Swing Gate Operator

User's Manual

Model: ZK1800(U)

WARNING!

ONLY QUALIFIED AND EXPERIENCED TECHNICIANS SHOULD ATTEMPT INSTALLATION OR SERVICE TO THIS UNIT, OTHERWISE, SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE MAY OCCUR.

PLEASE KEEP THESE INSTRUCTIONS FOR FURTHER REFERENCE.

CONTENT

1. Important Safety Information

Read the entire user's manual before beginning installation, and carefully obey the following instructions:

- The gate operator should be installed by a qualified technician. DO NOT in any way modify the components of the gate operator, otherwise, serious personal injury or property damage may occur.
- To prevent the risk of electrocution, be sure to turn off all power to the ZK1800(U) until installation is complete.
- The operator should be switched off before repairing it or opening its cover.
- When opening or closing the gate, do not attempt to walk or drive through the gate. Do not touch the gate while in operation.
- The auto-stop function must be checked during installation to ensure that the gate can auto-stop in the event of obstruction.
- This auto-stop function should be regularly inspected and adjusted, if necessary.
- Children should not be allowed to play near or operate automatic gates.
- Keep the remote control away from children.
- The automatic gate operator must be grounded.
- Be careful when in close proximity to moving parts where hands or fingers could be pinched.
- Do not allow control devices to be placed so that a person can access them by reaching through the gate.
- Never active your gate operator until you ensure that the area is clear of people, pets or other obstructions.
- The entrance is for vehicles only. Pedestrians must use a separate entrance.
- Our company reserves the right to change the design and specification without prior notification.

Failure to comply with the instructions above may result in personal injury or property damage. Our company does not accept responsibility for damage or injury resulting from installing this operator.

2. Additional Features

- Use this operator with single or double swing gates.
- Supports gate leafs up to 300kg and 3m.
- Supports up to 25 RF remotes, 2 included.
- User programmable and user erasable remote codes.
- RF hopping code technology prevents your remote code being accessible to others.
- For your safety, the ZK1800(U) will stop if it encounters an obstruction during closing or opening.
- Manual key release design for emergency purposes.

3. Specifications

Table 1 Technical data

Model	ZK1800	ZK1800U
Power supply	AC220×(1±10%)V, 50Hz	AC110×(1±10%)V, 60Hz
Rated force	2500N	
Maximum force	3000N	
Working angle of gate	90° or 105°	
90° opening or closing time (one gate leaf)	22 seconds	
105° opening or closing time (one gate leaf)	27 seconds	
Max. gate section weight	300 kg	
Max. gate section width	3 meters	
Max. travel distance (Fig.4)	265 mm（90°），330mm(105°)	
Cycles per hour (20°C)	⩽15	
Motor thermal protection	120°C	
Ambient temperature	-20°C~+45°C	

4. Necessary Tools

The following tools may be necessary to install the operator. You will need an electric drill, hacksaw, screwdrivers, tape measure, level, wire cutters and wire stripper, a socket set, and possibly access to a welder if your installation cannot use the supplied brackets. If the brackets shipped do not fit your gate because of the dimensions of your gate, you may have to fabricate brackets for your application or notch a column in order to obtain the necessary set back.

5. Site Preparation

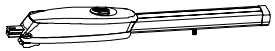
Before you begin the operator installation, make sure the following conditions are observed:

- The gate and post must be suitable for being automated.
- Check that the structure is sufficiently strong and rigid, the operator must operate on a reinforced point on the gate and that its dimensions and weights conform to those listed in the specifications of this document.
- The gate should be mounted to the fence post and swinging freely, there should be little resistance in the swing of the gate.
- Make sure that the gate is plumb and level.
- The fence posts must be mounted in concrete.
- If you want to use electric lock, make sure the bottom of the gate is 45-50mm from the ground. If the electric lock is not required, make sure the distance from the bottom of the gate to the ground more than 20mm.

6. Packing List

After receiving the product, you should make an unpack-inspection, in which you should check whether the product was damaged. If you have any problem please contact dealer.

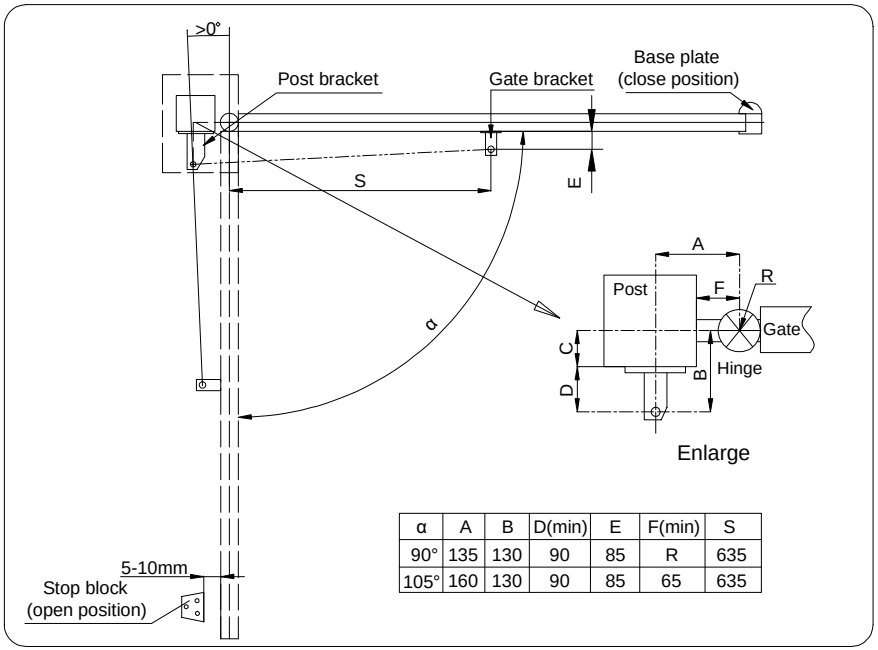
Table 2 Packing List of ZK1800(U) Swing Gate Operator

Item	Diagram		Quantity		Remark
			For one gate leaf	For two gate leafs	
Operator			1	2	
Post bracket			1	2	
Gate bracket			1	2	
Control box +2 remotes			1	1	
Stop block			1	2	Optional
Electric Lock			1	1	Optional
Base plate			1	1	Optional
Accessories	Pin	For mounting post bracket	1	2	In the same plastic bag.
	Circlip Ø12		1	2	
	Lock nut (M12)	For mounting gate bracket	1	2	
	Spring washer Ø12		1	2	
	Plain washer Ø12		1	2	
	bubble level		1	2	
	Release key		1	2	
User's manual			1	2	

7. Mechanical / Installation

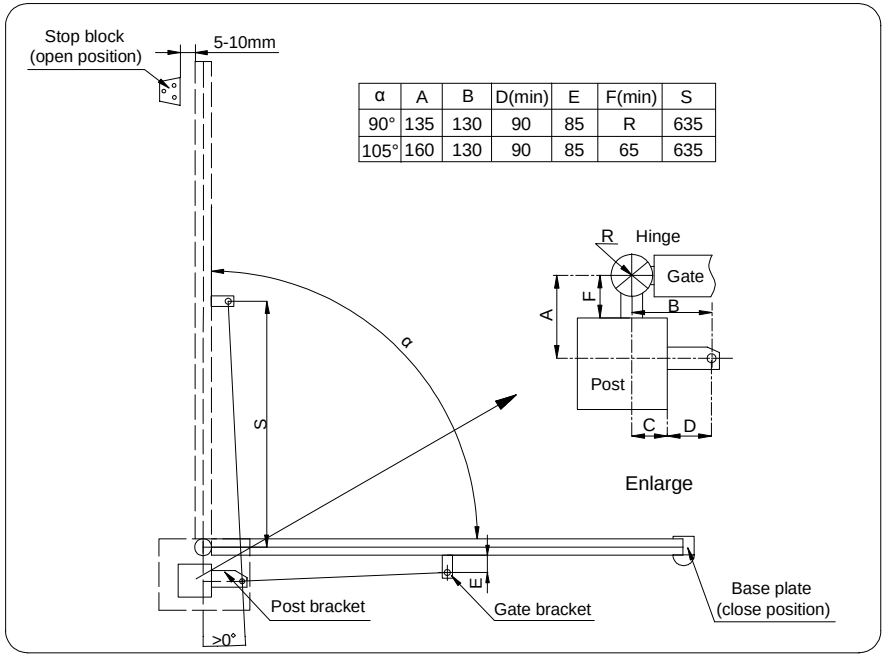
Begin with both operators unlocked. Next identify if this will be a "push to open" or a "pull to open" installation. In either configuration, the gate is mounted on one face of the mounting post, and the operator is mounted on the face 90 degrees from it. Below are schematics of both "push to open" and "pull to open" configurations.

As shown in the diagram below, correctly mounting geometry assures that the desired degrees of swing are achieved, that the gate speed is correct, and that the operator and gate will operate properly and have a long life.



α	A	B	D(min)	E	F(min)	S
90°	135	130	90	85	R	635
105°	160	130	90	85	65	635

Fig.1 Pull to open mounting geometry



α	A	B	D(min)	E	F(min)	S
90°	135	130	90	85	R	635
105°	160	130	90	85	65	635

Fig.2 Push to open mounting geometry

Main structure and dimension (see Fig.3 and Fig.4)

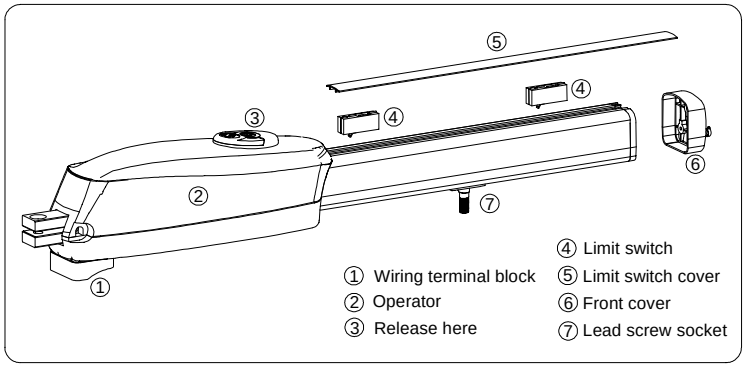


Fig.3

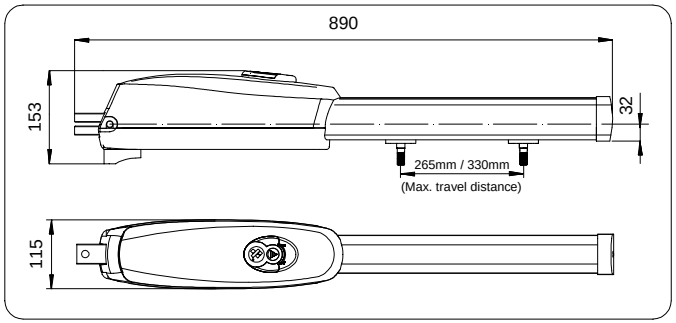


Fig.4

Installed automatic gate operator (see Fig.5)

Locate the gate operator between the two hinges, the installation height range is 300 – 800mm. this will prevent the gate from twisting and flexing. Add a cross bar on the gate if necessary.

Note: If the operator is mounted at a height above the specified range, and the gate is not sturdy enough, then it may result in bending or damage to the gate and gate operator.

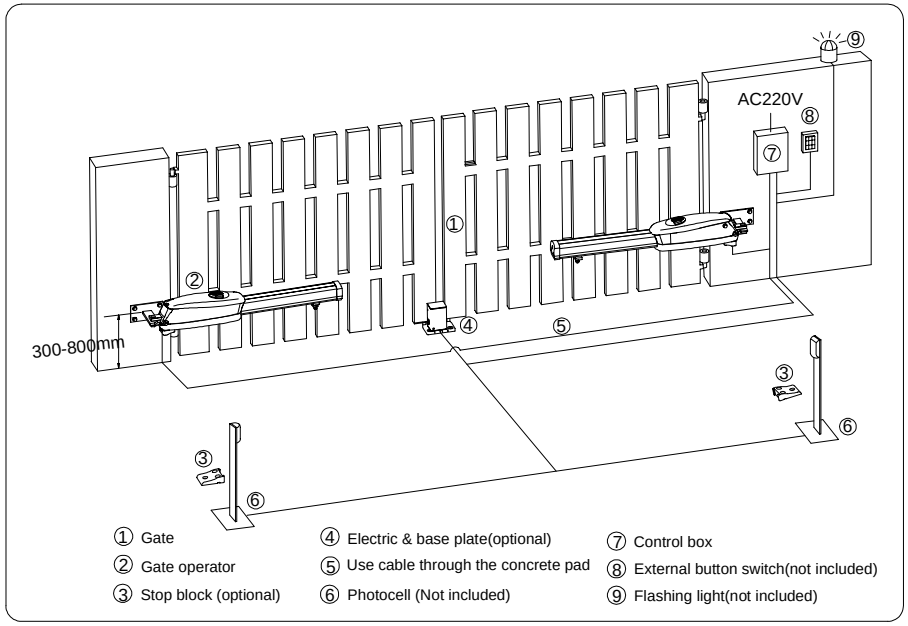


Fig.5

Rear parts of gate operator

- Weld the straight plate to post bracket, cut plate if necessary in order to obtain the correct mounting geometry.
- Fix the post bracket on the cement pillar with screws and spacers (or welding for metal pillar). Make sure that the bracket is plumb and lever. See Fig.6
- The bracket installation should meet the specifications as shown in figure 7.

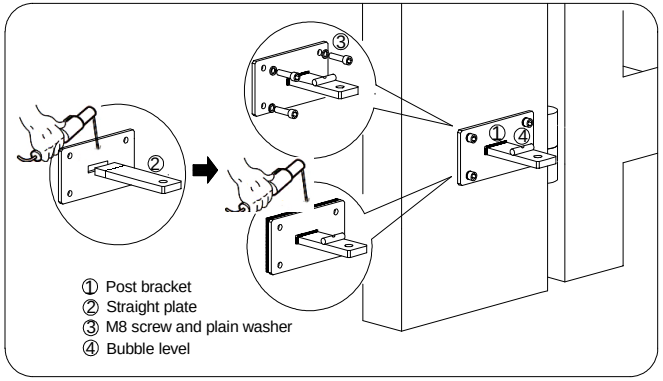
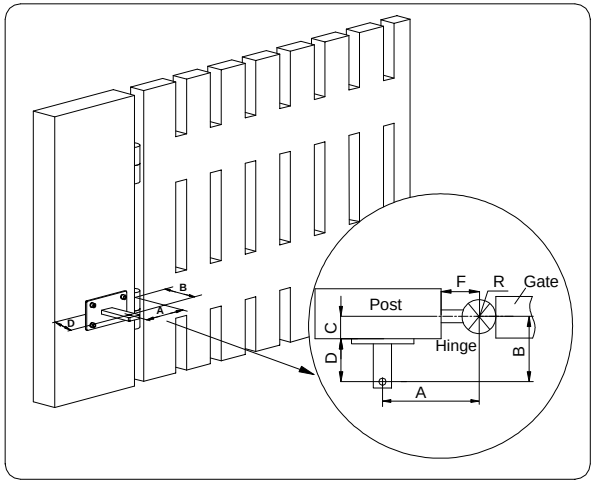


Fig.6



α（Angle）	A	B	D(min.)	E（Fig.8）	F(min.)	S(Fig.9)
90°	135	130	90	85	R	635
105°	160	130	90	85	65	635

Fig.7

If it is not possible to maintain the quotas indicated in the table see Fig.7, different measurements should be calculated with reference to the following items:
For α=90°, F≥R
For α=105°, F≥65mm
The difference between A and B must not exceed 30mm.
It is important to maintain the quota D, otherwise the gate will bump the post.
The thickness of gate (i.e. diameter of hinge) should be between 40mm and 70mm.

Front part of gate operator

- Weld the straight plate to the gate bracket, make sure E=85mm.
- Mark a vertical line around 635mm from the center of hinge. Fig.9
- If the gate brackets shipped do not fit your gate because of the dimensions of your gate, you may have to fabricate brackets for your application or notch a column in order to obtain the necessary set back.

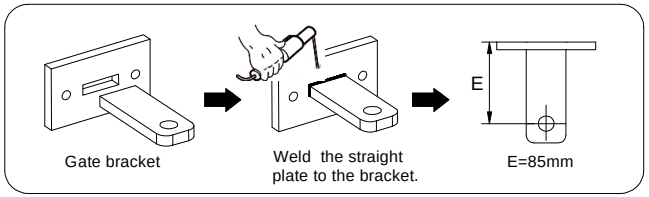


Fig.8

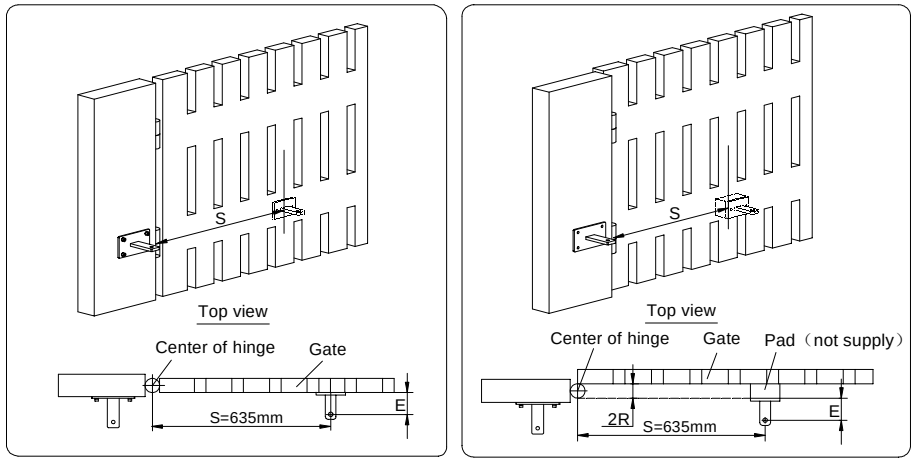


Fig.9

- Mount the rear part of the gate operator on the post bracket using the pin supplied, secure the pin using the circlip. Fig.10
- Install the gate bracket on to the front part of gate operator using the lock nut. See Fig.11

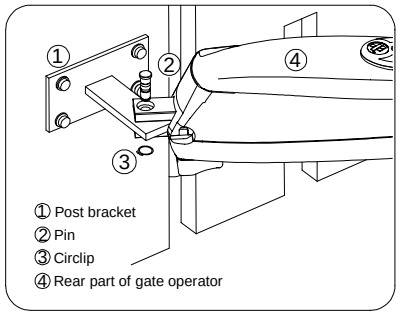


Fig.10

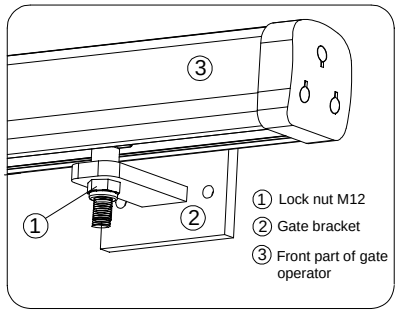


Fig.11

- Move the front part of gate operator up and down slowly, check the installation height of the gate bracket, fit the gate bracket to the gate, and the centerline of the gate bracket should align with the vertical line, and use a level to check the flatness of the operator (See Fig.12). Tack weld the gate bracket on the gate, the bracket installation should meet the specifications as shown in Fig.1 and Fig.2.
- Release the gate operator, open and close the gate manually, performing complete opening and closing travel. Movement must be smooth and the lead screw socket, should not reach the mechanical stop.
- If this is not the case, review bracket positioning and that its dimensions conform to those listed in the specifications of this document.
- After you have identified the desired position of the bracket, remove the gate operator and permanently weld the gate bracket top, bottom and sides. See Fig.13.
- Install the gate operator as shown in Fig.14.

Caution: welding with operator in place may damage the operator.

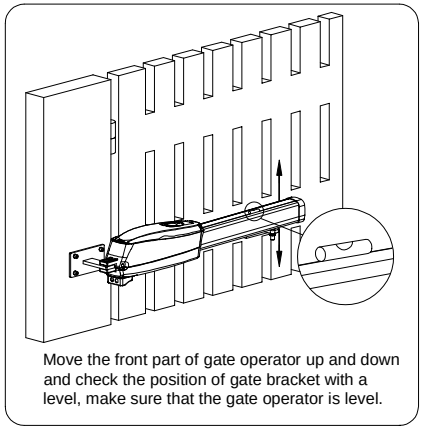


Fig.12

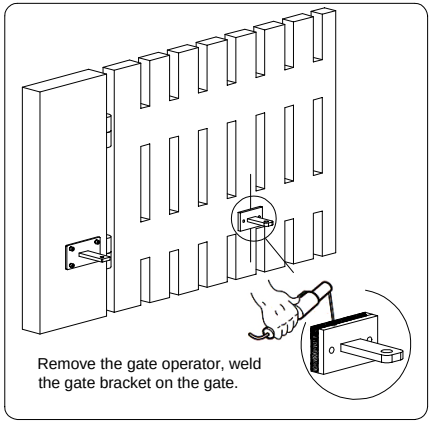


Fig.13

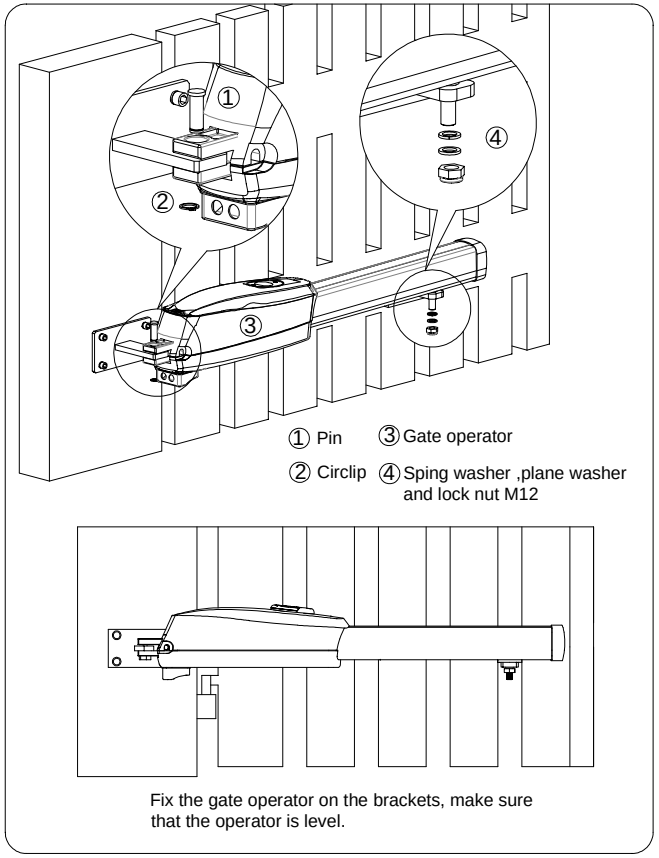


Fig.14

Stop block –open position

- After the gate reaches the desired angle (90° or 105°), ensure 5-10mm space exists between the gate and stop block See Fig.1 or Fig.2. This margin is required to prevent the gate from bumping on the stop block.
- Fix the stop block to the ground with expansion bolts, add pad if necessary.
- After mounting the operator, with the key unlocked, move the gate, verify that it stops at the proper position.

Electric lock

- An electric lock is provided for installation for gate lengths greater than 1.5 meters.
- To install the base plate of the lock, place the base plate between the two gates, determine the location, mark and drill the holes.
- Fix the base plate to the ground with 3 screws, make sure the gate is higher than base plate and that the lock pin can fit tightly in the hole in the plate.
- Weld the steel plate of the lock to the primary gate, and then fix the lock to the steel plate. See Fig.15 to determine the height of the electric lock.

Plate or tab (see Fig.15)

- The pair of gate sections will not start simultaneously. The gate section with the lock will start to open earlier than the other gate section, so that both sections can be locked properly.
- A plate or tab can be welded on the gate section with the lock so that when it closes, it will trap the gate section without the lock between itself and the base plate, thus locking both gate sections.

Top plate

- With the gate in the desired closed position.
- Weld a stop plate on the gate section without the lock.

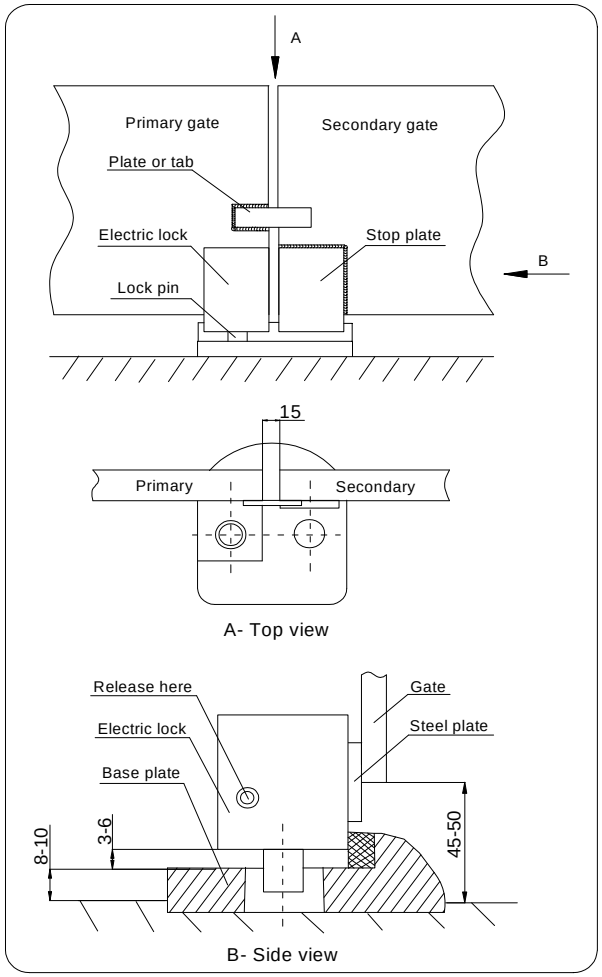


Fig.15

8. Mechanical / Adjustment

Manual operation (see Fig.16)

- If a power failure or a malfunction occurs the gate can be operated manually by releasing the operator to manual operation.
- Move the protection tab, insert the key supplied into the lock.
- Rotate the key clockwise by 180° to release the operator, open and close the gate manually.
- Reverse these steps when engage the operator.

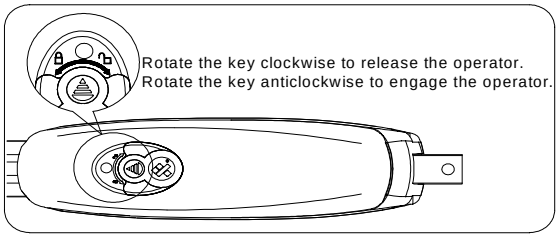


Fig.16

Limit switch

- Limit switches are needed to stop the gate at the correct open and closed positions.
- Isolate the power supply to the system.
- Back off the screw retaining the front cover, remove the front cover. Slide out the aluminium limit switch cover. (See Fig.17)
- Release the operator, manually close the gate to fully closed position.
- Slacken and then press down the screw locking the close limit switch by a screwdriver.
- Move the close limit switch into the required position and tighten the limit switch lock screw.(see Fig.18)
- Manually open the gate to fully open position.
- Slacken and then press down the screw locking the open limit switch by a screwdriver.
- Move the open limit switch into the required position and tighten the limit switch lock screw.

NOTE:

Move the open limit switch to right to open more, move the open limit switch to left to open less.
Move the close limit switch to right to close less, move the close limit switch to left to close more.

After limit switch adjustment, with power on, you can open the gate then close the gate and observe whether the gate has successfully reached the open and closed positions. If the gate does not reach the desired position, readjust the limit switch to suit the desired distance, the process is the same as the adjusting as above.

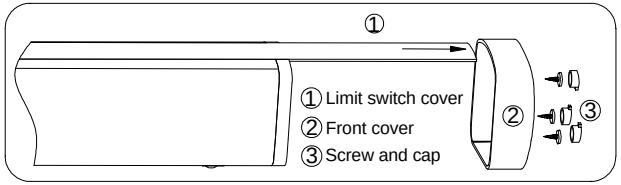


Fig.17

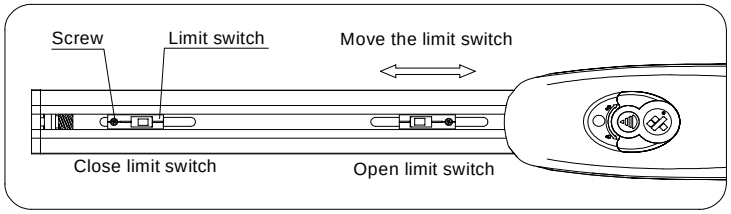


Fig.18

Mechanical stop

Move the gate to fully open and closed position, slacken the screws on the mechanical stop, move the mechanical stop to proper position until the stop is 10-20mm from the lead screw socket, tighten the screws. See Fig.19

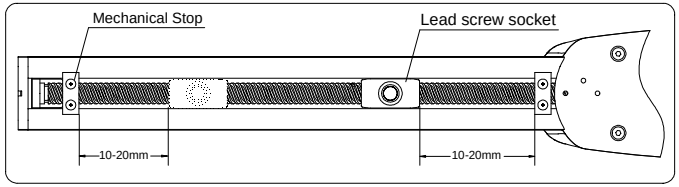


Fig.19

9. Electrical / Control Box Mounting

Install the cable

- In order to protect the wires, between the gate operator and the control box, armored cable, galvanized cable or PVC conduit must be set into the concrete when it is poured. To prevent rainwater from entering into the cable, arrange the cable as shown in Fig.20-A.
- Wires within the cable shall be located or protected so that no damage can result from contact with any rough or sharp part.
- The diameter of the cable must be more than 20mm, motor wire should be 0.75mm^2, the earth wire should be 1mm^2, and limit switch wire should be 0.5 mm^2.
- Use another cable for safety devices (such as electric lock, infrared photocell, flashing light, external button switch etc.), the wire size should be more than 0.5 mm^2.

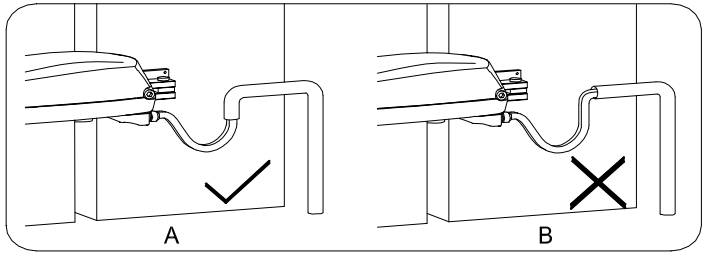


Fig.20

Install the control box

- The control box circuit should be equipped with breaker (10A).
- Make sure that power is OFF before making any electrical connections.
- Place the control box in the desired mounting position, open the cover of the control box, remove the control board, mark the mounting holes, and install the control box, fix the control board back to the box. See Fig.21
- Perform the wiring.

Note: we regard the gate with the electrical lock as the primary gate, the other gate as the secondary gate.

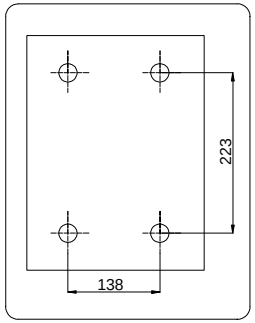


Fig.21 Control box mounting size

10. Electrical / Main Terminal Wiring

Note: following is wiring of 'pull to open' configurations. For 'push to open', please exchange the motor wires 'V1' and 'W1', 'V2' and 'W2', exchange the limit switch wries 'OP1' and 'CL1', 'OP2' and 'CL2'.

Connecting

Open the wiring terminal block cover, connect the gate operator to the control box as shown in table 3 and Fig.22, ensue that the wires and terminals match colors.

In order to prevent rainwater from entering main unit, remember to bend the cables downwards as shown in Fig.23.

Table 3

Primary operator	E	U	V	W	CL	COM	OP
Colour	Yellow & Green	Blue (white)	Brown (red)	Black	Red	White	Green
Control board	E	U1	V1	W1	CL1	COM	OP1
Secondary operator	E	U	V	W	CL	COM	OP
Colour	Yellow & Green	Blue (white)	Brown (red)	Black	Red	White	Green
Control board	E	U2	V2	W2	CL2	COM	OP2

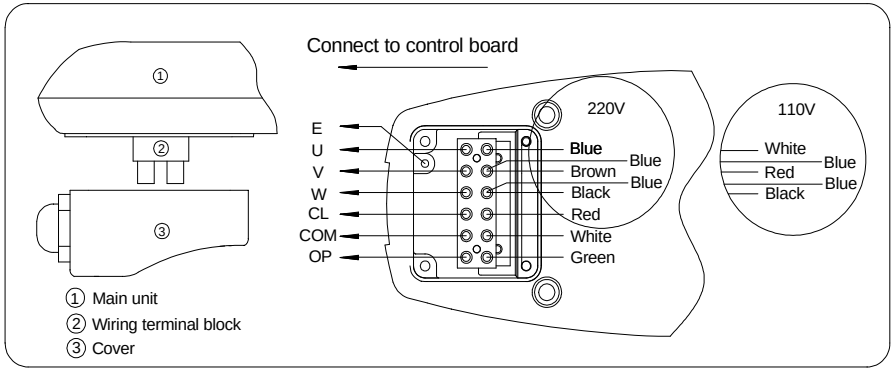


Fig.22

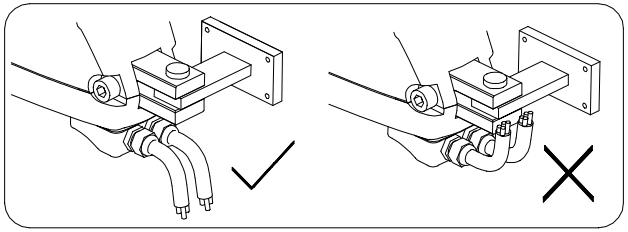


Fig.23

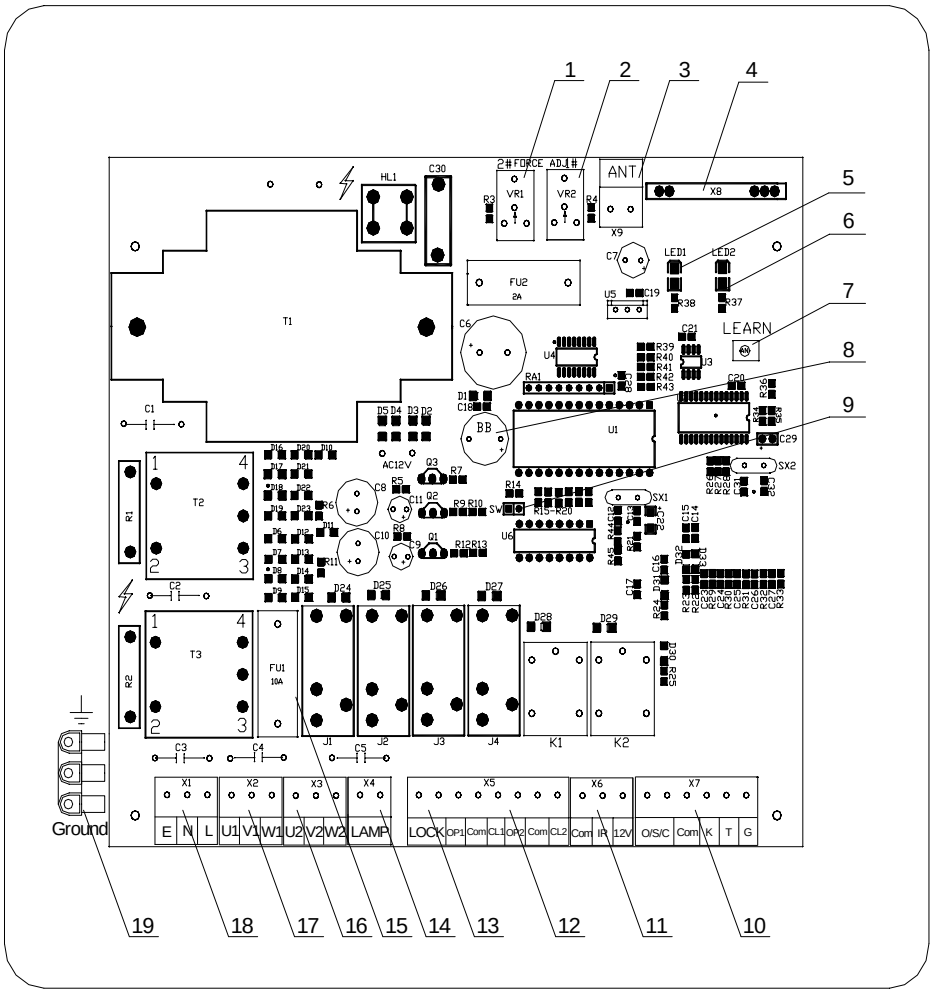


Fig.24 Control board diagram

Table 4 Wiring notes of control board

Position	Function	Remark
1	Force adjustor (for secondary gate-leaf)	The resistance may be increased or decreased by rotating clockwise or anticlockwise.
2	Force adjustor (for primary gate-leaf with electrical lock)	The resistance may be increased or decreased by rotating clockwise or anticlockwise.
3	Antenna	
4	Receiver panel	
5	Power indicator light (LED1)	1206 red
6	Learn indicated light (LED2)	1206 green
7	Learn button	6 mm x 6 mm
8	Beeper	DC12V
9	Set auto close function (SW)	
10	External button switch/keypad interface	Connect external button switch/keypad
11	Infrared photocell	Normally open (12V)
12	Limit switch	Normally open
13	Electric lock	DC12V
14	Flashing light	AC220V/AC110V
15	Fuse	AC220V: 5x20 10A ; AC110V: 5x20 15A
16	Secondary motor (for secondary gate-leaf)	
17	Primary motor (for primary gate-leaf with electrical lock)	
18	Power supply	AC220V/AC110V
19	Ground	

Power (see Fig.25)

Wire a standard grounded plug to your control board using standard electricians wiring practices. Wire the opposite end of this cable to the ' ⏚ ', 'N', 'L' contacts of the control board. Connect L to the power line, N to the neutral line, and ' ⏚ ' to the earth line.

Motor (see Fig.25)

Connect primary motor that on the primary gate (with electric lock) to 'U1', 'V1', 'W1'. Connect secondary motor to 'U2', 'V2' and 'W2'.

Flashing light (See Fig.25)

Attach two wires of flashing light to port 'LAMP'.

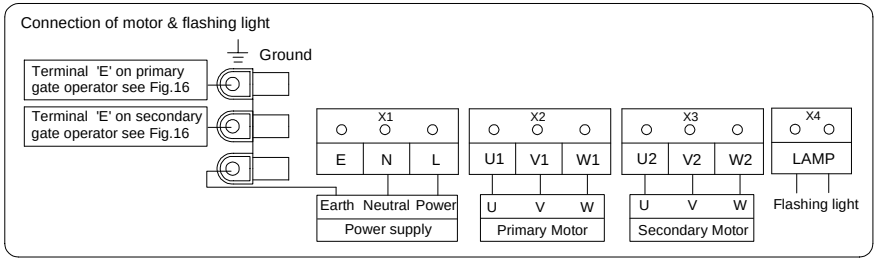


Fig.25

Electric lock DC12V (see Fig.26)

Connect two wires of electric lock to port 'LOCK'. Wire size should be more than 1 mm^2.

Limit switch (see Fig.26)

Connect primary limit switch that on primary gate operator (installed on primary gate with electric lock) to port 'OP1', 'COM', 'CL1'.

Connect secondary limit switch to port 'OP2', 'COM', 'CL2'.

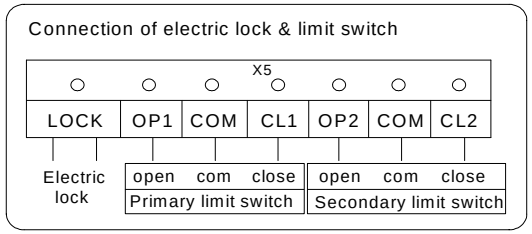


Fig.26

Note: Use operator with single gate, connect motor to 'U1', 'V1', 'W1', connect limit switch to 'OP1', 'COM', 'CL1', it is important to short the 'OP2' and 'COM', 'CL2' and 'COM' terminal with the jumper wires. See Fig.27.

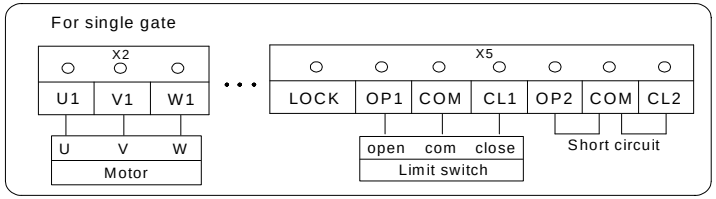


Fig.27

Infrared photocell (Normally open)

If the infrared beam is interrupted during closing, the gates will reverse and open immediately. During opening, the beeper will ring.

Connect signal wire of infrared device to 'IR' (see Fig.28 terminal X6), connect common wire (i.e. 'power supply –') of infrared device to 'COM', and connect 'power supply +' of infrared device to '12V'.

The control box is not factory equipped with an infrared device. The infrared device can be obtained through your dealer.

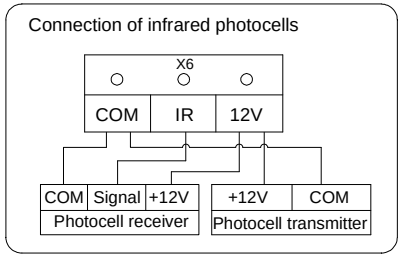


Fig.28

Install the external button switch (Normally open)

The ZK1800(U) is equipped with an interface for an external button switch or keypad.

To install the keypad attach two wires of your keypad to the 'O/S/C' terminal. The keypad will function in single channel mode.

For three-button switch installation, use the terminals for multi-channel mode. The port 'COM' is the common port, the port 'K' is used to open the gate, 'G' is used to close the gate, and 'T' is used to stop the gate. (See Fig.29 terminal X7)

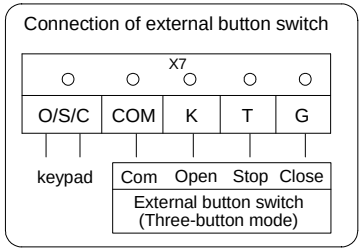


Fig.29

11. Electrical / Setting

Learn / erase remote controls

Adding extra remote controls (Learn):

- Press the 'LEARN' button on the control board (see Fig.24 No.7), then the green indicator 'LED2' (see Fig.24 No.6) will be on.
- Press the remote control button which you want to use, the 'LED2' will turn off.
- Press the same button again, the 'LED2' will flash about 5 seconds at 2Hz frequency. The learning process is finished.
- Up to 25 remote controls may be used.

To erase all remote controls

- Press and hold the 'LEARN' button on the control board until 'LED2' turns on and then turns off. This indicates that all the remote controls have been erased completely.
- The remote control works in a single channel mode. With each press of the remote control button which has been programmed, the gate will close, stop, open or stop cycle.

Warning: Notify the users that the gate is never to be operated unless it is in full view.

For safety and security, we recommend that the factory setting be replaced with a personal code.

Auto-stop function

- Slowly rotating the sensitivity sensor 'FORCE ADJ' (see Fig.24 No.1 and No.2) with a screwdriver, 1# sensor can be used to adjust primary operator, 2# sensor can be used to adjust secondary operator.
- Rotating the sensor clockwise increases the force. Rotating the sensor anticlockwise decrease the force.
- Place an immobile object along the gate path, allowing the gate to strike it while in the open or close cycle. The gate will stop if obstructed when closing or opening.
- If it does not, increase or decrease the force and repeat this test. Repeat the steps until the correct force has been set.
- Operators must be individually adjusted, repeat the steps as above for the secondary operator using the 2# sensor.

Auto-close function

- Place the jumper cap on both pins of terminal 'SW' see Fig.24, No.9, the gates will stay open for 30±3 seconds before automatically closing.
- Remove the jumper cap or place the jumper cap on one pin of terminal 'SW', the auto-close function is shut off.

An Infrared device is required to be installed for safety if the auto-close feature is enabled.

Factory preset: the auto-close function is shut off.

Open priority

The gate will return to open if you press the 'OPEN' button on the three-button mode external button switch during closing, the beeper will ring.

Operation

- Unlock the gate operator with the key. Push the gates to the opened position manually. Lock the gate operator with the key.
- Turn the power on.
- Close the gates by using remote control or external button switch. The secondary gate closes first, after 3 seconds, the primary gate-leaf closes, the secondary gate-leaf will stop earlier than the primary gate-leaf with lock, so that both sections can be locked properly, or you can stop the gate at its closed position by remote control or external button switch.
- If gates do not stop or bind before stopping, verify that the stop is firmly in place, and the sensitivity adjustment knob for that gate on the control board is adjusted correctly. Adjust counter-clockwise to reduce binding.
- Open the gates by remote control or external button switch. Firstly, the electrical lock will be opened, the primary gate-leaf with lock opens, after 3 seconds, the secondary gate-leaf opens, the primary gate-leaf will stop earlier than the secondary gate-leaf.
- If gates do not stop or bind before stopping, verify that the stop is firmly in place, and the force adjustment knob for that gate on the control board is adjusted correctly. Adjust counter-clockwise to reduce binding.
- Total working time: 30 seconds.

12. Maintenance

- Add 1# lithium base grease to lead screw regularly.
- Regularly verify that the gate swings freely and add grease regularly.
- Make sure the hinges function perfectly.
- Verify correct operation of the safety devices.
- Keep operator clean at all times.

13. Troubleshooting

Table 5

Symptoms	Possible cause	Remedy
Motor fails to work.	Power is OFF or wiring is incorrect.	Turn the power ON. Check the wiring.
Motor runs, but gate does not open or close.	(1) The gate is obstructed. (2) The lead screw is obstructed. (3) The operator is released.	(1) Remove obstructions. (2) Clean the lead screw, add grease if necessary. (3) Engage the operator.
Gate fails to stop	The 'FORCE ADJ' is adjusted too high.	Adjust 'FORCE ADJ' anticlockwise to decrease force.
Gate begins to close, then stops.	(1) The 'FORCE ADJ' is adjusted too low. (2) The gate is obstructed.	(1) Adjust 'FORCE ADJ' clockwise to increase force. (2) Remove obstructions.
Gate running direction is not correct, or gates run in different direction.	Wiring is incorrect.	Change the wires 'V1' and 'W1' or 'V2' and 'W2'. If the wiring between two gates is wrong and the gates cannot work, please check the wiring between 'U1, V1, W1' and 'U2, V2, W2'.
Remote control does not work.	(1) The indicator light of remote control does not light. (2) Remote control is not suitable for receiver.	(1) Battery level may be low, replace the battery inside the remote control. (2) Re-program the remote control.
Gate does not open far enough or does not have the proper opening angle.	The gate operator is not installed properly according to Fig.1-2 in the gate geometry section of this manual.	Either modify the installation to meet Fig.1-2 or adjust the size or replace the installation brackets in accordance with the gate geometry section of this manual.