User Manual
For
SJSPD003 Serial highway barrier gate

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1 Features

1.1 The master controller employs the hi-reliable microprocessor

- The system features good integration and strong logic work;
- The master controller has multiple running modes to meet the requirements of different customers; The customer may install some applications to realize special functions;
- The master controller is equipped with the interfaces for connecting with auto charging system loop inductor and signal lamp.

1.2 The product adopts specially-designed AC220V torque motor.

- The maintenance-free motor is employed which might be stopped at any position and no damage will be caused. When it is located at the two ends the motor's power shall be automatically reduced to 20W it may save the energy avoid the conditions of condensation and corrosion moreover it may normally work in cold season;
- The driving unit employs sine generator on which the speed-down device is taken off to make the structure be more compact and reasonable; it greatly reduces the mechanical failures
- The special wiring structure may help to avoid the instant heavy current and instant voltage fluctuation in the moment of electric connecting or breaking it may be directly powered by UPS and other equipments in the same power network may be normally worked.

1.3 Durable structure with beautiful appearance

- The housing is made by the special steel board and it's painted by the bisque or nacarat high class paint which may not only prevent corrupting but also may avoid fading for the ultraviolet radiation.
- The flange-shaft is made of special aluminum materials with red glistening film covered which may be clearly seen at night;
- The folding flange-shaft is specially designed for different applications (such as the underground parking lot);

1.4 Safety functions

- 90ºCollision prevention: if the vehicle collides with the flange-shaft the collision prevention function may make the barrier arm rotate 90 degrees to avoid or reduce the damage to the barrier arm and vehicle;
- LED red/green signal lamp: change the passing signal for the vehicle (option)
- Infrared ray protection: it may be detected if the people walk through the barrier arm to avoid any possible accident; (option)
- Remote control: wireless remote controlling is available with the effective distance longer than 25m; (option)
- Falling protection: the loop induction shall prevent the barrier arm fall down when the vehicle is under it;(option)

2 Main Indexes

- Technical Parameters

Parameters	SJSPD003A	SJSPD003B	SJSPD003C	SJSPD003D
Supply voltage	AC230V / AC110V	AC230V / AC110V	AC230V / AC110V	AC230V / AC110V
Power Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Rated Power	80W	80W	80W	80W
Rated Rotary Speed	30 r/min	25 r/min	15 r/min	10 r/min
Rated Torque	12N·m	18N·m	24N·m	30N·m
Standard Arm length	2.5m	3.0m	4.0m	5.0m
Noise	≤60dB	≤60dB	≤60dB	≤60dB
Raising/Falling Time	0.9s	1.4s	1.8s	3.2s
Service Life	≥5million times	≥5million times	≥5million times	≥5million times
Error Action	≯0.01%	≯0.01%	≯0.01%	≯0.01%

- Work Environment

  Ambient Temperature: -40ºC～+75ºC

  Relative Humidity: 50%～90%

  Atmospheric Pressure: 86Kpa～106 Kpa

3 Safety Precautions

3.1 General

- SJSPD003 serial highway barrier gate has been well designed manufactured and tested and appropriately adjusted. Failure to operate in accordance with the instructions when installing and using might cause injury and damage to the personal body and equipments.
- Please read this handbook carefully before using and installing the product to ensure operational safety and avoid accidents
- Correct installation and use of the product shall be entitled the quality promise and sound after-sale service of the maker.
- SJSPD003 serial highway barrier gate is applicable to these automatic charging systems such as expressway parking lot and 3D garage.
- master controller is applicable to TY-PD003-MAG automatic traffic barrier and it's not advised for other devices.

3.2 Safety

- Nobody is allowed to stand under or walk through when the flange-shaft raises or falls; do not stand or put objects at the rotary range of the shaft.
- The operator should observe the moving condition of the shaft and the surrounding when operating the shaft. If there is no special condition do not stop the action in the process of raising/falling.
- Please cut off the power and keep the shaft raised in case of power failure;
- The installation and wiring must be conducted according to the construction standard and electric regulations;
- The power line must be connected on the socket that has grounding protection never try to eliminate the grounding lead of the power line.
- Only the professional personnel is allowed to set up running mode and install IR detector.

3.3 Safety symbols

Safety symbols used in this handbook

- **Warning!**

This symbol is used in this handbook to warn installer for potential harm. Please read these instructions very carefully.

- **Caution!**

This symbol is used in this handbook to designate those actions or states which represent a potential hazard to equipment. Please read these instructions very carefully.

- **Note!**

This symbol is used in this handbook to designate useful information for the operator.

4 Installation

4.1 Guidelines for Foundation

Select and confirm the installing position (concrete groundwork is required) according to the actual condition. Lay the wires and pipes (G3/4') according to the rules and regulations of GBJ232 *Code for Construction and Acceptance of Electrical Equipment Installation Engineering*. The figure 4.1 is the auto flange-shaft and the typical installation diagram.

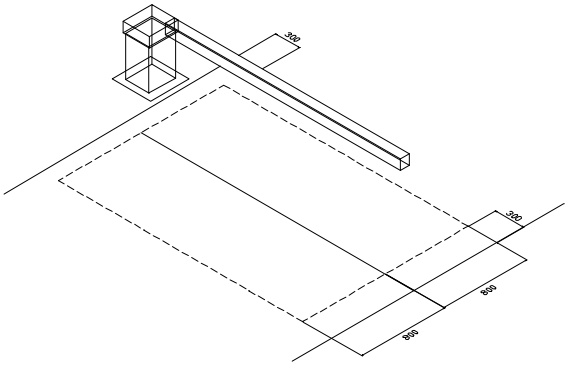


Fig. 4.1
Foundation

4.2 Housing installation

Confirm the installing position of auto flange-shaft and fix four foundation bolts on the ground for the housing. The attached installing template could be used to punch when installing. Note: the disconnecting direction of the collision prevention device should be consistent to the passing direction of vehicle. The related sizes are described in the figure 4.2:

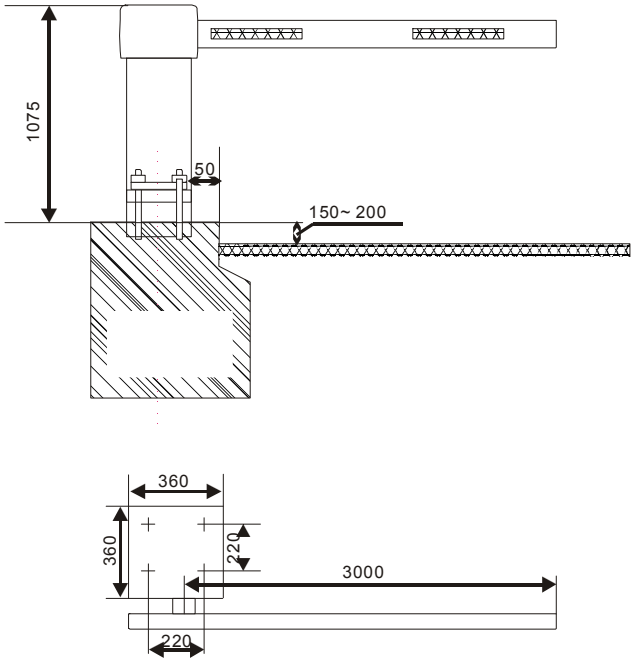


Fig. 4.2
Size of Embedment and Installation

4.3 Installation

Check the attached accessories and take out the pressboard fix the flange-shaft on the foundation. The direction of flange-shaft could be adjusted by loosening nut to get the proper position and angle and then screw down the bolts.

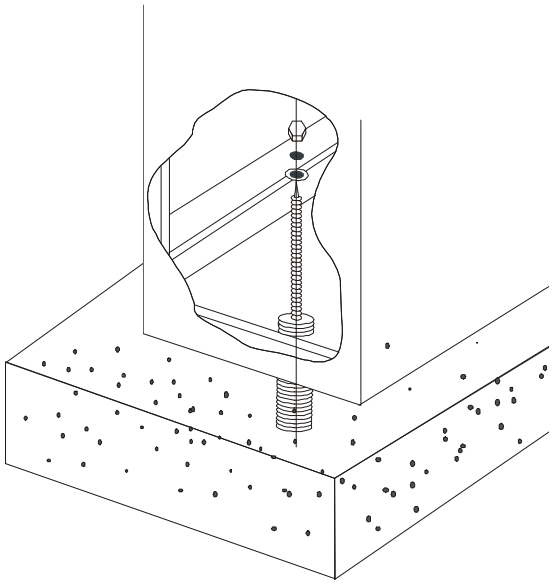
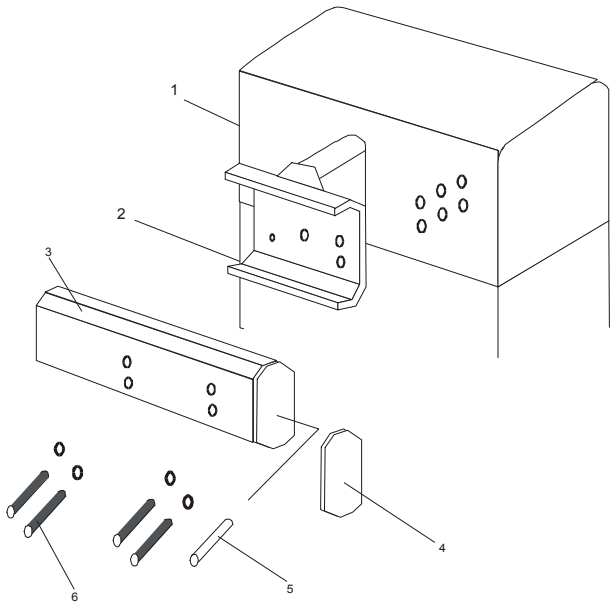


Fig.4.3
Adjustment of the Housing

4.3 Flange-shaft installation

4.4According to figure 4.4 use the attached tools (bushing bolts and tapping pin) to install the flange-shaft inside the flute of the major axis bracket.

Fig.4.4
Installation of flange shaft



1 Housing 2 Bracket 3 Flange-shaft

4 Tapping Pin 5 Bushing 6 Bolts

The shaft and bracket must be horizontally installed

M8Use M8 bolts to fix the shaft with the bracket

5 Panels and Terminals of the Master Controller

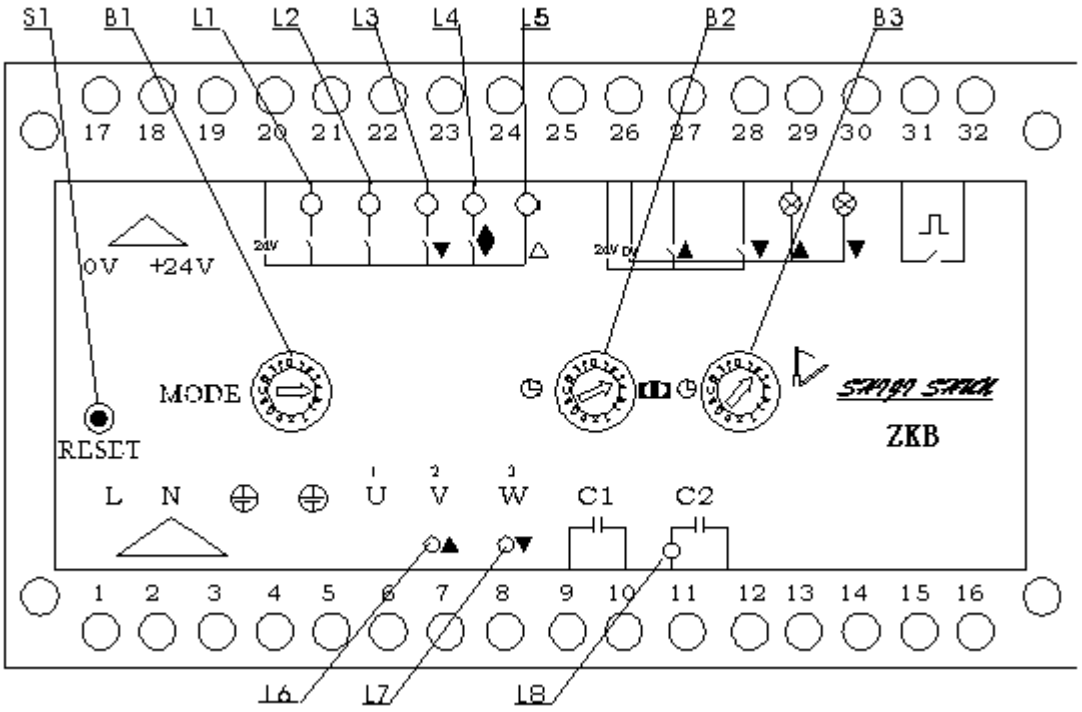


Fig.5.1
Panels and terminals on panel

Caution:
Do cut off the power before installation.
Voltage of terminal 1/2: 220V!

Indicators and Buttons on Panel

- S1: reset button use to reset the master controller;
- B1: mode selection rotate the knob to select the work mode;
- B2: running time use to select the total running time (2s-16s);
- B3: automatic falling time use to select the automatic falling time (5s-7s);
- L1: raising signal indicator mean the raising signal input when it's turned on;
- L2: loop raising signal indicator mean loop inductance raising signal input when it's turned on;
- L3: falling signal indicator mean falling signal input when it's turned on;
- L4: limit switch indicator mean raising/falling position when it's turned on it may work with L6 or L7 to display the status of flange shaft.
- L5: safety switch indicator mean the master controller may respond to the falling signal when it's turned on;
- L6: raising indicator mean the flange shaft is being raised when it's turned on;
- L7: falling indicator mean the flange shaft is being fallen when it's turned on;
- L8: power output indicator mean total power output when it's turned on.

Definition of the Terminals

PE must be connected to ensure the safety of the controller

Please use the designated models and brands!

No. of Terminals	Definitions
1	To power L;
2	To power N;
3	To ground lead of the power PE;
4	To ground lead of the motor PE;
5	To public line C of the motor
6	To falling control line V
7	To raising control line W;
89	To running capacity (4uF/AC450V);
1011	To speed reducing RC (R=5Ω/25W C=4uf/AC450V);
17	+24V grounding terminal
18	+24V power terminal 0.2A current Max.;
19	+24V output public terminal of control signal;
20	Open pulse input terminal civil level available;
21	Open pulse input terminal some terminal inputs have the function of auto falling high level available;
22	Close pulse input terminal high level available;
23	In-place switch signal public input terminal of in-place switch high level available;
24	Safety switch input terminal high level available;
25	+24V power terminal
26	+24V grounding terminal
27	Open pulse input terminal same as terminal 20;
28	Close pulse input terminal same as terminal 22;
29	Output level in the status of raising;
30	Output level in the status of falling;

6、Functions and Adjustment of the Automatic Traffic Barrier

6.1 Running Mode and Wiring Methods

Nine running modes are available and select by B1 switch (MODE) on the panel.

It's advised to operate Mode 1-4 by manual. It may select and install safety device (install loop detector under the flange shaft) the output terminals of safety device are connected with terminal 19 and 24. If the output is open circuit the shaft shall not fall down. It's advised to operate Mode 5-8 by automatic it must install safety device.

The running mode has been set up according to client's requirement before leaving the factory. If you want to change the mode please refer to the instructions as below and select the proper mode each mode has its own wiring method.

If the maker has set up the running mode in advance, it's advised not to change, or it might cause error. The external control terminal could be connected with the passive input only, it might damage the electric parts if with the active input.

MODE 1 Synchronization control

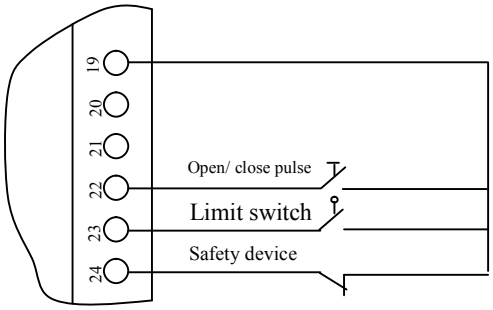


Fig.6.1 Wiring diagram of Mode 1

Single-button operation. The status is synchronous to the action of flange shaft;

Press the button to fall down and release the button to rise up;

The button is connected between terminal 19 and 22.

MODE2 Locking control

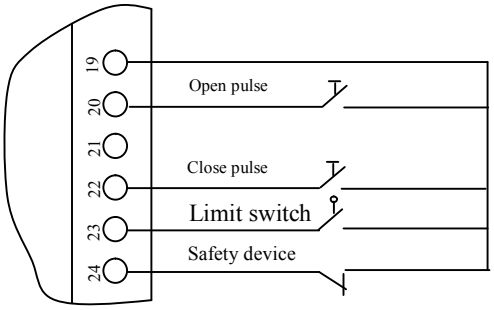


Fig.6.2 Wiring diagram of Mode 2

Double-button locking operation

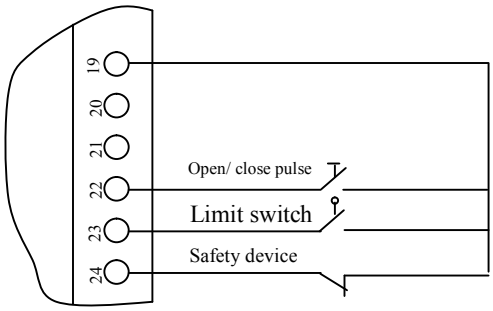
ON/OFF is connected with terminal 19/20;

Press ON button to rise up the shaft;

Press OFF button without release to fall down till it reaches the lowest position or it will rise up automatically;

MODE3 Single-button sequential control

Fig.6.3
Wiring diagram of
Mode 3

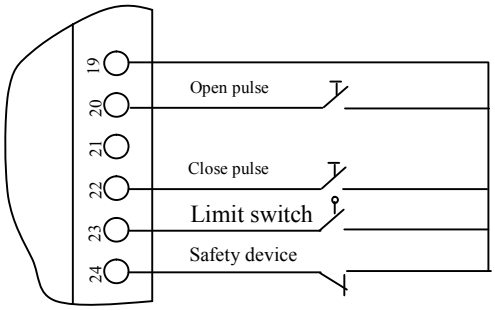


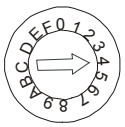
Single-button sequential control

Press the button once to raise/fall down the shaft one time operating process: raise—fall—raise… The switch is connected between terminal 19 and 20;

MODE4 Double-button control

Fig.6.4
Wiring diagram of
Mode 4



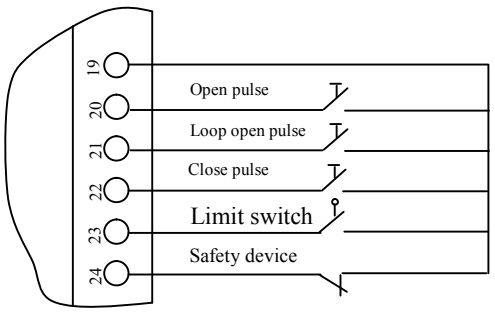


Double-button pulse control

ON/OFF is connected with terminal 19/20 and terminal 19/22 to raise/fall the shaft respectively press ON button to raise and press OFF button to fall down;

MODE5 Highway barrier arm falling

Fig.6.5
Wiring diagram of
Mode 5



ON/OFF is connected with terminal 19/20 and terminal 19-22;

Press ON button or when the open pulse has signal input the shaft will be raised.

And it automatically falls down after a time delay (adjusted via B3 switch on the panel) press OFF button to fall down barrier arm..After the vehicle leaves the control area the shaft will automatically fall down as for the close pulse produced by HRB.

Control area means the sensitive range of the loop inductance embedded under the shaft. The loop inductance outputs the control signal through the loop sensor and the signal is connected with terminal 19/24 when the vehicle stays on the control area the shaft will not fall down;In Mode 5 safety device is required (such as loop sensor).

MODE6 Automatic direction judgment

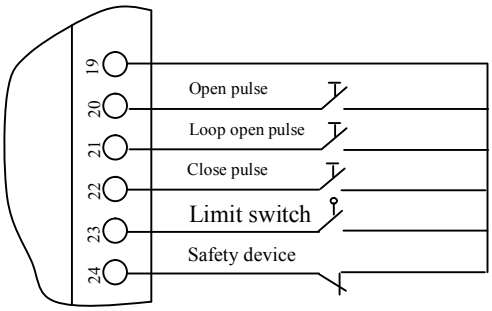


Fig.6.6
Wiring diagram of Mode 6

ON/OFF is connected with terminal 19/20 and terminal 19/22.
Press ON button or start the loop to produce open pulse signal (21) to raise the shaft;
When the vehicle leaves the control area the shaft falls down;
It may also fall down the shaft by OFF button.

In Mode 5-8, Terminal 24 has effective signal, when it's disconnected with terminal 19, the shaft shall not fall down.

MODE7 Safety control

Refer to figure 6-5 for the wiring method of Mode 7.
Refer to Mode 5 for the functions but automatic falling function is not available in this mode;
ON/OFF is connected with terminal 19/20 and terminal 19/22;
Press ON button or start the loop to produce open pulse signal (21) to raise the shaft;
It may also fall down the shaft by OFF button.

MODE8 Safety control

Refer to figure 6-5 for the wiring method of Mode 8.
Refer to Mode 7 for the functions but automatic falling function is not available in this mode;
ON/OFF is connected with terminal 19/20 and terminal 19/22; Press ON button or start the loop to produce open pulse signal (21) to raise the shaft;It may also fall down the shaft by OFF button.

MODE 9-F Assistant extension function

Mode 9-F is for special setup according to client's requirements.

In general cases, if Mode 9-F is selected, the shaft shall not fall down or rise up.

6.3 Deceleration and stop

The functions of deceleration and reverse stop are available in raising and falling the flange-shaft it helps to stop the flange-shaft and improves the stability of stopping shaft it works with the limit switch to make the flange-shaft stop stably and the motor's power shall be automatically reduced after the flange-shaft falls down and the proper driving force shall be synchronously produced to lock the flange-shaft consequently the clutch is unnecessary to be installed on the mechanical system and it's also convenient to raise the flange-shaft when breaking the electricity.

6.4 Status display

Maximum current output of the controller is 20Ma.

The user may check whether the controller is normally working via the indicators.

The working status of flange-shaft is displayed on the master controller.

Flange-shaft raising: Terminal 26/29 produces +24V level output terminal 30 is anode L4 L5 and L6 shall be turned on;

Flange-shaft falling: Terminal 26/30 produces +24V level output terminal 30 is anode L4 L5 and L7 shall be turned on;

The output of master controller may be used for the passing lamp. The green lamp shall be turned on when raising the flange-shaft which indicates the vehicle may pass the red lamp shall be turned on when falling the flange-shaft which indicates the vehicle is forbidden to pass.

6.5 Count function

Relay contact's capacity:
Max×24V DC
0.25A/250V AC

In the function mode 4 when the flange-shaft is raised the terminal 31/32 relay contact of master controller shall produce 300ms close signal in the function modes 5 6 7 and 8 when the loop of falling flange-shaft is activated each time the terminal 31/32 relay contact shall produce 300ms close signal. The external controlling system may be counted according to this way.

6.6 Adjustment of total operating time

The value of total running time must be bigger than the raising/falling time of the shaft (generally 2S higher), in case of strong wind, additional 2S should be added to ensure correct work.

Every operation of the system shall be protected by the total operating time. The total operating time means the total time from executing the order to stopping operation the time may be set up by adjusting the DIP switch (B2) on the master controller. The total operating time is 2S-16S.

6.7 Adjustment of Auto Falling Time

56TYB3HRBTY5S-7.5S2Modes 5 and 6 have the auto falling function. Auto falling time may be adjusted by the DIP switch (B3) on the master controller. The falling time function may be started if there is one raising signal. Consequently provided that the inductor has no raising signal or the safety controlling device is not activated the flange-shaft shall be automatically fallen down after the preset falling time. The auto falling time is 5S-7.5S. The default is 2.

The stability of stopping flange-shaft may be changed by the travel switch loosen the cam first and then rotate the cam to change the time the master controller may confirm the proper braking time according to the position of this travel switch so as to make the flange-shaft raise and fall stably and correctly. It may be adjusted upwards or downwards according to the actual needs. Lock the cam after adjustment. The switching position has been adjusted before ex-factory. Only the professional personnel is allowed to adjust if need or it might cause some failures.

Onlythe professional personnel is allowed to adjust if need, or it might cause some failures.

6.9 Adjustment of Flange-Shaft

It must cut off the power before adjusting the shaft; Do NOT electrify the device if the cover is not moved back; or it might cause serious personal injury.

- Adjust Shaft (1) to horizontal position and lock it;
- Screw off the bolts fixing the housing and cover and remove the cover;
- Screw off two hexagonal bolts at the two ends of connecting rod (4) insert the attached bend axis into the hole on the rod (4) to rotate the rod (4) adjust the shaft (1) to horizontal position and then screw down two hexagonal bolts;
- Raise the shaft (1) to vertical position adjust the nut on the spring pole to properly distribute the tension to the two directions so as to ensure the shaft (1) has a 45 degree of angle with the horizontal level when it's in free status;
- After all connections are in good condition move back the cover and screw down the nuts.
- Check the parts carefully and then connect the power supply to use the product.

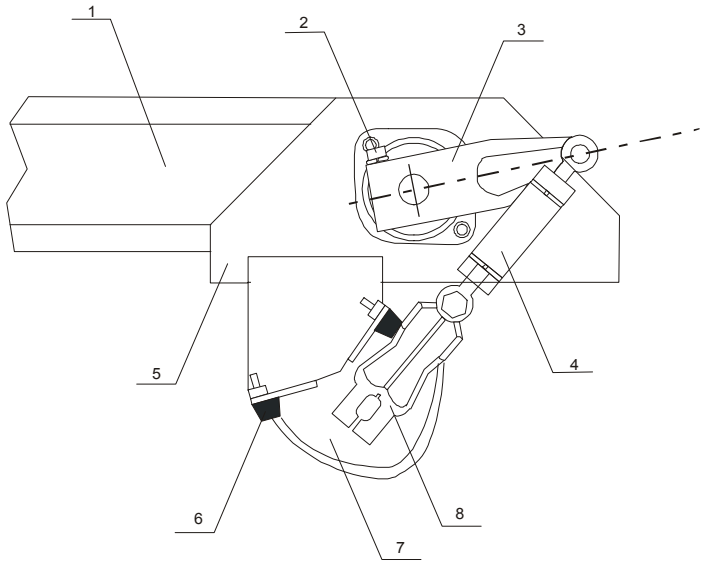
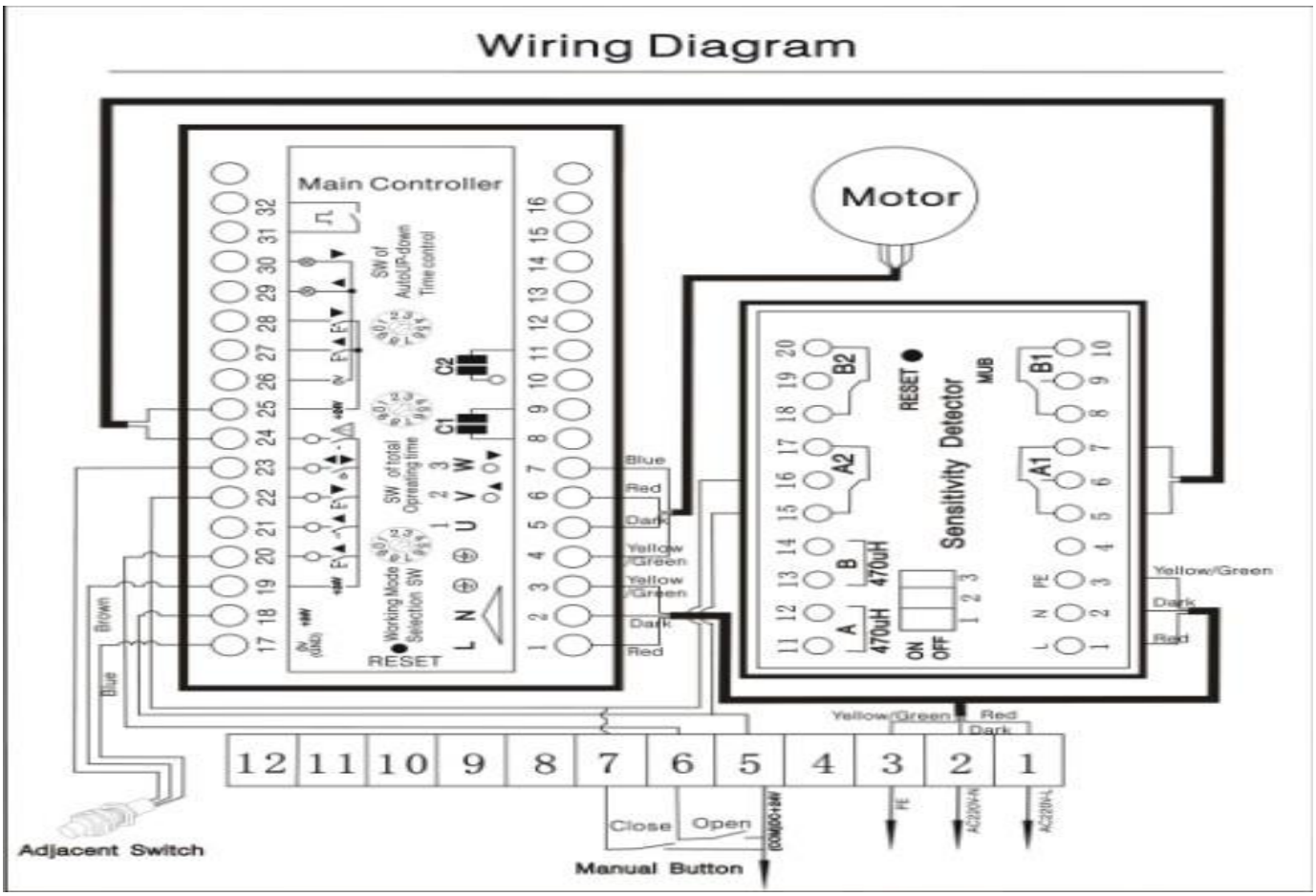


Fig.6.7
Adjustment of
Flange Shaft

1. Flange-shaft 2. Hexagonal bolt 3. Driven rocker 4. Connecting rod

5. Bracket 6. Cushioning device 7. Motor 8. Driving rocker

7 Wiring Diagram



7.1 Interfaces and Circuits inside the Controller

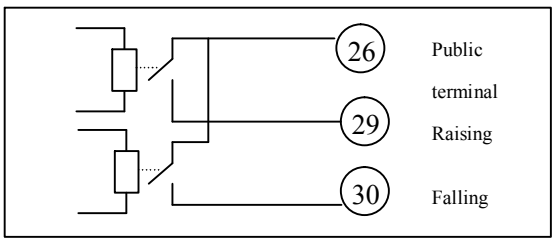
Input interfaces of raising/falling (photoelectric isolation input)

Photoelectric isolation input

（）Output interfaces of shaft's status (relay contact)

Fig.7-3

Relay output



（）Pulse signal output (relay contact output)

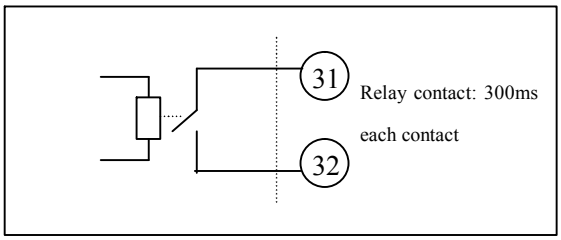
Fig.7-4

Pulse output mode

Relay contact capacity

Max×1A/24V DC

0.25A/250V AC



7.2 Common Connections of Control Signal

- Raising/falling control by relay output

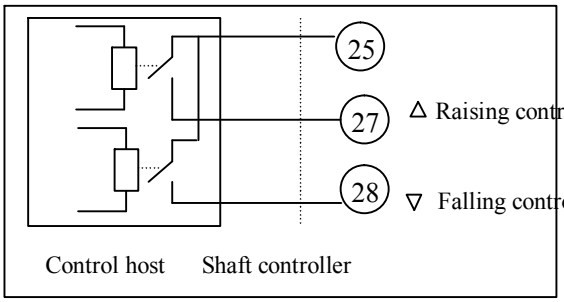


Fig.7-5

Relay output control

- Raising/falling control by photoelectric isolation output

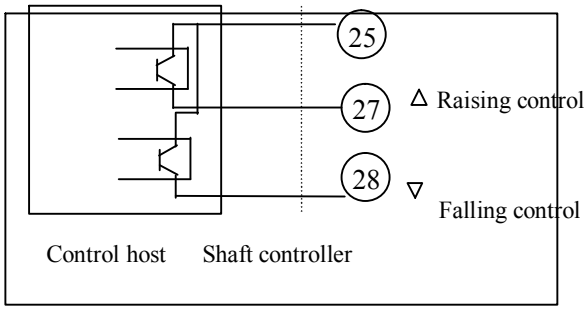


Fig.7-6

Photoelectric output control

Fig.7-7

Direct control mode of relay

Terminal 29/30 of the master controller is the output mode of relay

- Control road signal lamp by raising/falling output

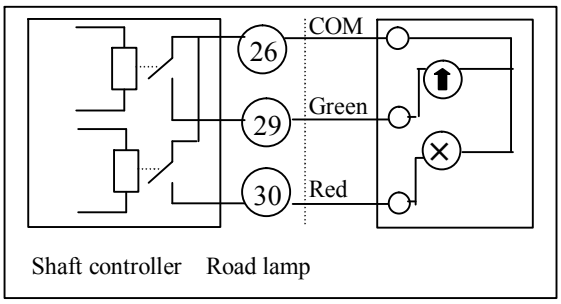


Fig.7-8

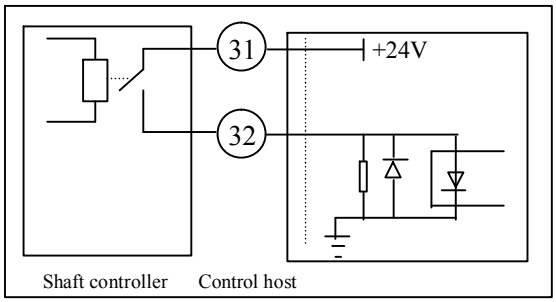
Count pulse output

Relay contact capacity:

Max×1A/24V DC

0.25A/250V AC

- Detect by Pulse Counting



8 Trouble shooting

Faults	Possible Reasons	Solutions
The shaft fails to raise/fall	The wire connection is not good	Check the connections
	ZKB20 or terminal 22 is short circuit	Check connection and controller
	HRB locked	Check loop inductance
	Controller error	Change a controller
	Fuse blows out	Change a fuse
The shaft could raise or fall only	ZKB20 or terminal 22 is short circuit	Check connection and controller
	The stroke switch's leads are connected in converse	Connect the leads correctly
The motor fails to move the shaft	The tension of the spring is not adjusted in balance	Adjust the tension of the spring to make the shaft has a 45 degree of angle with the horizontal level
The shaft couldn't raise/fall down to the vertical/horizontal level	The length of connecting rod is improperly adjusted	Make the shaft at raising/falling position adjust the length of the rod to make the shaft at vertical/horizontal position and then lock the nut.
When the shaft reaches the vertical/horizontal level the shaft is heavily shaken	The tension of the spring is not adjusted in balance	Adjust the position of the limit switch's cam to make the shaft run stably when it reaches the vertical/horizontal level.

9 Maintenance

Every three months

1. Check the condition of all parts connection;
2. Lubricate all rotary parts.

Every six months

Check the condition of the abrasion of all rotary parts repair or change these parts that are heavily abraded.

10 Service Records

Date of Installation_____

Place of Purchasing_____

Tel: _____

Installed By_____

After-sale Service Tel:_____

Service Contents_____

_____