Operating Instructions DC Servo Barrier Gate MicroDrive

V1.0

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Warning!
For safety, please do follow the instruction strictly to operate this product:
1. Make sure there is no person or any obstruction under the boom when it is power on, resume or falling.
2. There must be a grounding connection for the barrier cabinet.
3. It is forbidden to open the barrier cabinet top cover or door when it is working..
4. Before delivery, the barrier gate spring and the boom length are well-balanced. It is not allowed to change the boom length randomly. If needed, please check with the technician.

1.Brief Introduction

DC Brushless Servo motorized barrier gate, the newly designed, maintenance free with exclusive MicroDrive unit offers 100% more torque, 100% duty, are the fastest toll barriers available with an opening time as fast as 0.6 seconds. Opening speed is adjustable from 0.6s/0.9s to 6s or more.
This barrier redefines performance in non-stop toll applications. It is the ideal solution for very high frequented toll stations providing great reliability and sustainability as well as comprehensive functionality.
This Barrier use innovative technology design and manufactured with precision machinery to guarantee satisfaction in quality and reliability for years to come. The barrier has been lab tested for more than 10 millions opening /closing and still without any degrade in performance.

2. Technical Data

2.1 Working temperature (motor): -35℃~ + 85℃
2.2 Working Power: 220V±10%, 110V ±10%
2.3 Motor Rated Power: 100/200W MAX
2.4 Humidity: ≤90% RH
2.5 Distance of remote control: L≥30M
2.6 Insulation Grade: F

3. Functions and Features

3.1 NO SENSOR&LIMIT SWITCH
Innovative design which doesn't need any sensor and limit switch. All control by SFMCU drive unit precisely. Four main parts only, mechanical, motor, control unit, power supply.

3.2 MAINTENENCE FREE
DC Brushless Servo motor doesn't need a carbon brush while brush motor request you replace the carbon brush in a certain time. Galvanized and powder coated parts are anti-rust ensure long term usage. And no other smaller parts need to be maintain too.

3.3 24/7 CONTINUS OPERATION
With a very smooth and quiet motorized drive mechanism, Open and close very stable, offer maximum reliability at fast speeds, high quality and maximum ease of use, and which allow the barrier in 7*24 hours non-stop usage.

3.4 SPEED ADJUSTABLE
Our DC servo barrier gate allows you to set opening and closing speed according to requirements. Shorter arm, the faster speed can be set.

3.5 AUTO-REVERSE FUNCTION
When arm falling and meets obstacles, arm will auto reverse to prevent further damages.

3.6 MULTIPLE INTERFACES
3.6.1 Wire Control Signal Input(open&close&stop)
3.6.2 Infrared Photocells
3.6.3 Loop Detector
3.6.4 R&G Light signal (Up&Down Limit signal output optional), can use for counting purpose also
3.6.5 Arm Presence Detection(Optional)
3.6.6 RS485 Communication(Optional)
3.6.7 More If Required

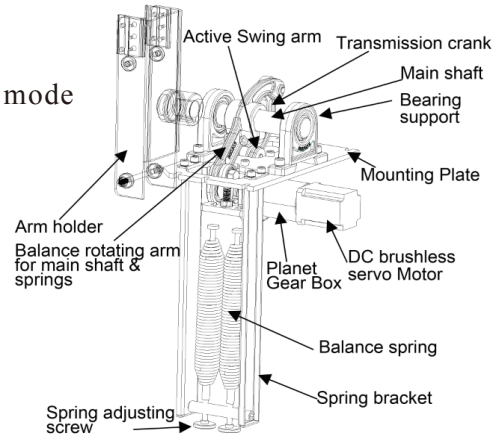
3.7 EASY INTEGRATION
Access Reader or Push button or remote controller can be used to trigger the barrier gate to open via a simply dry contact signal. After delay timer elapsed, barrier gate will close automatically by itself in a certain time(optional function)

3.8 USER FRIENDLY
Motorized arms provide comfortable passage while maintaining a high level and high density of car flow management, such as in toll gate.

3.10 AUTO-RECOVERY
When power off, barrier arm can be lifted up by manual for a free exit. When power supply is restored, Barrier gate will automatically return to close position.

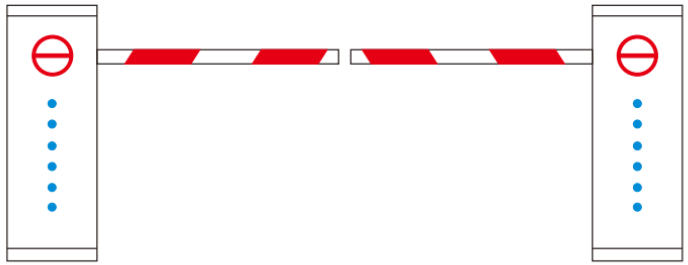
3.11 Auto Testing Mode
Control board can set auto testing mode

4. Mechanism Structure



(Figure 1)

5. Installation Direction Definition
When placing the order, please confirm "left-installed" or "right- installed". Figures as below:



Left-(installed)

Cabinet fixed at the left of entrance

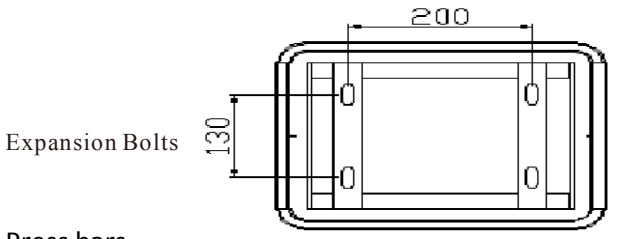
Right-(installed)

Cabinet fixed at the right of entrance

(Figure 2)

6.Mechanical Part Installation and Adjustment

6.1. Installation of cabinet
Please select the correct type of barrier ate according the specifications of the place, and then fix the barrier cabinet with expansion bolts. (refer to Figure 3)



(According to the supplementary size)

(Figure 3)

6.2. Spring selection, installation and adjustment

The barrier gate is well-adjusted before delivery. If need to cut the boom shorter, please re-adjust the spring balance to ensure the smooth operation of the barrier. Also you can adjust the speed to slower or faster when arm made longer or cut shorter

6.2.1. Spring selection

The length of spring prevails in kind, designing change without notice. The spring selection please refer to the spring selection table in the Appendix I of the Manual or which sticks on the door of the barrier cabinet.

6.2.2. Spring installation, dis-assembly and replacement Dismantlement steps: Keep the boom at vertical (open) position, see figure1, loosen the spring fixing nuts on the bottom of the spring by adjustable or 8th spanner, unscrew the fastening wing nuts in the bottom of the spring by manual, then take off the spring.The steps for installation and dis-assembly the spring are the opposite.

6.2.3. Spring force adjustment

When power off, adjust the springs balance to make sure the arm will stay in the angle 45-60 degrees towards the horizontal, and not going down or going up, which mean the spring force is well balanced.

7. Controller Wiring and Instructions

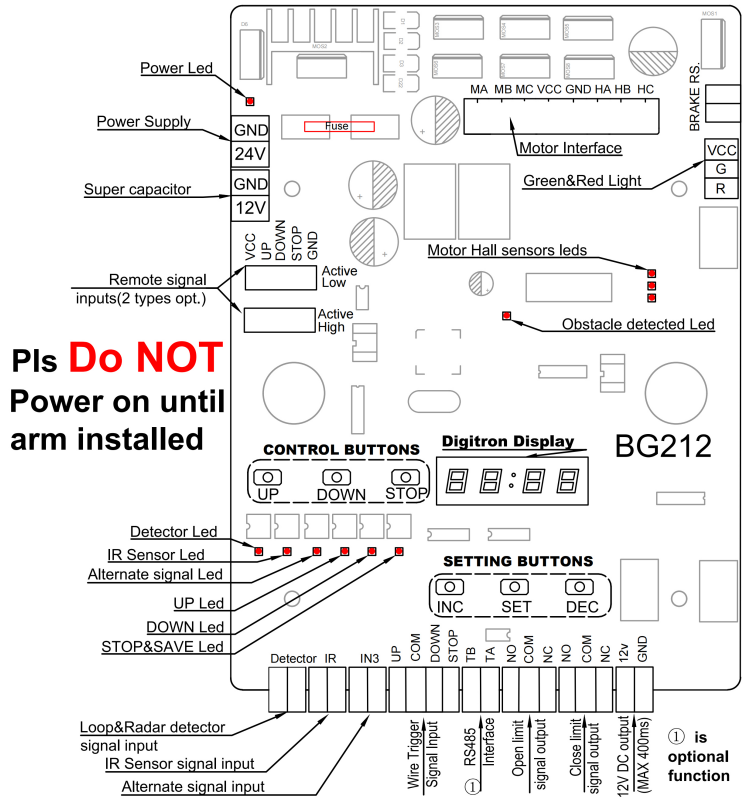
7.1. Controller interface explanations

All the electrical connections are done before delivery. The necessity is to connect the power and grounding connection. Explanations and instructions for the main function interfaces and indicator light is as following:

7.1.1. 220V/110V Power supply DIP switch in power supply:

This barrier motor supports 24VDC power input, and controller support 12V DC power input. There are two power supplies, one is 220V or 110V input(by DIP switch) while output is 24V DC, and another input is 110~220V AC while output is 12V DC. So one is for motor power supply, and another is for control board power supply. the DIP switch is toggled in before delivery, if need to change the input voltage, please toggle the switch cap into correct position before power on .

BLDC Barrier Gate Wirings



Regular Menu List

LP01: Working mode (0 is testing,1 is Normal)
LP02: Auto delay close time setting (0-60s)
LP03: RS485 address (0-255) (①optional)
LP04: Memory or not with open signal(0-1)

DP01: Max open speed range (1-10/16)
DP02: Opening brake pulse duration (0-255)
DP03: The starting brake angle of opening (37-150)
DP04: Max braking strength when opening (0-10)
DP05: Max close speed range (1-10/16)
DP06: Closing brake pulse duration (0-255)
DP07: The starting brake angle of closing (37-150)
DP09: Default
DP10: Opening angle (0-150, default 102)
DP11: The lowest running speed (1-16)
DP12: First speed/Max auto reverse speed (1-16)

Non-User Menu List

NP02: Reset control board
NP03: Arm detection(optional)
NP04: Continuous opening time when reverse opening failure (0~20, 0 is off, 1 unit=0.5sec)
NP05: Arm auto close or not when power resume
NP07: Barrier Installation directional (0 is right

(Figure 4)

7.1.2. Motor interface:

The 24V DC brushless/servo motor has 8 wires connected to control board.

7.1.3. Power interface:

Power supplies output 24V DC 8.5A to control board

7.1.4. R&G (LED) light power supply:
24V DC, so require the led strip or lamp power supply should be 24VDC.

7.1.5. R&G light interface:
When boom falling down to horizontal position, red light will keep lighting; when boom lifting up to vertical position, green light will keep lighting. During the boom falling down or lifting up, the red light will keep lighting. (Please refer to Appendix III for wire diagram)
The interface also can be used to output open limit signal and close limit signal, Please check wiring Figure 4 for reference (Optional output).

7.1.6. Wire control signal input interface:
This interface is dry contact input signal, UP/ DOWN / STOP connect with "COM ", the control board will respond accordingly. User can use this interface to connect with parking system, and it can also wiring connected to button switch to control the barrier. (Please refer to Figure 4 for for main control board wire control)

7.1.7. Photocells interface:
This interface is dry contact input signal, only for responding opening when shorts circuit the terminal "Photocells" during closing. This is mostly use for prevent damage when boom falling. So normally photocells are installed paralleled and under the arm. Boom will keep open, or will auto-reverse when there are obstacles between photocells.

7.1.8. Loop detector interface:
This interface is dry contact input signal, only for responding to auto closing after signal input and then disappeared. So first it should received dry contact or relay input, after the input signal disappeared, boom will auto falling to closed

7.1.9. RS485 interface (Optional):
This interface is used for communication between computer and control unit. We provide SDK for customers to develop software to receive barrier gate status and control barrier gate operations.

7.1.10. Battery interface:
This interface is used for battery, the battery can be used to keep barrier gate working normal when power off.

7.1.11. Other interface(Arm detection, optional):

Currently it's used for arm detection. This function is not open unless needed, you can open this function from menu settings. Please see Appendix VI for reference.

7.1.12. SET button:
3 buttons for menu setting, INC, SET, DEC, setting guidance please refer to Appendix V

7.1.13. Manual control button
'UP', 'DOWN', 'STOP' , these 3 buttons allow you to control barrier gate open, close and stop by manual. The stop button also used as save setting button.

7.2. Controller auto-detect after power-on description.

When the arm is in open position, the controller should re-confirm the close position of boom after power-on or resume power: The barrier gate will auto close slowly one time by default. This require the boom are installed, if not controller can not close to right position. During the re-confirming process, it detects all open and anti-bumping signal interface, and it will stop learning if there is signal. After finish leaning, the boom stays at the down limit position and Buzzer will beep one time.

If spring installed but no boom, or there is obstacles on the boom during down process, or the spring and boom in serious imbalance, need to remove the obstruction or adjust the spring, then power-on again.
If boom is in closing position when, please do not hold or stop the arm move, the barrier gate will confirm it's close position very soon.

8. Boom horizontal and vertical fine adjustment

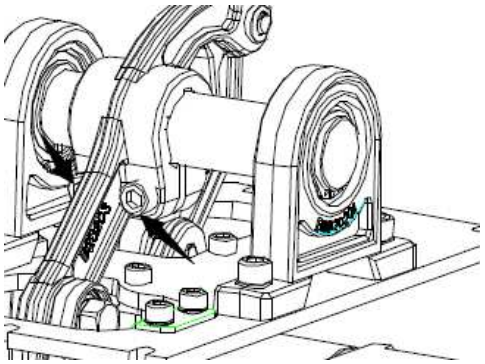


Figure 5

8.1 Horizontal adjustment:
Power off first. And loosen the two screws(see figure 5) on balance rotating arm a little but not totally loosed, then rotate barrier arm to make the active swing arm to mechanical limit position. In this situation, keep the arm in horizontal status, and fasten the two screws on balance rotating arm.

8.2 Vertical adjustment
After 8.1 finished, power on(make sure arm installed), after system started, press 'UP' button to check the vertical position. If not, please follow menu settings to adjust DP10. For example, barrier arm not full 90 degrees open, increase the value of DP10. If open more than 90 degrees, decrease the value of DP10 too, setting details please refer to appendix VI.

9. Working Codes meanings and error code solutions

9.1. When power-on, press "UP" or "DOWN" button, there is no reaction on the boom.
9.1.1. Check up the power supply and the fuse.
9.1.2. Check if the remote controller matches the radio receiver; or check up the battery inside and then change it if it is lack of power.
9.1.3. Check whether there is co-channel interference, and press the buttons on the control board to check if can work.
9.1.4. Check up if the external protection circuit is failure or in protection status. Check up the condition of photocell and loop detector are lighting.

9.2. The barrier gate closes half, and then stop learning, during controller self-test after power-on.
9.2.1. Check up if the boom is installed, the barrier gate need to work with boom if springs installed.

10.Warranty and Service Items
10.1. Free service is offered for component parts in one year warranty time. (not includes the barrier boom and remotes)
10.2. Lifetime service with charge accordingly.
10.3. Technical questions are supported.
10.4. The below items and situations are not included in the range of free service:
10.4.1. The user does not follow the instruction and cause any damage of the product.
10.4.2. The power supply is not stable, over the range of permitted voltage or not accordant to safety electric using standard.

10.4.3. The user installs or uses the product in wrong methods, cause damage to the appearance of product.
10.4.4. Natural disaster causes damage to the product.
10.4.5. Warranty time is over.
10.4.6. Service items are out of our promises.

11. Maintenance
11.1. Keep the barrier gate clean.
11.2. Check the joints ever month in case of any loose parts.
11.3. Check the balance status of spring after the barrier gate running 1 million times; change new springs after running 3 million times, to avoid spring breaking due to excessive fatigue.
11.4. Check the easily worn-out parts every half year and renew it.
11.5. Remote control distance will be shortened or not work in cases like big object screening, battery exhausting, extreme weathers.

12. Packing List

Name	Specificatio	Quantit	Unit	Application
Screws, Nuts, Flat	M12*70	2	sets	Fixing the
Boom Fixing Bar		1	pcs	Fixing the boom
Cabinet Fixing Bar		2	pcs	Fixing the
Expansion Screws	M14*150	4	sets	Fixing the
Support Post		1	pcs	Optional
Radio Emitter		1	pcs	Optional
Keys		2	pcs	For cabinet door
Remote Controller		2	pcs	
Manual		1	pcs	

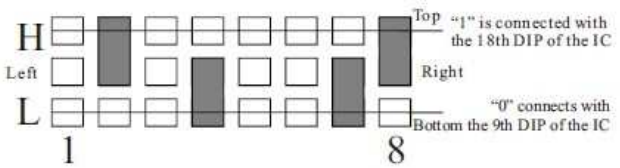
Appendix I. Table of Spring Selection and Suggested Max Speed with Boom Length

This mechanism comes standard with 1 pcs 3.5mm and 1pcs 4.5mm springs. If the standard springs don't meet the actual boom length requirement, please replace or add the corresponding spring.

Boom Length(Meter: M)	Spring Diameter Φ(mm)		Suggested max speed
Straight Boom	Link Hole Selection		
2≥L≥2.5	empty	3.5	0.6
4≥L≥3	empty	4.5	0.9
4.5≥L>4	3.5	4.5	1.2
6≥L>4.5	4.5	4.5	2
Folding arm			
2≥L≥2.5			1.5
4≥L≥3			1.8
4.5≥L>4			1.8
6≥L>4.5			2
2-Fence Boom			
4>L≥3	4.5	4.5	2
4.5≥L≥4	5.5	5.5	2.5
3-Fence Boom			
3≥L≥2	4.5	4.5	2
4≥L>3	5.5	5.5	3

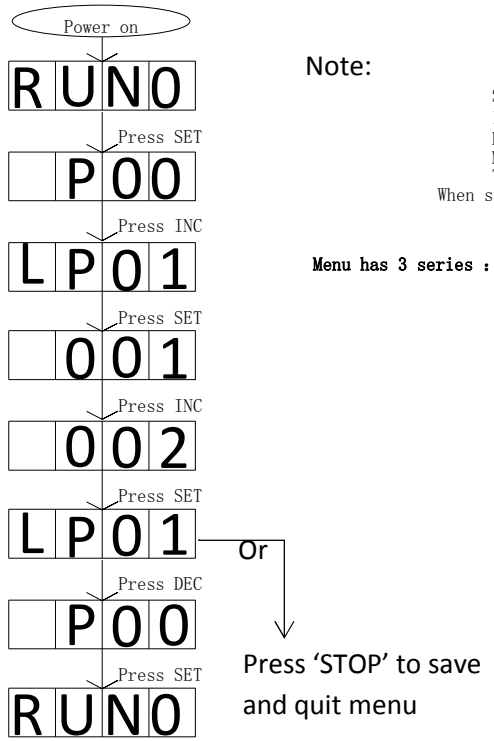
Appendix II : Remote Control Coding

When you need to add remote remote controller, please coding the new remote controller code same as previous ones.
Coding method: open the remote controller, take out the battery, there is dial plate, the direction is from right to left. The solder between middle port and top port is state “1”. The solder between middle port and bottom port is state “0”. Empty is state “X”. The code as below is 10XX0X1X (Warning: please take out the battery before coding!).



Appendix III: System Menu Setting Procedures

Note：When you quit and save the menu setting, please set the menu to POO,



Note:

SET is Function Key
INC is Increase
DEC is Decrease
Menu in&out is P00
This is Cyclic Menu
When system in work, Digitron displays RUNX

Menu has 3 series :

L is Logical menu
D is Drive menu
N is Non-users menu

then press the SET to RUNX, then it is OK, You also can press ‘STOP’ button to quit and save menu setting too. And then resume power to test.

Appendix IV: Setting Menu Explanations

LP01: Working mode(0 is Continuous testing mode，1 is Normal working mode)
LP02：Auto delay time setting.(0-60, 0 is NO auto close, for example，3 means barrier gate will auto close in 3 sec after opened)
LP03：RS485 address(0-255)(optional)
RS485 communication equipment address (barrier gate or control board)
LP04： Memory or not with open signal
0 is without memory, no matter how many times open signal, arm will auto fall once a car passage was detected

1 is with memory, when receive 2 times open signal, arm will auto fall until two cars pass detected(with loop detector for auto close), After arm fall with button or remote, memory number cleared
Noted: this menu updated from 20th, Sep. 2019, previous is default with memory and can not change.

LP05: Green/Red light or UP/DOWN limit output
0 is Green/Red Light output
1 is UP/DOWN limit output
Noted: this menu updated from 20th, Sep. 2019, previous is only Green/Red Light output, this is for controller version BG206 to BG208
BG210 from 2021, May do not have this version, limit signal has interface separately.

DP01: Max open speed range(1-16)
The highest speed when opening

DP02: Opening brake pulse duration(0-255)
The speed need to be controlled to achieve when opening to close position, the bigger the value, the slower the speed controlled, vice verse. Default value is 5.

DP03: The stating brake angle of opening (37-115)
The starting angle of braking when opening

DP04: Max braking strength when opening(0-10)
The strength of braking when opening

DP05: Max close speed range(1-16)
The highest speed when closing

DP06: Closing brake pulse duration(0-255)
The speed need to be controlled to achieve when closing to close position, the bigger the value, the slower the speed controlled, vice verse. Default value is 5.

DP07: The stating brake angle of opening (37-115)
The starting angle of braking when opening

DP08:Max braking strength when closing(0-10)
The strength of braking when closing

DP09: Default

DP10: Opening angle (0-115)
Horizontal degree is 0, when power on, barrier gate will auto close to find 0 position, open to position degree is about 90 degrees. Sometimes the degrees will more than or less than because of mechanical parts matching or precision issues.

DP11:The lowest running speed(1-16)

The end speed of barrier gate opening or closing to position. The longer the arm, the bigger the value. Normal value is 1, if too big, barrier arm will be shake. If over loaded, can increase the value by one

DP12: First speed/Max auto revers speed.(1-16)
Closing Speed of auto finding 0 point (First power on or resume power), also the maximum auto-revers speed. Normal value 5 or 6.

Normally, just need to adjust DP04/05/07/08 when arm is shaking in closing or opening, others default.

Non-User Menu

NP02: Reset control board
Enter this menu, display P-H, long press button INC until display P-F, then all parameters are default.

NP03: Arm detection
0 is no arm detection(default), 1 is with arm detection, when no arm detected, barrier gate not working.

NP04: Opening lasting time when abnormal(0-40)
When gate reverse abnormal, how long the opening signal time lasts. 1 unit is 0.5sec, default is 0

NP05: Automatic close when power resume to finish initialization or not.

NP07: Motor forward/Reversal(000/001)
NP07=000, the board is used for Right installed barrier gate
NP07=001, the board is used for Left installed barrier gate

Appendix V Digitron Display Code and Meanings

Digitron display	**Meanings**
STAT (START)	The system is starting
RESU(RESUME)	The gate is resetting
CHAS(CHACK SENSOR)	Sensor check
TEST	Gate Auto testing
RUNX（X is the system operation Mode and the Setting Value of LP02）	System Normally Operating
LPXX	Logic Menu Display
dPXX	Menu Driven Display
NPXX	Non User Menu Display
E-LA	Arm lost error
E-PL(ERROR PULSE)	Motor Default Phase
E-CS	Gate operation overtime
INXX(IN NUM)(xx the opening signal quantity)	the vehicle quantity can be entered display
P-H	Dates resuming to be Default Value
P-F	Dates resuming Default Value
NOPE（NO POWER）	Opening when no power(when there is super capacitor)