Boom Barrier User Manual

AB-DBA-900

Contents

1. SAFETY

1.1 General Safety Information

The AB-DBA-900 was designed, built and tested using advanced technology and will have left our factory only after having satisfied a stringent safety and reliability criteria. Nevertheless, the barrier system can represent a risk to people and their properties if it is not operated correctly. These operating instructions must therefore be read in their entirety, and all safety information contained within there must be complied with.

The manufacturer shall refuse to accept liability and shall withdraw a warranty cover if this barrier system is used incorrectly or is used for a purpose for which it is not intended.

1.2 Intended Use

The AB-DBA-900 barriers are designed for use in controlling the entrance and exit lanes of car park areas, multi-storey car parks and other vehicular access routes. It is not permitted to use these barrier systems for any other purpose. Modifications or changes to the barrier or its control modules are prohibited. Only original Australian Bollards spare parts and accessories may be used.

A safe clearance distance of at least 500mm must be provided between the top of the boom barrier and the closest solid obstacle (building, wall, fence etc). The barrier activating elements must be installed at a position that provides a direct line of site to the barrier. The motion of the boom barrier must be directly visible to the person operating the barrier. Whilst the boom barrier is in motions, people and other objects are prohibited from being in the immediate vicinity of the barrier. Automated systems must be provided with a specially marked pedestrian walkway (actual location to be determined on site).

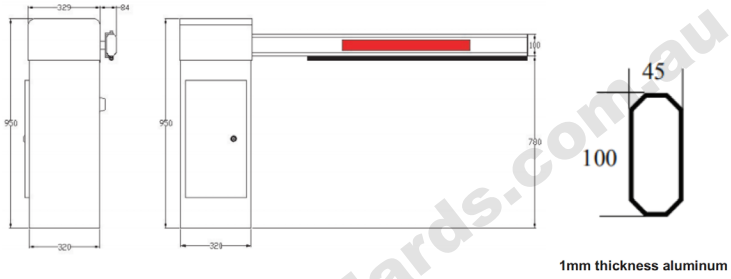
If the barrier and operating elements have been installed and connected in a fixed mains power supply, an all-pole, lockable, electrical master switch must be used.
The assembly and installation instructions must be complied with in their entirety. Permission must be requested from Australian Bollards prior to any alterations. Boom barriers longer than 3.5m require a supporting bracket. All electrical connections, wiring work and exchange of any components may only be performed by appropriately trained electrical technicians.

Before opening any electrical or electronic modules within the barrier, they must first be disconnected from the main power supply. Technical modifications or changes to the barrier system are prohibited.

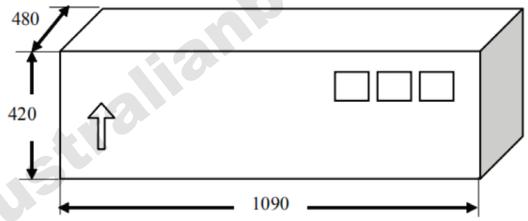
2. PACKING

The AB-DBA-900 barrier housing uses corrugated cardboard box with cushioning material packaging for packing, and boom arm uses bubble plastic film for packaging (poly wood packaging will be provided upon the customer's cost if required). Displayed below are the dimensions of the packaging box and barrier:

The manufacturer shall refuse to accept liability and shall withdraw warranty cover if this barrier system is used incorrectly or is used for a purpose for which it is not intended.



Dimensions of barrier housing & boom arm (mm)



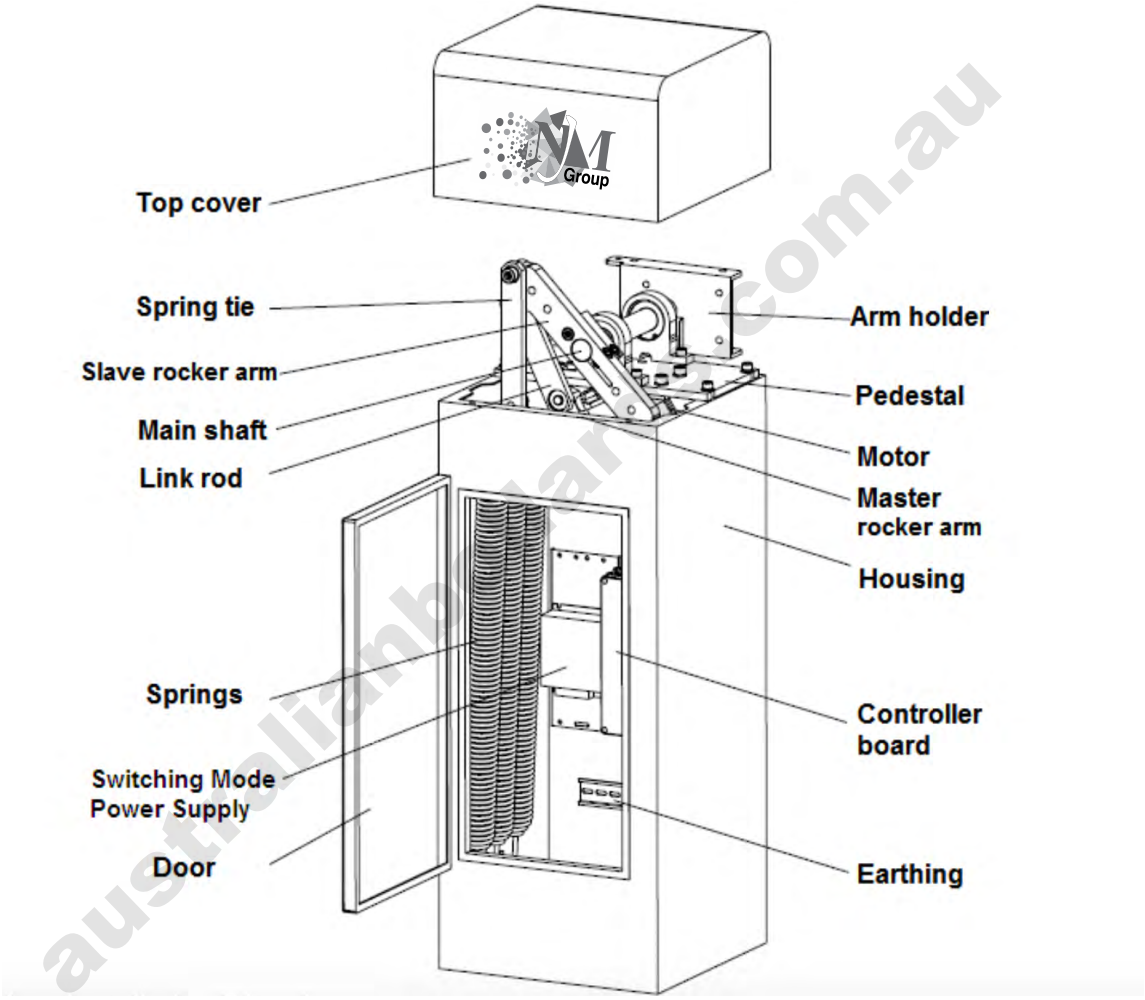
Dimensions of packing box (mm)

Following accessories should exist when open the package:

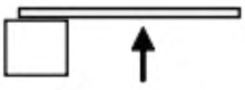
- 4 PCS. M16 X 120mm expansion bolt used to fix housing barrier housing onto the foundation.
- 4 PCS. M8 X 60mm (for fence arm) or M8 X 20mm (for straight/crank arm) hexangular lock screw used to assembly boom.
- 1 PC Boom Lining for boom fixing.
- 1 PC end cap of the boom.
- 1 PC key to the housing barrier door.
- Other optional accessories if the customer chooses to buy.

3. INSTALLATION

3.1 Structure of Barrier



3.2 Arm Installation Direction

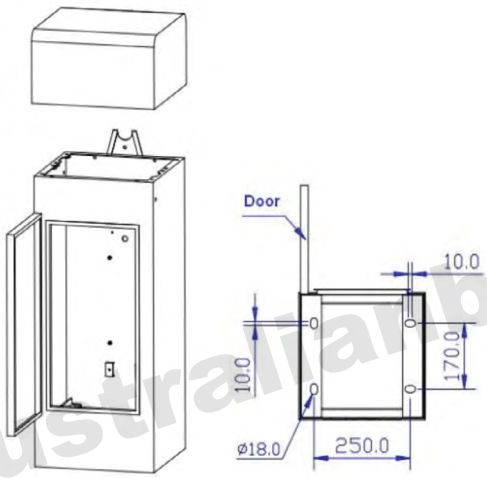


a) Leftward

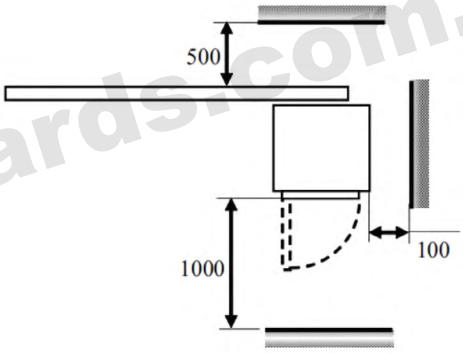
b) Rightward

3.3 Foundation

To ensure that the gate barrier is working stably under all operating conditions, a concrete foundation with the following dimensions must be provided:



Foundation diagram (mm)



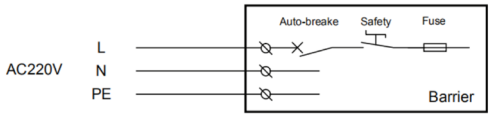
Minimum Installation Space(mm)

1. Fix those 4PCS expansion bolt (M16*145) on the concrete foundation according to the above Foundation Diagram in “3.3 Foundation”;

2. Align the bottom hole of the barrier to those 4PCS expansion bolts, lock and fasten them by nuts. Please be sure that the barrier can work steady.

3.4 Power Connection

The AB-DBA-900 barrier uses the AC90-240V & 50/60HZ input as its power supply. A fuse has been integrated by the barrier control unit. For the safety and ease of maintenance and repair, the barrier has set the auto-breaker and safety switch in the power supply circuit.



4. SPECIFICATION, FEATURES AND FUNCTION

4.1 Technical Specification

Power Supply	AC90~240V, 50/60HZ, Max.0.5A
Motor	(DC 24V±10%) 50W standard torque brushless motor
Control unit	80C51 MCU, 20Mhz basic frequency, PWM variable frequency servo motor technology, multiplexing 0~5V switch input, multi relay output; No isolated RS485 communication interface, WatchDog shut down protect.
Loop detector input	Either active or passive dry contact input; 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has RC hardware filter and 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig to protect from crash to obstructer, and 0 to 1 trig barrier boom to move up.
Infrared Photocell input	Either active or passive dry contact input, 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig to protect from crash to obstructer, and 0 to 1 trig barrier boom to move up.
Up & Down input	Either active or passive input, 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig
Traffic light output Loop detector Syn. output	AC 220V power output (passive), Max. current 3A/ AC220V. Relay works if barrier boom move >2/3 and releases if boom move <2/3. Relay NO output, Max.AC 220V/0.5A, Max.DC 12V/1A
WIFI & TCP/IP interface (optional)	Barrier can be controlled by smart phone with WIFI interface, and controlled by PC with TCP/IP interface
RS 485 interface	Semi-duplex RS485 interface, switch time 10 ms, 8 data bits, 1 stop bit, no checksum, 9600 bps, ASCII decimal code.
Opening/closing time	1 to 6 seconds frequency conversion stepless speed regulation
Wireless Remoter (optional)	Two button remote transmitter, distance: 20~50m

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Spring	1~3 pcs. springs according to boom length
Arm	45×100mm Aluminum alloy arm or round arm, Max. 6m E1---Pulse angle sensor or motor failure;
Housing	2mm cold-roller sheet, anti-UV light and static plating, IP 54
Arm direction	Left/right exchangeable
Housing dimension	950mm×329mm×320mm
Gross Weight	Around 46 KG
Operating temperature	-25ºC -55ºC
Humidity	10%-95%

4.1 Technical Specification

4.2.1 Open/Close Time is Regulable Stepless thanks to PMW Variable Frequency Controller

The gate barrier adopts a digital frequency conversion servo controller, which allows stepless speed control of the drive motor under the condition of no loss of an output torque. The opening and closing times are respectively set 1~4 or 2~6 seconds.

4.2.2 PMW Variable Frequency Servo Controller Ensures Smooth Movement of Boom

The gate barrier can set the smoothness of up and down separately. After setting, regardless of the speed, the frequency conversion servo controller can automatically detect the self-optimisation and can automatically eliminate the boom shocking, which not only enhances the intelligent experiences, but also significantly extends the mechanical and electrical life of the gate barrier.

4.2.3 Sensorless electrical and maintenance free

The gate barrier adopts a brushless motor, an integrated angle encoder inside, full digital servo control, no contact or non-contact sensor for in-position detection, no electrical maintenance, and avoid all kinds of wear and hazards.

4.2.4 Automatically check the operation status and report failure

List of failure code as below:

E1 Pulse angle sensor or motor failure;
E3 'up' input failure (Input short circuit remains more than 10 sec. regarding as fail);
E4 'down' input failure (Input short circuit remains more than 10 sec. regarding as fail).
E5 "1# Loop Detector" input failure (Input short circuit remain more than 10 seconds regarding as fail).
E6 "Infrared photo cell" input failure (Input short circuit remain more than 10 seconds regarding as fail).
E7 Always-on mode.

4.2.5 Control interface and function

1) Up and Down control

Be able to go up (down) when the barrier boom is moving down (up) without stop process. There are five ways to control the barrier movement including:

- 'Up' and 'Down' inputs by a push button.
- Remote control.
- RS485 serial command.
- WIFI control.
- TCP/IP control.

2) Anti-hit by pressure resistance bounce

While moving down, the boom arm will immediately go back to a vertical position once it is obstructed by an imposed force, protecting the vehicle or person so they are not hit by the boom arm. The sensitivity is adjustable

Note: This function does not work when the angle is <9° both in a vertical and a horizontal position.

3) Safety--- Anti-hit by Loop Detector (Optional)

Suppose1# loop detector is connected to the gate barrier. While the boom barrier is moving down, if a oncoming vehicle is detected to be existing on the ground induction coil (to be connected to1# loop detector), the boom barrier will go back to a vertical position immediately until the loop input is dismissed and then the boom barrier will go down immediately. Note: This function does not work when the boom barrier horizontal angle is <9°.

4) Safety--- Anti-hit by IR photocell (Optional)

Suppose a Photo Cell is connected to the gate barrier. While the boom barrier moves down, if the infrared transportation between the transmitter and the receiver is blocked by a human or vehicle, the barrier arm will go back to a vertical position immediately. The arm will automatically close once the infrared transportation recovers. Note: This function does not work when the boom barriers horizontal angle is <9°.

5) Double safety--- Anti-hit by Loop Detector & IR photocell (Optional)

To double protect a vehicle by connecting a loop detector and an IR photocell to the gate barrier. While the boom barrier moves down, if the infrared transportation between the transmitter and the receiver was blocked by an oncoming vehicle, or the oncoming vehicle was detected to be existing on the ground induction coil, or both happened, the barrier arm will go back to a vertical position immediately. The arm will automatically & immediately close once the infrared transportation recovers and at the same time the vehicle has already passed through the ground induction coil.

6) Safety--- Anti-hit by "Opening Priority"

If a vehicle is coming while the boom arm moves down, the boom arm will immediately go back to a vertical position once a manual open command is given by guard, by pushing the button or remoter transmitter, which prevents the vehicle from being hit by the boom arm.

7) Automatically close after the given time

Once this function is set "ON", the barrier will automatically close after given time (1-90 seconds adjustable) if there is no any up or down input after the barrier opens fully. This function is OFF as a default.

8) Automatically Close by 1# loop detector (Optional)

If 1# loop detector is connected to the gate barrier (connect 1# loop detector to "Loop 1" terminal of controller board. Refer to 5.4 for details), if no any up or down input after the boom opened fully, the barrier will automatically close after vehicle pass.

9) Automatically open by 2# loop detector (Optional)

If 2# loop detector is connected to the gate barrier (connect 2# loop detector to "Loop 2" terminal of the controller board. Refer to 5.4 for details). Once 2# loop input was triggered when the boom barrier is in a horizontal position, the boom barrier will open automatically and immediately.

10) Always-open mode (Optional) Keep continuously pressing

"Stop" button of remote transmitter for 3 seconds, the boom arm will go up to a vertical position and stay there until the "close" button of the remoter transmitter is pressed for 3 seconds to finish always-open mode.

11) Traffic light control (Optional)

When the boom barrier goes up more than 2/3, the relay shorted, the port connected to the green light output will be AC 220V, the port connected to the red light will not output; when the boom barrier goes down more than 1/3, the green light will not output, and the red light output will be AC 220V.

4.2.6 Easily change boom direction on site

The barrier can be adjusted to the left and right direction on site according to the installation situation. It is not necessary to return to the factory or send accessories, which is convenient for the stocking and installation.

4.2.7 Easily change boom type on site (optional)

12 The default arm holder is universal, allowing the user to expand or replace the arm holder's accessories on the site to change to a different kind of arm, such as the octagonal boom, round boom, swing-away arm, folding arm and fence arm.

4.2.8 Anti-collision protects boom arm (optional)

Once the anti-collision mechanism is installed, it will protect the boom arm by ensuring there is no damage if the boom arm is collided by a vehicle.

4.2.9 Anti-condensation in cold climate

The barrier uses low power consumption, even without closing and opening the input, which will keep the motor in a normal temperature. The lubricant will not be frozen so that the barrier will keep working in a frozen environment.

4.2.10 Automatically open when power off (optional)

If the power suddenly turns off while the boom closes, the boom will automatically fully close down if the angle between the boom and a vertical plane beyond 45 degrees. If power failure occurs while the boom is opening, the boom will automatically continue to open up fully if the angle between the boom and the level surface beyond 45 degrees.

4.2.11 Manually control in case of no power

Once the power is off, just open the cabinet and manually turn the manual/lock lever handle in the power-off state and the arm will follow. The arm can be locked in any position between the horizontal and vertical. When the barrier motor is stopped, lock down the lock lever button of the manual/lock lever handle, and the barrier is locked. Even if it is energised, it will not be unlocked. To unlock, unlock the lock lever button of the manual/lock lever handle. Warning: Not allowed to use the function when the power is on. This may result in hurting your hand and motor damage.

4.2.12 Transparent plastic covers on Control Board

A transparent plastic cover on the Control Board to make the Control Board waterproof and dust proof, also protecting the operator.

5. OPERATIONS

5.1 Safety Tips

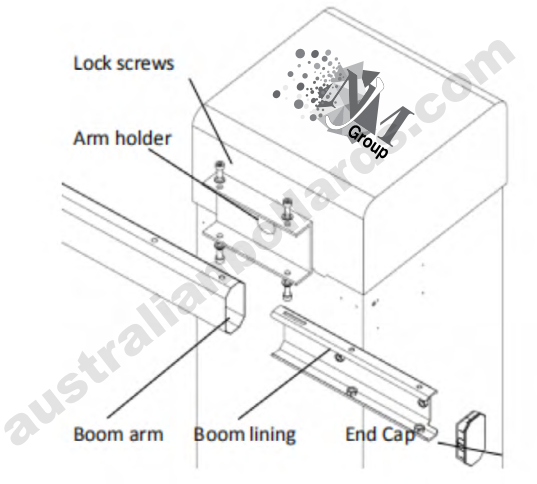
Prevent smashing by boom arm: Don't stand under the boomarm while it is moving down.

Prevent electric shock: If the barrier uses non-secure AC220V as a power supply, the wiring terminals and control board will be electrified with non-secure voltage after power. Don't touch these parts after power.

Prevent mechanical injury: There are many exposed mechanical parts which will have a dislocation movement while the barrier is at work. Don't touch these while at work.

5.2 Boom Arm Assembly (Without Swing-off)

1. Insert the boom lining into the boom arm and align the four mounting holes at the upper and lower.
2. Put the boom arm into the boom holder and re-align the four mounting holes at the upper and lower. Lock and fasten the boom arm using 4pcs boom locking screws.
3. Push the boom cover into the boom arm.



CAUTION:

- The boom arm must be installed in a vertical position or when the spring is completely loosened. Otherwise, the counter-electromotive force generated by the motor rotating rapidly due to the spring tension will burn the controller.

- If the balance spring has been installed but no boom arm is installed onto the barrier, this may burn the controller board.

5.3 Adjust Boom Length

Before delivery, parameters have been programmed well according to the boom length required by customers. Parameters according to the following steps: If you need to re-adjust the boom length, you must firstly adjust the spring balance and then program the parameters according to the following steps:

5.3.1 Under status of Power-off, remove the boom from the barrier gate and cut the boom to the desired length and then assemble to the barrier gate. (Refer to 6.2 Boom arm assembly).

5.3.2 Select the appropriate quantity of the balance spring according to the boom length, and hang the springs to the barrier.

5.3.3 Firstly, make sure the boom is at a vertical position and the power is off, then rotate the manual handle to move the boom down until it keeps static at 45°. If the boom can stop in the +15° range when softly pushed down or when the boom lifts up for 0.5 seconds, it means the spring is already balanced. (Power on barrier, it will open/close normally). Otherwise, you have to adjust the spring tightness according to the steps below:

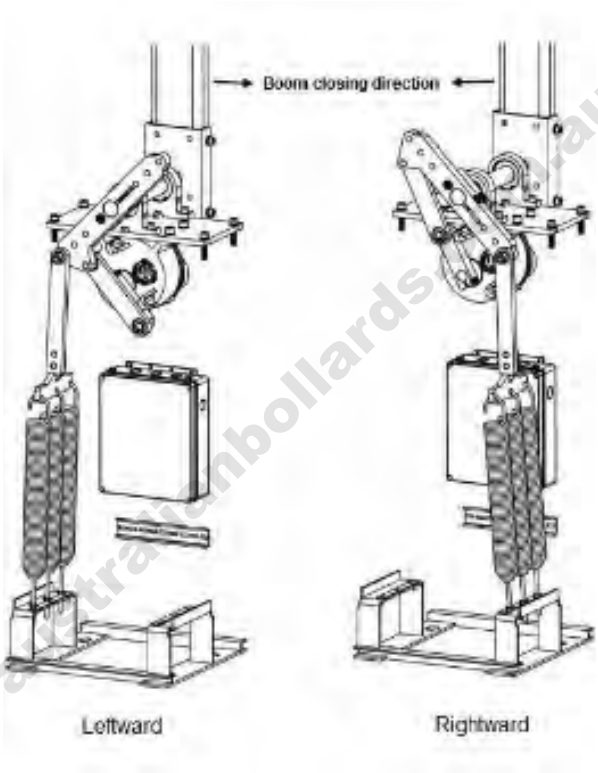
If the spring is too loose, it will need to be tightened.
Power off barrier, rotate the manual handle to move the boom down until it keeps static at 45 degrees. If the boom cannot stop in the 15° range when the boom is softly pushed down for 0.5 seconds, then this means the spring is too loose, and will need to be tightened. You will need to repeat step 5.3.3 again until the spring is balanced.

If the spring is too tight, you will need to loosen the spring Power off barrier and rotate the manual handle to move the boom down until it keeps static at 45°. If the boom cannot stop in a 15° range when you lift up the boom for 0.5 seconds, it means the spring is too tight and needs to be loosened. You will need to repeat step 5.3.3 again until the spring is balanced.

5.4 Adjust boom direction

The boom direction has been set properly according to the customer requirements. If the boom direction does not match to the site, then please adjust the boom direction according to the following steps:

1) Remove the boom when the power is off, and the spring is loose.
2) Remove the spring and spring tie, move and hang it to the other side of weight rocker.
3) Install the boom and loosen the main shaft holding block and the counterweight rocker. Rotate the arm to the desired position, locking the main shaft holding block and rocker.
4) Adjust the spring balance according to the point 5.3.
5) Power on and set the opposite boom direction mode (C0) on controller.

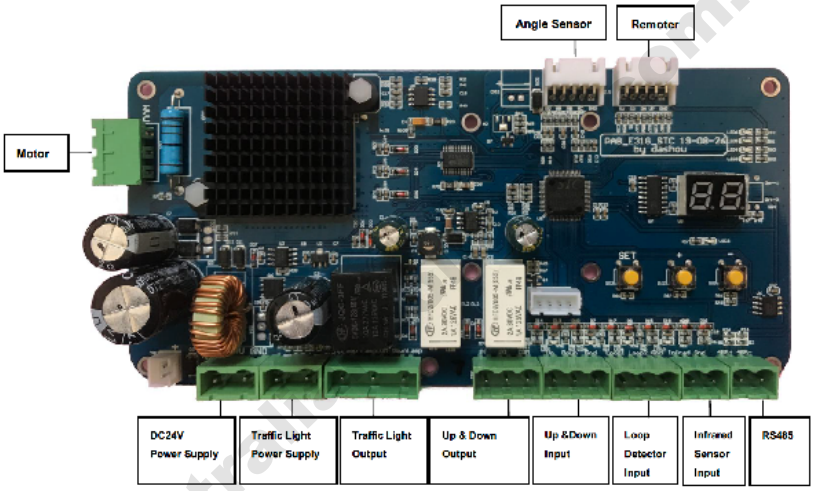


C0—Boom direction mode
0=rightward, 1=leftward

Note:

The boom arm must be installed in a vertical position or the spring is completely loosened. Otherwise, the counter-electromotive force generated by the motor will rotate rapidly due to the spring tension burning the controller.

6.5 Controller Board and Wiring Diagram



Caution: When setting the parameters, they will not be recorded until the LED digital tube displays 0.

Note: Continuously press the "SET" button of the controller for 1 second to show the barrier software version.

5.6 Parameter Programming

There are three buttons saying “SET”, “+”, and “-“ on the control unit. In a normal condition, ‘+’ is used manually for the ‘up’ control and ‘-‘ is used manually for the ‘down’ control. The numeric LED shows the barrier arm movement status (‘0’ for vertical, around ‘90’ for horizontal) or the failure code.

- Enter Programming mode

  Simultaneously press the “SET” & “+” button to enter the programming mode. The first default display will function ‘1’ (F1);

- Select function

  At the status of function’1’, every time you press “SET button, the function code will add 1, from 1 to 9 and cycling. See below the function code.

- Set Parameter

  Under the selected function, press ‘+’ or ‘-‘ to display value, within 10 seconds. Press ‘+’ to increase the parameter value, or press ‘-’to decrease the value. Press ‘SET’ to save and return to “select function” status.

- Exit Programming mode

  Simultaneously press the ‘SET’ & ‘-‘ buttons to exit programming mode, or it will exit automatically if no input for more than 30s during programming.

Function code:

- F1: Deceleration Point For Open (Default value: 35)
  Inappropriate value may cause to open slow or a strong shake.

- F2: Deceleration Point For Close (Default value: 60)
  Inappropriate value may cause to close slow or a strong shake.

- F3: Value of Auto-Reverse on Obstacle (Default: 50)
  Value 12~99, the more value, the less sensitive. 99 to close

- F4: Address: 1~99. (Default: 99) 17.

- F5: Automatic close in given time (Default 99).
  Value 1~99 sec. This function will shut down at 92~99 seconds.
  Value 91: The boom will open fully and then close if a close command was given while the boom opens.

- F6: the smaller the value, the faster the speed.
  (Default 10 for 50 ratio, 20 for 100 ratio)

- F7: Down speed, 0~60, the smaller the value, the faster the speed.
  Any number between 0~60 can be set.
  For example, 10 for 1 second, 15 for 1.5 seconds and 60 for 6 seconds.

- F8: Loop detector N/O or N/C setting
  0: Loop detector #1 N/O; 1: Loop detector #1 N/C

- F9: Loop detector filtering time, 0~6, units per second. (Default 0).
  The larger value, the longer filtering time, invalid when 0.

- C0: Arm direction setting, 0 is rightward, 1 is leftward.
  (Default: Set according to the customer's order).

Value	RL1 Relay	RL2 Relay	RL3 Relay
00	Traffic Light	Look Detector feedback	None
01	Boom movement reminder output (Flashing light & siren)	Look Detector feedback	None
10	Traffic Light	Boom open fully	Boom close fully
11	Boom movement reminder output (Flashing light & siren)	Boom open fully	Boom close fully

- C1---Relay function setting (Default 10)

- C2-- Alway-open Mode of remoter (Default 0)
  0 disable#1 enable

- C3--Memory of Repeated Opening (Default 0)
  0 disable#1 enable

- C4--Reduction Radio (Default: according to customer)
  0 for 50:1 reduction radio, 1 for 100:1 reduction radio

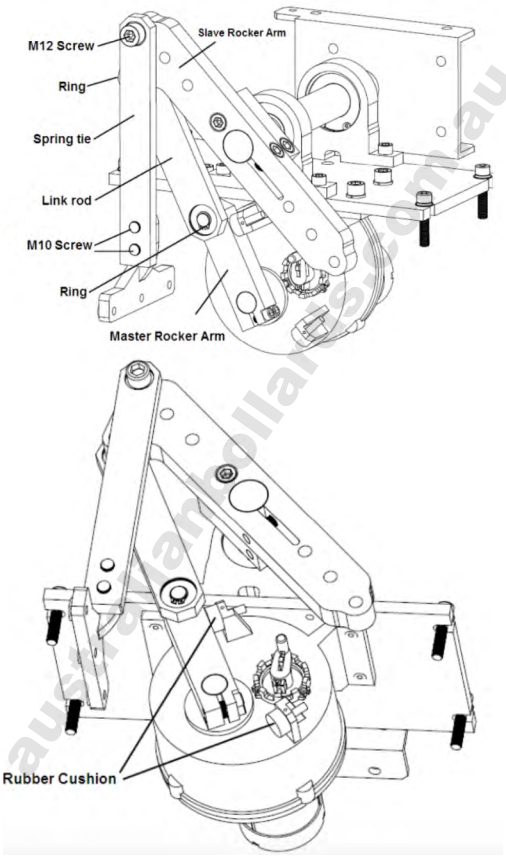
- C5~C9 For manufacturer usage only.
  Do not modify them, or it may cause problem.

Note: Advanced menu C0~C9 won't be shown unless you continuously press the "SET" button for 6 seconds under the function mode to enable C0~C.

6. MAINTENANCE AND REPAIR

6.1 Maintenance

Check the following items on a regular basis every three months:



1) Screws loosing

Open the barrier's top cover and control the barrier up and down. Visually check if the spring tie screw is loose, and if the link rod retaining ring is in the right position. The loosing of the link rod screws, and the retaining ring will cause the boom to fall uncontrolled or even cause a vehicle accident.

If loose, firstly turn the power off, then manually fasten the loosened screws and power on.

2) Rubber Cushion damaged

Open the barrier's top cover and control the barrier up and down. Visually check whether the Rubber Cushion is damaged while the active arm has hit it. If damaged, spin out the old damaged rubber Cushion and replace it with a new one.

3) Springs balancing

Temporarily turn the power off and place the boom barrier arm at the position between a 40~45-degree angle to the horizontal and check whether the boom arm can keep a static hanging balance. If balance cannot be kept, you will need to adjust the springs balance (Refer to 5.3 – Adjust boom length).

4) Controller Board displaying

While the barrier is working, visually check whether the controller Board's numeral LED normally displays its angle value when the boom barrier arms are moving. If a fault code displays, find the reason and deal it. (Refer to 5.6 – Circuit Self-test).

6.2 FAQs and Troubleshooting

FAQ 1: Turn back halfway while the boom arm is moving down.

Possibility: 1. If F3 value is less than 25, maybe the pressure resistance rebound threshold is too sensitive, which may be triggered by the boom inertia or wind blowing.
2. The springs tension is too tight

Solution: 1. Increases the threshold value of pressure resistance rebound to 50.
2. Reduce the spring tension according to balance adjusting instructions. (5.3 / 2).

FAQ 2: The boom arm cannot open and close, also controller board LED display E1 fault code.

Possibility: 1. If the boom arm can't move up after the power is on but manually moves, it can make the controller display the moving angle value, indicating that the motor is damaged.
2. If the boom arm moves slowly, but the controller board LED does not display the moving angle value, this indicates that the pulse angle sensor is damaged.

Solution: 1. Replace the motor.
2. Replace the angle encoder which is on the motor.

FAQ 3: Boom arm shock hardly when it starts to open or close

Possibility: 1. The boom arm was not tightly fixed onto the housing barrier.
2. Transmission devices inside the barrier were loosened.
3. The balance spring was broken.

Solution: 1. Check and re-fix the boom arm onto the housing barrier tightly.
2. Adjust the Limit Screw of Transmission device and the Rubber Cushion.
3. Replace the same balance spring.

FAQ 4: The boom cannot move, and it cannot be controlled by the remoter, however, it can be controlled by the Entry Station.

Possibility:
1. The battery of remoter (transmitter) has run down.
2. The remoter (transmitter) became damaged.
3. The remoter (receiver) became damaged.
4. The controller board became damaged.

Solution:
1. Observe whether the indicator of the remoter (transmitter) is on or off when the button is pressed. If the indicator is off, check whether the battery has run down, or if the antenna is in good condition.
2. Each barrier will be equipped with two remoters (transmitters) if purchased by the customer. If both of the transmitters do not work, it means the receive may be damaged.
3. If the receiver on the controller board ticks when the remoter (transmitter) is pressed, this means the receiver is working, and the controller board may be damaged.

FAQ 5: The boom can be controlled by the remoter and software but cannot be controlled by the Entry Station.

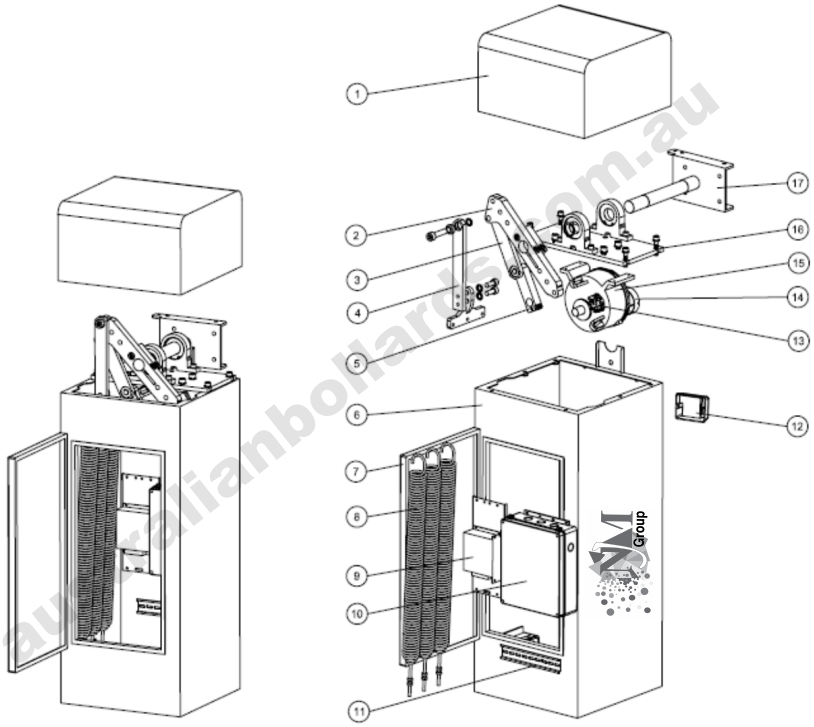
Possibility:
1. The loop detector of entry/exit station became damaged.
2. The loop detector cable has an open circuit or a short circuit.
3. No event upload when swiping the card, or the card is invalid.

Solution:
1. Whether the loop detector cable is activated, when swiping the card, and after activating the loop detector cable, observe whether the indicator light on the loop detector is always on. If there is no constant light, the loop detector or loop detector cable has a problem. Power off and interchange the loop detector of the barrier gate with entry/exit station. If it works normally, it means the loop detector is damaged; if the same, it means that there is a problem with the loop detector cable, and it may be broken or short-circuited.

2. When the loop detector senses the active loop detector coil, check whether there is an LED light up on the control board. If there is, check whether there is an event upload on the computer and whether it is a valid card reading. If there is no event upload, then there may be a problem with the card reader. If there is an event upload, check the uploaded event, whether it is an expired card, an already entered card, or an invalid card.

3. If there is no event upload, check whether the card reader is normal.

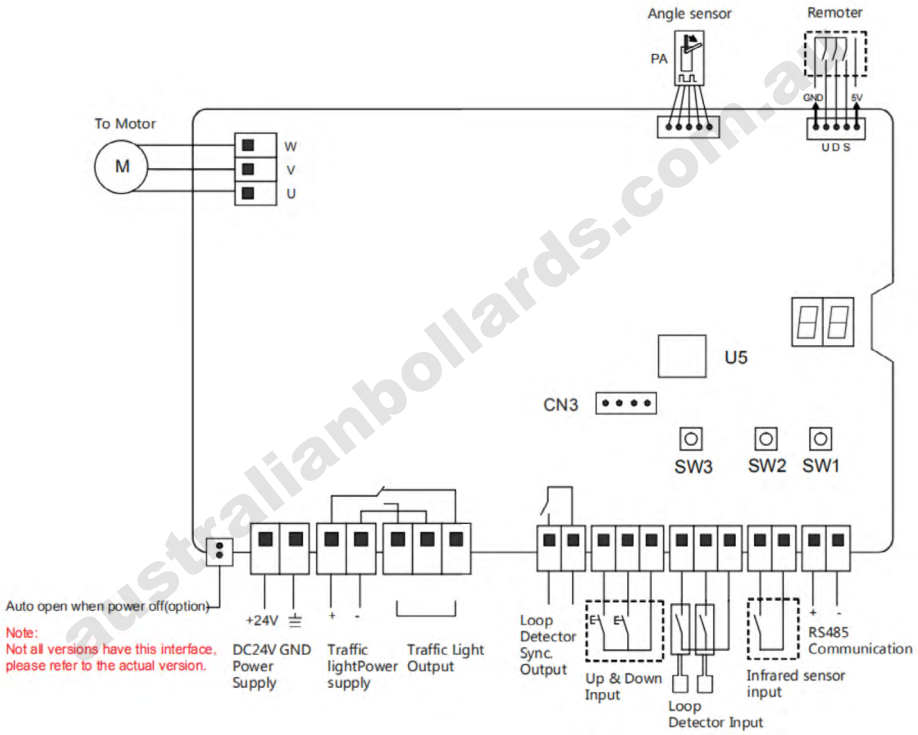
7. MECHANICAL EXPLOSION DRAWINGS AND PART LISTS



Mechnical Parts List

1	Top cover	14	Brushless servo motor
2	Slave rocker arm	15	Reducer
3	Link rod	16	Pedestal
4	Springs tie	17	Arm holder(includes main shaft)
5	Master rocker arm		
6	Housing		
7	Door		
8	Springs		
9	Switching mode power supply		
10	Controller board		
11	Earthing		
12	Remote receiver		
13	Manual handle		

8. ELECTRICAL DIAGRAM AND PARTS LIST



Code:	Name:
SW1	Up Button
SW2	Down Button
SW3	Set Button
U5	Control Chip
CN3	Wifi / RJ45 module interface
M	Motor
PA	Angle Sensor