



## **C600 SLIDING GATE OPERATOR (100)**

### **USER'S MANUAL**

### **(MAGNETIC LIMIT SWITCH)**



**STEEL AND PIPES, INC.**

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CE Approved



ISO9001:2000

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### 1. Important safety precautions

Carefully read and follow all safety precaution and warnings before attempting to install and use sliding gate operator, incorrect installation can lead to severe injury.

- Installing the C600 gate operator requires installation of standard 110V electrical wiring. This work should only be performed by a trained technician. Miswiring could cause personal injury or DEATH.
- To prevent the risk of electrocution, be sure to turn off all power to the C600 until installation is complete.
- The gate operator should be installed by a qualified technician; otherwise, serious personal injury or property damage may occur.
- Before installation, the clutch should be unlocked.
- The auto-reverse function must be checked during installation to ensure that the gate can auto-reverse in the event of obstruction.
- This auto-reverse function should be regularly inspected and adjusted, if necessary.
- When opening or closing the gate, do not attempt to walk or drive through the gate.
- Do not touch the gate while it is in operation.
- Children should not be allowed to play near or operate automatic gate.
- The automatic gate operator must be grounded.
- Install the gate operator on the inside of the property, DO NOT install it on the outside of the property where the public has access to it.
- Be careful when in close proximity to moving parts where hands or fingers could be pinched.
- Additional safety equipment such as photoelectric sensors, safety edges, roller guards and warning signs must be installed to prevent injury.
- Do not allow control devices to be placed so that a person can access them by reaching through the gate.
- In the event of power failure, an emergency release key allows you to operate the gate manually.
- The operator should be switched off before repairing it or opening its cover.
- Please erase and reprogram the code after installing the operator.

### 2. Main features

- Infrared safety beam interface.
- User programmable and user erasable remote codes.
- RF hopping code technology prevents your remote code being accessible to others.
- Supports up to 100 remote controls.
- For your safety, the C600 will stop and reverse if it encounters an obstruction on closing and stop when it encounters an obstruction on opening.
- Manual key release design for emergency purposes.
- Auto-close feature is available for this operator.
- Pedestrian mode.
- Single Phase Motor.

### 3. Main technical parameters

Power supply	AC 110×(1±10%)V, 60Hz
Motor speed	1680 r/min
Gate moving speed	10m/min
Required electrical circuit	10A
Output torque	14N·m
Auto close time	0 ~44 sec.

Remote control mode	Single Button
Environmental temperature	-20°C~+50°C
Main unit dimension	263×240×153mm
MCU logic voltage	DC5V
Net weight	21 Kg
Emergency release key in case of power failure	

#### 4. Necessary Tools

The following tools may be necessary to install the C600 Gate operator. You will need screwdrivers, an electric drill, wire cutters and a wire stripper, a socket set, and possibly access to a welder.

#### 5. Site Preparation

Before you begin the operator installation, the gate should be mounted and moving freely, there should be little resistance in the movement of the gate. The gate and post must be suitable for being automated. Check that the structure is sufficiently strong and rigid, and that its dimensions and weights conform to those listed in the specifications table of this document. Make sure that the gate is plumb and level. The fence posts must be mounted in concrete. The C600 is powered by 110V/60Hz AC power, therefore if you have not already done so; wire a waterproof outlet near the gate following proper safety standards for your area. If you are not experienced with this type of wiring or if your area requires it, hire a professional electrician to perform this as well as wire in the C600 in the electrical section. The C600 requires at least a 10A service. Make sure your electrician takes into account the voltage drop involved in running many feet of wire to your installation location. If an insufficient gauge of wire is used, there will be insufficient power at the site to operate the operator.

#### Parts List

Item	Quantity
Sliding gate operator	1
Operator Base	1
Remote control	2
Master Links	2
Chain	1
Chain Bolts	2
Chain Brackets	2
"U" Bolts for square & round gate frame	4
2 ¾_ (M8x 70mm) Bolts for mounting operator to the base and washers	4
2 ½_ (M8x65mm) Bolts for mounting Magnet brackets and washers	4
3 ¾_ Anchor bolts, Anchors, Washers and Nuts (In the same bag with manual release key)	4
5/8_ (M8x15mm) Socket Head Cap screws for mounting chain box	4
Manual release key	2
Magnet brackets	2
Magnets	2
1m BVR 0.7mm <sup>2</sup> antenna	1
User's manual	1

#### 6. Mechanical Installation

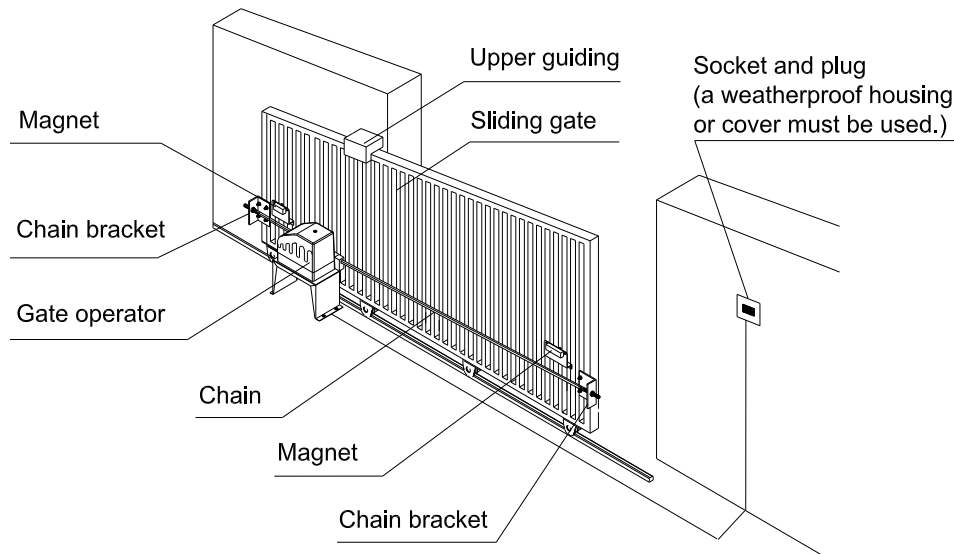


Fig.1

### Installation and Adjustment

The C600 Chain-driven Gate Operator operates by forcing a straight piece of chain through its chain box. This length of chain is extended between two chain brackets located at opposite ends of the gate. The entire configuration is shown in the diagram above.

#### Concrete Pad

The base unit of the gate operator requires a concrete pad in order to maintain proper stability. The concrete pad should be approximately 24" (600mm) x 12" (300mm) x 18" (460mm) deep in order to provide for adequate operation.

Once the gate is mounted adequately, electrical power is available, and the concrete pad is poured, you are ready to proceed.

#### Anchors

You can use the anchors that are provided with the operator, 3 3/4" anchor bolts (4), anchors, washers, and nuts. These anchors must be set into the concrete when it is poured, or you can use wedge anchors (1/4" x 4").

#### Operator Base

Mount the gate operator base to the concrete pad. The distance between the gate and the base should be no more than 2 1/2" (64mm). Verify that the operator is leveled properly.

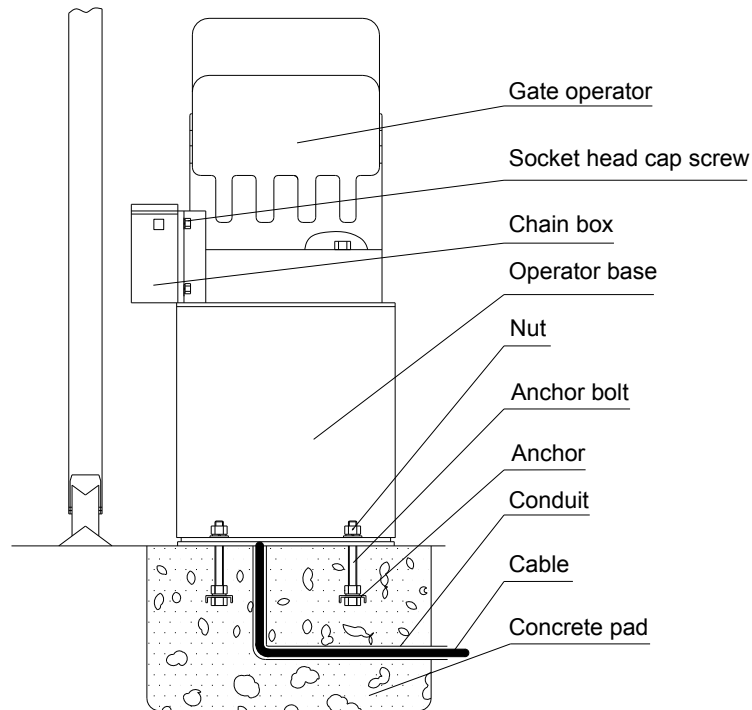


Fig.2

Chain Box

Make sure the ends of the guide chain are out of the chain holes on both sides of the chain box. Remove the cover and insert the manual release key and turn counter-clockwise to disengage the clutch. Remove the elastic band from the shaft and line up the key on the shaft with the sprocket at the chain box. Insert the sprocket from the chain box into the operator shaft. Place the operator on top of the base and use (4) 5/8 " (M8x15mm) socket head cap screws to mount the chain box in to the base.

Operator

Mount the gate operator to the base using (4) 2 3/4 " (M8x70mm) #48 bolts and washers. Make sure there is no more than 1/8" (2mm) of space between the cover and the chain box. Check the operator and make sure it is lined up with the gate.

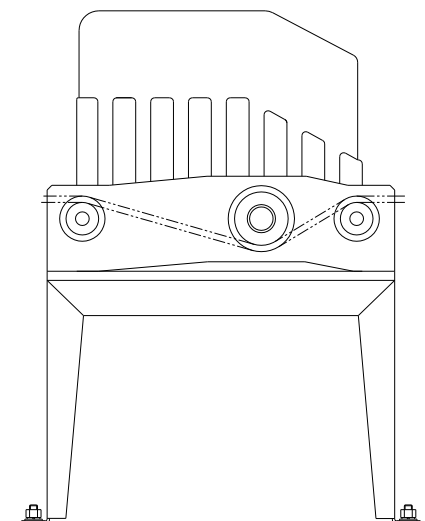


Fig.3

Chain Brackets

Use the appropriate bolts to attach the chain bracket to the frame of the gate. If the gate is of square frame style, use the square bolts shown.

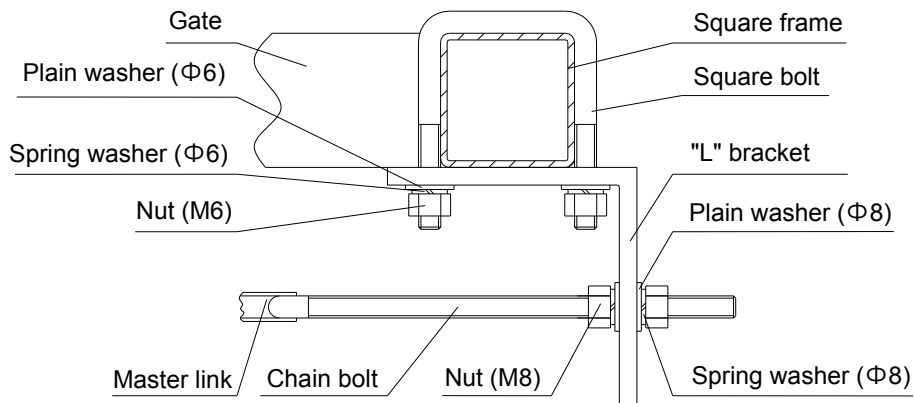


Fig.4

If the gate is of round frame style, use the round bolts shown.

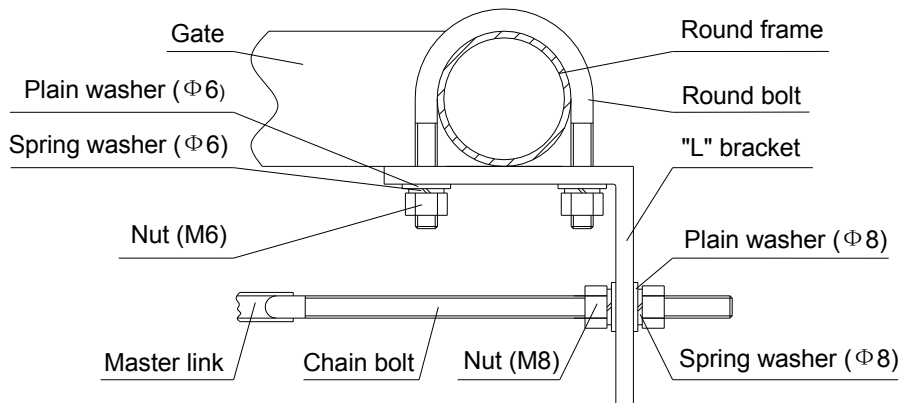


Fig.5

Chain

Close the gate and attach a chain bolt to the piece of chain that comes with the chain box using enclosure master links. Tighten the chain bolt to the bracket with washers and nuts. Pull the chain through the chain wheel box to the other chain bracket at the opposite end of the gate. Connect the other end of the chain and the chain bolt, and then tighten the chain bolt to the chain bracket. Thread up the chain by adjusting the chain bolt. Cut the chain to length if necessary. Make sure that the chain is perfectly aligned with the chain holes on the chain box. Tighten the chain by tightening the chain bolts at either end. See illustration below.

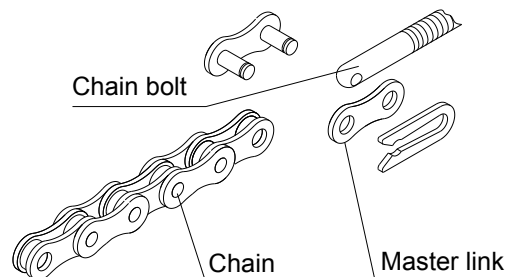


Fig.6

### Magnets for Limit Switch

Install the magnet and magnetic limit switch as shown in Fig.7. The magnet and limit switch are used to control the position of the gate. When the magnet is installed, release the gear clutch and push the sliding gate manually to pre-determine the position. Fit the magnet bracket to the gate and then tighten the gear clutch. The lower bracket is for open position and higher bracket is for close position. Finally adjust the magnet to the proper position by moving the gate with the motor. The magnet should be .39 - .59 "away from the magnetic limit switch. If it is too far away, the switch will fail to work. The distance between the magnet and the operator should be @ ½" (12mm) with the operator cover on. Adjust the position of the magnetic limit switch until the positions of the opening and closing meet the requirement.

**Important Note: Please note the two magnet brackets (fixed plate) are different: one is higher and another is lower. Verify and if necessary exchange the two brackets position. Also if necessary exchange the limit switch wires CL (close) and OP (open). Another common problem is there are four reed switches inside the magnetic limit switch: two are upper and two are lower. The magnet position can be installed in the middle so it inducts both reed switches. Solution: adjust the magnet upper or lower.**

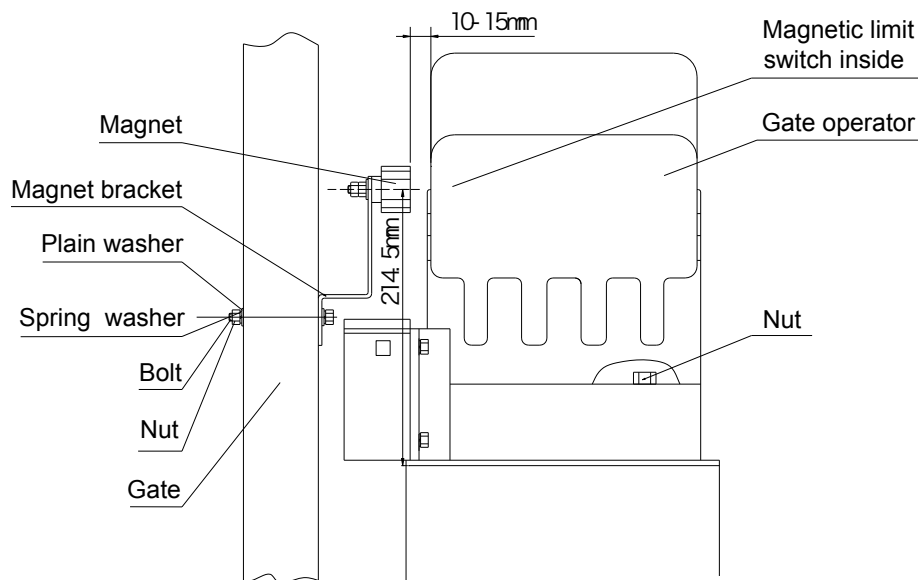


Fig.7

## 7. Electrical

The control box should be equipped with a single-phase breaker (10A). Make sure that the power is OFF before making any electrical connections. Remove the cover of the control box, perform the wiring and replace the cover again. (See control board scheme and wiring notes for control board)

### Power

Using 18-3 gauge electrical wire, wire a standard grounded plug to your control board using standard electricians wiring practices. Wire the opposite end of this cable to the E, N, L contacts (block 20) of the control board. Connect L to the power or brown line (or red line), N to the neutral or blue line (or black line), and E to the ground line (yellow/green)



Control board scheme

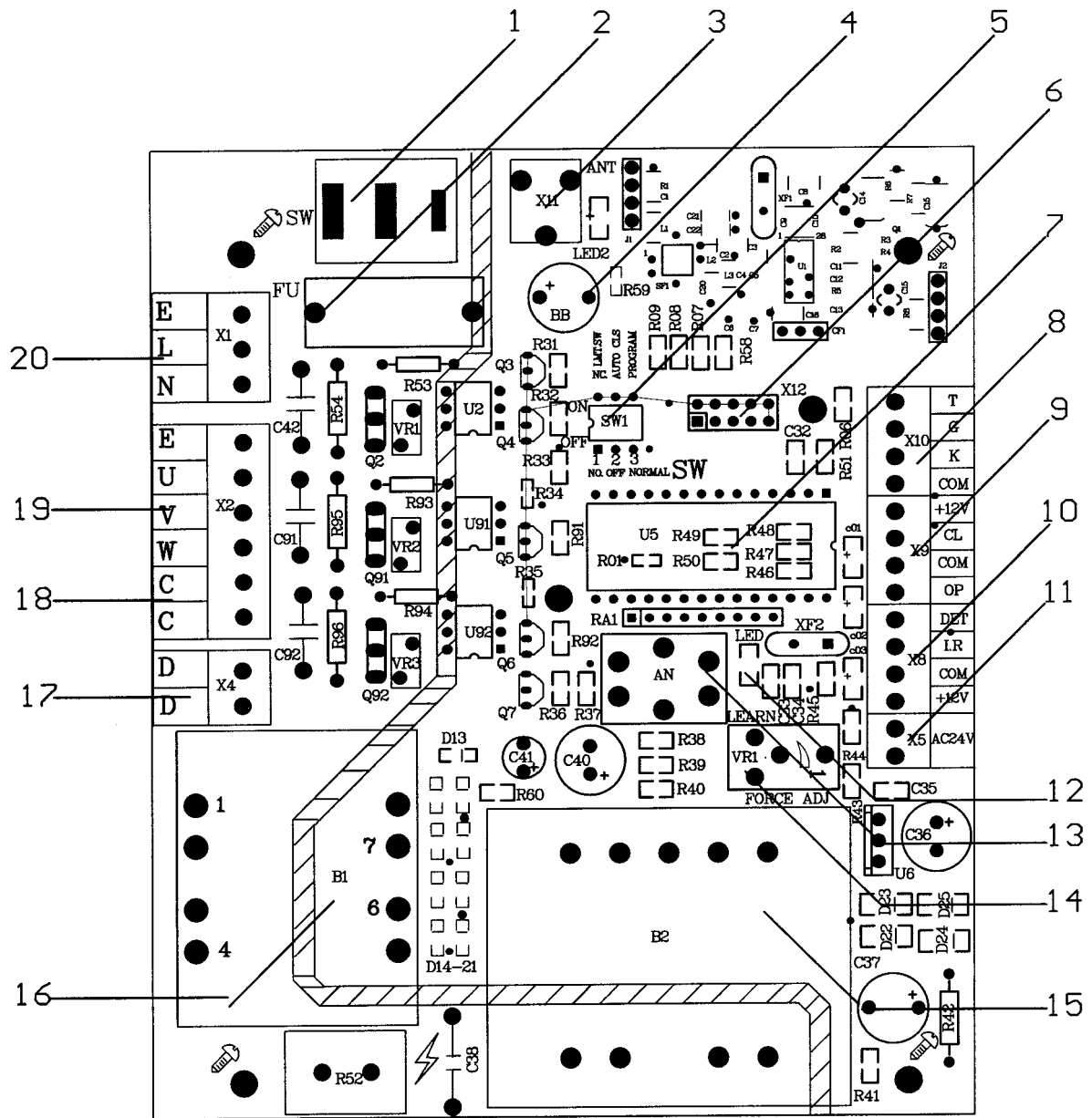
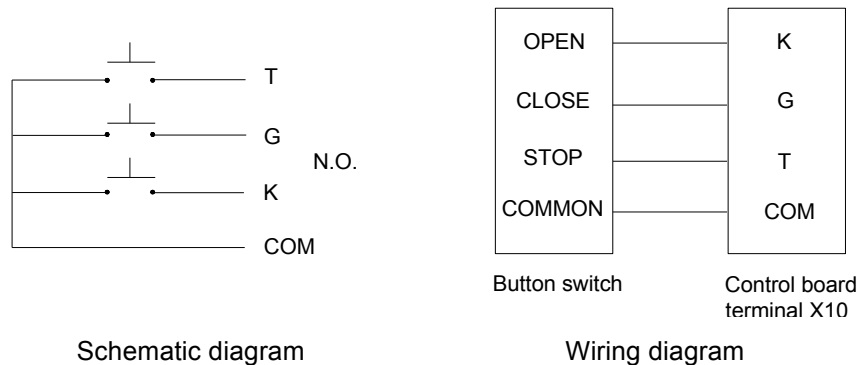


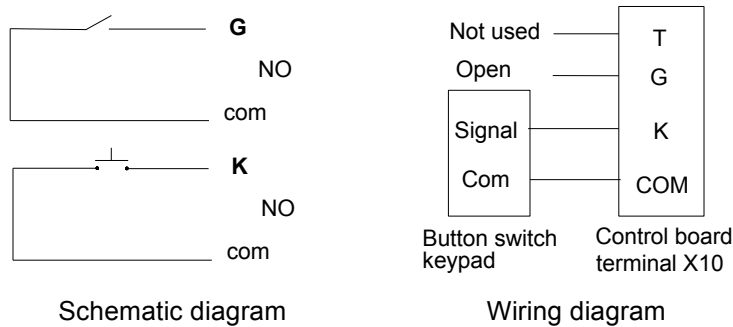
Fig.7

**Wiring notes for control board**

1. Power switch: ON/OFF
2. Fuse: 10A, Ø5x20
3. Antenna: ANT
4. Beeper: DC12V
5. DIP switch
6. Memory Card: 93C66
7. MCU: PIC 16C57C
8. External button switch (Three-button mode, Normally open contact): T (stop), G (close), K (open), COM (common)

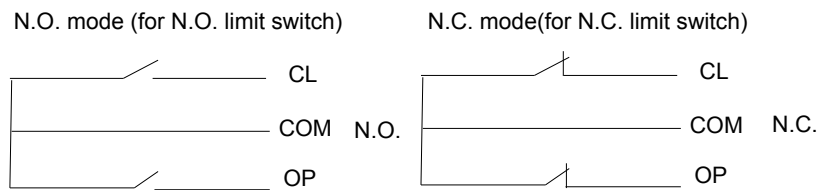


Single-button switch / Keypad (Single-button mode, Normally open contact): T (Not used), G (Open priority), K (Open/stop/close), COM (common)  
 To install the keypad attach one lead of your keypad to the 'K' terminal and the other to the 'COM' terminal. The keypad will function in single channel mode just like the RF remote.



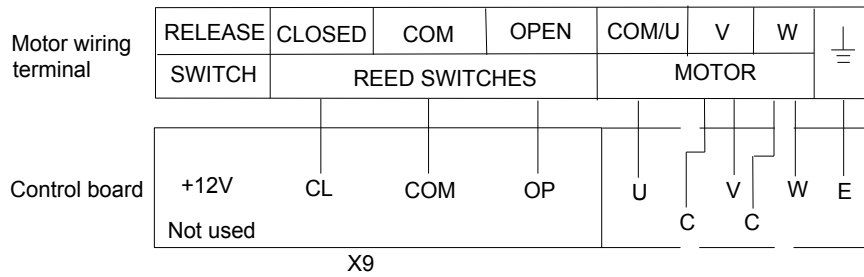
**NOTE: Two modes (three-button mode or single-button mode) you can select according to your order.**

9.Limit switch: CL (Close limit), COM (Com), OP (Open limit), +12V (Output power supply)



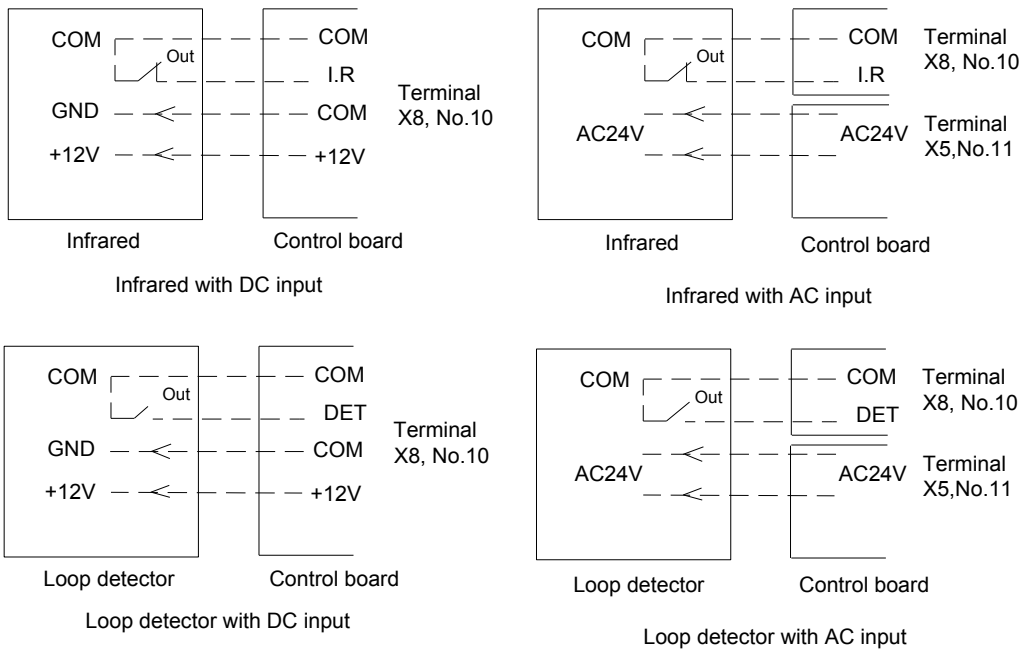
It is adjustable by DIP switch.(See Table1)

Schematic diagram



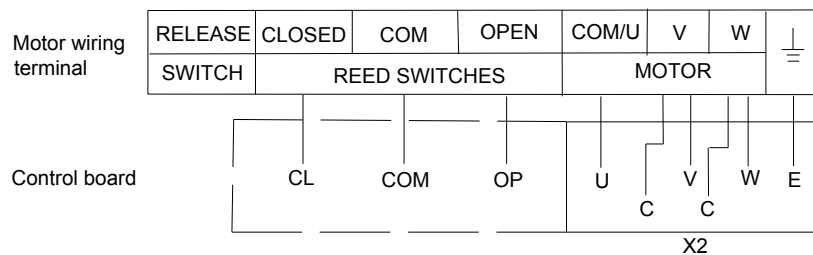
Wiring diagram

10. Output power supply: +12V (DC +12V), COM (CO), DET (Loop detector), I.R. (Infrared photocell N.C)



Schematic diagram

- 11. Output power supply: AC24V
- 12. Power Indicator: LED
- 13. Learn button: AN (For remote control)
- 14. Force Adjustor (VR1): Clockwise +, Counterclockwise -
- 15. Power Transformer: 110V 12Vx2
- 16. Sampling Transformer: 110V/8.8V 4W
- 17. Alarm Lamp: 110V
- 18. Motor Capacitor
- 19. Motor: U (com), V (Positive direction), W (Opposite direction), E (Earth),



Wiring diagram

20. Power Input: E (Earth), L (Live), N (Neutral) AC110V

## 8. Tuning and operation

### Remote control

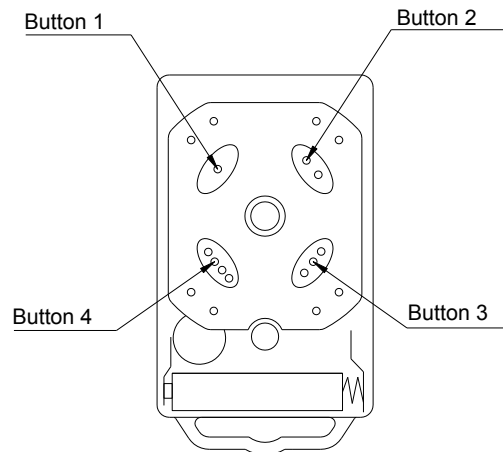


Fig.8

- **To add extra remote controls (Learning):** Press the button 'AN' (See control board scheme No.13) on the control board, then the 'LED2' will be on and turn off, the beeper will ring about 1 second, then press the remote control button which you want to use, the beeper will ring about 2 seconds and the 'LED2' will turns on about 2 seconds and then turns off. The learning process is finished. Up to 100 remote controls may be used.
- **To erase all existing remote controls,** press and hold 'AN' button about 14 sec until the beeper stops ringing. This indicates that all the remote controls have been erased completely.
- The remote control works in a single channel mode. It has four buttons. The function of button 1, button 2, and button3 are the same. With each press of the remote control button which has been programmed, the gate will open, stop, close or stop cycle.
- Button 1, button 2 and button 3 are used to open or close the gate. Button 4 is available to set pedestrian mode. Note: if you canceled the pedestrian mode, the function of button 4 is same as the other three buttons.
- **Warning:** Notify the users that the gate is never to be operated unless it is in full view.
- **Verify open direction:** If the gate does not move in the desired direction, then you will need to reverse the motor operating direction. You can do this by exchanging wires 'V' and 'W', 'OP' and 'CL', then insert the wire connector terminal block.

Table 1 DIP switch  
(See Fig.7 terminal 5)

Position	Dip Switch	Function
1	ON	Limit switch mode is NC.
	OFF	Limit switch mode is NO.
2	ON	Auto-close function and auto-close function of pedestrian mode are available.
	OFF	Both Auto-close function and auto-close function of pedestrian mode are shut off.
3	ON	Programming / In this position the control board is in programming condition, NOT USE condition.
	OFF	Normal / In this position the control board can be normally used.

- Set auto-close function (This feature can be selected to make the gate stay open for some time before it automatically closes. The auto-close time can be adjusted to between 0 and 44 seconds.): please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press the remote control button (button 1, button 2 or button 3) that has been programmed to open the gate (see **Verify open direction** section). Stop the gate at any position by pressing the same button, wait for some seconds according to your requirements (the range is 1~44 sec.), this period of time is regarded as 'auto-close time'. Close the gate by pressing the same button. Press the button again to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the auto-close function has been set.
- Cancel auto-close function: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press the remote control button (button 1, button 2 or button 3) that has been programmed to open the gate (see **Verify open direction** section). Stop the gate at any position by pressing the same button, wait until the gate close automatically (45 sec.). Press the same button to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the auto-close function has been canceled.
- Pedestrian mode: Pedestrian mode can be used to open gate about 0.3~1.5 meters for people pass through.  
\*Set width of pedestrian mode: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press button 4 to open the gate (see **Verify open direction** section), Wait until the gate travels the distance according to your requirements (the distance range is 0.3m~1.5m or wait for 3~10 sec.), it is regarded as 'the width of pedestrian mode'. Then press the same button/button 4 to stop the gate, wait for some seconds (1~ 44 sec.). Close the gate by pressing the same button/button 4. Press the same button again to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the **width of pedestrian mode** has been set. If you open the gate with button 4, the gate will stop at the expected position that you have set.  
\*Set auto-close function of pedestrian mode: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press button 4 to open the gate (see **Verify open direction** section), wait some seconds (3~10 sec.). Then press the same button/button 4 to stop the gate, wait some seconds according to your requirements (1~44 sec.), this period of time is regarded as 'auto-close time of pedestrian mode'. Close the gate by pressing the same button/button 4. Press the same button again to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the **auto-close function of pedestrian mode** has been set.  
Note: the new width of pedestrian mode has been re-programmed in the device and replaced the original width you have set in **Set width of pedestrian mode** section. If you open the gate with button 4, the gate will stop at the new expected position that you have set, after some seconds as what you have set, the gate will close automatically.
- Cancel width / auto-close function of pedestrian mode  
\*Cancel both width and auto-close function of pedestrian mode: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press button 4 to open the gate (see **Verify open direction** section). Wait for more than 15 sec.. Then press the same button/button 4 to stop the gate. Wait until the gate close automatically (45 sec.). Press the same button to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return

DIP switch 3 to OFF position immediately. Thus the width and auto-close function of pedestrian mode have been canceled.

\*Cancel width of pedestrian mode, keep auto-close function of pedestrian mode: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press button 4 to open the gate (see **Verify open direction** section). Wait for more than 15 sec.. Then press the same button/button 4 to stop the gate. Wait some seconds according to your requirements (1~44 sec.). Then press the same button/button 4 to close the gate, press the same button again to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the width of pedestrian mode has been canceled, the auto-close function of pedestrian mode has been reserved.

Note: the new auto-close time of pedestrian mode has been re-programmed in the device and replaced the original auto-close time of pedestrian mode that you have been set in **Set auto-close function of pedestrian mode** section.

\*Keep width of pedestrian mode, cancel auto-close function of pedestrian mode: Please turn on the second and the third DIP switch (See Fig.7 terminal 5) to ON position. Press button 4 to open the gate (see **Verify open direction** section). Wait some seconds (3~10 sec.), then press the same button/button 4 to stop the gate. Wait until the gate close automatically (45 sec.). Press the same button again to stop the gate or the gate will stop automatically at its closed position if the magnetic limit switch is reached. After this setup is complete, return DIP switch 3 to OFF position immediately. Thus the width of pedestrian mode has been reserved, the auto-close function of pedestrian mode has been canceled.

Note: the new width of pedestrian mode has been re-programmed in the device and replaced the original width.

If you open the gate with button 4, the gate will stop at the expected position that you have set, but the gate will not close automatically.

- Turn on the second DIP switch to OFF position (Factory preset: OFF position), both auto close function and auto-close function of pedestrian mode were shut off.
- Safe guard (Infrared device): If the infrared beam is broken during closing, the gate will reverse and open immediately. The control box is not factory equipped with an infrared device.
- Tuning the auto-reverse safety function: rotate the 'Force Adj. VR1' knob (See Fig.7 No.14) with a screwdriver. The resistance may be increased or decreased by rotating clockwise or counterclockwise. NOTE: if the gate fails to reverse in the event of obstruction, then the opening force or closing force should be checked for conformity with requirements and adjusted accordingly. The gate will reverse if obstructed when closing, and will stop if jammed when opening.  
Please exchange wires 'V' and 'W' if the auto-reverse direction is wrong. Exchange wires 'OP' and 'CL' if the limit direction is wrong.
- **WARNING:** Do not attempt to tune the gate by placing your hand, arm or other body part in the path of the gate, as serious injury could result. Damage to the gate operator motors may also occur by placing a heavy immovable object in the path during the testing phase. Instead, place a light object in the path (e.g., a chair or trash can) which can be pushed out of the way without causing damage to gate motors, if the setting is still too high. Note: This auto reverse function should be regularly inspected and adjusted if necessary. Once the tuning is complete you may replace the cover.

### Activities Covered in this section

- **Remote control:** With each press of the button, the gate will open, stop, close or stop cycle. **(Single-button mode)**
- **External button switch (not supply): two different modes (three-button or single-button) you can select according to your order.**  
Three-button external button switch: press 'OPEN' button, the gate will open. Press 'STOP' button, the gate will stop. Press 'CLOSE' button, the gate will close.  
Single-button/keypad: with each press of the button, the gate will close, stop, open or stop cycle.
- **Auto-reverse function:** After adjusting the opening force and closing force, the gate will reverse and go open if obstructed when closing, and will stop if jammed when opening.
- **Auto-close function:** This feature can be selected to make the gate stay open for several seconds before it automatically closes. The auto-close time can be adjusted to between 0 and 44 seconds.
- **Pedestrian mode:** This feature can be used to open gate about 0.3~1.5 meters for people pass through.
- **Safe guard (Infrared photocell):** If infrared beam is broken during closing, the gate will reverse and go open immediately. This feature will not function if the gate is in fully opened and closed positions or during opening.
- **Open priority:** The gate will return to open if press 'OPEN' button of external button switch during closing.
- **Loop detector:** If loop detector detects vehicles during closing, the gate will reopen immediately and stay open until the vehicles move out of the loop. After vehicles move out of the loop, the gate will continue to close.  
If loop detector detects vehicles when the gate stops, the gate will remain stop until vehicles move out of the loop. After vehicles move out of the loop, the gate will close. The gate will keep opening if loop detector detects vehicles during opening. After vehicles pass through the loop, the bar will close.
- **Limit switch:** The switch is used to accurately stop the gate in the opened and closed positions.  
If the gate stops at opened position when the limit switch is reached, the gate will not move if it receives open signals.  
If the gate stops at closed position when the limit switch is reached, the gate will not move if it receives close signals.

### 9. Check

- Check the power supply, grounding and wiring before running the device.
- Release the disengagement mechanism with the release key to determine whether or not the gate can be moved manually. If everything is in good working order, tighten the disengagement mechanism with the key.
- Switch the power on and run the device to ensure that the gate is sliding smoothly.
- Adjust the magnet position until the gate opened and closed properly at the limited positions.
- The motor is only designed to work for less than 5 minutes. If it runs continually for an extended period of time, a thermal protector will stop it because of the high temperature.

### 10. Maintenance

Every six months check the following items for proper operation of the unit.

- Check the chain lubricant and add 2# grease regularly.
- Lubricate shafts and sprockets.
- Keep operator clean at all times.
- Check and tighten anchors bolts.

## 11. Trouble Shooting

Trouble	Possible causes	Solutions
Motor only runs in one direction.	The wire connector terminal block becomes loose.	Check wire connector terminal block make sure it is plugged in terminal block 10 (X8).
	The limit switch wire connector terminal block becomes loose.	Check limit switch wire connector terminal block make sure it is plugged in terminal block 9 (X9). Check the limit switch mode.
	The electric component on the control board such as Q2, Q91 or Q92 may be damaged.	Replace the electric component Q2, Q91 or Q92 (BTA16/600) or replace the board.
By pressing button 1(button 2 or button 3) which has been programmed to open the gate, press the same button again to stop the gate in required position, but the gate will auto-close immediately.	The auto-close time is too short.	Reset the auto-close time. See <b>Set auto-close function</b> section.
When you use button 4 of remote control to open the gate, gate travels too short.	The width of pedestrian mode is too narrow.	Reset the width of pedestrian mode. See <b>Set width of pedestrian mode</b> section.
When you use button 4 of remote control to open the gate, but the gate will auto-close immediately.	The auto-close time of pedestrian mode is too short.	Reset the auto-close time of pedestrian. See <b>Set auto-close function of pedestrian mode</b> section.
The gate will not open or close.	The limit switch wire connector terminal block becomes loose.	Check the limit switch mode (see table 1 DIP switch).
	Connecting wires or terminal blocks are too loose.	Check the connecting wires and terminal blocks.
	The electric component on the control board such as Q2, Q91 or Q92 may be damaged.	Replace the electric component Q2, Q91 or Q92 (BTA16/600) or replace the board.
	Power switch is OFF	Make sure power switch is ON.
Remote control does not work	The indicator light of remote control does not light.	Check the batteries on your remote control.
	Remote control is not suitable for receiver.	After making sure the codes are correct, erase remote controls and then re-program the codes in the device. See <b>Adding extra remote controls (learning)</b> section.
	Broken receive board	Replace receive board.
When you open the gate by using button 1(button 2 or button 3) which has been programmed, gate will stop in mid-travel or reverse before reaching the fully limit position.	The Force Adj. (VR1) is adjusted too small.	Check the Force Adj. (VR1). Adjust VR1 to increase force.
	Gate is obstructed.	Remove the obstruction.
The remote control operating distance is too short.	Signals are shielded by the gate.	Link a new antenna (1~1.2m BVR 0.75mm <sup>2</sup> see parts list) to the old antenna. Then fix the antenna on the wall vertically, make sure the total height from the top of antenna to the ground is approx. 1.5m.
The gate opens, but stops and will not return.	<ol style="list-style-type: none"> <li>Please note the two magnet brackets (fixed plate) are different: one is higher and another is lower. Please try to exchange the two brackets position.</li> <li>Please try to exchange the limit switch wires CL (close) and OP (open).</li> </ol>	There are two reed switches inside the magnetic limit switch: one is upper and another is lower. Maybe the magnet position was installed in the middle so it induces both reed switches. Solution: adjust the magnet upper or lower.