Limit/Interlocking)	
Relay Signal Output 2		
Failure Type	13 Failures Display	
Distant Control	Remote Transmitter and Receiver	
Working Temperature	-20℃~50℃	
Package Weight	2.5kg	
Package Size	395*270*185mm	

★Connection between Main Machine and Control Unit

~220V
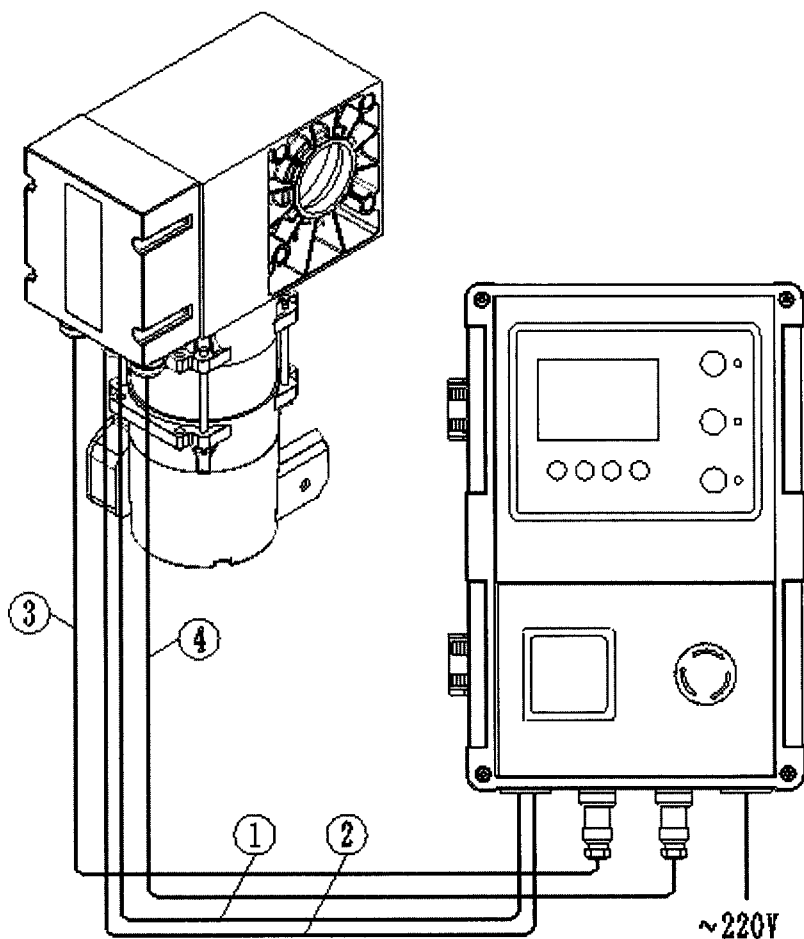
①——Manual/Auto switching line
②——Encoder line
③——Hall line
④——Motor line

Wiring Diagram
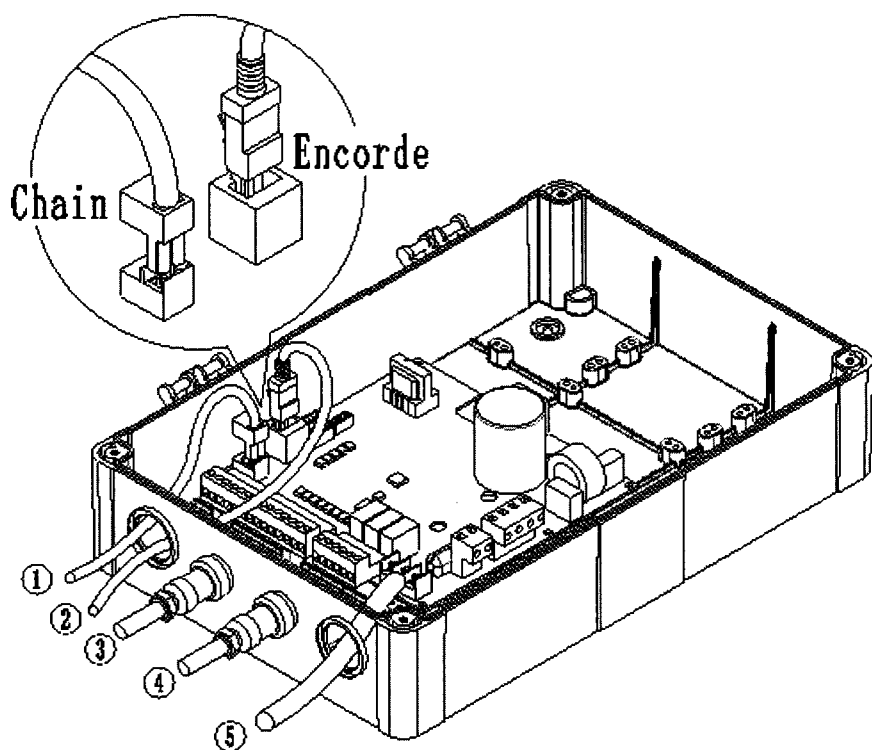
① ——Manual/Auto switching line
② ——Encoder line
③ ——Hall line
④ ——Motor line
⑤ ——Power line

★Operation Interface Illustration

Display Screen

UP

STOP

Travel Setting

DOWN

Indicator Light

Industrial Door 90%
MODE: AUTO
STATUS: OPENING
Set | Err | Parm | Mode

Failure Display

Parameter Setting

Mode Selection

Door Running Height Display

UP/DOWN Limit Position Setting

Working Mode Display

Industrial Door 90%

MODE: AUTO

STATUS: OPENING

Set | Err | Parm | Mode

Operation Status Display

13 Working Failure Display

19 Working Parameters Setting

3 Working Modes Selection

6

★Operation Step One: Flow Chart of Travel UP/DOWN Limit Position Setting

```
┌─────────────────────────────┐
│ ┌─────────────────────────┐ │
│ │ Industrial  Door    0%  │ │
│ │ MODE:          AUTO     │ │
│ │ STATUS:        OK       │ │
│ │ ┌───┐ ┌───┐ ┌────┐ ┌────┐│ │
│ │ │Set│ │Err│ │Parm│ │Mode││ │
│ │ └───┘ └───┘ └────┘ └────┘│ │
│ └─────────────────────────┘ │
└─────────────────────────────┘
```

Failure option flicker after powering on, press Failure button to check the failure content.

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```
┌─────────────────────────────┐
│ ┌─────────────────────────┐ │
│ │ U:0      │   ERR 01      │ │
│ │ D:0      │ No Limit setting│
│ │ P:4456   │               │ │
│ │ TRIG     │         ┌───┐ │ │
│ │          │         │Esc│ │ │
│ └──────────┴─────────└───┘─┘ │
└─────────────────────────────┘
```

UP/DOWN limit position is not set, press Esc button to set the travel.

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```
┌─────────────────────────────┐
│ ┌─────────────────────────┐ │
│ │ Industrial  Door    0%  │ │
│ │ MODE:          AUTO     │ │
│ │ STATUS:        OK       │ │
│ │ ┌───┐ ┌───┐ ┌────┐ ┌────┐│ │
│ │ │Set│ │Err│ │Parm│ │Mode││ │
│ │ └───┘ └───┘ └────┘ └────┘│ │
│ └─────────────────────────┘ │
└─────────────────────────────┘
```

Press travel setting button to set the UP/DOWN limit position.

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```
┌─────────────────────────────┐
│   Password                  │
│      2 1                     │
│                             │
│ ┌──┐ ┌──┐ ┌──┐ ┌───┐        │
│ │ + │ │ → │ │OK│ │Esc│      │
│ └──┘ └──┘ └──┘ └───┘        │
└─────────────────────────────┘
```
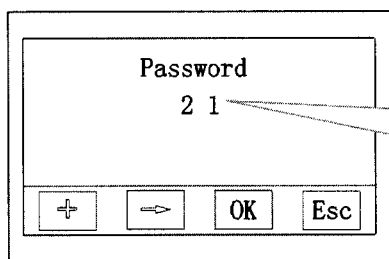
Input password
"21" to enter into
travel setting
menu.

```
┌─────────────────────────────┐
│                             │
│   Reset Limit?              │
│                             │
│ ┌──┐              ┌───┐     │
│ │OK│              │Esc│     │
│ └──┘              └───┘     │
└─────────────────────────────┘
```
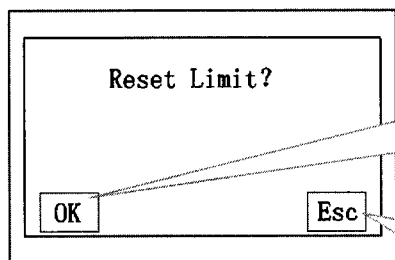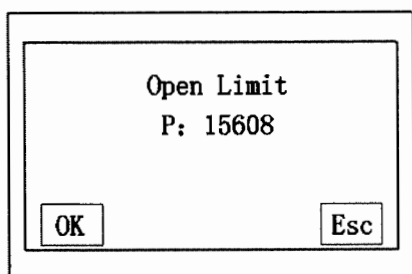
For resetting the travel
limit position, press
Confirm button.
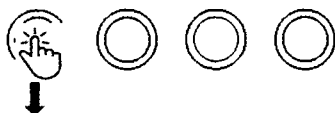
UP/DOWN limit position
has been set and no
need to change it any
more, then please press
Esc button.

```
┌─────────────────────────────┐
│   Press OPEN-Key            │
│      Dirction               │
│      Correct?               │
│ ┌───┐           ┌──┐        │
│ │Yes│           │No│        │
│ └───┘           └──┘        │
└─────────────────────────────┘
```
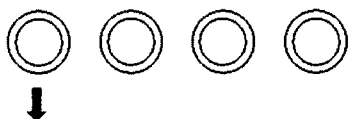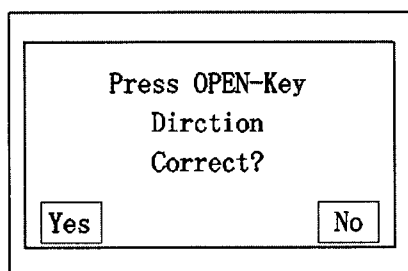
Press UP button, if
the door runs
upward, press Yes.
If the door runs
downward, press
No, system will
automatically
change the running
direction.

8

```
┌─────────────────────────┐
│  ┌───────────────────┐  │
│  │   Open Limit      │  │       Press UP to
│  │   P: 15608        │  │       make the door
│  │                   │  │       run upward to
│  │ OK          Esc   │  │       proper position,
│  └───────────────────┘  │       press OK.
└─────────────────────────┘
   ○    ○    ○    ○
```
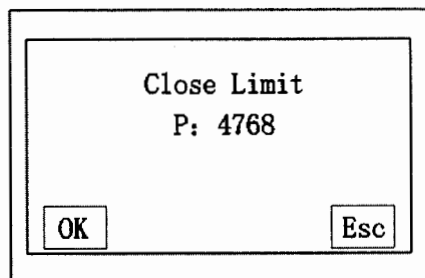
```
┌─────────────────────────┐
│  ┌───────────────────┐  │       Press DOWN to
│  │   Close Limit     │  │       make the door
│  │   P: 4768         │  │       run downward to
│  │                   │  │       proper position,
│  │ OK          Esc   │  │       press OK.
│  └───────────────────┘  │
└─────────────────────────┘
   ○    ○    ○    ○
```
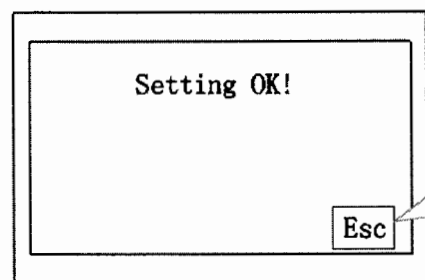
```
┌─────────────────────────┐
│  ┌───────────────────┐  │       UP/DOWN limit
│  │                   │  │       position set
│  │   Setting OK!     │  │       successfully, press
│  │                   │  │       Esc button to return to
│  │             Esc   │  │       the main menu.
│  └───────────────────┘  │
└─────────────────────────┘
   ○    ○    ○    ○
```

★Operation Step Two: Working Mode Selection

```
┌─────────────────────────────────┐
│  Industrial  Door   100%        │
│  MODE：       AUTO               │
│  STATUS：     OK                 │
│  [Set]  [Err]  [Parm]  [Mode]   │
└─────────────────────────────────┘
```
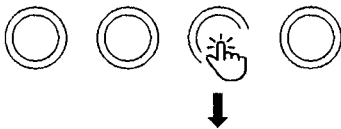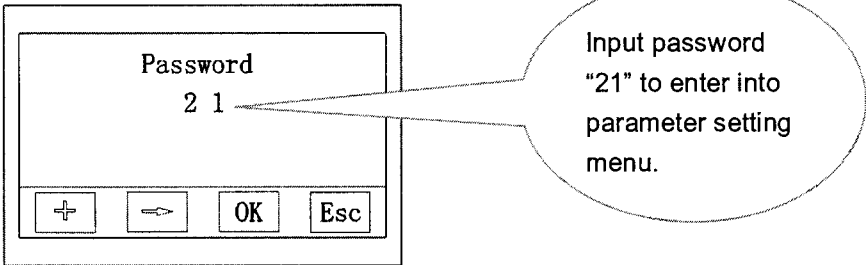
○ ○ ○ ☜
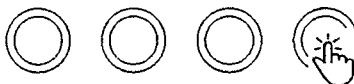
1、Auto: Press UP button, the door will run upward to the UP limit position, it'll stay until the Auto-close time is up, then it'll automatically close to its DOWN limit position.

2、Manual: Press UP button, the door will run upward to the UP limit position and stop; Press DOWN button, the door will run downward to the DOWN limit position.

3、Inching: Press and hold this button, the door will run, once release this button, the door will stop.
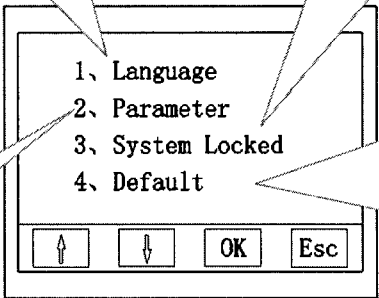
Please check if the upward or downward operation of the door is to your requirement after finishing the above two steps. If it is, no more extra settings would be required, the door will work under its default working mode. If it is not, please set the parameters under parameter setting menu.
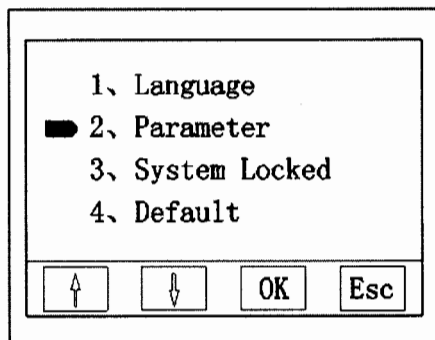
★Customized Step One: Parameter Setting

```
Password
2 1
┌──┐ ┌──┐ ┌──┐ ┌──┐
│ ╬│ │ ═│ │OK│ │Esc│
└──┘ └──┘ └──┘ └──┘
```

Input password "21" to enter into parameter setting menu.

Users set private password to limit the total running time. System will be locked after reaching the running times. To unlock it only against the private password.

Language select

```
1、Language
2、Parameter
3、System Locked
4、Default
┌──┐ ┌──┐ ┌──┐ ┌──┐
│ ↑│ │ ↓│ │OK│ │Esc│
└──┘ └──┘ └──┘ └──┘
```

19 Parameter setting

Besides the language interface and system protection setting, all the parameters will be restored to factory setting.
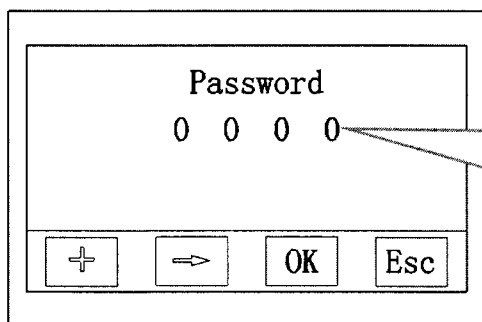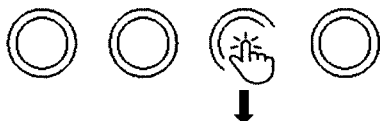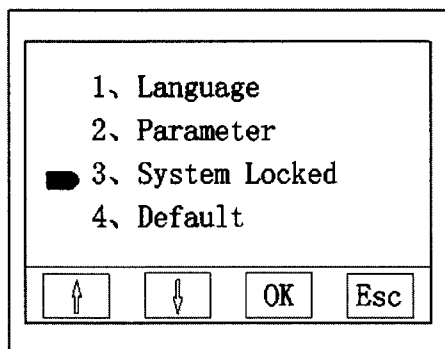
11

Parameter Interface Diagram

```
┌─────────────────────────────────────┐
│  ┌────────────────────────────────┐  │
│  │                                │  │
│  │   1、Language                   │  │
│  │ ▶ 2、Parameter                  │  │
│  │   3、System Locked              │  │
│  │   4、Default                    │  │
│  │                                │  │
│  │  ┌───┐  ┌───┐  ┌────┐ ┌─────┐  │  │
│  │  │ ↑ │  │ ↓ │  │ OK │ │ Esc │  │  │
│  │  └───┘  └───┘  └────┘ └─────┘  │  │
│  └────────────────────────────────┘  │
└─────────────────────────────────────┘

    ◯      ◯      ◉      ◯
```

No.	Parameter	Value(Adjustable)	Default Value
1	Opening Speed	10%-100%	40%
2	Closing Speed	10%-100%	30%
3	Soft Start Distance	15-100	30
4	Slow Stop Distance	15-100	25
5	Auto-close Delay Time	0-120 Sec., 0 sec. is invalid	3 Sec.
6	Acceleration Time	2-20 Sec.	2 Sec.
7	Airbag Height	20-600 Pulse	20 Pulse
8	Pre-Stop Time	0-100 Pulse	20 Pulse
9	REV Delay Time	0.2-2 Sec.	0.2 Sec.
10	Inching Speed	10%-100%	10%
11	Manually Opening Mode	Continue or Inch	Continue
12	Manually Closing Mode	Continue or Inch	Continue
13	Relay Output		
	Output 1 Setting	disable	√
		Failure Output	
		Operation Output	
		Opening in Position Output	

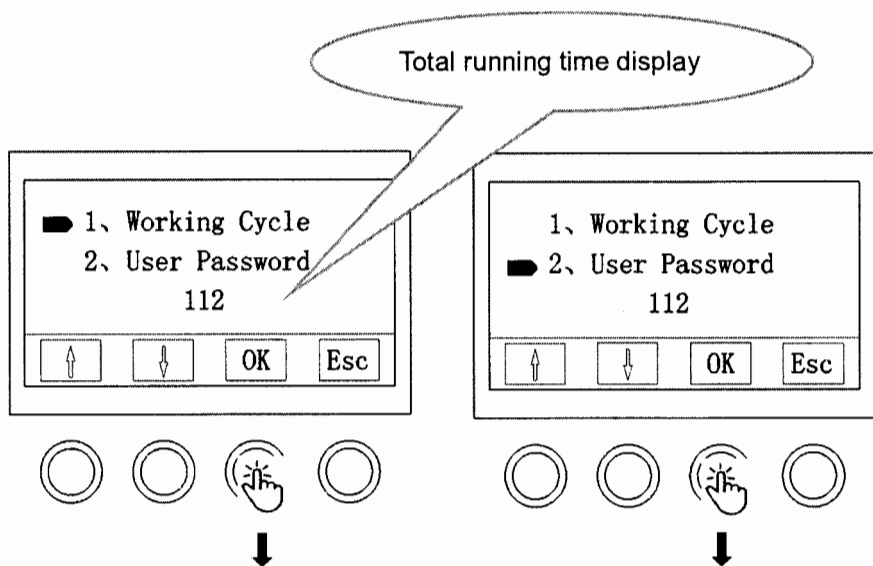|		Closing in Position Output		
		Not UP Limit Position Output		
		Not DOWN Limit Position Output		
	Output 2 Setting	disable	√	
		Failure Output		
		Operation Output		
		Opening in Position Output		
		Closing in Position Output		
		Not UP Limit Position Output		
		Not DOWN Limit Position Output		
14	Partial Opening	0-100%（Opening height in percentage）	50%	
15	LCD Backlight	Backlight always on		
		Auto-close after 60sec.	√	
16	Infrared Sensor Type Selection	NO	√	
		NC		
17	Loop Detector Type Selection	NO	√	
		NC		
18	Airbag Protection Device Type Selection	Level signal	NO	√
			NC	
		Pulse signal		
19	Remote Control Mode Selection	Three Button(Three channels)		
		Single Button(Single channel)	√	

★Customized Step Two: System Protection Setting

The system supports protection setting, which allows users to set specific password to limit the total running times of the machine. The machine will be locked after reaching the limited running times. It can be unlocked only against the specific password.

```
    1、 Language
    2、 Parameter
  ➡ 3、 System Locked
    4、 Default

  [ ↑ ]  [ ↓ ]  [ OK ]  [ Esc ]
```

○ ○ ⊚ ○

↓

```
        Password
        0  0  0  0

  [ ⊹ ]  [ ⇒ ]  [ OK ]  [ Esc ]
```

The password by default is "0000", press Confirm to directly enter into.

○ ○ ⊚ ○

1、Working Cycle
2、User Password
112

↑   ↓   OK   Esc

1、Working Cycle
2、User Password
112

↑   ↓   OK   Esc

Input the upper limit of total running time.

Input the specific password

Work Cycle

5   X1000

+   —   OK   Esc

New Password
0 0 0 0

+   →   OK   Esc
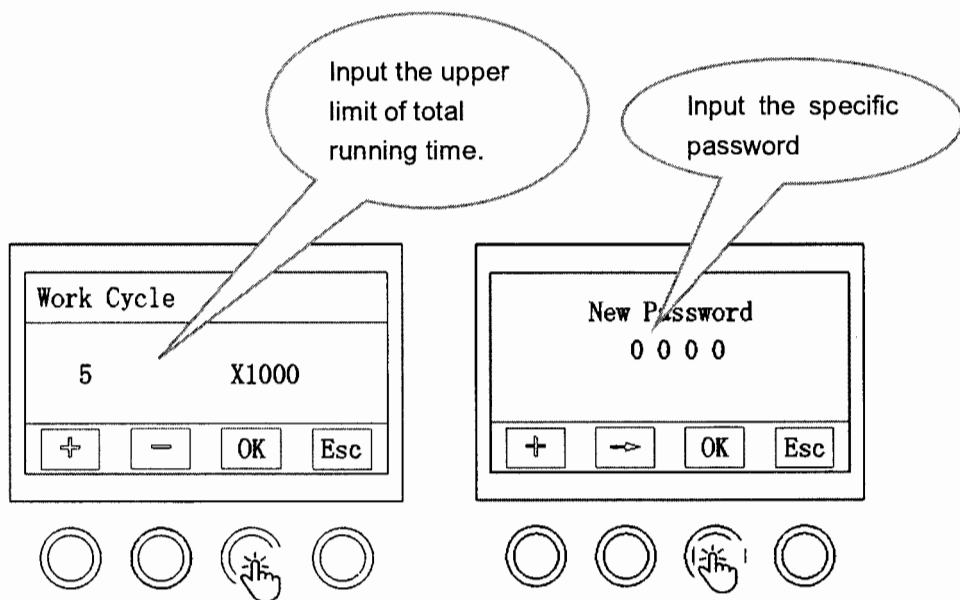
★External Equipments Connection

1. Single button connection. Please connect to "OSC" and "COM" ports. Press the external single button，the door will run under the cycle of "Open-Stop-Close-Stop"


Single button cycle

COM 24V OSC PART DIND COM IR LOOP EDGE STOP DOWN UP 24V COM
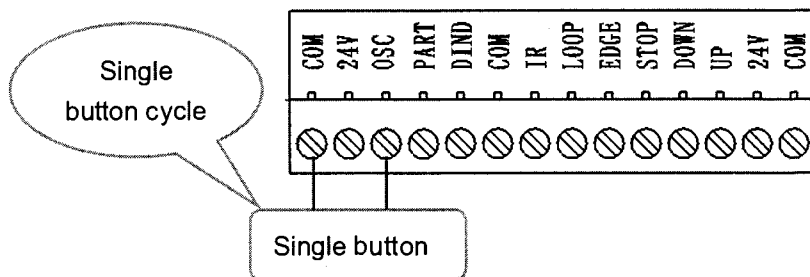
Single button

2. Partial opening connection. Please connect to "PART" and "COM" ports. **Partial opening height can be set under <u>parameter setting menu 14.</u> Partial opening height.** Single button, radar, or loop detector can be connected under "Auto Mode" but with type for these accessories be "NO", to trigger the signal, the door will open to the height that has been set, it'll stop at the position till the auto-close time is up, then it'll automatically close to the limit position; But under "Manual Mode", the door will open to the height that has been set, it'll stay in the position without automatically closing, if need to close the door, must click ① button.


Partial opening

COM 24V OSC PART DIND COM IR LOOP EDGE STOP DOWN UP 24V COM

Single button, Loop detector, Radar
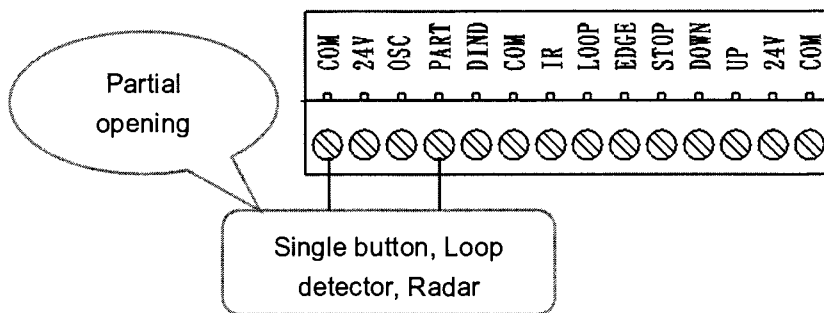
3. Small door interlocking (door in door). If there is a smaller door inside the main door, connect closing signal line of the smaller door to "DIND" and "COM" ports. Under which if the smaller door is opened, the main door will not work; The smaller door is closed, then the main door can work.


Door in door

Small door closing signal
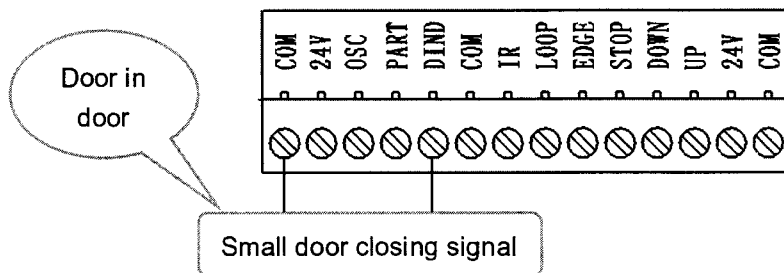
4. Infrared sensor connection. **Please make sure the connected infrared sensor is "NO". System default type is "NO". To change it into "NC", please set it under** parameter setting menu 16. **Infrared sensor type selection.** Connect to "24V"、"COM", and "IR" ports accordingly.


Infrared sensor input

NO/NC signal
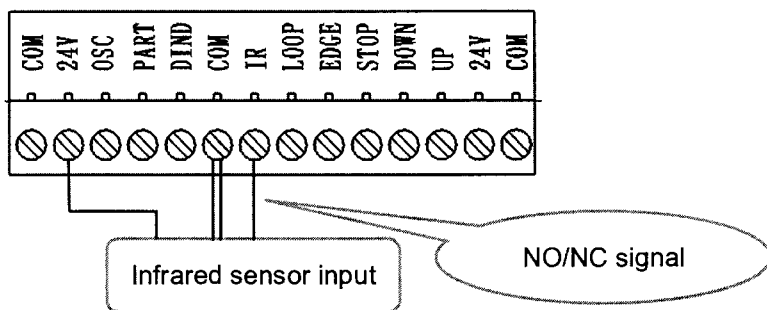
5. Loop detector or radar connection. **Please make sure the type of connected loop detector or radar is "NO". System default type is "NO". To change it into "NC", please set it under** parameter setting menu 17. **Loop detector type selection.** Connect to "24V"、 "COM" and "LOOP" ports accordingly.

Loop detector

NO/NC signal
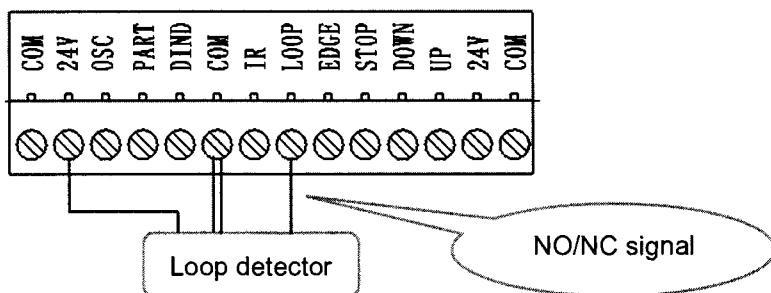
6. Airbag protection device or safety edge strip connection. **Please make sure the type of airbag protection or safety edge is "level signal" or "pulse signal", level signal has two type: NO and NC. By default is NO, if NC is required, please set it under parameter setting menu 18. Airbag protection device type selection. Effective range of airbag protection device or safety edge strip can be adjusted under parameter setting menu 7.Airbag protection device height.** Connect to "24V"、"COM" and "ADGE" ports accordingly.
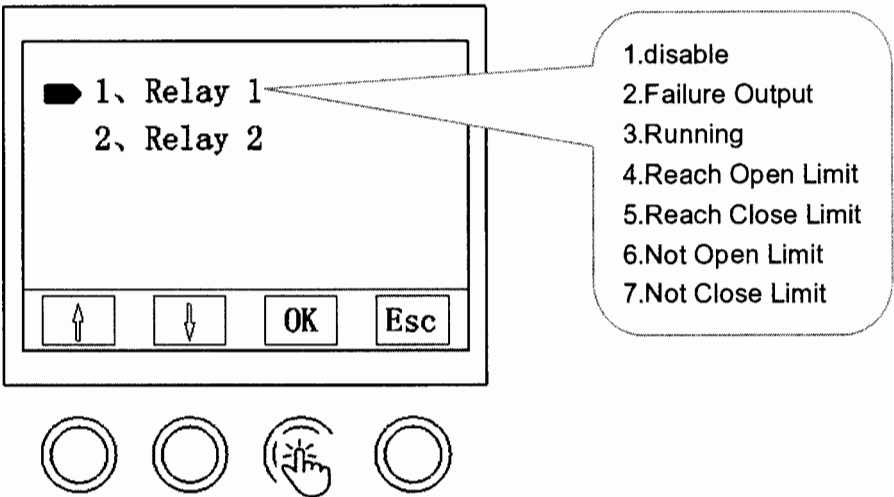

Airbag protection device
or safety edge strip

NO/NC signal
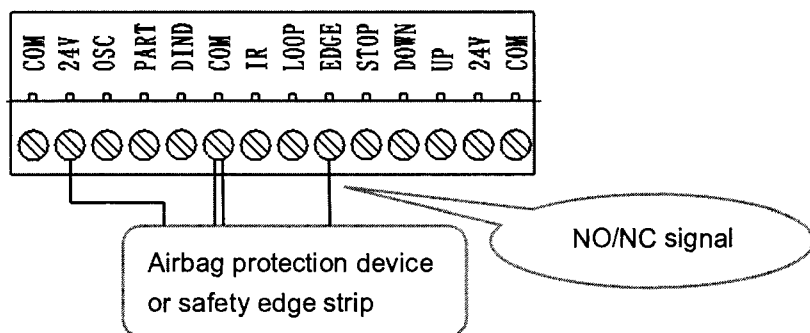
7. Three button switch connection. Please connect to "UP"、"DOWN"、"STOP" and "COM" ports to implement external three button function.
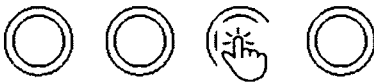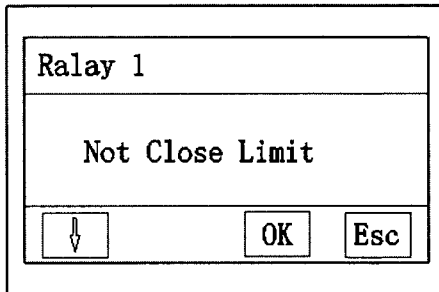

Three button switch
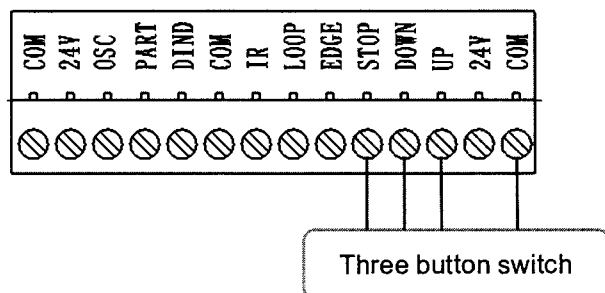
8. Alarm lamp output. The default power supply for alarm lamp is 220V. Connect to the two corresponding output ports under "LAMP", when the machine is on working, the alarm lamp will flash, when the machine is no on working, the alarm lamp will be off.

```
OUT1 OUT2 LAMP
```

Alarm lamp
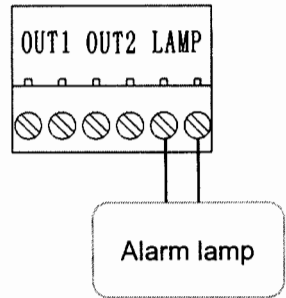
9. Relay output. **Please refer to parameter setting menu 13. Relay output, two relays' output ports are available under the system, each has 6 kinds of output types for choosing.**

■ 1、 Relay 1
   2、 Relay 2

| ↑ | ↓ | OK | Esc |

1.disable
2.Failure Output
3.Running
4.Reach Open Limit
5.Reach Close Limit
6.Not Open Limit
7.Not Close Limit

For example: Dual machine interlocking. Select 7. Not Close limit position output for relay 1 of both control units

```
┌─────────────────────────────┐
│  Ralay 1                    │
│                             │
│      Not Close Limit        │
│                             │
│   │↓│         │ OK │ │Esc│  │
└─────────────────────────────┘
```

Connect two ports under OUT1 on the control unit 1 with "STOP" and "COM" ports on the control unit 2.

Connect two ports under OUT1 on the control unit 2 with "STOP" and "COM" ports on the control unit 1.

After the above connections, it will implement when one machine is on working, another one will be shut down.
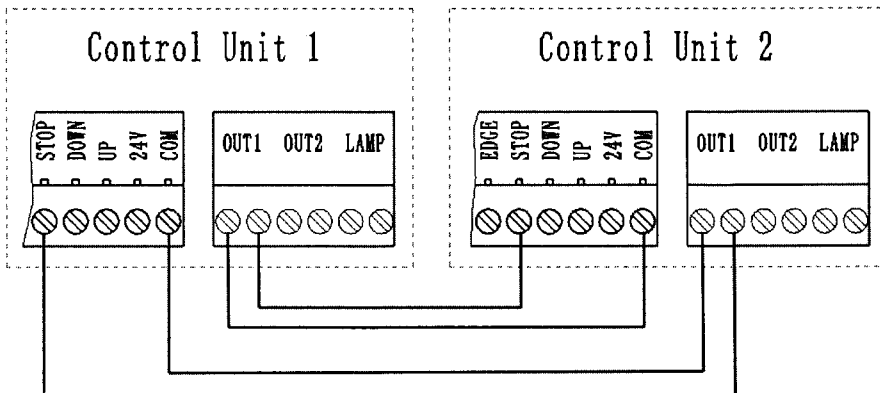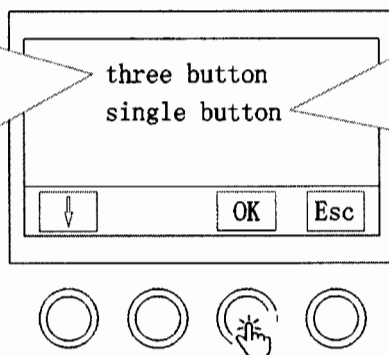

10. Remote Control Learning and Delete

① Press the black button AN once on the control board, LED indicator light will be on for a sec., press any of the button on the remote control

(e.g. button 1), LED will be on for a sec. again; Press the same button on the remote control for the last time, LED will flicker for 4 sec. then it'll be off, after which the remote control learning is complete.

② Learning for more remote controls, please repeat the above steps. Up to 25pcs of remote controls can be learned on the same control board. **If the setting (Parameter setting menu 19. Remote control mode setting) is three button mode, then the remote controls to be paired will be three button mode (first button: OPEN, second button: CLOSE, third button: STOP); If the setting is single button mode, then the remote control to be paired will be single button mode (button 1: OPEN-STOP-CLOSE-STOP cycle)**

Learning Button

LED

AN
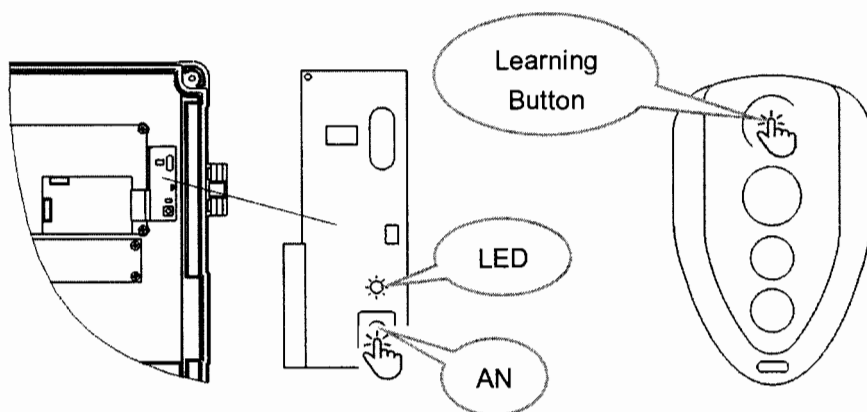
Select three button mode, remote control would be first button: Open; Second button: Close; Third button: Stop

three button
single button

OK   Esc

Select single button mode, "Open-Stop-Close-Stop" will be controlled by single button on the remote control.

Note: As long as the "button 1" is learned, then the learning for this remote control is complete.

Remote control delete:

Press and hold the AN button on the control board for a while, LED will be always on, release the button until the LED is off. All the paired remote controls have been deleted. Remote controls can be re-learned according to user's necessary.

Note: It is recommended to clear all the original password settings before officially use. It'll be much safer to re-set all password settings by user themselves.

★Failure and Troubleshooting

The system will monitor the working status of the machine at any time, if there is any abnormality during the operation, the system will give instruction to stop operation, and the failure option on the screen will flicker at the same time. Users may enter into failure menu to solve the problem according to the failure tips.

No.	Code	Failure Content	Troubleshooting
1	ERR01	Electronic Limit Switch Is Not Set	If this failure is shown after firstly powering on, please set the electronic limit switch according to the operation step one.
2.	ERR02	Travel Limit Failure	Travel is set too short、too long or DOWN limit position is over the UP limit position, please reset the electronic limit switch according to the operation step one.

3	ERR03	Absolute Encoder failure	Check whether the RJ45 connectors on the two ends of the encoder line are tightly contacted or not. Replace the encoder circuit board.
4	ERR04	Motor Encoder Failure	Check whether the 5 core aviation plug is plug in or not. Check whether the connection line between 5 core aviation plug and hall terminal is loose or not. Replace motor encoder
5	ERR05	Motor Failure	Check whether the 4 core aviation plug is plug in or not. Check whether the connection line between 4 core aviation plug and motor terminals is loose or not. Replace the motor.
6	ERR06	Overvoltage	Measure the input voltage; Make sure the input voltage is lower than 250V.
7	ERR07	Overcurrent	Check if it is overload operation. If so, to reduce the load. Check if the input voltage is low.
8	ERR08	Overload	Check if it is overload operation. If so, to reduce the load. Increase the acceleration time.

9	ERR09	Undervoltage	Measure the input voltage, make sure the input voltage is lower than 35V.
10	ERR10	Relay Failure	Relay port no output under specific status. Replace the reply.
11	ERR11	Controller Failure	Check whether the connection line between drive and controller is loose or not. Replace the control board.
12	ERR12	Drive Failure	Temperature of drive module is too high. Check if it is overload operation. If so, to reduce the load. Check if the input voltage is low. Replace the drive board.
13	ERR13	System Locked	Limited total running time has been set. To be unlocked only against the private password.